

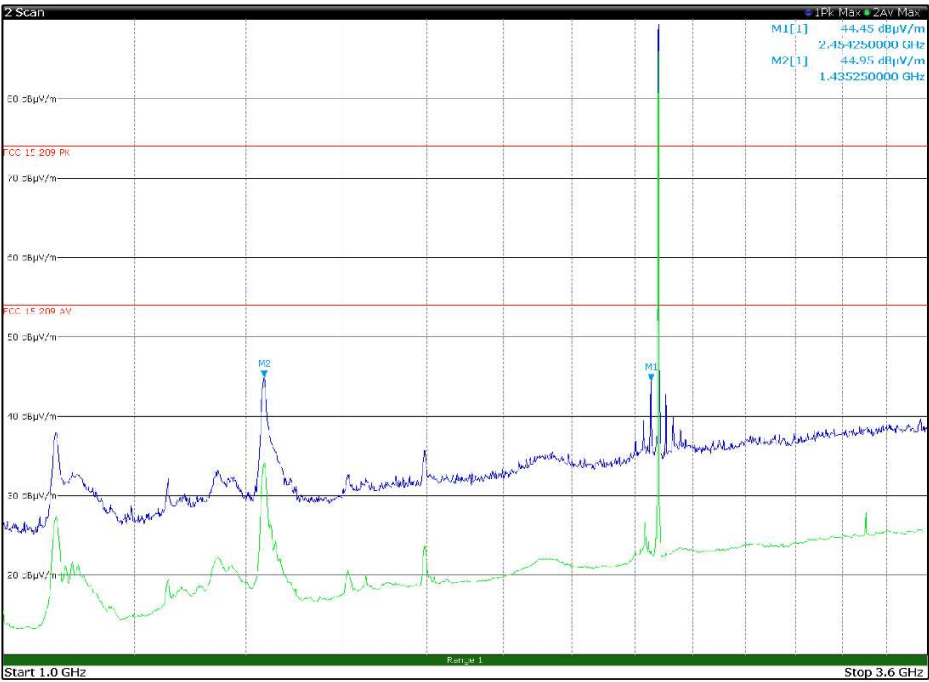


Figure 8.7-59: Radiated spurious emissions 1 to 3.6 GHz, High channel with antenna in horizontal polarization
Limit exceeded by the carrier

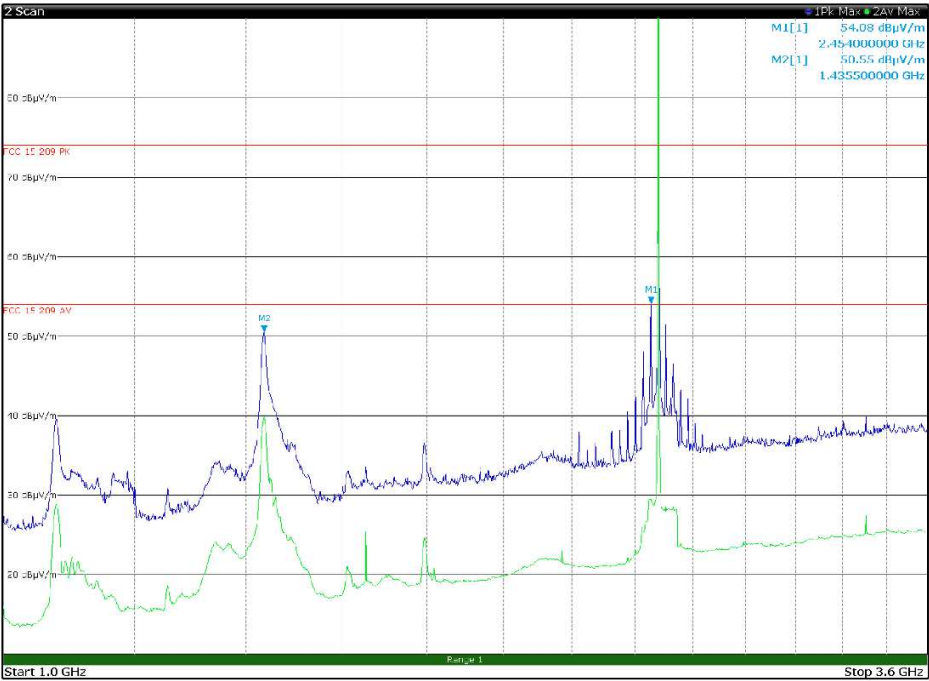


Figure 8.7-60: Radiated spurious emissions 1 to 3.6 GHz, High channel with antenna in vertical polarization
Limit exceeded by the carrier

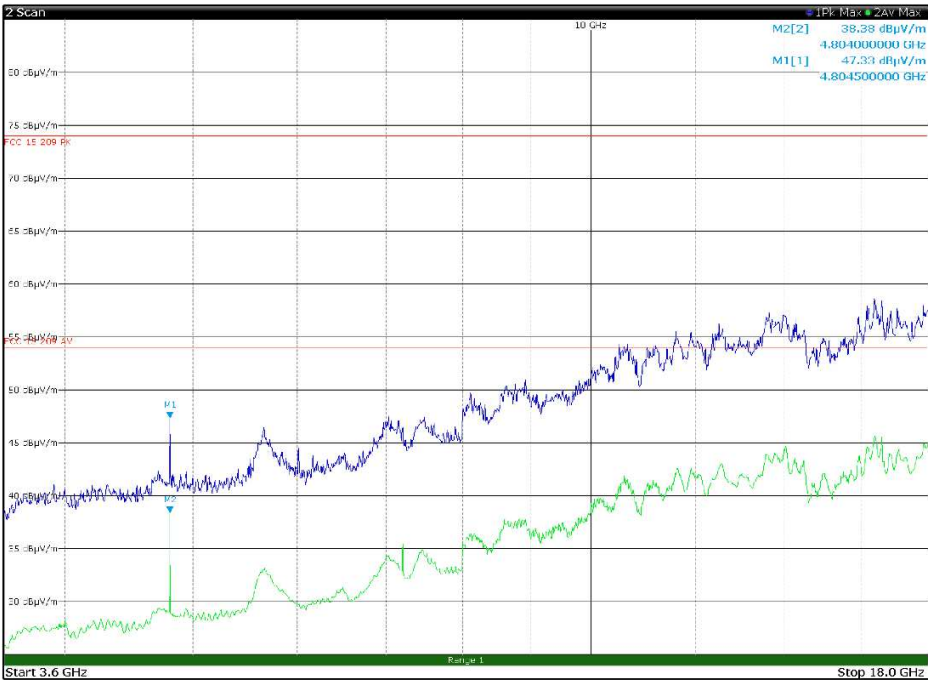


Figure 8.7-61: Radiated spurious emissions 3.6 to 18 GHz, Low channel with antenna in horizontal polarization

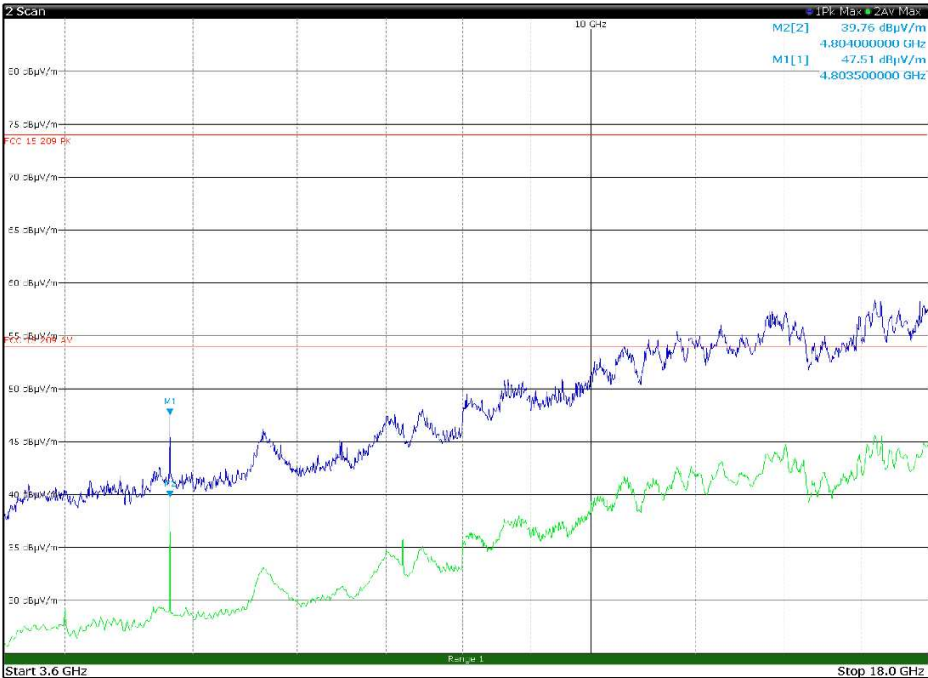


Figure 8.7-62: Radiated spurious emissions 3.6 to 18 GHz, Low channel with antenna in vertical polarization

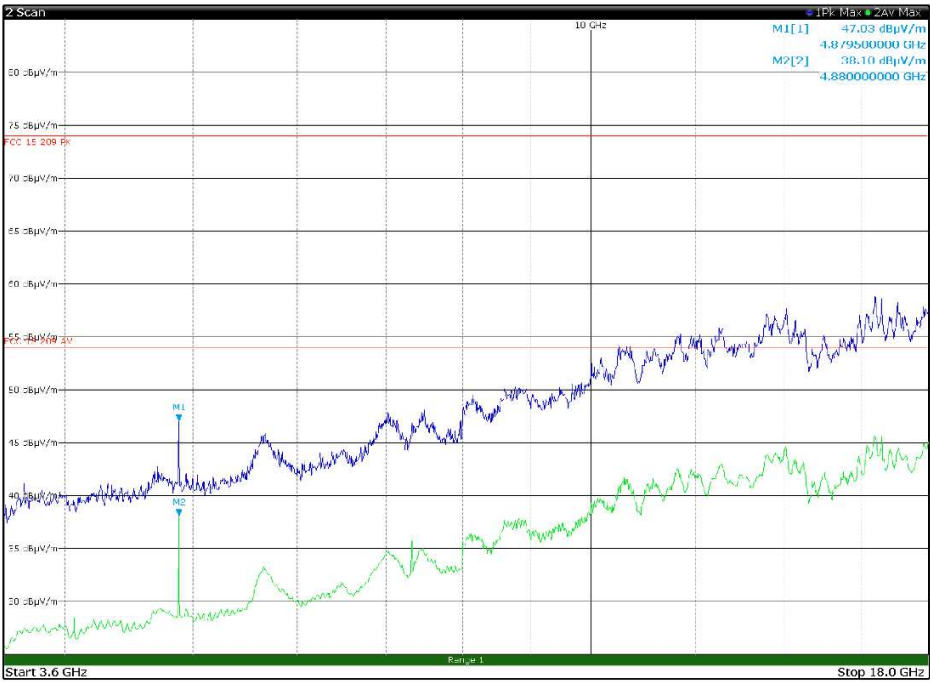


Figure 8.7-63: Radiated spurious emissions 3.6 to 18 GHz, Mid channel with antenna in horizontal polarization

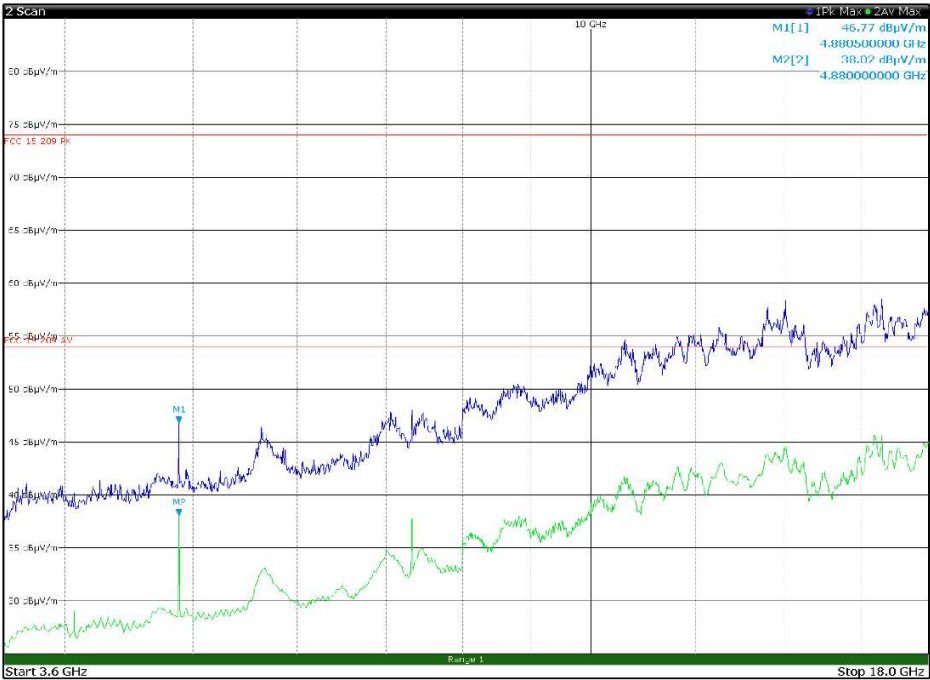


Figure 8.7-64: Radiated spurious emissions 3.6 to 18 GHz, Mid channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

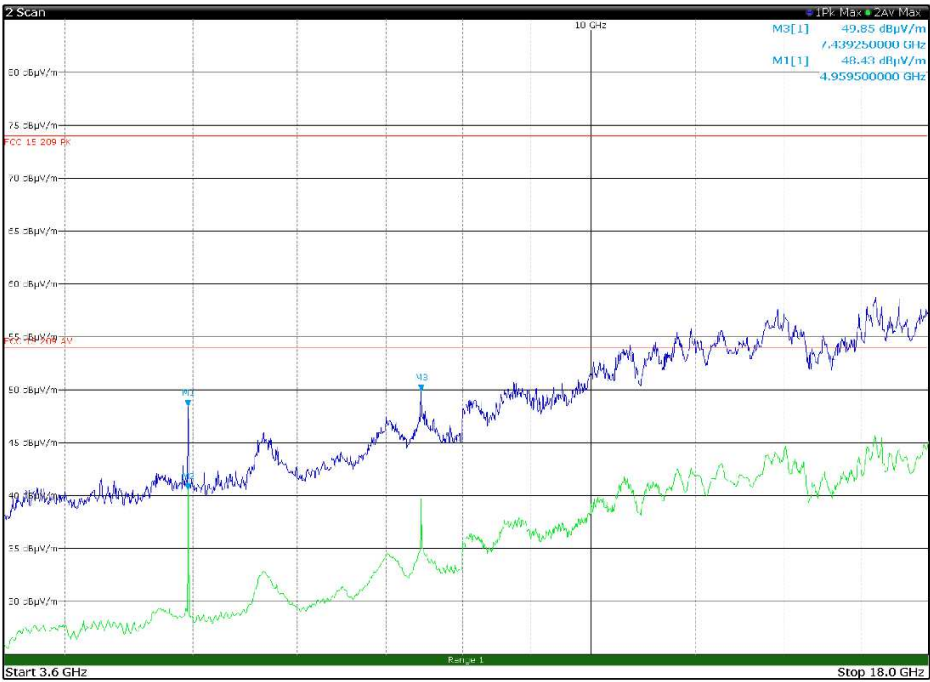


Figure 8.7-65: Radiated spurious emissions 3.6 to 18 GHz, High channel with antenna in horizontal polarization

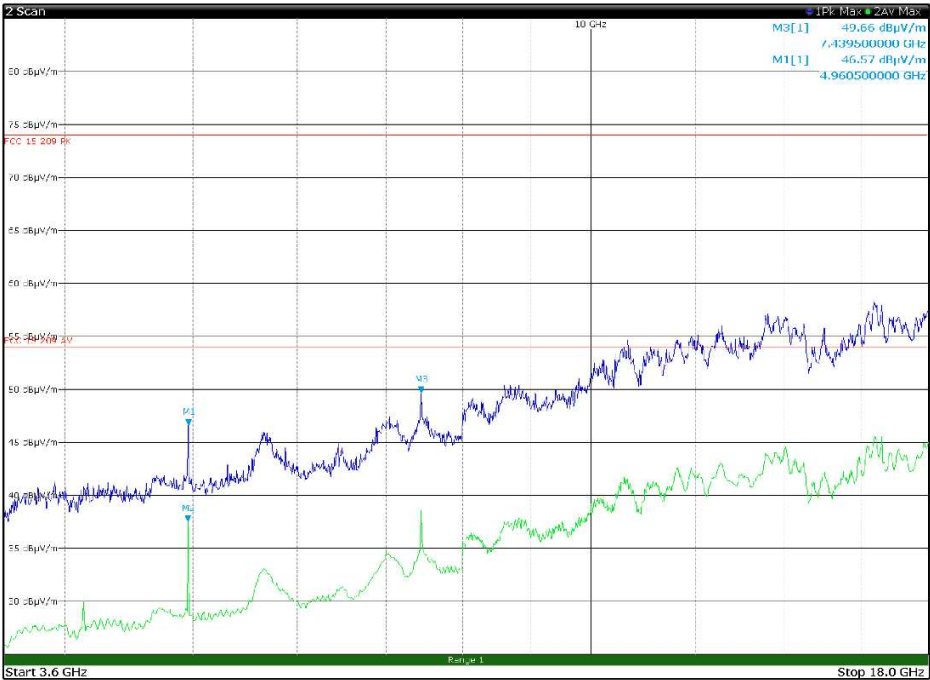


Figure 8.7-66: Radiated spurious emissions 3.6 to 18 GHz, High channel with antenna in vertical polarization

Section 8	Testing data
Test name	FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
Specification	FCC Part 15 Subpart C and RSS-247, Issue 2

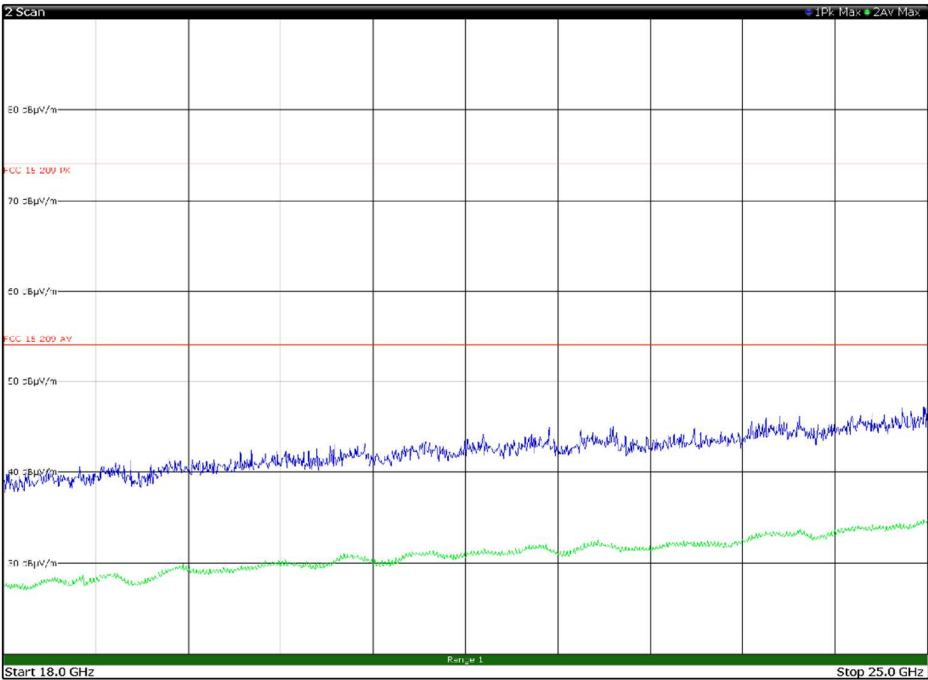


Figure 8.7-67: Radiated spurious emissions 18 to 25 GHz, Low channel with antenna in horizontal polarization

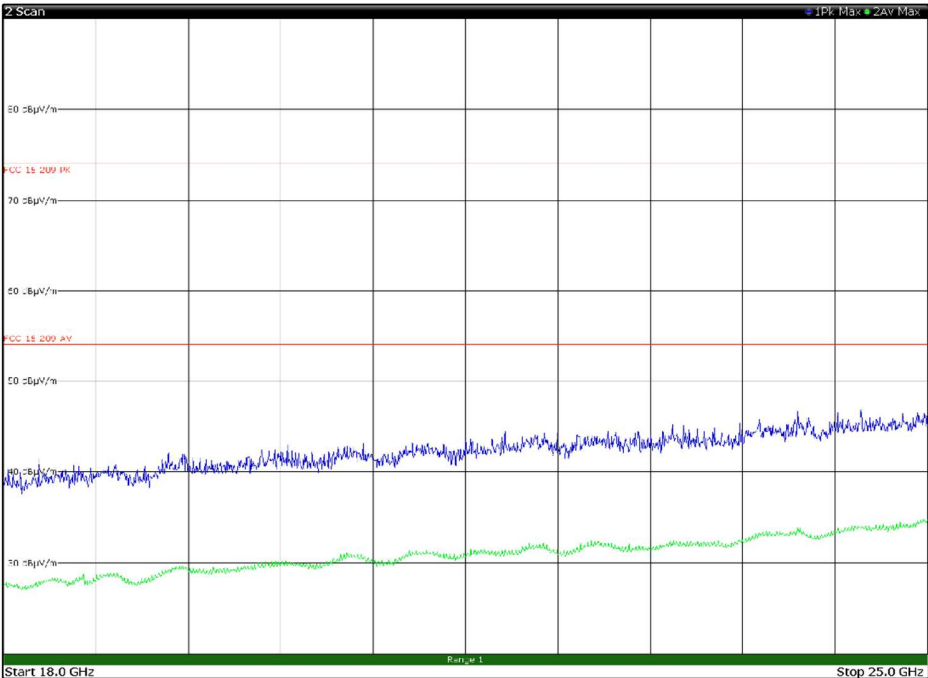


Figure 8.7-68: Radiated spurious emissions 18 to 25 GHz, Low channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

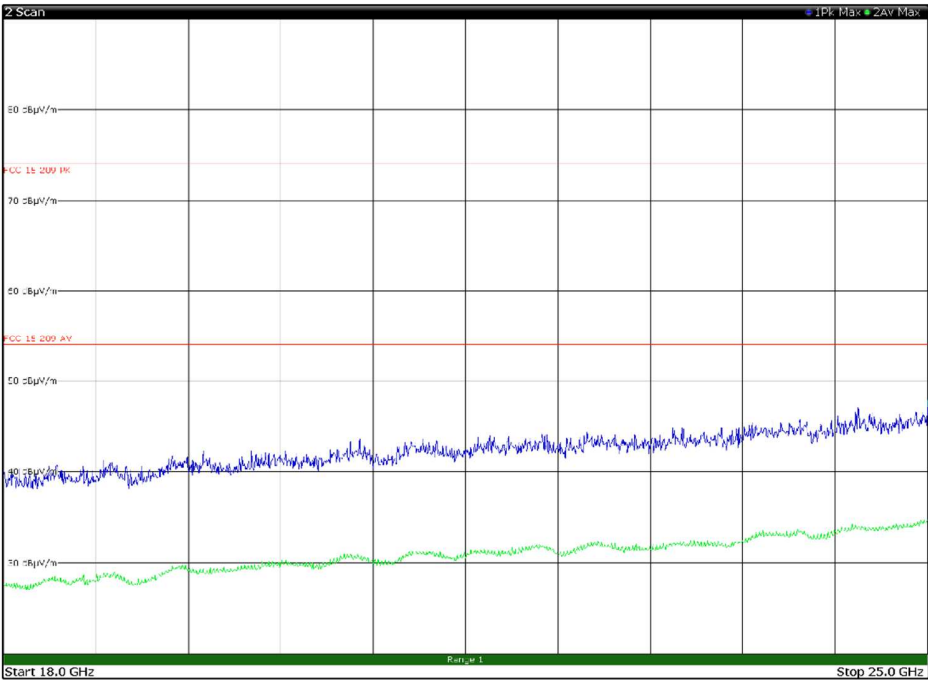


Figure 8.7-69: Radiated spurious emissions 18 to 25 GHz, Mid channel with antenna in horizontal polarization

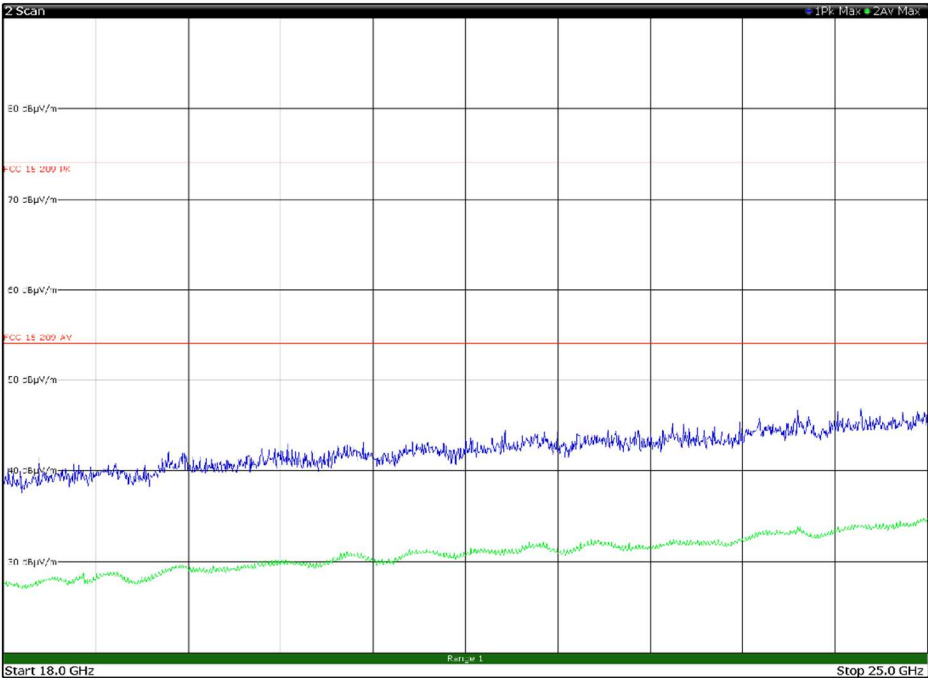


Figure 8.7-70: Radiated spurious emissions 18 to 25 GHz, Mid channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

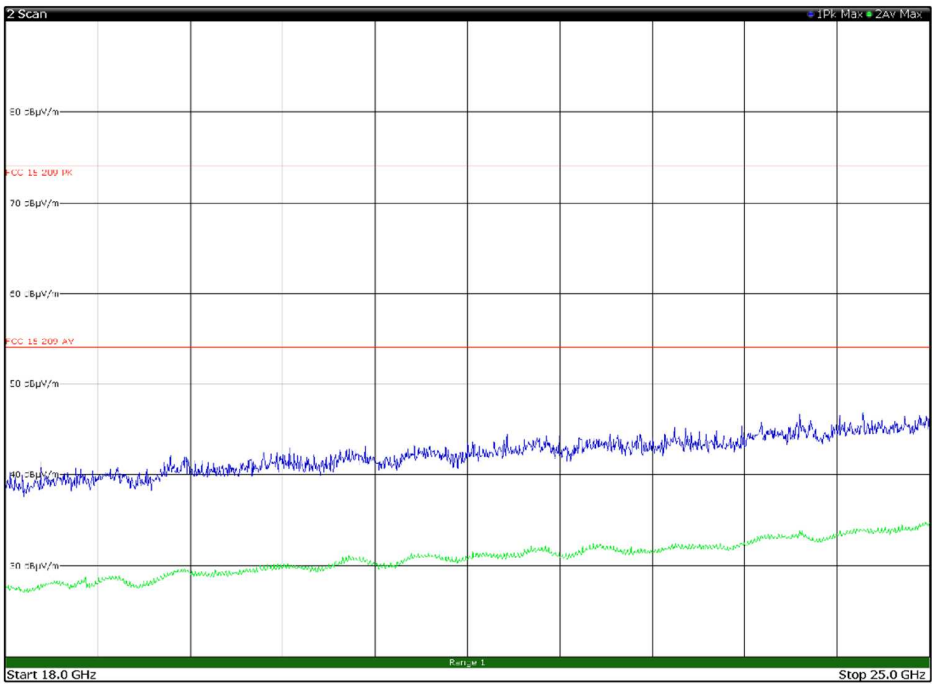


Figure 8.7-71: Radiated spurious emissions 18 to 25 GHz, High channel with antenna in horizontal polarization

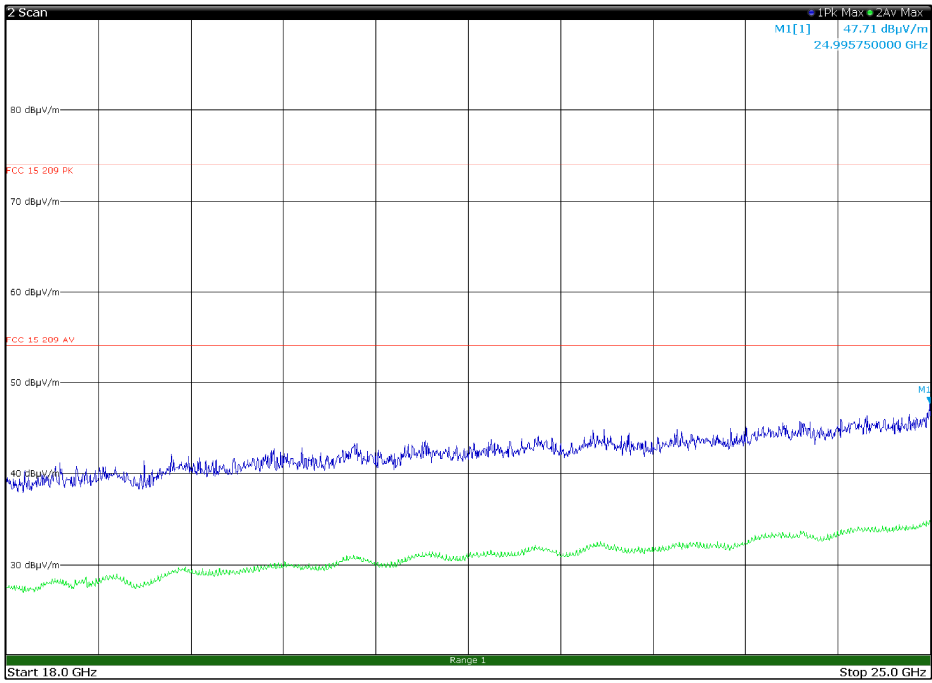


Figure 8.7-72: Radiated spurious emissions 18 to 25 GHz, High channel with antenna in vertical polarization

8.7.1 Test data for DYGATE-10-12-GS04 Antenna configuration 2

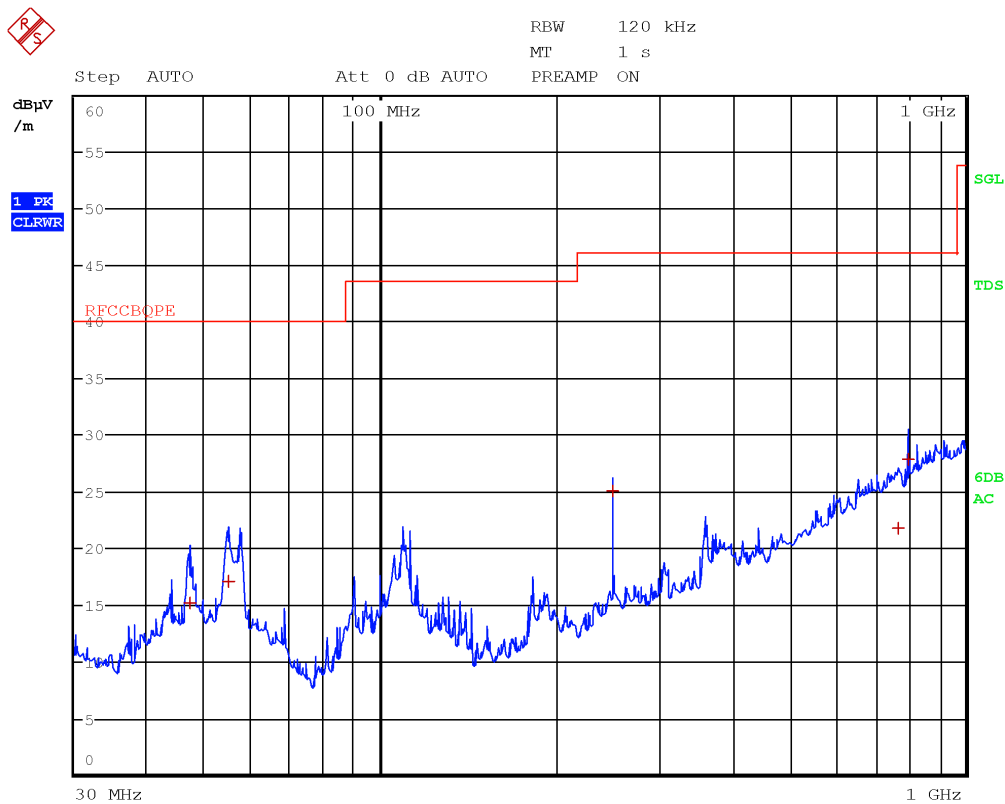


Figure 8.7-73: Radiated spurious emissions 30 to 1000 MHz, Low channel with antenna in horizontal polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
47.1600	15.2	40.0	-24.8	QP
54.9600	17.1	40.0	-22.9	QP
250.0000	25.0	46.0	-21.0	QP
768.1200	21.8	46.0	-24.2	QP
800.6400	27.9	46.0	-18.1	QP

Section 8
Test name
Specification

Testing data
 FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
 FCC Part 15 Subpart C and RSS-247, Issue 2

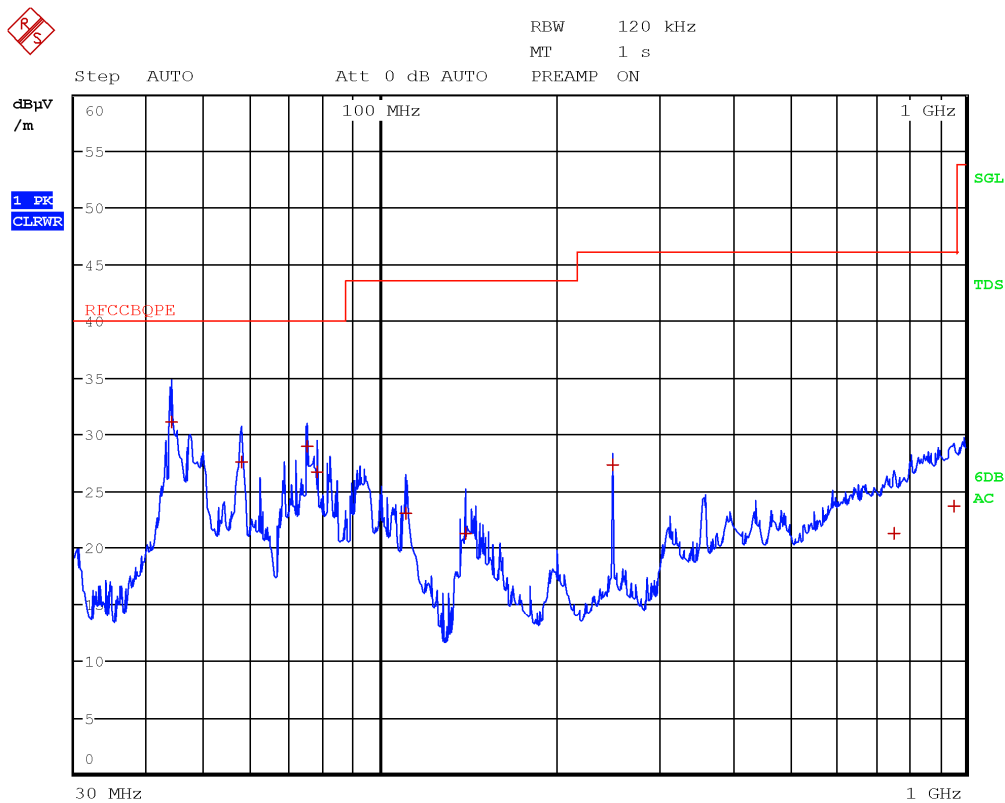


Figure 8.7-74: Radiated spurious emissions 30 to 1000 MHz, Low channel with antenna in vertical polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
43.8400	31.1	40.0	-8.9	QP
57.8400	27.6	40.0	-12.4	QP
74.7600	29.0	40.0	-11.0	QP
77.8800	26.7	40.0	-13.3	QP
110.7200	23.1	43.5	-20.4	QP
140.1600	21.3	43.5	-22.2	QP
250.0000	27.3	46.0	-18.7	QP
754.2800	21.3	46.0	-24.7	QP
955.1600	23.7	46.0	-22.3	QP

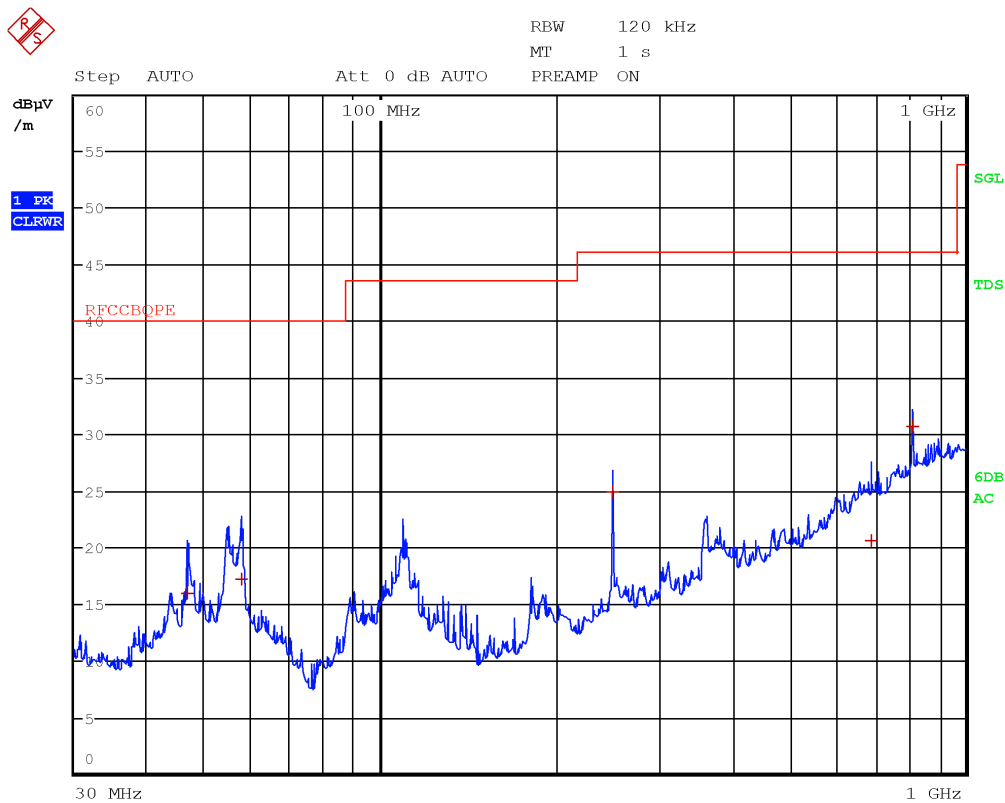


Figure 8.7-75: Radiated spurious emissions 30 to 1000 MHz, Mid channel with antenna in horizontal polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
46.8000	15.9	40.0	-24.1	QP
57.8400	17.2	40.0	-22.8	QP
250.0000	25.0	46.0	-21.0	QP
689.7200	20.6	46.0	-25.4	QP
813.3600	30.7	46.0	-15.3	QP

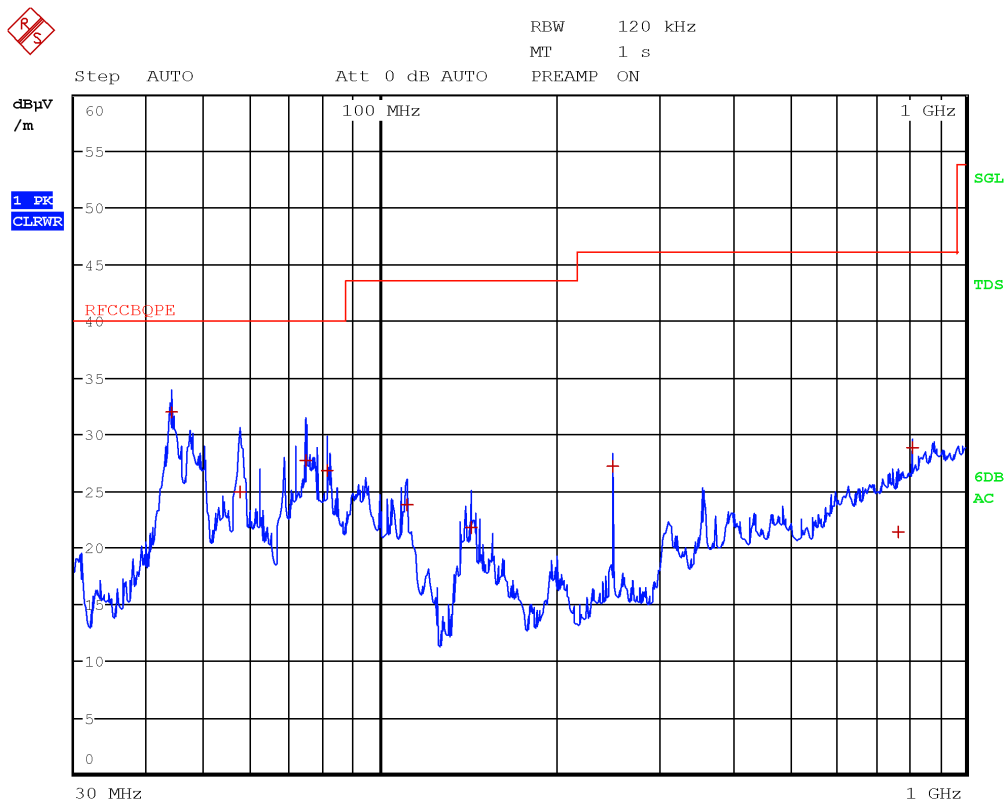


Figure 8.7-76: Radiated spurious emissions 30 to 1000 MHz, Mid channel with antenna in vertical polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
43.8000	32.0	40.0	-8.0	QP
57.4400	24.9	40.0	-15.1	QP
74.7200	27.7	40.0	-12.3	QP
81.2000	26.8	40.0	-13.2	QP
110.8000	23.9	43.5	-19.6	QP
143.2800	21.7	43.5	-21.8	QP
250.0000	27.3	46.0	-18.7	QP
766.1200	21.4	46.0	-24.6	QP
813.3200	28.8	46.0	-17.2	QP

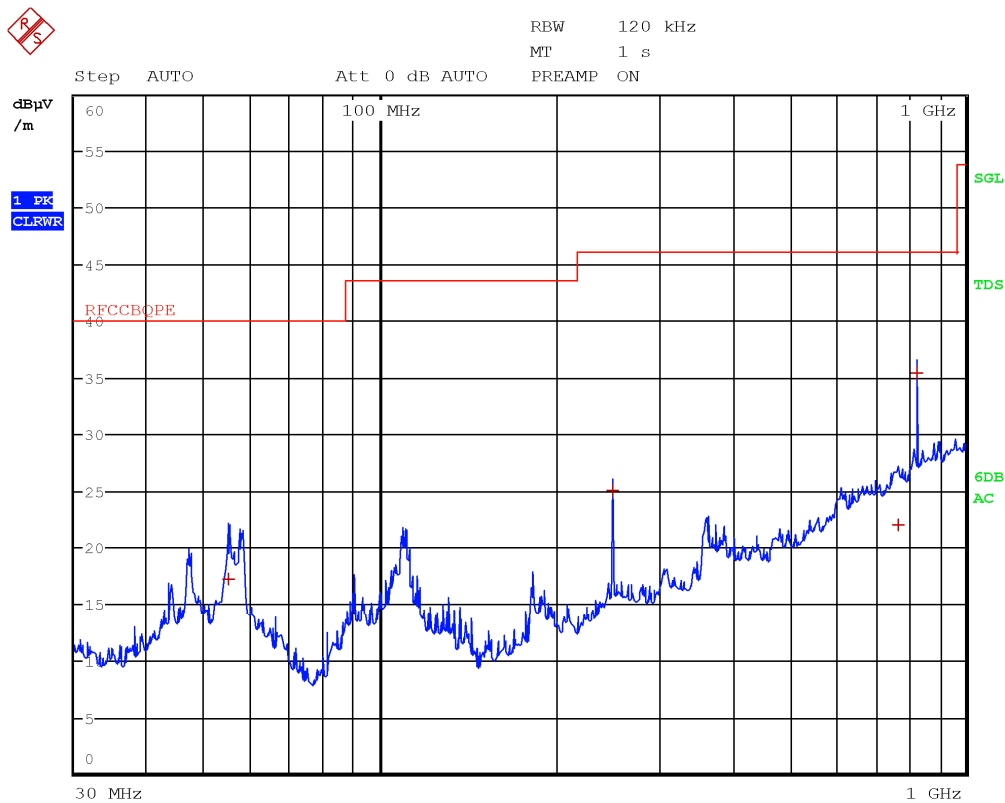


Figure 8.7-77: Radiated spurious emissions 30 to 1000 MHz, High channel with antenna in horizontal polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
55.0800	17.3	40.0	-22.7	QP
250.0000	25.0	46.0	-21.0	QP
766.3600	22.0	46.0	-24.0	QP
826.6400	35.5	46.0	-10.5	QP

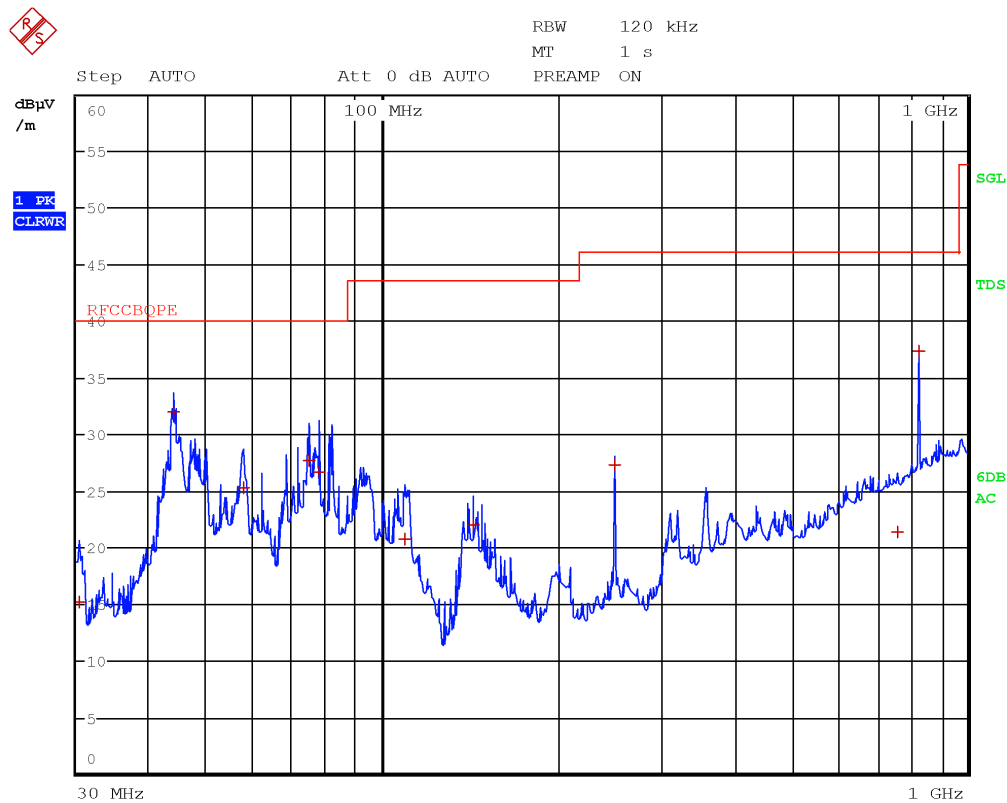


Figure 8.7-78: Radiated spurious emissions 30 to 1000 MHz, High channel with antenna in vertical polarization

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
30.3200	15.3	40.0	-24.7	QP
43.8000	32.1	40.0	-7.9	QP
57.7200	25.3	40.0	-14.7	QP
74.8400	27.7	40.0	-12.3	QP
77.8800	26.7	40.0	-13.3	QP
109.0800	20.8	43.5	-22.7	QP
143.3200	22.1	43.5	-21.4	QP
250.0000	27.3	46.0	-18.7	QP
758.6000	21.4	46.0	-24.6	QP
826.6000	37.5	46.0	-8.5	QP

Test name	Specification
-----------	---------------

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

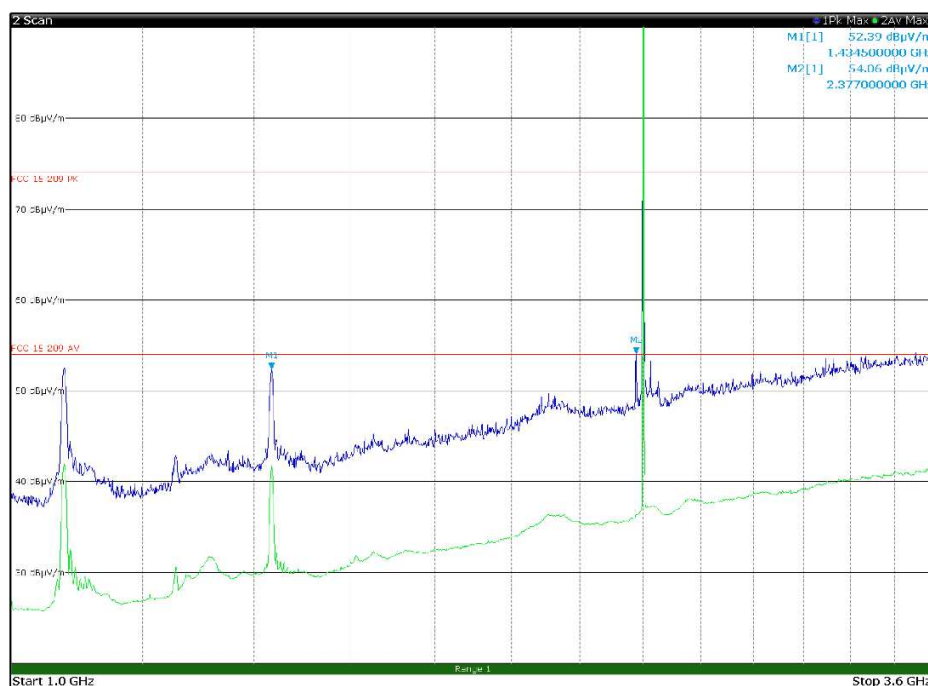


Figure 8.7-79: Radiated spurious emissions 1 to 3.6 GHz, Low channel with antenna in horizontal polarization

Limit exceeded by the carrier

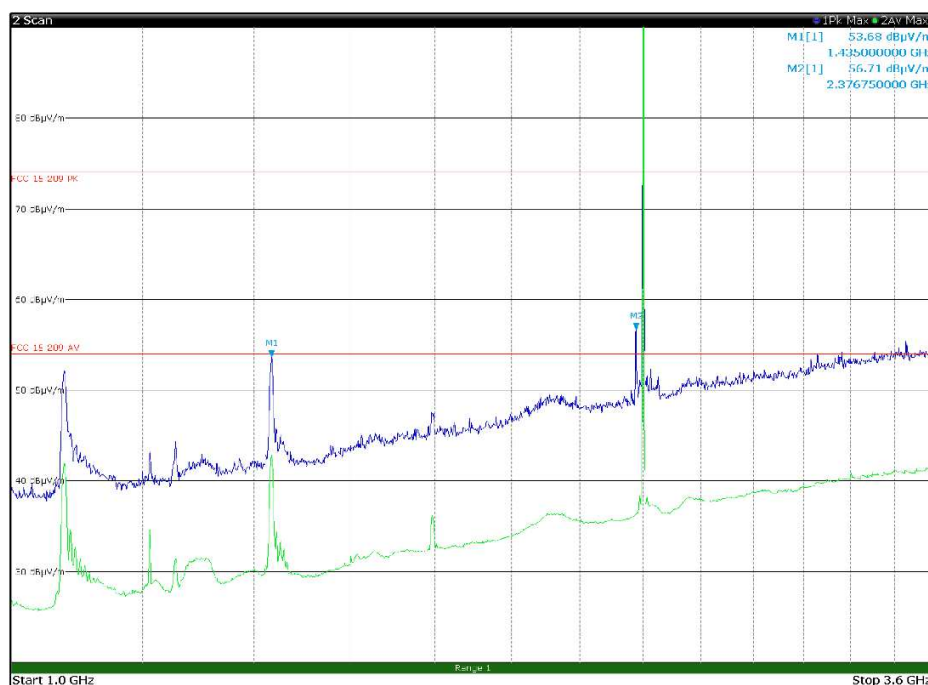


Figure 8.7-80: Radiated spurious emissions 1 to 3.6 GHz, Low channel with antenna in vertical polarization

Limit exceeded by the carrier

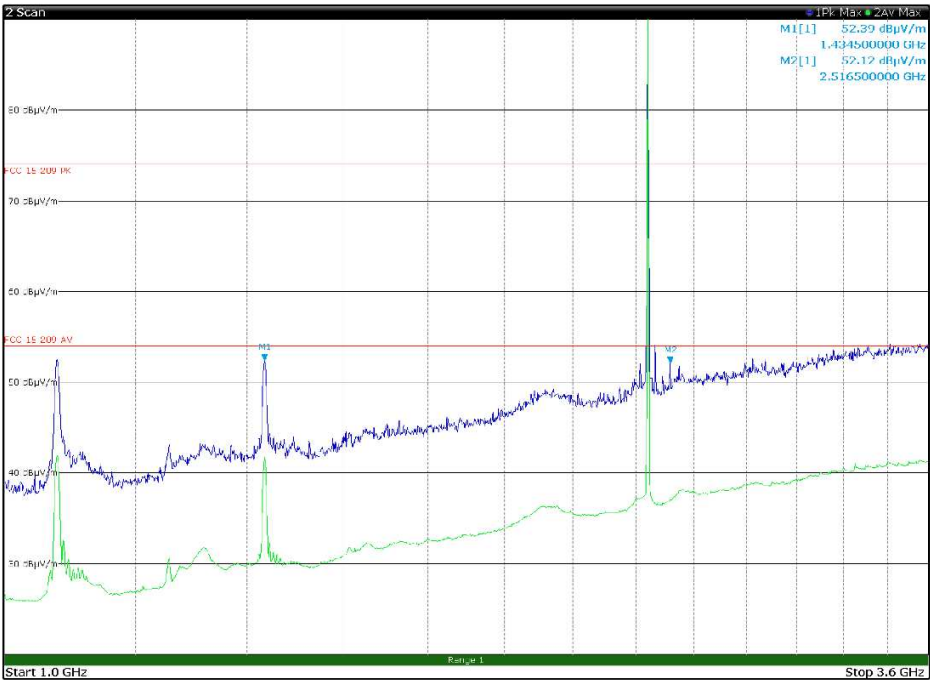


Figure 8.7-81: Radiated spurious emissions 1 to 3.6 GHz, Mid channel with antenna in horizontal polarization

Limit exceeded by the carrier

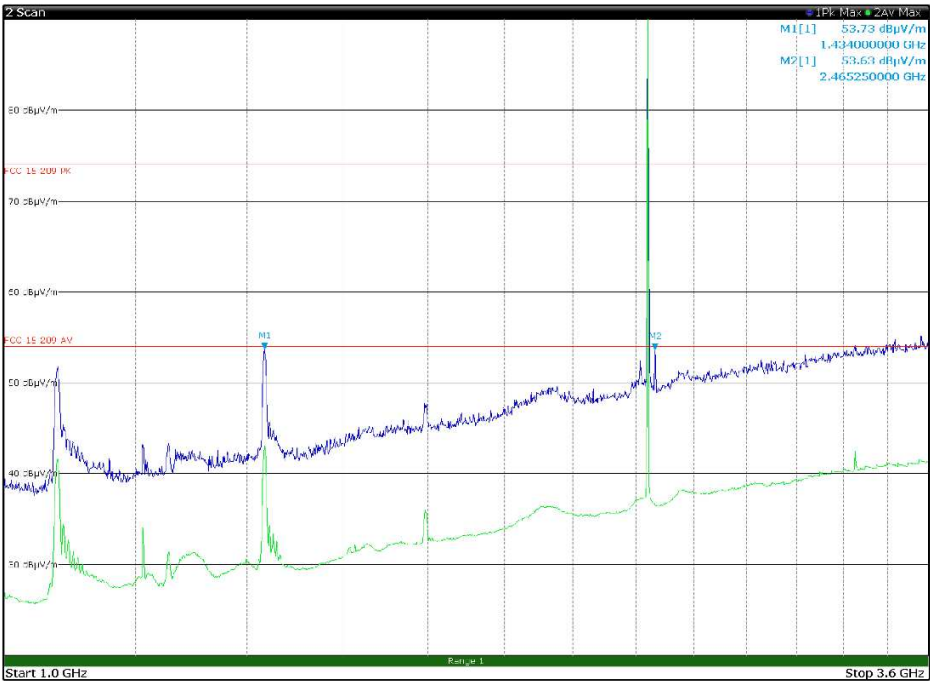


Figure 8.7-82: Radiated spurious emissions 1 to 3.6 GHz, Mid channel with antenna in vertical polarization

Limit exceeded by the carrier

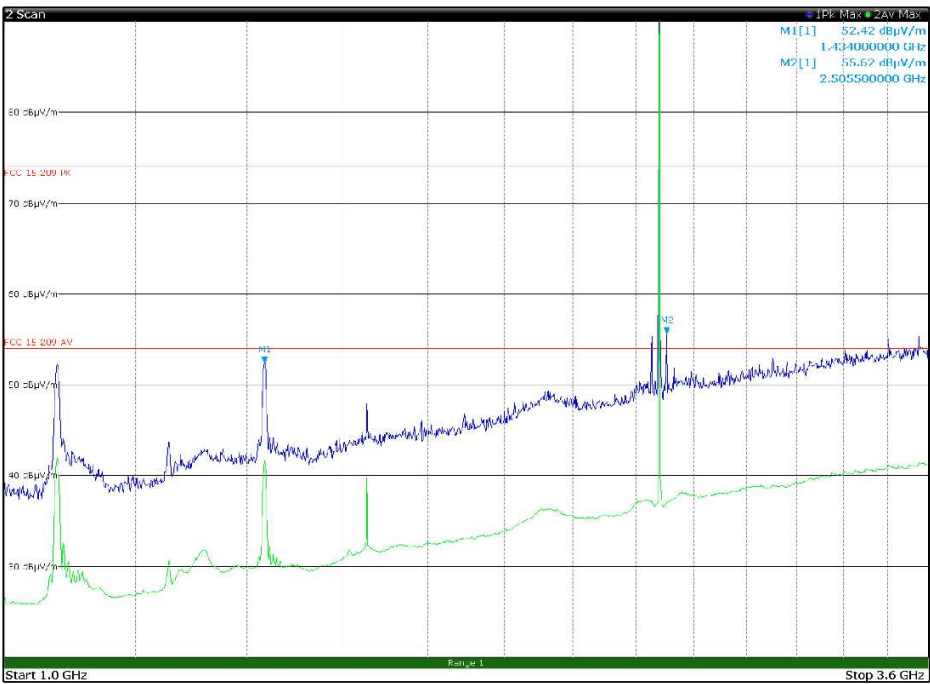


Figure 8.7-83: Radiated spurious emissions 1 to 3.6 GHz, High channel with antenna in horizontal polarization

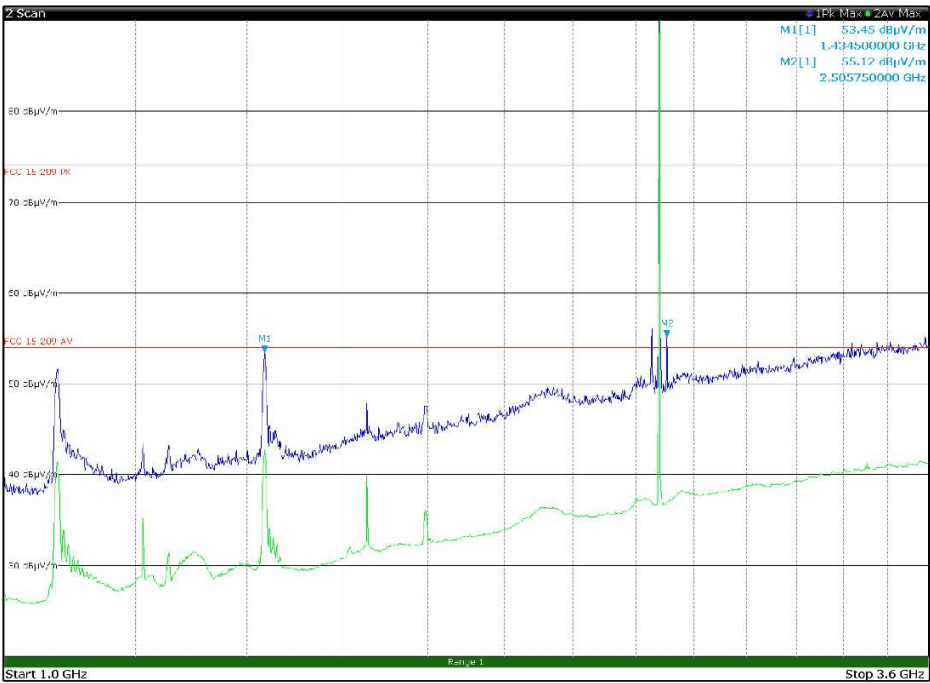


Figure 8.7-84: Radiated spurious emissions 1 to 3.6 GHz, High channel with antenna in vertical polarization

Limit exceeded by the carrier

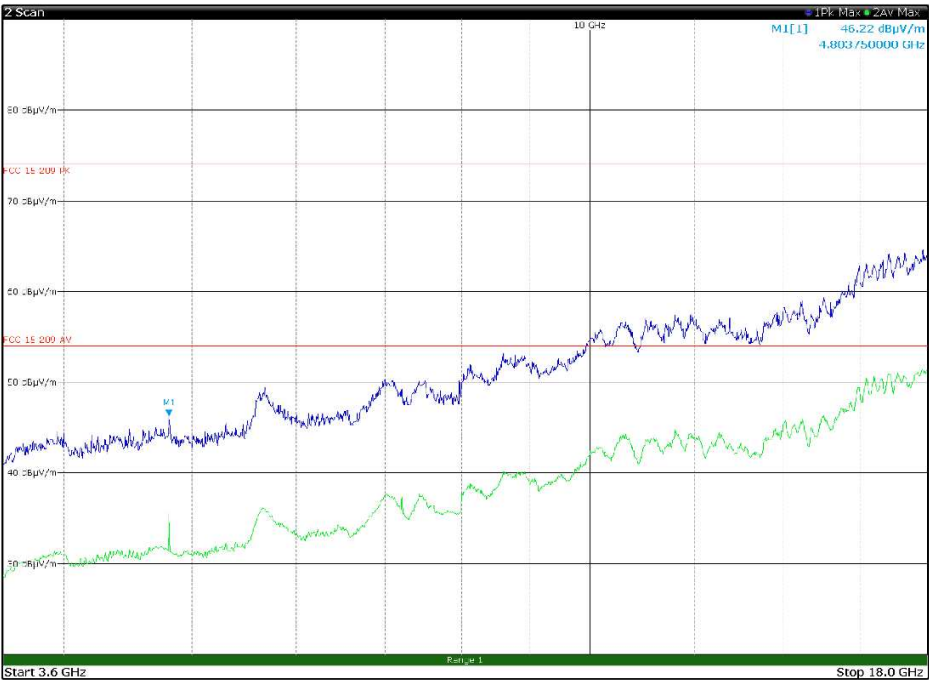


Figure 8.7-85: Radiated spurious emissions 3.6 to 18 GHz, Low channel with antenna in horizontal polarization

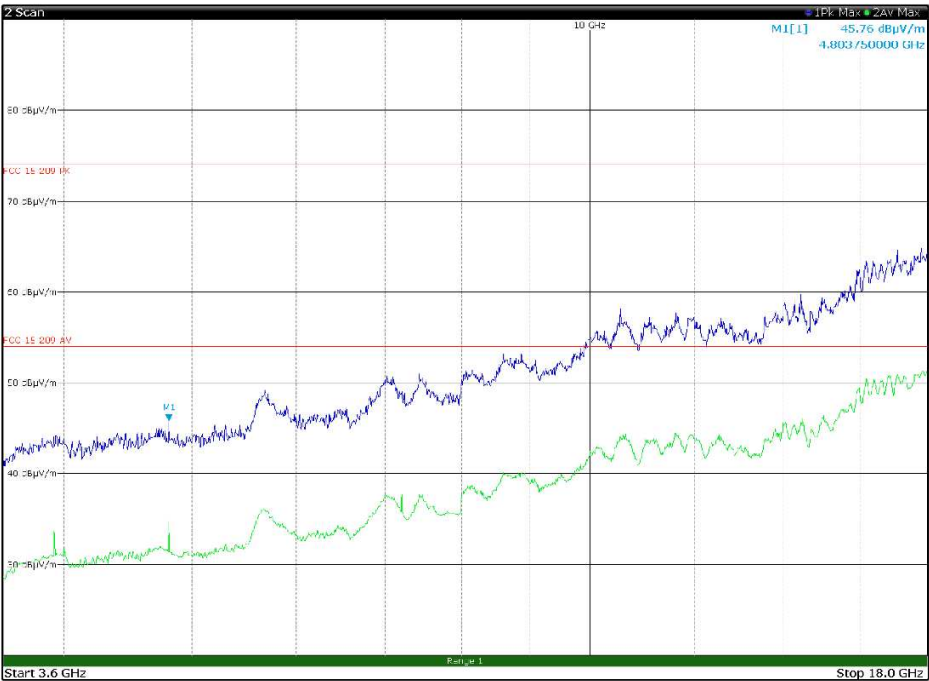


Figure 8.7-86: Radiated spurious emissions 3.6 to 18 GHz, Low channel with antenna in vertical polarization

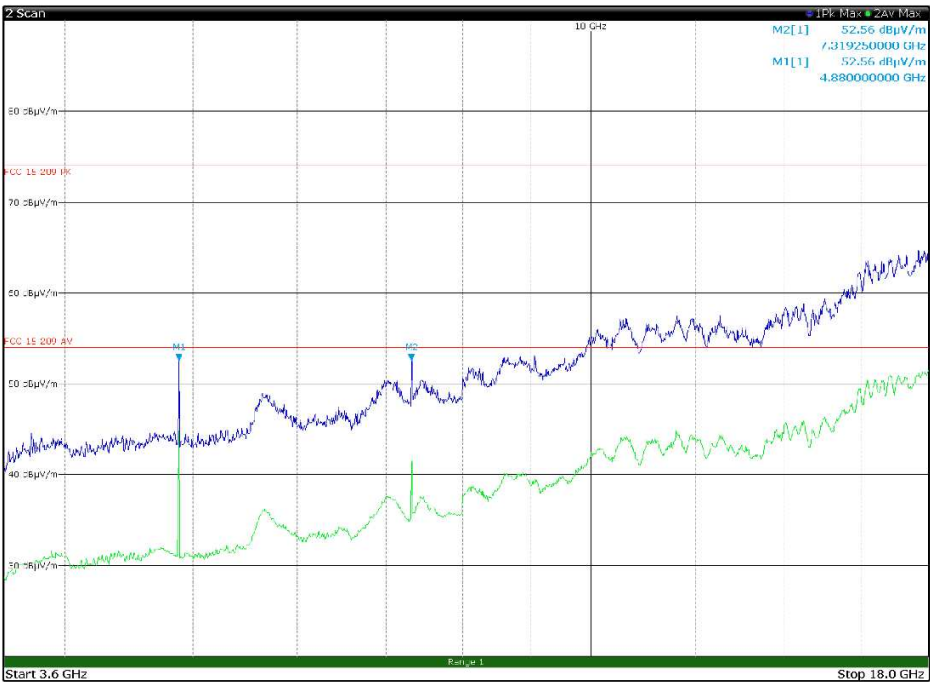


Figure 8.7-87: Radiated spurious emissions 3.6 to 18 GHz, Mid channel with antenna in horizontal polarization

Frequency (GHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
4.880	52.6	74	-21.4	PK
4.880	41.3	54	-12.7	AV
7.320	52.6	74	-21.4	PK
7.320	41.5	54	-12.5	AV

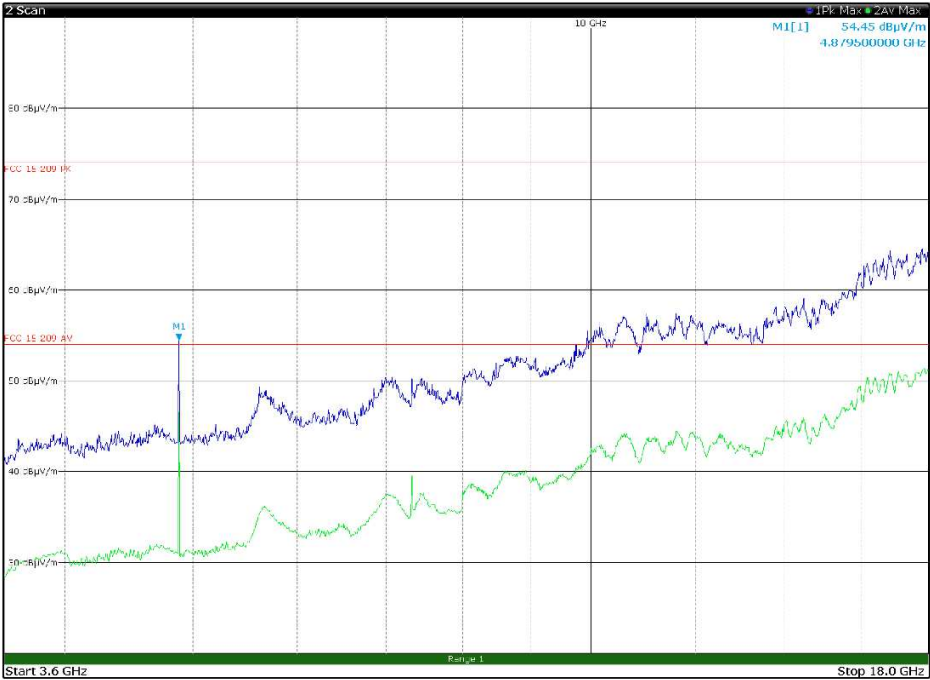


Figure 8.7-88: Radiated spurious emissions 3.6 to 18 GHz, Mid channel with antenna in vertical polarization

Frequency (GHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
4.880	54.5	74	-19.5	PK
4.880	44.1	54	-9.9	AV

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

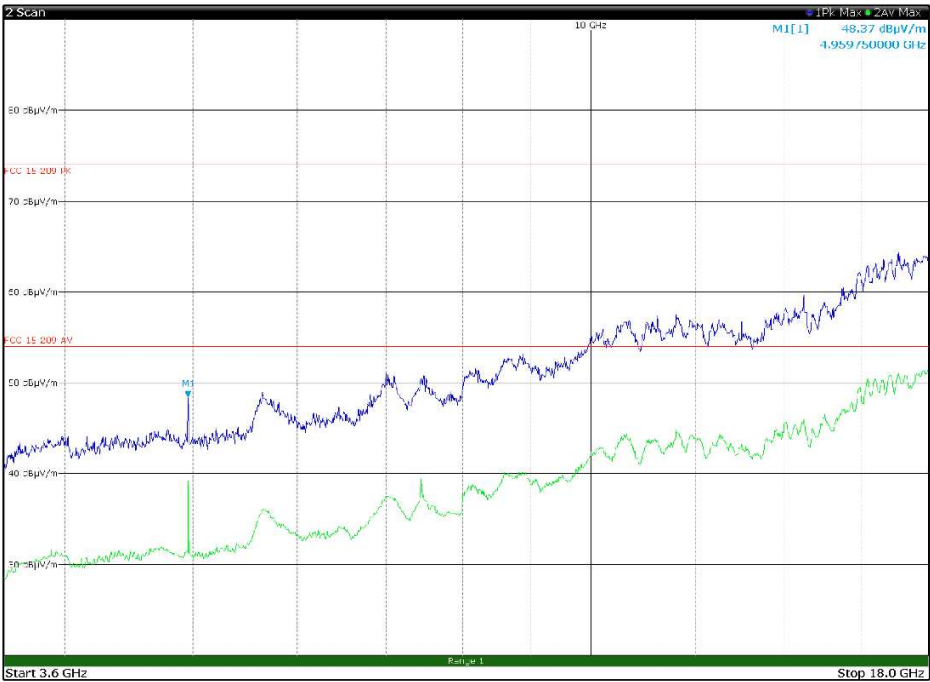


Figure 8.7-89: Radiated spurious emissions 3.6 to 18 GHz, High channel with antenna in horizontal polarization

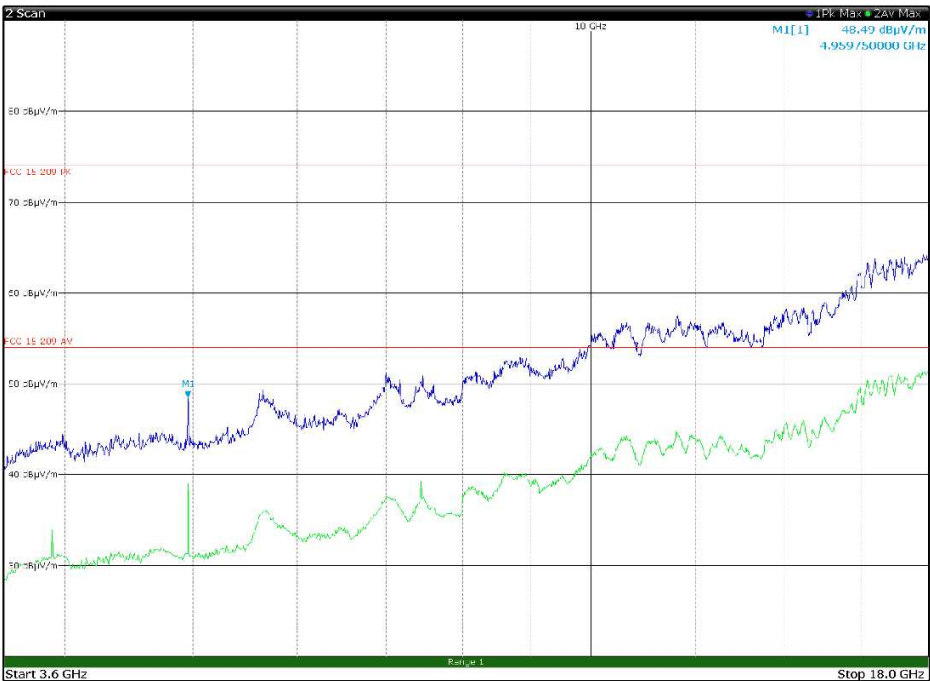


Figure 8.7-90: Radiated spurious emissions 3.6 to 18 GHz, High channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

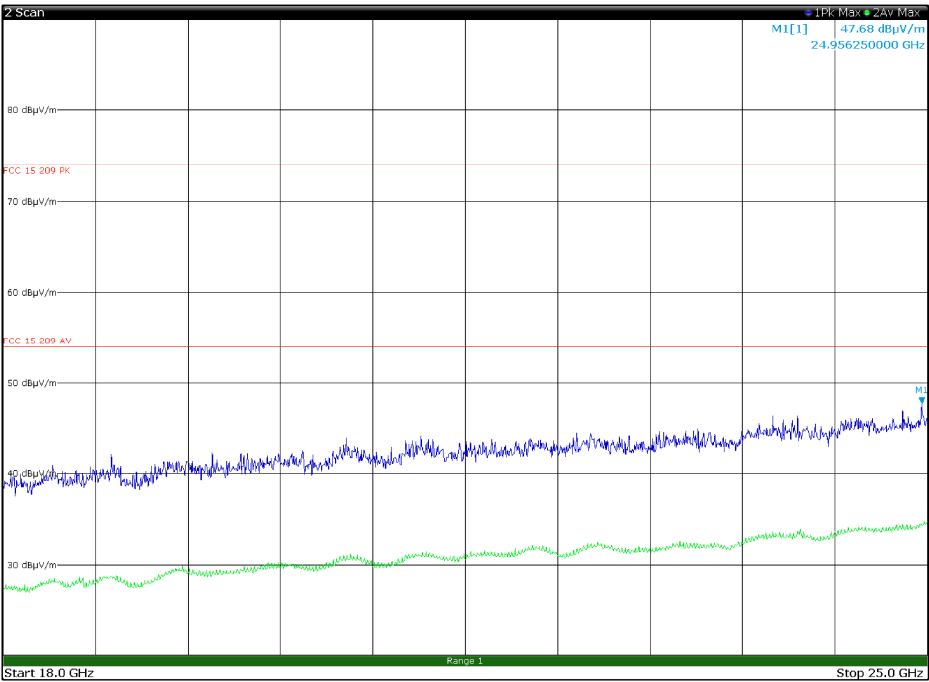


Figure 8.7-91: Radiated spurious emissions 18 to 25 GHz, Low channel with antenna in horizontal polarization

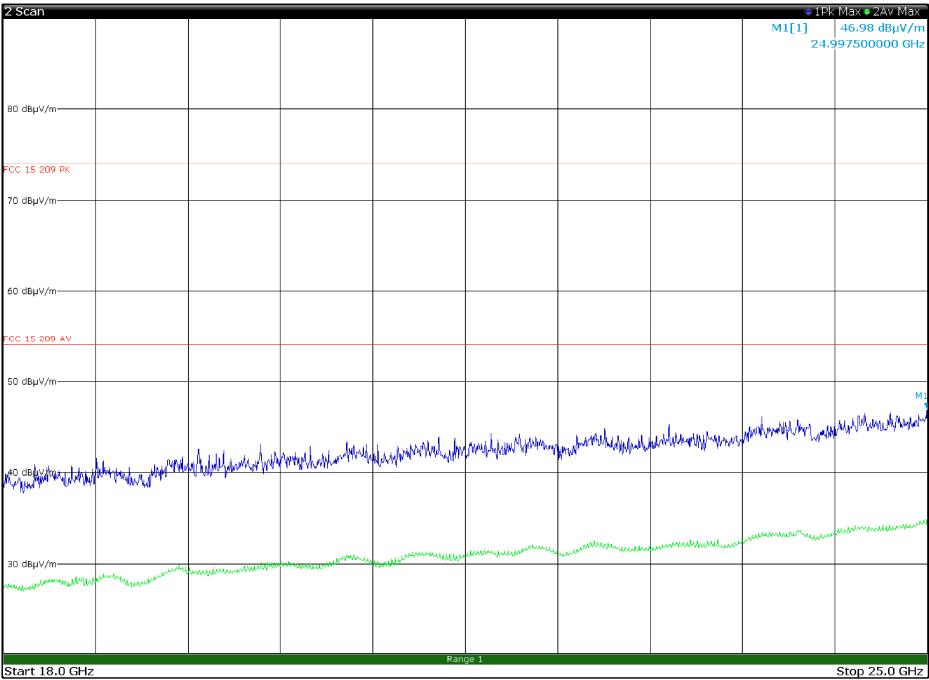


Figure 8.7-92: Radiated spurious emissions 18 to 25 GHz, Low channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

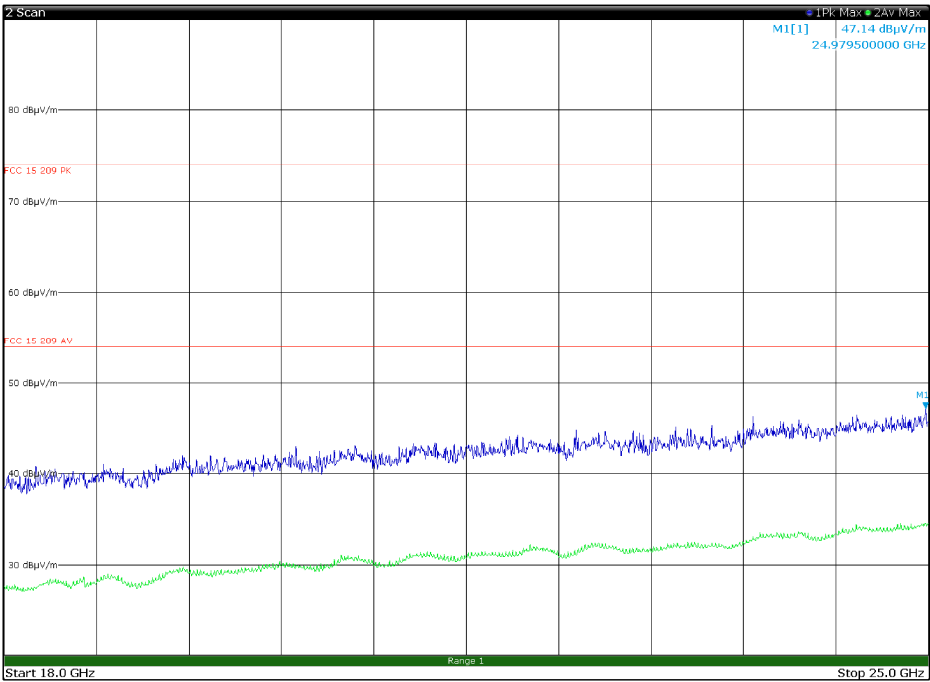


Figure 8.7-93: Radiated spurious emissions 18 to 25 GHz, Mid channel with antenna in horizontal polarization

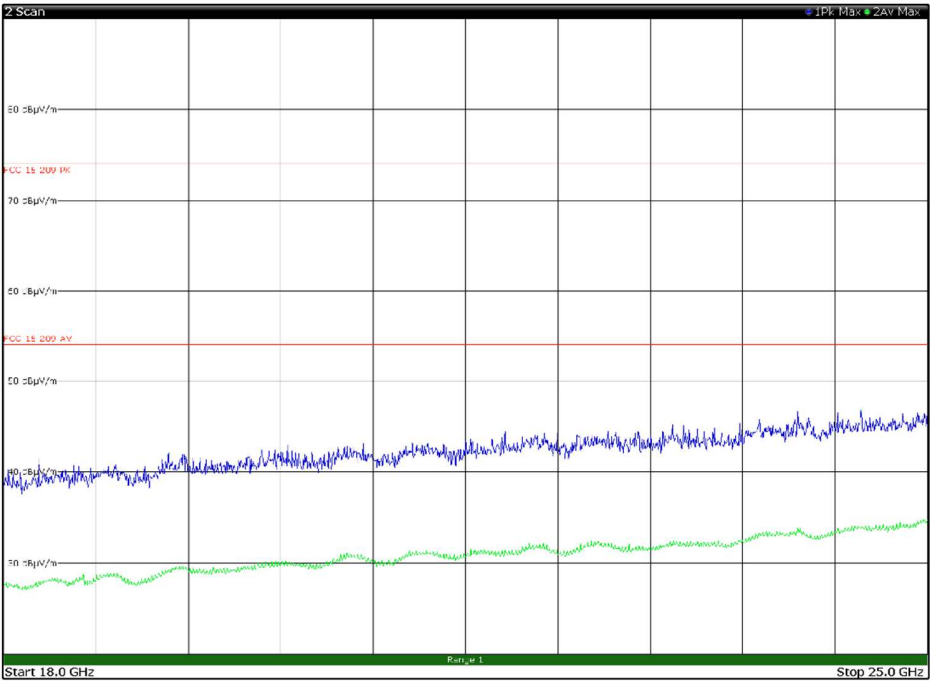


Figure 8.7-94: Radiated spurious emissions 18 to 25 GHz, Mid channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC 15.247(d) and RSS-247 5.5 Spurious (out-of-band) unwanted emissions
FCC Part 15 Subpart C and RSS-247, Issue 2

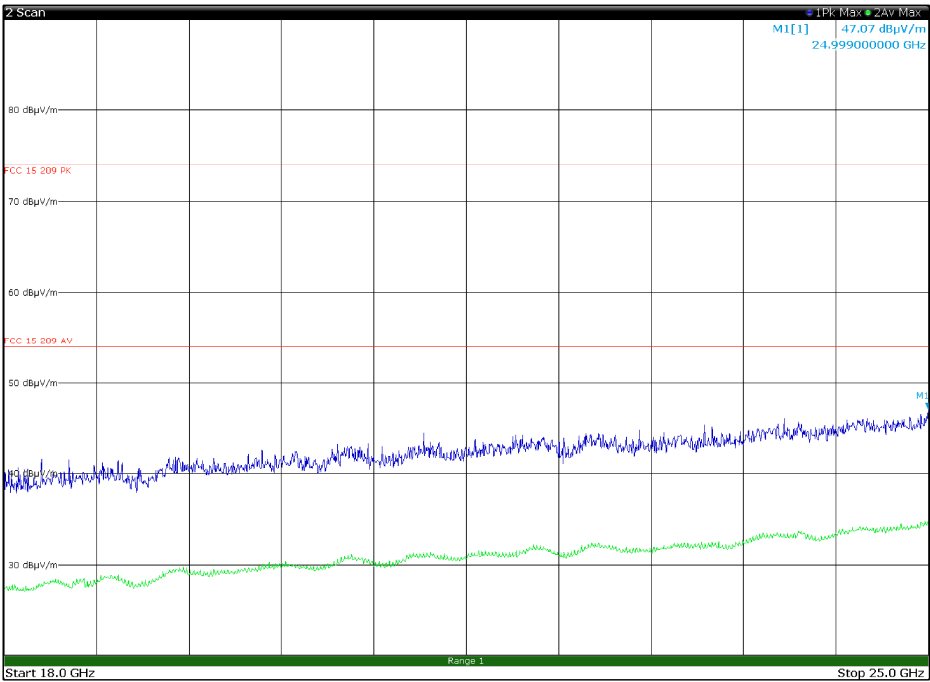


Figure 8.7-95: Radiated spurious emissions 18 to 25 GHz, High channel with antenna in horizontal polarization

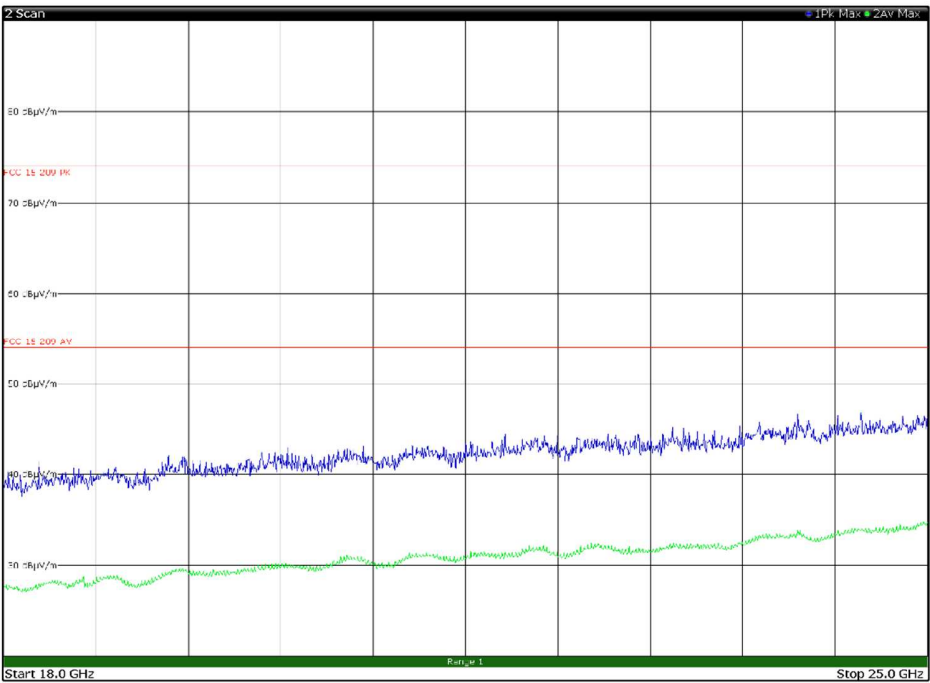


Figure 8.7-96: Radiated spurious emissions 18 to 25 GHz, High channel with antenna in vertical polarization

Section 8
Test name
Specification

Testing data
FCC Clause 15.247(e) and RSS-247 5.2(b) Power spectral density for digitally modulated devices
FCC Part 15 Subpart C and RSS-247, Issue 2



8.8 FCC 15.247(e) and RSS-247 5.2(b) Power spectral density for digitally modulated devices

8.8.1 Definitions and limits

FCC:

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

ISED:

The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

8.8.2 Test date

Start date January 19, 2021

8.8.3 Observations, settings and special notes

The test was performed using method PKPSD (peak PSD).
Spectrum analyser settings:

Resolution bandwidth:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
Video bandwidth:	$\geq 3 \times \text{RBW}$
Frequency span:	2 MHz
Detector mode:	Peak
Trace mode:	Maxhold

8.8.4 Equipment list

Table 8.8-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESW44	101620	2020-08	2021-08
Shielded room	Siemens	Conducted emission test room	1862	NCR	NCR

Note: NCR - no calibration required, VOU - verify on use

8.8.5 Test data

Table 8.8-2: PSD measurements results

Modulation	Frequency, MHz	PSD, dBm/3 kHz	PSD limit, dBm/3 kHz	Margin, dB
BLE	2402	-10.1	8	18.1
	2440	-10.7	8	18.7
	2480	-10.8	8	18.8

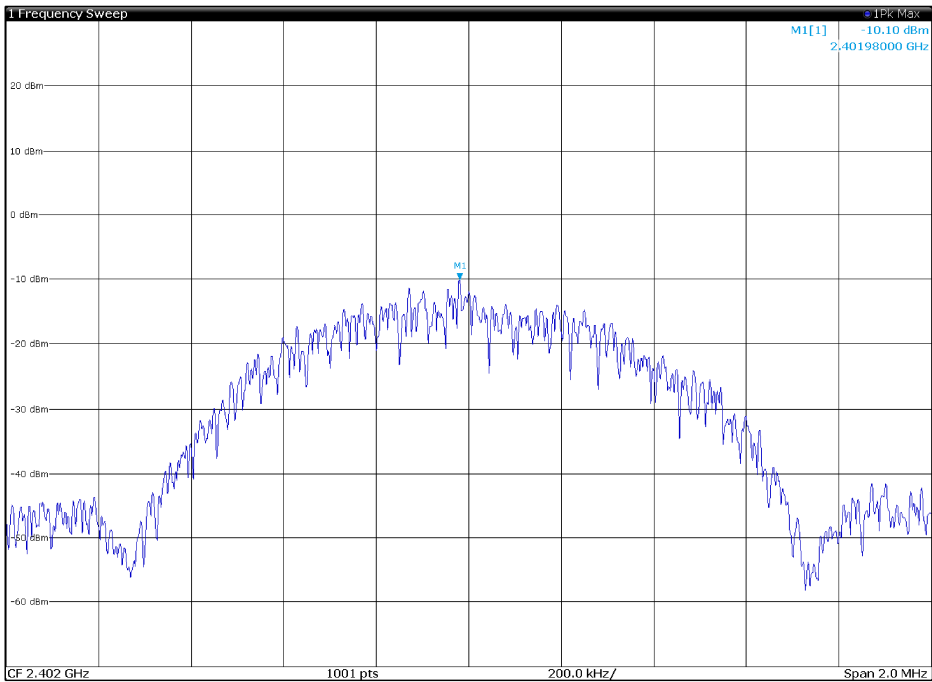


Figure 8.8-1: PSD sample plot on BLE - Low channel

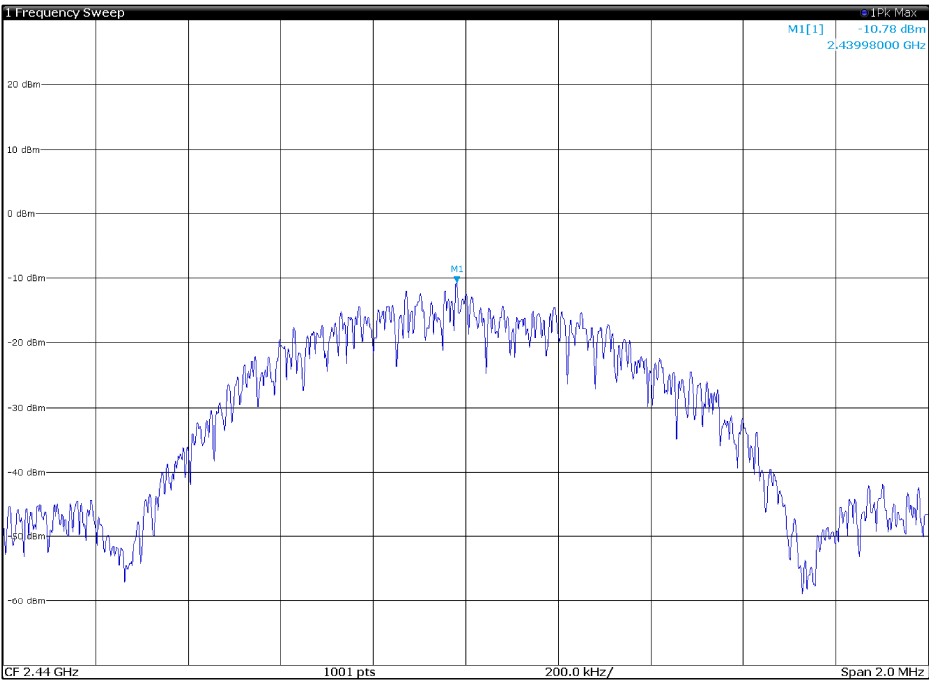


Figure 8.8-2: PSD sample plot on BLE - Mid channel

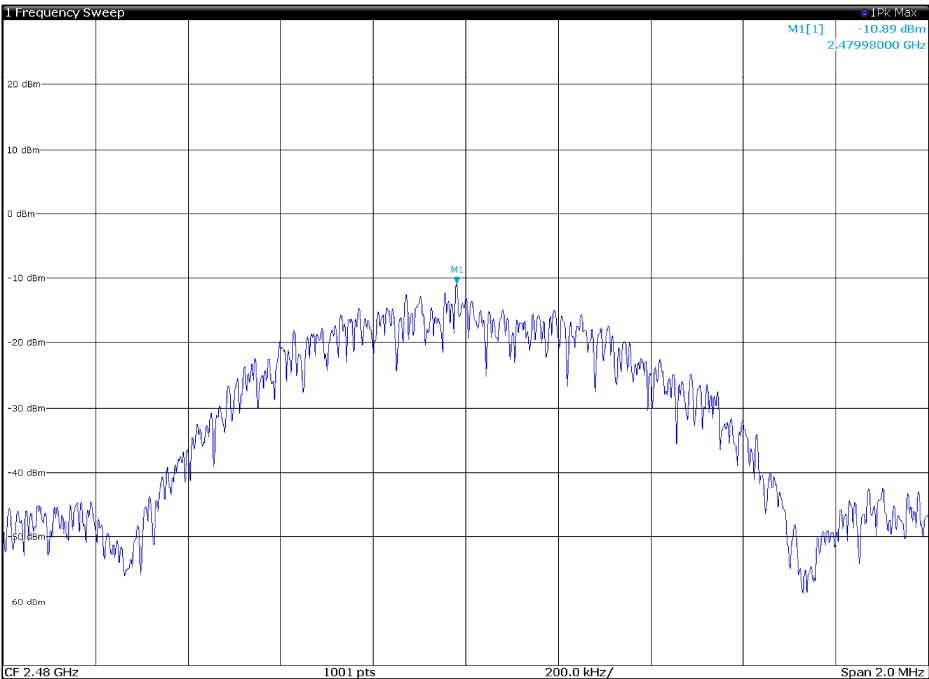
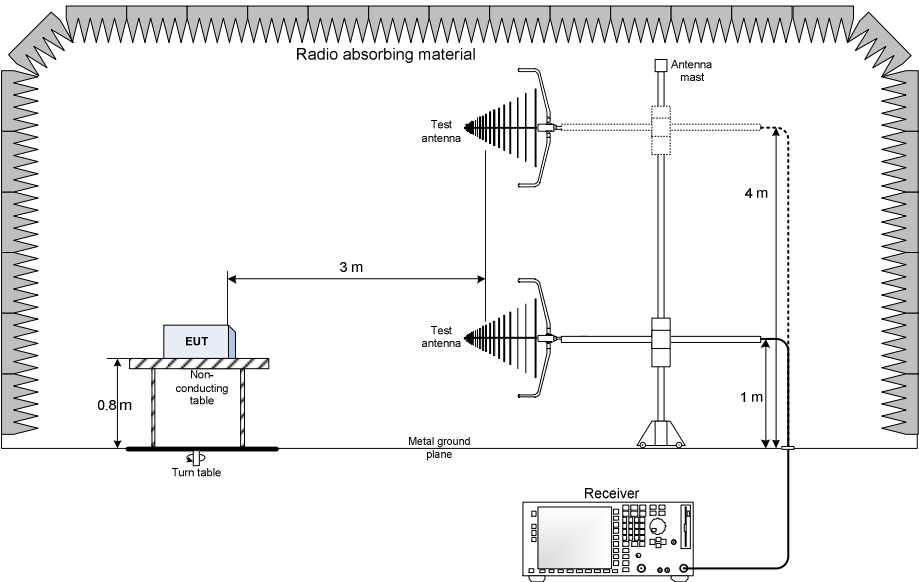


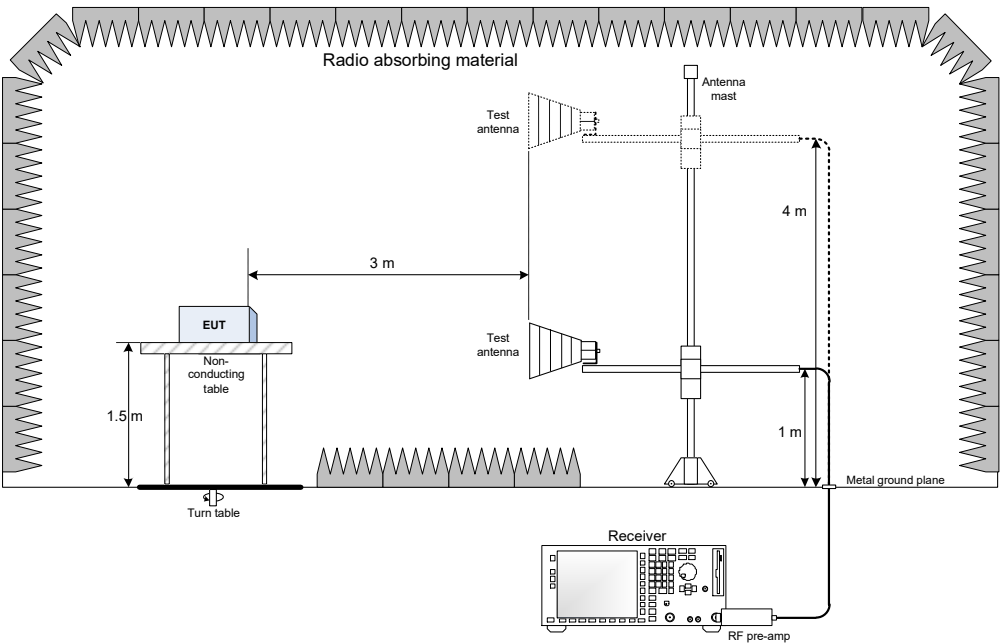
Figure 8.8-3: PSD sample plot on BLE - High channel

Section 9. Block diagrams of test set-ups

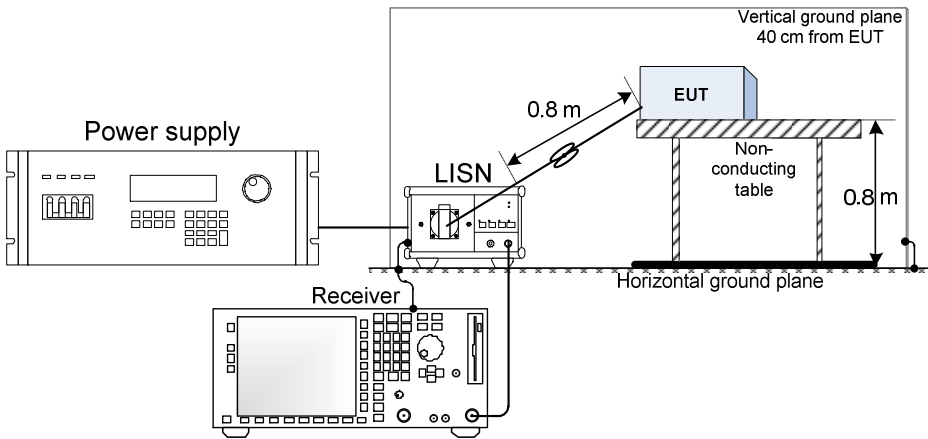
9.1 Radiated emissions set-up for frequencies below 1 GHz



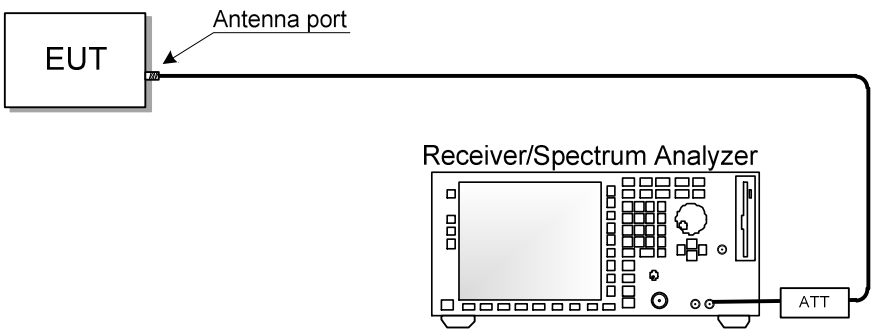
9.2 Radiated emissions set-up for frequencies above 1 GHz



9.3 Conducted emissions set-up

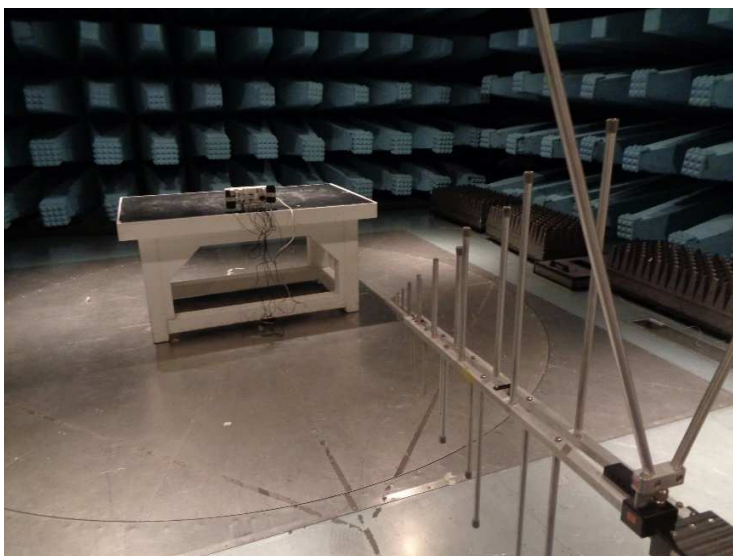


9.4 Antenna port set-up



Section 10. Photos

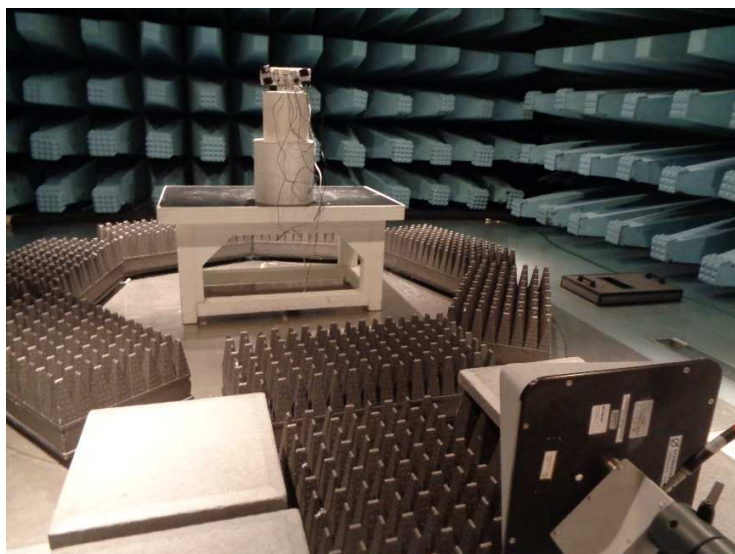
10.1 Photos of the test set-up



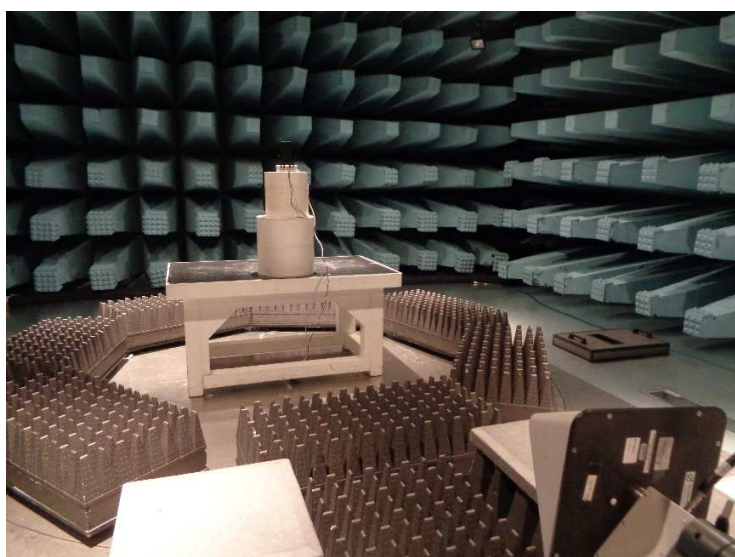
Radiated emission below 1 GHz – Antenna configuration 1



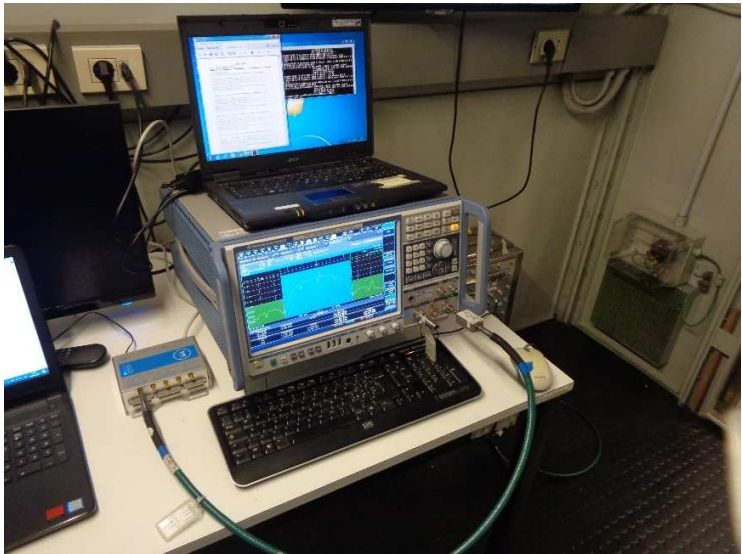
Radiated emission below 1 GHz – Antenna configuration 2



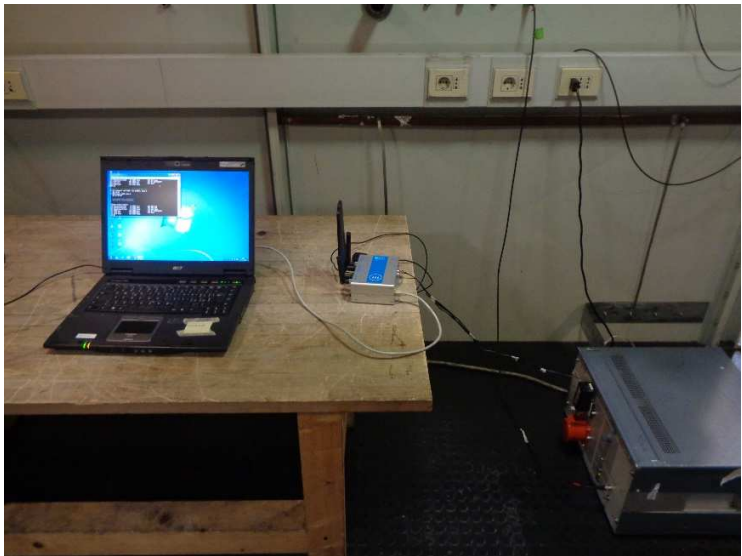
Radiated emission above 1 GHz - Configuration 1



Radiated emission above 1 GHz - Configuration 2



Conducted emission on the antenna port



Conducted emission on the AC Mains

10.2 Photos of the EUT

REGATE-10-12-GS04











DYGATE-10-12-GS04









(End of report)