

RADIO TEST REPORT – 452156-1TRFWL

Type of assessment:

Final product testing

Applicant:

IDS Georadar Srl

Via A. Righi, 1/2 – 56121 Pisa (PI) – Italy

Product:

System for real time detection of rockfall events

Model:

ROCKSPOT

Model variant(s):

--

FCC ID:

UFW-ROCKSPOT

Specifications:

- ◆ FCC 47 CFR Part 90, Subpart F

Date of issue: November 9, 2021

P. Barbieri

Tested by



Signature

D. Guarnone

Reviewed by



Signature



Lab locations

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Site number	682159 (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.

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 90, Subpart F	Radiolocation Service
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1.2 Test methods

ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
FCC 47 CFR Part 2, Subpart J	Equipment authorization procedures

1.3 Exclusions

None

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 1.3 above. 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 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Date of issue	Details of changes made to test report
452156-1TRFWL	November 9, 2021	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

There were no modifications performed to the EUT during this assessment.

2.2 Technical judgment

None

2.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

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.

The following instruments are used to monitor the environmental conditions:

Equipment	Manufacturer	Model no.	Asset no.	Cal date	Next cal.
Thermo-hygrometer data loggers	Testo	175-H2	20012380/305	2020-12	2022-12
Thermo-hygrometer data loggers	Testo	175-H2	38203337/703	2020-12	2022-12
Barometer	Castle	GPB 3300	072015	2021-04	2022-04

3.2 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 4 Measurement uncertainty

4.1 Uncertainty of measurement

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002.

The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

EUT	Type	Test	Range	Measurement Uncertainty	Notes
Transmitter	Conducted	Frequency error	0.001 MHz ÷ 40 GHz	0.08 ppm	(1)
		Carrier power RF Output Power	0.009 MHz ÷ 30 MHz	1.1 dB	(1)
			30 MHz ÷ 18 GHz	1.5 dB	(1)
			18 MHz ÷ 40 GHz	3.0 dB	(1)
			40 MHz ÷ 140 GHz	5.0 dB	(1)
		Adjacent channel power	1 MHz ÷ 18 GHz	1.4 dB	(1)
		Conducted spurious emissions	0.009 MHz ÷ 18 GHz	3.0 dB	(1)
			18 GHz ÷ 40 GHz	4.2 dB	(1)
			40 GHz ÷ 220 GHz	6.0 dB	(1)
		Intermodulation attenuation	1 MHz ÷ 18 GHz	2.2 dB	(1)
		Attack time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Attack time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Release time – frequency behaviour	1 MHz ÷ 18 GHz	2.0 ms	(1)
		Release time – power behaviour	1 MHz ÷ 18 GHz	2.5 ms	(1)
		Transient behaviour of the transmitter– Transient frequency behaviour	1 MHz ÷ 18 GHz	0.2 kHz	(1)
		Transient behaviour of the transmitter – Power level slope	1 MHz ÷ 18 GHz	9%	(1)
		Frequency deviation - Maximum permissible frequency deviation	0.001 MHz ÷ 18 GHz	1.3%	(1)
		Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz	0.001 MHz ÷ 18 GHz	0.5 dB	(1)
		Dwell time	-	3%	(1)
		Hopping Frequency Separation	0.01 MHz ÷ 18 GHz	1%	(1)
		Occupied Channel Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
		Modulation Bandwidth	0.01 MHz ÷ 18 GHz	2%	(1)
	Radiated	Radiated spurious emissions	0.009 MHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)
		Effective radiated power transmitter	10 kHz ÷ 26.5 GHz	6.0 dB	(1)
			26.5 GHz ÷ 66 GHz	8.0 dB	(1)
			66 GHz ÷ 220 GHz	10 dB	(1)

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %

Section 5 Information provided by the applicant

5.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

5.2 Applicant/Manufacture

Applicant name	IDS Georadar Srl
Applicant address	Via A. Righi, 1/2 – 56121 Pisa (PI) – Italy
Manufacture name	Same as applicant
Manufacture address	Same as applicant

5.3 EUT information

Product name	System for real time detection of rockfall events
Model	ROCKSPOT
Model variant(s)	--
Serial number	090-19-000073
Part number	887724
Power supply requirements	24 V DC from an external AC/DC adapter
Product description and theory of operation	The EUT is a remote sensing monitoring system, capable of detecting in real-time the occurrence of sudden falling of rocks, mudflows, avalanches or any similar falling event related to geological/environmental hazards hereinafter called Sudden Falling Event (in short SFE) and to provide corresponding real-time tracking. IDS GeoRadar stress out that RockSpot has not been designed as an automatic decision-making system; in fact, it has been designed for providing information and notification to the Decision Maker. Critical decisions about reactive measures to be taken with reference to sudden falling event related to geologic hazard must be taken by the Decision Maker under his exclusive responsibility.

5.4 Technical information

Frequency band	10.4 GHz – 10.5 GHz
Frequency Min	10.402 GHz for sub-band 1 / 10.448 GHz for sub-band 2 / 10.406 GHz for sub-band 3
Frequency Max	10.446 GHz for sub-band 1 / 10.492 GHz for sub-band 2 / 10.488 GHz for sub-band 3
Channel numbers	N/A
RF power Max (W), Conducted	1.175 W (30.7 dBm)
Field strength, dBμV/m @ 3 m	N/A
Measured BW (kHz), 99% OBW	46.6 MHz for sub-band 1 / 46.5 MHz for sub-band 2 / 81.6 for sub-band 3
Type of modulation	FMCW
Emission classification	46M6F1D for sub-band 1 / 46M5F1D for sub-band 2 / 81M6F1D for sub-band 3
Transmitter spurious, dBm @ 3 m	-17.9 dBm @ 10.09 GHz
Antenna information	Integral antenna with 9 dBi gain

5.5 EUT setup details

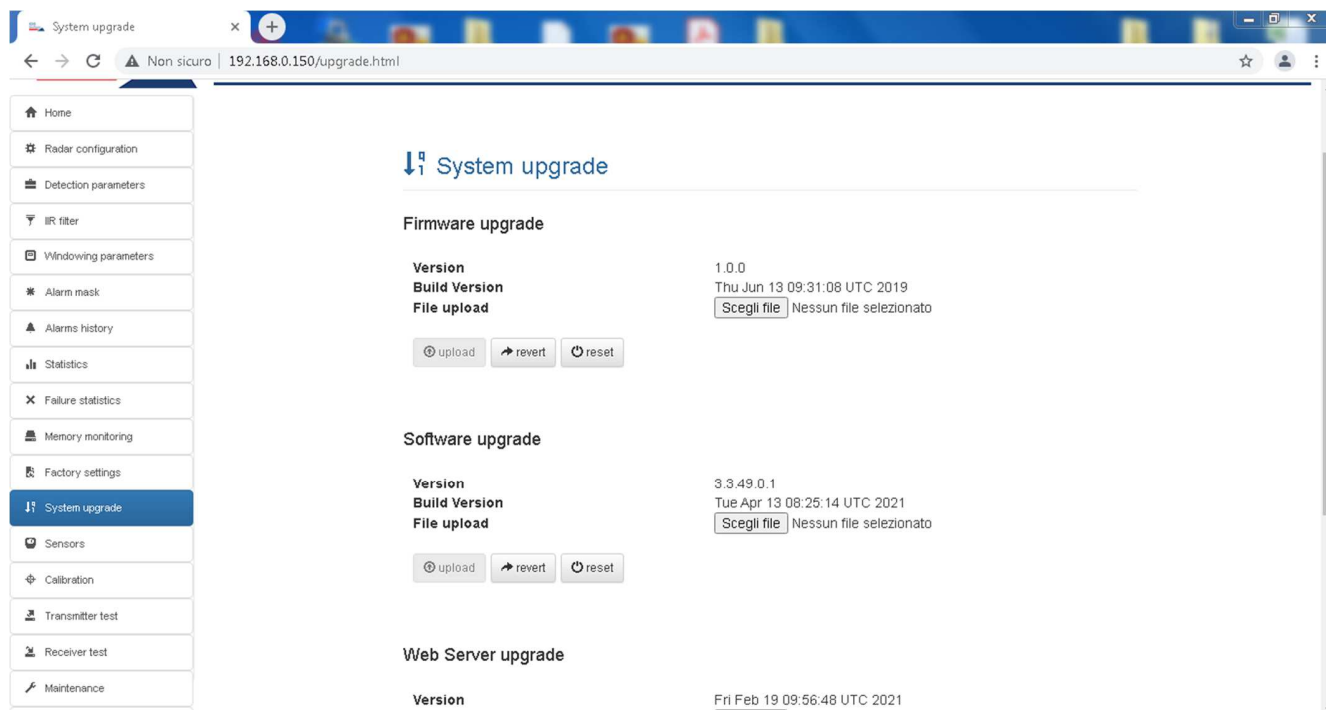
5.5.1 Radio exercise details

The EUT has been forced in CW and FMCW continuous transmission mode with the following dedicated software accessible with a chrome browser:

The screenshot shows a web browser window with the address bar displaying "192.168.0.150/maintenance.html". The page title is "Maintenance". On the left, there is a sidebar menu with various options: Home, Radar configuration, Detection parameters, IIR filter, Windowing parameters, Alarm mask, Alarms history, Statistics, Failure statistics, Memory monitoring, Factory settings, System upgrade, Sensors, Calibration, Transmitter test, Receiver test, and Maintenance (which is highlighted). The main content area is titled "Maintenance" and contains several configuration sections:

- RF status bits:** A list of parameters with dropdown menus:
 - SYNT: OFF
 - HPA: ON
 - SWCAL: 50Q
 - SWRX1: ANT
 - SWRX2: ANT
 - SWRX3: ANT
 - SWRX4: ANT
- DDS:**
 - DDS selector: CW
 - CW freq.: 362.20 MHz
 - FMCW start freq.: 350.52 MHz
 - FMCW band: 10 MHz
 - FMCW duration: 64 μs
- Others:**
 - HPF: ☒
 - TXGC: 500
 - RXGC: 7

An "Apply" button is located at the bottom of the configuration area.



5.5.2 EUT setup configuration

Table 5.5-1: EUT sub assemblies

Description	Brand name	Model, Part number, Serial number, Revision level
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The EUT is composed by a single unit

Table 5.5-2: EUT interface ports

Description	Qty.
DC Power Port	1
Ethernet line	2

Table 5.5-3: Support equipment

Description	Brand name	Model, Part number, Serial number, Revision level
AC/DC adapter	Mean Well	GST120a20-JD
Notebook	Packard Bell	EasyNote TS

Table 5.5-4: Inter-connection cables

Cable description	From	To	Length (m)
DC power cable	Adapter	EUT	1.5
Ethernet line	EUT	PC	2.7

EUT setup configuration, continued

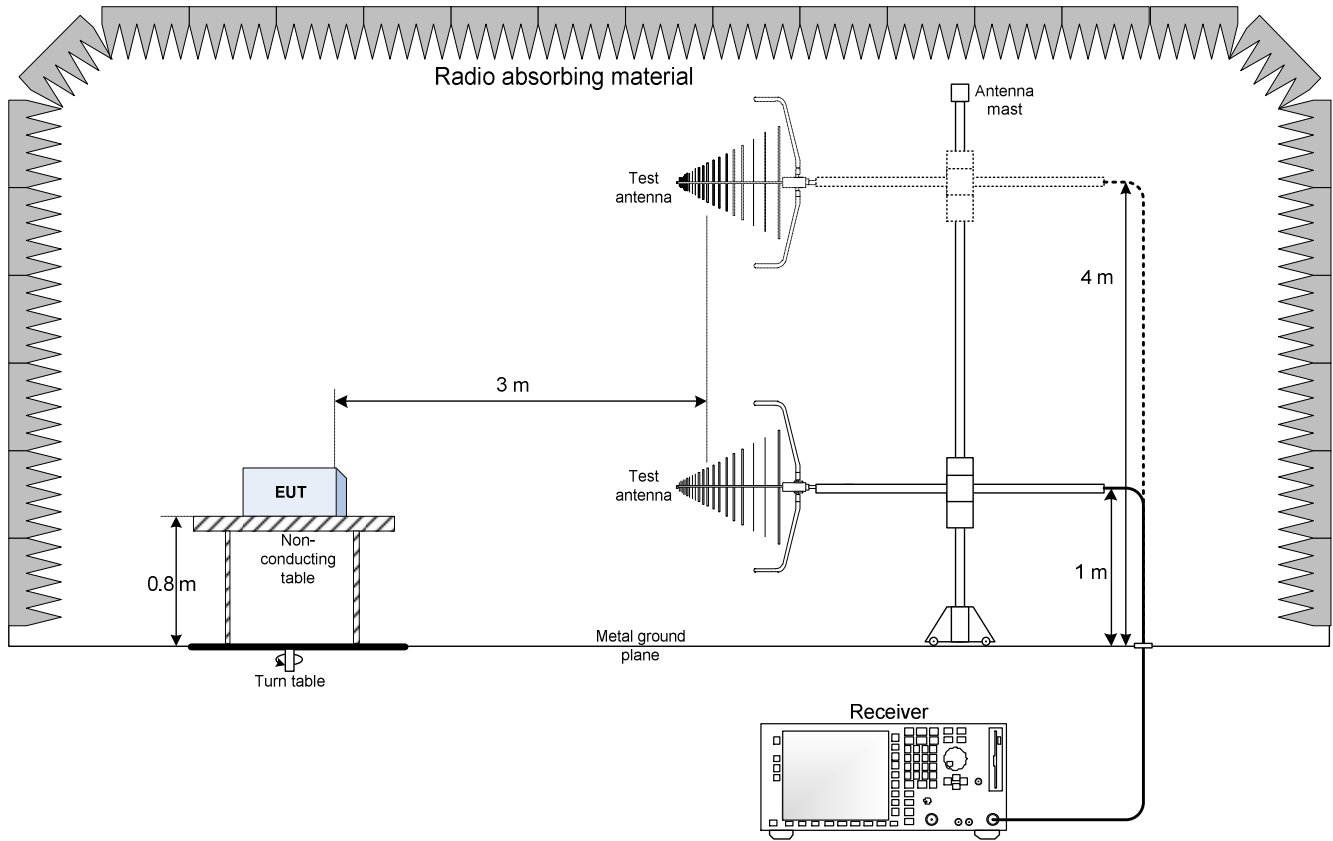


Figure 5.5-1: Radiated testing below 1 GHz block diagram

EUT setup configuration, continued

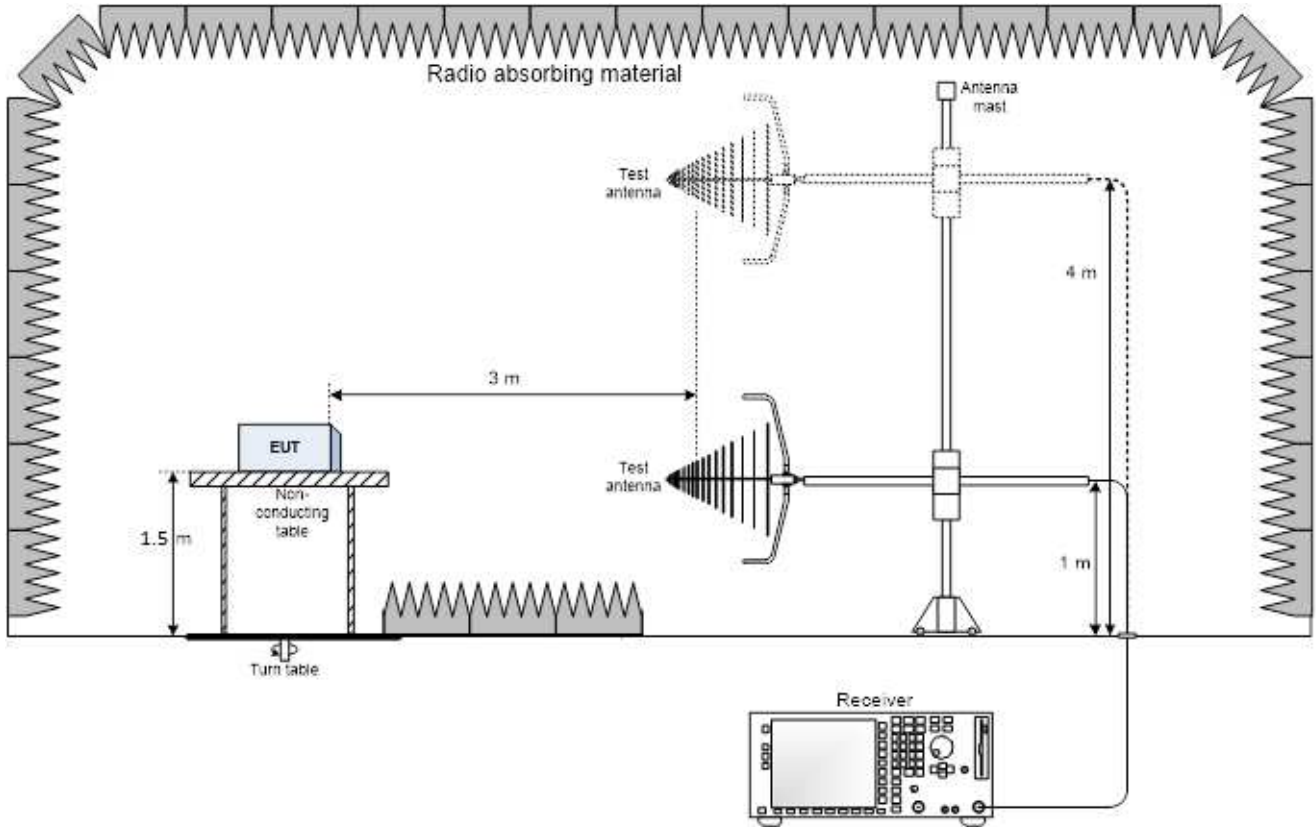


Figure 5.5-2: Radiated testing above 1 GHz block diagram

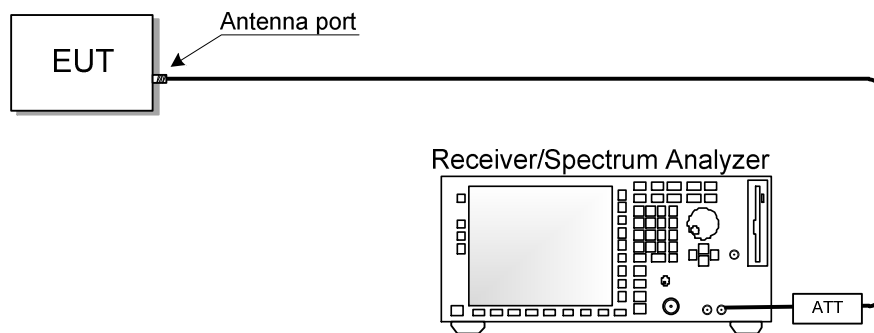


Figure 5.5-3: Antenna port testing block diagram

Section 6 Summary of test results

6.1 Testing location

Test location (s)	Nemko Spa
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6.2 Testing period

Test start date	November 3, 2021	Test end date	November 9, 2021
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6.3 Sample information

Receipt date	November 2, 2021	Nemko sample ID number(s)	4521560001
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6.4 FCC Part 2 and 90 Subpart F test requirements results

Table 6.4-1: FCC requirements results

Section	Method (clause)	Test description	Verdict
90.103(b) / 90.205(r)	ANSI C63.26 (5.2.7)	RF power output	Pass
90.103(b)	ANSI C63.26 (5.4.4)	Occupied bandwidth	Pass
90.210(c)(3)	ANSI C63.26 (5.7)	Spurious emissions at antenna terminals (conducted)	Pass
90.210(c)(3)	ANSI C63.26 (5.5)	Field strength of spurious radiation	Pass
90.213	ANSI C63.26 (5.6)	Frequency stability	Pass

Notes: --

Section 7 Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767	2021-01	2022-01
EMI Receiver	Rohde & Schwarz	ESW44	101620	2021-08	2022-08
Climatic Chamber	MSL	EC500DA	15022	2021-01	2022-01
Antenna Trilog 25MHz - 8GHz	Schwarzbeck Mess-Elektronik	VULB9162	9162-025	2021-07	2024-07
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
Horn Antenna	A.H.System Inc.	SAS-574	558	2020-01	2023-01
Horn Antenna	Sage	SAR-2507-19VF-R2	15715-01	2021-06	2024-06
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121	2021-01	2022-01
Broadband Bench Top Amplifier	Sage	STB-1834034030-KFKF-L1	18490-01	2021-04	2022-04
Harmonic Mixer	Radiometer Physics	FS-Z60	100988	2021-01	2024-01
Controller	Maturo	FCU3.0	10041	NCR	NCR
Tilt antenna mast	Maturo	TAM4.0-E	10042	NCR	NCR
Turntable	Maturo	TT4.0-5T	2.527	NCR	NCR
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530	2021-09	2023-09
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767	2021-01	2022-01

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

Section 8 Testing data

8.1 RF power output

8.1.1 References, definitions and limits

FCC §90.205:

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.

FCC §90.103:

- (b) Frequencies available. The following table indicates frequencies available for assignment to stations in the Radiolocation Service, together with the class of station(s) to which they are normally assigned, and the specific assignment limitations, which are explained in paragraph (c) of this section:

Frequency or band	Class of station(s)	Limitation
10000 to 10500 MHzdo	12, 13, 19

- (12) This frequency is shared with and is on a secondary basis to the Government Radiolocation Service.
 (13) Operations in this band are limited to survey operations using transmitters with a peak power not to exceed 5 watts into the antenna.
 (19) Operations in this band are on a secondary basis to the Amateur Radio Service (part 97). Pulsed emissions are prohibited.

8.1.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	November 5, 2021

8.1.3 Observations, settings and special notes

Test performed with a CW signal at 10.45 GHz.

Spectrum analyzer settings:

Resolution bandwidth	≥ OBW
Video bandwidth	≥ 3 × RBW
Frequency span	≥ 2 × OBW
Detector mode	Peak
Trace mode	Max Hold

8.1.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
EMI Receiver	Rohde & Schwarz	ESW44	101620
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152
Controller	Maturo	FCU3.0	10041
Tilt antenna mast	Maturo	TAM4.0-E	10042
Turntable	Maturo	TT4.0-ST	2.527
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767

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



8.1.5 Test data

Table 8.1-1: Transmitter power results for FCC

Modulation	Frequency, MHz	EIRP, dBm	Antenna gain, dBi	Output power, dBm	Output power, W	Limit, W
CW	10450	39.7	9	30.7	1.175	5

$$\text{RF output power} = \text{EIRP} - \text{Antenna gain} = 39.7 \text{ dBm} - 9 \text{ dB} = 30.7 \text{ dBm} = 1.175 \text{ W} < 5 \text{ W}$$

Test data, continued

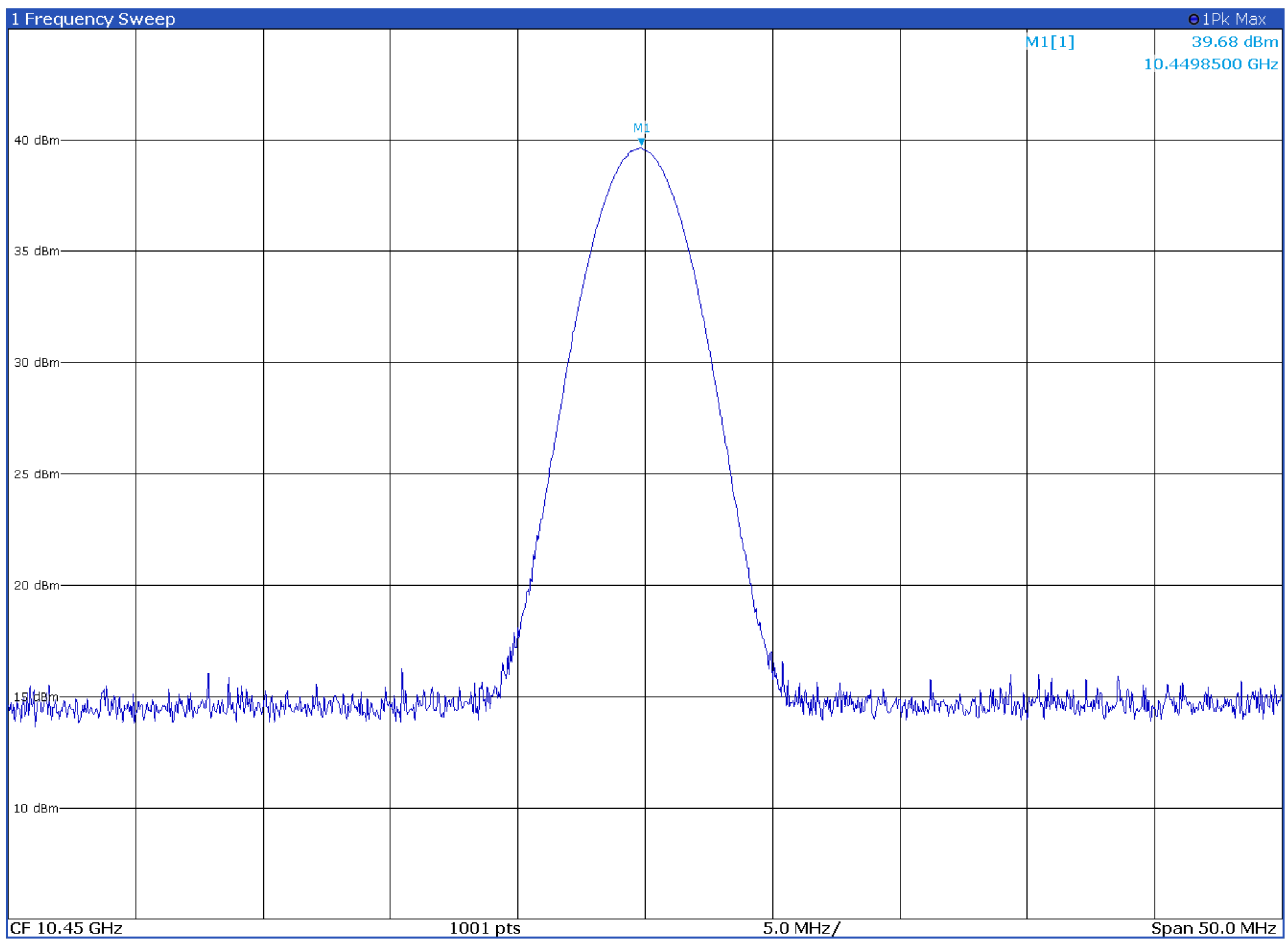


Figure 8.1-1: EIRP

8.2 Occupied bandwidth

8.2.1 References, definitions and limits

FCC §90.103:

- (b) Frequencies available. The following table indicates frequencies available for assignment to stations in the Radiolocation Service, together with the class of station(s) to which they are normally assigned, and the specific assignment limitations, which are explained in paragraph (c) of this section:

Frequency or band	Class of station(s)	Limitation
10000 to 10500 MHzdo	12, 13, 19

- (12) This frequency is shared with and is on a secondary basis to the Government Radiolocation Service.
(13) Operations in this band are limited to survey operations using transmitters with a peak power not to exceed 5 watts into the antenna.
(19) Operations in this band are on a secondary basis to the Amateur Radio Service (part 97). Pulsed emissions are prohibited.

8.2.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	November 5, 2021

8.2.3 Observations, settings and special notes

Test performed with a FMCW signal in three sub-band.

Spectrum analyser settings:

Resolution bandwidth	1–5% of OBW
Video bandwidth	$\geq 3 \times \text{RBW}$
Frequency span	$1.5 \times \text{OBW}$
Detector mode	Peak
Trace mode	Max Hold

8.2.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.
EMI Receiver	Rohde & Schwarz	ESW44	101620
Antenna 1 - 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152
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
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767

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

8.2.5 Test data

Table 8.2-1: 99% occupied bandwidth results

Modulation	Sub-band	99% occupied bandwidth, MHz
FMCW	1	46.6
FMCW	2	46.5
FMCW	3	81.6

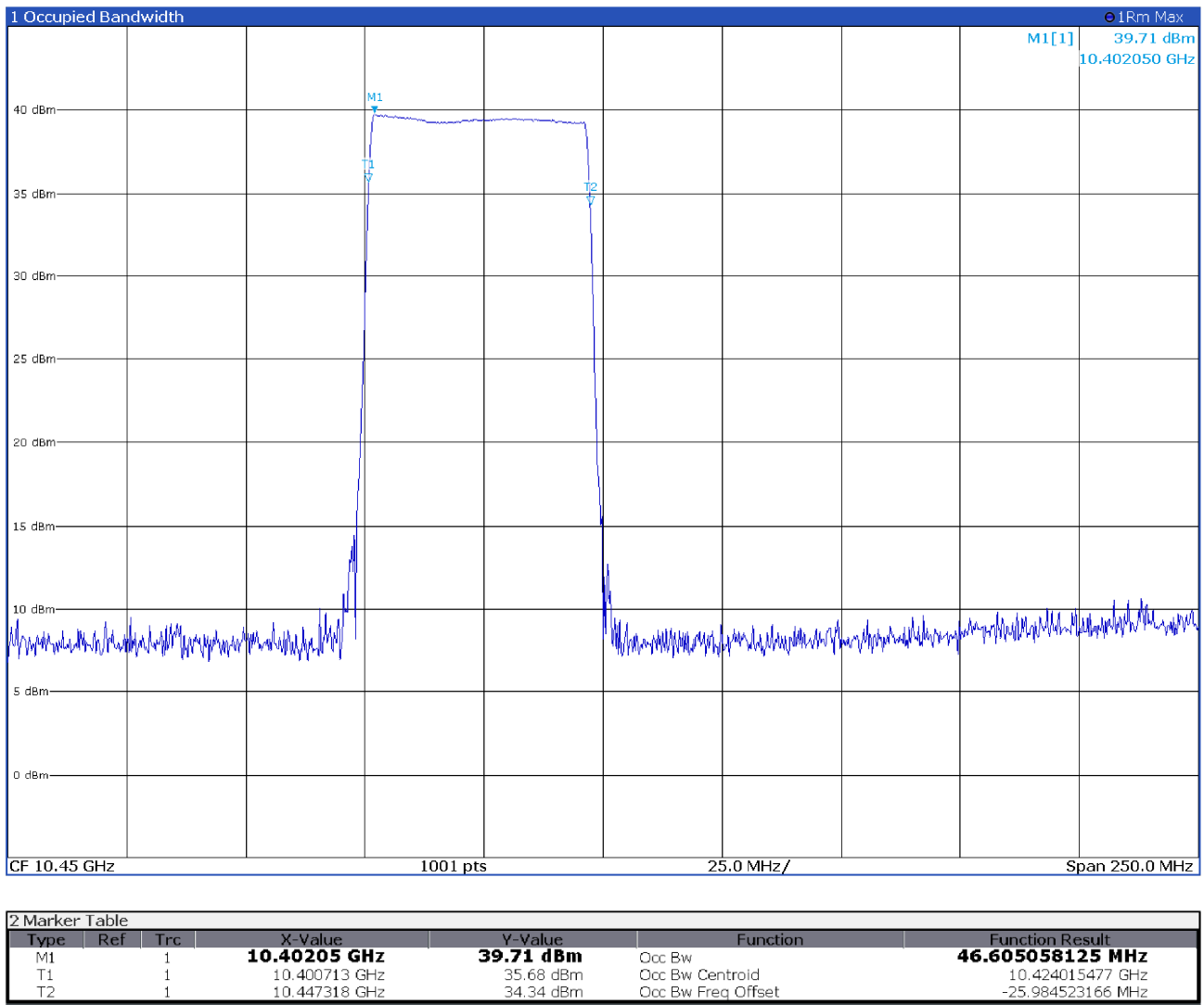


Figure 8.2-1: 99% occupied bandwidth with sub-band 1



Test data, continued

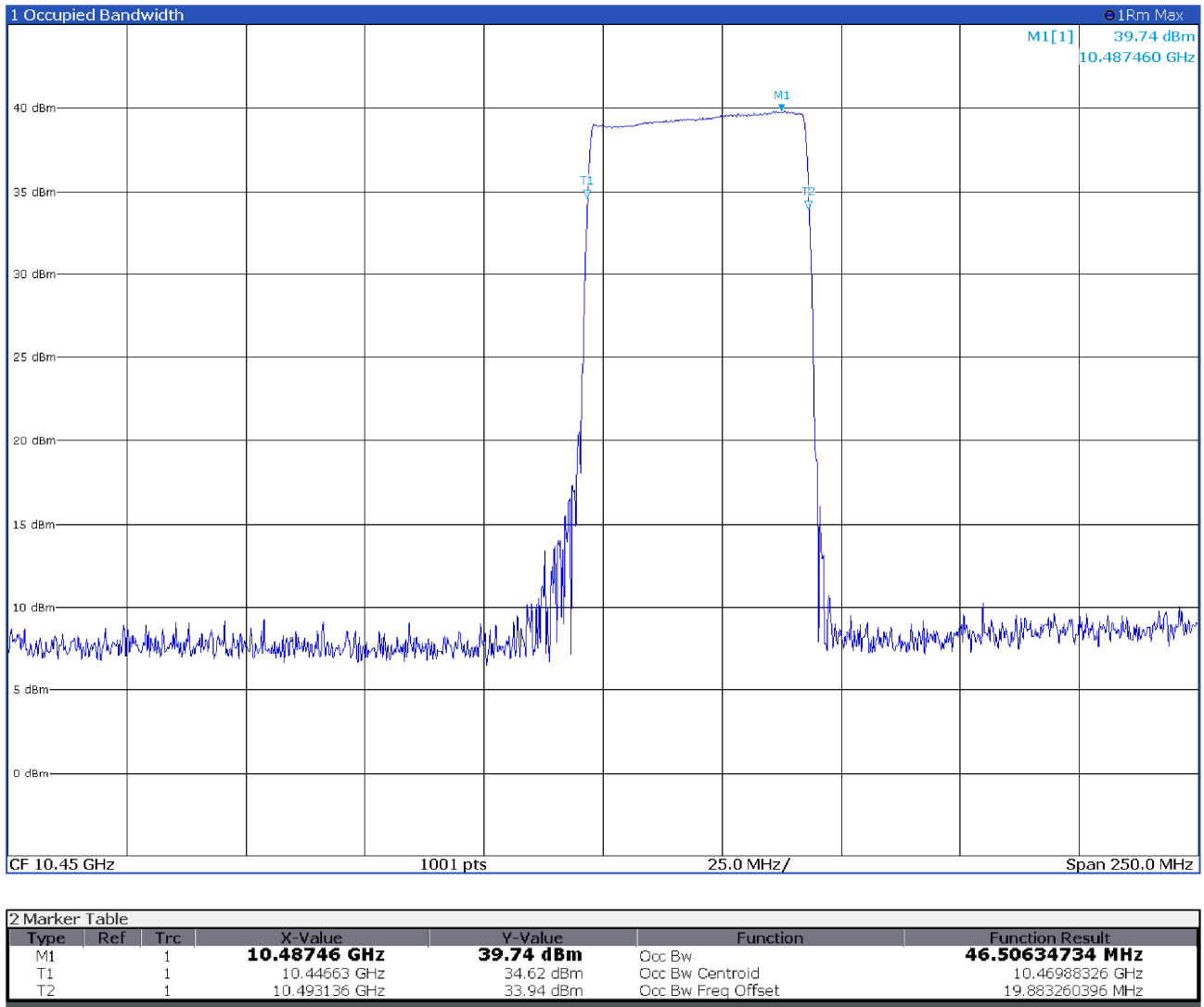


Figure 8.2-2: 99% occupied bandwidth with sub-band 2



Test data, continued

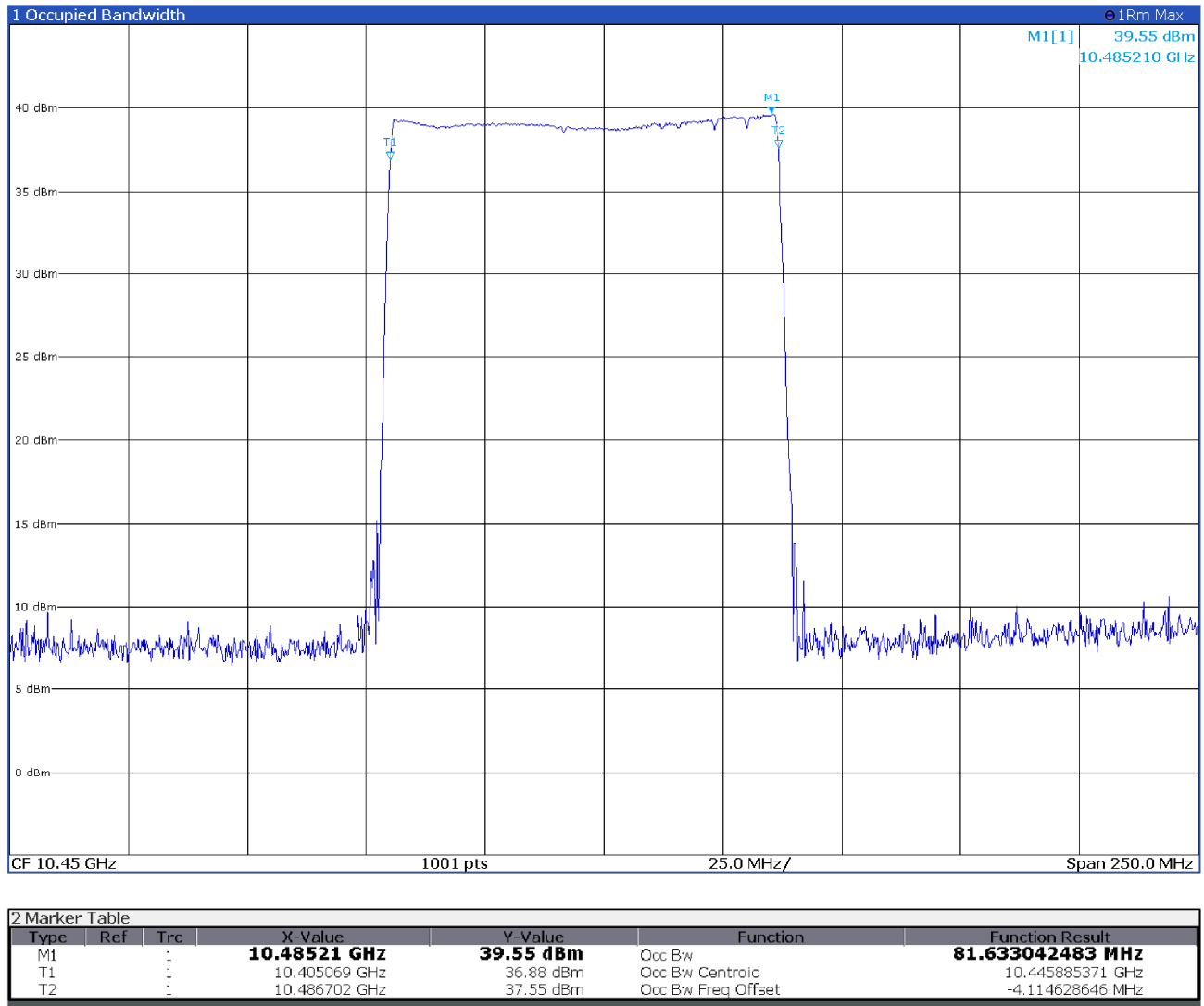


Figure 8.2-3: 99% occupied bandwidth with sub-band 3

8.3 Frequency stability

8.3.1 References, definitions and limits

FCC §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.

Table 8.3-1: Minimum frequency stability

Frequency range (MHz)	Fixed and base stations	Mobile stations over 2 watts output power	Mobile stations 2 watts or less output power
Above 2450 ¹⁰			

Notes: ¹⁰ Frequency stability for DSRCs equipment in the 5895-5925 MHz band is specified in subpart M of this part. For all other equipment, frequency stability is to be specified in the station authorization.

- (b) 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.

8.3.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	November 9, 2021

8.3.3 Observations, settings and special notes

Test performed with a CW signal at 10.45 GHz.

8.3.4 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767	2021-01	2022-01
Climatic Chamber	MSL	EC500DA	15022	2021-01	2022-01

8.3.5 Test data

Table 8.3-2: Transmitter frequency stability results

Test conditions	Frequency, Hz	Drift, Hz	Drift, ppm
+50 °C, Nominal	10450051682.1	201682.1	19.3
+40 °C, Nominal	10450051682.1	201682.1	19.3
+30 °C, Nominal	10449950318.6	100318.6	9.6
+20 °C, -15% voltage	10449951363.5	101363.5	9.7
+20 °C, Nominal	10449850000.0	Reference	Reference
+20 °C, +15% voltage	10450050637.1	200637.1	19.2
+10 °C, Nominal	10450053772.1	203772.1	19.5
0 °C, Nominal	10450150955.7	300955.7	28.8
-10 °C, Nominal	10449950318.6	100318.6	9.6

8.4 Transmitter Unwanted Emissions

8.4.1 References, definitions and limits

FCC §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.

- (c) Emission Mask C. For transmitters that are not equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier output power (P) as follows:
- (3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(P)$ dB.

8.4.2 Test summary

Verdict	Pass		
Tested by	P. Barbieri	Test date	November 5, 2021

8.4.3 Observations, settings and special notes

Test performed with a CW signal at 10.45 GHz.

Spectrum analyzer settings:

Resolution bandwidth	100k Hz (below 1 GHz); 1 MHz (above 1 GHz)
Video bandwidth	> RBW
Detector mode	Peak
Trace mode	Max Hold

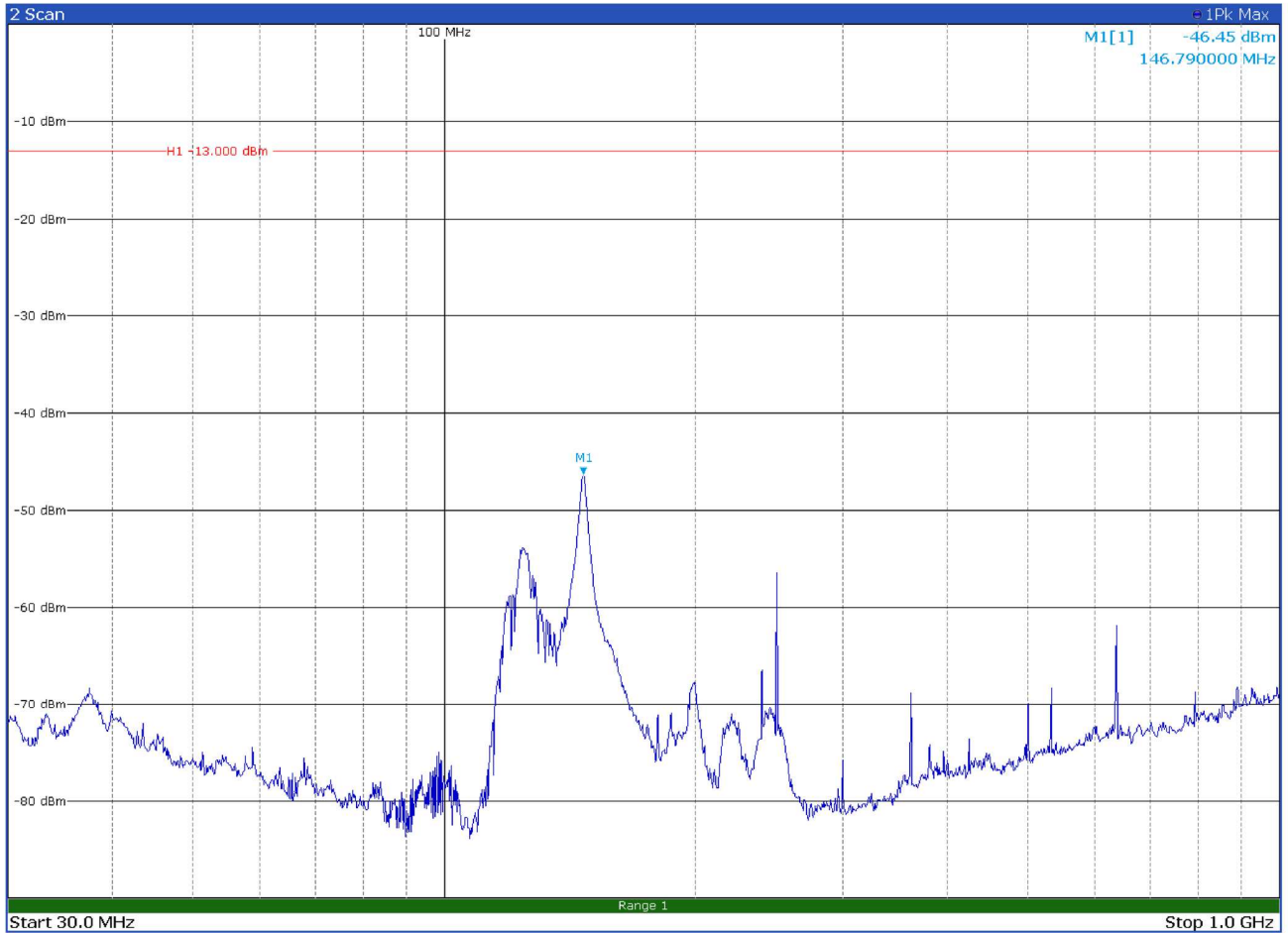
8.4.1 Test equipment used

Equipment	Manufacturer	Model no.	Asset no.	Cal cycle	Next cal.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767	2021-01	2022-01
EMI Receiver	Rohde & Schwarz	ESW44	101620	2021-08	2022-08
Antenna Trilog 25MHz - 8GHz	Schwarzbeck Mess-Elektronik	VULB9162	9162-025	2021-07	2024-07
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
Horn Antenna	A.H.System Inc.	SAS-574	558	2020-01	2023-01
Horn Antenna	Sage	SAR-2507-19VF-R2	15715-01	2021-06	2024-06
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121	2021-01	2022-01
Broadband Bench Top Amplifier	Sage	STB-1834034030-KFKF-L1	18490-01	2021-04	2022-04
Harmonic Mixer	Radiometer Physics	FS-Z60	100988	2021-01	2024-01
Controller	Maturo	FCU3.0	10041	NCR	NCR
Tilt antenna mast	Maturo	TAM4.0-E	10042	NCR	NCR
Turntable	Maturo	TT4.0-ST	2.527	NCR	NCR
Semi-anechoic chamber	Nemko S.p.a.	10m semi-anechoic chamber	530	2021-09	2023-09
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767	2021-01	2022-01

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



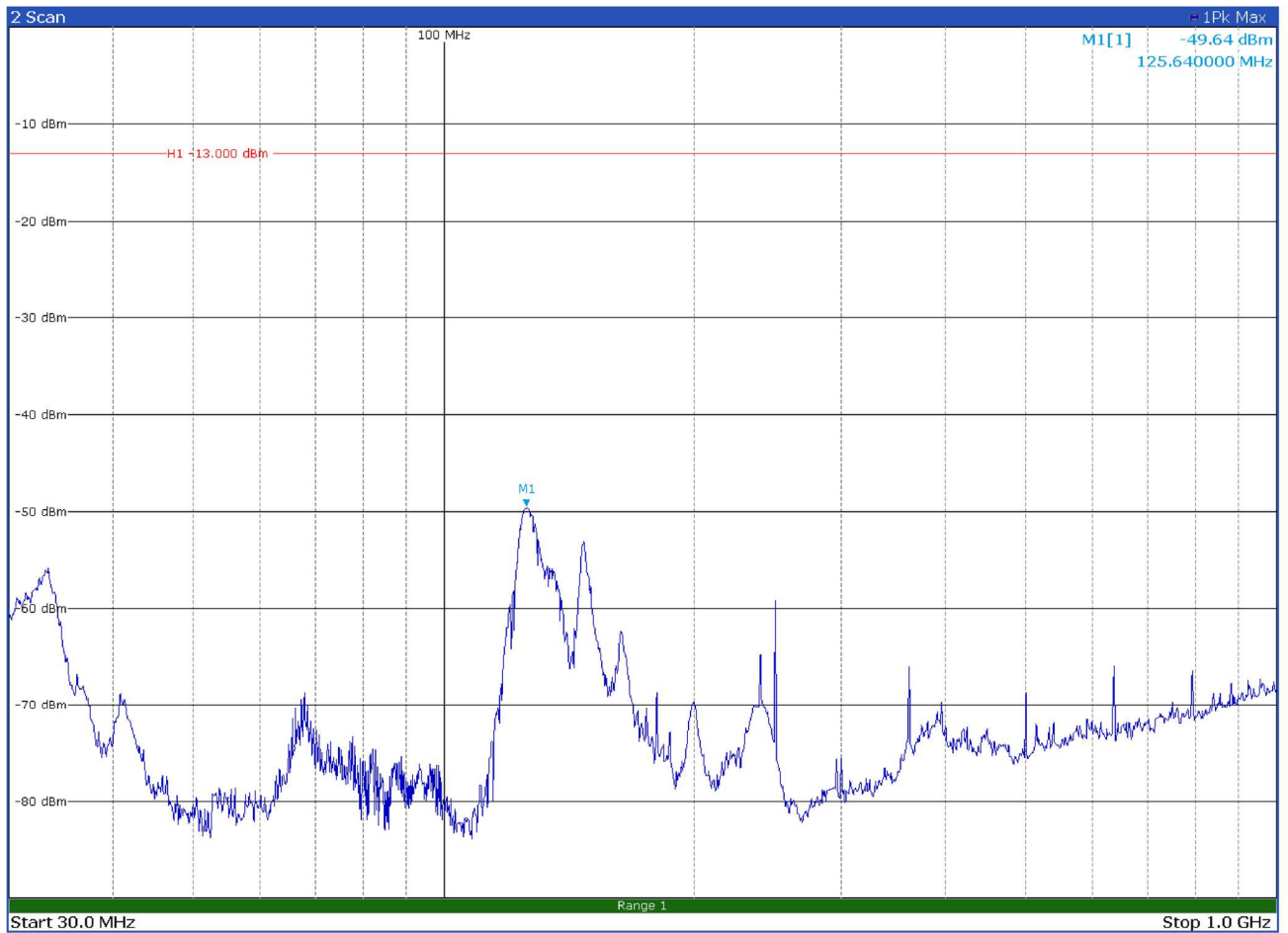
8.4.2 Test data



Radiated spurious emissions— Frequency range 30 to 1000 MHz with antenna in horizontal polarization



Test data, continued

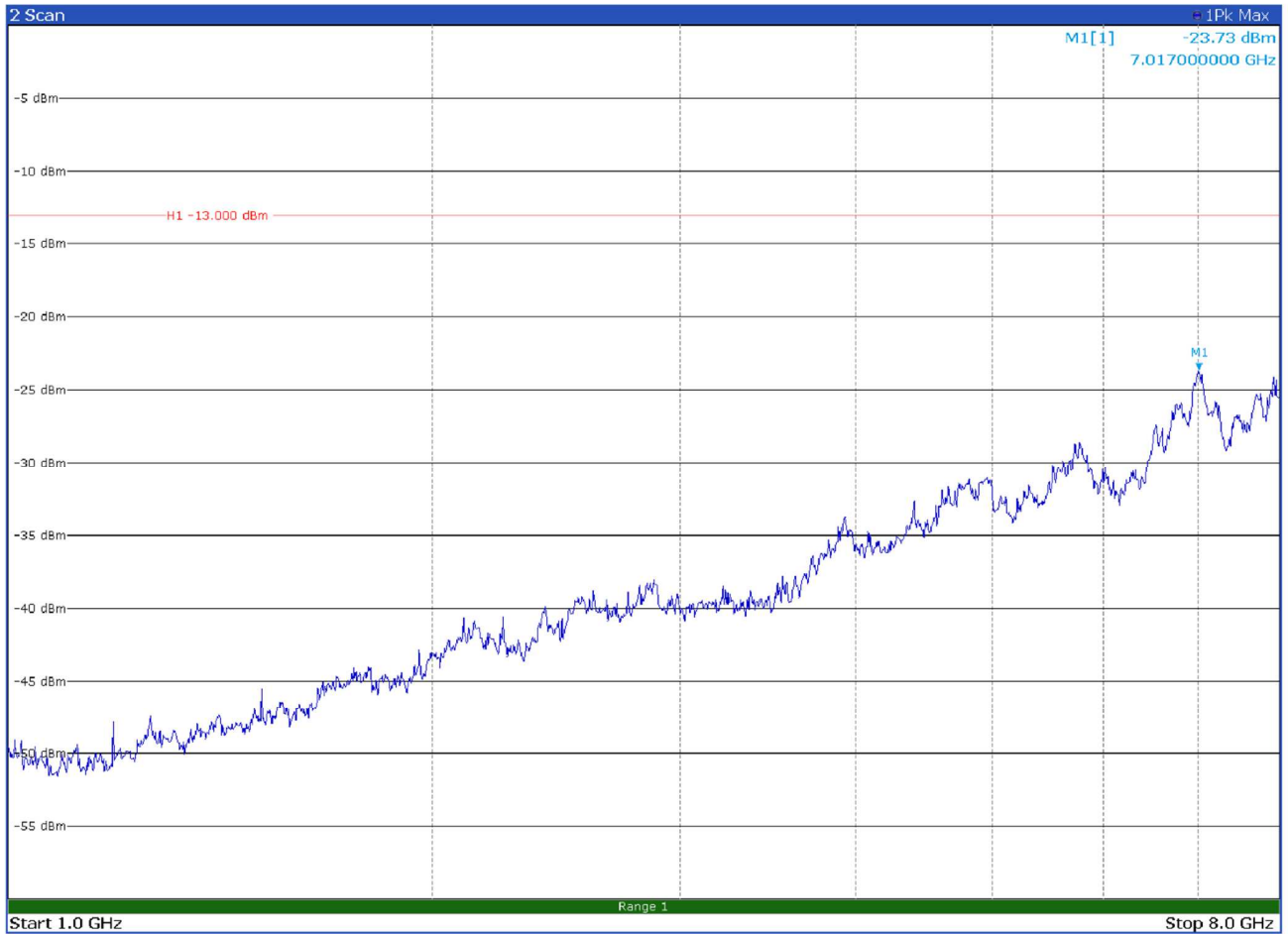


Radiated spurious emissions— Frequency range 30 to 1000 MHz with antenna in vertical polarization



Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

Test data, continued

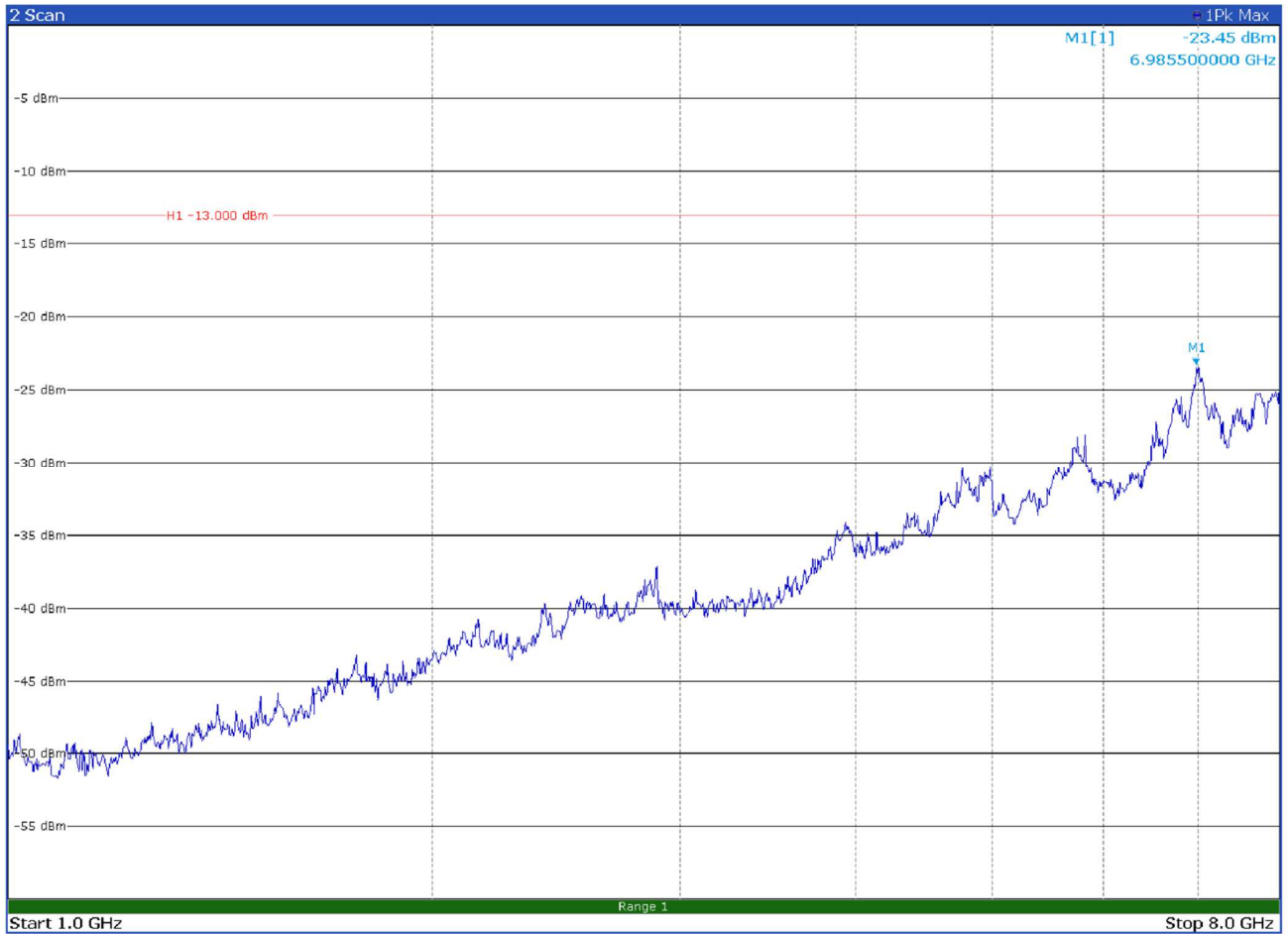


Radiated spurious emissions— Frequency range 1000 to 8000 MHz with antenna in horizontal polarization



Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

Test data, continued

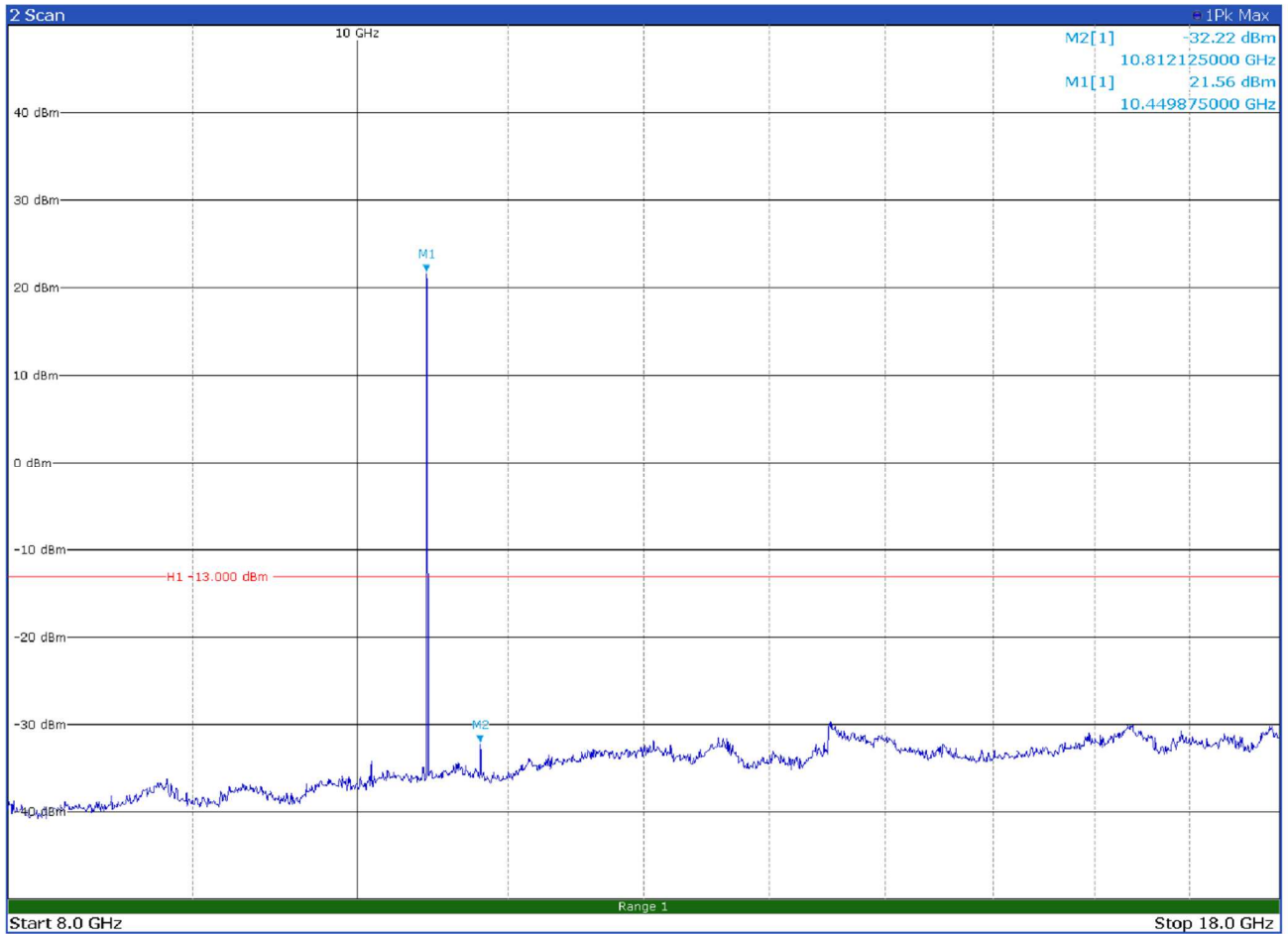


Radiated spurious emissions—Frequency range 1000 to 8000 MHz with antenna in vertical polarization

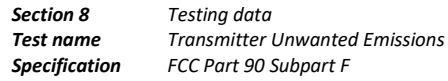


Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

Test data, continued



Radiated spurious emissions— Frequency range 8000 to 18000 MHz with antenna in horizontal polarization



The spectrum plot shows a signal with a dominant peak at 10.812125 GHz, which is the carrier frequency. The peak power is -20.24 dBm. There are two sidebands, M1 and M2, located at 10.812125 GHz ± 17.92 MHz. The sideband power is -17.92 dBm. The plot also shows a noise floor at -40 dBm and a reference line at -13.000 dBm. The frequency range is from 8.0 GHz to 18.0 GHz.

Component	Frequency (GHz)	Power (dBm)
Carrier	10.812125	-20.24
M1	10.812125 - 0.01792	-17.92
M2	10.812125 + 0.01792	-17.92
Noise Floor	-	-40
Reference	-	-13.000

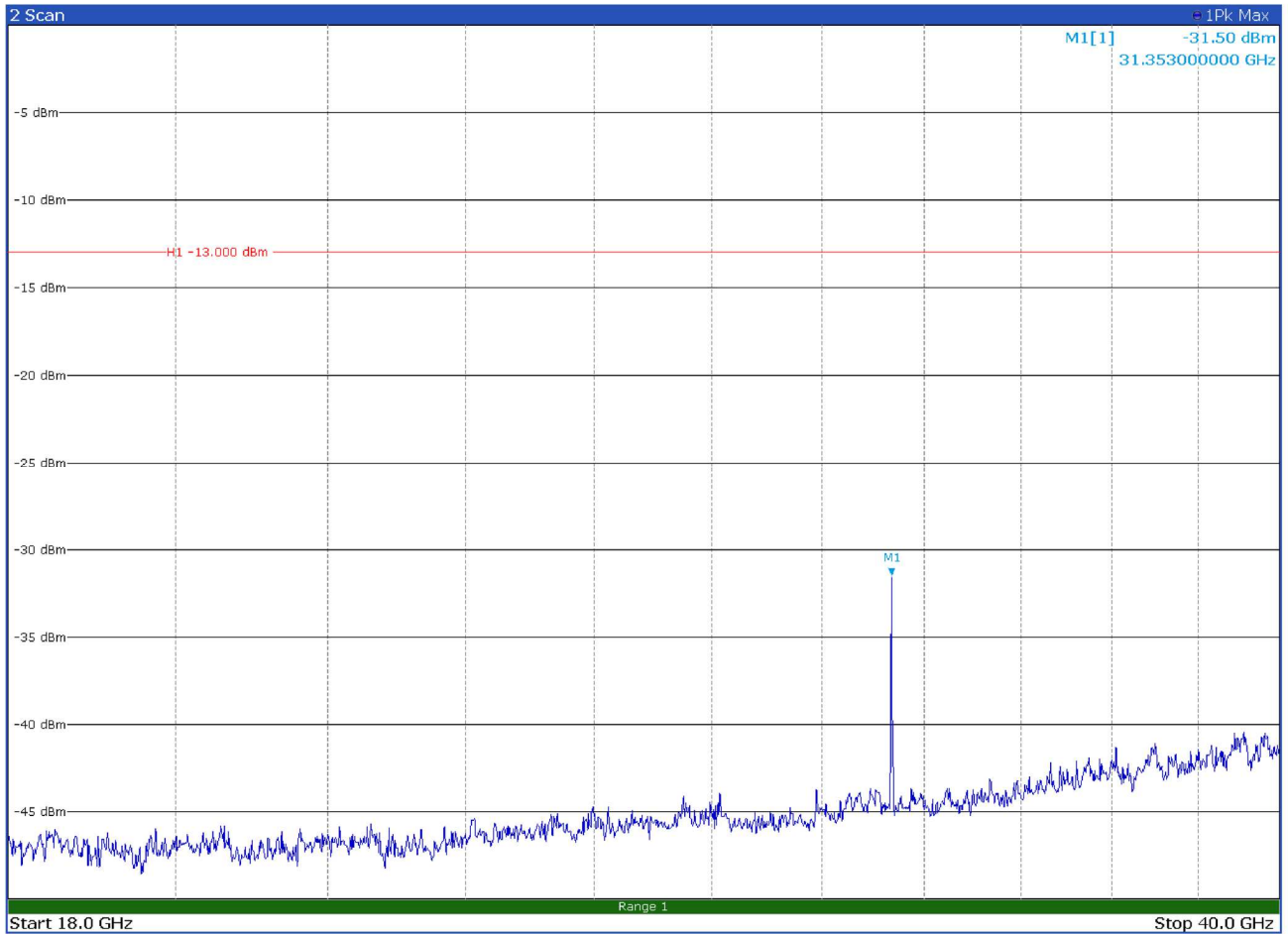
Page 1/1

Report reference ID: 452156-1TRFWL



Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

Test data, continued

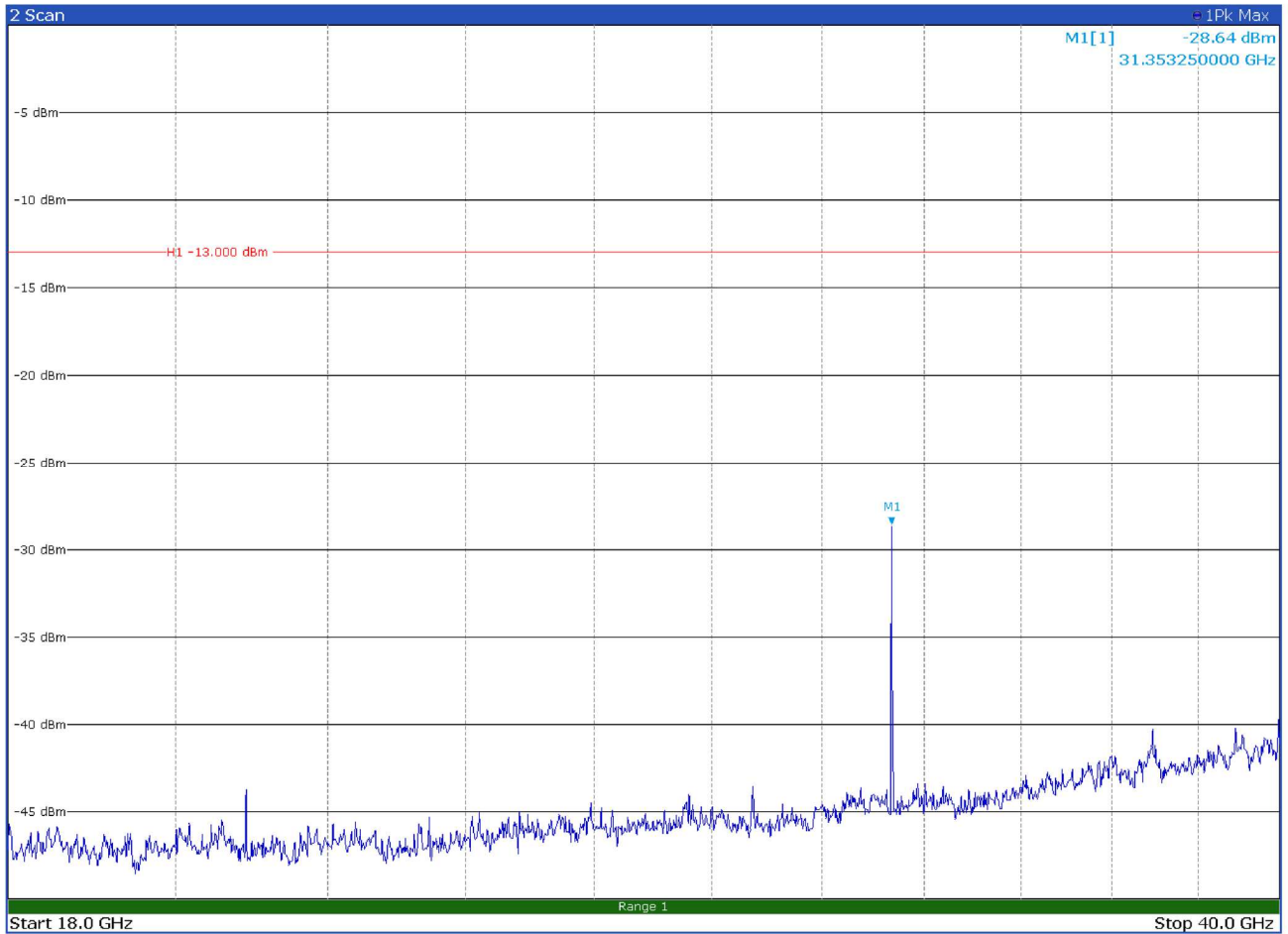


Radiated spurious emissions—Frequency range 18 to 40 GHz with antenna in horizontal polarization



Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

Test data, continued

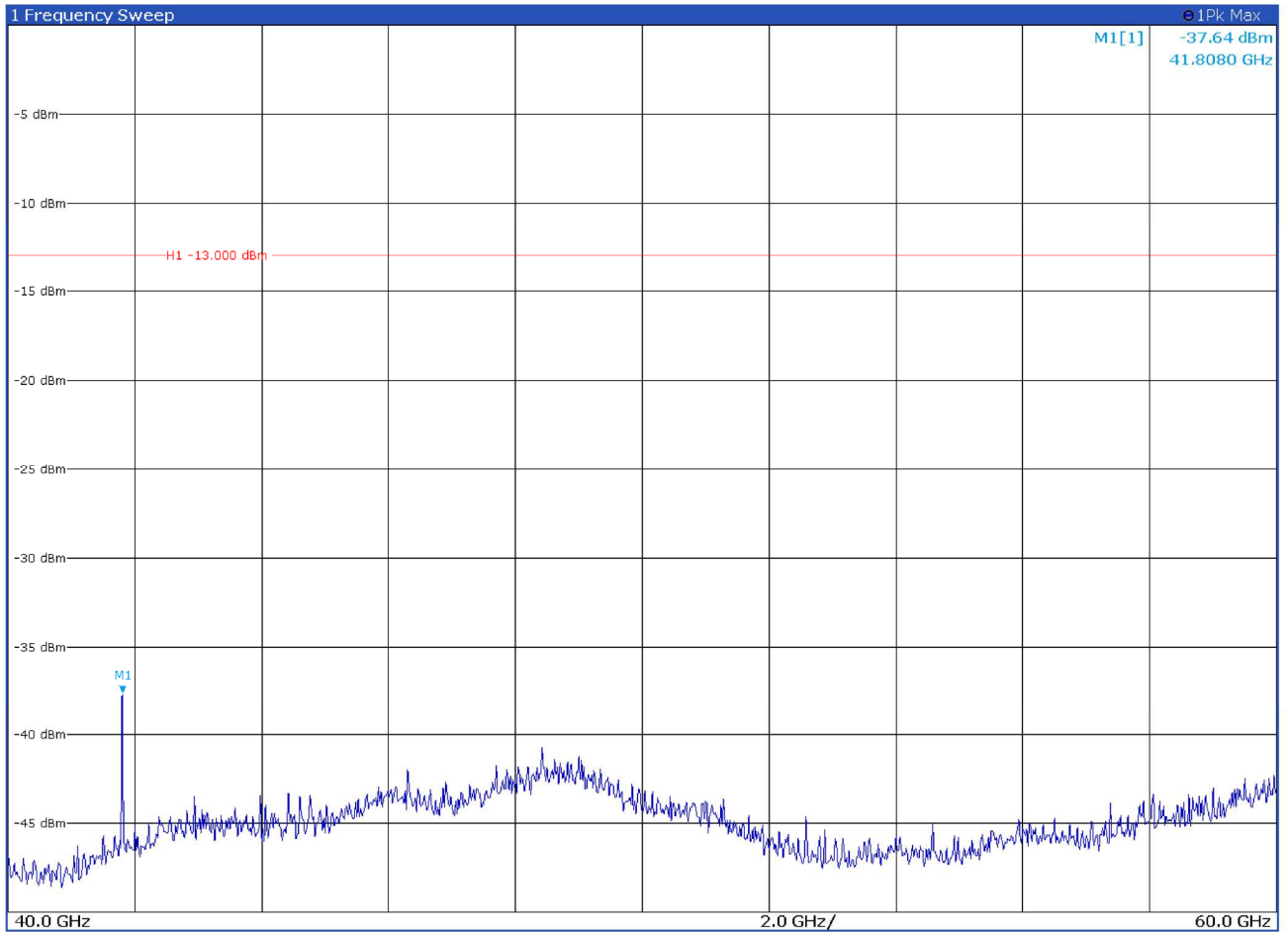


Radiated spurious emissions— Frequency range 18 to 40 GHz with antenna in vertical polarization



Section 8 *Testing data*
Test name *Transmitter Unwanted Emissions*
Specification *FCC Part 90 Subpart F*

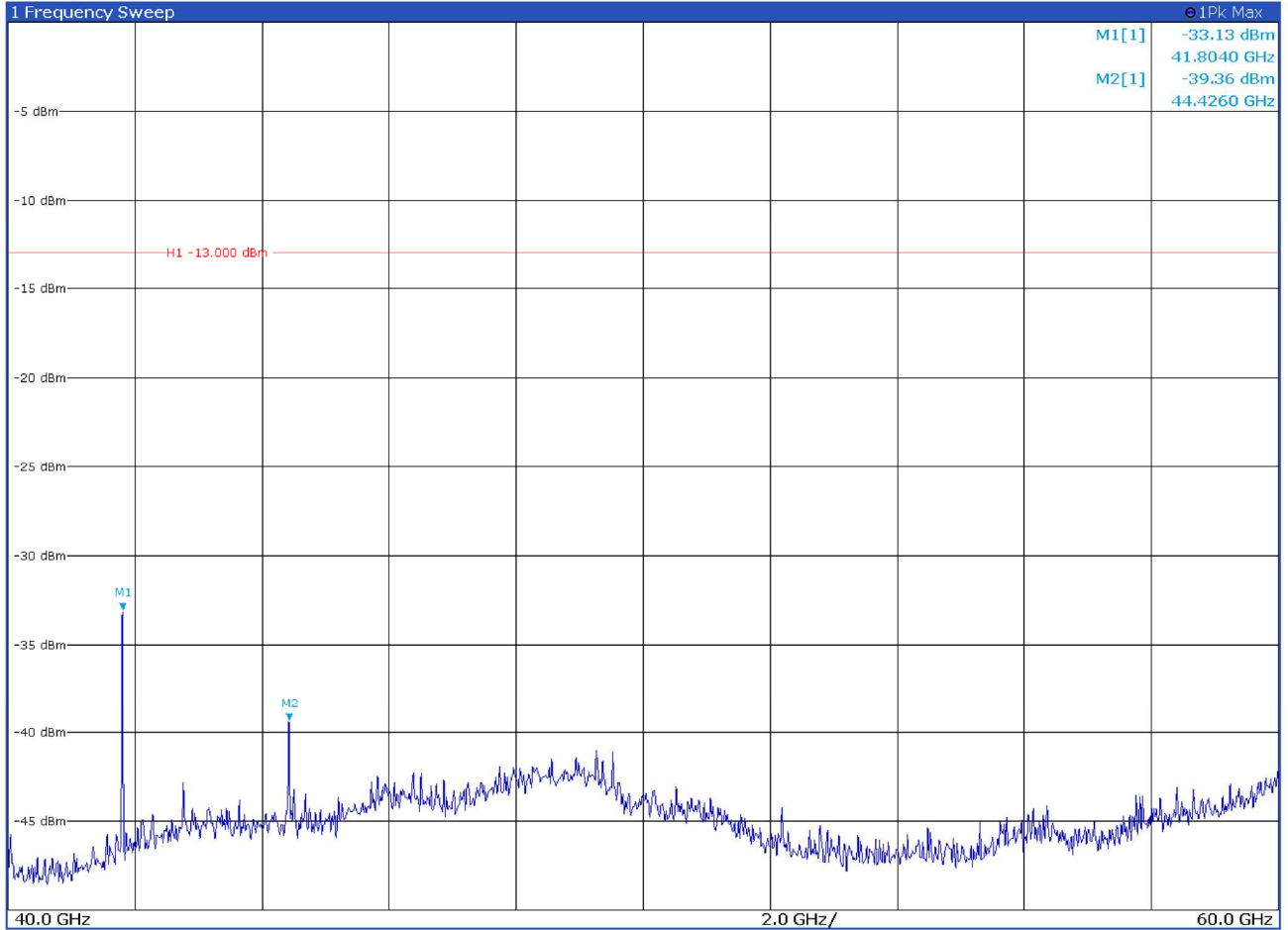
Test data, continued



Radiated spurious emissions— Frequency range 40 to 60 GHz with antenna in horizontal polarization



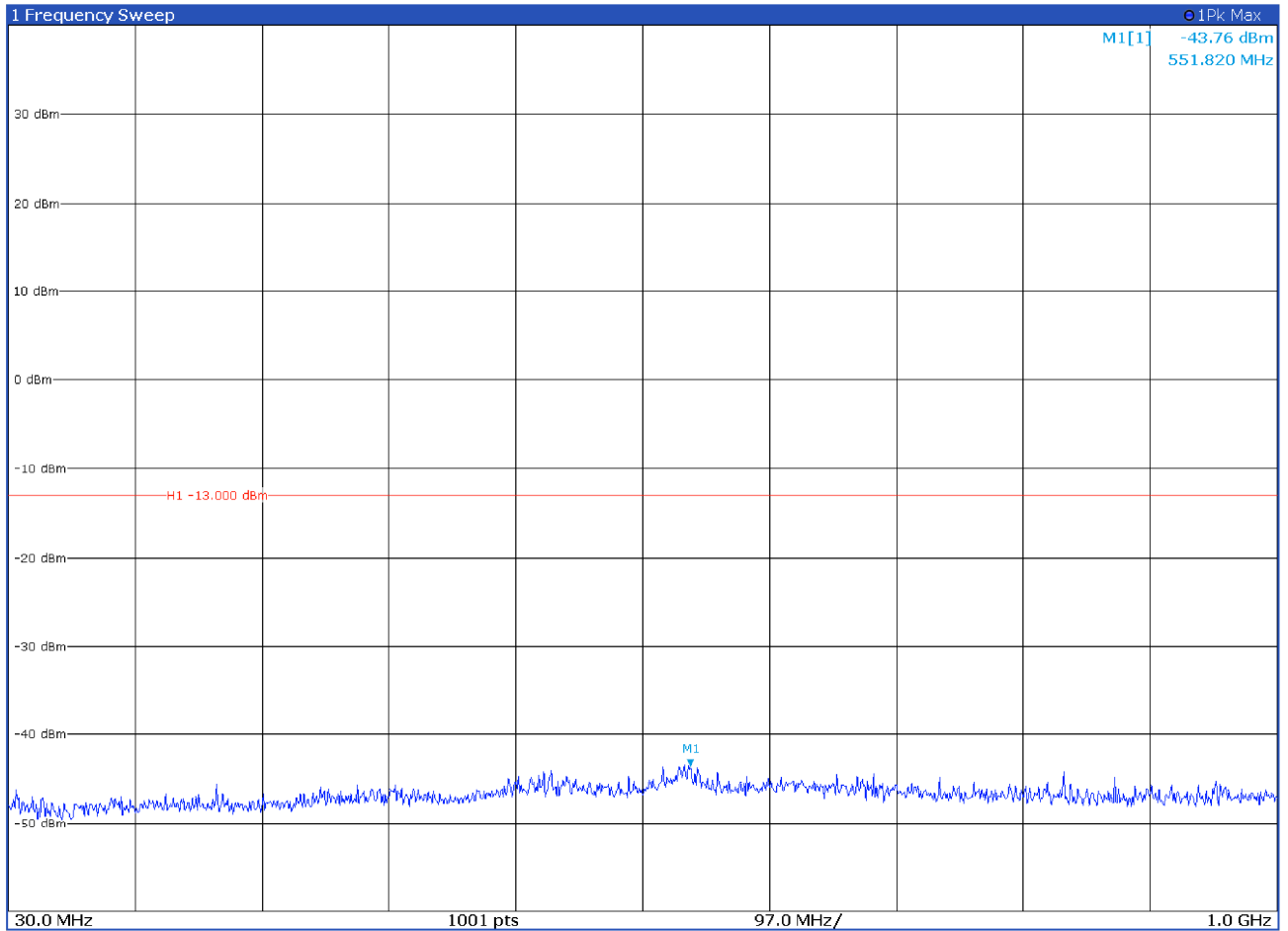
Test data, continued



Radiated spurious emissions— Frequency range 40 to 60 GHz with antenna in vertical polarization



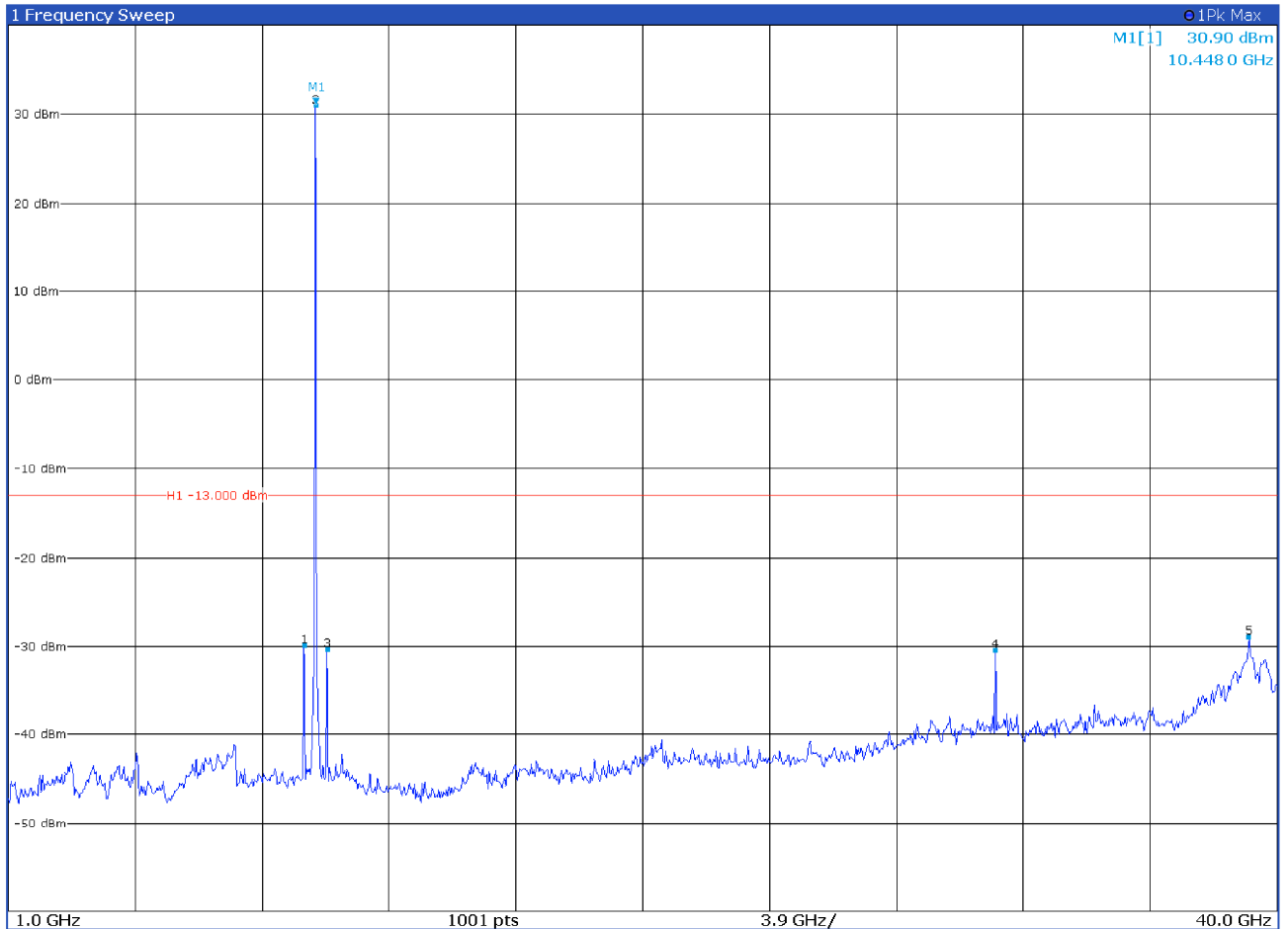
Test data, continued



Conducted spurious emissions – Frequency range 30 to 1000 MHz



Test data, continued

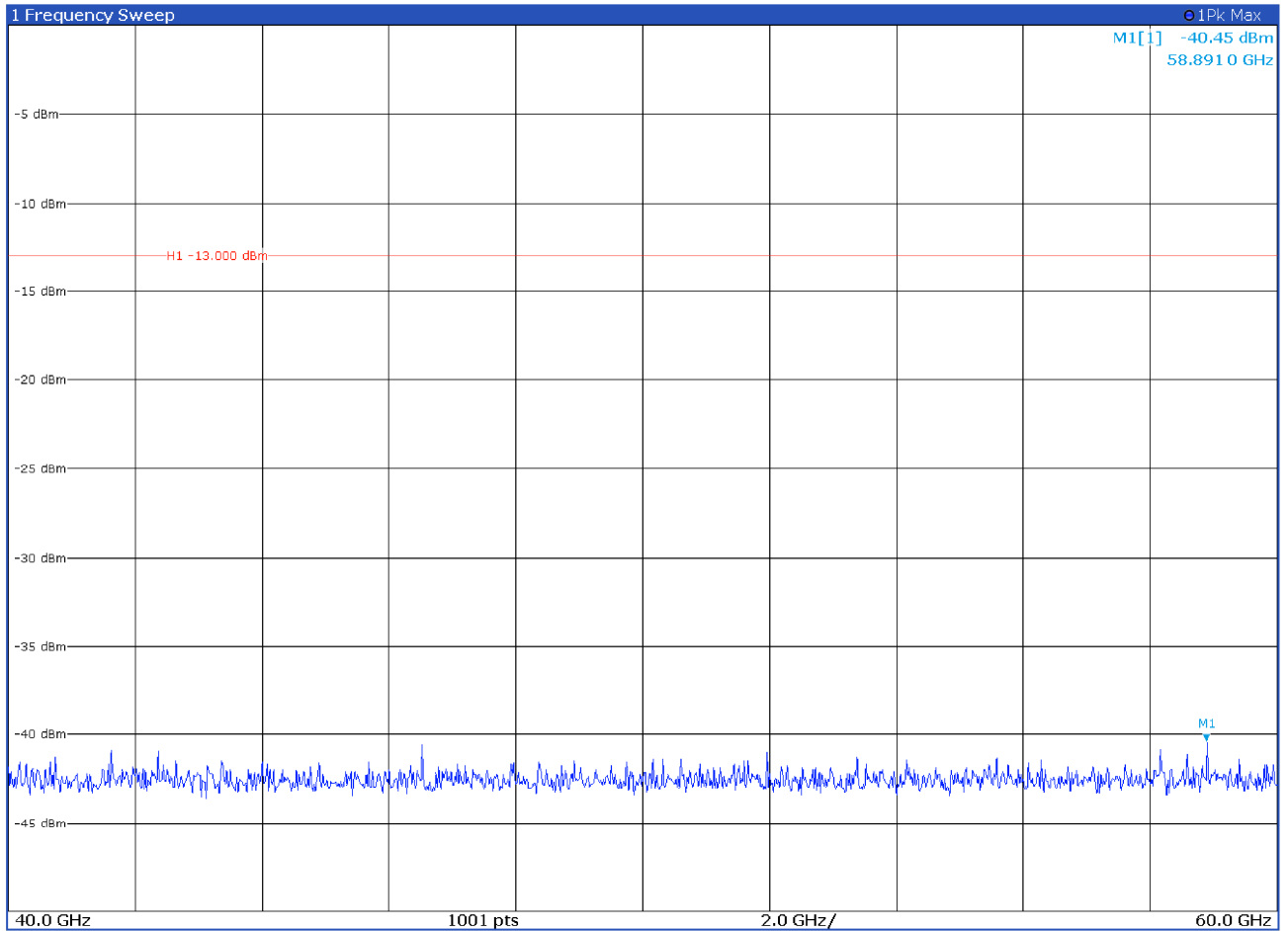


Conducted spurious emissions – Frequency range 1 to 40 GHz

2 Marker Peak List					
No	X-Value	Y-Value	No	X-Value	Y-Value
1	10.097 000 GHz	-29.923 dBm	4	31.331 000 GHz	-30.503 dBm
2	10.448 000 GHz	30.897 dBm	5	39.123 000 GHz	-29.019 dBm
3	10.799 000 GHz	-30.391 dBm			



Test data, continued



Conducted spurious emissions – Frequency range 40 to 60 GHz

Section 9 EUT photos

9.1 Set-up photos

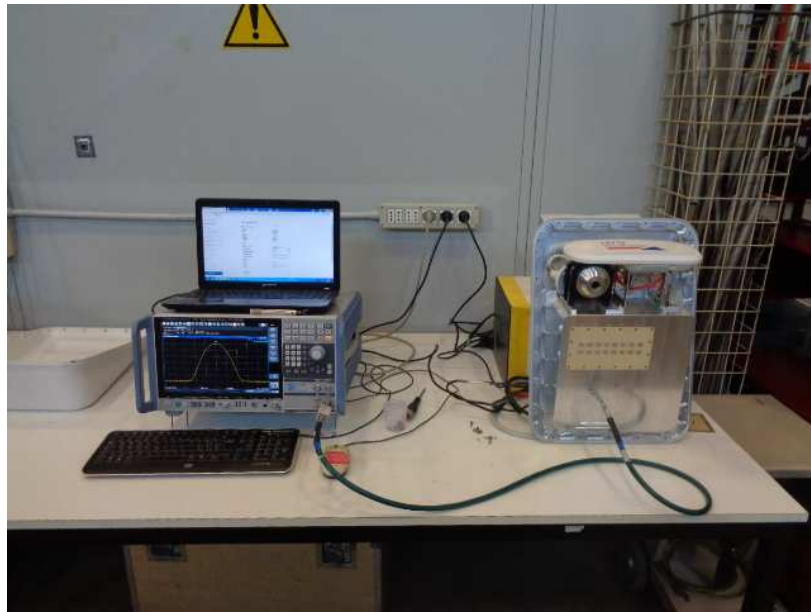


Figure 9.1-1: Antenna port testing set-up



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: Front view photo



Figure 9.2-2: Rear view photo

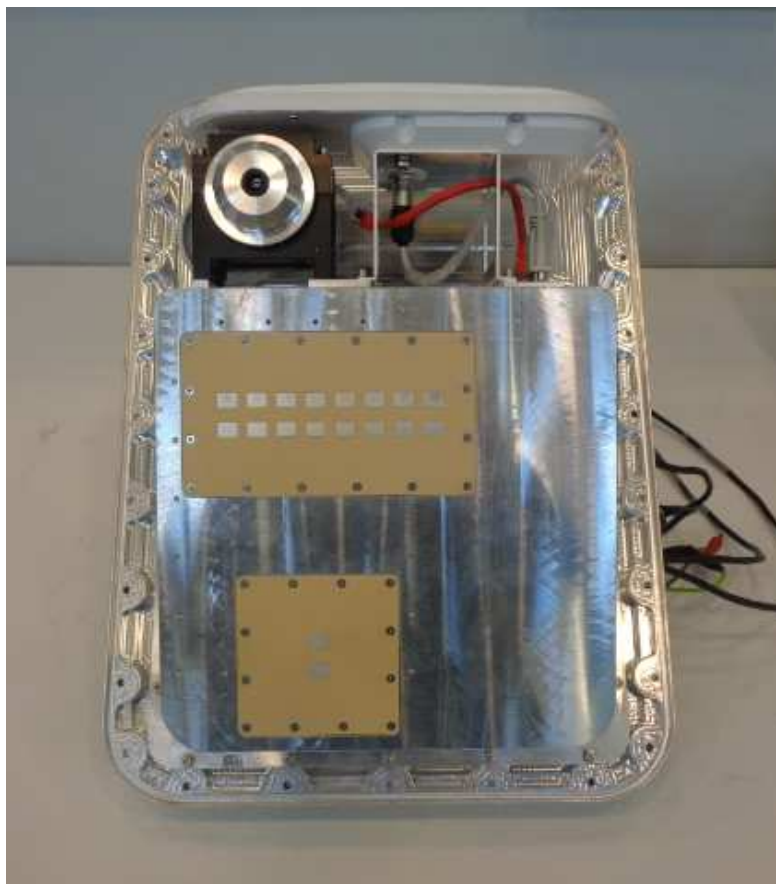


Figure 9.2-3: Internal view photo

End of the test report