5.5 OUT-OF-BAND EMISSION LIMITS

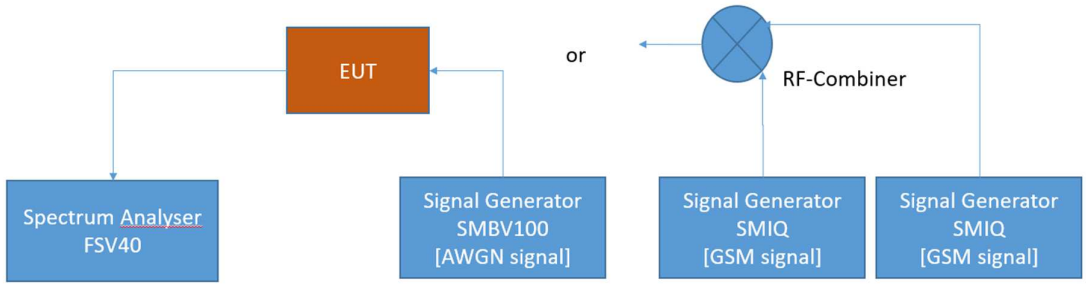
Standard FCC Part §2.1051, §27.53

The test was performed according to:
ANSI C63.26, KDB 935210 D05 v01r03: 3.6

5.5.1 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.

5.5.2 TEST REQUIREMENTS / LIMITS

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§27.53 – Emission limits

Band 30

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

(2) For fixed customer premises equipment (CPE) stations operating in the 2305-2320 MHz band and the 2345-2360 MHz band transmitting with more than 2 watts per 5 megahertz average EIRP:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

(3) For fixed CPE stations operating in the 2305-2320 MHz and 2345-2360 MHz bands transmitting with 2 watts per 5 megahertz average EIRP or less:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

(5) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(6) [Reserved]

(7) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power;

(8) Waiver requests of any of the out-of-band emission limits in paragraphs (a)(1) through (a)(7) of this section shall be entertained only if interference protection equivalent to that afforded by the limits is shown;

(9) [Reserved]

(10) The out-of-band emissions limits in paragraphs (a)(1) through (a)(3) of this section may be modified by the private contractual agreement of all affected licensees, who must maintain a copy of the agreement in their station files and disclose it to prospective assignees, transferees, or spectrum lessees and, upon request, to the Commission.

Band 41 BRS (LBS/MBS/UBS)

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(1) Prior to the transition, and thereafter, solely within the MBS, for analog operations with an EIRP in excess of −9 dBW, the signal shall be attenuated at the channel edges by at least 38 dB relative to the peak visual carrier, then linearly sloping from that level to at least 60 dB of attenuation at 1 MHz below the lower band edge and 0.5 MHz above the upper band edge, and attenuated at least 60 dB at all other frequencies.

(2) For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5.5.3 TEST PROTOCOL

Band 41 BRS (LBS), 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]**
Narrowband	0.3 dB < AGC	lower	2496.2	-1.6	-22.2	-13.0	9.2
Narrowband	3 dB > AGC	lower	2496.2	1.7	-21-6	-13.0	8.6
Wideband	0.3 dB < AGC	lower	2498.5	-1.4	-22.0	-13.0	9.0
Wideband	3 dB > AGC	lower	2498.5	1.9	-22.1	-13.0	9.1
Narrowband	0.3 dB < AGC	upper	2567.8	-1.6	-21.4	-13.0	8.4
Narrowband	3 dB > AGC	upper	2567.8	1.8	-22.0	-13.0	9.0
Wideband	0.3 dB < AGC	upper	2565.5	-1.3	-19.7	-13.0	6.7
Wideband	3 dB > AGC	upper	2565.5	1.9	-19.7	-13.0	6.7

Band 41 BRS (LBS), 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]**
NB	0.3 dB < AGC	lower	2496.2	2496.4	-1.6	-25.7	-13.0	12.7
NB	3 dB > AGC	lower	2496.2	2496.4	1.7	-24.4	-13.0	11.4
WB	0.3 dB < AGC	lower	2498.5	2501.0	-1.4	-22.3	-13.0	9.3
WB	3 dB > AGC	lower	2498.5	2501.0	1.9	-22.1	-13.0	9.1
NB	0.3 dB < AGC	upper	2567.8	2567.6	-1.6	-24.8	-13.0	11.8
NB	3 dB > AGC	upper	2567.8	2567.6	1.8	-23.8	-13.0	10.8
WB	0.3 dB < AGC	upper	2565.5	2563.0	-1.3	-20.0	-13.0	7.0
WB	3 dB > AGC	upper	2565.5	2563.0	1.9	-19.6	-13.0	6.6

Explanations: NB: narrowband; WB: wideband

Band 41 BRS (MBS), 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]**
Narrowband	0.3 dB < AGC	lower	2572.2	-3.0	-14.2	-13.0	1.2
Narrowband	3 dB > AGC	lower	2572.2	0.2	-13.9	-13.0	0.9
Wideband	0.3 dB < AGC	lower	2574.5	-2.3	-20.1	-13.0	7.1
Wideband	3 dB > AGC	lower	2574.5	1.0	-20.4	-13.0	7.4
Narrowband	0.3 dB < AGC	upper	2613.8	-2.8	-13.5	-13.0	0.5
Narrowband	3 dB > AGC	upper	2613.8	0.6	-13.8	-13.0	0.8
Wideband	0.3 dB < AGC	upper	2611.5	-2.0	-20.1	-13.0	7.1
Wideband	3 dB > AGC	upper	2611.5	1.4	-20.6	-13.0	7.6

Band 41 BRS (MBS), 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]**
NB	0.3 dB < AGC	lower	2572.2	2572.4	-3.0	-17.8	-13.0	4.8
NB	3 dB > AGC	lower	2572.2	2572.4	0.2	-16.8	-13.0	3.8
WB	0.3 dB < AGC	lower	2574.5	2577.0	-2.3	-20.6	-13.0	7.6
WB	3 dB > AGC	lower	2574.5	2577.0	1.0	-20.9	-13.0	7.9
NB	0.3 dB < AGC	upper	2613.8	2613.6	-2.8	-16.7	-13.0	3.7
NB	3 dB > AGC	upper	2613.8	2613.6	0.6	-15.2	-13.0	2.2
WB	0.3 dB < AGC	upper	2611.5	2609.0	-2.0	-20.9	-13.0	7.9
WB	3 dB > AGC	upper	2611.5	2609.0	1.4	-21.1	-13.0	8.1

Explanations: NB: narrowband; WB: wideband

Band 41 BRS (UBS), 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]**
Narrowband	0.3 dB < AGC	lower	2618.2	-2.3	-20.3	-13.0	7.3
Narrowband	3 dB > AGC	lower	2618.2	0.9	-20.2	-13.0	7.2
Wideband	0.3 dB < AGC	lower	2620.5	-1.9	-19.8	-13.0	6.8
Wideband	3 dB > AGC	lower	2620.5	1.4	-20.2	-13.0	7.2
Narrowband	0.3 dB < AGC	upper	2589.8	-0.8	-21.4	-13.0	8.4
Narrowband	3 dB > AGC	upper	2589.8	2.5	-20.6	-13.0	7.6
Wideband	0.3 dB < AGC	upper	2687.5	-0.7	-20.2	-13.0	7.2
Wideband	3 dB > AGC	upper	2687.5	2.7	-19.9	-13.0	6.9

Band 41 BRS (UBS), 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]**
NB	0.3 dB < AGC	lower	2618.2	2618.4	-2.3	-23.0	-13.0	10.0
NB	3 dB > AGC	lower	2618.2	2618.4	0.9	-23.1	-13.0	10.1
WB	0.3 dB < AGC	lower	2620.5	2623.0	-1.9	-19.8	-13.0	6.8
WB	3 dB > AGC	lower	2620.5	2623.0	1.4	-20.2	-13.0	7.2
NB	0.3 dB < AGC	upper	2589.8	2589.6	-0.8	-22.6	-13.0	9.6
NB	3 dB > AGC	upper	2589.8	2589.6	2.5	-23.3	-13.0	10.3
WB	0.3 dB < AGC	upper	2687.5	2685.0	-0.7	-20.6	-13.0	7.6
WB	3 dB > AGC	upper	2687.5	2685.0	2.7	-20.9	-13.0	7.9

Explanations: NB: narrowband; WB: wideband

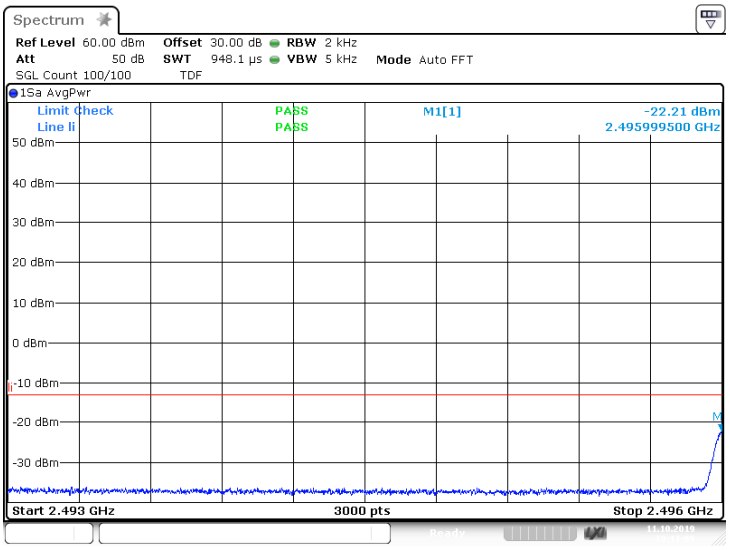
Band 30 WCS 2300, downlink, Number of input signals = 1							
Signal Type	**Input Power**	**Band Edge**	**Signal Frequency [MHz]**	**Input Power [dBm]**	**Maximum Out-of-band Power [dBm]**	**Limit Out-of-band Power [dBm]**	**Margin to Limit [dB]**
Narrowband	0.3 dB < AGC	lower	2350.2	-4.0	-20.6	-13.0	7.6
Narrowband	3 dB > AGC	lower	2350.2	-0.5	-21.3	-13.0	8.3
Wideband	0.3 dB < AGC	lower	2352.5	-3.7	-20.9	-13.0	7.9
Wideband	3 dB > AGC	lower	2352.5	-0.4	-20.7	-13.0	7.7
Narrowband	0.3 dB < AGC	upper	2359.8	-4.0	-21.2	-13.0	8.2
Narrowband	3 dB > AGC	upper	2359.8	-0.6	-20.9	-13.0	7.9
Wideband	0.3 dB < AGC	upper	2357.5	-3.6	-20.1	-13.0	7.1
Wideband	3 dB > AGC	upper	2357.5	-0.4	-18.9	-13.0	5.9

Band 30 WCS 2300, 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]**
NB	0.3 dB < AGC	lower	2350.2	2350.4	-4.0	-23.1	-13.0	10.1
NB	3 dB > AGC	lower	2350.2	2350.4	-0.5	-23.9	-13.0	10.9
WB	0.3 dB < AGC	lower	2352.5	2355.0	-3.7	-21.4	-13.0	8.4
WB	3 dB > AGC	lower	2352.5	2355.0	-0.4	-21.0	-13.0	8.0
NB	0.3 dB < AGC	upper	2359.8	2359.6	-4.0	-23.2	-13.0	10.2
NB	3 dB > AGC	upper	2359.8	2359.6	-0.6	-23.4	-13.0	10.4
WB	0.3 dB < AGC	upper	2357.5	2355.0	-3.6	-21.4	-13.0	8.4
WB	3 dB > AGC	upper	2357.5	2355.0	-0.4	-21.5	-13.0	8.5

Explanations: NB: narrowband; WB: wideband

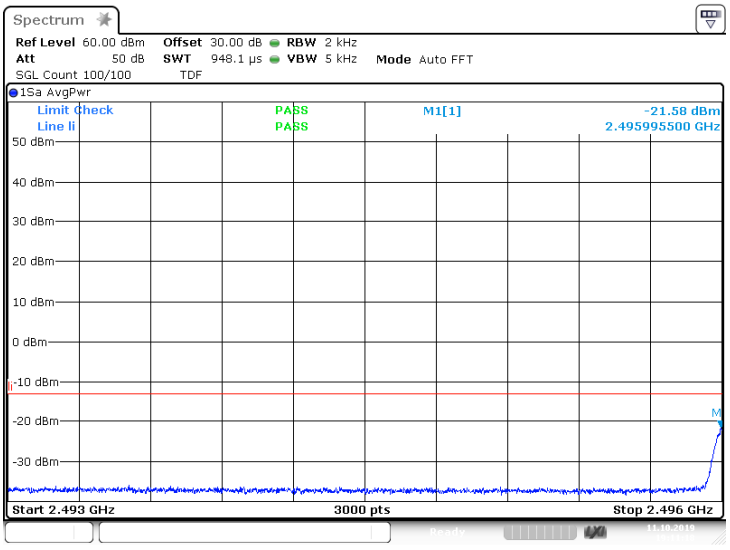
5.5.4 MEASUREMENT PLOT

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



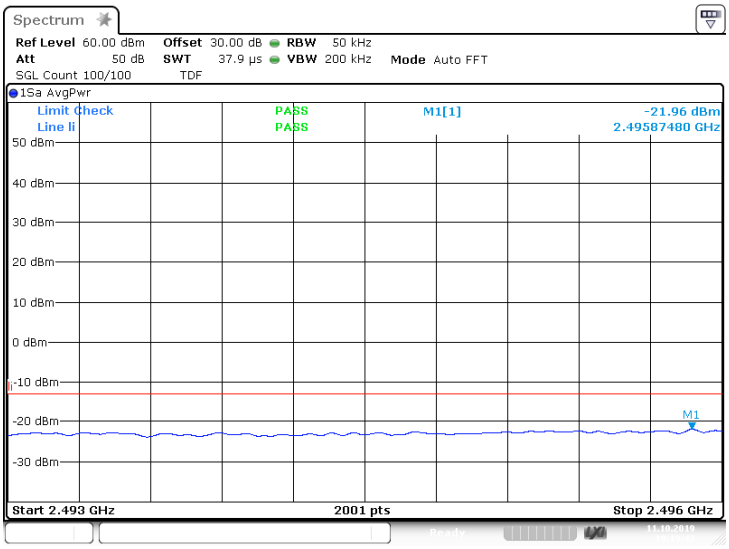
3.6.2 out of band emi BRS Low ANT 1 GSM lower lcarrier -0.3 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



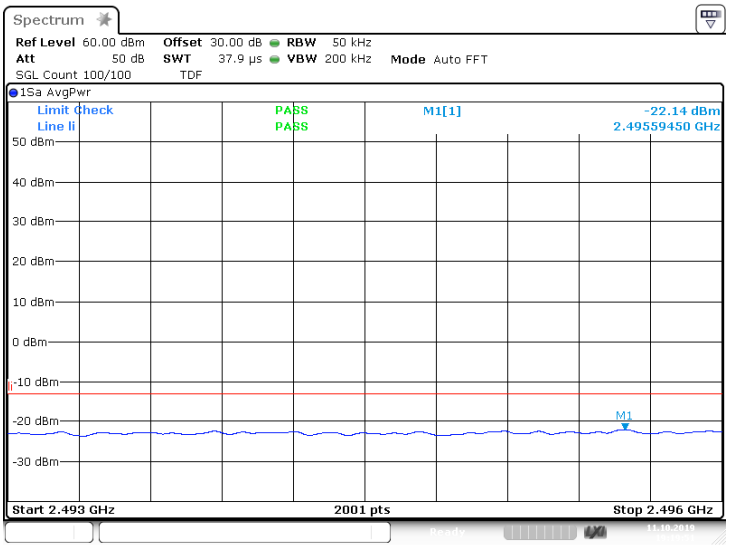
3.6.2 out of band emi BRS Low ANT 1 GSM lower lcarrier +3.0 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



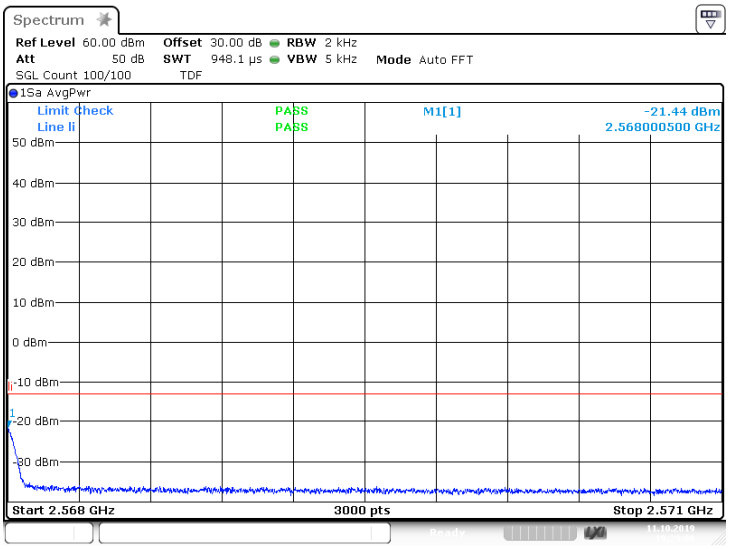
3.6.2 out of band emi BRS Low ANT 1 AWGN lower 1carrier -0.3 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



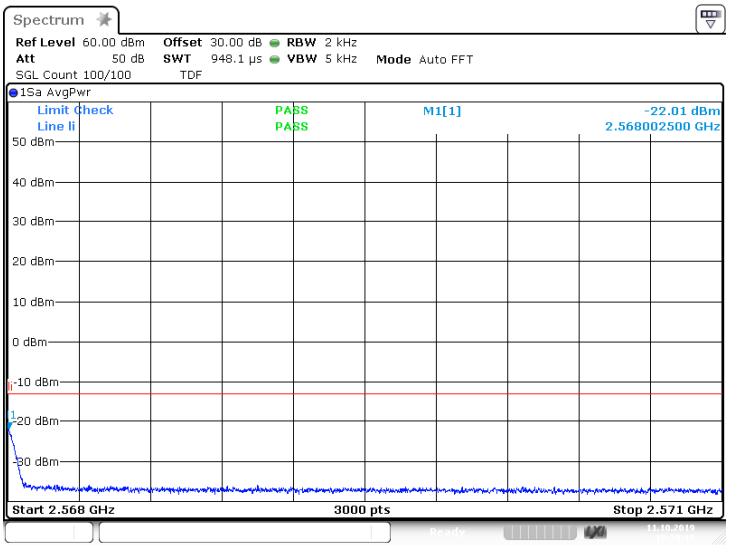
3.6.2 out of band emi BRS Low ANT 1 AWGN lower 1carrier +3.0 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



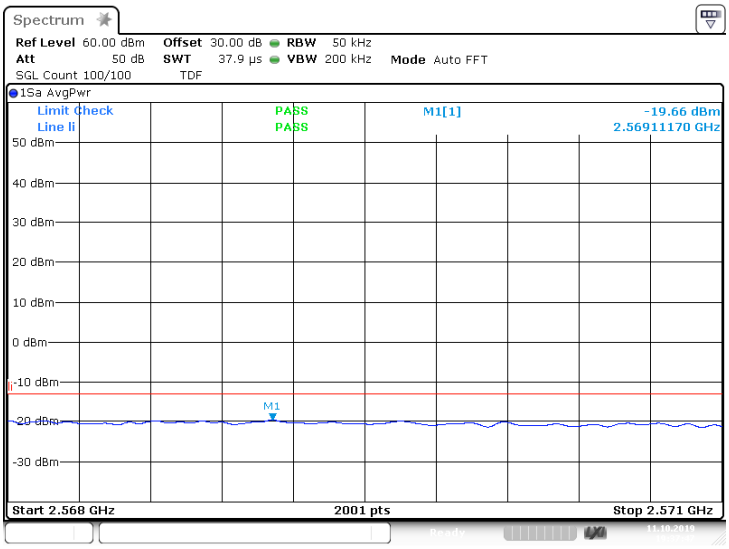
3.6.2 out of band emi BRS Low ANT 1 GSM upper 1carrier -0.3 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



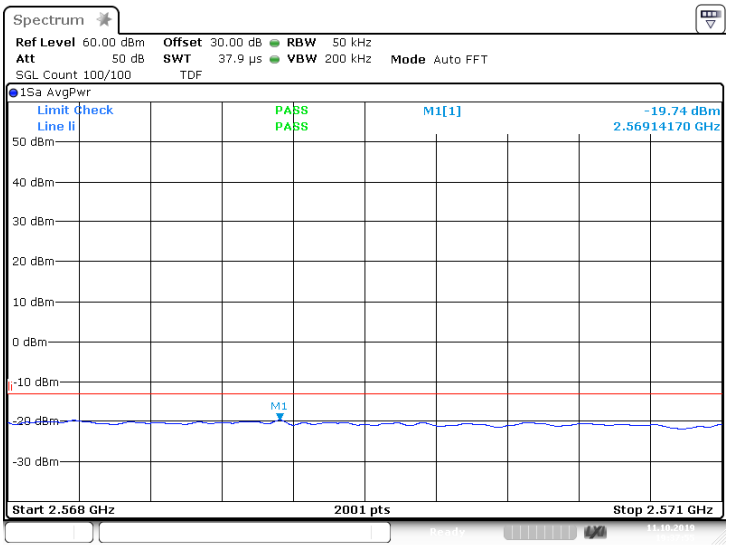
3.6.2 out of band emi BRS Low ANT 1 GSM upper 1carrier +3.0 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



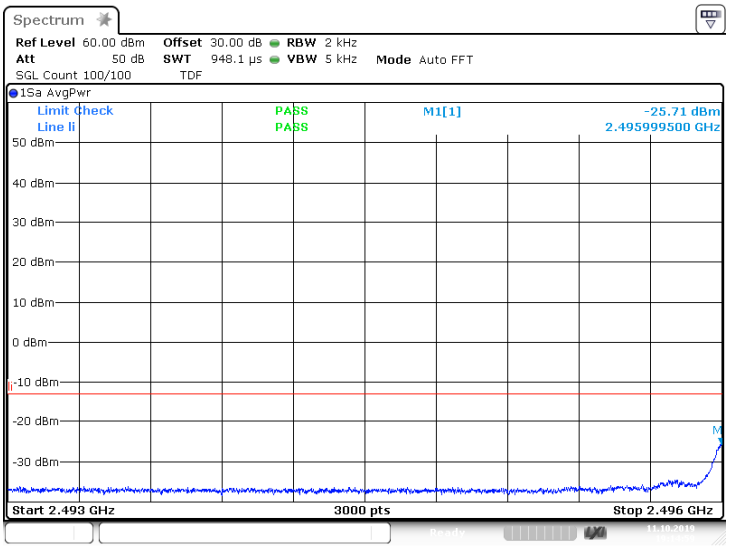
3.6.2 out of band emi BRS Low ANT 1 AWGN upper 1carrier -0.3 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



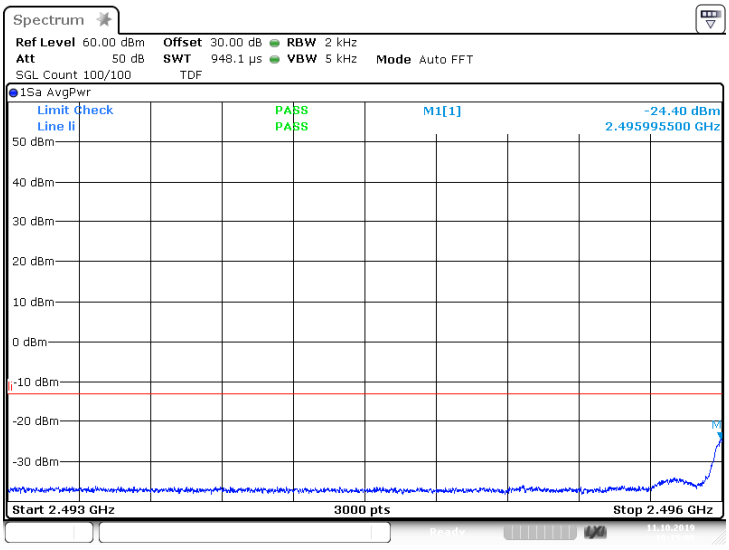
3.6.2 out of band emi BRS Low ANT 1 AWGN upper 1carrier +3.0 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



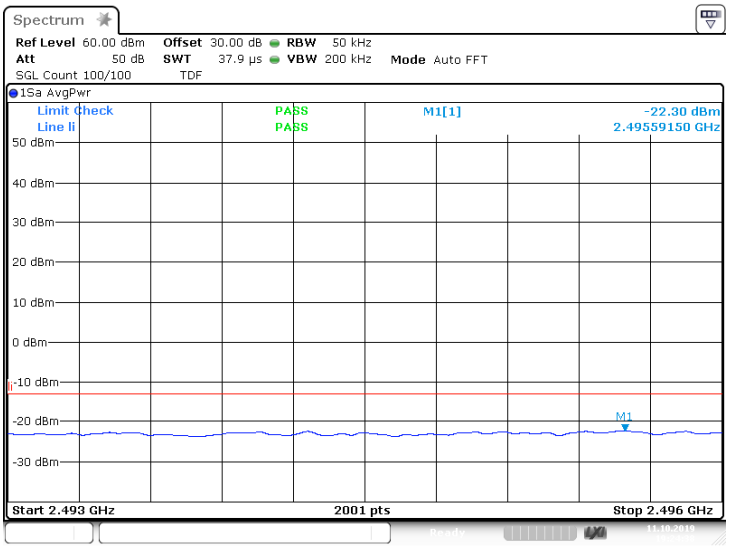
3.6.2 out of band emi BRS Low ANT 1 GSM lower 2carriers -0.3 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



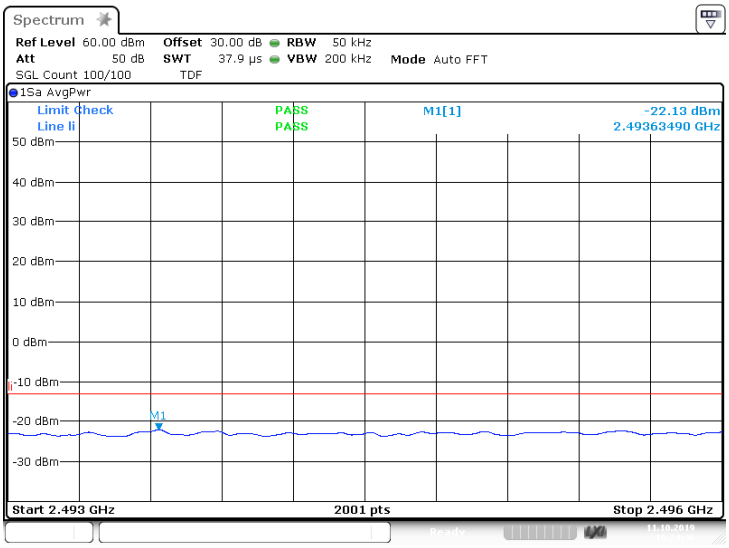
3.6.2 out of band emi BRS Low ANT 1 GSM lower 2carriers +3.0 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



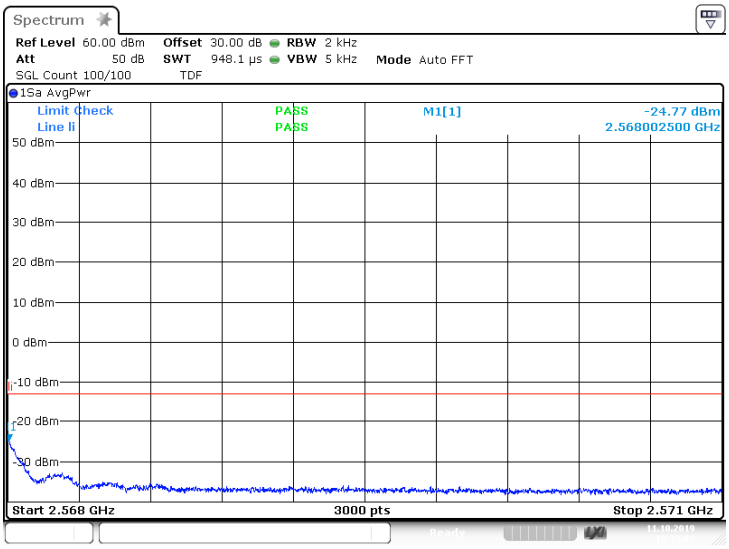
3.6.2 out of band emi BRS Low ANT 1 AWGN lower 2carriers -0.
3 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



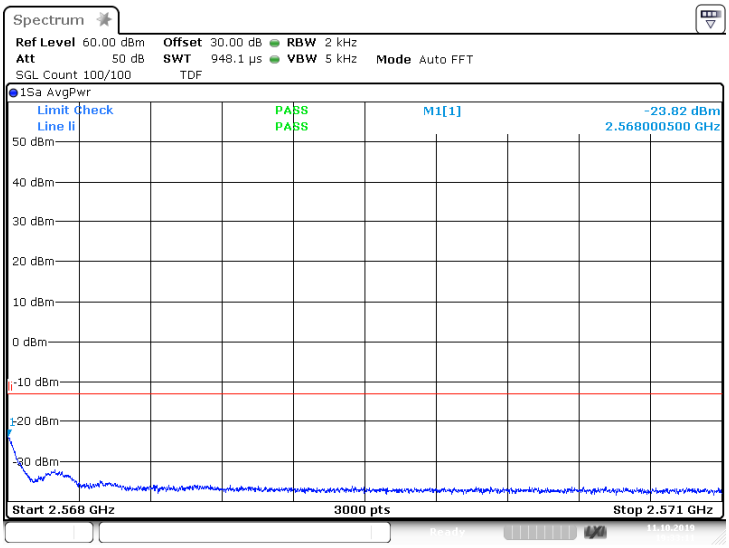
3.6.2 out of band emi BRS Low ANT 1 AWGN lower 2carriers +3.
0 dB 2.493G 2.496G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



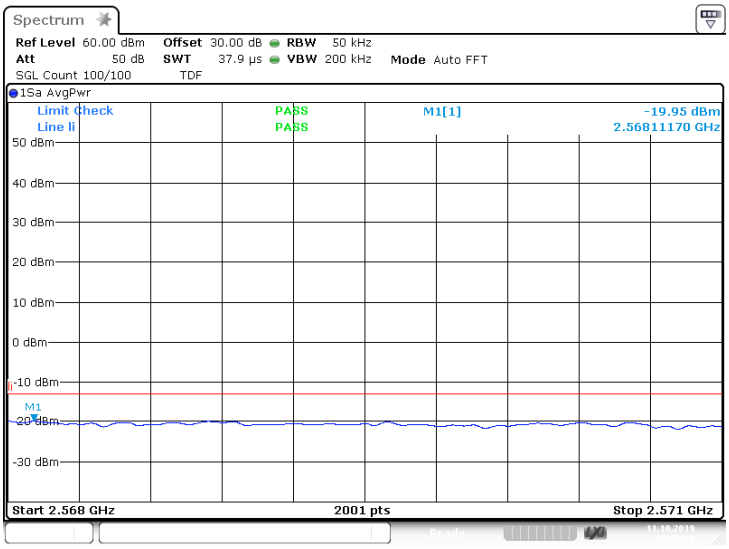
3.6.2 out of band emi BRS Low ANT 1 GSM upper 2carriers -0.3 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



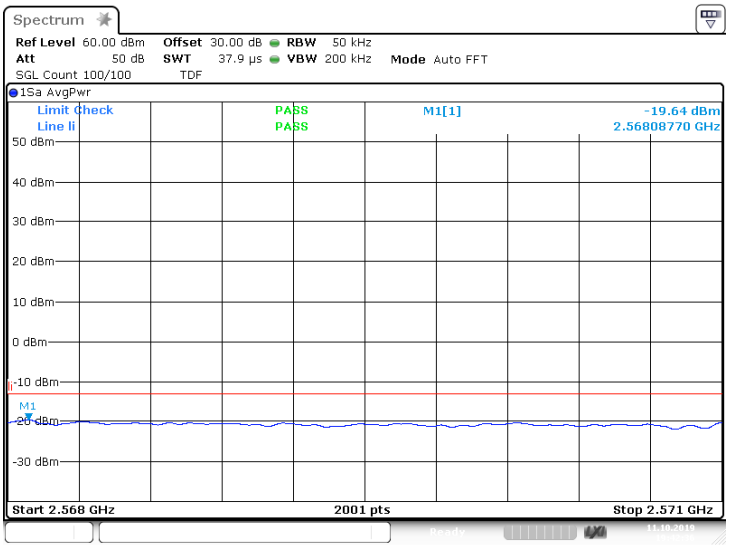
3.6.2 out of band emi BRS Low ANT 1 GSM upper 2carriers +3.0 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



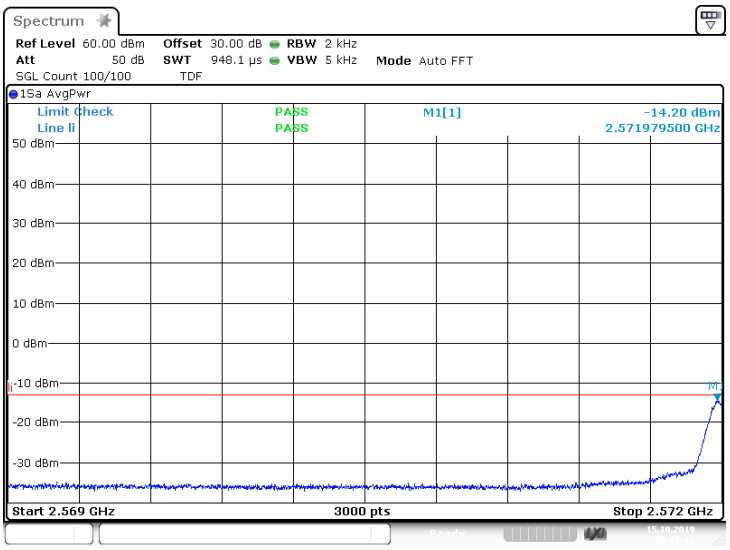
3.6.2 out of band emi BRS Low ANT 1 AWGN upper 2carriers -0.
3 dB 2.568G 2.571G

Band: 41 BRS (LBS); ANT 1; Frequency: 2.4960 GHz to 2.5680 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



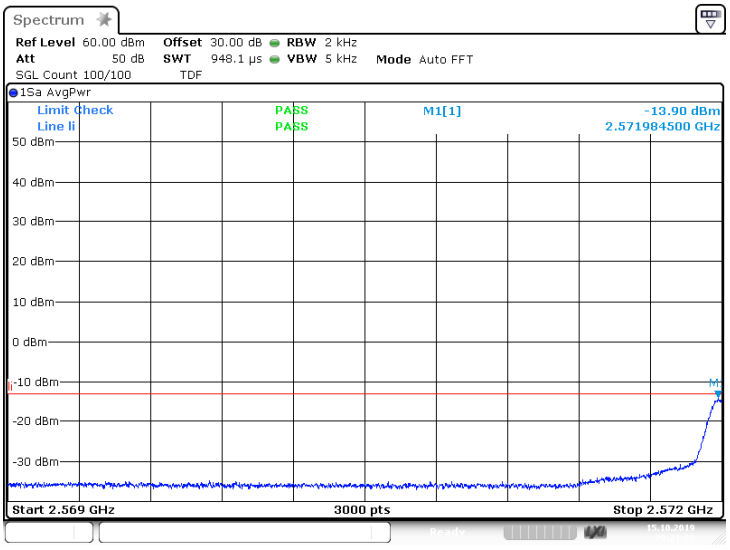
3.6.2 out of band emi BRS Low ANT 1 AWGN upper 2carriers +3.
0 dB 2.568G 2.571G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



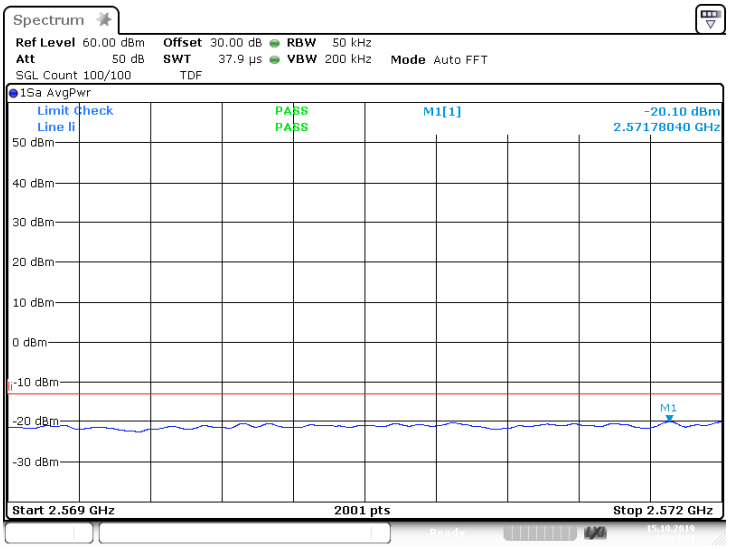
3.6.2 out of band emi BRS Mid ANT 1 GSM lower 1carrier -0.3 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



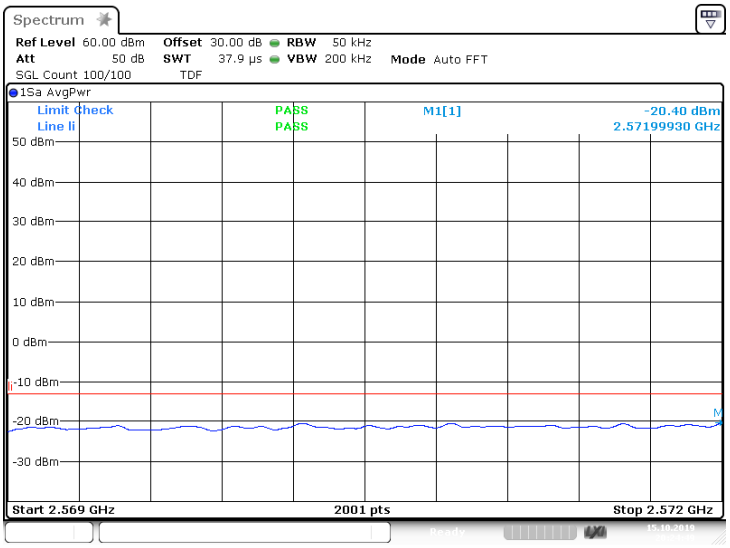
3.6.2 out of band emi BRS Mid ANT 1 GSM lower 1carrier +3.0 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



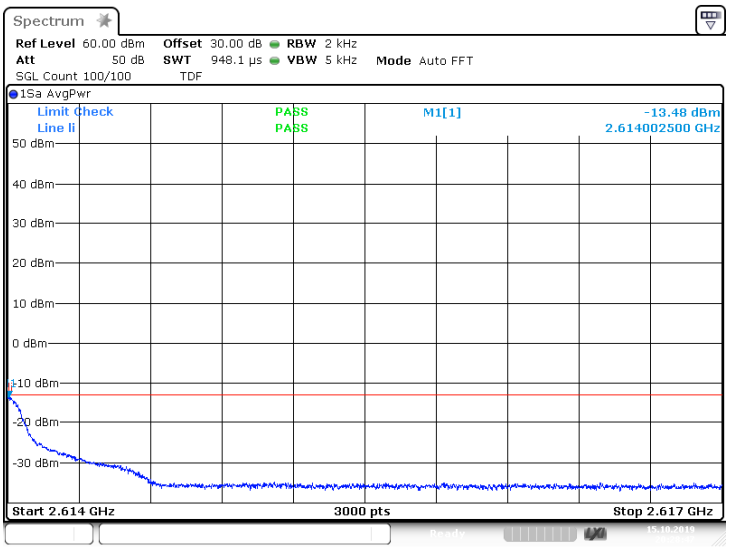
3.6.2 out of band emi BRS Mid ANT 1 AWGN lower 1carrier -0.3 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



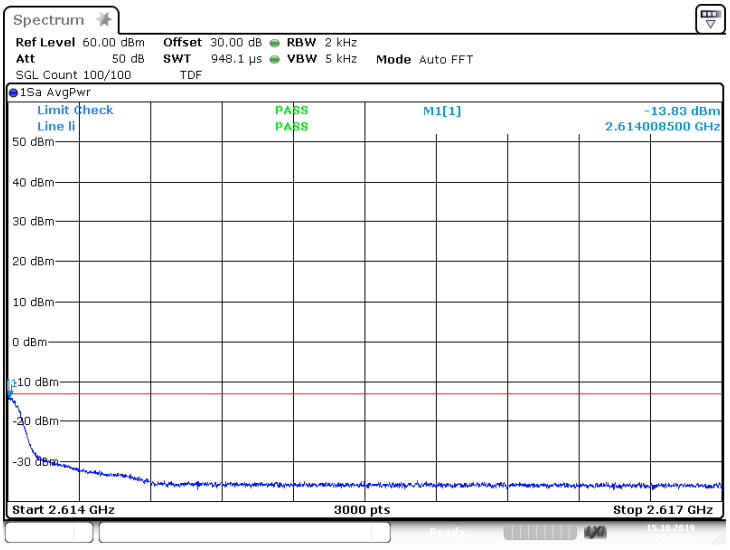
3.6.2 out of band emi BRS Mid ANT 1 AWGN lower 1carrier +3.0 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



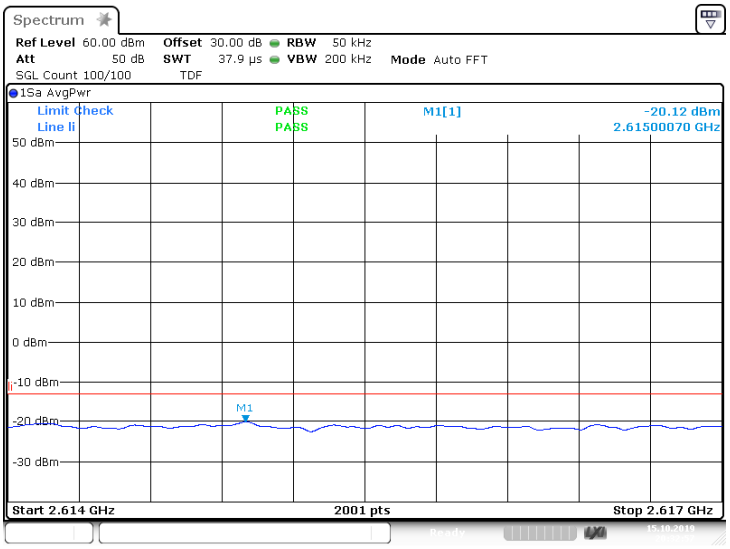
3.6.2 out of band emi BRS Mid ANT 1 GSM upper 1carrier -0.3 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



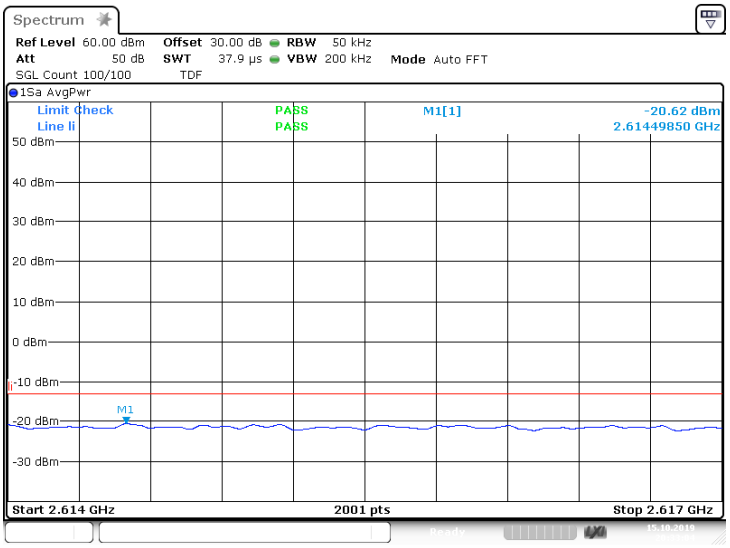
3.6.2 out of band emi BRS Mid ANT 1 GSM upper 1carrier +3.0 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



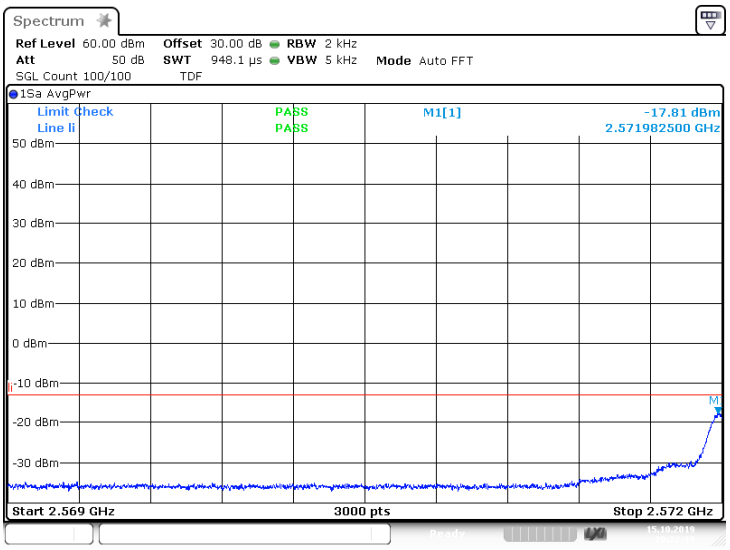
3.6.2 out of band emi BRS Mid ANT 1 AWGN upper 1carrier -0.3 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



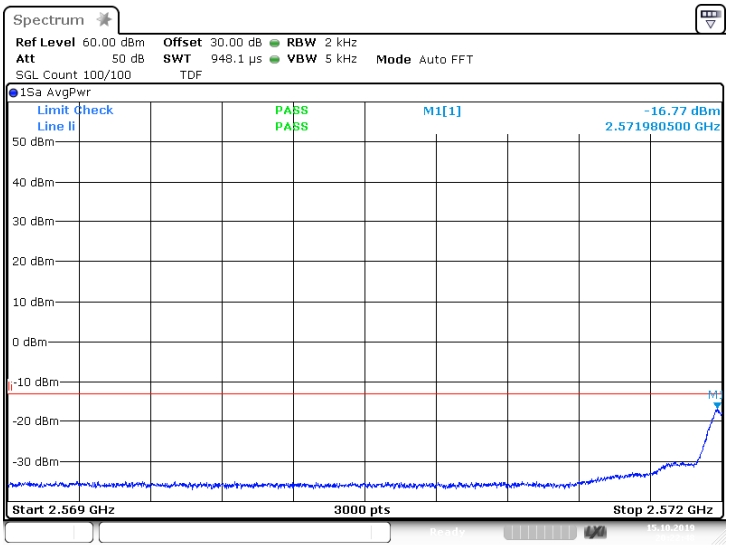
3.6.2 out of band emi BRS Mid ANT 1 AWGN upper 1carrier +3.0 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



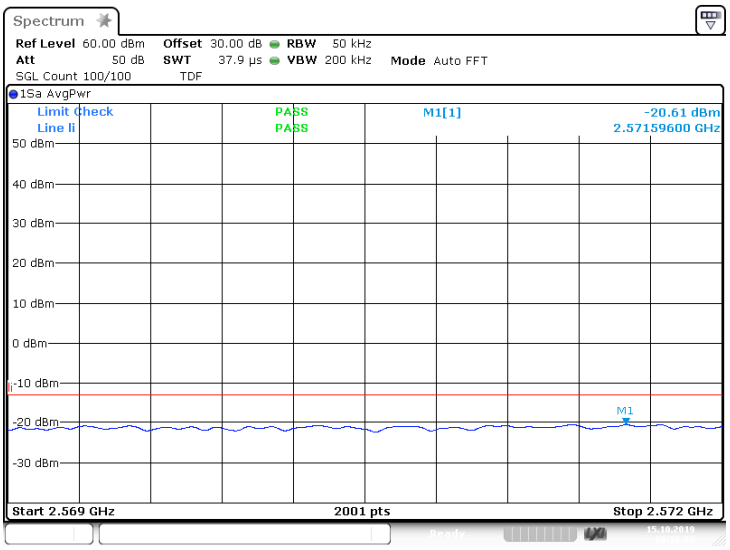
3.6.2 out of band emi BRS Mid ANT 1 GSM lower 2carriers -0.3 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



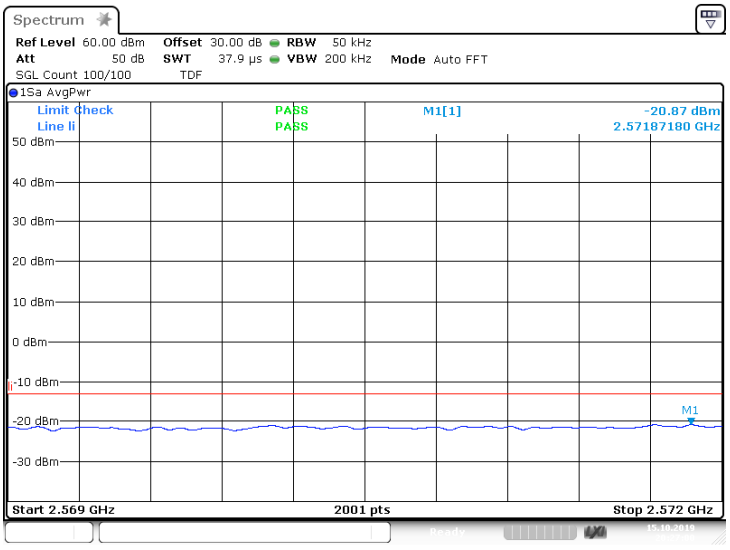
3.6.2 out of band emi BRS Mid ANT 1 GSM lower 2carriers +3.0 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



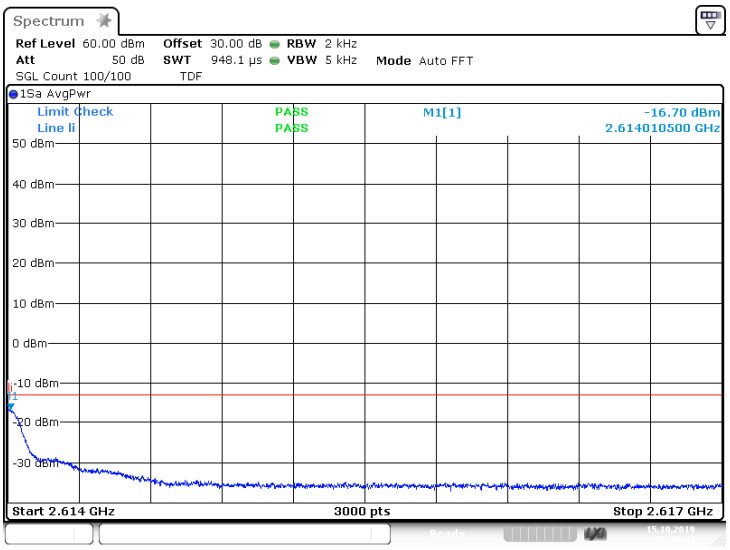
3.6.2 out of band emi BRS Mid ANT 1 AWGN lower 2carriers -0.
3 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



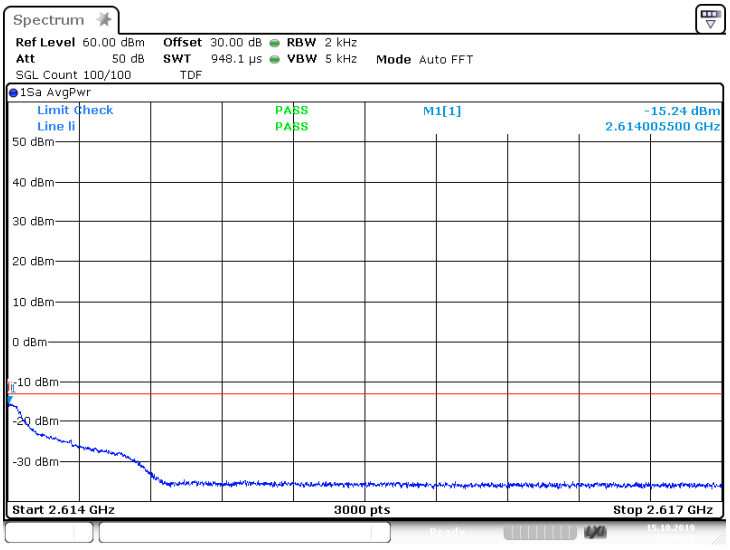
3.6.2 out of band emi BRS Mid ANT 1 AWGN lower 2carriers +3.
0 dB 2.569G 2.572G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



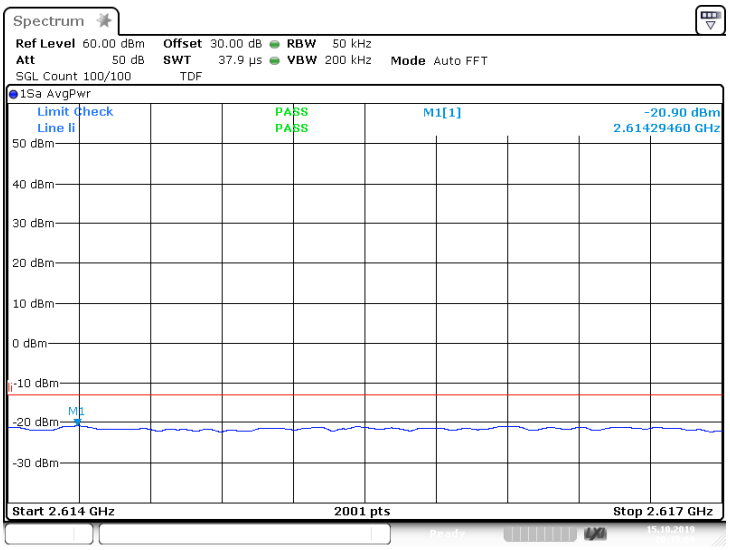
3.6.2 out of band emi BRS Mid ANT 1 GSM upper 2carriers -0.3 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



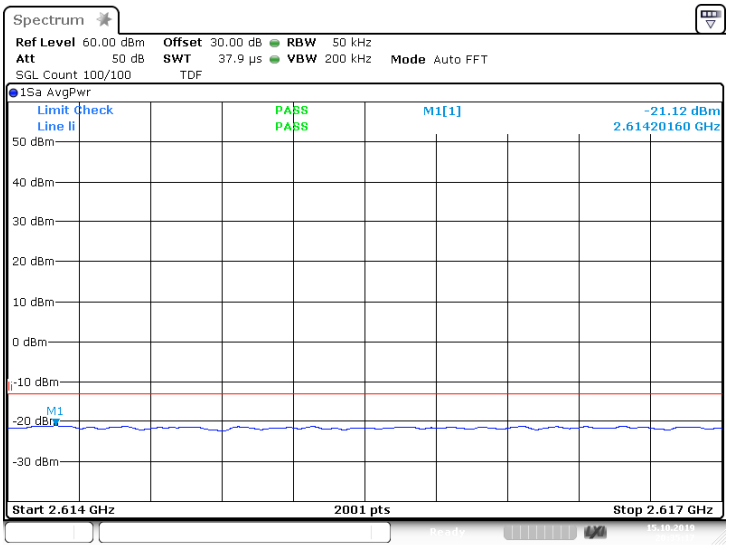
3.6.2 out of band emi BRS Mid ANT 1 GSM upper 2carriers +3.0 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



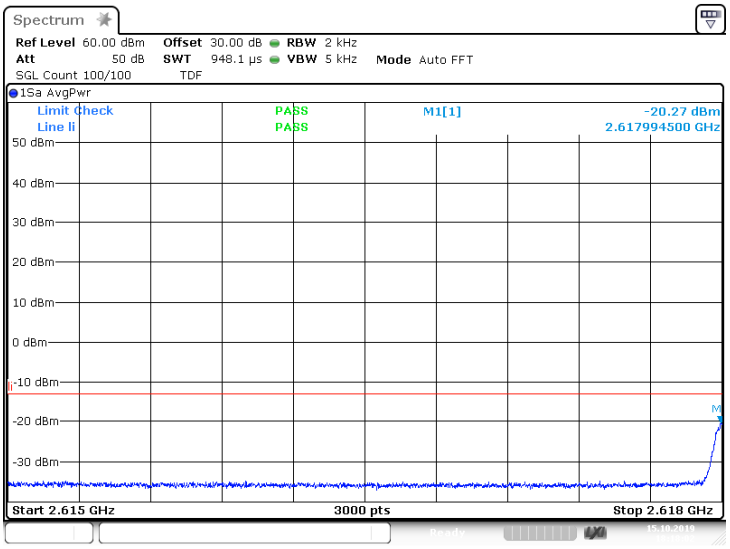
3.6.2 out of band emi BRS Mid ANT 1 AWGN upper 2carriers -0.
3 dB 2.614G 2.617G

Band: 41 BRS (MBS); ANT 1; Frequency: 2.5720 GHz to 2.6140 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



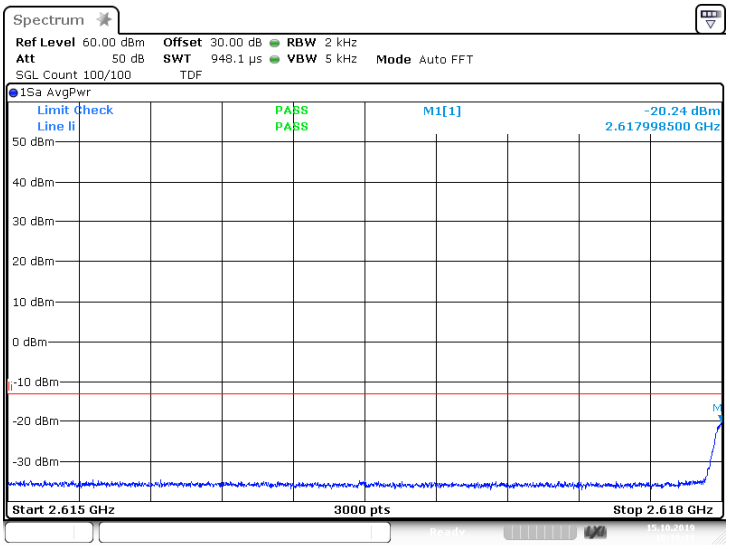
3.6.2 out of band emi BRS Mid ANT 1 AWGN upper 2carriers +3.
0 dB 2.614G 2.617G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



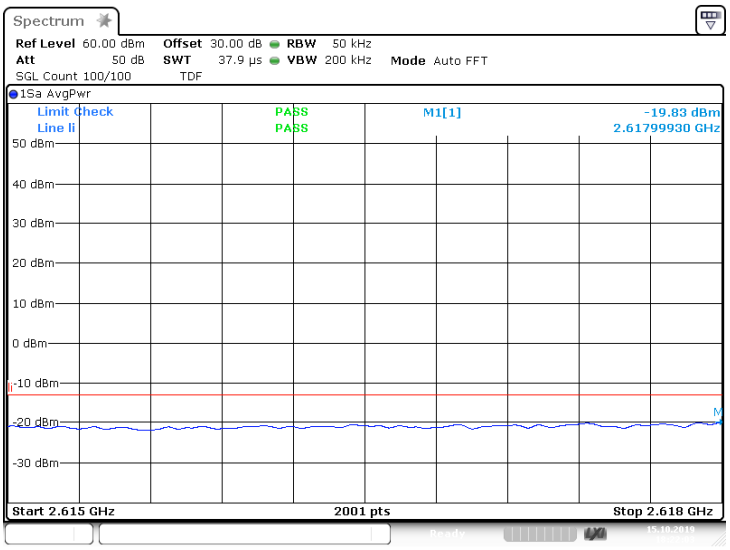
3.6.2 out of band emi BRS High ANT 1 GSM lower 1carrier -0.3 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



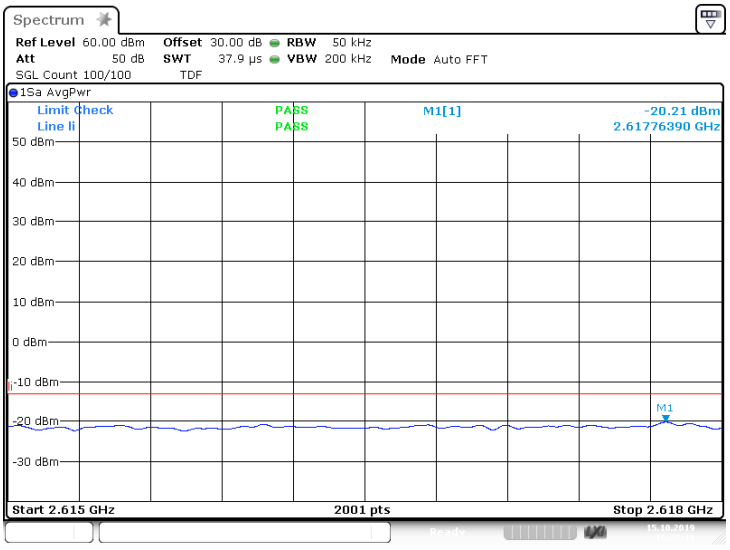
3.6.2 out of band emi BRS High ANT 1 GSM lower 1carrier +3.0 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



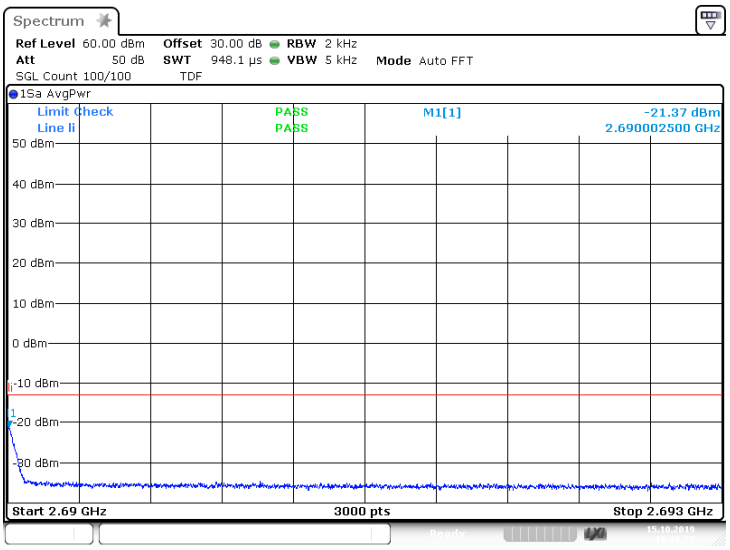
3.6.2 out of band emi BRS High ANT 1 AWGN lower 1carrier -0.
3 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



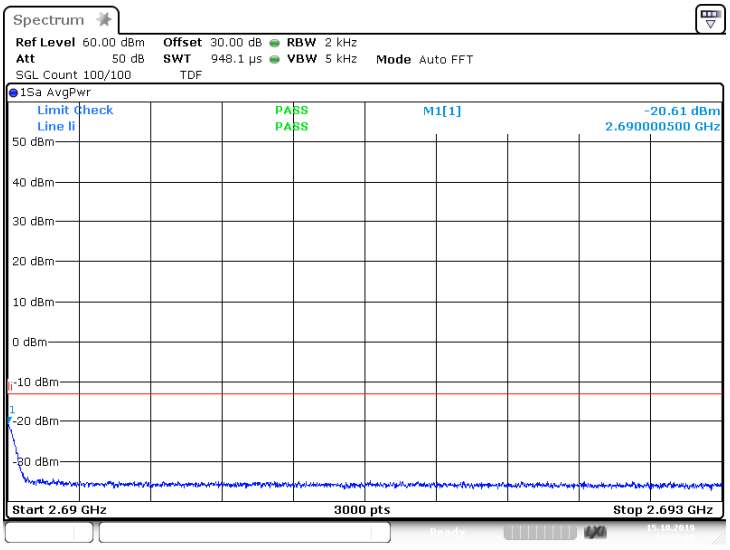
3.6.2 out of band emi BRS High ANT 1 AWGN lower 1carrier +3.
0 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



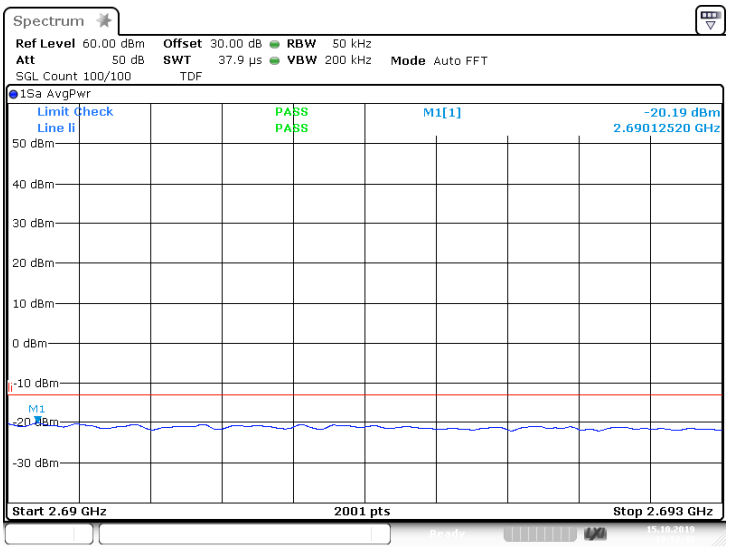
3.6.2 out of band emi BRS High ANT 1 GSM upper 1carrier -0.3 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



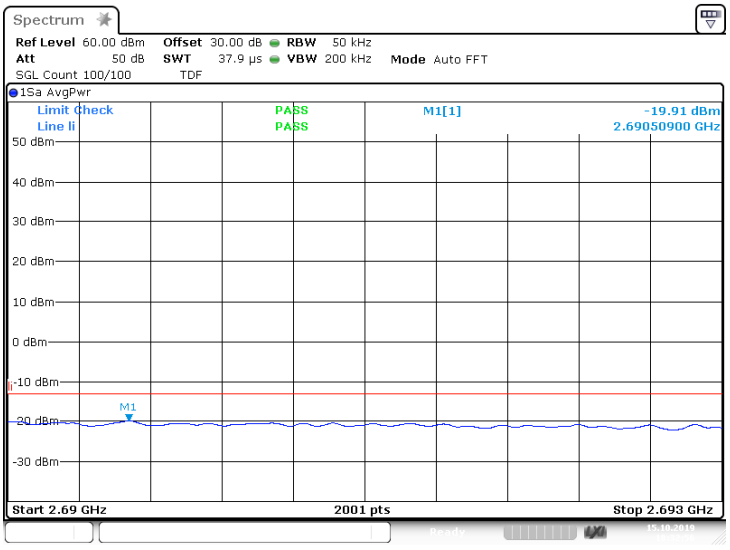
3.6.2 out of band emi BRS High ANT 1 GSM upper 1carrier +3.0 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



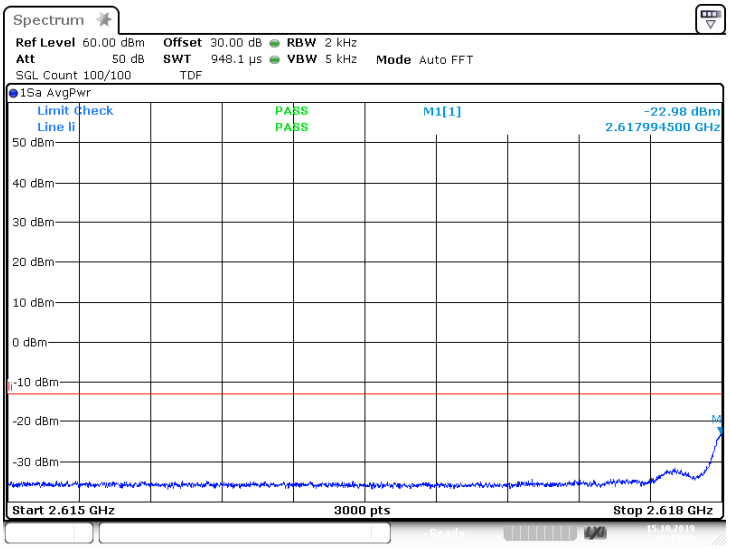
3.6.2 out of band emi BRS High ANT 1 AWGN upper 1carrier -0.
3 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



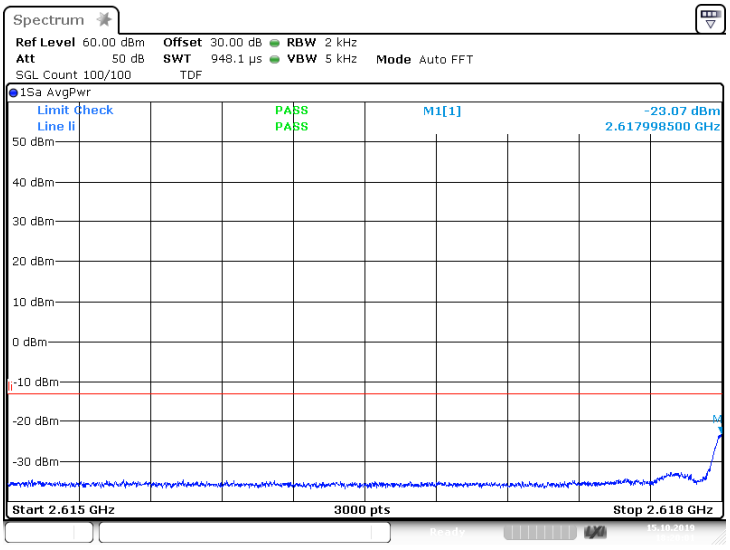
3.6.2 out of band emi BRS High ANT 1 AWGN upper 1carrier +3.
0 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



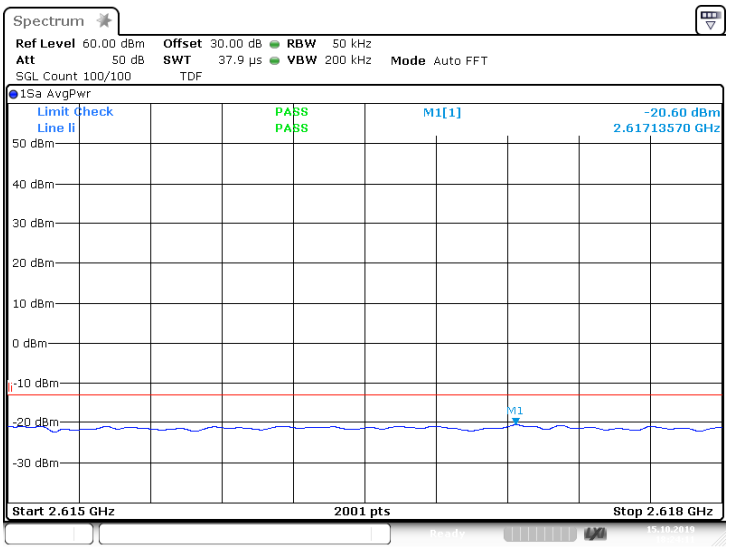
3.6.2 out of band emi BRS High ANT 1 GSM lower 2carriers -0.
3 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



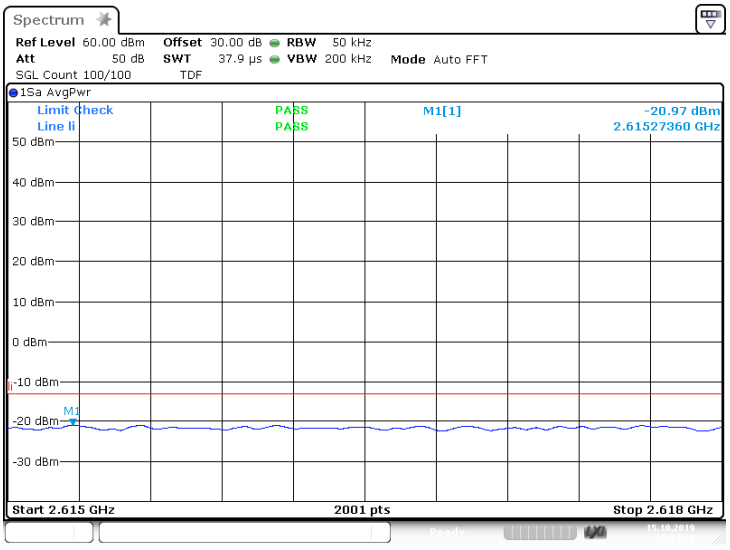
3.6.2 out of band emi BRS High ANT 1 GSM lower 2carriers +3.
0 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



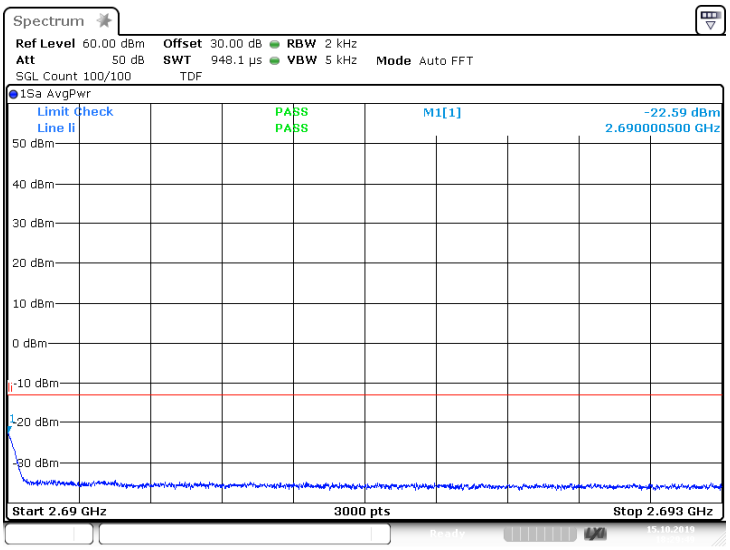
3.6.2 out of band emi BRS High ANT 1 AWGN lower 2carriers -0 .3 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



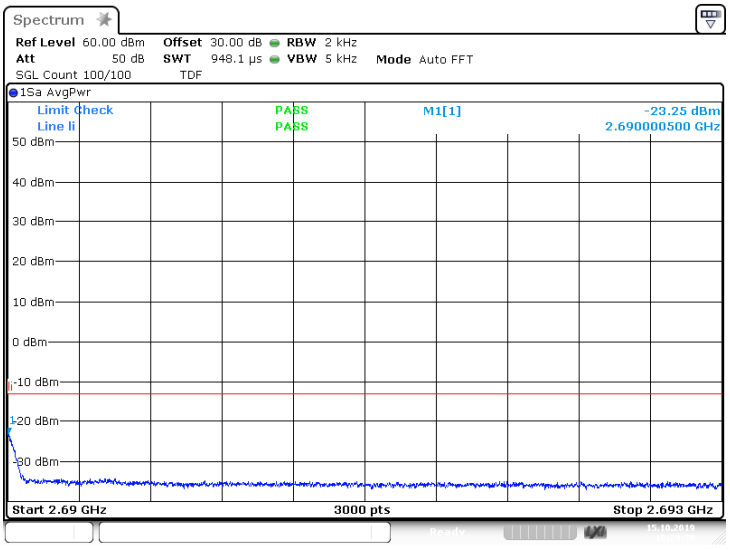
3.6.2 out of band emi BRS High ANT 1 AWGN lower 2carriers +3 .0 dB 2.615G 2.618G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



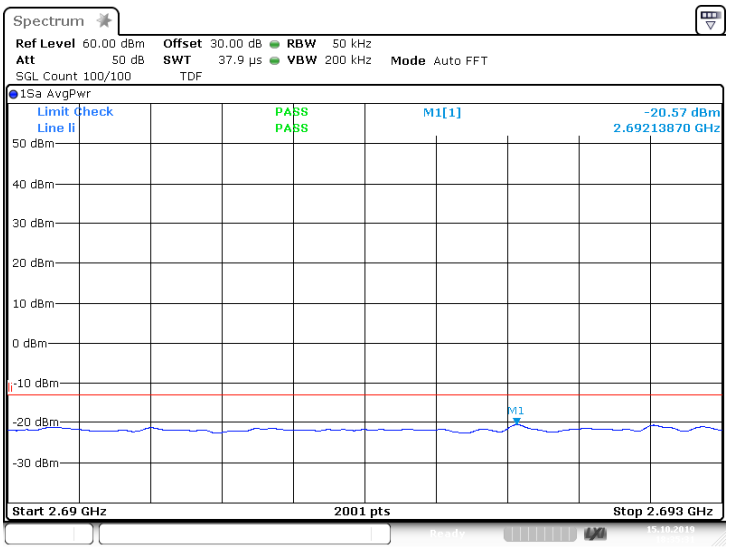
3.6.2 out of band emi BRS High ANT 1 GSM upper 2carriers -0.
3 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



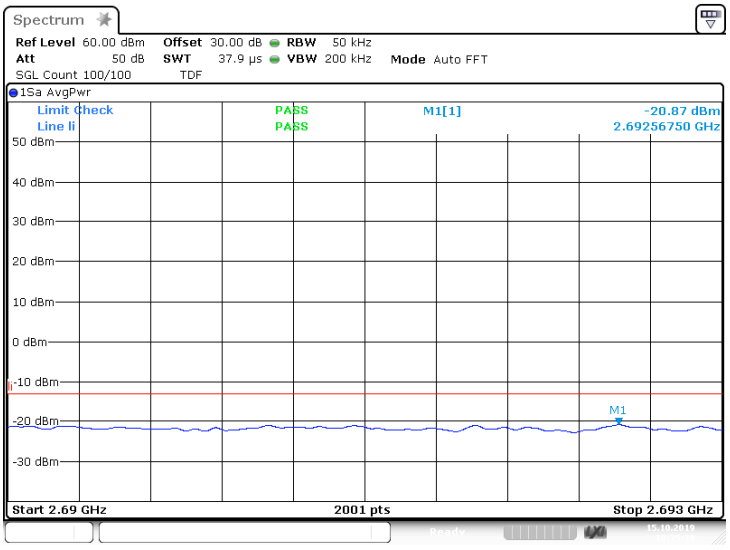
3.6.2 out of band emi BRS High ANT 1 GSM upper 2carriers +3.
0 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



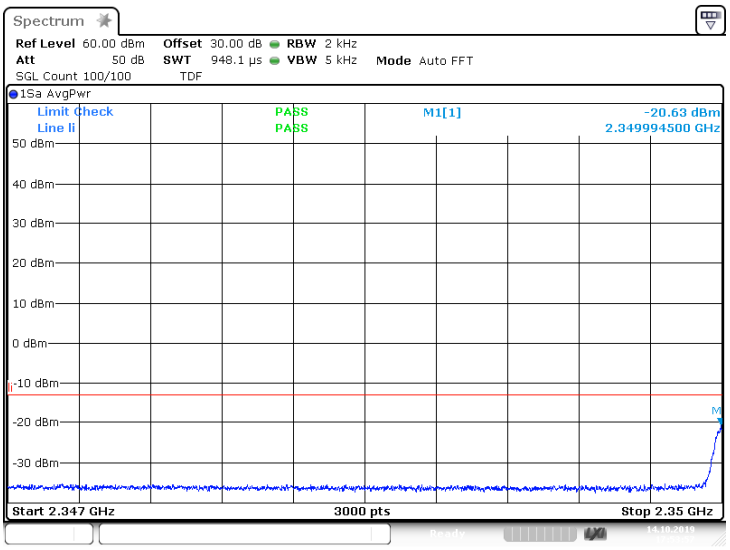
3.6.2 out of band emi BRS High ANT 1 AWGN upper 2carriers -0 .3 dB 2.690G 2.693G

Band: 41 BRS (UBS); ANT 1; Frequency: 2.6180 GHz to 2.6900 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi BRS High ANT 1 AWGN upper 2carriers +3 .0 dB 2.690G 2.693G

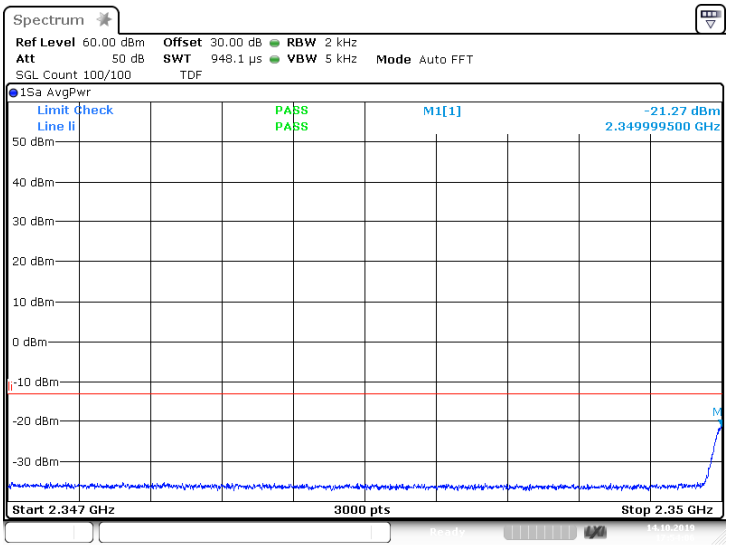
Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



3.6.2 out of band emi WCS 2300 GSM lower lcarrier -0.3 dB 2.

347G 2.350G

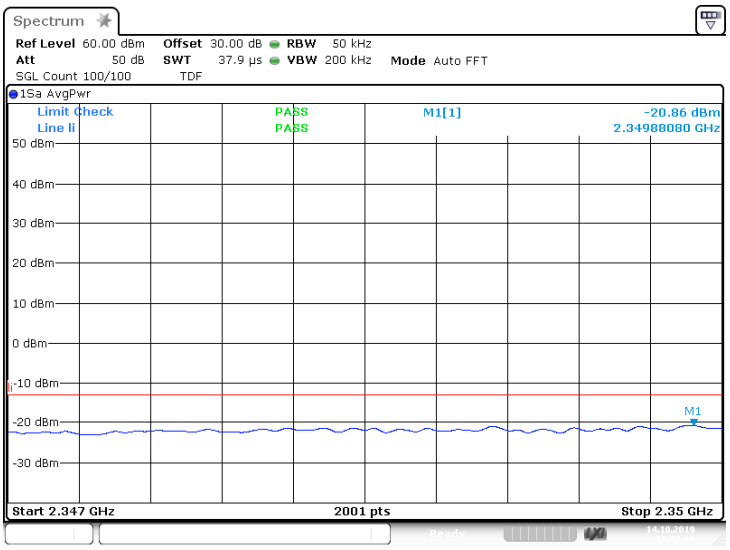
Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi WCS 2300 GSM lower lcarrier +3.0 dB 2.

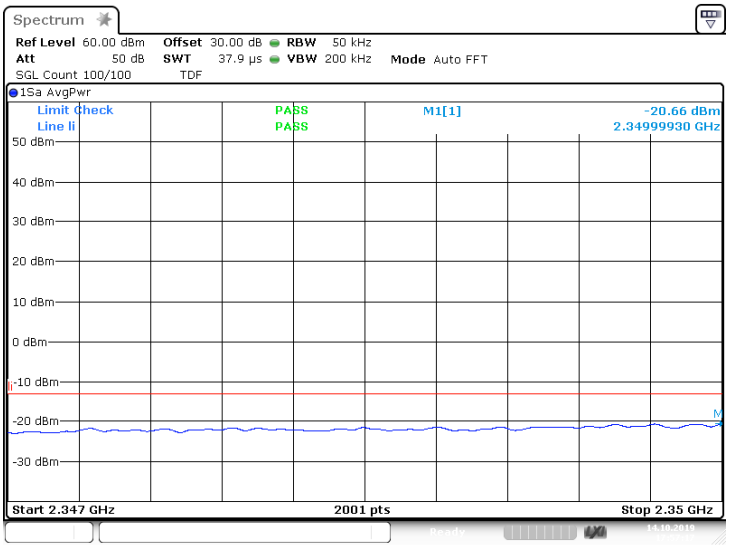
347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



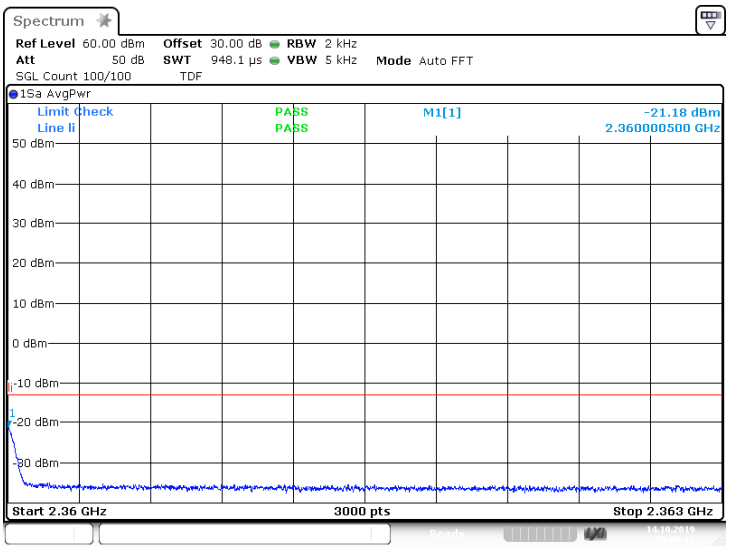
3.6.2 out of band emi WCS 2300 AWGN lower 1carrier -0.3 dB 2
.347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi WCS 2300 AWGN lower 1carrier +3.0 dB 2
.347G 2.350G

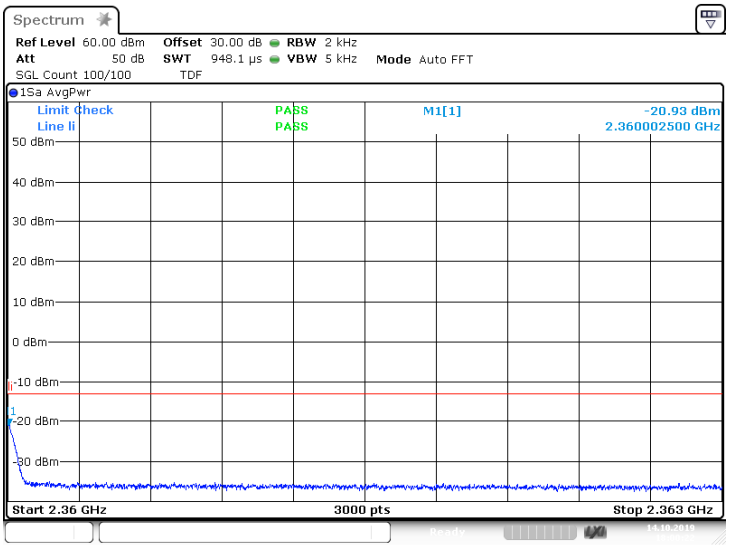
Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 1



3.6.2 out of band emi WCS 2300 GSM upper 1carrier -0.3 dB 2.

360G 2.363G

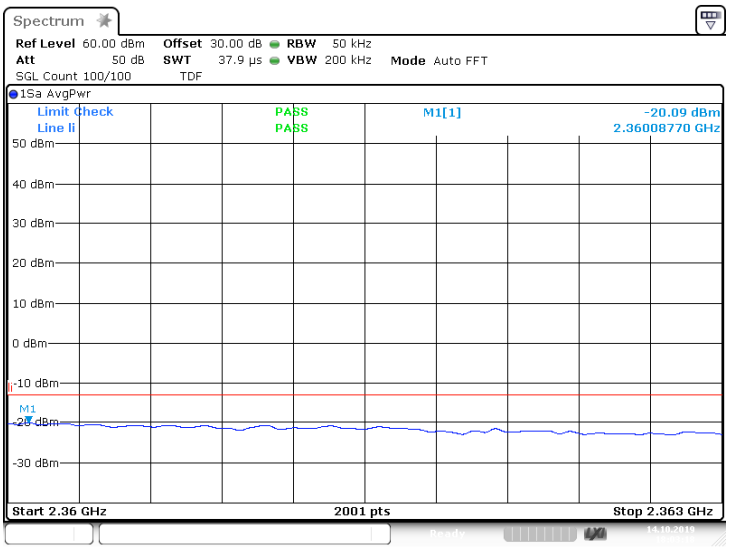
Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 1



3.6.2 out of band emi WCS 2300 GSM upper 1carrier +3.0 dB 2.

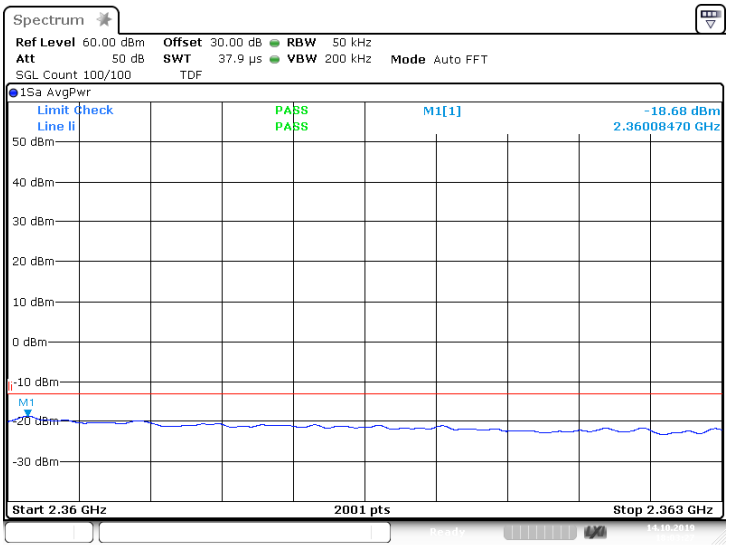
360G 2.363G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 1



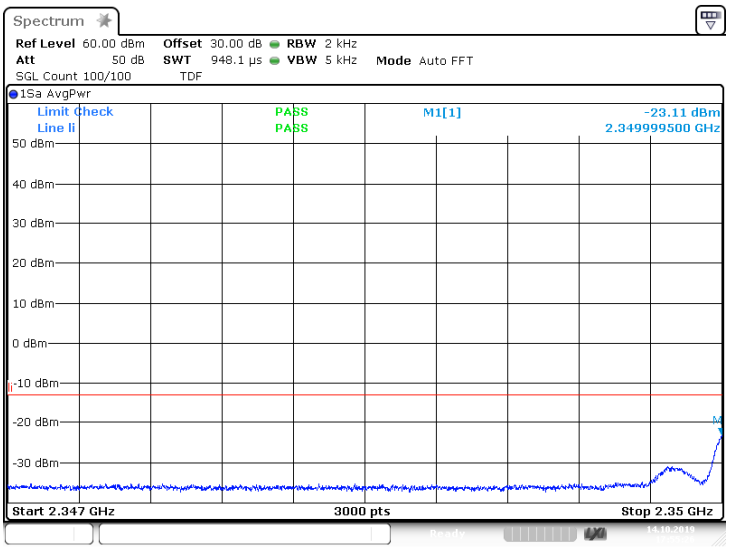
3.6.2 out of band emi WCS 2300 AWGN upper 1carrier -0.3 dB 2
.360G 2.363G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 1



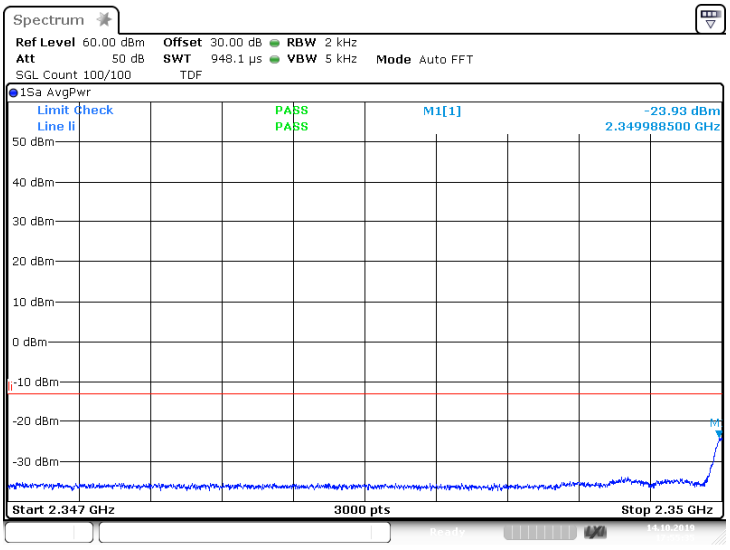
3.6.2 out of band emi WCS 2300 AWGN upper 1carrier +3.0 dB 2
.360G 2.363G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



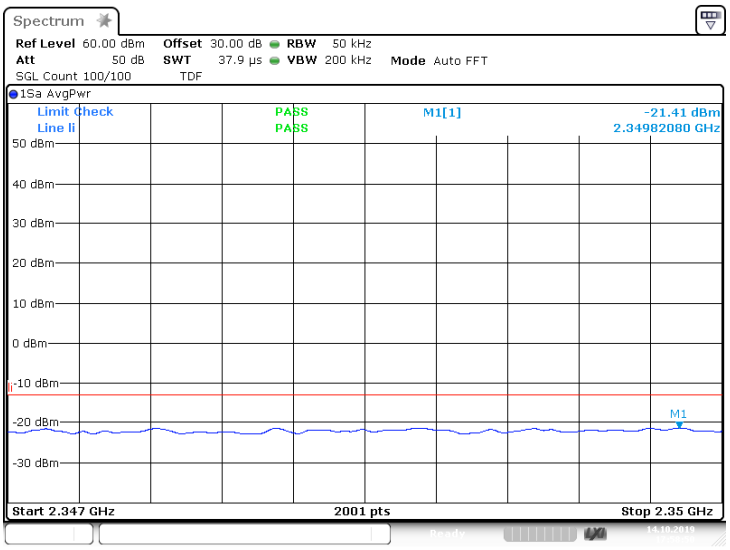
3.6.2 out of band emi WCS 2300 GSM lower 2carriers -0.3 dB 2
.347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



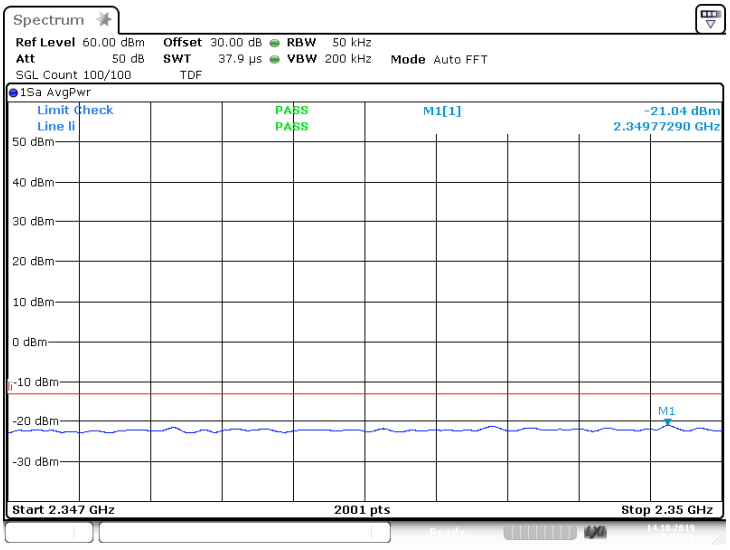
3.6.2 out of band emi WCS 2300 GSM lower 2carriers +3.0 dB 2
.347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



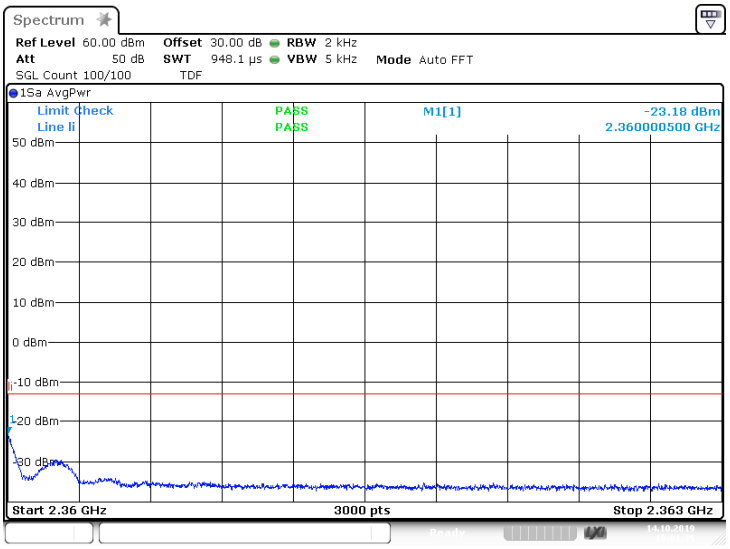
3.6.2 out of band emi WCS 2300 AWGN lower 2carriers -0.3 dB
2.347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: lower; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



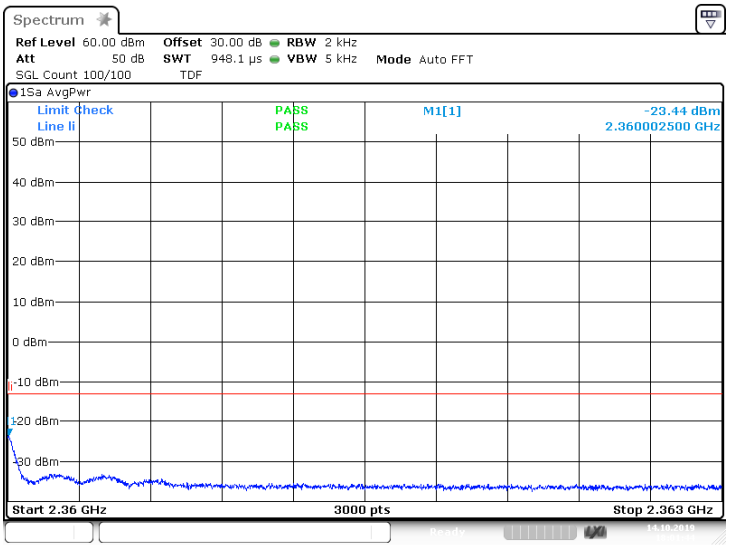
3.6.2 out of band emi WCS 2300 AWGN lower 2carriers +3.0 dB
2.347G 2.350G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: GSM; Input Power = 0.3 dB < AGC; Number of signals 2



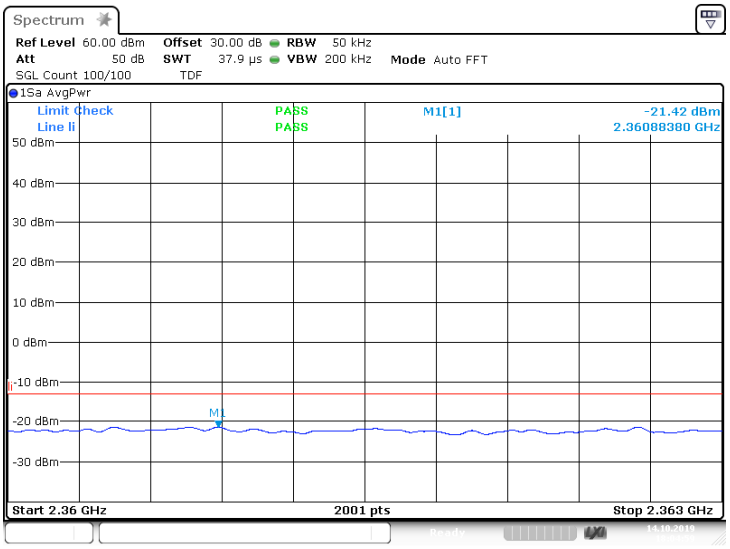
3.6.2 out of band emi WCS 2300 GSM upper 2carriers -0.3 dB 2
.360G 2.363G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: GSM; Input Power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi WCS 2300 GSM upper 2carriers +3.0 dB 2
.360G 2.363G

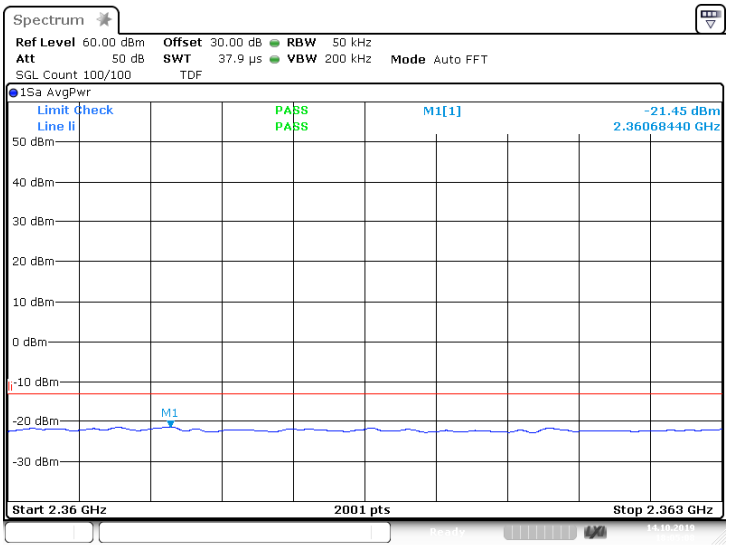
Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: AWGN; Input Power = 0.3 dB < AGC; Number of signals 2



3.6.2 out of band emi WCS 2300 AWGN upper 2carriers -0.3 dB

2.360G 2.363G

Band: 30 WCS 2300; ANT1; Frequency: 2.3500 GHz to 2.3600 GHz; Band Edge: upper; Mod: AWGN; Input Power = 3 dB > AGC; Number of signals 2



3.6.2 out of band emi WCS 2300 AWGN upper 2carriers +3.0 dB

2.360G 2.363G

5.5.5 TEST EQUIPMENT USED

- Conducted

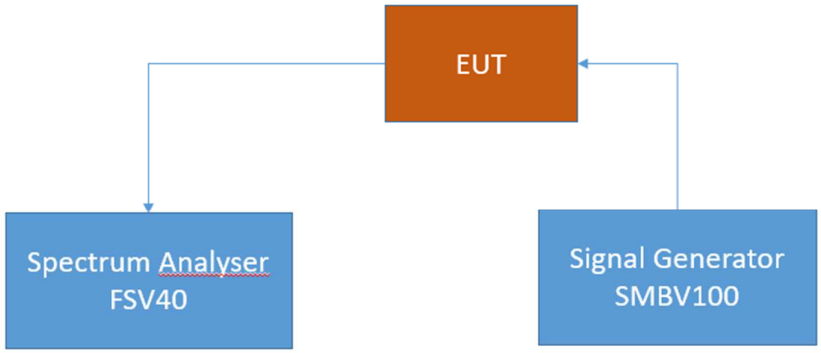
5.6 OUT-OF-BAND REJECTION

Standard FCC Part 27

The test was performed according to:
ANSI C63.26

5.6.1 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.

5.6.2 TEST REQUIREMENTS / LIMITS

For this test case exists no applicable limit

5.6.3 TEST PROTOCOL

Band 41 BRS (LBS), 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 [MHz]**
2534.0	34.9	2492.5	2571.7	79.2

Band 41 BRS (MBS), 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 [MHz]**
2595.0	36.8	2570.3	2615.7	45.5

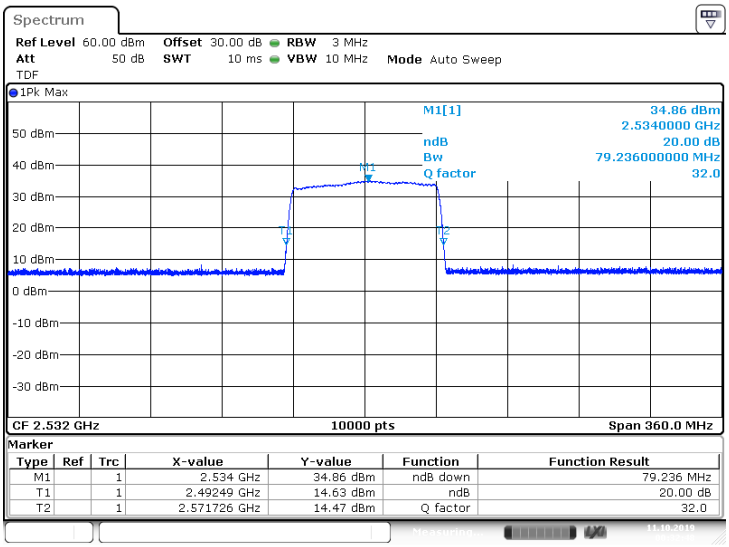
Band 41 BRS (UBS), downlink				
Highest Power Frequency [MHz]	**Output Power [dBm]**	**Lower Highest Power -20 dB Frequency [MHz]**	**Upper Highest Power -20 dB Frequency [MHz]**	**20 dB Bandwidth [MHz]**
2650.0	37.0	2614.3	1693.5	79.2

Band 30 WCS, 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 [MHz]**
2357.8	37.4	2349.7	2360.3	10.6

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

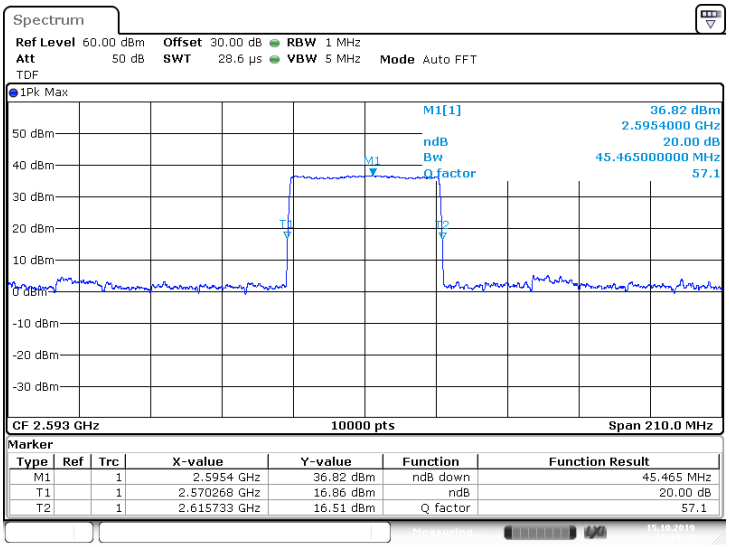
5.6.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Frequency Band = Band 41 BRS (LBS), Direction = RF downlink



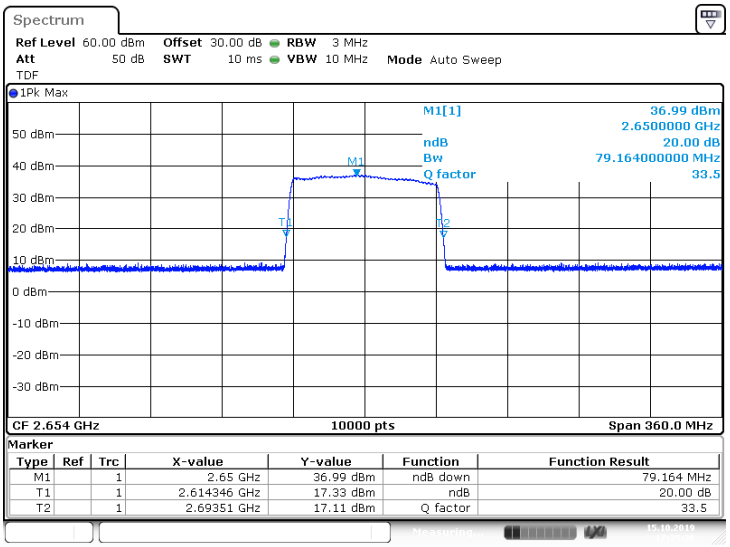
3.3 Out of band rejection BRS Low ANT 1 2.53200G
_20dB

Frequency Band = Band 41 BRS (MBS), Direction = RF downlink



3.3 Out of band rejection BRS Mid ANT 1 2.59300G
_20dB

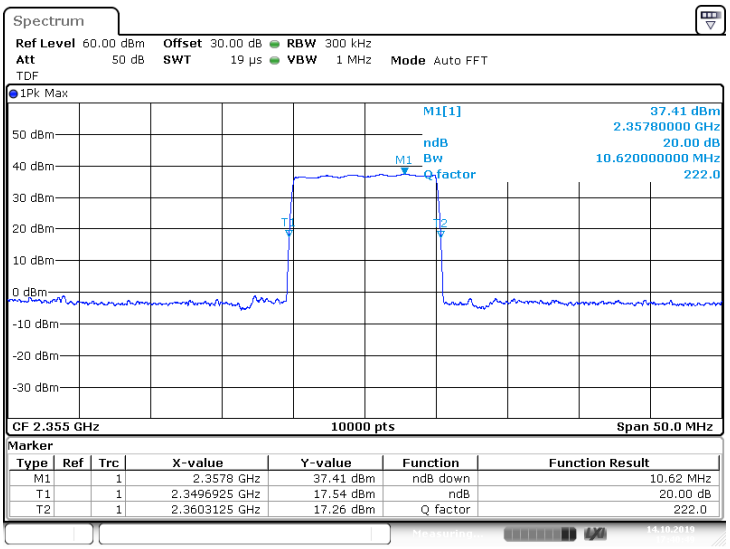
Frequency Band = Band 41 BRS (UBS), Direction = RF downlink



3.3 Out of band rejection BRS High ANT 1 2.65400G

_20dB

Frequency Band = Band 30 WCS 2300, Direction = RF downlink



3.3 Out of band rejection WCS 2300 2.35500G

_20dB

5.6.5 TEST EQUIPMENT USED

- Conducted

5.7 FIELD STRENGTH OF SPURIOUS RADIATION

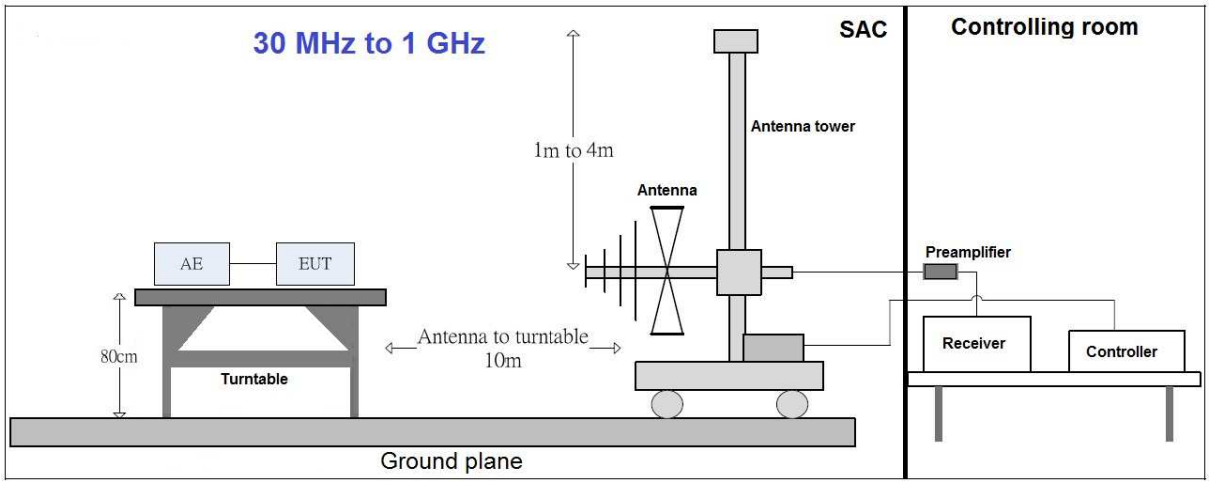
Standard FCC Part 27, §27.53

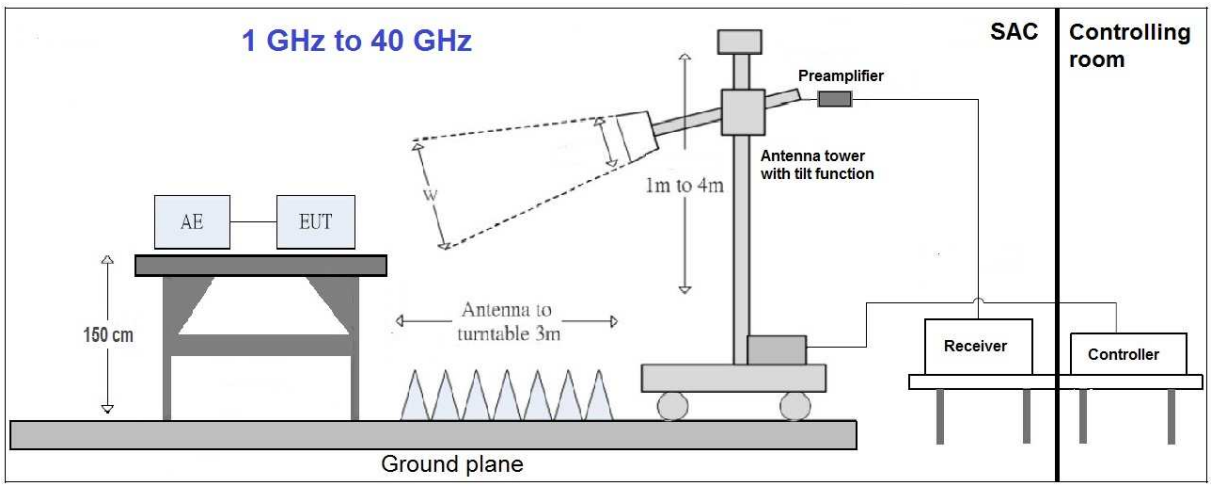
The test was performed according to:
ANSI C63.26

5.7.1 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:





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 1.5 x 1.5 m² in the semi-anechoic chamber, 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane.. The influence of the EUT support table that is used between 30–1000 MHz was evaluated. For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions.

The measurement procedure is implemented into the EMI test software BAT EMC from NEXIO. 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 by 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: 10 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° to 180°
- Turntable step size: 15°
- Height variation range: 1 – 4 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 ± 45° 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 ± 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: ± 30 ° 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 at 1.5 m height in the semi-anechoic chamber. Absorbers are placed around and between the turn table and the antenna tower.
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 30 °.
The turn table step size (azimuth angle) for the preliminary measurement is 15 °.
Step 2:
The maximum RFI field strength was determined during the measurement by rotating the turntable (±180 degrees) and varying the height of the receive antenna (h = 1 ... 4 m) with a additional tilt function of the antenna.The turn table azimuth will slowly vary by ± 15°.
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

5.7.2 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 30

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

(2) For fixed customer premises equipment (CPE) stations operating in the 2305-2320 MHz band and the 2345-2360 MHz band transmitting with more than 2 watts per 5 megahertz average EIRP:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

(3) For fixed CPE stations operating in the 2305-2320 MHz and 2345-2360 MHz bands transmitting with 2 watts per 5 megahertz average EIRP or less:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

(4) For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.

(5) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the channel blocks at 2305, 2310, 2315, 2320, 2345, 2350, 2355, and 2360 MHz, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 1 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

(6) [Reserved]

(7) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power;

(8) Waiver requests of any of the out-of-band emission limits in paragraphs (a)(1) through (a)(7) of this section shall be entertained only if interference protection equivalent to that afforded by the limits is shown;

(9) [Reserved]

(10) The out-of-band emissions limits in paragraphs (a)(1) through (a)(3) of this section may be modified by the private contractual agreement of all affected licensees, who must maintain a copy of the agreement in their station files and disclose it to prospective assignees, transferees, or spectrum lessees and, upon request, to the Commission.

Band 41 BRS (LBS/MBS/UBS)

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(1) Prior to the transition, and thereafter, solely within the MBS, for analog operations with an EIRP in excess of −9 dBW, the signal shall be attenuated at the channel edges by at least 38 dB relative to the peak visual carrier, then linearly sloping from that level to at least 60 dB of attenuation at 1 MHz below the lower band edge and 0.5 MHz above the upper band edge, and attenuated at least 60 dB at all other frequencies.

(2) For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

5.7.3 TEST PROTOCOL

Band 41 BRS (LBS), downlink;						
Spurious Freq. [MHz]	**Spurious Level [dBm]**	**P_{in} [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
1699.8	-53.4	-6.4/-8.0/-6.4	PEAK	100	-13.0	40.4
2532.0	-28.4	-6.4/-8.0/-6.4	PEAK	100	-13.0	15.4
5064.0	-33.0	-6.4/-8.0/-6.4	PEAK	100	-13.0	20.0
2496.2	-26.2	-6.4/-8.0/-6.4	PEAK	100	-13.0	13.2
2532.0	-29.8	-6.4/-8.0/-6.4	PEAK	100	-13.0	16.8
5064.0	-37.0	-6.4/-8.0/-6.4	PEAK	100	-13.0	24.0
10946.6	-23.6	-6.4/-8.0/-6.4	PEAK	100	-13.0	10.6

Band 41 BRS (MBS), downlink;						
Spurious Freq. [MHz]	**Spurious Level [dBm]**	**P_{in} [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
2572.2	-25.0	-7.1/-8.0/-7.6	PEAK	100	-13.0	12.0
5186.0	-36.3	-7.1/-8.0/-7.6	PEAK	100	-13.0	23.3
2572.2	-26.8	-7.1/-8.0/-7.6	PEAK	100	-13.0	13.8
5186.0	-41.6	-7.1/-8.0/-7.6	PEAK	100	-13.0	28.6
10926.5	-23.1	-7.1/-8.0/-7.6	PEAK	100	-13.0	10.1

Band 41 BRS (UBS), downlink;						
Spurious Freq. [MHz]	**Spurious Level [dBm]**	**P_{in} [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
1467.9	-59.6	-7.1/-8.3/-5.6	PEAK	100	-13.0	46.6
2464.0	-52.8	-7.1/-8.3/-5.6	PEAK	100	-13.0	39.8
2654.0	-32.1	-7.1/-8.3/-5.6	PEAK	100	-13.0	19.1
5308.0	-41.2	-7.1/-8.3/-5.6	PEAK	100	-13.0	28.2
2618.2	-34.5	-7.1/-8.3/-5.6	PEAK	100	-13.0	21.5
5308.1	-41.4	-7.1/-8.3/-5.6	PEAK	100	-13.0	28.4
10944.8	-23.5	-7.1/-8.3/-5.6	PEAK	100	-13.0	10.5

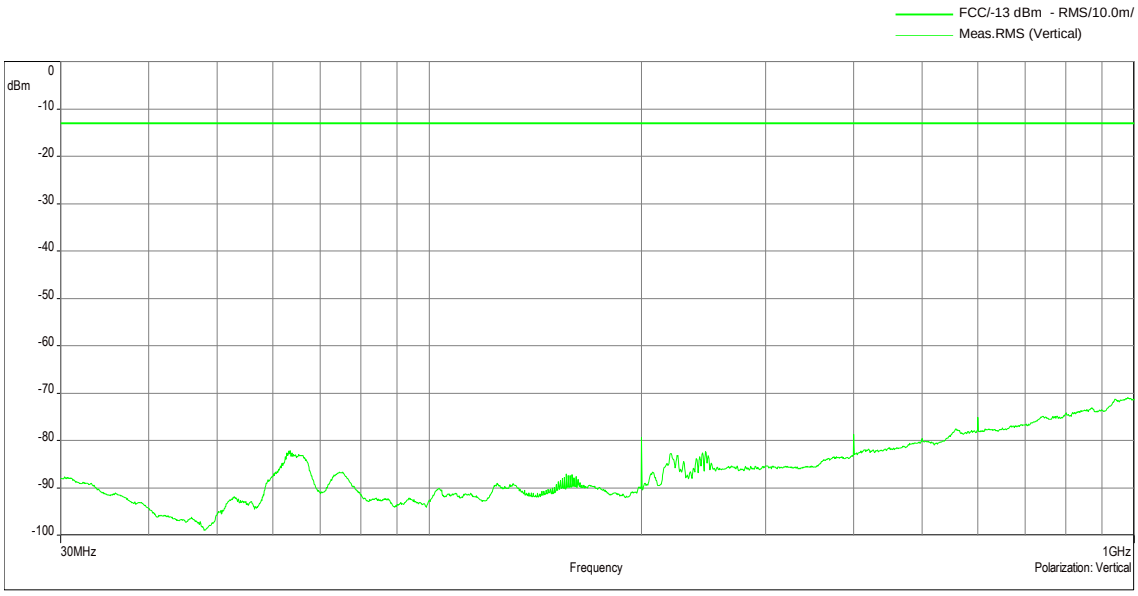
Band 30 WCS 2300, downlink;						
Spurious Freq. [MHz]	**Spurious Level [dBm]**	**P_{in} [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
1689.0	-54.0	-8.8/-8.2/-8.8	PEAK	100	-13.0	41.0
2350.2	-29.2	-8.8/-8.2/-8.8	PEAK	100	-13.0	16.2
2359.8	-27.3	-8.8/-8.2/-8.8	PEAK	100	-13.0	14.3
2355.0	-22.4	-8.8/-8.2/-8.8	PEAK	100	-13.0	9.4
10957.1	-23.9	-8.8/-8.2/-8.8	PEAK	100	-13.0	10.9

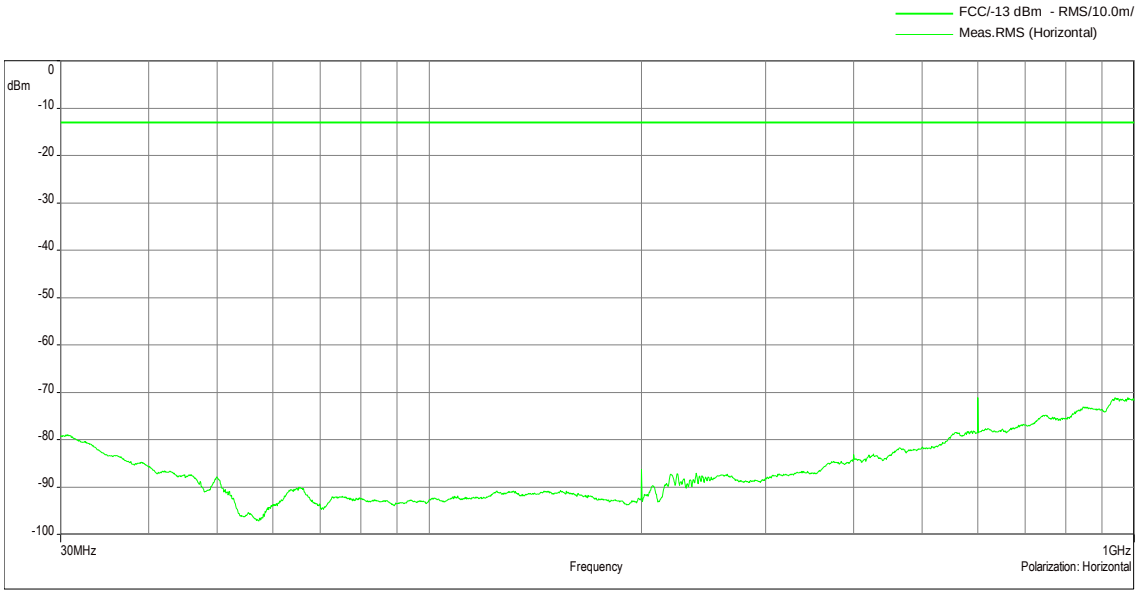
Remark: Please see next sub-clause for the measurement plot.

5.7.4 MEASUREMENT PLOT

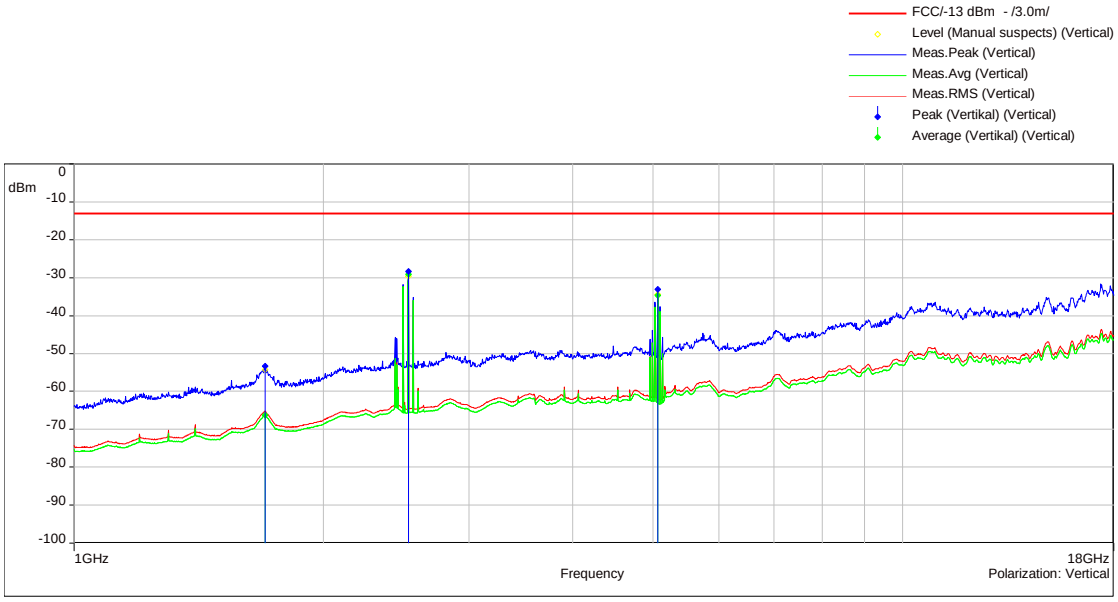
Frequency Band = Band 41 BRS (LBS); Test Frequencies = low, mid and high;
Direction = RF downlink

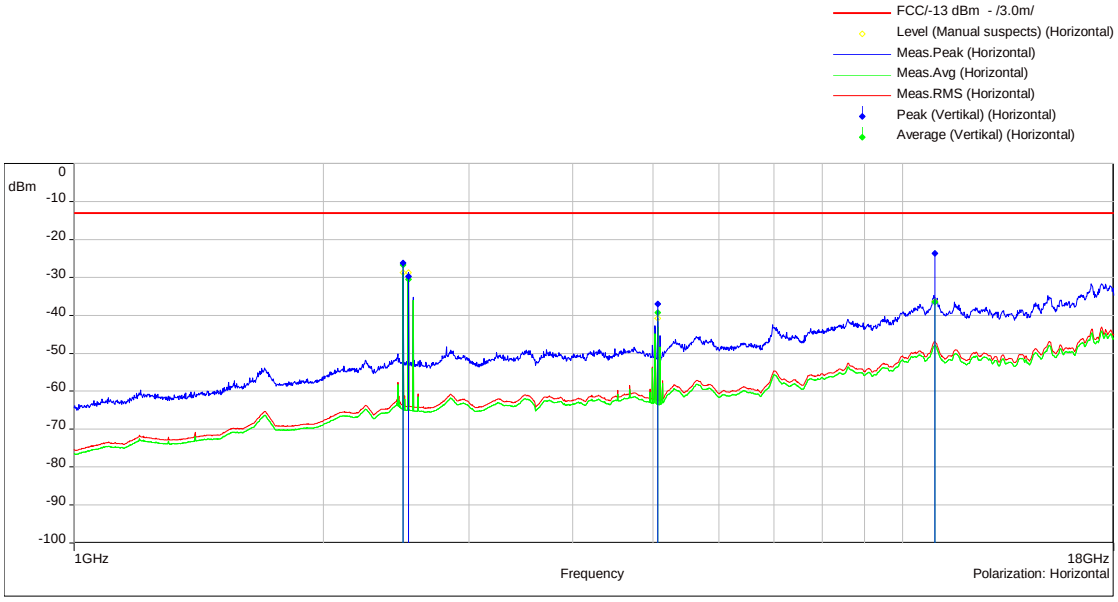
30 MHz - 1 GHz



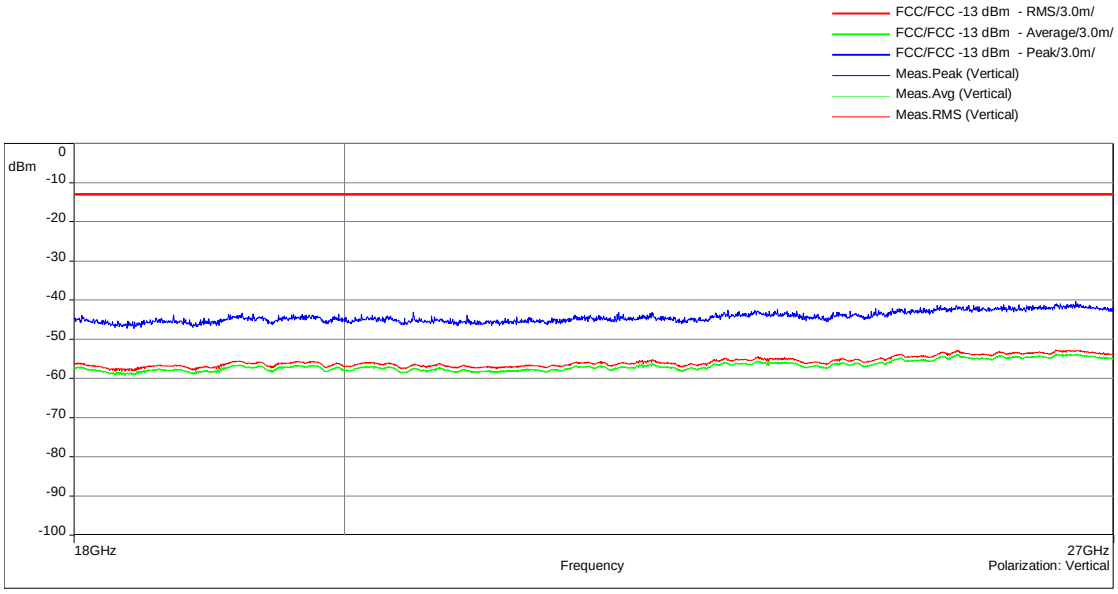


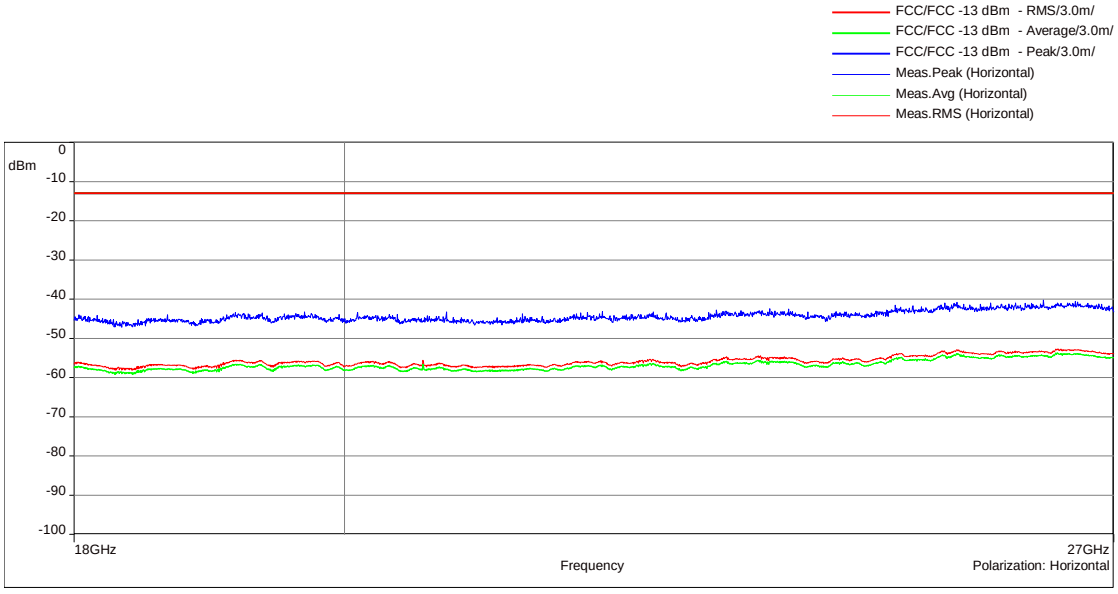
1 GHz - 18 GHz


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Vertical)
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
Peak (Vertikal) (Vertical)
Average (Vertikal) (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1GHz
Frequency
18GHz
Polarization: Vertical

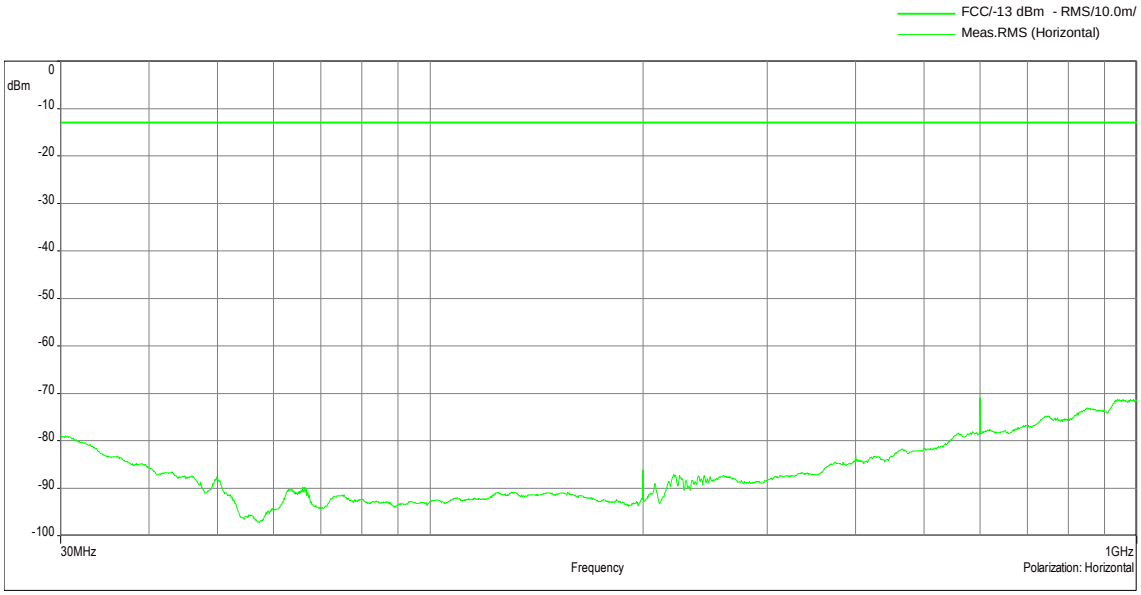

FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Horizontal)
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
Peak (Vertikal) (Horizontal)
Average (Vertikal) (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1GHz
Frequency
18GHz
Polarization: Horizontal

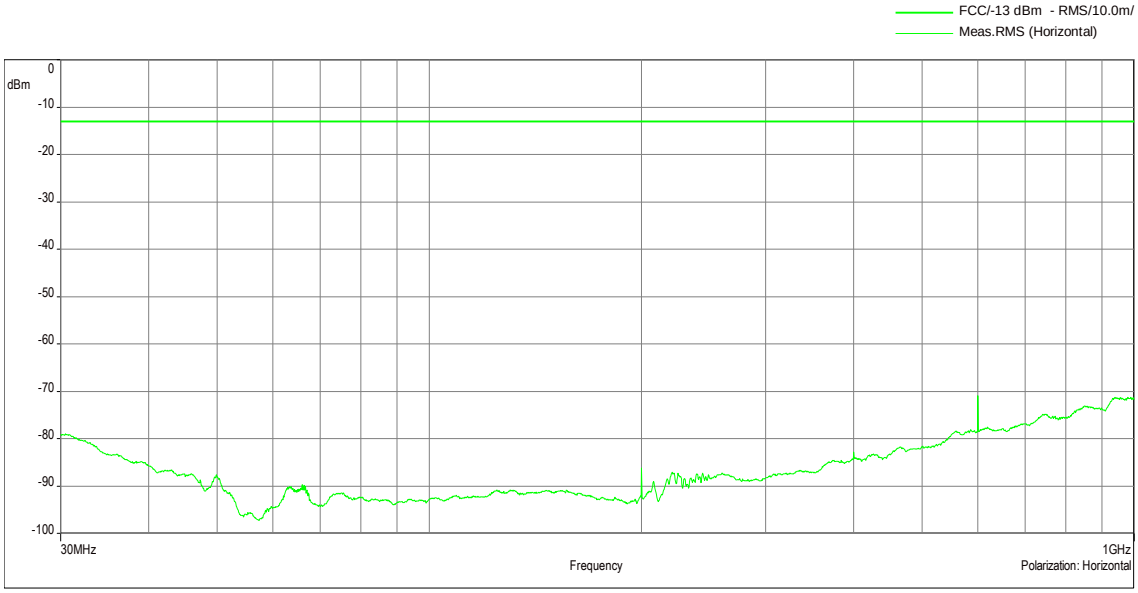
18 GHz - 27 GHz


FCC/FCC -13 dBm - RMS/3.0m/
FCC/FCC -13 dBm - Average/3.0m/
FCC/FCC -13 dBm - Peak/3.0m/
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
18GHz
Frequency
27GHz
Polarization: Vertical

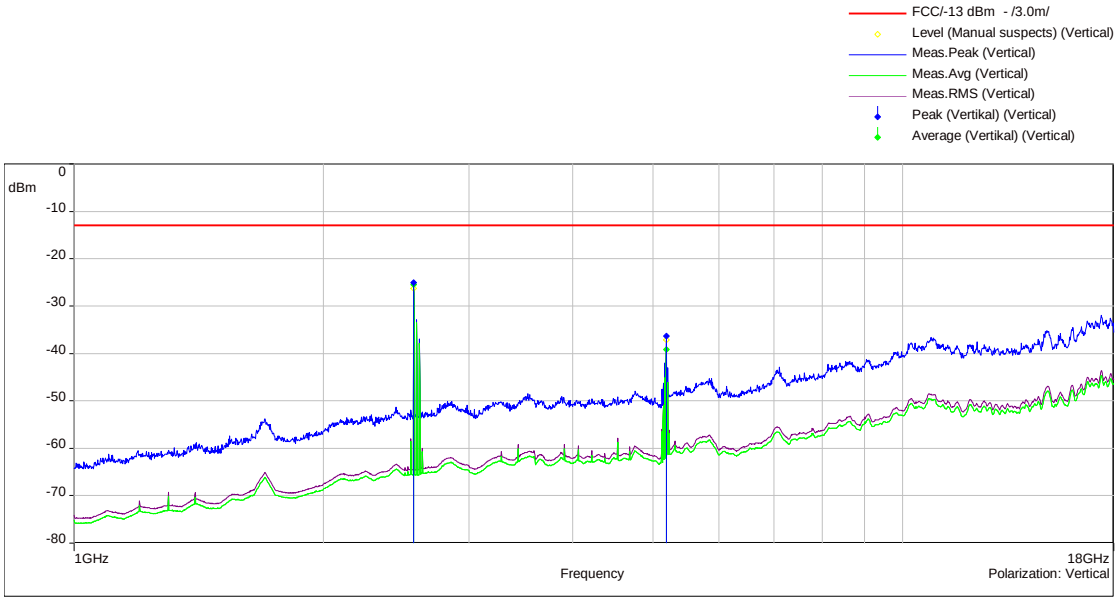

FCC/FCC -13 dBm - RMS/3.0m/
FCC/FCC -13 dBm - Average/3.0m/
FCC/FCC -13 dBm - Peak/3.0m/
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
18GHz
Frequency
27GHz
Polarization: Horizontal

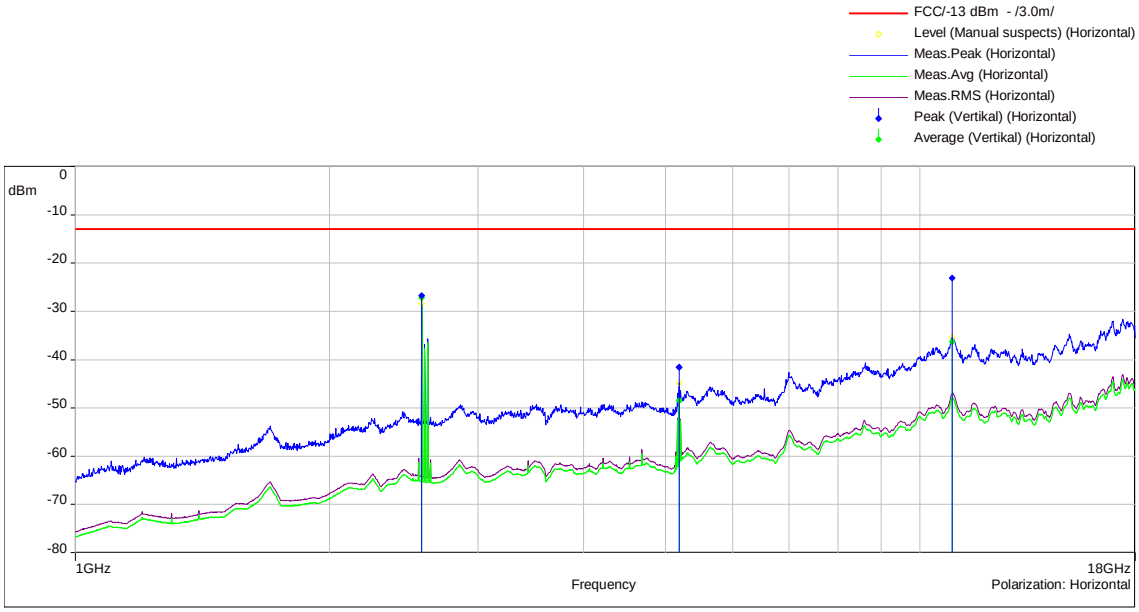
Frequency Band = Band 41 BRS (MBS); Test Frequencies = low, mid and high;
Direction = RF downlink
30 MHz - 1 GHz



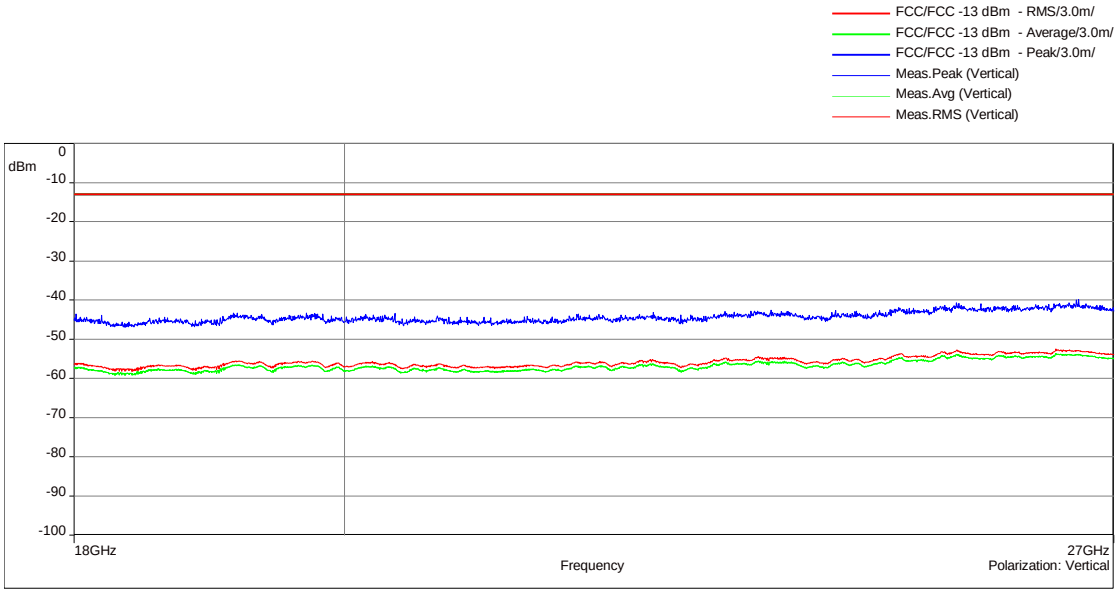


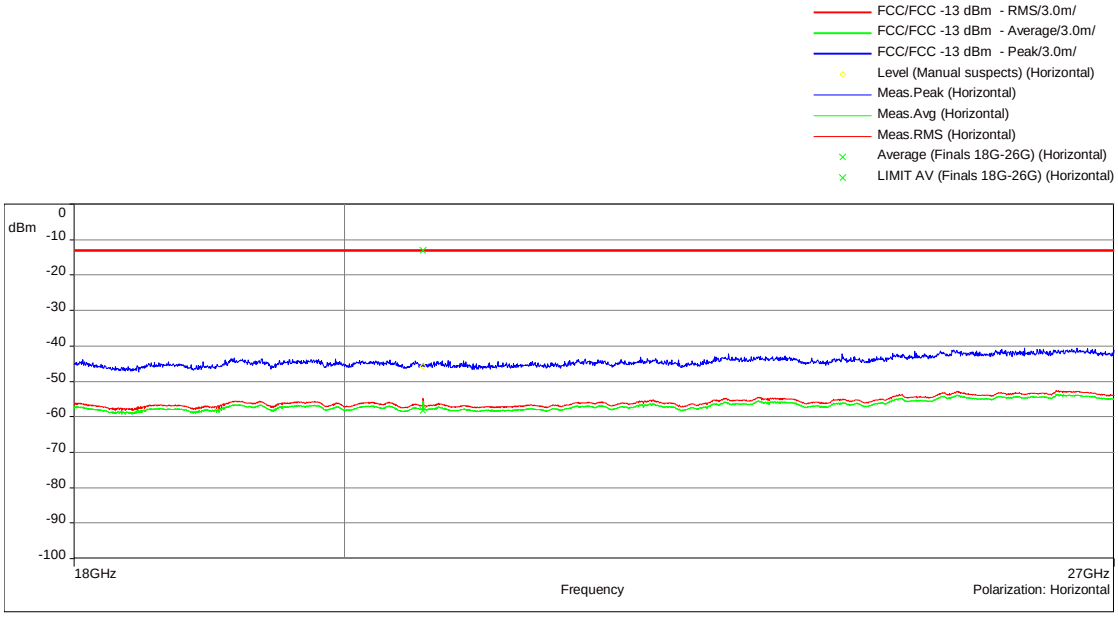
1 GHz - 18 GHz


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Vertical)
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
Peak (Vertikal) (Vertical)
Average (Vertikal) (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
1GHz
Frequency
18GHz
Polarization: Vertical


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Horizontal)
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
Peak (Vertikal) (Horizontal)
Average (Vertikal) (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
1GHz
Frequency
18GHz
Polarization: Horizontal

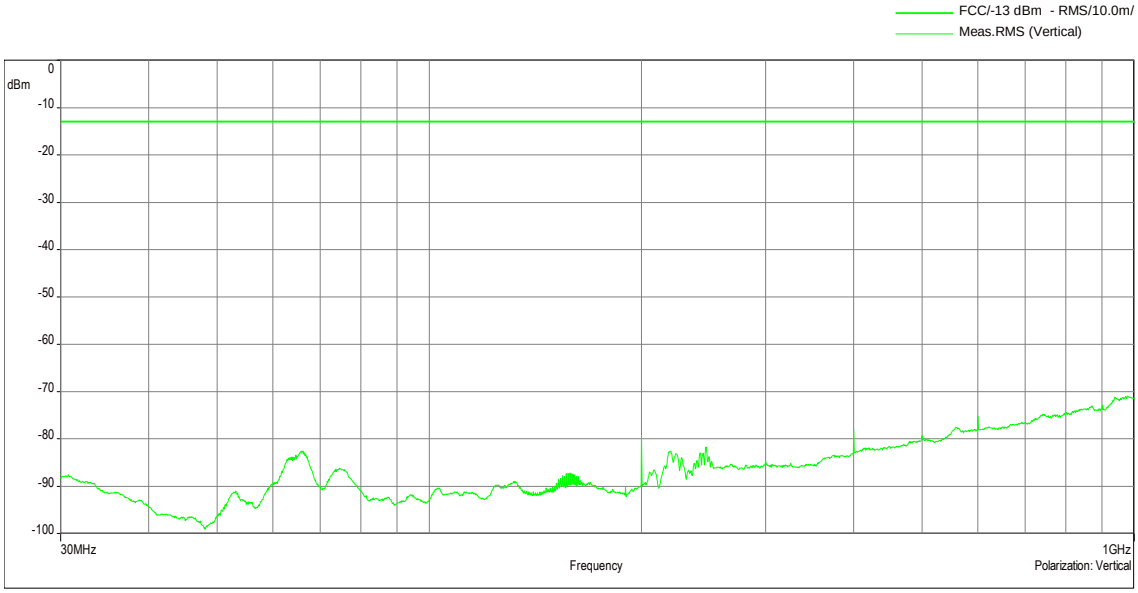
18 GHz - 27 GHz

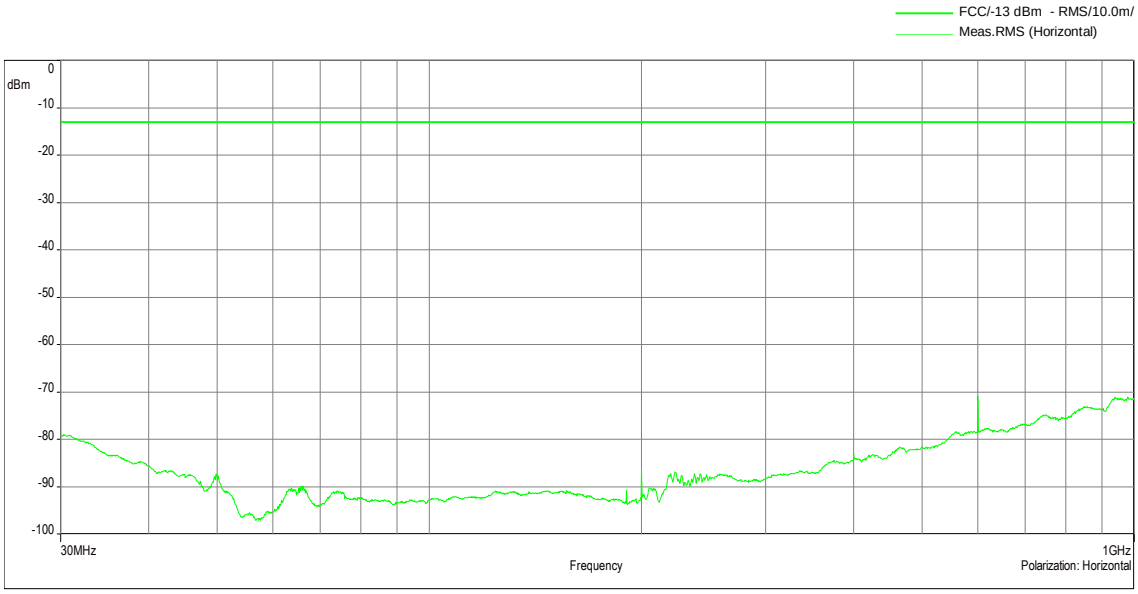




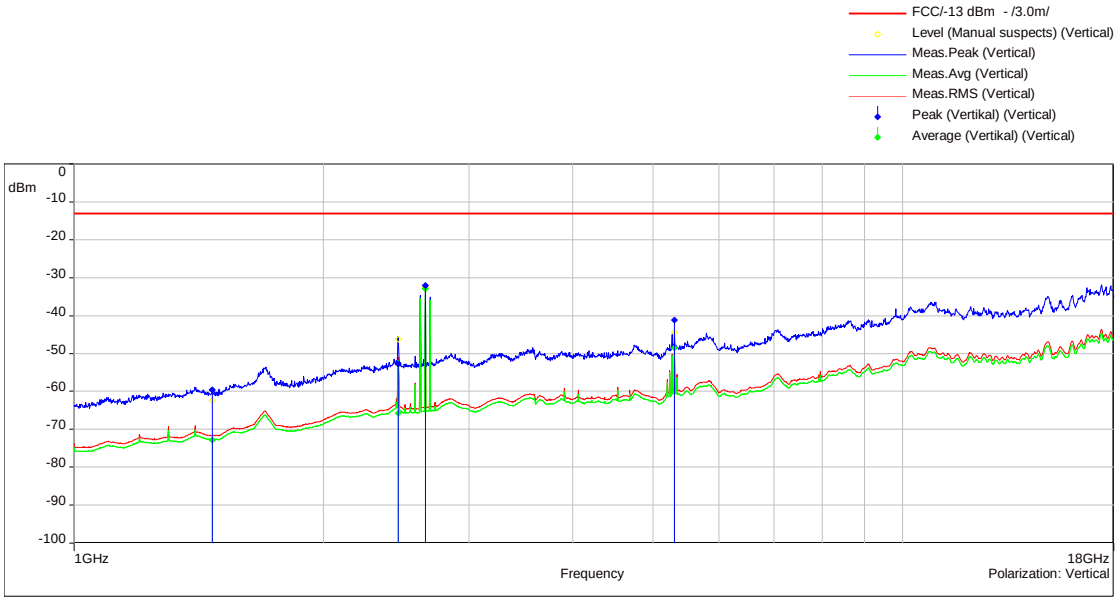
Frequency Band = Band 41 BRS (UBS); Test Frequencies = low, mid and high;
Direction = RF downlink

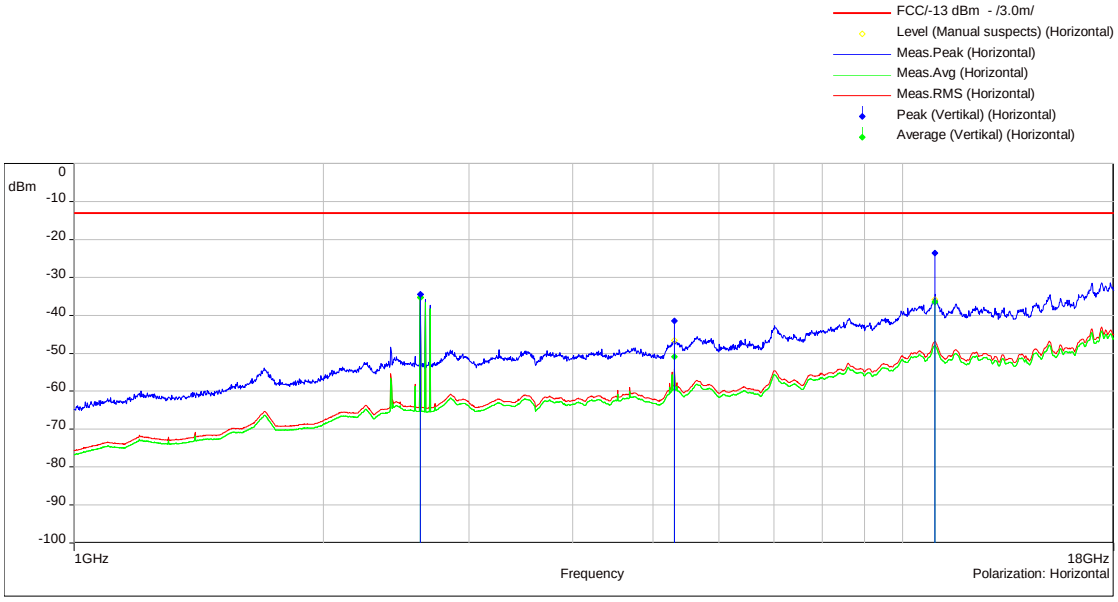
30 MHz - 1 GHz



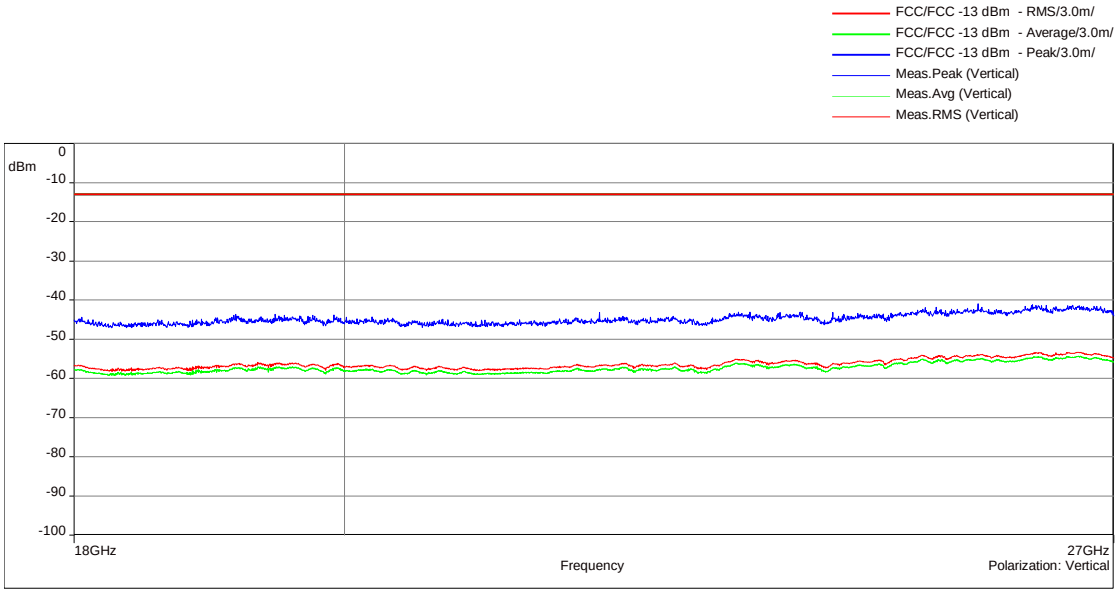


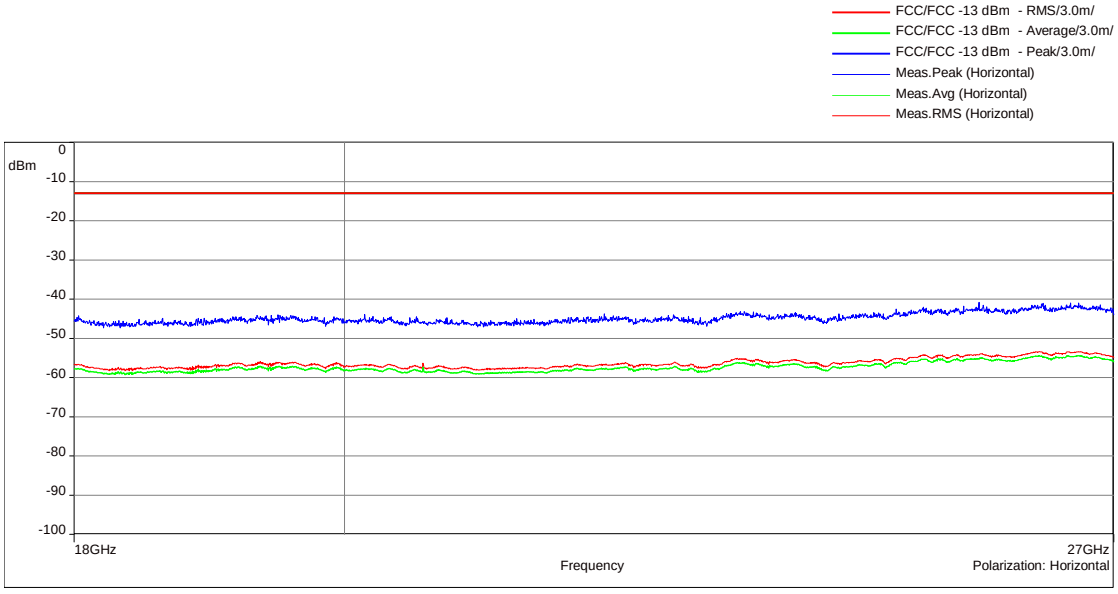
1 GHz - 18 GHz


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Vertical)
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
Peak (Vertikal) (Vertical)
Average (Vertikal) (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1GHz
Frequency
18GHz
Polarization: Vertical


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Horizontal)
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
Peak (Vertikal) (Horizontal)
Average (Vertikal) (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
1GHz
Frequency
18GHz
Polarization: Horizontal

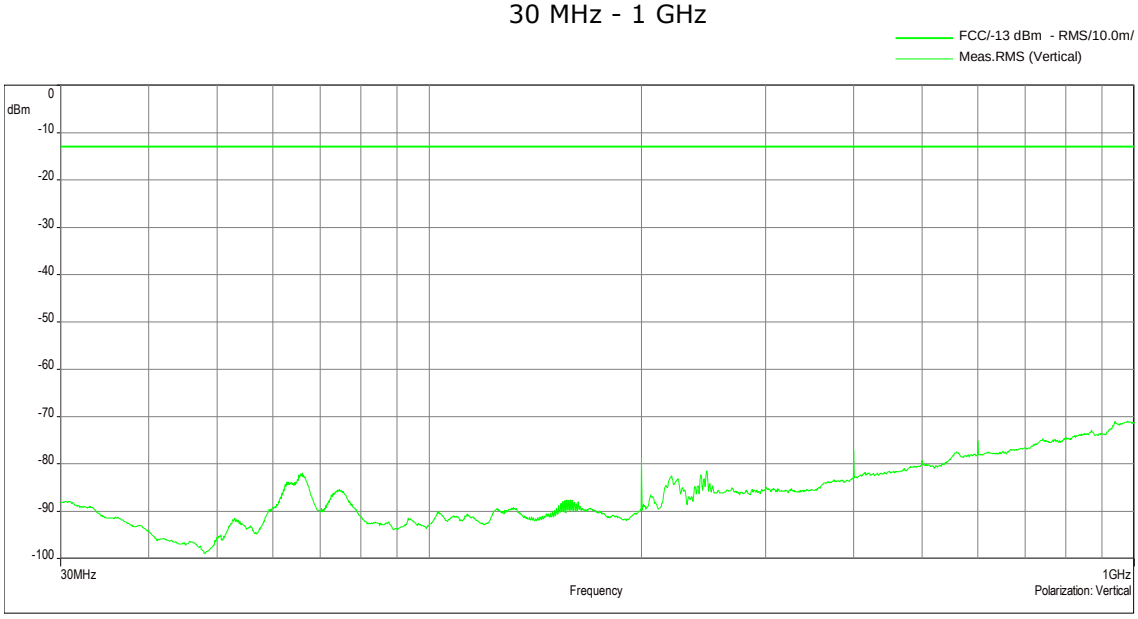
18 GHz - 27 GHz

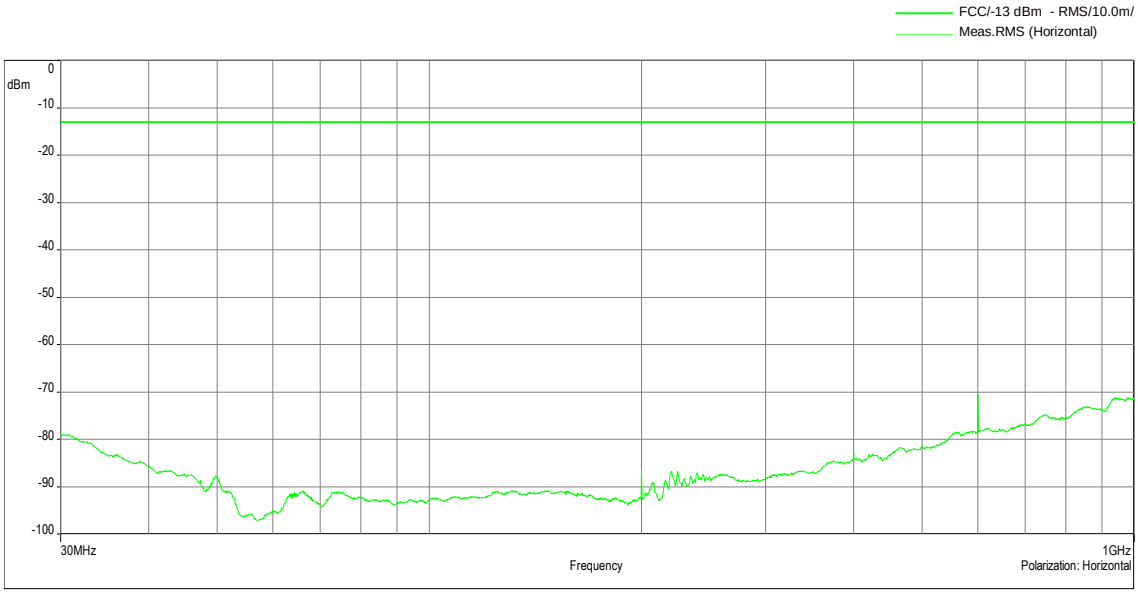

FCC/FCC -13 dBm - RMS/3.0m/
FCC/FCC -13 dBm - Average/3.0m/
FCC/FCC -13 dBm - Peak/3.0m/
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
18GHz
Frequency
27GHz
Polarization: Vertical


FCC/FCC -13 dBm - RMS/3.0m/
FCC/FCC -13 dBm - Average/3.0m/
FCC/FCC -13 dBm - Peak/3.0m/
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
18GHz
Frequency
27GHz
Polarization: Horizontal

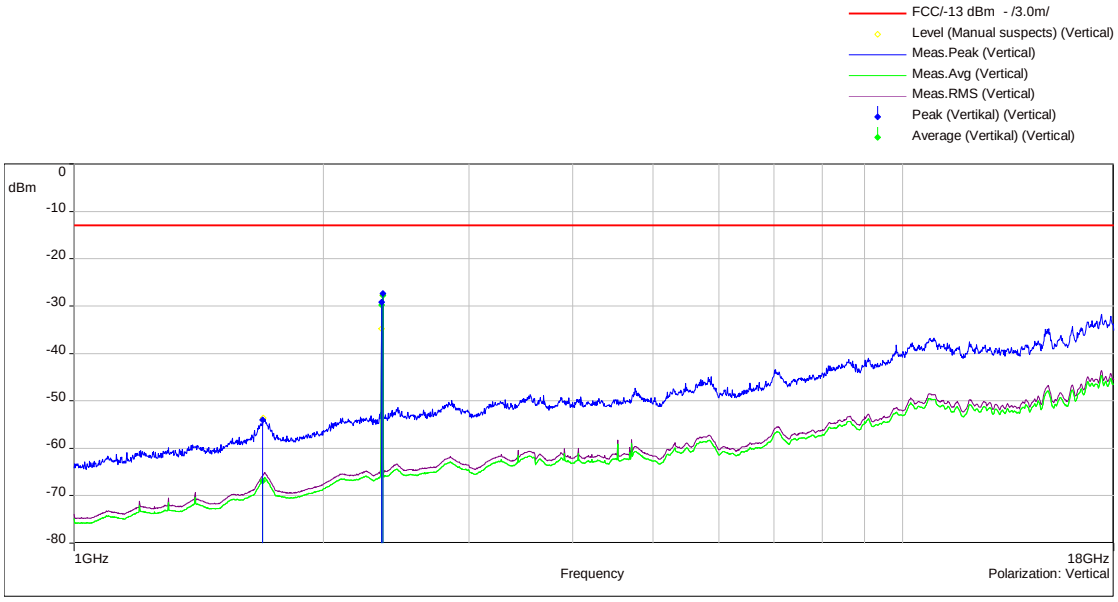
Frequency Band = Band 30 WCS 2300; Test Frequencies = low, mid and high;
Direction = RF downlink

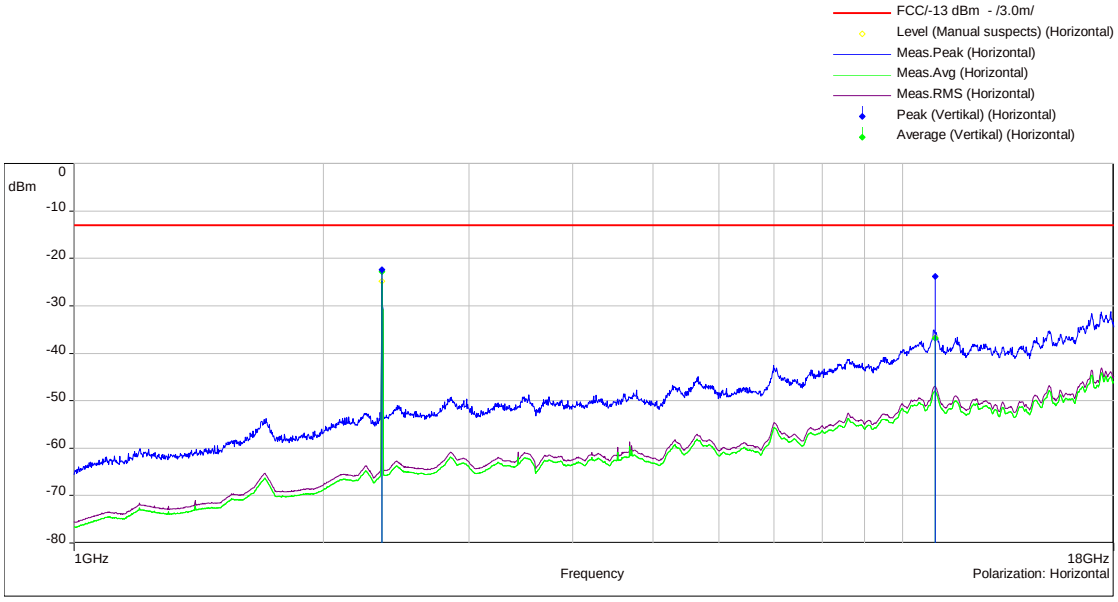
30 MHz - 1 GHz



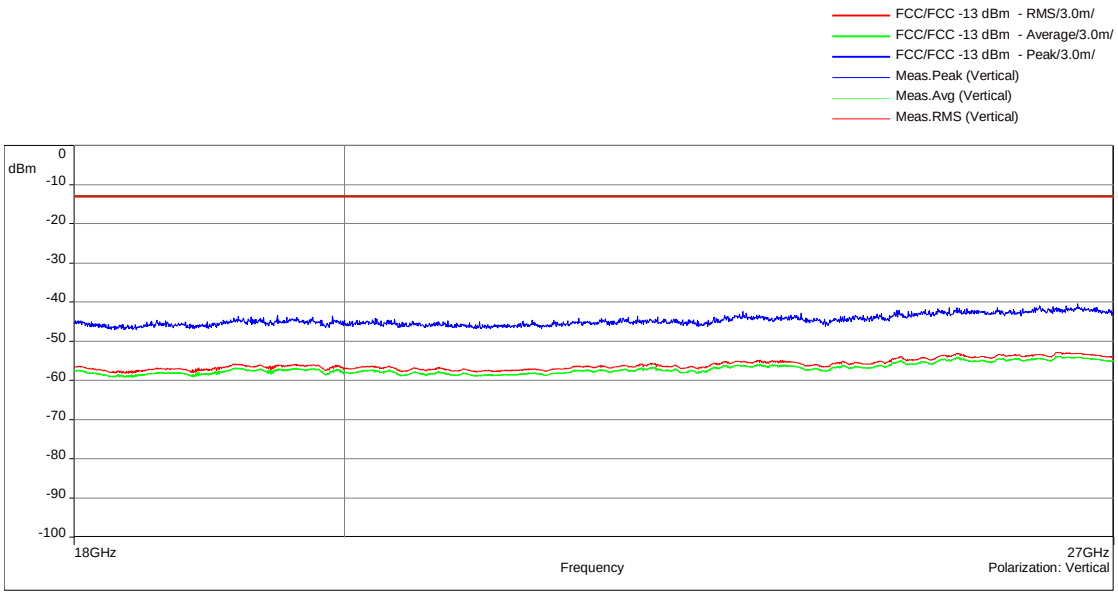


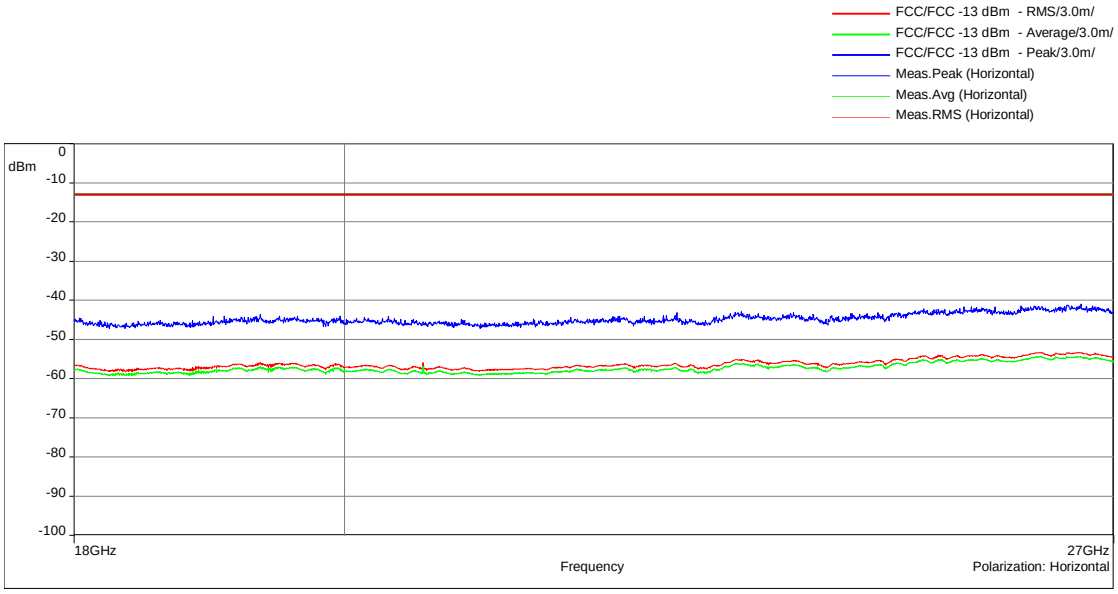
1 GHz - 18 GHz


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Vertical)
Meas.Peak (Vertical)
Meas.Avg (Vertical)
Meas.RMS (Vertical)
Peak (Vertikal) (Vertical)
Average (Vertikal) (Vertical)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
1GHz
Frequency
18GHz
Polarization: Vertical


FCC/-13 dBm - /3.0m/
Level (Manual suspects) (Horizontal)
Meas.Peak (Horizontal)
Meas.Avg (Horizontal)
Meas.RMS (Horizontal)
Peak (Vertikal) (Horizontal)
Average (Vertikal) (Horizontal)
dBm
0
-10
-20
-30
-40
-50
-60
-70
-80
1GHz
Frequency
18GHz
Polarization: Horizontal

18 GHz - 27 GHz





5.7.5 FIELD STRENGTH CALCULATIONS

FS = SA + AF + CL + PA

Where as:

FS = Field strength
SA = EMC test receiver reading
AF = Antenna factor
CL = Cable loss
PA = Preamplifier

5.7.6 TEST EQUIPMENT USED

- Radiated Emissions

6 TEST EQUIPMENT

1 Conducted

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last Calibration	Calibration Due
1.1	FSV40	Signal Analyzer 10 Hz - 40 GHz	Rohde & Schwarz	E2050	2019-10	2020-10
1.2	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	G2089	2017-08	2020-08
1.3	SMIQ	Vector Signal Generator 9 kHz – 3.3 GHz	Rohde & Schwarz	G1509	2018-10	2021-10
1.4	SMIQ	Vector Signal Generator 9 kHz – 3.3 GHz	Rohde & Schwarz	G1510	2018-10	2021-10
1.5	ESH3-Z5	Line Impedance Stabilisation Network (LISN) 150 Hz – 30 MHz	Rohde & Schwarz	K794	2019-02	2020-10
1.6	30.3015	ThermoHygro Datalogger	TFA	X 507	2018-08	2020-08
1.7	BAT-EMC	Software	Nexio	V3.18.0.32	---	---

2 Radiated Emissions

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last Calibration	Calibration Due
2.1	ESU40	EMI test receiver 10 Hz - 40 GHz	Rohde & Schwarz	E2025	2018-10	2020-10
2.2	HFH2-Z2	Antenna 9 kHz – 30 MHz	Rohde & Schwarz	K549	2018-10	2020-10
2.3	CBL 6111C	Antenna 30 MHz – 1 GHz	Chase	K1026	2018-12	2019-12
2.4	HL 025	Antenna 1 GHz - 18 GHz	Rohde & Schwarz	K1114	2019-06	2020-06
2.5	MWH-1826/B	Antenna 18 GHz – 26.5 GHz	ARA Inc.	K1042	2018-11	2020-11
2.6	MWH-2640/B	Antenna 26 GHz - 40 GHz	ARA Inc.	K1043	2018-11	2020-11
2.7	AM1431	Pre amplifier 10 kHz – 1 GHz	Miteq	K1721	2019-10	2021-10
2.8	AFS4-00102000	Preamplifier 100 MHz - 20 GHz	Miteq	K817	2019-08	2021-08
2.9	AFS4-00102000	Preamplifier 100 MHz - 20 GHz	Miteq	K838	2019-10	2020-10
2.10	JS43-1800-4000	Preamplifier 18 GHz - 40 GHz	Miteq	K1104	2019-05	2020-10
2.11	BAT-EMC	Software	Nexio	V3.18.0.32	---	---

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

7 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.

7.1 LISN ROHDE & SCHWARZ ESH3-Z5 (150 KHZ – 30 MHZ)

Frequency		Corr.
MHz		dB
0.15		10.25
5		10.91
7		11.15
10		11.35
12		11.53
14		11.72
16		11.90
18		12.03
20		12.19
22		12.29
24		12.40
26		12.53
28		12.60
30		12.69

LISN insertion loss ESH3-Z5 K794	Cable loss 1 (inside chamber K1865	Cable loss 2 (chamber to receiver) K1125 K1124	Limiter K877
dB	dB	dB	dB
0.12	0.05	0.18	9.90
0.25	0.17	0.55	9.94
0.39	0.21	0.61	9.94
0.42	0.25	0.71	9.97
0.52	0.26	0.77	9.98
0.63	0.29	0.82	9.98
0.72	0.30	0.86	10.02
0.80	0.31	0.89	10.03
0.88	0.33	0.94	10.04
0.91	0.34	0.98	10.06
0.94	0.36	1.02	10.08
0.97	0.37	1.07	10.12
0.99	0.39	1.10	10.12
1.02	0.40	1.15	10.12

Sample calculation

U_{LISN} (dB µV) = U (dB µV) + 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.

7.2 ANTENNA ROHDE & SCHWARZ HFH2-Z2 (9 KHZ – 30 MHZ)

Frequency	AF HFH-Z2)	Corr.	Cable loss 1 (inside chamber) K1865	Cable loss 2 (chamber to receiver) K1122 + K1761	Distance corr. (-40 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	dB	dB	m	m
0.009	22.30	-79.96	0.01	0.03	-80	300	3
0.01	22.30	-79.95	0.02	0.03	-80	300	3
0.015	21.55	-79.94	0.03	0.03	-80	300	3
0.02	20.80	-79.93	0.04	0.03	-80	300	3
0.025	20.50	-79.93	0.04	0.03	-80	300	3
0.03	20.20	-79.92	0.05	0.03	-80	300	3
0.05	20.00	-79.92	0.05	0.03	-80	300	3
0.08	19.88	-79.91	0.05	0.04	-80	300	3
0.1	19.80	-79.91	0.05	0.04	-80	300	3
0.2	19.79	-79.91	0.05	0.04	-80	300	3
0.3	19.78	-79.88	0.06	0.06	-80	300	3
0.49	19.76	-79.87	0.06	0.07	-80	300	3
0.490001	19.76	-39.87	0.06	0.07	-40	30	3
0.5	19.76	-39.87	0.06	0.07	-40	30	3
0.8	19.72	-39.84	0.07	0.09	-40	30	3
1	19.70	-39.84	0.07	0.09	-40	30	3
2	19.73	-39.77	0.10	0.13	-40	30	3
3	19.77	-39.70	0.13	0.17	-40	30	3
4	19.80	-39.65	0.16	0.19	-40	30	3
5	19.70	-39.62	0.17	0.21	-40	30	3
6	19.60	-39.58	0.19	0.23	-40	30	3
8	19.50	-39.50	0.24	0.26	-40	30	3
10	19.50	-39.45	0.25	0.30	-40	30	3
12	20.00	-39.42	0.26	0.32	-40	30	3
14	20.36	-39.37	0.29	0.34	-40	30	3
16	20.43	-39.33	0.30	0.37	-40	30	3
18	20.47	-39.30	0.31	0.39	-40	30	3
20	20.48	-39.26	0.33	0.41	-40	30	3
22	20.37	-39.24	0.34	0.42	-40	30	3
24	20.25	-39.19	0.36	0.45	-40	30	3
26	20.09	-39.16	0.37	0.47	-40	30	3
28	19.90	-39.12	0.39	0.49	-40	30	3
30	19.70	-39.09	0.40	0.51	-40	30	3

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values

7.3 ANTENNA CHASE CBL 6111C (30 MHZ – 1 GHZ)

(d_{Limit} = 10 m)

-	CBL 6111C K1026	Corr.	Cable loss 1 (inside chamber to floor) K1813	Pre-amplifier K1721	Cable loss 2 (under chamber) K1121	Cable loss 3 (Chamber to receiver K1761	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	dB	dB	dB	m
30	24.7	-37.78	0.02	-38.26	0.40	0.06	10
50	14.2	-37.49	0.28	-38.38	0.50	0.11	10
100	15.6	-37.31	0.52	-38.66	0.71	0.12	10
150	16.6	-37.17	0.73	-38.85	0.81	0.14	10
200	14.5	-36.85	0.95	-38.90	0.94	0.16	10
250	18.0	-36.56	1.10	-38.91	1.07	0.18	10
300	18.8	-36.05	1.20	-38.65	1.20	0.20	10
350	20.0	-35.87	1.29	-38.63	1.25	0.22	10
400	21.4	-35.57	1.36	-38.54	1.38	0.23	10
450	22.4	-35.14	1.42	-38.25	1.45	0.24	10
500	23.3	-34.64	1.49	-37.91	1.52	0.26	10
550	24.8	-34.47	1.54	-37.84	1.56	0.27	10
600	25.0	-34.20	1.60	-37.73	1.65	0.28	10
650	25.9	-34.30	1.64	-37.99	1.75	0.30	10
700	26.0	-33.98	1.71	-37.80	1.81	0.30	10
750	27.9	-33.99	1.77	-37.95	1.87	0.32	10
800	27.0	-34.32	1.80	-38.34	1.90	0.32	10
850	28.9	-34.24	1.85	-38.41	1.98	0.34	10
900	28.5	-34.76	1.91	-39.02	2.00	0.35	10
950	30.5	-34.50	1.93	-38.89	2.10	0.36	10
1000	29.8	-34.03	1.99	-38.57	2.18	0.37	10

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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 = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

7.4 ANTENNA ROHDE & SCHWARZ HL 025 (1 GHZ – 18 GHZ)

Frequency	AF R&S HL 025 K1114	Corr.	Pre-amp K838	Cable loss (to receiver) K1910
MHz	dB (1/m)	dB	dB	dB
1000	21.27	-19.15	-20.92	1.77
2000	27.32	-18.10	-20.60	2.50
3000	30.97	-17.33	-20.43	3.10
4000	33.48	-17.01	-20.58	3.57
5000	34.99	-17.04	-21.08	4.04
6000	36.98	-17.09	-21.52	4.43
7000	37.94	-16.73	-21.53	4.80
8000	39.21	-15.81	-20.97	5.16
9000	40.62	-15.02	-20.44	5.42
10000	41.78	-14.62	-20.42	5.80
11000	43.05	-14.75	-20.83	6.08
12000	43.12	-15.07	-21.41	6.34
13000	43.51	-15.50	-22.10	6.60
14000	44.53	-15.62	-22.48	6.86
15000	44.96	-15.47	-22.55	7.08
16000	45.57	-15.14	-22.49	7.35
17000	45.66	-15.44	-22.90	7.46
18000	45.44	-15.41	-23.27	7.86

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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.

7.5 ANTENNA ARA INC. MWH-1826-B (18 GHZ – 26.5 GHZ) PARTIALLY IN CONJUNCTION WITH PRE-AMPLIFIER MITEQ JS43-1800-4000: THE USE OF THE PRE-AMPLIFIER IS DEPENDENT FROM THE FIELD STRENGTH

Frequency	AF MWH-1826/B K1042	Corr.	Pre-amp K1104	Cable loss (to receiver) K1910
MHz	dB (1/m)	dB	dB	dB
18000	32.6	-35.37	-43.23	7.86
18500	32.5	-38.45	-46.40	7.95
19000	32.6	-37.84	-45.93	8.09
19500	32.7	-37.10	-45.21	8.11
20000	32.7	-37.27	-45.57	8.30
20500	32.9	-37.16	-45.49	8.33
21000	33.1	-36.82	-45.29	8.47
21500	33.0	-36.80	-45.33	8.53
22000	33.1	-36.40	-45.10	8.70
22500	33.2	-35.94	-44.78	8.84
23000	33.5	-36.62	-45.51	8.89
23500	33.5	-35.26	-44.36	9.10
24000	33.5	-35.87	-44.96	9.09
24500	33.8	-36.22	-45.32	9.10
25000	33.8	-35.48	-44.84	9.36
25500	33.8	-35.37	-44.67	9.30
26000	34.1	-35.84	-45.41	9.57
26500	34.4	-35.49	-45.10	9.61
27000	32.6	-35.37	-45.98	9.86

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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.

7.6 ANTENNA ARA INC. MWH-2640-B (26 GHZ – 40 GHZ)) PARTIALLY IN CONJUNCTION WITH PRE-AMPLIFIER MITEQ JS43-1800-4000: THE USE OF THE PRE-AMPLIFIER IS DEPENDENT FROM THE FIELD STRENGTH

Frequency	AF MWH-2640/B K1043	Corr.	Pre-amp K1104	Cable loss (to receiver) K1910
GHz	dB (1/m)	dB	dB	dB
26.5	35.8	-36.27	-45.88	9.61
27.0	35.5	-36.12	-45.98	9.86
28.0	36.4	-35.66	-45.55	9.89
29.0	35.9	-37.11	-47.07	9.96
30.0	36.3	-37.49	-47.70	10.21
31.0	36.2	-36.47	-46.93	10.46
32.0	36.7	-35.66	-46.14	10.48
33.0	37.0	-36.77	-47.58	10.81
34.0	37.2	-37.33	-48.43	11.10
35.0	37.1	-38.50	-49.69	11.19
36.0	37.4	-39.25	-50.76	11.51
37.0	37.6	-38.84	-50.33	11.49
38.0	37.8	-36.63	-48.24	11.61
39.0	38.0	-32.15	-43.94	11.79
40.0	37.9	-30.37	-42.22	11.85

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (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 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

8 MEASUREMENT UNCERTAINTIES

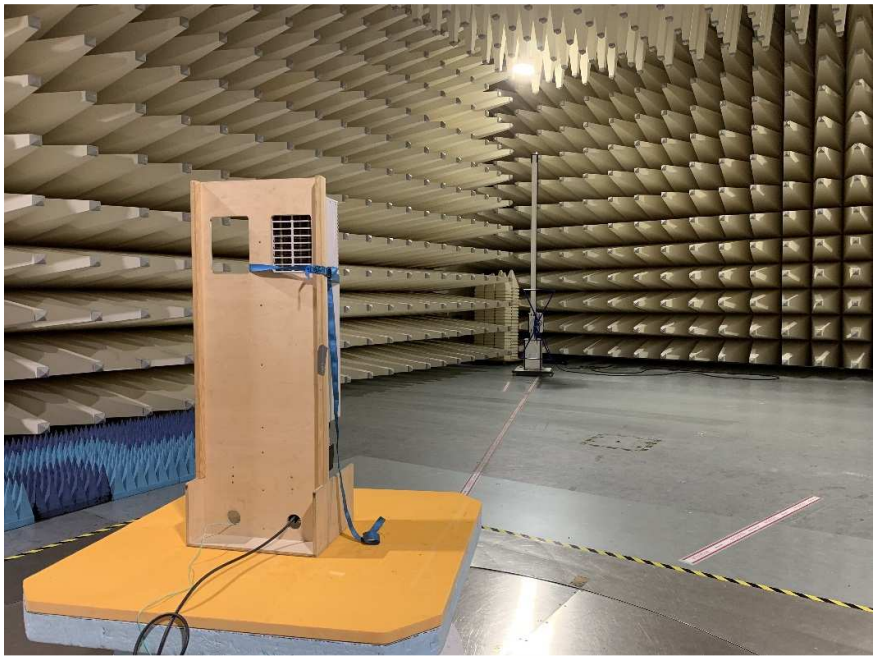
KDB 935210 D05	ECL
Power measurement	0.68 dB
Measuring AGC threshold level	0.90 dB
Out of band rejection	0.90 dB
Input-versus-output signal comparison	0.91 dB
Mean power output	0.90 dB
Measuring out-of-band/out-of-block (including intermodulation) emissions and spurious emissions	0.90 dB
Out-of-band/out-of-block emissions conducted measurements	0.90 dB
Spurious emissions conducted	2.18 dB
Spurious emissions radiated mesurements	5.38 dB
Total frequency uncertainty	2×10^{-7}

reference : ECL-MU5.4.6.3-EMC-14-001-V02.00 MU Wireless.xlsx

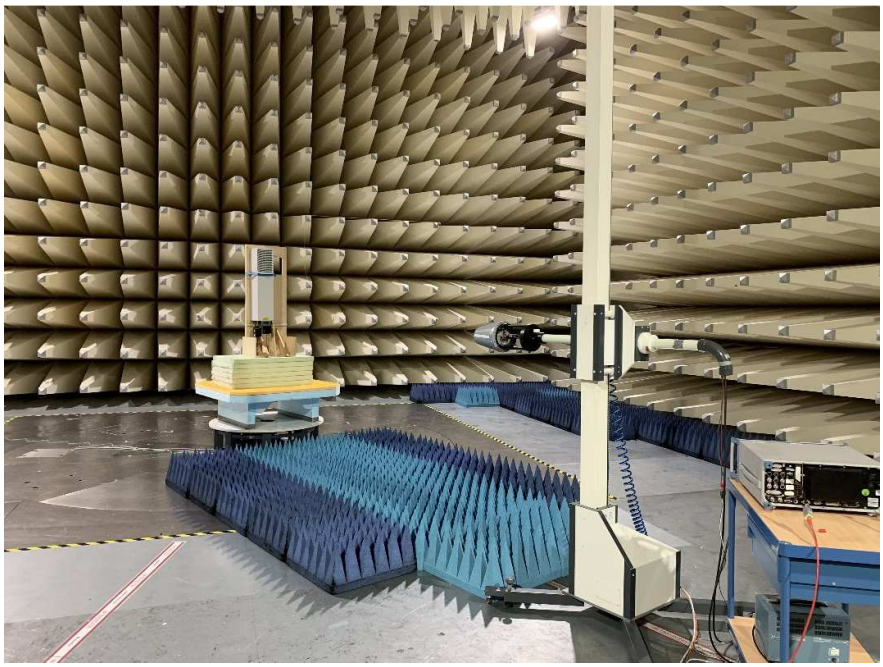
9 PHOTO REPORT

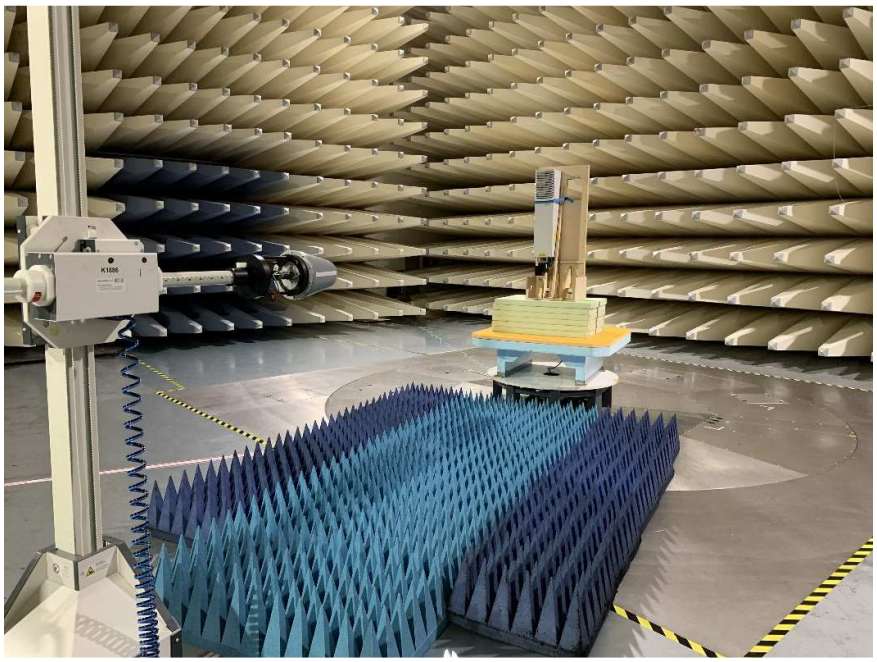
Labeling DUT

Measuring field strength of spurious radiation, Setup for 30 MHz to 1 GHz



Measuring field strength of spurious radiation, Setup for 1 GHz to 27 GHz





Florian Mosandl
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Date: 2019.12.06 10:55:51 +01'00'