

UNOFFICIAL TRANSLATION

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TECHNICAL LICENSE CONDITIONS FOR 2500 - 2570 MHz / 2620 - 2690 MHz

1. The license holder can possess and operate base stations that belong to an electronic communications system and operate in frequency bands 25YY - 25YY MHz/ 26XX - 26XX MHz within the license area.

2. Technical license conditions are set in annexes 1 and 2, depending on the duplexing method.

3. The restrictions for the use of spectrum in certain geographical areas

There are usage restrictions in the following geographical areas:

- Area A: Rectangular with corner points at 24E3636 / 60N1658, 24E5226 / 60N1658, 24E5226 / 60N0940 and 24E3636 / 60N0940. Restrictions apply in the following communities in whole or in part: Espoo, Kauniainen, Helsinki and Vantaa
- Area B: Circle with center point at 23E5157 / 61N2603 and with 4 km radius. Restrictions apply in the following communities in whole or in part: Lempäälä, Kangasala and Tampere
- Area D: Triangular with corner points at 25E2151 / 65N0607, 25E3900 / 65N0413 and 25E3124 / 64N5838. Restrictions apply in the following communities in whole or in part: Haukipudas, Kiiminki and Oulu
- Area E: Circle with center point at 23E0651 / 60N2253 and with 4 km radius. Restrictions apply in part of the Salo community.
- Area G: Rectangular with corner points at 25E4134 / 62N1355, 25E4549 / 62N1532, 25E4734 / 62N1437 and 25E4325 / 62N1254. Restrictions apply in part of the Jyväskylä community.

The restrictions apply to the following frequency bands that have been reserved for research, development and teaching purposes in specific geographical areas:

- Area A: frequency bands 2560 - 2570 MHz / 2680 - 2690 MHz.
- Area B: frequency bands 2540 - 2550 MHz / 2660 - 2670 MHz.
- Area D: frequency bands 2520 - 2530 MHz / 2640 - 2650 MHz.
- Area E: frequency bands 2500 - 2510 MHz / 2620 - 2630 MHz.
- Area G: frequency bands 2500 - 2510 MHz / 2620 - 2630 MHz.

The field strength of a base station referred to in this radio license shall not exceed 44 dB μ V/m at the border of the restriction area at an altitude of 2 meters.

4. The power flux density in the frequency band 2690-2700 MHz shall not exceed the limit stated in ITU-R RA. 769-2 of -205 dBW/m²/Hz at Metsähovi Radio Observatory. The Observatory is located at coordinates 24E2338 / 60N1305 (geographic coordinate system KKJ Finland) and its antenna height is 60 m above sea level.

5. The electronic communications systems operating in the frequency bands 25YY - 25YY MHz and 26XX - 26XX MHz shall emit maximum of -45 dBm/MHz EIRP radiated power to frequencies below 2500 MHz.

6. At the border areas licensees must comply with coordination agreements that have been agreed with neighboring countries' authorities.

7. The licensee must maintain a database of technical information concerning the base stations (incl. geographical coordinates, transmitter power, antenna cable attenuation, antenna gain (dBi), antenna height, direction of maximum radiation and the frequencies in use. Ficora should have access to this database.

Further information

1. When using unrestricted Time Division Duplex (TDD), any usage of a 5 MHz guard block is subject to an increased risk of interference.

2. The license-exempted use of UWB transmitters in the 2200 - 8000 MHz frequency band may increase interference levels in the 2500-2690 MHz frequency band. Detailed information on UWB transmitter power densities is available in the Commission decision 2009/343/EC.

3. Technical license conditions are based on parameters used in CEPT Report 19. These parameters have been optimized for the most likely use of this frequency band. These technical license conditions may not prevent harmful interference in every situation.

4. Other radio networks operating within the 2500-2690 MHz frequency band may emit outside their own frequency block maximum of -45 dBm/MHz EIRP in the 2500-2615 MHz frequency band and maximum +4dBm/MHz EIRP in the 2615-2690 frequency band.

Specific conditions for network using Frequency Division Duplex (FDD)

1. The uplink band (25XX-25YY MHz) is to be used for terminal station transmission and the downlink band (26XX-26YY) for base station transmission.
2. Within the allocated spectrum block, maximum radiated power for mobile terminals is 31 dBm/5 MHz TRP (total radiated power) and for terminal stations at fixed location 35 dBm/5 MHz EIRP (Equivalent isotropically radiated power).
3. Within the allocated spectrum block, maximum radiated power for base stations in a sector is 61 dBm/5 MHz EIRP.
4. Maximum out-of- block EIRP power on downlink bands:

In the downlink frequency band, within 0-1 MHz from the block edge the radiated power EIRP from base station shall not exceed the following:

Frequency offset from block edge	Maximum radiated power (EIRP)
$0 \text{ MHz} < \Delta F < 0.2 \text{ MHz}$	+3 dBm/30kHz
$0.2 \text{ MHz} < \Delta F \leq 1 \text{ MHz}$	+3-15*($ \Delta F -0.2$) dBm/30kHz

$|\Delta F|$ is frequency offset from upper and lower edge of the downlink frequency block.

The maximum radiated power from a base station is +4 dBm/MHz within the frequency band 2615 - 2690 MHz at frequency offsets exceeding 1 MHz outside a frequency block (see annex 3, figures 1 and 2).

5. The radiated power from a base station shall not exceed -45 dBm/MHz in the frequency band 2500-2615 MHz, (see annex 3, pictures 1,2,3)
6. The license holder may deviate from the technical specifications in item 4 above subject to the precondition that other affected license holders approve such deviation.

Specific conditions for network using Time division (TDD)

1. Inside the allocated spectrum block, maximum radiated power for mobile terminals is 31 dBm/5 MHz TRP (total radiated power) and for terminals at fixed location 35 dBm/5 MHz EIRP (Equivalent isotropically radiated power).
2. Inside the allocated spectrum block, maximum radiated power for base stations in a sector is 61 dBm/5 MHz EIRP.
3. The radiated power EIRP from base station using 26xx - 26yy frequency bands, shall not exceed the following within 0-1 MHz from the block edge :

Frequency offset from block edge	Maximum radiated power (EIRP)
$0 \text{ MHz} < \Delta F < 0.2 \text{ MHz}$	+3 dBm/30kHz
$0.2 \text{ MHz} < \Delta F \leq 1 \text{ MHz}$	+3-15*($ \Delta F -0.2$) dBm/30kHz

$|\Delta F|$ is frequency offset from upper and lower edge of the frequency block 26xx - 26yy MHz.

4. The maximum radiated power EIRP from a base station is +4 dBm/MHz within the frequency band 2615 - 2690 MHz at frequency offsets exceeding 1 MHz outside the frequency block 26xx - 26yy MHz. (see annex 3, figures 1 and 2).
5. The maximum radiated power EIRP from a base station operating in the 26xx - 26yy frequency band into frequency band 2500-2615 MHz, shall not exceed -45 dBm/MHz (see annex 3, pictures 1,2,3)
6. Whenever a radio system using unrestricted Time Division Duplex (TDD) and a radio system using Frequency Division Duplex (FDD) in the uplink spectrum band or two systems using unsynchronized Time Division Duplex (TDD) operate in adjacent frequency bands a 5 MHz block for restricted use is needed to avoid harmful interference. The license holder may leave frequency bands 25aa-25bb and 25cc-25dd unused as a guard bands . Alternatively, the license holder may use these 5 MHz blocks of restricted use with the maximum radiated power of 25 dBm/5 MHz EIRP from base station in a sector within the frequency bands 25aa-25bb and 25cc-25dd. Outside the frequency bands 25aa-25bb and 25cc-25dd the maximum radiated power EIRP from base station shall not exceed -45 dBm/MHz.
7. The license holder may deviate from the technical specifications in item 3 and 4 above subject to the precondition that other affected license holders approve such deviation.

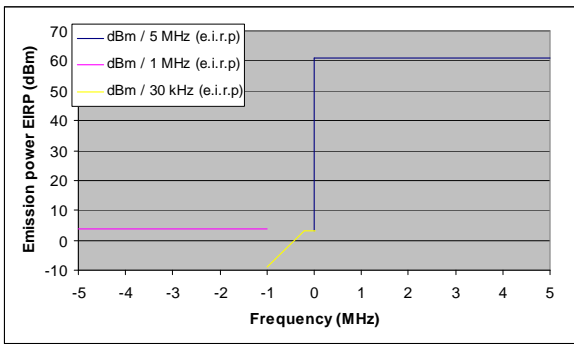


Figure 1. Out-of-band emission 0 to 5 MHz from the lower block edge

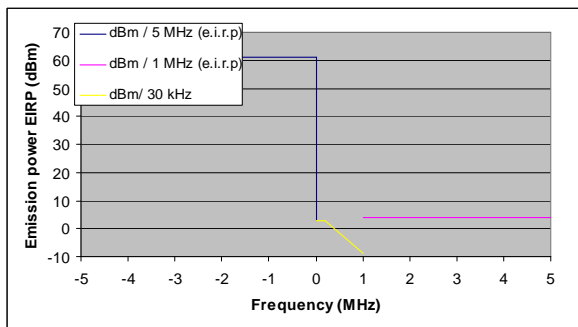


Figure 2. Out-of-band emission 0 to 5 MHz from the upper block edge.

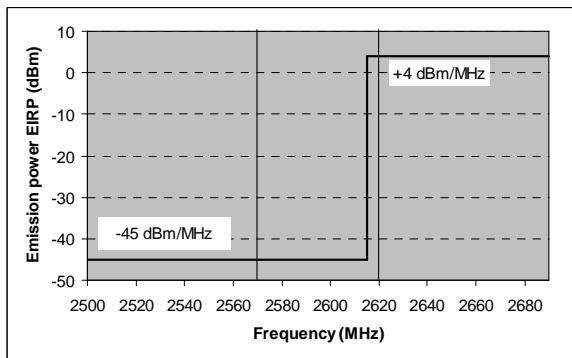


Figure 3. Base station radiated power EIRP at frequency offsets exceeding 1 MHz from the frequency block.