FCC Measurement / Technical Report on

SPECTERA SKM
SKM 1G4

FCC ID: DMOSKM1G4
IC: 2099A-SKM1G4

Test Report Reference: MDE_SENNH_2602_FCC_01

Test Laboratory:
7layers GmbH
Borsigstrasse 11
40880 Ratingen
Germany

Deutsche Akkreditierungsstelle D-PL-12140-01-00

Table of Contents

1 APPLIED STANDARDS AND TEST SUMMARY

1.1 APPLIED STANDARDS

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 2, 15 and 74 (10-1-24 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

§15.207 Conducted limits

Part 74, Subpart H – Low Power Auxiliary Stations

§74.802 Frequency Assignment
§74.861 Technical Requirements

Note:

- ANSI C63.26–2015 is applied.
- EN 300 422-1, V2.2.1 is applied

2 MEASUREMENT SUMMARY

47 CFR CHAPTER I FCC PART 15.207 §15.207 (a)

Conducted AC measurement

The measurement was performed according to ANSI C63.10, chapter 6.2

OP-Mode Band, Measurement method, Radio Technology	Setup	Date	Final Result FCC	IC
-, -, -	-	-	N/A	N/A

47 CFR CHAPTER I FCC PART 74H §74.861 (d)(1)

Output Power Conducted

The measurement was performed according to ANSI C63.26, chapter 5.2.4.4

OP-Mode Band, Measurement method, Operating Frequency, Radio Technology	Setup	Date	Final Result FCC	IC
1435 – 1525 MHz, conducted, Lowest, WMAS 6 MHz	S01_AA02	2026-06-24	Passed	-
1435 – 1525 MHz, conducted, Mid, WMAS 6 MHz	S01_BA02	2026-06-24	Passed	-
1435 – 1525 MHz, conducted, Highest, WMAS 6 MHz	S01_BA02	2026-06-24	Passed	-

47 CFR CHAPTER I FCC PART 74H §2.1055

Transmitter Frequency Stability

The measurement was performed according to ANSI C63.26, chapter 5.6

OP-Mode Band, Measurement method, Operating Frequency, Radio Technology	Setup	Date	Final Result FCC	IC
1435 – 1525 MHz, conducted, Mid, WMAS 6 MHz	S01_AA02	2026-06-25 2026-06-30	Passed	-

47 CFR CHAPTER I FCC PART 74H §74.861 (d)(4) (iii), §2.1049 (h)

Occupied Bandwidth

The measurement was performed according to ANSI C63.26, chapter 5.4.4

OP-Mode Band, Measurement method, Operating Frequency, Radio Technology	Setup	Date	Final Result FCC	IC
1435 – 1525 MHz, Conducted, Lowest, WMAS 6 MHz	S01_AA02	2026-06-24	Passed	-
1435 – 1525 MHz, Conducted, Mid, WMAS 6 MHz	S01_AA02	2026-06-24	Passed	-
1435 – 1525 MHz, Conducted, Highest, WMAS 6 MHz	S01_AA02	2026-06-24	Passed	-

47 CFR CHAPTER I FCC PART 15.236 §74.861 (d)(4)(iv)

Transmitter unwanted emissions in the spurious domain

The measurement was performed according to ANSI C63.26, chapter 5.5.2.3.1

Final Result

OP-Mode Band, Measurement method, Operating Frequency, Radio Technology	Setup	Date	FCC	IC
1435 – 1525 MHz, radiated, Lowest, WMAS 6 MHz	S01_AA01	2026-06-29 2026-06-30	Passed	-
1435 – 1525 MHz, radiated, Mid, WMAS 6 MHz	S01_AA01	2026-06-29 2026-06-30	Passed	-
1435 – 1525 MHz, radiated, Highest, WMAS 6 MHz	S01_AA01	2026-06-29 2026-06-30	Passed	-

47 CFR CHAPTER I FCC PART 15.236 §74.861 (d)(4)(iii)

Emissions within the band

(Transmitter unwanted emissions in the OOB domain)

The measurement was performed according to EN 300 422-1, clause 5.4.3

Final Result

OP-Mode Band, Measurement method, Operating Frequency, Radio Technology	Setup	Date	FCC	IC
1435 – 1525 MHz, conducted, Lowest, WMAS 6 MHz	S02_AA02	2026-06-24	Passed	-
1435 – 1525 MHz, conducted, Mid, WMAS 6 MHz	S02_AA02	2026-06-24	Passed	-
1435 – 1525 MHz, conducted, Highest, WMAS 6 MHz	S02_AA02	2026-06-24	Passed	-

3 REVISION HISTORY

Report version control			
Version	**Release date**	**Change Description**	**Version validity**
initial	2026-07-27	--	valid
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COMMENT: -

(responsible for accreditation scope)
Dipl.-Ing. Daniel Gall

(responsible for testing and report)
Dipl.-Ing. Marco Kullik

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

4 ADMINISTRATIVE DATA

4.1 TESTING LABORATORY

Company Name:	7layers GmbH
Address:	Borsigstr. 11 40880 Ratingen Germany
Laboratory accreditation no:	DAkkS D-PL-12140-01-00
FCC Designation Number:	DE0015
FCC Test Firm Registration:	929146
ISED CAB Identifier	DE0007; ISED#: 3699A
Responsible for accreditation scope:	Dipl.-Ing. Daniel Gall
Report Template Version:	2026-04-27

4.2 PROJECT DATA

Responsible for testing and report:	Dipl.-Ing. Marco Kullik
Date of Report:	2026-07-27
Testing Period:	2026-06-24 to 2026-06-30

4.3 APPLICANT DATA

Company Name: Address:	Sennheiser electronic SE & Co. KG Am Labor 1 D-30900 Wedemark Germany
Contact Person:	Mr. Ouajdi Ochi

4.4 MANUFACTURER DATA

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

5 TEST OBJECT DATA

5.1 GENERAL DESCRIPTION OF RADIO DEVICE

Kind of Device product description	Microphone Transceiver part of SPECTERA WMAS system.
Product name	SPECTERA SKM
Modell	SPECTERA SKM 1G4
Declared EUT data by the supplier	
Power Supply Type	DC Battery (Li-Ion Battery), Model: BA 70
Normal Voltage	3.8 V / DC
Normal Temperature	20°C
Low Temperature	-10.0 °C
High Temperature	+50.0 °C
Antenna type / gain	Integral, 1.7 dBi
Tuning Range	1438 MHz – 1522 MHz
Declared Channel Bandwidth	6.0 MHz
Declared Maximum Transmission Output Power [E.I.R.P]	1435 – 1525 MHz: 100 mW / 20.0 dBm [E.I.R.P]
Channel Separation [MHz]	Typically 12.0 MHz, minimum 6.0 MHz
Transmission Type	Continuous
Operating Modes, used Modulations and Data Rates for testing	Ultra Low Latency, OFDM
Frequency of Channels	Lowest: 1438.0 MHz Mid: 1480.0 MHz Highest: 1522.0 MHz
Min. Number of Audio Channels	1
Max. Number of Audio Channels	64
EUT provides unmodulated Test Mode	Yes
Interfaces	• Enclosure

5.2 TESTED RADIO DEVICES

Sample Name	Sample Code	Description
EUT aa01	DE1511006aa01	Radiated Sample
Sample Parameter	**Value**	
HW Version	402904-1	
SW Version	cert1.4.0	
Serial No.	1026000408	
Comment	Microphone Head: SHURE BETA 58A Microphone Head Adapter: SPECTERA SKM 58 Adapter	

Sample Name	Sample Code	Description
EUT aa02	DE1511006aa02	Conducted Sample
Sample Parameter	**Value**	
HW Version	402904-1	
SW Version	cert1.4.0	
Serial No.	1026000412	
Comment	-	

5.3 TESTED ANCILLARY EQUIPMENT

Device	Details (Manufacturer, Type Model, OUT Code)	Reason for using
-	-	-

5.4 GENERAL DESCRIPTION OF AUXILIARY EQUIPMENT

Device	Details (Manufacturer, Type Model, HW, SW, S/N)	Description
AUX01	Sennheiser, 19- Inch Rack; Art. No.: 509162, FMO2, SpecteraBS_cert1.4.0, 1325000919	SPECTERA Base Station
AUX02	Sennheiser, SPECTERA DAD UHF, FMO2, cert1.4.0, 1493000050	SPECTERA DAD, conducted sample
AUX03	Conducted Microphone Head	to inject 1 kHz tone conducted

5.5 USED SETUPS

Setup	Combination of EUTs, auxiliary and ancillary equipment	Description
S01_AA01	EUT aa01	Radiated Setup, TX-Testmode
S01_AA02	EUT aa02	Conducted Setup, TX-Testmode, TX-CW-Testmode
S02_AA02	EUT aa02, AUX01, AUX02, AUX03	Conducted Setup, TX 1 kHz tone

5.6 OPERATING MODES / TEST CHANNELS

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

WMAS	Band: 1435 – 1525 MHz		
Test Channels:	**low**	**mid**	**high**
Frequency [MHz]	1438	1480	1522

5.7 PRODUCT LABELLING

5.7.1 FCC ID LABEL

Please refer to the documentation of the applicant.

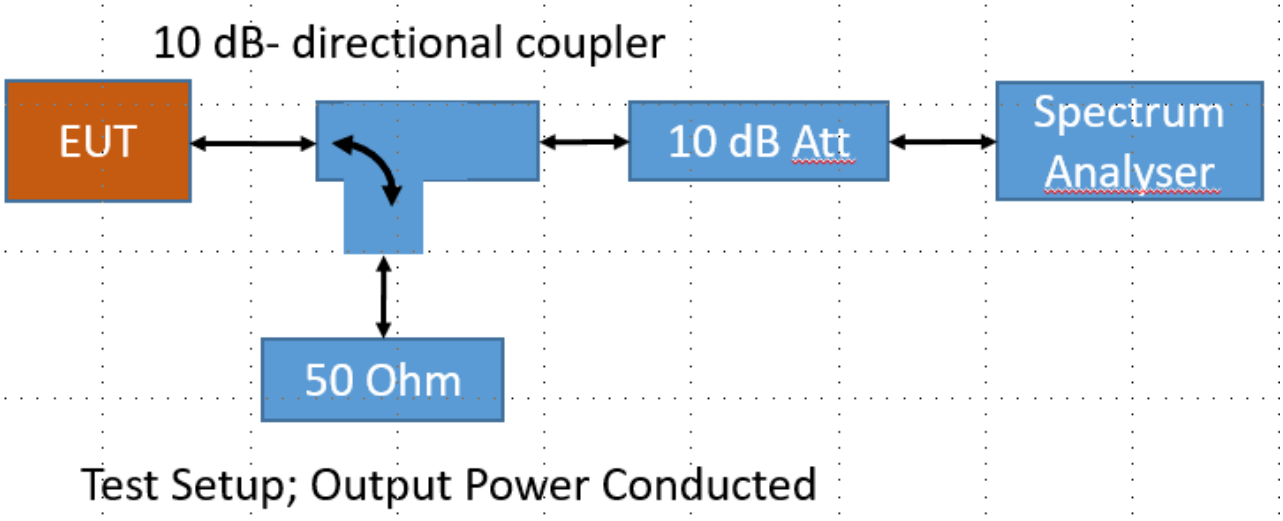
5.7.2 LOCATION OF THE LABEL ON THE EUT

Please refer to the documentation of the applicant.

6 TEST RESULTS

6.1 OUTPUT POWER CONDUCTED §74.861 (d)(1)

Test case performed according: ANSI C63.26, chapter 5.2.4.4



Test Setup; Output Power Conducted

6.1.1 LIMITS: § 74.861 (E) (II), § 74.861 (D)(1)

Frequency Bands	**Output Power (conducted)**
470 – 608 MHz 1435 – 1525 MHz	≤ 250 mW (24 dBm) ≤ 250 mW (24 dBm)

6.1.2 TEST CASE DETAILS:

Ambient temperature: 25 °C
Air Pressure: 1012 hPa
Humidity: 43 %

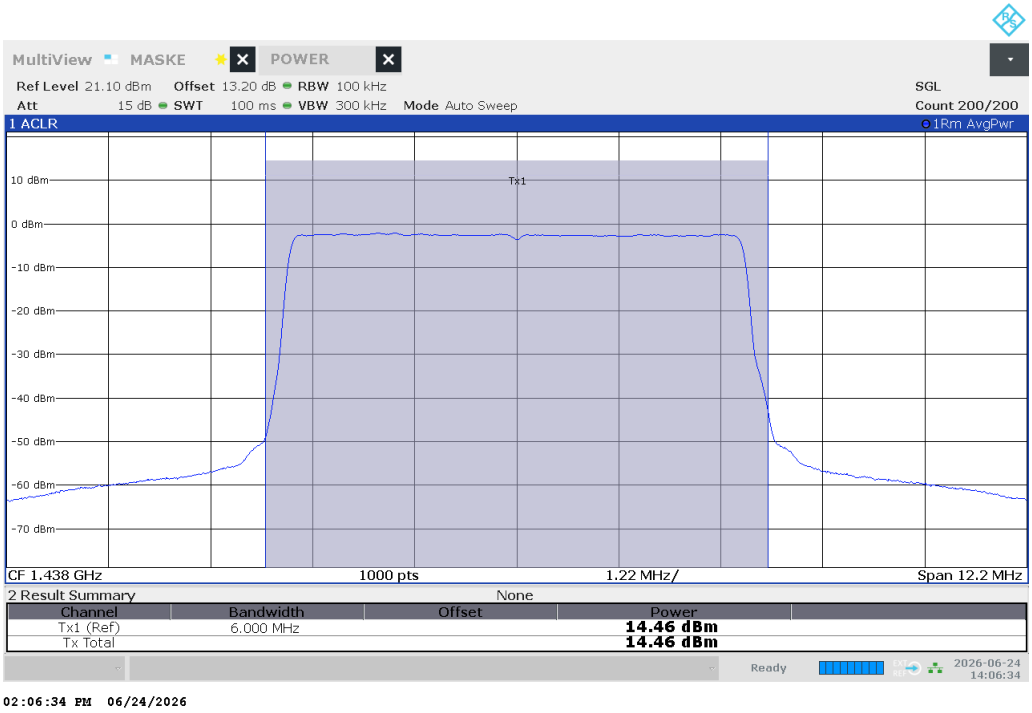
Band: 1435 MHz - 1525 MHz						
Measurement Method	**Frequency**	**Voltage**	**Nominal Operating Frequency [MHz]**	**Output Power Conducted [dBm]**	**Limit Conducted [dBm]**	**Margin to Limit [dB]**
Conducted	Low	Normal	1438.000	14.5	24.0	9.5
Conducted	Mid	Normal	1480.000	14.5	24.0	9.5
Conducted	High	Normal	1522.000	14.5	24.0	9.5

Comments:

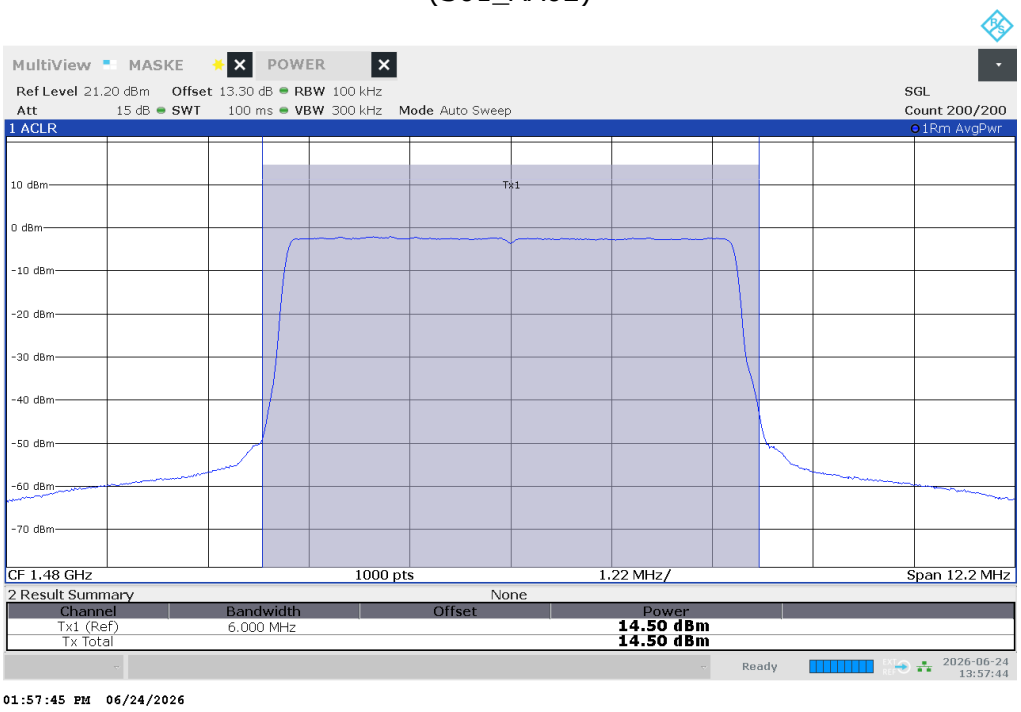
- The measurement was performed conducted.
- The Output Power value does not contain the antenna gain.
- TX Test Mode of the EUT used.

6.1.3 MEASUREMENT PLOTS:

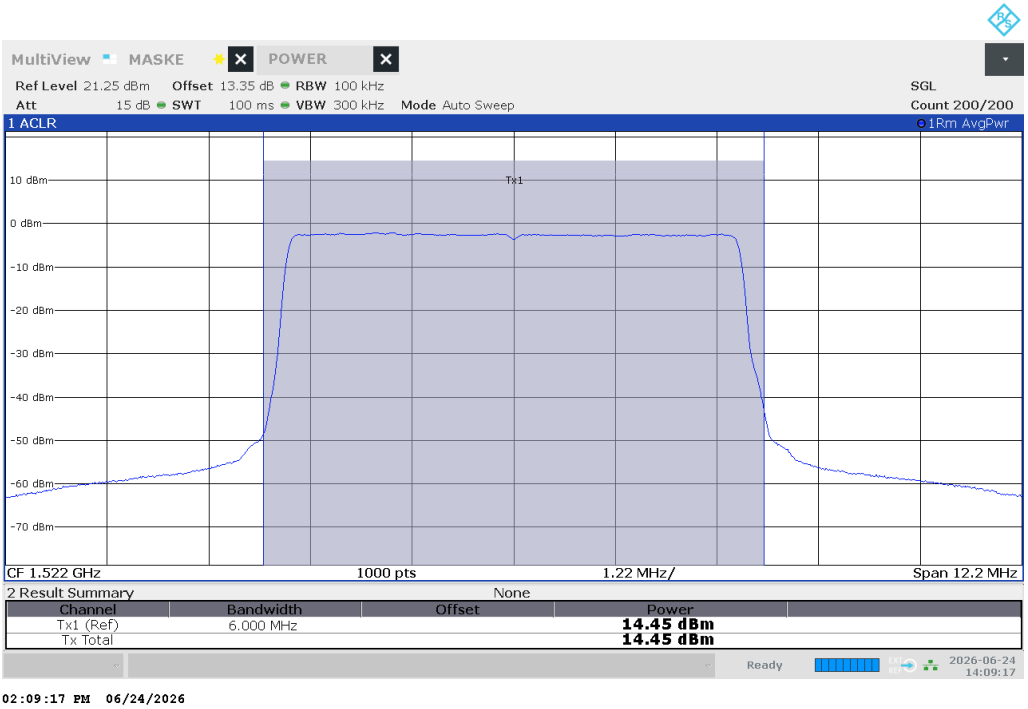
Measurement method = conducted, Operating Frequency = Low, Radio Technology = WMAS (S01_AA02)



Measurement method = conducted, Operating Frequency = Mid, Radio Technology = WMAS (S01_AA02)



Measurement method = conducted, Operating Frequency = High, Radio Technology = WMAS (S01_AA02)



TEST EQUIPMENT USED:

- Radio Lab

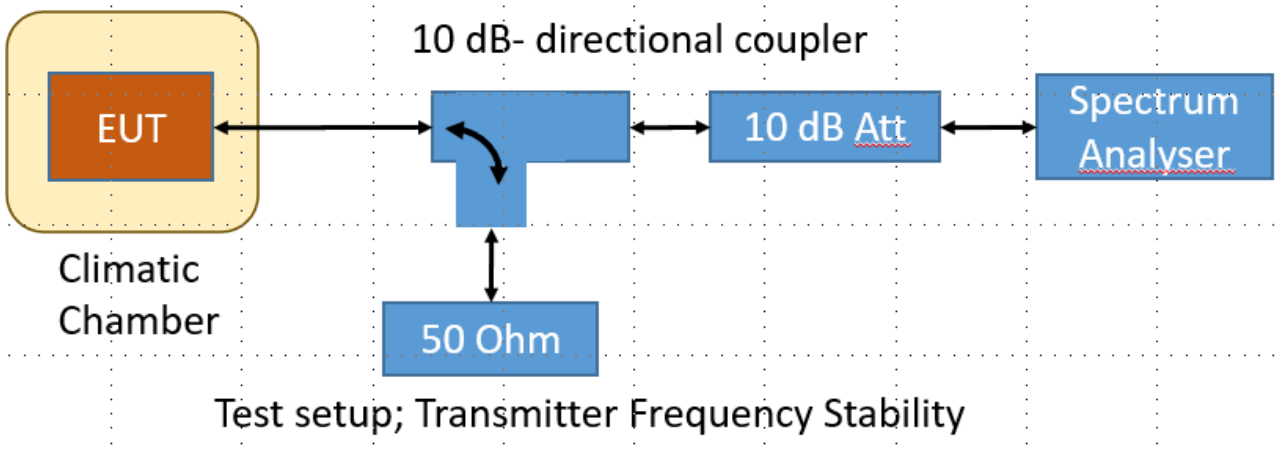
6.2 TRANSMITTER FREQUENCY STABILITY

§74.861 (e)(4)
§2.1055

Test case performed according: ANSI C63.26, Chapter 5.6

Definition:
The Declared Centre Frequency (fc) is the centre of the Operating Channel. Transmitter Frequency Stability is a measurement of the transmitter frequency error determined by the positive or negative difference between the declared centre frequency and the actual centre frequency of the device.

Test Setup:
The test was performed with the following setup:



Test setup; Transmitter Frequency Stability

6.2.1 LIMITS: LIMITS: §74.861 (C)

Low power auxiliary transmitters not required to operate on specific carrier frequencies shall operate sufficiently within the authorized frequency band edges to ensure the emission bandwidth falls entirely within the authorized band. With following frequency tolerance is the requirement - stated above – fulfilled. For the measurement the limit of Part 74.861 (e)(4) has been used: The frequency tolerance of the transmitter shall be 0.005 percent.

6.2.2 TEST CASE DETAILS:

Ambient temperature: 27 °C
Air Pressure: 1012 hPa
Humidity: 49 %

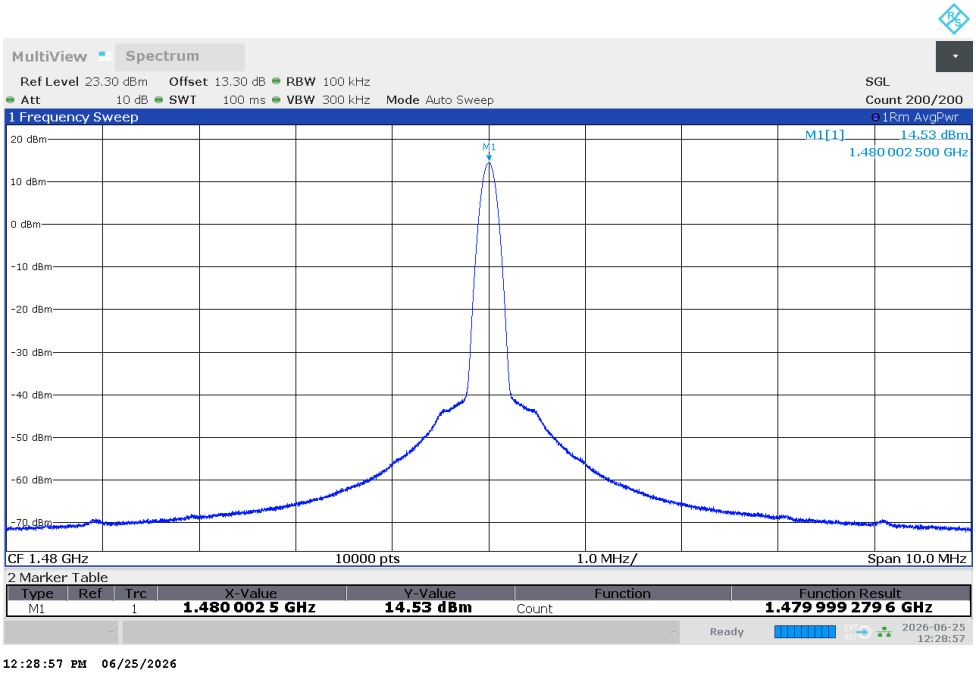
Band: 1435 MHz - 1525 MHz							
Frequency	**Temperature [°C]**	**Voltage**	**Nominal Operating Frequency [MHz]**	**Measured Operating Frequency [MHz]**	**Delta f [kHz]**	**Limit +/- [kHz]**	**Margin to Limit [kHz]**
Mid	20	Normal	1480.000	1479.9994945	-0.51	74.00	73.49
Mid	20	Low	1480.000	1479.9994596	-0.54	74.00	73.46
Mid	20	High	1480.000	1479.9993525	-0.65	74.00	73.35
Mid	-30	Normal	1480.000	1479.9998469	-0.15	74.00	73.85
Mid	-20	Normal	1480.000	1479.9998316	-0.17	74.00	73.83
Mid	-10	Normal	1480.000	1479.9994959	-0.50	74.00	73.50
Mid	0	Normal	1480.000	1479.9994142	-0.59	74.00	73.41
Mid	10	Normal	1480.000	1479.9994537	-0.55	74.00	73.45
Mid	30	Normal	1480.000	1479.9995100	-0.49	74.00	73.51
Mid	**40**	**Normal**	**1480.000**	**1479.9992796**	**-0.72**	**74.00**	**73.28**
Mid	**50**	**Normal**	**1480.000**	**1479.9999497**	**-0.05**	**74.00**	**73.95**

Comments:

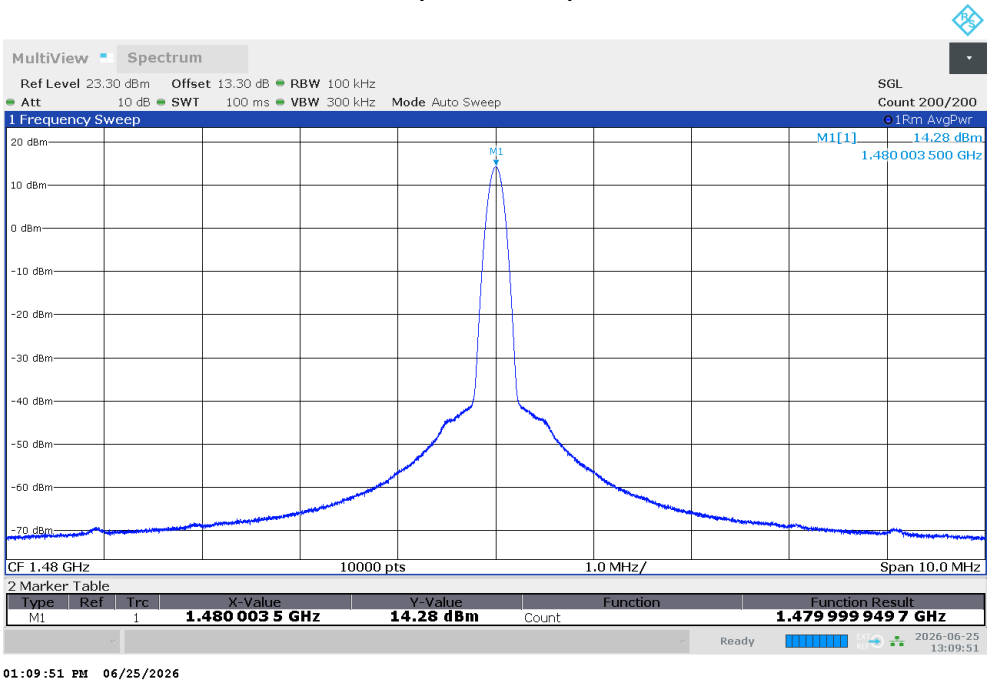
- The measurement was performed conducted.
- TX-CW Test Mode of the EUT used.
- Low voltage = 3.23 V
- High voltage = 4.37 V
- In the testcase "Occupied Bandwidth"
  - the lower 99 % frequency of the lowest channel is 329.9 kHz from the lower band edge. With the maximum lower frequency deviation of – 0.72 kHz the signal stays in the operating frequency band.
  - the upper 99 % frequency of the highest channel is 351.5 kHz from the upper band edge. With minimum frequency deviation of – 0.05 kHz the signal stays in the operating frequency band. There is no positive frequency deviation.

6.2.3 MEASUREMENT PLOTS (WORST-CASE)

Measurement method = conducted, Temperature = 40°C, Voltage = Normal, Operating Frequency = Mid, Radio Technology = WMAS 6 MHz (S01_AA02)



Measurement method = conducted, Temperature = 50°C, Voltage = Normal, Operating Frequency = Mid, Radio Technology = WMAS 6 MHz (S01_AA02)



TEST EQUIPMENT USED:

Radio Lab

6.3 OCCUPIED BANDWIDTH

§74.861 (e)(5)
§2.1049 (h)

Test case performed according: ANSI C63.26, Clause 5.4.4

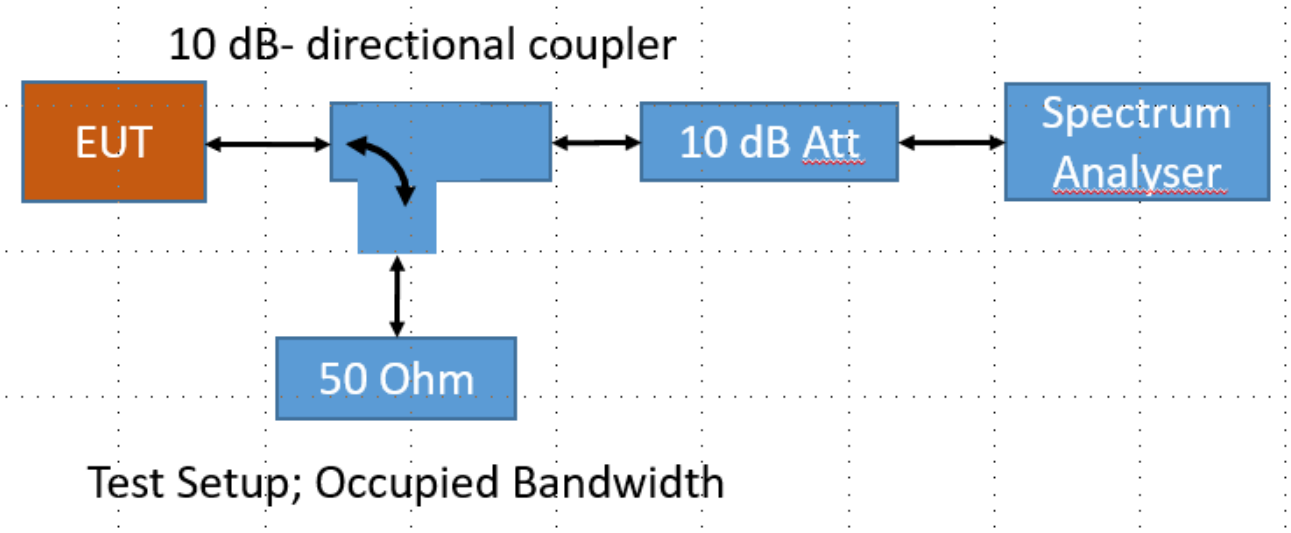
Definition:
The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.
The results recorded were measured with the modulation which produce the worst-case (widest) emission bandwidth.

Analyzer settings:

- Resolution Bandwidth (RBW): 1 – 5 % of the OBW
- Video Bandwidth (VBW): ≥ 3 times the RBW
- Span: 1.5 – 5 x OBW
- Trace: Maxhold
- Sweeps: allow the trace to stabilize
- Sweeptime: 1 ms
- Detector: Peak

The 99 % measurement function of the spectrum analyser function was used to determine the 99 % bandwidth.

Test Setup:
The test was performed with the following setup:



Test Setup; Occupied Bandwidth

6.3.1 LIMITS: §74.861 (E), (5)

Occupied Bandwidth

§74.861 (d)(4) (iii)
≤ 20 MHz

6.3.2 TEST CASE DETAILS:

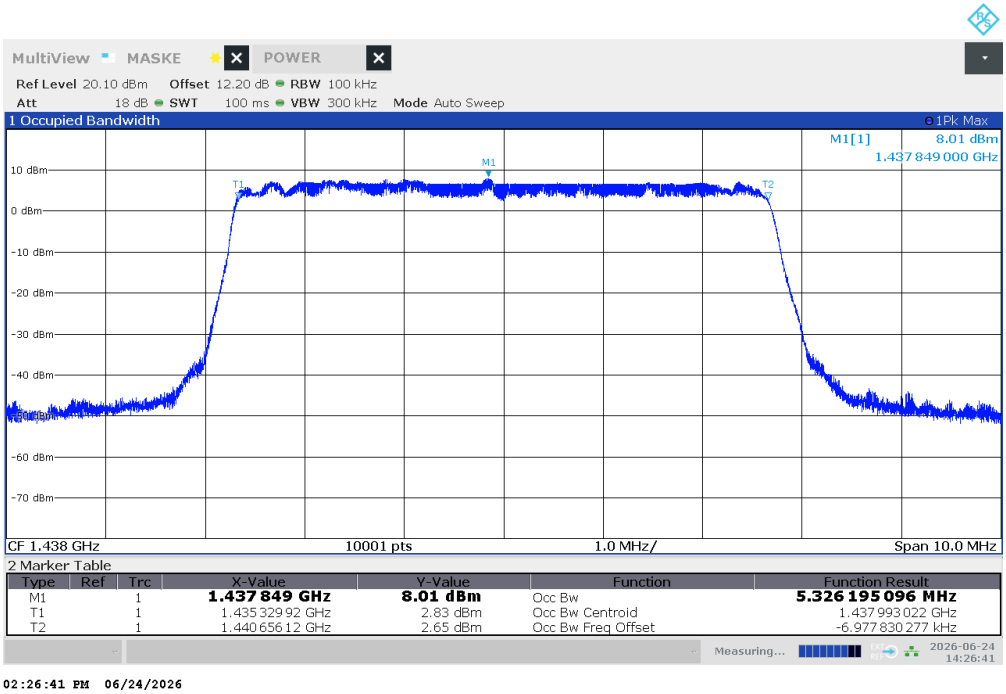
Ambient temperature: 27 °C
Air Pressure: 1012 hPa
Humidity: 49 %

Band: 1435 MHz - 1525 MHz						
Frequency	**Nominal Operating Frequency [MHz]**	**Lower 99% Frequency [MHz]**	**Upper 99% Frequency [MHz]**	**OCW [kHz]**	**Limit OCB [kHz]**	**Margin to Limit [kHz]**
Low	1438.000	1435.3299	1440.6561	5326.2000	20000.00	14673.80
Mid	1480.000	1477.3313	1482.6533	5322.0500	20000.00	14677.95
High	1522.000	1519.3303	1524.6485	5318.2100	20000.00	15681.79

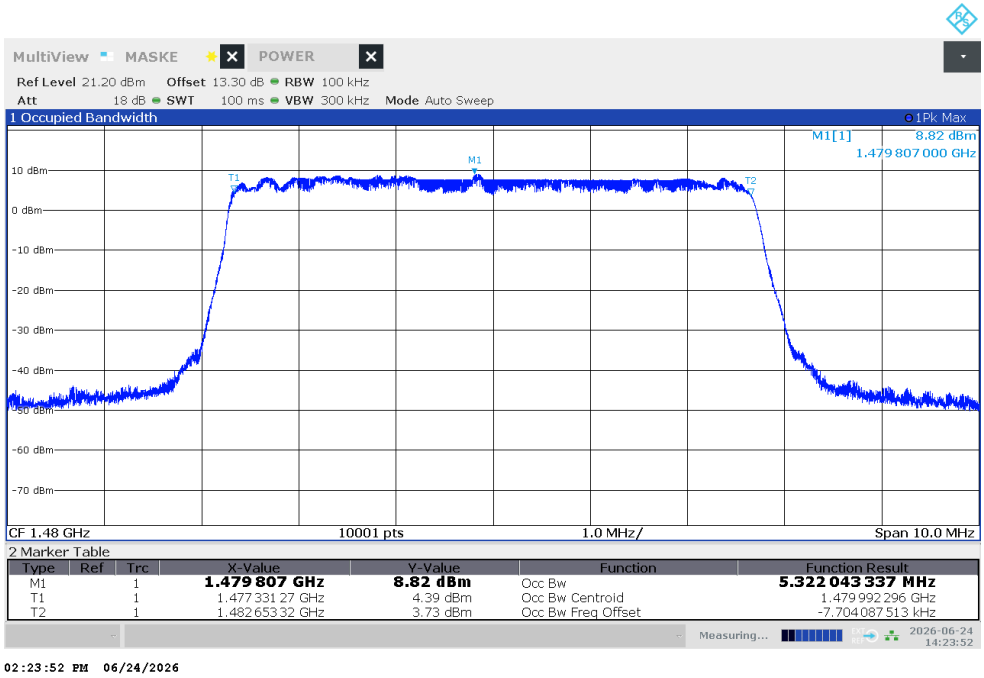
Comments:
- The measurement was performed conducted.
- TX Test Mode of the EUT used.

6.3.3 MEASUREMENT PLOTS:

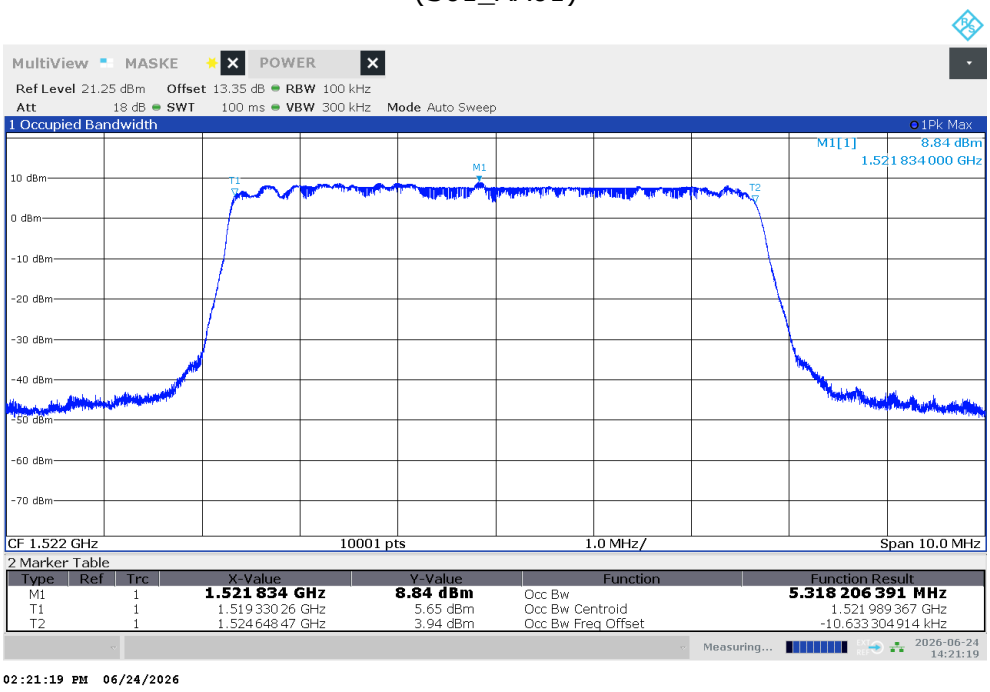
Operating Frequency = Mid, Channel = Low, Radio Technology = WMAS 6 MHz (S01_AA02)



Operating Frequency = Mid, Channel = Mid, Radio Technology = WMAS 6 MHz (S01_AA02)



Operating Frequency = Mid, Channel = High, Radio Technology = WMAS 6 MHz (S01_AA01)



TEST EQUIPMENT USED:

- Radio Lab

6.4 TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

§74.861 (e)(7)(iv)
§74.861 (d)(4)(iv)

The test was performed according to:
ANSI C63.26, chapter 5.5.2.3.1

6.4.1 TEST DESCRIPTION

The test set-up was made in accordance to the general provisions of ANSI C63.10 in a typical installation configuration. The measurements were performed according to the following sub-chapters of ANSI C63.26:

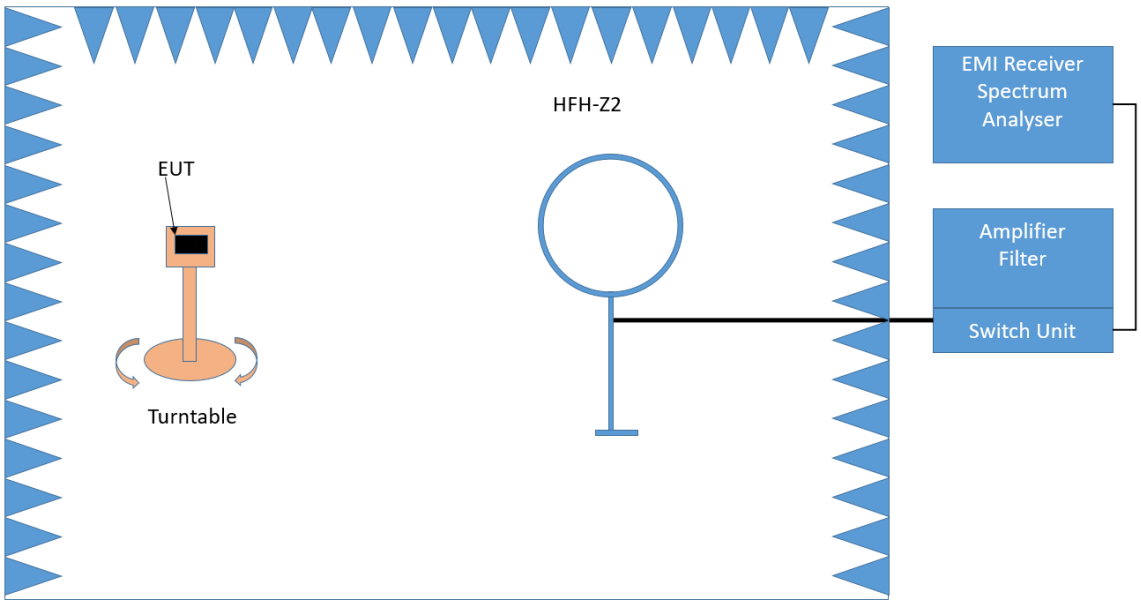
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHZ: Chapter 6.6 (procedure according 6.6.5 used)

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.

Below 1 GHz:

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

1. Measurement up to 30 MHz



Test Setup; Spurious Emission Radiated (SAC), 9 kHz – 30 MHz

The Loop antenna HFH2-Z2 is used.

Step 1: pre measurement

- Anechoic chamber
- Antenna distance: 3 m
- Antenna height: 1 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)

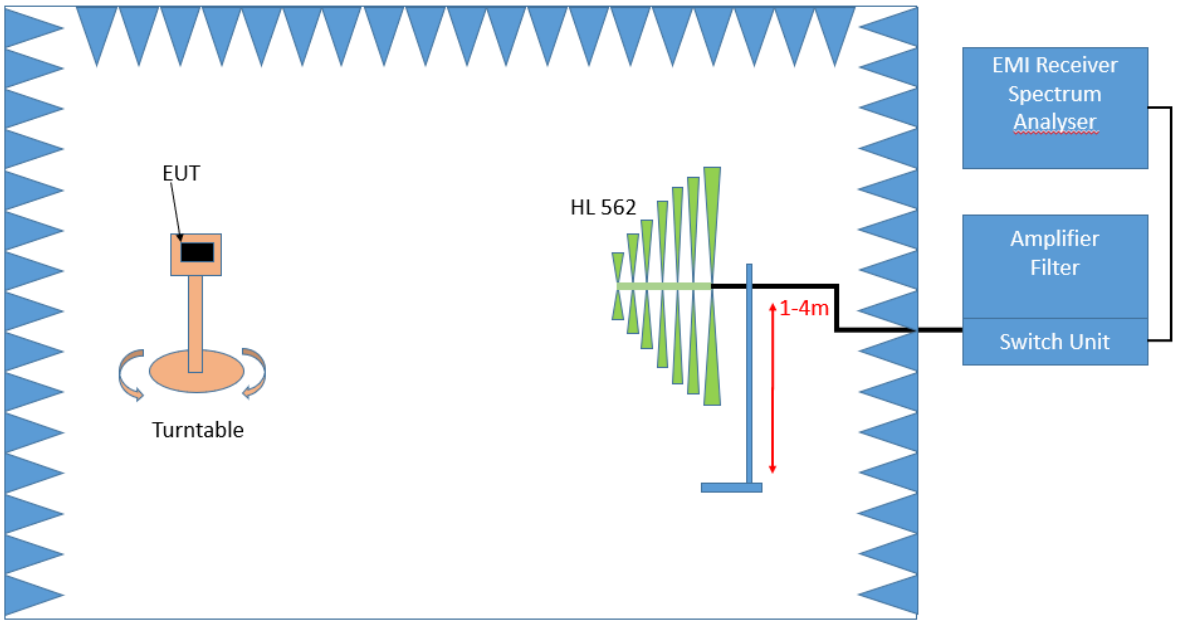
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

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.

- Detector: Quasi-Peak (9 kHz – 150 kHz, Peak / Average 150 kHz- 30 MHz)
- 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



Test Setup; Spurious Emission Radiated (SAC), 30 MHz- 1GHz

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
- Frequency range: 30 – 1000 MHz
- RBW: 100 kHz
- VBW: 300 kHz
- Sweep time: 10 s
- Turntable angle range: –180° to 90°
- Turntable step size: 90°
- Height variation range: 1 – 4 m
- Height variation step size: 1.5 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 360°. 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 between 1 – 4 meter. 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
- RBW: 100 kHz
- VBW: 300 kHz
- Sweep time: 100 ms
- Turntable angle range: 360 °
- Height variation range:1 – 4 m
- Antenna Polarisation: max. value determined in step 1

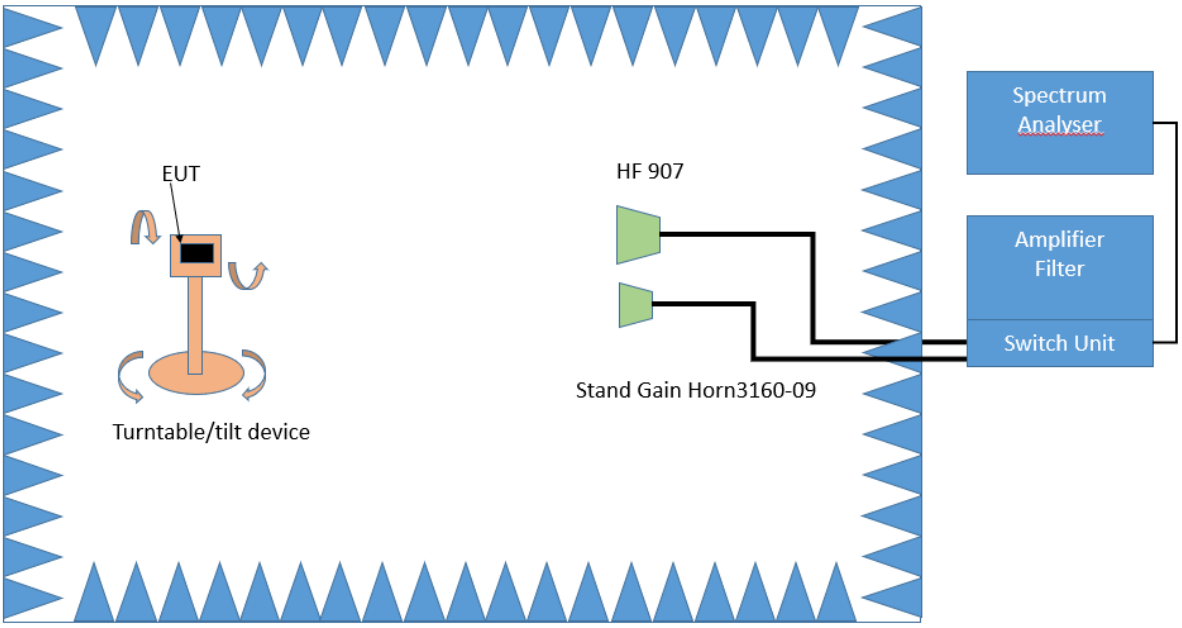
Step 3: Final measurement with RMS detector
With the settings determined in step 2, the final measurement will be performed:
EMI receiver settings for step 3:
- Detector: RMS
- Measured frequencies: in step 1 determined frequencies
- RBW: 100 kHz
- VBW: 300 kHz
- Sweep time: 1 s

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.

Above 1 GHz:

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.

3. Measurement above 1 GHz



Test Setup; Spurious Emission Radiated (FAC), 1 GHz-26.5 GHz

Step 1:
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 °.
Spectrum analyser settings:
- Detector: RMS
- RBW = 1 MHz
- VBW = 3 MHz

Step 2:
The turn table azimuth will slowly vary by ± 22.5°.
The elevation angle will slowly vary by ± 45°
Spectrum analyser settings:
- Detector: Peak

Step 3:
Spectrum analyser settings for step 3:
- Detector: RMS / CISPR Average
- Measured frequencies: in step 1 determined frequencies
- RBW = 1 MHz
- VBW = 3 MHz
- Measuring time: 1 s

6.4.2 LIMITS: EN 300 422-1, CLAUSE 4.2.4.1.2

Frequency range	**Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)**	**Bandwidth**
9 kHz – 150 kHz	–36 dBm	1 kHz
150 kHz – 30 MHz	–36 dBm	10 kHz
30 MHz to 1 GHz	–36 dBm	Fc + 2,5 B ≤ f ≤ fc + 4 B: 1 kHz Fc + 4 B < f ≤ fc + 10 B: 10 kHz f > fc + 10 B: 100 kHz f < fc - 10 B: 100 kHz fc - 10 B ≤ f < fc - 4 B: 10 kHz fc - 4 B ≤ f ≤ fc - 2,5 B: 1 kHz
Except:		
47 MHz to 74 MHz 87.5 MHz to 118 MHz	–54 dBm	100 kHz
174 MHz to 230 MHz 470 MHz to 862 MHz	–54 dBm	Fc + 2,5 B ≤ f ≤ fc + 4 B: 1 kHz Fc + 4 B < f ≤ fc + 10 B: 10 kHz f > fc + 10 B: 100 kHz f < fc - 10 B: 100 kHz fc - 10 B ≤ f < fc - 4 B: 10 kHz fc - 4 B ≤ f ≤ fc - 2,5 B: 1 kHz
1 GHz < f ≤ F_{upper}	–30 dBm	Fc + 2,5 B ≤ f ≤ fc + 10 B: 30 kHz Fc + 10 B < f ≤ fc + 12 B: 300 kHz f > fc + 12 B: 1 MHz f < fc - 12 B: 1 MHz fc - 12 B ≤ f < fc - 10 B: 300 kHz fc - 10 B ≤ f ≤ fc - 2,5 B: 30 kHz

6.4.3 TEST CASE DETAILS:

Ambient temperature: 28 - 32°C
Air Pressure: 1009 - 1012 hPa
Humidity: 50 -53 %

Band: 1435 MHz - 1525 MHz					
Operating Mode: TX-On, Low channel					
Measurement Method	**Frequency [MHz]**	**Spurious Level RMS [dBm]**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
Radiated	2697.62	-34.1	1000	-30.0	4.1

Band: 1435 MHz - 1525 MHz					
Operating Mode: TX-On, Mid channel					
Measurement Method	**Frequency [MHz]**	**Spurious Level RMS [dBm]**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
Radiated	2698.85	-34.1	1000	-30.0	4.1

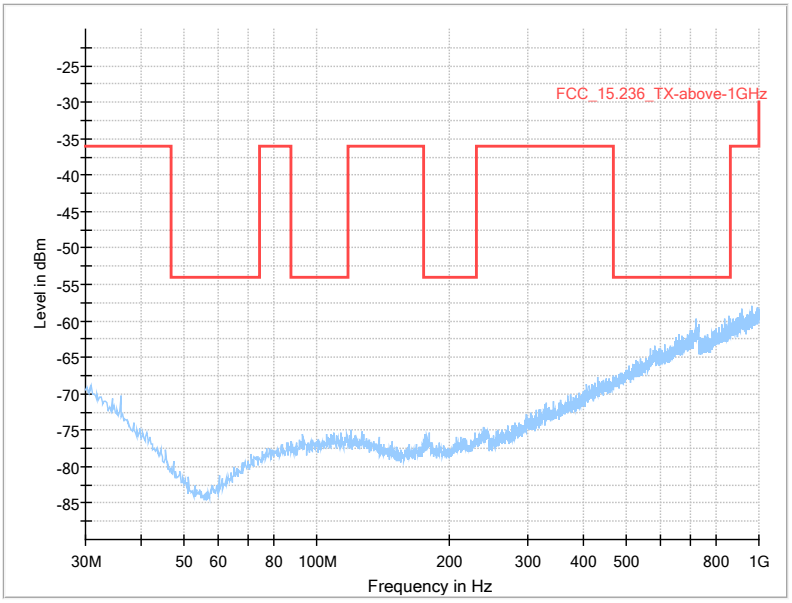
Band: 1435 MHz - 1525 MHz					
Operating Mode: TX-On, High channel					
Measurement Method	**Frequency [MHz]**	**Spurious Level RMS [dBm]**	**RBW [kHz]**	**Limit [dBm]**	**Margin to Limit [dB]**
Radiated	2698.89	-34.1	1000	-30.0	4.1

Comments:

- Tested frequency range: 30 MHz – 16 GHz.
- The measurement was performed with maximum output power.
- TX Test Mode of the EUT used.

6.4.4 MEASUREMENT PLOTS:

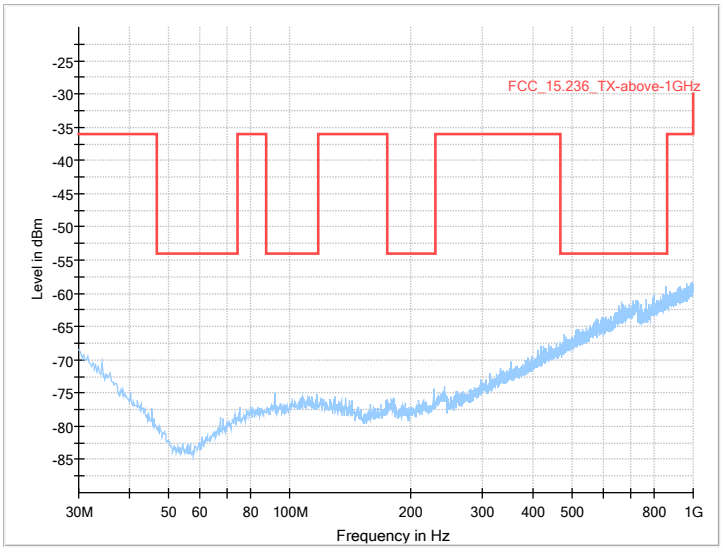
Measurement method = radiated, Temperature = Normal, Operating Frequency = Low, Radio Technology = WMAS 6 MHz
(S01_AA01)



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

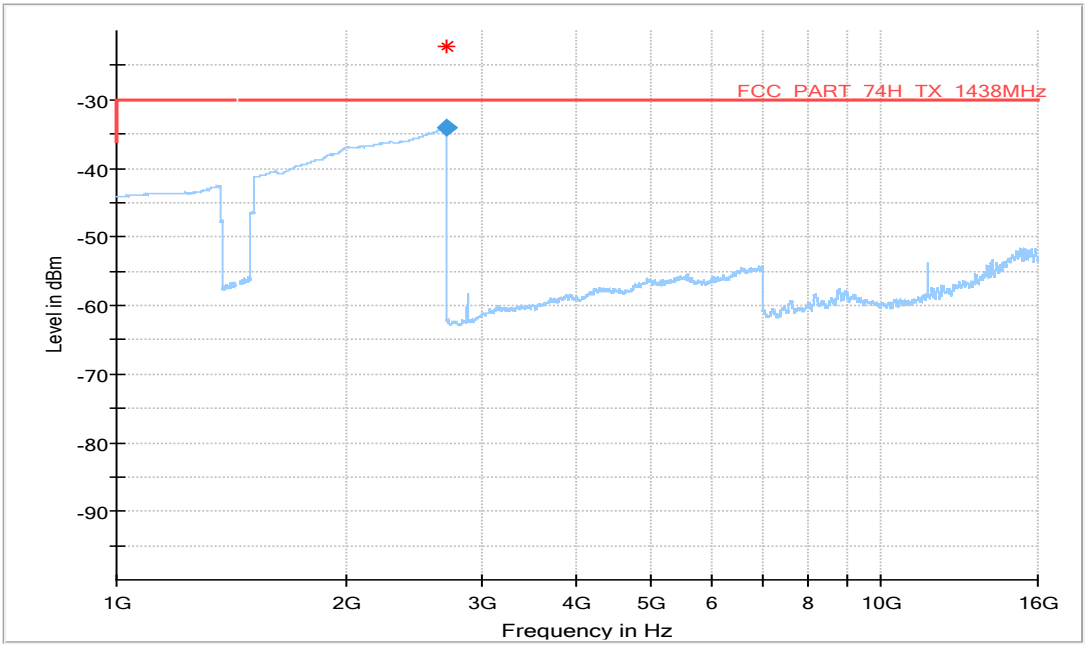
EUT horizontal



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

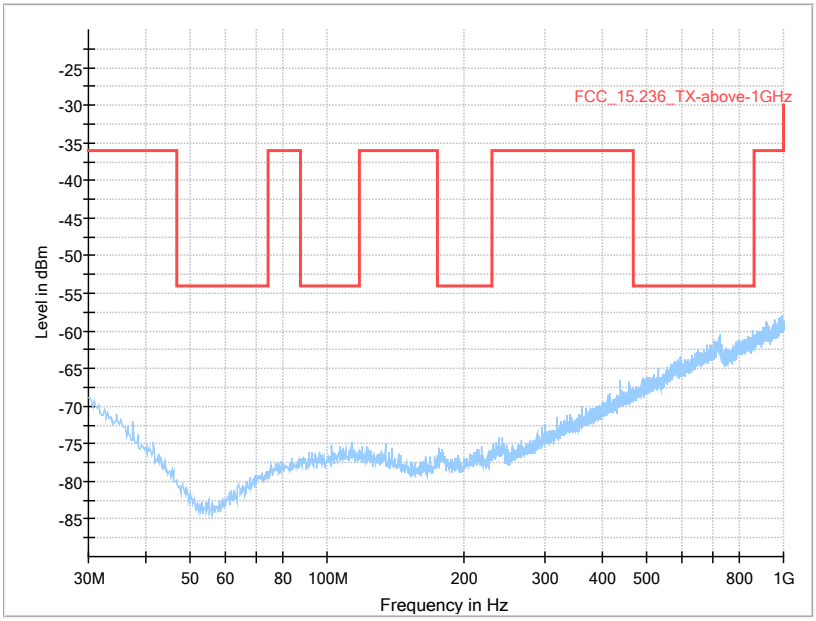
EUT vertical



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2697.620000	-34.13	-30.00	4.13	1000.0	1000.000	150.0	H	73.0	-4.0	-59.2

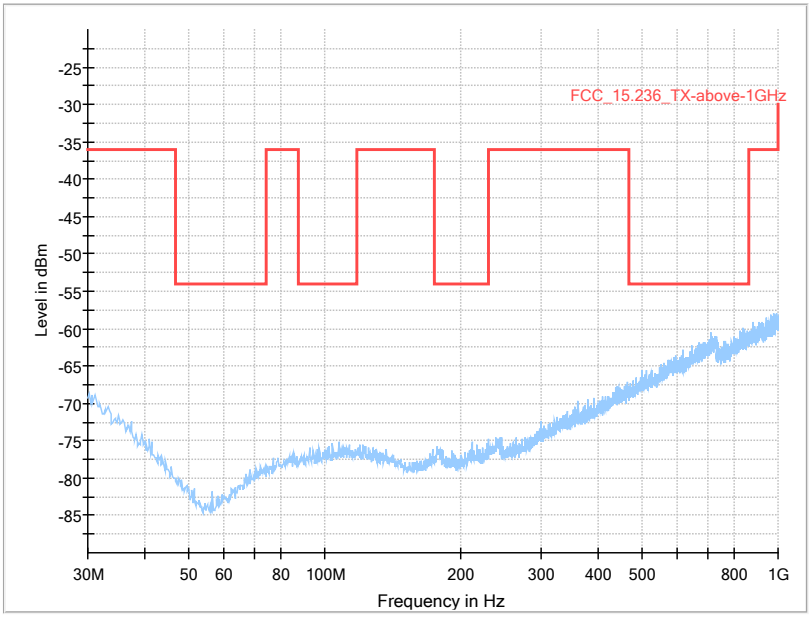
Measurement method = radiated, Temperature = Normal, Operating Frequency = Mid, Radio Technology = WMAS 6 MHz
(S01_AA01)



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

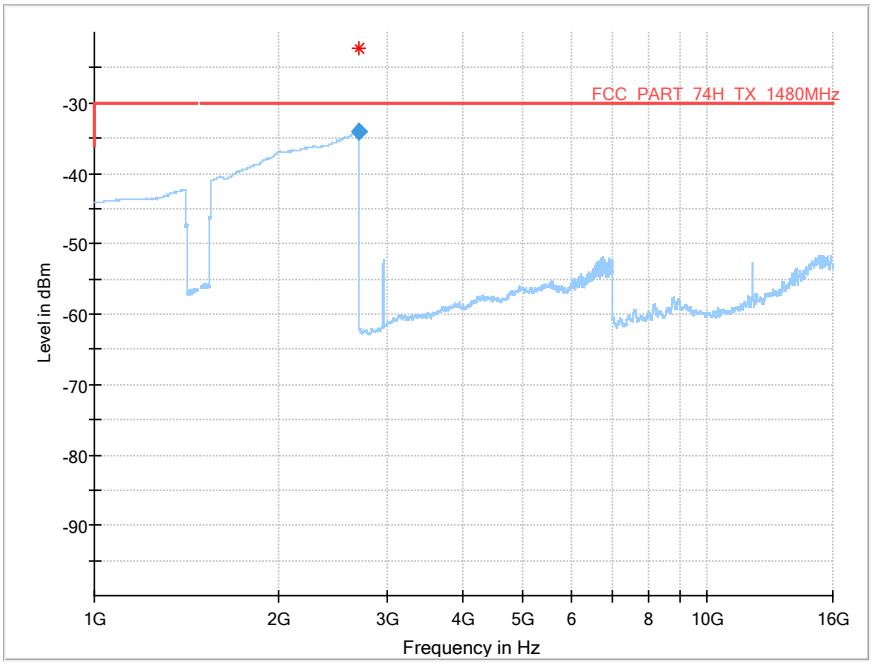
EUT horizontal



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

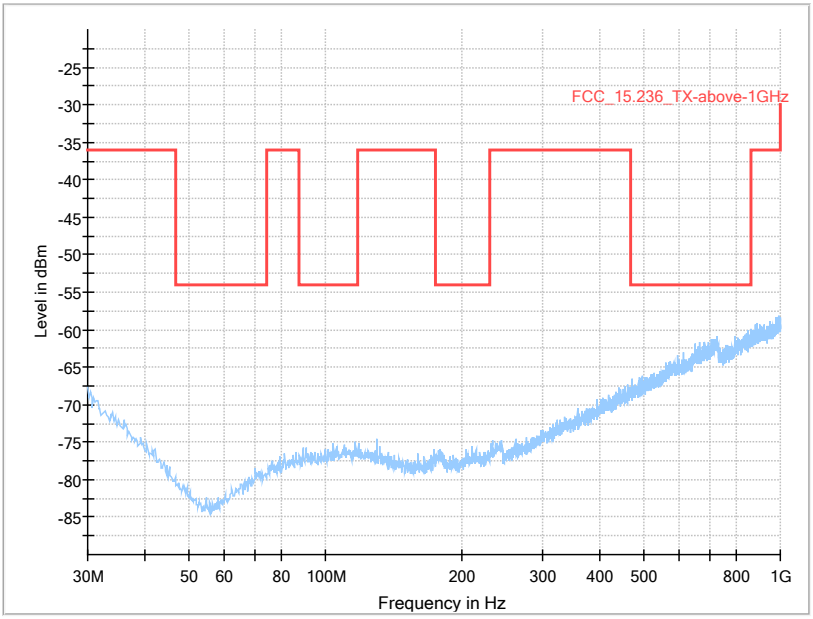
EUT vertical



Final Result

Frequency	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2698.852000	-34.12	-30.00	4.12	1000.0	1000.000	150.0	V	-2.0	-4.0	-59.2

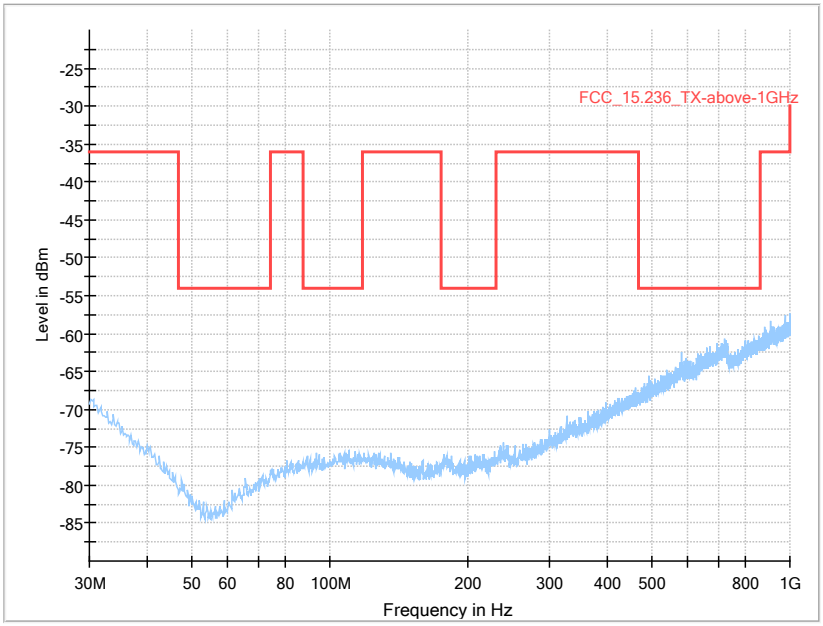
Measurement method = radiated, Temperature = Normal, Operating Frequency = high, Radio Technology = WMAS 6 MHz
(S01_AA01)



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

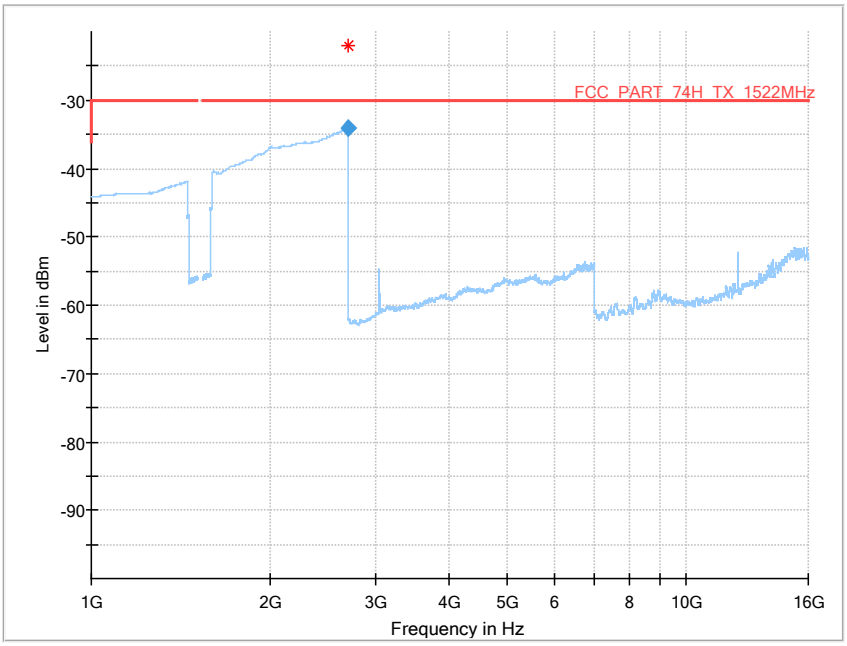
EUT horizontal



Final Result

Frequency (MHz)	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
---	---	---	---	---	---	---		---	---

EUT vertical



Final Result

Frequency	RMS (dBm)	Limit (dBm)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Elevation (deg)	Corr. (dB)
2698.894000	-34.12	-30.00	4.12	1000.0	1000.000	150.0	V	-24.0	22.0	-59.2

TEST EQUIPMENT USED:

- Radiated Emissions SAC < 1 Ghz
- Radiated Emissions FAR 2.4 GHz FCC

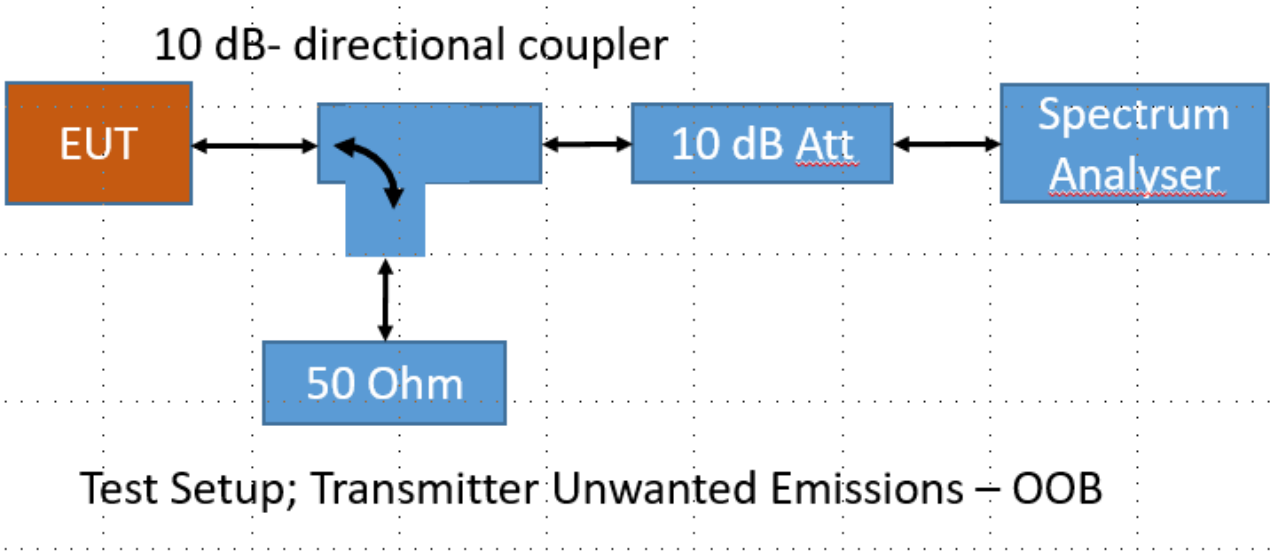
6.5 TRANSMITTER UNWANTED EMISSIONS IN THE OUT OF BAND DOMAIN

§74.861 (e)(7)(iii)
§74.861 (d)(4)(iii)

Test case performed according: EN 300 422-1, clause 5.4.3

Definition:
Transmitter unwanted emissions in the out of band domain are emissions on a frequency or frequencies immediately outside the operating channel, which results from the modulation process, but excluding spurious emissions.

Test Setup:
The test was performed with the following setup:



6.5.1 LIMITS: EN 300 422-1, CLAUSE 4.2.4.2.2

The limits in figure 3 are applicable for WMAS, where B is the Declared Channel Bandwidth.

The mean Power Density, measured with 100 kHz measurement bandwidth and PEAK detector, of the transmitter unwanted emissions shall not exceed the limits of the mask provided in figure 3.

The limits in figure 3 are relative to transmitter RF output power according to clauses 4.2.1 and 5.4.1.

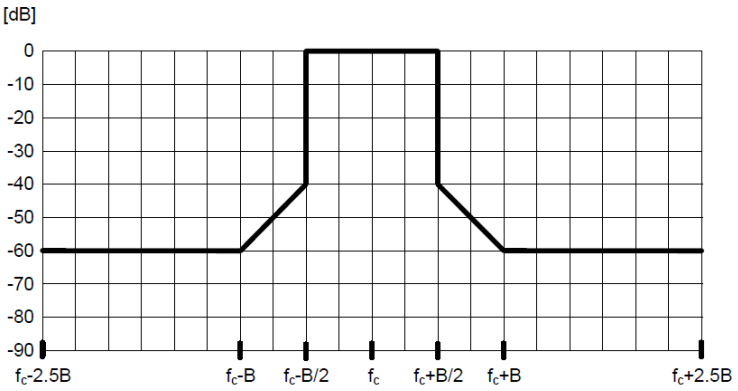


Figure 3: Transmit spectral power mask for WMAS, RBW = 100 kHz

6.5.2 TEST CASE DETAILS:

Ambient temperature: 27 °C
Air Pressure: 1012 hPa
Humidity: 49 %

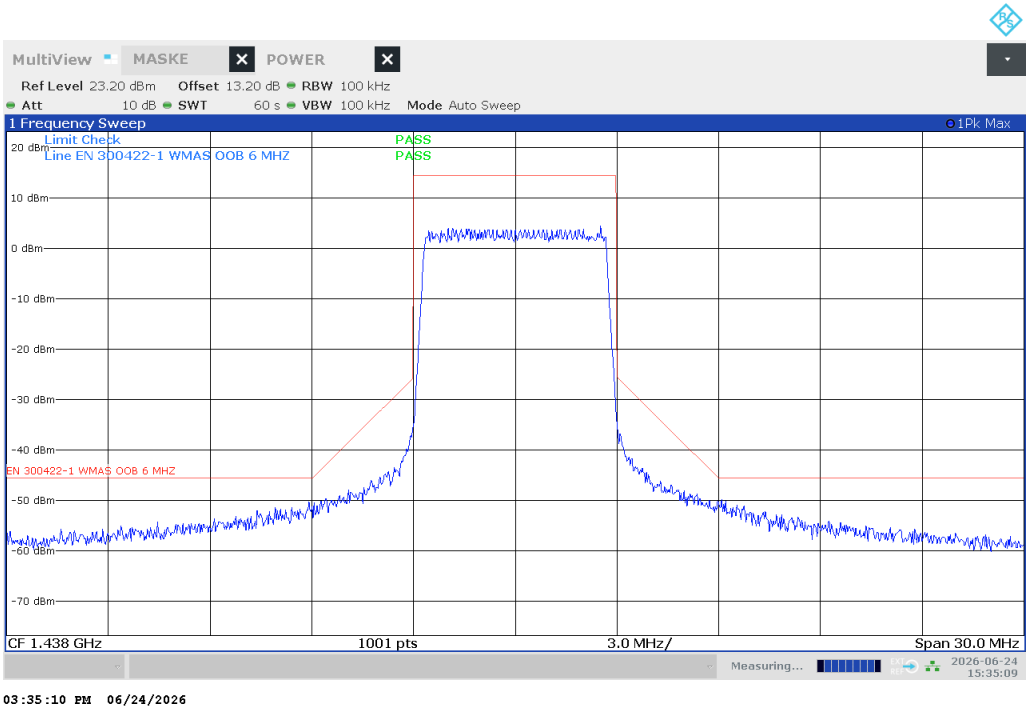
Band: 1435 MHz - 1525 MHz		
Frequency	**Nominal Operating Frequency [MHz]**	**Within Spectrum Mask**
Low	1438.000	YES
Mid	1480.000	YES
High	1522.000	YES

Comments:

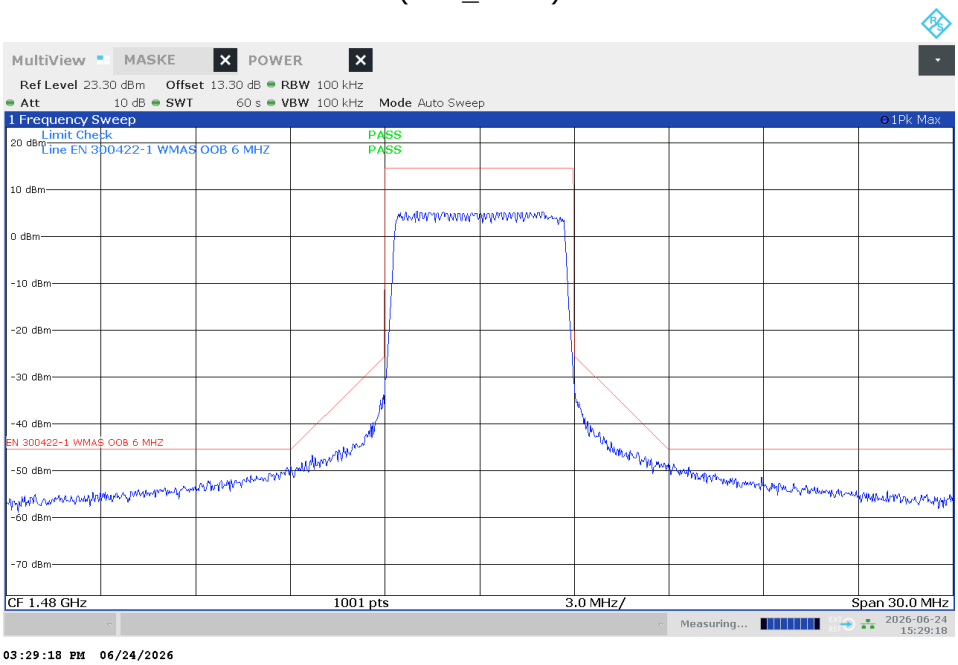
- The measurement was performed conducted.

6.5.3 MEASUREMENT PLOTS:

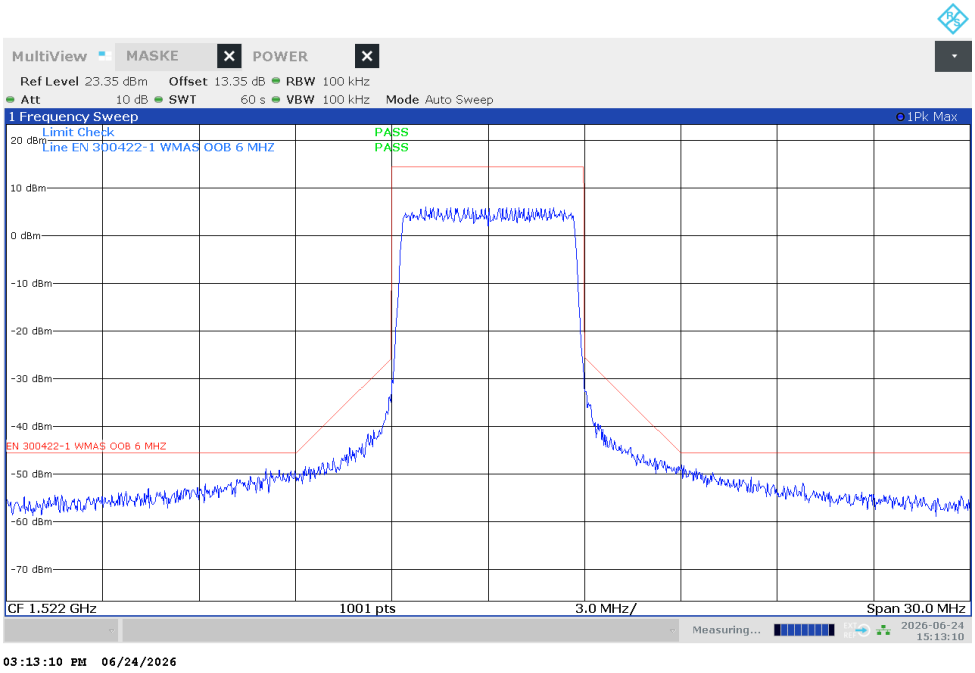
Measurement method = conducted, Temperature = Normal, Operating Frequency = Low, Radio Technology = WMAS 6 MHz
(S02_AA02)



Measurement method = conducted, Temperature = Normal, Operating Frequency = Mid,
Radio Technology = WMAS 6 MHz
(S02_AA02)



Measurement method = conducted, Temperature = Normal, Operating Frequency = High,
Radio Technology = WMAS 6 MHz
(S02_AA02)



TEST EQUIPMENT USED:

- Radio Lab

7 TEST EQUIPMENT USED FOR TESTS

7.1 TEST EQUIPMENT HARDWARE

1 Radio Lab

Conducted Radio Test Lab

Ref. No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
1.1	EX520	Digital Multimeter 12	Extech Instruments Corp	05157876	2024-12	2026-12
1.2	Temperature Chamber VT 4002	Temperature Chamber Vötsch 03	Vötsch	58566002150010	2024-07	2026-07
1.3	FSW43	Signal Analyser	Rohde & Schwarz GmbH & Co. KG	102013	2025-09	2027-09
1.4	Opus 20 THI	T/H Logger 03	Lufft Mess- und Regeltechnik GmbH	115.0318.0802.033	2025-11	2027-11
1.5	UPL	Audio Analyser	Rohde & Schwarz	830768/015	2024-07	2027-07
1.6	10 dB coupler	A2023-10	Atlantic Microwave	-	N/A	N/A
1.7	10 dB coupler	A2023-10	Atlantic Microwave	-	N/A	N/A

2 Radiated Emissions FAR 2.4 GHz FCC

Radiated emission tests for 2.4 GHz ISM devices in a fully anechoic room

Ref. No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
2.1	Innco Systems CO3000	Controller for bore sight mast FAC	Innco Systems	CO3000/1460/54740522/P	N/A	N/A
2.2	AMF-7D00101800-30-10P-R	Broadband Amplifier 100 MHz - 18 GHz	Miteq	-	N/A	N/A
2.3	ASP 1.2/1.8-10 kg	Antenna Mast	Maturo GmbH	-	N/A	N/A
2.4	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
2.5	MCU	Controller Maturo	Maturo GmbH	4390315	N/A	N/A
2.6	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2025-09	2027-09
2.7	JS4-18002600-32-5P	Broadband Amplifier 18 GHz - 26 GHz	Miteq	849785	N/A	N/A
2.8	FSW43	Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	103779	2024-12	2026-12
2.9	3160-09	Standard Gain / Pyramidal Horn Antenna 26.5 GHz	EMCO Elektronic GmbH	00083069	N/A	N/A
2.10	WHKX 7.0/18G-8SS	High Pass Filter	Wainwright Instruments GmbH	09	N/A	N/A
2.11	MA3000/0800-XP-ET-compact	Bore Sight Antenna Mast	Innco Systems	9210522	N/A	N/A
2.12	TT 1.5 WI	Turn Table	Maturo GmbH	-	N/A	N/A
2.13	HL 562 ULTRALOG	Biconical-log-per Antenna (30 MHz - 3 GHz) with HL562E biconicals	Rohde & Schwarz GmbH & Co. KG	830547	2025-04	2028-04

Ref. No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
2.14	VLFX-650+	Low Pass Filter DC650 MHz	Mini-Circuits	15542	N/A	N/A
2.15	5HC3500/18000-1.2-KK	High Pass Filter	Trilithic	200035008	N/A	N/A
2.16	Opus 20 THI (8120.00)	ThermoHygro Datalogger	Lufft Mess- und Regeltechnik GmbH	115.0318.0802.033	2025-11	2027-11
2.17	TD1.5-10kg	EUT Tilt Device (Rohacell)	Maturo GmbH	TD1.5-10kg/024/3790709	N/A	N/A
2.18	AFS42-00101800-25-S-42	Broadband Amplifier 25 MHz - 18 GHz	Miteq	2035324	N/A	N/A
2.19	HF 907	Double-ridged horn	Rohde & Schwarz	102444	2024-10	2027-10

3 Radiated Emissions SAC up to 1 GHz

Radiated emission tests up to 1 GHz in a semi anechoic room

Ref.No.	Device Name	Description	Manufacturer	Serial Number	Last Calibration	Calibration Due
3.1	N5000/NP	Filter for EUT, 2 Lines, 250 V, 16 A	ETS-LINDGREN	241515	N/A	N/A
3.2	Opus10 TPR (8253.00)	T/P Logger 13	Lufft Mess- und Regeltechnik GmbH	13936	2026-02	2028-02
3.3	ESW44	EMI Receiver / Spectrum Analyzer	Rohde & Schwarz GmbH & Co. KG	101603	2026-04	2028-03
3.4	Anechoic Chamber 01	SAC/FAR, 10.58 m x 6.38 m x 6.00 m	Frankonia Germany EMC Solution GmbH	none	N/A	N/A
3.5	HL 562 EULTRALOG	Biconical-log-per antenna (30 MHz - 6 GHz)	Rohde & Schwarz GmbH & Co. KG	102299	2024-07	2027-07
3.6	Fluke 177	Digital Multimeter 03 (Multimeter)	Fluke Europe B.V.	86670383	2025-09	2027-09
3.7	Opus10 THI (8152.00)	T/H Logger 10	Lufft Mess- und Regeltechnik GmbH	12488	2026-02	2028-02
3.8	EP 1200/B, NA/B1	AC Source, Amplifier with integrated variable Oscillator	Spitzenberger & Spies GmbH & Co. KG	B6278	N/A	N/A
3.9	DS 420S	Turn Table 2 m diameter	HD GmbH	420/573/99	N/A	N/A
3.10	CS-RUB6	Rubidium Frequency Standard	Rohde & Schwarz GmbH & Co. KG	100451	2025-07	2027-07
3.11	AM 4.0	Antenna Mast 4 m	Maturo GmbH	AM4.0/180/1192 0513	N/A	N/A

The calibration interval is the time interval between “Last Calibration” and “Calibration Due”

7.2 TEST EQUIPMENT SOFTWARE

Semi-Anechoic Chamber:	
Software	Version
EMC32 Measurement Software	10.60.10
INNCO Mast Controller	1.02.62
INNCO Mast Height	34.10
INNCO Mast Elevation	36.11
MATURO Controller	1.30
MATURO Mast	12.19
MATURO Turn-Table	30.10
Fully-Anechoic Chamber:	
Software	Version
EMC32 Measurement Software	10.60.10
MATURO Controller	1.30
MATURO Turn-Unit	11.10
MATURO Mast	12.10
MATURO Turntable	12.11
INNCO Controller	1.03.02
INNCO Mast Height	34.10
INNCO Mast Elevation	36.11
TS 8997	
WMS32 Measurement Software	11.70.00 + Hotfix 01 (till 2026-03-12), 12.30.00
Conducted AC Emissions:	
Software	Version
EMC32 Measurement Software	10.60.20
Radio Laboratory	
Software	Version
7layers Cellular RF Solution Version (only used for cellular tests)	1.0.0

8 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.

8.1 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.

8.2 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

8.3 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.

8.4 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.

8.5 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.

8.6 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

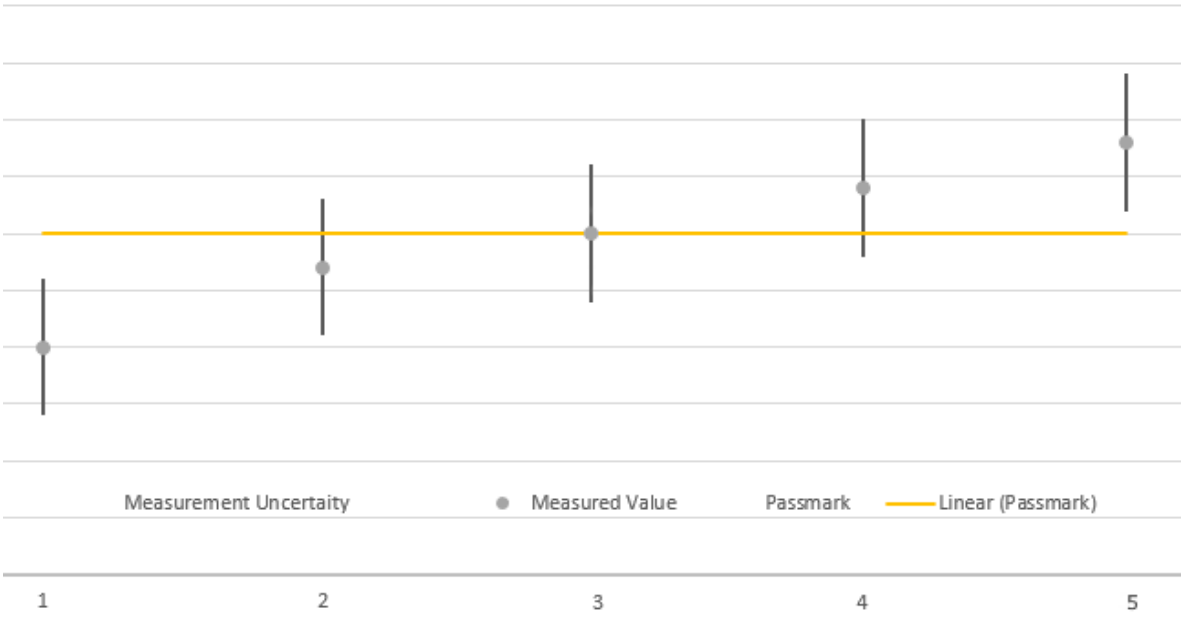
Sample calculation

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.

9 MEASUREMENT UNCERTAINTIES

Parameter	Uncertainty
Occupied channel Bandwidth	± 5%
RF Output Power, conducted	± 1.5 dB
Power Spectral Density, conducted	± 3.0 dB
Unwanted Emissions, conducted	± 3.0 dB
Unwanted emissions, radiated	± 4.5 dB
RF Output power, radiated	± 2.8 dB
Temperature	± 0.3 °C
Humidity	± 3%
DC and low frequency voltages	± 1.5% + 2 digits
Time	± 5%
Duty Cycle	± 5%

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	on pass mark	within pass mark	Passed
4	above pass mark	within pass mark	Failed
5	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

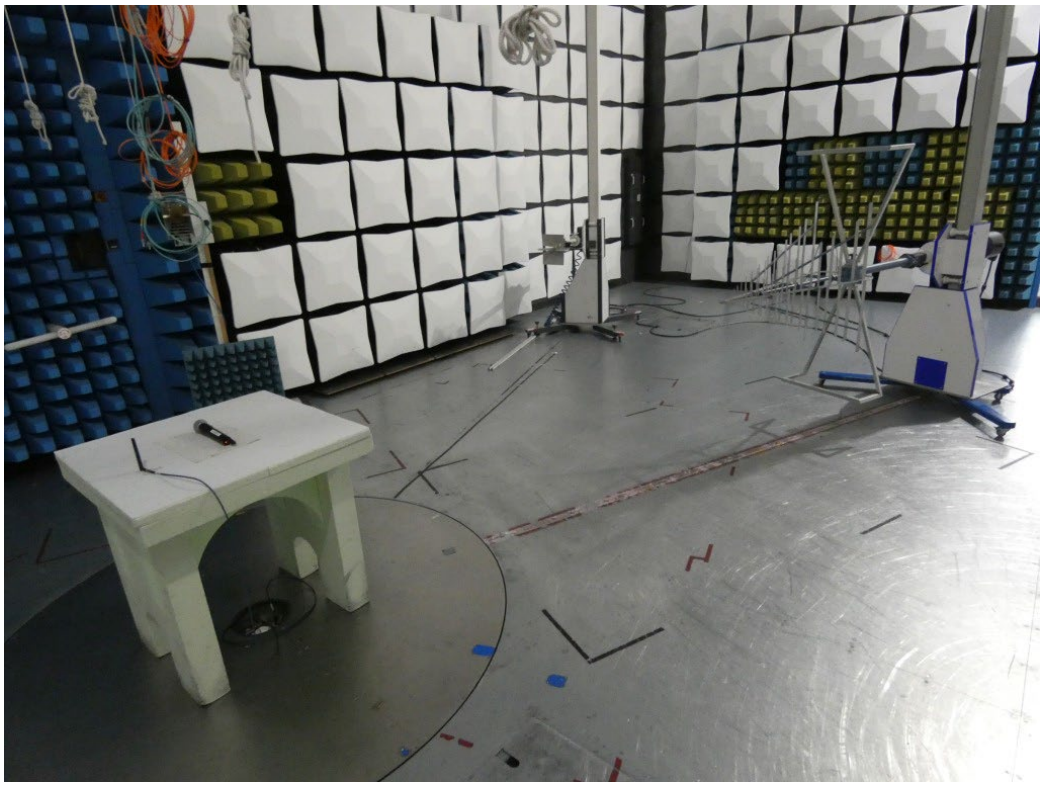


Photo 1: Setup Spurious Emissions Radiated (SAC), < 1 GHz, EUT horizontal

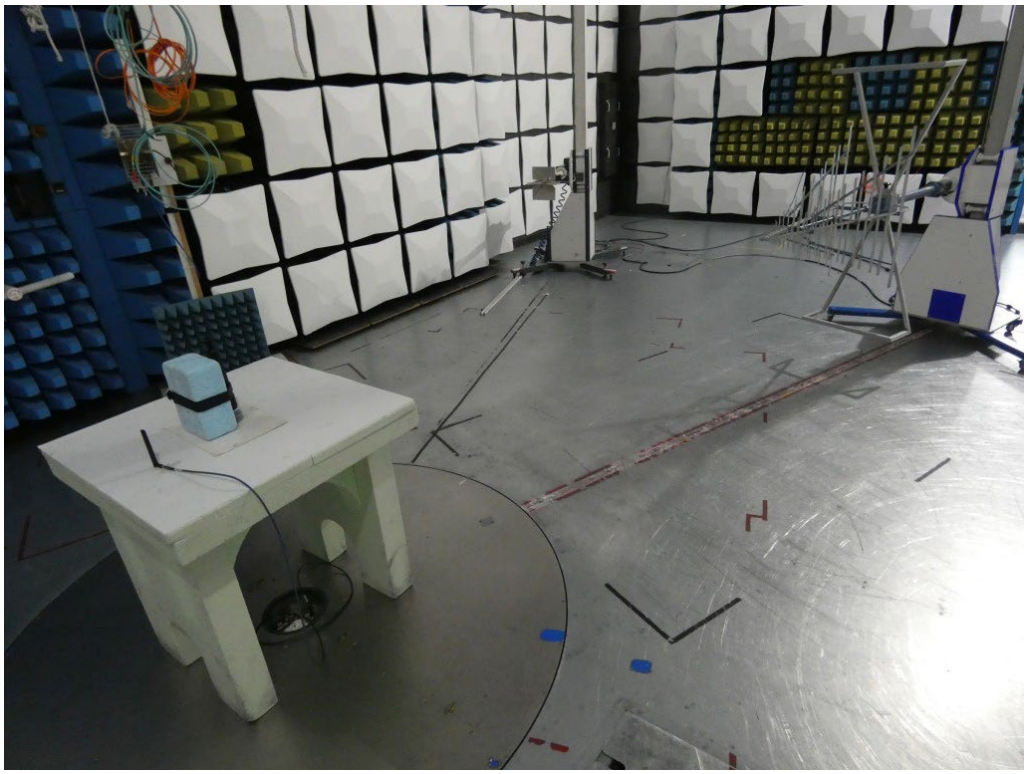


Photo 2: Setup Spurious Emissions Radiated (SAC), < 1 GHz, EUT vertical

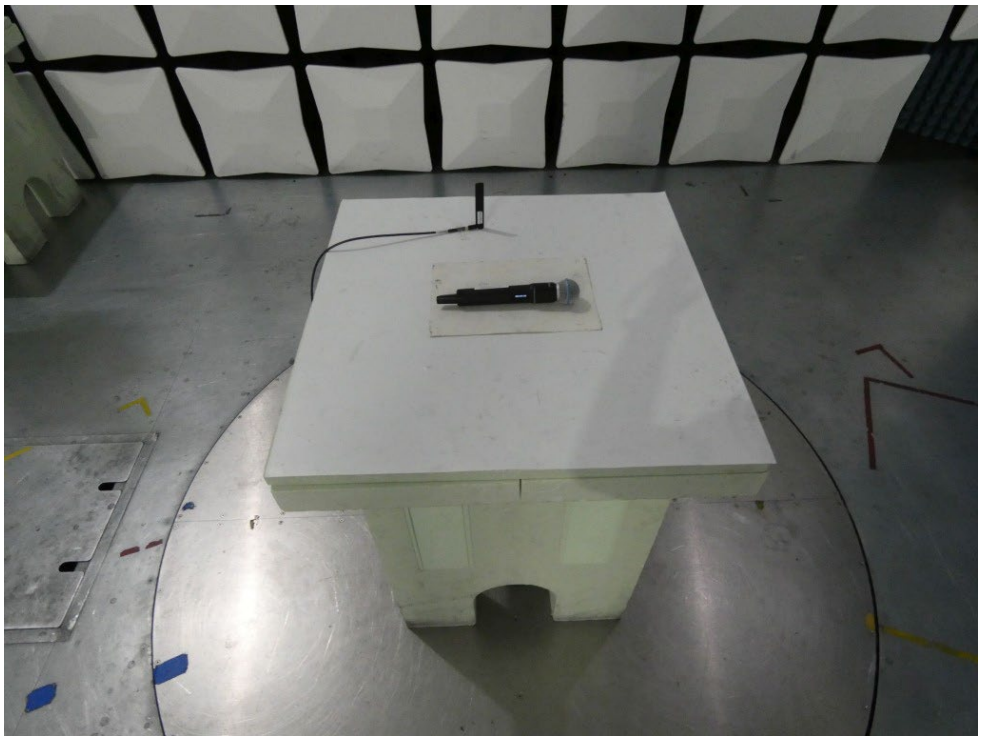


Photo 3: Setup Spurious Emissions Radiated (SAC), < 1 GHz, detail view, EUT horizontal

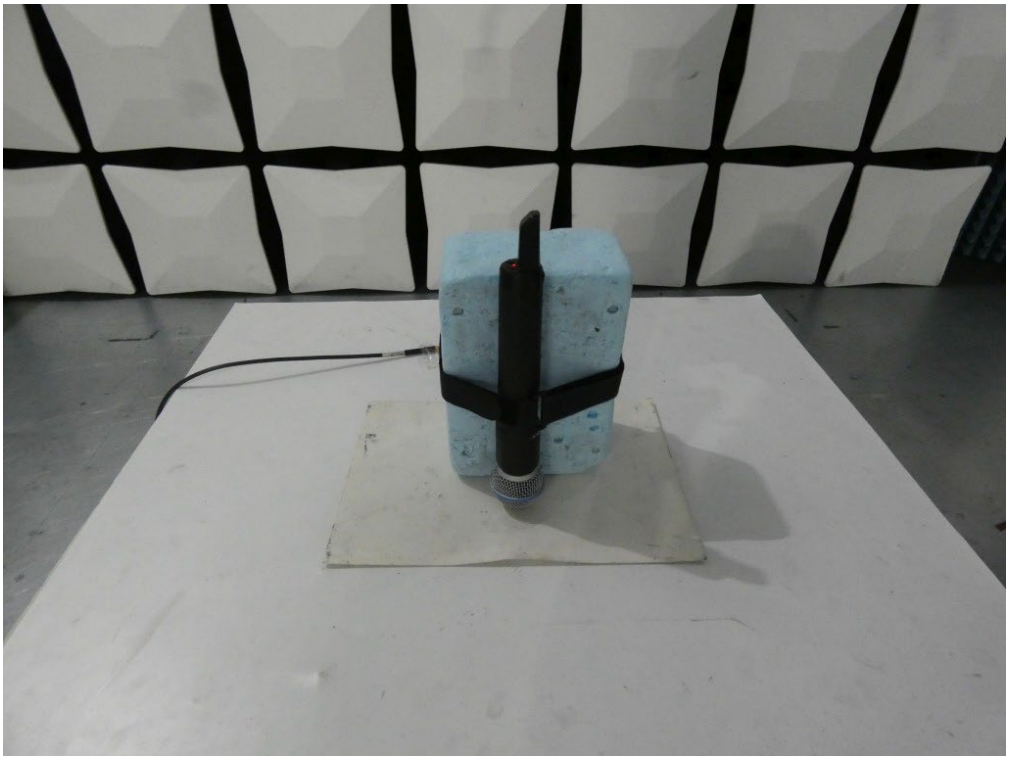


Photo 4: Setup Spurious Emissions Radiated (SAC), < 1 GHz, detail view, EUT vertical

Photo 5: Setup Spurious Emissions Radiated (FAC), > 1GHz

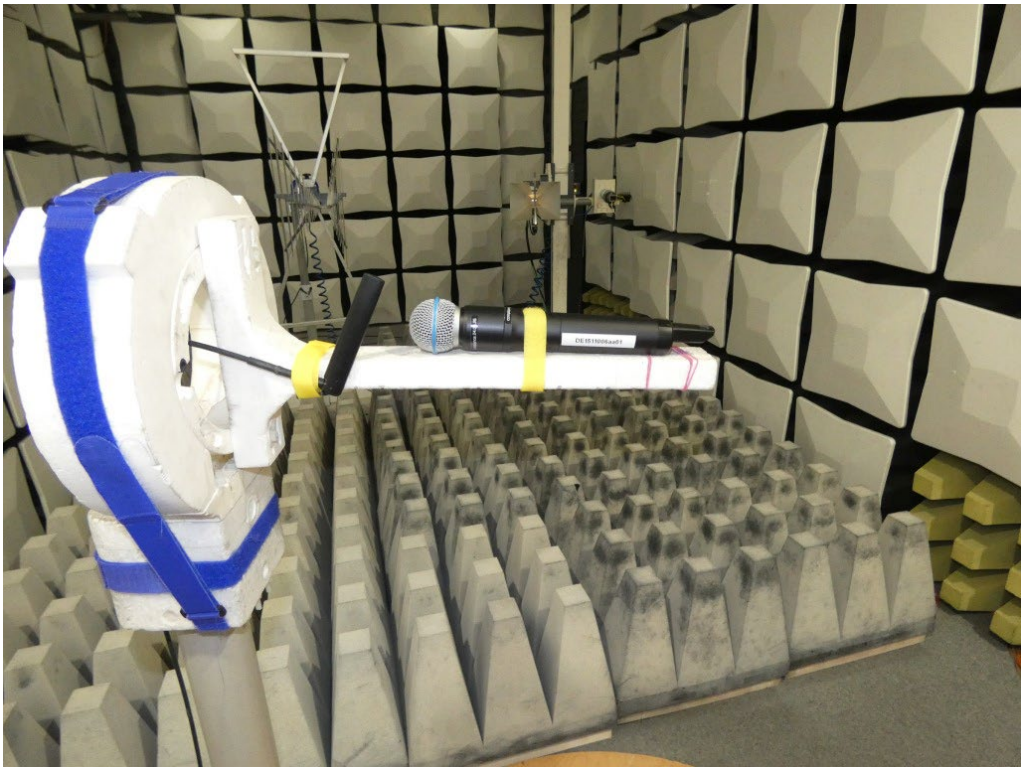


Photo 6: Setup Spurious Emissions Radiated (FAC), > 1GHz, detail view

Photo 7: Setup Conducted Tests (S02_AA02)

Photo 8: EUT in climatic chamber

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