3GPP TSG-RAN5 Meeting #102
Athens, Greece, Feb 26th – March 1st

R5-240664

Way Forward on SW Implementation on Machine Readable PICS and Applicability

Qualcomm

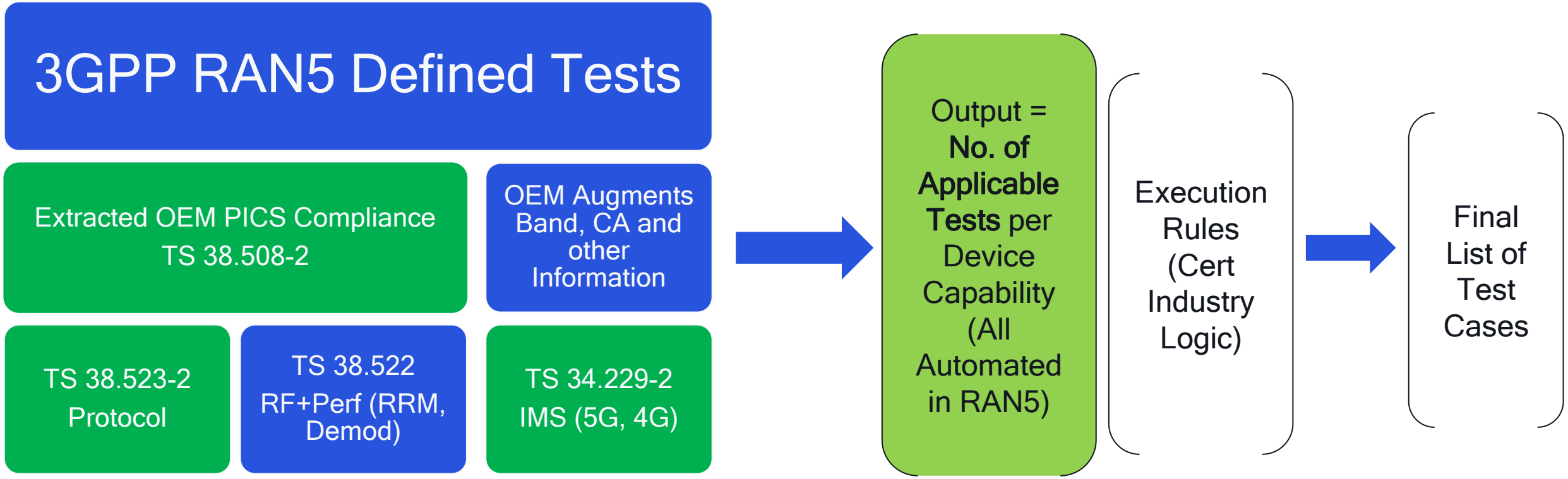
Updates, Agenda for Discussion

- Recap: Industry Value and Progress

- Proposals on PICS processing
  A. Basic Excel Translation of TS 38.508-2
  B. Allow DUT Declaration i.e allow user to enter PICS value
  C. Data Processing of above (for ex - in a separate tab)
  D. Meaningful association of extracted data to be used for outside automation

- Procedural Proposals and overall W/F

Background – Overall Industry value



Updates:

- Based on proposal in R5-233200 and outcome in RAN5#99, a separate exploder has been created - 3GPP_TSG_RAN_WG5_APPLICABILITY
- Green items above now have Prototype SW Implementation as demonstrated in RAN5#100 - R5-234320
- As per outcome of R5-237464 in RAN5#101, it was agreed to explore providing the solution in steps, with initial focus on releasing machine readable PICS

Proposals - Output Format of TS 38.508-2

A. Basic Excel translation of TS 38.508-2

- Read the DOCX file specified or latest version
  - Extract all tables from above DOCX contents
  - Read Tables and Rows
- Key\Value Mapping of Table\Items no. to PICS
- Generate user input File\Template From extracted PICS >**Input to B.**

Item	UE Physical Layer Baseline Implementation Capabilities	Ref.	Release	Mnemonic	M	If indicated "Yes" the feature shall be implemented and successfully tested for the corresponding release	Comments
1	Support PDSCH reception based on semi-persistent scheduling	38.306, 4.2.7.10	Rel-15	pc_downlinkSPS	No		
2	Support 256QAM for PDSCH for FR1	38.306, 4.2.7.10	Rel-15	pc_pdsch_256QAM_FR1	CY		Mandatory for non-RedCap UEs and optional for RedCap UEs.
3	Support 256QAM for PDSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pdsch_256QAM_FR2	No		
4	Support 256QAM for PUSCH for at least one NR FR1 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR1	No		
4a	Support 256QAM for PUSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR2	No		
5	Support receiving PDSCH using PDSCH mapping type A with less than seven symbols	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeA	Yes	Yes	
6	Support receiving PDSCH using PDSCH mapping type B	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeB	Yes		
7	Support resource allocation	38.306,	Rel-15	pc_ra_Type0_PUSCH	No		

Table A.4.3.2-1: UE Physical Layer Baseline Implementation Capabilities

	Item	UE Physical Layer Baseline Implementation Capabilities	Ref.	Release	Mnemonic	DUT Support
A.4.3.2-1/1	1	Support PDSCH reception based on semi-persistent scheduling	38.306, 4.2.7.10	Rel-15	pc_downlinkSPS	
A.4.3.2-1/2	2	Support 256QAM for PDSCH for FR1	38.306, 4.2.7.10	Rel-15	pc_pdsch_256QAM_FR1	
A.4.3.2-1/3	3	Support 256QAM for PDSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pdsch_256QAM_FR2	
A.4.3.2-1/4	4	Support 256QAM for PUSCH for at least one NR FR1 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR1	
A.4.3.2-1/4a	4a	Support 256QAM for PUSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR2	
A.4.3.2-1/5	5	Support receiving PDSCH using PDSCH mapping type A with less than s	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeA	
A.4.3.2-1/6	6	Support receiving PDSCH using PDSCH mapping type B	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeB	
A.4.3.2-1/7	7	Support resource allocation Type 0 for PUSCH	38.306, 4.2.7.10	Rel-15	pc_ra_Type0_PUSCH	
A.4.3.2-1/8	8	Support scaling factor 0.75 is applied to the band in the max data rate	38.306, 4.2.7	Rel-15	pc_scalingFactor0dot75	
A.4.3.2-1/9	9	Support reconfiguration with sync using a contention free random acc	38.306, 4.2.7.10	Rel-15	pc_csi_RS_CFRA_ForHO	

User Input template

- B. Allow DUT input i.e enter the value of PICS and Other Tables
- User input format: Key-Value mapping of PICS

Table A.4.3.2-1: UE Physical Layer Baseline Implementation Capabilities

	Item	UE Physical Layer Baseline Implementation Capabilities	Ref.	Release	Mnemonic	DUT Support
A.4.3.2-1/1	1	Support PDSCH reception based on semi-persistent scheduling	38.306, 4.2.7.10	Rel-15	pc_downlinkSPS	FALSE
A.4.3.2-1/2	2	Support 256QAM for PDSCH for FR1	38.306, 4.2.7.10	Rel-15	pc_pdsch_256QAM_FR1	TRUE
A.4.3.2-1/3	3	Support 256QAM for PDSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pdsch_256QAM_FR2	TRUE
A.4.3.2-1/4	4	Support 256QAM for PUSCH for at least one NR FR1 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR1	TRUE
A.4.3.2-1/4a	4a	Support 256QAM for PUSCH for at least one NR FR2 band	38.306, 4.2.7.2	Rel-15	pc_pusch_256QAM_FR2	TRUE
A.4.3.2-1/5	5	Support receiving PDSCH using PDSCH mapping type A with less t	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeA	TRUE
A.4.3.2-1/6	6	Support receiving PDSCH using PDSCH mapping type B	38.306, 4.2.7.10	Rel-15	pc_pdsch_MappingTypeB	FALSE

User filled in based on DUT Support

- User input can be of following forms for PICS or Data:
  - True/False
    - E.g.: pc_downlinkSPS
    - Some of these are independent, some of these are dependent.
      - E.g.: pc_recommendedBitRateQuery
  - Enumeration
    - E.g. pc_APN_Default_Configuration
  - Char String:
    - E.g.:pc_APN_ID_Internet;
    - Non PICS - Bandwidth or Bandwidth, Bandwidth Class etc

C. Extract DUT Supported PICS (Mnemonic) and associated selection parameter

- **Example Use Case:**
- **This Can be used for test case selection**

Table A.4.3.2-1: UE Physical Layer Baseline Implementation Capabilities			
	UE Physical Layer Baseline Implementation Capabilities	Mnemonic	DUT Support
A.4.3.2-1/1	Support PDSCH reception based on semi-persistent scheduling	pc_downlinkSPS	FALSE
A.4.3.2-1/2	Support 256QAM for PDSCH for FR1	pc_pdsch_256QAM_FR1	TRUE
A.4.3.2-1/3	Support 256QAM for PDSCH for at least one NR FR2 band	pc_pdsch_256QAM_FR2	TRUE
A.4.3.2-1/4	Support 256QAM for PUSCH for at least one NR FR1 band	pc_pusch_256QAM_FR1	TRUE
A.4.3.2-1/4a	Support 256QAM for PUSCH for at least one NR FR2 band	pc_pusch_256QAM_FR2	TRUE
A.4.3.2-1/5	Support receiving PDSCH using PDSCH mapping type A with less t	pc_pdsch_MappingTypeA	TRUE
A.4.3.2-1/6	Support receiving PDSCH using PDSCH mapping type B	pc_pdsch_MappingTypeB	FALSE

Using this information,
the test case selection expression
can be evaluated and
hence the list of TCs applicable for a DUT

- Gives the list of test cases that can be executed and can be used as an input to external automation i.e derive conditions

Clause	TC Title	Release	Applicability Condition	Applicability Comment	Condition Applicability	Applicable PICS
6.1.1.1	PLMN selection of RPLMN, HPLMN/EHPLMN, UPLM	Rel-15	C21	UEs supporting 5G Core	True	pc_5GCN
6.1.1.5	PLMN selection of RPLMN, HPLMN/EHPLMN, UPLM	Rel-15	C36	UEs supporting 5G Core and user initiated PLM	False	pc_5GCN AND pc_UserInitiatedPL
6.1.1.6	PLMN selection / Periodic reselection / Minimum	Rel-15	C34	UEs supporting 5G Core and MinimumPeriod	False	pc_5GCN AND pc_eMinimumPeri
6.1.1.7	PLMN selection of RPLMN or (E)HPLMN; Automati	Rel-15	C21	UEs supporting 5G Core	True	pc_5GCN
6.1.1.8	PLMN selection of RPLMN or (E)HPLMN; Manual m	Rel-15	C91	UEs supporting 5G Core and ManualModeNe	True	pc_5GCN AND pc_PLMN_Manual_
6.1.2.4	Cell reselection for interband operation	Rel-15	C37	UEs supporting 5G Core and more than 1 FDD	True	pc_5GCN AND (pc_nrFDD_MultiBa
6.1.2.5	Cell reselection for interband operation using Pco	Rel-15	C38	UEs supporting 5G Core and NR FDD and NR T	True	pc_5GCN AND pc_nrFDD AND pc_
6.1.2.7	Cell reselection / Equivalent PLMN	Rel-15	C21	UEs supporting 5G Core	True	pc_5GCN
6.1.2.24	Slice-based cell reselection / Re-seletion prioritie	Rel-17	C240	UEs supporting 5G Core and slice based cell re	False	pc_5GCN AND pc_sliceInfoforCell
6.1.2.26	Cell Selection / RedCap	Rel-17	C212	UEs supporting 5G Core and RedCap	True	pc_5GCN AND pc_supportOfRedC
6.1.2.27	Cell reselection / inter-frequency / RedCap	Rel-17	C212	UEs supporting 5G Core and RedCap	True	pc_5GCN AND pc_supportOfRedC

Applicable TCs for a given DUT

W/F

1. RAN5 to **endorse** creation of “machine readable PICS” during every spec release of TS 38.508-2, draft version to be released in TS 38.508-1 v18.2.0

2. **W/F on output format- -**
   A. Basic Excel Translation of TS 38.508-2
   B. Allow DUT Declaration i.e allow user to enter PICS value
   C. Data Processing of above(ex - in a separate tab of excel)

   Providing all above as an output will be most valuable to ecosystem as Step-1, this will allow to
   1. Fill DUT PICS compliance in standard format
   2. Help further automation to derive test case applicability

3. RAN5 (Contributing companies, other resources) to produce SW and support maintenance for creation of “machine readable PICS”
   A. SW is not released outside of ETSI
   B. Procedure, Documentation, ToR (?)
   C. Resolve Challenges in implementing above proposals

References:-

- RAN5#99
  - R5-233200 SW Implementation of RAN5 Applicability
- RAN5#100
  - R5-234320 Progress on Proposal-1 : SW Implementation of NR Applicability Specs
- RAN5#101
  - R5-237464 - Discussion – Software Implementation of NR Applicability Specifications -SIG - Conclusions and Next Steps
  - R5-237465 - Discussion – Software Implementation of NR Applicability Specifications - RF Updates, Conclusions and Next Steps