**3GPP TSG-RAN WG4 Meeting # 116 *R4-2511740***

**Bengaluru, India, 25th - 29th August, 2025**

**Agenda Item:** 7.22.3.2

**Source:** Huawei, HiSilicon

**Title: Introduction of receiver sensitivity requirements for Ambient IoT Devices**

**Document for:** Approval

# 1 Introduction

In this contribution, the receiver sensitivity requirements for AIoT devices are introduced.

# 2 Text proposal

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# 7 Receiver characteristics

## 7.1 General

Unless otherwise stated, the receiver characteristics are specified over the air (OTA). The power levels for all R2D signals are defined assuming a 0 dBi reference antenna located at the center of the quiet zone. The minimum requirements on effective isotropic sensitivity (EIS) apply to two measurements, corresponding to DL signals in orthogonal polarizations.

## 7.2 Reference sensitivity

### 7.2.1 General

The reference sensitivity power level REFSENS is defined as the EIS level at the centre of the quiet zone in the RX gain peak direction, at which the successful detection rate shall meet or exceed the requirements for the specified reference measurement channel.

### 7.2.2 Reference sensitivity power level

The successful detection rate shall be ≥ 90% of the reference measurement channels as specified in Annexes C.1, C.2 and C.3 with peak reference sensitivity specified in Table 7.2.2-1. The requirement is verified with the test metric of EIS at the peak antenna gain direction as specified in clause 8.2.1.

Table 7.2.2-1: Reference sensitivity

|  |  |  |
| --- | --- | --- |
| Operating band | Sensitivity Level | REFSENS (dBm) |
| According to subclause 5.2 | L1 | -34 |

NOTE: The peak reference sensitivity is measured at the low, middle and high frequency of the supported

band(s), and the average value is verified against the requirement.

### 7.2.3 EIS partial sphere coverage

The reference measurement channels and detection criterion shall be as specified in clause 7.2.2

The maximum EIS measured over the partial sphere around the device is defined as the partial sphere coverage requirement and is found in Table 7.2.3-1 below. The requirement is verified with the test metric of EIS as specified in clause 8.2.1.

Table 7.2.3-1: EIS partial sphere coverage

|  |  |  |
| --- | --- | --- |
| Operating band | EIS (dBm) | Angular width |
| According to subclause 5.2 | -28.5 | ±45 degrees |

NOTE: The EIS partial sphere coverage requirement is verified at the middle frequency of the supported

band(s).

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Annex C (normative): Measurement channels

## C.1 General

Unless stated otherwise, the transmitter and receiver performances are measured through the contention-free access (CFA) procedure, consisting of one R2D message and one D2R message.

## C.2 R2D reference measurement channels

## C.3 D2R reference measurement channels

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