



Wireless test report – REP039747

Applicant:

TOPCON POSITIONING SYSTEMS, INC.
7400 National Drive, Livermore CA 94551, USA

Product name:

Multiradio module

Model:

CL20

Variant:

CL-20 3G FCC

FCC ID:

WR4-CL20

IC Registration number

6050B-CL20

Specifications:

- ◆ FCC 47 CFR Part 15 Subpart C, §15.209 and RSS-210 Issue 10 §7.3
- ◆ FCC 47 CFR Part 15 Subpart C, §15.247 (d) and RSS-247 Issue 3 §5.5
- ◆ FCC 47 CFR Part 22 Subpart H, §22.917 (a) and RSS-132 Issue 4 §5.5
- ◆ FCC 47 CFR Part 24 Subpart E, §24.238 (a) and RSS-133 Issue 6 §6.5

This test report may not be partially reproduced, except with the prior written permission of Nemko Spa

The test report merely corresponds to the tested sample.

The phase of sampling / collection of equipment under test is carried out by the customer.

Test location(s)

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 test site registration number: 682159 (10 m semi anechoic chamber) ISED test site number: 9109A

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.

Copyright notification

Nemko Spa authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Spa accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Date of issue: October 19, 2023

Tested by O. Frau (project handler) Signature: 
(name, function)

Reviewed by R. Giampaglia (verifier) Signature: 
(name, function)

Table of contents

Table of contents	3
Section 1. Report summary	4
1.1 Applicant and manufacturer	4
1.2 Test specifications	4
1.3 Test methods	4
1.4 Statement of compliance	4
1.5 Exclusions	4
1.6 Test report revision history	4
Section 2. Summary of test results.....	5
2.1 FCC Part 15 Subpart C, FCC Part 22 Subpart H and FCC Part 24 Subpart E test results.....	5
2.2 RSS test results	5
Section 3. Equipment under test (EUT) details	6
3.1 Sample information.....	6
3.2 EUT information	6
3.3 Technical information	6
3.4 EUT setup diagram	6
3.5 EUT exercise details.....	6
Section 4. Engineering considerations.....	7
4.1 Modifications incorporated in the EUT.....	7
4.2 Technical judgment	7
4.3 Deviations from laboratory tests procedures	7
Section 5. Test conditions.....	8
5.1 Atmospheric conditions	8
5.2 Power supply range	8
Section 6. Measurement uncertainty	9
6.1 Uncertainty of measurement	9
Section 7. Test equipment	11
7.1 Test equipment list.....	11
Section 8. Testing data	12
8.1 Radiated emission	12
Section 9. Block diagrams of test set-ups	35
9.1 Radiated emissions set-up for frequencies below 1 GHz.....	35
9.2 Radiated emissions set-up for frequencies above 1 GHz.....	35
Section 10. Photos.....	36
10.1 Photos of the test set-up	36
10.2 Photos of the EUT	37

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	TOPCON POSITIONING SYSTEMS, INC.
Address	7400 National Drive, Livermore CA 94551, USA

1.2 Test specifications

FCC 47 CFR Part 15 Subpart C, §15.209	Radiated emission limits; general requirements.
FCC 47 CFR Part 15 Subpart C, §15.247	Operation within the bands 902.2 -927.8 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
FCC 47 CFR Part 22 Subpart H, §22.917	Emission limitations for cellular equipment.
FCC 47 CFR Part 24 Subpart E, §24.238	Emission limitations for Broadband PCS equipment.
RSS-210 Issue 10, December 2019, Amendment (April 2020) - §7.3	Licence-Exempt Radio Apparatus: Category I Equipment - Transmitters with wanted and unwanted emissions that are within the general field strength limits
RSS-247 Issue 3, August 2023 - §5.5	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices - Unwanted emissions
RSS-132 Issue 4, January 31, 2023 - §5.5	Cellular Systems Operating in the Bands 824-849 MHz and 869-894 MHz - Transmitter Unwanted Emissions
RSS-133 Issue 6 Amendment 1, January 18, 2018 - §6.5.1	2 GHz Personal Communications Services - Transmitter Unwanted Emissions
RSS-Gen Issue 5, April 2018, Amendment 1 (March 2019), Amendment 2 (February 2021)	General Requirements for Compliance of Radio Apparatus

1.3 Test methods

ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ANSI C63.26 v2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

1.4 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.5 below. Results obtained indicate that the product under test complies 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

As per quote, the purpose of this report is verification of transmitters colocation. Only inter-modulation products within restricted bands were assessed, other requirements were excluded from the scope of this report.

1.6 Test report revision history

Revision #	Date of issue	Details of changes made to test report
REP039747	October 19, 2023	Original report issued

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, FCC Part 22 Subpart H and FCC Part 24 Subpart E test results

Part	Test description	Verdict
§15.209	Radiated emission limits; general requirements.	Pass
§15.247 (d)	Spurious emissions.	Pass
§22.917 (a)	Out of band emissions for cellular equipment.	Pass
§24.238 (a)	Out of band emissions for Broadband PCS equipment.	Pass

2.2 RSS test results

Part	Test description	Verdict
RSS-210 Issue 10 §7.3	Transmitter emission limits	Pass
RSS-247 Issue 3 §5.5	Unwanted emissions	Pass
RSS-132 Issue 4 §5.5	Transmitter Unwanted Emissions	Pass
RSS-133 Issue 6 §6.5.1	Transmitter Unwanted Emissions	Pass

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	March 5, 2020
Nemko sample ID number	392900

3.2 EUT information

Product name	Multiradio module
Model	CL-20 3G FCC
Serial number	007-2006-0002-02

3.3 Technical information

Frequency band	WIFI: 2400–2483.5 MHz band GSM/PCS: North America Bands
Type of modulation	GFSK, 802.11a/n, OFDM
Emission classification (F1D, G1D, D1D)	F1D, W7D
EUT power requirements	5 V DC
Antenna information	Integral antenna Tekfun model FX-W06

3.4 EUT setup diagram

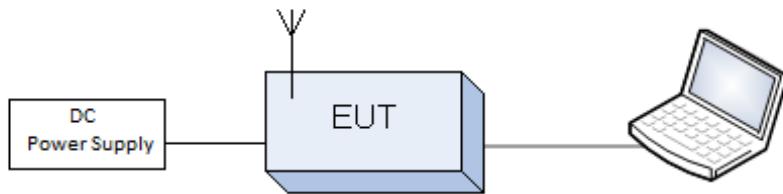


Figure 3.4-1: Setup diagram

3.5 EUT exercise details

Test mode forced in transmission mode with dedicated script. Hardware version revision 2 code 1949190604020. Firmware version 01.01

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

Temperature	18–33 °C
Relative humidity	30–60 %
Air pressure	980–1060 mbar

Test equipment used for the monitoring of the environmental conditions

Equipment	Manufacturer	Model no.	Asset no.	Cal date	Next cal.
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305	2022-12	2024-12
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703	2022-12	2024-12
Barometer	Castle	GPB 3300	072015	2023-04	2024-04

5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

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)
			0.009 MHz ÷ 30 MHz	1.1 dB	(1)
	Carrier power RF Output Power	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)
			0.009 MHz ÷ 18 GHz	3.0 dB	(1)
	Conducted spurious emissions	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)	
		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)
			0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
Receiver	Radiated	Radiated spurious emissions	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)
	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)
	Conducted	Conducted spurious emissions	1 MHz ÷ 18 GHz	6.0 dB	(1)
			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)

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. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESU8	100202	2023-01	2024-01
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESW44	101620	2023-05	2024-05
Trilog Antenna (30 MHz ÷ 7 GHz)	Schwarzbeck	VULB 9162	9162-025	2021-07	2024-07
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148	9148-123	2021-07	2024-07
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV 9718	9718-137	2023-02	2026-02
Horn antenna (4 ÷ 40 GHz)	RFSpin	DRH40	061106A40	2023-08	2024-08
Preamplifier (18 ÷ 40 GHz)	Miteq	JS44-18004000-35-8P-R	1.627	2023-08	2024-08
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	2021-09	2024-09
Shielded room	Siemens	10m control room	1947	NCR	NCR

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

Section 8. Testing data

8.1 Radiated emission

Definitions and limits

FCC § 15.209 (f)

In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device.

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

FCC §22.917 (a)

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

FCC §24.238 (a)

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

RSS-247 Issue 3 §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RSS-132 Issue 4 §5.5

Equipment shall meet the unwanted emission limits specified below:

- i. In the first 1.0 MHz band immediately outside and adjacent to each of the sub-bands specified in Section 5.1, the power of emissions per any 1% of the occupied bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB.
- ii. After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated below the transmitter output power P (dBW) by at least $43 + 10 \log(p)$ dB. If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.

p is the output power specified in watts.

RSS-133 Issue 6 §6.5.1

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

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

Table 8.1-1: FCC §15.209 – Radiated emission limits

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	67.6 – 20 × log ₁₀ (F)	300
0.490–1.705	24000/F	87.6 – 20 × 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 8.1-2: 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			

Table 8.1-3: ISED restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	
8.41425–8.41475	167.72–173.2	3500–4400	Above 38.6
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 8.1-3 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard

Test summary

Test start date	September 18, 2023
Test engineer	P. Barbieri

Observations, settings and special notes

The spectrum was searched from 30 MHz to 25 GHz.

EUT's 3G and WIFI transmitters were set to transmit continuously, different channel setting has been investigated as per provided by client's setup
Radiated measurements were performed at a distance of 3 m.

Spectrum analyzer settings for frequencies below 1000 MHz:

Detector mode	Quasi-Peak
Resolution bandwidth	120 kHz
Trace mode	Max Hold
Measurement time	100 ms

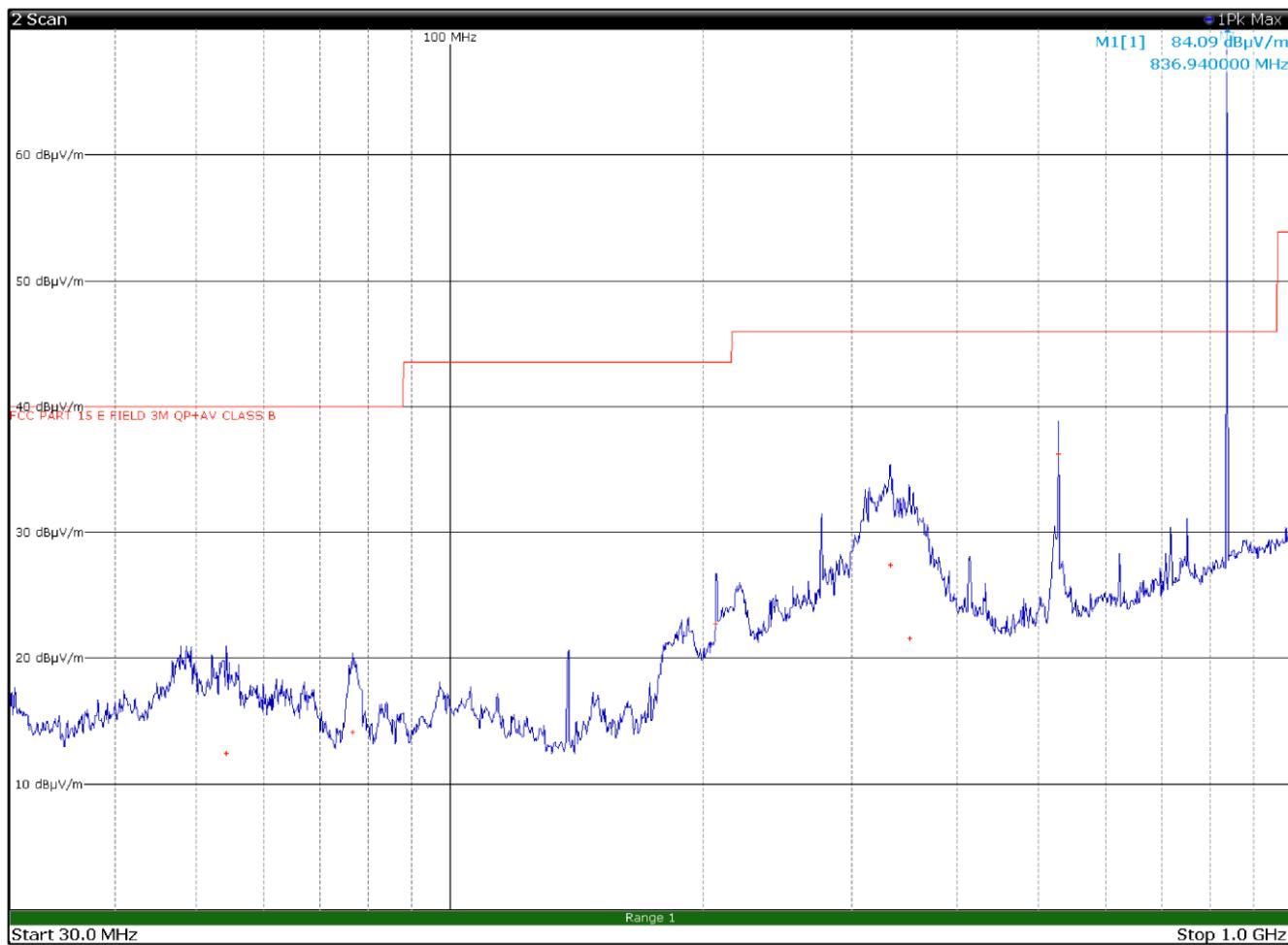
Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

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

Spectrum analyser settings for average radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Average
Trace mode:	Max Hold

8.1.4 Test data

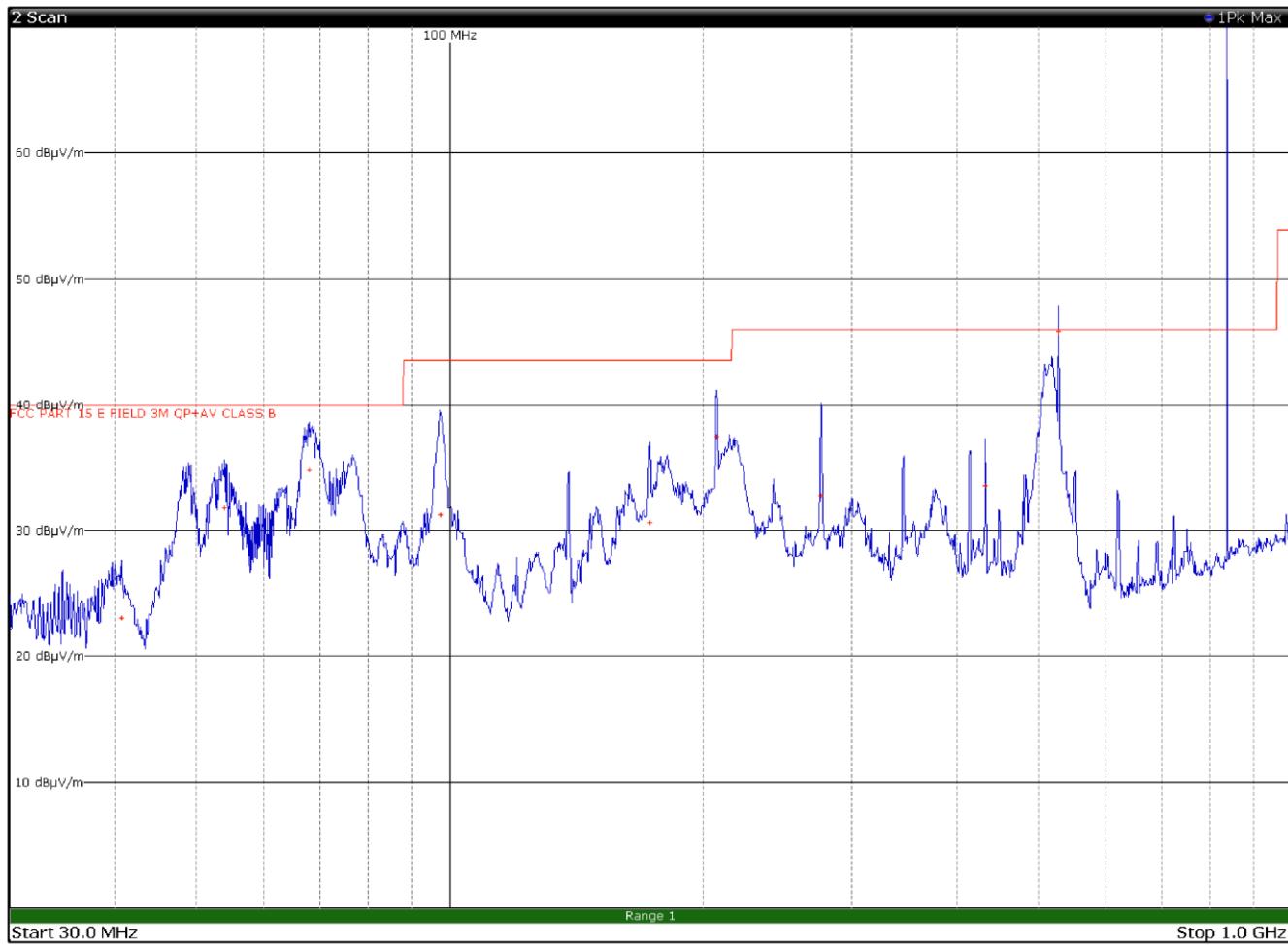


Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
54.2400	12.5	40.0	-27.5	QP
76.6200	14.1	40.0	-25.9	QP
206.7900	22.7	43.5	-20.8	QP
332.9700	27.4	46.0	-18.6	QP
351.0300	21.6	46.0	-24.4	QP
528.0000	36.3	46.0	-9.7	QP

Limit exceeded by the carrier

8.1.4 Test data, continued

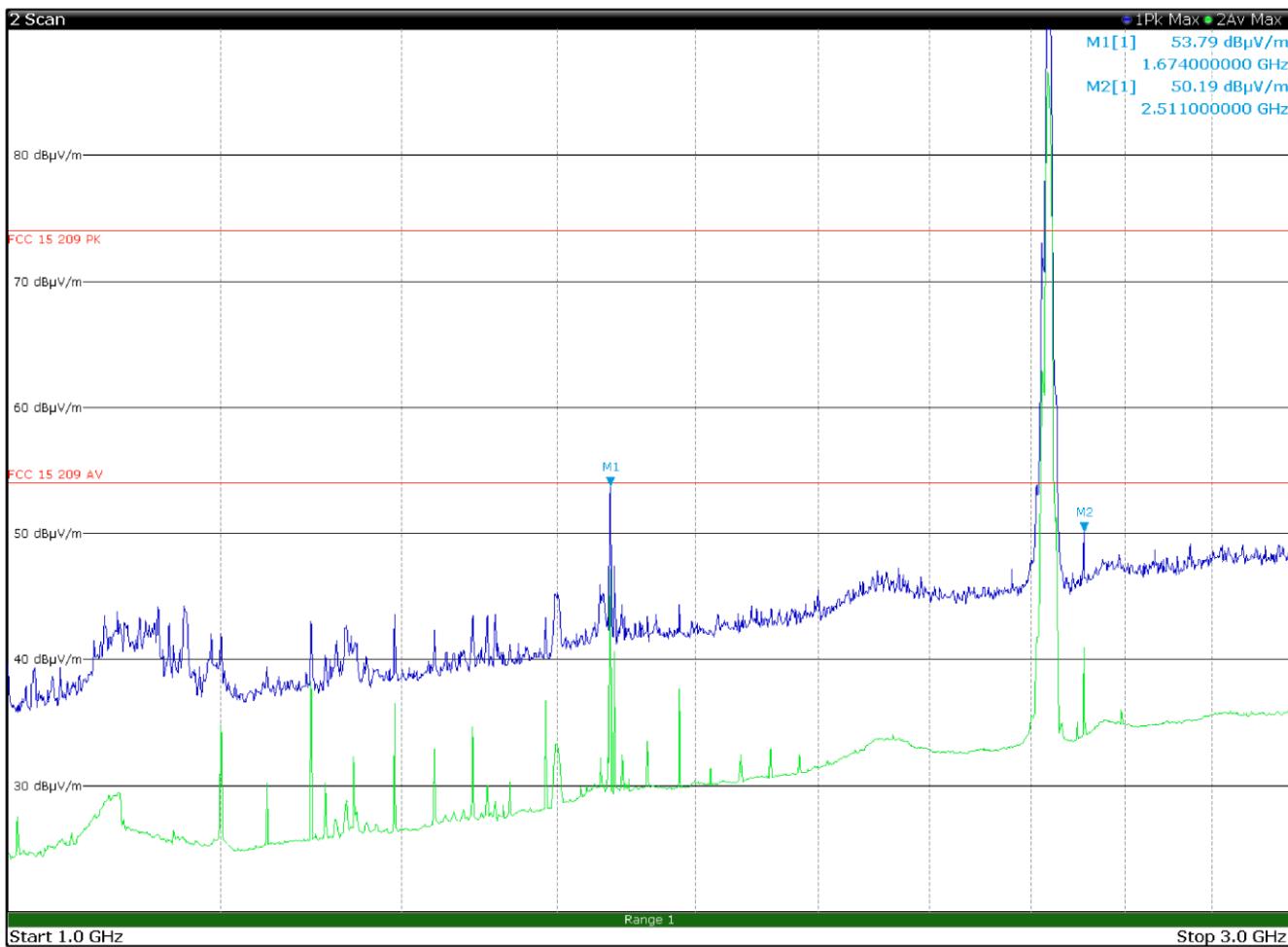


Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
40.7100	23.1	40.0	-16.9	QP
53.9400	31.8	40.0	-8.2	QP
67.9500	34.9	40.0	-5.1	QP
97.2900	31.3	43.5	-12.2	QP
172.8600	30.7	43.5	-12.8	QP
207.4800	37.5	43.5	-6.0	QP
275.7000	32.8	46.0	-13.2	QP
432.0000	33.6	46.0	-12.4	QP
528.0000	45.8	46.0	-0.2	QP

Limit exceeded by the carrier

8.1.4 Test data, continued



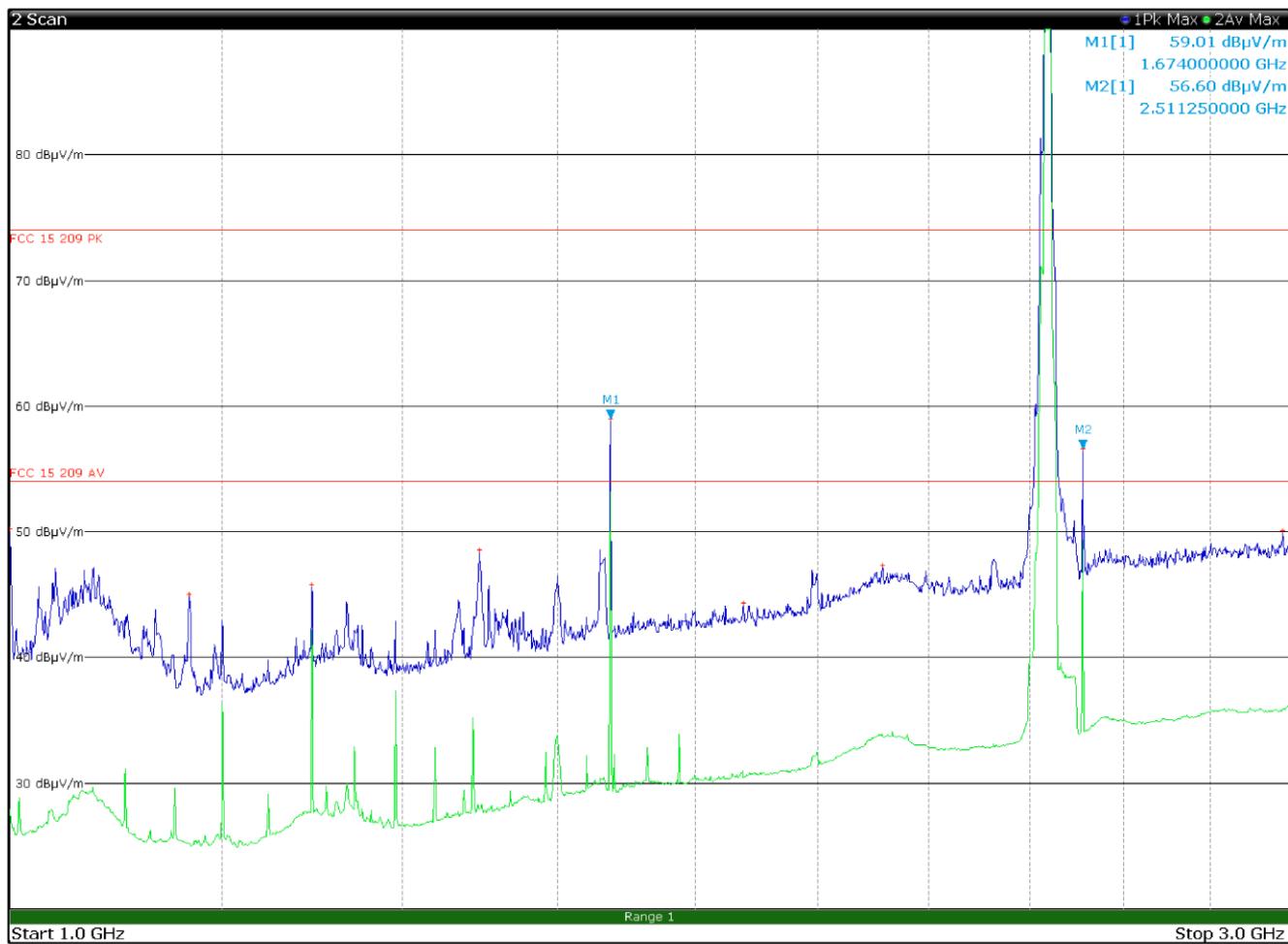
Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1674.000	53.8	82.2	-28.4	PK
2512.250	50.2	82.2	-32.0	PK

The limit for GSM is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

Limit exceeded by the carrier

8.1.4 Test data, continued



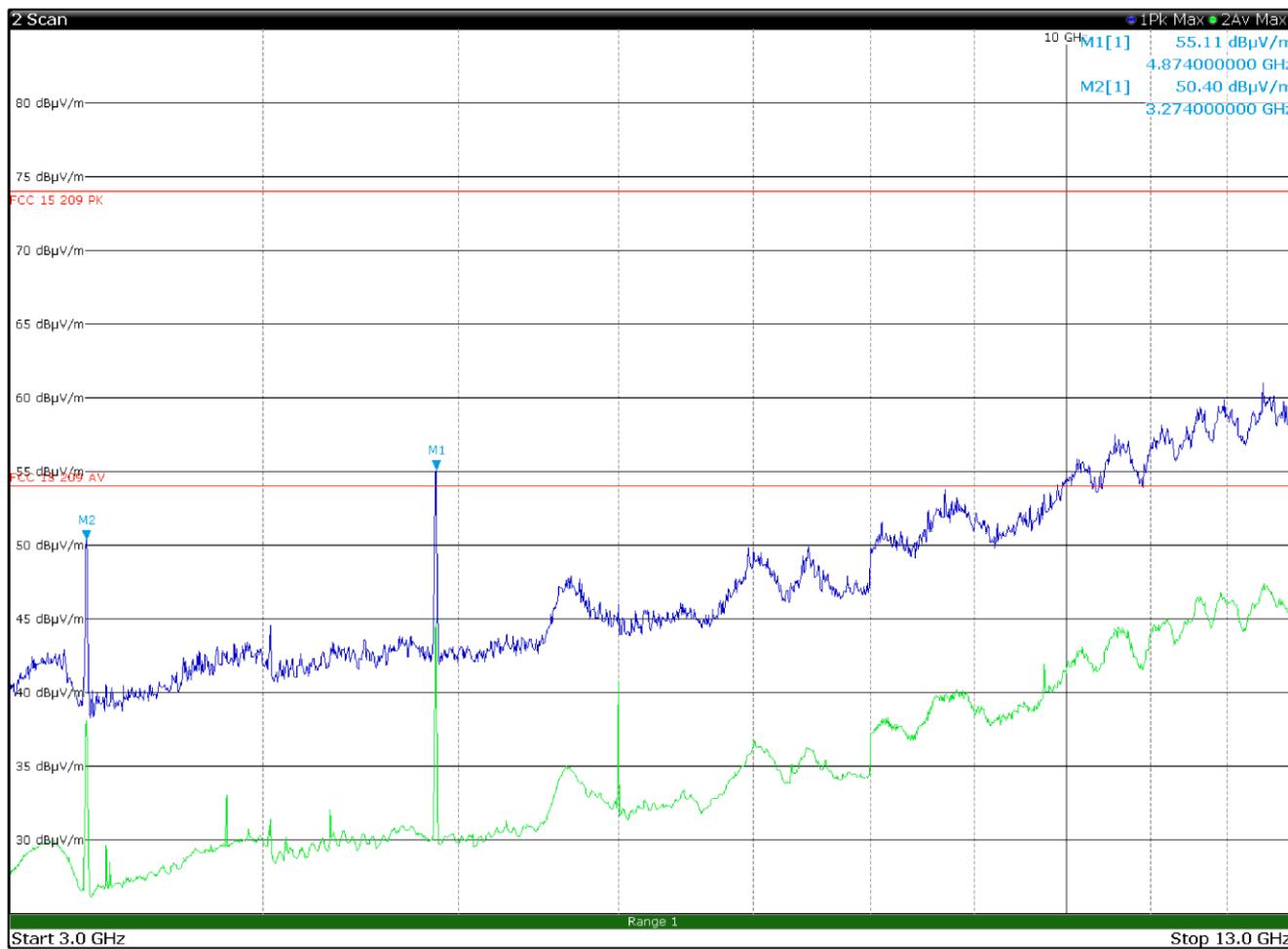
Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1674.000	59.1	82.2	-23.1	PK
2512.250	56.6	82.2	-25.6	PK

The limit for GSM is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

Limit exceeded by the carrier

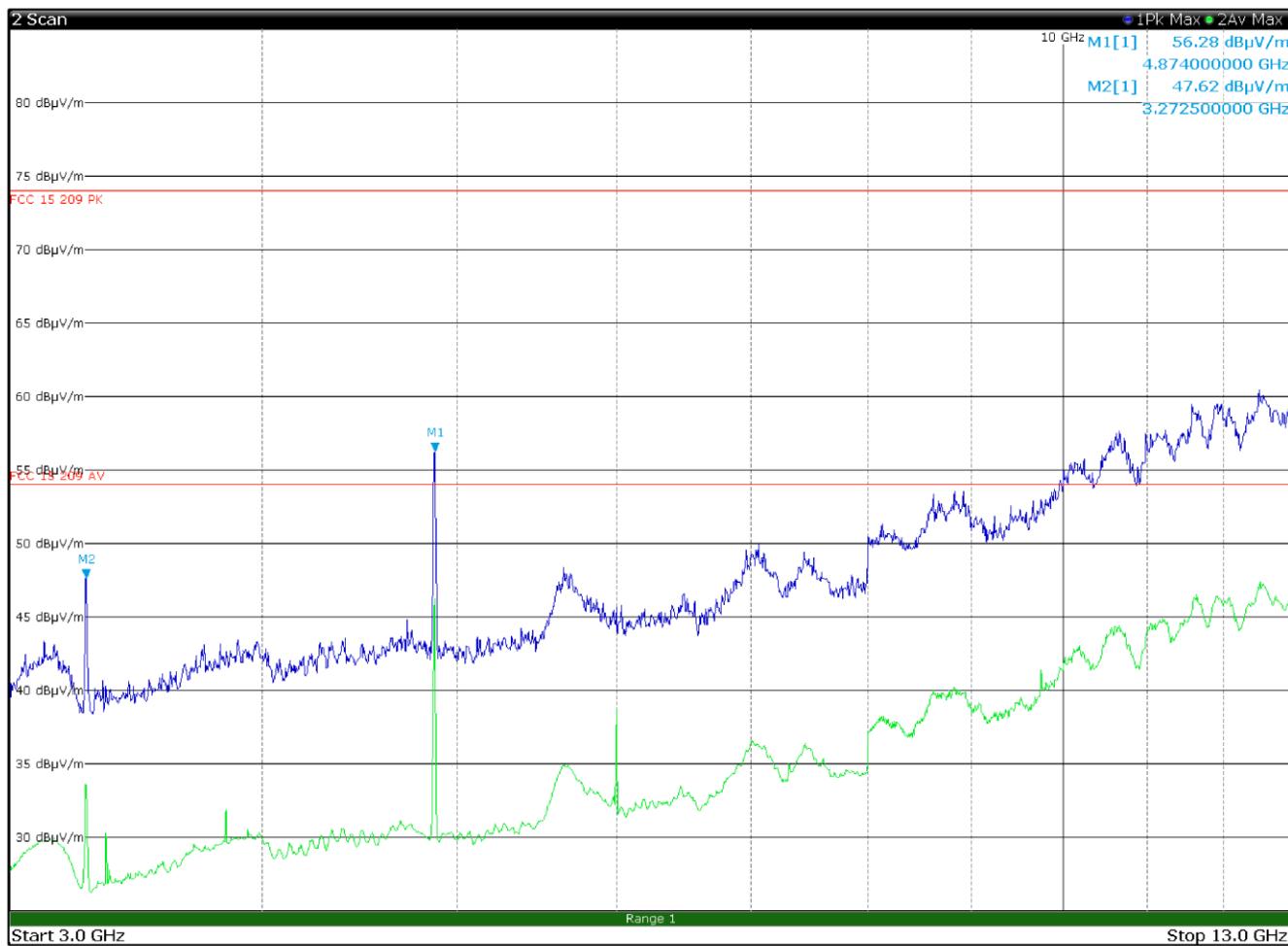
8.1.4 Test data, continued



Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

Frequency (GHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
4.8740	45.3	54.0	-8.7	AV
4.8740	55.2	74.0	-18.8	PK

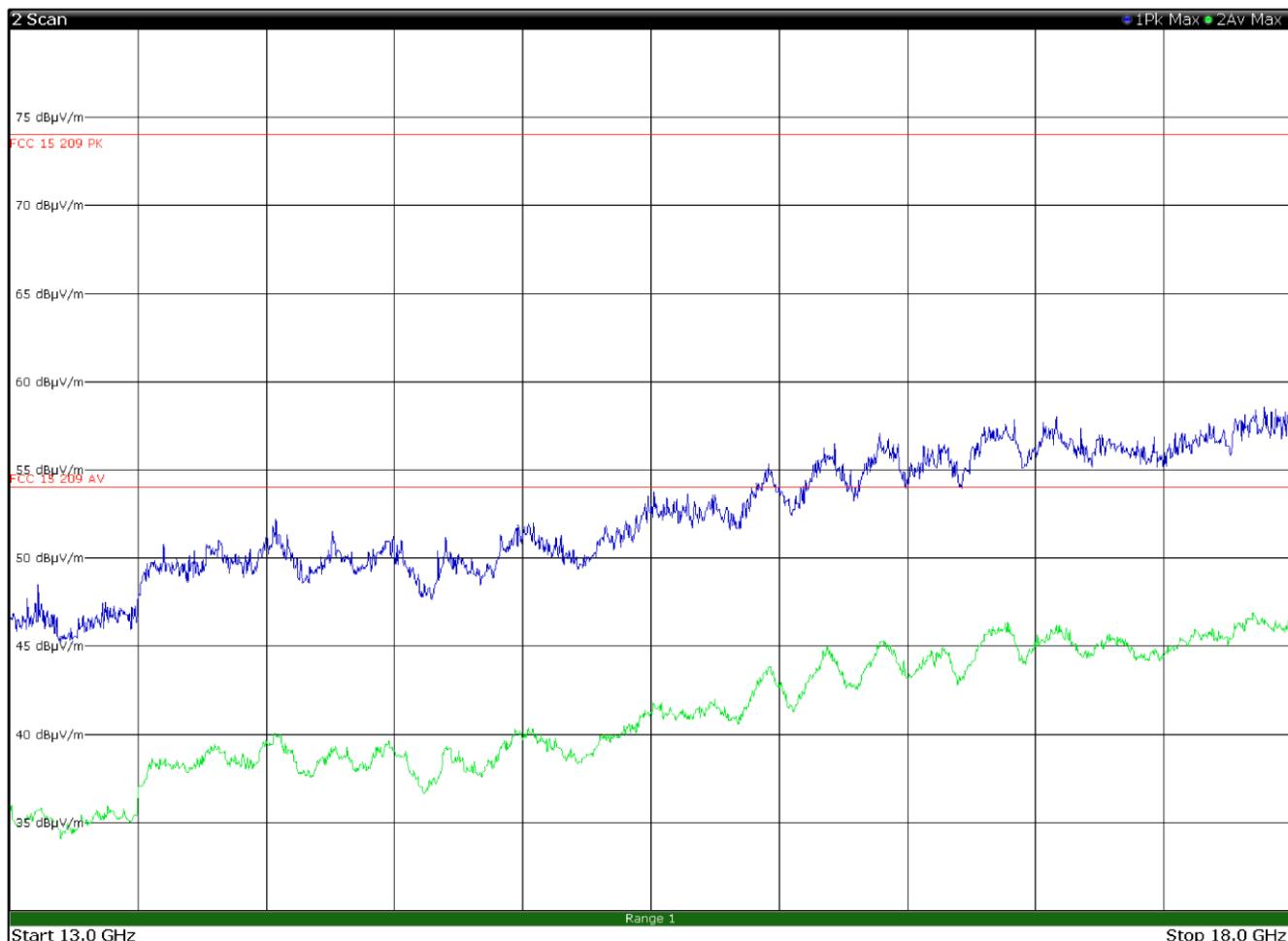
8.1.4 Test data, continued



Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

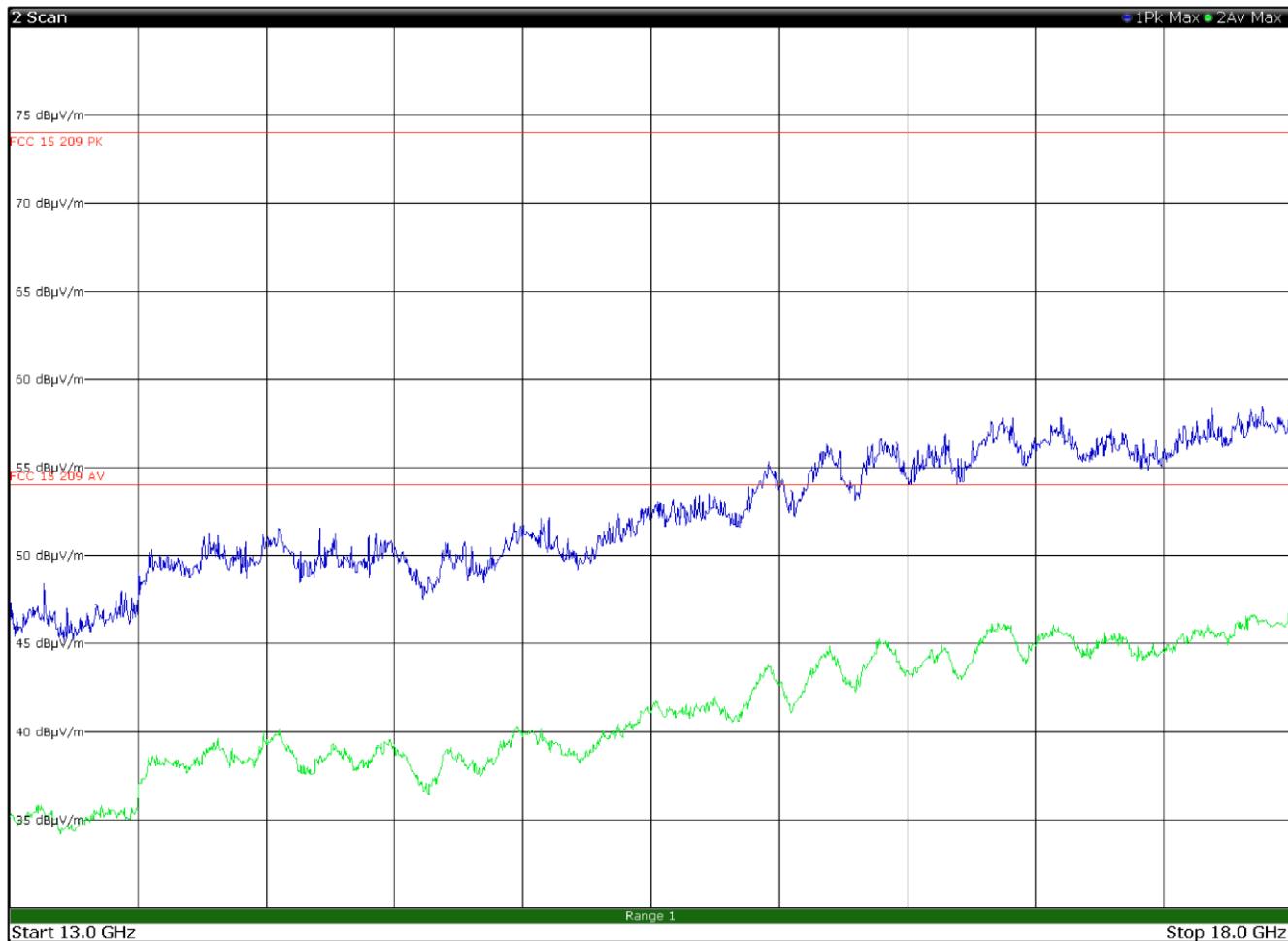
Frequency (GHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
4.8740	47.1	54.0	-6.9	AV
4.8740	56.3	74.0	-17.7	PK

8.1.4 Test data, continued

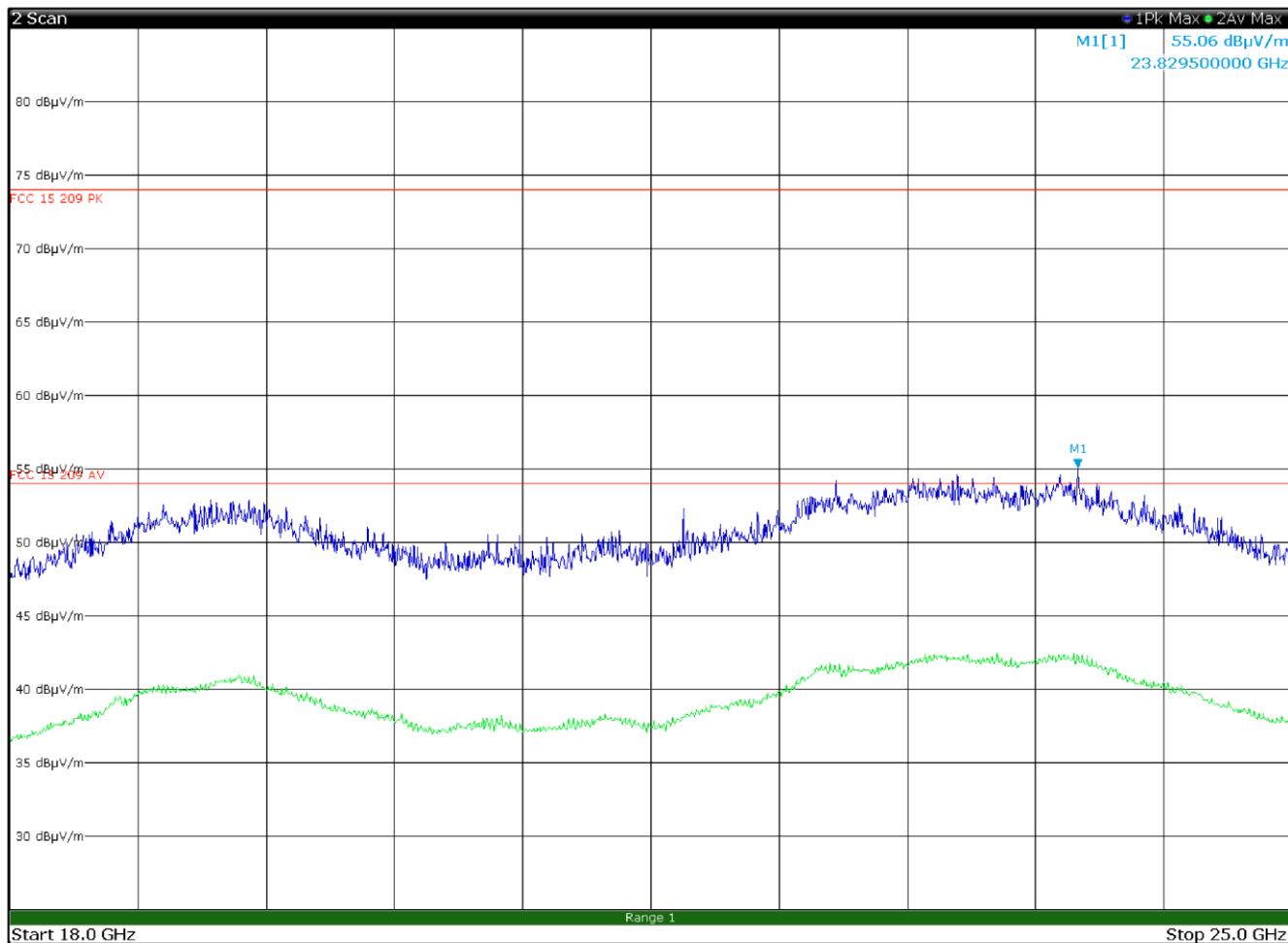


Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

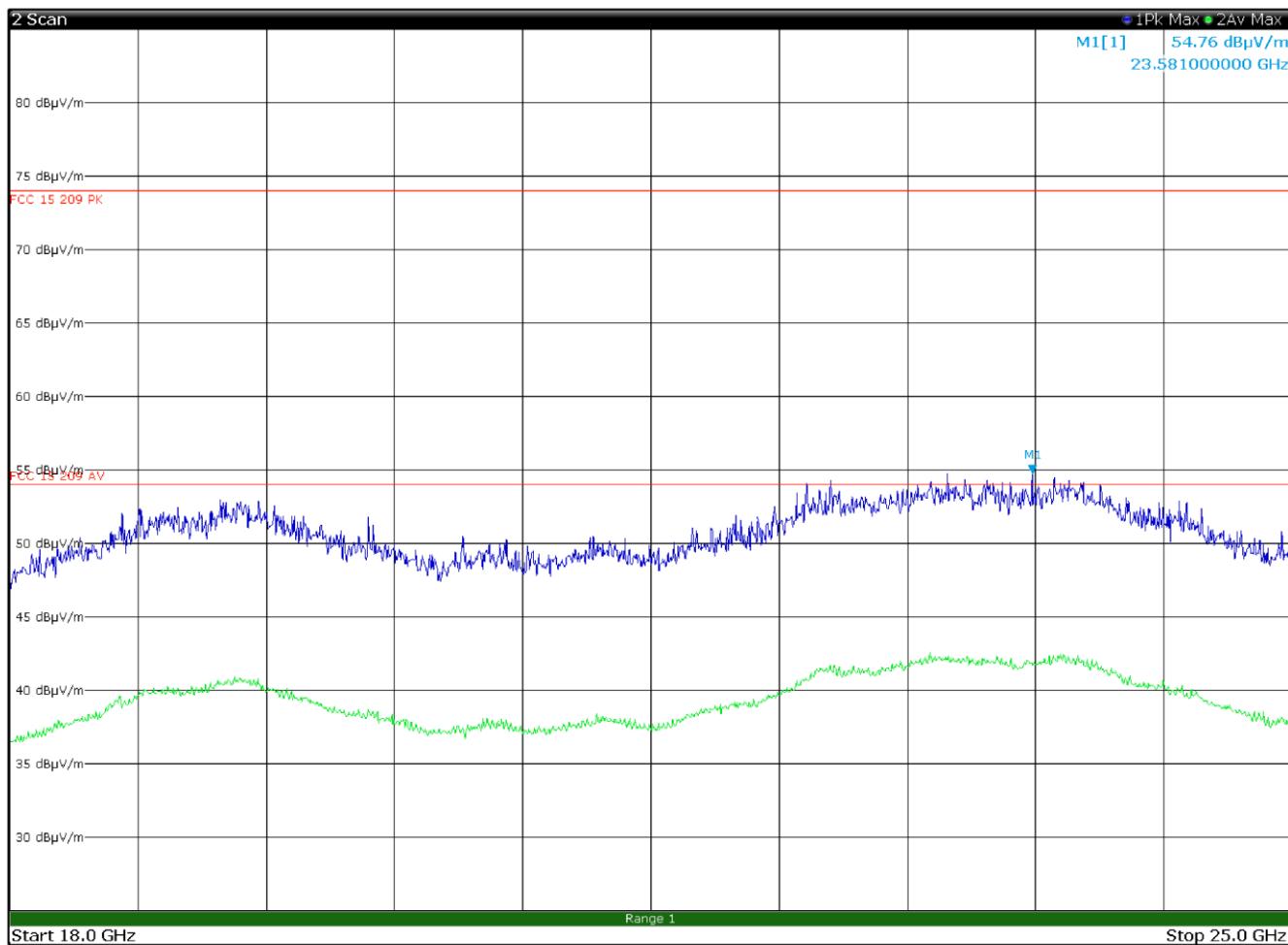
8.1.4 Test data, continued



Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

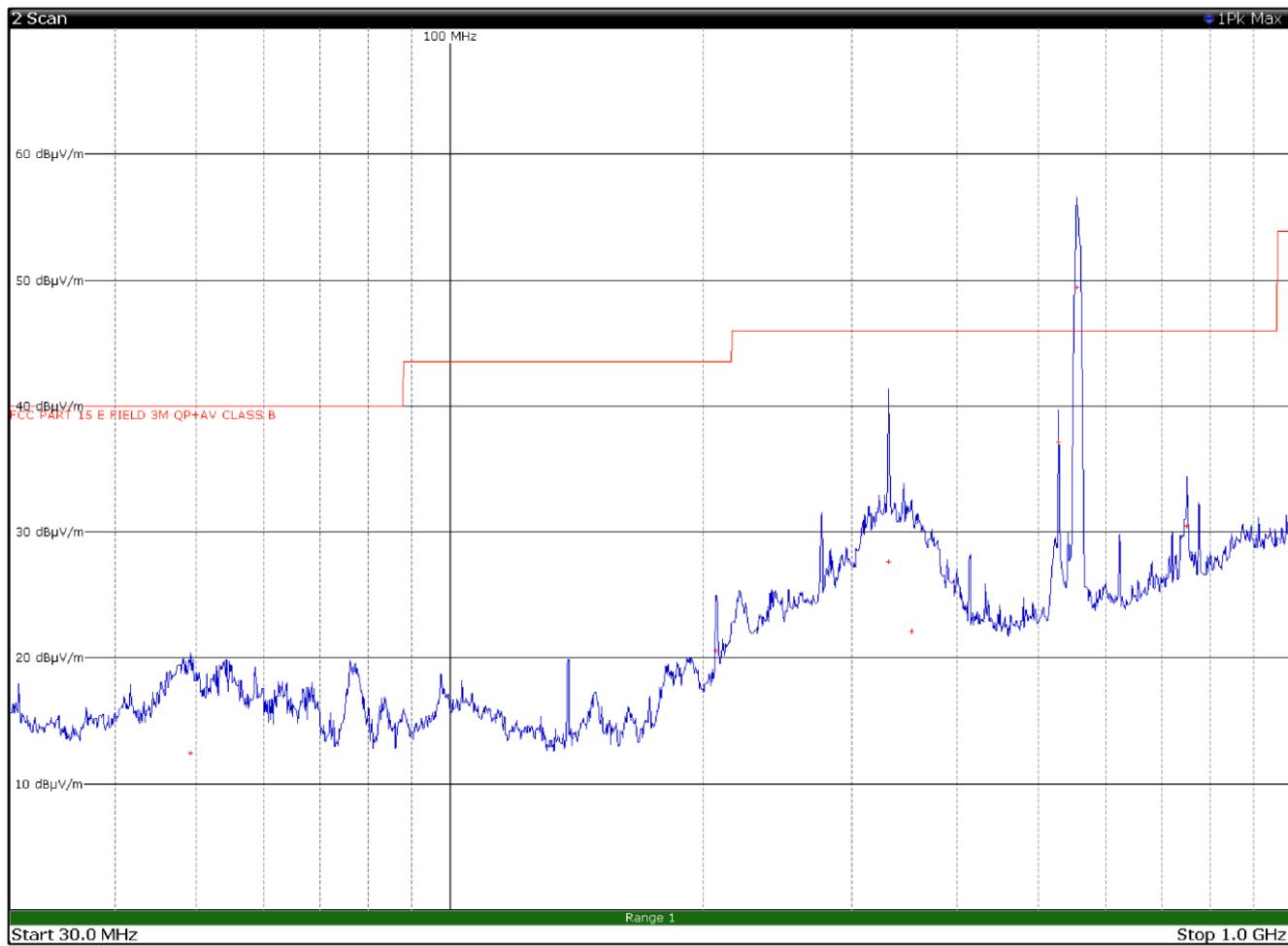


Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz



Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 837 MHz and WIFI Tx at 2437 MHz

8.1.4 Test data, continued

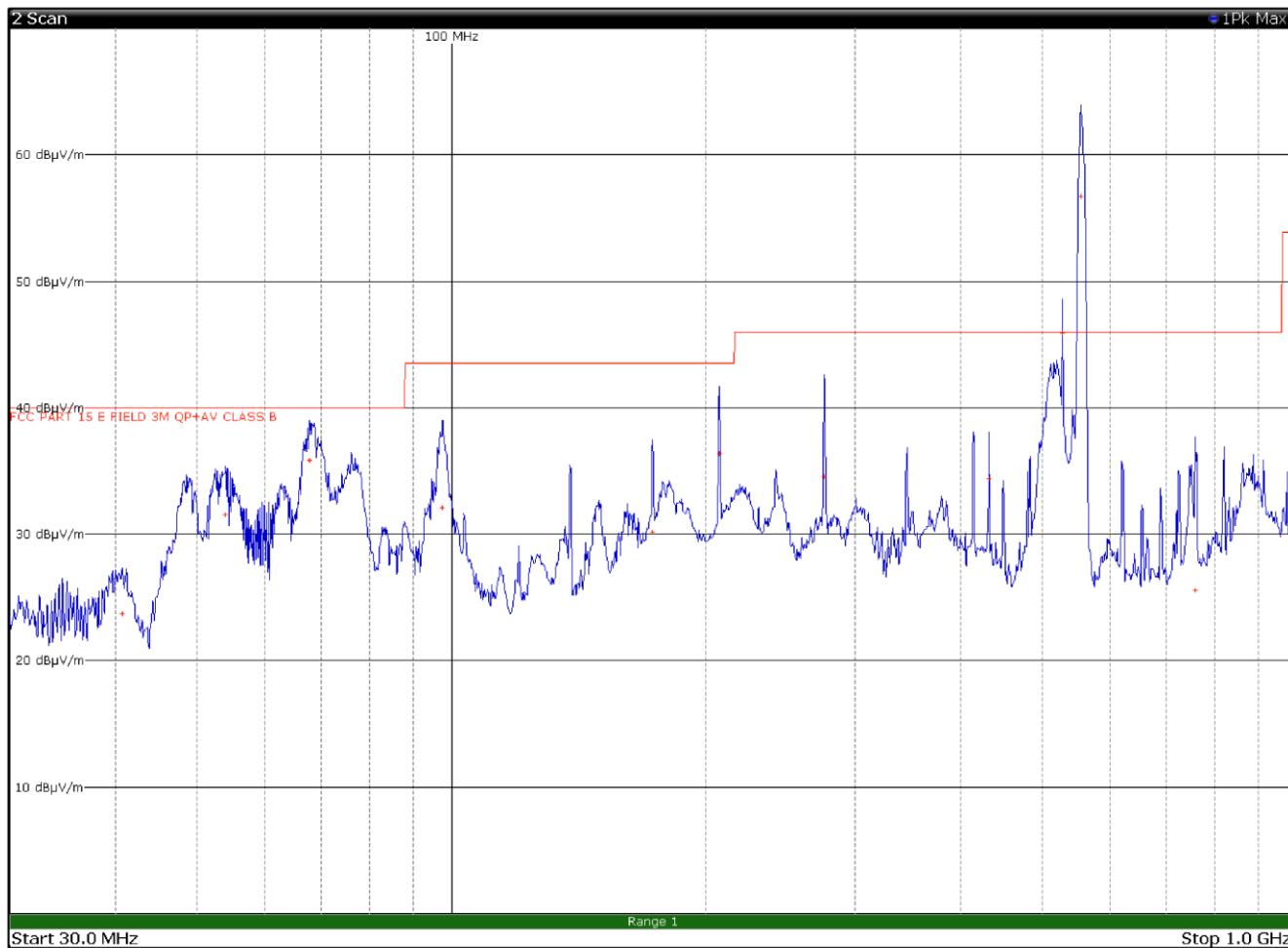


Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
49.2000	12.5	40.0	-27.5	QP
206.7900	20.6	43.5	-22.9	QP
331.8600	27.6	46.0	-18.4	QP
352.9500	22.1	46.0	-23.9	QP
528.0000	37.2	46.0	-8.8	QP
554.4600	57.9	82.2	-24.3	PK
749.6100	30.5	46.0	-15.5	QP

The limit for GSM is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

8.1.4 Test data, continued

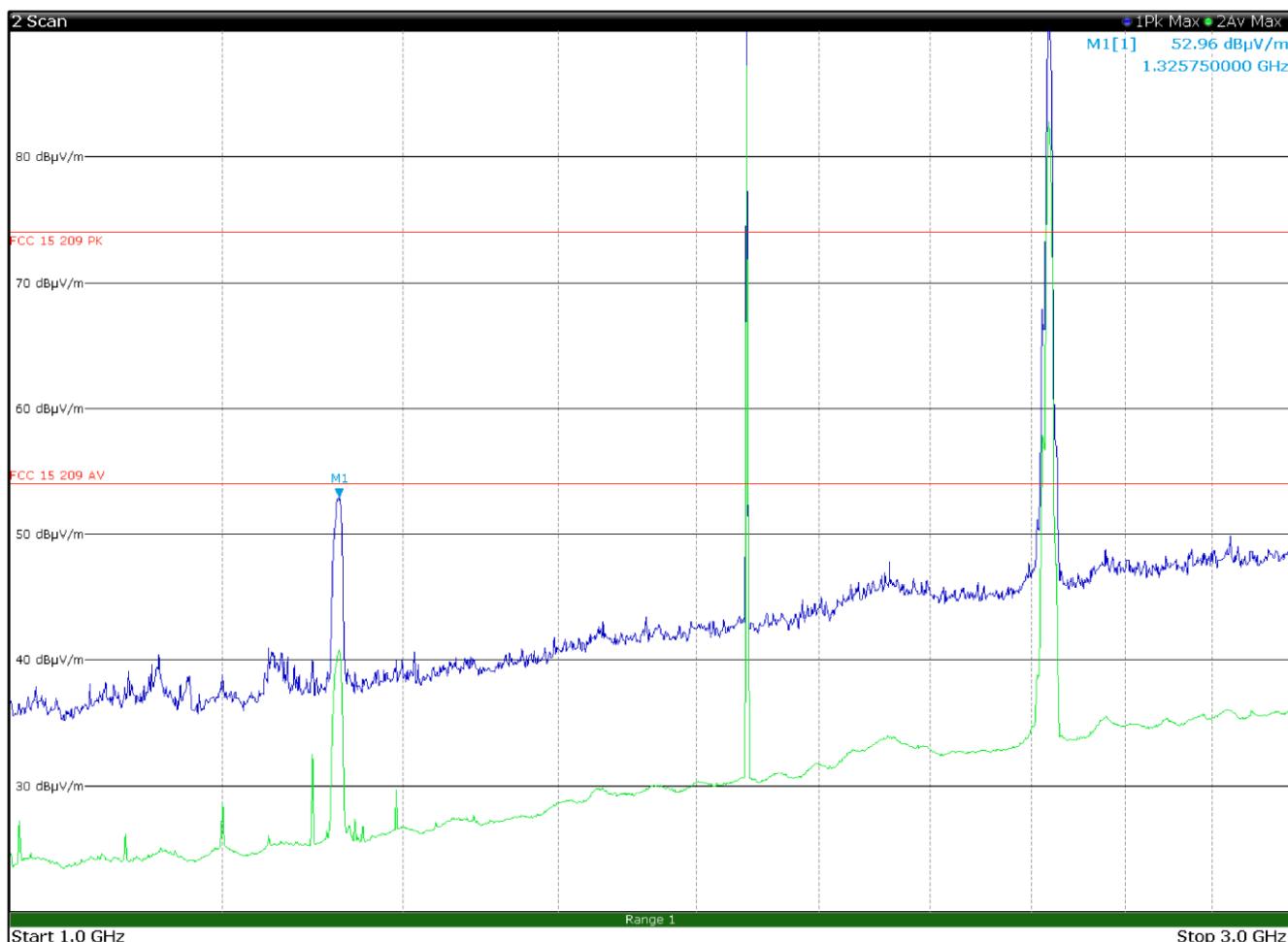


Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
40.7100	23.8	40.0	-16.2	QP
53.9400	31.6	40.0	-8.4	QP
67.8900	35.9	40.0	-4.1	QP
97.5300	32.1	43.5	-11.4	QP
172.8900	30.2	43.5	-13.3	QP
207.4800	36.5	43.5	-7.0	QP
275.7000	34.6	46.0	-11.4	QP
432.0000	34.5	46.0	-11.5	QP
528.0000	45.9	46.0	-0.1	QP
554.5200	63.8	82.2	-18.4	PK
758.1300	25.6	46.0	-20.4	QP

The limit for GSM is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

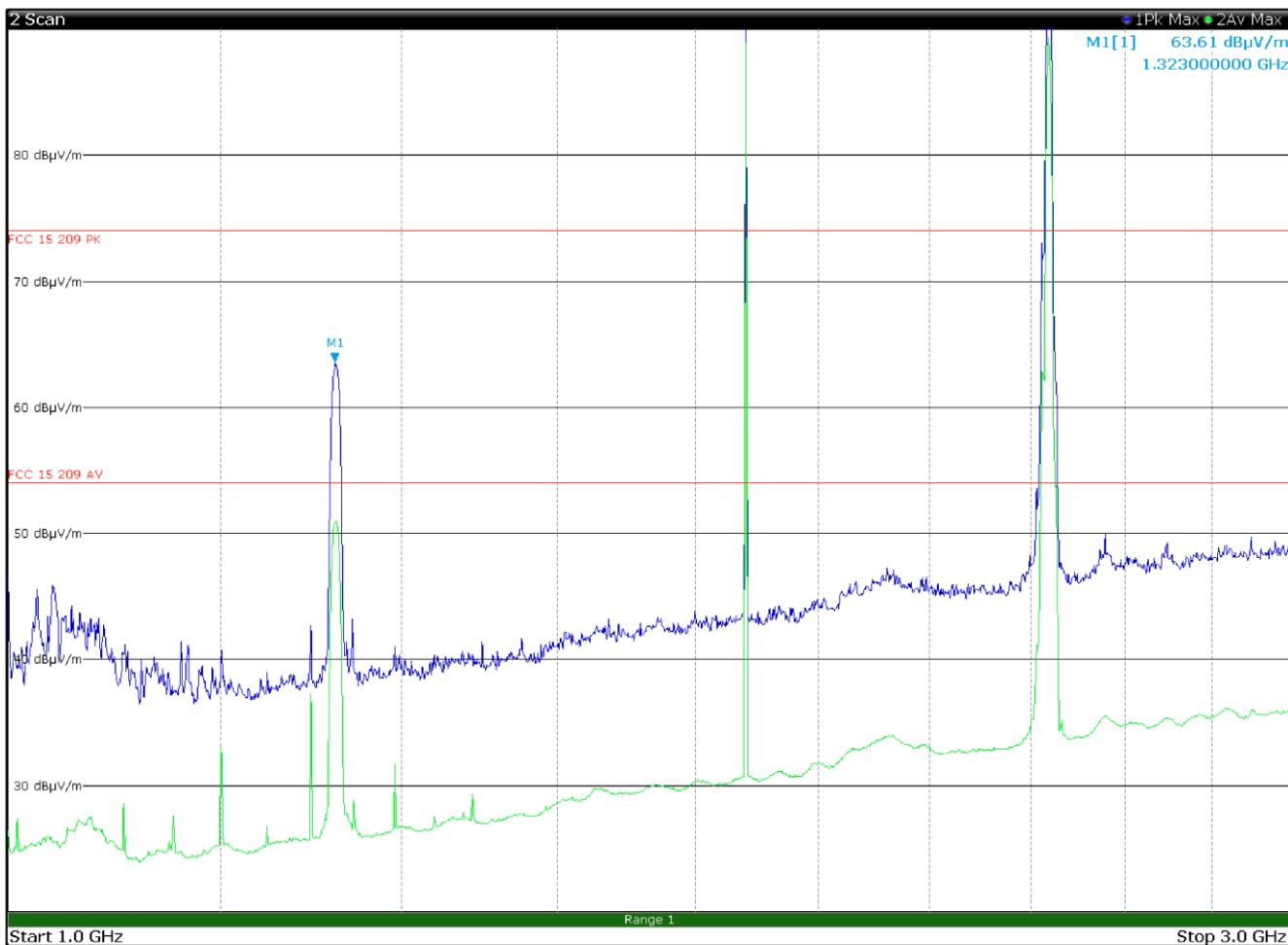
8.1.4 Test data, continued



Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Limit exceeded by the carrier

8.1.4 Test data, continued



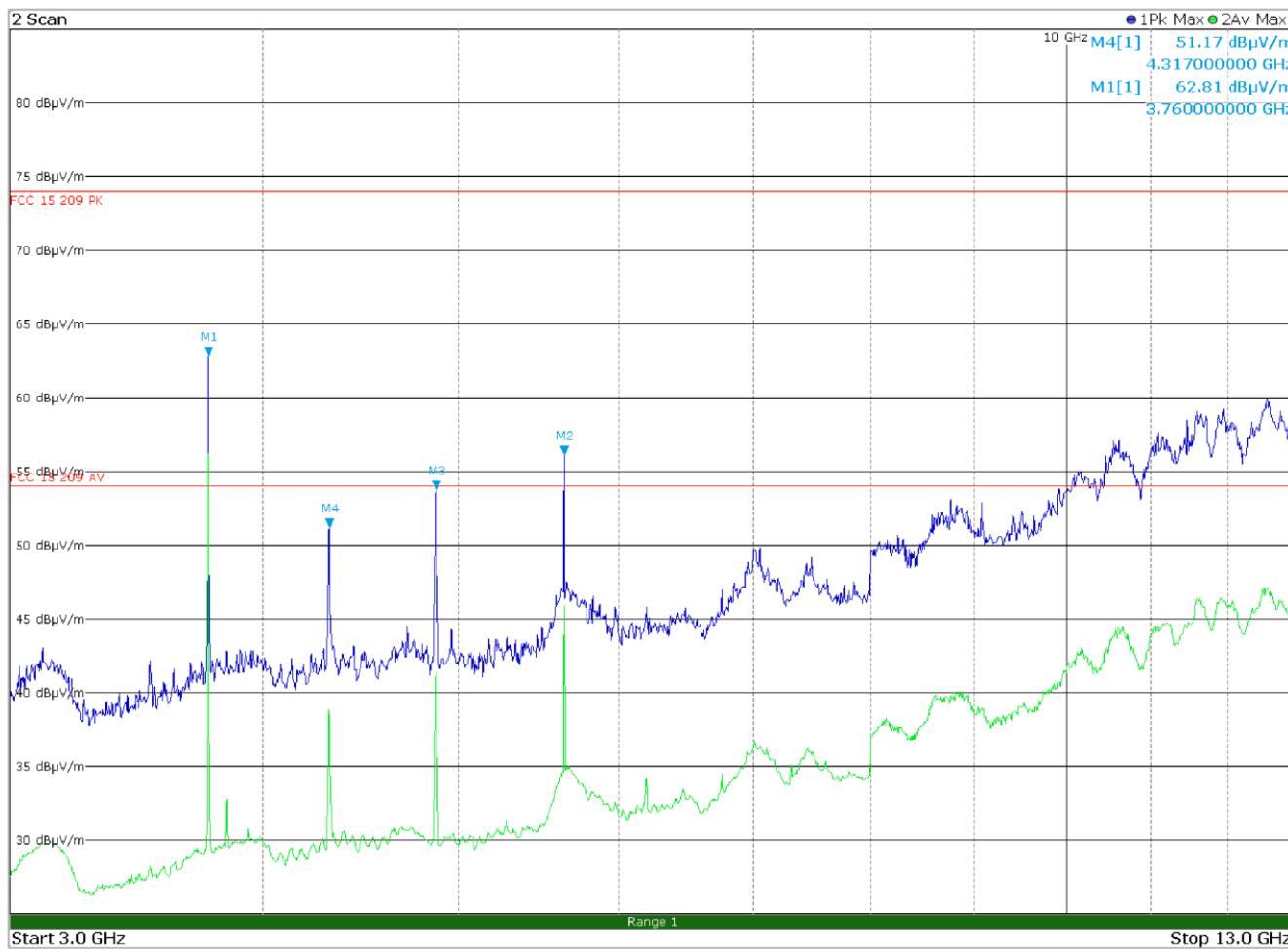
Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1323.000	63.6	82.2	-18.6	PK

The limit for GSM is -13 dBm. Limit (dBμV/m) = limit (dBm) + 95.23 = 82.2 dBμV/m

Limit exceeded by the carrier

8.1.4 Test data, continued

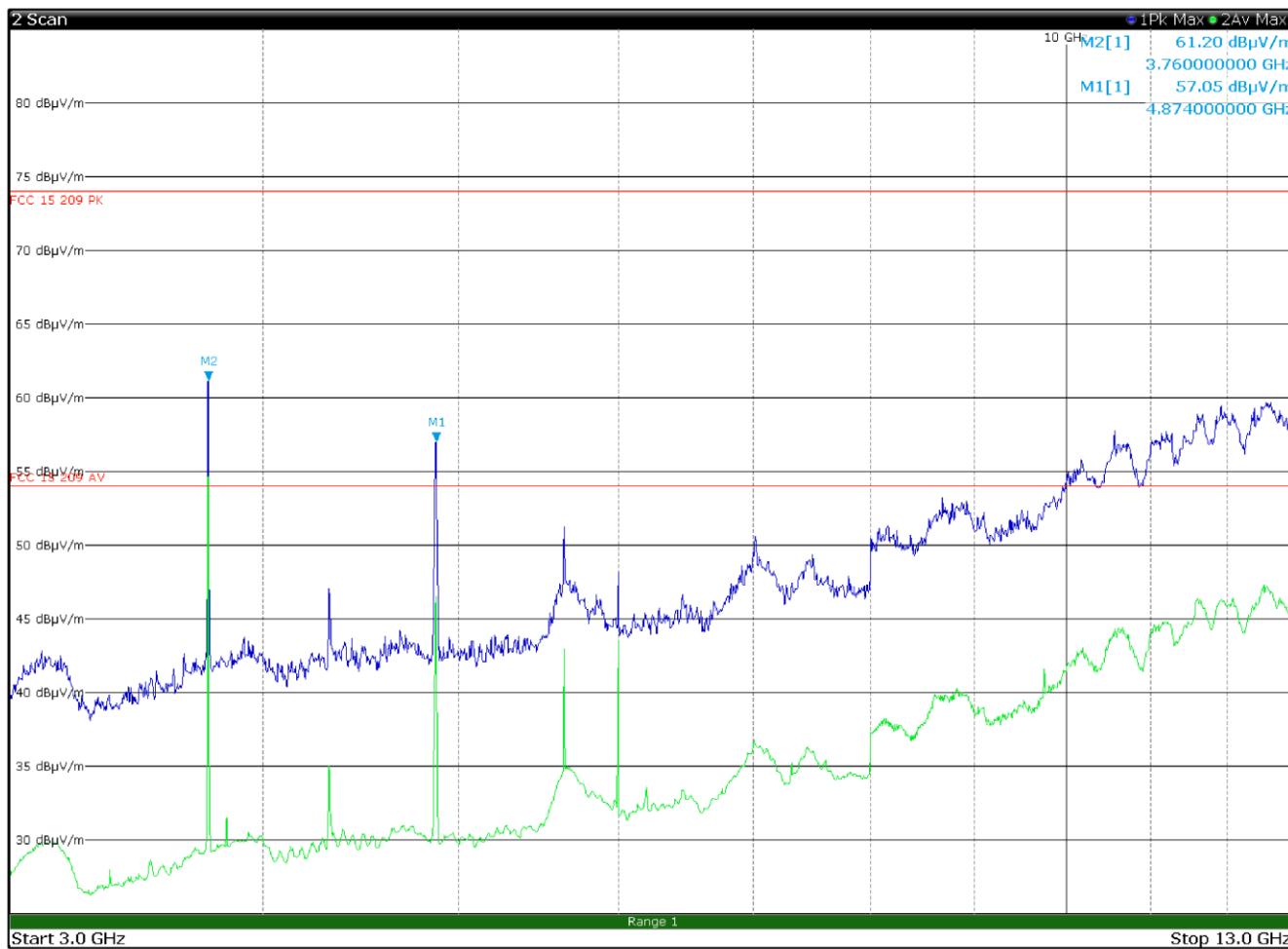


Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

3 Marker Table	Wnd	Type	Ref	Trc	X-value	Y-value
Scan	M1		1		3.76 GHz	62.81 dB μ V/m
Scan	M2		1		5.63975 GHz	56.09 dB μ V/m
Scan	M3		1		4.874 GHz	53.74 dB μ V/m
Scan	M4		1		4.317 GHz	51.17 dB μ V/m

The limit for GSM is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

8.1.4 Test data, continued

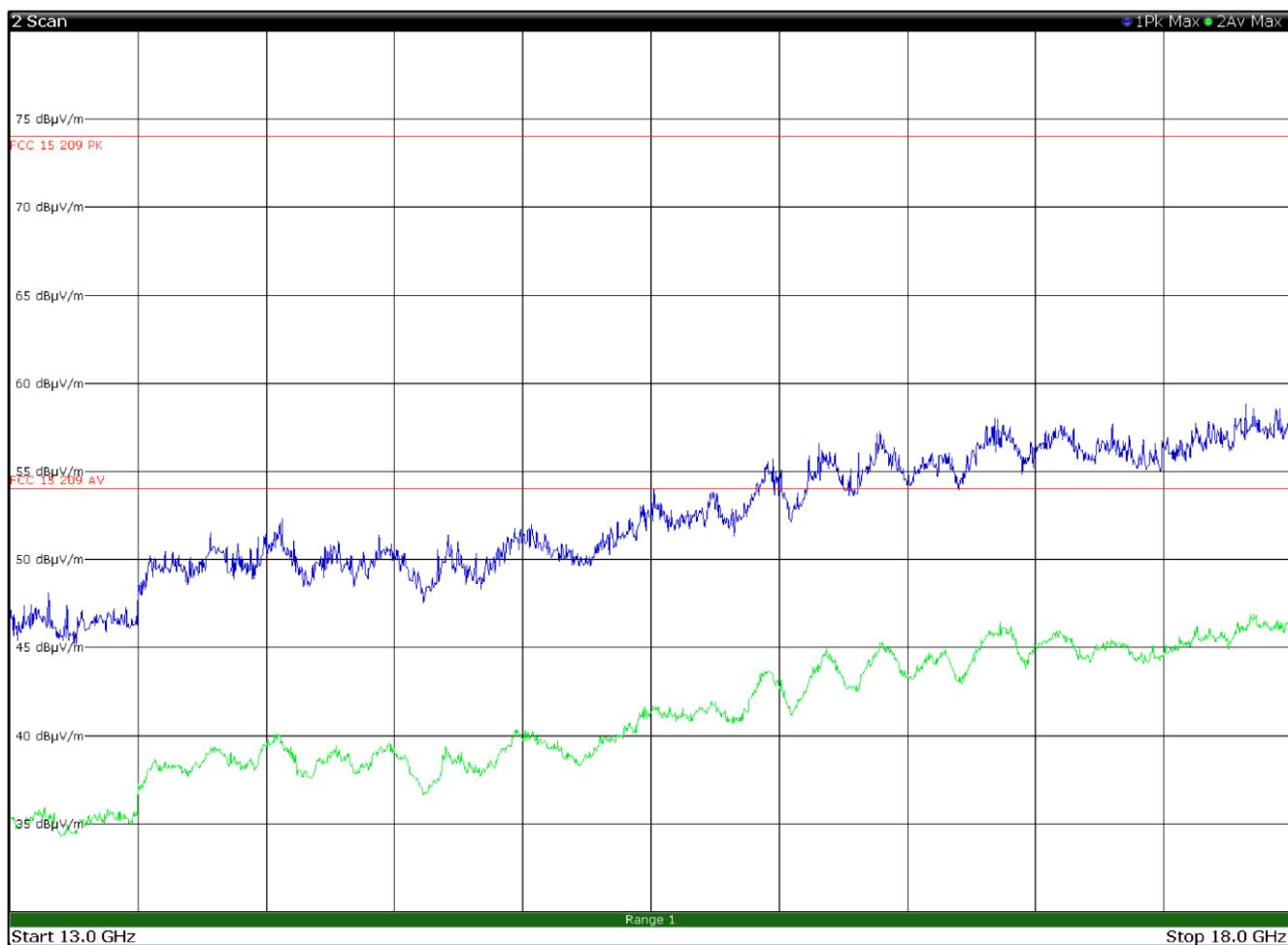


Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
3760.000	61.2	82.2	-21.0	PK
4874.000	47.8	54.0	-6.2	AV
4874.000	57.1	74.0	-16.9	PK

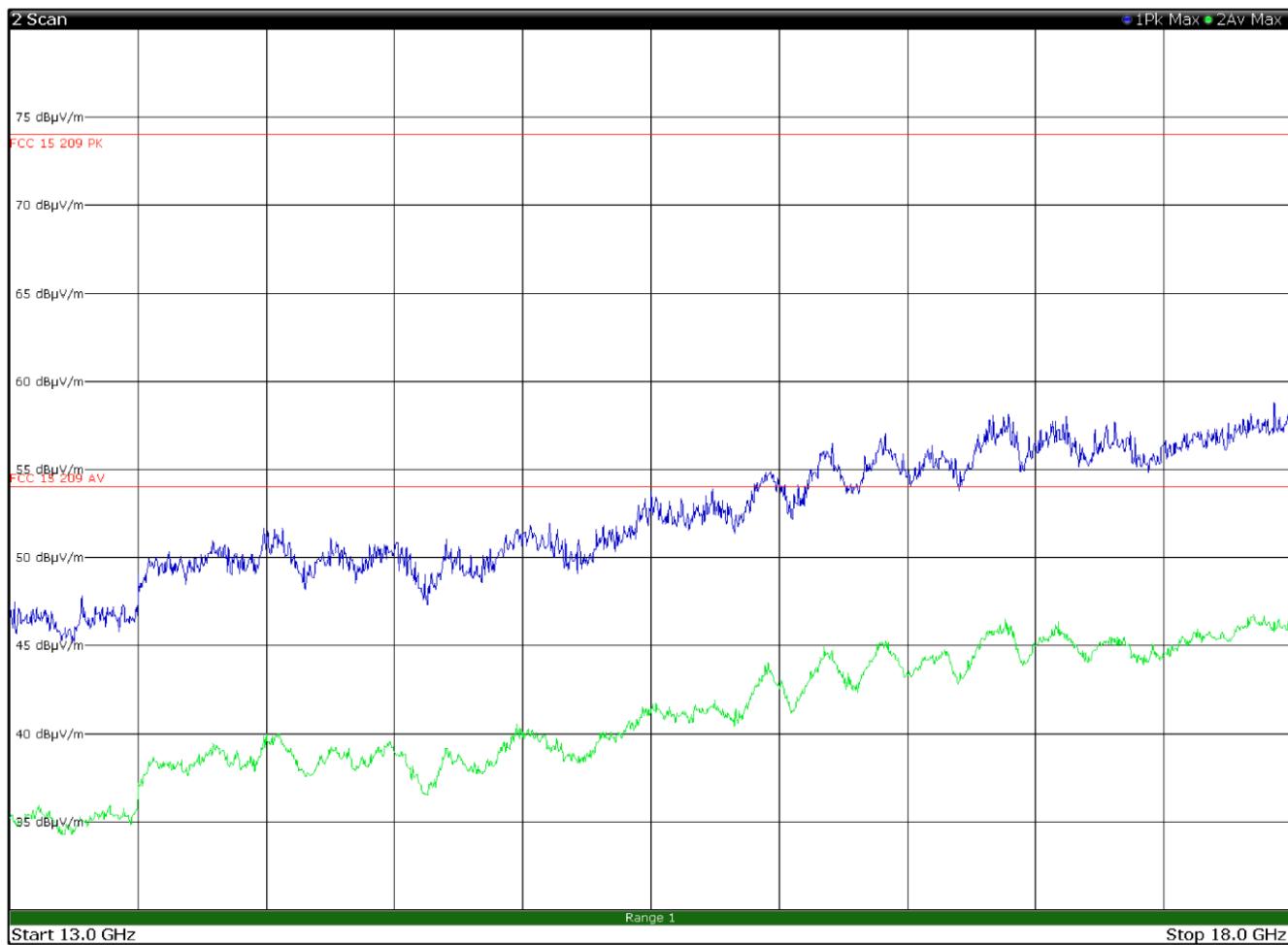
The limit for FCC 22.917 is -13 dBm. Limit (dB μ V/m) = limit (dBm) + 95.23 = 82.2 dB μ V/m

8.1.4 Test data, continued

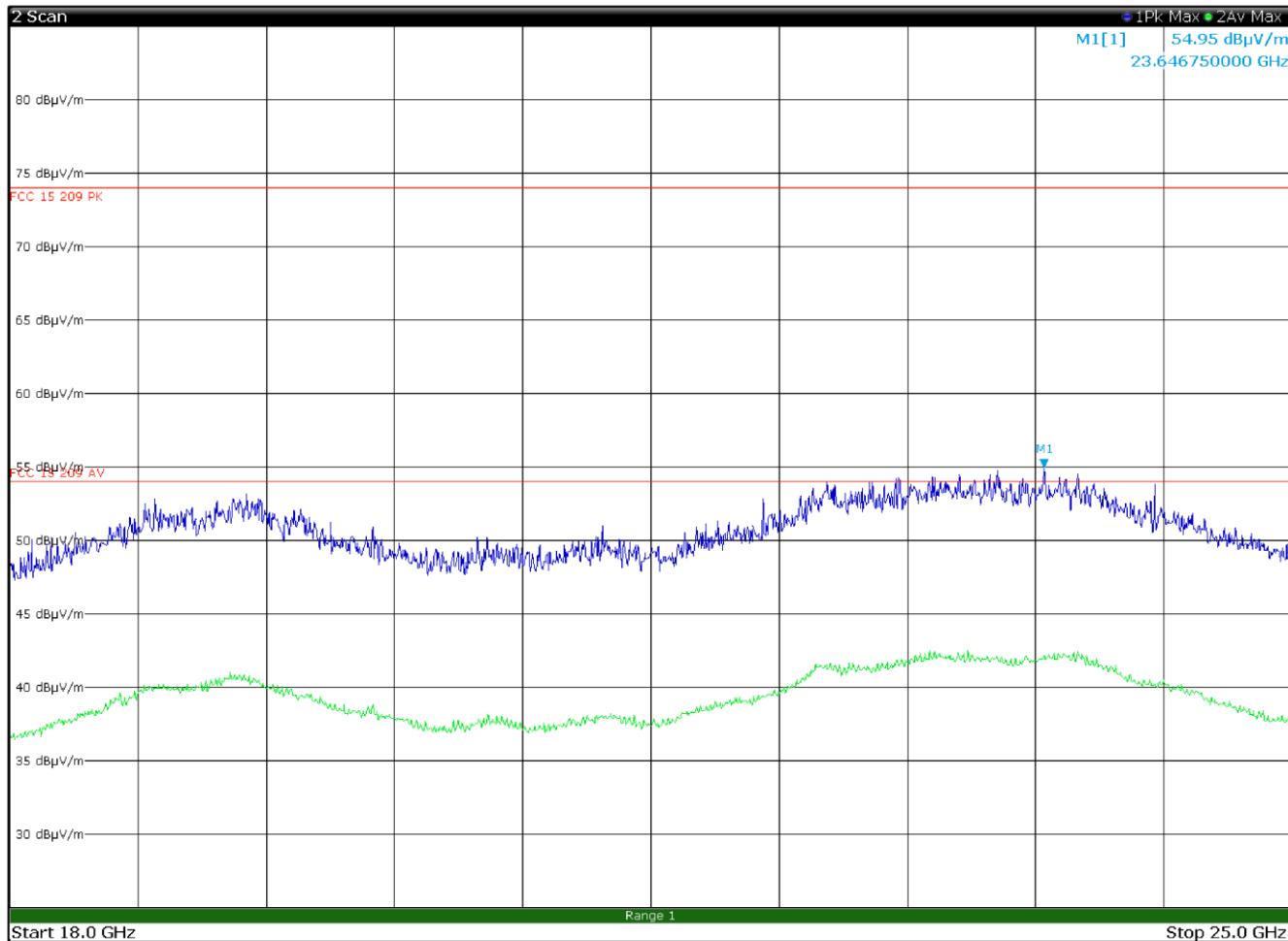


Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

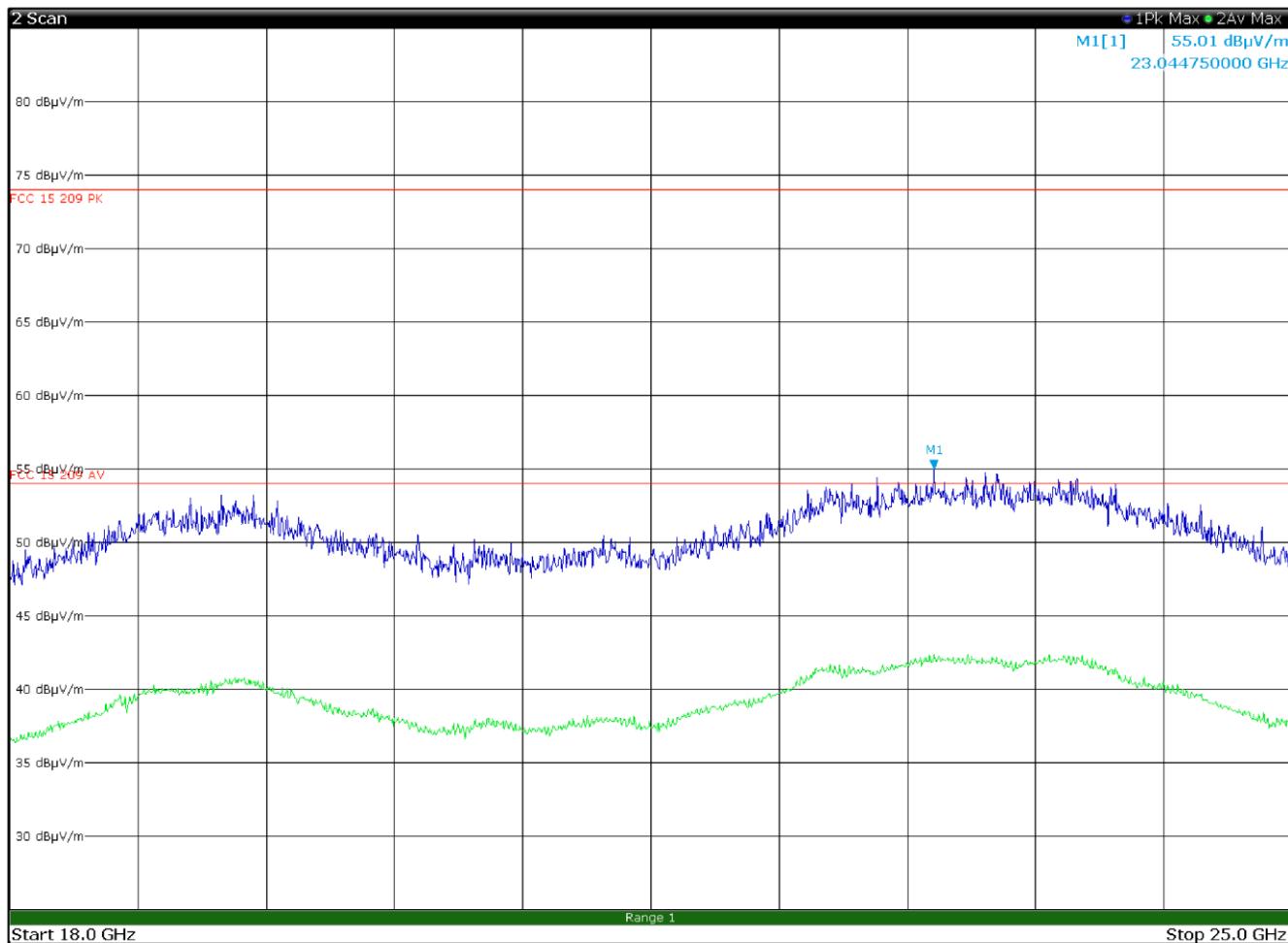
8.1.4 Test data, continued



Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz



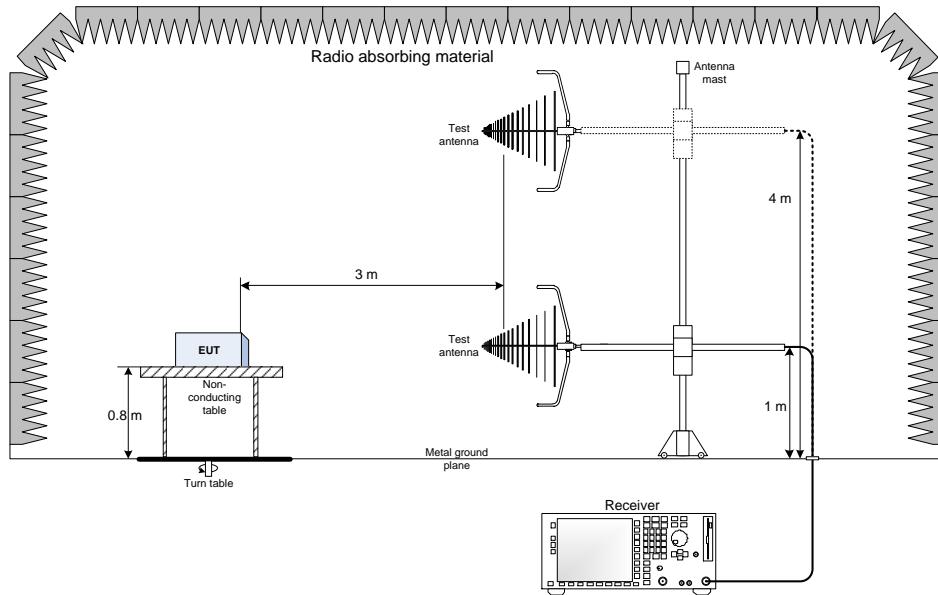
Radiated spurious emissions with antenna in vertical polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz



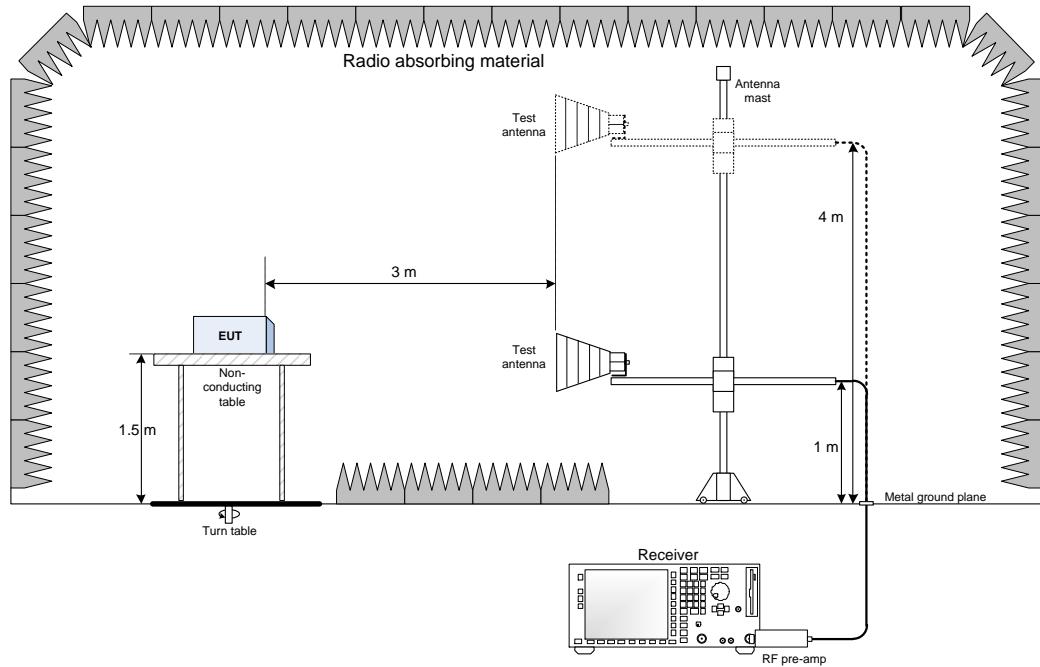
Radiated spurious emissions with antenna in horizontal polarization and with
GSM Tx at 1880 MHz and WIFI Tx at 2437 MHz

Section 9. Block diagrams of test set-ups

9.1 Radiated emissions set-up for frequencies below 1 GHz

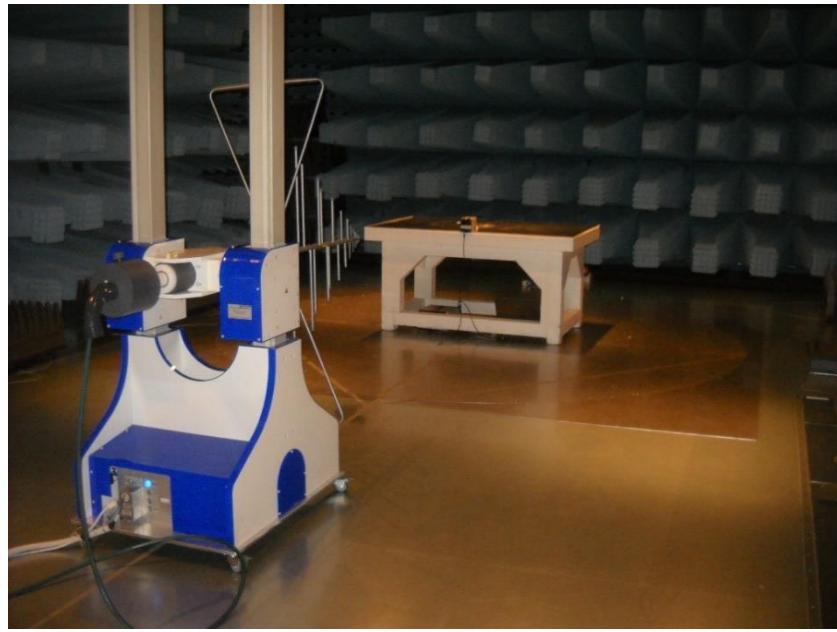


9.2 Radiated emissions set-up for frequencies above 1 GHz



Section 10. Photos

10.1 Photos of the test set-up



Set-up for radiated emission below 1 GHz



Set-up for radiated emission above 1 GHz

10.2 Photos of the EUT



(End of report)