

# FCC Measurement / Technical Report on

## SPECTERA SEK

## SEK UHF

FCC ID: DMOSEKUHF  
IC: 2099A-SEKUHF

**Test Report Reference:** MDE\_SENNH\_2402\_FCC\_02

**Test Laboratory:**

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Germany



Deutsche  
Akkreditierungsstelle  
D-PL-12140-01-00

**Note:**

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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## 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 and 15 (10-1-23 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

§ 15.236 Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-698 MHz.

#### **Applicable ISED Standards**

RSS-Gen, Issue 5 + Amendment 1 (March 2021) + Amendment 2 (February 2021)

RSS-210, Issue 11

#### **Note:**

- ANSI C63.10-2020 is applied.
- EN 300 422-1, V2.2.1 is applied

## 1.2 FCC-IC CORRELATION TABLE

**Correlation of measurement requirements for  
Operation of wireless microphones in the bands 54-72 MHz, 76-88 MHz, 174-  
216 MHz, 470-608 MHz and 614-698 MHz  
from  
FCC and ISED Canada  
WMAS Systems**

| Measurement                            | FCC reference             | ISED reference                     |
|----------------------------------------|---------------------------|------------------------------------|
| Conducted Emissions<br>(AC Power Line) | §15.207                   | RSS-GEN, Issue 5: 8.8              |
| Output Power                           | §15.236 (d)(1),(ii),(iii) | RSS-210, Issue 11:<br>Annex G, G.2 |
| Occupied Bandwidth                     | §15.236 (d)(2)            | RSS-210, Issue 11:<br>Annex G, G.3 |
| Transmitter Frequency<br>Stability     | -                         | RSS-210, Issue 11:<br>Annex G, G.4 |
| Transmitter Unwanted<br>Emissions      | 15.236 (g), (3), (4)      | RSS-210, Issue 11:<br>Annex G, G.5 |
| Modulation                             | -                         | RSS-210, Issue 11:<br>Annex G, G.6 |

## 2 MEASUREMENT SUMMARY

### 47 CFR CHAPTER I FCC PART 15.207 RSS-GEN, Issue 5

(a)  
Chapter 8.8

Conducted AC measurement

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

**Final Result**

**OP-Mode**

**Setup**

**Date**

**FCC**

**IC**

Measurement method, Radio Technology  
conducted, WMAS 6 MHz

-

-

N/A

N/A

### 47 CFR CHAPTER I FCC PART 15.236 RSS-210, Issue 11

§15.236 (d)(1),(ii),(iii)  
Annex G, G.2

Output Power

The measurement was performed according to ANSI C63.10, chapter 6.5

**Final Result**

**OP-Mode**

**Setup**

**Date**

**FCC**

**IC**

Measurement method, Operating Frequency,  
Radio Technology

radiated, Lowest, WMAS 6 MHz

S01\_AC01

2024-08-08

Passed

Passed

radiated, Mid, WMAS 6 MHz

S01\_AC01

2024-08-08

Passed

Passed

radiated, Highest, WMAS 6 MHz

S01\_AC01

2024-08-08

Passed

Passed

radiated, Mid (Duplex Gap),  
WMAS 6 MHz

S01\_AC01

2024-08-12

Passed

Passed

### 47 CFR CHAPTER I FCC PART 15.236 RSS-210, Issue 11

Annex G, G.4

Transmitter Frequency Stability

The measurement was performed according to  
RSS-GEN Issue 5, chapter 6.11

**Final Result**

**OP-Mode**

**Setup**

**Date**

**FCC**

**IC**

Measurement method, Operating  
Frequency, Radio Technology

conducted, Mid, WMAS 6 MHz

S01\_AA01

2024-08-08  
2024-09-17

-

Passed

conducted, Mid (Duplex Gap), WMAS 6 MHz

S01\_AA01

2024-08-12  
2024-09-17

-

Passed

### 47 CFR CHAPTER I FCC PART 15.236 RSS-210, Issue 11

§15.236 (d)(2)  
Annex G, G.3

Occupied Bandwidth

The measurement was performed according to ANSI C63.10, chapter 6.9.3

**Final Result**

**OP-Mode**

**Setup**

**Result**

Measurement Method, Operating Frequency, Radio Technology

Conducted, Lowest, WMAS 6 MHz

S02\_AA01

2024-08-08

Passed

Passed

Conducted, Mid, WMAS 6 MHz

S02\_AA01

2024-08-08

Passed

Passed

Conducted, Highest, WMAS 6 MHz

S02\_AA01

2024-08-08

Passed

Passed

Conducted, Mid (Duplex Gap), WMAS 6 MHz

S02\_AA01

2024-08-12

Passed

Passed

**47 CFR CHAPTER I FCC PART 15.236**  
**RSS-210, Issue 11**

 §15.236 (g)(4)  
 Annex G, G.5

Transmitter unwanted emissions in the spurious domain

 The measurement was performed according to  
 ANSI C63.10, chapter 6.4/6.5/6.6.5

**Final Result**

| <b>OP-Mode</b>                                                         | <b>Setup</b> | <b>Date</b>                            | <b>FCC</b> | <b>IC</b> |
|------------------------------------------------------------------------|--------------|----------------------------------------|------------|-----------|
| Measurement method, temperature, Operating Frequency, Radio Technology |              |                                        |            |           |
| radiated, Normal, Lowest, WMAS 6 MHz                                   | S01_AC01     | 2024-08-01<br>2024-08-13<br>2024-08-29 | Passed     | Passed    |
| radiated, Normal, Mid, WMAS 6 MHz                                      | S01_AC01     | 2024-08-01<br>2024-08-13<br>2024-08-29 | Passed     | Passed    |
| radiated, Normal, Highest, WMAS 6 MHz                                  | S01_AC01     | 2024-08-01<br>2024-08-13<br>2024-08-29 | Passed     | Passed    |
| radiated, Normal, Mid (Duplex Gap), WMAS 6 MHz                         | S01_AC01     | 2024-08-01<br>2024-08-13<br>2024-08-29 | Passed     | Passed    |

**47 CFR CHAPTER I FCC PART 15.236**  
**RSS-210, Issue 11**

 §15.236 (g)(3)  
 Annex G, G.5

Transmitter unwanted emissions in the OOB domain

The measurement was performed according to EN 300 422-1, clause 5.4.4

**Final Result**

| <b>OP-Mode</b>                                                         | <b>Setup</b> | <b>Date</b> | <b>FCC</b> | <b>IC</b> |
|------------------------------------------------------------------------|--------------|-------------|------------|-----------|
| Measurement method, temperature, Operating Frequency, Radio Technology |              |             |            |           |
| conducted, Normal, Lowest, WMAS 6 MHz                                  | S02_AA01     | 2024-08-08  | Passed     | Passed    |
| conducted, Normal, Mid, WMAS 6 MHz                                     | S02_AA01     | 2024-08-08  | Passed     | Passed    |
| conducted, Normal, Highest, WMAS 6 MHz                                 | S02_AA01     | 2024-08-08  | Passed     | Passed    |
| Conducted, Mid (Duplex Gap), WMAS 6 MHz                                | S02_AA01     | 2024-08-12  | Passed     | Passed    |

### 3 REVISION HISTORY

| Report version control |              |                    |                  |
|------------------------|--------------|--------------------|------------------|
| Version                | Release date | Change Description | Version validity |
| initial                | 2024-09-20   | --                 | valid            |
| --                     | --           | --                 | --               |

COMMENT: -



(responsible for accreditation scope)  
Dipl.-Ing. Robert Machulec



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



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## 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. Robert Machulec

Report Template Version: 2024-07-04

### 4.2 PROJECT DATA

Responsible for testing and report: Dipl.-Ing. Marco Kullik

Date of Report: 2024-09-20

Testing Period: 2024-08-01 to 2024-09-17

### 4.3 APPLICANT DATA

Company Name: Sennheiser electronic SE & Co. KG

Address: 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<br>product description                              | Bodypack MIC/EM Transceiver part of SPECTERA WMAS system.                                                      |
| Product name                                                       | SPECTERA SEK                                                                                                   |
| Modell                                                             | SPECTERA SEK UHF                                                                                               |
| <b>Declared EUT data by the supplier</b>                           |                                                                                                                |
| 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 (according to RSS-GEN tested at -30°C)                                                                |
| High Temperature                                                   | +50.0 °C (according to RSS-GEN tested at +50°C)                                                                |
| Antenna type / gain                                                | Integral,<br>Lower Band Edge: -2.7 dBi (-4.8 dBd)<br>Higher Band Edge: -0.3 dBi (-2.4 dBd)                     |
| Tuning Range                                                       | 473 – 605 MHz<br>660 MHz                                                                                       |
| Declared Channel<br>Bandwidth                                      | 6.0 MHz                                                                                                        |
| Declared Maximum<br>Transmission Output<br>Power [E.I.R.P.]        | 473 – 605 MHz: 100 mW / 20.0 dBm [E.I.R.P.]<br>660 MHz: 20 mW / 13 dBm [E.I.R.P.]                              |
| Channel Separation<br>[MHz]                                        | Typically 12.0 MHz, minimum 6.0 MHz                                                                            |
| Transmission Type                                                  | Continuous                                                                                                     |
| Operating Modes, used<br>Modulations and Data<br>Rates for testing | Live Ultra Low Latency, OFDM                                                                                   |
| Frequency of Channels                                              | Lowest: 473.0 MHz<br>Mid: 539.0 MHz<br>Highest: 605.0 MHz<br>Mid Duplex Gap: 660.0 MHz                         |
| Min. Number of Audio<br>Channels                                   | 1                                                                                                              |
| Max. Number of Audio<br>Channels                                   | 64                                                                                                             |
| EUT provides<br>unmodulated Test<br>Mode                           | Yes                                                                                                            |
| Interfaces                                                         | <ul style="list-style-type: none"> <li>• Enclosure</li> <li>• Antenna port</li> <li>• Earphone port</li> </ul> |

## 5.2 TESTED RADIO DEVICES

| Sample Name      | Sample Code          | Description      |
|------------------|----------------------|------------------|
| EUT aa01         | DE1511003aa01        | Conducted Sample |
| Sample Parameter | Value                |                  |
| HW Version       | FMO2                 |                  |
| SW Version       | v0.20.1+48-g3aba512d |                  |
| Serial No.       | 1174000243           |                  |
| Comment          | -                    |                  |

| Sample Name      | Sample Code          | Description     |
|------------------|----------------------|-----------------|
| EUT ac01         | DE1511003ac01        | Radiated Sample |
| Sample Parameter | Value                |                 |
| HW Version       | FMO2                 |                 |
| SW Version       | v0.20.1+48-g3aba512d |                 |
| Serial No.       | 1174000248           |                 |
| 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, 594190 Rev. 04, Nightly.20240103.1, 1393000079 | SPECTERA Base Station |
| AUX02  | Sennheiser, SPECTERA DAD UHF, FMO2, v0.20.1+48-g3aba512d, 1493000050                        | SPECTERA DAD          |

## 5.5 USED SETUPS

| Setup    | Combination of EUTs, auxiliary and ancillary equipment | Description                                  |
|----------|--------------------------------------------------------|----------------------------------------------|
| S01_AA01 | EUT aa01                                               | Conducted Setup, TX-Testmode, TX-CW Testmode |
| S02_AA01 | EUT aa01, AUX01, AUX02                                 | Conducted Setup, TX 1 kHz tone               |
| S01_AC01 | EUT ac01                                               | Radiated Setup, TX-Testmode                  |

## 5.6 OPERATING MODES / TEST CHANNELS

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

**WMAS**  
**Test Channels:**  
**Frequency [MHz]**

|                                      |            |                |
|--------------------------------------|------------|----------------|
| <b>Band:</b><br><b>470 – 608 MHz</b> |            |                |
| <b>lowest</b>                        | <b>mid</b> | <b>highest</b> |
| 473                                  | 539        | 605            |

**WMAS**  
**Test Channels:**  
**Frequency [MHz]**

|                                      |            |                |
|--------------------------------------|------------|----------------|
| <b>Band:</b><br><b>657 – 663 MHz</b> |            |                |
| <b>lowest</b>                        | <b>mid</b> | <b>highest</b> |
| -                                    | 660        | -              |

## 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

**§15.236 (d)(1),(ii),(iii)**

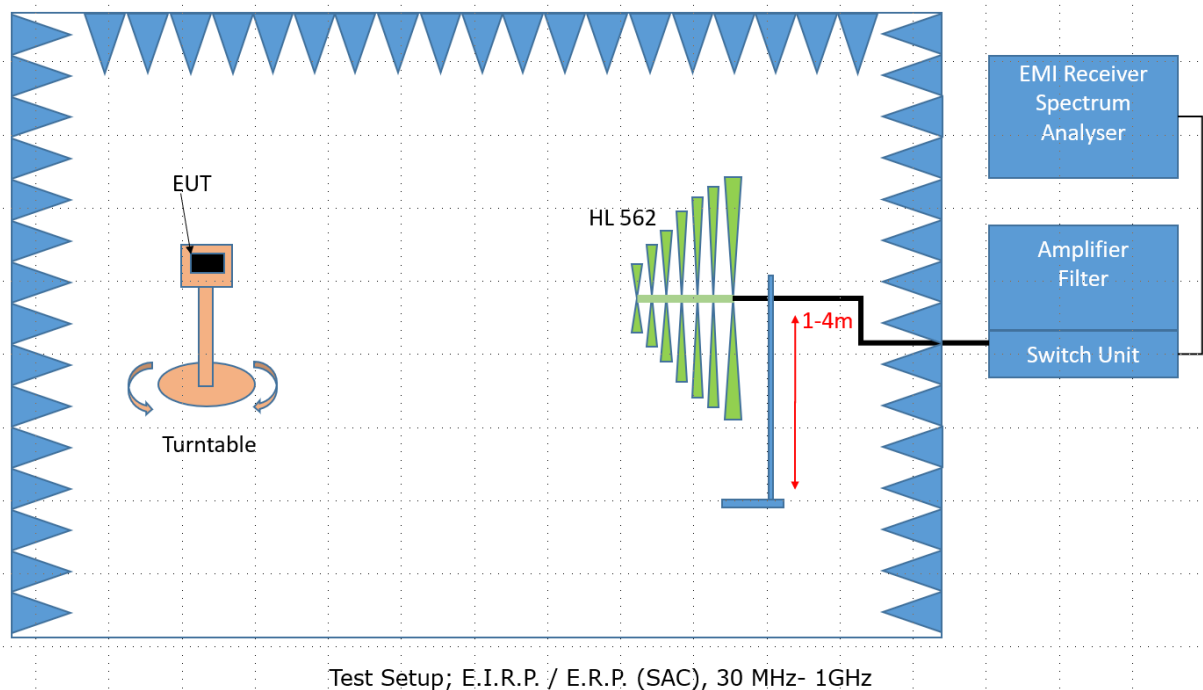
#### **Test case performed according: ANSI C63.10, chapter 6.5**

The measurement procedure is implemented into the EMI test software EMC32 from R&S. Exploratory tests are performed at 3 orthogonal axes (> 1GHz) / 2°orthogonal (< 1 GHz) 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.

#### **Test Setup:**

The test was performed with the following setups:

Radiated < 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: Average
- Frequency range: TX-frequency +/- 20 MHz
- IF-Bandwidth: 10 MHz
- Measuring time / Frequency step: 100 ms
- 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 TX-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
- IF – Bandwidth: 10 MHz
- Measuring 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 QP detector**

With the settings determined in step 2, the final measurement will be performed:

EMI receiver settings for step 3:

- Detector: Average
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 10 MHz
- Measuring time: 1 s

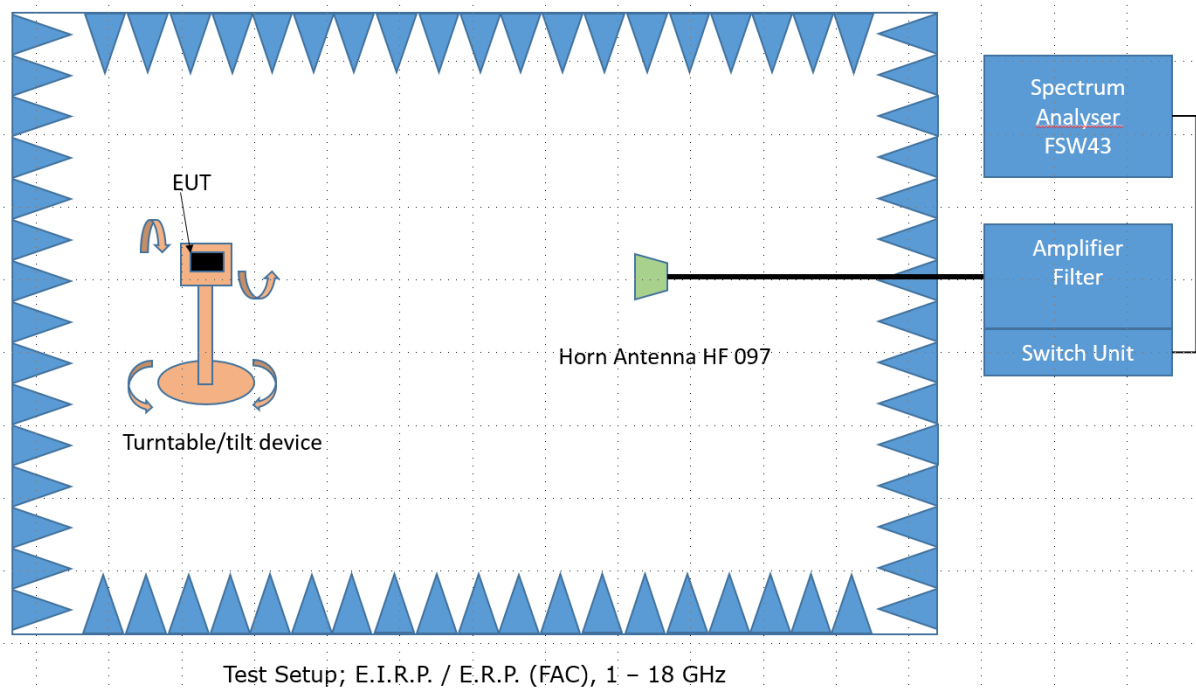
After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.

The calculation from the measured electrical field strength value [dB $\mu$ V/m] to the E.I.R.P output value was done with the measured far field loss of the SAC at these particular frequencies.

Radiated > 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.



### 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: Peak, Average
- RBW = 1 MHz
- VBW = 3 MHz

### Step 2:

The turn table azimuth will slowly vary by  $\pm 22.5^\circ$ .

The elevation angle will slowly vary by  $\pm 45^\circ$

Spectrum analyser settings:

- Detector: Peak

### Step 3:

Spectrum analyser settings for step 3:

- Detector: Peak / CISPR Average
- Measured frequencies: in step 1 determined frequencies
- RBW = 1 MHz
- VBW = 3 MHz
- Measuring time: 1 s

### 6.1.1 LIMITS: § 15.236 (D)(1),(II),(III), RSS-210 ANNEX G, G.2

| Frequency Bands | Output Power (FCC)<br>(E.I.R.P.)                          | Output Power (ISED)<br>(E.I.R.P.) |
|-----------------|-----------------------------------------------------------|-----------------------------------|
| 470 – 608 MHz   | OBW ≤ 1MHz: 50 mW [17 dBm]<br>OBW > 1MHz: 100 mW [20 dBm] | ≤ 250 mW [24 dBm]                 |
| 657 -663 MHz    | ≤ 20 mW [13 dBm]                                          | ≤ 20 mW [13 dBm]                  |

### 6.1.2 TEST CASE DETAILS:

**Ambient temperature:** 29 °C  
**Air Pressure:** 1009 hPa  
**Humidity:** 51 %

| Band: 470 MHz - 608 MHz |              |           |         |                                   |                             |                      |                      |
|-------------------------|--------------|-----------|---------|-----------------------------------|-----------------------------|----------------------|----------------------|
| Measurement Method      | EUT Position | Frequency | Voltage | Nominal Operating Frequency [MHz] | Output Power e.i.r.p. [dBm] | Limit e.i.r.p. [dBm] | Margin to Limit [dB] |
| Radiated                | Vertical     | Low       | Normal  | 473.000                           | 12.6                        | 20.0                 | 7.4                  |
| Radiated                | Horizontal   | Low       | Normal  | 473.000                           | 13.2                        | 20.0                 | 6.8                  |
| Radiated                | Vertical     | Mid       | Normal  | 539.000                           | 19.3                        | 20.0                 | 0.7                  |
| Radiated                | Horizontal   | Mid       | Normal  | 539.000                           | 9.1                         | 20.0                 | 10.9                 |
| Radiated                | Vertical     | High      | Normal  | 605.000                           | 16.8                        | 20.0                 | 3.2                  |
| Radiated                | Horizontal   | High      | Normal  | 605.000                           | 17.3                        | 20.0                 | 2.7                  |

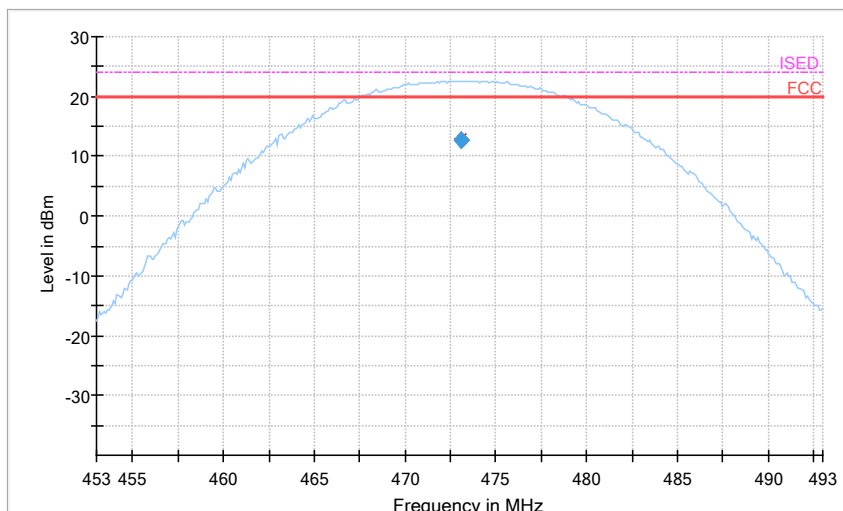
| Band (Duplex Gap): 657 MHz - 663 MHz |              |           |         |                                   |                             |                      |                      |
|--------------------------------------|--------------|-----------|---------|-----------------------------------|-----------------------------|----------------------|----------------------|
| Measurement Method                   | EUT Position | Frequency | Voltage | Nominal Operating Frequency [MHz] | Output Power e.i.r.p. [dBm] | Limit e.i.r.p. [dBm] | Margin to Limit [dB] |
| Radiated                             | Vertical     | Mid       | Normal  | 660.000                           | 9.5                         | 13.0                 | 3.5                  |
| Radiated                             | Horizontal   | Mid       | Normal  | 660.000                           | 8.3                         | 13.0                 | 4.7                  |

#### Comments:

- The measurement was performed radiated.
- TX Test Mode of the EUT used.

### 6.1.3 MEASUREMENT PLOTS:

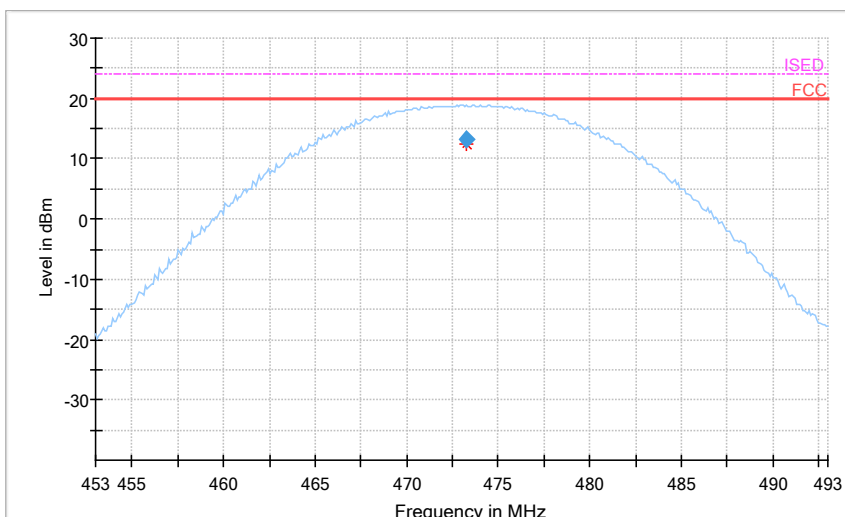
Measurement method = radiated, EUT = vertical, Operating Frequency = Low,  
Radio Technology = WMAS  
(S01\_AD01)



### Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 473.056250      | 12.62         | 20.00       | 7.03        | 1000.0          | 10000.00        | 107.0       | V   | -19.0         | -81.6      |

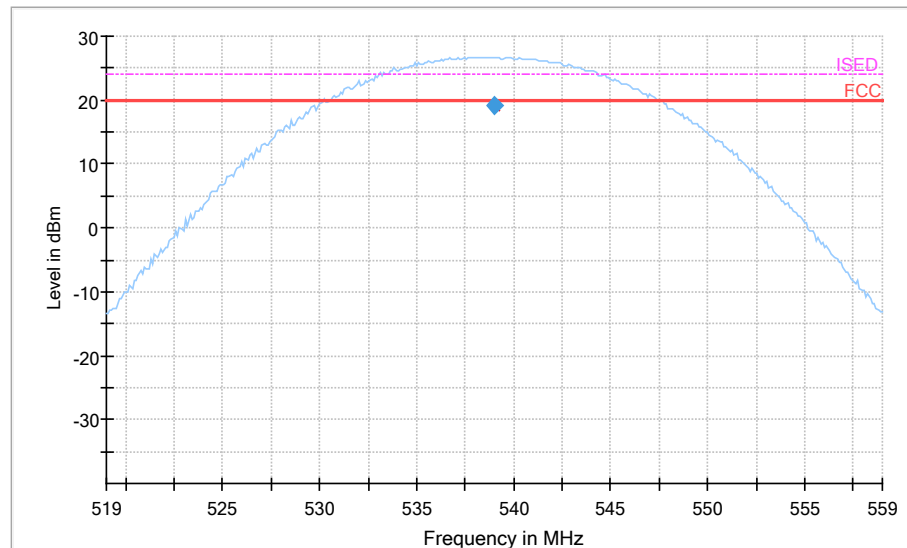
Measurement method = radiated, EUT = horizontal, Operating Frequency = Low,  
Radio Technology = WMAS  
(S01\_AD01)



### Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 473.268750      | 13.22         | 20.00       | 6.78        | 1000.0          | 10000.00        | 191.0       | H   | 248.0         | -81.8      |

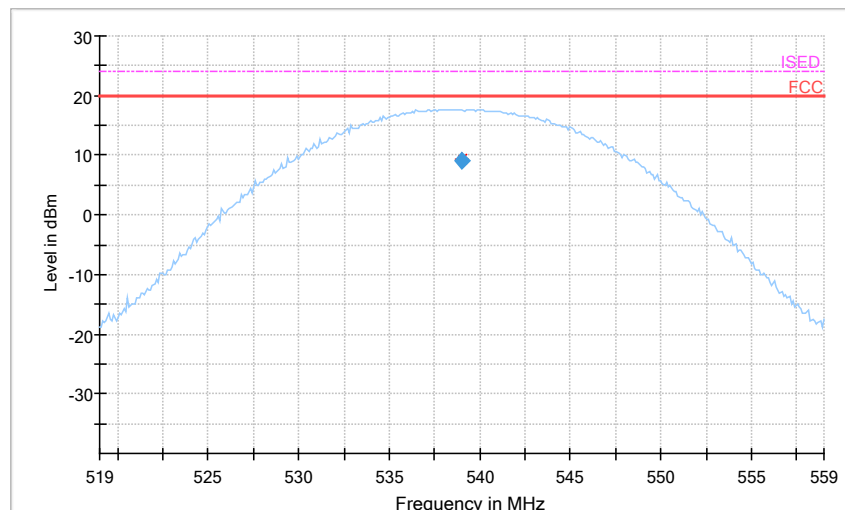
Measurement method = radiated, EUT = vertical, Operating Frequency = Mid,  
Radio Technology = WMAS  
(S01\_AD01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 539.037500      | 19.28         | 20.00       | 0.72        | 1000.0          | 10000.00        | 100.0       | V   | -12.0         | -78.7      |

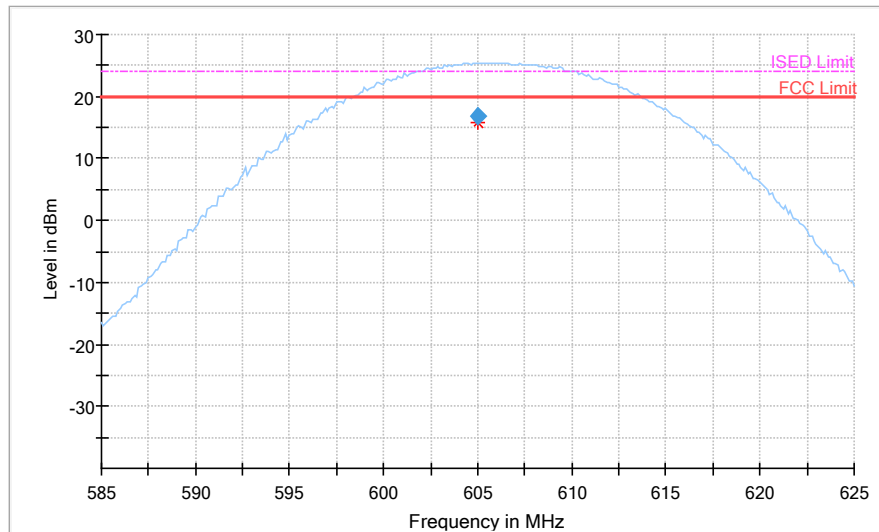
Measurement method = radiated, EUT = horizontal, Operating Frequency = Mid,  
Radio Technology = WMAS  
(S01\_AA01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 539.037500      | 9.14          | 20.00       | 10.86       | 1000.0          | 10000.00        | 359.0       | H   | 251.0         | -74.6      |

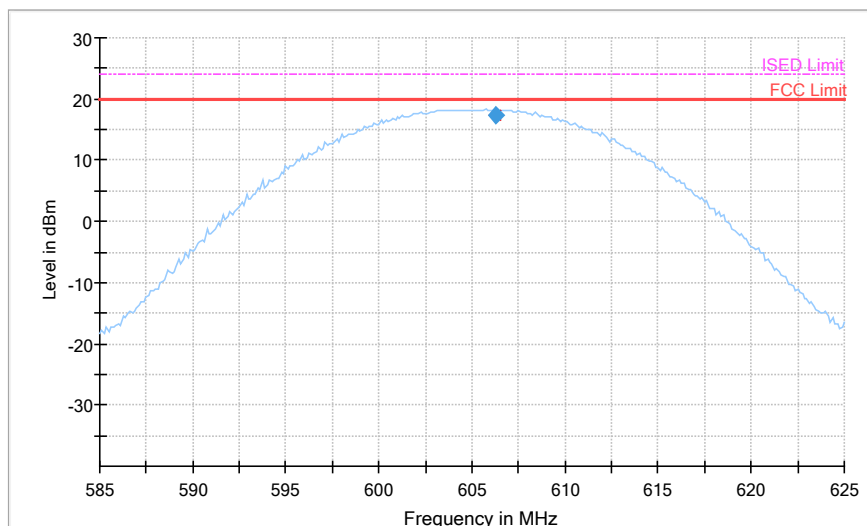
Measurement method = radiated, EUT = vertical, Operating Frequency = High,  
Radio Technology = WMAS  
(S01\_AD01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 605.000000      | 16.76         | 20.00       | 3.24        | 1000.0          | 10000.00        | 100.0       | V   | -154.0        | -75.3      |

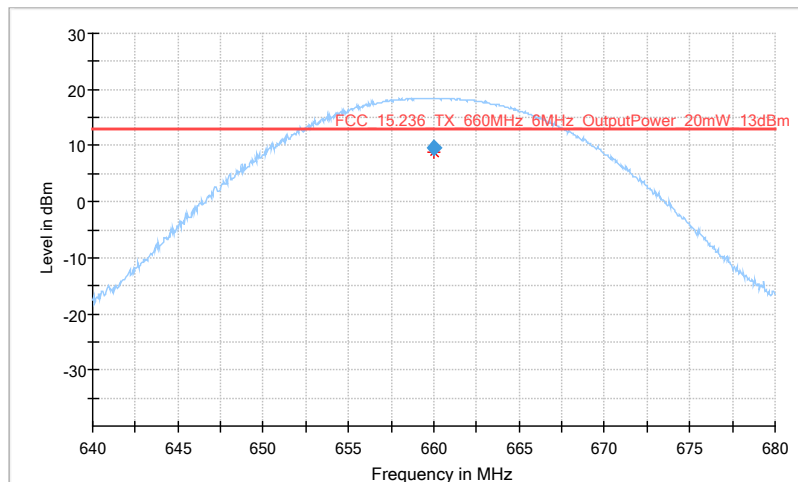
Measurement method = radiated, EUT = horizontal, Operating Frequency = High,  
Radio Technology = WMAS  
(S01\_AA01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 606.250000      | 17.26         | 20.00       | 2.74        | 1000.0          | 10000.00        | 143.0       | H   | -90.0         | -75.9      |

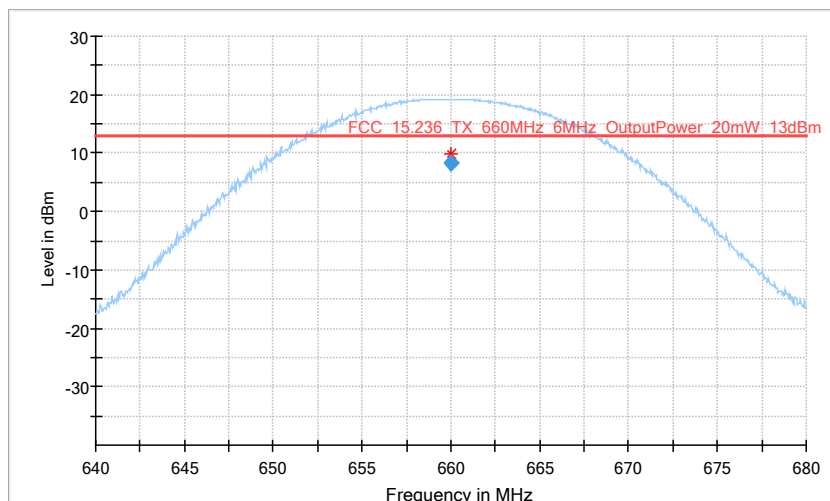
Measurement method = radiated, EUT = vertical, Operating Frequency = Mid (Duplex Gap),  
Radio Technology = WMAS  
(S01\_AA01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 660.000000      | 9.51          | 13.00       | 3.49        | 1000.0          | 10000.000       | 161.0       | V   | -8.0          | -74.0      |

Measurement method = radiated, EUT = horizontal, Operating Frequency = Mid (Duplex Gap),  
Radio Technology = WMAS  
(S01\_AA01)



## Final Result

| Frequency (MHz) | Average (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|-----------------|---------------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|------------|
| 660.000000      | 8.33          | 13.00       | 4.67        | 1000.0          | 10000.00        | 160.0       | V   | -21.0         | -74.9      |

TEST EQUIPMENT USED:

- Radiated Emissions SAC < 1GHz

## 6.2 TRANSMITTER FREQUENCY STABILITY

**RSS-210,  
Annex G, G.4**

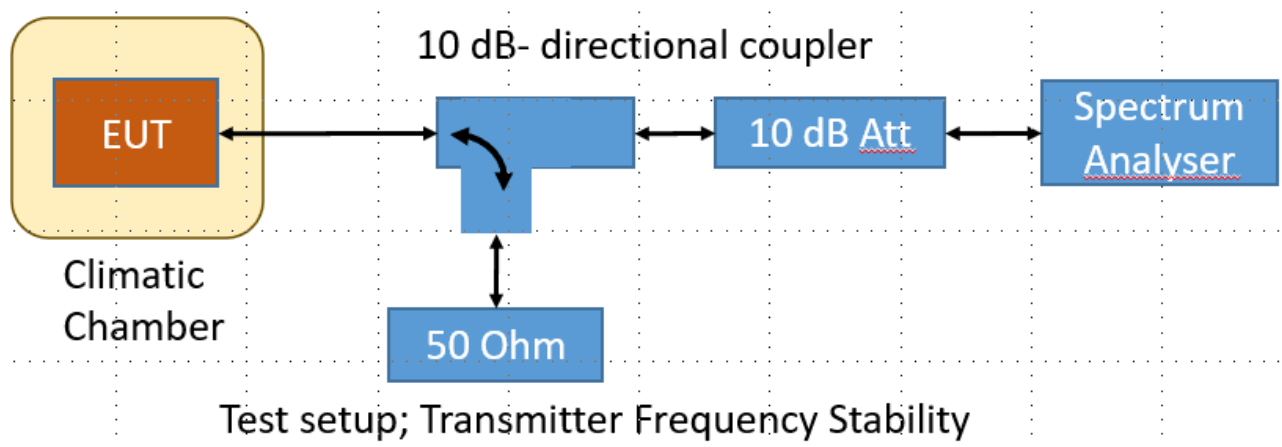
**Test case performed according: RSS-GEN, Chapter 6.11**

### Definition:

The Declared Centre Frequency ( $f_c$ ) 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:



6.2.1 LIMITS: LIMITS: § 15.236 (F)(2)  
RSS-210, ANNEX G, G.4

### § 15.236

The frequency stability for WMAS shall be sufficient to ensure that the authorized bandwidth stays within the TV channel (6 MHz)

### RSS-210

The frequency stability for WMAS shall be sufficient to ensure that the authorized bandwidth stays within the TV channel (6 MHz) when tested to the temperature and supply voltage variations specified in RSS-Gen.

## 6.2.2 TEST CASE DETAILS:

**Ambient temperature:** 26 °C  
**Air Pressure:** 1014 hPa  
**Humidity:** 62 %

| Band; 470 MHz - 608 MHz |                  |         |                                   |                  |                                    |               |
|-------------------------|------------------|---------|-----------------------------------|------------------|------------------------------------|---------------|
| Frequency               | Temperature [°C] | Voltage | Nominal Operating Frequency [MHz] | Stays in Channel | Measured Operating Frequency [MHz] | Delta f [kHz] |
| Mid                     | 20               | Normal  | 539.000                           | YES              | 538.9995359                        | -0.46         |
| Mid                     | 20               | Low     | 539.000                           | YES              | 538.9995641                        | -0.44         |
| Mid                     | 20               | High    | 539.000                           | YES              | 538.9995722                        | -0.43         |
| Mid                     | -30              | Normal  | 539.000                           | YES              | 538.9997822                        | -0.22         |
| Mid                     | 50               | Normal  | 539.000                           | YES              | 538.9996491                        | -0.35         |

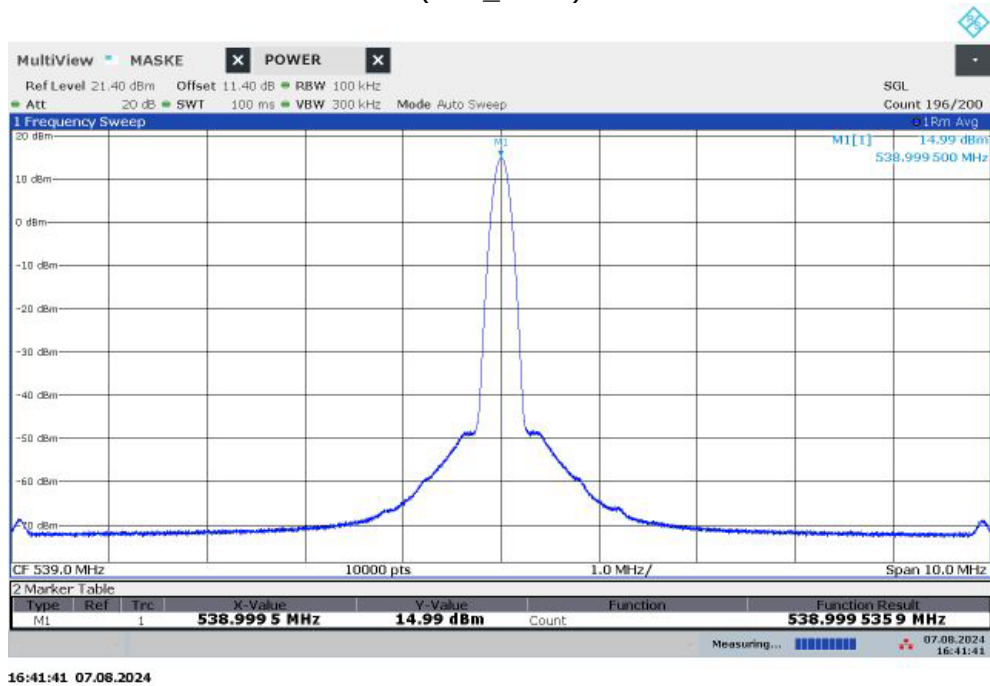
| Band; 657 MHz - 663 MHz |                  |         |                                   |                  |                                    |               |
|-------------------------|------------------|---------|-----------------------------------|------------------|------------------------------------|---------------|
| Frequency               | Temperature [°C] | Voltage | Nominal Operating Frequency [MHz] | Stays in Channel | Measured Operating Frequency [MHz] | Delta f [kHz] |
| Mid                     | 20               | Normal  | 660.000                           | YES              | 659.9994979                        | 0.50          |
| Mid                     | 20               | Low     | 660.000                           | YES              | 659.9994835                        | 0.52          |
| Mid                     | 20               | High    | 660.000                           | YES              | 659.9994925                        | 0.51          |
| Mid                     | -30              | Normal  | 660.000                           | YES              | 659.9997429                        | 0.26          |
| Mid                     | 50               | Normal  | 660.000                           | YES              | 659.9995652                        | 0.43          |

### Comments:

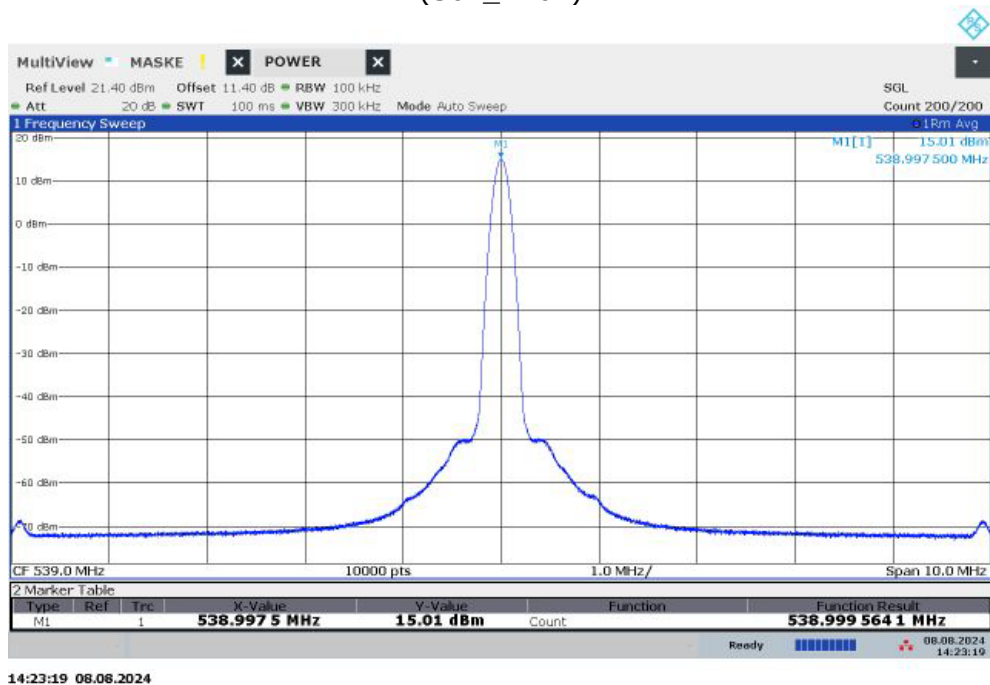
- The measurement was performed conducted.
- TX-CW Test Mode of the EUT used.
- Low voltage = 3.23 V (according to RSS-GEN)
- High voltage = 4.37 V (according to RSS-GEN)
- The verdict "Stays in Channel" is given, because the measured frequency deviation is much smaller than the difference of the 99% OBW lower and upper frequency to the channel border frequencies.

### 6.2.3 MEASUREMENT PLOTS:

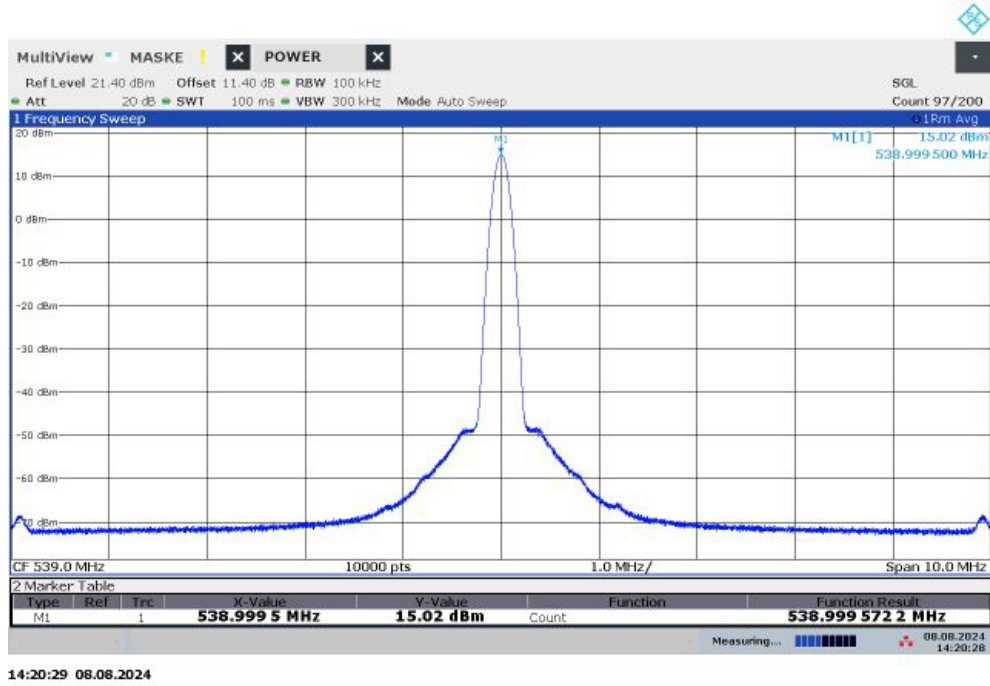
Temperature = Normal, Voltage = Normal, Operating Frequency = Mid,  
(S01\_AA01)



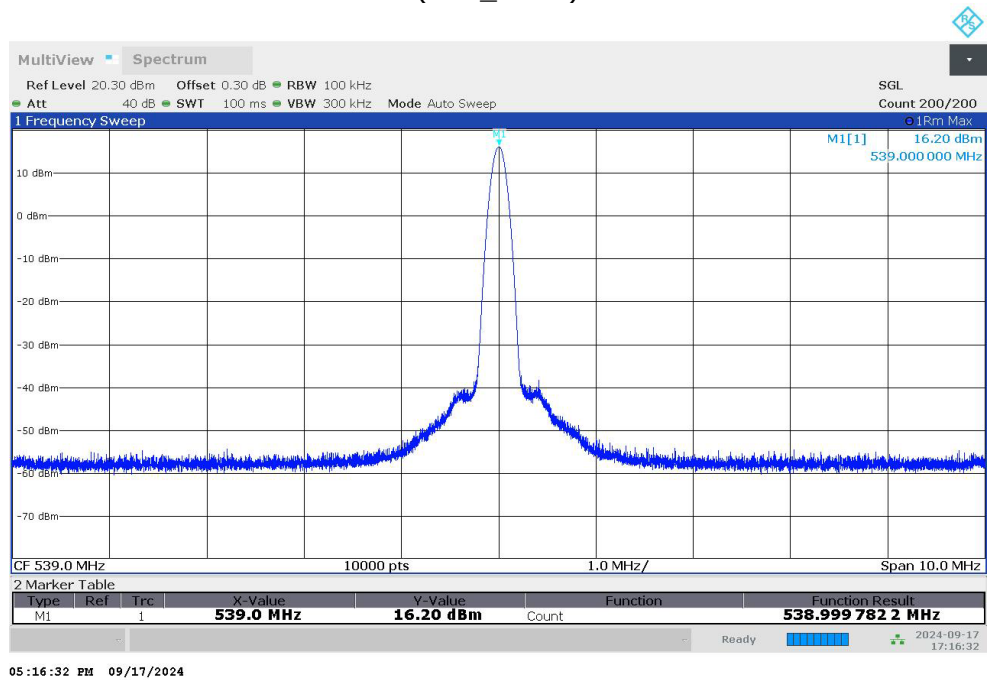
Temperature = Normal, Voltage = Low, Operating Frequency = Mid  
(S01\_AA01)



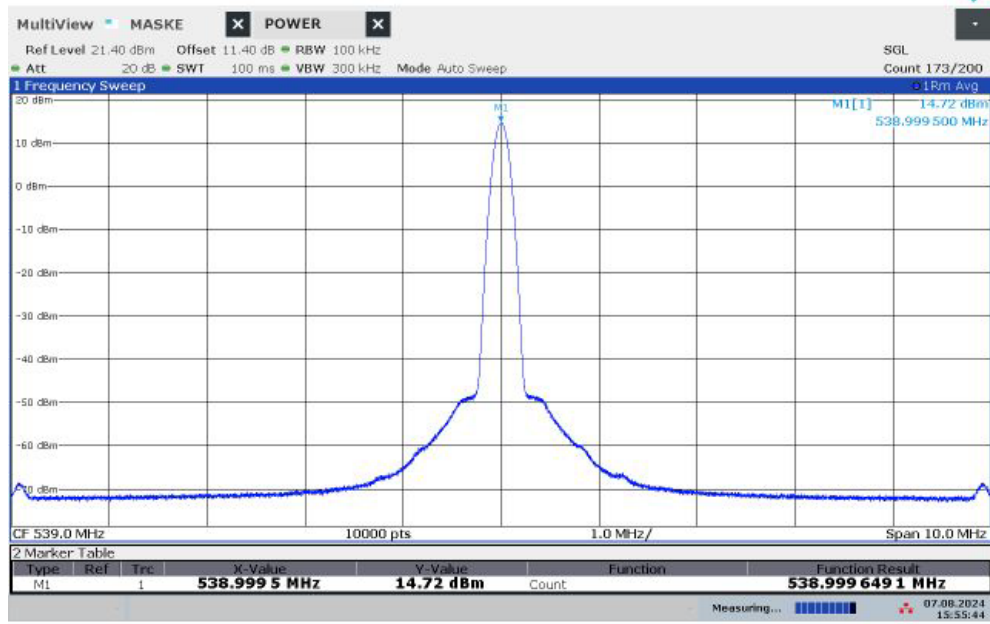
Temperature = Normal, Voltage = High, Operating Frequency = Mid  
(S01\_AA01)



Temperature = Low, Voltage = Normal, Operating Frequency = Mid  
(S01\_AA01)

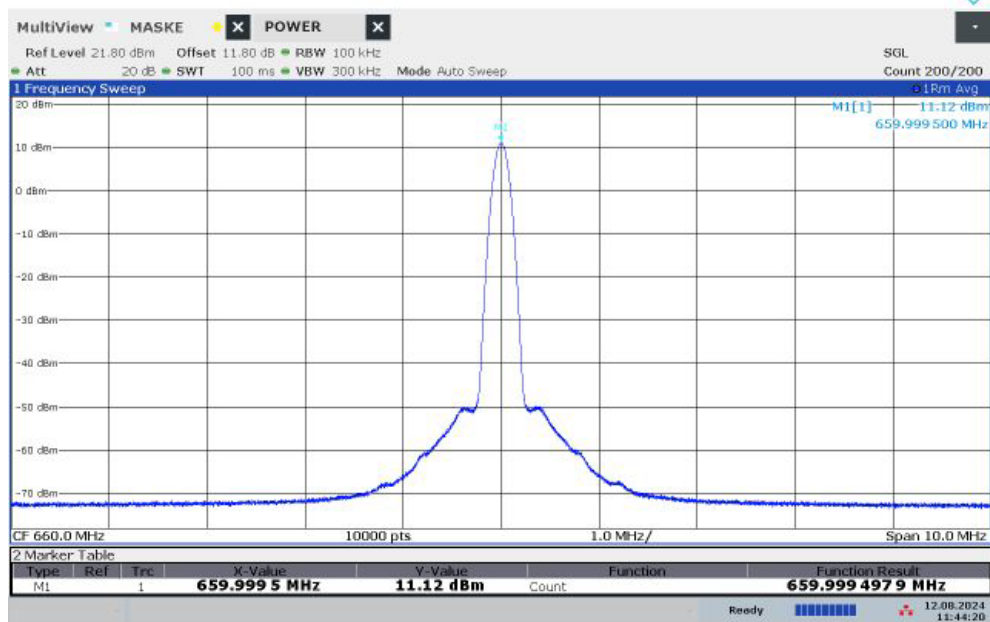


Temperature = High, Voltage = Normal, Operating Frequency = Mid  
(S01\_AA01)



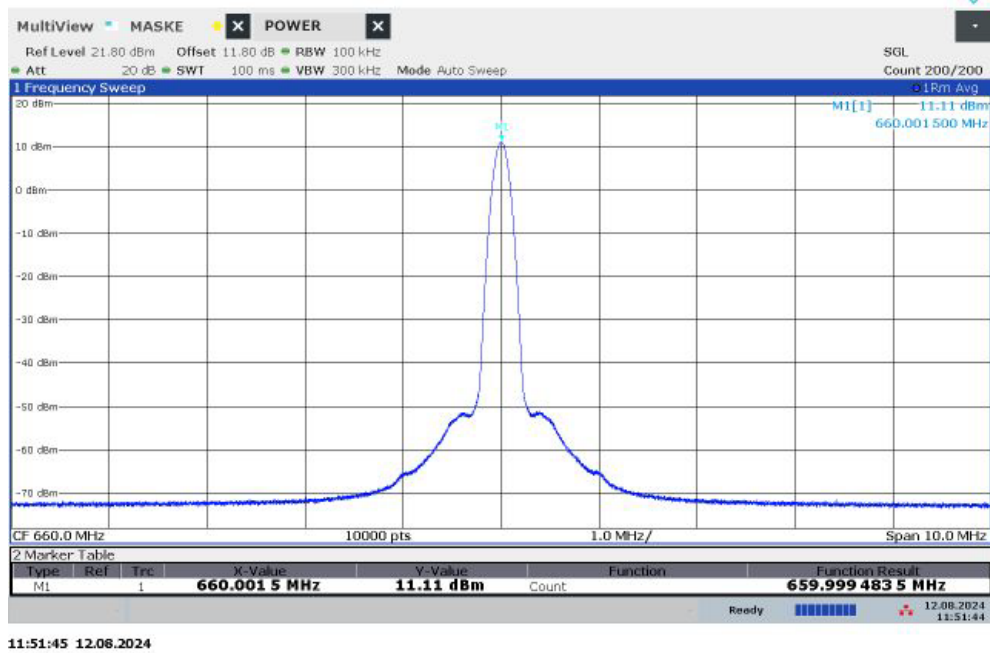
15:55:44 07.08.2024

Temperature = Normal, Voltage = Normal, Operating Frequency = Mid (Duplex Gap),  
(S01\_AA01)

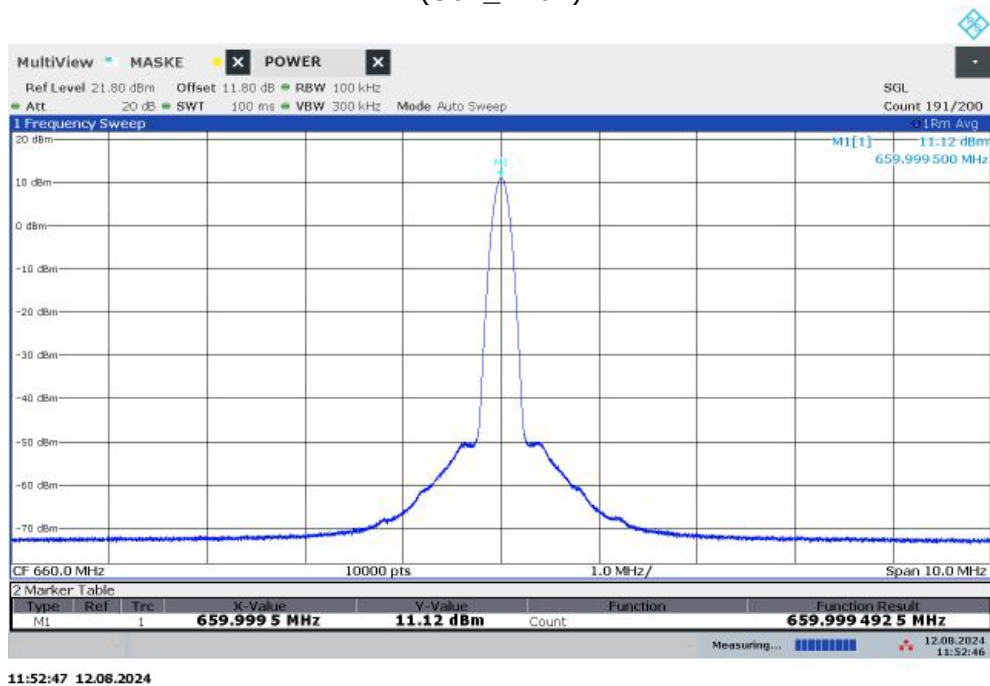


11:44:21 12.08.2024

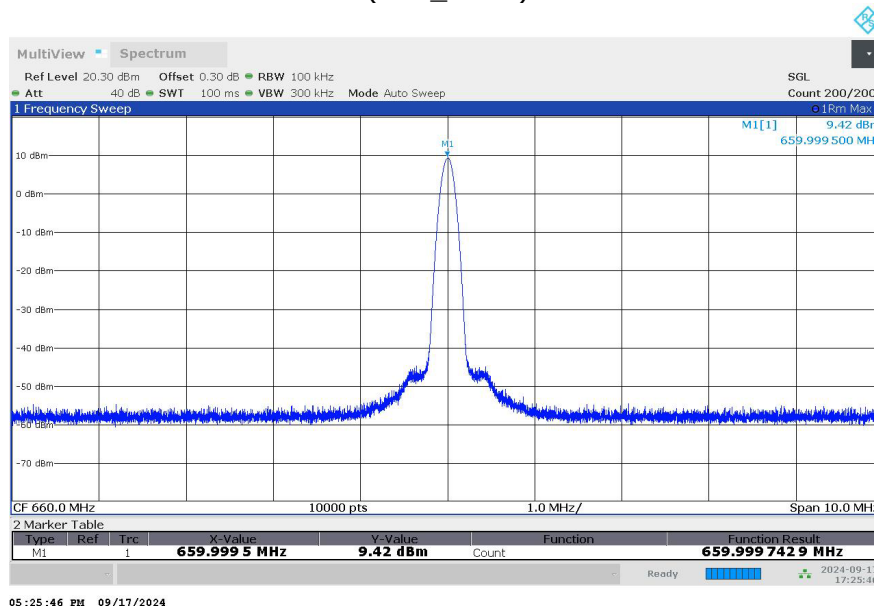
Temperature = Normal, Voltage = Low, Operating Frequency = Mid (Duplex Gap)  
(S01\_AA01)



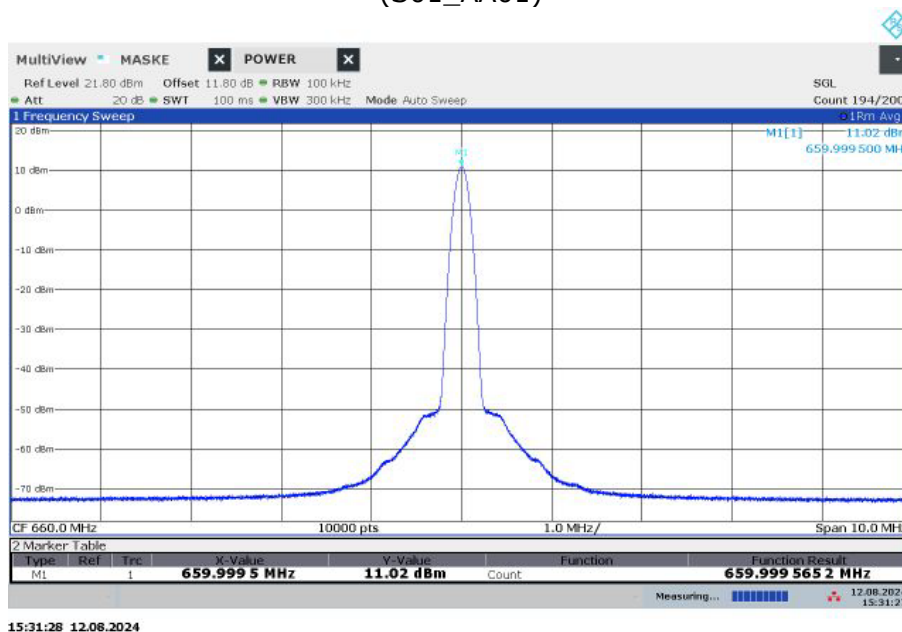
Temperature = Normal, Voltage = High, Operating Frequency = Mid (Duplex Gap)  
(S01\_AA01)



Temperature = Low, Voltage = Normal, Operating Frequency = Mid (Duplex Gap)  
(S01\_AA01)



Temperature = High, Voltage = Normal, Operating Frequency = Mid (Duplex Gap)  
(S01\_AA01)



TEST EQUIPMENT USED:  
Radio Lab

## 6.3 OCCUPIED BANDWIDTH

§15.236 (d)(2)

### Test case performed according: ANSI C63.10, Clause 6.9.3

#### 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.

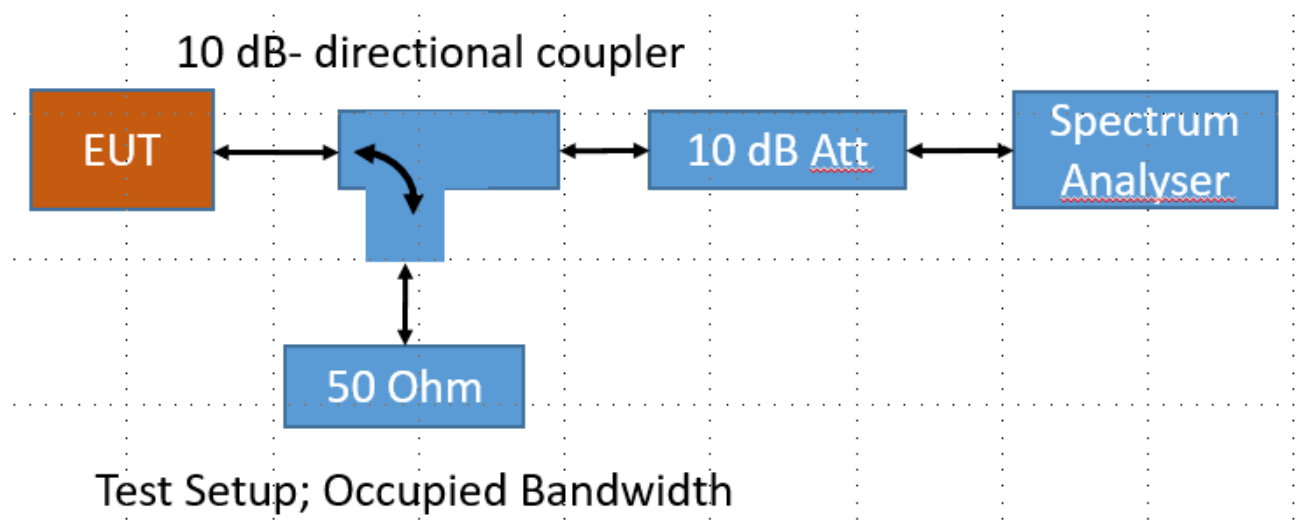
#### Analyzer settings:

- Resolution Bandwidth (RBW): approx.  $\geq 1\%$  of the span, but not below
- Video Bandwidth (VBW):  $\geq 3$  times the RBW
- Span: 30 Mhz
- Trace: Maxhold
- Sweeps: allow the trace to stabilize
- Sweep time: 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:



### 6.3.1 LIMITS: §15.236 (D),(2) RSS-210, ANNEX G, G.3

#### Occupied Bandwidth

| §15.236 (d),(2) | RSS-210, Annex G, G.3 |
|-----------------|-----------------------|
| $\leq 6$ MHz    | $< 6$ MHz             |

#### Audio channels

| §15.236 (d),(2) | RSS-210, Annex G, G.3 |
|-----------------|-----------------------|
| $\geq 3$ / MHz  | $\geq 3$ / MHz        |

### 6.3.2 TEST CASE DETAILS:

**Ambient temperature:** 26 °C  
**Air Pressure:** 1014 hPa  
**Humidity:** 62 %

| Band: 470 MHz - 608 MHz |                                   |                           |                           |           |                 |                       |
|-------------------------|-----------------------------------|---------------------------|---------------------------|-----------|-----------------|-----------------------|
| Frequency               | Nominal Operating Frequency [MHz] | Lower 99% Frequency [MHz] | Upper 99% Frequency [MHz] | OCW [kHz] | Limit OCB [kHz] | Margin to Limit [kHz] |
| Low                     | 473.000                           | 470.2609                  | 475.7438                  | 5482.9000 | 6000.0000       | 517.1000              |
| Mid                     | 539.000                           | 536.2346                  | 541.7346                  | 5500.0000 | 6000.0000       | 500.0000              |
| High                    | 605.000                           | 602.2338                  | 607.7591                  | 5525.3000 | 6000.0000       | 474.7000              |

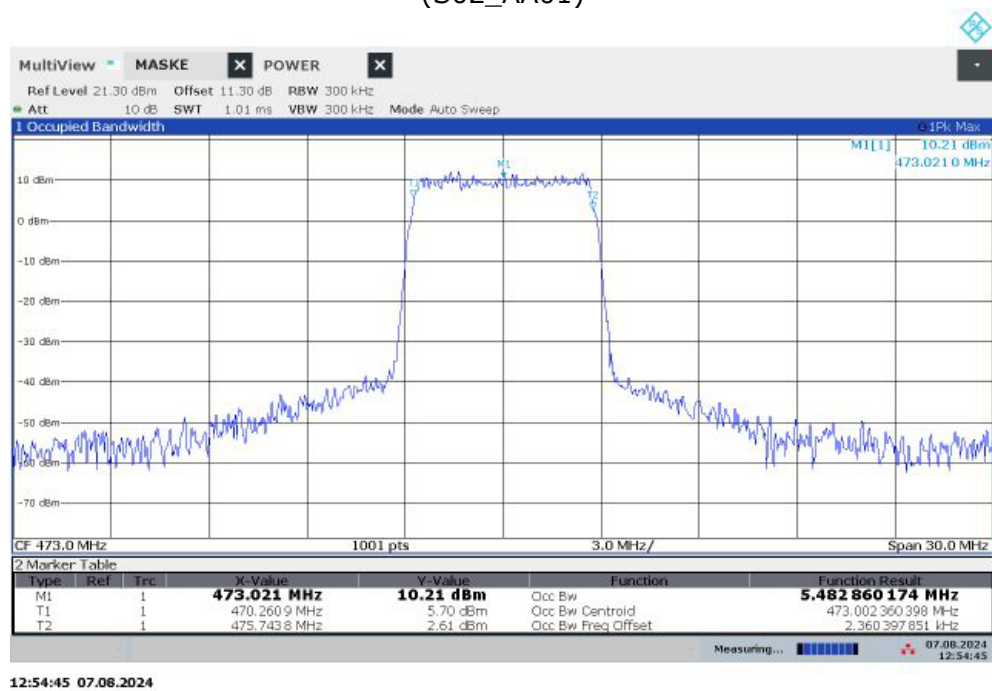
| Band: 657 MHz - 663 MHz |                                   |                           |                           |           |                 |                       |
|-------------------------|-----------------------------------|---------------------------|---------------------------|-----------|-----------------|-----------------------|
| Frequency               | Nominal Operating Frequency [MHz] | Lower 99% Frequency [MHz] | Upper 99% Frequency [MHz] | OCW [kHz] | Limit OCB [kHz] | Margin to Limit [kHz] |
| Mid                     | 660.000                           | 657.2400                  | 662.7423                  | 5502.3000 | 6000.0000       | 497.7000              |

#### Comments:

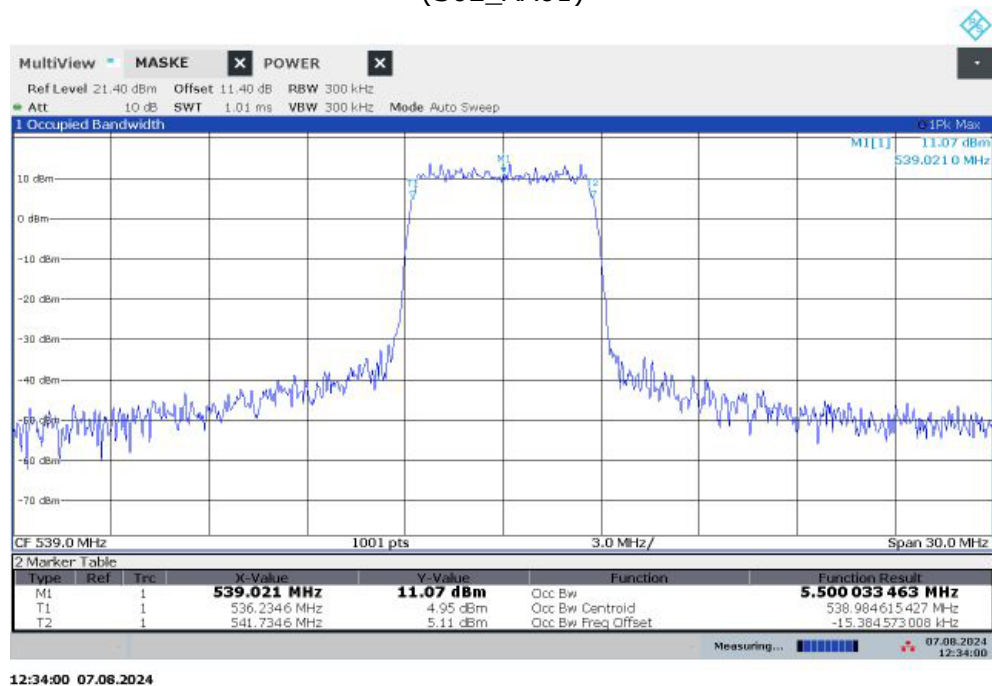
- The measurement was performed conducted.

### 6.3.3 MEASUREMENT PLOTS:

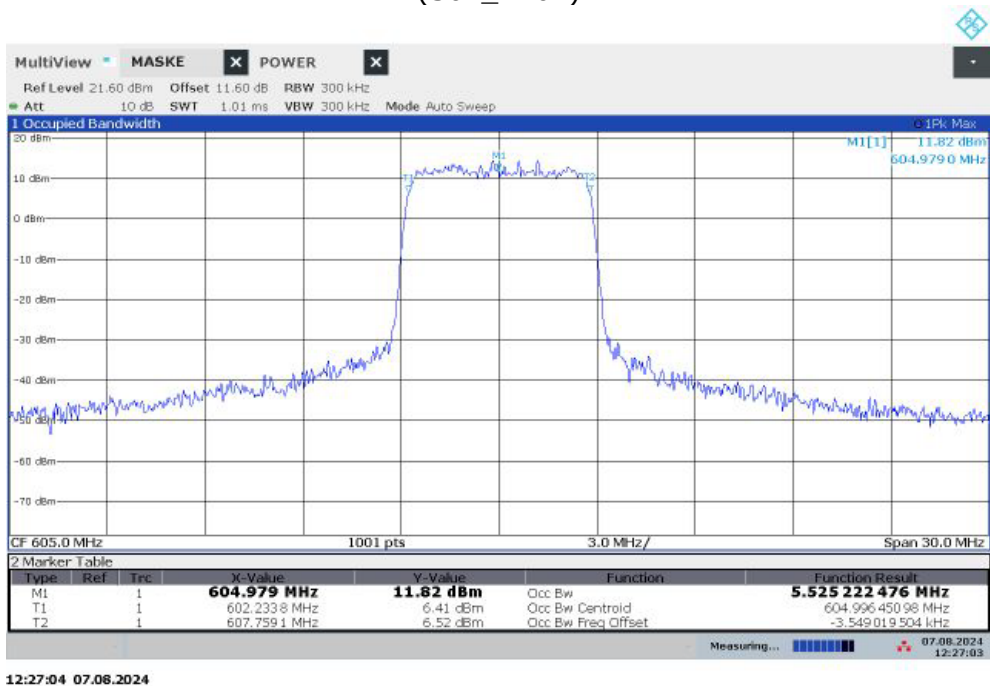
Operating Frequency = Low, Radio Technology = WMAS  
(S02\_AA01)



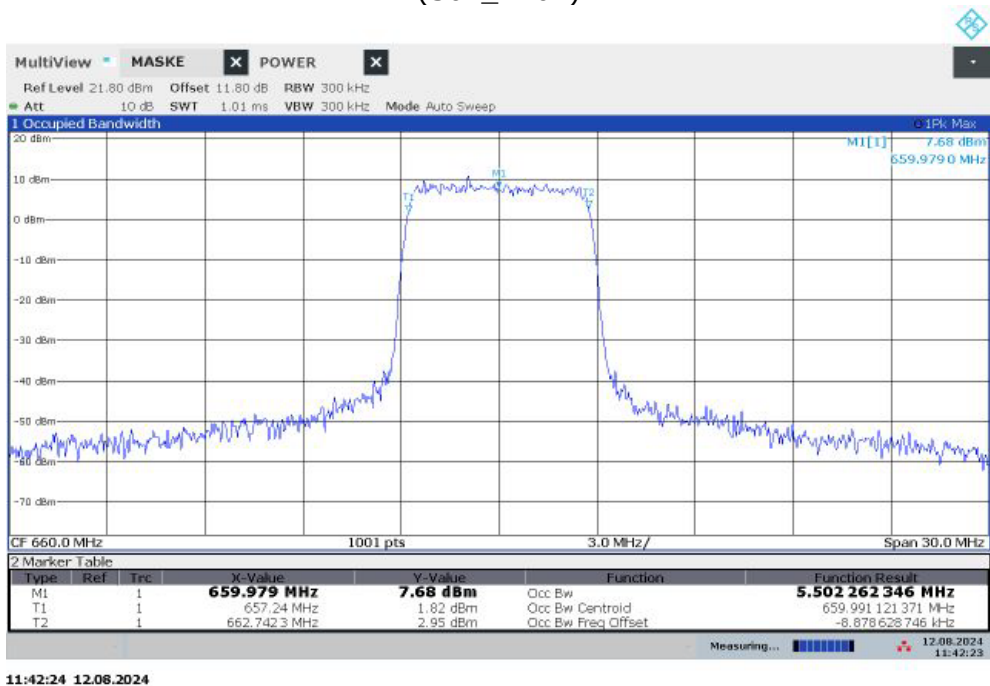
Operating Frequency = Mid, Radio Technology = WMAS  
(S02\_AA01)



Operating Frequency = High, Radio Technology = WMAS  
(S02\_AA01)



Operating Frequency = Mid (Duplex Gap), Radio Technology = WMAS  
(S02\_AA01)



TEST EQUIPMENT USED:  
- Radio Lab

## 6.4 TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

**§15.236 (g)(4)**

### The test was performed according to:

ANSI C63.10, chapter 6.4, 6.5, 6.6.5

#### 6.4.1 TEST DESCRIPTION

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

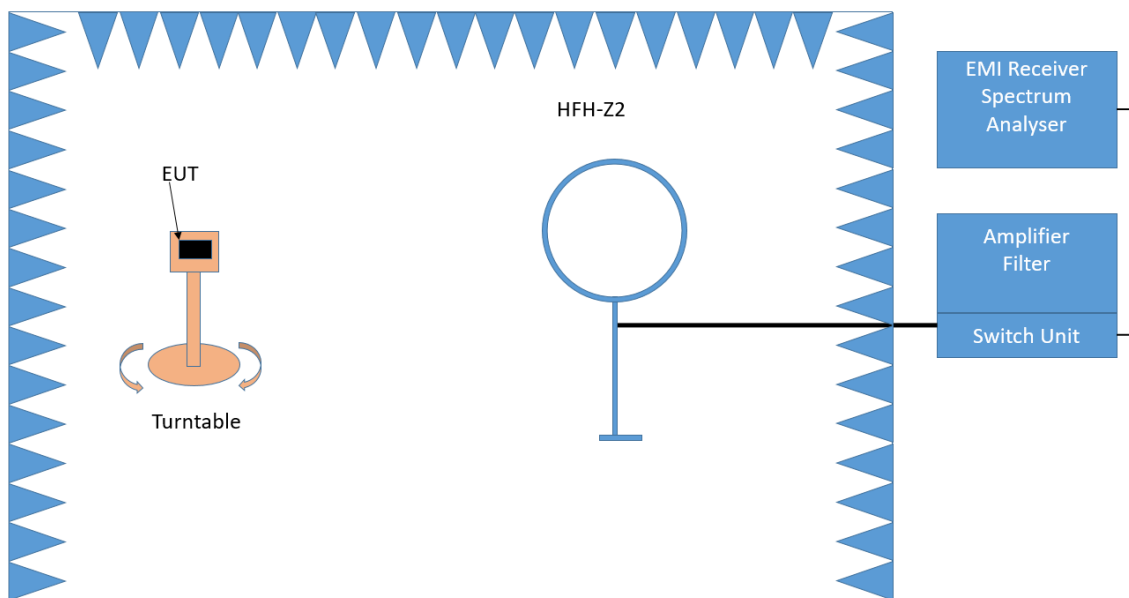
- < 30 MHz: Chapter 6.4
- 30 MHz – 1 GHz: Chapter 6.5
- > 1 GHz: Chapter 6.6 (procedure according 6.6.5 used)

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)

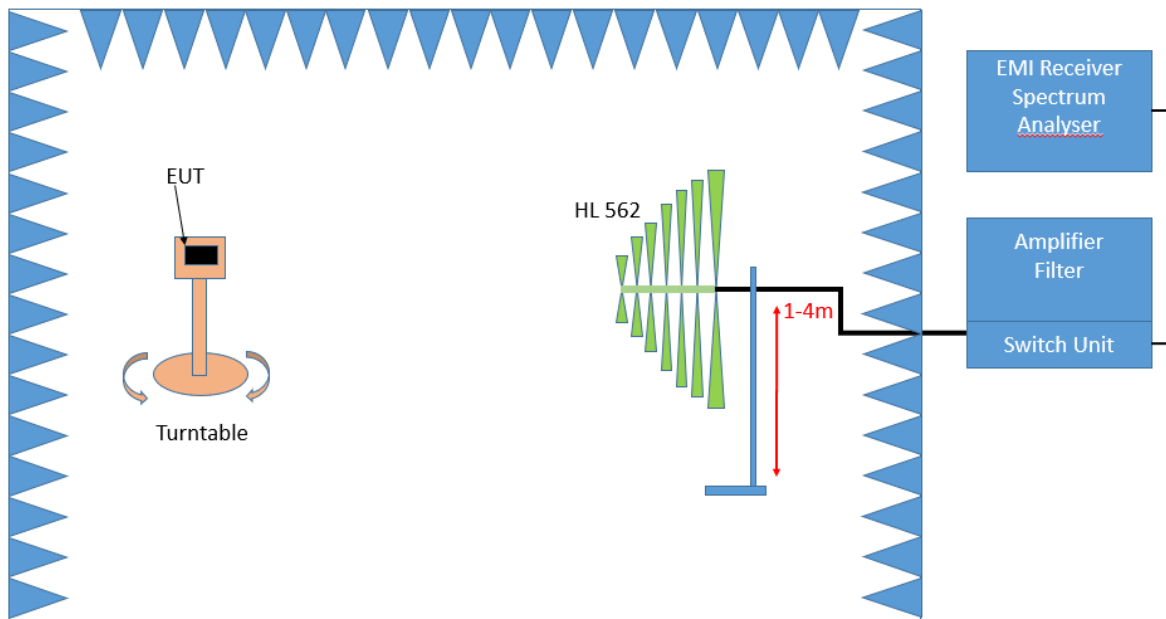
Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

### 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:  $-180^{\circ}$  to  $90^{\circ}$
- Turntable step size:  $90^{\circ}$
- 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  $360^{\circ}$ . 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:  $360^{\circ}$
- 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:

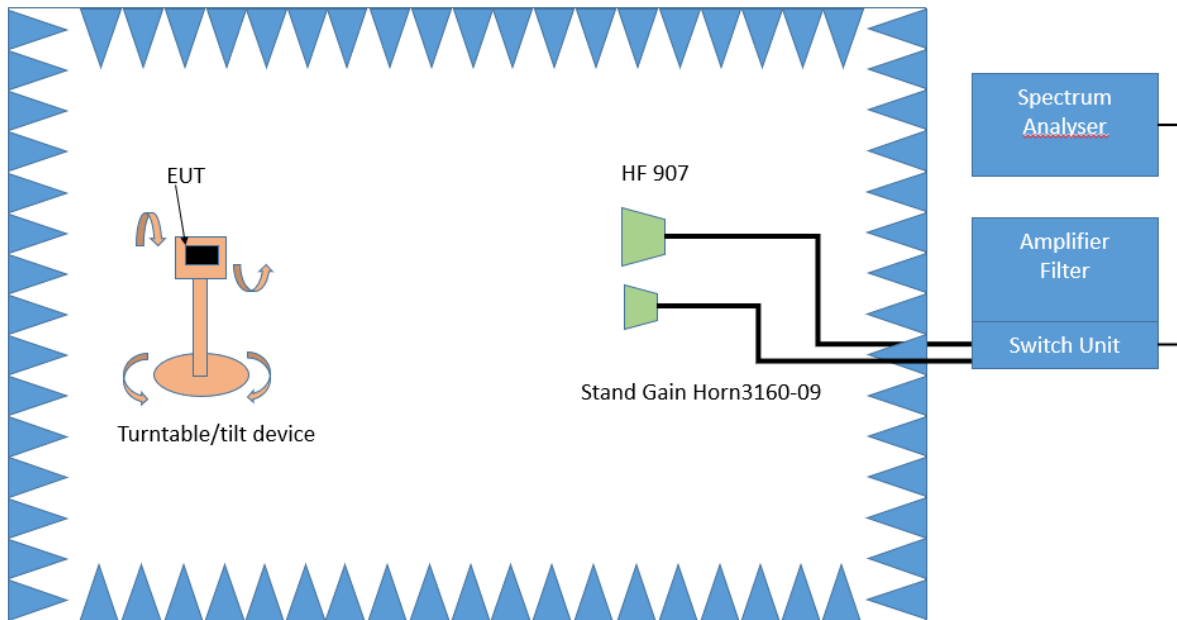
- Detector: RMS
- Measured frequencies: in step 1 determined frequencies
- RBW: 100 kHz
- VBW = 300 kHz
- Sweep time: 1 s

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  $\pm 22.5^\circ$ .

The elevation angle will slowly vary by  $\pm 45^\circ$

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,<br>e.r.p. ( $\leq 1$ GHz)<br>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                                                           | $F_c + 2,5 B \leq f \leq f_c + 4 B$ : 1 kHz<br>$F_c + 4 B < f \leq f_c + 10 B$ : 10 kHz<br>$f > f_c + 10 B$ : 100 kHz<br>$f < f_c - 10 B$ : 100 kHz<br>$f_c - 10 B \leq f < f_c - 4 B$ : 10 kHz<br>$f_c - 4 B \leq f \leq f_c - 2,5 B$ : 1 kHz     |
| Except:                                   |                                                                   |                                                                                                                                                                                                                                                    |
| 47 MHz to 74 MHz<br>87.5 MHz to 118 MHz   | -54 dBm                                                           | 100 kHz                                                                                                                                                                                                                                            |
| 174 MHz to 230 MHz<br>470 MHz to 862 MHz  | -54 dBm                                                           | $F_c + 2,5 B \leq f \leq f_c + 4 B$ : 1 kHz<br>$F_c + 4 B < f \leq f_c + 10 B$ : 10 kHz<br>$f > f_c + 10 B$ : 100 kHz<br>$f < f_c - 10 B$ : 100 kHz<br>$f_c - 10 B \leq f < f_c - 4 B$ : 10 kHz<br>$f_c - 4 B \leq f \leq f_c - 2,5 B$ : 1 kHz     |
|                                           |                                                                   |                                                                                                                                                                                                                                                    |
| $1 \text{ GHz} < f \leq F_{\text{upper}}$ | -30 dBm                                                           | $F_c + 2,5 B \leq f \leq f_c + 10 B$ : 30 kHz<br>$F_c + 10 B < f \leq f_c + 12 B$ : 300 kHz<br>$f > f_c + 12 B$ : 1 MHz<br>$f < f_c - 12 B$ : 1 MHz<br>$f_c - 12 B \leq f < f_c - 10 B$ : 300 kHz<br>$f_c - 10 B \leq f \leq f_c - 2,5 B$ : 30 kHz |

**Table: Frequency range for measurement of unwanted emissions  
(from ERC Recommendation 74-01 [2])**

| Applicable<br>fundamental<br>Frequency range | Frequency range for measurements |                                                       |
|----------------------------------------------|----------------------------------|-------------------------------------------------------|
|                                              | Lower frequency                  | Upper frequency                                       |
| 9 kHz – 100 MHz                              | 9 kHz                            | 1 GHz                                                 |
| 100 MHz – 300 MHz                            | 9 kHz                            | 10 <sup>th</sup> harmonics of the operating frequency |
| 300 MHz – 600 MHz                            | 30 MHz                           | 3 GHz                                                 |
| 600 MHz – 3 GHz                              | 30 MHz                           | 5 <sup>th</sup> harmonics of the operating frequency  |

#### 6.4.3 TEST CASE DETAILS:

**Ambient temperature:** 26-31°C  
**Air Pressure:** 1000 -1009 hPa  
**Humidity:** 40 – 49 %

| Band: 470 MHz - 608 MHz            |                 |                          |           |             |                      |
|------------------------------------|-----------------|--------------------------|-----------|-------------|----------------------|
| Operating Mode: TX-On, Low channel |                 |                          |           |             |                      |
| Measurement Method                 | Frequency [MHz] | Spurious Level RMS [dBm] | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| Radiated                           | 946.1616        | -53.8                    | 100       | -36.0       | 17.8                 |

| Band: 470 MHz - 608 MHz            |                 |                          |           |             |                      |
|------------------------------------|-----------------|--------------------------|-----------|-------------|----------------------|
| Operating Mode: TX-On, Mid channel |                 |                          |           |             |                      |
| Measurement Method                 | Frequency [MHz] | Spurious Level RMS [dBm] | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| Radiated                           | 1616.200        | -49.8                    | 1000      | -30.0       | 19.8                 |

| Band: 470 MHz - 608 MHz             |                 |                          |           |             |                      |
|-------------------------------------|-----------------|--------------------------|-----------|-------------|----------------------|
| Operating Mode: TX-On, High channel |                 |                          |           |             |                      |
| Measurement Method                  | Frequency [MHz] | Spurious Level RMS [dBm] | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| Radiated                            | 536.3480        | -62.2                    | 100       | -54.0       | 8.2                  |
| Radiated                            | 1814.2000       | -45.0                    | 1000      | -30.0       | 15.0                 |

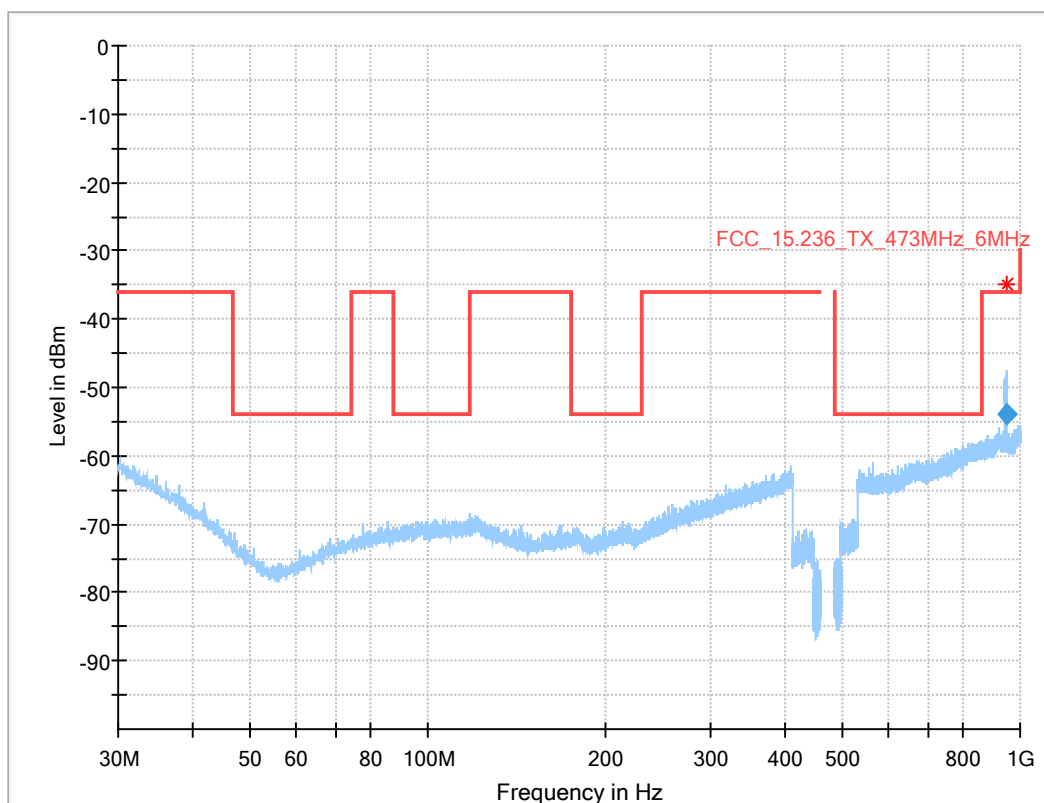
| Band: 657 MHz - 663 MHz            |                 |                          |           |             |                      |
|------------------------------------|-----------------|--------------------------|-----------|-------------|----------------------|
| Operating Mode: TX-On, Mid channel |                 |                          |           |             |                      |
| Measurement Method                 | Frequency [MHz] | Spurious Level RMS [dBm] | RBW [kHz] | Limit [dBm] | Margin to Limit [dB] |
| Radiated                           | 1978.900        | -49.2                    | 1000      | -30.0       | 19.2                 |

#### Comments:

- Tested frequency range: 30 MHz – 7 GHz.
- The measurement was performed with maximum output power.
- TX - Test mode used.

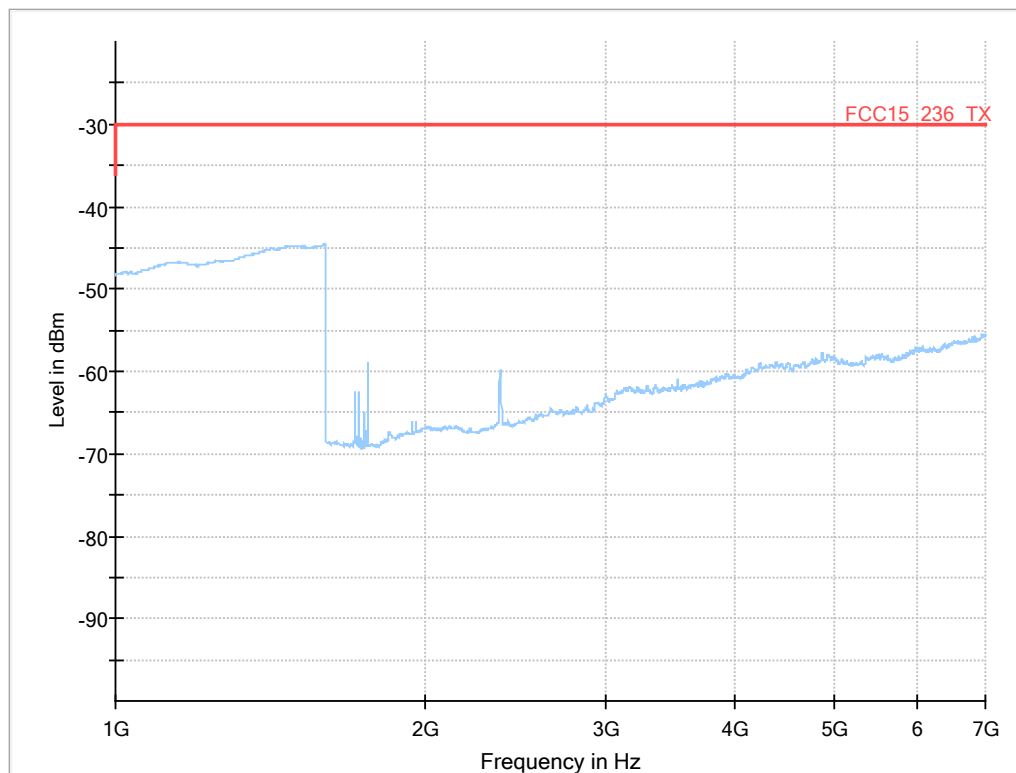
#### 6.4.4 MEASUREMENT PLOTS:

Measurement method = radiated, Temperature = Normal, Operating Frequency = Low,  
 Radio Technology = WMAS  
 (S01\_AC01)



#### Final Result

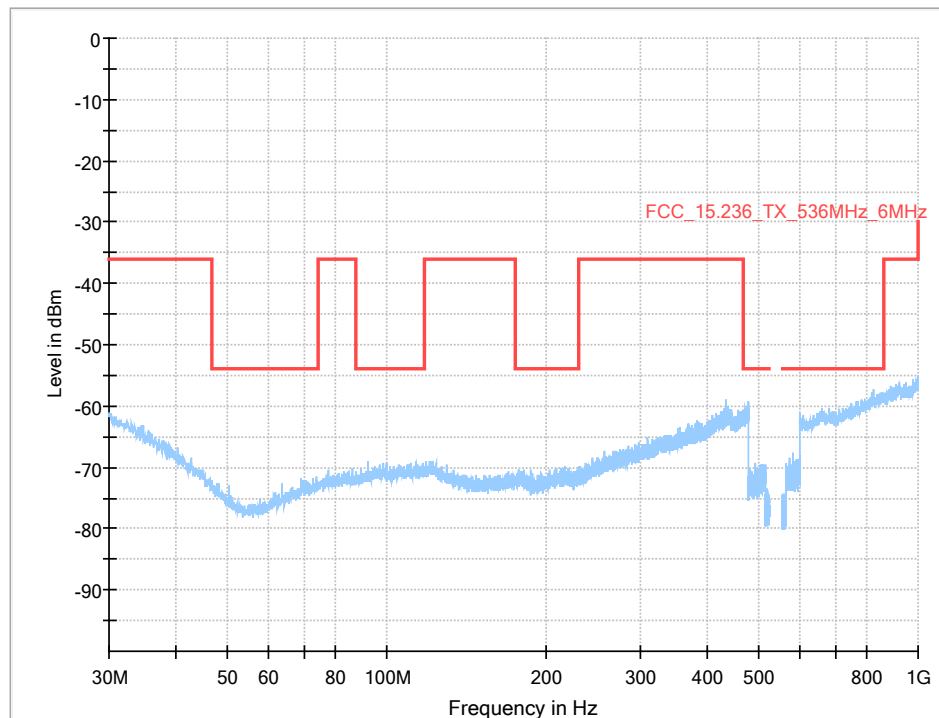
| Frequency (MHz) | RMS (dBm) | Limit (dBm) | Margin | Meas. Time (ms) | Bandwidth | Height | Pol | Azimuth | Corr. (dB) |
|-----------------|-----------|-------------|--------|-----------------|-----------|--------|-----|---------|------------|
| 946.161571      | -53.82    | -36.00      | 17.82  | 1000.0          | 100.000   | 102.0  | V   | 127.0   | -68.9      |



### Final Result

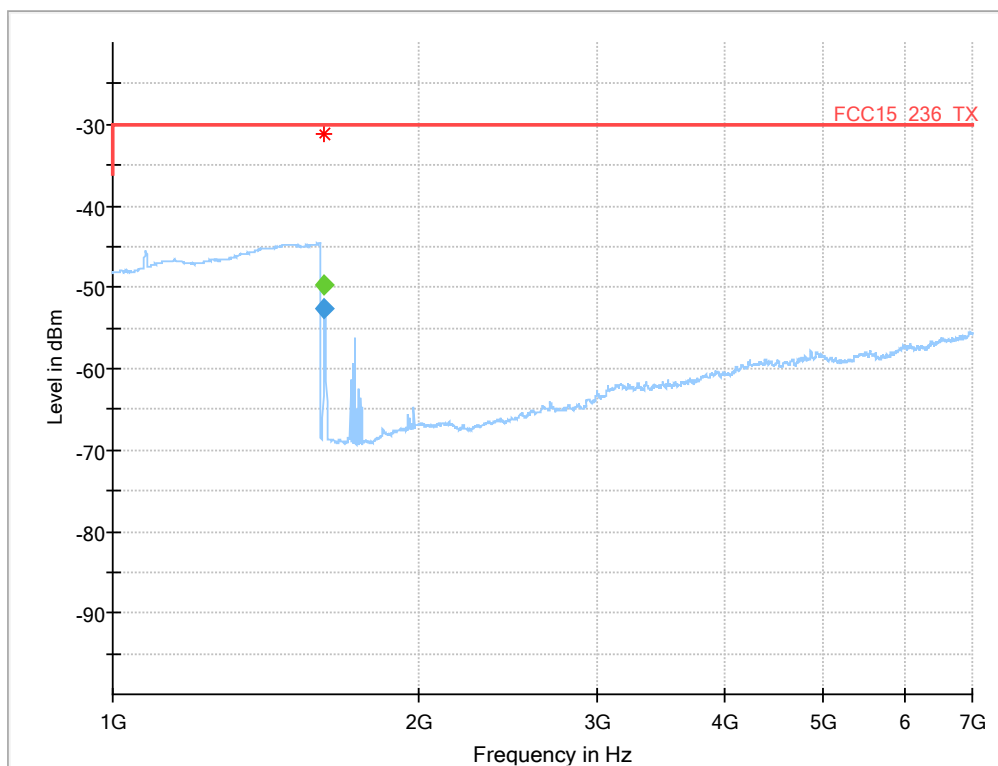
| Frequency (MHz) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation | Corr. (dB) |
|-----------------|-----------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------|------------|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

Measurement method = radiated, Temperature = Normal, Operating Frequency = Mid,  
Radio Technology = WMAS  
(S01\_AC01)



#### Final Result

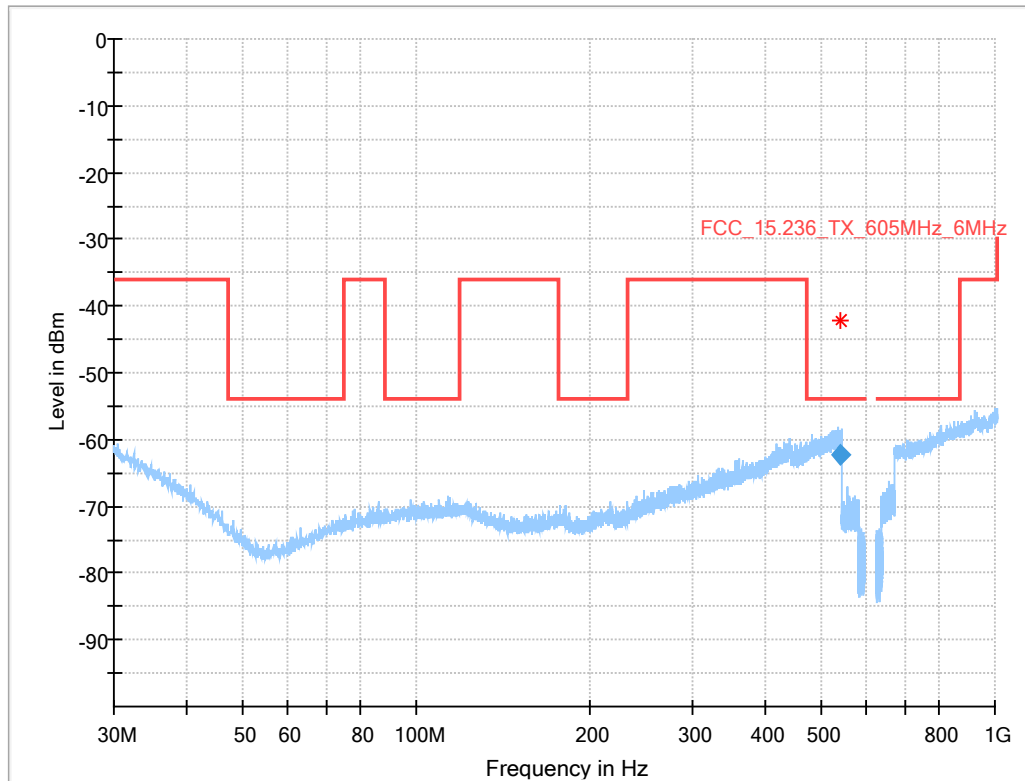
| Frequency<br>(MHz) | RMS<br>(dBm) | Limit<br>(dBm) | Margi<br>n | Meas. Time<br>(ms) | Bandwid<br>th | Heigh<br>t | Pol | Azimut<br>h | Corr.<br>(dB) |
|--------------------|--------------|----------------|------------|--------------------|---------------|------------|-----|-------------|---------------|
| ---                | ---          | ---            | ---        | ---                | ---           | ---        |     | ---         | ---           |



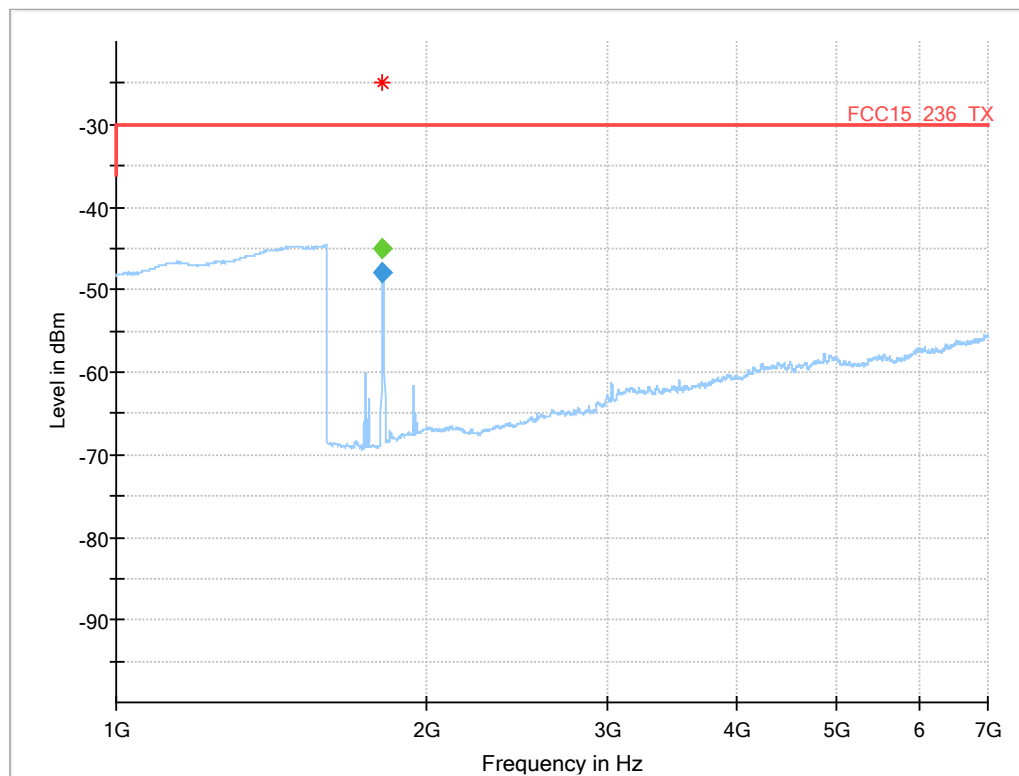
### Final Result

| Frequency (MHz) | CAverage (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth h | Height (cm) | Pol | Azimet h | Elevation (deg) | Corr. (dB) |
|-----------------|----------------|-----------|-------------|-------------|-----------------|-------------|-------------|-----|----------|-----------------|------------|
| 1616.200        | -52.7          | ---       | -30.00      | 22.72       | 1000.0          | 1000.000    | 150.0       | H   | -18.0    | -13.0           | -100.5     |
| 1616.200        | ---            | -49.8     | -30.00      | 19.84       | 1000.0          | 1000.000    | 150.0       | H   | -18.0    | -13.0           | -100.5     |

Measurement method = radiated, Temperature = Normal, Operating Frequency = high,  
Radio Technology = WMAS  
(S01\_AC01)



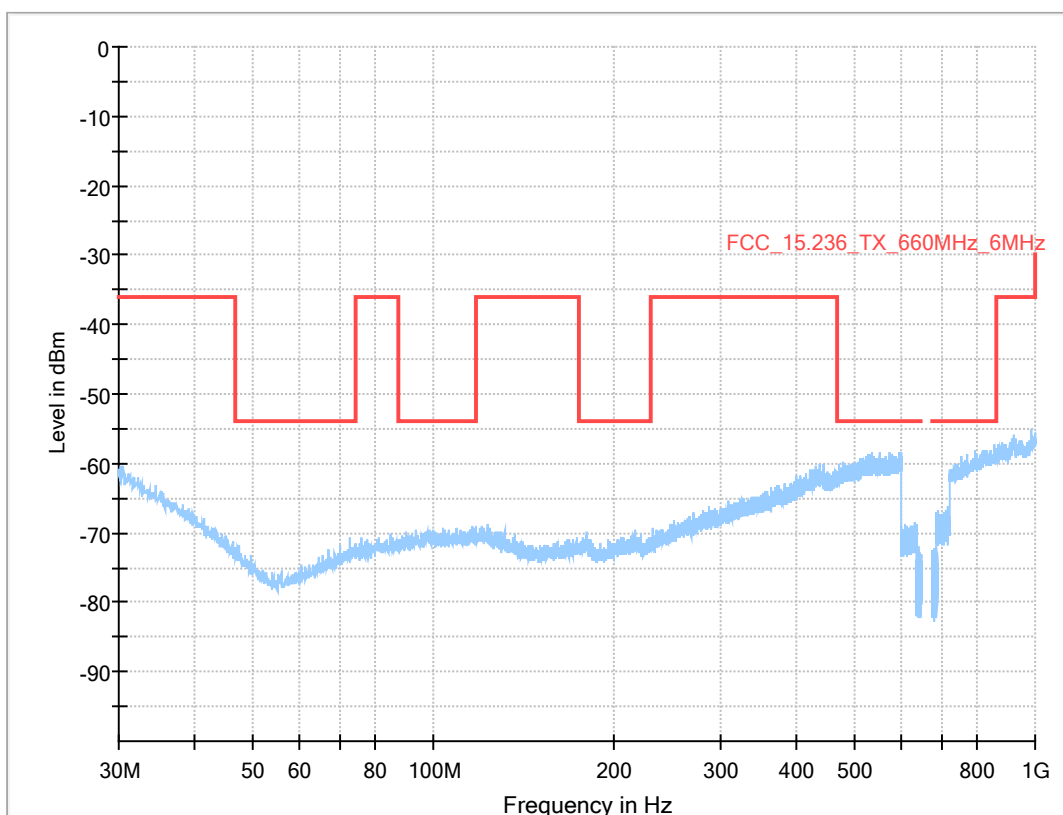
| Frequency (MHz) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time | Bandwidth (kHz) | Height (cm) | Pol | Azimuth h | Corr. (dB) |
|-----------------|-----------|-------------|-------------|------------|-----------------|-------------|-----|-----------|------------|
| 536.348000      | -62.16    | -54.00      | 8.16        | 1000.0     | 100.000         | 143.0       | V   | -101.0    | -76.2      |



### Final Result

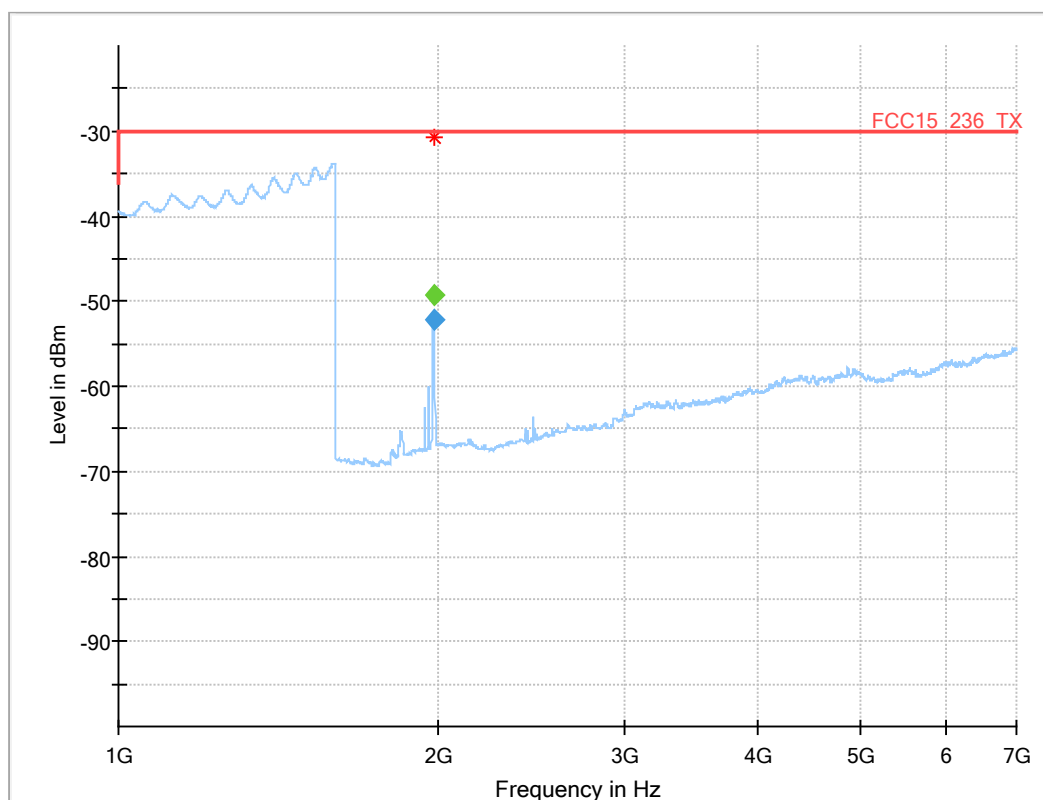
| Frequency (MHz) | CAverage (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB) |
|-----------------|----------------|-----------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|------------|
| 1814.200        | -48.0          | ---       | -30.00      | 18.02       | 1000.0          | 1000.000        | 150.0       | H   | 111.0         | 9.0             | -          |
| 1814.200        | ---            | -45.0     | -30.00      | 15.01       | 1000.0          | 1000.000        | 150.0       | H   | 111.0         | 9.0             | -          |

Measurement method = radiated, Temperature = Normal,  
 Operating Frequency = Mid (Duplex Gap), Radio Technology = WMAS  
 (S01\_AC01)



### Final Result

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



### Final Result

| Frequency (MHz) | CAverage (dBm) | RMS (dBm) | Limit (dBm) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Elevation (deg) | Corr. (dB) |
|-----------------|----------------|-----------|-------------|-------------|-----------------|-----------------|-------------|-----|---------------|-----------------|------------|
| 1978.900        | ---            | -49.2     | -30.00      | 19.16       | 1000.0          | 1000.000        | 150.0       | H   | 125.0         | 22.0            | -99.1      |
| 1978.900        | -52.1          | ---       | -30.00      | 22.11       | 1000.0          | 1000.000        | 150.0       | H   | 125.0         | 22.0            | -99.1      |

### 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 §15.236 (g)(3)

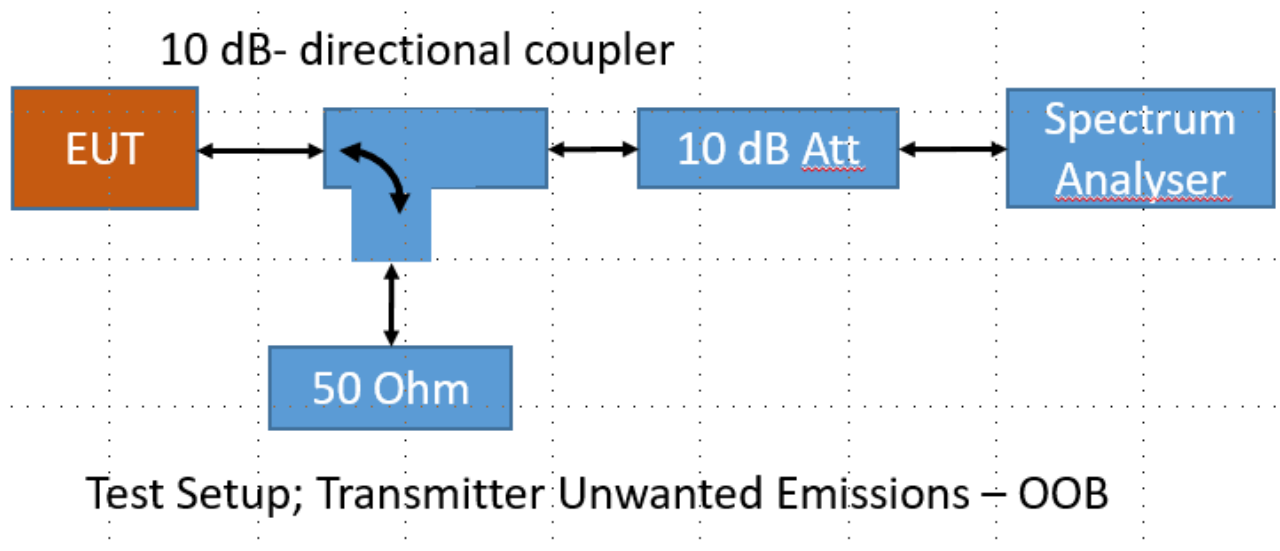
**Test case performed according: EN 300 422-1, clause 5.4.3**

### 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.

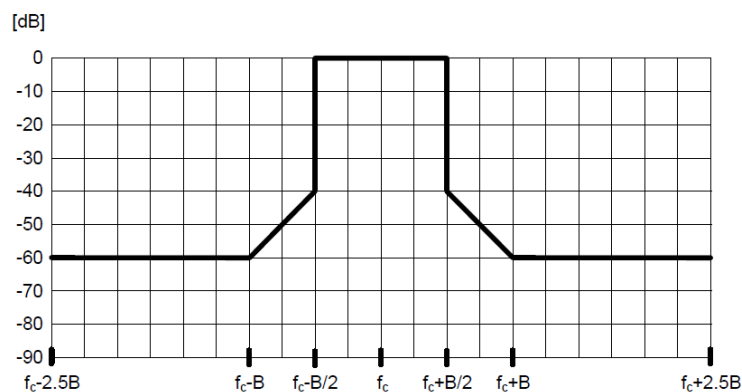


Figure 3: Transmit spectral power mask for WMAS, RBW = 100 kHz

## 6.5.2 TEST CASE DETAILS:

**Ambient temperature:** 26°C  
**Air Pressure:** 1014 hPa  
**Humidity:** 62%

| Ban:, 470 MHz - 608 MHz |                                   |                      |
|-------------------------|-----------------------------------|----------------------|
| Frequency               | Nominal Operating Frequency [MHz] | Within Spectrum Mask |
| Low                     | 473.000                           | YES                  |
| Mid                     | 539.000                           | YES                  |
| High                    | 605.000                           | YES                  |

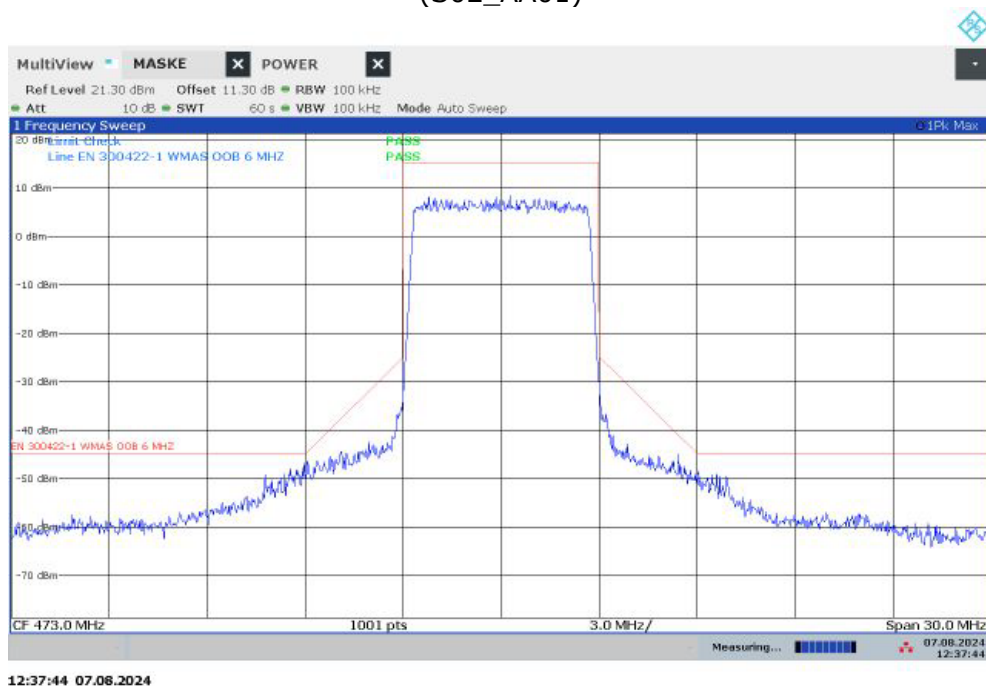
| Band: 657 MHz - 663 MHz |                                   |                      |
|-------------------------|-----------------------------------|----------------------|
| Frequency               | Nominal Operating Frequency [MHz] | Within Spectrum Mask |
| Mid                     | 660.000                           | YES                  |

### Comments:

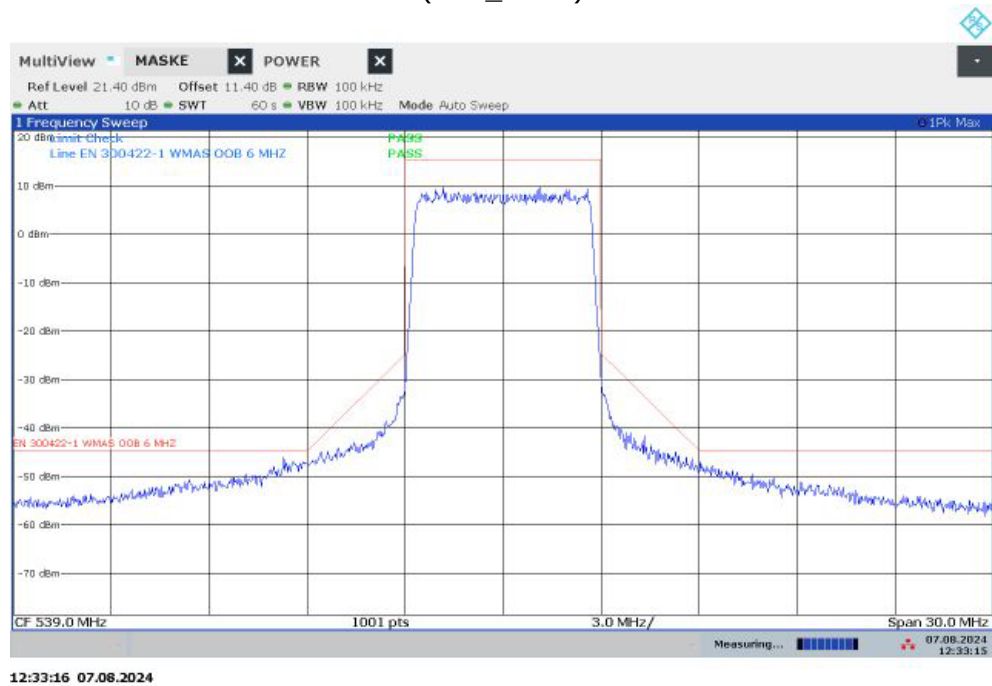
- The measurement was performed conducted.

## 6.5.3 MEASUREMENT PLOTS:

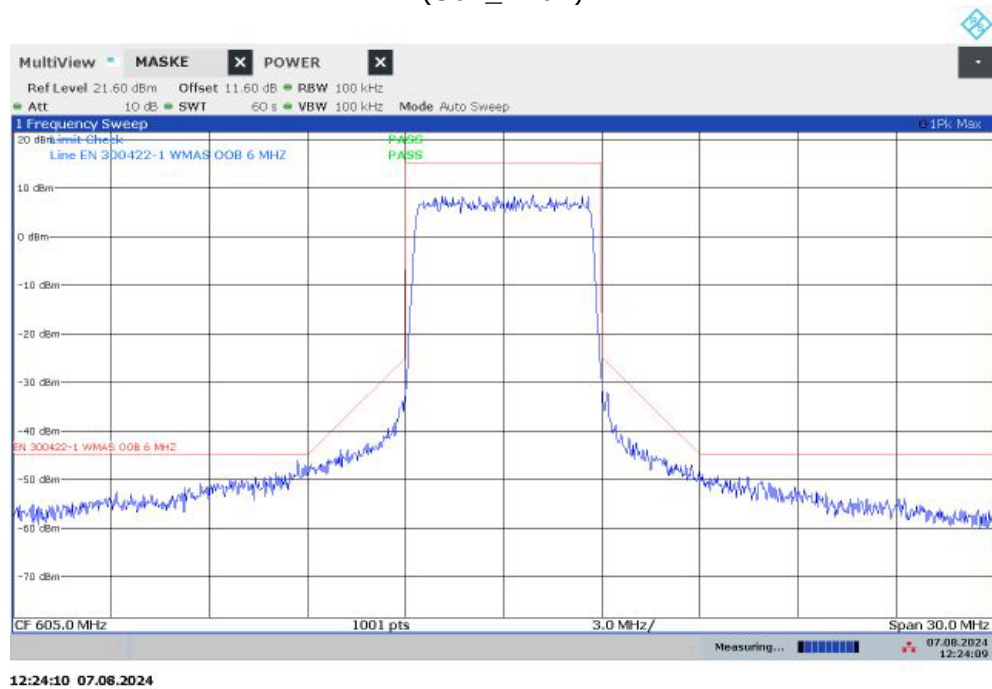
Measurement method = conducted, Temperature = Normal, Operating Frequency = Low,  
 Radio Technology = WMA5  
 (S02\_AA01)



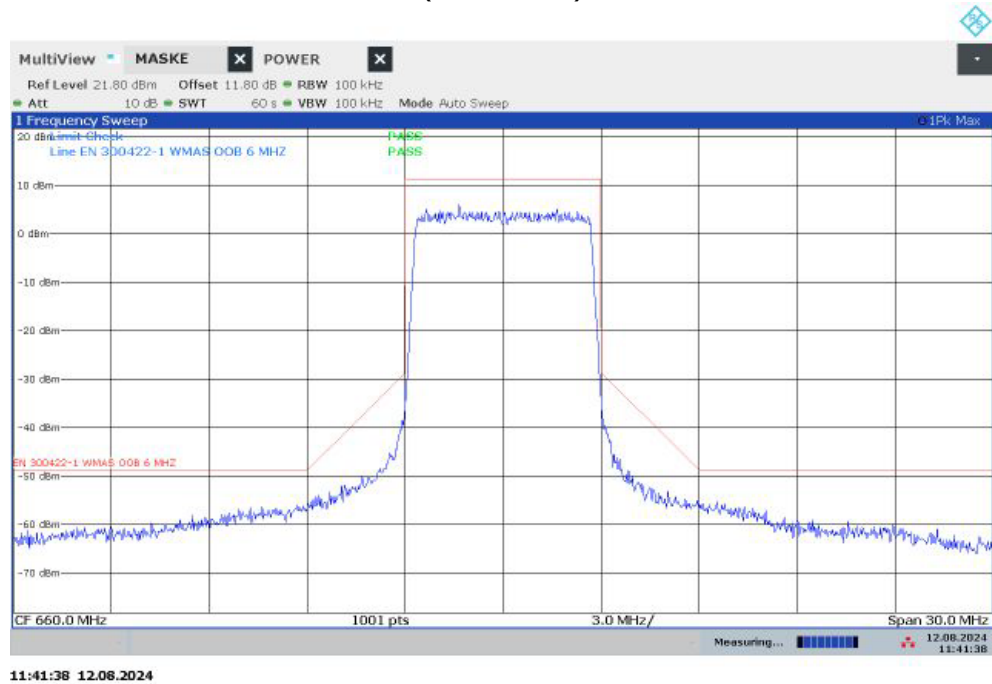
Measurement method = conducted, Temperature = Normal, Operating Frequency = Mid,  
Radio Technology = WMAS  
(S02\_AA01)



Measurement method = conducted, Temperature = Normal, Operating Frequency = High,  
Radio Technology = WMAS  
(S02\_AA01)



Measurement method = conducted, Temperature = Normal,  
Operating Frequency = Mid (Duplex Gap), Radio Technology = WMAS  
(S02\_AA01)



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      | SMB100A                     | Signal Generator 9 kHz - 6 GHz        | Rohde & Schwarz                   | 107695         | 2024-07          | 2027-07         |
| 1.2      | EX520                       | Digital Multimeter 12                 | Extech Instruments Corp           | 05157876       | 2022-06          | 2024-06         |
| 1.3      | Temperature Chamber VT 4002 | Temperature Chamber Vötsch 03         | Vötsch                            | 58566002150010 | 2022-05          | 2024-05         |
| 1.4      | FSW43                       | Signal Analyser                       | Rohde & Schwarz GmbH & Co. KG     | 102013         | 2023-07          | 2025-07         |
| 1.5      | FSW26                       | Signal Analyser                       | Rohde & Schwarz GmbH & Co. KG     | 104459         | 2023-05          | 2025-07         |
| 1.6      | Opus10 THI                  | T/H Logger 03                         | Lufft Mess- und Regeltechnik GmbH | 7482           | 2023-12          | 2025-12         |
| 1.7      | SMBV100A                    | Vector Signal Generator 9 kHz - 6 GHz | Rohde & Schwarz                   | 260001         | 2023-08          | 2026-08         |
| 1.8      | UPL 16                      | Audio Analyser                        | Rohde & Schwarz                   | 830695/001     | 2022-01          | 2025-01         |
| 1.9      | 10 dB coupler               | A2023-10                              | Atlantic Microwave                | -              | -                | -               |
| 1.10     | 10 dB coupler               | A2023-10                              | Atlantic Microwave                | -              | -                | -               |

#### 1 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 |
|---------|-------------------------|----------------------------------------------------------|-------------------------------------|-------------------------|------------------|-----------------|
| 1.1     | Opus10 TPR (8253.00)    | T/P Logger 13                                            | Lufft Mess- und Regeltechnik GmbH   | 13936                   | 2023-12          | 2025-12         |
| 1.2     | Innco Systems CO3000    | Controller for bore sight mast FAC                       | innco systems GmbH                  | CO3000/1460/54 740522/P | N/A              | N/A             |
| 1.3     | AMF-7D00101800-30-10P-R | Broadband Amplifier 100 MHz - 18 GHz                     | Miteq                               |                         | N/A              | N/A             |
| 1.4     | 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             |
| 1.5     | Fluke 177               | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383                | 2023-08          | 2025-08         |
| 1.6     | JS4-18002600-32-5P      | Broadband Amplifier 18 GHz - 26 GHz                      | Miteq                               | 849785                  | N/A              | N/A             |
| 1.7     | FSW43                   | Spectrum Analyzer                                        | Rohde & Schwarz GmbH & Co. KG       | 103779                  | 2023-04          | 2025-04         |
| 1.8     | EP 1200/B, NA/B1        | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278                   | N/A              | N/A             |

| Ref.No. | Device Name               | Description                                     | Manufacturer                      | Serial Number          | Last Calibration | Calibration Due |
|---------|---------------------------|-------------------------------------------------|-----------------------------------|------------------------|------------------|-----------------|
| 1.9     | 3160-09                   | Standard Gain / Pyramidal Horn Antenna 26.5 GHz | EMCO Electronic GmbH              | 00083069               | N/A              | N/A             |
| 1.10    | WHKX 7.0/18G-8SS          | High Pass Filter                                | Wainwright Instruments GmbH       | 09                     | N/A              | N/A             |
| 1.11    | MA3000/0800-XP-ET-compact | Bore Sight Antenna Mast                         | innco systems GmbH                | 9210522                | N/A              | N/A             |
| 1.12    | TT 1.5 WI                 | Turn Table                                      | Maturo GmbH                       | -                      | N/A              | N/A             |
| 1.13    | 5HC3500/18000-1.2-KK      | High Pass Filter                                | Trilithic                         | 200035008              | N/A              | N/A             |
| 1.14    | Opus 20 THI (8120.00)     | ThermoHygro Datalogger                          | Lufft Mess- und Regeltechnik GmbH | 115.0318.0802.033      | 2023-08          | 2025-08         |
| 1.15    | TD1.5-10kg                | EUT Tilt Device (Rohacell)                      | Maturo GmbH                       | TD1.5-10kg/024/3790709 | N/A              | N/A             |
| 1.16    | AFS42-00101800-25-S-42    | Broadband Amplifier 25 MHz - 18 GHz             | Miteq                             | 2035324                | N/A              | N/A             |
| 1.17    | HF 907                    | Double-ridged horn                              | Rohde & Schwarz                   | 102444                 | 2021-09          | 2024-09         |

## 2 Radiated Emissions SAC H-Field

Radiated emission tests in the H-Field in a semi anechoic room

| Ref.No. | Device Name          | Description                                              | Manufacturer                        | Serial Number | Last Calibration | Calibration Due |
|---------|----------------------|----------------------------------------------------------|-------------------------------------|---------------|------------------|-----------------|
| 2.1     | N5000/NP             | Filter for EUT, 2 Lines, 250 V, 16 A                     | ETS-LINDGREN                        | 241515        | N/A              | N/A             |
| 2.2     | Opus10 TPR (8253.00) | T/P Logger 13                                            | Lufft Mess- und Regeltechnik GmbH   | 13936         | 2023-12          | 2025-12         |
| 2.3     | ESW44                | EMI Receiver / Spectrum Analyzer                         | Rohde & Schwarz GmbH & Co. KG       | 101603        | 2024-03          | 2026-03         |
| 2.4     | 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             |
| 2.5     | Fluke 177            | Digital Multimeter 03 (Multimeter)                       | Fluke Europe B.V.                   | 86670383      | 2023-08          | 2025-08         |
| 2.6     | Opus10 THI (8152.00) | T/H Logger 10                                            | Lufft Mess- und Regeltechnik GmbH   | 12488         | 2023-12          | 2025-12         |
| 2.7     | EP 1200/B, NA/B1     | AC Source, Amplifier with integrated variable Oscillator | Spitzenberger & Spies GmbH & Co. KG | B6278         | N/A              | N/A             |
| 2.8     | DS 420S              | Turn Table 2 m diameter                                  | HD GmbH                             | 420/573/99    | N/A              | N/A             |
| 2.9     | HFH2-Z2              | Loop Antenna + 3 Axis Tripod                             | Rohde & Schwarz GmbH & Co. KG       | 829324/006    |                  |                 |
| 2.10    | CS-RUB6              | Rubidium Frequency Standard                              | Rohde & Schwarz GmbH & Co. KG       | 100321        | 2023-10          | 2024-10         |

## 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                                                      | Lufth Mess- und Regeltechnik GmbH   | 13936               | 2023-12          | 2025-12         |
| 3.3     | ESW44                | EMI Receiver / Spectrum Analyzer                                   | Rohde & Schwarz GmbH & Co. KG       | 101603              | 2024-03          | 2026-03         |
| 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 ULTRALOG      | Biconical-log-per antenna (30 MHz - 3 GHz) with HL 562E biconicals | Rohde & Schwarz GmbH & Co. KG       | 830547/003          | 2021-09          | 2024-09         |
| 3.6     | Fluke 177            | Digital Multimeter 03 (Multimeter)                                 | Fluke Europe B.V.                   | 86670383            | 2023-08          | 2025-08         |
| 3.7     | Opus10 THI (8152.00) | T/H Logger 10                                                      | Lufth Mess- und Regeltechnik GmbH   | 12488               | 2023-12          | 2025-12         |
| 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       | 100321              | 2023-10          | 2024-10         |
| 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

|                                |                                                  |
|--------------------------------|--------------------------------------------------|
| <b>Semi-Anechoic Chamber:</b>  |                                                  |
| 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              | 1.24                                             |
| MATURO Mast                    | 12.19                                            |
| MATURO Turn-Table              | 30.10                                            |
| <b>Fully-Anechoic Chamber:</b> |                                                  |
| 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                                            |
| <b>TS 8997</b>                 |                                                  |
| WMS32 Measurement Software     | 11.60.00 (till 2024-03-19), 11.70.00 + Hotfix 01 |
| <b>Conducted AC Emissions:</b> |                                                  |
| Software                       | Version                                          |
| EMC32 Measurement Software     | 10.60.20                                         |

## 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<br>insertion<br>loss<br>ESH3-<br>Z5 | cable<br>loss<br>(incl. 10<br>dB<br>atten-<br>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

$$U_{\text{LISN}} (\text{dB } \mu\text{V}) = U (\text{dB } \mu\text{V}) + \text{Corr. (dB)}$$

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<br>HFH-Z2) | Corr. | cable<br>loss 1<br>(inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-40 dB/<br>decade) | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit) | d <sub>used</sub><br>(meas.<br>distance<br>(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

$$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

distance correction =  $-40 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

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)

( $d_{\text{Limit}} = 3 \text{ m}$ )

| Frequency<br>MHz | AF<br>R&S<br>HL562<br>dB (1/m) | Corr.<br>dB |
|------------------|--------------------------------|-------------|
| 30               | 18.6                           | 0.6         |
| 50               | 6.0                            | 0.9         |
| 100              | 9.7                            | 1.2         |
| 150              | 7.9                            | 1.6         |
| 200              | 7.6                            | 1.9         |
| 250              | 9.5                            | 2.1         |
| 300              | 11.0                           | 2.3         |
| 350              | 12.4                           | 2.6         |
| 400              | 13.6                           | 2.9         |
| 450              | 14.7                           | 3.1         |
| 500              | 15.6                           | 3.2         |
| 550              | 16.3                           | 3.5         |
| 600              | 17.2                           | 3.5         |
| 650              | 18.1                           | 3.6         |
| 700              | 18.5                           | 3.6         |
| 750              | 19.1                           | 4.1         |
| 800              | 19.6                           | 4.1         |
| 850              | 20.1                           | 4.4         |
| 900              | 20.8                           | 4.7         |
| 950              | 21.1                           | 4.8         |
| 1000             | 21.6                           | 4.9         |

| cable<br>loss 1<br>(inside<br>chamber)<br>dB | cable<br>loss 2<br>(outside<br>chamber)<br>dB | cable<br>loss 3<br>(switch<br>unit)<br>dB | cable<br>loss 4<br>(to<br>receiver)<br>dB | distance<br>corr.<br>(-20 dB/<br>decade)<br>dB | $d_{\text{Limit}}$<br>(meas.<br>distance<br>(limit))<br>m | $d_{\text{used}}$<br>(meas.<br>distance<br>(used))<br>m |
|----------------------------------------------|-----------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------|
| 0.29                                         | 0.04                                          | 0.23                                      | 0.02                                      | 0.0                                            | 3                                                         | 3                                                       |
| 0.39                                         | 0.09                                          | 0.32                                      | 0.08                                      | 0.0                                            | 3                                                         | 3                                                       |
| 0.56                                         | 0.14                                          | 0.47                                      | 0.08                                      | 0.0                                            | 3                                                         | 3                                                       |
| 0.73                                         | 0.20                                          | 0.59                                      | 0.12                                      | 0.0                                            | 3                                                         | 3                                                       |
| 0.84                                         | 0.21                                          | 0.70                                      | 0.11                                      | 0.0                                            | 3                                                         | 3                                                       |
| 0.98                                         | 0.24                                          | 0.80                                      | 0.13                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.04                                         | 0.26                                          | 0.89                                      | 0.15                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.18                                         | 0.31                                          | 0.96                                      | 0.13                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.28                                         | 0.35                                          | 1.03                                      | 0.19                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.39                                         | 0.38                                          | 1.11                                      | 0.22                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.44                                         | 0.39                                          | 1.20                                      | 0.19                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.55                                         | 0.46                                          | 1.24                                      | 0.23                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.59                                         | 0.43                                          | 1.29                                      | 0.23                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.67                                         | 0.34                                          | 1.35                                      | 0.22                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.67                                         | 0.42                                          | 1.41                                      | 0.15                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.87                                         | 0.54                                          | 1.46                                      | 0.25                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.90                                         | 0.46                                          | 1.51                                      | 0.25                                      | 0.0                                            | 3                                                         | 3                                                       |
| 1.99                                         | 0.60                                          | 1.56                                      | 0.27                                      | 0.0                                            | 3                                                         | 3                                                       |
| 2.14                                         | 0.60                                          | 1.63                                      | 0.29                                      | 0.0                                            | 3                                                         | 3                                                       |
| 2.22                                         | 0.60                                          | 1.66                                      | 0.33                                      | 0.0                                            | 3                                                         | 3                                                       |
| 2.23                                         | 0.61                                          | 1.71                                      | 0.30                                      | 0.0                                            | 3                                                         | 3                                                       |

( $d_{\text{Limit}} = 10 \text{ m}$ )

|      |      |      |
|------|------|------|
| 30   | 18.6 | -9.9 |
| 50   | 6.0  | -9.6 |
| 100  | 9.7  | -9.2 |
| 150  | 7.9  | -8.8 |
| 200  | 7.6  | -8.6 |
| 250  | 9.5  | -8.3 |
| 300  | 11.0 | -8.1 |
| 350  | 12.4 | -7.9 |
| 400  | 13.6 | -7.6 |
| 450  | 14.7 | -7.4 |
| 500  | 15.6 | -7.2 |
| 550  | 16.3 | -7.0 |
| 600  | 17.2 | -6.9 |
| 650  | 18.1 | -6.9 |
| 700  | 18.5 | -6.8 |
| 750  | 19.1 | -6.3 |
| 800  | 19.6 | -6.3 |
| 850  | 20.1 | -6.0 |
| 900  | 20.8 | -5.8 |
| 950  | 21.1 | -5.6 |
| 1000 | 21.6 | -5.6 |

|      |      |      |      |       |    |   |
|------|------|------|------|-------|----|---|
| 0.29 | 0.04 | 0.23 | 0.02 | -10.5 | 10 | 3 |
| 0.39 | 0.09 | 0.32 | 0.08 | -10.5 | 10 | 3 |
| 0.56 | 0.14 | 0.47 | 0.08 | -10.5 | 10 | 3 |
| 0.73 | 0.20 | 0.59 | 0.12 | -10.5 | 10 | 3 |
| 0.84 | 0.21 | 0.70 | 0.11 | -10.5 | 10 | 3 |
| 0.98 | 0.24 | 0.80 | 0.13 | -10.5 | 10 | 3 |
| 1.04 | 0.26 | 0.89 | 0.15 | -10.5 | 10 | 3 |
| 1.18 | 0.31 | 0.96 | 0.13 | -10.5 | 10 | 3 |
| 1.28 | 0.35 | 1.03 | 0.19 | -10.5 | 10 | 3 |
| 1.39 | 0.38 | 1.11 | 0.22 | -10.5 | 10 | 3 |
| 1.44 | 0.39 | 1.20 | 0.19 | -10.5 | 10 | 3 |
| 1.55 | 0.46 | 1.24 | 0.23 | -10.5 | 10 | 3 |
| 1.59 | 0.43 | 1.29 | 0.23 | -10.5 | 10 | 3 |
| 1.67 | 0.34 | 1.35 | 0.22 | -10.5 | 10 | 3 |
| 1.67 | 0.42 | 1.41 | 0.15 | -10.5 | 10 | 3 |
| 1.87 | 0.54 | 1.46 | 0.25 | -10.5 | 10 | 3 |
| 1.90 | 0.46 | 1.51 | 0.25 | -10.5 | 10 | 3 |
| 1.99 | 0.60 | 1.56 | 0.27 | -10.5 | 10 | 3 |
| 2.14 | 0.60 | 1.63 | 0.29 | -10.5 | 10 | 3 |
| 2.22 | 0.60 | 1.66 | 0.33 | -10.5 | 10 | 3 |
| 2.23 | 0.61 | 1.71 | 0.30 | -10.5 | 10 | 3 |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

distance correction =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

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<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 1000      | 24.4               | -19.4 |
| 2000      | 28.5               | -17.4 |
| 3000      | 31.0               | -16.1 |
| 4000      | 33.1               | -14.7 |
| 5000      | 34.4               | -13.7 |
| 6000      | 34.7               | -12.7 |
| 7000      | 35.6               | -11.0 |

| cable<br>loss 1<br>(relay +<br>cable<br>inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable<br>loss 4 (to<br>receiver) |  |  |
|------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------|----------------------------------|--|--|
| dB                                                         | dB                                      | dB                                                                   | dB                               |  |  |
| 0.99                                                       | 0.31                                    | -21.51                                                               | 0.79                             |  |  |
| 1.44                                                       | 0.44                                    | -20.63                                                               | 1.38                             |  |  |
| 1.87                                                       | 0.53                                    | -19.85                                                               | 1.33                             |  |  |
| 2.41                                                       | 0.67                                    | -19.13                                                               | 1.31                             |  |  |
| 2.78                                                       | 0.86                                    | -18.71                                                               | 1.40                             |  |  |
| 2.74                                                       | 0.90                                    | -17.83                                                               | 1.47                             |  |  |
| 2.82                                                       | 0.86                                    | -16.19                                                               | 1.46                             |  |  |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 3000      | 31.0               | -23.4 |
| 4000      | 33.1               | -23.3 |
| 5000      | 34.4               | -21.7 |
| 6000      | 34.7               | -21.2 |
| 7000      | 35.6               | -19.8 |

| cable<br>loss 1<br>(relay<br>inside<br>chamber) | cable<br>loss 2<br>(inside<br>chamber) | cable<br>loss 3<br>(outside<br>chamber) | cable<br>loss 4<br>(switch<br>unit,<br>atten-<br>uator &<br>pre-amp) | cable<br>loss 5 (to<br>receiver) | used<br>for<br>FCC<br>15.247 |
|-------------------------------------------------|----------------------------------------|-----------------------------------------|----------------------------------------------------------------------|----------------------------------|------------------------------|
| dB                                              | dB                                     | dB                                      | dB                                                                   | dB                               |                              |
| 0.47                                            | 1.87                                   | 0.53                                    | -27.58                                                               | 1.33                             |                              |
| 0.56                                            | 2.41                                   | 0.67                                    | -28.23                                                               | 1.31                             |                              |
| 0.61                                            | 2.78                                   | 0.86                                    | -27.35                                                               | 1.40                             |                              |
| 0.58                                            | 2.74                                   | 0.90                                    | -26.89                                                               | 1.47                             |                              |
| 0.66                                            | 2.82                                   | 0.86                                    | -25.58                                                               | 1.46                             |                              |

| Frequency | AF<br>R&S<br>HF907 | Corr. |
|-----------|--------------------|-------|
| MHz       | dB (1/m)           | dB    |
| 7000      | 35.6               | -57.3 |
| 8000      | 36.3               | -56.3 |
| 9000      | 37.1               | -55.3 |
| 10000     | 37.5               | -56.2 |
| 11000     | 37.5               | -55.3 |
| 12000     | 37.6               | -53.7 |
| 13000     | 38.2               | -53.5 |
| 14000     | 39.9               | -56.3 |
| 15000     | 40.9               | -54.1 |
| 16000     | 41.3               | -54.1 |
| 17000     | 42.8               | -54.4 |
| 18000     | 44.2               | -54.7 |

| cable<br>loss 1<br>(relay<br>inside<br>chamber) | cable<br>loss 2<br>(High<br>Pass) | cable<br>loss 3<br>(pre-<br>amp) | cable<br>loss 4<br>(inside<br>chamber) | cable<br>loss 5<br>(outside<br>chamber) | cable<br>loss 6<br>(to<br>receiver) |
|-------------------------------------------------|-----------------------------------|----------------------------------|----------------------------------------|-----------------------------------------|-------------------------------------|
| dB                                              | dB                                | dB                               | dB                                     | dB                                      | dB                                  |
| 0.56                                            | 1.28                              | -62.72                           | 2.66                                   | 0.94                                    | 1.46                                |
| 0.69                                            | 0.71                              | -61.49                           | 2.84                                   | 1.00                                    | 1.53                                |
| 0.68                                            | 0.65                              | -60.80                           | 3.06                                   | 1.09                                    | 1.60                                |
| 0.70                                            | 0.54                              | -61.91                           | 3.28                                   | 1.20                                    | 1.67                                |
| 0.80                                            | 0.61                              | -61.40                           | 3.43                                   | 1.27                                    | 1.70                                |
| 0.84                                            | 0.42                              | -59.70                           | 3.53                                   | 1.26                                    | 1.73                                |
| 0.83                                            | 0.44                              | -59.81                           | 3.75                                   | 1.32                                    | 1.83                                |
| 0.91                                            | 0.53                              | -63.03                           | 3.91                                   | 1.40                                    | 1.77                                |
| 0.98                                            | 0.54                              | -61.05                           | 4.02                                   | 1.44                                    | 1.83                                |
| 1.23                                            | 0.49                              | -61.51                           | 4.17                                   | 1.51                                    | 1.85                                |
| 1.36                                            | 0.76                              | -62.36                           | 4.34                                   | 1.53                                    | 2.00                                |
| 1.70                                            | 0.53                              | -62.88                           | 4.41                                   | 1.55                                    | 1.91                                |

#### Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + \text{AF (dB 1/m)} + \text{Corr. (dB)}$

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<br>MHz | AF<br>EMCO<br>3160-09<br>dB (1/m) | Corr.<br>dB | cable<br>loss 1<br>(inside<br>chamber)<br>dB | cable<br>loss 2<br>(pre-<br>amp)<br>dB | cable<br>loss 3<br>(inside<br>chamber)<br>dB | cable<br>loss 4<br>(switch<br>unit)<br>dB | cable<br>loss 5<br>(to<br>receiver)<br>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

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

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<br>EMCO<br>3160-10 | Corr. | cable<br>loss 1<br>(inside<br>chamber) | cable<br>loss 2<br>(outside<br>chamber) | cable<br>loss 3<br>(switch<br>unit) | cable<br>loss 4<br>(to<br>receiver) | distance<br>corr.<br>(-20 dB/<br>decade) | d <sub>Limit</sub><br>(meas.<br>distance<br>(limit)) | d <sub>used</sub><br>(meas.<br>distance<br>(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

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

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 =  $-20 * \text{LOG} (d_{\text{Limit}} / d_{\text{used}})$

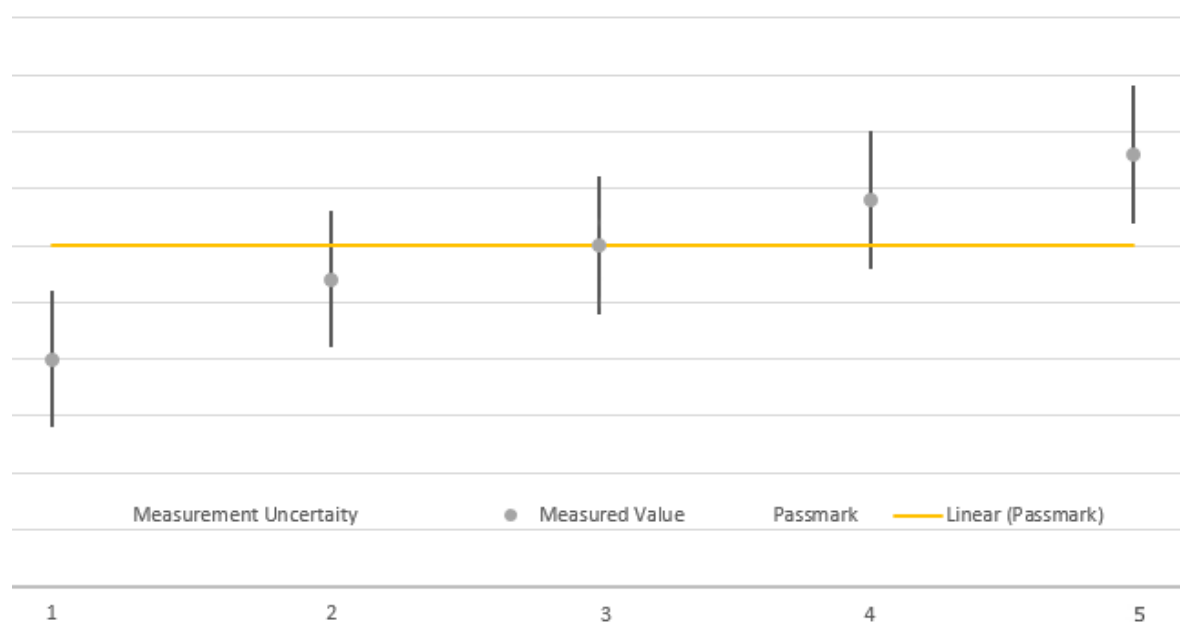
Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

## 9 MEASUREMENT UNCERTAINTIES

| Parameter                         | Uncertainty                        |
|-----------------------------------|------------------------------------|
| Occupied channel Bandwidth        | $\pm 5\%$                          |
| RF Output Power, conducted        | $\pm 1.5 \text{ dB}$               |
| Power Spectral Density, conducted | $\pm 3.0 \text{ dB}$               |
| Unwanted Emissions, conducted     | $\pm 3.0 \text{ dB}$               |
| Unwanted emissions, radiated      | $\pm 4.5 \text{ dB}$               |
| RF Output power, radiated         | $\pm 2.8 \text{ dB}$               |
| Temperature                       | $\pm 0.3 \text{ }^{\circ}\text{C}$ |
| Humidity                          | $\pm 3\%$                          |
| DC and low frequency voltages     | $\pm 1.5\% + 2 \text{ digits}$     |
| Time                              | $\pm 5\%$                          |
| Duty Cycle                        | $\pm 5\%$                          |

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 %.

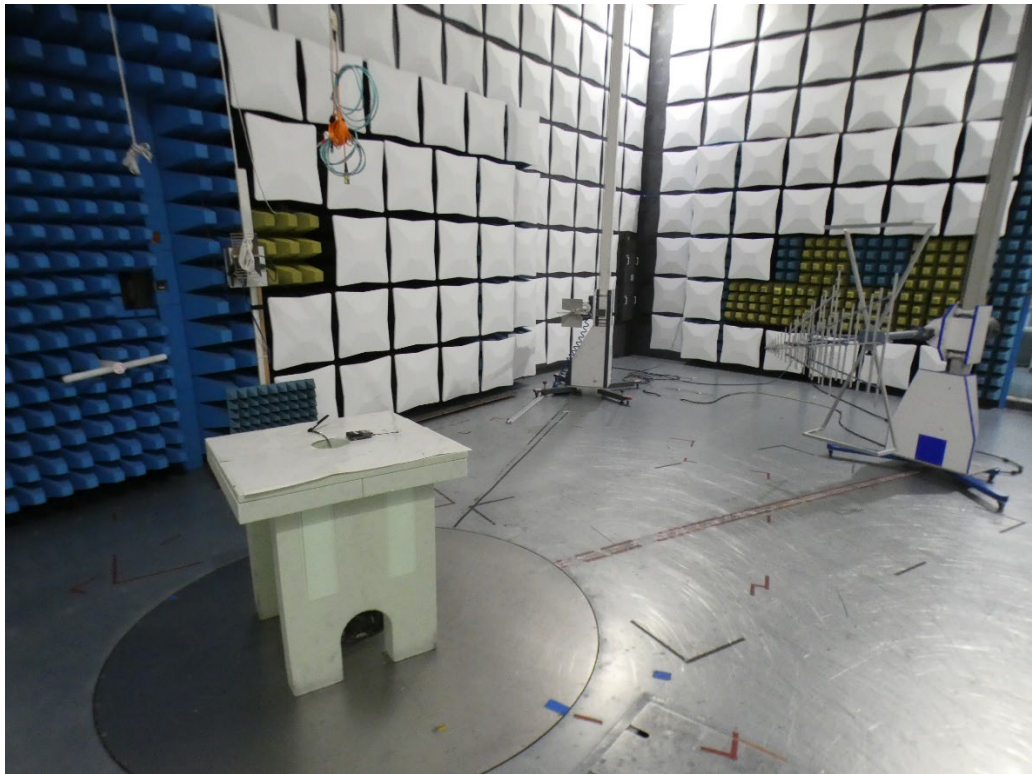


The verdicts in this test report are given according the above diagram:

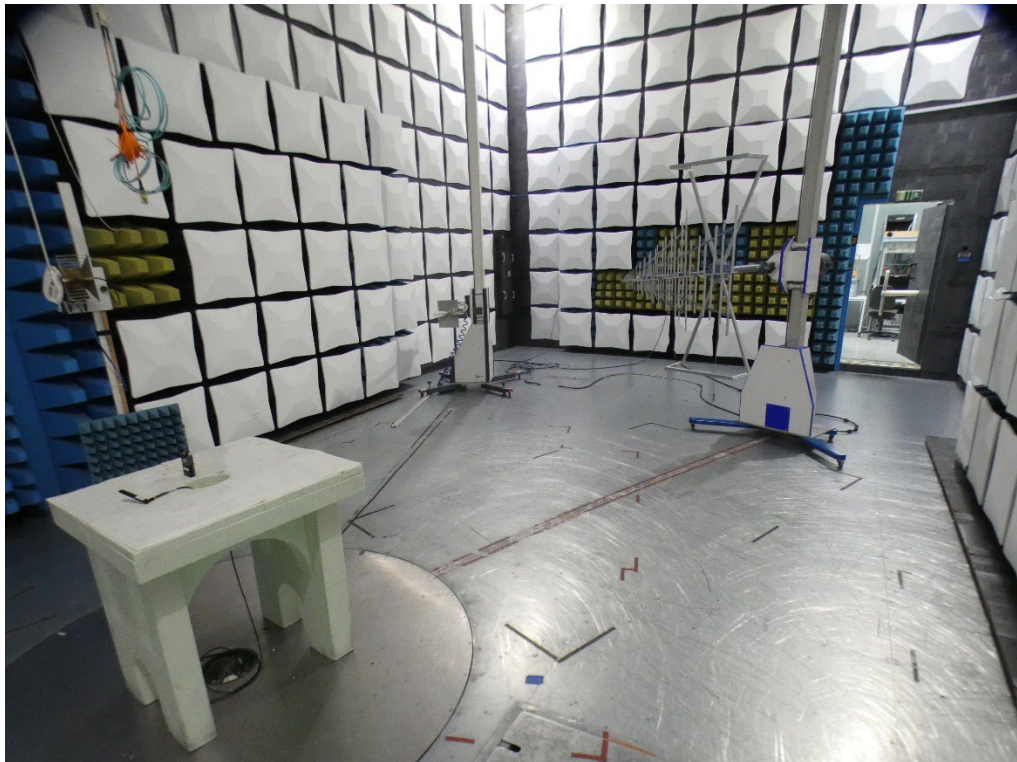
| Case | Measured Value  | Uncertainty Range | Verdict |
|------|-----------------|-------------------|---------|
| 1    | below pass mark | below pass mark   | Passed  |
| 2    | below pass mark | within pass mark  | Passed  |
| 3    | on pass mark    | within pass mark  | Passed  |
| 4    | above pass 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.

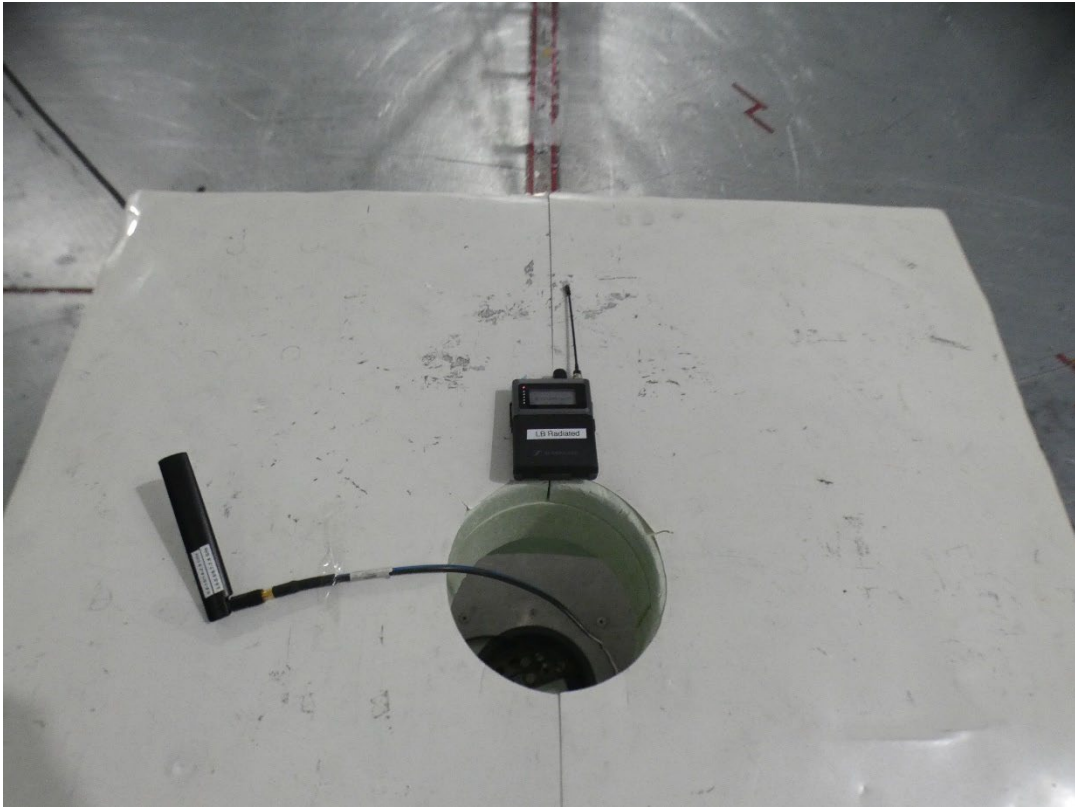
## 10 PHOTO REPORT



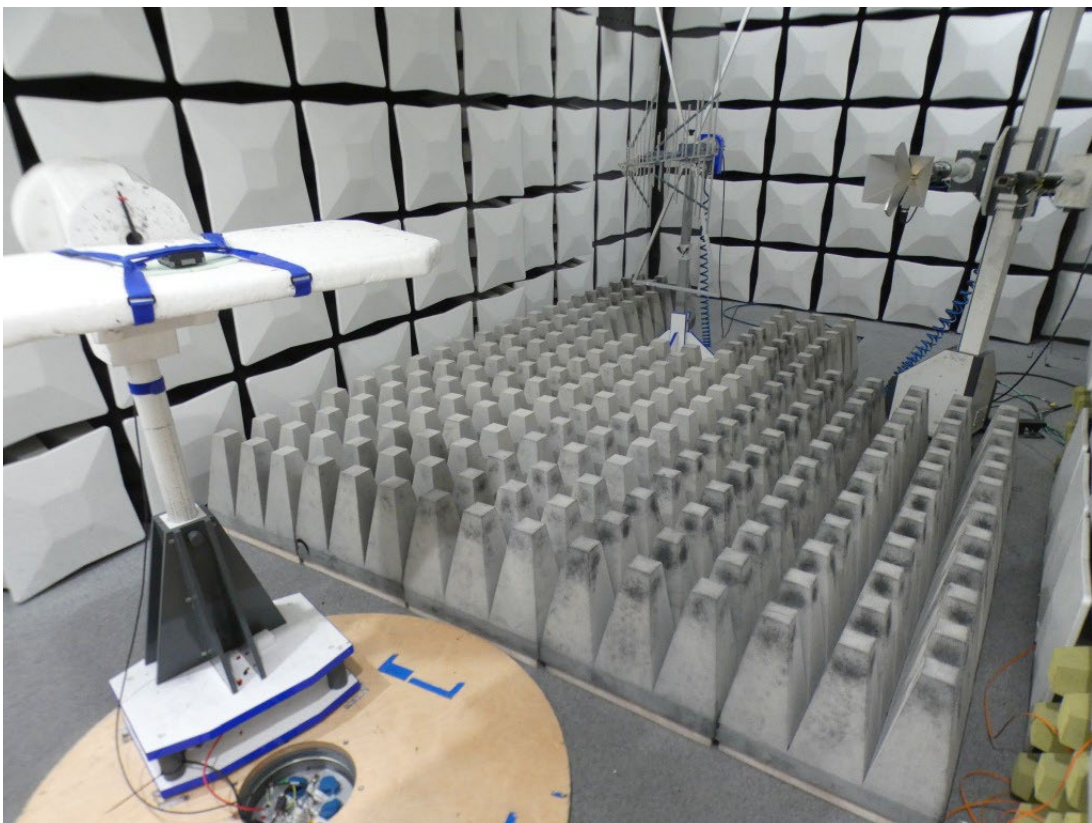
**Photo 1:** Setup Spurious Emissions Radiated (SAC), < 1 GHz, EUT horizontal



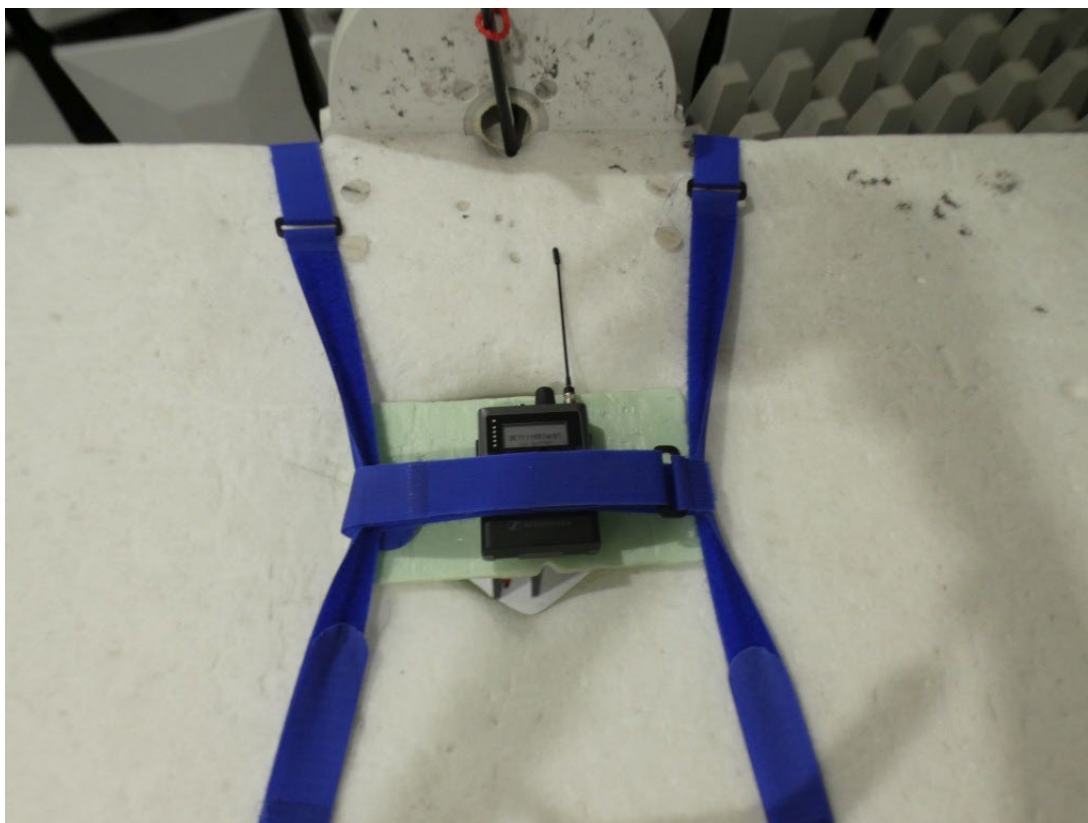
**Photo 2:** Setup Spurious Emissions Radiated (SAC), < 1 GHz, EUT vertical



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



**Photo 3:** Setup Spurious Emissions Radiated (FAC), > 1GHz



**Photo 4:** Setup Spurious Emissions Radiated (FAC), > 1GHz, detail view

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