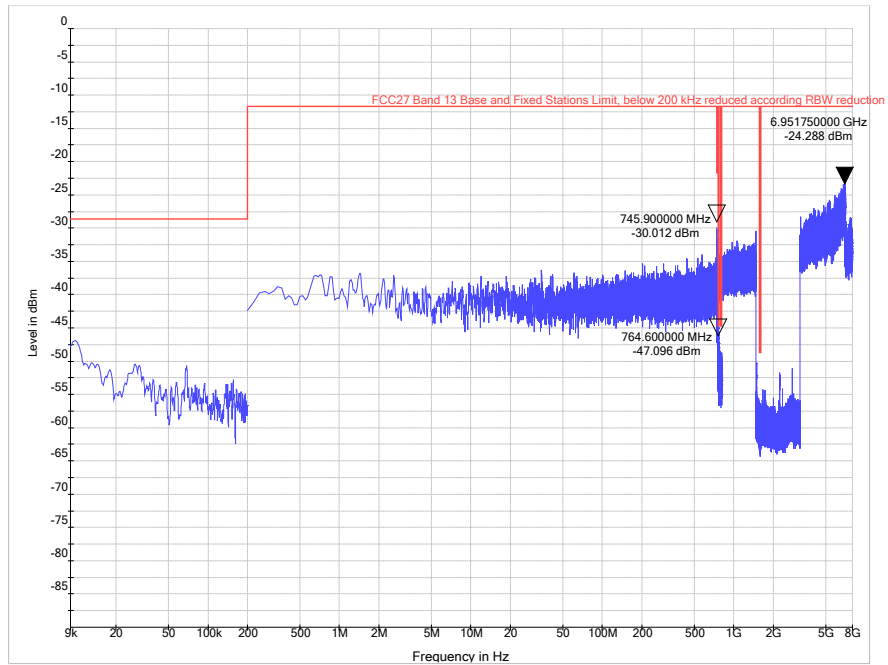
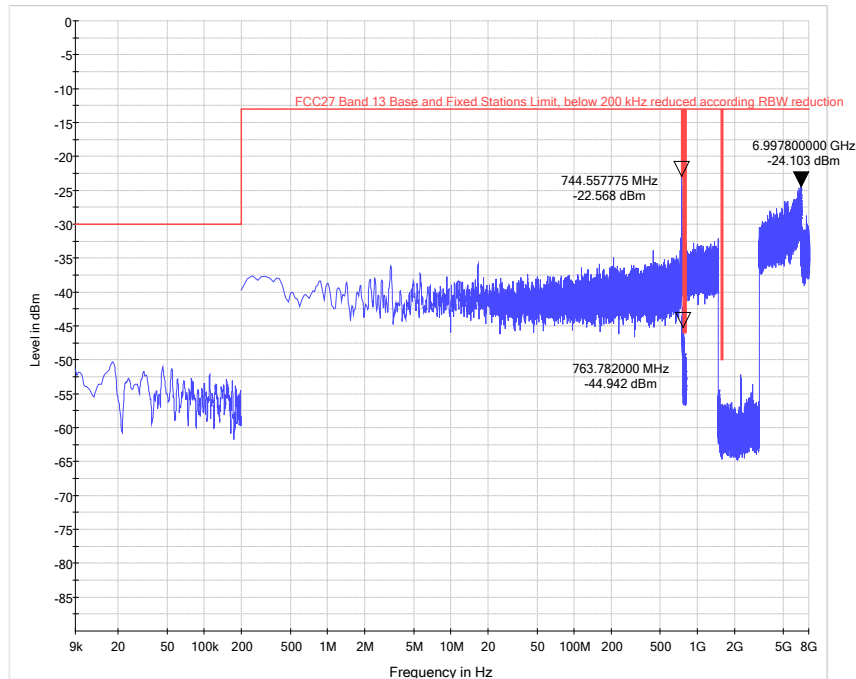


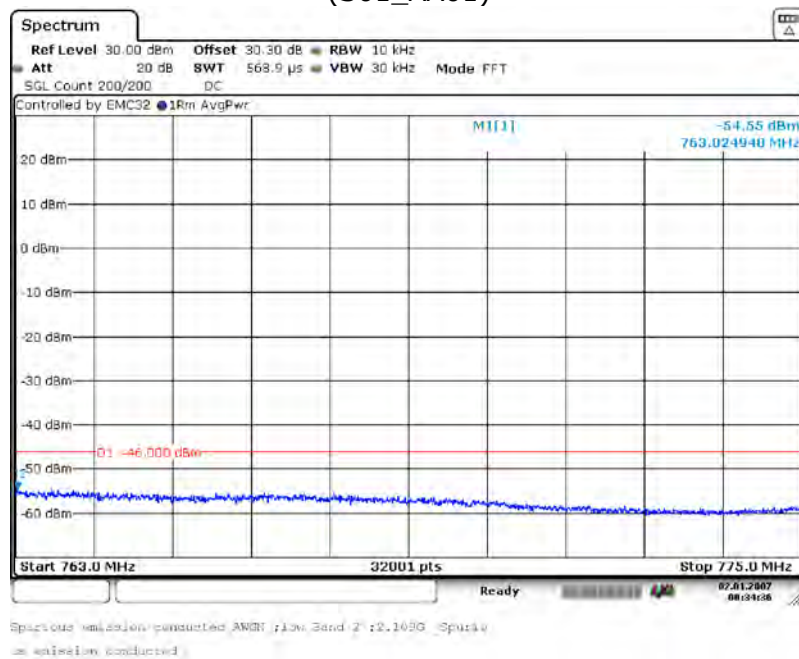
Frequency Band = Band 13, Test Frequency = low, Direction = RF downlink, Signal Type = Narrowband (S01\_AA01)



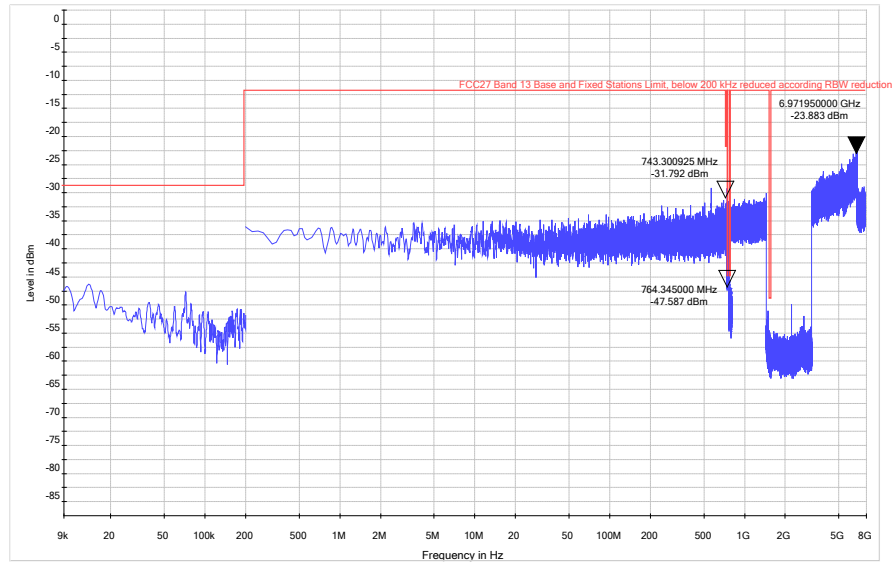
Frequency Band = Band 13, Test Frequency = low, Direction = RF downlink, Signal Type = Wideband  
(S01\_AA01)



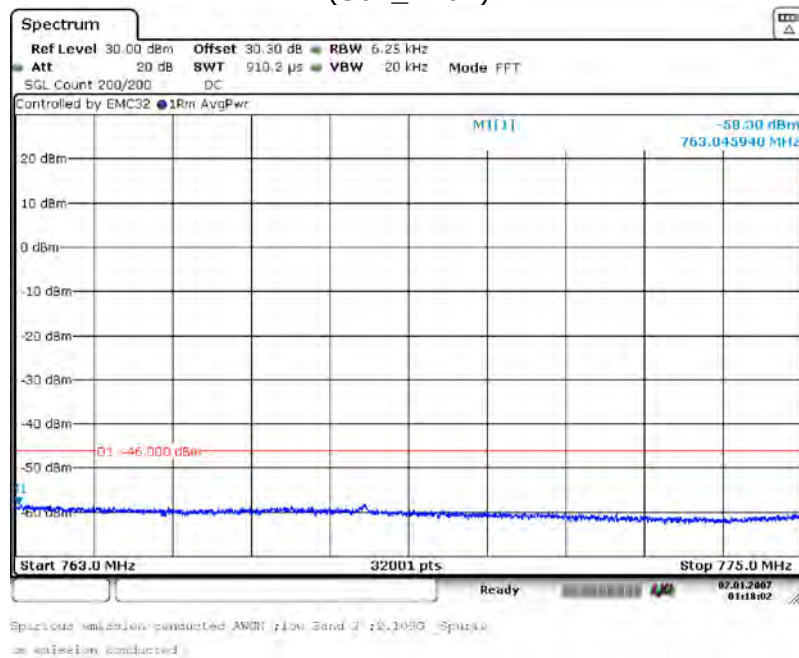
Frequency Band = Band 13, Test Frequency = low, Direction = RF downlink, Signal Type = Wideband, final measurement, 763 – 775 MHz  
(S01\_AA01)



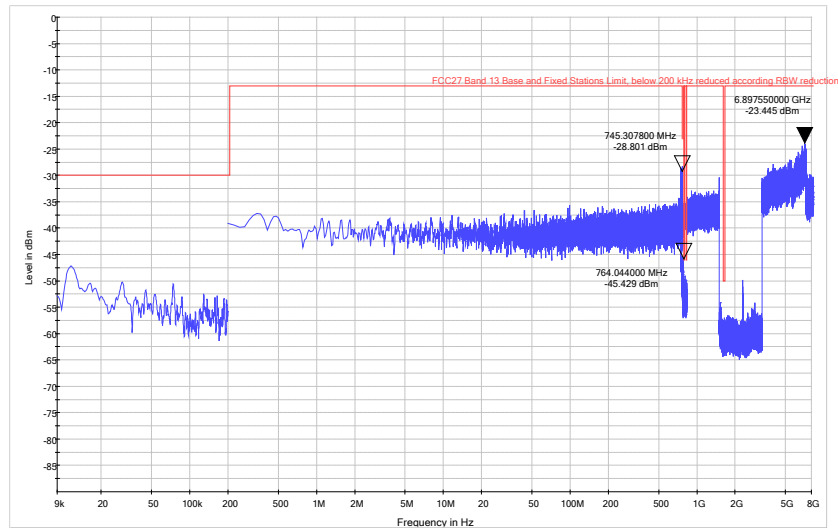
Frequency Band = Band 13, Test Frequency = high, Direction = RF downlink, Signal Type = Narrowband  
(S01\_AA01)



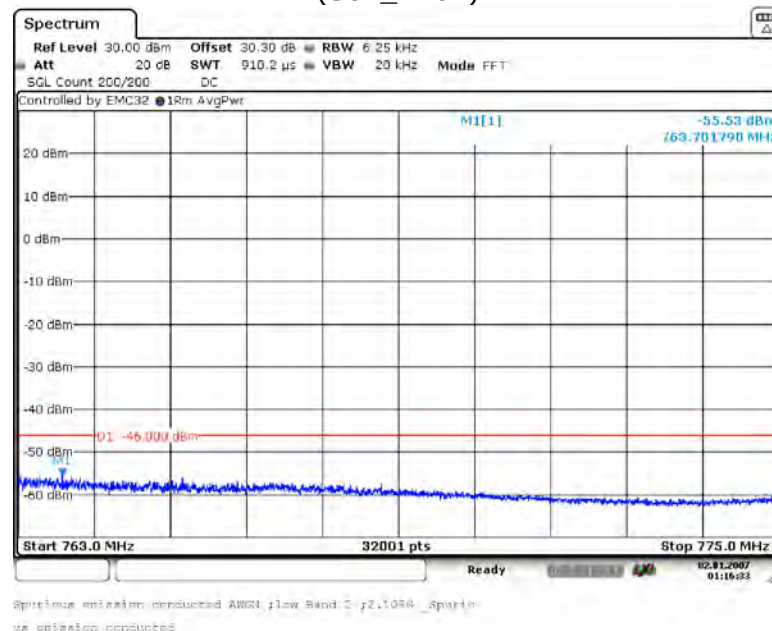
Frequency Band = Band 13, Test Frequency = high, Direction = RF downlink, Signal Type = Narrowband, final measurement, 763 – 775 MHz  
(S01\_AA01)



Frequency Band = Band 13, Test Frequency = high, Direction = RF downlink, Signal Type = Wideband  
(S01\_AA01)



Frequency Band = Band 13, Test Frequency = high, Direction = RF downlink, Signal Type = Wideband, final measurement, 763 – 775 MHz  
(S01\_AA01)



#### 4.4.5 TEST EQUIPMENT USED

- R&S TS8997

## 4.5 OUT-OF-BAND EMISSION LIMITS

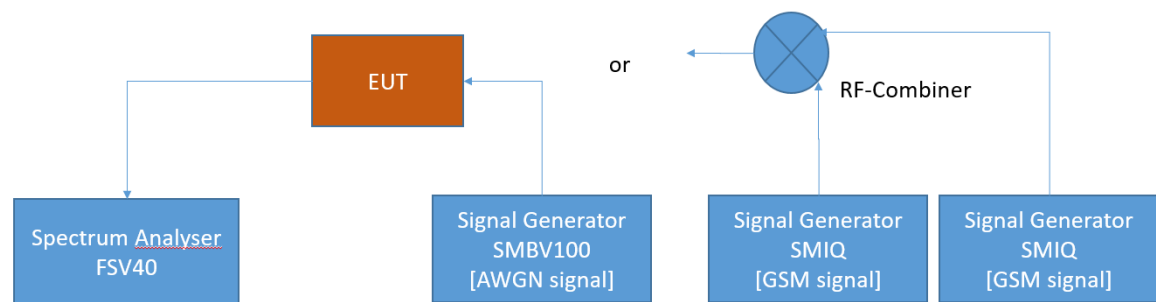
Standard FCC Part §2.1051, §27.53

**The test was performed according to:**  
ANSI C63.26, KDB 935210 D05 v01r02: 3.6

### 4.5.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band emission limit for industrial signal boosters. The limits itself come from the applicable rule part for each operating band.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; Out-of-band emissions

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

### 4.5.2 TEST REQUIREMENTS / LIMITS

#### Part 27; Miscellaneous Wireless Communication Services

##### Subpart C – Technical standards

##### §27.53 – Emission limits

##### Band 13

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;
- (2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

- (3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;
- (4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;
- (5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;
- (f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.
- (6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

#### **Band 12:**

- (g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

#### **Band 4:**

- (h) *AWS emission limits—(1) General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10} (P)$  dB.

### **RSS-130; 4.6 Transmitter Unwanted Emissions**

4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

4.6.2 In addition to the limit outlined in Section 4.6.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

- (a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
  - o (i)  $76 + 10 \log_{10} p$  (watts), dB, for base and fixed equipment, and
  - o (ii)  $65 + 10 \log_{10} p$  (watts), dB, for mobile and portable equipment.
- (b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed  $-70$  dBW/MHz for wideband signal and  $-80$  dBW for discrete emission with bandwidth less than 700 Hz.

## RSS-139; 6.6 Transmitter Unwanted Emissions

Equipment shall comply with the limits in (i) and (ii) below.

- i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.
- ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

### 4.5.3 TEST PROTOCOL

| Band 12, downlink, Number of input signals = 1 |              |           |                        |                   |                                 |                               |                      |
|------------------------------------------------|--------------|-----------|------------------------|-------------------|---------------------------------|-------------------------------|----------------------|
| Signal Type                                    | Input Power  | Band Edge | Signal Frequency [MHz] | Input Power [dBm] | Maximum Out-of-band Power [dBm] | Limit Out-of-band Power [dBm] | Margin to Limit [dB] |
| Wideband                                       | 0.3 dB < AGC | upper     | 743.50                 | 0.1               | -24.5                           | -13.0                         | 11.5                 |
| Wideband                                       | 3 dB > AGC   | upper     | 743.50                 | 3.4               | -22.8                           | -13.0                         | 9.8                  |
| Narrowband                                     | 0.3 dB < AGC | upper     | 745.80                 | -0.1              | -17.1                           | -13.0                         | 4.1                  |
| Narrowband                                     | 3 dB > AGC   | upper     | 745.80                 | 3.2               | -17.4                           | -13.0                         | 4.4                  |
| Wideband                                       | 0.3 dB < AGC | lower     | 731.50                 | 0.7               | -29.1                           | -13.0                         | 16.1                 |
| Wideband                                       | 3 dB > AGC   | lower     | 731.50                 | 4.0               | -29.4                           | -13.0                         | 16.4                 |
| Narrowband                                     | 0.3 dB < AGC | lower     | 729.20                 | -0.5              | -19.9                           | -13.0                         | 6.9                  |
| Narrowband                                     | 3 dB > AGC   | lower     | 729.20                 | 2.8               | -18.9                           | -13.0                         | 5.9                  |

| Band 12, downlink, Number of input signals = 2 |              |           |                           |                           |                   |                                 |                               |                      |
|------------------------------------------------|--------------|-----------|---------------------------|---------------------------|-------------------|---------------------------------|-------------------------------|----------------------|
| Signal Type                                    | Input Power  | Band Edge | Signal Frequency f1 [MHz] | Signal Frequency f2 [MHz] | Input Power [dBm] | Maximum Out-of-band Power [dBm] | Limit Out-of-band Power [dBm] | Margin to Limit [dB] |
| WB                                             | 0.3 dB < AGC | upper     | 743.50                    | 738.50                    | 0.1               | -27.9                           | -13.0                         | 14.9                 |
| WB                                             | 3 dB > AGC   | upper     | 743.50                    | 738.50                    | 3.4               | -27.2                           | -13.0                         | 14.2                 |
| NB                                             | 0.3 dB < AGC | upper     | 745.80                    | 745.60                    | -0.1              | -20.4                           | -13.0                         | 7.4                  |
| NB                                             | 3 dB > AGC   | upper     | 745.80                    | 745.60                    | 3.2               | -20.2                           | -13.0                         | 7.2                  |
| WB                                             | 0.3 dB < AGC | lower     | 731.50                    | 736.50                    | 0.7               | -30.6                           | -13.0                         | 17.6                 |
| WB                                             | 3 dB > AGC   | lower     | 731.50                    | 736.50                    | 4.0               | -31.1                           | -13.0                         | 18.1                 |
| NB                                             | 0.3 dB < AGC | lower     | 729.20                    | 729.40                    | -0.5              | -21.8                           | -13.0                         | 8.8                  |
| NB                                             | 3 dB > AGC   | lower     | 729.20                    | 729.40                    | 2.8               | -22.4                           | -13.0                         | 9.4                  |

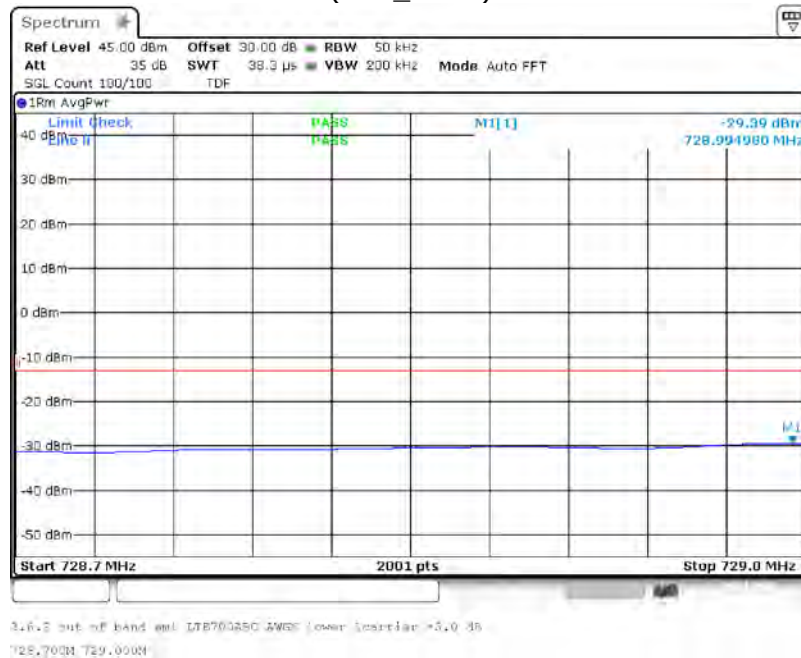
| Band 13, downlink, Number of input signals = 1 |              |           |                        |                   |                                 |                               |                      |
|------------------------------------------------|--------------|-----------|------------------------|-------------------|---------------------------------|-------------------------------|----------------------|
| Signal Type                                    | Input Power  | Band Edge | Signal Frequency [MHz] | Input Power [dBm] | Maximum Out-of-band Power [dBm] | Limit Out-of-band Power [dBm] | Margin to Limit [dB] |
| Wideband                                       | 0.3 dB < AGC | upper     | 753.50                 | 0.1               | -32.5                           | -13.0                         | 19.5                 |
| Wideband                                       | 3 dB > AGC   | upper     | 753.50                 | 3.4               | -31.1                           | -13.0                         | 18.1                 |
| Narrowband                                     | 0.3 dB < AGC | upper     | 755.80                 | -0.1              | -18.2                           | -13.0                         | 5.2                  |
| Narrowband                                     | 3 dB > AGC   | upper     | 755.80                 | 3.2               | -17.7                           | -13.0                         | 4.7                  |
| Wideband                                       | 0.3 dB < AGC | lower     | 748.50                 | -0.7              | -30.9                           | -13.0                         | 17.9                 |
| Wideband                                       | 3 dB > AGC   | lower     | 748.50                 | 2.6               | -31.0                           | -13.0                         | 18.0                 |
| Narrowband                                     | 0.3 dB < AGC | lower     | 746.20                 | -1.1              | -18.8                           | -13.0                         | 5.8                  |
| Narrowband                                     | 3 dB > AGC   | lower     | 746.20                 | 2.2               | -19.3                           | -13.0                         | 6.3                  |

| Band 13, downlink, Number of input signals = 2 |              |           |                           |                           |                   |                                 |                               |                      |
|------------------------------------------------|--------------|-----------|---------------------------|---------------------------|-------------------|---------------------------------|-------------------------------|----------------------|
| Signal Type                                    | Input Power  | Band Edge | Signal Frequency f1 [MHz] | Signal Frequency f2 [MHz] | Input Power [dBm] | Maximum Out-of-band Power [dBm] | Limit Out-of-band Power [dBm] | Margin to Limit [dB] |
| WB                                             | 0.3 dB < AGC | upper     | 753.50                    | 748.50                    | 0.1               | -33.1                           | -13.0                         | 20.1                 |
| WB                                             | 3 dB > AGC   | upper     | 753.50                    | 748.50                    | 3.4               | -33.0                           | -13.0                         | 20.0                 |
| NB                                             | 0.3 dB < AGC | upper     | 755.80                    | 755.60                    | -0.1              | -20.7                           | -13.0                         | 7.7                  |
| NB                                             | 3 dB > AGC   | upper     | 755.80                    | 755.60                    | 3.2               | -20.6                           | -13.0                         | 7.6                  |
| WB                                             | 0.3 dB < AGC | lower     | 748.50                    | 753.50                    | -0.7              | -32.5                           | -13.0                         | 19.5                 |
| WB                                             | 3 dB > AGC   | lower     | 748.50                    | 753.50                    | 2.6               | -32.3                           | -13.0                         | 19.3                 |
| NB                                             | 0.3 dB < AGC | lower     | 746.20                    | 746.40                    | -1.1              | -22.4                           | -13.0                         | 9.4                  |
| NB                                             | 3 dB > AGC   | lower     | 746.20                    | 746.40                    | 2.2               | -21.0                           | -13.0                         | 8.0                  |

Remark: Please see next sub-clause for the measurement plot.

#### 4.5.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

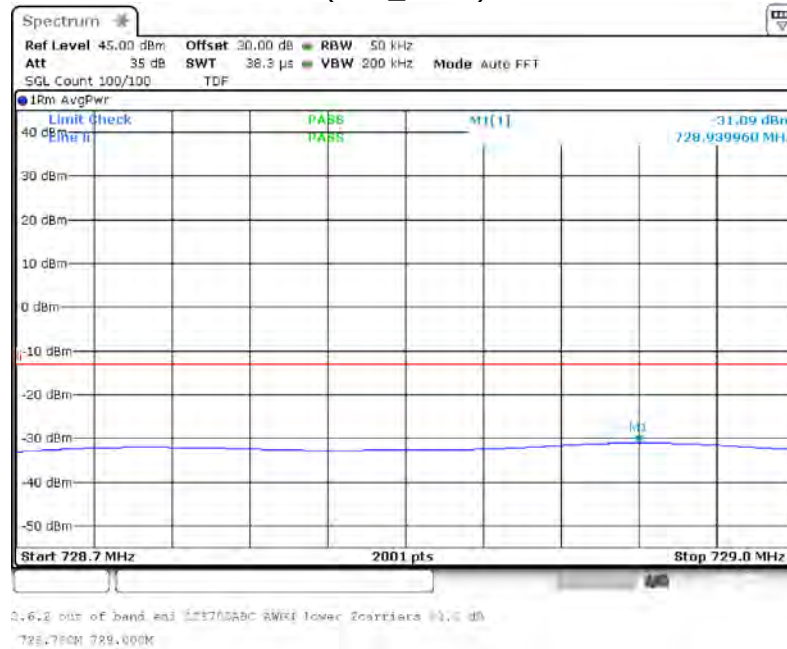
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



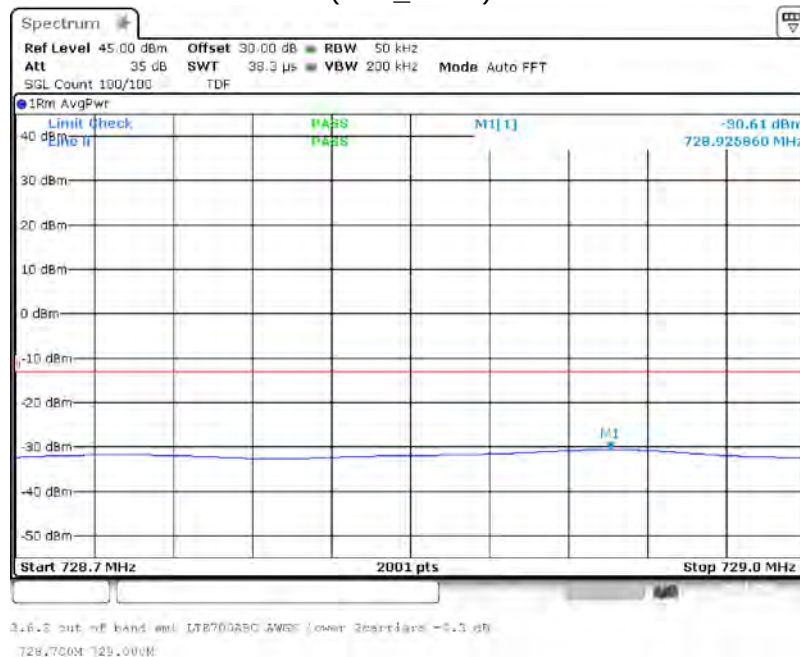
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



Band Edge = Lower, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



Band Edge = Lower, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



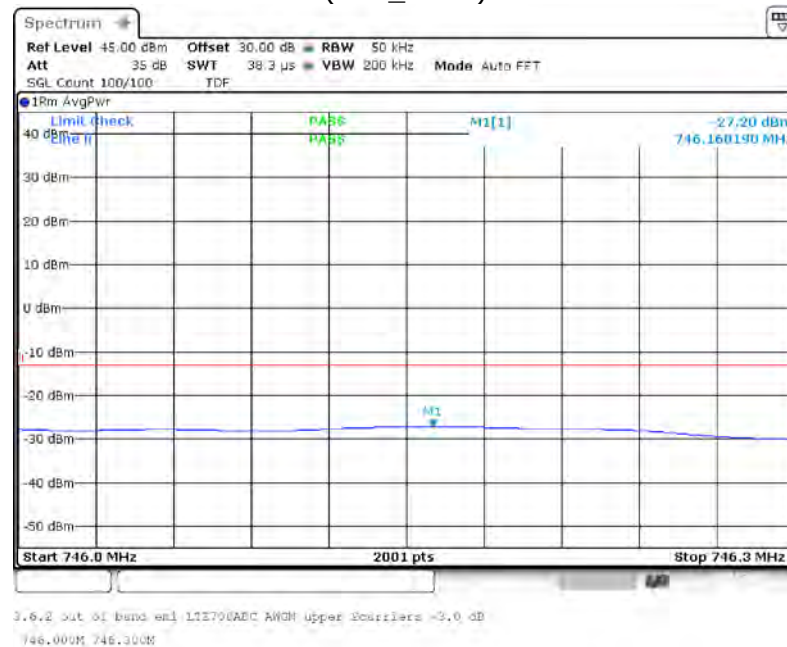
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



Band Edge = Upper, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



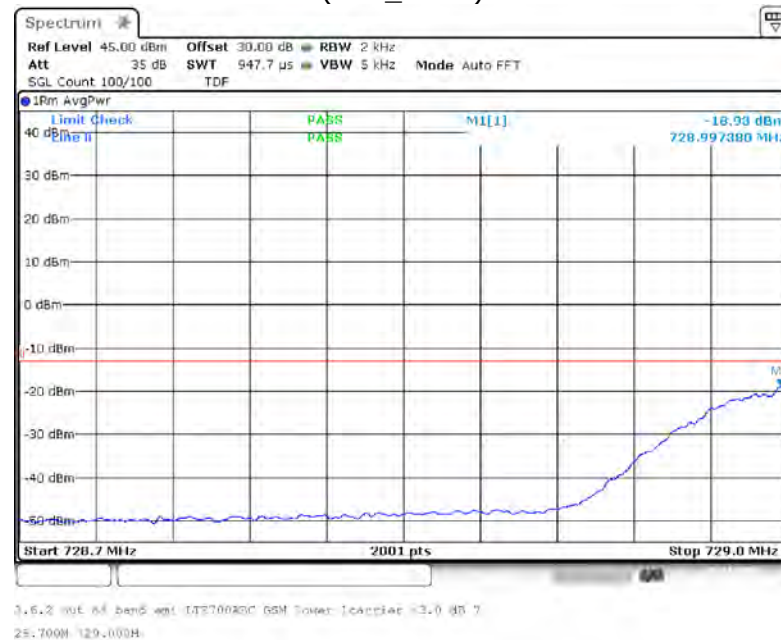
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



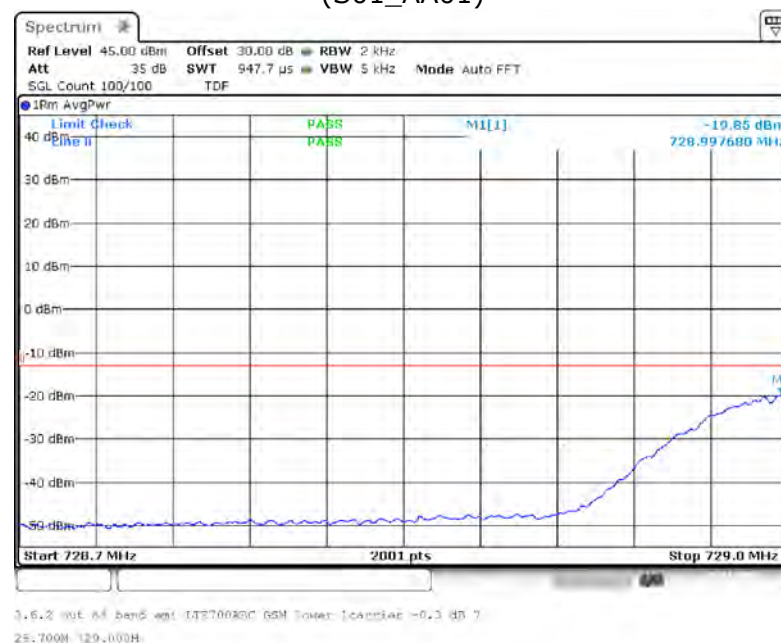
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



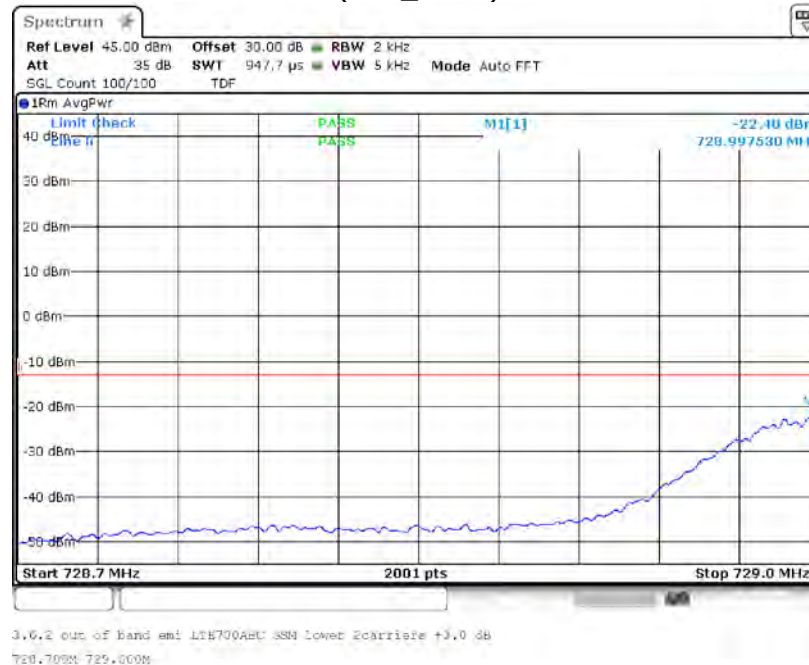
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



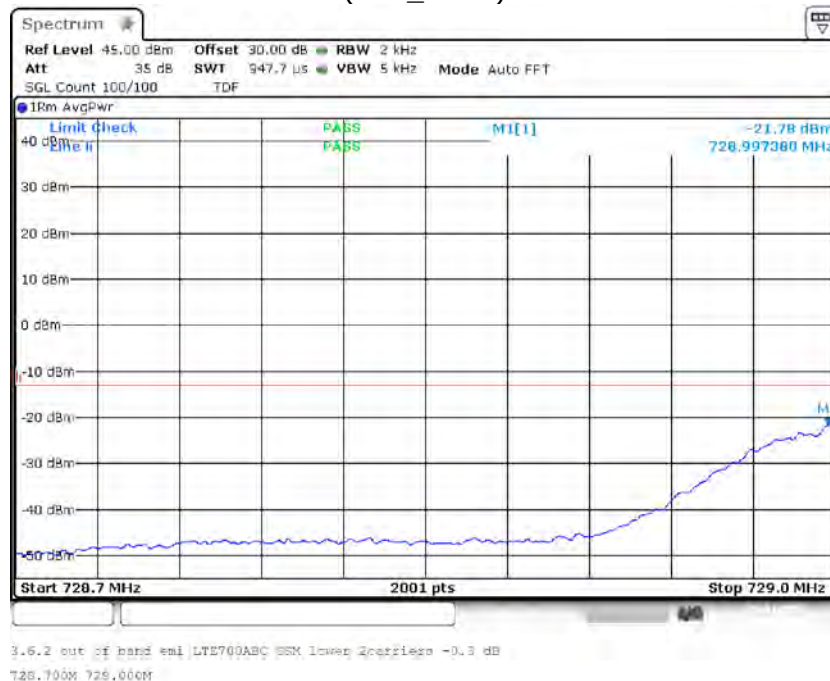
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



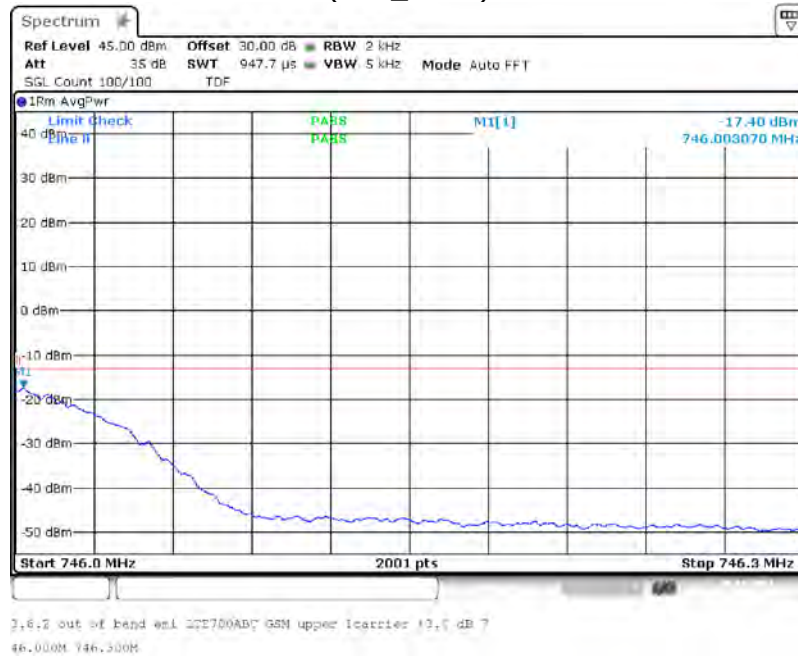
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



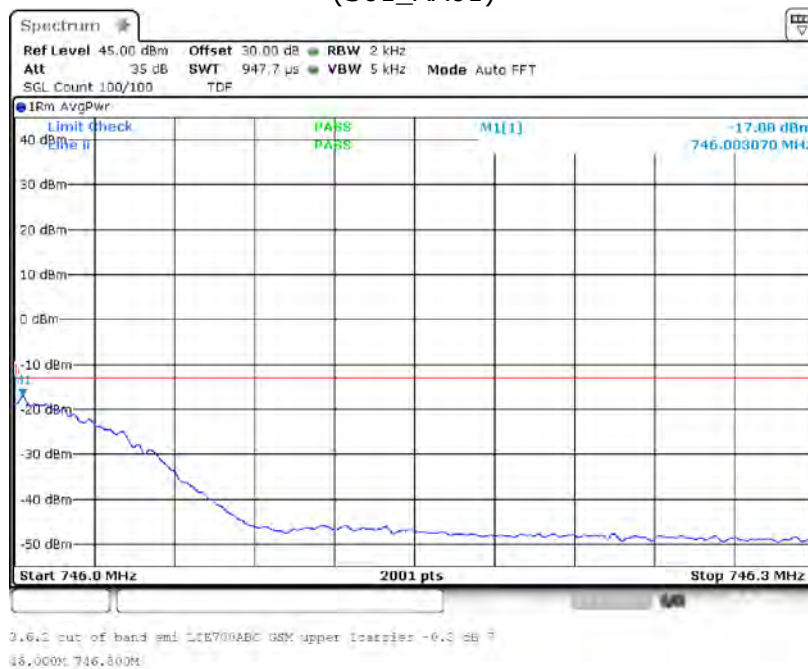
Band Edge = Lower, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



Band Edge = Upper, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



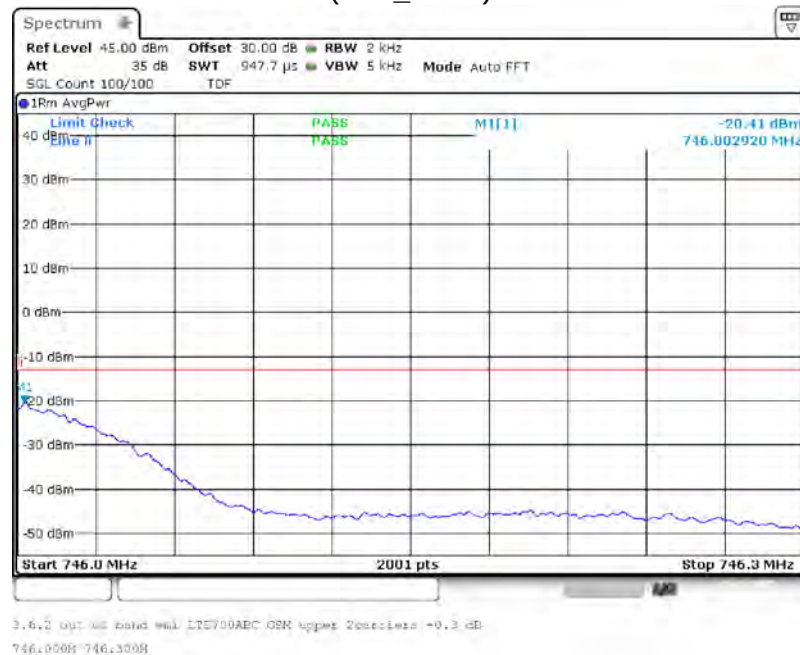
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



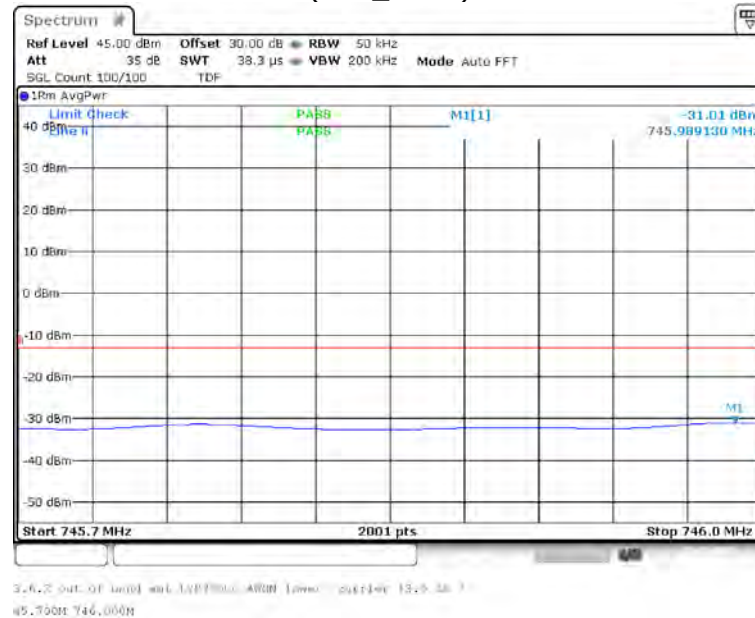
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



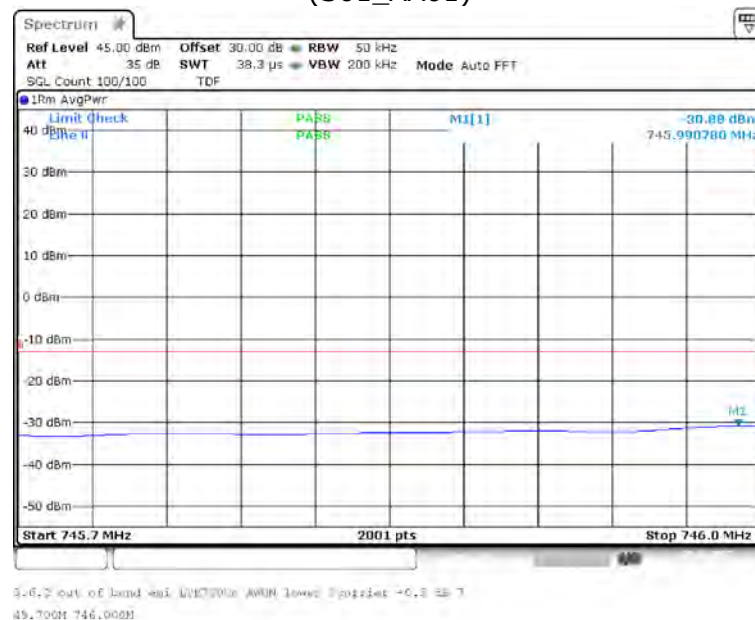
Band Edge = Upper, Frequency Band = Band 12, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



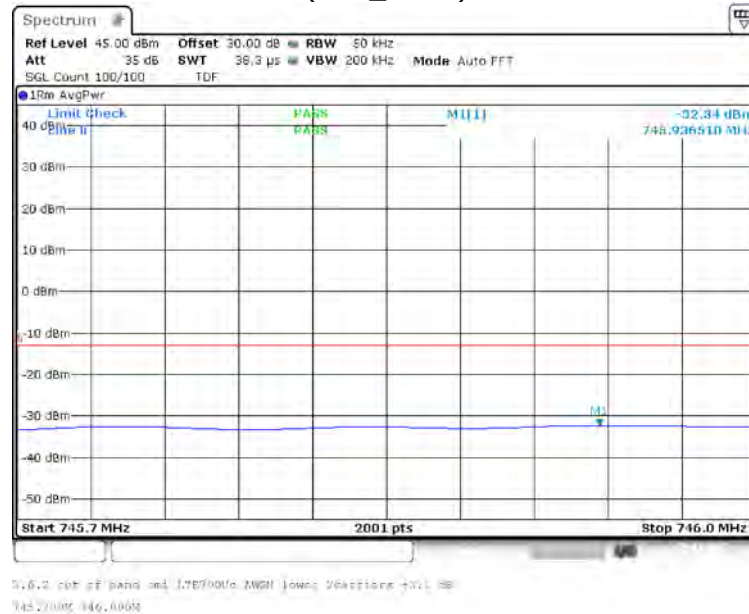
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



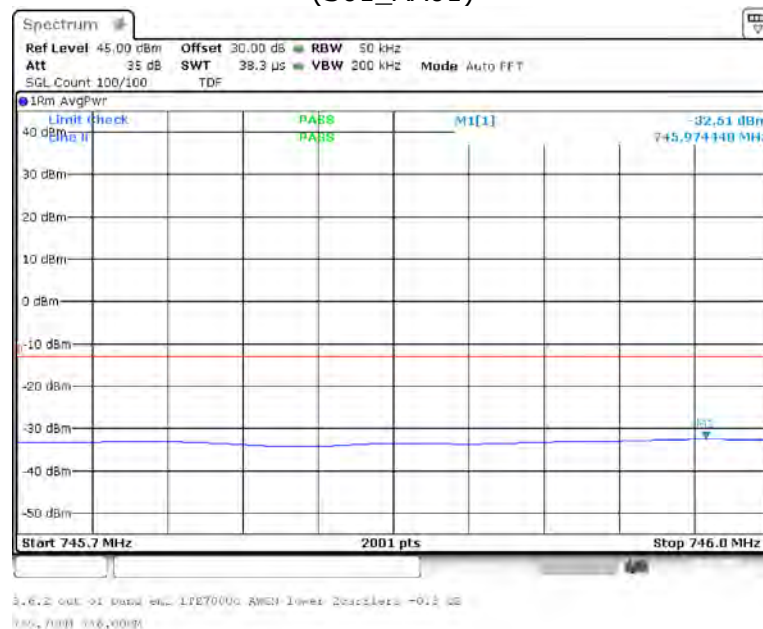
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



Band Edge = Lower, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



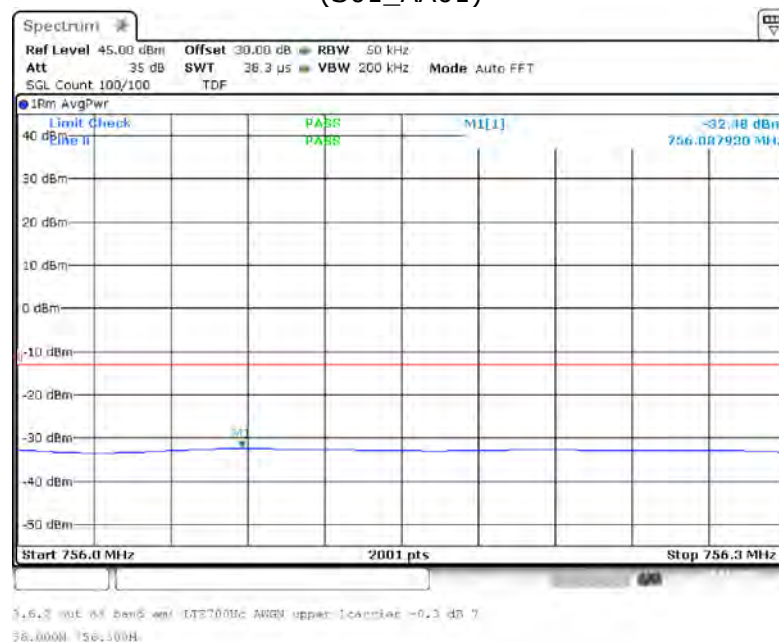
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



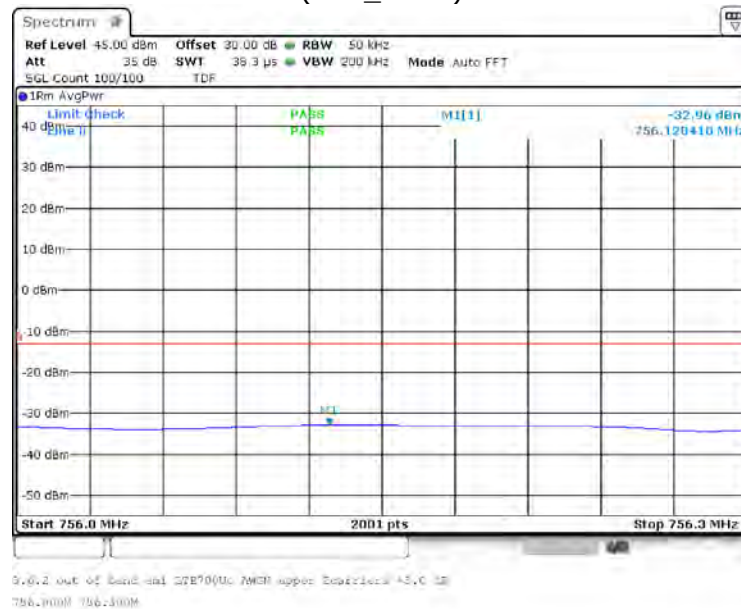
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



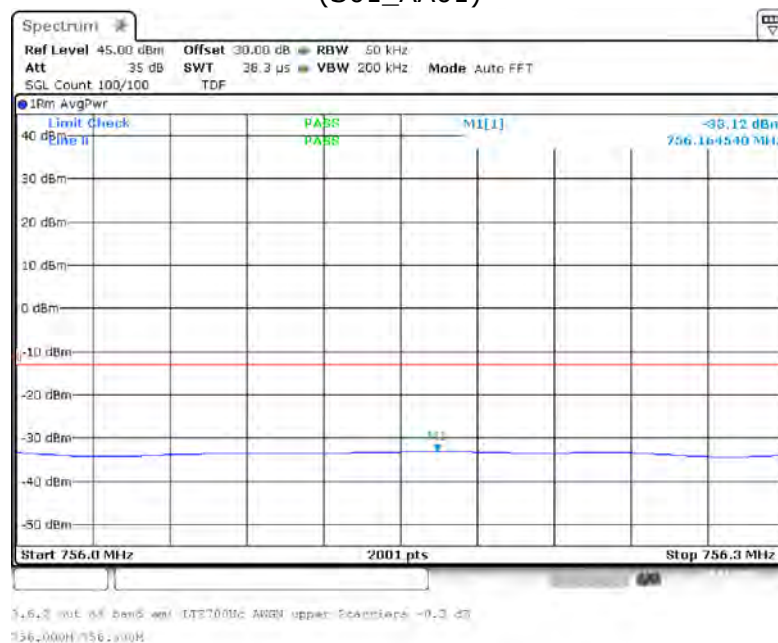
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



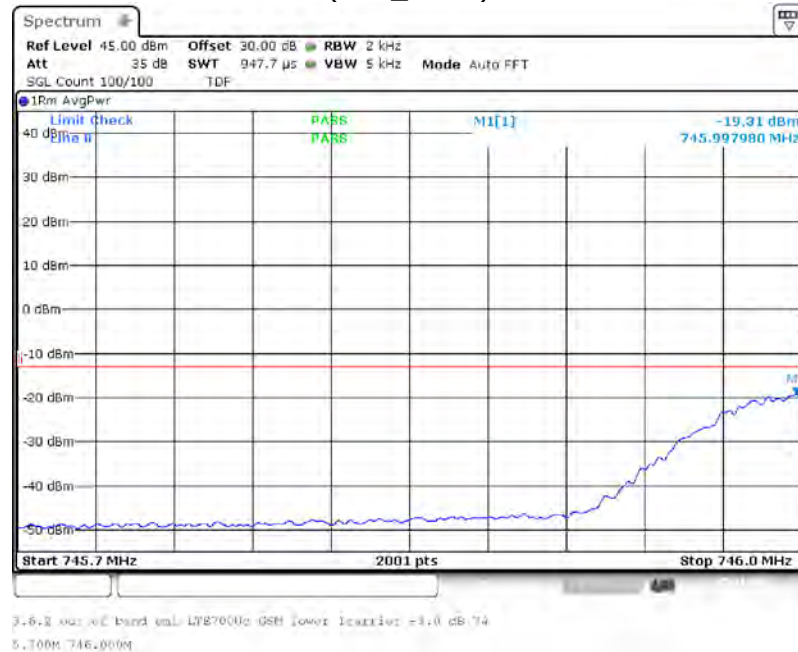
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Wideband (S01\_AA01)



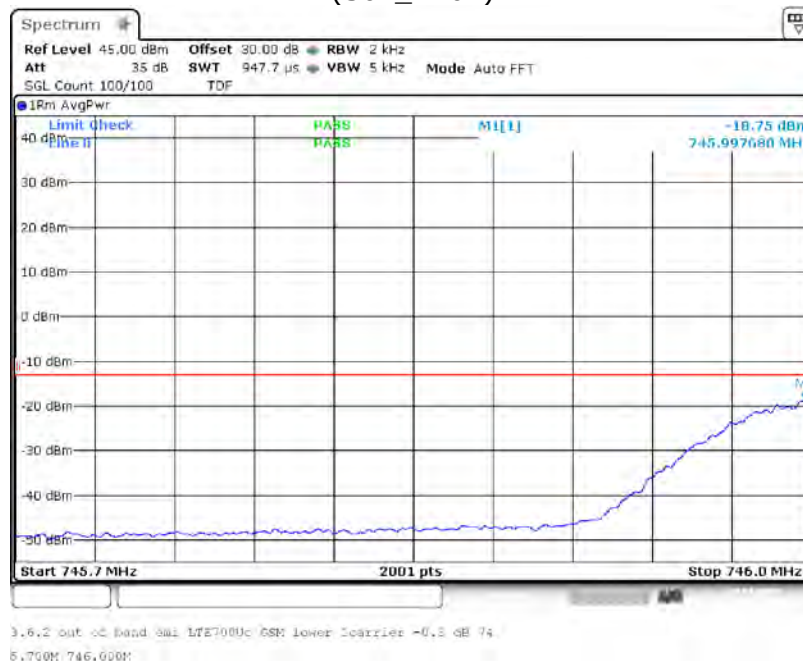
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Wideband (S01\_AA01)



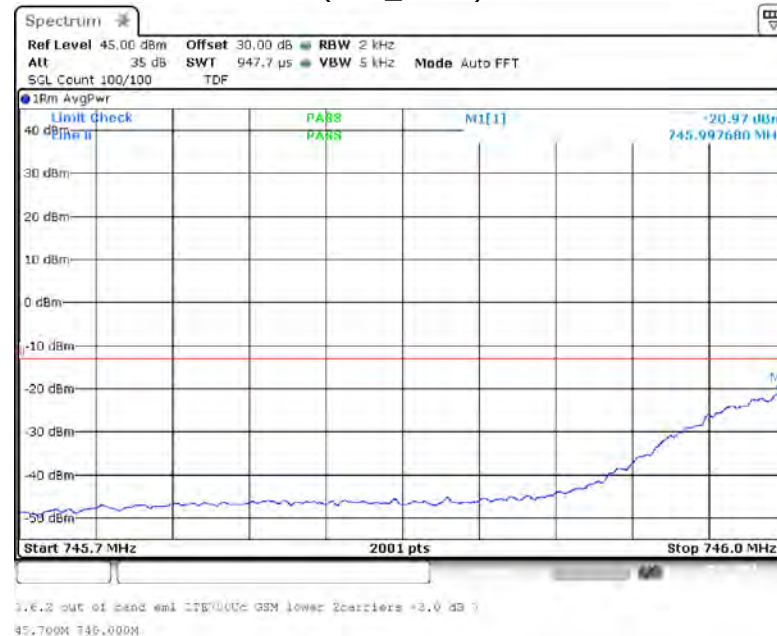
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



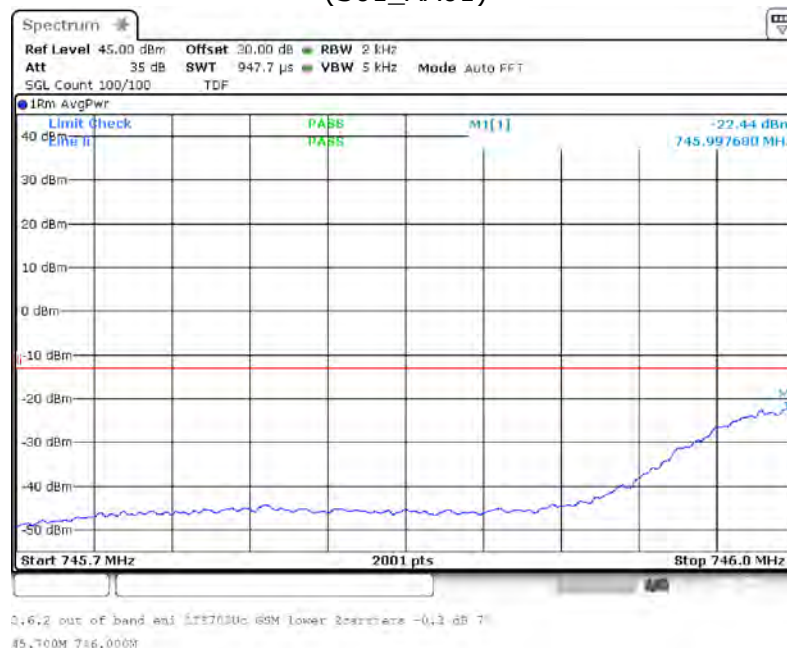
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



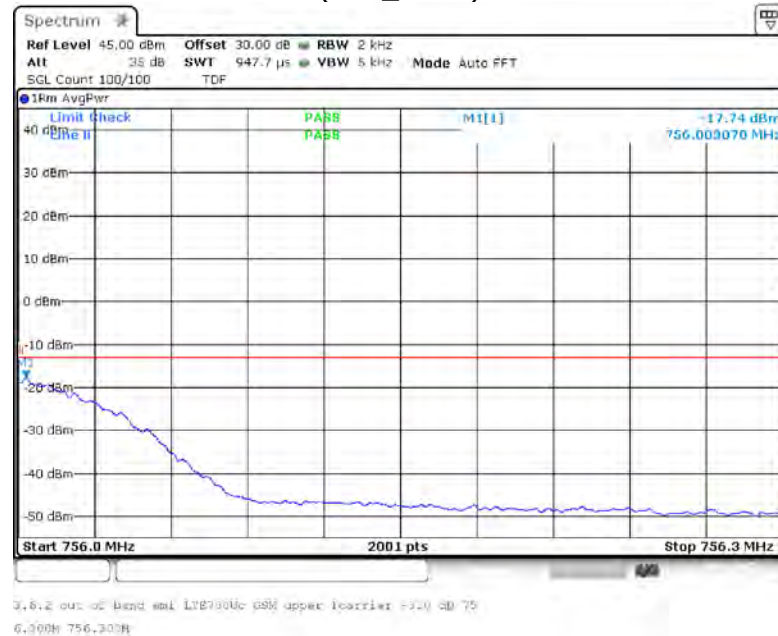
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



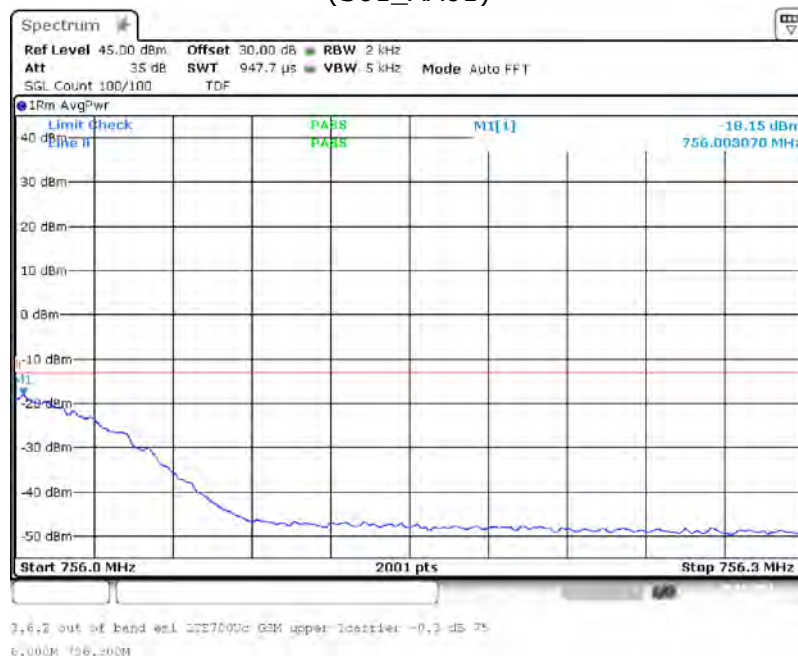
Band Edge = Lower, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



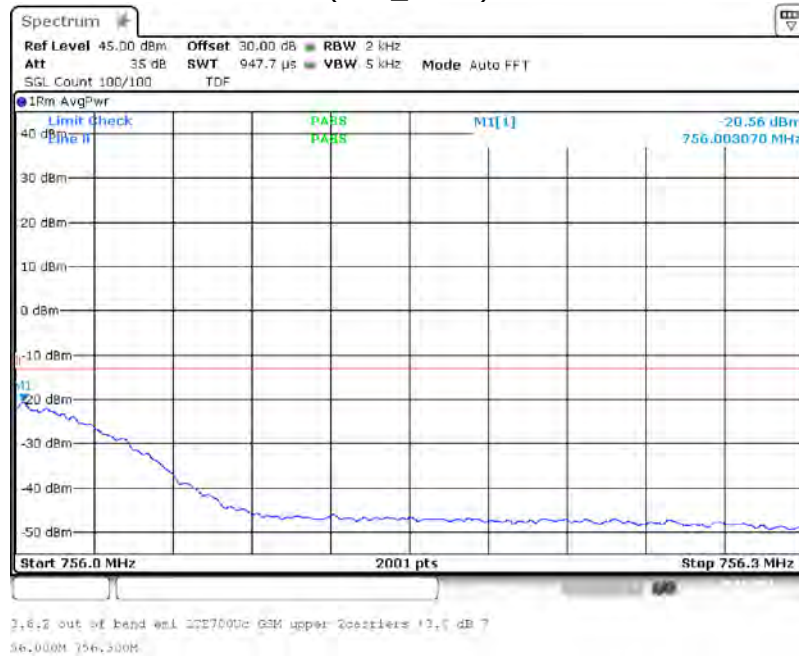
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



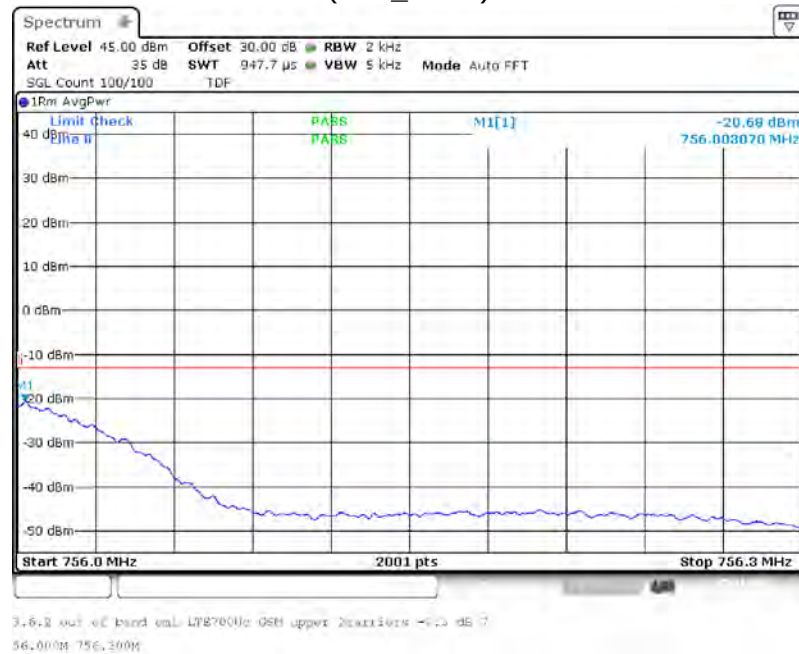
Band Edge = Upper, Frequency Band = Band 13, Number of signals = 1, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



Band Edge = Upper, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 3 dB > AGC, Signal Type = Narrowband (S01\_AA01)



Band Edge = Upper, Frequency Band = Band 13, Number of signals = 2, Direction = RF downlink, Input Power = 0.3 dB < AGC, Signal Type = Narrowband (S01\_AA01)



#### 4.5.5 TEST EQUIPMENT USED

- FCC Conducted Base Station / Repeater

## 4.6 OUT-OF-BAND REJECTION

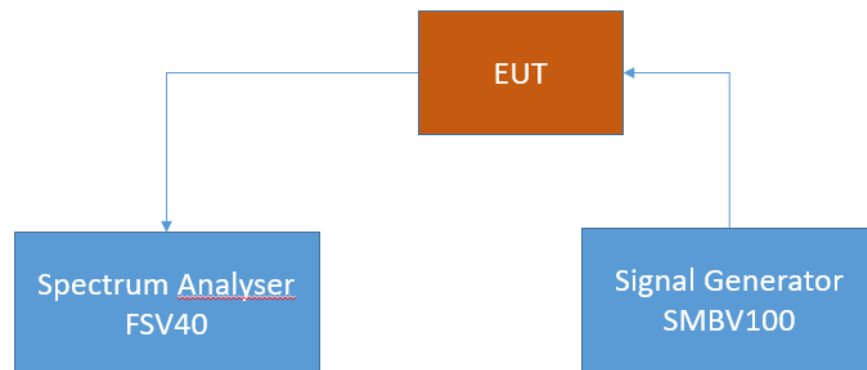
Standard FCC Part 27

**The test was performed according to:**  
ANSI C63.26

### 4.6.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band rejection test case for industrial signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; Out-of-band rejection

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

### 4.6.2 TEST REQUIREMENTS / LIMITS

For this test case exists no applicable limit

#### 4.6.3 TEST PROTOCOL

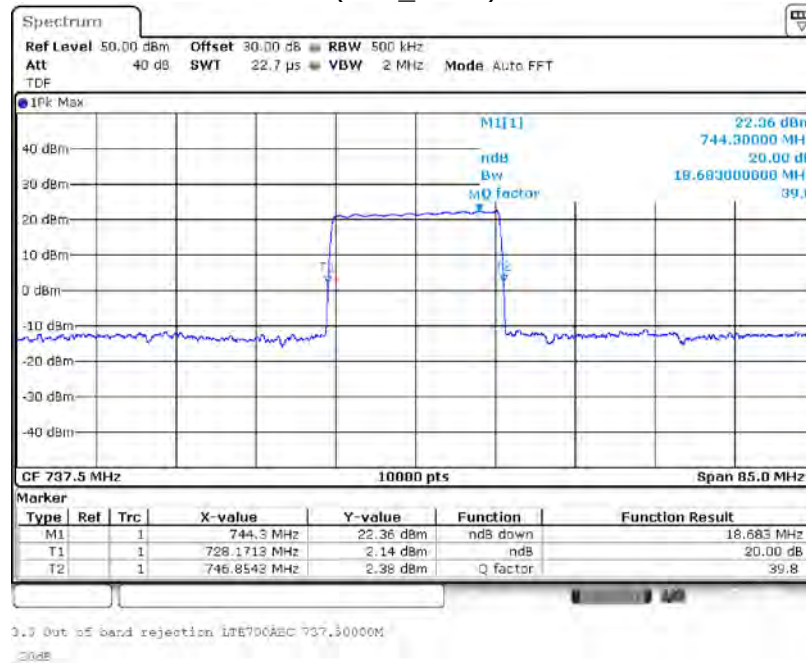
| Band 12, downlink             |                    |                                            |                                            |                       |
|-------------------------------|--------------------|--------------------------------------------|--------------------------------------------|-----------------------|
| Highest Power Frequency [MHz] | Output Power [dBm] | Lower Highest Power -20 dB Frequency [MHz] | Upper Highest Power -20 dB Frequency [MHz] | 20 dB Bandwidth [kHz] |
| 744.300                       | 22.360             | 728.171                                    | 746.854                                    | 18683.0               |

| Band 13, downlink             |                    |                                            |                                            |                       |
|-------------------------------|--------------------|--------------------------------------------|--------------------------------------------|-----------------------|
| Highest Power Frequency [MHz] | Output Power [dBm] | Lower Highest Power -20 dB Frequency [MHz] | Upper Highest Power -20 dB Frequency [MHz] | 20 dB Bandwidth [kHz] |
| 746.100                       | 23.290             | 745.683                                    | 756.308                                    | 10625.0               |

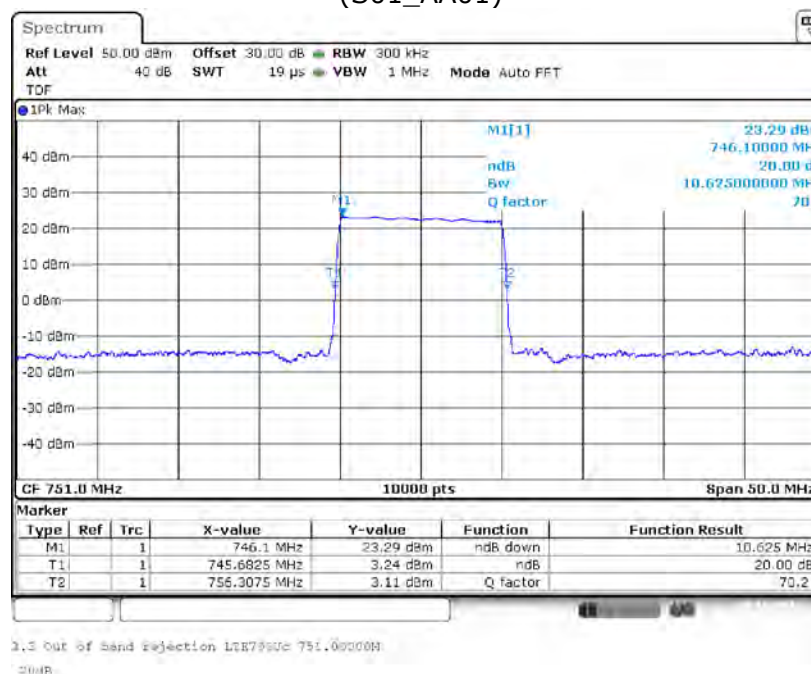
Remark: Please see next sub-clause for the measurement plot.

#### 4.6.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Frequency Band = Band 12, Direction = RF downlink  
(S01\_AA01)



Frequency Band = Band 13, Direction = RF downlink  
(S01\_AA01)



#### 4.6.5 TEST EQUIPMENT USED

- FCC Conducted Base Station / Repeater

## 4.7 FIELD STRENGTH OF SPURIOUS RADIATION

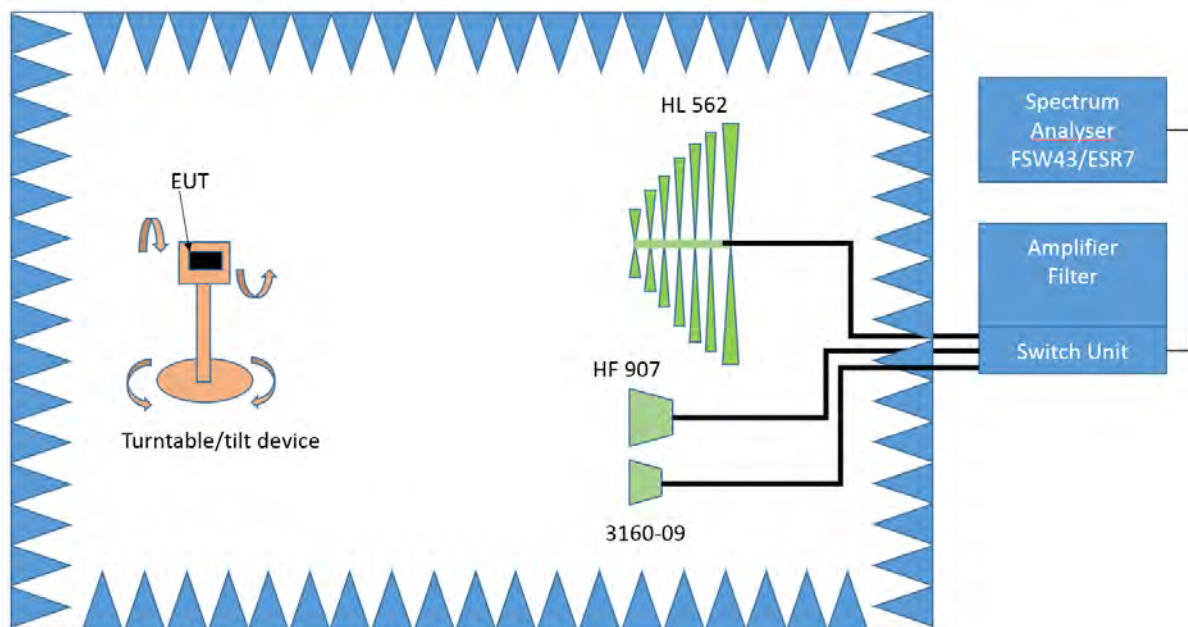
Standard FCC Part 27, §24.53

**The test was performed according to:**  
ANSI C63.26

### 4.7.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the applicable radiated spurious emission measurements per § 2.1053

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90; Industrial Signal Booster – Test Setup; Field Strength of Spurious Radiation

The test set-up was made in accordance to the general provisions of ANSI C63.4 in a typical installation configuration. The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m<sup>2</sup> in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

The measurement procedure is implemented into the EMI test software EMC32 from R&S. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is also performed at 3 axes. A pre-check is performed while the EUT is powered from a DC power source.

### 1. Measurement above 30 MHz and up to 1 GHz

#### Step 1: Preliminary scan

This is a preliminary test to identify the highest amplitudes relative to the limit.

Settings for step 1:

- Antenna distance: 3 m
- Detector: Peak-Maxhold / Quasipeak (FFT-based)
- Frequency range: 30 – 1000 MHz

- Frequency steps: 30 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 ms
- Turntable angle range:  $-180^{\circ}$  to  $90^{\circ}$
- Turntable step size:  $90^{\circ}$
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

#### **Step 2: Adjustment measurement**

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by  $\pm 45^{\circ}$  around this value. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary by  $\pm 100$  cm around the antenna height determined. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range:  $\pm 45^{\circ}$  around the determined value
- Height variation range:  $\pm 100$  cm around the determined value
- Antenna Polarisation: max. value determined in step 1

#### **Step 3: Final measurement with QP detector**

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: Quasi-Peak ( $< 1$  GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

### **3. Measurement above 1 GHz**

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:

#### **Step 1:**

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of  $90^{\circ}$ .

The turn table step size (azimuth angle) for the preliminary measurement is  $45^{\circ}$ .

#### **Step 2:**

Due to the fact, that in this frequency range the test is performed in a fully anechoic room, the height scan of the receiving antenna instep 2 is omitted. Instead of this, a maximum search with a step size  $\pm 45^{\circ}$  for the elevation axis is performed.

The turn table azimuth will slowly vary by  $\pm 22.5^\circ$ .

The elevation angle will slowly vary by  $\pm 45^\circ$

EMI receiver settings (for all steps):

- Detector: Peak, Average
- IF Bandwidth = 1 MHz

**Step 3:**

Spectrum analyser settings for step 3:

- Detector: Peak / Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz
- Measuring time: 1 s

## 4.7.2 TEST REQUIREMENTS / LIMITS

### **FCC Part 2.1053; Measurement required: Field strength of spurious radiation:**

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate.

### **Part 27; Miscellaneous Wireless Communication Services**

#### **Subpart C – Technical standards**

#### **§27.53 – Emission limits**

##### **Band 13**

(c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to  $-70$  dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and  $-80$  dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with

an antenna that is representative of the type that will be used with the equipment in normal operation.

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

#### **Band 12:**

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

#### **Band 4:**

(h) *AWS emission limits—(1) General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least  $43 + 10 \log_{10}(P)$  dB.

#### **RSS-130; 4.6 Transmitter Unwanted Emissions**

4.6.1 The power of any unwanted emissions in any 100 kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least  $43 + 10 \log_{10} p$  (watts), dB. However, in the 100 kHz band immediately outside the equipment's operating frequency range, a resolution bandwidth of 30 kHz may be employed.

4.6.2 In addition to the limit outlined in Section 4.6.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:

- (a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:
  - o (i)  $76 + 10 \log_{10} p$  (watts), dB, for base and fixed equipment, and
  - o (ii)  $65 + 10 \log_{10} p$  (watts), dB, for mobile and portable equipment.
- (b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed  $-70$  dBW/MHz for wideband signal and  $-80$  dBW for discrete emission with bandwidth less than 700 Hz.

## RSS-139; 6.6 Transmitter Unwanted Emissions

Equipment shall comply with the limits in (i) and (ii) below.

- i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.
- ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least  $43 + 10 \log_{10} p$  (watts) dB.

### 4.7.3 TEST PROTOCOL

| Band 4/10/66, downlink |                      |             |          |           |             |                      |
|------------------------|----------------------|-------------|----------|-----------|-------------|----------------------|
| Spurious Freq. [MHz]   | Spurious Level [dBm] | Pin [dBm]   | Detector | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| -                      | -                    | 3.6/0.6/2.0 | RMS      | 100       | -13.0       | - - -                |
| -                      | -                    | 3.6/0.6/2.0 | RMS      | 100       | -13.0       | - - -                |
| -                      | -                    | 3.6/0.6/2.0 | RMS      | 100       | -13.0       | - - -                |
| -                      | -                    | 3.6/0.6/2.0 | RMS      | 100       | -13.0       | - - -                |
| -                      | -                    | 3.6/0.6/2.0 | RMS      | 100       | -13.0       | - - -                |

| Band 12, downlink    |                      |              |          |           |             |                      |
|----------------------|----------------------|--------------|----------|-----------|-------------|----------------------|
| Spurious Freq. [MHz] | Spurious Level [dBm] | Pin [dBm]    | Detector | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| -                    | -                    | -0.2/0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.2/0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.2/0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.2/0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.2/0.6/0.2 | RMS      | 100       | -13.0       | - - -                |

| Band 13, downlink    |                      |               |          |           |             |                      |
|----------------------|----------------------|---------------|----------|-----------|-------------|----------------------|
| Spurious Freq. [MHz] | Spurious Level [dBm] | Pin [dBm]     | Detector | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| -                    | -                    | -0.8/-0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.8/-0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.8/-0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.8/-0.6/0.2 | RMS      | 100       | -13.0       | - - -                |
| -                    | -                    | -0.8/-0.6/0.2 | RMS      | 100       | -13.0       | - - -                |

Remark: Please see next sub-clause for the measurement plot.

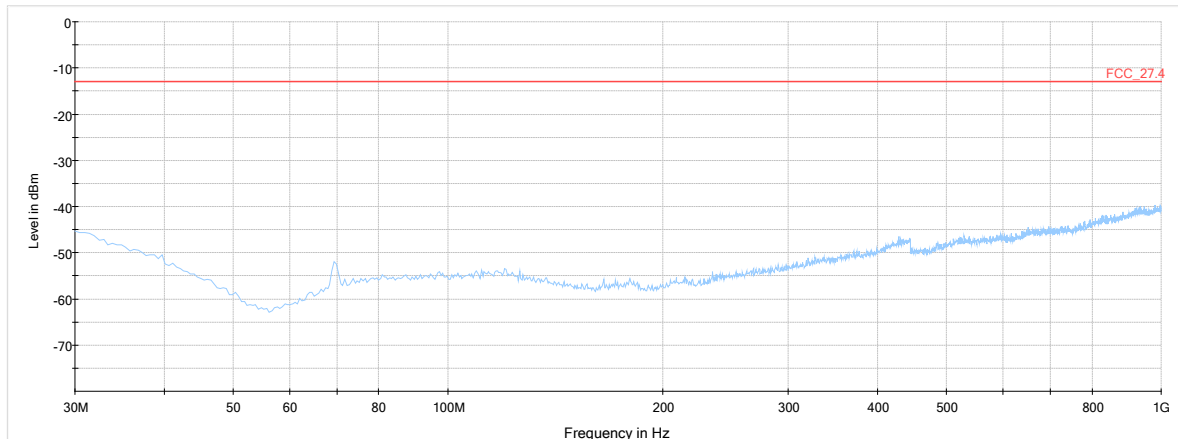
The three required test frequencies (low, mid, high) were injected simultaneously conducted into the EUT.

The RF output ports were terminated with 50 Ohm

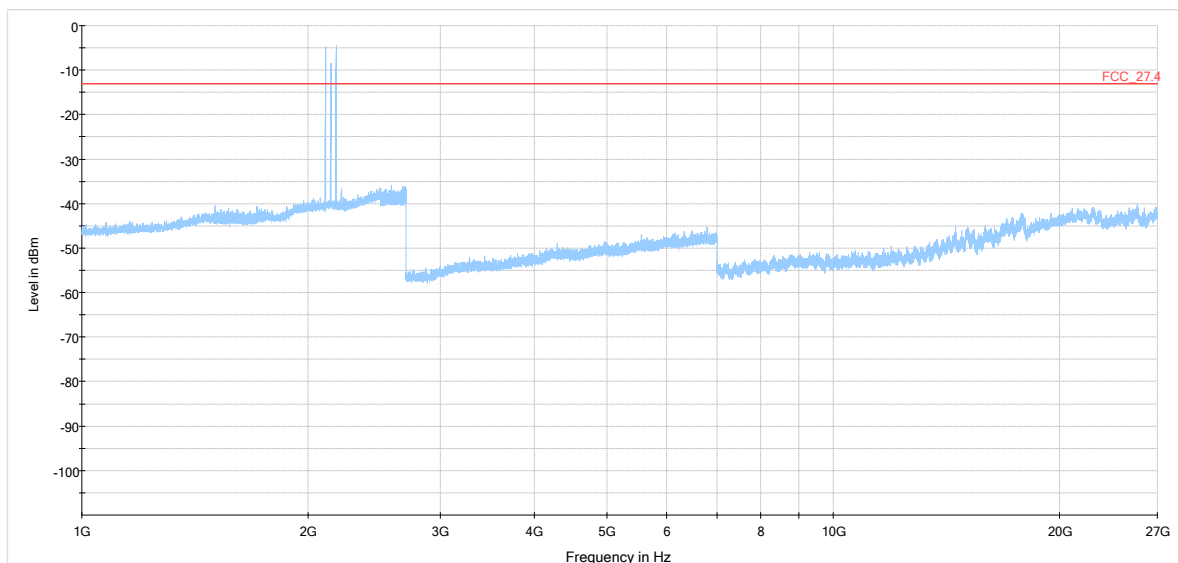
Pin: The single power of each of the three channels (bottom, middle, top).

#### 4.7.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Frequency Band = Band 4/10/66, Test Frequency = low, Direction = RF downlink  
(S01\_AA01)



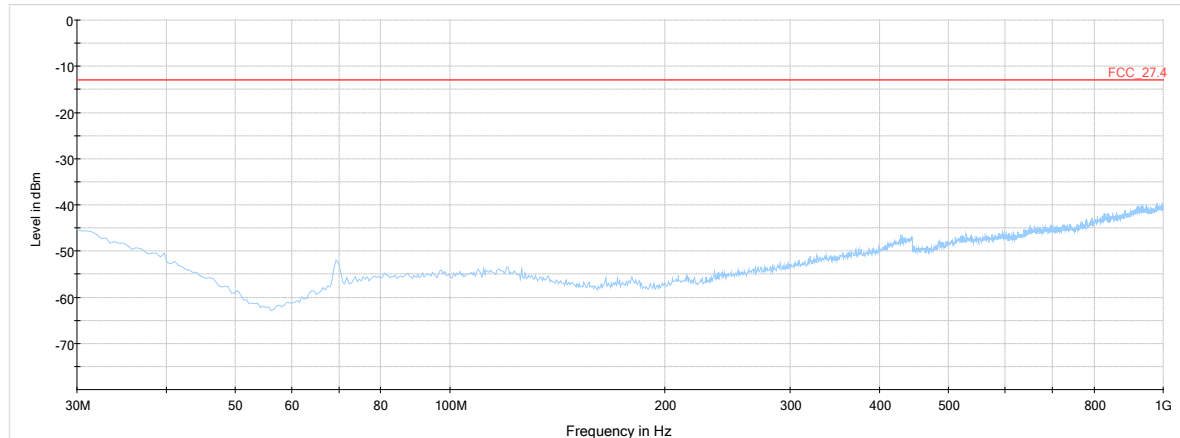
30 MHz - 1 GHz



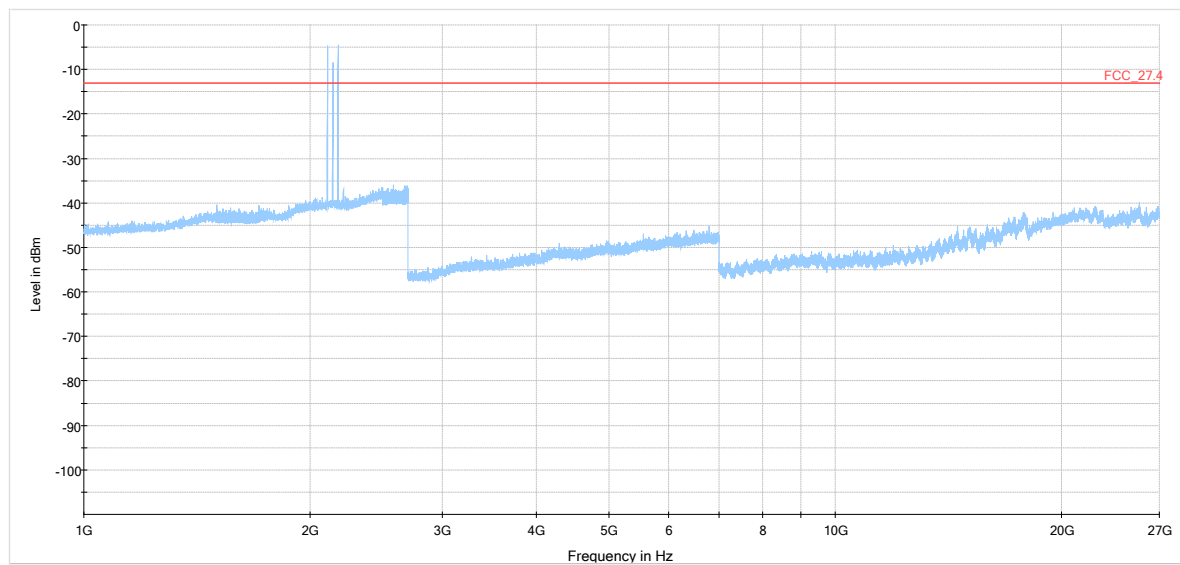
1 GHz - 27 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 4/10/66, Test Frequency = mid, Direction = RF downlink  
(S01\_AA01)



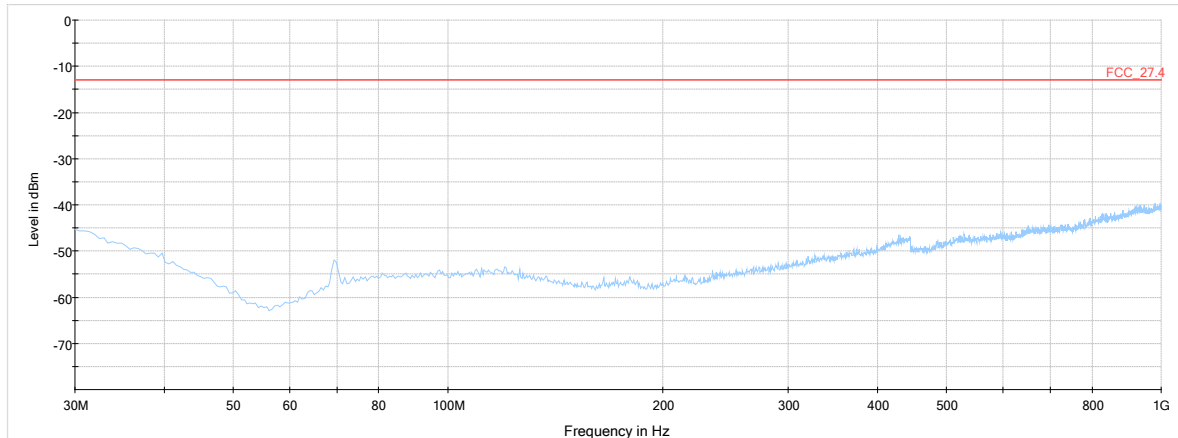
30 MHz - 1 GHz



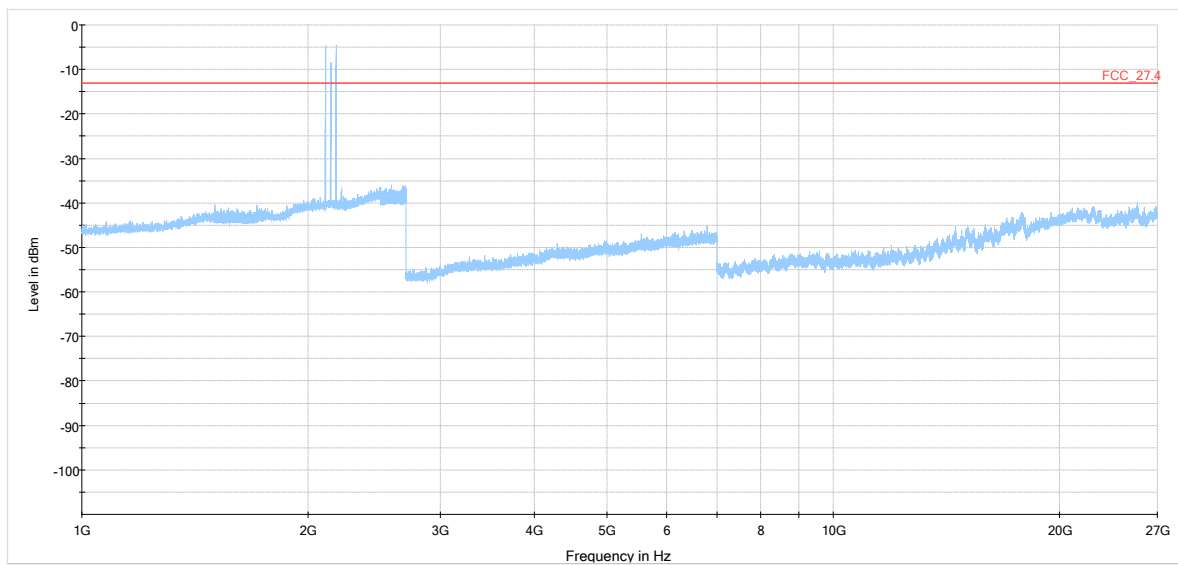
1 GHz - 27 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 4/10/66, Test Frequency = high, Direction = RF downlink  
(S01\_AA01)



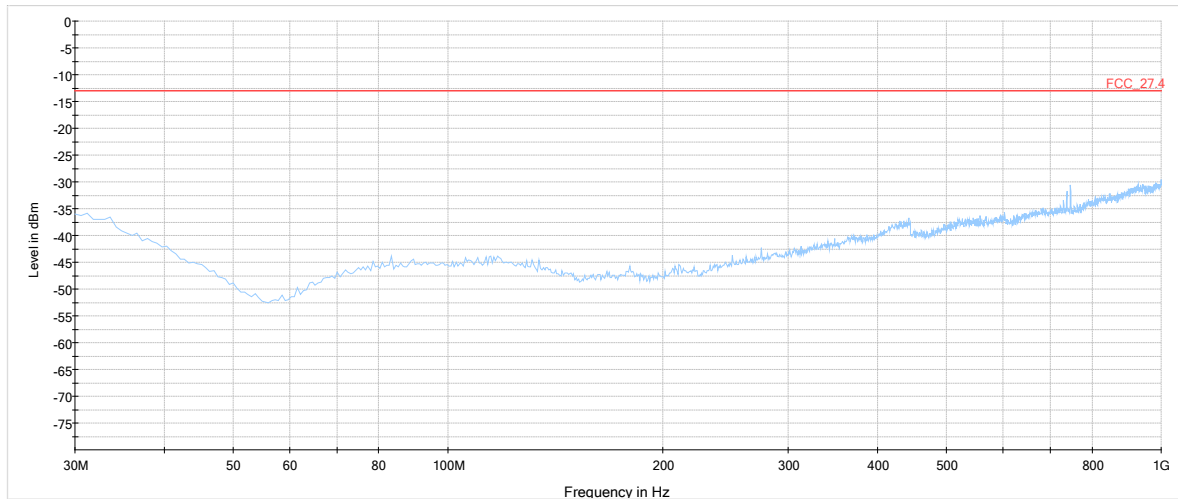
30 MHz - 1 GHz



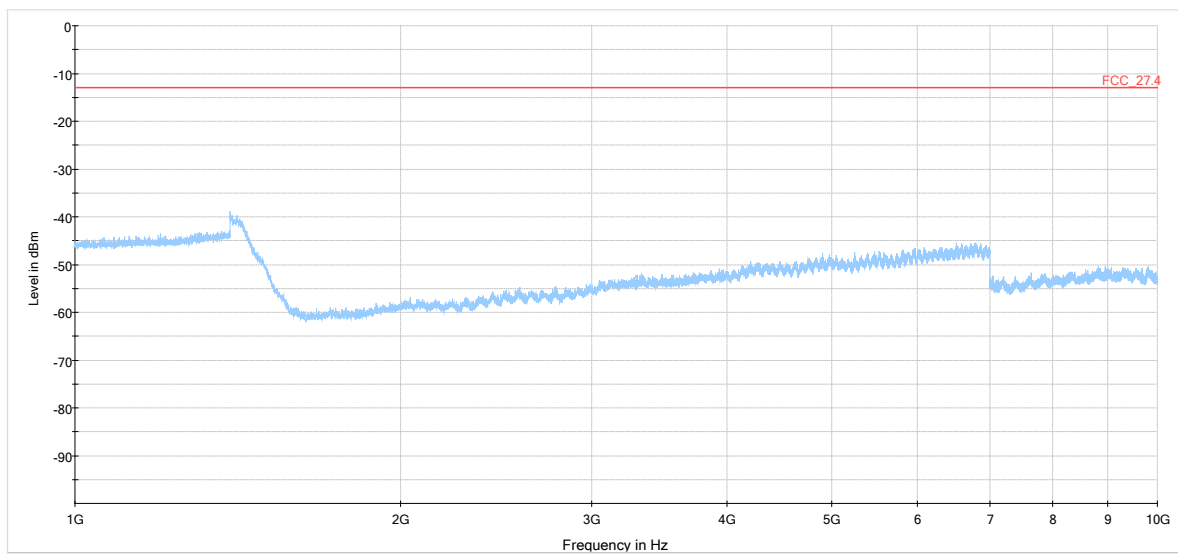
1 GHz - 27 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 12, Test Frequency = low, Direction = RF downlink  
(S01\_AA01)



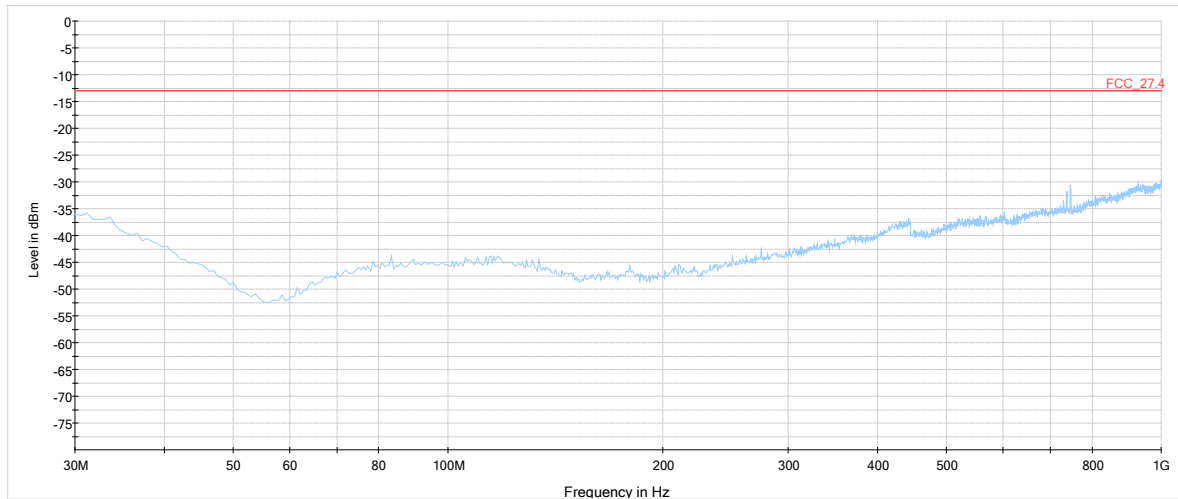
30 MHz - 1 GHz



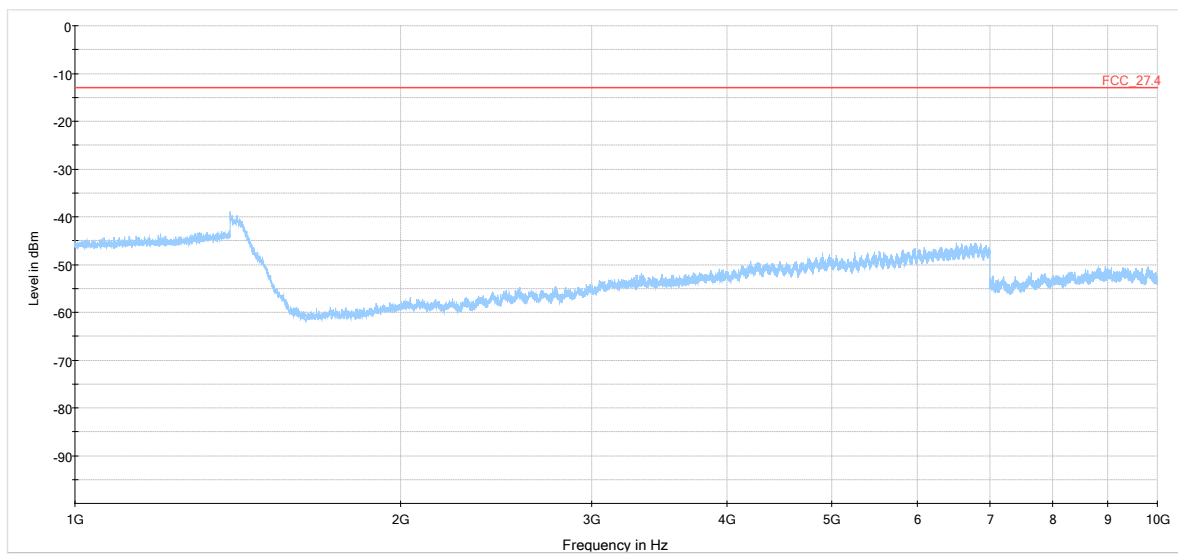
1 GHz - 10 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 12, Test Frequency = mid, Direction = RF downlink  
(S01\_AA01)



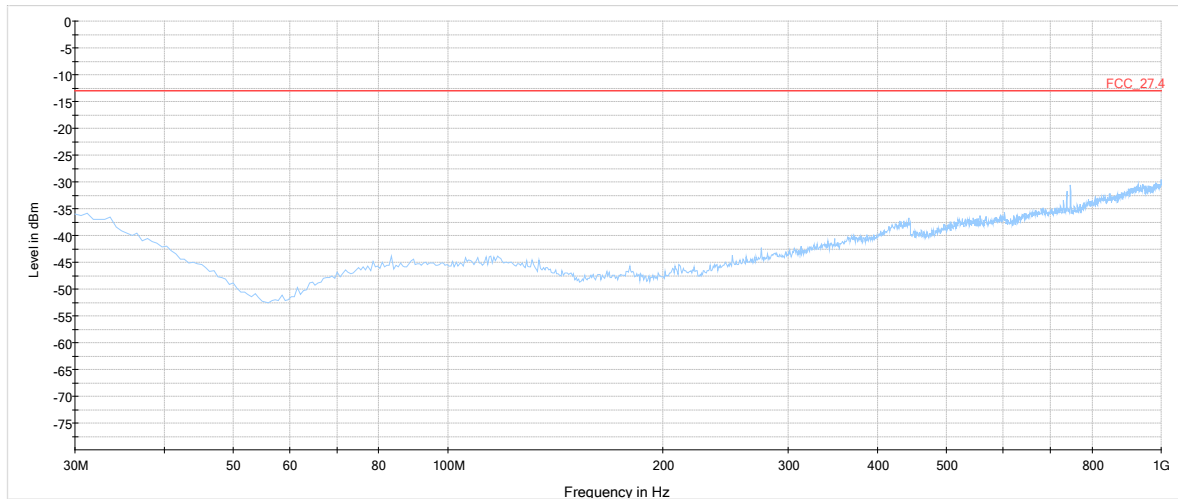
30 MHz - 1 GHz



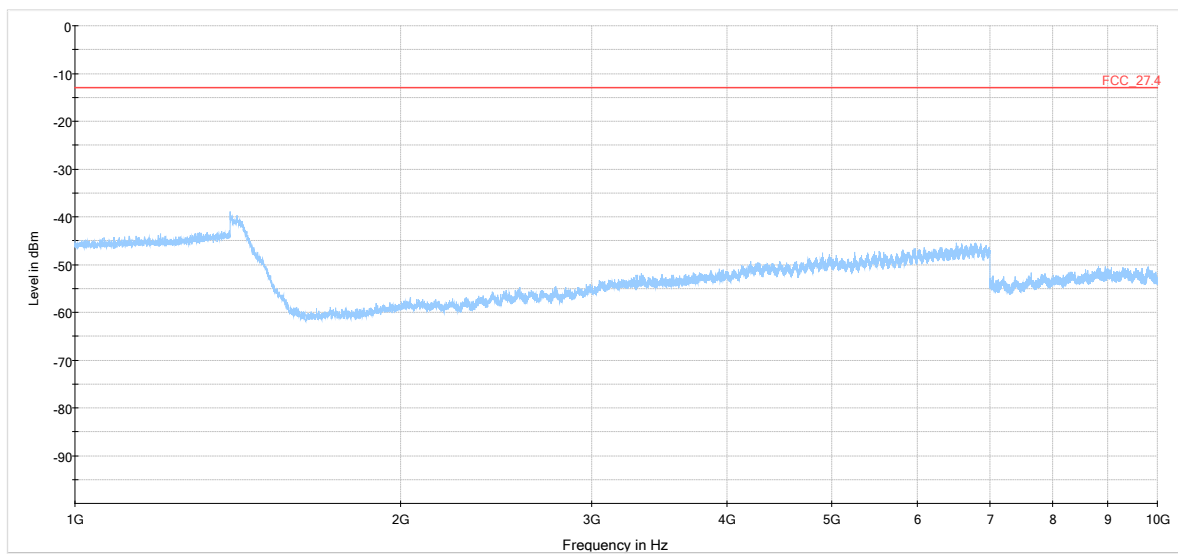
1 GHz - 10 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 12, Test Frequency = high, Direction = RF downlink  
(S01\_AA01)



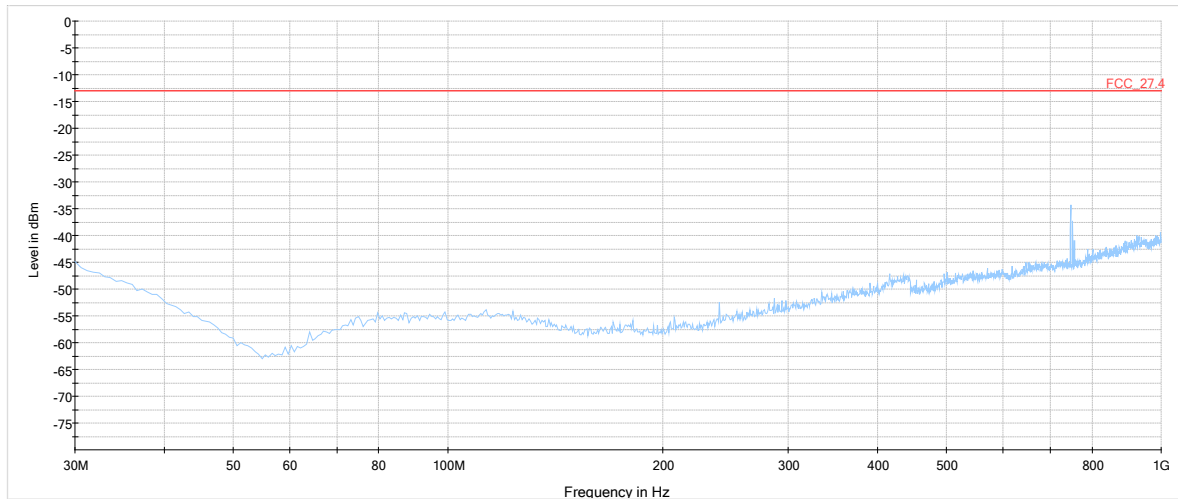
30 MHz - 1 GHz



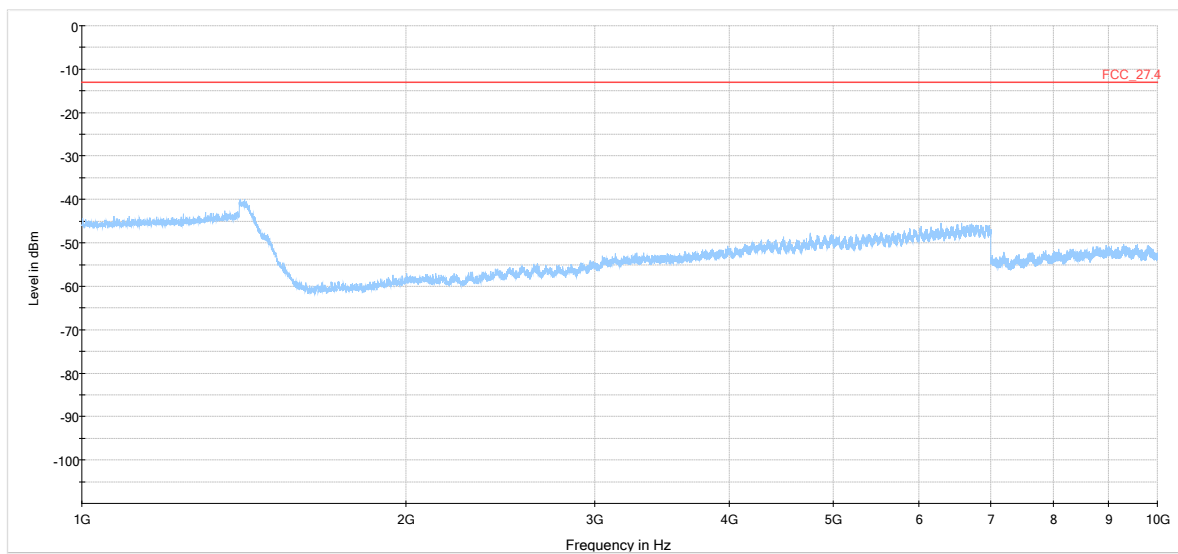
1 GHz - 10 GHz

Note: The three peaks at appr. 2150 MHz are the wanted signals.

Frequency Band = Band 13, Test Frequency = low, Direction = RF downlink  
(S01\_AA01)

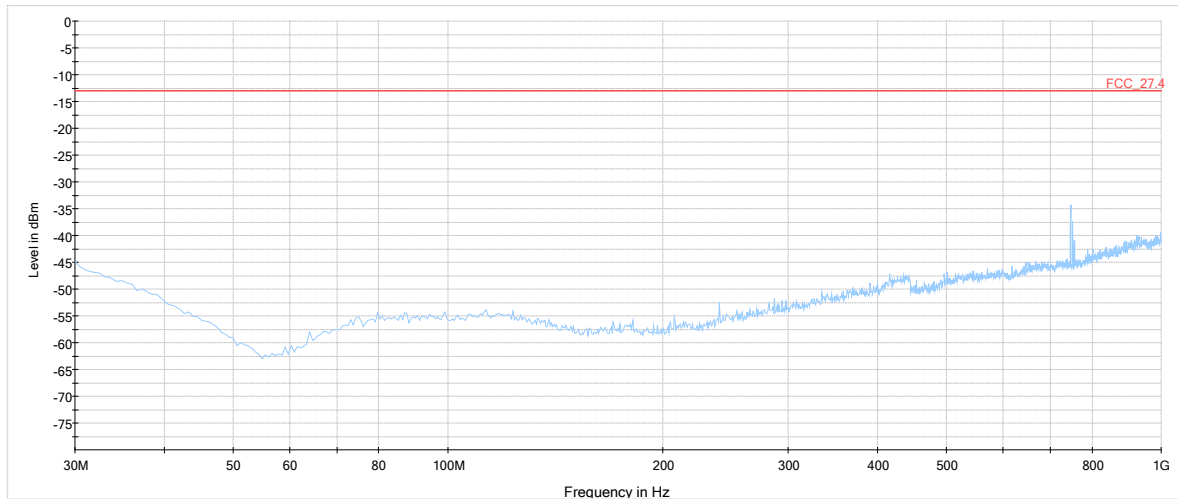


30 MHz - 1 GHz

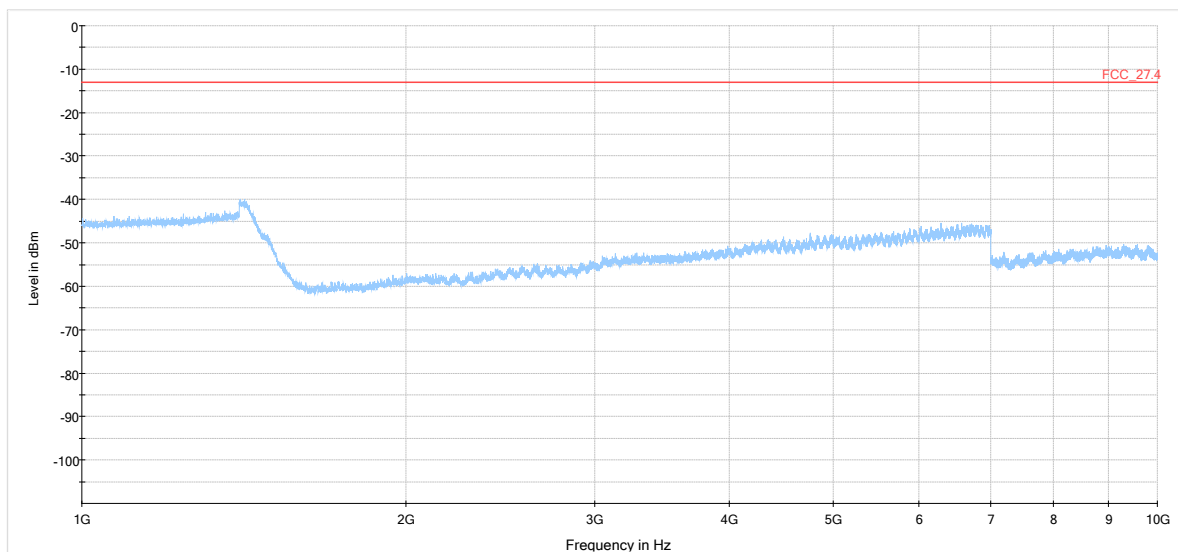


1 GHz - 10 GHz

Frequency Band = Band 13, Test Frequency = mid, Direction = RF downlink  
(S01\_AA01)

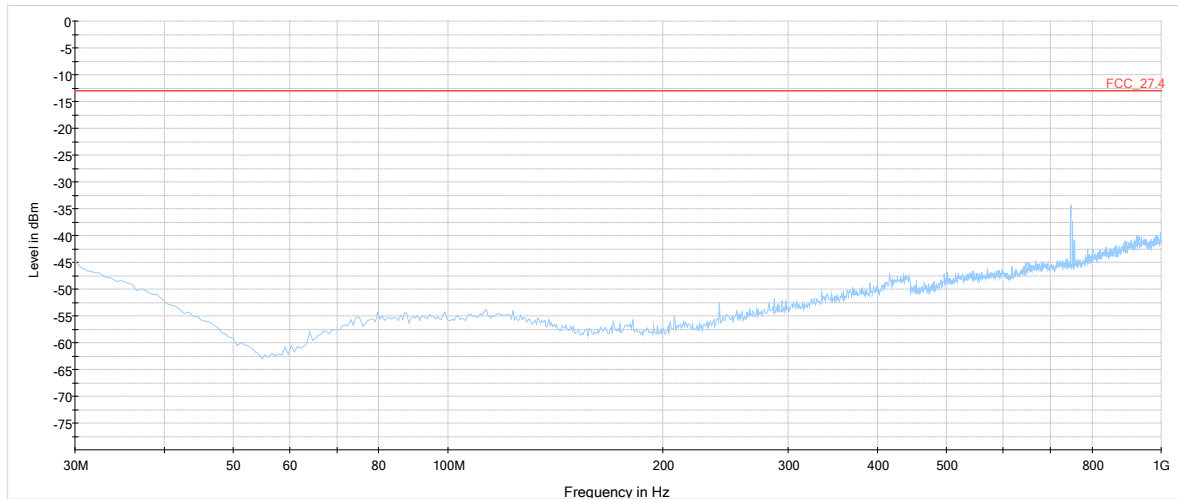


30 MHz - 1 GHz

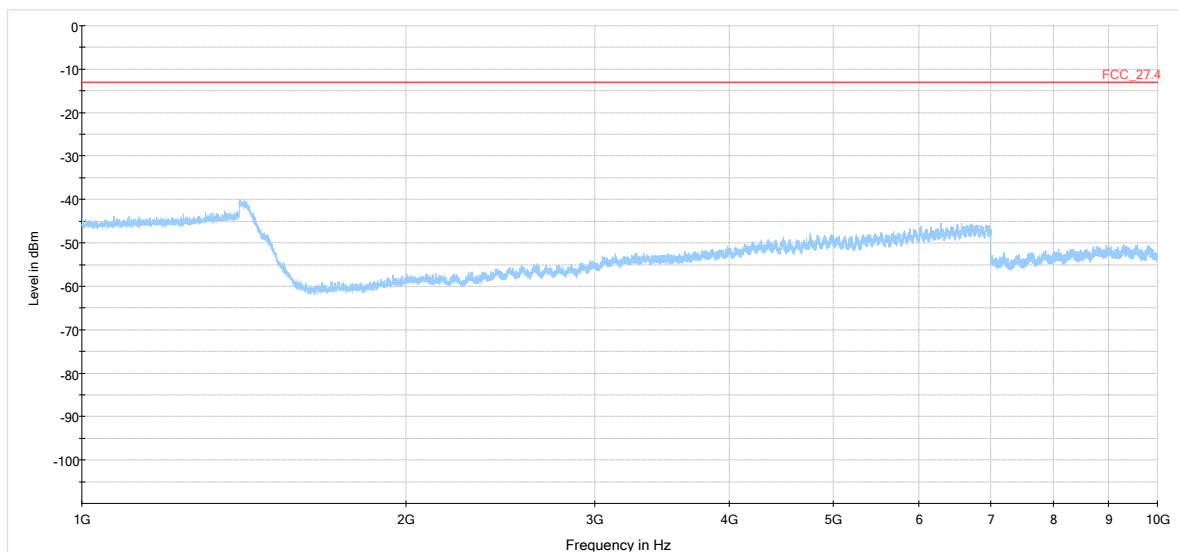


1 GHz - 10 GHz

Frequency Band = Band 13, Test Frequency = high, Direction = RF downlink  
(S01\_AA01)



30 MHz - 1 GHz



1 GHz - 10 GHz

#### 4.7.5 TEST EQUIPMENT USED

- Radiated Emissions

## 5 TEST EQUIPMENT

1 R&S TS8997  
EN300328/301893/FCC cond. Test Lab

| Ref.No. | Device Name          | Description                                | Manufacturer                      | Serial Number  | Last Calibration | Calibration Due |
|---------|----------------------|--------------------------------------------|-----------------------------------|----------------|------------------|-----------------|
| 1.1     | SMB100A              | Signal Generator 9 kHz - 6 GHz             | Rohde & Schwarz                   | 107695         | 2017-07          | 2020-07         |
| 1.2     | MFS                  | Rubidium Frequency Standard                | Datum-Beverly                     | 5489/001       | 2018-07          | 2020-07         |
| 1.3     | 1515 / 93459         | Broadband Power Divider SMA (Aux)          | Weinschel Associates              | LN673          |                  |                 |
| 1.4     | FSV30                | Signal Analyzer 10 Hz - 30 GHz             | Rohde & Schwarz                   | 103005         | 2018-04          | 2020-04         |
| 1.5     | Fluke 177            | Digital Multimeter 03 (Multimeter)         | Fluke Europe B.V.                 | 86670383       | 2018-04          | 2020-04         |
| 1.6     | VT 4002              | Climatic Chamber                           | Vötsch                            | 58566002150010 | 2018-04          | 2020-04         |
| 1.7     | A8455-4              | 4 Way Power Divider (SMA)                  |                                   | -              |                  |                 |
| 1.8     | Opus10 THI (8152.00) | ThermoHygro Datalogger 03 (Environ)        | Lufft Mess- und Regeltechnik GmbH | 7482           | 2017-03          | 2019-03         |
| 1.9     | SMBV100A             | Vector Signal Generator 9 kHz - 6 GHz      | Rohde & Schwarz                   | 259291         | 2016-10          | 2019-10         |
| 1.10    | OSP120               | Switching Unit with integrated power meter | Rohde & Schwarz                   | 101158         | 2018-05          | 2021-05         |

2 Radiated Emissions  
Lab to perform radiated emission tests

| Ref.No. | Device Name          | Description                               | Manufacturer                      | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|-------------------------------------------|-----------------------------------|---------------|------------------|-----------------|
| 2.1     | NRV-Z1               | Sensor Head A                             | Rohde & Schwarz                   | 827753/005    | 2018-07          | 2019-07         |
| 2.2     | MFS                  | Rubidium Frequency Normal MFS             | Datum GmbH                        | 002           | 2018-10          | 2020-10         |
| 2.3     | Opus10 TPR (8253.00) | ThermoAirpressure Datalogger 13 (Environ) | Lufft Mess- und Regeltechnik GmbH | 13936         | 2017-04          | 2019-04         |
| 2.4     | ESW44                | EMI Test Receiver                         | Rohde & Schwarz                   | 101603        | 2018-05          | 2019-05         |
| 2.5     | Anechoic Chamber     | 10.38 x 6.38 x 6.00 m <sup>3</sup>        | Frankonia                         | none          | 2018-06          | 2020-06         |
| 2.6     | HL 562               | Ultralog new biconicals                   | Rohde & Schwarz                   | 830547/003    | 2018-07          | 2021-07         |
| 2.7     | 5HC2700/12750-1.5-KK | High Pass Filter                          | Trilithic                         | 9942012       |                  |                 |
| 2.8     | ASP 1.2/1.8-10 kg    | Antenna Mast                              | Maturo GmbH                       | -             |                  |                 |

| Ref.No. | Device Name                   | Description                                     | Manufacturer                      | Serial Number          | Last Calibration | Calibration Due |
|---------|-------------------------------|-------------------------------------------------|-----------------------------------|------------------------|------------------|-----------------|
| 2.9     | Fully Anechoic Room           | 8.80m x 4.60m x 4.05m (l x w x h)               | Albatross Projects                | P26971-647-001-PRB     | 2018-06          | 2020-06         |
| 2.10    | Fluke 177                     | Digital Multimeter 03 (Multimeter)              | Fluke Europe B.V.                 | 86670383               | 2018-04          | 2020-04         |
| 2.11    | JS4-18002600-32-5P            | Broadband Amplifier 18 GHz - 26 GHz             | Miteq                             | 849785                 |                  |                 |
| 2.12    | FSW 43                        | Spectrum Analyzer                               | Rohde & Schwarz                   | 103779                 | 2019-02          | 2021-02         |
| 2.13    | 3160-09                       | Standard Gain / Pyramidal Horn Antenna 26.5 GHz | EMCO Elektronik GmbH              | 00083069               |                  |                 |
| 2.14    | WHKX 7.0/18G-8SS              | High Pass Filter                                | Wainwright                        | 09                     |                  |                 |
| 2.15    | 4HC1600/12750-1.5-KK          | High Pass Filter                                | Trilithic                         | 9942011                |                  |                 |
| 2.16    | Chroma 6404                   | AC Power Source                                 | Chroma ATE INC.                   | 64040001304            |                  |                 |
| 2.17    | JS4-00102600-42-5A            | Broadband Amplifier 30 MHz - 26 GHz             | Miteq                             | 619368                 |                  |                 |
| 2.18    | TT 1.5 WI                     | Turn Table                                      | Maturo GmbH                       | -                      |                  |                 |
| 2.19    | HL 562 Ultralog               | Log.-per. Antenna                               | Rohde & Schwarz                   | 100609                 | 2016-04          | 2019-04         |
| 2.20    | 3160-10                       | Standard Gain / Pyramidal Horn Antenna 40 GHz   | EMCO Elektronik GmbH              | 00086675               |                  |                 |
| 2.21    | 5HC3500/18000-1.2-KK          | High Pass Filter                                | Trilithic                         | 200035008              |                  |                 |
| 2.22    | Opus10 THI (8152.00)          | ThermoHygro Datalogger 12 (Environ)             | Lufft Mess- und Regeltechnik GmbH | 12482                  | 2017-03          | 2019-03         |
| 2.23    | ESR 7                         | EMI Receiver / Spectrum Analyzer                | Rohde & Schwarz                   | 101424                 | 2019-01          | 2020-01         |
| 2.24    | JS4-00101800-35-5P            | Broadband Amplifier 30 MHz - 18 GHz             | Miteq                             | 896037                 |                  |                 |
| 2.25    | AS 620 P                      | Antenna mast                                    | HD GmbH                           | 620/37                 |                  |                 |
| 2.26    | Tilt device Maturo (Rohacell) | Antrieb TD1.5-10kg                              | Maturo GmbH                       | TD1.5-10kg/024/3790709 |                  |                 |
| 2.27    | PAS 2.5 - 10 kg               | Antenna Mast                                    | Maturo GmbH                       | -                      |                  |                 |
| 2.28    | AM 4.0                        | Antenna mast                                    | Maturo GmbH                       | AM4.0/180/11920513     |                  |                 |
| 2.29    | HF 907                        | Double-ridged horn                              | Rohde & Schwarz                   | 102444                 | 2018-07          | 2021-07         |

3 FCC Conducted Base Station / Repeater  
EN300328/301893/FCC cond. Test Lab

| Ref.No. | Device Name | Description                             | Manufacturer    | Serial Number | Last Calibration | Calibration Due |
|---------|-------------|-----------------------------------------|-----------------|---------------|------------------|-----------------|
| 3.1     | FSV40       | Signal Analyzer 10 Hz - 40 GHz          | Rohde & Schwarz | 100886        | 2018-10          | 2019-10         |
| 3.2     | SMBV100A    | Vector Signal Generator 9 kHz - 6 GHz   | Rohde & Schwarz | 255975        | 2017-08          | 2019-08         |
| 3.3     | SMIQ        | Vector Signal Generator 9 kHz - 3.3 GHz | Rohde & Schwarz | 831389/062    | 2018-10          | 2020-10         |

The calibration interval is the time interval between "Last Calibration" and "Calibration Due"

## 6 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

### 6.1 LISN R&S ESH3-Z5 (150 KHZ – 30 MHZ)

| Frequency |  | Corr. | LISN<br>insertion<br>loss<br>ESH3-<br>Z5 | cable<br>loss<br>(incl. 10<br>dB<br>atten-<br>uator) |
|-----------|--|-------|------------------------------------------|------------------------------------------------------|
| MHz       |  | dB    | dB                                       | dB                                                   |
| 0.15      |  | 10.1  | 0.1                                      | 10.0                                                 |
| 5         |  | 10.3  | 0.1                                      | 10.2                                                 |
| 7         |  | 10.3  | 0.2                                      | 10.3                                                 |
| 10        |  | 10.3  | 0.2                                      | 10.3                                                 |
| 12        |  | 10.7  | 0.3                                      | 10.4                                                 |
| 14        |  | 10.7  | 0.3                                      | 10.4                                                 |
| 16        |  | 10.8  | 0.4                                      | 10.4                                                 |
| 18        |  | 10.9  | 0.4                                      | 10.3                                                 |
| 20        |  | 10.9  | 0.4                                      | 10.3                                                 |
| 22        |  | 11.1  | 0.3                                      | 10.6                                                 |
| 24        |  | 11.1  | 0.3                                      | 10.6                                                 |
| 26        |  | 11.2  | 0.3                                      | 10.7                                                 |
| 28        |  | 11.2  | 0.3                                      | 10.7                                                 |
| 30        |  | 11.3  | 0.3                                      | 10.8                                                 |

#### Sample calculation

$$U_{\text{LISN}} (\text{dB } \mu\text{V}) = U (\text{dB } \mu\text{V}) + \text{Corr. (dB)}$$

U = Receiver reading

LISN Insertion loss = Voltage Division Factor of LISN

Corr. = sum of single correction factors of used LISN, cables, switch units (if used)

Linear interpolation will be used for frequencies in between the values in the table.

## 6.2 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

| Frequency | AF       | Corr. | cable loss 1     | cable loss 2      | cable loss 3  | cable loss 4  | distance corr.  | d <sub>Limit</sub>       | d <sub>used</sub>       |
|-----------|----------|-------|------------------|-------------------|---------------|---------------|-----------------|--------------------------|-------------------------|
| MHz       | dB (1/m) | dB    | (inside chamber) | (outside chamber) | (switch unit) | (to receiver) | (-40 dB/decade) | (meas. distance (limit)) | (meas. distance (used)) |
|           |          |       | dB               | dB                | dB            | dB            | dB              | m                        | m                       |
| 0.009     | 20.30    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.01      | 20.45    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.015     | 20.37    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.02      | 20.36    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.025     | 20.38    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.03      | 20.32    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.05      | 20.35    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.08      | 20.30    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.1       | 20.20    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.2       | 20.17    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.3       | 20.14    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.49      | 20.12    | -79.6 | 0.1              | 0.1               | 0.1           | 0.1           | -80             | 300                      | 3                       |
| 0.490001  | 20.12    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 0.3       | 20.11    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 0.8       | 20.10    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 1         | 20.09    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 2         | 20.08    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 3         | 20.06    | -39.6 | 0.1              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 4         | 20.05    | -39.5 | 0.2              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 5         | 20.05    | -39.5 | 0.2              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 6         | 20.02    | -39.5 | 0.2              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 8         | 19.95    | -39.5 | 0.2              | 0.1               | 0.1           | 0.1           | -40             | 30                       | 3                       |
| 10        | 19.83    | -39.4 | 0.2              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 12        | 19.71    | -39.4 | 0.2              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 14        | 19.54    | -39.4 | 0.2              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 16        | 19.53    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 18        | 19.50    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 20        | 19.57    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 22        | 19.61    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 24        | 19.61    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 26        | 19.54    | -39.3 | 0.3              | 0.1               | 0.2           | 0.1           | -40             | 30                       | 3                       |
| 28        | 19.46    | -39.2 | 0.3              | 0.1               | 0.3           | 0.1           | -40             | 30                       | 3                       |
| 30        | 19.73    | -39.1 | 0.4              | 0.1               | 0.3           | 0.1           | -40             | 30                       | 3                       |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 distance correction =  $-40 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$   
 Linear interpolation will be used for frequencies in between the values in the table.  
 Table shows an extract of values

### 6.3 ANTENNA R&S HL562 (30 MHz – 1 GHz)

( $d_{\text{Limit}} = 3 \text{ m}$ )

| Frequency | AF<br>R&S<br>HL562 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 30        | 18.6               | 0.6   |
| 50        | 6.0                | 0.9   |
| 100       | 9.7                | 1.2   |
| 150       | 7.9                | 1.6   |
| 200       | 7.6                | 1.9   |
| 250       | 9.5                | 2.1   |
| 300       | 11.0               | 2.3   |
| 350       | 12.4               | 2.6   |
| 400       | 13.6               | 2.9   |
| 450       | 14.7               | 3.1   |
| 500       | 15.6               | 3.2   |
| 550       | 16.3               | 3.5   |
| 600       | 17.2               | 3.5   |
| 650       | 18.1               | 3.6   |
| 700       | 18.5               | 3.6   |
| 750       | 19.1               | 4.1   |
| 800       | 19.6               | 4.1   |
| 850       | 20.1               | 4.4   |
| 900       | 20.8               | 4.7   |
| 950       | 21.1               | 4.8   |
| 1000      | 21.6               | 4.9   |

| cable<br>loss 1<br>(inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-20 dB/<br>decade) | $d_{\text{Limit}}$<br>(meas.<br>distance<br>(limit)) | $d_{\text{used}}$<br>(meas.<br>distance<br>(used)) |
|----------------------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|------------------------------------------|------------------------------------------------------|----------------------------------------------------|
| dB                                     | dB                                      | dB                                  | dB                                  | dB                                       | m                                                    | m                                                  |
| 0.29                                   | 0.04                                    | 0.23                                | 0.02                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.39                                   | 0.09                                    | 0.32                                | 0.08                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.36                                   | 0.14                                    | 0.47                                | 0.08                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.73                                   | 0.20                                    | 0.39                                | 0.12                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.84                                   | 0.21                                    | 0.70                                | 0.11                                | 0.0                                      | 3                                                    | 3                                                  |
| 0.98                                   | 0.24                                    | 0.80                                | 0.13                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.04                                   | 0.26                                    | 0.89                                | 0.15                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.18                                   | 0.31                                    | 0.96                                | 0.13                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.28                                   | 0.35                                    | 1.03                                | 0.19                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.39                                   | 0.38                                    | 1.11                                | 0.22                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.44                                   | 0.39                                    | 1.20                                | 0.19                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.55                                   | 0.46                                    | 1.24                                | 0.23                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.59                                   | 0.43                                    | 1.29                                | 0.23                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.67                                   | 0.34                                    | 1.35                                | 0.22                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.67                                   | 0.42                                    | 1.41                                | 0.15                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.87                                   | 0.34                                    | 1.46                                | 0.25                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.90                                   | 0.46                                    | 1.51                                | 0.25                                | 0.0                                      | 3                                                    | 3                                                  |
| 1.99                                   | 0.60                                    | 1.56                                | 0.27                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.14                                   | 0.60                                    | 1.63                                | 0.29                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.22                                   | 0.60                                    | 1.66                                | 0.33                                | 0.0                                      | 3                                                    | 3                                                  |
| 2.23                                   | 0.61                                    | 1.71                                | 0.30                                | 0.0                                      | 3                                                    | 3                                                  |

( $d_{\text{Limit}} = 10 \text{ m}$ )

|      |      |      |
|------|------|------|
| 30   | 18.6 | -9.9 |
| 50   | 6.0  | -9.6 |
| 100  | 9.7  | -9.2 |
| 150  | 7.9  | -8.8 |
| 200  | 7.6  | -8.6 |
| 250  | 9.5  | -8.3 |
| 300  | 11.0 | -8.1 |
| 350  | 12.4 | -7.9 |
| 400  | 13.6 | -7.6 |
| 450  | 14.7 | -7.4 |
| 500  | 15.6 | -7.2 |
| 550  | 16.3 | -7.0 |
| 600  | 17.2 | -6.9 |
| 650  | 18.1 | -6.9 |
| 700  | 18.5 | -6.8 |
| 750  | 19.1 | -6.3 |
| 800  | 19.6 | -6.3 |
| 850  | 20.1 | -6.0 |
| 900  | 20.8 | -5.8 |
| 950  | 21.1 | -5.6 |
| 1000 | 21.6 | -5.6 |

|      |      |      |      |       |    |   |
|------|------|------|------|-------|----|---|
| 0.29 | 0.04 | 0.23 | 0.02 | -10.3 | 10 | 3 |
| 0.39 | 0.09 | 0.32 | 0.08 | -10.3 | 10 | 3 |
| 0.36 | 0.14 | 0.47 | 0.08 | -10.3 | 10 | 3 |
| 0.73 | 0.20 | 0.39 | 0.12 | -10.3 | 10 | 3 |
| 0.84 | 0.21 | 0.70 | 0.11 | -10.3 | 10 | 3 |
| 0.98 | 0.24 | 0.80 | 0.13 | -10.3 | 10 | 3 |
| 1.04 | 0.26 | 0.89 | 0.15 | -10.3 | 10 | 3 |
| 1.18 | 0.31 | 0.96 | 0.13 | -10.3 | 10 | 3 |
| 1.28 | 0.35 | 1.03 | 0.19 | -10.3 | 10 | 3 |
| 1.39 | 0.38 | 1.11 | 0.22 | -10.3 | 10 | 3 |
| 1.44 | 0.39 | 1.20 | 0.19 | -10.3 | 10 | 3 |
| 1.55 | 0.46 | 1.24 | 0.23 | -10.3 | 10 | 3 |
| 1.59 | 0.43 | 1.29 | 0.23 | -10.3 | 10 | 3 |
| 1.67 | 0.34 | 1.35 | 0.22 | -10.3 | 10 | 3 |
| 1.67 | 0.42 | 1.41 | 0.15 | -10.3 | 10 | 3 |
| 1.87 | 0.34 | 1.46 | 0.25 | -10.3 | 10 | 3 |
| 1.90 | 0.46 | 1.51 | 0.25 | -10.3 | 10 | 3 |
| 1.99 | 0.60 | 1.56 | 0.27 | -10.3 | 10 | 3 |
| 2.14 | 0.60 | 1.63 | 0.29 | -10.3 | 10 | 3 |
| 2.22 | 0.60 | 1.66 | 0.33 | -10.3 | 10 | 3 |
| 2.23 | 0.61 | 1.71 | 0.30 | -10.3 | 10 | 3 |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$   
 $U$  = Receiver reading  
 $\text{AF}$  = Antenna factor  
 $\text{Corr.}$  = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 $\text{distance correction} = -20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$   
 Linear interpolation will be used for frequencies in between the values in the table.  
 Tables show an extract of values.

#### 6.4 ANTENNA R&S HF907 (1 GHZ – 18 GHZ)

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 1000      | 24.4               | -19.4 |
| 2000      | 28.5               | -17.4 |
| 3000      | 31.0               | -16.1 |
| 4000      | 33.1               | -14.7 |
| 5000      | 34.4               | -13.7 |
| 6000      | 34.7               | -12.7 |
| 7000      | 35.6               | -11.0 |

| cable<br>loss 1<br>(relay +<br>cable<br>inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable<br>loss 4 (to<br>receiver) |  |  |
|------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------|----------------------------------|--|--|
| dB                                                         | dB                                      | dB                                                                   | dB                               |  |  |
| 0.99                                                       | 0.31                                    | -21.51                                                               | 0.79                             |  |  |
| 1.44                                                       | 0.44                                    | -20.63                                                               | 1.38                             |  |  |
| 1.87                                                       | 0.33                                    | -19.85                                                               | 1.33                             |  |  |
| 2.41                                                       | 0.67                                    | -19.13                                                               | 1.31                             |  |  |
| 2.78                                                       | 0.86                                    | -18.71                                                               | 1.40                             |  |  |
| 2.74                                                       | 0.90                                    | -17.83                                                               | 1.47                             |  |  |
| 2.82                                                       | 0.86                                    | -16.19                                                               | 1.46                             |  |  |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 3000      | 31.0               | -23.4 |
| 4000      | 33.1               | -23.3 |
| 5000      | 34.4               | -21.7 |
| 6000      | 34.7               | -21.2 |
| 7000      | 35.6               | -19.8 |

| cable<br>loss 1<br>(relay<br>inside<br>chamber) | cable<br>loss 2<br>(inside<br>chamber) | cable<br>loss 3<br>(outside<br>chamber) | cable<br>loss 4<br>(switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable<br>loss 5 (to<br>receiver) | used<br>for<br>FCC<br>15.247 |
|-------------------------------------------------|----------------------------------------|-----------------------------------------|----------------------------------------------------------------------|----------------------------------|------------------------------|
| dB                                              | dB                                     | dB                                      | dB                                                                   | dB                               |                              |
| 0.47                                            | 1.87                                   | 0.33                                    | -27.58                                                               | 1.33                             |                              |
| 0.36                                            | 2.41                                   | 0.67                                    | -28.23                                                               | 1.31                             |                              |
| 0.61                                            | 2.78                                   | 0.86                                    | -27.35                                                               | 1.40                             |                              |
| 0.38                                            | 2.74                                   | 0.90                                    | -26.89                                                               | 1.47                             |                              |
| 0.66                                            | 2.82                                   | 0.86                                    | -25.58                                                               | 1.46                             |                              |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 7000      | 35.6               | -57.3 |
| 8000      | 36.3               | -56.3 |
| 9000      | 37.1               | -55.3 |
| 10000     | 37.5               | -56.2 |
| 11000     | 37.5               | -55.3 |
| 12000     | 37.6               | -53.7 |
| 13000     | 38.2               | -53.5 |
| 14000     | 39.9               | -56.3 |
| 15000     | 40.9               | -54.1 |
| 16000     | 41.3               | -54.1 |
| 17000     | 42.8               | -54.4 |
| 18000     | 44.2               | -54.7 |

| cable<br>loss 1<br>(relay<br>inside<br>chamber) | cable<br>loss 2<br>(High<br>Pass) | cable<br>loss 3<br>(pre-<br>amp) | cable<br>loss 4<br>(inside<br>chamber) | cable<br>loss 5<br>(outside<br>chamber) | cable<br>loss 6<br>(to<br>receiver) |
|-------------------------------------------------|-----------------------------------|----------------------------------|----------------------------------------|-----------------------------------------|-------------------------------------|
| dB                                              | dB                                | dB                               | dB                                     | dB                                      | dB                                  |
| 0.36                                            | 1.28                              | -62.72                           | 2.66                                   | 0.94                                    | 1.46                                |
| 0.69                                            | 0.71                              | -61.49                           | 2.84                                   | 1.00                                    | 1.53                                |
| 0.68                                            | 0.65                              | -60.80                           | 3.06                                   | 1.09                                    | 1.60                                |
| 0.70                                            | 0.34                              | -61.91                           | 3.28                                   | 1.20                                    | 1.67                                |
| 0.80                                            | 0.61                              | -61.40                           | 3.43                                   | 1.27                                    | 1.70                                |
| 0.84                                            | 0.42                              | -59.70                           | 3.53                                   | 1.26                                    | 1.73                                |
| 0.83                                            | 0.44                              | -59.81                           | 3.75                                   | 1.32                                    | 1.83                                |
| 0.91                                            | 0.33                              | -63.03                           | 3.91                                   | 1.40                                    | 1.77                                |
| 0.98                                            | 0.34                              | -61.05                           | 4.02                                   | 1.44                                    | 1.83                                |
| 1.23                                            | 0.49                              | -61.51                           | 4.17                                   | 1.51                                    | 1.85                                |
| 1.36                                            | 0.76                              | -62.36                           | 4.34                                   | 1.53                                    | 2.00                                |
| 1.70                                            | 0.33                              | -62.88                           | 4.41                                   | 1.55                                    | 1.91                                |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Tables show an extract of values.

## 6.5 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

| Frequency | AF<br>EMCO<br>3160-09 | Corr. | cable<br>loss 1<br>(inside<br>chamber) | cable<br>loss 2<br>(pre-<br>amp) | cable<br>loss 3<br>(inside<br>chamber) | cable<br>loss 4<br>(switch<br>unit) | cable<br>loss 5<br>(to<br>receiver) |
|-----------|-----------------------|-------|----------------------------------------|----------------------------------|----------------------------------------|-------------------------------------|-------------------------------------|
| MHz       | dB (1/m)              | dB    | dB                                     | dB                               | dB                                     | dB                                  | dB                                  |
| 18000     | 40.2                  | -23.5 | 0.72                                   | -35.85                           | 6.20                                   | 2.81                                | 2.65                                |
| 18500     | 40.2                  | -23.2 | 0.69                                   | -35.71                           | 6.46                                   | 2.76                                | 2.59                                |
| 19000     | 40.2                  | -22.0 | 0.76                                   | -35.44                           | 6.69                                   | 3.15                                | 2.79                                |
| 19500     | 40.3                  | -21.3 | 0.74                                   | -35.07                           | 7.04                                   | 3.11                                | 2.91                                |
| 20000     | 40.3                  | -20.3 | 0.72                                   | -34.49                           | 7.30                                   | 3.07                                | 3.05                                |
| 20500     | 40.3                  | -19.9 | 0.78                                   | -34.46                           | 7.48                                   | 3.12                                | 3.15                                |
| 21000     | 40.3                  | -19.1 | 0.87                                   | -34.07                           | 7.61                                   | 3.20                                | 3.33                                |
| 21500     | 40.3                  | -19.1 | 0.90                                   | -33.96                           | 7.47                                   | 3.28                                | 3.19                                |
| 22000     | 40.3                  | -18.7 | 0.89                                   | -33.57                           | 7.34                                   | 3.35                                | 3.28                                |
| 22500     | 40.4                  | -19.0 | 0.87                                   | -33.66                           | 7.06                                   | 3.75                                | 2.94                                |
| 23000     | 40.4                  | -19.5 | 0.88                                   | -33.75                           | 6.92                                   | 3.77                                | 2.70                                |
| 23500     | 40.4                  | -19.3 | 0.90                                   | -33.35                           | 6.99                                   | 3.52                                | 2.66                                |
| 24000     | 40.4                  | -19.8 | 0.88                                   | -33.99                           | 6.88                                   | 3.88                                | 2.58                                |
| 24500     | 40.4                  | -19.5 | 0.91                                   | -33.89                           | 7.01                                   | 3.93                                | 2.51                                |
| 25000     | 40.4                  | -19.3 | 0.88                                   | -33.00                           | 6.72                                   | 3.96                                | 2.14                                |
| 25500     | 40.3                  | -20.4 | 0.89                                   | -34.07                           | 6.90                                   | 3.66                                | 2.22                                |
| 26000     | 40.3                  | -21.3 | 0.86                                   | -35.11                           | 7.02                                   | 3.69                                | 2.28                                |
| 26500     | 40.3                  | -21.1 | 0.90                                   | -35.20                           | 7.15                                   | 3.91                                | 2.36                                |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 6.6 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

| Frequency | AF<br>EMCO<br>3160-10 | Corr. | cable<br>loss 1<br>(inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-20 dB/<br>decade) | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit)) | d <sub>used</sub><br>(meas.<br>distance<br>(used)) |
|-----------|-----------------------|-------|----------------------------------------|-----------------------------------------|-------------------------------------|-------------------------------------|------------------------------------------|------------------------------------------------------|----------------------------------------------------|
| GHz       | dB (1/m)              | dB    | dB                                     | dB                                      | dB                                  | dB                                  | dB                                       | m                                                    | m                                                  |
| 26.5      | 43.4                  | -11.2 | 4.4                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 27.0      | 43.4                  | -11.2 | 4.4                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 28.0      | 43.4                  | -11.1 | 4.5                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 29.0      | 43.5                  | -11.0 | 4.6                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 30.0      | 43.5                  | -10.9 | 4.7                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 31.0      | 43.5                  | -10.8 | 4.7                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 32.0      | 43.5                  | -10.7 | 4.8                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 33.0      | 43.6                  | -10.7 | 4.9                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 34.0      | 43.6                  | -10.6 | 5.0                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 35.0      | 43.6                  | -10.3 | 5.1                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 36.0      | 43.6                  | -10.4 | 5.1                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 37.0      | 43.7                  | -10.3 | 5.2                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 38.0      | 43.7                  | -10.2 | 5.3                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 39.0      | 43.7                  | -10.2 | 5.4                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |
| 40.0      | 43.8                  | -10.1 | 5.5                                    |                                         |                                     |                                     | -15.6                                    | 3                                                    | 0.3                                                |

### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

distance correction =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 7 MEASUREMENT UNCERTAINTIES

| Test Case(s)                                                                                    | Parameter          | Uncertainty                    |
|-------------------------------------------------------------------------------------------------|--------------------|--------------------------------|
| - Field strength of spurious radiation                                                          | Power              | $\pm 5.5$ dB                   |
| - Out-of-band rejection<br>- Occupied Bandwidth<br>- Input versus output spectrum               | Power<br>Frequency | $\pm 2.9$ dB<br>$\pm 11.2$ kHz |
| - Effective radiated power, mean output power and zone enhancer gain<br>- Peak to Average Ratio | Power              | $\pm 2.2$ dB                   |
| - Out-of-band emission limits<br>- Conducted Spurious Emissions at Antenna Terminal             | Power<br>Frequency | $\pm 2.2$ dB<br>$\pm 11.2$ kHz |

## 8 PHOTO REPORT

Please see separate photo report.