ITU-APT Foundation of India (IAFI)[1]

# SUGGESTED UPDATES TO THE WORKING DOCUMENT TOWARD A NEW APT REPORT ON CURRENT STATUS AND FUTURE PLAN OF USAGE IN THE FREQUENCY RANGES OF 7.125-24 GHZ AND 92-300 GHZ IN ASIA PACIFIC REGION

## 1. Introduction:

AWG-29 had started work on a new APT Report on current status and future plan of usage in the frequency ranges of 7.125-24 GHz and 92-300 GHz in Asia pacific region to on future spectrum planning for advanced IMT coverage and capacity improvements in 2025~2030 in Asia Pacific Region accounting for the service and technology trends, Mobile connectivity targets (examples includes speed, throughput, coverage), fixed broadband connectivity targets and foreseen IMT deployment and Spectrum planning for advanced IMT coverage and capacity improvements. This report is also expected to share the industry's finding on IMT spectrum planning with Asia-pacific countries.

The working Document from AWG-30 in document AWG-30/TMP-63 (Rev.1) was carried forward and is expected to be completed by AWG-31.

## 2. Proposal:

IAFI has further updated the working document towards the proposed new APT Report on current status and future plan of usage in the frequency ranges of 7.125-24 GHz and 92-300 GHz in Asia pacific region.

An updated working document is enclosed for further drafting.

[1] ITU-APT Foundation of India (IAFI) is a new Affiliate member of APT. Details of IAFI can be seen at itu-apt.org

# WORKING DOCUMENT TOWARD A NEW APT REPORT ON CURRENT STATUS AND FUTURE PLAN OF USAGE IN THE FREQUENCY RANGES OF 7.125-24 GHZ AND 92-300 GHZ IN ASIA PACIFIC REGION

*[Editor's note: there're still different views on the content of Section 1 after discussion at this AWG meeting. The SWG will continue working on this document at next AWG meeting.]*

## 1. Introduction

There is growing momentum around IMT-2030/6G development and policy planning at the international, regional, and national levels. The ITU-R Working Party 5D started the work to define IMT towards 2030 and beyond (IMT-2030/6G) in year 2021, by initiating the work on an IMT-2030 framework, as the responsible group for IMT matters. The new ITU Recommendation that contains the detailed standards are expected to be completed in 2030 while the technology proposals are expected to be contributed to ITU early 2029 and the first IMT-2030/6G products are expected to be available around same time with widespread deployment shortly after that.

As regards 3GPP, its IMT-2030/6G standards work is expected to begin around year 2025 (Release 19 or 20), and to be finalized around year 2028/2029 with (Release 21or 22).

Spectrum requirements for next generation of IMT will be even more demanding than the situation in the IMT-2020/5G era as a more diverse range of spectrum bands may be required to satisfy the new emerging use-cases – that include reuse of existing bands and new spectrum across various ranges all the way from UHF to mmWave and EHF ranges (THz).

Globally, mobile industry and academia are conducting research activities to address the tremendous growth in traffic with also new use cases and user demands for year 2030 and beyond. Various countries including countries in APT region have earmarked resources including financial support for similar research work towards 6G. Correspondingly, frequency allocation and regulatory frameworks issues also need to be addressed in parallel so that the development of the technology can proceed.

In the world of 2030 and beyond, human intelligence will be augmented by being tightly coupled and seamlessly intertwined with the ubiquitous intelligent network and digital technologies. It is expected that future IMT system towards 2030 and beyond will support and further accelerate a change for a better and sustainable world with significantly increased efficiency in the use of resources, energy, and cost, thus facilitating new and sustainable ways of living in the next decades. Such needs will require spectrum resources from a variety of frequency ranges. Moreover, experience in the future will be enriched by the seamless unification of the physical and digital (cyber) worlds achieved through a new ecosystem of networks and device technologies. It is foreseen that an enhanced digital world experience consisting of multi-sensory experiences enabling transformative forms of human collaboration

such as human-machine and machine-machine interactions will bring life-improving use cases and create new economic value.

At the same time, it is anticipated that there will be continuing demands for achieving sustainable energy solutions, cost and resource efficiency, high capacity, low latency, strong security, resilience, safety from the societal challenges and efficiency under all circumstance in coverage and operation, enabling future IMT as trustworthy and AI-native system, distributed cloud and communication systems. Besides increasing ambitions with various use cases and enhanced performance, IMT for 2030 and beyond should be an integral part of a sustainable and carbon neutral world.

To address the envisioned requirements, a number of IMT technologies to increase the spectral efficiency and capacity have been discussed in ITU-R WP5D. Furthermore, as outlined above, frequency allocations and regulatory frameworks also need to be established to enable the successful development of IMT for 2030 and beyond.

The development of IMT networks within APT region or even within countries are unbalanced; some developed/urban areas focus on the high user demands in local area, while some undeveloped areas focus on the large coverage sub-urban area with low user density. To meet all the needs of APT areas and to avoid the digital divide in the era of future IMT, the appropriate choices of frequency bands to provide coverage, capacity and performance are necessary and are important to the cost-effective implementation of future IMT systems, while ensuring that radiowave propagation characteristics and implementation complexity and cost factors are taken into account.

Spectrum identification for IMT in various spectrum bands is a long-drawn two stage process which in stage one involves diligent ITU-R co-existence/sharing studies followed by stage two of spectrum identification during WRCs. This brings in a gap between the identification of frequency bands for IMT and actual deployment of IMT systems in those bands. Hence a timely availability of spectrum is extremely important to support the IMT planning and development.

AWG is conducting study on “Current status and future plan of usage in the frequency ranges of 7.125-24 GHz and 92-300 GHz in Asia Pacific countries” in order to support a further study on considering the possibility of additional frequency bands for International Mobile Telecommunications (IMT), in the view of the harmonization of spectrum usage, the efficient and effective deployment of IMT systems.

## 2. Terminologies and definitions

3GPP : 3rd Generation Partnership Project

AI: Artificial Intelligence

A-ESIM: Aeronautical Earth Station in Motion

D2D: Device to Device

ESIM: Earth Station in Motion

IMT: International Mobile Telecommunications

mmWave : Millimetre Waves

M-ESIM: Maritime Earth Station in Motion

RLAN: Radio Local Area Network

THz : Tera Hertz

UHF: Ultra-High Frequency

EHF: Extremely High Frequency

WRC: World Radio Conference

## 3. Current usages

**Question 1:** What is/are current application(s) and usage (e.g. ESIM, point-to-point link, point-to-multipoint link, radar, mobile broadband, etc.) and in the frequency ranges of 7.125-24 GHz and 92-300 GHz in your country?
***Please provide detail***
***NOTE:***
- *Type of use, for example: commercial, private, government, etc.*

*[Editor's note: Due to difficulty and complexity to merge the answers to Question 1, AWG-30 initially incorporated all answers to Question 1 as enclosed document for further work at AWG-31.]*
*[Editor's note: In AWG-31, this table will be modified to get an easy understanding. Normal attachment of file will be preferred for administrations]*


## 4. Future plans

**4.1 Question 2:** Do you plan to change the current application which were answered in Question 1? If so, please specify in detail as much as possible.

**Response from APT members:**

Source:

- AWG-30/INP-13 (Thailand), 14 (Myanmar), 24 (Japan), 33 (New Zealand), 40 (Korea), 67 (Indonesia), 70 (Viet Nam), 76 (Papua New Guinea), 78 (India) and 79 (Lao)

| **Source** | **Answer** |
|---|---|
| AWG-30/INP-13 (Thailand) | There is no plan to change the current applications mentioned above in the near future. |
| AWG-30/INP-14 (Myanmar) | Not yet |
| AWG-30/INP-24 (Japan) | The attached frequency assignment plan is revised regularly, so in general the plan for the frequency bands questioned could also be changed in future. |

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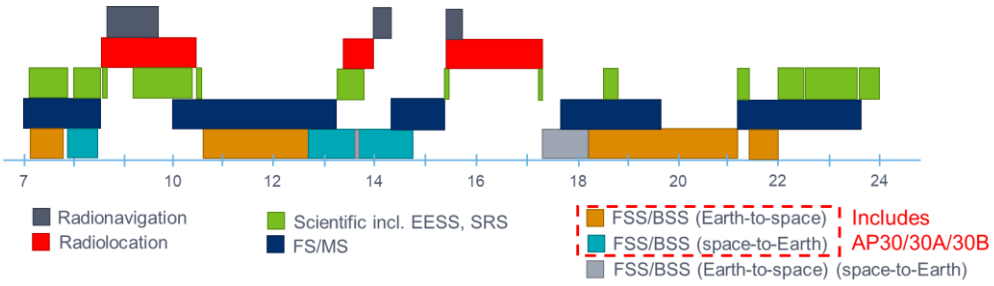
|---|---|
| AWG-30/INP-33<br>(New Zealand) | No current plans although we continue to monitor developments. |
| AWG-30/INP-40<br>(Rep. of Korea) | The Republic of Korea is considering planning which application(s) could be shared with IMT in the future, depending on the studies below Question 3. |
| AWG-30/INP-67<br>(Indonesia) | No plan, taking into account those frequency bands anticipating future plan. |
| AWG-30/INP-70<br>(Viet Nam) | Consider the feasibility of new IMT bands in the frequency bands of 7.125-24 GHz and 92-300 GHz based on sharing and compatibility studies with incumbent primary services |
| AWG-30/INP-76<br>(Papua New Guinea) | Depending on the outcome of WRC-23, A-ESIM and M-ESIM applications in the band 12.75 – 13.25 GHz are the possible changes to the current applications for the band between 7 – 24 GHz.<br><br>In general, Papua New Guinea administration believe the changes to the current frequency allocation table (i.e. Article 5 of RR) for the band 7 – 24 GHz and 92 – 300 GHz will depend on the outcome of WRC-23 and future WRC. It would be a challenge to answer the above question without knowing the outcome of WRC-23 and future WRC. In this regard, planning to deploy IMT-2030 in the band 7 – 24 GHz or in the band 92 – 300 GHz would not be reasonable answer to the above question without the proper process and appropriate ITU-R study.<br><br>Meanwhile, Papua New Guinea noticed that some administrations have proposed to conduct future ITU-R study on the possible IMT identification for the band 7 – 24 GHz. In this regard, Papua New Guinea don't have any plan to allow IMT-2030 deployment for the band 7 – 24 GHz at this stage due to the following reasons:<br><br>a) Below are the chart indicated all of the services for the band 7 – 24 GHz on primary basis<br><br>  <br><br>Spectrum in the 7-24 GHz range is congested with critical applications |

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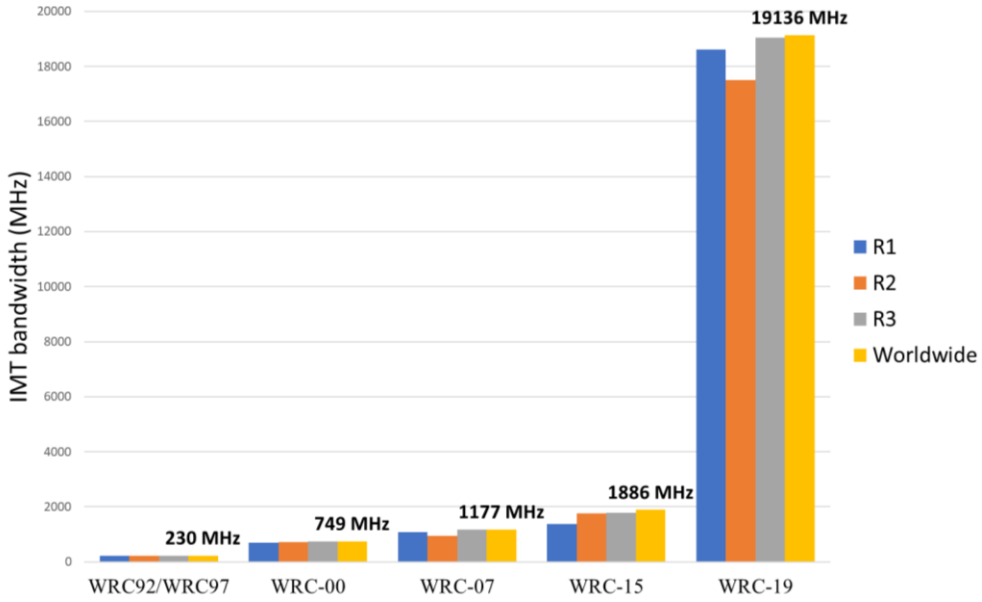
| | b) Refer to the outcome of WRC-19, there are already significant amount of spectrum with a total of 17.25 GHz which 14.75 GHz of spectrum have been identified for IMT globally<br>c) During this WRC-23 study cycle, there are total of 2.2 GHz of spectrum which will be considered for possible IMT identification in regional/global basis.<br>d) The below chart show the total amount of spectrum identified for IMT for every WRC and the utilization of these IMT spectrum need to be addressed and assessed before asking for more IMT spectrum.<br>  <br><br>https://www.itu.int/en/ITU-R/seminars/rrs/2017-Africa/Documents/Plenary/03_%20WRC-15%20Outcomes.pdf |
| AWG-30/INP-78<br>(India) | No changes planned yet but may consider based on future co-existence studies and WRC decisions. |
| AWG-30/INP-79<br>(Lao) | None at this moment. |

**4.2 Question 3:** What is/are planned or potential future applications in these bands 7.125-24 GHz and 92-300 GHz?

**Response from APT members:**

Source:

- AWG-30/INP-13 (Thailand), 14 (Myanmar), 24 (Japan), 33 (New Zealand), 40 (Korea), 67 (Indonesia), 70 (Viet Nam), 76 (Papua New Guinea), 78 (India) and 79 (Lao)

<table>
<tr><th>Source</th><th>Answer</th></tr>
<tr><td>AWG-30/INP-13<br>(Thailand)</td><td>We would like to maintain current applications in these mentioned bands until there are more specific demands or significant change in technology trends.</td></tr>
<tr><td>AWG-30/INP-14<br>(Myanmar)</td><td>Not yet</td></tr>
<tr><td>AWG-30/INP-24<br>(Japan)</td><td>The frequency band 252-275 GHz is allocated to the mobile service and the frequency band 275-296 GHz is able to be used for land mobile service applications. A wide range of contiguous bands could be used for future mobile service applications such as XR, D2D, CPMS, RLAN etc. which may require ultra-high data rates up to Tbit/s and might be supported by future IMT technologies.
<table>
<tr><th>Frequency Portion</th><th>Future Applications</th><th>Timeline</th></tr>
<tr><td>252-300 GHz</td><td>VR/AR/MR<br>Device-to-Device communications<br>Close proximity mobile system<br>Local area networks<br>Fronthaul & backhaul<br>Imaging & sensing radar</td><td>2030<br>2030<br>2030<br>2030<br>2030<br>2030</td></tr>
</table></td></tr>
<tr><td>AWG-30/INP-33<br>(New Zealand)</td><td>No current plans although we continue to monitor developments.</td></tr>
<tr><td>AWG-30/INP-40<br>(Rep. of Korea)</td><td>The Republic of Korea is planning studies on the frequency ranges 7.125-24 GHz (upper mid-band/centimetric wave band) and bands 92-275 GHz (sub-THz band) for IMT for 2030 and beyond.</td></tr>
<tr><td>AWG-30/INP-67<br>(Indonesia)</td><td>No plan</td></tr>
<tr><td>AWG-30/INP-70<br>(Viet Nam)</td><td>Viet Nam is planning studies on the frequency ranges 7.125-24 GHz (upper mid-band/centimetric wave band) and bands 92-300 GHz (sub-THz band) for IMT for 2030 and beyond.</td></tr>
<tr><td>AWG-30/INP-76<br>(Papua New Guinea)</td><td>Proposal for the study on IMT identification for the band 7 – 24 GHz would not be feasible and reasonable as mentioned in our responses to Question#2.<br>In addition to the above reasons, Papua New Guinea would like to share the other justifications why the proposal for future IMT identification for the band 7 – 24 GHz would not be reasonable:<br>a) On average globally, only 50% of the available IMT identified spectrum below 5 GHz is licensed</td></tr>
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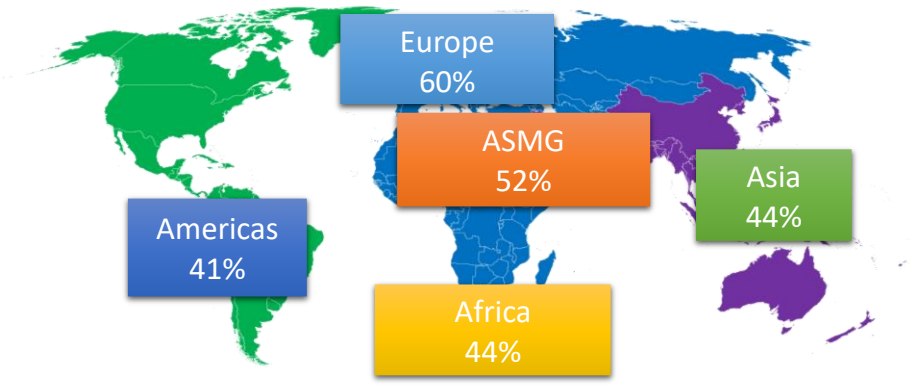
|---|---|
| | https://www.lstelcom.com/fileadmin/content/lst/marketing/media/2019_Study_LicensingUseofMobileSpectrum.pdf<br>  <br><br>b) The work on IMT-2030/6G vision including 6G detailed standards @ WP 5D are expected to be completed by 2030 while the candidate radio-interface technology proposals are expected to be evaluated before then. Considering the timing, we believe a future IMT agenda item relating to 6G should be considered @ WRC-27 as a potential agenda item @ WRC-30.<br><br>c) As per OFCOM discussion paper released this year (i.e. https://www.ofcom.org.uk/__data/assets/pdf_file/0017/232082/mobile-spectrum-demand-discussion-paper.pdf), OFCOM is of the view that that IMT/mobile spectrum broadly sufficient to meet future demand to 2030 with the greater level of uncertainty beyond 2030. |
| AWG-30/INP-78 (India) | Not yet planned. May consider based on answer in Question 2. |
| AWG-30/INP-79 (Lao) | None at this moment. |

**5. Summary / Conclusion**

[TBD]