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| **Radiocommunication Study Groups** |  |
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| Received: 29 August 2022Subject: Sharing studies for WRC-23 agenda item 1.5 | **Document 6-1/122-E** |
| **30 August 2022** |
| **English only** |
| Saudi Arabia (Kingdom of), Egypt (Arab Republic of), United Arab Emirates |
| Questions and comments on 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

The following are questions and comments on some of the sharing studies in Section 3.1.2.3 of the last TG 6/1 Chairman’s Report, which use Monte Carlo analysis method and accounts for 9 UE’s per IMT sector and 21 sectors (single tier system) with antenna discrimination.

ATTACHMENT 1

**Source:** Document R19-TG6.1-C-0106!N3!MSW-E rev07-TDF as updated by the CG of TG 6/1 on 30 May 2022.

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#### 3.1.2.3 New study 2 - Interference from IMT user equipment to broadcasting receiver

{Editor’s note: Source Document 6-1/CGShaComp/1}

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Coordination of an assignment to a receiving station of the mobile service is addressed by the GE06 Agreement. Yet, at a national or bilateral level, administrations may wish to conduct further detailed analysis to evaluate possible interference to the broadcasting service from IMT user equipment (UE).

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.

Table 3.1.2.2-1

Distance between stations to protect DTTB fixed rooftop reception from
IMT UE co-channel interference (*I/N*=-10 dB)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | rooft top DTTB receiver interfered with by an LTE UE (w/o Rx ant discr) | rooft top DTTB receiver interfered with by an LTE UE (w/ Rx ant discr) |  |
| F | receiver noise figure | 6 | 6 | dB |
| k | Boltzmann's constant | 1.38E-23 | 1.38E-23 | J/K |
| T0 | absolute temperature | 290 | 290 | K |
| B | receiver noise bandwidth | 7.77E+06 | 7.77E+06 | Hz |
| Pn | receiver noise input power | -129.1 | -129.1 | dBW |
| I/N | protection criterion as per Rec. ITU-R BT.1895 | -10 | -10 | dB |
| Ps max | maximum unwanted receiver input power | -139.07 | -139.07 | dBW |
|  |  |  |  |  |
| f | frequency | 6.50E+08 | 6.50E+08 | Hz |
| c | light speed | 3.00E+08 | 3.00E+08 | m/s |
|  | wavelength | 0.46 | 0.46 | m |
| G | antenna gain related to half dipole | 11.1 | 11.1 | dBd |
| Aa | effective antenna aperture | -4.46 | -4.46 | dB m2 |
| max | maximum unwanted power flux-density at receiving place | -130.51 | -130.51 | dB(W/m2) |
| Emax unw 10 m | maximum unwanted field strength at the location of the receiving antenna | 15.3 | 15.3 | dB(μV/m) |
| Lf | feeder loss | 4.1 | 4.1 | dB |
| Gequiv | Giso - Lf | 9.2 | 9.2 | dBi |
| D | antenna discrimination (Rec. ITU-R BT.419) | 0(1) | 16(2) | dB |
| Hrx | DTTB Rx antenna height | 10 | 10 | m |
| Htx | UE antenna height | 1.5 | 1.5 | m |
| EIRP | UE EIRP | 23 | 23 | dBm |
| Lbody | body loss | 4 | 4 | dB |
| EIRPequiv | UE EIRP - body loss | 19 | 19 | dBm |
|  | percentage of time | 50 | 50 | % |
| Lpath | path loss | 137.2 | 121.2 | dB |
| **d** | **Distance between stationscalculated with Rec. ITU-R P.1546-6** | **5.4** | **2.5** | **km** |
| 1. No antenna discrimination. LTE UE is located between DTTB Tx and Rx (vertical elevation angle between DTTB Rx and LTE UE antennas is about 0.09° at 5.4 km separation distance)2. Full (maximum) antenna discrimination. LTE UE is located behind the DTTB Rx antenna |

The table above shows that a distance of several kilometres is necessary to protect a DTTB rooftop antenna from possible co-channel interference by an IMT UE.

Table 2 of Report ITU-R M.2292 mentions that the IMT cell radius is around 8 km in a rural scenario. Hence, to protect DTTB receivers, it might be necessary to prevent LTE base stations rollout closer than 13.5 km to a DTTB service area ($5.4+8≈13.5)$. This distance may be appropriate when DTTB and LTE uplink are operating on a shared channel.

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Notes and Questions on the Study

• The study does not mention the methodology used, however it is assumed to be MCL, as it is describing interference from an (single) IMT UE to a broadcasting DTTB receiver. What is it?

• The study mentions 50% time percentage, is this for the IMT system or for the interference from IMT to broadcasting? 50% is not the recommended value of time percentage for interference into broadcasting.

• What is the percentage of indoor/outdoor IMT UEs?

• No mention of activity factor or average UE Tx power, or aggregate interference?

• No description of geometry, clutter, deployment scenario, etc.

Accordingly, this study needs to consider number of critical aspects and parameters and may need to be re-evaluated to ensure accuracy.

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