

Unlocking Spectrum above 6 GHz for 5G Mobile Communications

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WRC-19 preparations – WRC-15 AI10

Nokia thinking on 5G spectrum

Current activities should be focused to find ranges/bands to be **studied** between WRC-15 and WRC-19 (and not to find and decide on the bands to allocate)

Keep the 5G spectrum ranges to be studied as wide as possible.

Keep as many ranges alive as possible, especially below 30GHz.

2-4 wide ranges in low (~6-20GHz), medium (~20-40GHz) and high (~40-90GHz) frequencies.

For example:

5.925 – 8.5 GHz

10.7 – 19.7 GHz

24.25 – 29.5 GHz

36 – 50.2 GHz

66 – 71 GHz

71 – 76 / 81 - 86 GHz

Storyline

5G would need spectrum both from cm and mm-ranges, but exact amount of spectrum bandwidth needed is still under study. Based on very initial considerations on multiple 5G use case scenarios, noting that key technical parameters of 5G are still under study, spectrum bandwidth estimate per operator could be ~500MHz below 20GHz, ~1GHz between 20-40GHz and ~2 GHz above 40GHz.

5G spectrum bands/ranges – key points for Nokia

1) Get sufficient amount of suitable new spectrum bands for 5G from WRC-19

- This means that sufficient amount of suitable spectrum bands needs to be studied between WRC-15 and WRC-19
 - ➔ No exclusions of bands/ranges w/o due studies

2) Smooth re-farming of existing IMT bands for 5G

- No roadblocks to use 5G in IMT bands below 6GHz.

5G spectrum bands/ranges – where are we @ October 2015?

- The variety of 5G services, scenarios and use cases puts high demands on 5G networks with regards to coverage, capacity and reliability
 - availability of a spectrum amount of several GHz required
 - sought in different spectrum parts in the whole range up to 100 GHz
- Some Regulators: focus the study on limited set of bands so that WRC-19 Agenda Item does not become too wide
- Some Regulators: having rather wide approach (~ 6-100GHz, with some passive and non-harmonized (AP3x) bands excluded)
- Some efforts: create some criteria and principles how to produce a focused list, such as to consider bands already allocated to mobile or fixed services
- Detailed studies on suitable bands/ranges and e.g. information on future plans of incumbents, is needed between WRC-15 and WRC-19

Metis II WP3 overview



1. WP3 is focused on 5G spectrum topics, both regulatory and technical aspects of it.
2. WP3 will focus on the integration of spectrum above 6 GHz, consideration of new 5G user groups and vertical industries as well as the increased flexibility needed to make best use of different kinds of spectrum access mechanisms available.
3. Also, WP3 will focus on providing technical justification and rationale why more spectrum above 6 GHz is needed for 5G
 - this will facilitate preparations towards WRC-19