



Shenzhen HTT Technology Co., Ltd.

TEST REPORT

FCC Rules and Regulations Part PART 15.249

Report Reference No.....: HTT202204425F01

FCC ID.....: 2ABDB-S8

Compiled by
(position+printed name+signature.. File administrators

Ervin Xu

Supervised by
(position+printed name+signature.. Project Engineer

Bruce Zhu

Approved by
(position+printed name+signature.. RF Manager

Kevin Yang

Date of issue..... May.06,2022

Testing Laboratory Name Shenzhen HTT Technology Co.,Ltd.

Address 1F, Building B, Huafeng International Robotics Industrial Park,
Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an
District, Shenzhen, Guangdong, China

Applicant's name Shenzhen Sungi Technology Co., Ltd

Address 4F,20th BLD,Xiawei Yuan,Gushu,Bao'an district,Shenzhen,China

Standard FCC Rules and Regulations Part PART 15.249

Shenzhen HTT Technology Co.,Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HTT Technology Co.,Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HTT Technology Co.,Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description Wireless vertical mouse

Trade Mark N/A

Manufacturer Shenzhen Sungi Technology Co., Ltd

Model/Type reference..... S8

Listed Models S8L, S9, S9L, S6, S8GD, S8LD, S8LGD, S8LLD,
S9LD, S9LLD, S6LD, S1, S2, S3, S7

Modulation GFSK

Frequency..... 2402-2480MHz

Ratings DC 3.7V/650mAh Form Battery and DC 5V From External Circuit

Result..... PASS

TEST REPORT

Equipment under Test : Wireless vertical mouse

Model /Type : S8

Listed Models : S8L, S9, S9L, S6, S8GD, S8LD, S8LGD, S8LLD,
S9LD, S9LLD, S6LD, S1, S2, S3, S7

Applicant : **Shenzhen Sungi Technology Co., Ltd**

Address : 4F,20th BLD,Xiaweyuan,Gushu,Bao'an district,Shenzhen,China

Manufacturer : **Shenzhen Sungi Technology Co., Ltd**

Address : 4F,20th BLD,Xiaweyuan,Gushu,Bao'an district,Shenzhen,China

| | |
|---------------------|-------------|
| Test Result: | PASS |
|---------------------|-------------|

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

| | |
|--|-----------|
| 1. TEST STANDARDS | 4 |
| 2. SUMMARY | 5 |
| 2.1. General Remarks | 5 |
| 2.2. Product Description | 5 |
| 2.3. Equipment Under Test | 5 |
| 2.4. Short description of the Equipment under Test (EUT) | 5 |
| 2.5. EUT operation mode | 5 |
| 2.6. Block Diagram of Test Setup | 6 |
| 2.7. Modifications | 6 |
| 3. TEST ENVIRONMENT | 7 |
| 3.1. Address of the test laboratory | 7 |
| 3.2. Test Facility | 7 |
| 3.3. Environmental conditions | 7 |
| 3.4. Summary of measurement results | 8 |
| 3.5. Statement of the measurement uncertainty | 8 |
| 3.6. Equipments Used during the Test | 8 |
| 4. TEST CONDITIONS AND RESULTS | 10 |
| 4.1. AC Power Conducted Emission | 10 |
| 4.2. Radiated Emission and Band Edges | 13 |
| 4.3. 20dB Bandwidth Measurement | 22 |
| 4.4. Antenna Requirement | 24 |
| 5. TEST SETUP PHOTOS OF THE EUT | 25 |
| 6. TEST PHOTOS OF THE EUT | 25 |

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

2. SUMMARY

2.1. General Remarks

| | | |
|--------------------------------|---|-------------|
| Date of receipt of test sample | : | Apr.27,2022 |
| | | |
| Testing commenced on | : | Apr.27,2022 |
| | | |
| Testing concluded on | : | May.06,2022 |

2.2. Product Description

| | |
|---------------------|---|
| Name of EUT | Wireless vertical mouse |
| Model Number | S8 |
| List Model: | S8L, S9, S9L, S6, S8GD, S8LD, S8LGD, S8LLD, S9LD, S9LLD, S6LD, S1, S2, S3, S7 |
| Power Rating | DC 3.7V/650mAh Form Battery and DC 5V From External Circuit |
| Sample ID: | HTT202204425-1#(Engineer sample) HTT202204425-2#(Normal sample) |
| Operation frequency | 2402-2480MHz |
| Modulation | GFSK |
| Antenna Type | PCB antenna |
| Antenna Gain | 0dBi |

2.3. Equipment Under Test

Power supply system utilised

| | | | |
|----------------------|---|---|-----------------------------------|
| Power supply voltage | : | <input type="radio"/> 230V / 50 Hz | <input type="radio"/> 120V / 60Hz |
| | | <input type="radio"/> 12 V DC | <input type="radio"/> 24 V DC |
| | | <input checked="" type="radio"/> Other (specified in blank below) | |

DC 3.7V From Battery

2.4. Short description of the Equipment under Test (EUT)

This is a Wireless vertical mouse

For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The Applicant use Key to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 40 channels provided to the EUT. Channel Low,Mid and High was selected to test.

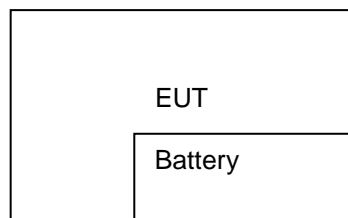
| Channel | Frequency(MHz) | Channel | Frequency(MHz) |
|---------|----------------|---------|----------------|
| 0 | 2402 | 20 | 2442 |
| 1 | 2404 | 21 | 2444 |
| 2 | 2406 | 22 | 2446 |
| 3 | 2408 | 23 | 2448 |
| 4 | 2410 | 24 | 2450 |
| 5 | 2412 | 25 | 2452 |

| | | | |
|----|------|----|------|
| 6 | 2414 | 26 | 2454 |
| 7 | 2416 | 27 | 2456 |
| 8 | 2418 | 28 | 2458 |
| 9 | 2420 | 29 | 2460 |
| 10 | 2422 | 30 | 2462 |
| 11 | 2424 | 31 | 2464 |
| 12 | 2426 | 32 | 2466 |
| 13 | 2428 | 33 | 2468 |
| 14 | 2430 | 34 | 2470 |
| 15 | 2432 | 35 | 2472 |
| 16 | 2434 | 36 | 2474 |
| 17 | 2436 | 37 | 2476 |
| 18 | 2438 | 38 | 2478 |
| 19 | 2440 | 39 | 2480 |

Test frequency:

| Channel | Frequency (MHz) |
|---------|-----------------|
| Low | 2402 |
| Mid | 2440 |
| High | 2480 |

2.6. Block Diagram of Test Setup



2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen HTT Technology Co.,Ltd.

1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road, Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 779513 Designation Number: CN1319

Shenzhen HTT Technology Co.,Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6435.01

Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

| | |
|-----------------------|--------------|
| Temperature: | 23 ° C |
| | |
| Humidity: | 48 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

AC Main Conducted testing:

| | |
|-----------------------|--------------|
| Temperature: | 24 ° C |
| | |
| Humidity: | 45 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

Conducted testing:

| | |
|-----------------------|--------------|
| Temperature: | 24 ° C |
| | |
| Humidity: | 45 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

3.4. Summary of measurement results

| FCC PART 15.249 | | |
|--------------------|-------------------------------|------|
| FCC Part 15.249(a) | Field Strength of Fundamental | PASS |
| FCC Part 15.209 | Spurious Emission | PASS |
| FCC Part 15.209 | Band edge | PASS |
| FCC Part 15.215(c) | 20dB bandwidth | PASS |
| FCC Part 15.207 | Conducted Emission | PASS |
| FCC Part 15.203 | Antenna Requirement | PASS |

3.5. Statement of the measurement uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2

Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2

3.6. Equipments Used during the Test

| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|------|---------------------------------|-------------------------------------|--------------------|---------------|---------------------|-------------------------|
| 1 | 3m Semi- Anechoic Chamber | Shenzhen C.R.T technology co., LTD | 9*6*6 | HTT-E028 | Aug. 10 2020 | Aug. 09 2024 |
| 2 | Control Room | Shenzhen C.R.T technology co., LTD | 4.8*3.5*3.0 | HTT-E030 | Aug. 10 2020 | Aug. 09 2024 |
| 3 | EMI Test Receiver | Rohde&Schwar | ESCI7 | HTT-E022 | May 21 2021 | May 20 2022 |
| 4 | Spectrum Analyzer | Rohde&Schwar | FSP | HTT-E037 | May 21 2021 | May 20 2022 |
| 5 | Coaxial Cable | ZDecl | ZT26-NJ-NJ-0.6M | HTT-E018 | May 21 2021 | May 20 2022 |
| 6 | Coaxial Cable | ZDecl | ZT26-NJ-SMAJ-2M | HTT-E019 | May 21 2021 | May 20 2022 |
| 7 | Coaxial Cable | ZDecl | ZT26-NJ-SMAJ-0.6M | HTT-E020 | May 21 2021 | May 20 2022 |
| 8 | Coaxial Cable | ZDecl | ZT26-NJ-SMAJ-8.5M | HTT-E021 | May 21 2021 | May 20 2022 |
| 9 | Composite logarithmic antenna | Schwarzbeck | VULB 9168 | HTT-E017 | Aug. 22 2021 | Aug. 21 2022 |
| 10 | Horn Antenna | Schwarzbeck | BBHA9120D | HTT-E016 | Aug. 22 2021 | Aug. 21 2022 |
| 11 | Loop Antenna | Zhinan | ZN30900C | HTT-E039 | Aug. 22 2021 | Aug. 21 2022 |
| 12 | Horn Antenna | Beijing Hangwei Dayang | OBH100400 | HTT-E040 | Aug. 22 2021 | Aug. 21 2022 |
| 13 | low frequency Amplifier | Sonoma Instrument | 310 | HTT-E015 | May 21 2021 | May 20 2022 |
| 14 | high-frequency Amplifier | HP | 8449B | HTT-E014 | May 21 2021 | May 20 2022 |
| 15 | Variable frequency power supply | Shenzhen Anbiao Instrument Co., Ltd | ANB-10VA | HTT-082 | May 21 2021 | May 20 2022 |
| 16 | EMI Test Receiver | Rohde & Schwarz | ESCS30 | HTT-E004 | May 21 2021 | May 20 2022 |
| 17 | Artificial Mains | Rohde & Schwarz | ESH3-Z5 | HTT-E006 | May 21 2021 | May 20 2022 |
| 18 | Artificial Mains | Rohde & Schwarz | ENV-216 | HTT-E038 | May 21 2021 | May 20 2022 |
| 19 | Cable Line | Robinson | Z302S-NJ-BNCJ-1.5M | HTT-E001 | May 21 2021 | May 20 2022 |
| 20 | Attenuator | Robinson | 6810.17A | HTT-E007 | May 21 2021 | May 20 2022 |
| 21 | Variable frequency power supply | Shenzhen Yanghong Electric Co., Ltd | YF-650 (5KVA) | HTT-E032 | May 21 2021 | May 20 2022 |

| | | | | | | |
|----|-------------------------------------|--|---------|----------|-------------|-------------|
| 22 | Control Room | Shenzhen C.R.T technology co., LTD | 8*4*3.5 | HTT-E029 | May 21 2021 | May 20 2022 |
| 23 | DC power supply | Agilent | E3632A | HTT-E023 | May 21 2021 | May 20 2022 |
| 24 | EMI Test Receiver | Agilent | N9020A | HTT-E024 | May 21 2021 | May 20 2022 |
| 25 | Analog signal generator | Agilent | N5181A | HTT-E025 | May 21 2021 | May 20 2022 |
| 26 | Vector signal generator | Agilent | N5182A | HTT-E026 | May 21 2021 | May 20 2022 |
| 27 | Power sensor | Keysight | U2021XA | HTT-E027 | May 21 2021 | May 20 2022 |
| 28 | Temperature and humidity meter | Shenzhen Anbiao Instrument Co., Ltd | TH10R | HTT-074 | May 21 2021 | May 20 2022 |
| 29 | Radiated Emission Test Software | Farad | EZ-EMC | N/A | N/A | N/A |
| 30 | Conducted Emission Test Software | Farad | EZ-EMC | N/A | N/A | N/A |
| 31 | RF Test Software | panshanrf | TST | N/A | N/A | N/A |

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

| Frequency range (MHz) | Limit (dBuV) | |
|-----------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

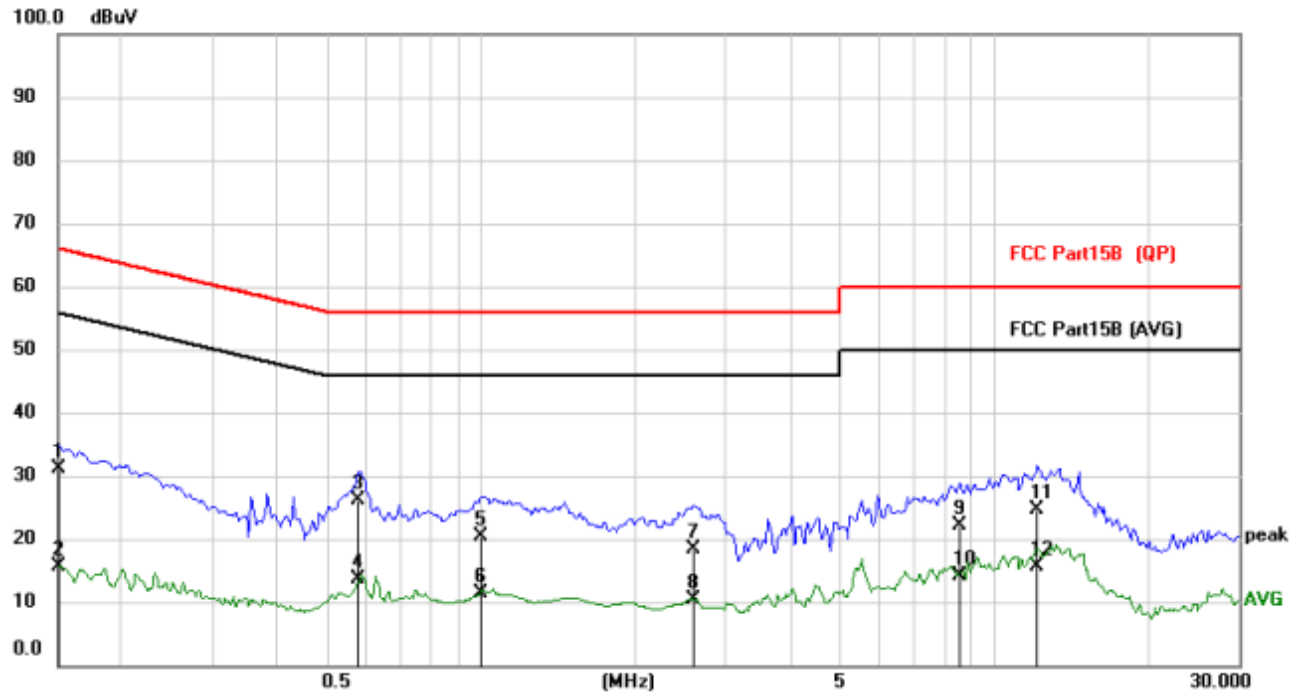
TEST RESULTS

PASS

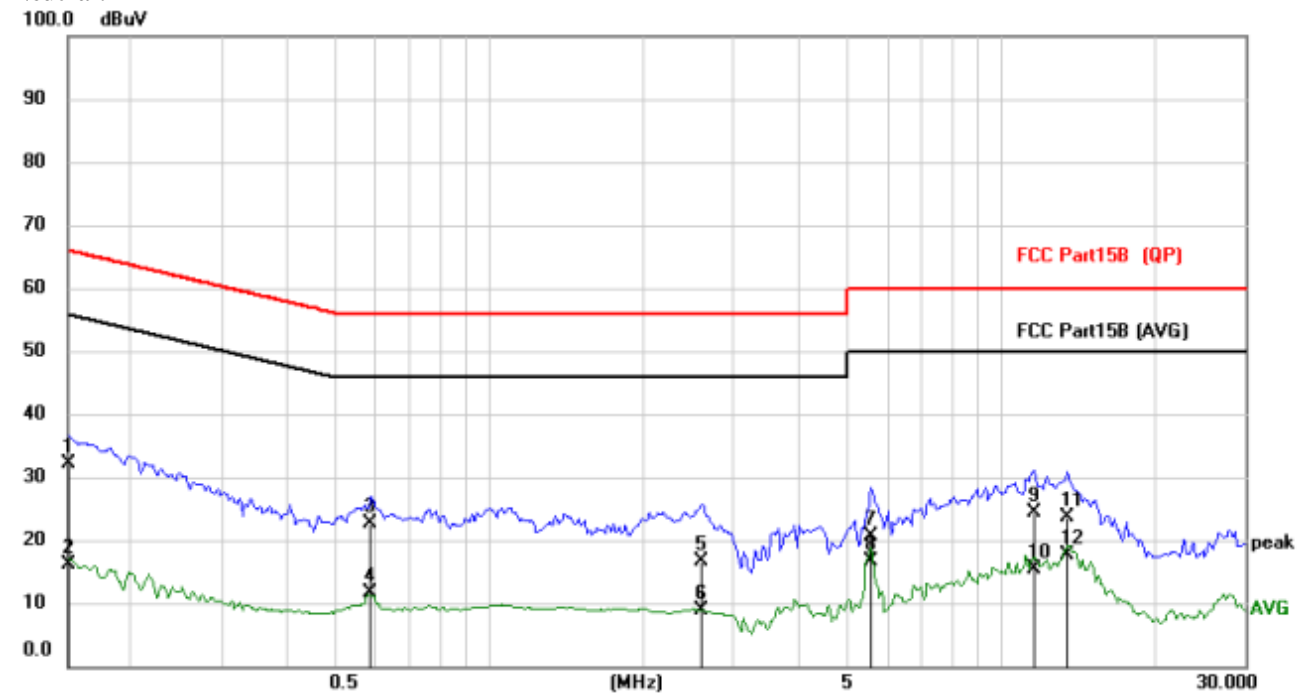
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:

Line:



| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|
| | | MHz | Level | Factor | ment | | | Detector |
| | | | dBuV | dB | dBuV | dBuV | dB | |
| 1 | | 0.1500 | 20.76 | 10.37 | 31.13 | 66.00 | -34.87 | QP |
| 2 | | 0.1500 | 5.33 | 10.37 | 15.70 | 56.00 | -40.30 | AVG |
| 3 | * | 0.5790 | 15.46 | 10.57 | 26.03 | 56.00 | -29.97 | QP |
| 4 | | 0.5790 | 3.09 | 10.57 | 13.66 | 46.00 | -32.34 | AVG |
| 5 | | 1.0041 | 9.60 | 10.90 | 20.50 | 56.00 | -35.50 | QP |
| 6 | | 1.0041 | 0.50 | 10.90 | 11.40 | 46.00 | -34.60 | AVG |
| 7 | | 2.5953 | 7.62 | 10.84 | 18.46 | 56.00 | -37.54 | QP |
| 8 | | 2.5953 | -0.36 | 10.84 | 10.48 | 46.00 | -35.52 | AVG |
| 9 | | 8.5692 | 10.59 | 11.47 | 22.06 | 60.00 | -37.94 | QP |
| 10 | | 8.5692 | 2.67 | 11.47 | 14.14 | 50.00 | -35.86 | AVG |
| 11 | | 12.1767 | 12.87 | 11.76 | 24.63 | 60.00 | -35.37 | QP |
| 12 | | 12.1767 | 3.83 | 11.76 | 15.59 | 50.00 | -34.41 | AVG |

Neutral:

| No. Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | |
|---------|---------|---------------|----------------|-------------|-------|--------|----------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | 0.1500 | 21.91 | 10.27 | 32.18 | 66.00 | -33.82 | QP |
| 2 | 0.1500 | 5.92 | 10.27 | 16.19 | 56.00 | -39.81 | AVG |
| 3 | 0.5868 | 12.20 | 10.48 | 22.68 | 56.00 | -33.32 | QP |
| 4 | 0.5868 | 1.13 | 10.48 | 11.61 | 46.00 | -34.39 | AVG |
| 5 | 2.6031 | 5.85 | 10.84 | 16.69 | 56.00 | -39.31 | QP |
| 6 | 2.6031 | -2.05 | 10.84 | 8.79 | 46.00 | -37.21 | AVG |
| 7 | 5.5739 | 9.63 | 10.90 | 20.53 | 60.00 | -39.47 | QP |
| 8 | 5.5739 | 5.67 | 10.90 | 16.57 | 50.00 | -33.43 | AVG |
| 9 | 11.6307 | 12.56 | 11.73 | 24.29 | 60.00 | -35.71 | QP |
| 10 | 11.6307 | 3.59 | 11.73 | 15.32 | 50.00 | -34.68 | AVG |
| 11 | 13.4676 | 11.58 | 11.99 | 23.57 | 60.00 | -36.43 | QP |
| 12 * | 13.4676 | 5.59 | 11.99 | 17.58 | 50.00 | -32.42 | AVG |

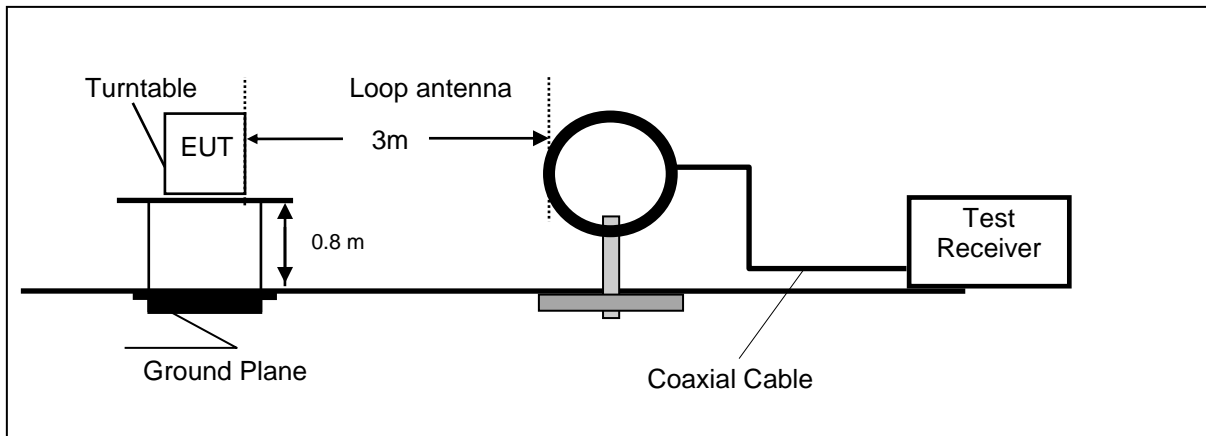
Notes:

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. Final Level = Receiver Read level + LISN Factor + Cable Los

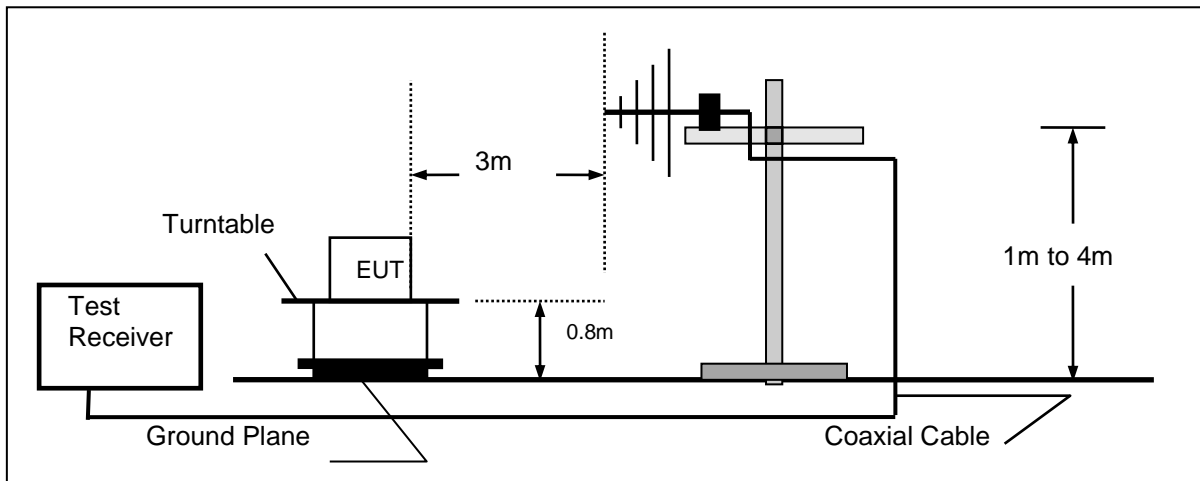
4.2. Radiated Emission and Band Edges

TEST CONFIGURATION

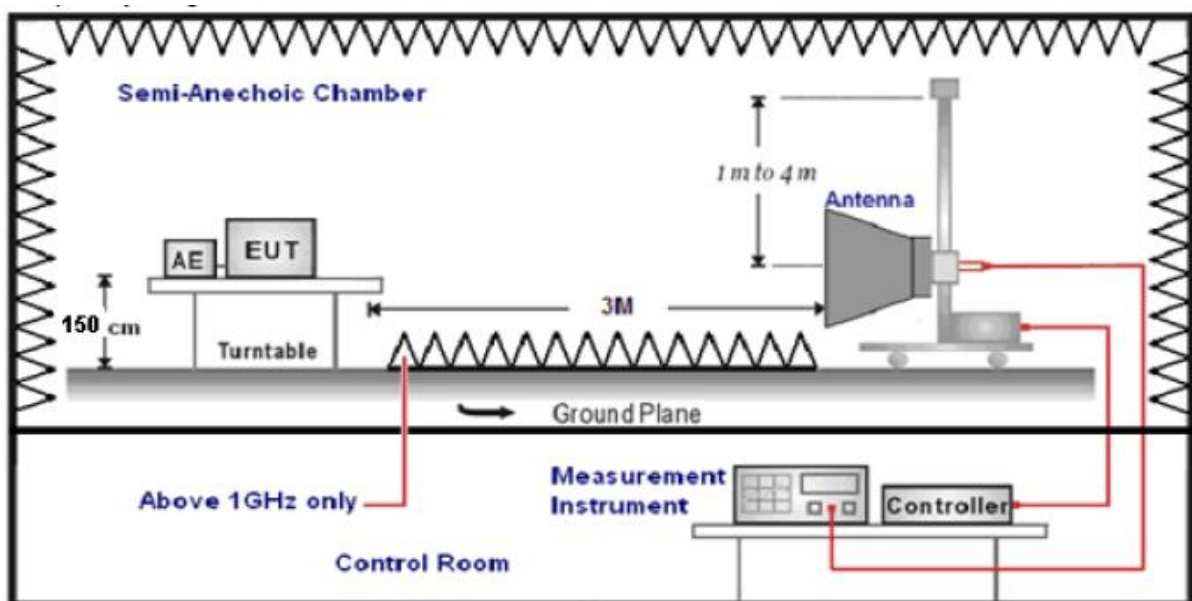
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 26MHz and maximum operation frequency was 1910MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type | Test Distance |
|----------------------|----------------------------|---------------|
| 9KHz-30MHz | Active Loop Antenna | 3 |
| 30MHz-1GHz | Ultra-Broadband Antenna | 3 |
| 1GHz-18GHz | Double Ridged Horn Antenna | 3 |
| 18GHz-25GHz | Horn Antenna | 1 |

7. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|----------------------|---|----------|
| 9KHz-150KHz | RBW=200Hz/VBW=3KHz, Sweep time=Auto | QP |
| 150KHz-30MHz | RBW=9KHz/VBW=100KHz, Sweep time=Auto | QP |
| 30MHz-1GHz | RBW=120KHz/VBW=1000KHz, Sweep time=Auto | QP |
| 1GHz-40GHz | Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto | Peak |

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

| | |
|---------------------------|--|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude | AG = Amplifier Gain |
| AF = Antenna Factor | |

$$\text{Transd}=AF +CL-AG$$

RADIATION LIMIT

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBμV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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)

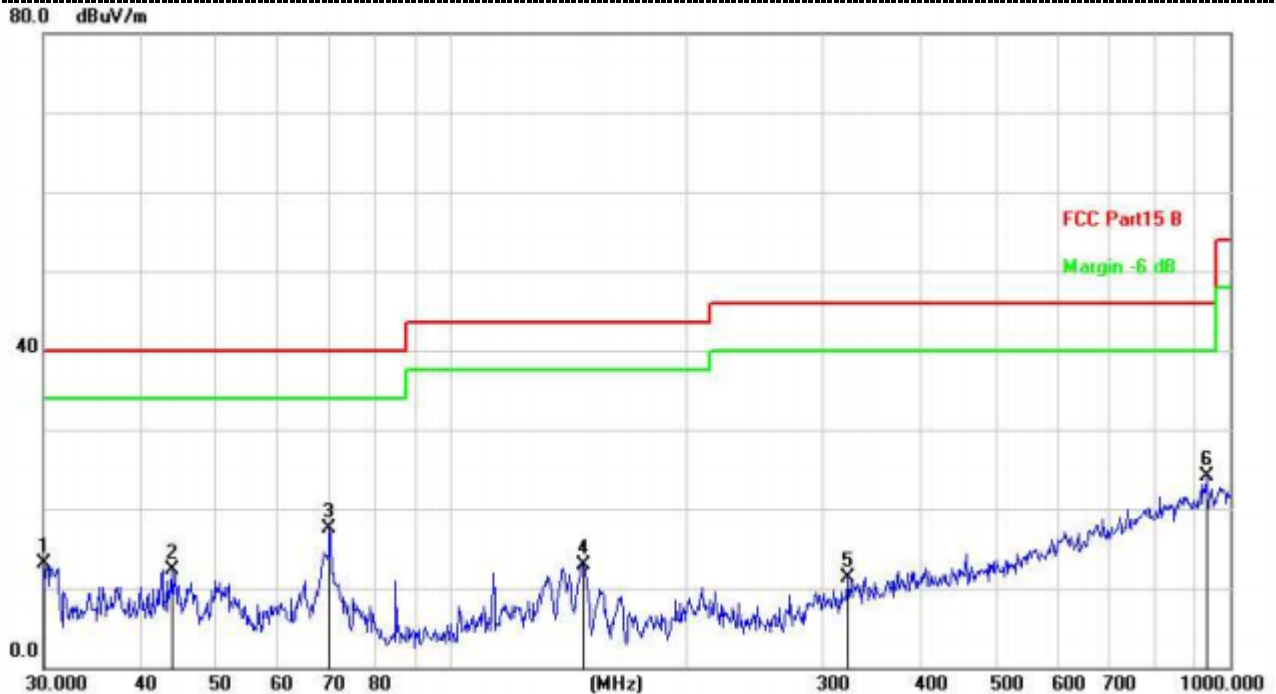
Radiated emission limits

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | Radiated (μV/m) |
|-----------------|-------------------|--|-----------------------|
| 0.009-0.49 | 3 | $20\log(2400/F(\text{KHz}))+40\log(300/3)$ | $2400/F(\text{KHz})$ |
| 0.49-1.705 | 3 | $20\log(24000/F(\text{KHz}))+40\log(30/3)$ | $24000/F(\text{KHz})$ |
| 1.705-30 | 3 | $20\log(30)+40\log(30/3)$ | 30 |
| 30-88 | 3 | 40.0 | 100 |
| 88-216 | 3 | 43.5 | 150 |
| 216-960 | 3 | 46.0 | 200 |
| Above 960 | 3 | 54.0 | 500 |

TEST RESULTS

Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. Both modes of GFSK were tested at Low, Middle, and High channel and recorded worst mode at GFSK
3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

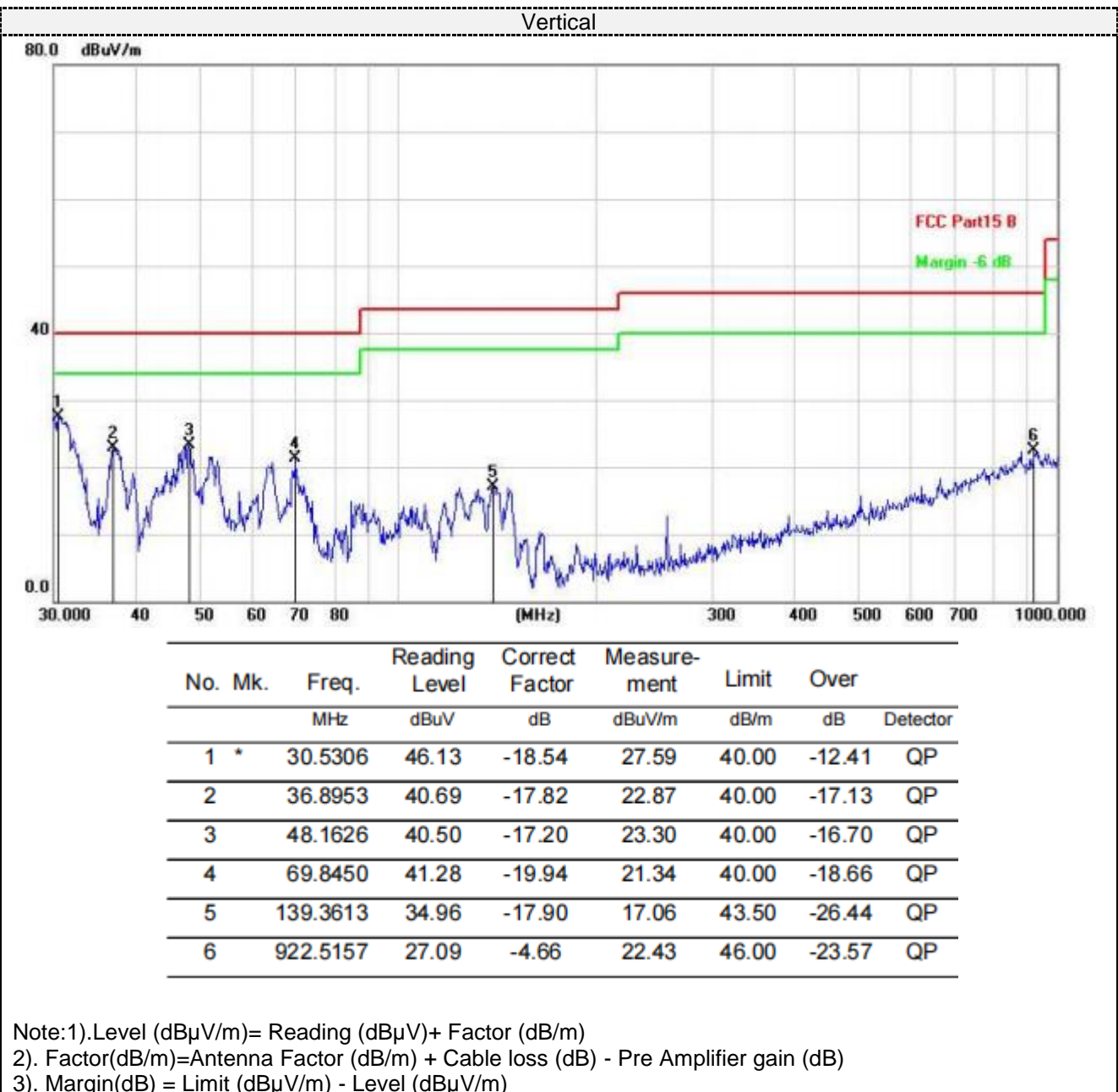
For 30MHz-1GHz**Horizontal**

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV/m | Limit dB/m | Over dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|---------------|------------|----------|
| 1 | | 30.0000 | 31.78 | -18.59 | 13.19 | 40.00 | -26.81 | peak |
| 2 | | 43.8119 | 29.60 | -17.27 | 12.33 | 40.00 | -27.67 | peak |
| 3 | | 69.8450 | 37.54 | -19.94 | 17.60 | 40.00 | -22.40 | peak |
| 4 | | 147.9214 | 30.69 | -17.80 | 12.89 | 43.50 | -30.61 | peak |
| 5 | | 323.3204 | 28.31 | -17.09 | 11.22 | 46.00 | -34.78 | peak |
| 6 | * | 932.2715 | 28.71 | -4.65 | 24.06 | 46.00 | -21.94 | peak |

Note: 1). Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

2). Factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin (dB) = Limit (dBuV/m) - Level (dBuV/m)



For 1GHz to 25GHz

GFSK (above 1GHz)

CH Low (2402MHz)

Horizontal:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402 | 104.26 | 26.26 | 5.75 | 33.15 | 103.12 | 114.00 | -10.88 | peak |
| 2402 | 86.25 | 26.26 | 5.75 | 33.15 | 85.11 | 94.00 | -8.89 | AVG |
| 4804 | 52.36 | 31.40 | 8.18 | 32.10 | 59.84 | 74.00 | -14.16 | peak |
| 4804 | 33.26 | 31.40 | 8.18 | 32.10 | 40.74 | 54.00 | -13.26 | AVG |
| 7206 | 42.69 | 35.80 | 10.83 | 31.40 | 57.92 | 74.00 | -16.08 | peak |
| 7206 | 26.48 | 35.80 | 10.83 | 31.40 | 41.71 | 54.00 | -12.29 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2402 | 106.59 | 26.26 | 5.75 | 33.15 | 105.45 | 114.00 | -8.55 | peak |
| 2402 | 88.26 | 26.26 | 5.75 | 33.15 | 87.12 | 94.00 | -6.88 | AVG |
| 4804 | 54.36 | 31.40 | 8.18 | 32.10 | 61.84 | 74.00 | -12.16 | peak |
| 4804 | 35.45 | 31.40 | 8.18 | 32.10 | 42.93 | 54.00 | -11.07 | AVG |
| 7206 | 44.26 | 35.80 | 10.83 | 31.40 | 59.49 | 74.00 | -14.51 | peak |
| 7206 | 28.16 | 35.80 | 10.83 | 31.40 | 43.39 | 54.00 | -10.61 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

CH Middle (2440MHz)

Horizontal:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2440 | 104.54 | 27.15 | 6.25 | 32.85 | 105.09 | 114 | -8.91 | peak |
| 2440 | 85.26 | 27.15 | 6.25 | 33.85 | 84.81 | 94 | -9.19 | AVG |
| 4880 | 51.36 | 31.40 | 9.17 | 32.10 | 59.83 | 74.00 | -14.17 | peak |
| 4880 | 35.95 | 31.40 | 9.17 | 32.10 | 44.42 | 54.00 | -9.58 | AVG |
| 7320 | 44.68 | 35.80 | 10.83 | 31.40 | 59.91 | 74.00 | -14.09 | peak |
| 7320 | 27.88 | 35.80 | 10.83 | 31.40 | 43.11 | 54.00 | -10.89 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2440 | 106.11 | 27.15 | 6.25 | 32.85 | 106.66 | 114.00 | -7.34 | peak |
| 2440 | 84.26 | 27.15 | 6.25 | 33.85 | 83.81 | 94.00 | -10.19 | AVG |
| 4880 | 53.12 | 31.40 | 9.17 | 32.10 | 61.59 | 74.00 | -12.41 | peak |
| 4880 | 36.97 | 31.40 | 9.17 | 32.10 | 45.44 | 54.00 | -8.56 | AVG |
| 7320 | 45.91 | 35.80 | 10.83 | 31.40 | 61.14 | 74.00 | -12.86 | peak |
| 7320 | 29.07 | 35.80 | 10.83 | 31.40 | 44.30 | 54.00 | -9.70 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

CH High (2480MHz)

Horizontal:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2480 | 101.26 | 28.40 | 6.85 | 32.60 | 103.91 | 114 | -10.09 | peak |
| 2480 | 82.26 | 28.40 | 6.85 | 32.60 | 84.91 | 94 | -9.09 | AVG |
| 4960 | 51.36 | 31.40 | 9.17 | 32.10 | 59.83 | 74.00 | -14.17 | peak |
| 4960 | 37.15 | 31.40 | 9.17 | 32.10 | 45.62 | 54.00 | -8.38 | AVG |
| 7440 | 44.29 | 35.80 | 10.83 | 31.40 | 59.52 | 74.00 | -14.48 | peak |
| 7440 | 27.49 | 35.80 | 10.83 | 31.40 | 42.72 | 54.00 | -11.28 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

| Frequency | Meter Reading | Antenna Factor | Cable Loss | Preamp Factor | Emission Level | Limits | Margin | Detector Type |
|-----------|---------------|----------------|------------|---------------|----------------|----------|--------|---------------|
| (MHz) | (dBμV) | (dB/m) | (dB) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | |
| 2480 | 102.11 | 28.40 | 6.85 | 32.60 | 104.76 | 114.00 | -9.24 | peak |
| 2480 | 83.26 | 28.40 | 6.85 | 32.60 | 85.91 | 94.00 | -8.09 | AVG |
| 4960 | 53.26 | 31.40 | 9.17 | 32.10 | 61.73 | 74.00 | -12.27 | peak |
| 4960 | 39.48 | 31.40 | 9.17 | 32.10 | 47.95 | 54.00 | -6.05 | AVG |
| 7440 | 46.33 | 35.80 | 10.83 | 31.40 | 61.56 | 74.00 | -12.44 | peak |
| 7440 | 28.49 | 35.80 | 10.83 | 31.40 | 43.72 | 54.00 | -10.28 | AVG |
| --- | --- | | | --- | --- | --- | --- | --- |
| --- | --- | | | --- | --- | --- | --- | --- |

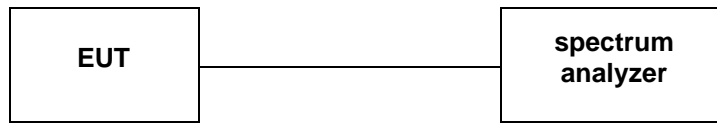
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Remark:

- (1) Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

4.3. 20dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30KHz RBW and 300KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

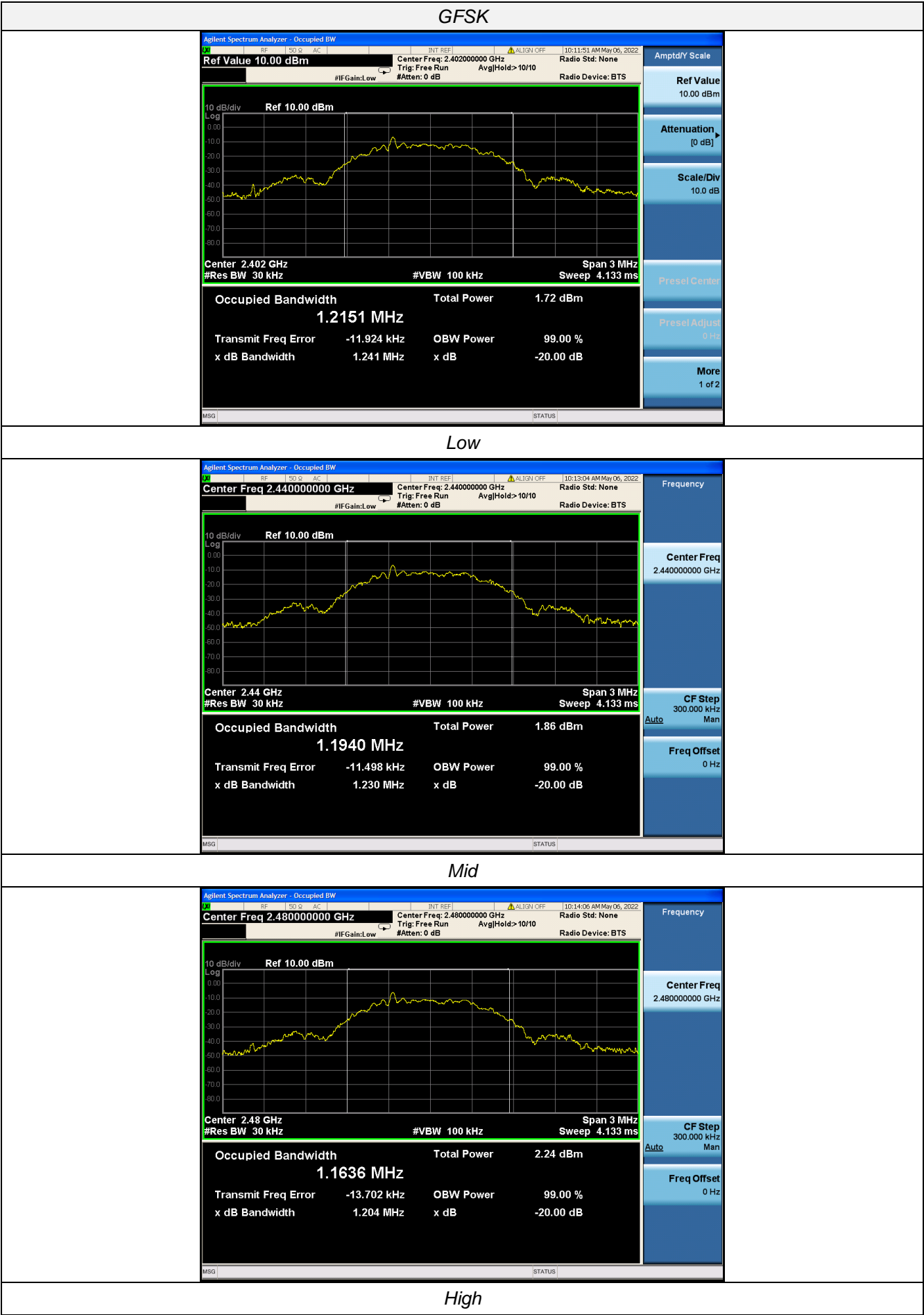
LIMIT

N/A

TEST RESULTS

| Modulation | Channel | 20dB bandwidth (MHz) | Result |
|------------|---------|----------------------|--------|
| GFSK | Low | 1.241 | PASS |
| | Mid | 1.230 | |
| | High | 1.204 | |

Note: 1.The test results including the cable lose.



4.4. Antenna Requirement

Standard Applicable

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 (c), 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.

Antenna Information

The maximum gain of antenna was 0.0 dBi.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen HTT Technology Co., Ltd. does not assume any responsibility.

5. Test Setup Photos of the EUT

Reference to the **appendix I** for details

6. Test Photos of the EUT

Reference to the **appendix II** for details.

.....**End of Report**.....