



# TEST REPORT

No. I22N01112-BLE

for

**Shenzhen Tinno Mobile Technology Corp.**

**Smart Phone**

**Model Name: U328AA**

**with**

**Hardware Version: V1.0**

**Software Version: U328AAV01.08.10**

**FCC ID: XD6U328AA**

**Issued Date: 2022-07-25**

**Designation Number: CN1210**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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No. I22N01112-BLE

## **1. Summary of Test Report**

### **1.1. Test Items**

|                     |  |
|---------------------|--|
| Product Name        | Smart Phone                            |
| Model Name          | U328AA                                 |
| Applicant's name    | Shenzhen Tinno Mobile Technology Corp. |
| Manufacturer's Name | Shenzhen Tinno Mobile Technology Corp. |

### **1.2. Test Standards**

FCC Part15-2019; ANSI C63.10-2013

### **1.3. Test Result**

**Pass**

Please refer to "5.2. Test Results"

### **1.4. Testing Location**

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China

### **1.5. Project data**

Testing Start Date: 2022-05-19  
Testing End Date: 2022-07-25

### **1.6. Signature**

Lin Zechuang

(Prepared this test report)

An Ran

(Reviewed this test report)

Zhang Bojun

(Approved this test report)



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Shenzhen Tinno Mobile Technology Corp.  
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Shenzhen ,PRC  
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E-Mail xiaoping.li@tinno.com  
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### **2.2. Manufacturer Information**

Company Name: Shenzhen Tinno Mobile Technology Corp.  
27-001, South Side of Tianlong Mobile Headquarters Building,  
Address: Tongfa South Road, Xili Community, Xili Street, Nanshan District,  
Shenzhen ,PRC  
Contact Person xiaoping.li  
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Telephone: 0755-86095550  
Fax: 0755-86095551



### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

|                              |                              |
|------------------------------|------------------------------|
| Product Name                 | Smart Phone                  |
| Model Name                   | U328AA                       |
| Frequency Range              | 2400MHz~2483.5MHz            |
| Equipment type               | Bluetooth® Low Energy        |
| Type of Modulation           | GFSK                         |
| PHY                          | LE 1M/2M                     |
| Number of Channels           | 40                           |
| Antenna Type                 | Embedded antenna             |
| Antenna Gain                 | -0.82dBi                     |
| Power Supply                 | 3.85V DC by Battery          |
| FCC ID                       | XD6U328AA                    |
| Condition of EUT as received | No abnormality in appearance |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### **3.2. Internal Identification of EUT used during the test**

| EUT ID* | IMEI            | HW Version | SW Version      | Receive Date |
|---------|-----------------|------------|-----------------|--------------|
| UT02aa  | 866913060002471 | V1.0       | U328AAV01.08.10 | 2022-05-18   |
| UT16aa  | 866913060013221 | V1.0       | U328AAV01.08.10 | 2022-06-20   |

\*EUT ID: is used to identify the test sample in the lab internally.

UT02aa is used for conduction test, UT16aa is used for radiation test and AC Power line Conducted Emission test.

#### **3.3. Internal Identification of AE used during the test**

| AE ID* | Description | AE ID* |
|--------|-------------|--------|
| AE1    | Battery     | /      |
| AE2    | Charger     | /      |
| AE3    | USB Cable   | /      |

##### **AE1-1**

|                 |                                       |
|-----------------|---------------------------------------|
| Model           | LT25H426271P                          |
| Manufacturer    | Guangdong Fenghua New Energy Co.,Ltd. |
| Capacity        | 2500mAh                               |
| Nominal Voltage | 3.85V                                 |

##### **AE1-2**

|              |                                |
|--------------|--------------------------------|
| Model        | LT25H426271W                   |
| Manufacturer | Ningbo Veken Battery Co., Ltd. |
| Capacity     | 2500mAh                        |



|                 |   |
|-----------------|---|
| Nominal Voltage | 3.85V                                   |
| AE2-1           |   |
| Model           | TN-050120U9                             |
| Manufacturer    | Chongqing Lianmao Electronics Co., Ltd. |
| AE2-2           |   |
| Model           | TN-050120U8                             |
| Manufacturer    | Guangdong Beicom Electronics Co., Ltd.  |
| AE3-1           |   |
| Model           | 336275                                  |
| Manufacturer    | SUNTOPS (SHENZHEN) ELECTRONICS CO., LTD |
| AE3-2           |   |
| Model           | T365-011B-1                             |
| Manufacturer    | Shenzhen Yihuaxing Electronics Co. Ltd. |

\*AE ID: is used to identify the test sample in the lab internally.

### **3.4. General Description**

The Equipment under Test (EUT) is a model of Smart Phone with integrated antenna and battery. It consists of normal options: Lithium Battery, Charger and USB Cable. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the client.



## **4. Reference Documents**

### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

| <b>Reference</b> | <b>Title</b>  | <b>Version</b> |
|------------------|---|----------------|
| FCC Part 15      | FCC CFR 47, Part 15, Subpart C:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902–928MHz,<br>2400–2483.5 MHz, and 5725–5850 MHz | 2019           |
| ANSI C63.10      | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices  | 2013           |

## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

| No | Test cases                                | Sub-clause of Part 15C | Verdict |
|----|---|------------------------|---------|
| 0  | Antenna Requirement                       | 15.203                 | P       |
| 1  | Maximum Peak Output Power                 | 15.247 (b)             | P       |
| 2  | Peak Power Spectral Density               | 15.247 (e)             | P       |
| 3  | 6dB Bandwidth                             | 15.247 (a)             | P       |
| 4  | Band Edges Compliance                     | 15.247 (d)             | P       |
| 5  | Transmitter Spurious Emission - Conducted | 15.247 (d)             | P       |
| 6  | Transmitter Spurious Emission - Radiated  | 15.247, 15.205, 15.209 | P       |
| 7  | AC Power line Conducted Emission          | 15.107, 15.207         | P       |

See **ANNEX A** for details.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

## 6. Test Equipments Utilized

### Conducted test system

| No. | Equipment              | Model    | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|------------------------|----------|---------------|-----------------|----------------------|--------------------|
| 1   | Vector Signal Analyzer | FSV40    | 100903        | Rohde & Schwarz | 2022-12-29           | 1 year             |
| 2   | Power Sensor           | U2021XA  | MY55430013    | Keysight        | 2022-12-29           | 1 year             |
| 3   | Data Acquisiton        | U2531A   | TW55443507    | Keysight        | /                    | /                  |
| 4   | RF Control Unit        | JS0806-2 | 21C8060398    | Tonscend        | 2023-05-08           | 1 year             |
| 5   | Test Receiver          | ESCI     | 100701        | Rohde & Schwarz | 2023-01-12           | 1 year             |
| 6   | LISN                   | ENV216   | 102067        | Rohde & Schwarz | 2023-07-14           | 1 year             |

### Radiated test system

| No. | Equipment         | Model               | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|-------------------|---------------------|---------------|-----------------|----------------------|--------------------|
| 1   | Loop Antenna      | HLA6120             | 35779         | TESEQ           | 2025-05-12           | 3 years            |
| 2   | BiLog Antenna     | 3142E               | 0224831       | ETS-Lindgren    | 2024-05-27           | 3 years            |
| 3   | Horn Antenna      | 3117                | 00066577      | ETS-Lindgren    | 2025-04-17           | 3 years            |
| 4   | Horn Antenna      | QSH-SL-18-26-S-20   | 17013         | Q-par           | 2023-01-06           | 3 years            |
| 5   | Horn Antenna      | QSH-SL-8-26-40-K-20 | 17014         | Q-par           | 2023-01-06           | 3 years            |
| 6   | Test Receiver     | ESR7                | 101676        | Rohde & Schwarz | 2022-11-24           | 1 year             |
| 7   | Spectrum Analyser | FSV40               | 101192        | Rohde & Schwarz | 2023-01-12           | 1 year             |
| 8   | Chamber           | FACT3-2.0           | 1285          | ETS-Lindgren    | 2023-05-29           | 2 years            |

### Test software

| No. | Equipment      | Manufacturer    | Version  |
|-----|----------------|-----------------|----------|
| 1   | RF Test System | Tonscend        | 3.1      |
| 2   | EMC32          | Rohde & Schwarz | 10.50.40 |

EUT is engineering software provided by the customer to control the transmitting signal.

The EUT was programmed to be in continuously transmitting mode.

### Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

## **7. Laboratory Environment**

### **Semi-anechoic chamber**

|                                   |  |
|-----------------------------------|--|
| Temperature                       | Min. = 15 °C, Max. = 35 °C                   |
| Relative humidity                 | Min. = 20 %, Max. = 75 %                     |
| Shielding effectiveness           | 0.014MHz-1MHz > 60 dB; 1MHz-18000MHz > 90 dB |
| Electrical insulation             | > 2MΩ  |
| Ground system resistance          | < 4 Ω  |
| Normalised site attenuation (NSA) | < ±4 dB, 3 m distance, from 30 to 1000 MHz   |

### **Shielded room**

|                          |  |
|--------------------------|--|
| Temperature              | Min. = 15 °C, Max. = 35 °C                   |
| Relative humidity        | Min. = 20 %, Max. = 75 %                     |
| Shielding effectiveness  | 0.014MHz-1MHz > 60 dB; 1MHz-18000MHz > 90 dB |
| Electrical insulation    | > 2MΩ  |
| Ground system resistance | < 4 Ω  |

### **Fully-anechoic chamber**

|                                    |  |
|------------------------------------|--|
| Temperature                        | Min. = 15 °C, Max. = 35 °C                   |
| Relative humidity                  | Min. = 20 %, Max. = 75 %                     |
| Shielding effectiveness            | 0.014MHz-1MHz > 60 dB; 1MHz-18000MHz > 90 dB |
| Electrical insulation              | > 2MΩ  |
| Ground system resistance           | < 4 Ω  |
| Voltage Standing Wave Ratio (VSWR) | ≤ 6 dB, from 1 to 18 GHz, 3 m distance       |
| Uniformity of field strength       | Between 0 and 6 dB, from 80 to 6000 MHz      |

## 8. Measurement Uncertainty

| Test Name                                    | Uncertainty ( $k=2$ )        |        |
|--|------------------------------|--------|
| 1. Maximum Peak Output Power                 | 1.32dB                       |        |
| 2. Peak Power Spectral Density               | 2.32dB                       |        |
| 3. 6dB Bandwidth                             | 4.56kHz                      |        |
| 4. Band Edges Compliance                     | 1.92dB                       |        |
| 5. Transmitter Spurious Emission - Conducted | 30MHz $\leq$ f < 1GHz        | 1.41dB |
|  | 1GHz $\leq$ f < 7GHz         | 1.92dB |
|  | 7GHz $\leq$ f < 13GHz        | 2.31dB |
|  | 13GHz $\leq$ f < 26GHz       | 2.61dB |
| 6. Transmitter Spurious Emission - Radiated  | 9kHz $\leq$ f < 30MHz        | 1.79dB |
|  | 30MHz $\leq$ f < 1GHz        | 4.86dB |
|  | 1GHz $\leq$ f < 18GHz        | 4.50dB |
|  | 18GHz $\leq$ f < 40GHz       | 2.90dB |
| 7. AC Power line Conducted Emission          | 150kHz $\leq$ f $\leq$ 30MHz | 2.62dB |

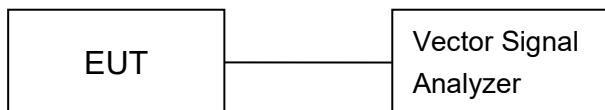
## **ANNEX A: Detailed Test Results**

### **Test Configuration**

The measurement is made according to ANSI C63.10.

#### **1) Conducted Measurements**

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the spectrum analyzer to start measurement.
5. Record the values.

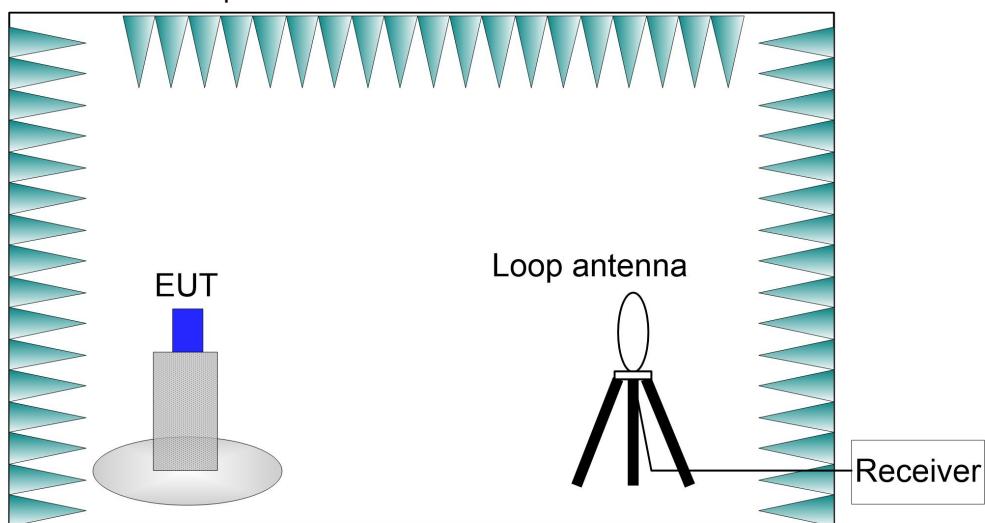


#### **2) Radiated Measurements**

##### **Test setup:**

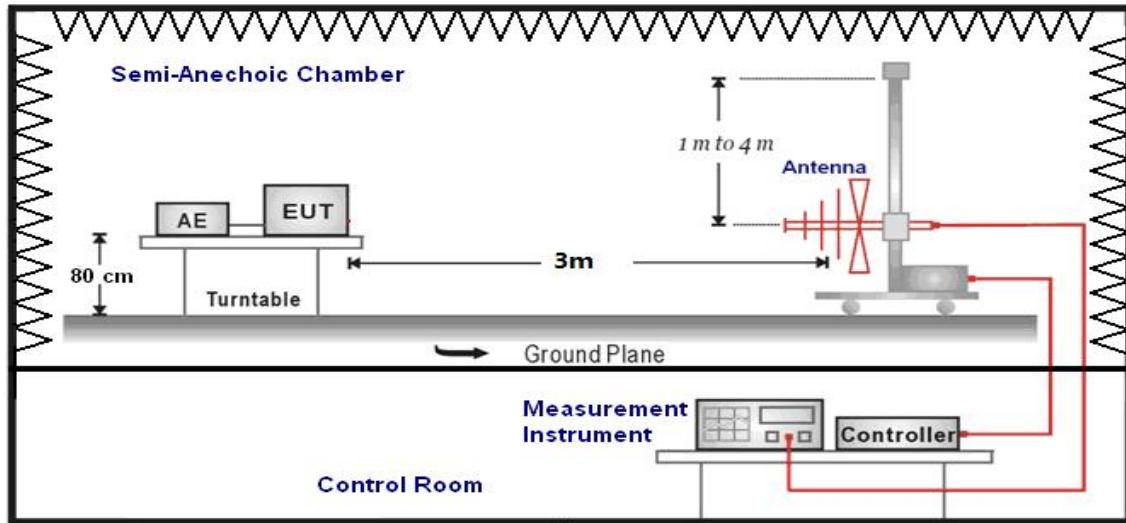
##### **9kHz-30MHz:**

The EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



### 30MHz-1GHz:

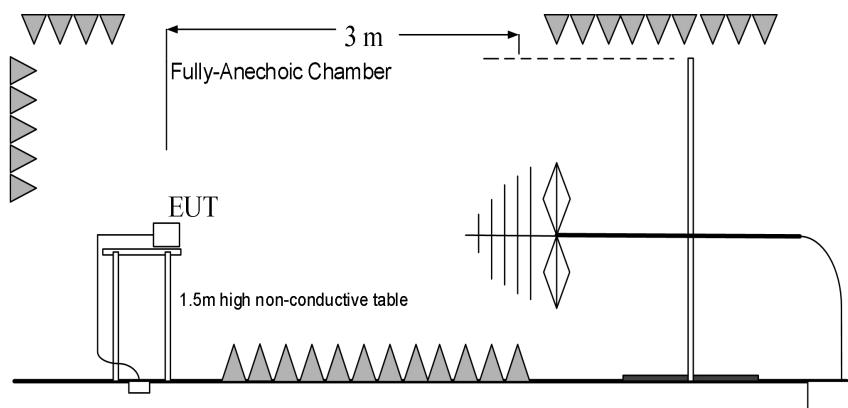
The EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

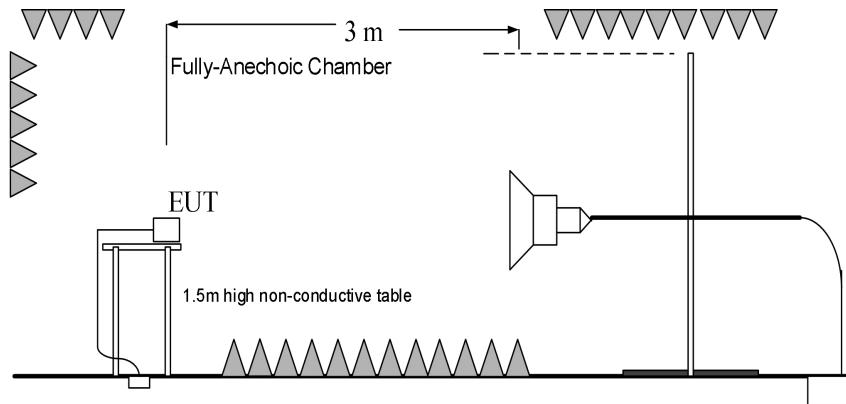


### Above 1GHz:

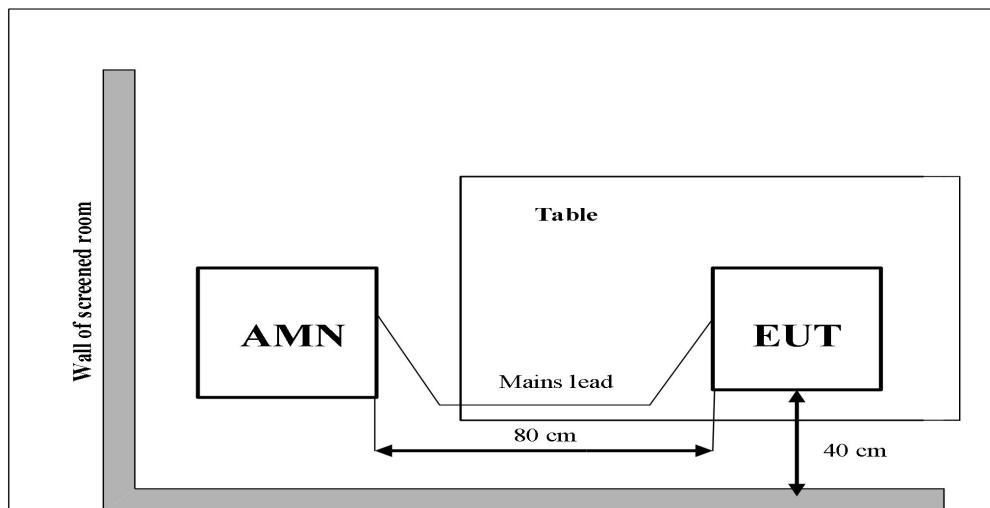
EUT was placed on a 1.5 meter high non-conductive table at a 3 meter test distance from the receive antenna. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiving antenna polarization.

### 1GHz-3GHz:



**3GHz-40GHz:**

**3) AC Power line Conducted Emission Measurement**

For Bluetooth LE, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.





## A.0 Antenna requirement

### Measurement Limit:

| Standard            | Requirement  |
|---------------------|--|
| FCC CRF Part 15.203 | An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. |

**Conclusion: The Directional gains of antenna used for transmitting is -0.82dBi.**

**The RF transmitter uses an integrate antenna without connector.**



### A.1 Maximum Peak Output Power

**Method of Measurement: See ANSI C63.10-clause 11.9.1.3**

The maximum peak conducted output power may be measured using a broadband peak RF power meter.

**Measurement Limit:**

| Standard                  | Limit (dBm) |
|---------------------------|-------------|
| FCC 47 CRF Part 15.247(b) | < 30        |

**Measurement Results:**

| Mode  | Frequency (MHz) | RF output power (dBm) | Conclusion |
|-------|-----------------|-----------------------|------------|
| LE 1M | 2402(CH0)       | -3.44                 | P          |
|       | 2440(CH19)      | -2.50                 | P          |
|       | 2480(CH39)      | -3.69                 | P          |
| LE 2M | 2402(CH0)       | -3.56                 | P          |
|       | 2440(CH19)      | -2.59                 | P          |
|       | 2480(CH39)      | -3.73                 | P          |

**Conclusion: Pass**

## A.2 Peak Power Spectral Density

**Method of Measurement: See ANSI C63.10-clause 11.10.2**

**Measurement Limit:**

| Standard                  | Limit (dBm/3 kHz) |
|---------------------------|-------------------|
| FCC 47 CRF Part 15.247(e) | < 8 dBm/3 kHz     |

**Measurement Results:**

| Mode  | Frequency (MHz) | Peak Power Spectral Density (dBm/10 kHz) | Conclusion |
|-------|-----------------|--|------------|
| LE 1M | 2402(CH0)       | Fig.1                                    | -14.53     |
|       | 2440(CH19)      | Fig.2                                    | -13.54     |
|       | 2480(CH39)      | Fig.3                                    | -14.71     |
| LE 2M | 2402(CH0)       | Fig.4                                    | -17.80     |
|       | 2440(CH19)      | Fig.5                                    | -16.66     |
|       | 2480(CH39)      | Fig.6                                    | -17.93     |

**See below for test graphs.**

**Conclusion: PASS**

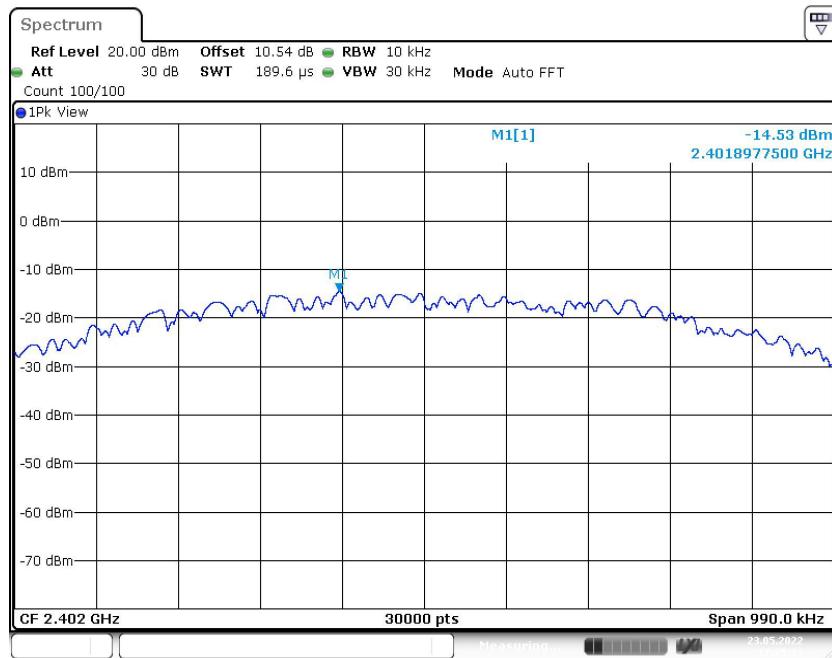


Fig.1 Power Spectral Density (CH0), LE 1M

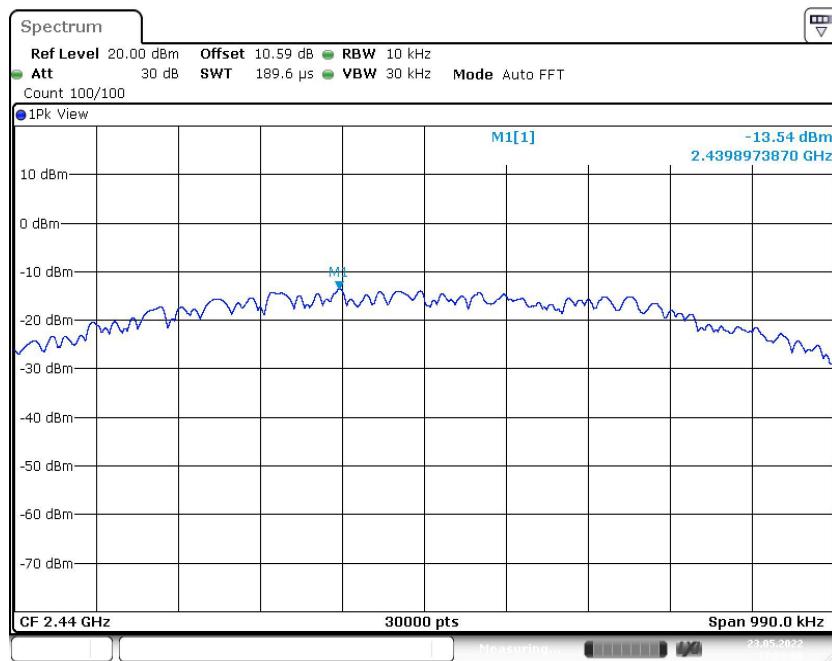
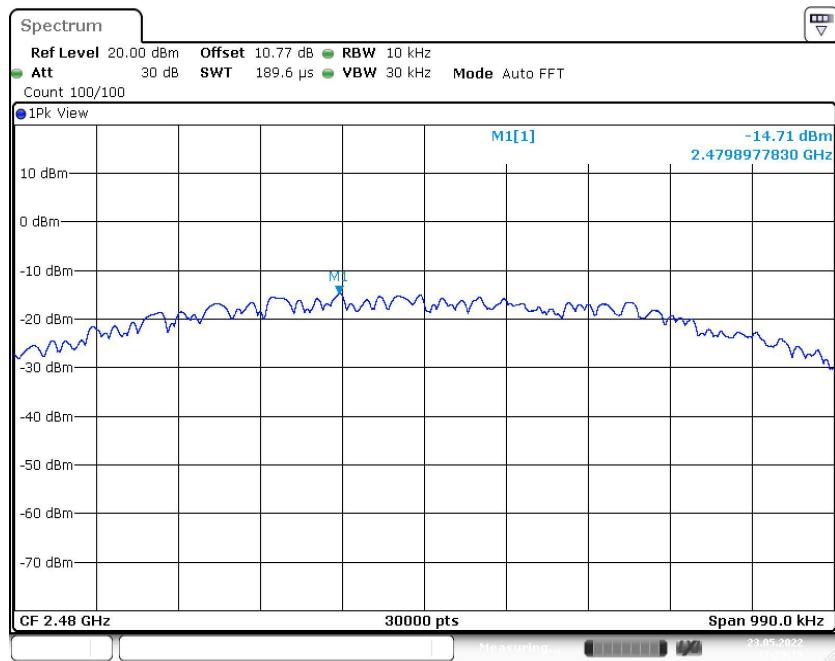
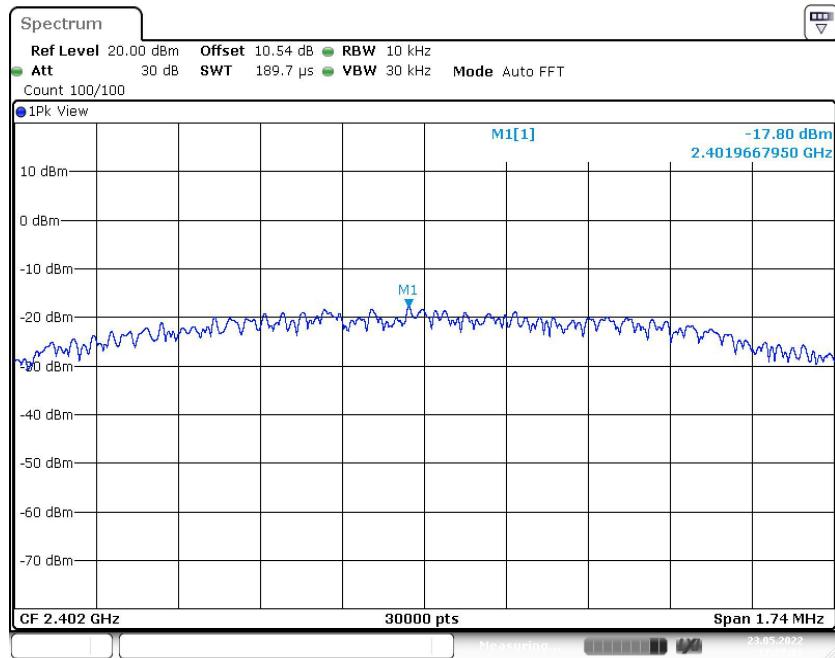


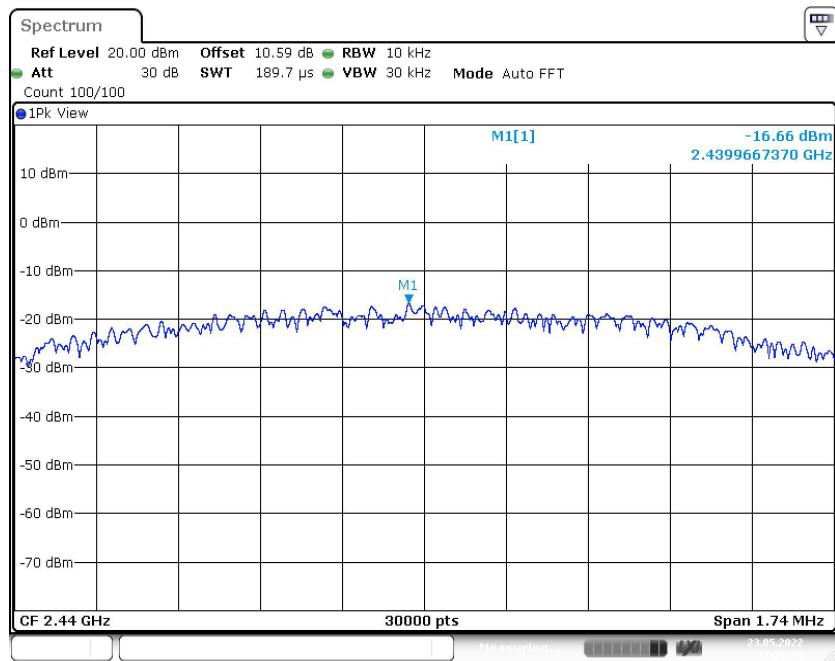
Fig.2 Power Spectral Density (CH19), LE 1M



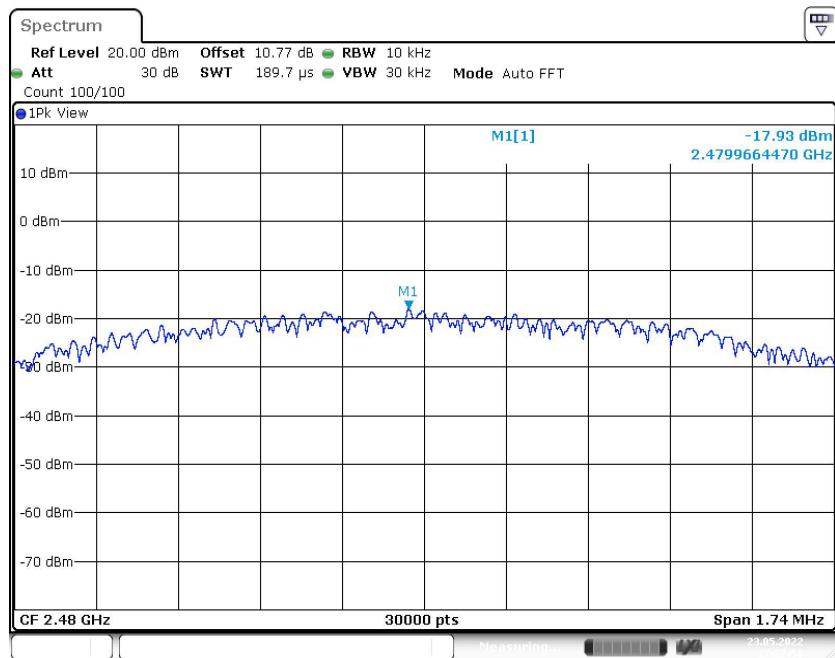
**Fig.3 Power Spectral Density (CH39), LE 1M**



**Fig.4 Power Spectral Density (CH0), LE 2M**



**Fig.5 Power Spectral Density (CH19), LE 2M**



**Fig.6 Power Spectral Density (CH39), LE 2M**



### A.3 6dB Bandwidth

**Method of Measurement: See ANSI C63.10-clause 11.8.2**

**Measurement Limit:**

| Standard                   | Limit (MHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.247 (a) | $\geq 0.5$  |

**Measurement Result:**

| Mode  | Frequency (MHz) | Test Results (MHz) | Conclusion |
|-------|-----------------|--------------------|------------|
| LE 1M | 2402(CH0)       | Fig.7              | 0.66       |
|       | 2440(CH19)      | Fig.8              | 0.66       |
|       | 2480(CH39)      | Fig.9              | 0.66       |
| LE 2M | 2402(CH0)       | Fig.10             | 1.16       |
|       | 2440(CH19)      | Fig.11             | 1.16       |
|       | 2480(CH39)      | Fig.12             | 1.16       |

See below for test graphs.

**Conclusion: PASS**

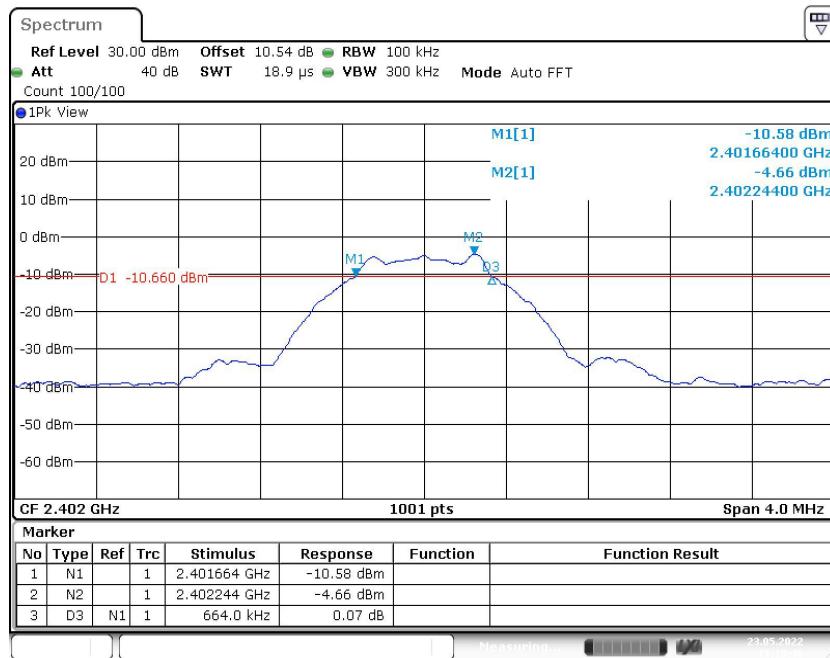


Fig.7 6dB Bandwidth (CH0), LE 1M

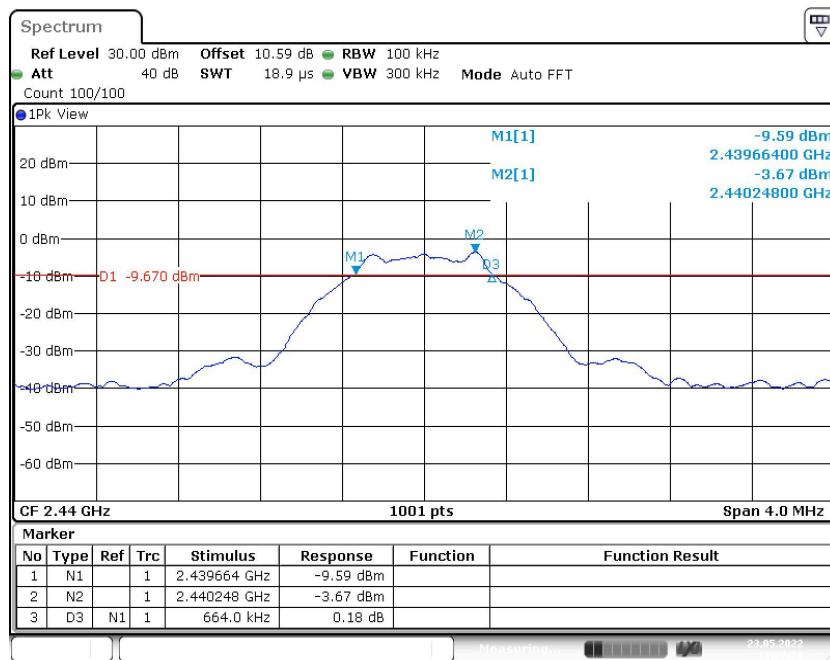


Fig.8 6dB Bandwidth (CH19), LE 1M

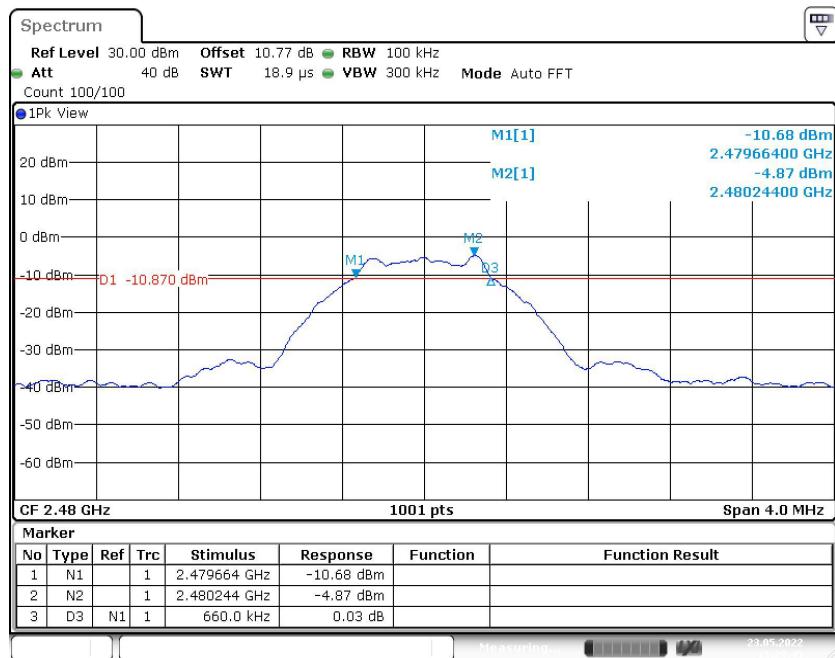


Fig.9 6dB Bandwidth (CH39), LE 1M

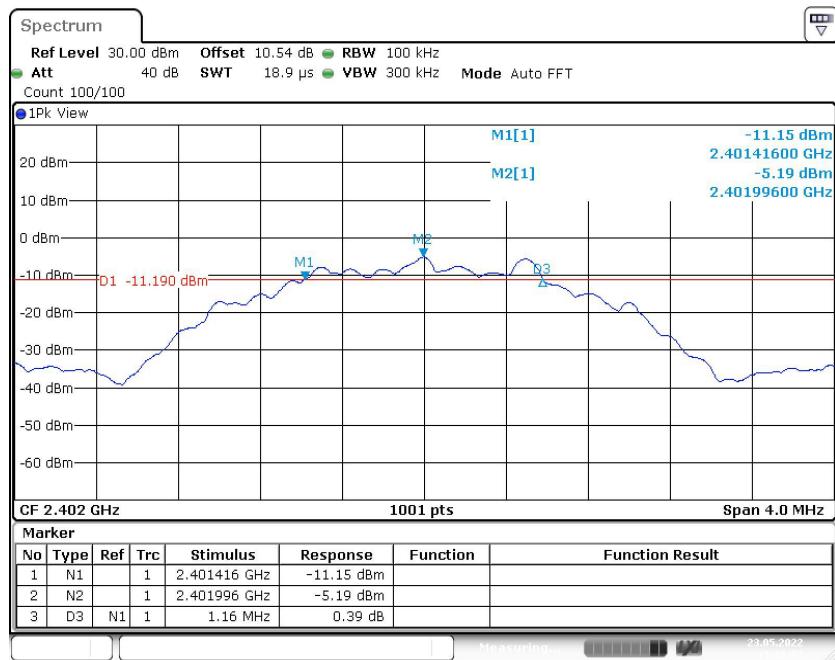


Fig.10 6dB Bandwidth (CH0), LE 2M

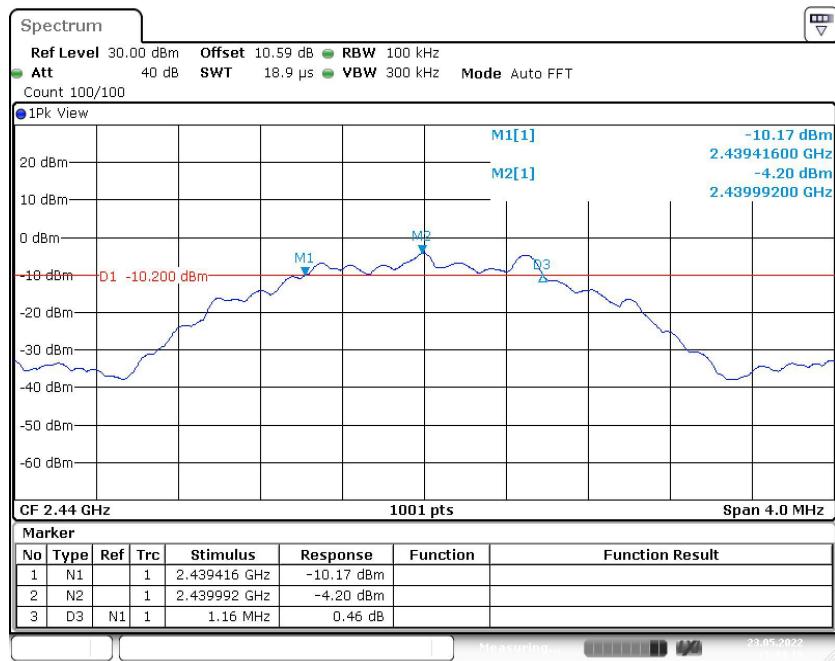


Fig.11 6dB Bandwidth (CH19), LE 2M

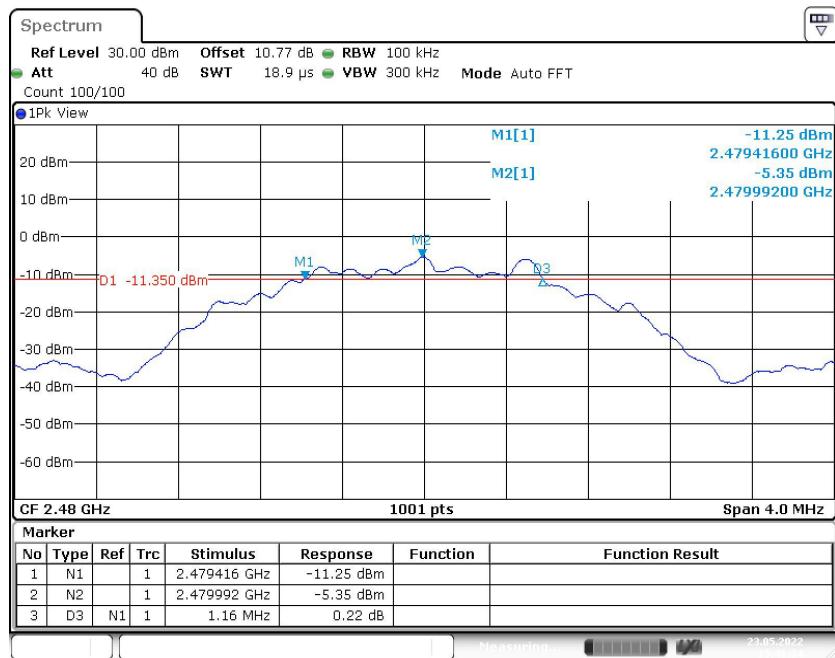


Fig.12 6dB Bandwidth (CH39), LE 2M



#### A.4 Band Edges Compliance

**Method of Measurement: See ANSI C63.10-clause 11.13.3.2**

**Measurement Limit:**

| Standard                   | Limit (dB) |
|----------------------------|------------|
| FCC 47 CFR Part 15.247 (d) | > 20       |

**Measurement Result:**

| Mode  | Frequency (MHz) | Test Results (dB) | Conclusion |
|-------|-----------------|-------------------|------------|
| LE 1M | 2402(CH0)       | Fig.13            | P          |
|       | 2480(CH39)      | Fig.14            | P          |
| LE 2M | 2402(CH0)       | Fig.15            | P          |
|       | 2480(CH39)      | Fig.16            | P          |

See below for test graphs.

Conclusion: **PASS**

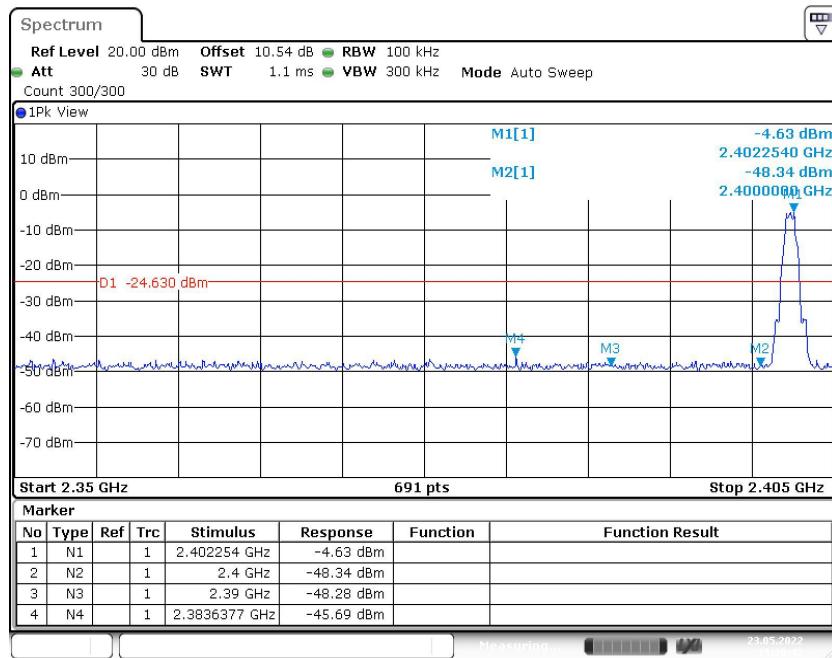


Fig.13 Band Edges (CH0), LE 1M

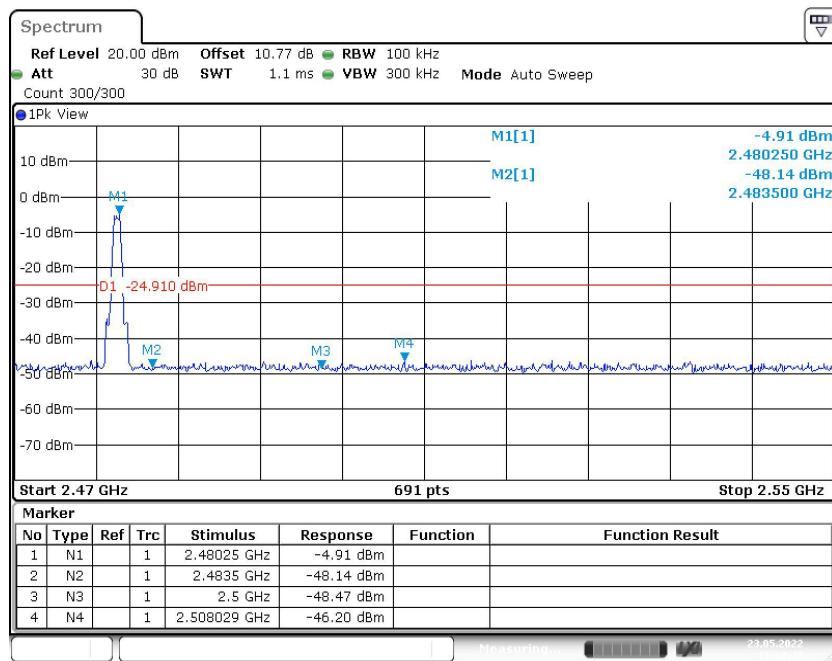


Fig.14 Band Edges (CH39), LE 1M

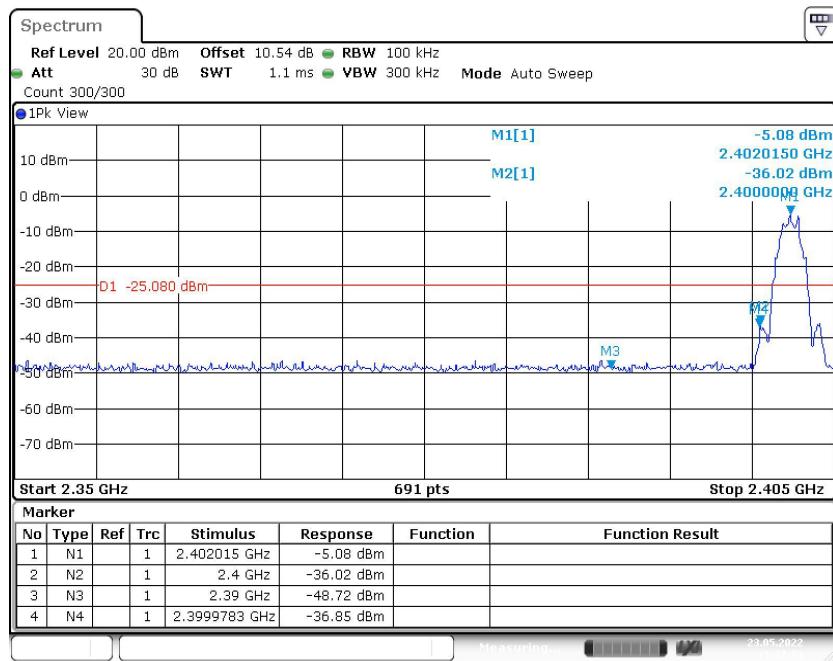


Fig.15 Band Edges (CH0), LE 2M

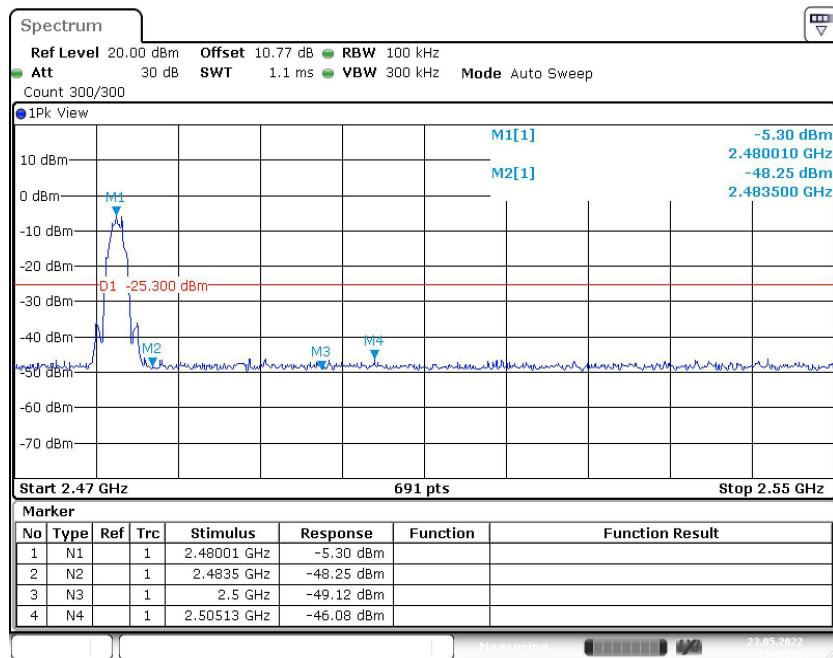


Fig.16 Band Edges (CH39), LE 2M

### A.5 Transmitter Spurious Emission - Conducted

**Method of Measurement: See ANSI C63.10-clause 11.11.2&11.11.3**

**Measurement Limit:**

| Standard                   | Limit (dBm)  |
|----------------------------|--|
| FCC 47 CFR Part 15.247 (d) | 20dBm below peak output power in 100 kHz bandwidth |

**Measurement Results:**

| Mode  | Channel | Frequency Range | Test Results | Conclusion |
|-------|---------|-----------------|--------------|------------|
| LE 1M | 0       | 2.402 GHz       | Fig.17       | P          |
|       |         | 30MHz -1GHz     | Fig.18       | P          |
|       |         | 1GHz-26.5GHz    | Fig.19       | P          |
|       | 19      | 2.440 GHz       | Fig.20       | P          |
|       |         | 30MHz -1GHz     | Fig.21       | P          |
|       |         | 1GHz-26.5GHz    | Fig.22       | P          |
|       | 39      | 2.480 GHz       | Fig.23       | P          |
|       |         | 30MHz -1GHz     | Fig.24       | P          |
|       |         | 1GHz-26.5GHz    | Fig.25       | P          |
| LE 2M | 0       | 2.402 GHz       | Fig.26       | P          |
|       |         | 30MHz -1GHz     | Fig.27       | P          |
|       |         | 1GHz-26.5GHz    | Fig.28       | P          |
|       | 19      | 2.440 GHz       | Fig.29       | P          |
|       |         | 30MHz -1GHz     | Fig.30       | P          |
|       |         | 1GHz-26.5GHz    | Fig.31       | P          |
|       | 39      | 2.480 GHz       | Fig.32       | P          |
|       |         | 30MHz -1GHz     | Fig.33       | P          |
|       |         | 1GHz-26.5GHz    | Fig.34       | P          |

See below for test graphs.

**Conclusion: Pass**

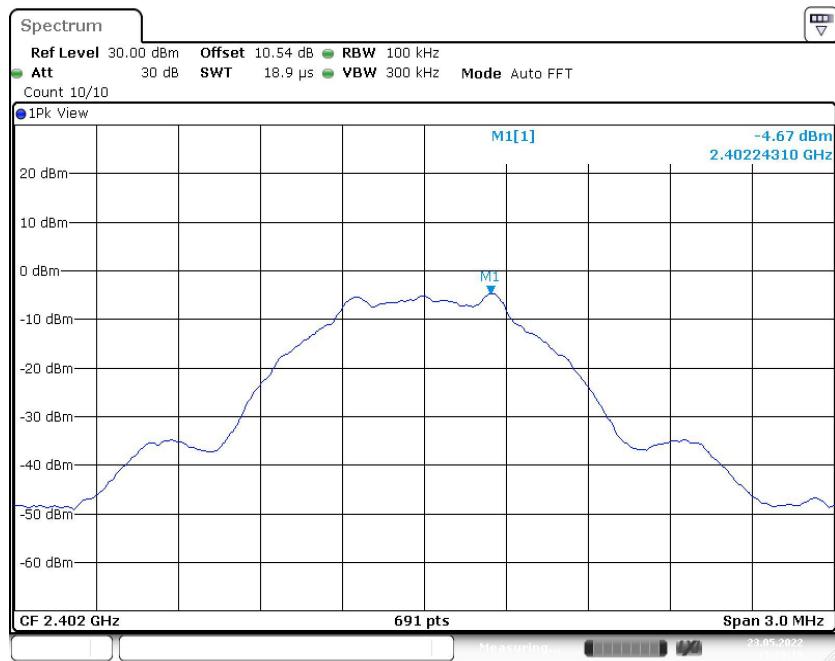


Fig.17 Conducted Spurious Emission (CH0, Center Frequency), LE 1M

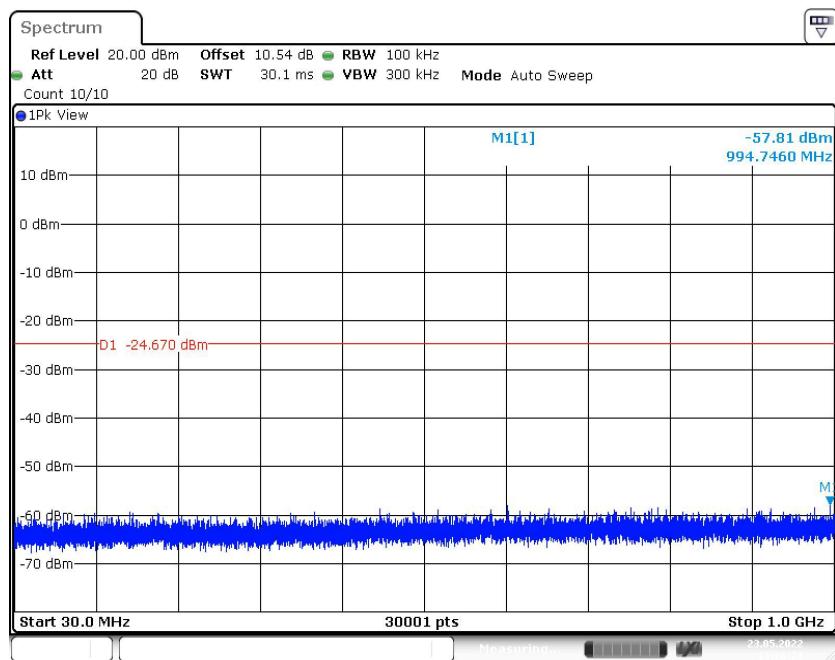
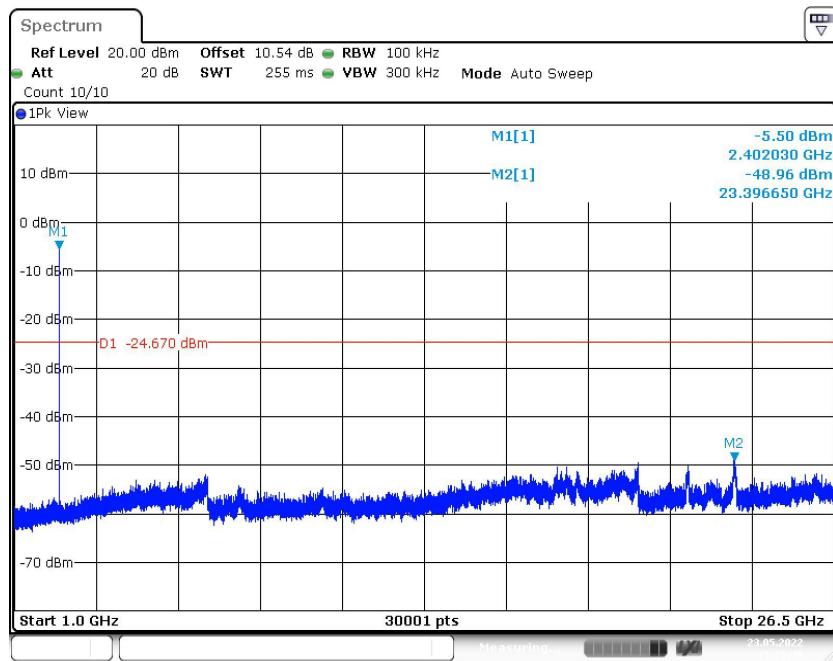


Fig.18 Conducted Spurious Emission (CH0, 30MHz -1GHz), LE 1M



**Fig.19 Conducted Spurious Emission (CH0, 1GHz-26.5GHz), LE 1M**



**Fig.20 Conducted Spurious Emission (CH19, Center Frequency), LE 1M**

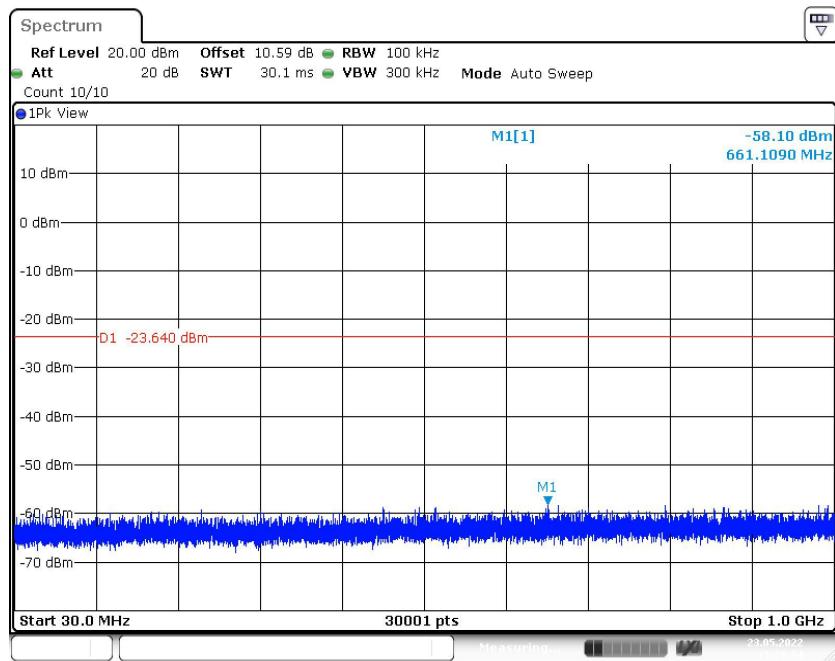


Fig.21 Conducted Spurious Emission (CH19, 30MHz -1GHz), LE 1M

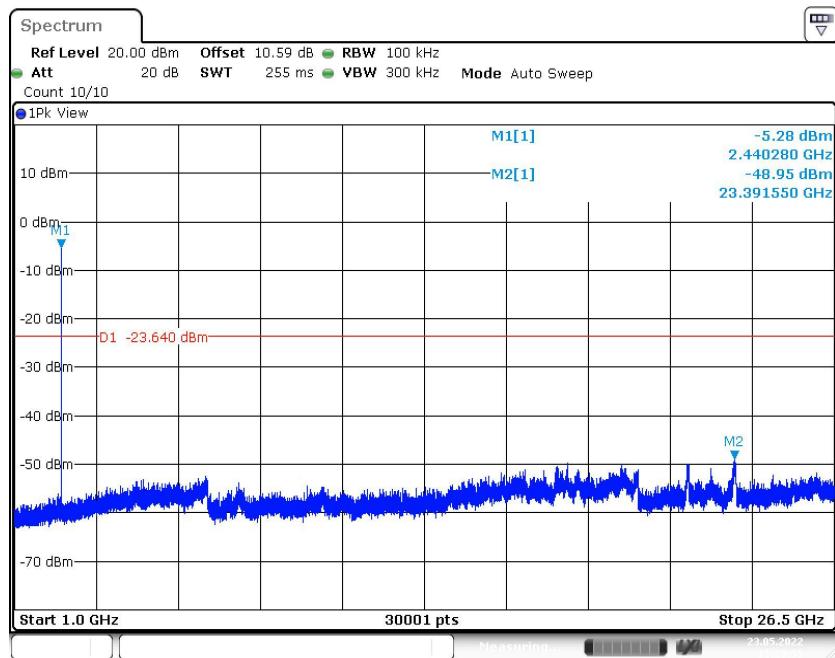
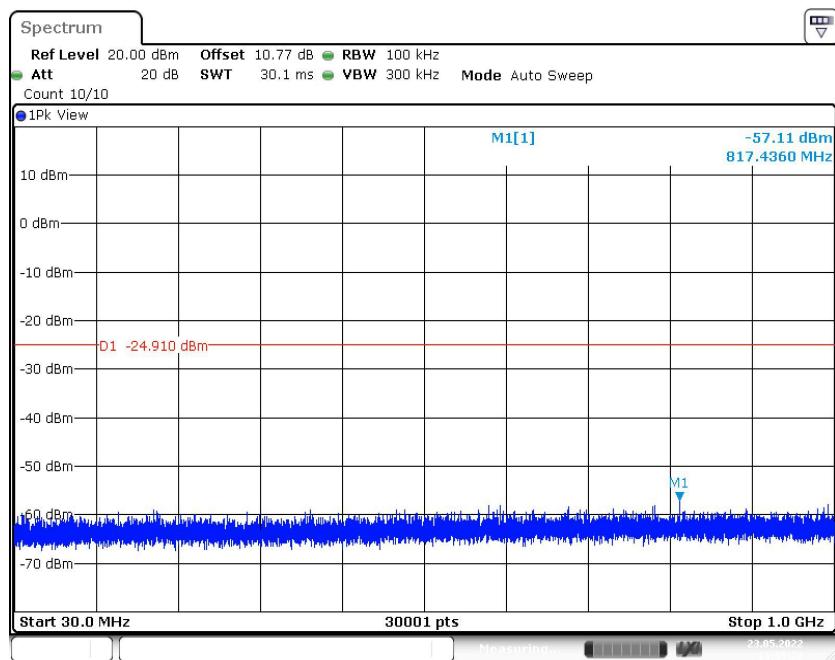


Fig.22 Conducted Spurious Emission (CH19, 1GHz-26.5GHz), LE 1M



**Fig.23 Conducted Spurious Emission (CH39, Center Frequency), LE 1M**



**Fig.24 Conducted Spurious Emission (CH39, 30MHz -1GHz), LE 1M**