**3GPP TSG-RAN WG4 Meeting # 111 draft R4-2410597**

Fukuoka, Japan, May 20 – May 24, 2024

**Agenda item:** 10.13.4

**Source:** Moderator (Huawei)

**Title:** WF on impacts of A-IoT on RF requirements

**Document for:** Approval

# Way forward

## Topic #1: A-IoT System Parameters

### Issue 1-1: System parameter

Agreement:

* RAN4 will define the D2R and/or R2D channel bandwidth and operating bands for A-IoT
	+ Wait for the conclusions from other WGs to discuss the detailed parameters.
	+ FFS on whether to have the same or different channel bandwidths for devices, BS and intermediate node

## Topic #2: A-IoT BS

### Issue 2-1: start point

Agreement:

* The existing NR BS RF requirement framework can be used as starting point for A-IoT BS.
	+ FFS on the detailed requirements.

### Issue 2-4: TX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.

|  |
| --- |
| **RF Requirement for AIoT BS- TX part** |
| TX requirement  | Transmit output power | Maximum output power |  |
| Output power dynamic |  |
| Transmit ON/OFF power |  |
| Transmission times |  |
| Transmit signal quality | Frequency error |  |
| EVM |  |
| TAE |  |
| ~~In-band emissions~~ |  |
| Unwanted emissions | Occupied bandwidth |  |
| SEM |  |
| ACLR |  |
| Operating band unwanted emissions |  |
| Transmitter spurious emissions |  |
| Transmitter intermodulation |  |

### Issue 2-5: RX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.

|  |
| --- |
| **RF Requirement for AIoT BS- RX part** |
| RX requirement | Reference sensitivity  |  |
| Dynamic range  |  |
| In-channel selectivity |  |
| Adjacent Channel Selectivity |  |
| In-band blocking |  |
| Out-of-band blocking |  |
| Receiver intermodulation |  |
| Narrowband intermodulation |  |
| Rx spurious emission |  |
| Receiver intermodulation |  |

### Issue 2-6: CW for D1T1

* Recommended WF
	+ To further investigate output power, emission requirements for CW node
		- FFS for other requirements.

## Topic #3: A-IoT device

### Issue 3-3: TX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.
		- Encourage companies to provide views on RF requirements impact for different device types.

|  |
| --- |
| **RF Requirement for AIoT device- TX part** |
| Tx requirement  | Transmit output power | Maximum output power |  |
| Output power dynamic | Transmit OFF power |  |
| Transmit time mask |  |
| Minimum output power |  |
| Power control requirement |  |
| Transmit ON/OFF power | Transmit OFF power |  |
| ON/OFF time mask |  |
| Transmit signal quality | Frequency error |  |
| EVM |  |
| In band emissions  |  |
| Carrier leakage |  |
| Output RF spectrum emissions | Occupied bandwidth |  |
| SEM |  |
| ACLR |  |
| Spurious emissions |  |
| Transmit intermodulation |  |

### Issue 3-4: RX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.
		- Encourage companies to provide views on RF requirements impact for different device types.

|  |
| --- |
| **RF Requirement for AIoT device- RX part** |
| RX requirement | Reference sensitivity |  |
| Maximum input power |  |
| ACS |  |
| ASCS |  |
| In-band blocking |  |
| Out-of-band blocking |  |
| Receiver intermodulation |  |
| Rx spurious emission |  |

### Issue 3-5: testability

* Recommended WF
	+ FFS on whether conducted conformance test is feasible for AIOT devices.
	+ FFS on OTA test method, performance metric, etc.

### Issue 3-6: Energy harvesting

* ~~Recommended WF~~
	+ ~~According to SID and RAN1 agreement, energy harvesting is not a common objective for RAN4. In general, no need to discuss RF requirements of Energy harvesting.~~
	+ ~~FFS on whether energy harvesting should be considered for RF requirements impact discussion in RAN4.~~
		- ~~Clarification on SID on RAN4 scope may be needed.~~

## Topic #4: Intermediate node （UE）

### Issue 4-2: TX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.

|  |
| --- |
| **RF Requirement for AIoT intermediate UE- TX part** |
| TX requirement | Maximum output power  |  |
| Output power dynamics |  |
| Transmit ON/OFF power |  |
| Transmitted signal quality |  |
| Transmission times |  |
| Occupied bandwidth |  |
| Tx intermodulation |  |
| ACLR |  |
| Operating band unwanted emissions  |  |
| Transmitter spurious emissions |  |

### Issue 4-3: RX

* Recommended WF
	+ Use the following table as starting point for RF requirements impact study. The table is for information.

|  |
| --- |
| **RF Requirement for AIoT intermediate UE- RX part** |
| RX requirement | Reference sensitivity |  |
| Maximum input power |  |
| ICS |  |
| ACS |  |
| In-band blocking |  |
| Out-of-band blocking |  |
| Receiver intermodulation |  |
| Rx spurious emission |  |

### Issue 4-4: CW for D2T2

* Recommended WF
	+ To further investigate output power, emission requirements for CW node
		- FFS for other requirements.