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**APT REPORT ON**

**HARMONIZED FREQUENCY ARRANGEMENT FOR BAND 3 300-3 400 MHZ**

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**1 Introduction**

At ITU-R World Radio Conference 2015 (WRC-15), the band 3 300-3 400 MHz is allocated to the mobile service on a primary basis by 73 countries via footnotes 5.429, 5.429A, 5.429C and 5.429E, and is identified for the implementation of International Mobile Telecommunications (IMT) by 45 countries including Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Congo (Rep. of the), Côte d’Ivoire, Egypt, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mauritania, Mozambique, Namibia, Niger, Nigeria, Uganda, the Dem. Rep. of the Congo, Rwanda, Sudan, South Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Zambia and Zimbabwe in Region 1, Argentina, Colombia, Costa Rica, Ecuador, Mexico and Uruguay in Region 2, and Cambodia, India, Lao P.D.R., Pakistan, the Philippines and Viet Nam in Region 3 via footnotes 5.429B, 5.429D, and 5.429F.

The frequency band 3 300-3 400 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 3300-3400 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 band 3 300-3 400 MHz. The objective is to develop possible harmonized frequency arrangement on 3 300-3 400 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 primary mobile allocation in Region 3.

**3 Vocabulary of terms**

APT Asia Pacific Telecommunity

IMT International Mobile Telecommunications

WRC World Radiocommunication Conference

**4 References**

ITU-R Radio Regulation (2016)

Recommendation ITU-R M.1036-5, “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/AWG/REP-50, “APT survey report on frequency bands in relation to study onWRC-15 Agenda Item 1.1”

APT/AWG/REP-83, “APT Report on Survey the usage and the usage and future plan of the band 3300-3400 MHz in the Asia Pacific region”

**5 Key Considerations for Frequency Arrangements**

In RR Resolution 223 (Rev.WRC-15) *invites ITU-R* numbers 3, 4, 5 and 6 detail a number of studies that are to be undertaken when developing the harmonized frequency arrangement for this band.

To maximize the benefits for APT countries, the frequency arrangements for IMT should be harmonized to the maximum practical extent to facilitate interoperability, for economies of scale and to enable seamless roaming by users. As far as practical, these arrangements should also reflect the importance of efficient usage of the spectrum.

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 3 300-3 400MHz band, especially by deploying TDD systems with different uplink-downlink configurations.

ITU-R Working Party 5D is working on the revision of recommendation ITU-R M.1036. Working Party 5D is considering the inclusion of frequency arrangement for a band which contains 3 300 – 3 400 MHz as a portion of frequency arrangement F3 (three parts in 3 300-3 400 MHz, 3 400-3 600MHz and 3 600-3 700 MHz), based on TDD duplex mode[[1]](#footnote-1).

For LTE, 3GPP has specified the band 3 300 – 3 400 MHz as band 52 based on TDD duplex mode; while for 5G NR, the band 3 300-3 400 MHz is included in band numbers n77 (3 300 – 4 200 MHz) and n78 (3 300 – 3 800 MHz) based on TDD duplex mode, as in Table 2.

Table 1: 3GPP band number definition for 5G NR related to band 3 300-3 400 MHz

|  |  |  |  |
| --- | --- | --- | --- |
| **Band number** | **UL** | **DL** | **Duplex mode** |
| n77 | 3.3 – 4.2 GHz | 3.3 – 4.2 GHz | TDD |
| n78 | 3.3 – 3.8 GHz | 3.3 – 3.8 GHz | TDD |

**6 APT Harmonized Band Plan for IMT**

A possible harmonized band plan for implementation of IMT in the band 3 300‑3 400 MHz is provided in the following figure 1. Use of this band plan should take into account coexistence measures mentioned in **Section 7** **Implementation Issues**.

TDD

3300

3 400

Figure 1: A possible harmonized band plan for 3 300-3 400 MHz band

**7 Implementation Issues**

It is noted that the technical and operational measures to ensure coexistence between IMT systems operating in 3 300 – 3 400 MHz band and other systems operating in adjacent bands should be employed. Those measures might include, but not limit to, in-block power limit, out-of-block emission limits (sometime can be call Block-Edge-Mask (BEM)) and guard band. One example of implementing guard band is illustrated as below:

TDD

3300

3 400

GB

[Guard band]

Figure 2: A possible example of implementing guard band in 3 300-3 400 MHz frequency arrangement

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1. Attachment 4.2 of R15-WP5D-C-1184!H04!MSW-E, <https://www.itu.int/md/R15-WP5D-C-1184/en> [↑](#footnote-ref-1)