Report Reference ID:	REP033557

Test specification:	Title 47-Telecommunication Chapter I - Federal Communications Commission **Part 90** – Private Land Mobile Radio Services **Subpart F** – Radiolocation Service **RSS-Gen Issue 5 April 2018 - Amendment 1 March 2019 – Amendment 2 February 2021** General Requirements for Compliance of Radio Apparatus **RSS-210 Issue 10 December 2019** Licence-Exempt Radio Apparatus: Category I Equipment

Applicant:	IDS GeoRadar Srl – Via A. Righi, 1/2 – 56121 Pisa (PI) – Italy
Apparatus:	Interferometric radar sensor
Model:	IBIS-KU-ETH3
FCC ID:	UFW-IBIS-KU-ETH3
IC Registration number	8991A-IBISKUETH3

Testing laboratory:	**Nemko Spa** Via del Carroccio, 4 – 20853 Biassono (MB) – Italy

	Name, function and signature	**Date**
Tested by:	P. Barbieri (project handler)	2024-03-22
Reviewed by:	D. Guarnone (verifier)	2024-03-22

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Section 1: Report summary

1.1 Test specification

Specifications	**Part 90 Subpart F** – Radiolocation Service **RSS-Gen Issue 5 April 2018 - Amendment 1 March 2019 – Amendment 2 February 2021** General Requirements for Compliance of Radio Apparatus **RSS-210 Issue 10 December 2019** Licence-Exempt Radio Apparatus: Category I Equipment

1.2 Statement of compliance

Compliance	In the configuration tested the EUT was found compliant Yes ☒ No ☐ This report contains an assessment of apparatus against specifications based upon tests carried out on samples submitted at Nemko Spa. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90 Subpart F. The tests were conducted in accordance with ANSI C63.26.

1.3 Exclusions

Exclusions	None

1.4 Registration number

Test site:	FCC ID number 682159 / ISED ID number 9109A

1.5 Test report revision history

Revision #	Details of changes made to test report
1	Original report issued

1.6 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. 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.

Section 2: Summary of test results

2.1 FCest results

Test Specification Clause	Methods	Test description	Verdict
FCC 47 CFR §2.1046 §90.205(r) RSS-210 B.11	ANSI C63.26	RF power output	Pass
FCC 47 CFR §2.1049 §90.209 RSS-Gen § 6.7	ANSI C63.26	Occupied Bandwidth	Pass
FCC 47 CFR §2.1051 §90.210(b) RSS-Gen § 6.13	ANSI C63.26	Emission mask	Pass
FCC 47 CFR §2.1051 §90.210(b) RSS-Gen § 6.13	ANSI C63.26	Spurious emissions at antenna terminals	Pass
FCC 47 CFR §2.1051 §90.210(b) RSS-Gen § 6.13	ANSI C63.26	Field strength of spurious radiation	Pass
§90.213 §21055 RSS-Gen § 6.11	ANSI C63.26	Frequency stability	Pass

Notes:
Possible test case verdicts:
test case does not apply to the test object: N/A (Not applicable)
test object does meet the requirement: P (Pass)
test object does not meet the requirement: F (Fail)

Section 3: Equipment under test (EUT) and application details

3.1 Applicant details

Applicant	Name:	IDS GeoRadar Srl
	Address:	Via A. Righi 6, 6A, 8
	City:	Pisa
	Province/State:	Pisa
	Post code:	56121
	Country:	Italy
Manufacturer	Name:	IDS GeoRadar Srl
	Address:	Via A. Righi 6, 6A, 8
	City:	Pisa
	Province/State:	Pisa
	Post code:	56121
	Country:	Italy
Canadian representative	Name:	Leica Geosystems Ltd
	Address:	1-3761 Victoria Park Ave
	City:	Scarborough
	Province/State:	Ontario
	Post code:	M1W3S2
	Country:	Canada
	IC company number:	3177B

3.2 Modular equipment

a) Single modular approval	Single modular approval Yes ☐ No ☒
b) Limited single modular approval	Limited single modular approval Yes ☐ No ☒

3.3 Product details

FCC ID	Grantee code:	UFW
	Product code:	-IBIS-KU-ETH3
IC Registration number	8991A-IBISKUETH3	
Equipment class	TNB – Licensed Non-Broadcast Station Transmitter	
Equipment category	Interferometric radar sensor	
Description of product as it is marketed	Ku-Band Radar Sensor	
	Model name:	IBIS-KU-ETH3
	Serial number:	PRJ00522080001 Number assigned by Nemko Spa
Product	The EUT is also classified as Terminal Equipment subject to IC CS-03 No ☒ Yes ☐	

3.4 Application purpose

Type of application	☒ Original certification ☐ Change in identification of presently authorized equipment Original FCC ID: Grant date: ☐ Class II permissive change or modification of presently authorized equipment

3.5 Certification details

Services requested Type of assessment	☒ New certification ☐ New family ☐ Re-assessment ☐ Existing family ☐ Multiple listing

3.6 Composite/related equipment

a) Composite equipment	The EUT is a composite device subject to an additional equipment authorization Yes ☐ No ☒
b) Related equipment	The EUT is part of a system that operates with, or is marketed with, another device that requires an equipment authorization Yes ☐ No ☒

3.7 Sample information

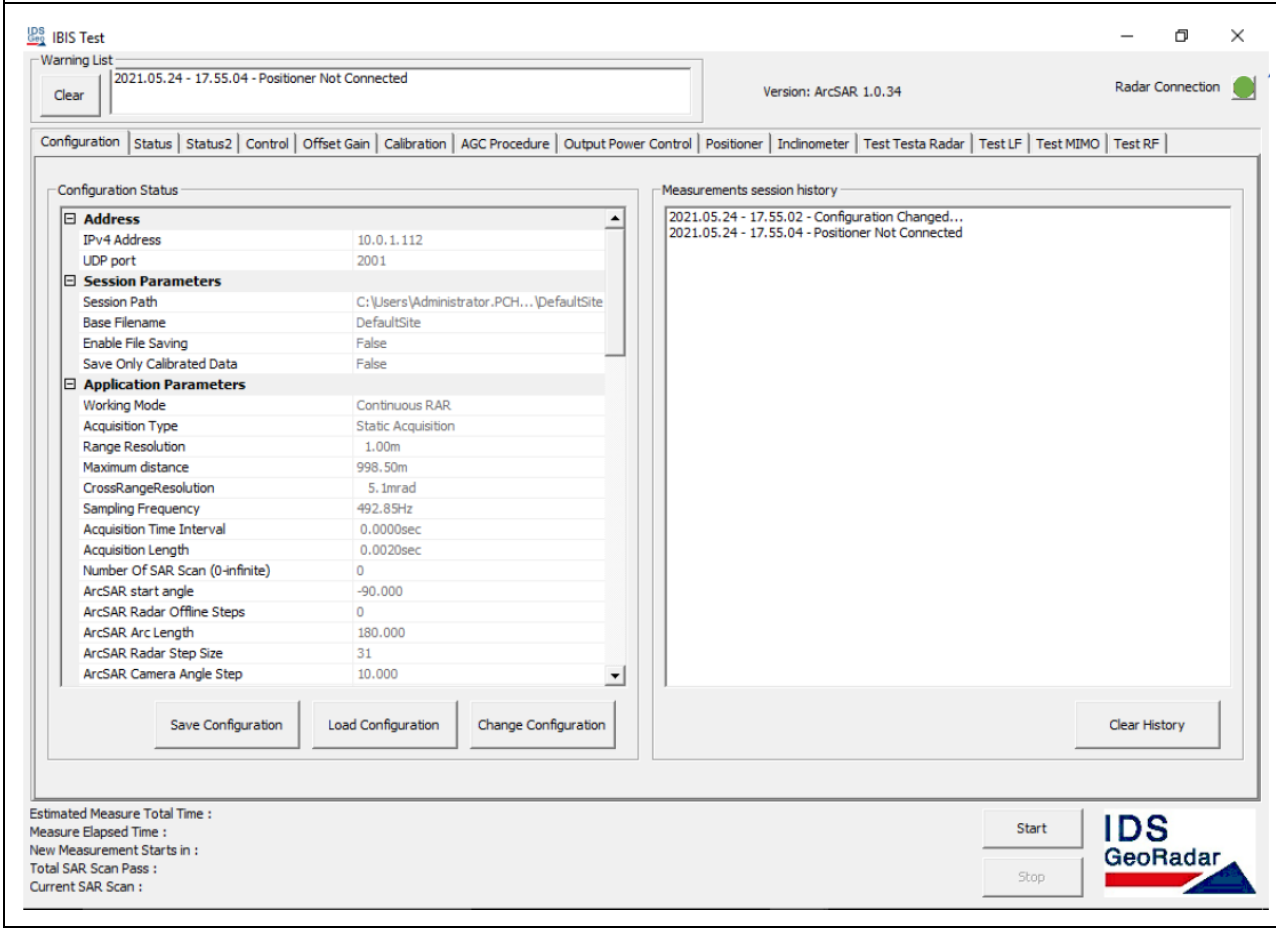
Receipt date:	2024-03-18
Nemko sample ID:	PRJ00522080001

3.8 EUT technical specifications

Operating band:	17.1 GHz – 17.3 GHz
Operating frequency:	17.1 GHz – 17.3 GHz
Modulation type:	FMCW
Occupied bandwidth:	190.3 MHz
Channel spacing:	--
Emission designator:	190MF0N
RF Output	TX1 20.8 dBm + TX2 20.0 dBm
Antenna type:	External Antenna Gain Max IBIS-ANT4-H11V10 (22 dBi) Gain Min IBIS-ANT7-H50V31 (13.5 dBi)
Power source:	9 – 36 VDC

3.9 Accessories and support equipment

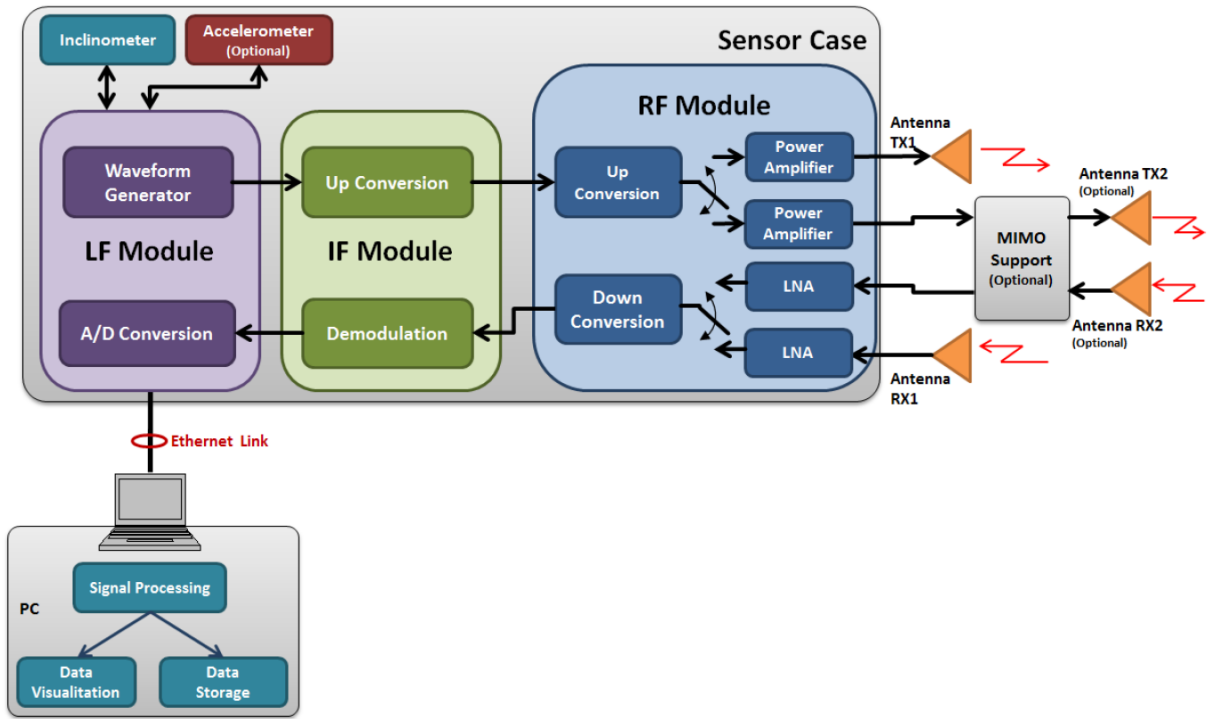
The following information identifies accessories used to exercise the EUT during testing:



3.10 Operation of the EUT during testing

Details:	Transmitting at max gain with max RF power output.

3.11 EUT setup diagram



3.12 Software and Firmware version used during tests

Details:	ArcSAR 1.0.34

Section 4: Engineering considerations

4.1 Modifications incorporated in the EUT

Modifications	Modifications performed to the EUT during this assessment None ☒ Yes ☐, performed by Client ☐ or Nemko ☐ Details:

4.2 Deviations from laboratory tests procedures

Deviations	Deviations from laboratory test procedures None ☒ Yes ☐ - details are listed below:

4.3 Technical judgment

Judgment	None

Section 5: Test conditions

5.1 Deviations from laboratory tests procedures

No deviations were made from laboratory test procedures.

5.2 Test conditions, power source and ambient temperatures

Normal temperature, humidity and air pressure test conditions	Unless different values are declared in the test case, following ambient conditions apply for the tests: Temperature: 18 ÷ 33 °C Relative humidity: 30 ÷ 60 % Air pressure: 980 ÷ 1060 hPa When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.
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.

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

5.3 Measurement uncertainty

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2, ETSI TR 100 028-1, ETSI TR 100 028-2 and other specific test standards and is documented in Nemko Spa working manuals WML1002 and WML0078. 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 Power Density	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 ÷ 40 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 transmitted, Power density	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)
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 %

5.4 Test equipment

Equipment	Manufacturer	Model	Serial N°	Cal Date	Due Date
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	9162-025	2021-07	2024-07
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESU8	100202	2023-09	2024-09
EMI receiver (2 Hz ÷ 44 GHz)	Rohde & Schwarz	ESW44	101620	2023-09	2024-09
EMI receiver (2 Hz ÷ 43.5 GHz)	Rohde & Schwarz	FSW43	101767	2023-09	2024-09
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
Bilog Antenna (1 ÷ 18 GHz)	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152	2021-09	2024-09
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck Mess-Elektronik	BBV9718C	00121	2024-02	2025-02
Double Ridge Horn Antenna (18 ÷ 40 GHz)	RFSpin	DRH40	061106A40	2023-05	2026-05
Preamplifier (18 ÷ 40 GHz)	Sage	STB-1834034030-KFKF-L1	18490-01	2023-05	2024-05
Pyramidal Horn Antenna (40 ÷ 60 GHz)	Sage	SAR-2507-19VF-R2	15715-01	2021-06	2024-06
Pyramidal Horn Antenna (60 ÷ 90 GHz)	Sage	SAR-2013-121F-E2	17383.01	2021-07	2024-07
Harmonic Mixer (40 ÷ 60 GHz)	Radiometer Physics	RPG FS Z60	100988	2024-02	2027-02
Harmonic Mixer (60 ÷ 90 GHz)	Radiometer Physics	RPG FS Z90	101670	2024-02	2027-02
Semi-anechoic chamber	Nemko	10 m semi-anechoic chamber	530	2023-09	2025-09
Semi anechoic chamber	Comtest	SAC-3	1711-150	2022-09	2024-09
Coaxial cable	Rosenberger+Huber-Suhner	RE03+RE04	1.510+1.511	2023-10	2024-10
Coaxial cable	Rosenberger+Huber-Suhner	RE04+RE05	1.511+1.512	2023-12	2024-12
Coaxial cable	Rosenberger+Huber-Suhner	RE01+RE02	1.654+1.655	2024-02	2025-02
Coaxial cable	Rosenberger+Huber+Suhner	CE01+CE02	1.498+1.632	2023-11	2024-11
Climatic Chamber	MSL	EC500DA	15022	2022-03	2024-03

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use

Section 6: Test results

6.1 RF power output

FCC 47 CFR § 90.205 (r)
Applicants for licenses must request and use no more power than the actual power necessary for satisfactory operation. Except where otherwise specifically provided for, the maximum power that will be authorized to applicants whose license applications for new stations are filed after August 18, 1995 is as follows:

(r) *All other frequency bands.* Requested transmitter power will be considered and authorized on a case by case basis.

RSS 210 Annex B.11
The following carrier frequencies are available for use by radar and other mobile devices:

a. 17.15 GHz: 0.3 W e.i.r.p.

b. 94 GHz: 0.4 W e.i.r.p.

Parameters, such as occupied bandwidth and permissible out-of-band emissions, will be evaluated on a case-by-case basis.

Test date: 2024-03-18

Test results: Pass

Note: In order to comply with RSS 210 Annex B.11 limits, the output power should be adjusted depending on antenna gain.

Special notes

Signal stimulation: CW

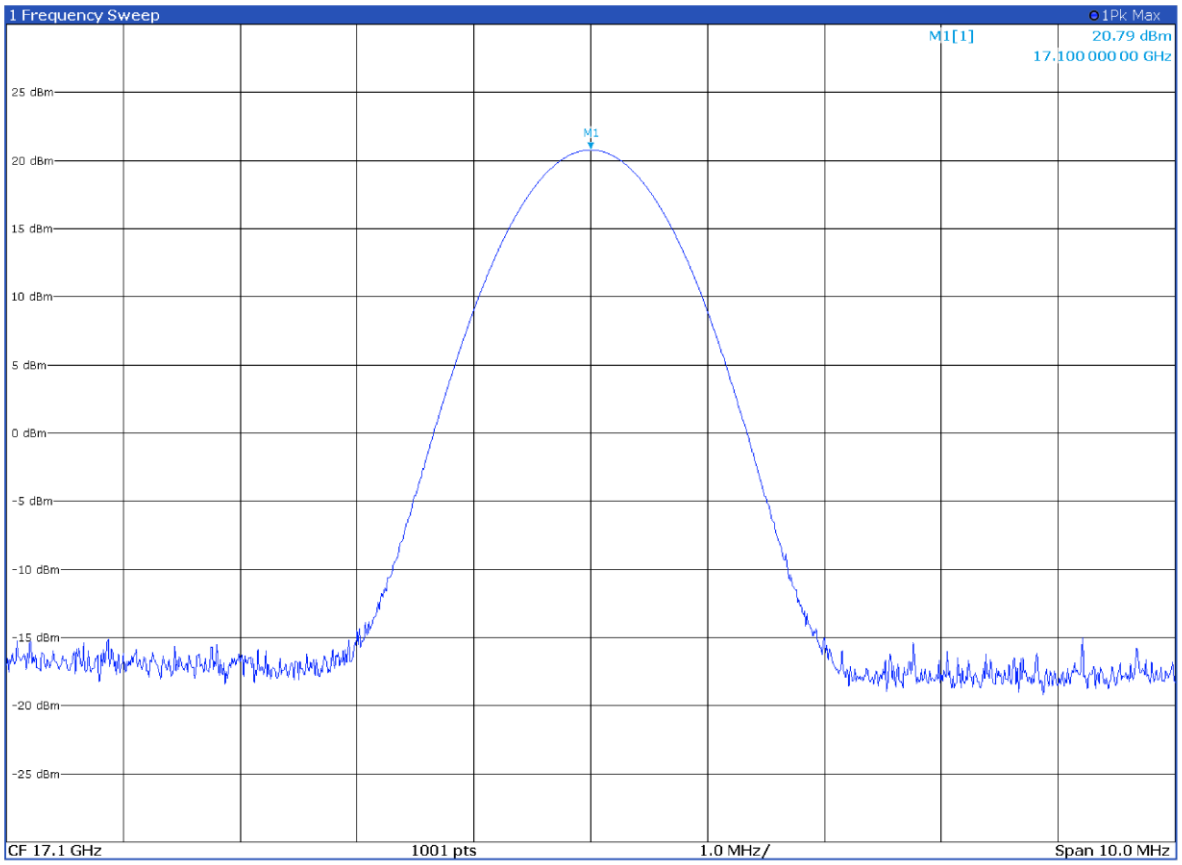
Test equipment

Equipment	Manufacturer	Model	Serial N°
EMI receiver (2 Hz ÷ 43.5 GHz)	Rohde & Schwarz	FSW43	101767

Result:

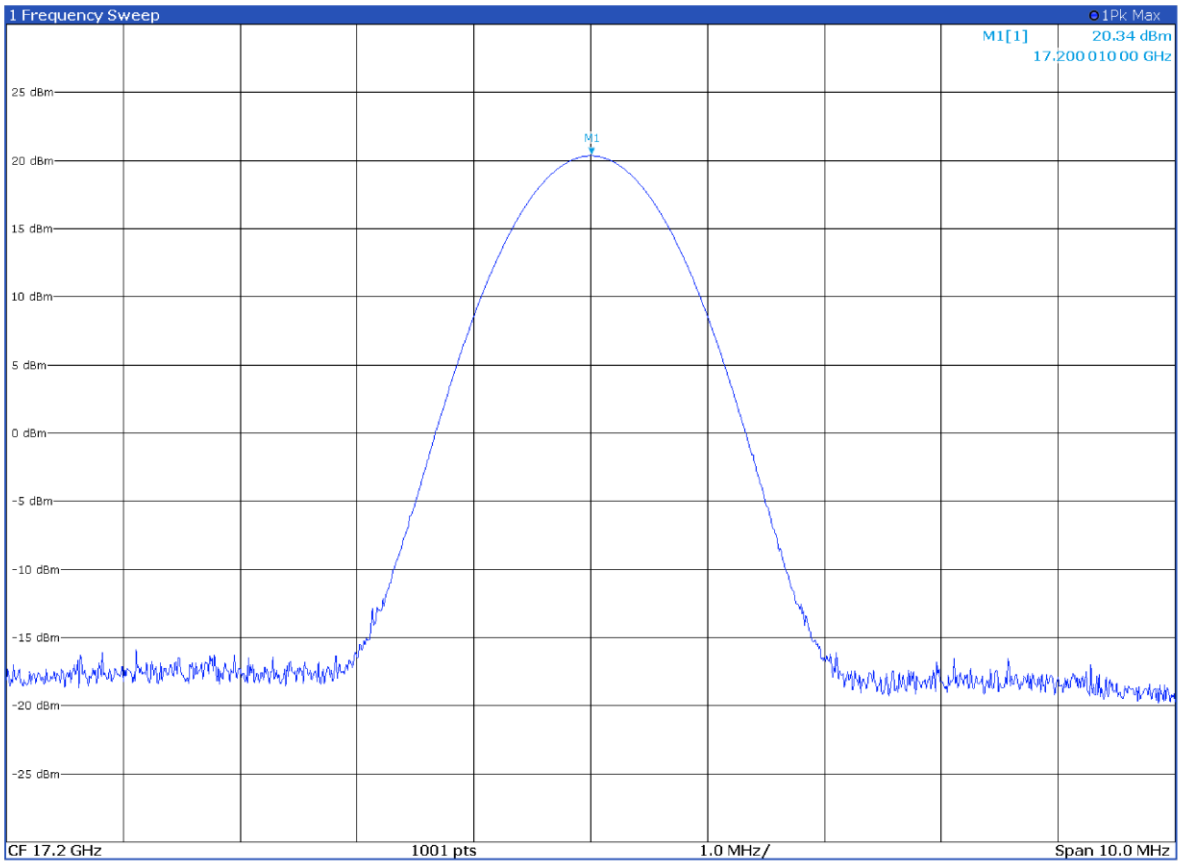
Frequency (channel)	Conducted output power TX1	Conducted output power TX2
17.1 GHz (low)	20.8 dBm	19.8 dBm
17.2 GHz (mid)	20.4 dBm	18.2 dBm
17.3 GHz (high)	20.7 dBm	20.0 dBm

Test data



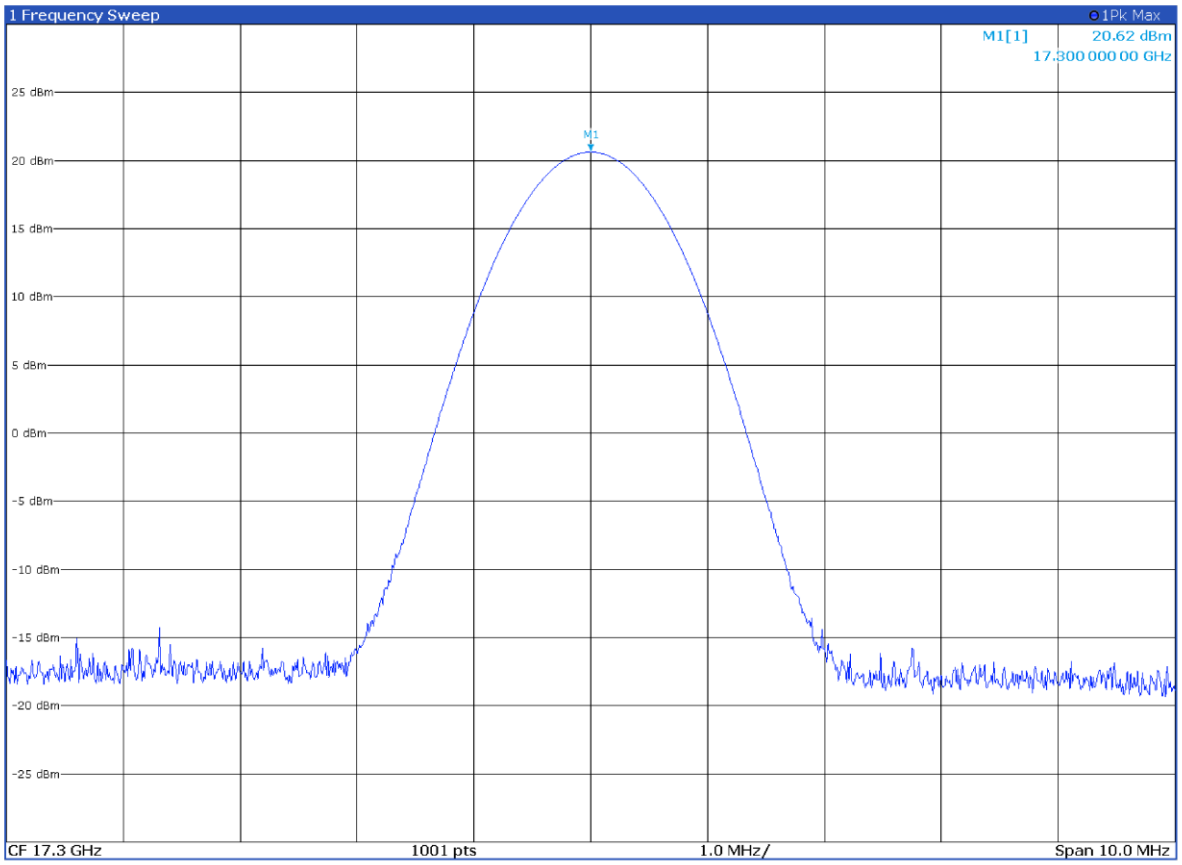
Channel Low – TX1

Test data



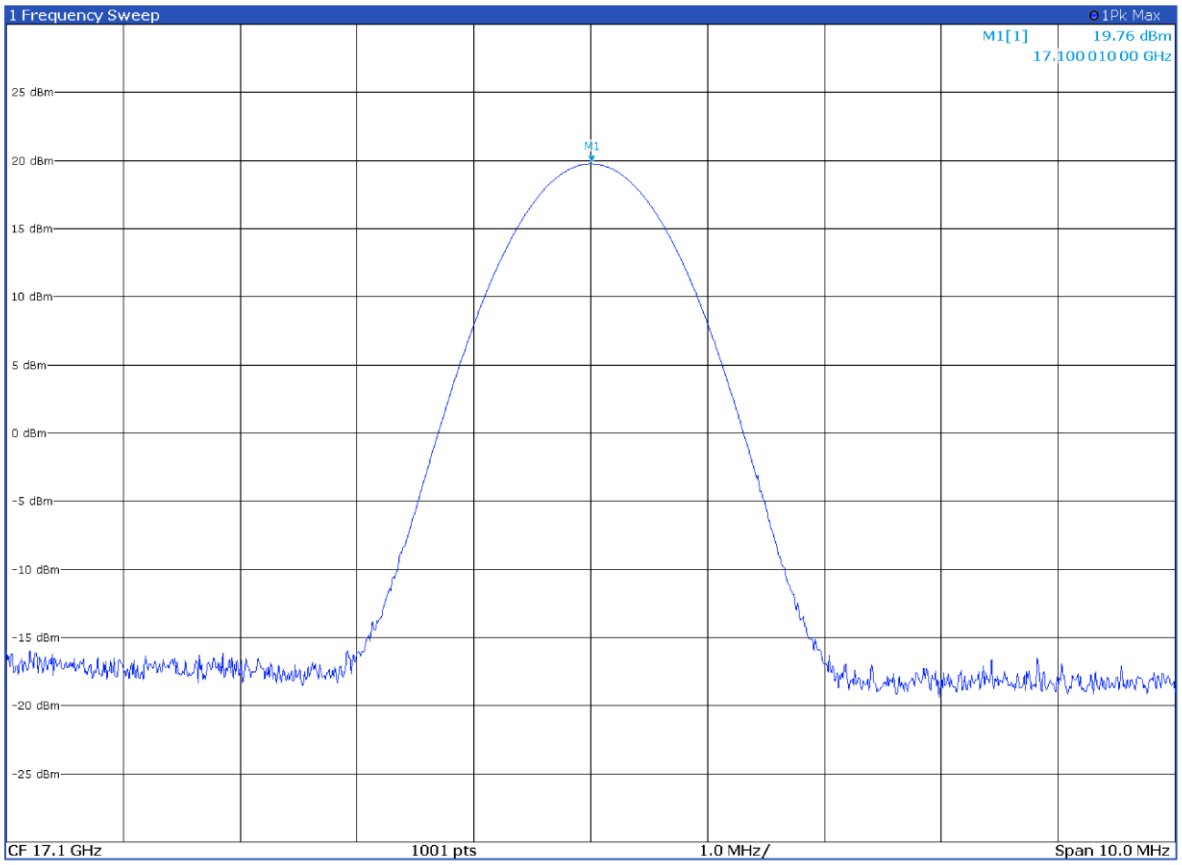
Channel Mid – TX1

Test data



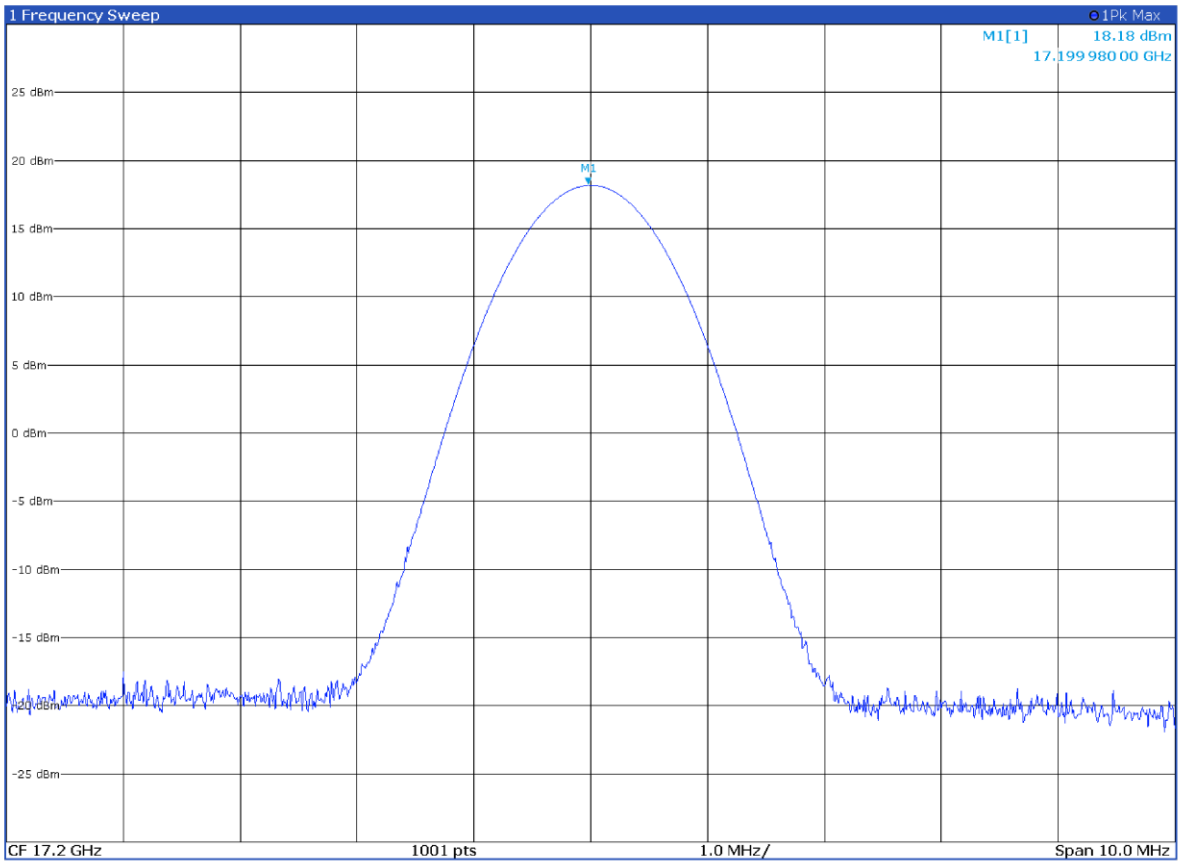
Channel High – TX1

Test data



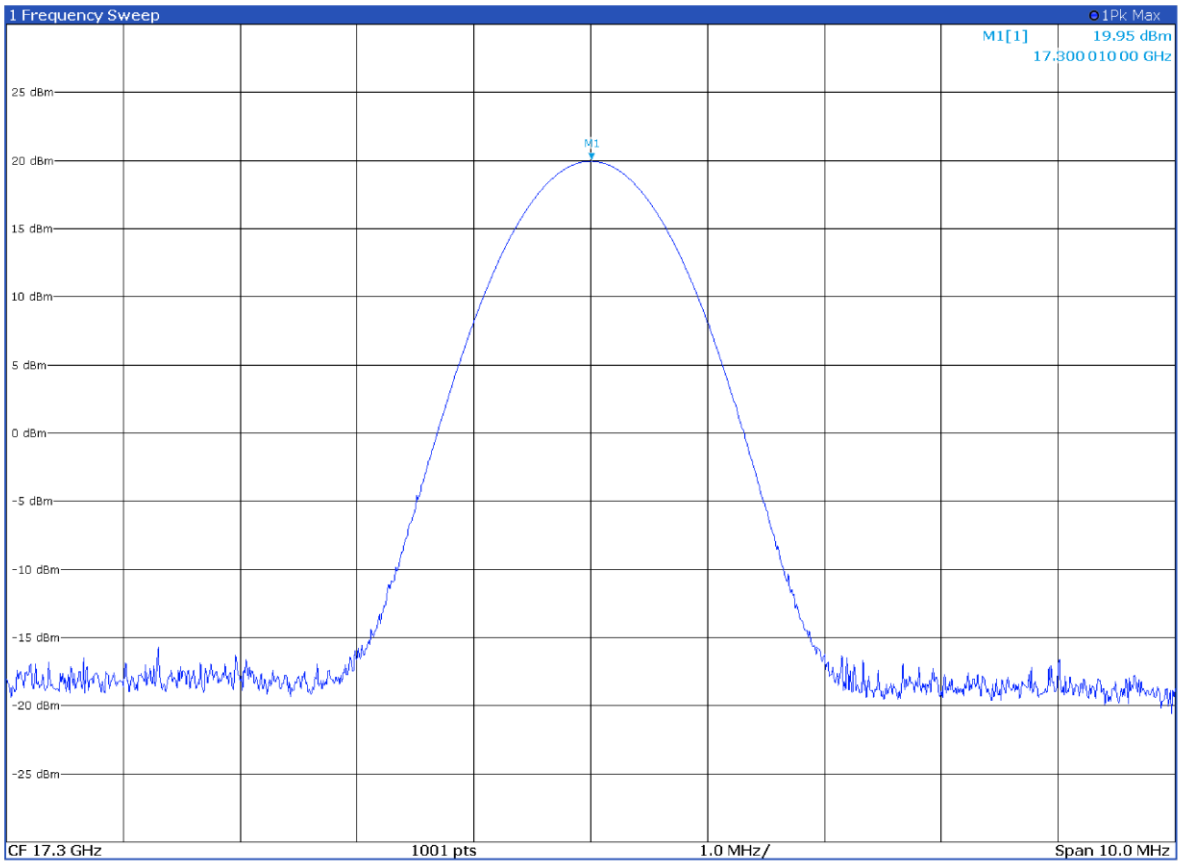
Channel Low – TX2

Test data



Channel Mid – TX2

Test data



Channel High – TX2

6.2 Occupied Bandwidth

FCC 47 CFR § 90.209

(a) Each authorization issued to a station licensed under this part will show an emission designator representing the class of emission authorized. The designator will be prefixed by a specified necessary bandwidth. This number does not necessarily indicate the bandwidth occupied by the emission at any instant. In those cases where §2.202 of this chapter does not provide a formula for the computation of necessary bandwidth, the occupied bandwidth, as defined in part 2 of this chapter, may be used in lieu of the necessary bandwidth.

(b) The maximum authorized single channel bandwidth of emission corresponding to the type of emission specified in §90.207 is as follows:

(1) For A1A or A1B emissions, the maximum authorized bandwidth is 0.25 kHz. The maximum authorized bandwidth for type A3E emission is 8 kHz.

(2) For operations below 25 MHz utilizing J3E emission, the bandwidth occupied by the emission shall not exceed 3000 Hz. The assigned frequency will be specified in the authorization. The authorized carrier frequency will be 1400 Hz lower in frequency than the assigned frequency. Only upper sideband emission may be used. In the case of regularly available double sideband radiotelephone channels, an assigned frequency for J3E emissions is available either 1600 Hz below or 1400 Hz above the double sideband radiotelephone assigned frequency.

(3) For all other types of emissions, the maximum authorized bandwidth shall not be more than that normally authorized for voice operations.

(4) Where a frequency is assigned exclusively to a single licensee, more than a single emission may be used within the authorized bandwidth. In such cases, the frequency stability requirements of §90.213 must be met for each emission.

(5) Unless specified elsewhere, channel spacings and bandwidths that will be authorized in the following frequency bands are given in the following table.

TABLE 1 TO §90.209(b)(5)—STANDARD CHANNEL SPACING/BANDWIDTH

Frequency band (MHz)	Channel spacing (kHz)	Authorized bandwidth (kHz)
Below 25[2]		
25-50	20	20
72-76	20	20
150-174	[1]7.5	[1 3]20/11.25/6
216-220[5]	6.25	20/11.25/6
220-222	5	4
406-512[2]	[1]6.25	[1 3 6]20/11.25/6
806-809/851-854	12.5	20
809-817/854-862	12.5	[6]20/11.25
817-824/862-869	25	[6]20
896-901/935-940	12.5	13.6
902-928[4]		
929-930	25	20
1427-1432[5]	12.5	12.5
[3]2450-2483.5[2]		
Above 2500[2]		

RSS-Gen - Clause 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs

Test date: 2024-03-18

Test results: Pass

Special notes

Signal stimulation: FMCW

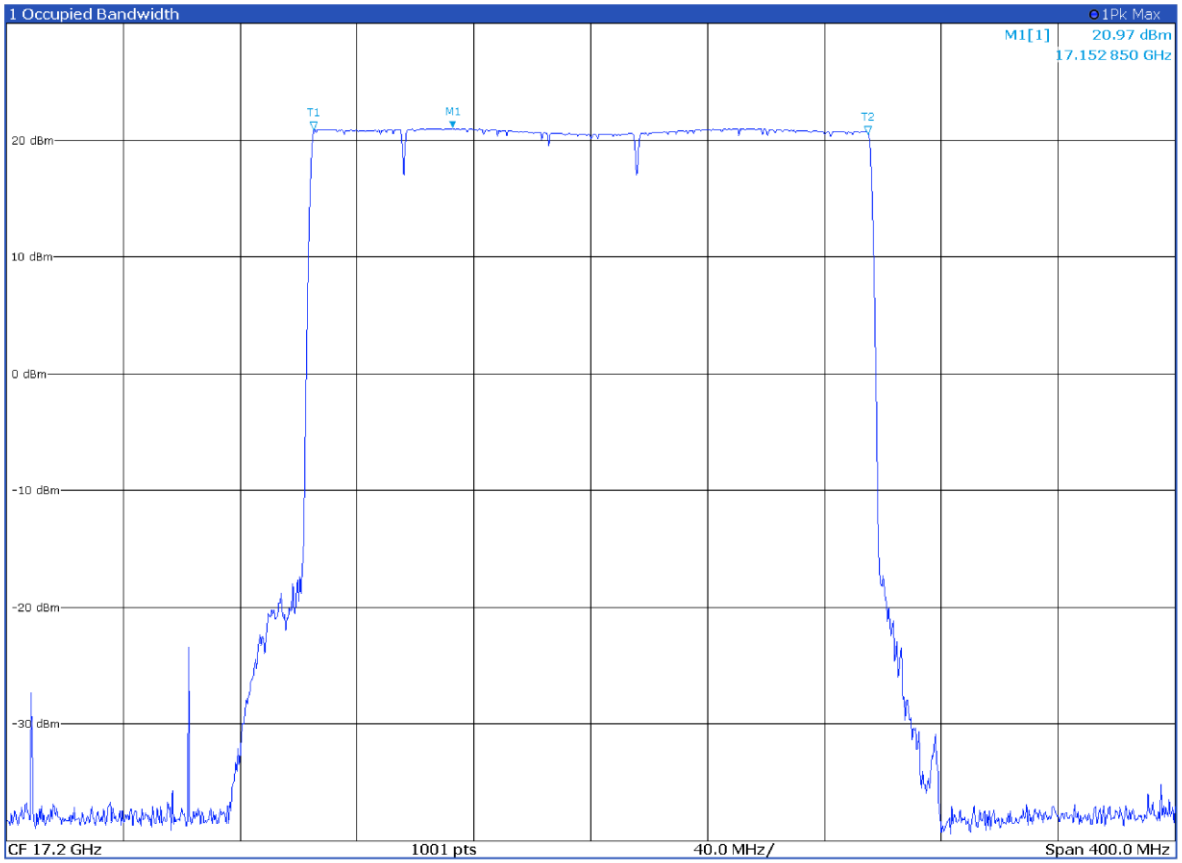
Test equipment

Equipment	Manufacturer	Model	Serial N°
EMI receiver (2 Hz ÷ 43.5 GHz)	Rohde & Schwarz	FSW43	101767

Result:

Frequency	Bandwidth TX 1	Bandwidth TX 2
17.1GHz – 17.3 GHz (sweep)	189.8 MHz	190.3 MHz

Test data

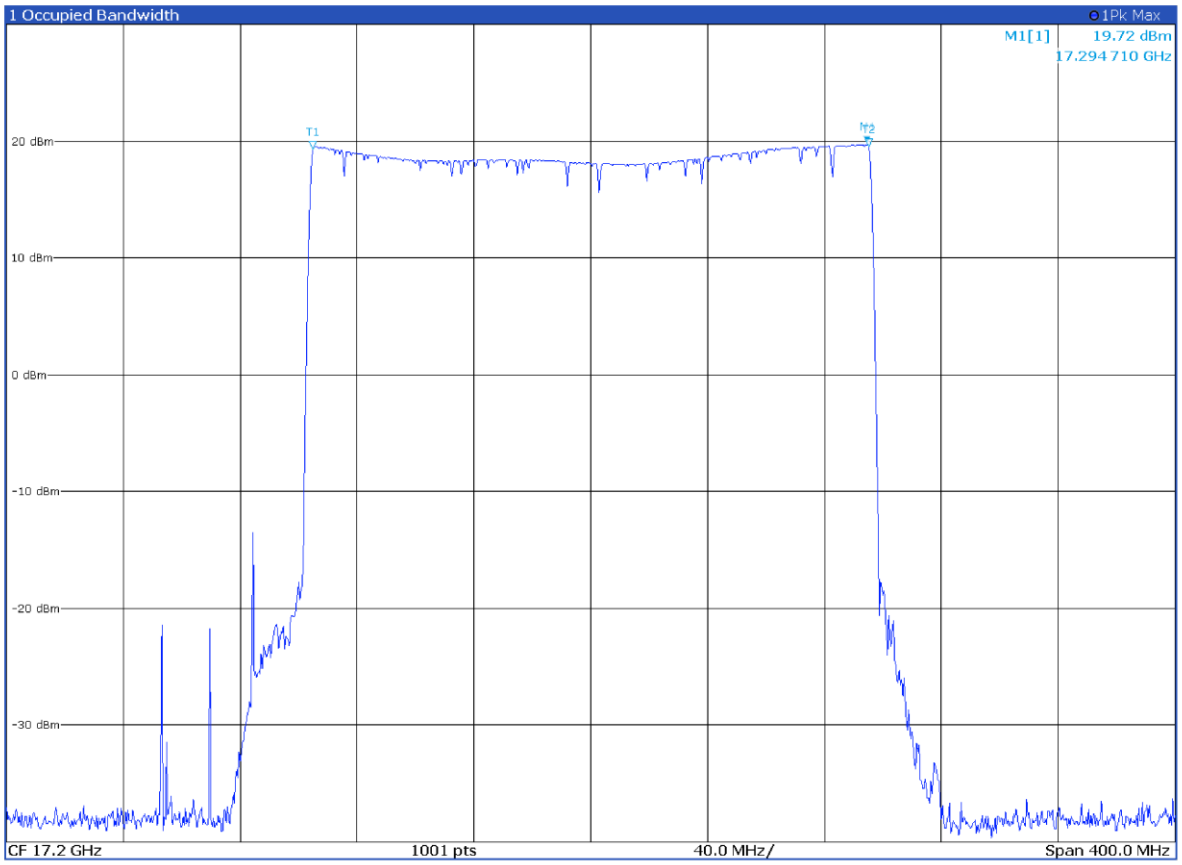


2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**17.152 85 GHz**	**20.97 dBm**	Occ Bw	**189.774 625 319 MHz**
T1		1	17.105 191 GHz	20.89 dBm	Occ Bw Centroid	17.200 078 422 GHz
T2		1	17.294 966 GHz	20.52 dBm	Occ Bw Freq Offset	78.421 846 237 kHz

TX1

Test data



2 Marker Table

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1		1	**17.294 71 GHz**	**19.72 dBm**	Occ Bw	**190.314 227 792 MHz**
T1		1	17.104 882 GHz	19.26 dBm	Occ Bw Centroid	17.200 039 059 GHz
T2		1	17.295 196 GHz	19.54 dBm	Occ Bw Freq Offset	39.059 132 225 kHz

TX2

6.8 Clause 90.213 Frequency stability measurements

FCC 47 CFR § 90.213

(a) Unless noted elsewhere, transmitters used in the services governed by this part must have a minimum frequency stability as specified in the following table.

Frequency range (MHz)	Fixed and base stations	Mobile stations	
		Over 2 watts output power	2 watts or less output power
150-174	[5][11] 5	[6] 5	[4][6] 50
216-220	1.0		1.0
220-222[12]	0.1	1.5	1.5
421-512	[7][11][14] 2.5	[8] 5	[8] 5
806-809	[14] 1.0	1.5	1.5
809-824	[14] 1.5	2.5	2.5
851-854	1.0	1.5	1.5
854-869	1.5	2.5	2.5
896-901	[14] 0.1	1.5	1.5
902-928	2.5	2.5	2.5
902-928[13]	2.5	2.5	2.5
929-930	1.5		
935-940	0.1	1.5	1.5
1427-1435	[9] 300	300	300
Above 2450[10]			

(b) Click to open paragraph tools For the purpose of determining the frequency stability limits, the power of a transmitter is considered to be the maximum rated output power as specified by the manufacturer.

RSS Gen Clause 6.11

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:

The reference temperature for radio transmitters is +20°C (+68°F). 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. 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:
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
at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage
For licence-exempt devices, the following conditions apply:
at the temperatures of -20°C (-4°F), +20°C (+68°F) and +50°C (+122°F), and at the manufacturer's rated supply voltage at the temperature of +20°C (+68°F) and at ±15% of the manufacturer's rated supply voltage.
If the frequency stability limits are only met within a temperature range that is smaller than the range specified in (a) for licensed or licence-exempt devices, the frequency stability requirement will be deemed to be met if the transmitter is automatically prevented from operating outside this smaller temperature range and if the published operating characteristics for the equipment are revised to reflect this restricted temperature range. If the device contains both licence and licence-exempt transmitter modules, the device's frequency stability shall be measured under the most stringent condition specified in the applicable RSS of the transmitter module. In addition, if an unmodulated carrier is not available, the method used to measure frequency stability shall be described in the test report.

Test date: 2024-03-19

Test results: Pass

Special notes
Signal stimulation: CW

Test equipment			
Equipment	**Manufacturer**	**Model**	**Serial N°**
EMI receiver (2 Hz ÷ 43.5 GHz)	Rohde & Schwarz	FSW43	101767
Climatic Chamber	MSL	EC500DA	15022

Result:	
Test conditions	**Frequency, GHz**
+50 °C, Nominal	17.200 000 550
+40 °C, Nominal	17.200 000 373
+30 °C, Nominal	17.200 000 161
+20 °C, +15 %	17.199 999 873
+20 °C, Nominal	17.199 999 875
+20 °C, −15 %	17.199 999 879
+10 °C, Nominal	17.199 999 852
0 °C, Nominal	17.199 999 814
−10 °C, Nominal	17.199 999 812
−20 °C, Nominal	17.199 999 821
−30 °C, Nominal	17.199 999 935

Field Strength of spurious radiation

FCC 47 CFR § 90.210

Except as indicated elsewhere in this part, transmitters used in the radio services governed by this part must comply with the emission masks outlined in this section. Unless otherwise stated, per paragraphs (d)(4), (e)(4), and (o) of this section, measurements of emission power can be expressed in either peak or average values provided that emission powers are expressed with the same parameters used to specify the unmodulated transmitter carrier power. For transmitters that do not produce a full power unmodulated carrier, reference to the unmodulated transmitter carrier power refers to the total power contained in the channel bandwidth. Unless indicated elsewhere in this part, the table in this section specifies the emission masks for equipment operating under this part.

(b) Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.

(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB.

RSS Gen Clause 6.13

Transmitter unwanted emissions

Detector

When the unwanted emissions limits are defined in relative terms, the same parameter, peak power or average power, shall be used as the reference for both the transmitter's output power and the unwanted emissions measurements. When the unwanted emissions limits are expressed in absolute terms, unless otherwise stated in the applicable RSS, the following conditions shall apply. Below 1 GHz, compliance with the limits shall be demonstrated using a CISPR quasi-peak detector and the related measurement bandwidth. Above 1 GHz, compliance with the limits shall be demonstrated using a linear average detector with a minimum resolution bandwidth of 1 MHz.

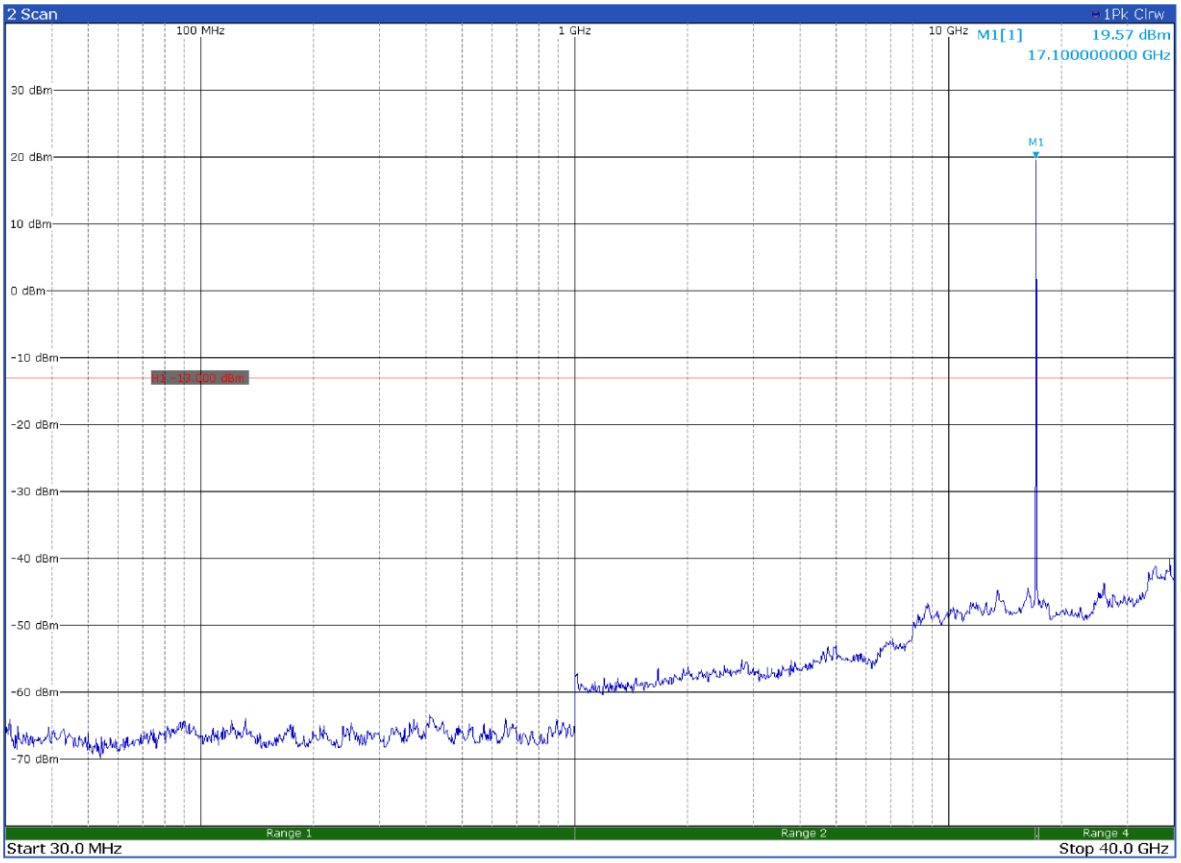
Frequency range for measuring unwanted emission

In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated or used in the equipment, whichever is lower, without going below 9 kHz, up to at least the applicable frequency given below. If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. If the equipment operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower. If the equipment operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise in the applicable RSS.

Test date: From 2024-03-19 to 2024-03-22
Test results: Pass

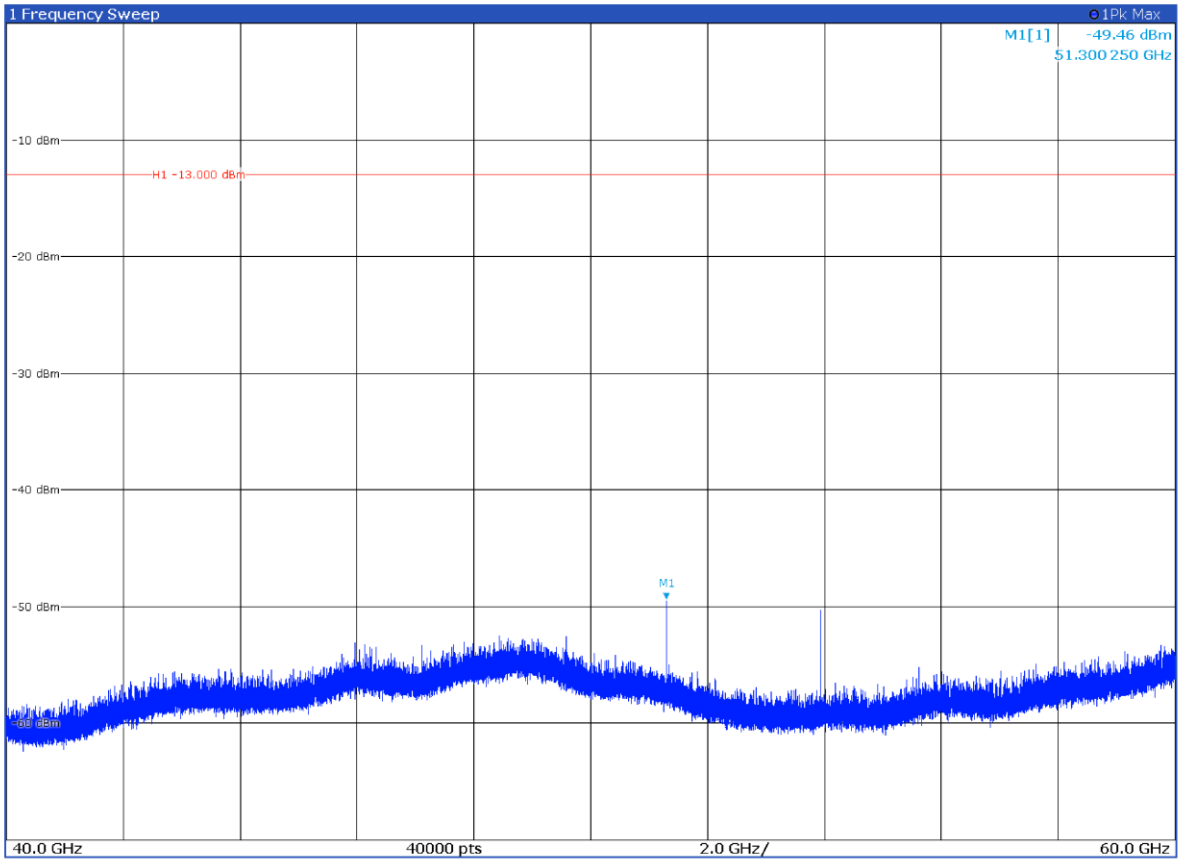
Test equipment			
Equipment	**Manufacturer**	**Model**	**Serial N°**
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	9162-025
EMI receiver (20 Hz ÷ 8 GHz)	Rohde & Schwarz	ESU8	100202
EMI receiver (2 Hz ÷ 44 GHz)	Rohde & Schwarz	ESW44	101620
EMI receiver (2 Hz ÷ 43.5 GHz)	Rohde & Schwarz	FSW43	101767
Controller	Maturo	FCU3.0	10041
Tilt antenna mast	Maturo	TAM4.0-E	10042
Turntable	Maturo	TT4.0-5T	2.527
Bilog Antenna (1 ÷ 18 GHz)	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152
Preamplifier (1 ÷ 18 GHz)	Schwarzbeck Mess-Elektronik	BBV9718C	00121
Double Ridge Horn Antenna (18 ÷ 40 GHz)	RFSpin	DRH40	061106A40
Preamplifier (18 ÷ 40 GHz)	Sage	STB-1834034030-KFKF-L1	18490-01
Pyramidal Horn Antenna (40 ÷ 60 GHz)	Sage	SAR-2507-19VF-R2	15715-01
Pyramidal Horn Antenna (60 ÷ 90 GHz)	Sage	SAR-2013-121F-E2	17383.01
Harmonic Mixer (40 ÷ 60 GHz)	Radiometer Physics	RPG FS Z60	100988
Harmonic Mixer (60 ÷ 90 GHz)	Radiometer Physics	RPG FS Z90	101670
Semi-anechoic chamber	Nemko	10 m semi-anechoic chamber	530

Test data



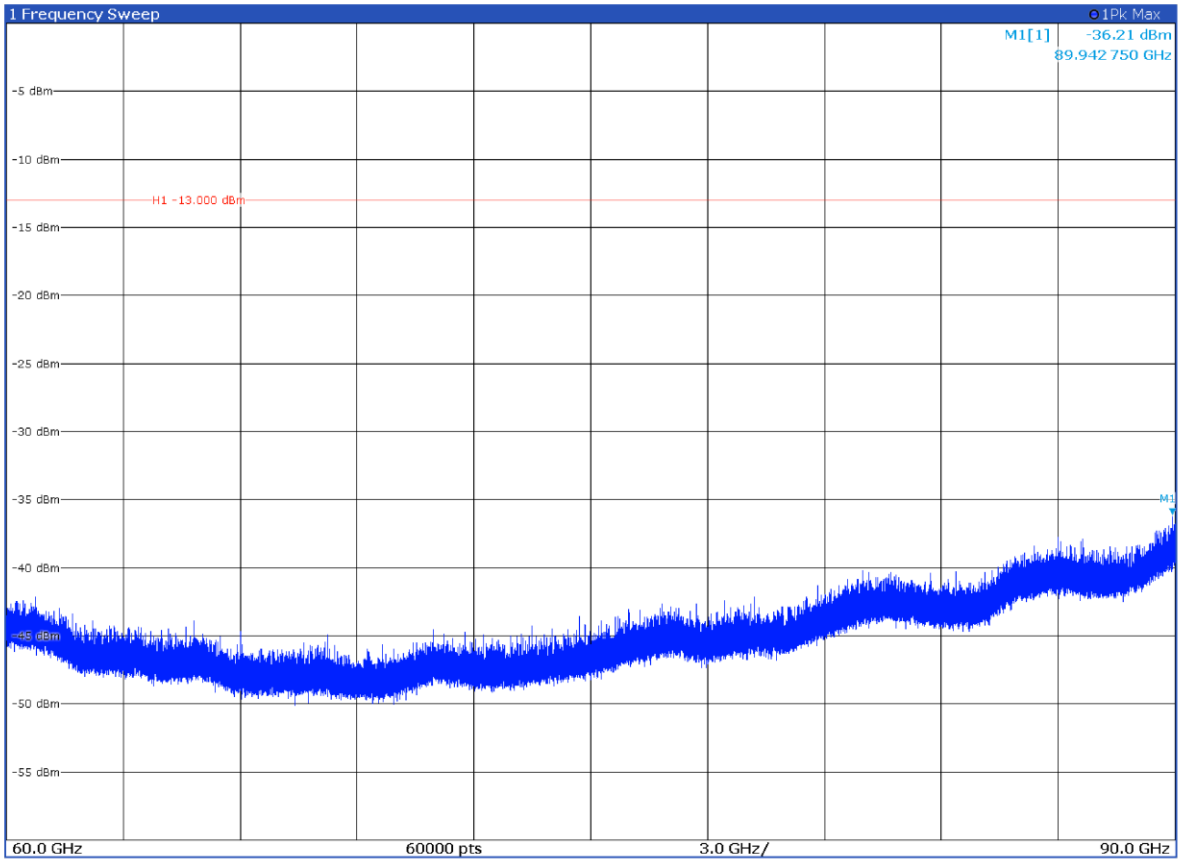
Conducted spurious emissions from 30 MHz to 40 GHz
Low channel, TX 1
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



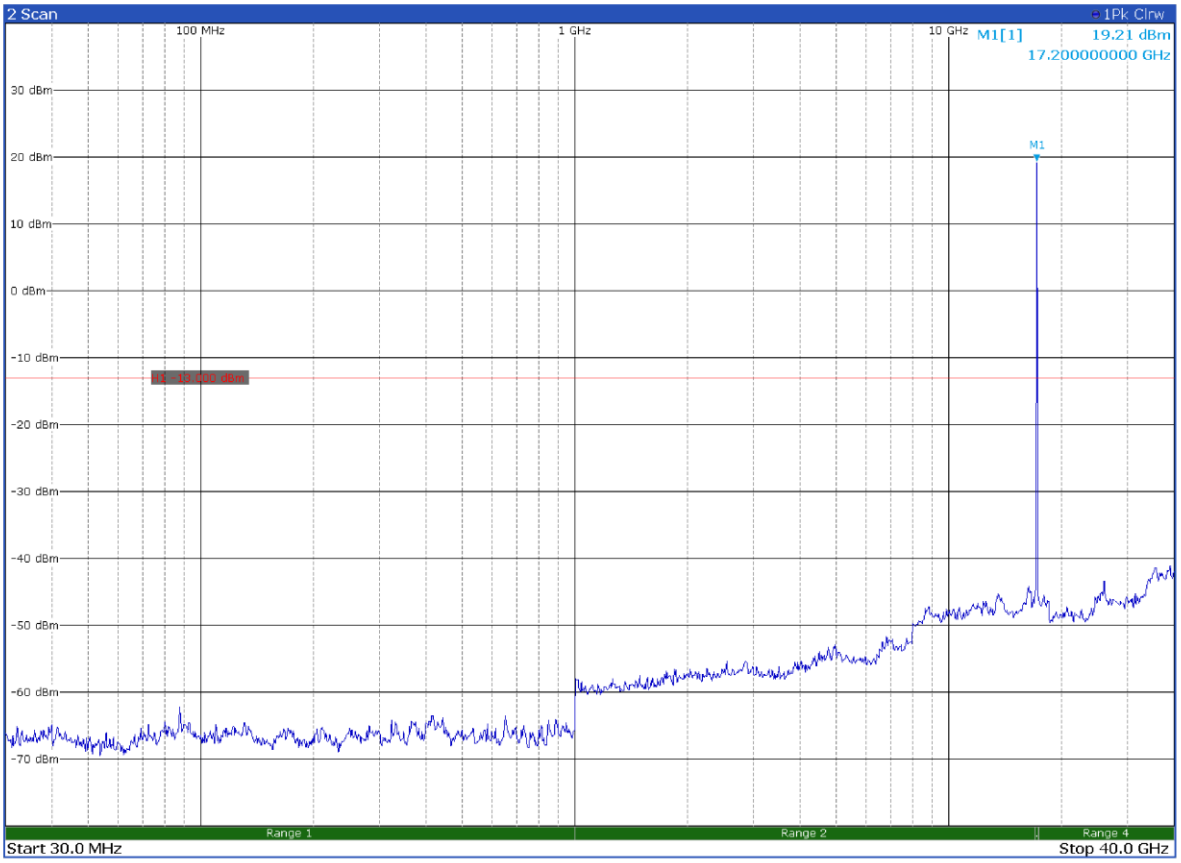
Conducted spurious emissions from 40 GHz to 60 GHz
Low channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



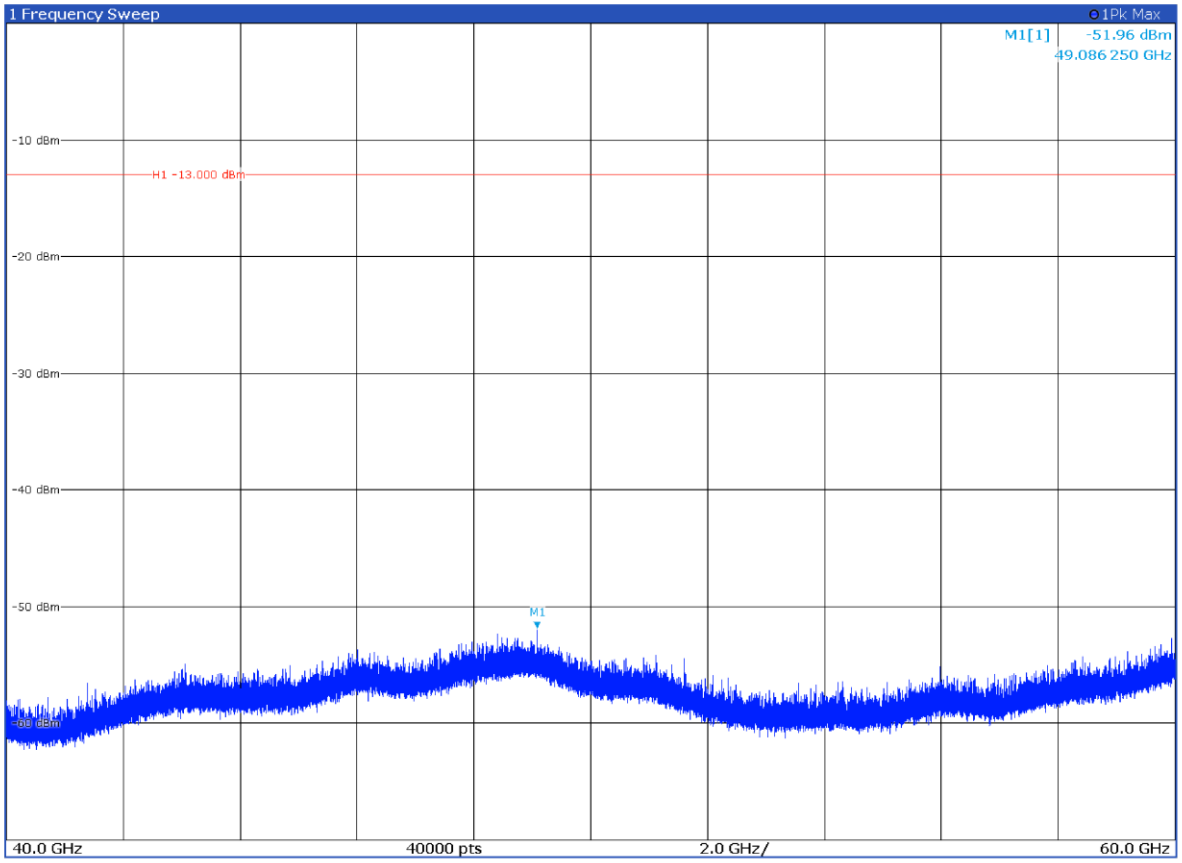
Conducted spurious emissions from 60 GHz to 90 GHz
Low channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



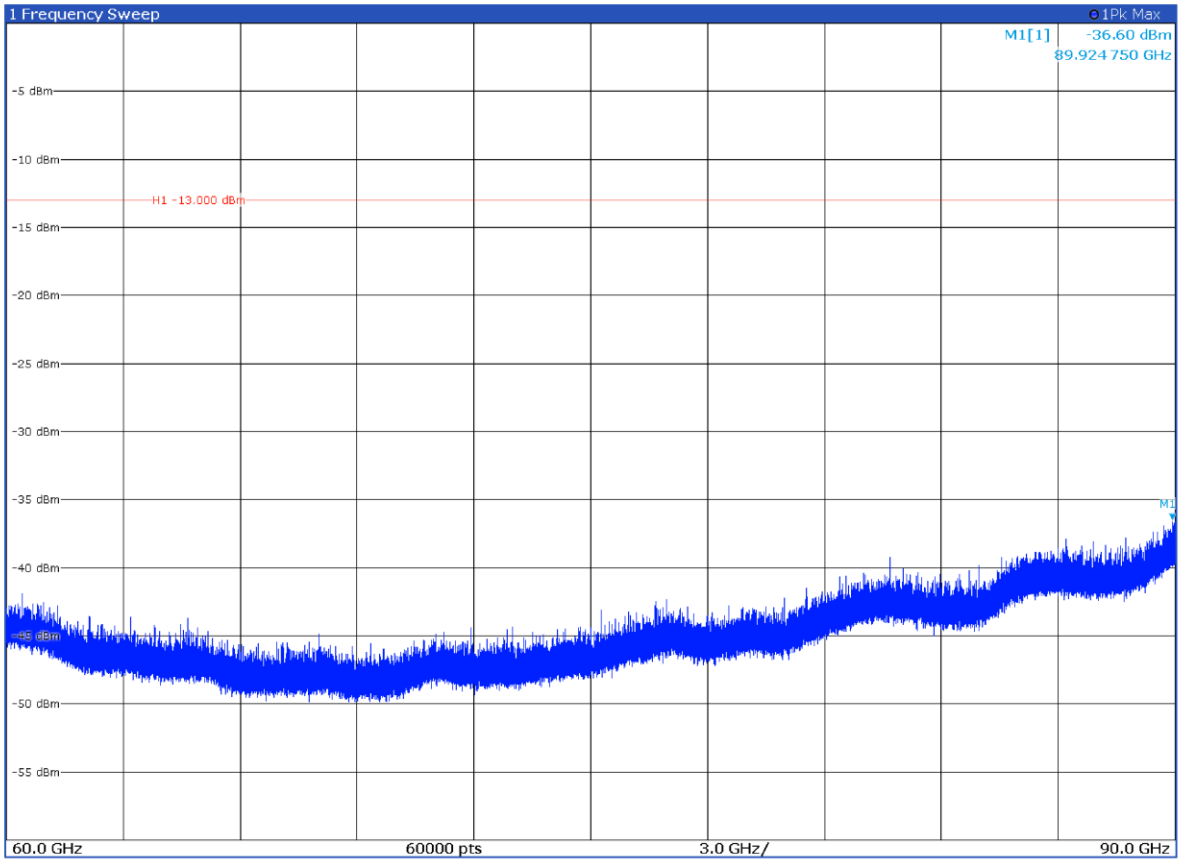
Conducted spurious emissions from 30 MHz to 40 GHz
Mid channel, TX 1
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



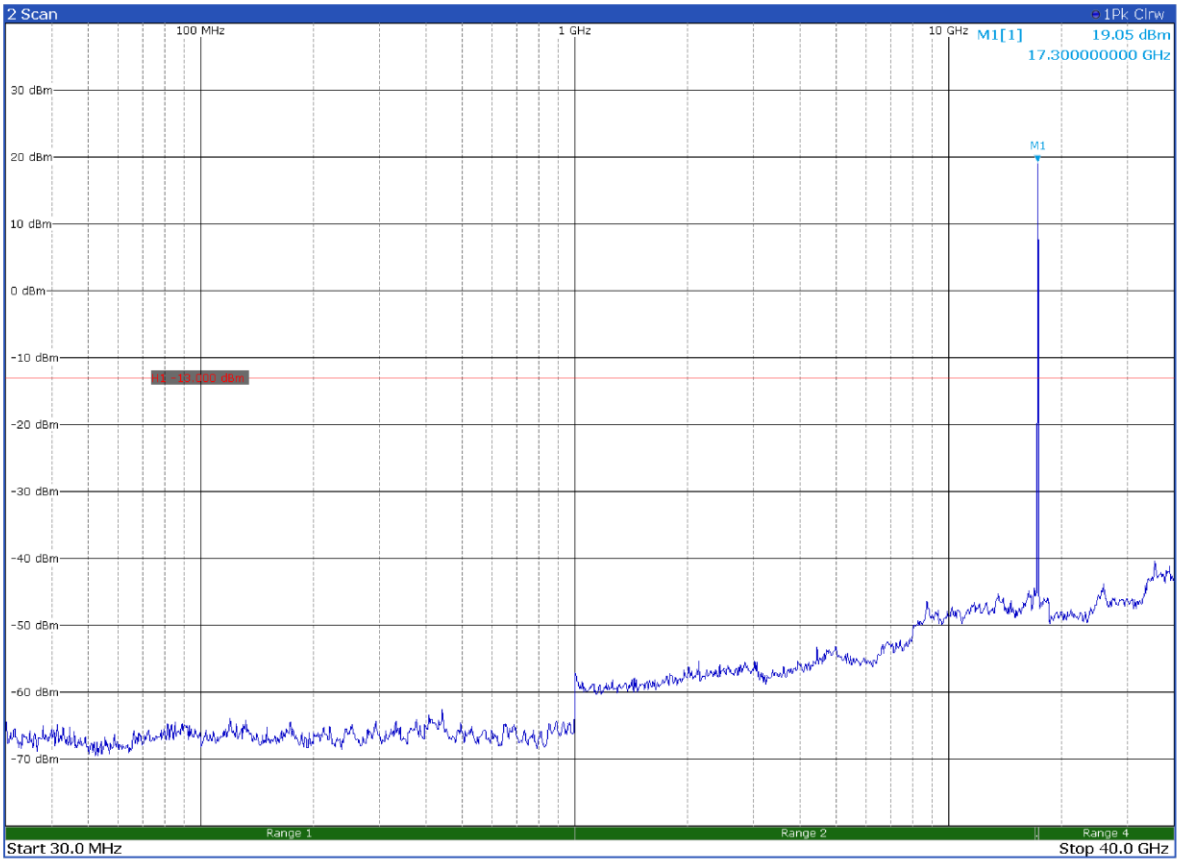
Conducted spurious emissions from 40 GHz to 60 GHz
Mid channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



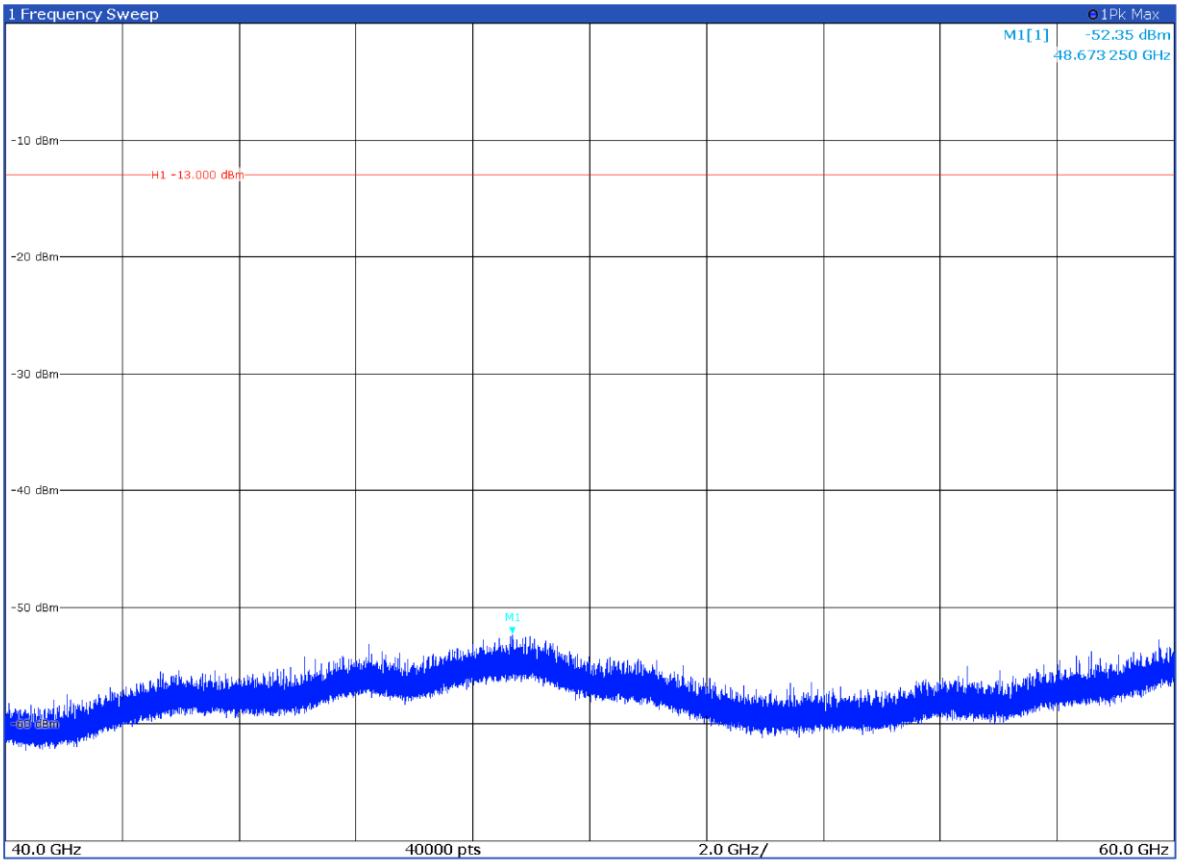
Conducted spurious emissions from 60 GHz to 90 GHz
Mid channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



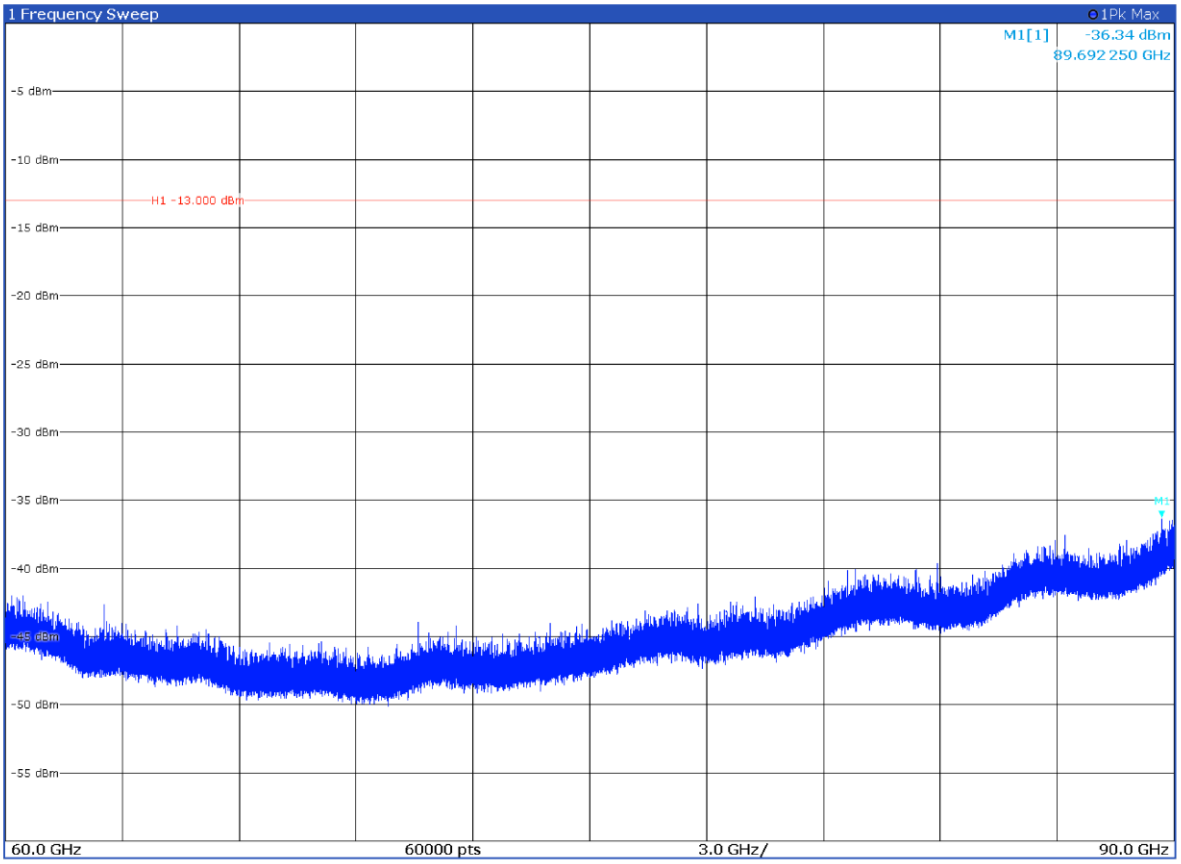
Conducted spurious emissions from 30 MHz to 40 GHz
High channel, TX 1
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



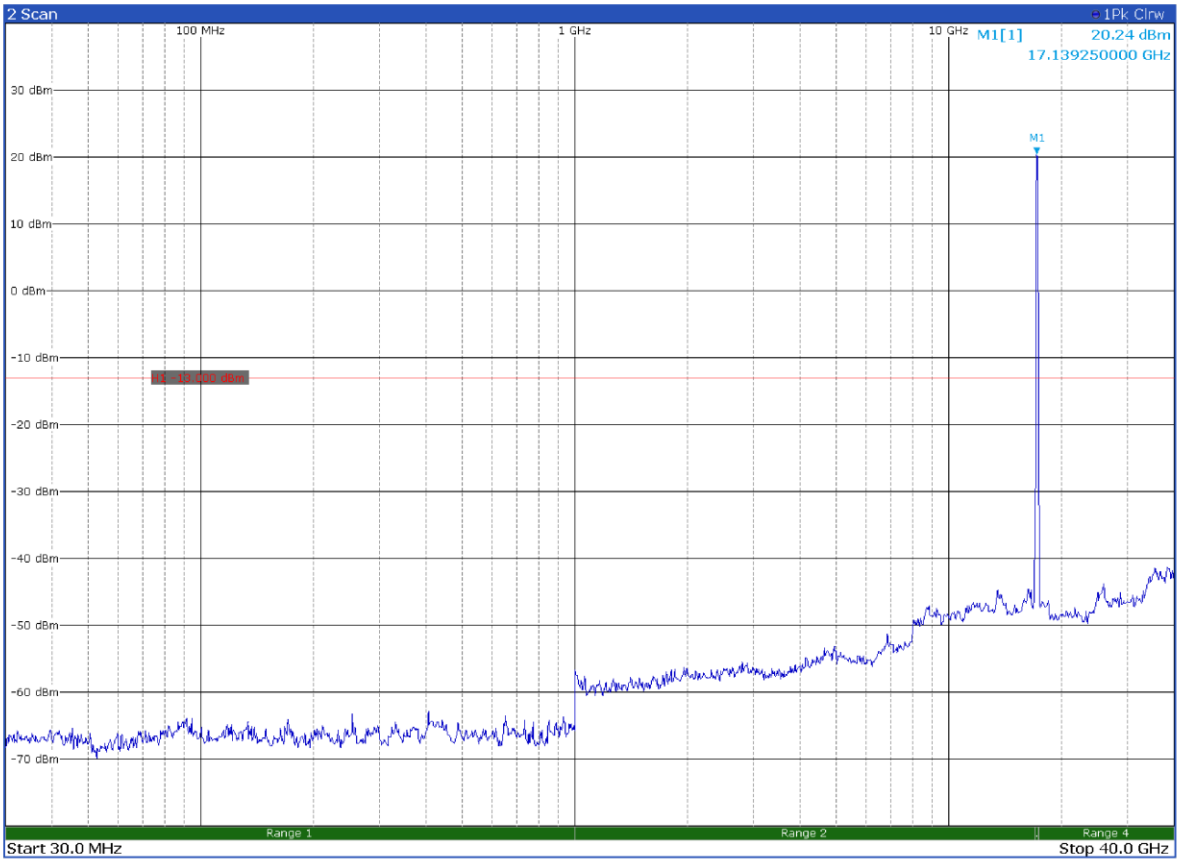
Conducted spurious emissions from 40 GHz to 60 GHz
High channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



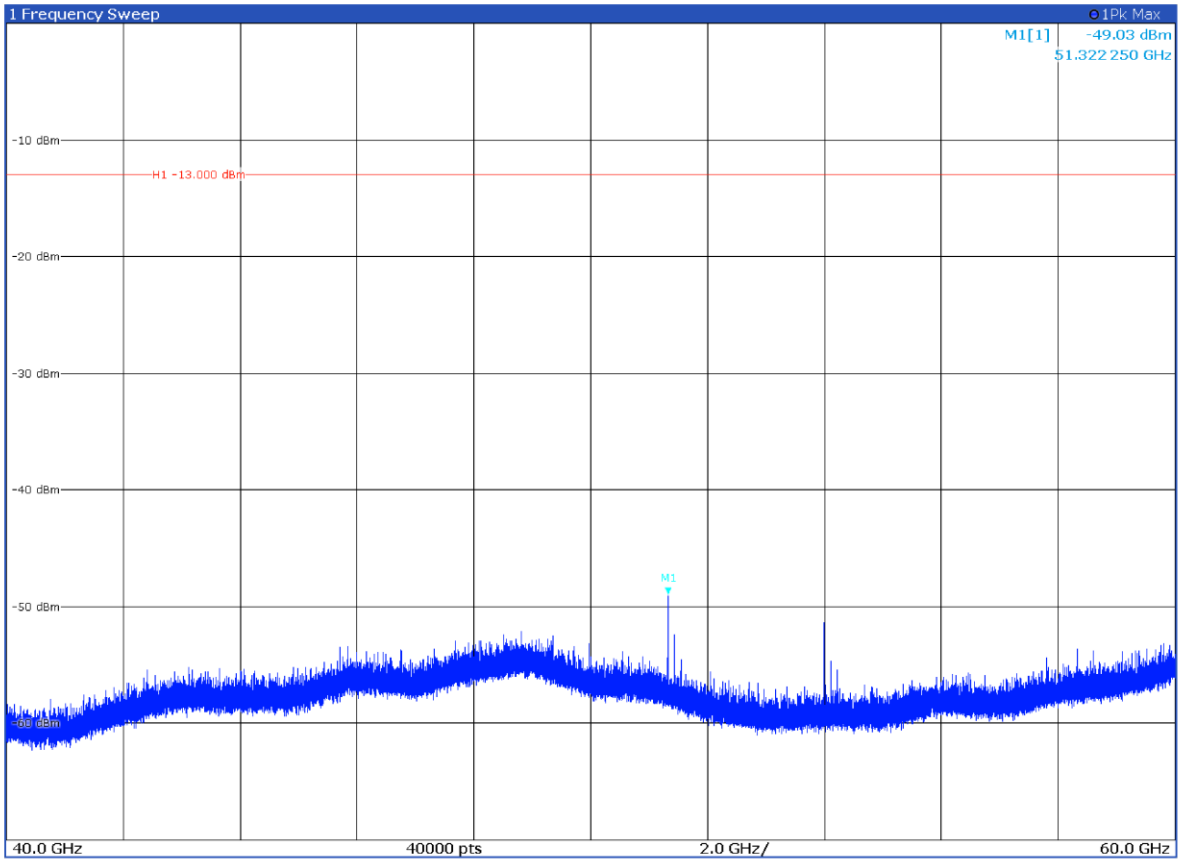
Conducted spurious emissions from 60 GHz to 90 GHz
High channel, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



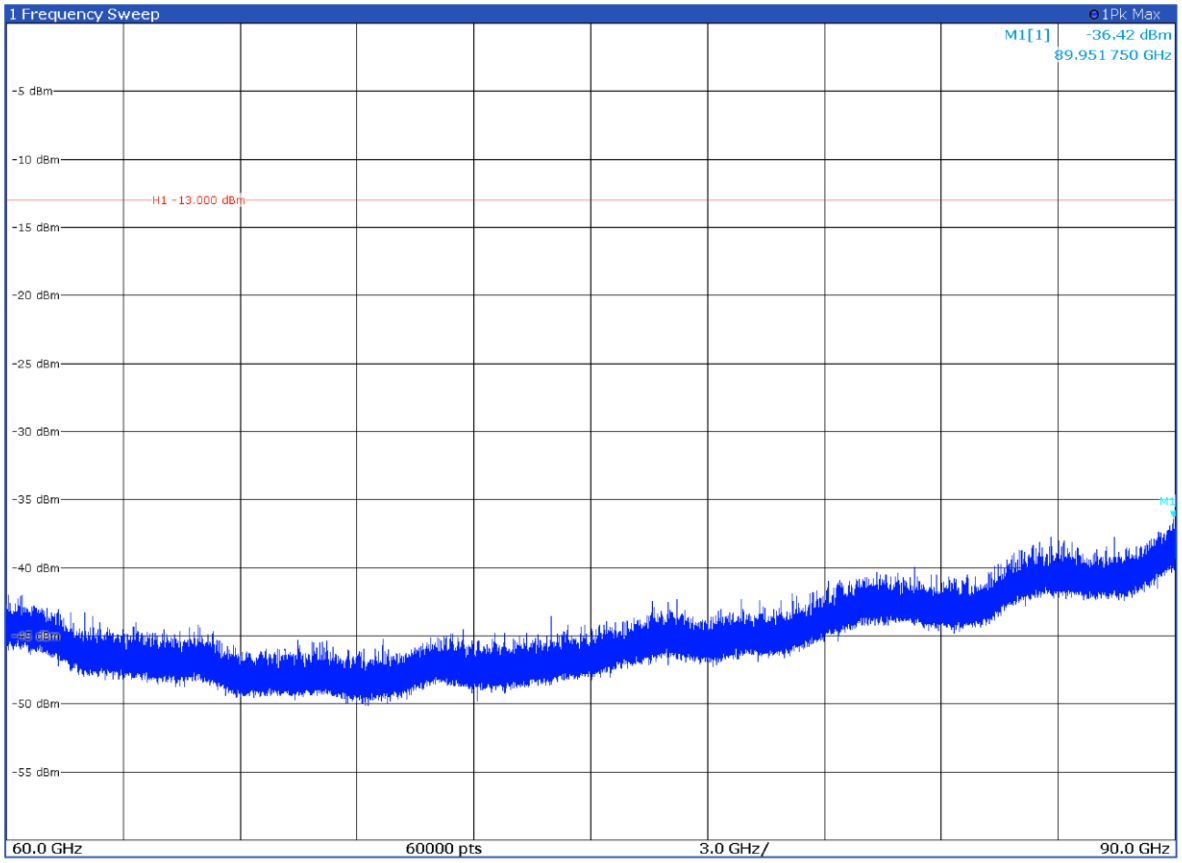
Conducted spurious emissions from 30 MHz to 40 GHz
Sweep, TX 1
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



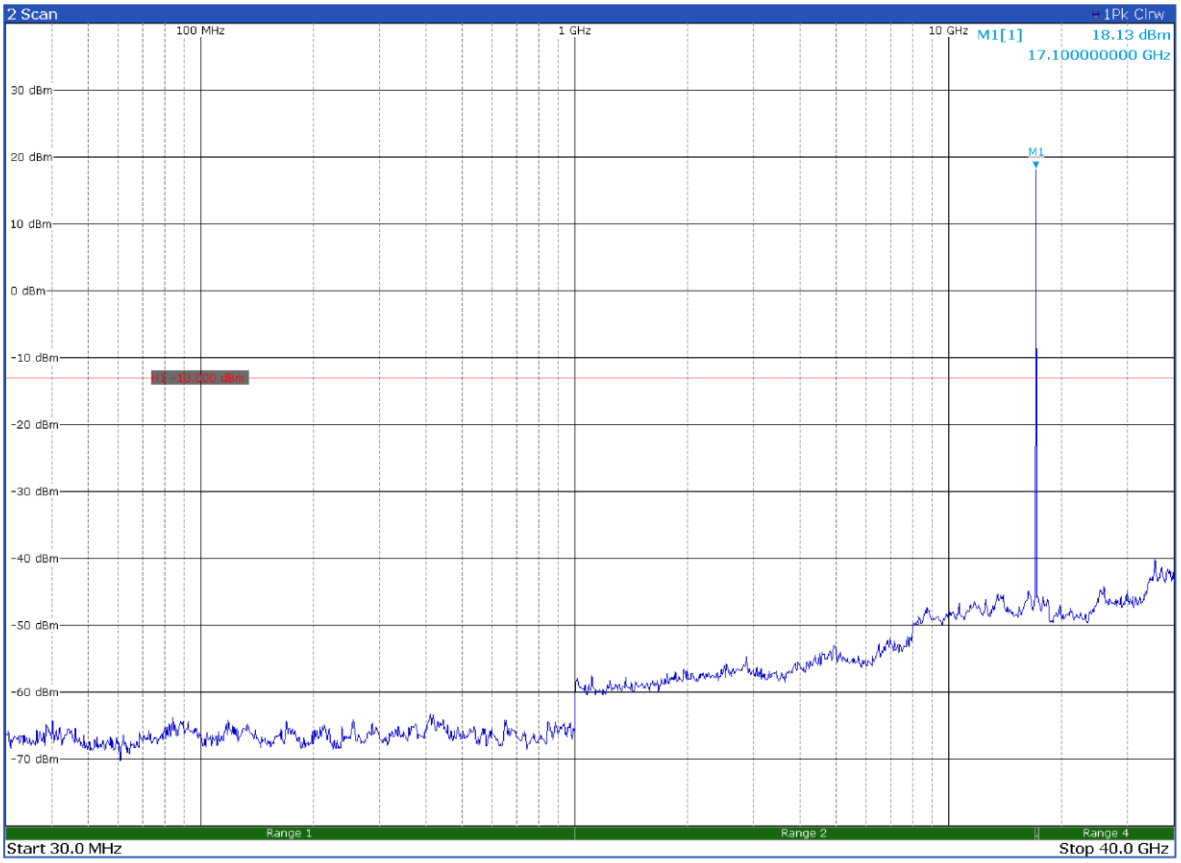
Conducted spurious emissions from 40 GHz to 60 GHz
Sweep, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



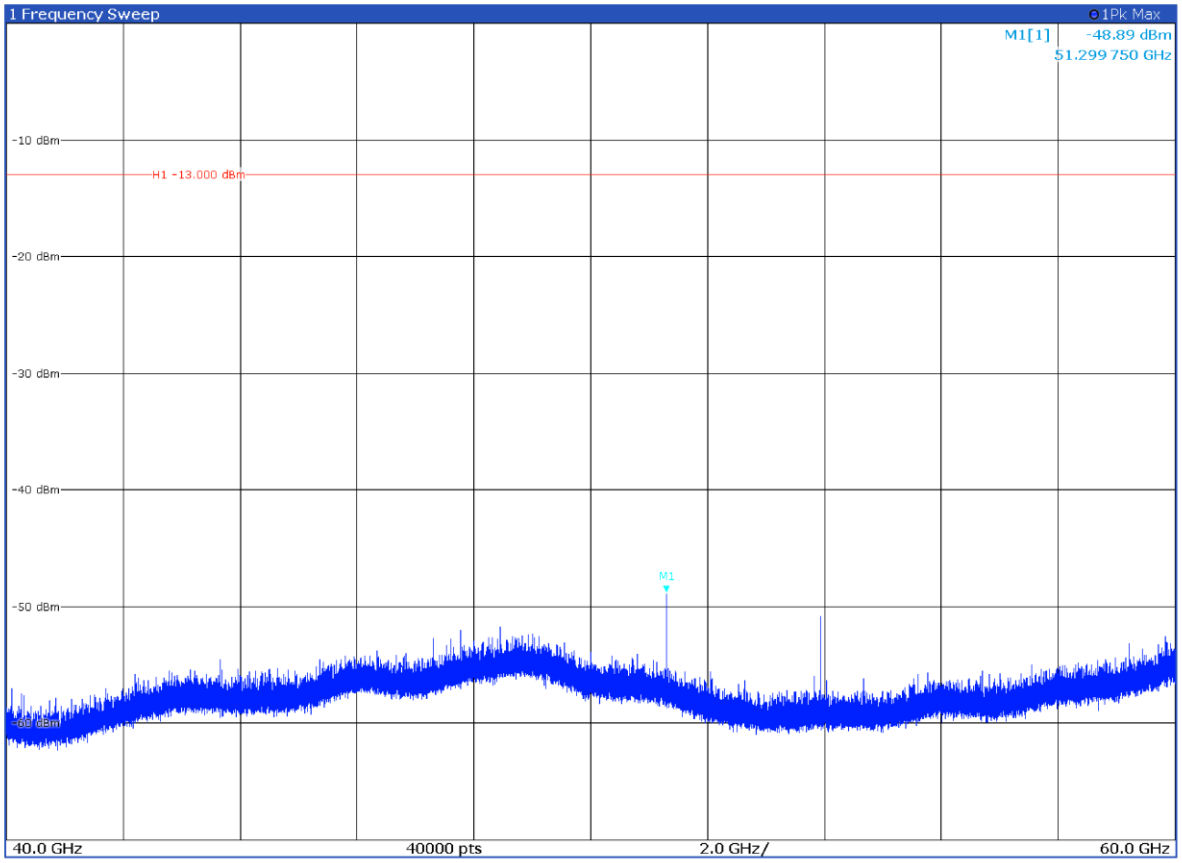
Conducted spurious emissions from 60 GHz to 90 GHz
Sweep, TX 1
Note: for MIMO operation the limit is 3 dB lower

Test data



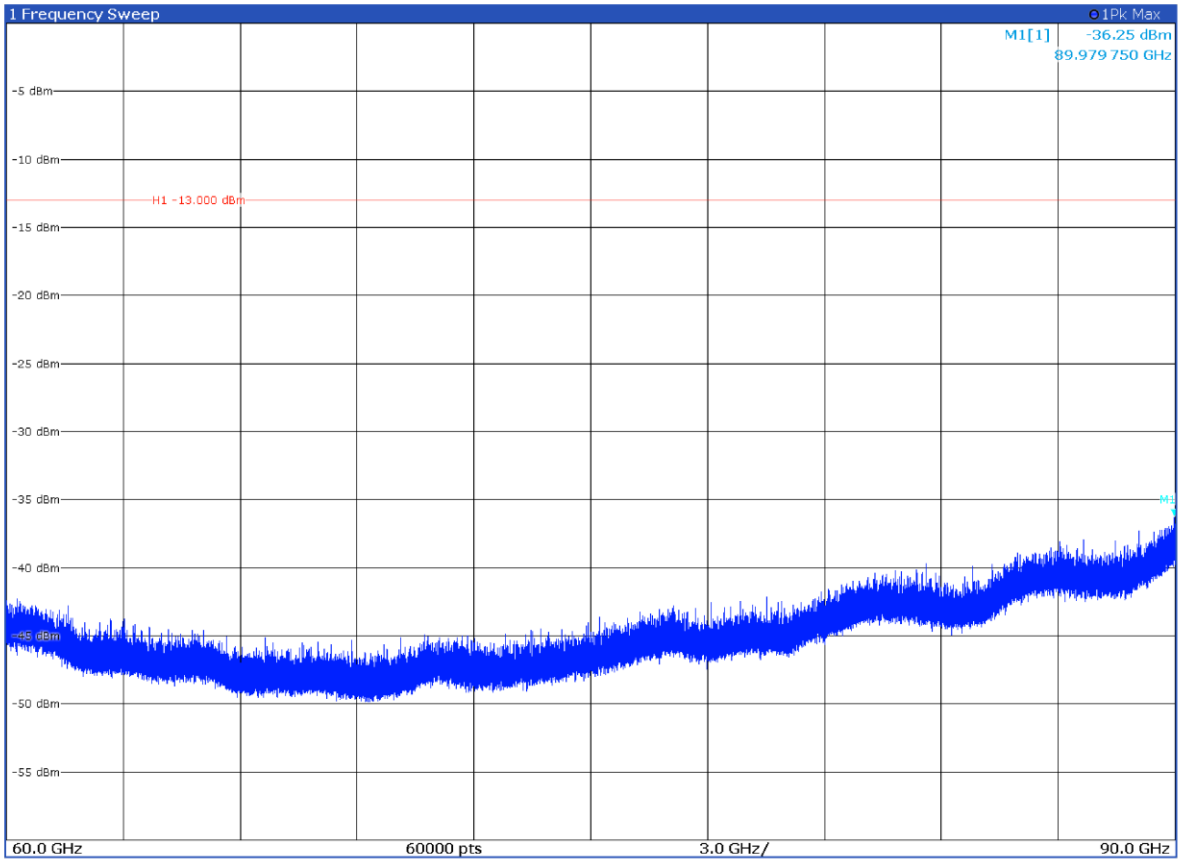
Conducted spurious emissions from 30 MHz to 40 GHz
Low channel, TX 2
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



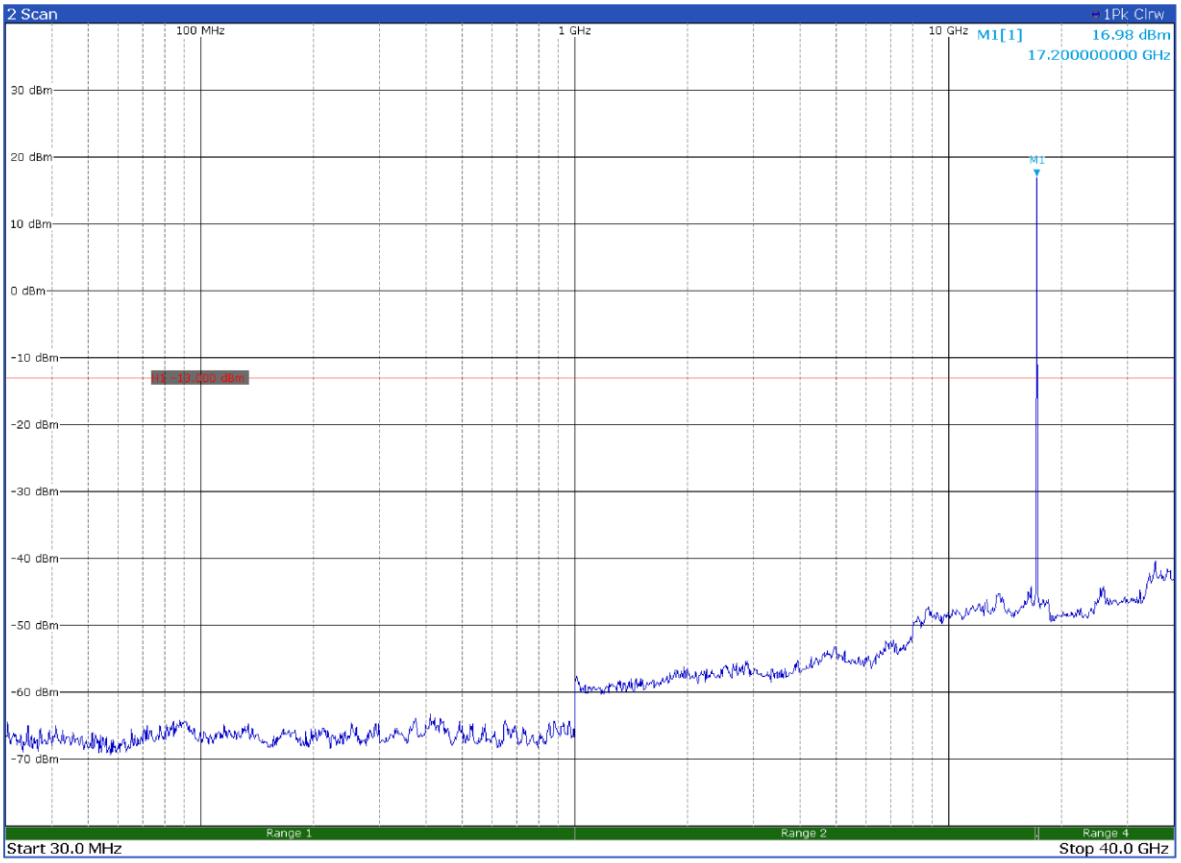
Conducted spurious emissions from 40 GHz to 60 GHz
Low channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



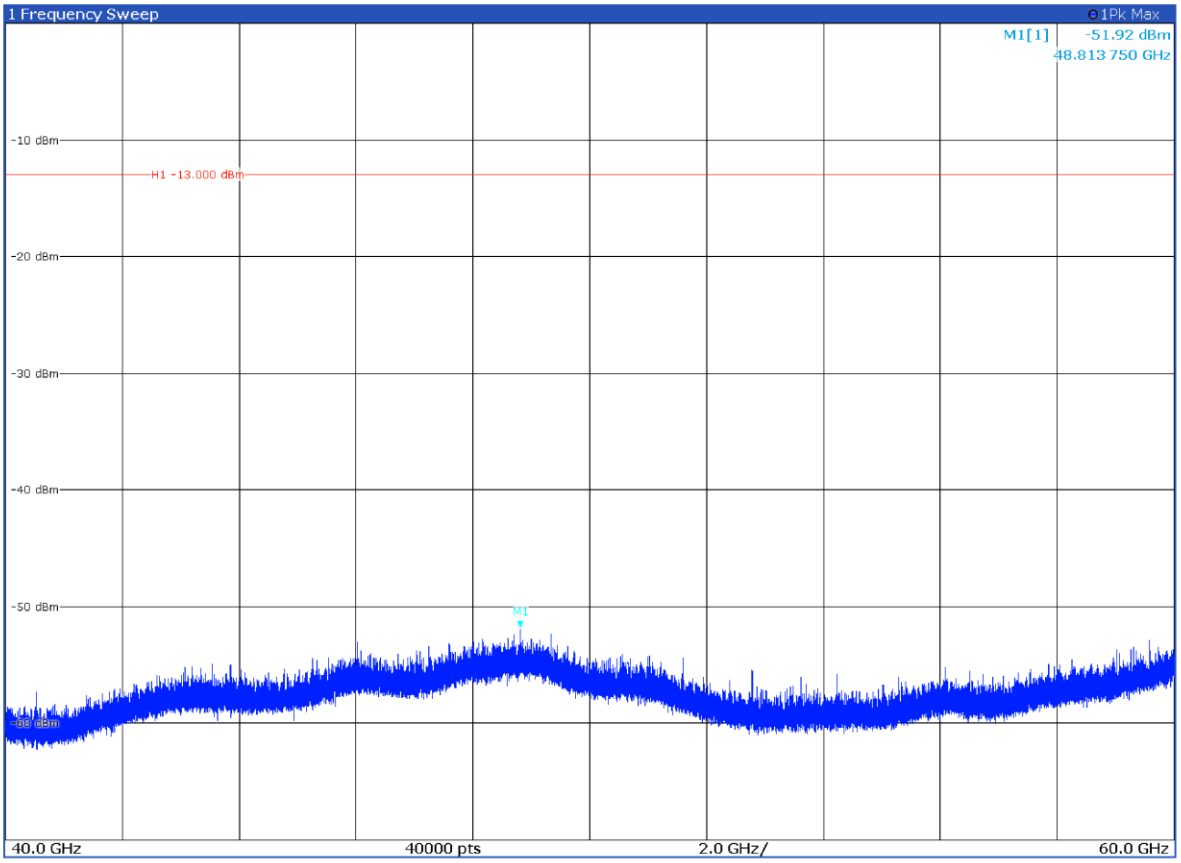
Conducted spurious emissions from 60 GHz to 90 GHz
Low channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



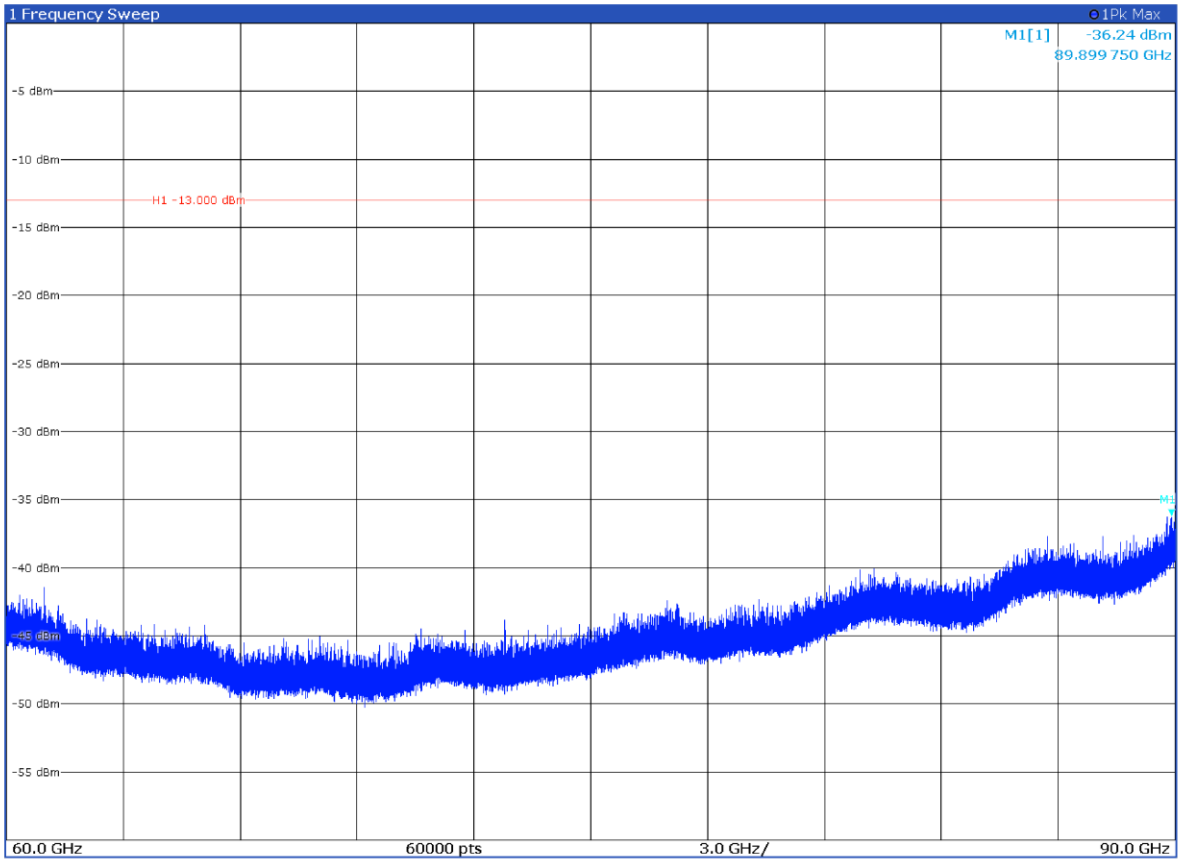
Conducted spurious emissions from 30 MHz to 40 GHz
Mid channel, TX 2
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



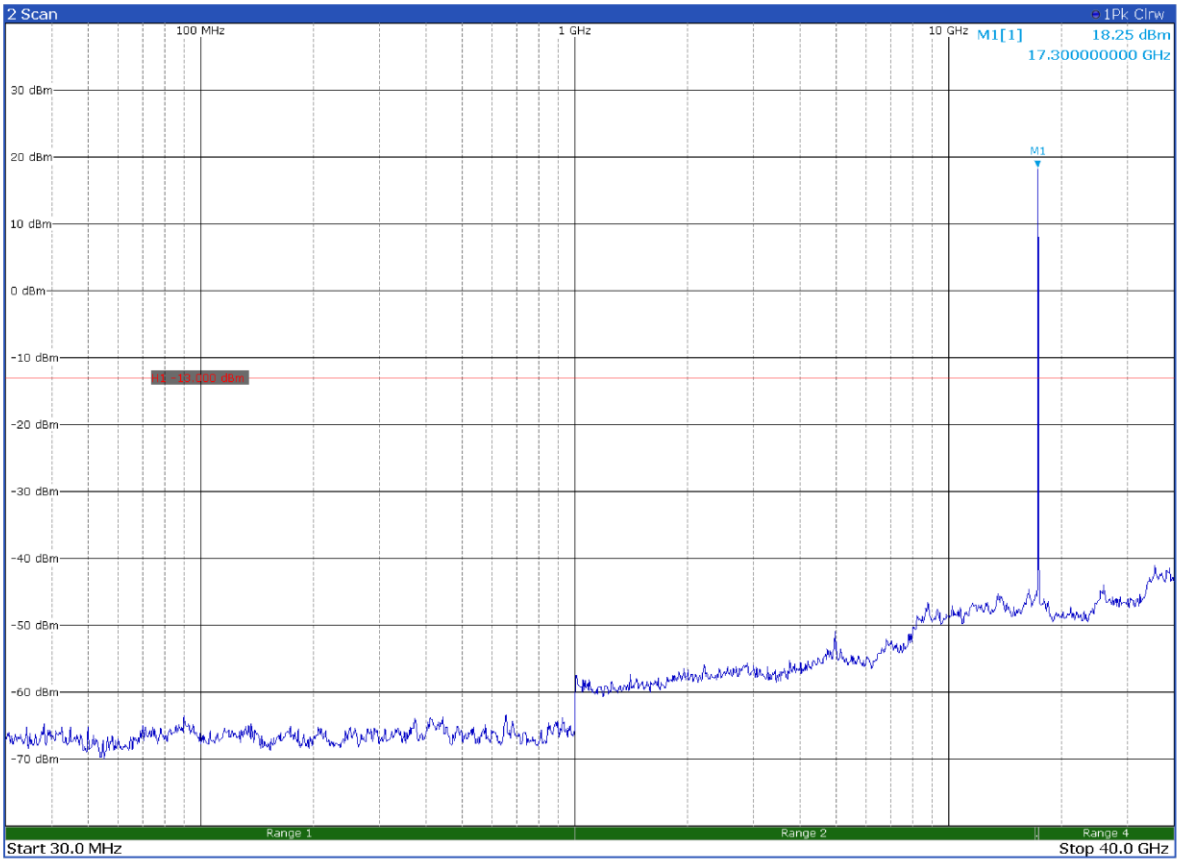
Conducted spurious emissions from 40 GHz to 60 GHz
Mid channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



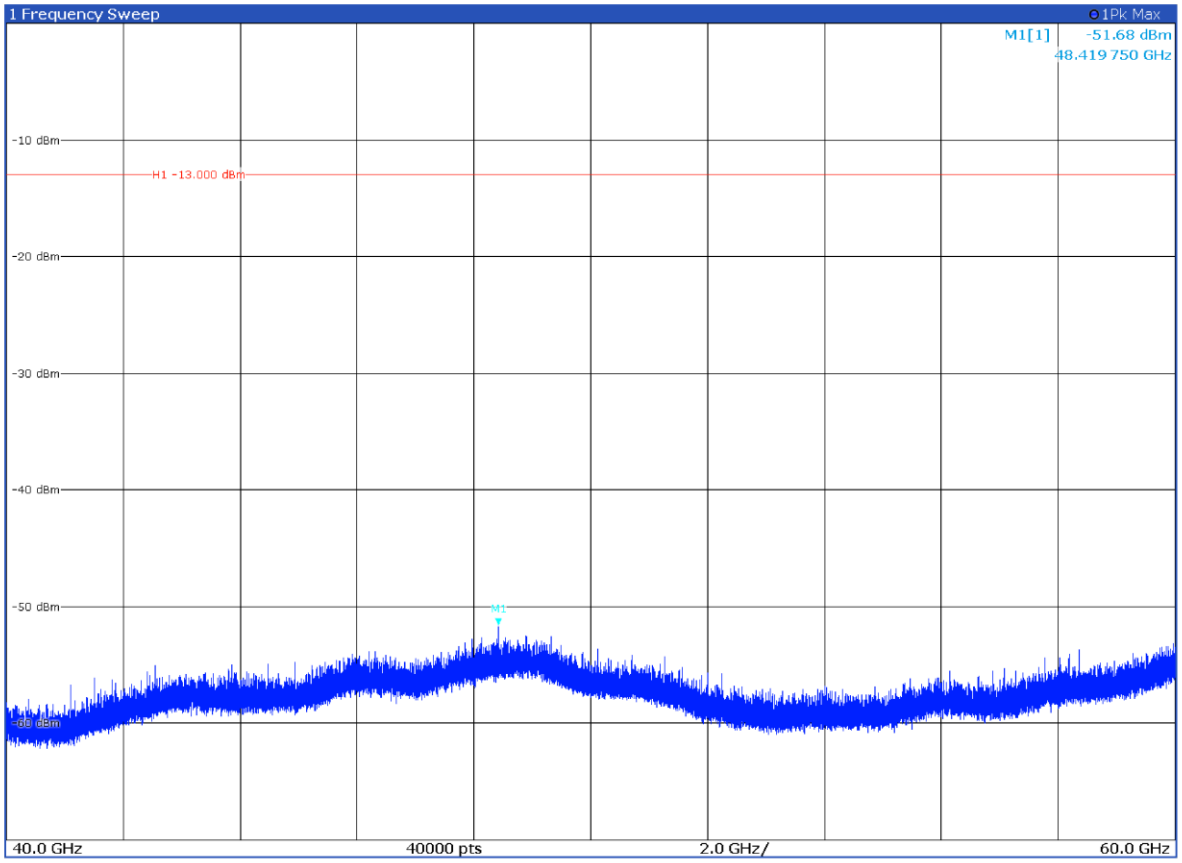
Conducted spurious emissions from 60 GHz to 90 GHz
Mid channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



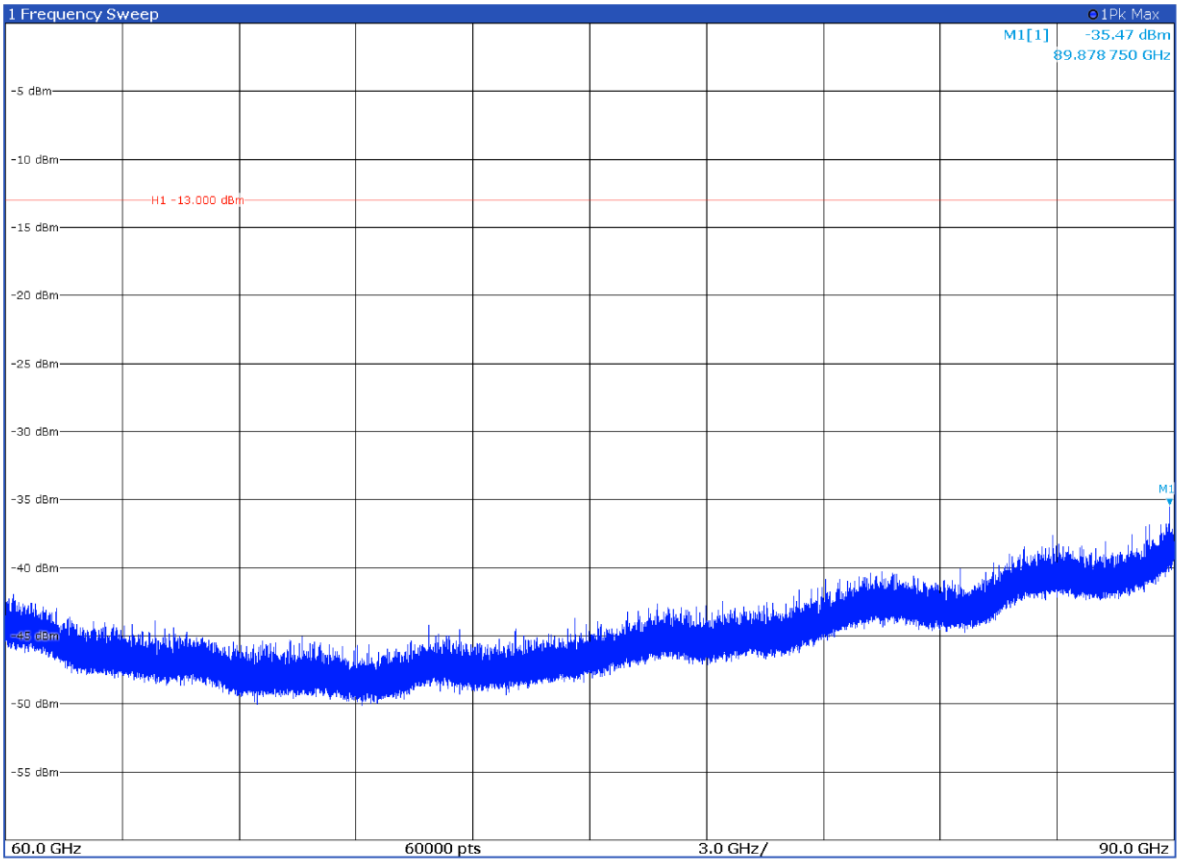
Conducted spurious emissions from 30 MHz to 40 GHz
High channel, TX 2
Limit exceeded by the carrier
Note: for MIMO operation the limit is 3 dB lower

Test data



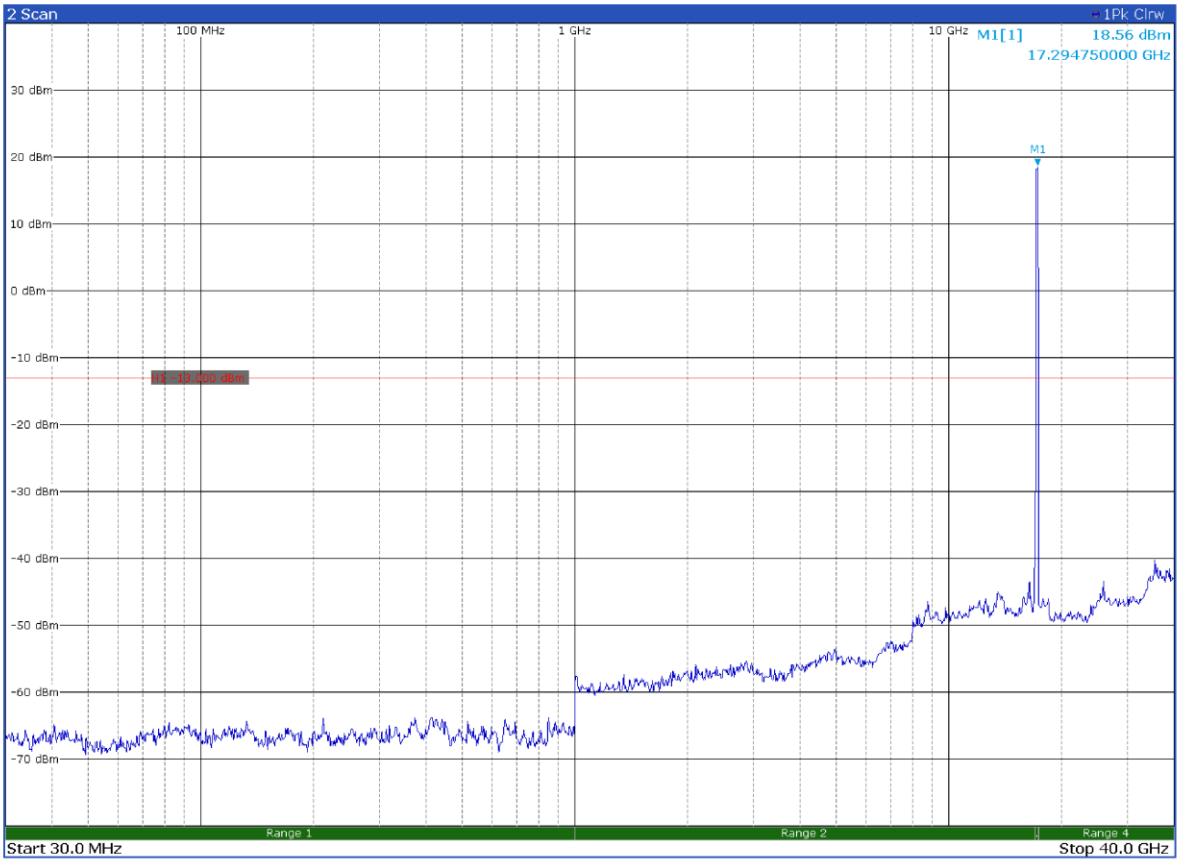
Conducted spurious emissions from 40 GHz to 60 GHz
High channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



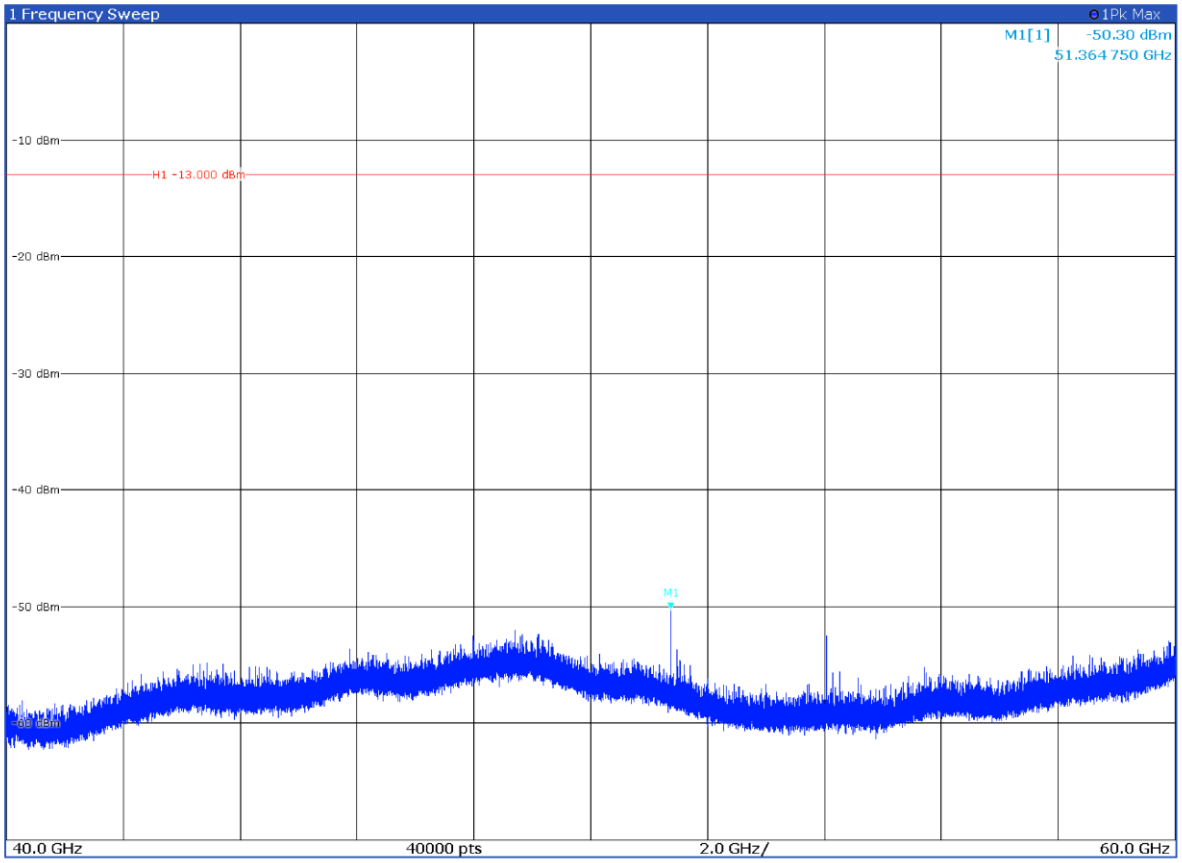
Conducted spurious emissions from 60 GHz to 90 GHz
High channel, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



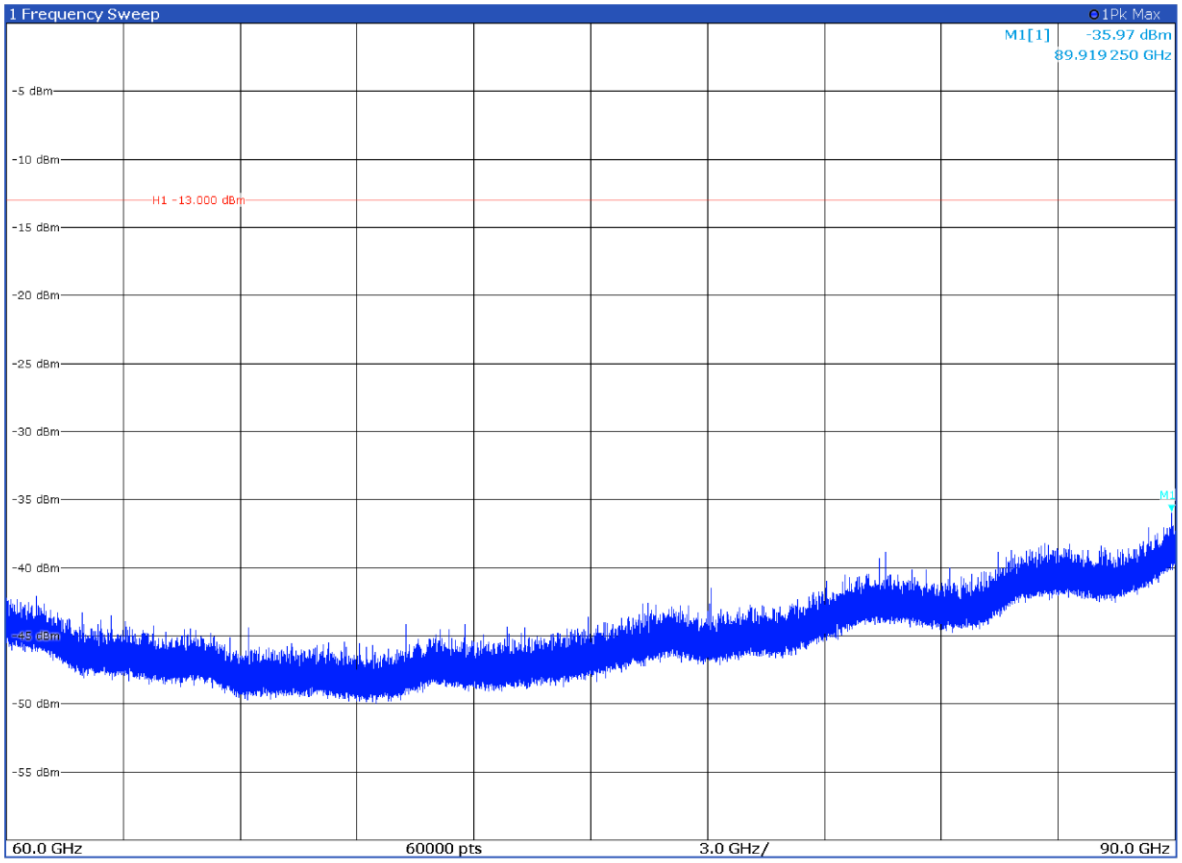
Conducted spurious emissions from 30 MHz to 40 GHz
Sweep, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



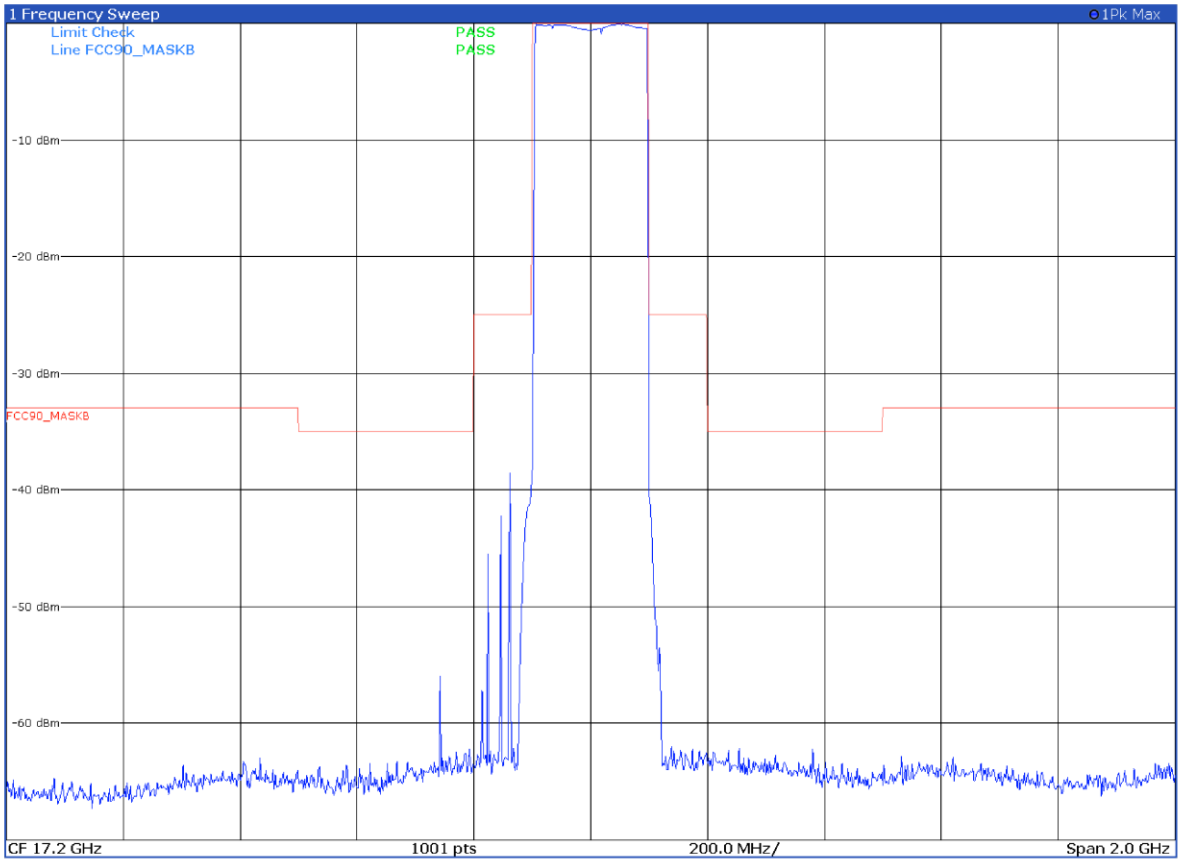
Conducted spurious emissions from 40 GHz to 60 GHz
Sweep, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



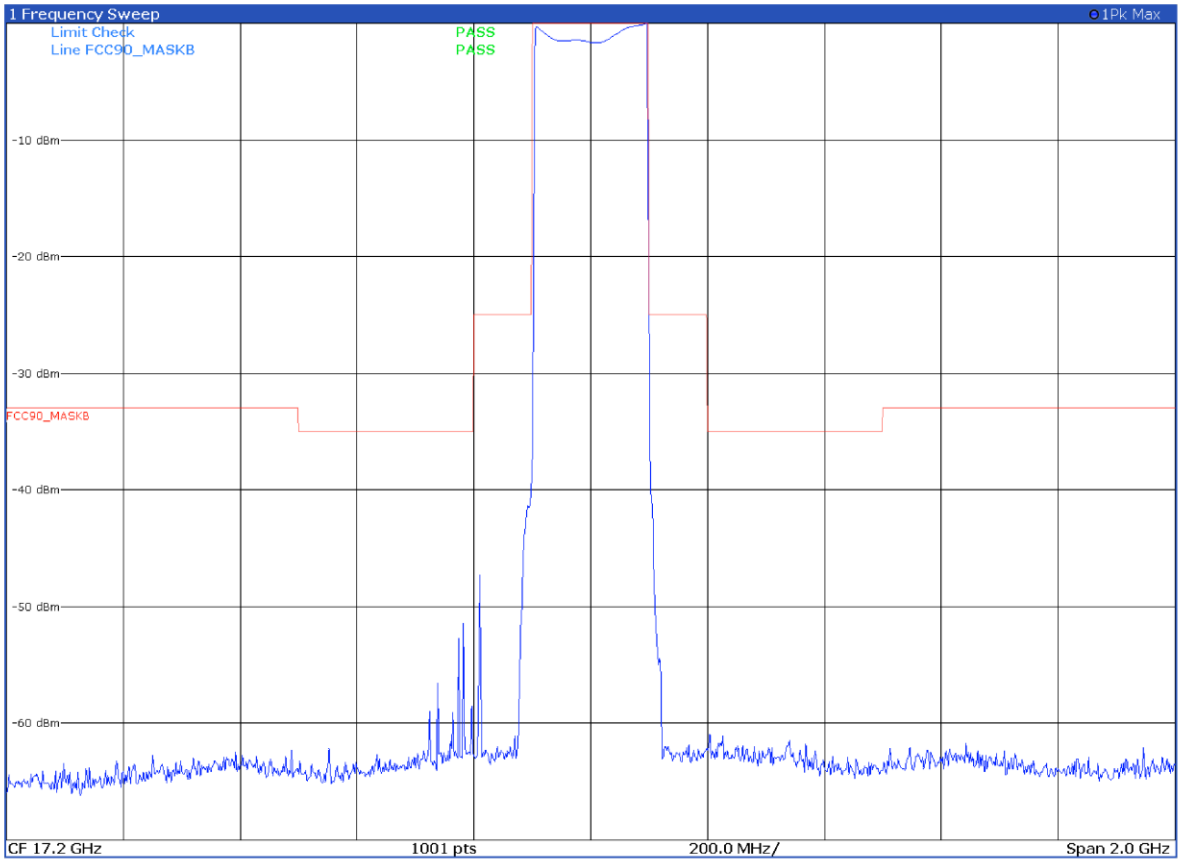
Conducted spurious emissions from 60 GHz to 90 GHz
Sweep, TX 2
Note: for MIMO operation the limit is 3 dB lower

Test data



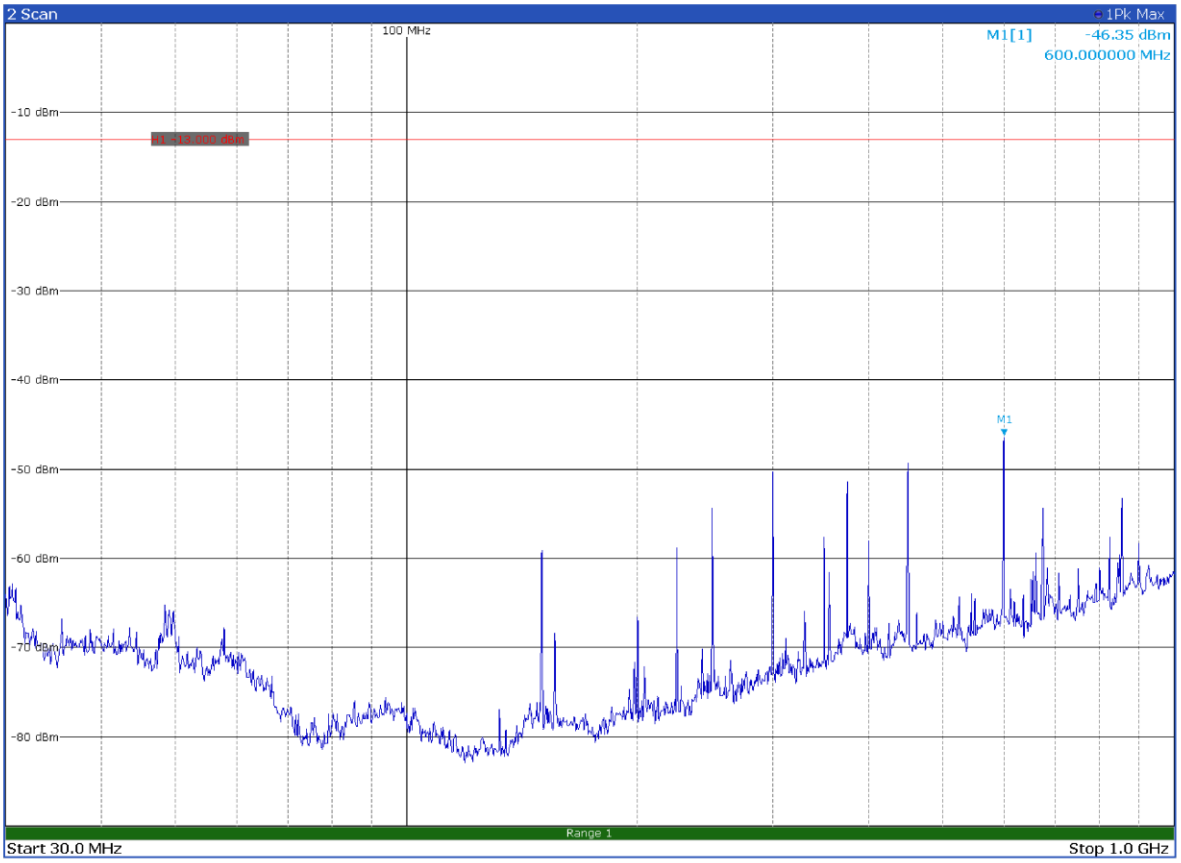
Emission Mask B
Sweep, TX 1

Test data



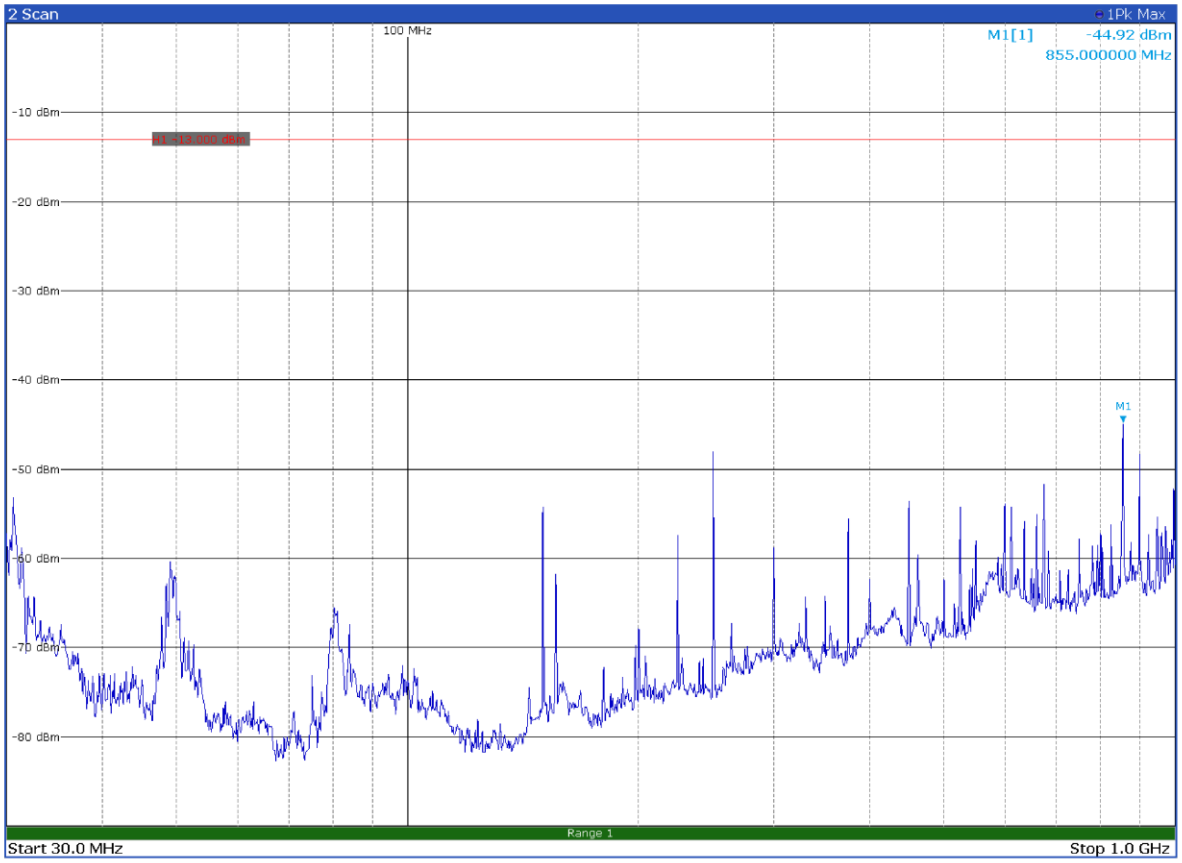
Emission Mask B
Sweep, TX 2

Test data



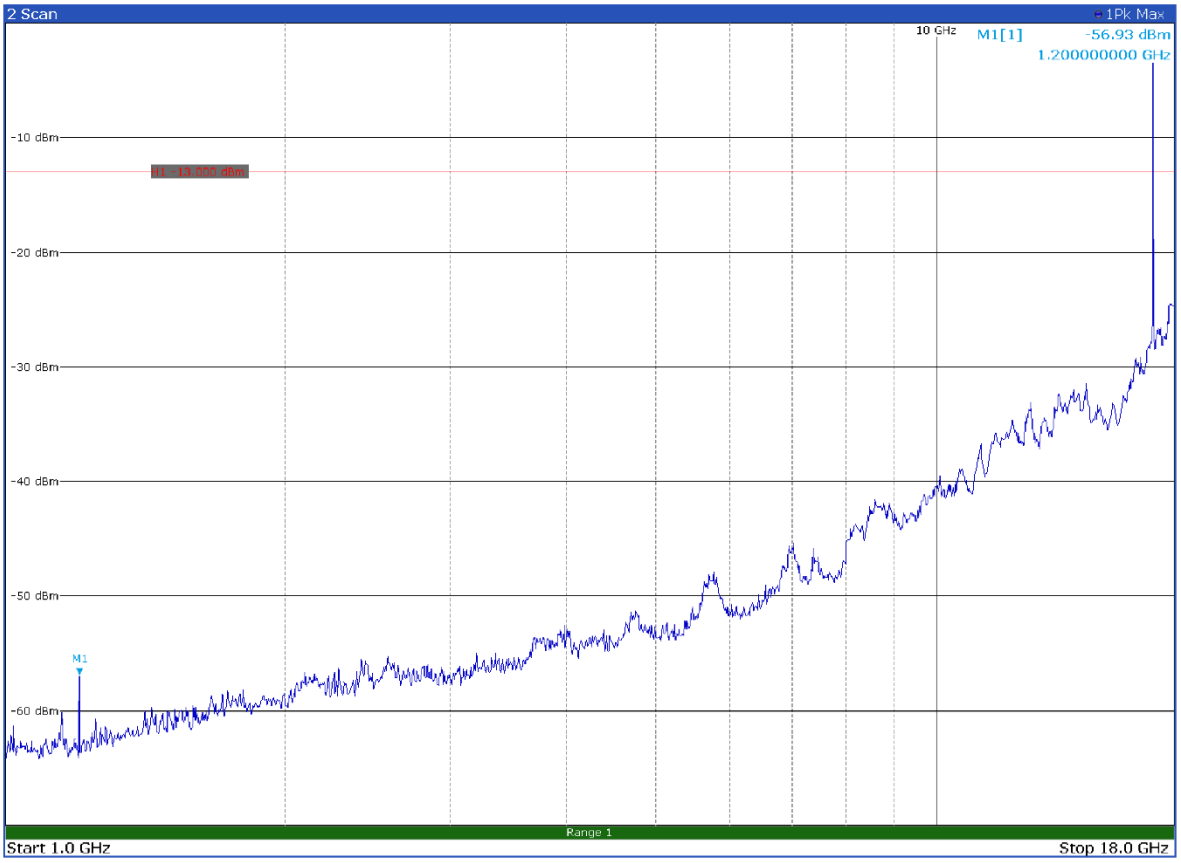
Radiated spurious emissions from 30 MHz to 1 GHz – Antenna in horizontal polarization
Low channel

Test data



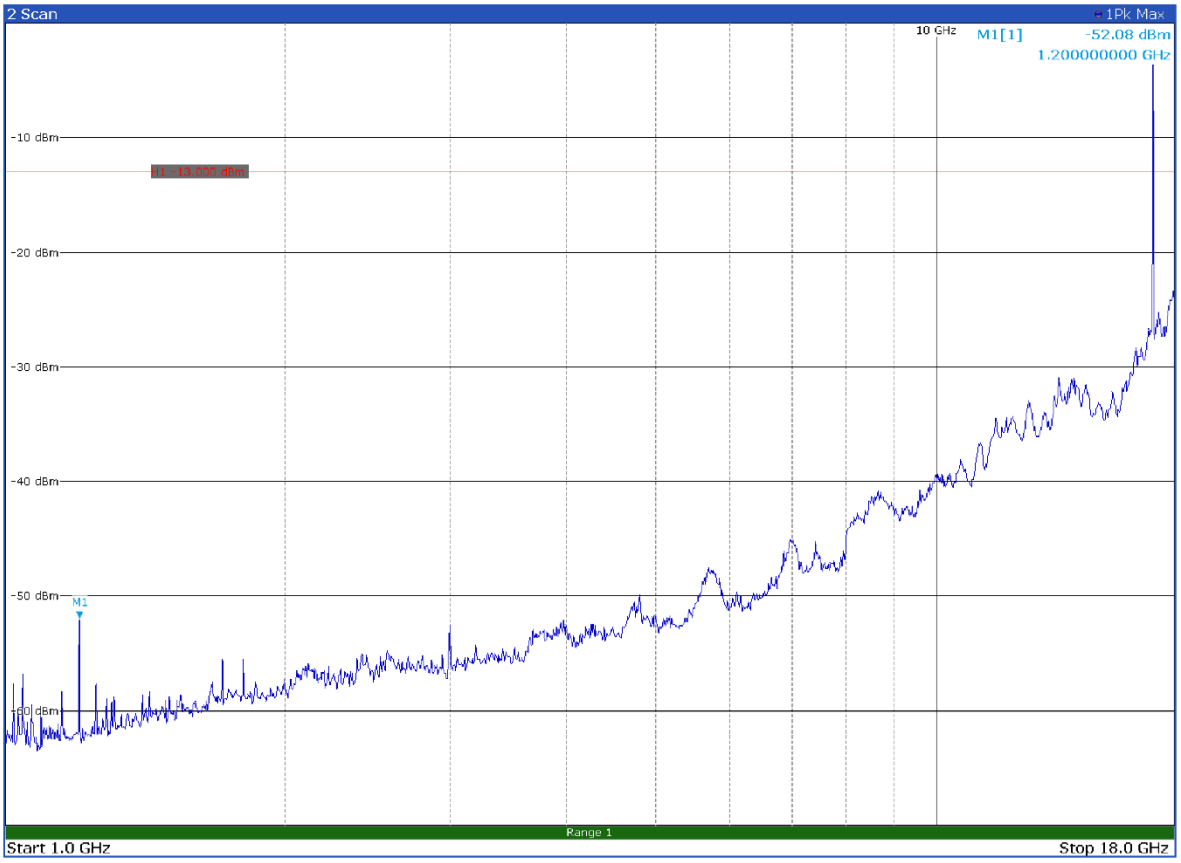
Radiated spurious emissions from 30 MHz to 1 GHz – Antenna in vertical polarization
Low channel

Test data



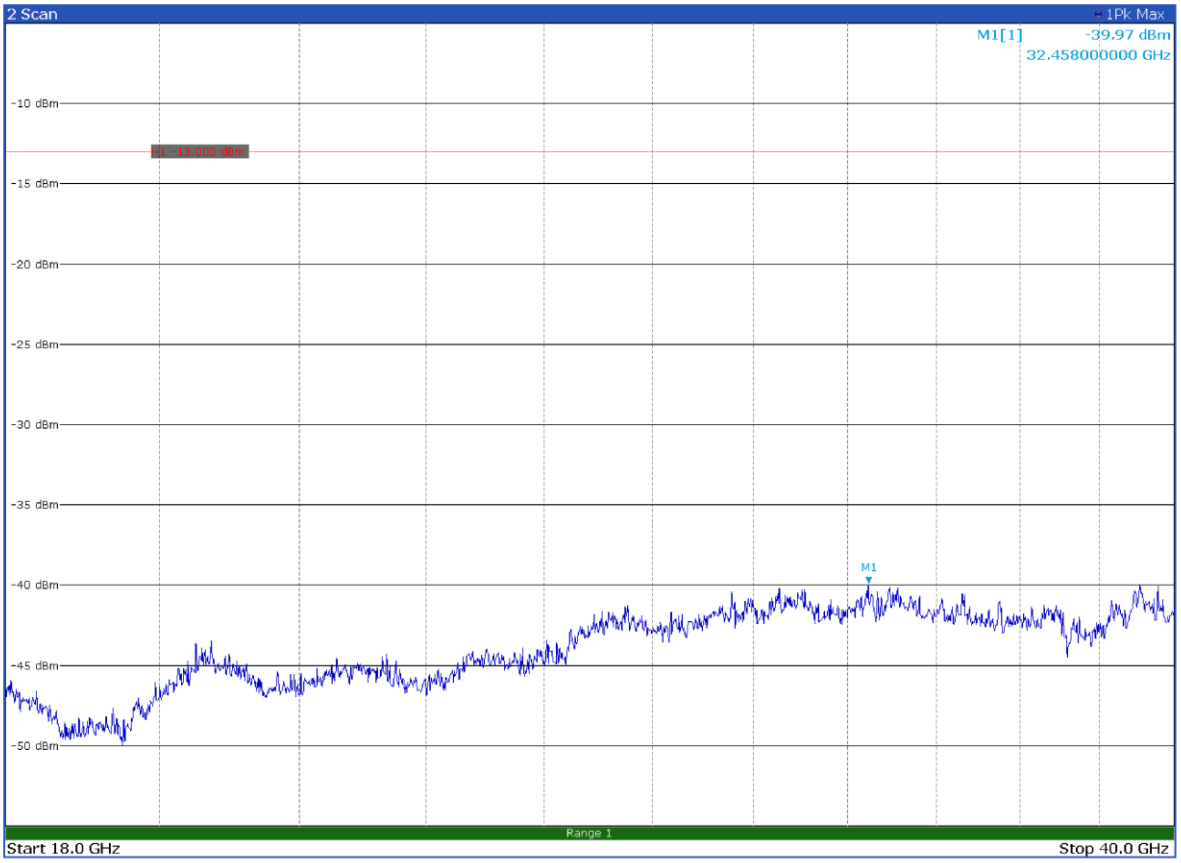
Radiated spurious emissions from 1 GHz to 18 GHz – Antenna in horizontal polarization
Low channel
Limit exceeded by the carrier

Test data



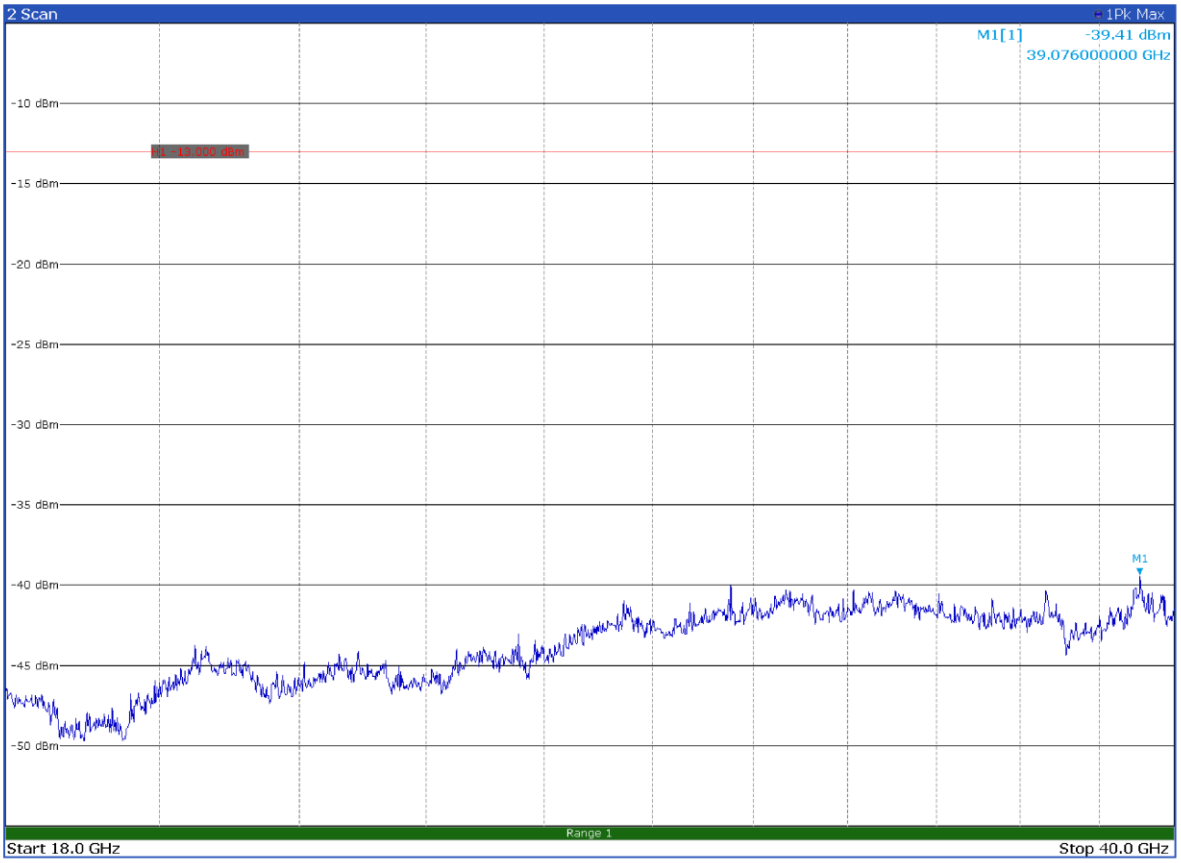
Radiated spurious emissions from 1 GHz to 18 GHz – Antenna in vertical polarization
Low channel
Limit exceeded by the carrier

Test data



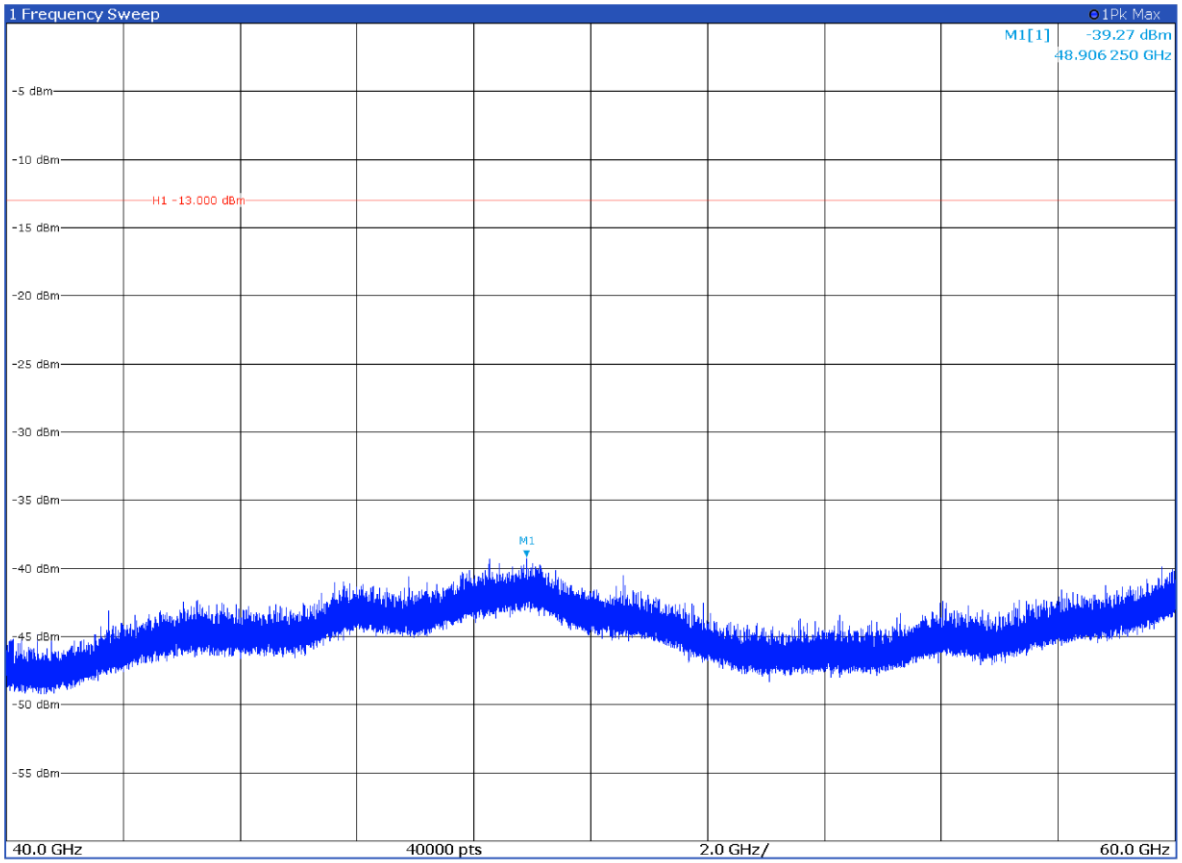
Radiated spurious emissions from 18 GHz to 40 GHz – Antenna in horizontal polarization
Low channel

Test data



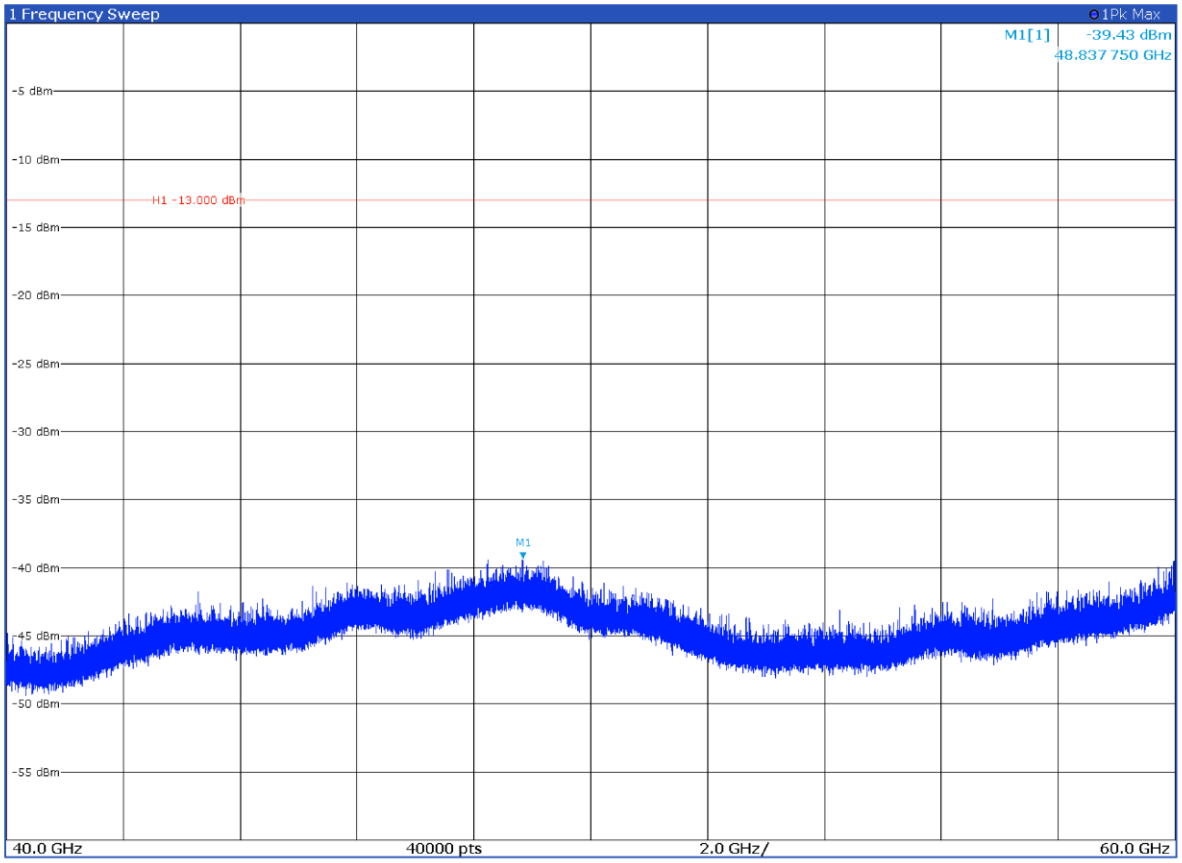
Radiated spurious emissions from 18 GHz to 40 GHz – Antenna in vertical polarization
Low channel

Test data



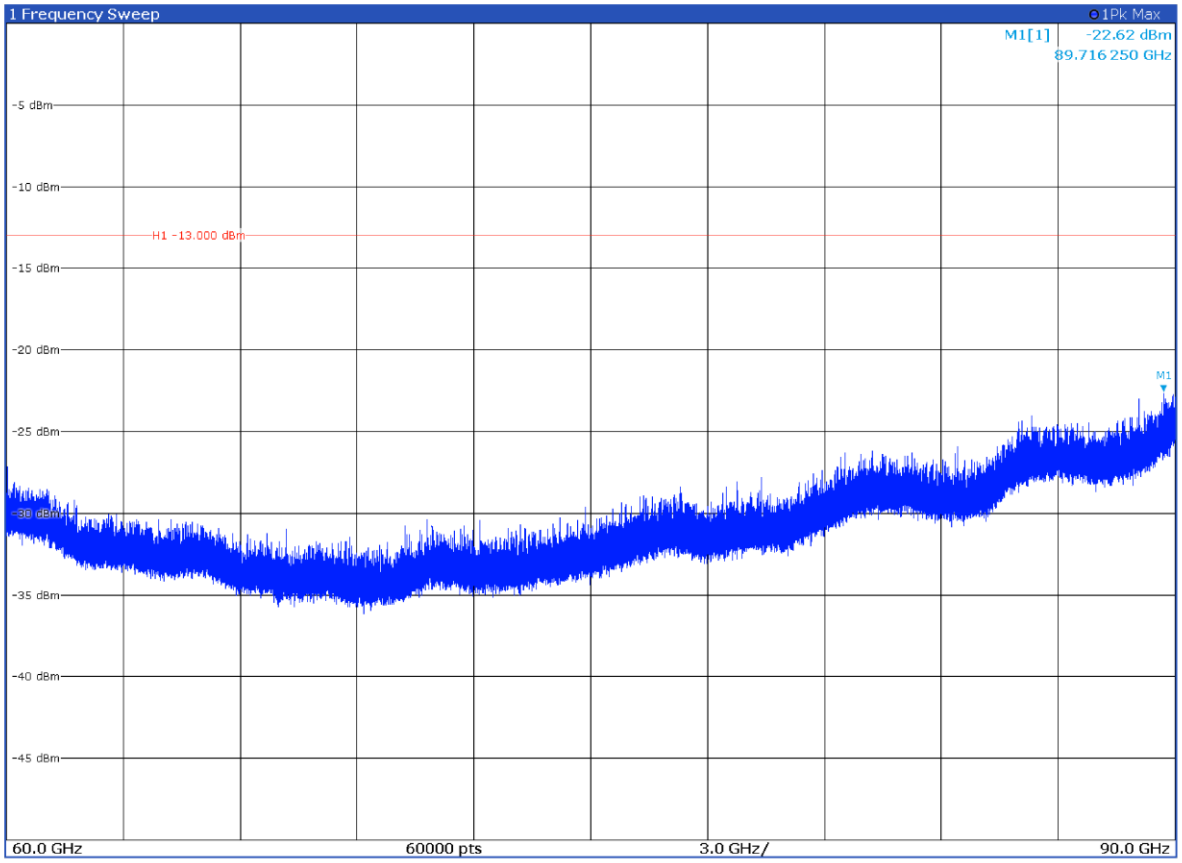
Radiated spurious emissions from 40 GHz to 60 GHz – Antenna in horizontal polarization
Low channel

Test data



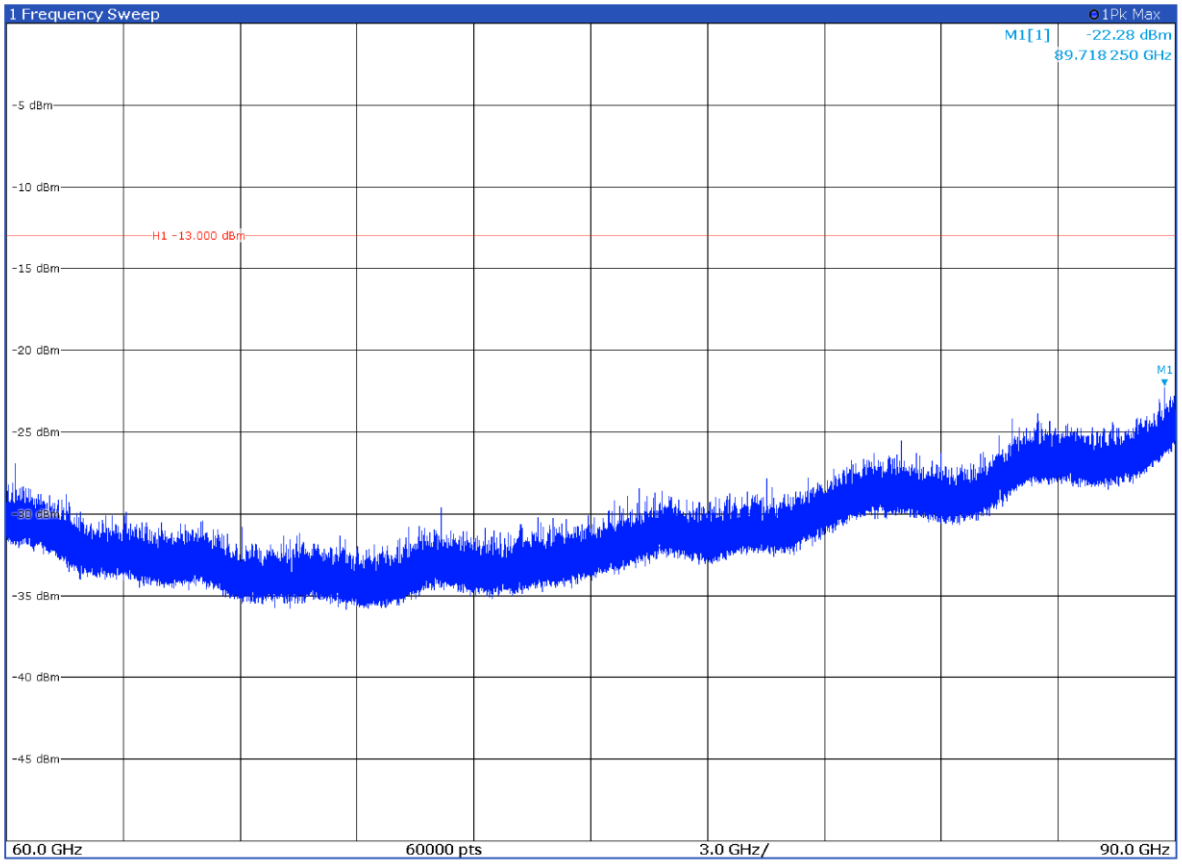
Radiated spurious emissions from 40 GHz to 60 GHz – Antenna in vertical polarization
Low channel

Test data



Radiated spurious emissions from 60 GHz to 90 GHz – Antenna in horizontal polarization
Low channel

Test data



Radiated spurious emissions from 60 GHz to 90 GHz – Antenna in vertical polarization
Low channel