ONE WORLD o OUR APPROVAL

Wireless test report – 397261-3TRFWL

Applicant:

Eurotech SpA

Product name:

Dynagate 10-06

Model:

Dygate-10-06-35

Model variant:

Dygate-10-06-34

FCC ID:

UKMMRG1012

IC Registration number:

21442-MRG1012

Specifications:

- FCC 47 CFR Part 15 Subpart C, §15.209
  Radiated emission limits; general requirements.
- RSS-GEN, Issue 5, Mar 2019, Amendment 1, section 8.9
  Transmitter Emission Limits

Date of issue: May 12, 2020

Tested by (name, function and signature)	P. Barbieri	(project handler)	Signature:
Reviewed by (name, function and signature)	D. Guarnone	(verifier)	Signature:

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: 682159; IC: 9109A (10 m semi anechoic chamber)

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 ISO/IEC 17025 accreditation.

Copyright notification

Table of contents

Section 1. Report summary

1.1 Applicant and manufacturer

Company name	Eurotech SpA
Address	Via Fratelli Solari 3/a – 33020 Amaro (UD) – Italy

1.2 Test specifications

FCC 47 CFR Part 15 Subpart C, §15.209	Radiated emission limits; general requirements.
RSS-GEN, Issue 5, section 8.9	Transmitter Emission Limits for Licence-Exempt Radio Apparatus

1.3 Test methods

ANSI C63.10 v2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

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
397261-3TRFWL	June 18, 2020	Original report issued

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

Part	Test description	Verdict
§15.209	Radiated emission limits; general requirements.	Pass

2.2 RSS-GEN, Issue 5, Amendment 1, section 8.9, test results

Part	Test description	Verdict
8.9	Transmitter Emission Limits for Licence-Exempt Radio Apparatus	Pass

Section 3. Equipment under test (EUT) details

3.1 Sample information

Receipt date	March 25, 2020
Nemko sample ID number	393383-1/1

3.2 EUT information

Product name	Dygate-10-06-35
Model	Dygate-10-06-35
Model variant	Dygate-10-06-34
Serial number	H120CRA0003, H120CRA0005

3.3 Technical information

RSS number and Issue number	RSS-GEN, Issue 5, Mar 2019, Amendment 1, section 8.9
Frequency band	WIFI/ BT/BLE: 2412.0-2462.0 MHz band WIFI: 5150-5250 / 5250-5350 / 5470-5725 / 5725-5850 MHz bands LTE North America Bands
Type of modulation	GFSK, 802.11a/n, OFDM
Emission classification (F1D, G1D, D1D)	18M2W7D, 17M9W7D
Transmitter spurious, Units @ distance	43.4 dBµV/m @ 3 m (@ 138.600 MHz)
EUT power requirements	24 $V_{DC,}$ via 120 V_{AC} adapter or battery
Antenna information	The EUT uses a unique antenna coupling.

3.4 EUT setup diagram

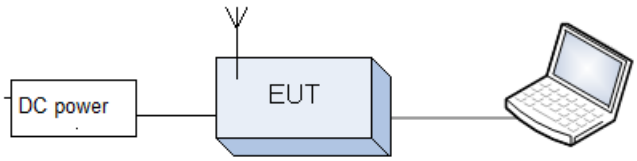


Figure 3.4-1: *Setup diagram*

3.5 Product description and theory of operation

The ReliaGATE and DynaGATE 10-12 are loT Edge Gateways that have been designed to deliver LTE connectivity (with 3G fallback) to industrial and lightly rugged applications. Based on the TI AM335x Cortex-A8 (Sitara) processor family, with 1 GB of RAM, 4 GB of eMMC and user-accessible MicroSD and dual Micro-SIM slots, the ReliaGATE and DynaGATE 10-12 are low power gateways suitable for demanding use cases. They support a 6 to 36 V power supply with transient protection and ignition sense, two protected RS-232/RS-485 serial ports, two CAN bus interfaces, three noise and surge protected USB ports, and four isolated digital interfaces

3.6 EUT sub assemblies

Table 3.6-1: *EUT sub assemblies*

Description	Brand name	Model/Part number	Serial number

3.7 EUT exercise details

EUT was set to continuously transmit mode during tests, by test software provided by client.
The EUT runs a Linux operating system which allows for the testing to be performed using engineering test tools and scripts. Communication with the EUT is via a serial console or Ethernet connection which provides a Linux command line interface for execution of the test tools/scripts. These tools/scripts configure the radio modules to enable continuous transmission with the ability to adjust modulation, frequency and output power as required.

WiFi/BT – using a engineering test tool provided by the silicon vendor allowing for full radio control.
Cellular – using Linux scripts running AT command sequences provided by the cellular radio module vendor allowing for full radio control.

Linux operating system version: 4.9.57-eurotech-ti.

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

The EUT has WIFI and Bluetooth in 2.4 GHz band, WIFI is chosen to be the representative worst-case due to higher output power.

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:

Temperature	18 – 33 °C
Relative humidity	25 – 70 %
Air pressure	860 – 1060 mbar

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model no.	Asset no.	Cal date	Next cal.
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305	2019-01	2021-01
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703	2019-01	2021-01
Barometer	Castle	GPB 3300	072015	2019-12	2020-12

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 ±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)
		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)

EUT	Type	Test	Range	Measurement Uncertainty	Notes
Receiver	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)
		Sensitivity measurement	1 MHz ÷ 18 GHz	6.0 dB	(1)
	Conducted	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)

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	2020-01	2021-01
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESW44	101620	2019-08	2020-08
Trilog Antenna (30 MHz ÷ 7 GHz)	Schwarzbeck	VULB 9162	9162-025	2018-07	2021-07
Bilog antenna (1 ÷ 18 GHz)	Schwarzbeck	STLP 9148	9148-123	2018-07	2021-07
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck	BBV 9718	9718-137	2019-09	2020-09
Horn antenna (18 ÷ 40 GHz)	A.H. System	SAS-574	558	2020-01	2023-01
Preamplifier (18 ÷ 40 GHz)	Miteq	JS44-18004000-35-8P-R	1.627	2019-09	2020-09
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	2019-09	2021-09
Shielded room	Siemens	10m control room	1947	NCR	NCR
LISN three phase (9 kHz ÷30 MHz)	Rohde & Schwarz	ESH2-Z5	872 460/041	2019-09	2020-09
Shielded room	Siemens	Conducted emission test room	1862	NCR	NCR

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

Section 8. Testing data

8.1 FCC 15.209 and RSS-GEN section 8.9 Radiated emission limits; general requirements

8.1.1 Definitions and limits

FCC:
(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.

ISED:
Except when the requirements applicable to a given device state otherwise, emissions from licence‑exempt transmitters shall comply with the field strength limits shown in Table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

Table 8.1-1: *FCC §15.209 and RSS-Gen – Radiated emission limits*

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	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 8.1-2: *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	Above 38.6
8.41425–8.41475	167.72–173.2	3500–4400	
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 8.1-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 8.1-3: *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			

8.1.2 Test summary

Test start date	May 29, 2020
Test engineer	D. Giuarnone

8.1.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to 40 GHz.
EUT's LTE and WIFI transmitters were set to transmit continuously, different channel setting has been investigated as per provided by client's setup, only the worst-case is presented.
Radiated measurements were performed at a distance of 3 m for frequency rand below 18 GHz, and 1 m for frequency range above 18 GHz. No inter-modulation products emissions were detected above 18 GHz within 6 dB below the limit.

Spectrum analyzer settings for frequencies below 30 MHz:

Detector mode	Quasi-Peak
Resolution bandwidth	9 kHz
Video bandwidth	30 kHz
Trace mode	Max Hold
Measurement time	100 ms

Spectrum analyser settings for radiated measurements within restricted bands 30 MHz to 1 GHz:

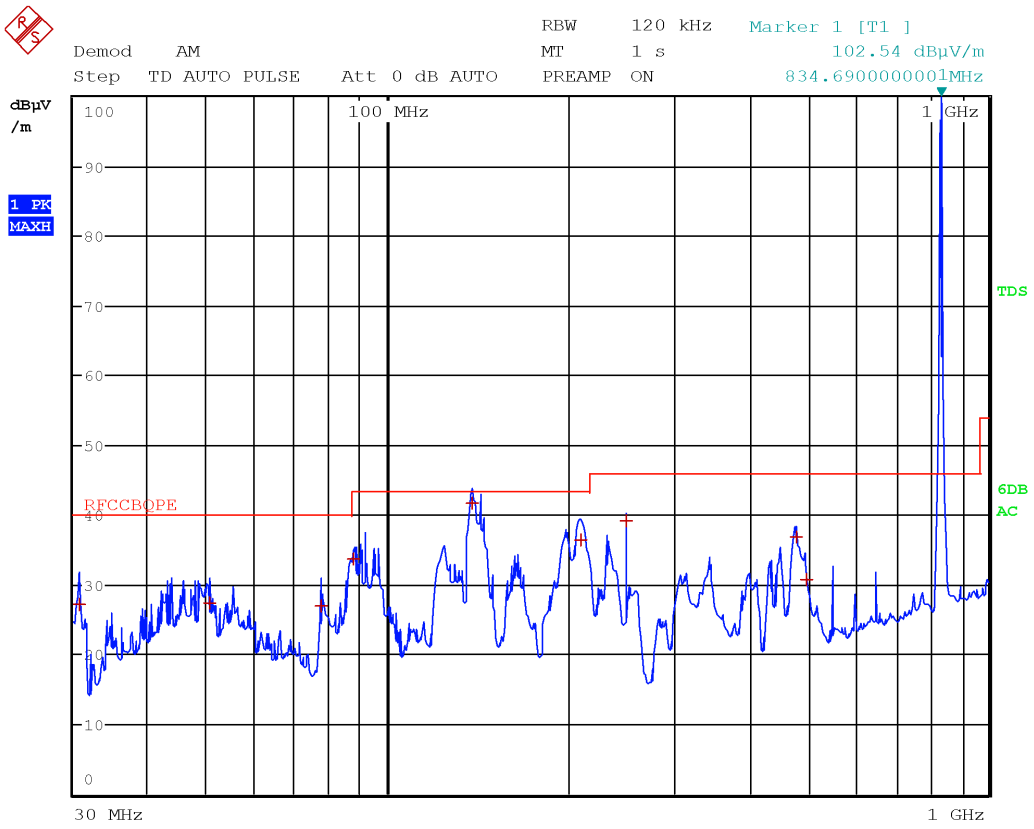
Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak
Trace mode:	Max Hold

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

Resolution bandwidth:	1 MHz
Video bandwidth:	10 Hz
Detector mode:	Peak
Trace mode:	Max Hold

8.1.4 Test data

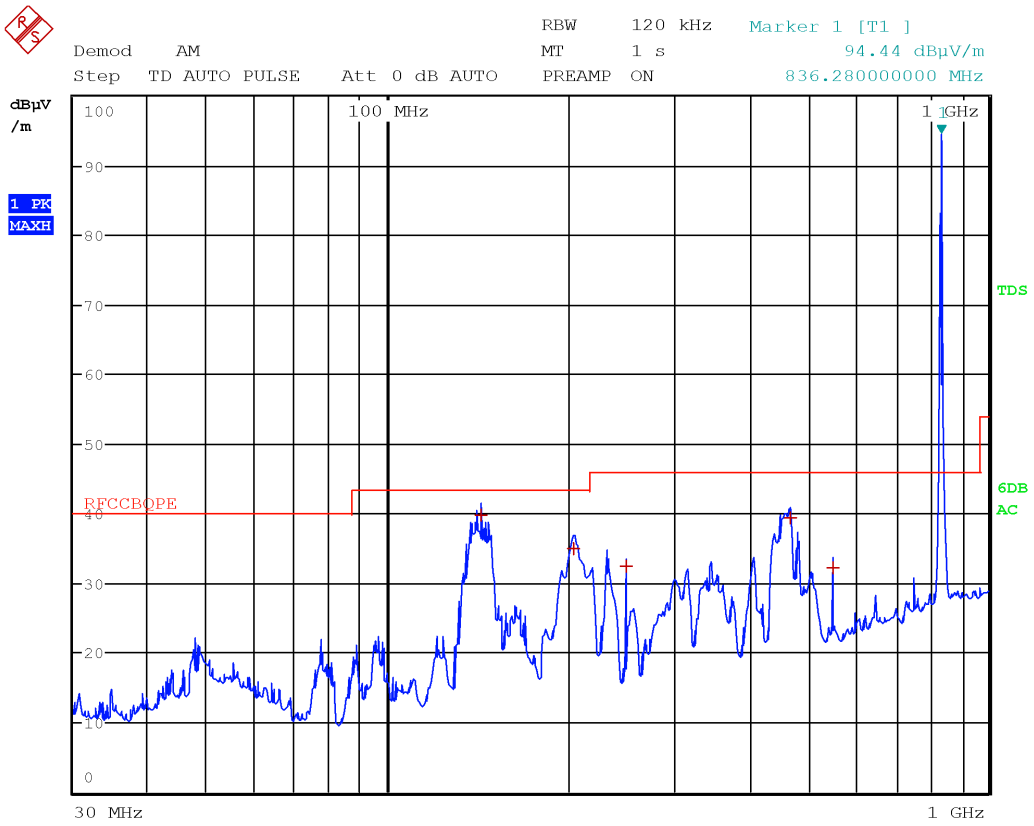
Dygate-10-06-35



Radiated spurious emissions, UMTS Tx at 836MHz, WIFI Tx at 2437 MHz – antenna in vertical polarization

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

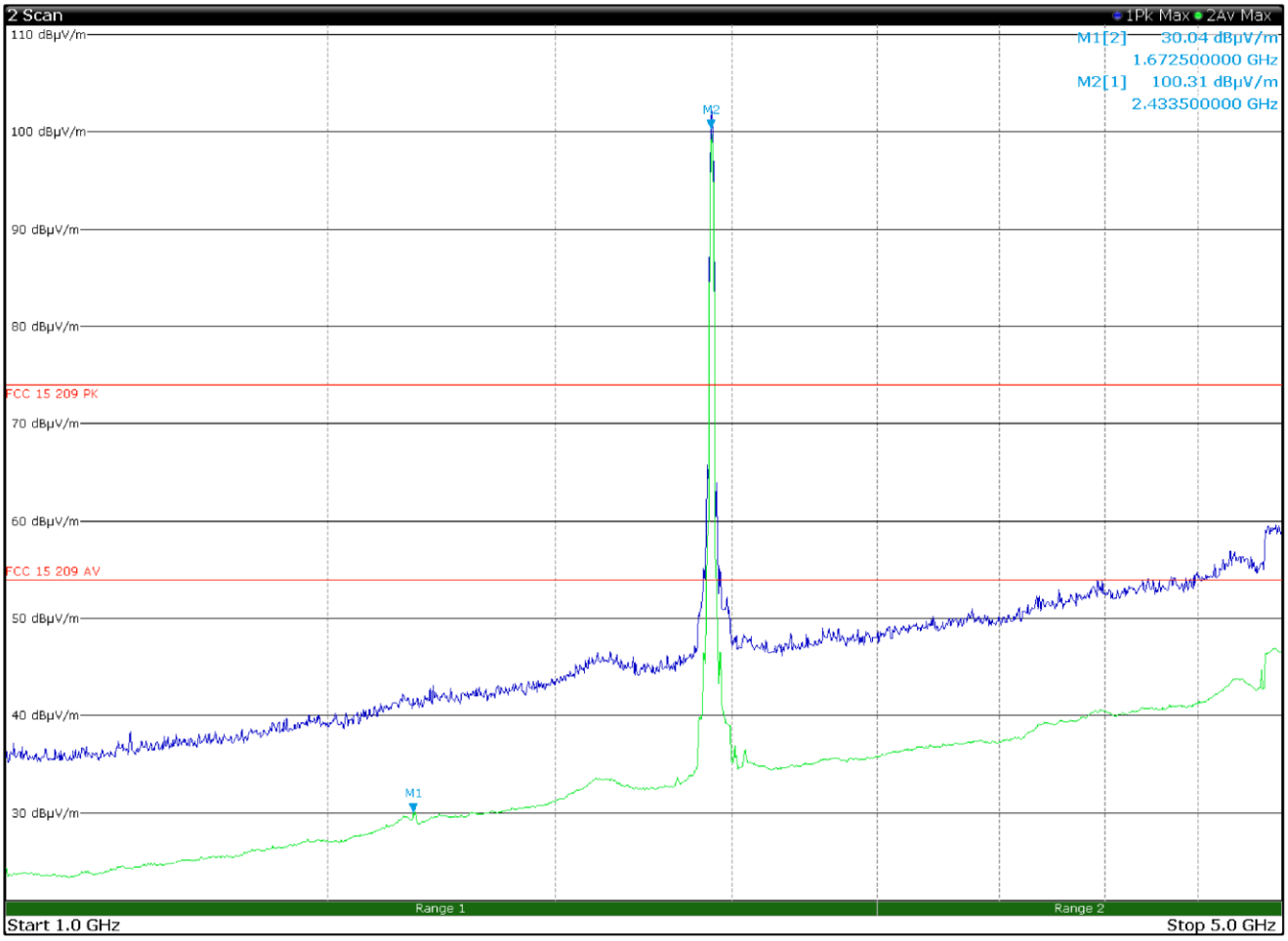
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.6300	27.2	40.0	-12.8	QP
50.4300	27.5	40.0	-12.5	QP
77.5800	27.1	40.0	-12.9	QP
87.6300	33.8	40.0	-6.2	QP
138.6600	41.8	43.5	-1.7	QP
210.1800	36.5	43.5	-7.0	QP
250.0200	39.2	46.0	-6.8	QP
477.9900	36.8	46.0	-9.2	QP
496.9200	30.8	46.0	-15.2	QP



Radiated spurious emissions, UMTS Tx at 836MHz, WIFI Tx at 2437 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
143.2800	39.8	43.5	-3.7	QP
204.3000	35.0	43.5	-8.5	QP
250.0200	32.6	46.0	-13.4	QP
467.4300	39.5	46.0	-6.5	QP
549.9900	32.3	46.0	-13.7	QP



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Radiated spurious emissions, UMTS Tx at 836MHz, WIFI Tx at 2437MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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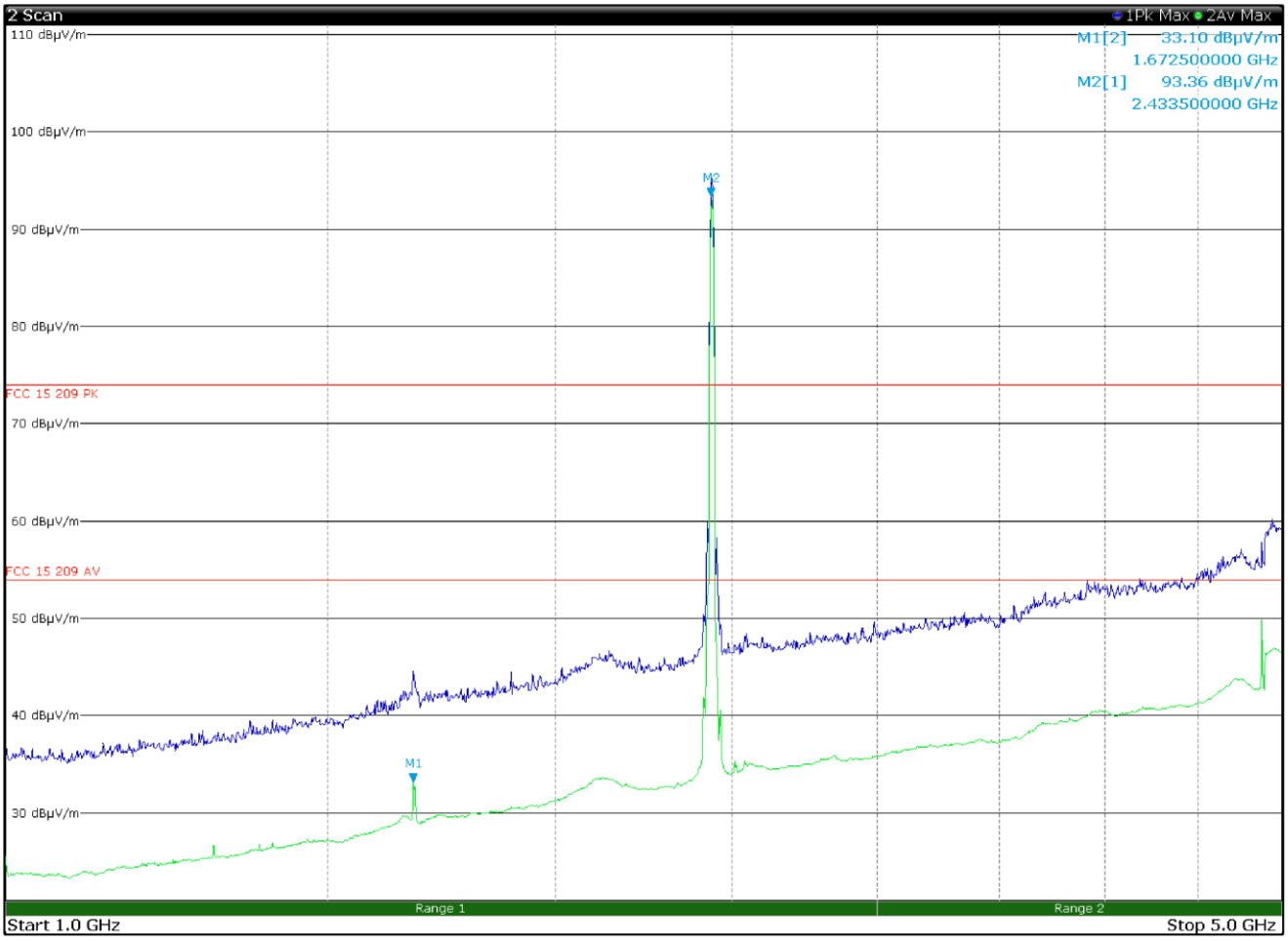
The limit for UMTS is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



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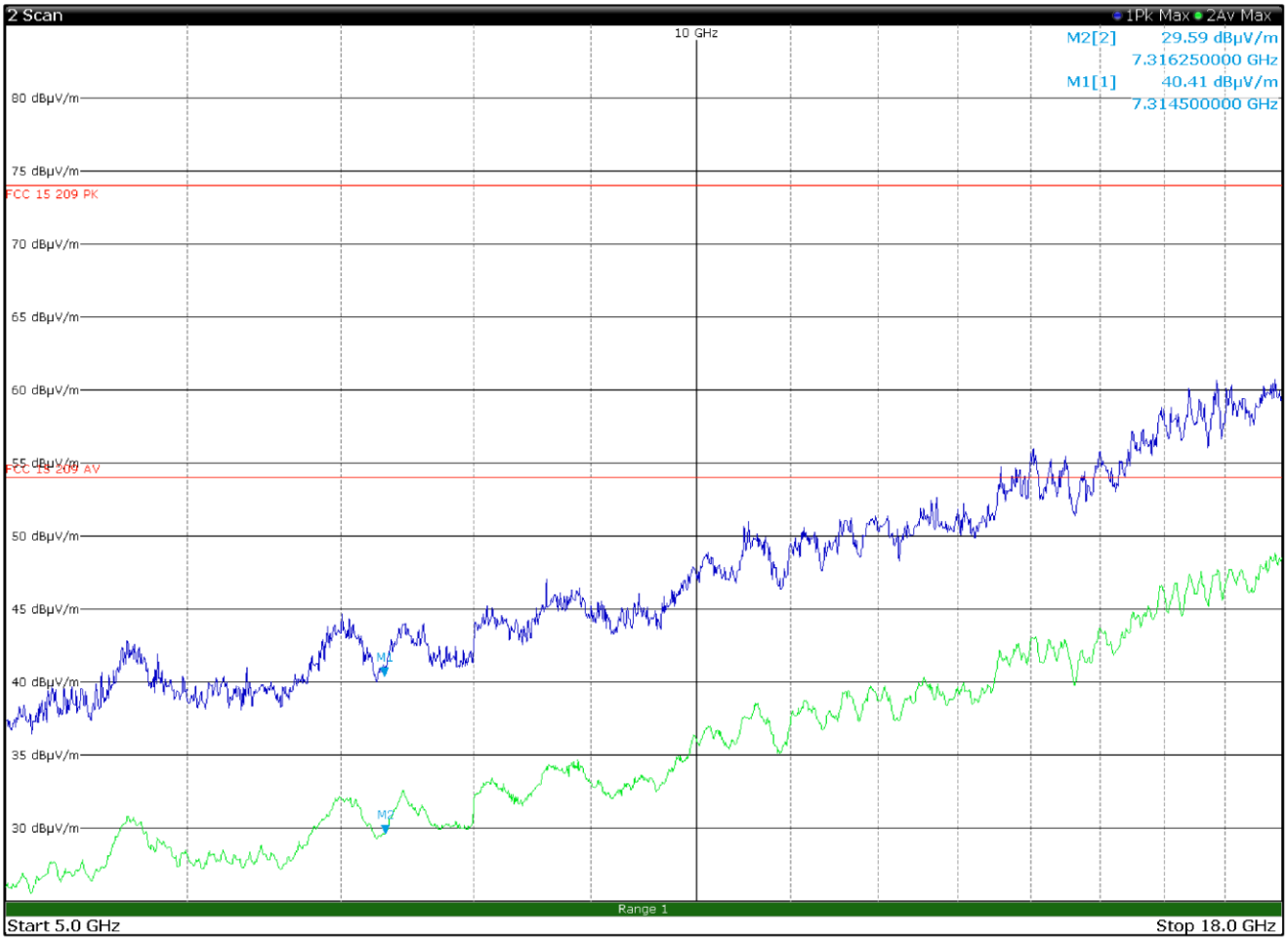
Radiated spurious emissions, UMTS Tx at 836.6 MHz, WIFI Tx at 2437 MHz – antenna in vertical polarization –

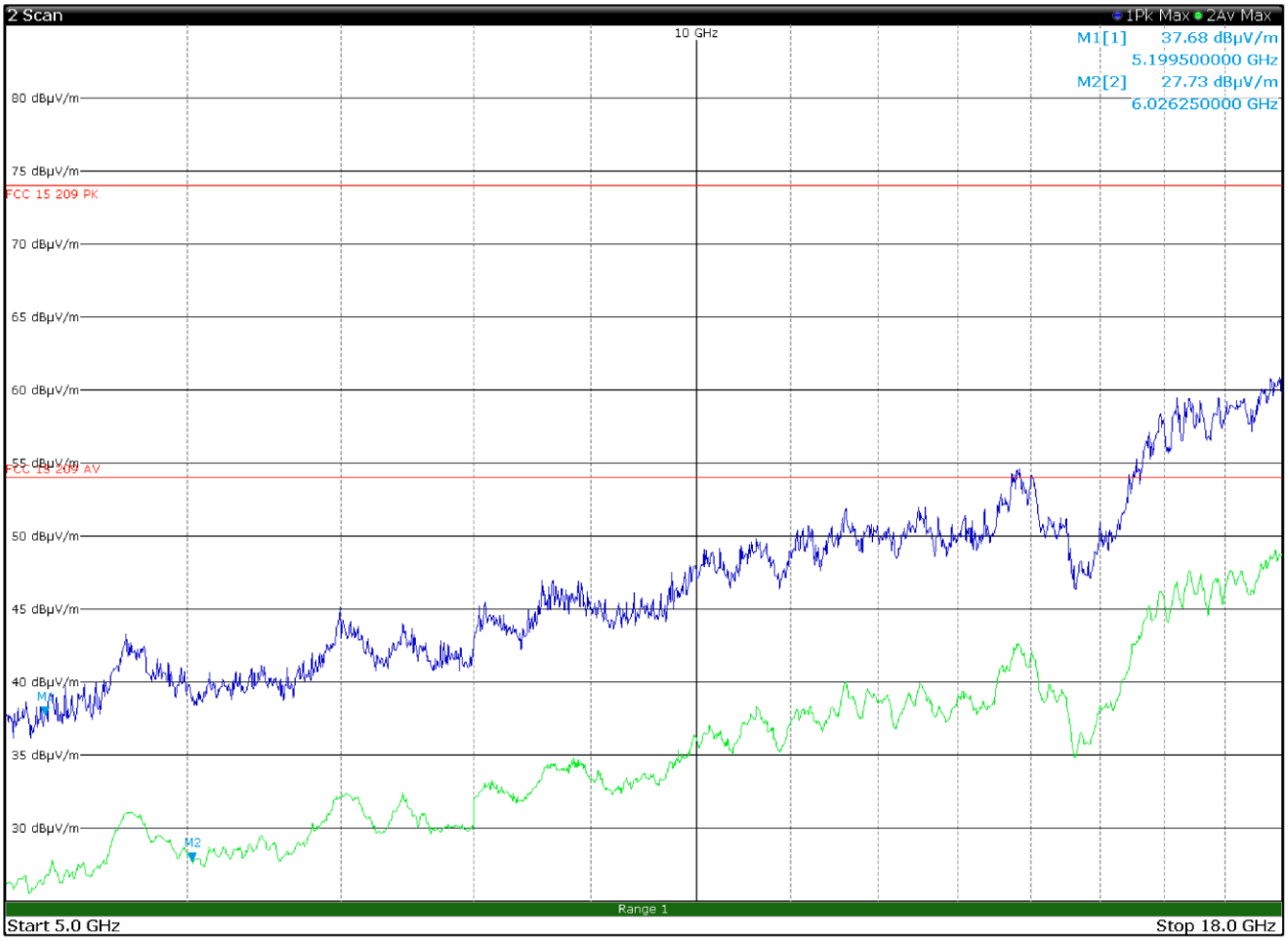
Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
--	--	--	--	--

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

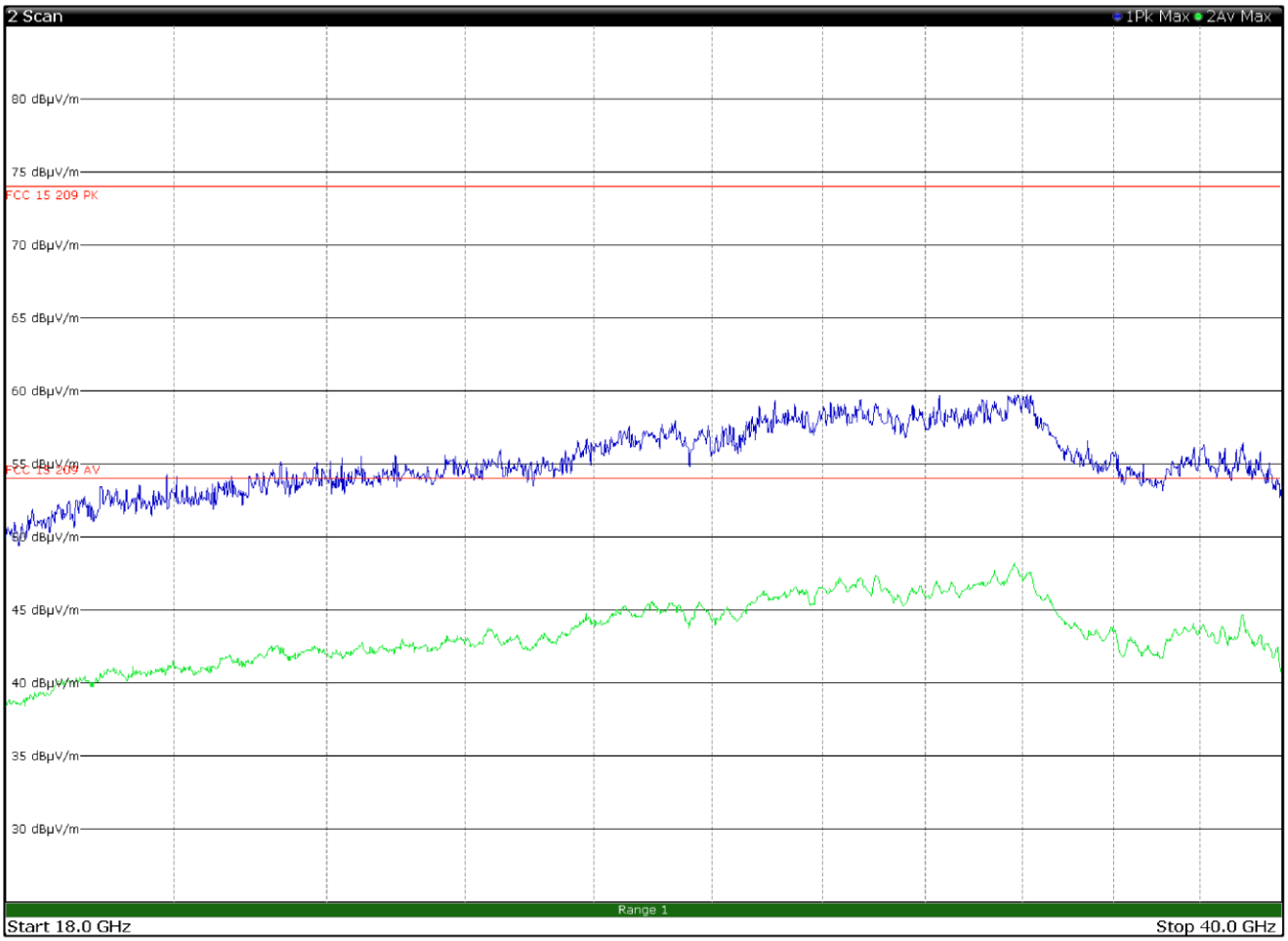


: Radiated spurious emissions, UMTS Tx at 836.6 MHz WIFI Tx at 2437 MHz – antenna in horizontal polarization –

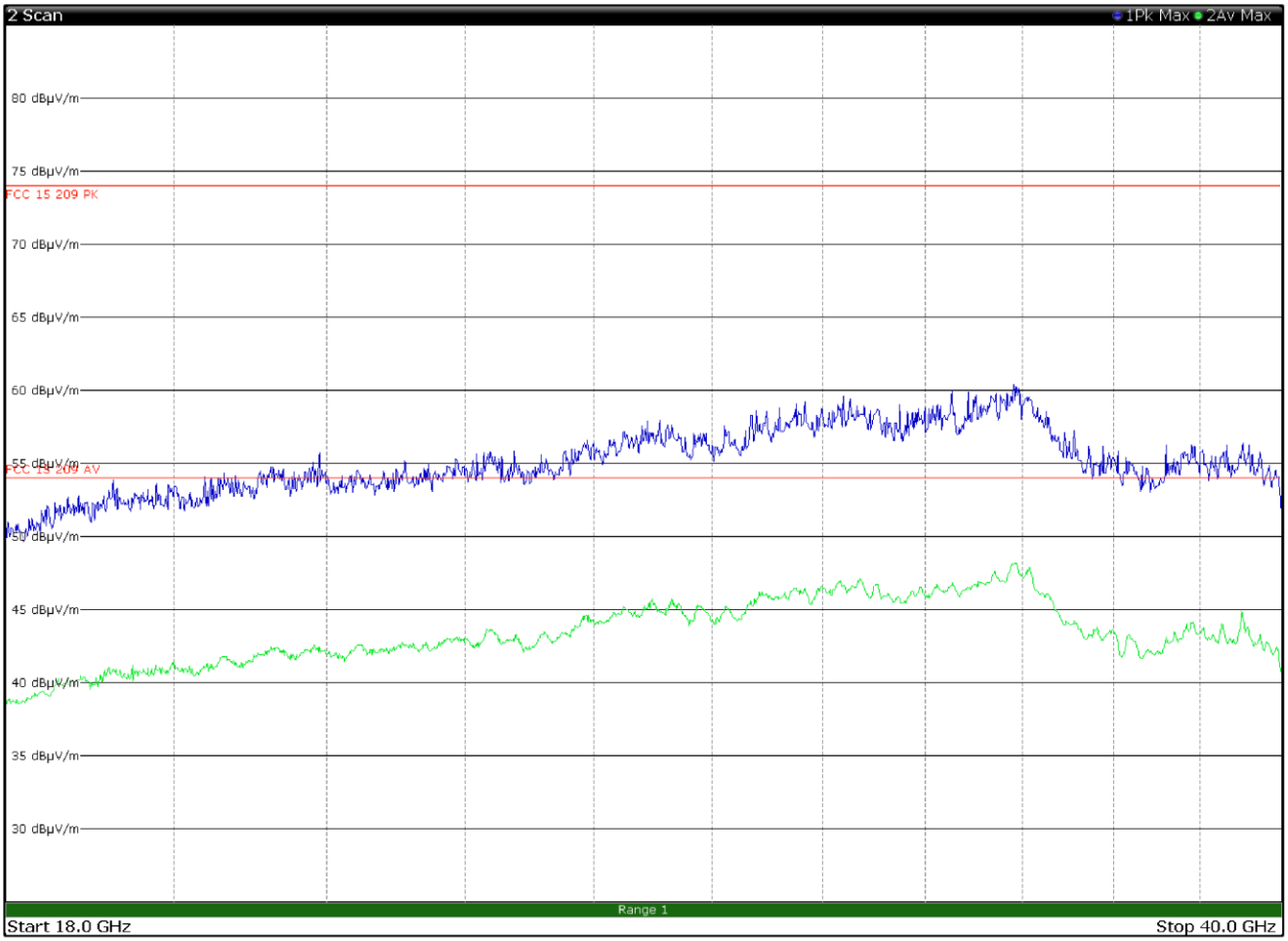


***:** Radiated spurious emissions, UMTS Tx at 836.6 MHz WIFI Tx at 2412 MHz WIFI Tx at 2437 MHz – antenna in vertical polarization –*

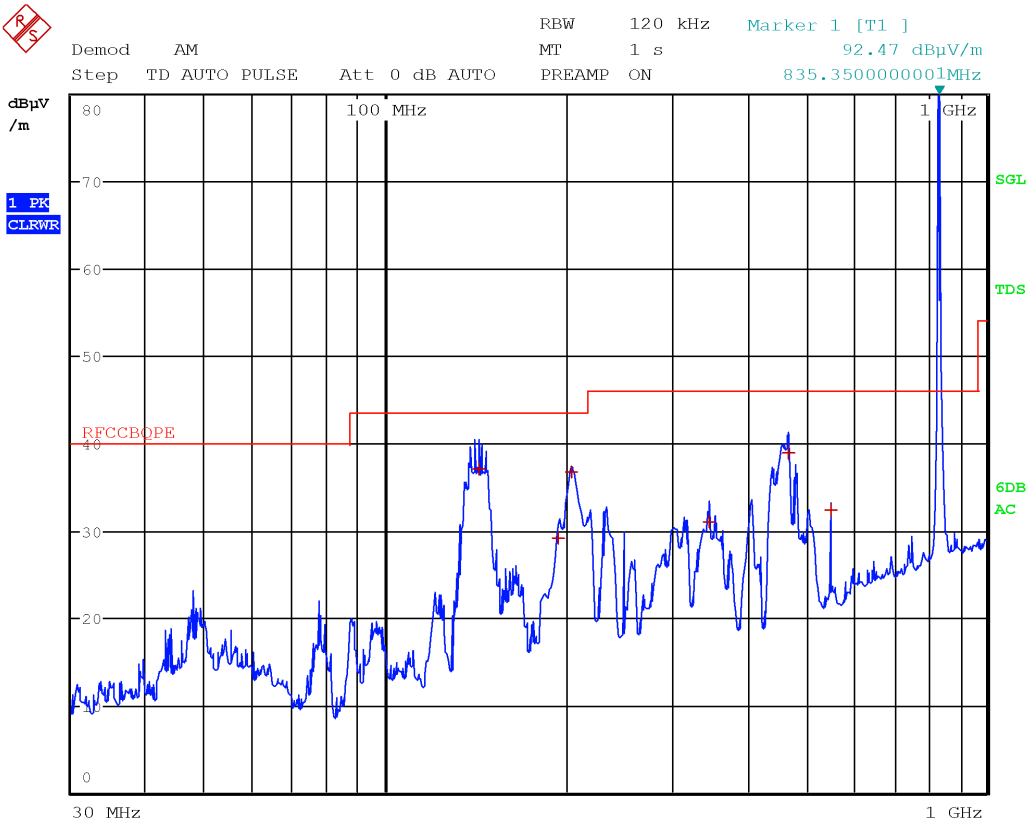
Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
--	--	--	--	--



Radiated spurious emissions, LTE Tx at 782 MHz, WIFI Tx at 2437 MHz – antenna in horizontal polarization – EUT in configuration 1



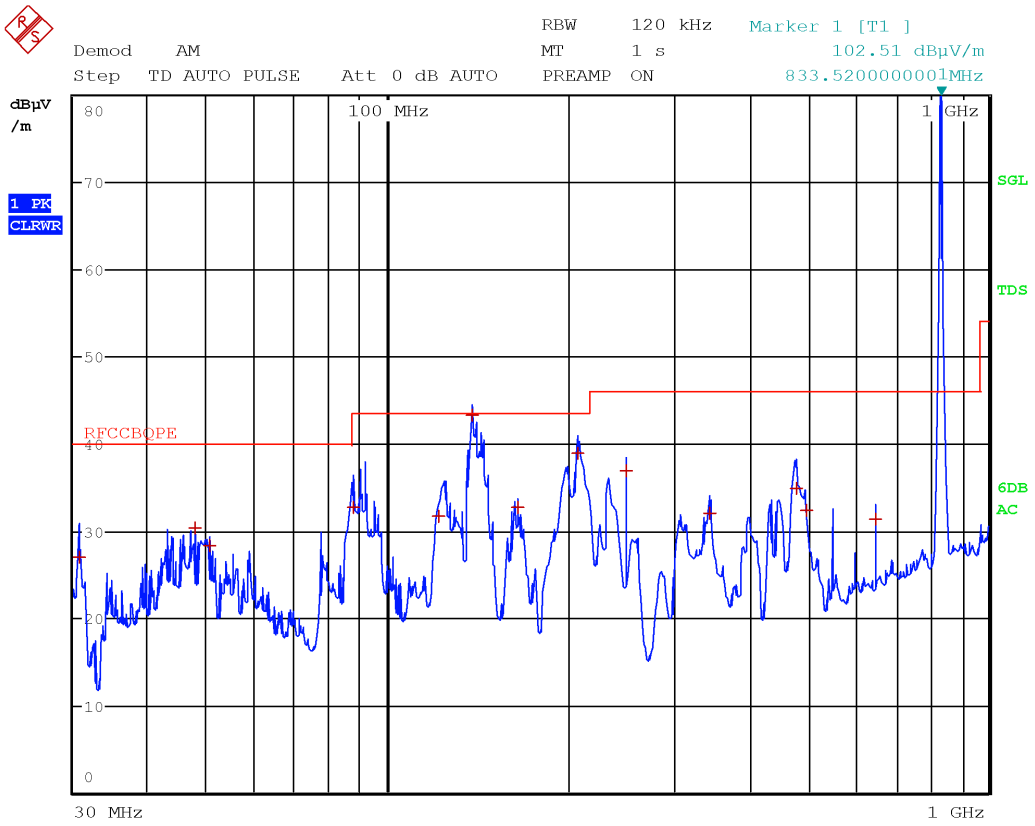
Radiated spurious emissions, LTE Tx at 782 MHz, WIFI Tx at 2437MHz – antenna in vertical polarization



Radiated spurious emissions, UMTS Tx at 836.6 MHz, WIFI Tx at 5220 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

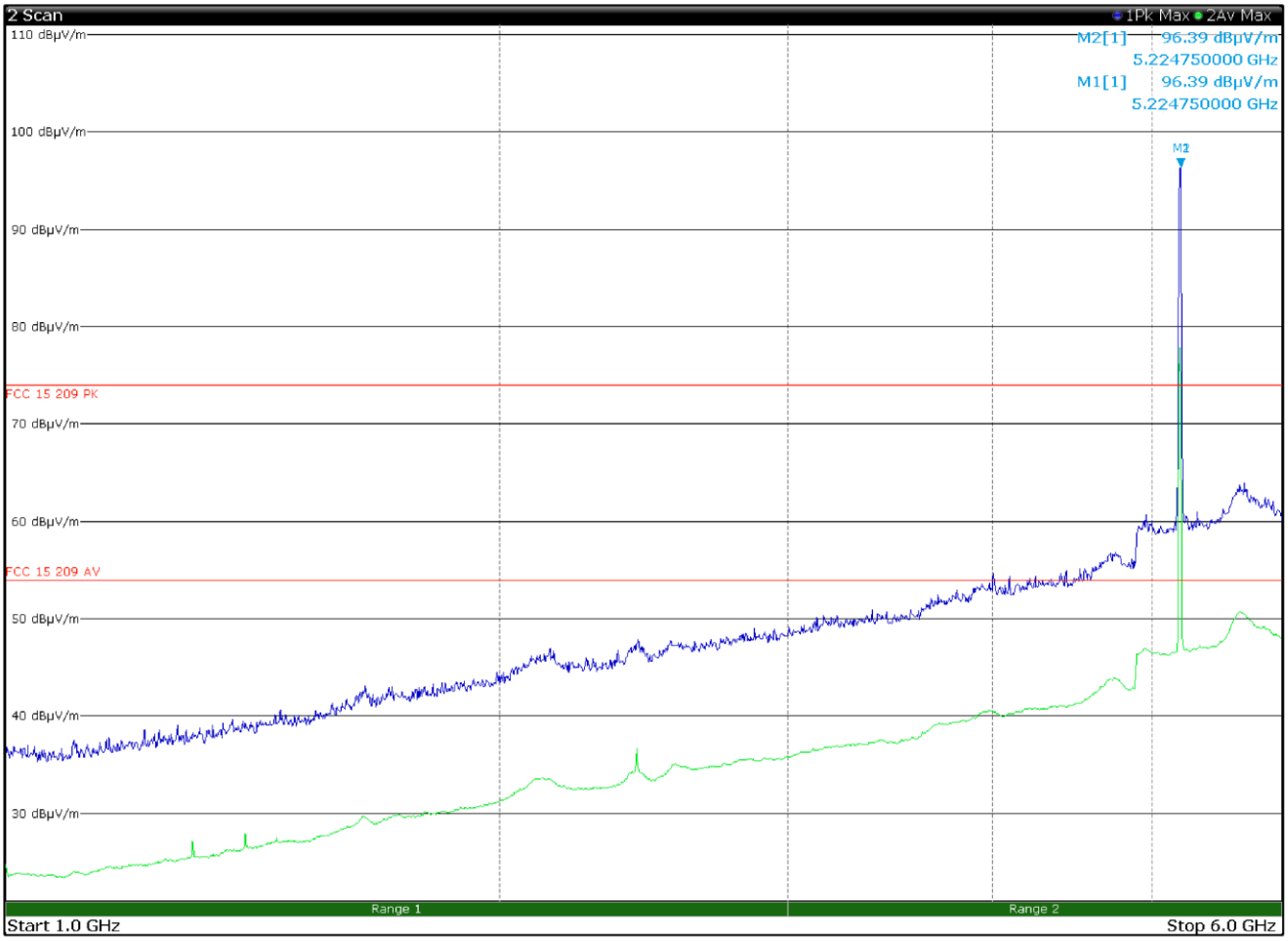
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
143.2500	37.1	43.5	-6.4	QP
193.7400	29.3	43.5	-14.2	QP
204.3600	36.7	43.5	-6.8	QP
345.1500	31.1	46.0	-14.9	QP
467.2800	39.0	46.0	-7.0	QP
550.0200	32.3	46.0	-13.7	QP



Radiated spurious emissions, UMTS Tx at 836.6 MHz,WIFI Tx at 5220 MHz – antenna in vertical polarization – EUT

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.6300	27.0	40.0	-13.0	QP
47.8200	30.3	40.0	-9.7	QP
50.4600	28.4	40.0	-11.6	QP
87.4800	32.7	40.0	-7.3	QP
121.8600	31.7	43.5	-11.8	QP
138.5700	43.3	43.5	-0.2	QP
164.4000	32.7	43.5	-10.8	QP
207.8400	39.0	43.5	-4.5	QP
250.0200	37.0	46.0	-9.0	QP
344.0700	32.1	46.0	-13.9	QP
477.7800	34.9	46.0	-11.1	QP
496.7700	32.3	46.0	-13.7	QP
650.0100	31.3	46.0	-14.7	QP



: Radiated spurious emissions, UMTS Tx at 836.6 MHz,WIFI Tx at 5220 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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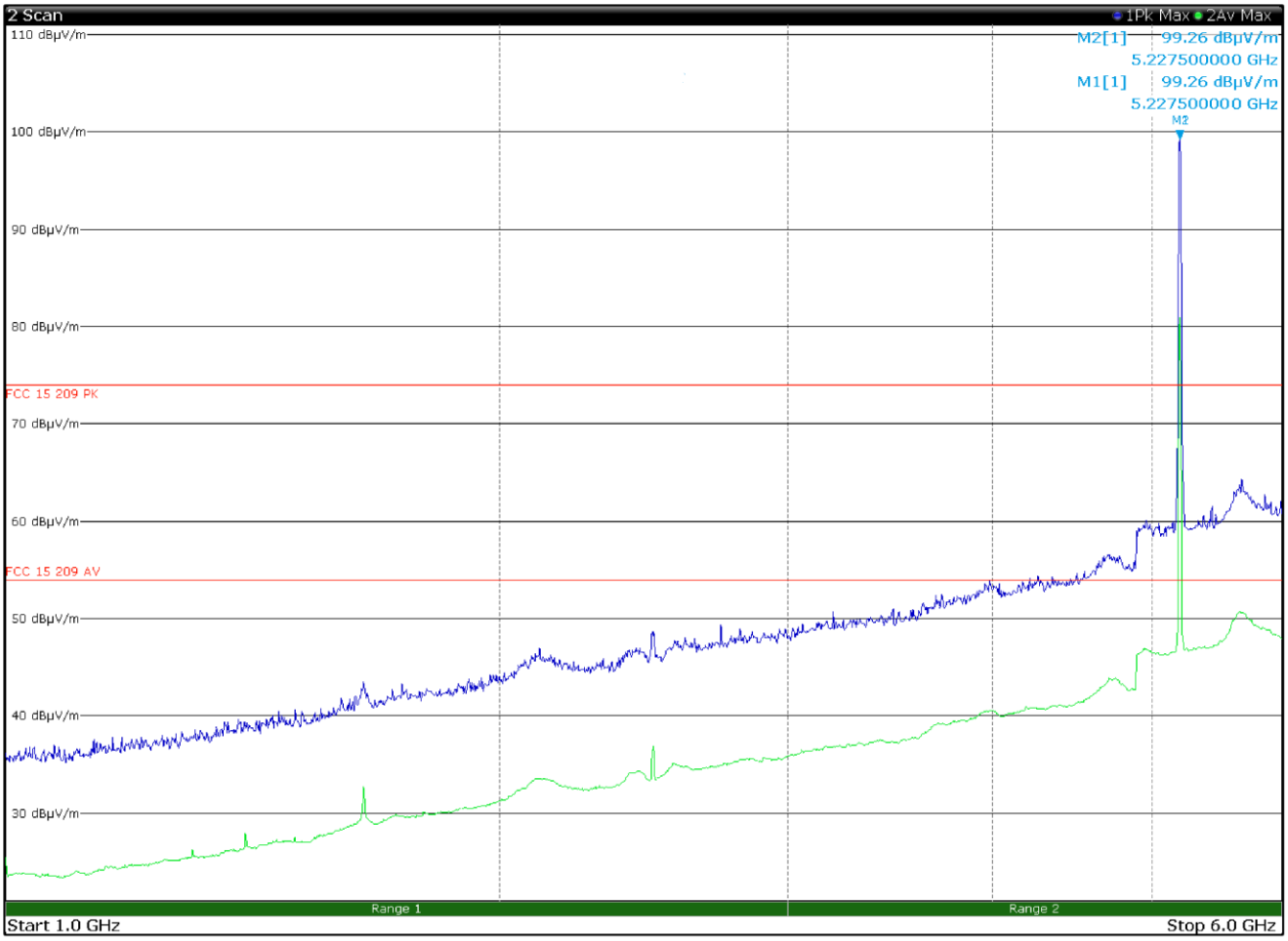
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, UMTS Tx at 836.6 MHz,WIFI WIFI Tx at 5220 MHz – antenna in vertical polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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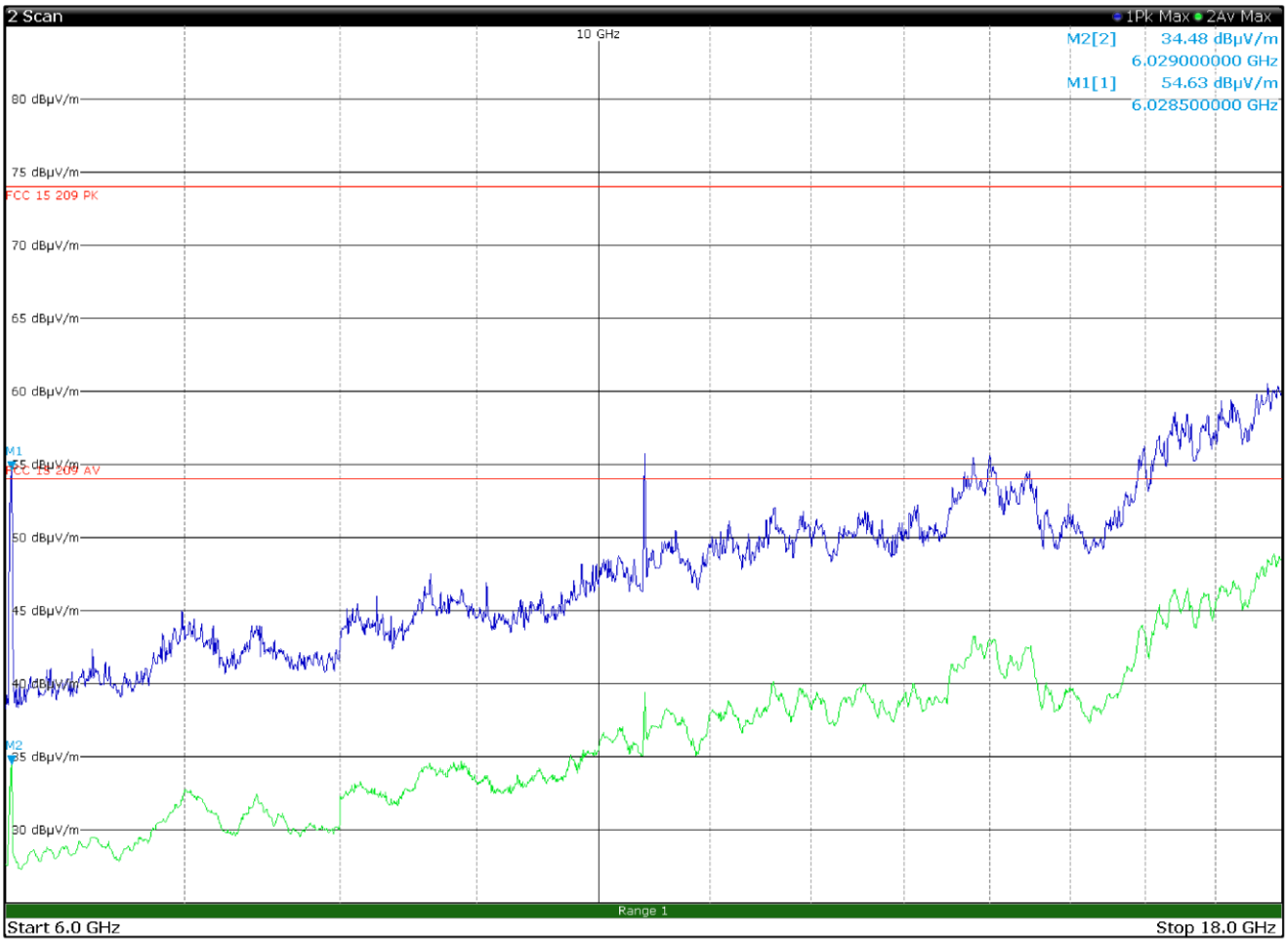
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, UMTS Tx at 836.6 MHz,WIFI WIFI Tx at 5220 MHz – antenna in horizontal polarization –

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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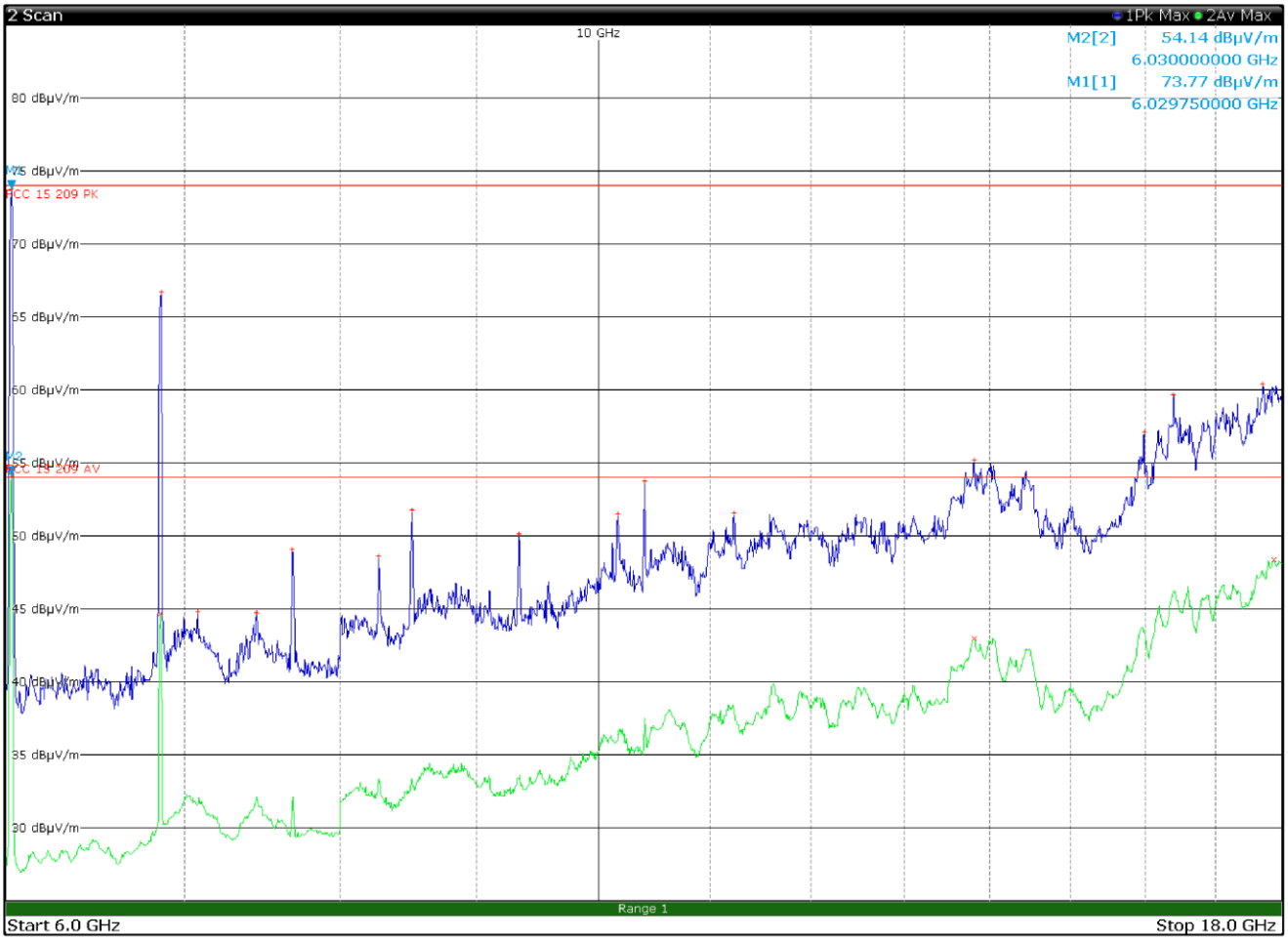
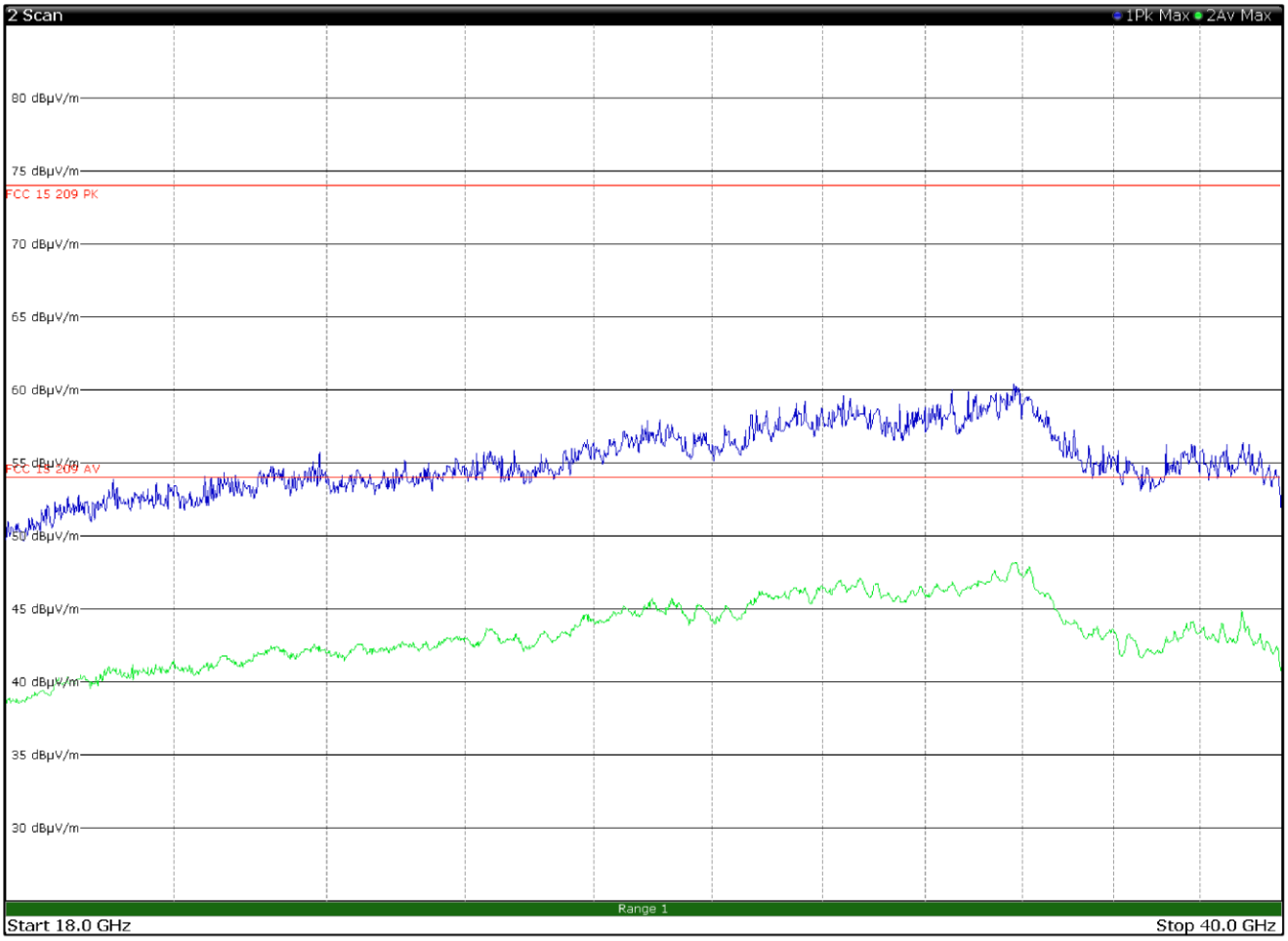


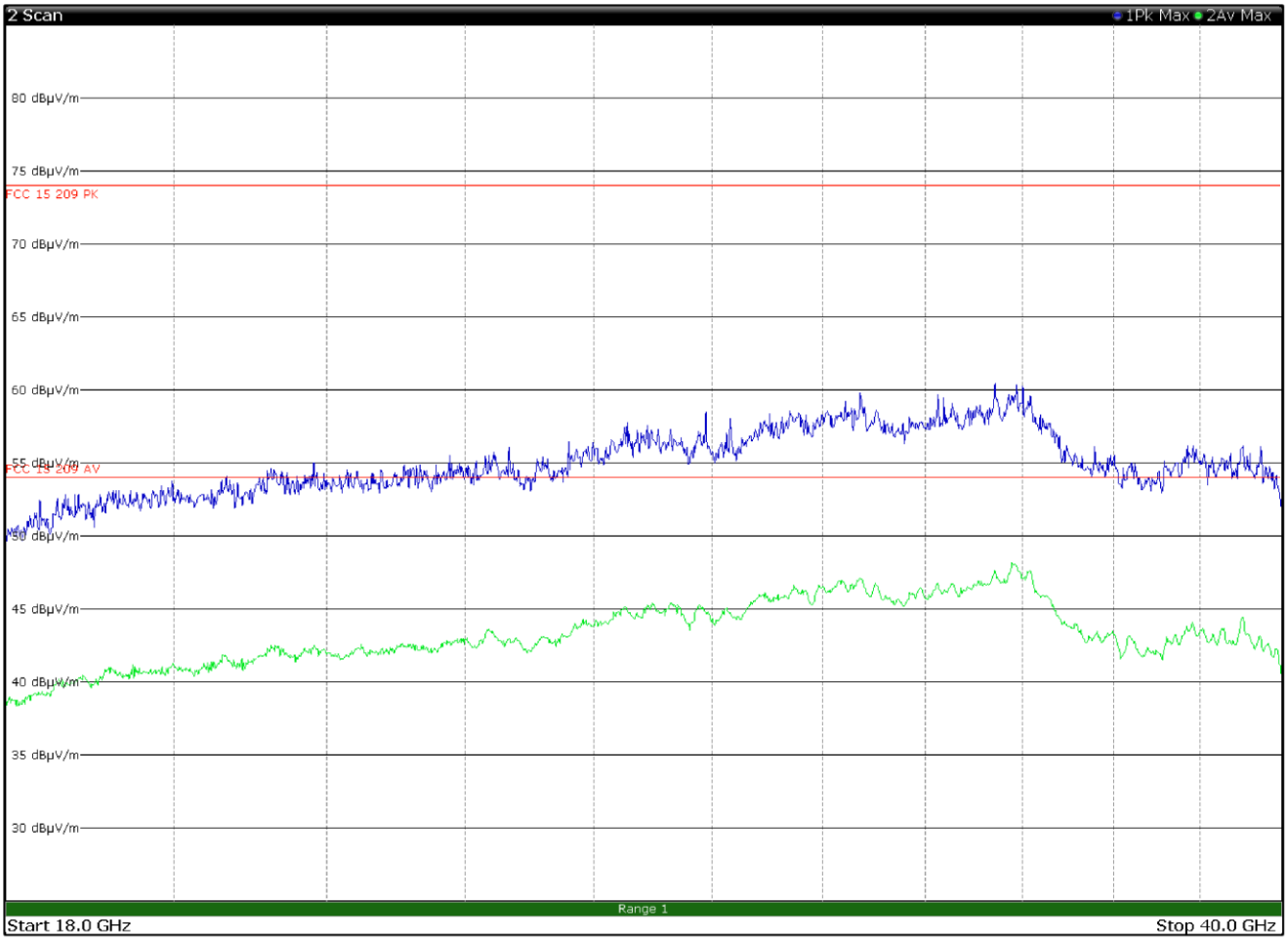
Radiated spurious emissions, UMTS Tx at 836.6 MHz,WIFI WIFI Tx at 5220 MHz – antenna in vertical polarization

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
6.03000	73.7	82.2	-8.5	PK

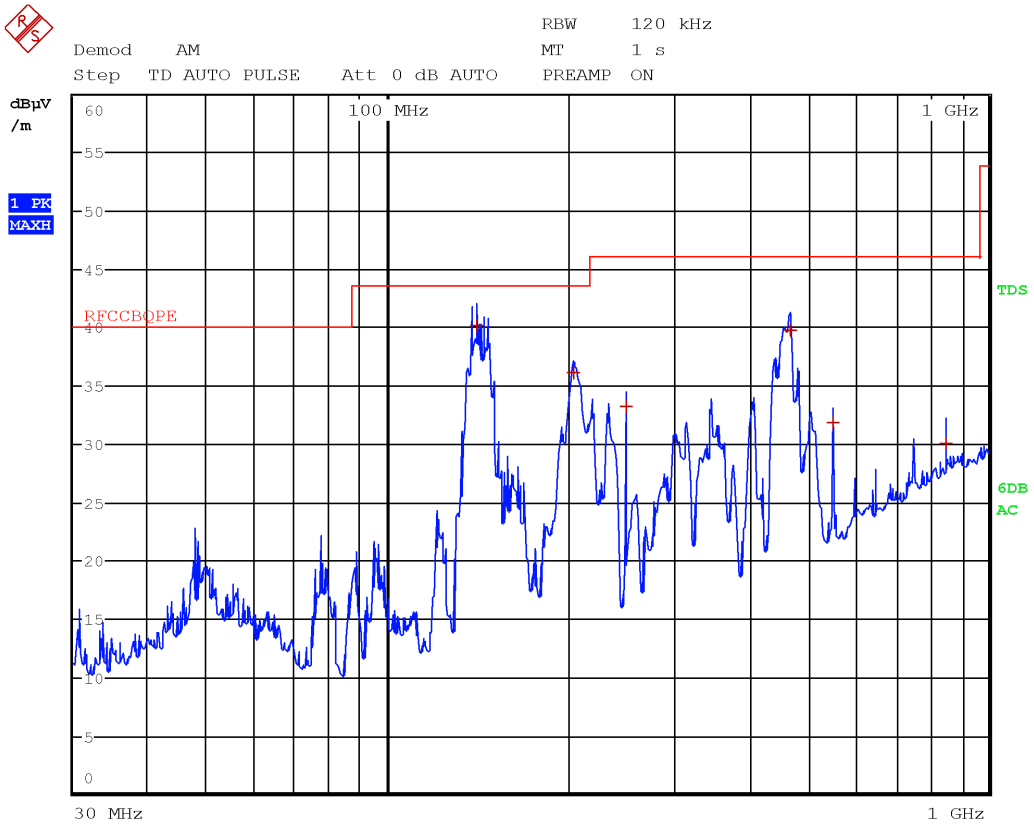
The limit for UMTS is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, UMTS 836.6 MHz, WIFI Tx at 5220 MHz – antenna in horizontal polarization –

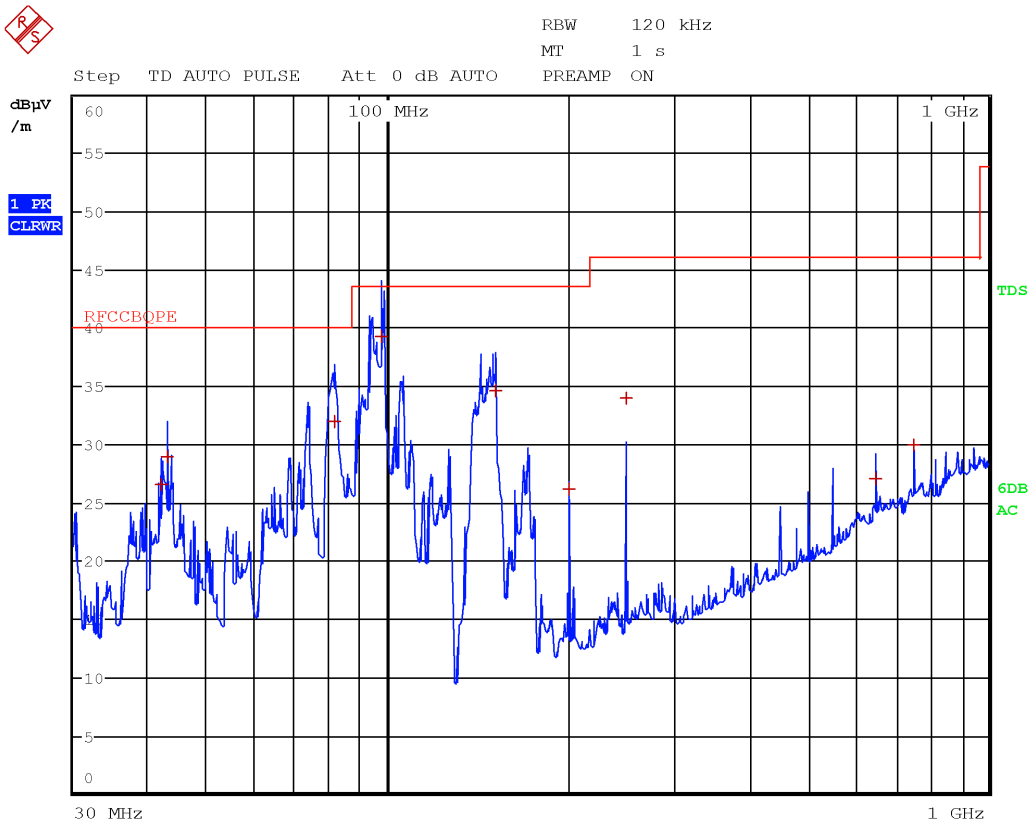


Radiated spurious emissions, UMTS 836.6 MHz, WIFI Tx at 5220 MHzz – antenna in vertical polarization



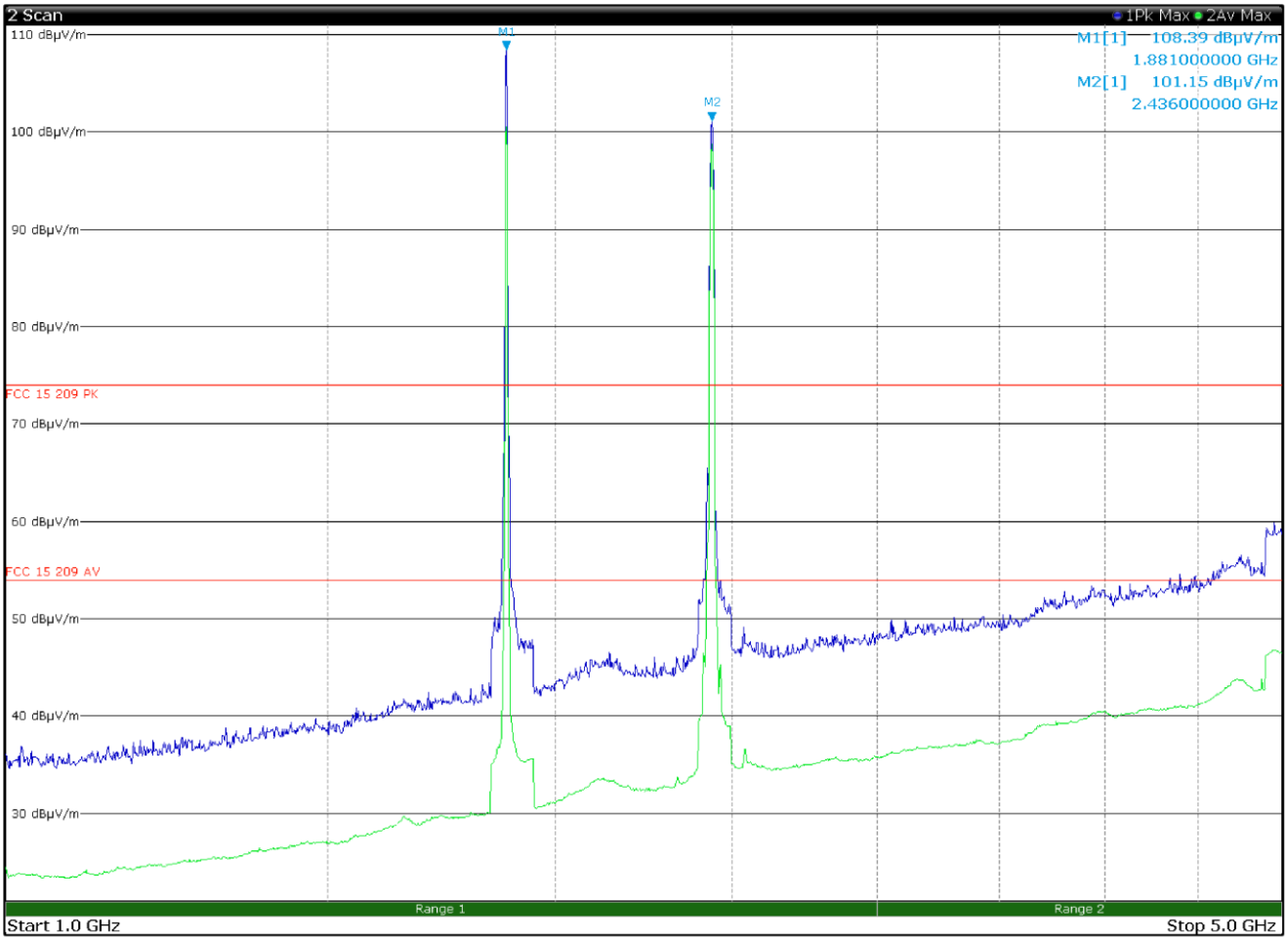
Radiated spurious emissions,UMTS Tx at 1880MHz, WIFI Tx at 2437MHz – antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
140.9100	40.1	43.5	-3.4	QP
204.3900	36.1	43.5	-7.4	QP
250.0200	33.2	46.0	-12.8	QP
467.4300	39.8	46.0	-6.2	QP
550.0200	31.8	46.0	-14.2	QP
850.0200	30.1	46.0	-15.9	QP



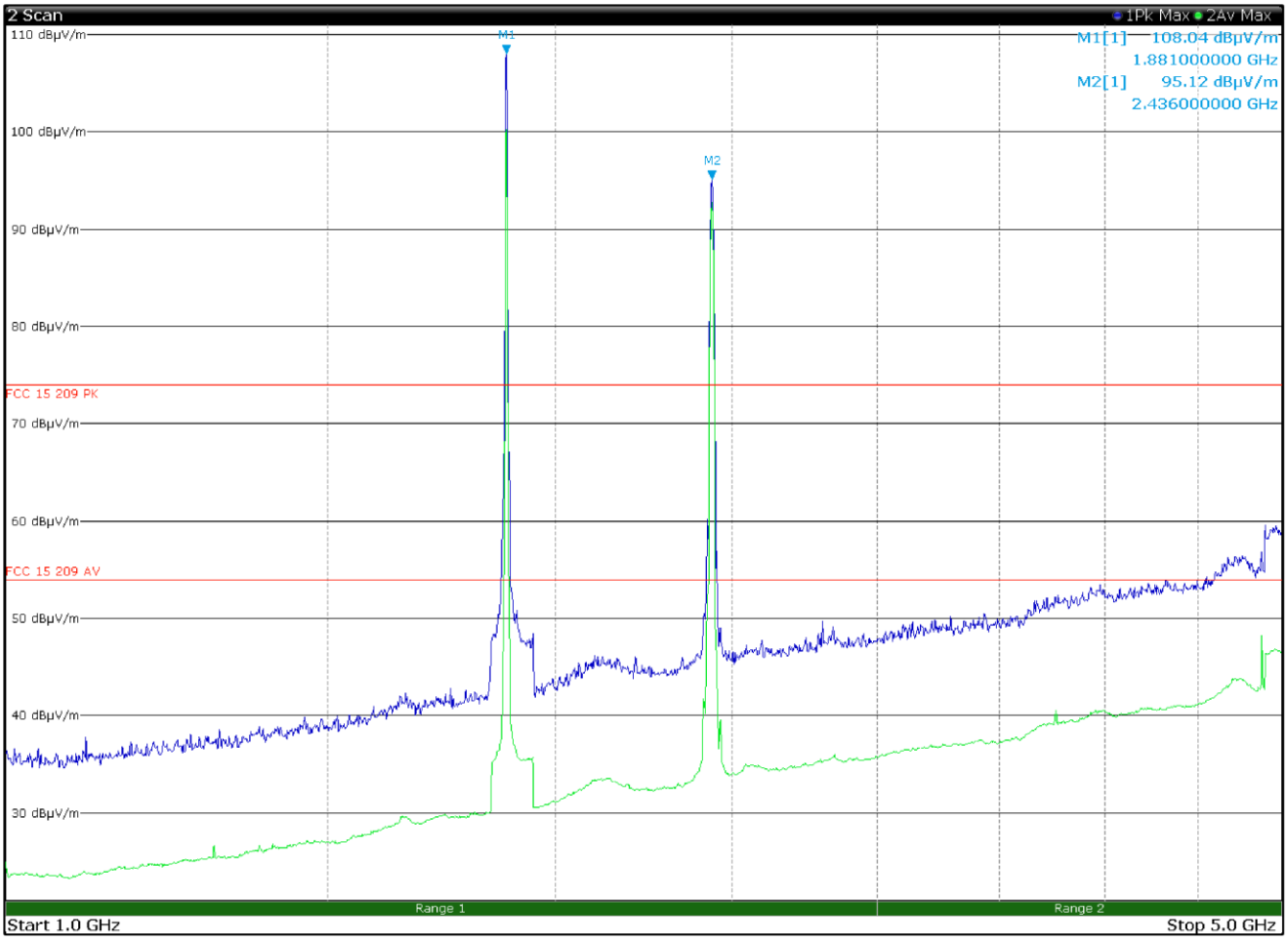
Radiated spurious emissions,UMTS Tx at 1880MHz, WIFI Tx at 2437 MHz – antenna in vetiical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
42.0900	26.5	40.0	-13.5	QP
42.9600	29.0	40.0	-11.0	QP
81.3600	32.0	40.0	-8.0	QP
97.8300	39.3	43.5	-4.2	QP
151.5000	34.6	43.5	-8.9	QP
200.0100	26.1	43.5	-17.4	QP
250.0200	34.0	46.0	-12.0	QP
650.0100	27.1	46.0	-18.9	QP
750.0000	29.9	46.0	-16.1	QP



: Radiated spurious emissions,UMTS Tx at 1880MHz, WIFI Tx at 2437 MHz – antenna in horizontal polarization –

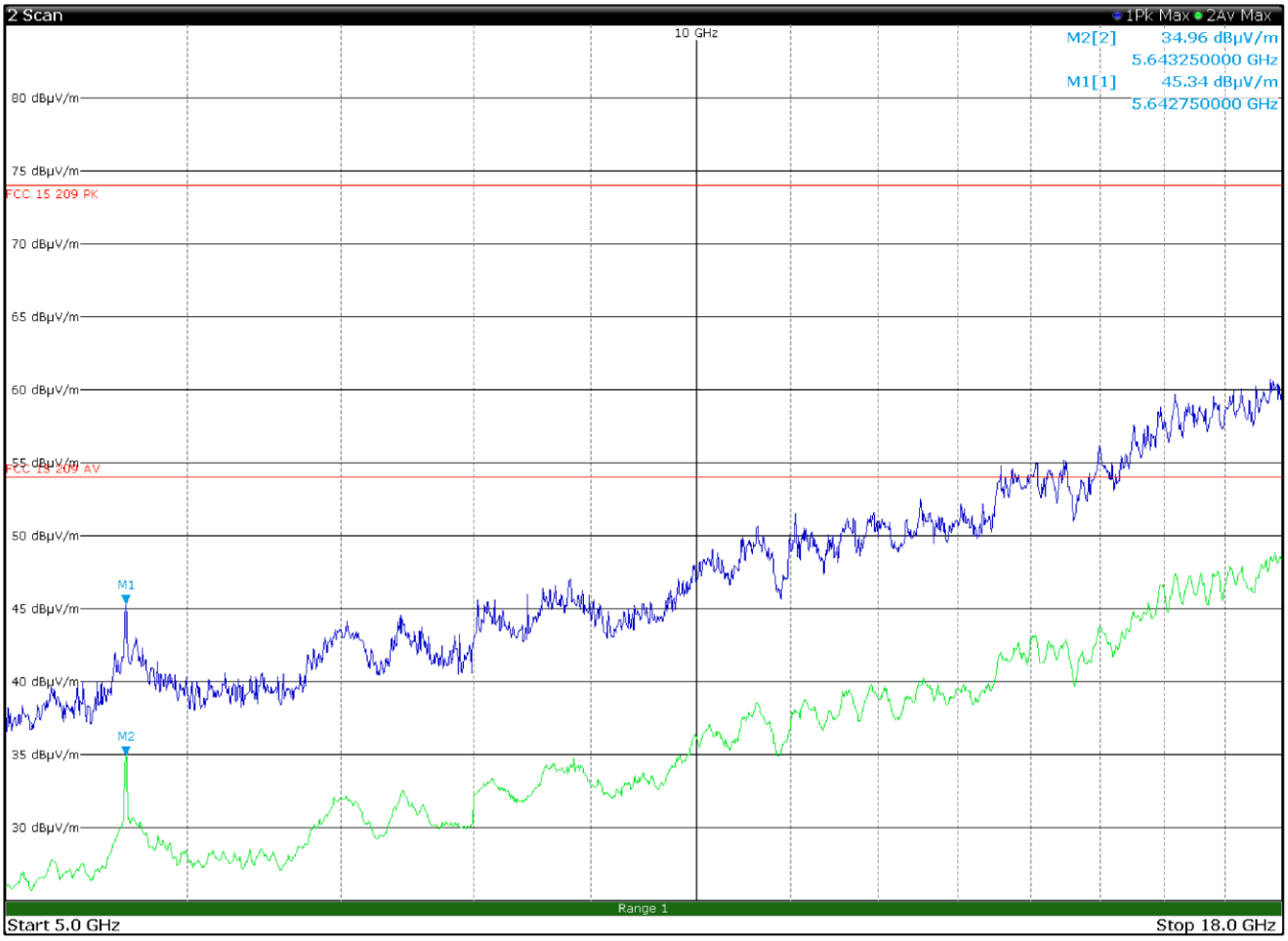
Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected



15:19:11 01.06.2020 **Page 1/1**

***:** Radiated spurious emissions, UMTS Tx at 1880 MHz, WIFI Tx at 2437MHz – antenna in vertical polarization –*

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected



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Radiated spurious emissions,UMTS Tx at 1880 MHz, WIFI Tx at 2437 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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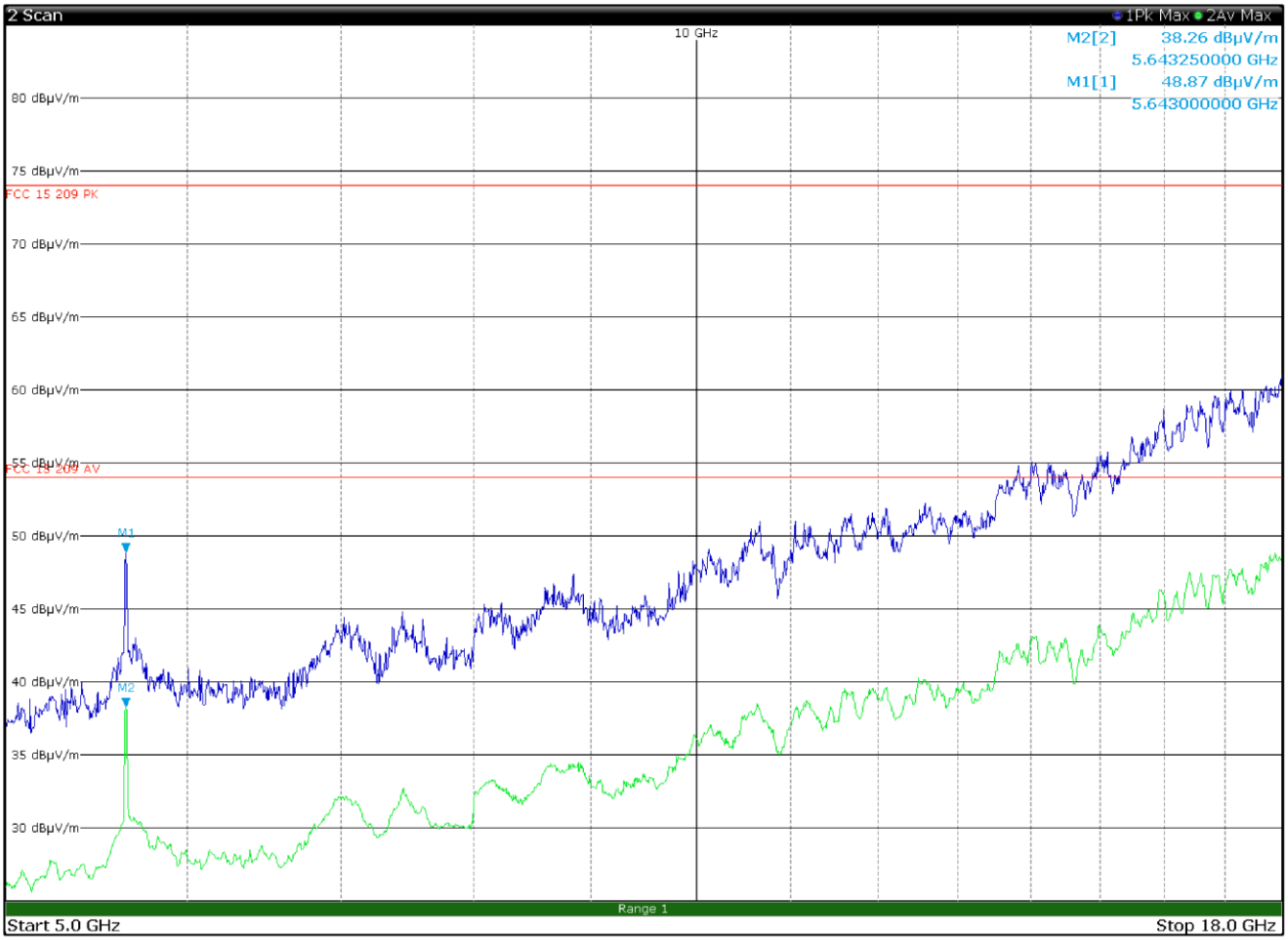
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



: Radiated spurious emissions, UMTS Tx at 1880 MHz, WIFI Tx at 2437MHz – antenna in vertical polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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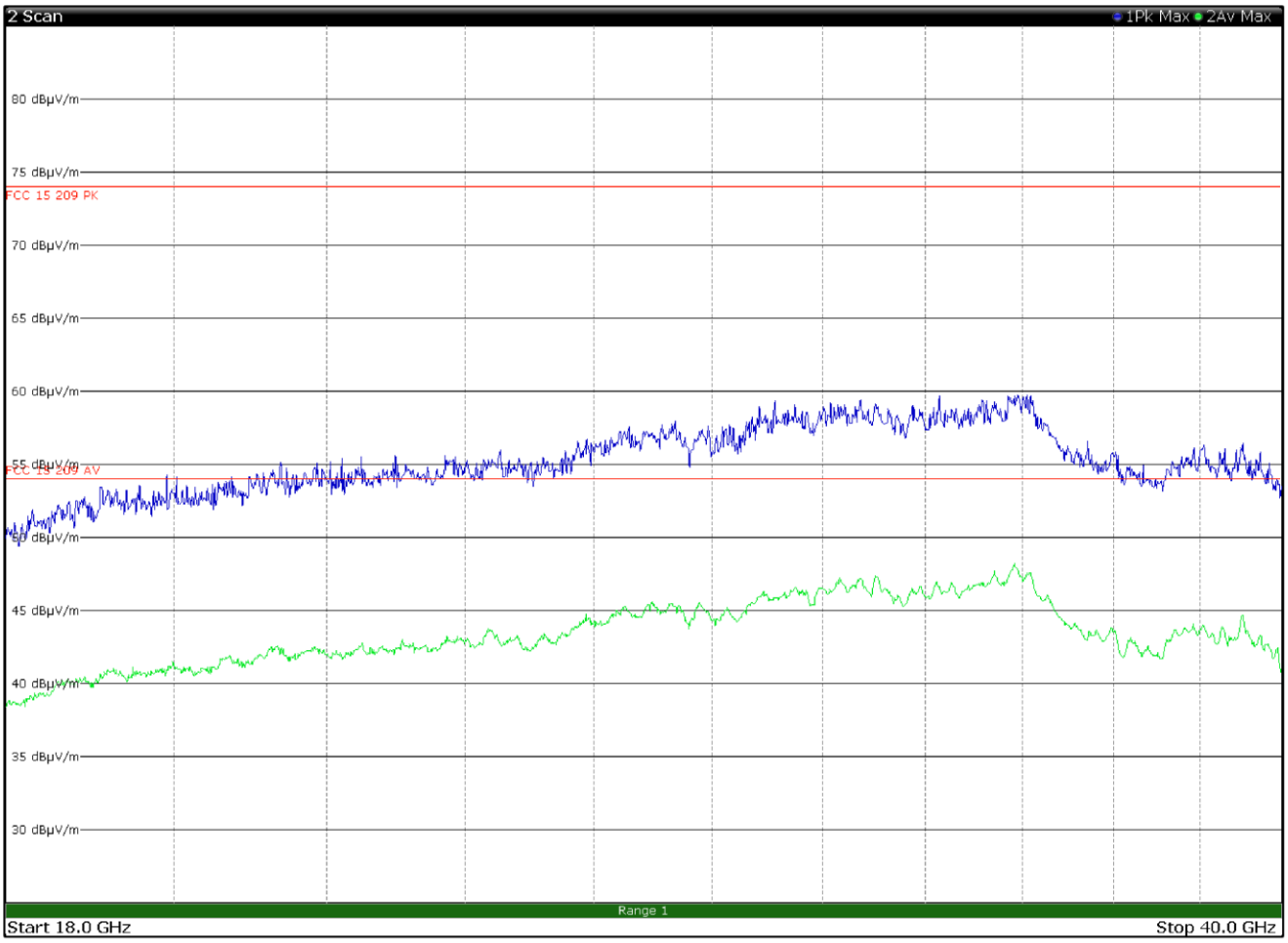
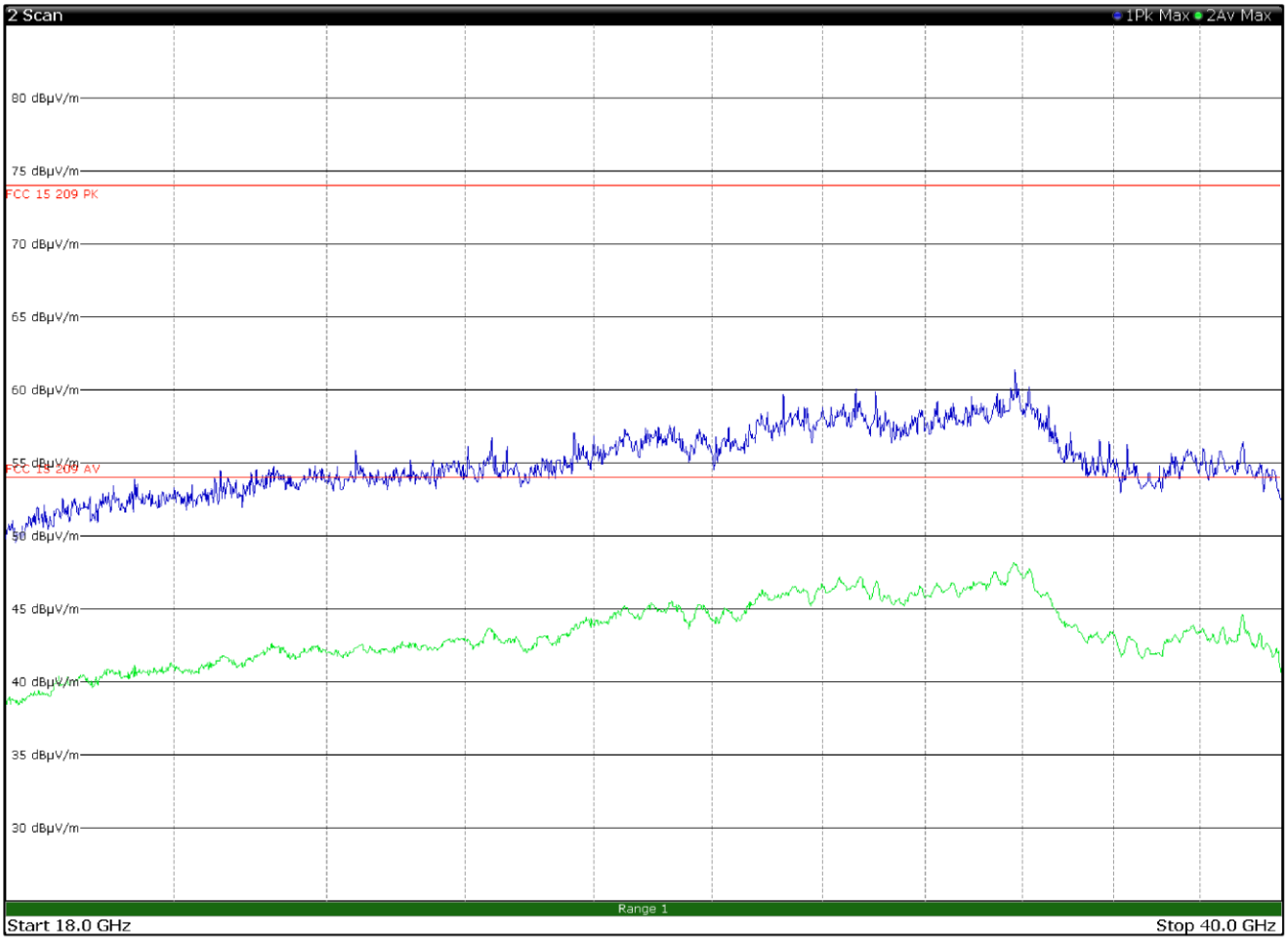
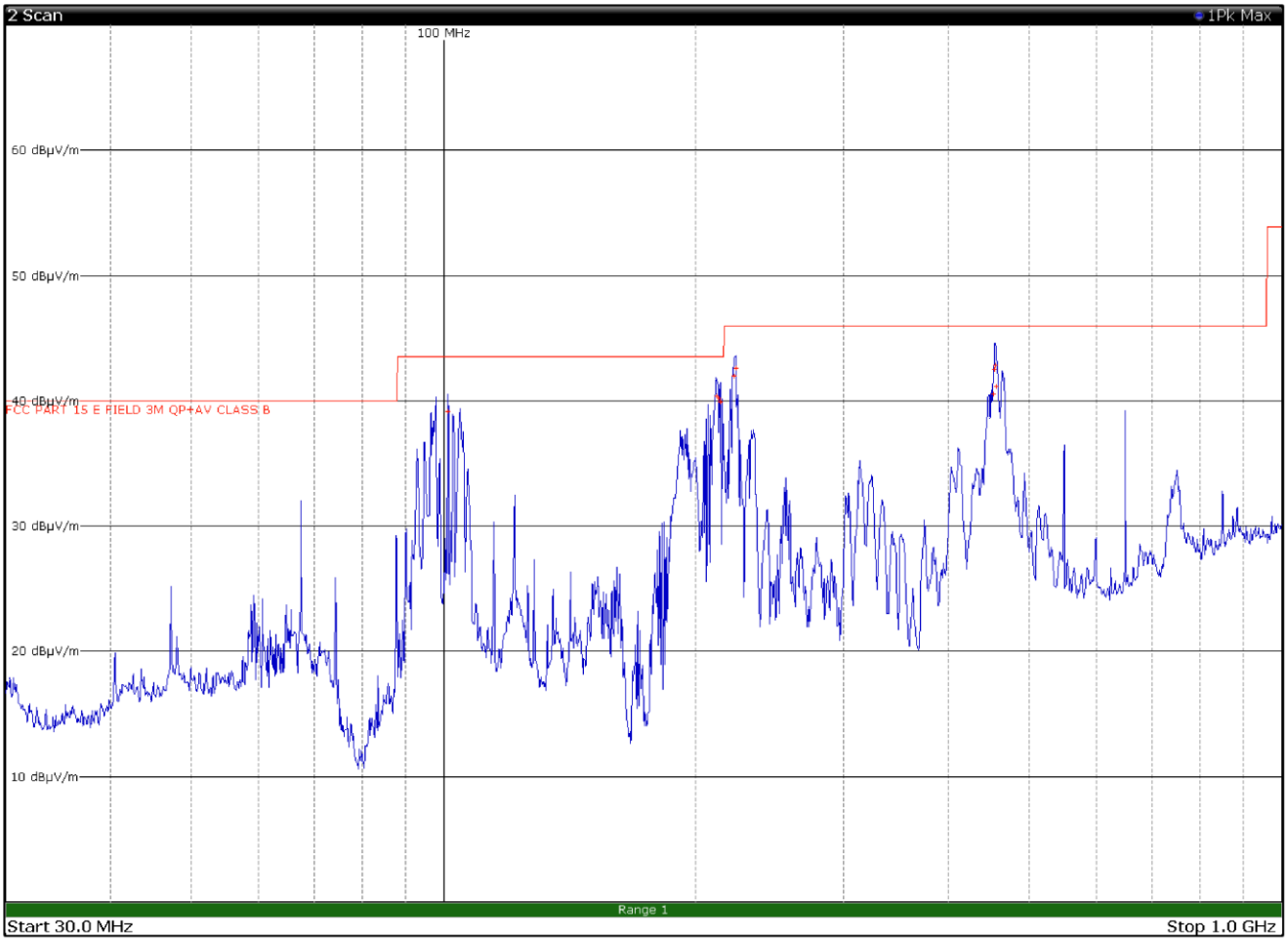
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



***:** Radiated spurious emissions, UMTS Tx at 1880 MHz, WIFI Tx at 2437MHz – antenna in horizontal polarization –*

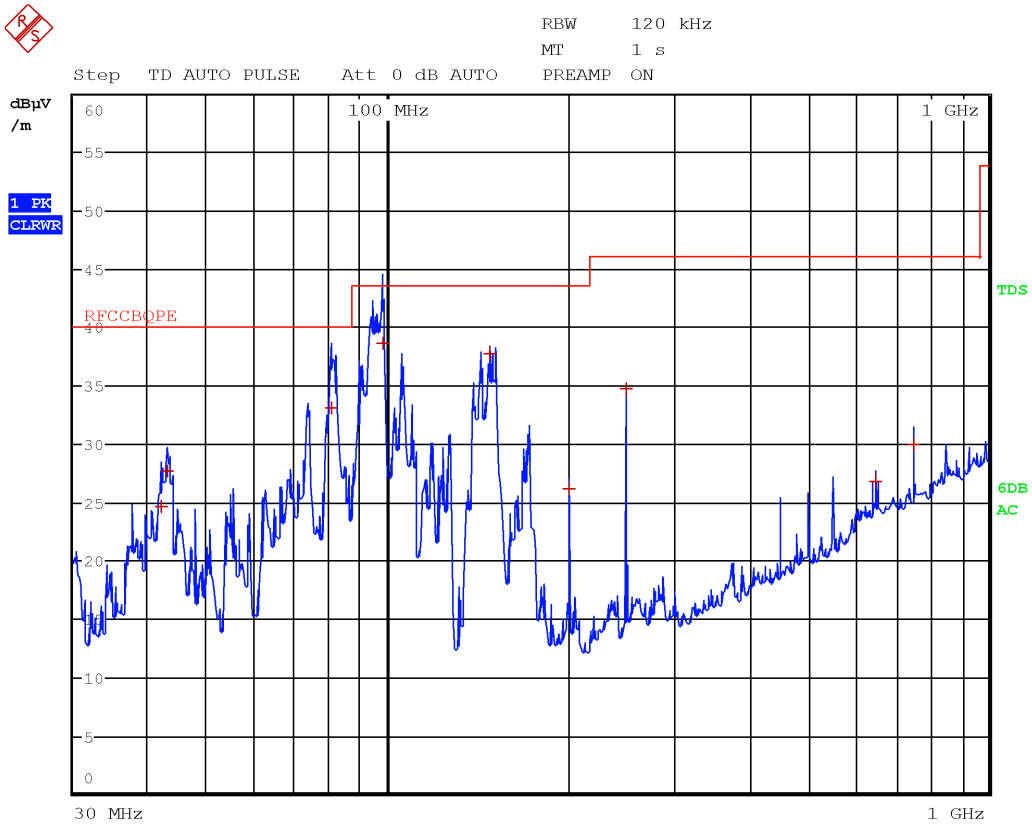


Radiated spurious emissions, UMTS Tx at 1880 MHz, WIFI Tx at 2437MHz – antenna in vertical polarization –



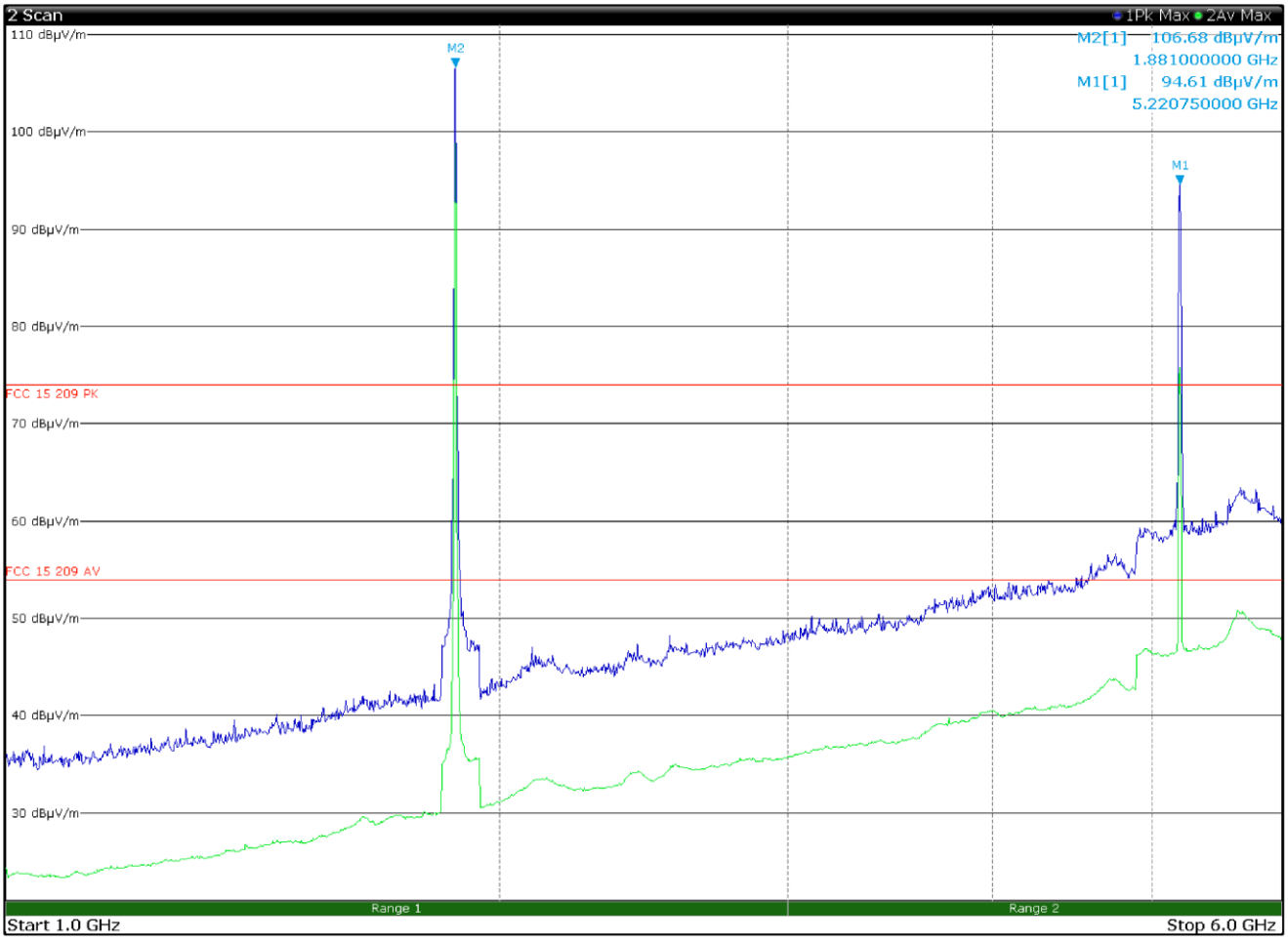
Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
101.1900	39.1	43.5	-4.4	QP
211.4400	40.4	43.5	-3.1	QP
212.6100	40.2	43.5	-3.3	QP
213.7800	39.9	43.5	-3.6	QP
222.0300	42.0	46.0	-4.0	QP
223.1700	42.6	46.0	-3.4	QP
453.4500	40.5	46.0	-5.5	QP
454.6200	42.6	46.0	-3.5	QP
455.7900	42.8	46.0	-3.2	QP
456.9600	41.1	46.0	-4.9	QP



: Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
198.5400	40.1	43.5	-3.4	QP
199.7100	42.5	43.5	-1.0	QP
200.8800	40.6	43.5	-2.9	QP
202.0200	38.4	43.5	-5.1	QP
211.5000	41.1	43.5	-2.4	QP
212.5800	41.6	43.5	-1.9	QP
213.7800	39.8	43.5	-3.7	QP
446.5200	37.8	46.0	-8.2	QP
447.5700	40.9	46.0	-5.1	QP
466.5000	38.0	46.0	-8.0	QP



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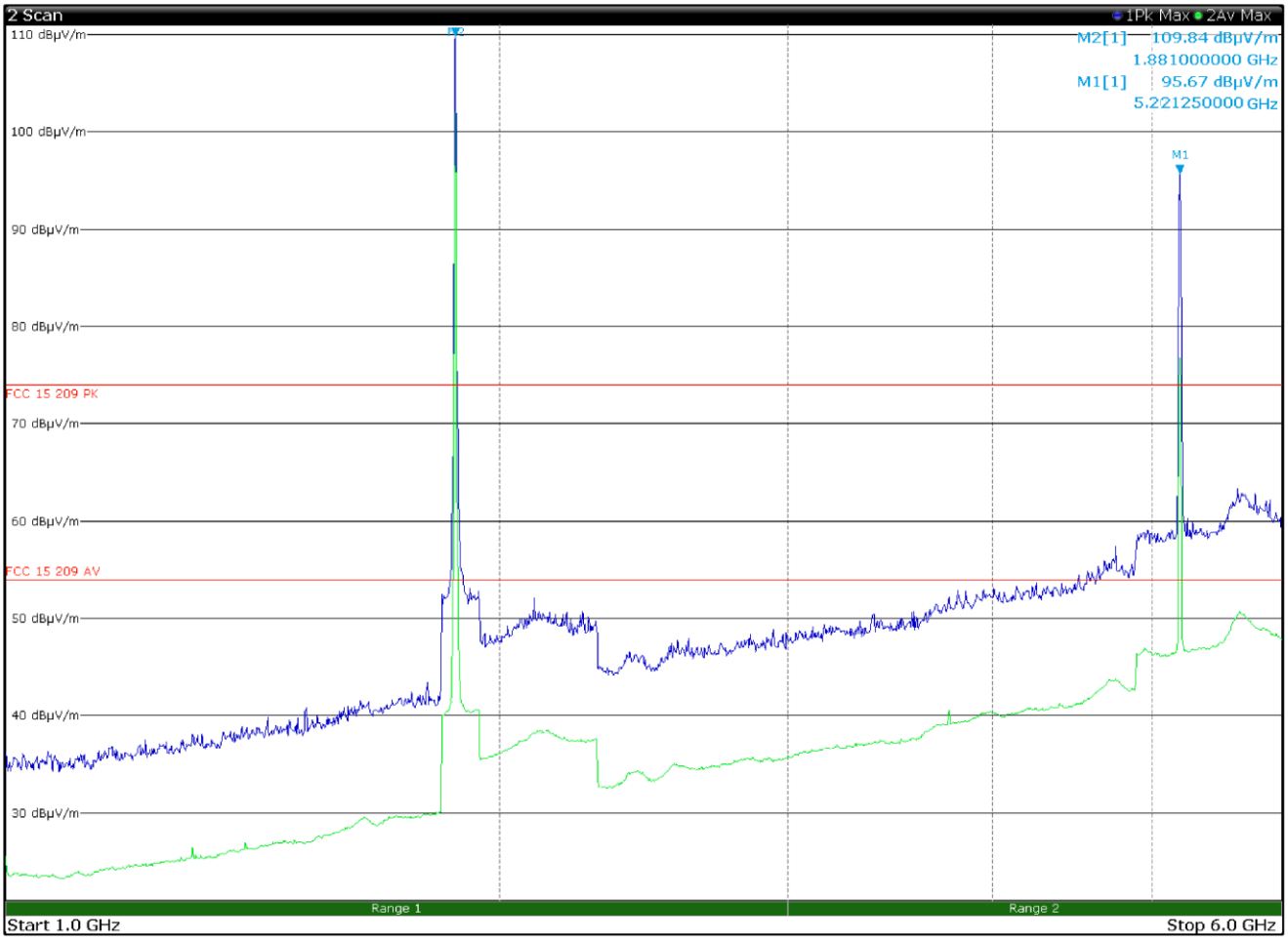
Radiated spurious emissions, Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected



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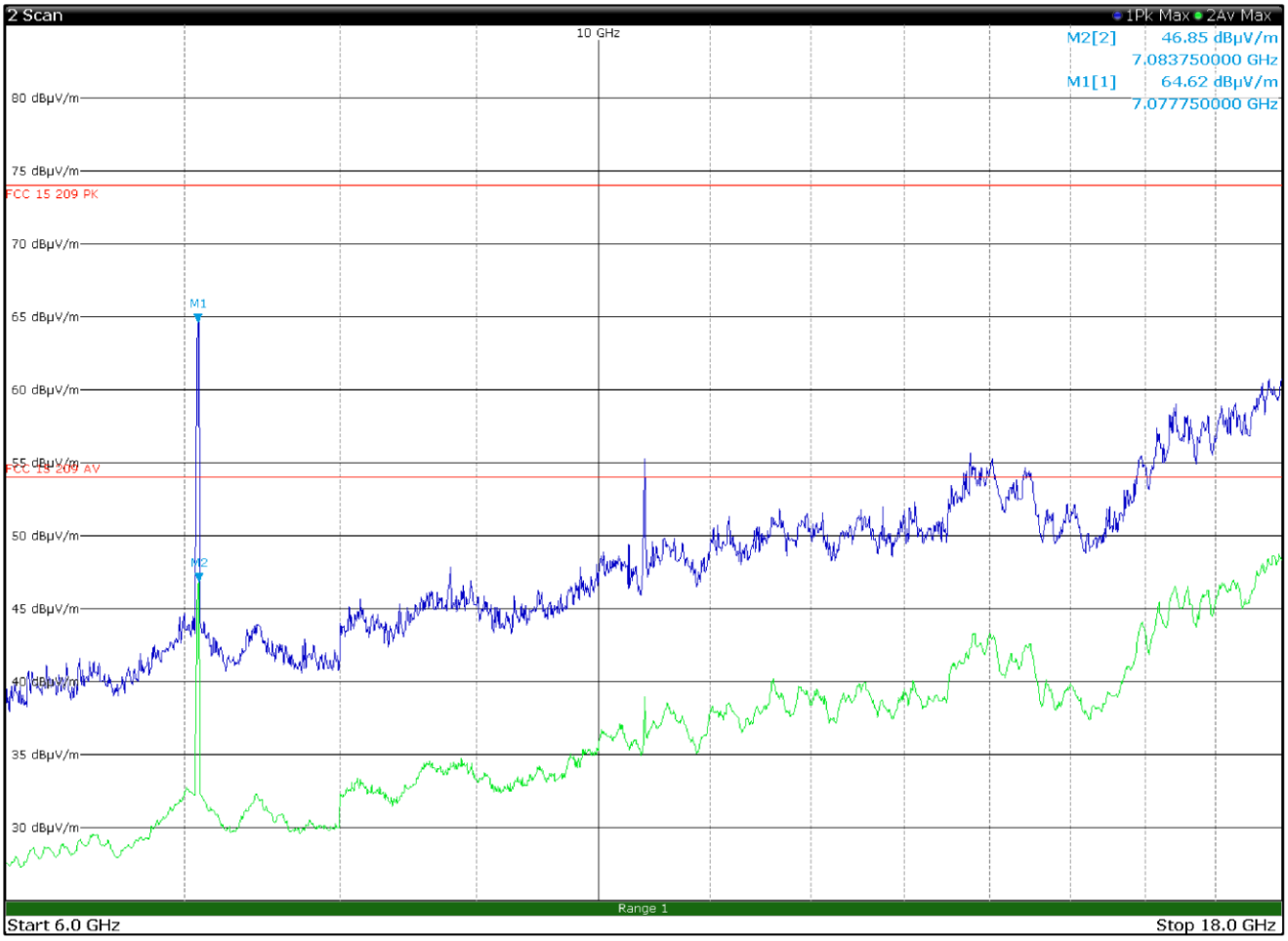
Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in vertical polarization

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected



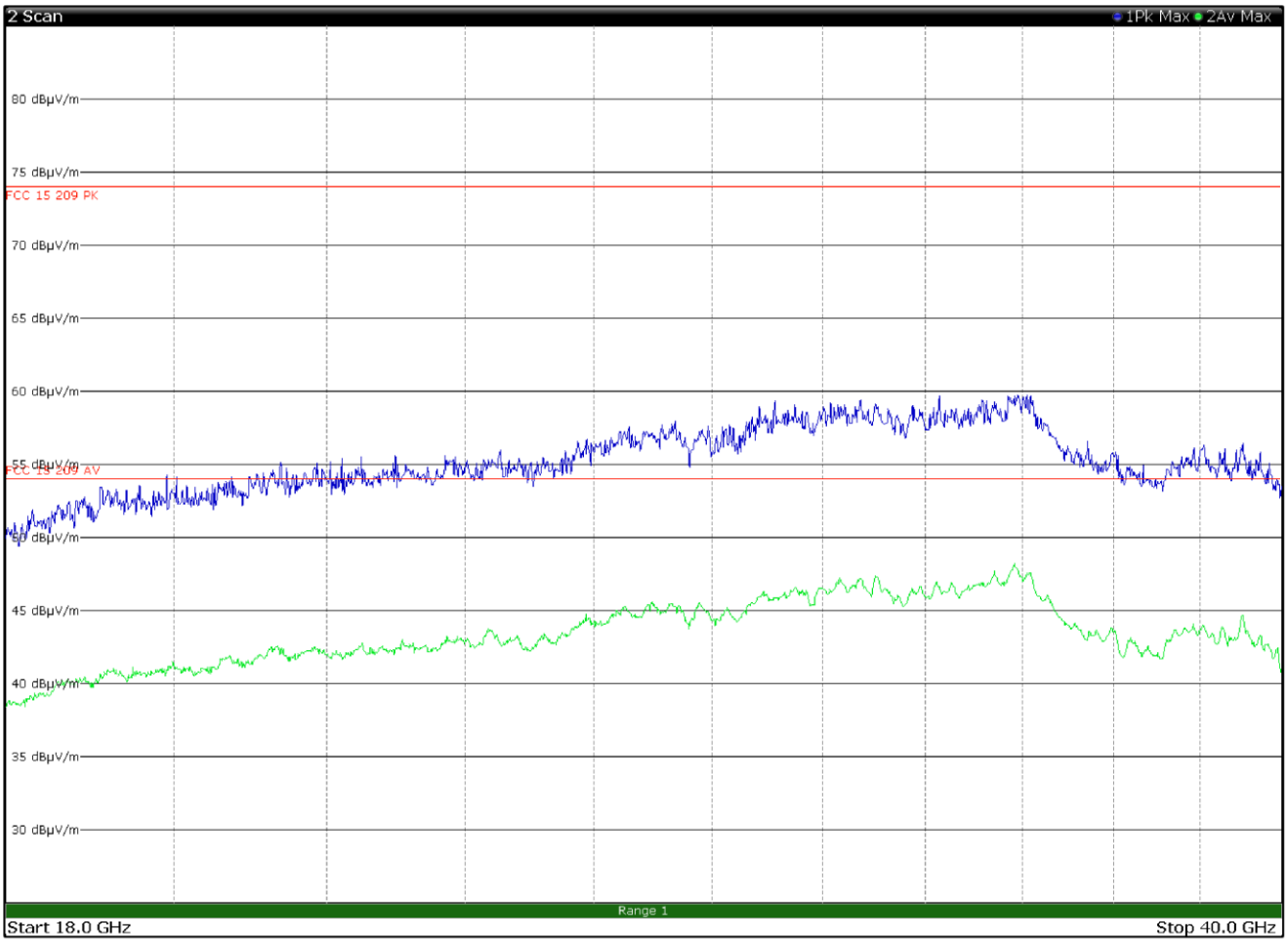
17:50:02 01.06.2020

Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in horizontal polarization

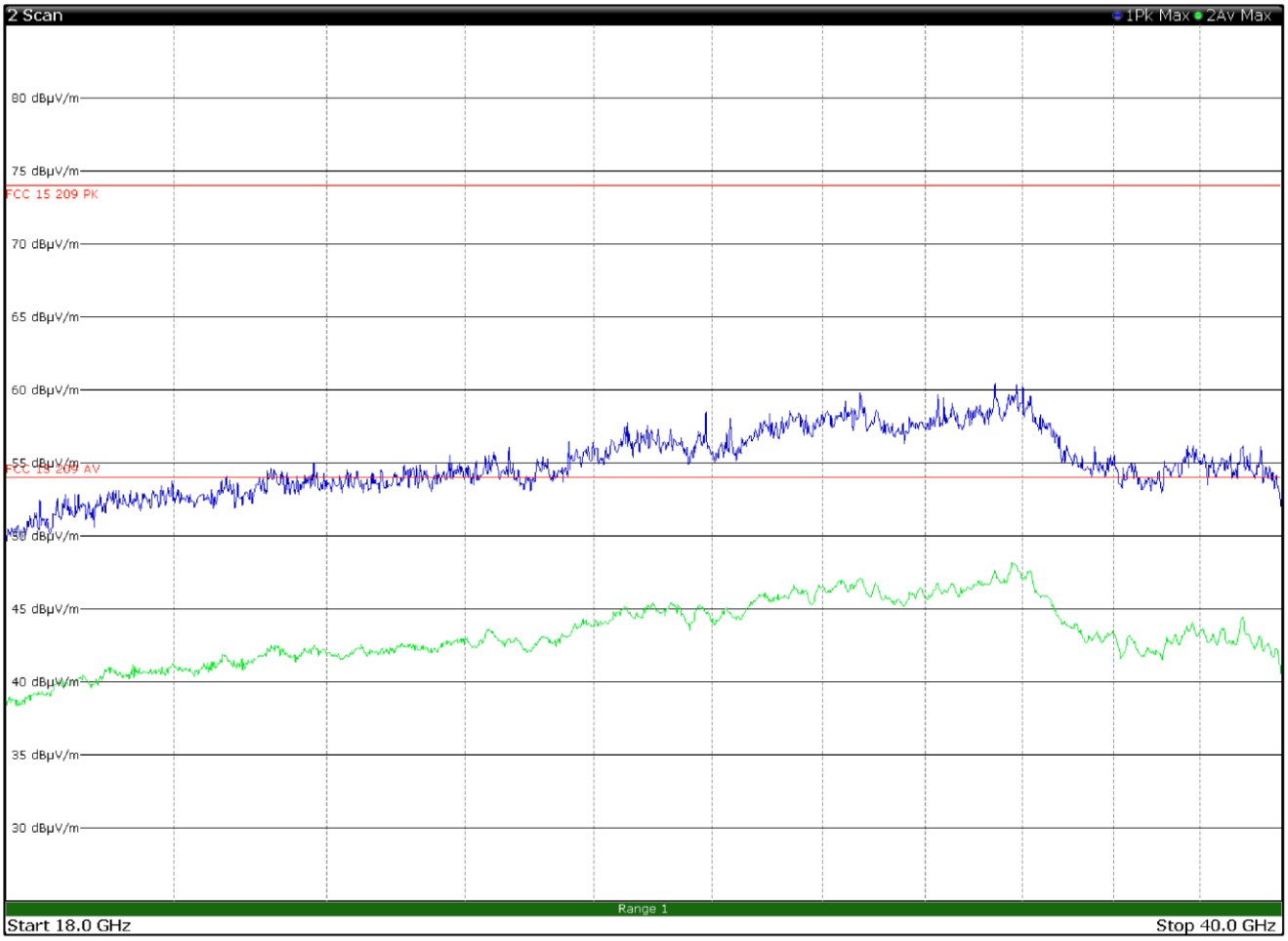
Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
7077.750	64.6	82.2	-17.6	PK

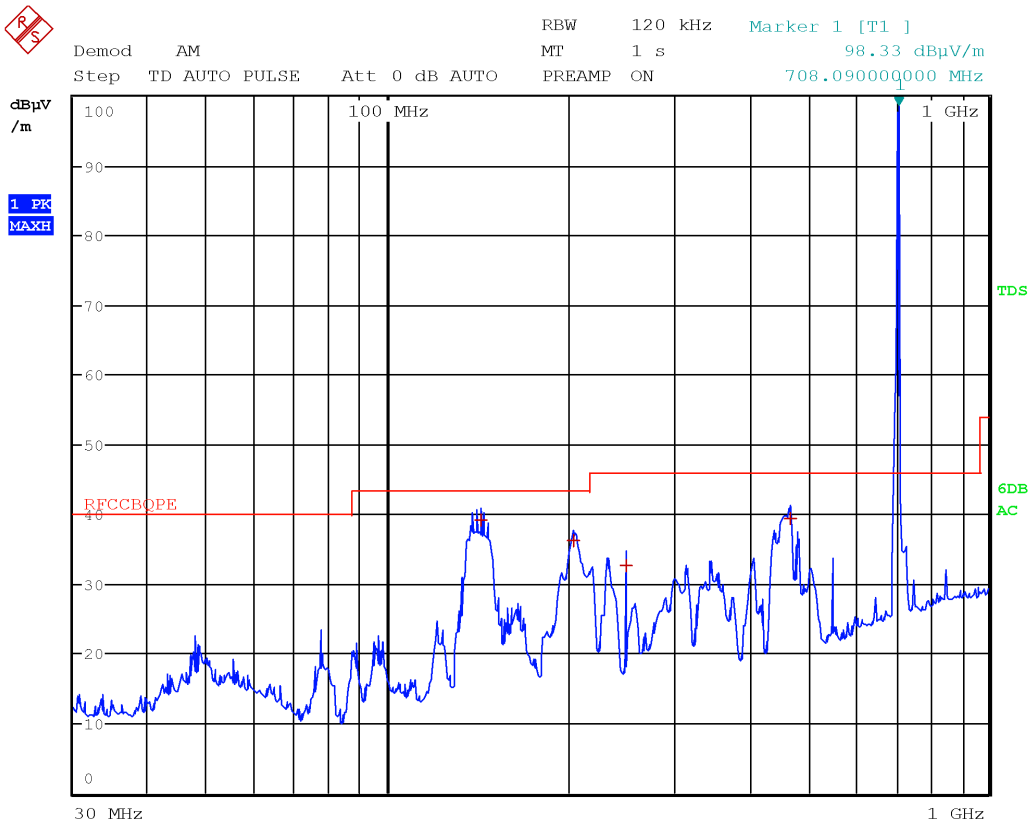
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in horizontal polarization



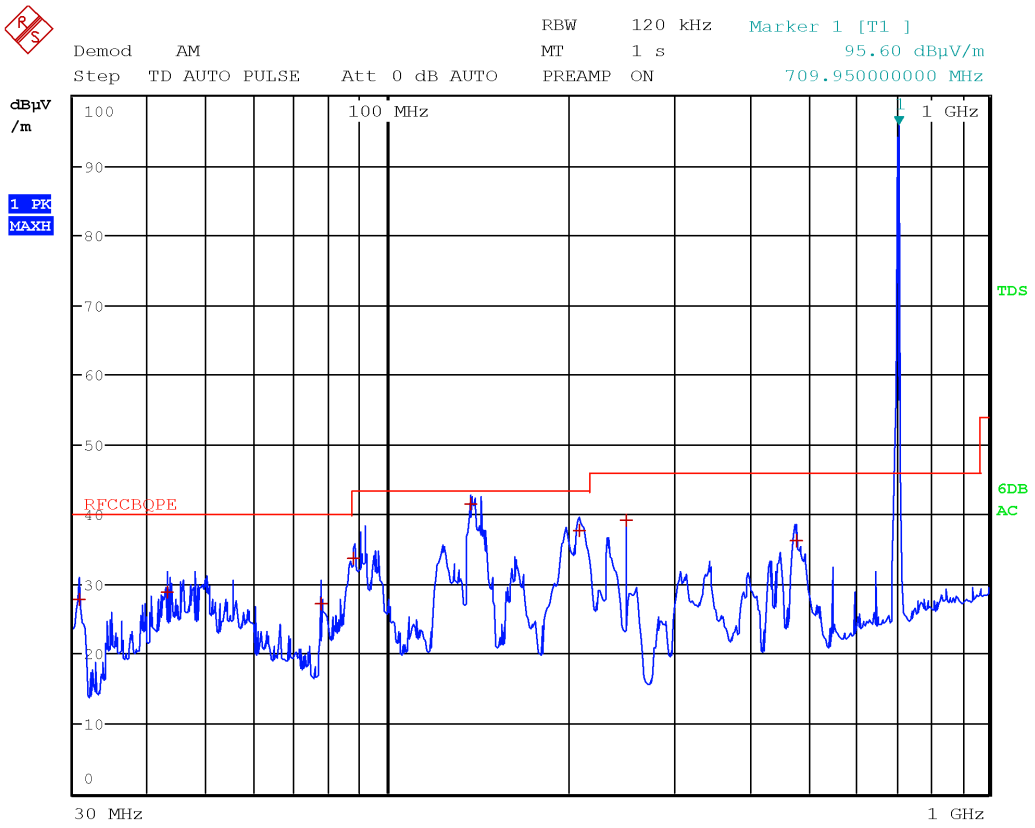
Radiated spurious emissions, UMTS Tx at 1880 MHz,, WIFI Tx at 5220 MHz – antenna in vertical polarization



Radiated spurious emissions, LTE Tx at 707.5MHz, WIFI Tx at 2437 MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

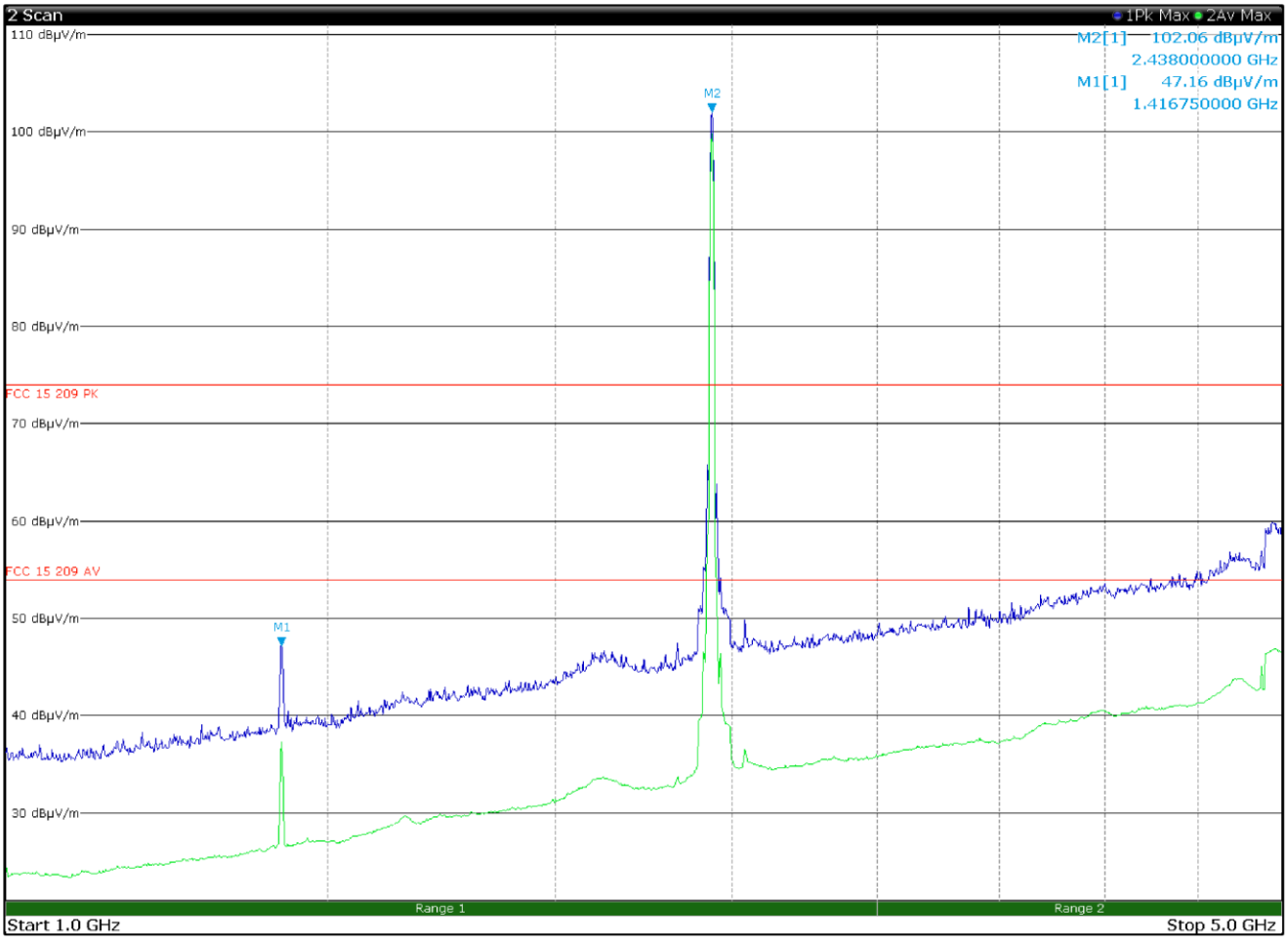
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
143.2500	39.1	43.5	-4.4	QP
204.3900	36.2	43.5	-7.3	QP
250.0200	32.7	46.0	-13.3	QP
467.4300	39.5	46.0	-6.5	QP



Radiated spurious emissions, LTE Tx at 707.5 MHz, WIFI Tx at 2437 MHz – antenna in vertical polarization – EUT in configuration 2

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.6300	27.8	40.0	-12.2	QP
42.9600	29.0	40.0	-11.0	QP
77.6100	27.3	40.0	-12.7	QP
87.6600	33.8	40.0	-6.2	QP
137.4000	41.6	43.5	-1.9	QP
209.0400	37.7	43.5	-5.8	QP
250.0200	39.2	46.0	-6.8	QP
477.9300	36.3	46.0	-9.7	QP



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Radiated spurious emissions, LTE Tx at 707.5MHz, WIFI Tx at 2437MHz – antenna in horizontal polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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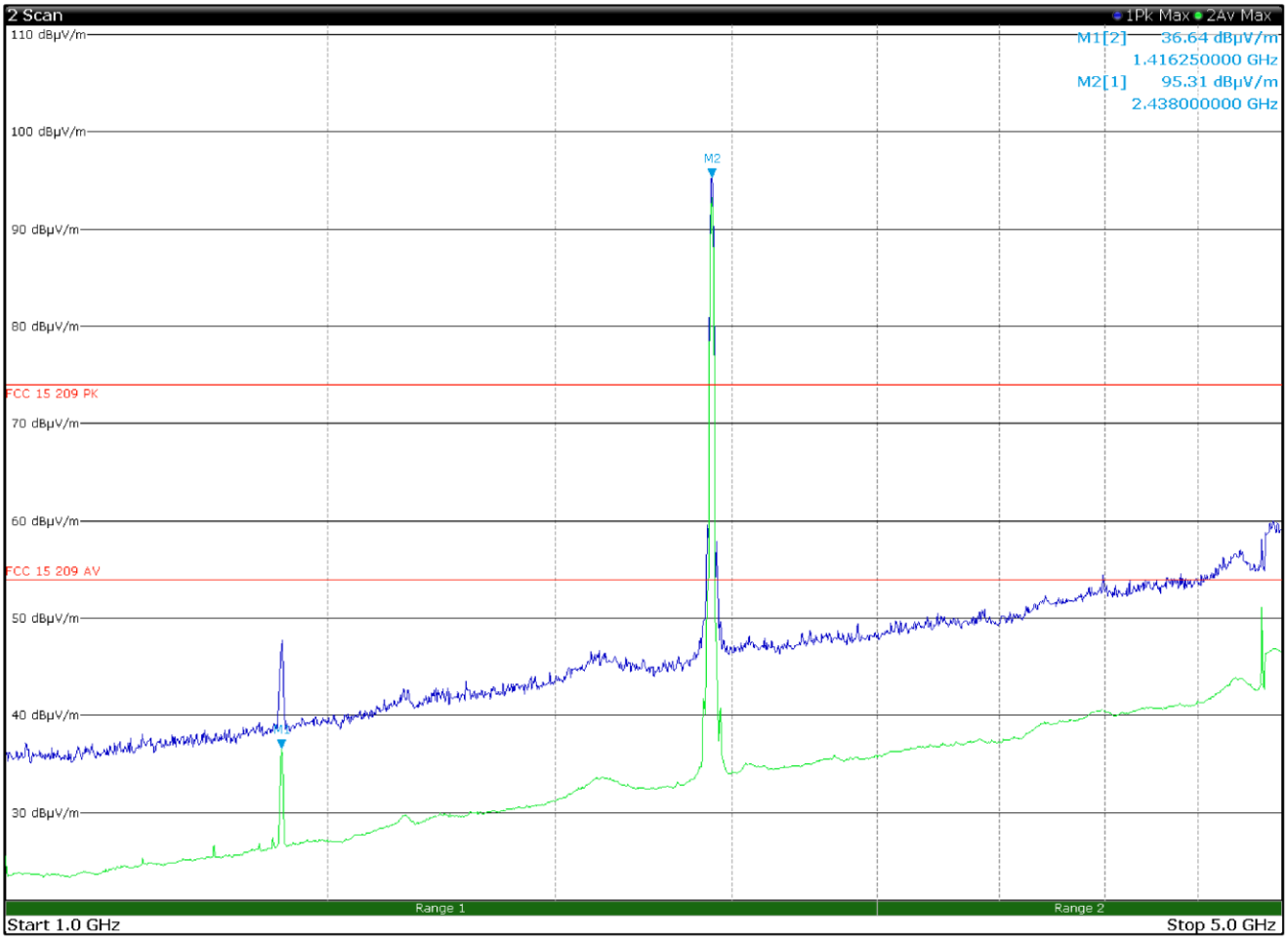
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, LTE Tx at 707.5MHz, WIFI Tx at 2437MHz – antenna in vertical polarization –

Note: Emissions above the limit were from intentional emissions. no intermodulation emissions were detected

Frequency (GHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
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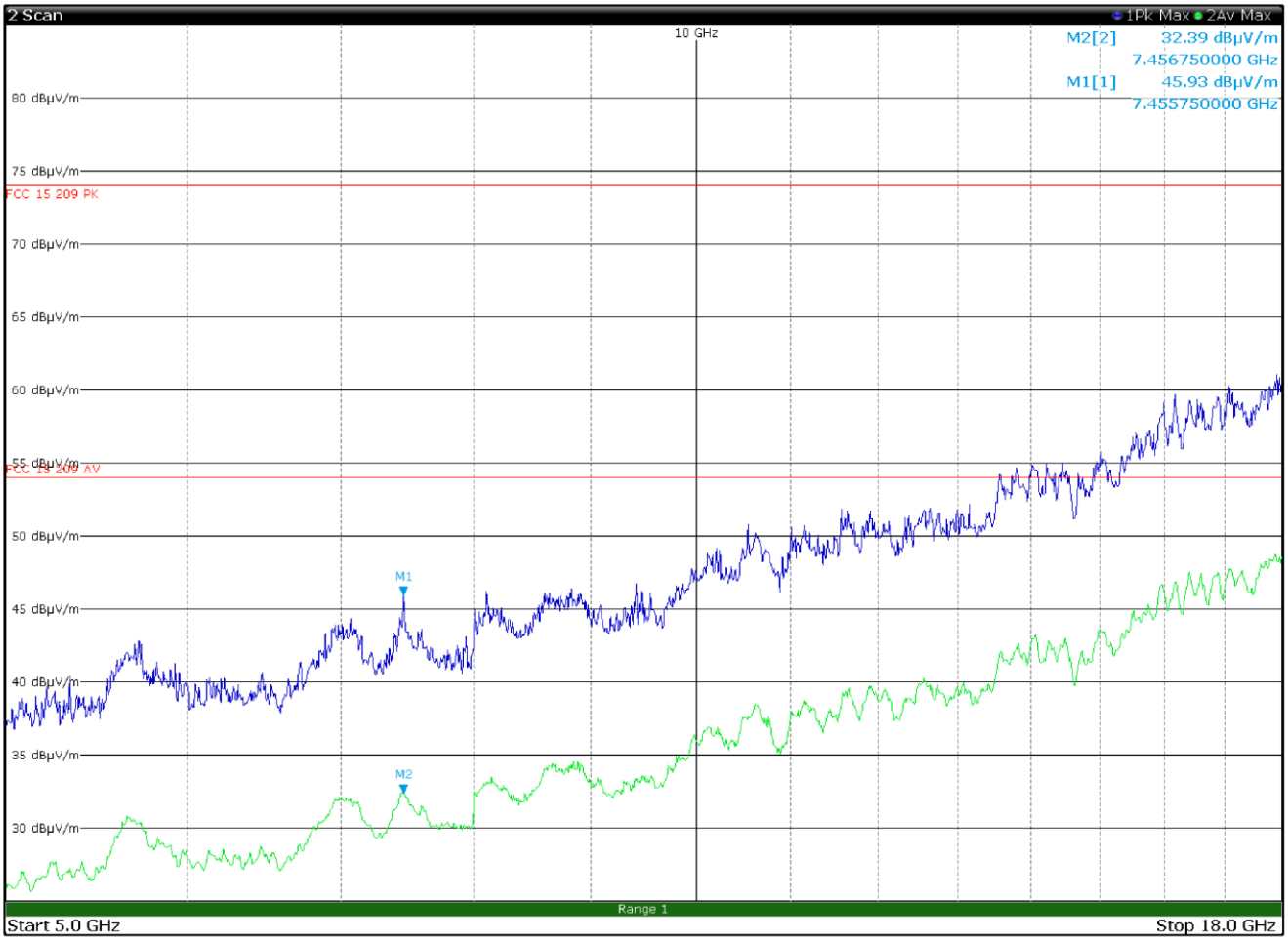
The limit for LTE is -13 dBm. Limit (dBµV/m) = limit (dBm) + 95.23 = 82.2 dBµV/m



Radiated spurious emissions, LTE Tx at 707.5MHz, WIFI Tx at 2437MHz – antenna in horizontal polarization –