

## Test Report

of the accredited Testing Laboratory  
0274 – TÜV AUSTRIA GMBH – Location Vienna - EMC Radio  
ISED Laboratory Company Number: 2932K, CAB identifier: AT0001

**Order Confirmation Number: 2024-AT-TC-EE-ET-EX-0-000005**  
About

the Radio - test listed below

**Applicant:** VusionGroup GmbH  
Kalsdorfer Strasse 12  
A – 8072 Fernitz-Mellach

**Test object:** Electronic shelf labelling system  
Product Marketing Name: E300 2.1  
Model: EDB2-0210-A  
FCC-ID: 2ACQM-EDB2-0210-A  
IC-ID: 12154A-EDB20210A

**Serial number:** Prototype

**Accredited regulation:** FCC: 47 CFR Part 15 (eCFR 22.07.2024)  
RSS-247 Issue 3, August 2023  
RSS-102 Issue 6, Dember 2023  
ANSI C63.10-2020

Andreas Malek



**Examined by / Testing Laboratory**  
**TÜV AUSTRIA GMBH**



Michael Emminger



**Approved by / Testing Laboratory**  
**TÜV AUSTRIA GMBH**

The results of this test report only refer to the provided equipment.

Issued on 28.03.2025 in Vienna / TIC

## Contents

|          | Designation                                             | PAGE    |
|----------|---------------------------------------------------------|---------|
| 1.       | Applicant                                               | 3       |
| 2.       | Description of EUT                                      | 4       |
| 3.       | Standards / Final result                                | 5       |
| 4.       | Test results                                            |         |
|          | List of measurements according to 47 CFR 15 and RSS-247 |         |
| 4.1      | Test object data                                        | 6       |
| 4.2      | Number of channels and channel spacing                  | 7       |
| 4.3      | 6 dB Bandwidth                                          | 8 – 10  |
| 4.4      | 99% dB Bandwidth                                        | 11 – 13 |
| 4.5      | Maximum Peak RF Power Output                            | 14      |
| 4.6      | Power Spectral Density                                  | 15 – 17 |
| 4.7      | Emissions in restricted bands                           | 18 – 28 |
| 4.8      | RF Exposure                                             | 29 – 33 |
| Appendix | Designation                                             | PAGES   |
| 1        | Test equipment used                                     | 5       |
| 2        | Photodocumentation                                      | 10      |

## 1. Applicant

**Company:** VusionGroup GmbH

**Department:** Product & Project Manager

**Address:** A – 8072 Fernitz-Mellach; Kalsdorfer Strasse 12

**Contact person:** Mrs. Tamara Risek Gmajnic

**EUT received on:** 05.11.2024

**Tests were performed on:** 05.11. to 17.12.2024 and on 28.03.2025

## 2. Description of EUT

**EUT:** Electronic shelf labelling system

**Product Name:** E300 2.1

**Model:** EDB2-0210-A

**Serial Number:** Prototype

**Manufacturer:** VusionGroup GmbH

**Description:** VusionGroup GmbH provided the following configuration for the measurements:

Prototype with special firmware for continuous transmission

**Operating mode:** The measurements were carried out at the following running states:  
test-firmware running, transmitting continuously

**Technical data EUT:** Rated voltage: 3VDC  
Rated frequency: DC  
Mains voltage during the tests: 3VDC

**Climatic conditions in the emc laboratory:** Relative humidity: 38%  
Temperature: 23°C

### 3. Standards / Final result

| Name                                                                                                    | Title                                                                                                                        | Deviation | Result |
|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------|--------|
| FCC: 47 CFR Part 15<br>(eCFR 05.11.2024)                                                                | RADIO FREQUENCY DEVICES                                                                                                      | none      | OK     |
| RSS-247 Issue 3,<br>August 2023                                                                         | Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices | none      | OK     |
| RSS-102 Issue 6,<br>December 2023                                                                       | Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)                               | none      | OK     |
| ANSI C63.10-2020                                                                                        | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices                               | none      | OK     |
| <p>Result: Opinions and interpretation of testing laboratory<br/>OK: EUT passed<br/>NOK: EUT failed</p> |                                                                                                                              |           |        |

## 4. TEST RESULTS

### 4.1. TEST OBJECT DATA

General EUT Description

2.1033 (c) Technical description

2.1033 (4) Type of emission: 1M04F1D – Channel spacing 2 MHz

2.1033 (5) Frequency range: 2402 to 2480 MHz (channel center frequencies).

2.1033 (6) Power range and Controls: The maximum peak output power is 5,13 mW and there is no power regulation.

2.1033 (7) Maximum output power rating: 5,13 mW eirp.

2.1033 (8) DC Voltage and Current: 3V DC

RSS-135 This standard does not apply to:

- 1.1.(a) a receiver that scans radio frequencies for the purpose of enabling its associated transmitter to avoid transmitting in an occupied frequency but which does not have the capability of decoding the message (e.g. converting it to audio voice) contained in the radio signal

Worst case Spurious Emissions: 36,62 dBµV/m Average @ 9608,8 MHz

Tests were performed November 5<sup>th</sup> to December 17<sup>th</sup> 2024 and on March 28<sup>th</sup> 2025.

All test equipment was calibrated at the time of testing.

#### 4.2. Number of channels and channel spacing

§ 2.1033

Conducted Measurement

Rated output power: 5,13 mW

There are 40 Channels used, starting at 2402 till 2480 MHz each separated by 2 MHz channel spacing.

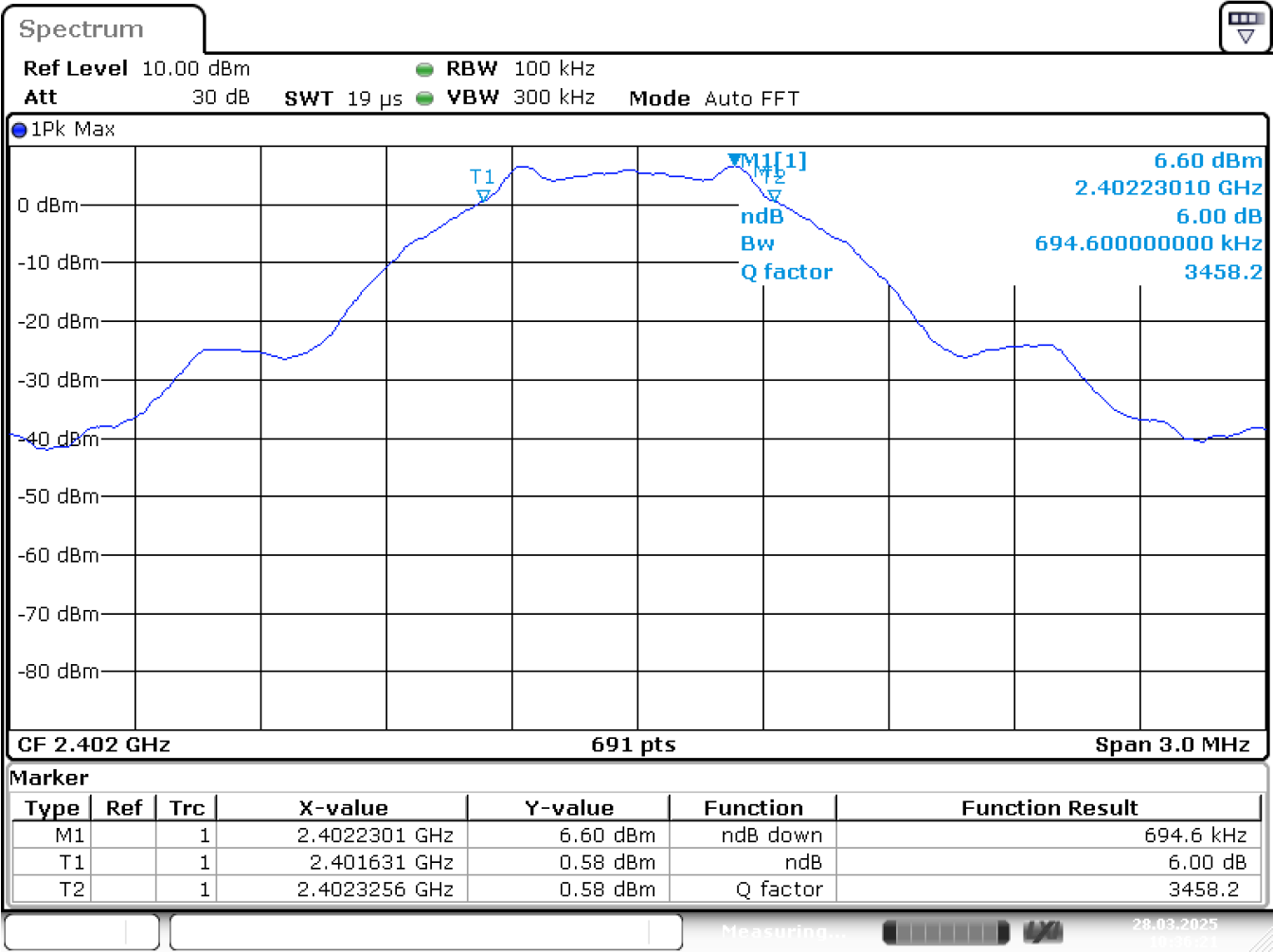
Test Equipment used: N/A

4.3. 6 dB Bandwidth

§ 15.247(a)(2)  
5.2.a)

Conducted Measurement

Rated output power: 5,13 mW Channel 0 (2402 MHz center frequency)



Date: 28.MAR.2025 10:36:22

6dB Bandwidth: 694,6 kHz

DTS Bandwidth measurement according to KDB 558074 and ANSI C63.10.

LIMIT SUBCLAUSE 15.247(e) – 5.2.a)

|                             |                                 |
|-----------------------------|---------------------------------|
| Under normal test conditons | 6 dB Bandwidth at least 500 kHz |
|-----------------------------|---------------------------------|

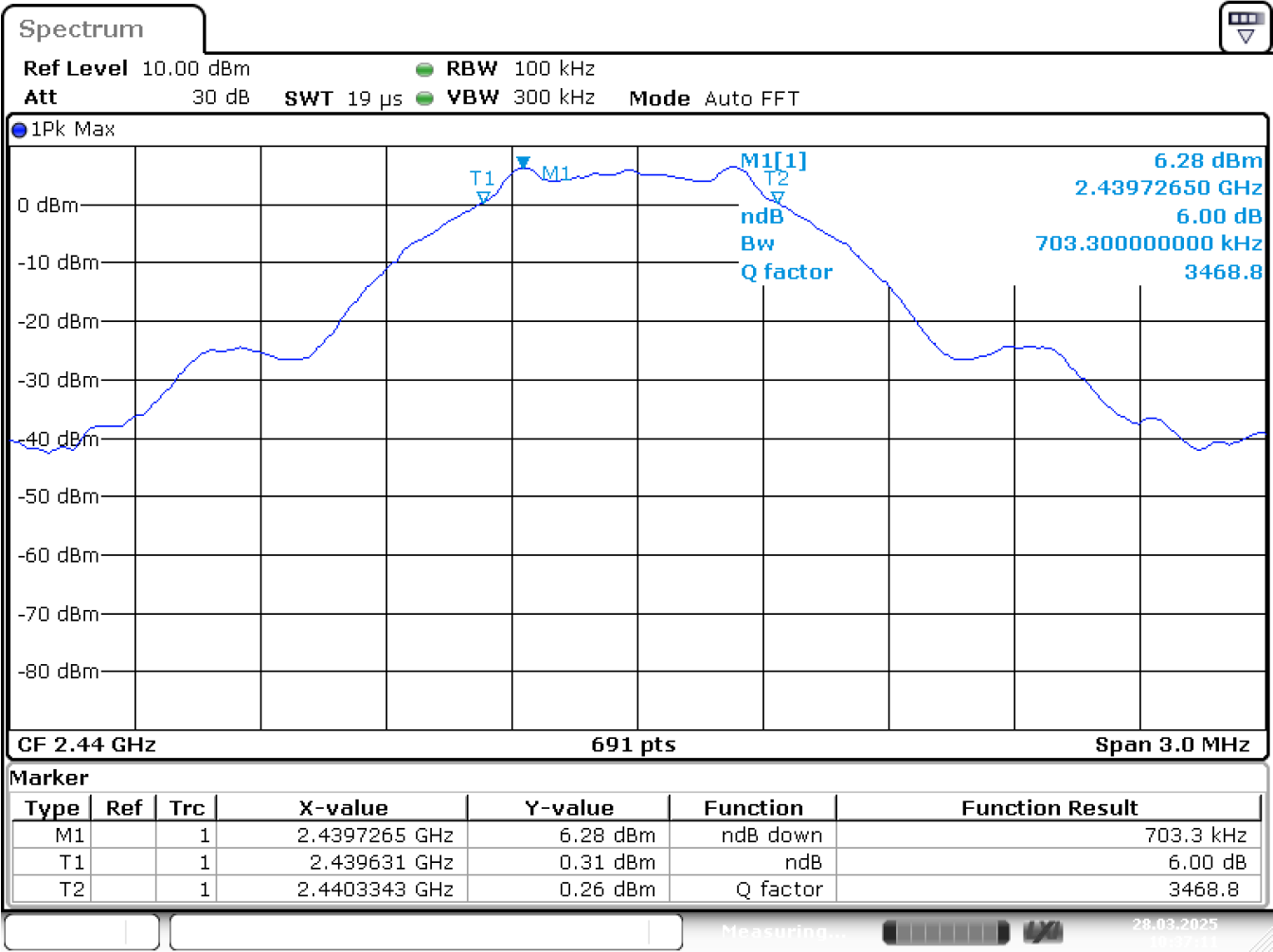
Test Equipment used: EMV-205;

6 dB Bandwidth

§ 15.247(a)(2)  
5.2.a)

Conducted Measurement

Rated output power: 5,13 mW Channel 19 (2440 MHz center frequency)



Date: 28.MAR.2025 10:37:11

6dB Bandwidth: 703,3 kHz

DTS Bandwidth measurement according to KDB 558074 and ANSI C63.10.

LIMIT SUBCLAUSE 15.247(e) – 5.2.a)

|                             |                                 |
|-----------------------------|---------------------------------|
| Under normal test conditons | 6 dB Bandwidth at least 500 kHz |
|-----------------------------|---------------------------------|

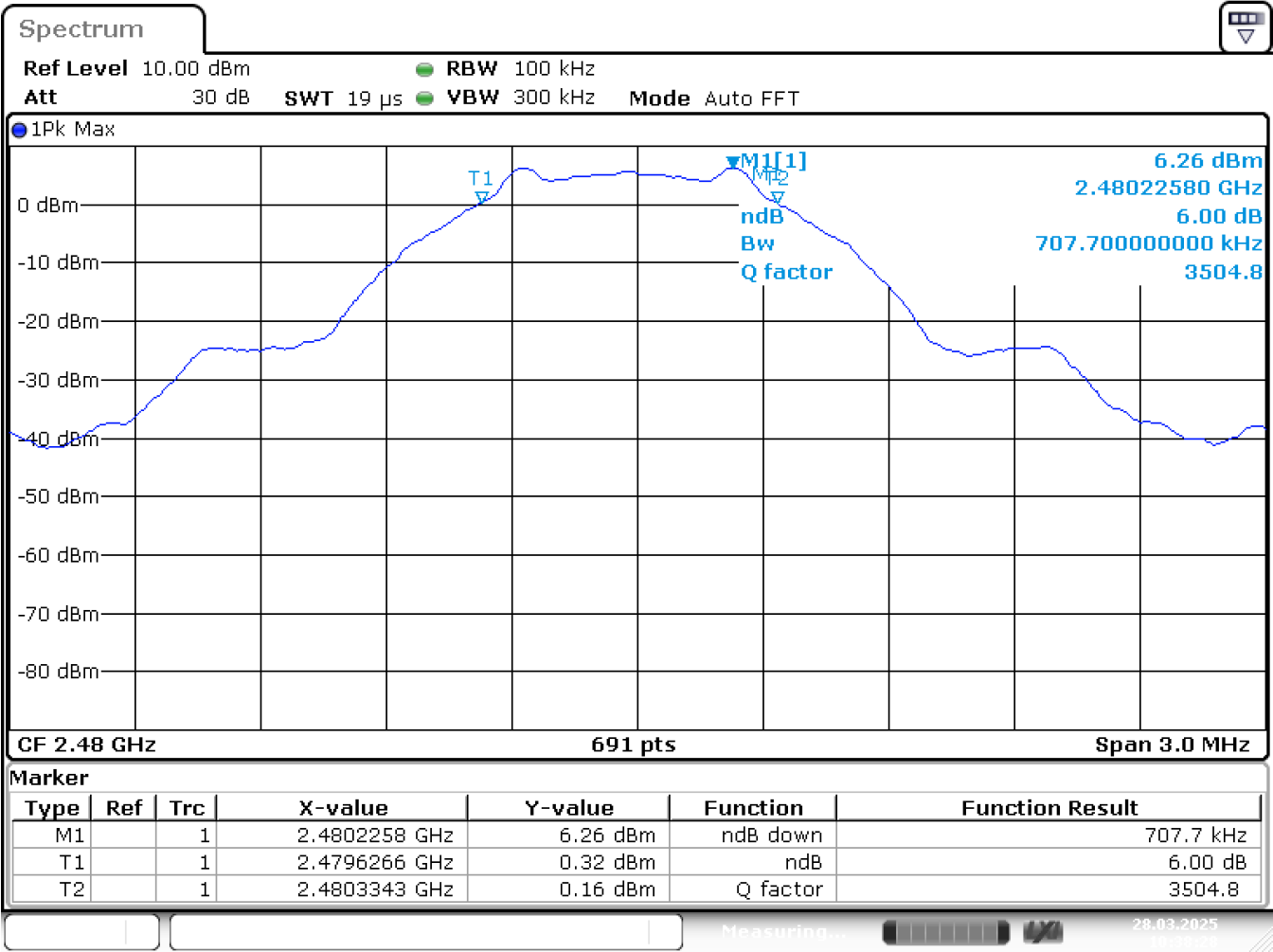
Test Equipment used: EMV-205;

6 dB Bandwidth

§ 15.247(a)(2)  
5.2.a)

Conducted Measurement

Rated output power: 5,13 mW Channel 39 (2480 MHz center frequency)



Date: 28.MAR.2025 10:38:28

6dB Bandwidth: 707,7 kHz

DTS Bandwidth measurement according to KDB 558074 and ANSI C63.10.

LIMIT SUBCLAUSE 15.247(e) – 5.2.a)

|                             |                                 |
|-----------------------------|---------------------------------|
| Under normal test conditons | 6 dB Bandwidth at least 500 kHz |
|-----------------------------|---------------------------------|

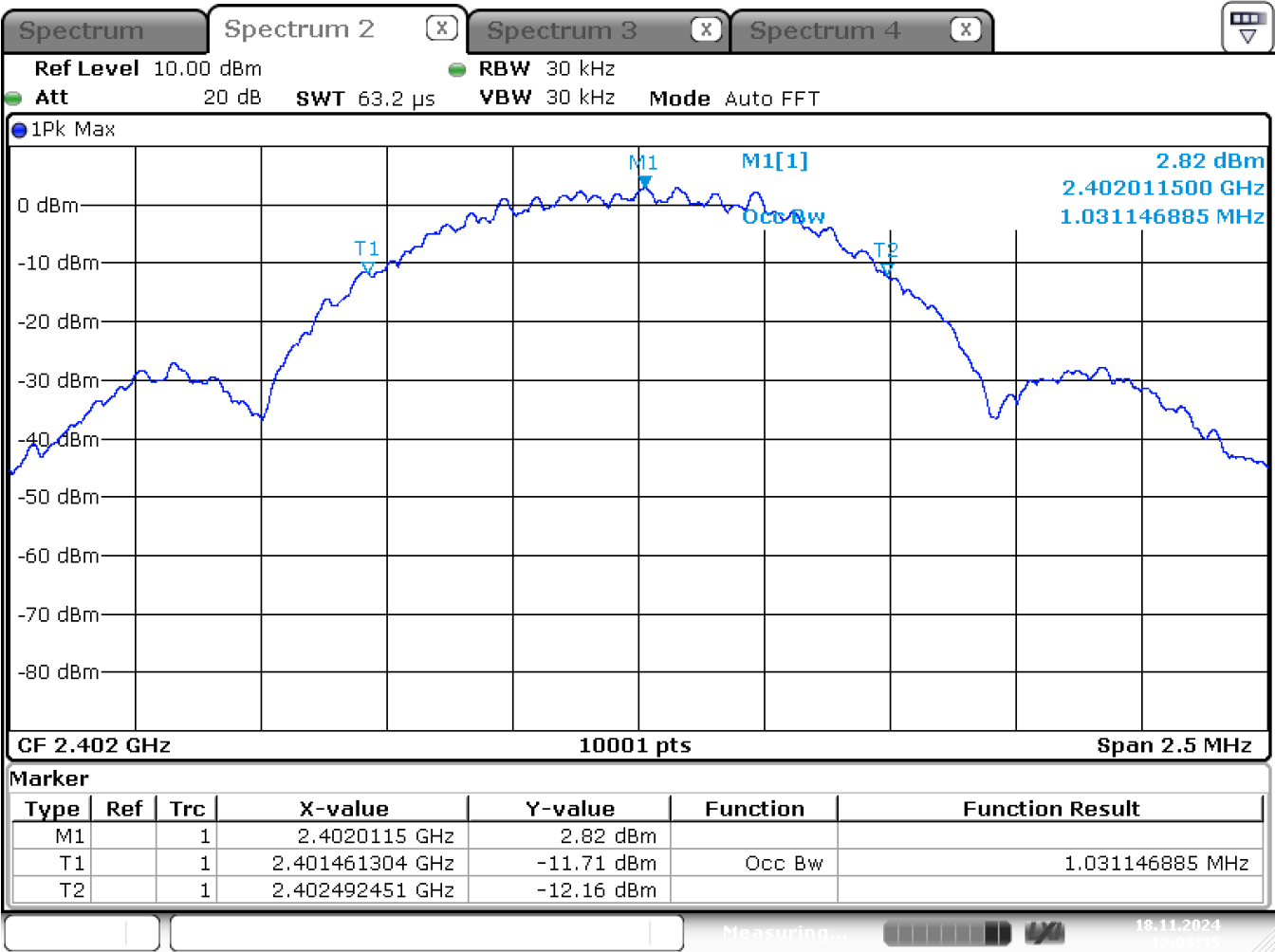
Test Equipment used: EMV-205;

4.4. 99% Bandwidth

RSS 247

Conducted Measurement

Rated output power: 5,13 mW Channel 0 (2402 MHz center frequency)



Date: 18.NOV.2024 12:09:35

99% Bandwidth: 1031,1 kHz

LIMIT RSS 247

None; for IC reporting purposes only

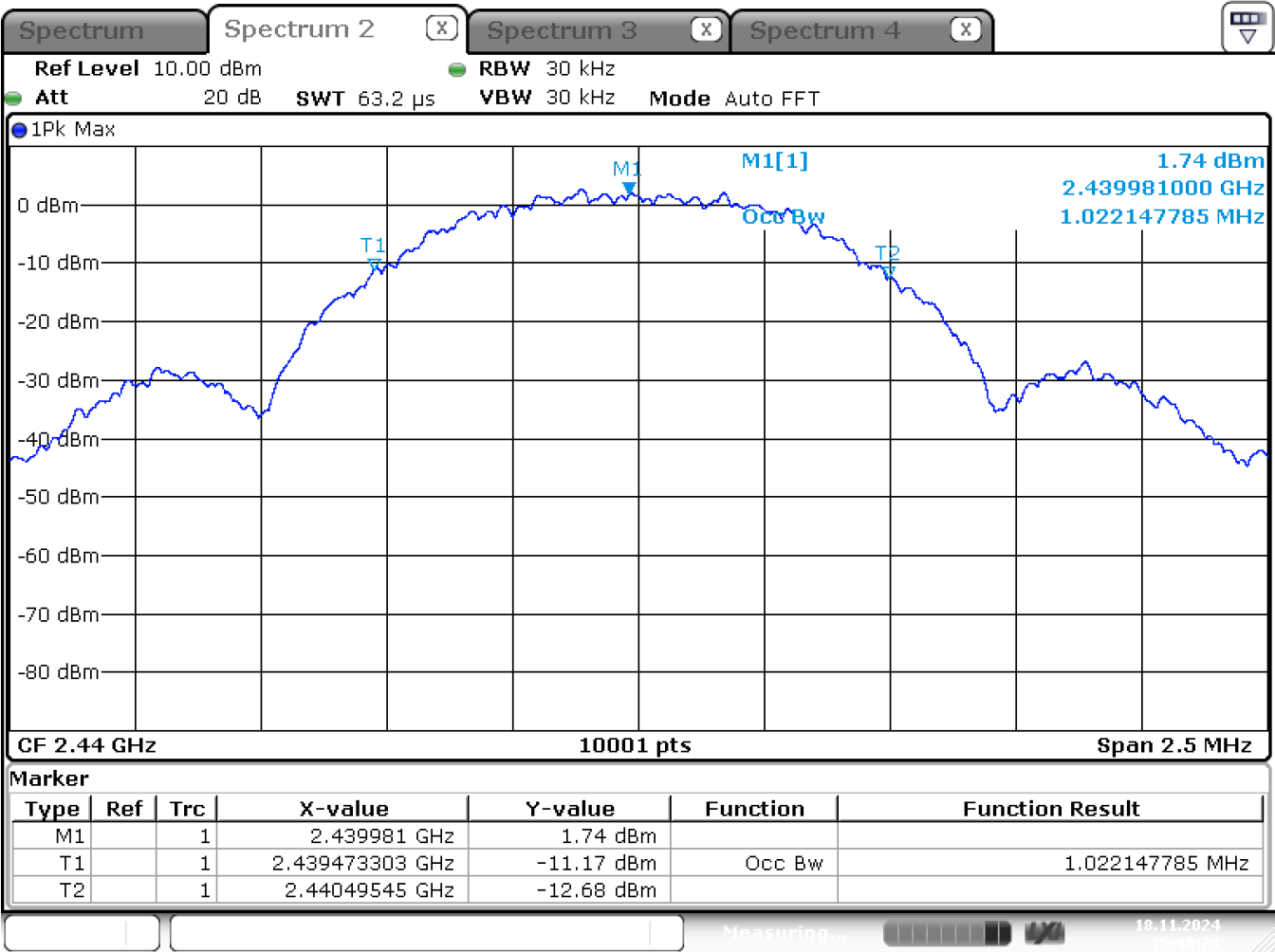
Test Equipment used: EMV-205;

99% Bandwidth

RSS 247

Conducted Measurement

Rated output power: 5,13 mW Channel 19 (2440 MHz center frequency)



Date: 18.NOV.2024 15:40:23

99% Bandwidth: 1022,1 kHz

LIMIT RSS 247

None; for IC reporting purposes only

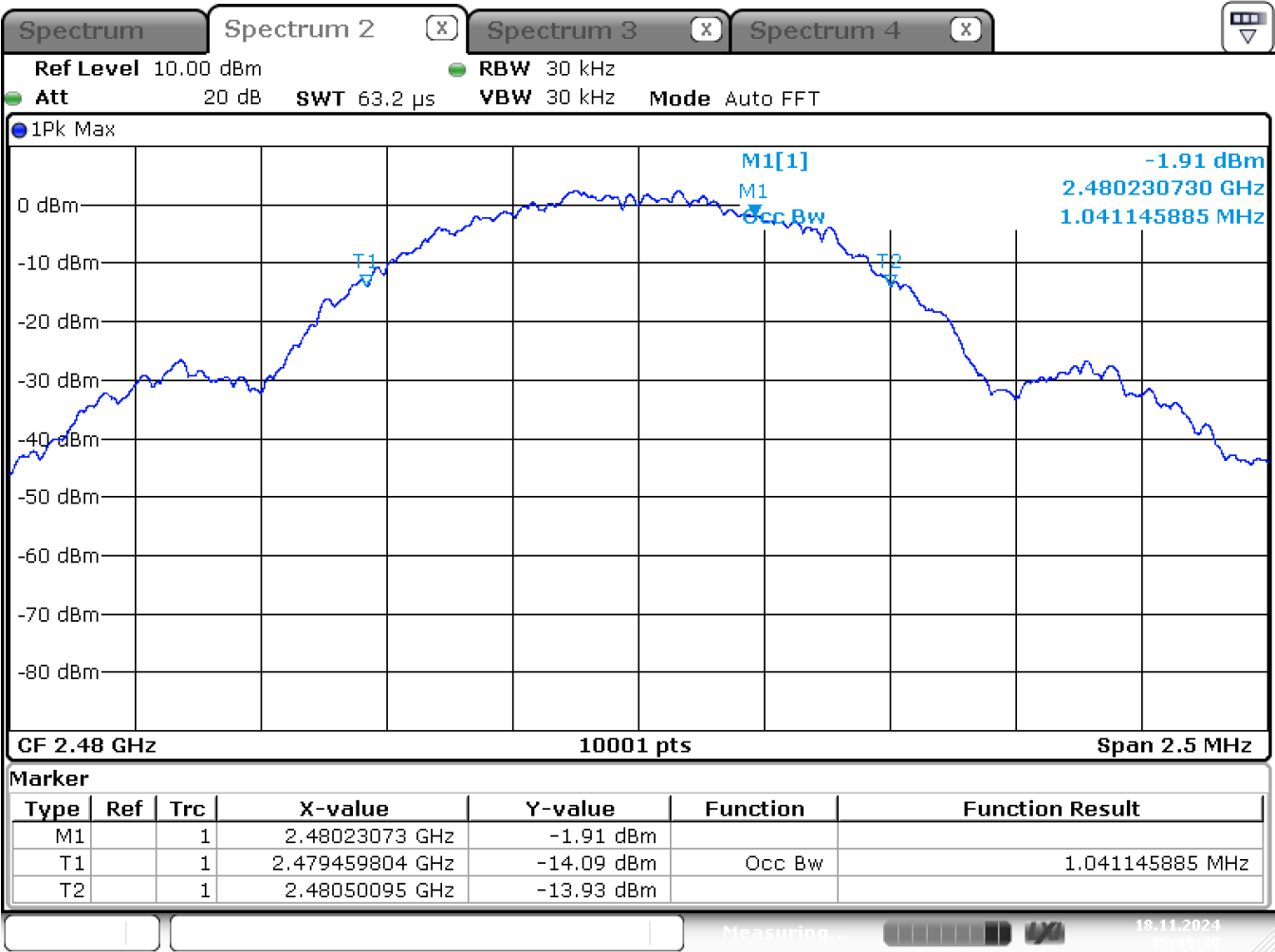
Test Equipment used: EMV-205;

99% Bandwidth

RSS 247

Conducted Measurement

Rated output power: 5,13 mW Channel 39 (2480 MHz center frequency)



Date: 18.NOV.2024 15:49:39

99% Bandwidth: 1041,1 kHz

**LIMIT**                      **RSS 247**

None; for IC reporting purposes only

Test Equipment used: EMV-205;

4.5. Maximum Peak RF Power Output

§ 15.247(b)(3)  
5.4.4

Measurement according to ANSI C63.10 11.9.1.2

Conducted Measurement

Rated output power: 5,13 mW

| Test conditions           |                          | Transmitter power (mW) |          |          |
|---------------------------|--------------------------|------------------------|----------|----------|
|                           |                          | 2402 MHz               | 2440 MHz | 2480 MHz |
| T <sub>nom</sub> ( 23 )°C | V <sub>nom</sub> ( 3 ) V | 4,60                   | 4,49     | 4,36     |
| Measurement uncertainty   |                          | ± 0,75 dB              |          |          |

Radiated Measurement

Rated output power: 5,13 mW

| Test conditions           |                          | Transmitter power (mW) EIRP |          |          |
|---------------------------|--------------------------|-----------------------------|----------|----------|
|                           |                          | 2402 MHz                    | 2440 MHz | 2480 MHz |
| T <sub>nom</sub> ( 23 )°C | V <sub>nom</sub> ( 3 ) V | 5,13                        | 4,27     | 3,09     |
| Measurement uncertainty   |                          | ± 2 dB                      |          |          |

| Maximum Gain derived from EIRP and conducted measurement: |                       | Maximum Gain (dBi) |          |          |
|-----------------------------------------------------------|-----------------------|--------------------|----------|----------|
| Test condition                                            |                       | 2402 MHz           | 2440 MHz | 2480 MHz |
| T <sub>nom</sub> 23 °C                                    | V <sub>nom</sub> (3)V | 0,47               | -0,22    | -1,49    |

LIMIT SUBCLAUSE 15.247(b)(3) – 5.4.4

|                             |                        |
|-----------------------------|------------------------|
| Under normal test conditons | 1W conducted (4W eirp) |
|-----------------------------|------------------------|

Test Equipment used: EMV-220; NT-100; NT-110/1; NT-111/1; NT-139; NT-207/1;

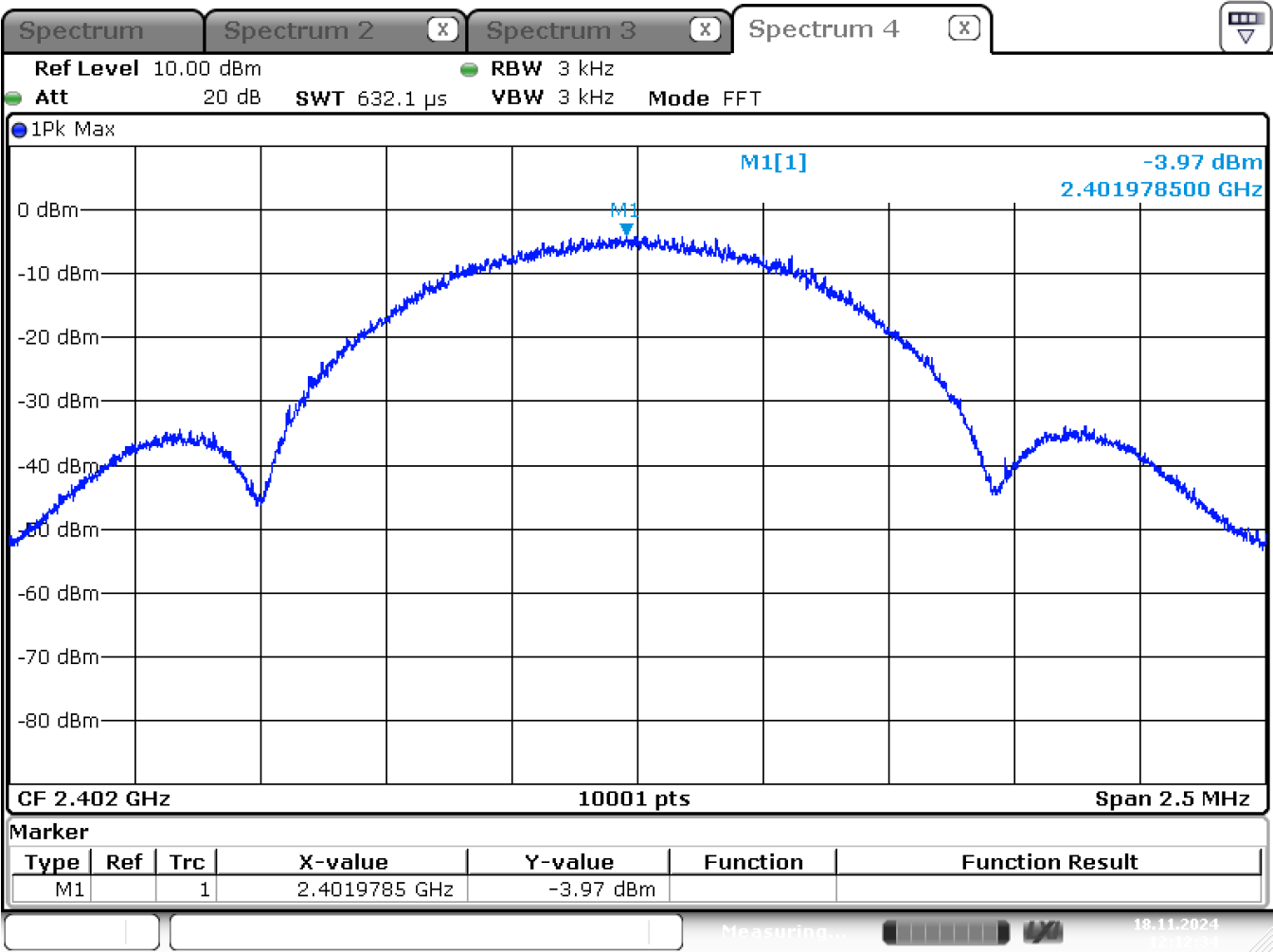
Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

4.6. Power spectral density

§ 15.247(e)  
5.2.2

Conducted Measurement

Rated output power: 5,13 mW Channel 0 (2402 MHz center frequency)



Date: 18.NOV.2024 12:12:34

Power Spectral density: -3.97 dBm @ 2401,98 MHz

**LIMIT SUBCLAUSE 15.247(e) – 5.2 b)**

|                             |                         |
|-----------------------------|-------------------------|
| Under normal test conditons | +8dBm in any 3 kHz band |
|-----------------------------|-------------------------|

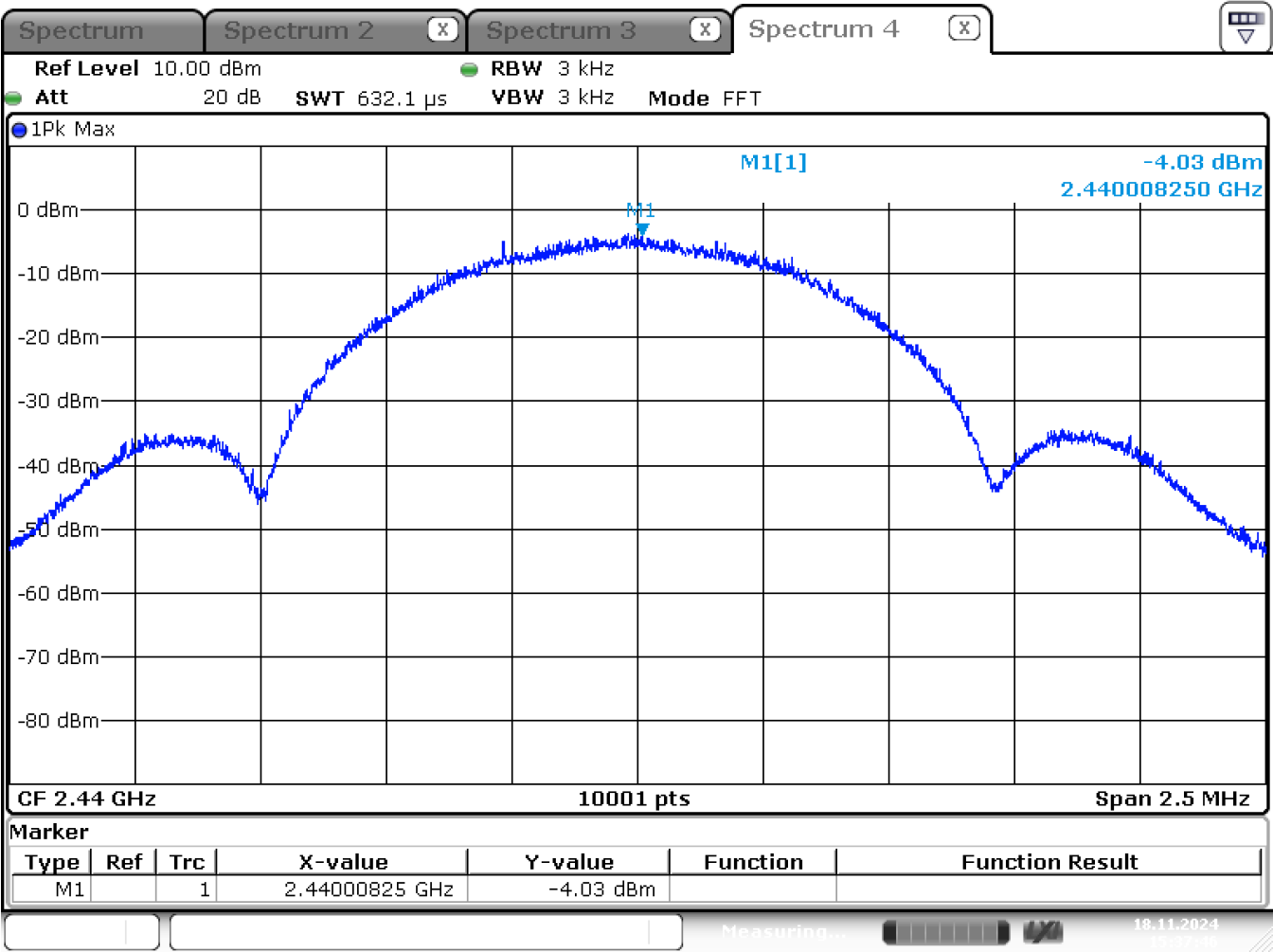
Test Equipment used: EMV-205;

Power spectral density

§ 15.247(e)  
5.2 b)

Conducted Measurement

Rated output power: 5,13 mW Channel 19 (2440 MHz center frequency)



Date: 18.NOV.2024 15:37:46

Power Spectral density: -4,03 dBm @ 2440,01 MHz

LIMIT SUBCLAUSE 15.247(e) – 5.2 b)

|                             |                         |
|-----------------------------|-------------------------|
| Under normal test conditons | +8dBm in any 3 kHz band |
|-----------------------------|-------------------------|

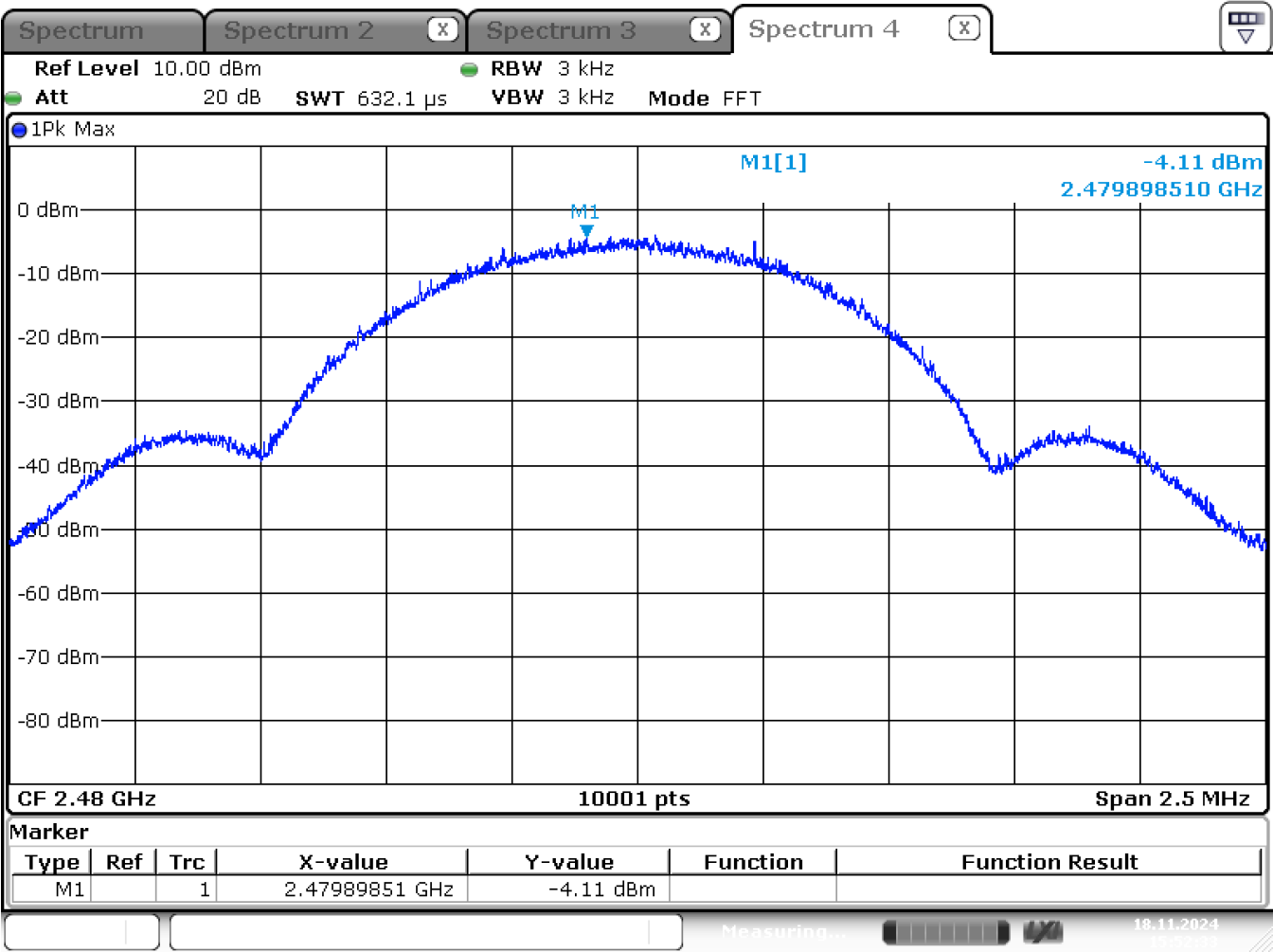
Test Equipment used: EMV-205;

Power spectral density

§ 15.247(e)  
5.2 b)

Conducted Measurement

Rated output power: 5,13 mW Channel 39 (2480 MHz center frequency)



Date: 18.NOV.2024 15:52:33

Power Spectral density: -4,11 dBm @ 2479,90 MHz

LIMIT SUBCLAUSE 15.247(e) – 5.2 b)

|                             |                         |
|-----------------------------|-------------------------|
| Under normal test conditons | +8dBm in any 3 kHz band |
|-----------------------------|-------------------------|

Test Equipment used: EMV-205;

#### 4.7. Emissions in restricted bands

##### Emissions falling within restricted frequency bands

§ 15.209(a)  
RSS-Gen

##### Measuring apparatus parameters 9 kHz to 150 kHz

| Parameter       | Preview measurement | Final measurement | Parameter      | Preview measurement | Final measurement |
|-----------------|---------------------|-------------------|----------------|---------------------|-------------------|
| Start frequency | 9 kHz               | 9 kHz             | Detector       | Max Peak            | Quasi Peak        |
| Stop frequency  | 150 kHz             | 150 kHz           | Measuring time | 10 ms               | 1 s               |
| Stepsize        | 50 Hz               | 50 Hz             | RF-attenuation | 0dB                 | 0dB               |
| IF- Bandwidth   | 200 Hz              | 200 Hz            | Preamplifier   | 20 dB               | 20 dB             |

##### Measuring apparatus parameters 150 kHz to 30 MHz

| Parameter       | Preview measurement | Final measurement | Parameter      | Preview measurement | Final measurement |
|-----------------|---------------------|-------------------|----------------|---------------------|-------------------|
| Start frequency | 150 kHz             | 150 kHz           | Detector       | Max Peak            | Quasi Peak        |
| Stop frequency  | 30 MHz              | 30 MHz            | Measuring time | 10 ms               | 1 s               |
| Stepsize        | 2.25 kHz            | 2.25 kHz          | RF-attenuation | 0dB                 | 0dB               |
| IF- Bandwidth   | 9 kHz               | 9 kHz             | Preamplifier   | 20 dB               | 20 dB             |

##### Measuring apparatus parameters 30 MHz to 1000 MHz

| Parameter       | Preview measurement | Final measurement | Parameter      | Preview measurement | Final measurement |
|-----------------|---------------------|-------------------|----------------|---------------------|-------------------|
| Start frequency | 30 MHz              | 30 MHz            | Detector       | Max Peak            | Quasi Peak        |
| Stop frequency  | 1000 MHz            | 1000 MHz          | Measuring time | 10 ms               | 1 s               |
| Stepsize        | 30 kHz              | 30 kHz            | RF-attenuation | 0dB                 | 0dB               |
| IF- Bandwidth   | 120 kHz             | 120 kHz           | Preamplifier   | 20 dB               | 20 dB             |

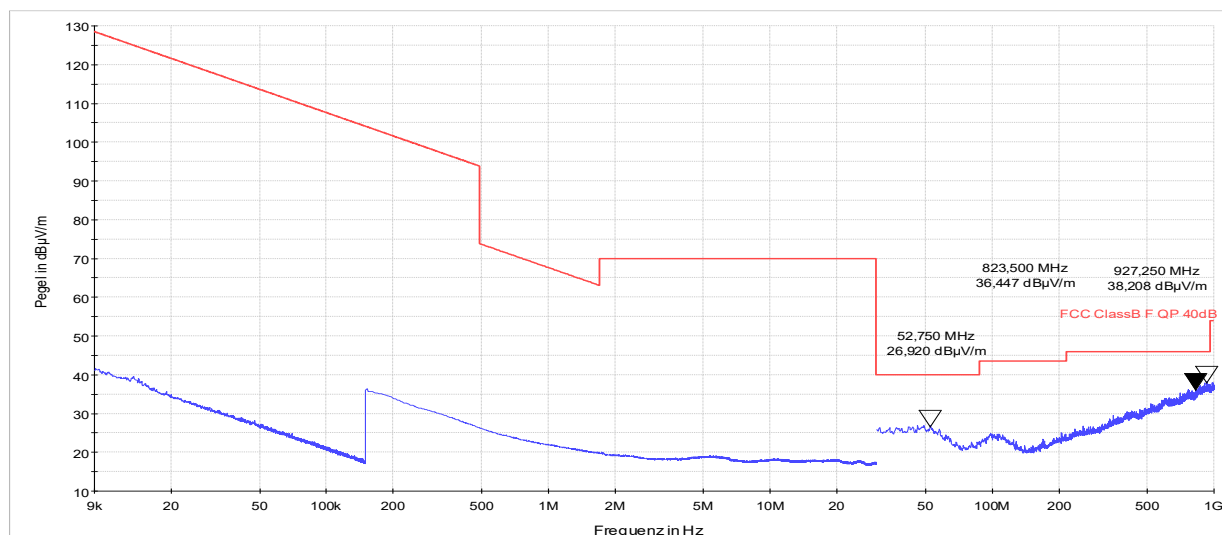
##### Measuring apparatus parameters 1 GHz to 25 GHz

| Parameter       | Preview measurement | Final measurement | Parameter      | Preview measurement | Final measurement  |
|-----------------|---------------------|-------------------|----------------|---------------------|--------------------|
| Start frequency | 1 GHz               | 1 GHz             | Detector       | Max Peak / Average  | Max Peak / Average |
| Stop frequency  | 25 GHz              | 25 GHz            | Measuring time | 100 ms              | 100 ms             |
| Stepsize        | 250 kHz             | 250 kHz           | RF-attenuation | 0dB                 | 0dB                |
| IF- Bandwidth   | 1 MHz               | 1 MHz             | Preamplifier   | 20 dB               | 20 dB              |

# Emissions in restricted bands Emissions falling within restricted frequency bands

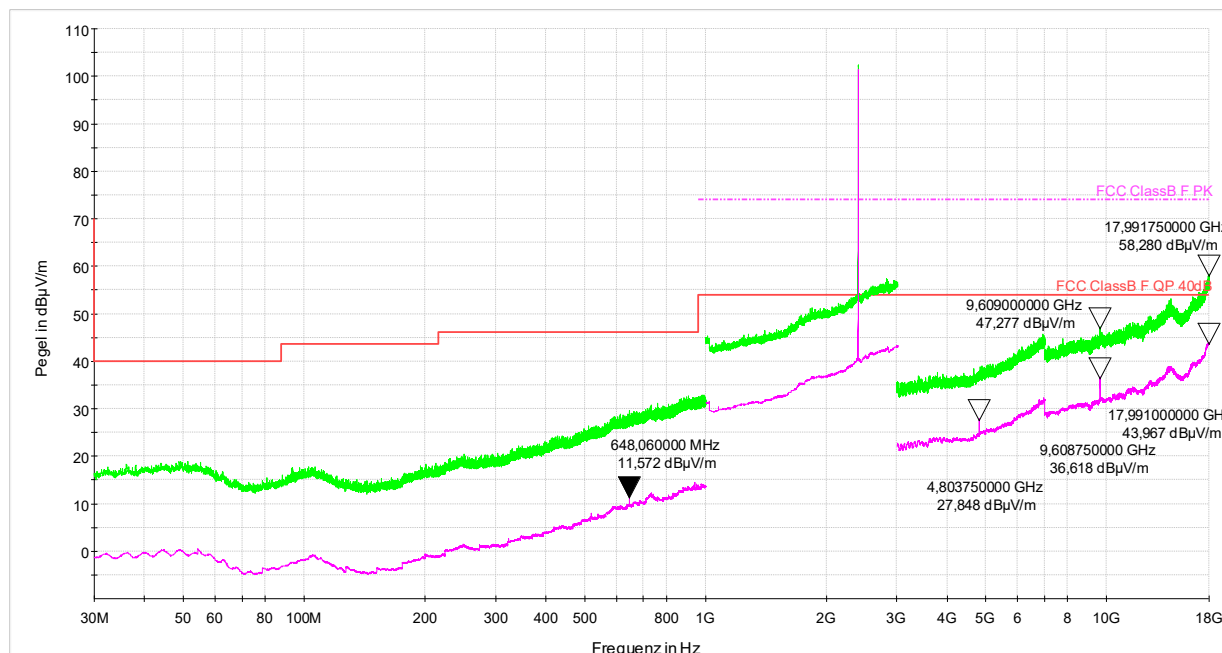
§ 15.209(a)  
RSS-Gen

Setup: CH 0: 2402 MHz



— QPK\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F0\_DisplayComp [E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F0\_DisplayComp.Result:2]  
 — QPK\_CLRWR [Ergebnistabelle.Result:1]  
 — FCC ClassB F QP 40dB [JEM1 radiated]  
 — QPK\_MAXH [Ergebnistabelle.Result:2]  
 — PK+\_MAXH:E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F1\_DisplayComp [E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F1\_DisplayComp.Result:2]

Measurement with Peak-Detector (green line) and Average detector (magenta line):



— PK+\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F3  
 — PK+\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F1  
 — FCC ClassB F QP 40dB  
 — PK+\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F2  
 — PK+\_CLRWR  
 — AVG\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F3  
 — AVG\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F1  
 — FCC ClassB F PK  
 — AVG\_MAXH(1):E300\_2.1\_Ziggy\_2.1\_BWRY\_CH0\_F2  
 — PK+\_MAXH  
 — AVG\_MAXH

Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

Worst case emission: Average @ 9608,8 MHz: 36,62 dBµV/m

| Frequency (MHz) | Value (dBµV/m) |
|-----------------|----------------|
| 4803,8          | 27,85 (AVG)    |
| 9608,8          | 36,62 (AVG)    |
| 9609,0          | 47,28 (PK)     |

The other values are noise.

Remark: Although the measurements were made up to the 10<sup>th</sup> harmonic (25 GHz) the frequency range above 18 GHz is not automatized, so no graphs are available. Nevertheless, no emissions above noise level were found in the frequency range above 18 GHz.

**LIMIT SUBCLAUSE 15.209(a) – RSS-Gen**

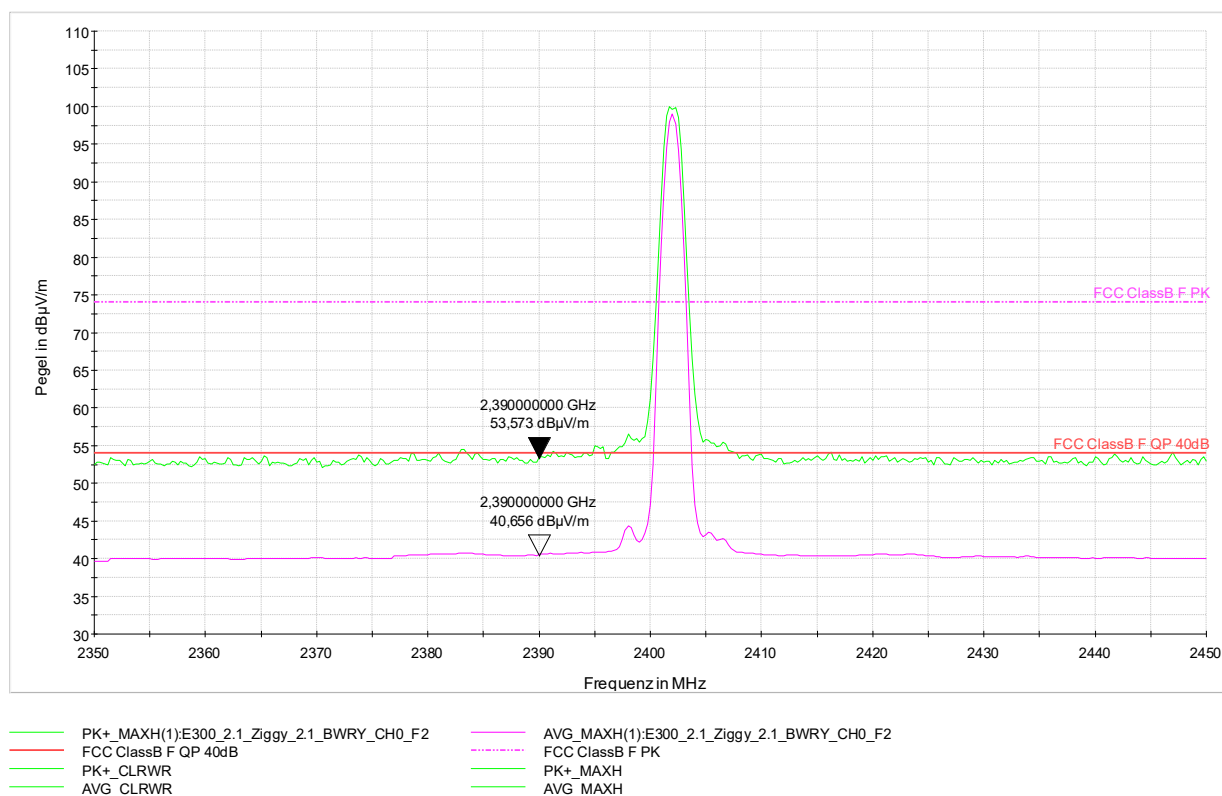
| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

Test Equipment used: NT-100; NT-110/1; NT-111/1; NT-132; NT-207/1;

# Emissions in restricted bands § 15.209(a), § 15.212(c) Emissions falling within restricted frequency bands RSS-Gen

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: CH 0: 2402 MHz



Frequency band (§ 15.247): 2400-2483.5 MHz

The 20 dB bandwidth of the emission on the lowest channel is fully contained within the frequency band.

**LIMIT SUBCLAUSE 15.209(a) – RSS-Gen**

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

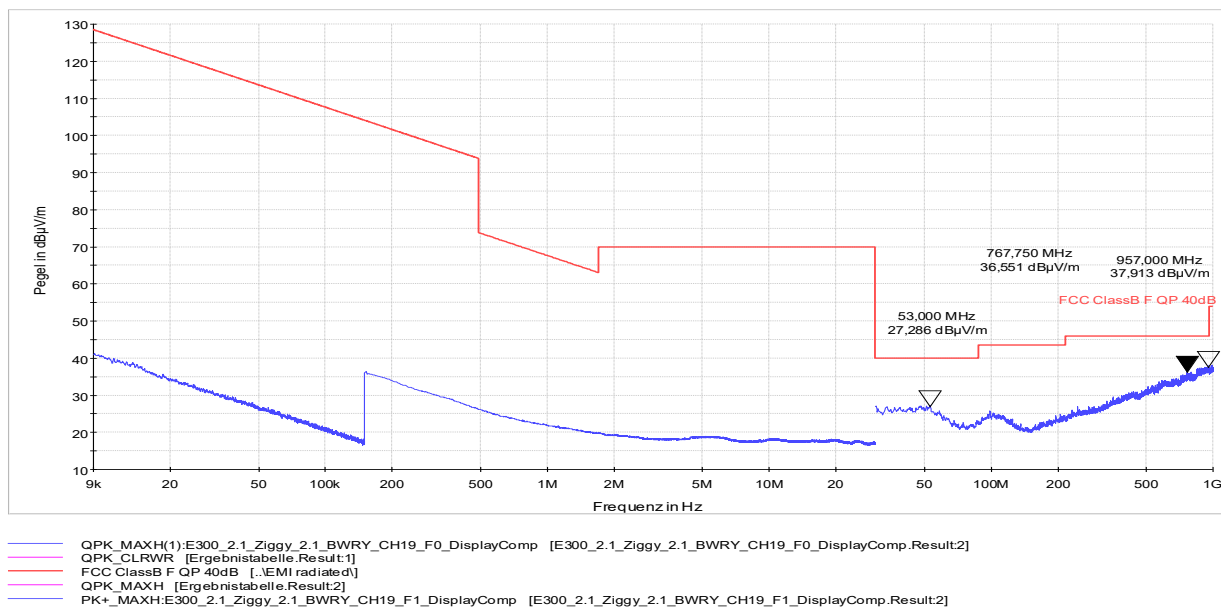
**LIMIT SUBCLAUSE 15.212(c)**

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

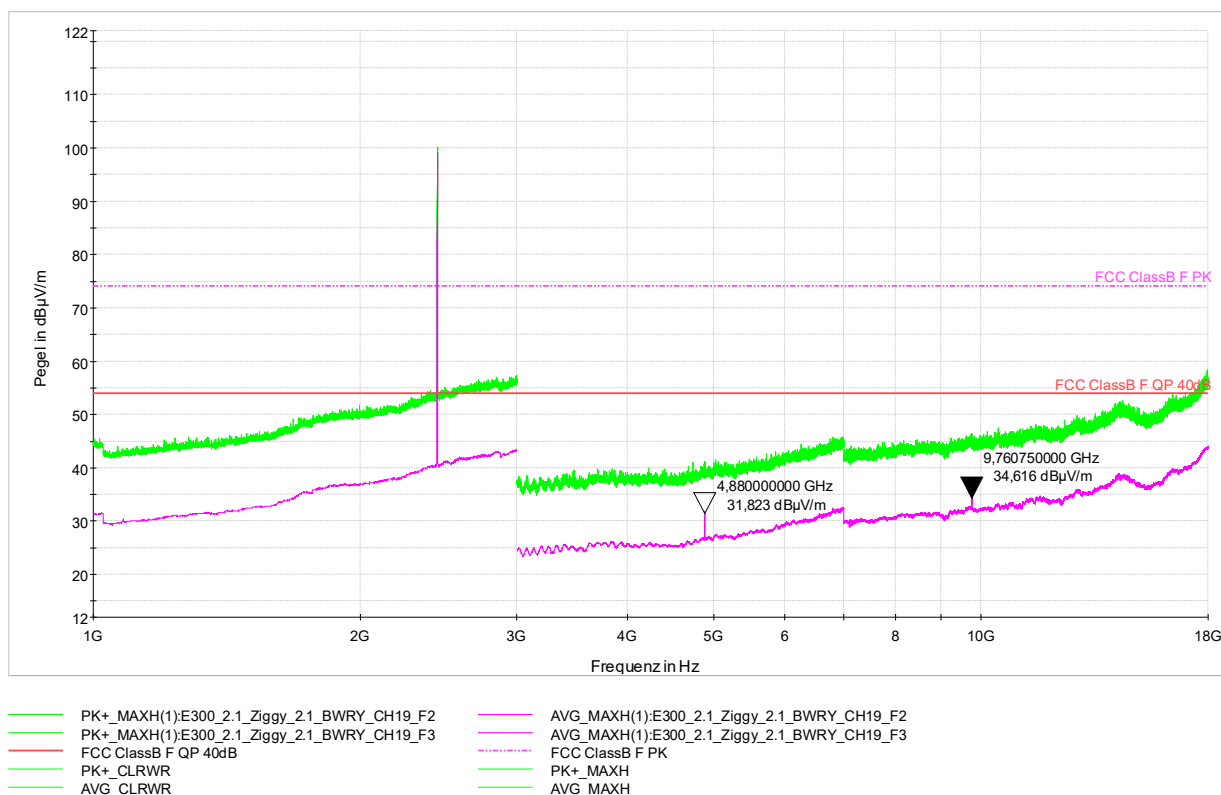
Test Equipment used: NT-100; NT-110/1; NT-111/1; NT-131/1; NT-139; NT-207/1;

**Emissions in restricted bands**  
**Emissions falling within restricted frequency bands****§ 15.209(a)**  
**RSS-Gen**

Setup: CH 19: 2440 MHz



Measurement with Peak-Detector (green line) and Average detector (magenta line):



Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

Worst case emission: Average @ 9760,8 MHz: 34,62 dBµV/m

| Frequency (MHz) | Value (dBµV/m) |
|-----------------|----------------|
| 4880,0          | 31,82 (AVG)    |
| 9760,8          | 34,62 (AVG)    |

The other values are noise

Remark: Although the measurements were made up to the 10<sup>th</sup> harmonic (25 GHz) the frequency range above 18 GHz is not automatized, so no graphs are available. Nevertheless, no emissions above noise level were found in the frequency range above 18 GHz.

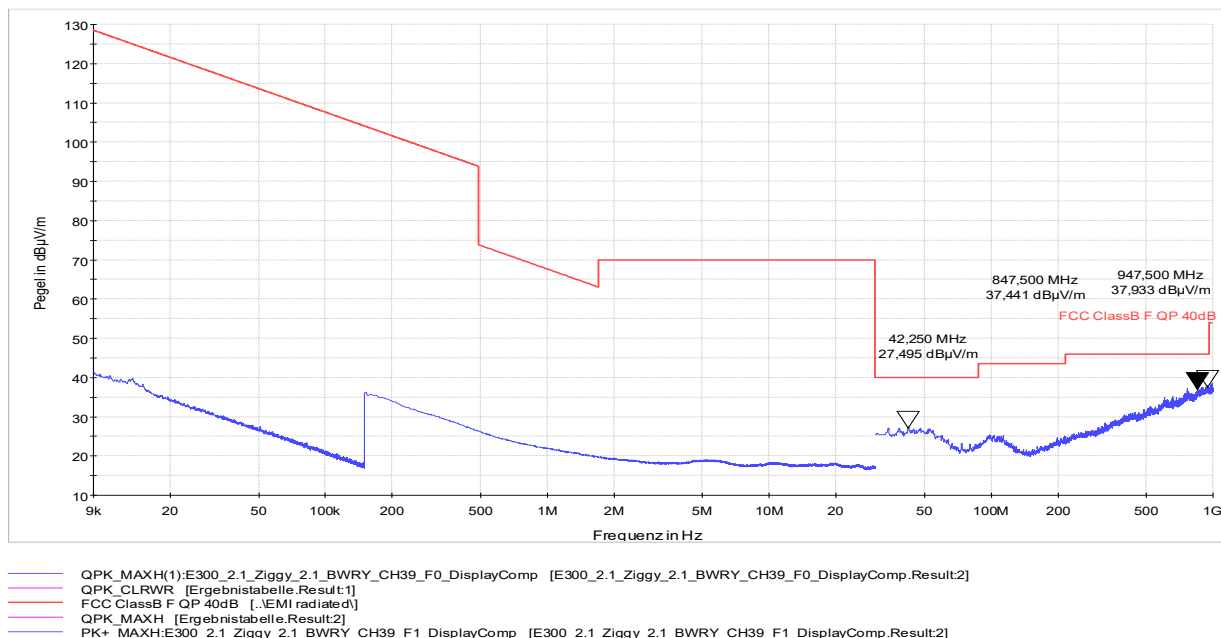
**LIMIT SUBCLAUSE 15.209(a) – RSS-Gen**

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

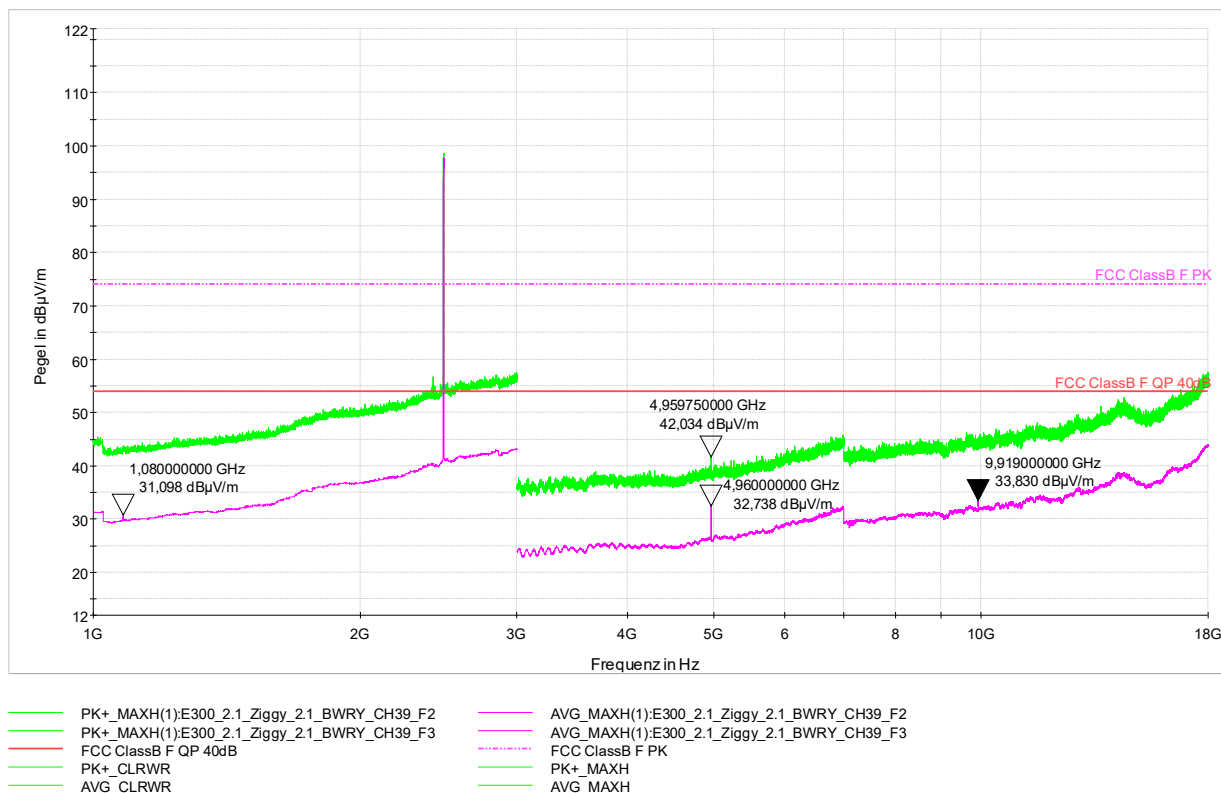
Test Equipment used: NT-100; NT-110/1; NT-111/1; NT-132; NT-207/1;

**Emissions in restricted bands**  
**Emissions falling within restricted frequency bands****§ 15.209(a)**  
**RSS-Gen**

Setup: CH 39: 2480 MHz



Measurement with Peak-Detector (green line) and Average detector (magenta line):



Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

Worst case emission: Average @ 9919,0 MHz: 33,83 dBµV/m

| Frequency (MHz) | Value (dBµV/m) |
|-----------------|----------------|
| 1080,0          | 31,10 (AVG)    |
| 4959,8          | 42,03 (PK)     |
| 4960,0          | 32,74 (AVG)    |
| 9919,0          | 33,83 (AVG)    |

The other values are noise.

Remark: Although the measurements were made up to the 10<sup>th</sup> harmonic (25 GHz) the frequency range above 18 GHz is not automatized, so no graphs are available. Nevertheless, no emissions above noise level were found in the frequency range above 18 GHz.

**LIMIT SUBCLAUSE 15.209(a) – RSS-Gen**

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

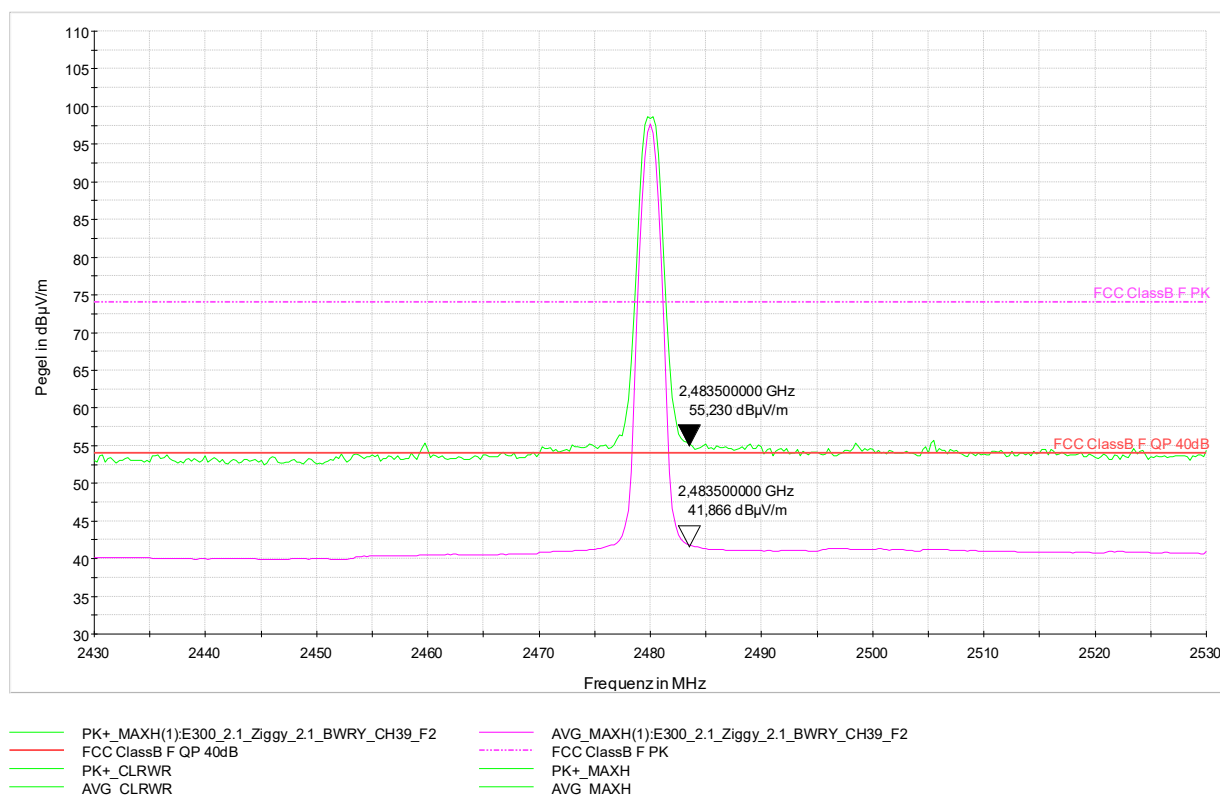
Test Equipment used: NT-100; NT-110/1; NT-111/1; NT-132; NT-207/1;

**Emissions in restricted bands**  
**Emissions falling within restricted frequency bands**

 § 15.209(a), § 15.212(c)  
 RSS-Gen

Measurement with Peak-Detector (green line) and Average detector (magenta line): Band Edge requirement

Setup: CH 39: 2480 MHz



Frequency band (§ 15.247): 2400-2483.5 MHz

The 20 dB bandwidth of the emission on the lowest channel is fully contained within the frequency band.

**LIMIT SUBCLAUSE 15.209(a) – RSS-Gen**

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

Band edges of the nearest restricted bands: 2390 MHz and 2483,5 MHz.

**LIMIT SUBCLAUSE 15.212(c)**

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

Test Equipment used: NT-100; NT-110/1; NT-111/1; NT-131/1; NT-139; NT-207/1;

## 4.8 RF Exposure

**KDB 447498 D04**  
**§1.1307(b)(3)(i)(B)**

according to KDB 447498 D04 Interim General RF Exposure Guidance v01 "RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES".

The device has only one antenna and simultaneous transmission does not apply.  
 The evaluation followed the flowchart in Figure A.1.

Title 47 §1.1307(b)(3)(i)(B):

(3) Determination of exemption. (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

Maximum conducted power and EIRP values are taken from Section 4.5.

Calculations are done for a minimum separation distance of 1 cm. This distance is derived from the device casing. It is conservative, as customers are not expected to touch or lean on electronic shelf labels for extended periods of time.

Production variance was declared by the manufacturer, see operational description.

| f [MHz] | cond. P [mW] | duty cycle [1] | production variance [1] | max. time-averaged power [mW] | EIRP [mW] | ERP [mW] | ERP incl. prod. var. [mW] |
|---------|--------------|----------------|-------------------------|-------------------------------|-----------|----------|---------------------------|
| 2402    | 4,60         | 1              | 1,58                    | 7,27                          | 5,13      | 3,13     | 4,94                      |
| 2440    | 4,49         | 1              | 1,58                    | 7,09                          | 4,27      | 2,60     | 4,11                      |
| 2480    | 4,36         | 1              | 1,58                    | 6,88                          | 3,09      | 1,88     | 2,98                      |

\*) Duty cycle was not measured, factor 1 is a worst case assumption.

Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

Title 47 §1.1307(b)(3)(i)(B) exemption calculation:

| Frequency range<br>(see 4.1 and 4.2) | max(max. time avg.<br>P, ERP) [mW] | §1.1307(b)(3)(i)(B)<br>limit (P <sub>th</sub> ) [mW] | P / P <sub>th</sub> [1] | < 1 |
|--------------------------------------|------------------------------------|------------------------------------------------------|-------------------------|-----|
| 2402                                 | 7,27                               | 10,39                                                | 0,70                    | OK  |
| 2440                                 | 7,09                               | 10,28                                                | 0,69                    | OK  |
| 2480                                 | 6,88                               | 10,17                                                | 0,68                    | OK  |

The available maximum time-averaged ERP is below P<sub>th</sub> for separation distances of 1 cm and above.

The device is a *SAR exempt RF device* as per Title 47 §1.1307(b)(3)(i)(B).

## RF Exposure

## RSS-102, Issue 6

## 6.3 SAR exemption limits

Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance

| Frequency<br>(MHz) | Exemption Limits (mW)                      |                                            |                                            |                                            |                                            |
|--------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
|                    | At separation<br>distance of<br>≤5 mm (mW) | At separation<br>distance of<br>10 mm (mW) | At separation<br>distance of<br>15 mm (mW) | At separation<br>distance of<br>20 mm (mW) | At separation<br>distance of<br>25 mm (mW) |
| ≤300               | 45                                         | 116                                        | 139                                        | 163                                        | 189                                        |
| 450                | 32                                         | 71                                         | 87                                         | 104                                        | 124                                        |
| 835                | 21                                         | 32                                         | 41                                         | 54                                         | 72                                         |
| 1900               | 6                                          | 10                                         | 18                                         | 33                                         | 57                                         |
| 2450               | 3                                          | 7                                          | 16                                         | 32                                         | 56                                         |
| 3500               | 2                                          | 6                                          | 15                                         | 29                                         | 50                                         |
| 5800               | 1                                          | 5                                          | 13                                         | 23                                         | 32                                         |

| Frequency<br>(MHz) | Exemption Limits (mW)                      |                                            |                                            |                                            |                                             |
|--------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|---------------------------------------------|
|                    | At separation<br>distance of<br>30 mm (mW) | At separation<br>distance of<br>35 mm (mW) | At separation<br>distance of<br>40 mm (mW) | At separation<br>distance of<br>45 mm (mW) | At separation<br>distance of<br>≥50 mm (mW) |
| ≤300               | 216                                        | 246                                        | 280                                        | 319                                        | 362                                         |
| 450                | 147                                        | 175                                        | 208                                        | 248                                        | 296                                         |
| 835                | 96                                         | 129                                        | 172                                        | 228                                        | 298                                         |
| 1900               | 92                                         | 138                                        | 194                                        | 257                                        | 323                                         |
| 2450               | 89                                         | 128                                        | 170                                        | 209                                        | 245                                         |
| 3500               | 72                                         | 94                                         | 114                                        | 134                                        | 158                                         |
| 5800               | 41                                         | 54                                         | 74                                         | 102                                        | 128                                         |

The exemption limits in table 11 are based on measurements and simulations of half-wave dipole antennas at separation distances of 5 mm to 50 mm from a flat phantom, which provides a SAR value of approximately 0.4 W/kg for 1 g of tissue.

For limb-worn devices where the 10 gram of tissue applies, the exemption limits for routine evaluation in table 11 are multiplied by a factor of 2.5.

Grundvorlage / Basic Template: FM-TAGMBH-KBS-0100b\_Grundvorlage Prüfbericht akkreditiert-EN, Rev. 04

For controlled-use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in table 11 Table 11 are multiplied by a factor of 5.

When the operating frequency of the device is between two frequencies located in table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in table 11, linear interpolation may be applied for the applicable frequency. Alternatively, the limit corresponding to the smaller distance may be employed. For example, in case of a 7 mm separation distance, either use the exception value for a 5 mm separation distance or interpolate between the limits corresponding to 5 mm and 10 mm separation distances.

For implanted medical devices, the exemption limit for routine SAR evaluation is set at an output power of 1 mW, regardless of frequency.

RSS-102 Exemption calculation

| Frequency (MHz) | cond. P (mW) | max. EIRP (mW) | Duty Cycle (1) | Tune-up tolerance (1) | Avg. cond. P (mW) | Avg. EIRP (mW) | separation distance (mm) | Limit (mW) |    |
|-----------------|--------------|----------------|----------------|-----------------------|-------------------|----------------|--------------------------|------------|----|
| 2402            | 4,60         | 5,13           | 1              | 1,58                  | 7,27              | 8,11           | 10                       | 18.15      | OK |
| 2440            | 4,49         | 4,27           | 1              | 1,58                  | 7,09              | 6,75           | 10                       | 17.64      | OK |
| 2480            | 4,36         | 3,09           | 1              | 1,58                  | 6,89              | 4,88           | 10                       | 17.43      | OK |

\*) Duty cycle was not measured, factor 1 is a worst case assumption.

\*\*) Calculations are done for a minimum separation distance of 1 cm and limb worn exposure. The distance is derived from the device casing. It is conservative, as customers are not expected to touch electronic shelf labels for extended periods of time.

The time-averaged output power is below the exemption limit for routine evaluation.

# Appendix 1

## Test equipment used

|                                                                        |           |                                                                              |                 |
|------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------|-----------------|
| <input type="checkbox"/> Anechoic Chamber with 3m measurement distance | NT-100    | <input type="checkbox"/> Ant. tripod for EN61000-4-3 Model TP1000A           | NT-156          |
| <input type="checkbox"/> Stripline according to ISO 11452-5            | NT-108    | <input type="checkbox"/> Power quality analyzer Fluke 1760 (complete set)    | NT-160 - NT-173 |
| <input type="checkbox"/> MA4000 - Antenna mast 1 - 4 m height          | NT-110/1  |                                                                              |                 |
| <input type="checkbox"/> DS - Turntable 0 - 400 ° Azimuth              | NT-111/1  | <input type="checkbox"/> ESCI - Test receiver 9 kHz - 7 GHz                  | NT-203/1        |
| <input type="checkbox"/> CO3000 Controller Mast+Turntable              | NT-112/1  | <input type="checkbox"/> ESR – Test receiver 20 Hz – 26,5 GHz                | NT-207/1        |
| <input type="checkbox"/> HUF-Z3 - Log. Per. Antenna 200 - 1000 MHz     | NT-121    | <input type="checkbox"/> Digital Radio Tester CMW500                         | NT-208/1        |
| <input type="checkbox"/> FMZB1513 - Loop Antenna 9 kHz - 30 MHz        | NT-122/1  | <input type="checkbox"/> Noise-gen., ITU-R 559-2 20 Hz – 20 kHz              | NT-209          |
| <input type="checkbox"/> HFH-Z6 - Rod Antenna 9 kHz - 30 MHz           | NT-123    | <input type="checkbox"/> CMTA - Radiocommunication analyzer ; 0,1 - 1000 MHz | NT-210          |
| <input type="checkbox"/> Dipole Antenna VHA9103 30 - 300 MHz           | NT-124/1a | <input type="checkbox"/> 3271 - Spectrum analyzer 100 Hz - 26,5 GHz          | NT-211          |
| <input type="checkbox"/> Dipole Antenna UHA9105 300 - 1000 MHz         | NT-124/1b | <input type="checkbox"/> Digital Radio Tester Aeroflex 3920                  | NT-212/1        |
| <input type="checkbox"/> 3115 - Horn Antenna 1 - 18 GHz (immunity)     | NT-125    | <input type="checkbox"/> Mixer M28HW 26,5 GHz - 40 GHz                       | NT-214          |
| <input type="checkbox"/> 3116 - Horn Antenna 18 - 40 GHz               | NT-126    | <input type="checkbox"/> RubiSource T&M Timing reference                     | NT-216          |
| <input type="checkbox"/> SAS-200/543 - Bicon. Antenna 20 MHz - 300 MHz | NT-127    | <input type="checkbox"/> Radiocommunicationanalyzer SWR 1180 MD              | NT-217          |
| <input type="checkbox"/> AT-1080 - Log. Per. Antenna 80 - 1000 MHz     | NT-128    | <input type="checkbox"/> Mixer FS-Z60 40 GHz – 60 GHz                        | NT-218/1        |
| <input type="checkbox"/> HK-116 - bicon. Antenna 20 MHz - 300 MHz      | NT-129    | <input type="checkbox"/> Mixer FS-Z90 60 GHz – 90 GHz                        | NT-219/1        |
| <input type="checkbox"/> HK-116 - bicon. Antenna 20 MHz - 300 MHz      | NT-130    | <input type="checkbox"/> GDS-2504 Digital scope                              | P-W/OS03        |
| <input type="checkbox"/> 3146 - Log. Per. Antenna 200 – 1000 MHz       | NT-131    | <input type="checkbox"/> TPS 2014 Digital scope                              | NT-222          |
| <input type="checkbox"/> VULB 9163 Trilog Antenna 30 – 3000 MHz        | NT-131/1  | <input type="checkbox"/> Artificial Ear according to IEC 60318               | NT-224          |
| <input type="checkbox"/> Loop Antenna H-Field                          | NT-132    | <input type="checkbox"/> 1 kHz Sound calibrator                              | NT-225          |
| <input type="checkbox"/> Horn Antenna 500 MHz - 2900 MHz               | NT-133    | <input type="checkbox"/> SRM-3006 Spectrumalyzer                             | NT-233/1a       |
| <input type="checkbox"/> Horn Antenna 500 MHz - 6000 MHz               | NT-133/1  | <input type="checkbox"/> E-field probe SRM 75 MHz – 3 GHz                    | NT-234          |
| <input type="checkbox"/> Log. per. Antenna 800 MHz - 2500 MHz          | NT-134    | <input type="checkbox"/> Field Meter NBM-500 incl. E- and H-Field probes     | NT-240a-e       |
| <input type="checkbox"/> Log. per. Antenna 800 MHz - 2500 MHz          | NT-135    | <input type="checkbox"/> Magnetometer HP-01                                  | NT-241/1        |
| <input type="checkbox"/> BiConiLog Antenna 26 MHz – 2000 MHz           | NT-137    | <input type="checkbox"/> EFA-3 H-field- / E-field probe                      | NT-243          |
| <input type="checkbox"/> Conical Dipol Antenna PCD8250                 | NT-138    | <input type="checkbox"/> EHP-50F H-field- / E-field probe                    | NT-243/1        |
| <input type="checkbox"/> HF 906 - Horn Antenna 1 - 18 GHz (emission)   | NT-139    | <input type="checkbox"/> Field Meter EMR-200 100 kHz – 3 GHz                 | NT-244          |
| <input type="checkbox"/> HZ-1 Antenna tripod                           | NT-150    | <input type="checkbox"/> E-field probe 100 kHz – 3 GHz                       | NT-245          |
| <input type="checkbox"/> BN 1500 Antenna tripod                        | NT-151    | <input type="checkbox"/> H-field probe 300 kHz – 30 MHz                      | NT-246          |

**Competence Center:**  
Electrical & Enviromental

Test report number:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 1 of 5

Date: 28.03.2025

## Appendix 1 (continued)

### Test equipment used

|                                                                                |             |                                                                                 |          |
|--------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------|----------|
| <input type="checkbox"/> E-field probe<br>3 MHz – 18 GHz                       | NT-247      | <input type="checkbox"/> Prana N-MT 500 - RF-Amplifier<br>80 - 1000 MHz / 500 W | NT-332/1 |
| <input type="checkbox"/> H-field probe<br>27 MHz – 1 GHz                       | NT-248      | <input type="checkbox"/> BBA150 RF-Amplifier<br>1 GHz - 6 GHz                   | NT-333/1 |
| <input type="checkbox"/> ELT-400<br>1 Hz – 400 kHz                             | NT-249      | <input type="checkbox"/> APA01 – RF-Amplifier<br>0,5 GHz – 2,5 GHz              | NT-334   |
| <input type="checkbox"/> MDS 21 - Absorbing clamp<br>30 - 1000 MHz             | NT-250      | <input type="checkbox"/> Preamplifier<br>1 GHz - 4 GHz                          | NT-335   |
| <input type="checkbox"/> CDN EMCL-35<br>EM Injection clamp                     | NT-251/1    | <input type="checkbox"/> Preamplifier for GPS<br>MKU 152 A                      | NT-336   |
| <input type="checkbox"/> FCC-203I-DCN<br>Ferrite decoupling network            | NT-252      | <input type="checkbox"/> Preamplifier<br>1 GHz – 18 GHz                         | NT-337/1 |
| <input type="checkbox"/> PR50<br>Current Probe                                 | NT-253      | <input type="checkbox"/> DC Block 10 MHz – 18 GHz<br>Model 8048                 | NT-338   |
| <input type="checkbox"/> i310s<br>Current Probe                                | NT-254/1    | <input type="checkbox"/> 2-97201<br>Electronic load                             | NT-341   |
| <input type="checkbox"/> Fluke 87 V<br>True RMS Multimeter                     | NT-260      | <input type="checkbox"/> TSX3510P - Power supply<br>0-30 V / 0 - 10 A           | NT-344   |
| <input type="checkbox"/> Model 2000<br>Digital Multimeter                      | NT-261      | <input type="checkbox"/> TSX3510P - Power supply<br>0-30 V / 0 - 10 A           | NT-345   |
| <input type="checkbox"/> Fluke 87 V<br>Digital Multimeter                      | NT-262/1    | <input type="checkbox"/> VDS 200<br>Mobil-impuls-generator                      | NT-350   |
| <input type="checkbox"/> ESH2-Z5-U1 Artificial mains<br>network 4x25A          | NT-300      | <input type="checkbox"/> LD 200<br>Mobil-impuls-generator                       | NT-351   |
| <input type="checkbox"/> ESH3-Z5-U1 Artificial mains<br>network 2x10A          | NT-301      | <input type="checkbox"/> MPG 200<br>Mobil-Impuls-Generators                     | NT-352   |
| <input type="checkbox"/> ESH3-Z6-U1 Artificial mains<br>network 1x100A         | NT-302      | <input type="checkbox"/> EFT 200<br>Mobil-impuls-generator                      | NT-353   |
| <input type="checkbox"/> ESH3-Z6-U1 Artificial mains<br>network 1x100A         | NT-302a     | <input type="checkbox"/> AN 200 S1<br>Artificial Network                        | NT-354   |
| <input type="checkbox"/> EZ10<br>T-Artificial Network                          | NT-305      | <input type="checkbox"/> FP-EFT 32M<br>3 ph. Coupling filter (Burst)            | NT-400/1 |
| <input type="checkbox"/> SMA100A - Signal generator<br>9 kHz - 6 GHz           | NT-310/1    | <input type="checkbox"/> PHE 4500 - Mains impedance<br>network                  | NT-401   |
| <input type="checkbox"/> RefRad<br>Reference generator                         | NT-312      | <input type="checkbox"/> IP 6.2 Coupling filter for<br>data lines (Surge)       | NT-403   |
| <input type="checkbox"/> SMP 02 Signal generator<br>10 MHz - 20 GHz            | NT-313      | <input type="checkbox"/> TK 9421 High Power Volt. Probe<br>150 kHz - 30 MHz     | NT-409   |
| <input type="checkbox"/> 40 MHz Arbitrary Generator<br>TGA1241                 | NT-315      | <input type="checkbox"/> ESH2-Z3 - Probe<br>9 kHz - 30 MHz                      | NT-410   |
| <input type="checkbox"/> Artificial mains network<br>NSLK 8127-PLC             | NT-316      | <input type="checkbox"/> CN-EFT1000 - Capacitive clamp<br>(Burst)               | NT-411/1 |
| <input type="checkbox"/> PSURGE 4.1<br>Surge generator                         | NT-324      | <input type="checkbox"/> Highpass-Filter<br>100 MHz – 3 GHz                     | NT-412   |
| <input type="checkbox"/> IMU4000<br>Immunity test system                       | NT-325/1a-e | <input type="checkbox"/> Highpass-Filter<br>600 MHz – 4 GHz                     | NT-413   |
| <input type="checkbox"/> VCS 500-M6<br>Surge-Generator                         | NT-326      | <input type="checkbox"/> Highpass-Filter<br>1250 MHz – 4 GHz                    | NT-414   |
| <input type="checkbox"/> Oscillatory Wave Simulator incl.<br>Coupling networks | NT-328a+b+c | <input type="checkbox"/> Highpass-Filter<br>1800 MHz – 16 GHz                   | NT-415   |
| <input type="checkbox"/> BTA-250 - RF-Amplifier<br>9 kHz - 220 MHz / 250 W     | NT-330      |                                                                                 |          |

**Competence Center:**  
Electrical & Environmental

Test report number:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 2 of 5

Date: 28.03.2025

## Appendix 1 (continued)

### Test equipment used

|                          |                                               |          |                          |                                                           |                    |
|--------------------------|-----------------------------------------------|----------|--------------------------|-----------------------------------------------------------|--------------------|
| <input type="checkbox"/> | RF-Attenuator 10 dB<br>DC – 18 GHz / 50 W     | NT-417/1 | <input type="checkbox"/> | 95242-1 – Current probe<br>1 MHz – 400 MHz                | NT-468             |
| <input type="checkbox"/> | RF-Attenuator 6 dB<br>DC – 18 GHz / 50 W      | NT-418   | <input type="checkbox"/> | 94106-1L-1 – Current probe<br>100 kHz – 450 MHz           | NT-471             |
| <input type="checkbox"/> | RF-Attenuator 3 dB<br>DC – 18 GHz / 50 W      | NT-419   | <input type="checkbox"/> | WHKX12-2700-3000-18000<br>3 GHz Highpass filter           | NT-472             |
| <input type="checkbox"/> | RF-Attenuator 20 dB<br>DC - 1000 MHz / 25 W   | NT-421   | <input type="checkbox"/> | WHKX10-3870-4500-18000<br>4,5 GHz Highpass filter         | NT-473             |
| <input type="checkbox"/> | RF-Attenuator 30 dB<br>DC - 1000 MHz / 1 W    | NT-423   | <input type="checkbox"/> | CDN S9 USB3.0<br>Coupling decoupling network              | NT-474             |
| <input type="checkbox"/> | RF-Attenuator<br>30 dB                        | NT-424   | <input type="checkbox"/> | CDN S2 XLR3-1<br>Coupling decoupling network              | NT-475             |
| <input type="checkbox"/> | RF-Attenuator 6 dB<br>DC - 1000 MHz / 1 W     | NT-425   | <input type="checkbox"/> | CDN S8 RJ45<br>Coupling decoupling network                | NT-476             |
| <input type="checkbox"/> | RF-Attenuator 6 dB<br>DC - 1000 MHz / 1 W     | NT-426   | <input type="checkbox"/> | GA 1240 Power amplifier<br>according to EN 61000-4-16     | NT-480             |
| <input type="checkbox"/> | RF-Attenuator<br>6 dB                         | NT-428   | <input type="checkbox"/> | Coupling networks<br>according to EN 61000-4-16           | NT-481 -<br>NT-483 |
| <input type="checkbox"/> | RF-Attenuator<br>0 dB - 81 dB                 | NT-429   | <input type="checkbox"/> | Van der Hoofden Test Head                                 | NT-484             |
| <input type="checkbox"/> | WRU 27 - Band blocking<br>27 MHz              | NT-430   | <input type="checkbox"/> | WRCJV12-5820-5850-5950-5980<br>5,9 GHz Band Reject Filter | NT-490             |
| <input type="checkbox"/> | WHJ450C9 AA - High pass<br>450 MHz            | NT-431   | <input type="checkbox"/> | WHKX10-5670-6300-18000<br>6 GHz Highpass filter           | NT-491             |
| <input type="checkbox"/> | WHJ250C9 AA - High pass<br>250 MHz            | NT-432   | <input type="checkbox"/> | WHK12-935-1000-7000<br>1 GHz Highpass filter              | NT-492             |
| <input type="checkbox"/> | RF-Load<br>150 W                              | NT-433   | <input type="checkbox"/> | EMC Video/Audiosystem                                     | NT-511/1           |
| <input type="checkbox"/> | Impedance transducer<br>1:4 ; 1:9 ; 1:16      | NT-435   | <input type="checkbox"/> | EMC32 Version 10.60.20<br>Test software                   | NT-520/1           |
| <input type="checkbox"/> | RF-Attenuator DC – 18 GHz<br>6 dB             | NT-436   | <input type="checkbox"/> | SRM-TS Version 1.3<br>software for SRM-3000               | NT-522             |
| <input type="checkbox"/> | RF-Attenuator DC – 18 GHz<br>6 dB             | NT-437   | <input type="checkbox"/> | SRM-TS Version 1.3.1<br>software for SRM-3006             | NT-522/1           |
| <input type="checkbox"/> | RF-Attenuator DC – 18 GHz<br>10 dB            | NT-438   | <input type="checkbox"/> | Spitzenberger und Spies<br>Test software V4.1             | NT-525             |
| <input type="checkbox"/> | RF-Attenuator DC – 18 GHz<br>20 dB            | NT-439   | <input type="checkbox"/> | Vertical coupling plane<br>(ESD)                          | NT-531             |
| <input type="checkbox"/> | ESH3-Z2 - Pulse limiter<br>9 kHz - 30 MHz     | NT-441   | <input type="checkbox"/> | Test cable #4<br>for EN 61000-4-6                         | NT-553             |
| <input type="checkbox"/> | Power Divider<br>6 dB/1 W/50 Ohm              | NT-443   | <input type="checkbox"/> | Test cable #3<br>for conducted emission                   | NT-554             |
| <input type="checkbox"/> | Directional coupler<br>0,1 MHz – 70 MHz       | NT-444   | <input type="checkbox"/> | Test cable #5+#6<br>ESD-cable (2x470k)                    | NT-555 +<br>NT-556 |
| <input type="checkbox"/> | Directional coupler<br>0,1 MHz – 70 MHz       | NT-445   | <input type="checkbox"/> | Test cable #8<br>Sucoflex 104EA                           | NT-559             |
| <input type="checkbox"/> | Tube imitations<br>according to EN 55015      | NT-450   | <input type="checkbox"/> | Test cable #9<br>(for outdoor measurements)               | NT-580             |
| <input type="checkbox"/> | FCC-801-M3-16A<br>Coupling decoupling network | NT-458   | <input type="checkbox"/> | Test cable #10<br>(for outdoor measurements)              | NT-581             |
| <input type="checkbox"/> | FCC-801-M2-50A<br>Coupling decoupling network | NT-459   | <input type="checkbox"/> | Test cable #13<br>Sucoflex 104PE                          | NT-584             |
| <input type="checkbox"/> | FCC-801-M5-25<br>Coupling decoupling network  | NT-460   | <input type="checkbox"/> | Test cable #21<br>for SRM-3000                            | NT-592             |
| <input type="checkbox"/> | FCC-801-T4<br>Coupling decoupling network     | NT-463   | <input type="checkbox"/> | Shield chamber                                            | NT-600             |
| <input type="checkbox"/> | FCC-801-C1<br>Coupling decoupling network     | NT-464   | <input type="checkbox"/> | Climatic chamber                                          | M-1200             |
| <input type="checkbox"/> | SW 9605 - Current probe<br>150 kHz – 30 MHz   | NT-465/1 |                          |                                                           |                    |

**Competence Center:**  
Electrical & Environmental

Test report number:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 3 of 5

Date: 28.03.2025

## Appendix 1 (continued)

### Test equipment used

|                                                                           |                     |                                                                             |                 |
|---------------------------------------------------------------------------|---------------------|-----------------------------------------------------------------------------|-----------------|
| <input type="checkbox"/> Anechoic Chamber<br>3 m / 5 m measuring distance | EMV-100             | <input type="checkbox"/> Diode power probe<br>R&S NRP40S                    | EMV-220         |
| <input type="checkbox"/> Turntable<br>6 m diameter                        | EMV-101             | <input type="checkbox"/> HF- Amplifier 9 kHz-225 MHz<br>BBL200              | EMV-300/1       |
| <input type="checkbox"/> Antenna mast + controller                        | EMV-102+<br>EMV-103 | <input type="checkbox"/> HF- Amplifier 80 -1000 MHz<br>BBA150               | EMV-301         |
| <input type="checkbox"/> EMC Video/Audiosystem                            | EMV-104             | <input type="checkbox"/> HF- Amplifier 0,8 - 6 GHz<br>BBA150                | EMV-302         |
| <input type="checkbox"/> EMC Software<br>EMC32 Version 10.6.2             | EMV-105             | <input type="checkbox"/> High Power Ant. 20-200 MHz<br>HPBA-2510            | EMV-303/1       |
| <input type="checkbox"/> Hornantenna 1 – 18 GHz<br>HF 907                 | EMV-110             | <input type="checkbox"/> High Power Ant. 20-200 MHz<br>S12018-21            | EMV-303/2       |
| <input type="checkbox"/> Antennapre.amp. 1 – 18 GHz<br>BBV 9718 D         | EMV-111/1           | <input type="checkbox"/> Log.per Antenna 80-2700 MHz<br>STLP 9128 E special | EMV-304         |
| <input type="checkbox"/> Trilog Antenna 30-3000 MHz<br>VULB9163           | EMV-112             | <input type="checkbox"/> Log.per Antenna 0,7 – 9 GHz<br>STLP9149            | EMV-305         |
| <input type="checkbox"/> Monopol 9 kHz – 30 MHz<br>VAMP 9243              | EMV-113             | <input type="checkbox"/> HF- Amplifier 9 kHz-250 MHz<br>BBA150 (low noise)  | EMV-306         |
| <input type="checkbox"/> Antennapre.amp 18 – 40 GHz<br>BBV 9721           | EMV-114             | <input type="checkbox"/> ISO11451-2 TLS<br>10 kHz – 30 MHz                  | EMV-307         |
| <input type="checkbox"/> Hornantenna 200 – 2000 MHz<br>AH-220             | EMV-115             | <input type="checkbox"/> Load Dump Generator<br>LD 200N                     | EMV-350         |
| <input type="checkbox"/> DC Artificial Network<br>PVDC 8300               | EMV-150             | <input type="checkbox"/> Ultra Compact Symulator<br>UCS 200N100             | EMV-351         |
| <input type="checkbox"/> AC Artificial Network<br>NNLK 8121 RC            | EMV-151             | <input type="checkbox"/> Automotive Power fail module<br>PFM 200N100.1      | EMV-352         |
| <input type="checkbox"/> AC Artificial Network<br>NNLK 140                | EMV-<br>153a-d      | <input type="checkbox"/> Voltage Drop Symulator<br>VDS 200Q100              | EMV-353         |
| <input type="checkbox"/> EMI Receiver<br>ESW44                            | EMV-200/1           | <input type="checkbox"/> Arb. Generator<br>AutoWave                         | EMV-354         |
| <input type="checkbox"/> Signalgenerator 9 kHz – 40 GHz<br>N5173B         | EMV-201             | <input type="checkbox"/> Ultra Compact Symulator<br>UCS 500N7               | EMV-355         |
| <input type="checkbox"/> GPS Frequency normal<br>LBE-1420                 | EMV-202/1           | <input type="checkbox"/> Coupling decoupling network<br>CNI 503B7 / 32 A    | EMV-356         |
| <input type="checkbox"/> DC Power supply<br>N5745A                        | EMV-203             | <input type="checkbox"/> Coupling decoupling network<br>CNI 503B7 / 63 A    | EMV-357         |
| <input type="checkbox"/> Spektrum Analyzator<br>FSV40                     | EMV-205             | <input type="checkbox"/> Telecom Surge Generator<br>TSurge 7                | EMV-358         |
| <input type="checkbox"/> Thd Multimeter<br>Model 2015                     | EMV-206             | <input type="checkbox"/> Coupling decoupling network<br>CNI 508N2           | EMV-359         |
| <input type="checkbox"/> Poweramplifier<br>PAS15000                       | EMV-<br>207/abc     | <input type="checkbox"/> Coupling decoupling network<br>CNV 504N2.2         | EMV-360         |
| <input type="checkbox"/> Inrush Current Source                            | EMV-<br>208/abc     | <input type="checkbox"/> Immunity generator<br>NSG4060/NSG4060-1            | EMV-361         |
| <input type="checkbox"/> Arb.-generator<br>Sycore                         | EMV-209             | <input type="checkbox"/> Coupling network<br>CDND M316-2                    | EMV-362         |
| <input type="checkbox"/> Harmonics/Flicker analyzer<br>ARS 16/3           | EMV-210             | <input type="checkbox"/> Coupling network<br>CT419-5                        | EMV-363         |
| <input type="checkbox"/> Power Supply<br>Regatron AC                      | EMV-214             | <input type="checkbox"/> ESD Generator<br>NSG 437                           | EMV-364         |
| <input type="checkbox"/> Power Supply<br>Regatron DC                      | EMV-215             | <input type="checkbox"/> Pulse Limiter<br>VTSD 9561-F BNC                   | EMV-405         |
| <input type="checkbox"/> Harmonics/Flicker analyser<br>Zimmer             | EMV-216             | <input type="checkbox"/> Transient emission<br>BSM200N40+BS200N100          | EMV-<br>450+451 |
| <input type="checkbox"/> Flicker Impedanz<br>Newtons4th 753               | EMV-218             | <input type="checkbox"/> Cap. Coupling Clamp<br>HFK                         | EMV-455         |
| <input type="checkbox"/> Comemso                                          | EMV-219             | <input type="checkbox"/> Mag. Field System<br>MS100N+MC26100+MC2630         | EMV-<br>456-458 |

**Competence Center:**  
Electrical & Environmental

Test report number:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 4 of 5

Date: 28.03.2025

# Appendix 1 (continued)

## Test equipment used

**Competence Center:**  
Electrical & Enviromental

Test report number:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 5 of 5

Date: 28.03.2025

|                          |                                      |             |
|--------------------------|--------------------------------------|-------------|
| <input type="checkbox"/> | Coupling network<br>CDN M2-100A      | EMV-459     |
| <input type="checkbox"/> | Coupling network<br>CDN M3-32A       | EMV-460     |
| <input type="checkbox"/> | Coupling network<br>CDN M5-100A      | EMV-461     |
| <input type="checkbox"/> | Current Clamp<br>CIP 9136A           | EMV-462     |
| <input type="checkbox"/> | DC Artificial Network<br>HV-AN 150   | EMV-464+465 |
| <input type="checkbox"/> | Coupling Clamp<br>EM 101             | EMV-466     |
| <input type="checkbox"/> | Decoupling Clamp<br>FTC 101          | EMV-467     |
| <input type="checkbox"/> | Power attenuator<br>10 dB / 250 Watt | EMV-469/2   |
| <input type="checkbox"/> | HV AMN<br>NNHV 8123 800A             | EMV-472     |
| <input type="checkbox"/> | HV AMN<br>NNHV 8123 800A             | EMV-473     |

## Appendix 2 Photodocumentation

**Division:**  
Industry & Energy

Description: Front view

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 1 of 10

Date: 28.03.2025



## Appendix 2

### Photodocumentation

**Division:**  
Industry & Energy

Description: Rear view

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 2 of 10

Date: 28.03.2025



## Appendix 2 Photodocumentation

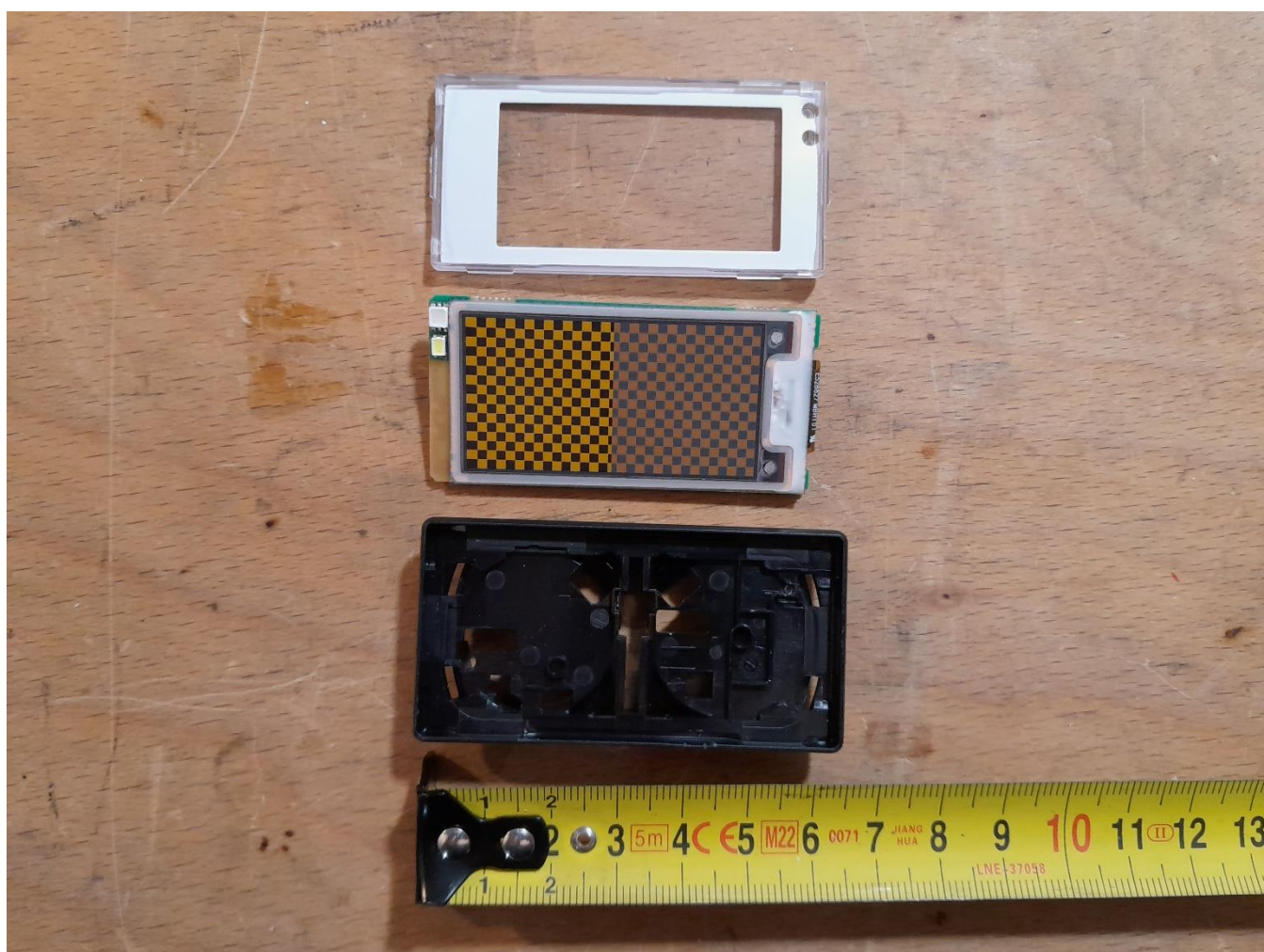
**Division:**  
Industry & Energy

Description: Case opened

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 3 of 10

Date: 28.03.2025



## Appendix 2 Photodocumentation

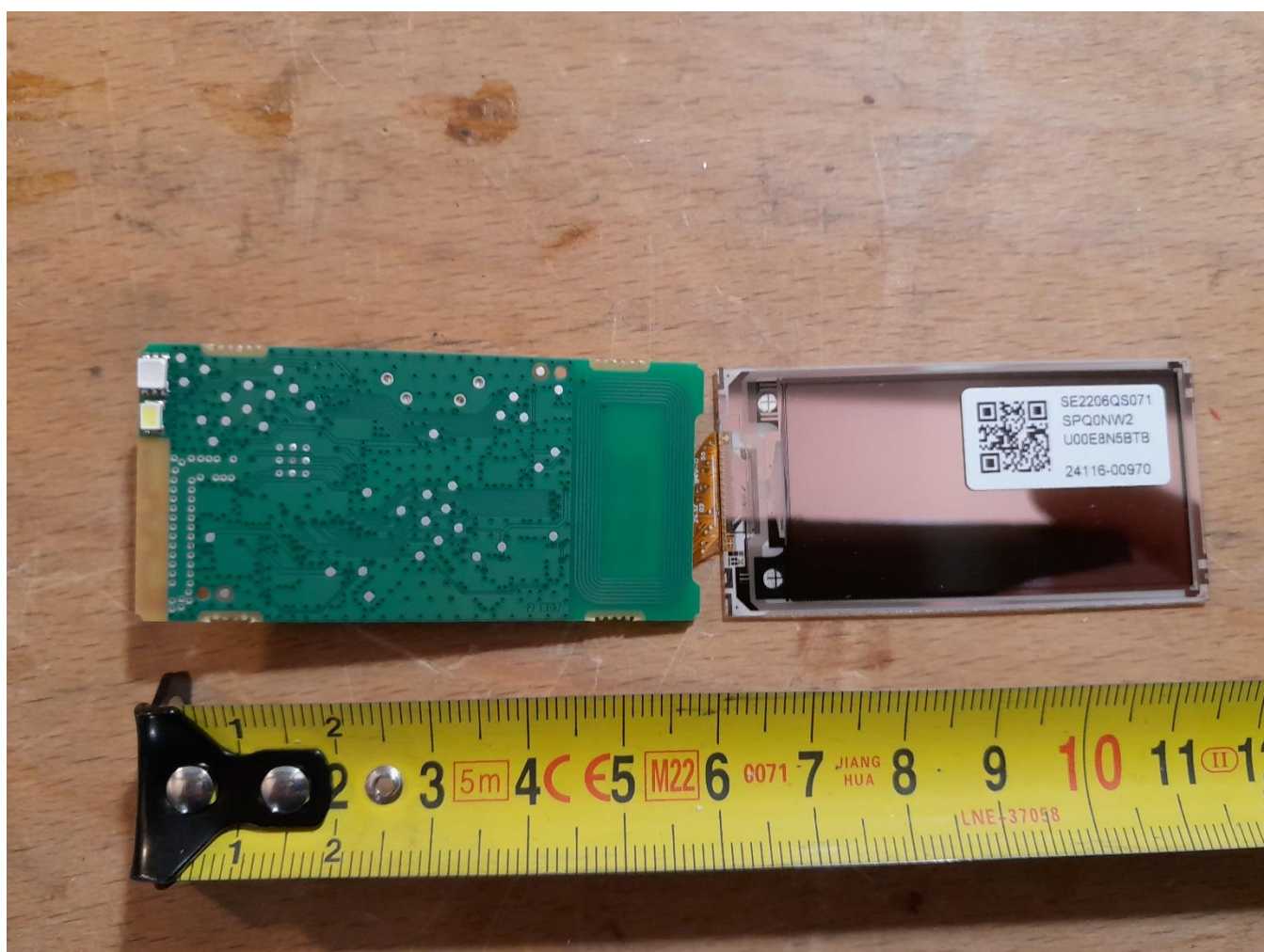
**Division:**  
Industry & Energy

Description: Internal view #1

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 4 of 10

Date: 28.03.2025



## Appendix 2 Photodocumentation

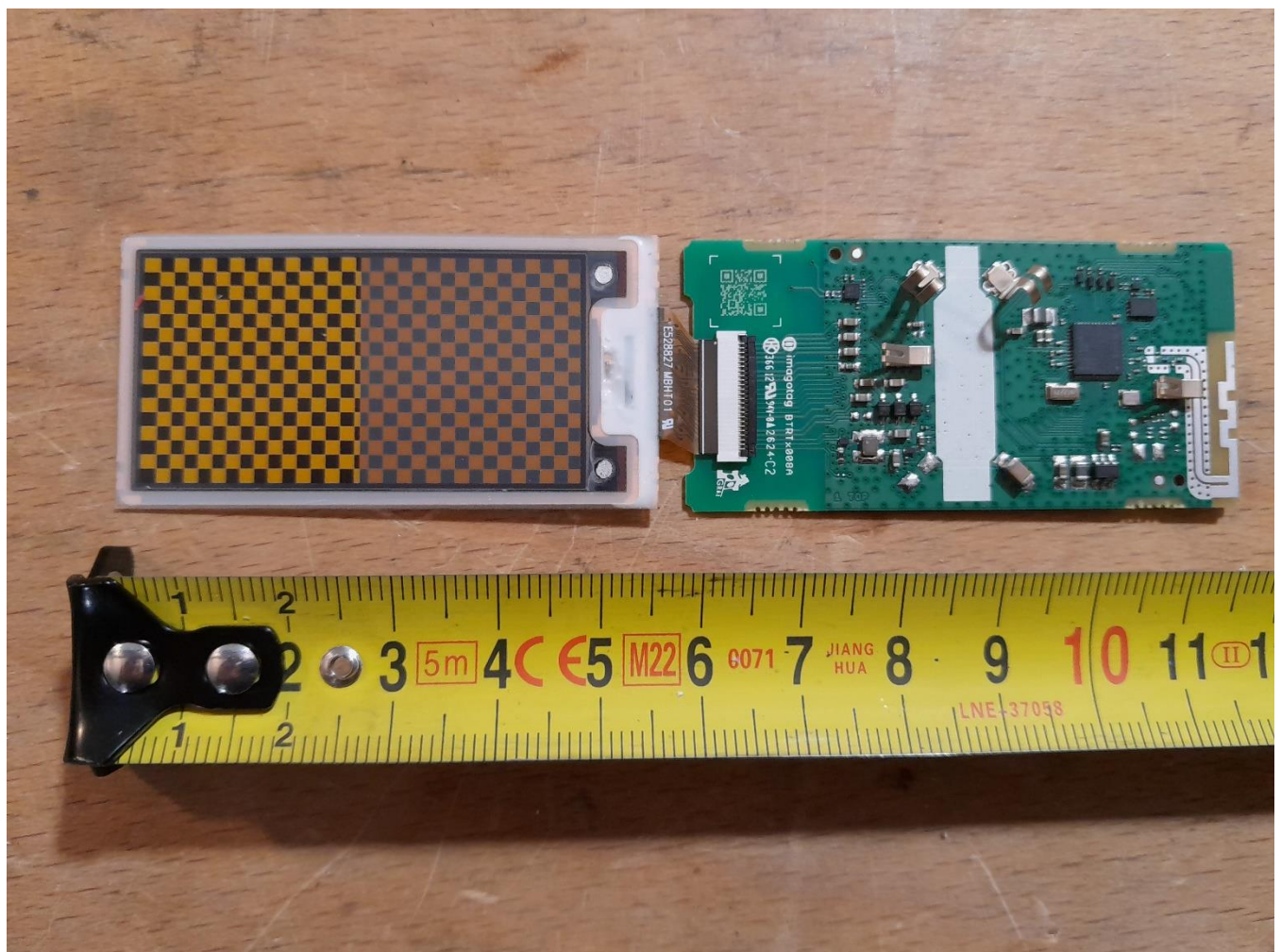
**Division:**  
Industry & Energy

Description: Internal view #2

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 5 of 10

Date: 28.03.2025



## Appendix 2 Photodocumentation

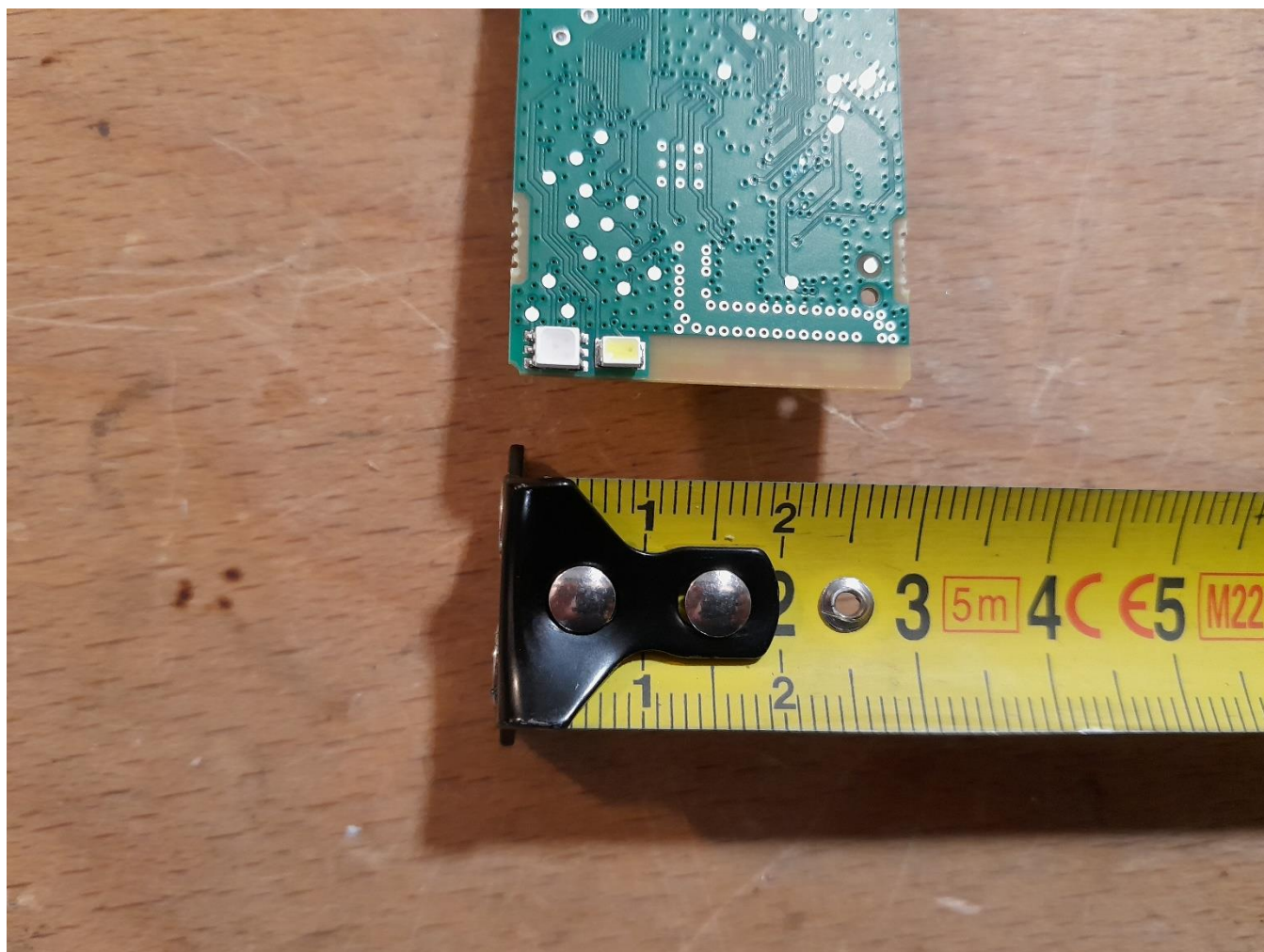
**Division:**  
Industry & Energy

Description: Antenna detail #1

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 6 of 10

Date: 28.03.2025



## Appendix 2

### Photodocumentation

**Division:**  
Industry & Energy

Description: Antenna detail #2  
meandered inverted-F Antenna (IFA) fed by a  
coplanar waveguide

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 7 of 10

Date: 28.03.2025



## Appendix 2

### Photodocumentation

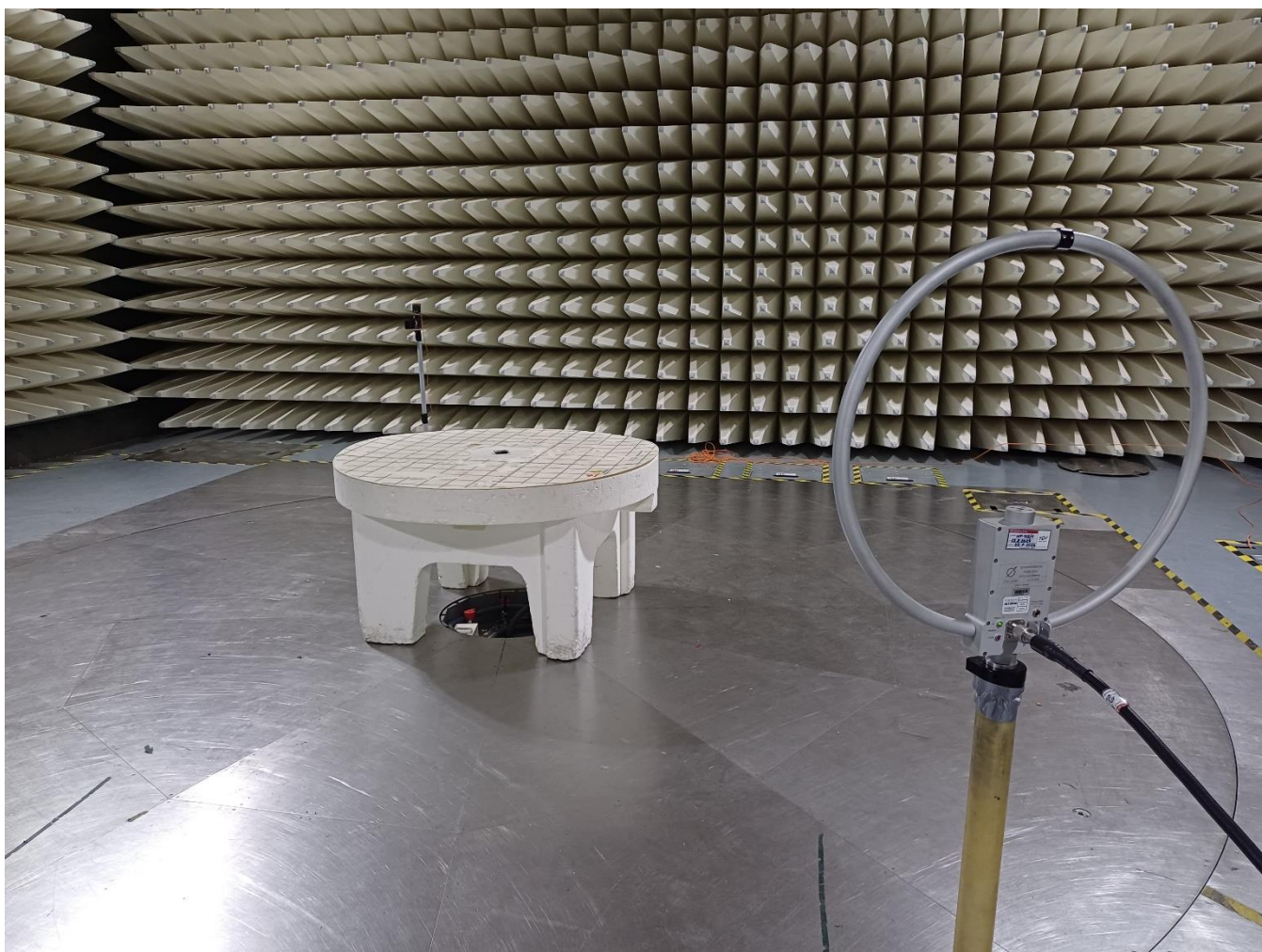
**Division:**  
Industry & Energy

Description: Test setup emissions below 30 MHz

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 8 of 10

Date: 28.03.2025



## Appendix 2

### Photodocumentation

**Division:**  
Industry & Energy

Description: Test setup emissions 30 MHz - 1 GHz

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 9 of 10

Date: 28.03.2025



## Appendix 2 Photodocumentation

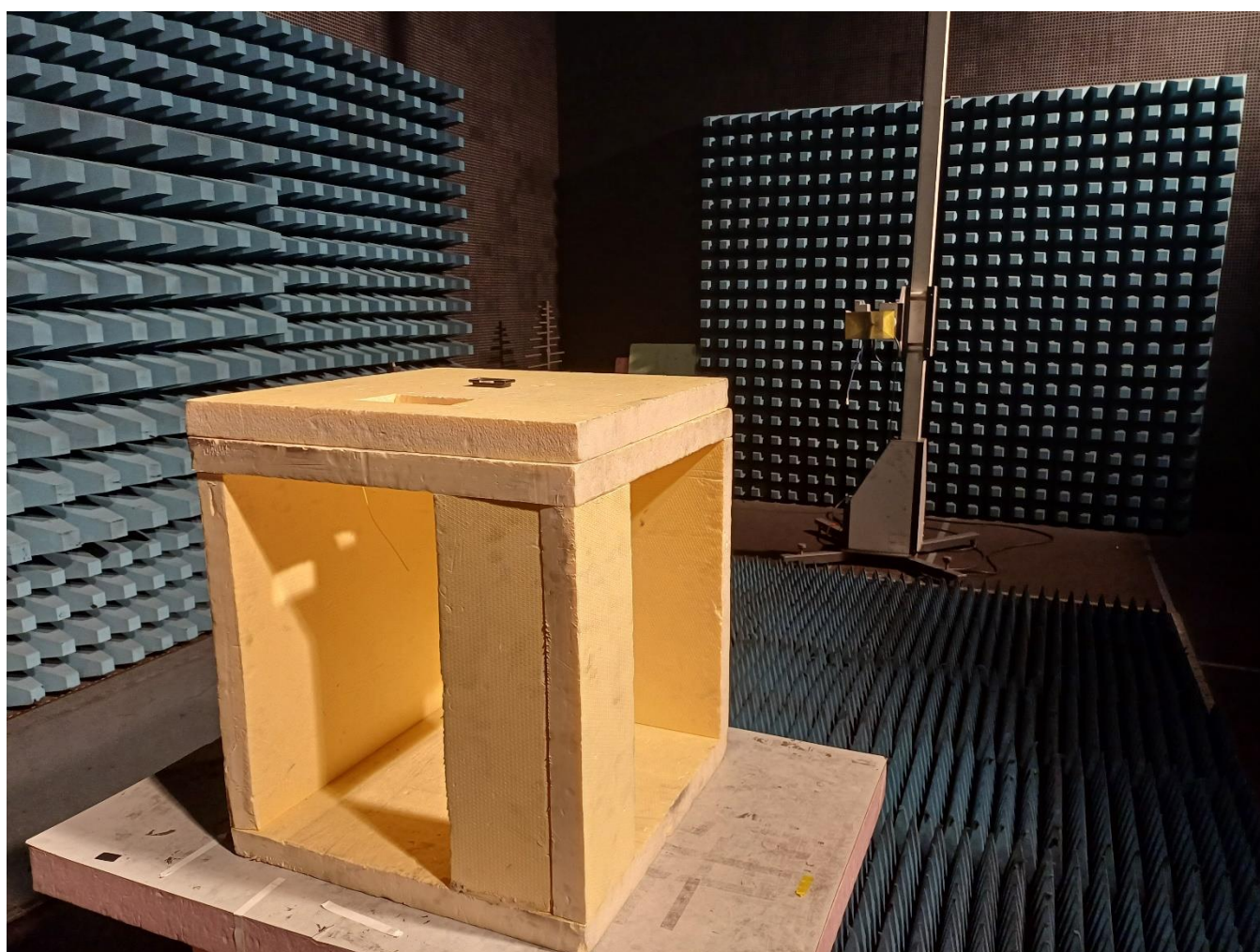
**Division:**  
Industry & Energy

Description: Test setup emissions above 1 GHz

Test report reference:  
2024-AT-TC-EE-ET-EX-0-  
000005-FG-036-E1

Page: 10 of 10

Date: 28.03.2025



--- END OF TEST REPORT ---

