



5G Spectrum Requirements White Paper v2.0

next generation mobile networks



NGMN White Paper

Additional spectrum bands for 5G and the WRC-19 and beyond

by NGMN Alliance

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1 Introduction

The purpose of this paper is to lay out the NGMN vision on the current process of identification of new spectrum for IMT services within the ITU process, as well as exploring the opportunity for new frequency ranges suitable for the deployment of 5G in the next decade.

NGMN is acknowledging the important mission of International Telecommunication Union (ITU) of global and regional harmonisation of suitable frequency ranges for the next generation of mobile services. This has a significant impact on the timing of adopting 5G, reduce the deployment costs and facilitate border coordination between countries.

In addition to bands already identified for IMT below 6GHz (NGMN Spectrum White Paper, January 12th 2017), the mobile community will need to access new spectrum bands in order to fulfil the 5G promise. The characteristics of these bands (e.g. large contiguous bandwidths, short wave lengths) make them particularly suitable for the 5G ecosystem that is currently envisaged.

2 World Radio Conference 2019

Agenda Item 1.13

Under the Resolution 238 of the previous conference, in November 2019, ITU will decide on the identification of additional spectrum for IMT from within the following ranges:

- 24.25-27.5GHz, 37-40.5GHz, 42.5-43.5GHz, 45.5-47GHz, 47.2-50.2GHz, 50.4-52.6GHz, 66-76GHz and 81-86GHz, which have allocations to the mobile service on a primary basis; and
- 31.8-33.4GHz, 40.5-42.5GHz and 47-47.2GHz, which may require additional allocations to the mobile service on a primary basis,

The group tasked with developing sharing and compatibility studies between IMT and other services in the frequency bands under study, TG5/1, has made significant progress, however, the work is yet to be completed. Therefore, NGMN believes that at his stage in the preparatory process it is too early to draw any conclusions and the opportunity for all the above mentioned ranges to become IMT bands should be further explored.

Nevertheless, NGMN considers that the following ranges have a higher potential and should represent a priority for IMT identification:

- 24.25 - 27.5GHz band (26GHz) represents an attractive candidate band due to the potential large bandwidth available, and the vicinity to the 28GHz band that is considered by some regions outside of the ITU process. Special attention should be given to the 24.25 - 27.5GHz band, due to a potential tuning range up to 29.5GHz that can lead to economies of scale in the provision of globally harmonized 5G services.
- 37-43.5GHz band (40GHz) has a variety of existing services operating in this range, however studies so far indicate that co-existence with IMT is feasible. In addition, parts of the band are already identified for mobile and certain ranges remain currently vacant in many countries. This band has a higher potential importance as it would provide additional capacity in millimetre wave range for future 5G services following the successful deployments of 26GHz and 28GHz bands. Its significance is also increased as the sharing and compatibility studies of 32GHz band do not offer optimistic results.
- 66-71GHz range is receiving more interest and support mainly after FCC's decision to include 64-71GHz band as an unlicensed band in its Spectrum Frontiers initiative. For future 5G

services, providing a diversity of licensed and unlicensed bands will be enriching a host of possibilities for various use cases.

Agenda Item 10

NGMN recognises the important task of developing the preliminary agenda for the subsequent conference (WRC-23) and the role this can play in opening new opportunities for the developing and expanding the 5G ecosystem.

In this regard, NGMN believes that the potential of the following frequency bands should be further explored:

- 470-694MHz, already included in the preliminary agenda of the WRC-23 for Region 1. A potential IMT identification could lead to improved coverage and indoor penetration.
- 3800-4200MHz (including 3700-4200 MHz in the US) this band is particularly attractive for future 5G deployments due to the vicinity to the 3300-3800GHz range, which is widely viewed as the pioneer core band for 5G and offers the best opportunity for a global 5G band.
- Bands between 6 and 24GHz-There is a gap in spectrum availability between 6-24GHz that is not currently addressed in the ITU WRC-19 process and this needs to be addressed given the relative lack of large bandwidth allocations below 6 GHz and the coverage issues associated to bands above 24GHz

Agenda Item 1.14-HAPS

'To consider, on the basis of the ITU-R studies, appropriate regulatory actions for high altitude platform stations (HAPS) within existing fixed service allocations'

The AI includes study of the bands 24.25-27.5 GHz (Region 2 only) and 38-39.5 GHz, overlapping with the work being carried out under Agenda Item 1.13 to identify spectrum for IMT.

NGMN members are of the view that any Agenda Items for which there is an overlap with any of the bands studied under A.I, 1.13 should not affect the IMT identification and subsequent 5G development in these bands.