Test Report

Test report no.: 21025154-22149-0
Date of issue: 2022-04-01

Test result: The test item **- passed - and complies** with below listed standards.

Applicant
Symeo GmbH

Manufacturer
Same as applicant

Test Item
BSX300350

RF-Spectrum Testing according to:

FCC 47 CFR Part 15
Radio Frequency Devices, Subpart C -
§ 15.258 Operation in the bands 116-123 GHz, 174.8-182 GHz, 185-190 GHz and 244-246 GHz

Tested by (name, function, signature)	*Karsten Geraldy* *Lab Manager RF*	signature
Approved by (name, function, signature)	*Andreas Bender* *Deputy Managing Director*	signature

Applicant and Test item details	
Applicant	Symeo GmbH Prof.-Messerschmitt-Str. 3 85579, Neubiberg/München, Germany Phone: +49 89 6607796-0 Fax: +49 89 6607796-190
Manufacturer	Same as applicant
Test item description	LPR-1DHP-350
Model/Type reference	BSX300350
Standard specific information	
FCC ID	W5IBSX300350
Frequency	120 GHz – 123 GHz
Antenna	integrated chip antenna with dielectric lens
Power supply	100 - 240 V AC via Power Over Ethernet Adapter (48 V DC)
Temperature range	-40 °C to +70 °C

Disclaimer and Notes

Within this test report, a ☒ point / ☐ comma is used as a decimal separator.
If otherwise, a detailed note is added adjected to its use.

IBL-Lab GmbH does not take test samples. The samples used for testing are provided by the applicant.

Decision rule:
Decision rule based on simple acceptance without guard bands, binary statement, based on mutually agreed uncertainty tolerances with expansion factor k=2 according to ILAC-G8:09/2019

1 TABLE OF CONTENTS

2 GENERAL INFORMATION

2.1 Administrative details

Testing laboratory	**IBL-Lab GmbH** Heinrich-Hertz-Allee 7 66386 Sankt Ingbert / Germany Fon: +49 6894 38938-0 Fax: +49 6894 38938-99 URL: www.ib-lenhardt.de E-Mail: info@ib-lenhardt.de
Accreditation	The testing laboratory is accredited by Deutsche Akkreditierungsstelle GmbH (DAkkS) in compliance with DIN EN ISO/IEC 17025:2018. Scope of testing and registration number: • Electronics D-PL-21375-01-01 • Electromagnetic Compatibility D-PL-21375-01-02 • Electromagnetic Compatibility and Telecommunication (FCC requirements) D-PL-21375-01-03 Testing Laboratory Designation Number DE0024 • Telecommunication (TC) and Electromagnetic Compatibility (EMC) for Canadian Standards D-PL-21375-01-04 ISED Company Number 27156 Testing Laboratory CAB Identifier DE0020 • Telecommunication (TC) D-PL-21375-01-05 Website DAkkS: https://www.dakks.de/ The Deutsche Akkreditierungsstelle GmbH (DAkkS) is also a signatory to the ILAC Mutual Recognition Arrangement
Testing location	**IBL-Lab GmbH** Heinrich-Hertz-Allee 7 66386 St. Ingbert / Germany
Date of receipt of test samples	2021-11-29
Start – End of tests	2021-12-08 – 2022-02-14

2.2 Possible test case verdicts

Test sample meets the requirements	P (PASS)
Test sample does not meet the requirements	F (FAIL)
Test case does not apply to the test sample	N/A (Not applicable)
Test case not performed	N/P (Not performed)

2.3 Observations

No additional observations other than the reported observations within this test report have been made.

2.4 Opinions and interpretations

No appropriate opinions or interpretations according ISO/IEC 17025:2017 clause 7.8.7 are within this test report.

2.5 Revision History

-0 Initial Version

2.6 Further documents

List of further applicable documents belonging to the present test report:
– no additional documents –

3 ENVIRONMENTAL & TEST CONDITIONS

3.1 Environmental conditions

Temperature	20°C ± 5°C
Relative humidity	25-75% r.H.
Barometric Pressure	860-1060 mbar
Power supply	230 V AC ± 5%

3.2 Normal and extreme test conditions

	minimum	nominal	maximum
Temperature	-20 °C	20 °C	50 °C
Relative humidity	-/-	45 % r.h.	-/-
Power supply	94 V AC	110 V AC	127 V AC

4 TEST STANDARDS AND REFERENCES

Test standard (accredited)	**Description**
FCC 47 CFR Part 15	Radio Frequency Devices, Subpart C - § 15.258 Operation in the bands 116-123 GHz, 174.8-182 GHz, 185-190 GHz and 244-246 GHz

Reference	**Description**
ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

5 EQUIPMENT UNDER TEST (EUT)

5.1 Product description

The LPR®-1DHP-350 radar system performs 1D distance measurements for short and medium ranges with high accuracy. By means of primary radar or secondary radar measurements, the LPR®-1DHP-350 can detect the position and speed - for example of cranes and rail-bound transport systems - in real-time and make the data available via the device interfaces.
The sensors are simple to install and easy to put into operation with the aid of a web interface. A directional antenna is integrated into the housing. The device features the latest mm-wave technology, allowing it to achieve highly precise measurements. Even under the harshest environments and weather conditions such as rain, fog, snow, dust, smoke or vibrations, the maintenance- and wear-and-tear-free wireless technology operates reliably and with a high degree of availability - indoors and outdoors.

5.2 Description of test item

Model name*	BSX300350
Serial number*	ED6FR20009
PCB identifier*	PLB102266, E621, 1.30 PLB102932, EC27, 1.12
Hardware status*	v1.10
Software status*	BR2019-105-g70fd83e.devel_spurs

*: as declared by applicant

5.3 Technical data of test item

Operational frequency band*	120 GHz – 123 GHz
Type of radio transmission*	modulated carrier
Modulation type*	FMCW
Number of channels*	1 GHz band (block no. 30): 140 2 GHz band (block no. 31): 180 3 GHz band (block no. 32): 180
Channel bandwidth*	<3 GHz
Channel spacing*	N/A
Duty cycle*	100%
Antenna*	integrated chip antenna with dielectric lens
Rated RF output power*	<20 dBm
Power supply*	100 - 240 V AC via Power Over Ethernet Adapter (48 V DC)
Temperature range*	-40 °C to +70 °C

*: as declared by applicant

5.4 Additional information

Model differences	N/A
Ancillaries tested with	PoE Adapter: tp-link, Model TL-POE150S, S/N 22134J7003629 AC/DC Adapter: tp-link, T480050-2C1 LAN cable BSX300350, S/N ED6FR20010 for testing slave mode
Additional equipment used for testing	Lab Notebook with AC/DC-adapter used for EUT setup

6 SUMMARY OF TEST RESULTS

Test specification
FCC 47 CFR Part 15

Clause	Requirement / Test case	Test Conditions	Result / Remark	Verdict
§15.258(b)(1)	Average power / Peak power	Normal	AVG: 13.9 dBm Peak: 15.1 dBm	P
§2.1049	Occupied bandwidth (99% bandwidth)	Normal	2937.4 MHz	P
§15.258(c) / §15.209(a)	Spurious emissions	Normal	< limit	P
§15.258(d)	Transmitter frequency stability	Normal/Extreme	within band	P

Note
FCC's Millimeter Wave Test Procedures: I. A radiated method of measurements in order to demonstrate compliance with the various regulatory requirements has been chosen in consideration of test equipment availability and the limitations of many external harmonic mixers. A conducted method of measurement could be employed if EUT and mixer waveguides both are accessible and of the same type (WG number) and if waveguide sections and transitions can be found. Another potential problem is that the peak power output may exceed the +20 dBm input power limit of many commercially available mixers. For these reasons a radiated method is preferred.

Comments and observations
When changing the channel number in the test software, the used channel bandwidth will be adjusted (upper frequency is reduced). As worst case the maximum channel bandwidth was tested. 1 GHz band: CH 6400, 2 GHz band: CH 6540, 3 GHz band: CH 6720 were used for testing.

7 TEST RESULTS

7.1 Average power / Peak power

§15.258(b)
Emission levels within the 116-123 GHz, 174.8-182 GHz, 185-190 GHz and 244-246 GHz bands shall not exceed the following equivalent isotropically radiated power (EIRP) limits as measured during the transmit interval:
(1) The average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm;
(3) The peak power shall be measured with a detection bandwidth that encompasses the entire occupied bandwidth within the intended band of operation, *e.g.,* 116-123 GHz, 174.8-182 GHz, 185-190 GHz or 244-246 GHz. The average emission levels shall be measured over the actual time period during which transmission occurs.

Limits
The average power of any emission shall not exceed 40 dBm and the peak power of any emission shall not exceed 43 dBm

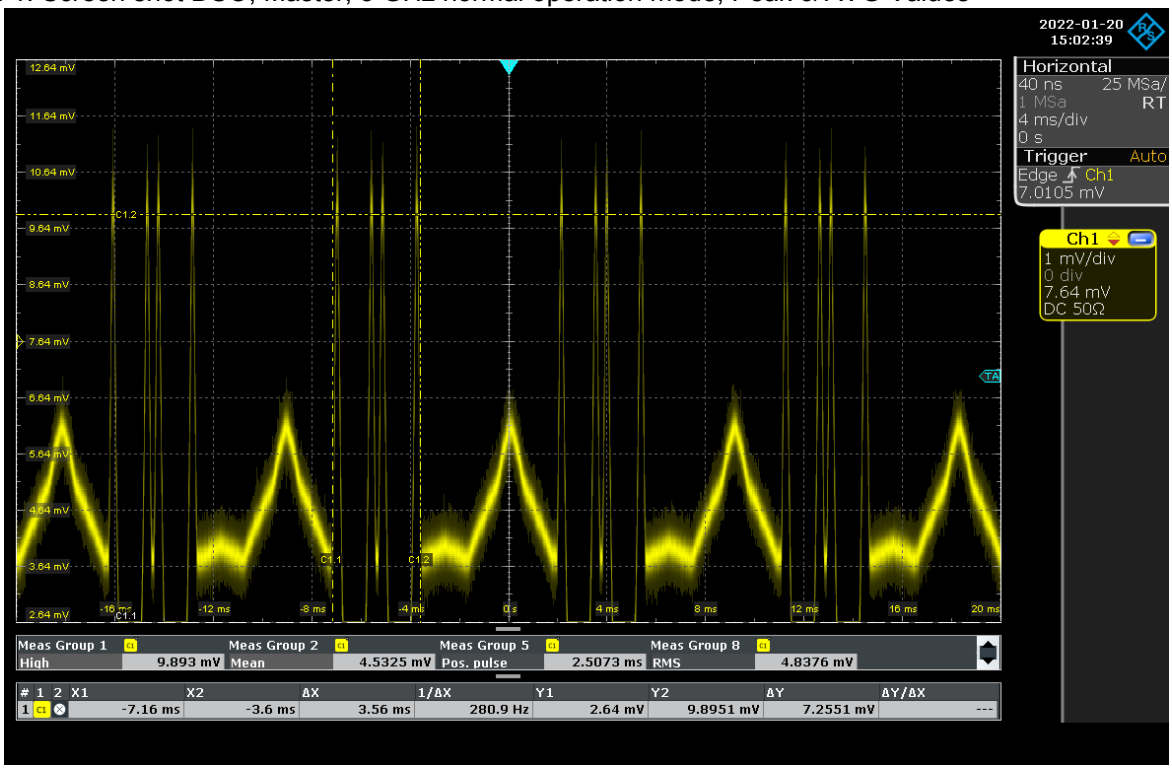
Test procedure
According to ANSI C63.10, 9.11 Measurement of the fundamental emission using an RF detector diode and substitution method.

Test setup: 8.5

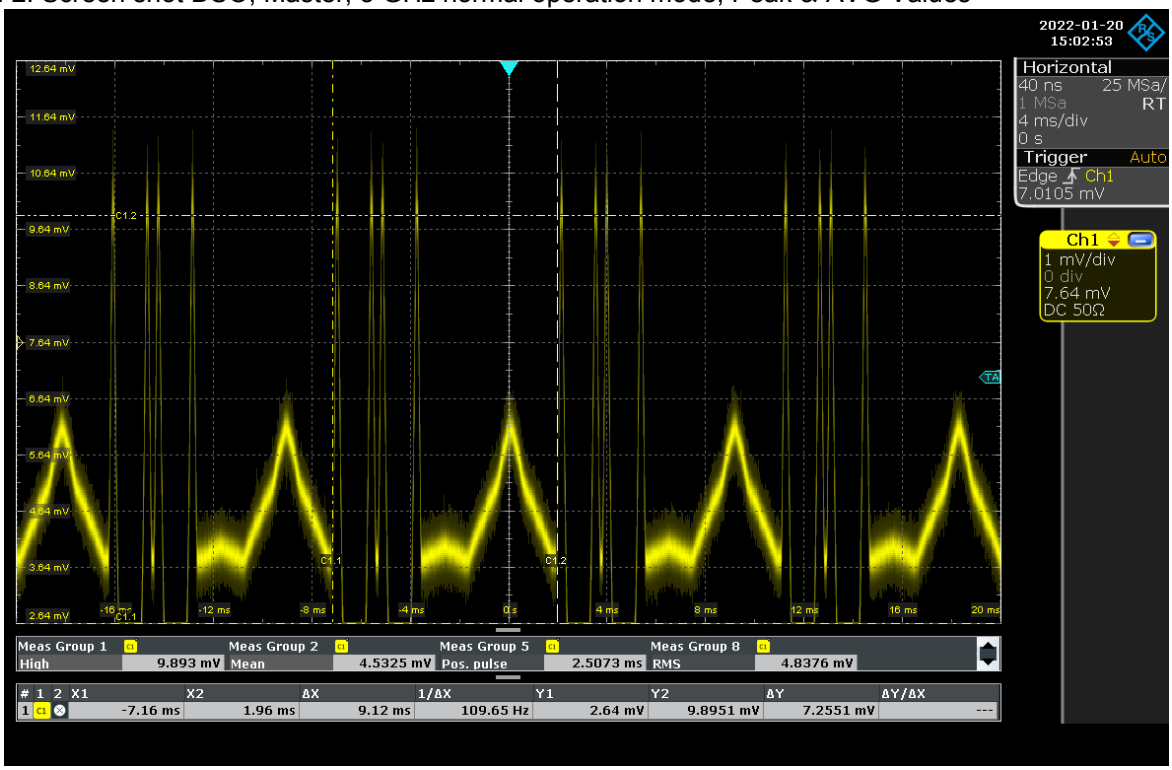
Test results

EUT mode	Temperature / Voltage	Test distance	Peak Power	Mean Power	Duty Cycle
3 GHz mode	T_{nom} / V_{nom}	1 m	15.1 dBm	13.9 dBm	100 %
1 GHz mode	T_{nom} / V_{nom}	1 m	15.1 dBm	13.1 dBm	100 %

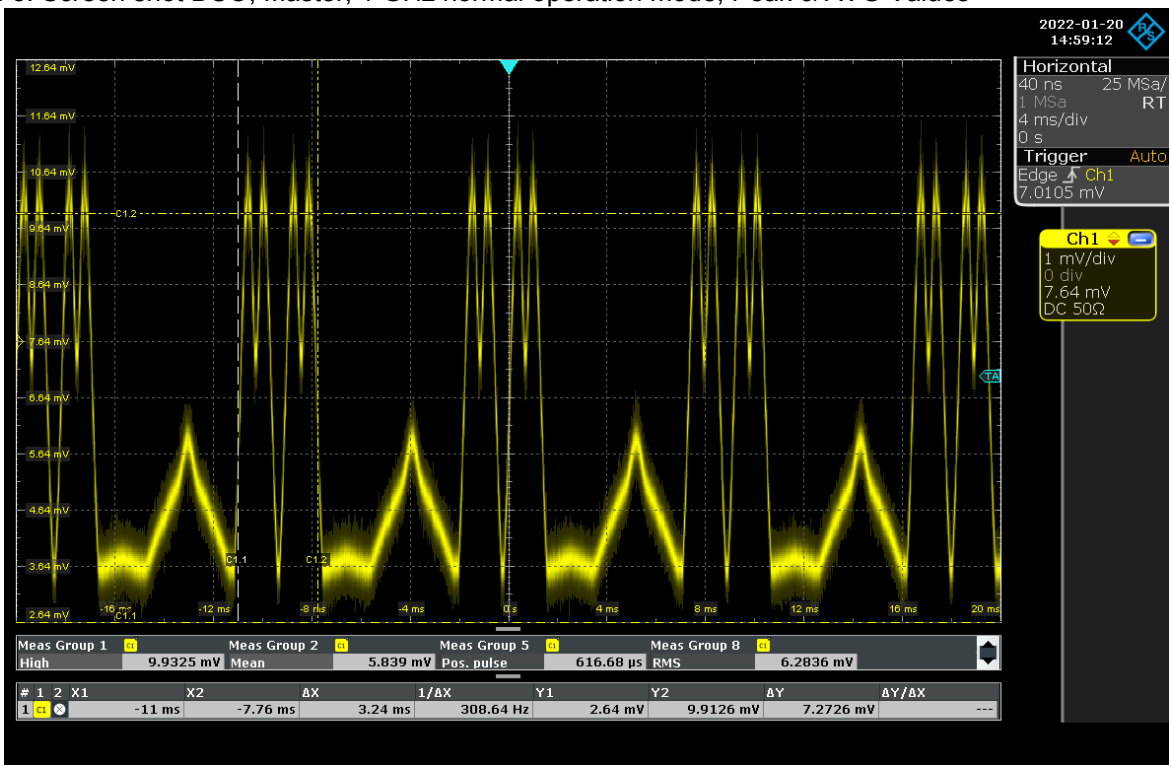
Plot no. 1: Screen shot DSO, Master, 3 GHz normal operation mode, Peak & AVG Values



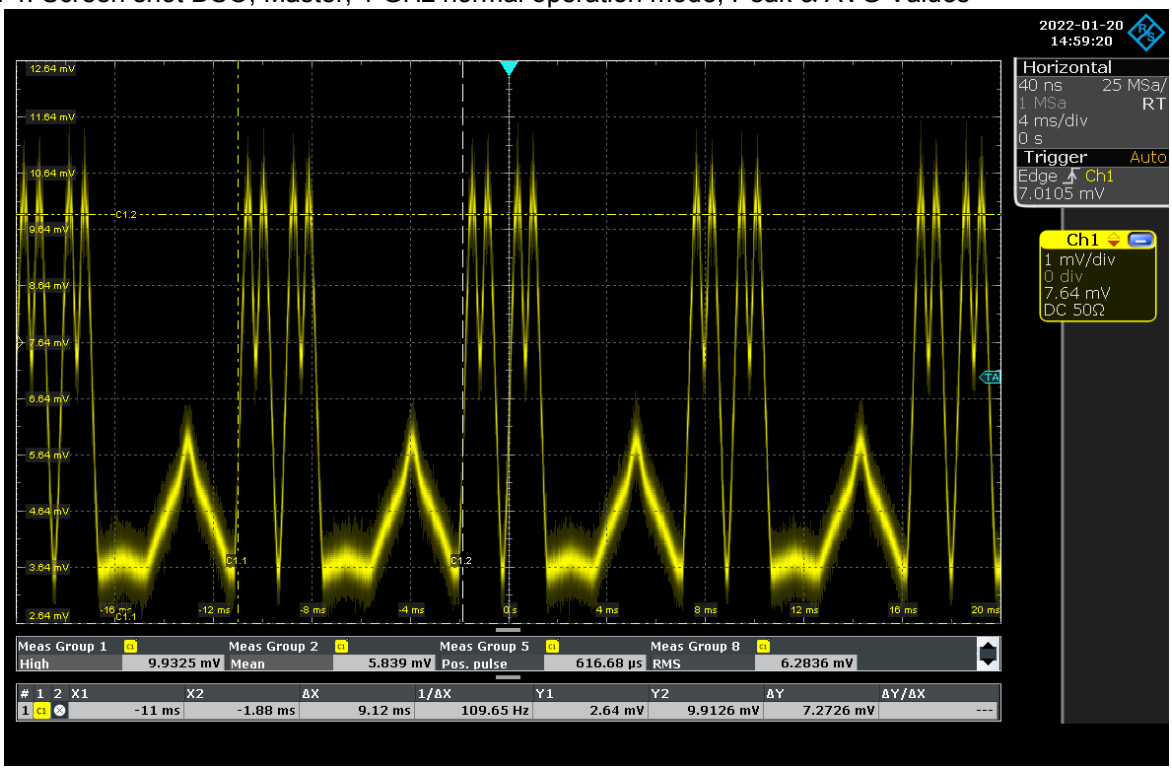
Plot no. 2: Screen shot DSO, Master, 3 GHz normal operation mode, Peak & AVG Values



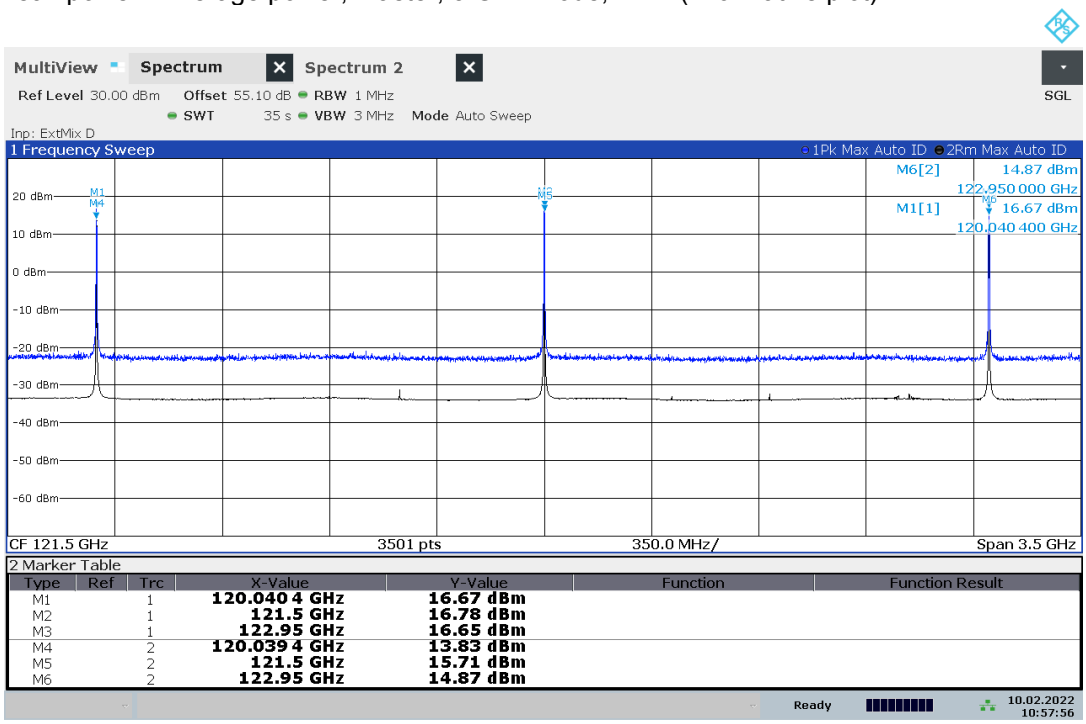
Plot no. 3: Screen shot DSO, Master, 1 GHz normal operation mode, Peak & AVG Values



Plot no. 4: Screen shot DSO, Master, 1 GHz normal operation mode, Peak & AVG Values

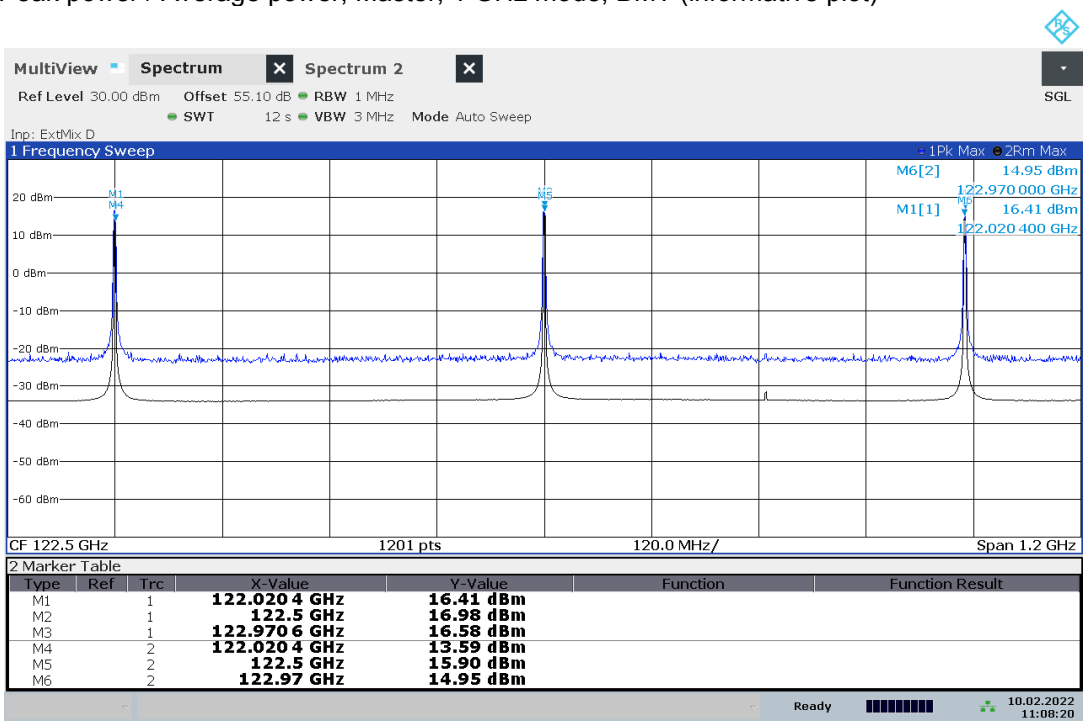


Plot no. 5: Peak power / Average power, Master, 3 GHz mode, BMT (informative plot)



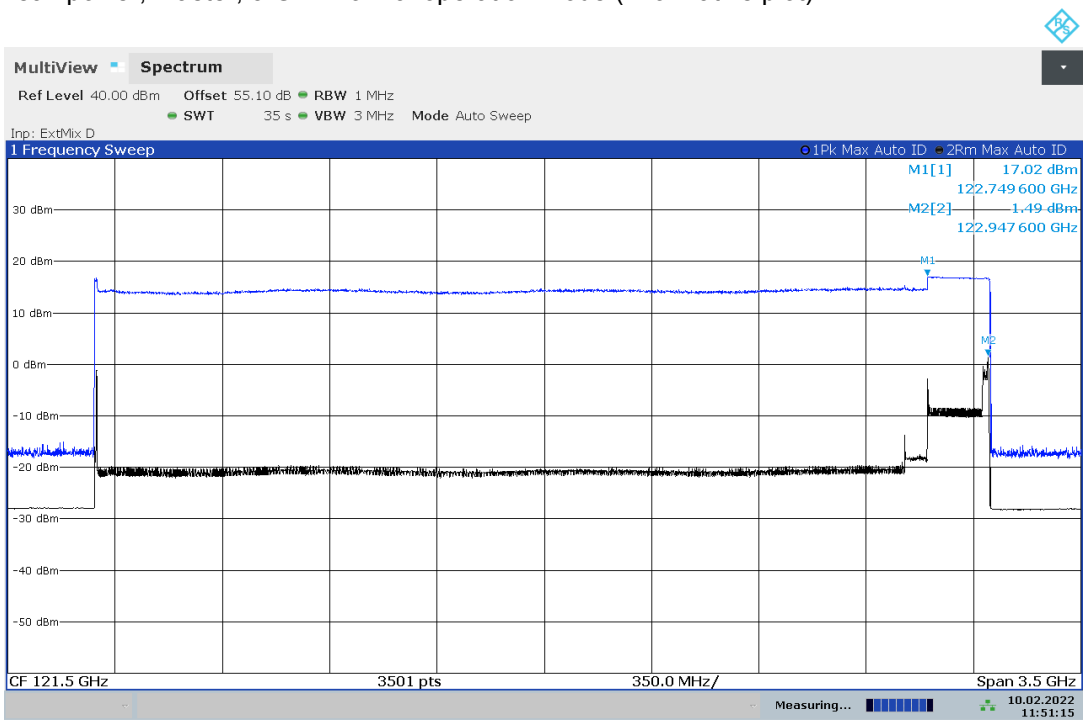
10:57:57 10.02.2022

Plot no. 6: Peak power / Average power, Master, 1 GHz mode, BMT (informative plot)



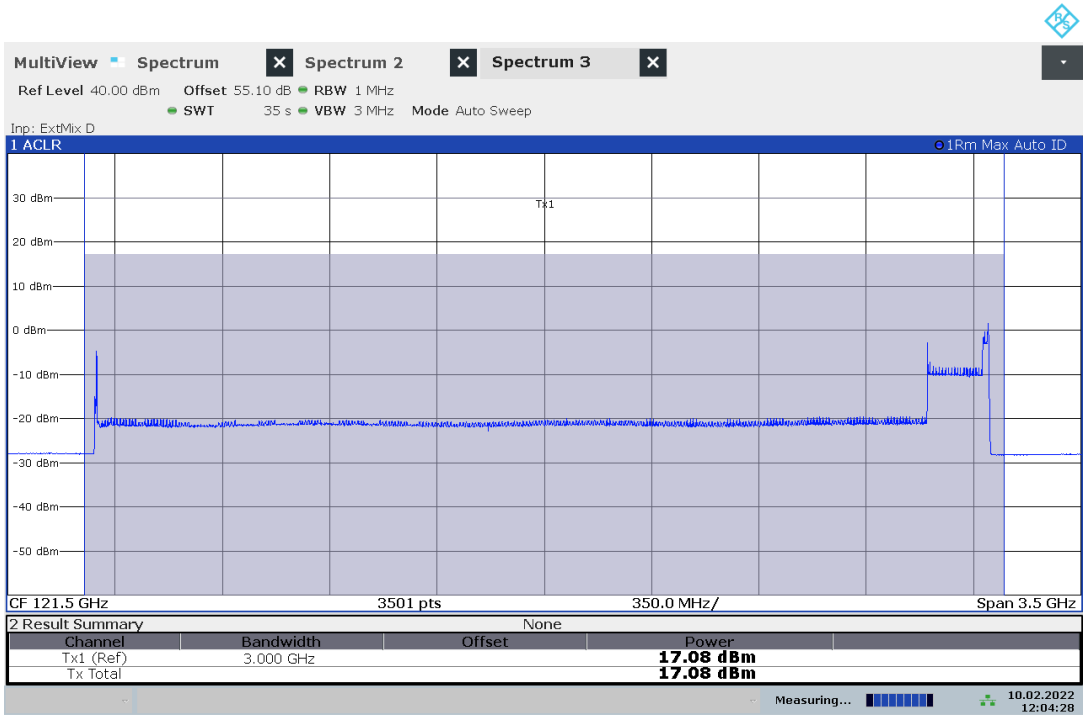
11:08:20 10.02.2022

Plot no. 7: Peak power, Master, 3 GHz normal operation mode (informative plot)



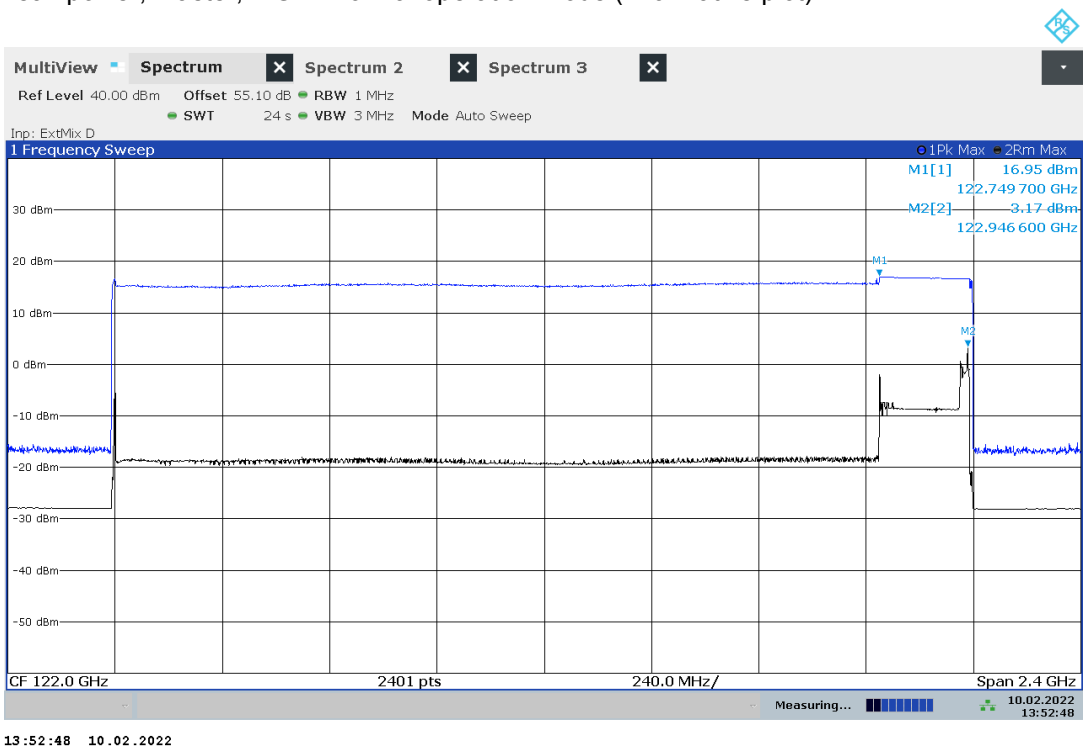
11:51:15 10.02.2022

Plot no. 8: Average power, Master, 3 GHz normal operation mode (informative plot)



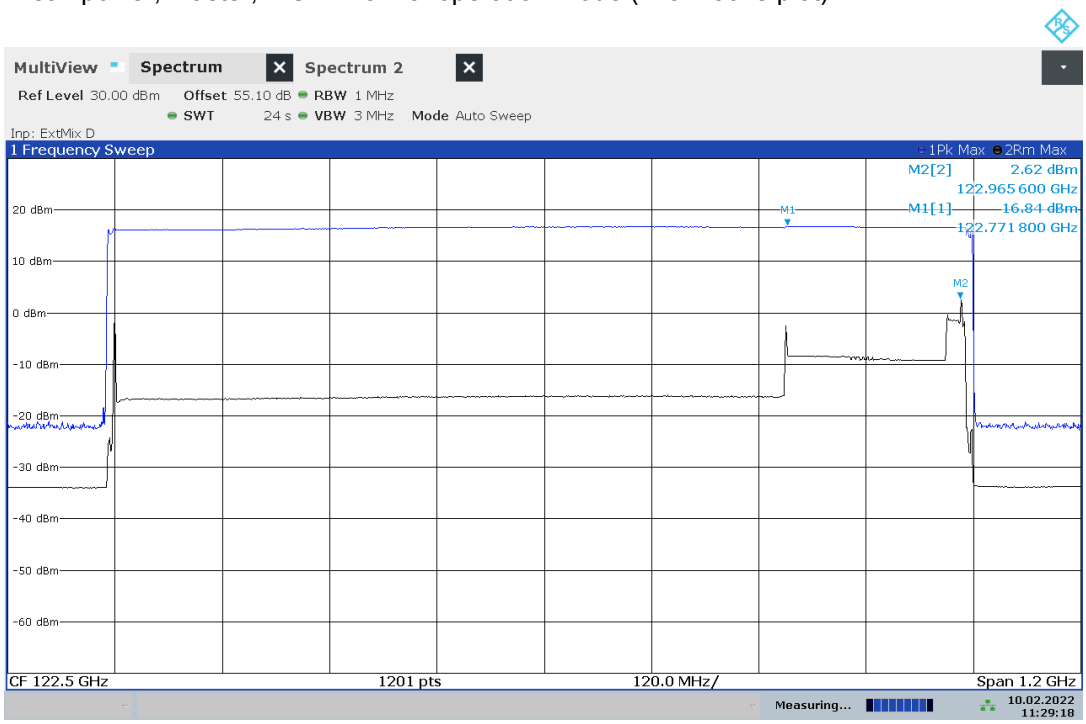
12:04:28 10.02.2022

Plot no. 9: Peak power, Master, 2 GHz normal operation mode (informative plot)



Plot no. 10: Average power, Master, 2 GHz normal operation mode (informative plot)

Plot no. 11: Peak power, Master, 1 GHz normal operation mode (informative plot)

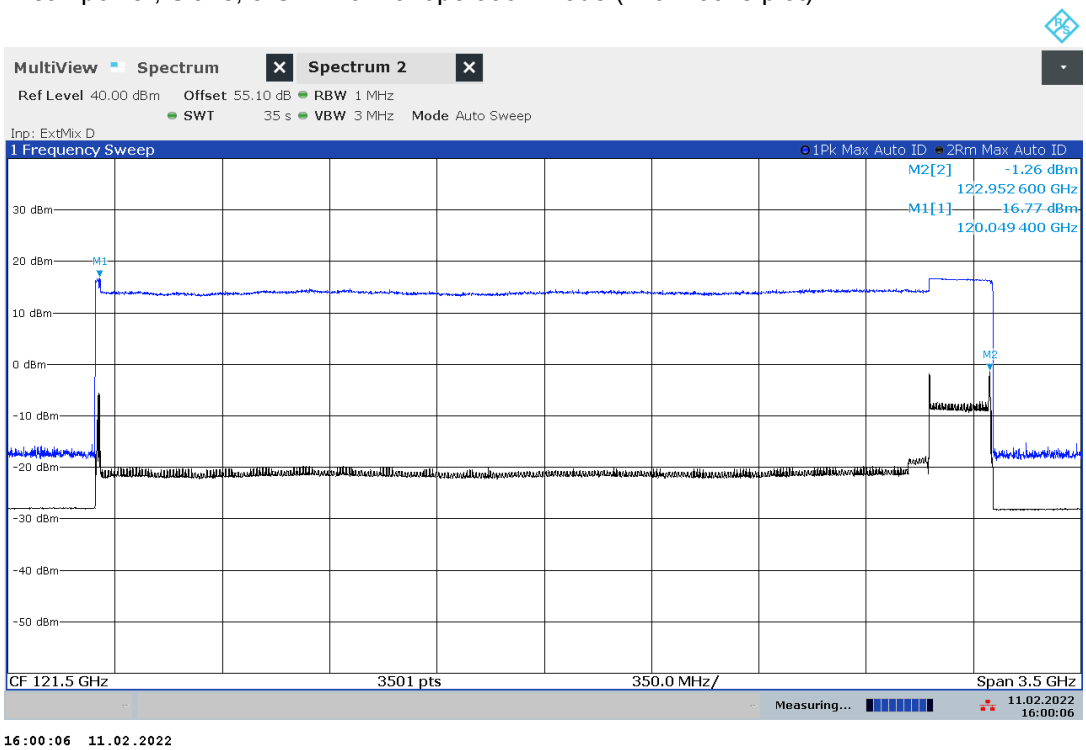


11:29:19 10.02.2022

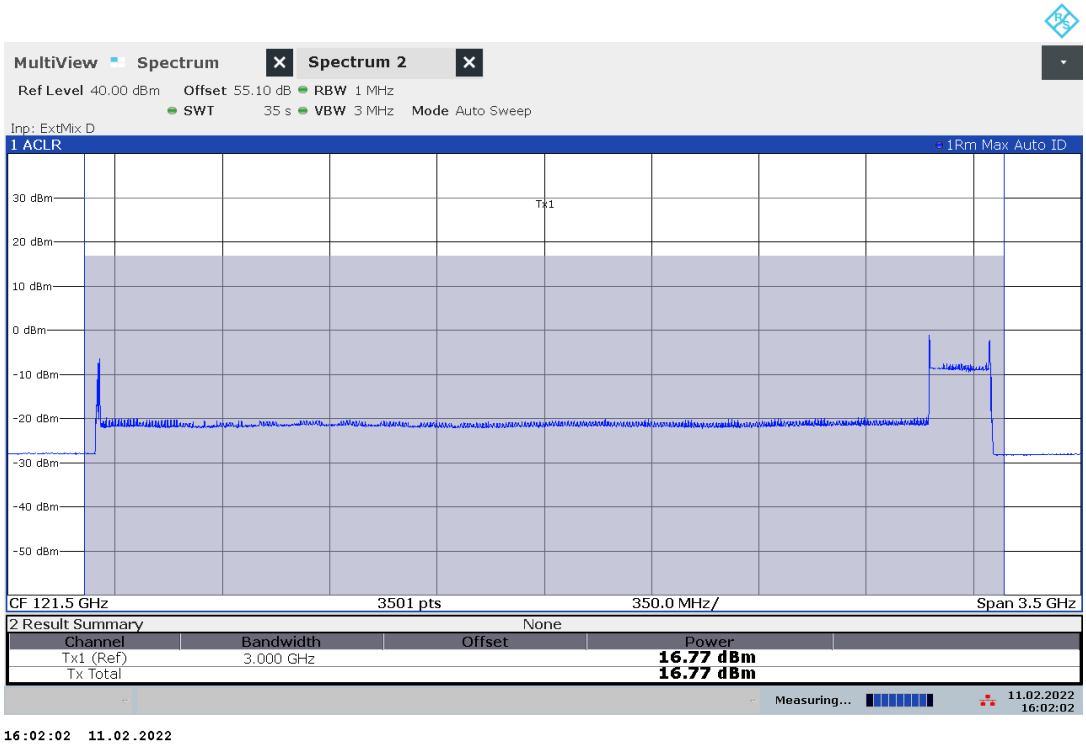
Plot no. 12: Average power, Master, 1 GHz normal operation mode (informative plot)

12:26:53 10.02.2022

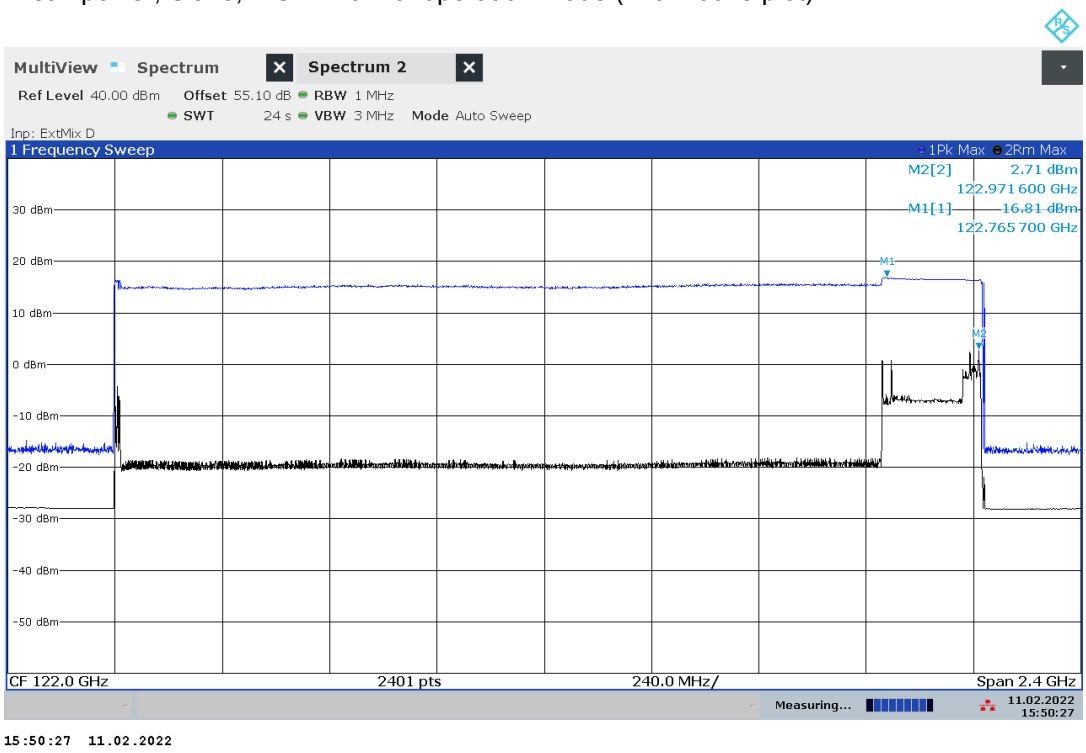
Plot no. 13: Peak power, Slave, 3 GHz normal operation mode (informative plot)



Plot no. 14: Average power, Slave, 3 GHz normal operation mode (informative plot)

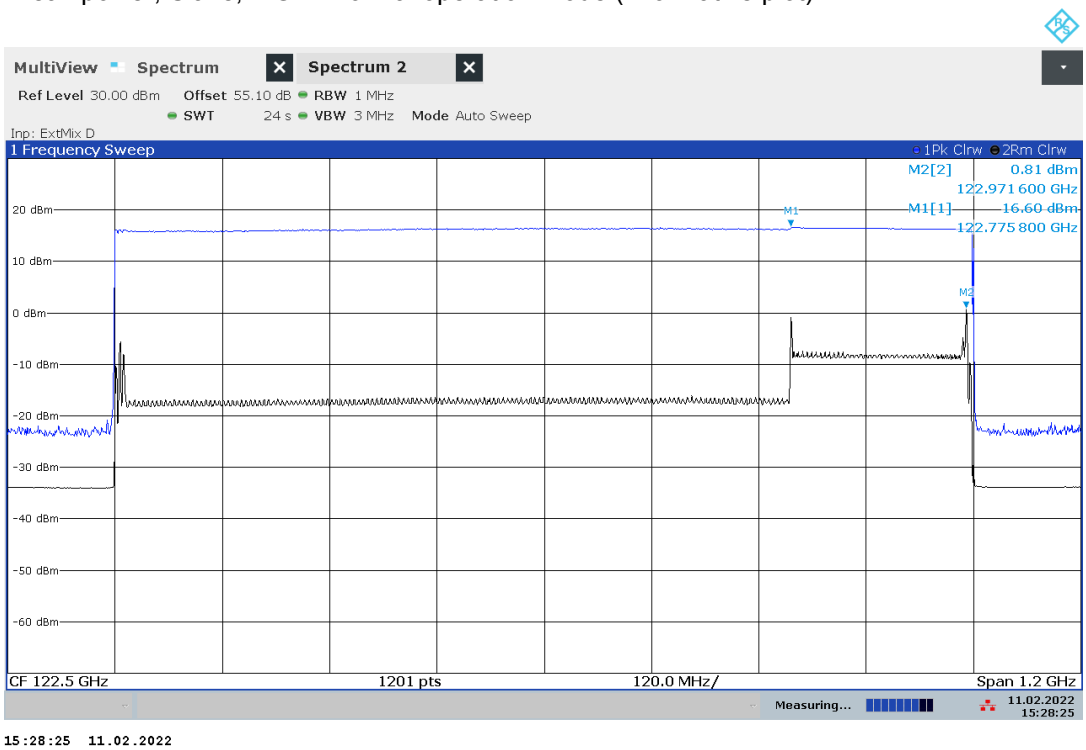


Plot no. 15: Peak power, Slave, 2 GHz normal operation mode (informative plot)



Plot no. 16: Average power, Slave, 2 GHz normal operation mode (informative plot)

Plot no. 17: Peak power, Slave, 1 GHz normal operation mode (informative plot)



15:28:25 11.02.2022

Plot no. 18: Average power, Slave, 1 GHz normal operation mode (informative plot)

15:34:47 11.02.2022

7.2 Occupied bandwidth (§2.1049)

Description

§2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

Limits

The radar device's occupied bandwidth (i.e. 99% emission bandwidth) shall be contained in the given frequency band.

Test procedure

ANSI C63.10, 6.9

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.

c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

d) Step a) through step c) might require iteration to adjust within the specified range.

e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.

f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.

g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.

h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Note

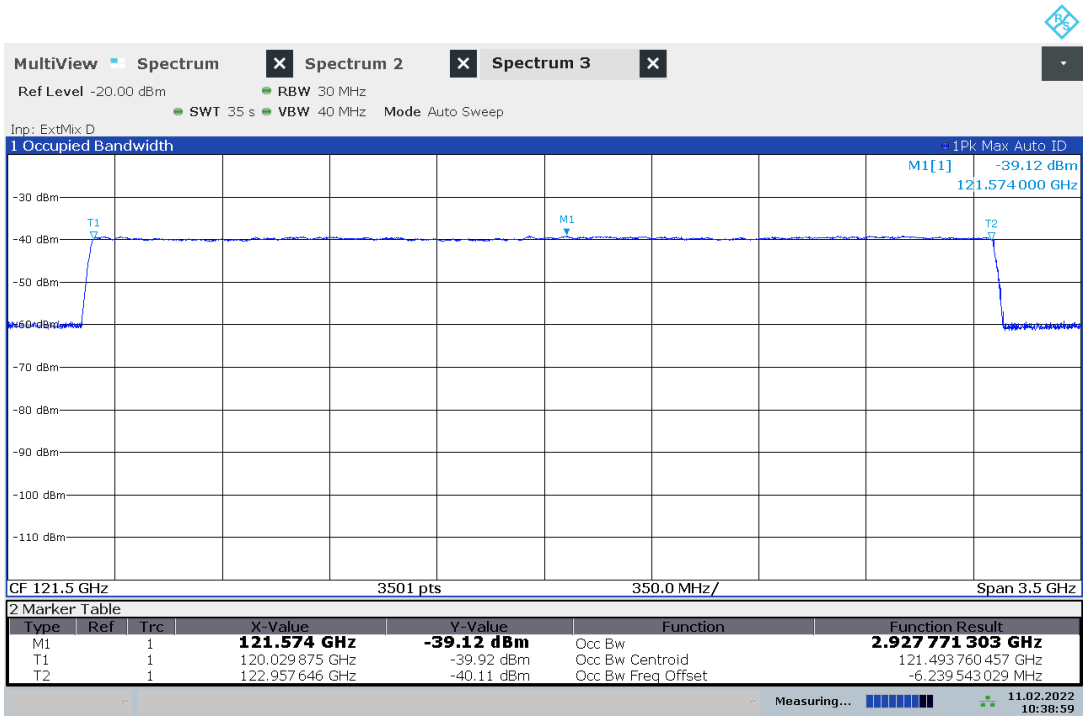
Measurements with the peak detector are also suitable to demonstrate compliance of an EUT, as long as the required resolution bandwidth is used, because peak detection will yield amplitudes equal to or greater than amplitudes measured with quasi-peak (RMS) detector. The measurement data from a spectrum analyser peak detector will represent the worst-case results (see ANSI C63.10, 4.1.3).

Test setup: 8.3, 8.4

Test distance: 1 m

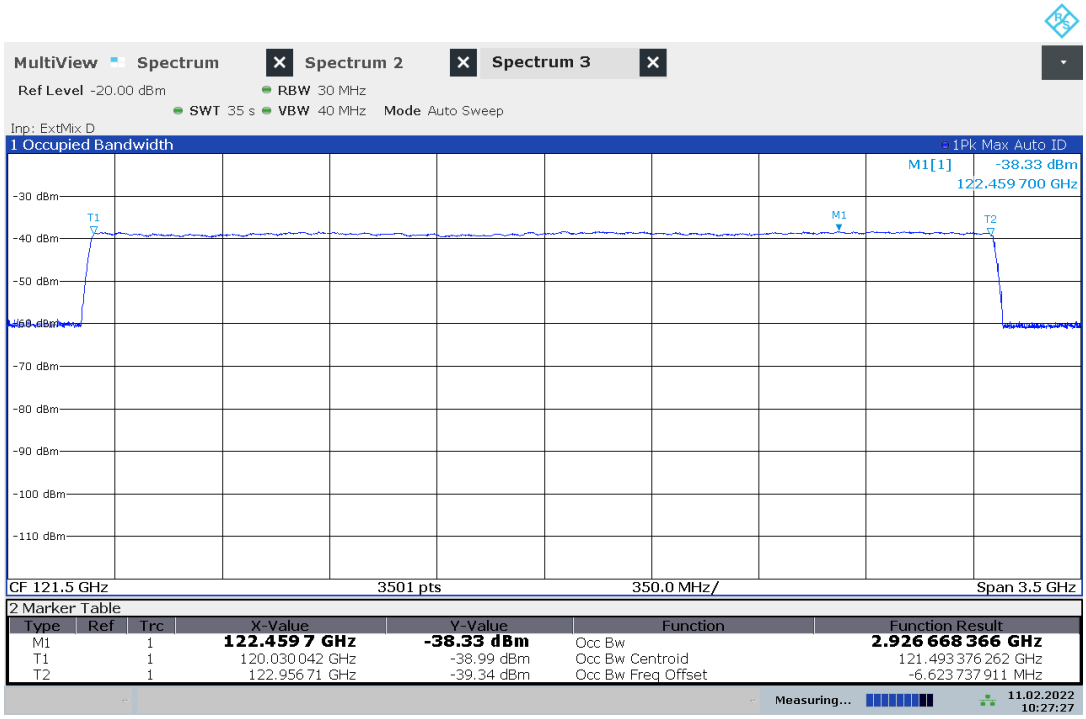
Test results under normal and extreme test conditions:				
EUT mode	**Test conditions**	**f_L [GHz]**	**f_H [GHz]**	**99% OBW [MHz]**
Master, 3 GHz	50 °C	120.0299	122.9576	2927.771
Master, 3 GHz	40 °C	120.0300	122.9567	2926.668
Master, 3 GHz	30 °C	120.0293	122.9564	2927.107
Master, 3 GHz	20 °C	120.0298	**122.9582**	**2928.420**
Master, 3 GHz	10 °C	120.0283	122.9559	2927.557
Master, 3 GHz	0 °C	**120.0275**	122.9553	2927.813
Master, 3 GHz	-10 °C	**120.0275**	122.9555	2928.058
Master, 3 GHz	-20 °C	120.0381	122.9553	2917.207
Master, 2 GHz	20 °C	121.0316	122.9584	1926.736
Master, 1 GHz	20 °C	122.0018	**122.9893**	987.4965
Slave, 3 GHz	20 °C	**120.0304**	**122.9678**	**2937.361**
Slave, 2 GHz	20 °C	121.0360	122.9622	1926.182
Slave, 1 GHz	20 °C	122.0193	122.9785	959.1116
With voltage variation				
Input voltage variation does not affect the transmitted signal (see plots for ambient/normal temperature).				

Plot no. 19: 99% OBW, Peak detector, 50 °C, Master, 3 GHz mode



10:38:59 11.02.2022

Plot no. 20: 99% OBW, Peak detector, 40 °C, Master, 3 GHz mode

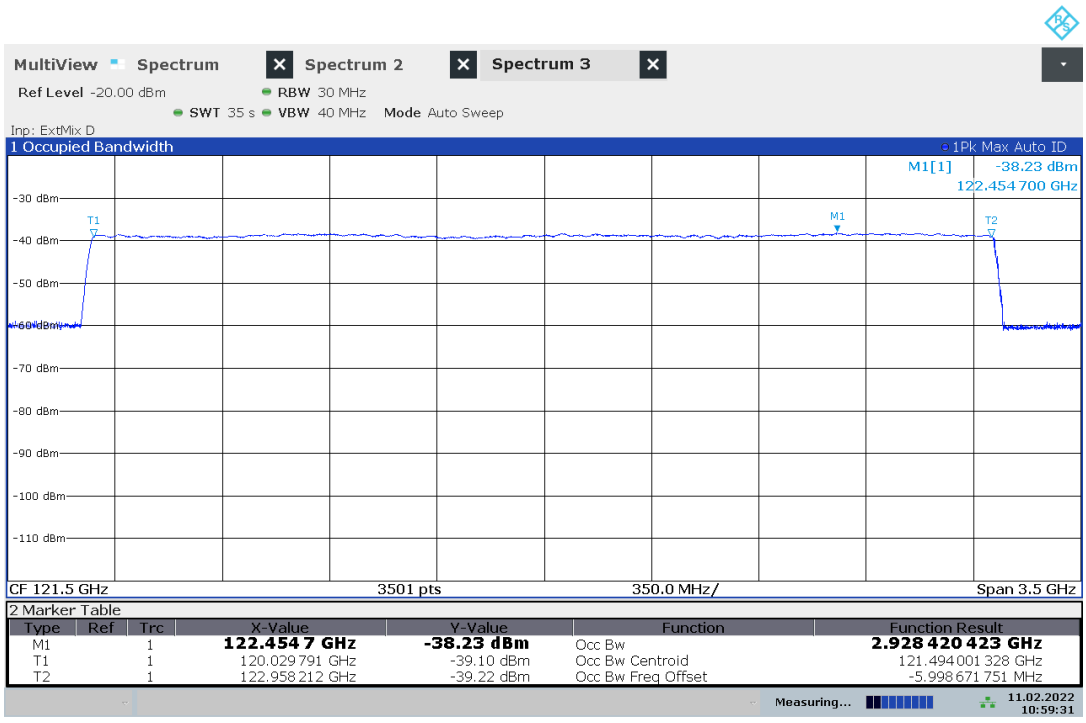


10:27:27 11.02.2022

Plot no. 21: 99% OBW, Peak detector, 30 °C, Master, 3 GHz mode

10:15:05 11.02.2022

Plot no. 22: 99% OBW, Peak detector, 20 °C, $V_{min-max}$, Master, 3 GHz mode



10:59:32 11.02.2022

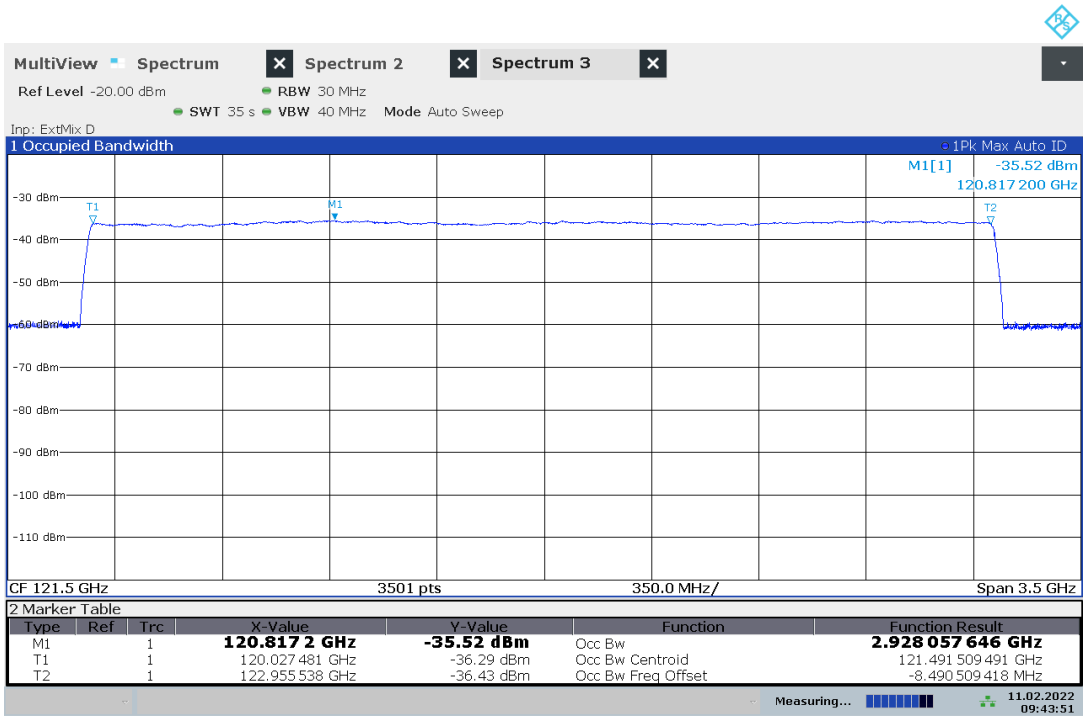
Plot no. 23: 99% OBW, Peak detector, 10 °C, Master, 3 GHz mode

10:06:27 11.02.2022

Plot no. 24: 99% OBW, Peak detector, 0 °C, Master, 3 GHz mode

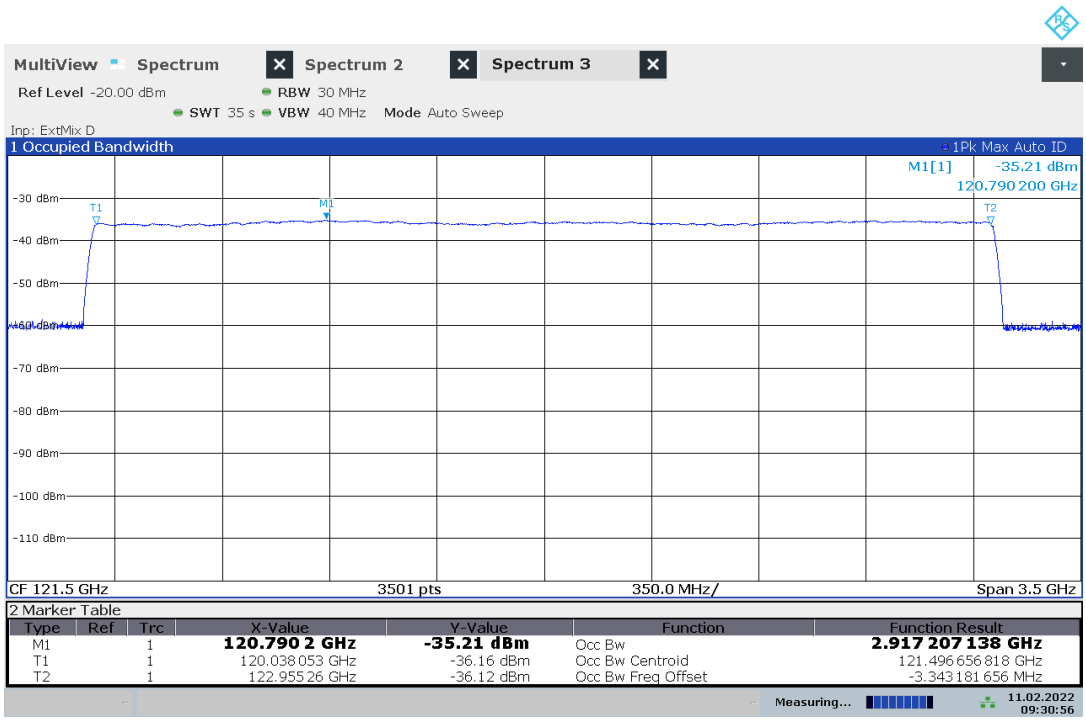
09:55:22 11.02.2022

Plot no. 25: 99% OBW, Peak detector, -10 °C, Master, 3 GHz mode



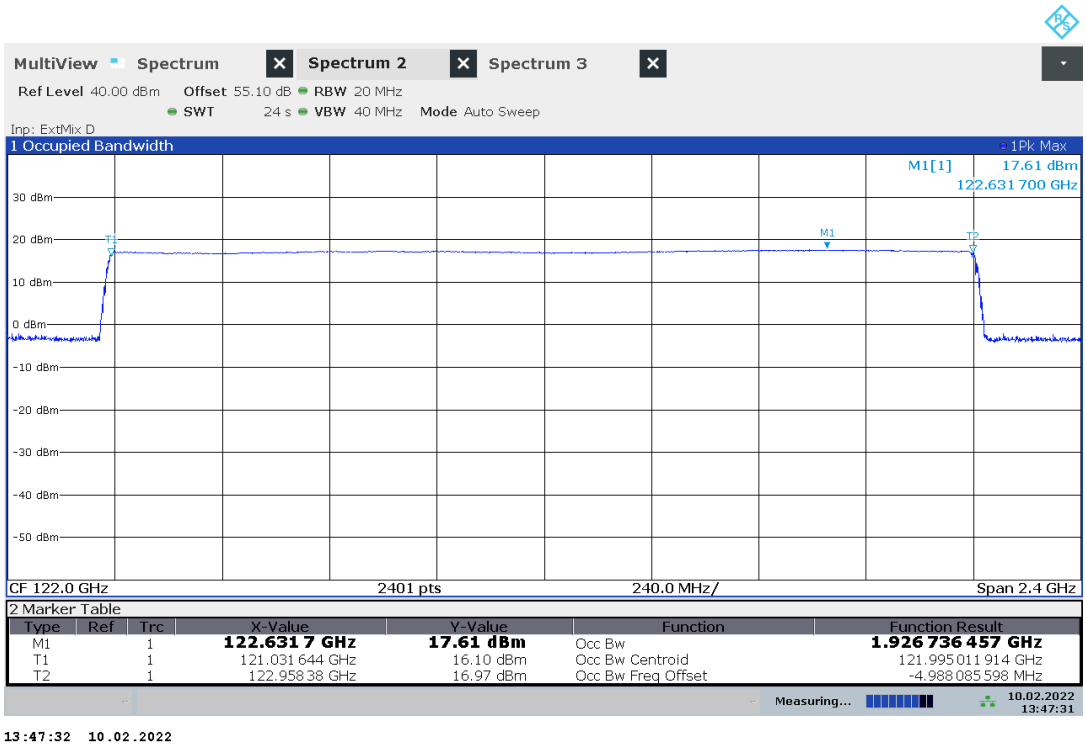
09:43:51 11.02.2022

Plot no. 26: 99% OBW, Peak detector, -20 °C, Master, 3 GHz mode

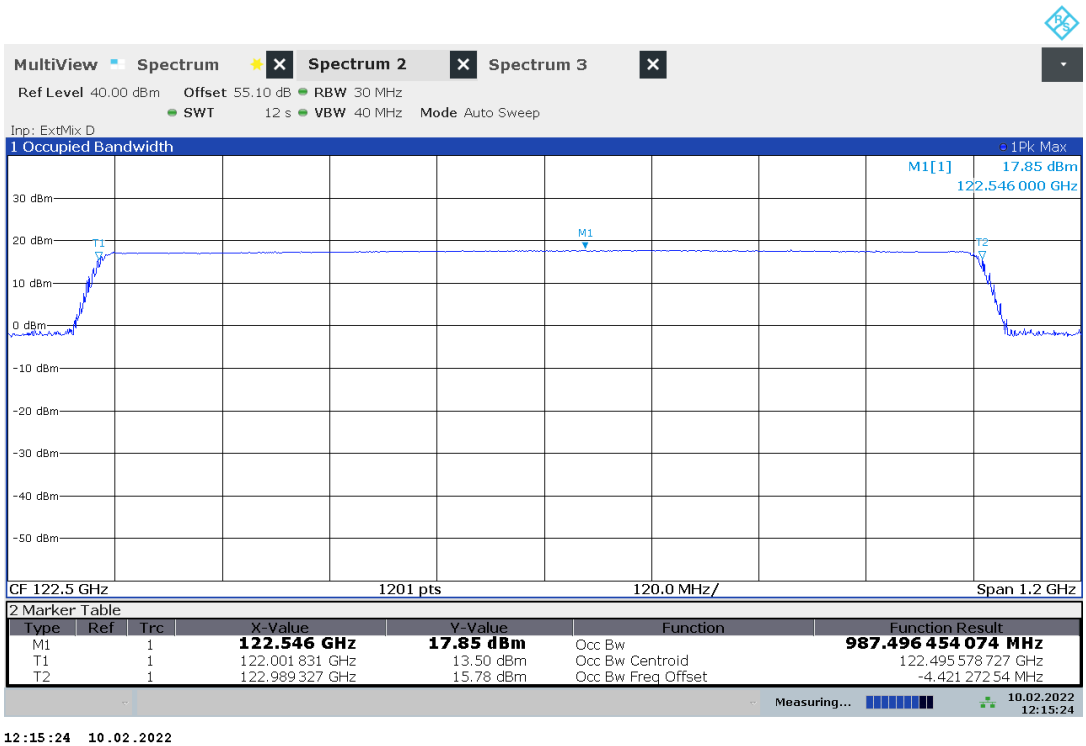


09:30:56 11.02.2022

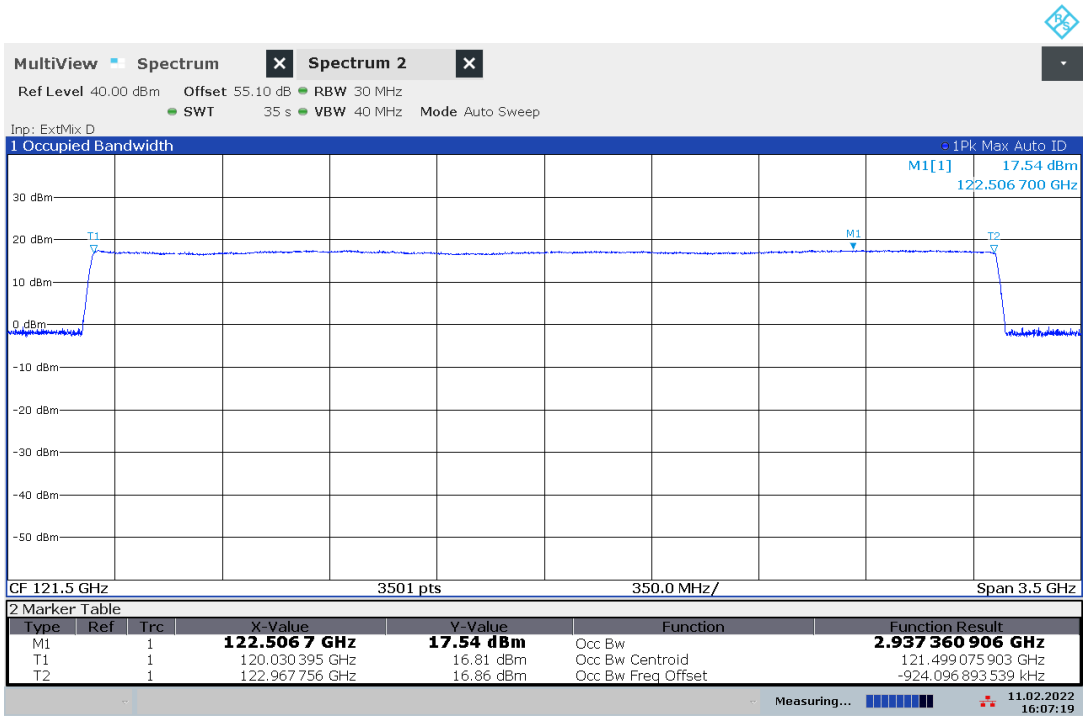
Plot no. 27: 99% OBW, Peak detector, 20 °C, Master, 2 GHz mode



Plot no. 28: 99% OBW, Peak detector, -30 °C, Master, 1 GHz mode

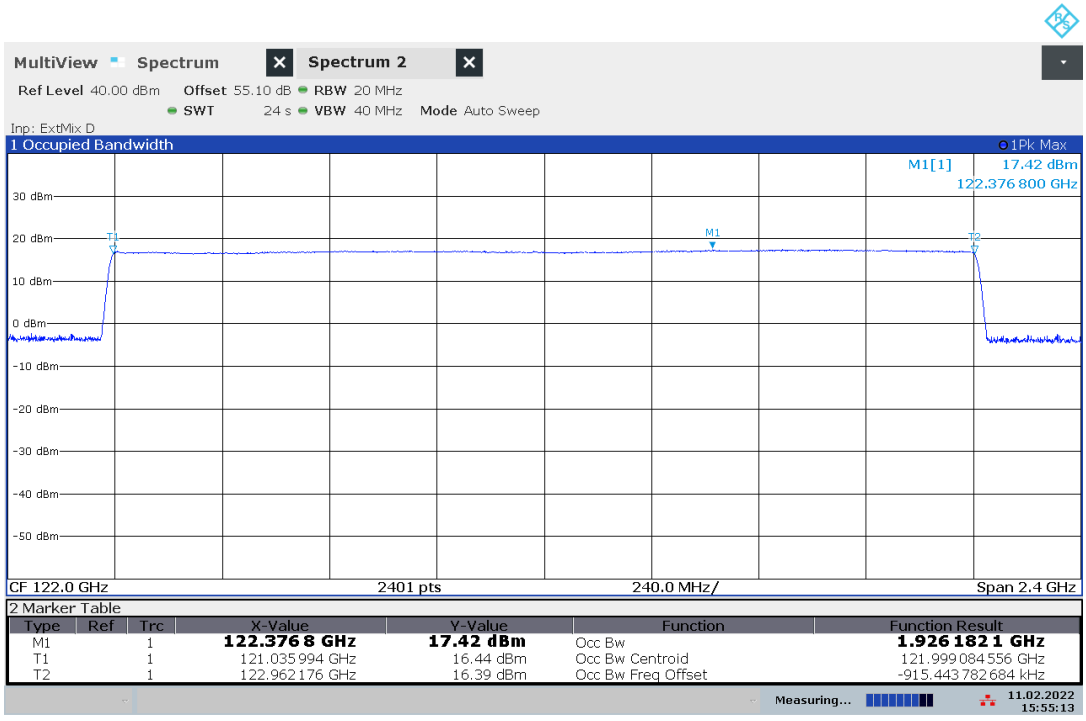


Plot no. 29: 99% OBW, Peak detector, 20 °C, Slave, 3 GHz mode



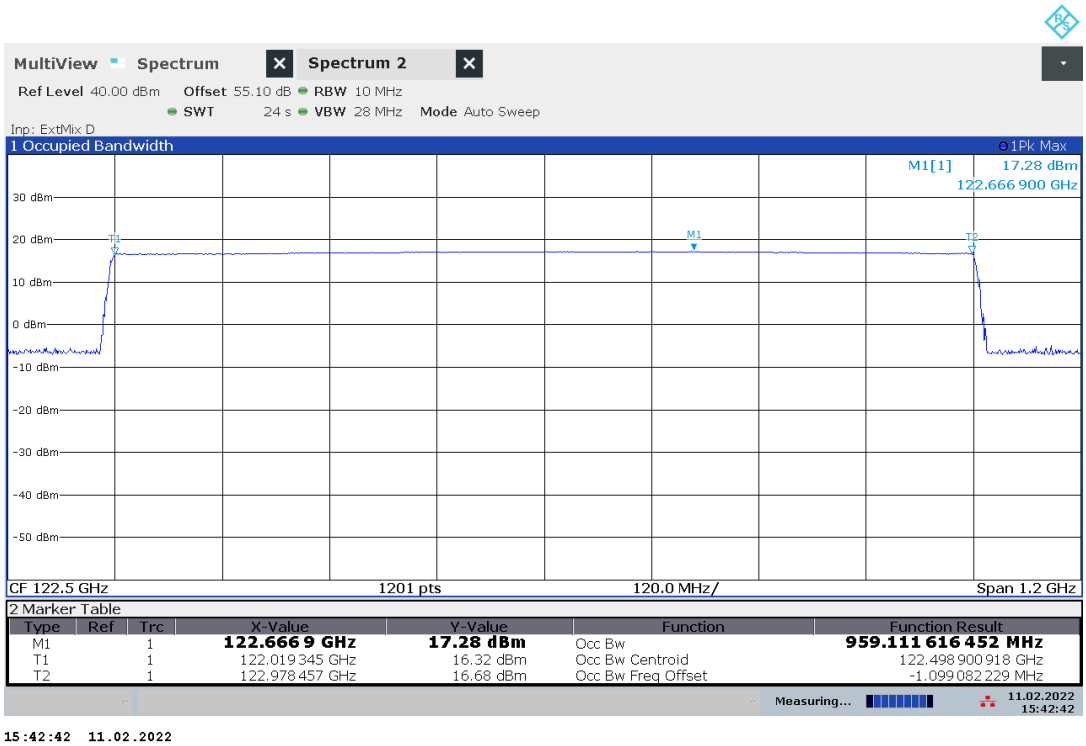
16:07:19 11.02.2022

Plot no. 30: 99% OBW, Peak detector, 20 °C, Slave, 2 GHz mode



15:55:13 11.02.2022

Plot no. 31: 99% OBW, Peak detector, 20 °C, Slave, 1 GHz mode



7.3 Field strength of emissions (spurious and harmonics)

Description / Limits

§15.258(c) Spurious emissions shall be limited as follows:

(1) The power density of any emissions outside the band of operation, *e.g.,* 116-123 GHz, 174.8-182 GHz, 185-190 GHz or 244-246 GHz, shall consist solely of spurious emissions.

(2) Radiated emissions below 40 GHz shall not exceed the general limits in §15.209:

Frequency	Field Strength	Measurement distance
0.009 – 0.490 MHz	2400/F[kHz] µV/m	300 m
0.490 – 1.705 MHz	24000/F[kHz] µV/m	30 m
1.705 – 30.0 MHz	30.0 µV/m / 29.5 dBµV/m	30 m
30 – 88 MHz	100 µV/m / 40.0 dBµV/m	3 m
88 – 216 MHz	150 µV/m / 43.5 dBµV/m	3 m
216 – 960 MHz	200 µV/m / 46.0 dBµV/m	3 m
960 – 40 000 MHz	500 µV/m / 54.0 dBµV/m	3 m

(3) Between 40 GHz and the highest frequency specified in §15.33, the level of these emissions shall not exceed 90 pW/cm^2 at a distance of 3 meters. This corresponds to an EIRP of -9.9 dBm.

(4) The levels of the spurious emissions shall not exceed the level of the fundamental emission.

Test procedure

§15.31 (c) Except as otherwise indicated in §15.256, for swept frequency equipment, measurements shall be made with the frequency sweep stopped at those frequencies chosen for the measurements to be reported.

§15.31 (m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range	Number of frequencies	Location
< 1MHz bandwidth	1	middle
1 – 10 MHz bandwidth	2	1 near bottom and 1 near top
> 10 MHz bandwidth	3	1 near bottom / middle / top

§15.35 (b) Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g.,see §§15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

§15.35 (c) Unless otherwise specified, e.g., §§15.255(b), and 15.256(l)(5), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to Supplier's Declaration of Conformity.

Calculation of the far field distance (Rayleigh distance):
The aperture dimensions of these horn antennas shall be small enough so that the measurement distance in meters is equal to or greater than the Rayleigh distance (i.e. $R_m = 2D^2 / \lambda$), where D is the largest linear dimension (i.e. width or height) of the antenna aperture in m and λ is the free-space wavelength in meters at the frequency of measurement.

Antenna type	Frequency range [GHz]	D [m]	Highest frequency in use [GHz]	Far field distance R_m [m]
20240-20	18.0 – 26.5	0.0520	26.5	0.47
22240-20	26.5 – 40.0	0.0342	40	0.31
23240-20	33.0 – 50.0	0.0280	50	0.26
24240-20	40.0 – 60.0	0.0230	60	0.21
25240-20	50.0 – 75.0	0.0185	75	0.17
26240-20	60.0 – 90.0	0.0150	90	0.13
27240-20	75.0 – 110	0.0124	110	0.11
28240-20	90.0 – 140	0.0100	140	0.09
29240-20	110 – 170	0.0085	170	0.08
30240-20	140 – 220	0.0068	220	0.06
32240-20	220 – 325	0.00446	325	0.04
570240-20	325 – 500	0.00294	375	0.02

Used test distances:

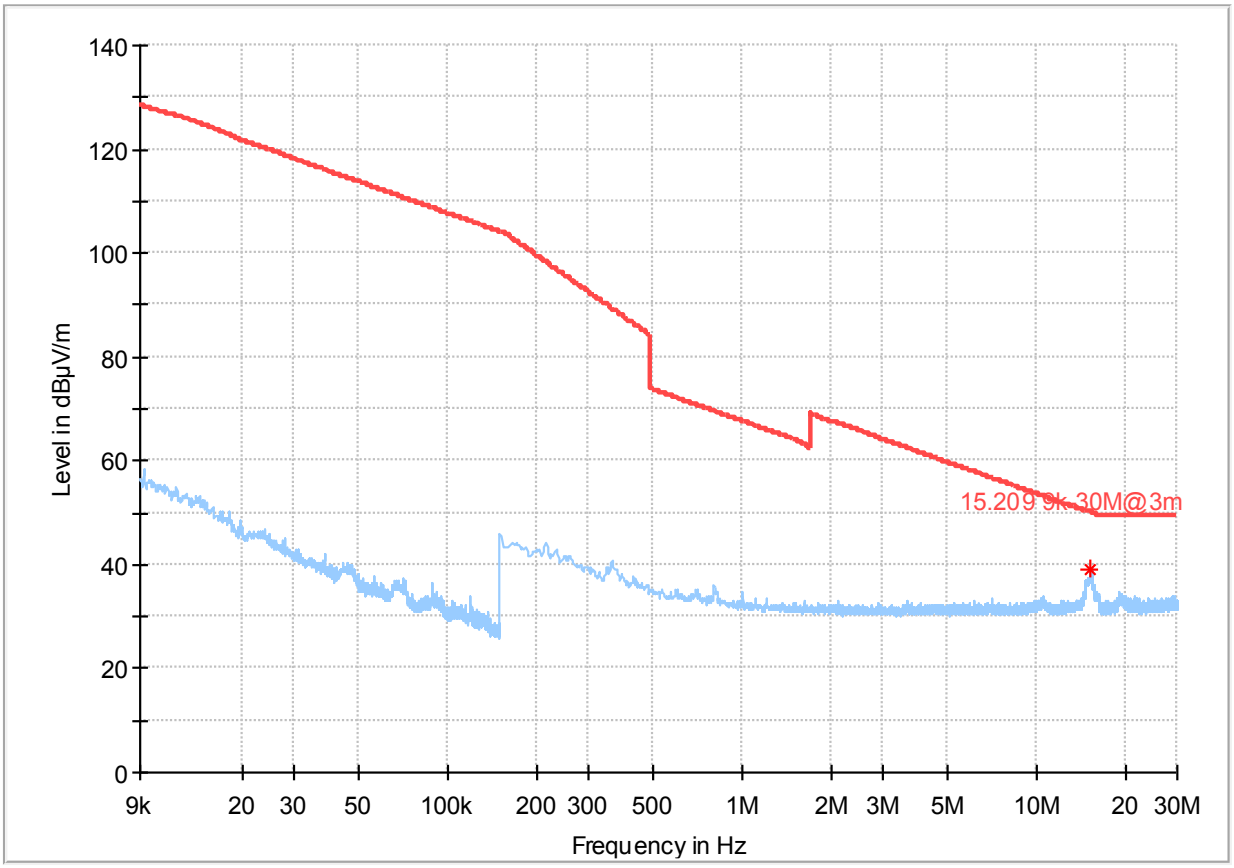
Up to 18 GHz:	3.00 m
18 – 75 GHz:	0.50 m
75 – 110 GHz:	0.20 m
110 – 140 GHz:	0.10 m
140 – 220 GHz:	0.15 m
220 – 325 GHz:	0.04 m
325 – 375 GHz:	0.02 m
in-band tests:	1.0 m

Test setup: 8.1 – 8.4
Test distance correction factor of 20dB/decade is already considered in the plots / result table (if applicable).

Test results:

Channel / Mode	Frequency [GHz]	Detector	Test distance [m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]
No critical emissions found, please refer to plots.						

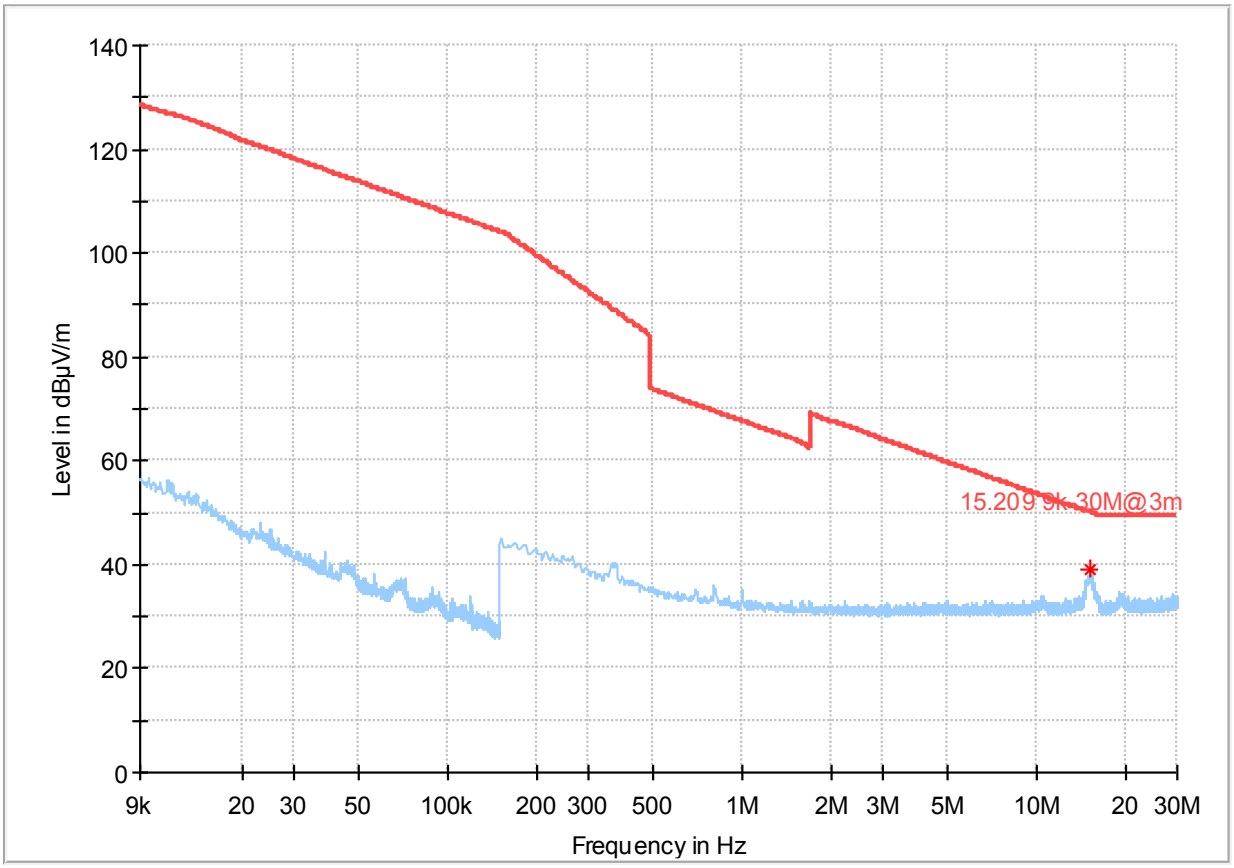
Plot no. 32: radiated emissions 9 kHz – 30 MHz, loop antenna, 3 GHz mode, bottom frequency



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
15.240750	39.15	50.05	10.90	---	---	H	0.0	20.5

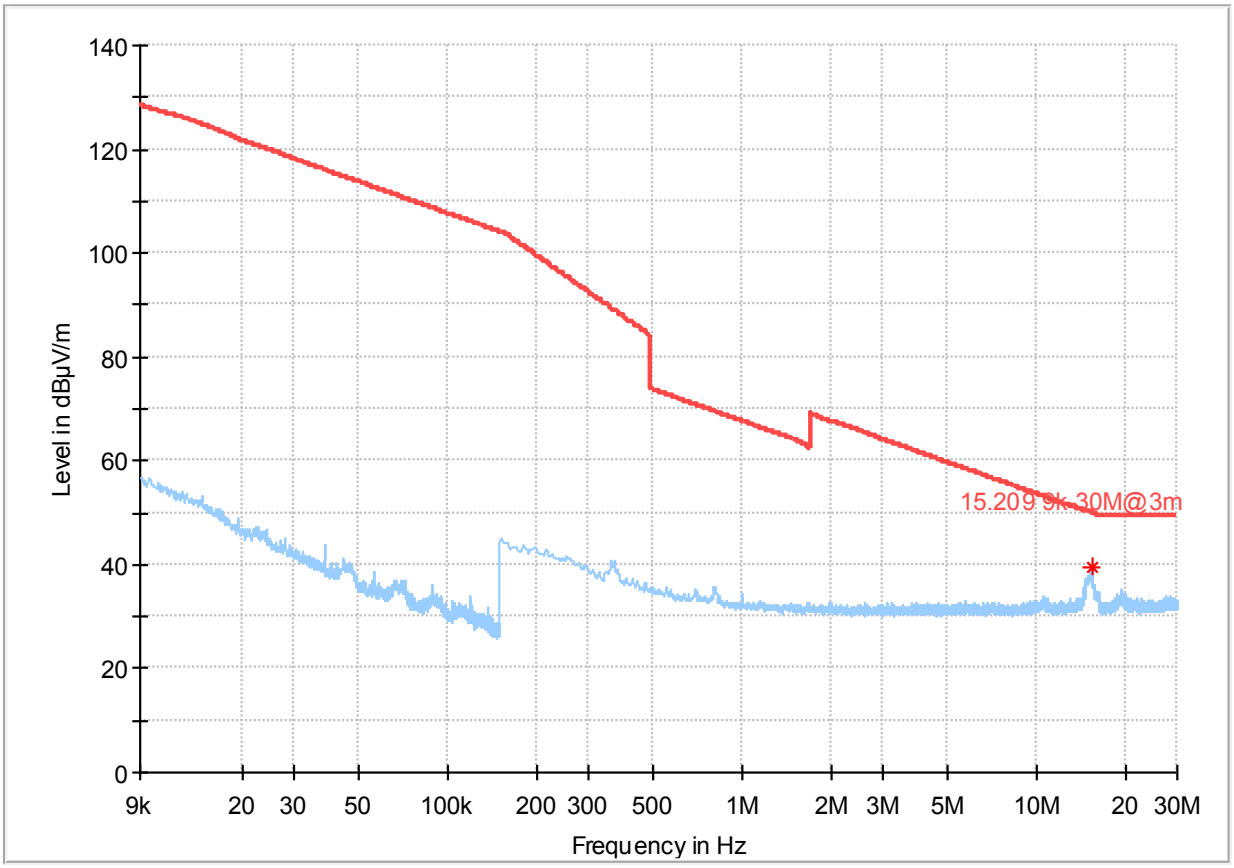
Plot no. 33: radiated emissions 9 kHz – 30 MHz, loop antenna, 3 GHz mode, mid frequency



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
15.308250	38.92	50.04	11.13	---	---	V	270.0	20.5

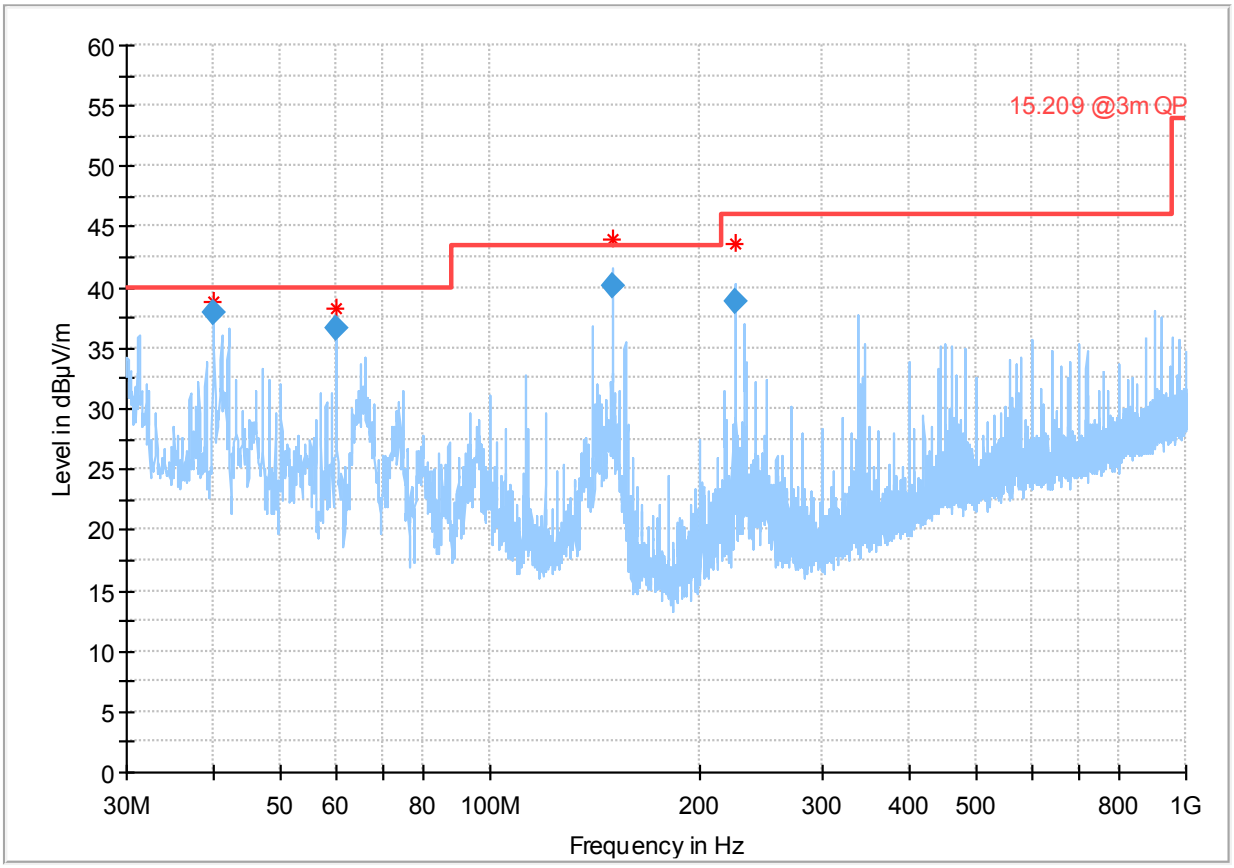
Plot no. 34: radiated emissions 9 kHz – 30 MHz, loop antenna, 3 GHz mode, top frequency



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)
15.366750	39.57	50.04	10.47	---	---	V	270.0	20.5

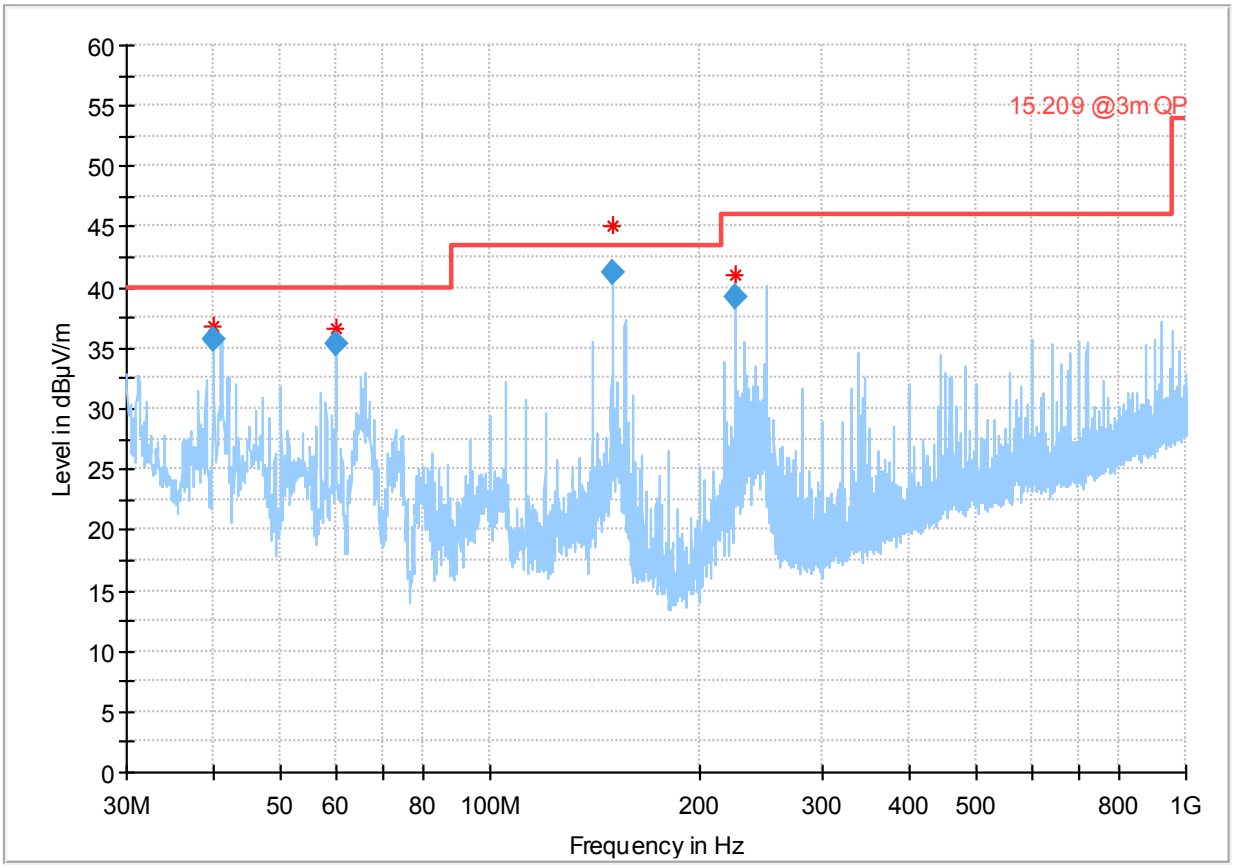
Plot no. 35: radiated emissions 30 MHz – 1 GHz, hor./vert. polarization, 3 GHz mode, bottom frequency



Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
40.014500	37.93	40.00	2.07	100.0	120.000	100.0	V	186.0
59.998000	36.63	40.00	3.37	100.0	120.000	154.0	V	69.0
149.989000	40.06	43.50	3.44	100.0	120.000	153.0	H	182.0
224.995000	38.87	46.00	7.13	100.0	120.000	119.0	V	171.0

Plot no. 36: radiated emissions 30 MHz – 1 GHz, hor./vert. polarization, 3 GHz mode, mid frequency

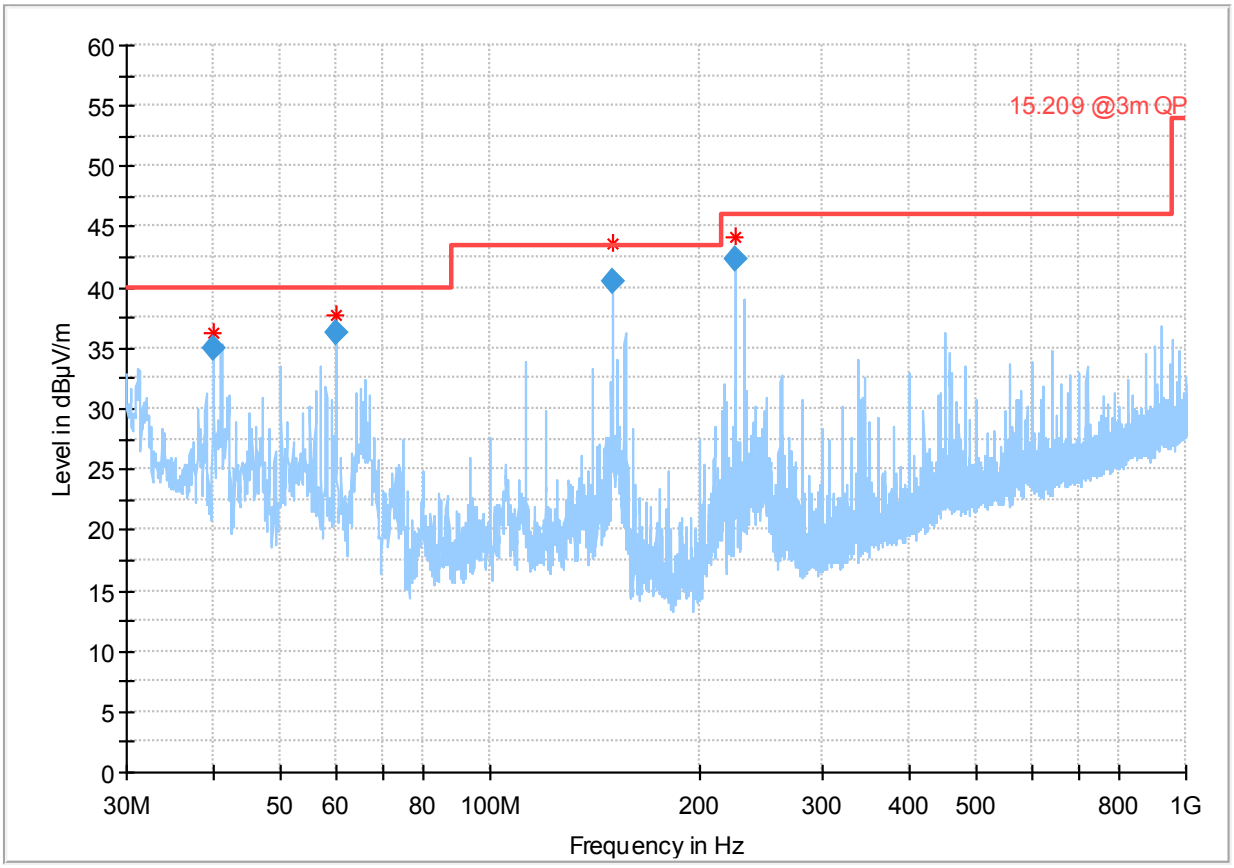


Preview Result 1-PK+ | Critical_Freqs PK+ | 15.209 @3m QP
Final_Result QPK | MaxPeak-PK+ (Single) | QuasiPeak-QPK (Single)

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
40.016000	35.73	40.00	4.27	100.0	120.000	100.0	V	302.0
59.998000	35.33	40.00	4.67	100.0	120.000	147.0	V	329.0
149.989000	41.27	43.50	2.23	100.0	120.000	103.0	V	275.0
224.995000	39.18	46.00	6.82	100.0	120.000	100.0	V	130.0

Plot no. 37: radiated emissions 30 MHz – 1 GHz, hor./vert. polarization, 3 GHz mode, top frequency

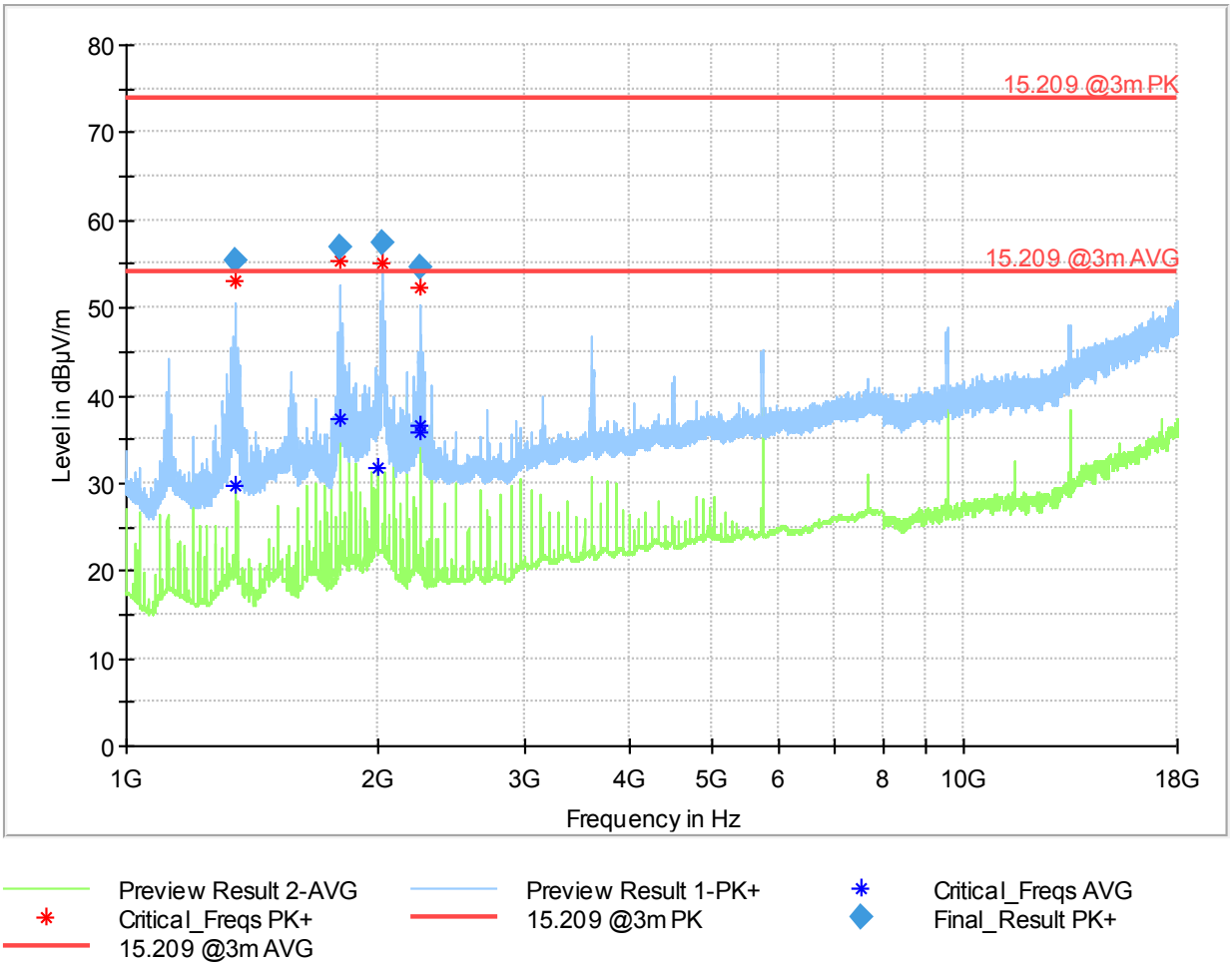


Preview Result 1-PK+ | Critical_Freqs PK+ | 15.209 @3m QP
Final_Result QPK | MaxPeak-PK+ (Single) | QuasiPeak-QPK (Single)

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
40.016000	34.89	40.00	5.11	100.0	120.000	100.0	V	128.0
59.996500	36.28	40.00	3.72	100.0	120.000	150.0	V	3.0
149.989000	40.45	43.50	3.05	100.0	120.000	100.0	V	277.0
224.993500	42.28	46.00	3.72	100.0	120.000	100.0	V	181.0

Plot no. 38: radiated emissions 1 GHz – 18 GHz, hor./vert. polarization, 3 GHz mode, bottom frequency



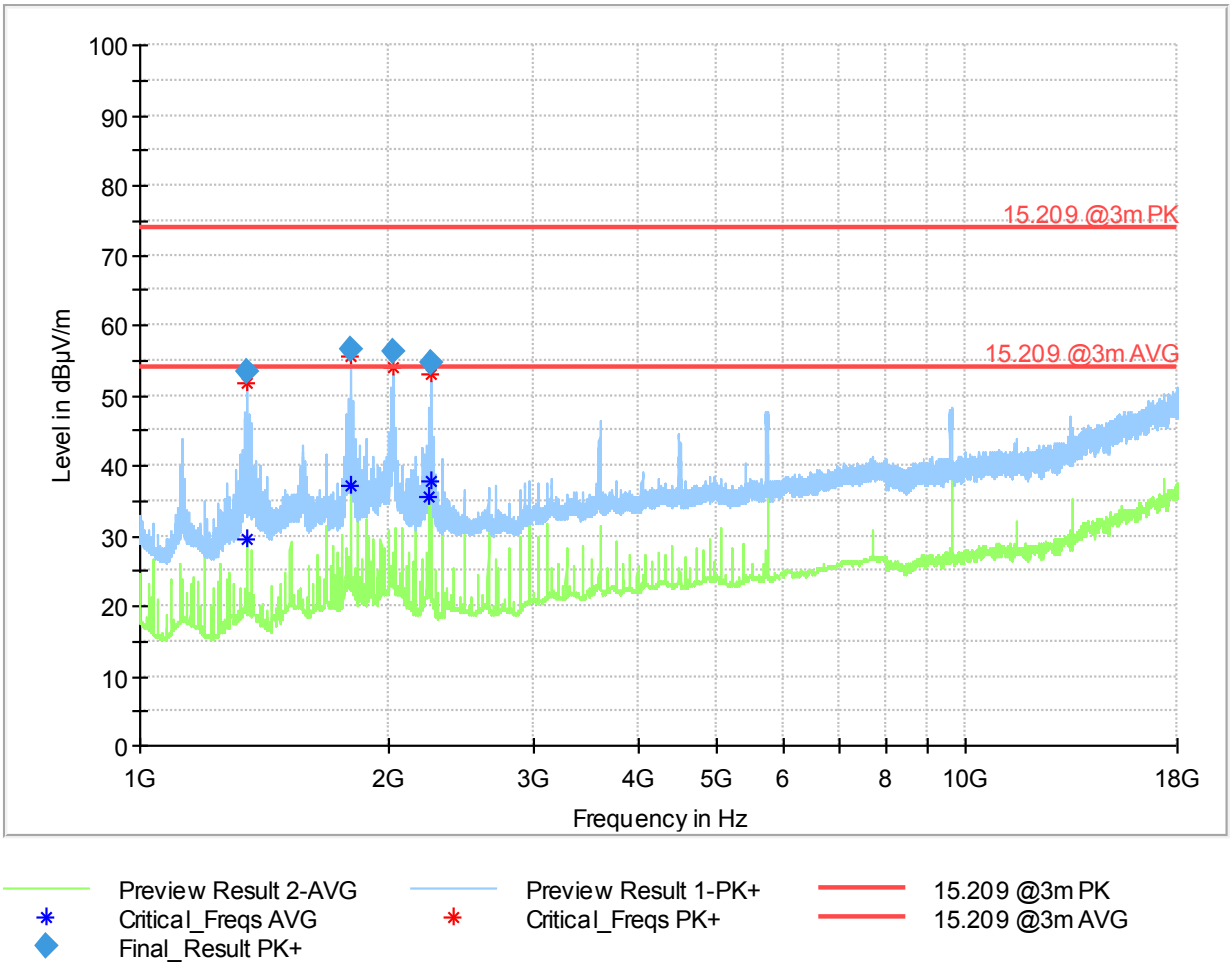
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1349.950000	52.96	---	74.00	21.04	---	---	150.0	V	32.0
1350.025000	---	29.84	54.00	24.16	---	---	150.0	V	4.0
1800.025000	55.45	---	74.00	18.55	---	---	150.0	H	31.0
1800.025000	---	37.29	54.00	16.71	---	---	150.0	H	3.0
1999.975000	---	31.63	54.00	22.37	---	---	150.0	V	13.0
2025.100000	55.18	---	74.00	18.82	---	---	150.0	H	97.0
2239.975000	---	36.67	54.00	17.33	---	---	150.0	H	107.0
2249.950000	52.22	---	74.00	21.78	---	---	150.0	H	96.0
2250.025000	---	35.90	54.00	18.10	---	---	150.0	H	114.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1349.950000	55.25	74.00	18.75	100.0	1000.000	150.0	V	32.0
1800.025000	56.82	74.00	17.18	100.0	1000.000	150.0	H	31.0
2025.100000	57.32	74.00	16.68	100.0	1000.000	150.0	H	97.0
2249.950000	54.64	74.00	19.36	100.0	1000.000	150.0	H	96.0

Plot no. 39: radiated emissions 1 GHz – 18 GHz, hor./vert. polarization, 3 GHz mode, mid frequency



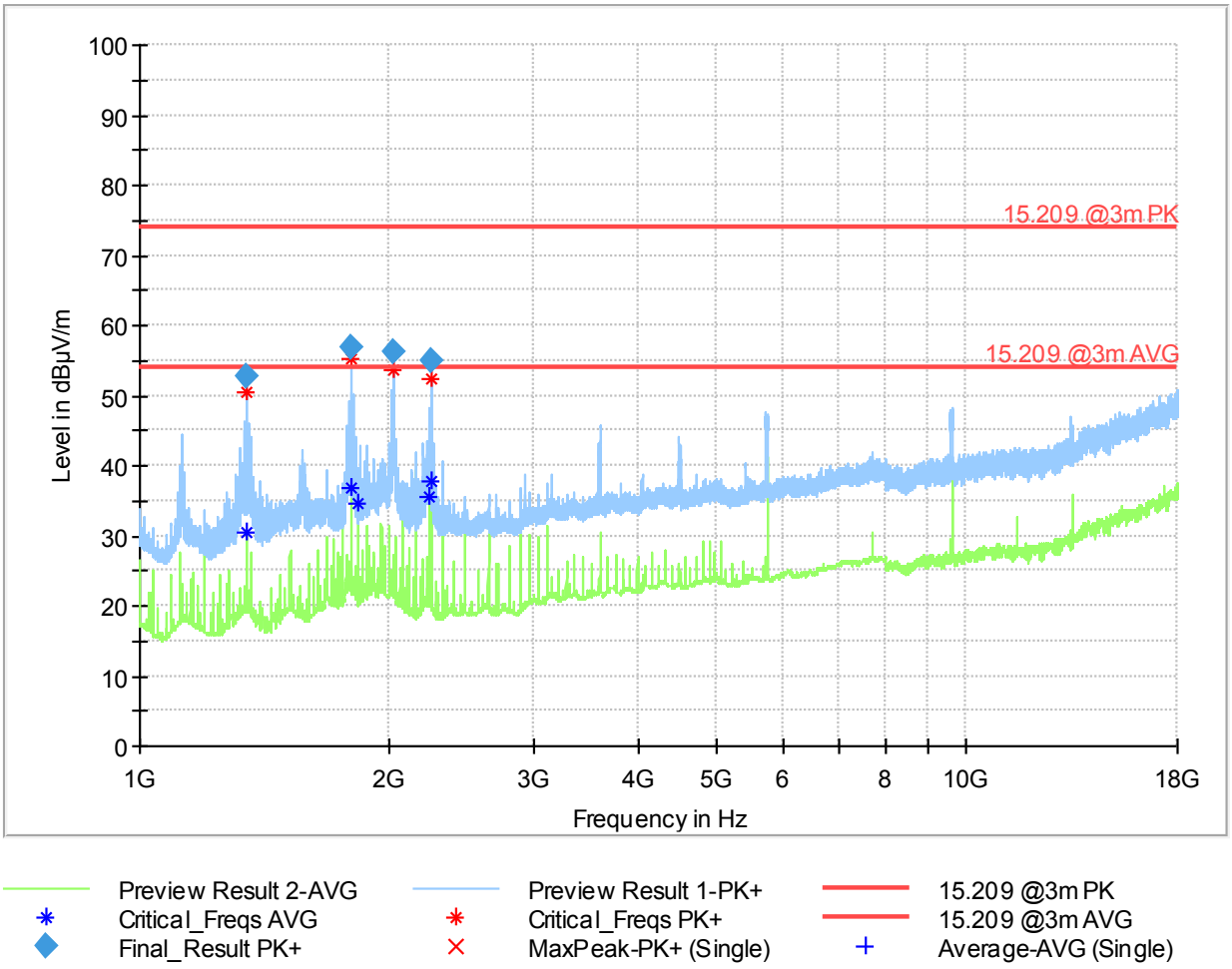
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1349.950000	51.67	---	74.00	22.33	---	---	150.0	V	43.0
1350.025000	---	29.42	54.00	24.58	---	---	150.0	V	13.0
1799.950000	55.46	---	74.00	18.54	---	---	150.0	V	15.0
1800.025000	---	37.13	54.00	16.87	---	---	150.0	H	3.0
2025.025000	54.08	---	74.00	19.92	---	---	150.0	V	43.0
2239.975000	---	35.43	54.00	18.57	---	---	150.0	H	3.0
2249.950000	53.10	---	74.00	20.90	---	---	150.0	H	103.0
2250.025000	---	37.65	54.00	16.35	---	---	150.0	H	106.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1349.950000	53.47	74.00	20.53	100.0	1000.000	150.0	V	43.0
1799.950000	56.39	74.00	17.61	100.0	1000.000	150.0	V	15.0
2025.025000	56.04	74.00	17.96	100.0	1000.000	150.0	V	43.0
2249.950000	54.53	74.00	19.47	100.0	1000.000	150.0	H	103.0

Plot no. 40: radiated emissions 1 GHz – 18 GHz, hor./vert. polarization, 3 GHz mode, top frequency



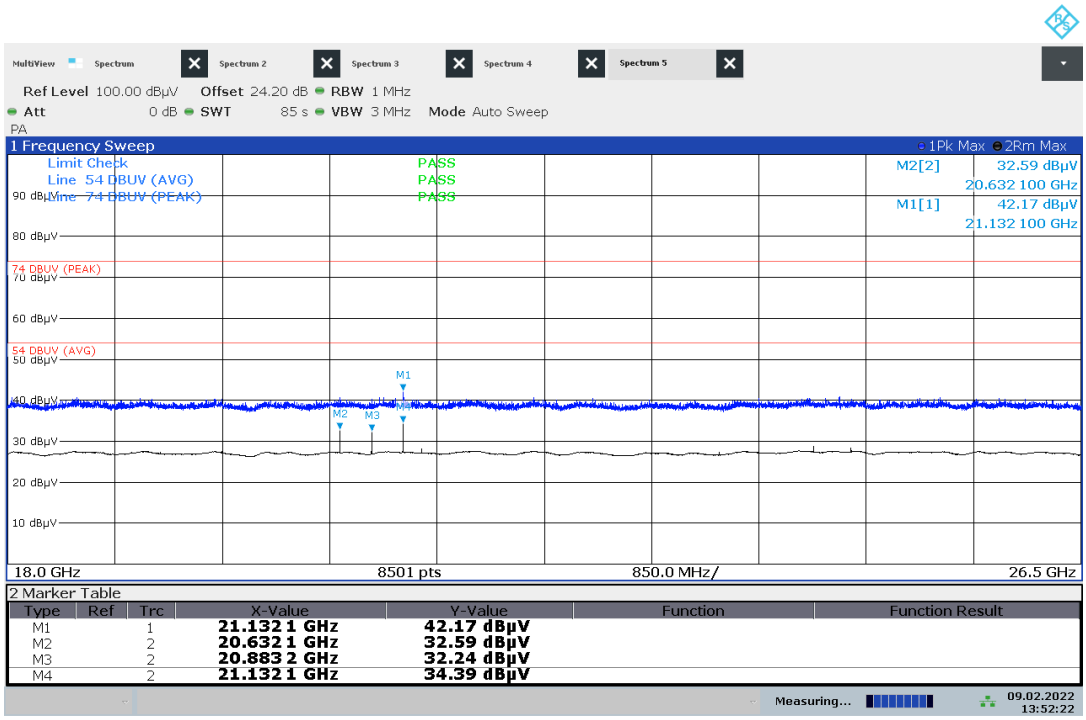
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1350.025000	---	30.36	54.00	23.64	---	---	150.0	V	13.0
1350.025000	50.59	---	74.00	23.41	---	---	150.0	V	13.0
1800.025000	55.20	---	74.00	18.80	---	---	150.0	V	28.0
1800.025000	---	36.85	54.00	17.15	---	---	150.0	H	13.0
1840.000000	---	34.56	54.00	19.44	---	---	150.0	H	107.0
2024.950000	53.78	---	74.00	20.22	---	---	150.0	V	43.0
2239.975000	---	35.45	54.00	18.55	---	---	150.0	H	318.0
2249.875000	52.34	---	74.00	21.66	---	---	150.0	H	102.0
2250.025000	---	37.64	54.00	16.36	---	---	150.0	H	107.0

Final_Result

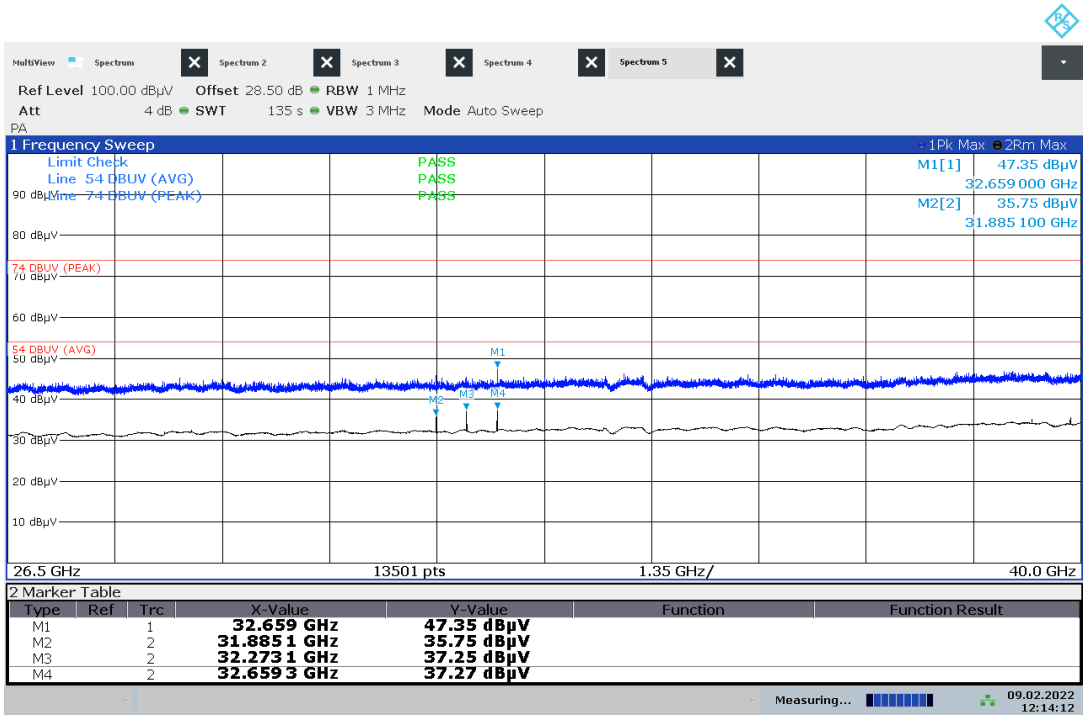
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1350.025000	52.58	74.00	21.42	100.0	1000.000	150.0	V	13.0
1800.025000	56.75	74.00	17.25	100.0	1000.000	150.0	V	28.0
2024.950000	56.33	74.00	17.67	100.0	1000.000	150.0	V	43.0
2249.875000	54.91	74.00	19.09	100.0	1000.000	150.0	H	102.0

Plot no. 41: radiated emissions 18 GHz – 26.5 GHz, hor./vert. polarization, 3 GHz mode, BMT



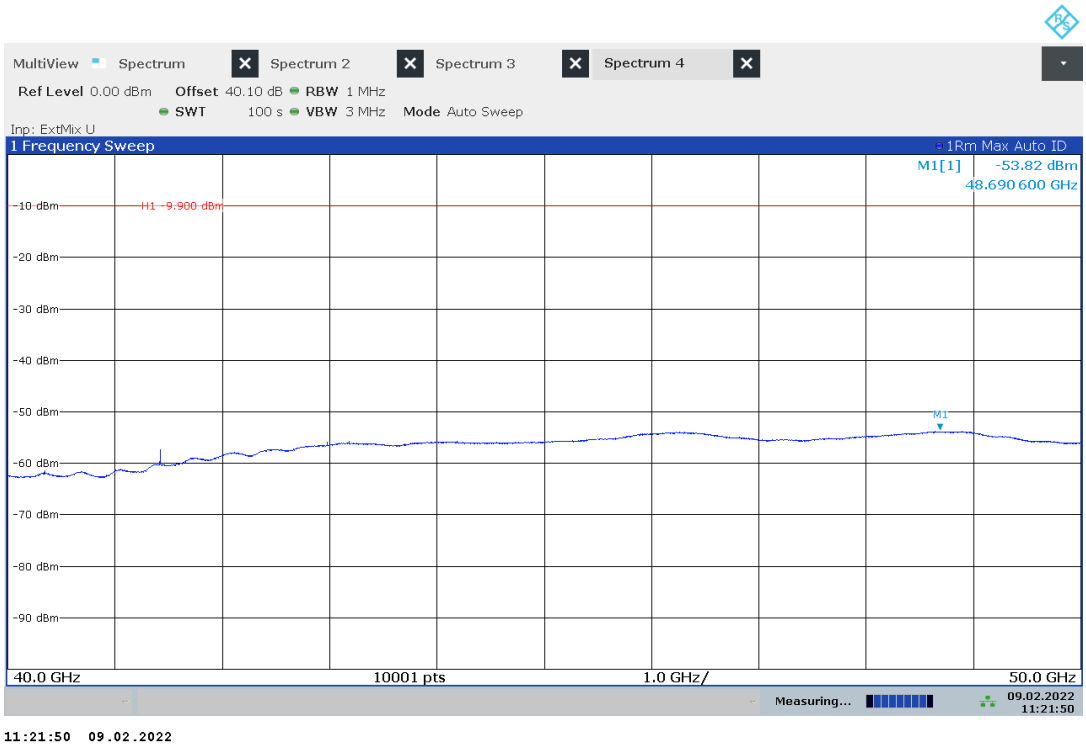
13:52:23 09.02.2022

Plot no. 42: radiated emissions 26.5 GHz – 40 GHz, hor./vert. polarization, 3 GHz mode, BMT



12:14:12 09.02.2022

Plot no. 43: radiated emissions 40 GHz – 50 GHz, hor./vert. polarization, 3 GHz mode, BMT



Plot no. 44: radiated emissions 50 GHz – 75 GHz, hor./vert. polarization, 3 GHz mode, BMT