Sharing of spectrum between FPLMTS and fixed point-to-point links

1 Introduction

The frequency bands between 1 and 3 GHz considered for FPLMTS are today used for other purposes, among them fixed and mobile point-to-point links.

In this document a distance from the link is estimated, where no FPLMTS transmitters should exist in order to not give rise to an unacceptable interference level into a link.

2 Radio link

The following table shows an example of radio link systems at about 1800 MHz:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed link bit rate</td>
<td>8 Mbit/s</td>
<td>34 Mbit/s</td>
</tr>
<tr>
<td>Receiver threshold at $10^{-6}$ BER</td>
<td>-86 dBm</td>
<td>-78 dBm</td>
</tr>
<tr>
<td>Minimum C/I</td>
<td>15 dB</td>
<td>20 dB</td>
</tr>
<tr>
<td>Fading margin for network planning</td>
<td>30 dB</td>
<td>30 dB</td>
</tr>
</tbody>
</table>
Radiation pattern envelope:

\[ G_p(\phi), G_c(\phi) \]

(dBi)

-30 \quad 0 \quad \phi \quad 180

Azimuth \pm \text{ degrees from main lobe.}

Fig 1 Example of used link antenna characteristic at 1800 MHz

3 FPLMTS

Three different scenarios are considered:

1 Macrocell base stations
   EIRP: 35 dBm
   Base antenna Height: 30 m
   Average distance between bases: 3 km

2 Microcell stations
   EIRP: 24 dBm
   Antenna Height: 1.5 m
   Average distance between stations: 250 m

3 Picocell stations
   EIRP: 17 dBm
   Average distance between stations: 100 m
Two interference levels are considered: -85 dBm and -100 dBm.

The FPLMTS system is spread uniformly over the area.

The link antenna is either using vertical polarisation, that is parallel with FPLMTS, or horizontal, cross-polarisation.

Results

Fig 4.1 Macro cells. Parallel polarisation. The outer line describes the -100 dBm distance, and the other the -85 dBm distance.

Fig 4.2 Macro cells cross polarisation.
Sharing of spectrum between platforms and fixed point-to-point links
Radio link

Receiver threshold $10^{-6}$ PER:

- 8 Mbit: $R_{8\text{ Mbit}} := -86$ (dBm)
- 34 Mbit: $R_{34\text{ Mbit}} := -78$ (dBm)

Feeder loss:

- $F := 3$ (dB)

Minimum carrier to interference when disturbed by another radio link:

- $C_{8\text{ Mbit}} := 15$ (dB)
- $C_{34\text{ Mbit}} := 20$ (dB)

Fading margin above receiver threshold:

- $M := 30$ (dB)

Antenna gain main lobe

- 2.4 m (8 foot) diameter: $G := 31$ (dBi)

Radiation pattern envelope:

![Diagram of radiation pattern envelope](image)

- Parallel polarized
- Cross polarized

Azimuth = degrees from main lobe.