

RADIO TEST REPORT – 453405TRFWL

Type of assessment:

Transmitters co-location

Applicant:

Eurotech Spa

Via Fratelli Solari, 3/A – 33020 Amaro (UD) – Italy

Model:

BTGATE-20-31-31

Variants:

**BTGATE-20-31-00, BTGATE-20-31-11,
BTGATE-20-31-21**

FCC ID:

UKM-BTG2031

IC Registration number:

21442-BTG2031

Specifications:

- ◆ **FCC 47 CFR Part 15 Subpart C, §15.209**
Radiated emission limits; general requirements.
- ◆ **RSS-GEN, Issue 5, Apr. 2018, Amendment 1 (March 2019), Amendment 2 (February 2021), section 8.9**
Transmitter Emission Limits

Date of issue: January 28, 2022

P. Barbieri

Tested by



Signature

D. Guarnone

Reviewed by



Signature

This test report shall not be partially reproduced without the prior written consent of Nemko S.p.A. The phase of sampling of equipment under test is carried out by the customer. Results indicated in this test report refer exclusively to the tested samples and apply to the sample as received. This Test Report, when bearing the Nemko name and logo is only valid when issued by a Nemko laboratory, or by a laboratory having special agreement with Nemko.

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 contained in this report are within Nemko Spa 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.

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, general requirements test results.....	5
2.2 ISED RSS-GEN, Issue 5, 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	7
3.5 Product description and theory of operation	7
3.6 EUT exercise details.....	7
Section 4. Engineering considerations	8
4.1 Modifications incorporated in the EUT.....	8
4.2 Technical judgment.....	8
4.3 Deviations from laboratory tests procedures.....	8
Section 5. Test conditions	9
5.1 Atmospheric conditions	9
5.2 Power supply range.....	9
Section 6. Measurement uncertainty	10
6.1 Uncertainty of measurement	10
Section 7. Test equipment	11
7.1 Test equipment list.....	11
Section 8. Testing data	12
8.1 FCC 15.209 and RSS-GEN section 8.9 Radiated emission limits; general requirements.....	12
Section 9. Block diagrams of test set-ups	142
9.1 Radiated emissions set-up for frequencies below 1 GHz.....	142
9.2 Radiated emissions set-up for frequencies above 1 GHz.....	142
Section 10. Photos	143
10.1 Photos of the test set-up	143
10.2 Photos of the EUT.....	144

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, Apr. 2018, Amendment 1 (March 2019), Amendment 2 (February 2021), 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
453405TRFWL	2022-01-28	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 ISED RSS-GEN, Issue 5, Apr. 2018, Amendment 1 (March 2019), Amendment 2 (February 2021) 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	2021-12-27
Nemko sample ID number	4534050007

3.2 EUT information

Model	BTGATE-20-31-31
Serial number	A121CN20011

3.3 Technical information

RSS number and Issue number	RSS-GEN, Issue 5, Apr. 2018, section 8.9		
Frequency band	WIFI / BT / BLE: 2400 – 2483.5 MHz band WIFI: 5150–5250 MHz, 5725–5850 MHz bands GSM / PCS / WCDMA / LTE North America Bands		
Type of modulation	GFSK, 802.11a/n, OFDM		
Emission classification (F1D, G1D, D1D)	F1D, W7D		
EUT power requirements	24 – 110 V DC 34 W		
Antenna information	The EUT uses two set of antennas ad following: SET A		
	Type	Manufacturer	Model
	WIFI antenna	Linx	ANT-DB1-RAF-RPS
	WIFI antenna	Linx	ANT-DB1-RAF-RPS
	GPS antenna	2J antenna	2J4301MPGF
	Cellular antenna	2J antenna	2JW0124-C868B
	Cellular antenna	2J antenna	2JW0124-C868B
	SET B		
	Type	Manufacturer	Model
	WIFI antenna	2J antenna	2J4802P
	WIFI antenna	2J antenna	2J4802P
	GPS antenna	2J antenna	2J4301MPGF
	Cellular antenna	2J antenna	2J6983MPa

3.4 EUT setup diagram

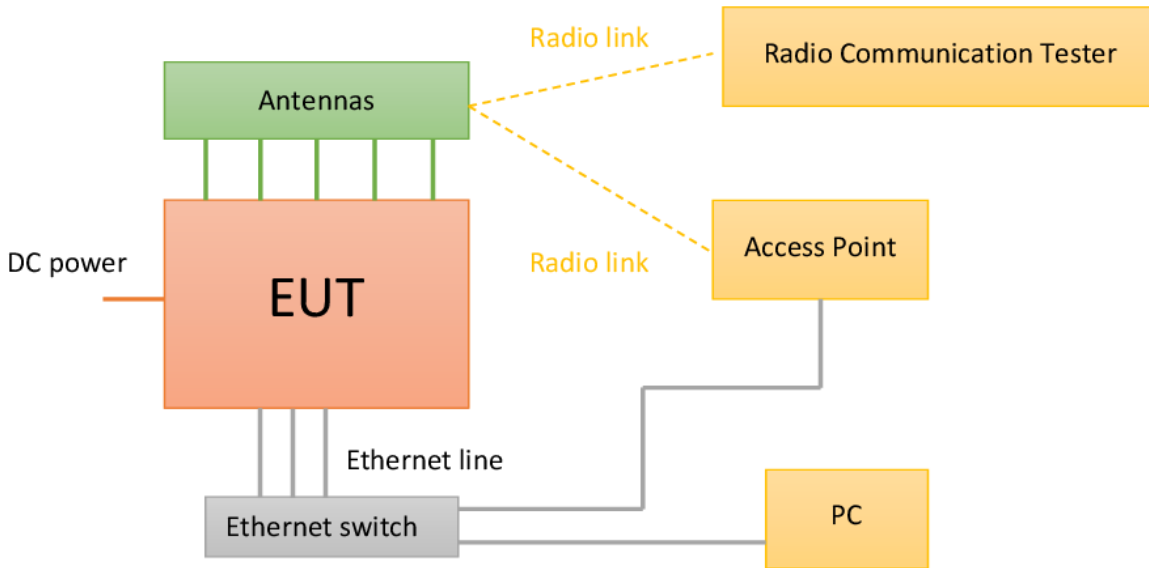


Figure 3.4-1: Setup diagram

3.5 Product description and theory of operation

The EUT is a modular IoT Edge Gateway system which addresses the challenges of the next-generation applications for smart transportation by combining hardware and software for Edge processing and Cloud connectivity. The EUT is a stand-alone gateway that can be expanded with a family of Modules that provide a wide range of additional features. The EUT and its Expansion Modules can be combined to create a flexible system that suits any use case with the ideal solution. The EUT is based on the Intel® Atom™ E3900 processor, with up to 8GB of ECC RAM, up to 32GB of eMMC, and an optional SSD storage module. Interfaces include up to 3x GbE, 2x USB 3.0, Serial, and Display ports; security features include TPM 2.0. A high accuracy GNSS receiver supporting GPS/GLONASS with UDR (Untethered Dead Reckoning) is available in selected configurations. A railway certified power supply offers an ultra-wide input voltage range: 24 to 110VDC. The power is distributed by the EUT to the Expansion Modules.

3.6 EUT exercise details

The EUT has been forced in transmission mode using a radio communication tester R&S CMW 290 and an access point Eurotech DYNAGATE-10-12-GS03.

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.
Data logger con diagnosi in campo	Testo	175-H2	20012380/305	2020-12	2022-12
Data logger con diagnosi in campo	Testo	175-H2	38203337/703	2020-12	2022-12
Barometer	Castle	GPB 3300	072015	2021-07	2022-07

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:

Test	Range	Measurement Uncertainty	Notes
Radiated Disturbance	Antenna distance 1 m, 3 m, 10 m 0.009 ÷ 200 MHz	5.0 dB	(1)
	Antenna distance 1 m, 3 m, 10 m 200 ÷ 1000 MHz	5.2 dB	(1)
	Antenna distance 1 m, 3 m, 10 m 1 ÷ 6 GHz	5.2 dB	(1)
	Antenna distance 1 m, 3 m 6 ÷ 18 GHz	5.5 dB	(1)
	Antenna distance 1 m, 3 m 18 ÷ 40 GHz	7.2 dB	(1)
Radiated Disturbance with large loop antenna system (LLAS)	0.009 ÷ 30 MHz	3.3 dB	(1)
Conducted Disturbance	0.02 ÷ 150 kHz with AMN	3.8 dB	(1)
	150 kHz ÷ 30 MHz with AMN	3.4 dB	(1)
	150 kHz ÷ 30 MHz with AAN	4.6 dB	(1)
	9 kHz ÷ 30 MHz with voltage probe	2.9 dB	(1)
	150 kHz ÷ 30 MHz with current probe	2.9 dB	(1)
Frequency	10 Hz ÷ 1 kHz	0.2 %	(1)
	1 kHz ÷ 40 GHz	10 ⁻⁶	(1)
Electromagnetic fields (EMF)	Magnetic, Electric and Electromagnetic fields: 0 Hz ÷ 40 GHz	25 %	(1)
Electrical quantities (voltage, current, resistance)	AC/DC Voltage 10 mV ÷ 1000 V 0÷100 kHz AC/DC Current 0.1 mA ÷ 400 A 0÷1 kHz Resistance 100 mΩ ÷ 10 MΩ	2.5 %	(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 %

(2) The instruments used for this immunity test is according to the tolerances requested by the applicable standard

(3) The reported expanded uncertainty of measurement is related to the stimulus quantity

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Description	Manufacturer	Model	Identifier	Cal Date	Due Date
EMI Receiver	Rohde & Schwarz	ESW44	101620	2021-08	2022-08
Antenna Trilog 25-2000 MHz	Schwarzbeck Mess-Elektronik	VULB9168	9168-242	2021-06	2024-06
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152	2021-09	2024-09
Double Ridge Horn Antenna	RFSpin	DRH40	061106A40	2020-04	2023-04
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121	2021-01	2022-01
Preamplifier	Schwarzbeck Mess-Elektronik	BBV9718	BBV9718-137	2021-04	2022-04
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530	2021-09	2023-09

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 × 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: 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	
12.29–12.293	240–285	4500–5150	Above 38.6
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

Verdict	Pass
Tested by	P. Barbieri

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. No inter-modulation products emissions were detected within 6 dB below the limit.

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

Resolution bandwidth:	120 kHz
Detector mode:	Quasi-Peak

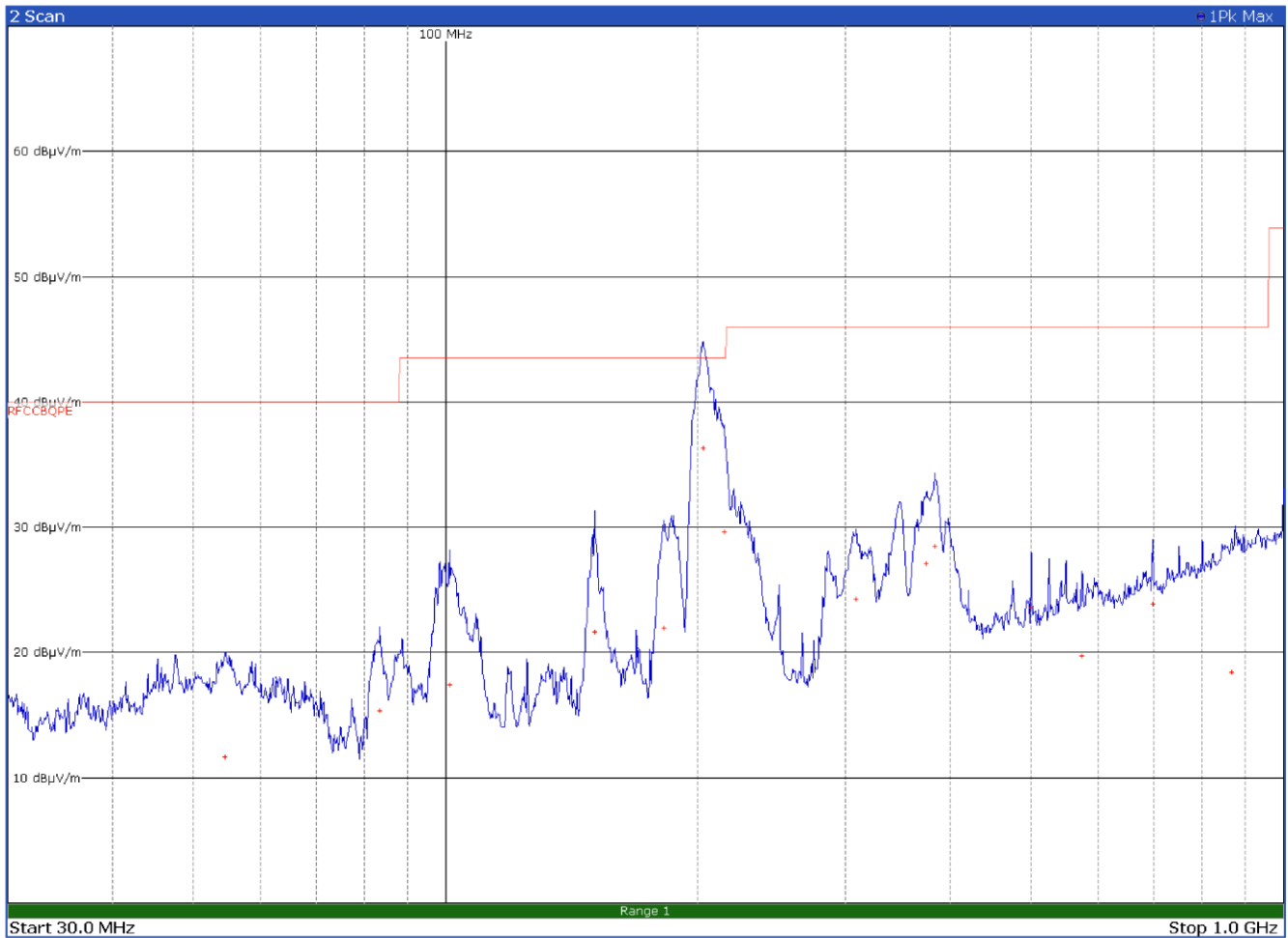
Receiver settings for peak radiated measurements within restricted bands above 1 GHz:

Resolution bandwidth:	1 MHz
Detector mode:	Peak

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

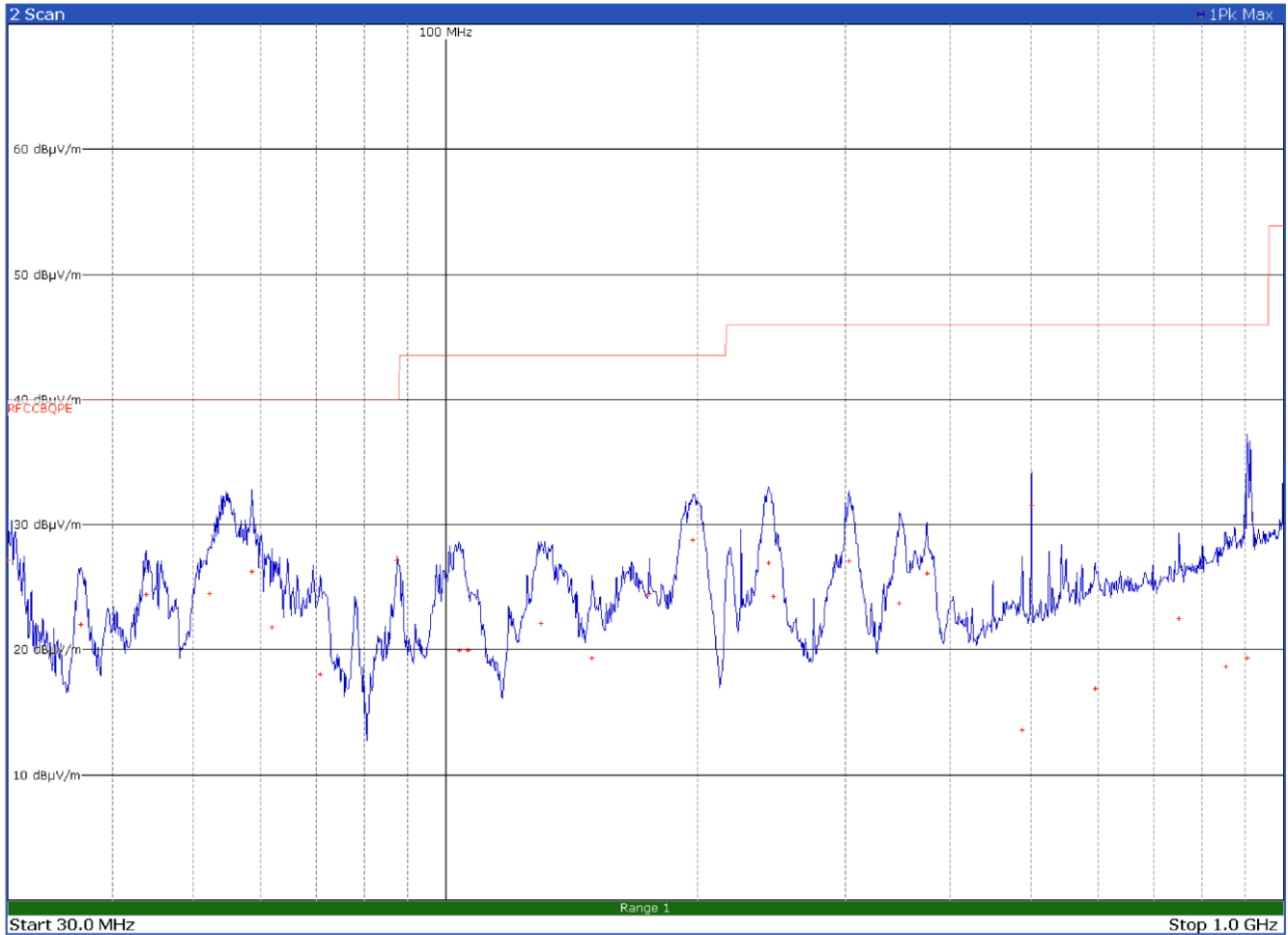
Resolution bandwidth:	1 MHz
Detector mode:	Average

8.1.4 Test data for ANTENNA SET A – PCS 1900 at 1880 MHz and WIFI 802.11g at 2437 MHz



Antenna in horizontal polarization

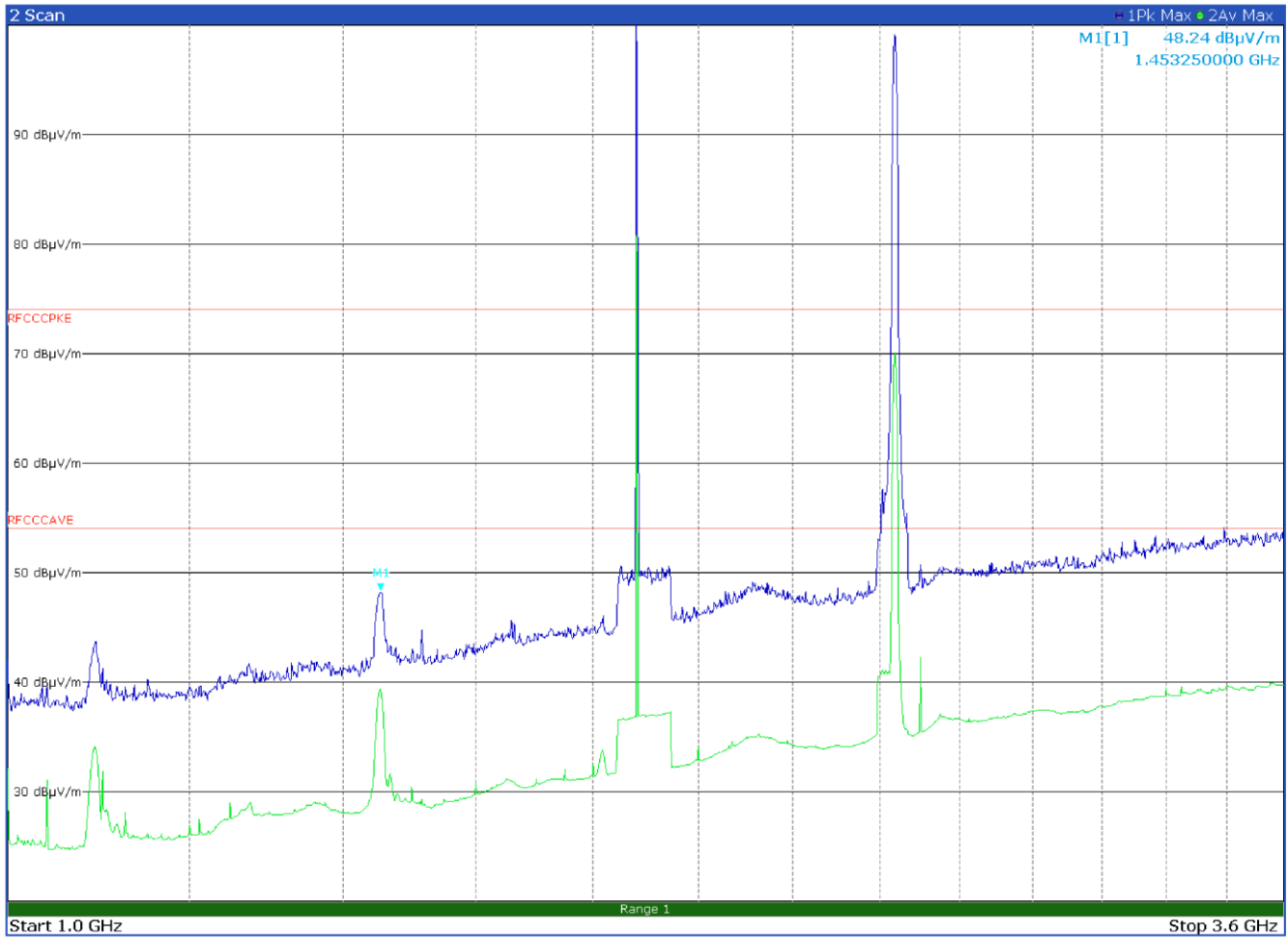
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
54.5400	11.7	40.0	-28.3	QP
83.3100	15.4	40.0	-24.6	QP
101.0400	17.4	43.5	-26.1	QP
150.6600	21.7	43.5	-21.8	QP
182.2500	22.0	43.5	-21.5	QP
202.6800	36.3	43.5	-7.2	QP
214.8300	29.7	43.5	-13.8	QP
308.9700	24.3	46.0	-21.7	QP
374.0100	27.1	46.0	-18.9	QP
383.5800	28.5	46.0	-17.5	QP
500.0100	23.6	46.0	-22.4	QP
575.0100	19.8	46.0	-26.2	QP
698.2200	23.9	46.0	-22.1	QP
867.3600	18.5	46.0	-27.5	QP



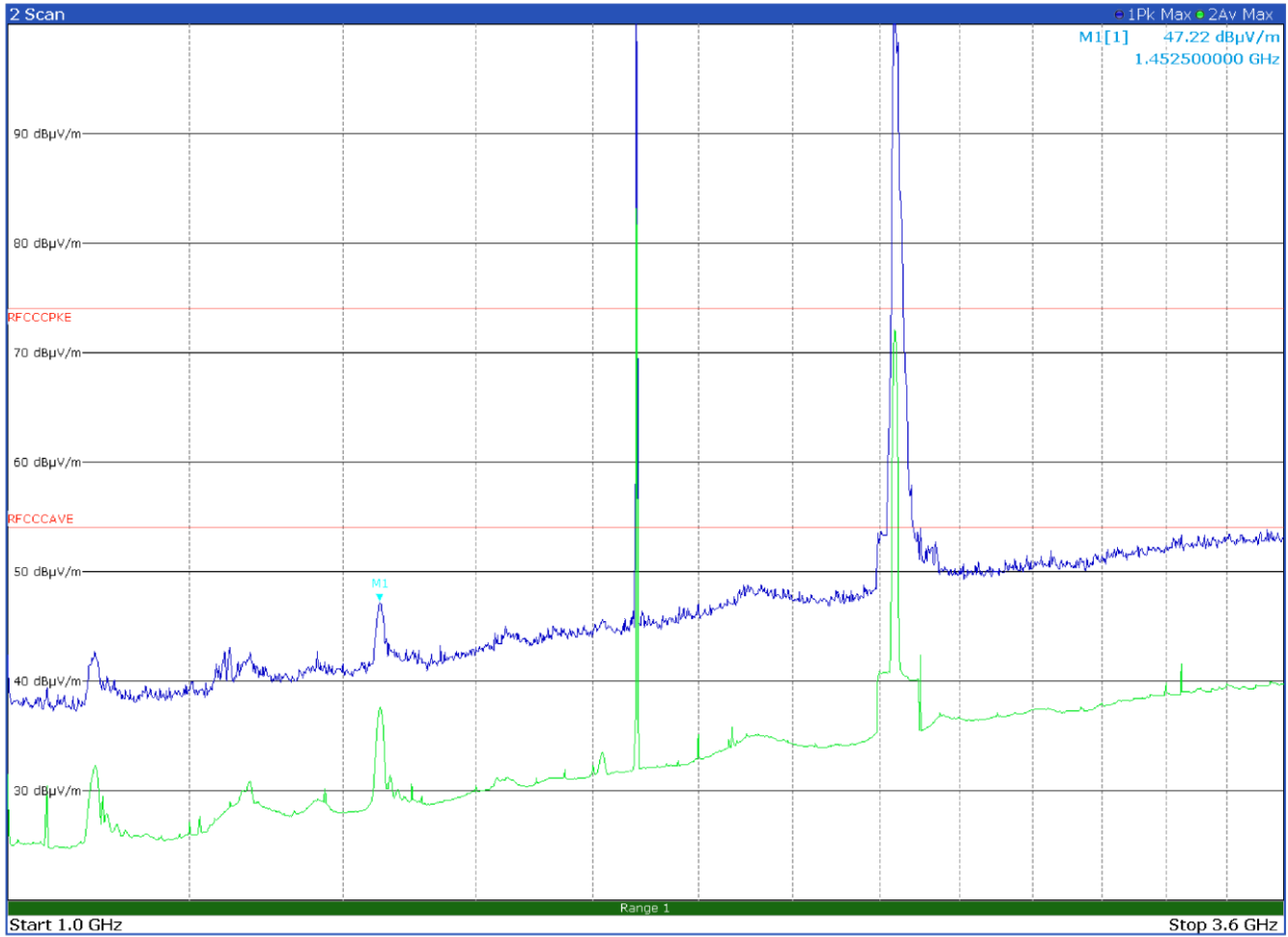
Antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	27.2	40.0	-12.8	QP
36.6300	22.1	40.0	-17.9	QP
43.8300	24.4	40.0	-15.6	QP
52.2600	24.5	40.0	-15.5	QP
58.6500	26.3	40.0	-13.7	QP
62.0100	21.8	40.0	-18.2	QP
70.8300	18.1	40.0	-21.9	QP
87.4500	27.2	40.0	-12.8	QP
103.6800	20.0	43.5	-23.5	QP
106.2600	20.0	43.5	-23.5	QP
129.9300	22.2	43.5	-21.3	QP
149.3700	19.4	43.5	-24.1	QP
174.9900	24.5	43.5	-19.0	QP
197.3100	28.8	43.5	-14.7	QP
242.7600	27.0	46.0	-19.0	QP
246.2100	24.3	46.0	-21.7	QP
302.8500	27.1	46.0	-18.9	QP
348.0000	23.8	46.0	-22.2	QP
375.0000	26.2	46.0	-19.8	QP
487.8300	13.6	46.0	-32.4	QP
500.0400	31.6	46.0	-14.4	QP

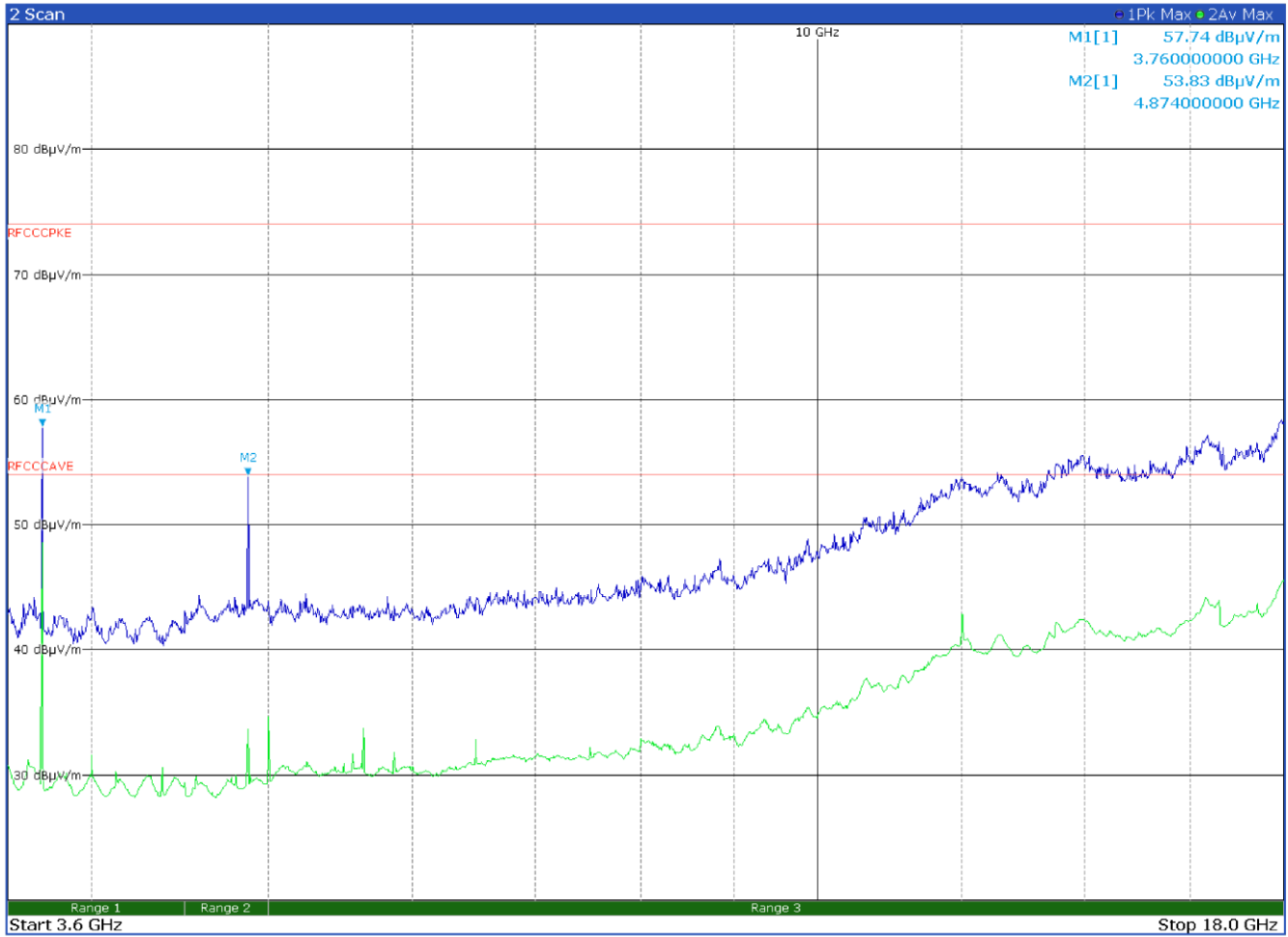
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
595.4700	16.9	46.0	-29.1	QP
750.0300	22.5	46.0	-23.5	QP
853.5000	18.7	46.0	-27.3	QP
904.8600	19.4	46.0	-26.6	QP



Antenna in horizontal polarization – No inter-modulation product founds
 Limit exceeded by carrier – All the peak found are below the average limit



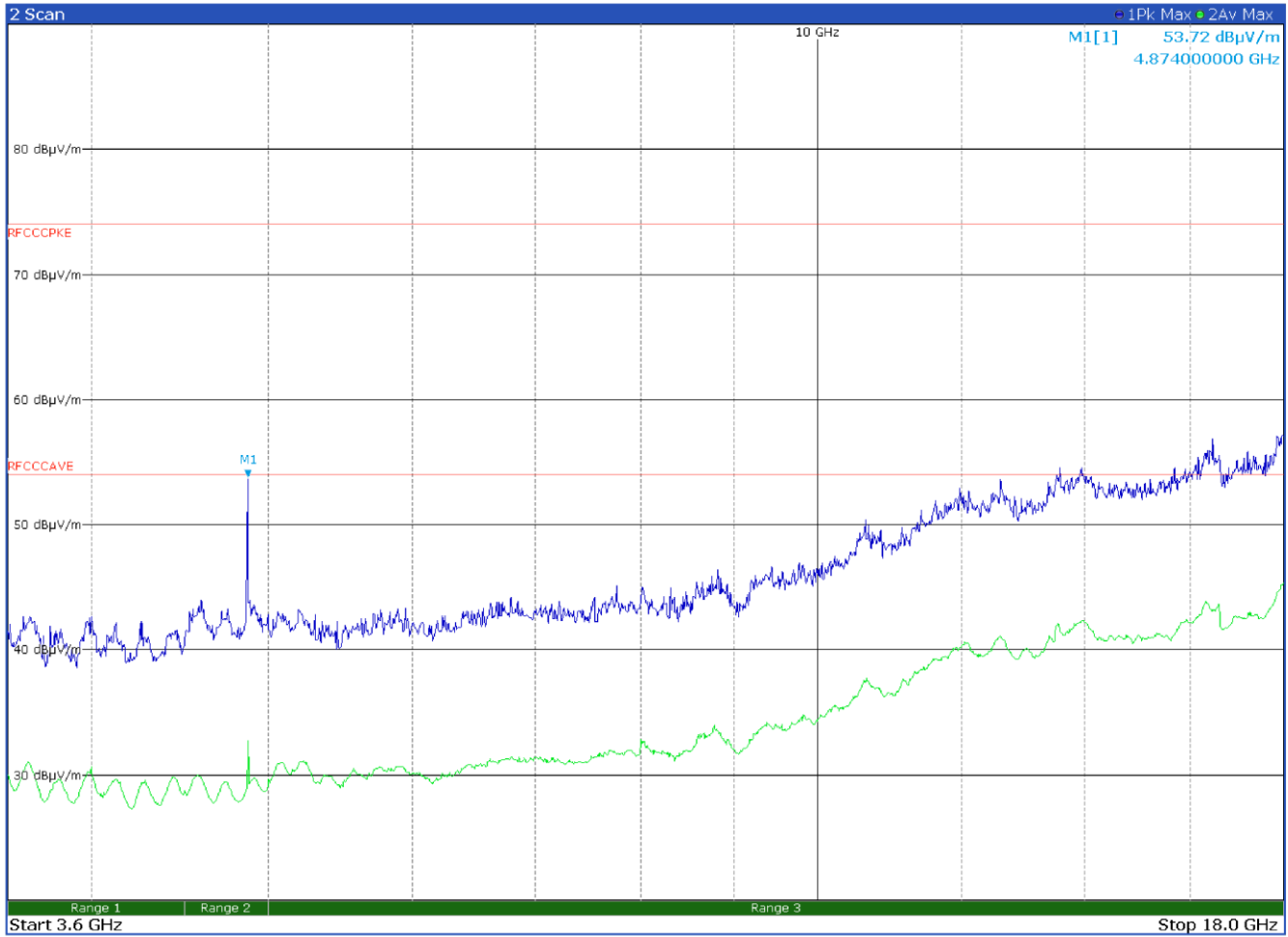
Antenna in vertical polarization – No inter-modulation product founds
Limit exceeded by carrier – All the peak found are below the average limit



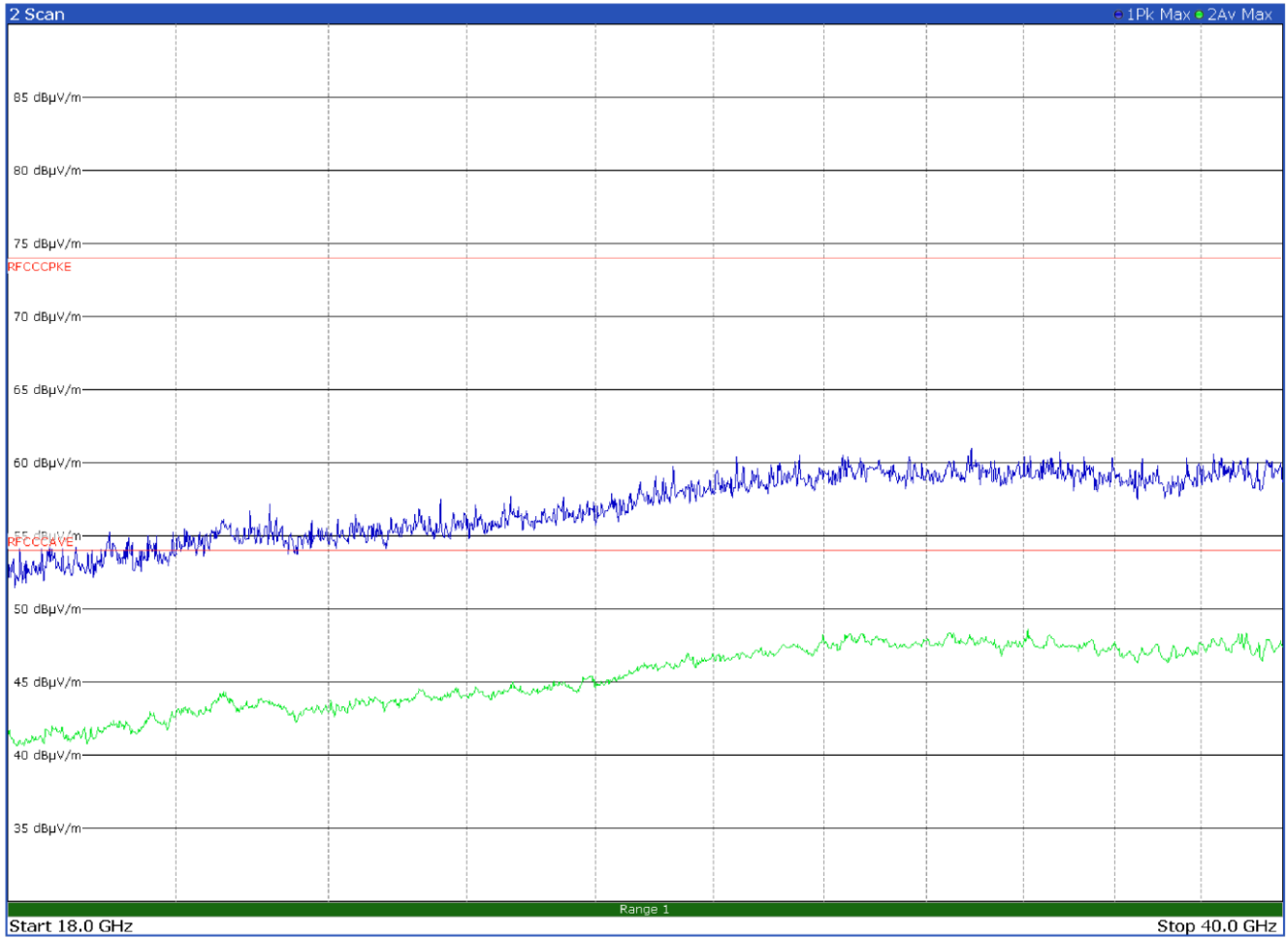
Antenna in horizontal polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
3760.0	57.7	82.2	-24.5	Peak

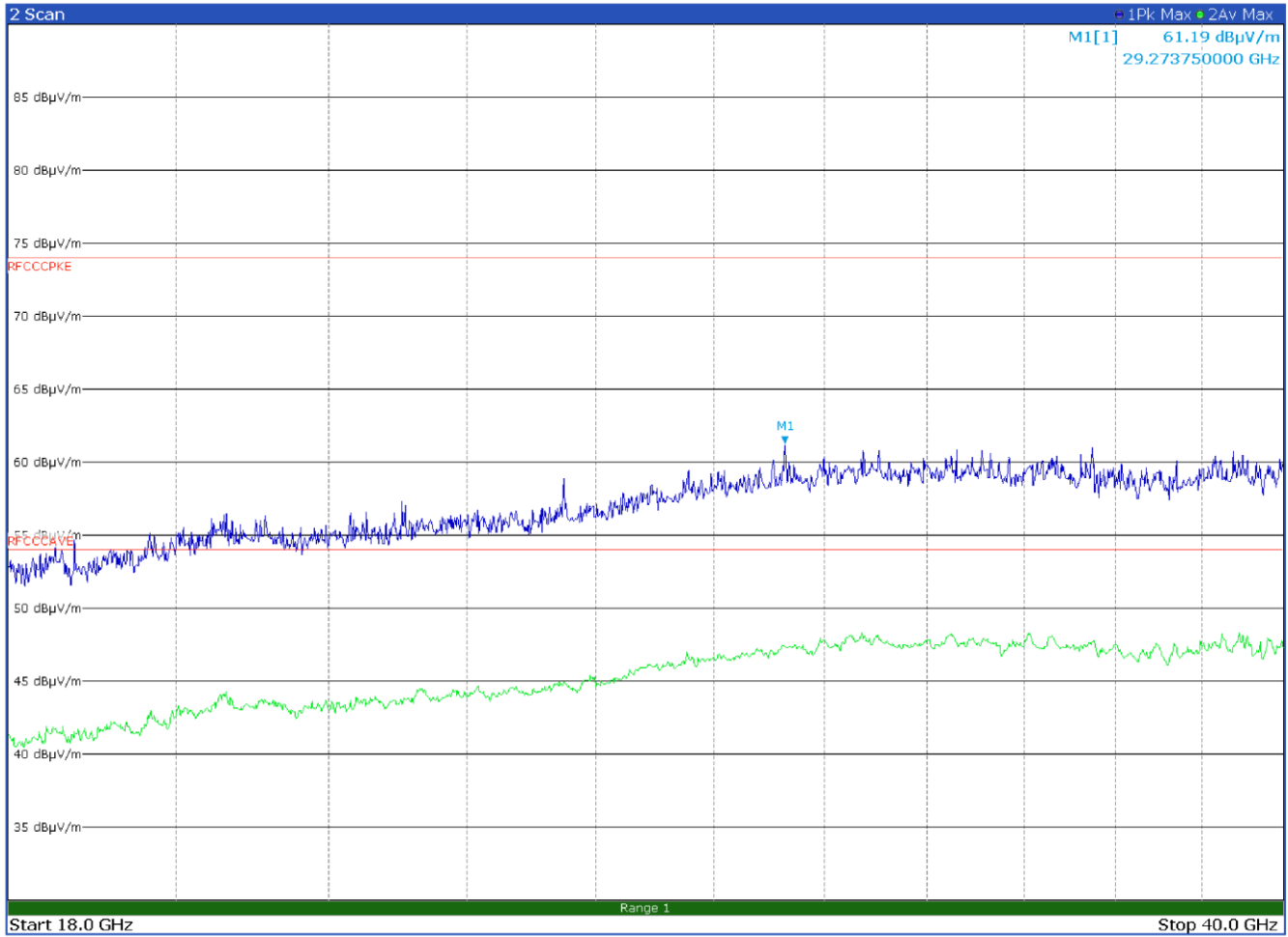
No inter-modulation product founds – All the other peak found are below the average limit



Antenna in vertical polarization – No inter-modulation product founds – All the peak found are below the average limit

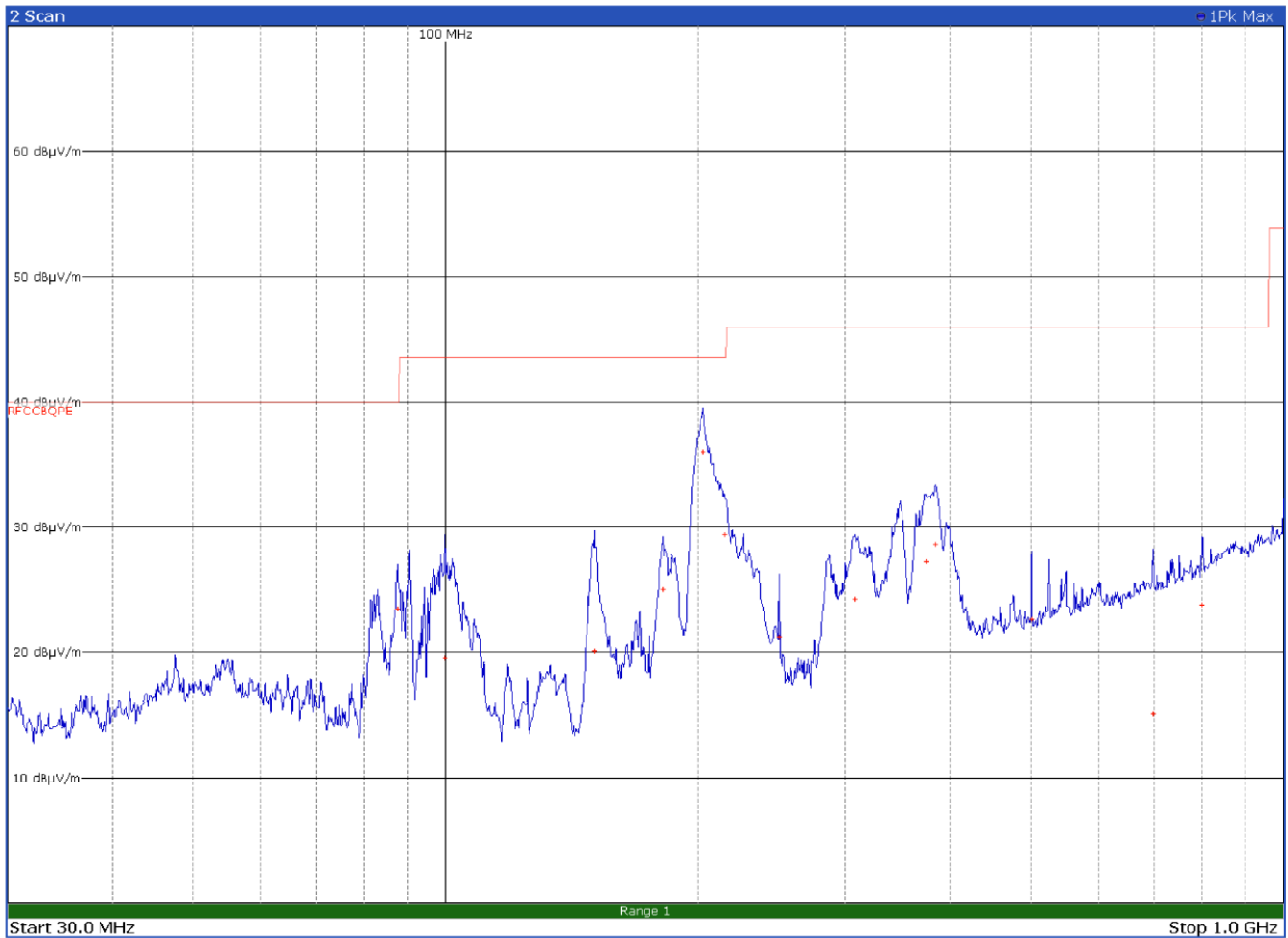


Antenna in horizontal polarization – No inter-modulation product founds



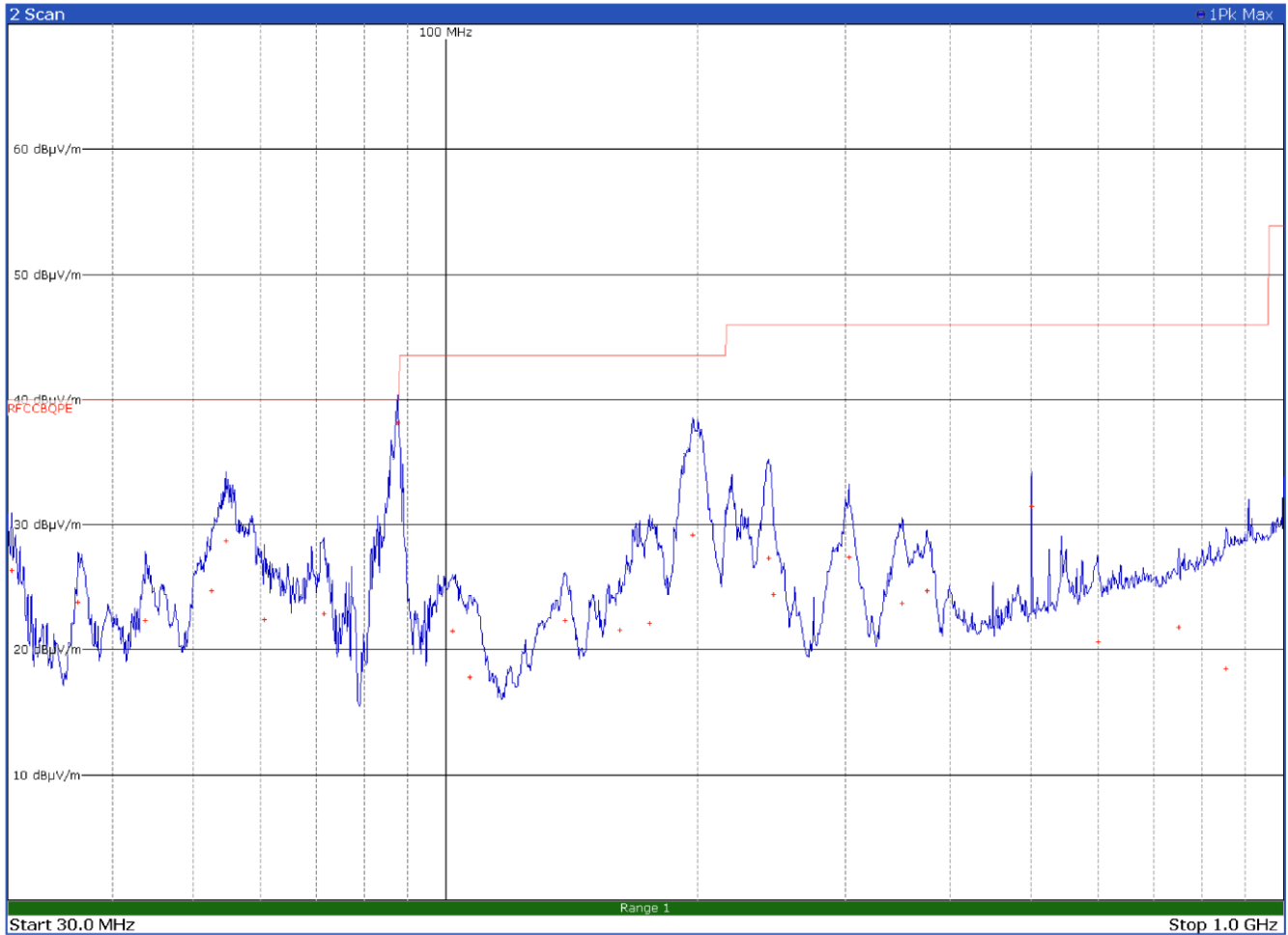
Antenna in vertical polarization – No inter-modulation product founds

8.1.5 Test data for ANTENNA SET A – PCS 1900 at 1880 MHz and WIFI 802.11a at 5300 MHz



Antenna in horizontal polarization

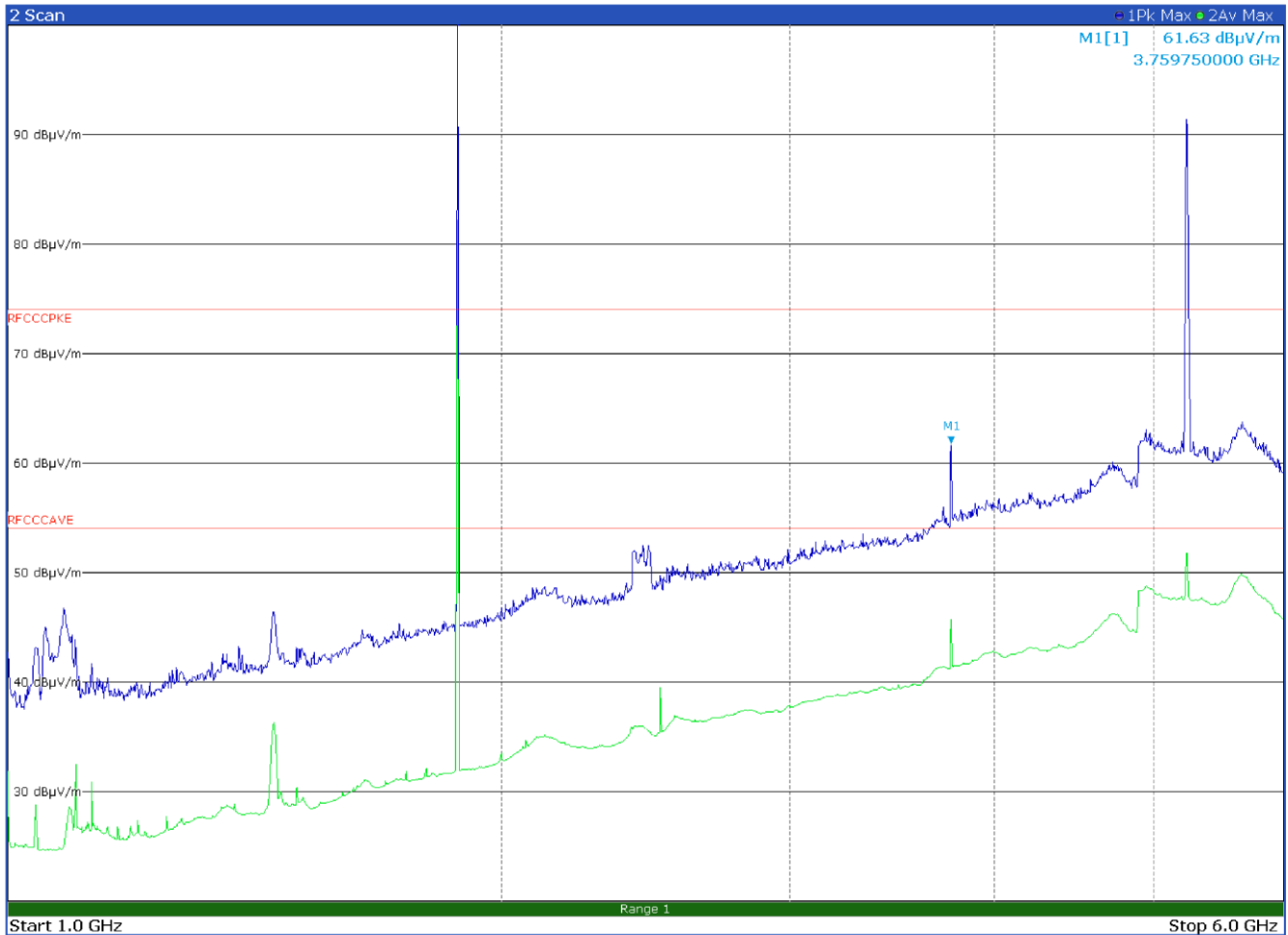
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
87.6300	23.6	40.0	-16.4	QP
99.7800	19.6	43.5	-23.9	QP
150.5700	20.2	43.5	-23.3	QP
181.7400	25.0	43.5	-18.5	QP
202.8600	36.0	43.5	-7.5	QP
214.8000	29.4	43.5	-14.1	QP
249.9900	21.3	46.0	-24.7	QP
308.0700	24.3	46.0	-21.7	QP
374.2800	27.3	46.0	-18.7	QP
384.3900	28.7	46.0	-17.3	QP
500.0400	22.7	46.0	-23.3	QP
698.1600	15.2	46.0	-30.8	QP
800.0100	23.8	46.0	-22.2	QP



Antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.3300	26.4	40.0	-13.6	QP
36.4200	23.9	40.0	-16.1	QP
43.8000	22.4	40.0	-17.6	QP
52.5600	24.7	40.0	-15.3	QP
54.6000	28.8	40.0	-11.2	QP
60.6600	22.5	40.0	-17.5	QP
71.4900	22.9	40.0	-17.1	QP
87.6300	38.2	40.0	-1.8	QP
101.9100	21.5	43.5	-22.0	QP
106.9500	17.9	43.5	-25.6	QP
138.6000	22.4	43.5	-21.1	QP
161.1300	21.6	43.5	-21.9	QP
175.0500	22.1	43.5	-21.4	QP
197.1000	29.2	43.5	-14.3	QP
242.8200	27.3	46.0	-18.7	QP
246.1500	24.5	46.0	-21.5	QP
303.0600	27.5	46.0	-18.5	QP
350.5200	23.8	46.0	-22.2	QP
375.0000	24.7	46.0	-21.3	QP
500.0400	31.5	46.0	-14.5	QP
600.0000	20.7	46.0	-25.3	QP

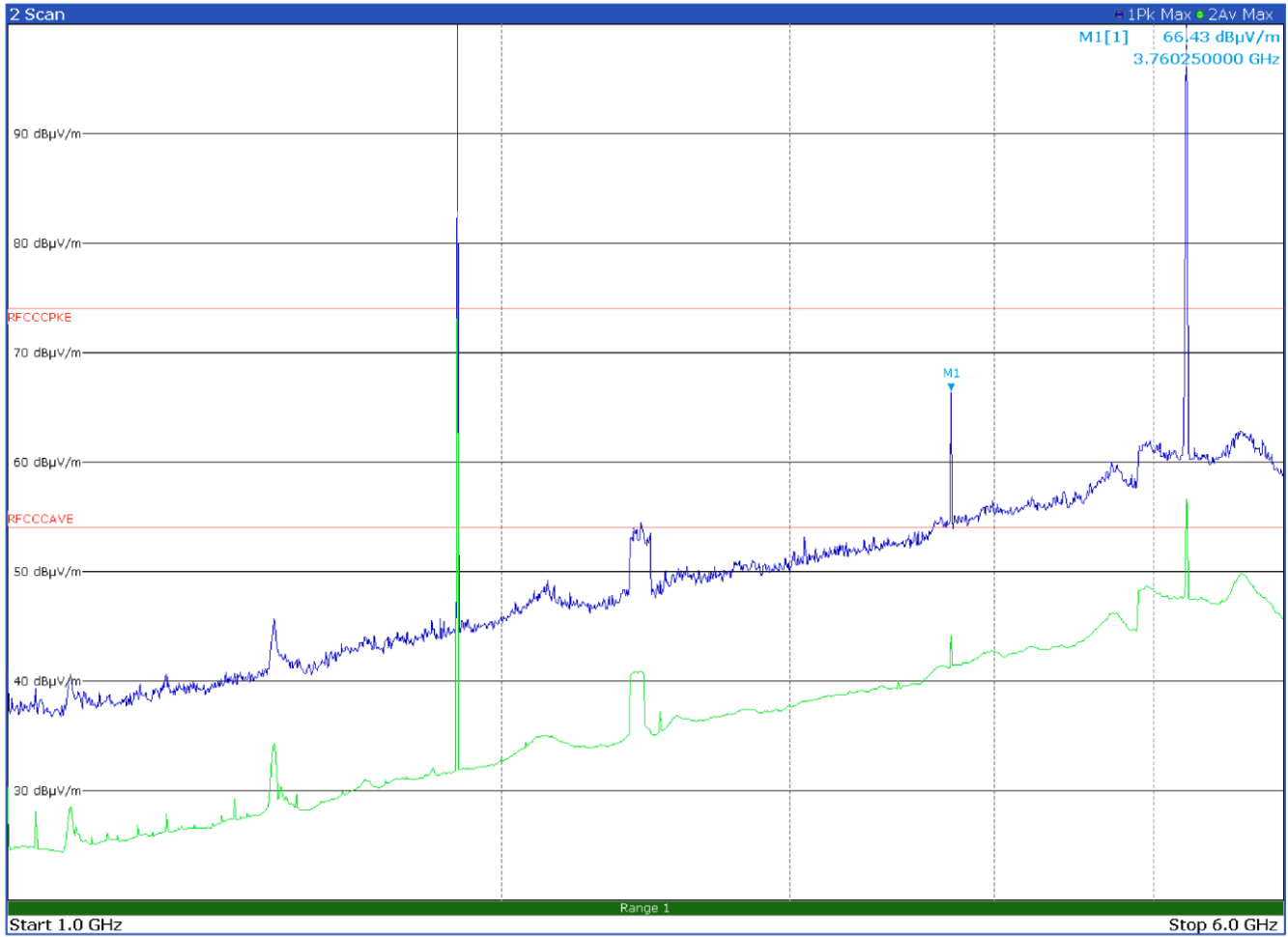
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
750.0300	21.9	46.0	-24.1	QP
853.3200	18.6	46.0	-27.4	QP



Antenna in horizontal polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
3759.7	61.6	82.2	-20.6	Peak

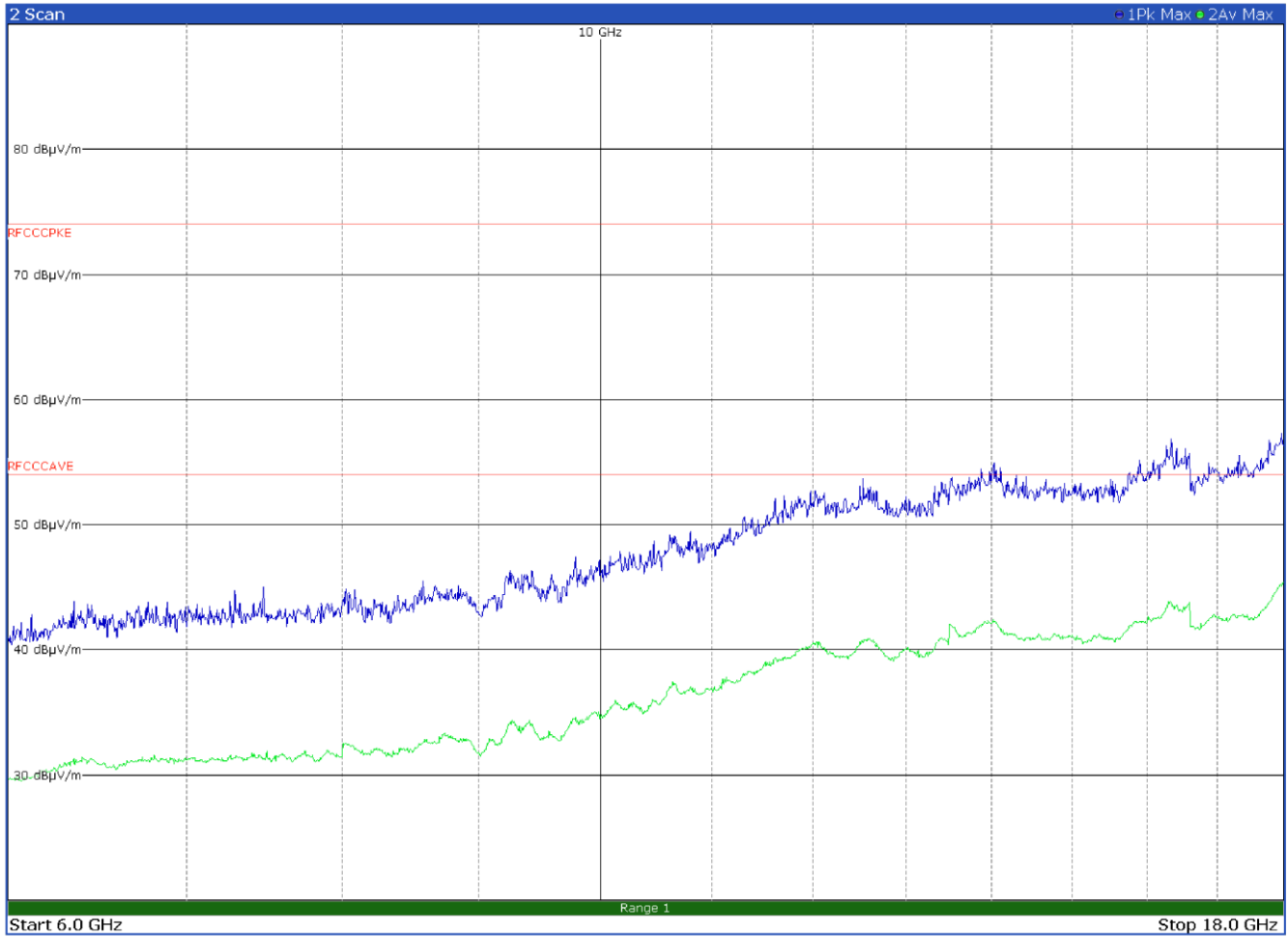
No inter-modulation product founds – All the other peak found are below the average limit



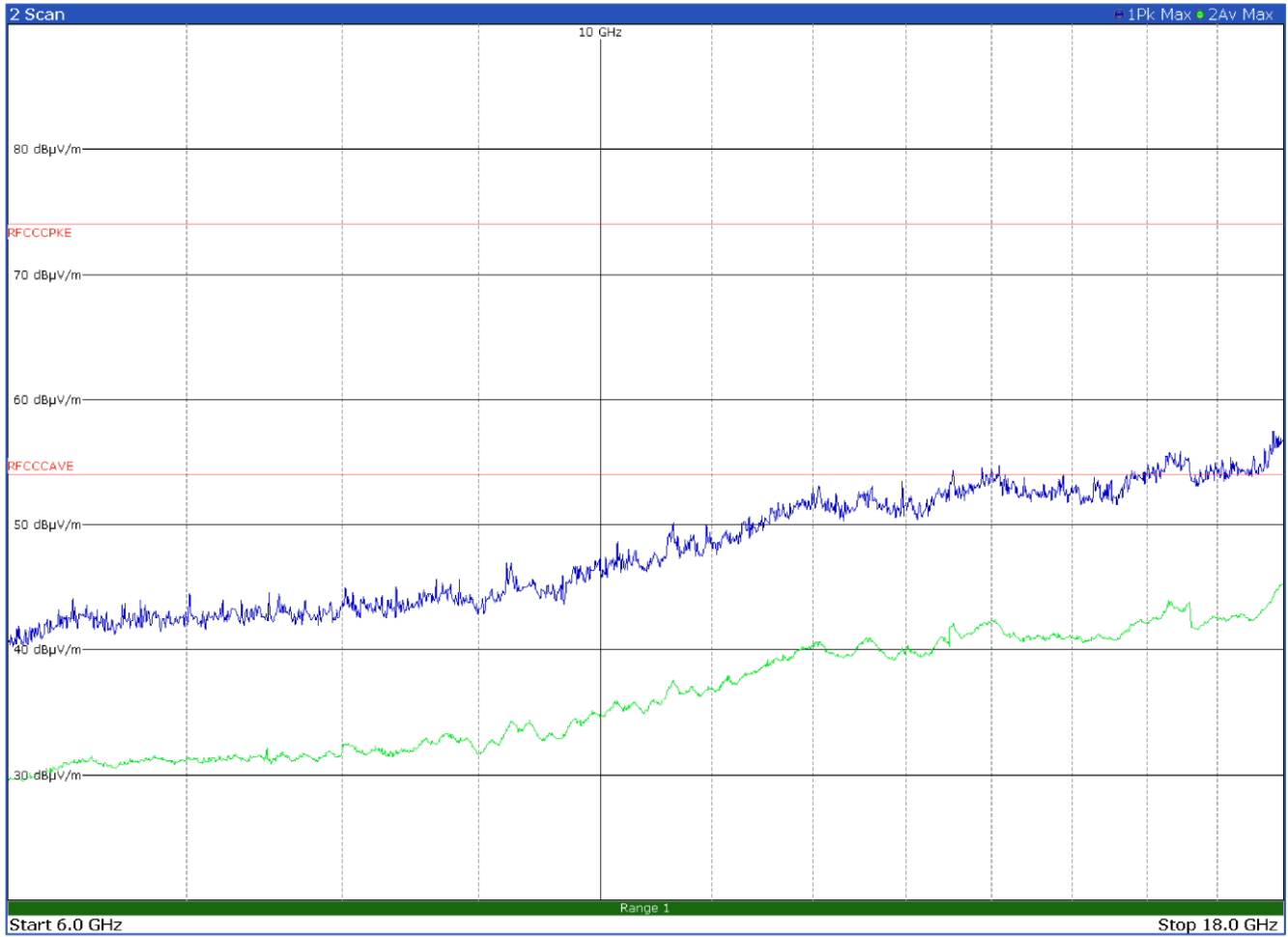
Antenna in vertical polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
3760.2	66.4	82.2	-15.8	Peak

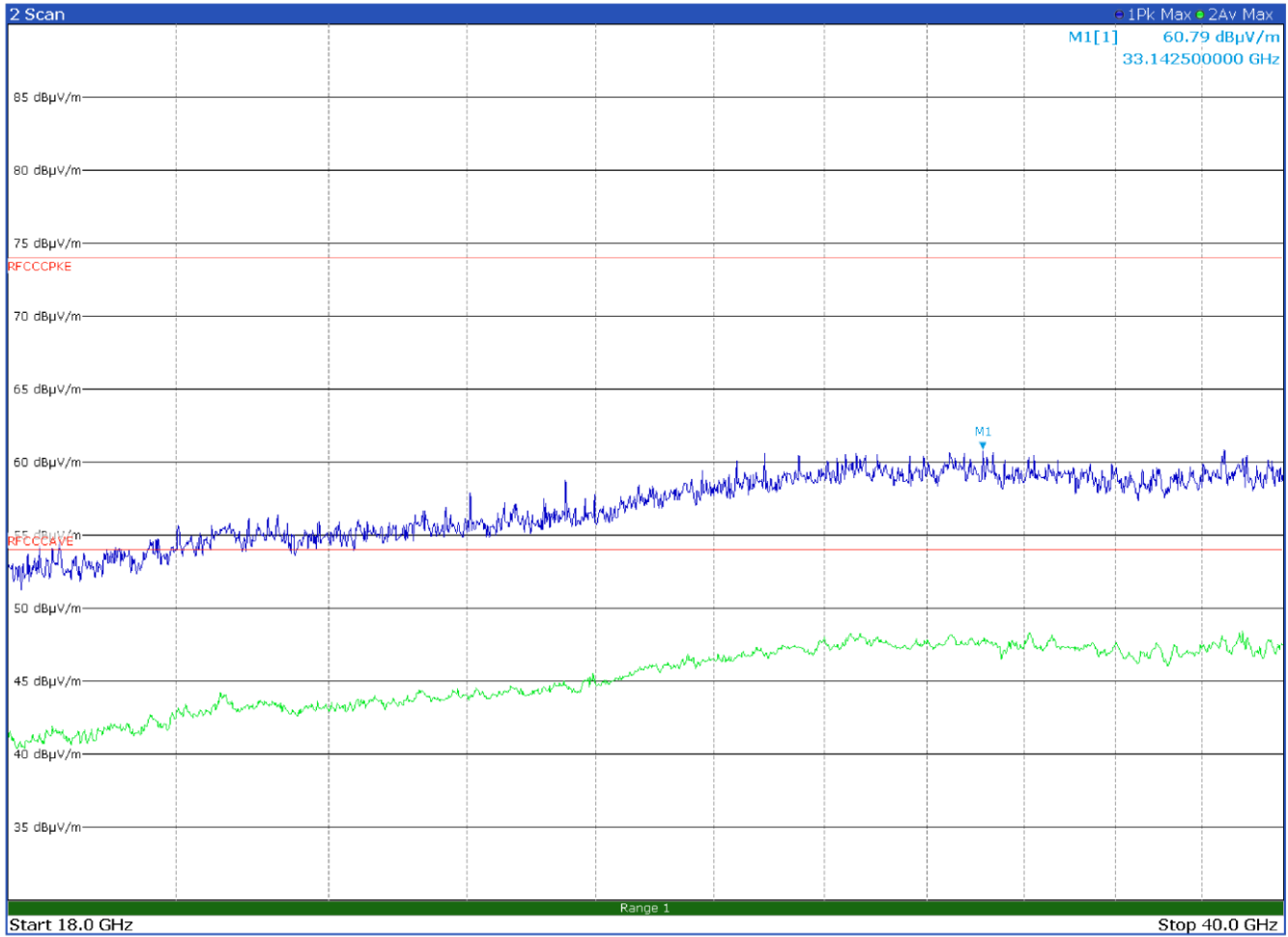
No inter-modulation product founds – All the other peak found are below the average limit



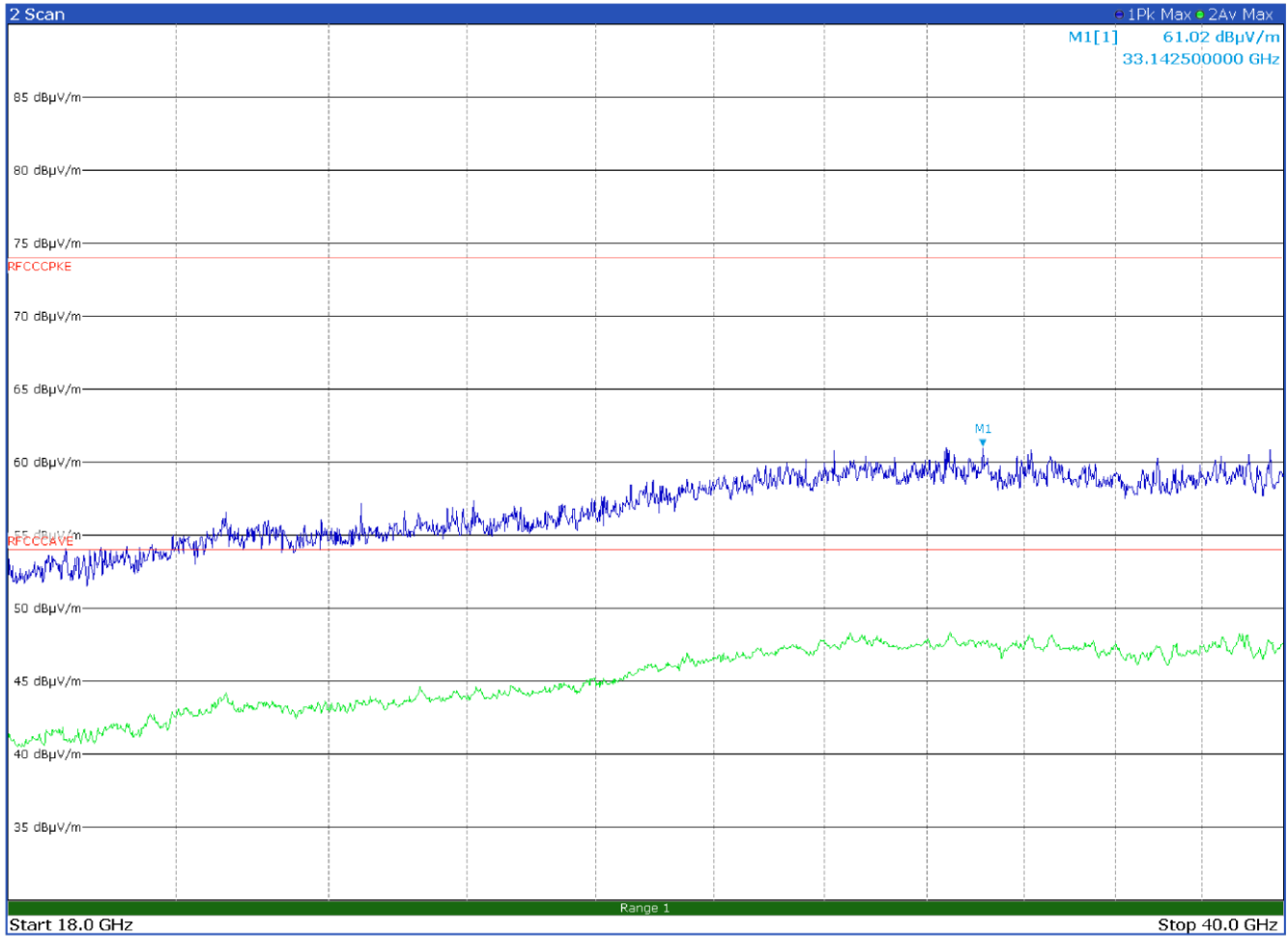
Antenna in horizontal polarization – No inter-modulation product founds



Antenna in vertical polarization – No inter-modulation product founds

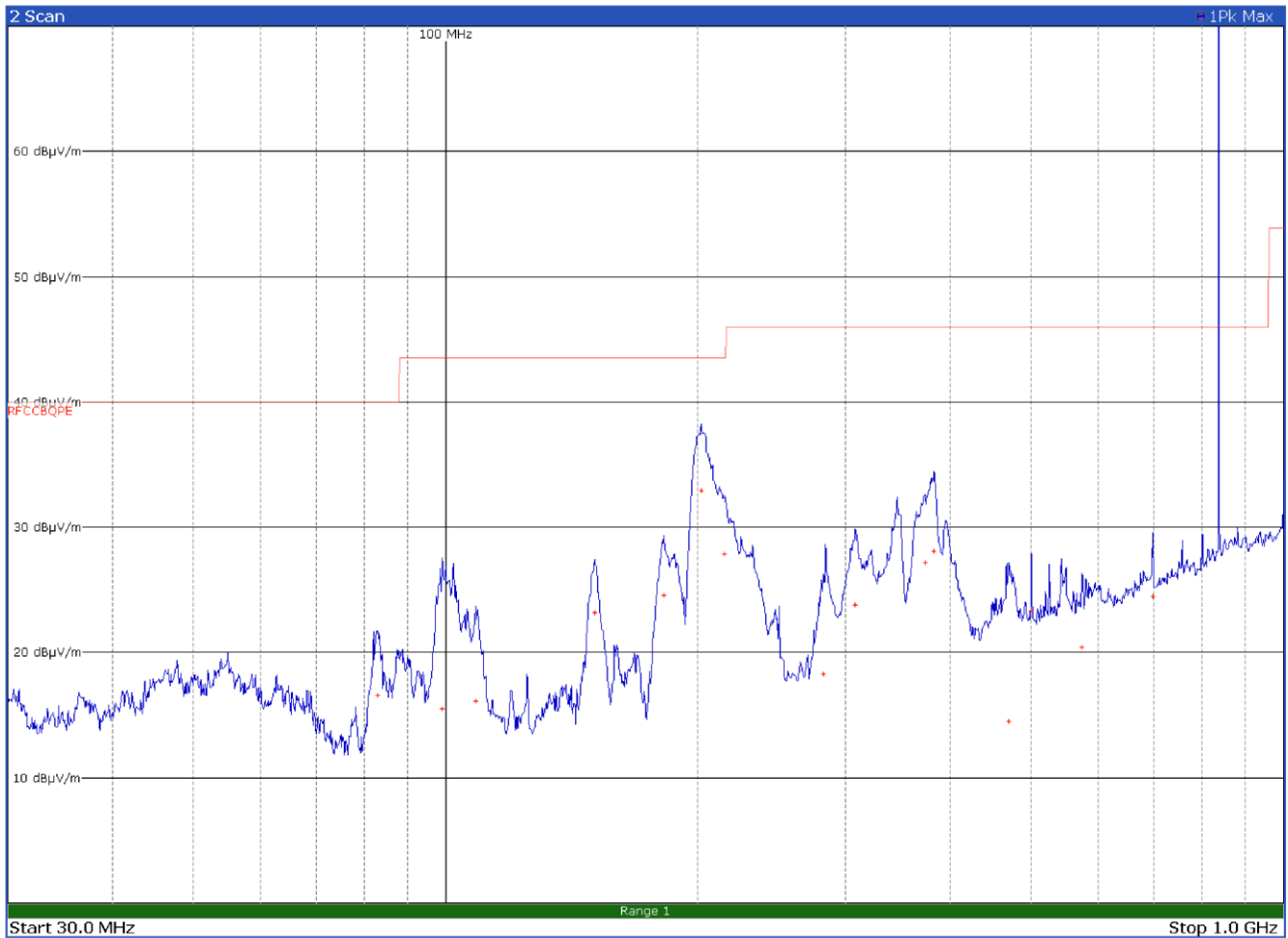


Antenna in horizontal polarization – No inter-modulation product founds



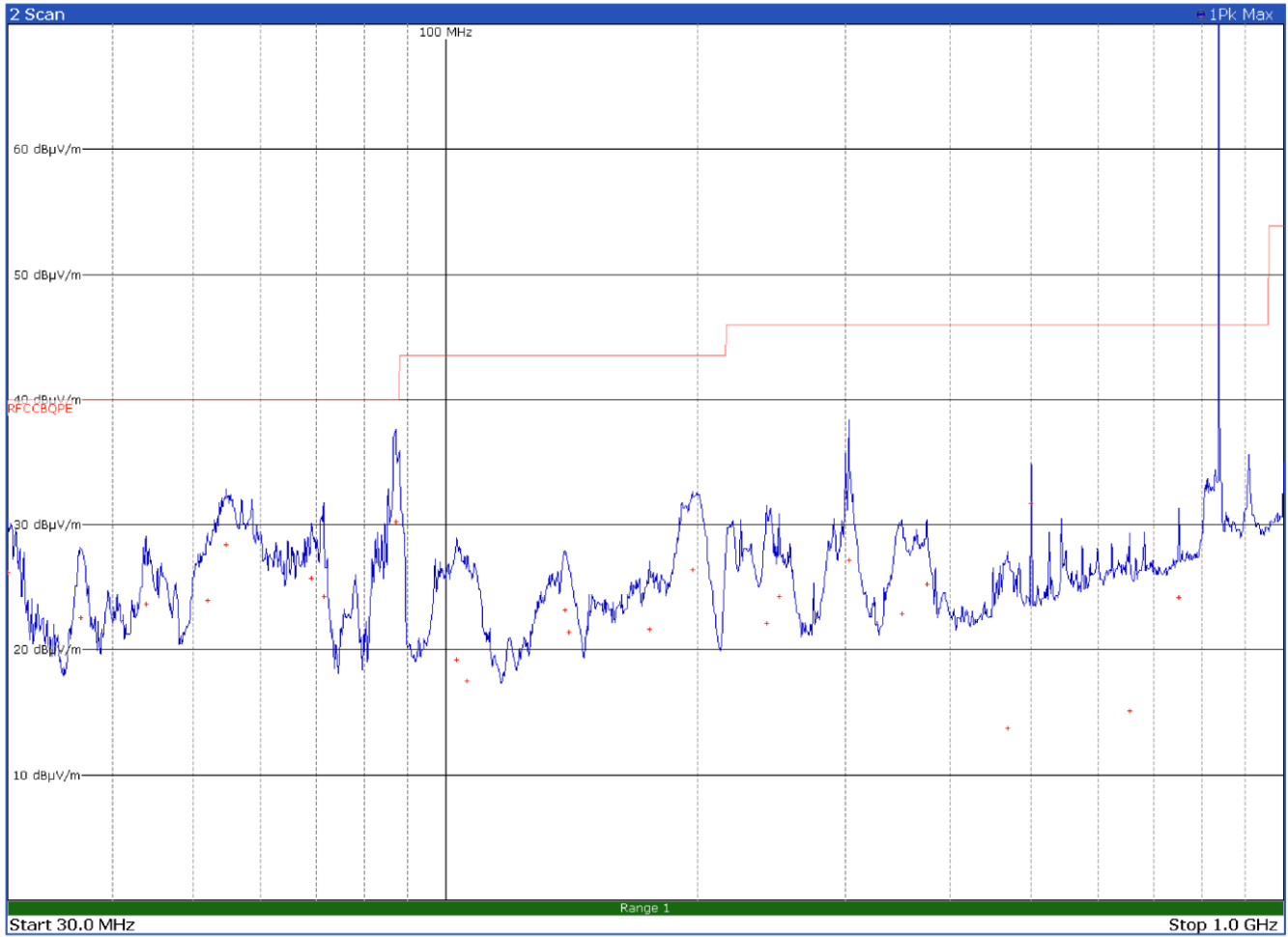
Antenna in vertical polarization – No inter-modulation product founds

8.1.6 Test data for ANTENNA SET A – GSM 850 at 836.6 MHz and WIFI 802.11g at 2437 MHz



Antenna in horizontal polarization– Limit exceeded by carrier

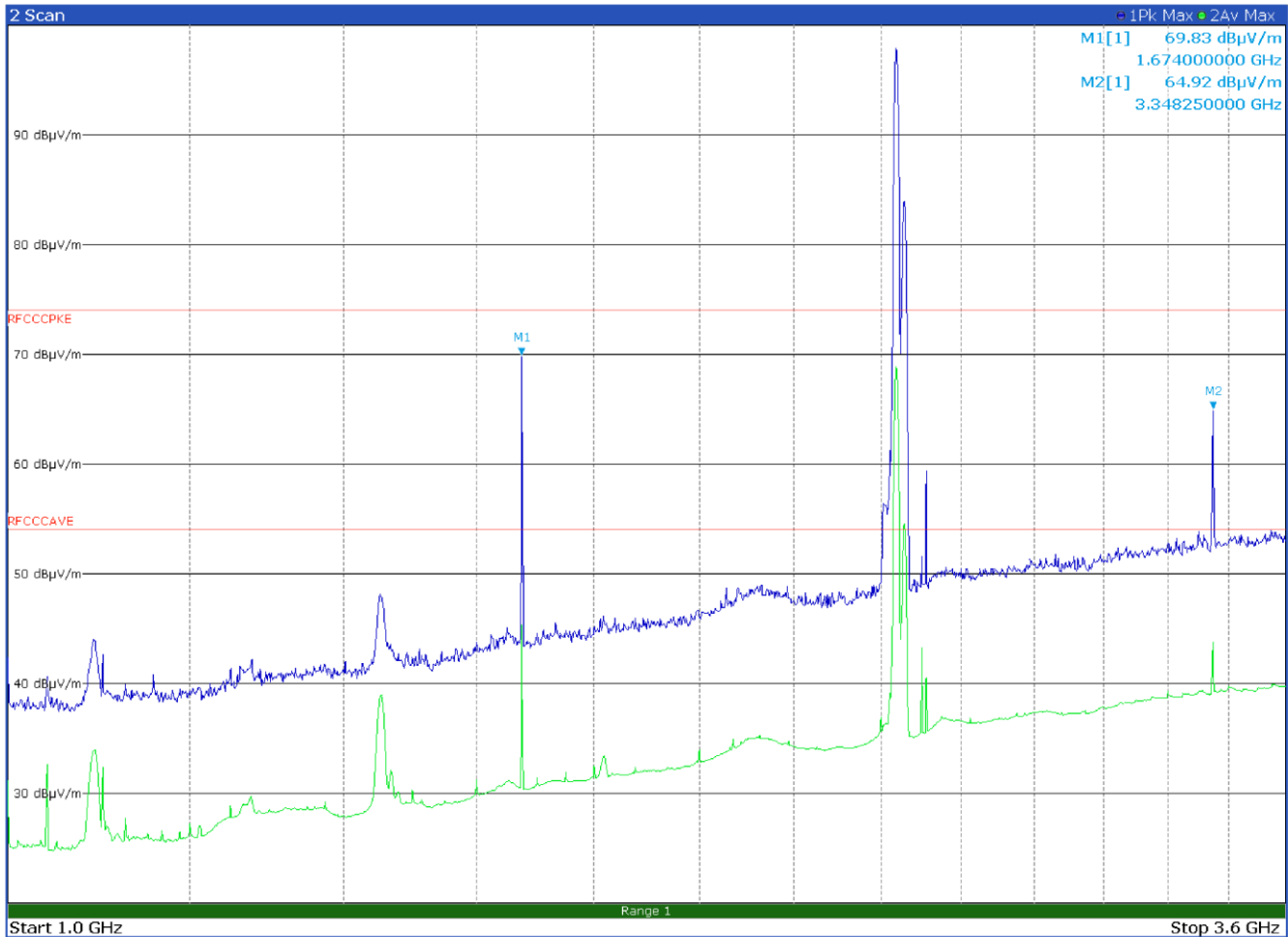
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
82.9800	16.6	40.0	-23.4	QP
99.0300	15.6	43.5	-27.9	QP
108.6300	16.2	43.5	-27.3	QP
150.4500	23.2	43.5	-20.3	QP
182.1600	24.6	43.5	-18.9	QP
201.7200	33.0	43.5	-10.5	QP
215.2500	27.9	43.5	-15.6	QP
282.5700	18.3	46.0	-27.7	QP
308.2500	23.8	46.0	-22.2	QP
373.4700	27.2	46.0	-18.8	QP
382.8600	28.2	46.0	-17.8	QP
470.2500	14.6	46.0	-31.4	QP
500.0100	23.3	46.0	-22.7	QP
575.0100	20.4	46.0	-25.6	QP
698.2200	24.5	46.0	-21.5	QP



Antenna in vertical polarization– Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	26.2	40.0	-13.8	QP
36.6300	22.6	40.0	-17.4	QP
43.8300	23.7	40.0	-16.3	QP
51.9300	24.0	40.0	-16.0	QP
54.6600	28.4	40.0	-11.6	QP
69.1500	25.7	40.0	-14.3	QP
71.4600	24.3	40.0	-15.7	QP
87.1200	30.3	40.0	-9.7	QP
103.0500	19.2	43.5	-24.3	QP
106.1100	17.5	43.5	-26.0	QP
138.6300	23.2	43.5	-20.3	QP
140.3700	21.5	43.5	-22.0	QP
175.0200	21.7	43.5	-21.8	QP
197.0400	26.5	43.5	-17.0	QP
241.4400	22.1	46.0	-23.9	QP
249.9900	24.3	46.0	-21.7	QP
303.0300	27.2	46.0	-18.8	QP
350.2800	23.0	46.0	-23.0	QP
375.0000	25.3	46.0	-20.7	QP
468.6300	13.8	46.0	-32.2	QP
500.0100	31.8	46.0	-14.2	QP

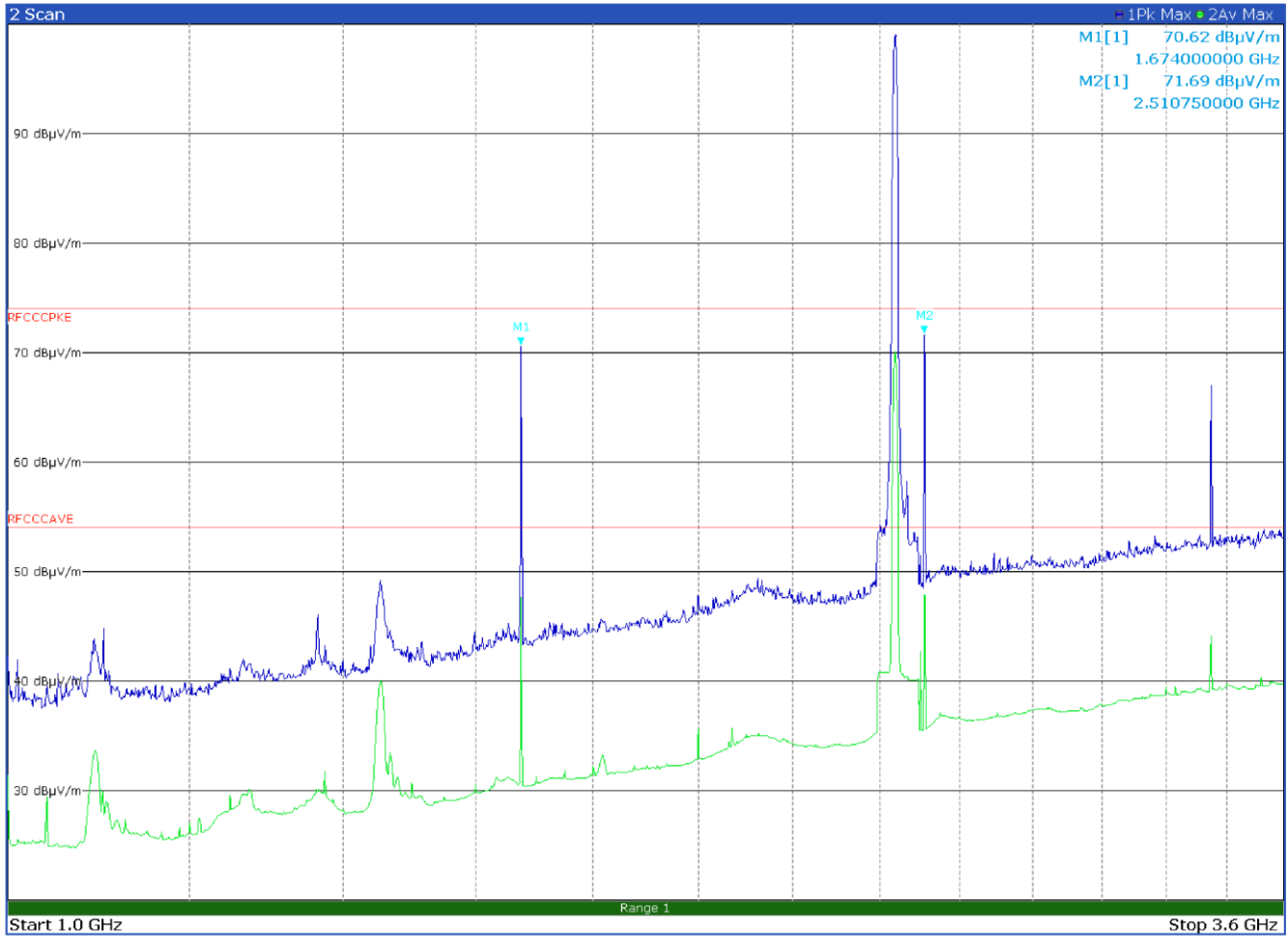
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
655.6200	15.2	46.0	-30.8	QP
750.0000	24.2	46.0	-21.8	QP



Antenna in horizontal polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1674.0	63.8	82.2	-18.4	Peak
2510.0	59.1	82.2	-23.1	Peak
3348.2	64.9	82.2	-17.3	Peak

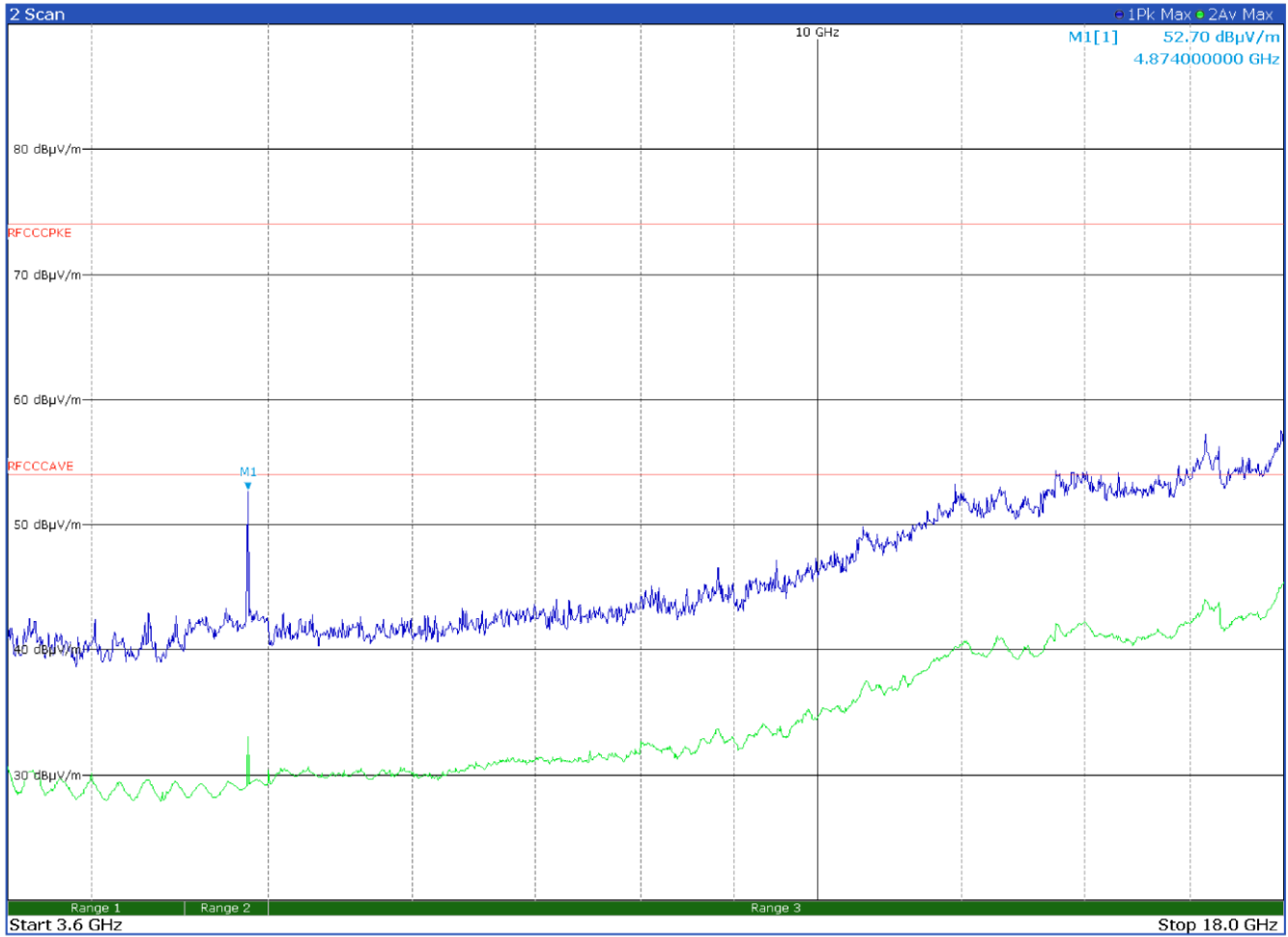
No inter-modulation product founds – All the other peak found are below the average limit



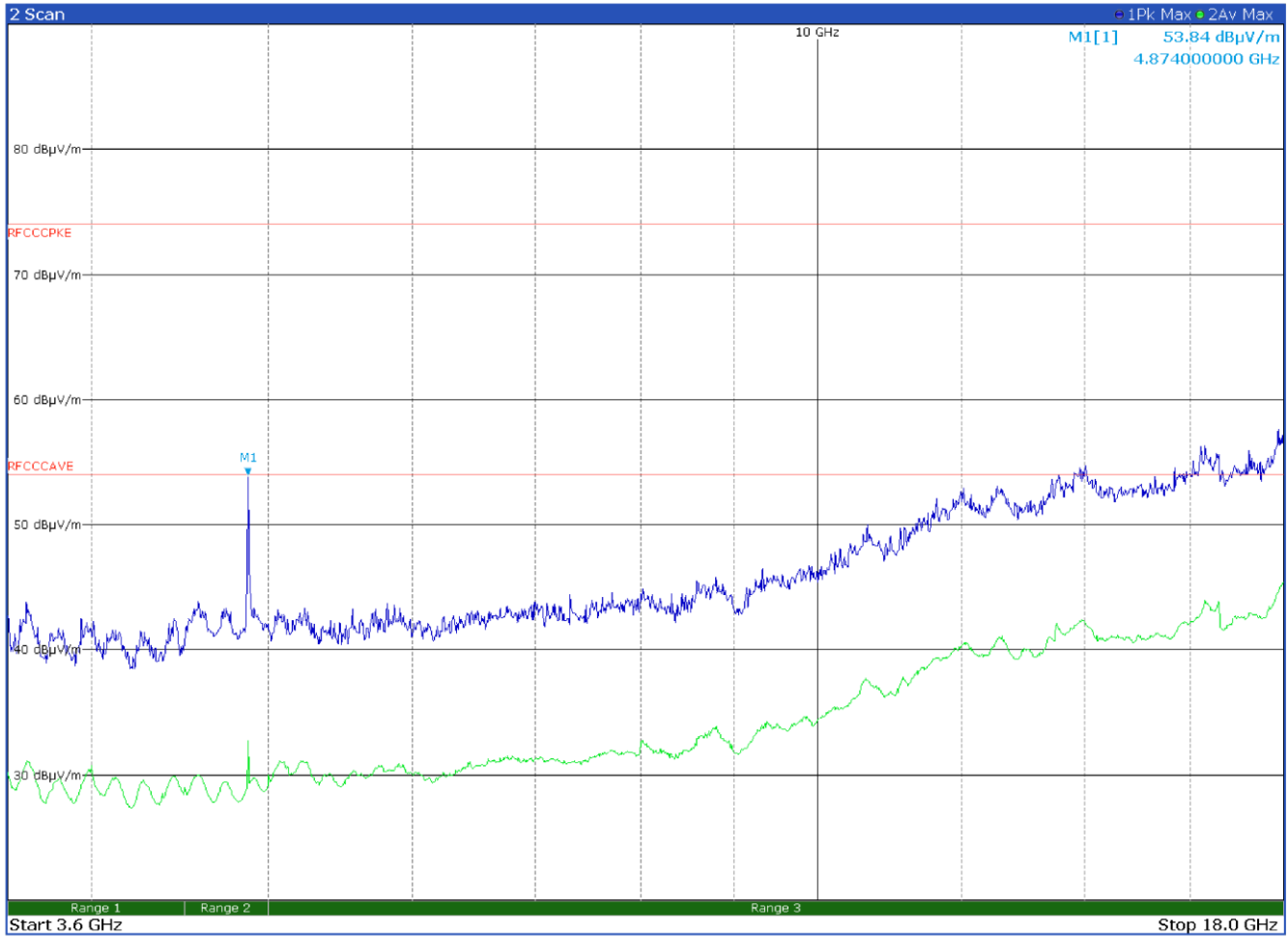
Antenna in vertical polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1674.0	70.6	82.2	-11.6	Peak
2510.7	71.7	82.2	-10.5	Peak
3345.2	68.3	82.2	-13.9	Peak

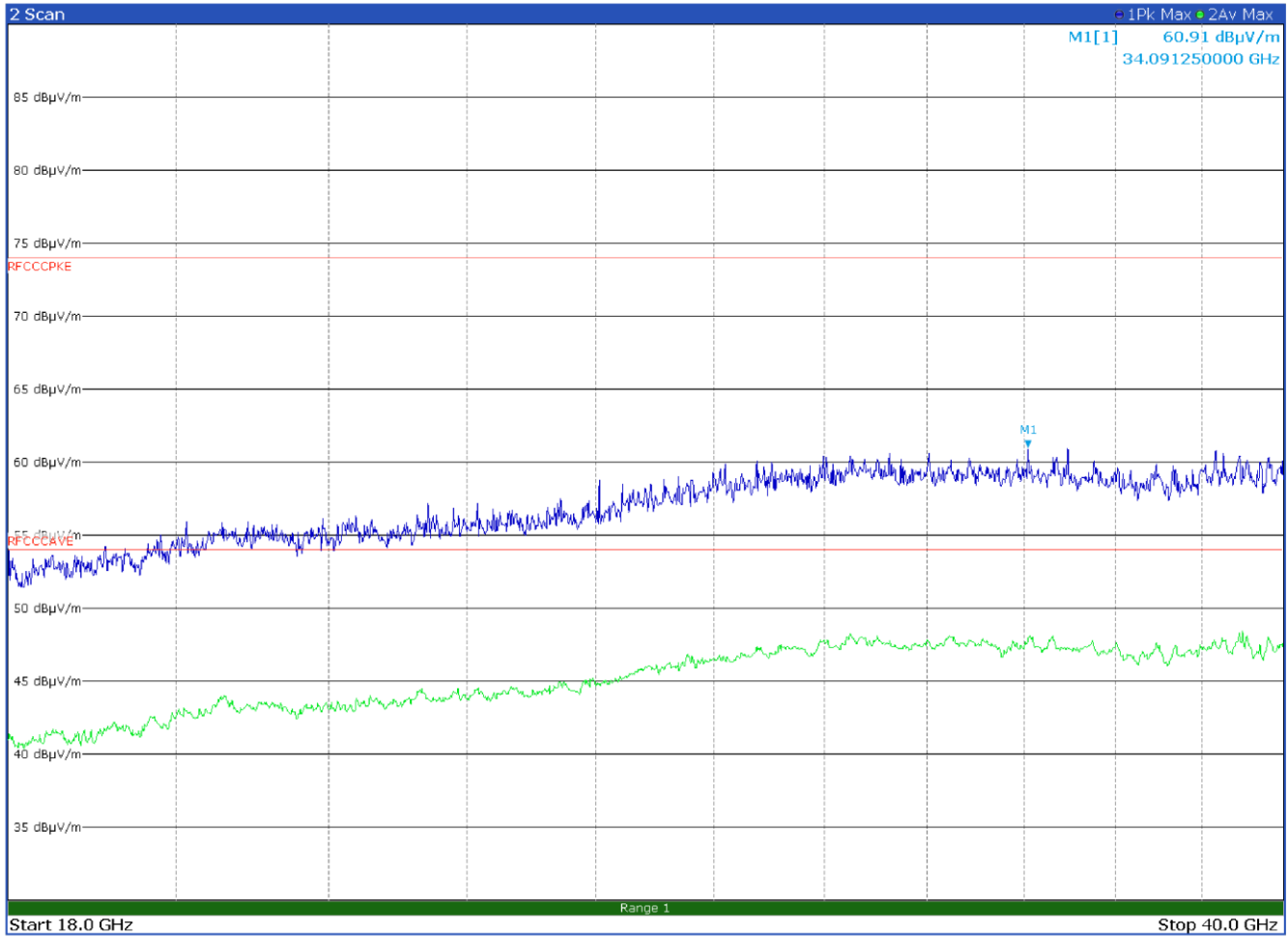
No inter-modulation product founds – All the other peak found are below the average limit



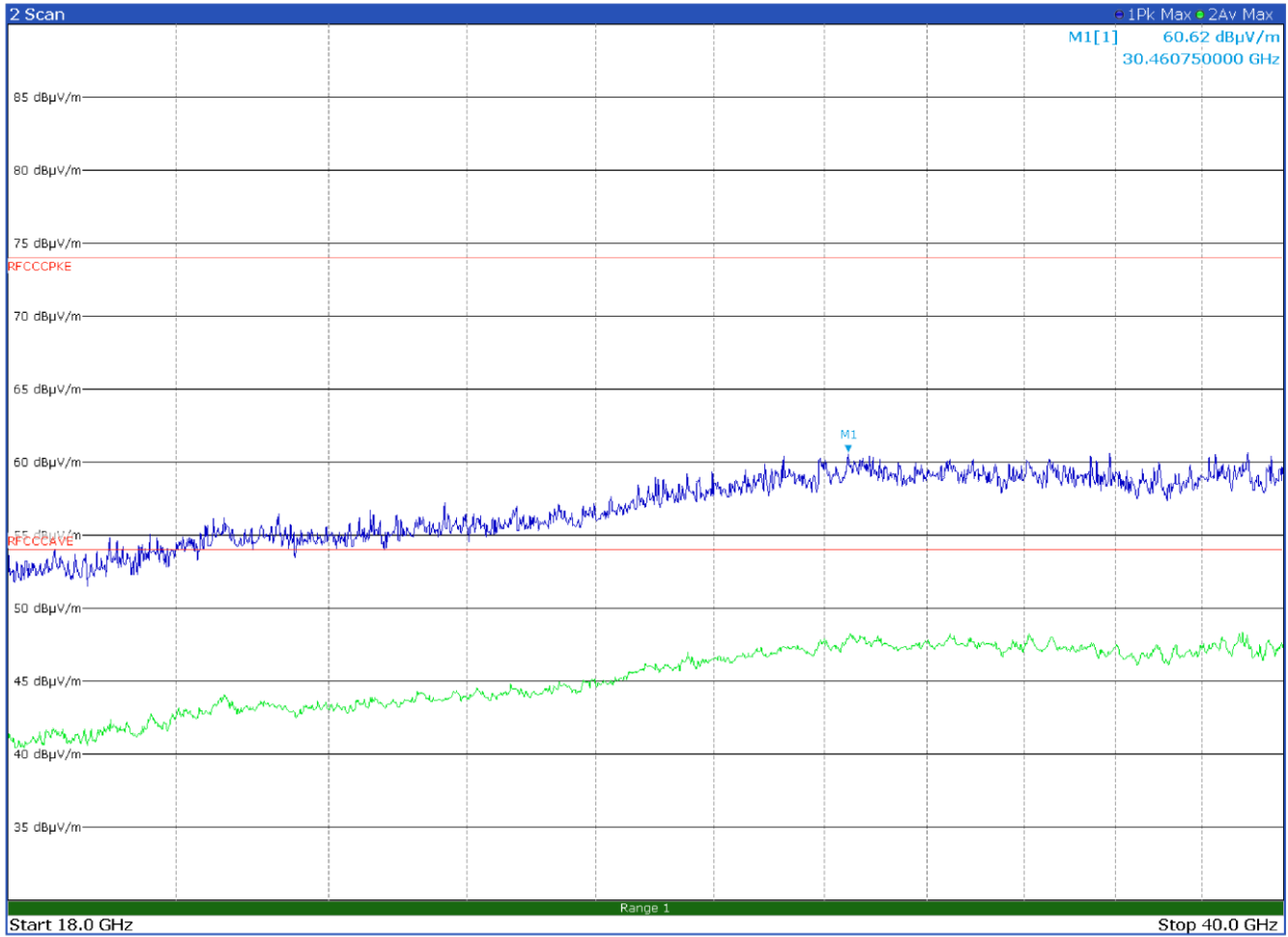
Antenna in horizontal polarization – No inter-modulation product founds – All the peak found are below the average limit



Antenna in vertical polarization – No inter-modulation product founds – All the peak found are below the average limit

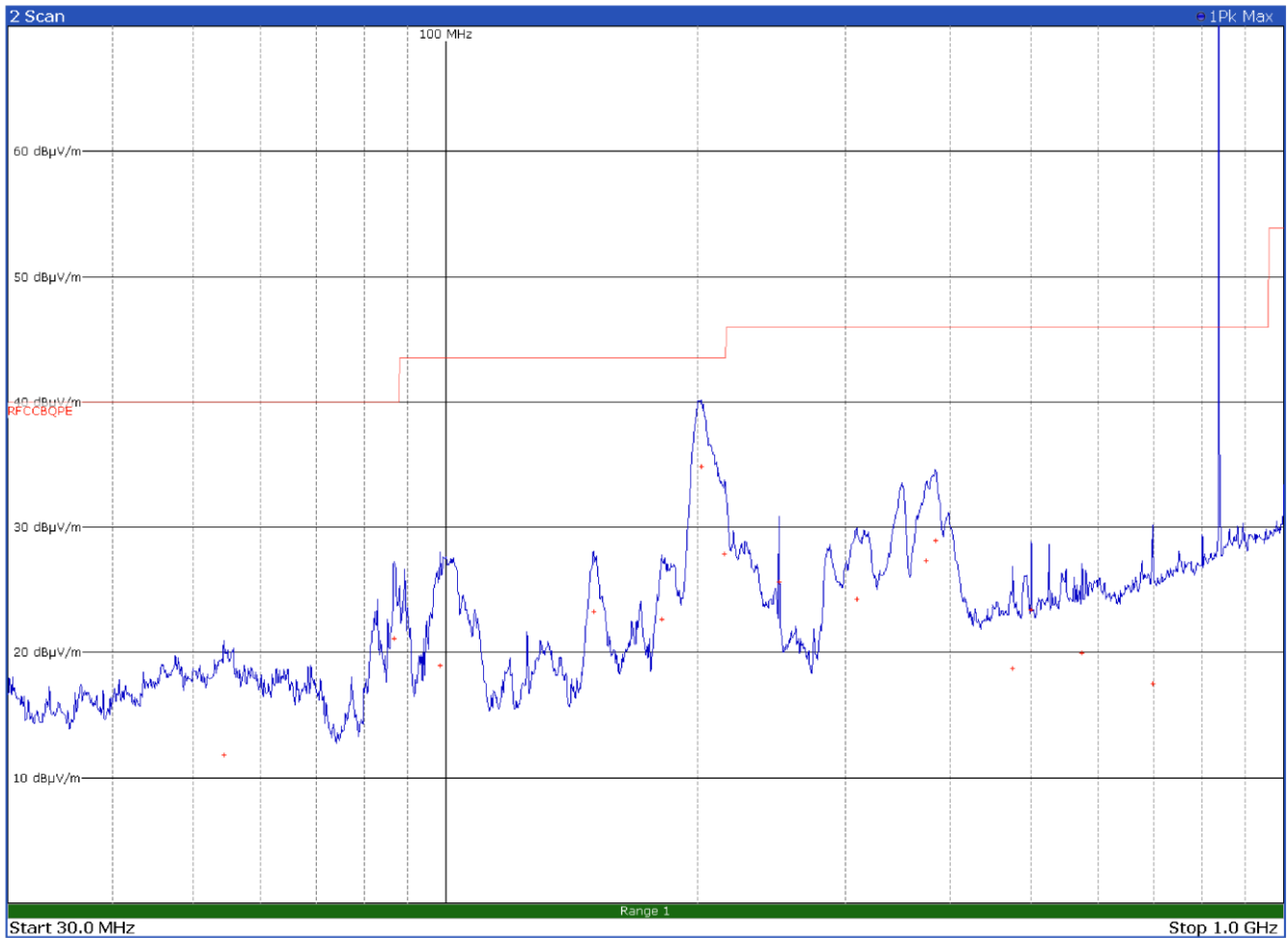


Antenna in horizontal polarization – No inter-modulation product founds



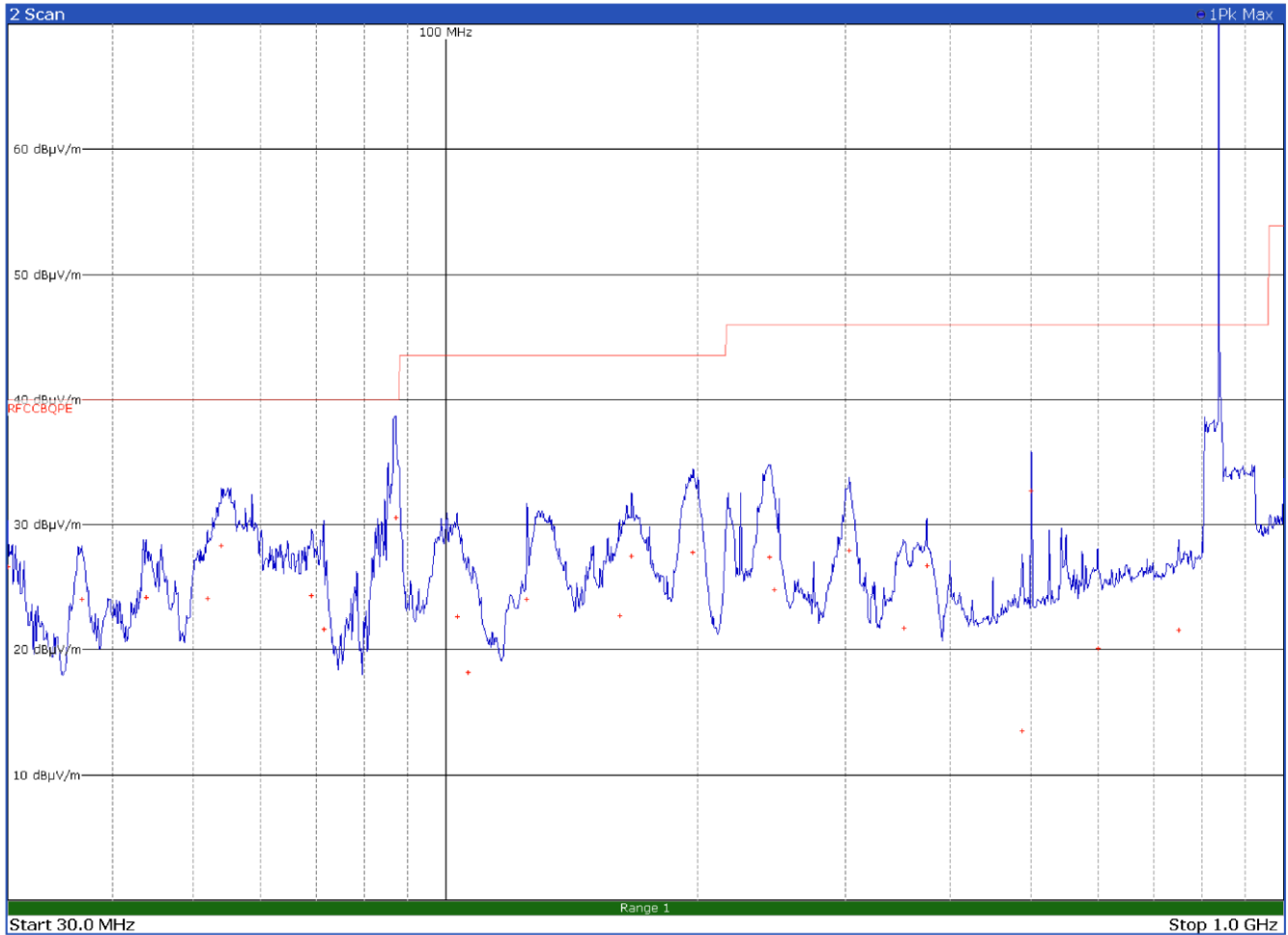
Antenna in vertical polarization – No inter-modulation product founds

8.1.7 Test data for ANTENNA SET A – GSM 850 at 836.6 MHz and WIFI 802.11a at 5300 MHz



Antenna in horizontal polarization – Limit exceeded by carrier

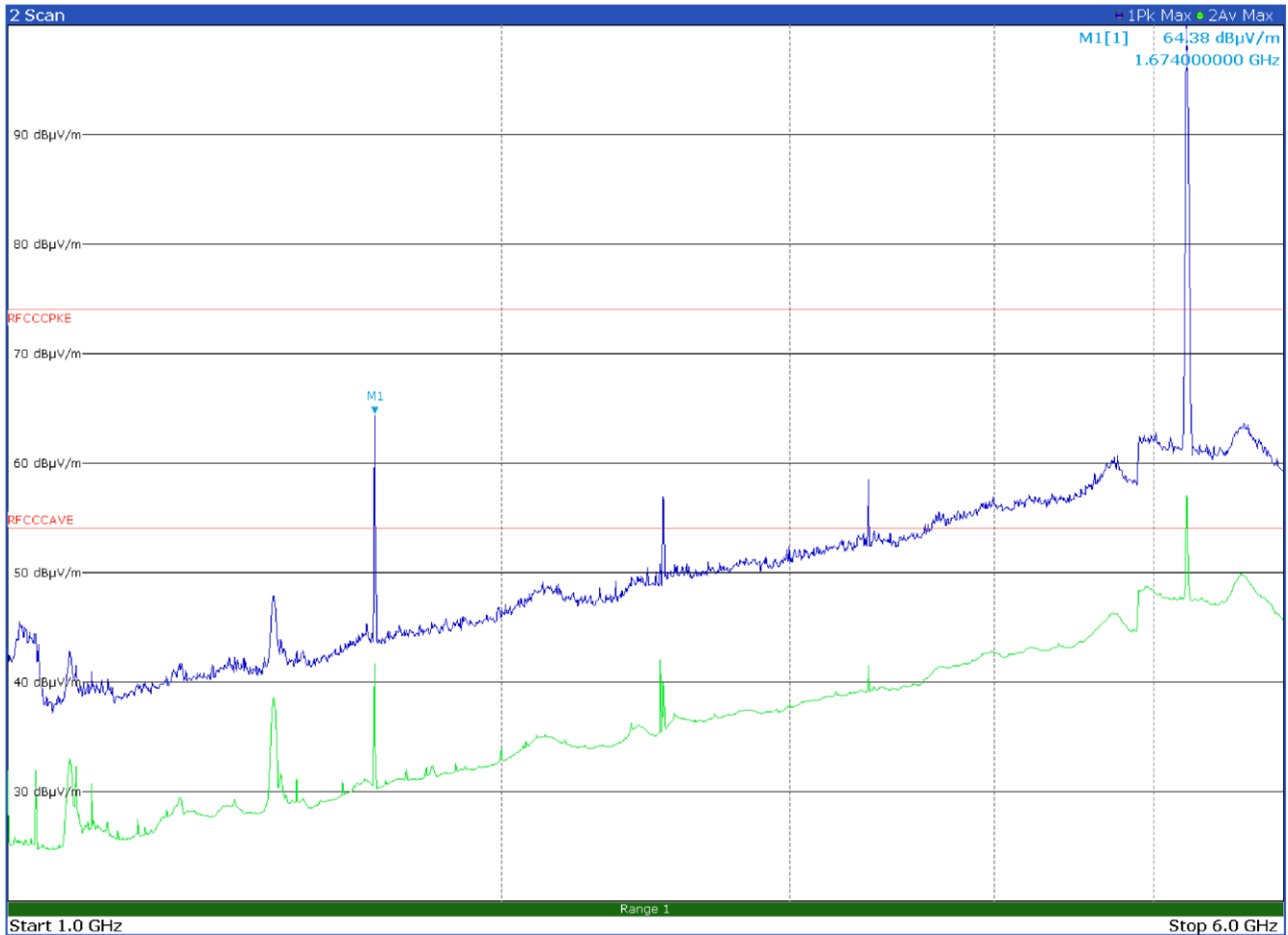
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
54.3000	11.9	40.0	-28.1	QP
86.7300	21.2	40.0	-18.8	QP
98.4000	19.0	43.5	-24.5	QP
150.0000	23.3	43.5	-20.2	QP
181.0500	22.7	43.5	-20.8	QP
201.6900	34.9	43.5	-8.6	QP
215.3400	27.9	43.5	-15.6	QP
250.0200	25.7	46.0	-20.3	QP
309.5100	24.3	46.0	-21.7	QP
374.1000	27.3	46.0	-18.7	QP
384.0000	28.9	46.0	-17.1	QP
475.0200	18.8	46.0	-27.2	QP
500.0100	23.5	46.0	-22.5	QP
575.0100	20.0	46.0	-26.0	QP
698.1900	17.6	46.0	-28.4	QP



Antenna in vertical polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	26.7	40.0	-13.3	QP
36.7500	24.1	40.0	-15.9	QP
43.8300	24.2	40.0	-15.8	QP
51.9000	24.2	40.0	-15.8	QP
53.9400	28.4	40.0	-11.6	QP
69.1200	24.4	40.0	-15.6	QP
71.4600	21.7	40.0	-18.3	QP
87.1200	30.6	40.0	-9.4	QP
103.1100	22.7	43.5	-20.8	QP
106.4100	18.2	43.5	-25.3	QP
124.9800	24.1	43.5	-19.4	QP
161.1000	22.8	43.5	-20.7	QP
166.6800	27.5	43.5	-16.0	QP
197.3400	27.8	43.5	-15.7	QP
243.7200	27.5	46.0	-18.5	QP
246.7800	24.9	46.0	-21.1	QP
303.2400	28.0	46.0	-18.0	QP
352.0500	21.8	46.0	-24.2	QP
375.0000	26.8	46.0	-19.2	QP
487.8300	13.5	46.0	-32.5	QP
500.0100	32.8	46.0	-13.2	QP

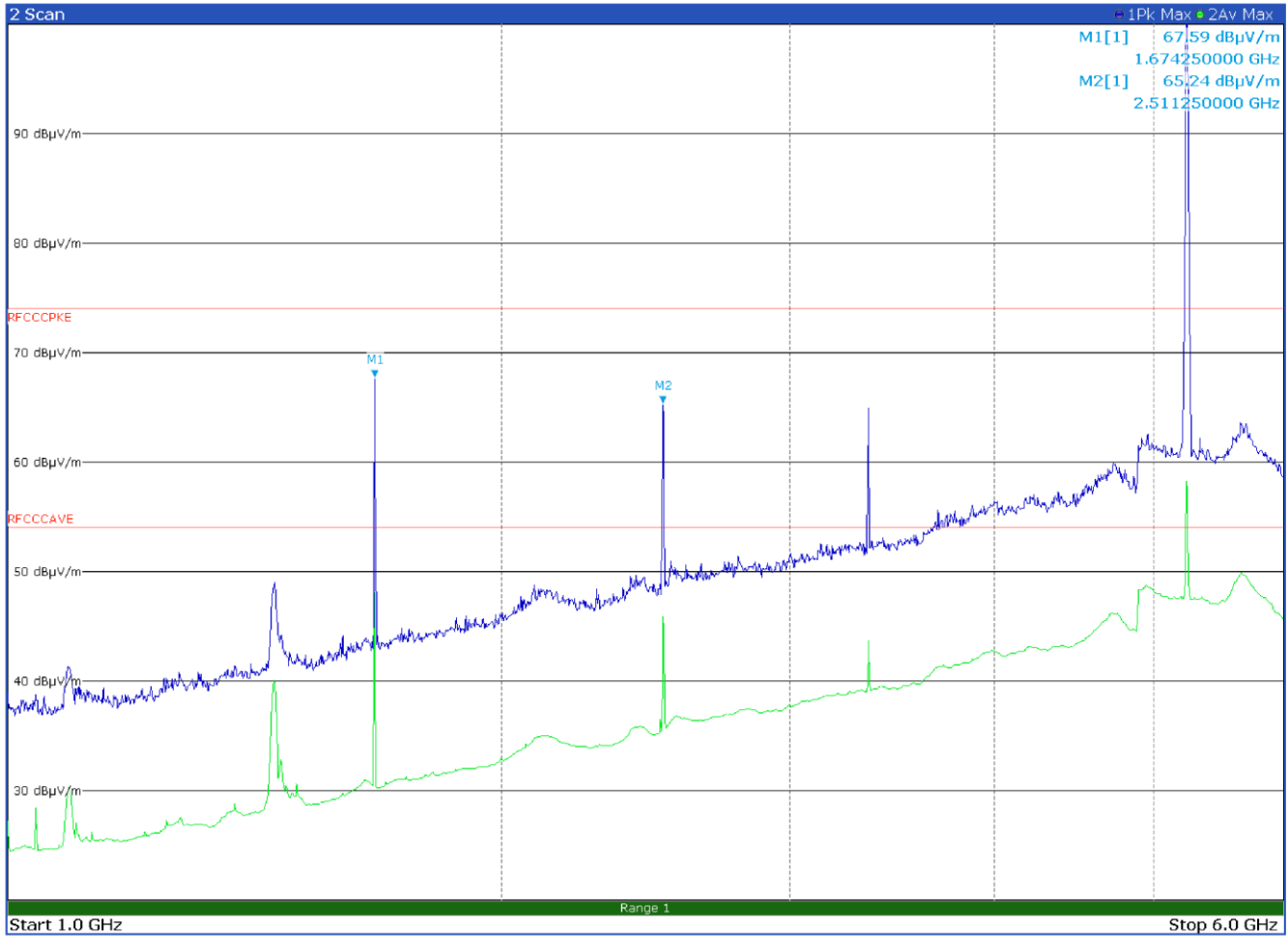
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
600.0000	20.2	46.0	-25.8	QP
750.0000	21.6	46.0	-24.4	QP



Antenna in horizontal polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
1674.0	63.4	82.2	-18.8	Peak
2510.0	58.3	82.2	-23.9	Peak
3348.2	58.9	82.2	-23.3	Peak

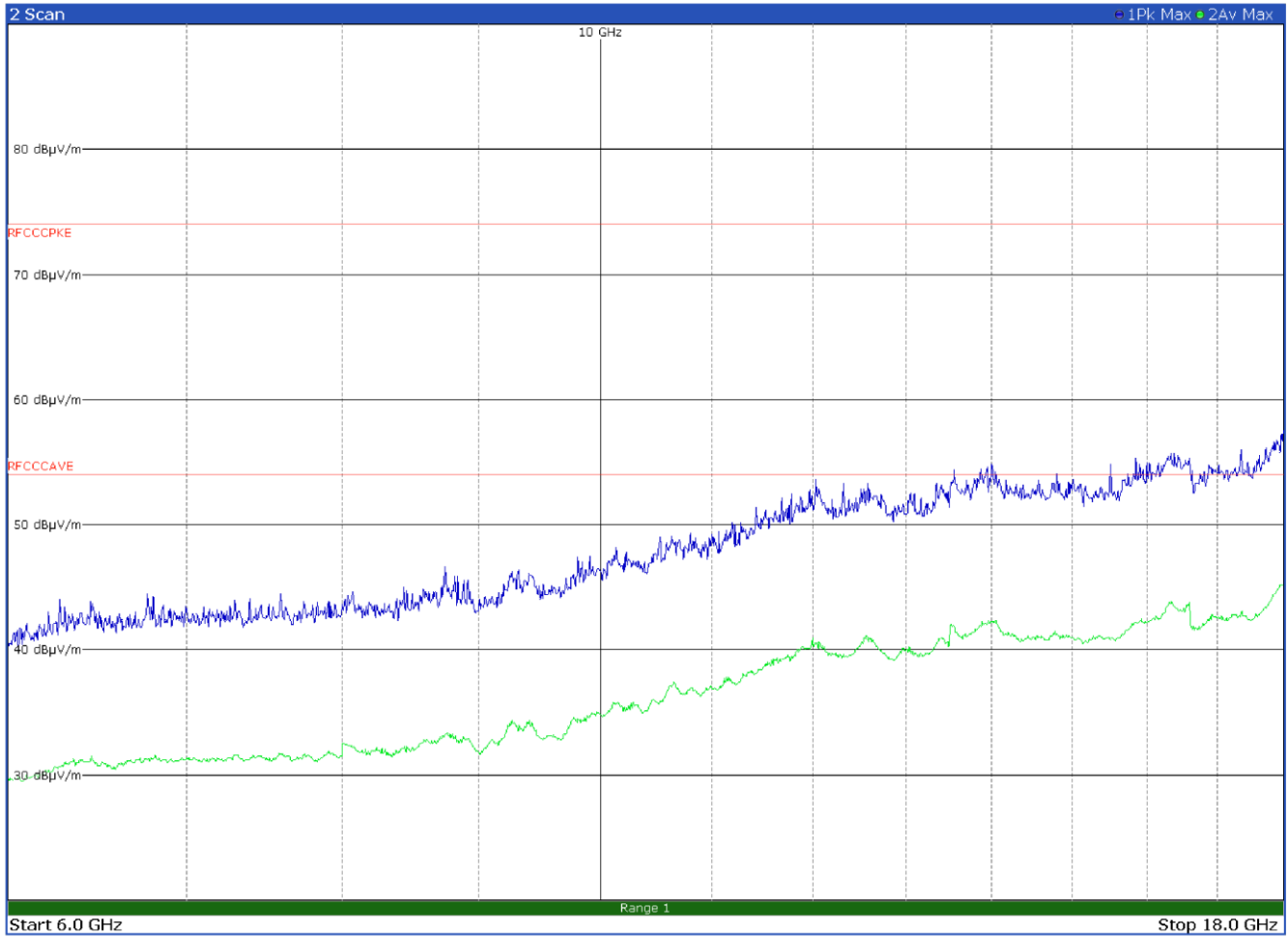
No inter-modulation product founds – All the other peak found are below the average limit



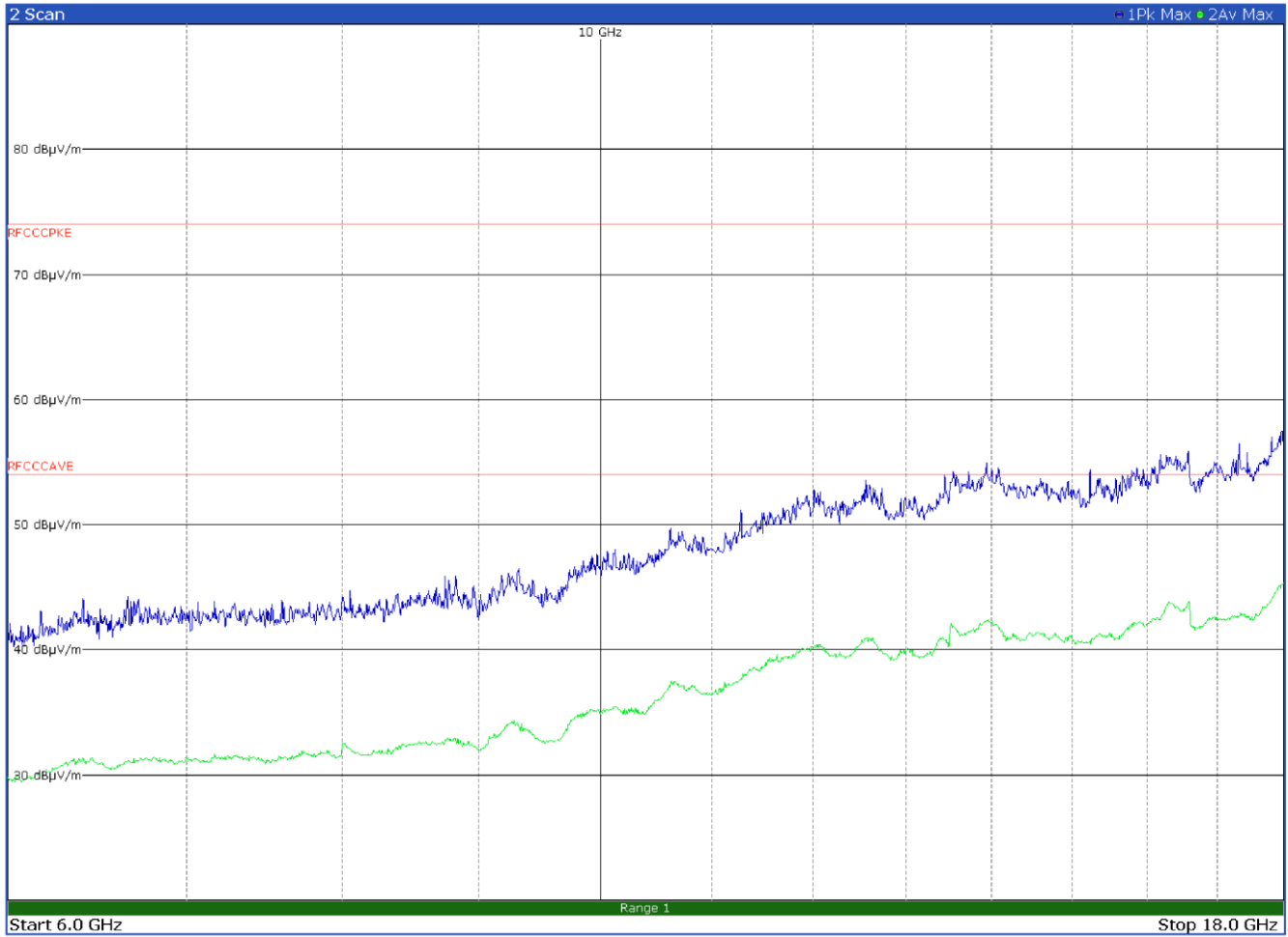
Antenna in vertical polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1674.2	67.6	82.2	-14.6	Peak
2511.2	65.2	82.2	-17.0	Peak
3348.2	64.1	82.2	-18.1	Peak

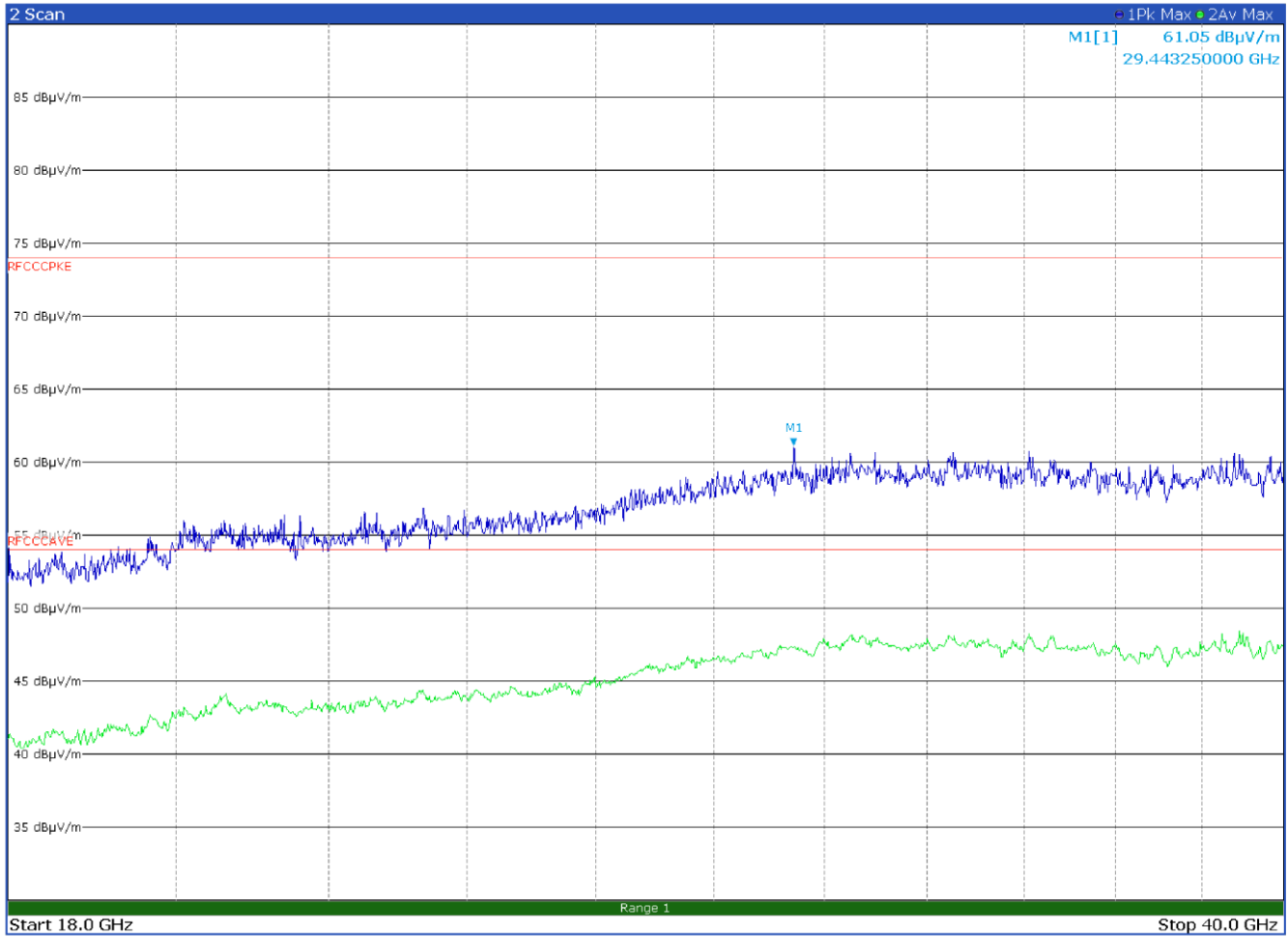
No inter-modulation product founds – All the other peak found are below the average limit



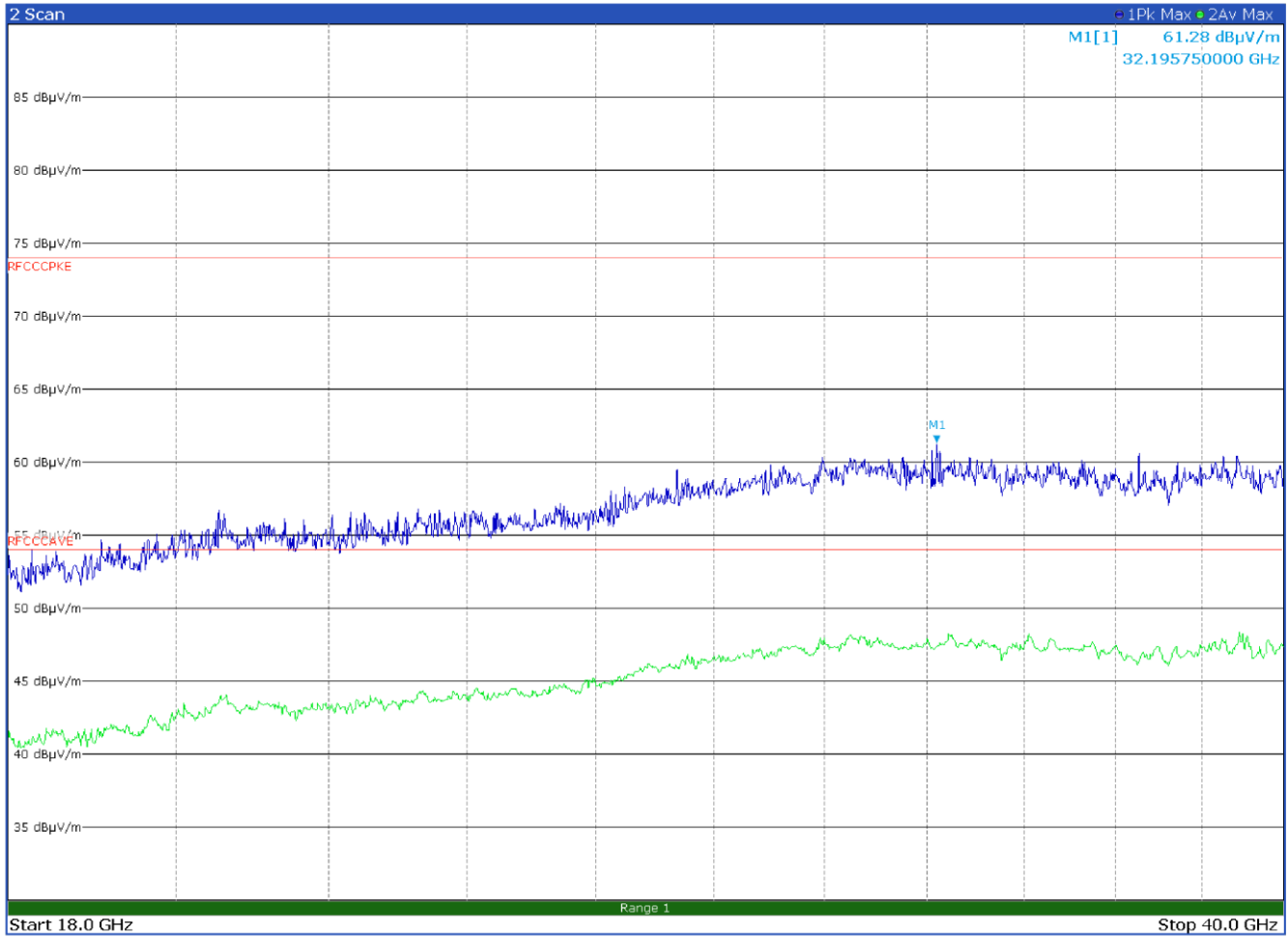
Antenna in horizontal polarization – No inter-modulation product founds



Antenna in vertical polarization – No inter-modulation product founds

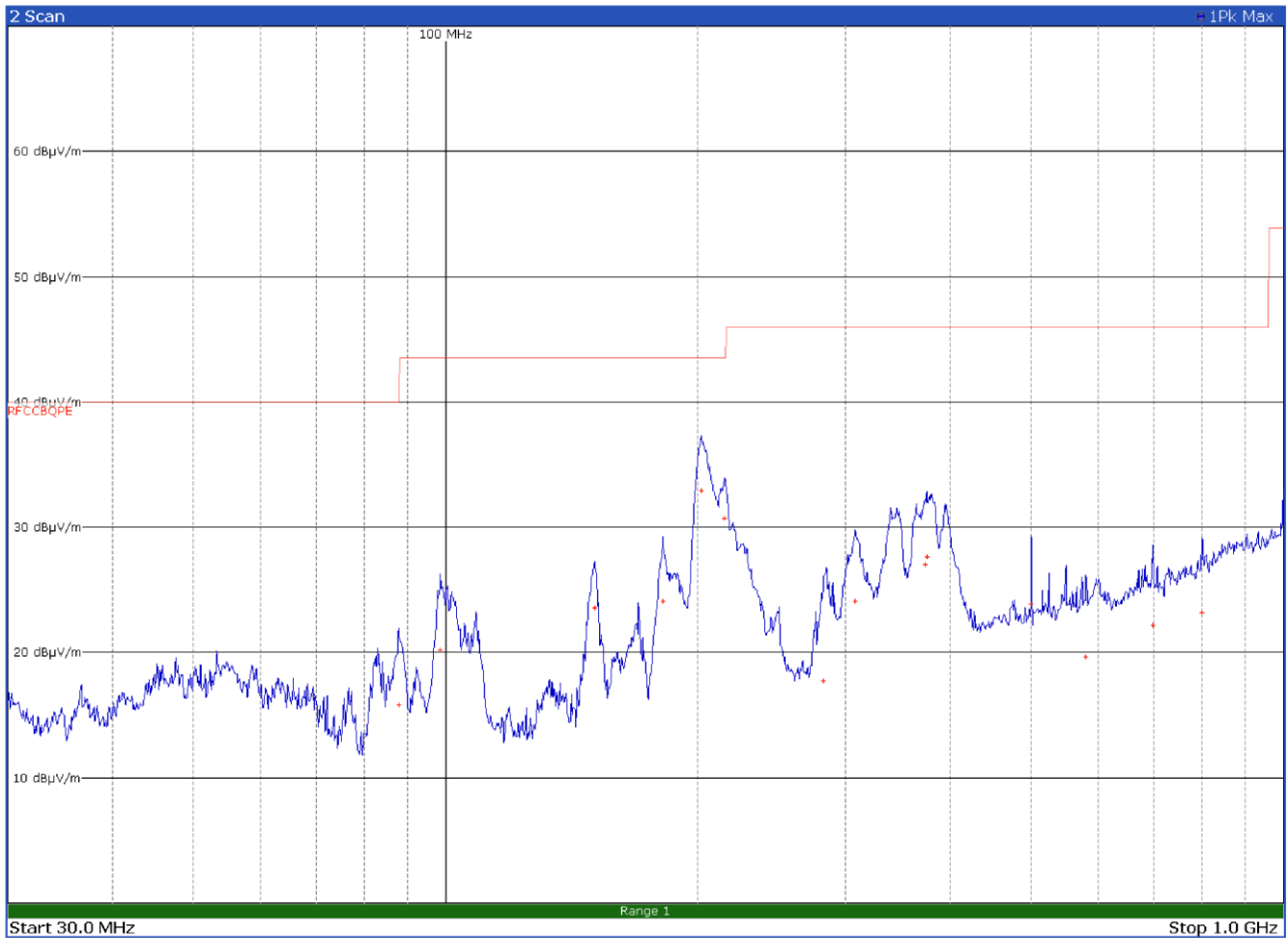


Antenna in horizontal polarization – No inter-modulation product founds



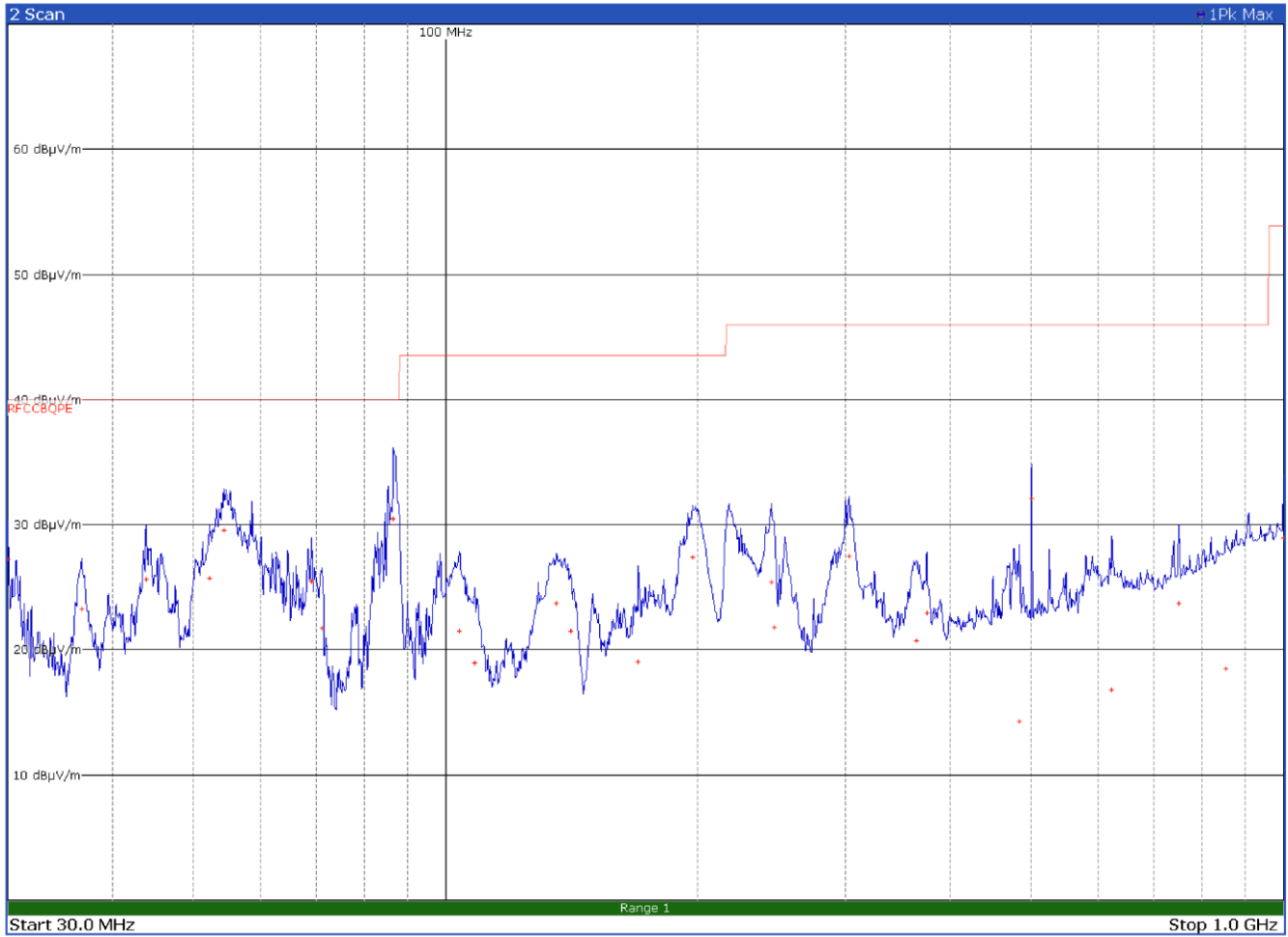
Antenna in vertical polarization – No inter-modulation product founds

8.1.8 Test data for ANTENNA SET A – WCDMA B4 at 1732.6 MHz and WIFI 802.11g at 2437 MHz



Antenna in horizontal polarization

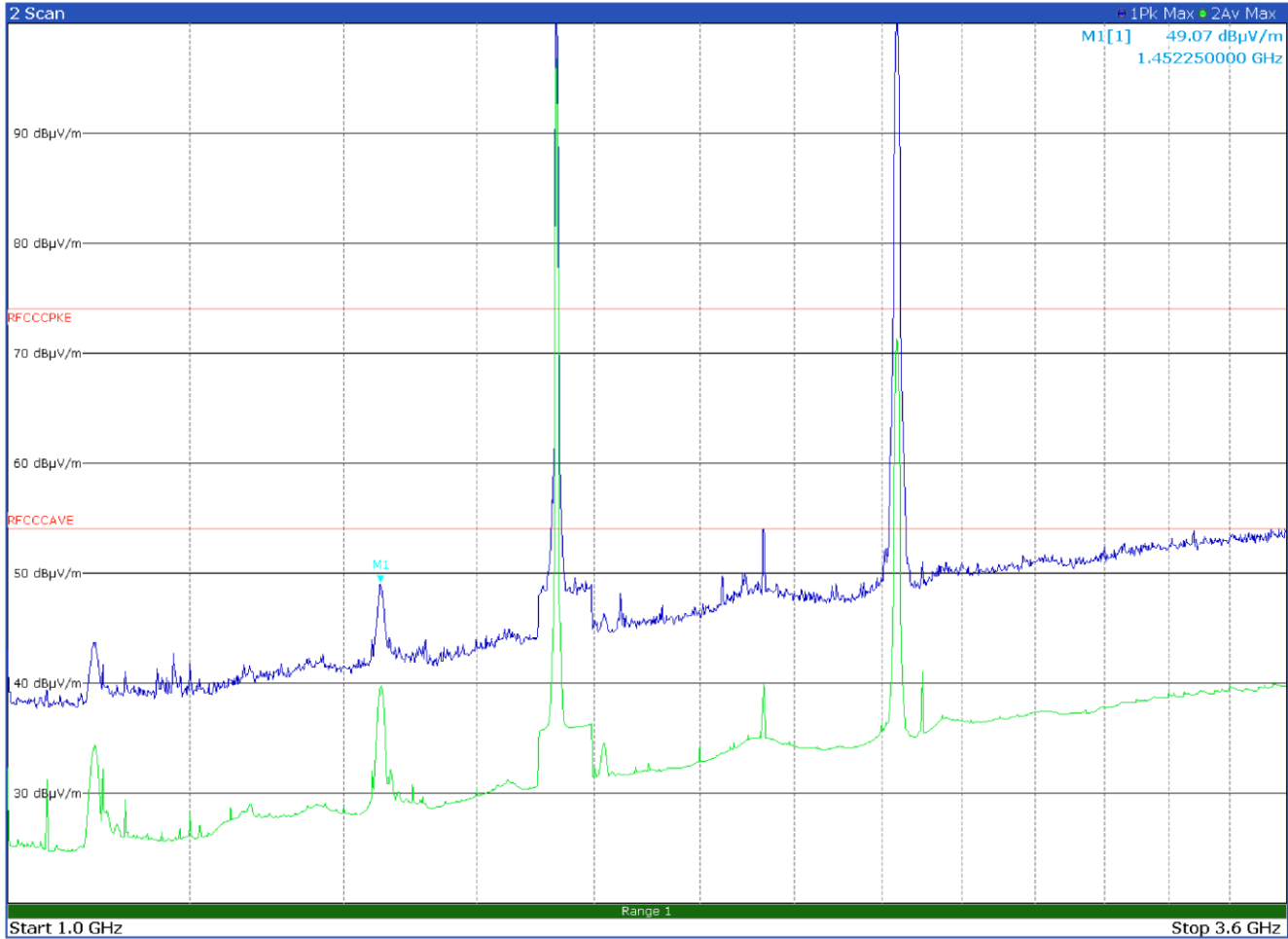
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
87.7800	15.8	40.0	-24.2	QP
98.4900	20.3	43.5	-23.2	QP
150.4500	23.6	43.5	-19.9	QP
181.7700	24.1	43.5	-19.4	QP
201.6600	33.0	43.5	-10.5	QP
215.2200	30.7	43.5	-12.8	QP
282.4800	17.8	46.0	-28.2	QP
308.2800	24.1	46.0	-21.9	QP
373.4100	27.0	46.0	-19.0	QP
375.0000	27.7	46.0	-18.3	QP
500.0100	23.9	46.0	-22.1	QP
581.0400	19.7	46.0	-26.3	QP
698.1000	22.3	46.0	-23.7	QP
799.9800	23.2	46.0	-22.8	QP



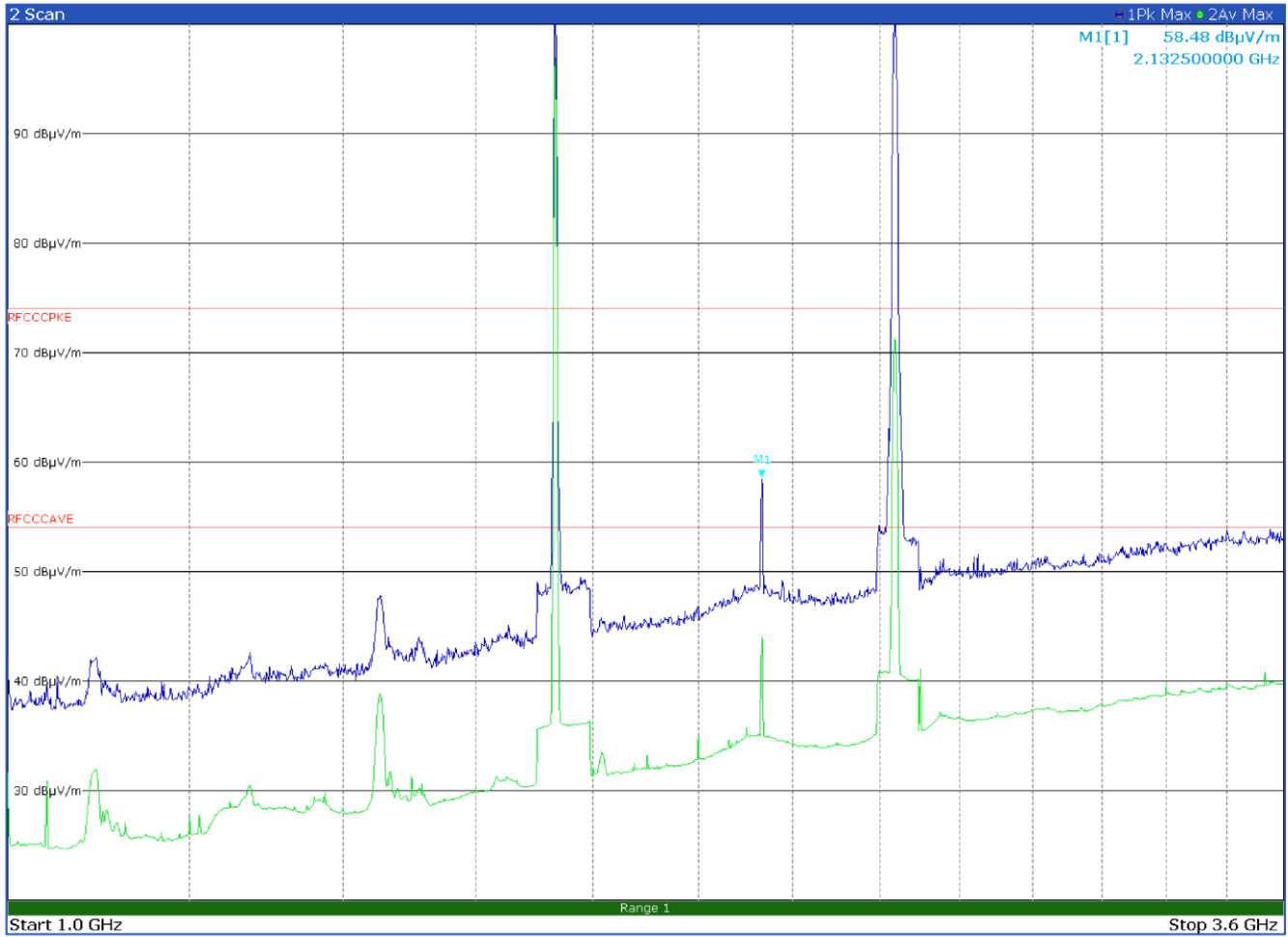
Antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	27.3	40.0	-12.7	QP
36.7500	23.3	40.0	-16.7	QP
43.8300	25.7	40.0	-14.3	QP
52.2600	25.8	40.0	-14.2	QP
54.3000	29.6	40.0	-10.4	QP
69.1200	25.5	40.0	-14.5	QP
71.1600	21.8	40.0	-18.2	QP
86.5200	30.5	40.0	-9.5	QP
103.8900	21.5	43.5	-22.0	QP
108.2700	19.0	43.5	-24.5	QP
135.5700	23.7	43.5	-19.8	QP
140.9700	21.5	43.5	-22.0	QP
169.6500	19.1	43.5	-24.4	QP
197.2500	27.4	43.5	-16.1	QP
244.8900	25.5	46.0	-20.5	QP
246.7500	21.9	46.0	-24.1	QP
302.8800	27.5	46.0	-18.5	QP
364.5600	20.7	46.0	-25.3	QP
375.0000	23.0	46.0	-23.0	QP
483.9600	14.3	46.0	-31.7	QP
500.0400	32.2	46.0	-13.8	QP

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
624.0300	16.9	46.0	-29.1	QP
750.0000	23.7	46.0	-22.3	QP
853.1700	18.5	46.0	-27.5	QP
1000.0000	29.0	53.9	-24.9	QP



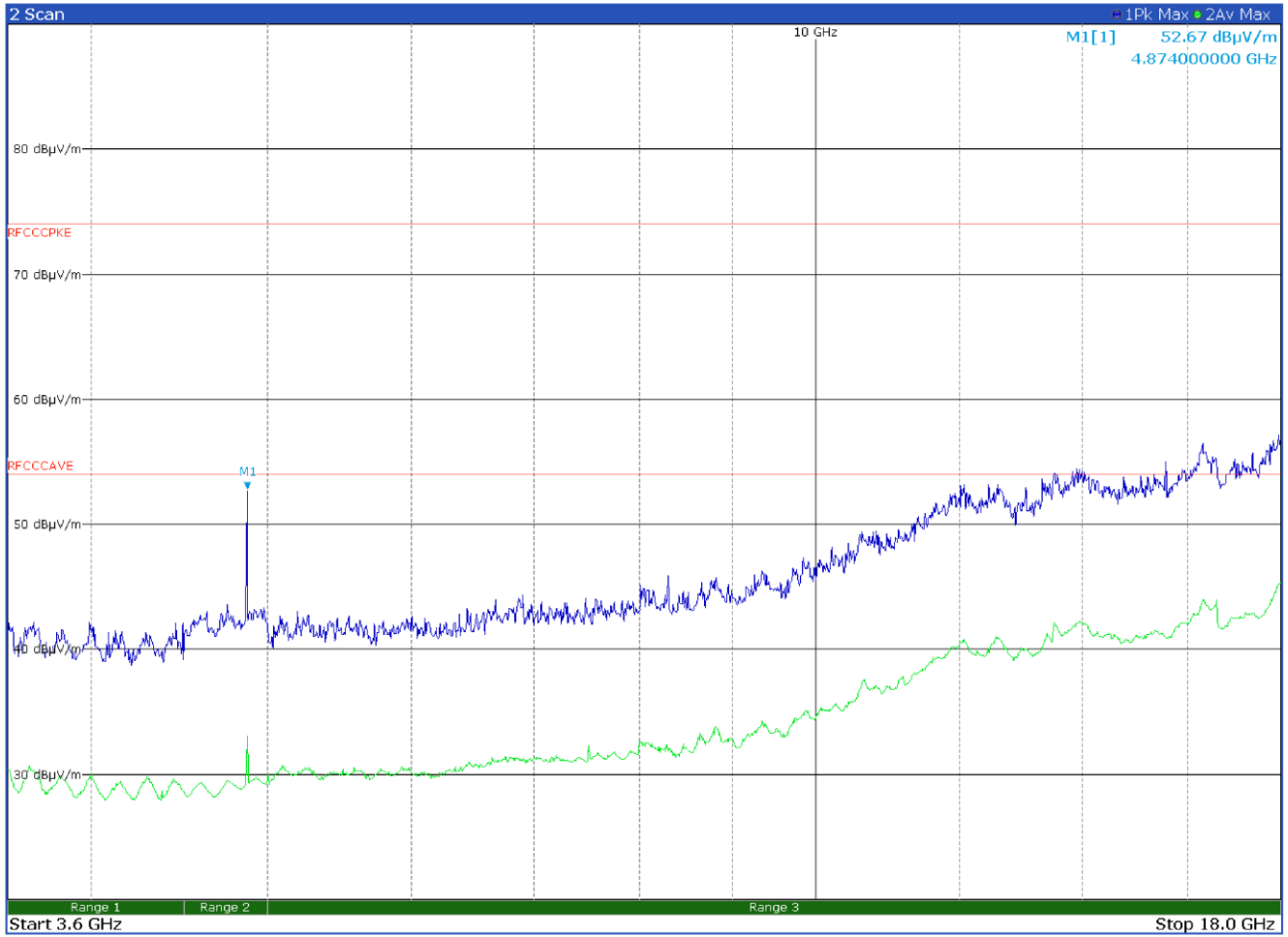
Antenna in horizontal polarization – No inter-modulation product founds
 Limit exceeded by carrier – All the peak found are below the average limit



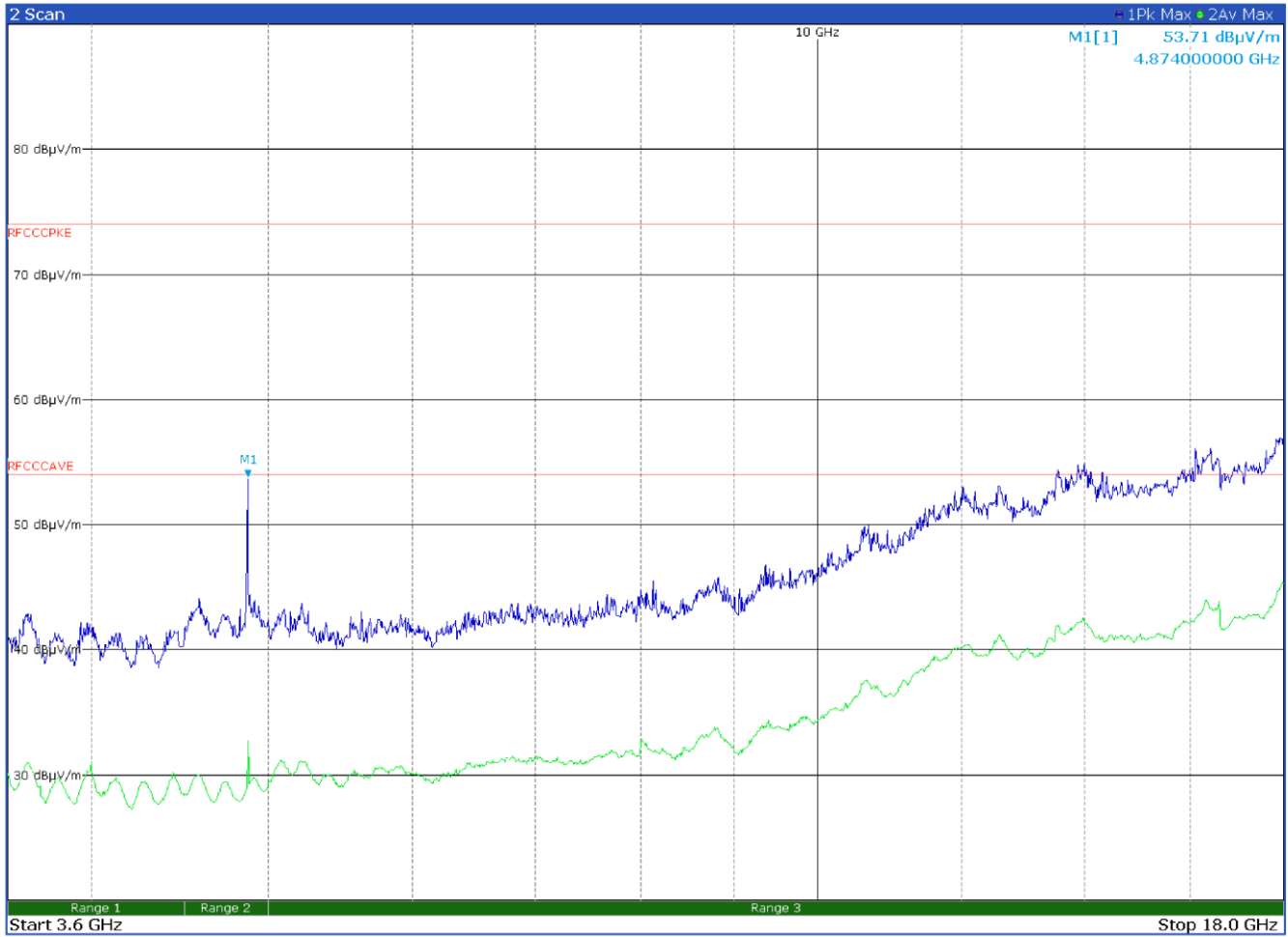
Antenna in vertical polarization – Limit exceeded by carrier

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
2132.5	58.5	74.0	-19.2	Peak
2132.5	47.3	54.0	-6.7	Average

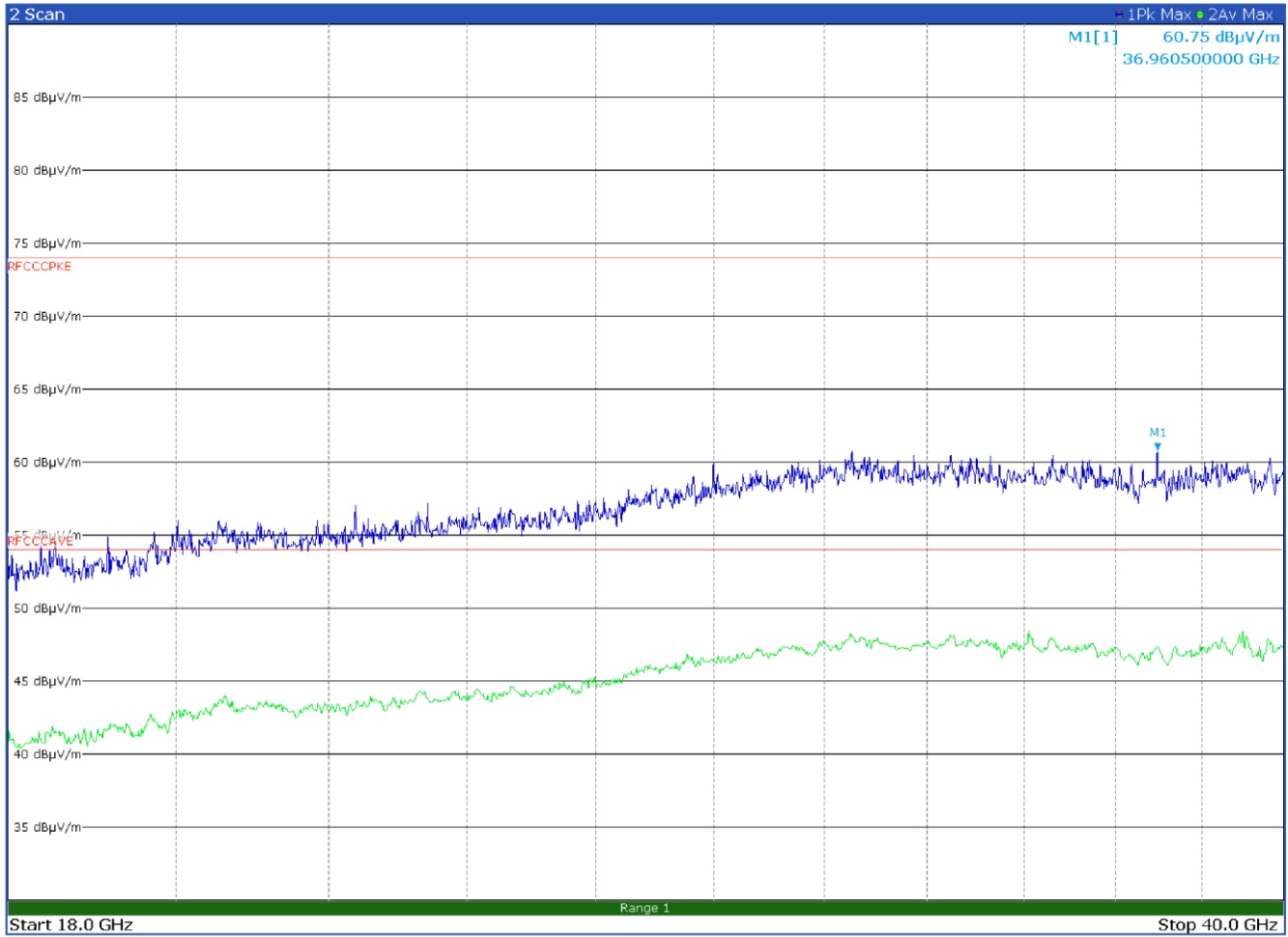
All the other peak found are below the average limit



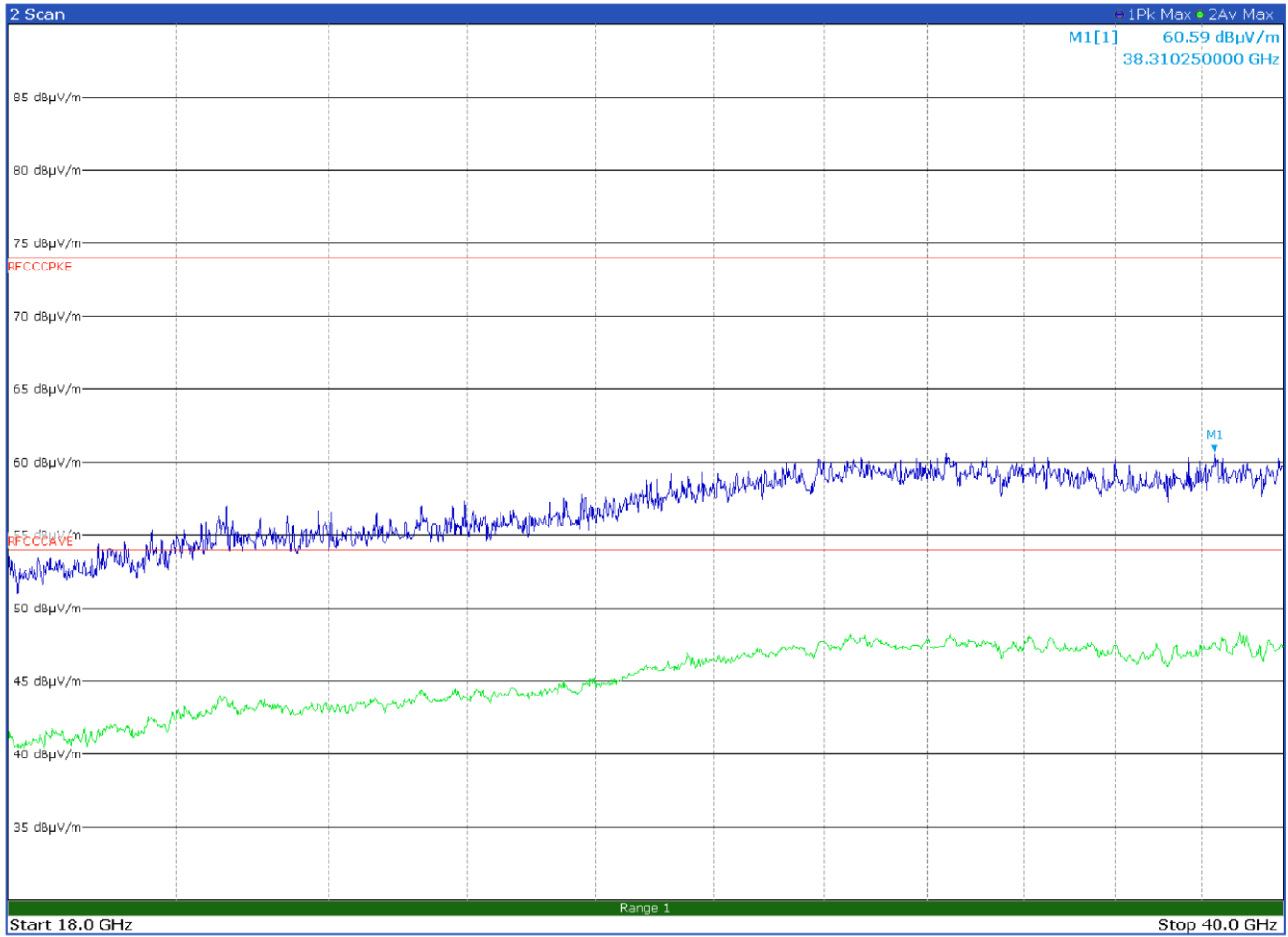
Antenna in horizontal polarization – No inter-modulation product founds – All the peak found are below the average limit



Antenna in vertical polarization – No inter-modulation product founds – All the peak found are below the average limit

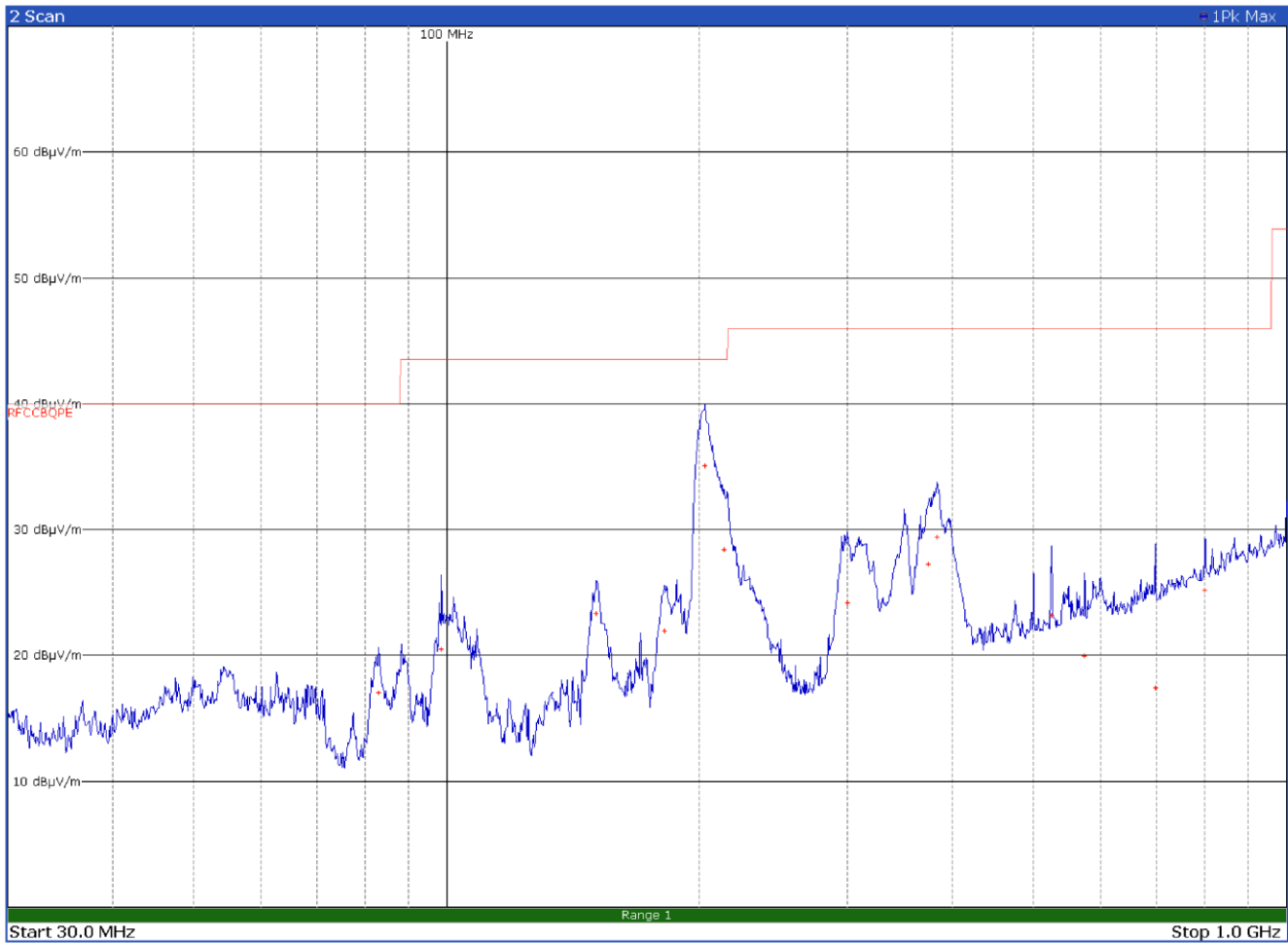


Antenna in horizontal polarization – No inter-modulation product founds



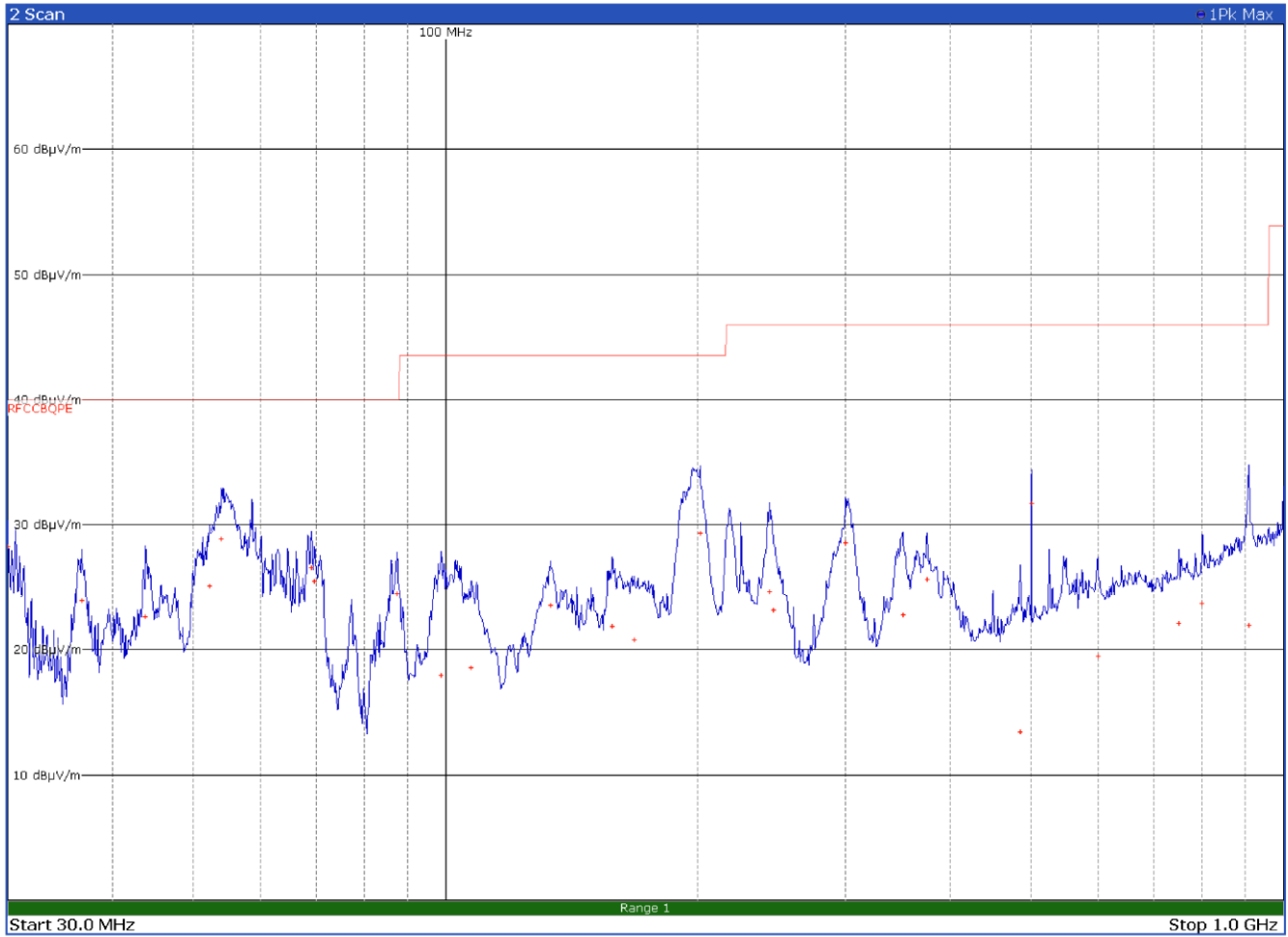
Antenna in vertical polarization – No inter-modulation product founds

8.1.9 Test data for ANTENNA SET A – WCDMA B4 at 1732.6 MHz and WIFI 802.11a at 5300 MHz



Antenna in horizontal polarization

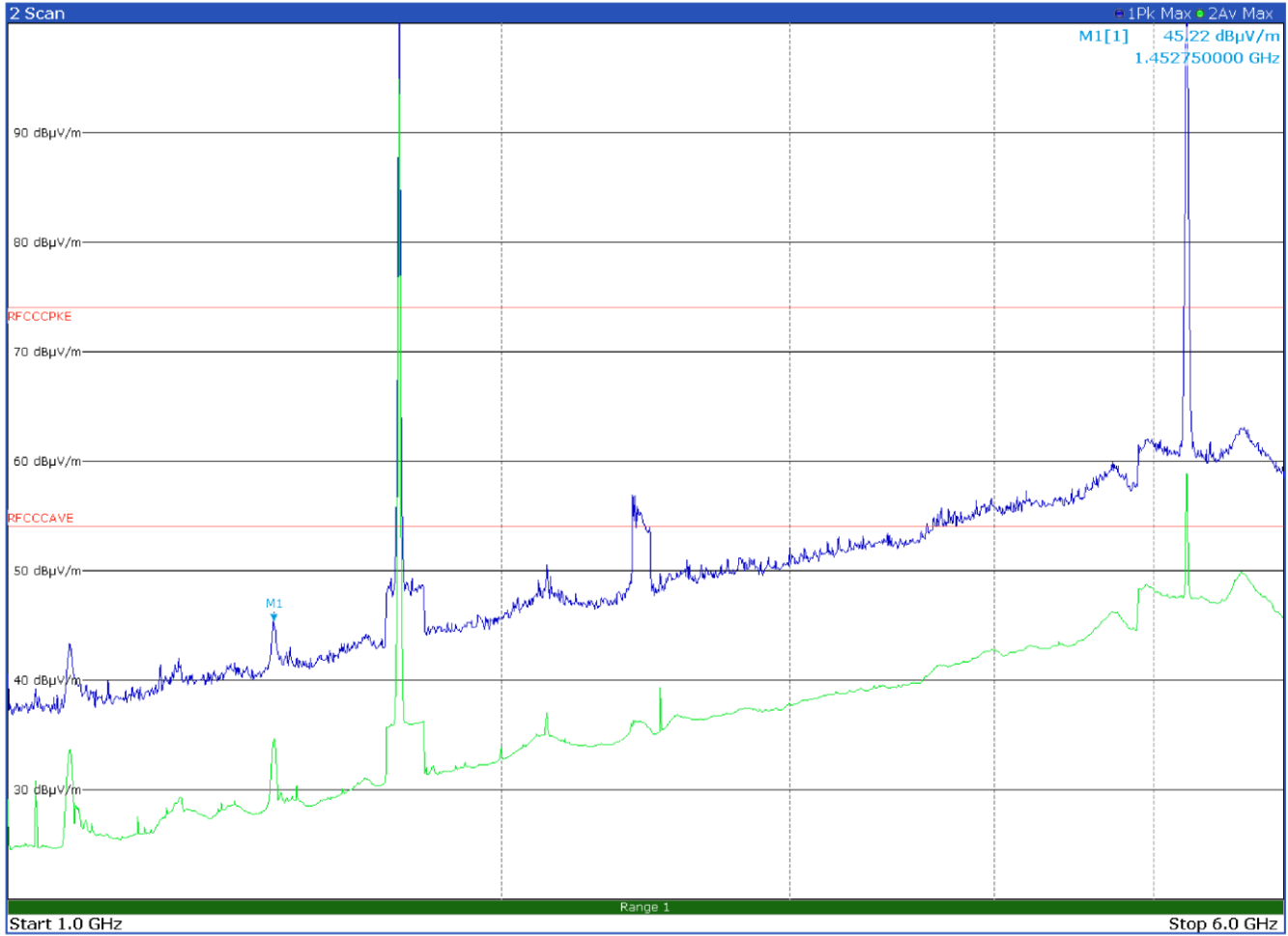
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
82.9200	17.1	40.0	-22.9	QP
98.4300	20.6	43.5	-22.9	QP
150.7200	23.4	43.5	-20.1	QP
181.7400	22.0	43.5	-21.5	QP
202.9200	35.1	43.5	-8.4	QP
213.8100	28.4	43.5	-15.1	QP
300.3000	24.3	46.0	-21.7	QP
374.1000	27.3	46.0	-18.7	QP
383.7600	29.4	46.0	-16.6	QP
525.0000	23.2	46.0	-22.8	QP
575.0100	20.0	46.0	-26.0	QP
698.1000	17.4	46.0	-28.6	QP
800.0100	25.2	46.0	-20.8	QP



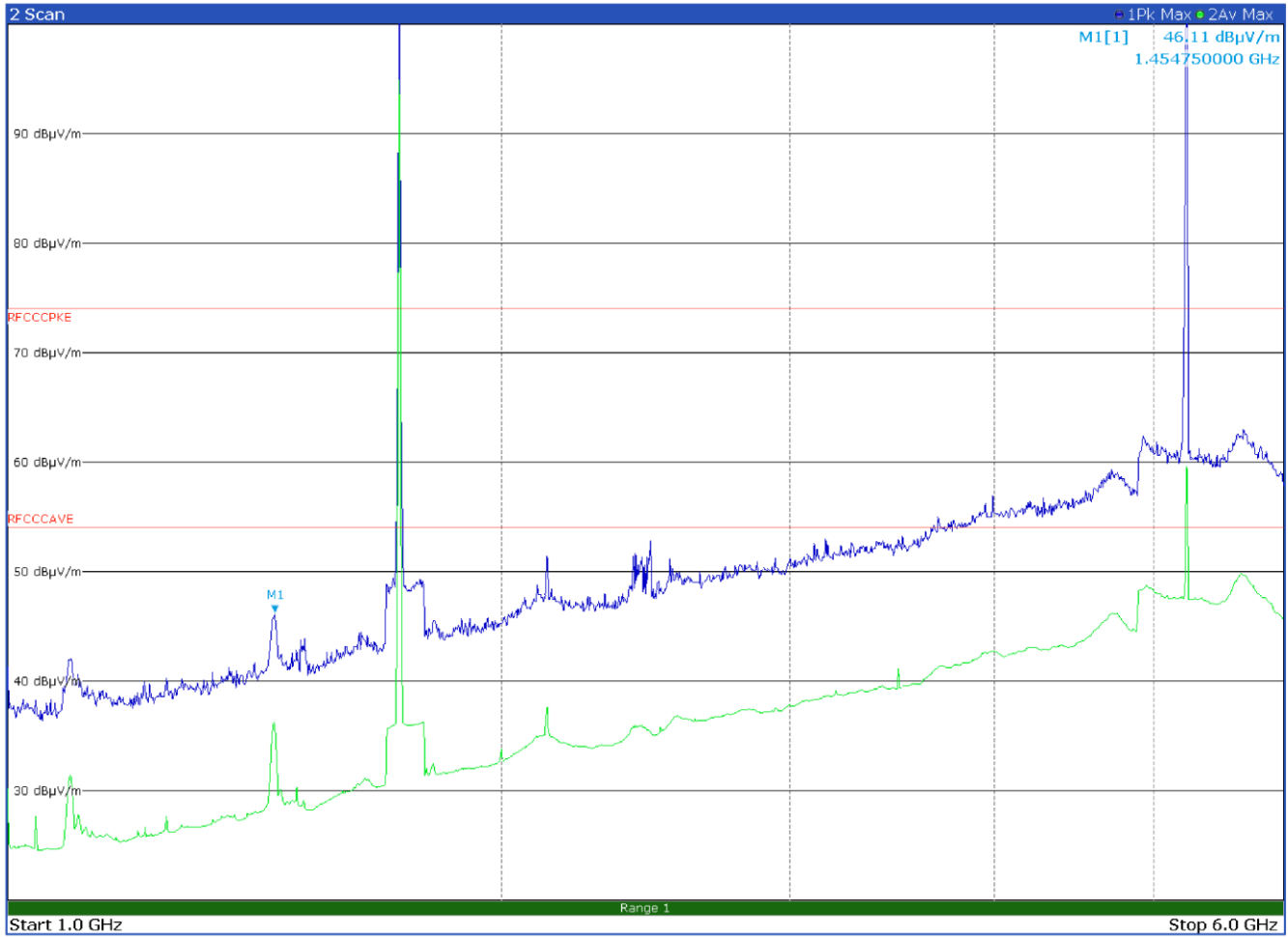
Antenna in vertical polarization

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
30.0000	28.3	40.0	-11.7	QP
36.7500	24.0	40.0	-16.0	QP
43.8000	22.7	40.0	-17.3	QP
52.2600	25.2	40.0	-14.8	QP
53.9400	28.9	40.0	-11.1	QP
69.1200	26.6	40.0	-13.4	QP
69.7200	25.6	40.0	-14.4	QP
87.4800	24.5	40.0	-15.5	QP
98.7600	18.0	43.5	-25.5	QP
107.2500	18.6	43.5	-24.9	QP
133.5000	23.6	43.5	-19.9	QP
158.1000	21.9	43.5	-21.6	QP
167.8500	20.9	43.5	-22.6	QP
201.2400	29.3	43.5	-14.2	QP
243.6300	24.7	46.0	-21.3	QP
246.0000	23.2	46.0	-22.8	QP
300.2700	28.6	46.0	-17.4	QP
351.0900	22.8	46.0	-23.2	QP
375.0000	25.7	46.0	-20.3	QP
485.0400	13.5	46.0	-32.5	QP
500.0400	31.7	46.0	-14.3	QP

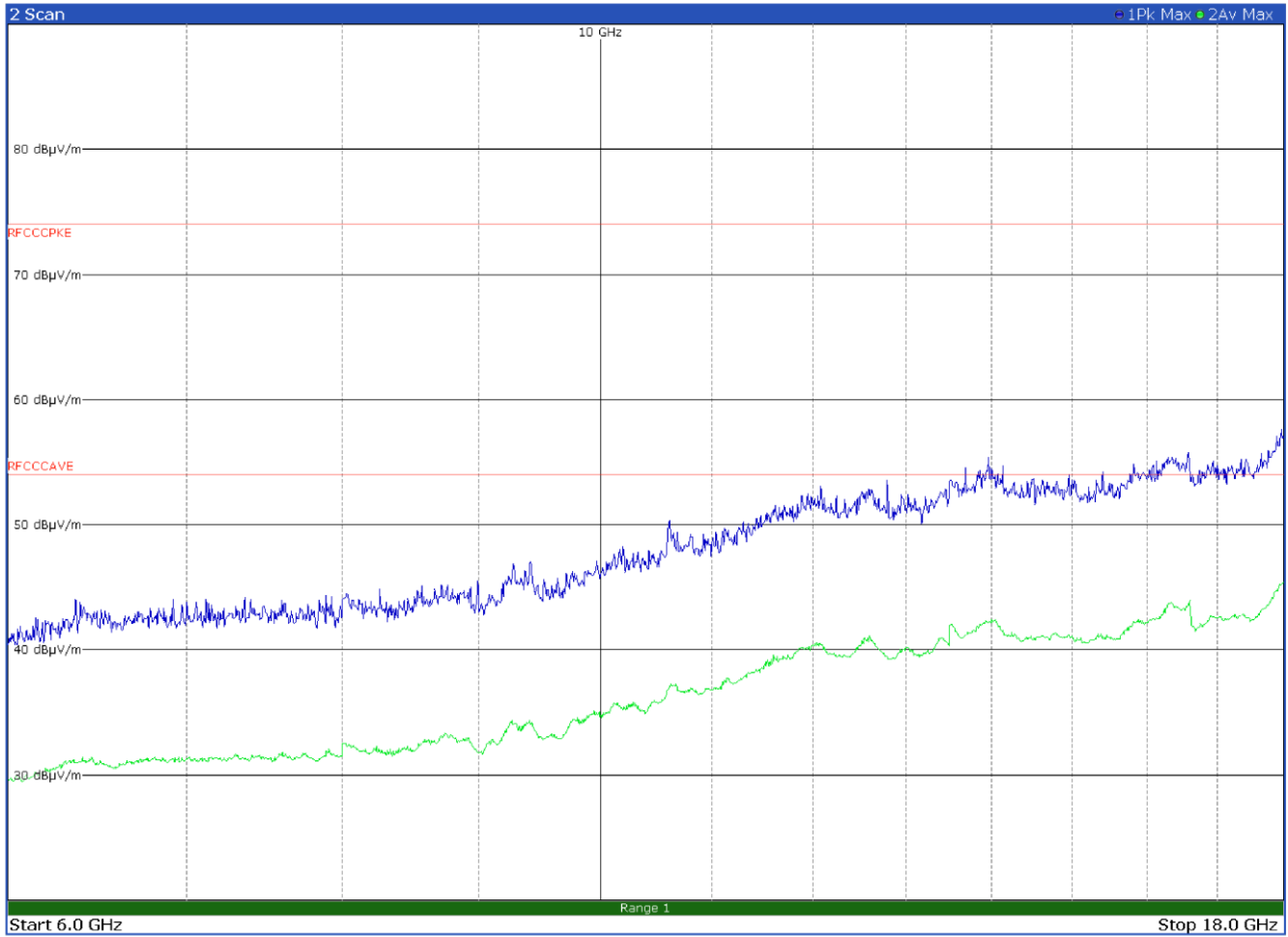
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector
600.0000	19.5	46.0	-26.5	QP
750.0000	22.1	46.0	-23.9	QP
800.0100	23.8	46.0	-22.2	QP
909.0000	22.0	46.0	-24.0	QP



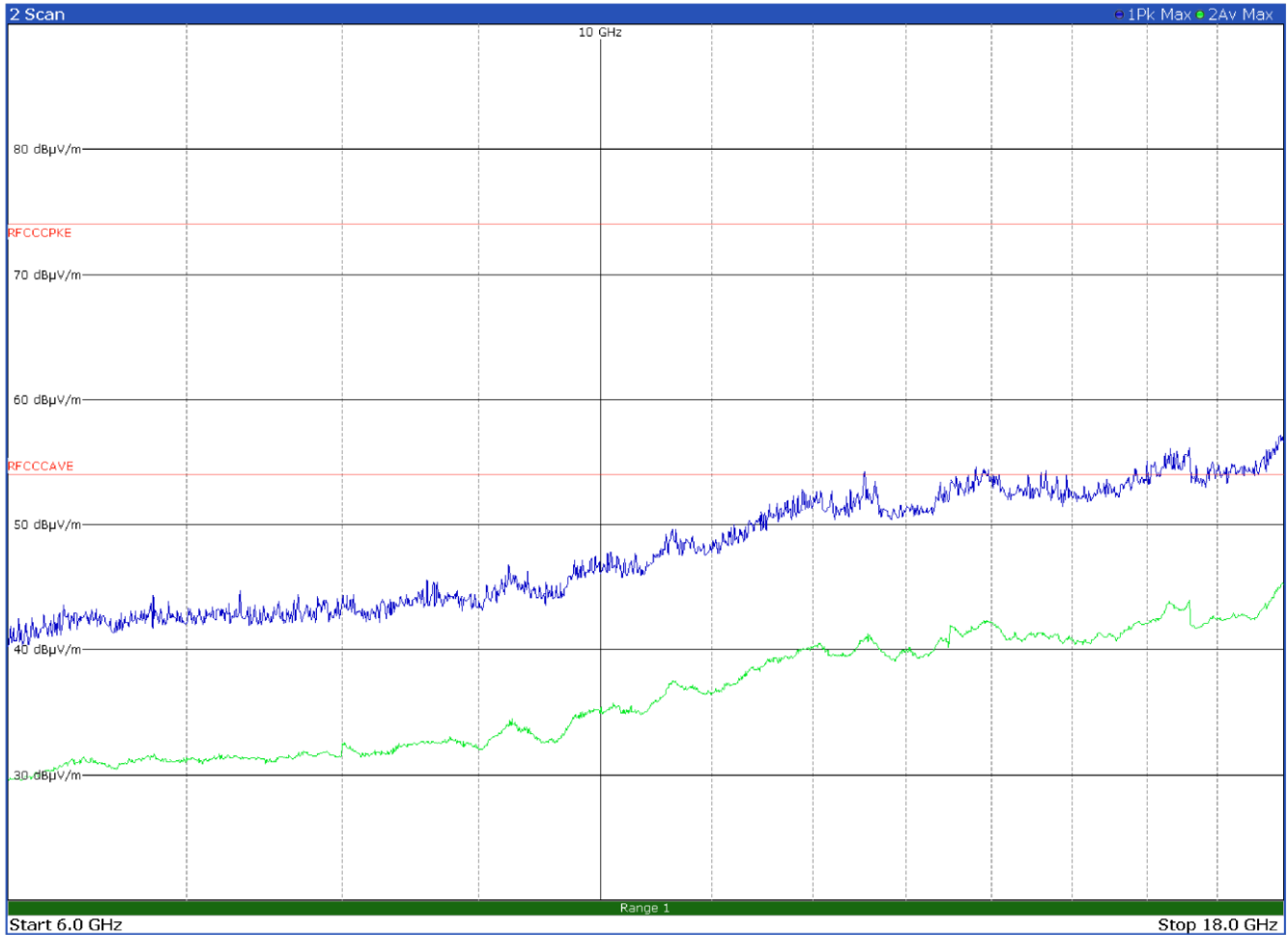
Antenna in horizontal polarization – No inter-modulation product founds
 Limit exceeded by carrier – All the peak found are below the average limit



Antenna in vertical polarization – No inter-modulation product founds
 Limit exceeded by carrier – All the peak found are below the average limit



Antenna in horizontal polarization – No inter-modulation product founds



Antenna in vertical polarization – No inter-modulation product founds