|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | ECC PT1\_CG4G(23)017rev1 | |
| ECC PT1 CG 4 GHz #7 | | | | |
| Web Meeting, 13 March 2023, 9:30-12:30 | | | | |
|  | | | | |
| Date issued: | 12 March 2023 | | | |
| Source: | Lithuania | | | |
| Subject: | Other parameters and assumptions for studies | | | |
|  | | | | |
| Group membership required to read? (Y/N) | | N | |  |
|  | | | | |
|  | | | | |
| Summary: | | | | |
| This input identifies most of interference scenarios under task for studies and proposes the new template to cover propagation characteristics (including clutter and wall loss parameters). | | | | |
| Proposal: | | | | |
| invites Group to  consider replacing material in sections 1 and 2 in document ECC PT1\_CG4G(23)013\_Annex 2 by the proposal in this input contribution;  consider the new structure for scenarios to be used for sections 4 and 5 of draft CEPT Report. | | | | |
| Background: | | | | |
| CG 4GHz #6 (1-2 March, Germany, Mainz) document [ECC PT1\_CG4G(23)013\_Annex 2](https://www.cept.org/Documents/ecc-pt1/76269/ecc-pt1_cg4g-23-013_annex-2_other-parameters-and-assumptions-for-studies-cg4g_6-output) (Other parameters and assumptions for studies - CG4G\_6 output). | | | | |

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# Coexistence scenarios

The layout of the scenarios can be illustrated in Figure 1.

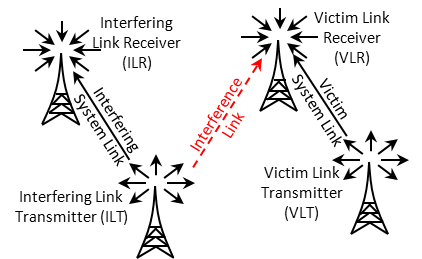
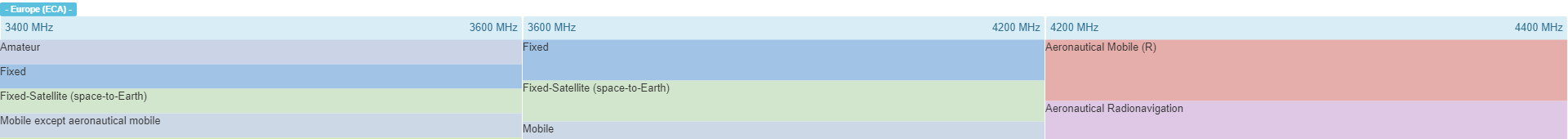


Figure 1: Layout of scenarios

Allocation of services and application according to ECO Frequency Information System ([EFIS](https://efis.cept.org/)) for frequency range 3400-4400 MHz are provided in Figure 2. Applications to be covered by studies are summarised in Table 1.



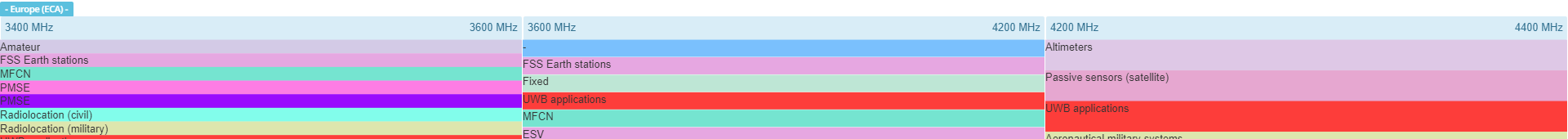


Figure 2: Services and applications in ECA Table for frequency range 3400-4400 MHz

Table 1: Services and systems to be considered for studies

|  |  |  |
| --- | --- | --- |
| Studies | Allocation | Application |
| In-band (sharing):  3800-4200 MHz | FIXED | Fixed link |
| FIXED-SATELLITE (space-to-Earth) | Earth station |
| MOBILE | WBB LMP |
| Adjacent band (compatibility):  3400-3800 MHz and 4200-4400 MHz, as applicable | FIXED | Fixed link |
| FIXED-SATELLITE (space-to-Earth) | Earth station |
| MOBILE | MFCN |
| AERONAUTICAL MOBILE (R) | WAIC |
| AERONAUTICAL RADIONAVIGATION | RA |
| Note: WBB LMP – terrestrial wireless broadband systems providing local-area (i.e. low/medium power) network connectivity; MFCN – mobile/fixed communications networks which includes IMT and other communications networks in the mobile and fixed services" which would include fixed wireless access but not point-to-point links; WAIC – wireless avionics intra-communication; RA – Radio Altimeters. | | |

General overview of interference scenarios is provided in Table 2.

Table 2: Interference scenarios (interference links)

|  |  |  |  |
| --- | --- | --- | --- |
| Interfering system | Victim system | Studies | Section |
| **Between WBB LMP** | | |  |
| WBB LP | WBB LP | In-band: co-channel, adj-channel | Table 4 (co-channel),  Table 6 (adjacent channel) |
| WBB MP | WBB MP | In-band: co-channel, adj-channel |
| WBB MP | WBB LP | In-band: co-channel, adj-channel |
| **Between WBB LMP and MFCN** | | |  |
| WBB LP | MFCN | Adj-band | Table 9 (WBB LMP into MFCN),  Table 11 (MFCN into WBB LMP) |
| WBB MP | MFCN | Adj-band |
| MFCN | WBB LP | Adj-band |
| MFCN | WBB MP | Adj-band |
| **Between WBB LMP and FS** | | |  |
| WBB LP | FS | In-band: co-channel, adj-channel | Table 7 (co-channel and adjacent channel) |
| WBB MP | FS | In-band: co-channel, adj-channel |
| WBB LP | FS | Adj-band | Table 12 |
| WBB MP | FS | Adj-band |
| **Between WBB LMP and FSS (s-E)** | | |  |
| WBB LP | FSS (s-E) | In-band: co-channel, adj-channel | Table 8 (co-channel and adjacent channel) |
| WBB MP | FSS (s-E) | In-band: co-channel, adj-channel |
| WBB LP | FSS (s-E) | Adj-band | Table 13 |
| WBB MP | FSS (s-E) | Adj-band |
| **Between WBB LMP and WAIC** | | |  |
| WBB LP | WAIC | Adj-band | Table 14 |
| WBB MP | WAIC | Adj-band |
| **Between WBB LMP and RA** | | |  |
| WBB LP | RA | Adj-band | Table 15 |
| WBB MP | RA | Adj-band |

Mobile service systems deployment can by defined in the following way:

BS/UE of WBB LMP:

* Low Power (LP) Base Station (BS);

Outdoors: LP BSout non-AAS

Indoors: LP BSin non-AAS

* Medium Power (MP) Base Station (BS);

Outdoors: MP BSout non-AAS

Outdoors: MP BSout AAS

* User equipment (UE)

Outdoors: UEout

Indoors: UEin

BS/UE of MFCN (5G commercial in 3.4-3.8 GHz band):

* Wide Aea (WA) Base Station (BS) – Macrocell

Outdoors: MFCN BSout\_macro AAS

* Medium Range (MR) Base Station (BS) – Microcell

Outdoors: MFCN BSout\_micro non-AAS

Outdoors: MFCN BSout\_micro AAS

* Local Area (LA) Base Station (BS) – Picocell

Indoors: MFCN BSin\_pico non-AAS

* User equipment (UE)

Outdoors: UEout

Indoors: UEin

Table 3: Interfering or victim system links

|  |  |  |
| --- | --- | --- |
| System | System link | Comment |
| WBB LP | BSout ↔ UEout | Outdoor BS link with outdoor UE |
| WBB LP | BSout ↔ UEin | Outdoor BS link with indoor UE |
| WBB LP | BSin ↔ UEin | Indoor BS link with indoors UE |
| WBB MP | BSout ↔ UEout | Outdoor BS link with outdoor UE |
| MFCN | BSout\_macro ↔ UEout  BSout\_micro ↔ UEout  BSin\_pico ↔ UEin | Outdoor BS link with outdoor UE  (Macro cell, Micro cell)  Indoor BS link with indoor UE (Pico cell) |
| FS | Tx/Rx ↔ Tx/Rx | Link of fixed link between transmitter and receiver |
| FSS (s-E) | Tx → Rx | Earth station receiving from satellite |
| WAIC | Tx/Rx ↔ Tx/Rx | WAIC link onboard aircraft |
| RA | Tx → Rx | Receiving radio altimeter onboard aircraft |

# Propagation characteristics for coexistence scenarios

## In-band sharing studies

### Between WBB LMP in the 3.8-4.2 GHz frequency band

#### Co-channel

Table 4: Coexistence scenarios between WBB LMP, unsynchronised, co-channel

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Interferer (ILT) | | |  | Victim (VLR) | | | Propagation model | Antenna height | | Clutter | | BEL | | Environment | |
|  |  |  |  |  |  |  |  | ILT | VLR | ILT | VLR | ILT | VLR | ILT | VLR |
| LP | BSout | non-AAS | → | LP | BSout | non-AAS |  |  |  |  |  |  |  |  |  |
| LP | BSout | non-AAS | → | LP | BSin | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | LP | BSout | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | LP | BSin | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | LP | BSout | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | LP | BSin | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MP | BSout | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MP | BSout | AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MP | BSout | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MP | BSout | AAS |  |  |  |  |  |  |  |  |  |

Table 5: System link of WBB LMP

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Base station | | | |  | | User equipment | | Propagation model | | Antenna height | | | Clutter | | | BEL | | | Environment | | |
|  |  |  |  | |  | |  | | BS | | UE | BS | | UE | BS | | UE | BS | | UE |
| LP | BSout | non-AAS | ↔ | | UEout | |  | |  | |  |  | |  |  | |  |  | |  |
| LP | BSout | non-AAS | ↔ | | UEin | |  | |  | |  |  | |  |  | |  |  | |  |
| LP | BSin | non-AAS | ↔ | | UEin | |  | |  | |  |  | |  |  | |  |  | |  |
| MP | BSout | non-AAS | ↔ | | UEout | |  | |  | |  |  | |  |  | |  |  | |  |
| MP | BSout | AAS | ↔ | | UEout | |  | |  | |  |  | |  |  | |  |  | |  |

#### Adjacent channel

Table 6: Coexistence scenarios between WBB LMP, unsynchronised, adjacent channel

[same as Table 4]

### Between WBB LMP and incumbent users in the 3.8-4.2 GHz frequency band

#### Between WBB LMP and FS

Table 7: Coexistence scenarios between WBB LMP and FS in 3.8-4.2 GHz frequency band

#### Between WBB LMP and FSS (s-E)

Table 8: Coexistence scenarios between WBB LMP and FSS (s-E) in 3.8-4.2 GHz frequency band

## Adjacent band compatibility studies

### WBB LMP in 3.8-4.2 GHz and systems below 3.8 GHz

#### Between WBB LMP and MFCN

Table 9: Compatibility scenarios between WBB LMP (interferer) and MFCN (victim) below 3.8 GHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Interferer (ILT) | | |  | Victim (VLR) | | | Propagation model | Antenna height | | Clutter | | BEL | | Environment | |
|  |  |  |  |  |  |  |  | ILT | VLR | ILT | VLR | ILT | VLR | ILT | VLR |
| LP | BSout | non-AAS | → | MFCN | BSout\_macro | AAS |  |  |  |  |  |  |  |  |  |
| LP | BSout | non-AAS | → | MFCN | BSout\_micro | non-AAS |  |  |  |  |  |  |  |  |  |
| LP | BSout | non-AAS | → | MFCN | BSout\_micro | AAS |  |  |  |  |  |  |  |  |  |
| LP | BSout | non-AAS | → | MFCN | BSin\_pico | non-AAS |  |  |  |  |  |  |  |  |  |
| LP | BSin | non-AAS | → | MFCN | BSout\_macro | AAS |  |  |  |  |  |  |  |  |  |
| LP | BSin | non-AAS | → | MFCN | BSout\_micro | non-AAS |  |  |  |  |  |  |  |  |  |
| LP | BSin | non-AAS | → | MFCN | BSout\_micro | AAS |  |  |  |  |  |  |  |  |  |
| LP | BSin | non-AAS | → | MFCN | BSin\_pico | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MFCN | BSout\_macro | AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MFCN | BSout\_micro | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MFCN | BSout\_micro | AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | non-AAS | → | MFCN | BSin\_pico | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MFCN | BSout\_macro | AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MFCN | BSout\_micro | non-AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MFCN | BSout\_micro | AAS |  |  |  |  |  |  |  |  |  |
| MP | BSout | AAS | → | MFCN | BSin\_pico | non-AAS |  |  |  |  |  |  |  |  |  |

Table 10: System link of MFCN

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Base station | | |  | User equipment | Propagation model | Antenna height | | Clutter | | BEL | | Environment | |
|  |  |  |  |  |  | BS | UE | BS | UE | BS | UE | BS | UE |
| MFCN | BSout\_macro | AAS | ↔ | UEout |  |  |  |  |  |  |  |  |  |
| MFCN | BSout\_micro | non-AAS | ↔ | UEout |  |  |  |  |  |  |  |  |  |
| MFCN | BSout\_micro | AAS | ↔ | UEout |  |  |  |  |  |  |  |  |  |
| MFCN | BSin\_pico | non-AAS | ↔ | UEin |  |  |  |  |  |  |  |  |  |

For system link of WBB LMP see Table 5.

Table 11: Compatibility scenarios between WBB LMP (victim) and MFCN (interferer) below 3.8 GHz

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Interferer (ILT) | | | |  | | Victim (VLR) | | | | Propagation model | | Antenna height | | | Clutter | | | BEL | | | Environment | | |
|  |  |  |  | |  | |  |  |  | | ILT | | VLR | ILT | | VLR | ILT | | VLR | ILT | | VLR |
| MFCN | BSout\_macro | AAS | → | | LP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | non-AAS | → | | LP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | AAS | → | | LP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSin\_pico | non-AAS | → | | LP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_macro | AAS | → | | LP | | BSin | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | non-AAS | → | | LP | | BSin | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | AAS | → | | LP | | BSin | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSin\_pico | non-AAS | → | | LP | | BSin | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_macro | AAS | → | | MP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | non-AAS | → | | MP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | AAS | → | | MP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSin\_pico | non-AAS | → | | MP | | BSout | non-AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_macro | AAS | → | | MP | | BSout | AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | non-AAS | → | | MP | | BSout | AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSout\_micro | AAS | → | | MP | | BSout | AAS |  | |  | |  |  | |  |  | |  |  | |  |
| MFCN | BSin\_pico | non-AAS | → | | MP | | BSout | AAS |  | |  | |  |  | |  |  | |  |  | |  |

For system link of WBB LMP see Table 5 and for MFCN see Table 10.

#### Between WBB LMP and FS

Table 12: Compatibility scenarios between WBB LMP and FS below 3.8 GHz

#### Between WBB LMP and FSS (s-E)

Table 13: Compatibility scenarios between WBB LMP and FSS (s-E) below 3.8 GHz

### WBB LMP in 3.8-4.2 GHz and systems above 4.2 GHz

#### Between WBB LMP and WAIC

Table 14: Compatibility scenarios between WBB LMP and WAIC above 4.2 GHz

#### Between WBB LMP and RA

Table 15: Compatibility scenarios between WBB LMP and RA above 4.2 GHz