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Test report

411757-3TRFWL

Date of issue: January 15, 2021

Applicant:

Ste Industries Srl

Via Oslavia, 17/8D – 20134 Milano (MI) – Italy

Product:

Micro.sp TPMS gateway for vehicular use

Model:

SKG417ST1

FCC ID:

2ASEL-SKG417

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.249

  Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.

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Test location

Company name	Nemko Spa
Address	Via del Carroccio, 4
City	Biassono
Province	MB
Postal code	20853
Country	Italy
Telephone	+39 039 220 12 01
Facsimile	+39 039 220 12 21
Website	www.nemko.com
Site number	FCC ID number 682159 (10 m semi anechoic chamber)

Tested by (name, function and signature)	P. Barbieri	(project handler)
Reviewed by (name, function and signature)	D. Guarnone	(verifier)
Date	January 15, 2021	

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report. This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contain in this report are within Nemko Spa's ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Applicant and manufacturer info

Company name	Ste Industries Srl
Address	Via Oslavia, 17/8D
City	Milano
Province/State	MI
Postal/Zip code	20134
Country	Italy

1.2 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.249	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.

1.3 Test methods

ANSI C63.10 v 2013	American National Standard for Procedures for Compliance Testing of Unsilenced Wireless Devices

1.4 Statement of compliance

Testing was performed against all relevant requirements of the test standard. Results obtained indicate that the product under test does not comply in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.5 Exclusions

None

1.6 Test report revision history

Revision #	Details of changes made to test report
411757-3TRFWL	Original report issued

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C test results

Part	Test description	Verdict
§15.249(a)	Field strength of emissions	Not applicable
§15.203	Antenna requirement	Pass [1]
§15.249(b)	Fixed, point-to-point	Not applicable
§15.249(d)	Emissions radiated outside of the specified frequency bands	Pass
§15.249(e)	Peak field strength	Pass

Notes: [1] The Antennas are located within the enclosure of EUT and not user accessible.

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	2020-12-18
Nemko sample ID number	411757

3.2 EUT information

Product name	Micro.sp TPMS gateway for vehicular use
Model	SKG417ST1
Serial number	4117570001 (Number assigned by Nemko Spa)

3.3 Technical information

Operating band	2400 to 2483.5 MHz
Operating frequency	2481 MHz
Modulation type	Proprietary Micro.sp© technology
Field strength (dBµV/m @ 3 m)	83 dBµV/m
Measured BW (kHz) (99 %)	248 kHz
Emission classification (F1D, G1D, D1D)	248KF1D
Equipment class	DXT - Part 15 Low Power Transceiver, Rx Verified
Power requirements	12 / 24 V DC from vehicle battery
Antenna information	The EUT uses a unique antenna coupling/ non-detachable antenna to the intentional radiator.

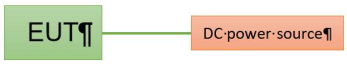
3.4 Product description and theory of operation

The EUT is an on board gateway based on Micro.sp® technology intended to be used in Bridgestone fleet management application in order to achieving a continuous monitoring of TPMS Micro.sp® sensors installed in truck's tires. The EUT communicate to the Bridgestone telematic unit via CAN bus, through a custom PGN, the TPMSs data received by Micro.sp®. To cover a wide area from tractor to trailers a master/slave approch is implemented. Slave units collect Micro.sp® data and communicate these data to a master unit via a proprietary radio protocol at 2.4GHz.

3.5 EUT exercise details

The EUT has been forced to transmit continuously

3.6 EUT setup diagram



3.7 EUT sub assemblies

The EUT is composed by a single unit

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 Atmospheric conditions

In the laboratory, the following ambient conditions are respected for each test reported below:

Ambient temperature:	18 ÷ 33 °C [(1)]
Relative Humidity:	25 ÷ 70 % [(2)]
Atmospheric pressure:	860 ÷ 1060 hPa

[(1)] For luminaire, temperature during tests was verified to be within 18 ÷ 30 °C
[(2)] During ESD test, humidity was verified to be within 30 ÷ 60 %

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model	Serial N°
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703
Barometer	Castle	GPB 3300	072015

5.2 Power supply range

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Section 6. Measurement uncertainty

6.1 Uncertainty of measurement

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002. The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:
P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.
F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.
Hereafter Nemko's measurement uncertainties are reported:

EUT	Type	Test	Range	Measurement Uncertainty	Notes
Transmitter	Conducted	Frequency error	0.001 MHz ÷ 40 GHz	0.08 ppm	(1)
		Carrier power RF Output Power	0.009 MHz ÷ 30 MHz	1.1 dB	(1)
			30 MHz ÷ 18 GHz	1.5 dB	(1)
			18 MHz ÷ 40 GHz	3.0 dB	(1)
			40 MHz ÷ 140 GHz	5.0 dB	(1)
		Adjacent channel power	1 MHz ÷ 18 GHz	1.4 dB	(1)
		Conducted spurious emissions	0.009 MHz ÷ 18 GHz	3.0 dB	(1)
			18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
		Intermodulation attenuation	1 MHz ÷ 18 GHz	2.2 dB	(1)
		Attack time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Attack time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Release time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Release time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Transient behaviour of the transmitter– Transient frequency behaviour	1 MHz ÷ 18 GHz	0.2 kHz	(1)
		Transient behaviour of the transmitter – Power level slope	1 MHz ÷ 18 GHz	9%	(1)
		Frequency deviation - Maximum permissible frequency deviation	0.001 MHz ÷ 18 GHz	1.3%	(1)
		Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz	0.001 MHz ÷ 18 GHz	0.5 dB	(1)
		Dwell time	-	3%	(1)
		Hopping Frequency Separation	0.01 MHz ÷ 18 GHz	1%	(1)
		Occupied Channel Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
		Modulation Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
	Radiated	Radiated spurious emissions	0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
		Effective radiated power transmitter	10 kHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)

NOTES:
(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95 %

Section 7. Testing data

7.1 FCC 15.31(m) Number of frequencies

7.1.1 Definitions and limits

Measurements on intentional radiators or receivers shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table.

Table 7.1-1: *Frequency Range of Operation*

Frequency range over which the device operates (in each band)	Number of test frequencies required	Location of measurement frequency inside the operating frequency range
1 MHz or less	1	Center (middle of the band)
1–10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near center and 1 near low end

Note: "near" means as close as possible to or at the centre / low end / high end of the frequency range over which the device operates.

7.1.2 Test summary

Test date	December 23, 2020	Temperature	22 °C
Test engineer	P. Barbieri	Air pressure	990 mbar
Verdict	Pass	Relative humidity	35 %

7.1.3 Observations, settings and special notes

None

7.1.4 Test data

Table 7.1-2: *Test channels selection*

Start of Frequency range, MHz	End of Frequency range, MHz	Frequency range bandwidth, MHz	Low channel, MHz	Mid channel, MHz	High channel, MHz
2400	2483.5	83.5	--	--	2481

The EUT use only one channel

7.2 FCC 15.203 Antenna requirement

7.2.1 Definitions and limits

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

7.2.2 Test summary

Test date	December 23, 2020	Temperature	22 °C
Test engineer	P. Barbieri	Air pressure	990 mbar
Verdict	Pass	Relative humidity	35 %

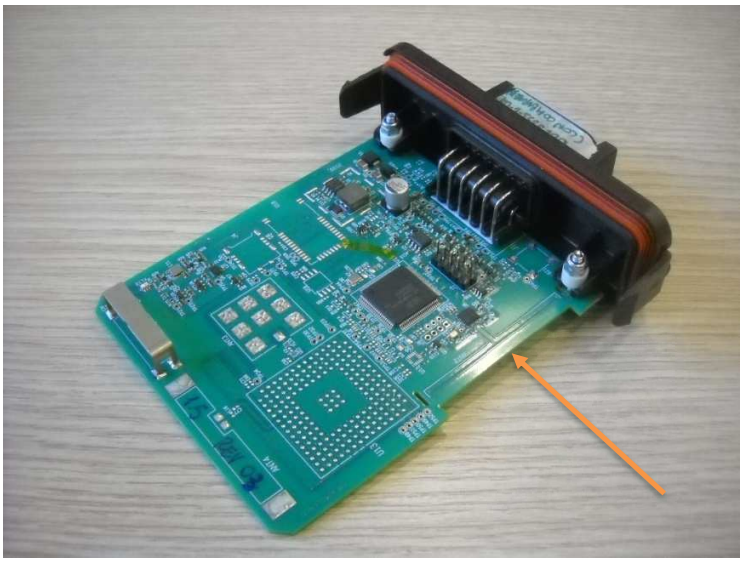
7.2.3 Observations, settings and special notes

None

7.2.4 Test data

Must the EUT be professionally installed?	☐ YES	☒ NO	
Does the EUT have detachable antenna(s)?	☐ YES	☒ NO	
If detachable, is the antenna connector(s) non-standard?	☐ YES	☐ NO	☒ N/A

The EUT use PCB antenna with 0 dBi gain



7.3 FCC 15.249(a) Field strength of emissions

7.3.1 Definitions and limits

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Table 7.3-1: *Field strength limits*

Fundamental frequency (MHz)	Field strength of fundamental (mV/m)	(dBµV/m)	Field strength of spurious emissions (µV/m)	(dBµV/m)
902 to 928	50	94	500	54
2400 to 2483.5	50	94	500	54
5725 to 5875	50	94	500	54
24000 to 24250	250	108	2500	68

(c) Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Table 7.3-2: *FCC §15.209– Radiated emission limits*

Frequency, MHz	Field strength of emissions µV/m	dBµV/m	Measurement distance, m
0.009–0.490	2400/F	$67.6 – 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 – 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test

Table 7.3-3: *FCC restricted frequency bands*

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

7.3.2 Test summary

Test date	December 23, 2020	Temperature	22 °C
Test engineer	P. Barbieri	Air pressure	990 mbar
Verdict	Pass	Relative humidity	35 %

7.3.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to 25 GHz.
Radiated measurements were performed at a distance of 3 m.
EUTs that can be operated in multiple orientations (such as handheld, portable, or modular devices) shall be tested in three orientations.
Average radiated emissions were obtained by subtracting duty cycle / correction factor from the peak measurement results.

Spectrum analyser settings for radiated measurements below 1 GHz:

Resolution bandwidth	100 kHz
Video bandwidth	300 kHz
Detector mode	Peak
Trace mode	Max Hold

Spectrum analyser settings for radiated measurements above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak
Trace mode	Max Hold

7.3.4 Test equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI receiver	R&S	ESU8	100202	2020-08	2021-08
EMI receiver	R&S	ESW44	101620	2020-09	2021-09
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	9162-025	2018-07	2021-07
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148	9148-152	2018-09	2021-09
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV9718	9718-137	2020-07	2021-07
Double ridge horn antenna (4 ÷ 40 GHz)	RFSpin	DRH40	061106A40	2020-04	2023-04
Broadband preamplifier (18 ÷ 40 GHz)	Sage	STB-1834034030-KFKF-L1	18490-01	2020-03	2021-03
Controller	Maturo	FCU3.0	10041	NCR	NCR
Tilt antenna mast	Maturo	TAM4.0-E	10042	NCR	NCR
Turntable	Maturo	TT4.0-5T	2.527	NCR	NCR
Semi-anechoic chamber	Nemko	10m semi-anechoic chamber	530	2018-09	2021-09
Shielded room	Siemens	10m control room	1947	NCR	NCR

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

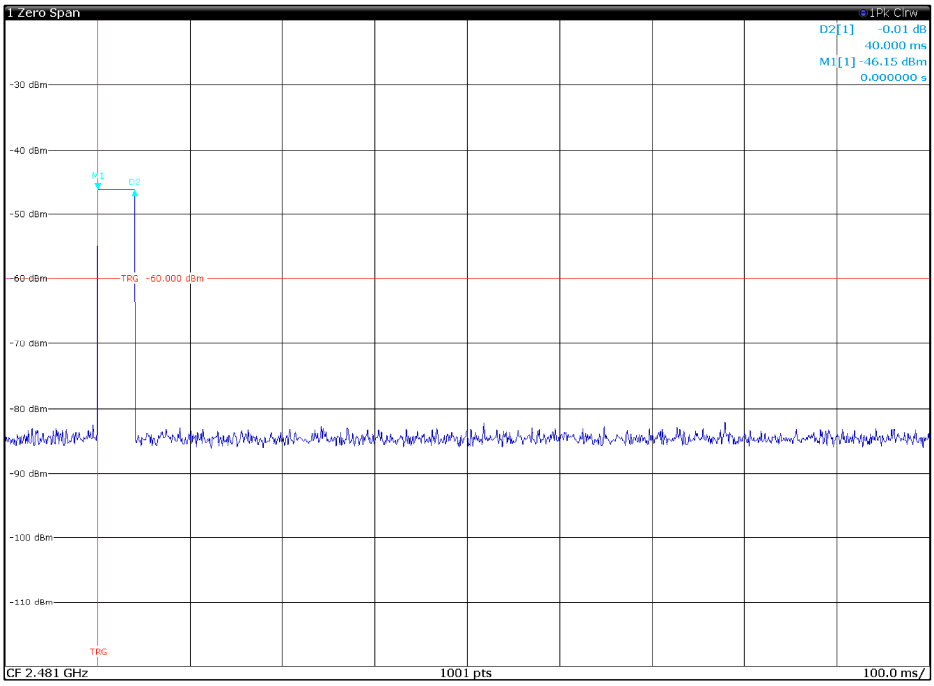
7.3.5 Test data

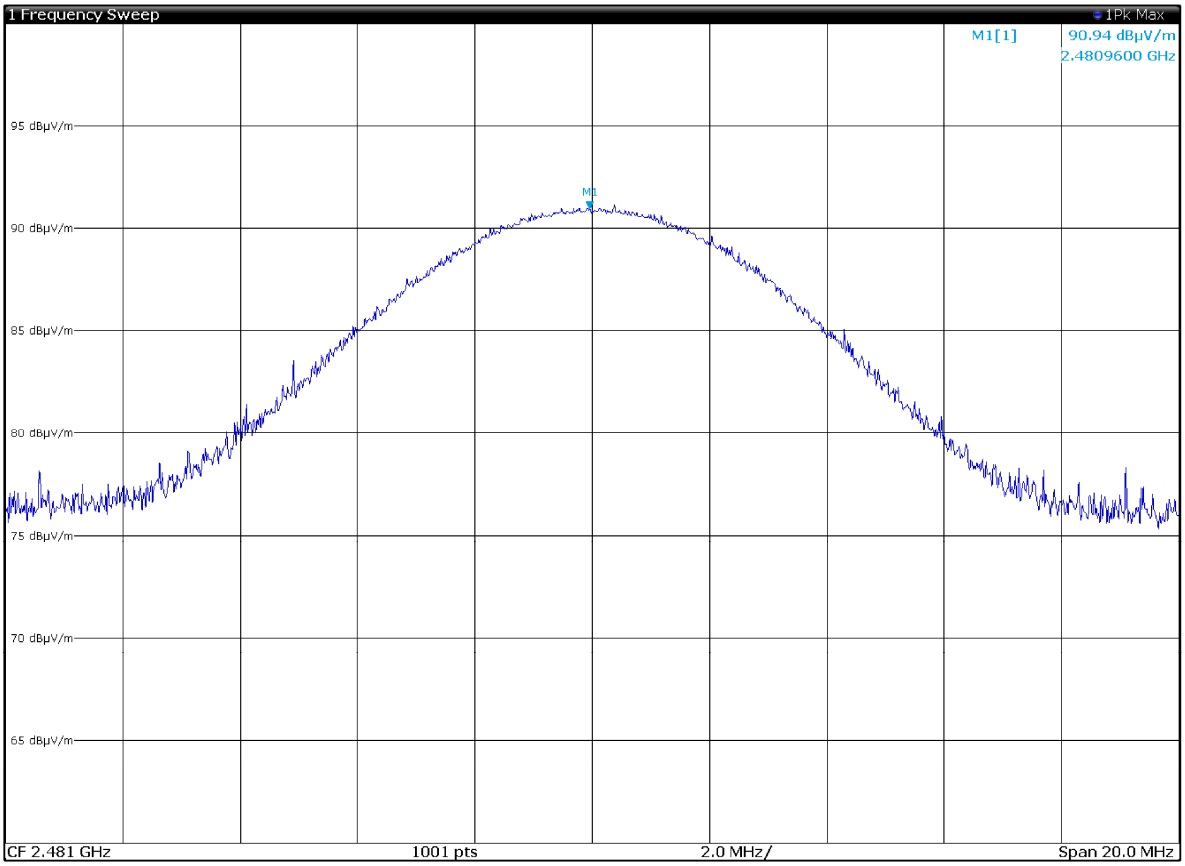
Duty cycle/average factor calculations

§15.35(c) When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed; the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

$$Duty\ cycle\ or\ average\ factor = 20 \times \log_{10}\left(\frac{Tx_{100_{ms}}}{100_{ms}}\right)$$

Duty cycle correction factor for 40 ms pulse duration = 20 × $\log_{10}$ (40 / 100) = −7.95 dB

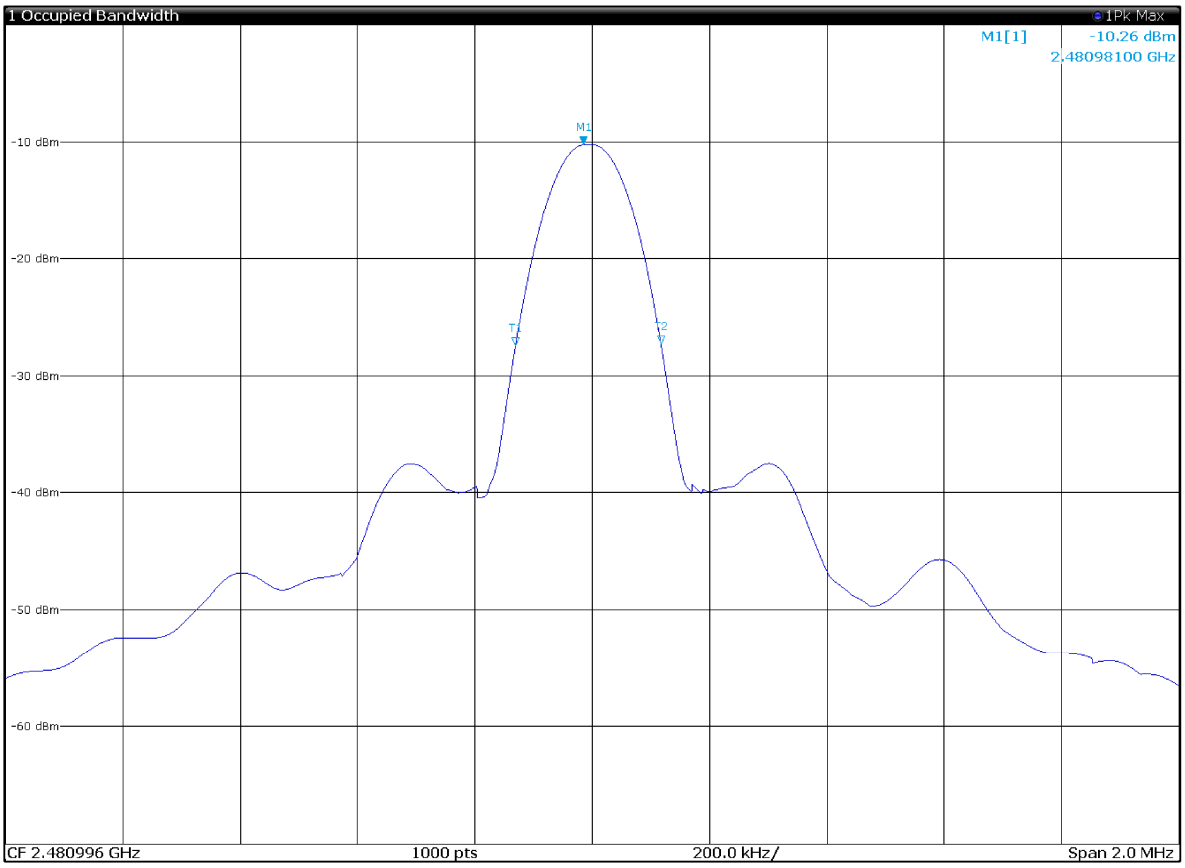




Field strength of fundamental

Frequency, MHz	Peak field strength, dBµV/m	Duty cycle factor, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
2481	90.9	-7.95	83.0	94.0	-11.0

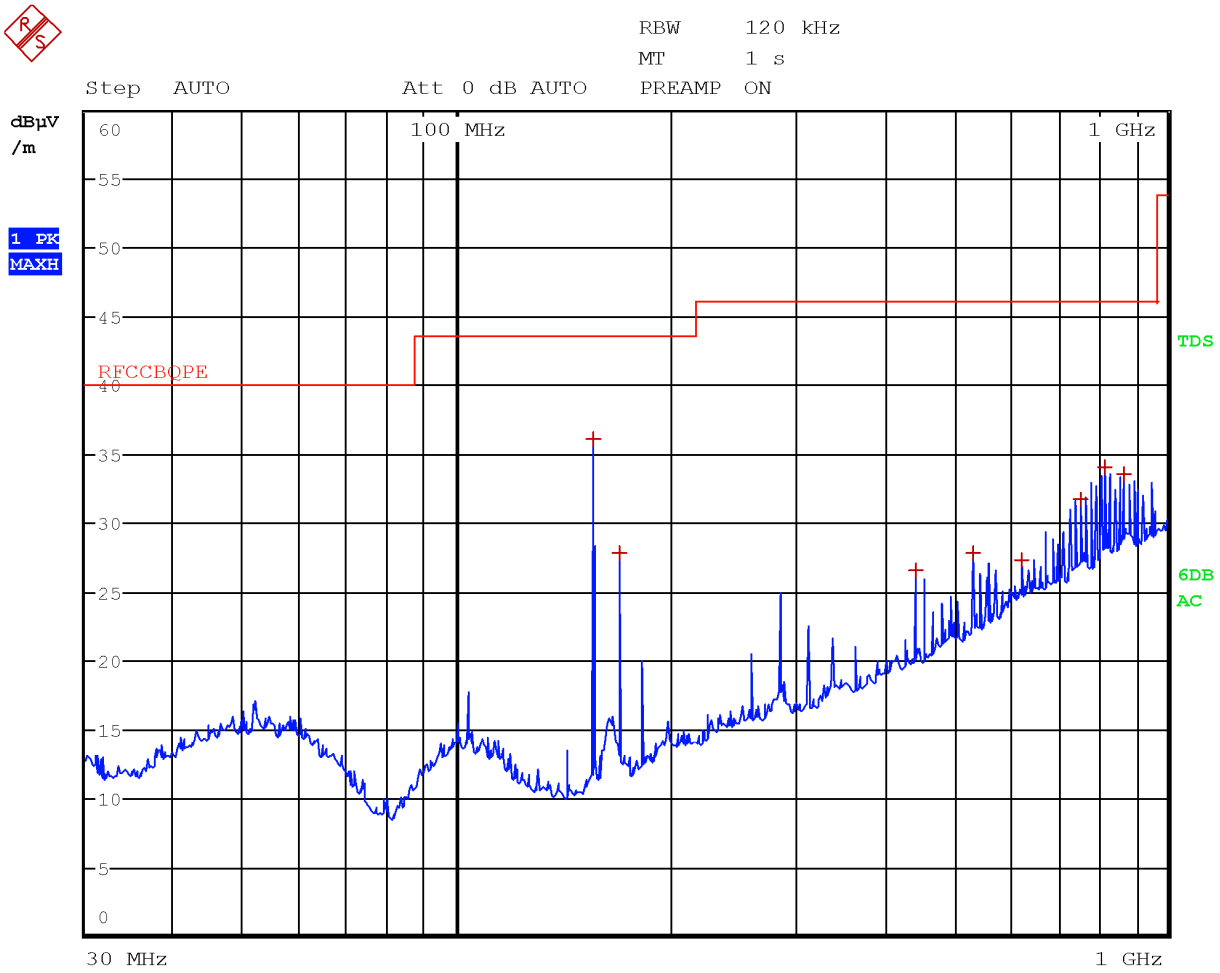
Section 8 Testing data
Test name FCC 15.249(a) Field strength of emissions
Specification FCC Part 15 Subpart C



99% Bandwidth

2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**2.480981 GHz**	**-10.26 dBm**	Occ Bw	**247.944320395 kHz**
T1		1	2.4808653 GHz	-27.46 dBm	Occ Bw Centroid	2.48098927 GHz
T2		1	2.48111324 GHz	-27.30 dBm	Occ Bw Freq Offset	-6.729587938 kHz

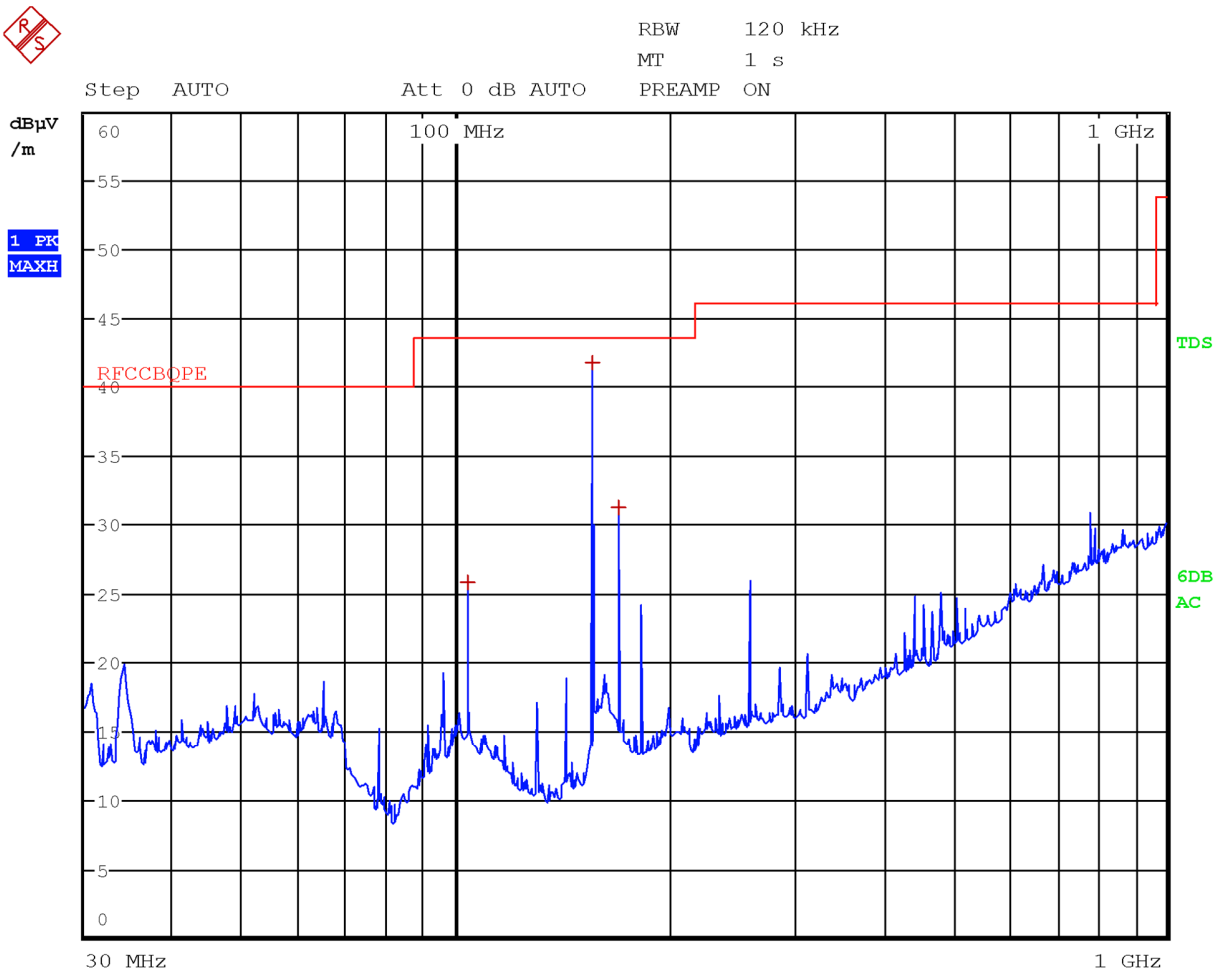


Radiated emission in the frequency range 30 to 1000 MHz with EUT in horizontal position and the antenna in horizontal polarization

Frequency, MHz	Peak field strength, dBµV/m	Limit, dBµV/m	Margin, dB
156.0000	36.1	43.5	-7.4
168.9900	27.8	43.5	-15.7
441.9900	26.6	46.0	-19.4
533.0100	27.8	46.0	-18.2
624.0000	27.3	46.0	-18.7
753.9900	31.8	46.0	-14.2
819.0000	34.1	46.0	-11.9
870.9900	33.7	46.0	-12.3

No additional measure needed because peak value of the field strength is under the 15.209 limits

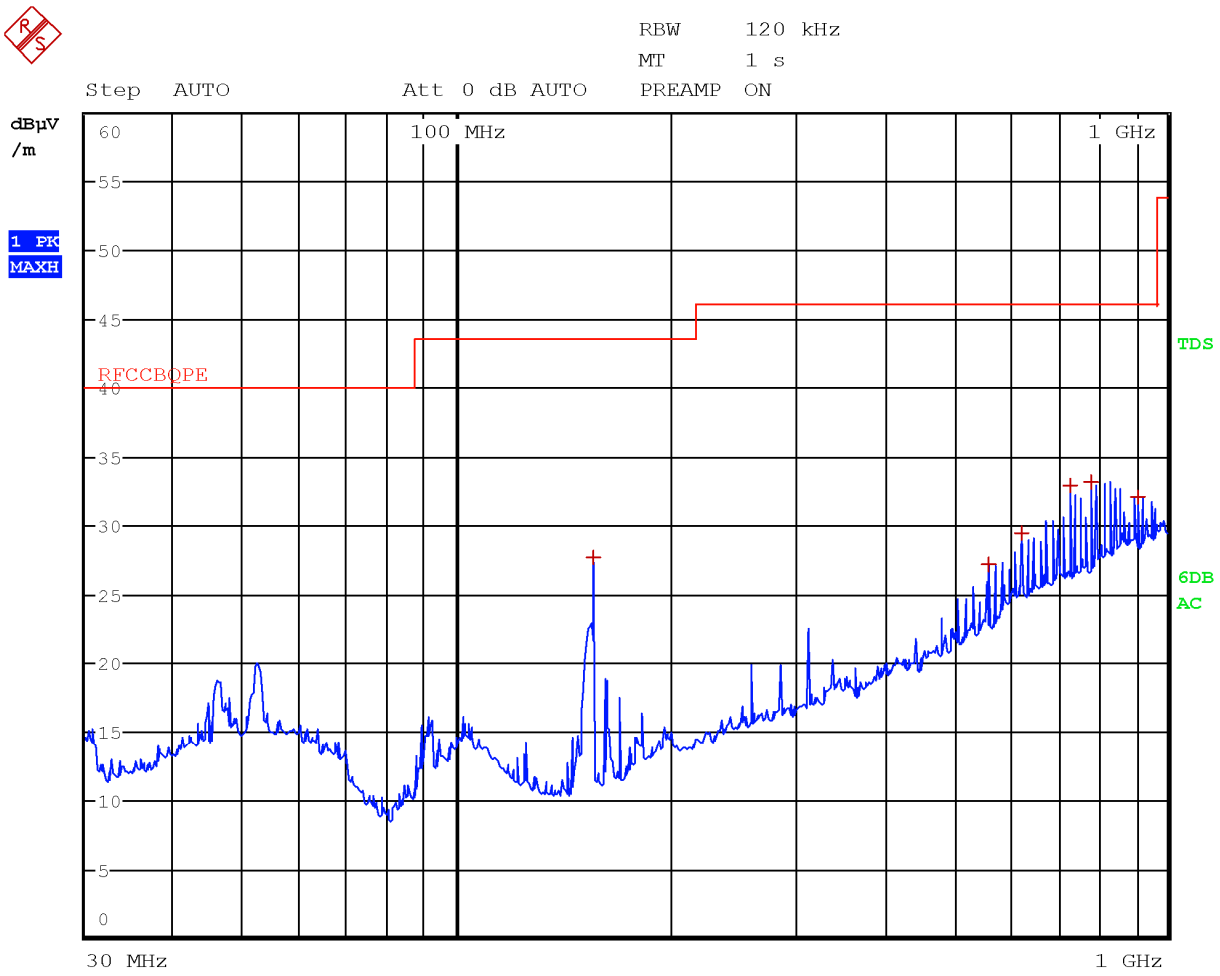
Section 8 Testing data
Test name FCC 15.249(a) Field strength of emissions
Specification FCC Part 15 Subpart C



Radiated emission in the frequency range 30 to 1000 MHz with EUT in horizontal position and the antenna in vertical polarization

Frequency, MHz	Peak field strength, dBµV/m	Limit, dBµV/m	Margin, dB
104.0100	25.8	43.5	-17.7
156.0000	41.9	43.5	-1.6
168.9900	31.3	43.5	-12.2

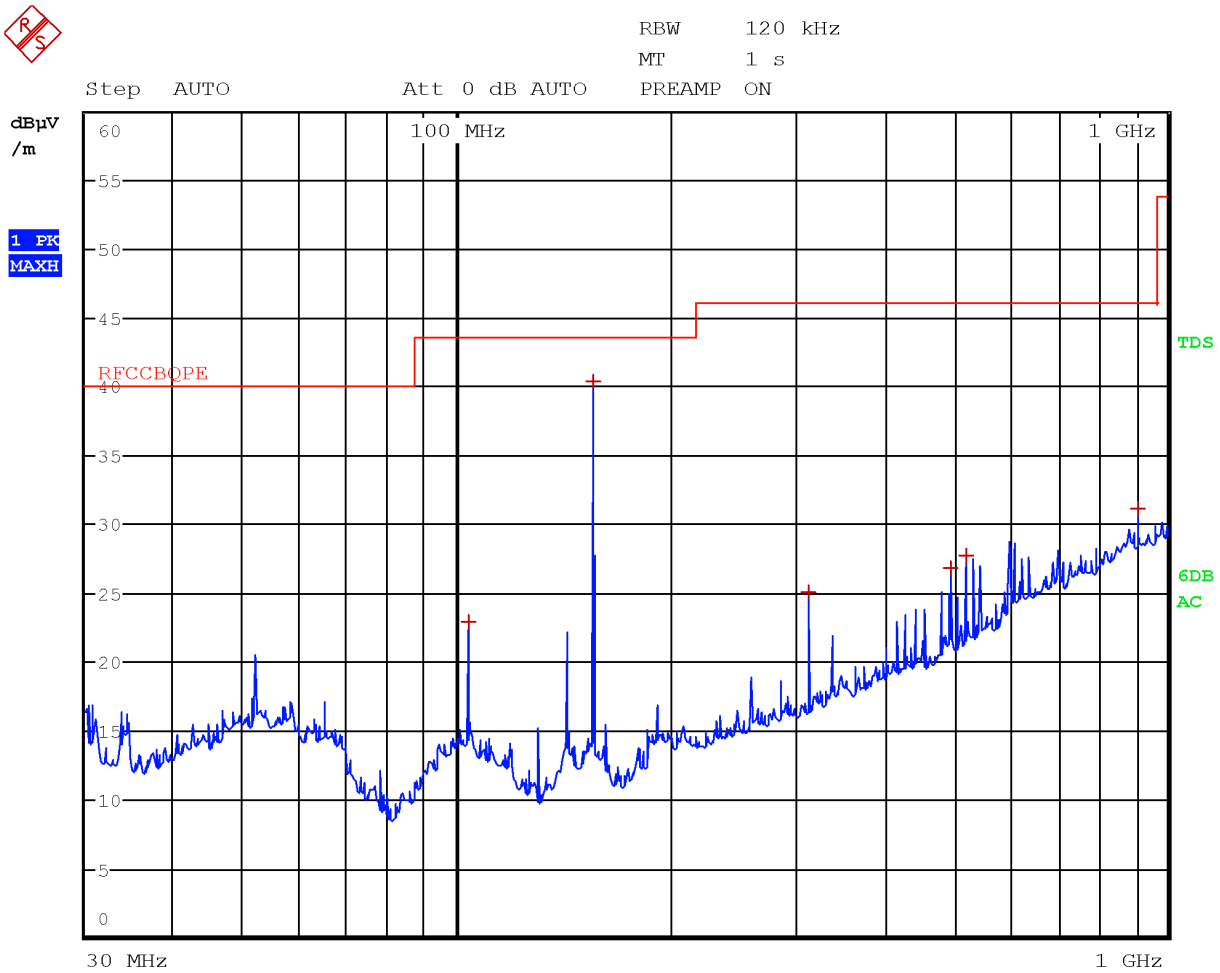
No additional measure needed because peak value of the field strength is under the 15.209 limits



Radiated emission in the frequency range 30 to 1000 MHz with EUT in vertical position and the antenna in horizontal polarization

Frequency, MHz	Peak field strength, dBµV/m	Limit, dBµV/m	Margin, dB
156.0000	27.8	43.5	-15.7
558.9900	27.2	46.0	-18.8
624.0000	29.5	46.0	-16.5
728.0100	33.0	46.0	-13.0
780.0000	33.3	46.0	-12.7
909.9900	32.1	46.0	-13.9

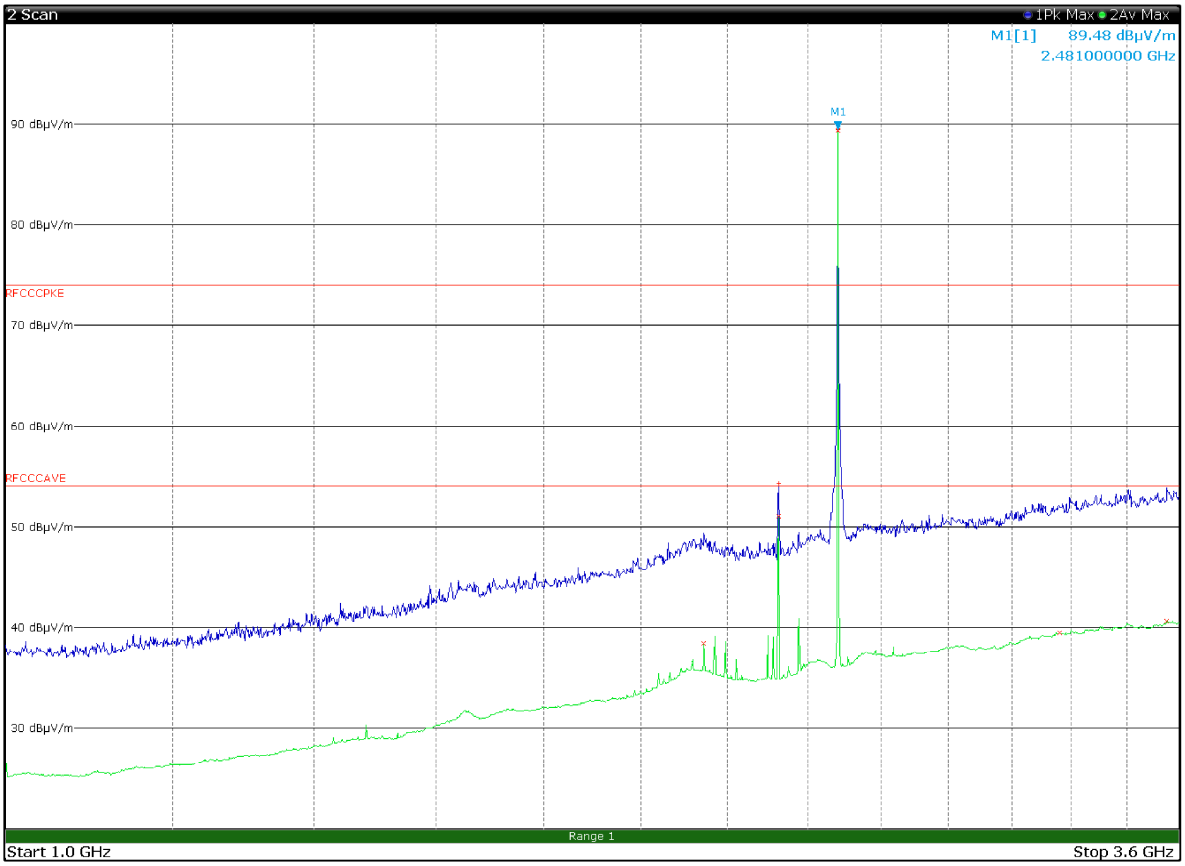
No additional measure needed because peak value of the field strength is under the 15.209 limits



Radiated emission in the frequency range 30 to 1000 MHz with EUT in vertical position and the antenna in vertical polarization

Frequency, MHz	Peak field strength, dBµV/m	Limit, dBµV/m	Margin, dB
104.0100	22.9	43.5	-20.6
156.0000	40.4	43.5	-3.1
312.0000	25.0	46.0	-21.0
493.9800	26.8	46.0	-19.2
519.9900	27.7	46.0	-18.3
909.9900	31.1	46.0	-14.9

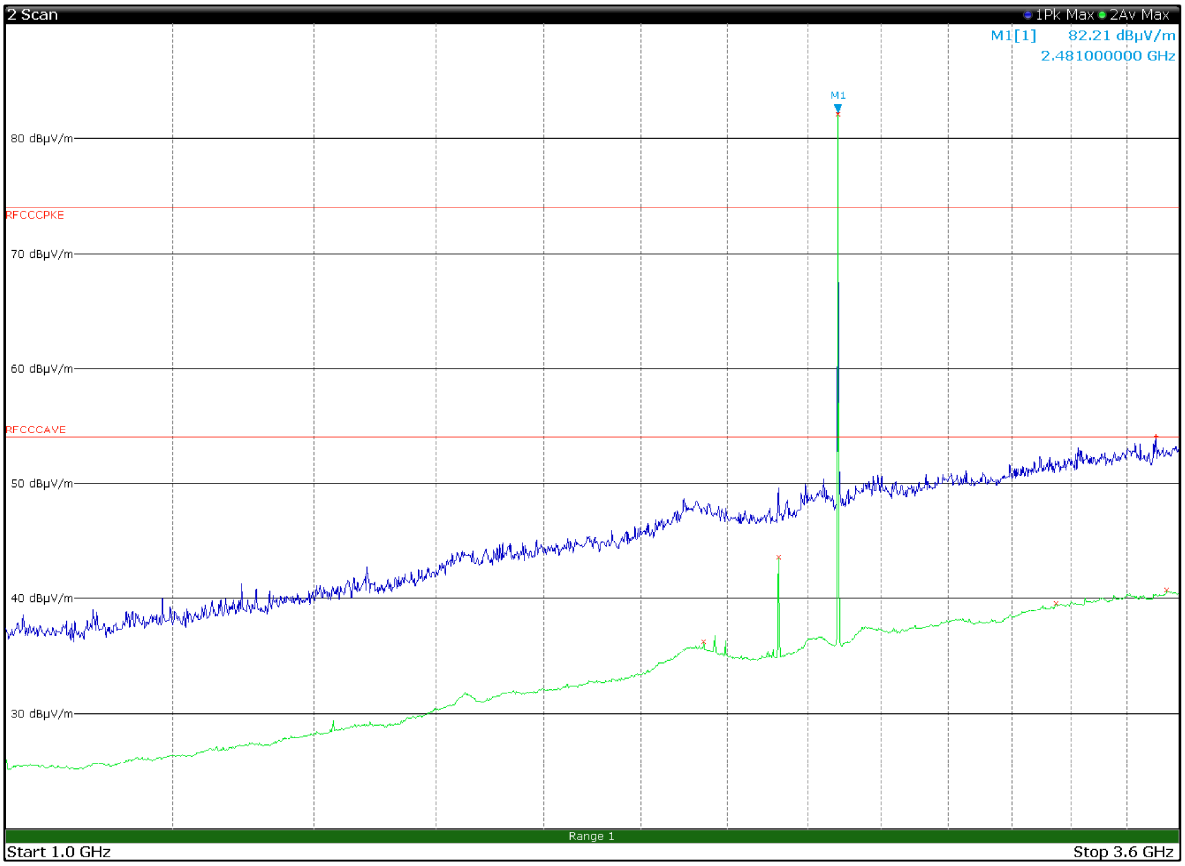
No additional measure needed because peak value of the field strength is under the 15.209 limits



Radiated emission in the frequency range 1 to 3.6 GHz with EUT in horizontal position and the antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2143.0000	38.5	54.0	-15.5	Av
2325.0000	54.4	74.0	-19.6	Pk
2325.0000	51.1	54.0	-2.9	Av
3160.0000	39.5	54.0	-14.5	Av
3553.2500	40.6	54.0	-13.4	Av

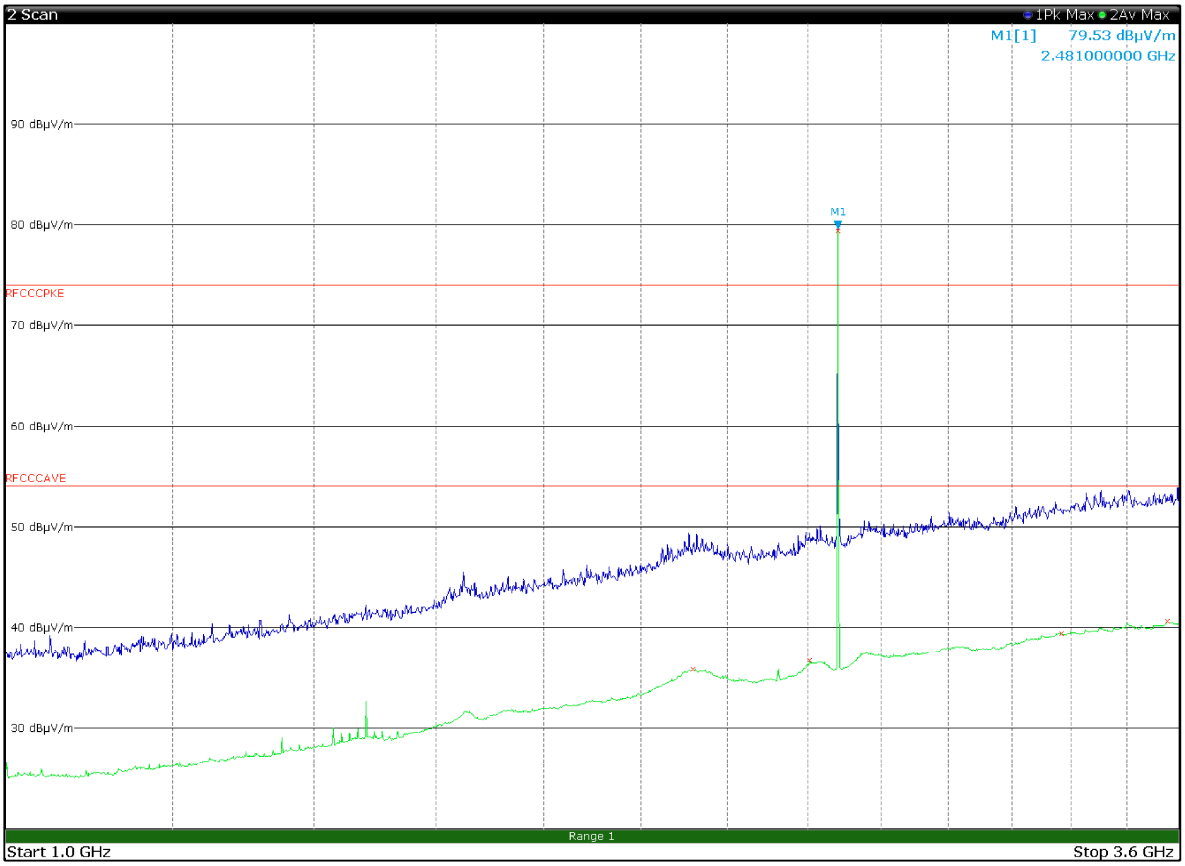
Limit exceeded by the carrier



Radiated emission in the frequency range 1 to 3.6 GHz with EUT in horizontal position and the antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2143.0000	36.4	54.0	-17.6	Av
2325.0000	43.6	54.0	-10.4	Av
3148.0000	39.6	54.0	-14.4	Av
3510.2500	54.1	74.0	-19.9	Pk
3552.7500	40.8	54.0	-13.2	Av

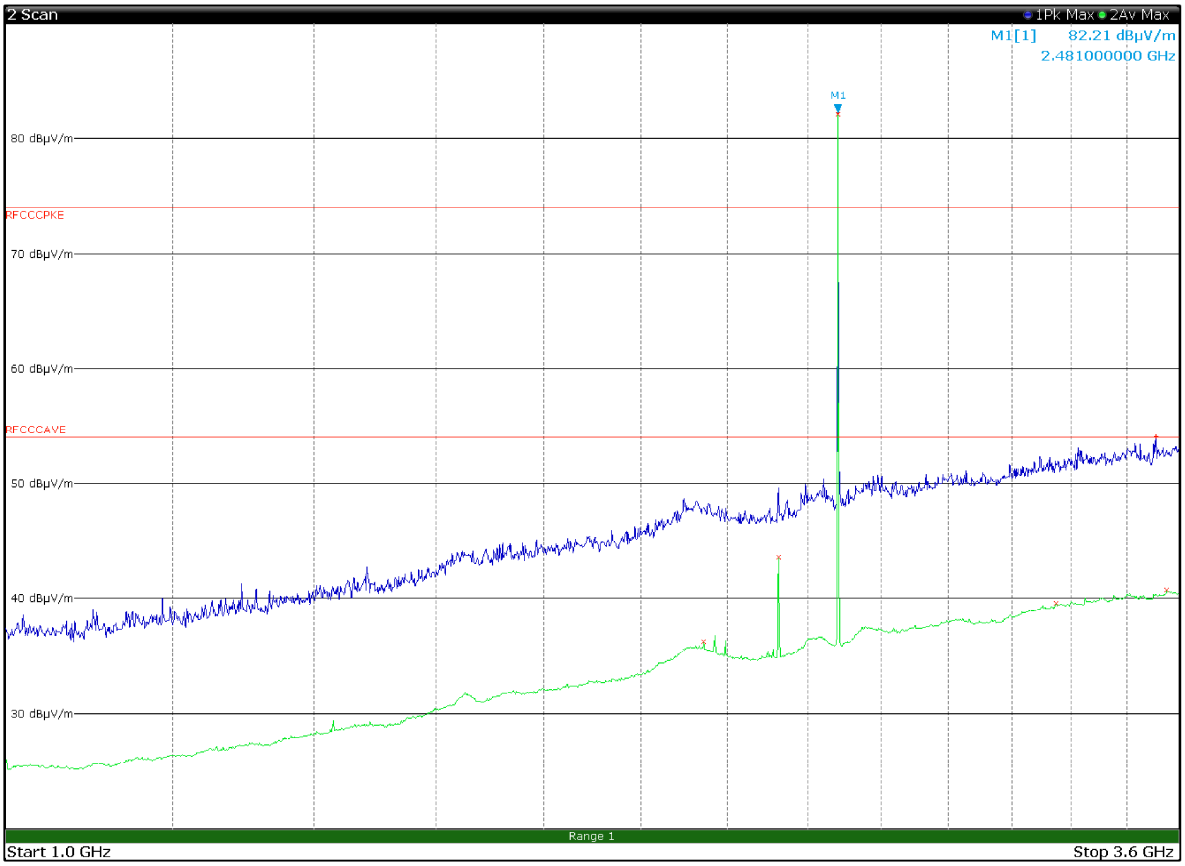
Limit exceeded by the carrier



Radiated emission in the frequency range 1 to 3.6 GHz with EUT in vertical position and the antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2118.2500	35.9	54.0	-18.1	Av
2406.5000	36.7	54.0	-17.3	Av
3165.5000	39.5	54.0	-14.5	Av
3555.0000	40.6	54.0	-13.4	Av

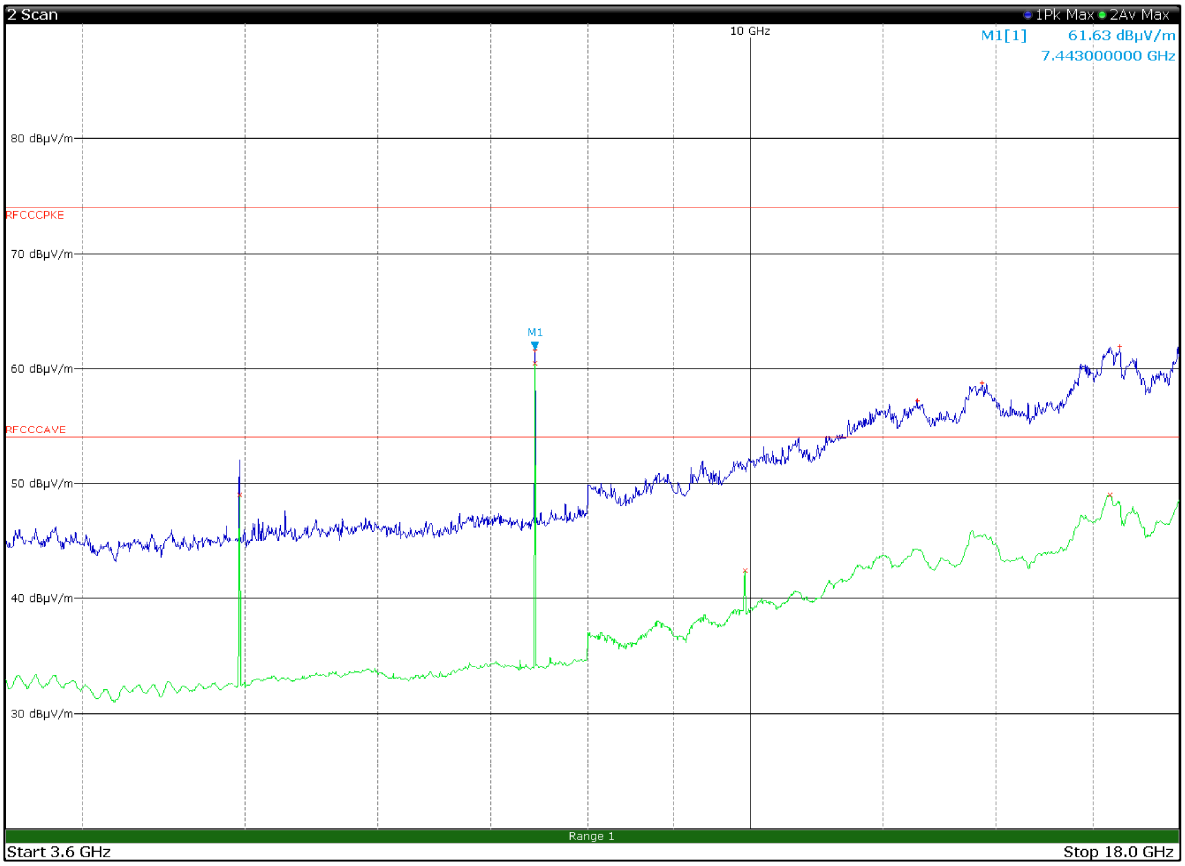
Limit exceeded by the carrier



Radiated emission in the frequency range 1 to 3.6 GHz with EUT in vertical position and the antenna in vertical polarization

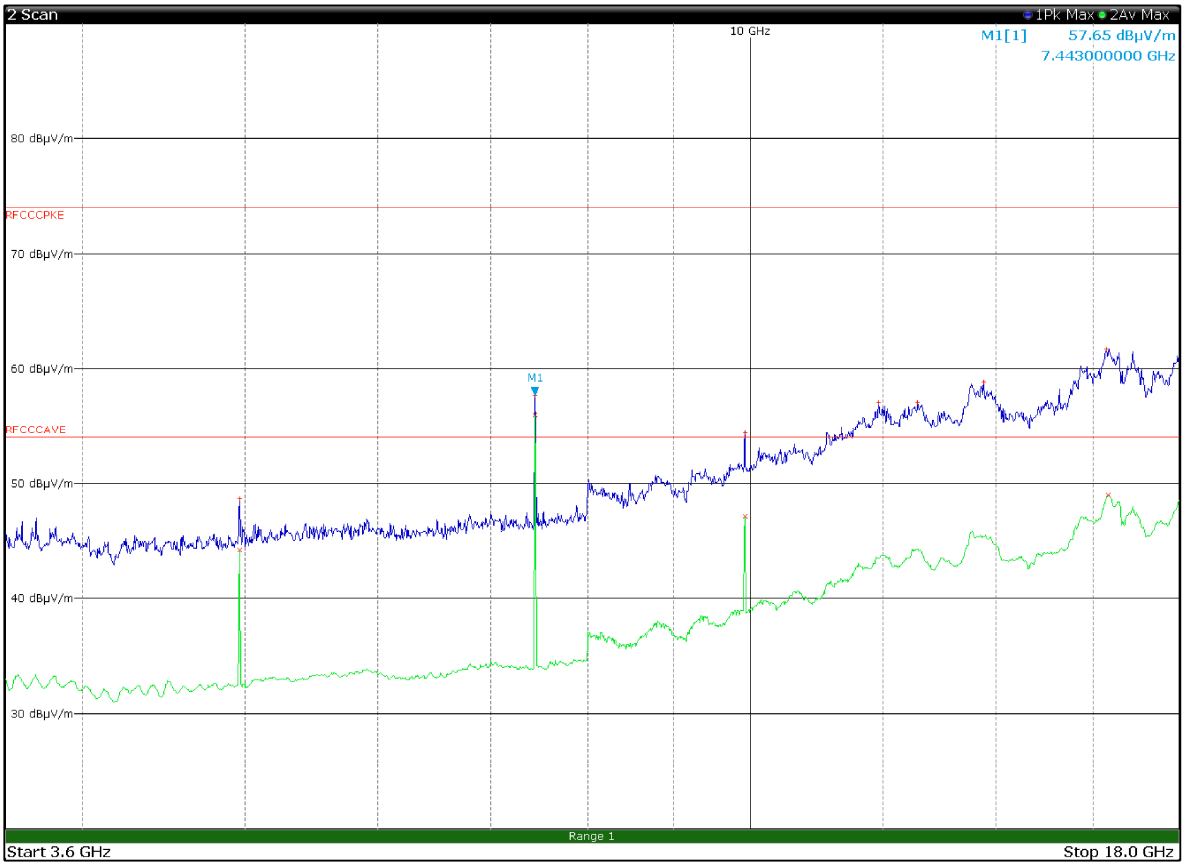
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2143.0000	38.4	54.0	-15.6	Av
2325.0000	54.6	74.0	-19.4	Pk
2325.0000	51.2	54.0	-2.8	Av
3159.0000	39.4	54.0	-14.6	Av
3557.2500	40.6	54.0	-13.4	Av
3588.7500	54.5	74.0	-19.5	Pk

Limit exceeded by the carrier



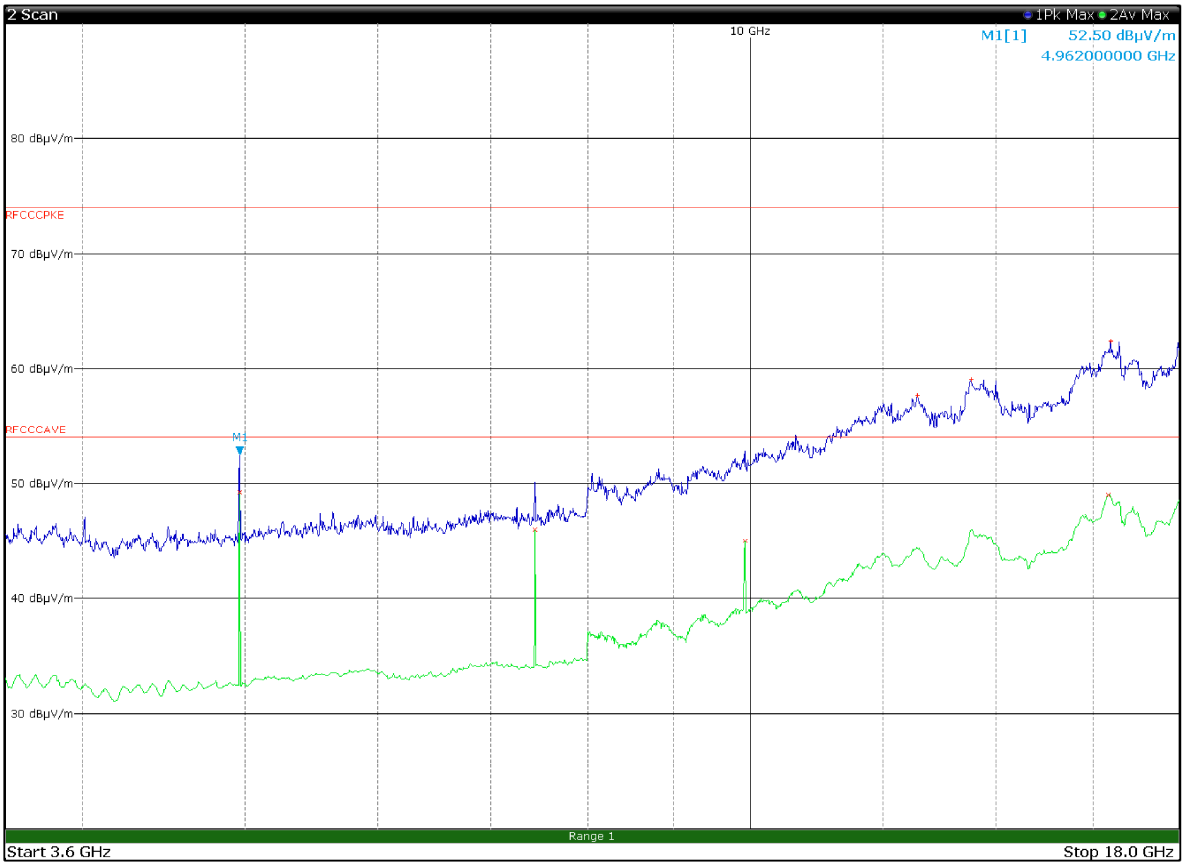
Radiated emission in the frequency range 3.6 to 18 GHz with EUT in horizontal position and the antenna in horizontal polarization

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Duty cycle factor, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
4962.0	52.5	74.0	-21.5	-7.95	44.6	54.0	-9.5
7443.0	61.7	74.0	-12.3	-7.95	53.8	54.0	-0.3



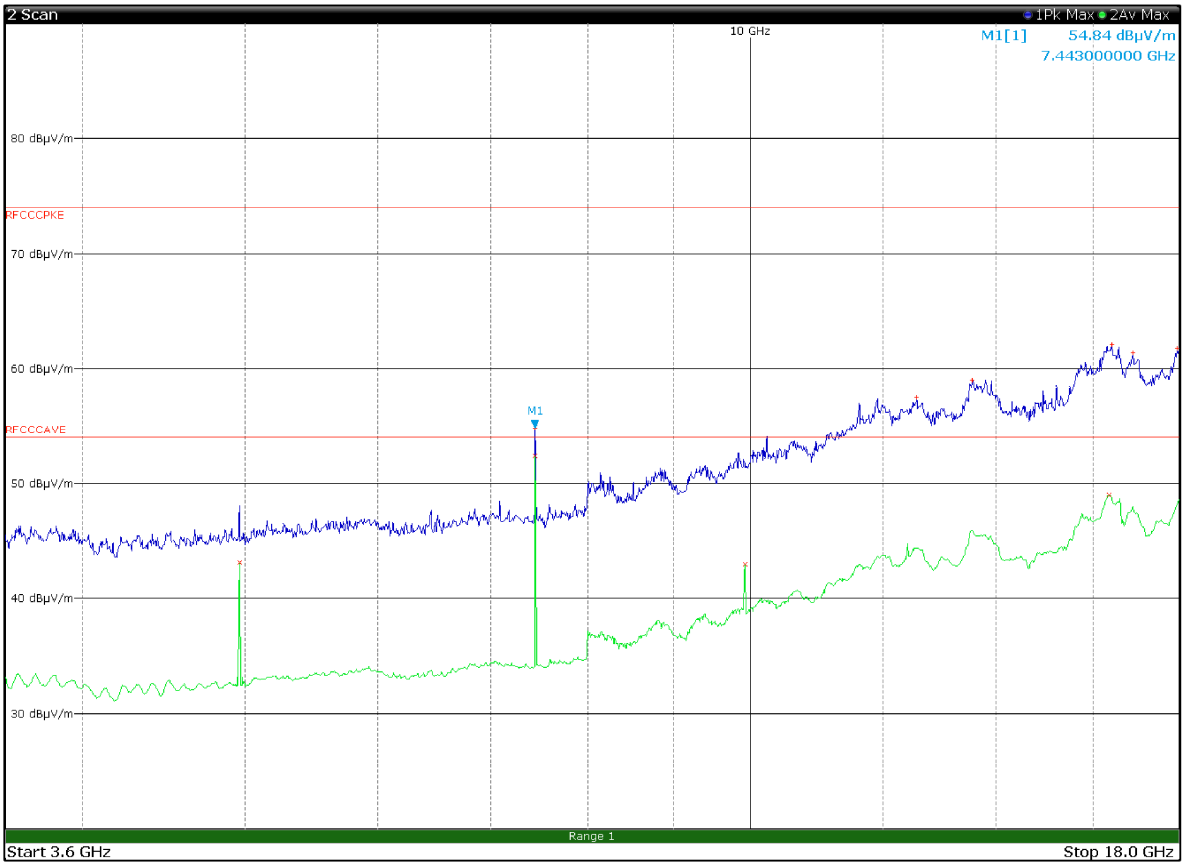
Radiated emission in the frequency range 3.6 to 18 GHz with EUT in horizontal position and the antenna in vertical polarization

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Duty cycle factor, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
4962.0	48.8	74.0	-25.2	-7.95	40.9	54.0	-13.2
7443.0	57.7	74.0	-16.3	-7.95	49.8	54.0	-4.3
9924.0	54.4	74.0	-19.6	-7.95	46.5	55.0	-8.6



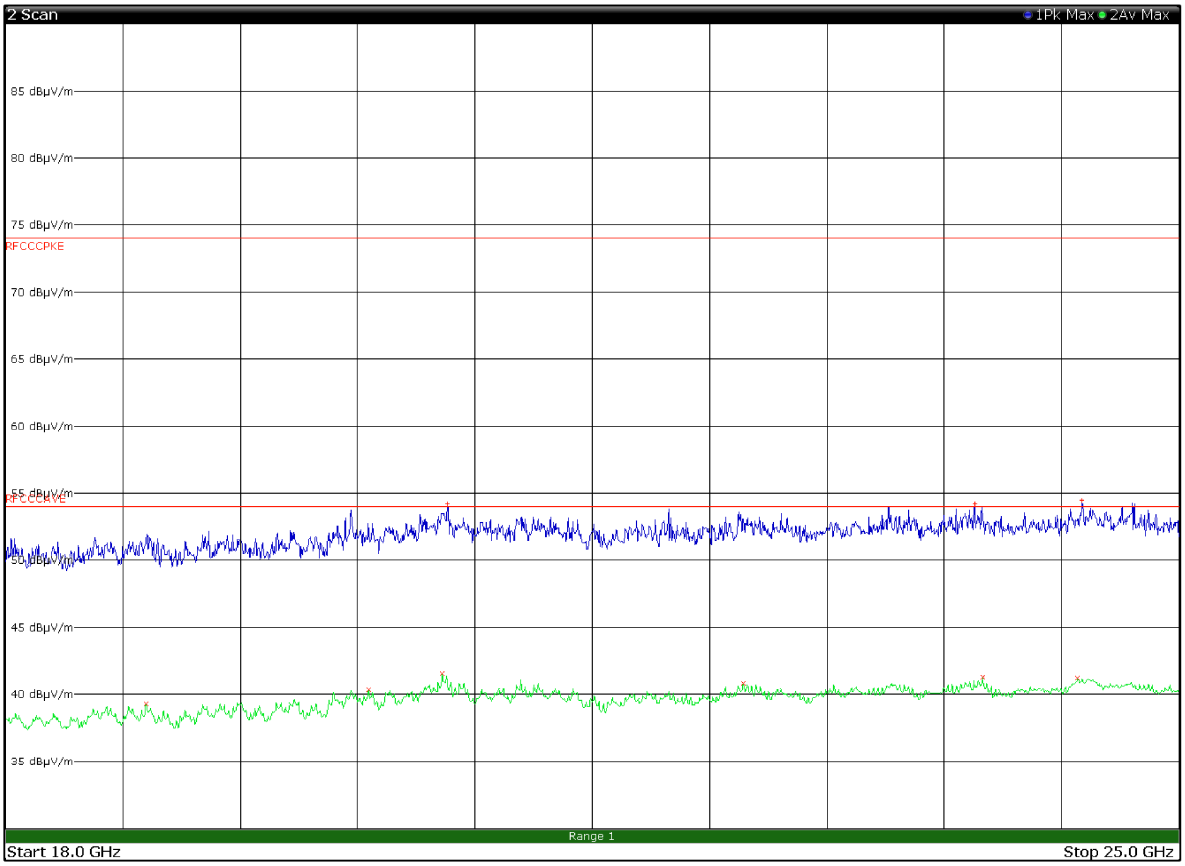
Radiated emission in the frequency range 3.6 to 18 GHz with EUT in vertical position and the antenna in horizontal polarization

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Duty cycle factor, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
4962.0	52.5	74.0	-21.5	-7.95	44.6	54.0	-9.5
7443.0	50.1	74.0	-23.9	-7.95	42.2	54.0	-11.9
9924.0	52.8	74.0	-21.2	-7.95	44.9	55.0	-10.2



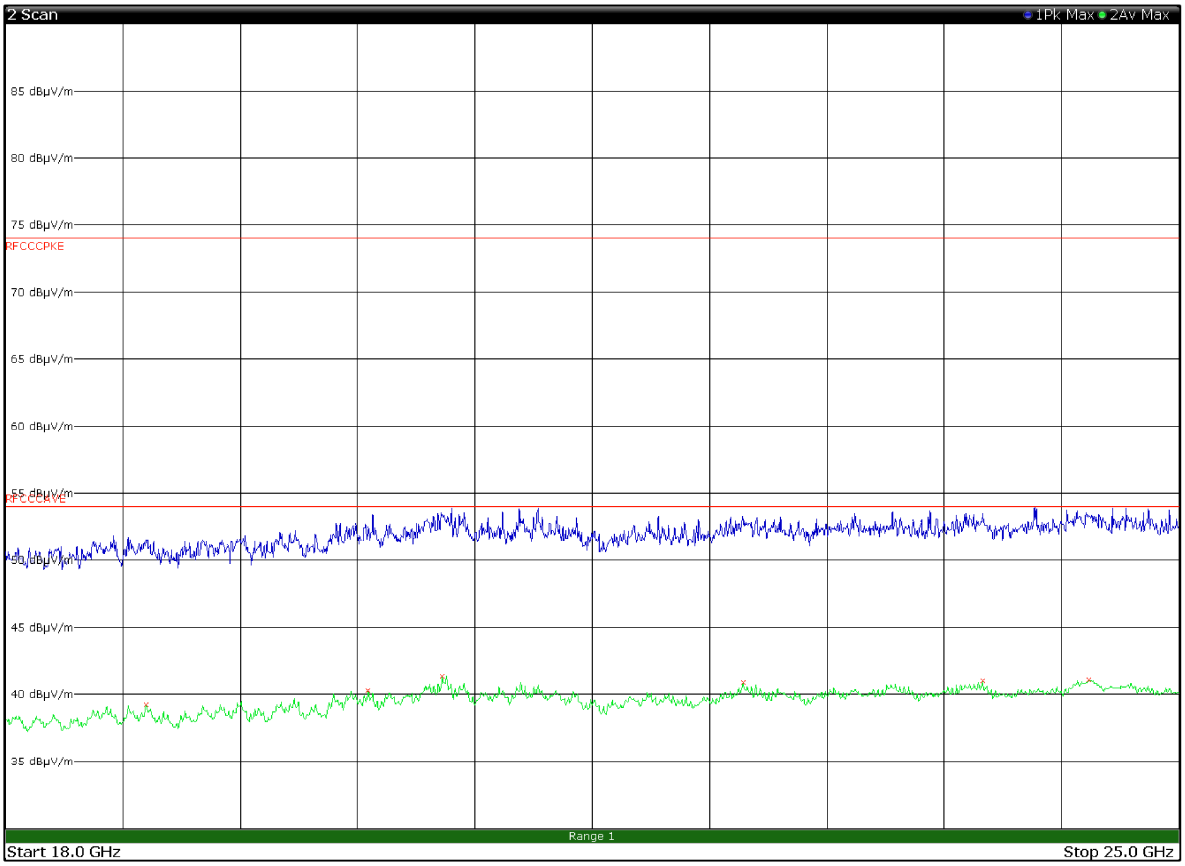
Radiated emission in the frequency range 3.6 to 18 GHz with EUT in vertical position and the antenna in vertical polarization

Frequency, MHz	Peak field strength, dBµV/m	Peak limit, dBµV/m	Margin, dB	Duty cycle factor, dB	Average field strength, dBµV/m	Average limit, dBµV/m	Margin, dB
4962.0	47.6	74.0	-26.4	-7.95	39.7	54.0	-14.4
7443.0	54.8	74.0	-19.2	-7.95	46.9	54.0	-7.2
9924.0	52.3	74.0	-21.7	-7.95	44.4	55.0	-10.7



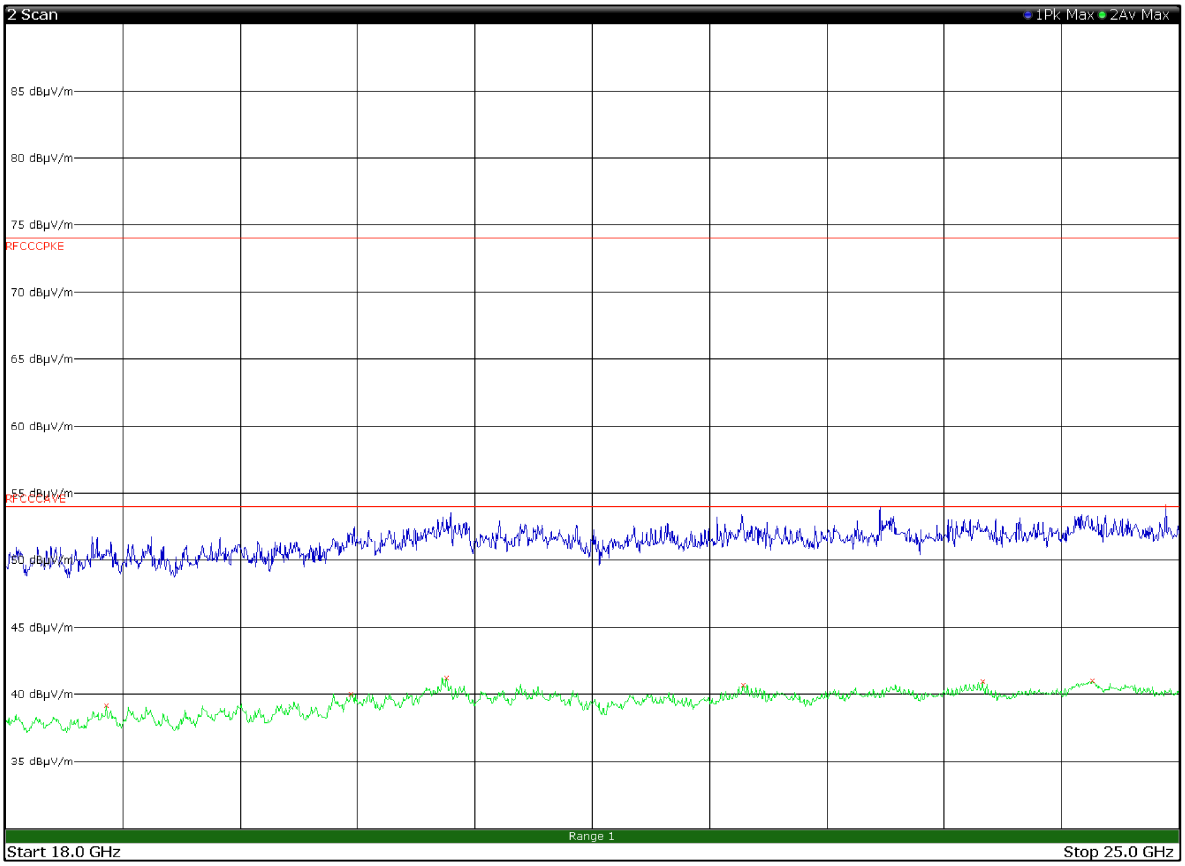
Radiated emission in the frequency range 18 to 25 GHz with EUT in horizontal position and the antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
18838.0000	39.3	54.0	-14.7	Av
20164.0000	40.4	54.0	-13.6	Av
20605.5000	41.6	54.0	-12.4	Av
20637.5000	54.2	74.0	-19.8	Pk
22399.5000	40.8	54.0	-13.2	Av
23781.7500	54.3	74.0	-19.7	Pk
23829.7500	41.3	54.0	-12.7	Av
24393.5000	41.2	54.0	-12.8	Av
24419.7500	54.5	74.0	-19.5	Pk



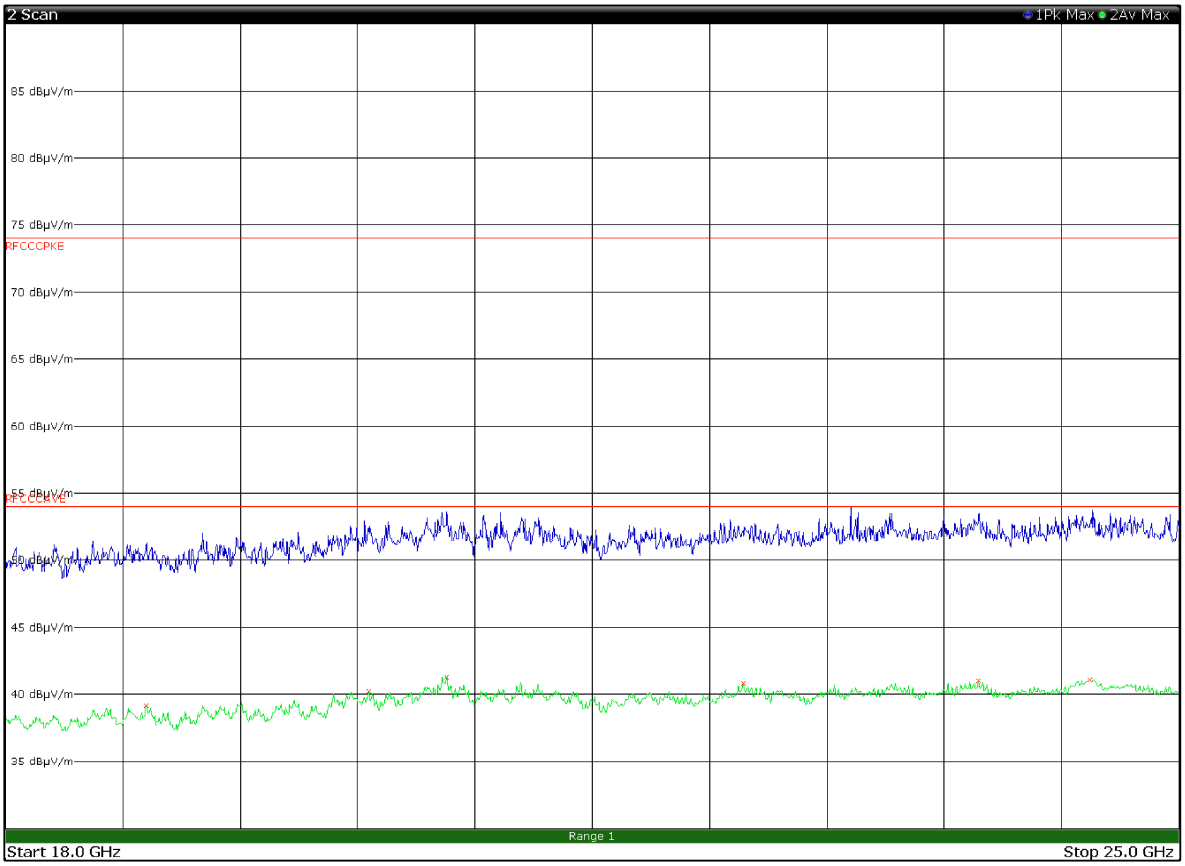
Radiated emission in the frequency range 18 to 25 GHz with EUT in horizontal position and the antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
18837.0000	39.2	54.0	-14.8	Av
20163.5000	40.3	54.0	-13.7	Av
20605.5000	41.4	54.0	-12.6	Av
22400.0000	40.9	54.0	-13.1	Av
23829.7500	41.0	54.0	-13.0	Av
24463.5000	41.1	54.0	-12.9	Av



Radiated emission in the frequency range 18 to 25 GHz with EUT in vertical position and the antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
18600.7500	39.2	54.0	-14.8	Av
20059.0000	40.1	54.0	-13.9	Av
20628.2500	41.2	54.0	-12.8	Av
22400.0000	40.7	54.0	-13.3	Av
23829.5000	41.0	54.0	-13.0	Av
24483.2500	41.0	54.0	-13.0	Av
24921.0000	54.1	74.0	-19.9	Pk

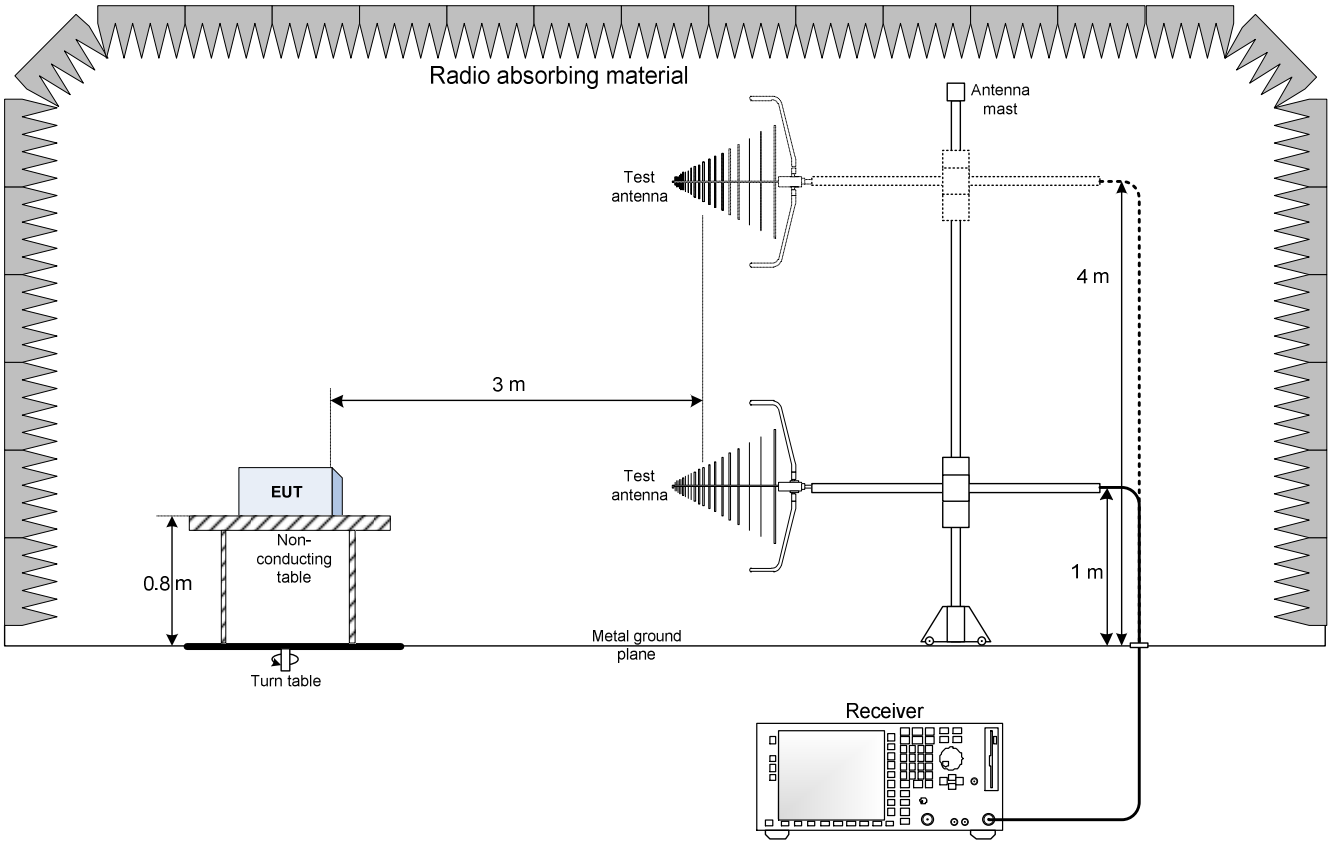


Radiated emission in the frequency range 18 to 25 GHz with EUT in vertical position and the antenna in vertical polarization

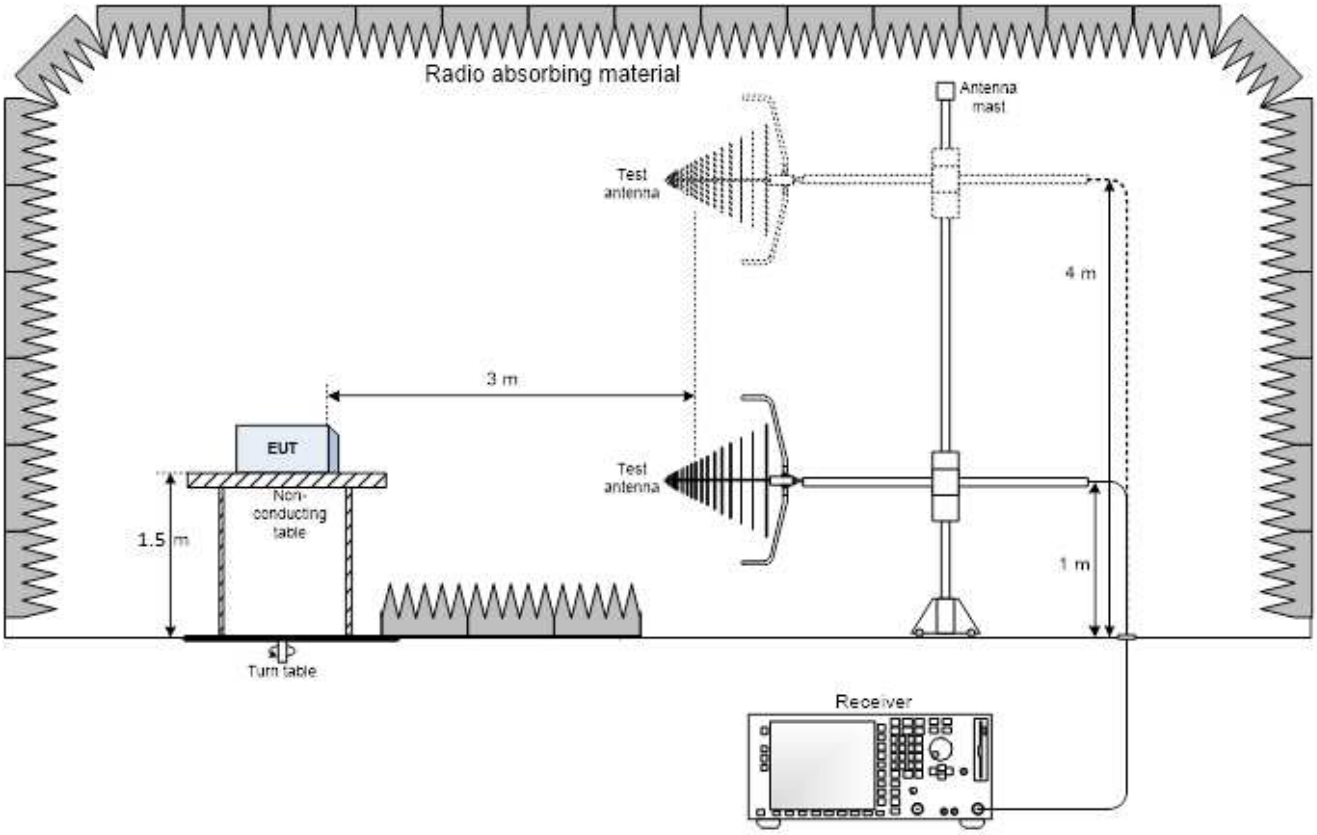
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
18838.0000	39.2	54.0	-14.8	Av
20164.0000	40.3	54.0	-13.7	Av
20631.7500	41.3	54.0	-12.7	Av
22400.0000	40.8	54.0	-13.2	Av
23803.5000	41.0	54.0	-13.0	Av
24466.2500	41.1	54.0	-12.9	Av

Section 8. Block diagrams of test set-ups

8.1 Radiated emissions set-up for frequencies below 1 GHz



8.2 Radiated emissions set-up for frequencies above 1 GHz



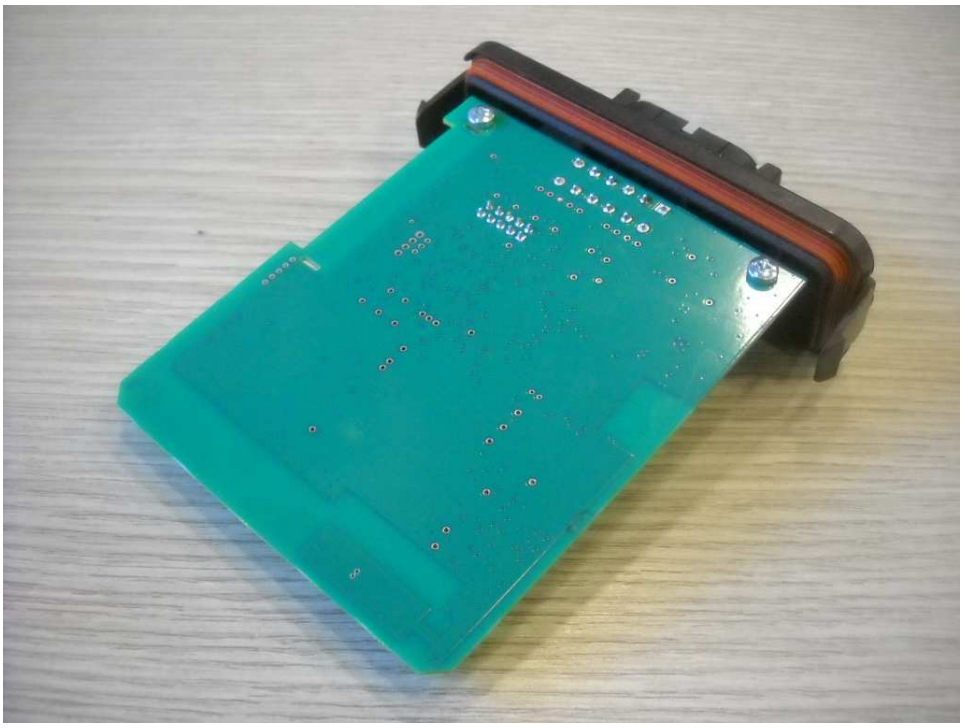
Section 9. Photos

9.1 Photos of the test set-up

Radiated emissions set-up for frequencies below 1 GHz

Radiated emissions set-up for frequencies above 1 GHz

9.2 Photos of the EUT



End of report