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| **Radiocommunication Study Groups** |  |
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| Received: 29 August 2022  Subject: Sharing studies for WRC-23 agenda item 1.5 | **Document 6-1/123-E** |
| **30 August 2022** |
| **English only** |
| Saudi Arabia (Kingdom of), Egypt (Arab Republic of), United Arab Emirates | |
| Re-evaluation of sharing studies in TG 6/1  for WRC-23 agenda item 1.5 | |
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Introduction

Resolution **235 (WRC-15)** calls for review of the spectrum use and needs within the frequency band 470-960 MHz in Region 1, and to take appropriate regulatory actions including potential allocation to Mobile Service and/or identification of IMT within the whole band, or parts thereof. It resolves to invite ITU-R, after the 2019 World Radiocommunication Conference and in time for the 2023 World Radiocommunication Conference:

1 to review the spectrum use and study the spectrum needs of existing services within the frequency band 470-960 MHz in Region 1, in particular the spectrum requirements of the broadcasting and mobile, except aeronautical mobile, services, taking into account the relevant ITU Radiocommunication Sector (ITU-R) studies, Recommendations and Reports;

2 to carry out sharing and compatibility studies, as appropriate, in the frequency band 470-694 MHz in Region 1 between the broadcasting and mobile, except aeronautical mobile, services, taking into account relevant ITU-R studies, Recommendations and Reports.

Multiple administrations presented their serious concerns regarding the activities of the informative Correspondence Group (CG) by TG 6/1 since the outcomes did not take into consideration several documents and contributions, and simply noted them without taking appropriate action in their regard. Please refer to the other contributions on some of these concerns submitted to the last TG 6/1 meeting.

Proposal

This contribution was submitted to the CG, which provides the results of the re-evaluation of the sharing study in Section 3.1.2.3 of TG 6/1 Chairman’s Report, using the given parameters provided in study 3.1.2.3. The study uses a Monte Carlo analysis method and accounts for 9 UE’s per IMT sector and 21 sectors (single tier system) with antenna discrimination. The given results should be included in the report on sharing and compatibility studies, summary of studies and CPM text.

**Attachment**: 1

ATTACHMENT 1

# 1 Introduction

This contribution provides a sharing and compatibility study between IMT user equipment and broadcasting receivers within the frequency band 470-694 MHz in Region 1. This study considered the parameters of Study 3.1.2.3 as submitted in the CG as revisions to the TG 6/1 Chairman’s Report. The study analyses the possibility of interference from IMT UEs to broadcasting receivers. This study calculates the necessary distance between an IMT UE and a roof top antenna to protect DTTB reception against IMT UE co-channel interference.

# 2 Parameters and Deployment

The study is conducted using the recommended propagation model ITU-R P.1546-6. The deployment scenario is to protect DTTB fixed rooftop reception from IMT UE co-channel interference in an urban setting. Monte Carlo simulations were conducted to evaluate interference probability using the given parameters.

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|  | Parameter | Value |
| **IMT UE Tx** | EIRP (dBm) | 19 |
| Height (m) | 1.5 |
| Body Loss (dB) | 4 |
| Indoor Percentage | 70 |
| Typical Gain (dBi) | -3 |
| Percentage Time (%) | 50 |
| **Broadcasting Rx** | Antenna Gain (Rx) (dBi) | 9.15 |
| Antenna Height (Rx) (m) | 10 |
| Antenna Pattern (Rx) | ITU-R BT.419-3 |
| Noise Figure (Rx) (dB) | 6 |
| Bandwidth (MHz) | 7.77 |
| I/N (dB) | -10 |

# 3 Results

The below results were obtained by re-conducting the study using the available parameters and assumptions from TG 6/1 parameter tables. Monte Carlo methodology was used, and 9 UE’s per IMT sector, with 21 sectors (single tier IMT system). Full discrimination between the systems is considered. The protection distance was calculated as below:

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| Probability of interference from 10 MHz IMT UL UE's into 8 MHz DTTB reception;  IMT BS-DTTB co-channel – 9 UE's per BS Sector - Single Tier System | |
| Minimum separation distance | Probability of Interference |
| (m) |
| 10 | 6.10% |
| 100 | 4.40% |
| 200 | 3.00% |
| 300 | 1.20% |

As can be seen from the above Monte Carlo study results using the same parameters as found in Study 3.1.2.3 in the TG 6/1 Chairman’s Report, the protection distances from IMT UE’s to DTTB receivers is in the range of few hundred meters.

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