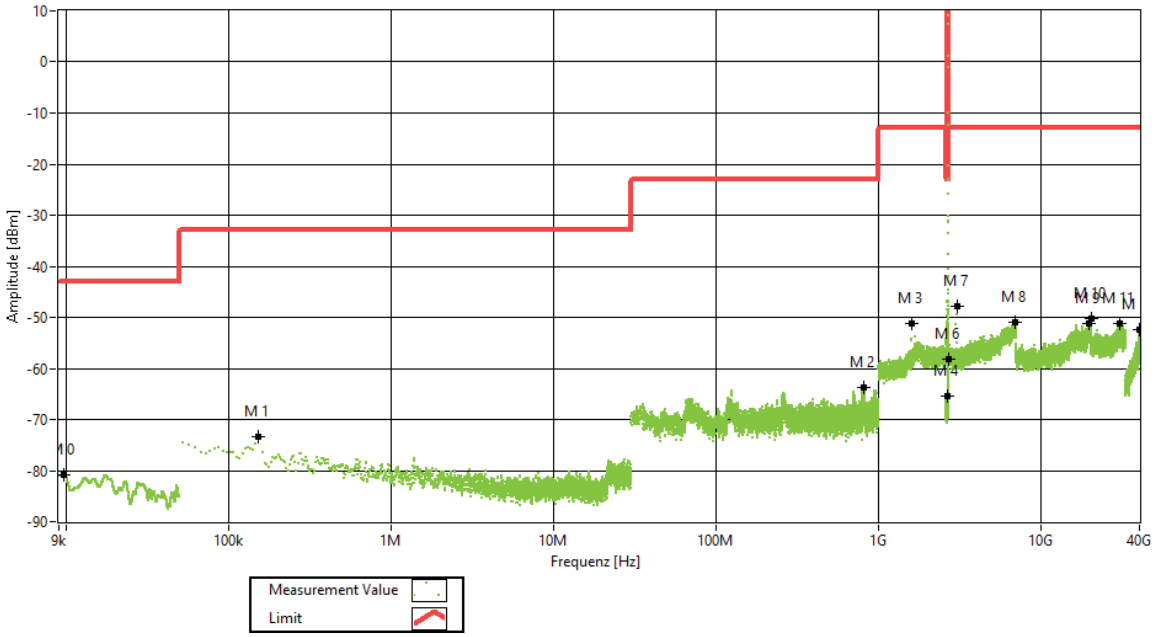
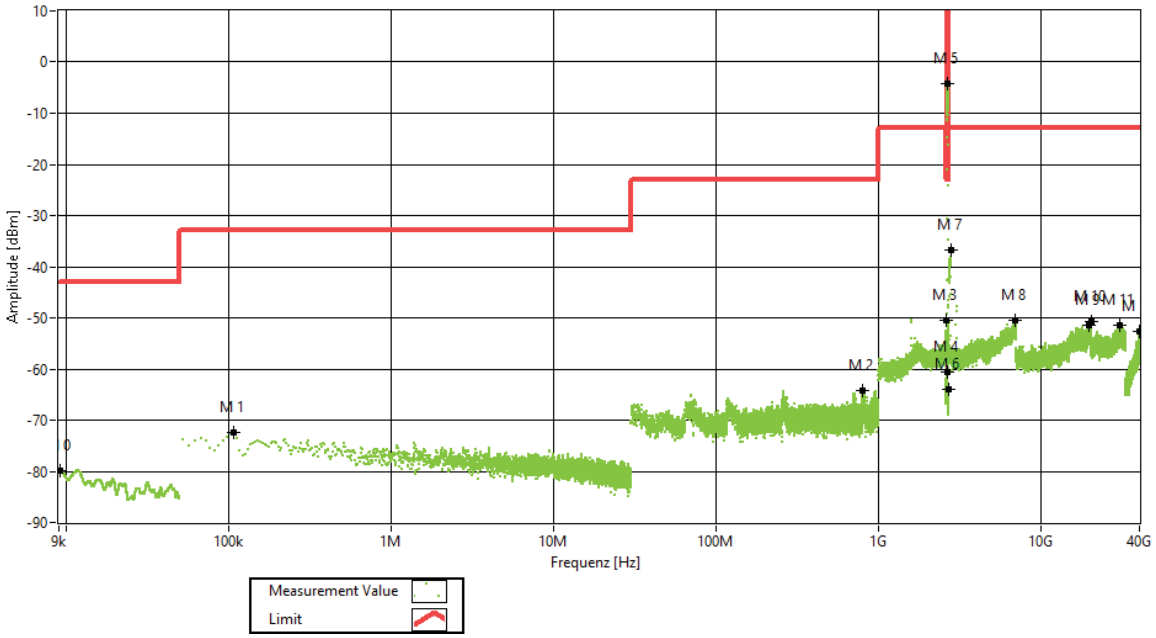
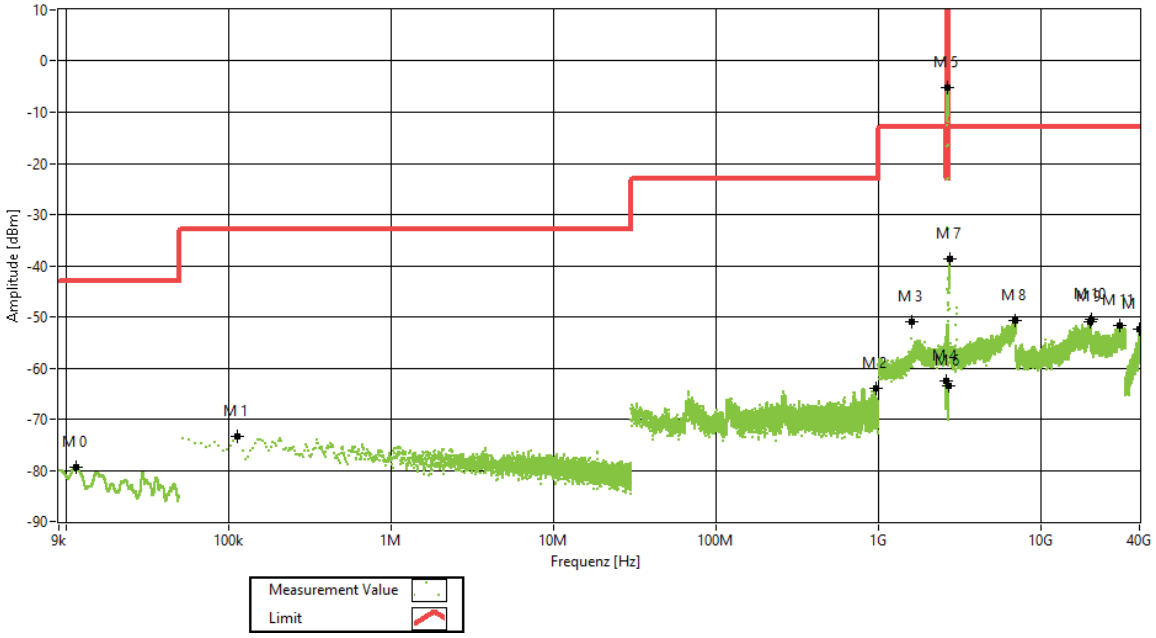
Frequency band = Band 41 BRS (UBS), Test frequency = high, Direction = RF downlink,
Signal type = Narrowband



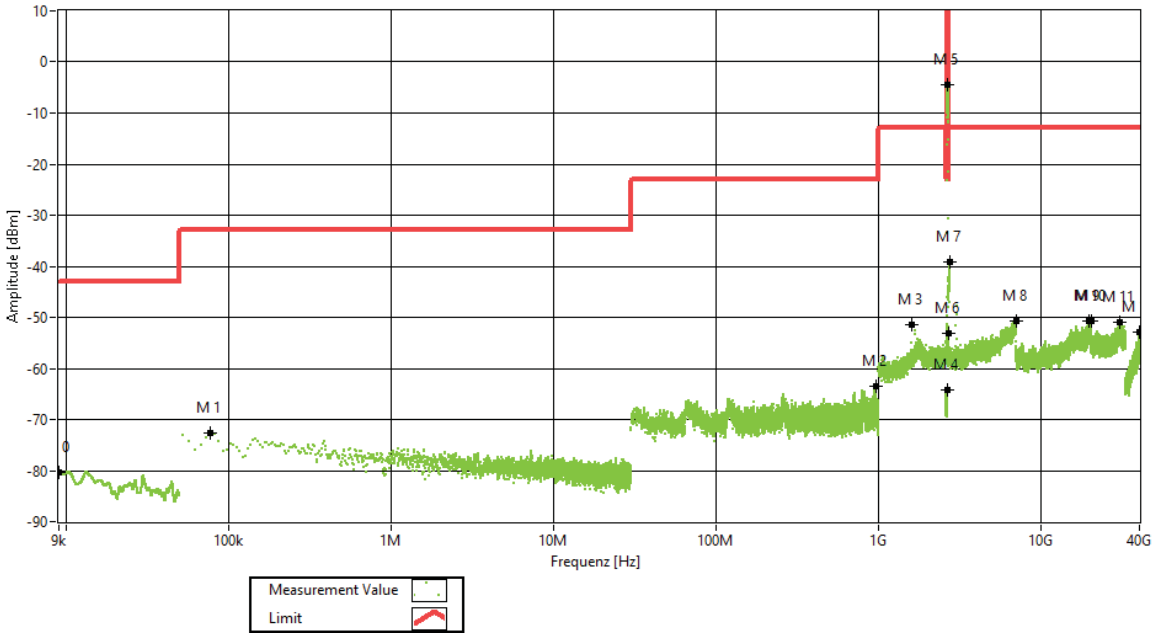
Frequency band = Band 41 BRS (UBS), Test frequency = low, Direction = RF downlink, Signal type = AWGN 45M



Frequency band = Band 41 BRS (UBS), Test frequency = mid, Direction = RF downlink, Signal type = AWGN 45M



Frequency band = Band 41 BRS (UBS), Test frequency = high, Direction = RF downlink,
Signal type = AWGN 45M



5.4.5 TEST EQUIPMENT USED

- Conducted

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 v01r04: 3.6

Test date: 2025-03-29

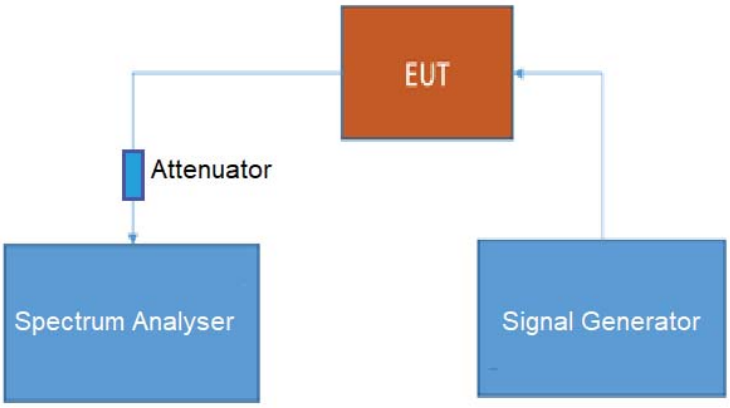
Environmental conditions: 23.8 °C; 28 % r. H.

Test engineer: Thomas Hufnagel

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:



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

Abstract from FCC Part 2:

FCC Part 2.1051; Measurement required: Spurious emissions at antenna terminal:

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§27.53 – Emission limits

Band 41 BRS (LBS/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.

Abstract from ISED RSS-199:

RSS-199; 5.6 Unwanted emission limits

Unwanted emissions shall be measured in terms of average values when the transmitter is operating at the manufacturer's rated power and modulated as specified in RSS-Gen. Equipment shall meet the unwanted emission limits, specified below, outside each frequency block group. For each channel bandwidth supported by the equipment under test, the unwanted emissions shall be measured and reported for two channel frequencies: one located as close as possible to the low end and one located as close as possible to the high end of the equipment's operating frequency range.

For the unwanted emission limits, in the 1 MHz band immediately outside and adjacent to the frequency block group, the power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for fixed stations, base stations, and fixed subscriber equipment, and 2% for subscriber equipment other than fixed subscriber equipment. Beyond this 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.

For all equipment, the TRP or total conducted power (sum of conducted power across all antenna connectors), where applicable, of the unwanted emissions outside the frequency block or frequency block group shall not exceed the limits shown in the tables below.

Table 4: Unwanted emission limits for fixed station, base station and fixed subscriber equipment

Offset from the edge of the frequency block or frequency block group (MHz)	Unwanted emission limits
≤ 1	-13 dBm/(1% of OB*)
> 1	-13 dBm/MHz

*OB is the occupied bandwidth

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]**
Wideband	0.3 dB < AGC	upper	2565.5	-0.1	-39.3	-13.0	26.3
Wideband	3 dB > AGC	upper	2565.5	3.2	-37.6	-13.0	24.6
Wideband 5G	0.3 dB < AGC	upper	2545.5	-0.4	-40.5	-13.0	27.5
Wideband 5G	3 dB > AGC	upper	2545.5	2.6	-40.6	-13.0	27.6
Narrowband	-0.3 dB < AGC	upper	2567.8	-0.1	-35.1	-13.0	22.1
Narrowband	3 dB > AGC	upper	2567.8	3.2	-36.9	-13.0	23.9
Wideband	0.3 dB < AGC	lower	2498.5	0.5	-47.9	-13.0	34.9
Wideband	3 dB > AGC	lower	2498.5	3.8	-49.6	-13.0	36.6
Wideband 5G	0.3 dB < AGC	lower	2518.5	0.2	-50.2	-13.0	37.2
Wideband 5G	3 dB > AGC	lower	2518.5	3.2	-50.1	-13.0	37.1
Narrowband	-0.3 dB < AGC	lower	2496.2	0.5	-41.0	-13.0	28.0
Narrowband	3 dB > AGC	lower	2496.2	3.8	-40.7	-13.0	27.7

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]**
Wideband	0.3 dB < AGC	upper	2565.5	2563.0	-0.3	-38.0	-13.0	25.0
Wideband	3 dB > AGC	upper	2565.5	2563.0	3.0	-39.3	-13.0	26.3
Narrowband	0.3 dB < AGC	upper	2567.8	2567.6	0.1	-36.0	-13.0	23.0
Narrowband	3 dB > AGC	upper	2567.8	2567.6	3.4	-37.7	-13.0	24.7
Wideband	0.3 dB < AGC	lower	2498.5	2501.0	0.5	-51.5	-13.0	38.5
Wideband	3 dB > AGC	lower	2498.5	2501.0	3.8	-52.3	-13.0	39.3
Narrowband	0.3 dB < AGC	lower	2496.2	2496.4	0.5	-43.0	-13.0	30.0
Narrowband	3 dB > AGC	lower	2496.2	2496.4	3.8	-43.3	-13.0	30.3

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]**
Wideband	0.3 dB < AGC	upper	2611.50	-0.9	-39.6	-13	26.6
Wideband	3 dB > AGC	upper	2611.50	2.4	-41.0	-13	28.0
Wideband 5G	0.3 dB < AGC	upper	2601.50	-1.2	-45.8	-13	32.8
Wideband 5G	3 dB > AGC	upper	2601.50	1.8	-44.1	-13	31.1
Narrowband	-0.3 dB < AGC	upper	2613.80	-1.1	-33.8	-13	20.8
Narrowband	3 dB > AGC	upper	2613.80	2.2	-33.7	-13	20.7
Wideband	0.3 dB < AGC	lower	2574.50	-0.1	-50.3	-13	37.3
Wideband	3 dB > AGC	lower	2574.50	3.2	-51.5	-13	38.5
Wideband 5G	0.3 dB < AGC	lower	2584.50	-0.4	-49.4	-13	36.4
Wideband 5G	3 dB > AGC	lower	2584.50	2.6	-49.8	-13	36.8
Narrowband	-0.3 dB < AGC	lower	2572.20	-0.1	-35.7	-13	22.7
Narrowband	3 dB > AGC	lower	2572.20	3.2	-36.0	-13	23.0

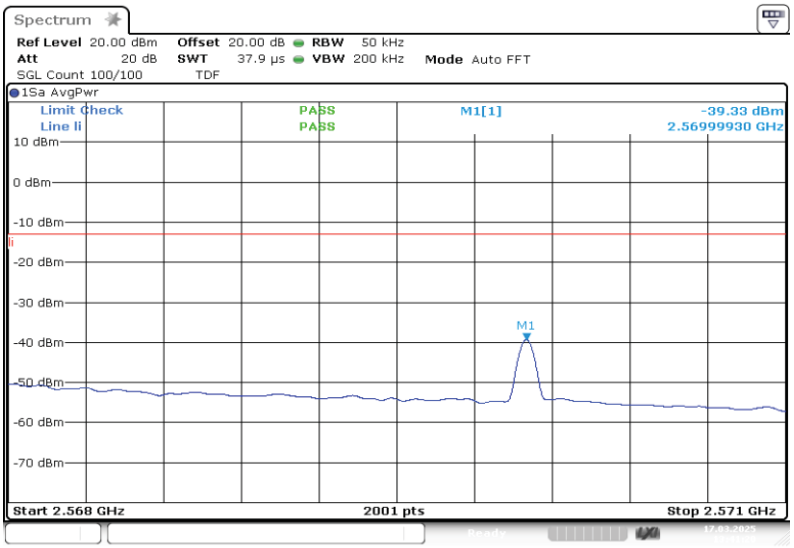
Band 41 BRS (MBS), downlink, Number of input signals = 2								
Signal Type	**Input Power**	**Band Edge**	**Signal Frequency f1 [MHz]**	**Signal Frequency f2 [MHz]**	**Input Power [dBm]**	**Maximum Out-of-band Power [dBm]**	**Limit Out-of-band Power [dBm]**	**Margin to Limit [dB]**
Wideband	0.3 dB < AGC	upper	2611.5	2609.0	-0.9	-41.9	-13.0	28.9
Wideband	3 dB > AGC	upper	2611.5	2609.0	2.4	-42.4	-13.0	29.4
Narrowband	0.3 dB < AGC	upper	2613.8	2613.6	-0.9	-34.5	-13.0	21.5
Narrowband	3 dB > AGC	upper	2613.8	2613.6	2.4	-34.0	-13.0	21.0
Wideband	0.3 dB < AGC	lower	2574.5	2577.0	-0.3	-53.2	-13.0	40.2
Wideband	3 dB > AGC	lower	2574.5	2577.0	3.0	-53.2	-13.0	40.2
Narrowband	0.3 dB < AGC	lower	2572.2	2572.4	-0.1	-38.7	-13.0	25.7
Narrowband	3 dB > AGC	lower	2572.2	2572.4	3.2	-38.3	-13.0	25.3

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]**
Wideband	0.3 dB < AGC	upper	2687.50	0.1	-36.8	-13.0	23.8
Wideband	3 dB > AGC	upper	2687.50	3.4	-37.0	-13.0	24.0
Wideband 5G	0.3 dB < AGC	upper	2667.50	-0.2	-40.3	-13.0	27.3
Wideband 5G	3 dB > AGC	upper	2667.50	2.8	-41.0	-13.0	28.0
Narrowband	-0.3 dB < AGC	upper	2689.80	0.3	-27.7	-13.0	14.7
Narrowband	3 dB > AGC	upper	2689.80	3.6	-27.2	-13.0	14.2
Wideband	0.3 dB < AGC	lower	2620.50	1.3	-51.3	-13.0	38.3
Wideband	3 dB > AGC	lower	2620.50	4.6	-52.0	-13.0	39.0
Wideband 5G	0.3 dB < AGC	lower	2640.50	1.0	-51.3	-13.0	38.3
Wideband 5G	3 dB > AGC	lower	2640.50	4.0	-52.7	-13.0	39.7
Narrowband	-0.3 dB < AGC	lower	2618.20	1.3	-40.1	-13.0	27.1
Narrowband	3 dB > AGC	lower	2618.20	4.6	-40.0	-13.0	27.0

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]**
Wideband	0.3 dB < AGC	upper	2687.5	2685.0	-0.1	-38.7	-13.0	25.7
Wideband	3 dB > AGC	upper	2687.5	2685.0	3.2	-40.2	-13.0	27.2
Narrowband	0.3 dB < AGC	upper	2689.8	2689.6	0.5	-29.4	-13.0	16.4
Narrowband	3 dB > AGC	upper	2689.8	2689.6	3.8	-30.7	-13.0	17.7
Wideband	0.3 dB < AGC	lower	2620.5	2623.0	1.3	-53.4	-13.0	40.4
Wideband	3 dB > AGC	lower	2620.5	2623.0	4.6	-54.8	-13.0	41.8
Narrowband	0.3 dB < AGC	lower	2618.2	2618.4	1.3	-42.9	-13.0	29.9
Narrowband	3 dB > AGC	lower	2618.2	2618.4	4.6	-43.6	-13.0	30.6

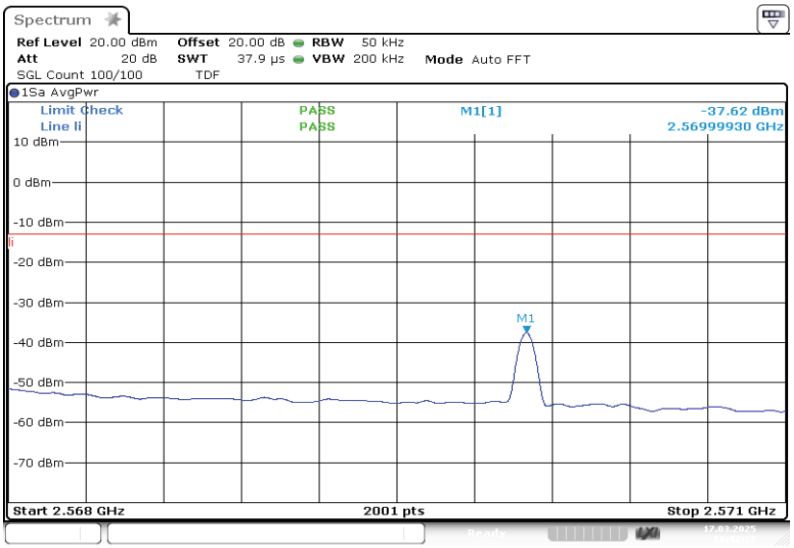
5.5.4 MEASUREMENT PLOT

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



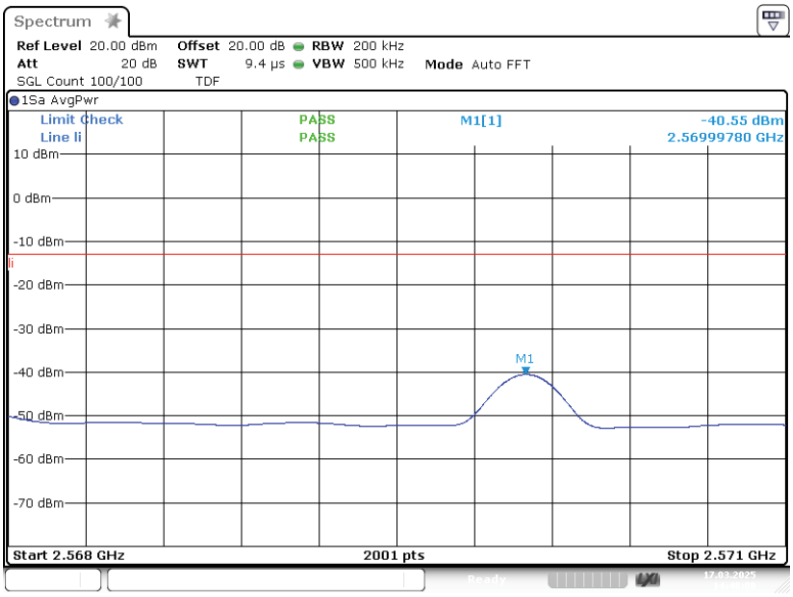
3.6.2 out of band emi BRS Low AWGN upper 1carrier -0.3 dB 2.
568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



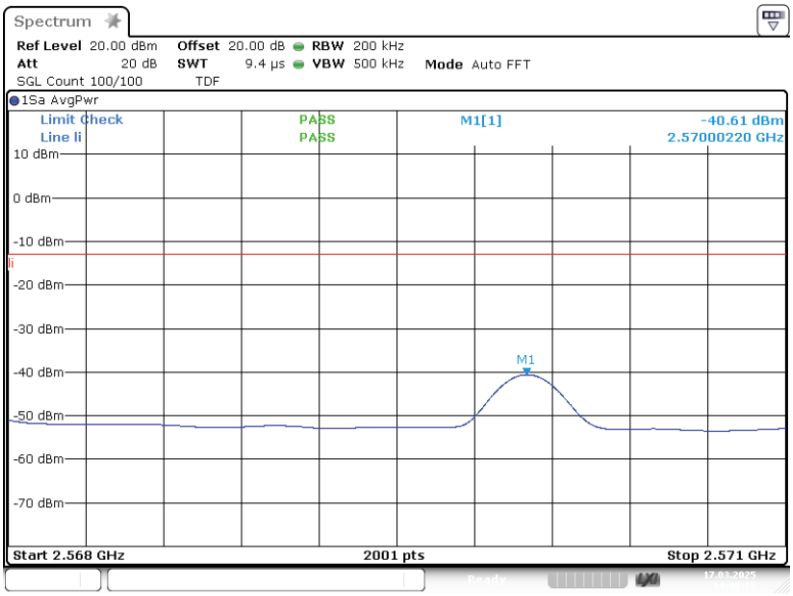
3.6.2 out of band emi BRS Low AWGN upper 1carrier +3.0 dB 2.
568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



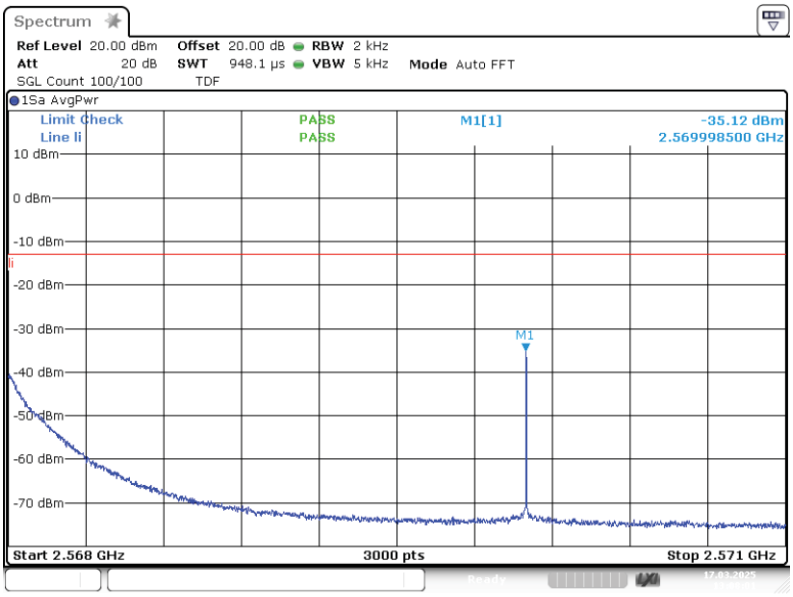
3.6.2 out of band emi BRS Low AWGN 45M upper 1carrier -0.3 d
B 2.568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



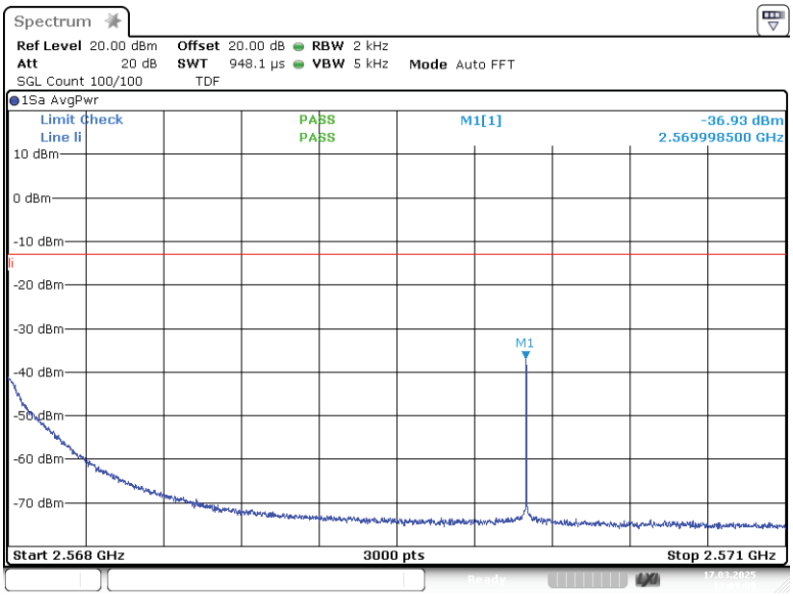
3.6.2 out of band emi BRS Low AWGN 45M upper 1carrier +3.0 d
B 2.568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



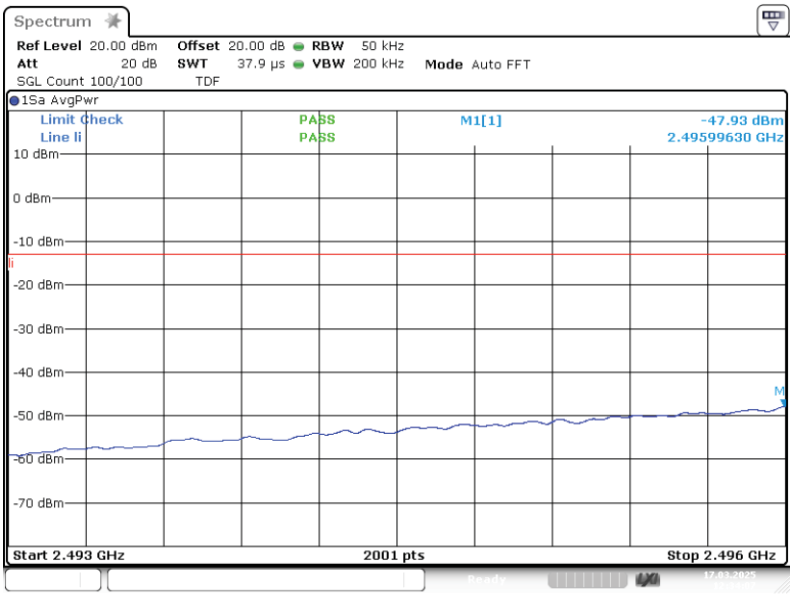
3.6.2 out of band emi BRS Low GSM upper 1carrier -0.3 dB 2.5
68G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



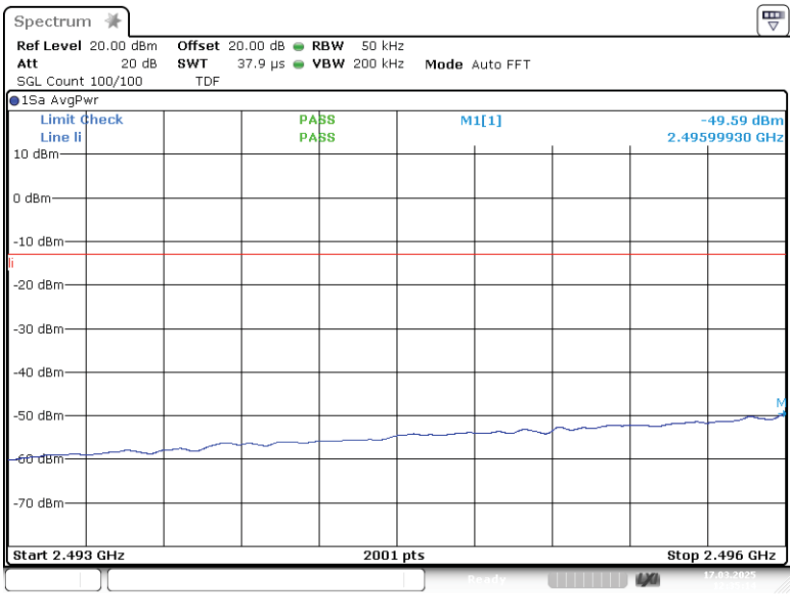
3.6.2 out of band emi BRS Low GSM upper 1carrier +3.0 dB 2.5
68G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



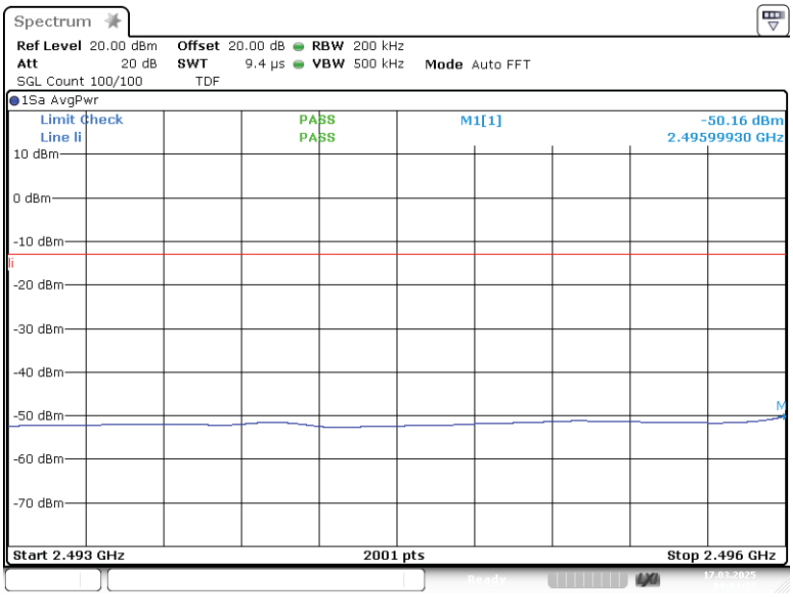
3.6.2 out of band emi BRS Low AWGN lower 1carrier -0.3 dB 2.
493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



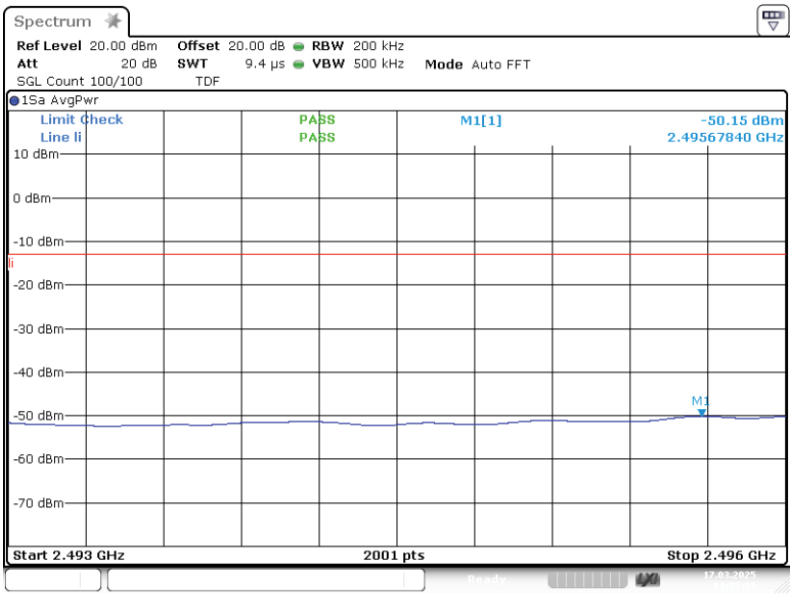
3.6.2 out of band emi BRS Low AWGN lower 1carrier +3.0 dB 2.
493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



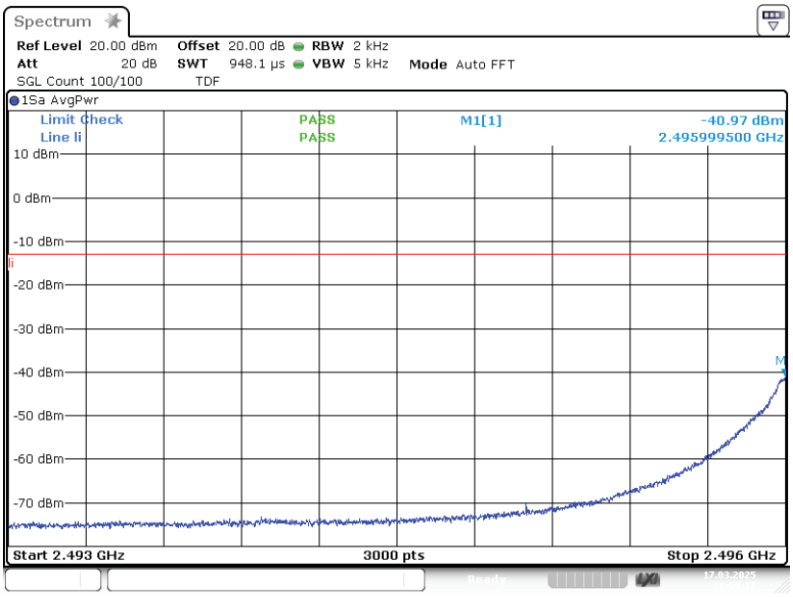
3.6.2 out of band emi BRS Low AWGN 45M lower 1carrier -0.3 d
B 2.493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



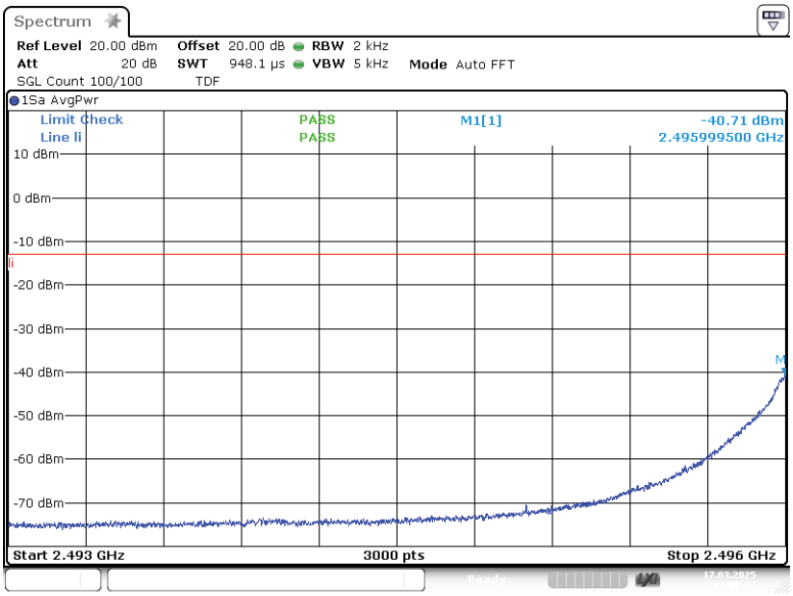
3.6.2 out of band emi BRS Low AWGN 45M lower 1carrier +3.0 d
B 2.493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



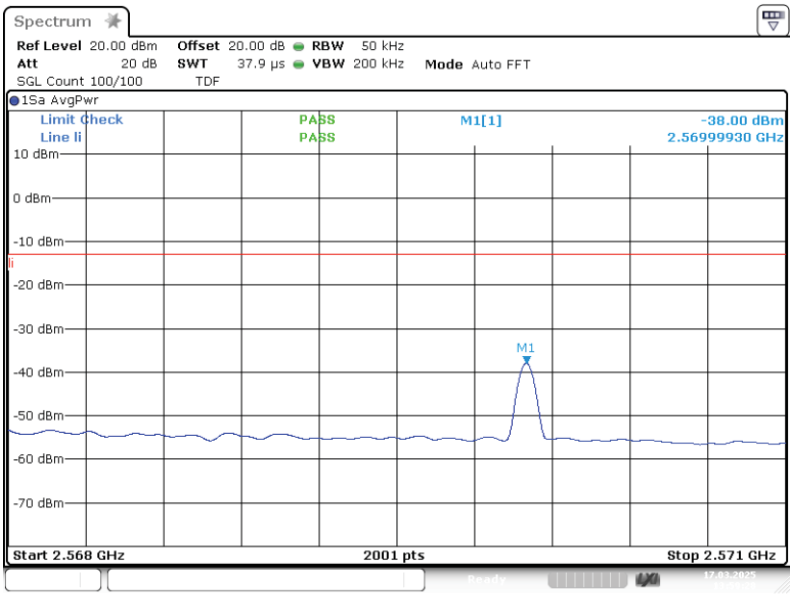
3.6.2 out of band emi BRS Low GSM lower 1carrier -0.3 dB 2.4
93G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



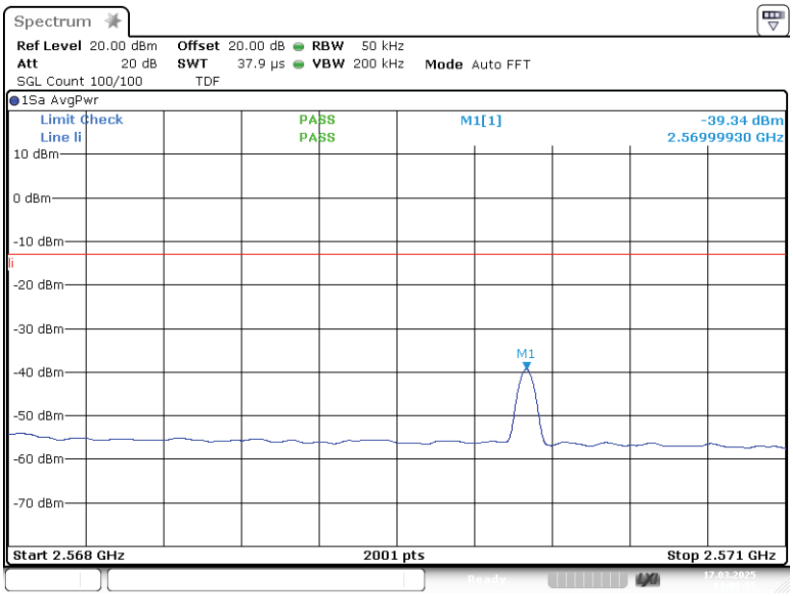
3.6.2 out of band emi BRS Low GSM lower 1carrier +3.0 dB 2.4
93G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



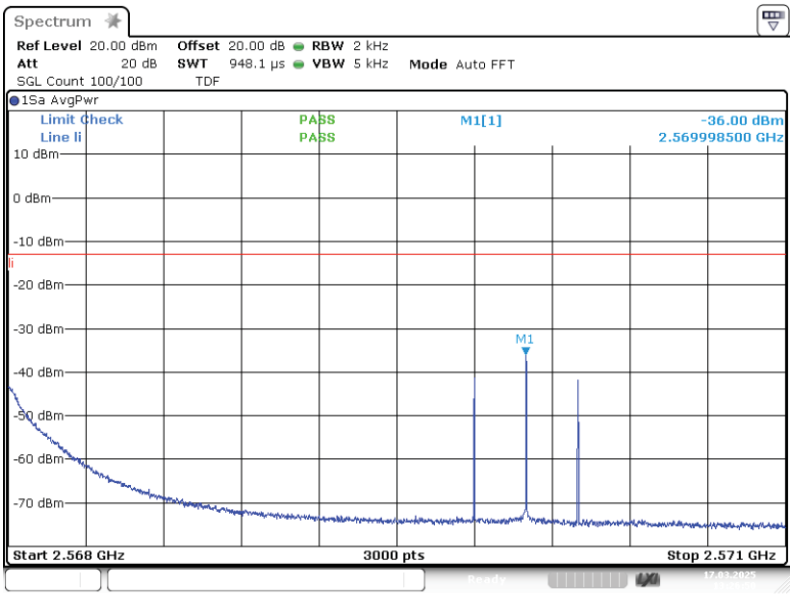
3.6.2 out of band emi BRS Low AWGN upper 2carriers -0.3 dB 2
.568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



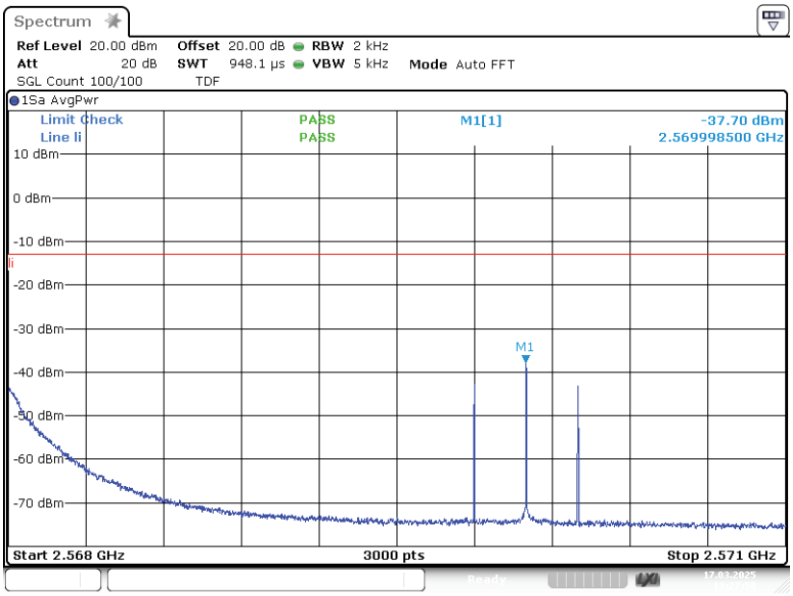
3.6.2 out of band emi BRS Low AWGN upper 2carriers +3.0 dB 2
.568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



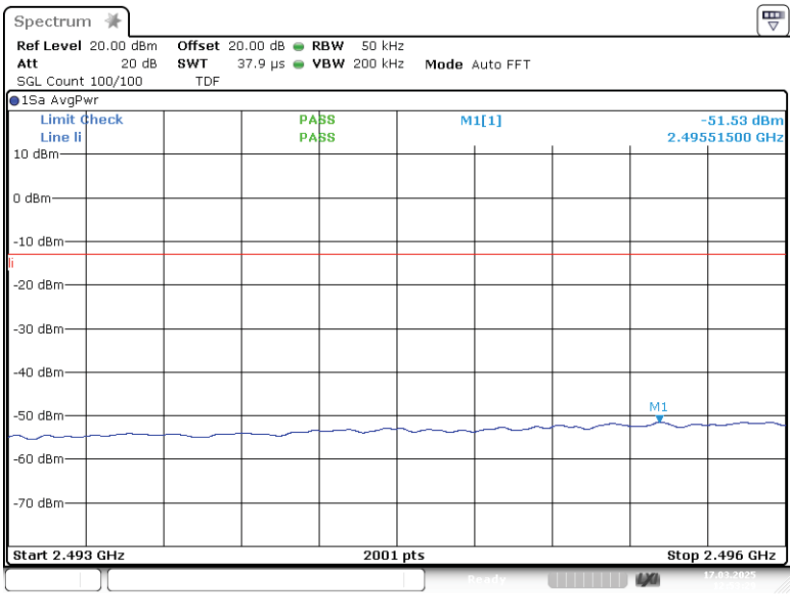
3.6.2 out of band emi BRS Low GSM upper 2carriers -0.3 dB 2.
568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



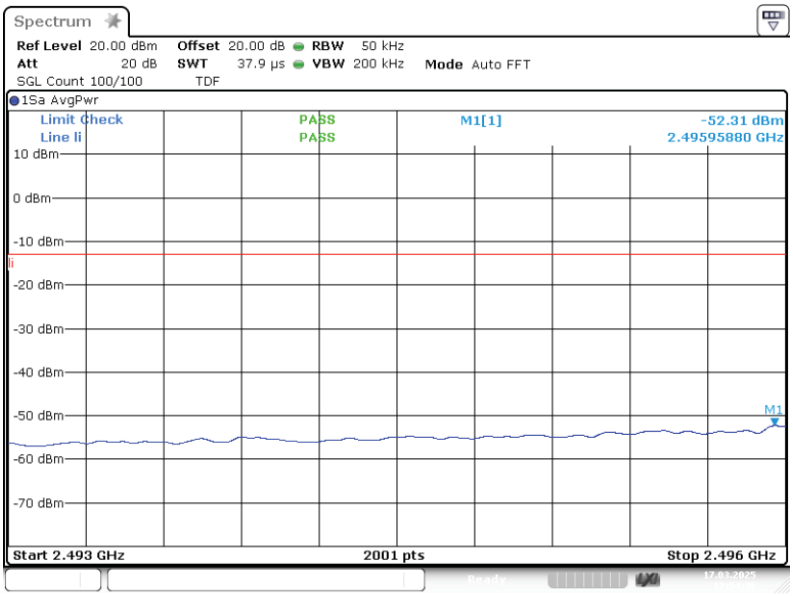
3.6.2 out of band emi BRS Low GSM upper 2carriers +3.0 dB 2.
568G 2.571G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



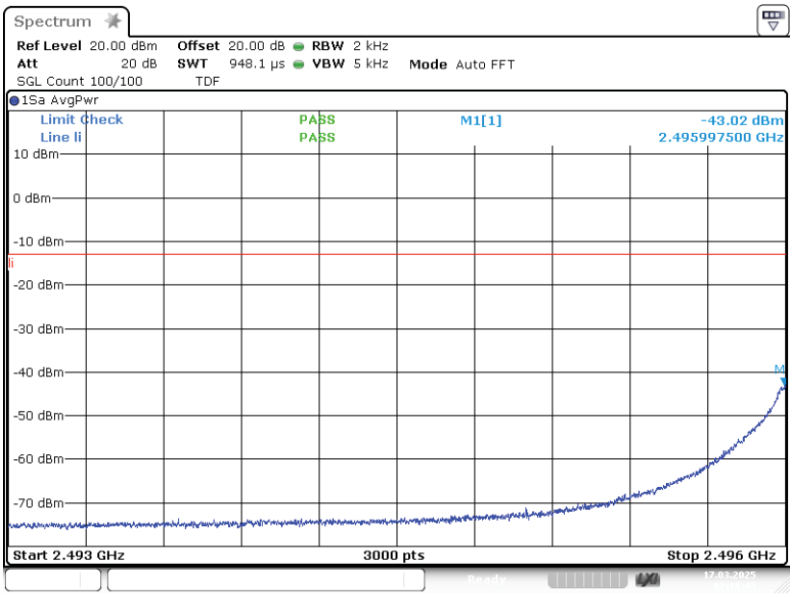
3.6.2 out of band emi BRS Low AWGN lower 2carriers -0.3 dB 2
.493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



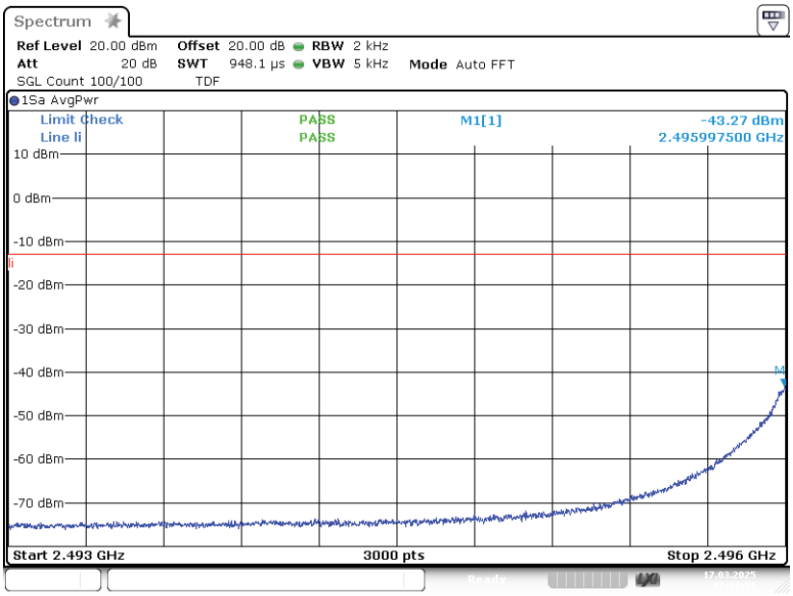
3.6.2 out of band emi BRS Low AWGN lower 2carriers +3.0 dB 2
.493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



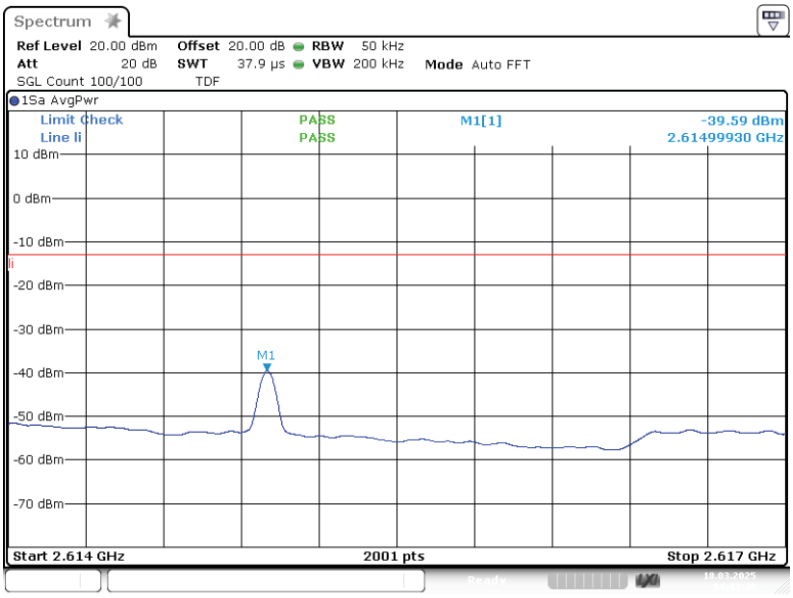
3.6.2 out of band emi BRS Low GSM lower 2carriers -0.3 dB 2.
493G 2.496G

Band: BRS LBS; Frequency: 2.4960 GHz to 2.5680 GHz; Band edge: lower; Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



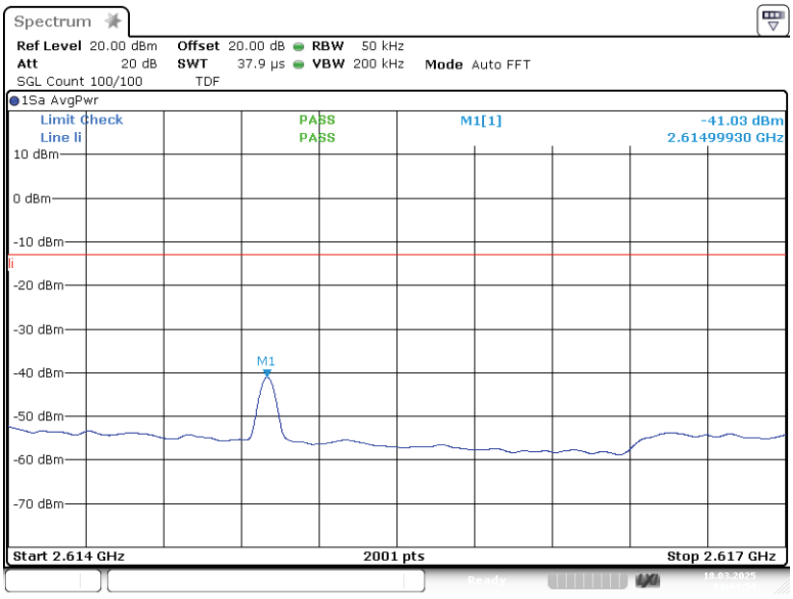
3.6.2 out of band emi BRS Low GSM lower 2carriers +3.0 dB 2.
493G 2.496G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN;
Input power = 0.3 dB < AGC; Number of signals 1



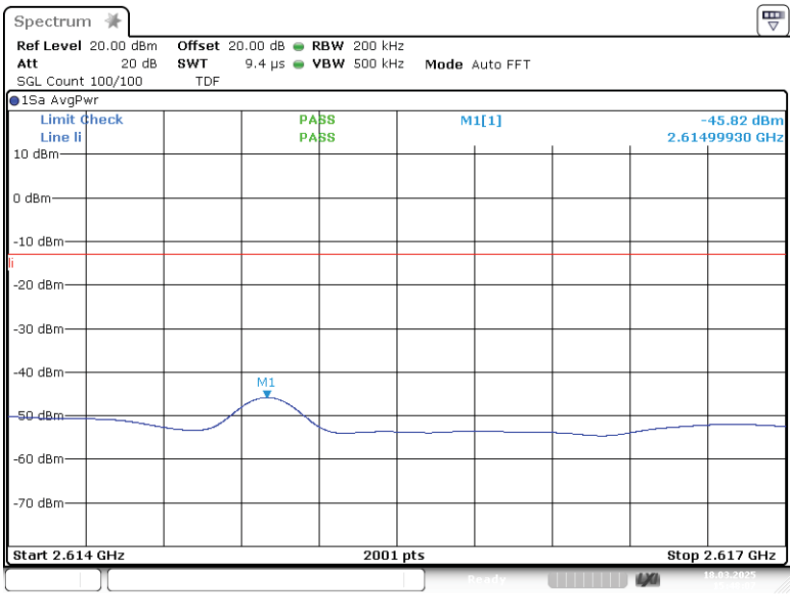
3.6.2 out of band emi BRS Mid AWGN upper 1carrier -0.3 dB 2.
614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN;
Input power = 3 dB > AGC; Number of signals 1



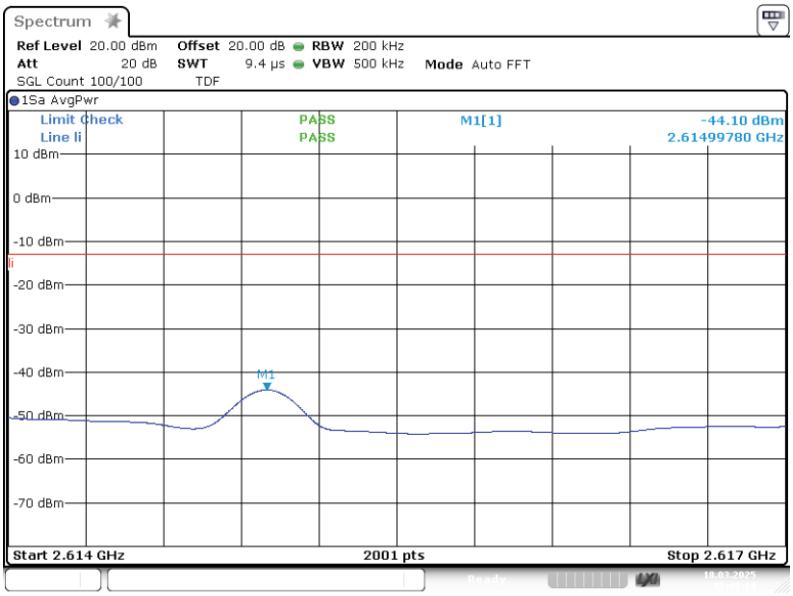
3.6.2 out of band emi BRS Mid AWGN upper 1carrier +3.0 dB 2.
614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN 25M; Input power = 0.3 dB < AGC; Number of signals 1



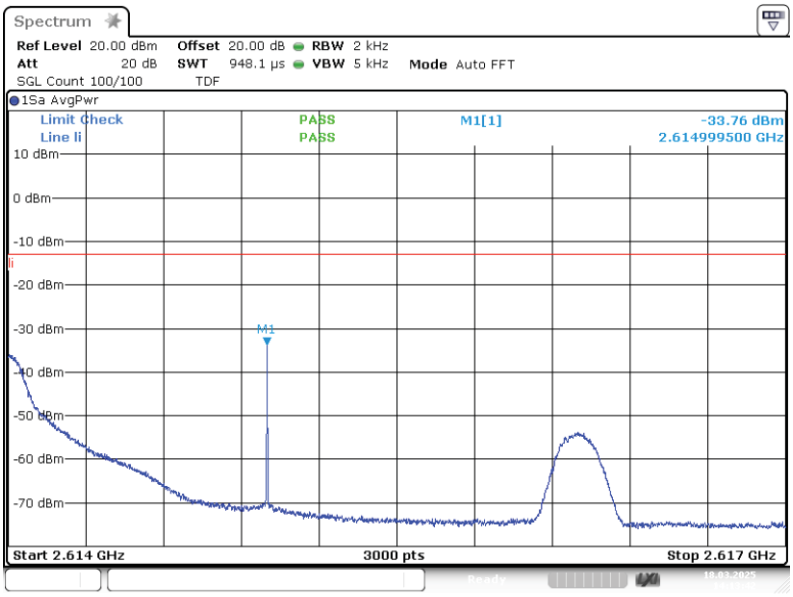
3.6.2 out of band emi BRS Mid AWGN 25M upper 1carrier -0.3 d
B 2.614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN 25M; Input power = 3 dB > AGC; Number of signals 1



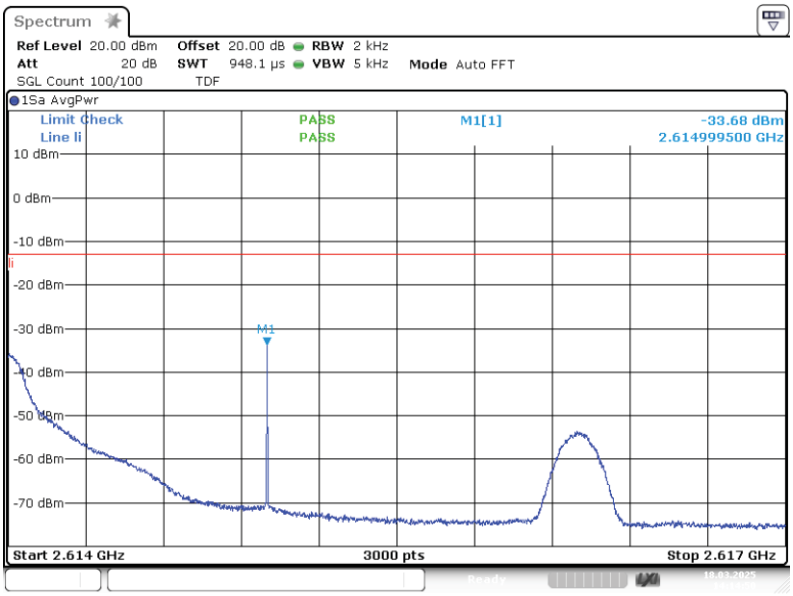
3.6.2 out of band emi BRS Mid AWGN 25M upper 1carrier +3.0 d
B 2.614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



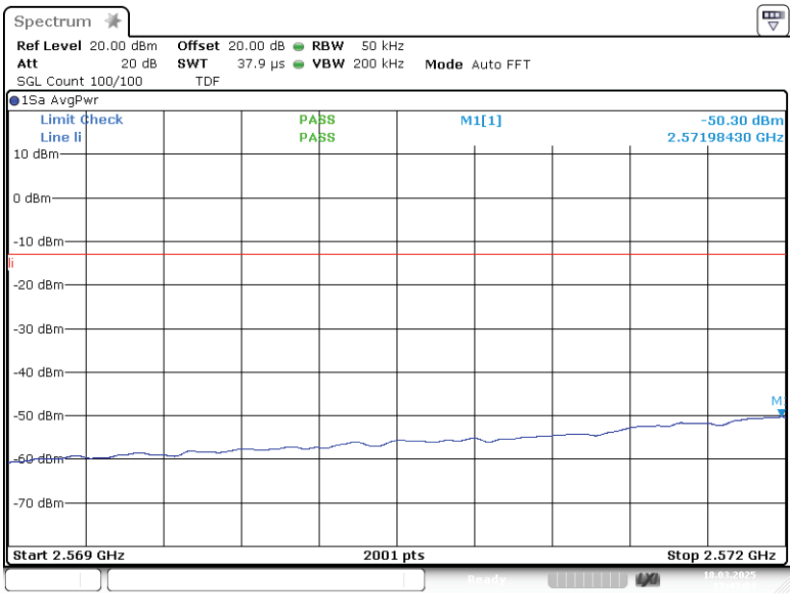
3.6.2 out of band emi BRS Mid GSM upper 1carrier -0.3 dB 2.6
14G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



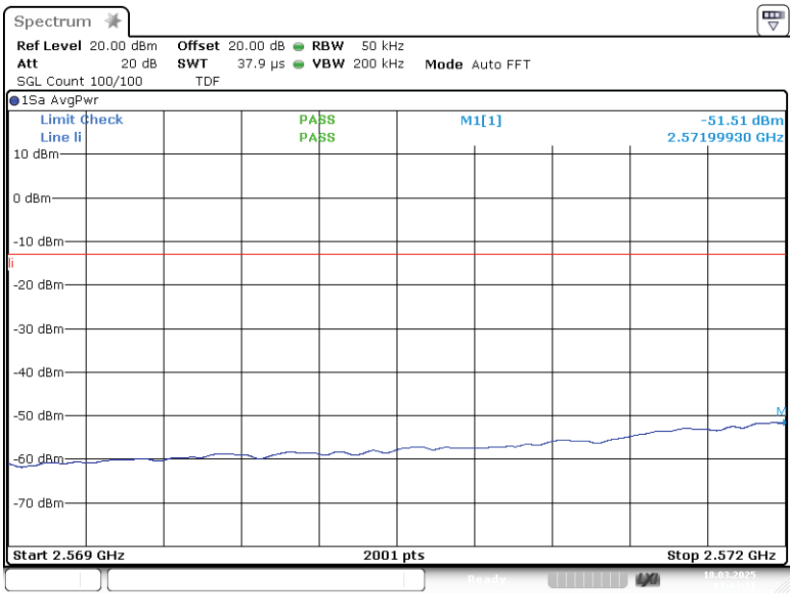
3.6.2 out of band emi BRS Mid GSM upper 1carrier +3.0 dB 2.6
14G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



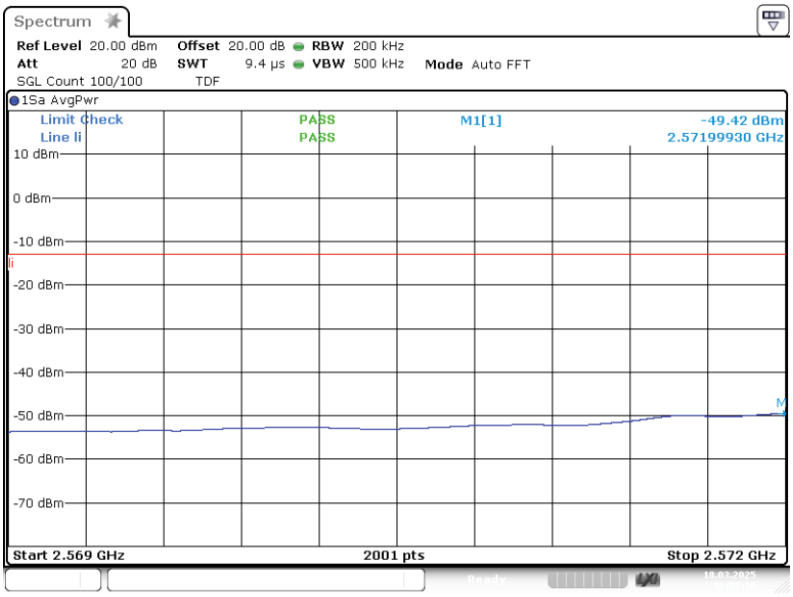
3.6.2 out of band emi BRS Mid AWGN lower 1carrier -0.3 dB 2.
569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



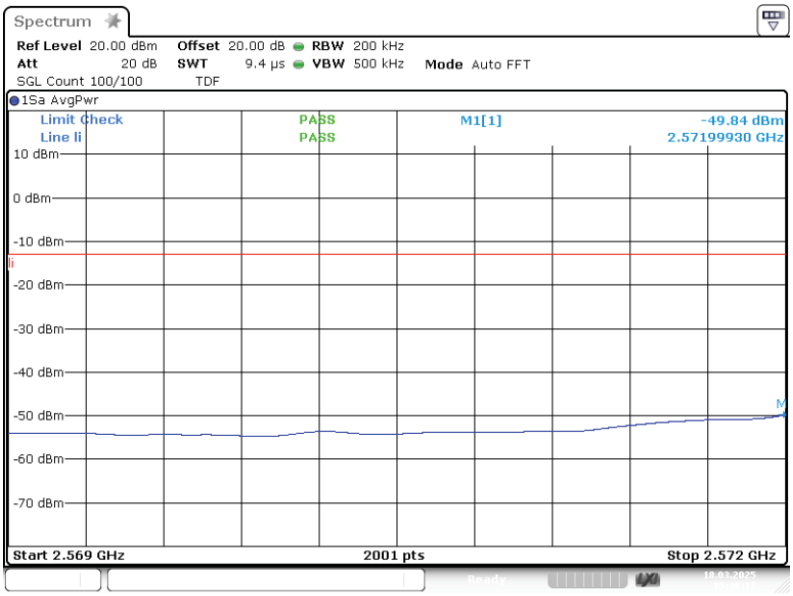
3.6.2 out of band emi BRS Mid AWGN lower 1carrier +3.0 dB 2.
569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN 25M; Input power = 0.3 dB < AGC; Number of signals 1



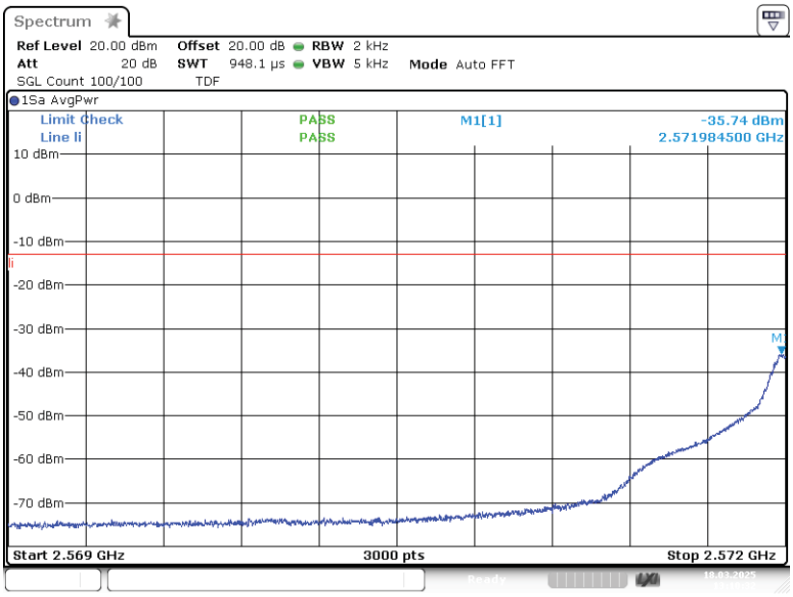
3.6.2 out of band emi BRS Mid AWGN 25M lower 1carrier -0.3 d
B 2.569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN 25M; Input power = 3 dB > AGC; Number of signals 1



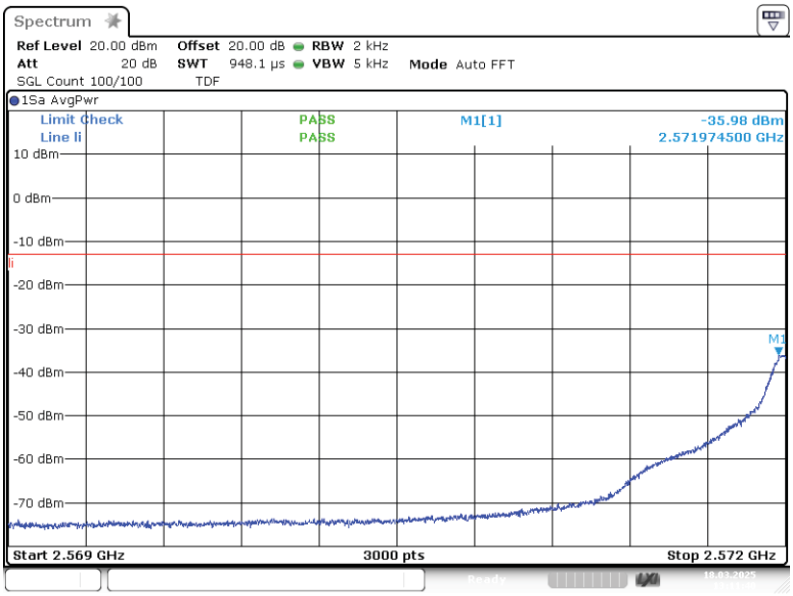
3.6.2 out of band emi BRS Mid AWGN 25M lower 1carrier +3.0 d
B 2.569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



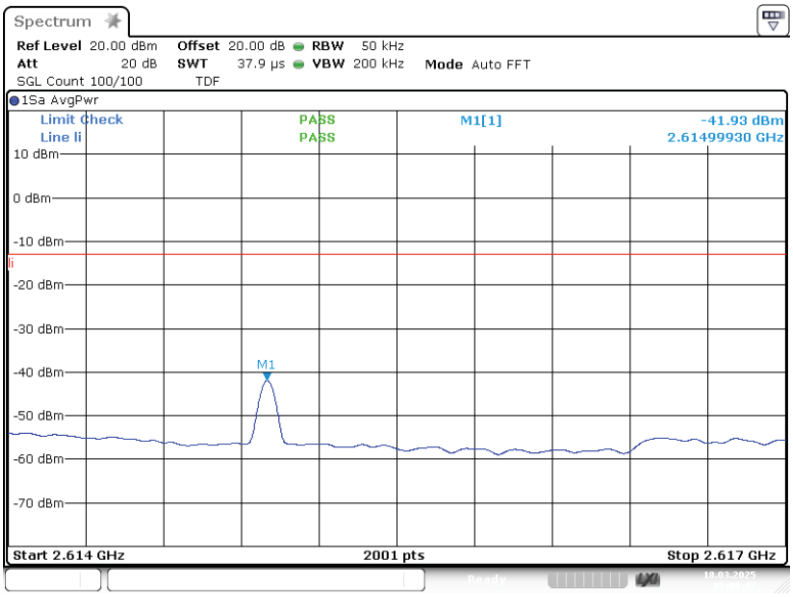
3.6.2 out of band emi BRS Mid GSM lower 1carrier -0.3 dB 2.5
69G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



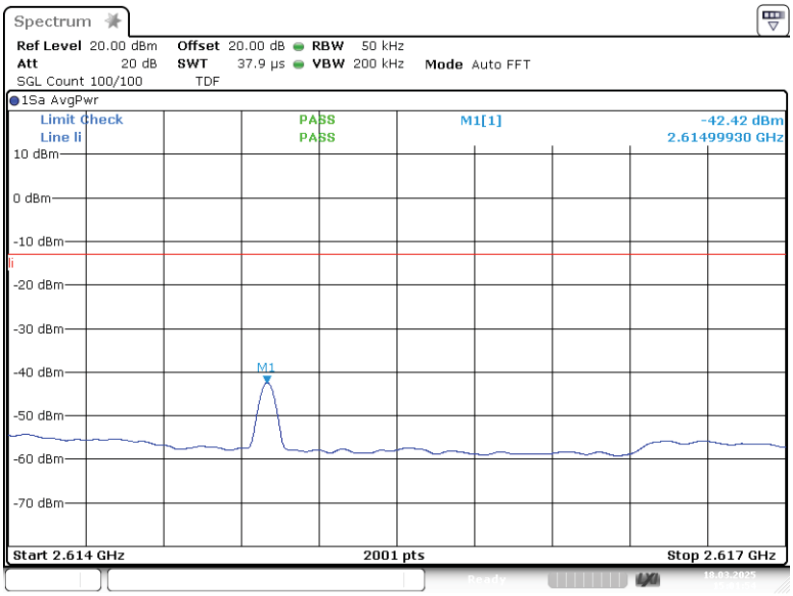
3.6.2 out of band emi BRS Mid GSM lower 1carrier +3.0 dB 2.5
69G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN;
Input power = 0.3 dB < AGC; Number of signals 2



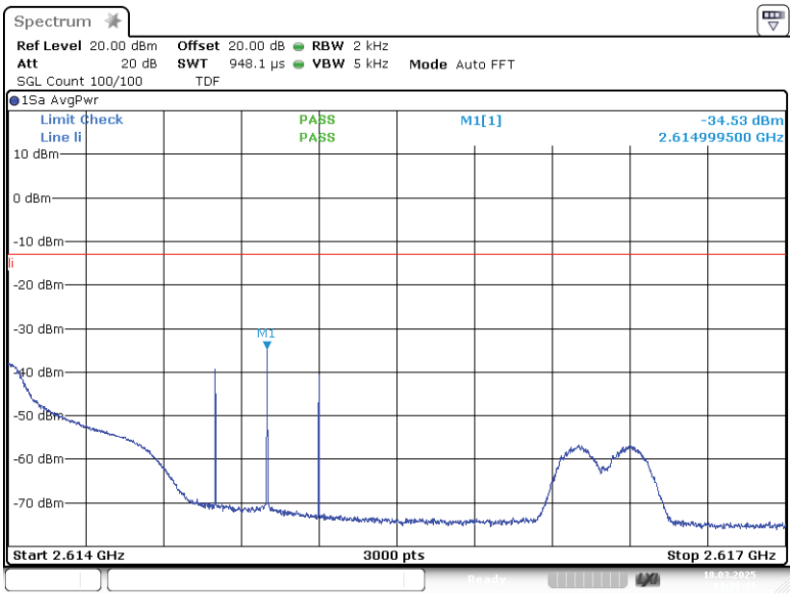
3.6.2 out of band emi BRS Mid AWGN upper 2carriers -0.3 dB 2
.614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: AWGN;
Input power = 3 dB > AGC; Number of signals 2



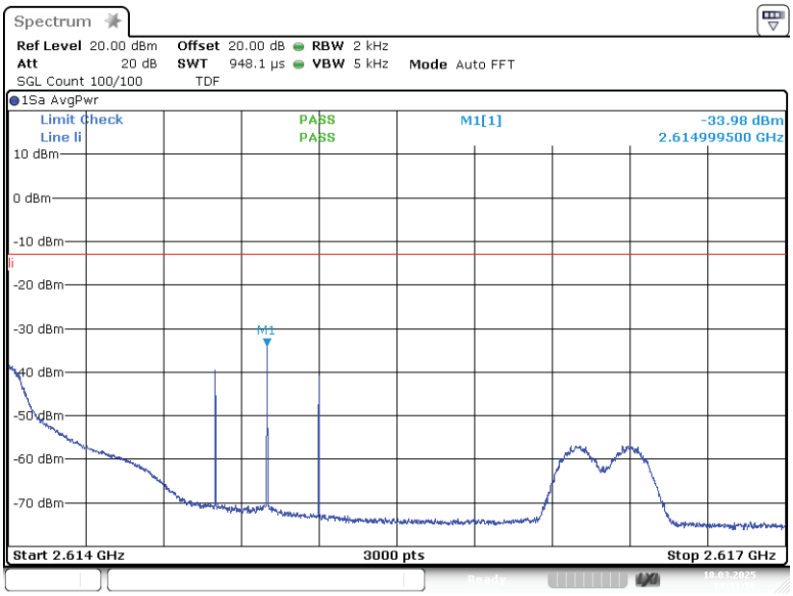
3.6.2 out of band emi BRS Mid AWGN upper 2carriers +3.0 dB 2
.614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



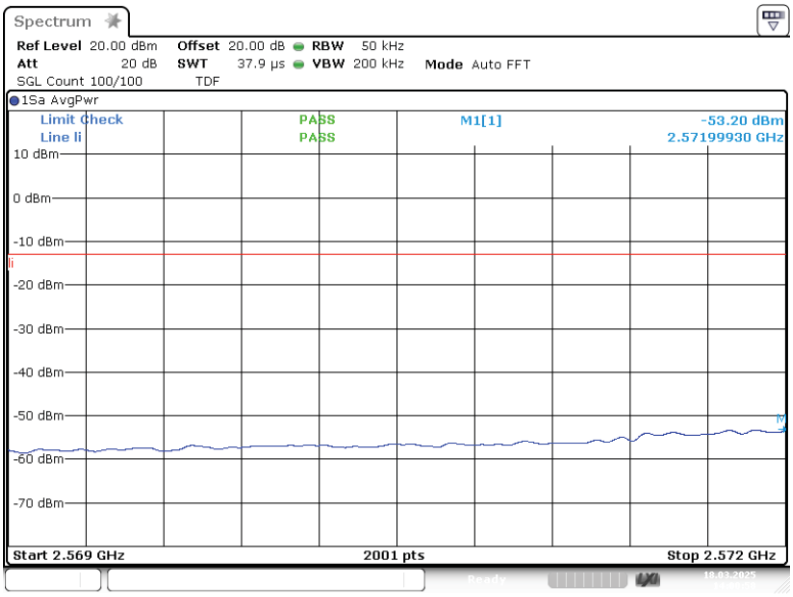
3.6.2 out of band emi BRS Mid GSM upper 2carriers -0.3 dB 2.
614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



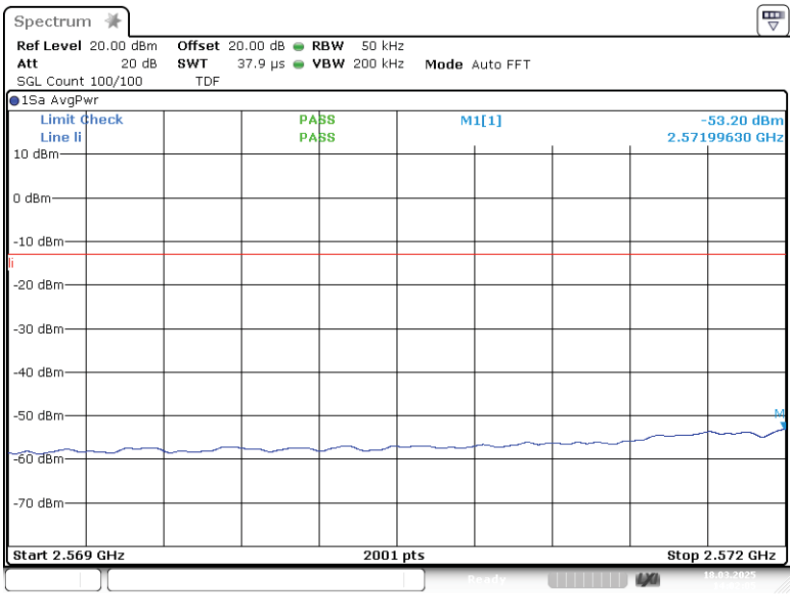
3.6.2 out of band emi BRS Mid GSM upper 2carriers +3.0 dB 2.
614G 2.617G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



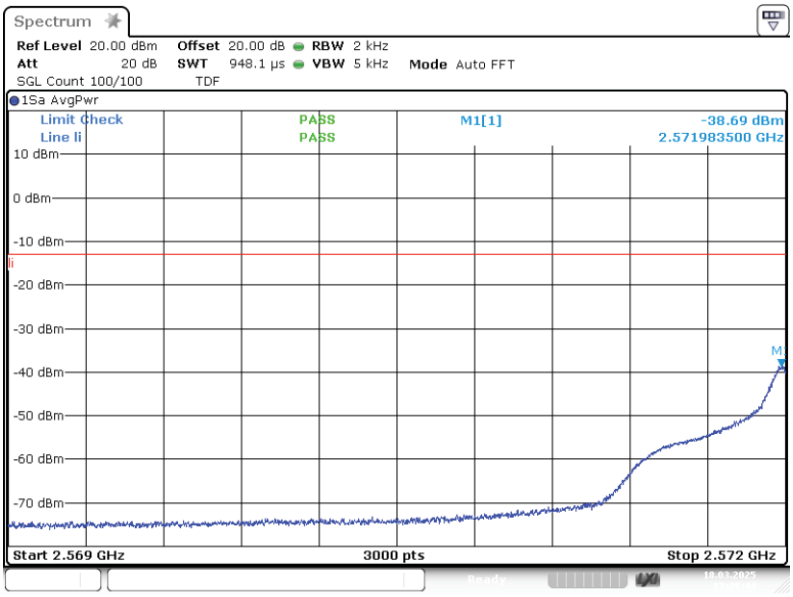
3.6.2 out of band emi BRS Mid AWGN lower 2carriers -0.3 dB 2
.569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



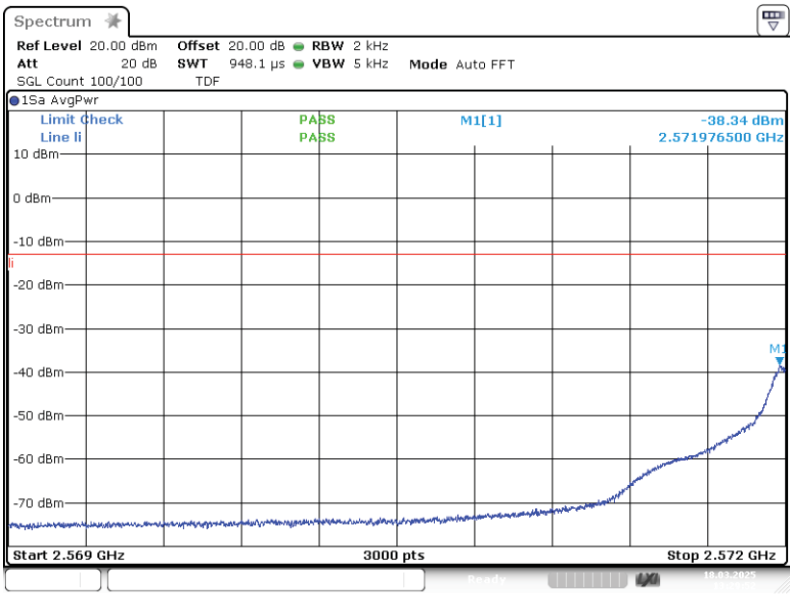
3.6.2 out of band emi BRS Mid AWGN lower 2carriers +3.0 dB 2
.569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



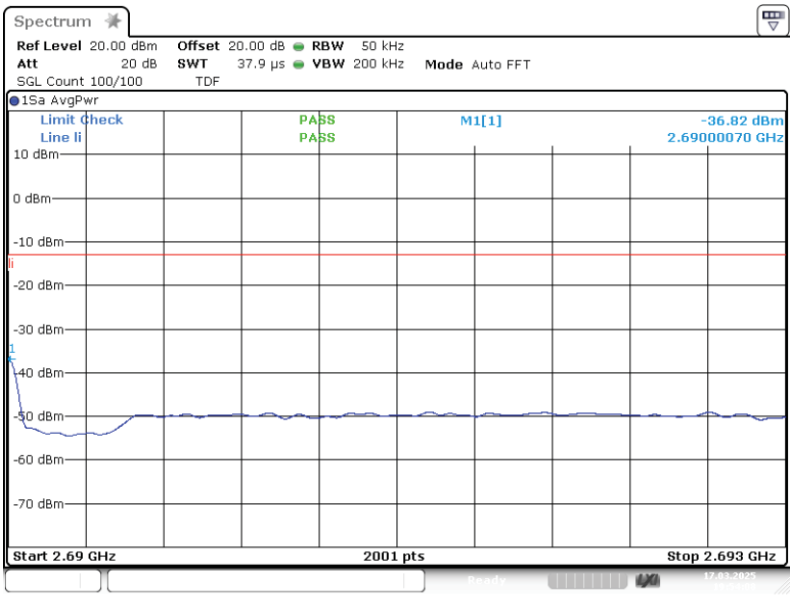
3.6.2 out of band emi BRS Mid GSM lower 2carriers -0.3 dB 2.
569G 2.572G

Band: BRS MBS; Frequency: 2.5720 GHz to 2.6140 GHz; Band edge: lower; Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



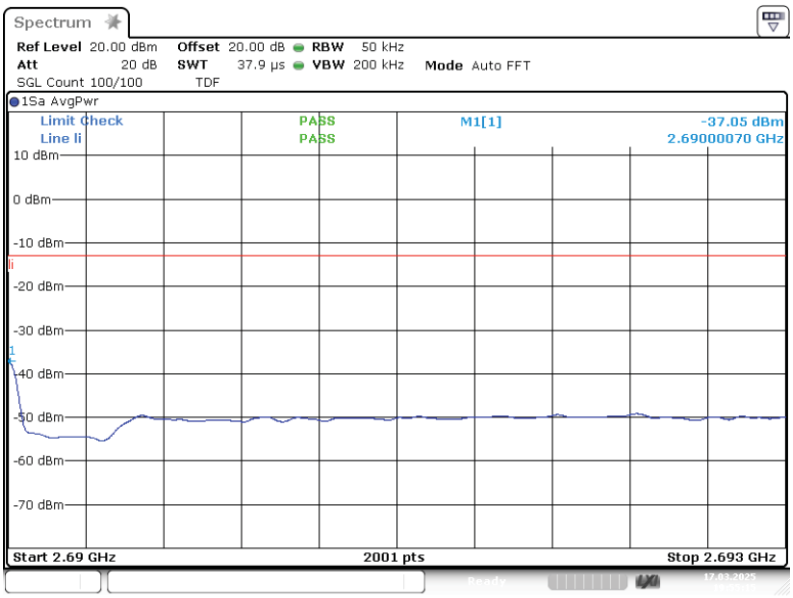
3.6.2 out of band emi BRS Mid GSM lower 2carriers +3.0 dB 2.
569G 2.572G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



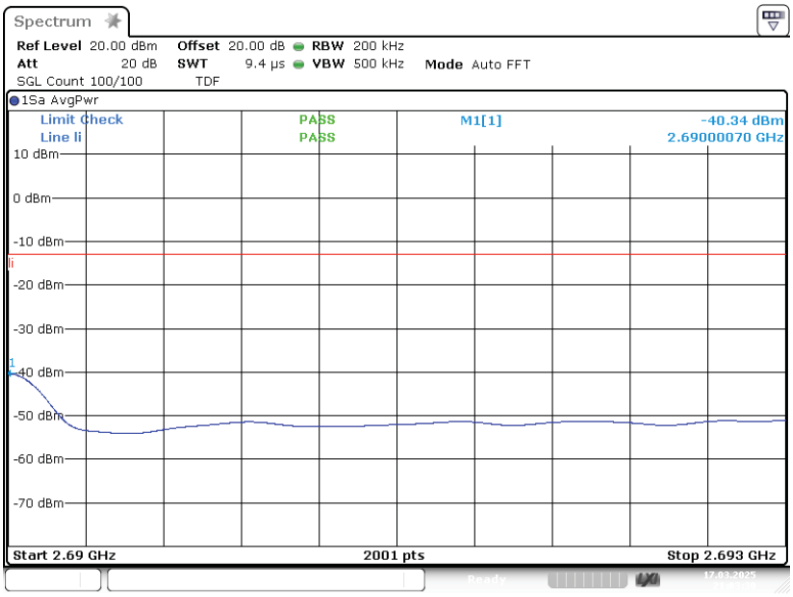
3.6.2 out of band emi BRS High AWGN upper 1carrier -0.3 dB 2
.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



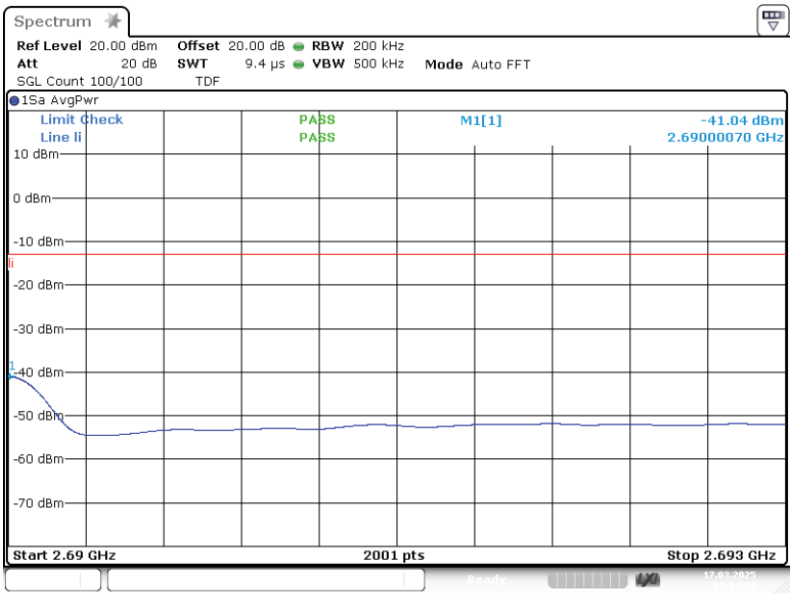
3.6.2 out of band emi BRS High AWGN upper 1carrier +3.0 dB 2
.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



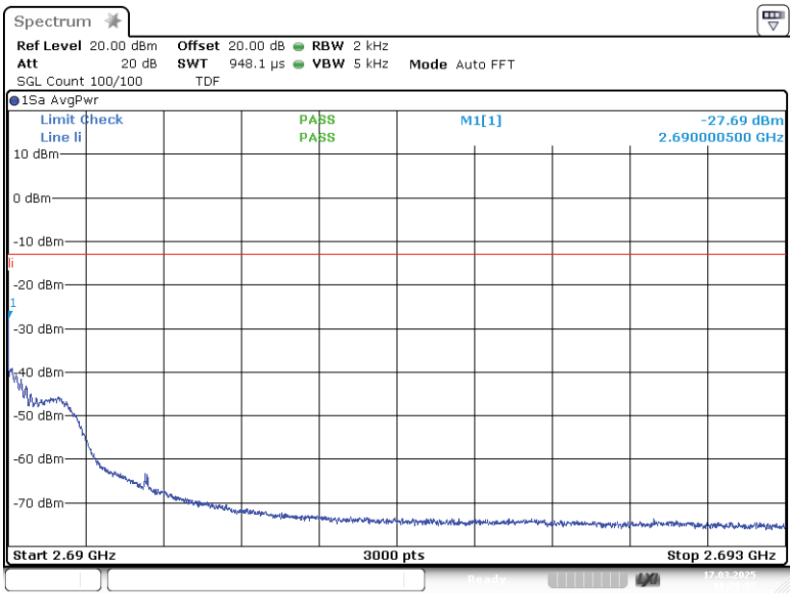
3.6.2 out of band emi BRS High AWGN 45M upper 1carrier -0.3 dB 2.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



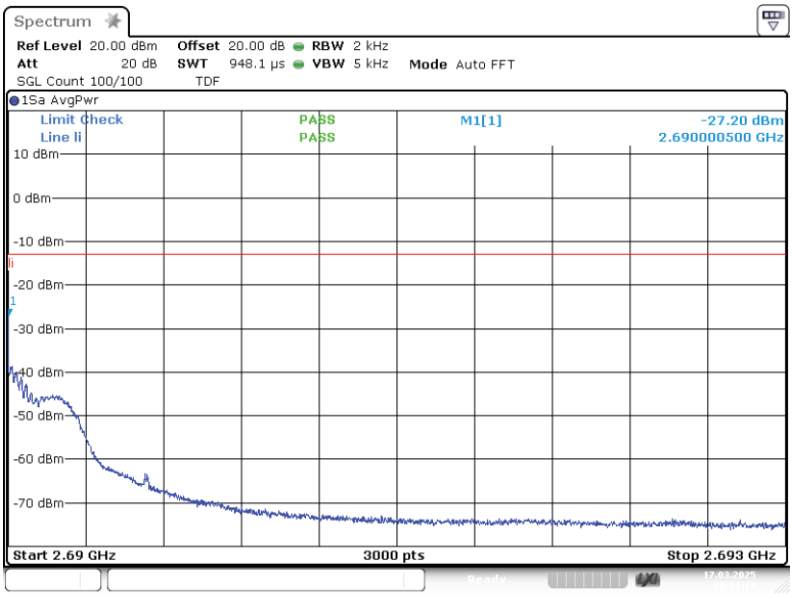
3.6.2 out of band emi BRS High AWGN 45M upper 1carrier +3.0 dB 2.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



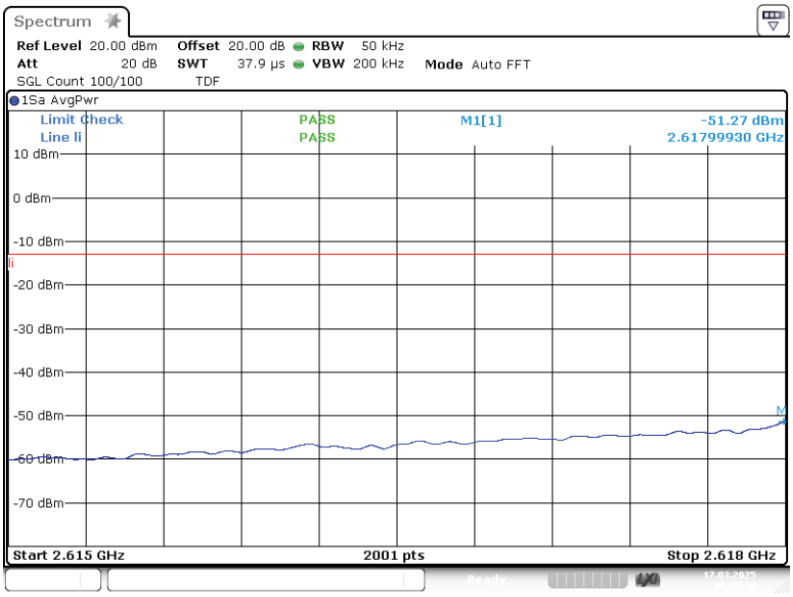
3.6.2 out of band emi BRS High GSM upper 1carrier -0.3 dB 2.
690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



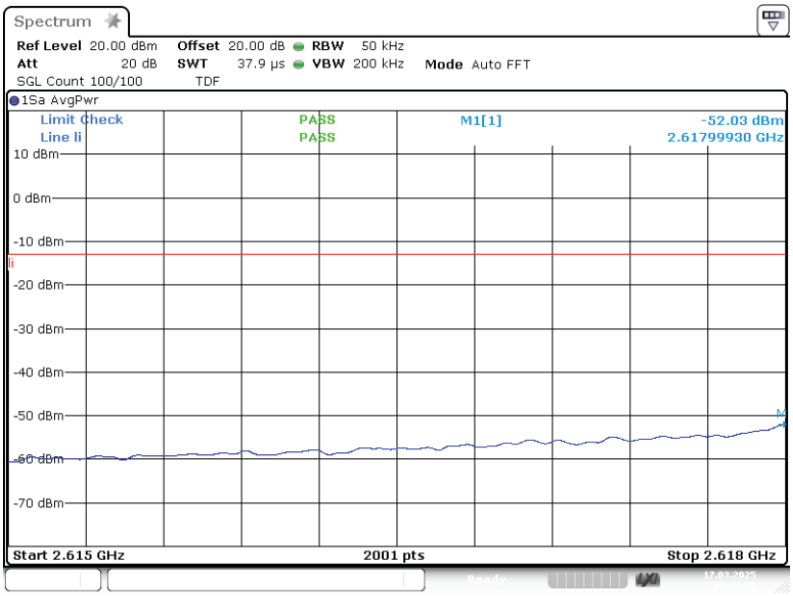
3.6.2 out of band emi BRS High GSM upper 1carrier +3.0 dB 2.
690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 1



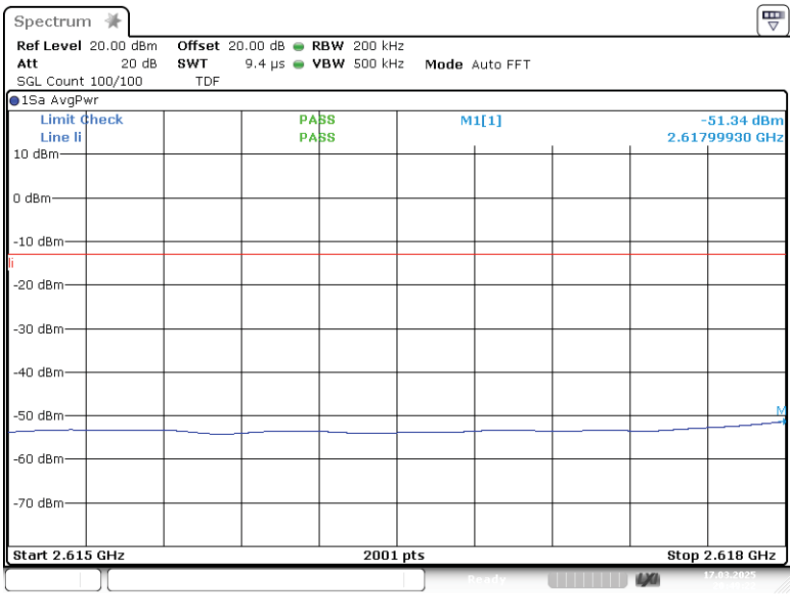
3.6.2 out of band emi BRS High AWGN lower 1carrier -0.3 dB 2
.615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 1



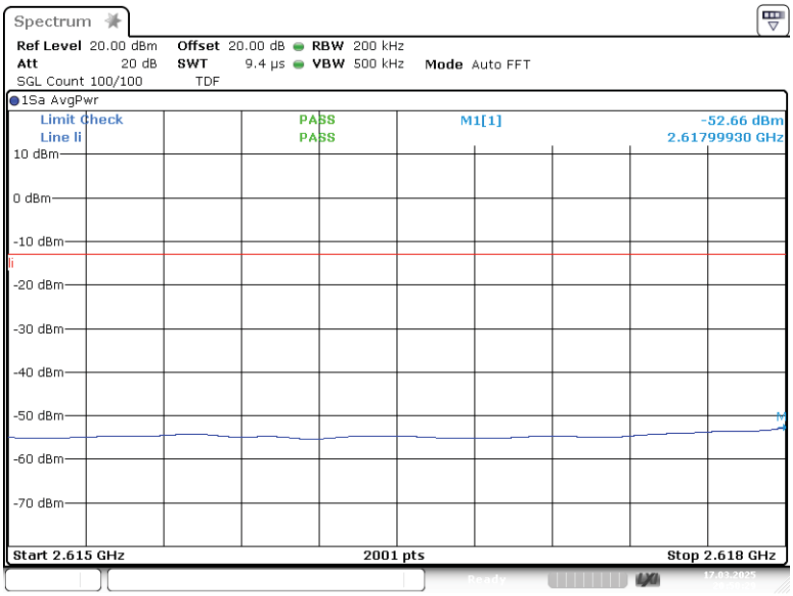
3.6.2 out of band emi BRS High AWGN lower 1carrier +3.0 dB 2
.615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN 45M; Input power = 0.3 dB < AGC; Number of signals 1



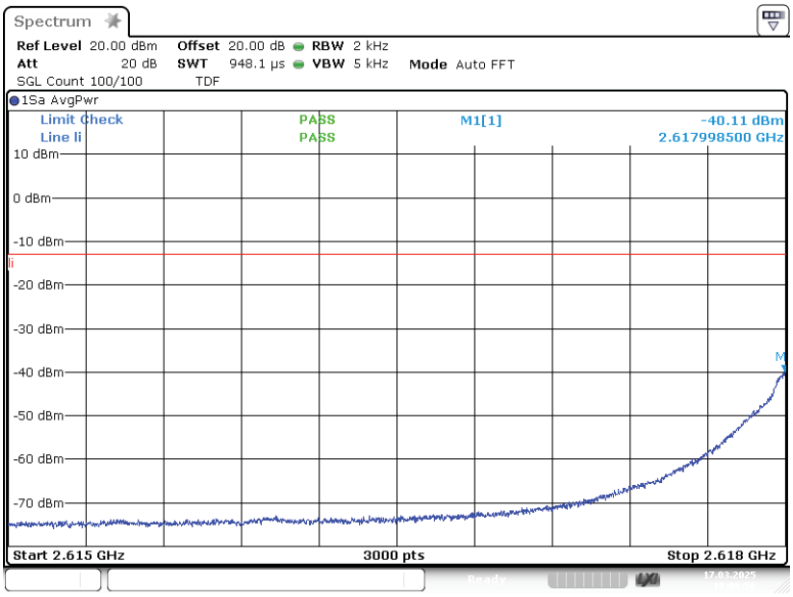
3.6.2 out of band emi BRS High AWGN 45M lower 1carrier -0.3 dB 2.615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN 45M; Input power = 3 dB > AGC; Number of signals 1



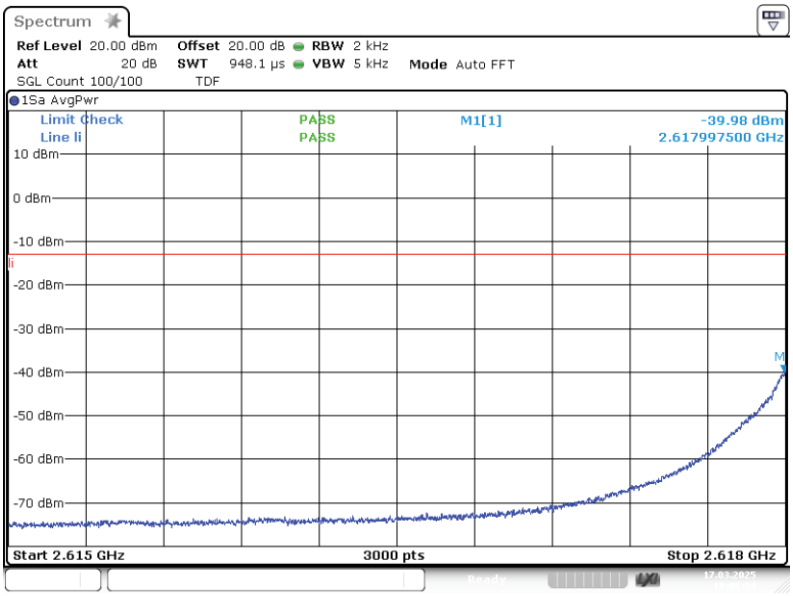
3.6.2 out of band emi BRS High AWGN 45M lower 1carrier +3.0 dB 2.615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 1



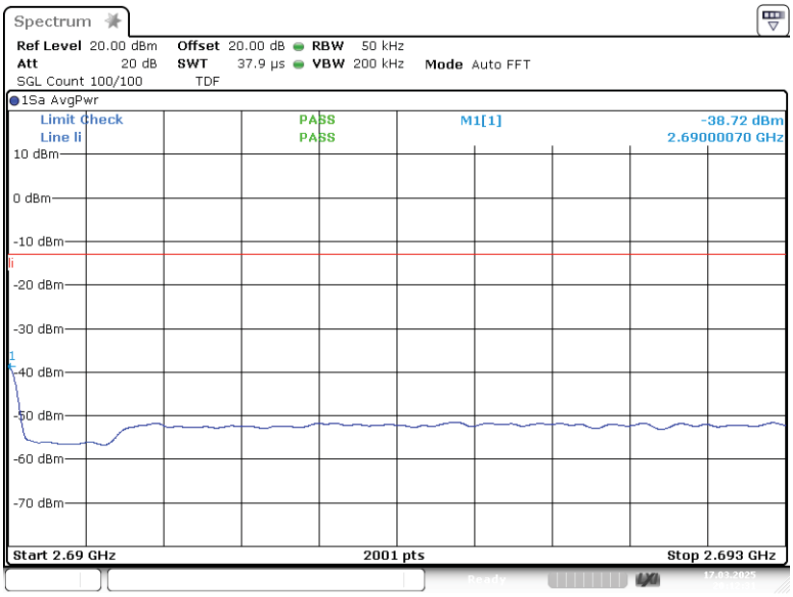
3.6.2 out of band emi BRS High GSM lower 1carrier -0.3 dB 2.
615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: GSM; Input power = 3 dB > AGC; Number of signals 1



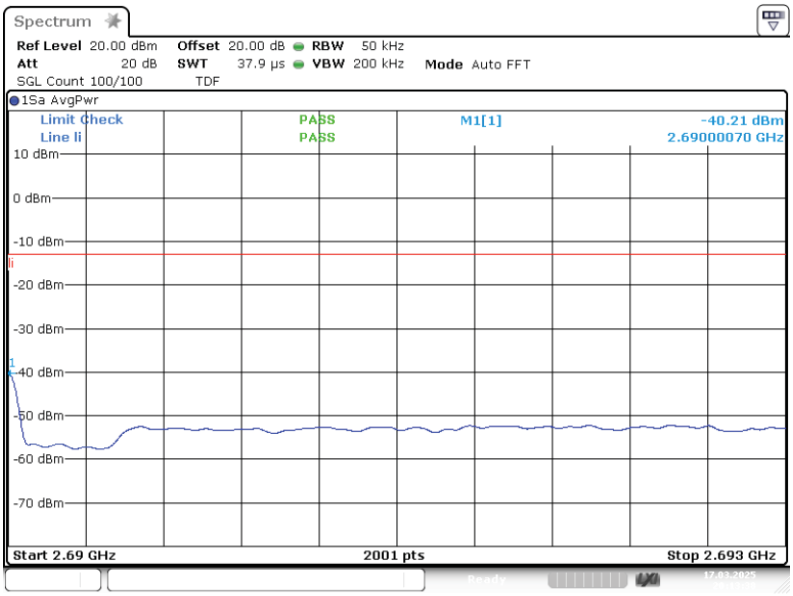
3.6.2 out of band emi BRS High GSM lower 1carrier +3.0 dB 2.
615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



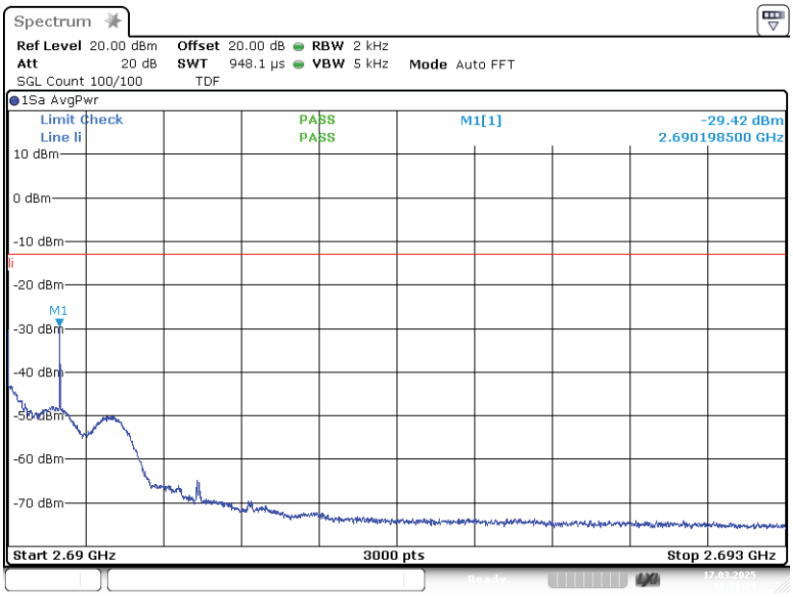
3.6.2 out of band emi BRS High AWGN upper 2carriers -0.3 dB
2.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



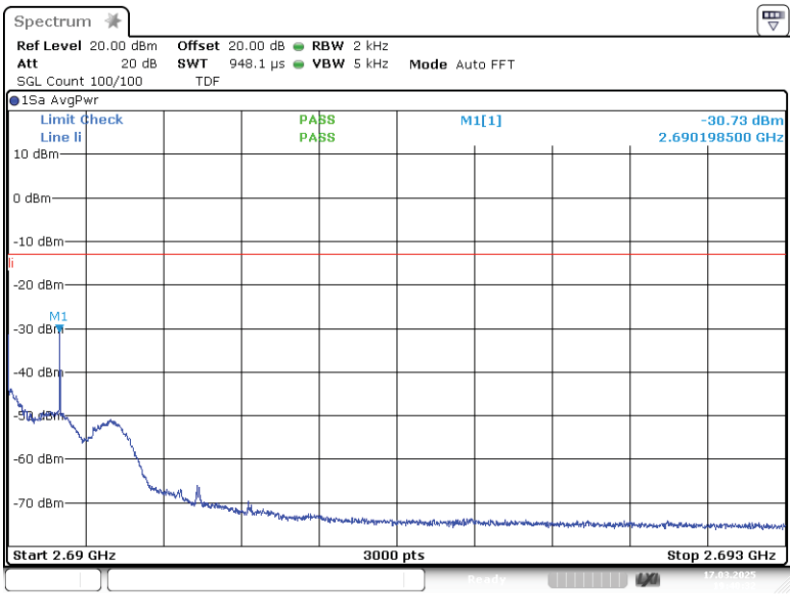
3.6.2 out of band emi BRS High AWGN upper 2carriers +3.0 dB
2.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: GSM; Input power = 0.3 dB < AGC; Number of signals 2



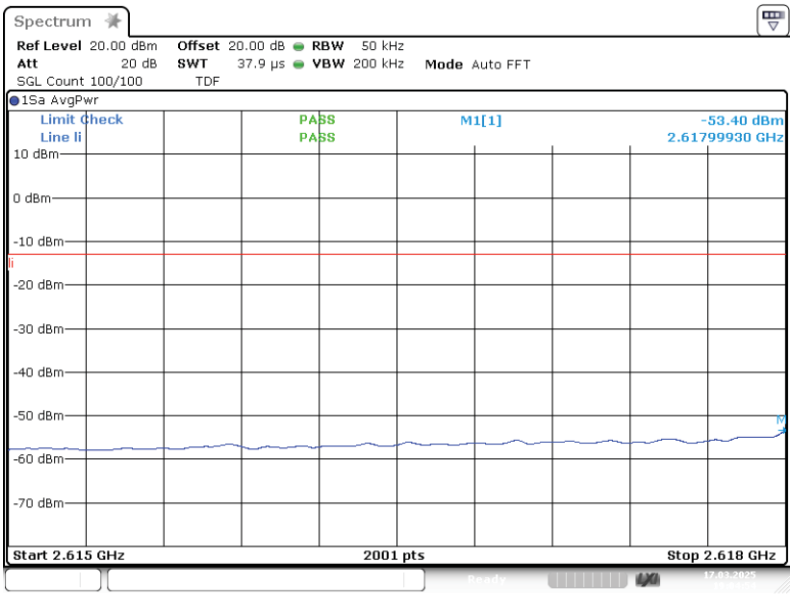
3.6.2 out of band emi BRS High GSM upper 2carriers -0.3 dB 2
.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: upper; Mod: GSM; Input power = 3 dB > AGC; Number of signals 2



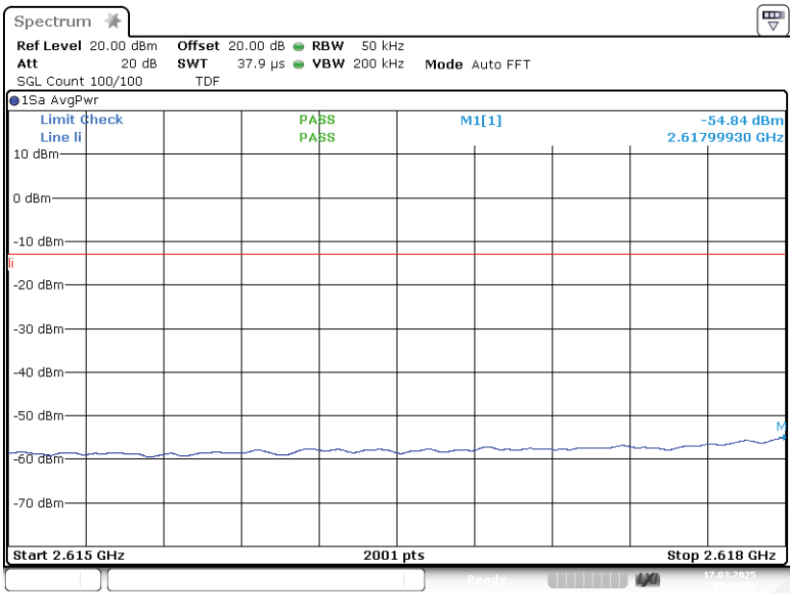
3.6.2 out of band emi BRS High GSM upper 2carriers +3.0 dB 2
.690G 2.693G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN; Input power = 0.3 dB < AGC; Number of signals 2



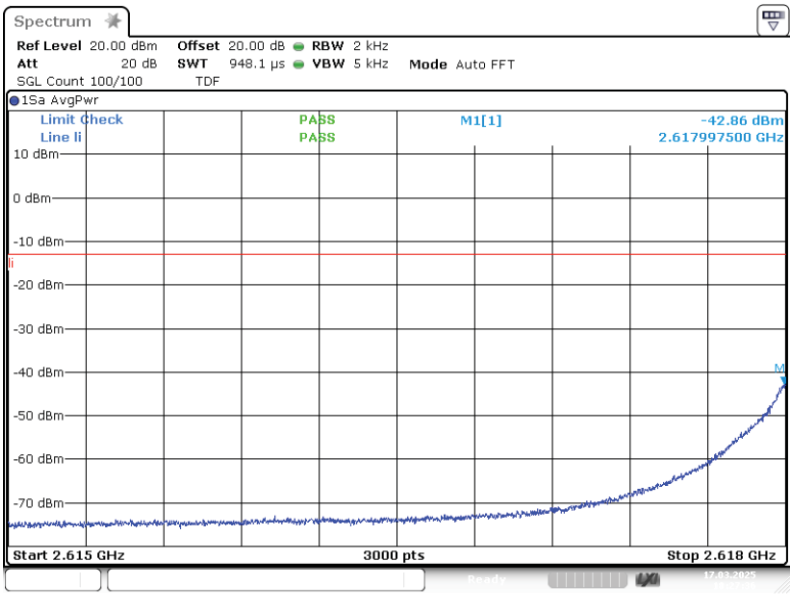
3.6.2 out of band emi BRS High AWGN lower 2carriers -0.3 dB
2.615G 2.618G

Band: BRS UBS; Frequency: 2.6180 GHz to 2.6900 GHz; Band edge: lower; Mod: AWGN; Input power = 3 dB > AGC; Number of signals 2



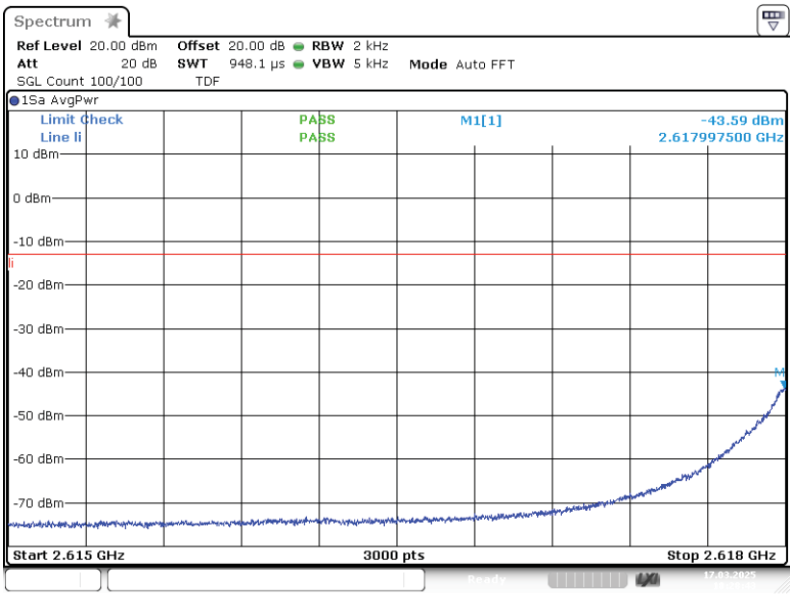
3.6.2 out of band emi BRS High AWGN lower 2carriers +3.0 dB
2.615G 2.618G

Band: BRS UBS; 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 GSM lower 2carriers -0.3 dB 2
.615G 2.618G

Band: BRS UBS; 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 GSM lower 2carriers +3.0 dB 2
.615G 2.618G

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

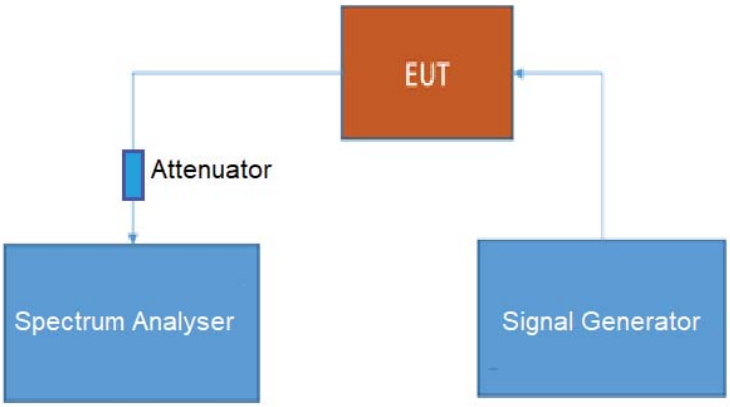
Test date: 2025-03-17 - 2025-03-18

Environmental conditions: 22.8 °C; 26 % r. H./23.5 °C; 23 % r. H./

Test engineer: Thomas Hufnagel

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:



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]**
2500.0	3.86	2492.274	2571.834	79.560

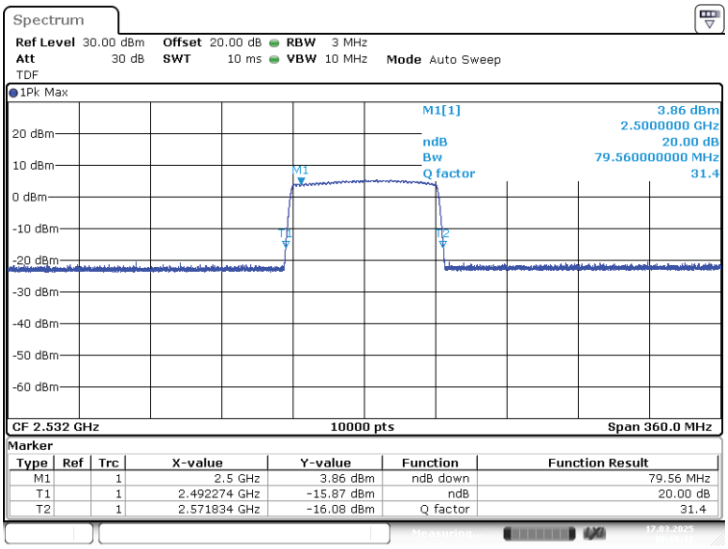
Band 41 BRS (MBS), downlink				
Highest Power Frequency [MHz]	**Output Power [dBm]**	**Lower Highest Power -20 dB Frequency [MHz]**	**Upper Highest Power -20 dB Frequency [MHz]**	**20 dB Bandwidth [MHz]**
2589.6	4.75	2570.331	2615.691	45.360

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]**
2661.8	4.49	2614.382	2693.654	79.272

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

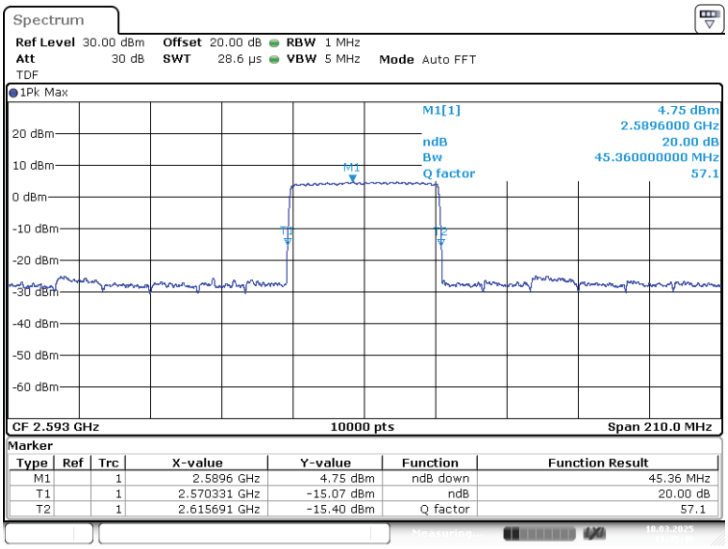
5.6.4 MEASUREMENT PLOT

Frequency band = Band 41 BRS (LBS); Direction = RF downlink



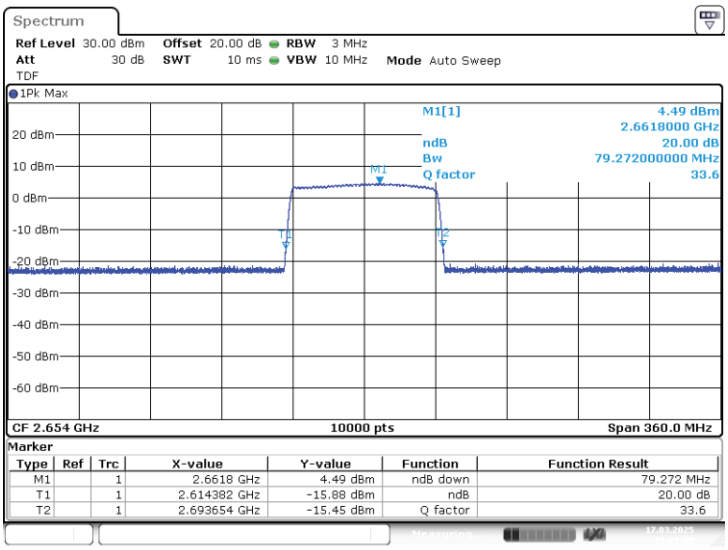
3.3 Out of band rejection BRS Low 2.53200G
_20dB

Frequency band = Band 41 BRS (MBS); Direction = RF downlink



3.3 Out of band rejection BRS Mid 2.59300G
_20dB

Frequency band = Band 41 BRS (UBS); Direction = RF downlink



3.3 Out of band rejection BRS High 2.65400G
_20dB

5.6.5 TEST EQUIPMENT USED

- Conducted

5.7 FREQUENCY STABILITY

The frequency stability test case was not carried out, as any frequency errors are eliminated by the given system architecture. This is achieved by generating the LOs in the head-end station and the LOs in the remote unit with a common reference clock. This reference clock is transmitted from the head-end station to the remote unit and regenerated there. This means that the same reference frequency is used for all signal conversions (up- and down-conversion as well as analog-to-digital and digital-to-analog conversion) and any frequency error in the reference clock is compensated therefore. This is already clear from the measurement markings for the occupied bandwidth (26dB bandwidth). It can be seen that the DUT has no influence on the frequency (comparison between input and output signal). In addition, it is operationally necessary for the frequency deviation to be significantly smaller than the spectral distance between the transmission bandwidth edge and the channel bandwidth edge in order to meet the signal quality requirement (signal purity) and such ensure that the fundamental emissions remain within the authorized bands of operation.

5.8 FIELD STRENGTH OF SPURIOUS RADIATION

Standard FCC Part 27, §24.53

The test was performed according to:
ANSI C63.26

Test date: 2025-03-29

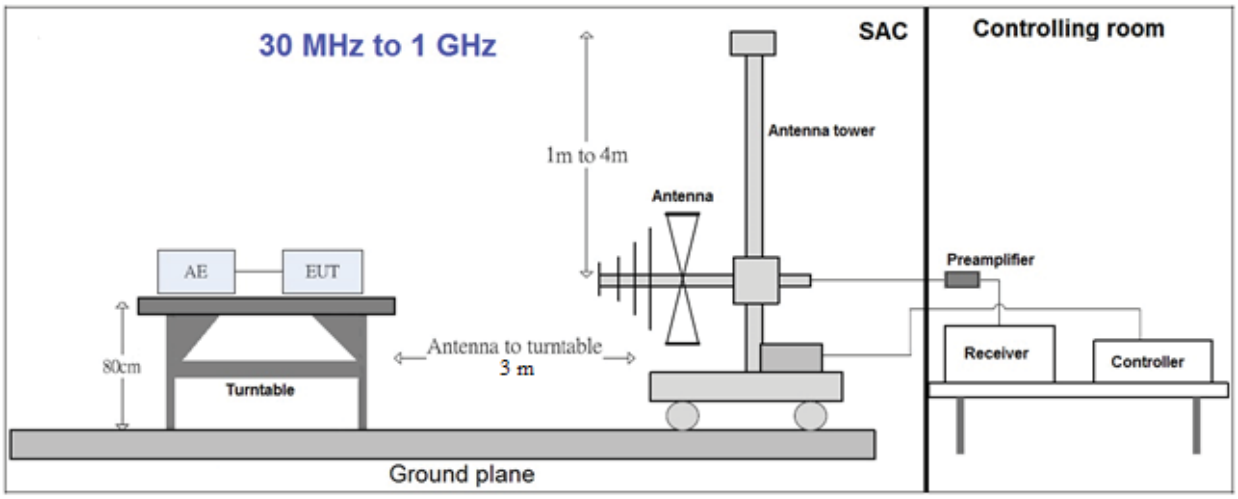
Environmental conditions: 23.0 °C; 45 % r. H.

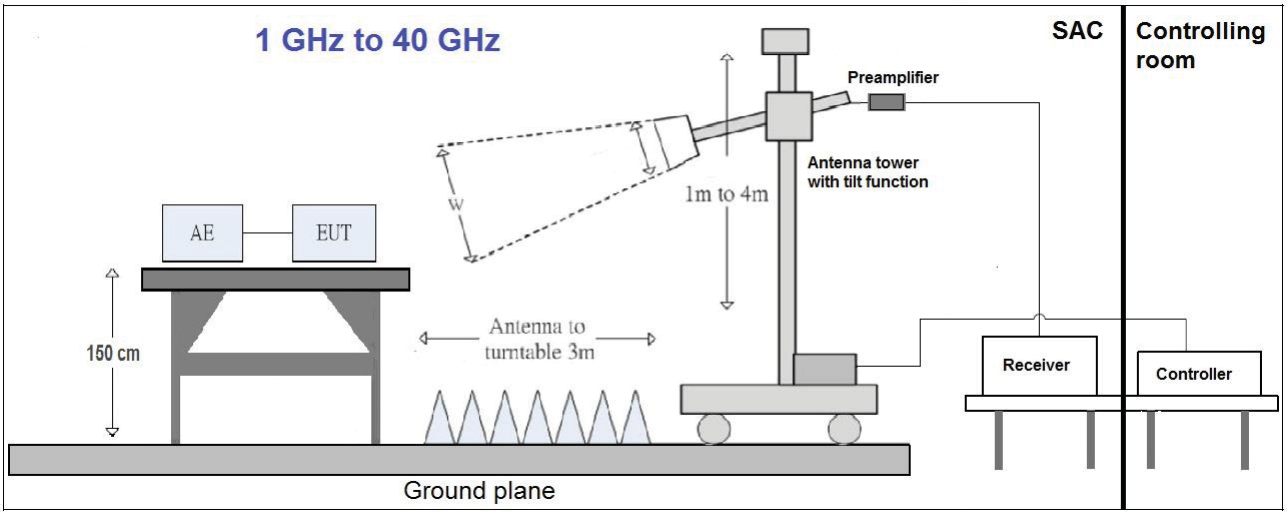
Test engineer: Thomas Hufnagel

5.8.1 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 meters 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 meters 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: 3 m
- Detector: PEAK
- Frequency range: 30 – 1000 MHz
- Frequency steps: 30 kHz
- IF–Bandwidth: 100 kHz
- Turntable angle range: –180° to 180°
- Turntable step size: 15°
- Height variation range: 1 – 4 m
- Height variation step size: 1 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 ±15° 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
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 100 kHz
- Turntable angle range: ±15 ° around the determined value
- Antenna Polarisation: max. value determined in step 1

Step 3: Final measurement with RMS detector
With the settings determined in step 2. the final measurement will be performed:
EMI receiver settings for step 3:
- Detector: RMS (< 1 GHz)
- Measured frequencies: in step 1 and step 2 determined frequencies
- IF – Bandwidth: 100 kHz

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 15 °.
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
- IF Bandwidth = 1 MHz

Step 3:

Final measurement with RMS detector
Spectrum analyser settings for step 3:
- Detector: RMS
- Measured frequencies: in step 2 determined frequencies
- IF – Bandwidth: 1 MHz

5.8.2 TEST REQUIREMENTS/LIMITS

Abstract from FCC Part 2:

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.

Abstract from FCC Part 27:

Part 27; Miscellaneous Wireless Communication Services

Subpart C – Technical standards

§27.53 – Emission limits

Band 41BRS (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.

Abstract RSS-131 from ISED:

RSS-131; 10.5 Spurious emissions

The spurious emissions of a zone enhancer shall not exceed −13 dBm in any 100 kHz measurement bandwidth.

5.8.3 TEST PROTOCOL

General considerations concerning the limits:

The measuring bandwidth of 1 MHz was chosen according the test requirements exept at the bands from 30 MHz to 1 GHz: At these bands reducing of measurement bandwidth was done. Also outside the downlink frequency band at lower frequencies the measurement bandwidths were reduced to have the possibility to record the spurious emissions at these lower frequencies.

At frequencies were measuring bandwidths were reduced also the limit lines were reduced acoording the given formula:

$$p\ RBWreduced\ [dBm] = 10 * \log\left(RBWreduced\ [kHz] \quad / \quad 1000\ kHz\right) + pRBW\ 1000\ kHz[dBm]$$

Hereby "p" are the limit lines' values.

Considerations to MIMO operation:

Because only one antenna port is available not MIMO operation mode was tested.

Measurement tables with one antenna

30 MHz to 1 GHz:

Band 41 BRS, LBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
98.4/hor.	-81.6	-0.9	RMS	100	-23.0	58.6
160.7/hor.	-84.7	-0.9	RMS	100	-23.0	61.7
358.7/hor.	-79.5	-0.9	RMS	100	-23.0	56.5
98.4/vert.	-77.3	-0.9	RMS	100	-23.0	54.3
161.0/vert	-87.5	-0.9	RMS	100	-23.0	64.5
358.1/vert	-75.0	-0.9	RMS	100	-23.0	52.0
800/vert	-79.3	-0.9	RMS	100	-23.0	56.3

Band 41 BRS, MBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
98.4/hor.	-81.6	-1.0	RMS	100	-23.0	58.6
155.8/hor.	-85.2	-1.0	RMS	100	-23.0	62.2
218.6/hor.	-93.3	-1.0	RMS	100	-23.0	70.3
358.5/hor.	-79.3	-1.0	RMS	100	-23.0	56.3
98.4/vert.	-77.3	-1.0	RMS	100	-23.0	54.3
358.9/vert.	-75.1	-1.0	RMS	100	-23.0	52.1
508.1/vert.	-95.2	-1.0	RMS	100	-23.0	72.2

Band 41 BRS, UBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
98.4	-82.3	-0.3	RMS	100	-23.0	59.3
156.0	-86.0	-0.3	RMS	100	-23.0	63.0
357.7	-80.3	-0.3	RMS	100	-23.0	57.3
62.6	-88.6	-0.3	RMS	100	-23.0	65.6
98.0	-76.8	-0.3	RMS	100	-23.0	53.8
359.1	-75.2	-0.3	RMS	100	-23.0	52.2

Abbreviations:

"hor.": horizontal position
"vert.": vertical position

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

Above 1 GHz to 18 GHz:

Band 41 BRS, LBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
1600.2	-59.2	-0.9	RMS	1000	-13.0	46.2
2532	-36.7	-0.9	RMS	1000	-13.0	23.7
3199.6	-54.1	-0.9	RMS	1000	-13.0	41.1
17128.4	-56.2	-0.9	RMS	1000	-13.0	43.2
2496.2	-37.4	-0.9	RMS	1000	-13.0	24.4
2532	-35.5	-0.9	RMS	1000	-13.0	22.5
2567.6	-37.9	-0.9	RMS	1000	-13.0	24.9
3200	-54.8	-0.9	RMS	1000	-13.0	41.8

Band 41 BRS, MBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
1599.8	-59.4	-1.0	RMS	1000	-13.0	46.4
2572.2	-38.1	-1.0	RMS	1000	-13.0	25.1
2592.8	-37.5	-1.0	RMS	1000	-13.0	24.5
2613.8	-36.6	-1.0	RMS	1000	-13.0	23.6
3199.8	-52.6	-1.0	RMS	1000	-13.0	39.6
1600	-64.2	-1.0	RMS	1000	-13.0	51.2
2572.2	-39.5	-1.0	RMS	1000	-13.0	26.5
2593	-39.0	-1.0	RMS	1000	-13.0	26.0
2613.6	-40.6	-1.0	RMS	1000	-13.0	27.6

Band 41 BRS, UBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
2653.8	-39.6	-0.3	RMS	1000	-13.0	26.6
2689.8	-40.1	-0.3	RMS	1000	-13.0	27.1
6741.4	-49.9	-0.3	RMS	1000	-13.0	36.9
1874.8	-58.5	-0.3	RMS	1000	-13.0	45.5
2618.2	-36.3	-0.3	RMS	1000	-13.0	23.3
2654	-36.8	-0.3	RMS	1000	-13.0	23.8
2689.6	-38.8	-0.3	RMS	1000	-13.0	25.8
3200	-49.9	-0.3	RMS	1000	-13.0	36.9

Abbreviations:

"hor.": horizontal position
"vert.": vertical position
Remark: Please see next sub-clause for the measurement plot.

Above 18 GHz to 27 GHz:

Band 41 BRS, LBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
20625	-56.4	-0.9	RMS	1000	-13.0	43.4
22773.3	-67.9	-0.9	RMS	1000	-13.0	54.9
25063.8	-67.2	-0.9	RMS	1000	-13.0	54.2
20625	-59.9	-0.9	RMS	1000	-13.0	46.9
22784.7	-67.7	-0.9	RMS	1000	-13.0	54.7
25075.8	-67.6	-0.9	RMS	1000	-13.0	54.6

Band 41 BRS, MBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
20624.7	-63.6	-1.0	RMS	1000	-13.0	50.6
22275.3	-69.6	-1.0	RMS	1000	-13.0	56.6
26510.1	-67.2	-1.0	RMS	1000	-13.0	54.2
20625	-61.6	-1.0	RMS	1000	-13.0	48.6
25066.2	-67.4	-1.0	RMS	1000	-13.0	54.4
26205.6	-68.5	-1.0	RMS	1000	-13.0	55.5

Band 41 BRS, UBS; downlink;						
Spurious freq. [MHz]	**Spurious level [dBm]**	**Pin [dBm]**	**Detector**	**RBW [kHz]**	**Limit [dBm]**	**Margin to limit [dB]**
20625	-55.6	-0.3	RMS	1000	-13.0	42.6
25052.1	-66.5	-0.3	RMS	1000	-13.0	53.5
26628	-66.4	-0.3	RMS	1000	-13.0	53.4
18340.8	-71.4	-0.3	RMS	1000	-13.0	58.4
20625.3	-64.6	-0.3	RMS	1000	-13.0	51.6
25071.9	-67.6	-0.3	RMS	1000	-13.0	54.6

Abbreviations:

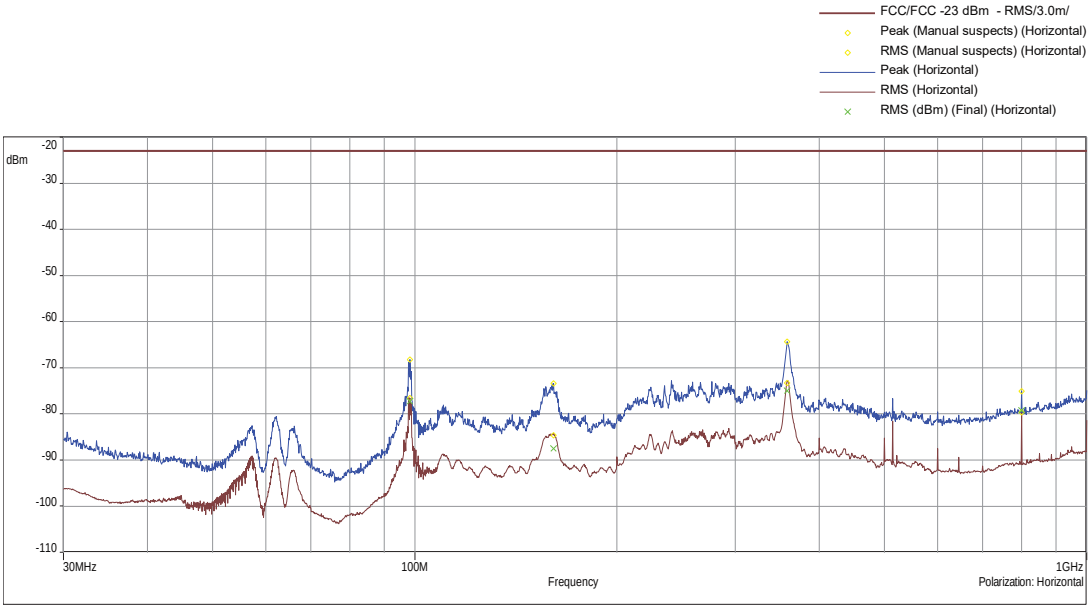
"hor.": horizontal position
"vert.": vertical position

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

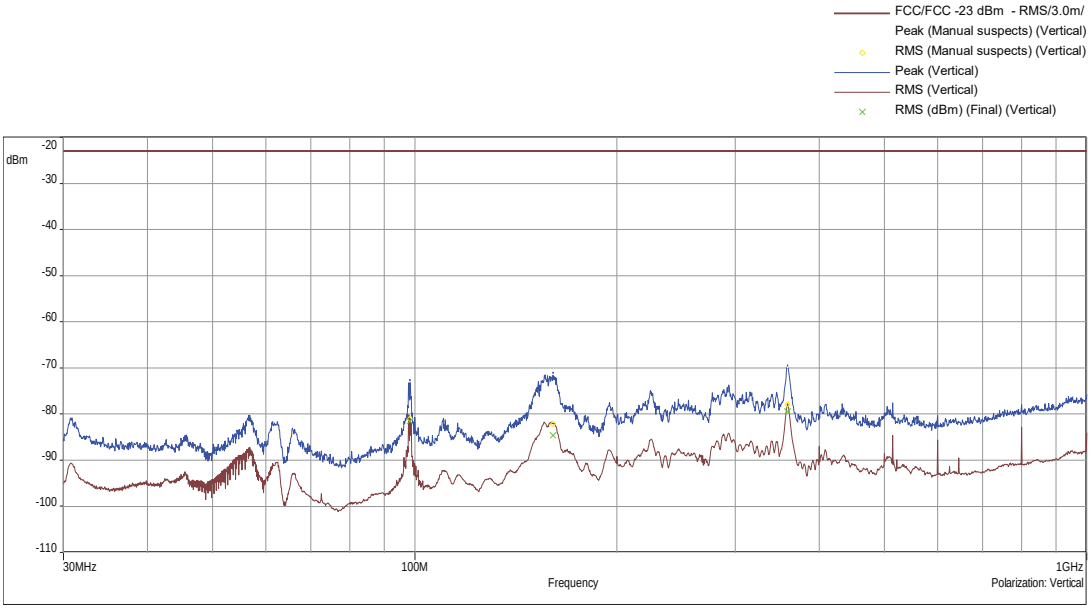
5.8.4 MEASUREMENT PLOT WITH ONE ANTENNA

5.8.4.1 Frequency band = Band 41 BRS, LBS;; Direction = RF downlink

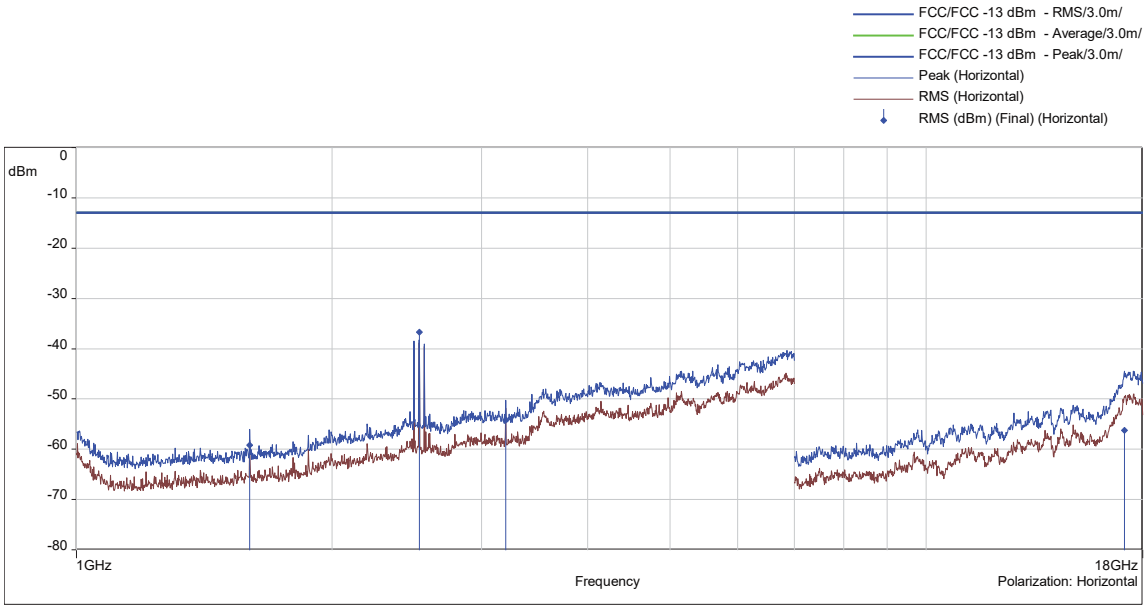
30 MHz - 1 GHz. horizontal



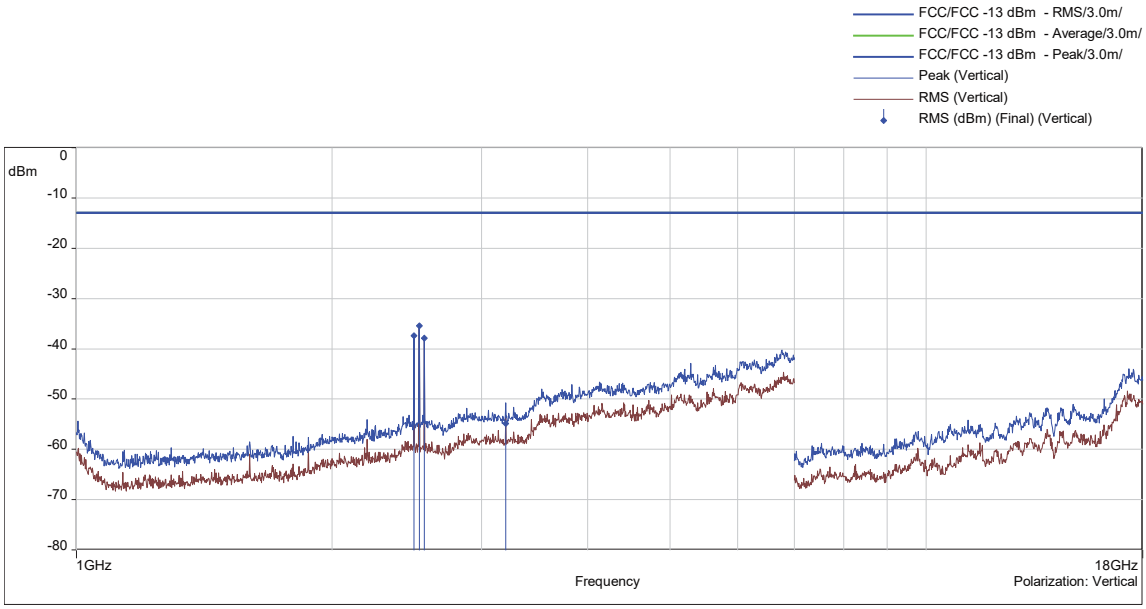
30 MHz - 1 GHz. vertical



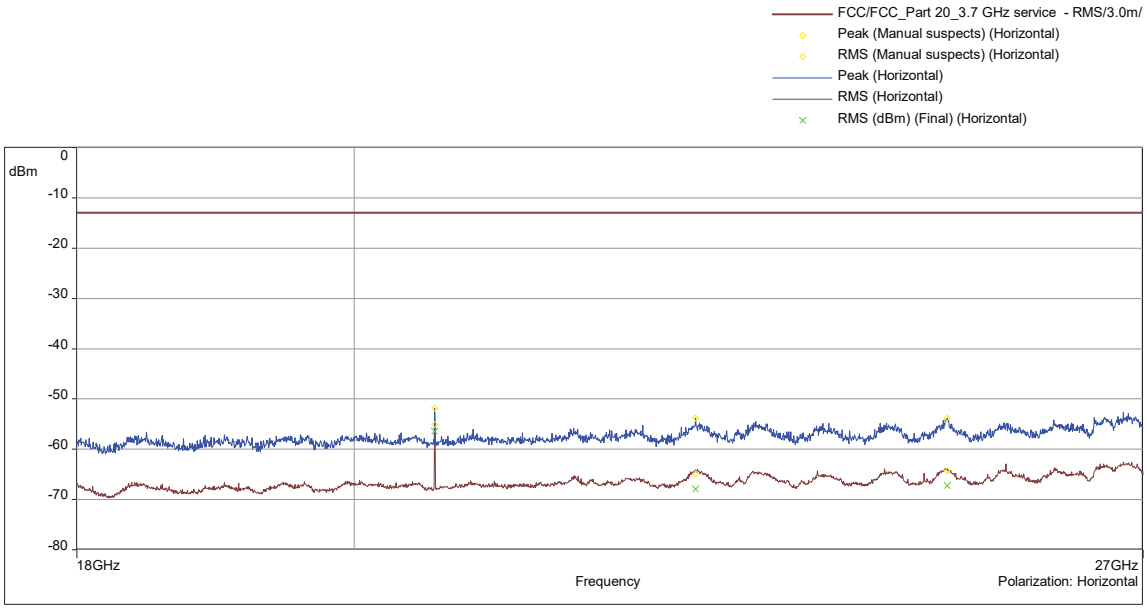
1 GHz - 18 GHz. horizontal



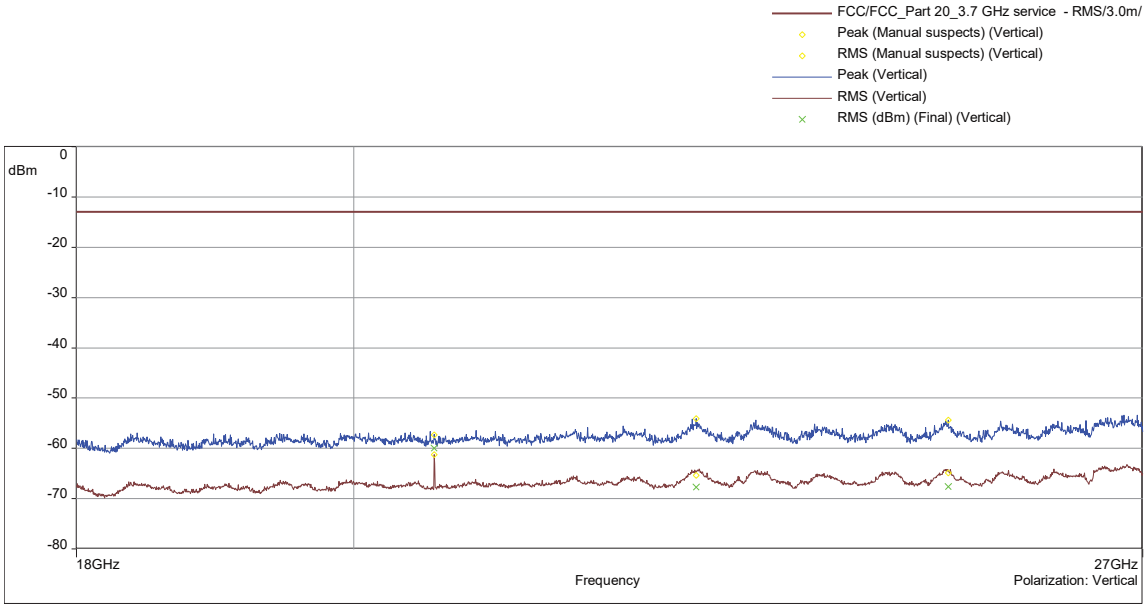
1 GHz - 18 GHz. vertical



18 GHz - 27 GHz. horizontal

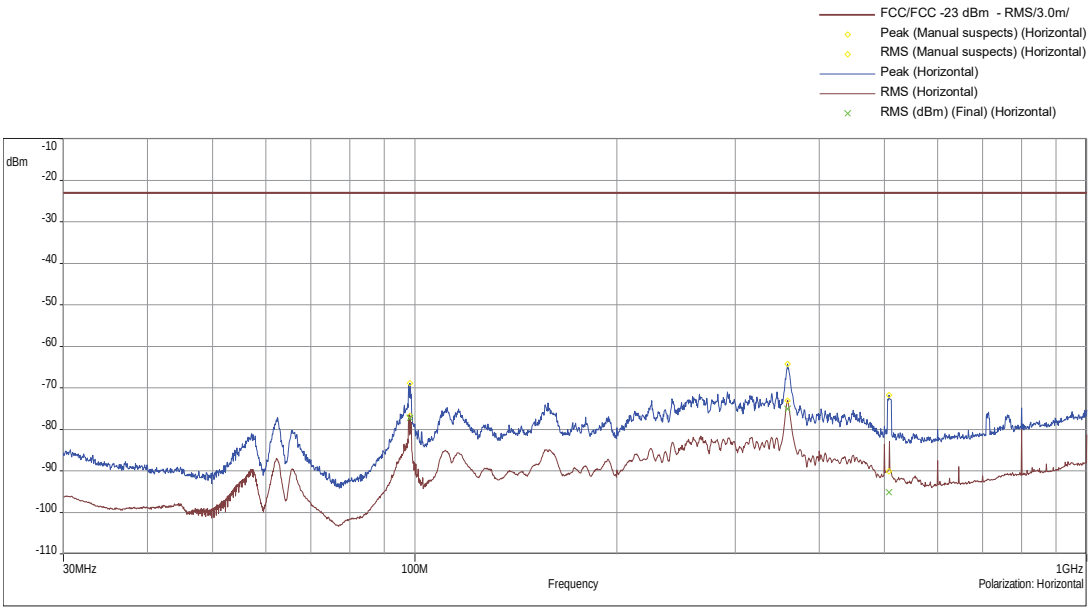


18 GHz - 27 GHz. vertical

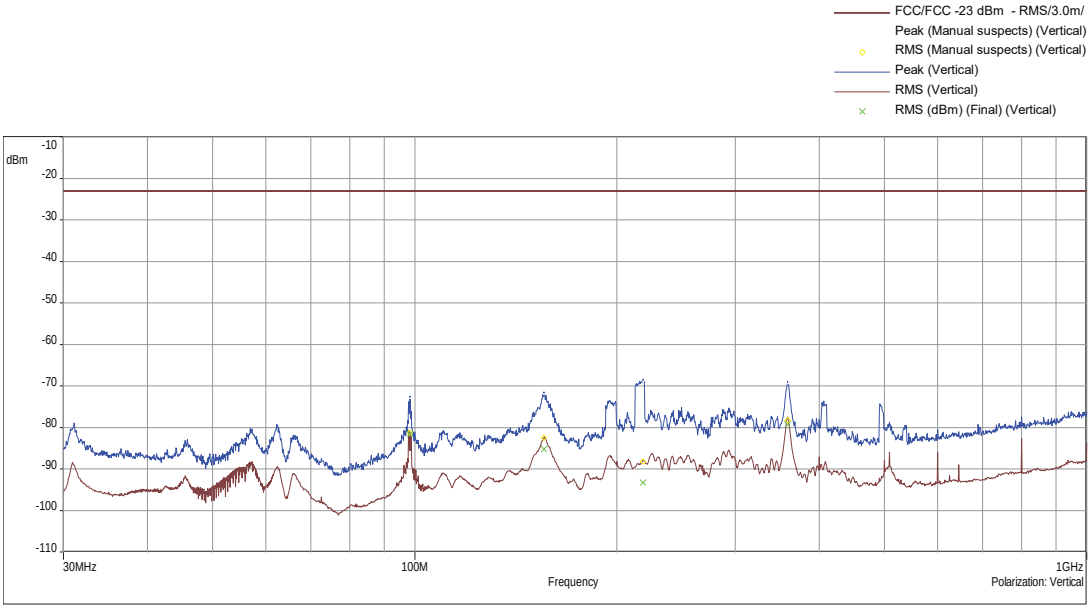


5.8.4.2 Frequency band = Band 41 BRS, MBS; Direction = RF downlink

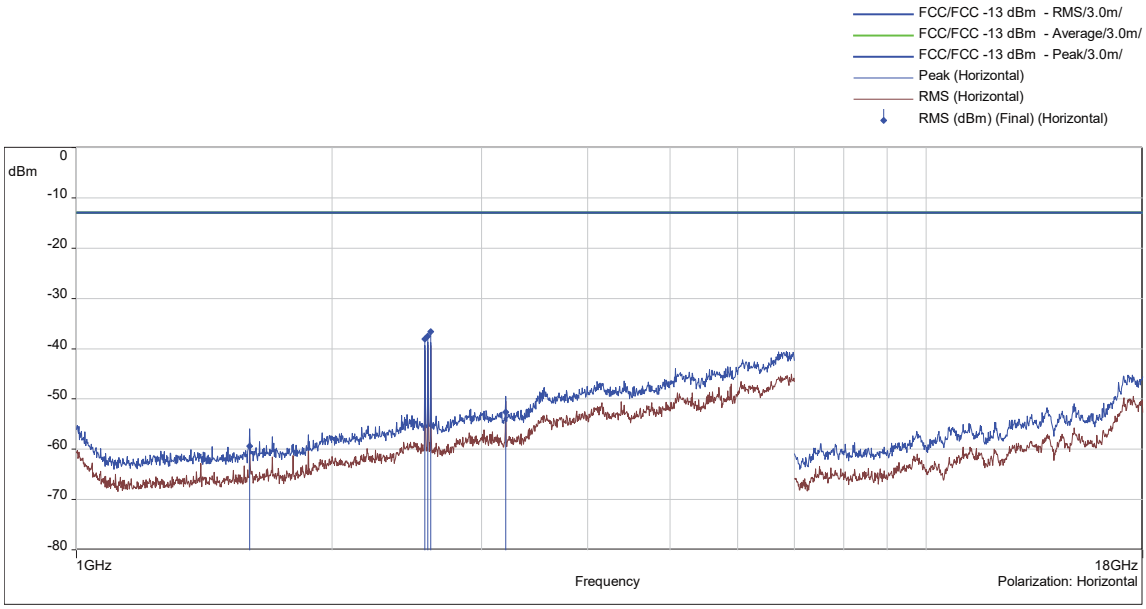
30 MHz - 1 GHz. horizontal



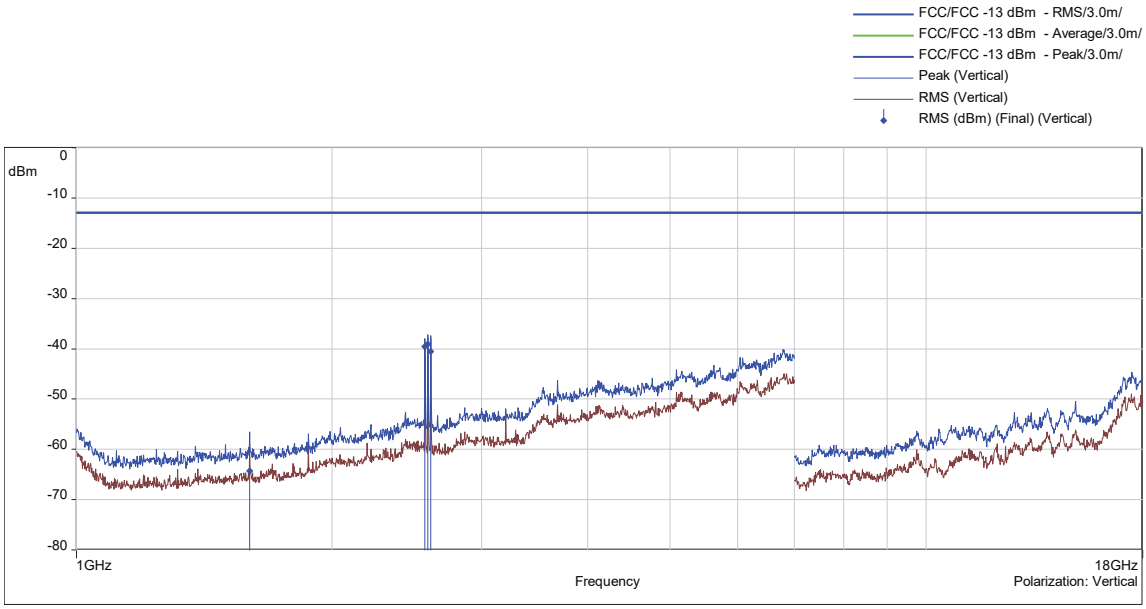
30 MHz - 1 GHz. vertical



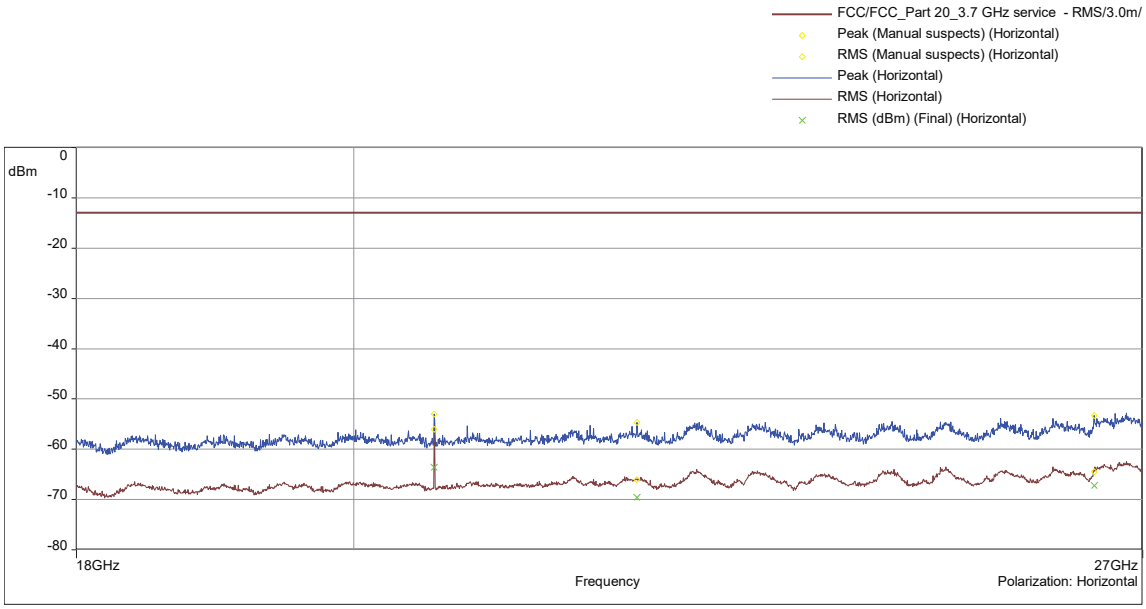
1 GHz - 18 GHz. horizontal



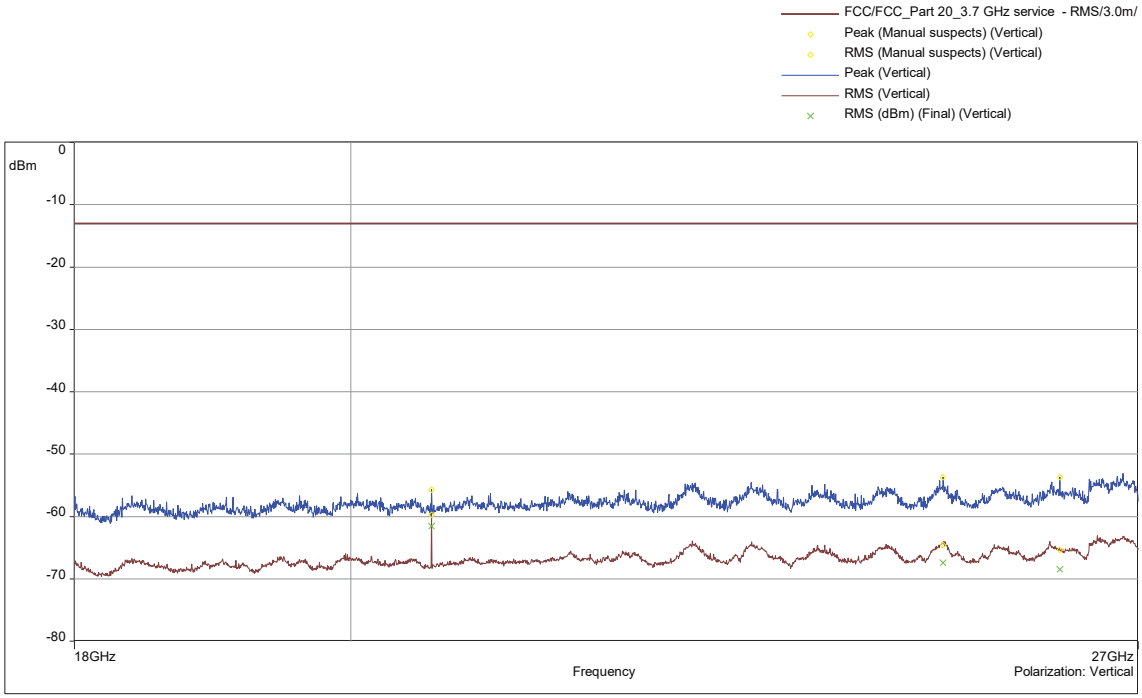
1 GHz - 18 GHz. vertical



18 GHz - 27 GHz. horizontal

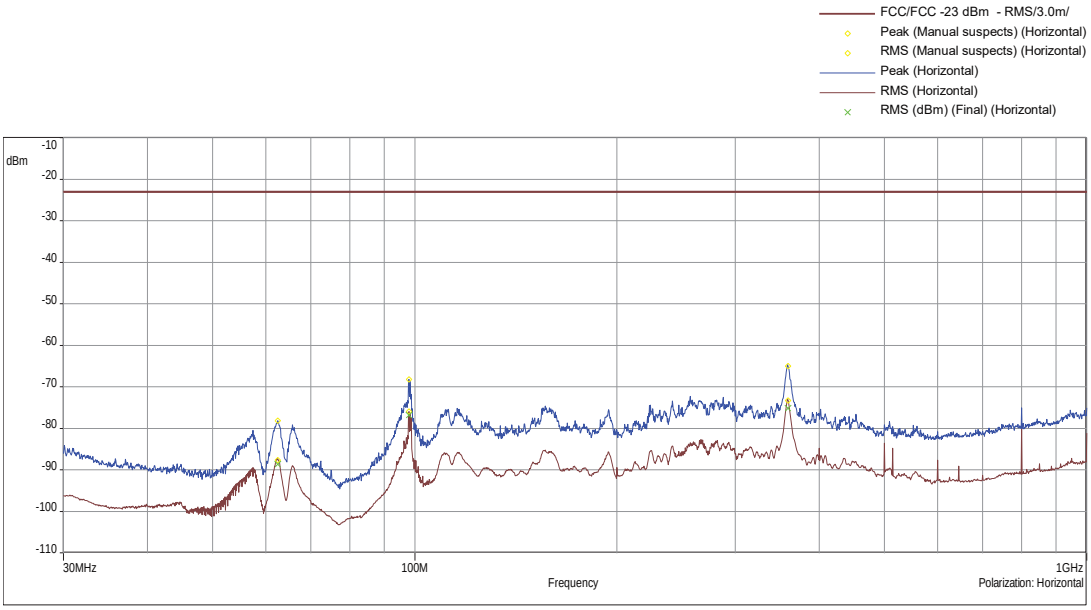


18 GHz - 27 GHz. vertical

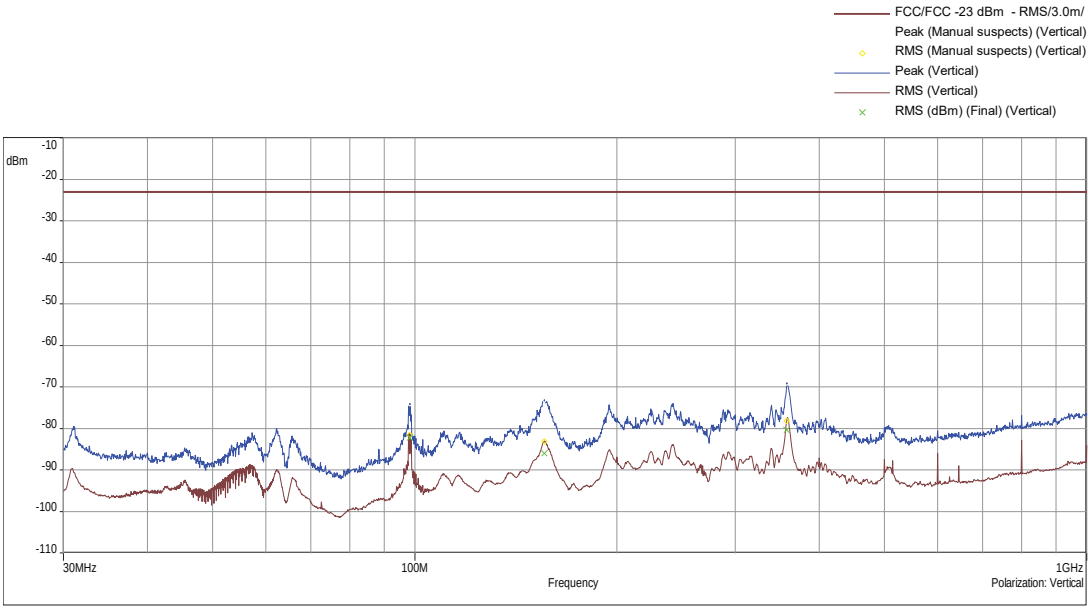


5.8.4.3 Frequency band = Band 41 BRS, UBS; Direction = RF downlink

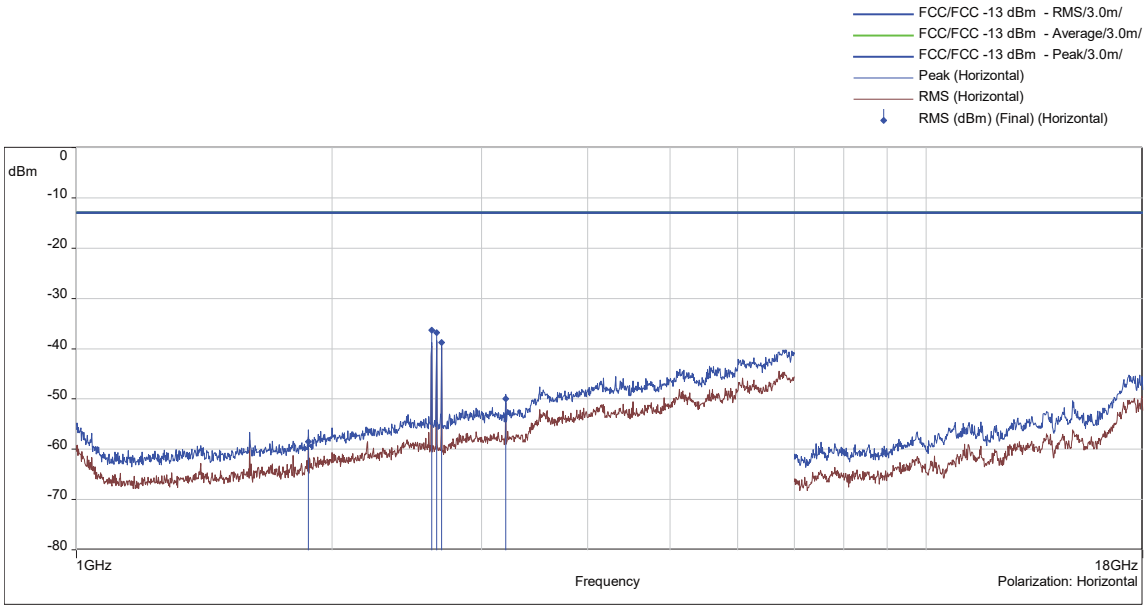
30 MHz - 1 GHz. horizontal



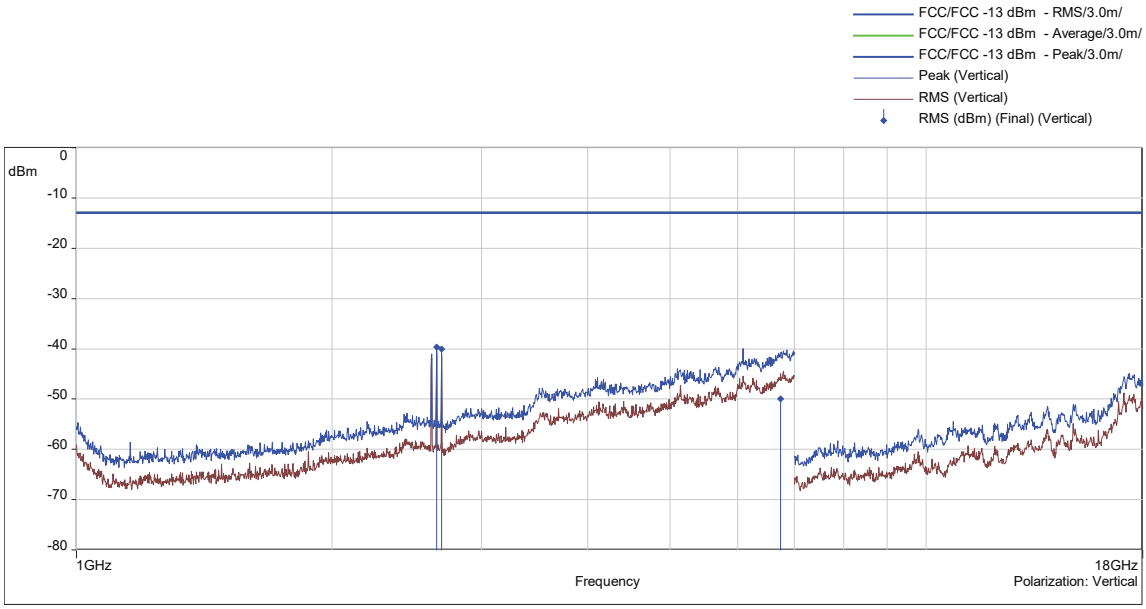
30 MHz - 1 GHz. vertical



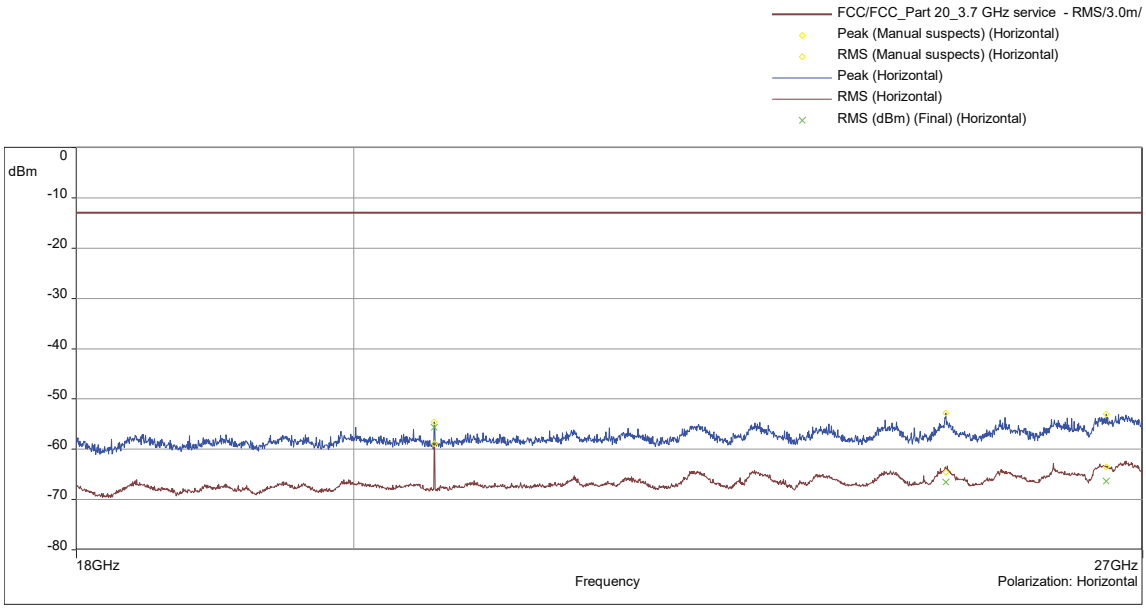
1 GHz - 18 GHz. horizontal



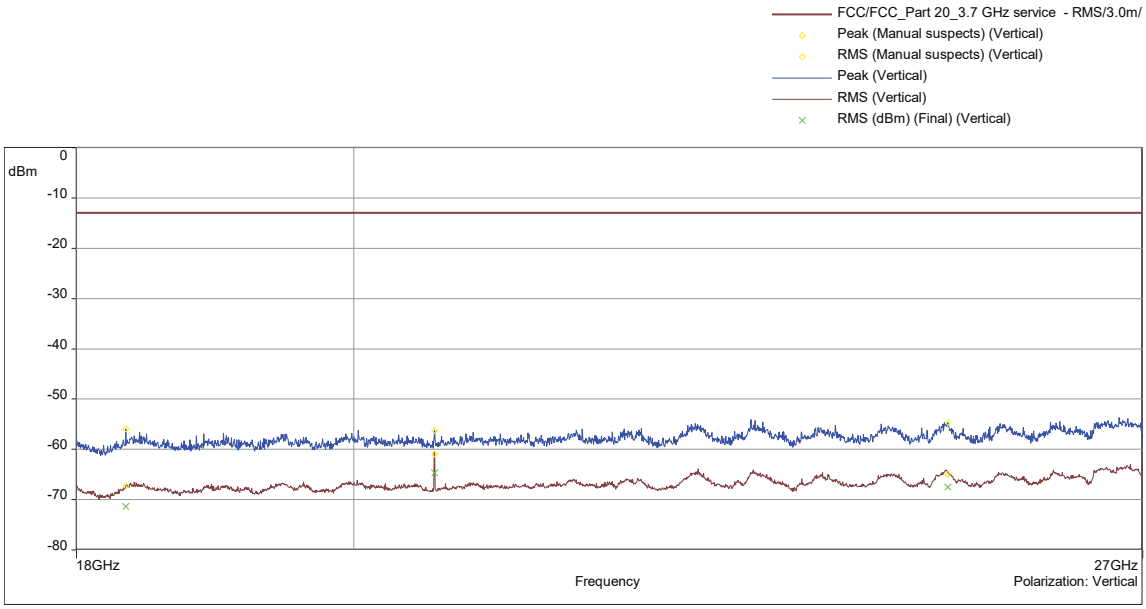
1 GHz - 18 GHz. vertical



18 GHz - 27 GHz. horizontal



18 GHz - 27 GHz. vertical



5.8.5 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

5.8.6 TEST EQUIPMENT USED

- Radiated Emissions

6 TEST EQUIPMENT

6.1 CONDUCTED EMISSIONS

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last calibration	Calibration due
1.1	FSV40	Signal Analyzer 10 Hz - 40 GHz	Rohde & Schwarz	E-003138	2023-10	2025-10
1.2	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	E-003206	2023-01	2026-01
1.3	CA-2.9MF-20-40-10W-RDC	Attenuator 20 dB	Tactron	E-004057	2024-10	2026-10
1.4	testo 175 H1	Thermo-Hygrometer	Testo	E-003922	2024-12	2025-12
1.5	Auto Messung 1 Channel V8.1	Software	Bureau Veritas	Software V8.1	---	---

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

6.2 RADIATED EMISSIONS

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last calibration	Calibration due
1.6	ESU40	EMI test receiver 10 Hz - 40 GHz	Rohde & Schwarz	E-003138	2024-10	2025-10
1.7	CBL 6111C	Antenna 30 MHz – 1 GHz	Chase	E-003226	2024-02	2026-02
1.8	LB-8180-SF	Antenna 0.8 GHz - 18 GHz	A-Info Inc.	E-004052	2024-08	2025-08
1.9	MWH-1826/B	Antenna 18 GHz – 26.5 GHz	ARA Inc.	E-004044	2024-08	2025-08
1.10	AM1431	Pre amplifier 10 kHz – 1 GHz	Miteq	E-003365	2024-10	2025-10
1.11	ZX60-06183LN+	Pre amplifier 6 GHz – 18 GHz	Miteq	E-003952	2024-10	2025-10
1.12	AMP-18000-40000-60-18-2.9-F	Preaamplifier 18 GHz - 40 GHz	Miteq	E-004003	2024-10	2025-10
1.13	CO3000	Controller SAC	Innco systems GmbH	E-003052 with Software 1.02.62	---	---
1.14	testo 176 P1	Thermo-Hygrometer	Testo	E-003918	2024-07	2025-07
1.15	BAT-EMC	Software	Nexio	V 2024.0.12.0	---	---

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

6.3 ANTENNA FACTORS. CABLE LOSS AND SAMPLE CALCULATION

The used factors for antennas, cables etc. are deposited in the used test systems (LabView program and BAT EMC programm). They are actualised by the returing calibration control.

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.

7 PHOTO REPORT

Please see separate photo report.

Annex A: Accreditation certificate (for information)

The accreditation relates to competences stated on the accreditation certificate. The current certificate is available on the homepage of the DAkkS and can be downloaded under accredited bodies with the processing number:

https://www.dakks.de/en

Annex B: Additional information provided by client

None.

****** End of test report *****