FCC Measurement/Technical Report on

RRS24F-ST3

FCC ID: QJJ-590113
IC: 8226A-590113

Test Report Reference: MDE_JENOP_2301_FCC_01

Test Laboratory:
7layers GmbH
Borsigstrasse 11
40880 Ratingen
Germany

Deutsche
Akkreditierungsstelle
D-PL-12140-01-01
D-PL-12140-01-02
D-PL-12140-01-03

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1 APPLIED STANDARDS AND TEST SUMMARY

1.1 APPLIED STANDARDS

Type of Authorization
Certification for an Intentional Radiator.

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2 and 15 (10-1-22 Edition). The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

Part 15, Subpart C – Intentional Radiators

§ 15.201 Equipment authorization requirement

§ 15.209 Radiated emission limits; general requirements

§ 15.245 Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz

Summary Test Results:

The EUT complied with all performed tests as listed in chapter 1.3 Measurement Summary / Signatures.

1.2 FCC-IC CORRELATION TABLE

Correlation of measurement requirements for Level-Probing-Radars equipment from FCC and IC

Measurement	FCC reference	IC reference
Fundamental bandwidth	§ 2.1049	RSS-210 Issue 10: Annex F (a)
Fundamental emission	§ 15.245 (b)	RSS-210 Issue 10: Annex F.2 (a)
Unwanted emissions	§ 15.245 (b)(1)(2)(3)	RSS-210 Issue 10: Annex F.2 (a)(b)(c)
Frequency Stability	§ 15.215 (c)	RSS-210 Issue 210: Annex F.2 (e)

1.3 MEASUREMENT SUMMARY / SIGNATURES

47 CFR CHAPTER I FCC PART 15 § 2.1049
Subpart J §2.1049

Fundamental bandwidth
The measurement was performed according to ANSI C63.10 (2013) Chapter 6.9 **Final Result**

OP-Mode Radio Technology, Frequency range	**Setup**	**Date**	**FCC**	**IC**
FSK Radar, 24.08 GHz – 24.09 GHz	S01_AA01	2023-11-30	Passed	Passed
FSK Radar, 24.12 GHz – 24.13 GHz	S01_AA01	2023-11-30	Passed	Passed
FSK Radar, 24.16 GHz – 24.17 GHz	S01_AA01	2023-11-30	Passed	Passed

47 CFR CHAPTER I FCC PART 15 § 15.245 (b)
Subpart C §15.245

Fundamental emission
The measurement was performed according to ANSI C63.10 (2013) Chapter 6.3.3, 6.6 **Final Result**

OP-Mode Radio Technology, Frequency range	**Setup**	**Date**	**FCC**	**IC**
FSK Radar, 24.08 GHz – 24.09 GHz	S01_AA01	2024-01-02	Passed	Passed
FSK Radar, 24.12 GHz – 24.13 GHz	S01_AA01	2024-01-02	Passed	Passed
FSK Radar, 24.16 GHz – 24.17 GHz	S01_AA01	2024-01-02	Passed	Passed

47 CFR CHAPTER I FCC PART 15 § 15.245 (b)(1)(2)(3)
Subpart C §15.256

Unwanted emissions
The measurement was performed according to ANSI C63.10 (2013) Chapter 6.4, 6.5, 6.6 **Final Result**

OP-Mode: outside tank enclosure Radio Technology, Measurement range	**Setup**	**Date**	**FCC**	**IC**
FSK Radar, 9 kHz – 30 MHz	S01_AA01	2023-10-24	Passed	Passed
FSK Radar, 30 MHz – 1 GHz	S01_AA01	2023-10-24	Passed	Passed
FSK Radar, 1 GHz – 18 GHz	S01_AA01	2023-10-24	Passed	Passed
FSK Radar, 18 GHz – 26 GHz	S01_AA01	2023-11-24	Passed	Passed
FSK Radar, 26 GHz – 40 GHz	S01_AA01	2023-12-13	Passed	Passed
FSK Radar, 40 GHz – 60 GHz	S01_AA01	2023-12-18	Passed	Passed
FSK Radar, 60 GHz – 90 GHz	S01_AA01	2024-01-02	Passed	Passed
FSK Radar, 90 GHz – 100 GHz	S01_AA01	2024-01-02	Passed	Passed

47 CFR CHAPTER I FCC PART 15 § 15.245 (c)
Subpart C §15.245

Frequency Stability
The measurement was performed according to ANSI C63.10 (2013) Chapter 6.8

Final Result

OP-Mode	Setup	Date	FCC	IC
Radio Technology, Frequency range				
FSK Radar, 24.08 GHz – 24.09 GHz	S01_AA01	2024-01-04	Passed	Passed
FSK Radar, 24.12 GHz – 24.13 GHz	S01_AA01	2024-01-04	Passed	Passed
FSK Radar, 24.16 GHz – 24.17 GHz	S01_AA01	2024-01-04	Passed	Passed

N/A: Not applicable
N/P: Not performed

2 REVISION HISTORY

Report version control			
Version	**Release date**	**Change Description**	**Version validity**
initial	2024-02-26	--	valid
--	--	--	--

COMMENT: --

(responsible for accreditation scope)
Dipl.-Ing. Marco Kullik

(responsible for testing and report)
B.Sc. Jens Dörwald

7 layers GmbH, Borsigstr. 11
40880 Ratingen, Germany
Phone +49 (0)2102 749 0

3 ADMINISTRATIVE DATA

3.1 TESTING LABORATORY

Company Name:	7layers GmbH
Address:	Borsigstr. 11 40880 Ratingen Germany

The test facility is accredited by the following accreditation organisation:

Laboratory accreditation no:	DAkkS D-PL-12140-01-01 D-PL-12140-01-02 D-PL-12140-01-03
FCC Designation Number:	DE0015
FCC Test Firm Registration:	929146
ISED CAB Identifier	DE0007; ISED#: 3699A
Responsible for accreditation scope:	Dipl.-Ing. Marco Kullik
Report Template Version:	2019-06-18

3.2 PROJECT DATA

Responsible for testing and report:	B.Sc. Jens Dörwald
Employees who performed the tests:	documented internally at 7Layers
Date of Report:	2024-02-26
Testing Period:	2023-10-24 to 2024-01-04

3.3 APPLICANT DATA

Company Name:	JENOPTIK Robot GmbH
Address:	Opladener Strasse 202 40789 Monheim Germany
Contact Person:	-

3.4 MANUFACTURER DATA

Company Name:	please see Applicant Data
Address:	
Contact Person:	

4 TEST OBJECT DATA

4.1 GENERAL EUT DESCRIPTION

Kind of Device product description	The EUT is a Radar Sensor System
Product name	RRS24F-ST3
Type	-
Declared EUT data by the supplier	
Voltage Type	DC
Voltage Level	12 V
Tested Modulation Type	FSK
General product description	The EUT is a speed radar meter device.
The EUT provides the following ports:	DC
Operating Frequencies	24.08 GHz – 24.09 GHz 24.12 GHz – 24.13 GHz 24.16 GHz – 24.17 GHz

The main components of the EUT are listed and described in chapter 3.2 EUT Main components.

4.2 EUT MAIN COMPONENTS

Sample Name	**Sample Code**	**Description**
EUT_aa01	DE1502000aa01	-
Sample Parameter	**Value**	
Serial No.	68470	
HW Version	01	
SW Version	M9Q	
Comment	-	

NOTE:The short description is used to simplify the identification of the EUT in this test report.

4.3 ANCILLARY EQUIPMENT

For the purposes of this test report, ancillary equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless Ancillary Equipment can influence the test results.

Device	**Details (Manufacturer, Type Model, OUT Code)**	**Description**
-	-	-

4.4 AUXILIARY EQUIPMENT

For the purposes of this test report, auxiliary equipment is defined as equipment which is used temporarily to enable operational and control features especially used for the tests of the EUT which is not used during normal operation or equipment that is used during the tests in combination with the EUT but is not subject of this test report. It is necessary to configure the system in a typical fashion, as a customer would normally use it.
But nevertheless Auxiliary Equipment can influence the test results.

Device	**Details (Manufacturer, Type Model, HW, SW, S/N)**	**Description**
-	-	-

4.5 EUT SETUPS

This chapter describes the combination of EUTs and equipment used for testing. The rationale for selecting the EUTs, ancillary and auxiliary equipment and interconnecting cables, is to test a representative configuration meeting the requirements of the referenced standards.

Setup	**Combination of EUTs**	**Description and Rationale**
S01_AA01	EUT_aa01	-

4.6 OPERATING MODES

This chapter describes the operating modes of the EUTs used for testing.

4.6.1 TEST CHANNELS

Channel 1: 24.08 GHz – 24.09 GHz
Channel 2: 24.12 GHz – 24.13 GHz
Channel 3: 24.16 GHz – 24.17 GHz

4.7 PRODUCT LABELLING

4.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

4.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

5 TEST RESULTS

5.1 FUNDAMENTAL BANDWIDTH

Standard **FCC Part 15 Subpart C**

The test was performed according to:
ANSI C63.10

5.1.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the fundamental bandwidth measurements.
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation.
The results recorded were measured with the modulation which produce the worst-case (smallest) emission bandwidth.

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in a fully-anechoic chamber. The EUT and the test antenna were adjusted for maximum main beam coupling.

Analyzer settings:

- Resolution Bandwidth (RBW): 100 kHz
- Video Bandwidth (VBW): 300 kHz
- Span: 30 MHz
- Trace: Maxhold
- Sweeps: allow the trace to stabilize
- Sweeptime: 10 ms
- Detector: Peak

5.1.2 TEST REQUIREMENTS / LIMITS

No applicable limit.

5.1.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1030 hPa
Humidity: 34 %

Channel	Lower -10 dB Frequency [MHz]	Upper -10 dB Frequency [MHz]	Lower Band Edge [MHz]	Upper Band Edge [MHz]	Occupied Bandwidth [MHz]	Margin to Lower Limit [MHz]	Margin to Upper Limit [MHz]
1	24089.14	24099.60	24075	24175	10.46	14.144	75.396
2	24118.98	24129.56	24075	24175	10.58	43.975	45.445
3	24158.82	24169.16	24075	24175	10.34	83.815	5.845

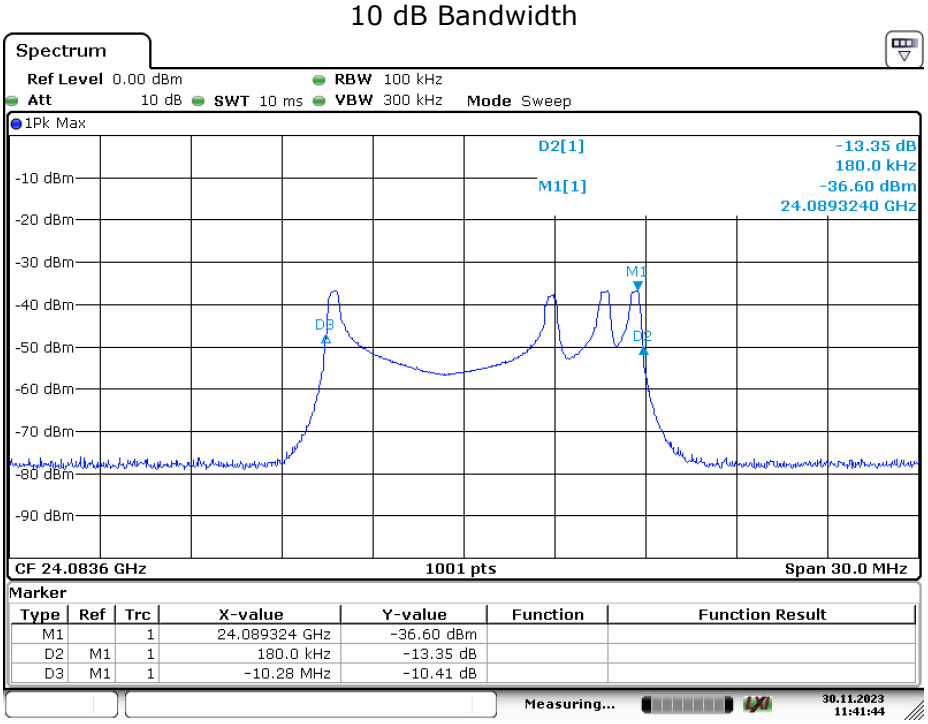
COMMENT: Measurement was performed with activated sweep function.

Channel	Maximum Level Frequency [MHz]	99 % Occupied Bandwidth [MHz]
1	24079.28	10.31
2	24128.39	10.34
3	24169.24	10.40

Remark: Please see next sub-clause for the measurement plot.

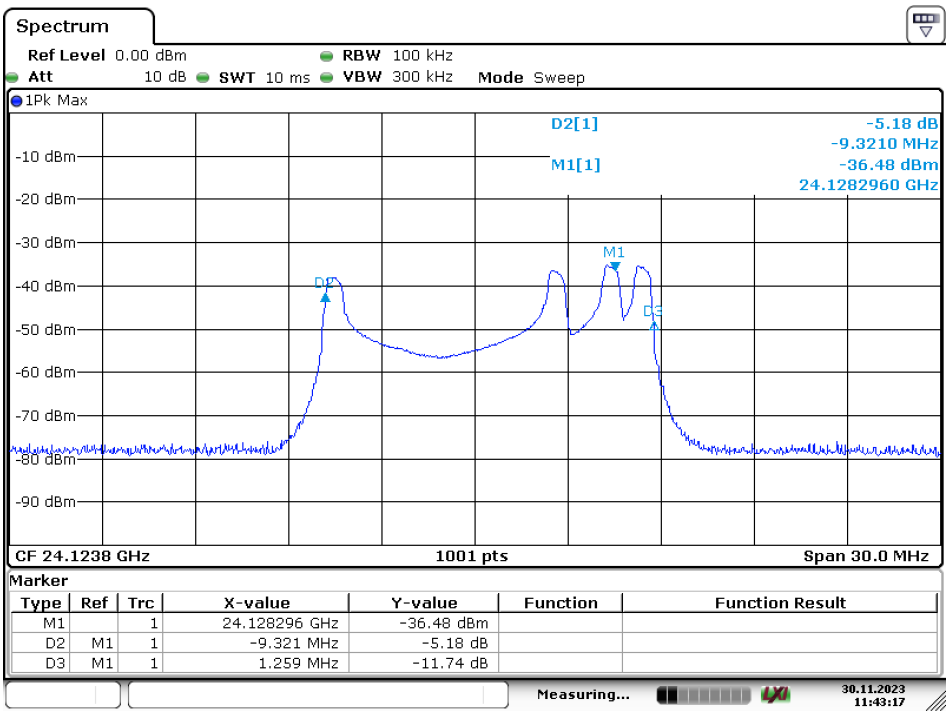
5.1.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Channel 1
10 dB Bandwidth



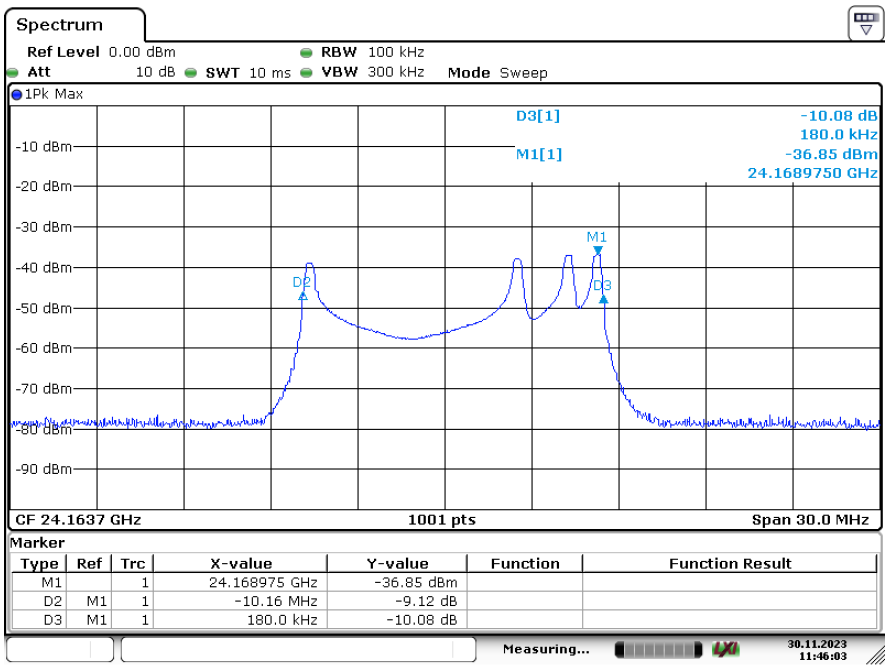
Date: 30.NOV.2023 11:41:44

Channel 2
10 dB Bandwidth



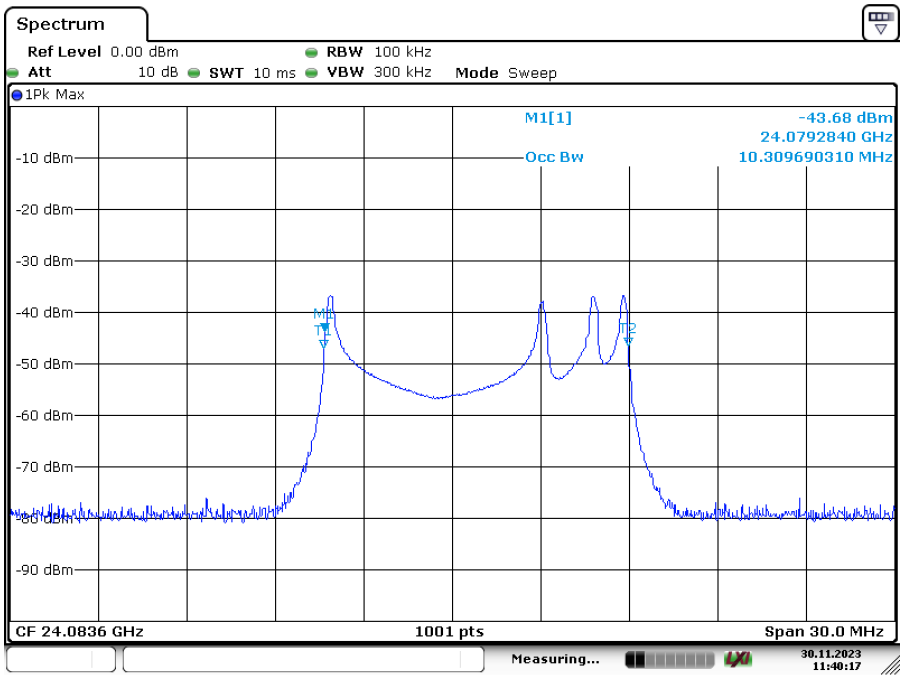
Date: 30.NOV.2023 11:43:17

Channel 3
10 dB Bandwidth



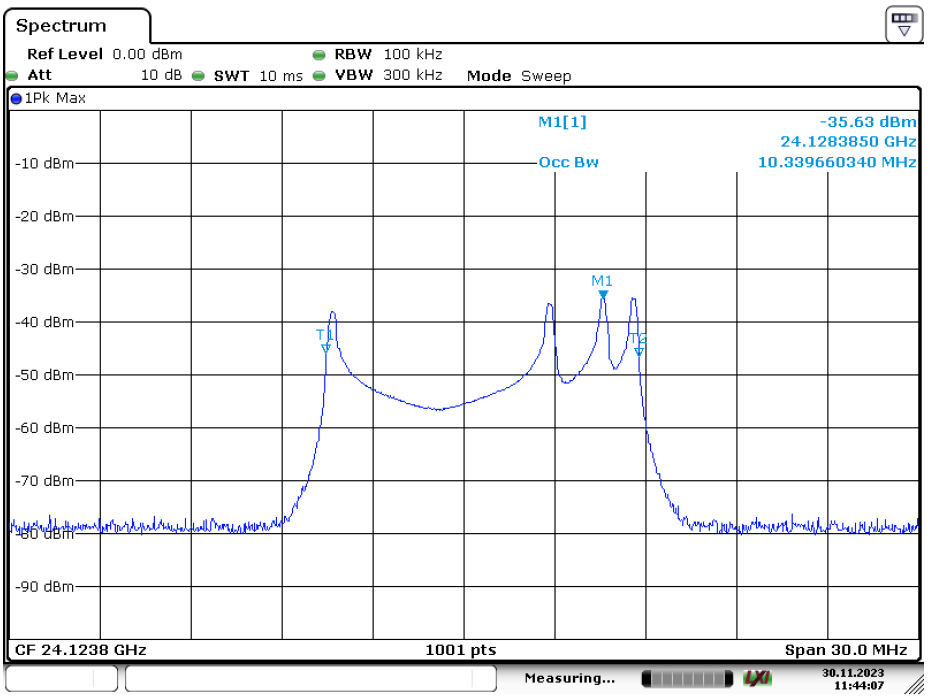
Date: 30.NOV.2023 11:46:03

Channel 1
99 % Bandwidth



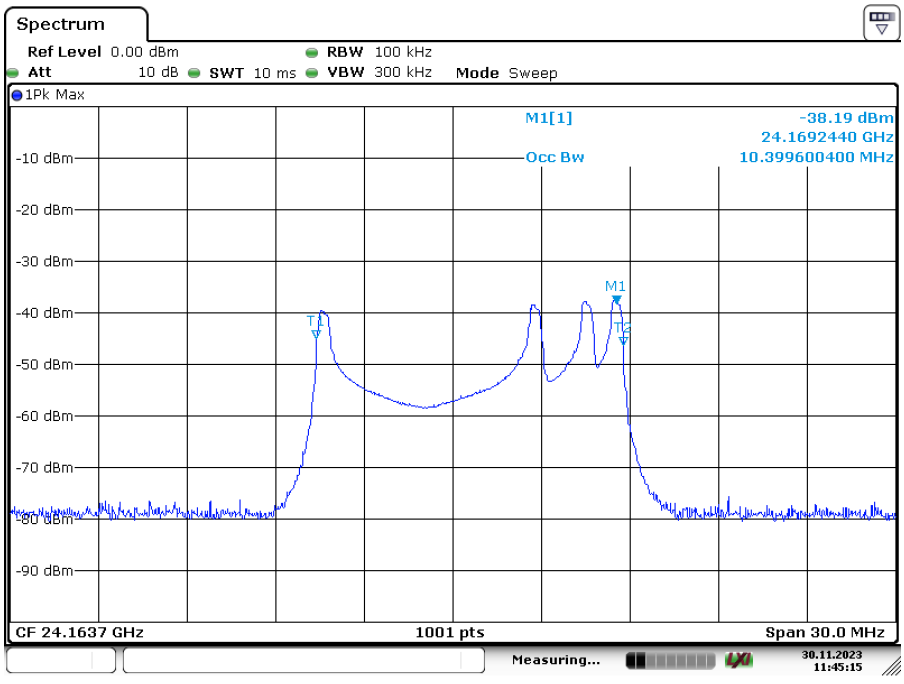
Date: 30.NOV.2023 11:40:17

Channel 2
99 % Bandwidth



Date: 30.NOV.2023 11:44:07

Channel 3
99 % Bandwidth



Date: 30.NOV.2023 11:45:15

5.1.5 TEST EQUIPMENT USED

- Radiated Emissions

5.2 FUNDAMENTAL EMISSION

Standard **FCC Part 15 Subpart C**

The test was performed according to:
ANSI C63.10

5.2.1 TEST DESCRIPTION

The Equipment Under Test (EUT) was set up to perform the fundamental emission measurements.
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation.
The results recorded were measured with the modulation which produce the worst-case (highest) fundamental emission.

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in a fully-anechoic chamber. The EUT and the test antenna were adjusted for maximum main beam coupling.

Analyzer settings:

- Resolution Bandwidth (RBW): 1000 kHz
- Video Bandwidth (VBW): 3000 kHz
- Span: 20 MHz
- Trace: Maxhold
- Sweeps: allow the trace to stabilize
- Sweeptime: 20 ms
- Detector: Peak / Average

5.2.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.245 (b)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency [MHz]	Field strength of fundamental [mV/m]	Field strength of harmonics [mV/m]
902 - 928	500	1.6
2435 - 2465	500	1.6
5785 – 5815	500	1.6
10500 - 10550	2500	25.0
24075 - 24175	2500	25.0

RSS-210 Annex F.2:
(a) The average field strength of emissions measured at 3m shall not exceed:

i. 2500 mV/m for fundamental emissions for devices operating in all frequency bands

5.2.3 TEST PROTOCOL

Ambient temperature: 25 °C
Air Pressure: 1030 hPa
Humidity: 34 %

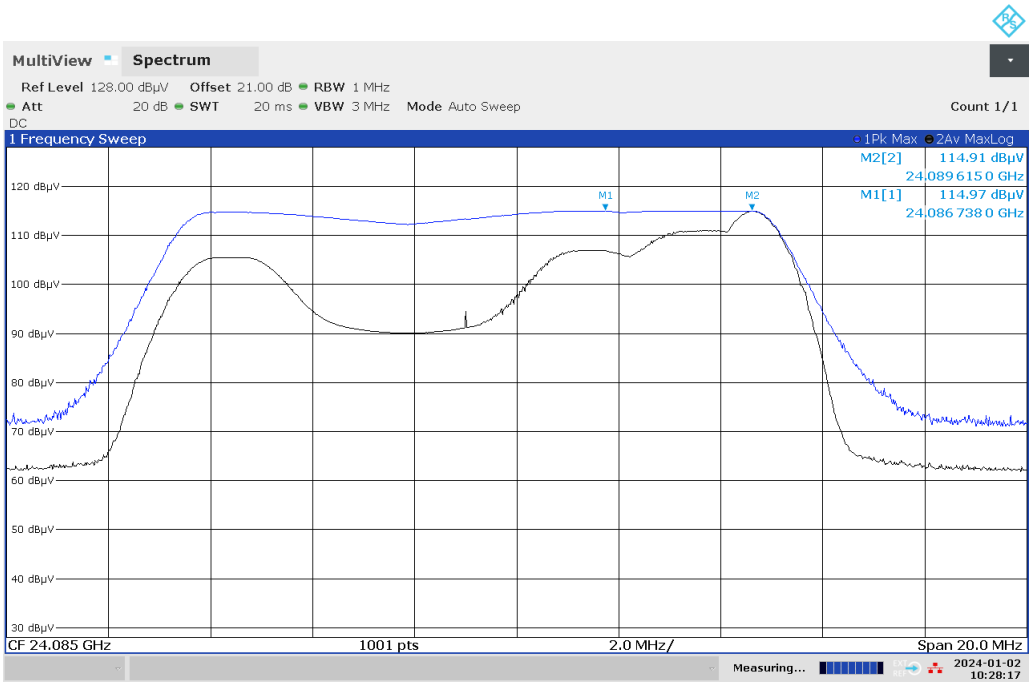
Channel	Centre Frequency [MHz]	Peak Level [dBµV/m]	Limit [dBµV/m]	Margin to Limit [dBµV]	Verdict
1	24085	114.91	127.96	13.05	Passed
2	24125	114.74	127.96	13.22	Passed
3	24165	115.22	127.96	12.74	Passed

Channel	Centre Frequency [MHz]	Average Level [dBµV/m]	Limit [dBµV/m]	Margin to Limit [dBµV]	Verdict
1	24085	114.91	127.96	13.05	Passed
2	24125	111.35	127.96	16.61	Passed
3	24165	111.20	127.96	16.76	Passed

Remark: Please see next sub-clause for the measurement plot.

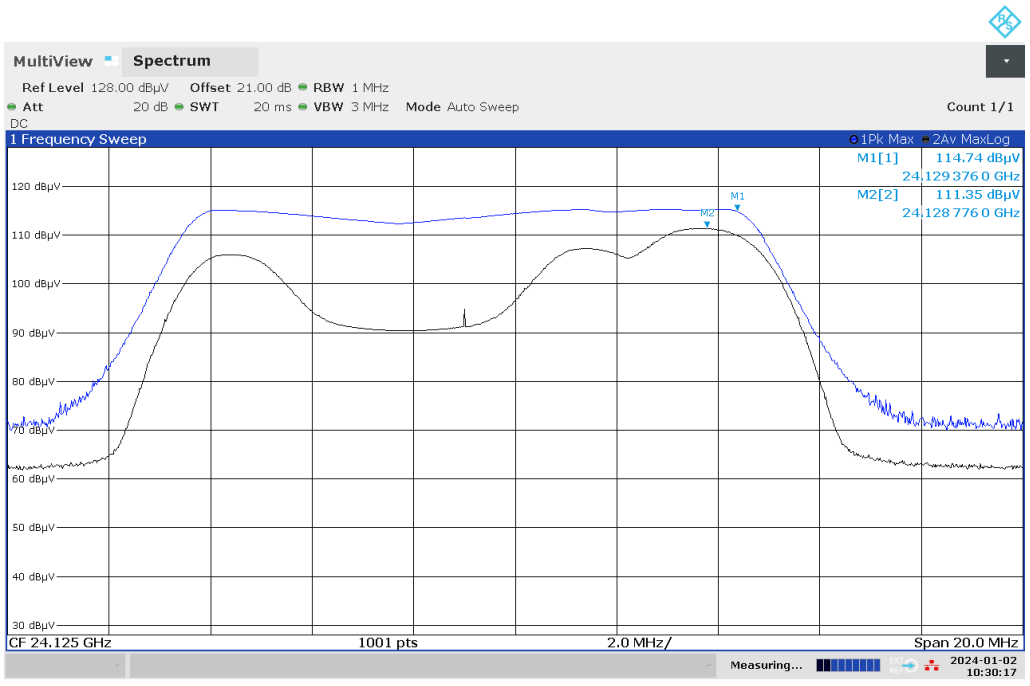
5.2.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Channel 1



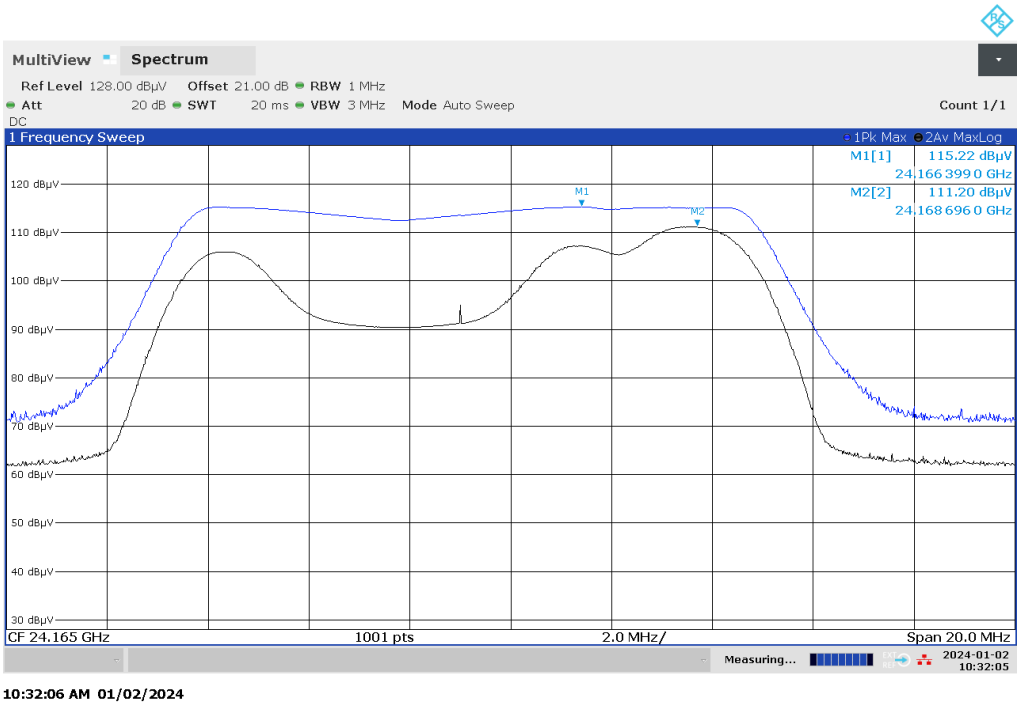
10:28:18 AM 01/02/2024

Channel 2



10:30:17 AM 01/02/2024

Channel 3



5.2.5 TEST EQUIPMENT USED

- Radiated Emissions

5.3 UNWANTED EMISSIONS

Standard **FCC Part 15 Subpart C**

The test was performed according to:
ANSI C63.10

5.3.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m² in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.
The measurement procedure is implemented into the EMI test software EMC32 from R&S.
Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is also performed at 3 axes.
A pre-check is performed while the EUT is powered from a DC power source.

1. Measurement up to 30 MHz
The Loop antenna HFH2-Z2 is used.

Step 1: pre measurement
- Anechoic chamber
- Antenna distance: 3 m
- Detector: Peak-Maxhold
- Frequency range: 0.009 - 0.15 MHz and 0.15 – 30 MHz
- Frequency steps: 0.05 kHz and 2.25 kHz
- IF–Bandwidth: 0.2 kHz and 9 kHz
- Measuring time / Frequency step: 100 ms (FFT-based)

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: final measurement
For the relevant emissions determined in step 1, an additional measurement with the following settings will be performed. Intention of this step is to find the maximum emission level.
- Open area test side
- Antenna distance: according to the Standard
- Detector: Quasi-Peak
- Frequency range: 0.009 – 30 MHz
- Frequency steps: measurement at frequencies detected in step 1
- IF–Bandwidth: 0.2 - 10 kHz
- Measuring time / Frequency step: 1 s

2. Measurement above 30 MHz and up to 1 GHz

Step 1: Preliminary scan
This is a preliminary test to identify the highest amplitudes relative to the limit.
Settings for step 1:
- Antenna distance: 3 m
- Detector: Peak-Maxhold / Quasipeak (FFT-based)
- Frequency range: 30 – 1000 MHz
- Frequency steps: 30 kHz
- IF–Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 ms
- Turntable angle range: –180° to 90°

- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

Step 2: Adjustment measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by ± 45° around this value. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary by ± 100 cm around the antenna height determined. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: ± 45 ° around the determined value
- Height variation range: ± 100 cm around the determined value
- Antenna Polarisation: max. value determined in step 1

Step 3: Final measurement with QP detector

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: Quasi-Peak (< 1 GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

3. Measurement above 1 GHz

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:

Step 1:

The Equipment Under Test (EUT) was set up on a non-conductive support (tilt device) at 1.5 m height in the fully-anechoic chamber.

All steps were performed with one height (1.5 m) of the receiving antenna only.

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 90 °.

The turn table step size (azimuth angle) for the preliminary measurement is 45 °.

Antenna distance:

1 GHz - 26 GHz: 3 m

26 GHz – 40 GHz: 1 m

40 GHz – 90 GHz: 0.5 m

90 GHz – 110 GHz: 0.2 m

Step 2:
Due to the fact, that in this frequency range the test is performed in a fully anechoic room, the height scan of the receiving antenna instep 2 is omitted. Instead of this, a maximum search with a step size ± 45° for the elevation axis is performed.
The turn table azimuth will slowly vary by ± 22.5°.
The elevation angle will slowly vary by ± 45°
EMI receiver settings (for all steps):
- Detector: Peak, Average
- IF Bandwidth = 1 MHz

Step 3:
Spectrum analyser settings for step 3:
- Detector: Peak / Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz
- Measuring time: 1 s

5.3.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.245

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency [MHz]	Field strength of fundamental [mV/m]	Field strength of harmonics [mV/m]
902 - 928	500	1.6
2435 - 2465	500	1.6
5785 – 5815	500	1.6
10500 - 10550	2500	25.0
24075 - 24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits.

(i) For the second and third harmonics of field disturbance sensors operating in the 24075–24175 MHz band and for other field disturbance sensors designed for use only within a building or to open building doors, 25.0 mV/m.
(ii) For all other field disturbance sensors, 7.5 mV/m.
(iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands, other than the second and third harmonics from devices operating in the 24075–24175 MHz band, fully comply with the limits given in § 15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

(2) Field strength limits are specified at a distance of 3 meters.

(3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(4) The emission limits shown above are based on measurement instrumentation employing an average detector. Provisions in §15.35 for limiting peak emissions apply.

FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency in MHz	Limit (µV/m)	Measurement distance (m)	Limits (dBµV/m)
0.009 – 0.49	2400/F(kHz)@300m	3	(48.5 – 13.8)@300m
0.49 – 1.705	24000/F(kHz)@30m	3	(33.8 – 23.0)@30m
1.705 – 30	30@30m	3	29.5@30m
30 – 88	100@3m	3	40.0@3m
88 – 216	150@3m	3	43.5@3m
216 – 960	200@3m	3	46.0@3m
above 960	500@3m	3	54.0@3m

RSS-210 Annex F.2:
(a) The average field strength of emissions measured at 3m shall not exceed:

i. 2500 mV/m for fundamental emissions for devices operating in all frequency bands

ii. 25 mV/m for harmonic emissions for devices operating in the bands 10.5-10.55 GHz, 24.075-24.175 GHz and 80 mV/m for harmonic emissions for devices operating in the band 33.4-36 GHz

(b) Harmonic emissions falling into restricted frequency bands listed in RSS-Gen and that are below 17.7 GHz shall meet the general field strength limits specified in RSS-Gen.

(c) Harmonic emissions falling into restricted bands listed in RSS-Gen and that are at or above 17.7 GHz shall not exceed the following field strength limits measured at a distance of 3m:

(i) 25 mV/m for the second and third harmonic emissions of devices operating in the band 24.075 – 24.175 GHz and for the second harmonic emission of devices operating in the band 33.4 – 36.0 GHz.
(ii) 7.5 mV/m for all other devices.

(d) Emissions radiated outside of these specified operating frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits specified in RSS-Gen, whichever is less stringent.

5.3.3 TEST PROTOCOL

Ambient temperature: 20 °C – 25 °C
Air Pressure: 1000 hPa – 1030 hPa
Humidity: 28 % - 40 %

Channel 1

Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin to Limit [dB]
497.64	39.5	QuasiPeak	120	46	6.50
528.15	37.95	QuasiPeak	120	46	8.05
531.54	43.04	QuasiPeak	120	46	2.96
539.10	25.31	QuasiPeak	120	46	20.69
829.38	44.41	QuasiPeak	120	46	1.59
834.39	18.5	QuasiPeak	120	46	27.50
836.04	17.06	QuasiPeak	120	46	28.94
863.28	36.19	QuasiPeak	120	46	9.81
4531.75	48.85	Peak	1000	74	25.15
4531.75	35.83	CAverage	1000	54	18.17
13537.50	56.23	Peak	1000	74	17.77
13537.50	42.82	CAverage	1000	54	11.18
17930.00	46.64	CAverage	1000	54	7.36
17930.00	59.94	Peak	1000	74	14.06

Channel 2

Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin to Limit [dB]
497.64	38.66	QuasiPeak	120	46	7.34
531.54	42.74	QuasiPeak	120	46	3.26
829.38	44.57	QuasiPeak	120	46	1.43
4515.00	48.30	Peak	1000	74	25.7
4515.00	26.62	CAverage	1000	54	27.38
13575.00	42.82	CAverage	1000	54	11.18
13575.25	55.65	Peak	1000	74	18.35
17880.25	46.60	CAverage	1000	54	7.40
17880.25	59.55	Peak	1000	74	14.45

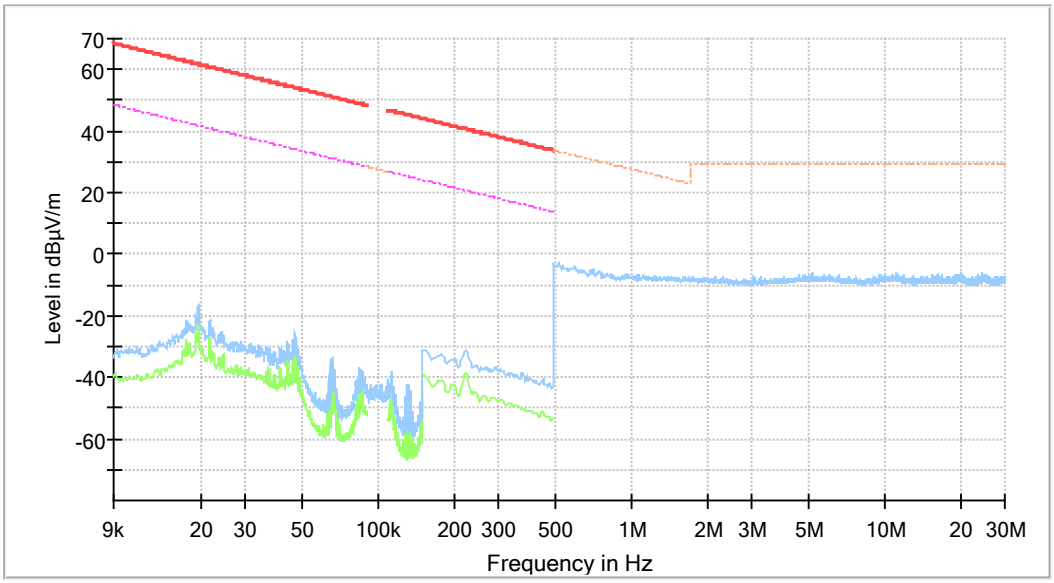
Channel 3

Spurious Freq. [MHz]	Spurious Level [dBµV/m]	Detector	RBW [kHz]	Limit [dBµV/m]	Margin to Limit [dB]
497.64	40.32	QuasiPeak	120	46	5.68
528.15	39.25	QuasiPeak	120	46	6.75
531.54	44.09	QuasiPeak	120	46	1.91
580.56	29.4	QuasiPeak	120	46	16.6
829.38	45.39	QuasiPeak	120	46	0.61
4514.75	47.94	Peak	1000	74	26.06
4515.00	44.27	CAverage	1000	54	9.73
13501.50	56.48	Peak	1000	74	17.52
13501.50	43.2	CAverage	1000	54	10.80

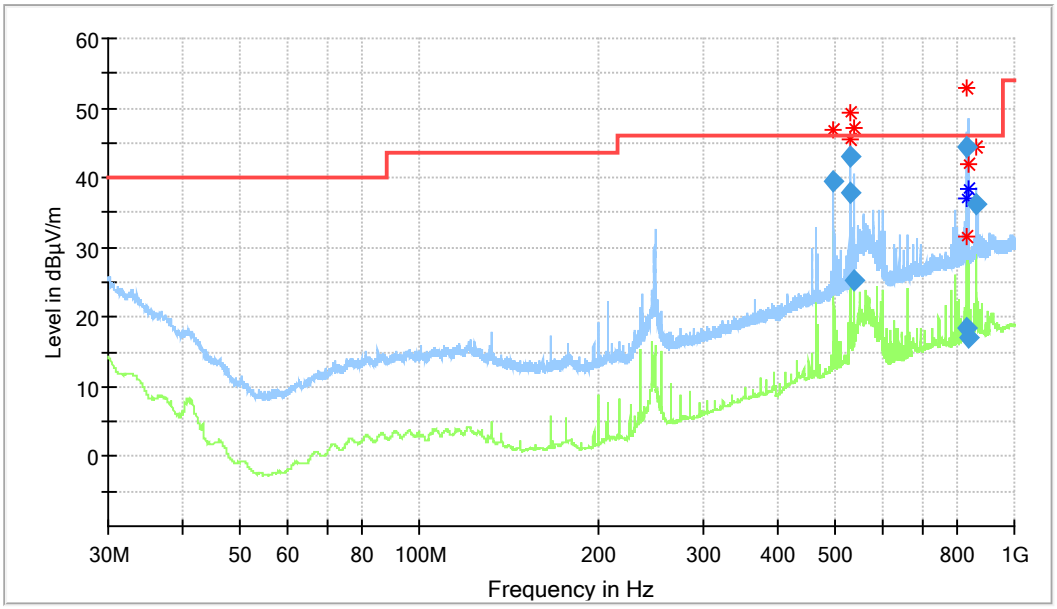
Remark: Please see next sub-clause for the measurement plot.

5.3.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Channel = 1
9 kHz – 30 MHz

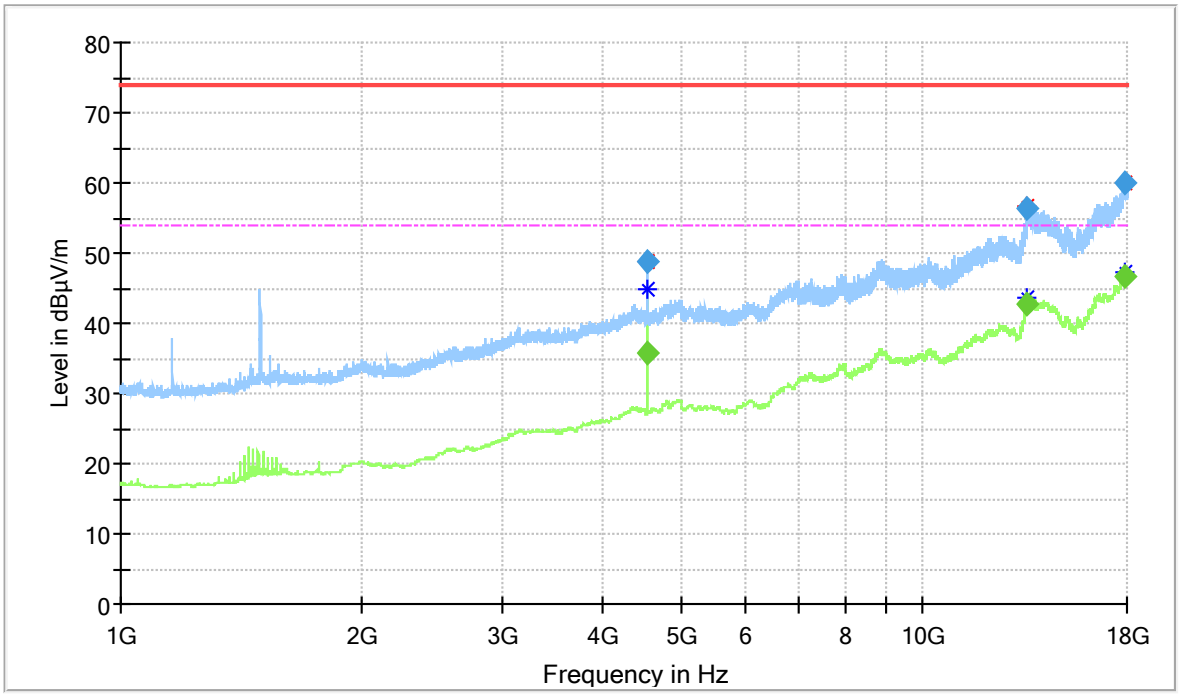


30 MHz – 1 GHz



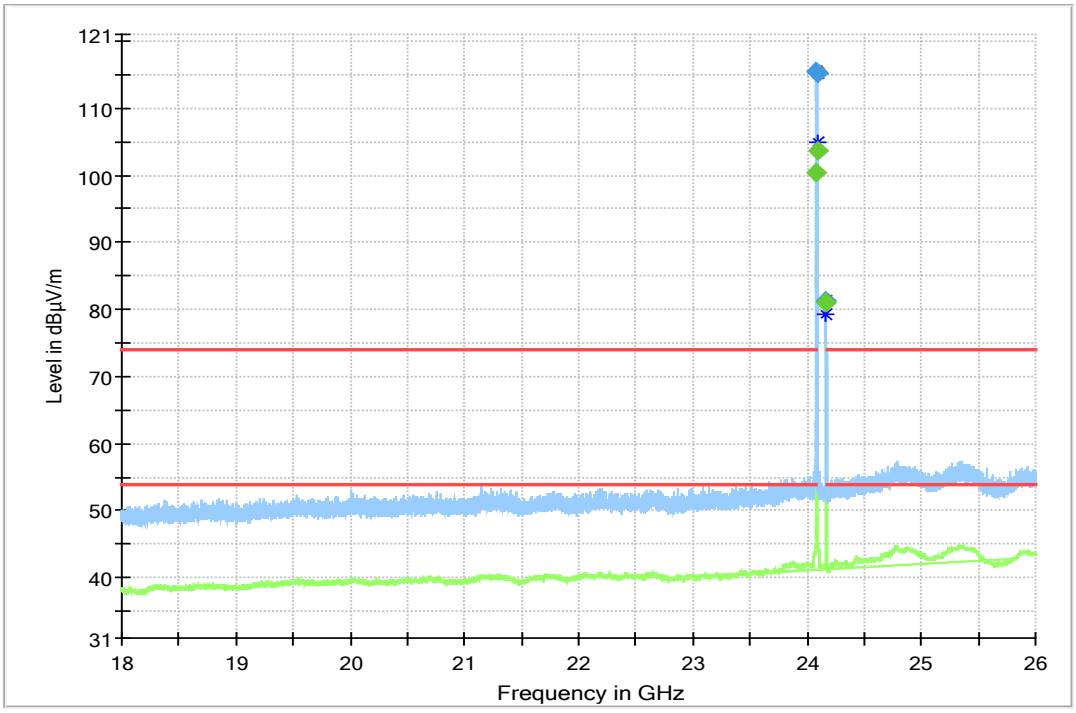
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
497.640000	39.50	46.00	6.50	1000.0	120.000	169.0	H	0.0	19.1
528.150000	37.95	46.00	8.05	1000.0	120.000	153.0	H	0.0	19.6
531.540000	43.04	46.00	2.96	1000.0	120.000	153.0	H	0.0	19.6
539.100000	25.31	46.00	20.69	1000.0	120.000	141.0	H	304.0	19.7
829.380000	44.41	46.00	1.59	1000.0	120.000	127.0	V	355.0	24.5
834.390000	18.50	46.00	27.50	1000.0	120.000	143.0	V	0.0	24.5
836.040000	17.06	46.00	28.94	1000.0	120.000	200.0	V	186.0	24.5
863.280000	36.19	46.00	9.81	1000.0	120.000	120.0	V	15.0	24.5

1 GHz – 18 GHz



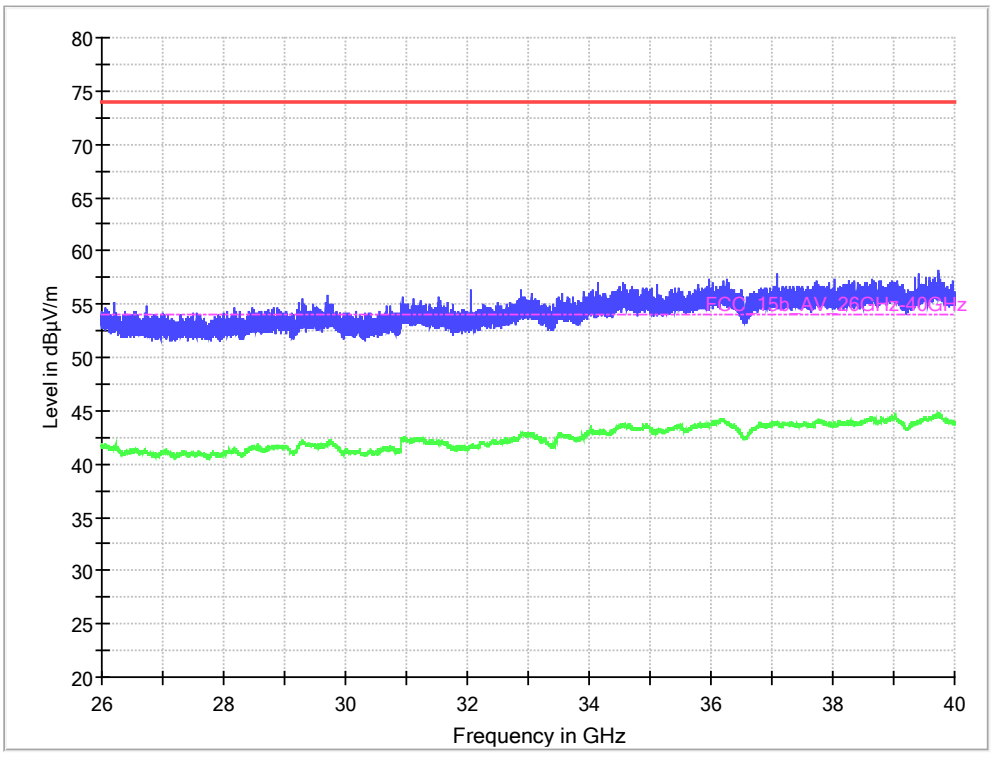
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4531.75	48.85	---	74.00	25.15	200.0	1000.000	116.0	V	-40.0	12.7
4531.75	---	35.83	54.00	18.17	200.0	1000.000	116.0	V	-34.0	12.7
13537.50	56.23	---	74.00	17.77	200.0	1000.000	364.0	H	-34.0	26.3
13537.50	---	42.82	54.00	11.18	200.0	1000.000	364.0	H	-34.0	26.3
17930.00	---	46.64	54.00	7.36	200.0	1000.000	364.0	H	-34.0	32.1
17930.00	59.94	---	74.00	14.06	200.0	1000.000	230.0	V	-157.0	32.1

18 GHz – 26 GHz

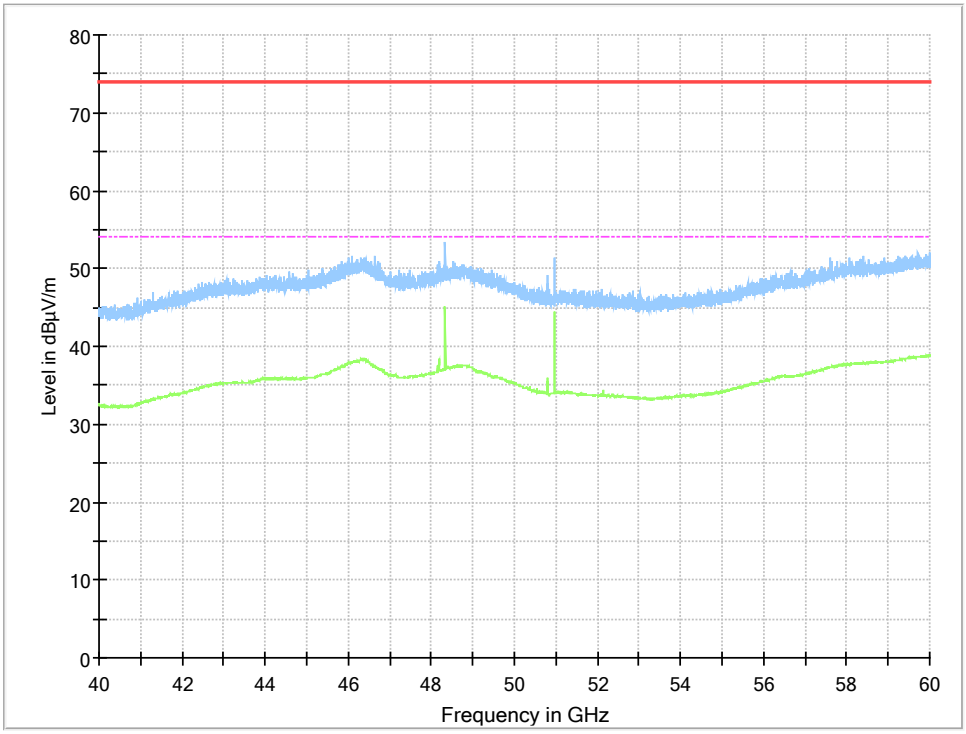


COMMENT: in-band emissions in 24.075 to 24.175 GHz band (wanted signal)

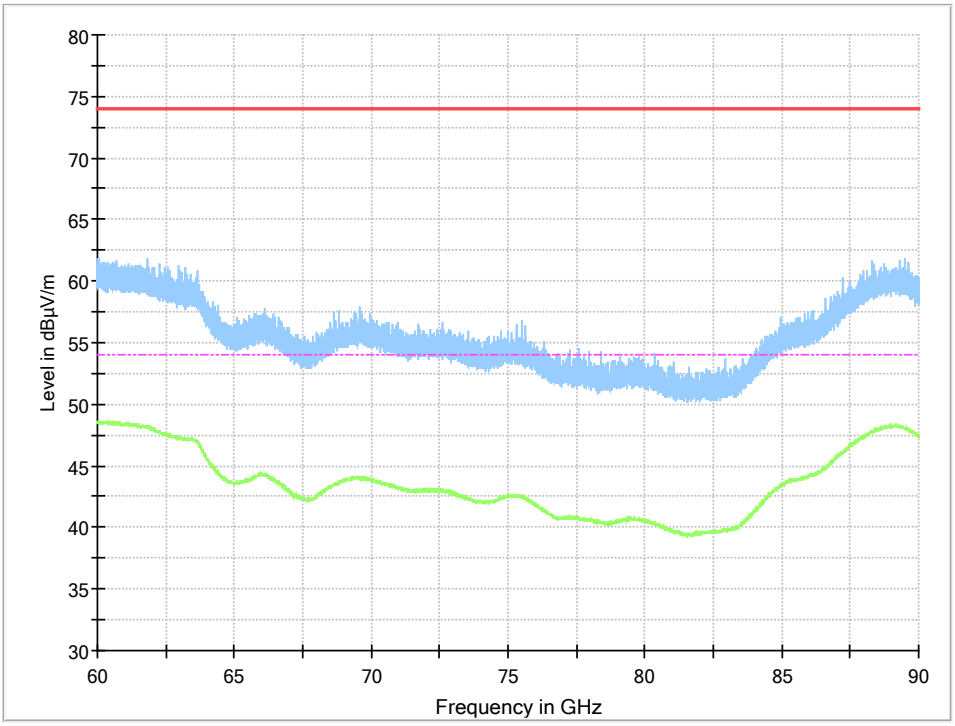
26 GHz – 40 GHz



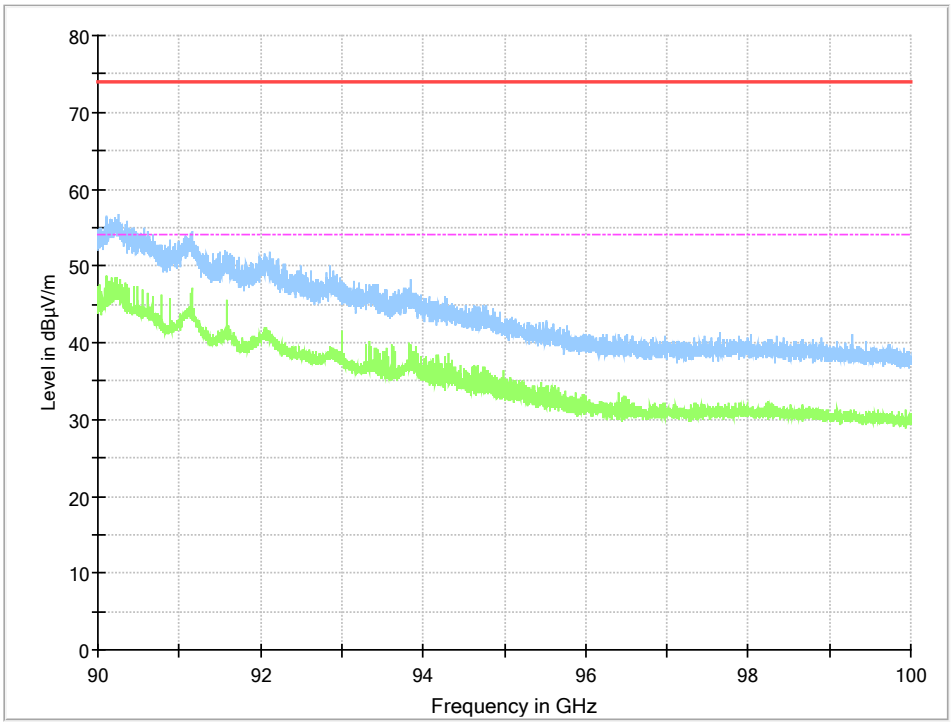
40 GHz – 60 GHz



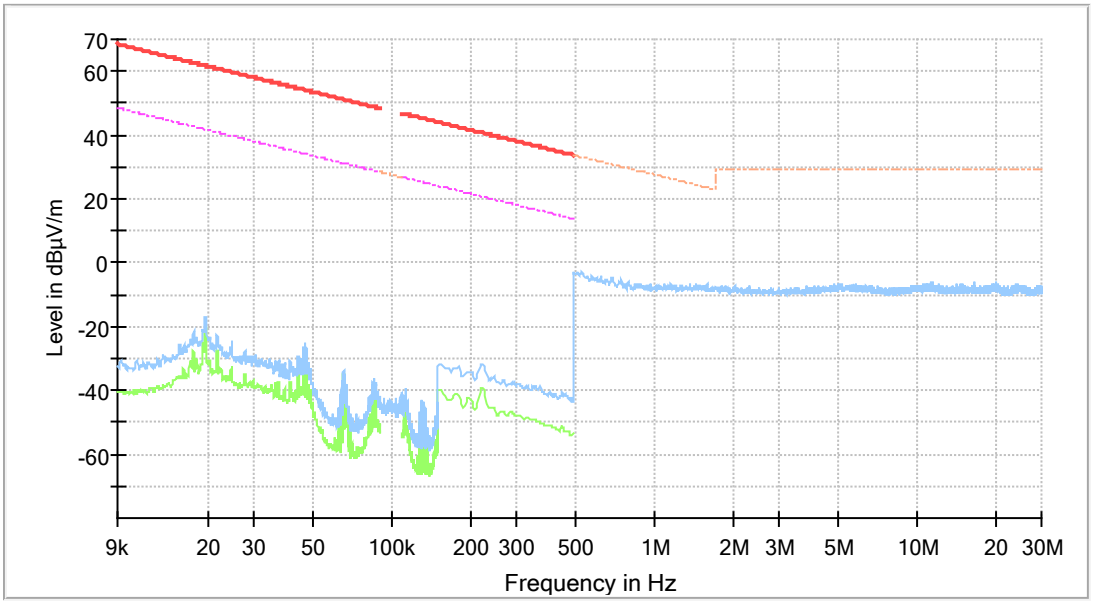
60 GHz – 90 GHz



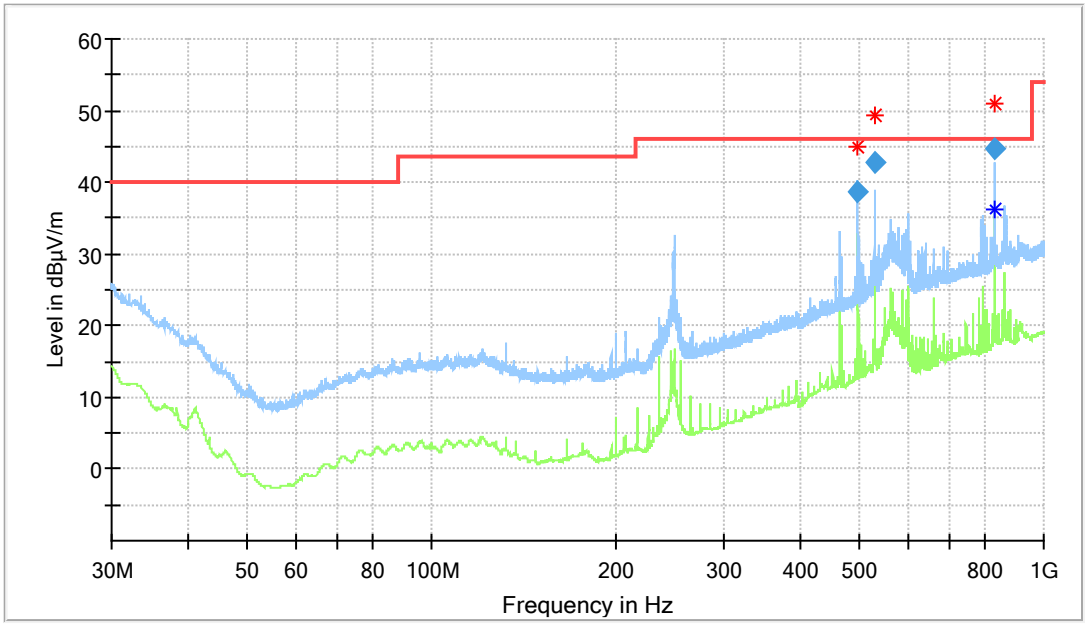
90 GHz – 100 GHz



Channel = 2
9 kHz – 30 MHz

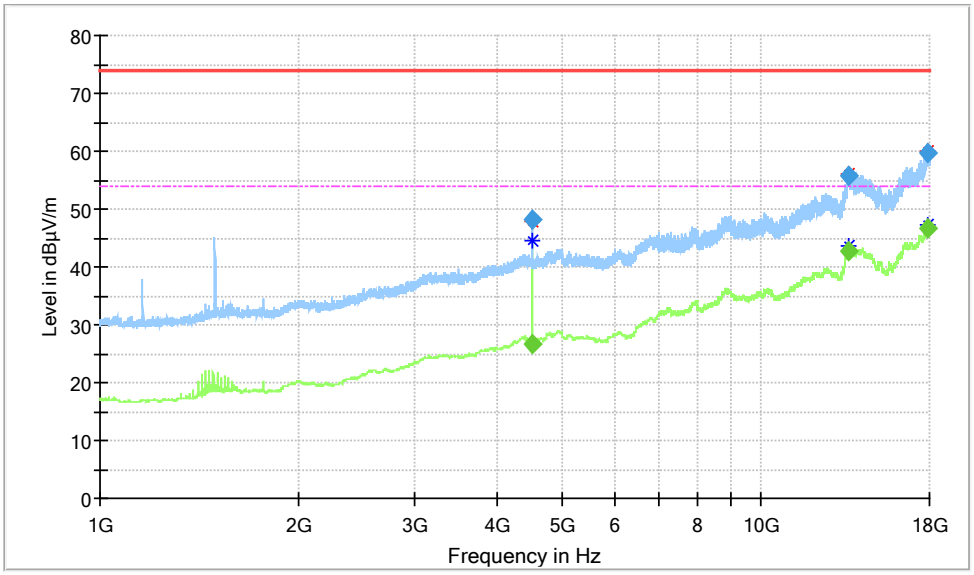


30 MHz – 1 GHz



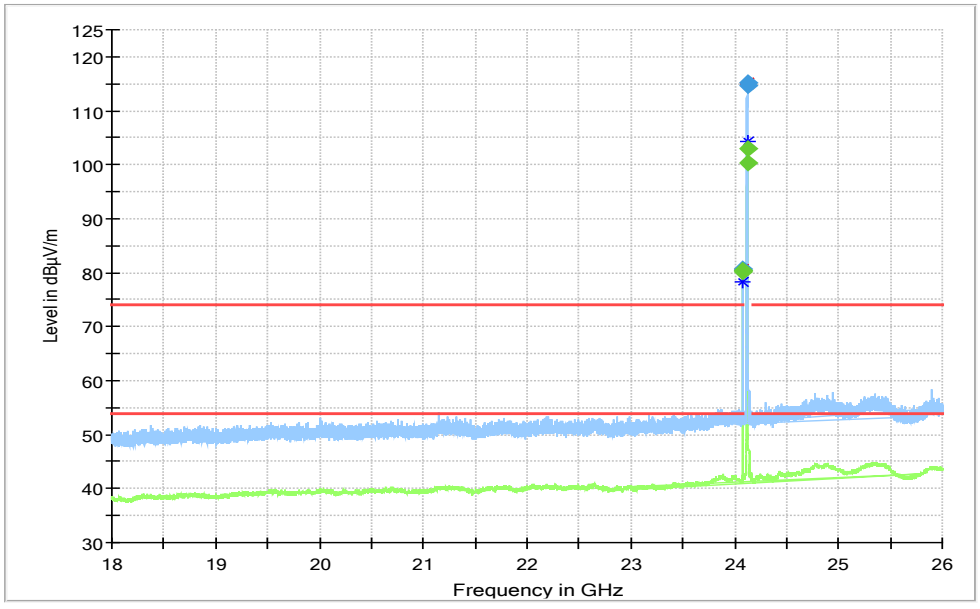
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
497.640000	38.66	46.00	7.34	1000.0	120.000	165.0	H	0.0	19.1
531.540000	42.74	46.00	3.26	1000.0	120.000	146.0	H	0.0	19.6
829.380000	44.57	46.00	1.43	1000.0	120.000	129.0	V	38.0	24.5

1 GHz – 18 GHz



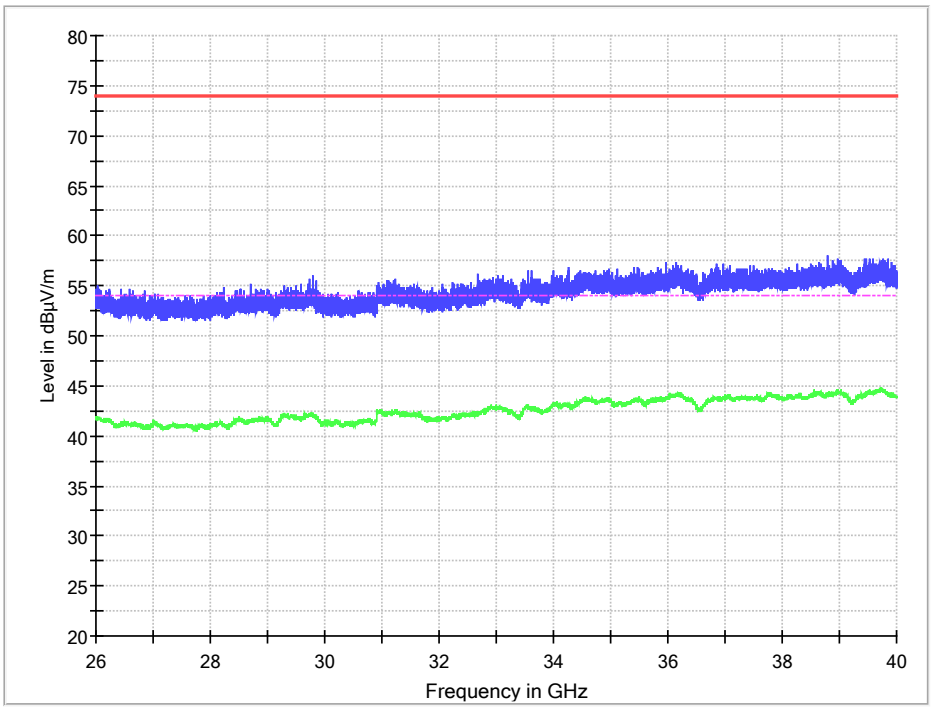
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4515.00	48.30	---	74.00	25.70	200.0	1000.000	114.0	V	-44.0	12.8
4515.00	---	26.62	54.00	27.38	200.0	1000.000	114.0	V	40.0	12.8
13575.00	---	42.82	54.00	11.18	200.0	1000.000	111.0	H	40.0	26.4
13575.25	55.65	---	74.00	18.35	200.0	1000.000	111.0	H	40.0	26.4
17880.25	---	46.60	54.00	7.40	200.0	1000.000	111.0	H	40.0	31.8
17880.25	59.55	---	74.00	14.45	200.0	1000.000	365.0	V	-64.0	31.8

18 GHz – 26 GHz

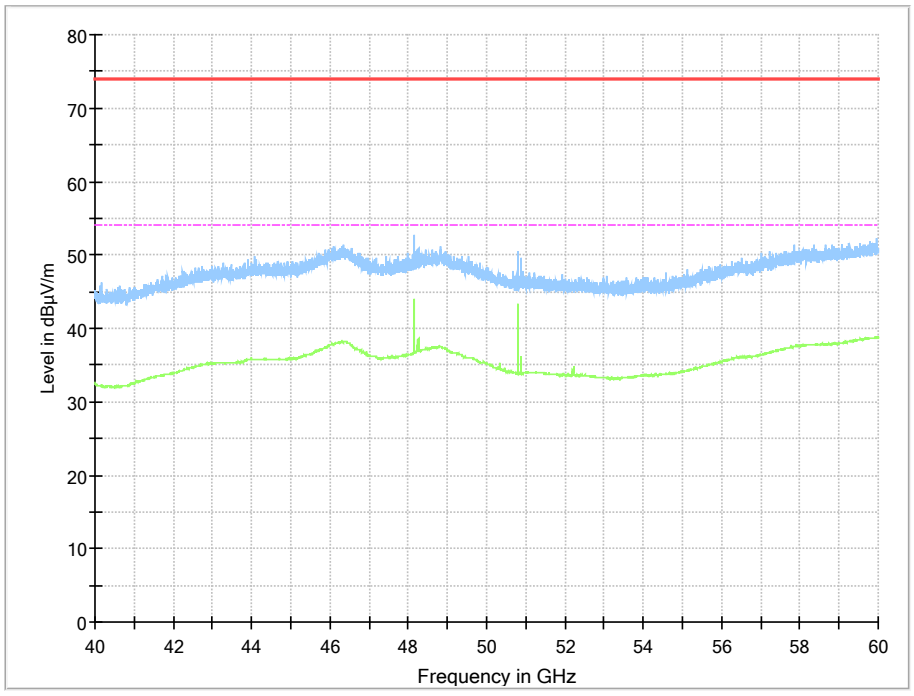


COMMENT: in-band emissions in 24.075 to 24.175 GHz band (wanted signal)

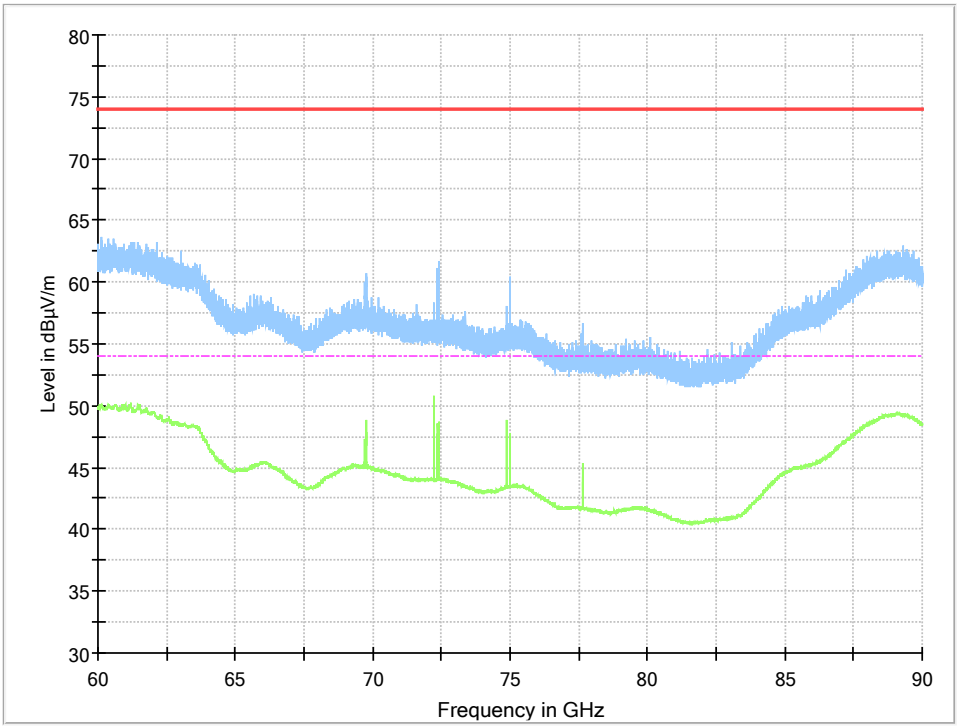
26 GHz – 40 GHz



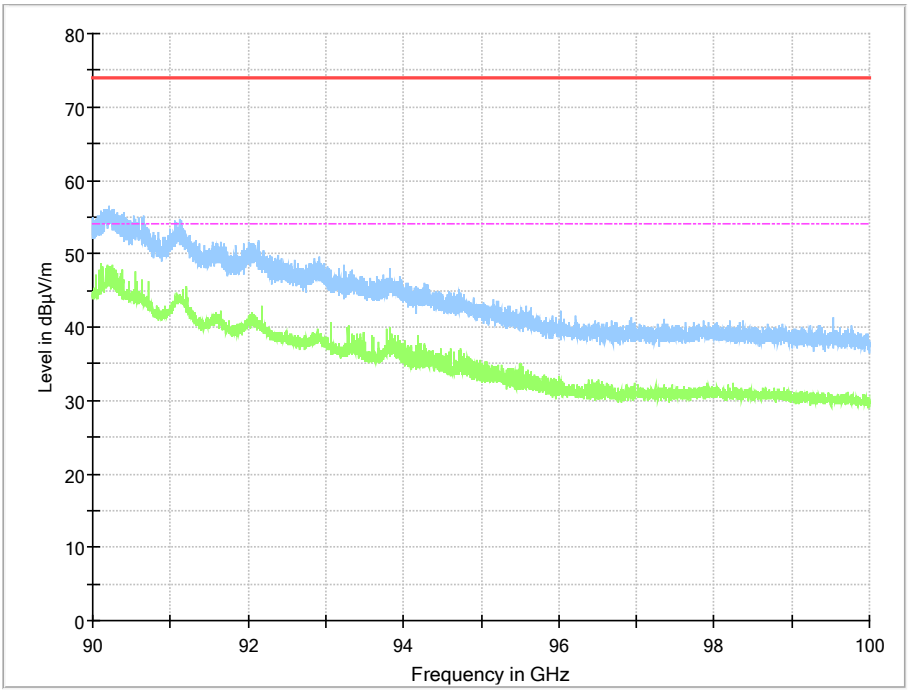
40 GHz – 60 GHz



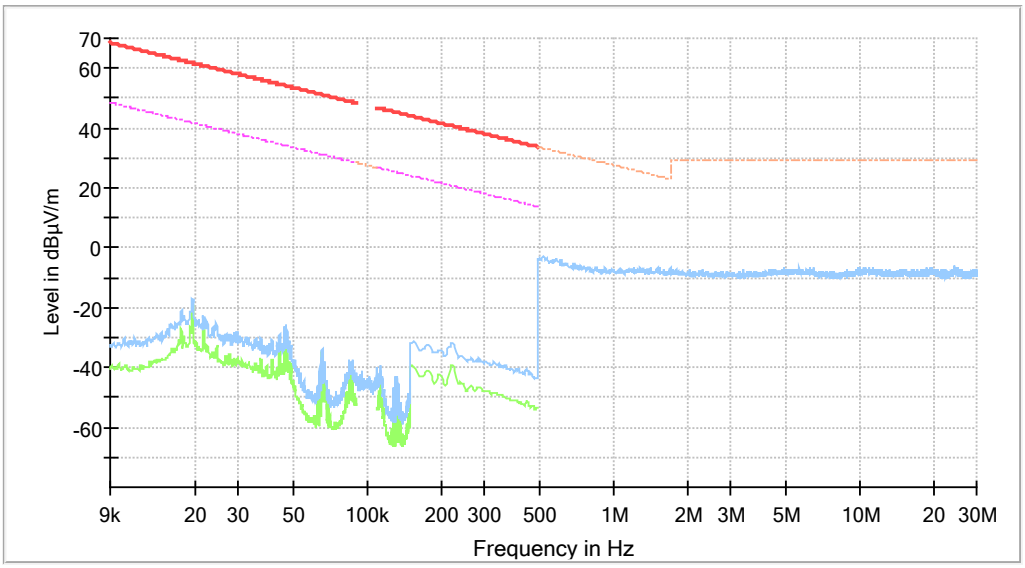
60 GHz – 90 GHz



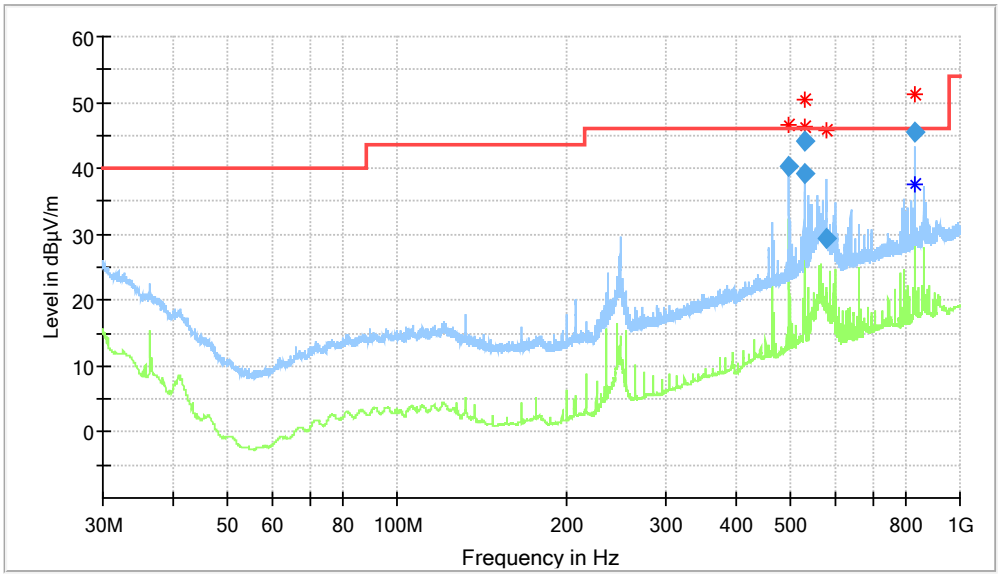
90 GHz – 100 GHz



Channel = 3
9 kHz – 30 MHz

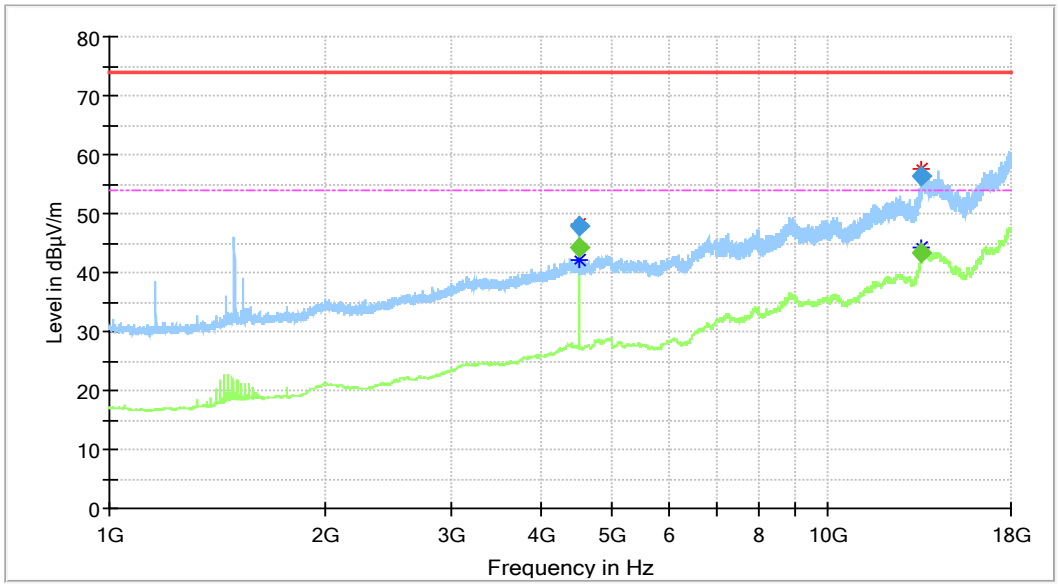


30 MHz – 1 GHz



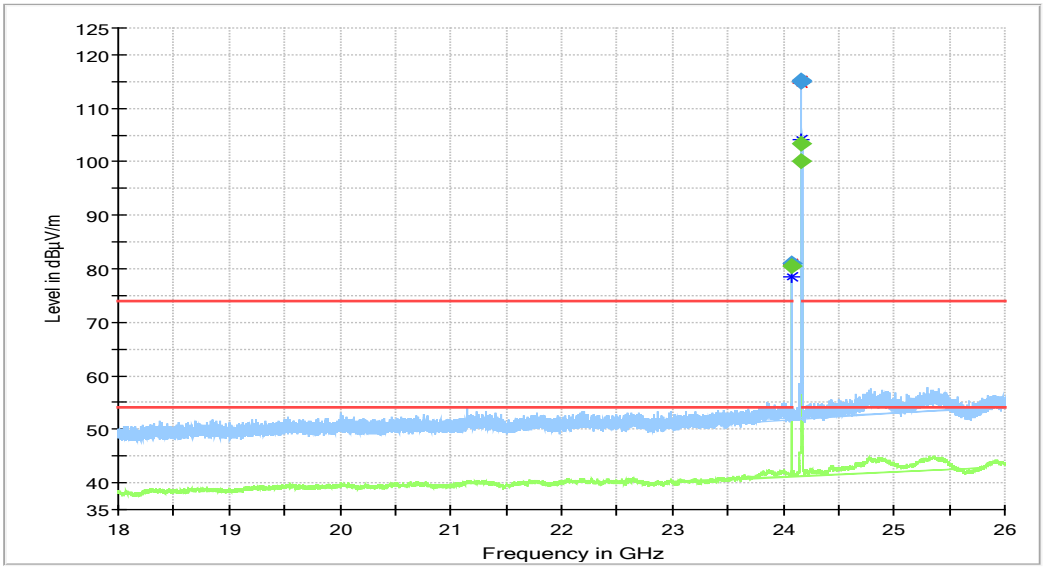
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
497.640000	40.32	46.00	5.68	1000.0	120.000	163.0	H	0.0	19.1
528.150000	39.25	46.00	6.75	1000.0	120.000	153.0	H	358.0	19.6
531.540000	44.09	46.00	1.91	1000.0	120.000	152.0	H	9.0	19.6
580.560000	29.40	46.00	16.60	1000.0	120.000	143.0	H	357.0	20.5
829.380000	45.39	46.00	0.61	1000.0	120.000	126.0	V	36.0	24.5

1 GHz – 18 GHz



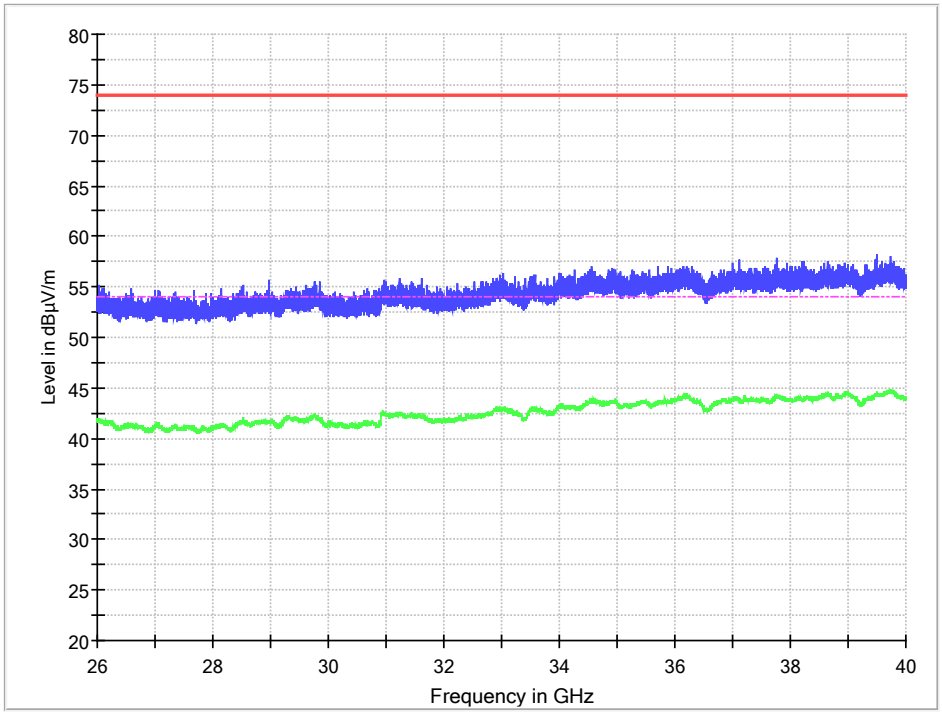
Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4514.75	47.94	---	74.00	26.06	200.0	1000.000	108.0	V	-27.0	12.8
4515.00	---	44.27	54.00	9.73	200.0	1000.000	108.0	V	-27.0	12.8
13501.50	56.48	---	74.00	17.52	200.0	1000.000	364.0	H	-174.0	26.6
13501.50	---	43.20	54.00	10.80	200.0	1000.000	100.0	V	-27.0	26.6

18 GHz – 26 GHz

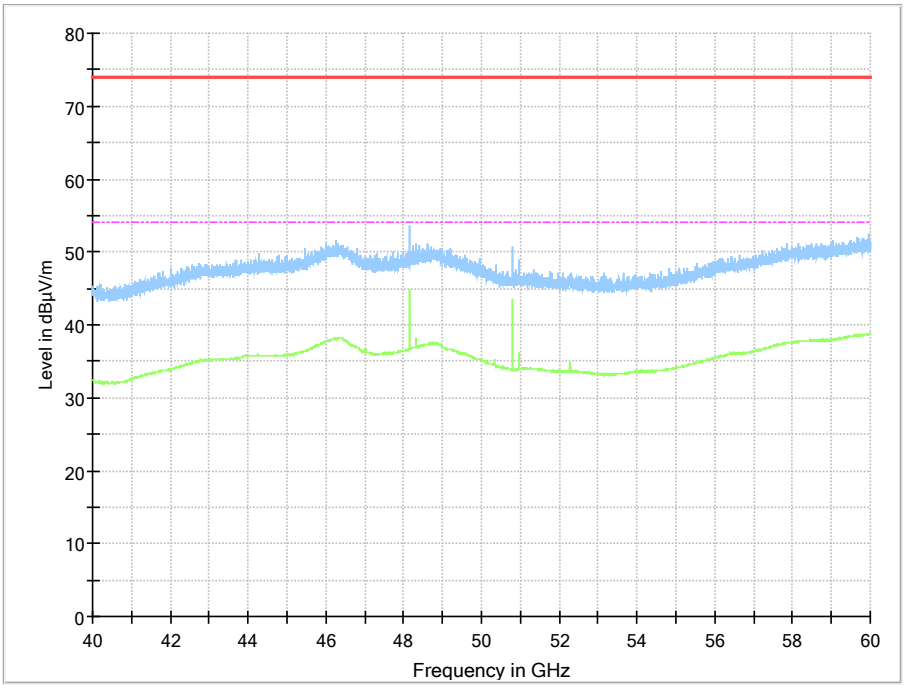


COMMENT: in-band emissions in 24.075 to 24.175 GHz band (wanted signal)

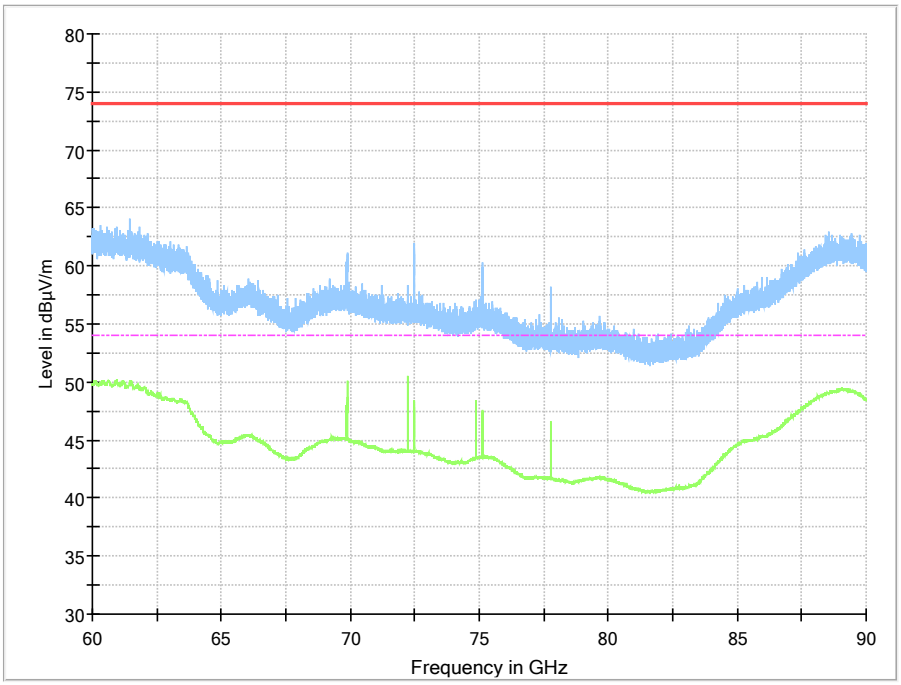
26 GHz – 40 GHz



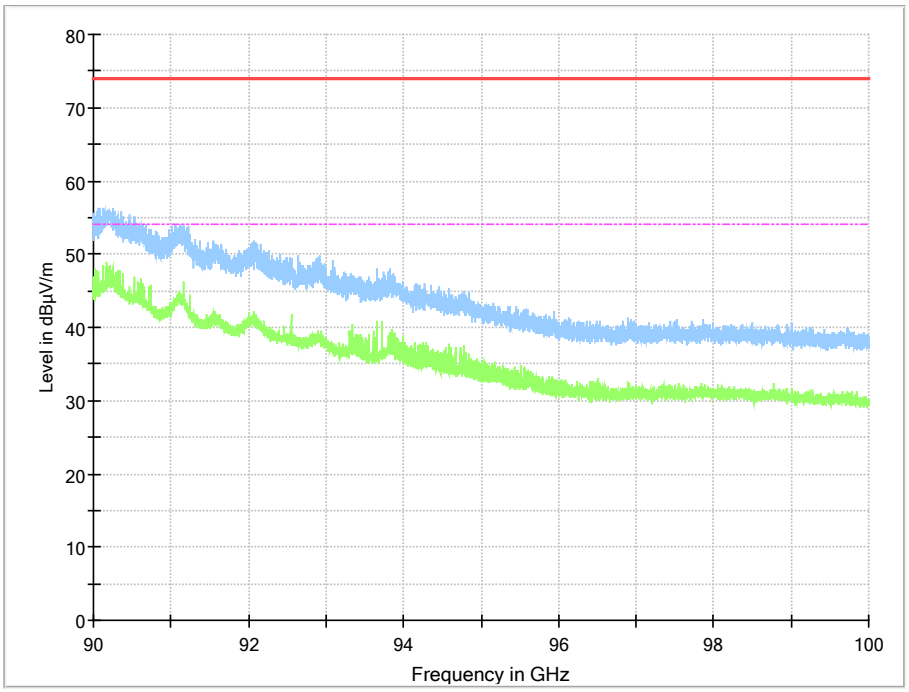
40 GHz – 60 GHz



60 GHz – 90 GHz



90 GHz – 100 GHz



5.3.5 TEST EQUIPMENT USED

- Radiated Emissions

5.4 FREQUENCY STABILITY

Standard **FCC Part 15 Subpart C**

The test was performed according to:
ANSI C63.10

5.4.1 TEST DESCRIPTION

As specified in Section 15.215(c), the bandwidth of the fundamental emission must be contained within the frequency band over the temperature range -20 to +50 degrees Celsius with an input voltage variation of 85% to 115% of rated input voltage. Frequency stability is to be measured according to Section 2.1055 at the highest and lowest frequency of operation and with the modulation that produces the widest emission bandwidth.

5.4.2 TEST REQUIREMENTS / LIMITS

FCC Part 15, Subpart C, §15.215 (c)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. In the case of intentional radiators operating under the provisions of subpart E, the emission bandwidth may span across multiple contiguous frequency bands identified in that subpart. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

RSS-210 Annex F.2:

(e) The carrier frequency stability shall be sufficient to ensure that the 40 dB bandwidth stays within the operating frequency band when tested at the temperature and supply voltage variations specified for the frequency stability measurement in RSS-Gen.

5.4.3 TEST PROTOCOL

Ambient temperature: 24 °C
Air Pressure: 1002 hPa
Humidity: 44 %

Channel 1

Temperature	Voltage	flow [MHz]	fHigh [MHz]	Occupied Bandwidth	Lower Limit	Upper Limit	Margin to lower limit [MHz]	Margin to upper limit [MHz]	Verdict
-20 °C	normal	24078.0	24090.2	12.2	24075	24175	3.0	84.8	Passed
-10 °C	normal	24078.2	24090.5	12.3	24075	24175	3.2	84.5	Passed
0 °C	normal	24078.1	24090.3	12.2	24075	24175	3.1	84.7	Passed
10 °C	normal	24078.4	24090.6	12.2	24075	24175	3.4	84.4	Passed
20 °C	low	24078.0	24090.5	12.6	24075	24175	2.9	84.5	Passed
20 °C	normal	24078.0	24090.6	12.6	24075	24175	3.0	84.4	Passed
20 °C	high	24078.1	24090.4	12.3	24075	24175	3.1	84.6	Passed
30 °C	normal	24078.1	24090.5	12.3	24075	24175	3.1	84.5	Passed
40 °C	normal	24077.8	24090.2	12.3	24075	24175	2.8	84.8	Passed
50 °C	normal	24077.8	24090.5	12.6	24075	24175	2.8	84.5	Passed

Channel 2

Temperature	Voltage	flow [MHz]	fHigh [MHz]	Occupied Bandwidth	Lower Limit	Upper Limit	Margin to lower limit [MHz]	Margin to upper limit [MHz]	Verdict
-20 °C	normal	24118.6	24130.9	12.3	24075	24175	43.6	44.1	Passed
-10 °C	normal	24118.5	24130.6	12.2	24075	24175	43.5	44.4	Passed
0 °C	normal	24118.5	24130.7	12.2	24075	24175	43.5	44.3	Passed
10 °C	normal	24118.2	24130.4	12.2	24075	24175	43.2	44.6	Passed
20 °C	low	24118.4	24130.6	12.2	24075	24175	43.4	44.4	Passed
20 °C	normal	24118.0	24130.2	12.2	24075	24175	43.0	44.8	Passed
20 °C	high	24118.2	24130.4	12.2	24075	24175	43.2	44.6	Passed
30 °C	normal	24118.1	24130.3	12.3	24075	24175	43.1	44.7	Passed
40 °C	normal	24118.0	24130.2	12.3	24075	24175	43.0	44.8	Passed
50 °C	normal	24117.9	24130.5	12.5	24075	24175	42.9	44.5	Passed

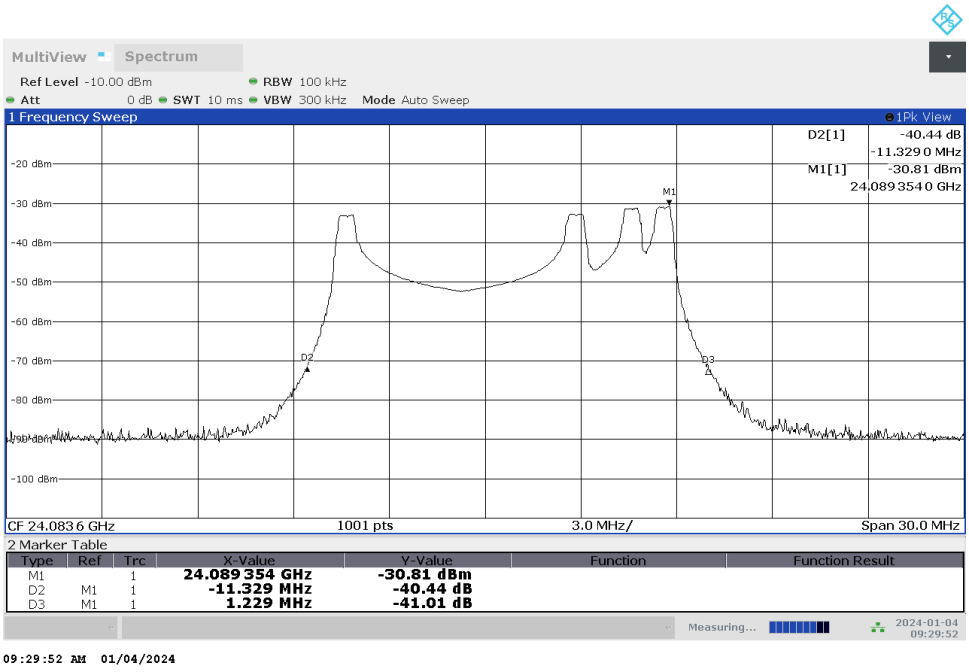
Channel 3

Temperature	Voltage	flow [MHz]	fHigh [MHz]	Occupied Bandwidth	Lower Limit	Upper Limit	Margin to lower limit [MHz]	Margin to upper limit [MHz]	Verdict
-20 °C	normal	24158.5	24170.9	12.4	24075	24175	83.5	4.1	Passed
-10 °C	normal	24158.6	24170.9	12.3	24075	24175	83.6	4.1	Passed
0 °C	normal	24158.3	24170.7	12.4	24075	24175	83.3	4.3	Passed
10 °C	normal	24158.2	24170.7	12.4	24075	24175	83.2	4.3	Passed
20 °C	low	24158.2	24170.5	12.3	24075	24175	83.2	4.5	Passed
20 °C	normal	24158.2	24170.6	12.3	24075	24175	83.2	4.4	Passed
20 °C	high	24157.9	24170.2	12.3	24075	24175	82.9	4.8	Passed
30 °C	normal	24158.1	24170.5	12.4	24075	24175	83.1	4.5	Passed
40 °C	normal	24158.2	24170.5	12.3	24075	24175	83.2	4.5	Passed
50 °C	normal	24157.8	24170.4	12.5	24075	24175	82.8	4.6	Passed

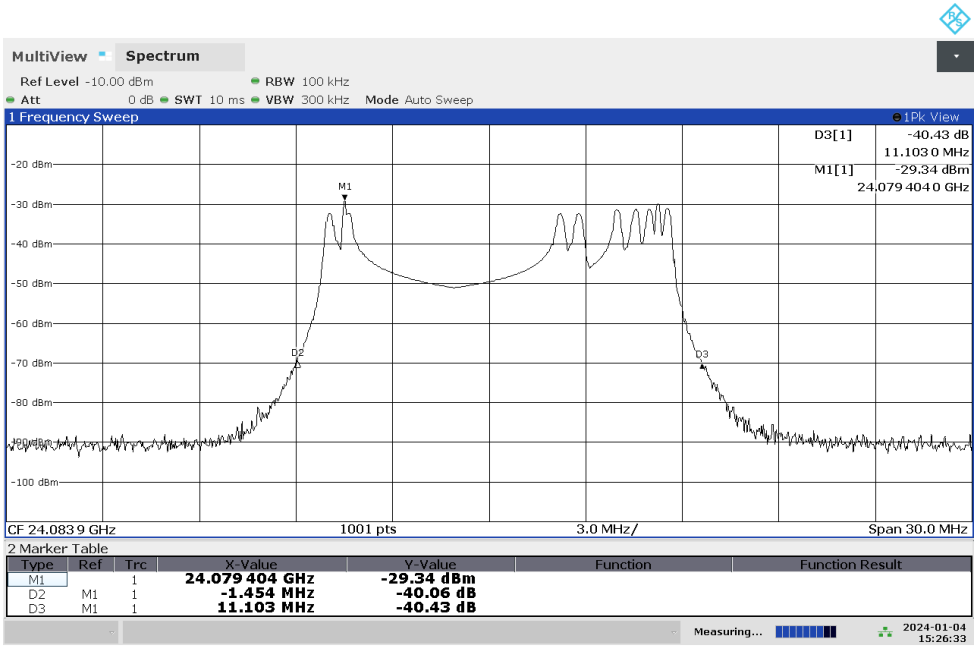
Remark: Please see next sub-clause for the measurement plot.

5.4.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

Voltage = normal; Temperature = 20 °C
Channel 1

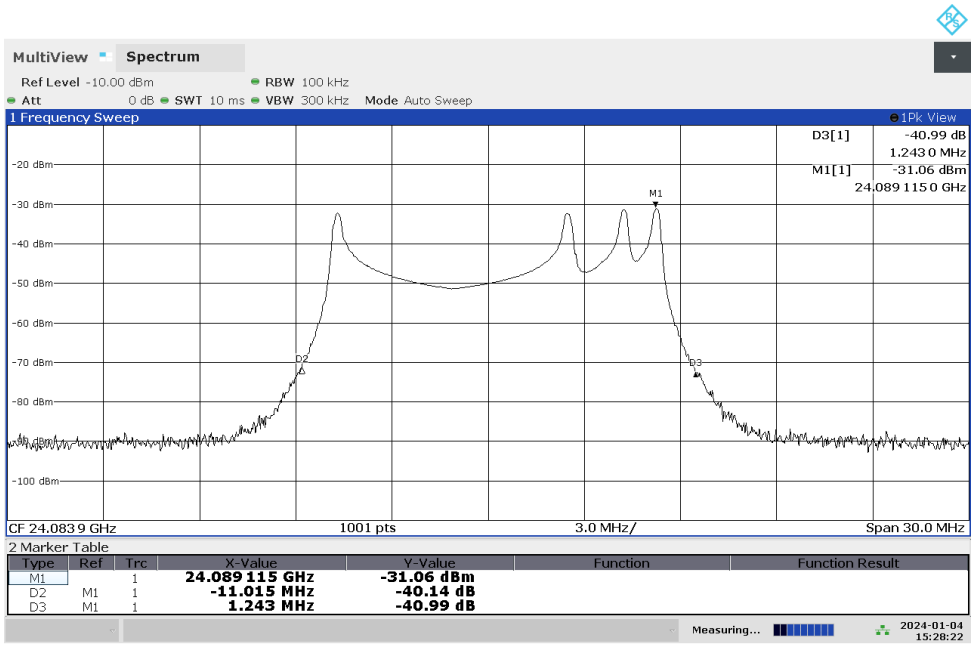


Voltage = low; Temperature = 20 °C
Channel 1



03:26:34 PM 01/04/2024

Voltage = high; Temperature = 20 °C
Channel 1



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5.4.5 TEST EQUIPMENT USED

- Radiated Emissions

6 TEST EQUIPMENT

1 Radiated Emissions
Lab to perform radiated emission tests

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.1	ESW44	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	101603	2022-01	2024-01
1.2	Anechoic Chamber 01	SAC/FAR, 10.58 m x 6.38 m x 6.00 m	Frankonia	none	N/A	N/A
1.3	FS-Z60	Harmonic Mixer 40 - 60 GHz	Rohde & Schwarz Messgerätebau GmbH	100178	2023-06	2026-06
1.4	FS-Z220	Harmonic Mixer 140 - 220 GHz	Rohde & Schwarz Messgerätebau GmbH	101005	2023-05	2026-05
1.5	SGH-05	Standard Gain / Pyramidal Horn Antenna (140 - 220 GHz)	Millitech	075	N/A	N/A
1.6	HL 562 ULTRALOG	Biconical-log-per antenna (30 MHz - 3 GHz) with HL 562E biconicals	Rohde & Schwarz GmbH & Co. KG	830547/003	2021-09	2024-09
1.7	AMF-7D00101800-30-10P-R	Broadband Amplifier 100 MHz - 18 GHz	Miteq		N/A	N/A
1.8	5HC2700/12750-1.5-KK	High Pass Filter	Trilithic	9942012	N/A	N/A
1.9	ASP 1.2/1.8-10 kg	Antenna Mast	Maturo GmbH	-	N/A	N/A
1.10	Anechoic Chamber 03	FAR, 8.80m x 4.60m x 4.05m (l x w x h)	Albatross Projects	P26971-647-001-PRB	N/A	N/A
1.11	WRD1920/1980-5/22-5EESD	Tunable Band Reject Filter	Wainwright Instruments GmbH	11	N/A	N/A
1.12	TDS 784C	Digital Oscilloscope [SA2] (Aux)	Tektronix	B021311	N/A	N/A
1.13	JS4-18002600-32-5P	Broadband Amplifier 18 GHz - 26 GHz	Miteq	849785	N/A	N/A
1.14	FSW 43	Spectrum Analyzer	Rohde & Schwarz	103779	2023-04	2025-04
1.15	3160-09	Standard Gain / Pyramidal Horn Antenna 26.5 GHz	EMCO Elektronic GmbH	00083069	N/A	N/A

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.16	SGH-19	Standard Gain / Pyramidal Horn Antenna (40 - 60 GHz)	Millitech	093	N/A	N/A
1.17	WHKX 7.0/18G-8SS	High Pass Filter	Wainwright Instruments GmbH	09	N/A	N/A
1.18	DS 420S	Turn Table 2 m diameter	HD GmbH	420/573/99	N/A	N/A
1.19	4HC1600/12750-1.5-KK	High Pass Filter	Trilithic	9942011	N/A	N/A
1.20	WRCD1879.8-0.2/40-10EE	Notch Filter Ultra Stable	Wainwright Instruments GmbH	16	N/A	N/A
1.21	Chroma 6404	AC Source	Chroma ATE INC.	64040001304	N/A	N/A
1.22	JS4-00102600-42-5A	Broadband Amplifier 30 MHz - 26 GHz	Miteq	619368	N/A	N/A
1.23	TT 1.5 WI	Turn Table	Maturo GmbH	-	N/A	N/A
1.24	HL 562 ULTRALOG	Biconical-log-per Antenna (30 MHz - 3 GHz)	Rohde & Schwarz GmbH & Co. KG	100609	2022-06	2025-06
1.25	3160-10	Standard Gain / Pyramidal Horn Antenna 40 GHz	EMCO Elektronic GmbH	00086675	N/A	N/A
1.26	MA4985-XP-ET	Bore Sight Antenna Mast	innco systems GmbH	none	N/A	N/A
1.27	SGH-08	Standard Gain / Pyramidal Horn Antenna (90 - 140 GHz)	Millitech	064	N/A	N/A
1.28	SGH-12	Standard Gain / Pyramidal HornAntenna (60 - 90 GHz)	Millitech	326	N/A	N/A
1.29	JUN-AIR Mod. 6-15	Air Compressor	JUN-AIR Deutschland GmbH	612582	N/A	N/A
1.30	5HC3500/18000-1.2-KK	High Pass Filter	Trilithic	200035008	N/A	N/A
1.31	FS-Z140	Harmonic Mixer 90 -140 GHz	Rohde & Schwarz Messgerätebau GmbH	101007	2023-05	2026-05
1.32	OLS-1 M	Fibre optic link USB 1.1	Ingenieurbüro Scheiba	018	N/A	N/A
1.33	JS4-00101800-35-5P	Broadband Amplifier 30 MHz - 18 GHz	Miteq	896037	N/A	N/A
1.34	AS 620 P	Antenna Mast (pneumatic polarisation)	HD GmbH	620/37	N/A	N/A
1.35	TD1.5-10kg	EUT Tilt Device (Rohacell)	Maturo GmbH	TD1.5-10kg/024/3790709	N/A	N/A

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.36	SGH-03	Standard Gain / Pyramidal Horn Antenna (220 - 325 GHz)	Millitech	060	N/A	N/A
1.37	FS-Z90	Harmonic Mixer 60 - 90 GHz	Rohde & Schwarz Messgerätebau GmbH	101686	2023-06	2026-06
1.38	Innco Systems CO3000	Controller for bore sight mast SAC	innco systems GmbH	CO3000/967/393 71016/L	N/A	N/A
1.39	PAS 2.5 - 10 kg	Antenna Mast	Maturo GmbH	-	N/A	N/A
1.40	AFS42-00101800-25-S-42	Broadband Amplifier 25 MHz - 18 GHz	Miteq	2035324	N/A	N/A
1.41	WRCA800/960-0.2/40-6EEK	Tuneable Notch Filter	Wainwright Instruments GmbH	20	N/A	N/A
1.42	AM 4.0	Antenna Mast 4 m	Maturo GmbH	AM4.0/180/1192 0513	N/A	N/A
1.43	HF 907	Double-ridged horn	Rohde & Schwarz	102444	2021-09	2024-09
1.44	Temperature Chamber VT 4002	Temperature Chamber Vötsch 03	Vötsch	58566002150010	2022-05	2024-05

The calibration interval is the time interval between "Last Calibration" and "Calibration Due"

6.1 TEST EQUIPMENT SOFTWARE

Semi-Anechoic Chamber:	
Software	Version
EMC32 Measurement Software	10.60.10
INNCO Mast Controller	1.02.62
MATURO Mast Controller	12.19
MATURO Turn-Table Controller	30.10
Fully-Anechoic Chamber:	
Software	Version
EMC32 Measurement Software	10.60.10
MATURO Turn-Unit Cotrolller	11.10
MATURO Mast Controller	12.10
MATURO Turntable Controller	12.11
INNCO Mast Controller	1.02.62
Conducted AC Emissions:	
Software	Version
EMC32 Measurement Software	10.60.20

7 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

7.1 LISN R&S ESH3-Z5 (150 KHZ – 30 MHZ)

Frequency		Corr.	LISN insertion loss ESH3-Z5	cable loss (incl. 10 dB atten-uator)
MHz		dB	dB	dB
0.15		10.1	0.1	10.0
5		10.3	0.1	10.2
7		10.5	0.2	10.3
10		10.5	0.2	10.3
12		10.7	0.3	10.4
14		10.7	0.3	10.4
16		10.8	0.4	10.4
18		10.9	0.4	10.5
20		10.9	0.4	10.5
22		11.1	0.5	10.6
24		11.1	0.5	10.6
26		11.2	0.5	10.7
28		11.2	0.5	10.7
30		11.3	0.5	10.8

Sample calculation

U_{LISN} (dB µV) = U (dB µV) + Corr. (dB)
U = Receiver reading
LISN Insertion loss = Voltage Division Factor of LISN
Corr. = sum of single correction factors of used LISN, cables, switch units (if used)
Linear interpolation will be used for frequencies in between the values in the table.

7.2 ANTENNA R&S HFH2-Z2 (9 KHZ – 30 MHZ)

Frequency	AF HFH-Z2)	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-40 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
0.009	20.50	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.01	20.45	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.015	20.37	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.02	20.36	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.025	20.38	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.03	20.32	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.05	20.35	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.08	20.30	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.1	20.20	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.2	20.17	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.3	20.14	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.49	20.12	-79.6	0.1	0.1	0.1	0.1	-80	300	3
0.490001	20.12	-39.6	0.1	0.1	0.1	0.1	-40	30	3
0.5	20.11	-39.6	0.1	0.1	0.1	0.1	-40	30	3
0.8	20.10	-39.6	0.1	0.1	0.1	0.1	-40	30	3
1	20.09	-39.6	0.1	0.1	0.1	0.1	-40	30	3
2	20.08	-39.6	0.1	0.1	0.1	0.1	-40	30	3
3	20.06	-39.6	0.1	0.1	0.1	0.1	-40	30	3
4	20.05	-39.5	0.2	0.1	0.1	0.1	-40	30	3
5	20.05	-39.5	0.2	0.1	0.1	0.1	-40	30	3
6	20.02	-39.5	0.2	0.1	0.1	0.1	-40	30	3
8	19.95	-39.5	0.2	0.1	0.1	0.1	-40	30	3
10	19.83	-39.4	0.2	0.1	0.2	0.1	-40	30	3
12	19.71	-39.4	0.2	0.1	0.2	0.1	-40	30	3
14	19.54	-39.4	0.2	0.1	0.2	0.1	-40	30	3
16	19.53	-39.3	0.3	0.1	0.2	0.1	-40	30	3
18	19.50	-39.3	0.3	0.1	0.2	0.1	-40	30	3
20	19.57	-39.3	0.3	0.1	0.2	0.1	-40	30	3
22	19.61	-39.3	0.3	0.1	0.2	0.1	-40	30	3
24	19.61	-39.3	0.3	0.1	0.2	0.1	-40	30	3
26	19.54	-39.3	0.3	0.1	0.2	0.1	-40	30	3
28	19.46	-39.2	0.3	0.1	0.3	0.1	-40	30	3
30	19.73	-39.1	0.4	0.1	0.3	0.1	-40	30	3

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
distance correction = -40 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values

7.3 ANTENNA R&S HL562 (30 MHZ – 1 GHZ)

(d_{Limit} = 3 m)

Frequency	AF R&S HL562	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
30	18.6	0.6	0.29	0.04	0.23	0.02	0.0	3	3
50	6.0	0.9	0.39	0.09	0.32	0.08	0.0	3	3
100	9.7	1.2	0.56	0.14	0.47	0.08	0.0	3	3
150	7.9	1.6	0.73	0.20	0.59	0.12	0.0	3	3
200	7.6	1.9	0.84	0.21	0.70	0.11	0.0	3	3
250	9.5	2.1	0.98	0.24	0.80	0.13	0.0	3	3
300	11.0	2.3	1.04	0.26	0.89	0.15	0.0	3	3
350	12.4	2.6	1.18	0.31	0.96	0.13	0.0	3	3
400	13.6	2.9	1.28	0.35	1.03	0.19	0.0	3	3
450	14.7	3.1	1.39	0.38	1.11	0.22	0.0	3	3
500	15.6	3.2	1.44	0.39	1.20	0.19	0.0	3	3
550	16.3	3.5	1.55	0.46	1.24	0.23	0.0	3	3
600	17.2	3.5	1.59	0.43	1.29	0.23	0.0	3	3
650	18.1	3.6	1.67	0.34	1.35	0.22	0.0	3	3
700	18.5	3.6	1.67	0.42	1.41	0.15	0.0	3	3
750	19.1	4.1	1.87	0.54	1.46	0.25	0.0	3	3
800	19.6	4.1	1.90	0.46	1.51	0.25	0.0	3	3
850	20.1	4.4	1.99	0.60	1.56	0.27	0.0	3	3
900	20.8	4.7	2.14	0.60	1.63	0.29	0.0	3	3
950	21.1	4.8	2.22	0.60	1.66	0.33	0.0	3	3
1000	21.6	4.9	2.23	0.61	1.71	0.30	0.0	3	3

(d_{Limit} = 10 m)

30	18.6	-9.9	0.29	0.04	0.23	0.02	-10.5	10	3
50	6.0	-9.6	0.39	0.09	0.32	0.08	-10.5	10	3
100	9.7	-9.2	0.56	0.14	0.47	0.08	-10.5	10	3
150	7.9	-8.8	0.73	0.20	0.59	0.12	-10.5	10	3
200	7.6	-8.6	0.84	0.21	0.70	0.11	-10.5	10	3
250	9.5	-8.3	0.98	0.24	0.80	0.13	-10.5	10	3
300	11.0	-8.1	1.04	0.26	0.89	0.15	-10.5	10	3
350	12.4	-7.9	1.18	0.31	0.96	0.13	-10.5	10	3
400	13.6	-7.6	1.28	0.35	1.03	0.19	-10.5	10	3
450	14.7	-7.4	1.39	0.38	1.11	0.22	-10.5	10	3
500	15.6	-7.2	1.44	0.39	1.20	0.19	-10.5	10	3
550	16.3	-7.0	1.55	0.46	1.24	0.23	-10.5	10	3
600	17.2	-6.9	1.59	0.43	1.29	0.23	-10.5	10	3
650	18.1	-6.9	1.67	0.34	1.35	0.22	-10.5	10	3
700	18.5	-6.8	1.67	0.42	1.41	0.15	-10.5	10	3
750	19.1	-6.3	1.87	0.54	1.46	0.25	-10.5	10	3
800	19.6	-6.3	1.90	0.46	1.51	0.25	-10.5	10	3
850	20.1	-6.0	1.99	0.60	1.56	0.27	-10.5	10	3
900	20.8	-5.8	2.14	0.60	1.63	0.29	-10.5	10	3
950	21.1	-5.6	2.22	0.60	1.66	0.33	-10.5	10	3
1000	21.6	-5.6	2.23	0.61	1.71	0.30	-10.5	10	3

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

7.4 ANTENNA R&S HF907 (1 GHZ – 18 GHZ)

Frequency	AF R&S HF907	Corr.	cable loss 1 (relay + cable inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit, atten-uator & pre-amp)	cable loss 4 (to receiver)		
MHz	dB (1/m)	dB	dB	dB	dB	dB		
1000	24.4	-19.4	0.99	0.31	-21.51	0.79		
2000	28.5	-17.4	1.44	0.44	-20.63	1.38		
3000	31.0	-16.1	1.87	0.53	-19.85	1.33		
4000	33.1	-14.7	2.41	0.67	-19.13	1.31		
5000	34.4	-13.7	2.78	0.86	-18.71	1.40		
6000	34.7	-12.7	2.74	0.90	-17.83	1.47		
7000	35.6	-11.0	2.82	0.86	-16.19	1.46		

Frequency	AF R&S HF907	Corr.	cable loss 1 (relay inside chamber)	cable loss 2 (inside chamber)	cable loss 3 (outside chamber)	cable loss 4 (switch unit, atten-uator & pre-amp)	cable loss 5 (to receiver)	used for FCC 15.247
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	
3000	31.0	-23.4	0.47	1.87	0.53	-27.58	1.33	
4000	33.1	-23.3	0.56	2.41	0.67	-28.23	1.31	
5000	34.4	-21.7	0.61	2.78	0.86	-27.35	1.40	
6000	34.7	-21.2	0.58	2.74	0.90	-26.89	1.47	
7000	35.6	-19.8	0.66	2.82	0.86	-25.58	1.46	

Frequency	AF R&S HF907	Corr.	cable loss 1 (relay inside chamber)	cable loss 2 (High Pass)	cable loss 3 (pre-amp)	cable loss 4 (inside chamber)	cable loss 5 (outside chamber)	cable loss 6 (to receiver)
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB	dB
7000	35.6	-57.3	0.56	1.28	-62.72	2.66	0.94	1.46
8000	36.3	-56.3	0.69	0.71	-61.49	2.84	1.00	1.53
9000	37.1	-55.3	0.68	0.65	-60.80	3.06	1.09	1.60
10000	37.5	-56.2	0.70	0.54	-61.91	3.28	1.20	1.67
11000	37.5	-55.3	0.80	0.61	-61.40	3.43	1.27	1.70
12000	37.6	-53.7	0.84	0.42	-59.70	3.53	1.26	1.73
13000	38.2	-53.5	0.83	0.44	-59.81	3.75	1.32	1.83
14000	39.9	-56.3	0.91	0.53	-63.03	3.91	1.40	1.77
15000	40.9	-54.1	0.98	0.54	-61.05	4.02	1.44	1.83
16000	41.3	-54.1	1.23	0.49	-61.51	4.17	1.51	1.85
17000	42.8	-54.4	1.36	0.76	-62.36	4.34	1.53	2.00
18000	44.2	-54.7	1.70	0.53	-62.88	4.41	1.55	1.91

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
Tables show an extract of values.

7.5 ANTENNA EMCO 3160-09 (18 GHZ – 26.5 GHZ)

Frequency	AF EMCO 3160-09	Corr.	cable loss 1 (inside chamber)	cable loss 2 (pre-amp)	cable loss 3 (inside chamber)	cable loss 4 (switch unit)	cable loss 5 (to receiver)
MHz	dB (1/m)	dB	dB	dB	dB	dB	dB
18000	40.2	-23.5	0.72	-35.85	6.20	2.81	2.65
18500	40.2	-23.2	0.69	-35.71	6.46	2.76	2.59
19000	40.2	-22.0	0.76	-35.44	6.69	3.15	2.79
19500	40.3	-21.3	0.74	-35.07	7.04	3.11	2.91
20000	40.3	-20.3	0.72	-34.49	7.30	3.07	3.05
20500	40.3	-19.9	0.78	-34.46	7.48	3.12	3.15
21000	40.3	-19.1	0.87	-34.07	7.61	3.20	3.33
21500	40.3	-19.1	0.90	-33.96	7.47	3.28	3.19
22000	40.3	-18.7	0.89	-33.57	7.34	3.35	3.28
22500	40.4	-19.0	0.87	-33.66	7.06	3.75	2.94
23000	40.4	-19.5	0.88	-33.75	6.92	3.77	2.70
23500	40.4	-19.3	0.90	-33.35	6.99	3.52	2.66
24000	40.4	-19.8	0.88	-33.99	6.88	3.88	2.58
24500	40.4	-19.5	0.91	-33.89	7.01	3.93	2.51
25000	40.4	-19.3	0.88	-33.00	6.72	3.96	2.14
25500	40.5	-20.4	0.89	-34.07	6.90	3.66	2.22
26000	40.5	-21.3	0.86	-35.11	7.02	3.69	2.28
26500	40.5	-21.1	0.90	-35.20	7.15	3.91	2.36

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

7.6 ANTENNA EMCO 3160-10 (26.5 GHZ – 40 GHZ)

Frequency	AF EMCO 3160-10	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
26.5	43.4	-11.2	4.4				-9.5	3	1.0
27.0	43.4	-11.2	4.4				-9.5	3	1.0
28.0	43.4	-11.1	4.5				-9.5	3	1.0
29.0	43.5	-11.0	4.6				-9.5	3	1.0
30.0	43.5	-10.9	4.7				-9.5	3	1.0
31.0	43.5	-10.8	4.7				-9.5	3	1.0
32.0	43.5	-10.7	4.8				-9.5	3	1.0
33.0	43.6	-10.7	4.9				-9.5	3	1.0
34.0	43.6	-10.6	5.0				-9.5	3	1.0
35.0	43.6	-10.5	5.1				-9.5	3	1.0
36.0	43.6	-10.4	5.1				-9.5	3	1.0
37.0	43.7	-10.3	5.2				-9.5	3	1.0
38.0	43.7	-10.2	5.3				-9.5	3	1.0
39.0	43.7	-10.2	5.4				-9.5	3	1.0
40.0	43.8	-10.1	5.5				-9.5	3	1.0

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

7.7 ANTENNA SGH-19 (40 GHZ – 60 GHZ)

Frequency	AF SGH-19	Corr.		cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	Harmonic Mixer FS-Z60	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB		dB	dB	dB	dB	dB	m	m
40.0	39.6	3.8					19.4	-15.6	3	0.5
41.0	39.7	2.7					18.3	-15.6	3	0.5
42.0	39.8	3.3					18.9	-15.6	3	0.5
43.0	39.9	2.7					18.3	-15.6	3	0.5
44.0	40.1	4.0					19.6	-15.6	3	0.5
45.0	40.2	3.8					19.4	-15.6	3	0.5
46.0	40.3	4.0					19.6	-15.6	3	0.5
47.0	40.4	4.3					19.9	-15.6	3	0.5
48.0	40.5	3.5					19.1	-15.6	3	0.5
49.0	40.6	3.2					18.8	-15.6	3	0.5
50.0	40.8	3.6					19.2	-15.6	3	0.5
51.0	40.9	2.6					18.2	-15.6	3	0.5
52.0	41.1	1.5					17.1	-15.6	3	0.5
53.0	41.1	0.1					15.7	-15.6	3	0.5
54.0	41.3	-1.0					14.6	-15.6	3	0.5
55.0	41.4	-0.8					14.8	-15.6	3	0.5
56.0	41.5	-1.2					14.4	-15.6	3	0.5
57.0	41.6	-0.8					14.8	-15.6	3	0.5
58.0	41.8	-0.9					14.7	-15.6	3	0.5
59.0	41.9	0.0					15.6	-15.6	3	0.5
60.0	42.1	1.3					16.9	-15.6	3	0.5

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

7.8 ANTENNA SGH-12 (60 GHZ – 90 GHZ)

Frequency	AF SGH-12	Corr.	cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	Harmonic Mixer FS-Z90	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB	dB	dB	dB	dB	dB	m	m
60.0	43.3	8.2				24.4	-15.6	3	0.5
61.5	43.4	7.3				23.8	-15.6	3	0.5
63.0	43.5	4.2				22.9	-15.6	3	0.5
64.5	43.6	4.2				19.8	-15.6	3	0.5
66.0	43.7	2.0				19.8	-15.6	3	0.5
67.5	43.8	3.4				17.6	-15.6	3	0.5
69.0	43.9	3.2				19.0	-15.6	3	0.5
70.5	44.0	2.4				18.8	-15.6	3	0.5
72.0	44.1	1.6				18.0	-15.6	3	0.5
73.5	44.2	1.7				17.2	-15.6	3	0.5
75.0	44.4	0.1				17.3	-15.6	3	0.5
76.5	44.5	-0.5				15.7	-15.6	3	0.5
78.0	44.6	-0.5				15.1	-15.6	3	0.5
79.5	44.7	-1.6				15.1	-15.6	3	0.5
81.0	44.8	-1.7				14.0	-15.6	3	0.5
82.5	45.0	-0.3				13.9	-15.6	3	0.5
84.0	45.1	2.2				15.3	-15.6	3	0.5
85.5	45.2	3.7				17.8	-15.6	3	0.5
87.0	45.4	5.9				19.3	-15.6	3	0.5
88.5	45.5	5.2				21.5	-15.6	3	0.5
90.0	45.6	8.2				20.8	-15.6	3	0.5

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

7.9 ANTENNA SGH-08 (90 GHZ – 140 GHZ)

Frequency	AF SGH-19	Corr.		cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	Harmonic Mixer FS-Z140	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB		dB	dB	dB	dB	dB	m	m
90.0	46.9	12.2					27.8	-15.6	3	0.5
92.5	47.0	10.8					26.4	-15.6	3	0.5
95.0	47.1	9.2					24.8	-15.6	3	0.5
97.5	47.2	7.5					23.1	-15.6	3	0.5
100.0	47.3	5.8					21.4	-15.6	3	0.5
102.5	47.4	6.0					21.6	-15.6	3	0.5
105.0	47.6	7.0					22.6	-15.6	3	0.5
107.5	47.7	5.8					21.4	-15.6	3	0.5
110.0	47.8	4.7					20.3	-15.6	3	0.5
112.5	47.9	4.1					19.7	-15.6	3	0.5
115.0	48.0	6.8					22.4	-15.6	3	0.5
117.5	48.2	7.3					22.9	-15.6	3	0.5
120.0	48.3	7.5					23.1	-15.6	3	0.5
122.5	48.4	10.4					26.0	-15.6	3	0.5
125.0	48.6	13.6					29.2	-15.6	3	0.5
127.5	48.7	15.5					31.1	-15.6	3	0.5
130.0	48.9	18.1					33.7	-15.6	3	0.5
132.5	49.0	13.5					29.1	-15.6	3	0.5
135.0	49.2	14.6					30.2	-15.6	3	0.5
137.5	49.3	14.1					29.7	-15.6	3	0.5
140.0	49.4	11.5					27.1	-15.6	3	0.5

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

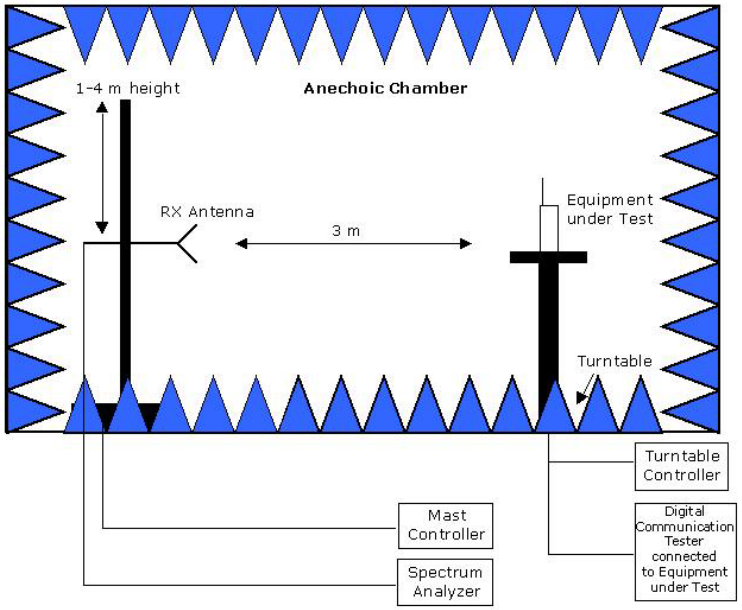
7.10 ANTENNA SGH-05 (140 GHZ – 200 GHZ)

Frequency	AF SGH-19	Corr.		cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	Harmonic Mixer FS-Z140	distance corr. (-20 dB/ decade)	d_{Limit} (meas. distance (limit)	d_{used} (meas. distance (used)
GHz	dB (1/m)	dB		dB	dB	dB	dB	dB	m	m
140.0	50.8	15.1					30.7	-15.6	3	0.5
142.0	50.8	11.0					26.6	-15.6	3	0.5
144.0	50.9	11.1					26.7	-15.6	3	0.5
146.0	50.9	12.1					27.7	-15.6	3	0.5
148.0	51.0	13.1					28.7	-15.6	3	0.5
150.0	51.0	15.4					31.0	-15.6	3	0.5
152.0	51.1	15.0					30.6	-15.6	3	0.5
154.0	51.1	16.9					32.5	-15.6	3	0.5
156.0	51.2	15.1					30.7	-15.6	3	0.5
158.0	51.3	15.3					30.9	-15.6	3	0.5
160.0	51.3	14.5					30.1	-15.6	3	0.5
162.0	51.4	14.2					29.8	-15.6	3	0.5
164.0	51.4	15.4					31.0	-15.6	3	0.5
166.0	51.5	13.5					29.1	-15.6	3	0.5
168.0	51.6	14.0					29.6	-15.6	3	0.5
170.0	51.6	15.1					30.7	-15.6	3	0.5
172.0	51.7	14.3					29.9	-15.6	3	0.5
174.0	51.8	14.7					30.3	-15.6	3	0.5
176.0	51.8	14.8					30.4	-15.6	3	0.5
178.0	51.9	14.6					30.2	-15.6	3	0.5
180.0	51.9	14.9					30.5	-15.6	3	0.5
182.0	52.0	14.7					30.3	-15.6	3	0.5
184.0	52.1	15.6					31.2	-15.6	3	0.5
186.0	52.1	16.8					32.4	-15.6	3	0.5
188.0	52.2	15.2					30.8	-15.6	3	0.5
190.0	52.3	16.8					32.4	-15.6	3	0.5
192.0	52.3	16.1					31.7	-15.6	3	0.5
194.0	52.4	14.8					30.4	-15.6	3	0.5
196.0	52.5	15.1					30.7	-15.6	3	0.5
198.0	52.6	13.8					29.4	-15.6	3	0.5
200.0	52.6	13.7					29.3	-15.6	3	0.5
202.0	52.7	14.0					29.6	-15.6	3	0.5
204.0	52.8	13.7					29.3	-15.6	3	0.5
206.0	52.8	13.4					29.0	-15.6	3	0.5
208.0	52.9	13.4					29.0	-15.6	3	0.5
210.0	53.0	13.9					29.5	-15.6	3	0.5
212.0	53.1	12.9					28.5	-15.6	3	0.5
214.0	53.2	13.1					28.7	-15.6	3	0.5
216.0	53.2	13.5					29.1	-15.6	3	0.5
218.0	53.3	14.5					30.1	-15.6	3	0.5
220.0	53.4	14.0					29.6	-15.6	3	0.5

Sample calculation

E (dB µV/m) = U (dB µV) + AF (dB 1/m) + Corr. (dB)
U = Receiver reading
AF = Antenna factor
Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)
Linear interpolation will be used for frequencies in between the values in the table.
distance correction = -20 * LOG (d_{Limit}/ d_{used})
Linear interpolation will be used for frequencies in between the values in the table.
Table shows an extract of values.

8 SETUP DRAWINGS



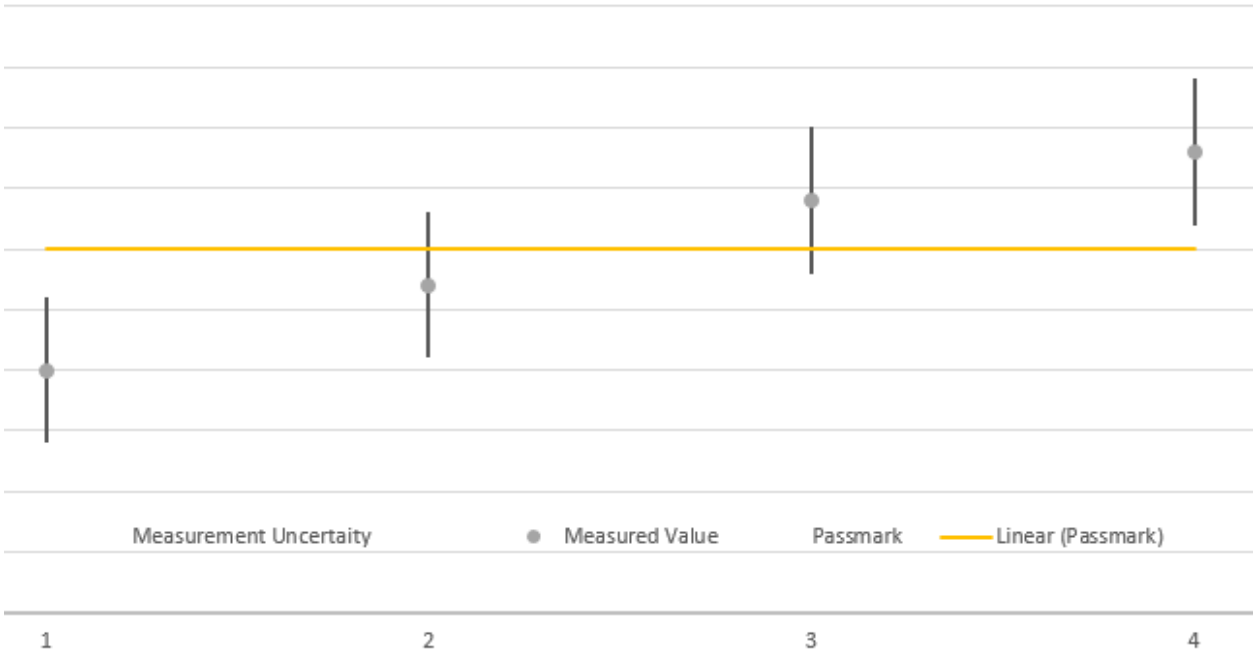
Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Drawing 1: Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting groundplane.

9 MEASUREMENT UNCERTAINTIES

Test Case	Parameter	Uncertainty
AC Power Line	Power	± 3.4 dB
Field Strength of spurious radiation	Power	± 5.5 dB
10 dB Bandwidth	Power Frequency	± 5.5 dB ± 100.0 kHz
Conducted Output Power	Power	± 2.2 dB
Band Edge Compliance	Power Frequency	± 2.2 dB ± 11.2 kHz
Frequency Stability	Frequency	± 25 Hz
Power Spectral Density	Power	± 2.2 dB

The measurement uncertainties for all parameters are calculated with an expansion factor (coverage factor) k = 1.96. This means, that the true value is in the corresponding interval with a probability of 95 %.



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so called shared risk principle.

10 PHOTO REPORT

Please see separate photo report.

*****END OF REPORT*****