



# FCC TEST REPORT

## FCC ID:2A9Q9-WTV-NV25

**Report Number.....** : ZKT-2501090738E

Date of Test..... Jan. 09, 2025 to Jan. 15, 2025

Date of issue..... Jan. 15, 2025

Total number of pages..... 41

Test Result ..... PASS

**Testing Laboratory.....** : Shenzhen ZKT Technology Co., Ltd.

Address ..... 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

**Applicant's name .....** : ShenZhen Zhongyi Technology Co.,Ltd.

Address ..... Room 401, No.4 Road One,Shangxue Science and Technology  
City, Xinxue Community, Bantian Street, Longgang District,  
Shenzhen, China

**Manufacturer's name .....** : ShenZhen Zhongyi Technology Co.,Ltd.

Address ..... Room 401, No.4 Road One,Shangxue Science and Technology  
City, Xinxue Community, Bantian Street, Longgang District,  
Shenzhen, China

Test specification:

Standard..... FCC CFR Title 47 Part 15 Subpart C Section 15.247  
ANSI C63.10:2013

Test procedure..... /

Non-standard test method ..... N/A

**Test Report Form No.....** : TRF-EL-111\_V0

**Test Report Form(s) Originator.....** : ZKT Testing

**Master TRF .....** : Dated: 2020-01-06

This device described above has been tested by ZKT, 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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**Product name.....** : Navi Air Tracker Compatible with iOS Find My App

Trademark ..... N/A

Model/Type reference..... WTV-NV25  
R5020

Ratings.....  
Battery capacity: DC 3V

**Testing procedure and testing location:****Testing Laboratory.....: Shenzhen ZKT Technology Co., Ltd.**Address.....: 1/F, No. 101, Building B, No. 6, Tangwei Community  
Industrial Avenue, Fuhai Street, Bao'an District,  
Shenzhen, China

Tested by (name + signature).....: Jim Liu

Reviewer (name + signature).....: Jackson Fang

Approved (name + signature).....: Lake Xie





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1.VERSION

| Report No.      | Version | Description             | Approved      |
|-----------------|---------|-------------------------|---------------|
| ZKT-2501090738E | Rev.01  | Initial issue of report | Jan. 15, 2025 |
|                 |         |                         |               |



## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.247) , Subpart C |                                  |          |        |
|---------------------------------|----------------------------------|----------|--------|
| Standard Section                | Test Item                        | Judgment | Remark |
| FCC part 15.203/15.247(c)       | Antenna requirement              | PASS     |        |
| ANSI C63.10:2013                | Duty Cycle                       | PASS     |        |
| FCC part 15.207                 | AC Power Line Conducted Emission | N/A      |        |
| FCC part 15.247 (b)(3)          | Conducted Peak Output Power      | PASS     |        |
| FCC part 15.247 (a)(2)          | 6DB Occupied Bandwidth           | PASS     |        |
| FCC part 15.247 (e)             | Power Spectral Density           | PASS     |        |
| FCC part 15.247 (d)             | Band Edge                        | PASS     |        |
| FCC part 15.205/15.209          | Spurious Emission                | PASS     |        |

NOTE:

(1)“N/A” denotes test is not applicable in this Test Report



## 2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

CAB identifier: CN0110

## 2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  · where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$  · providing a level of confidence of approximately 95 %.

| No. | Item                                              | Uncertainty |
|-----|---------------------------------------------------|-------------|
| 1   | 3m camber Radiated spurious emission(9KHz-30MHz)  | U=4.5dB     |
| 2   | 3m camber Radiated spurious emission(30MHz-1GHz)  | U=4.8dB     |
| 3   | 3m chamber Radiated spurious emission(1GHz-6GHz)  | U=4.9dB     |
| 4   | 3m chamber Radiated spurious emission(6GHz-40GHz) | U=5.0dB     |
| 5   | Conducted disturbance                             | U=3.2dB     |
| 6   | RF Band Edge                                      | U=1.68dB    |
| 7   | RF power conducted                                | U=1.86dB    |
| 8   | RF conducted Spurious Emission                    | U=2.2dB     |
| 9   | RF Occupied Bandwidth                             | U=1.8MHz    |
| 10  | RF Power Spectral Density                         | U=1.75dB    |
| 11  | humidity uncertainty                              | U=5.3%      |
| 12  | Temperature uncertainty                           | U=0.59°C    |



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                      |                                                                                     |
|----------------------|-------------------------------------------------------------------------------------|
| Product Name:        | Navi Air Tracker Compatible with iOS Find My App                                    |
| Model No.:           | WTV-NV25                                                                            |
| Serial No.:          | R5020                                                                               |
| Model Different.:    | All the model are the same circuit and RF module, only the model name is different. |
| Hardware Version:    | H1.0                                                                                |
| Software Version:    | S1.0                                                                                |
| Sample(s) Status:    | Engineer sample                                                                     |
| Operation Frequency: | 2402MHz~2480MHz                                                                     |
| Channel Numbers:     | 40                                                                                  |
| Channel Separation:  | 2MHz                                                                                |
| Modulation Type:     | GFSK                                                                                |
| Antenna Type:        | Chip Antenna                                                                        |
| Antenna gain:        | 2.67dBi                                                                             |
| Power supply:        | N/A                                                                                 |
| Battery capacity:    | DC 3V                                                                               |





| Operation Frequency each of channel |           |         |           |         |           |         |           |
|-------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                             | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1                                   | 2402 MHz  | 11      | 2422 MHz  | 21      | 2442 MHz  | 31      | 2462 MHz  |
| 2                                   | 2404 MHz  | 12      | 2424 MHz  | 22      | 2444 MHz  | 32      | 2464 MHz  |
| 3                                   | 2406 MHz  | 13      | 2426 MHz  | 23      | 2446 MHz  | 33      | 2466 MHz  |
| 4                                   | 2408 MHz  | 14      | 2428 MHz  | 24      | 2448 MHz  | 34      | 2468 MHz  |
| 5                                   | 2410 MHz  | 15      | 2430 MHz  | 25      | 2450 MHz  | 35      | 2470 MHz  |
| 6                                   | 2412 MHz  | 16      | 2432 MHz  | 26      | 2452 MHz  | 36      | 2472 MHz  |
| 7                                   | 2414 MHz  | 17      | 2434 MHz  | 27      | 2454 MHz  | 37      | 2474 MHz  |
| 8                                   | 2416 MHz  | 18      | 2436 MHz  | 28      | 2456 MHz  | 38      | 2476 MHz  |
| 9                                   | 2418 MHz  | 19      | 2438 MHz  | 29      | 2458 MHz  | 39      | 2478 MHz  |
| 10                                  | 2420 MHz  | 20      | 2440 MHz  | 30      | 2460 MHz  | 40      | 2480 MHz  |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel             | Frequency |
|---------------------|-----------|
| The lowest channel  | 2402MHz   |
| The middle channel  | 2440MHz   |
| The Highest channel | 2480MHz   |

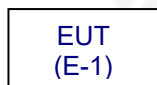
### 3.2 DESCRIPTION OF TEST MODES

|                                                                                                                                                                                                                                                                                                                                      |                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                                                                                                                    | Keep the EUT in continuously transmitting mode |
| Charging Mode:                                                                                                                                                                                                                                                                                                                       | Keep the EUT in Charging 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.<br>For battery operated equipment, the equipment tests shall be performed using a new battery. |                                                |
| Test Software                                                                                                                                                                                                                                                                                                                        | FCC_assist_1.0.2.2                             |
| Power level setup                                                                                                                                                                                                                                                                                                                    | 10dBm                                          |

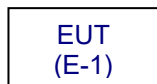


### 3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

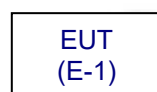
#### Conducted Emission



#### Radiated Emission



#### Conducted Spurious



### 3.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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  | Navi Air Tracker Compatible with iOS Find My App | N/A       | WTV-NV25       | N/A        | EUT  |
|      |                                                  |           |                |            |      |
|      |                                                  |           |                |            |      |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
|      |               |              |        |      |
|      |               |              |        |      |

#### 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.
- (3) EUT is tested with new battery.



## 3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

## Conduction Emissions Test

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No.        | Firmware Version | Last calibration | Calibrated until |
|------|-------------------|--------------|----------|-------------------|------------------|------------------|------------------|
| 1    | LISN              | R&S          | ENV216   | 101471            | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 2    | LISN              | CYBERTEK     | EM5040A  | E1850400149       | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | Test Cable        | N/A          | C-01     | N/A               | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 4    | EMI Test Receiver | R&S          | ESCI3    | 101393            | 4.42 SP3         | Sep. 29, 2024    | Sep. 28, 2025    |
| 5    | EMC Software      | Frad         | EZ-EMC   | Ver.EMC-CON 3A1.1 | N/A              | \                | \                |

## Radiation Emissions &amp; Radiation Spurious Emissions Test

| Item | Equipment                         | Manufacturer   | Type No.        | Serial No.         | Firmware Version | Last calibration | Calibrated until |
|------|-----------------------------------|----------------|-----------------|--------------------|------------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz)  | KEYSIGHT       | N9020A          | MY55370835         | A.17.05          | Sep. 29, 2024    | Sep. 28, 2025    |
| 2    | Spectrum Analyzer (10kHz-39.9GHz) | R&S            | FSV40-N         | 100363             | 1.71 SP2         | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | EMI Test Receiver (9kHz-7GHz)     | R&S            | ESCI7           | 100969             | 4.32             | Sep. 29, 2024    | Sep. 28, 2025    |
| 4    | Bilog Antenna (30MHz-1500MHz)     | Schwarzbeck    | VULB9168        | 00877              | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 5    | Horn Antenna (1GHz-18GHz)         | Agilent        | AH-118          | 071145             | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 6    | Horn Antenna (15GHz-40GHz)        | A.H.System     | SAS-574         | 588                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 7    | Loop Antenna                      | TESEQ          | HLA6121         | 58357              | N/A              | Oct. 11, 2024    | Oct. 10, 2025    |
| 8    | Amplifier (30-1000MHz)            | EM Electronics | EM330 Amplifier | 60747              | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 9    | Amplifier (1GHz-26.5GHz)          | HuiPu          | 8449B           | 3008A00315         | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 10   | Amplifier (500MHz-40GHz)          | QuanJuDa       | DLE-161         | 097                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 11   | Test Cable                        | N/A            | R-01            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 12   | Test Cable                        | N/A            | R-02            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 13   | Test Cable                        | N/A            | R-03            | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 14   | D.C. Power Supply                 | LongWei        | TPR-6405D       | N/A                | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 15   | EMC Software                      | Frad           | EZ-EMC          | Ver.EMC-CO N 3A1.1 | N/A              | \                | \                |
| 16   | Turntable                         | MF             | MF-7802BS       | N/A                | N/A              | \                | \                |
| 17   | Antenna tower                     | MF             | MF-7802BS       | N/A                | N/A              | \                | \                |



RF Conducted Test

| Item | Equipment                         | Manufacturer                | Type No.    | Serial No. | Firmware Version | Last calibration | Calibrated until |
|------|-----------------------------------|-----------------------------|-------------|------------|------------------|------------------|------------------|
| 1    | Spectrum Analyzer (9kHz-26.5GHz)  | KEYSIGHT                    | N9020A      | MY55370835 | A.17.05          | Sep. 29, 2024    | Sep. 28, 2025    |
| 2    | Spectrum Analyzer (10kHz-39.9GHz) | R&S                         | FSV40-N     | 100363     | 1.71 SP2         | Sep. 30, 2024    | Sep. 29, 2025    |
| 3    | Test Cable                        | N/A                         | RF-01       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 4    | Test Cable                        | N/A                         | RF-02       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 5    | Test Cable                        | N/A                         | RF-03       | N/A        | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 6    | ESG Signal Generator              | Agilent                     | E4421B      | GB40051203 | B.03.84          | Sep. 29, 2024    | Sep. 28, 2025    |
| 7    | Signal Generator                  | Agilent                     | N5182A      | MY47420215 | A.01.87          | Sep. 29, 2024    | Sep. 28, 2025    |
| 8    | Magnetic Field Probe Tester       | Narda                       | ELT-400     | 0-0344     | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 9    | Van der Hoofden measuring head    | Schwarzbeck Mess-elektronik | VDHH 9502   | 9502-039   | N/A              | Sep. 30, 2024    | Sep. 29, 2025    |
| 10   | Wideband Radio Communication Test | R&S                         | CMW500      | 106504     | V 3.7.22         | Sep. 30, 2024    | Sep. 29, 2025    |
| 11   | MWRF Power Meter Test system      | MW                          | MW100-RF CB | 10371      | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 12   | Power Meter                       | KEYSIGHT                    | N1912AP     | 926431     | A.05.00          | Sep. 29, 2024    | Sep. 28, 2025    |
| 13   | D.C. Power Supply                 | LongWei                     | TPR-6405D   | GQ7516     | N/A              | Sep. 29, 2024    | Sep. 28, 2025    |
| 14   | RF Software                       | MW                          | MTS8310     | V2.0.0.0   | N/A              | \                | \                |



#### 4. EMC EMISSION TEST

##### 4.1 CONDUCTED EMISSION MEASUREMENT

|                       |                                      |
|-----------------------|--------------------------------------|
| Test Requirement:     | FCC Part15 C Section 15.207          |
| Test Method:          | ANSI C63.10:2013                     |
| Test Frequency Range: | 150KHz to 30MHz                      |
| Receiver setup:       | RBW=9KHz, VBW=30KHz, Sweep time=auto |

##### 4.1.1 POWER LINE CONDUCTED EMISSION Limits

| FREQUENCY (MHz) | Limit (dBuV) |           | Standard |
|-----------------|--------------|-----------|----------|
|                 | Quas-peak    | Average   |          |
| 0.15 -0.5       | 66 - 56 *    | 56 - 46 * | FCC      |
| 0.50 -5.0       | 56.00        | 46.00     | FCC      |
| 5.0 -30.0       | 60.00        | 50.00     | FCC      |

Note:

(1) \*Decreases with the logarithm of the frequency.

##### 4.1.2 TEST PROCEDURE

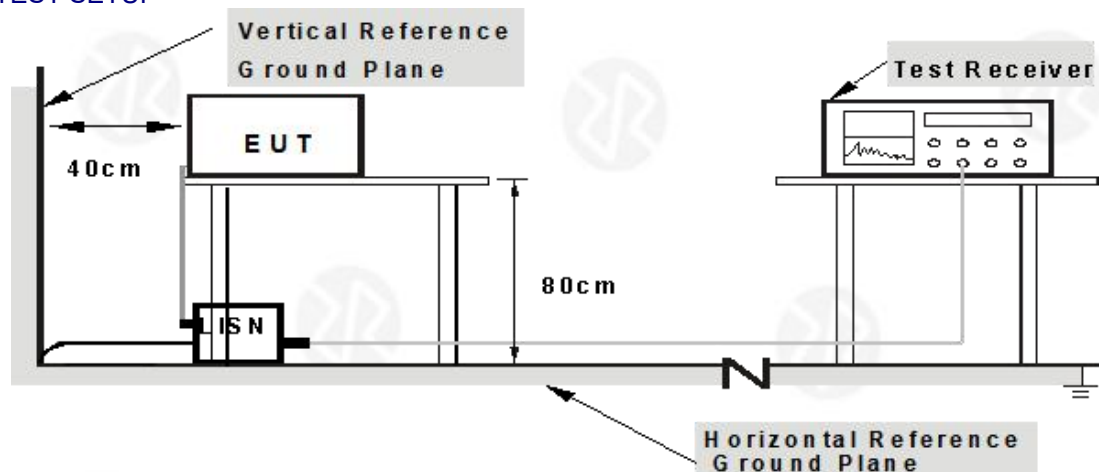
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

##### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.4 TEST SETUP



- 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

#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to Charging during test. This operating condition was tested and used to collect the included data.

#### 4.1.6 Test Result

The EUT is powered by DC only the test items is not applicable



## 4.2 RADIATED EMISSION MEASUREMENT

|                       |                             |            |        |        |            |
|-----------------------|-----------------------------|------------|--------|--------|------------|
| Test Requirement:     | FCC Part15 C Section 15.209 |            |        |        |            |
| Test Method:          | ANSI C63.10:2013            |            |        |        |            |
| Test Frequency Range: | 9kHz to 25GHz               |            |        |        |            |
| Test site:            | Measurement Distance: 3m    |            |        |        |            |
| Receiver setup:       | Frequency                   | Detector   | RBW    | VBW    | Value      |
|                       | 9KHz-150KHz                 | Quasi-peak | 200Hz  | 600Hz  | Quasi-peak |
|                       | 150KHz-30MHz                | Quasi-peak | 9KHz   | 30KHz  | Quasi-peak |
|                       | 30MHz-1GHz                  | Quasi-peak | 100KHz | 300KHz | Quasi-peak |
|                       | Above 1GHz                  | Peak       | 1MHz   | 3MHz   | Peak       |
|                       |                             | Peak       | 1MHz   | 10Hz   | Average    |

### 4.2.1 RADIATED EMISSION LIMITS

| Frequencies<br>(MHz) | Field Strength<br>(micorvolts/meter) | Measurement Distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009~0.490          | 2400/F(KHz)                          | 300                              |
| 0.490~1.705          | 24000/F(KHz)                         | 30                               |
| 1.705~30.0           | 30                                   | 30                               |
| 30~88                | 100                                  | 3                                |
| 88~216               | 150                                  | 3                                |
| 216~960              | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

### LIMITS OF RADIATED EMISSION MEASUREMENT

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) |         |
|-----------------|------------------------|---------|
|                 | PEAK                   | AVERAGE |
| Above 1000      | 74                     | 54      |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).





#### 4.2.2 TEST PROCEDURE

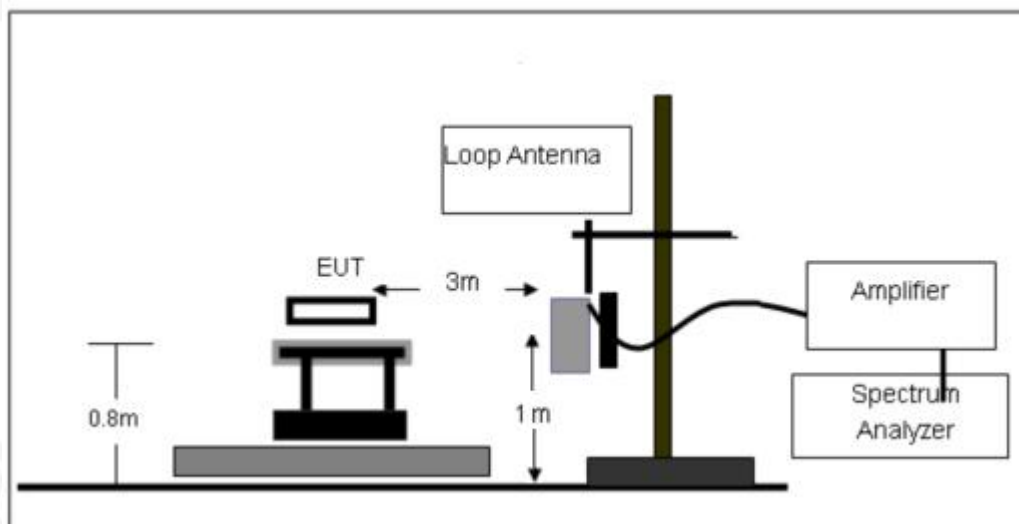
- The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8m; above 1GHz, the height was 1.5m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- For the radiated emission test above 1GHz:  
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.  
The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.  
Note:  
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

#### 4.2.3 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.4 TEST SETUP

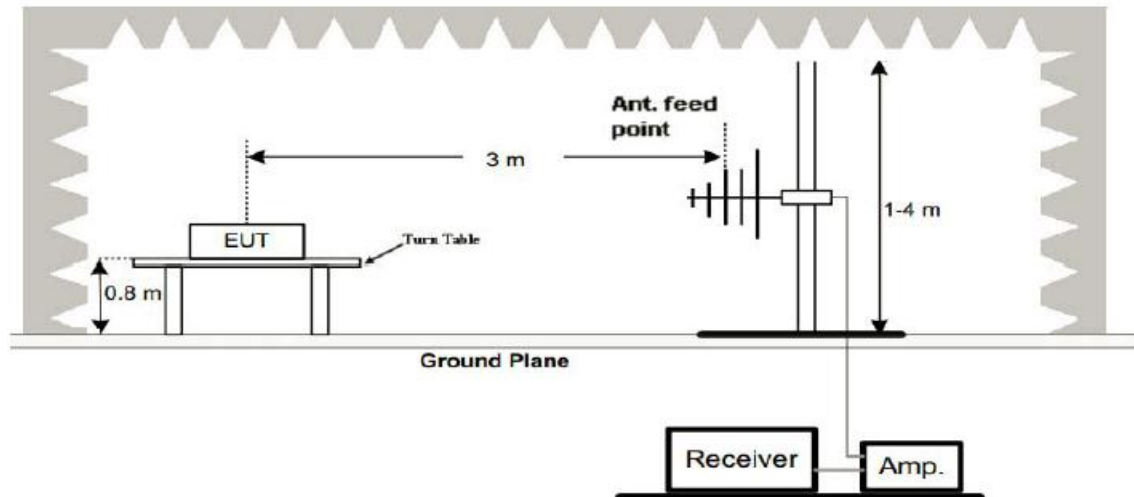
##### (A) Radiated Emission Test-Up Frequency Below 30MHz



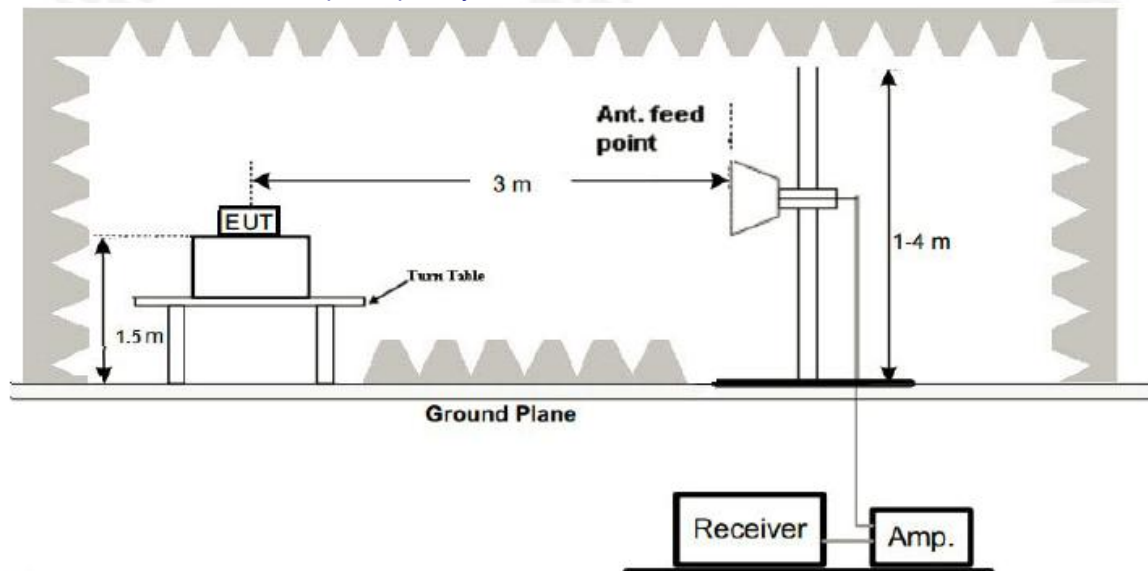




## (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz



## 4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

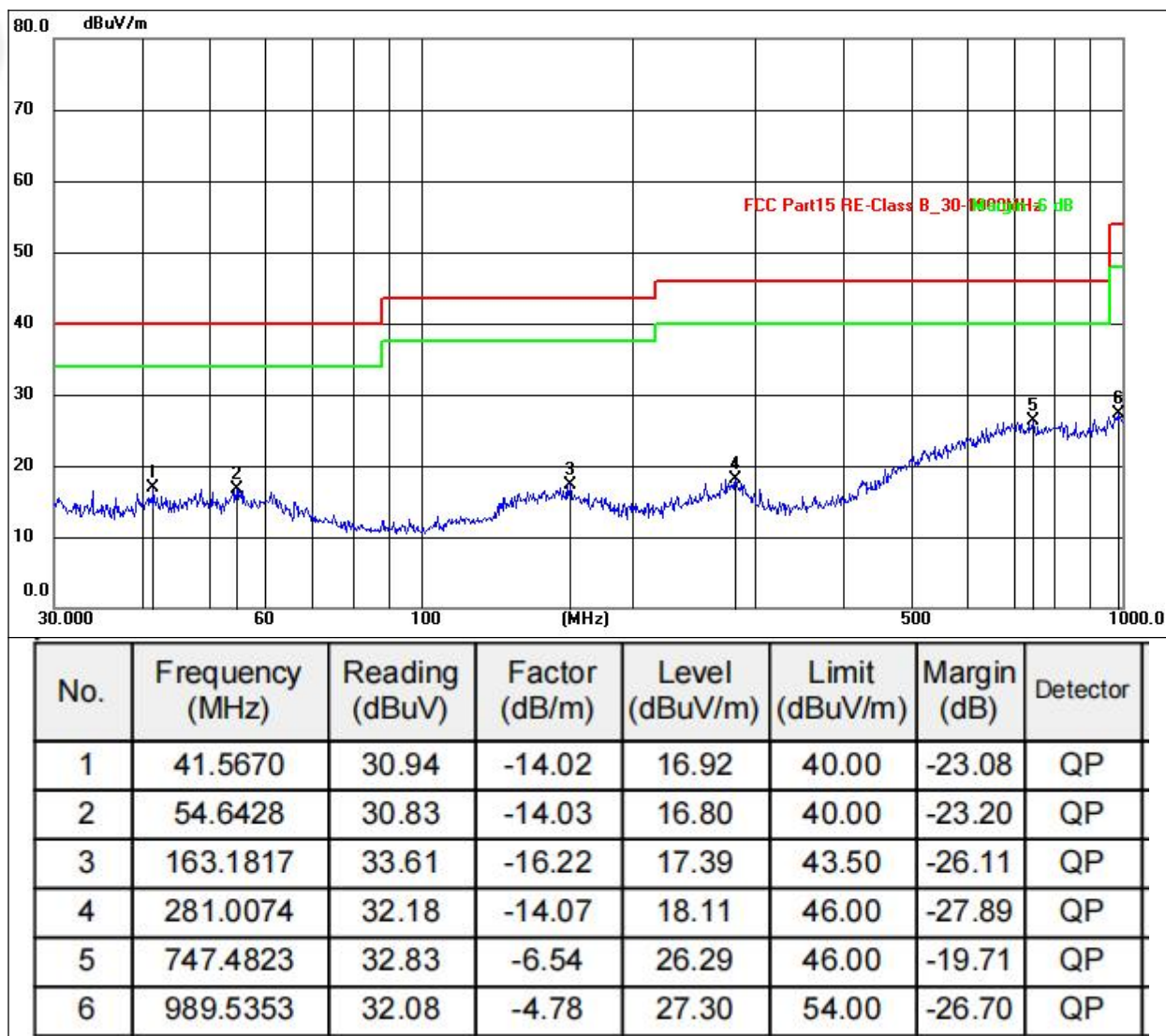
## 4.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



Between 30MHz – 1GHz

|               |         |                    |              |
|---------------|---------|--------------------|--------------|
| Temperature:  | 26°C    | Relative Humidity: | 54%          |
| Pressure:     | 101 kPa | Polarization:      | Horizontal   |
| Test Voltage: | DC 3V   | Test Mode :        | TX - 2402MHz |

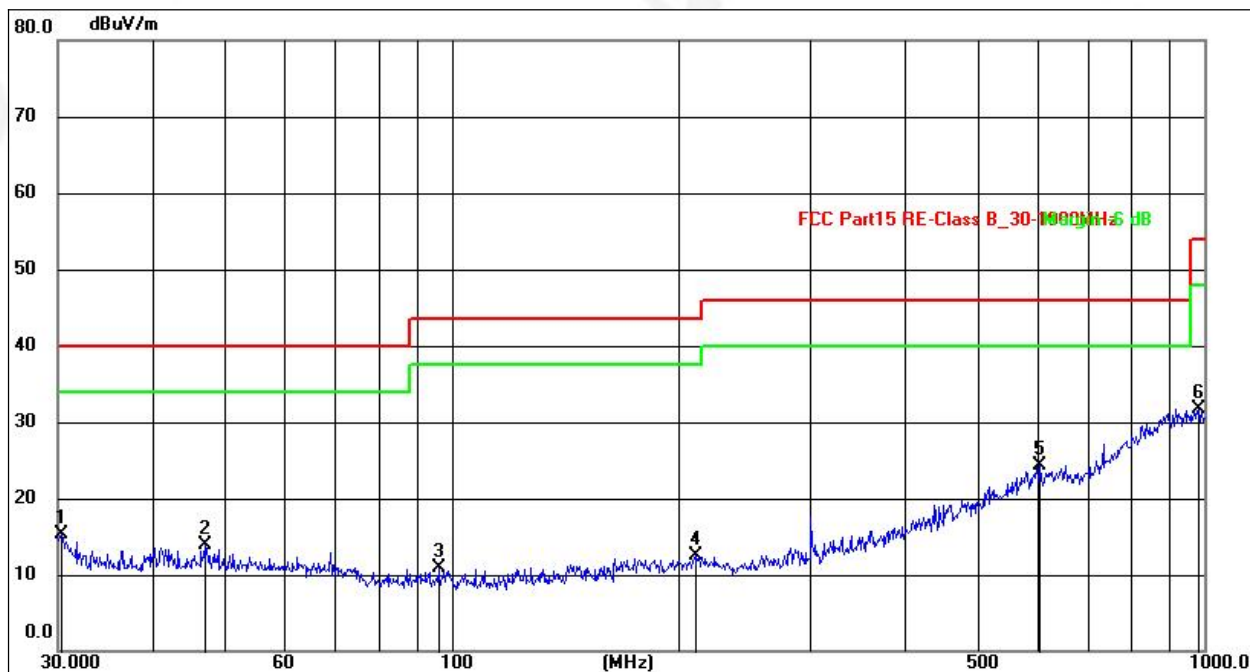


Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi - Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor = Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin = Measurement Level-Limit.
7. The test data shows only the worst case TX - 2402MHz.



|               |        |                    |              |
|---------------|--------|--------------------|--------------|
| Temperature:  | 26℃    | Relative Humidity: | 54%          |
| Pressure:     | 101kPa | Polarization:      | Vertical     |
| Test Voltage: | DC 3V  | Test Mode :        | TX - 2402MHz |



| No. | Frequency (MHz) | Reading (dBUV) | Factor (dB/m) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 30.3170         | 33.62          | -18.29        | 15.33          | 40.00          | -24.67      | QP       |
| 2   | 46.9947         | 30.99          | -17.06        | 13.93          | 40.00          | -26.07      | QP       |
| 3   | 96.0985         | 32.02          | -21.21        | 10.81          | 43.50          | -32.69      | QP       |
| 4   | 210.7860        | 32.64          | -20.22        | 12.42          | 43.50          | -31.08      | QP       |
| 5   | 605.6592        | 31.59          | -7.34         | 24.25          | 46.00          | -21.75      | QP       |
| 6   | 982.6200        | 31.69          | -0.01         | 31.68          | 54.00          | -22.32      | QP       |

Remarks:

1. An initial pre-scan was performed on the peak detector.
2. Quasi - Peak measurement were performed at the frequencies with maximized peak emission.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Final Level = Reading level + Correct Factor.
5. Correct Factor= Antenna factor+ Cable loss factor - Amplifier factor.
6. Margin= Measurement Level-Limit.
7. The test data shows only the worst case TX - 2402MHz.



## 1GHz~25GHz

| Polar<br>(H/V)      | Frequency | Meter<br>Reading | Pre-ampli<br>fier | Cable<br>Loss | Antenna<br>Factor | Emission<br>Level | Limits   | Margin | Detector<br>Type |
|---------------------|-----------|------------------|-------------------|---------------|-------------------|-------------------|----------|--------|------------------|
|                     | (MHz)     | (dBuV)           | (dB)              | (dB)          | (dB)              | (dBuV/m)          | (dBuV/m) | (dB)   |                  |
| Low Channel:2402MHz |           |                  |                   |               |                   |                   |          |        |                  |
| V                   | 4804.00   | 52.56            | 30.55             | 5.77          | 24.66             | 52.44             | 74.00    | -21.56 | PK               |
| V                   | 4804.00   | 43.06            | 30.55             | 5.77          | 24.66             | 42.94             | 54.00    | -11.06 | AV               |
| V                   | 7206.00   | 51.20            | 30.33             | 6.32          | 24.55             | 51.74             | 74.00    | -22.26 | PK               |
| V                   | 7206.00   | 43.93            | 30.33             | 6.32          | 24.55             | 44.47             | 54.00    | -9.53  | AV               |
| V                   | 9608.00   | 53.42            | 30.85             | 7.45          | 24.69             | 54.71             | 74.00    | -19.29 | PK               |
| V                   | 9608.00   | 43.11            | 30.85             | 7.45          | 24.69             | 44.40             | 54.00    | -9.60  | AV               |
| V                   | 12010.00  | 51.74            | 31.02             | 8.99          | 25.57             | 55.28             | 74.00    | -18.72 | PK               |
| V                   | 12010.00  | 43.50            | 31.02             | 8.99          | 25.57             | 47.04             | 54.00    | -6.96  | AV               |
| H                   | 4804.00   | 52.62            | 30.55             | 5.77          | 24.66             | 52.50             | 74.00    | -21.50 | PK               |
| H                   | 4804.00   | 43.55            | 30.55             | 5.77          | 24.66             | 43.43             | 54.00    | -10.57 | AV               |
| H                   | 7206.00   | 50.17            | 30.33             | 6.32          | 24.55             | 50.71             | 74.00    | -23.29 | PK               |
| H                   | 7206.00   | 43.19            | 30.33             | 6.32          | 24.55             | 43.73             | 54.00    | -10.27 | AV               |
| H                   | 9608.00   | 50.86            | 30.85             | 7.45          | 24.69             | 52.15             | 74.00    | -21.85 | PK               |
| H                   | 9608.00   | 43.91            | 30.85             | 7.45          | 24.69             | 45.20             | 54.00    | -8.80  | AV               |
| H                   | 12010.00  | 50.30            | 31.02             | 8.99          | 25.57             | 53.84             | 74.00    | -20.16 | PK               |
| H                   | 12010.00  | 43.94            | 31.02             | 8.99          | 25.57             | 47.48             | 54.00    | -6.52  | AV               |

| Polar<br>(H/V)         | Frequency | Meter<br>Reading | Pre-ampli<br>fier | Cable<br>Loss | Antenna<br>Factor | Emission<br>Level | Limits   | Margin | Detector<br>Type |
|------------------------|-----------|------------------|-------------------|---------------|-------------------|-------------------|----------|--------|------------------|
|                        | (MHz)     | (dBuV)           | (dB)              | (dB)          | (dB)              | (dBuV/m)          | (dBuV/m) | (dB)   |                  |
| Middle Channel:2440MHz |           |                  |                   |               |                   |                   |          |        |                  |
| V                      | 4882.00   | 54.06            | 30.55             | 5.77          | 24.66             | 53.94             | 74.00    | -20.06 | PK               |
| V                      | 4882.00   | 43.38            | 30.55             | 5.77          | 24.66             | 43.26             | 54.00    | -10.74 | AV               |
| V                      | 7323.00   | 54.34            | 30.33             | 6.32          | 24.55             | 54.88             | 74.00    | -19.12 | PK               |
| V                      | 7323.00   | 43.87            | 30.33             | 6.32          | 24.55             | 44.41             | 54.00    | -9.59  | AV               |
| V                      | 9764.00   | 51.96            | 30.85             | 7.45          | 24.69             | 53.25             | 74.00    | -20.75 | PK               |
| V                      | 9764.00   | 43.68            | 30.85             | 7.45          | 24.69             | 44.97             | 54.00    | -9.03  | AV               |
| V                      | 12205.00  | 52.60            | 31.02             | 8.99          | 25.57             | 56.14             | 74.00    | -17.86 | PK               |
| V                      | 12205.00  | 43.28            | 31.02             | 8.99          | 25.57             | 46.82             | 54.00    | -7.18  | AV               |
| H                      | 4882.00   | 51.69            | 30.55             | 5.77          | 24.66             | 51.57             | 74.00    | -22.43 | PK               |
| H                      | 4882.00   | 43.05            | 30.55             | 5.77          | 24.66             | 42.93             | 54.00    | -11.07 | AV               |
| H                      | 7323.00   | 53.83            | 30.33             | 6.32          | 24.55             | 54.37             | 74.00    | -19.63 | PK               |
| H                      | 7323.00   | 43.46            | 30.33             | 6.32          | 24.55             | 44.00             | 54.00    | -10.00 | AV               |
| H                      | 9764.00   | 50.57            | 30.85             | 7.45          | 24.69             | 51.86             | 74.00    | -22.14 | PK               |
| H                      | 9764.00   | 43.76            | 30.85             | 7.45          | 24.69             | 45.05             | 54.00    | -8.95  | AV               |
| H                      | 12205.00  | 50.96            | 31.02             | 8.99          | 25.57             | 54.50             | 74.00    | -19.50 | PK               |
| H                      | 12205.00  | 43.36            | 31.02             | 8.99          | 25.57             | 46.90             | 54.00    | -7.10  | AV               |





| Polar<br>(H/V)       | Frequency | Meter<br>Reading | Pre-ampli<br>fier | Cable<br>Loss | Antenna<br>Factor | Emission<br>Level | Limits   | Margin | Detector<br>Type |
|----------------------|-----------|------------------|-------------------|---------------|-------------------|-------------------|----------|--------|------------------|
|                      | (MHz)     | (dBuV)           | (dB)              | (dB)          | (dB)              | (dBuV/m)          | (dBuV/m) | (dB)   |                  |
| High Channel:2480MHz |           |                  |                   |               |                   |                   |          |        |                  |
| V                    | 4960.00   | 52.52            | 30.55             | 5.77          | 24.66             | 52.40             | 74.00    | -21.60 | PK               |
| V                    | 4960.00   | 43.48            | 30.55             | 5.77          | 24.66             | 43.36             | 54.00    | -10.64 | AV               |
| V                    | 7440.00   | 53.71            | 30.33             | 6.32          | 24.55             | 54.25             | 74.00    | -19.75 | PK               |
| V                    | 7440.00   | 43.33            | 30.33             | 6.32          | 24.55             | 43.87             | 54.00    | -10.13 | AV               |
| V                    | 9920.00   | 53.97            | 30.85             | 7.45          | 24.69             | 55.26             | 74.00    | -18.74 | PK               |
| V                    | 9920.00   | 43.57            | 30.85             | 7.45          | 24.69             | 44.86             | 54.00    | -9.14  | AV               |
| V                    | 12400.00  | 52.13            | 31.02             | 8.99          | 25.57             | 55.67             | 74.00    | -18.33 | PK               |
| V                    | 12400.00  | 43.69            | 31.02             | 8.99          | 25.57             | 47.23             | 54.00    | -6.77  | AV               |
| H                    | 4960.00   | 54.92            | 30.55             | 5.77          | 24.66             | 54.80             | 74.00    | -19.20 | PK               |
| H                    | 4960.00   | 43.20            | 30.55             | 5.77          | 24.66             | 43.08             | 54.00    | -10.92 | AV               |
| H                    | 7440.00   | 53.54            | 30.33             | 6.32          | 24.55             | 54.08             | 74.00    | -19.92 | PK               |
| H                    | 7440.00   | 43.71            | 30.33             | 6.32          | 24.55             | 44.25             | 54.00    | -9.75  | AV               |
| H                    | 9920.00   | 52.66            | 30.85             | 7.45          | 24.69             | 53.95             | 74.00    | -20.05 | PK               |
| H                    | 9920.00   | 43.37            | 30.85             | 7.45          | 24.69             | 44.66             | 54.00    | -9.34  | AV               |
| H                    | 12400.00  | 50.23            | 31.02             | 8.99          | 25.57             | 53.77             | 74.00    | -20.23 | PK               |
| H                    | 12400.00  | 43.56            | 31.02             | 8.99          | 25.57             | 47.10             | 54.00    | -6.90  | AV               |

## Remark:

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.



## 5. RADIATED BAND EMISSION MEASUREMENT

### 5.1 TEST REQUIREMENT:

|                       |                                                                                                    |          |      |      |         |
|-----------------------|----------------------------------------------------------------------------------------------------|----------|------|------|---------|
| Test Requirement:     | FCC Part15 C Section 15.209 and 15.205                                                             |          |      |      |         |
| Test Method:          | ANSI C63.10: 2013                                                                                  |          |      |      |         |
| Test Frequency Range: | All of the restrict bands were tested, only the worst band's (2390MHz to 2500MHz) data was showed. |          |      |      |         |
| Test site:            | Measurement Distance: 3m                                                                           |          |      |      |         |
| Receiver setup:       | Frequency                                                                                          | Detector | RBW  | VBW  | Value   |
|                       | Above                                                                                              | Peak     | 1MHz | 3MHz | Peak    |
|                       | 1GHz                                                                                               | Average  | 1MHz | 3MHz | Average |

### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) |         |
|-----------------|------------------------|---------|
|                 | PEAK                   | AVERAGE |
| Above 1000      | 74                     | 54      |

#### Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

### 5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
7. Test the EUT in the lowest channel, the Highest channel

#### Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

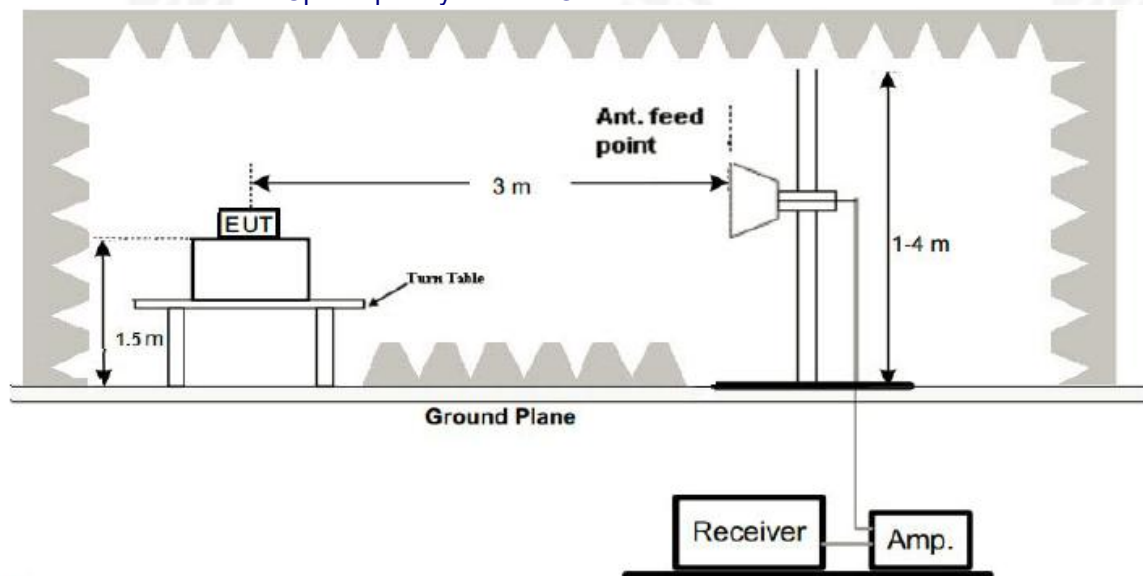
### 5.3 DEVIATION FROM TEST STANDARD

No deviation



## 5.4 TEST SETUP

### Radiated Emission Test-Up Frequency Above 1GHz



## 5.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.





## 5.6 TEST RESULT

|                                                                                                                  | Polar (H/V)           | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detect or Type | Result |
|------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------|----------------------|--------------------|-----------------|-----------------------|-------------------------|----------------|-------------|----------------|--------|
| GFSK                                                                                                             | Low Channel: 2402MHz  |                 |                      |                    |                 |                       |                         |                |             |                |        |
|                                                                                                                  | H                     | 2390.00         | 55.00                | 30.22              | 4.85            | 23.98                 | 53.61                   | 74.00          | -20.39      | PK             | PASS   |
|                                                                                                                  | H                     | 2390.00         | 44.10                | 30.22              | 4.85            | 23.98                 | 42.71                   | 54.00          | -11.29      | AV             | PASS   |
|                                                                                                                  | H                     | 2400.00         | 53.98                | 30.22              | 4.85            | 23.98                 | 52.59                   | 74.00          | -21.41      | PK             | PASS   |
|                                                                                                                  | H                     | 2400.00         | 44.70                | 30.22              | 4.85            | 23.98                 | 43.31                   | 54.00          | -10.69      | AV             | PASS   |
|                                                                                                                  | V                     | 2390.00         | 54.26                | 30.22              | 4.85            | 23.98                 | 52.87                   | 74.00          | -21.13      | PK             | PASS   |
|                                                                                                                  | V                     | 2390.00         | 44.77                | 30.22              | 4.85            | 23.98                 | 43.38                   | 54.00          | -10.62      | AV             | PASS   |
|                                                                                                                  | V                     | 2400.00         | 53.14                | 30.22              | 4.85            | 23.98                 | 51.75                   | 74.00          | -22.25      | PK             | PASS   |
|                                                                                                                  | V                     | 2400.00         | 44.76                | 30.22              | 4.85            | 23.98                 | 43.37                   | 54.00          | -10.63      | AV             | PASS   |
|                                                                                                                  | High Channel: 2480MHz |                 |                      |                    |                 |                       |                         |                |             |                |        |
|                                                                                                                  | H                     | 2483.50         | 53.81                | 30.22              | 4.85            | 23.98                 | 52.42                   | 74.00          | -21.58      | Pk             | PASS   |
|                                                                                                                  | H                     | 2483.50         | 44.93                | 30.22              | 4.85            | 23.98                 | 43.54                   | 54.00          | -10.46      | AV             | PASS   |
|                                                                                                                  | H                     | 2500.00         | 54.91                | 30.22              | 4.85            | 23.98                 | 53.52                   | 74.00          | -20.48      | Pk             | PASS   |
|                                                                                                                  | H                     | 2500.00         | 44.23                | 30.22              | 4.85            | 23.98                 | 42.84                   | 54.00          | -11.16      | AV             | PASS   |
|                                                                                                                  | V                     | 2483.50         | 53.65                | 30.22              | 4.85            | 23.98                 | 52.26                   | 74.00          | -21.74      | Pk             | PASS   |
|                                                                                                                  | V                     | 2483.50         | 44.15                | 30.22              | 4.85            | 23.98                 | 42.76                   | 54.00          | -11.24      | AV             | PASS   |
|                                                                                                                  | V                     | 2500.00         | 54.50                | 30.22              | 4.85            | 23.98                 | 53.11                   | 74.00          | -20.89      | Pk             | PASS   |
|                                                                                                                  | V                     | 2500.00         | 44.31                | 30.22              | 4.85            | 23.98                 | 42.92                   | 54.00          | -11.08      | AV             | PASS   |
| Remark:                                                                                                          |                       |                 |                      |                    |                 |                       |                         |                |             |                |        |
| 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit. |                       |                 |                      |                    |                 |                       |                         |                |             |                |        |



## 6. POWER SPECTRAL DENSITY TEST

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.247 (e)           |
| Test Method:      | KDB558074 D01 15.247 Meas Guidance v05r02 |

### 6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |                        |           |                       |        |
|---------------------------------|------------------------|-----------|-----------------------|--------|
| Section                         | Test Item              | Limit     | Frequency Range (MHz) | Result |
| 15.247 (e)                      | Power Spectral Density | 8dBm/3kHz | 2400-2483.5           | PASS   |

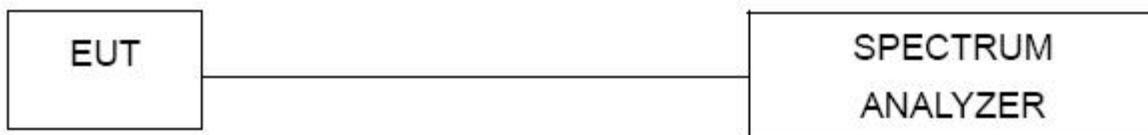
### 6.2 TEST PROCEDURE

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3\text{ kHz} \leq \text{RBW} \leq 100\text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 6.3 DEVIATION FROM STANDARD

No deviation.

### 6.4 TEST SETUP



### 6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.



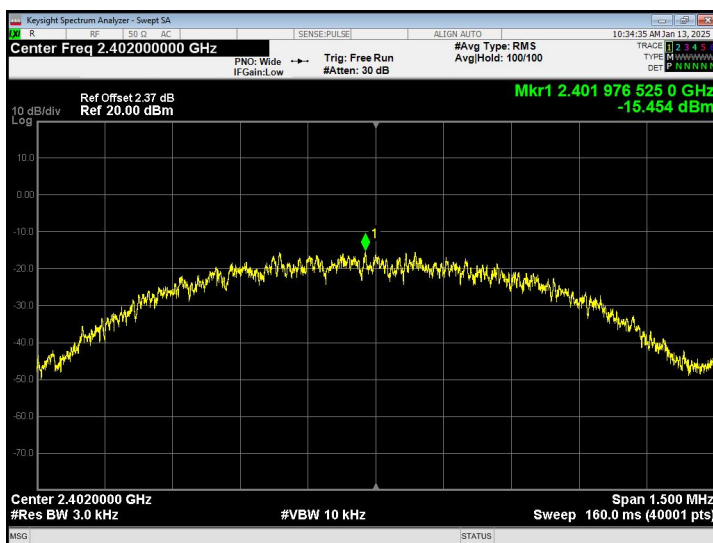
## 6.6 TEST RESULT

|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Temperature : | 26℃    | Relative Humidity : | 54%   |
| Pressure:     | 101kPa | Test Voltage:       | DC 3V |

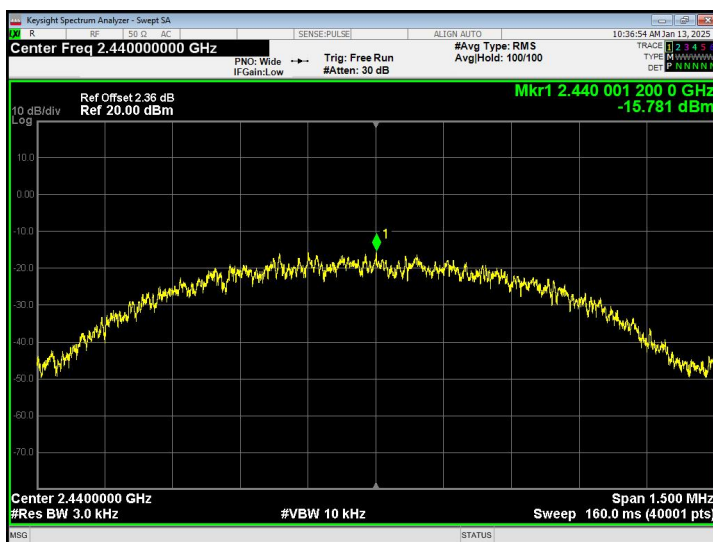
| Test Mode | Frequency (MHz) | Power Spectral Density (dBm/3kHz) | Limit (dBm/3kHz) | Result |
|-----------|-----------------|-----------------------------------|------------------|--------|
| GFSK      | 2402            | -15.454                           | 8                | PASS   |
|           | 2440            | -15.781                           | 8                | PASS   |
|           | 2480            | -16.264                           | 8                | PASS   |



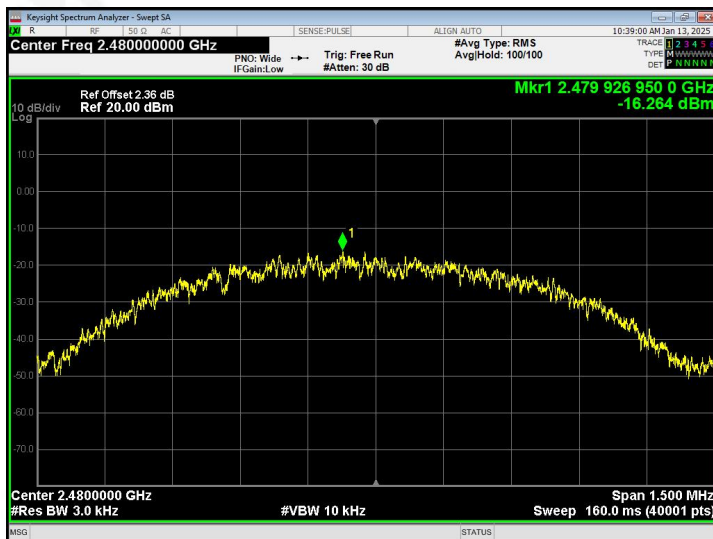
CH01



CH20



CH40





## 7. 6DB OCCUPIED BANDWIDTH

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(2)        |
| Test Method:      | KDB558074 D01 15.247 Meas Guidance v05r02 |

### 7.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |           |                                                  |                   |        |
|---------------------------------|-----------|--------------------------------------------------|-------------------|--------|
| Section                         | Test Item | Limit                                            | Frequency Range   | Result |
| 15.247(a)(2)                    | Bandwidth | $\geq 500\text{kHz}$<br>(6dB Occupied Bandwidth) | 2400-2483.5 (MHz) | PASS   |

### 7.2 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.3 DEVIATION FROM STANDARD

No deviation.

### 7.4 TEST SETUP



### 7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



## 7.6 TEST RESULT

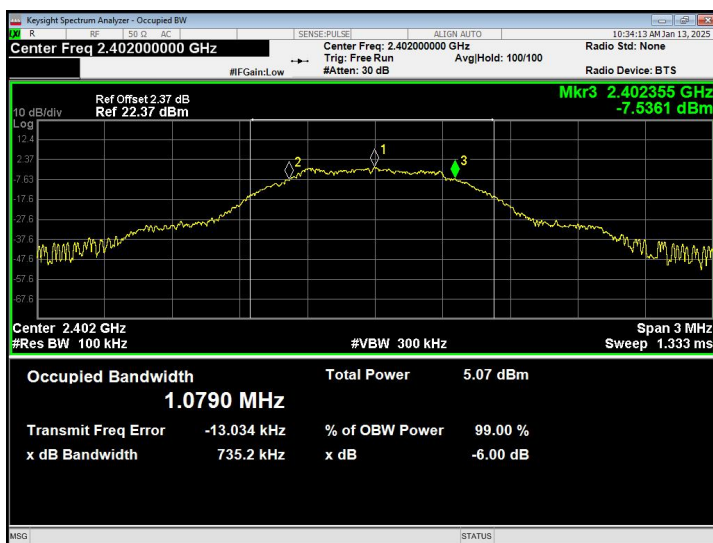
|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Temperature : | 26℃    | Relative Humidity : | 54%   |
| Pressure:     | 101kPa | Test Voltage:       | DC 3V |

| Test Mode | Frequency (MHz) | 6dB Occupied Bandwidth (MHz) | Limit (kHz) | Result |
|-----------|-----------------|------------------------------|-------------|--------|
| GFSK      | 2402            | 0.735                        | >500        | Pass   |
|           | 2440            | 0.745                        |             |        |
|           | 2480            | 0.752                        |             |        |





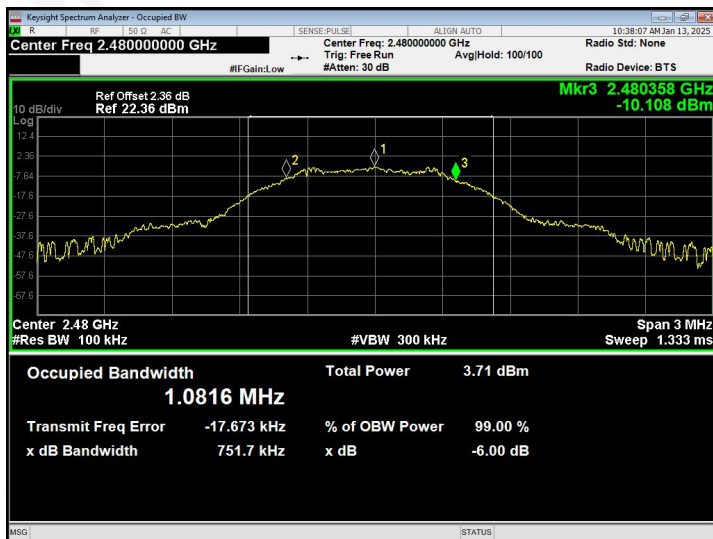
## CH 01



## CH20



## CH40





## 8. PEAK OUTPUT POWER TEST

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(3)        |
| Test Method:      | KDB558074 D01 15.247 Meas Guidance v05r02 |

### 8.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |                   |                 |                   |        |
|---------------------------------|-------------------|-----------------|-------------------|--------|
| Section                         | Test Item         | Limit           | Frequency Range   | Result |
| 15.247(b)(3)                    | Peak Output Power | 1 watt or 30dBm | 2400-2483.5 (MHz) | PASS   |

### 8.2 TEST PROCEDURE

- a. The EUT was directly connected to the Power meter

### 8.3 DEVIATION FROM STANDARD

No deviation.

### 8.4 TEST SETUP



### 8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



## 8.6 TEST RESULT

|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Temperature : | 26℃    | Relative Humidity : | 54%   |
| Pressure:     | 101kPa | Test Voltage:       | DC 3V |

| Test Mode | Test Frequency (MHz) | Peak Output Power (dBm) | Limit (dBm) | Result |
|-----------|----------------------|-------------------------|-------------|--------|
| GFSK      | 2402                 | -0.687                  | 30.00       | Pass   |
|           | 2440                 | -1.248                  |             |        |
|           | 2480                 | -2.060                  |             |        |



## 9. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

|                   |                                           |
|-------------------|-------------------------------------------|
| Test Requirement: | FCC Part15 C Section 15.247 (d)           |
| Test Method:      | KDB558074 D01 15.247 Meas Guidance v05r02 |

### 9.1 APPLICABLE STANDARD

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

### 9.2 TEST PROCEDURE

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

### 9.3 DEVIATION FROM STANDARD

No deviation.

### 9.4 TEST SETUP



### 9.5 EUT OPERATION CONDITIONS

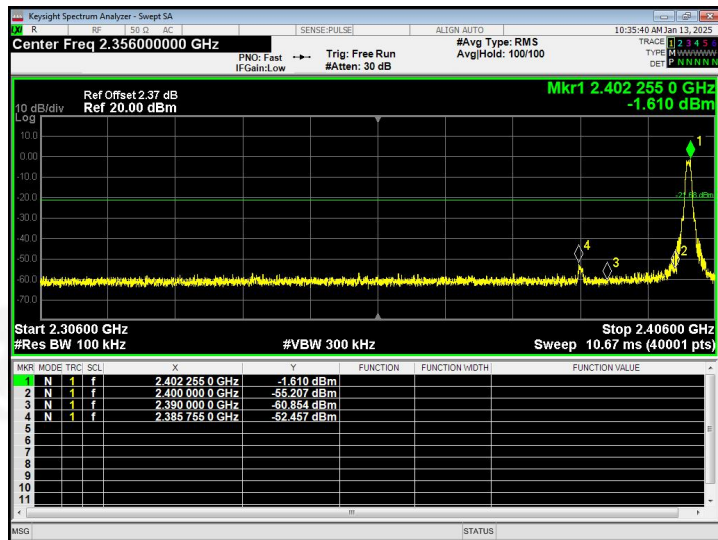
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



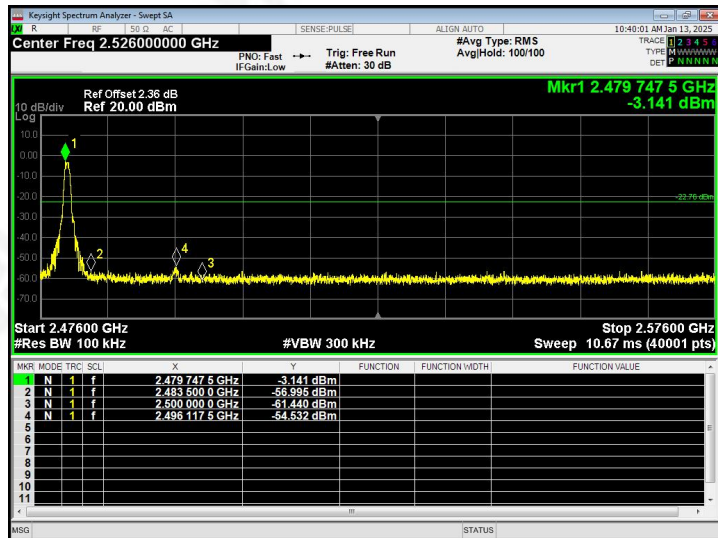
## 9.6 TEST RESULTS

|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Temperature : | 26°C   | Relative Humidity : | 54%   |
| Pressure:     | 101kPa | Test Voltage:       | DC 3V |

### Band Edge, Left Side



### Band Edge, Right Side



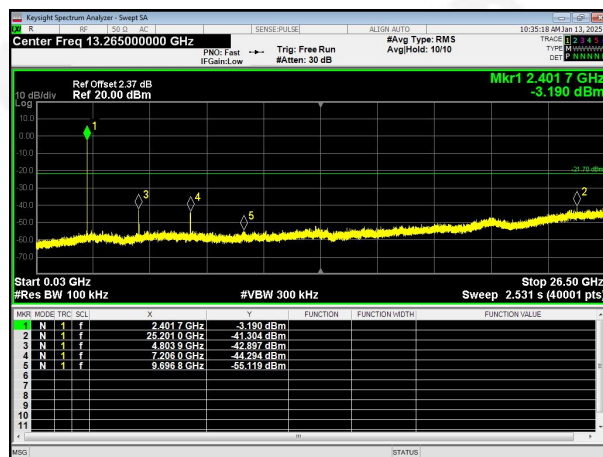


Keysight Spectrum Analyzer - Sweep SA

10 6 50 50 AC SENSE: PHASE ALIGN: AUTO 10:34:49 AM Jan 13, 2025

Center Freq 2.402000000 GHz #Avg Type: RMS AvgHold: 100/100

Trace 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015



Keysight Spectrum Analyzer - Sweet 54

Center Freq 2.440000000 GHz

Ref Offset 2.36 dB  
Ref 20.00 dBm

Span 1.500 MHz  
#Res BW 100 kHz  
#VBW 300 kHz

Trig: Free Run  
#Atten: 30 dB

Avg Type: RMS  
Avg/Hold: 100/100

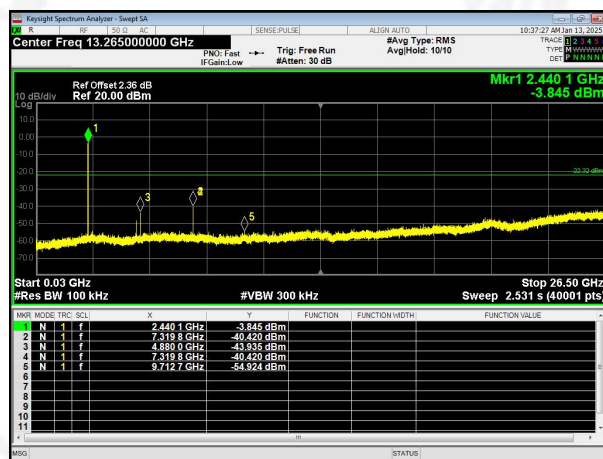
10:36:59 AM Jan 13, 2025

TRACER 1 2 3 4 5 6  
TYPE P N N N N N  
DEF P N N N N N

Mkr1 2.439 986 275 0 GHz  
-2.315 dBm

10 dB/div  
LOG

Center 2.4400000 GHz  
Span 1.500 MHz  
#Res BW 100 kHz  
#VBW 300 kHz  
Sweep 2.667 ms (40001 pts)



Keysight Spectrum Analyzer - Sweep 5A

Center Freq 2.480000000 GHz

SENSE: PULSE

ALIGN: AUTO

#Avg Type: RMS

Avg/Hold: 100/100

TRACER: 1 2 3 4 5 6

TIME: 00:13:15 AM Jan 13, 2025

TYPE: P

DEF: P

Ref Offset 2.36 dB

Ref 20.00 dBm

PNC: Wide

Tri: Free Run

#Anten: 30 dB

IF Calcd: Low

10 dB/div

Log

Mkr1 2.479 993 625 0 GHz

-2.955 dBm

Center 2.48000000 GHz

Span 1.500 MHz

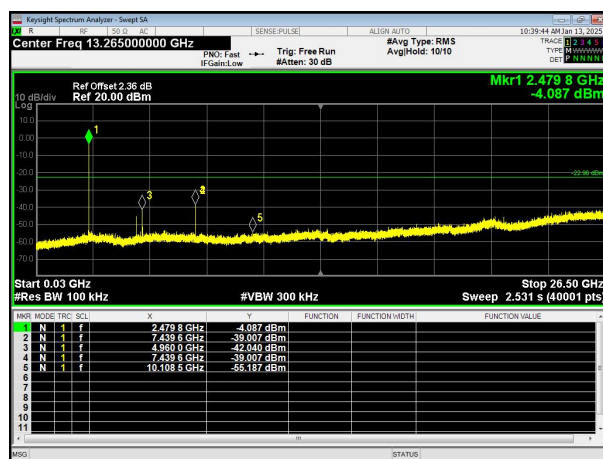
#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.667 ms (40001 pts)

MSG

(STATUS)



30MHz-26.5GHz





## 10.DUTY CYCLE

|              |                  |
|--------------|------------------|
| Test Method: | ANSI C63.10:2013 |
|--------------|------------------|

### 10.1 APPLIED PROCEDURES / LIMIT

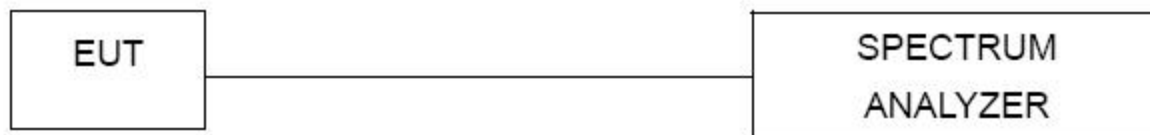
Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:

- a) A diode detector and an oscilloscope that together have a sufficiently short response time to permit accurate measurements of the ON and OFF times of the transmitted signal.
- b) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:
  - 1) Set the center frequency of the instrument to the center frequency of the transmission.
  - 2) Set  $RBW \geq OBW$  if possible; otherwise, set RBW to the largest available value.
  - 3) Set  $VBW \geq RBW$ . Set detector = peak or average.
  - 4) The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$  and the number of sweep points across duration  $T$  exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if  $T \leq 16.7 \mu s$ .)

### 10.2 DEVIATION FROM STANDARD

No deviation.

### 10.3 TEST SETUP

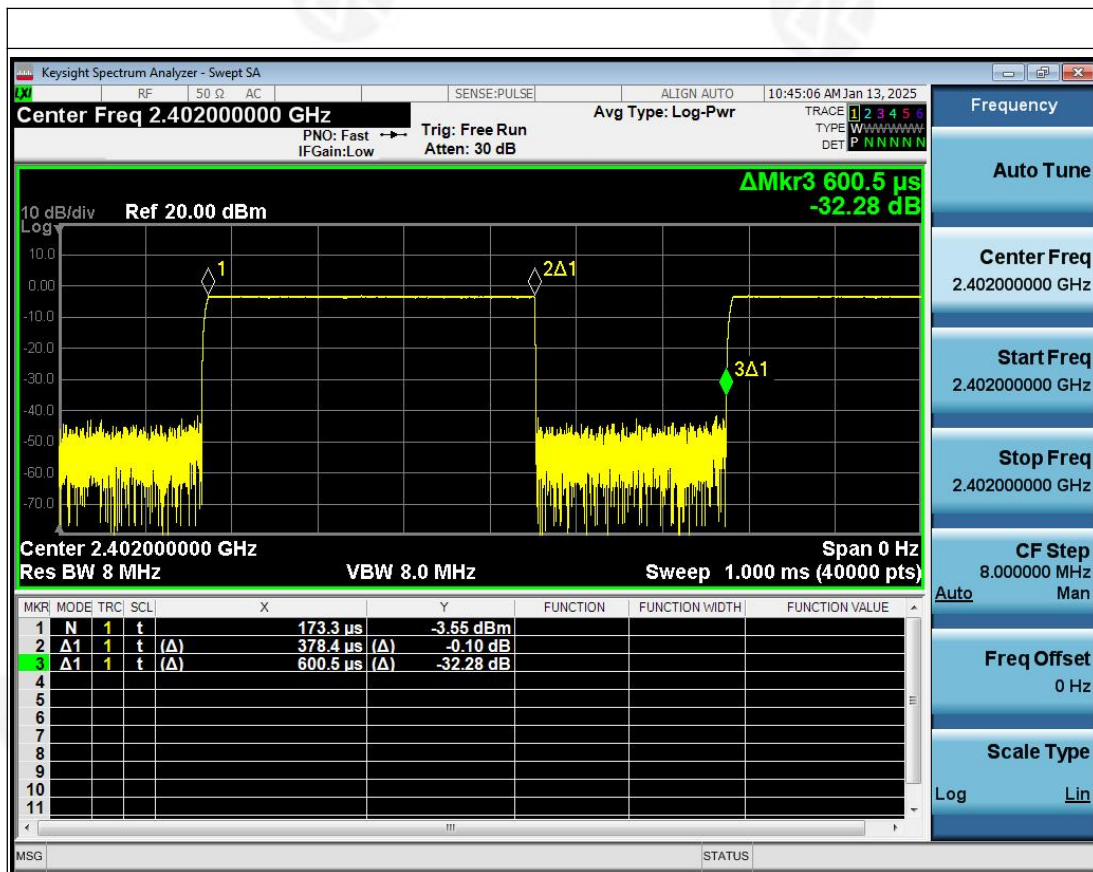




#### 10.4 TEST RESULTS

|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Temperature : | 26°C   | Relative Humidity : | 54%   |
| Pressure:     | 101kPa | Test Voltage:       | DC 3V |

|           |                 |                |        |
|-----------|-----------------|----------------|--------|
| Test Mode | Frequency (MHz) | Duty Cycle (%) | Result |
| GFSK      | 2402            | 63.01          | Pass   |



Note: All channel have been tested, and the report only reflects the worst case data.

Duty Cycle =  $\text{Ton} / \text{Total} \times 100\%$

Duty Cycle Correction Factor =  $10\log (1/\text{Duty Cycle})$



## 11.ANTENNA REQUIREMENT

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Standard requirement:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | FCC Part15 C Section 15.203 /247(c) |
| <p>15.203 requirement:<br/>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, 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.</p> <p>15.247(c) (1)(i) requirement:<br/>(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.</p> |                                     |
| EUT Antenna:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |
| The antenna is Chip antenna, the best case gain of the antennas is 2.67dBi, reference to the appendix II for details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                     |



## 12. TEST SETUP PHOTO

Reference to the appendix I for details.

## 13. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

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