**3GPP TSG-RAN WG4 Meeting # 112-bis R4-2417184**

**Hefei, China, October 14 – 18, 2024**

**Title:** WF for NTN NB-IoT Inband operation

**Agenda Item:** 4.4.1

**Source: Ericsson**

**Document for:** Approval

# Background

* NTN NB-IoT standalone operation is introduced from Rel-17
* NTN NB-IoT inband operation has not been introduced in specification till now.

# Open issue

* **Inband or guard band operation at network for NR NTN**
	+ Option 1: inband
* **In-band/guard band operation should be mandatory or optional feature**
	+ Option 1: mandatory
	+ Option 2: optional
* **From which release the in-band/guard band operation mode should be mandatory supported by NTN NB-IoT UE**
	+ Option 1: Rel-18
	+ Option 2: Rel-19
	+ Option 3: Not a mandatory feature
* **From which release the in-band/guard band operation mode should be optional supported by NTN NB-IoT UE**
	+ Option 1: Rel-18
	+ Option 2: other release
* **Signaling aspect and other potential cross group impact**
	+ **Issue 1: When configured with non-anchor carrier, NTN NB IoT UE needs to apply M\_DL offet differently for standalone mode and in-band mode, hence NTN NB-IoT needs to know which deployment mode the configured anchor carrier is:**
		- Further check if the NTN NB-IoT UE can use the MIB IE below to identify the In-band/guard band and standalone mode.
	+ Further check impact and/or consequencies in RAN1 specs if in-band mode is indicated

*MasterInformationBlock-NB* field descriptions

* + ***operationModeInfo***
		- Deployment scenario (in-band/guard-band/standalone) and related information. See TS 36.211 [21] and TS 36.213 [23].
		- *Inband-SamePCI* indicates an in-band deployment and that the NB-IoT and LTE cell share the same physical cell id and have the same number of NRS and CRS ports.
		- *Inband-DifferentPCI* indicates an in-band deployment and that the NB-IoT and LTE cell have different physical cell id.
		- *guardband* indicatesa guard-band deployment.
	+ **Issue 2: whether to define the UE capability for in-band operation**
		- Option 1: Yes
		- Option 2: No
* **Which CR category should be used for TEI CR?**
	+ - Option 1: Category C
		- Option 2: Category B
* **Which wording for the draftCR adding the F\_DL for in-band/guard band operation**:
	+ Option 1: Adding the same F\_DL forumular with in TS 36.101
		- i.e option 1 in draftCR R4-2416114
	+ Option 2: keep the same formular in TS 36.102 and modifying the M\_DL offset in a note for inband operation.
	+ Option 3: other option not excluded
* **Other specification impact**
* SAN TS 38.108 impact
	+ Evaluating NTN NB-IoT in-band operation RF specificaiton in next meeting
* SAN TS 36.108 impact
	+ EARFCN to adopt the same with 36.102
* SAN TS 38.181 impact
	+ Declaration of the NTN NB-IoT operation
	+ Related test for core requirement in TS 38.108

# Reference

* R4-2415461, On inband deployment of NTN NB-IoT in NR carrier, Ericsson
* R4-2416114, (TEI18) Draft CR to 36.102 In-band NB-IoT NTN deployment with NR, MTK