

# FCC Part 15C&RSS-247 TEST REPORT

**FCC ID: YGM-E300A**

**IC:21567-E300A**

**Product : Alexa Ceiling Amplifier**

**Model Name : E300A**

**Brand :**  

**Report No. : NCT23034168-2**

Prepared for

**Armour Home Electronics Limited**

**Woodside 2, Dunmow Road, Bishop's Stortford, Hertfordshire,  
CM23 5RG UNITED KINGDOM**

Prepared by

**Shenzhen NCT Testing Technology Co., Ltd.**

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## 1 TEST RESULT CERTIFICATION

Applicant's name : Armour Home Electronics Limited  
Address : Woodside 2, Dunmow Road, Bishop's Stortford, Hertfordshire, CM23 5RG UNITED KINGDOM  
Manufacture's name : Armour Home Electronics Limited  
Address : Woodside 2, Dunmow Road, Bishop's Stortford, Hertfordshire, CM23 5RG UNITED KINGDOM  
Product name : Alexa Ceiling Amplifier  
Model name : E300A  
Additional model : N/A  
Standards : FCC CFR47 Part 15 Section 15.247  
RSS-247 Issue 3: August 2023  
ANSI C63.10:2013  
Test procedure : RSS-GEN, Issue 5: March 2019  
Date of test : Sep. 02, 2023 to Oct. 18, 2023  
Date of Issue : Oct. 18, 2023  
Test Result : Pass

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

*Hugh Zhang*

Hugh Zhang / Engineer

Technical Manager:

*Henry Wang*  
Henry Wang / Manager



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## 2 Test Summary

| Test Items                  | Test Requirement                                                | Result |
|-----------------------------|-----------------------------------------------------------------|--------|
| Conduct Emission            | 15.207<br>RSS-Gen 8.8                                           | PASS   |
| Radiated Spurious Emissions | 15.205(a)<br>15.209<br>15.247(d)<br>RSS-Gen 8.9<br>RSS-Gen 8.10 | PASS   |
| Conducted Spurious Emission | 15.247(d)<br>RSS-247 5.5                                        | PASS   |
| Band edge                   | 15.247(d)<br>15.205(a)<br>RSS-247 5.5                           | PASS   |
| 6dB Bandwidth & 99% OCB     | 15.247(a)(2)<br>RSS-247 [5.2(1)]                                | PASS   |
| Maximum Peak Output Power   | 15.247(b)(3)<br>RSS-247.5.4(4)                                  | PASS   |
| Power Spectral Density      | 15.247(e)<br>RSS-247 [5.2(2)]                                   | PASS   |
| Antenna Requirement         | 15.203<br>15.247 (c)<br>RSS-Gen 6.8                             | PASS   |

Remark:

1. "N/A" denotes test is not applicable in this Test Report.

## 2.1 Test Site

### Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27

The certificate is valid until 2028.01.07

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L8251

Designation Number: CN1347

Test Firm Registration Number: 894804

Accredited by A2LA, June 14, 2023

The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0150

Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

### 3 General Information

#### 3.1 General Description of E.U.T.

|                                                                                                                                                                                                                                                                                                                                                                                 |   |                                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name                                                                                                                                                                                                                                                                                                                                                                    | : | Alexa Ceiling Amplifier                                                                                                                             |
| Model Name                                                                                                                                                                                                                                                                                                                                                                      | : | E300A                                                                                                                                               |
| Sample ID                                                                                                                                                                                                                                                                                                                                                                       | : | N/A                                                                                                                                                 |
| Sample(s) Status:                                                                                                                                                                                                                                                                                                                                                               | : | Engineer sample                                                                                                                                     |
| Additional model                                                                                                                                                                                                                                                                                                                                                                | : | N/A                                                                                                                                                 |
| Operating frequency                                                                                                                                                                                                                                                                                                                                                             | : | 2402-2480MHz                                                                                                                                        |
| Number of Channels                                                                                                                                                                                                                                                                                                                                                              | : | 40 channels                                                                                                                                         |
| Type of Modulation                                                                                                                                                                                                                                                                                                                                                              | : | GFSK                                                                                                                                                |
| Antenna installation                                                                                                                                                                                                                                                                                                                                                            | : | PCB Antenna                                                                                                                                         |
| Antenna Gain                                                                                                                                                                                                                                                                                                                                                                    | : | 3.5dBi                                                                                                                                              |
| Power supply                                                                                                                                                                                                                                                                                                                                                                    | : | DC 22V From adapter input AC 120V/60Hz                                                                                                              |
| Hardware Version                                                                                                                                                                                                                                                                                                                                                                | : | 24                                                                                                                                                  |
| Software Version                                                                                                                                                                                                                                                                                                                                                                | : | 2628.0001.0                                                                                                                                         |
| SWITCHING POWER ADAPTER:                                                                                                                                                                                                                                                                                                                                                        | : | Manufacturer: Dongguan YiDai Power Technology Co., LTD<br>Model: TD-ZN2200150-6B<br>Input: 100-240V~ 50/60Hz 1.5A Max<br>Output: DC 22.0V/1.5A, 33W |
| Remark: the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.<br>2.4G Wifi & BT antenna and 5G Wifi antenna cannot transmit at the same time. 2.4G WLAN and BT share the same antenna port and cannot transmit simultaneously. |   |                                                                                                                                                     |

### 3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

Channel List:

| Channel | Frequency (MHz) | Channel   | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|-----------|-----------------|---------|-----------------|
| 00      | <b>2402</b>     | 14        | 2430            | 28      | 2458            |
| 01      | 2404            | 15        | 2432            | 29      | 2460            |
| 02      | 2406            | 16        | 2434            | 30      | 2462            |
| 03      | 2408            | 17        | 2436            | 31      | 2464            |
| 04      | 2410            | 18        | 2438            | 32      | 2466            |
| 05      | 2412            | <b>19</b> | <b>2440</b>     | 33      | 2468            |
| 06      | 2414            | 20        | 2442            | 34      | 2470            |
| 07      | 2416            | 21        | 2444            | 35      | 2472            |
| 08      | 2418            | 22        | 2446            | 36      | 2474            |
| 09      | 2420            | 23        | 2448            | 37      | 2476            |
| 10      | 2422            | 24        | 2450            | 38      | 2478            |
| 11      | 2424            | 25        | 2452            | 39      | <b>2480</b>     |
| 12      | 2426            | 26        | 2454            |         |                 |
| 13      | 2428            | 27        | 2456            |         |                 |

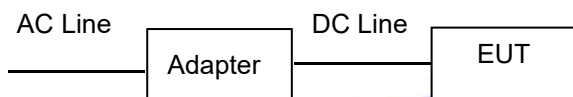
Note:

1. Test of channel was included the lowest, middle and highest frequency in highest data rate and to perform the test, then record on this report.

| Channel | Frequency(MHz) |
|---------|----------------|
| 0       | 2402           |
| 19      | 2440           |
| 39      | 2480           |

## 3.3 Test Setup Configuration

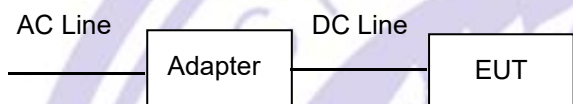
Conducted Emission



Radiated Emission



Conducted Spurious



## 3.4 Test Mode

|                                                                                                                                                                                                                                       |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                     | Keep the EUT in continuously transmitting mode. |
| Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. |                                                 |

|                   |                        |
|-------------------|------------------------|
| Test Software     | DutApi-w8887-BrdigeEth |
| Power level setup | ≤5dBm                  |

## 4 Equipment During Test

### 4.1 Equipments List

#### Conducted emission Test Equipment

| Name              | Model No.    | Serial No. | Manufacturer    | Date of Cal. | Due Date  |
|-------------------|--------------|------------|-----------------|--------------|-----------|
| 944 Shielded Room | 944 Room     | /          | EMToni          | 2022/5/31    | 2025/5/30 |
| EMI Test Receiver | ESPI         | 101604     | Rohde & Schwarz | 2023/6/21    | 2024/6/20 |
| LISN              | ENV 216      | 102796     | Rohde & Schwarz | 2023/6/21    | 2024/6/20 |
| LISN              | VN1-13S      | 004023     | CRANAGE         | 2023/6/21    | 2024/6/20 |
| Cable             | RG223-1500MM | NA         | RG              | 2023/6/21    | 2024/6/20 |

#### Radiated emission & Radio Frequency Test Equipment

| Name                                                | Model No.   | Serial No. | Manufacturer    | Date of Cal. | Due Date  |
|-----------------------------------------------------|-------------|------------|-----------------|--------------|-----------|
| 966 Shielded Room                                   | 966 Room    | /          | EMToni          | 2022/5/31    | 2025/5/30 |
| EMI Test Receiver                                   | ESCI        | 101178     | Rohde & Schwarz | 2023/6/21    | 2024/6/20 |
| Spectrum Analyze<br>(10Hz-26.5GHz)                  | N9020A      | MY50510202 | Agilent         | 2023/6/21    | 2024/6/20 |
| Amplifier<br>(30MHz-1GHz)                           | BBV 9743 B  | 00374      | SCHNARZBECK     | 2023/6/21    | 2024/6/20 |
| Bilog Antenna<br>(30MHz-1GHz)                       | VULB9162    | 00473      | SCHNARZBECK     | 2023/3/19    | 2025/3/18 |
| Horn antenna<br>(1GHz-18GHz)                        | BBHA 9120 D | 02622      | SCHNARZBECK     | 2023/3/19    | 2025/3/18 |
| Preamplifier<br>(1GHz-18GHz)                        | BBV 9718D   | 0024       | SCHNARZBECK     | 2023/6/21    | 2024/6/20 |
| Spectrum Analyze<br>(10Hz-40GHz)                    | FSV 40      | 100952     | Rohde & Schwarz | 2023/6/21    | 2024/6/20 |
| Preamplifier<br>(15GHz-40GHz)                       | BBV 9718D   | 0024       | SCHNARZBECK     | 2023/6/21    | 2024/6/20 |
| Double Ridge Guide<br>Horn Antenna<br>(18GHz-40GHz) | SAS-574     | 588        | A.H.System      | 2023/3/19    | 2025/3/18 |
| Loop Antenna<br>(9KHz-30MHz)                        | FMZB1519B   | 014        | SCHNARZBECK     | 2023/6/21    | 2024/6/20 |

|                           |                   |       |             |           |           |
|---------------------------|-------------------|-------|-------------|-----------|-----------|
| Amplifier<br>(9KHz-30MHz) | CVP 9222 C        | 00109 | SCHNARZBECK | 2023/6/21 | 2024/6/20 |
| Power Sensor              | TR1029-2          | 00473 | SCHNARZBECK | 2023/6/21 | 2024/6/20 |
| RF Swith                  | TR1029-1          | 02622 | SCHNARZBECK | 2023/6/21 | 2024/6/20 |
| Cable                     | DA800-<br>4000MM  | NA    | DA          | 2023/6/21 | 2024/6/20 |
| Cable                     | DA800-<br>11000MM | NA    | DA          | 2023/6/21 | 2024/6/20 |

## Other

| Item | Name                         | Manufacturer | Model  | Software version |
|------|------------------------------|--------------|--------|------------------|
| 1    | EMC Conduction Test System   | AUDIX        | e3     | 6.120718         |
| 2    | EMC radiation test system    | AUDIX        | e3     | 6.120718         |
| 3    | RF test system               | TACHOY       | RFTest | V1.0.0           |
| 4    | RF communication test system | TACHOY       | RFTest | V1.0.0           |

## 4.2 Measurement Uncertainty

| Parameter                                                                                       | Uncertainty              |
|-------------------------------------------------------------------------------------------------|--------------------------|
| RF output power, conducted                                                                      | ±1.0dB                   |
| Power Spectral Density, conducted                                                               | ±2.2dB                   |
| Radio Frequency                                                                                 | ± 1 x 10 <sup>-6</sup>   |
| Bandwidth                                                                                       | ± 1.5 x 10 <sup>-6</sup> |
| Time                                                                                            | ±2%                      |
| Duty Cycle                                                                                      | ±2%                      |
| Temperature                                                                                     | ±1°C                     |
| Humidity                                                                                        | ±5%                      |
| DC and low frequency voltages                                                                   | ±3%                      |
| Conducted Emissions (150kHz~30MHz)                                                              | ±3.64dB                  |
| Radiated Emission(30MHz~1GHz)                                                                   | ±5.03dB                  |
| Radiated Emission(1GHz~25GHz)                                                                   | ±4.74dB                  |
| Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95% |                          |

## 4.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment               | Mfr/Brand                                                                           | Model/Type No. | Series No. | Note |
|------|-------------------------|-------------------------------------------------------------------------------------|----------------|------------|------|
| E-1  | Alexa Ceiling Amplifier |  | E300A          | N/A        | EUT  |
| E-2  | Notebook                | Lenovo                                                                              | LN-A0403A3C    | 36001672   | AE   |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 5 Conducted Emission

|                  |                                                 |
|------------------|-------------------------------------------------|
| Test Requirement | : FCC CFR 47 Part 15 Section 15.207&RSS-Gen 8.8 |
| Test Method      | : ANSI C63.10: 2013 and RSS-Gen                 |
| Test Result      | : PASS                                          |
| Frequency Range  | : 150kHz to 30MHz                               |
| Class/Severity   | : Class B                                       |

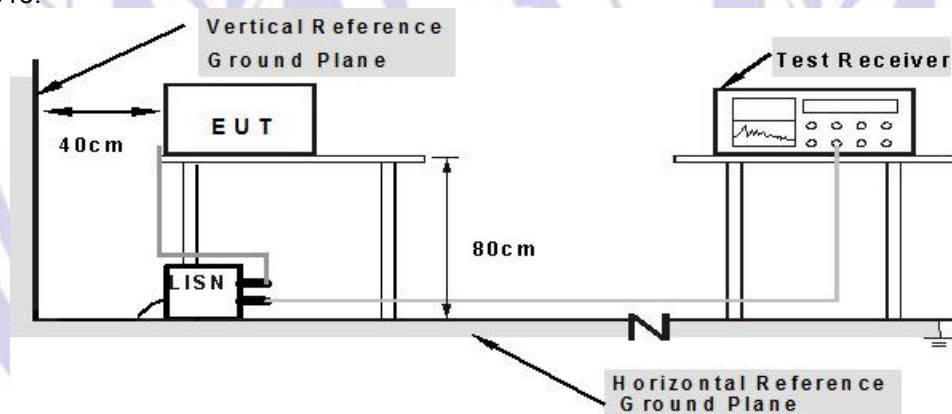
### 5.1 E.U.T. Operation

Operating Environment :

|                      |            |
|----------------------|------------|
| Temperature          | : 25.5 °C  |
| Humidity             | : 51 % RH  |
| Atmospheric Pressure | : 101.2kPa |

### 5.2 EUT Setup

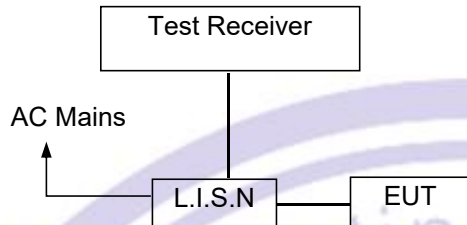
The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



**Note: 1.**Support units were connected to second LISN.

**2.**Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

### 5.3 Test SET-UP (Block Diagram of Configuration)



### 5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

### 5.5 Conducted Emission Limit

#### Conducted Emission

| Frequency(MHz) | Quasi-peak | Average |
|----------------|------------|---------|
| 0.15-0.5       | 66-56      | 56-46   |
| 0.5-5.0        | 56         | 46      |
| 5.0-30.0       | 60         | 50      |

#### Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 5.6 Measurement Description

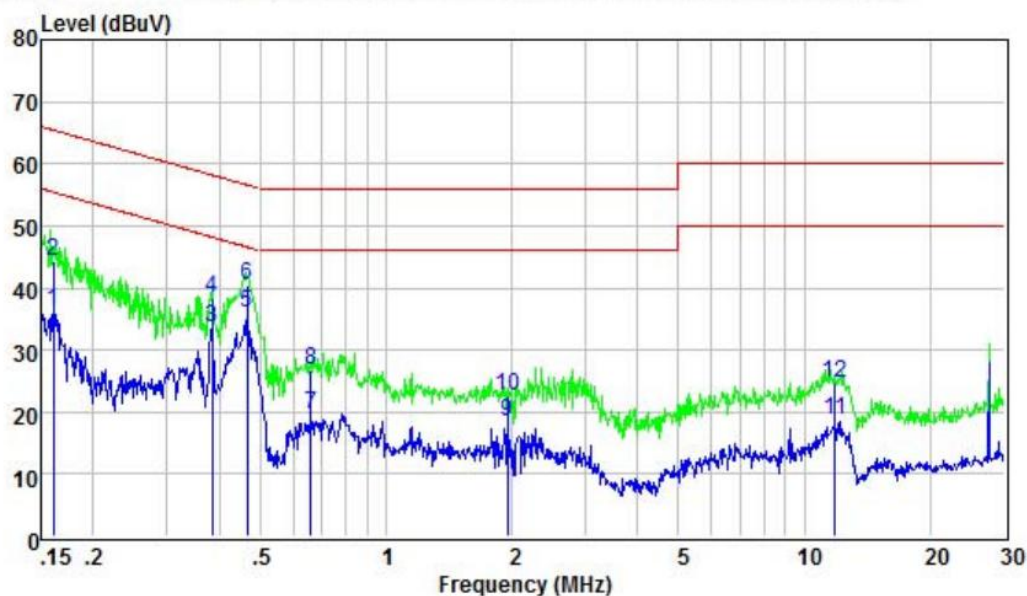
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 5.7 Conducted Emission Test Result

Pass

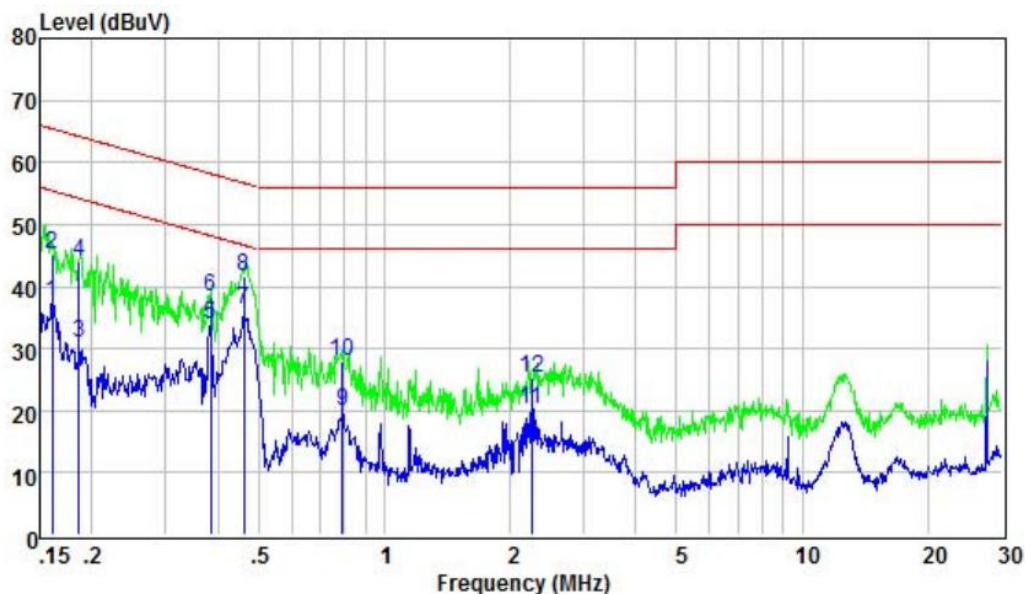
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

|          |        |         |   |
|----------|--------|---------|---|
| Channel: | Middle | Phase : | L |
|----------|--------|---------|---|



|    | Freq  | Level | LISN   | Cable | Limit | Over   |         |
|----|-------|-------|--------|-------|-------|--------|---------|
|    | MHz   | dBuV  | Factor | Loss  | Line  | Limit  | Remark  |
|    | MHz   | dBuV  | dB     | dB    | dBuV  | dB     |         |
| 1  | 0.16  | 36.14 | 9.63   | 0.05  | 55.43 | -19.29 | Average |
| 2  | 0.16  | 44.26 | 9.63   | 0.05  | 65.43 | -21.17 | QP      |
| 3  | 0.39  | 33.68 | 9.66   | 0.05  | 48.17 | -14.49 | Average |
| 4  | 0.39  | 38.25 | 9.66   | 0.05  | 58.17 | -19.92 | QP      |
| 5  | 0.47  | 35.93 | 9.68   | 0.05  | 46.58 | -10.65 | Average |
| 6  | 0.47  | 40.59 | 9.68   | 0.05  | 56.58 | -15.99 | QP      |
| 7  | 0.66  | 19.63 | 9.65   | 0.05  | 46.00 | -26.37 | Average |
| 8  | 0.66  | 26.63 | 9.65   | 0.05  | 56.00 | -29.37 | QP      |
| 9  | 1.95  | 18.58 | 9.59   | 0.06  | 46.00 | -27.42 | Average |
| 10 | 1.95  | 22.58 | 9.59   | 0.06  | 56.00 | -33.42 | QP      |
| 11 | 11.81 | 18.60 | 9.61   | 0.10  | 50.00 | -31.40 | Average |
| 12 | 11.81 | 24.60 | 9.61   | 0.10  | 60.00 | -35.40 | QP      |

|          |        |         |   |
|----------|--------|---------|---|
| Channel: | Middle | Phase : | N |
|----------|--------|---------|---|



|    | Freq | Level | LISN   | Cable | Limit | Over   |         |
|----|------|-------|--------|-------|-------|--------|---------|
|    | MHz  | dBuV  | Factor | Loss  | Line  | Limit  | Remark  |
|    |      |       | dB     | dB    | dBuV  | dB     |         |
| 1  | 0.16 | 37.52 | 9.59   | 0.05  | 55.43 | -17.91 | Average |
| 2  | 0.16 | 45.26 | 9.59   | 0.05  | 65.43 | -20.17 | QP      |
| 3  | 0.19 | 30.92 | 9.54   | 0.05  | 54.20 | -23.28 | Average |
| 4  | 0.19 | 43.92 | 9.54   | 0.05  | 64.20 | -20.28 | QP      |
| 5  | 0.39 | 33.85 | 9.61   | 0.05  | 48.17 | -14.32 | Average |
| 6  | 0.39 | 38.48 | 9.61   | 0.05  | 58.17 | -19.69 | QP      |
| 7  | 0.46 | 36.34 | 9.63   | 0.05  | 46.67 | -10.33 | Average |
| 8  | 0.46 | 41.68 | 9.63   | 0.05  | 56.67 | -14.99 | QP      |
| 9  | 0.80 | 19.99 | 9.63   | 0.05  | 46.00 | -26.01 | Average |
| 10 | 0.80 | 27.99 | 9.63   | 0.05  | 56.00 | -28.01 | QP      |
| 11 | 2.25 | 20.22 | 9.59   | 0.06  | 46.00 | -25.78 | Average |
| 12 | 2.25 | 25.22 | 9.59   | 0.06  | 56.00 | -30.78 | QP      |

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor

## 6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247  
RSS-Gen 8.9, RSS-Gen 8.10

Test Method : ANSI C63.10:2013  
and RSS-Gen

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

| Frequency (MHz) | Field Strength |              | Field Strength Limit at 3m Measurement Dist |                                |
|-----------------|----------------|--------------|---------------------------------------------|--------------------------------|
|                 | uV/m           | Distance (m) | uV/m                                        | dBuV/m                         |
| 0.009 ~ 0.490   | 2400/F(kHz)    | 300          | 10000 * 2400/F(kHz)                         | $20\log^{(2400/F(kHz))} + 80$  |
| 0.490 ~ 1.705   | 24000/F(kHz)   | 30           | 100 * 24000/F(kHz)                          | $20\log^{(24000/F(kHz))} + 40$ |
| 1.705 ~ 30      | 30             | 30           | 100 * 30                                    | $20\log^{(30)} + 40$           |
| 30 ~ 88         | 100            | 3            | 100                                         | $20\log^{(100)}$               |
| 88 ~ 216        | 150            | 3            | 150                                         | $20\log^{(150)}$               |
| 216 ~ 960       | 200            | 3            | 200                                         | $20\log^{(200)}$               |
| Above 960       | 500            | 3            | 500                                         | $20\log^{(500)}$               |

### 6.1 EUT Operation

Operating Environment :

Temperature : 23.5 °C

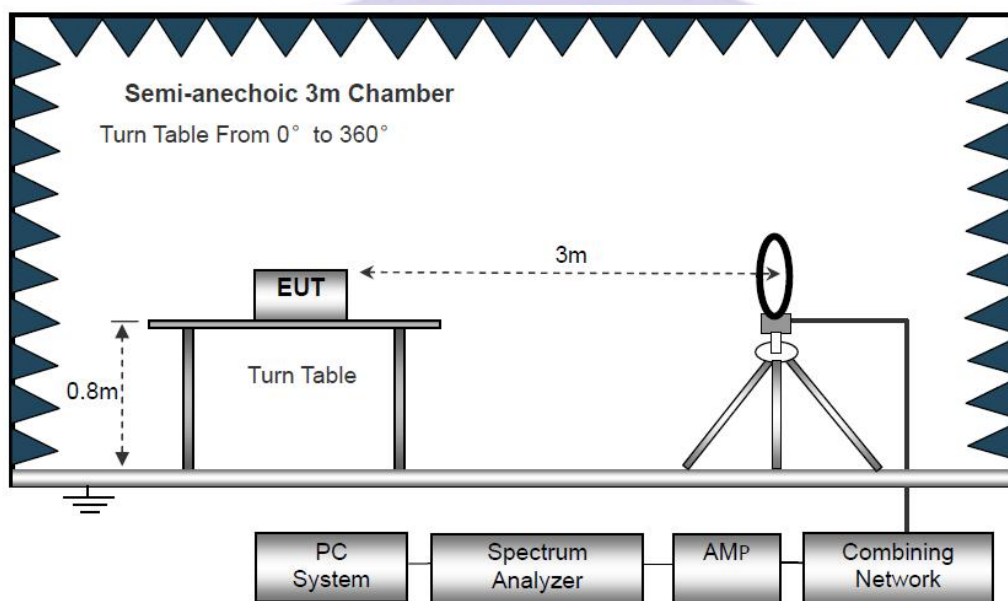
Humidity : 51.1 % RH

Atmospheric Pressure : 101.2kPa

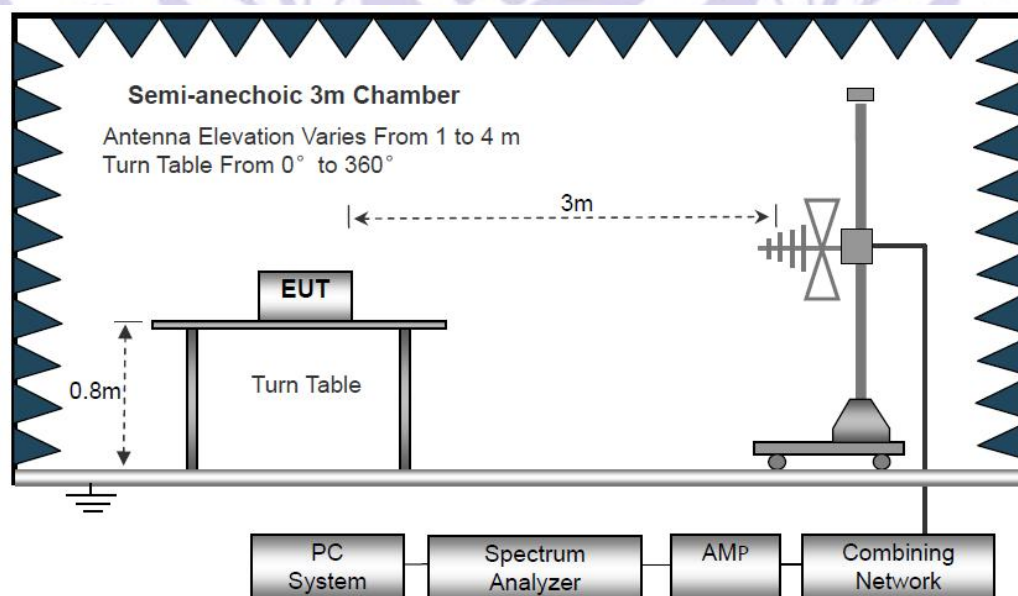
## 6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

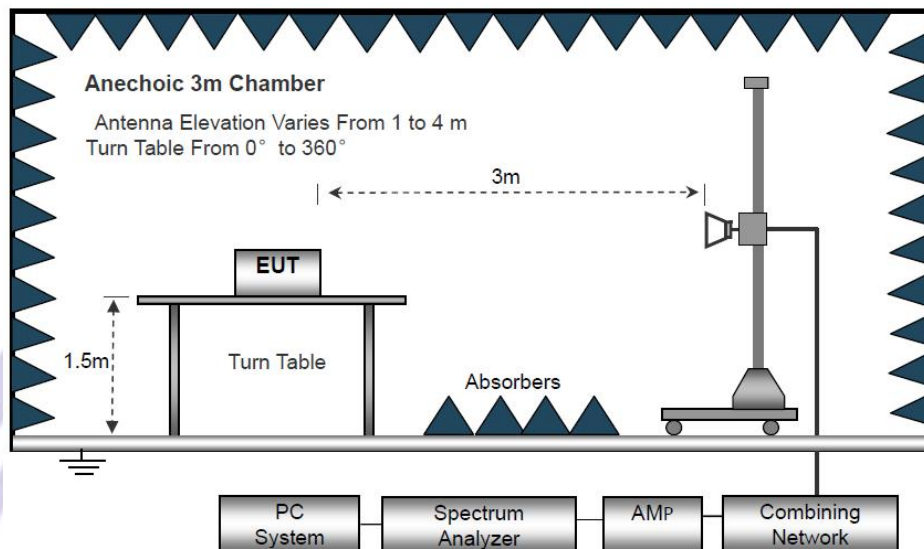
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



## 6.3 Spectrum Analyzer Setup

|                | Frequency    | Detector   | RBW    | VBW    | Remark           |
|----------------|--------------|------------|--------|--------|------------------|
| Receiver Setup | Below 30MHz  | --         | 10kHz  | 10kHz  | --               |
|                | 30MHz ~ 1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak Value |
|                | Above 1GHz   | Peak       | 1MHz   | 3MHz   | Peak Value       |
|                |              | RMS        | 1MHz   | 3MHz   | Average Value    |

## 6.4 Test Procedure

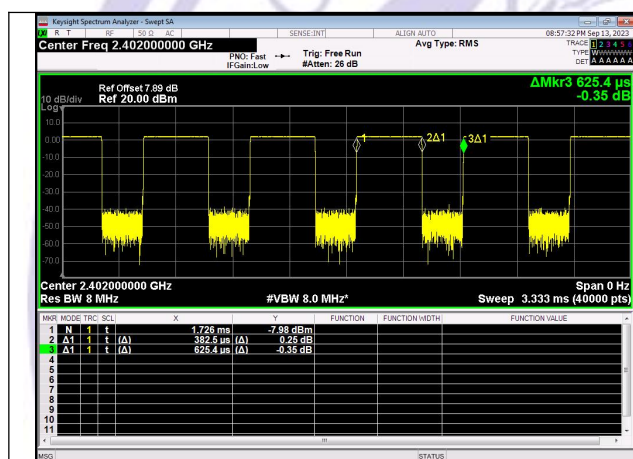
1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.
2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
  - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
  - 2) Change the antenna polarization and repeat 1) with vertical polarization.
  - 3) Make a hardcopy of the spectrum.
  - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
  - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
  - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
  - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
  - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
8. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

For Average Measurement:

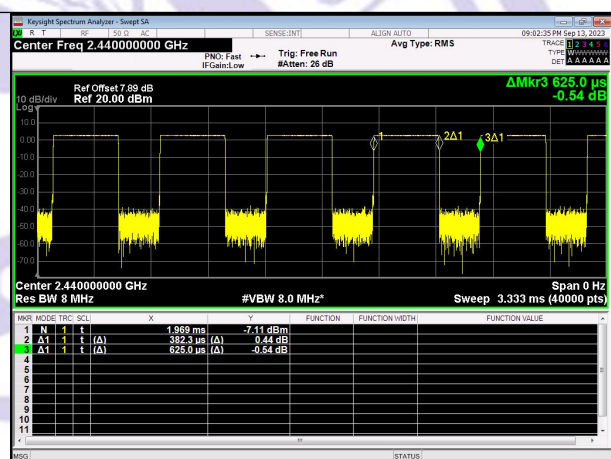
VBW=10Hz, when duty cycle is no less than 98 percent.

VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

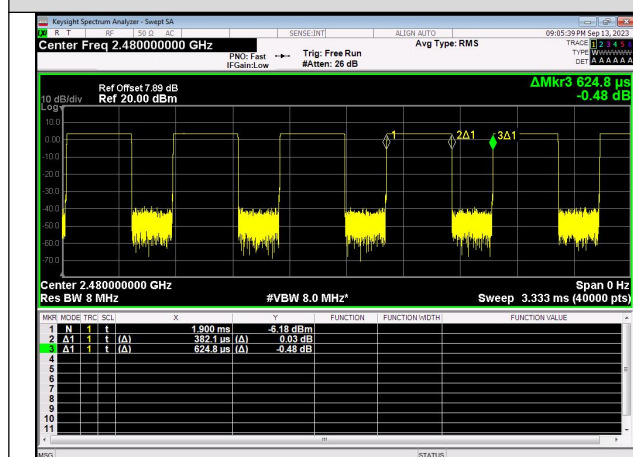
| Mode | Channel | On Time (ms) | Period (ms) | Duty Cycle (%) | Duty Cycle (linear) | Duty Cycle Factor (dB) |
|------|---------|--------------|-------------|----------------|---------------------|------------------------|
| LE   | 0       | 0.383        | 0.625       | 61.16          | 0.6116              | 2.1353                 |
|      | 19      | 0.382        | 0.625       | 61.17          | 0.6117              | 2.1346                 |
|      | 39      | 0.382        | 0.625       | 61.15          | 0.6115              | 2.1360                 |



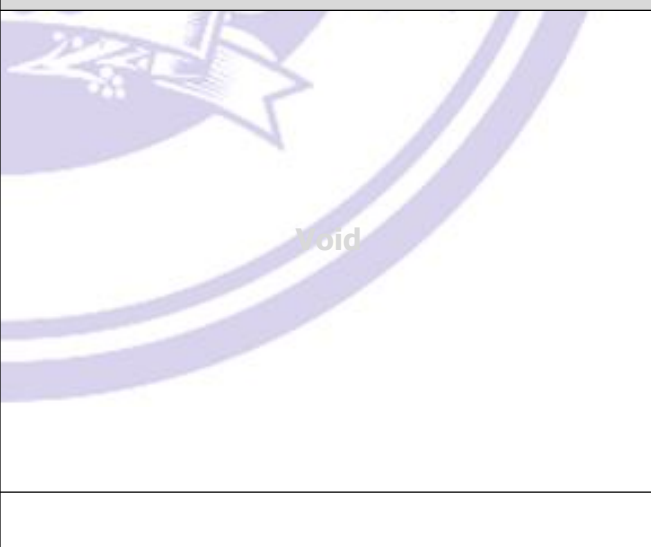
LE\_Channel 0



LE\_Channel 19



LE\_Channel 39



## 6.5 Summary of Test Results

### Test Frequency: 9KHz-30MHz

| Freq.<br>(MHz) | Ant.Pol.<br>H/V | Emission Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Over<br>(dB) |
|----------------|-----------------|----------------------------|----------------------|--------------|
| --             | --              | --                         | --                   | >20          |

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =  $40 \log(\text{Specific distance} / \text{test distance})$  (dB);

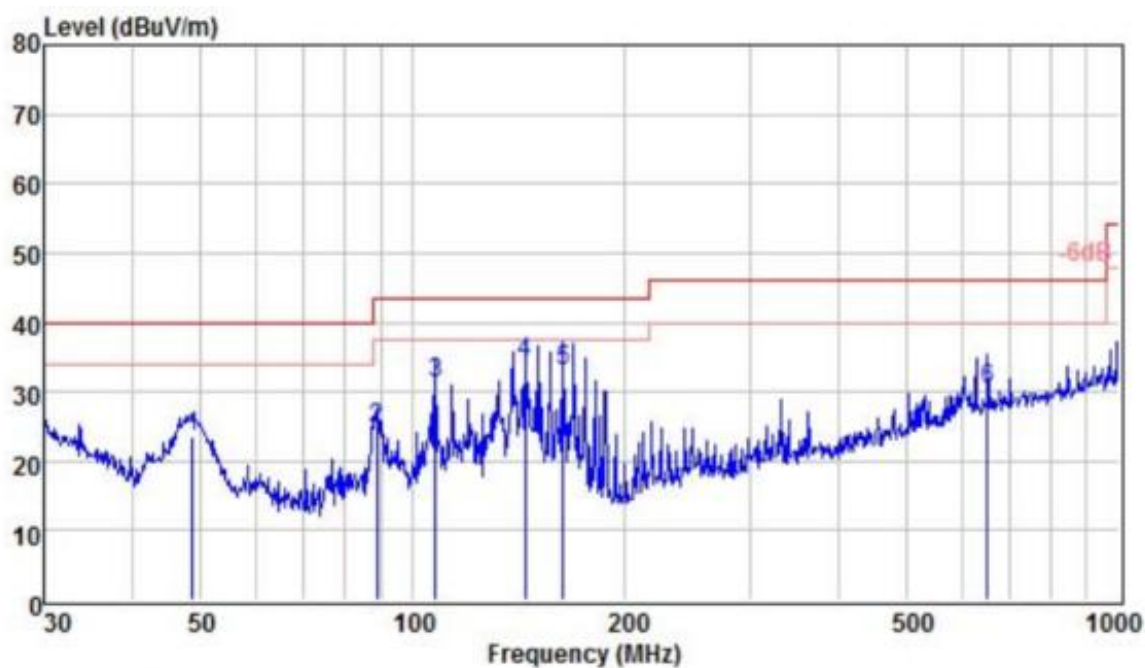
Limit line = Specific limits (dBuV) + distance extrapolation factor.

### Test Frequency: 30MHz ~ 1GHz

Pass.

Please refer to the following test plots for the worst test mode (GFSK (CH00: 2402MHz)).

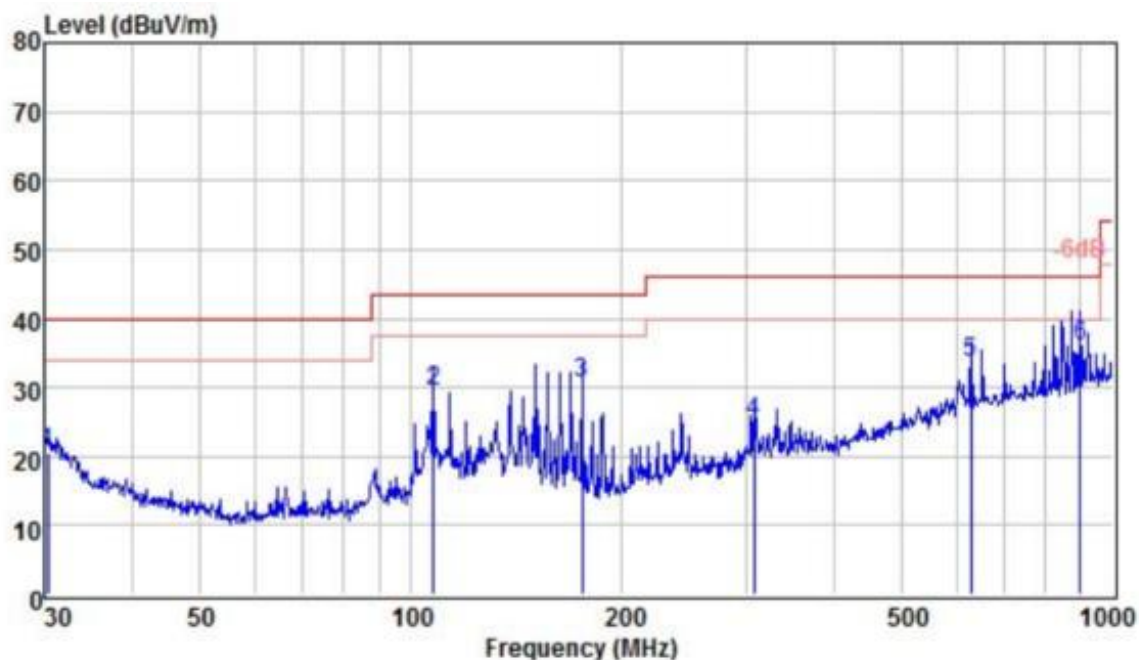
Test plot for Horizontal



|   | Freq   | ReadAntenna | Cable  |      | Limit  | Over   |           |
|---|--------|-------------|--------|------|--------|--------|-----------|
|   | MHz    | Level       | Factor | Loss | Line   | Limit  | Remark    |
|   | MHz    | dBuV        | dB/m   | dB   | dBuV/m | dBuV/m | dB        |
| 1 | 48.67  | 13.96       | 9.34   | 0.27 | 23.57  | 40.00  | -16.43 QP |
| 2 | 88.96  | 14.95       | 8.99   | 0.70 | 24.64  | 43.50  | -18.86 QP |
| 3 | 107.51 | 21.22       | 9.37   | 0.77 | 31.36  | 43.50  | -12.14 QP |
| 4 | 144.33 | 24.70       | 8.66   | 0.82 | 34.18  | 43.50  | -9.32 QP  |
| 5 | 163.18 | 22.79       | 9.49   | 0.84 | 33.12  | 43.50  | -10.38 QP |
| 6 | 651.94 | 7.20        | 21.45  | 1.68 | 30.33  | 46.00  | -15.67 QP |

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Test plot for Vertical



|   | Freq   | Read<br>Level | Antenna<br>Factor | Cable<br>Loss | Level  | Limit<br>Line | Over<br>Limit | Remark |
|---|--------|---------------|-------------------|---------------|--------|---------------|---------------|--------|
|   | MHz    | dBuV          | dB/m              | dB            | dBuV/m | dBuV/m        | dB            |        |
| 1 | 30.32  | 1.34          | 18.80             | 0.44          | 20.58  | 40.00         | -19.42        | QP     |
| 2 | 107.51 | 19.51         | 9.30              | 0.77          | 29.58  | 43.50         | -13.92        | QP     |
| 3 | 175.04 | 19.50         | 10.25             | 0.85          | 30.60  | 43.50         | -12.90        | QP     |
| 4 | 307.83 | 9.88          | 13.98             | 1.10          | 24.96  | 46.00         | -21.04        | QP     |
| 5 | 627.27 | 10.49         | 21.32             | 1.66          | 33.47  | 46.00         | -12.53        | QP     |
| 6 | 900.15 | 9.93          | 24.00             | 2.10          | 36.03  | 46.00         | -9.97         | QP     |

Remark:Emission Level=Reading+Cable Loss+ANT Factor-AMP Factor

**Test Frequency 1GHz-25GHz:**

| Polar<br>(H/V)      | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Pre-<br>amplifier<br>(dB) | Cable<br>Loss<br>(dB) | Antenna<br>Factor<br>(dB) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Detector<br>Type |
|---------------------|--------------------|----------------------------|---------------------------|-----------------------|---------------------------|-------------------------------|--------------------|----------------|------------------|
| Low Channel:2402MHz |                    |                            |                           |                       |                           |                               |                    |                |                  |
| V                   | 4804               | 55.12                      | 30.55                     | 5.77                  | 24.66                     | 55                            | 74.00              | -19            | Pk               |
| V                   | 4804               | 45.63                      | 30.55                     | 5.77                  | 24.66                     | 45.51                         | 54.00              | -8.49          | AV               |
| V                   | 7206               | 53.94                      | 30.33                     | 6.32                  | 24.55                     | 54.48                         | 74.00              | -19.52         | Pk               |
| V                   | 7206               | 44.15                      | 30.33                     | 6.32                  | 24.55                     | 44.69                         | 54.00              | -9.31          | AV               |
| V                   | 9608               | 51.63                      | 30.85                     | 7.45                  | 24.69                     | 52.92                         | 74.00              | -21.08         | Pk               |
| V                   | 9608               | 42.31                      | 30.85                     | 7.45                  | 24.69                     | 43.6                          | 54.00              | -10.4          | AV               |
| V                   | 12010              | 49.14                      | 31.02                     | 8.99                  | 25.57                     | 52.68                         | 74.00              | -21.32         | Pk               |
| V                   | 12010              | 40.72                      | 31.02                     | 8.99                  | 25.57                     | 44.26                         | 54.00              | -9.74          | AV               |
| H                   | 4804               | 55.36                      | 30.55                     | 5.77                  | 24.66                     | 55.24                         | 74.00              | -18.76         | Pk               |
| H                   | 4804               | 45.17                      | 30.55                     | 5.77                  | 24.66                     | 45.05                         | 54.00              | -8.95          | AV               |
| H                   | 7206               | 53.42                      | 30.33                     | 6.32                  | 24.55                     | 53.96                         | 74.00              | -20.04         | Pk               |
| H                   | 7206               | 43.17                      | 30.33                     | 6.32                  | 24.55                     | 43.71                         | 54.00              | -10.29         | AV               |
| H                   | 9608               | 51.35                      | 30.85                     | 7.45                  | 24.69                     | 52.64                         | 74.00              | -21.36         | Pk               |
| H                   | 9608               | 41.18                      | 30.85                     | 7.45                  | 24.69                     | 42.47                         | 54.00              | -11.53         | AV               |
| H                   | 12010              | 49.34                      | 31.02                     | 8.99                  | 25.57                     | 52.88                         | 74.00              | -21.12         | Pk               |
| H                   | 12010              | 39.94                      | 31.02                     | 8.99                  | 25.57                     | 43.48                         | 54.00              | -10.52         | AV               |

| Polar<br>(H/V)         | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Pre-<br>amplifier<br>(dB) | Cable<br>Loss<br>(dB) | Antenna<br>Factor<br>(dB) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Detector<br>Type |
|------------------------|--------------------|----------------------------|---------------------------|-----------------------|---------------------------|-------------------------------|--------------------|----------------|------------------|
| Middle Channel:2440MHz |                    |                            |                           |                       |                           |                               |                    |                |                  |
| V                      | 4880               | 55.12                      | 30.55                     | 5.77                  | 24.66                     | 55                            | 74.00              | -19            | Pk               |
| V                      | 4880               | 45.36                      | 30.55                     | 5.77                  | 24.66                     | 45.24                         | 54.00              | -8.76          | AV               |
| V                      | 7320               | 53.24                      | 30.33                     | 6.32                  | 24.55                     | 53.78                         | 74.00              | -20.22         | Pk               |
| V                      | 7320               | 43.53                      | 30.33                     | 6.32                  | 24.55                     | 44.07                         | 54.00              | -9.93          | AV               |
| V                      | 9760               | 51.42                      | 30.85                     | 7.45                  | 24.69                     | 52.71                         | 74.00              | -21.29         | Pk               |
| V                      | 9760               | 42.93                      | 30.85                     | 7.45                  | 24.69                     | 44.22                         | 54.00              | -9.78          | AV               |
| V                      | 12200              | 50.17                      | 31.02                     | 8.99                  | 25.57                     | 53.71                         | 74.00              | -20.29         | Pk               |
| V                      | 12200              | 40.42                      | 31.02                     | 8.99                  | 25.57                     | 43.96                         | 54.00              | -10.04         | AV               |
| H                      | 4880               | 54.63                      | 30.55                     | 5.77                  | 24.66                     | 54.51                         | 74.00              | -19.49         | Pk               |
| H                      | 4880               | 45.44                      | 30.55                     | 5.77                  | 24.66                     | 45.32                         | 54.00              | -8.68          | AV               |
| H                      | 7320               | 53.33                      | 30.33                     | 6.32                  | 24.55                     | 53.87                         | 74.00              | -20.13         | Pk               |
| H                      | 7320               | 44.73                      | 30.33                     | 6.32                  | 24.55                     | 45.27                         | 54.00              | -8.73          | AV               |
| H                      | 9760               | 52.12                      | 30.85                     | 7.45                  | 24.69                     | 53.41                         | 74.00              | -20.59         | Pk               |
| H                      | 9760               | 43.42                      | 30.85                     | 7.45                  | 24.69                     | 44.71                         | 54.00              | -9.29          | AV               |
| H                      | 12200              | 50.99                      | 31.02                     | 8.99                  | 25.57                     | 54.53                         | 74.00              | -19.47         | Pk               |
| H                      | 12200              | 41.13                      | 31.02                     | 8.99                  | 25.57                     | 44.67                         | 54.00              | -9.33          | AV               |

| Polar<br>(H/V)       | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Pre-<br>amplifier<br>(dB) | Cable<br>Loss<br>(dB) | Antenna<br>Factor<br>(dB) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Detector<br>Type |
|----------------------|--------------------|----------------------------|---------------------------|-----------------------|---------------------------|-------------------------------|--------------------|----------------|------------------|
| High Channel:2480MHz |                    |                            |                           |                       |                           |                               |                    |                |                  |
| V                    | 4960               | 54.93                      | 30.55                     | 5.77                  | 24.66                     | 54.81                         | 74.00              | -19.19         | Pk               |
| V                    | 4960               | 44.42                      | 30.55                     | 5.77                  | 24.66                     | 44.3                          | 54.00              | -9.7           | AV               |
| V                    | 7440               | 52.77                      | 30.33                     | 6.32                  | 24.55                     | 53.31                         | 74.00              | -20.69         | Pk               |
| V                    | 7440               | 43.32                      | 30.33                     | 6.32                  | 24.55                     | 43.86                         | 54.00              | -10.14         | AV               |
| V                    | 9920               | 49.73                      | 30.85                     | 7.45                  | 24.69                     | 51.02                         | 74.00              | -22.98         | Pk               |
| V                    | 9920               | 39.16                      | 30.85                     | 7.45                  | 24.69                     | 40.45                         | 54.00              | -13.55         | AV               |
| V                    | 12400              | 48.66                      | 31.02                     | 8.99                  | 25.57                     | 52.2                          | 74.00              | -21.8          | Pk               |
| V                    | 12400              | 39.77                      | 31.02                     | 8.99                  | 25.57                     | 43.31                         | 54.00              | -10.69         | AV               |
| H                    | 4960               | 54.34                      | 30.55                     | 5.77                  | 24.66                     | 54.22                         | 74.00              | -19.78         | Pk               |
| H                    | 4960               | 45.45                      | 30.55                     | 5.77                  | 24.66                     | 45.33                         | 54.00              | -8.67          | AV               |
| H                    | 7440               | 52.16                      | 30.33                     | 6.32                  | 24.55                     | 52.7                          | 74.00              | -21.3          | Pk               |
| H                    | 7440               | 43.63                      | 30.33                     | 6.32                  | 24.55                     | 44.17                         | 54.00              | -9.83          | AV               |
| H                    | 9920               | 50.75                      | 30.85                     | 7.45                  | 24.69                     | 52.04                         | 74.00              | -21.96         | Pk               |
| H                    | 9920               | 41.42                      | 30.85                     | 7.45                  | 24.69                     | 42.71                         | 54.00              | -11.29         | AV               |
| H                    | 12400              | 49.36                      | 31.02                     | 8.99                  | 25.57                     | 52.9                          | 74.00              | -21.1          | Pk               |
| H                    | 12400              | 39.14                      | 31.02                     | 8.99                  | 25.57                     | 42.68                         | 54.00              | -11.32         | AV               |

Note: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,

Margin= Emission Level - Limit

2. If peak below the average limit, the average emission was no test.

3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

### Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

|                                                                                                                 | Polar<br>(H/V)        | Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Pre-<br>amplifier<br>(dB) | Cable<br>Loss<br>(dB) | Antenna<br>Factor<br>(dB/m) | Emission<br>level<br>(dBuV/m) | Limit<br>(dBuV<br>/m) | Detec<br>tor<br>Type | Result |
|-----------------------------------------------------------------------------------------------------------------|-----------------------|--------------------|----------------------------|---------------------------|-----------------------|-----------------------------|-------------------------------|-----------------------|----------------------|--------|
| GFSK                                                                                                            | Low Channel: 2402MHz  |                    |                            |                           |                       |                             |                               |                       |                      |        |
|                                                                                                                 | H                     | 2390               | 56.36                      | 30.22                     | 4.85                  | 23.98                       | 54.97                         | 74                    | PK                   | PASS   |
|                                                                                                                 | H                     | 2390               | 47.41                      | 30.22                     | 4.85                  | 23.98                       | 46.02                         | 54                    | AV                   | PASS   |
|                                                                                                                 | H                     | 2400               | 55.32                      | 30.22                     | 4.85                  | 23.98                       | 53.93                         | 74                    | PK                   | PASS   |
|                                                                                                                 | H                     | 2400               | 45.96                      | 30.22                     | 4.85                  | 23.98                       | 44.57                         | 54                    | AV                   | PASS   |
|                                                                                                                 | V                     | 2390               | 56.44                      | 30.22                     | 4.85                  | 23.98                       | 55.05                         | 74                    | PK                   | PASS   |
|                                                                                                                 | V                     | 2390               | 45.12                      | 30.22                     | 4.85                  | 23.98                       | 43.73                         | 54                    | AV                   | PASS   |
|                                                                                                                 | V                     | 2400               | 55.36                      | 30.22                     | 4.85                  | 23.98                       | 53.97                         | 74                    | PK                   | PASS   |
|                                                                                                                 | V                     | 2400               | 46.74                      | 30.22                     | 4.85                  | 23.98                       | 45.35                         | 54                    | AV                   | PASS   |
|                                                                                                                 | High Channel: 2480MHz |                    |                            |                           |                       |                             |                               |                       |                      |        |
|                                                                                                                 | H                     | 2483.50            | 56.23                      | 35.11                     | 3.56                  | 27.75                       | 52.43                         | 74                    | PK                   | PASS   |
|                                                                                                                 | H                     | 2483.50            | 46.42                      | 35.11                     | 3.56                  | 27.75                       | 42.62                         | 54                    | AV                   | PASS   |
|                                                                                                                 | H                     | 2500.00            | 56.42                      | 35.10                     | 3.57                  | 27.80                       | 52.69                         | 74                    | PK                   | PASS   |
|                                                                                                                 | H                     | 2500.00            | 46.36                      | 35.10                     | 3.57                  | 27.80                       | 42.63                         | 54                    | AV                   | PASS   |
|                                                                                                                 | V                     | 2483.50            | 56.73                      | 35.11                     | 3.56                  | 27.75                       | 52.93                         | 74                    | PK                   | PASS   |
|                                                                                                                 | V                     | 2483.50            | 56.19                      | 35.11                     | 3.56                  | 27.75                       | 52.39                         | 54                    | AV                   | PASS   |
|                                                                                                                 | V                     | 2500.00            | 56.74                      | 35.10                     | 3.57                  | 27.80                       | 53.01                         | 74                    | PK                   | PASS   |
|                                                                                                                 | V                     | 2500.00            | 46.54                      | 35.10                     | 3.57                  | 27.80                       | 42.81                         | 54                    | AV                   | PASS   |
| Remark:                                                                                                         |                       |                    |                            |                           |                       |                             |                               |                       |                      |        |
| 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit |                       |                    |                            |                           |                       |                             |                               |                       |                      |        |

## **7 Conduct Band Edge And Spurious Emissions Measurement**

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | : Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).<br>RSS-247 5.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test Method      | : ANSI C63.10:2013 and RSS-Gen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Test Limit       | : Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |

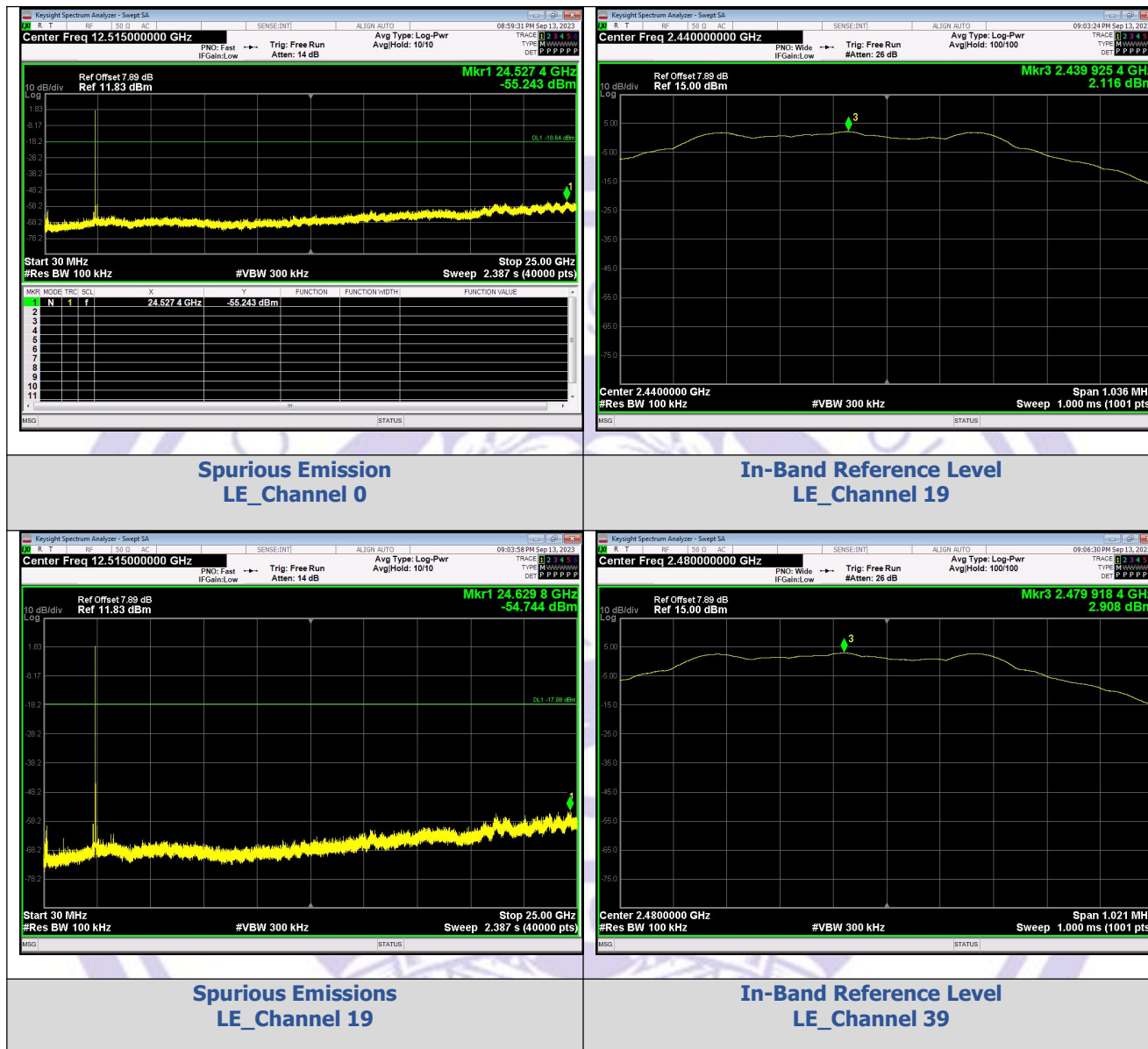
### **7.1 Test Procedure**

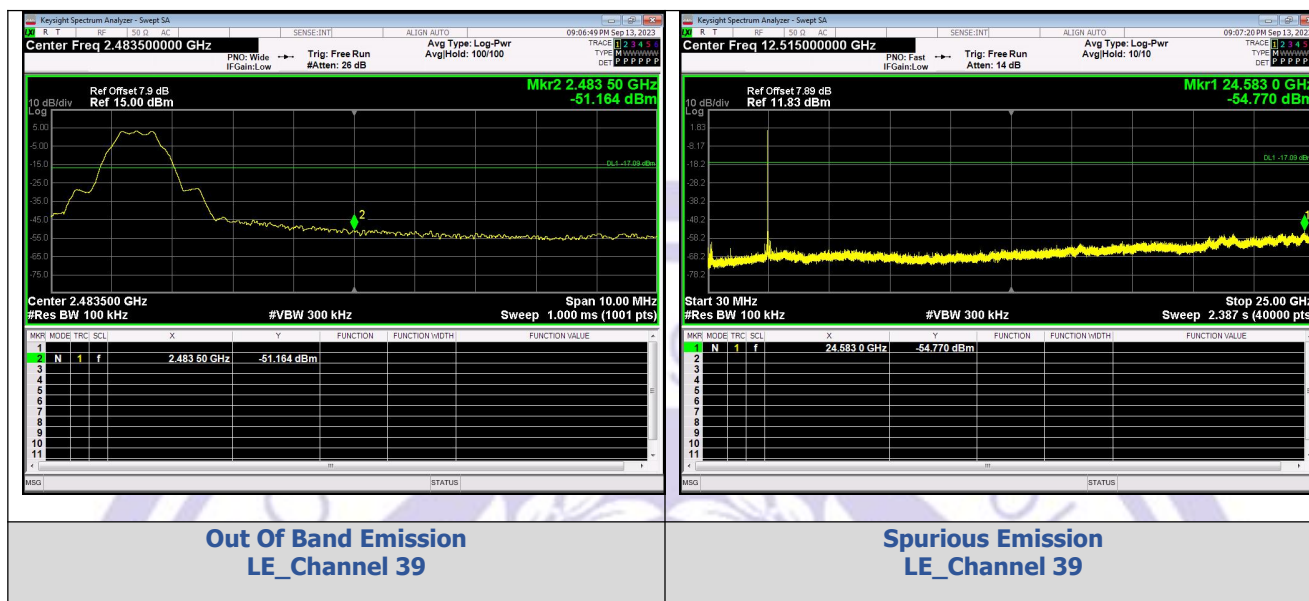
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto  
Detector function = peak, Trace = max hold

## 7.2 Test Result

| Mode | Channel | OOB Emission Frequency (MHz) | OOB Emission Level (dBm) | Limit (dBm) | Over Limit (dB) | Result |
|------|---------|------------------------------|--------------------------|-------------|-----------------|--------|
| LE   | 0       | 2400.00                      | -47.197                  | -18.64      | -29             | PASS   |
|      |         | 24527.4                      | -55.243                  | -18.64      | -36.603         | PASS   |
|      | 19      | 24629.8                      | -54.744                  | -17.88      | -36.864         | PASS   |
|      | 39      | 2483.50                      | -51.164                  | -17.09      | -34             | PASS   |
|      |         | 24583.0                      | -54.770                  | -17.09      | -37.680         | PASS   |







Out Of Band Emission  
LE\_Channel 39

Spurious Emission  
LE\_Channel 39

## 8 6dB Bandwidth Measurement & 99% OCB Test

Test Requirement : FCC CFR47 Part 15 Section 15.247 (a)(2)&RSS-247[5.2(1)]

Test Method : ANSI C63.10:2013 and RSS-Gen

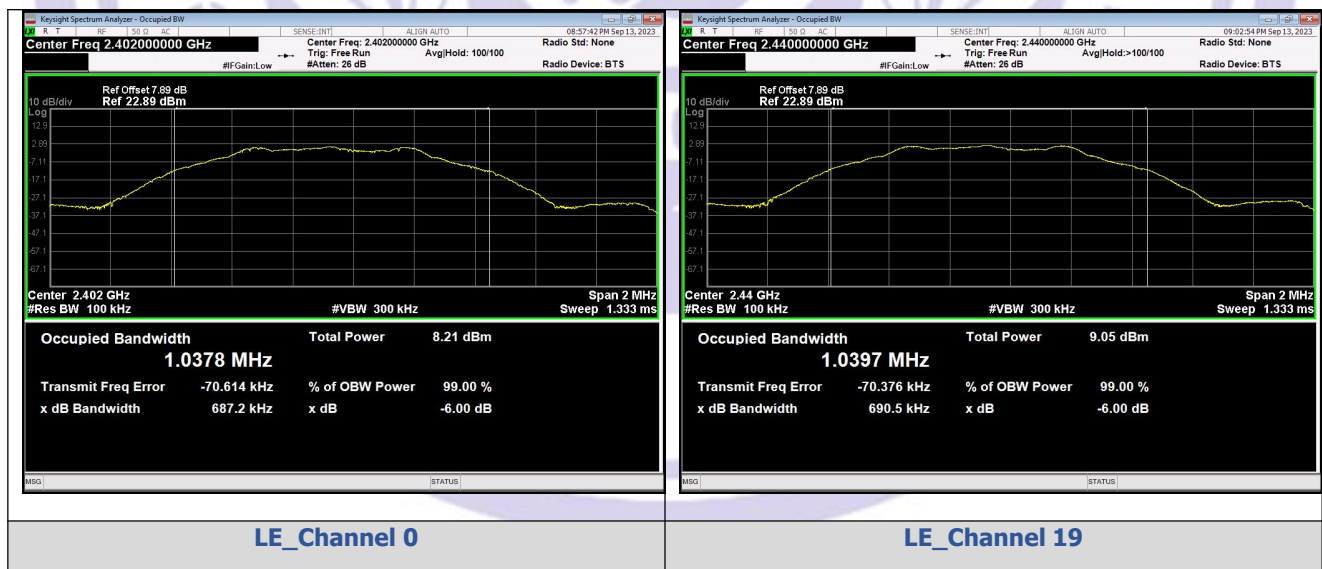
Test Limit Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

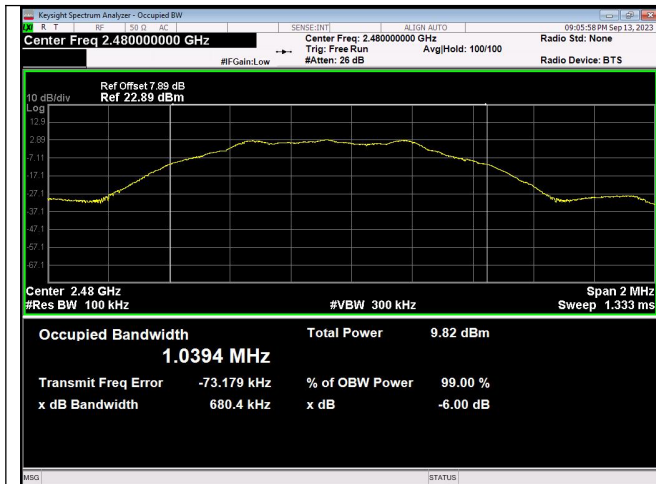
### 8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz(For 6dB bandwidth)
3. Set the spectrum analyzer: RBW = 20kHz, VBW = 62kHz(For LE 99% bandwidth)

### 8.2 Test Result

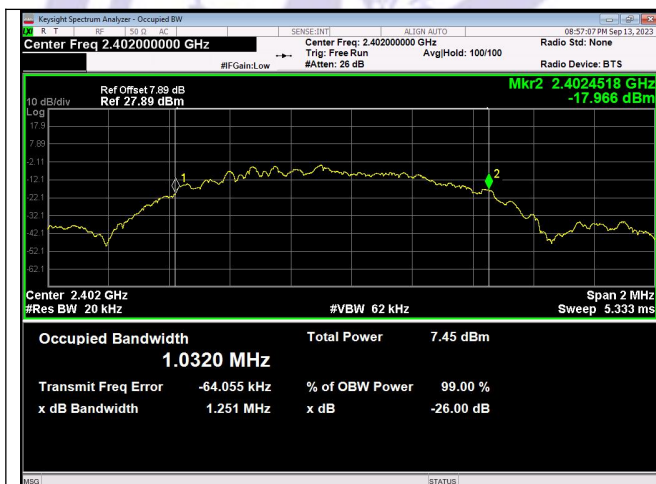
| Mode | Channel number | Channel frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | 6dB BW Required Limit (KHz) | Result |
|------|----------------|-------------------------|---------------------|---------------------|-----------------------------|--------|
| LE   | 00             | 2402                    | 0.6872              | 1.0320              | >500                        | Pass   |
|      | 19             | 2440                    | 0.6905              | 1.0302              | >500                        |        |
|      | 39             | 2480                    | 0.6804              | 1.0300              | >500                        |        |



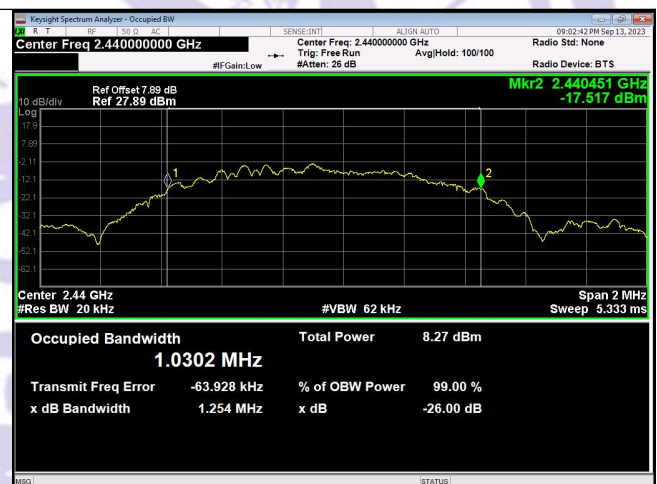


LE\_Channel 39

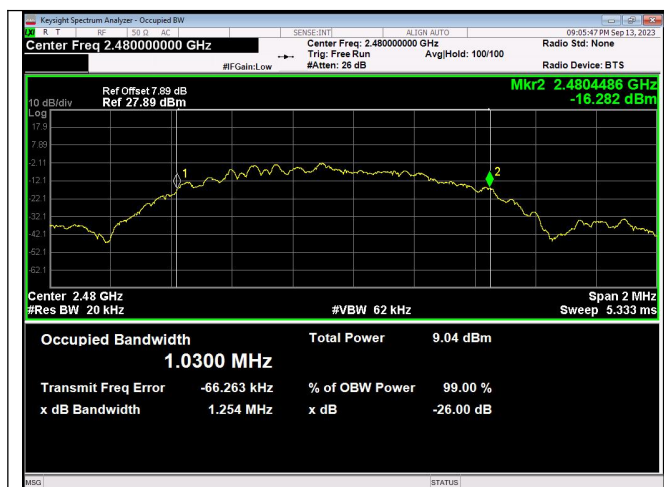
Void



LE\_Channel 0



LE\_Channel 19



LE\_Channel 39

Void

## 9 Maximum Peak Output Power

Test Requirement : FCC CFR47 Part 15 Section 15.247 (b)(3)&RSS-247 5.4(4)

Test Method : ANSI C63.10:2013 and RSS-Gen

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

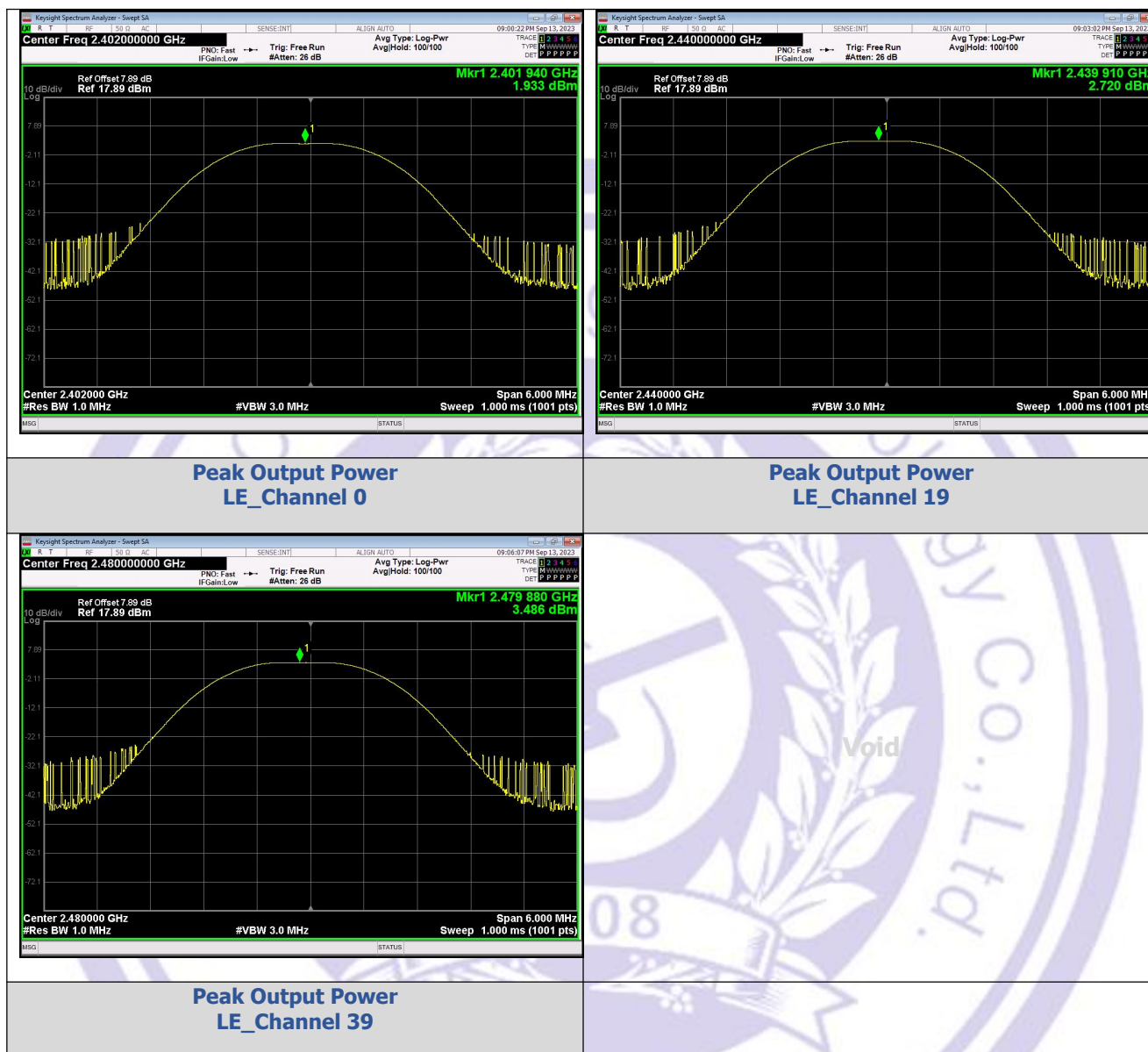
### 9.1 Test Procedure

1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Measure the conducted output power and record the results in the test report.

### 9.2 Test Result

| Mode | Channel | Peak Output Power (dBm) | Peak Output Power (mW) | Max. Avg. Power (dBm) | Limit (dBm) | Result |
|------|---------|-------------------------|------------------------|-----------------------|-------------|--------|
| LE   | 0       | 1.933                   | 1.56                   | None                  | 30          | PASS   |
|      | 19      | 2.720                   | 1.87                   | None                  | 30          | PASS   |
|      | 39      | 3.486                   | 2.23                   | None                  | 30          | PASS   |

| Mode | Channel | Peak Output Power (dBm) | Peak Power Limit (dBm) | EIRP (dBm) | EIRP Limit (dBm) | Max. Avg. Power (dBm) | Result |
|------|---------|-------------------------|------------------------|------------|------------------|-----------------------|--------|
| LE   | 0       | 1.933                   | 30                     | 3.433      | 36.02            | None                  | PASS   |
|      | 19      | 2.720                   | 30                     | 4.220      | 36.02            | None                  | PASS   |
|      | 39      | 3.486                   | 30                     | 4.986      | 36.02            | None                  | PASS   |



## 10 Power Spectral density

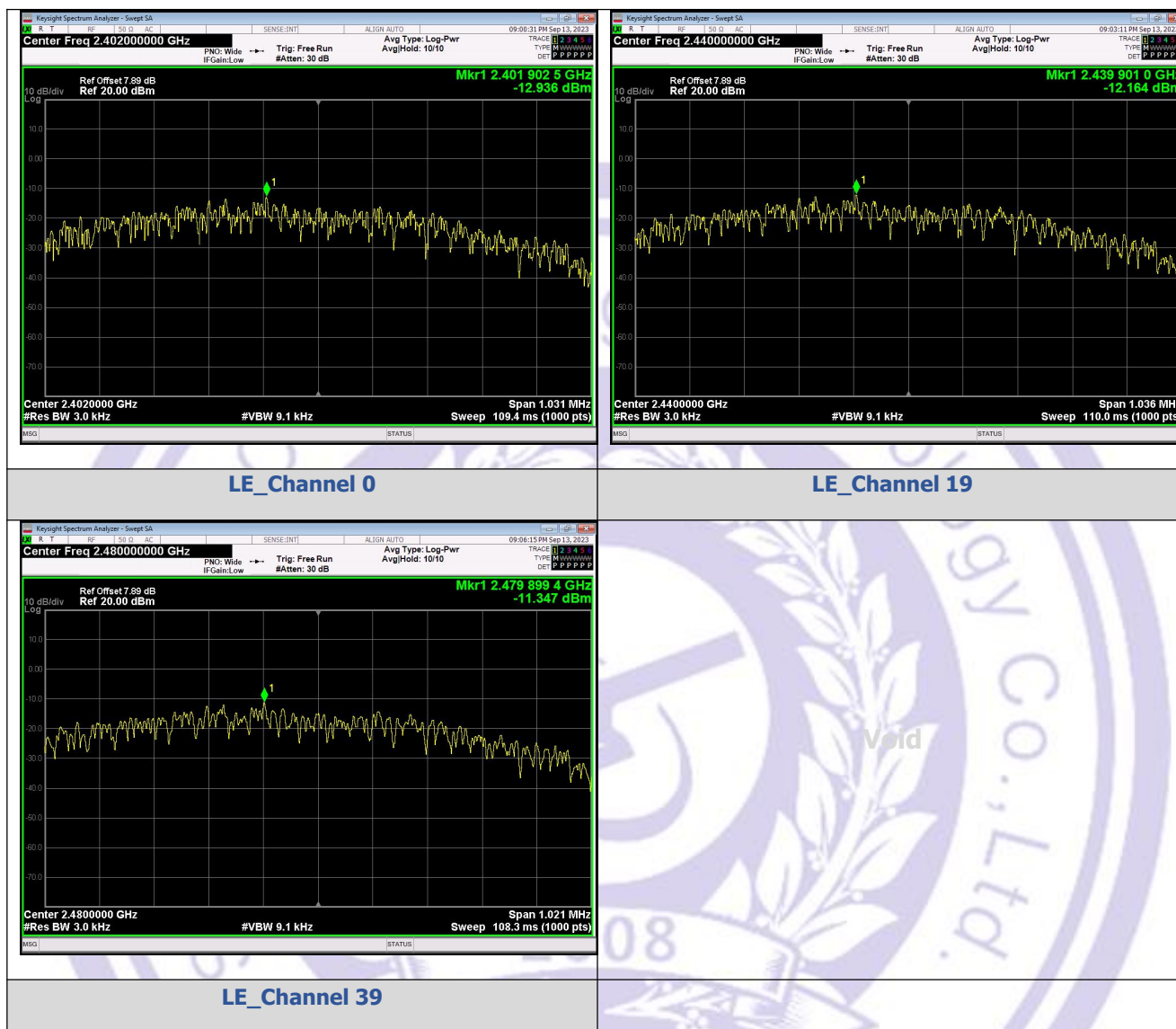
|                  |                                                                                                                                                                                                                                                                                                                                |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | : FCC CFR47 Part 15 Section 15.247 (e)&RSS-247 [5.2(2)]                                                                                                                                                                                                                                                                        |
| Test Method      | : ANSI C63.10:2013 and RSS-Gen                                                                                                                                                                                                                                                                                                 |
| Test Limit       | : Regulation 15.247(f) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. |

### 10.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 9.1kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

### 10.2 Test Result

| Mode | Channel number | Channel frequency (MHz) | Measurement level (dBm) | Required Limit (dBm/3kHz) | Pass/Fail |
|------|----------------|-------------------------|-------------------------|---------------------------|-----------|
|      |                |                         | PSD/3kHz                |                           |           |
| LE   | 00             | 2402                    | -12.936                 | 8                         | PASS      |
|      | 19             | 2440                    | -12.164                 | 8                         | PASS      |
|      | 39             | 2480                    | -11.347                 | 8                         | PASS      |



## 11 Antenna Application

### 11.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 11.2 Result

The antenna is PCB antenna, the best case gain of the antennas is 3.5dBi, reference to the appendix II for details

## 12 Test Setup

Please see the attachment for details.



## 13 EUT Photos

Please see the attachment for details.

\*\*\*\*\*THE END REPORT\*\*\*\*\*

