**3GPP TSG-RAN WG4 Meeting # 97-e *R4-2017576***

 **Electronic Meeting, 2 - 13 November 2020**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **37.941** | **CR** |  | **rev** | **1** | **Current version:** | **15.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | CR to TR 37.941: Corrections to TRP measurement procedures  |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | R4 |
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| ***Work item code:*** | OTA\_BS\_testing-Perf  |  | ***Date:*** | 2020-11-02 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-15 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | Cross-references are incorrect in a few procedures in clause 6.3.2.2.  |
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| ***Summary of change:*** | Cross-references in the following procedures are corrected:* Two cuts with pattern multiplication
* Full sphere
* Two or three cuts

This is a revision of R4-2016290. |
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| ***Consequences if not approved:*** | The incorrect cross-references could lead misinterpretation and confusion. |
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| ***Clauses affected:*** | 6.3.2.2 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ... |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

<Start of change >

#### 6.3.2.2 Procedures for BS output power

##### 6.3.2.2.1 General

**Test purpose:** Accurate TRP assessment.

The radiation source is assumed to be limited to the antennas on the BS and it’s not necessary to take the dimensions of the whole BS into account for calculations of the far-field distance and the reference angular resolution. The test choices are as follows.

##### 6.3.2.2.2 Two cuts with pattern multiplication

Use this method when the antenna symmetries are compatible with pattern multiplication, see clause 6.3.4.5 (orthogonal cuts grids). Following steps are performed during the measurement:

1. Calculate the reference angular steps as described in clause 6.3.4.2 (reference angular step criteria).

2. Align the BS to allow for proper pattern multiplication. Measure EIRP on two orthogonal cuts with steps smaller or equal to the reference steps according to step 1.

3. Apply pattern multiplication to extrapolate the two cuts data to full-sphere.

4. Apply numerical integration to obtain the TRP estimate.

##### 6.3.2.2.3 Full sphere

Following steps are performed during the measurement:

1. Calculate the reference angular steps as described in clause 6.3.4.2 (reference angular step criteria). Other methods for determining the required angular steps are not precluded.

2. Choose the angular steps smaller than or equal to the reference angular steps.

3. Measure EIRP values on a spherical grid according to clause 6.3.4.1 (spherical equal angle grids). Having the poles of the measurement grid along the direction of the main beam shall be avoided.

NOTE:Spherical grids of clause 6.3.4.3 (spherical equal area grids), 6.3.4.4 (spherical Fibonacci grids) and 6.3.4.6 (wave vector space sampling grids) can also be used with proper angular steps.

4. Apply suitable numerical integration to calculate the TRP estimate.

##### 6.3.2.2.4 Beam-based directions

This method is only applicable if directivity of BS antenna is known for the operating frequency. The peak EIRP of a beam is measured at the *beam peak direction* within the *beam direction pair*. Following the same approach, the peak EIRP of a beam can be obtained, which is used to derive TRP estimate using directivity of BS antenna as follows:

 $TRP\_{Estimate}=\frac{EIRP\_{peak}}{D\_{EUT}}$

, where DEUT is the directivity of BS.

For the case of OTA BS output power, the directivity (DBSoutputpower) shall be defined as:

 $D\_{BSOutputpower}= \frac{P\_{rated,c,EIRP}}{P\_{rated,c,TRP}}$

#### 6.3.2.3 Procedures for SEM and OBUE

##### 6.3.2.3.1 General

**Test purpose:** Accurate or controlled overestimate of TRP.

The radiation source is limited to the antennas on the BS and it’s not necessary to take the dimension of the whole BS into account for calculations of the far-field distance and the reference angular steps. The test choices are as follows.

##### 6.3.2.3.2 Two cuts with pattern multiplication

Use the same procedure as in clause 6.3.2.2.2.

##### 6.3.2.3.3 Two or three cuts

Use this method when the cuts described in clause 6.3.4.5 (orthogonal cuts grids) can be identified, but the pattern multiplication is not applicable according to the requirements in clause 6.3.2.5. This method will provide an overestimated value for TRP. Following steps are performed during the measurement.

1. Calculate the reference angular steps.

2. Measure EIRP on two orthogonal cuts with angular steps smaller than or equal to the reference steps according to step 3. Align the BS such that the cardinal cuts are measured. See figure 6.3.4.5-1.

3. Calculate the average EIRP in each cut and then the TRP estimate according to clause 6.3.4.5 (orthogonal cuts grids).

4. If the TRP estimate is above the requirement limit, perform the measurement on a third cut (See figure 6.3.4.5-1) and repeat step 3.

##### 6.3.2.3.4 Full sphere

Use the same procedure as in clause 6.3.2.2.3 for full sphere with appropriate reference steps.

##### 6.3.2.3.5 Beam-based directions

This method only applicable if directivity of BS antenna is available for the downlink operating band plus ΔfOBUE on either side of the band edge. Refer to clause 6.3.2.2.4 for more details.

The pre-scan (refer to clause 6.3.2.5.2), peak (refer to clause 6.3.2.5.3) and equal sector with peak average methods (refer to clause 6.3.2.5.4) are possible options.

<End of change>