**3GPP TSG RAN meeting #90e RP-20xxxx**

**Electronic Meeting, 7-11 December 2020**

**Agenda item:** TBA

**Source:** Email discussion moderator (Intel)

**Title:** Report from Email Discussion [90E][43][60GHz\_OTA]

**Document for:** Discussion and decision

# Introduction

This document provides as summary of the following email discussion during RAN#90-e:

**[90E][43][60GHz\_OTA]**

Goal: Generate an agreeable way forward.

Input contributions covered: 2661

# Discussion

## Background

The following summarizes the key observations and proposals listed in RP-202661:

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| ***Observation #1: OTA test methods are used as a baseline approach for NR mmWave test methodology for RF, RRM, and Demodulation testing.***  ***Observation #2: The existing mmWave OTA UE test methods are applicable to FR2 frequency bands and their extension to carrier frequencies above 52.6 GHz should be further studied***  **Proposal #1: Further study and define NR 52.6-71GHz OTA test methods within the Rel-17 timeframe**   * + **Option 1: Initiate a separate SI in parallel with NR 52.6 – 71 GHz WI**   + **Option 2: Extend the scope of the NR 52.6 – 71 GHz WI to cover the testability aspects**   **Proposal #2: Consider the following SI/WI objectives to enable NR 52.6-71GHz OTA test methods**   * + *Study and define the over the air (OTA) test methods for UE RF, RRM, and demodulation requirements for the 52.6GHz-71GHz frequency range [RAN4]*     - *Extend the applicability of the FR2 OTA test methods in TR 38.810 wherever possible*     - *Identify any changes needed, including general testing and calibration, permitted test methods, multi-path fading propagation conditions, measurement applicability criteria.*     - *Target device types: Handheld UE, laptop, tablet, FWA, vehicular mounted device; other UE types not precluded.* |

## Initial round

### Open issues

The following questions are proposed to be discussed in the initial round:

* Question #1: Whether to further study and define NR 52.6-71GHz OTA test methods within the Rel-17 timeframe
* Question #2: How to organize the NR 52.6-71GHz OTA test methods studies within the Rel-17 timeframe
  + Option 1: Initiate a separate SI to study NR 52.6-71GHz OTA test methods
  + Option 2: Extend the scope of the NR 52.6 – 71 GHz WI to cover the testability aspects
  + Option 3: other options?
* Question #3: Candidate study objectives
  + *Option 1: Study and define the over the air (OTA) test methods for UE RF, RRM, and demodulation requirements for the 52.6GHz-71GHz frequency range [RAN4]*
    - *Extend the applicability of the FR2 OTA test methods in TR 38.810 wherever possible*
    - *Identify any changes needed, including general testing and calibration, permitted test methods, multi-path fading propagation conditions, measurement applicability criteria.*
    - *Target device types: Handheld UE, laptop, tablet, FWA, vehicular mounted device; other UE types not precluded.*
    - *Utilize free space testing configuration for test methods definition.*

### Companies views’ collection

**Question #1: Whether to further study and define NR 52.6-71GHz OTA test methods within the Rel-17 timeframe?**

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| **Company** | **Comments** |
| Qualcomm | Q1: some study is definitely needed as there is a gap in testing for this frequency range. |
| ZTE | It is fine to study in Rel-17 timeframe if TU allowed, however this work should be started until RF core requirements is stable, otherwsie it seems no base are upon for further discussion. |
| Intel | Support to study in Rel-17. Agree with QC that there will be gap in case the test methods are not defined and RAN4 core requirements and RAN5 conformance requirements cannot be defined.  To ZTE: the work can start in May 2020 or later once some progress is made with RF requirements definition. |
| Huawei, HiSilicon | Before rushing to study in Rel-17 for 52.6-71GHz OTA test methods, we need to have a better understanding whether existing test framework for FR2 can be reused for 52.6-71GHz, which should be based on available RF requirements. However, requirements are not studied yet. |
| Keysight | The decision to extend NR to 71 GHz seems to have been made. It is therefore inevitable that there will be requirements at some point in the future and that those requirements will have to be tested. It is also the case that existing FR2 test system that have to operate down to 24.25 GHz cannot be extended to 71 GHz without significant changes in architecture. It is therefore essential that 3GPP gives the test community a clear and early message that test systems covering the range 52.6 GHz to 71 GHz are expected in order that essential design work can be prioritized. Keysight therefore supports studying this during Rel-17. |
| MTK | Fine to have some study. But we would prefer to first focus on whether the existing FR2 testing framework can be re-used here for 52.6-71GHz. If we later identify new issues for 52.6-71GHz, we can further discuss how and where to discuss new test methods |
| vivo | We support to do some study. We also need to consider that the FR2 testability is always started after we have some initial thinking of core requirements. So maybe the starting time need to be further discussed. |

**Question #2: How to organize the NR 52.6-71GHz OTA test methods studies within the Rel-17 timeframe**

* **Option 1: Initiate a separate SI to study NR 52.6-71GHz OTA test methods**
* **Option 2: Extend the scope of the NR 52.6 – 71 GHz WI to cover the testability aspects**
* **Option 3: other options?**

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| **Company** | **Comments** |
| Qualcomm | Q2: Option 3: We believe there are also other OTA testing issues arising from different WIs, there should be a broader discussion on how we handle all of them. Each could be handled in its own WI/SI (basically Option 2 applied independently to each item), however this might not be the most efficient way. Considering that OTA discussions are mainly handled by the same delegates, it should be discussed whether a study item handling all OTA issues in one release should be used. This could be an ongoing SI in which topics are added and concluded one by one. Such handling would offer a wholistic approach which would be very important to achieve a unified testing discussion. Divergence in terms of testing solutions/methodologies would be very harmful for the eco-system. |
| ZTE | Option 2 is more preferred as this 52.6-71GHz OTA test method should be similar as the existing FR2 OTA test.  Given QC’s comments, we are also fine to put all FR2 OTA testing issues in one umbrella SI as OTA delegates should be same for different topics. |
| Intel | Prefer Option 1 to have a separate SI. The SI scope aims to define test methods for RF/RRM/Demod requirements. We assume that the work can progress during the Rel-17 Performance stage. So, in case we add objectives to the WI, there is a risk that the whole WI Core part should be extended in case the test methods work is incomplete by the Core part completion deadline.  We are also OK to put all mmWave OTA testing aspects in one umbrella SI. In this case it makes sense to extend the objectives of Rel-17 FR2 Test Methods enhancements SI. |
| Huawei, HiSilicon | Option 2. The test methods are relevant to the RF requirements specified in the WI. Once the requirements are available, the test methods can be studied. |
| Keysight | Don’t have a strong preference. It may be that there is overlap with existing test systems < 52.6 GHz and the issue of CA should also be considered so the extension to 71 GHz cannot necessarily be handled in isolation of other bands. |
| MTK | Option 3. We prefer to first start the feasibility study in existing ongoing SI to check if FR2 test methods can be re-used first. It seems to us this will bring the least impact in TU budget and is easiest to be handled the same group of OTA experts. Once we have a clear study conclusion, we can know better how to start the following works. |
| vivo | Option3. Existing test methods can be the starting point for higher frequency, we prefer to discuss a proper way to treat the FR2 testability issue.  Now the FR2 upper frequency of the test system has been changed several times from 43.5GHz~49GHz~71GHz. A big picture of FR2 test method project is much helpful for RAN4 FR2 OTA management. |
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**Question 3: Candidate study objectives**

* ***Option 1: Study and define the over the air (OTA) test methods for UE RF, RRM, and demodulation requirements for the 52.6GHz-71GHz frequency range [RAN4]***
  + ***Extend the applicability of the FR2 OTA test methods in TR 38.810 wherever possible***
  + ***Identify any changes needed, including general testing and calibration, permitted test methods, multi-path fading propagation conditions, measurement applicability criteria.***
  + ***Target device types: Handheld UE, laptop, tablet, FWA, vehicular mounted device; other UE types not precluded.***
  + ***Utilize free space testing configuration for test methods definition.***

Companies are encouraged to share views on the candidate objectives of the studies and whether proposed Option 1 objectives are acceptable.

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| **Company** | **Comments** |
| Qualcomm | Q3: we mainly agree with the bullets, we believe that FWA and vehicular mounted device can be de-prioritize, at least for now. |
| ZTE | Just wondering in 52.6-71GHz, are we going to define so many device types? If not, we need to consider so many use cases here? |
| Intel | Support the objectives.  We are fine to prioritize handheld UE, laptop, tablet type of devices. FWA and vehicular mounted devices can be treated with the 2nd priority. |
| Huawei, HiSilicon | As commented for Q2, it’s too early to consider the detailed objectives as no RF requirements are specified yet. |
| Keysight | The need to test bands other than 52.6 to 71 GHz in the same test system needs to be made clear up front as this will have a major impact on the design of future systems. |
| MTK | Objectives are fine to us. The problem is about the timeline. There could be some dependency to either RAN1 work or RAN4 RF requirement. Some breakdown is needed to know which topics can be studied first and which topics should be started later. |
| vivo | Prioritization of UE type is needed, which is highly related to the system capability. We also suggest to study preliminary MU assessment of the new test methods in RAN4, for 52.6GHz-71GHz frequency range. |
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### Summary and recommendation for further discussion

## Intermediate round

## Fine-tuning round

# Conclusion

Based on the email discussion, the following are proposed:

* TBD