Test data, continued

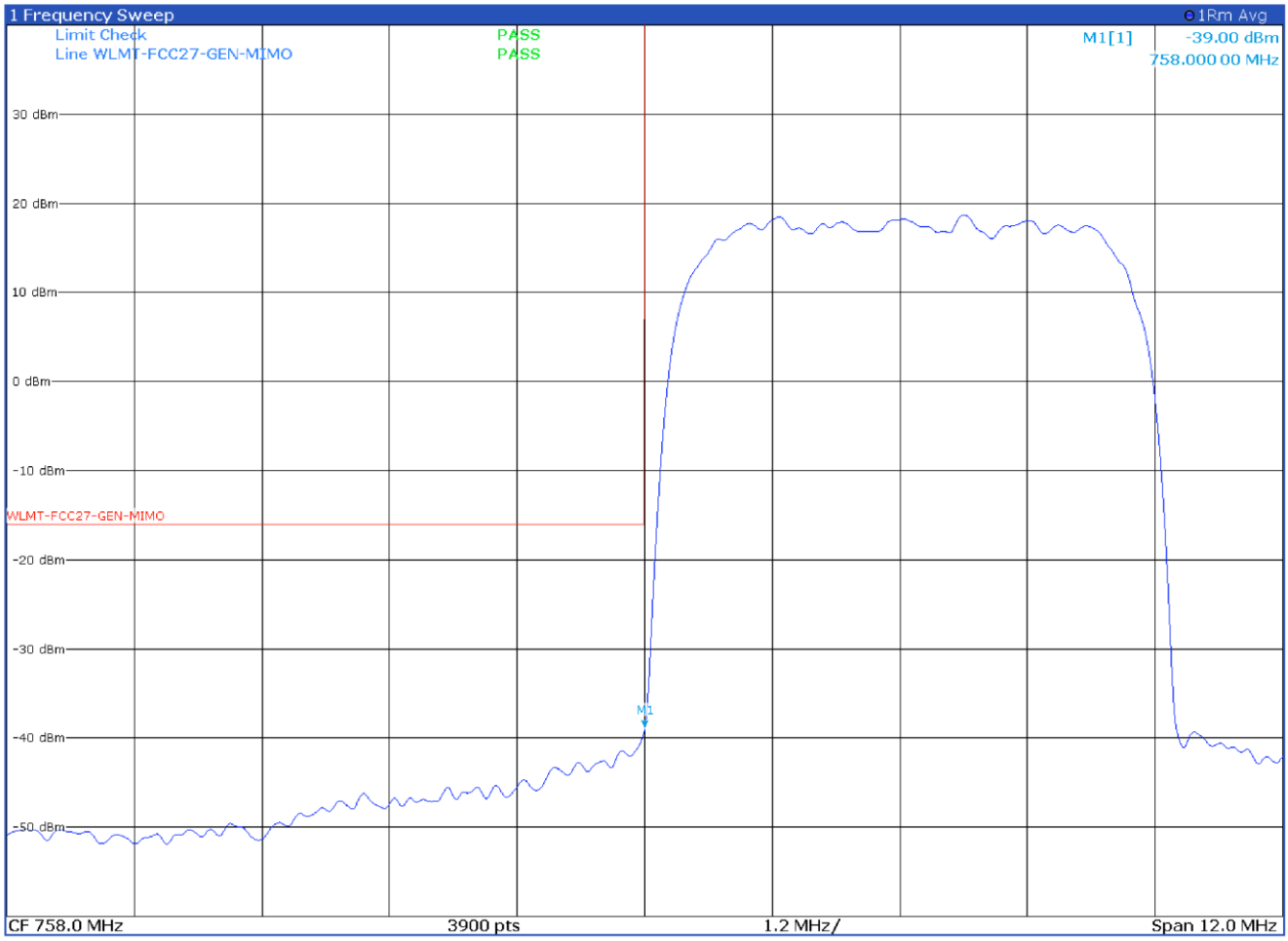


Figure 8.5-15: *Antenna port 2 single carrier lower block edge with input signal at AGC threshold*

Test data, continued

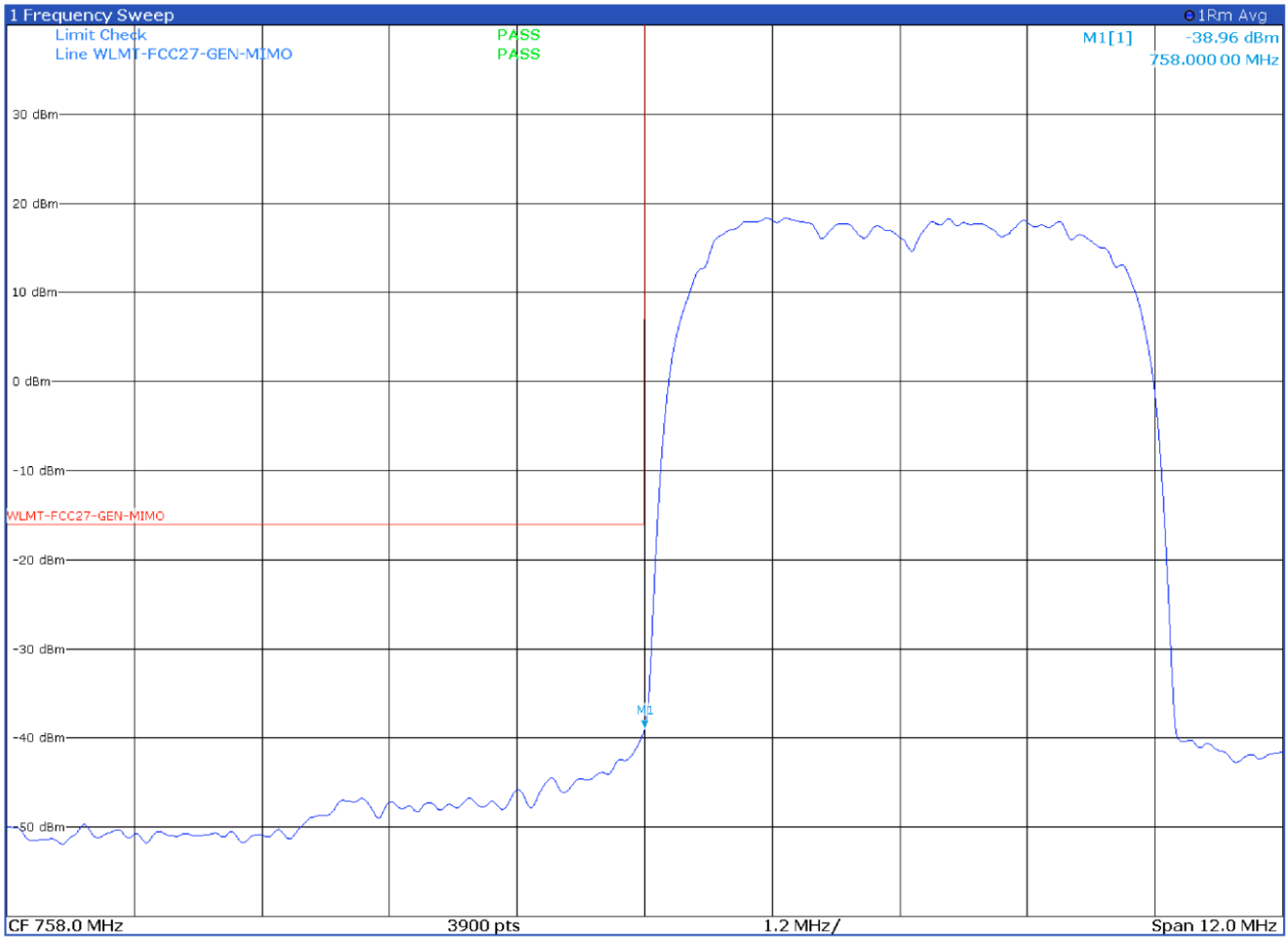


Figure 8.5-16: *Antenna port 2 single carrier lower block edge with input signal at AGC threshold +3 dB*

8.6 Spurious emissions conducted measurements

8.6.1 References, definitions and limits

FCC §90.543(e)

For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

FCC §90.219(e)

(3) Spurious emissions from a signal booster must not exceed −13 dBm within any 100 kHz measurement bandwidth.

RSS-131, Clause 5.2

Industrial Zone Enhancers, including DASs, shall employ a gain control feature and shall comply with all the requirements in the RSS which applies to the equipment with which the zone enhancer is to be used. In addition, the equipment shall comply with the requirements specified in this section.

RSS-140, Clause 4.4

Transmitter unwanted emission limits

The power of any unwanted emission outside the bands 758-768 MHz and 788-798 MHz shall be attenuated below the transmitter output power P in dBW as follows, where p is the transmitter output power in watts:

(a) For any frequency between 769-775 MHz and 799-806 MHz:
76 + 10 log (p), dB in a 6.25 kHz band for fixed and base station equipment
65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment

(b)	For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz for wideband emissions, and −80 dBW/kHz for discrete emissions of less than 700 Hz bandwidth.

8.6.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	January 27, 2022

8.6.3 Observations, settings and special notes

The spectrum was searched from 9 kHz to the 10th harmonic.
All measurements were performed using peak detector according to note 4 of 935210 D05 Indus Booster Basic Meas v01r04 paragraph 3.6.3.
Limit line (43 + 10 $\log_{10}$ (P) or −13 dBm) was adjusted for MIMO operation by 3 dB*: −13 dBm – 3 dB = −16 dBm
*MIMO correction factor for 2 antenna ports: 10 × $\text{Log}_{10}(2)$ = 3.01 dB

Spectrum analyser settings:

Resolution bandwidth:	Reference bandwidth in the applicable rule section for the supported frequency band
Video bandwidth:	VBW ≥ 3 × RBW
Detector mode:	Peak
Trace mode:	Max Hold

Input signal frequency

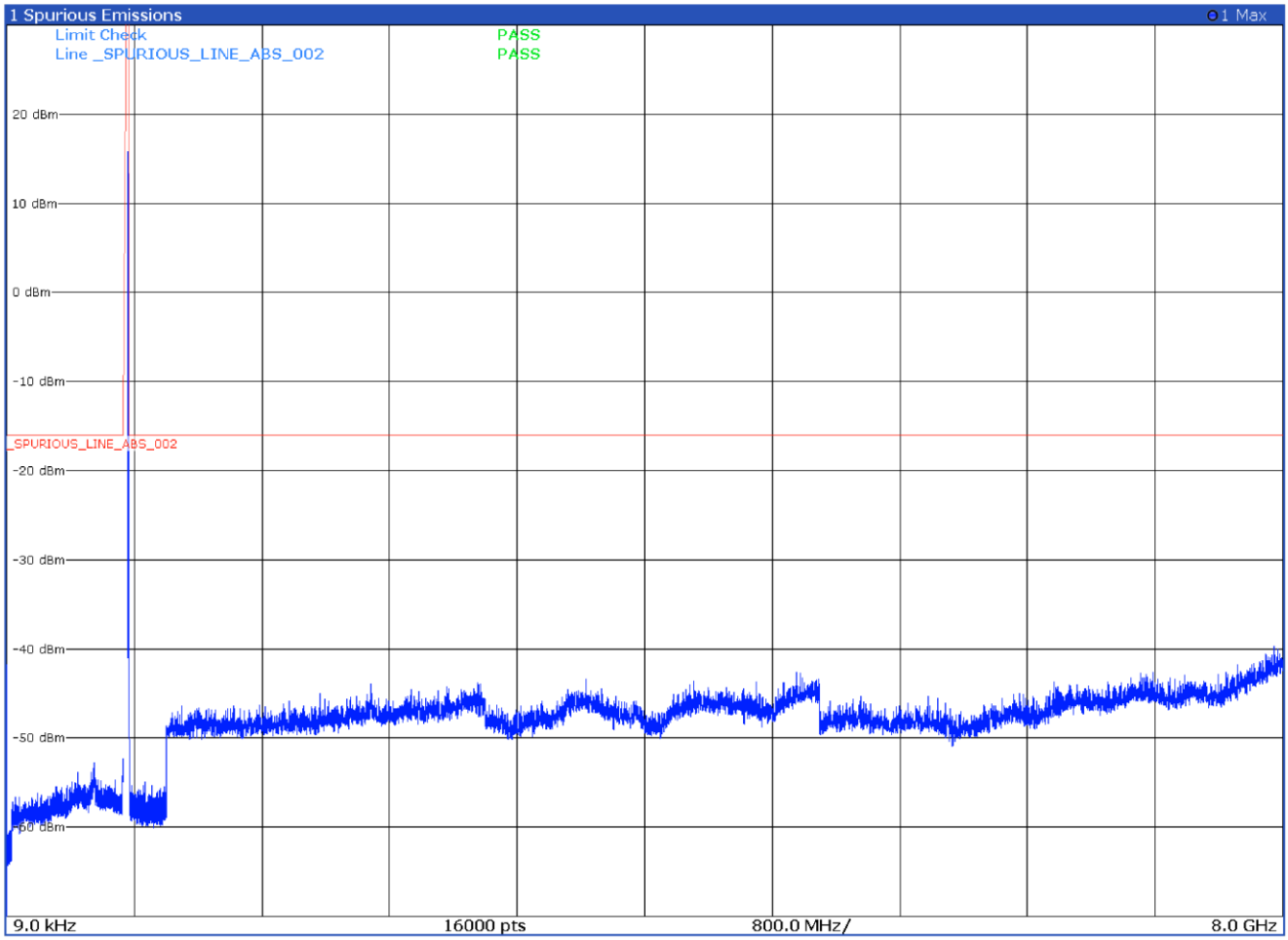
Low channel	760.5 MHz
Mid channel	763.0 MHz
High channel	765.5 MHz

8.6.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263397

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

8.6.5 Test data

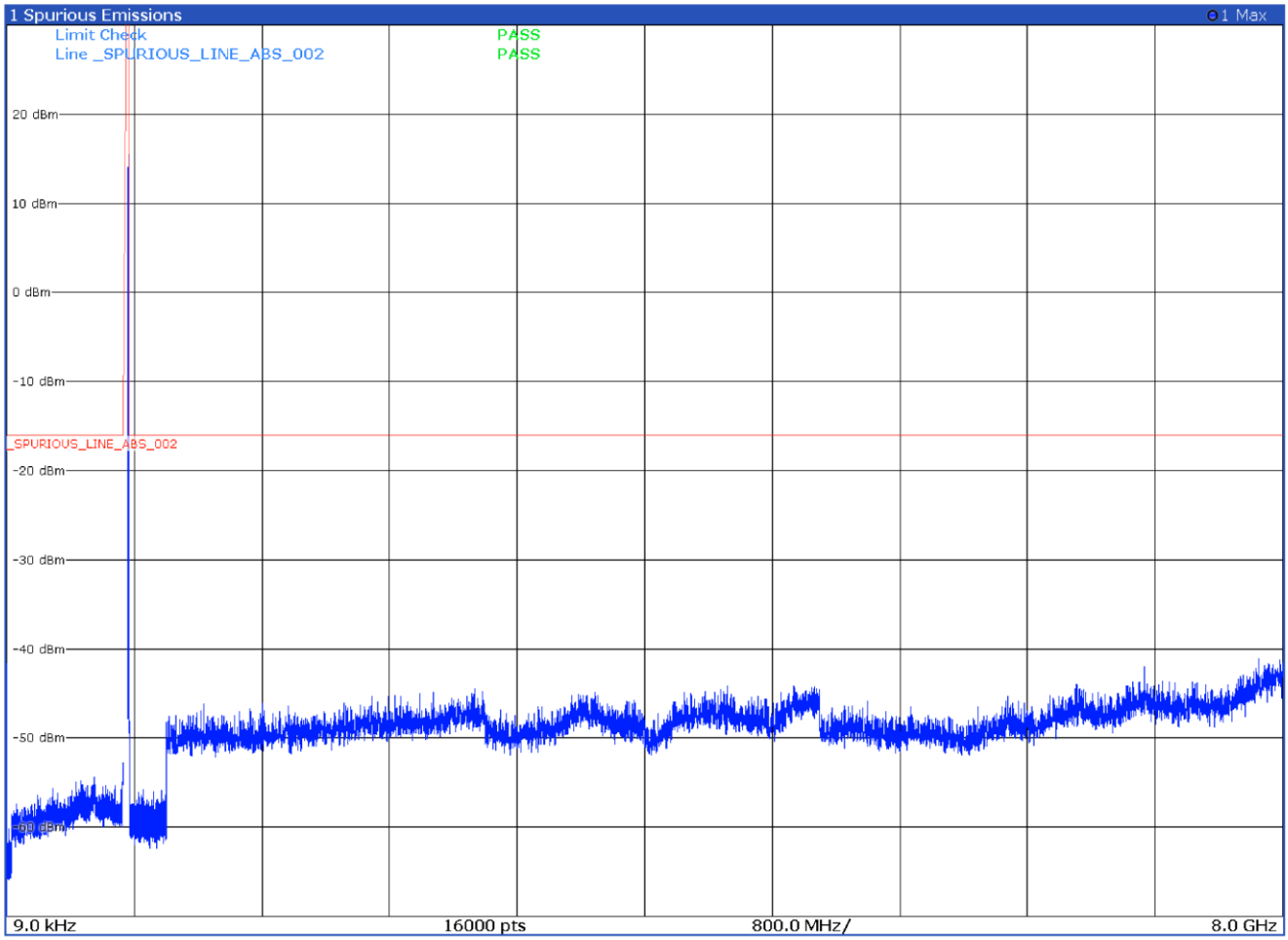


2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**10.480 50 kHz**	**-64.99 dBm**	**-48.99 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-41.77 dBm**	**-25.77 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**728.825 25 MHz**	**-52.36 dBm**	**-36.36 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**761.152 50 MHz**	**15.75 dBm**	**-34.25 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.058 00 MHz**	**-49.73 dBm**	**-33.73 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.945 31 GHz**	**-39.74 dBm**	**-23.74 dB**

Figure 8.6-1: *Conducted spurious emissions of low channel, antenna port 1*

Test data, continued

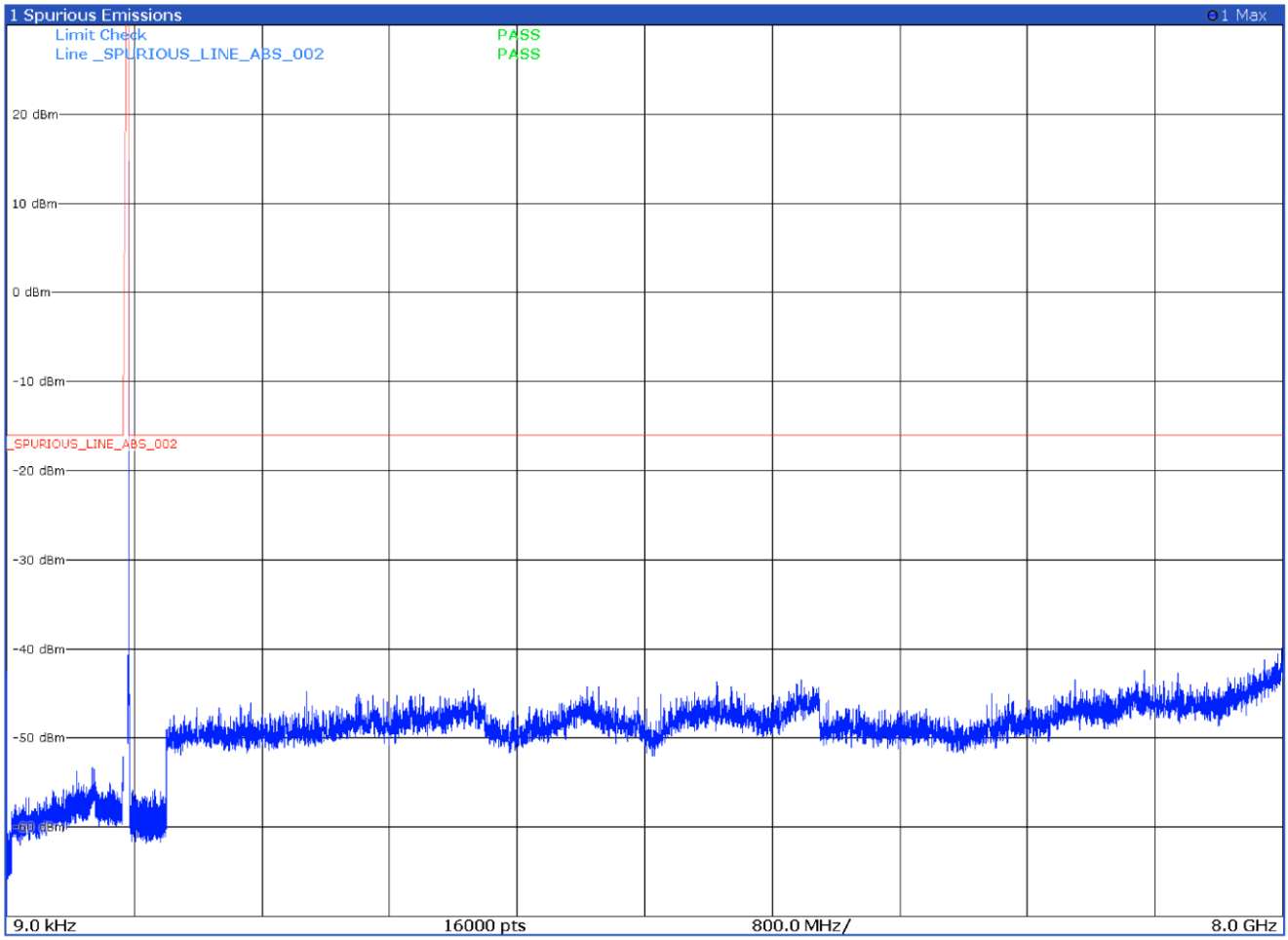


2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**137.380 50 kHz**	**-66.29 dBm**	**-50.29 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-41.65 dBm**	**-25.65 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**726.728 25 MHz**	**-52.79 dBm**	**-36.79 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**762.722 50 MHz**	**15.41 dBm**	**-34.59 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.058 00 MHz**	**-45.93 dBm**	**-29.93 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.846 44 GHz**	**-41.12 dBm**	**-25.12 dB**

Figure 8.6-2: *Conducted spurious emissions of mid channel, antenna port 1*

Test data, continued

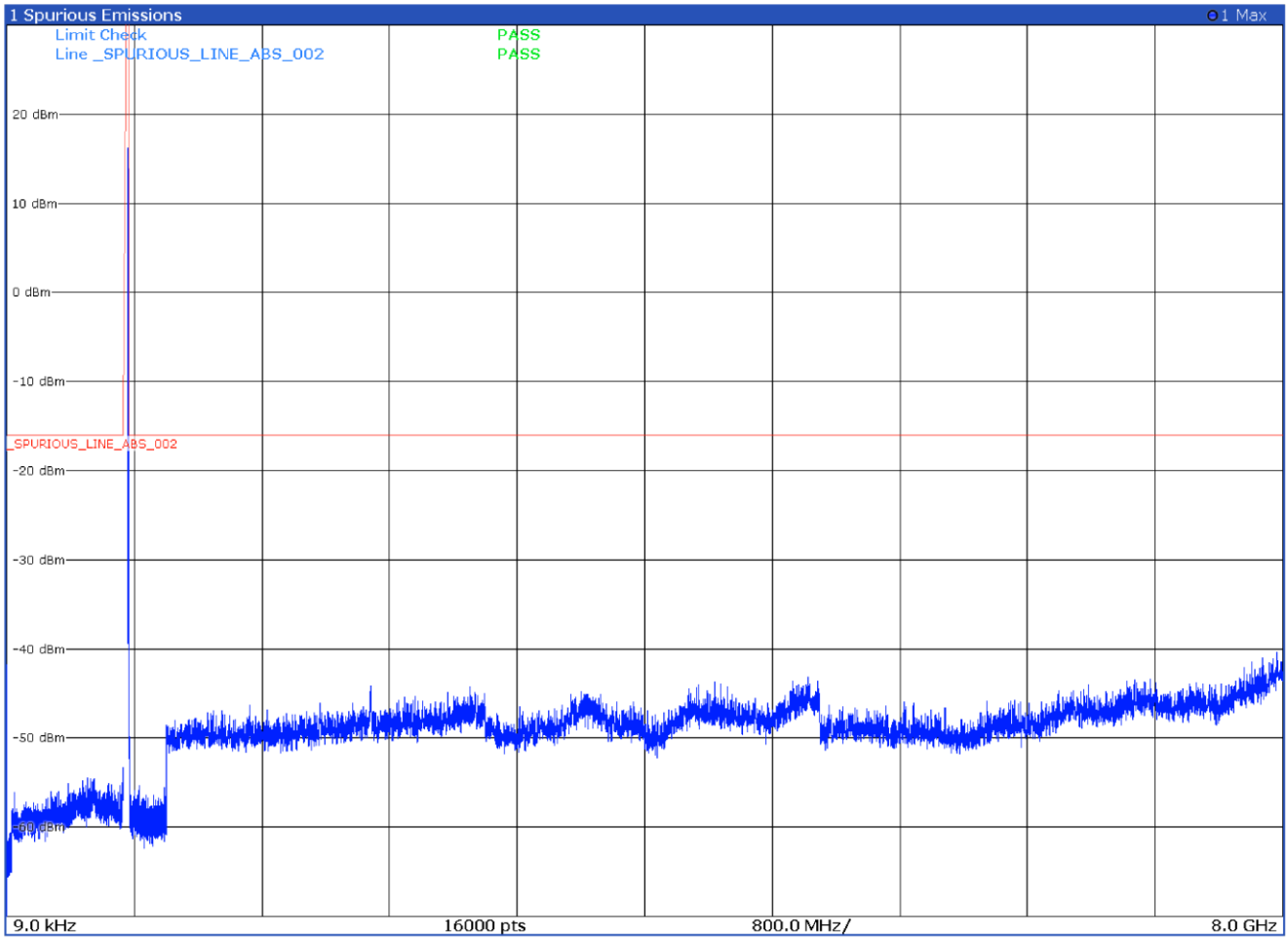


2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**126.241 50 kHz**	**-65.36 dBm**	**-49.36 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-42.48 dBm**	**-26.48 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**727.427 25 MHz**	**-52.15 dBm**	**-36.15 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**765.227 50 MHz**	**14.73 dBm**	**-35.27 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.058 00 MHz**	**-43.82 dBm**	**-27.82 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.996 06 GHz**	**-39.93 dBm**	**-23.93 dB**

Figure 8.6-3: *Conducted spurious emissions of high channel, antenna port 1*

Test data, continued

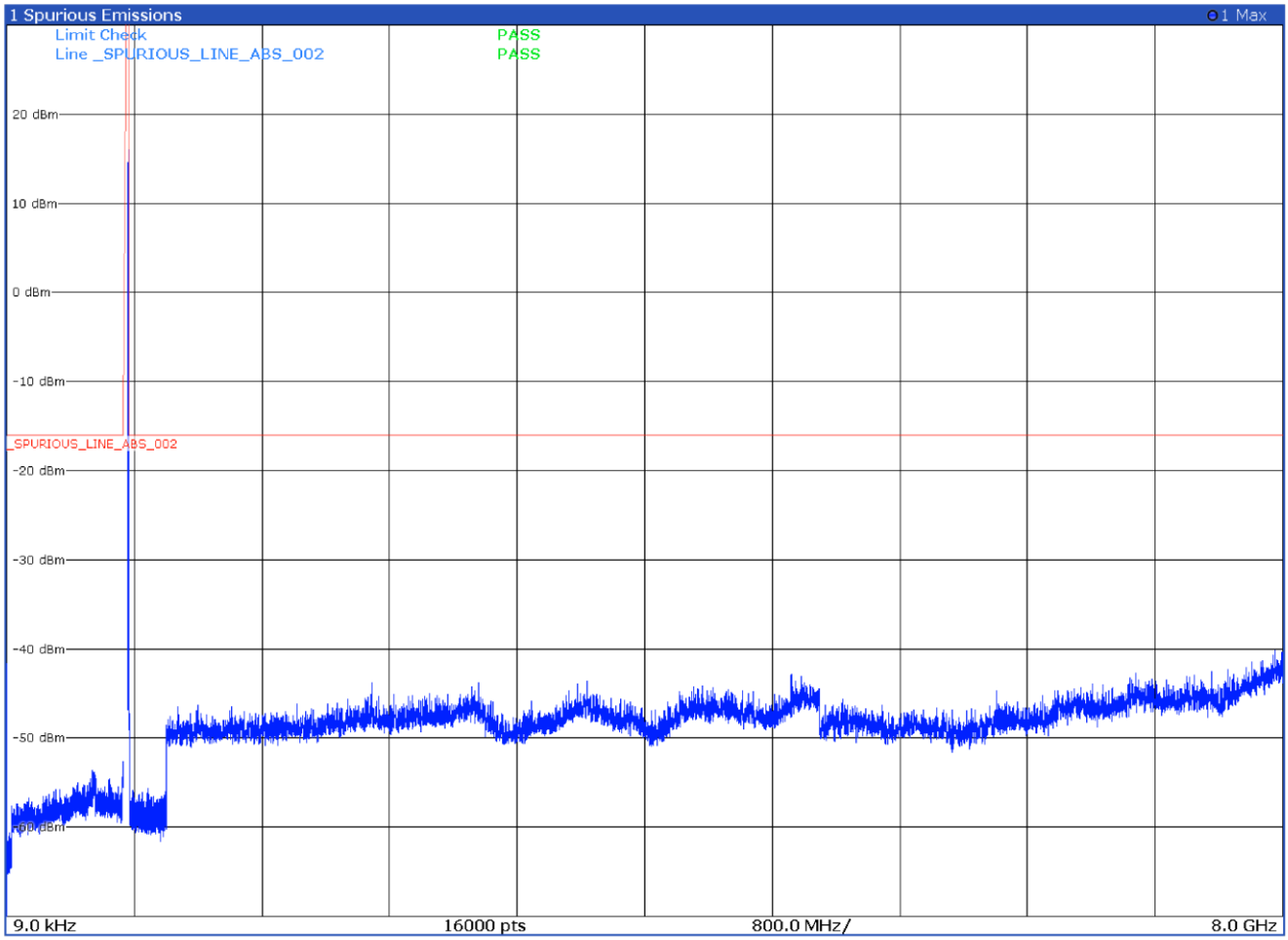


2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**126.241 50 kHz**	**-65.82 dBm**	**-49.82 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-41.80 dBm**	**-25.80 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**727.776 75 MHz**	**-53.32 dBm**	**-37.32 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**761.167 50 MHz**	**16.21 dBm**	**-33.79 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.174 00 MHz**	**-49.88 dBm**	**-33.88 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.964 56 GHz**	**-40.37 dBm**	**-24.37 dB**

Figure 8.6-4: *Conducted spurious emissions of low channel, antenna port 2*

Test data, continued

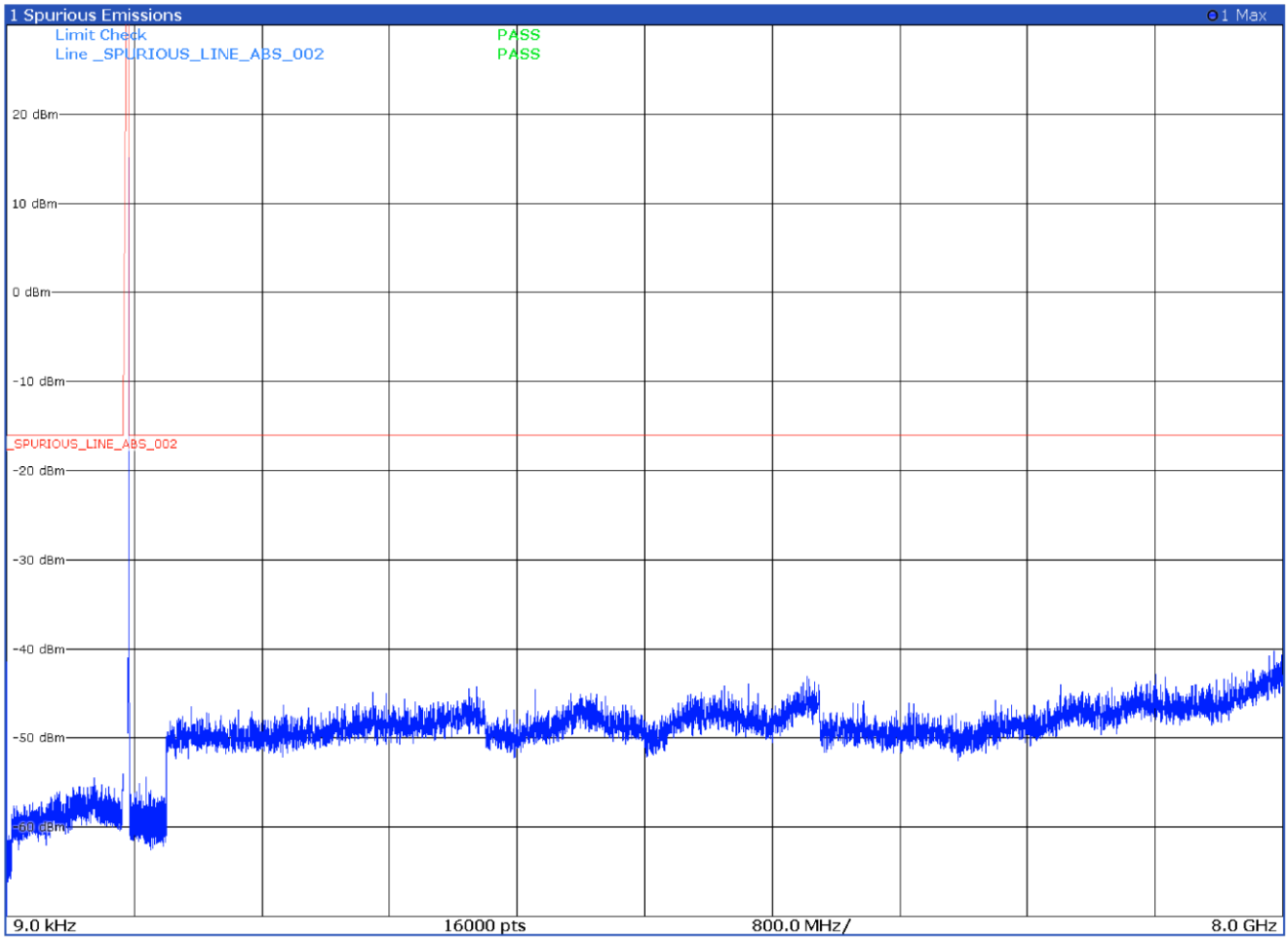


2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**18.658 50 kHz**	**-65.97 dBm**	**-49.97 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-41.62 dBm**	**-25.62 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**728.475 75 MHz**	**-52.63 dBm**	**-36.63 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**762.722 50 MHz**	**16.00 dBm**	**-34.00 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.058 00 MHz**	**-46.68 dBm**	**-30.68 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.952 31 GHz**	**-40.19 dBm**	**-24.19 dB**

Figure 8.6-5: *Conducted spurious emissions of mid channel, antenna port 2*

Test data, continued



2 Result Summary

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 kHz	150.000 kHz	1.000 kHz	**133.996 50 kHz**	**-66.82 dBm**	**-50.82 dB**
150.000 kHz	30.000 MHz	10.000 kHz	**702.225 00 kHz**	**-41.43 dBm**	**-25.43 dB**
30.000 MHz	729.000 MHz	100.000 kHz	**727.077 75 MHz**	**-54.18 dBm**	**-38.18 dB**
758.000 MHz	768.000 MHz	100.000 kHz	**765.222 50 MHz**	**15.09 dBm**	**-34.91 dB**
768.000 MHz	1.000 GHz	100.000 kHz	**768.058 00 MHz**	**-43.62 dBm**	**-27.62 dB**
1.000 GHz	8.000 GHz	1.000 MHz	**7.944 44 GHz**	**-40.30 dBm**	**-24.30 dB**

Figure 8.6-6: *Conducted spurious emissions of high channel, antenna port 2*

Test data, continued

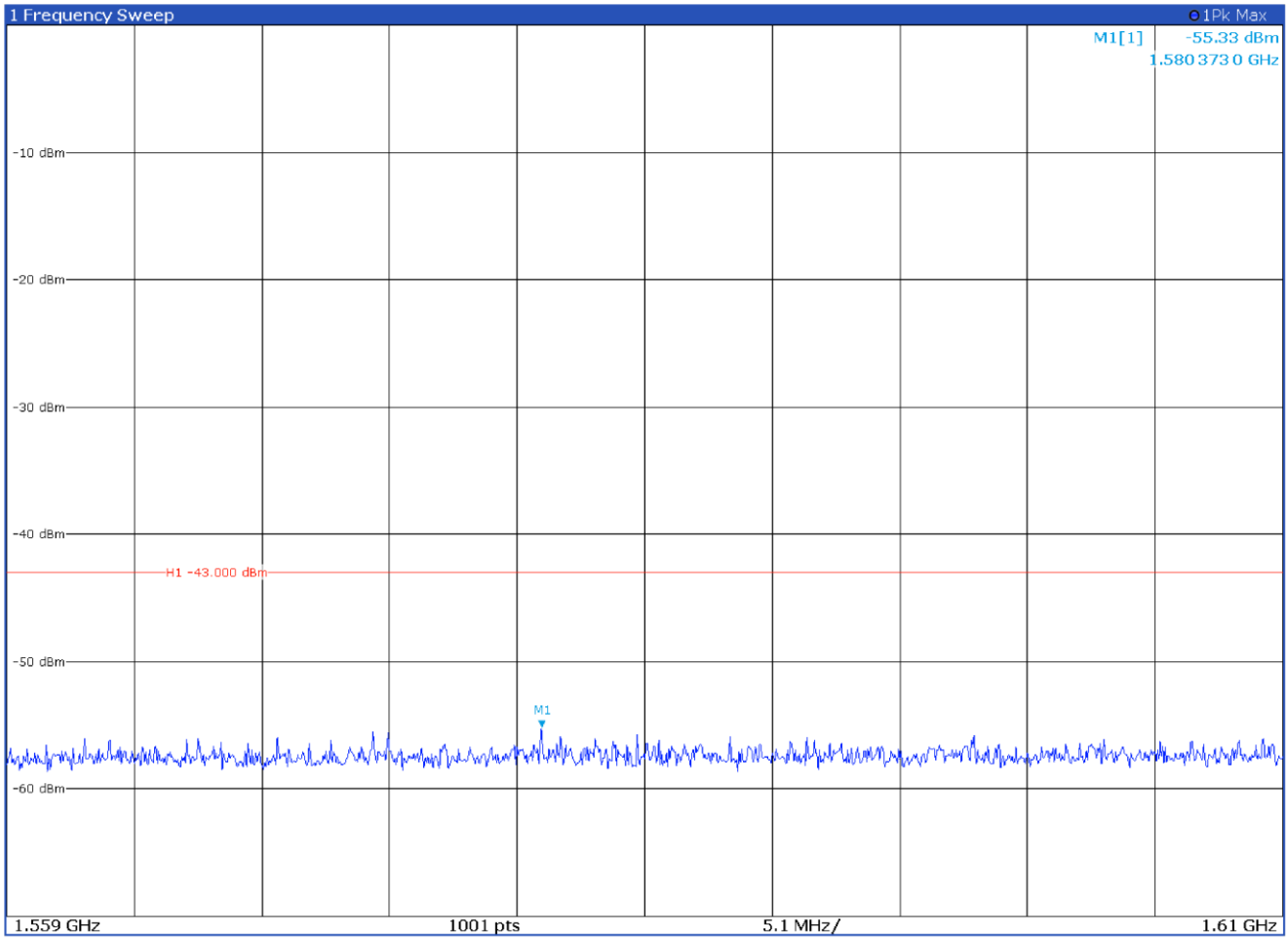


Figure 8.6-7: *Conducted spurious emissions of low channel, antenna port 1 – broad band*

Test data, continued

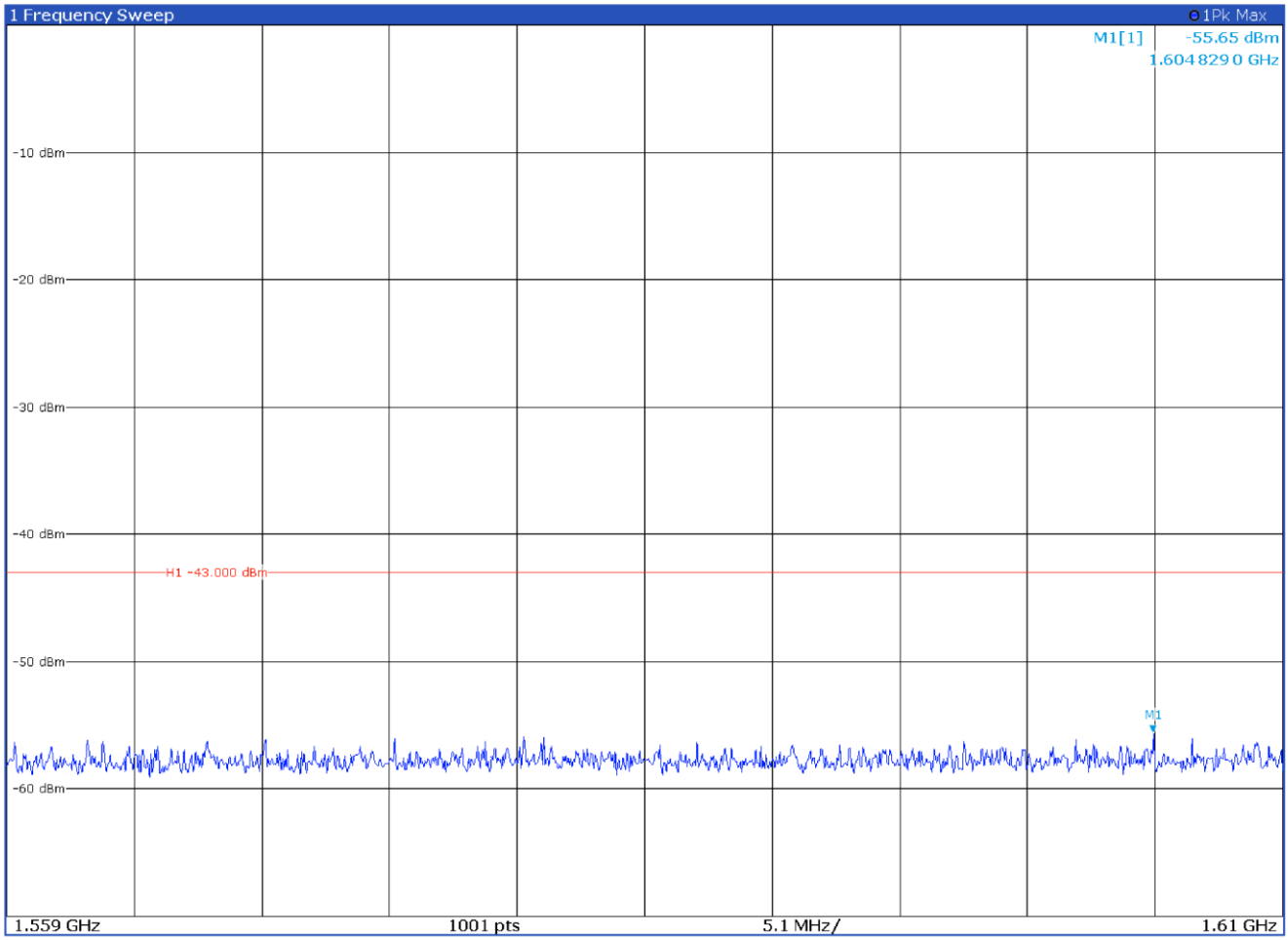


Figure 8.6-8: *Conducted spurious emissions of mid channel, antenna port 1 – broad band*

Test data, continued

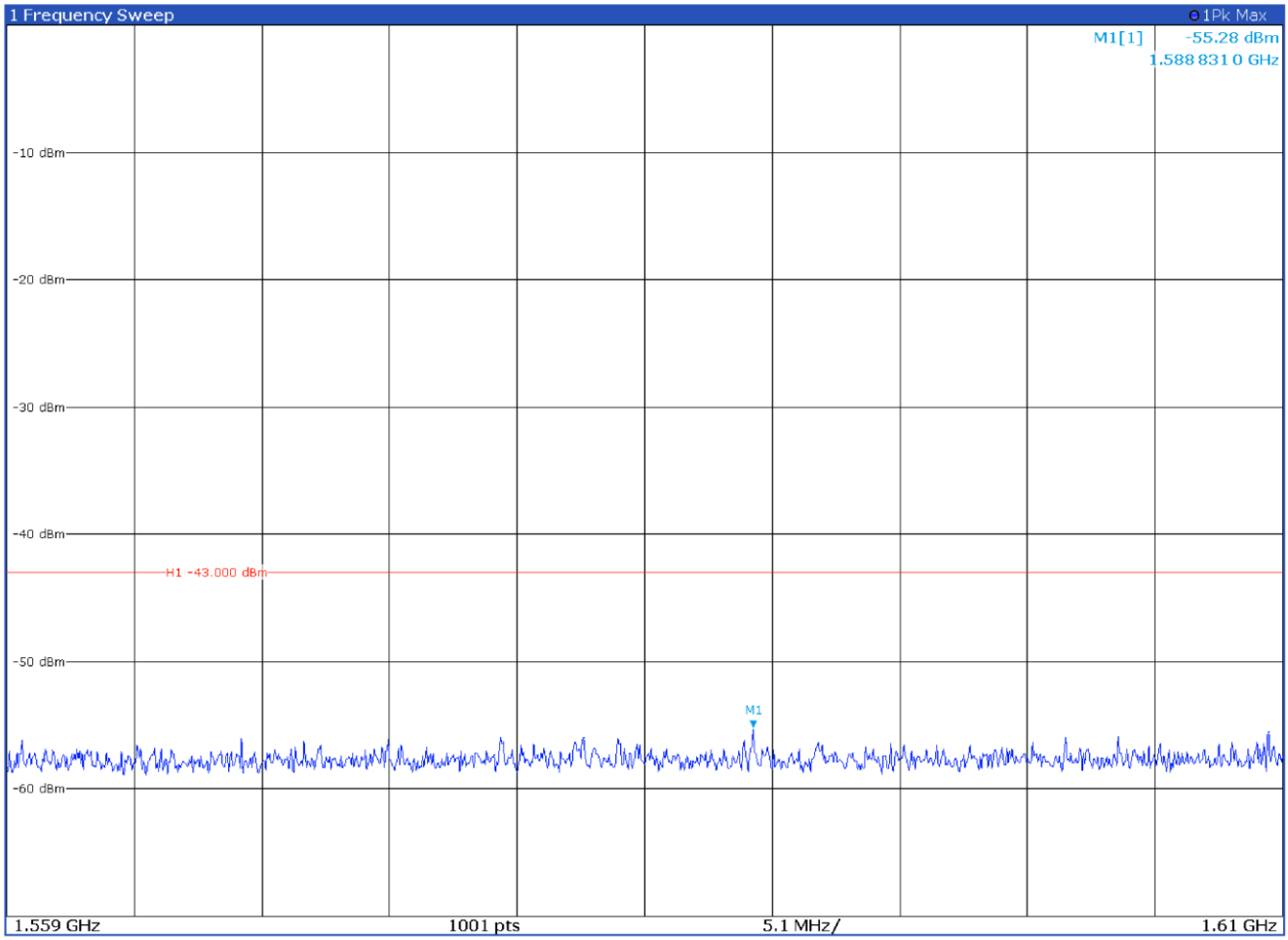


Figure 8.6-9: *Conducted spurious emissions of high channel, antenna port 1 – broad band*

Test data, continued

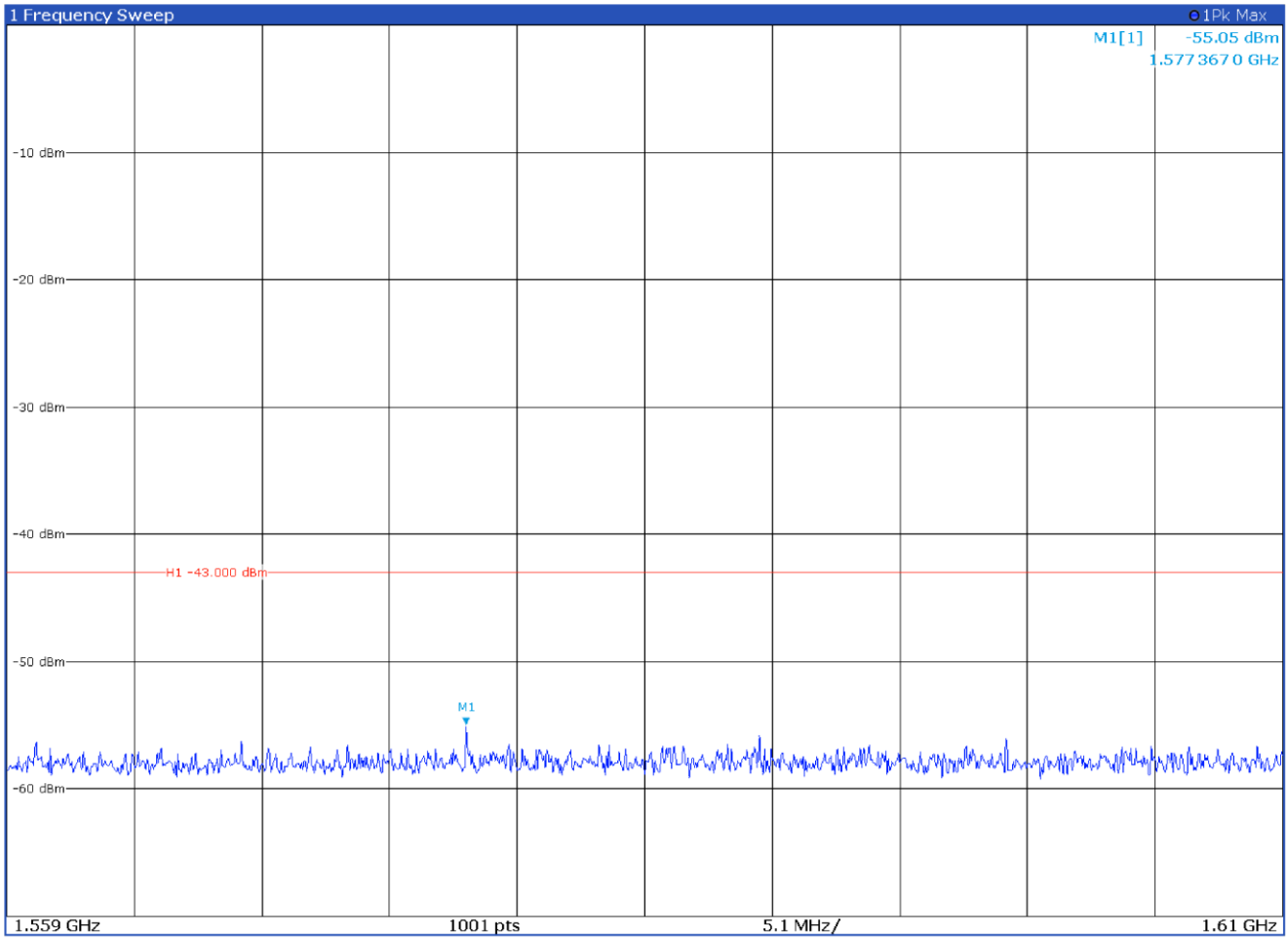


Figure 8.6-10: *Conducted spurious emissions of low channel, antenna port 2 – broad band*

Test data, continued

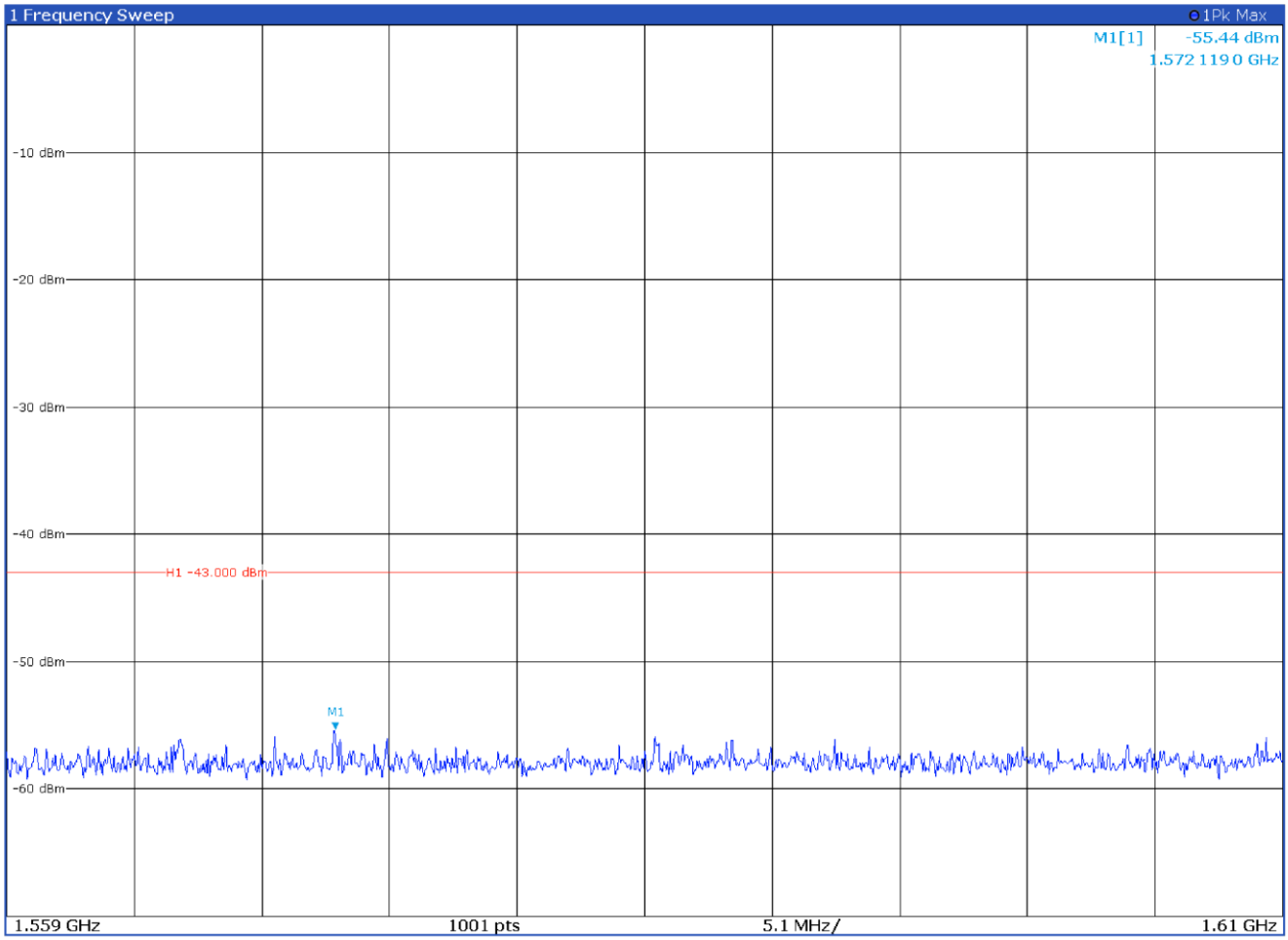


Figure 8.6-11: *Conducted spurious emissions of mid channel, antenna port 2 – broad band*

Test data, continued

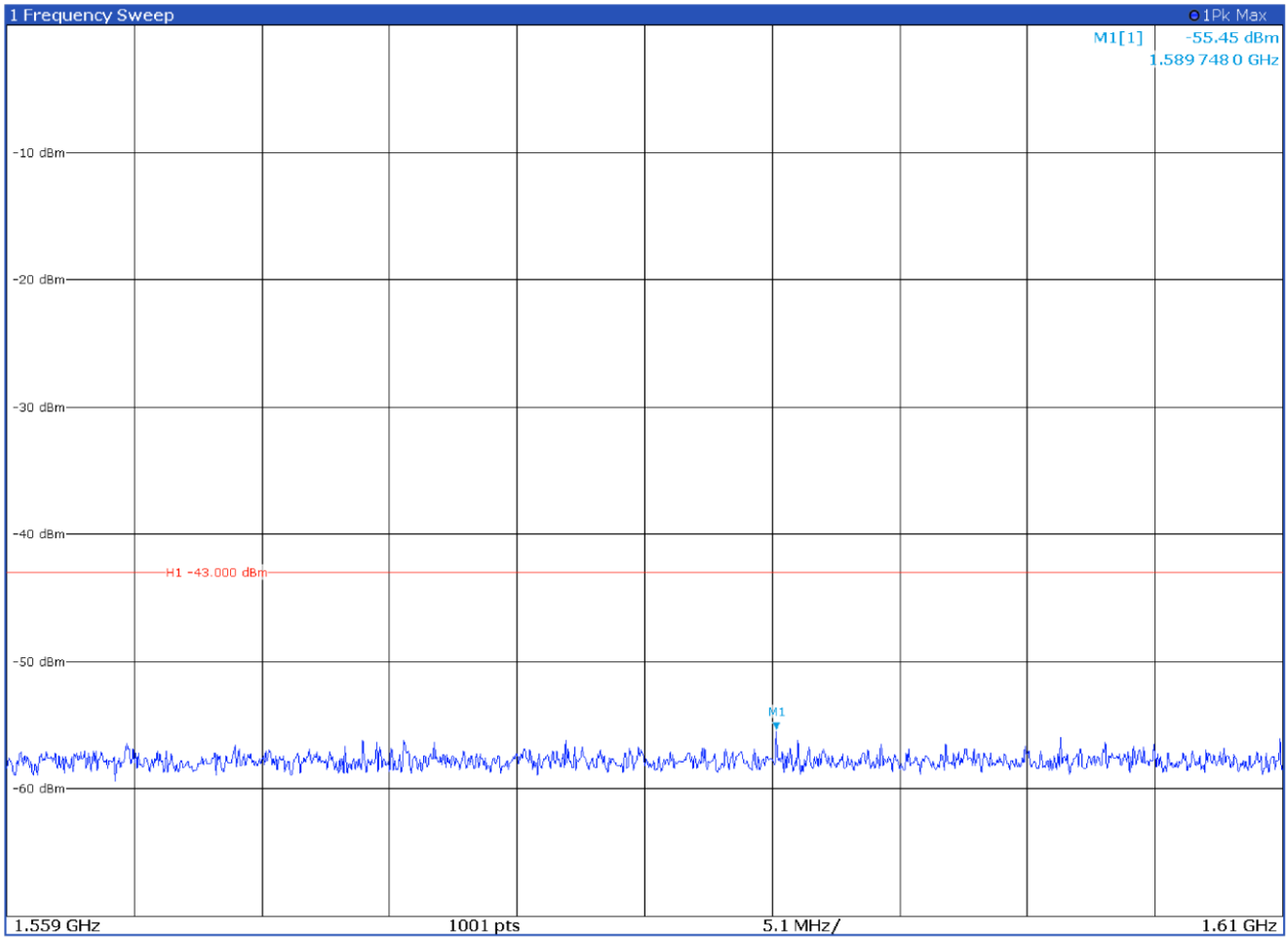


Figure 8.6-12: *Conducted spurious emissions of high channel, antenna port 2 – broad band*

Test data, continued

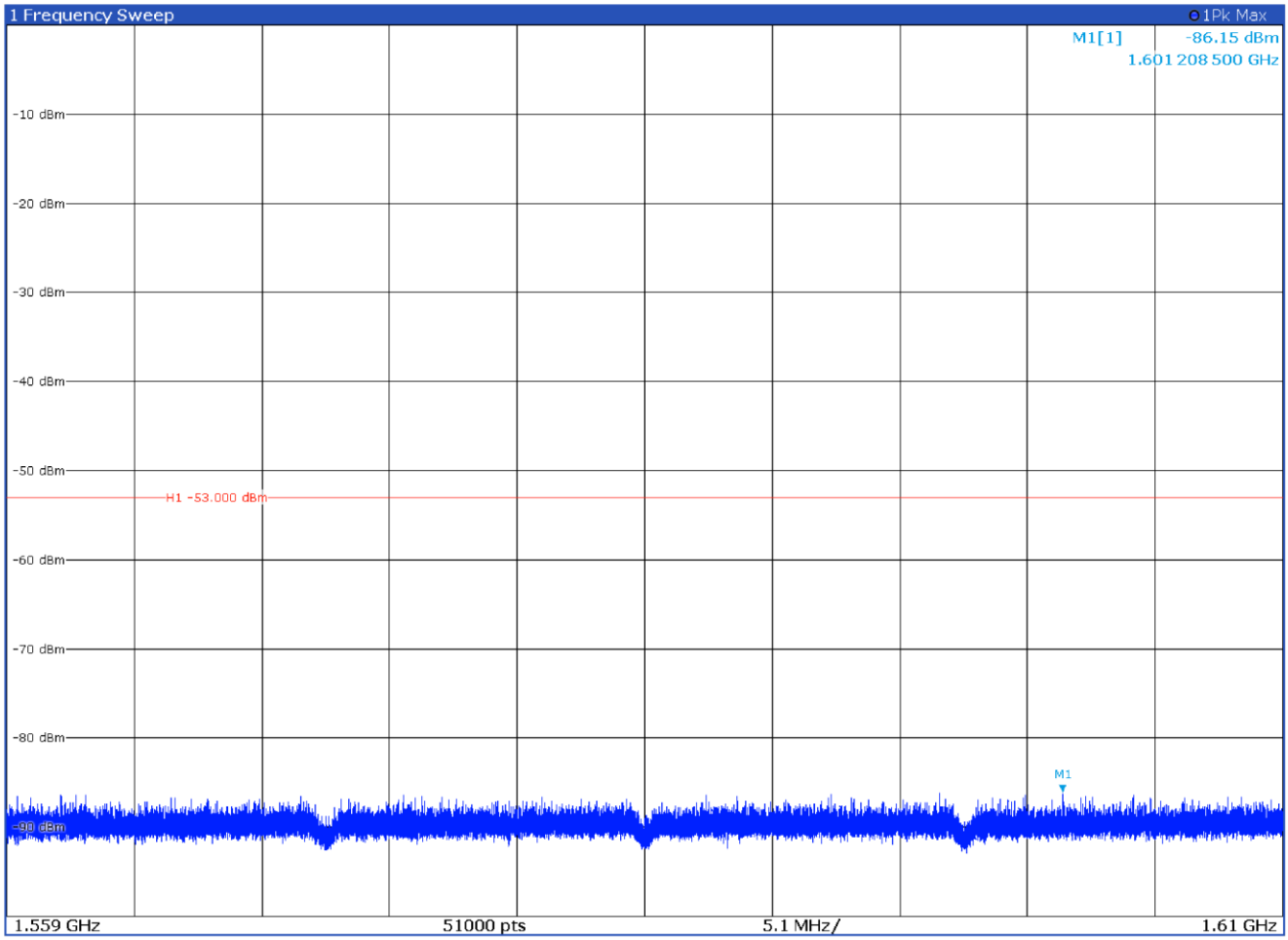


Figure 8.6-13: *Conducted spurious emissions of low channel, antenna port 1 – narrow band*

Test data, continued

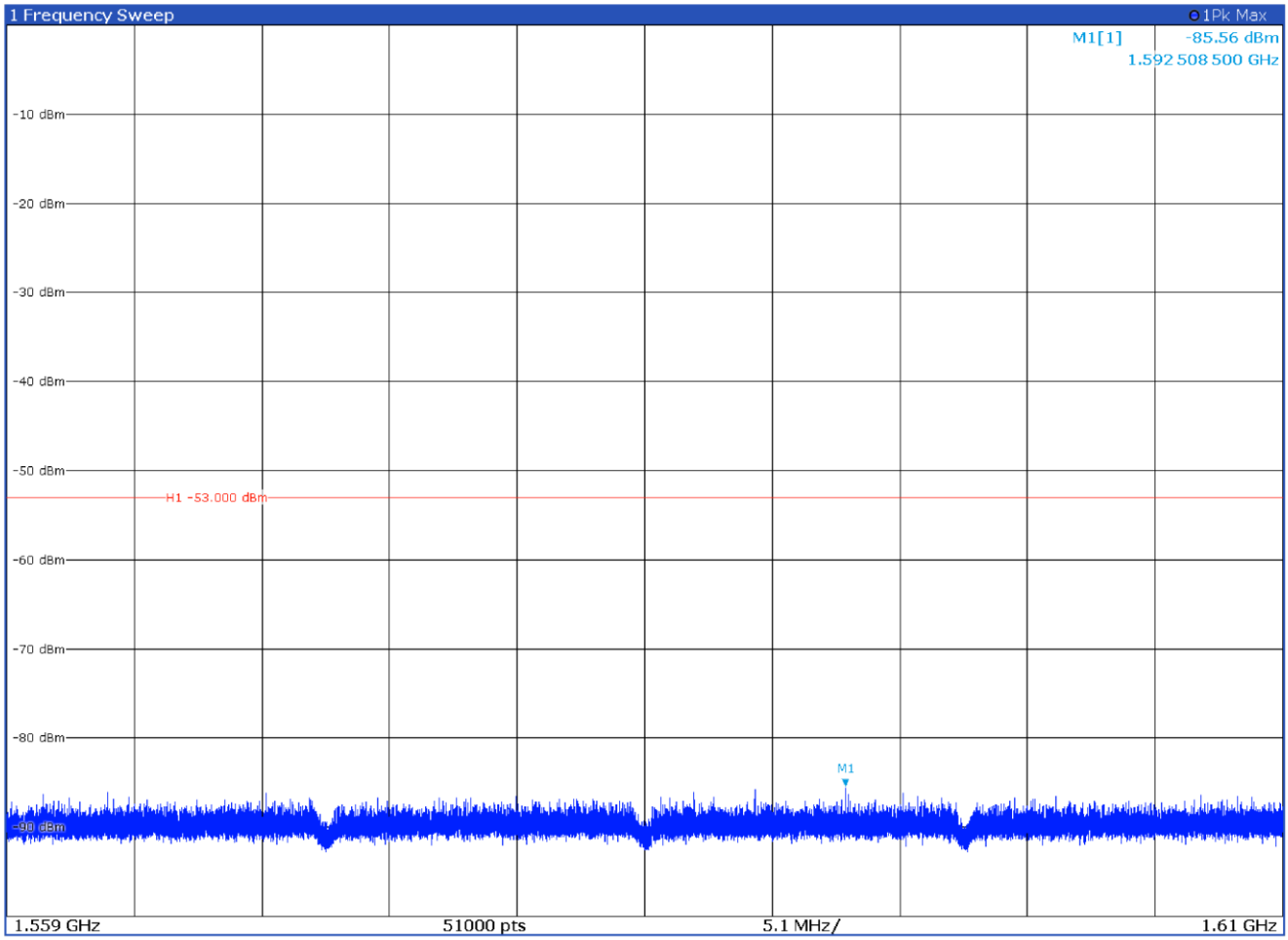


Figure 8.6-14: *Conducted spurious emissions of mid channel, antenna port 1 – narrow band*

Test data, continued

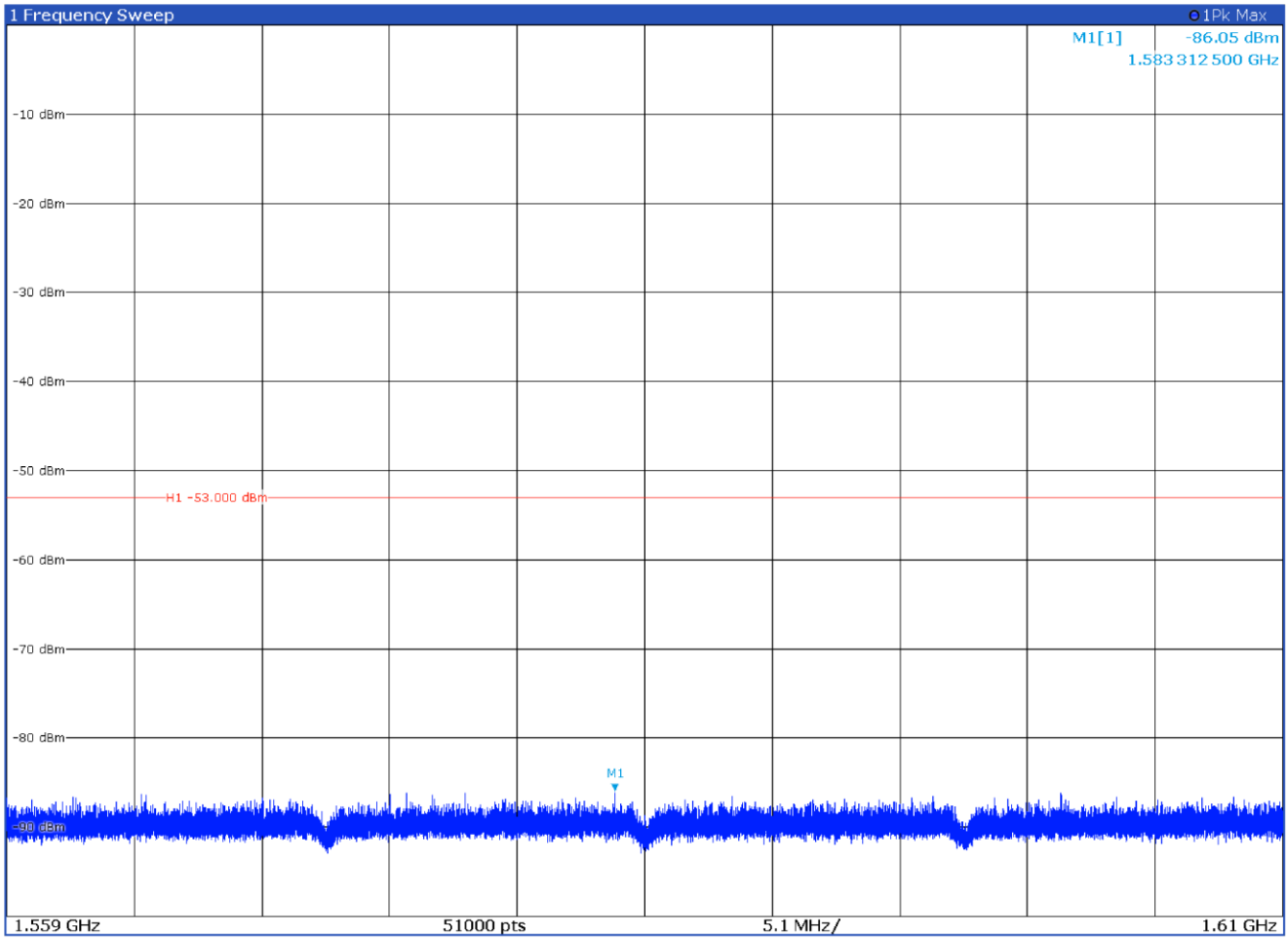


Figure 8.6-15: *Conducted spurious emissions of high channel, antenna port 1 – narrow band*

Test data, continued

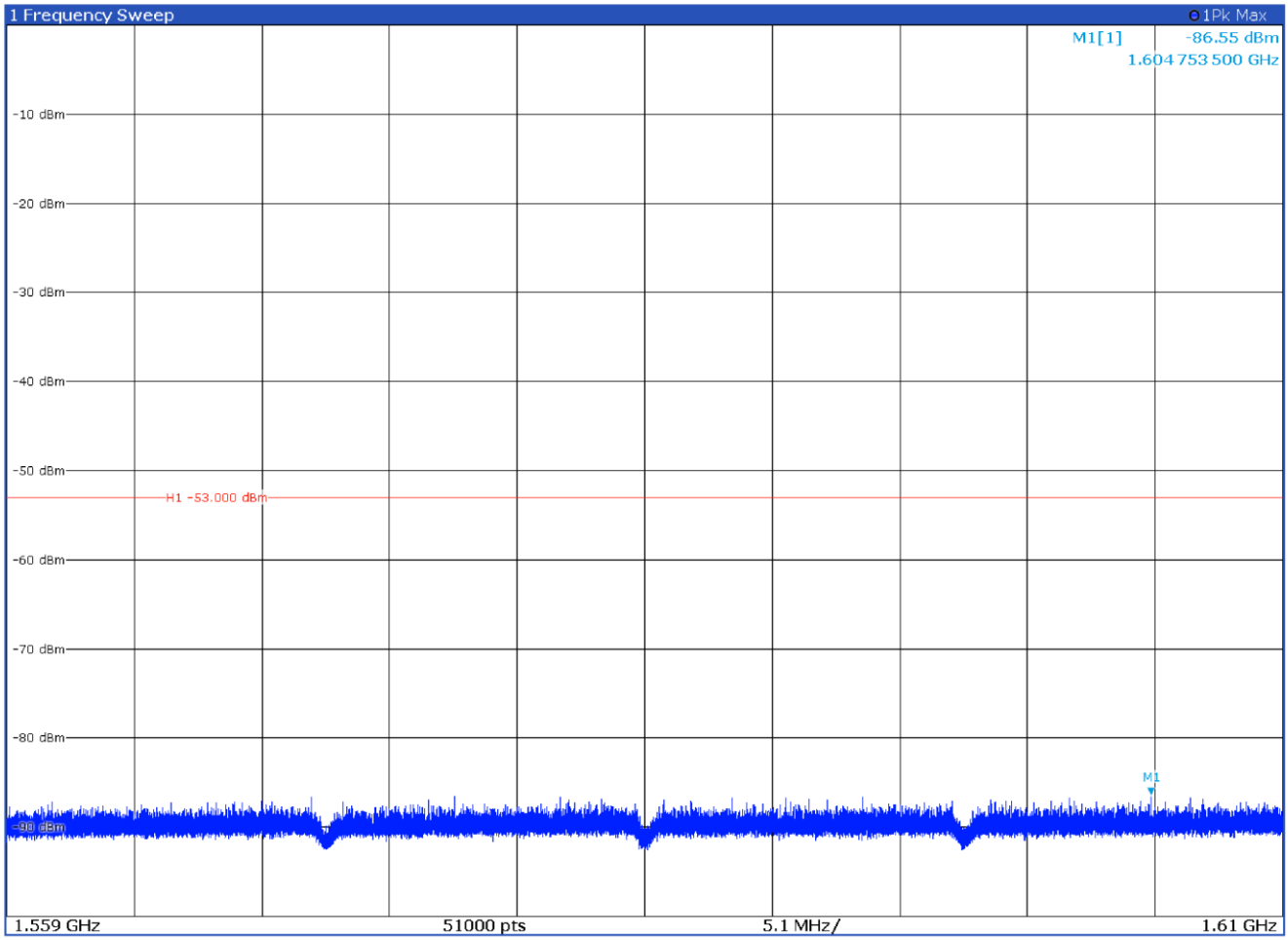


Figure 8.6-16: *Conducted spurious emissions of low channel, antenna port 2 – narrow band*

Test data, continued

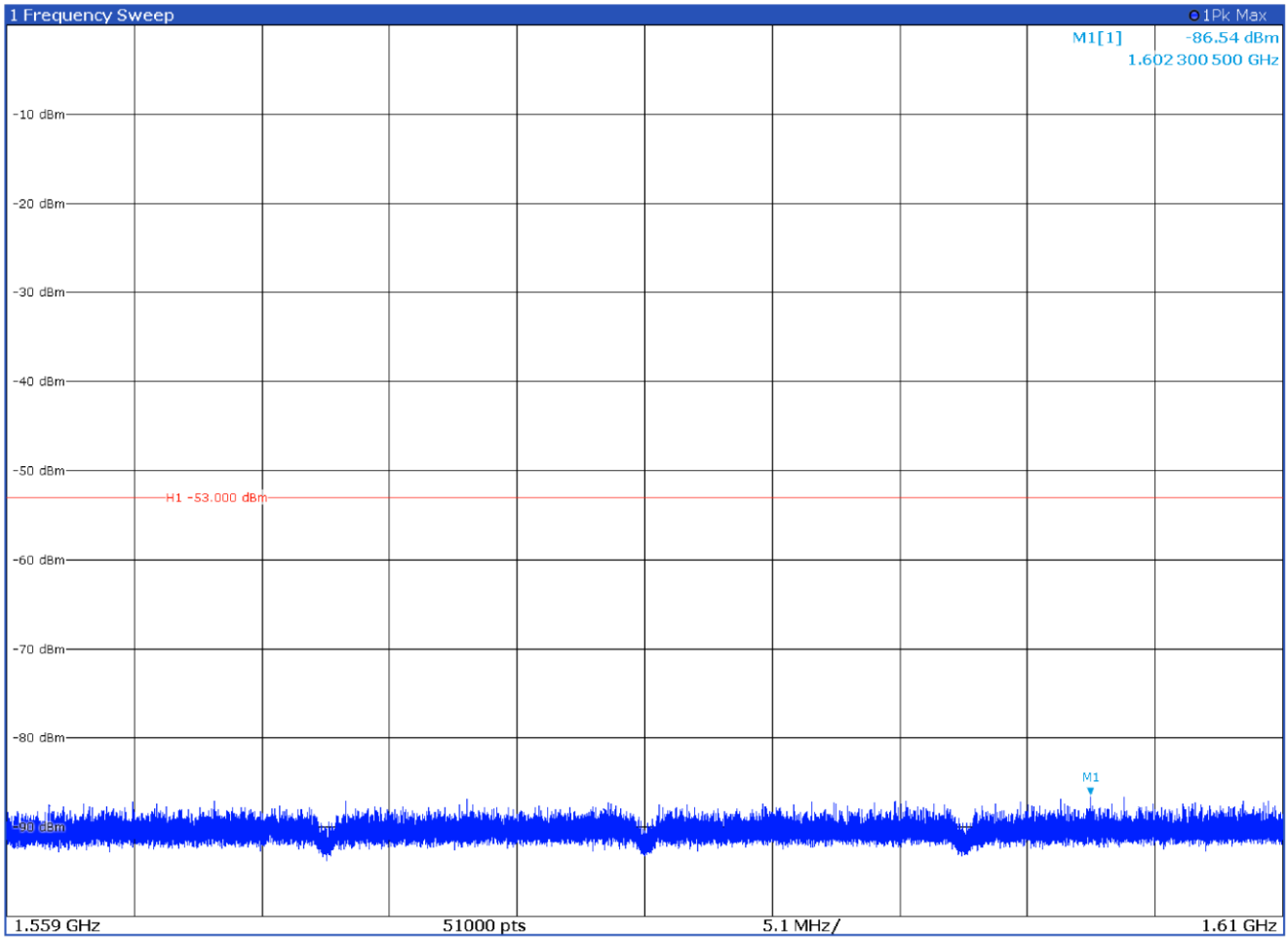


Figure 8.6-17: *Conducted spurious emissions of mid channel, antenna port 2 – narrow band*

Test data, continued

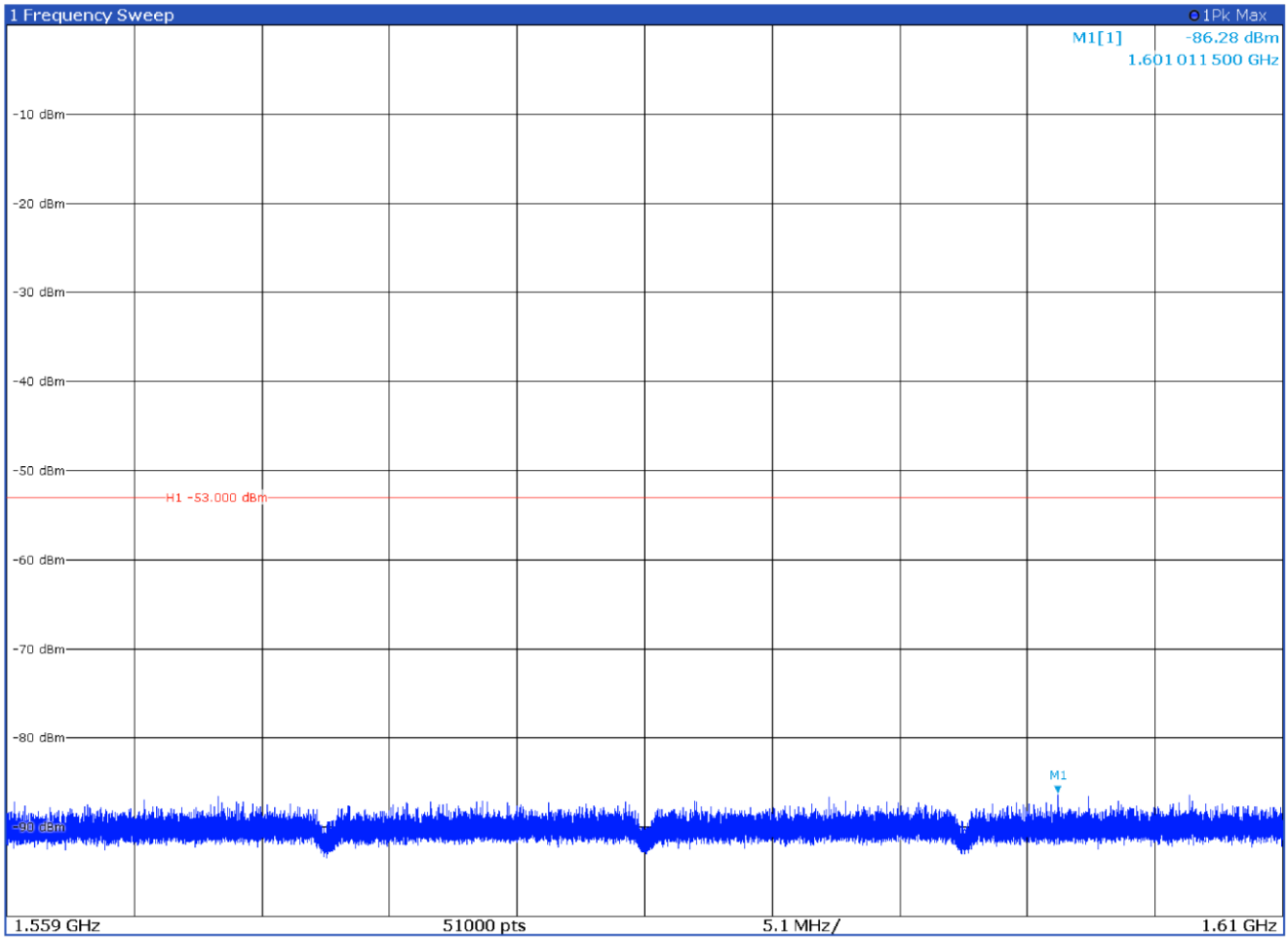


Figure 8.6-18: *Conducted spurious emissions of high channel, antenna port 2 – narrow band*

8.7 Spurious emissions radiated measurements

8.7.1 References, definitions and limits

FCC §90.543(e)

For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

(4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

FCC §90.543(f)

For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

FCC §90.219(e)

(3) Spurious emissions from a signal booster must not exceed −13 dBm within any 100 kHz measurement bandwidth.

RSS-131, Clause 5.2

Industrial Zone Enhancers, including DASs, shall employ a gain control feature and shall comply with all the requirements in the RSS which applies to the equipment with which the zone enhancer is to be used. In addition, the equipment shall comply with the requirements specified in this section.

RSS-140, Clause 4.4

Transmitter unwanted emission limits

The power of any unwanted emission outside the bands 758-768 MHz and 788-798 MHz shall be attenuated below the transmitter output power P in dBW as follows, where p is the transmitter output power in watts:

(a) For any frequency between 769-775 MHz and 799-806 MHz:
76 + 10 log (p), dB in a 6.25 kHz band for fixed and base station equipment
65 + 10 log (p), dB in a 6.25 kHz band for mobile and portable/hand-held equipment

(b)	For any frequency between 775-788 MHz, above 806 MHz, and below 758 MHz: 43 + 10 log (p), dB in a bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency bands 758-768 MHz and 788-798 MHz, a resolution bandwidth of 30 kHz may be employed.

In addition, the equivalent isotropically radiated power (e.i.r.p.) of all emissions, including harmonics in the band 1559-1610 MHz, shall not exceed −70 dBW/MHz for wideband emissions, and −80 dBW/kHz for discrete emissions of less than 700 Hz bandwidth.

8.7.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	February 8, 2022

8.7.3 Observations, settings and special notes

The spectrum was searched from 30 MHz to the 10th harmonic.
All measurements were performed using peak detector according to note 4 of 935210 D05 Indus Booster Basic Meas v01r04 paragraph 3.6.3.
Testing was performed with RF ports terminated with 50 Ohm load.
In the graphics below, no radiated spurious emission found and the limit is exceeded only by the carrier.

Spectrum analyser settings:

Resolution bandwidth:	100 kHz and 1 MHz
Video bandwidth:	VBW ≥ 3 × RBW
Detector mode:	Peak
Trace mode:	Max Hold

Input signal frequency

Low channel	760.5 MHz
Middle channel	763.0 MHz
High channel	765.5 MHz

8.7.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767
EMI Receiver	Rohde & Schwarz	ESW44	101620
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263397
Antenna Trilog 25MHz - 8GHz	Schwarzbeck Mess-Elektronik	VULB9162	9162-025
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152
Double Ridge Horn Antenna	RFSpin	DRH40	061106A40
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121
Broadband Bench Top Amplifier	Sage	STB-1834034030-KFKF-L1	18490-01
Controller	Maturo	FCU3.0	10041
Tilt antenna mast	Maturo	TAM4.0-E	10042
Turntable	Maturo	TT4.0-5T	2.527
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530

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

8.7.5 Test data

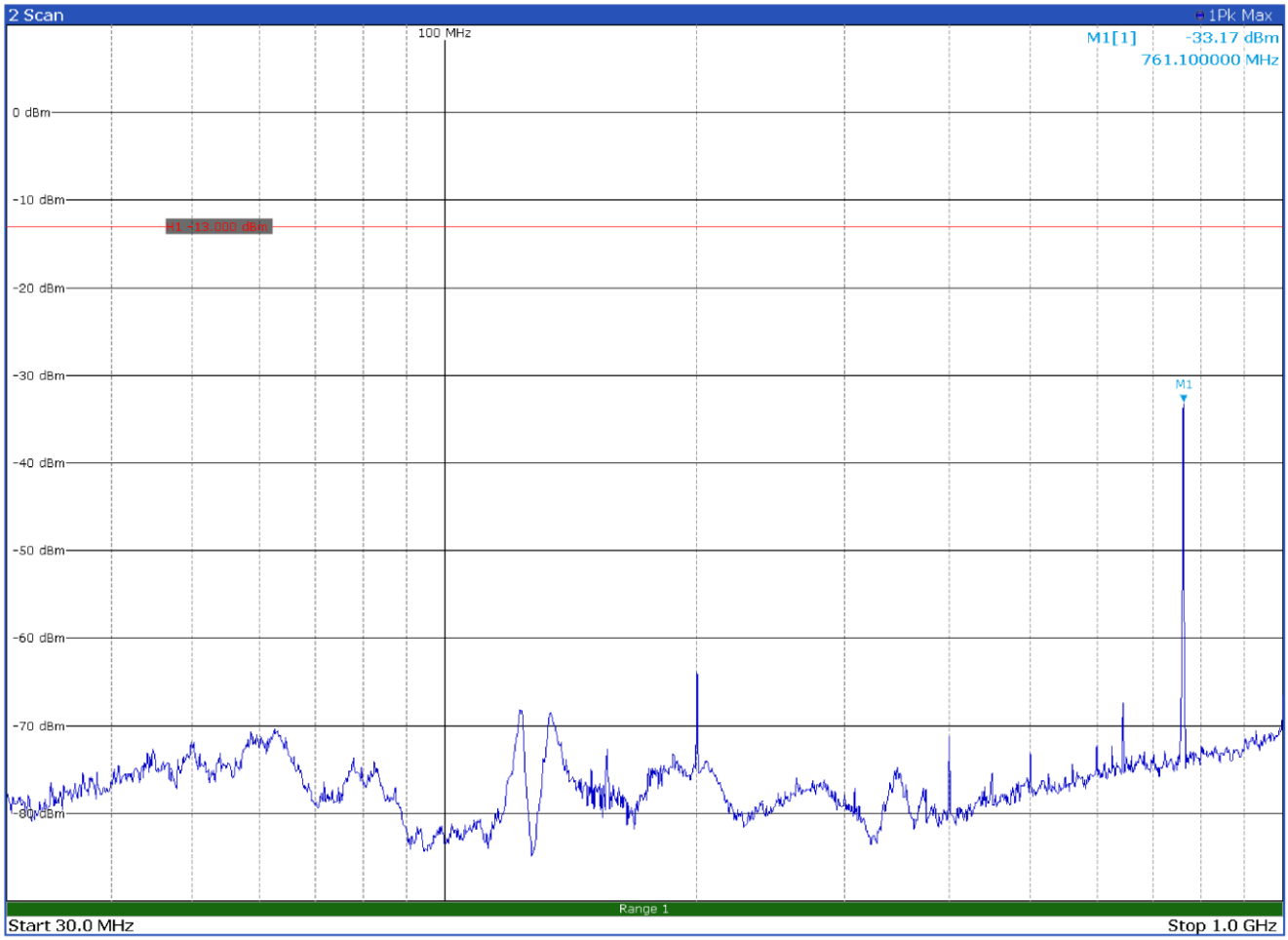


Figure 8.7-1: *Radiated spurious emissions below 1 GHz, low channel with antenna in horizontal polarization*

Test data, continued

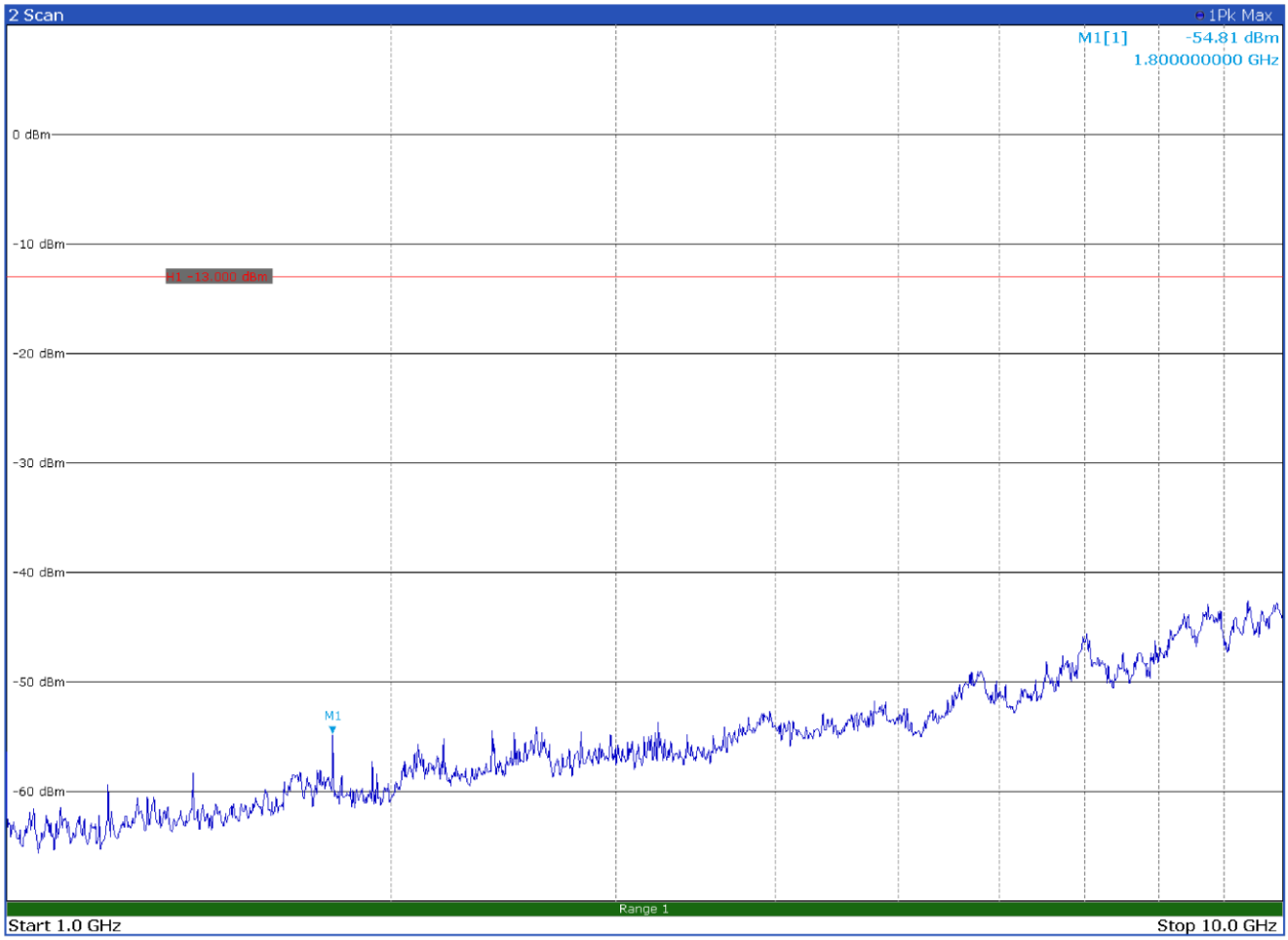


Figure 8.7-2: *Radiated spurious emissions from 1 GHz to 10 GHz, low channel with antenna in horizontal polarization*

Test data, continued

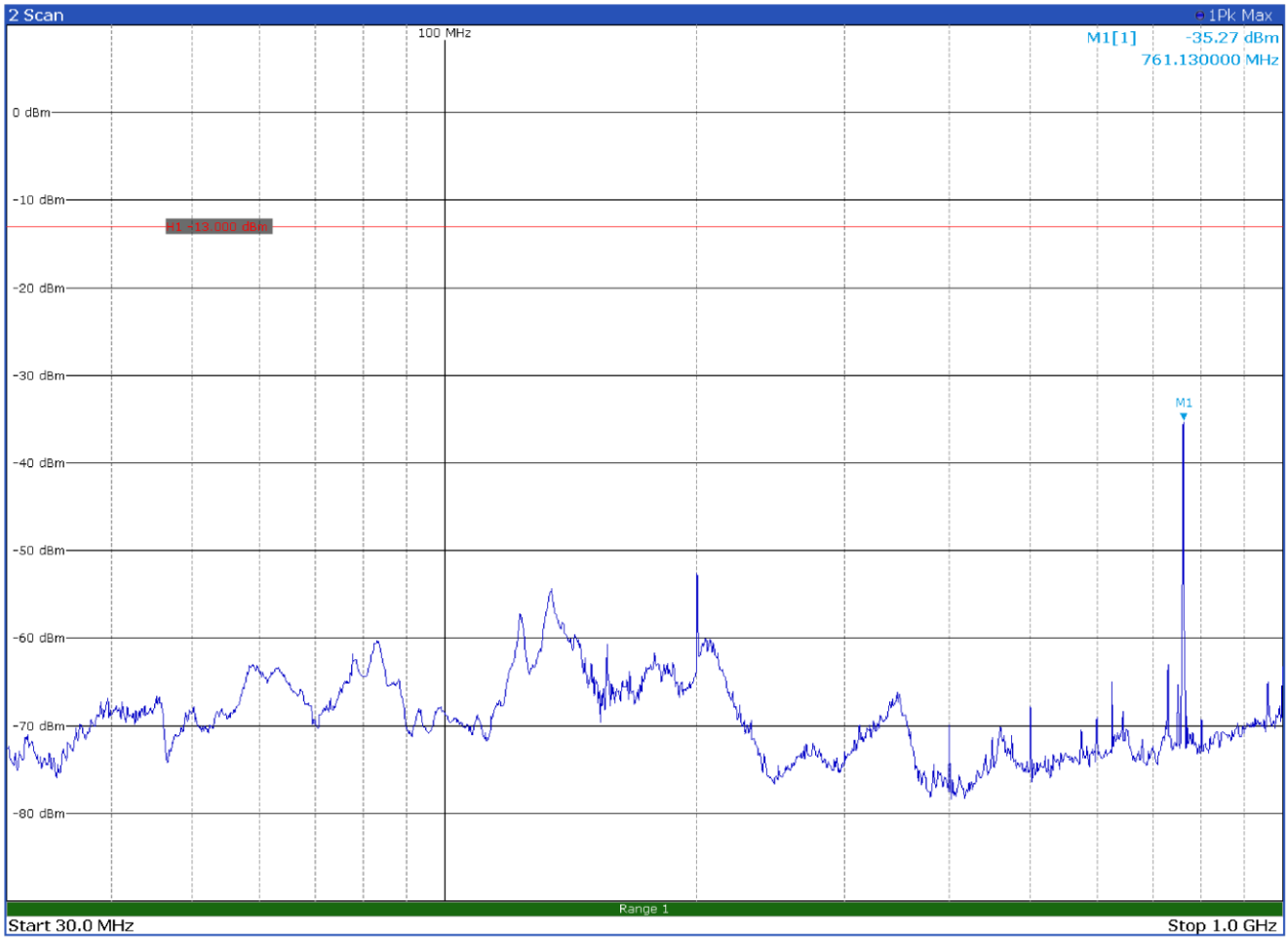


Figure 8.7-3: *Radiated spurious emissions below 1 GHz, low channel with antenna in vertical polarization*

Test data, continued

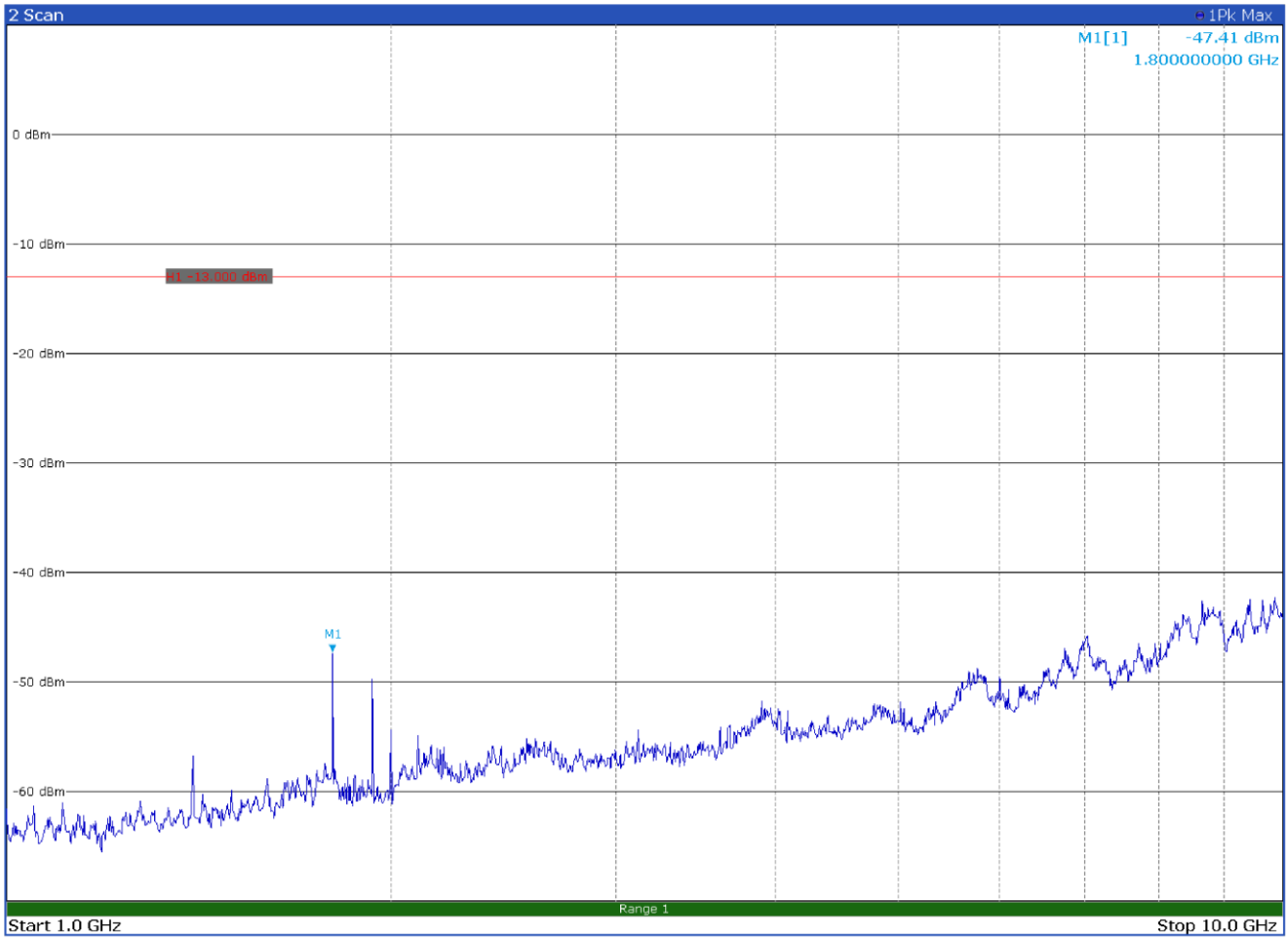


Figure 8.7-4: *Radiated spurious emissions from 1 GHz to 10 GHz, low channel with antenna in vertical polarization*

Test data, continued

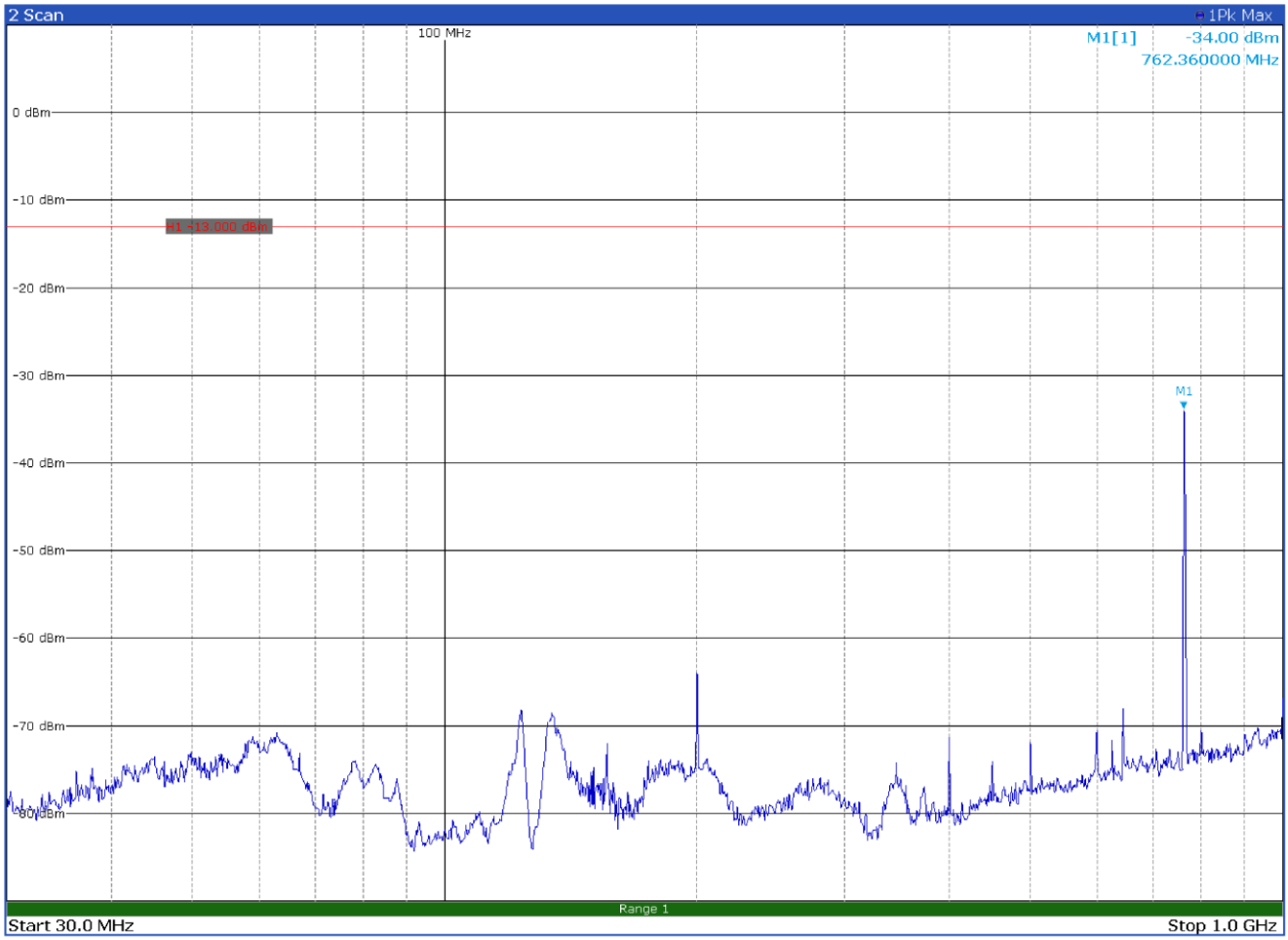


Figure 8.7-5: *Radiated spurious emissions below 1 GHz, mid channel with antenna in horizontal polarization*

Test data, continued

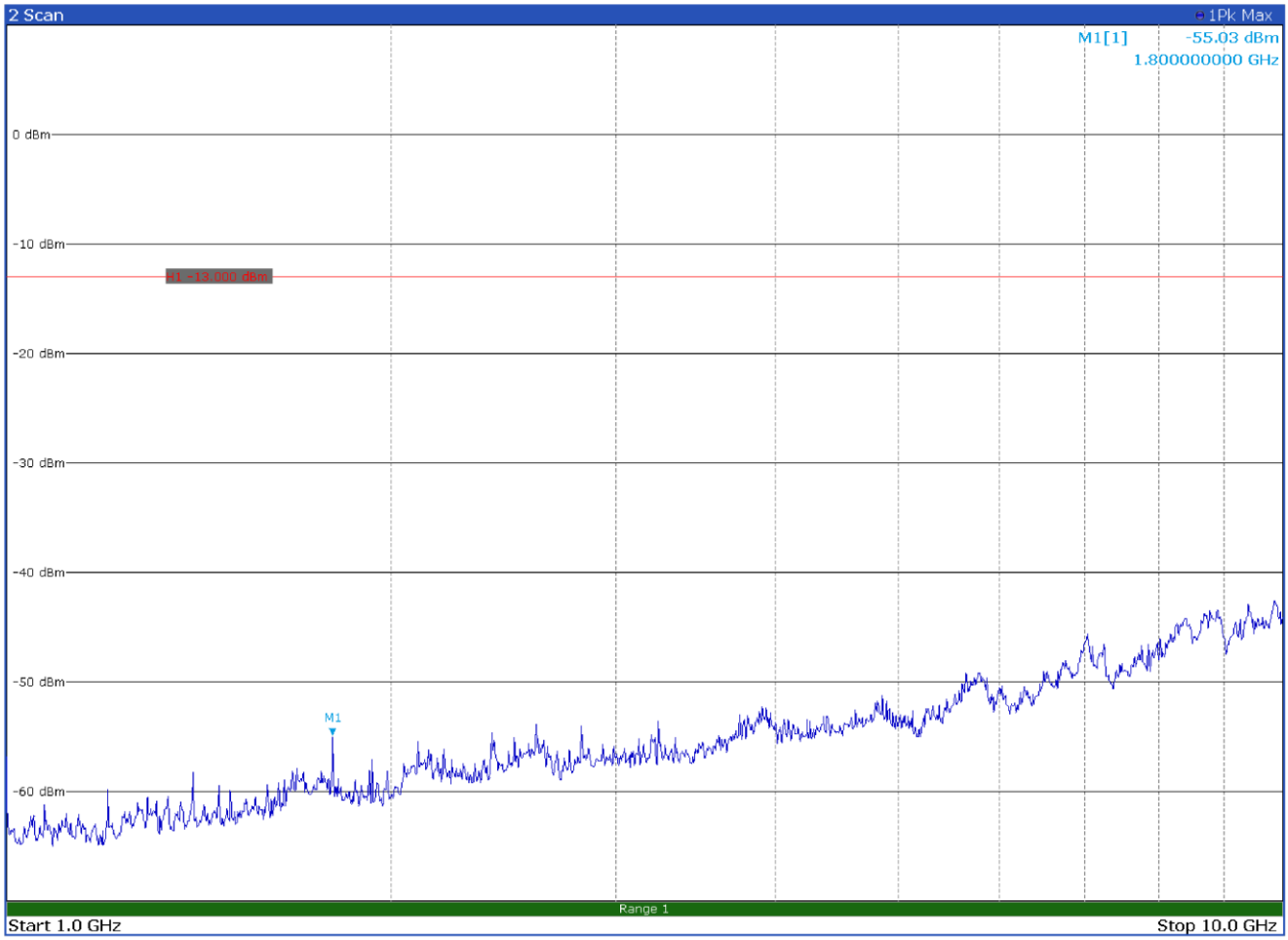


Figure 8.7-6: *Radiated spurious emissions from 1 GHz to 10 GHz, mid channel with antenna in horizontal polarization*

Test data, continued

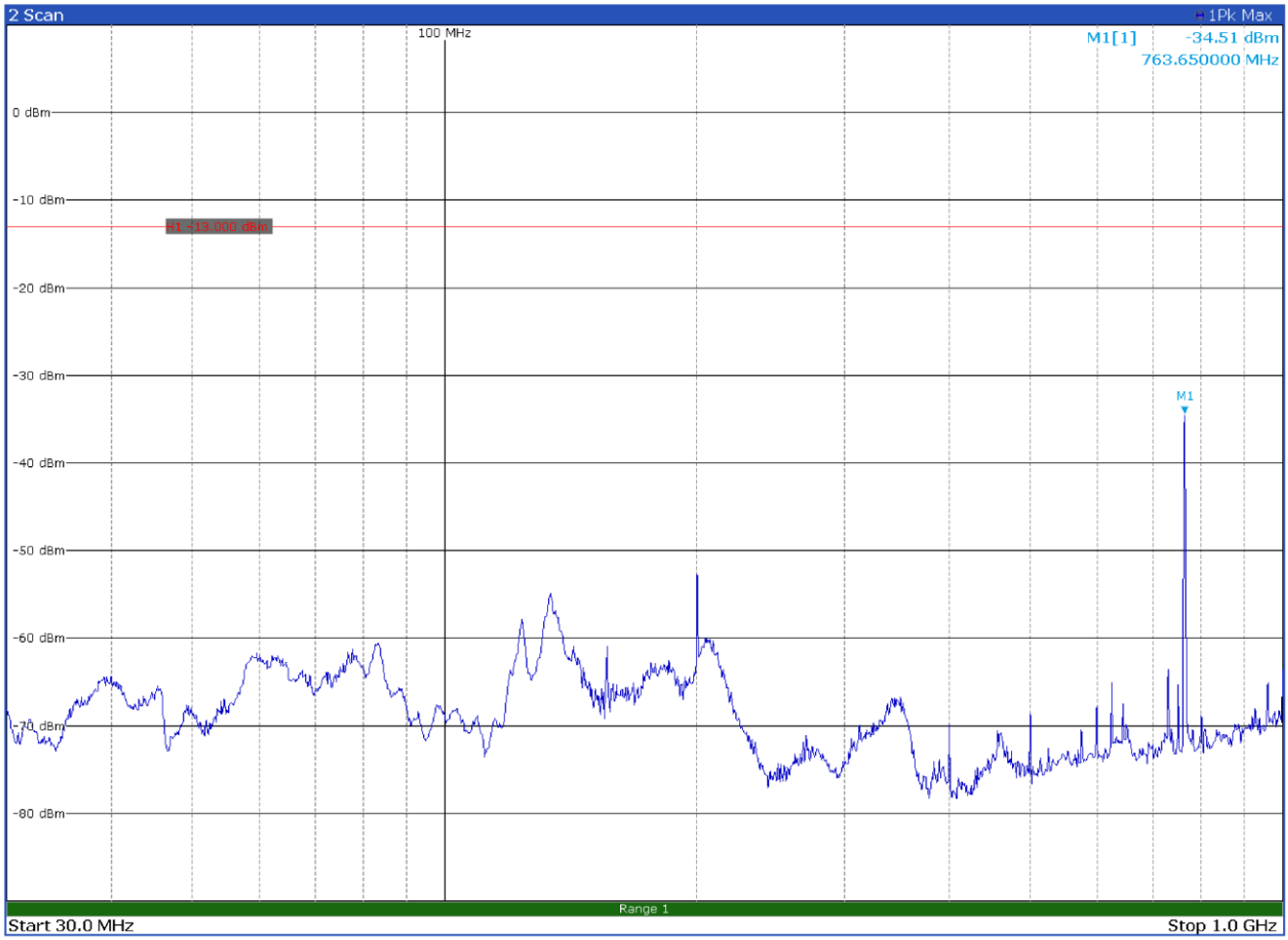


Figure 8.7-7: *Radiated spurious emissions below 1 GHz, mid channel with antenna in vertical polarization*

Test data, continued

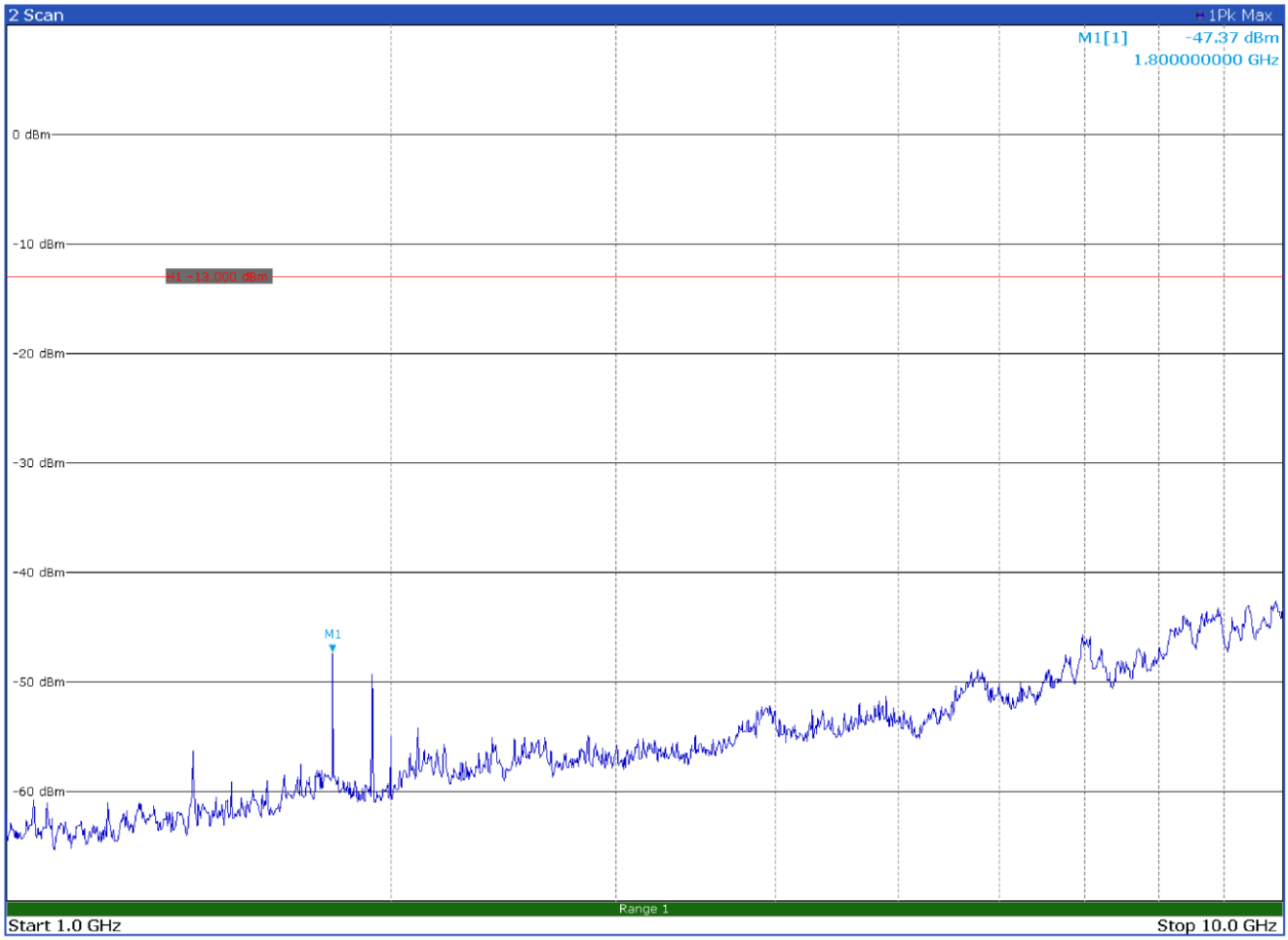


Figure 8.7-8: *Radiated spurious emissions from 1 GHz to 10 GHz, mid channel with antenna in vertical polarization*

Test data, continued

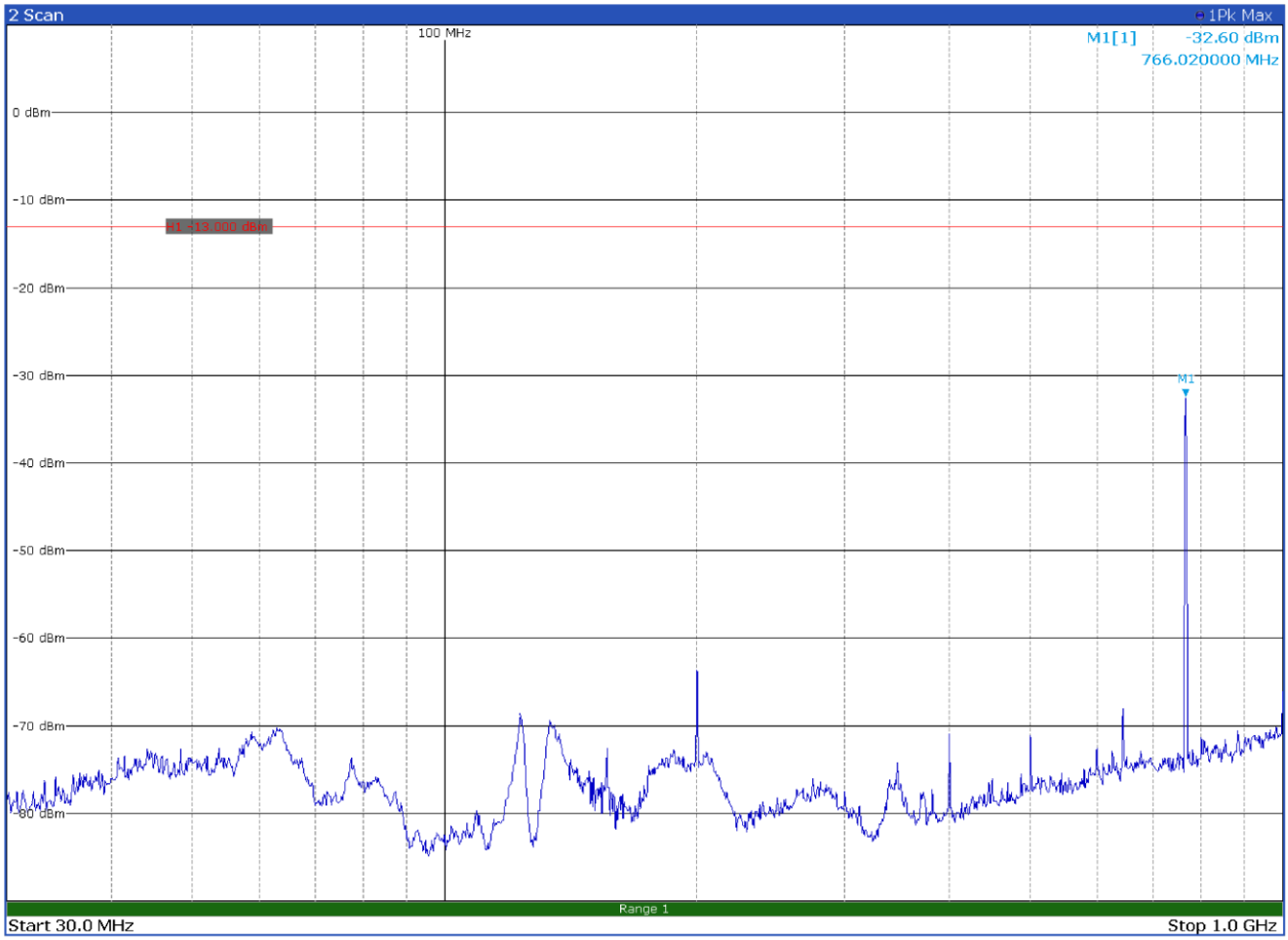


Figure 8.7-9: *Radiated spurious emissions below 1 GHz, high channel with antenna in horizontal polarization*

Test data, continued

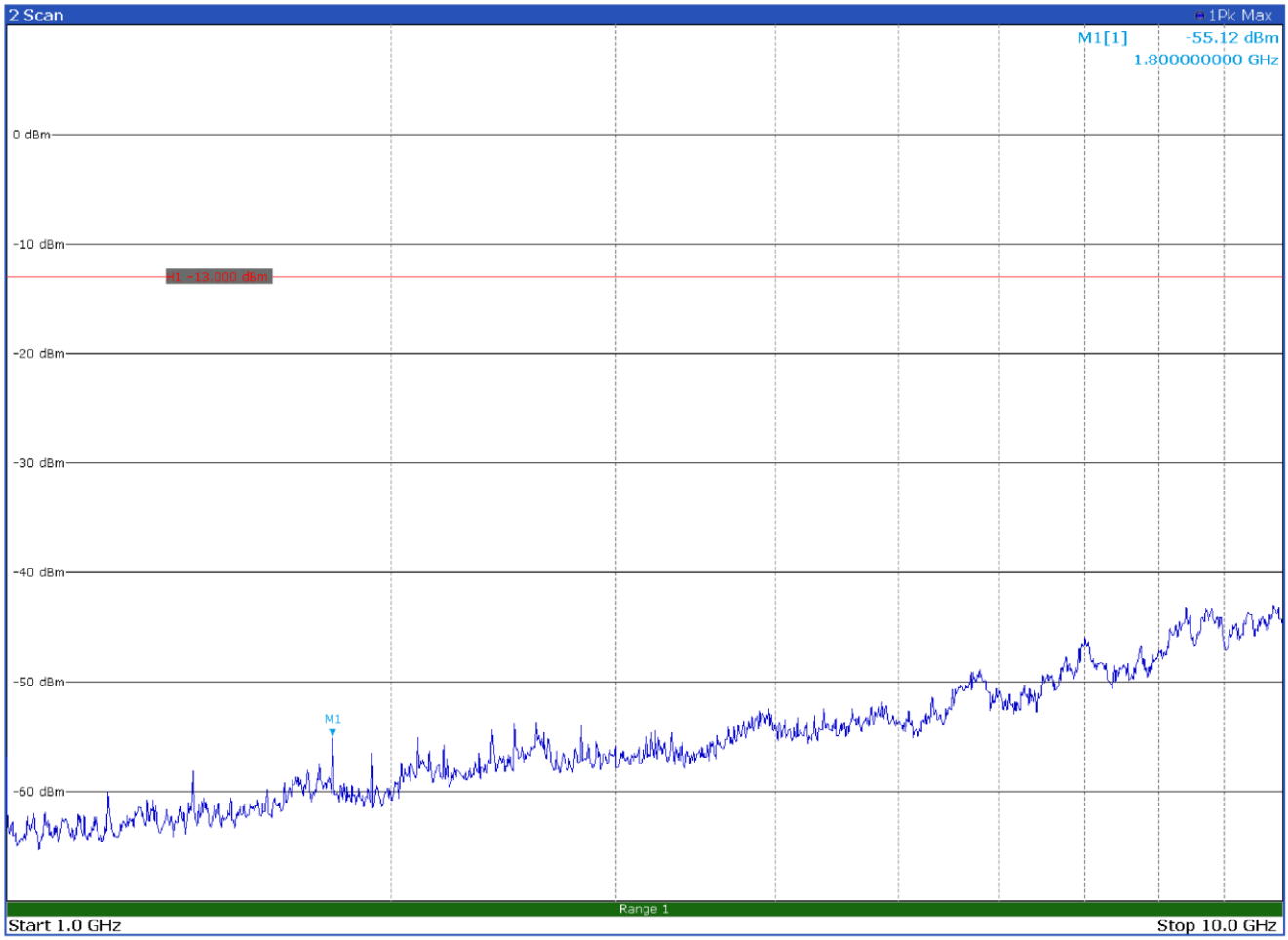


Figure 8.7-10: *Radiated spurious emissions from 1 GHz to 10 GHz, high channel with antenna in horizontal polarization*

Test data, continued

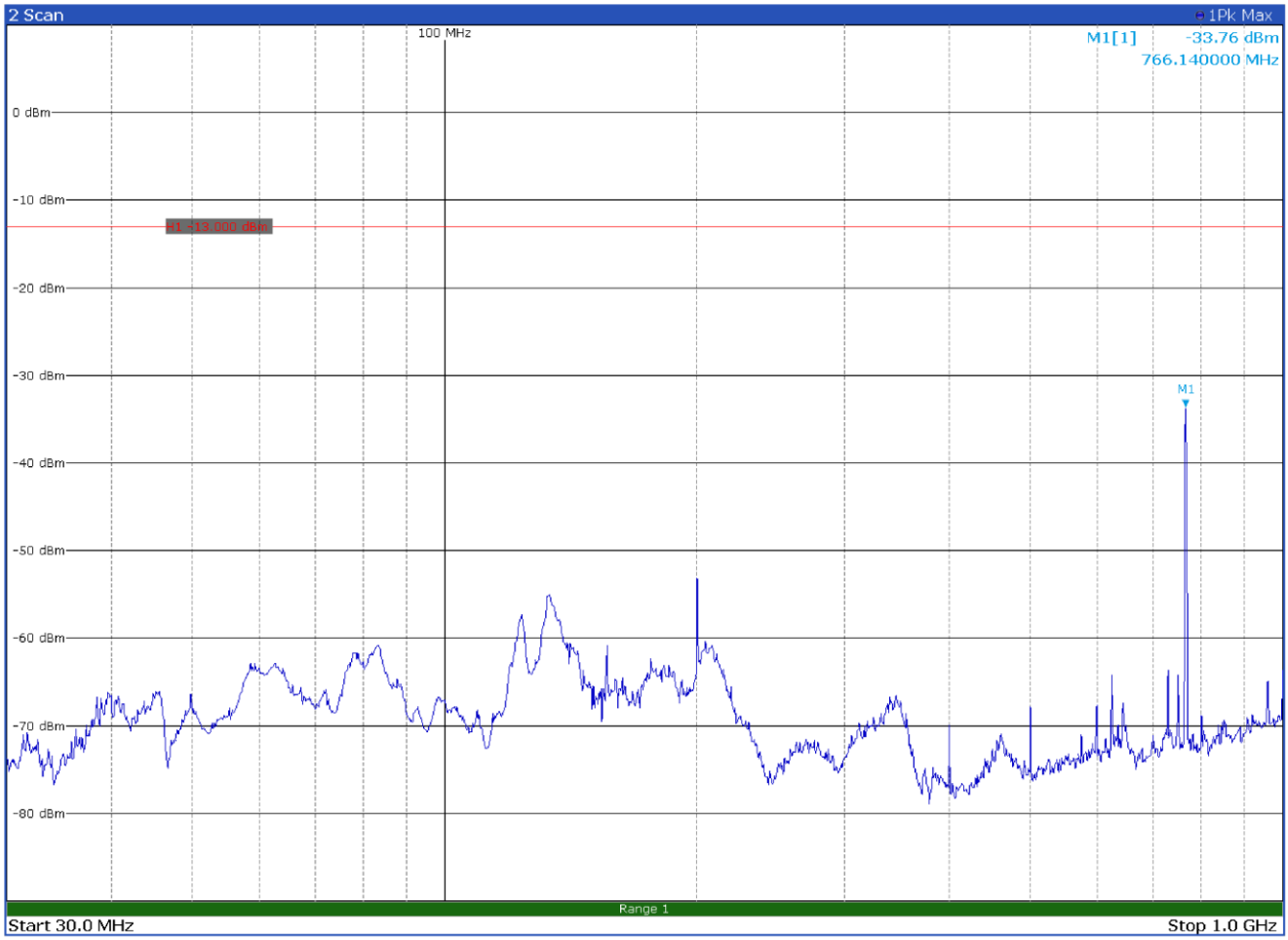


Figure 8.7-11: *Radiated spurious emissions below 1 GHz, high channel with antenna in vertical polarization*

Test data, continued

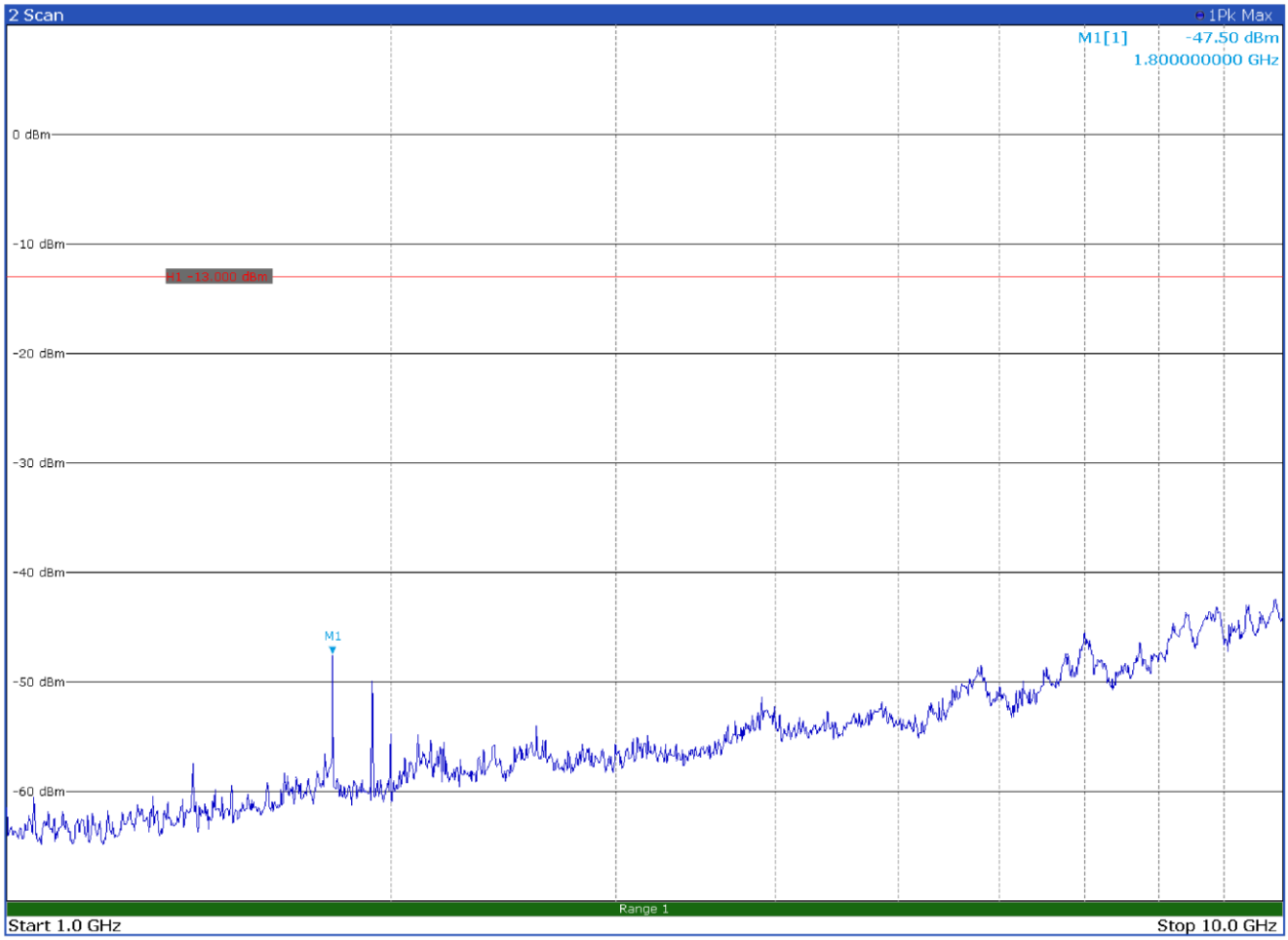


Figure 8.7-12: *Radiated spurious emissions from 1 GHz to 10 GHz, high channel with antenna in vertical polarization*

Test data, continued

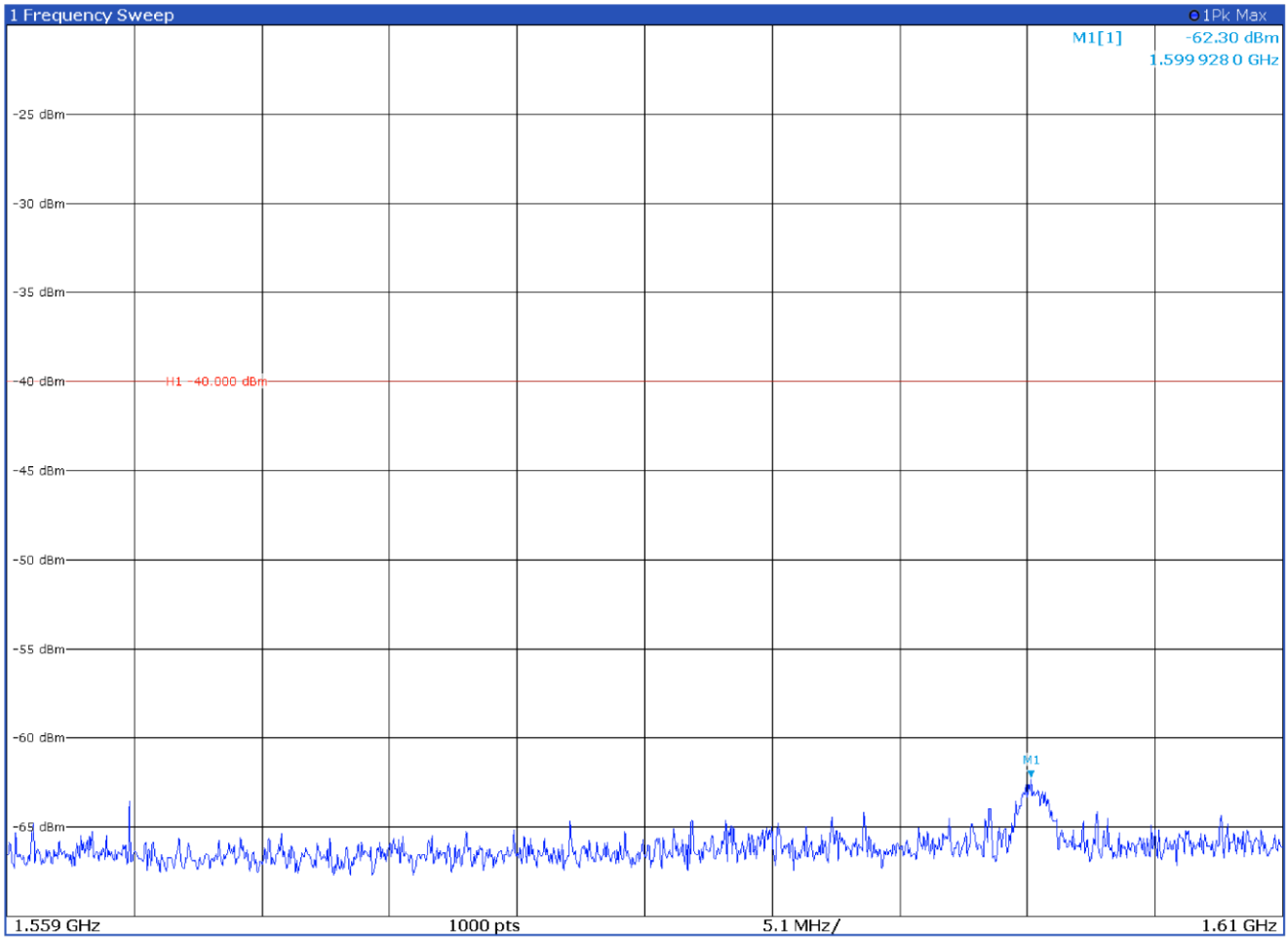


Figure 8.7-13: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), low channel with antenna in horizontal polarization*

Test data, continued

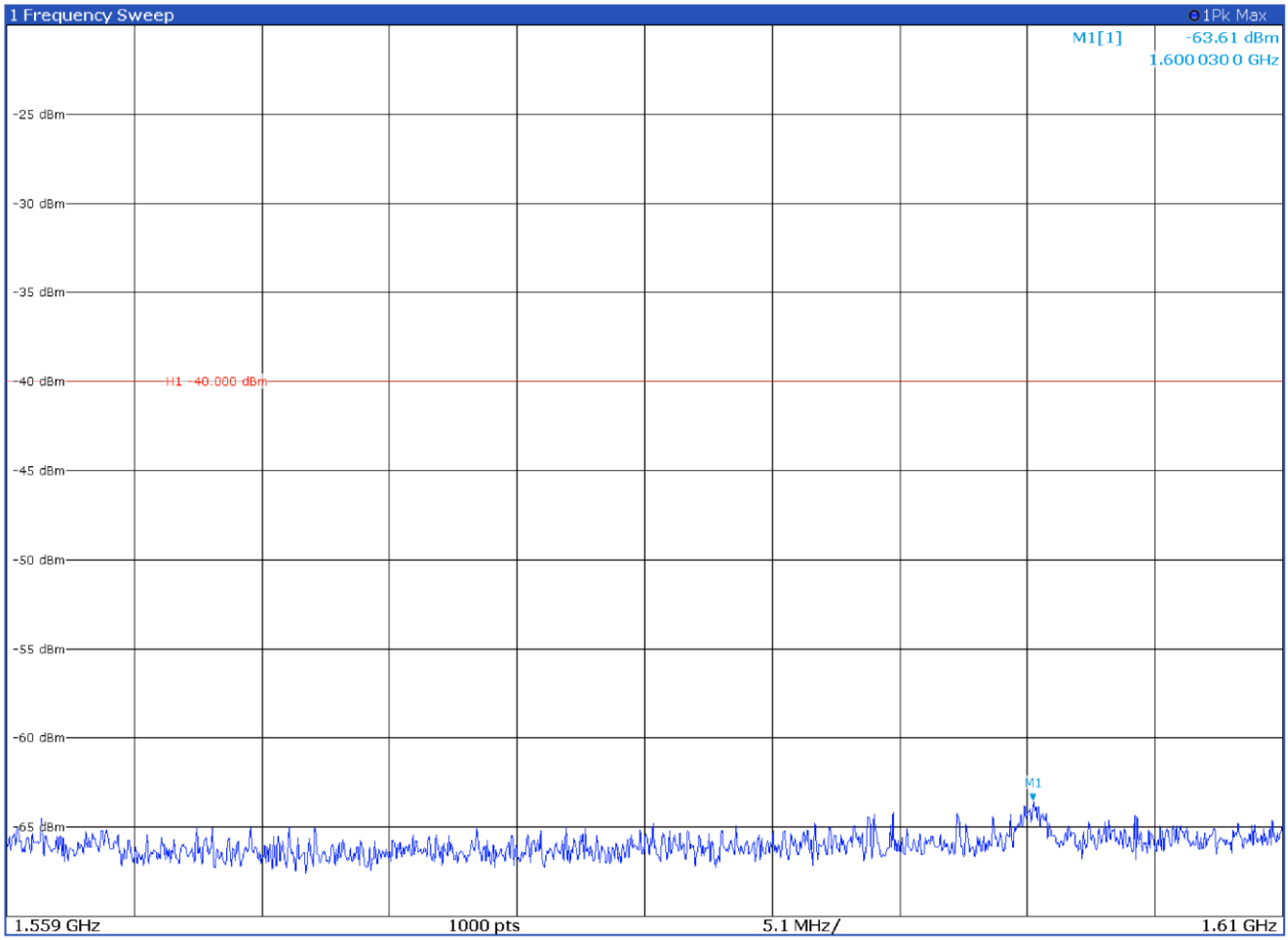


Figure 8.7-14: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), low channel with antenna in vertical polarization*

Test data, continued

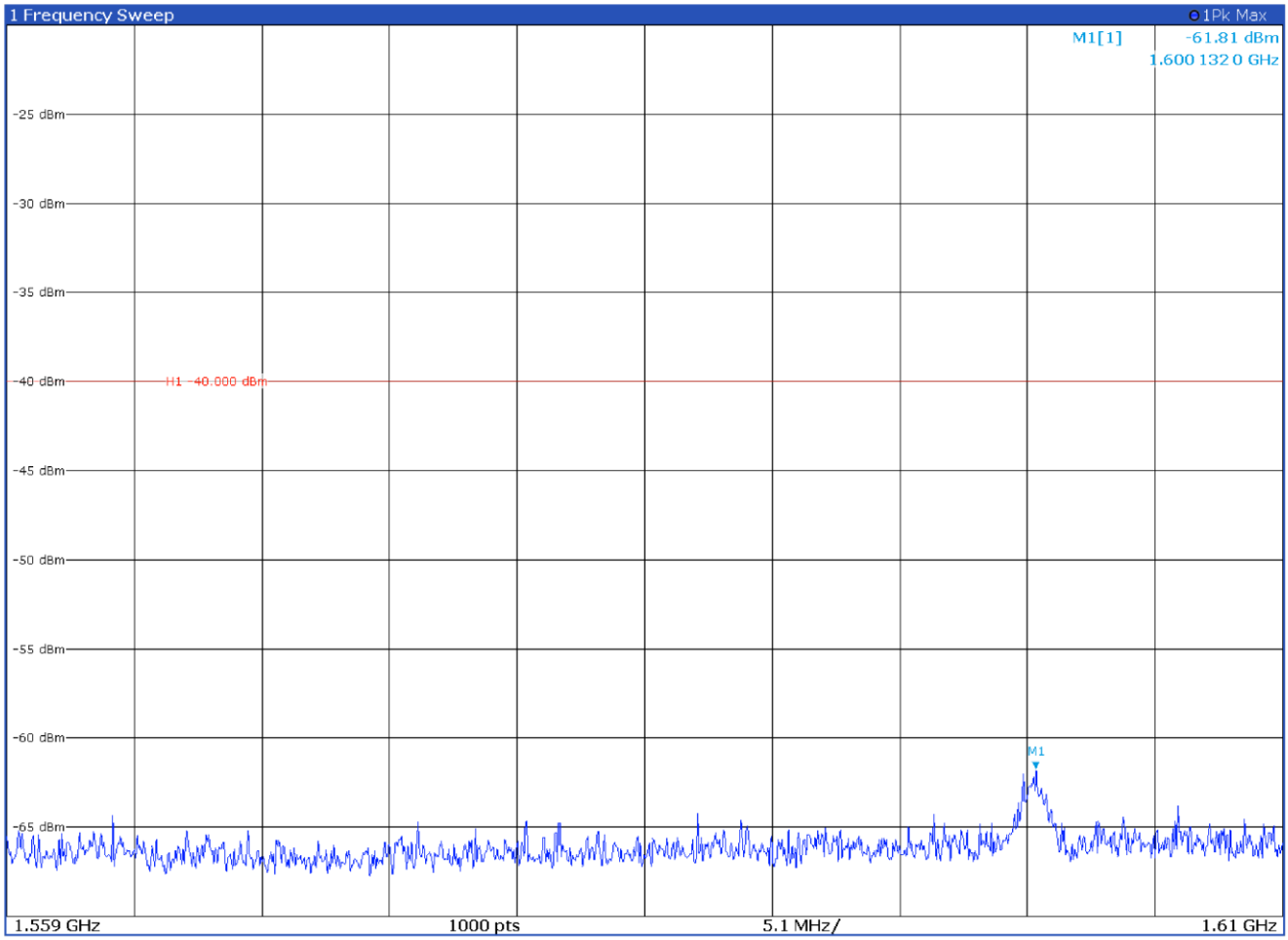


Figure 8.7-15: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), mid channel with antenna in horizontal polarization*

Test data, continued

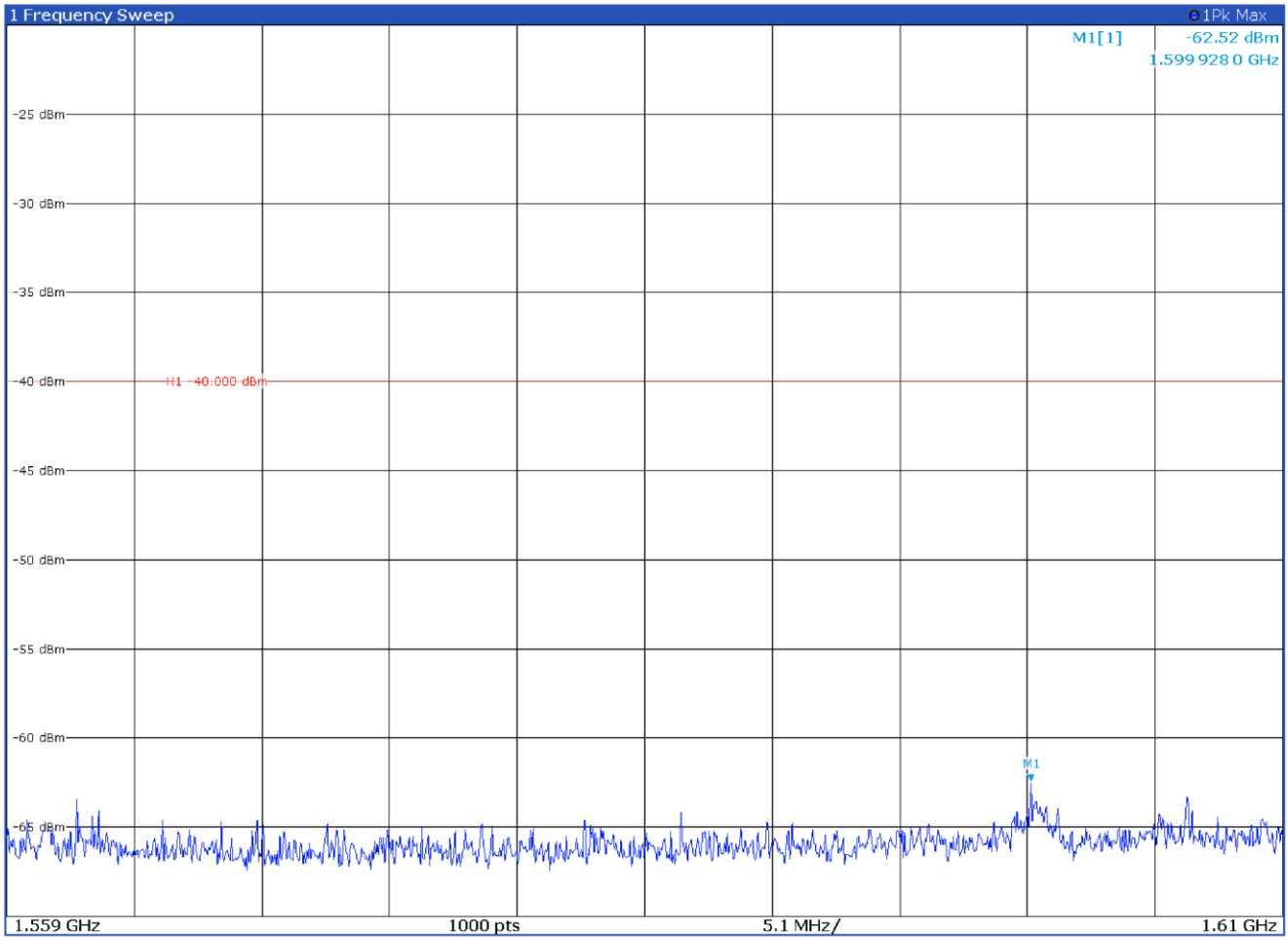


Figure 8.7-16: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), mid channel with antenna in vertical polarization*

Test data, continued

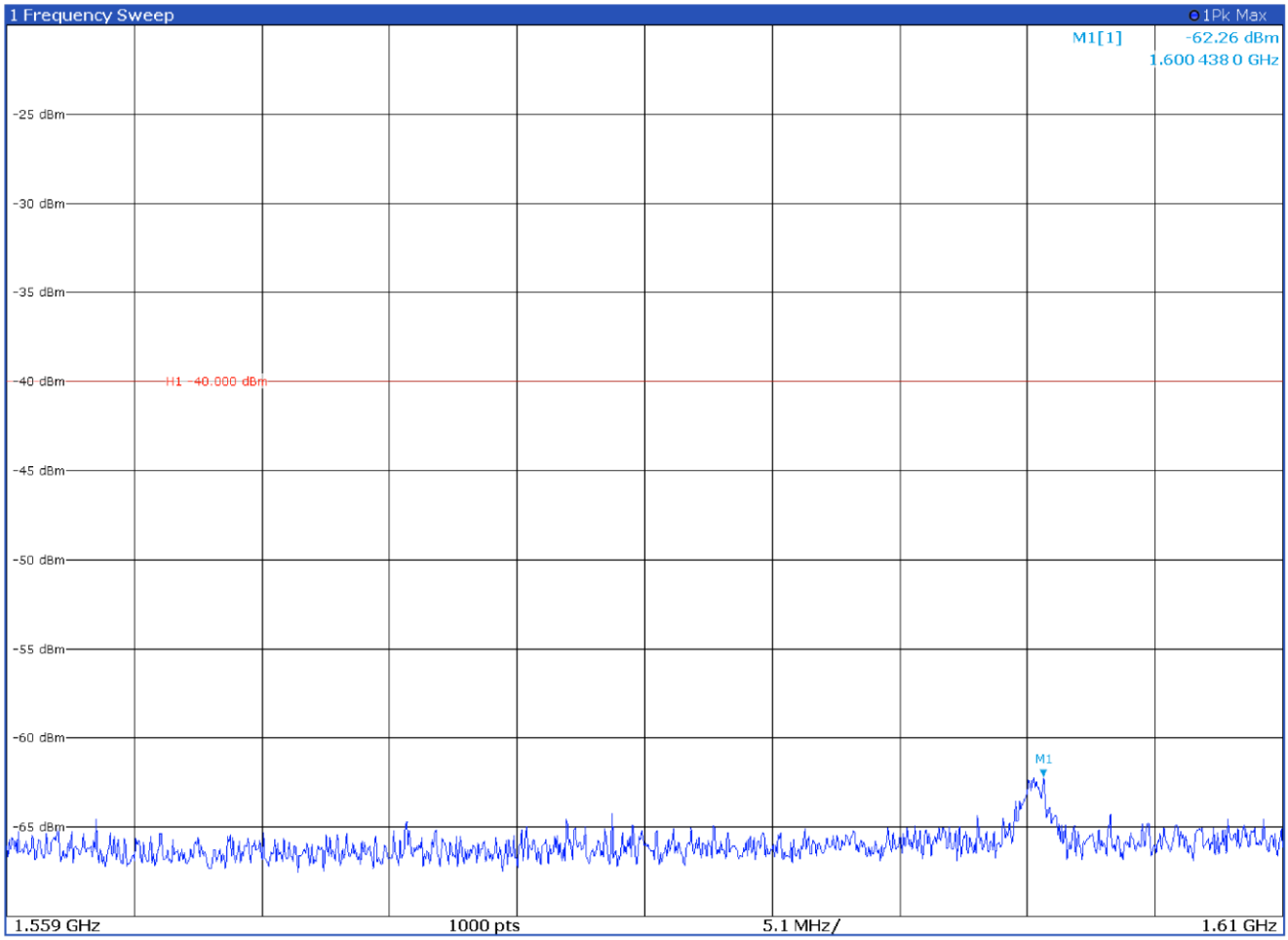


Figure 8.7-17: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), high channel with antenna in horizontal polarization*

Test data, continued

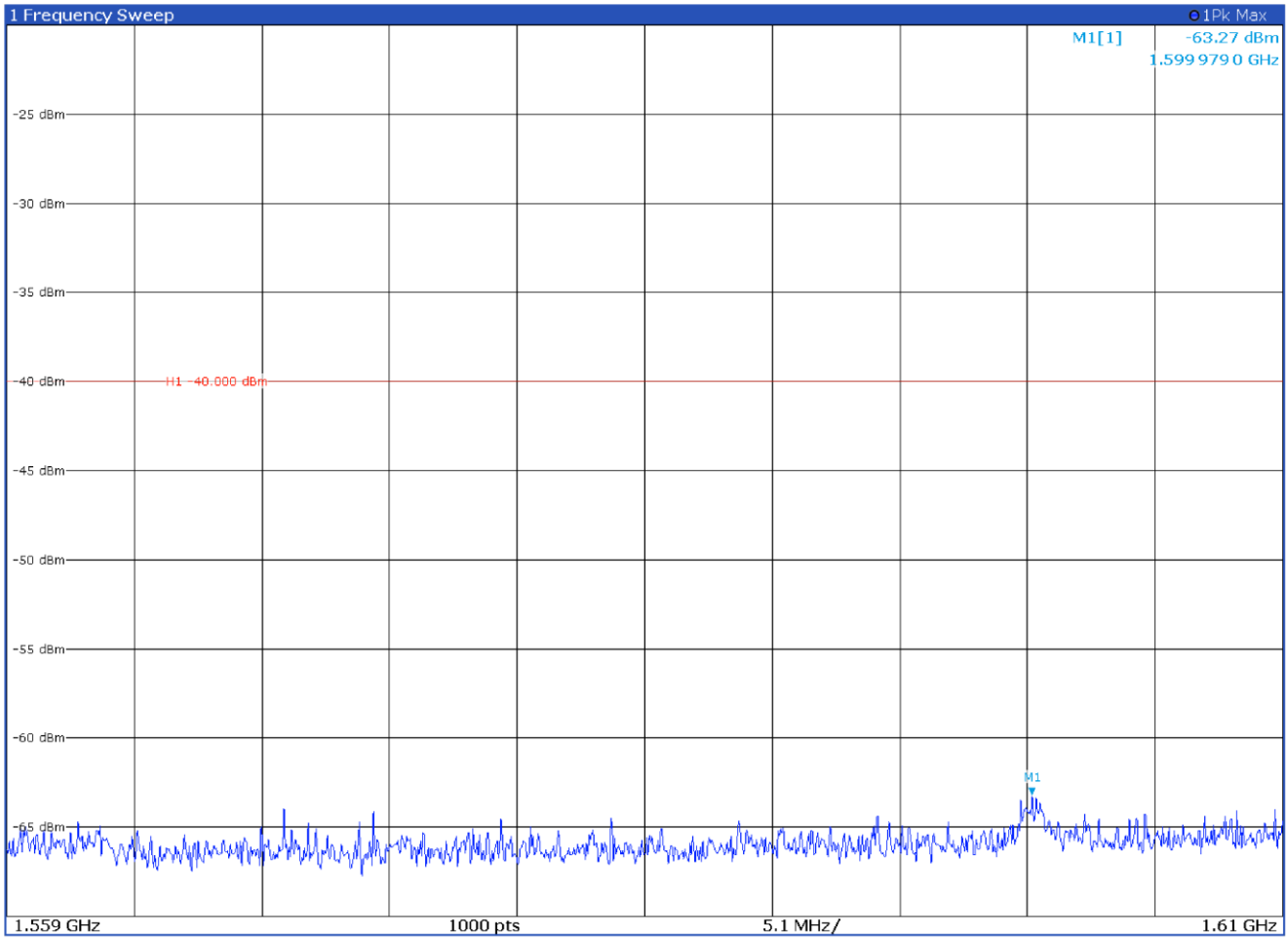


Figure 8.7-18: *Radiated spurious emissions from 1559 MHz to 1610 MHz (broad band), high channel with antenna in vertical polarization*

Test data, continued

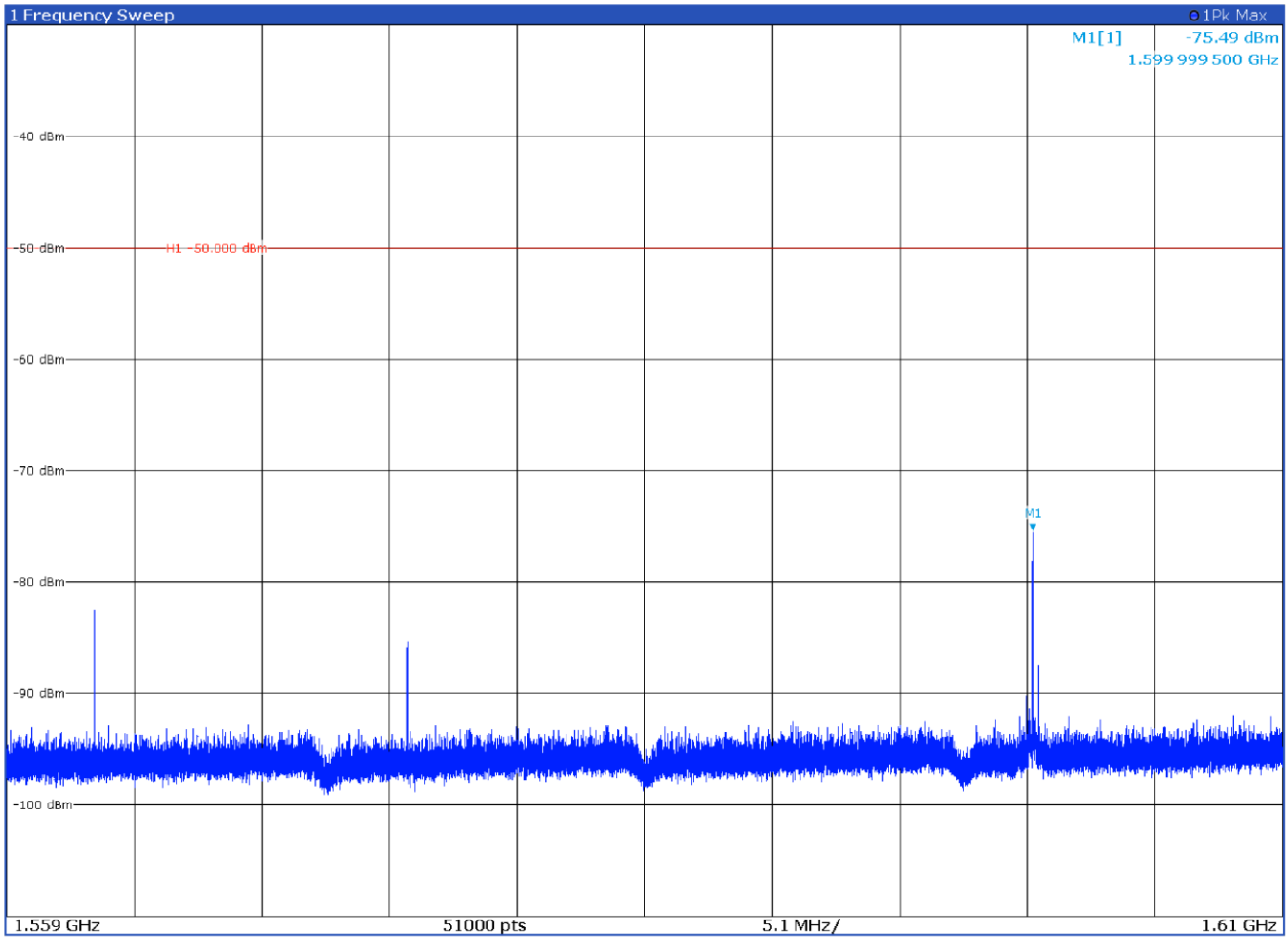


Figure 8.7-19: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), low channel with antenna in horizontal polarization*

Test data, continued

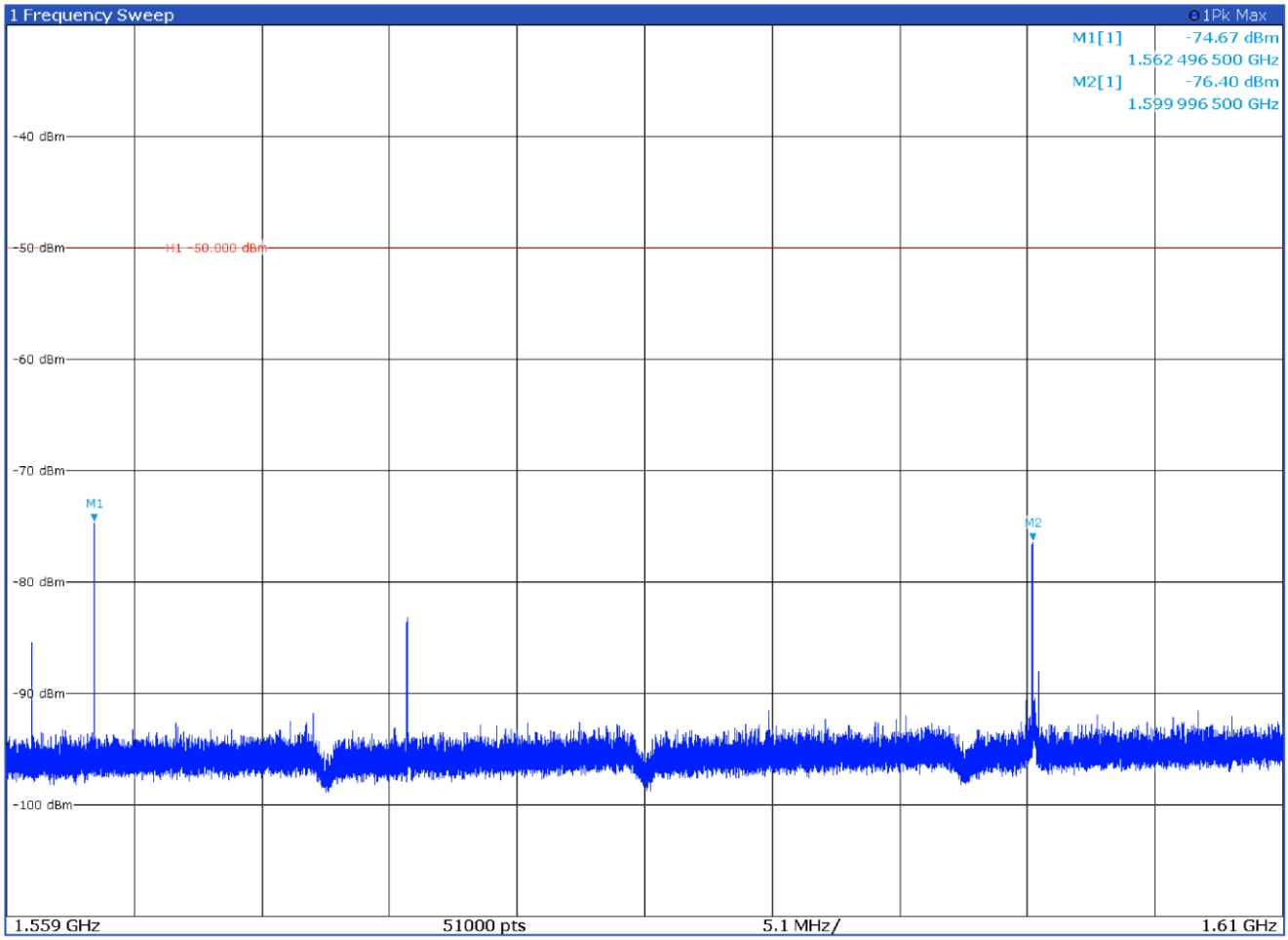


Figure 8.7-20: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), low channel with antenna in vertical polarization*

Test data, continued

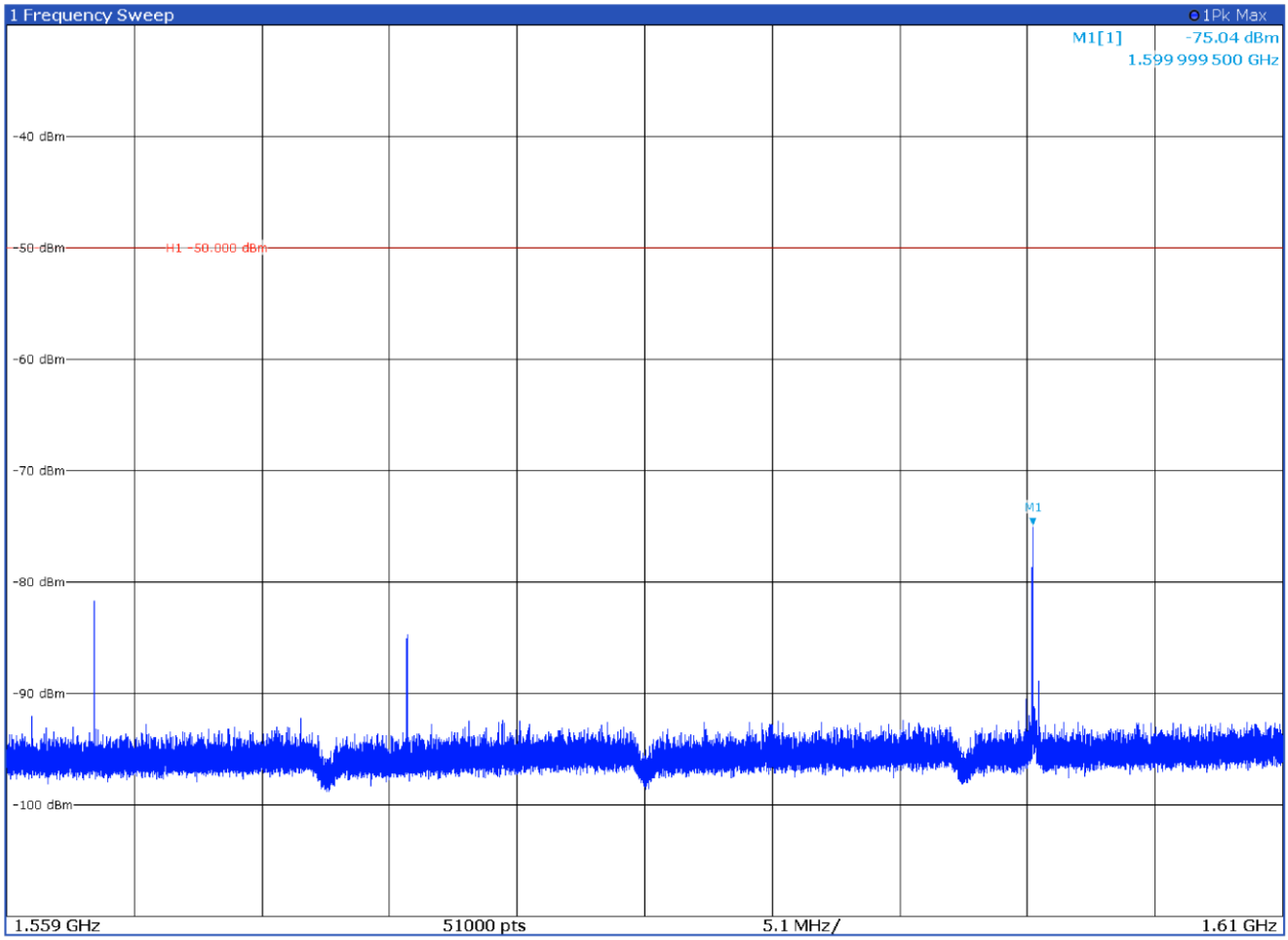


Figure 8.7-21: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), mid channel with antenna in horizontal polarization*

Test data, continued

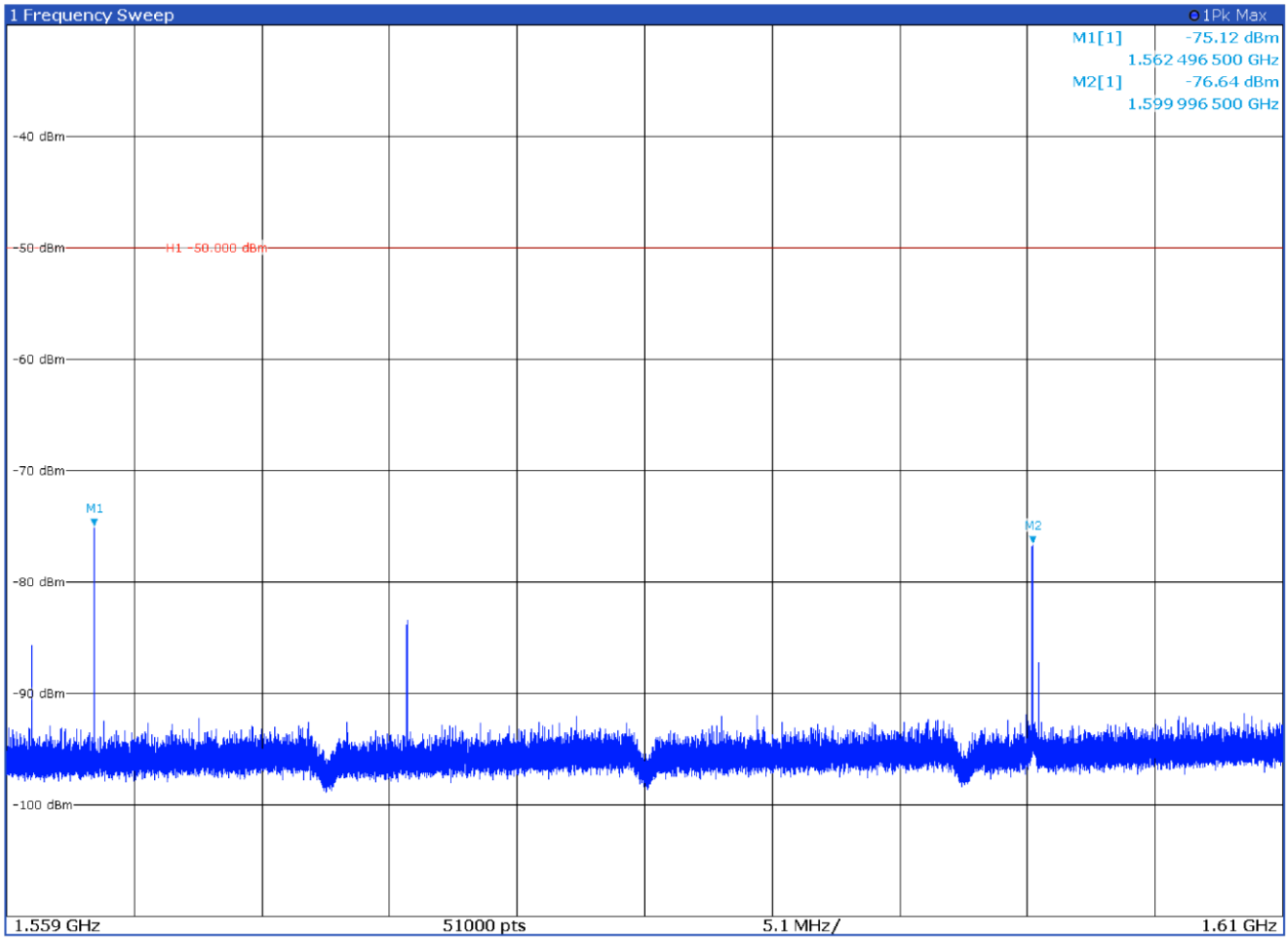


Figure 8.7-22: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), mid channel with antenna in vertical polarization*

Test data, continued

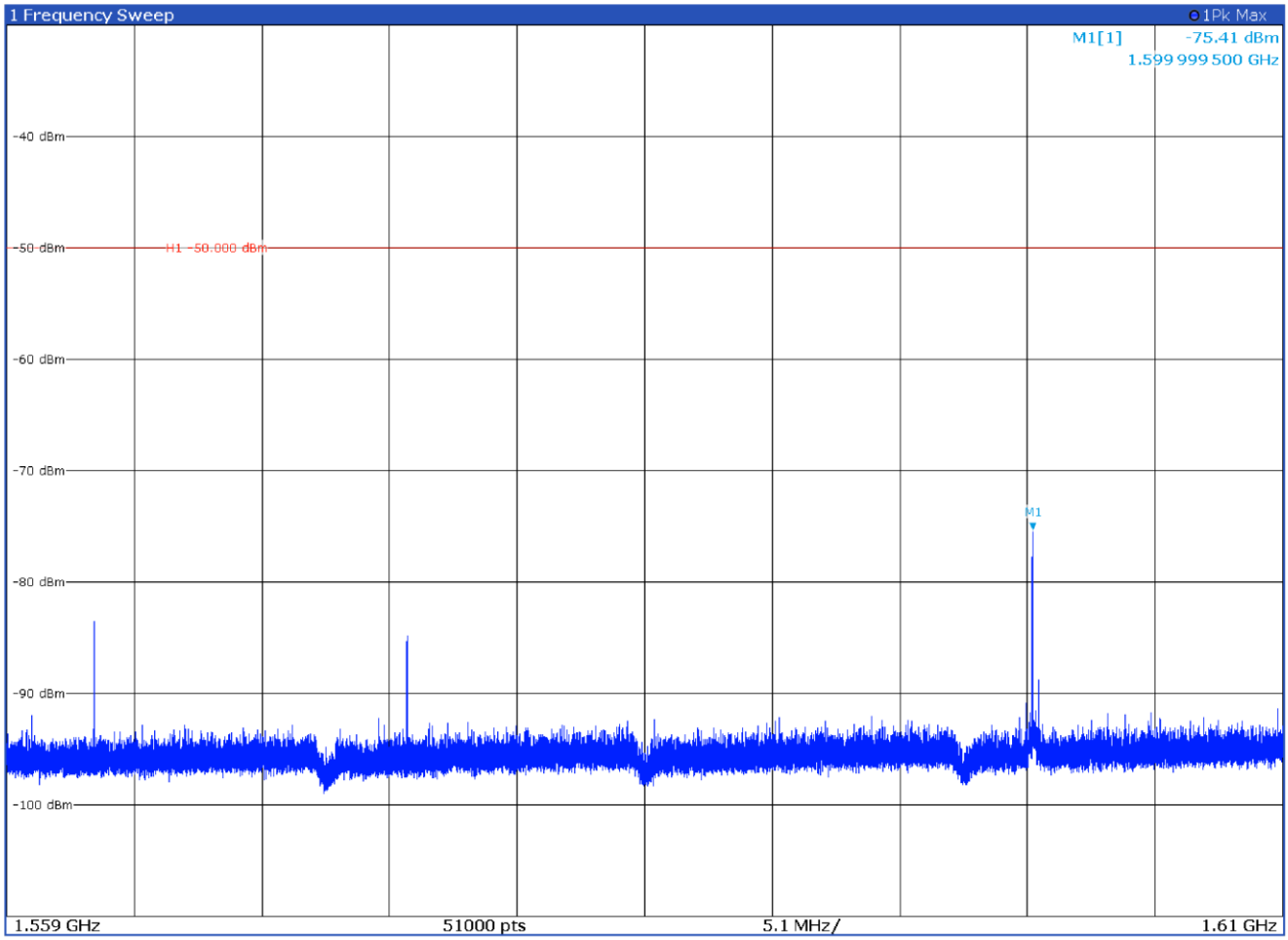


Figure 8.7-23: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), high channel with antenna in horizontal polarization*

Test data, continued

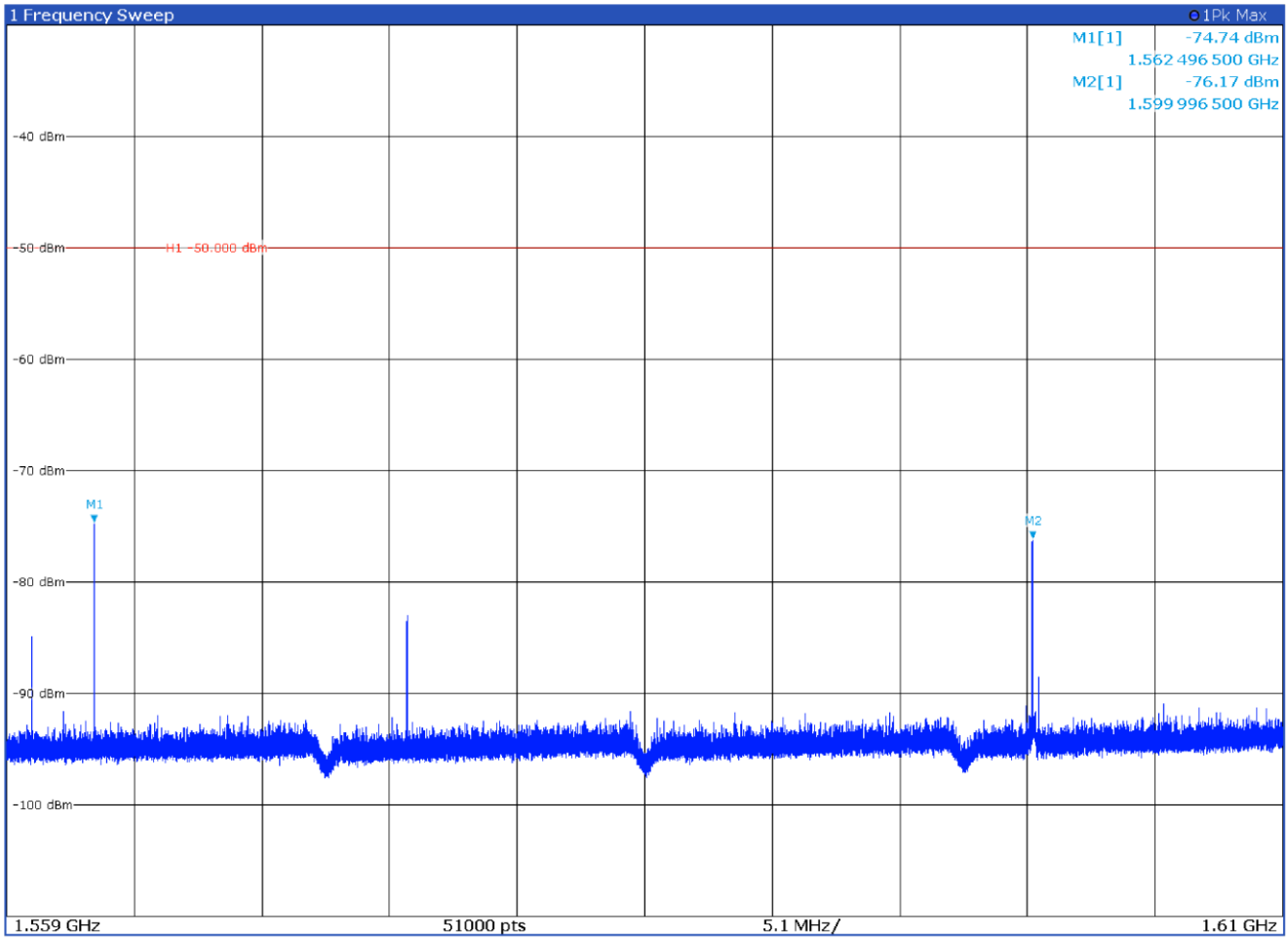


Figure 8.7-24: *Radiated spurious emissions from 1559 MHz to 1610 MHz (narrow band), high channel with antenna in vertical polarization*

8.8 Frequency stability measurements

8.8.1 References, definitions and limits

FCC § 90.539

Transmitters designed to operate in 769-775 MHz and 799-805 MHz frequency bands must meet the frequency stability requirements in this section.

(a) Mobile, portable and control transmitters must normally use automatic frequency control (AFC) to lock on to the base station signal.

(b) The frequency stability of base transmitters operating in the narrowband segment must be 100 parts per billion or better.

(c) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25 kHz (4 channel aggregate).

(d) The frequency stability of mobile, portable, and control transmitters operating in the narrowband segment must be 400 parts per billion or better when AFC is locked to the base station. When AFC is not locked to the base station, the frequency stability must be at least 1.0 ppm for 6.25 kHz, 1.5 ppm for 12.5 kHz (2 channel aggregate), and 2.5 ppm for 25 kHz (4 channel aggregate).

(e) The frequency stability of mobile, portable and control transmitters operating in the wideband segment must be 1.25 parts per million or better when AFC is locked to a base station, and 5 parts per million or better when AFC is not locked.

RSS-131, Clause 5.2.4

Industrial zone enhancers shall comply with the frequency stability given in the RSS that applies to the equipment with which the zone enhancer is to be used. In cases where the frequency stability limit is not given in the applicable RSS, the equipment shall comply with a frequency stability of ± 1.5 ppm. For zone enhancers with no input signal processing capability, the frequency stability measurement in this section is not required.

RSS-140, Clause 4.2

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested at the temperature and supply voltage variations specified in RSS-Gen.

RSS-Gen, Clause 6.11

Transmitter frequency stability

Frequency stability is a measure of frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at an appropriate reference temperature and the rated supply voltage.

When the measurement method of transmitter frequency stability is not stated in the applicable RSS or reference standards, the following conditions apply:

a. The reference temperature for radio transmitters is +20°C (+68°F).

b. A hand-held device that is only capable of operating using internal batteries shall be tested at the battery's nominal voltage, and again at the battery's operating end-point voltage, which shall be specified by the equipment manufacturer. For this test, either a battery or an external power supply can be used.

c. The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency-determining circuit element shall be made subsequent to this initial set-up.

With the transmitter installed in an environmental test chamber, the unmodulated carrier frequency and frequency stability shall be measured under the conditions specified below for licensed and licence-exempt devices, unless specified otherwise in the applicable RSS. A sufficient stabilization period at each temperature shall be used prior to each frequency measurement.

For licensed devices, the following measurement conditions apply:

a. at the temperatures of -30°C (-22°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage

b. at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage

8.8.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	February 8, 2022

8.8.3 Observations, settings and special notes

Testing was performed per ANSI C63.26 Paragraphs 5.6.3, 5.6.4 and 5.6.5 methods.

8.8.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
EMI Receiver	Rohde & Schwarz	ESU8	100202
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263397
Climatic Chamber	MSL	EC500DA	15022

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

8.8.5 Test data

Table 8.8-1: *Transmitter frequency stability results for antenna port 1*

Test conditions	Frequency, Hz	Drift, Hz	Drift, ppm	Limit ±ppm	Margin, ±ppm
+50 °C, Nominal	762999801.9	19.5	0.02556	1.5	1.47
+40 °C, Nominal	762999798.7	16.3	0.02136	1.5	1.48
+30 °C, Nominal	762999795.3	12.9	0.01691	1.5	1.48
+20 °C, -15% voltage	762999783.5	1.1	0.00144	1.5	1.50
+20 °C, Nominal	762999782.4	Reference	Reference	Reference	Reference
+20 °C, +15% voltage	762999780.5	-1.9	-0.00249	1.5	1.50
+10 °C, Nominal	762999763.1	-19.3	-0.02529	1.5	1.47
0 °C, Nominal	762999751.6	-30.8	-0.04037	1.5	1.46
−10 °C, Nominal	762999729.8	-52.6	-0.06894	1.5	1.43
−20 °C, Nominal	762999722.8	-59.6	-0.07811	1.5	1.42
−30 °C, Nominal	762999661.3	-121.1	-0.15872	1.5	1.34

Table 8.8-2: *Transmitter frequency stability results for antenna port 2*

Test conditions	Frequency, Hz	Drift, Hz	Drift, ppm	Limit ±ppm	Margin, ±ppm
+50 °C, Nominal	762999802.3	19.1	0.02503	1.5	1.47
+40 °C, Nominal	762999800.0	16.8	0.02202	1.5	1.48
+30 °C, Nominal	762999795.7	12.5	0.01638	1.5	1.48
+20 °C, -15% voltage	762999784.7	1.5	0.00197	1.5	1.50
+20 °C, Nominal	762999783.2	Reference	Reference	Reference	Reference
+20 °C, +15% voltage	762999781.7	-1.5	-0.00197	1.5	1.50
+10 °C, Nominal	762999764.7	-18.5	-0.02425	1.5	1.48
0 °C, Nominal	762999752.4	-30.8	-0.04037	1.5	1.46
−10 °C, Nominal	762999731.1	-52.1	-0.06828	1.5	1.43
−20 °C, Nominal	762999724.5	-58.7	-0.07693	1.5	1.42
−30 °C, Nominal	762999661.6	-121.6	-0.15937	1.5	1.34

8.9 Noise figure measurements

8.9.1 References, definitions and limits

FCC § 90.219(e)(2)

(2) The noise figure of a signal booster must not exceed 9 dB in either direction.

8.9.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	January 27, 2022

8.9.3 Observations, settings and special notes

It is acceptable to do 90.219(d)(6)(ii) (i.e., ERP of noise within the passband < −43 dBm in 10 kHz RBW) for the downlink path only, in place of Section 90.219(e)(2) noise figure test data (i.e., NF ≤ 9 dB for both UL and DL).

8.9.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263397

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

8.9.5 Test data

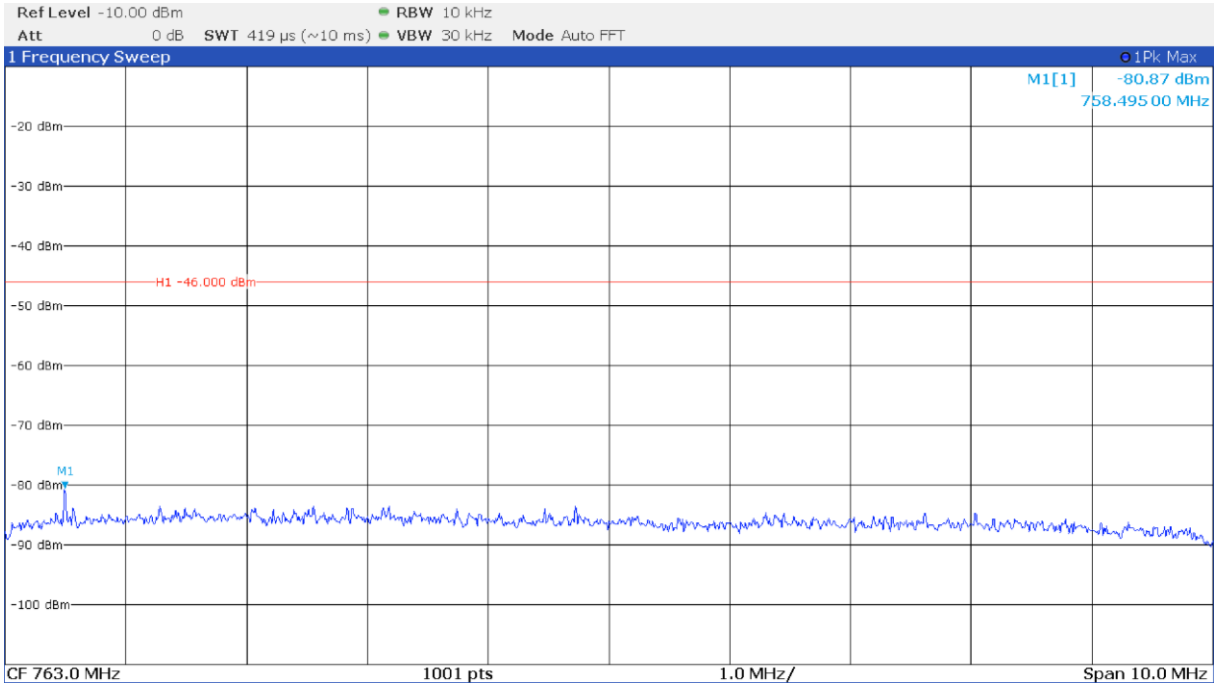


Figure 8.9-1: *Noise for antenna port 1*

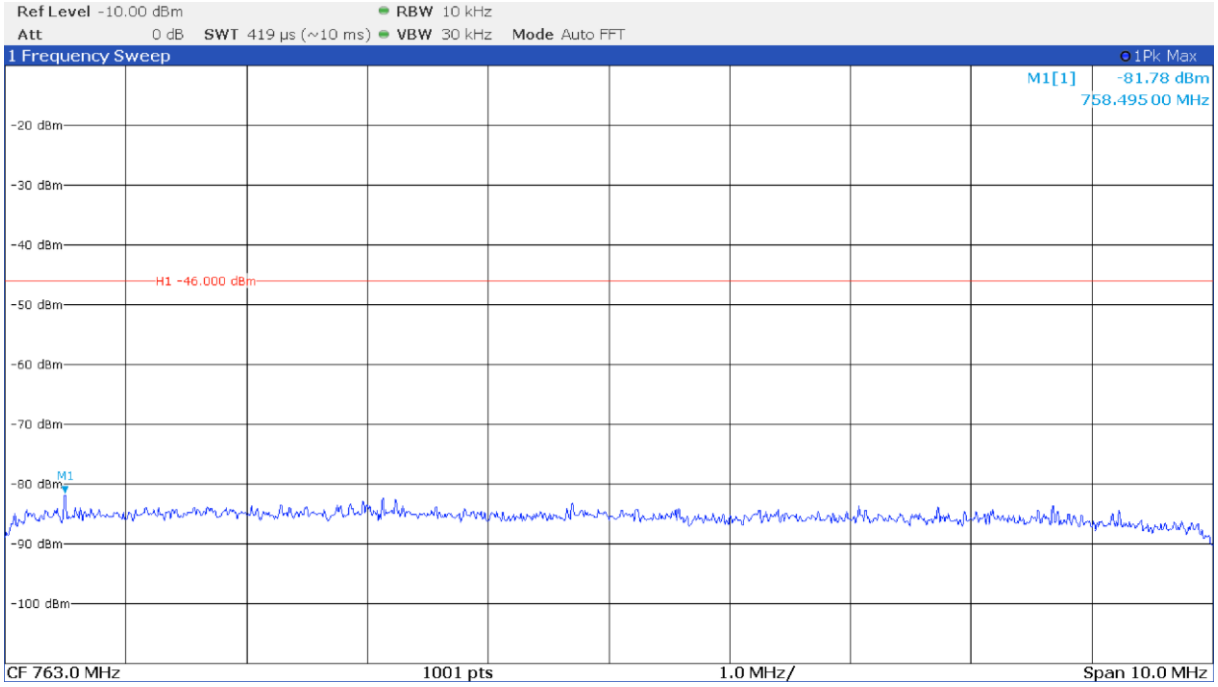


Figure 8.9-2: *Noise for antenna port 2*

Section 9 EUT photos

9.1 Set-up photos

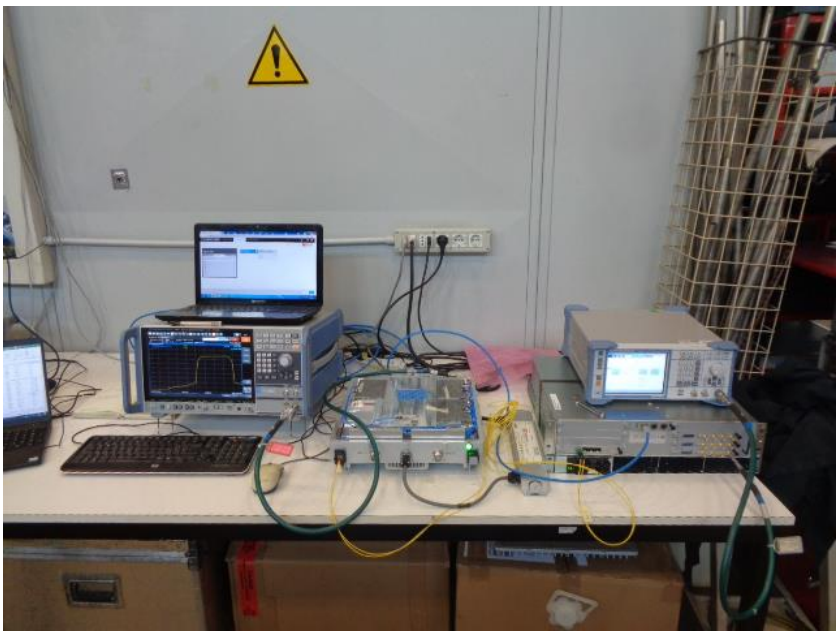


Figure 9.1-1: *Antenna port testing set-up*

Figure 9.1-2: *Antenna port testing set-up in climatic chamber*

Figure 9.1-3: *Radiated emissions set-up for frequencies below 1 GHz*

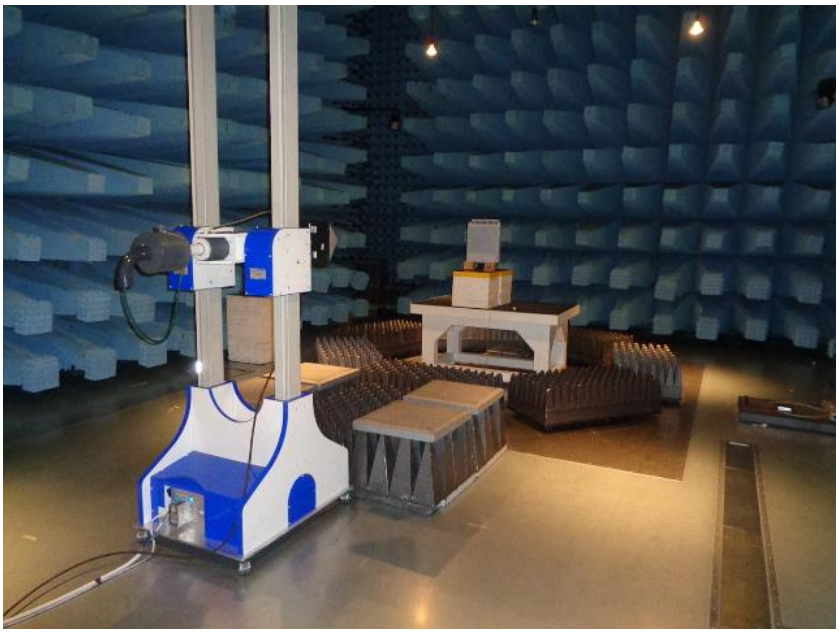


Figure 9.1-4: *Radiated emissions set-up for frequencies above 1 GHz*

9.2 External photos

Figure 9.2-1: *EUT photo*

End of the test report