**Third Generation Partnership Project (3GPP™)**

**DRAFT Meeting Report  
for  
TSG RAN WG4  
meeting: e**

**Electronic Meeting, Online, 02/11/2020 to 13/11/2020**

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Contents:

1 Opening of the E-meeting 5

2 Approval of the agenda 5

3 Letters / reports from other groups / meetings 5

4 Rel-15 New radio access technology 6

4.3 UE EMC [NR\_newRAT-Core] 6

4.3.1 General [NR\_newRAT-Core] 6

4.3.2 Emission requirements [NR\_newRAT-Core] 6

4.3.3 Immunity requirements [NR\_newRAT-Core] 6

4.4 BS RF [NR\_newRAT-Core] 6

4.4.1 General [NR\_newRAT-Core] 6

4.4.2 Transmitter characteristics maintenance [NR\_newRAT-Core] 6

4.4.3 Receiver characteristics maintenance [NR\_newRAT-Core] 7

4.5 BS conformance testing [NR\_newRAT-Perf] 7

4.5.1 General [NR\_newRAT-Perf] 7

4.5.2 BS specifications clean-ups (including conformance testing and core) [NR\_newRAT-Perf/Core] 8

4.5.2.1 eAAS specifications [NR\_newRAT-Perf/Core] 8

4.5.2.2 MSR specifications [NR\_newRAT-Perf/Core] 15

4.5.2.3 NR conformance testing specifications [NR\_newRAT-Perf] 21

4.5.3 Conducted conformance testing (38.141-1) [NR\_newRAT-Perf] 24

4.5.4 Radiated conformance testing (38.141-2) [NR\_newRAT-Perf] 24

4.6 BS EMC [NR\_newRAT-Core] 27

4.6.1 Core requirements [NR\_newRAT-Core] 27

4.6.1.1 Emission requirements [NR\_newRAT-Core] 27

4.6.1.2 Immunity requirements [NR\_newRAT-Core] 27

4.6.2 Performance requirements [NR\_newRAT-Perf] 28

4.9 Demodulation and CSI requirements maintenance (38.101-4/38.104) [NR\_newRAT-Perf] 30

4.9.1 UE demodulation requirements [NR\_newRAT-Perf] 30

4.9.2 CSI requirements [NR\_newRAT-Perf] 32

4.9.3 BS demodulation requirements [NR\_newRAT-Perf] 33

4.11 Testability Maintenance (38.810) [FS\_NR\_test\_methods] 34

5 LTE maintenance (up to Rel15) [WI code or TEI] 34

5.1 BS RF requirements [WI code or TEI] 34

5.4 Demodulation and CSI requirements [WI code or TEI] 36

5.4.1 UE demodulation and CSI requirements [WI code or TEI] 36

5.4.2 BS demodulation requirements [WI code or TEI] 39

6 Rel-16 Work Items for LTE 40

6.1 Additional MTC enhancements for LTE [LTE\_eMTC5] 40

6.1.4 Demodulation and CSI requirements maintenance (36.101) [LTE\_eMTC5-Perf] 40

6.1.4.1 UE demodulation requirements [LTE\_eMTC5-Perf] 40

6.1.4.2 CSI requirements [LTE\_eMTC5-Perf] 40

6.2 Additional enhancements for NB-IoT [NB\_IOTenh3] 40

6.2.4 Demodulation and CSI requirements maintenance (36.101/36.104) [NB\_IOTenh3-Perf] 40

6.2.4.1 UE demodulation requirements [NB\_IOTenh3-Perf] 40

6.2.4.2 BS demodulation requirements [NB\_IOTenh3-Perf] 41

6.4 R16 LTE maintenance [WI code] 41

6.4.1 BS RF requirements [WI code] 41

6.4.4 Demodulation and CSI requirements [WI code] 41

6.4.4.1 UE demodulation and CSI requirements [WI code] 41

6.4.4.2 BS demodulation requirements [WI code] 42

7 Rel-16 non-spectrum related work items for NR 42

7.1 NR-based access to unlicensed spectrum [NR\_unlic] 42

7.1.4 BS RF requirements [NR\_unlic-Core] 42

7.1.4.1 General [NR\_unlic-Core] 42

7.1.4.2 Transmitter characteristics [NR\_unlic-Core] 44

7.1.4.3 Receiver characteristics [NR\_unlic-Core] 45

7.1.5 BS conformance testing [NR\_unlic-Perf] 46

7.1.5.1 General [NR\_unlic-Perf] 46

7.1.5.2 Transmitter characteristics [NR\_unlic-Perf] 47

7.1.5.3 Receiver characteristics [NR\_unlic-Perf] 47

7.1.8 Demodulation and CSI requirements (38.101-4/38.104) [NR\_unlic-Perf] 47

7.1.8.1 General [NR\_unlic-Perf] 47

7.1.8.2 UE demodulation requirements [NR\_unlic-Perf] 50

7.1.8.2.1 PDSCH requirements [NR\_unlic-Perf] 50

7.1.8.2.2 PDCCH requirements [NR\_unlic-Perf] 52

7.1.8.3 CSI requirements [NR\_unlic-Perf] 52

7.1.8.4 BS demodulation requirements [NR\_unlic-Perf] 53

7.1.8.4.1 PUSCH requirements [NR\_unlic-Perf] 53

7.1.8.4.2 PUCCH requirements [NR\_unlic-Perf] 55

7.1.8.4.3 PRACH requirements [NR\_unlic-Perf] 56

7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL] 57

7.3.7 Demodulation and CSI requirements (38.101-4) [5G\_V2X\_NRSL-Perf] 57

7.3.7.1 General [5G\_V2X\_NRSL-Perf] 57

7.3.7.2 Single link test [5G\_V2X\_NRSL-Perf] 59

7.3.7.3 Multiple link test [5G\_V2X\_NRSL-Perf] 61

7.4 Integrated Access and Backhaul for NR [NR\_IAB] 63

7.4.1 General [NR\_IAB-Core] 63

7.4.1.1 System parameters maintenance [NR\_IAB-Core] 63

7.4.1.2 Others [NR\_IAB-Core] 64

7.4.2 RF requirements maintenance [NR\_IAB-Core] 66

7.4.2.1 Transmitter characteristics [NR\_IAB-Core] 66

7.4.2.1.1 Tx Power related requirements [NR\_IAB-Core] 66

7.4.2.1.2 Transmitted signal quality [NR\_IAB-Core] 67

7.4.2.1.3 Unwanted emissions [NR\_IAB-Core] 68

7.4.2.1.4 Others [NR\_IAB-Core] 69

7.4.2.2 Receiver characteristics [NR\_IAB-Core] 69

7.4.2.2.1 Sensitivity and dynamic range requirements [NR\_IAB-Core] 69

7.4.2.2.2 In-band selectivity and blocking requirements [NR\_IAB-Core] 70

7.4.2.2.3 Others [NR\_IAB-Core] 71

7.4.3 RF conformance testing [NR\_IAB-Perf] 71

7.4.3.1 General and work plan [NR\_IAB-Perf] 71

7.4.3.2 Common test issues for conducted and radiated conformance testing [NR\_IAB-Perf] 72

7.4.3.2.1 Test configurations [NR\_IAB-Perf] 72

7.4.3.2.2 Test models [NR\_IAB-Perf] 73

7.4.3.2.3 Others [NR\_IAB-Perf] 74

7.4.3.3 Conducted conformance testing [NR\_IAB-Perf] 74

7.4.3.3.1 Transmitter characteristics [NR\_IAB-Perf] 74

7.4.3.3.2 Receiver characteristics [NR\_IAB-Perf] 74

7.4.3.3.3 Other test issues [NR\_IAB-Perf] 75

7.4.3.4 Radiated conformance testing [NR\_IAB-Perf] 75

7.4.3.4.1 Transmitter characteristics [NR\_IAB-Perf] 75

7.4.3.4.2 Receiver characteristics [NR\_IAB-Perf] 75

7.4.3.4.3 Other test issues [NR\_IAB-Perf] 75

7.4.6 EMC core requirements maintenance [NR\_IAB-Core] 75

7.4.6.1 General [NR\_IAB-Core] 75

7.4.6.2 Emission requirements [NR\_IAB-Core] 76

7.4.6.3 Immunity requirements [NR\_IAB-Core] 77

7.4.7 EMC performance requirements [NR\_IAB-Perf] 77

7.4.8 Demodulation and CSI requirements [NR\_IAB-Perf] 78

7.4.8.1 General [NR\_IAB-Perf] 78

7.4.8.2 IAB-DU performance requirements [NR\_IAB-Perf] 79

7.4.8.3 IAB-MT performance requirements [NR\_IAB-Perf] 80

7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh] 80

7.5.4 Demodulation and CSI requirements (38.101-4) [LTE\_NR\_DC\_CA\_enh-Perf] 80

7.6 UE power saving in NR [NR\_UE\_pow\_sav] 81

7.6.3 Demodulation and CSI requirements (38.101-4) [NR\_UE\_pow\_sav-Perf] 81

7.8 Physical layer enhancements for NR URLLC [NR\_L1enh\_URLLC-Core] 82

7.8.1 Demodulation and CSI requirements (38.101-4/38.104) [NR\_L1enh\_URLLC-Perf] 82

7.8.1.1 Performance requirements with ultra-low BLER [NR\_L1enh\_URLLC-Perf] 82

7.8.1.1.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 83

7.8.1.1.2 CSI requirements [NR\_L1enh\_URLLC-Perf] 84

7.8.1.1.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 86

7.8.1.2 Performance requirements with higher BLER [NR\_L1enh\_URLLC-Perf] 89

7.8.1.2.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf] 89

7.8.1.2.2 BS demodulation requirements [NR\_L1enh\_URLLC-Perf] 92

7.9 Enhancements on MIMO for NR [NR\_eMIMO] 96

7.9.4 Demodulation and CSI requirements (38.101-4) [NR\_eMIMO-Perf] 96

7.9.4.1 General [NR\_eMIMO-Perf] 96

7.9.4.2 Demodulation requirements [NR\_eMIMO-Perf] 97

7.9.4.2.1 Single-DCI based SDM scheme [NR\_eMIMO-Perf] 97

7.9.4.2.2 Multi-DCI based transmission scheme [NR\_eMIMO-Perf] 98

7.9.4.2.3 Single-DCI based transmission schemes (URLLC) [NR\_eMIMO-Perf] 99

7.9.4.3 CSI requirements [NR\_eMIMO-Perf] 100

7.10 Add support of NR DL 256QAM for FR2 [NR\_DL256QAM\_FR2] 102

7.10.1 Demodulation and CSI requirements (38.101-4) [NR\_DL256QAM\_FR2-Perf] 102

7.10.1.1 UE Demodulation requirements [NR\_DL256QAM\_FR2-Perf] 102

7.10.1.2 SDR requirements [NR\_DL256QAM\_FR2-Perf] 104

7.10.1.3 CSI requirements [NR\_DL256QAM\_FR2-Perf] 105

7.15 NR support for high speed train scenario [NR\_HST] 106

7.15.3 Demodulation and CSI requirements (38.101-4 / 38.104) [NR\_HST-Perf] 106

7.15.3.1 UE demodulation and CSI requirements [NR\_HST-Perf] 106

7.15.3.1.1 Requirements for DPS transmission scheme(s) [NR\_HST-Perf] 107

7.15.3.1.2 Requirements for HST-SFN [NR\_HST-Perf] 109

7.15.3.1.3 Requirements for HST single tap [NR\_HST-Perf] 110

7.15.3.1.4 Requirements for multi-path fading channels [NR\_HST-Perf] 111

7.15.3.1.5 Applicability rule [NR\_HST-Perf] 111

7.15.3.2 BS demodulation requirements [NR\_HST-Perf] 112

7.15.3.2.1 PUSCH requirements [NR\_HST-Perf] 112

7.15.3.2.2 PRACH requirements [NR\_HST-Perf] 114

7.15.3.2.3 UL timing adjustment requirements [NR\_HST-Perf] 116

7.16 NR performance requirement enhancement [NR\_perf\_enh-Perf] 119

7.16.1 UE demodulation and CSI requirements (38.101-4) [NR\_perf\_enh-Perf] 119

7.16.1.1 NR CA PDSCH requirements [NR\_perf\_enh-Perf] 119

7.16.1.2 PMI reporting requirements with larger number of Tx ports [NR\_perf\_enh-Perf] 121

7.16.1.3 FR1 CA and EN-DC power imbalance requirements [NR\_perf\_enh-Perf] 123

7.16.1.4 NR CA CQI reporting requirements [NR\_perf\_enh-Perf] 125

7.16.1.5 Release independent [NR\_perf\_enh-Perf] 126

7.16.2 BS demodulation requirements (38.104) [NR\_perf\_enh-Perf] 127

7.17 Over the air (OTA) base station (BS) testing TR [OTA\_BS\_testing-Perf] 128

7.17.1 General [OTA\_BS\_testing-Perf] 128

7.17.2 MU / TT values: derivation and tables [OTA\_BS\_testing-Perf] 128

7.17.3 Annexes [OTA\_BS\_testing-Perf] 130

7.17.4 Others [OTA\_BS\_testing-Perf] 130

7.18 2-step RACH for NR [NR\_2step\_RACH-Perf] 132

7.18.3 BS Demodulation requirements (38.104) [NR\_2step\_RACH-Perf] 132

7.18.4 Others [NR\_2step\_RACH-Perf] 135

7.19 R16 NR maintenance [WI code or TEI16] 135

7.19.4 BS RF [WI code or TEI16] 135

7.19.6 Demodulation and CSI [WI code or TEI16] 139

7.19.7 NR MIMO OTA test methods (38.827) [FS\_NR\_MIMO\_OTA\_test] 139

8 Rel-16 UE feature list 141

9 Rel-16 spectrum related Work Items for NR 141

10 Rel-17 spectrum related Work Items for NR 141

11 Reply to ITU-R LS (RP-200042) 141

12 Rel-17 non-spectrum related work items for NR 141

12.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs [NR\_MIMO\_OTA] 141

12.1.1 General [NR\_MIMO\_OTA] 141

12.1.2 Performance Requirements [NR\_MIMO\_OTA-Core] 142

12.1.2.1 Performance Requirements for FR1 [NR\_MIMO\_OTA-Core] 142

12.1.2.2 Performance Requirements for FR2 [NR\_MIMO\_OTA-Core] 143

12.1.3 Testing methodologies [NR\_MIMO\_OTA-Core] 143

12.1.3.1 Testing parameters for Performance [NR\_MIMO\_OTA-Core] 144

12.1.3.2 Optimization of test methodologies [NR\_MIMO\_OTA-Core] 144

12.1.3.3 Channel model validation [NR\_MIMO\_OTA-Core] 145

12.8 Solutions for NR to support non-terrestrial networks (NTN) [NR\_NTN\_solutions] 146

12.8.1 General and work plan [NR\_NTN\_solutions] 146

12.8.2 Use cases, deployment scenarios, and regulatory information [NR\_NTN\_solutions-Core] 147

12.8.3 Coexistence aspects [NR\_NTN\_solutions -Core] 148

12.8.3.1 Simulation assumptions [NR\_NTN\_solutions -Core] 148

12.8.3.2 UE requirements aspects [NR\_NTN\_solutions -Core] 149

12.8.3.3 BS requirements aspects [NR\_NTN\_solutions -Core] 149

12.8.4 RRM requirements [NR\_NTN\_solutions-Core] 149

13 Rel-17 Study Items for NR 150

13.1 Study on enhanced test methods for FR2 in NR [FS\_FR2\_enhTestMethods] 150

13.1.1 Test methodology for high DL power and low UL power test cases [FS\_FR2\_enhTestMethods] 150

13.1.2 Polarization basis mismatch [FS\_FR2\_enhTestMethods] 151

13.1.3 Enhanced test methods for inter-band (FR2+FR2) CA [FS\_FR2\_enhTestMethods] 153

13.1.4 Extreme temperature conditions [FS\_FR2\_enhTestMethods] 154

13.1.5 Enhanced test methods for FR2 DL 256QAM RF [FS\_FR2\_enhTestMethods] 154

13.1.6 Test time reduction [FS\_FR2\_enhTestMethods] 154

13.1.7 Testability for band n262 [FS\_FR2\_enhTestMethods] 154

13.1.7.1 Extension of frequency applicability of permitted methods in 38.810 [FS\_FR2\_enhTestMethods] 155

13.1.7.2 Extension of frequency applicability of enhancement objectives 1-6 [FS\_FR2\_enhTestMethods] 155

14 Rel-17 Work Items for LTE 155

15 Rel-17 Study Items for LTE 155

16 Liaison and output to other groups 155

17 Revision of the Work Plan 155

18 Any other business 155

19 Close of the E-meeting 155

BACKUP 156

## 1 Opening of the E-meeting

The Chairman Steven Chen (Apple) opened the meeting on RAN4 reflector on /11/2020.

**Intellectual Property Rights Policy**

The attention of the delegates to the meeting of this Technical Specification Group was drawn to the fact that 3GPP Individual Members have the obligation under the IPR Policies of their respective Organizational Partners to inform their respective Organizational Partners of Essential IPRs they become aware of.

The delegates were asked to take note that they were thereby invited:

- to investigate whether their organization or any other organization owns IPRs which were, or were likely to become Essential in respect of the work of 3GPP.

- to notify their respective Organizational Partners of all potential IPRs, e.g., for ETSI, by means of the IPR Information Statement and the Licensing declaration forms.

**Statement regarding competition law**

The attention of the delegates to the meeting was drawn to the fact that 3GPP activities were subject to all applicable antitrust and competition laws and that compliance with said laws was therefore required by any participant of the meeting, including the Chairman and Vice-Chairmen and were invited to seek any clarification needed with their legal counsel. The leadership would conduct the present meeting with impartiality and in the interests of 3GPP. Delegates were reminded that timely submission of work items in advance of TSG/WG meetings was important to allow for full and fair consideration of such matters.

**Meeting Arrangements**

The meeting was conducted on three parallel sessions; Main session, RRM session and BS RF Test Demod session. The Main session was chaired by RAN4 Chairman Steven Chen (Apple), RRM session was chaired by RAN4 Vice Chairman Andrey Chervyakov (Intel) and BS RF Test Demod session was chaired by RAN4 ViceChairman Haijie Qiu (Samsung). The sessions were further broken down into separate email threads to address specific technical topics lead by assigned discussion moderators. Webinar sessions were used to summarize progress, resolve controversial issues and decide way forward.

## 2 Approval of the agenda

## 3 Letters / reports from other groups / meetings

## 4 Rel-15 New radio access technology

### 4.3 UE EMC [NR\_newRAT-Core]

#### 4.3.1 General [NR\_newRAT-Core]

#### 4.3.2 Emission requirements [NR\_newRAT-Core]

#### 4.3.3 Immunity requirements [NR\_newRAT-Core]

### 4.4 BS RF [NR\_newRAT-Core]

#### 4.4.1 General [NR\_newRAT-Core]

**R4-2017400 Email discussion summary for [97e][302] NR\_BSRF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017602 (from R4-2017400).**

**R4-2017602 Email discussion summary for [97e][302] NR\_BSRF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014313 Support of Japan regulation for 2.5GHz(BWA) in NR BS**

*Type: other For: Information  
 Source: SoftBank Corp., KDDI Corporation, NEC Corporation*

**Abstract:**

Explanation of BS-RF modifications needed for n41 for Japan

**Decision: Noted.**

#### 4.4.2 Transmitter characteristics maintenance [NR\_newRAT-Core]

**R4-2016345 CR to 38.104 on Category B OTA spurious emissions for Band n257**

*Type: CR For: Agreement  
 38.104 v15.11.0 CR-0260 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES updates RAN4 on the process of completing Rel-15 of the European Harmonised Standard EN 301 908. The LS clarifies that NR BS should support also band n257 in Europe.

**Decision: Return to.**

**R4-2016346 CR to 38.104 on Category B OTA spurious emissions for and n257**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0261 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES makes clear that NR BS should support also band n257 in Europe. The CR adds Band n257 to Category B limits for OTA spurious emissions.

**Decision: Return to.**

**R4-2016347 CR to 38.141-2 on Category B OTA spurious emissions for Band n257**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0254 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES updates RAN4 on the process of completing Rel-15 of the European Harmonised Standard EN 301 908. The LS clarifies that NR BS should support also band n257 in Europe.

**Decision: Return to.**

**R4-2016348 CR to 38.141-2 on Category B OTA spurious emissions for Band n257**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0255 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES makes clear that NR BS should support also band n257 in Europe. The CR adds Band n257 to Category B limits for OTA spurious emissions.

**Decision: Return to.**

#### 4.4.3 Receiver characteristics maintenance [NR\_newRAT-Core]

### 4.5 BS conformance testing [NR\_newRAT-Perf]

#### 4.5.1 General [NR\_newRAT-Perf]

**R4-2017401 Email discussion summary for [97e][303] NR\_Conformance\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017603 (from R4-2017401).**

**RR4-2017603 Email discussion summary for [97e][303] NR\_Conformance\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017586 WF on AAS co-location for adjacent bands**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

#### 4.5.2 BS specifications clean-ups (including conformance testing and core) [NR\_newRAT-Perf/Core]

##### 4.5.2.1 eAAS specifications [NR\_newRAT-Perf/Core]

**R4-2015949 CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-13**

*Type: CR For: Agreement  
 37.145-1 v13.10.0 CR-0221 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

It was observed that there are still undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

Furthermore, related ATC2/ANTC2 as well as ATC3/ANTC3 text was aligned for consistency purposes.

**Decision: Revised to R4-2017589 (from R4-2015949).**

**R4-2017589 CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-13**

*Type: CR For: Agreement  
 37.145-1 v13.10.0 CR-0221 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

It was observed that there are still undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

Furthermore, related ATC2/ANTC2 as well as ATC3/ANTC3 text was aligned for consistency purposes.

**Decision: Return to.**

**R4-2015950 CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-14**

*Type: CR For: Agreement  
 37.145-1 v14.8.0 CR-0222 Cat: A (Rel-14)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections. Furthermore, related ATC2/ANTC2 as well as ATC3/ANTC3 text was aligned for consi

**Decision: Return to.**

**R4-2015951 CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-15**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0223 Cat: A (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections. Furthermore, related ATC2/ANTC2 as well as ATC3/ANTC3 text was aligned for consi

**Decision: Return to.**

**R4-2015952 CR to TS 37.145-1: correction of manufacturer's declarations for test signal configurations, Rel-16**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0224 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections. Furthermore, related ATC2/ANTC2 as well as ATC3/ANTC3 text was aligned for consi

**Decision: Return to.**

**R4-2015953 CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-13**

*Type: CR For: Agreement  
 37.145-2 v13.12.0 CR-0246 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

It was observed that there are still undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

**Decision: Revised to R4-2017649 (from R4-2015953).**

**R4-2017649 CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-13**

*Type: CR For: Agreement  
 37.145-2 v13.12.0 CR-0246 Cat: F (Rel-13)  
  
 Source: Huawei*

**Abstract:**

It was observed that there are still undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

**Decision: Return to.**

**R4-2015954 CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-14**

*Type: CR For: Agreement  
 37.145-2 v14.10.0 CR-0247 Cat: A (Rel-14)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

**Decision: Return to.**

**R4-2015955 CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0248 Cat: A (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

**Decision: Return to.**

**R4-2015956 CR to TS 37.145-2: correction of manufacturer's declarations for test signal configurations, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0249 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Undefined terms "DUID" and “AUTC” mistakenly used instead of proper manufacturer's declaration and test signal confugration numbers in the test signal configuration sections.

**Decision: Return to.**

**R4-2016068 CR to TS 37.145-2 - Update CLTA definition, Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0251 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

The current CLTA definition can lead to unfeasibly large low band CLTA when testing high band systems. The definition has been added to maintain test integrety with smaller antennas.

**Decision: Return to.**

**R4-2016069 CR to TS 37.145-2 - Update CLTA definition, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0252 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Implement changes to CLTA height

**Decision: Return to.**

**R4-2016073 CR to TS 37.145-1: Corrections to conformance requirements, Rel-15**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0226 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During TFES drafting of the harmonized standard for AAS (EN 301 908 part 23) which is based on the AAS conformance specification a number or errors in 37.145-1 were identified. These need to be corrected so part 23 and 37.145-1 are aligned.

**Decision: Revised to R4-2017590 (from R4-2016073).**

**R4-2017590 CR to TS 37.145-1: Corrections to conformance requirements, Rel-15**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0226 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During TFES drafting of the harmonized standard for AAS (EN 301 908 part 23) which is based on the AAS conformance specification a number or errors in 37.145-1 were identified. These need to be corrected so part 23 and 37.145-1 are aligned.

**Decision: Return to.**

**R4-2016074 CR to TS 37.145-1: Corrections to conformance requirements, Rel-16**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0227 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Corrections to conformance specification based on errors identified while drafting the European harmonized standard

**Decision: Return to.**

**R4-2016075 CR to TS 37.145-2: Corrections to conformance requirements including UEM additional requirements, Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0253 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During TFES drafting of the harmonized standard for AAS (EN 301 908 part 23) which is based on the AAS conformance specification a number or errors in 37.145-2 were identified. These need to be corrected so part 23 and 37.145-2 are aligned.

**Decision: Return to.**

**R4-2016076 CR to TS 37.145-2: Corrections to conformance requirements including UEM additional requirements, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0254 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Corrections to conformance specification based on errors identified while drafting the European harmonized standard

**Decision: Return to.**

**R4-2016077 CR to TS 37.105: Corrections to core requirements including UEM additional requirements, Rel-15**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0205 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During drafting of the Eurpopean harmonized standard for AAS (EN 301 908 part 23) which is based on the AAS conformance specification a number or errors in 37.145-2 were identified. A number of these relate back to the core specification TS 37.105.

**Decision: Revised to R4-2017591 (from R4-2016077).**

**R4-2017591 CR to TS 37.105: Corrections to core requirements including UEM additional requirements, Rel-15**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0205 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

During drafting of the Eurpopean harmonized standard for AAS (EN 301 908 part 23) which is based on the AAS conformance specification a number or errors in 37.145-2 were identified. A number of these relate back to the core specification TS 37.105.

**Decision: Return to.**

**R4-2016078 CR to TS 37.105: Corrections to core requirements including UEM additional requirements, Rel-16**

*Type: CR For: Agreement  
 37.105 v16.5.0 CR-0206 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Corrections to core specification based on errors identified while drafting the European harmonized standard

**Decision: Return to.**

**R4-2016079 Discussion on AAS UEM additional requirements**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

There is an error between the MSR and single RAT E-UTRA UEM additional requirements. The referenced core requirements are identical but the AAS implementation is different. This is discussed and correcting proposal made.

Proposal 1: Update the E-UTRA core requirement so the referenced requirements are basic limits like the MSR reference.

Proposal 2: The missing UEM addition requirements (MSR and SR E-UTRA) in 37.145-2 are copied from the MSR requirements in 37.105.

**Decision: Noted.**

**R4-2016080 CR to TS 37.145-2: Corrections to single RAT E-UTRA additional requirements for band 89, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0255 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

The SUL band, band 89 has been given the wrong value for coexistence requirements.

**Decision: Agreed.**

**R4-2016127 CR to 37.145-2: Correction on NR REFSENS**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0256 Cat: F (Rel-15)  
  
 Source: ZTE Corporation*

**Abstract:**

NR REFSENS is not aligned with TS 38.104, this should be corrected

**Decision: Agreed.**

**R4-2016128 CR to 37.145-2: Correction on NR REFSENS**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0257 Cat: A (Rel-16)  
  
 Source: ZTE Corporation*

**Decision: Agreed.**

**R4-2016202 CR to 37.145-1: Correction to applicability of additional BC3 requirement (Rel-15)**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0228 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

On top of generic Tx IM and blocking requirement, there is additional requirement for BC3 base stations which uses 1.28Mcps UTRA TDD signal. Since this signal is not used anymore in any deployment, it is not clear why such requirement would need to be applicable. This CR is proposing to remove this requirement for CSA3A, CRs to remove this requirement for CS16/17 base stations were agreed at RAN4#96-e.

**Decision: Agreed.**

**R4-2016203 CR to 37.145-1: Correction to applicability of additional BC3 requirement (Rel-16)**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0229 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Agreed.**

**R4-2016204 CR to 37.145-2: Correction to applicability of additional BC3 requirement (Rel-15)**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0258 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

On top of generic Tx IM and blocking requirement, there is additional requirement for BC3 base stations which uses 1.28Mcps UTRA TDD signal. Since this signal is not used anymore in any deployment, it is not clear why such requirement would need to be applicable. This CR is proposing to remove this requirement for RCSA3A, CRs to remove this requirement for CS16/17 base stations were agreed at RAN4#96-e.

**Decision: Agreed.**

**R4-2016205 CR to 37.145-2: Correction to applicability of additional BC3 requirement (Rel-16)**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0259 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Agreed.**

**R4-2016282 CR to TS 37.145-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0260 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

There exist cases where testing becomes impractical with the current CLTA definition.

**Decision: Revised to R4-2017588 (from R4-2016282).**

**R4-2017588 CR to TS 37.145-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0260 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

There exist cases where testing becomes impractical with the current CLTA definition.

**Decision: Return to.**

**R4-2016283 CR to TS 37.145-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0261 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The vertical radiating dimension definition is added to the out-of-band CLTA.

**Decision: Return to.**

**R4-2016502 TS 37.145-2: Corrections OTA SEM, OTA Rx intermod and OTA ACS**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0265 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

There are a number of wrong references and editorial mistakes in the specifications

**Decision: Agreed.**

**R4-2016503 TS 37.145-2: Corrections OTA SEM, OTA Rx intermod and OTA ACS**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0266 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Diverse corrections in OTA SEM, OTA Rx intermod and OTA ACS

**Decision: Agreed.**

##### 4.5.2.2 MSR specifications [NR\_newRAT-Perf/Core]

**R4-2015957 CR to TS 37.104: addition of missing note for BC1/BC3 OBUE applicability table for WA BS, Rel-16**

*Type: CR For: Agreement  
 37.104 v16.7.0 CR-0912 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

It was observed, that the Rel-16 version of the TS 37.104 specification is missing the note for BC1/BC3 OBUE applicability table for WA BS, which should be same as captured in Rel-15 version of the TS 37.141 test specification. The referred note was introduced by the MSR\_GSM\_UTRA\_LTE\_NR-Core WI.

The referred note was still present in version 16.2.0 of TS 37.104 (based on CR in R4-1905014), but not in version 16.3.0 and onwards (there was CR in R4-1908049 which was Voiding Note1, but Note2 shall still be kept in the spec, while it is missing).

**Decision: Agreed.**

**R4-2016184 CR to 37.104: Correction to ACLR limit in non-contiguous spectrum (Rel-15)**

*Type: CR For: Agreement  
 37.104 v15.11.0 CR-0913 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

NR Base Station ACLR limit in non-contiguous spectrum is tested with NTC21. Since this test configuration has one NR carrier in the first sub-block and E-UTRA carrier in the second sub-block, NOTE 3 in Table 6.6.4.6-2a may be misleading.

**Decision: Agreed.**

**R4-2016185 CR to 37.104: Correction to ACLR limit in non-contiguous spectrum (Rel-16)**

*Type: CR For: Agreement  
 37.104 v16.7.0 CR-0914 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Agreed.**

**R4-2016186 CR to 37.141: Correction to ACLR limit in non-contiguous spectrum (Rel-15)**

*Type: CR For: Agreement  
 37.141 v15.12.0 CR-0953 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

NR Base Station ACLR limit in non-contiguous spectrum is tested with NTC21. Since this test configuration has one NR carrier in the first sub-block and E-UTRA carrier in the second sub-block, NOTE 3 in Table 6.6.4.5.6-2a may be misleading.

**Decision: Agreed.**

**R4-2016187 CR to 37.141: Correction to ACLR limit in non-contiguous spectrum (Rel-16)**

*Type: CR For: Agreement  
 37.141 v16.7.0 CR-0954 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Agreed.**

**R4-2016349 CR to 37.104 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.104 v15.11.0 CR-0916 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Agreed.**

**R4-2016350 CR to 37.104 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.104 v16.7.0 CR-0917 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Agreed.**

**R4-2016351 CR to 37.141 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.141 v15.12.0 CR-0955 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Agreed.**

**R4-2016352 CR to 37.141 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.141 v16.7.0 CR-0956 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Agreed.**

**R4-2016353 CR to 37.105 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0208 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Revised to R4-2017430 (from R4-2016353).**

**R4-2017430 CR to 37.105 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0208 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Return to.**

**R4-2016354 CR to 37.105 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.105 v16.5.0 CR-0209 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Return to.**

**R4-2016355 CR to 37.145-1 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0230 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Agreed.**

**R4-2016356 CR to 37.145-1 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0231 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Agreed.**

**R4-2016357 CR to 37.145-2 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0262 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Revised to R4-2017431 (from R4-2016353).**

**R4-2017431 CR to 37.145-2 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0262 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Return to.**

**R4-2016358 CR to 37.145-2 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0263 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Return to.**

**R4-2016359 CR to 36.104 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 36.104 v15.9.0 CR-4918 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Agreed.**

**R4-2016360 CR to 36.104 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 36.104 v16.7.0 CR-4919 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Agreed.**

**R4-2016361 CR to 36.141 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 36.141 v15.10.0 CR-1286 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

An LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink), providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulation for operation in the bands 1920-1980 MHz and 2110-2170 MHz. This view has been confirmed through an LS exchange with ECC PT1. The limit was removed from the ETSI Harmonised Standard EN 301 908.

**Decision: Agreed.**

**R4-2016362 CR to 36.141 on Removal of additional limit for Band 1**

*Type: CR For: Agreement  
 36.141 v16.7.0 CR-1287 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The LS from ETSI TFES explains that the additional limit for operation in Band 1 (2110 – 2170 MHz downlink) , providing a “slope” in the region 5-10 MHz outside the operating band, can be removed. The additional limit is not part of the ECC or EC regulati

**Decision: Agreed.**

**R4-2016363 CR to 37.104 on MSR Blocking correction**

*Type: CR For: Agreement  
 37.104 v15.11.0 CR-0918 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The table reference for the general blocking requirement frequency range is incorrect and needs to be corrected.

**Decision: Agreed.**

**R4-2016364 CR to 37.104 on MSR Blocking correction**

*Type: CR For: Agreement  
 37.104 v16.7.0 CR-0919 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The table reference for the general blocking requirement frequency range is incorrect and needs to be corrected.

**Decision: Agreed.**

**R4-2016365 CR to 37.141 on MSR Blocking correction**

*Type: CR For: Agreement  
 37.141 v15.12.0 CR-0957 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

The table reference for the general blocking requirement frequency range is incorrect and needs to be corrected.

**Decision: Agreed.**

**R4-2016366 CR to 37.141 on MSR Blocking correction**

*Type: CR For: Agreement  
 37.141 v16.7.0 CR-0958 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

The table reference for the general blocking requirement frequency range is incorrect and needs to be corrected. The cross-reference for OOB blocking also needs to be corrected.

**Decision: Agreed.**

**R4-2016367 CR to 37.105 on NR+UTRA support for AAS**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0210 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

When AAS BS specs were developed fully in Rel-15, there was support included for LTE and UTRA and multi-RAT operation with LTE+UTRA. GSM/EDGE was implicitly excluded. NR support was later introduced in 2018-12 (CR in R4-1808429), but only in combination with LTE. It is not explicitly stated which RATs or RAT combinations that are not covered.

**Decision: Return to.**

**R4-2016368 CR to 37.105 on NR+UTRA support for AAS**

*Type: CR For: Agreement  
 37.105 v16.5.0 CR-0211 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Presently, it is not explicitly explained in TS 37.105 what RATs and RAT combinations that are not supported by AAS BS. This is clarified by the CR.

**Decision: Return to.**

##### 4.5.2.3 NR conformance testing specifications [NR\_newRAT-Perf]

**R4-2015378 On PN23 sequence generation for data content for NR test models**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Observation 1: Current specification is ambiguous and generation of PN23 is not clear. It can be noticed that 2 different interpretation (options) of PN23 sequence generation can exist.

Observation 2: It is not clear how PN sequence should be generated for TDD.

Proposal: It is proposed to clarify PN sequence generation for NR TMs to avoid ambiguity as proposed in CRs [10-13].

**Decision: Noted.**

**R4-2015379 CR to TS 38.141-1 clarification on PN23 sequence generation**

*Type: CR For: Agreement  
 38.141-1 v15.7.0 CR-0160 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces clarification to PN23 sequence generation in data content section for NR test models describes in [1], and clarify whether the same PN23 sequence is used for all PDCCH/PDSCH or individual PN23 sequence is used for each PDCCH/PDSCH in TMs with multi-users. Also clarification for TDD case is added.

[1]

R4-2015378 On PN23 sequence generation for data content for NR test models, Nokia, Nokia Shanghai Bell

**Decision: Return to.**

**R4-2015380 CR to TS 38.141-1 clarification on PN23 sequence generation**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0161 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Return to.**

**R4-2015381 CR to TS 38.141-2 clarification on PN23 sequence generation**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0237 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces clarification to PN23 sequence generation in data content section for NR test models describes in [1], and clarify whether the same PN23 sequence is used for all PDCCH/PDSCH or individual PN23 sequence is used for each PDCCH/PDSCH in TMs with multi-users. Also clarification for TDD case is added.

[1]

R4-2015378 On PN23 sequence generation for data content for NR test models, Nokia, Nokia Shanghai Bell

**Decision: Return to.**

**R4-2015382 CR to TS 38.141-2 clarification on PN23 sequence generation**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0238 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Return to.**

**R4-2016067 Discussion on CLTA maximum height**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss remaining options on CLTA height modification form WF last meeting.

Proposal 1: Update CLTA definition according to option 1.

**Decision: Noted.**

**R4-2016070 CR to TS 38.141-2 - Update CLTA definition, Rel-15**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0247 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

The current CLTA definition can lead to unfeasibly large low band CLTA when testing high band systems. The definition has been added to maintain test integrety with smaller antennas.

**Decision: Return to.**

**R4-2016071 CR to TS 38.141-2 - Update CLTA definition, Rel-16**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0248 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Implement changes to CLTA height

**Decision: Return to.**

**R4-2016072 Discussion on co-location for adjacent bands**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss issue with co-location requirements for adjacent bands.

Proposal 1: Update CLTA definition according to option 1.

**Decision: Noted.**

**R4-2016284 On selecting CLTA maximum height**

*Type: other For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

At the last RAN4#96-e meeting, a way forward on selecting CLTA maximum height [1] was approved with two possible options for down selecting.

This document evaluates the two options and concludes with our proposal.

**Decision: Noted.**

**R4-2016286 CR to TS 38.141-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0252 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

There exist cases where testing becomes impractical with the current CLTA definition.

**Decision: Return to.**

**R4-2016287 CR to TS 38.141-2: Out-of-band co-location test antenna definition**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0253 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

The vertical radiating dimension definition is added to the out-of-band CLTA.

**Decision: Return to.**

#### 4.5.3 Conducted conformance testing (38.141-1) [NR\_newRAT-Perf]

#### 4.5.4 Radiated conformance testing (38.141-2) [NR\_newRAT-Perf]

**R4-2014394 Discussion on out of band CLTA maximum height**

*Type: discussion For: Discussion  
 Source: CATT*

**Abstract:**

Observation 1: The availability condition for option 1 is not clear, which may affect the selection of out-of-band CLTA and requirement verification.

Observation 2: For option 1, two candidate out-of-band CLTAs might be available for a specific co-located band, which will result in different out-of-band CLTA selection and different test results.

Observation 3: For option 1, there is the case that no candidate out-of-band CLTA for a specific co-located band is available.

Observation 4: 1.5m height limit could be used as the height limit for option 2.

**Decision: Noted.**

**R4-2014395 CR for TS 38.141-2: Correction on half-power vertical beam width for the out of band CLTA**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0226 Cat: F (Rel-15)  
  
 Source: CATT*

**Abstract:**

When the out of band is much lower than the operating band of test object antenna, the existing half-power vertical beam width definition for the out of band CLTA will result in unrealistic antenna height.

**Decision: Return to.**

**R4-2014396 CR for TS 38.141-2: Correction on half-power vertical beam width for the out of band CLTA**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0227 Cat: A (Rel-16)  
  
 Source: CATT*

**Abstract:**

When the out of band is much lower than the operating band of test object antenna, the existing half-power vertical beam width definition for the out of band CLTA will result in unrealistic antenna height.

**Decision: Return to.**

**R4-2015716 CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0242 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction to the CLTA length

**Decision: Revised to R4-2017587 (from R4-2015716).**

**R4-2017587 CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0242 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Correction to the CLTA length

**Decision: Return to.**

**R4-2015717 CR to TS 38.141-2: Improvement of out-of-band CLTA characteristics**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0243 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction to the CLTA length

**Decision: Return to.**

**R4-2016152 CR to 38.141-2: Annex C correction on frequency range of FR2 TT table (C.2)**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0249 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

During study to prepare MU and TT value in TR 38.817-02 documents, study was conducted up to 40GHz. Also with n259 WI, it was looked at up to 43.5GHz. However, in 38.141-2, TT tables for FR2 Rx was left as frequency range up to upper FR2 range which is not correct because study wasn’t done up to such high frequency. Studied value up to 43.5G should not be applied up to 52.6GHz, it is large enough difference to use existing value. Also, during discussion, it was agreed that MU/TT study would be conducted when new band will be added.

**Decision: Revised to R4-2017592 (from R4-2016152).**

**R4-2017592 CR to 38.141-2: Annex C correction on frequency range of FR2 TT table (C.2)**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0249 Cat: F (Rel-15)  
  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

During study to prepare MU and TT value in TR 38.817-02 documents; study was conducted up to 40GHz. Also with n259 WI, it was looked at up to 43.5GHz. However, in 38.141-2, TT tables for FR2 Rx was left as frequency range up to upper FR2 range which is not correct because study wasn’t done up to such high frequency. Studied value up to 43.5G should not be applied up to 52.6GHz, it is large enough difference to use existing value. Also, during discussion, it was agreed that MU/TT study would be conducted when new band will be added.

**Decision: Return to.**

**R4-2016153 CR to 38.141-2: Annex C correction on frequency range of FR2 TT table (C.2)**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0250 Cat: A (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Decision: Withdrawn.**

**R4-2017655 CR to 38.141-2: Annex C correction on frequency range of FR2 TT table (C.2)**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-XXX Cat: F (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2016289 Discussions on TRP procedures**

*Type: other For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This contribution discusses the open issue related two TRP measurement procedures, namely two orthogonal cuts with pattern multiplication and beam-based directions.

Proposal 1: A numerical form of the TRP integral for the two orthogonal cuts with pattern multiplication is defined to allow computation of TRP estimate from discrete data samples.

Proposal 2: Criteria for determining whether correlation exists before applying the beam-based directions procedure should be added to the TR 37.941 as background information, which are as follows:

(a) Maximum radiation of unwanted emissions occurs in the same direction as the wanted signal.

(b) The main lobe of the wanted signal and the unwanted emissions with respect to the axis of maximum radiation should have the same symmetry.

(c) HPBW in the azimuth and elevation direction for the unwanted emissions should correspond to those of the wanted signal.

(d) The directivity-beamwidth product of the unwanted emissions should correspond to that for the wanted signal.

**Decision: Noted.**

### 4.6 BS EMC [NR\_newRAT-Core]

**R4-2017402 Email discussion summary for [97e][304] NR\_EMC**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017604 (from R4-2017402).**

**R4-2017604 Email discussion summary for [97e][304] NR\_EMC**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015958 CR to TS 38.113: correction of the scope and other technical improvements, Rel-15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0029 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Multiple technical improvements were incorporated into TS 38.113, e.g. clarifiaction to the scope and redundant text, clarification on the test methodology for RF electromagnetic field, and more.

**Decision: Revised to R4-2017441 (from R4-2015958).**

**R4-2017441 CR to TS 38.113: correction of the scope and other technical improvements, Rel-15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0029 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Multiple technical improvements were incorporated into TS 38.113, e.g. clarifiaction to the scope and redundant text, clarification on the test methodology for RF electromagnetic field, and more.

**Decision: Return to.**

**R4-2015959 CR to TS 38.113: correction of the scope and other technical improvements, Rel-16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0030 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Multiple technical improvements were incorporated into TS 38.113, e.g. clarifiaction to the scope and redundant text, clarification on the test methodology for RF electromagnetic field, and more.

**Decision: Return to.**

#### 4.6.1 Core requirements [NR\_newRAT-Core]

##### 4.6.1.1 Emission requirements [NR\_newRAT-Core]

##### 4.6.1.2 Immunity requirements [NR\_newRAT-Core]

**R4-2015568 CR to TS 38.113 correcting Exclusion Bands Title, Release 15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0027 Cat: D (Rel-15)  
  
 Source: Ericsson Inc.*

**Abstract:**

Correction to include missing title in section 4.4 (Exclusion Bands).

**Decision: Not pursued.**

**R4-2015569 CR to TS 38.113 correcting Exclusion Bands Title, Release 16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0028 Cat: A (Rel-16)  
  
 Source: Ericsson Inc.*

**Abstract:**

Correction to include missing title in section 4.4 (Exclusion Bands).

**Decision: Withdrawn.**

#### 4.6.2 Performance requirements [NR\_newRAT-Perf]

**R4-2015100 CR to TS 37.113 on Voltage dips and interruptions, Release 15**

*Type: CR For: Agreement  
 37.113 v15.9.0 CR-0110 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Specification of the Voltage dips and interruptions (Test method and levels) requirement is not aligned with IEC 61000411, nor with the NR BS EMC specification. Performance criteria is updated to reflect considerations on the test levels.

**Decision: Revised to R4-2017435 (from R4-2015100).**

**R4-2017435 CR to TS 37.113 on Voltage dips and interruptions, Release 15**

*Type: CR For: Agreement  
 37.113 v15.9.0 CR-0110 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Specification of the Voltage dips and interruptions (Test method and levels) requirement is not aligned with IEC 61000411, nor with the NR BS EMC specification. Performance criteria is updated to reflect considerations on the test levels.

**Decision: Return to.**

**R4-2015101 CR to TS 37.113 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 37.113 v16.0.0 CR-0111 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Specification of the Voltage dips and interruptions (Test method and levels) requirement is not aligned with IEC 61000411, nor with the NR BS EMC specification. Performance criteria is updated to reflect considerations on the test levels.

Session Chair Note: *Please don’t upload the Rel-16 Cat A CR before the corresponding Rel-15 Cat F CR agreed.*

**Decision: Revised to R4-2017436 (from R4-2015101).**

**R4-2017436 CR to TS 37.113 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 37.113 v16.0.0 CR-0111 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Specification of the Voltage dips and interruptions (Test method and levels) requirement is not aligned with IEC 61000411, nor with the NR BS EMC specification. Performance criteria is updated to reflect considerations on the test levels.

**Decision: Return to.**

**R4-2015102 CR to TS 38.113 on Voltage dips and interruptions, Release 15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0023 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

**Decision: Revised to R4-2017437 (from R4-2015102).**

**R4-2017437 CR to TS 38.113 on Voltage dips and interruptions, Release 15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0023 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

**Decision: Return to.**

**R4-2015103 CR to TS 38.113 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0024 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

Session Chair Note: *Please don’t upload the Rel-16 Cat A CR before the corresponding Rel-15 Cat F CR agreed.*

**Decision: Revised to R4-2017438 (from R4-2015103).**

**R4-2017438 CR to TS 38.113 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0024 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

**Decision: Return to.**

**R4-2015104 CR to TS 38.113 on Performance criteria for transient phenomena, Release 15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0025 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria for transient phenomena is updated to reflect alignment both with TS 37.113 MSR EMC (which includes also NR) standard and ETSI considerations.

**Decision: Revised to R4-2017439 (from R4-2015104).**

**R4-2017439 CR to TS 38.113 on Performance criteria for transient phenomena, Release 15**

*Type: CR For: Agreement  
 38.113 v15.11.0 CR-0025 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria for transient phenomena is updated to reflect alignment both with TS 37.113 MSR EMC (which includes also NR) standard and ETSI considerations.

**Decision: Return to.**

**R4-2015105 CR to TS 38.113 on Performance criteria for transient phenomena, Release 16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0026 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria for transient phenomena is updated to reflect alignment both with TS 37.113 MSR EMC (which includes also NR) standard and ETSI considerations.

Session Chair Note: *Please don’t upload the Rel-16 Cat A CR before the corresponding Rel-15 Cat F CR agreed.*

**Decision: Revised to R4-2017440 (from R4-2015105).**

**R4-2017440 CR to TS 38.113 on Performance criteria for transient phenomena, Release 16**

*Type: CR For: Agreement  
 38.113 v16.1.0 CR-0026 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria for transient phenomena is updated to reflect alignment both with TS 37.113 MSR EMC (which includes also NR) standard and ETSI considerations.

**Decision: Return to.**

### 4.9 Demodulation and CSI requirements maintenance (38.101-4/38.104) [NR\_newRAT-Perf]

**R4-2017412 Email discussion summary for [97e][314] NR\_Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017605 (from R4-2017412).**

**R4-2017605 Email discussion summary for [97e][314] NR\_Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

#### 4.9.1 UE demodulation requirements [NR\_newRAT-Perf]

**R4-2014015 Update of Noc for NR operating bands in FR2**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0079 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

The Rel-15 FR2 multi-band requirement framework was updated in R4-2006352, and introduces a maximum cap to the per-band relaxation factors. Clause 4.5.3 needs to be aligned to these changes.

**Decision: Agreed.**

**R4-2014016 Update of Noc for NR operating bands in FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0080 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Decision: Agreed.**

**R4-2015824 CR: Correction of FRC for PDSCH demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0106 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Information bit payload in PDSCH Reference Channel for 64QAM in slots where TRS is trasmittted is not correct.

**Decision: Revised to R4-2017447 (from R4-2015824).**

**R4-2017447 CR: Correction of FRC for PDSCH demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0106 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Information bit payload in PDSCH Reference Channel for 64QAM in slots where TRS is trasmittted is not correct.

**Decision: Return to.**

**R4-2015825 CR: Correction of FRC for PDSCH demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0107 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR corrects the FRC for PDSCH demodulation requirements

**Decision: Return to.**

**R4-2016424 CR: Updates to OCNG pattern reference**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0116 Cat: F (Rel-15)  
  
 Source: Huawei Technologies Sweden AB*

**Abstract:**

OCNG FDD pattern 1 and OCNG TDD pattern 2 are defined in Annex A.5, but ‘OCNG’ is wrongly configured for “Symbols for all unused REs” in the test parameters instead of OCNG pattern, it is easy to create confusion for testing.

**Discussion:**

The secretary commented that (on the coversheet) the version should read 15.7.0 instead of 15.07.0.

**Decision: Revised to R4-2017448 (from R4-2016424).**

**R4-2017448 CR: Updates to OCNG pattern reference**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0116 Cat: F (Rel-15)  
  
 Source: Huawei Technologies Sweden AB*

**Abstract:**

OCNG FDD pattern 1 and OCNG TDD pattern 2 are defined in Annex A.5, but ‘OCNG’ is wrongly configured for “Symbols for all unused REs” in the test parameters instead of OCNG pattern, it is easy to create confusion for testing.

**Discussion:**

The secretary commented that (on the coversheet) the version should read 15.7.0 instead of 15.07.0.

**Decision: Return to.**

**R4-2016425 CR: Updates OCNG pattern reference (Rel-16)**

*Type: CR For: (not specified)  
 38.101-4 v16.2.0 CR-0117 Cat: A (Rel-16)  
  
 Source: Huawei Technologies Sweden AB*

**Decision: Return to.**

**R4-2016448 CR: Correction on OCNG pattern**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0118 Cat: F (Rel-15)  
  
 Source: Qualcomm, Inc.*

**Decision: Revised to R4-2017449 (from R4-2016448).**

**R4-2017449 CR: Correction on OCNG pattern**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0118 Cat: F (Rel-15)  
  
 Source: Qualcomm, Inc.*

**Decision: Return to.**

**R4-2016449 CR: Correction on OCNG pattern**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0119 Cat: A (Rel-16)  
  
 Source: Qualcomm, Inc.*

**Abstract:**

When data is not FDMed with DMRS, RAN1 spec requires power boosting on PDSCH DMRS to keep the same power across symbols. If OCNG is padded into the empty REs on PDSCH DMRS symbols, power across data and PDSCH DMRS symbols are different. Text is added to clarify that OCNG pattern is not applied to PDSCH DMRS symbols to avoid this power difference across symbols.

Session Chair Note: *Please don’t upload the Rel-16 Cat A CR before the corresponding Rel-15 Cat F CR agreed.*

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017450 (from R4-2016449).**

**R4-2017450 CR: Correction on OCNG pattern**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0119 Cat: A (Rel-16)  
  
 Source: Qualcomm, Inc.*

**Abstract:**

When data is not FDMed with DMRS, RAN1 spec requires power boosting on PDSCH DMRS to keep the same power across symbols. If OCNG is padded into the empty REs on PDSCH DMRS symbols, power across data and PDSCH DMRS symbols are different. Text is added to clarify that OCNG pattern is not applied to PDSCH DMRS symbols to avoid this power difference across symbols.

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

#### 4.9.2 CSI requirements [NR\_newRAT-Perf]

**R4-2014050 Correction to FR1 Aperiodic CSI Reporting**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0081 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Incorrect Aperiodic Report Slot Offset. Current values will NOT schedule Aperiodic CSI Reports in an UL slot.

**Decision: Return to.**

**R4-2014051 Correction to FR1 Aperiodic CSI Reporting**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0082 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Change Aperiodic Report Slot Offset value from 9 to 8

**Decision: Return to.**

**R4-2014052 Correction to FR2 PMI Aperiodic CSI Reporting**

*Type: CR For: Agreement  
 38.101-4 v15.7.0 CR-0083 Cat: F (Rel-15)  
  
 Source: ANRITSU LTD*

**Abstract:**

Incorrect Aperiodic Report Slot Offset. Current values will NOT schedule Aperiodic CSI Reports in an UL slot.

Test 1:

Test 2:

**Decision: Return to.**

**R4-2014053 Correction to FR2 PMI Aperiodic CSI Reporting**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0084 Cat: A (Rel-16)  
  
 Source: ANRITSU LTD*

**Abstract:**

Correct Aperiodic Report Slot Offset values for Test 1 and Test 2:

Test 1: change 7 to 6, Test 2: change 9 to 8

**Decision: Return to.**

#### 4.9.3 BS demodulation requirements [NR\_newRAT-Perf]

**R4-2014494 CR for 38.141-2: Add error-free feedback in demodulation requirement test setup**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0229 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

OTA test setup section is missing the error-free feedback link.

**Decision: Agreed.**

**R4-2014509 CR for 38.141-2: Add error-free feedback in demodulation requirement test setup**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0230 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Added note in PUSCH minimum performance requirement OTA test setup, following the text agreed in TR 37.941 (section 15.3) on HARQ feedback, to allow HARQ feedback on an error-free feedback link in OTA testing.

Note adapted from TS 38.141-1.

**Decision: Agreed.**

**R4-2015843 Adding MCS12 and 30% throughput requirements and corresponding FRC tables for FR2 PUSCH performance in TS38.104 v15.11.0**

*Type: CR For: Agreement  
 38.104 v15.11.0 CR-0256 Cat: B (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Rel-16 has added MCS12 and 30% throghput requirements for 2-O PUSCH performance which previous target SNR values are very close or over 20dB test limit. Rel-15 should align these requirements with Rel-16 to let these cases testable.

**Discussion:**

The secretary commented that the CR number 0256 is missing on the coversheet.

**Decision: Not pursued.**

**R4-2015844 Adding MCS12 and 30% throughput requirements and corresponding FRC tables for FR2 PUSCH performance in TS38.141-2 v15.7.0**

*Type: CR For: Agreement  
 38.141-2 v15.7.0 CR-0244 Cat: B (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

Rel-16 has added MCS12 and 30% throghput requirements for 2-O PUSCH performance which previous target SNR values are very close or over 20dB test limit. Rel-15 should align these requirements with Rel-16 to let these cases testable.

Session Chair： Move to this AI from AI 4.5.4

**Discussion:**

The secretary commented that the CR number 0244 is missing on the coversheet.

**Decision: Not pursued.**

### 4.11 Testability Maintenance (38.810) [FS\_NR\_test\_methods]

## 5 LTE maintenance (up to Rel15) [WI code or TEI]

### 5.1 BS RF requirements [WI code or TEI]

**R4-2017399 Email discussion summary for [97e][301] LTE\_BSRF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017606 (from R4-2017399).**

**R4-2017606 Email discussion summary for [97e][301] LTE\_BSRF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014469 CR to TS 36.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 36.141 v13.14.0 CR-1276 Cat: F (Rel-13)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

It is not clear whether the manufacturer’s declaration on ‘the number of supported NB-IoT carriers’ applies to NB-IoT in-band or guard band operation only, or also applies to NB-IoT standalone operation. For TS 37.141, it was agreed in R4#96-e (R4-2012573) to keep the existing manufacturer’s declaration on ‘the number of supported PRBs’ for NB-IoT in-band or guard band operation, and add the manufacturer’s declaration on ‘the number of supported NB-IoT carriers’ for NB-IoT standalone operation.

**Decision: Agreed.**

**R4-2014470 CR to TS 36.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 36.141 v14.11.0 CR-1277 Cat: A (Rel-14)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Change the existing manufacturer’s declaration to ‘the number of supported PRBs’ for NB-IoT in-band or guard band operation and add the manufacturer’s declaration on ‘the number of supported NB-IoT carriers’ for NB-IoT standalone operation.

**Decision: Agreed.**

**R4-2014471 CR to TS 36.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 36.141 v15.10.0 CR-1278 Cat: A (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Change the existing manufacturer’s declaration to ‘the number of supported PRBs’ for NB-IoT in-band or guard band operation and add the manufacturer’s declaration on ‘the number of supported NB-IoT carriers’ for NB-IoT standalone operation.

**Decision: Agreed.**

**R4-2014472 CR to TS 36.141: Clarification on manufacturer's declaration of the number of supported NB-IoT carriers**

*Type: CR For: Agreement  
 36.141 v16.7.0 CR-1279 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Change the existing manufacturer’s declaration to ‘the number of supported PRBs’ for NB-IoT in-band or guard band operation and add the manufacturer’s declaration on ‘the number of supported NB-IoT carriers’ for NB-IoT standalone operation.

**Decision: Agreed.**

**R4-2015375 Further discussion on additional optional EDT level for test**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution, we further discuss issue of additional optional energy detection threshold in conformance tests for LAA/eLAA.

Observation: Changes of EDT threshold by adding additional optional value that is declared by BS vendor would not relax EDT requirements, but only would allow to use specific regulatory requirements for EDT test.

Proposal: It is proposed to introduce changes for EDT level in TS 37.107 by adding alternative option 1 from WF that is declared by BS vendor and introduce it from Rel-15 onwards.

**Decision: Noted.**

**R4-2015376 CR to 37.107 with update of EDT level**

*Type: CR For: Agreement  
 37.107 v15.3.0 CR-0008 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces update for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213. Details of this changes are described in [1].

[1]

R4-2015375, Further discussion on additional optional EDT level for test, Nokia, Nokia Shaghai Bell.

**Decision: Revised to R4-2017451 (from R4-2015376).**

**R4-2017451 CR to 37.107 with update of EDT level**

*Type: CR For: Agreement  
 37.107 v15.3.0 CR-0008 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces update for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213. Details of this changes are described in [1].

[1]

R4-2015375, Further discussion on additional optional EDT level for test, Nokia, Nokia Shaghai Bell.

**Decision: Return to.**

**R4-2015377 CR to 37.107 with update of EDT level**

*Type: CR For: Agreement  
 37.107 v16.1.0 CR-0009 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces update for interfering signal of energy detection accuracy (EDT) to align with RAN1 specification TS 37.213.

**Decision: Return to.**

### 5.4 Demodulation and CSI requirements [WI code or TEI]

#### 5.4.1 UE demodulation and CSI requirements [WI code or TEI]

**R4-2017411 Email discussion summary for [97e][313] LTE\_Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017607 (from R4-2017411).**

**R4-2017607 Email discussion summary for [97e][313] LTE\_Demod\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015589 CR on cleanup for LTE FeMBMS(Rel-14)**

*Type: CR For: Agreement  
 36.101 v14.16.0 CR-5691 Cat: F (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

**Discussion:**

The secretary commented that the CR number 5691 is missing on the coversheet.

**Decision: Revised to R4-2017452 (from R4-2015589).**

**R4-2017452 CR on cleanup for LTE FeMBMS(Rel-14)**

*Type: CR For: Agreement  
 36.101 v14.16.0 CR-5691 Cat: F (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

**Discussion:**

The secretary commented that the CR number 5691 is missing on the coversheet.

**Decision: Return to.**

**R4-2015590 CR on cleanup for LTE FeMBMS(Rel-15)**

*Type: CR For: Agreement  
 36.101 v15.12.0 CR-5692 Cat: A (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

Session Chair Note: *Please don’t upload the Cat A CR before the corresponding Cat F CR agreed.*

**Discussion:**

The secretary commented that the CR number 5692 is missing on the coversheet.

**Decision: Revised to R4-2017453 (from R4-2015590).**

**R4-2017453 CR on cleanup for LTE FeMBMS(Rel-15)**

*Type: CR For: Agreement  
 36.101 v15.12.0 CR-5692 Cat: A (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

**Discussion:**

The secretary commented that the CR number 5692 is missing on the coversheet.

**Decision: Return to.**

**R4-2015591 CR on cleanup for LTE FeMBMS(Rel-16)**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5693 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

Session Chair Note: *Please don’t upload the Cat A CR before the corresponding Cat F CR agreed.*

**Discussion:**

The secretary commented that the CR number 5693 is missing on the coversheet.

**Decision: Revised to R4-2017454 (from R4-2015591).**

**R4-2017454 CR on cleanup for LTE FeMBMS(Rel-16)**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5693 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE FeMBMS performance requirements.

**Discussion:**

The secretary commented that the CR number 5693 is missing on the coversheet.

**Decision: Return to.**

**R4-2015630 CR: Updates to LTE V2X performance requirements**

*Type: CR For: Agreement  
 36.101 v14.16.0 CR-5695 Cat: F (Rel-14)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The square bracket of SNR point @ 10% BLER for soft buffer test requirement in Table 14.7-2 is still existing.

For PSCCH/PSSCH decoding test, this test can’t verify the maximum number of bits per TTI and it is verified on soft buffer test.

~~Session Chair Note: CAT CR missing?~~

**Decision: Agreed.**

**R4-2017645 CR: Updates to LTE V2X performance requirements**

*Type: CR      For: Agreement  
                  36.101 v15.12.0     CR-x  Cat: A (Rel-15)*

*Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Withdrawn.**

**R4-2017646 CR: Updates to LTE V2X performance requirements**

*Type: CR      For: Agreement  
                  36.101 v16.7.0      CR-x  Cat: A (Rel-16)*

*Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Withdrawn.**

**R4-2017656 CR: Updates to LTE V2X performance requirements**

*Type: CR      For: Agreement  
                  36.101 v15.12.0     CR-x  Cat: A (Rel-15)*

*Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017657 CR: Updates to LTE V2X performance requirements**

*Type: CR      For: Agreement  
                  36.101 v16.7.0      CR-x  Cat: A (Rel-16)*

*Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015835 CR: Addition of applicability for MTC UE capable of 64QAM DL**

*Type: CR For: Agreement  
 36.101 v15.12.0 CR-5699 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

No applicability rule is specified for PDSCH demodulation requirements with 64QAM for MTC UE

Session Chair Note: same CR as R4-2010463 approved in RAN4#96-e, missed to be implemented in TS36.101 V15.12.0. Corresponding CAT CR already implemented in TS36.101 V16.6.0.

**Decision: Agreed.**

**R4-2015668 CR for 36.101: Cleanup for performance requirements of sTTI (Rel-15)**

*Type: CR For: Agreement  
 36.101 v15.12.0 CR-5697 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SNR test points and CQI reporting requirements are in []

Session Chair: Moved to this AI from AI 5.4.2

**Decision: Revised to R4-2017455 (from R4-2015668).**

**R4-2017455 CR for 36.101: Cleanup for performance requirements of sTTI (Rel-15)**

*Type: CR For: Agreement  
 36.101 v15.12.0 CR-5697 Cat: F (Rel-15)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SNR test points and CQI reporting requirements are in []

Session Chair: Moved to this AI from AI 5.4.2

**Decision: Return to.**

**R4-2015669 CR for 36.101: Cleanup for performance requirements of sTTI (Rel-16)**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5698 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SNR test points and CQI reporting requirements are in []

Session Chair: Moved to this AI from AI 5.4.2

Session Chair Note: *Please don’t upload the Cat A CR before the corresponding Cat F CR agreed*

**Decision: Revised to R4-2017456 (from R4-2015669).**

**R4-2017456 CR for 36.101: Cleanup for performance requirements of sTTI (Rel-16)**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5698 Cat: A (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

SNR test points and CQI reporting requirements are in []

Session Chair: Moved to this AI from AI 5.4.2

**Decision: Return to.**

#### 5.4.2 BS demodulation requirements [WI code or TEI]

**R4-2014944 Correction of eLAA FRC table**

*Type: CR For: Agreement  
 36.141 v14.11.0 CR-1280 Cat: F (Rel-14)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Fixed reference channel table of eLAA contains wrong reference channel identification. In the current version of the specification, there are duplicated FRCs identified by A18-1 and A.18-2.

**Decision: Agreed.**

**R4-2014945 Correction of eLAA FRC table**

*Type: CR For: Agreement  
 36.141 v15.10.0 CR-1281 Cat: A (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Fixed reference channel table of eLAA contains wrong reference channel identification. In the current version of the specification, there are duplicated FRCs identified by A18-1 and A.18-2.

**Decision: Agreed.**

**R4-2014946 Correction of eLAA FRC table**

*Type: CR For: Agreement  
 36.141 v16.7.0 CR-1282 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Fixed reference channel table of eLAA contains wrong reference channel identification. In the current version of the specification, there are duplicated FRCs identified by A18-1 and A.18-2.

**Decision: Agreed.**

## 6 Rel-16 Work Items for LTE

### 6.1 Additional MTC enhancements for LTE [LTE\_eMTC5]

#### 6.1.4 Demodulation and CSI requirements maintenance (36.101) [LTE\_eMTC5-Perf]

##### 6.1.4.1 UE demodulation requirements [LTE\_eMTC5-Perf]

**R4-2015836 Clean up of enhanced MPDCCH demodulation requirements**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5700 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Removal of [] from the requirements.

**Decision: Agreed.**

##### 6.1.4.2 CSI requirements [LTE\_eMTC5-Perf]

**R4-2015837 Clean up of CSI-RS based PMI reporting test for non-BL UEs**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5701 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of CSI-RS based PMI reporting test for non-BL UEs.

**Decision: Revised to R4-2017458 (from R4-2015837).**

**R4-2017458 Clean up of CSI-RS based PMI reporting test for non-BL UEs**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5701 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Correction of CSI-RS based PMI reporting test for non-BL UEs.

**Decision: Return to.**

### 6.2 Additional enhancements for NB-IoT [NB\_IOTenh3]

#### 6.2.4 Demodulation and CSI requirements maintenance (36.101/36.104) [NB\_IOTenh3-Perf]

##### 6.2.4.1 UE demodulation requirements [NB\_IOTenh3-Perf]

**R4-2015631 CR: Cleanup for NPDSCH performance requirements for multi-TB interleaved transmission in TS 36.101**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5696 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The square bracket of SNR point @ 70% Throughput for NPDSCH with multi-TB interleaved transmission in Table 8.12.1.1.4-2 is still existing.

**Decision: Revised to R4-2017457 (from R4-2015631).**

**R4-2017457 CR: Cleanup for NPDSCH performance requirements for multi-TB interleaved transmission in TS 36.101**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5696 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The square bracket of SNR point @ 70% Throughput for NPDSCH with multi-TB interleaved transmission in Table 8.12.1.1.4-2 is still existing.

**Decision: Return to.**

##### 6.2.4.2 BS demodulation requirements [NB\_IOTenh3-Perf]

**R4-2015632 CR: Addition of NPUSCH format1 performance requirements for multi-TB interleaved transmission in TS 36.104**

*Type: CR For: Agreement  
 36.104 v16.7.0 CR-4915 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Performance requirements part for NPUSCH format 1 with multi-TB interleaved transmission agreed in R4-2012600 was not implemented in latest TS 36.104 version 16.7.0.

**Decision: Agreed.**

**R4-2015633 CR: Cleanup for NPUSCH format 1 conformance testing for multi-TB interleaved transmission in TS 36.141**

*Type: CR For: Agreement  
 36.141 v16.7.0 CR-1284 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

The square bracket of SNR point @ 70%of maximum throughput in Table 8.5.1.5-4 is still exsiting

**Decision: Agreed.**

### 6.4 R16 LTE maintenance [WI code]

#### 6.4.1 BS RF requirements [WI code]

#### 6.4.4 Demodulation and CSI requirements [WI code]

##### 6.4.4.1 UE demodulation and CSI requirements [WI code]

**R4-2015613 CR on cleanup for LTE-based 5G terrestrial broadcast**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5694 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE-based 5G terrestrial broadcast performance requirements.

**Discussion:**

The secretary commented that the CR number 5694 is missing on the coversheet.

**Decision: Revised to R4-2017459 (from R4-2015613).**

**R4-2017459 CR on cleanup for LTE-based 5G terrestrial broadcast**

*Type: CR For: Agreement  
 36.101 v16.7.0 CR-5694 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Remove square brackets in LTE-based 5G terrestrial broadcast performance requirements.

**Discussion:**

The secretary commented that the CR number 5694 is missing on the coversheet.

**Decision: Return to.**

##### 6.4.4.2 BS demodulation requirements [WI code]

## 7 Rel-16 non-spectrum related work items for NR

### 7.1 NR-based access to unlicensed spectrum [NR\_unlic]

#### 7.1.4 BS RF requirements [NR\_unlic-Core]

##### 7.1.4.1 General [NR\_unlic-Core]

**R4-2017403 Email discussion summary for [97e][305] NR\_unlic\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017608 (from R4-2017403).**

**RR4-2017608 Email discussion summary for [97e][305] NR\_unlic\_RF\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017461 WF on NR-U remaining BS RF core requirements**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

|  |  |  |
| --- | --- | --- |
| **GTW session on 11.4th**  **Issue 1-1: LO leakage for NR-U puncture channels**  Currently in BS specification for both band n46 and n96 there is OBUE section where there is in [ ] following sentence on LO leakage:   |  | | --- | | [An exception to the spectrum emission requirements for the non-transmitted 20 MHz channels allows a single [2] MHz bandwidth to extend to [], or [-20] dBm, whichever is the greatest. ] |   Following proposals has been made:   * Proposals   + Option 1: To keep LO exception and remove the [ ] in order to align with ETSI BRAN mask to keep previous agreements (Ericsson R4-2015725, Huawei)   + Option 2: To remove LO leakage exception requirements for NR-U BS (ZTE R4-2016124, Nokia R4-2015374, Huawei) * Recommended WF   + TBA   E///: This is from Bran-ETSI mask, not sure how we remove this now; this also exists in UE side.  Nokia: Yes, ETSI BRAN allows this exception. We prefer to remove this exception.  ZTE: Exception only allowed in UE side in NR requirements. From RF aspect, BS no needs such exception.  E///: this exception due to punctured channel.  ZTE: we are not compared to LAA, we refer to no-contiguous transmission cases in NR.  Agreement: Remove LO leakage exception requirements for NR-U BS  **Issue 1-2:** **On ΔfOBUE for band n96**  Currently in BS core specification there is TBD for **ΔfOBUE** for bands in range 900 MHz < FUL,high – FUL,low ≤ 1200 MHz. Following proposals has been made:   * Proposals   + Option 1: It is proposed to define 50 MHz ΔfOBUE for band n96 for BS type 1-C and BS type 1-H (Nokia, R4-2015372)     - Note: if this option is agreed discuss if new table should be introduced (Huawei R4-2015695)   + Option 2: No offset is needed for OBUE requirements for 900 MHz < FUL,high – FUL,low ≤ 1200 MHz, removal of offset for OBUE for band **n96** (Ericsson R4-2015725) * Recommended WF   + TBA   E///: the offset introduced for NR because of larger BW; band n96 only for US, no cat B emission requirements, then we think no need such offset.  Huawei: If we consider this band n96 is only for US, no matter offset it is, since spurious and OBUE is same; but from spec structure aspect, better to align the definition. Since this is for US with unlicensed operation, considering the new band with same frequency range in future with licenced usage, we prefer to have a separate table.  ZTE: We have same view as Huawei, better a separate table for unlicensed band.  According to FCC, the emission is -27dBm/MHz; we need to address this issue.  Nokia: We need to align the specification definition since this is essential for requirements and test we have in 3GPP RAN4.  Huawei: The boundary defined for licensed band considering covering WA BS, for unlicensed band n96, we only LA and Medium BS class; also the BS type is different.  ZTE: we should have the boundary definition since the requirement is different; we need to address the FCC requirements.  E//: The boundary defined to differentiate CAT A and CAT B; according to FCC, the requirements applied just out of band. We prefer no separate table if introduced the offset.  Nokia: For LAA BS, only support medium and LA as well and we have a common table. Not clear why we need to have to split in NR.  Even in current NR, there are some bands CAT B not applicable, we still need to have boundary. For 1C and 1H we can have separate tables.  Huawei: This NR-U operation not applicable for WA BS; meanwhile we can’t exclude the possibility for licensed operation.  Nokia: band 48 is one example band as US band.  One possible approach we still have one table, and note this is not applicable for WA BS.  ZTE: Even for Local, and Medium BS, the licensed and un-licensed operation and situation still could be different.  In LAA, we don’t have same frequency range with licensed operation.  Huawei: Similar view as ZTE. We stick to our proposal with separate table.  Nokia: We can comprise to have separate table for sake of progress.  Tentative agreement: RAN4 agree to define the ΔfOBUE for band n96. (pending on further check by E///)   * + Introduce separate table(s) for unlicensed operation band n46,n96   + The ΔfOBUE will be further discussed considering FCC requirements   ZTE: 50MHz can’t address -27dBm FCC requirements. From FCC report, the offset is 0, then we need to define guard-band in the band, not out of the band.  The same issue for boundary of in-band and out band blocking requirements since the filter will be applied.  Nokia: We should define the boundary based on 3GPP requirements, for FCC regional issue we prefer to handle separately.  ZTE: This band is used for US only; we need to address FCC requirements.  ZTE: We use the filter for TX and Rx side, from implementation aspect, we can’t decouple them.  **Issue 1-3: On ΔfOOB for band n96**  Currently in BS core specification there is TBD for **ΔfOOB** for bands in range 900 MHz < FUL,high – FUL,low ≤ 1200 MHz. Following proposals has been made:   * Proposals   + Option 1: It is proposed to define 70 MHz ΔfOOB offset for band n96 for BS type 1-C and BS type 1-H (Nokia, R4-2015372).     - Note: if this option is agreed discuss if new table should be introduced (Huawei R4-2015696).   + Option 2: TBA * Recommended WF   + TBA   RAN4 agree to introduce ΔfOOB for band n96   * + Introduce separate table(s) for unlicensed operation band n46,n96   + ΔfOOB value : further discuss considering FCC requirements impact and aims to make agreements on the value in this meeting.   Nokia: We are open to hear proposals from companies; meanwhile we need to conclude by this meeting.  Huawei: If the update the frequency offset agreed, then the value 70MHz is OK for us.  ZTE: we also provide filter data; it’s difficult to achieve FCC requirements with current channel arrangement; that’s the reason we didn’t provide the boundary values. We would like to work together with other companies to address Tx FCC requirements; then we can conclude both Tx and Rx side.  Nokia: We are discussing on Rx side, the FCC only impact Tx side.  Nokia: we use similar manner as WIFI assumption for generating filter data.  **Issue 1-4: On IBB interfering signal power level for band n96 for LA BS**  Currently in BS core specification there is [-35dBm] interfering signal for LA BS for n96.  Following proposals has been made:   * Proposals   + Option 1: for LA BS IBB interfering signal power level for band n96 should be -34dBm (ZTE, R4-2016124)   + Option 2: for LA BS IBB interfering signal power level for band n96 should be -35dBm (Nokia R4-2015373, Huawei R4-2015696,Ericsson) * Recommended WF   + TBA   ZTE: In BS receiver side, the wanted signal and interfering signal pending on NF; for band n96, NF is different compared to other bands.  Nokia: for interfering signal power is coming from simulation; for dynamic range pending on NF.  ZTE: The value for wide-area is coming from simulation; for local and medium with delta come from NF delta.  Huawei: In early phase for the local area BS interference signalling power, we also run simulation. It’s not entirely pending on REFSENS and NF.  Agreement: For LA BS IBB interfering signal power level for band n96 should be -35dBm  **Issue 1-5: On IBB interfering signal power level for band n96 for MR BS**  Currently in BS core specification there is no interfering signal for MR BS for n96.  Following proposals has been made:   * Proposals   + Option 1: for MR BS IBB interfering signal power level for band n96 should be band n96 -38 dBm. (Nokia, R4-2015373)   + Option 2: TBA * Recommended WF   + TBA   ZTE: We have to address the FCC requirements firstly, then we can conclude this for MR BS since it’s challenge for MR BS. For local area BS, it’s fine.  Need to further discuss considering FCC requirements impact.  **Issue 1-6: On OOBB requirement for band n96**  Currently in BS core specification there is note 3 in table 7.5.2-1:   |  | | --- | | NOTE 3: For band n96 Interfering Signal mean power is [-15] dBm. |   Following proposals has been made:   * Proposals   + Option 1a: for band n96 OOBB requirement interfering signal power level should be -15dBm (Nokia R4-2015373).   + Option 1b: for band n96 OOBB requirement interfering signal power level should be -15dBm and update the frequency offset (Huawei R4-2015696, ZTE, Nokia: OK to align offset with LAA) * Recommended WF   + TBA   Agreement: For band n96 OOBB requirement interfering signal power level should be -15dBm and update the frequency offset aligned with LAA.  **Issue 1-7: On Dynamic range interfering signal power level for band n96**  Currently in BS core specification there is table 7.3.2-3c where interfering signal values for Dynamic range are in brackets. Following proposals has been made:   * Proposals   + Option 1: It is proposed to align (with 1dB difference due to NF change) interfering signal levels for LA BS for band n96 and remove brackets from specification tables 7.3.2-3c (Dynamic range) (Nokia, R4-2015373, ZTE R4-2016125,Huawei)   + Option 2: TBA * Recommended WF   + TBA   Agreement: It is proposed to align (with 1dB difference due to NF change) interfering signal levels for LA BS for band n96 and remove brackets from specification tables 7.3.2-3c (Dynamic range)  **Issue 1-8: On ICS (in channel selectivity) interfering signal power level for band n96**  Currently in BS core specification there is table 7.8.2-3c where interfering signal values for ICS are in brackets. Following proposal have been made:   * Proposals   + Option 1: It is proposed to align (with 1dB difference due to NF change) interfering signal levels for LA BS for band n96 and remove brackets from specification tables 7.8.2-3c (In-channel selectivity) (Nokia, R4-2015373, ZTE R4-2016125,Huawei)   + Option 2: TBA * Recommended WF   + TBA   Agreement: It is proposed to align (with 1dB difference due to NF change) interfering signal levels for LA BS for band n96 and remove brackets from specification tables 7.8.2-3c.  **Issue 2-1: On AFC for band n96**  Currently in BS core specification there is no limitation in terms of AFC or band n96 specific limitations. Following proposal have been made.   * Proposals   + Option 1: Further discuss how to apply the FCC requirements and AFC or non-AFC policy for the carriers across U-NII bands (ZTE R4-2016124)   + Option 2: It is proposed that AFC aspects are out of scope of 3GPP specifications. (Nokia, Ericsson, Charter Communications Inc., Qualcomm, CableLabs, Apple (including comments from thread [106] issue 4-1) * Recommended WF   + TBA   Nokia: we can add note for medium BS.  Aligned with the conclusion in NR-U system parameter decision on AFC aspects.  **Issue 2-2: On band n96 restrictions**   * Proposals   + Option 1: It is proposed to restrict the entire band to indoor only deployment or further discuss the channel arrangement for upper edge of 6GHz bands to meet the required emission limits. (ZTE R4-2016124)   + Option 2: It is proposed to introduce Medium Range BS according to FCC regulation. (Nokia, Ericsson) * Recommended WF   + TBA   Agreement: It is proposed to introduce Medium Range BS according to FCC regulation based on the further discussion on FFC requirements impact. |

**R4-2015371 CR to TS 38.104 with NR-U remaining open issues updates**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0247 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces updates to NR-U, removes brackets, introduce requirments for remaining open issues.

**Decision: Revised to R4-2017462 (from R4-2015371).**

**R4-2017462 CR to TS 38.104 with NR-U remaining open issues updates**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0247 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This CR introduces updates to NR-U, removes brackets, introduce requirments for remaining open issues.

**Decision: Return to.**

**R4-2015372 On band n96 remaining issues**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This contribution discuss open issues for band n96.

Proposal 1: It is proposed to removed brackets for NR-ARFCN for band n96 in table 5.4.2.3-1 in Note 2 in TS 38.104 (BS core spec)

Proposal 2: It is proposed to removed brackets for GSCN for band n96 in Note 6 in table 5.4.3.3-1 of TS 38.104.

Proposal 3. It is proposed to introduce Medium Range BS for band n96.

Proposal 4: It is proposed to define 50 MHz ΔfOBUE for band n96 for BS type 1-C and BS type 1-H.

Proposal 5: It is proposed to define 70 MHz ΔfOOB offset for band n96 for BS type 1-C and BS type 1-H.

**Decision: Noted.**

**R4-2015698 CR for TS 38.104: Corrections for NR-U**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0254 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

To solve the remaining open issues for NR-U BS

**Decision: Return to.**

**R4-2016124 Discussions on remaining issue of NR-U BS RF requirements**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Abstract:**

Proposal 1: further discuss how to apply the FCC requirements and AFC or non-AFC policy for the carriers across U-NII bands;

Proposal 2: for LA BS IBB/OOBB requirements for n96, IBB interfering signal power level should be -34dBm and OOBB requirement should be -15dBm;

Observation 1: it is very challenging to achieve the required attenuation for lower edge and upper edge of 6GHz assuming -27dBm/MHz emission limit needed out of 6GHz band in FCC report.

Proposal 3 : to remove LO leakage exception requirements for NR-U BS.

Proposal 4: to restrict the entire band to indoor only deployment or further discuss the channel arrangement for upper edge of 6GHz bands to meet the required emission limits.

**Decision: Noted.**

**R4-2016125 CR to 38.104: Corrections on NR-U BS RF requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0259 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

Some of NR-U BS RF requirements is not correct and therefore some further corrections are needed.

**Decision: Return to.**

**R4-2016188 CR to 36.104: Introduction of n96 medium range requirements**

*Type: CR For: Agreement  
 36.104 v16.7.0 CR-4917 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of n96 medium range requirements.

**Discussion:**

The secretary wondered what is the correct Release? It reads Rel-17 on the coversheet but the CR is allocated for Rel-16.

**Decision: Revised to R4-2017463 (from R4-2016188).**

**R4-2017463 CR to 36.104: Introduction of n96 medium range requirements**

*Type: CR For: Agreement  
 36.104 v16.7.0 CR-4917 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of n96 medium range requirements.

**Discussion:**

The secretary wondered what is the correct Release? It reads Rel-17 on the coversheet but the CR is allocated for Rel-16.

**Decision: Return to.**

**R4-2016189 CR to 37.104: Introduction of n96 medium range requirements**

*Type: CR For: Agreement  
 37.104 v16.7.0 CR-0915 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of n96 medium range requirements.

**Decision: Return to.**

**R4-2016190 CR to 37.105: Introduction of n96 medium range requirements**

*Type: CR For: Agreement  
 37.105 v16.5.0 CR-0207 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of n96 medium range requirements.

**Decision: Return to.**

##### 7.1.4.2 Transmitter characteristics [NR\_unlic-Core]

**R4-2015374 BS OBUE mask for NR-U**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This contribtion discusses OBUE mask details for NR-U.

Proposal: It is proposed to remove LO leakage exception requirements for NR-U BS OBUE.

**Decision: Noted.**

**R4-2015695 On remaining issues for BS TX**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: It is proposed to define the boundary between OBUE and spurious emission in a separate Table for NR-U n46 and n96.

**Decision: Noted.**

**R4-2015725 Discussion on remaining NR-U BS RF Requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

During last RAN4 meeting, RAN4 #96-e, some proponent companies brought forward open issues relating to NR-U BS requirements which needed further discussion. In-band / Out of band boundary and requirement. LO leakage for NR-U punctured channels.

Proposal: Align both NR-U 1-C and NR-U 1-O OBUE and OOBB offsets to NR for n46

Proposal: No offset is needed for OOB and OBUE requirements, removal of offset for OBUE and OOB

Proposal: Remove the [ ] in order to align with ETSI BRAN mask as previous agreement states

**Decision: Noted.**

**R4-2015726 CR to TS 38.104: Removal of ΔfOBUE for wider than 900 MHz**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0255 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Frequency offset for OBUE is not needed.

Further explianation is detailed in

R4-2015725

Only NR-U (n96) contains operating band larger than 900 MHz. However, n96 is only applicable in the USA only subject to FCC Report and Order [FCC 20-51]”. The offset is not required for USA region, as there is no category B emissions requirement.

**Decision: Return to.**

##### 7.1.4.3 Receiver characteristics [NR\_unlic-Core]

**R4-2015373 On interfering signals for NR-U Rx requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This contribution discuss interfering signal levels.

Proposal 1: It is proposed to align (with 1dB difference due to NF change) interfering signal levels for LA BS for band n96 and remove brackets from specification tables 7.3.2-3c (Dynamic range) and 7.8.2-3c (In-channel selectivity).

Proposal 2: It is proposed to define interfering signal levels for n96 MR BS for dynamic range and in-channel selectivity with 1dB adjustment due to NF change.

Proposal 3: It is proposed to define -15 dBm interfering signal power for out-of-band blocking requirement for band n96.

Proposal 4. It is proposed to remove brackets for LA BS interfering signal for general blocking requirements and define requirement with interfering signal power of -35 dBm.

Proposal 5. It is proposed to reuse legacy NR FR1 interfering signal for MR BS for band n96 of -38 dBm.

**Decision: Noted.**

**R4-2015696 On remaining issues for BS RX**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: It is proposed to define the boundary between in-band blocking and out of band blocking in a separate Table for NR-U n46 and n96.

Proposal 2: For NR-U n46 and n96, -35 dBm CW interfering signal applies to the frequency range of ΔfOOB to 500 MHz outside the band edge.

**Decision: Noted.**

#### 7.1.5 BS conformance testing [NR\_unlic-Perf]

##### 7.1.5.1 General [NR\_unlic-Perf]

**R4-2017404 Email discussion summary for [97e][306] NR\_unlic\_RF\_Conformance**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017609 (from R4-2017404).**

**RR4-2017609 Email discussion summary for [97e][306] NR\_unlic\_RF\_Conformance**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017464 WF on work plan and working split for NR-U BS conformance testing**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

Note: add MU/TT options in WF and capture which spec for which company

**Discussion:**

**Decision: Return to.**

**R4-2015384 Discussion on NR-U BS RF conformance tests**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Proposal 1: It is proposed to split responsibility for drafting big CRs to given BS test specification between interested companies.

Proposal 2: Companies responsible for drafting big CRs should provide changes required to specification for RAN4#98-e meeting.

Proposal 3: Companies are encouraged to provide their views on above mentioned test requirements and test tolerances to be applicable up to 7125 MHz.

**Decision: Noted.**

**R4-2016126 CR to TS 38.141-1: introduction of NR-U into TS 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0165 Cat: B (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

NR-U BS conformance testing requirement is provided and therefore the corresponding requirements should be specified.

**Decision: Not pursued.**

##### 7.1.5.2 Transmitter characteristics [NR\_unlic-Perf]

**R4-2015383 Draft CR to TS 37.107 With NR-U intorduction for perfromance part**

*Type: draftCR For: Endorsement  
 37.107 v16.1.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

This is draft CR to TS 37.107 with updates related to NR-U introduction for perfromance part.

The aim of this CR is to collect companies’ views and comments on proposed updates.

**Decision: Return to.**

##### 7.1.5.3 Receiver characteristics [NR\_unlic-Perf]

#### 7.1.8 Demodulation and CSI requirements (38.101-4/38.104) [NR\_unlic-Perf]

##### 7.1.8.1 General [NR\_unlic-Perf]

|  |
| --- |
| GTW Session 11.9th  **Topics from UE demod email thread[315]**  1: General part  **Issue 1-1-1: Define additional separate tests for FBE and LBE**   * Proposals   + Option 1: No (Apple, MediaTek, Qualcomm, Intel, Huawei)   + Option 2: Yes * Recommended WF   + Do not define additional tests specific for FBE or LBE;   Agreement: Do not define additional tests specific for FBE or LBE.  FFS whether separate or one unified LBT model for FBE and LBE.  Huawei: Is it related issue 2-1-1 to design PDSCH requirements agonistic to FBE or LBE. How about LBT model except for test parameters? WE think separate LBT model maybe needed or not.  QC: We believe it’s feasible to define requirements applied for both.  **Issue 1-1-2: Define requirements with Fixed Downlink Transmission (COT) duration**   * Proposals   + Option 1: No, use random COT from a set of values (Huawei, Ericsson );   + Option 2: Yes (Ericsson, Qualcomm, Apple, MediaTek, Intel); * Recommended WF   + Does Huawei agree to define a Fixed Downlink (or COT) Transmission duration?   E///: We also support option 1, the purpose of LAA burst transmission model was to verify the performance under non-slot based on transmission. We can limit the upper limit as 2ms with random COT.  Huawei: For LBE, dynamic COT more realistic. The COT and burst transmission mode should be discussed together. In last RAN4 meeting, we already use LAA as staring point. Several companies share how to adopt LAA model with some modifications.  One generic LBT model or separate LBT model for FBE and LBE ? We should support dynamic LBET model.  Apple: What’s the difference among fixed COT and dynamic COT model? We think no different processing from UE receiver side for NR. We agree using LAA LBT model as starting point, not means we need to accept everything from there.  Qualcomm: Similar view as Apple, no difference from UE receiver side. Meanwhile test effort will be increased compared to fixed model considering NR-U as uplink transmission.  Huawei: We should combine burst transmission length and fixed COT length; LBE and FBE.  QC: Channel access and DL transmission duration are separate topics.  FFS for COT duration with two options:   * Option 1: random COT duration * Option 2: Fixed Downlink Transmission (COT) duration   **Issue 1-1-7: Test Scenarios for Demodulation requirements;**   * Proposals   + Option 1: Only Scenario A (MediaTek, Huawei);     - Use PCell for SSB and HARQ feedback (Huawei);   + Option 2: Only Scenario C     - Option 2-1: Defined only for Scenario C, applicable to other scenarios ();   + Option 3: Both Scenario A and Scenario C (Apple, Ericsson, Qualcomm, Intel);     - Prioritize Scenario A (MediaTek); * Recommended WF   + Define requirements for the unlicensed CC, and apply for both scenarios A and C   Agreement:  Define same test cases for the unlicensed CC, and apply for both scenarios A and C   * FFS for details test set-up for scenario A and C   **Issue 1-1-8: Define PDCCH requirements**   * Proposals   + Option 1: Yes, with adapted burst transmission model (Ericsson);   + Option 2: No (Apple, MediaTek, Intel, Huawei, Qualcomm, Intel, Huawei); * Recommended WF   + Do not define NR-U Demod PDCCH Performance Requirements   Agreement: Do not define NR-U Demod PDCCH Performance Requirements  **Issue 1-1-9: Define CQI reporting requirements**   * Proposals   + Option 1: Yes (Huawei)     - Option 1-1: For static channel conditions, reusing the burst model(Apple);     - Option 1-2: With adapted burst transmission model (Ericsson);   + Option 2: No   + Option 3: Needs further discussions (MediaTek, Qualcomm); * Recommended WF   + Keep discussing, and clarify expected behavior   Apple: Whether the parameters or these options features should be enable during CSI test cases?  Huawei: We also think more study needed.  FFS for whether CQI requirements needed or not, further discuss the configured parameters and expected UE behavior  **Issue 1-2-2: Slot Format proposed**   * Proposals   + Option 1: For 30kHz, 2ms Duration, DDDS (S=7D:2G:2U) according to presented model in R4-2016063 (Qualcomm);   + Option 2: For 30kHz, 7D -1S-2U (Huawei); * Recommended WF   + Discuss in the 2nd round   Huawei: Just try to reuse the typical pattern and aligned with Rel-15 used.  QC: For NR-U operation, the meaning of TDD pattern in NR-U operation? Every COT can be shared among uplink and downlink.  FFS for slot format  **Issue 1-3-1: LBT Model in Demod Performance Tests**   * Proposals   + Option 1: Model LBT failure as part of the burst transmission model (Apple, Qualcomm, Huawei, MediaTek, Ericsson, Intel);   + Option 2: No LBT modelling (); * Recommended WF   + Model LBT as part of the burst transmission Model;   Agreement: Model LBT failure ~~implicitly~~ as part of the DL burst transmission model.  **Issue 1-3-2: Applicability of LBT Model to SSB Transmission**   * Proposals   + Option 1: Same LBT model as for Data (MediaTek, Apple, Qualcomm, Ericsson);   + Option 2: Don’t model LBT failure for SSB slot additionally (Huawei, Ericsson); * Recommended WF   + Clarify in the 2nd round option 2 and discuss whether needs to be treated according to the Scenario;   Huawei: SSB transmitted in broad cast manner, not sure how to model SSB failure. gNB failed to get the chance to transmission in instance, then SSB may be missed.  E///: We are also fine with option 1.  Apple: The same burst transmission model applied for data and SSB. SSB and TRS ?  QC: We think no meaning to treat the DL signaling include data, SSB, TRS separately. A unified model applied for all DL signals.  Huawei: During test cases, just configure SSB periodicity in test cases.  Apple: without CSI validation and DCI 2\_0 will be unpractical.  Agreement: Define the unified burst transmission model applied for all DL transmitted signals in unlicensed carriers.  QC: no SSB transmission from unlicensed cell in scenario A?  Huawei: SSB transmitted in licensed carrier in scenario A.  **Topics from BS demod email thread[316]**  1: General part：  **1-5  Sub-topic 1-5-1: Test scenarios**  **Issue 1-5-1-1: How to reuse NR Rel-15 performance requirements for licensed CC for Scenario A**  ·         Proposals  -          Option 1: Reuse all applicable requirements during the selection of the largest aggregated bandwidth for testing.  -          Option 2: Just choose one specific bandwidth for testing, such as 20MHz  ·         Recommended WF  Nokia: On scenario A, option 1 more proper, the requirements will be applied for licensed operation as well.  Ericsson: prefer option 2. The requirements similar with different CHBWs, introduce test case with 20MHz only.  Samsung: Both option 1 and option 2 feasible. For NR-U we think 20MHz for unlicensed CHBW, to align with this, 20MHz can be used for licensed CC as well.  Huawei: We think both option 2 and option 1 feasible.  Nokia: Will gNB support Scenario A, does this gNB need to operate under such licensed band without NR-U operation as well?  FFS for further study    **Issue 1-5-1-2: Bandwidth for performance requirements definition for unlicensed carrier**  ·         Proposals  -          Option 1: Only define the requirements for single carrier with 20MHz (Ericsson, Samsung)  -          Option 2: Define the requirements for single carrier with 20MHz,40MHz,60MHz and 80MHz, with the test applicability rule that a BS only has to perform tests for 20MHz and the largest supported bandwidth based on BS vendor’s declaration (Nokia, Intel)  -          Option 3: Define the requirements for single carrier with 20MHz,40MHz,60MHz and 80MHz, with the test applicability rule that a BS only has to perform tests for the largest supported bandwidth based on BS vendor’s declaration (Nokia, Huawei)  - Option 4: define the requirements for 20MHz only and define test applicable rules based on declaration (Samsung)  ·         Recommended WF  Nokia: both option 2 and option 3 fine for us.  Samsung: we think 20MHz typical considering LBT with wideband operation. Based on Rel-15 evaluation and history, the CHBW impact minor. We think test effort need to be considered. How to deal with wideband operation 1.  Huawei: we prefer option 3.  E///: We share similar view as Samsung. We can have test applicable rules.  FFS with below options:  Option 1: Define the requirements for single carrier with 20MHz only with the test applicability rule that a BS only has to perform tests for the largest supported bandwidth based on BS vendor’s declaration.  Option 2: Define the requirements for single carrier with 20MHz,40MHz,60MHz and 80MHz, with the test applicability rule that a BS only has to perform tests for the largest supported bandwidth based on BS vendor’s declaration  **Issue 1-5-1-3: Test cases definition for Scenario A and Scenario C**  ·         Proposals  -          Option 1: Only define test cases for scenario A  -          Option 2: Define different test cases for Scenario A and C, i.e. different requirements for unlicensed CC for Scenario A and C  -          Option 3: Define one set of test cases for Scenarios A and C, i.e. one set of requirements for unlicensed CC for Scenario A and C.  ·         Recommended WF  -          Moderator reword the options, please comments if it includes all options from companies.  Agreement:  RAN4 will introduce Test cases/requirements for both scenario A and scenario C with below candidate options:   * Define one set of test cases for Scenarios A and C, i.e. one set of requirements for unlicensed CC for Scenario A and C. (Huawei, Samsung, Nokia, E/// ,Intel)   Nokia: Do we plan to have BS declaration for these scenarios? Interlace and so on..  E///: We think we need to introduce test cases covering both scenarios.  **Issue 1-5-1-4: Test applicability**  ·         Proposals  n  The tests should apply based on BS declaration of supporting Scenario A and~~/or~~ Scenario C  o    Option 1: If a BS supports both Scenario A and Scenario C, and define one set of performance requirements for unlicensed CC  l  Option 1a: BS only needs to pass the requirements for Scenario A that include performance requirements for both licensed CC(s) and unlicensed CC(s)  l  Option 1b: BS only tests performance requirements ~~f~~or scenario C for unlicensed CC(s) ~~considering the performance requirements for licensed CC has been verified in NR Rel-15~~  ~~o    Option 2: If a BS supports both Scenario A and Scenario C, and two set of performance requirements for unlicensed CC for Scenario A and C:~~  ~~l  Option 2a: BS should test both set of requirements~~  ~~l  Option 2b: other options~~  ·         Recommended WF  -          Removed Option 1c from 1st round summary considering that it is similar as Option 1a.   FFS for the test applicable rules for a BS supports both Scenario A and Scenario C   * Option 1a: BS only needs to pass the requirements for Scenario A that include performance requirements for both licensed CC(s) and unlicensed CC(s) * Option 1b: BS only tests performance requirements ~~f~~or scenario C for unlicensed CC(s) * Other options not excluded |

**R4-2017413 Email discussion summary for [97e][315] NR\_unlic\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017610 (from R4-2017413).**

**RR4-2017610 Email discussion summary for [97e][315] NR\_unlic\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017465 Way Forward on NR-U UE demodulation requirements**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017414 Email discussion summary for [97e][316] NR\_unlic\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017611 (from R4-2017414).**

**RR4-2017611 Email discussion summary for [97e][316] NR\_unlic\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017466 Way forward on NR-U BS demodulation requirements for general part and PUSCH**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017467 Way forward on PUCCH demodulation requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017468 Way forward on PRACH demodulation requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014240 Discussion on demodulation requirements for NR-U**

*Type: discussion For: Discussion  
 Source: Apple*

**Abstract:**

Proposal #1: Do not define additional tests for FBE and LBE devices separately.

Proposal #2: Define requirements with randomly chosen COT duration and fixed DRS window duration.

Proposal #3: Define requirements for both Scenario A and Scenario C and define applicability rules.

Proposal #4: Do not define requirements for PDCCH with DCI format 2-0.

Proposal #5: Introduce CQI reporting requirements in static channel conditions for NR-U.

Proposal #6: Do not model LBT failure separately in addition to the burst transmission model.

Proposal #7: Burst transmission model shall also be applied to SSB slots.

Proposal #8: COT duration shall be randomly chosen from a set during the simulation.

Proposal #9: Define requirements with PDSCH mapping Type A alone.

Proposal #10: Configure PDCCH monitoring on Format 2-0 with CO-DurationPerCell-r16 and indicate the randomly chosen COT duration

**Decision: Noted.**

**R4-2014940 General Demodulation performance requirements for NR-U**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on general aspects regarding NR-U BS demodulation.

Proposal 1: RAN4 to define PUSCH, PRACH, and PUCCH requirements that apply to all scenarios A, B, and C.

Proposal 2: RAN4 to define BS demodulation wideband requirements that are agnostic to the wideband operation modes 1 and 2.

Proposal 3: RAN4 to define wideband performance requirements for 20, 40, 60, and 80 MHz.

Proposal 4: Similar to Rel-15, depending on vendor declaration, define an applicability rule that a BS only has to perform tests for 20 MHz and the largest supported bandwidth.

**Decision: Noted.**

**R4-2015130 Discussion on UE performance requirement for NR-U**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: Define same test cases for both FBE and LBE devices.

Proposal 2: Support option 1. To define test cases for carrier aggregation between licensed band NR (PCell) and NR-U (SCell).

Proposal 3: Support option 2. Do not define test case for PDCCH format 2\_0.

Proposal 4: Support option 3 to define test case for both PDSCH mapping Type A and Type B.

Proposal 5: We propose using a subset of fixed values for PDSCH Type B duration and starting position, for example, [starting position, duration] = [2, 4], [2, 12], can be selected.

Proposal 6: Support to model LBT failure for data and SSB.

**Decision: Noted.**

**R4-2015851 discussion on general issues in NR-U performance requirements**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discuss some general issues on BS and UE demodulation separately.

Proposal 1: Consider a minimum subset of Rel-15 test cases for NR-U scenario and define proper applicability rules for these requirements.

Proposal 2: Define demodulation requirements for the corresponding scenarios, but these requirements can be applied for other scenarios. Meanwhile, only define requirements for single carrier and don’t define requirements for intra-band CA.

Proposal 3: Do not consider mode 2 transmission of Wideband operation 2 during the NR-U BS demodulation discussion.

Proposal 4: Do not define requirements for Wideband Operation 1 specially. The requirement for 20MHz can be used for either Wideband Operation 1 or 2.

Proposal 5: Reuse Rel-15 demodulation assumptions as much as possible for NR-U demodulation.

Proposal 6: Define requirements for TDLA30-10 channel model. FFS for TDLB100 and TDLC300.

Proposal 7: Define low Doppler shift for TDLB100 and TDLC300 if we agree to define requirements for them.

Proposal 8: Define PDSCH demodulation requirements with Type A mapping.

Proposal 9: Consider 2ms COT in order to adapt the LTE burst transmission model with suitable number of possible slot length configurations

Proposal 10: Agree to reuse the LTE values for S2 configuration

Proposal 11: Define PDCCH, and CQI requirements with adaptations to the burst transmission model.

**Decision: Noted.**

**R4-2015986 Discussion on NR-U General aspects**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: Do not introduce COT duration in the RAN4 demodulation tests

Proposal 2: RAN4 to define demodulation requirements for Scenario C and make them applicable for other NR-U scenarios

Proposal 3: Do not define NR-U PDCCH demodulation requirements

Observation 1: To define requirements for the specific mode of wideband operation LBT failure model is required

Proposal 4: RAN4 to define demodulation requirements for the wideband operation which are agnostic to the mode of wideband operation

Proposal 5: RAN4 to define requirements for bandwidth equal to 60MHz.

**Decision: Noted.**

**R4-2016063 DL Transmission Model Definition for NR-U Demod Performances**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

Describe in detail our proposal for the NR-U DL Transmission Model to be used for Demod Performance.

Proposal 1: Specify the DL Transmission Model for NR Unlicensed for SCS30kHz only.

Proposal 2: Define the DL Transmission Model for NR Unlicensed as specified in this paper in Section 2.2, Steps 1)-7). The model is summarized here for clarity:

-Compute COT and Unoccupied duration as specified by Test Parameters, then repeat it periodically for the entire test;

- Fully allocate PDCCH and PDSCH in COT, except for Guard and UL Symbols at the end of COT as specified by Test Parameters;

-Use a threshold pLBT to control randomized LBT failures;

Proposal 3: Use the base Slot Pattern shown in Figure 2.3 1, created according to the Model presented in this paper, for NR Unlicensed Demod Performance Tests for 30kHz SCS.

Proposal 4: Specify a single LBT model that covers Data and SSB.

Proposal 5: Model LBT as described by the model presented in this paper, section 2.3. Use pLBT = 0 (always clear channel) for Scenario C Tests and pLBT = [TBD>0] (some probability of occupied channel) for Scenario A Tests.

**Decision: Noted.**

##### 7.1.8.2 UE demodulation requirements [NR\_unlic-Perf]

###### 7.1.8.2.1 PDSCH requirements [NR\_unlic-Perf]

**R4-2015634 Discussion on NR-U PDSCH performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015987 Discussion on NR-U PDSCH requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: For NR-U demodulation tests, burst length shall be defined as the number of slots rather than the number of subframes. We propose to use fixed S1 in units of slots for each SCS: {1, 3, 5, 8} for 15MHz SCS and {1, 6, 10, 16} for 30MHz SCS.

Proposal 2: For NR-U demodulation test, the starting position for the first slot is randomly selected from OFDM symbol 0 and OFDM symbol 7 with equal probability. If symbol 0 was selected PDSCH Type-A mapping should be used for all slots in the burst. If symbol 7 was selected – PDSCH Type-B mapping with the duration equal to 4 symbols should be used for the first slot and, PDSCH Type-A mapping should be used for all remaining slots in the burst.

Proposal 3: For NR-U demodulation test, PDSCH Type-B mapping with corresponding durations to be used for all slots in case if UE supports typeB-PDSCH-length-r16.

Proposal 4: For NR-U demodulation tests, we propose to define fixed S2 – {6, 9, 12, 14}.

Proposal 5: Do not model LBT failure.

Proposal 6: Consider COT duration equal to single burst transmission duration.

**Decision: Noted.**

**R4-2016064 Simulation Assumptions for NR-U PDSCH Demodulation Performance Tests**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

Present a proposal for the simulation assumptions to be used in NR Unlicensed PDSCH Demod Performance test.

Proposal 1: For NR-U PDSCH Demod Performance Tests use the common test parameters from licensed NR PDSCH Demod Performance as a starting point.

Proposal 2: To define NR-U PDSCH Demod Performance Tests, use the DL Transmission model Parameters in Table 2.2-4 in the Simulation Assumptions.

Proposal 3: To define the prioritized test for NR-U PDSCH Demod Performance Tests, for both Channel Access parameters ’ChannelAccessType-r16’=semistatic and ’ChannelAccessType-r16’=dynamic, use the simulation assumptions listed in this paper, in Tables 2.1-1, 2.2-2, 2.2-3 and Table 2.2-4.

**Decision: Noted.**

**R4-2016089 Discussion on NR-U PDSCH demodulation requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides our views on PDSCH demodulation requirements for NR-U.

Proposal 1: Define PDSCH demodulation test cases for both Scenario A, and Scenario C.

Proposal 2: Adapt the test setup from LTE LAA for Scenario A

Proposal 3: Use 30kHz numerology as baseline for NR-U demodulation test cases.

Proposal 4: Use low delay spread and doppler speeds for propagation channels e.g. TDLA30.

Proposal 5: Use Table 1 parameters as starting point for NR-U PDSCH simulation assumptions.

**Decision: Noted.**

###### 7.1.8.2.2 PDCCH requirements [NR\_unlic-Perf]

**R4-2015635 Discussion on NR-U PDCCH performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: No PDCCH demodulation requirements are needed to define for Rel-16 NR-U.

**Decision: Noted.**

**R4-2016090 Discussion on NR-U PDCCH demodulation requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides our views on PDCCH demodulation requirements for NR-U.

Observation 1: PDCCH performance requirements from Rel-15 have not been verified under burst-like transmission

Observation 2: Probability of missed scheduling grant is not captured by Rel-15 eMBB PDCCH requirements.

Proposal 1: Use the simulation assumptions from Table 1 as baseline for PDCCH NR-U demodulation requirements

**Decision: Noted.**

##### 7.1.8.3 CSI requirements [NR\_unlic-Perf]

**R4-2015636 Discussion on NR-U CSI requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: Introduce CQI requirements for NR-U for following UE behavior:

 UE does not average the channel measurement across the different transmission bursts

 UE does the CSI measurement by using the valid slots when the transmission varies burst by burst.

Proposal 2: Set two sets of burst transmissions, each with distinct transmission power level and keeping the interference level constant during the test. The SNR is quite different.

 Use aperiodic CSI reporting

 CA scenario can be used as baseline. PCell (license band) is used for HARQ ACK/NACK feedback and aperiodic CSI triggering/reporting.

 CQI distribute criterion and BLER criterion can be used as test metric

**Decision: Noted.**

**R4-2016091 Discussion on NR-U CSI performance requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides our views on CSI performance requirements for NR-U.

Observation: Scenario A share similarities with CA CQI requirements, and Scenario C share similarities with SA CQI requirements.

Proposal: Use the simulation assumptions from Table 1 as baseline for NR-U CQI performance requirements.

**Decision: Noted.**

##### 7.1.8.4 BS demodulation requirements [NR\_unlic-Perf]

**R4-2015117 View on BS demodulation requirement for NR-U**

*Type: discussion For: Discussion  
 Source: Samsung*

**Abstract:**

Proposal 1: Define demodulation requirements only for Scenario A (LAA), but these requirements can be applied for other scenarios. Meanwhile, only define requirements for single carrier and don’t define requirements for intra-band CA.

Proposal 2: Define the demodulation requirement with 20 MHz CBW with TDD 15 KHz and 30 KHz, only one SCS can be tested.

Proposal 3: Do not define requirements for wideband operation 1.

Proposal 4: Do not define requirements for GC-UCI multiplexing on PUSCH

**Decision: Noted.**

###### 7.1.8.4.1 PUSCH requirements [NR\_unlic-Perf]

**R4-2014941 PUSCH Demodulation performance requirements for operation in unlicensed bands**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Proposal 1: RAN4 to consider only 1 interlace allocation for PUSCH performance requirements.

Proposal 2: RAN4 to define wideband performance requirements for 20, 40, 60, and 80 MHz.

Proposal 3: Depending on vendor declaration, define that a BS is only required to perform tests for 20 MHz and the largest supported bandwidth.

Proposal 4: RAN4 to define BS demodulation requirements for CG-UCI multiplexed on PUSCH, if demodulation impact is identified.

Proposal 5: RAN4 to consider the following parameters as baseline the definition of PUSCH BS demodulation requirements

**Decision: Noted.**

**R4-2015637 Discussion on NR-U PUSCH performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: Define the BS requirements only for scenario A. i.e. Carrier aggregation between licensed band NR and unlicensed band NR-U.

Proposal 2: Define the performance requirements per CC only for scenario A. For the performance requirement of PCell, reuse it from NR Rel-15. For the performance requirement of SCell, define the case with bandwidth of 20MHz, 40MHz, 60MHz and 80MHz.

Proposal 3: No need to define the BS requirement for wideband operation 1

Proposal 4: Set intra cell guard size to 0 for PUSCH requirements.

Proposal 5: Introduce the performance requirements for CG-UCI when it is multiplexing on PUSCH with interlaced resource allocation and no HARQ-ACK, CSI part 1, CSI part 2 are existed.

Proposal 6: Use Table 1 as simulation assumptions

**Decision: Noted.**

**R4-2015852 discussion on NR-U PUSCH demodulation assumptions**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on NR-U PUSCH demodulation assumptions.

Proposal 1: Only consider 20MHz bandwidth for NR-U PUSCH requirement.

Proposal 2: Using single interlace with 10 PRBs for NR-U PUSCH demodulation simulation.

Proposal 3: Consider following assumptions for NR-U PUSCH demodulation simulation.

Proposal 4: Consider introduce a Rel-15 requirement for HARQ-ACK multiplexing on PUSCH with more than 2 HARQ-ACK information bits and using it to cover CG-UCI multiplexing on CG-PUSCH in NR-U scenario with proper applicability rule.

**Decision: Noted.**

**R4-2015988 Discussion on NR-U PUSCH requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: RAN4 to define demodulation requirements for PRB-Interlaced PUSCH Resource Allocation considering single interlace.

Proposal 2: Do not define requirements for UCI multiplexed on PUSCH

**Decision: Noted.**

###### 7.1.8.4.2 PUCCH requirements [NR\_unlic-Perf]

**R4-2014942 PUCCH Demodulation performance requirements for operation in unlicensed bands**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Proposal 1: RAN4 to define demodulation requirements to all interlaced PUCCH formats (i.e. formats 0, 1, 2, and 3), with NR-U specific applicability rule for the new formats.

Proposal 2: RAN4 to define performance requirements only for 1 interlace PUCCH.

Proposal 3: RAN4 to consider NR-U PUCCH performance requirements without frequency hopping.

Proposal 4: RAN4 to consider QPSK modulation order tor NR-U PUCCH formats 2 and 3.

Proposal 5: RAN4 to consider Rel.15 PUCCH requirements as a baseline for the discussion of the NR-U PUCCH test scenarios as in the table below:

**Decision: Noted.**

**R4-2015638 Discussion on NR-U PUCCH performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: Define the requirements for PRB-interlaced PUCCH resource allocation with following simulation setups:

 PF0/1/2/3

 Both 15 kHz and 30 kHz

 Test applicability rules:

 Unless otherwise stated, PUCCH requirement tests shall apply only for each PUCCH format declared to be supported

 Unless otherwise stated, PUCCH requirement tests shall apply only for each subcarrier spacing declared to be supported

Proposal 2: Only test one interlace and use interlace index 0 for PF0/1/2/3.

Proposal 3: Not configure frequency hopping for all cases.

Proposal 4: Use 1T4R for all cases.

Proposal 5: Use Table 2~Table 5 as simulation assumptions for performance requirements for NR-U PF0/1/2/3 respectively

**Decision: Noted.**

**R4-2015853 discussion on NR-U PUCCH demodulation assumptions**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on NR-U PUCCH demodulation assumptions.

Proposal 1: Introduce requirements for PUCCH enhanced format 0/1/2/3.

Proposal 2: Introduce NR-U PUCCH requirements with single interlace for enhanced format 0/1/2/3.

Proposal 3: Introduce NR-U PUCCH requirements with 2 discontinuous interlaces for enhanced format 2/3.

**Decision: Noted.**

**R4-2015989 Discussion on NR-U PUCCH requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: RAN4 to define demodulation requirements for PRB-Interlaced PUCCH Resource Allocation considering single interlace.

Proposal 2: RAN4 to define demodulation requirements for PDCCH enhanced formats 0/1/2/3

Proposal 3: For EPF 0/1/2/3 performance requirements RAN4 to reuse test configurations of Rel-15 PF 0/1/2/3 keeping only BW = 20MHz

**Decision: Noted.**

###### 7.1.8.4.3 PRACH requirements [NR\_unlic-Perf]

**R4-2014943 PRACH Demodulation performance requirements for operation in unlicensed bands**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Proposal 1: RAN4 to define NR-U BS demodulation performance requirements for 15 kHz and 30 kHz and formats A2, B4, and C2.

Proposal 2: RAN4 to consider Rel. 15 PRACH for Normal Mode testing parameters as a baseline for the discussion on the parameters for NR-U performance requirements as in the table below:

**Decision: Noted.**

**R4-2015639 Discussion on NR-U PRACH performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Proposal 1: Define the performance requirements for wideband PRACH with following assumptions:

 Sequence length: LRA=1151 for 15kHz and LRA=571 for 30kHz

 Format: B4, C2

 Ncs: 164 for LRA=1151 and 190 for LRA=571

 Logic root sequence index: 0

 v: 0

 Propagation conditions and CFO: AWGN and TDLA 30-10 with 600Hz CFO

 Antenna configuration: 1T4R

 Time error tolerance and test metric are reused from Rel-15 NR PRACH.

**Decision: Noted.**

**R4-2015854 discussion on NR-U PRACH demodulation assumptions**

*Type: other For: Discussion  
 Source: Ericsson*

**Abstract:**

Discussion on NR-U PRACH demodulation assumptions.

**Decision: Noted.**

**R4-2015990 Discussion on NR-U PRACH requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: RAN4 to define the performance requirements for both LRA = 1151 and LRA = 571 preamble length.

Proposal 2: RAN4 to define new test preambles

Proposal 3: For NR-U PRACH performance requirements RAN4 to reuse the test configuration parameters used for Rel-15 LRA = 139 preamble

Proposal 4: For NR-U PRACH performance requirements RAN4 to keep using existing test metrics: the false alarm probability shall be less than or equal to 0.1% and the probability of detection shall be equal to or exceed 99%

**Decision: Noted.**

### 7.3 5G V2X with NR sidelink [5G\_V2X\_NRSL]

#### 7.3.7 Demodulation and CSI requirements (38.101-4) [5G\_V2X\_NRSL-Perf]

##### 7.3.7.1 General [5G\_V2X\_NRSL-Perf]

**R4-2017415 Email discussion summary for [97e][317] V2X\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017612 (from R4-2017415).**

**RR4-2017612 Email discussion summary for [97e][317] V2X\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (LGE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017469 WF on single link tests for NR V2X demodulation performance**

*Type: other For: Approval  
 Source: LGE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017470 Simulation assumptions for NR V2X single link test case**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017416 Email discussion summary for [97e][318] V2X\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017613 (from R4-2017416).**

**RR4-2017613 Email discussion summary for [97e][318] V2X\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Intel)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017471 WF on multiple link tests for NR V2X demodulation performance**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017472 Simulation assumptions for NR V2X multiple link test case**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014419 Simulation results of NR V2X demodulation test**

*Type: discussion For: Discussion  
 Source: CATT*

**Abstract:**

In this contribution, the initial simulation results are provided based on the simulation assuptions agreed in the last meeting.

**Decision: Noted.**

**R4-2014537 Discussion on V2X work scope and general simulation assumptions**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Abstract:**

Proposal 1: Define SDR requirements with active Sidelink in the scope of Rel-16 V2X.

Proposal 2: Define Rel-16 V2X demodulation requirements for different relative vehicle speeds: 30, 260 and 500 km/h.

Proposal 3: Define Rel-16 V2X demodulation requirements for scenarios with gNB based synchronisation, relative vehicle speed 30 km/h, TX/RX frequency offset ±1300 Hz and TX/RX time offset ±24Ts.

Proposal 4: Postpone the discussion on definition of 256QAM until simulation assumption for verification of basic V2X functionality will be stable.

Proposal 5: Use the following resource pool configuration for V2X demodulation requirements with CBW 20 MHz and SCS 30 kHz: sub-channel size = 10 PRBs, number of sub-channels = 5.

**Decision: Noted.**

**R4-2014779 Discussion on V2X Demod test case**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Abstract:**

Proposal 1: 40MHz CBW should be configured for PSCCH/PSSCH decoding capability test.

Proposal 2: The velocity configuration of NR V2X test case can reuse LTE V2X.

Proposal 3: PSFCH should be transmitted on every slot and 3DMRS symbols for PSSCH test cases.

Proposal 4: 1 S-SSB per SL period should be configured for 30kHz SCS.

Proposal 5: Not to define 256QAM demodulation test case.

Proposal 6: Not to define SDR with active sidelink test case.

**Decision: Noted.**

##### 7.3.7.2 Single link test [5G\_V2X\_NRSL-Perf]

**R4-2014417 Discussion on single link demodulation test for NR V2X**

*Type: discussion For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014420 CR for 38.101-1: Introduce PSBCH performance requirements for NR V2X**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0087 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

Introduce PSBCH performance requirements for NR V2X

**Decision: Postponed.**

**R4-2014538 Discussion on Single Link V2X requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014637 NR V2X Demod single link requirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Abstract:**

Proposal 1: Introduce two tests for PSSCH with 64QAM MCS table with low speed 30km/h and high speed 500km/h. For high speed tests, consider the following configurations (a) TDL\_C 300ns channel (b) More subchannel allocation (c) Not configuring PSFCH. (a)+(b) is preferred in our opinion.

Proposal 2: Configure 2 DMRS symbol for PSSCH low speed test.

Proposal 3: PSSCH tests MCS configuration: MCS 21 for low speed, and MCS 4 for high speed

Proposal 4: Define the requirement based on subchannel size of 10RB for all PSSCH tests except high speed.

Proposal 5: Define 256QAM PSSCH demod test with the same configuration as low speed PSSCH demod test configuration, only change the MCS to lowest one in 256QAM (MCS 20).

Proposal 6: Set beta = 2.25 for all PSSCH tests.

Proposal 7: Use relative speed of 260km/h and SCI 1 payload size = 28bits in PSCCH test.

Proposal 8: Use 30km/h relative speed and no repetition for PSBCH test.

Proposal 9: Consider 1 PSFCH in PSFCH detection performance test. Statistics to be collected:

Option 2 (ACK/NACK type): Pr(NACK to ACK) < 0.1%.

Option 1 (NACK only type): Pr(NACK miss) < 1%, or Pr(DTX to NACK)<1% (if we have DTX).

**Decision: Noted.**

**R4-2014652 Discussion on NR V2X single link test cases**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Abstract:**

Proposal 1: DMRS configuration for PSSCH demodulation should be considered depending on relative velocity as case 1 and case 3 in option 1.

Proposal 2: PSFCH transmission should be considered every 4 slots.

Proposal 3: QPSK and 64QAM modulation order should be considered for PSSCH demodulation requirements

Proposal 4: 256QAM modulation order should be verified with applicability rule.

Proposal 5: TDLA30-1350 should be used for PSCCH demodulation requirement.

Proposal 6: Only ACK/NACK feedback mode should be considered for PSFCH demodulation (single link) requirement.

Proposal 7: Use simulation assumptions Table 1~4 for single link tests

**Decision: Noted.**

**R4-2014668 Initial simulation results for NR V2X single link test cases**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Abstract:**

In this contribution, we provide initial simulation results for single link test cases for alignment.

**Decision: Noted.**

**R4-2014780 CR on NR V2X PSFCH demodulation requirements**

*Type: draftCR For: Endorsement  
 38.133 v16.5.0  
 Source: MediaTek inc.*

**Abstract:**

The V2X PSFCH demodulation requirements are missing

**Decision: Postponed.**

**R4-2015640 Discussion on performance requirements for NR V2X single-link test**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015641 Simulation results for NR V2X single-link test**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

##### 7.3.7.3 Multiple link test [5G\_V2X\_NRSL-Perf]

**R4-2014418 Discussion on multiple link demodulation test for NR V2X**

*Type: discussion For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014539 Discussion on Multiple Link V2X requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014636 NR V2X Demod multiple linkrequirement**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2014638 CR: Demod HARQ buffer soft combining test cases for NR V2X**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Qualcomm, Inc.*

**Decision: Postponed.**

**R4-2014669 Discussion on NR V2X multiple link test cases**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2014670 Initial simulation results for NR V2X multiple link test cases**

*Type: discussion For: Discussion  
 Source: LG Electronics Inc.*

**Decision: Noted.**

**R4-2015642 Discussion on performance requirements for NR V2X multi-link test**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015643 Draft CR: Introduce power imbalance with two links test for NR sidelink**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the work plan of V2X demodulation, companies should submit draft CRs in RAN 4 97-e meeting and RAN 4 has agree to introduce power imbalance with two links test

**Decision: Postponed.**

**R4-2015644 Draft CR: Introduce PSCCH/PSSCH decoding capability test for NR sidelink**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the work plan of V2X demodulation, companies should submit draft CRs in RAN 4 97-e meeting and RAN 4 has agree to introduce PSCCH/PSSCH decoding capability test

**Decision: Postponed.**

**R4-2015645 Draft CR: PSFCH decoding capability test for NR sidelink**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

According to the work plan of V2X demodulation, companies should submit draft CRs in RAN 4 97-e meeting.

**Decision: Postponed.**

### 7.4 Integrated Access and Backhaul for NR [NR\_IAB]

#### 7.4.1 General [NR\_IAB-Core]

|  |
| --- |
| **GTW Session on Nov.2nd 4:00-7:00 am UTC time**  - IAB conformance work plan (0.5H)  - [309]/[310] IAB RF conformance (1.5 H)  - [319] IAB Demod  (1H)  **Conformance specification drafting plan (15 minutes)**  **Issue 1-2-1: Number of specifications and how the split is done (from email thread [309])**  In this issue it will be discussed how many conformance specifications will be needed and how topics are arranged between the specifications. Two clear options have been provided but other opinions are also welcomed.   * Proposals   + Option 1: Single specification covering conducted and radiated testing for RF, demod and RRM.   + Option 2: Two specifications, one capturing conducted and the other radiated testing. Each specification captures RF, demod and RRM. * Recommended WF   + Option 2   RAN4 agree to introduce dedicated IAB conformance specification(s) which supposed to cover both RF, demod and [RRM] conformance testing   * RRM part need to be further confirmed by RRM experts in this meeting * Two specification parts, one for conducted testing and one for radiated testing i.e. -1/-2   In Dec RAN-P, IAB WID will be updated to include nee IAB conformance testing specification.  RAN4 will continue to discuss the spec skeleton in email thread [309] for issue 1-2-2, demod and RRM experts are encouraged to follow this discussion for general sections i.e. section 4 , Annex in R4-2016084; for sub-sections under RRM and Demod sections can be discussed separately in dedicated RRM and Demod email thread.  **Common test issues from email thread [309] (1H15 minutes)**  **Issue 2-1-1: IAB-MT test setup**  Some individual proposals are also made to confirm the test setup as a starting point. These proposals are gathered below for commenting.   * Proposals   + BS principles of constructing and configuring the test case using test models and configurations is adopted.   + In the same test setup, DUT can be either IAB-DU or IAB-MT i.e. different setups are not needed   + TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup * Recommended WF   + Agree above proposals   QC: IAB-MT needs to have function of bidirectional link with TE. The test set-up for IAB-MT would be hybrid of UE test and BS test method.  CATT: If the principle refers to test point is OK. If referring to details, i.e. REFSNES, we have different approach among BS and UE test set-up.  ZTE: IAB-MT has full function including sync on PSS/SSS, cell access which not applicable for BS test set-up.  E///: Similar as BS, no need to include DL signals in IAB-MT Tx requirements test set-up. This is left open to implementation which means both BS approach and UE approach allowed. Following BS approach of test modes will save test time/effort.  Nokia: In BS demodulation, there is linkage between TE and BS, not always means Uu interface. We can use similar approach as BS to have generic test set-up, for other details leave to implementation which means not preclude BS approach or UE approach either.  Huawei: We agree with E/// and Nokia. Test interface can be left open and test set-up as generic as possible to focus the necessary information matched with core requirements. There are some exceptions i.e. frequency error, maximum power, which we may need to study how to introduce the test cases.  Keysight: share similar view as QC, if following BS approach, what’s the functionality for sync? Test linkage functionality need to be clarified further since the device is not gNB.  Samsung: We agree with other infra-vendors, even IAB-MT act like UE, on the other side, IAB-MT will be designed based on customer request which similar as BS i.e. IAB-MT no need to implement all the CHBW and SCS. We are open to further discuss the additional necessity information needed for IAB-MT besides the test set-up used for BS.  QC: IAB-MT needs to sync with IAB-donor node, this functionality need to be guarantee during test.  Nokia: The test linkage used in BS approach already be approved work well.  E///: Similar as UE, BS also has sync procedure with interaction with UE in real deployment. On the other side, for BS conformance approach, we don’t mandate to simulate/establish such linkage in test set-up.  Samsung: The scope of test set-up, we are discussing the linkage between DUT (IAB-MT) and TE?  ZTE: IAB-MT has several function based on RRC parameters and SSB configuration; BS just have configuration tables no such detailed information.  Huawei: We are discussing the RF requirements not the features IAB-MT supported. Leaving it flexible would be helpful.  Nokia: In one test configuration, we should have test modes meanwhile TE vendors have choice to choose which test modes or both can be implemented.  Initial condition in sync can be adopted for all the demod test cases.  The linkage is part of test set-up, FRC/RMC, test modes also part of the test set-up.  If some additional information needed for specific test cases, this can be included for those specific test cases.  E///: UE is black box test and BS is white box testing. IAB-MT is network node, no need to mandate the black or white box approach. Regarding sync, as long as we can ensure the sync among IAB-MT and TE, no need to mandate the details for that TE procedure.  Keysight: The functionality need to be address firstly before detailed test set-up. What we need the basis for test set-up need to be clarified.  QC: Sync always needs to operate and maintain all the time during the test. We are not talking about white box/black box issue.  E///: We already have test procedure in BS conformance testing. We change test approach means we may need to change TEs .  Using BS test structure to generate the test set-up including test configurations, test models, RF channels  - Test linkage between TE and DUT (IAB-MT) need to be further discussed including what’s the basis information needed, and which part can be left open to implementation.  - TS descriptions of environments shall not mandate specific equipment and therefore allow flexibility in connection setup  **Issue 2-1-2: IAB-MT test models**  For test models two main views are present. Either BS test models are taken as baseline and the content is modified to reflect UL operation, or UE test models are taken into use either directly or with modifications.   * Proposals   + Option 1: BS test models are the baseline for IAB-MT test models, content is modified for UL operation. Combining some TMs can be further discussed.   + Option 2: UE test models are the reference for IAB-MT test models. These models will be further simplified to be used for IAB-MT. * Recommended WF   + Discuss above options. Discuss in second round details including proposals for TDD configuration and DM-RS configuration.   IAB-MT tests models will be introduced for UL operation, regarding the detailed parameters need to be included in Test models will be further discussed.   * We will further compare the UE test models (uplink RMC) and BS Test models to narrow down and simplify the necessary information   **Issue 2-1-3: IAB-MT test configurations**  Majority of the companies express a view that BS test configurations can be re-used for IAB-MT while some details like power allocation may need some modification. One company also raised the option that some test configuration related parameters are adopted from UE test specifications.   * Proposals   + Option 1: BS test configurations are the baseline to be used for IAB-MT.   + Option 2: Test frequency, test channel bandwidth and test parameters of IAB-MT should follow the UE configuration * Recommended WF   + option 1   BS test configurations are the baseline to be used for IAB-MT. For the details need to be further checked including CHBW and other parameters.  **Issue 2-1-4: IAB-MT test environments**  Majority of the companies express that the same test facilities are used for gNB and IAB-Node testing. However, concerns are also raised if there is a need to try to adopt also some UE aspects, which differ from gNB, into the environment discussion.   * Proposals   + Option 1: IAB-MT uses the same test environments, i.e. chamber types, MU/TT, environmental conditions, as IAB-DU.   + Option 2: Additional work is needed to see if/how UE test environment aspects can to be accommodated to coexist with option 1. Aspects to be considered include at least MU/TT, temperature, humidity, and vibration and power source conditions. * Recommended WF   + Option 1   Keysight: This is related previous discussion for test set-up, it’s premature to conclude now.  Huawei: For chamber part should be same, for other parts need to be confirmed.  Samsung: Fine with option 1 pending the agreement on test set-up conclusion. And we have some delta requirements i.e. foe.  ZTE: For chamber part should be same, for other parts we would like to check.  Companies are encouraged to provide detailed comments in the email thread for the factors which need to be evaluated.  **Issue 2-1-5: IAB-MT receiver testing**   * Proposals:   + Receiver DL baseband configuration for RF: align with performance testing FRC definition   + There is no need to specify the message content in receiver test case. * Recommended WF   + TBA   E///: Align the format with IAB-MT FRC parameters. Message contents mean special test signalling refers to RAN5 spec.   * DL FRC configured for IAB-MT receiver testing and IAB-MT performance testing FRC definition need to be aligned.   **Issue 1-3-1: Connection to IAB RF for IAB Demod test from email thread [319]**   * Proposals   + Option 1 (Ericsson): Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent   + Option 2: Other options are not precluded. * Recommended WF   + Collect views in 1st round.   Agreement: Co-ordinate the decisions on IAB demod and IAB RF testing to the extent necessary to ensure that the approach to testing is consistent  **IAB Demod specific test issues from email thread [319] (1H)**  **Sub topic 3-1 IAB\_MT Demod conformance testing set-up**  **Issue 3-1-2: DUT placement reference point and orientation**   * Proposals   + Option 1 (Nokia): Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.   + Option 2: Other options are not precluded. * Recommended WF   + Collect views in 1st round.   E///: Fine with option 1, reference points for RF and Demod could be same.  Agreement: Coordinate reference point and orientation of the IAB-MT under test is for manufacture declaration.  **Issue 3-1-3: DUT feedback**   * Proposals   + Option 1 (Nokia): HARQ/RV feedback done via an error-free digital feedback (RF or cable link).   + Option 2: Other options are not precluded. * Recommended WF   + Collect views in 1st round.   Agreement: HARQ/RV feedback done via an error-free digital feedback, the feedback linkage to TE still FFS  **Issue 3-1-4: KPI deriving entity**   * Proposals   + Option 1 (Nokia): Performance indicators are derived by the DUT, i.e., by the IAB-MT   + Option 2: Other options are not precluded. * Recommended WF   + Collect views in 1st round.   No need to be specified in the specification for KPI deriving entity.  **Sub-topic 2-1: IAB-DU > General requirement scope**  **Issue 2-1-1: IAB DU backhaul and access link differences**   * Background   + Agreement from [R4-2012644]     - Backhaul and access links Limit the scope of IAB demod to UL (access and backhaul) and DL (backhaul) links. * Proposals   + Option 1 (Ericsson): Discuss whether there is any difference in RX scenario between backhaul and access for the IAB-DU   + Option 2: Other options not precluded. * Recommended WF   + Companies are invited to discuss and present options, along with stating the impact of the proposals on the BS demod requirement re-use.   Huawei: NO need to have discrimination for performance requirements for backhaul and access scenarios.  E///: We should have one set requirements, no need to discriminate the scenarios in the specification. We should ensure the scenarios should be covered in the requirements.   * RAN4 will introduce IAB-DU demodulation requirements covering UL access and backhaul links. * No need to discriminate the test cases for these two links in the specification.   **Issue 2-1-2: Additional requirement configurations on top of BS ones**   * Proposals   + Option 1 (Ericsson): The IAB DU backhaul link requirements are a sub-set of the IAB-DU access link requirements.   + Option 2 (Nokia, Huawei): There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.   + Option 3: Other options not precluded. * Recommended WF   + No contributor wants to introduce requirements that go beyond previous BS requirements; one contributor explicitly proposes to not have additional requirements, while another one seems to also propose this indirectly. Is it agreeable to say “The IAB DU backhaul link requirements are a sub-set of the IAB-DU access link requirements; no new requirements beyond BS requirements shall be introduced.”? * There is no need to introduce any new performance requirements for IAB-DU in addition to already existing BS requirements.   Huawei: Some specific test cases only defined under high speed scenarios, we would like to check whether channel model need to be replaced.  E///: We assume such high speed scenarios mentioned for Rel-15 not Rel-16, backhaul link maybe not applicable but for access link still meaningful. We need to check the details.  **Issue 2-1-3: Basis for requirement re-use**   * Proposals   + Option 1 (Huawei, Nokia): Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.   + Option 2 (Nokia, ~~Huawei~~): Base IAB-DU performance requirements on the 3GPP Release 15 features (e.g., excluding HST, URLLC, etc.) and consider additional features only by request.   + Option 3 (Ericsson): Discuss which Rel-16/15 requirements to exclude.   + Option 4: Other options not precluded. * Recommended WF   + Collect views in 1st round.   E///: Access link can be supported some of Rel-16 features. Meanwhile we also realize no actual needs in current moment.   * Based on Rel-15 gNB performance requirements to discuss IAB-DU performance requirements definition.   **Issue 2-3-1: General SCS/CBW combinations**   * Proposals   + Option 1 (Huawei): Define performance requirements to be agnostic w.r.t. bandwidth and SCS.   + Option 2: Other options are not precluded. * Recommended WF   + Collect views in 1st round.   E///: We should try to reuse existing BS requirements without simulation effort since we already have them in BS spec, no need this applicable approach.  Nokia: We have existing requirements and applicable rules in BS requirements; we share similar view as E///. What’s the reference for this band agonistic approach?  Samsung: In the beginning of this WI, RAN4 agree that IAB-MT have no impact on existing BS requirements. We prefer the similar reference approach as we did for RF core for performance requirements.  Huawei: If companies have concern on this proposal, it’s fine for us. We can’t decide totally reuse at this moment, we can discuss case by case manner.  In principle, reuse the existing BS requirements as generic approach meanwhile the exceptions for the specific test cases not excluded pending on further discussion.  Using existing applicable rules for CHBW, SCS and number of RX antenna configuration as starting point, further refinement not precluded. |

**R4-2017405 Email discussion summary for [97e][307] NR\_IAB\_General**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017614 (from R4-2017405).**

**RR4-2017614 Email discussion summary for [97e][307] NR\_IAB\_General**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017642 Draft CR to TS 38.174: maintenance of TS 38.174 clause 4**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017643 Draft CR to TS 38.174: add new sub-clauses to TS 38.174 clause 4**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017644 Draft CR to TS 38.174: maintenance of TS 38.174 clause 5**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017474 Draft CR to TS 38.174: maintenance of TS 38.174 References and Definitions**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017475 Draft CR to TS 38.174: maintenance of TS 38.174 Symbols and Abbreviations**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2016139 Draft CR to TS 38.174: IAB General and RF core maintenance**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: ZTE Corporation*

**Abstract:**

IAB core requirement is not defined correctly and needs further revision. Lot of editorial corrections are also needed

**Decision: Not pursued.**

##### 7.4.1.1 System parameters maintenance [NR\_IAB-Core]

**R4-2014384 Draft CR to TS 38.174: IAB-MT CA support and maintanance of clause 4 to 5**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: CATT*

**Abstract:**

The CA support for IAB-MT is not complete in the spec and some maintanance is neccesary for clause 4 and clause 5.

**Decision: Not pursued.**

**R4-2014752 Correction CR on TR38.809**

*Type: CR For: Agreement  
 38.809 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: Samsung*

**Abstract:**

There are sub-clauses voided in version submitted to RAN#89e which can be cleanup in Nov meeting according to guidance shared in RAN4 reflector.

**Decision: Revised to R4-2017473 (from R4-2014752).**

**R4-2017473 Correction CR on TR38.809**

*Type: CR For: Agreement  
 38.809 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: Samsung*

**Abstract:**

There are sub-clauses voided in version submitted to RAN#89e which can be cleanup in Nov meeting according to guidance shared in RAN4 reflector.

**Decision: For email approval**

**R4-2015433 DraftCR to TS 38.174: System parameter corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

IAB-MT channel bandwidth for CA is missing from the specification. It is required for emission measurements. Frequency range for operating band n41 is erroneous.

**Decision: Not pursued.**

**R4-2016081 draftCR to TS 38.147: IAB-MT number of TRX**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Huawei*

**Abstract:**

The minimum number of TRX for the IAB-MT in the refernece poimnt definition clause is still FFS

**Decision: Not pursued.**

**R4-2016251 CR on System parameters maintenance**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

IAB-MT CA feature system parameter missing,

**Decision: Not pursued.**

**R4-2016260 CR on System parameters**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

“BR” not known,

**Decision: Endorsed.**

##### 7.4.1.2 Others [NR\_IAB-Core]

**R4-2014385 Draft CR to TS 38.174: maintanance of references and definitions**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: CATT*

**Abstract:**

The references and the defintions are not complete.

**Decision: Not pursued.**

**R4-2014751 Draft CR with correction on section 4**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Samsung*

**Abstract:**

There are mistakes for which correction needed in applicability of requiremnt table for IAB-MT

**Decision: Not pursued.**

**R4-2015434 DraftCR to TS 38.174: General section corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Most symbol and abbreviation definitions are missing even though they are used in the specification. Minimum number of IAB-MT transceivers is agreed and no longer FFS. Regional requirement section is empty, while regional requirements like category B requirements are included in the specification. Section for requirements for contiguous and non-contiguous spectrum includes content only IAB-DU while the same principles apply also for IAB-MT. Specification contains editorial errors.

**Decision: Not pursued.**

**R4-2016083 draftCR to TS 38.174: Definitions, symbols and abreviations**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Huawei*

**Abstract:**

The definitions symbols and abbreviations sections of the TS were not completed in the 1st revision

**Decision: Not pursued.**

**R4-2016250 CR on general requirements in TS 38.174**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Missing the regional requirement in 4.5. Align the with other RAN4 agreement in 4.3.3. Add contigous and non-contigous spectrum on wide area IAB-MT. Add the OTA co-location clause title.

**Decision: Not pursued.**

**R4-2016259 CR on general requirements in TR 38.809**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Editorial change

**Decision: Endorsed.**

#### 7.4.2 RF requirements maintenance [NR\_IAB-Core]

**R4-2017406 Email discussion summary for [97e][308] NR\_IAB\_RF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017615 (from R4-2017406).**

**R4-2017615 Email discussion summary for [97e][308] NR\_IAB\_RF\_Maintenance**

*Type: other For: Information  
 Source: Moderator (Qualcomm)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

|  |
| --- |
| **GTW Session on 11.4th**  **Issues from email thread [310] IAB conformance testing part2:**  **Issue 1-1: reference condition on dynamic range for IAB-MT**   * Proposals   + Option 1: [R4-2014391] Test point on [2][3][4]     - [2] Low PSD with full RB allocation     - [3] High PSD with partial RB allocation     - [4] High PSD with full RB allocation   + Option 2: [R4-2015441] Test point on [1] and [4] with test requirement as PSD difference + 10\*log10(NRBratio)     - [1] Low PSD with narrow RB allocation     - [4] High PSD with full RB allocation   + Not preclude other option * Recommended WF   + To be discussed   E///: We need to clarify whether applicable for both WA and local IAB-MT or only local IAB-MT.  For test point 4, if it’s aligned with maximum power then probably no need to test on test point 4.  In general, we think further study needed.  QC: we support option to include test point [3], IAB-MT should have capability to boost power similar as UE.  Nokia: High PSD means for same PSD in [3] and [4], maximum power dynamic change with 5dB/10dB pending on IAB-MT class. We need to align the core requirements definition which reached in previous.  We should have test requirements cover both IAB-MT classes, and the test procedure can be further discussed and simplified if feasible.  We prefer option 2, as these test points can meet both the corners of X and Y core requirements.  CATT: our proposal is similar as option 1. For test point 4 may be already verified by maximum power requirements.  Huawei: The core requirements means under fixed condition. Option 2 didn’t directly match with core as test X. Y in the same time which has benefits on test cases. Meanwhile we should ensure test cases matched with core, irrespective of number of test cases.  We have requirements for WA IAB\_MT, and then we need have dedicated test cases.  Samsung: we have similar view as Huawei and Nokia, this requirement applicable for both WA and Local IAB-MT classes.  Even IAB-MT need to similar UE functionality, meanwhile not sure IAB-MT need to support entirely functionality.  One possible way: we can introduce some specific test point based on declaration basis.   * RAN4 will introduce conformance test cases for dynamic range requirements for both wide-area and local-area IAB-MT classes.   + RAN4 will further discuss the uncertainty impact on the feasibility of introducing test cases   The candidate test points for dynamic range test cases collected for further consideration till now to aligned with the agreements reached in R4-2008775:   * [1] Low PSD with narrow RB allocation * [2] Low PSD with full RB allocation * [3] High PSD with partial RB allocation * [4] High PSD with full RB allocation with maximum output power * Other proposals not excluded   **Issue 1-2: Test independency of power control and dynamic range**   * Proposals: [R4-2015441] Dynamic range and power control tests to be defined separately. * Recommended WF   + Check and confirm above proposal   Agreement:  Dynamic range and power control tests to be defined separately.   * Further discuss test applicable rules among these test cases not excluded   **Issues from email thread [308] IAB RF maintenance:**  IAB-MT Tx EVM measurement procedure  **Issue 1-1: EVM Measurement procedure**   * Proposals   + Option 1: Re-use Rel.15 UE EVM testing procedures without spectrum flatness, in-band emission, LO leakage and IQ-imbalance requirements and remove DFT-s-OFM signals for IAB-MT(R4-2014388, R4-2016137)   + Option 2: Re-use BS test procedure and use single requirement for all channels, remove DTS-s-OFDM (R4-2015207) * Recommended WF   + Adopt Option 1. The IAB-MT is transmitting signals just like a UE and the BS receiver is the same for IAB-MTs and UEs so same requirements and test procedure should be followed   Nokia: The aims for test procedure captured in Core specification Annex; or we are talking about conformance test procedure.  We already agree no spectrum flatness, in-band emission leakage and IQ imbalance core requirements for IAB-MT.  For Core annex EVM measurement procedure, we think option 2 BS approach should be OK.  E///: This is also connected to generic conformance test set-up discussion.  CATT: Option 1 is from CATT and ZTE. Question 1: what signal should be transmitted? DL/UL, we believe IAB-MT TX should be UL signal. The detailed processing on TE side for EVM measurement procedure pending on TX signal transmitted.  ZTE: Our major proposal is to replace DL signal as UL signal for IAB-MT Tx.  QC: Signaling processing aspect from EVM measurement procedure; and conformance test set-up procedure.  For signaling processing aspect captured in Annex of core, we need to use UE approach. For conformance test set-up, we should discuss under conformance agenda.  Nokia: For IAB-MT, the transmitted signal should be UL. The remaining issue would be PTRS, PTRS usage should be aligned with infra design.  E///: We think no need to differentiate different physical channels, generic requirements can be enough. Using BS approach still possible.  ZTE: Test modes still specified for different physical channels (PDCCH and PDSCH).  Agreement:  The signaling processing procedure on IAB-MT EVM requirements which similar as captured in Annex of BS and UE RF specification will be discussed in RF maintenance agenda.   * Alt1: Reusing UE approach with modification to remove spectrum flatness, in-band emission, LO leakage and IQ-imbalance parts * Alt2: Reusing BS approach and replacing DL channels as UL channels for IAB-MT * FFS whether PTRS need be configured or not * FFS whether RAN4 will introduce test cases for UL DFT-S-OFDM signals, if introduced clarification for optional supporting needed   For other test set-up issues will be discussed in conformance agenda. |

##### 7.4.2.1 Transmitter characteristics [NR\_IAB-Core]

**R4-2016137 Further discussion on IAB-MT power control and EVM measurement**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

###### 7.4.2.1.1 Tx Power related requirements [NR\_IAB-Core]

**R4-2016257 CR on Tx Power related requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Remove the FDD band requirement as IAB does not have FDD band in Rel-16. Correct the power control requirement reference table

**Decision: Revised to R4-2017482 (from R4-2016257).**

**R4-2017482 CR on Tx Power related requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Remove the FDD band requirement as IAB does not have FDD band in Rel-16. Correct the power control requirement reference table

**Decision: Return to.**

**R4-2016264 CR on Tx Power related requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Adding the local area IAB-MT on the RAN4 agreement

**Decision: Endorsed.**

###### 7.4.2.1.2 Transmitted signal quality [NR\_IAB-Core]

**R4-2014386 Draft CR to TS 38.174: Transmitted signal quality maintainance**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: CATT*

**Abstract:**

The spec structure of transmitted signal quality is not aligned with other requirements.

The EVM frame structure for measurement is missing.

The EVM measurement process for IAB-MT is [TBD] not void.

**Decision: Revised to R4-2017476 (from R4-2014386).**

**R4-2017476 Draft CR to TS 38.174: Transmitted signal quality maintainance**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: CATT*

**Abstract:**

The spec structure of transmitted signal quality is not aligned with other requirements.

The EVM frame structure for measurement is missing.

The EVM measurement process for IAB-MT is [TBD] not void.

**Decision: Return to.**

**R4-2014387 Draft CR to TS 38.809: Transmitted signal quality maintainance**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: CATT*

**Abstract:**

There’s no background of EVM measurement frame structure in the TP.

The titles of sub-caluse 7.5.2 and 9.6.2 are missing.

**Decision: Revised to R4-2017477 (from R4-2014387).**

**R4-2017477 Draft CR to TS 38.809: Transmitted signal quality maintainance**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: CATT*

**Abstract:**

There’s no background of EVM measurement frame structure in the TP.

The titles of sub-caluse 7.5.2 and 9.6.2 are missing.

**Decision: Return to.**

**R4-2015207 IAB EVM procedure and other consideration**

*Type: discussion For: Approval  
 38.174 v..  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2015435 DraftCR to TS 38.174: Transmitted signal quality**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

IAB-MT modulation quality requirement is included in section belonging to frequency error.

**Decision: Not pursued.**

**R4-2016082 draft CR to TS 38.174 - Correction of IAB-modulation quality sub-clause.**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Huawei*

**Abstract:**

The IAB modulation quality sub clause text is in the woring place.

**Decision: Not pursued.**

**R4-2016255 CR on Tx signal quality requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Terminology replacement and specification structure re-arrangement

**Decision: Not pursued.**

**R4-2016263 CR on Tx signal quality related requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Weaken the frequency error requriement reasoning, there are different synchronization implementation depending on different architecture design.

**Decision: Revised to R4-2017478 (from R4-2016263).**

**R4-2017478 CR on Tx signal quality related requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Weaken the frequency error requriement reasoning, there are different synchronization implementation depending on different architecture design.

**Decision: Return to.**

###### 7.4.2.1.3 Unwanted emissions [NR\_IAB-Core]

**R4-2016258 CR on unwanted emission requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

5MHz IAB-MT/IAB-DU channel bandwidth is not supported in IAB Rel-16 frequency band.

**Decision: Not pursued.**

**R4-2017483 CR on unwanted emission requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2016265 CR on unwanted emission requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Adding the text for the IAB-MT downlink transmission requriement

**Decision: Endorsed.**

###### 7.4.2.1.4 Others [NR\_IAB-Core]

**R4-2014388 Discussion on IAB-MT EVM measurement process**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2016256 CR on Tx characteristic other requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Annex F for interference charateristic is missing

**Decision: Revised to R4-2017486 (from R4-2016256).**

**R4-2017486 CR on Tx characteristic other requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Annex F for interference charateristic is missing

**Decision: Return to.**

##### 7.4.2.2 Receiver characteristics [NR\_IAB-Core]

###### 7.4.2.2.1 Sensitivity and dynamic range requirements [NR\_IAB-Core]

**R4-2017651 draftCR to TS 38.174: Section 10.2 OTA sensitivity**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Huawei*

**Abstract:**

Corrections to defined terms in the OTA sensitivity section

**Decision: Return to.**

**R4-2015436 DraftCR to TS 38.174: Sensitivity corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Section 7.1 with general sensitivity information is empty. FR2 OTA reference sensitivity requirement table for IAB-MT is empty. Editorial errors exist.

**Decision: Revised to R4-2017479 (from R4-2015436).**

**R4-2017479 DraftCR to TS 38.174: Sensitivity corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Section 7.1 with general sensitivity information is empty. FR2 OTA reference sensitivity requirement table for IAB-MT is empty. Editorial errors exist.

**Decision: Return to.**

**R4-2016254 CR on Sensitivity and dynamic range related requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

The new TS specication for conformance test not decided and number of the declared direction can be discussed in conformance phase with adding bracket for now.

**Decision: Not pursued.**

**R4-2016262 CR on Sensitivity and dynamic range related requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Weaken the statement in 8.2.2 for SNR requriement. The SNR is taken after simulation and agreement in RAN4. Typo correction on 10.2

**Decision: Endorsed.**

###### 7.4.2.2.2 In-band selectivity and blocking requirements [NR\_IAB-Core]

**R4-2015437 DraftCR to TS 38.174: In-band selectivity corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Some ACS interferer offsets are not defined. There are errors whether delta OTAREFSENS or delta OTAminSENS is used to offset the interfering signal mean power in IAB-MT in-band blocking test. Editorial errors exist.

**Decision: Revised to R4-2017480 (from R4-2015437).**

**R4-2017480 DraftCR to TS 38.174: In-band selectivity corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Some ACS interferer offsets are not defined. There are errors whether delta OTAREFSENS or delta OTAminSENS is used to offset the interfering signal mean power in IAB-MT in-band blocking test. Editorial errors exist.

**Decision: Return to.**

**R4-2016252 CR on Inband selectivity and blocking requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

inband selectivity and blocking requirements correction in TS38.174

**Decision: Revised to R4-2017481 (from R4-2016252).**

**R4-2017481 CR on Inband selectivity and blocking requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

inband selectivity and blocking requirements correction in TS38.174

**Decision: Return to.**

**R4-2016261 CR on Inband selectivity and blocking requirements chapter**

*Type: draftCR For: Endorsement  
 38.809 v16.0.0  
 Source: Ericsson*

**Abstract:**

Correct the tabel number and adding the unit

**Decision: Endorsed.**

###### 7.4.2.2.3 Others [NR\_IAB-Core]

**R4-2015438 DraftCR to TS 38.174: OOB blocking and Rx spurious corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Section number 7.5.2 is applied for multiple different sections. Problem exists also in table numbers. n259 data is missing from table providing step frequencies for defining the radiated Rx spurious emission limits for IAB-MT type 2-O

**Decision: Revised to R4-2017484 (from R4-2015438).**

**R4-2017484 DraftCR to TS 38.174: OOB blocking and Rx spurious corrections**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Section number 7.5.2 is applied for multiple different sections. Problem exists also in table numbers. n259 data is missing from table providing step frequencies for defining the radiated Rx spurious emission limits for IAB-MT type 2-O

**Decision: Return to.**

**R4-2016253 CR on Rx Charateristic other related requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Correct the reference number to 38.104

**Decision: Revised to R4-2017485 (from R4-2016253).**

**R4-2017485 CR on Rx Charateristic other related requirements**

*Type: draftCR For: Endorsement  
 38.174 v16.0.0  
 Source: Ericsson*

**Abstract:**

Correct the reference number to 38.104

**Decision: Return to.**

#### 7.4.3 RF conformance testing [NR\_IAB-Perf]

##### 7.4.3.1 General and work plan [NR\_IAB-Perf]

**R4-2017407 Email discussion summary for [97e][309] NR\_IAB\_Conformance\_Part1**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017616 (from R4-2017407).**

**RR4-2017616 Email discussion summary for [97e][309] NR\_IAB\_Conformance\_Part1**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017487 WF on IAB conformance work plan and specifications**

*Type: other For: Approval  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017488 WF and test setup and test environments**

*Type: other For: Approval  
 Source:* Nokia, Nokia Shanghai Bell

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017489 WF on manufacturer declarations, test models and configurations including Rx FRC**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017408 Email discussion summary for [97e][310] NR\_IAB\_Conformance\_Part2**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017617 (from R4-2017408).**

**R4-2017617 Email discussion summary for [97e][310] NR\_IAB\_Conformance\_Part2**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017490 WF on dynamic range, power control (LA) and frequency error for IAB-MT**

*Type: other For: Approval  
 Source: CATT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017491 WF on detail aspects on IAB conformance testing**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014484 IAB RF Conformance Testing**

*Type: other For: Approval  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2014750 On IAB conformance testing**

*Type: other For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015439 IAB RF conformance testing framework**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016084 Discussion on conformance specification**

*Type: discussion For: Discussion  
 Source: Huawei*

**Abstract:**

Discuss drafting of the conformance specification

**Decision: Noted.**

**R4-2016245 On IAB conformance testing**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our general view on IAB RF conformance test work

**Decision: Noted.**

##### 7.4.3.2 Common test issues for conducted and radiated conformance testing [NR\_IAB-Perf]

**R4-2016138 Discussion on IAB conformance testing**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

###### 7.4.3.2.1 Test configurations [NR\_IAB-Perf]

**R4-2014389 Discussion on IAB RF test configuration**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014485 IAB RF Testing**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2015440 Test configurations for IAB RF conformance testing**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016243 IAB Common test issue on test configuration**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on test configuration for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.2.2 Test models [NR\_IAB-Perf]

**R4-2014390 Discussion on IAB RF test model**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2016244 IAB Common test issue on test model**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on test model for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.2.3 Others [NR\_IAB-Perf]

**R4-2016242 IAB Common test issue on enviroment conditions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on test enviromental conditions for IAB RF conformance test work

**Decision: Noted.**

##### 7.4.3.3 Conducted conformance testing [NR\_IAB-Perf]

###### 7.4.3.3.1 Transmitter characteristics [NR\_IAB-Perf]

**R4-2014391 Discussion on the reference conditions of IAB-MT output power dynamics**

*Type: other For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2015441 Radiated conformance testing, Tx requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016246 Conducted transmitter characteristic test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on conducted transmitter test for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.3.2 Receiver characteristics [NR\_IAB-Perf]

**R4-2015442 Radiated conformance testing, Rx requirements**

*Type: other For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2016247 Conducted receiver characteristic test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on conducted receiver test for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.3.3 Other test issues [NR\_IAB-Perf]

##### 7.4.3.4 Radiated conformance testing [NR\_IAB-Perf]

###### 7.4.3.4.1 Transmitter characteristics [NR\_IAB-Perf]

**R4-2016248 Radiated transmitter characteristic test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on OTA Transmitter test for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.4.2 Receiver characteristics [NR\_IAB-Perf]

**R4-2016249 Radiated receiver characteristic test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

In this paper, we present our view on OTA receiver test for IAB RF conformance test work

**Decision: Noted.**

###### 7.4.3.4.3 Other test issues [NR\_IAB-Perf]

#### 7.4.6 EMC core requirements maintenance [NR\_IAB-Core]

##### 7.4.6.1 General [NR\_IAB-Core]

**R4-2015026 CR to TS 38.175: IAB definition**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

There are no definitions for IAB type.

**Decision: Agreed.**

**R4-2015106 CR to TS 38.175 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0003 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

**Decision: Revised to R4-2017444 (from R4-2015106).**

**R4-2017444 CR to TS 38.175 on Voltage dips and interruptions, Release 16**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0003 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Performance criteria is updated to reflect considerations on the test levels.

**Decision: Return to.**

**R4-2015107 Definition of Exclusion Bands for IAB EMC nodes**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion paper on Exclusion bands for IAB EMC testing

**Decision: Noted.**

**R4-2015108 CR to TS 38.175 on Exclusion Bands**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0004 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Definition of Exclusion Band sizes is required to guarantee IAB nodes EMC testing.

**Decision: Not pursued.**

##### 7.4.6.2 Emission requirements [NR\_IAB-Core]

**R4-2015027 CR to TS 38.175: Radiated emission, IAB**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0002 Cat: F (Rel-16)  
  
 Source: ZTE Corporation*

**Abstract:**

The radiated eimssion IAB requirements need to be added.

**Decision: Revised to R4-2017442 (from R4-2015027).**

**R4-2017442 CR to TS 38.175: Radiated emission, IAB**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0002 Cat: F (Rel-16)  
  
 Source: ZTE Corporation, Ericsson*

**Abstract:**

The radiated eimssion IAB requirements need to be added.

**Decision: Return to.**

**R4-2015109 Discussion on IAB EMC Radiated Emissions**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion paper on EMC Radiated Emissions for IAB EMC

**Decision: Noted.**

**R4-2015110 CR to TS 38.175 on IAB EMC Emission**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0005 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Radiated emission limits for IAB node needs to be defined.

**Decision: Merged (with R4-2015027).**

##### 7.4.6.3 Immunity requirements [NR\_IAB-Core]

**R4-2015111 Discussion on Spatial Exclusion for IAB EMC RI test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion paper on Spatial Exclusion for IAB EMC Radiated Immunity Testing

**Decision: Noted.**

**R4-2015112 CR to TS 38.175 on Spatial Exclusion for IAB EMC Radiated Immunity test**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0006 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of spatial exclusion concept for IAB EMC CR to TS 38.175 on Spatial Exclusion for IAB EMC Radiated Immunity test.

**Decision: Revised to R4-2017443 (from R4-2015112).**

**R4-2017443 CR to TS 38.175 on Spatial Exclusion for IAB EMC Radiated Immunity test**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0006 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of spatial exclusion concept for IAB EMC CR to TS 38.175 on Spatial Exclusion for IAB EMC Radiated Immunity test.

**Decision: Return to.**

#### 7.4.7 EMC performance requirements [NR\_IAB-Perf]

**R4-2017445 WF on IAB EMC test/performance requirements**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015028 Discussion on the performance requirements of IAB EMC**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2015113 Discussion on IAB EMC performance requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion paper on IAB EMC Performance requirements

**Decision: Noted.**

**R4-2015114 CR to TS 38.175 on IAB EMC performance requirements**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0007 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of performance requirements in IAB EMC specification is required to complete the EMC IAB standard.

**Decision: Revised to R4-2017446 (from R4-2015114).**

**R4-2017446 CR to TS 38.175 on IAB EMC performance requirements**

*Type: CR For: Agreement  
 38.175 v16.0.0 CR-0007 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Introduction of performance requirements in IAB EMC specification is required to complete the EMC IAB standard.

**Decision: Return to.**

#### 7.4.8 Demodulation and CSI requirements [NR\_IAB-Perf]

##### 7.4.8.1 General [NR\_IAB-Perf]

**R4-2017417 Email discussion summary for [97e][319] NR\_IAB\_Demod**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017618 (from R4-2017417).**

**RR4-2017618 Email discussion summary for [97e][319] NR\_IAB\_Demod**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017492 WF on Rel-16 NR IAB demodulation requirements**

*Type: other For: Approval  
 Source:* Nokia, Nokia Shanghai Bell

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015868 On IAB testing approach**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

General discussion on approach to demodulation testing for IAB

**Decision: Noted.**

**R4-2016038 IAB Demodulation Testing**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016039 IAB Demodulation Testing**

*Type: discussion For: Discussion  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016443 On NR IAB general demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution, we provide an updated version of IAB demod work plan and our proposal about a possible bigCR work split.

**Decision: Noted.**

##### 7.4.8.2 IAB-DU performance requirements [NR\_IAB-Perf]

**R4-2015592 Discussion on NR IAB DU demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015870 IAB-DU demodulation requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Requirements matrix for DU

**Decision: Noted.**

**R4-2016444 On NR IAB-DU demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we extend further our previous contribution on IAB-DU demod and discuss the detailed scope of IAB-DU demodulation performance requirements.

**Decision: Noted.**

##### 7.4.8.3 IAB-MT performance requirements [NR\_IAB-Perf]

**R4-2015593 Discussion on NR IAB MT demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015869 IAB-MT demodulation requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Requirements matrix for MT

**Decision: Noted.**

**R4-2016433 On NR IAB-MT test setup and demodulation requirements**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this paper, we highlight some critical aspects of IAB technology and architecture, overview the existing BS and UE conformance testing setups, and propose a new IAB-MT test setup. Furthermore, we overview the performance requirements to be re-used/adap

**Decision: Noted.**

### 7.5 Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements [LTE\_NR\_DC\_CA\_enh]

#### 7.5.4 Demodulation and CSI requirements (38.101-4) [LTE\_NR\_DC\_CA\_enh-Perf]

**R4-2017418 Email discussion summary for [97e][320] MR\_DC\_Demod**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017493 Way forward on UE demodulation and CSI reporting requirements for MR-DC and CA enhancements**

*Type: other For: Approval  
Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015594 Discussion on Multi-RAT Dual-Connectivity and Carrier Aggregation enhancements demodulation performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015815 UE demodulation requirements for WI on MR-DC and CA enhancements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution discusses the impacts to UE demodulation and CSI reporting requirements due to WI on MR-DC and CA enhancements

**Decision: Noted.**

### 7.8 Physical layer enhancements for NR URLLC [NR\_L1enh\_URLLC-Core]

#### 7.8.1 Demodulation and CSI requirements (38.101-4/38.104) [NR\_L1enh\_URLLC-Perf]

|  |
| --- |
| **GTW Session 11.5th**  **Topics from email thread [322]**  **Issue 2-1-1: Use of early pass/fail**   * Proposals   + Option 1: Use early pass/fail criteria for CQI test (Huawei, Ericsson, Apple, Intel)   + Option 2: Do not use early pass/fail criteria * Recommended WF   + Agree option 1   Agreement: Use early pass/fail criteria for CQI test  **Issue 2-1-2: Include X (0.5dB) in CQI test**   * Proposals   + Option 1:Yes (Qualcomm)   + Option 2: No (Ericsson, Apple, Huawei, Intel) * Recommended WF   + Discuss in GTW   QC: Other companies concern on X delta may bring wrong CQI reporting which lead UE fain in the test, but we observed the SNR gap is big enough.  Apple: CQI test use two test points to verify CQI reporting, +0.5 dB margin has no significant impact on test time reduction, and impact the test purpose of CQI.  E///: Even SNR gap among CQI is >0.5dB, but in test cases, we may still have UE the SNR levels close the CQI boundary.  Huawei: we share similar view as E///. The delta of 0.5dB may bring UE fain in the test; we think confidence level reduction can achieve the test purpose for time reduction.  Intel: X delta dB we are not sure bring the benefit on time reduction since the test procedure is different compared to FMCS test cases.  QC: We think the approach among Fixe MCS and CQI would be similar. The gap is pretty high i.e. 1.5dB among SNR between adjacent CQI level. We think confidence level is very important and essential.  E///: we didn’t see the need to test under very high confidence level. The purpose is to verify UE using CQI table 3. For NW side, the CQI reporting should match the exact SNR setting. We have concern on the delta on CQI test cases.  Apple: Test procedure is different among Fixed MCS test cases and CQI test cases not clear using delta X can bring benefits from test time reduction. We don’t think we need to introduce test applicable rules among CQI test cases and Fixed MCS test cases.  QC: eMBB can enable OLLA for CQI adjusting, for URLLC CQI test case is critical. If UE following CQI criteria, gap should be enough.  Apple: We can’t align UE assumption for CQI and SNR mapping table which up to UE implementation and that’s the reason we have 1dB offset with 2 test points in the spec for CQI.  QC: We intended to choose middle point in SNR level. We can take some margin considering implementation difference.  Ex. Test Level as 3dB  UE 1: SNR 1.5dB for CQI X, SNR 3.4dB for CQI X+1  UE2: SNR 2dB for CQI X, 4 dB for CQI X+1  What will be happen with 3dB +X (0.5dB), for such of UE1 and UE2?  Question 1: Do we need to align UE assumption for CQI and SNR mapping?  Candidate options for further discussion in this meeting:  Op1: 98.6% Confidence level with X = 0 dB  Op2: 99% Confidence level with X = 0 dB  Op3: 99.999% Confidence level with X = [0.5] dB  Op4: NO test cases for CQI table 3 with ultra-BLER  We will comeback in 2nd week to make agreements based on majority supporting among these options.  **Issue 2-1-3: Confidence level**   * Proposals   + Option 1: 99.999% (Qualcomm)   + Option 2: 99% (Ericsson)   + Option 3: 98.6% (Ericsson, Apple, Huawei, Intel)   + Option 4: 95% (Ericsson, Apple, Huawei, Intel)   + (Other options not precluded) * Recommended WF   + Discuss in GTW   **Issue 2-1-4: Lower bound for median CQI**   * Proposals   + Option 1: Define a lower bound for median CQI (Qualcomm, Ericsson, Apple, Huawei)   + Option 2: No lower bound (Intel) * Recommended WF   + Discuss in GTW   E///: The low bound was to ensure no CQI 0 reporting during the test.  Further discuss the SNR test points to see if any lower bound needs to be defined.  **Topics from email thread [323]**  Sub-topic 2-3: UE demodulation requirements for pre-emption  **Issue 2-3-1: Simulation results observation (based on R4-2015628):**  The gain between with and without buffer flushing is  MCS13 with 20% probability:   * About 0.5 dB (Ericsson, Huawei, MTK) * More than 2.5 dB (Intel, Apple)   MCS13 with 10% probability:   * Less than 0.5 dB (Ericsson, Huawei, MTK, Intel) * More than 1 dB (Apple)   MCS4 with 20% probability:   * Less than 0.1 dB (Ericsson, Huawei, MTK, Intel, Apple)   MCS4 with 10% probability:   * Less than 0.03 dB (Ericsson, Huawei, MTK, Intel, Apple) * More than 1 dB (QC) * Recommended WF   + QC: Please double check your simulation results as it seems there is larger span between yours and others’ results.   + Please update your results if necessary.   **Issue 2-3-2: Test metric:**   * Proposals   + Option 1: 70% maximum throughput with gain larger than 1dB. (Huawei, Apple, Ericsson)   + Option 2: 1% or 10% BLER for scenarios with 2 re-transmissions. (Intel)   + Option 3: 1% BLER or 70% maximum throughput for scenarios with 4 re-transmissions. (Intel)   + Option 4: 70% maximum throughput (MTK) * Recommended WF   + The main intention for this case is to find the performance difference between with and without buffer flushing. So the test metric should be defined based on this intention. By considering the limited time left, the moderator does not recommend to change the test metric but to define the agreed test metric (70% maximum throughput) with gain larger than 1dB. Based on the current simulation results, there is a large span between companies and the gain between with and without buffer flushing is fairly small. To achieve gain larger than 1dB, one suggestion is to increase the MCS value. E.g. MCS16 or higher. Please update your simulation results if new results are available. (Huawei, Intel)     - QC: Gain should not very across MCS.   **Issue 2-3-3: MCS**   * Proposals   + Option 1: MCS16 from Table 1. (Huawei)   + Option 2: MCS13 from Table 1 (Apple, Ericsson, Intel)   + Option 3: MCS 4 from Table 1 (QC) * Recommended WF   + TBD   **Issue 2-3-4: Pre-emption probability**   * Proposals   + Option 1: 20%. (Huawei, Apple, Intel in case of 4 re-transmissions)   + Option 2: 10% (Ericsson, QC, Intel in case of 2 re-transmissions and BLER test metric, MTK) * Recommended WF   + TBD   Select proper test parameters and test metric to discriminate UE behavior and ensure proper UE processing i.e. the performance gap > 1dB   * Companies are encouraged to bring simulation results for MCS 16, and MCS 17 for comparison purpose. * We will further check the results from companies to make decisions. * Continue to discuss the simulation assumption and align companies’ results.   QC: Changing MCS levels maybe not helpful for performance gap. We may need to consider other parameters.  We are open to try other options. We also need to align the simulation assumption details to align the results among companies.  Apple: MCS 16 have higher code rating, with improper processing the performance loss more obviously. We have some agreements on UE behaviour assumption.  E///: We need to clarify the gap means the average results from companies? In our simulation, we update the results we see >1 dB gap under MCS 16.  Intel: With high MCS with higher modulation order and coding rate, the performance gap will be increased. Also collect the results for average to align the results.  QC: Agree E///, we need to discuss what MCSs to be simulated. The quality of LLR under low MCS is worse than high MCS.  Sub-topic 3-1: Rel-16 URLLC UE features  **Issue 3-1-2: Whether to define performance requirements for PDCCH enhancement.**   * Proposals   + Option 1: Yes (Huawei, Ericsson)   + Option 2: No (Intel, Apple, QC) * Recommended WF   + TBD   **Issue 3-1-2a: Whether to define PDCCH performance requirements for DCI format 1\_2**   * Proposals   + Option 1: Yes (Ericsson, CTC)   + Option 2: No (Apple, QC, Huawei, MTK) * Recommended WF   + TBD   Huawei: just DCI size difference, no UE receiver processing difference, no need see from our side.  MTK: Same view as Huawei  Apple: Same view as Huawei  Intel: Similar view as Huawei  QC: Similar view as Huawei  China Telecomm: DCI size will impact the code rate and impact the receiver performance.  Agreement: no requirements for DCI format 1\_2.  **Issue 3-1-2b: Whether to define PDCCH performance requirements for covering multiple PDCCH monitoring occasions per slot.**   * Proposals   + Option 1: Yes   + Option 2: No (Ericsson, Apple) * Recommended WF   + TBD   Agreement: Not define PDCCH performance requirements for covering multiple PDCCH monitoring occasions per slot  Sub-topic 3-2: Release independent  **Issue 3-2-1: UE URLLC requirements for Rel-15 features release independent from Rel-15**   * Proposals   + Option 1: Yes (Huawei, QC, CTC, Intel)   + Option 2: No * Recommended WF   + Option 1   Agreement: UE URLLC requirements for Rel-15 features release independent from Rel-15  Sub-topic 6-1: Rel-16 URLLC BS features  **Issue 6-1-2: Whether to define performance requirements for PUSCH repetition type B**   * Proposals   + Option 1: Yes (Huawei, Intel, CTC)   + Option 2: No (Nokia, Samsung, Ericsson) * Recommended WF   + TBD   Nokia: what’s the timeline for this WI performance part?  Huawei: Current timeline is Dec, but we should focus on the technical discussion on this feature.  E///: We expect same performance compared to existing test cases, what’s the delta?  Nokia: We can further discuss this feature, but we are worry about the completion date and progress.  Intel: Mapping pattern is different and processing from receiver side is different compared to existing test cases even the performance can be similar.  Samsung: Compared to Type B, what’s the difference from baseband processing aspect?  China Telecomm: From receiver side, the processing is same. Meanwhile from operator side, we would like to check the operating scenario since the deployment scenarios are different.  This feature is Rel-16 feature introduced by Rel-16 URLLC feature and we see much Rel-16 WI performance need to be extended, we think time line not issue.  Huawei: The mapping can cause slot boundary, we didn’t cover such scenario for slot-cross.  Samsung: Fine to comprise for cover this new scenario but would like to further discuss the details of parameters.  We should prioritize the existing Rel-15 open issues.  Nokia: There are 3 cases each of them required new implementation which required further study.   * Postpone the decision in next RAN4 meeting, and till Dec 2020 focused on Rel-15 test cases open issues.   **Issue 6-1-3: Whether to define performance requirements for Inter-UE multiplexing**   * Proposals   + Option 1: Yes   + Option 2: No (Huawei, Intel, Nokia, Ericsson, Samsung, Nokia, CTC) * Recommended WF   + Do not define the performance requirement for inter-UE multiplexing as no demodulation impact is expected.   Agreement: Do not define the performance requirement for inter-UE multiplexing as no demodulation impact is expected.  Sub-topic 4-1: BS demodulation requirements of high reliability for FR1  **Issue 4-1-2: Whether to clarify the safety statement in specification**   * Proposals   + Option 1: No need to specify any safety statements in specification (Huawei, Samsung)   + Option 2: Yes     - Option 1a: Since the URLLC features of 5G NR will potentially be used in safety critical applications, the ultimately chosen statistical testing methodology for testing of these features must be verified by an independent body of experts/statisticians, before requirements and test can be used as basis for safety critical implementations. All statistical analysis and discussions provided in this meeting are to be taken as a best effort and is not to be taken as due diligence     - Option 1b: (Ericsson)       * If the URLLC features of 5G NR would be used in safety or mission critical applications, the ultimately chosen statistical testing methodology for testing of these features must be verified by an independent body of experts/statisticians. It is also important to bear in mind that the demodulation requirements do not take account of all aspects of system operation (for example RF, transmitter, internal interfaces, higher layer protocol software etc.). * Recommended WF   Agreement: capture following note in WF, not include into specification. ( no other companies show views on this topic till now except Huawei, Samsung, Nokia and E///).   * If the URLLC features of 5G NR would be used in safety or mission critical applications, the ultimately chosen statistical testing methodology for testing of these features must be verified by an independent body of experts/statisticians. It is also important to bear in mind that the demodulation requirements do not take account of all aspects of system operation (for example RF, transmitter, internal interfaces, higher layer protocol software etc.). |

##### 7.8.1.1 Performance requirements with ultra-low BLER [NR\_L1enh\_URLLC-Perf]

**R4-2017420 Email discussion summary for [97e][322] NR\_URLLC\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017620 (from R4-2017420).**

**RR4-2017620 Email discussion summary for [97e][322] NR\_URLLC\_Demod\_Part1**

*Type: other For: Information  
 Source: Moderator (Ericsson)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017507 WF on ultra-low BLER requirements**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017508 LS to RAN5 on CQI reporting for URLLC**

*Type: LS out For: Approval  
 to ran5  
 Source: Qualcomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

###### 7.8.1.1.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf]

**R4-2014241 UE demodulation requirements for Ultra low BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014541 Simulation results for Ultra-low BLER UE demodulation requirements**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015622 CR to TS 38.101-4: Applicability rules for URLLC UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0102 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For URLLC UE demodulation requirements, four new demodulation requirements are defined for FR1 and two for FR2. To clearly introduce new demodulation requirements in specification, applicability rules for these demodulation requirements should be clarified.

**Decision: Revised to R4-2017515 (from R4-2015622).**

**R4-2017515 CR to TS 38.101-4: Applicability rules for URLLC UE demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0102 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For URLLC UE demodulation requirements, four new demodulation requirements are defined for FR1 and two for FR2. To clearly introduce new demodulation requirements in specification, applicability rules for these demodulation requirements should be clarified.

**Decision: Return to.**

**R4-2015862 Summary of ideal and impairment results for ultra-low BLER UE**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Moderator summary of simulation results

**Decision: Revised to R4-2017495 (from R4-2015862).**

**R4-2017495 Summary of ideal and impairment results for ultra-low BLER UE**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Moderator summary of simulation results

**Decision: Return to.**

**R4-2016004 CR on FRC for UE Ultra-low BLER requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0109 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR1 UE Ultra-low BLER demodulation requirements

**Decision: Revised to R4-2017496 (from R4-2016004).**

**R4-2017496 CR on FRC for UE Ultra-low BLER requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0109 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR1 UE Ultra-low BLER demodulation requirements

**Decision: Return to.**

**R4-2016105 Simulation results on UE URLLC demodulation performance requirements for Ultra low BLER**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for URLLC Ultra low BLER requirements

**Decision: Noted.**

**R4-2016107 CR to TS 38.101-4: Performance requirements for URLLC PDSCH 0.001% BLER**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0112 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

New feature of PDSCH with 0.001% BLER were defined for URLLC. In order to test the performance of this new feature, a demodulation requirements are introduced as per RAN4 agreements.

**Decision: Revised to R4-2017497 (from R4-2016107).**

**R4-2017497 CR to TS 38.101-4: Performance requirements for URLLC PDSCH 0.001% BLER**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0112 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

New feature of PDSCH with 0.001% BLER were defined for URLLC. In order to test the performance of this new feature, a demodulation requirements are introduced as per RAN4 agreements.

**Decision: Return to.**

###### 7.8.1.1.2 CSI requirements [NR\_L1enh\_URLLC-Perf]

**R4-2014542 Discussion on CSI requirements for Ultra-low BLER**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015615 Discussion on CSI requireements with ultra low-BLER**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Discuss the open issues.

**Decision: Noted.**

**R4-2015621 CR to TS 38.101-4: Applicability rules for URLLC CSI requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0101 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

A new CQI table is designed for URLLC, to introduce the new CQI requirements, the applicability rule for URLLC CQI requirements should be clearly defined.

**Decision: Revised to R4-2017498 (from R4-2015621).**

**R4-2017498 CR to TS 38.101-4: Applicability rules for URLLC CSI requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0101 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

A new CQI table is designed for URLLC, to introduce the new CQI requirements, the applicability rule for URLLC CQI requirements should be clearly defined.

**Decision: Return to.**

**R4-2015863 On 0.001%BLER CQI test**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Discussion on CQI test

**Decision: Noted.**

**R4-2015864 Simulation results on URLLC UE CQI reporting requirements for CQI table 3**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for 0.001% BLER

**Decision: Noted.**

**R4-2016375 Draft CR on CQI reporting requirements with Table 3**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0114 Cat: B (Rel-16)  
  
 Source: Apple*

**Abstract:**

CQI Table 3 is introduced for target BLER of 10-5 on PDSCH. CQI reporting requirements for Table 3 are agreed to be introduced for URLLC in RAN4.

**Discussion:**

The secretary commented that the CR number should be zero padded, i.e. 114 -> 0114, and encouraged the source company to consider removal of 'Draft' from the title because the document type is CR.

**Decision: Revised to R4-2017499 (from R4-2016375).**

**R4-2017499 Draft CR on CQI reporting requirements with Table 3**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0114 Cat: B (Rel-16)  
  
 Source: Apple*

**Abstract:**

CQI Table 3 is introduced for target BLER of 10-5 on PDSCH. CQI reporting requirements for Table 3 are agreed to be introduced for URLLC in RAN4.

**Discussion:**

The secretary commented that the CR number should be zero padded, i.e. 114 -> 0114, and encouraged the source company to consider removal of 'Draft' from the title because the document type is CR.

**Decision: Return to.**

**R4-2016376 Draft CR on Applicability of CQI reporting requirements with Table 3**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0115 Cat: F (Rel-16)  
  
 Source: Apple*

**Abstract:**

CQI Table 3 is introduced for target BLER of 10-5 on PDSCH. CQI reporting requirements for Table 3 are agreed to be introduced for URLLC in RAN4. Applicability of newly added tests for optional UE features needs to be added.

**Discussion:**

The secretary commented that the CR number should be zero padded, i.e. 115 -> 0115, and encouraged the source company to consider removal of 'Draft' from the title because the document type is CR.

**Decision: Not pursued.**

**R4-2016445 Views on URLLC Ultra-low BLER CSI Reporting Test Cases**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

###### 7.8.1.1.3 BS demodulation requirements [NR\_L1enh\_URLLC-Perf]

**R4-2014543 Simulation results for Ultra-low BLER BS requirements**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015024 Test requirements for 0.001% BLER**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0156 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR to introduce URLLC into the performance specifications is created according to the CR work split agreed at RAN4#95-e. The following areas are covered:

Requirements/Measurement of Performance requirements

Annex C.3 / Measurement system set-up Annex D (for 0.001% BLER)

**Decision: Revised to R4-2017501 (from R4-2015024).**

**R4-2017501 Test requirements for 0.001% BLER**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0156 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR to introduce URLLC into the performance specifications is created according to the CR work split agreed at RAN4#95-e. The following areas are covered:

Requirements/Measurement of Performance requirements

Annex C.3 / Measurement system set-up Annex D (for 0.001% BLER)

**Decision: Return to.**

**R4-2015025 Introduction of URLLC 0.001% BLER requirement**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0234 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There is a need to introduce the URLLC requirement for 0.001% BLER, as discussed for the CR split at RAN4#95-e.

**Decision: Revised to R4-2017502 (from R4-2015025).**

**R4-2017502 Introduction of URLLC 0.001% BLER requirement**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0234 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There is a need to introduce the URLLC requirement for 0.001% BLER, as discussed for the CR split at RAN4#95-e.

**Decision: Return to.**

**R4-2015094 On NR Rel-16 BS demodulation performance requirements with ultra-low BLER**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have explained our choices for an ultra-low BLER URLLC statistical testing appendix CR. No new simulation results were included.

**Decision: Noted.**

**R4-2015096 CR for 38.104: Ultra high reliability BS demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0243 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Endorsed draftCR in last meeting.

Errors in configuration tables.

**Decision: Revised to R4-2017503 (from R4-2015096).**

**R4-2017503 CR for 38.104: Ultra high reliability BS demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0243 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Endorsed draftCR in last meeting.

Errors in configuration tables.

**Decision: Return to.**

**R4-2015098 CR for 38.141-1: URLLC testing methodology appendix**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0157 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Intel, Ericsson, Huawei, HiSilicon*

**Abstract:**

The WF [R4-2012646] requested to provide a detailed description of the test methodology in the BS conformance specification

**Decision: Revised to R4-2017504 (from R4-2015098).**

**R4-2017504 CR for 38.141-1: URLLC testing methodology appendix**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0157 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Intel, Ericsson, Huawei, HiSilicon*

**Abstract:**

The WF [R4-2012646] requested to provide a detailed description of the test methodology in the BS conformance specification

**Decision: Return to.**

**R4-2015099 CR for 38.141-2: URLLC testing methodology appendix**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0235 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Intel, Ericsson, Huawei, HiSilicon*

**Abstract:**

The WF [R4-2012646] requested to provide a detailed description of the test methodology in the BS conformance specification.

**Decision: Revised to R4-2017505 (from R4-2015099).**

**R4-2017505 CR for 38.141-2: URLLC testing methodology appendix**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0235 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell, Intel, Ericsson, Huawei, HiSilicon*

**Abstract:**

The WF [R4-2012646] requested to provide a detailed description of the test methodology in the BS conformance specification.

**Decision: Return to.**

**R4-2015625 CR to TS 38.141-1: Applicability of URLLC BS demodulation requirements**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0163 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As demodulation requirements for PUSCH mapping Type B with 2 symbol length allocated were agreed to be introduced in specification, the existing applicability for mapping type is needed to be updated when considering the new requirements.

**Decision: Revised to R4-2017521 (from R4-2015625).**

**R4-2017521 CR to TS 38.141-1: Applicability of URLLC BS demodulation requirements**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0163 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As demodulation requirements for PUSCH mapping Type B with 2 symbol length allocated were agreed to be introduced in specification, the existing applicability for mapping type is needed to be updated when considering the new requirements.

**Decision: Return to.**

**R4-2015627 CR to TS 38.141-2: FRC for FR1 URLLC BS performance requirements**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0240 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For URLLC test cases, new FRCs are defined and agreed in RAN4.

**Decision: Revised to R4-2017506 (from R4-2015627).**

**R4-2017506 CR to TS 38.141-2: FRC for FR1 URLLC BS performance requirements**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0240 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

For URLLC test cases, new FRCs are defined and agreed in RAN4.

**Decision: Return to.**

**R4-2015861 Summary of ideal and impairment results for ultra-low BLER BS**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Moderator summary of simulation results

**Decision: Revised to R4-2017500 (from R4-2015861).**

**R4-2017500 Summary of ideal and impairment results for ultra-low BLER BS**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Moderator summary of simulation results

**Decision: Return to.**

**R4-2015867 Base station ultra-low BLER simulation results**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results

**Decision: Noted.**

##### 7.8.1.2 Performance requirements with higher BLER [NR\_L1enh\_URLLC-Perf]

**R4-2017421 Email discussion summary for [97e][323] NR\_URLLC\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017621 (from R4-2017421).**

**RR4-2017621 Email discussion summary for [97e][323] NR\_URLLC\_Demod\_Part2**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017509 WF on URLLC UE performance requirements with higher BLER**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017510 Simulation assumption for URLLC FR2 UE performance requirements with higher BLER**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017525 WF on URLLC BS performance requirement with higher BLER**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017526 Simulation assumption for URLLC FR2 BS performance requirement with higher BLER**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

###### 7.8.1.2.1 UE demodulation requirements [NR\_L1enh\_URLLC-Perf]

**R4-2014242 UE demodulation requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014243 CR on requirements with slot aggreagation in FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0085 Cat: B (Rel-16)  
  
 Source: Apple*

**Abstract:**

Demodulation performance requirements for PDSCH slot aggregation feature in FR2 has been agreed to be introduced in RAN4 for URLLC. New requirements for this need to be added to for this.

**Decision: Revised to R4-2017514 (from R4-2014243).**

**R4-2017514 CR on requirements with slot aggreagation in FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0085 Cat: B (Rel-16)  
  
 Source: Apple*

**Abstract:**

Demodulation performance requirements for PDSCH slot aggregation feature in FR2 has been agreed to be introduced in RAN4 for URLLC. New requirements for this need to be added to for this.

**Decision: Return to.**

**R4-2014544 Discussion on UE demodulation requirements for URLLC**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015129 Discussion on eMBB UE performance requirement with pre-emption**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015616 Simulation results on UE PDSCH demodulation reuqirements with higher BLER and low latency**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Abstract:**

provide simulation results for FR1 low latency case

**Decision: Noted.**

**R4-2015617 Discussion on URLLC UE demodulation requirements with higher BLER and low latency**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Discuss the open issues.

**Decision: Noted.**

**R4-2015620 CR to TS 38.101-4: Addition of UE performance requirements for FR1 URLLC PDSCH repetitions over multiple slots**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0100 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

New feature of PDSCH repetitions over multiple slots were defined for URLLC. In order to test the performance of this new feature, a demodulation requirements are introduced as per RAN4 agreements.

**Decision: Revised to R4-2017511 (from R4-2015620).**

**R4-2017511 CR to TS 38.101-4: Addition of UE performance requirements for FR1 URLLC PDSCH repetitions over multiple slots**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0100 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

New feature of PDSCH repetitions over multiple slots were defined for URLLC. In order to test the performance of this new feature, a demodulation requirements are introduced as per RAN4 agreements.

**Decision: Return to.**

**R4-2015628 Summary of simulation results for UE URLLC demodulation performance requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2016005 CR on FRC for UE Higher BLER requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0110 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR1 UE demodulation requirements for scenarios with repetition and Type B mapping

**Decision: Revised to R4-2017512 (from R4-2016005).**

**R4-2017512 CR on FRC for UE Higher BLER requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0110 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR1 UE demodulation requirements for scenarios with repetition and Type B mapping

**Decision: Return to.**

**R4-2016103 Discussion on UE URLLC demodulation performance requirements with higher BLER**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides an overview of UE URLLC demodulation requirements

**Decision: Noted.**

**R4-2016104 Simulation results on UE URLLC demodulation performance requirements with higher BLER**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for URLLC High BLER requirements

**Decision: Noted.**

**R4-2016106 CR to TS 38.101-4: Performance requirements for URLLC High BLER feature tests**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0111 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

New feature of PDSCH URLLC feature test requirements including:

Test case for pre-emption indication for FR1

FR2 Type B requirements

**Decision: Revised to R4-2017513 (from R4-2016106).**

**R4-2017513 CR to TS 38.101-4: Performance requirements for URLLC High BLER feature tests**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0111 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

New feature of PDSCH URLLC feature test requirements including:

Test case for pre-emption indication for FR1

FR2 Type B requirements

**Decision: Return to.**

**R4-2016462 Views on URLLC High BLER Demodulation Test Cases**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016504 CR on FR1 PDSCH Mapping Type B and Processing Capability 2 Requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0121 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Draft CR R4-2012652 was endorsed in last meeting with this change: FR1 PDSCH Mapping Type B and Processing Capability 2 requirements are not defined.

**Decision: Revised to R4-2017516 (from R4-2016504).**

**R4-2017516 CR on FR1 PDSCH Mapping Type B and Processing Capability 2 Requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0121 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Draft CR R4-2012652 was endorsed in last meeting with this change: FR1 PDSCH Mapping Type B and Processing Capability 2 requirements are not defined.

**Decision: Return to.**

###### 7.8.1.2.2 BS demodulation requirements [NR\_L1enh\_URLLC-Perf]

**R4-2014545 Discussion on BS demodulation requirements for URLLC**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014820 CR for TS 38.141-2: Introduction of performance requirements of PUSCH repetition type A and PUSCH mapping type B for URLLC**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0232 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Abstract:**

This CR introduces performance requirements of PUSCH repetition Type A and PUSCH mapping type B with non-slot transmission for URLLC.

**Decision: Revised to R4-2017517 (from R4-2014820).**

**R4-2017517 CR for TS 38.141-2: Introduction of performance requirements of PUSCH repetition type A and PUSCH mapping type B for URLLC**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0232 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Abstract:**

This CR introduces performance requirements of PUSCH repetition Type A and PUSCH mapping type B with non-slot transmission for URLLC.

**Decision: Return to.**

**R4-2014821 Views on NR BS performance for high-reliability and low-latency**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015023 FRCs for URLLC**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0155 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR to introduce URLLC into the performance specifications is created according to the CR work split agreed at RAN4#95-e. The following areas are covered FRC

A draft CR with the same content was endorsed in R4-2012654 at RAN4#96-e

**Decision: Revised to R4-2017518 (from R4-2015023).**

**R4-2017518 FRCs for URLLC**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0155 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

This CR to introduce URLLC into the performance specifications is created according to the CR work split agreed at RAN4#95-e. The following areas are covered FRC

A draft CR with the same content was endorsed in R4-2012654 at RAN4#96-e

**Decision: Return to.**

**R4-2015095 On NR Rel-16 BS demodulation performance requirements with higher BLER and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open high reliability and low latency (e)URLLC issues. In particular on, remaining configurations for FR1 high reliability, remaining configurations for FR2 low latency, and introduction of Rel-16

**Decision: Noted.**

**R4-2015097 CR for 38.104: Low latency BS demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0244 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Endorsed draftCR in last meeting.

Errors in configuration tables.

**Decision: Revised to R4-2017524 (from R4-2015097).**

**R4-2017524 CR for 38.104: Low latency BS demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0244 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Endorsed draftCR in last meeting.

Errors in configuration tables.

**Decision: Return to.**

**R4-2015122 Discussion and simulation results for BS URLLC requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015123 Draft CR on PUSCH repetition type A and PUSCH mapping type B radiated performance requirement for TS 38.104**

*Type: draftCR For: Endorsement  
 38.104 v16.5.0  
 Source: Samsung*

**Abstract:**

PUSCH requirements with high reliability and lower latency have been introduced in Rel-16 URLLC WI for FR2

**Decision: Revised to R4-2017519 (from R4-2015123).**

**R4-2017519 Draft CR on PUSCH repetition type A and PUSCH mapping type B radiated performance requirement for TS 38.104**

*Type: draftCR For: Endorsement  
 38.104 v16.5.0  
 Source: Samsung*

**Abstract:**

PUSCH requirements with high reliability and lower latency have been introduced in Rel-16 URLLC WI for FR2

**Decision: Return to.**

**R4-2015124 Draft CR on FRC for URLLC BS radiated performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.5.0  
 Source: Samsung*

**Abstract:**

PUSCH requirements with high reliability and lower latency have been introduced in URLLC in Rel-16. There is no FRC table for FR2 PUSCH requirements with high reliablity and lower latency requirement testing

**Decision: Revised to R4-2017520 (from R4-2015124).**

**R4-2017520 Draft CR on FRC for URLLC BS radiated performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.5.0  
 Source: Samsung*

**Abstract:**

PUSCH requirements with high reliability and lower latency have been introduced in URLLC in Rel-16. There is no FRC table for FR2 PUSCH requirements with high reliablity and lower latency requirement testing

**Decision: Return to.**

**R4-2015618 Discussion on URLLC BS demodulation requirements with higher BLER and low latency**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Abstract:**

Discuss the open issues.

**Decision: Noted.**

**R4-2015619 Simulation results on PUSCH demodulation reuqirements with higher BLER and low latency**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Abstract:**

provide simulation results for FR1 high reliability and low latency case

**Decision: Noted.**

**R4-2015623 CR to TS 38.104: Addition of BS performance requirements for URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0249 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was agreed to be introduced as the new feature for URLLC to improve the high reliability for PUSCH performance. In order to verify the demodulation performance for PUSCH repetition Type A, the new demodulation requirements are defined.

**Decision: Revised to R4-2017527 (from R4-2015623).**

**R4-2017527 CR to TS 38.104: Addition of BS performance requirements for URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0249 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was agreed to be introduced as the new feature for URLLC to improve the high reliability for PUSCH performance. In order to verify the demodulation performance for PUSCH repetition Type A, the new demodulation requirements are defined.

**Decision: Return to.**

**R4-2015624 CR to TS 38.141-1: Addition of BS conformance testing for URLLC demodulation requirements with higher BLER**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0162 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was defined as the new feature to improve the high reliability for PUSCH performance. PUSCH mapping Type B with low number of symbols was agreed to be configured to reduce latency. In order to verify these two features for URLLC, the demodulation requirements are defined and should be introduced in this specification.

**Decision: Revised to R4-2017528 (from R4-2015624).**

**R4-2017528 CR to TS 38.141-1: Addition of BS conformance testing for URLLC demodulation requirements with higher BLER**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0162 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was defined as the new feature to improve the high reliability for PUSCH performance. PUSCH mapping Type B with low number of symbols was agreed to be configured to reduce latency. In order to verify these two features for URLLC, the demodulation requirements are defined and should be introduced in this specification.

**Decision: Return to.**

**R4-2015626 CR to TS 38.141-2: Addition of BS conformance testing for FR2 URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0239 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was agreed to be introduced as the new feature for URLLC FR2 to improve the high reliability for PUSCH performance. In order to verify the demodulation performance for PUSCH repetition Type A, the new demodulation requirements are defined.

**Decision: Revised to R4-2017522 (from R4-2015626).**

**R4-2017522 CR to TS 38.141-2: Addition of BS conformance testing for FR2 URLLC PUSCH repetition Type A**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0239 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

PUSCH repetition Type A was agreed to be introduced as the new feature for URLLC FR2 to improve the high reliability for PUSCH performance. In order to verify the demodulation performance for PUSCH repetition Type A, the new demodulation requirements are defined.

**Decision: Return to.**

**R4-2015629 Summary of simulation results for BS URLLC demodulation performance requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2015865 BS demodulation parameters**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Proposals for remaining open parameters

**Decision: Noted.**

**R4-2015866 Simulation results for BS high BLER URLLC**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results

**Decision: Noted.**

**R4-2016006 CR on FR2 requirements for PUSCH mapping Type B with low number of symbols**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0246 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR2 BS PUSCH demodulation requirements for scenarios with PUSCH mapping Type B with low number of symbols

**Decision: Revised to R4-2017523 (from R4-2016006).**

**R4-2017523 CR on FR2 requirements for PUSCH mapping Type B with low number of symbols**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0246 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FR2 BS PUSCH demodulation requirements for scenarios with PUSCH mapping Type B with low number of symbols

**Decision: Return to.**

### 7.6 UE power saving in NR [NR\_UE\_pow\_sav]

#### 7.6.3 Demodulation and CSI requirements (38.101-4) [NR\_UE\_pow\_sav-Perf]

**R4-2017419 Email discussion summary for [97e][321] NR\_UE\_pow\_sav\_Demod**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017619 (from R4-2017419).**

**RR4-2017619 Email discussion summary for [97e][321] NR\_UE\_pow\_sav\_Demod**

*Type: other For: Information  
 Source: Moderator (CATT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017494 WF on power saving demodulation**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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| **GTW Session 11.6th**  **Sub-topic#1-1-1 : Test set-up**  **Issue 1-1-1: Which test metric do you prefer to be used for PDCCH-WUS/PDCCH test?**  During the first round discussion, companies showed their views on Option 1 and Option 2. There is a clear majority support to move forward with Option 1 to complete this WI.  Option 1: CATT, Intel, MediaTek, Apple, vivo, CMCC, Qualcomm   * + 1a: Compared to PDCCH demodulation requirement, SNR remains unchanged, and the Pm-dsg\_total=1.099%   + 1b: Pm-dsg\_total=1%, and add little margin to SNR comparing to the PDCCH demodulation requirement.   + 1c: Pm-dsg\_total=1%   Option 2: Huawei  Among the companies supporting option 1, there is a clear majority support to move forward with option 1c in terms of the test metric.  Huawei: we agreed to verify PDCCH-WUS, we think option2 still feasible to verify PDCCH-WUS with 0.1%.  We think it’s 4 times compared to URRLC test cases, we think it’s feasible.  For comprise, we can accept to go with 1% test metric meanwhile we would like to verify some specific design with multiple search space in test set-up.  From RAN1 aspect, PDCCH WUS can be configured with larger payload size.  Option 1 with 2 search space configured.  Agreement:  Option 1c: Pm-dsg\_total=1%  Payload size and search spaceconfiguration for PDCCH-WUS: FFS pending on 2nd round discussion  QC: We have different understanding on PDCCH-WUS usage, with configured PDCCH-WUS, not meaning UE should always be wake-up.  CMCC: We think large payload size is not typical scenario in NW.  MTK: 2 search spaces is UE implementation, also wondering the usage scenario using multiple search space considering power consumption issue.  Intel: With PDCCH-WUS should be configured under typical scenarios which means PDCCH-WUS performance should be roust compared to normal PDCCH performance.  Huawei: Payload size under PDCCH-WUS larger than PDCCH is more typical scenario.  QC: with 2~3 search spaces, 1 time or several times over multiple search space?  MTK: It’s not defined in specification clearly for UE implementation with multiple search space. It’s up to gNB scheduling.  Huawei: Yes, PDCCH-WUS transmitted several times over multi-search spaces. UE need to follow gNB scheduling.  QC: The Purpose of multiple search space in RAN1 just allows NW flexibility not reliable transmission with repetition transmission. It’s purely UE implementation for PDCCH-WUS decoding.  MTK: Similar view QC.  Huawei: we have different understanding of major purpose RAN1 introducing multi-search space. |

**R4-2014215 Discussion on PDCCH-WUS/PDCCG test**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014411 Discussion on power saving demodulation test**

*Type: discussion For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014412 CR for TS38.101-4, test for PDCCH DCI format 2\_6 demodulation**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0086 Cat: B (Rel-16)  
  
 Source: CATT*

**Abstract:**

Demodulation performance requirement for PDCCH DCI formant 2\_6 needs to be defined.

**Decision: Return to.**

**R4-2014454 Work plan for power saving demodulation**

*Type: other For: Approval  
 Source: CATT*

**Decision: Return to.**

**R4-2014529 Discussion on DCP test cases for R16 UE power saving**

*Type: discussion For: Discussion  
 Source: vivo*

**Decision: Noted.**

**R4-2014540 Discussion on PDCCH-WUS requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014727 Demodulation on UE power saving**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2015127 Discussion on performance requirements for PDCCH-WUS**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015595 Discussion on the performance requirements for NR power saving**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

### 7.9 Enhancements on MIMO for NR [NR\_eMIMO]

#### 7.9.4 Demodulation and CSI requirements (38.101-4) [NR\_eMIMO-Perf]

##### 7.9.4.1 General [NR\_eMIMO-Perf]

**R4-2017422 Email discussion summary for [97e][324] NR\_eMIMO\_Demod**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017622 (from R4-2017422).**

**RR4-2017622 Email discussion summary for [97e][324] NR\_eMIMO\_Demod**

*Type: other For: Information  
 Source: Moderator (Samsung)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017529 WF for NR eMIMO PDSCH requirement**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017530 Simulation assumption for PDSCH requirement with single-DCI and Multi-DCI transmission schemes**

*Type: other For: Approval  
 Source: Ericsson, Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017531 Way forward on PMI reporting requirement for NR eMIMO**

*Type: other For: Approval  
 Source: Ericsson, Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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| **GTW session 11.5th**  **Topic#2 CSI requirements**  **Issue 2-1-1: SU-MIMO VS MU-MIMO Setup**   * Proposals   + Option 1: SU-MIMO Set-up (Apple, R&S, Huawei, Qualcomm, Samsung) * Option 1a: Using SU-MIMO set-up to introduce PMI test cases meanwhile a MU-MIMO setup based demodulation test with test metric of either follow PMI based or random PMI based throughput can be introduced (Huawei) * Option 1b: Introduce Type II PMI test cases under SU-MIMO test set-up in Rel-16 timeframe. Further study and define proper performance requirements if needed under MU-MIMO scenarios in Rel-17 performance enhancement WI (Samsung)   + Option 2: MU-MIMO Set-up (Ericsson, Nokia)   Agreement:  Introduce Rel-16 eType II codebook requirements with SU-MIMO set-up under the condition that with proper test parameters, test metric/ test requirements and test procedure to ensure enough performance difference over than Type I i.e. UE which employ Type I reporting will fail in the test case   * Test metric : Further check results based on following candidate options during 2nd round   + Option 1: Following PMI/Random PMI   + Option 2: Following with eType II codebook / following PMI with Type I codebook   Further study and define proper performance requirements if needed under MU-MIMO scenario in Rel-17 performance enhancement WI.  The same agreements applied for Rel-15 Type II test case(s).  E//: We need to have clear meaning on what does the performance gap over Type I . We would like to further discuss test metric to guarantee the performance difference.  Apple: Any proposal for how to discriminate UE behavior?  E///: We should introduce test metric and test requirements to ensure UE processing properly.  Apple: Typically, we introduce test metric with TP ratio over random PMI. We see the gain achieved that’s the history we introduce test cases.  Huawei/Nokia: we would like to see the gain how to guarantee the discrimination UE behavior.  Apple: this meeting we have results show gain over Type I and random, what’s the plan we need to discuss the gain based on the results?  **Issue 2-2-1: MIMO Correlation**   * Proposals   + Option 1: XP (custom)low ( Ericsson)   + Option 2: XP Medium (Previous agreement)   Agreement:   * XP Medium (Baseline assumption) * XP (custom)low only can be considered if XP medium not workable   **Topic #1 PDSCH requirements**  **Issue 1-2-1: Number of test cases for single-DCI/multi-DCI eMBB transmission schemes**   * Proposals   + Option 1: 3 test cases per duplex mode with test applicability rule (Samsung, Intel, Ericsson, MTK, Qualcomm, Apple) * Test 1a: Single-DCI with frequency offset and negative time offset and overlapping scheduling * Test 1b: Single-DCI with positive time offset, and overlapping scheduling * Test 2a: Multi- DCI with frequency offset and negative time offset and non-overlapping scheduling * Applicability rule * If UE only supports single-DCI based multi-TRP transmission for eMBB, it should be tested with test case 1a and test case 1b * If UE can support both single-DCI and multi-DCI for eMBB, it should be tested test 2a and test 1b   + Option 2a: only 2 test cases per duplex mode (Huawei, Intel) * Test 1b: Single-DCI with frequency and positive time offset, and overlapping scheduling * Test 2a: Multi- DCI with frequency offset and negative time offset and non-overlapping scheduling   Agreement:  3 test cases per duplex mode with test applicability rule (Samsung, Intel, Ericsson, MTK, Qualcomm, Apple)   * Test 1a: Single-DCI with frequency offset and negative time offset and overlapping scheduling * Test 1b: Single-DCI with positive time offset, and overlapping scheduling * Test 2a: Multi- DCI with frequency offset and negative time offset and non-overlapping scheduling * Applicability rule * If UE only supports single-DCI based multi-TRP transmission for eMBB, it should be tested with test case 1a and test case 1b * If UE can support both single-DCI and multi-DCI for eMBB, it should be tested test 2a and test 1b * If UE only support multi-DCI transmission schemes for eMBB, it should be test 2a   **Issue 1-3-1: Test cases for URLLC Transmission schemes**  *Candidate options:*   * Proposals   + Option 1(Samsung, Intel, Ericsson, Huawei, MTK): Define performance requirement for URLLC transmission schemes with test applicability rule * Only FDM scheme A for UE capable of *supportFDM-SchemeA* and inter-slot TDM scheme for UE capable of *supportIntel-slotTDM* * Test applicability * FDM scheme is skipped if UE passes the multi-DCI based multi-TRP Tx requirements * TDM scheme is skipped if UE passes URLLC slot aggregation requirements and anyone of the other multi-TRP Tx requirements   + Option 2(Apple, Qualcomm): No to define requirement for URLLC transmission schemes   Agreement:  Define performance requirement for URLLC transmission schemes with test applicability rule   * Only FDM scheme A for UE capable of *supportFDM-SchemeA* and inter-slot TDM scheme for UE capable of *supportIntel-slotTDM* * Test applicability * FDM scheme is skipped if UE passes the multi-DCI based multi-TRP Tx requirements * TDM scheme is skipped if UE passes URLLC slot aggregation requirements and anyone of the other multi-TRP Tx requirements |

**R4-2014248 Draft CR for eMIMO demod requirements - General and Applicability rule**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Apple*

**Abstract:**

Under eMIMO WI, PDSCH demodulation requirements are agreed to be defined for multi-TRP multi-DCI and single DCI SDM scheme. The applicability of the newly defined tests needs to be captured.

**Decision: Revised to R4-2017601 (from R4-2014248).**

**R4-2017601 Draft CR for eMIMO demod requirements - General and Applicability rule**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Apple*

**Abstract:**

Under eMIMO WI, PDSCH demodulation requirements are agreed to be defined for multi-TRP multi-DCI and single DCI SDM scheme. The applicability of the newly defined tests needs to be captured.

**Decision: Return to.**

**R4-2014741 Views for Multi-Panel/TRP transmision schemes**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2014742 Simulation results summary for Rel-16 eMIMO WI**

*Type: discussion For: Information  
 Source: Samsung*

**Decision: Return to.**

##### 7.9.4.2 Demodulation requirements [NR\_eMIMO-Perf]

**R4-2015830 Draft CR: PDSCH FRC for eMIMO sDCI/mDCI-based SDM transmission**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Ericsson*

**Abstract:**

FRC for PDSCH demodulation requirement with sDCI/mDCI-based SDM transmission is missing.

**Decision: Revised to R4-2017650 (from R4-2015830).**

**R4-2017650 Draft CR: PDSCH FRC for eMIMO sDCI/mDCI-based SDM transmission**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Ericsson*

**Abstract:**

FRC for PDSCH demodulation requirement with sDCI/mDCI-based SDM transmission is missing.

**Decision: Return to.**

###### 7.9.4.2.1 Single-DCI based SDM scheme [NR\_eMIMO-Perf]

**R4-2014557 Views on UE demodulation requirements for single-DCI based multi-TRP SDM Tx scheme**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014743 Simulation results for Single-DCI SDM scheme**

*Type: discussion For: Information  
 Source: Samsung*

**Decision: Noted.**

**R4-2015650 Simulaiton results of PDSCH requirements for Single-DCI SDM scheme**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015653 DraftCR for 38.101-4: Introduction of PDSCH requirement with Single-DCI based SDM scheme**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PDSCH requirements of Single-DCI based SDM scheme and the aligned requirements need to be added into the specfication

**Decision: Revised to R4-2017532 (from R4-2015653).**

**R4-2017532 DraftCR for 38.101-4: Introduction of PDSCH requirement with Single-DCI based SDM scheme**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PDSCH requirements of Single-DCI based SDM scheme and the aligned requirements need to be added into the specfication

**Decision: Return to.**

**R4-2015831 Simulation results of single-DCI based SDM transmission**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution provides the PDSCH simulation results of sDCI-based SDM transmission schemes.

**Decision: Noted.**

###### 7.9.4.2.2 Multi-DCI based transmission scheme [NR\_eMIMO-Perf]

**R4-2014556 Views on UE demodulation requirements for multi-DCI based multi-TRP Tx schemes**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014744 Simulation results for Multi-DCI transmission schemes**

*Type: discussion For: Information  
 Source: Samsung*

**Decision: Noted.**

**R4-2015128 Simulation results on PDSCH performance requirements for multi-DCI based multi-TRP transmission**

*Type: discussion For: Discussion  
 Source: MediaTek inc.*

**Decision: Noted.**

**R4-2015648 Discussion on left open issues of PDSCH performance requirements for multi/single-DCI transmission scheme**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015649 Simulation results of PDSCH requirements for Multi-DCI transmission scheme**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015654 DraftCR for 38.101-4: Introduction of PDSCH requirement with Multi-DCI based transmission scheme**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PDSCH requirements of Multi-DCI based transmission scheme and the aligned requirements need to be added into the specfication

**Decision: Revised to R4-2017533 (from R4-2015654).**

**R4-2017533 DraftCR for 38.101-4: Introduction of PDSCH requirement with Multi-DCI based transmission scheme**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PDSCH requirements of Multi-DCI based transmission scheme and the aligned requirements need to be added into the specfication

**Decision: Return to.**

**R4-2015832 PDSCH requirements for mDCI/sDCI-based SDM transmission**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the PDSCH demodulation requirements with mDCI/sDCI-based SDM transmission schemes.

**Decision: Noted.**

**R4-2015833 Simulation results of multi-DCI based SDM transmission**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution provides the PDSCH simulation results of mDCI-based SDM transmission schemes.

**Decision: Noted.**

###### 7.9.4.2.3 Single-DCI based transmission schemes (URLLC) [NR\_eMIMO-Perf]

**R4-2014558 Views on UE demodulation requirements for single-DCI based multi-TRP Repetition Tx schemes**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014559 CR to TS 38.101-4: Performance requirements single-DCI based multi-TRP Repetition Tx schemes**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0089 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 DL performacne requirements for single-DCI based multi-TRP Tx schemes

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017534 (from R4-2014559).**

**R4-2017534 CR to TS 38.101-4: Performance requirements single-DCI based multi-TRP Repetition Tx schemes**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0089 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 DL performacne requirements for single-DCI based multi-TRP Tx schemes

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2014745 Simulation results for Single-DCI URLLC schemes**

*Type: discussion For: Information  
 Source: Samsung*

**Decision: Noted.**

**R4-2015651 Discussion on PDSCH performance reuqirements for Multi-TRP URLLC schemes**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015652 Simulation results of PDSCH requirements for Single-DCI URLLC schemes**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015834 Discussion on sDCI-based FDM/TDM transmission schemes**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the PDSCH demodulation requirements on sDCI-based FDM/TDM transmission schemes.

**Decision: Noted.**

##### 7.9.4.3 CSI requirements [NR\_eMIMO-Perf]

**R4-2014249 On PMI reporting requirements with eType II codebook**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014740 Views and simulation results for Rel-16 Type II PMI test case**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2014747 Draft CR for introduction of Rel-15 Type II PMI test cases**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Samsung*

**Abstract:**

Introduce PMI tese case to verify UE reporting accuracy for Rel-16 Type II codebook

**Decision: Revised to R4-2017535 (from R4-2014747).**

**R4-2017535 Draft CR for introduction of Rel-15 Type II PMI test cases**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Samsung*

**Abstract:**

Introduce PMI tese case to verify UE reporting accuracy for Rel-16 Type II codebook

**Decision: Return to.**

**R4-2014949 On PMI reporting requirements for enhanced Type II codebooks**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2015646 Discussion on the test setup of (e)Type II codebook based PMI reporting test**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015647 Simulation results for SU-MIMO eType II codebook based PMI reporting test**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016033 Discussion on Type II PMI reporting test definition**

*Type: discussion For: Approval  
 Source: Rohde & Schwarz*

**Decision: Noted.**

**R4-2016101 Simulation results for Rel-16 Type II codebook**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for Rel-16 Type II codebook

**Decision: Noted.**

**R4-2016102 Evaluations of Rel-16 Type II PMI testing**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides our views on Rel-16 Type II codebook PMI testing

**Decision: Noted.**

**R4-2016429 Views on CSI Reporting test cases for eMIMO**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

### 7.10 Add support of NR DL 256QAM for FR2 [NR\_DL256QAM\_FR2]

#### 7.10.1 Demodulation and CSI requirements (38.101-4) [NR\_DL256QAM\_FR2-Perf]

**R4-2017423 Email discussion summary for [97e][325] NR\_DL256QAM\_FR2\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017623 (from R4-2017423).**

**RR4-2017623 Email discussion summary for [97e][325] NR\_DL256QAM\_FR2\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

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| **GTW session 11.9th**  **Issue 1-1: Propagation condition**  ·    *Agreement in RAN4 #96e (R4-2012666, WF)*  –   *Propagation condition*  o *Use fading channel*  o *In the next meeting, companies are encouraged to provide ideal and impairment results for both option 1A and option 1B, and down select one of the two options based on simulation results.*   * *Option 1A: TDLA30-300* * *Option 1B: TDLD30-75*   §   *Note: extra effort on TDLD channel model simplification is needed.*  ·    *Candidate options:*  –   Option 1A: TDLA30-300 (CTC, Huawei, DCM first priority)  –   Option 1B: TDLD30-75 (ZTE, Intel, QC, DCM second priority)  Intel: We evaluated the achievable SNR points, both options feasible meanwhile option 1B has larger margin and option 1B has extended test coverage since it’s not included in current spec.  E///: What’s TE vendors’ feedback, FR2 test feasibility has been analyzed in RAN5.  China Telecomm: We are fine with TDLD, meanwhile till now we don’t have simplified TDLD channel model, any volunteer plan to contribute?  In existing Rel-15 UE performance test cases, test cases with high SNR points already exists , nothing specific for this test cases. We are open to discuss the issue in generic way not stick to this WI specific.  Huawei: From simulation results, only 1dB performance difference, from test aspect, no much difference. Option 1B need additional work for channel model into option 1B.  QC: We share similar concern as E///, we have 1.5 dB additional margin compared to option 1A. We think option 1B more close to FR2 deployment reality.  Intel: We can volunteer to do the channel model work.  Agreement:  Introduce test case with option 1B based on the assumption that we can complete the work for introducing TDL-D channel model into specification in RAN4#98e. If no conclusion for introducing TDL-D channel model in RAN4#98e, then RAN4 will adopt option 1A instead of option 1B.  **Issue 2-1: Whether to define SDR requirements for FR2 256QAM**  ·    *Candidate options:*  –   Option 1: Add 256QAM (modulation format of 8) to FR2 SDR requirements (CTC, DCM)  –   Option 2: Not to define FR2 SDR requirements for 256QAM (Intel, Huawei, Ericsson, QC)  Intel: Due to SNR limitation, FR2 SDR test cases is quite challenge. With 256QAM cases, the applicable test cases quite rare for SDR test cases.  China Telecomm: We can comprise without 256QAM SDR test under the condition we can have CQI test cases with CQI table 2.  DoCoMo: Similar view as China Telecomm.  Huawei: Both fading and static CQI or only one of test cases for CQI test cases?  Agreement:  No SDR test cases for FR2 256QAM  Introduce fading CQI test cases only under rank1 with CQI table 2 in FR2  No static CQI test cases with rank2  **Issue 3-1 (Whether to define FR2 CQI reporting requirements for CQI table 2) & Issue 3-2 (SNR testing point)**  ·    *Check if it is reasonable to select the following options for the two technic issues discussed in the first round:*  –   Issue #1: Metrics to judge whether 256QAM can be ‘covered’   * Metric for AWGN condition: SNR achieving median CQI 12 * Metric for fading condition: SNR point that 256QAM can be reported with around 36% - 50% probability   –   Issue #2: use option 1   * Option 1: Extra 3dB margin needs to be considered for high SNR test point   ·    *Moderator’s recommendation:*  –   For AGWN condition with rank 2, not define CQI reporting requirements  –   For fading condition with rank 1, define CQI reporting requirements   * Candidate SNR testing point for the higher SNR: 17/18dB (without margin)   E///: For fading CQI and static CQI test, the reliability with 256QM CQI values is quite low which need to increase SNR points, about 20-22dB SNR points.  China Telecomm: From simulation results, at SNR 17-18 dB points , over 50% can achieve 256QAM CQI values. We think no test feasibility issue.  QC: Our study based fixed MCS levels, at least more 19dB to have 256QAM MCS levels. Another observation from E///, the achievable 20% BLER. With test, OLLA applied then 256QAM not achievable.  E///: When we decide test cases, we need to consider 10% BLER.  Agreement:  Fading CQI test cases under rank1 transmission with CQI table 2:   * SNR: FFS for higher test points   No SDR test cases for FR2 256QAM  Introduce fading CQI test cases only under rank1 with CQI table 2 in FR2  China Telecomm: In static CQI test cases, we use rank2 transmission. We already define candidate test applicable rules, if Static CQI rank2 test, then skip existing static CQI test cases with CQI table 1.  Static CQI test cases with rank 1: E///  Fading CQI test cases with rank 1: Huawei, China Telecomm |

**R4-2017536 WF on UE demodulation and CSI reporting requirements for FR2 DL 256QAM**

*Type: other For: Approval  
 Source: China Telecomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

##### 7.10.1.1 UE Demodulation requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2014546 Discussion on UE demodulation requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014547 Summary of simulation results FR2 DL 256QAM demodulation requirements**

*Type: other For: Information  
 Source: Intel Corporation*

**Decision: Return to.**

**R4-2014674 Updated work plan for FR2 DL 256QAM demodulation and CSI reporting requirements**

*Type: Work Plan For: Approval  
 Source: China Telecom*

**Decision: Return to.**

**R4-2014675 On UE demodulation requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2015019 Propagation Condition for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2015021** **CR to demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: ZTE Corporation*

**Decision: Revised to R4-2017537 (from R4-2015021).**

**R4-2017537 CR to demodulation performance requirements**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: ZTE Corporation*

**Decision: Return to.**

**R4-2015314 Views on 256QAM UE requirements for FR2**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015596 CR on applicability and FRC for PDSCH normal demodulation for DL 256QAM for FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0095 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce applicability rules and FRC for PDSCH normal demodulation for DL 256QAM for FR2 as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0095 is missing on the coversheet.

**Decision: Endorsed.**

**R4-2015597 Discussion on PDSCH requirements for NR DL 256QAM for FR2**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016095 Simulation results for FR2 256QAM UE demodulation**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides simulation results for UE demodulation for FR2 256QAM

**Decision: Noted.**

##### 7.10.1.2 SDR requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2014548 Discussion on SDR requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014676 On SDR requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2015315 Views on 256QAM SDR requirements for FR2**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015598 CR on SDR requirements for DL 256QAM for FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0096 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce SDR requirements for DL 256QAM for FR2 if RAN4 achieve agreements

**Discussion:**

The secretary commented that the CR number 0096 is missing on the coversheet.

**Decision: Revised to R4-2017538 (from R4-2015598).**

**R4-2017538 CR on SDR requirements for DL 256QAM for FR2**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0096 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce SDR requirements for DL 256QAM for FR2 if RAN4 achieve agreements

**Discussion:**

The secretary commented that the CR number 0096 is missing on the coversheet.

**Decision: Return to.**

**R4-2015599 Discussion on SDR requirements for NR DL 256QAM for FR2**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015600 Summary of simulation results for SDR requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016093 Discussion on FR2 DL 256QAM? SDR Requirements**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

This paper provides our views on SDR requirements for FR2 256QAM

**Decision: Noted.**

##### 7.10.1.3 CSI requirements [NR\_DL256QAM\_FR2-Perf]

**R4-2014677 On CQI reporting requirements for FR2 DL 256QAM**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2014678 Summary of CQI reporting simulation results for FR2 DL 256QAM (TDD)**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Return to.**

**R4-2015601 Discussion and simulation results on CQI requirements for NR DL 256QAM for FR2**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2016092 Discussion on FR2 DL 256QAM? UE CQI testing**

*Type: discussion For: Approval  
 Source: Ericsson*

**Abstract:**

This paper provides our views on CSI performance requirements for FR2 256QAM

**Decision: Noted.**

**R4-2016094 Simulation results for FR2 256QAM UE CQI performance requirements**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for UE CQI performance requirements for FR2 256QAM

**Decision: Noted.**

### 7.15 NR support for high speed train scenario [NR\_HST]

#### 7.15.3 Demodulation and CSI requirements (38.101-4 / 38.104) [NR\_HST-Perf]

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| GTW session 11.5th  Topics from email thread [326]  **Issue 1-1: MCS**   * + **Option 1 (ZTE, Apple): MCS 13 based on 64QAM table (same as HST-SFN)**   + **Option 2 (Intel, Huawei, CMCC, Ericsson): MCS 17 based on 64QAM tables**   **Recommended WF: Can we go with option2?**  Agreement: **MCS 17 based on 64QAM tables**  **Issue 1-2: Scheduling in TDD special slot**   * Option 1 (Intel, Huawei, ZTE, Apple, vivo, Ericsson): Scheduled PDSCH in TDD special slots and the special slot configuration as S: 6D 4G 4U. * Option 2 (QC): Not schedule PDSCH in TDD special slots for HST-DPS TDD tests   **Recommended WF: Can we go with option 1?**  QC: DPS schema 1a, huge jump see from one RRH to another RRH; due to that point, the estimation on special slots have performance loss due to DMRS pattern (1 DMRS symbol only). Time vary channel observed at the transition points.  Intel: We have results no show performance impact.  E//: Similar view as Intel, for transition period only 1% percentile in test time, the impact on performance neglectable.  Huawei: Similar view as Intel, the operation under transition period up to implementation.  Vivo: Similar view as Intel, lower MCS in special slot.  **Tentative Agreement:** Scheduled PDSCH in TDD special slots and the special slot configuration as S: 6D 4G 4U as baseline based on the assumption that no obvious performance degradation compared to no slots scheduled in special slot. (pending on further check by QC)  **Issue 1-3: Number of active TCI states in DPS transmission scheme 1b**   * Option 1 (Apple, Huawei, CMCC, QC, Apple, ZTE, vivo, Ericsson): with 2 active TCI states. * Option 2 (Intel): with 2 and 3 active TCI states. * Option 3 (Intel): Define requirements only for scenario with more than 2 active TCI states.   **Recommended WF: Can we go with option 1?**  Agreement:  Go with option 1 in Rel-16 , RAN4 can decide whether to further discuss test cases with >2 active TCI states in Rel-17 timeframe i.e. in Rel-17 FR1 HST WI.  **Issue 1-4: Modified step 3 for transmission scheme 1a**  **Issue 1-5: Modified test setup for transmission scheme 1a**  **Issue 1-7: Transmission scheme 1b with 2 active TCI states**  Agreement: In test setup for DPS 1a (Step3), PDSCH associated with TCI #0 is transmitted during the slots from 0 to [n] + HARQ needed time + 3ms.   * Note: MAC CE transmitted in slot n   **[Test setup for transmission scheme 1a~~:~~**   * Two RRH s of RRH#(2k) and RRH#(2k+1) are assumed, and SSB#0 is transmitted from both TRPs, where k is the RRH number with k=0,1, 2, …   + UE is configured with TCI#(k mod 2) and TCI#(k+1 mod 2) that are associated with TRS#(k mod 2) and TRS#(k+1 mod 2) transmitted from RRH#(2k) and RRH#(2k+1) respectively by RRC signalling tci-StatesToAddModList in the PDSCH-Config and tci-PresentInDCI is not configured;   + All the configured TCI states are known to UE. UE is configured with NZP-CSI-RS resource for L1-RSRP measurements by RRC signaling nzp-CSI-RS-ResourceSet within the CSI-ResourceConfig and periodic CSI reporting by setting reportConfigType to periodic and reportQuantity to cri-RSRP (Note: reported L1-RSRP mesurements are not tested) * TE actives TCI #0 for PDCCH by “TCI State Indication for UE-specific PDCCH MAC CE”; * PDSCH associated with TCI #0 is transmitted during the slots from 0 to (n-1) + HARQ needed time + 3ms ~~+ first TRS + TRS processing time;~~ * In slot n TE start triggering TCI state switching command to TCI #1 by “TCI State Indication for UE-specific PDCCH MAC CE”; * PDSCH associated with TCI #1 is transmitted in slots from n + HARQ needed time + 3ms + first TRS + TRS processing time to N. * PDSCH associated with TCI #(k mod 2) (k=0,1,2,…) is transmitted in slot from max((2k-1)n + HARQ needed time + 3ms +[ first TRS + TRS processing time], 0) to ((2k+1)n-1) + HARQ needed time + 3ms, where n slots are equivalent to time that needed to pass middle point between two RRHs, N slots is equivalent to time that needed to pass second RRH. And k is the RRH number in the channel model.]   **Issue 1-6: SSB and TRS transmission**  Agreement: Every RRH has to transmit QCL’ed SSB and TRS for every TCI state used in the DPS schemes  **Issue 1-9: Switch command**  Agreement: The switch command is transmitted via MAC CE, the corresponding PDSCH carrying that MAC CE should be ensured to be decoded successfully and MCS 4 should be used.  **Issue 1-10: PDCCH and PDSCH setting during the transition time**   * + Option 1 (Apple, ZTE): For DPS transmission mode 1a, PDCCH/PDSCH are DTXed from the time gNB indicate MAC CE TCI state switch + HARQ processing time + 3ms, to the time UE received and processed the first TRS from the new TRP.   + Option 2 (Intel): * Use same SNR point for all DPS Tx schemes requirements definition: * Skip PDSCH allocation on slots with TRS transmission * Skip PDSCH allocation on slots from n to m, where n slots are equivalent to time that needed to pass middle point between two RRH and m is a slot which corresponds to HARQ needed time on MAC CE command in DPS scheme 1a.   + Option 3 (Ericsson): TE does not consider the transition period for throughput calculation   **Recommended WF: Need further discussion**  CMCC: for 1a, option 1; for 1b, no transition time needed.  Intel: Option 1 and option 3 same actually. For 1b, the transition period should be same no need to differentiate 1a and 1b with option 1.  QC: Option 1 and 3 same. This only applied for option 1a, no additional processing time for 1b if UE support multiple active TCI states, that’s the key difference for 1a and 1b. Option 1/3 aligned with RRM core requirements assumption.  Huawei: To unify the test set-up among option 1a and option 1b.  E///: Agree with option 1/3 same. During DTXed period, means OCNG transmitted?  QC: We don’t think unified test set-up useful here for 1a and 1b.  Agreement: For transmission scheme 1a :  For DPS transmission mode 1a, PDCCH/PDSCH are DTXed from the time gNB indicate MAC CE TCI state switch + HARQ processing time + 3ms, to the time UE received and processed the first TRS from the new TRP.  TE does not consider the transition period for throughput calculation  OCNG pattern will be applied for DTXed period.  **Issue 1-11: Extra test metric for DPS requirements**   * Proposals   + Option 1 (Huawei): For DPS requirements definition, besides the 70% maximum throughput, define an extra test metric that,     - for DPS 1a, UE should meet probability of 99% (ACK and NACK) transmission for all PDSCH scheduled at each switching time point of (2k+1)n + HARQ needed time + 3ms + first TRS + TRS processing during the test     - for DPS 1b with 2 active TCI states, UE meet probability of 99% (ACK and NACK) transmission for all PDSCH scheduled at each switching time point of (2k+1)n + HARQ needed time + 3ms during the test     - for DPS 1b with more than 2 active TCI state, UE meet probability of 99% (ACK and NACK) transmission for all PDSCH scheduled at each switching time point of (2k+1)n+1 during the test * Recommended WF: Need further discussion   Q1: Whether to define extra test metric?   * Option 1 (Huawei): Yes * Option 2 (Apple, Intel, Ericsson): No   Q2: How to define extra test metric?  Further discuss in 2nd round  **Issue 5-1: Test applicability between HST-SFN and HST single tap/Issue 5-6: HST single tap requirements**  – Option 1 (DOCOMO, Intel): Skip the Rel-15 HST single tap test, if UE passes the requirements for HST-SFN  – Option 2 (Apple, Huawei, Ericsson, vivo, QC): Skip both Rel-15 and Rel-16 HST single tap test, if UE passes the requirements for HST-SFN  – Option 3 (DOCOMO): Skip both Rel-15 and Rel-16 HST single tap test except for Rel-16 FDD HST single-tap, if UE passes the requirements for HST-SFN  NTT DoCoMO: we prefer to align with LTE approach. We don’t test applicable rules among Rel-8 single tap and Rel-14 HST-SFN.  Intel: HST single tap has high Doppler shift.  QC: If needed, QC can comprise to option 3.  E///: we also have concern no test coverage on HST single tap and we are fine with option3.  ViVo: We are fine for comprise to option 3.  Agreement: Skip both Rel-15 and Rel-16 HST single tap test except for Rel-16 FDD HST single-tap, if UE passes the requirements for HST-SFN  **Recommended WF: Need further discussion**  **Whether to define a rule UE performs at least one of HST single tap tests?**  **Issue 5-2: Test applicability between HST-SFN and HST multi-path fading**  – Option 1 (Apple, QC): Do not test UE under HST multi-path scenarios, if UE passes the requirements for HST-SFN.  – Option 2 (DOCOMO, CMCC, Huawei, Ericsson): Do not define any applicability rules between HST-SFN and HST multi-path fading performance test cases  QC: Doppler spread under HST\_SFN much larger then HST multi-path scenario, that’s the logic we think test applicable rules can be applied.  Intel: Advanced receiver for HST-SFN ultized different CE algorithm to handle multi-path; multipath channel UE use different CE algorithm.  Agreement: Do not define any applicability rules between HST-SFN and HST multi-path fading performance test cases.  **Issue 5-3: Test applicability between different Doppler frequencies for the same channel model**  Agreement:   * + For FDD     - ***(Last meeting agreement)*** Define applicability rule for TDLB100-400       * Rel-15 multi-path fading with TDLB100-400 (Table 5.2.2.1.1-3 Test 1-1 and Table 5.2.3.1.1-3 Test 1-1) is not applicable for UE that passes Rel-16 multi-path fading tests TDLC300-600 for FDD     - Not define any applicability rule for TDLC300-100   + For TDD     - ***(Last meeting agreement)*** Not define any applicability rule for TDLB100-400 multi-path fading tests   Not define any applicability rule for TDLC300-100 multi-path fading tests  **Issue 5-4: Applicability rules between HST-SFN, and DPS schemes**  – Option 1 (Intel, ZTE, Apple, Qualcomm, vivo):  If UE passed HST-SFN requirements it does not need to be tested in HST-DPS.  – Option 2 (CMCC, Huawei, Ericsson, Intel):  Do not introduce applicability rule between DPS and HST-SFN requirements  **Recommended WF: Need further discussion**  CMCC: We see potential UE implementation difference among HST SFN and DPS, we are fine to comprise to define test applicable rules for DPS scheme and HST single Tap.  Huawei: Similar view as CMCC.  Intel: We fine with option 2 either.  E///: From deployment scenario could be same, but from receiver aspect we see different. We would see the whole package, if UE pass HST-SFN then almost all other test cases skipped.  DoCoMo: Similar view as E///.  QC: For DPS schemes 1a/1b and HST-SFN, Doppler shift under HST-SFN already cover DPS scheme 1a/1b.  Apple:  **Issue 5-4b: Applicability rules between HST-SFN, single tap and DPS schemes**  – Option 1 (Ericsson, Huawei)   * If UE passed HST-DPS 1a or 1b, both Rel-15/16 HST single tap test cases can be skipped.   – Option 2 (DOCOMO)   * If UE passed HST-DPS 1a or 1b, Rel-15 HST Single-tap test and Rel-16 HST Single-tap test except for Rel-16 FDD HST Single-tap test can be skipped.   Agreement: If UE passed HST-DPS 1a or 1b, Rel-15 HST Single-tap test and Rel-16 HST Single-tap test except for Rel-16 FDD HST Single-tap test can be skipped.  No test applicable rules among HST-SFN and HST DPS schemes 1b  FFS whether test applicable rules for HST-SFN, HST DPS scheme 1a needed or not  If a UE declared supporting > 1 TCI states, the UE will pass scheme 1b and skipped scheme 1a test cases  If a UE only support 1 TCI state, the UE need to pass scheme 1a and skip scheme 1b test cases |

##### 7.15.3.1 UE demodulation and CSI requirements [NR\_HST-Perf]

**R4-2017424 Email discussion summary for [97e][326] NR\_HST\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017460 (from R4-2017424).**

**R4-2017460 Email discussion summary for [97e][326] NR\_HST\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017624 (from R4-2017460).**

**R4-2017624 Email discussion summary for [97e][326] NR\_HST\_Demod\_UE**

*Type: other For: Information  
 Source: Moderator (CMCC)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017549 WF on NR HST UE demodulation**

*Type: other For: Approval  
 Source: CMCC*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014633 View on NR HST demod**

*Type: discussion For: Discussion  
 Source: Qualcomm, Inc.*

**Decision: Noted.**

**R4-2015602 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2017647 (from R4-2015602).**

**R4-2017647 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

###### 7.15.3.1.1 Requirements for DPS transmission scheme(s) [NR\_HST-Perf]

**R4-2014216 Discussion on DPS transmission scheme in HST**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014553 Views on UE demodulation requirements for DPS transmission scheme for NR HST**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014563 CR to TS 38.101-4: Propagation conditions for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0091 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Propagation conditions description for HST test cases

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017539 (from R4-2014563).**

**R4-2017539 CR to TS 38.101-4: Propagation conditions for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0091 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Propagation conditions description for HST test cases

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2014701 Further discussion on DPS for NR HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2014704 Simulation results for DPS transmission scheme**

*Type: discussion For: Information  
 Source: CMCC*

**Decision: Noted.**

**R4-2015020 UE demodulation requirements for DPS transmission scheme**

*Type: discussion For: Discussion  
 Source: ZTE Corporation*

**Decision: Noted.**

**R4-2015603 CR on HST DPS requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0097 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce HST DPS requirements as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0097 is missing on the coversheet.

**Decision: Revised to R4-2017540 (from R4-2015603).**

**R4-2017540 CR on HST DPS requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0097 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce HST DPS requirements as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0097 is missing on the coversheet.

**Decision: Return to.**

**R4-2015604 Discussion on UE performance requirements for DPS transmission scheme**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015605 Simulation results on UE performance requirements for DPS 1a transmission scheme**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015812 PDSCH demodulation requirements for HST-DPS**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the PDSCH demodulation requirements with HST-DPS scenario.

**Decision: Noted.**

###### 7.15.3.1.2 Requirements for HST-SFN [NR\_HST-Perf]

**R4-2014562 CR to TS 38.101-4: HST-SFN FDD performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0090 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 DL HST-SFN FDD performacne requirements

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017542 (from R4-2014562).**

**R4-2017542 CR to TS 38.101-4: HST-SFN FDD performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0090 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 DL HST-SFN FDD performacne requirements

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2014690 CR on HST-SFN requirements for TDD**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0092 Cat: B (Rel-16)  
  
 Source: CMCC*

**Decision: Revised to R4-2017541 (from R4-2014690).**

**R4-2017541 CR on HST-SFN requirements for TDD**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0092 Cat: B (Rel-16)  
  
 Source: CMCC*

**Decision: Return to.**

**R4-2014696 CR on release independent for Rel.16 NR HST UE demodulation requirements**

*Type: CR For: Agreement  
 38.307 v15.6.0 CR-0034 Cat: B (Rel-15)  
  
 Source: CMCC*

**Decision: Revised to R4-2017543 (from R4-2014696).**

**R4-2017543 CR on release independent for Rel.16 NR HST UE demodulation requirements**

*Type: CR For: Agreement  
 38.307 v15.6.0 CR-0034 Cat: B (Rel-15)  
  
 Source: CMCC*

**Decision: Return to.**

**R4-2014698 CR on release independent for Rel.16 NR HST UE demodulation requirements**

*Type: CR For: Agreement  
 38.307 v16.4.0 CR-0036 Cat: B (Rel-16)  
  
 Source: CMCC*

**Decision: Revised to R4-2017544 (from R4-2014698).**

**R4-2017544 CR on release independent for Rel.16 NR HST UE demodulation requirements**

*Type: CR For: Agreement  
 38.307 v16.4.0 CR-0036 Cat: B (Rel-16)  
  
 Source: CMCC*

**Decision: Return to.**

**R4-2015813 Simulation results of PDSCH with HST-SFN**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This contribution provides the PDSCH simulation results with HST-SFN scenario.

**Decision: Noted.**

###### 7.15.3.1.3 Requirements for HST single tap [NR\_HST-Perf]

**R4-2015606 CR on HST single-tap and HST multi-path fading requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0098 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce minimum requirements for HST single-tap scenario and HST multi-path fading scenario as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0098 is missing on the coversheet.

**Decision: Revised to R4-2017545 (from R4-2015606).**

**R4-2017545 CR on HST single-tap and HST multi-path fading requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0098 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce minimum requirements for HST single-tap scenario and HST multi-path fading scenario as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0098 is missing on the coversheet.

**Decision: Return to.**

**R4-2016108 CR to TS38.101-4: Addition of Rel-16 HST FRCs**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0113 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Endorsed in RAN4#96-e R4-2011369

Introduction of Rel-16 HST TDD FRC without Special slot data. Addition of HST single Tap MCS17 FRC

**Decision: Revised to R4-2017546 (from R4-2016108).**

**R4-2017546 CR to TS38.101-4: Addition of Rel-16 HST FRCs**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0113 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Endorsed in RAN4#96-e R4-2011369

Introduction of Rel-16 HST TDD FRC without Special slot data. Addition of HST single Tap MCS17 FRC

**Decision: Return to.**

**R4-2016500 CR on FDD HST Single-Tap and Multipath Fading Requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0120 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Draft CR R4-2012673 was endorsed in last meeting with this change: FDD HST Single-Tap and Multipath Fading requirements are not defined.

**Decision: Revised to R4-2017547 (from R4-2016500).**

**R4-2017547 CR on FDD HST Single-Tap and Multipath Fading Requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0120 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Draft CR R4-2012673 was endorsed in last meeting with this change: FDD HST Single-Tap and Multipath Fading requirements are not defined.

**Decision: Return to.**

###### 7.15.3.1.4 Requirements for multi-path fading channels [NR\_HST-Perf]

###### 7.15.3.1.5 Applicability rule [NR\_HST-Perf]

**R4-2014217 Discussion on applicability rule for HST test**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014700 Discussion on applicability rule for UE demodulation requirements for NR HST**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2015313 Views on HST applicability rules**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015607 CR on applicability rules for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0099 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce applicability rules for HST scenarios as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0099 is missing on the coversheet.

**Decision: Revised to R4-2017548 (from R4-2015607).**

**R4-2017548 CR on applicability rules for HST scenarios**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0099 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce applicability rules for HST scenarios as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0099 is missing on the coversheet.

**Decision: Return to.**

**R4-2015608 Discussion on applicability rules for different scenarios**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015814 Applicability rule for PDSCH demodulation requirements in HST WI**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the applicability rule for PDSCH demodulation requirements in HST WI.

**Decision: Noted.**

##### 7.15.3.2 BS demodulation requirements [NR\_HST-Perf]

**R4-2017425 Email discussion summary for [97e][327] NR\_HST\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017625 (from R4-2017425).**

**RR4-2017625 Email discussion summary for [97e][327] NR\_HST\_Demod\_BS**

*Type: other For: Information  
 Source: Moderator (Nokia)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017550 WF on Rel-16 NR HST BS demodulation requirements**

*Type: other For: Approval  
 Source: Nokia*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014397 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Revised to R4-2017557 (from R4-2014397).**

**R4-2017557 Summary of ideal and impairment results for NR HST demodulation requirements**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Return to.**

**R4-2015183 Rel-16 NR HST BS demodulation requirements**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Decision: Noted.**

###### 7.15.3.2.1 PUSCH requirements [NR\_HST-Perf]

**R4-2014398 Simulation results for NR HST PUSCH demodulation requirement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014555 Simulation results for NR HST PUSCH**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014822 CR for TS 38.141-1: Updates of NR PUSCH performance requirements for Multi-path fading channel models under high Doppler values and applicability rules.**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0153 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Abstract:**

This CR updates performance requirements of PUSCH for Multi-path fading channel models under high Doppler values and applicability rules for PUSCH for HST.

**Decision: Revised to R4-2017551 (from R4-2014822).**

**R4-2017551 CR for TS 38.141-1: Updates of NR PUSCH performance requirements for Multi-path fading channel models under high Doppler values and applicability rules.**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0153 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC.*

**Abstract:**

This CR updates performance requirements of PUSCH for Multi-path fading channel models under high Doppler values and applicability rules for PUSCH for HST.

**Decision: Return to.**

**R4-2015090 On NR Rel-16 HST BS demodulation PUSCH requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open PUSCH HST issues. In particular, simulation results misalignment and multi-path carrier frequency. Additionally, we have delivered the results of our simulation campaign on multi-path fading

**Decision: Noted.**

**R4-2015091 CR for 38.104: HST PUSCH demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0242 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Agreement in RAN4#96-e to introduce multi-path fading channel requirements with high Doppler value in a separate table under section “8.2.4 Requirements for PUSCH for high speed train”.

Update of SNR requirements following simulation collection [R4-2012749].

**Decision: Revised to R4-2017552 (from R4-2015091).**

**R4-2017552 CR for 38.104: HST PUSCH demodulation requirements**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0242 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Agreement in RAN4#96-e to introduce multi-path fading channel requirements with high Doppler value in a separate table under section “8.2.4 Requirements for PUSCH for high speed train”.

Update of SNR requirements following simulation collection [R4-2012749].

**Decision: Return to.**

**R4-2015118 Simulation results for NR HST PUSCH**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015609 Simulation results on the NR HST PUSCH performance requirements**

*Type: other For: Information  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015846 Additional test cases and FRC tables for HST PUSCH**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0245 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Resubmission of endorsed Draft CR R4-2012681.

In RAN4#96-e, requirements for HST PUSCH under fading channel was agreed to be introduced in separate tables under the same section of AWGN channel requirements

**Discussion:**

The secretary commented that the CR number 0245 is missing on the coversheet.

**Decision: Revised to R4-2017553 (from R4-2015846).**

**R4-2017553 Additional test cases and FRC tables for HST PUSCH**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0245 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Resubmission of endorsed Draft CR R4-2012681.

In RAN4#96-e, requirements for HST PUSCH under fading channel was agreed to be introduced in separate tables under the same section of AWGN channel requirements

**Discussion:**

The secretary commented that the CR number 0245 is missing on the coversheet.

**Decision: Return to.**

**R4-2015850 simulation results for HST PUSCH under fading channel**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results for HST PUSCH under multipath fading channel

**Decision: Noted.**

###### 7.15.3.2.2 PRACH requirements [NR\_HST-Perf]

**R4-2014399 Simulation results for NR HST PRACH demodulation requirement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014554 Simulation results for NR HST PRACH**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2015092 On NR Rel-16 HST BS demodulation PRACH simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our simulation results for HST PRACH restricted sets under fading propagation conditions.

**Decision: Noted.**

**R4-2015120 Simulation results for NR HST PRACH**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015664 CR for 38.104: Introduction of performance requirements for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0250 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PRACH requirements of fading channel and the aligned requirements need to be added into the specfication

**Decision: Revised to R4-2017554 (from R4-2015664).**

**R4-2017554 CR for 38.104: Introduction of performance requirements for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0250 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PRACH requirements of fading channel and the aligned requirements need to be added into the specfication

**Decision: Return to.**

**R4-2015665 CR for 38.141-1: Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0251 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PRACH requirements of fading channel and the aligned requirements need to be added into the specfication

**Discussion:**

Withdrawn because Tdoc allocated for another specification.

**Decision:** The document was **withdrawn**.

**R4-2015666 CR for 38.141-2: Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0252 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

RAN4 agree to introduce PRACH requirements of fading channel and the aligned requirements need to be added into the specfication

**Discussion:**

Withdrawn because Tdoc allocated for another specification.

**Decision:** The document was **withdrawn**.

**R4-2015667 Simulation results for NR HST PRACH format 0 with restricted set A and B under fading channel**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015849 simulation results for HST PRACH under fading channel**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results for TDLC300-400 for restricted set type A/B

**Decision: Noted.**

**R4-2016596 CR for 38.141-1 Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0166 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2017555 (from R4-2016596).**

**R4-2017555 CR for 38.141-1 Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0166 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

**R4-2016597 CR for 38.141-2 Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0256 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Revised to R4-2017556 (from R4-2016597).**

**R4-2017556 CR for 38.141-2 Introduction of conformance testing for NR HST PRACH under fading channel**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0256 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Decision: Return to.**

###### 7.15.3.2.3 UL timing adjustment requirements [NR\_HST-Perf]

**R4-2014400 Simulation results for NR PUSCH UL timing adjustment demodulation requirement**

*Type: discussion For: Discussion  
 Source: CATT*

**Decision: Noted.**

**R4-2014426 Discussion on remaining issues of PUSCH UL TA**

*Type: discussion For: Approval  
 Source: CATT*

**Decision: Noted.**

**R4-2014427 CR for 38.141-2: Introduction of NR PUSCH UL timing adjustment performance requirement for scenario X**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0228 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

Scenario X for UL timing adjustment has been agreed in RAN4#96e meeting in non-HST part as well as the additional CBWs.

**Decision: Revised to R4-2017558 (from R4-2014427).**

**R4-2017558 CR for 38.141-2: Introduction of NR PUSCH UL timing adjustment performance requirement for scenario X**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0228 Cat: F (Rel-16)  
  
 Source: CATT*

**Abstract:**

Scenario X for UL timing adjustment has been agreed in RAN4#96e meeting in non-HST part as well as the additional CBWs.

**Decision: Return to.**

**R4-2014702 Discussion on remaining issues for NR HST BS demodulation**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2014823 Views on NR PUSCH for UL timing adjustment**

*Type: other For: Approval  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015093 On NR Rel-16 HST BS demodulation UL timing adjustment requirements and simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

In this contribution we have provided our views on various open UL TA HST issues. In particular, SCS/CBW combinations, and applicability rules for SCS/CBW combinations and implicit test passing.

Additionally, we have delivered the results of our simulatio

**Decision: Noted.**

**R4-2015119 Discussion and simulation results for NR HST UL timing adjustment**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015121 CR on UL timing adjustment conducted performance requirement for TS 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0158 Cat: B (Rel-16)  
  
 Source: Samsung*

**Abstract:**

UL timing adjustment requirement have been introduced for NR HST in Rel-16. Additional scenario X for UL timing adjustment have been agreed to be introduced

**Decision: Revised to R4-2017559 (from R4-2015121).**

**R4-2017559 CR on UL timing adjustment conducted performance requirement for TS 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0158 Cat: B (Rel-16)  
  
 Source: Samsung*

**Abstract:**

UL timing adjustment requirement have been introduced for NR HST in Rel-16. Additional scenario X for UL timing adjustment have been agreed to be introduced

**Decision: Return to.**

**R4-2015610 Discussion and simulation results on the UL timing adjustment**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015847 discussion on HST UL TA remain issues**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

discuss test cases for scenario X and relative applicability rules

**Decision: Noted.**

**R4-2015848 additional simulation results for UL TA**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

simulation results for scenario X, Y and Z for UL TA

**Decision: Noted.**

**R4-2016468 Simulation results for NR HST UL TA**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

### 7.16 NR performance requirement enhancement [NR\_perf\_enh-Perf]

**R4-2017426 Email discussion summary for [97e][328] NR\_perf\_enh\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017626 (from R4-2017426).**

**RR4-2017626 Email discussion summary for [97e][328] NR\_perf\_enh\_Demod**

*Type: other For: Information  
 Source: Moderator (China Telecomm)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017560 Way forward on release independent aspect for UE demodulation and CSI reporting requirements**

*Type: other For: Approval  
 Source:* Huawei, HiSilicon

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017561 Way forward on PDSCH CA normal demodulation requirements**

*Type: other For: Approval  
 Source: Intel*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017562 Way forward on PMI reporting requirements for Tx ports larger than 8 and up to 32**

*Type: other For: Approval  
 Source:* Ericsson, Samsung

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017563 Simulation assumptions for NR PMI reporting requirements for more than 8 Tx ports**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017570 Way forward on UE power imbalance requirements for FR1 CA and EN-DC**

*Type: other For: Approval  
 Source: NTT DoCoMo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017573 Way forward on CA CQI reporting requirements**

*Type: other For: Approval  
 Source: China Telecomm*

**Abstract:**

**Discussion:**

**Decision: Return to.**

|  |
| --- |
| GTW session 11.5th  **Sub-topic 3-2: Type II PMI test setup**  **Sub-topic 3-3: SU-MIMO Type II PMI test parameters**  **Issue 3-3-1: subbandAmplitude for type II codebook construction**   * Option 2: True (Apple, Samsung, QC, Huawei compromise)   Agreement: TRUE  **Issue 3-3-2: PMI-FormatIndicator for type II codebook**   * Option 2: Subband (Apple, Samsung, QC, Huawei compromise)   Agreement: Subband  **Issue 3-3-4: Subband size for type II PMI**  *Tentative agreement:*   * Option 2: 8 for FDD and 16 for TDD (CTC, Samsung, Ericsson, QC, Apple compromise, Huawei)   Agreement: 8 for FDD and 16 for TDD  **Issue 3-3-5: Implementation of Random type II PMI**  Agreement:  Use the following as baseline and further the results from companies. Other proposals can be considered in the next meeting based on consensus.   * For beam randomization   + Option 2: Limit the set of possible beams to the possible beams under the configuration of following PMI, i.e., set L=2 for random PMI generation * Amplitude and phase coefficient randomization   + Option 2B: Set the same NPSK, subbandAmplitude with the configuration for follow PMI for random PMI generation.   **Sub-topic 4-1: UE power imbalance requirements for FR1 intra-band contiguous CA**   * Issue 4-1-1: MCS   + For 2Rx:     - Option 1: MCS 26 (Intel, HW, CTC, E///)     - Option 2: MCS 25 (QC)   + For 4Rx:     - Option 1: MCS 28, and discuss whether to skip the slots containing TRS in the test (Intel, HW, CTC)   QC: Using MCS28 with TRS containing slot, the coding rate > 0.95.  Huawei: We are also OK with option 2.  E///: We prefer option 2. To maintain the same MCS for all slots.   * + - Option 2: MCS 27 (E///, CTC, QC)   Agreement:   * 2Rx: MCS 26 * 4Rx: MCS 27   **Sub-topic 4-2: UE power imbalance requirements for intra-band contiguous and non-contiguous EN-DC**   * Issue 4-2-2: Single or aggregated carriers for LTE in the test   + Option 1: Consider the aggregated contiguous carriers for LTE if UE supports it (E///, CMCC, DCM, CTC, Intel)   + Option 2: Do not consider the aggregated contiguous carriers for LTE (HW)   CTC: With asymmetric CHBW size among NR and LTE carrier, in order to achieve similar BW for test, companies proposed option 1.  Huawei: We have concern on the test effort, test cost and test feasibility. For all the existing Demod test cases, only one LTE carrier configured. We are not sure whether NR carrier can be easily replaced by LTE carrier by TE.  E///: We agree we need to check with RAN5 experts. Meanwhile several operators prefer option1.  CMCC: In our understanding, we already have over than 5 CC for LTE test cases. It’s a valid scenario for deployment.  NTT DoCoMO: Similar as CMCC, we are considering the deployment scenarios which matched with option1.  CTC: Regarding number of faders on test, we think it’s achievable.  Huawei: Test cost is concern, we think with 1 carrier in LTE still serve test purpose.  **Issue 4-2-4: Channel bandwidth combination for testing**  Moderator recommended the following WF in the 1st round:   * Recommended WF **(**CTC, E///, CMCC, DCM**)**   + Firstly discuss issue 4-2-1 to issue 4-2-4 separately, and then come up the CBW selection solution based on the agreements on these 4 issues.   + For this issue 4-2-4, can we agree with the following option 4A updated based on option 4?   Option 4A:   * + - Step 1: First select the CBW combinations with the same BWs between LTE carrier(s) ~~(single carrier or aggregated contiguous carriers)~~ and NR carrier. If there is no such CBW combination, go to Step 1a~~, Step 1b and Step 1c~~. Otherwise go to step 2.       * Step 1a: Select the CBW combinations that the BW of NR carrier is smaller than the ~~(aggregated)~~ BW of LTE carrier(s). If there is no such CBW combination, go to Step 1c.       * Step 1b: Among the CBW combinations selected from Step 1a, select the CBW combinations with the smallest CBW difference between NR carrier and LTE carrier(s). Go to step 2.       * Step 1c: select the EN-DC combinations with smallest CBW difference between the NR carrier and LTE carrier(s). Go to step 2.     - Step 2: Among the CBW combinations selected from Step 1, select the EN-DC combination with the largest aggregated CBW * Issues raised for Option 4A:   + Limitation on frequency separation for non-contiguous EN-DC     - Option 1: set limitation (Intel)     - Option 2: If the frequency separation between two CCs is considered in this meeting, we prefer to test more than frequency separation ((CBWLTE + CBWNR) /2 + min (CBWLTE, CBWNR)) if this combination is only available test case. (DCM)     - Option 3: Limitation with Minimum value between CBW of LTE and CBW of NR. (CMCC)   E///: the value will be 0.   * + - Option 4: no limitation in RAN4 requirements, test set-up up to RAN5 (E///, NTT DoCoMo, CMCC, Huawei, SoftBank)     - Option 5: no limitation in RAN4 requirements and choose the scenario with smallest separation for test (Intel)   Intel: We have brought analysis for the reason to have limitation.  E///: This is same RF scenario, no limitation in RF core requirements and test cases set-up is up to RAN5 design. We should align with RF core requirements.  DoCoMO: We don’t want to have limitation on these test cases.  CMCC: The limitation on Frequency separation pending on LO location. We support no limitation, if companies have concern on LO location, we can further clarify to ensure LO located in the middle.  Intel: we don’t want to have limitation, just take a scenario with smallest separation for test.  Agreement: No limitation in RAN4 requirements, test set-up up to RAN5.  **Sub-topic 5-1: Duplex mode and SCS combinations for CA CQI**   * For the performance requirements:   + Option 1: Reuse the duplex mode and SCS combination of PDSCH normal CA requirements (CTC, CMCC)   CMCC: Our preference with option 1 with option A, we can comprise to option B with option 1.  E///: For CQI test cases is static CQI test cases and demod using fading channel; based our simulation result, we didn’t see the difference.  Huawei: we share similar as E///, we already comprised to option 3 considering operators’ demand.  CMCC: With option 1, there is no additional test effort compared to option 3.   * + Option 3: (Ericsson, CTC, HW, DCM)     - FR1: FDD + FDD with 15 kHz SCS, TDD + TDD with 30 kHz SCS, FDD 15 kHz +TDD 30kHz     - FR2: TDD + TDD with 120 kHz SCS * Test applicability rule for **option 1** of performance requirement definition:   + Option A: Test 3 cases for FR1 (CMCC)   + Option B: Test 2 cases for FR1 (CTC, CMCC)     - Candidate option for detailed applicability rule:       * Test #1: FDD 15 kHz + TDD 30 kHz > FDD 15 kHz + FDD 15 kHz > FDD 15 kHz + TDD 15 kHz       * Test #2: TDD 30 kHz + TDD 30 kHz > TDD 15 kHz + TDD 30 kHz * Test applicability rule for **option 3** of performance requirement definition:   + Option A: Test 2 cases for FR1 (HW)     - Test #1: FDD 15 kHz + TDD 30 kHz > FDD 15 kHz + FDD 15 kHz     - Test #2: TDD 30 kHz + TDD 30 kHz   Agreement:   * For the performance requirements:   + - FR1: FDD + FDD with 15 kHz SCS, TDD + TDD with 30 kHz SCS, FDD 15 kHz +TDD 30kHz     - FR2: TDD + TDD with 120 kHz SCS * Test applicability rule for performance requirement definition:   + Test 2 cases for FR1     - Test #1: FDD 15 kHz + TDD 30 kHz > FDD 15 kHz + FDD 15 kHz     - Test #2: TDD 30 kHz + TDD 30 kHz   **Sub-topic 2-1: Test of different CA capabilities for CA normal PDSCH**   * Option 3 (CTC, CMCC, HW, DCM, ZTE)   + Intra-band CA: test intra-band contiguous CA, and intra-band non-contiguous CA   + Inter-band CA: test inter-band CA with the largest number of bands and inter-band CA with the largest aggregated CBW     - If the selection of “inter-band CA with the largest number of bands” and “inter-band CA with the largest aggregated CBW” results in the same CA configuration(s), only one inter-band CA configuration will be tested; otherwise, two inter-band CA configurations will be tested. * Option 4 (Intel)   + Intra-band CA: test intra-band contiguous CA, and intra-band non-contiguous CA   + Inter-band CA: test one inter-band configuration, which will be selected during CA configuration(s) and CBW combination selection procedure.   Intel: We are still on discussion on CA and CBW selection; we need to check what the UE capability. With option 3, we may face the situation UE can’t be tested pending on UE capability.  Agreement:  Intra-band CA: test intra-band contiguous CA, and intra-band non-contiguous CA |

#### 7.16.1 UE demodulation and CSI requirements (38.101-4) [NR\_perf\_enh-Perf]

##### 7.16.1.1 NR CA PDSCH requirements [NR\_perf\_enh-Perf]

**R4-2014498 Test applicability for NR CA PDSCH normal demodulation requirements**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2014549 Discussion on NR CA UE demodulation requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014550 Draft CR on FRC for Normal NR CA demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0088 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of FRCs for Normal CA requirements

**Decision: Agreed.**

**R4-2014729 Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0093 Cat: B (Rel-16)  
  
 Source: CMCC*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. NR CA PDSCH normal demodulation requirements for NR CA are agreed to be defined for the following CA configs:

FDD CA with 15kHz SCS

TDD CA

30kHz SCS + 30kHz SCS

15kHz SCS + 30kHz SCS

TDD FDD CA

FDD 15kHz SCS + TDD 15kHz SCS

FDD 15kHz SCS + TDD 30kHz SCS

DraftCR has been endorsed in RAN4 #96-e R4-2012693

**Decision: Revised to R4-2017567 (from R4-2014729).**

**R4-2017567 Introduction of NR PDSCH FR1 CA 2Rx performance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0093 Cat: B (Rel-16)  
  
 Source: CMCC*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. NR CA PDSCH normal demodulation requirements for NR CA are agreed to be defined for the following CA configs:

FDD CA with 15kHz SCS

TDD CA

30kHz SCS + 30kHz SCS

15kHz SCS + 30kHz SCS

TDD FDD CA

FDD 15kHz SCS + TDD 15kHz SCS

FDD 15kHz SCS + TDD 30kHz SCS

DraftCR has been endorsed in RAN4 #96-e R4-2012693

**Decision: Return to.**

**R4-2014730 Test applicability rule for NR CA PDSCH normal demodulation**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2015312 Views on test applicability rule for CA PDSCH requirements**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015655 Discussion on PDSCH CA normal demodulation requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015656 CR: Introduction of performance requirements for NR FR1 PDSCH CA with 4Rx**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0103 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. NR PDSCH normal demodulation requirements for NR CA were agreed to be defined for the following CA configs:

FDD CA with 15kHz SCS

TDD CA

30kHz SCS + 30kHz SCS

15kHz SCS + 30kHz SCS

TDD FDD CA

FDD 15kHz SCS + TDD 15kHz SCS

FDD 15kHz SCS + TDD 30kHz SCS

**Decision: Revised to R4-2017568 (from R4-2015656).**

**R4-2017568 CR: Introduction of performance requirements for NR FR1 PDSCH CA with 4Rx**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0103 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. NR PDSCH normal demodulation requirements for NR CA were agreed to be defined for the following CA configs:

FDD CA with 15kHz SCS

TDD CA

30kHz SCS + 30kHz SCS

15kHz SCS + 30kHz SCS

TDD FDD CA

FDD 15kHz SCS + TDD 15kHz SCS

FDD 15kHz SCS + TDD 30kHz SCS

**Decision: Return to.**

**R4-2016003 CR on Applicability rules for Normal NR CA demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0108 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of applicability rules for Normal CA requirements

**Decision: Revised to R4-2017566 (from R4-2016003).**

**R4-2017566 CR on Applicability rules for Normal NR CA demodulation requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0108 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Definition of applicability rules for Normal CA requirements

**Decision: Return to.**

**R4-2016512 CR on FR2 PDSCH CA Requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0122 Cat: B (Rel-16)  
  
 Source: Qualcomm Incorporated*

**Abstract:**

Draft CR R4-2012695 was endorsed in last meeting with this change: FR2 PDSCH CA requirements are not defined.

**Decision: Agreed.**

##### 7.16.1.2 PMI reporting requirements with larger number of Tx ports [NR\_perf\_enh-Perf]

**R4-2014252 On PMI reporting requirements with larger number of TX ports**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014551 Discussion on PMI Type I requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014672 On PMI reporting requirements for larger Tx ports**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2014746 Views and simulation results for Rel-15 Type II PMI test case**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2014748 Draft CR for introduction of Rel-15 Type II PMI test cases**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Samsung*

**Abstract:**

Introduce PMI tese case to verify UE reporting accuracy for Rel-15 Type II codebook

**Decision: Revised to R4-2017569 (from R4-2014748).**

**R4-2017569 Draft CR for introduction of Rel-15 Type II PMI test cases**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: Samsung*

**Abstract:**

Introduce PMI tese case to verify UE reporting accuracy for Rel-15 Type II codebook

**Decision: Return to.**

**R4-2015657 Simulaiton results for Type II codebook PMI reporting test**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015658 Discussion on the open issue of PMI reporting test with larger Tx ports**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015659 CR for TS 38.101-4: Applicability for NR PMI requirements with Tx ports larger than 8 and up to 32**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0104 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

This CR introduces the applicability rule for Type II codebook of NR PMI requirements with Tx ports larger than 8 and up to 32

**Decision: Technically Endorsed.**

**R4-2016098 Summary of simulation results of NR UE CSI PMI with 16, and 32Tx antennas**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides a collection of SP Type I PMI requirements

**Decision: Return to.**

**R4-2016099 Simulation results for Rel-15 Type II codebook**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

This paper provides our simulation results for Rel-15 Type II codebook

**Decision: Noted.**

**R4-2016100 Evaluations of Rel-15 Type II PMI testing**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This paper provides our views on Rel-15 Type II codebook PMI testing

**Decision: Noted.**

**R4-2016434 Parameters and simulation results on PMI reporting requirements with larger number of Tx ports**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

##### 7.16.1.3 FR1 CA and EN-DC power imbalance requirements [NR\_perf\_enh-Perf]

**R4-2014499 Power imbalance requirements for FR1 CA and EN-DC**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2015317 Views on FR1 power imbalance requirements**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015318 CR: FR1 EN-DC power imbalance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0094 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC, SoftBank Corp.*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. FR1 CA and EN-DC power imbalance requirements are agreed to be defined.

**Decision: Revised to R4-2017571 (from R4-2015318).**

**R4-2017571 CR: FR1 EN-DC power imbalance requirements**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0094 Cat: B (Rel-16)  
  
 Source: NTT DOCOMO, INC, SoftBank Corp.*

**Abstract:**

Revised Rel-16 NR performance requirements enhancement WI RP-200472 is approved in RAN#87-e meeting. FR1 CA and EN-DC power imbalance requirements are agreed to be defined.

**Decision: Return to.**

**R4-2015660 Discussion on UE power imbalance requirements for FR1 CA and EN-DC**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015661 CR: Addition of power imbalance requirements for intra-band contiguous CA and intra-band EN-DC**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0105 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As per the revised Rel-16 NR performance requirements enhancement WID RP-200472 approved in RAN#87-e meeting, PDSCH demodulation performance requirements with power imbalance for FR1 intra-band contiguous 2CC CA and intra-band EN-DC are agreed to be defined.

**Decision: Revised to R4-2017572 (from R4-2015661).**

**R4-2017572 CR: Addition of power imbalance requirements for intra-band contiguous CA and intra-band EN-DC**

*Type: CR For: Agreement  
 38.101-4 v16.2.0 CR-0105 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

As per the revised Rel-16 NR performance requirements enhancement WID RP-200472 approved in RAN#87-e meeting, PDSCH demodulation performance requirements with power imbalance for FR1 intra-band contiguous 2CC CA and intra-band EN-DC are agreed to be defined.

**Decision: Return to.**

**R4-2015820 PDSCH demodulation requirements with power imbalanced condition**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses PDSCH demodulation requirements with power imbalanced condition.

**Decision: Noted.**

**R4-2016463 Views on Power Imbalance Tests**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

##### 7.16.1.4 NR CA CQI reporting requirements [NR\_perf\_enh-Perf]

**R4-2014500 Duplex mode and SCS for CA CQI test**

*Type: discussion For: Discussion  
 Source: China Telecom*

**Decision: Noted.**

**R4-2014552 Discussion on FR1 CA and EN-DC power imbalance requirements**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014673 DraftCR: Adding applicability and requirements for FR1 and FR2 CA CQI reporting test**

*Type: draftCR For: Endorsement  
 38.101-4 v16.2.0  
 Source: China Telecom*

**Abstract:**

Introducing CA CQI reporting requirements for NR CA under AWGN condition is one of the objective of the Rel-16 NR performance requirements enhancement WI. In the RAN4 #96e meeting, the test metric and most of the test parameters have been decided in R4-2012692.

**Decision: Endorsed.**

**R4-2014728 Discussion on FR1 CA and EN-DC power imbalance requirements**

*Type: discussion For: Discussion  
 Source: CMCC*

**Decision: Noted.**

**R4-2015662 Discussion on CA CQI reporting requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015821 CA CQI reporting requirements**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the remaining open issues on CA CQI reporting requirements.

**Decision: Noted.**

##### 7.16.1.5 Release independent [NR\_perf\_enh-Perf]

**R4-2014253 On Release Independence for NR UE performance enhancement requirements**

*Type: discussion For: Discussion  
 Source: Apple*

**Decision: Noted.**

**R4-2014501 Draft CR for TS 38.307 on UE demodulation performance requirements (Rel-15)**

*Type: draftCR For: Endorsement  
 38.307 v15.6.0  
 Source: China Telecom*

**Abstract:**

For Rel-16 NR\_perf\_enh-Perf WI, the following agreements were reached in RAN4#94e in R4-2002390.

CA normal demodulation requirements

The requirements for those CA configurations that are defined as release independent from release 15 in TS 38.307 can be release independent from release 15

PMI reporting requirements for single panel Type I codebook

The requirements for 16 and 32 Tx ports can be release independent from release 15

Demodulation requirements for TDD LTE - NR coexistence

Release independent from release 15 for the TDD bands supporting spectrum sharing in Rel-15

The features/requirements in the last two bullets are not included in Rel-15 of 38.307.

**Decision: Revised to R4-2017564 (from R4-2014501).**

**R4-2017564 Draft CR for TS 38.307 on UE demodulation performance requirements (Rel-15)**

*Type: draftCR For: Endorsement  
 38.307 v15.6.0  
 Source: China Telecom*

**Abstract:**

For Rel-16 NR\_perf\_enh-Perf WI, the following agreements were reached in RAN4#94e in R4-2002390.

CA normal demodulation requirements

The requirements for those CA configurations that are defined as release independent from release 15 in TS 38.307 can be release independent from release 15

PMI reporting requirements for single panel Type I codebook

The requirements for 16 and 32 Tx ports can be release independent from release 15

Demodulation requirements for TDD LTE - NR coexistence

Release independent from release 15 for the TDD bands supporting spectrum sharing in Rel-15

The features/requirements in the last two bullets are not included in Rel-15 of 38.307.

**Decision: Return to.**

**R4-2014502 Draft CR for TS 38.307 on UE demodulation performance requirements (Rel-16)**

*Type: draftCR For: Endorsement  
 38.307 v16.4.0  
 Source: China Telecom*

**Abstract:**

For Rel-16 NR\_perf\_enh-Perf WI, the following agreements were reached in RAN4#94e in R4-2002390. This CR is to capture these RAN4 agreements into the specification.

CA normal demodulation requirements

The requirements for those CA configurations that are defined as release independent from release 15 in TS 38.307 can be release independent from release 15

PMI reporting requirements for single panel Type I codebook

The requirements for 16 and 32 Tx ports can be release independent from release 15

Demodulation requirements for TDD LTE - NR coexistence

Release independent from release 15 for the TDD bands supporting spectrum sharing in Rel-15

**Decision: Revised to R4-2017565 (from R4-2014501).**

**R4-2017565 Draft CR for TS 38.307 on UE demodulation performance requirements (Rel-16)**

*Type: draftCR For: Endorsement  
 38.307 v16.4.0  
 Source: China Telecom*

**Abstract:**

For Rel-16 NR\_perf\_enh-Perf WI, the following agreements were reached in RAN4#94e in R4-2002390. This CR is to capture these RAN4 agreements into the specification.

CA normal demodulation requirements

The requirements for those CA configurations that are defined as release independent from release 15 in TS 38.307 can be release independent from release 15

PMI reporting requirements for single panel Type I codebook

The requirements for 16 and 32 Tx ports can be release independent from release 15

Demodulation requirements for TDD LTE - NR coexistence

Release independent from release 15 for the TDD bands supporting spectrum sharing in Rel-15

**Decision: Return to.**

**R4-2015316 Views on release independence aspect for power imbalance requirements**

*Type: discussion For: Discussion  
 Source: NTT DOCOMO, INC.*

**Decision: Noted.**

**R4-2015663 Discussion on release independence for NR performance requirements enhancements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015822 Release independent requirements for Rel-16 performance requirement enhancement**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution discusses the release independent requirements discussed in Rel-16 UE performance enhancement WI.

**Decision: Noted.**

#### 7.16.2 BS demodulation requirements (38.104) [NR\_perf\_enh-Perf]

**R4-2015845 Adding FRC table description in Annex in TS38.104 v16.5.0**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0257 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There is a FRC table description missing.

**Discussion:**

The secretary commented that the CR number 0257 is missing on the coversheet.

**Decision: Revised to R4-2017574 (from R4-2015845).**

**R4-2017574 Adding FRC table description in Annex in TS38.104 v16.5.0**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0257 Cat: F (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

There is a FRC table description missing.

**Discussion:**

The secretary commented that the CR number 0257 is missing on the coversheet.

**Decision: Return to.**

### 7.17 Over the air (OTA) base station (BS) testing TR [OTA\_BS\_testing-Perf]

#### 7.17.1 General [OTA\_BS\_testing-Perf]

**R4-2017409 Email discussion summary for [97e][311] OTA\_BS\_Testing**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017627 (from R4-2017409).**

**R4-2017627 Email discussion summary for [97e][311] OTA\_BS\_Testing**

*Type: other For: Information  
 Source: Moderator (Huawei)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015960 CR to TR 37.941: overall TR cleanup, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0013 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941.

Full TR is attached to this cover page.

**Decision: Revised to R4-2017575 (from R4-2015960).**

**R4-2017575 CR to TR 37.941: overall TR cleanup, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0013 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941.

Full TR is attached to this cover page.

**Decision: Return to.**

**R4-2015961 CR to TR 37.941: overall TR cleanup, Rel-16**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0014 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Cleanup corrections of the whole TR 37.941, Rel-16.

**Decision: Return to.**

#### 7.17.2 MU / TT values: derivation and tables [OTA\_BS\_testing-Perf]

**R4-2015714 CR to TR 37.941: Removal of Square Brackets**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0011 Cat: F (Rel-15)  
  
 Source: Ericsson*

**Abstract:**

[ ] cannot be be in the final version TR

**Decision: Not pursued.**

**R4-2015715 CR to TR 37.941: Removal of Square Brackets**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0012 Cat: A (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

Removal of [ ] in MU tables in TR 37.941

**Decision: Withdrawn.**

**R4-2015962 CR to TR 37.941: MU and TT values alignments and corrections, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0015 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

It was observed that there were some inconsistencies across the MU and TT values in requirements specific sections and in the summary tables in cluase 17 and 18.

Regulatory decision is incorporated for the TT of the OTA RX spur requirement.

**Decision: Revised to R4-2017579 (from R4-2015962).**

**R4-2017579 CR to TR 37.941: MU and TT values alignments and corrections, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0015 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

It was observed that there were some inconsistencies across the MU and TT values in requirements specific sections and in the summary tables in cluase 17 and 18.

Regulatory decision is incorporated for the TT of the OTA RX spur requirement.

**Decision: Return to.**

**R4-2015963 CR to TR 37.941: MU and TT values alignments and corrections, Rel-16**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0016 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

MU and TT values inconsistencies are corrected among requirement specific sections and the summary tables, together with other text improvements. Regulatory decision is incorporated for the TT of the OTA RX spur requirement.

**Decision: Return to.**

**R4-2016370 Plane Wave Synthesizer – Pending MU terms from 4.2GHz to 6GHz**

*Type: discussion For: (not specified)  
 37.941 v..  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

**R4-2016466 CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0023 Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Revised to R4-2017577 (from R4-2016466).**

**R4-2017577 CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0023 Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Return to.**

**R4-2016467 Mirror CR to TR 37.941: Completion of MU terms for PWS.**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0024 Cat: A (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Return to.**

#### 7.17.3 Annexes [OTA\_BS\_testing-Perf]

**R4-2015964 CR to TR 37.941: alignments and corrections to the MU contributors and MU derivations, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0017 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

MU contributor terms alignment among MU tables and annexes is provided. Related Excel spreadsheets to be further updated to reflect modifications in the TR.

**Decision: Revised to R4-2017578 (from R4-2015964).**

**R4-2017578 CR to TR 37.941: alignments and corrections to the MU contributors and MU derivations, Rel-15**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0017 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

MU contributor terms alignment among MU tables and annexes is provided. Related Excel spreadsheets to be further updated to reflect modifications in the TR.

**Decision: Return to.**

**R4-2015965 CR to TR 37.941: alignments and corrections to the MU contributors and MU derivations, Rel-16**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0018 Cat: A (Rel-16)  
  
 Source: Huawei*

**Abstract:**

MU contributor terms alignment among MU tables and annexes is provided. Related Excel spreadsheets to be further updated to reflect modifications in the TR.

**Decision: Return to.**

#### 7.17.4 Others [OTA\_BS\_testing-Perf]

**R4-2016290 CR to TR 37.941: Corrections to TRP measurement procedures**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0019 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Cross-references are incorrect in a few procedures in clause 6.3.2.2.

**Decision: Revised to R4-2017576 (from R4-2016290).**

**R4-2017576 CR to TR 37.941: Corrections to TRP measurement procedures**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0019 Cat: F (Rel-15)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Cross-references are incorrect in a few procedures in clause 6.3.2.2.

**Decision: Return to.**

**R4-2016291 CR to TR 37.941: Corrections to TRP measurement procedures**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0020 Cat: A (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Cross-references are incorrect in a few procedures in clause 6.3.2.2.

**Decision: Return to.**

**R4-2016292 Justification for additional test cases for PWS**

*Type: discussion For: (not specified)  
 37.941 v..  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

**R4-2016293 CR to TR 37.941: Additional test cases for PWS**

*Type: CR For: Agreement  
 37.941 v15.1.0 CR-0021 Cat: F (Rel-15)  
  
 Source: ROHDE & SCHWARZ*

**Abstract:**

PWS method is able to cover additional test cases for BS OTA conformance

**Decision: Agreed.**

**R4-2016300 Mirror CR to TR 37.941: Additional test cases for PWS**

*Type: CR For: Agreement  
 37.941 v16.1.0 CR-0022 Cat: A (Rel-16)  
  
 Source: ROHDE & SCHWARZ*

**Decision: Agreed.**

### 7.18 2-step RACH for NR [NR\_2step\_RACH-Perf]

#### 7.18.3 BS Demodulation requirements (38.104) [NR\_2step\_RACH-Perf]

**R4-2017427 Email discussion summary for [97e][329] NR\_2step\_RACH\_Demod**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017628 (from R4-2017427).**

**R4-2017628 Email discussion summary for [97e][329] NR\_2step\_RACH\_Demod**

*Type: other For: Information  
 Source: Moderator (ZTE)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

|  |
| --- |
| **GTW session on 11.9th**  **Issue 1-1-1: Whether or not to define BS demodulation performance requirements for 2-step RACH with both DMRS configurations (1+1, 1+1+1) for FR1:**   * Proposals   + Option 1: No, only for one DMRS configuration   + Option 2: Yes, define requirements for both 2 and 3 DMRS symbols   **Issue 1-1-2: If answer to Issue 1-1-1 is Option 1, specify BS demodulation performance requirements for 2-step RACH with the following DMRS configuration for FR1:**   * Proposals   + Option 1: 1+1+1   + Option 2: 1+1   Agreement: for Issue 1-1-1 and 1-1-2 on DMRS configuration for FR1   * Define only one set of requirements for FR1 * Since the performance difference between two DMRS configuration is negligible, the same requirements would apply to both * When deriving performance requirements, simulation results with both DMRS configurations are treated together * In the tests, DMRS can be configured to 1+1 or 1+1+1 according to vendor’s declaration under the same core requirements   Huawei: fine with the recommendation, separate FRC maybe needed.  Samsung: Same comment as Huawei.  Nokia: We are fine with the comprise. We need to use CR to define the applicable rules.  ZTE: The basis with the comprise, the performance requirements will be same. We will have separate FRC tables in Annex, and have same table refer to both FRCs for introducing requirements.  E///: We are fine the comprise. One FRC with two alternative or separate FRC tables. We need to ensure this is single requirements.  **Issue 1-2-1: Regarding TO cycling level, BS demodulation requirements for 2-step RACH are specified with:**   * Proposals   + Option 1: only medium level TO cycling   + Option 2: both medium and high level TO cycling   + Option 3: both medium and high level TO cycling, but high level TO cycling is only for FR1   + Option 4: only high level TO cycling with revised TO values * Recommended WF   + *Compromise to Option 4: Only define performance requirements for high level TO cycling but with revised TO values*   **Issue 1-2-2: If answer to Issue 1-2-1 is either Option 2, 3 or 4, should TO values for high level TO cycling be revised?**   * Proposals   + Option 1: No, keep the current values   + Option 2: Yes, change to other values, e.g., 2.3us for the 30k SCS and 0.55us for the 120kHz SCS * Recommended WF:*Revise TO values for high TO cycling as following*   + *15 kHz: [0 : 0.1 : 3.8]*   + *30 kHz: [0 : 0.1 : 2]*   + *60 kHz: [0 : 0.1 : 0.6]*   + *120 kHz: [0 : 0.1 : 0.5]*   Agreement: Only define performance requirements for high level TO cycling but with revised TO values as following:   * + 15 kHz: [0 : 0.2 : 3.8]   + 30 kHz: [0 : 0.1 : 2]   + 60 kHz: [0 : 0.1 : 0.6]   + 120 kHz: [0 : 0.1 : 0.5]   Nokia: In the CR, we don’t mention the high level or medium level since only one set introduced.  Samsung: The step for time of offset, can we consider to increase step size considering test effort.  E///: We don’t think this impact test time too much.  Nokia: What are the values Samsung proposed?  Intel: Fine to change step size which bring benefits on test time reduction.  ZTE: We agree the points not balance among FR1 and FR2. The step-size no impact on performance.  **Issue 1-3: Set test metric for BS demodulation performance requirements for 2-step RACH as:**   * Proposals   + Option 1: BLER 0.01   + Option 2: BLER 0.1 * Recommended WF   + *Majority view to keep the current baseline as BLER = 0.01*   Agreement: BLER 0.01 |

**R4-2017580 Way forward on BS performance requirements for 2-step RACH**

*Type: other For: Approval  
 Source: ZTE*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014560 Views on BS demodulation requirements for NR 2-Step RACH**

*Type: discussion For: Discussion  
 Source: Intel Corporation*

**Decision: Noted.**

**R4-2014561 CR to TS 38.141-2: BS demodulation requirements for 2-step RACH (Annex)**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0231 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 2-step RACH demodulation performacne requirements

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Revised to R4-2017633 (from R4-2014561).**

**R4-2017633 CR to TS 38.141-2: BS demodulation requirements for 2-step RACH (Annex)**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0231 Cat: B (Rel-16)  
  
 Source: Intel Corporation*

**Abstract:**

Add Rel-16 2-step RACH demodulation performance requirements

**Discussion:**

The secretary commented if neither UICC, ME, Radio Access Network or Core Network boxes are checked on the coversheet, the CR does not change anything and hence the CR is not needed.

**Decision: Return to.**

**R4-2014937 2-step RACH BS demodulation performance requirements**

*Type: discussion For: Agreement  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Discussion on remaining topics for 2-step RACH BS demodulation

**Decision: Noted.**

**R4-2014938 2-step RACH BS demodulation simulation results**

*Type: discussion For: Discussion  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2014939 Introduction of 2-step RACH FRC tables in 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0154 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of FRCs in 38.141-1 related to 2-step RACH demodulation performance requirements

**Decision: Revised to R4-2017637 (from R4-2014939).**

**R4-2017637 Introduction of 2-step RACH FRC tables in 38.141-1**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-0154 Cat: B (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Introduction of FRCs in 38.141-1 related to 2-step RACH demodulation performance requirements

**Decision: Return to.**

**R4-2015022 Introduction of test procedure and requirement for 2-step RACH**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0233 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

2-step RACH test procedure and requirements should be introduced to the conformance specifications

**Decision: Not pursued.**

**R4-2017638 Introduction of test procedure and requirement for 2-step RACH**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0233 Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

2-step RACH test procedure and requirements should be introduced to the conformance specifications

**Decision: Withdrawn.**

**R4-2017654 CR to 38.141-1 Introduction of test procedure and requirements for 2-step RACH**

*Type: CR For: Agreement  
 38.141-1 v16.5.0 CR-XX Cat: B (Rel-16)  
  
 Source: Ericsson*

**Abstract:**

2-step RACH test procedure and requirements should be introduced to the conformance specifications

**Decision: Return to.**

**R4-2015125 Discussion and simulation results for BS 2-step RACH requirement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2015126 Draft CR on MsgA PUSCH radiated performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.5.0  
 Source: Samsung*

**Abstract:**

MsgA PUSCH requirements have been introduced for Rel-16 NR 2-step RACH

**Decision: Not pursued.**

**R4-2017634 Draft CR on MsgA PUSCH radiated performance requirement for TS 38.141-2**

*Type: draftCR For: Endorsement  
 38.141-2 v16.5.0  
 Source: Samsung*

**Abstract:**

MsgA PUSCH requirements have been introduced for Rel-16 NR 2-step RACH

**Decision: Withdrawn.**

**R4-2017653 CR on MsgA PUSCH radiated performance requirement for TS 38.141-2**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-XX Cat: B (Rel-16)  
  
 Source: Samsung*

**Abstract:**

MsgA PUSCH requirements have been introduced for Rel-16 NR 2-step RACH

**Decision: Return to.**

**R4-2015177 Draft CR to TS 38.104 BS demodulation requirements for 2-step RACH**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0245 Cat: B (Rel-16)  
  
 Source: ZTE Wistron Telecom AB*

**Abstract:**

BS demodulation requirements for 2-step RACH are missing in TS 38.104

**Decision: Not pursued.**

**R4-2017635 Draft CR to TS 38.104 BS demodulation requirements for 2-step RACH**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0245 Cat: B (Rel-16)  
  
 Source: ZTE Wistron Telecom AB*

**Abstract:**

BS demodulation requirements for 2-step RACH are missing in TS 38.104

**Decision: Return to.**

**R4-2015178 Simulation results on BS demodulation requirements for 2-step RACH**

*Type: discussion For: Information  
 Source: ZTE Wistron Telecom AB*

**Decision: Noted.**

**R4-2015179 Simulation results collection on BS demodulation requirements for 2-step RACH**

*Type: discussion For: Information  
 Source: ZTE Wistron Telecom AB*

**Decision: Return to.**

**R4-2015180 Open issues on BS demodulation requirements for 2-step RACH**

*Type: discussion For: Discussion  
 Source: ZTE Wistron Telecom AB*

**Decision: Noted.**

**R4-2015611 Discussion and simulation results on NR 2-step RACH BS performance requirements**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015612 CR on BS demodulation requirements for 2-step RACH for FR2**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0248 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce BS demodulation requirements for 2-step RACH for FR2 as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0248 is missing on the coversheet.

**Decision: Revised to R4-2017636 (from R4-2015612).**

**R4-2017636 CR on BS demodulation requirements for 2-step RACH for FR2**

*Type: CR For: Agreement  
 38.104 v16.5.0 CR-0248 Cat: B (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

Introduce BS demodulation requirements for 2-step RACH for FR2 as per RAN4 agreements

**Discussion:**

The secretary commented that the CR number 0248 is missing on the coversheet.

**Decision: Return to.**

**R4-2015857 2-step RACH open issues**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

Proposals for the remainin open issues with 2-step RACH

**Decision: Noted.**

**R4-2015858 2-step RACH simulation results**

*Type: other For: Information  
 Source: Ericsson*

**Abstract:**

Simulation results according to agreed assumptions

**Decision: Noted.**

#### 7.18.4 Others [NR\_2step\_RACH-Perf]

### 7.19 R16 NR maintenance [WI code or TEI16]

#### 7.19.4 BS RF [WI code or TEI16]

**R4-2015966 CR to TR 38.820: correction in the NF analysis for NR BS, Rel-16**

*Type: CR For: Agreement  
 38.820 v16.0.0 CR-0001 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

During TP drafting for the 52.6 – 71 GHz SI, it was observed that the text on NF analysis for NR BS in TR 38.820 is mistakenly pointing to the NF data from ETSI TR 101 854 in table 5.5.1.2-1, instead of the summary of state-of-the-art LNA-only noise figure publications in figure 5.5.1.2-1.

Cross-reference in the NF analysis for the NR BS is corrected in order to point to the right set of data and avoid incorrect text interpretation.

Session chair note: Move this AI from AI 7.19.

**Decision: Return to.**

**R4-2015967 CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.105 v16.5.0 CR-0204 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Referring to the Rel-16 WI on MSR\_GSM\_UTRA\_LTE\_NR, the MSR BS specification was extended with additional CS configuration (e.g. UTRA+EUTRA+NR).

WID in RP-190642 captured that only MSR BS specifications are to be affected, i.e. TS 37.104, TS 37.141.

Related MSR BS CRs are listed below:

TS 37.104: R4-1908049Introduction of requirements for NR + UTRA/GSM combinations

TS 37.141: R4-1910476Introduction of requirements for NR + UTRA/GSM combinations

Still, the referred WI has also impacted OBUE and blocking requirements, which also impacts the AAS BS specifications.

Therefore, this CR provides modifications to the AAS BS core specification TS 37.105, to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 MSR BS TS 37.104.

This is a resubmission of R4-2012582, updated to the latest spec version.

**Decision: Return to.**

**R4-2015968 CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-1 v16.4.0 CR-0225 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Referring to the Rel-16 WI on MSR\_GSM\_UTRA\_LTE\_NR, the MSR BS specification was extended with additional CS configuration (e.g. UTRA+EUTRA+NR).

WID in RP-190642 captured that only MSR BS specifications are to be affected, i.e. TS 37.104, TS 37.141.

Realted MSR BS CRs are listed below:

TS 37.104: R4-1908049Introduction of requirements for NR + UTRA/GSM combinations

TS 37.141: R4-1910476Introduction of requirements for NR + UTRA/GSM combinations

Still, the referred WI has also impacted OBUE and blocking requirements, which also impacts the AAS BS specifications, as well as the Capability Sets and test configurations were extended.

Therefore, this CR provides modifications to the AAS BS test specification TS 37.145-1, to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 MSR BS TS 37.141.

This is resubmission of R4-2012583.

**Decision: Return to.**

**R4-2015969 CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16**

*Type: CR For: Agreement  
 37.145-2 v16.5.0 CR-0250 Cat: F (Rel-16)  
  
 Source: Huawei*

**Abstract:**

Referring to the Rel-16 WI on MSR\_GSM\_UTRA\_LTE\_NR, the MSR BS specification was extended with additional CS configuration (e.g. UTRA+EUTRA+NR).

WID in RP-190642 captured that only MSR BS specifications are to be affected, i.e. TS 37.104, TS 37.141.

Realted MSR BS CRs are listed below:

TS 37.104: R4-1908049Introduction of requirements for NR + UTRA/GSM combinations

TS 37.141: R4-1910476Introduction of requirements for NR + UTRA/GSM combinations

Still, the referred WI has also impacted OBUE and blocking requirements, which also impacts the AAS BS specifications, as well as the Capability Sets and test configurations were extended.

Therefore, this CR provides modifications to the AAS BS test specification TS 37.145-1, to reflect modification from the MSR\_GSM\_UTRA\_LTE\_NR WI which were introduced to Rel-16 MSR BS TS 37.141.

This is a resubmission of R4-2012584, updated to the latest spec version.

**Decision: Return to.**

**R4-2016206 CR to 38.141-2: Correction to test system uncertainty**

*Type: CR For: Agreement  
 38.141-2 v16.5.0 CR-0251 Cat: F (Rel-16)  
  
 Source: Nokia, Nokia Shanghai Bell*

**Abstract:**

Clause 4.1.2.2 and 4.1.2.3 is not aligned with Annex C and RAN4 agreements on test system uncertainty up to 43.5GHz.

**Decision: Agreed.**

**R4-2016430 CR to TS 37.105: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0212 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

In relation to the following 3 CRs for UTRA+EUTRA+NR Capability Set to Rel-16 which were postponed last meeting, it was observed that the OBUE applicability table introduced by CR in R4-1811112 to the TS 37.104 v15.4.0, was not mirrored to the AAS specidication TS 37.105 Rel-15.

The below proposal CRs are fixinig this aspect for Rel-16, while this CRs is addressing missing OBUE applicability table for Rel-15.

1

CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

2

CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

3

CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

NOTE: Referring to related section in TS 37.104 Rel-16 specification, the OBUE applicabiltiy table captured the following band exceptions: band 1, 7, 38, 65. Below we provide some clarification on modifications applied in this CR:

Bands 7 and 38 were introduced based on the ECC decision for non-AAS BS products – so it is not applicable to AAS.

Band 65 was introduced for Rel-16, so it is not applicable to the Rel-15 CR.

**Decision: Revised to R4-2017432 (from R4-2016353).**

**R4-2017432 CR to TS 37.105: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.105 v15.10.0 CR-0212 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

In relation to the following 3 CRs for UTRA+EUTRA+NR Capability Set to Rel-16 which were postponed last meeting, it was observed that the OBUE applicability table introduced by CR in R4-1811112 to the TS 37.104 v15.4.0, was not mirrored to the AAS specidication TS 37.105 Rel-15.

The below proposal CRs are fixinig this aspect for Rel-16, while this CRs is addressing missing OBUE applicability table for Rel-15.

1

CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

2

CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

3

CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

NOTE: Referring to related section in TS 37.104 Rel-16 specification, the OBUE applicabiltiy table captured the following band exceptions: band 1, 7, 38, 65. Below we provide some clarification on modifications applied in this CR:

Bands 7 and 38 were introduced based on the ECC decision for non-AAS BS products – so it is not applicable to AAS.

Band 65 was introduced for Rel-16, so it is not applicable to the Rel-15 CR.

**Decision: Return to.**

**R4-2016431 CR to TS 37.145-1: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0232 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

In relation to the following 3 CRs for UTRA+EUTRA+NR Capability Set to Rel-16 which were postponed last meeting, it was observed that the OBUE applicability table was not mirrored to the AAS specifications for Rel-15.

The below proposal CRs are fixinig this aspect for Rel-16, while this CRs is addressing missing OBUE applicability table for Rel-15.

1

CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

2

CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

3

CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

NOTE: Referring to related section in TS 37.104 Rel-16 specification, the OBUE applicabiltiy table captured the following band exceptions: band 1, 7, 38, 65. Below we provide some clarification on modifications applied in this CR:

Bands 7 and 38 was introduced based on the ECC decision for non-AAS BS products – so it is not applicable to AAS.

Band 65 was introduced for Rel-16, so it is not applicable to the Rel-15 CR.

**Decision: Revised to R4-2017433 (from R4-2016353).**

**R4-2017433 CR to TS 37.145-1: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.145-1 v15.7.0 CR-0232 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

In relation to the following 3 CRs for UTRA+EUTRA+NR Capability Set to Rel-16 which were postponed last meeting, it was observed that the OBUE applicability table was not mirrored to the AAS specifications for Rel-15.

The below proposal CRs are fixinig this aspect for Rel-16, while this CRs is addressing missing OBUE applicability table for Rel-15.

1

CR to TS 37.105: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

2

CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

3

CR to TS 37.145-2: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16

NOTE: Referring to related section in TS 37.104 Rel-16 specification, the OBUE applicabiltiy table captured the following band exceptions: band 1, 7, 38, 65. Below we provide some clarification on modifications applied in this CR:

Bands 7 and 38 was introduced based on the ECC decision for non-AAS BS products – so it is not applicable to AAS.

Band 65 was introduced for Rel-16, so it is not applicable to the Rel-15 CR.

**Decision: Return to.**

**R4-2016432 CR to TS 37.145-2: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0264 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Based on the Rel-16 CR to the TS 37.145-2 in

R4-2015969 ("CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16"), it was identifed that there is missing OBUE applicability table in Rel-15 spec. This CR adds the missing OBUE a

**Decision: Revised to R4-2017434 (from R4-2016432).**

**R4-2017434 CR to TS 37.145-2: addition of the OBUE applicability table, Rel-15**

*Type: CR For: Agreement  
 37.145-2 v15.8.0 CR-0264 Cat: F (Rel-15)  
  
 Source: Huawei*

**Abstract:**

Based on the Rel-16 CR to the TS 37.145-2 in

R4-2015969 ("CR to TS 37.145-1: Introduction of new BS capability set for NR+EUTRA+UTRA, Rel-16"), it was identifed that there is missing OBUE applicability table in Rel-15 spec. This CR adds the missing OBUE a

**Decision: Return to.**

#### 7.19.6 Demodulation and CSI [WI code or TEI16]

#### 7.19.7 NR MIMO OTA test methods (38.827) [FS\_NR\_MIMO\_OTA\_test]

**R4-2014289 Addition of Time Domain Alternative for Spatial Correlation Validation**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0002 Cat: B (Rel-16)  
  
 Source: Spirent Communications*

**Abstract:**

Time Domain Techniques to validate Spatial Correlation have been agreed during R4#96e

**Discussion:**

The secretary commented that the CR number 0002 is missing on the coversheet.

**Decision: Revised to R4-2017581 (from R4-2014289).**

**R4-2017581 Addition of Time Domain Alternative for Spatial Correlation Validation**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0002 Cat: B (Rel-16)  
  
 Source: Spirent Communications*

**Abstract:**

Time Domain Techniques to validate Spatial Correlation have been agreed during R4#96e

**Discussion:**

The secretary commented that the CR number 0002 is missing on the coversheet.

**Decision: Revised to R4-2017658 (from R4-2017581).**

**R4-2017658 Addition of Time Domain Alternative for Spatial Correlation Validation**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0002 Cat: B (Rel-16)  
  
 Source: Spirent Communications*

**Abstract:**

Time Domain Techniques to validate Spatial Correlation have been agreed during R4#96e

**Discussion:**

The secretary commented that the CR number 0002 is missing on the coversheet.

**Decision: Return to.**

**R4-2016211 Update of FR2 probe configuration**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0003 Cat: F (Rel-16)  
  
 Source: Keysight Technologies UK Ltd*

**Abstract:**

To be produced once agreement on probe configuration has been reached

**Decision: Return to.**

**R4-2016227 Number of Slots for NR MIMO OTA testing**

*Type: other For: Endorsement  
 Source: vivo, CAICT*

**Decision: Noted.**

**R4-2016228 Number of Slots for NR MIMO OTA testing**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0004 Cat: F (Rel-16)  
  
 Source: vivo, CAICT*

**Abstract:**

The minimum number of slots has not been defined for NR MIMO OTA test method.

**Decision: Revised to R4-2017582 (from R4-2016228).**

**R4-2017582 Number of Slots for NR MIMO OTA testing**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0004 Cat: F (Rel-16)  
  
 Source: vivo, CAICT*

**Abstract:**

The minimum number of slots has not been defined for NR MIMO OTA test method.

**Decision: Return to.**

**R4-2016544 TP to 38.827 on channel model rotations**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0005 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

The secretary commented that the document type is wrong (pCR instead of CR), there is no coverhseet and the content also seems to be from another document (R4-2006742?).

**Decision: Revised to R4-2017639 (from R4-2016544).**

**R4-2017639 TP to 38.827 on channel model rotations**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0005 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

The secretary commented that the document type is wrong (pCR instead of CR), there is no coverhseet and the content also seems to be from another document (R4-2006742?).

Session chair: The title also needs to be changed to avoid misleading.

**Decision: Return to.**

**R4-2016546 CR to 38.827 on base station beamforming configuration**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0006 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

The secretary commented that the document type is wrong (pCR instead of CR), there is no coverhseet and the content also seems to be from another document (R4-2006742?).

**Decision: Revised to R4-2017640 (from R4-2016546).**

**R4-2017640 CR to 38.827 on base station beamforming configuration**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0006 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Discussion:**

The secretary commented that the document type is wrong (pCR instead of CR), there is no coverhseet and the content also seems to be from another document (R4-2006742?).

Session chair: The title also needs to be changed to avoid misleading.

**Decision: Return to.**

**R4-2016586 CR for 38.827 on corrections**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0007 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

corrections

**Decision: Revised to R4-2017641 (from R4-2016586).**

**R4-2017641 CR for 38.827 on corrections**

*Type: CR For: Agreement  
 38.827 v16.0.0 CR-0007 Cat: F (Rel-16)  
  
 Source: Huawei, HiSilicon*

**Abstract:**

corrections

**Decision: Return to.**

## 8 Rel-16 UE feature list

## 9 Rel-16 spectrum related Work Items for NR

## 10 Rel-17 spectrum related Work Items for NR

## 11 Reply to ITU-R LS (RP-200042)

## 12 Rel-17 non-spectrum related work items for NR

### 12.1 Multiple Input Multiple Output (MIMO) Over-the-Air (OTA) requirements for NR UEs [NR\_MIMO\_OTA]

#### 12.1.1 General [NR\_MIMO\_OTA]

**R4-2017428 Email discussion summary for [97e][330] NR\_MIMO\_OTA**

*Type: other For: Information  
 Source: Moderator (CAICT)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017629 (from R4-2017428).**

**RR4-2017629 Email discussion summary for [97e][330] NR\_MIMO\_OTA**

*Type: other For: Information  
 Source: Moderator (CAICT)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

|  |
| --- |
| **GTW session on 11.10th** Sub-topic 1-2 Testing parameters for Performance **Issue 1-2-1: FR1 4x4 vs. 2x2 channel models**  *Based on 1st round discussion, 5 companies support proposal 1, 2 companies suggest to also consider other channel models*  *Candidate options:*   * Option 1: CDL-C UMa for 4x4 and CDL-A UMi for 2x2 [R4-2016209] * Option 2: CDL-C UMi for 4x4 and CDL-C UMa for 2x2 * Option 3: CDL-C UMi for 4x4 and CDL-A UMa for 2x2   *Recommend WF:*  vivo: We have some concern to draw conclusion at this time, based on simulation and test results, we are not sure CDL-A UMi for 2x2, downlink power quite difficult.  QC: Since Uma more suitable for 2X2 with large test coverage, we would like to further check other options considering coverage mapping between different channel model and MIMO anttenas.4  Keysight: Any volunteer to do the study for other options except option 1.  Vivo: We are running simulation, need to more to check.  QC: We planned to bring evaluation in next RAN4 meeting, we would like to ensure test coverage.  Sprient: We support op1.  Agreement:  Option 1: CDL-C UMa for 4x4 and CDL-A UMi for 2x2 (baseline)  Option 2: CDL-C UMi for 4x4 and CDL-C UMa for 2x2  Option 3: CDL-C UMi for 4x4 and CDL-A UMa for 2x2  Make conclusion in RAN4#98e based on above options Sub-topic 1-3 Optimization of test methodologies **Issue 1-3-1: System implementation of 3D-MPAC**  *Based on 1st round discussion, 6 companies support (Keysight, Samsung, vivo, Sprient, Xiaomi, CAICT) option 1, 3 companies (OPPO, CAICT, R&S) support option2.*  *Candidate options:*   * Option 1: Adopt proposal 1. [R4-2016210] * Option 2: Adopt proposal 3, while proposal 1 is considered as an example of system implementation. [R4-2015353]   *If option2 is selected, the wording and the figures to explain it need to be improved.*  *Recommend WF:*  Keysight: In previous agreements, we plan to standardize the probe location, without clear definition, the measurement results may hard to harmonize with measurement uncertainty.  CAICT: We prefer option 2 considering flexibility benefits, willing to comprise with option 1.  Oppo: We think option 2 make probe location clear enough. We have implementation freedom for option2.  R&S: similar view as Oppo. We can further improve the rules.  Vivo: We already have agreements, taking LTE history; we need to have clear system layer-out to align the assumption for next step.  Keysight: The absolute probe location not fixed, but we already agree we need to standardize the absolute probe location.  Agreement: Adopt proposal 1. Sub-topic 1-4 channel model validation **Issue 1-4-2: Channel model validation limits for FR2 MIMO OTA**  *Tentative agreements:*   * Agree on reference curves (for 6 probe system) for FR2 channel models, for PDP, Doppler Temporal Correlation. [R4-2014536]   *Clarification question:*   * Q1: Further clarify the type of reference curves in R4-2014536, i.e. curves for limited probes, infinite number of probes. * Q2: What kind of curves should be provided as reference for channel model validation?   *Proposal:*   * Proposal 1(new): simulated curve with infinite number of probes first, and simulated curve with limited probes as reference (worst case):   + - For FR1, PDP, Doppler Temporal Correlation for 16 probes system     - For FR2, PDP, Doppler Temporal Correlation and PSP for 6 probes system   *Recommend WF:*  *MVG: XP ration curve also need to be included.*  Keysight: CE BW? -> BS filtering  Spirent: CE BW filtering only for PDP.  Vivo: We found with CW BW filtering, the curve close the actual measurement. We would like to add simulation curve into TR as reference.  QC: For FR2 with limited probes, how we can get the reference curve, we can start with infinite number of probes with theoretical analysis first.  Vivo: Nothing related to previous MVG proposal.  R&S: Make sense to go with theoretical analysis first.  Agreement:  RAN4 consider both of two cases  Case 1: simulated curve with infinite number of probes (optional)  Case 2: simulated curve with limited number of probes (16 probes for FR1 and 6 probes for FR2)  Case 2 should be used as a reference to determine pass fail limits.  Keysight/CAICT/MVG/vivo/QC/Huawei: support case 2 as reference.  R&S: We should need to consider range length. Sub-topic 2-2 Performance metric for FR1 MIMO OTA **Issue 2-2-1: Maximum downlink RS-EPRE for FR1 MIMO OTA performance metric**  *Candidate options for below 3GHz:*   * Option 1: -80dBm/15kHz or equivalent (-77dBm/30kHz); [R4-2014723] * Option 2: (new) -80dBm/15kHz for 10MHz gNB setting. Further study the value for 40MHz bandwidth.   *Recommend WF:*  *Agreement: option 2*  **Issue 2-2-2: Exception points for FR1 MIMO OTA performance metric for below 3GHz bands**  *Candidate options:*   * Option 1: 95%TP (10 of total 12 rotations) * Option 2: 70%TP (11 of total 12 rotations) and 90%TP (10 of total 12 rotations) (Samsung pending DL power agreements) * Option 3: 70%TP (11 of total 12 rotations) and 95%TP (10 of total 12 rotations) (QC) * Option 4: others   *Recommend WF:*  70%TP (11 of total 12 rotations) for 10MHz CHBW , FFS for 40MHz CHBW  FFS additional test metric with below options   * Option 1: 90%TP (10 of total 12 rotations) * Option 2: 95%TP (10 of total 12 rotations)   Samsung: This is pending on DL power, now we only agreement for 10MHz. We prefer option 3 based on the assumption DL power. Sub-topic 2-4 Simulation issues for FR2 performance evaluation **Issue 2-4: approaches for FR2 MIMO OTA**  *Candidate options:*   * Option 1: simulation results is major approach * Option 2: based on measurement results, simulation for checking and easy understanding the impacts. * Option 3: both simulation and measurement results are considered together. (vivo, QC)   *Recommend WF:*  Agreement: Option 3: Both simulation and measurement results are considered together Sub-topic 3-1 Number of slots for NR MIMO OTA testing **Issue 3-1: Number of slots for NR MIMO OTA testing**  *Based on 1st round discussion, 4 companies (Samsung, vivo, CAICT, Qualcomm) support option1 1(20k slots), 1 company (Keysight) support option 2.*  *Candidate options:*   * Option 1: Adopt 20k as minimum number of slots [R4-2016227] * Option 2: Adopt 40k slots for FR1, 75k slots for FR2 * Option 3: (new) Adopt 20k as minimum number of slots for FR1; 20k as the minimum number of slots for FR2 UMi models, and [75k] for fr2 Indoor Office models   *Recommend WF:*  For FR1 15kHz: 20k slots , 30kHz: 40k slots  For FR2 20k for FR2 UMi model, 75k for fr2 Indoor Office models  Further study to reduce the minimum number of slots not precluded |

**R4-2017585 WF on NR MIMO OTA**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017632 WF on FR2 MIMO OTA simulation assumption**

*Type: other For: Approval  
 Source: Huawei*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2015311 Framework on NR MIMO OTA requirements development**

*Type: discussion For: Approval  
 Source: CAICT,vivo*

**Abstract:**

Framework on NR MIMO OTA requirements including a set of guidelines for laboratories alignment activities

**Decision: Noted.**

**R4-2016216 TS 38.151 v0.1.0 NR MIMO OTA requirements**

*Type: draft TS For: Agreement  
 38.151 v0.1.0  
 Source: vivo*

**Abstract:**

New version TS

**Decision: Return to.**

**R4-2016217 LS on FR1 MIMO OTA**

*Type: LS out For: Approval  
 to CTIA, CCSA  
 Source: vivo, CAICT*

**Abstract:**

LS to CTIA and CCSA

**Decision: Revised to R4-2017583 (from R4-2016217).**

**R4-2017583 LS on FR1 MIMO OTA**

*Type: LS out For: Approval  
 to CTIA, CCSA  
 Source: vivo, CAICT*

**Abstract:**

LS to CTIA and CCSA

**Decision: Return to.**

**R4-2016218 TP to TS 38.151 v0.0.1 on general part**

*Type: pCR For: Approval  
 38.151 v0.0.1  
 Source: vivo, CAICT*

**Decision: Approved.**

**R4-2016588 Discussion on MIMO OTA framework**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

#### 12.1.2 Performance Requirements [NR\_MIMO\_OTA-Core]

**R4-2014829 Proposal of FR2 MIMO OTA simulation approach workplan**

*Type: discussion For: Approval  
 Source: MediaTek Beijing Inc.*

**Abstract:**

Proposal: Approve FR2 MIMO OTA simulation approach workplan as Fig 1. i.e.

• RAN4#99-e (May, 2021): agree on simulation setting

• RAN4#100 to RAN4#101 (Aug to Nov, 2021): simulation data collection

**Decision: Noted.**

##### 12.1.2.1 Performance Requirements for FR1 [NR\_MIMO\_OTA-Core]

**R4-2016209 On FR1 4x4 vs. 2x2 channel models**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2016220 Channel model simulation for FR1 performance requirement**

*Type: other For: Discussion  
 Source: vivo*

**Abstract:**

Channel model simulation to match 2x2 and 4x4 scenario

**Decision: Noted.**

##### 12.1.2.2 Performance Requirements for FR2 [NR\_MIMO\_OTA-Core]

**R4-2015352 Analysis on the impact of number of test points**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2016208 On FR2 MIMO OTA channel model down selection**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2016219 Discussions on FR2 MIMO OTA requirements**

*Type: other For: Approval  
 Source: vivo, CAICT*

**Decision: Noted.**

**R4-2016235 Views on for FR2 MIMO OTA**

*Type: discussion For: (not specified)  
 Source: Qualcomm Incorporated*

**Decision: Noted.**

**R4-2016539 Simulation assumptions for NR FR2 MIMO OTA**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

#### 12.1.3 Testing methodologies [NR\_MIMO\_OTA-Core]

**R4-2014688 Effect of White Box Approach on Simple-Sectored Multi-Probe Anechoic Chamber Design**

*Type: discussion For: Information  
 Source: BUPT*

**Abstract:**

This paper focus on white box approach and evaluate the system design for SS-MPAC using the black box and white box approach.

**Decision: Noted.**

**R4-2014710 Effect of White Box Approach on Simple-Sectored Multi-Probe Anechoic Chamber Design**

*Type: discussion For: Information  
 Source: BUPT*

**Abstract:**

This paper focus on white box approach and evaluate the system design for SS-MPAC using the black box and white box approach.

**Decision:** The document was **withdrawn**.

**R4-2015368 Discussion on MIMO OTA test methodologies**

*Type: discussion For: Approval  
 Source: Huawei,HiSilicon*

**Abstract:**

Proposal 1: We prefer to keep UMi CDL-C as final requirement in NR FR2 MIMO OTA.

**Decision: Noted.**

##### 12.1.3.1 Testing parameters for Performance [NR\_MIMO\_OTA-Core]

**R4-2014723 Discussion on FR1 and FR2 MIMO OTA**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2016222 TP to TS 38.151 v0.0.1 on FR1 test system for requirements**

*Type: pCR For: Approval  
 38.151 v0.0.1  
 Source: vivo, CAICT*

**Decision: Approved.**

**R4-2016589 Discussion on MIMO OTA open issues**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

##### 12.1.3.2 Optimization of test methodologies [NR\_MIMO\_OTA-Core]

**R4-2015258 on UE orientation clarification**

*Type: discussion For: Approval  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2015353 The rules for 3D-MPAC system implementation**

*Type: discussion For: Approval  
 Source: OPPO*

**Decision: Noted.**

**R4-2016210 On Probe Configurations and Channel model vs. OTA test system coordinate systems for FR2 MIMO OTA**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

##### 12.1.3.3 Channel model validation [NR\_MIMO\_OTA-Core]

**R4-2014536 Channel Model Assumptions**

*Type: other For: Approval  
 Source: Spirent Communications*

**Abstract:**

Ideal curves for the PDP and Doppler Temporal Correlation are shown for each of the FR2 channel models.

Proposal 1. Agree on ideal curves for FR2 channel models, for PDP, Doppler Temporal Correlation.

Proposal 2. Agree on additional values for FR2: PSP,

**Decision: Noted.**

**R4-2016221 TP to TS 38.151 v0.0.1 on FR1 Channel model and RMC**

*Type: pCR For: Approval  
 38.151 v0.0.1  
 Source: vivo, CAICT, Spirent*

**Decision: Revised to R4-2017584 (from R4-2016221).**

**R4-2017584 TP to TS 38.151 v0.0.1 on FR1 Channel model and RMC**

*Type: pCR For: Approval  
 38.151 v0.0.1  
 Source: vivo, CAICT, Spirent*

**Decision: Return to.**

**R4-2016561 FR1 MIMO OTA channel model validation results**

*Type: discussion For: Approval  
 Source: CAICT,Keysight,vivo*

**Decision: Noted.**

### 12.8 Solutions for NR to support non-terrestrial networks (NTN) [NR\_NTN\_solutions]

#### 12.8.1 General and work plan [NR\_NTN\_solutions]

**R4-2017410 Email discussion summary for [97e][312] NTN\_Solutions**

*Type: other For: Information  
 Source: Moderator (THALES)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017630 (from R4-2017410).**

**RR4-2017630 Email discussion summary for [97e][312] NTN\_Solutions**

*Type: other For: Information  
 Source: Moderator (THALES)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017600 WF on NTN solutions**

*Type: other For: Approval  
 Source: THALES*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014066 On the status of NTN in 3GPP**

*Type: discussion For: (not specified)  
 Source: Fraunhofer HHI, Fraunhofer IIS*

**Abstract:**

This document analyses the work done by other WGs in NTN-related work and study items and shall serve as a starting point for delegates not yet involved in NTN to get an overview on the past work and open issues.

**Decision: Noted.**

**R4-2014381 NR\_NTN\_solutions work plan**

*Type: Work Plan For: Endorsement  
 Source: THALES*

**Decision: Noted.**

**R4-2014785 Views on NTN bands and coexistence study**

*Type: discussion For: Approval  
 Source: Samsung*

**Decision: Noted.**

**R4-2014880 Discussion on the applicability of DFT-S-OFDM for NTN**

*Type: discussion For: (not specified)  
 Source: CAICT*

**Decision: Noted.**

**R4-2015905 Specification structure for NTN nodes**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution is proposing specification structure for the introduction of NTN

**Decision: Noted.**

#### 12.8.2 Use cases, deployment scenarios, and regulatory information [NR\_NTN\_solutions-Core]

**R4-2014467 Possible FR2 exemplary band for NR based satellite networks**

*Type: discussion For: Discussion  
 Source: HUGHES Network Systems Ltd, Thales*

**Decision: Noted.**

**R4-2015252 NTN - On use cases and deployment scenarios**

*Type: discussion For: Approval  
 Source: Nokia, Nokia Shanghai Bell*

**Decision: Noted.**

**R4-2015263 Initial discussion for NR to support non-terrestrial networks**

*Type: other For: Approval  
 Source: Xiaomi*

**Decision: Noted.**

**R4-2015547 General discussion about NTN topic**

*Type: other For: Approval  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015906 NTN Scenarios and Regulatory overview**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This conrtibution is clarifying NTN scenarios and associated wording. It analyze Radio Regulations to propose freqnecy bands for NTN

**Decision: Noted.**

**R4-2015913 NTN use case scenarios and architectures**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The objective of this document is to establish working assumption for the scenarios and use cases to be considered by NTN RAN4 work for the definition of the generic and core requirements for NTN-NR.

**Decision: Noted.**

**R4-2015915 Possible FR1 exemplary band for NR satellite networks**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The objective of this document is to provide an exemplary band in FR1 to be used by RAN4 work.

**Decision: Noted.**

#### 12.8.3 Coexistence aspects [NR\_NTN\_solutions -Core]

**R4-2015945 NTN Proposed RF Core Requirements**

*Type: discussion For: Discussion  
 Source: THALES*

**Abstract:**

The objective of this document is to propose a framework for NTN core requirements and consider in particular the potential Key Performance Indicators (KPIs) to be considered by NTN RAN4 work.

**Decision: Noted.**

##### 12.8.3.1 Simulation assumptions [NR\_NTN\_solutions -Core]

**R4-2015548 General discussion on NTN simulation assumptions**

*Type: discussion For: Discussion  
 Source: Huawei, HiSilicon*

**Decision: Noted.**

**R4-2015907 NTN Simulations discussion**

*Type: other For: Approval  
 Source: Ericsson*

**Abstract:**

This contribution provides an overview of the needed simulations for NTN and initiates related discussions

**Decision: Noted.**

**R4-2016112 Discussion on simulation assumptions for NTN coexistence study**

*Type: other For: Approval  
 Source: ZTE Corporation*

**Decision: Noted.**

##### 12.8.3.2 UE requirements aspects [NR\_NTN\_solutions -Core]

##### 12.8.3.3 BS requirements aspects [NR\_NTN\_solutions -Core]

**R4-2015908 NTN coexistence - BS requirements aspects**

*Type: discussion For: Discussion  
 Source: Ericsson*

**Abstract:**

This contribution introduces BS requirements aspects in the scope of NTN

**Decision: Noted.**

## 13 Rel-17 Study Items for NR

### 13.1 Study on enhanced test methods for FR2 in NR [FS\_FR2\_enhTestMethods]

**R4-2017429 Email discussion summary for [97e][331] FR2\_enhTestMethods**

*Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Revised to R4-2017631 (from R4-2017429).**

**RR4-2017631 Email discussion summary for [97e][331] FR2\_enhTestMethods**

*Type: other For: Information  
 Source: Moderator (Apple)*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017593 WF on remaining open issues with the test methodology for high DL power and low UL power test cases**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017594 WF on solutions to minimize the impact of polarization basis mismatch between the TE and DUT on the RF testing**

*Type: other For: Approval  
 Source: Samsung*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017595 WF on testability enhancements to support the verification of RF requirements for inter-band (FR2+FR2) CA**

*Type: other For: Approval  
 Source: Anritsu*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017596 WF on extreme temperature conditions for all applicable FR2 UE RF test cases**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017597 WF on testability enhancements to reduce test time**

*Type: other For: Approval  
 Source: vivo*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2017599 WF on testability aspects for the introduction of the new band n262**

*Type: other For: Approval  
 Source: Apple*

**Abstract:**

**Discussion:**

**Decision: Return to.**

**R4-2014918 Updated work plan for FS\_FR2\_enhTestMethods**

*Type: Work Plan For: Approval  
 Source: Apple Inc., vivo*

**Decision: Approved.**

**Note: the deadline for all objectives in the SI is the whole SI deadline.**

#### 13.1.1 Test methodology for high DL power and low UL power test cases [FS\_FR2\_enhTestMethods]

**R4-2014267 Impact on beam management due to spherical wavefront in DL**

*Type: other For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

We discuss need for dual pol TE

**Decision: Noted.**

**R4-2014919 TP to TR38.884 on High DL and Low UL power test cases**

*Type: other For: Approval  
 38.884 v..  
 Source: Apple Inc.*

**Decision: Revised to R4-2017598 (from R4-2014919).**

**R4-2017598 TP to TR38.884 on High DL and Low UL power test cases**

*Type: other For: Approval  
 38.884 v..  
 Source: Apple Inc.*

**Decision: Return to.**

**R4-2015319 Test methodology for high DL power and low UL power test cases**

*Type: discussion For: Approval  
 Source: CAICT*

**Decision: Noted.**

**R4-2016213 On Test methodology for high DL power and low UL power test cases**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2016377 Impact of phase variation – Simulation Results**

*Type: other For: Approval  
 Source: MVG Industries, Sony*

**Abstract:**

During RAN4#e-96, a WF was agreed [1] for AI-enhanced test methods for NR FR2. Specifically, the simulation assumptions were agreed upon. The aim is to address the issue of UE beam management sensitivity to phase variation of the DL signal. Based on the a

**Decision: Noted.**

**R4-2016562 Views on test methods for high DL power and low UL power TCs**

*Type: discussion For: Approval  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

#### 13.1.2 Polarization basis mismatch [FS\_FR2\_enhTestMethods]

**R4-2014266 FR2 testability enhancement for polarization mismatch**

*Type: other For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

We discuss need for dual pol TE

**Decision: Noted.**

**R4-2014725 Discussion on FR2 EIRP measurement enhancement**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

**R4-2014827 Analysis on practical TPMI and 2-port CSI-RS for EIRP measurement**

*Type: discussion For: Approval  
 Source: MediaTek Beijing Inc.*

**Abstract:**

Proposal1: List and apply “TPMI side condition method” as one of EIRP measurement enhancement methods for Rel-15 and forward UE.

Proposal2: “Practical TPMI” shall be further applied for “TPMI side condition method”

Proposal3: “2-port CSI-RS” shall be prov

**Decision: Noted.**

**R4-2014920 Views on polarization mismatch**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Decision: Noted.**

**R4-2015871 Views on testability enhancement for UE FR2 test**

*Type: other For: Discussion  
 Source: Sony, Ericsson*

**Decision: Noted.**

**R4-2015872 Views on testability enhancement for UE FR2 test**

*Type: other For: Discussion  
 Source: Sony, Ericsson*

**Decision:** The document was **withdrawn**.

**R4-2015895 Views on testability enhancement for UE FR2 test**

*Type: other For: Discussion  
 Source: Sony, Ericsson*

**Decision:** The document was **withdrawn**.

**R4-2016212 On minimizing the impact of polarization basis mismatch between the TE and DUT**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2016568 Views on polarization basis mismatch**

*Type: discussion For: Approval  
 Source: ROHDE & SCHWARZ*

**Decision: Noted.**

#### 13.1.3 Enhanced test methods for inter-band (FR2+FR2) CA [FS\_FR2\_enhTestMethods]

**R4-2014265 On impact of non-co-located test antennae for FR2 inter-band testing**

*Type: other For: Discussion  
 Source: Qualcomm Incorporated*

**Abstract:**

We study the effect of off-focus test system antenna in IFF systems before we list some ramifications to inter-band test requirements

**Decision: Noted.**

**R4-2014492 Beam correspondence performance measurement improvements of FR2 UEs using carrier aggregation and shared antenna arrays**

*Type: discussion For: (not specified)  
 Source: Fraunhofer HHI*

**Abstract:**

This contribution identifies limitations in the current framework which could affect beam correspondence with carrier aggregation in FR2.

**Decision: Noted.**

**R4-2014687 Testability of FR2 inter-band DL 2CA EIS by non co-located antenna**

*Type: discussion For: Approval  
 Source: Anritsu corporation*

**Decision: Noted.**

**R4-2014921 Impact of AoA offset on inter-band CA PSD difference**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Decision: Noted.**

#### 13.1.4 Extreme temperature conditions [FS\_FR2\_enhTestMethods]

**R4-2016214 On extreme temperature condition testing**

*Type: other For: Approval  
 Source: Keysight Technologies UK Ltd*

**Decision: Noted.**

**R4-2016223 Views on FR2 extreme condition testing**

*Type: other For: Approval  
 Source: vivo*

**Decision: Noted.**

#### 13.1.5 Enhanced test methods for FR2 DL 256QAM RF [FS\_FR2\_enhTestMethods]

#### 13.1.6 Test time reduction [FS\_FR2\_enhTestMethods]

**R4-2014491 Beam sweeping and test time reduction in FR2**

*Type: discussion For: (not specified)  
 Source: Fraunhofer HHI, Fraunhofer IIS*

**Decision: Noted.**

**R4-2014726 Discussion on FR2 test time reduction**

*Type: discussion For: Discussion  
 Source: Samsung*

**Decision: Noted.**

#### 13.1.7 Testability for band n262 [FS\_FR2\_enhTestMethods]

**R4-2014922 Band n262 testability**

*Type: discussion For: Discussion  
 Source: Apple Inc.*

**Decision: Noted.**

##### 13.1.7.1 Extension of frequency applicability of permitted methods in 38.810 [FS\_FR2\_enhTestMethods]

**R4-2016224 Discussion on Testability issue of 47GHz band**

*Type: other For: Approval  
 Source: vivo*

**Decision: Noted.**

##### 13.1.7.2 Extension of frequency applicability of enhancement objectives 1-6 [FS\_FR2\_enhTestMethods]

## 14 Rel-17 Work Items for LTE

## 15 Rel-17 Study Items for LTE

## 16 Liaison and output to other groups

## 17 Revision of the Work Plan

## 18 Any other business

## 19 Close of the E-meeting

Report prepared by: MCC

## BACKUP

**R4-20AAAAA Email discussion summary for**

*Type: other For: Approval  
 Source: XX*

**Abstract:**

**Discussion:**

**Decision: Return to.**