**텍스트, 클립아트이(가) 표시된 사진

자동 생성된 설명**

**APT REPORT ON**

**FREQUENCY ARRANGEMENTS FOR IMT IN THE BAND 4 800 – 4 990 MHZ**

**Edition: September 2020**

**The 26th Meeting of APT Wireless Group**

**14 – 18 April 2020**

**Virtual Meeting**

***(Source: AWG-26/OUT-07)***

**No. APT/AWG/REP-103**

**APT REPORT ON**

**FREQUENCY ARRANGEMENTS FOR IMT IN THE BAND**

**4 800 – 4 990 MHZ**

# 1 Introduction

The frequency band 4 800-4 990 MHz is already allocated to the mobile service on a primary basis in all three ITU Regions. At World Radiocommunication Conference 2015 (WRC-15) and World Radiocommunication Conference 2019 (WRC-19), the band 4 800-4 990 MHz, or portions thereof, is identified by 42 countries in all three ITU Regions for the implementation of International Mobile Telecommunications (IMT) under RR No. No. 5.441A[[1]](#footnote-1) and No. 5.441B[[2]](#footnote-2).

At the Radiocommunication Assembly (RA-19) in October 2019, the ITU Recommendation M.1036 revision 6 was approved as “Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications in the bands identified for IMT in the Radio Regulations” which newly includes the frequency arrangements for implementation of IMT in the band 4 800-4 990MHz.

The frequency band 4 800-4 990 MHz is suitable for use in dense urban areas to provide increased capacity and performance by using large contiguous bandwidths for IMT. The use of this frequency band for IMT could contribute to the economic and social policy objectives of the telecommunication development for Asia Pacific countries.

Considering the band 4 800-4 990 MHz has been identified for IMT in a number of Asia Pacific countries, the frequency arrangements in this band need to be developed for Region 3 in order to provide the reference to the APT administrations planning to use this frequency band for IMT to maximize additional benefit from harmonized use of the band.

# 2 Scope

This Report covers aspects related to the harmonized frequency arrangement for the implementation of IMT in the band 4 800-4 990 MHz. The objective is to develop possible harmonized frequency arrangement on 4 800-4 990 MHz in Asia Pacific Region based on the frequency allocation and arrangement in ITU and other Regions, for those countries in the APT region that wish to implement IMT in the existing allocation to the mobile service on a primary basis in Region 3.

**3 Vocabulary of terms**

APT Asia Pacific Telecommunity

IMT International Mobile Telecommunications

WRC World Radiocommunication Conference

AMS Aeronautical Mobile Service

MMS Maritime Mobile Service

TDD Time-Division Duplex

**4 References**

ITU-R Radio Regulations (2020)

Recommendation ITU-R M.1036-6/M.1036-6 (10/2019), “Frequency arrangements for implementation of the terrestrial component of International Mobile Telecommunications (IMT) in the bands identified for IMT in the Radio Regulations (RR)”.

APT/AWF/REC-01(Rev.1), APT Recommendation on Use of the Band 4940-4990 MHz for Public Protection and Disaster Relief (PPDR) Applications

APT/AWG/REP-50, “APT survey report on frequency bands in relation to study on WRC-15 Agenda Item 1.1”

APT/AWG/REP-82(Rev.1), “APT Report on Survey the usage and the usage and future plan of the band 4800-4990 MHz in the Asia Pacific region”

**5 Key Considerations for Frequency Arrangements**

There is a worldwide growing interest of using TDD frequency arrangement for IMT in the unpaired frequency bands in both developed and developing countries. TDD networks could provide contiguous spectrum blocks without center gap. In addition, it is beneficial to synchronies the TDD networks of different operators in the same geographic area to avoid guard bands between operators and therefore to facilitate an efficient spectrum usage. TDD frequency arrangement can achieve flexible use of the spectrum and high spectrum efficiency of 4 800-4 990 MHz band, especially by deploying TDD systems with different uplink-downlink configurations.

The ITU-R Recommendation M.1036-6 addresses frequency arrangement for the band 4800-4990 MHz solely with full band TDD option, frequency arrangement H1 as shown below in Table 1 and in Figure 1.

Table 1 Frequency arrangement for IMT in band 4 800-4 990MHz

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Frequency arrangements | Paired arrangements (FDD) | | | | Un-paired arrangements  (TDD) (MHz) | |
| Mobile station transmitter (MHz) | Centre gap (MHz) | Base station transmitter (MHz) | Duplex separation (MHz) |
| H1 |  |  |  |  | 4 800-4 990 |



Figure 1

Furthermore, the new radio interface technologies for IMT-2020 specified by 3GPP enable use of the frequency band 4 800-4 990 MHz by a band plan for TDD called Band n79.

Table 2 3GPP Band n79 definition

|  |  |  |  |
| --- | --- | --- | --- |
| Band number | UL | DL | Duplex mode |
| n79 | 4.4 – 5.0 GHz | 4.4 – 5.0 GHz | TDD |

Based on APT Recommendation on Use of the Band 4940-4990 MHz for Public Protection and Disaster Relief (PPDR) Applications (APT/AWF/REC-01(Rev.1)), APT also recommends, for guidance of APT member administrations, the frequency band 4940-4990 MHz or parts thereof may be used to support broadband networks designed for PPDR high rate data and video information transfer.

In **Radio Regulations Resolution 223 (Rev.WRC-19)** *invites ITU-R* 2 *to study the technical and regulatory conditions for the protection of stations of the AMS and the maritime mobile service (MMS) located in international airspace or waters (i.e. outside national territories) and operated in the frequency band 4 800-4 990 MHz*. In addition, it should be noted that some APT countries addressed that the sharing and compatibility studies between IMT and other systems need to be considered before implementing IMT in 4 800-4 990 MHz(see *4.9 Question 9* of No. APT/AWG/REP-82(Rev.1)).

**6 APT Harmonized Band Plan for IMT in 4 800-4 990 MHz**

It should be noted that the use of this band for IMT is subject to the provisions of RR. No. 5.441B.

A harmonized band plan for implementation of IMT in the band 4800**‑**4990MHz is provided in Figure 2, which is fully aligned with frequency arrangement H1 of the ITU-R Recommendation M.1036-6. Use of this band plan should take into account coexistence measures, if required, between IMT systems operating in this band and the existing systems operating in this and adjacent bands.



Figure 2: A Harmonised band plan for 4800-4990 MHz band

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 5.441A In Brazil, Paraguay and Uruguay, the frequency band 4 800-4 900 MHz, or portions thereof, is identified

   for the implementation of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of this frequency band for the implementation of IMT is subject to agreement obtained with neighbouring countries, and IMT stations shall not claim protection from stations of other applications of the mobile service. Such use shall be in accordance with Resolution 223 (Rev.WRC-19). (WRC-19) [↑](#footnote-ref-1)
2. 5.441B In Angola, Armenia, Azerbaijan, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, China, Côte d’Ivoire, Djibouti, Eswatini, Russian Federation, Gambia, Guinea, Iran (Islamic Republic of), Kazakhstan, Kenya, Lao P.D.R., Lesotho, Liberia, Malawi, Mauritius, Mongolia, Mozambique, Nigeria, Uganda, Uzbekistan, the Dem. Rep. of the Congo, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, South Africa, Tanzania, Togo, Viet Nam, Zambia and Zimbabwe, the frequency band 4 800-4 990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. **9.21** with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density (pfd) produced by this station does not exceed −155 dB(W/(m2 · 1 MHz)) produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. This pfd criterion is subject to review at WRC-23. Resolution **223 (Rev.WRC-19)** applies. This identification shall be effective after WRC-19. (WRC-19) [↑](#footnote-ref-2)