**3GPP TSG-RAN WG4 Meeting#111 R4-2409955**

**Fukuoka City, Fukuoka , Japan, 20th – 24th May, 2024**

**Agenda item:**  10.2.4

**Source:** ZTE Corporation

**Title:** Way Forward for [111][311] NR\_BS\_RF

**Document for:** Approval

# WF for U6GHz EIRP mask

**Issue 2-1 The applicability of frequency range within band n104**

**Agreement:**

* Option 1: 6425-7075MHz

**Issue 2-2 The naming for this requirement**

**Agreement:**

* OTA spatial emission

**Issue 2-3 Which sub-clause to capture the requirement**

**Agreement:**

* Use the new clause 9.9 to capture the requirement

**Issue 2-4 The applicable BS types to fulfill the Expected EIRP requirements**

**Agreement:**

* BS type 1-H and BS type 1-O

**Issue 2-5 The coordinate system for Expected EIRP requirement**

**Agreement:**



**Issue 2-6 Mechanical tilts related**

**Agreement:**

* NOTE 2: An IMT base station shall comply with the specified limits on expected e.i.r.p. spectral density for all declared mechanical tilts.

**Agreement:**

**Table 2.2.2-1: [CAR] declarations**

| **Parameter** | **Description** |
| --- | --- |
| min  | Minimum angle along  axis |
| max | Maximum angle along  axis |
| min | Minimum angle along  axis |
| max | Maximum angle along  axis |

* NOTE 1: further discuss the definition of min  max min max
* NOTE 2: reusing the existing declaration is not precluded, e.g. *OTA peak directions set*.

**Issue 2-7 Expected EIRP calculation in discrete spatial sampling grid**

**Agreement:**

* P$\left(θ\_{L} , θ\_{H}\right)=\frac{π}{2MN\left(sinθ\_{H}−sinθ\_{L}\right)}\sum\_{n=n\_{L}}^{n\_{H}}\sum\_{m=1}^{M}P1\left(θ\_{n},φ\_{m}\right) cos\left(θ\_{n}\right) , where P1 is measured as EIRP $
* M is the number of sampling points in the azimuth range;
* [N is the number of sampling points over upper hemisphere in the elevation range ]
* $n\_{L}$ is the lowest elevation sampling angle within the $\left(θ\_{L} , θ\_{H}\right)$ bounding range
* $n\_{H}$ is the highest elevation sampling angle within the $\left(θ\_{L} , θ\_{H}\right)$ bounding range
* $$$\left(\right)$$\sum\_{m=1}^{M}\left(θ\_{n},φ\_{m}\right) $ is to produce the global sum over the whole azimuth ranges for EIRP above the horizon in a given bin.

Note: the 1st equation should be carefully reviewed by companies.

**Issue 2-12 draft CRs**

* Agreement:
* To use the following draft CR as starting point;
* Further discuss where to capture the EERIP definition;
* Further update the θ to avoiding the confusion with the existing definition in the specification

## 9.9 OTA spatial emission

### 9.9.1 General

OTA spatial emission requirements are defined to set requirement on emission in unintended directions.

### 9.9.2 Protection of FSS UL

The requirement is defined to protect FSS (Earth-to-space) UL receiver operating within frequency range 6425 to 7075MHz from interference.

#### 9.9.2.1 Minimum requirement for BS type 1-H and BS type 1-O

For BS type 1-H and BS type 1-O, the requirement is defined as a maximum allowed Expected EIRP (EEIRP) level profile above horizon for elevation angular ranges listed in Table 9.9.2.1-1 and the elevation angles are described in figure 9.9.2.1-1.

EEIRP is defined as the average value of the EIRP, with the averaging being performed:

- Over azimuth angles from −180° to +180 ° and over the specified elevation angle range [θL ≤ θ < θH] in Table 9.9.2-1

[- With the BS generating beams within the *OTA peak directions set*.]

**Table 9.9.2.1-1: Maximum allowed EEIRP limit as function of elevation angular range**

| **Elevation angular ranges**[θL ≤ θ < θH]**(Degrees)** | **EEIRP limit(dBm/MHz)** |
| --- | --- |
| 0<<5 | 27 |
| 5<<10 | 23 |
| 10<<15 | 19 |
| 15<<20 | 18 |
| 20<<30 | 16 |
| 30<<60 | 15 |
| 60<<90 | 15 |
| Note 1: The requirement is applicable for the frequency range 6425 to 7075 MHz within band n104.Note 2: An IMT base station shall comply with the specified limits on EEIRP spectral density for all declared mechanical tilts. |



**Figure 9.9.2.1-1: Definitions of [θL and θH] angles.**

# Open issue for U6GHz EIRP mask and OTA testing

**Issue 2-8 Expected EIRP sampling grid for average EIRP**

* Recommended for further discussion:
	+ Need further discussions

**Issue 2-9 Other related with conformance testing declaration and RF channels**

* Recommended for further discussion:
	+ The following issues to be considered:
* the number of mechanical down-tilt and its corresponding angular coverage range;
* For each angular coverage range, the number of beams for conformance testing and its corresponding weighting factor;
* To balance the number for beams for conformance testing/complexity and test accuracy;
* The impacts of potential factors (measurement sampling grid for summation error etc) on EIRP accuracy.
* In conformance testing, consideration of converting coordinate system to 3GPP coordinate system, to align with other test cases
* Other issues are not precluded.

**Issue 2-10 Other related with RF channels**

* Recommended for further discussion:
	+ Need further discussions

**Issue 2-11 Other related with confidence intervals**

* Recommended for further discussion:
	+ Need further discussions

**Issue 3-1: Co-location reference antenna**

* Recommended for further discussion
	+ Further discuss the wideband antennas and check its possibility of translation between reference co-location antenna and wideband antenna;
	+ Further discuss co-location scenarios and coupling loss between two AAS BS especially for FR1 high bands;
	+ The analysis for co-location in this WID could be leveraged to SBFD if necessary.
	+ Other issues are not precluded.