# Test Report (Bluetooth)

| | |
|---|---|
| **Applicant:** | SHENZHEN GIEC DIGITAL CO., LTD |
| **Address of Applicant:** | 1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China |
| **Manufacturer:** | SHENZHEN GIEC DIGITAL CO., LTD |
| **Address of Manufacturer:** | 1st&3rd Building, No.26 Puzai Road, Pingdi, Longgang District, Shenzhen, China |
| **Factory:** | SHENZHEN JOWAY POWER SUPPLY CO., LTD |
| **Address of Factory:** | Building 11, antuoshan hi tech Industrial Park, Shaer community, Shajing street, Bao'an District, Shenzhen, China |

**Equipment Under Test (EUT)**

| | |
|---|---|
| Product Name: | True wireless earbuds |
| Model No.: | GIEC Y1005 |
| **FCC ID:** | 2AHYK-GIECY1005 |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart C Section 15.247 |
| **Date of sample receipt:** | September 21, 2020 |
| **Date of Test:** | September 22-29, 2020 |
| **Date of report issued:** | September 30, 2020 |
| **Test Result :** | PASS * |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

**Robinson Lo**
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *September 30, 2020* | *Original* |
| | | |
| | | |
| | | |
| | | |

| | | | |
|---|---|---|---|
| ***Prepared By:*** | ***Project Engineer*** | ***Date:*** | *September 30, 2020* |
| ***Check By:*** | ***Reviewer*** | ***Date:*** | *September 30, 2020* |

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# 4 Test Summary

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| Antenna Requirement | 15.203/15.247 (c) | Pass |
| AC Power Line Conducted Emission | 15.207 | Pass |
| Conducted Peak Output Power | 15.247 (b)(1) | Pass |
| 20dB Occupied Bandwidth | 15.247 (a)(1) | Pass |
| Carrier Frequencies Separation | 15.247 (a)(1) | Pass |
| Hopping Channel Number | 15.247 (a)(1) | Pass |
| Dwell Time | 15.247 (a)(1) | Pass |
| Pseudorandom Frequency Hopping Sequence | 15.247(b)(4) | Pass |
| Radiated Emission | 15.205/15.209 | Pass |
| Band Edge | 15.247(d) | Pass |

*Remarks:*

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013*

**Measurement Uncertainty**

| Test Item | Frequency Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 30MHz-200MHz | 3.8039dB | (1) |
| Radiated Emission | 200MHz-1GHz | 3.9679dB | (1) |
| Radiated Emission | 1GHz-18GHz | 4.29dB | (1) |
| Radiated Emission | 18GHz-40GHz | 3.30dB | (1) |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | 3.44dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | | |

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | True wireless earbuds |
| Model No.: | GIEC Y1005 |
| Test sample(s) ID: | GTS202009000212-1 |
| Sample(s) Status: | Engineer sample |
| Serial No.: | 20200B2000001 |
| Hardware Version: | V3.1 |
| Software Version: | V0 |
| Operation Frequency: | 2402MHz~2480MHz |
| Channel numbers: | 79 |
| Channel separation: | 1MHz |
| Modulation type: | GFSK, π/4-DQPSK, 8-DPSK |
| Antenna Type: | Integral Antenna |
| Antenna gain: | 5.19dBi(declare by applicant) |
| Power supply: | Charge box: Battery DC 3.7V, 500mAh, 1.85Wh<br>Earphone: Battery DC 3.7V, 30mAh, 0.11Wh |

| Operation Frequency each of channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2402MHz | 21 | 2422MHz | 41 | 2442MHz | 61 | 2462MHz |
| 2 | 2403MHz | 22 | 2423MHz | 42 | 2443MHz | 62 | 2463MHz |
| 3 | 2404MHz | 23 | 2424MHz | 43 | 2444MHz | 63 | 2464MHz |
| 4 | 2405MHz | 24 | 2425MHz | 44 | 2445MHz | 64 | 2465MHz |
| 5 | 2406MHz | 25 | 2426MHz | 45 | 2446MHz | 65 | 2466MHz |
| 6 | 2407MHz | 26 | 2427MHz | 46 | 2447MHz | 66 | 2467MHz |
| 7 | 2408MHz | 27 | 2428MHz | 47 | 2448MHz | 67 | 2468MHz |
| 8 | 2409MHz | 28 | 2429MHz | 48 | 2449MHz | 68 | 2469MHz |
| 9 | 2410MHz | 29 | 2430MHz | 49 | 2450MHz | 69 | 2470MHz |
| 10 | 2411MHz | 30 | 2431MHz | 50 | 2451MHz | 70 | 2471MHz |
| 11 | 2412MHz | 31 | 2432MHz | 51 | 2452MHz | 71 | 2472MHz |
| 12 | 2413MHz | 32 | 2433MHz | 52 | 2453MHz | 72 | 2473MHz |
| 13 | 2414MHz | 33 | 2434MHz | 53 | 2454MHz | 73 | 2474MHz |
| 14 | 2415MHz | 34 | 2435MHz | 54 | 2455MHz | 74 | 2475MHz |
| 15 | 2416MHz | 35 | 2436MHz | 55 | 2456MHz | 75 | 2476MHz |
| 16 | 2417MHz | 36 | 2437MHz | 56 | 2457MHz | 76 | 2477MHz |
| 17 | 2418MHz | 37 | 2438MHz | 57 | 2458MHz | 77 | 2478MHz |
| 18 | 2419MHz | 38 | 2439MHz | 58 | 2459MHz | 78 | 2479MHz |
| 19 | 2420MHz | 39 | 2440MHz | 59 | 2460MHz | 79 | 2480MHz |
| 20 | 2421MHz | 40 | 2441MHz | 60 | 2461MHz | | |

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 | 2441MHz |
| The Highest channel | 2480MHz |

## 5.2 Test mode

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

## 5.3 Description of Support Units

| Manufacturer | Description | Model | Serial Number |
|---|---|---|---|
| SAMSUNG | Mobile Phone | S7EDGE | R28H835BJ2B |
| APPLE | USB Charger | A1399 | N/A |

## 5.4 Deviation from Standards

None.

## 5.5 Abnormalities from Standard Conditions

None.

## 5.6 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

## 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

## 5.8 Additional Instructions

| | |
|---|---|
| Test Software | Special test command provided by manufacturer |
| Power level setup | Default |

# 6 Test Instruments list

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | July. 02 2020 | July. 01 2025 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | June. 25 2020 | June. 24 2021 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | June. 25 2020 | June. 24 2021 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120 D | GTS208 | June. 25 2020 | June. 24 2021 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June. 25 2020 | June. 24 2021 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | June. 25 2020 | June. 24 2021 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | June. 25 2020 | June. 24 2021 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | June. 25 2020 | June. 24 2021 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | June. 25 2020 | June. 24 2021 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | June. 25 2020 | June. 24 2021 |
| 13 | Amplifier(2GHz-20GHz) | HP | 84722A | GTS206 | June. 25 2020 | June. 24 2021 |
| 14 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June. 25 2020 | June. 24 2021 |
| 15 | Band filter | Amindeon | 82346 | GTS219 | June. 25 2020 | June. 24 2021 |
| 16 | Power Meter | Anritsu | ML2495A | GTS540 | June. 25 2020 | June. 24 2021 |
| 17 | Power Sensor | Anritsu | MA2411B | GTS541 | June. 25 2020 | June. 24 2021 |
| 18 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS575 | June. 25 2020 | June. 24 2021 |
| 19 | Splitter | Agilent | 11636B | GTS237 | June. 25 2020 | June. 24 2021 |
| 20 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | June. 25 2020 | June. 24 2021 |
| 21 | Breitband hornantenne | SCHWARZBECK | BBHA 9170 | GTS579 | Oct. 19 2019 | Oct. 18 2020 |
| 22 | Amplifier | TDK | PA-02-02 | GTS574 | Oct. 19 2019 | Oct. 18 2020 |
| 23 | Amplifier | TDK | PA-02-03 | GTS576 | Oct. 19 2019 | Oct. 18 2020 |
| 24 | PSA Series Spectrum Analyzer | Rohde & Schwarz | FSP | GTS578 | June. 25 2020 | June. 24 2021 |

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | GTS252 | May.15 2019 | May.14 2022 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 25 2020 | June. 24 2021 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | June. 25 2020 | June. 24 2021 |
| 4 | ENV216 2-L-V-NETZNACHB.DE | ROHDE&SCHWARZ | ENV216 | GTS226 | June. 25 2020 | June. 24 2021 |
| 5 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | KTJ | TA328 | GTS233 | June. 25 2020 | June. 24 2021 |
| 8 | Absorbing clamp | Elektronik-Feinmechanik | MDS21 | GTS229 | June. 25 2020 | June. 24 2021 |
| 9 | ISN | SCHWARZBECK | NTFM 8158 | GTD565 | June. 25 2020 | June. 24 2021 |

| RF Conducted Test: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | MXA Signal Analyzer | Agilent | N9020A | GTS566 | June. 25 2020 | June. 24 2021 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 25 2020 | June. 24 2021 |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS533 | June. 25 2020 | June. 24 2021 |
| 4 | MXG vector Signal Generator | Agilent | N5182A | GTS567 | June. 25 2020 | June. 24 2021 |
| 5 | ESG Analog Signal Generator | Agilent | E4428C | GTS568 | June. 25 2020 | June. 24 2021 |
| 6 | USB RF Power Sensor | DARE | RPR3006W | GTS569 | June. 25 2020 | June. 24 2021 |
| 7 | RF Switch Box | Shongyi | RFSW3003328 | GTS571 | June. 25 2020 | June. 24 2021 |
| 8 | Programmable Constant Temp & Humi Test Chamber | WEWON | WHTH-150L-40-880 | GTS572 | June. 25 2020 | June. 24 2021 |

| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | KTJ | TA328 | GTS243 | June. 25 2020 | June. 24 2021 |
| 2 | Barometer | ChangChun | DYM3 | GTS255 | June. 25 2020 | June. 24 2021 |

# 7 Test results and Measurement Data

## 7.1 Antenna requirement

| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|---|---|
| **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.<br>**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. | |
| **E.U.T Antenna:** | |
| *The antenna is integral antenna, the best case gain of the antenna is 5.19dBi, reference to the appendix II for details* | |

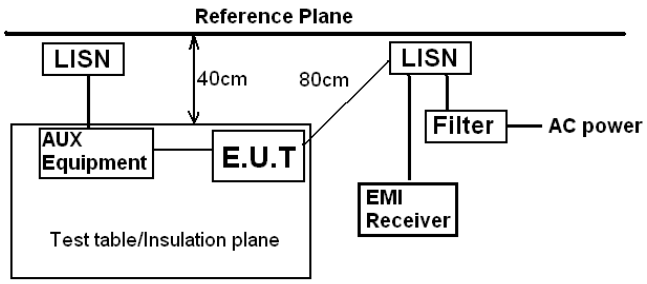
## 7.2 Conducted Emissions

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

| 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 setup:




*Remark:*
*E.U.T: Equipment Under Test*
*LISN: Line Impedence Stabilization Network*
*Test table height=0.8m*

Test procedure:

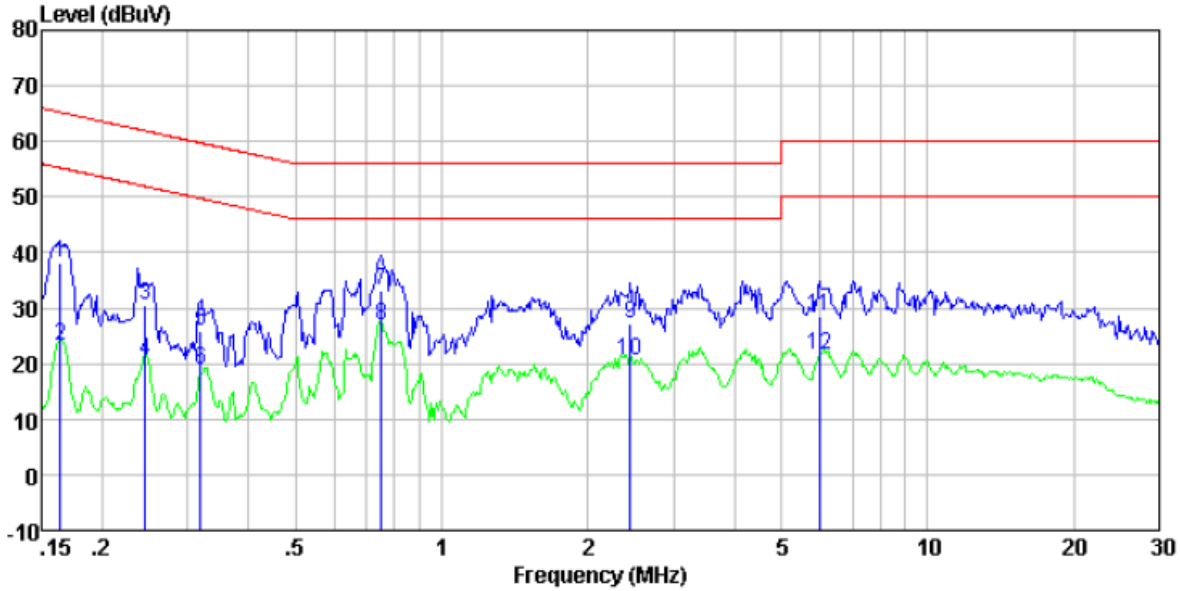
1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

| | | | | | | |
|---|---|---|---|---|---|---|
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.2 for details | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |
| Test voltage: | AC 120V, 60Hz | | | | | |
| Test results: | Pass | | | | | |

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

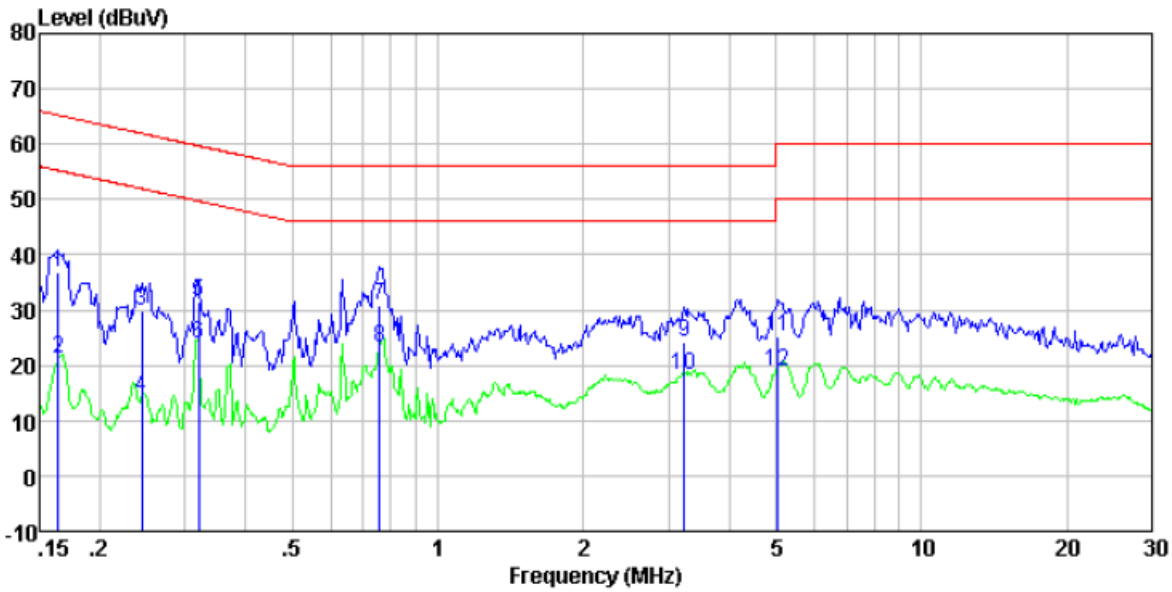
**Measurement data:**

**Line:**




| Freq MHz | Reading level dBuV | LISN/ISN factor dB/m | Cable loss dB | Level dBuV | Limit level dBuV | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.16 | 17.77 | 20.40 | 0.08 | 38.25 | 65.25 | -27.00 | QP |
| 0.16 | 2.71 | 20.40 | 0.08 | 23.19 | 55.25 | -32.06 | Average |
| 0.25 | 10.07 | 20.40 | 0.10 | 30.57 | 61.91 | -31.34 | QP |
| 0.25 | 0.04 | 20.40 | 0.10 | 20.54 | 51.91 | -31.37 | Average |
| 0.32 | 5.27 | 20.39 | 0.10 | 25.76 | 59.75 | -33.99 | QP |
| 0.32 | -1.67 | 20.39 | 0.10 | 18.82 | 49.75 | -30.93 | Average |
| 0.75 | 12.73 | 20.25 | 0.13 | 33.11 | 56.00 | -22.89 | QP |
| 0.75 | 6.42 | 20.25 | 0.13 | 26.80 | 46.00 | -19.20 | Average |
| 2.45 | 6.80 | 20.20 | 0.18 | 27.18 | 56.00 | -28.82 | QP |
| 2.45 | 0.23 | 20.20 | 0.18 | 20.61 | 46.00 | -25.39 | Average |
| 5.99 | 8.06 | 20.20 | 0.18 | 28.44 | 60.00 | -31.56 | QP |
| 5.99 | 1.34 | 20.20 | 0.18 | 21.72 | 50.00 | -28.28 | Average |

**Neutral:**

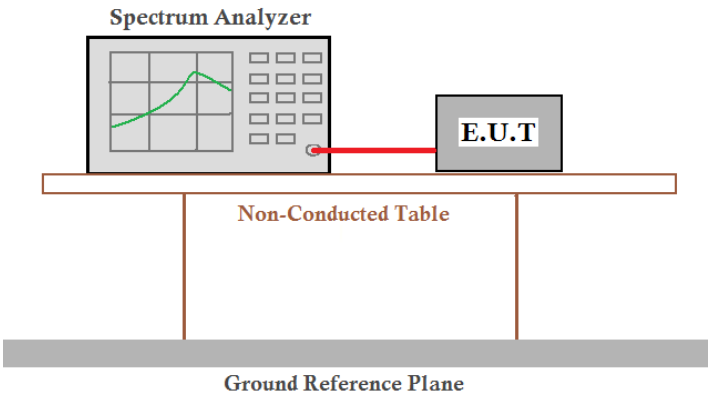



| Freq MHz | Reading level dBuV | LISN/ISN factor dB/m | Cable loss dB | Level dBuV | Limit level dBuV | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|
| 0.16 | 16.32 | 20.40 | 0.08 | 36.80 | 65.25 | -28.45 | QP |
| 0.16 | 0.60 | 20.40 | 0.08 | 21.08 | 55.25 | -34.17 | Average |
| 0.24 | 9.30 | 20.40 | 0.11 | 29.81 | 61.95 | -32.14 | QP |
| 0.24 | -6.31 | 20.40 | 0.11 | 14.20 | 51.95 | -37.75 | Average |
| 0.32 | 10.90 | 20.39 | 0.10 | 31.39 | 59.71 | -28.32 | QP |
| 0.32 | 3.29 | 20.39 | 0.10 | 23.78 | 49.71 | -25.93 | Average |
| 0.76 | 10.58 | 20.25 | 0.13 | 30.96 | 56.00 | -25.04 | QP |
| 0.76 | 2.95 | 20.25 | 0.13 | 23.33 | 46.00 | -22.67 | Average |
| 3.24 | 3.81 | 20.20 | 0.19 | 24.20 | 56.00 | -31.80 | QP |
| 3.24 | -2.19 | 20.20 | 0.19 | 18.20 | 46.00 | -27.80 | Average |
| 5.06 | 4.72 | 20.20 | 0.17 | 25.09 | 60.00 | -34.91 | QP |
| 5.06 | -1.51 | 20.20 | 0.17 | 18.86 | 50.00 | -31.14 | Average |

*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 Loss

## 7.3 Conducted Peak Output Power

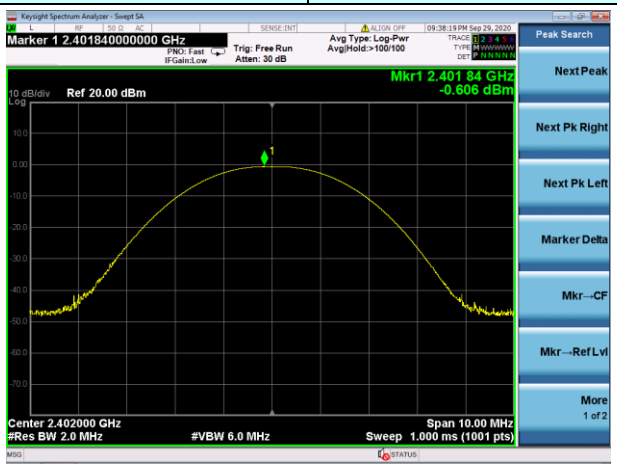
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(3) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | 20.97dBm |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

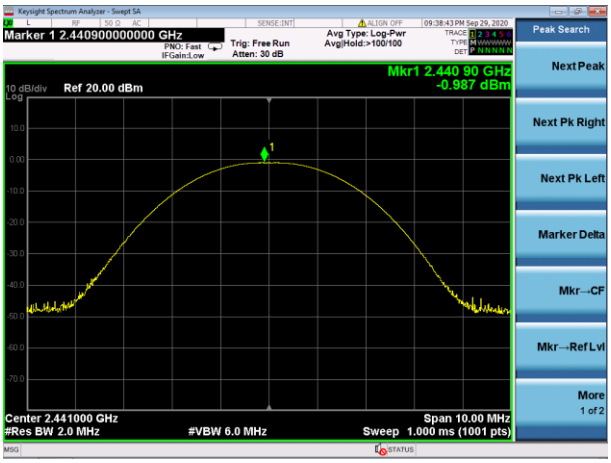
| Mode | Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|
| GFSK | Lowest | -0.606 | 20.97 | Pass |
| | Middle | -0.987 | | |
| | Highest | -1.362 | | |
| π/4-DQPSK | Lowest | -0.612 | 20.97 | Pass |
| | Middle | -0.986 | | |
| | Highest | -1.374 | | |
| 8-DPSK | Lowest | -0.078 | 20.97 | Pass |
| | Middle | -0.433 | | |
| | Highest | -0.807 | | |

**Test plot as follows:**

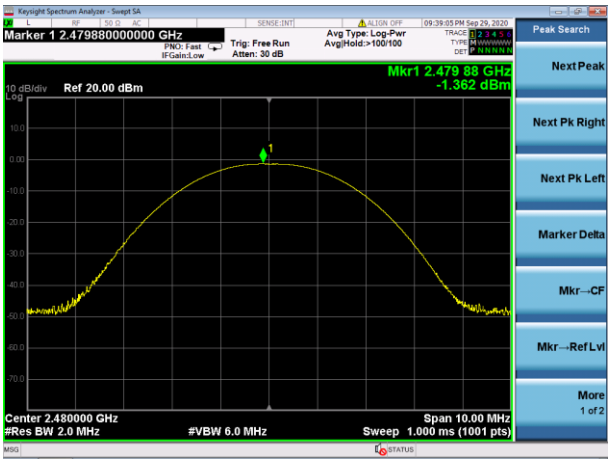
| Test mode: | GFSK mode |
|---|---|




Lowest channel

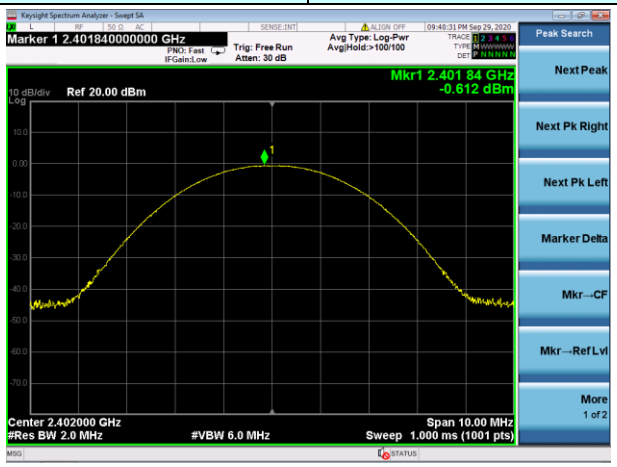



Middle channel




Highest channel

| Test mode: | π/4-DQPSK mode |
|---|---|

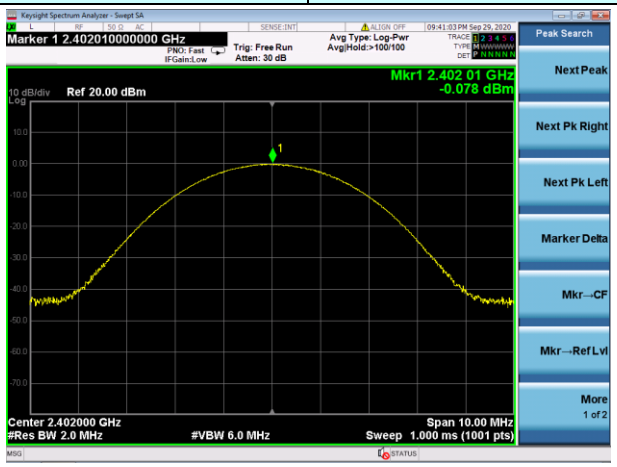



Lowest channel

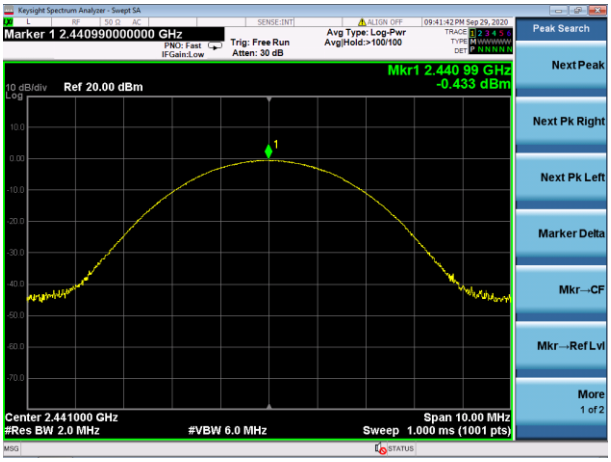
Middle channel

Highest channel

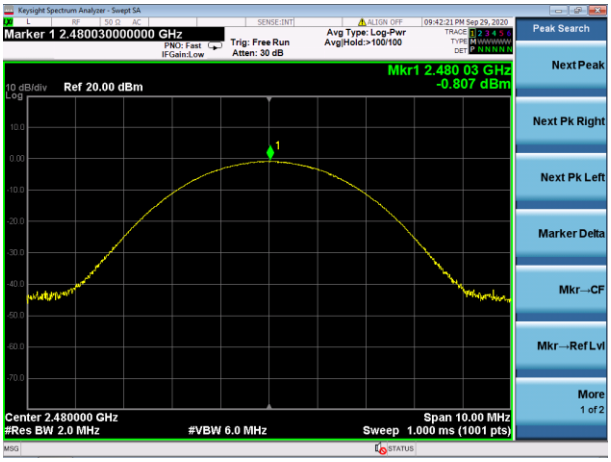
| Test mode: | 8-DPSK mode |
|---|---|




Lowest channel

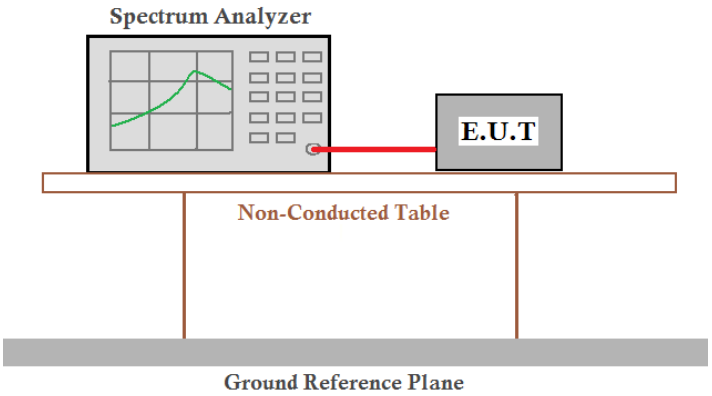



Middle channel




Highest channel

## 7.4 20dB Emission Bandwidth

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(2) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | N/A |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

| Mode | Test channel | 20dB Emission Bandwidth (MHz) | Result |
|---|---|---|---|
| GFSK | Lowest | 1.119 | Pass |
| | Middle | 1.118 | |
| | Highest | 1.118 | |
| π/4-DQPSK | Lowest | 1.372 | Pass |
| | Middle | 1.372 | |
| | Highest | 1.380 | |
| 8-DPSK | Lowest | 1.379 | Pass |
| | Middle | 1.380 | |
| | Highest | 1.388 | |

**Test plot as follows:**

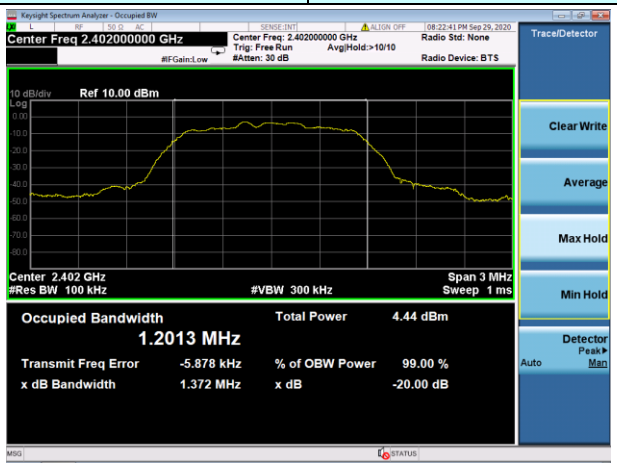
| Test mode: | GFSK mode |
|---|---|

Lowest channel

Middle channel

Highest channel

| Test mode: | π/4-DQPSK mode |
|---|---|




Lowest channel

Middle channel

Highest channel

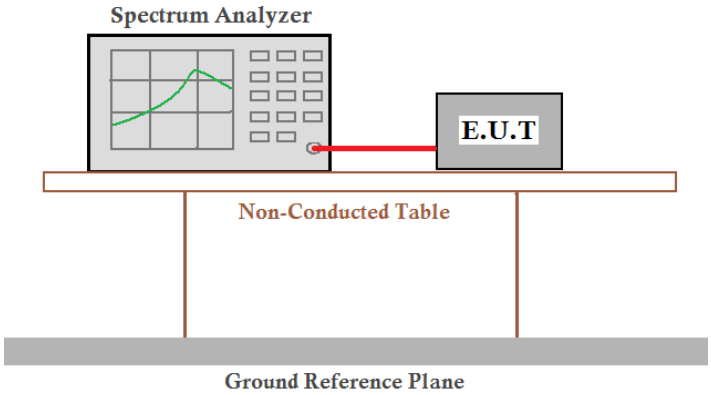
| Test mode: | 8-DPSK mode |
|---|---|

Lowest channel

Middle channel

Highest channel

## 7.5 Carrier Frequencies Separation

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100KHz, VBW=300KHz, detector=Peak |
| Limit: | 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater) |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

| Mode | Test channel | Carrier Frequencies Separation (kHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| GFSK | Lowest | 996 | 746 | Pass |
| | Middle | 1002 | 746 | Pass |
| | Highest | 1020 | 746 | Pass |
| π/4-DQPSK | Lowest | 993 | 920 | Pass |
| | Middle | 996 | 920 | Pass |
| | Highest | 999 | 920 | Pass |
| 8-DPSK | Lowest | 1008 | 925 | Pass |
| | Middle | 993 | 925 | Pass |
| | Highest | 999 | 925 | Pass |

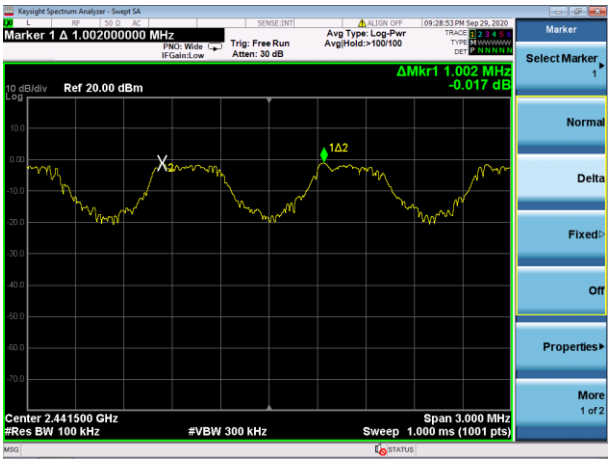
*Note: According to section 7.4*

| Mode | 20dB bandwidth (kHz) (worse case) | Limit (kHz) (Carrier Frequencies Separation) |
|---|---|---|
| GFSK | 1119 | 746 |
| π/4-DQPSK | 1380 | 920 |
| 8-DPSK | 1388 | 925 |

**Test plot as follows:**

| Test mode: | GFSK mode |
|---|---|

Lowest channel




Middle channel

Highest channel

| Test mode: | π/4-DQPSK mode |
|---|---|

Lowest channel

Middle channel

Highest channel

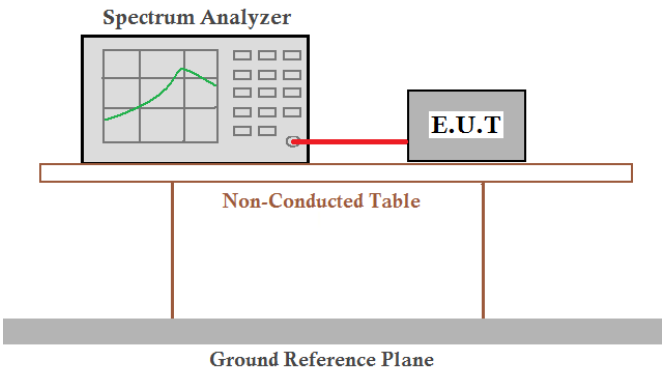
| Test mode: | 8-DPSK mode |
|---|---|

Lowest channel

Middle channel

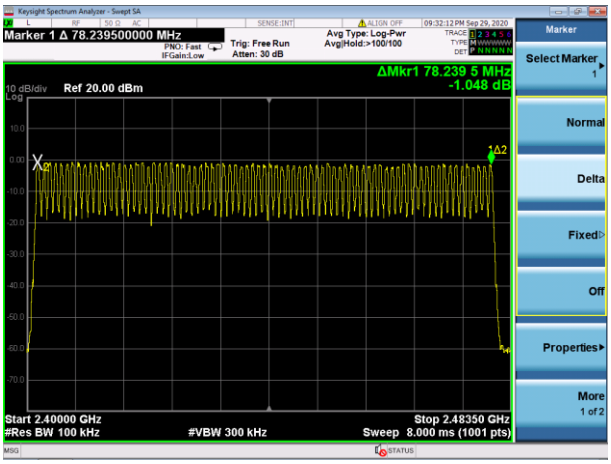
Highest channel

## 7.6 Hopping Channel Number

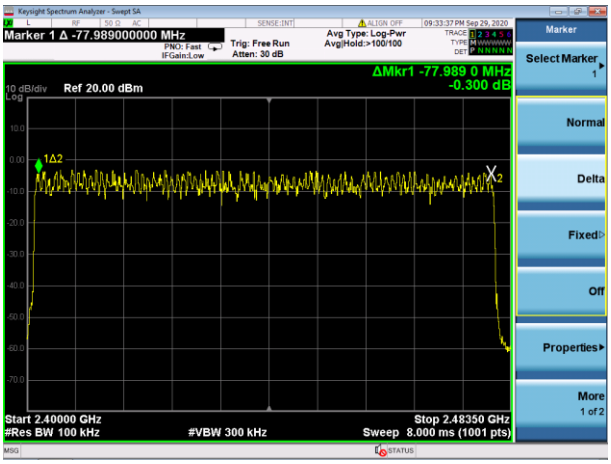
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak |
| Limit: | 15 channels |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data:**

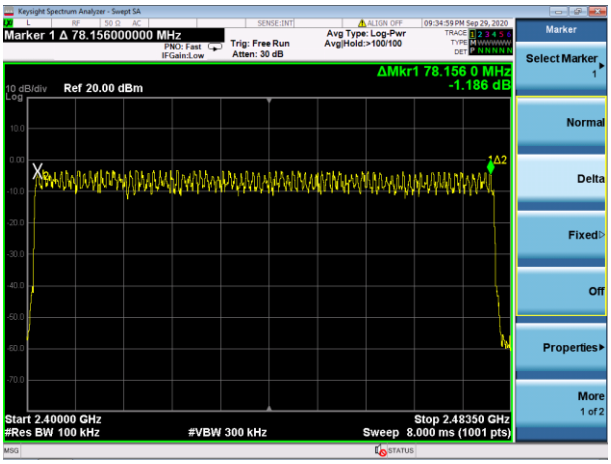
| Mode | Hopping channel numbers | Limit | Result |
|---|---|---|---|
| GFSK | 79 | 15 | Pass |
| π/4-DQPSK | 79 | 15 | Pass |
| 8-DPSK | 79 | 15 | Pass |




Test mode: GFSK mode

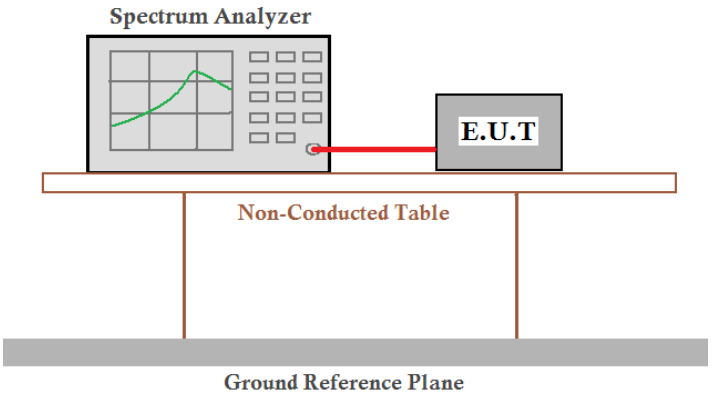



Test mode: π/4-DQPSK mode




Test mode: 8-DPSK mode

## 7.7 Dwell Time

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak |
| Limit: | 0.4 Second |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

| Frequency | Packet | Dwell time(ms) | Limit(ms) | Result |
|---|---|---|---|---|
| 2441MHz | DH1/2-DH1/3-DH1 | 127.68 | 400 | Pass |
| 2441MHz | DH3/2-DH3/3-DH3 | 267.20 | 400 | Pass |
| 2441MHz | DH5/2-DH5/3-DH5 | 308.91 | 400 | Pass |

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: 2441MHz as blow

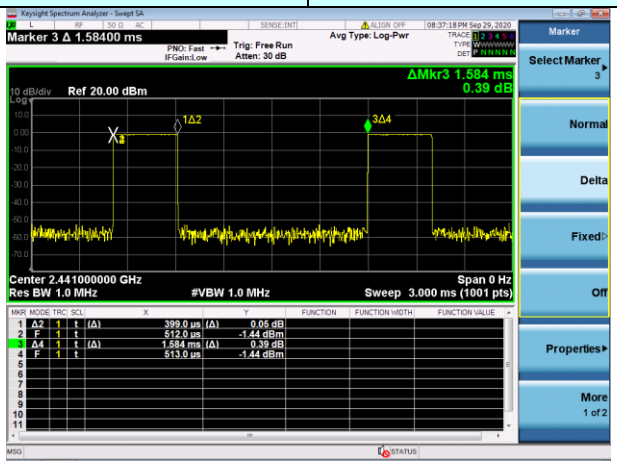
DH1/2-DH1/3-DH1 time slot=0.399(ms)*(1600/ (2*79))*31.6=127.68ms

DH3/2-DH3/3-DH3 time slot=1.670(ms)*(1600/ (4*79))*31.6=267.20ms

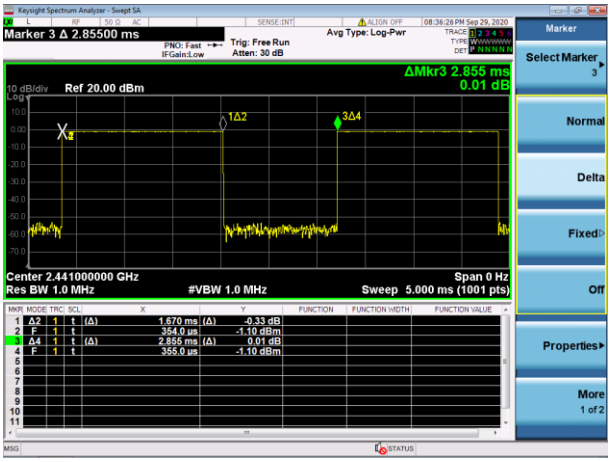
DH5/2-DH5/3-DH5 time slot=2.896(ms)*(1600/ (6*79))*31.6=308.91ms

**Test plot as follows:**

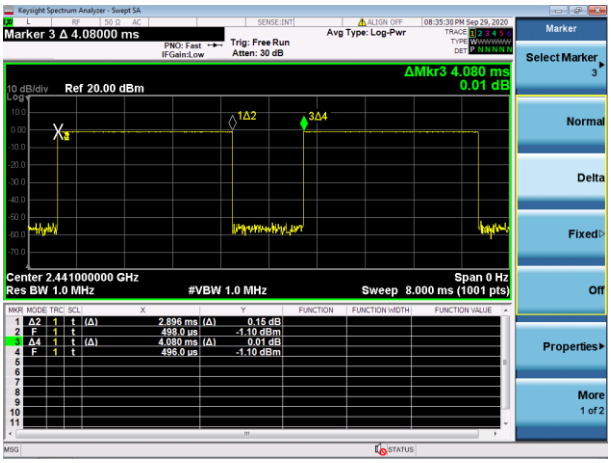
| Test channel: | 2441MHz |
|---|---|




DH1/2-DH1/3-DH1



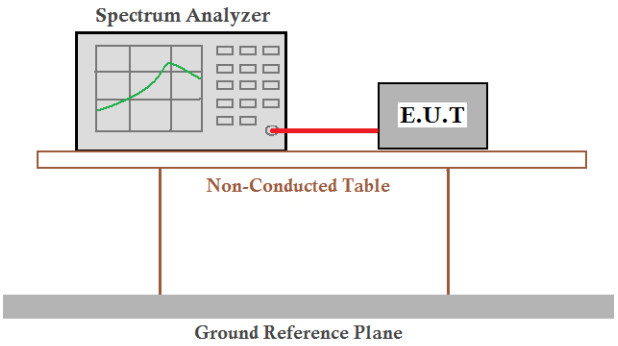

DH3/2-DH3/3-DH3




DH5/2-DH5/3-DH5

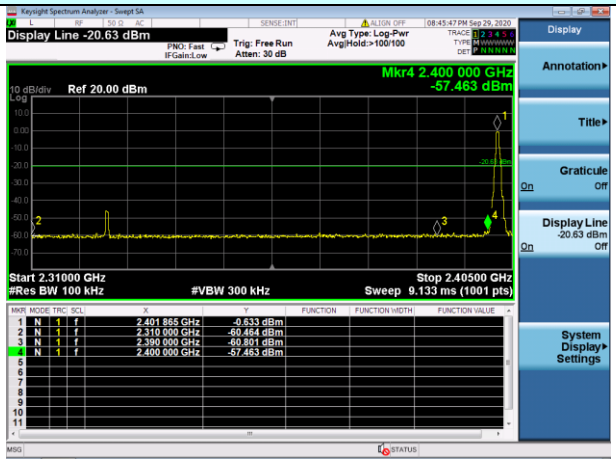
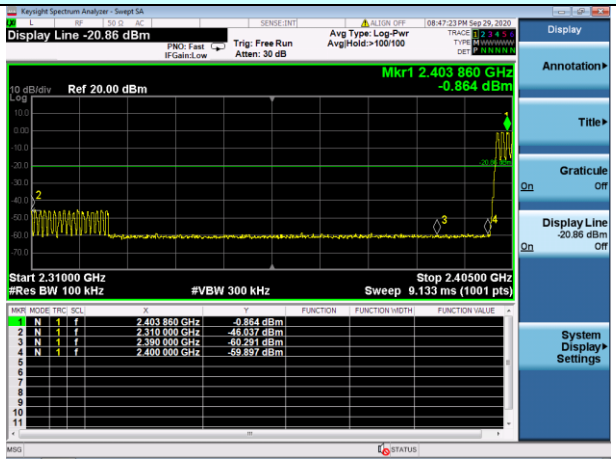
## 7.8 Band Edge

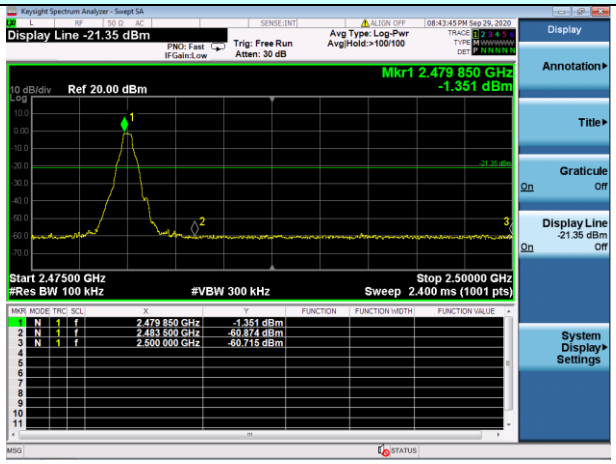
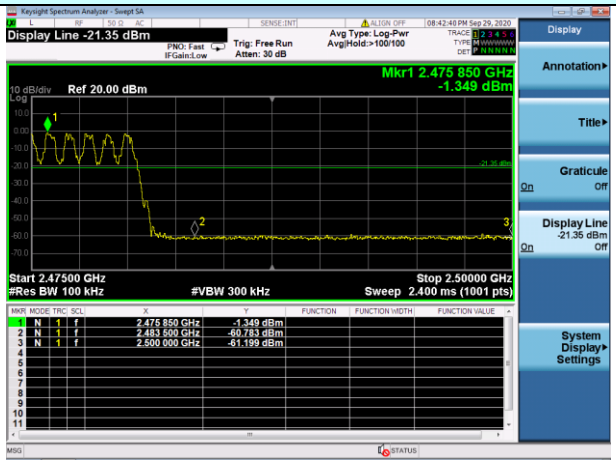
### 7.8.1 Conducted Emission Method

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100kHz, VBW=300kHz, Detector=Peak |
| Limit: | 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. |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

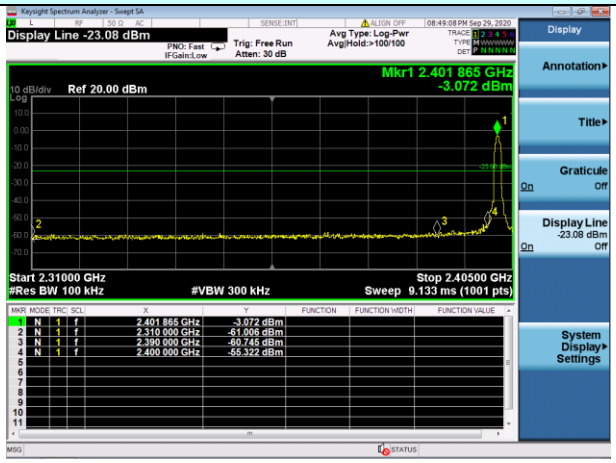
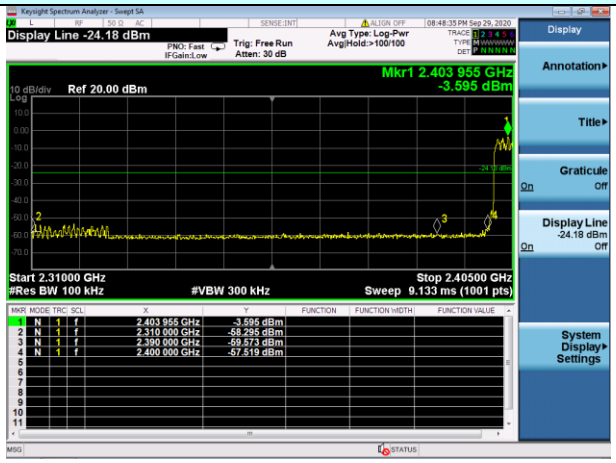
**Test plot as follows:**

**GFSK Mode:**

| Test channel: | Lowest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

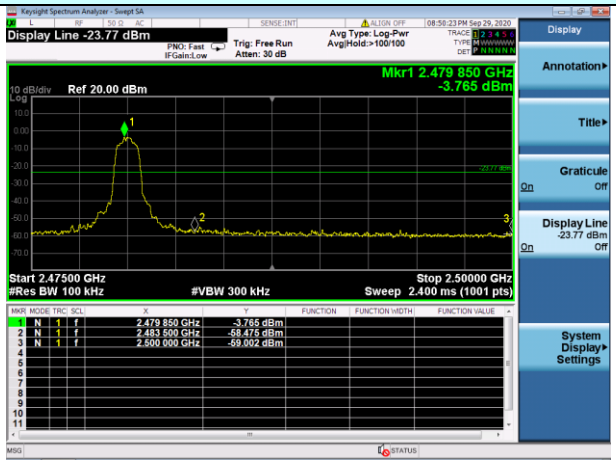
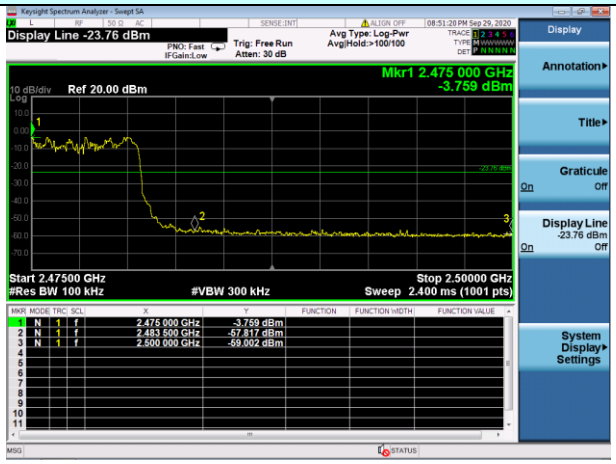
| Test channel: | Highest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

**π/4-DQPSK Mode:**

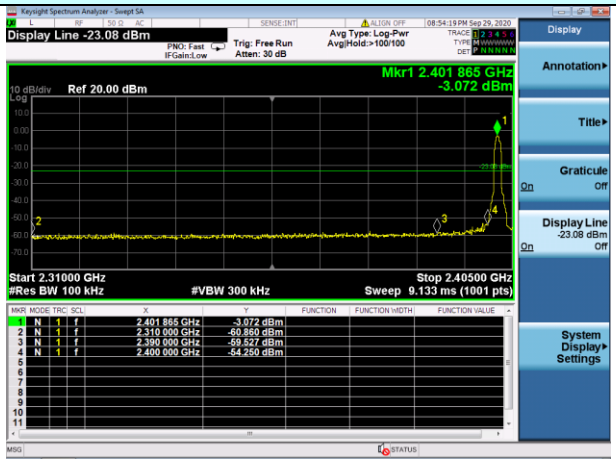
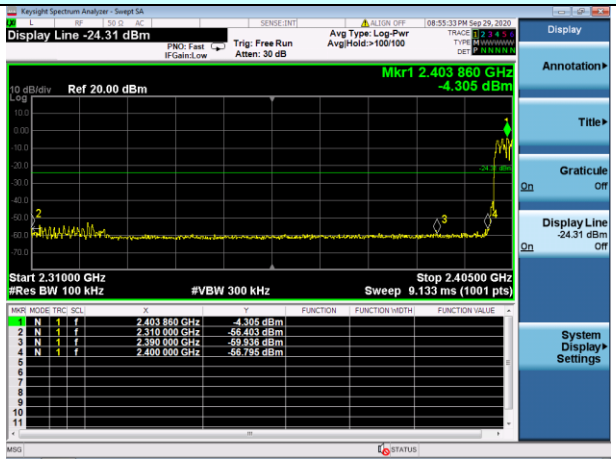
| Test channel: | Lowest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

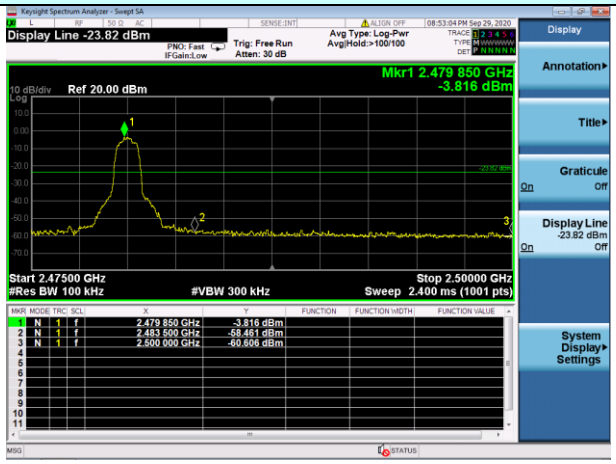
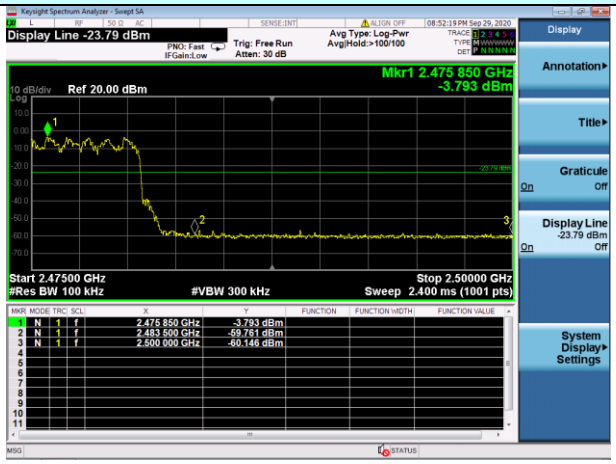




| Test channel: | Highest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

**8-DPSK Mode:**

| Test channel: | Lowest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

| Test channel: | Highest channel |
|---|---|
|  |  |
| No-hopping mode | Hopping mode |

### 7.8.2 Radiated Emission Method

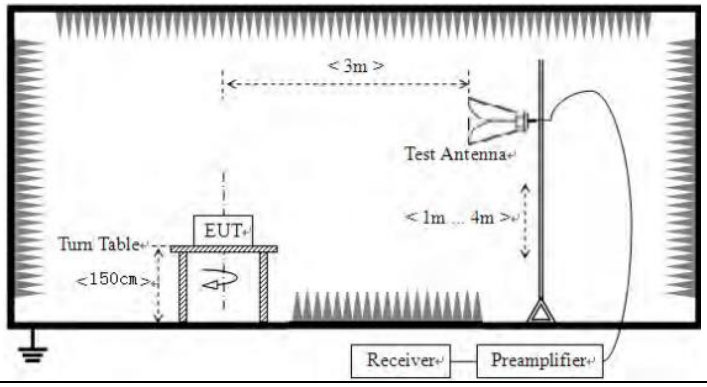
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.209 and 15.205 |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed. |
| Test site: | Measurement Distance: 3m |
| Receiver setup: | |

| Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | Peak | 1MHz | 10Hz | Average Value |

Limit:

| Frequency | Limit (dBuV/m @3m) | Remark |
|---|---|---|
| Above 1GHz | 54.00 | Average Value |
| | 74.00 | Peak Value |

Test setup:




Test Procedure:

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.

| | |
|---|---|
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

| Test channel: | Lowest channel |
|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2310.00 | 34.81 | 27.59 | 5.38 | 30.18 | 37.60 | 74.00 | -36.40 | Horizontal |
| 2390.00 | 38.15 | 27.59 | 5.38 | 30.18 | 40.94 | 74.00 | -33.06 | Horizontal |
| 2400.00 | 54.27 | 27.58 | 5.39 | 30.18 | 57.06 | 74.00 | -16.94 | Horizontal |
| 2310.00 | 34.23 | 27.59 | 5.38 | 30.18 | 37.02 | 74.00 | -36.98 | Vertical |
| 2390.00 | 38.25 | 27.59 | 5.38 | 30.18 | 41.04 | 74.00 | -32.96 | Vertical |
| 2400.00 | 55.80 | 27.58 | 5.39 | 30.18 | 58.59 | 74.00 | -15.41 | Vertical |

Average value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2310.00 | 26.28 | 27.59 | 5.38 | 30.18 | 29.07 | 54.00 | -24.93 | Horizontal |
| 2390.00 | 29.77 | 27.59 | 5.38 | 30.18 | 32.56 | 54.00 | -21.44 | Horizontal |
| 2400.00 | 40.73 | 27.58 | 5.39 | 30.18 | 43.52 | 54.00 | -10.48 | Horizontal |
| 2310.00 | 26.54 | 27.59 | 5.38 | 30.18 | 29.33 | 54.00 | -24.67 | Vertical |
| 2390.00 | 29.38 | 27.59 | 5.38 | 30.18 | 32.17 | 54.00 | -21.83 | Vertical |
| 2400.00 | 41.93 | 27.58 | 5.39 | 30.18 | 44.72 | 54.00 | -9.28 | Vertical |

| Test channel: | Highest channel |
|---|---|

Peak value:

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2483.50 | 39.69 | 27.53 | 5.47 | 29.93 | 42.76 | 74.00 | -31.24 | Horizontal |
| 2500.00 | 39.77 | 27.55 | 5.49 | 29.93 | 42.88 | 74.00 | -31.12 | Horizontal |
| 2483.50 | 39.75 | 27.53 | 5.47 | 29.93 | 42.82 | 74.00 | -31.18 | Vertical |
| 2500.00 | 40.31 | 27.55 | 5.49 | 29.93 | 43.42 | 74.00 | -30.58 | Vertical |

Average value:

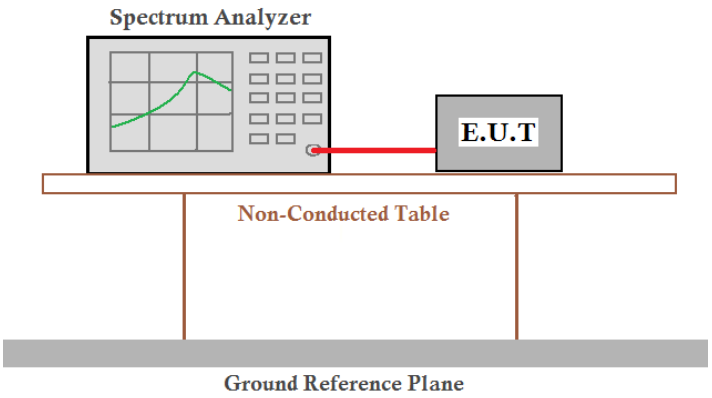
| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | Polarization |
|---|---|---|---|---|---|---|---|---|
| 2483.50 | 32.54 | 27.53 | 5.47 | 29.93 | 35.61 | 54.00 | -18.39 | Horizontal |
| 2500.00 | 31.22 | 27.55 | 5.49 | 29.93 | 34.33 | 54.00 | -19.67 | Horizontal |
| 2483.50 | 33.36 | 27.53 | 5.47 | 29.93 | 36.43 | 54.00 | -17.57 | Vertical |
| 2500.00 | 30.75 | 27.55 | 5.49 | 29.93 | 33.86 | 54.00 | -20.14 | Vertical |

*Remarks:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
4. *During the test, pre-scan the GFSK, π/4-DQPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.*

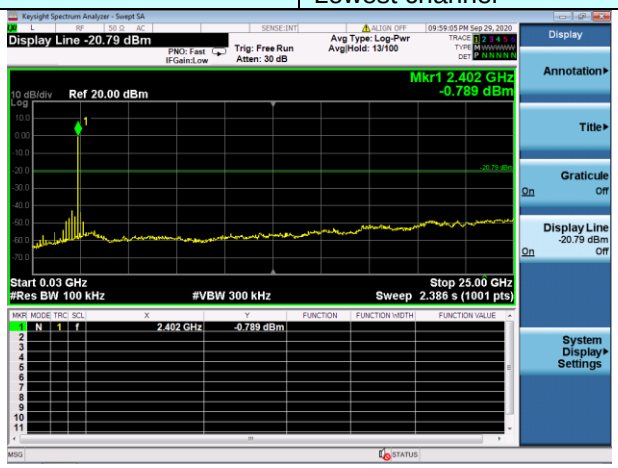
## 7.9 Spurious Emission

### 7.9.1 Conducted Emission Method

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.247 (d) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | 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. |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

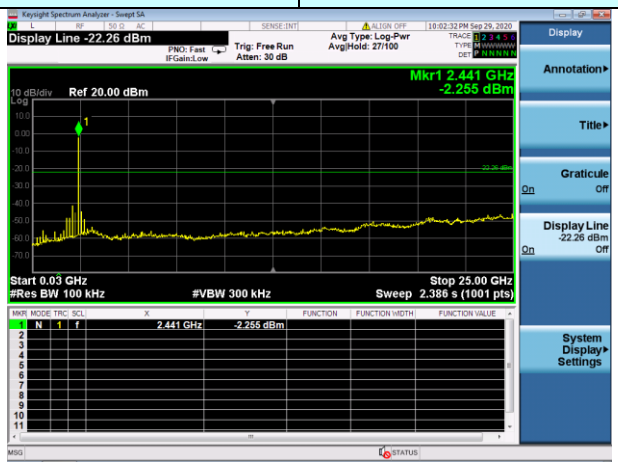
Remark:
During the test, pre-scan the GFSK, π/4-DQPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.

| Test channel: | Lowest channel |
|---|---|



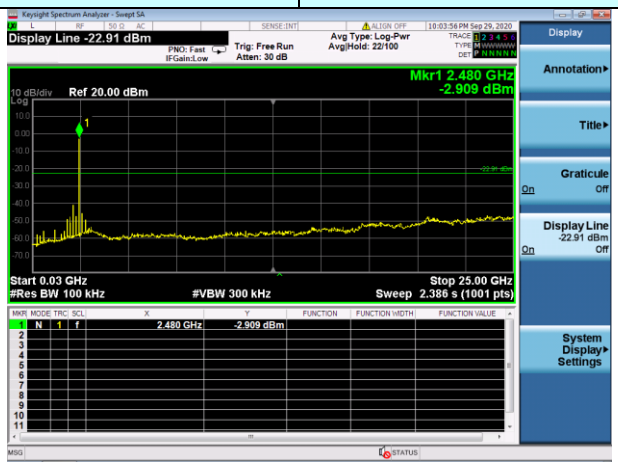

30MHz~25GHz

| Test channel: | Middle channel |
|---|---|




30MHz~25GHz

| Test channel: | Highest channel |
|---|---|




30MHz~25GHz

### 7.9.2 Radiated Emission Method

| | |
|---|---|
| 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:

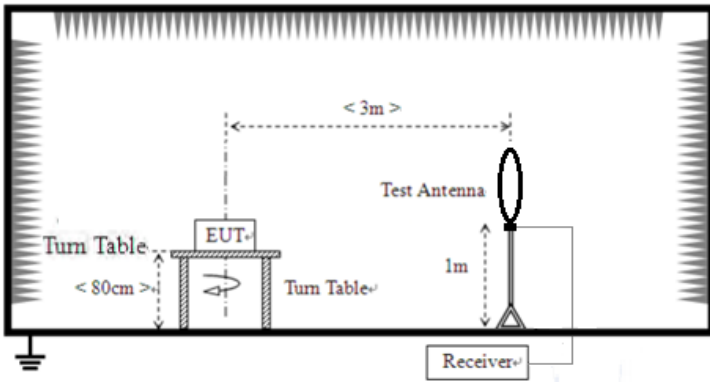
| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120KHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

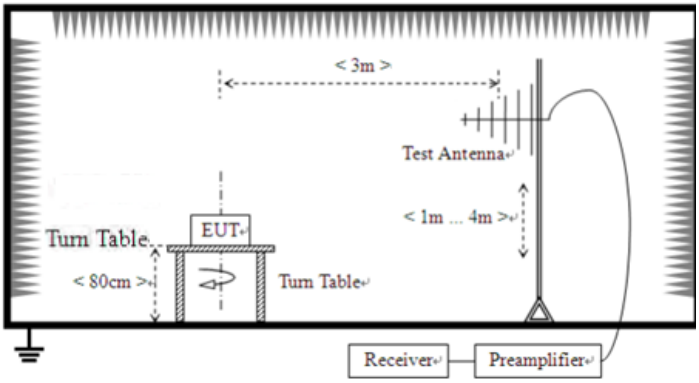
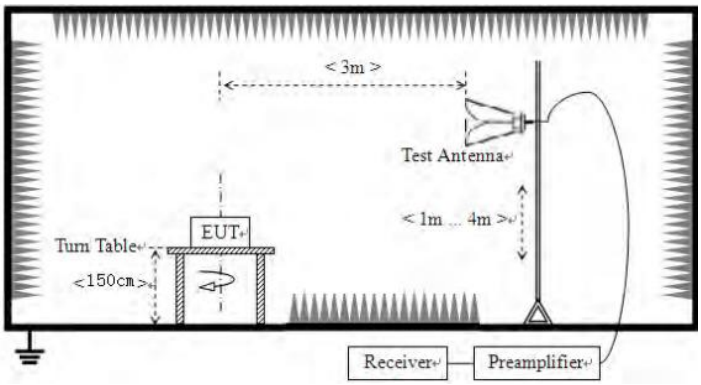
Limit:

| Frequency | Limit (uV/m) | Value | Measurement Distance |
|---|---|---|---|
| 0.009MHz-0.490MHz | 2400/F(KHz) | QP | 300m |
| 0.490MHz-1.705MHz | 24000/F(KHz) | QP | 30m |
| 1.705MHz-30MHz | 30 | QP | 30m |
| 30MHz-88MHz | 100 | QP | 3m |
| 88MHz-216MHz | 150 | QP | |
| 216MHz-960MHz | 200 | QP | |
| 960MHz-1GHz | 500 | QP | |
| Above 1GHz | 500 | Average | |
| | 5000 | Peak | |

Test setup:

For radiated emissions from 9kHz to 30MHz



| | |
|---|---|
| | For radiated emissions from 30MHz to1GHz<br>  <br><br>For radiated emissions above 1GHz<br>  <br> |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>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.<br>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.<br>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.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>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. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |

| | | | | | | |
|---|---|---|---|---|---|---|
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |
| Test voltage: | AC 120V, 60Hz | | | | | |
| Test results: | Pass | | | | | |

**Measurement data:**

*Remarks:*

1. *During the test, pre-scan the GFSK, π/4-DQPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

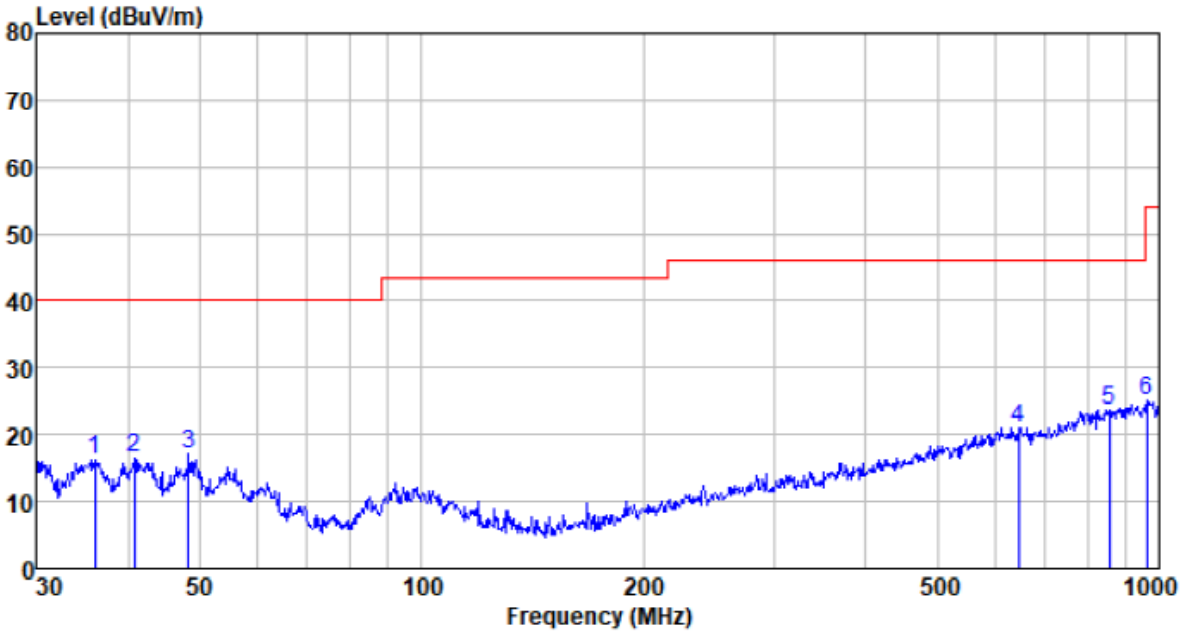
■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

■ **Below 1GHz**

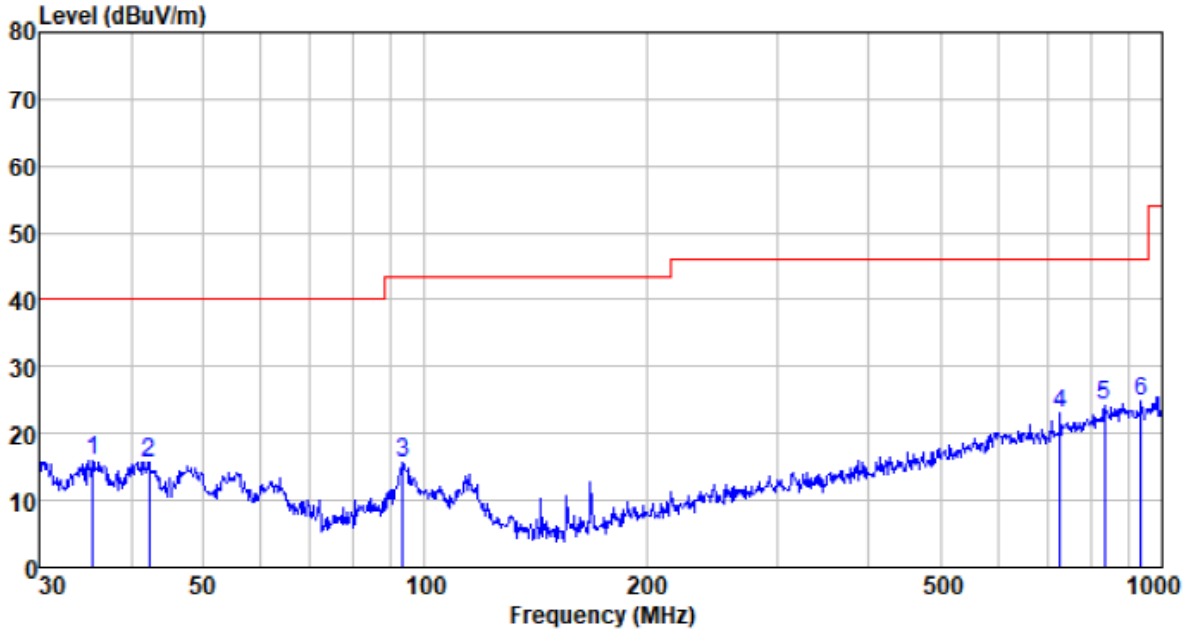
Pre-scan all test modes, found worst case at GFSK 2480MHz, and so only show the test result of GFSK 2480MHz

**Horizontal:**




| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 36.001 | 39.59 | 11.52 | 0.62 | 35.42 | 16.31 | 40.00 | -23.69 | QP |
| 40.702 | 39.27 | 12.21 | 0.67 | 35.70 | 16.45 | 40.00 | -23.55 | QP |
| 48.332 | 40.28 | 12.29 | 0.75 | 36.10 | 17.22 | 40.00 | -22.78 | QP |
| 645.120 | 35.20 | 19.55 | 3.89 | 37.58 | 21.06 | 46.00 | -24.94 | QP |
| 857.025 | 34.76 | 21.92 | 4.68 | 37.61 | 23.75 | 46.00 | -22.25 | QP |
| 962.162 | 34.94 | 22.55 | 5.09 | 37.54 | 25.04 | 54.00 | -28.96 | QP |

**Vertical:**




| Freq MHz | Reading level dBuV | Antenna factor dB/m | Cable loss dB | Preamp factor dB | level dBuV/m | Limit level dBuV/m | Over limit dB | Remark |
|---|---|---|---|---|---|---|---|---|
| 35.499 | 39.20 | 11.42 | 0.61 | 35.39 | 15.84 | 40.00 | -24.16 | QP |
| 42.302 | 38.51 | 12.23 | 0.69 | 35.79 | 15.64 | 40.00 | -24.36 | QP |
| 93.440 | 39.81 | 11.25 | 1.14 | 36.67 | 15.53 | 43.50 | -27.97 | QP |
| 726.805 | 36.31 | 20.10 | 4.19 | 37.63 | 22.97 | 46.00 | -23.03 | QP |
| 836.244 | 35.41 | 21.75 | 4.60 | 37.61 | 24.15 | 46.00 | -21.85 | QP |
| 935.546 | 34.92 | 22.45 | 4.99 | 37.57 | 24.79 | 46.00 | -21.21 | QP |

■ **Above 1GHz**

| Test channel: | Lowest channel |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4804.00 | 35.58 | 31.78 | 8.60 | 32.09 | 43.87 | 74.00 | -30.13 | Vertical |
| 7206.00 | 30.68 | 36.15 | 11.65 | 32.00 | 46.48 | 74.00 | -27.52 | Vertical |
| 9608.00 | 30.45 | 37.95 | 14.14 | 31.62 | 50.92 | 74.00 | -23.08 | Vertical |
| 12010.00 | * | | | | | 74.00 | | Vertical |
| 14412.00 | * | | | | | 74.00 | | Vertical |
| 4804.00 | 39.51 | 31.78 | 8.60 | 32.09 | 47.80 | 74.00 | -26.20 | Horizontal |
| 7206.00 | 32.29 | 36.15 | 11.65 | 32.00 | 48.09 | 74.00 | -25.91 | Horizontal |
| 9608.00 | 29.71 | 37.95 | 14.14 | 31.62 | 50.18 | 74.00 | -23.82 | Horizontal |
| 12010.00 | * | | | | | 74.00 | | Horizontal |
| 14412.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4804.00 | 24.72 | 31.78 | 8.60 | 32.09 | 33.01 | 54.00 | -20.99 | Vertical |
| 7206.00 | 19.56 | 36.15 | 11.65 | 32.00 | 35.36 | 54.00 | -18.64 | Vertical |
| 9608.00 | 18.75 | 37.95 | 14.14 | 31.62 | 39.22 | 54.00 | -14.78 | Vertical |
| 12010.00 | * | | | | | 54.00 | | Vertical |
| 14412.00 | * | | | | | 54.00 | | Vertical |
| 4804.00 | 28.75 | 31.78 | 8.60 | 32.09 | 37.04 | 54.00 | -16.96 | Horizontal |
| 7206.00 | 21.62 | 36.15 | 11.65 | 32.00 | 37.42 | 54.00 | -16.58 | Horizontal |
| 9608.00 | 18.34 | 37.95 | 14.14 | 31.62 | 38.81 | 54.00 | -15.19 | Horizontal |
| 12010.00 | * | | | | | 54.00 | | Horizontal |
| 14412.00 | * | | | | | 54.00 | | Horizontal |

| Test channel: | Middle channel |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4882.00 | 35.73 | 31.85 | 8.67 | 32.12 | 44.13 | 74.00 | -29.87 | Vertical |
| 7323.00 | 30.78 | 36.37 | 11.72 | 31.89 | 46.98 | 74.00 | -27.02 | Vertical |
| 9764.00 | 30.54 | 38.35 | 14.25 | 31.62 | 51.52 | 74.00 | -22.48 | Vertical |
| 12205.00 | * | | | | | 74.00 | | Vertical |
| 14646.00 | * | | | | | 74.00 | | Vertical |
| 4882.00 | 39.69 | 31.85 | 8.67 | 32.12 | 48.09 | 74.00 | -25.91 | Horizontal |
| 7323.00 | 32.40 | 36.37 | 11.72 | 31.89 | 48.60 | 74.00 | -25.40 | Horizontal |
| 9764.00 | 29.81 | 38.35 | 14.25 | 31.62 | 50.79 | 74.00 | -23.21 | Horizontal |
| 12205.00 | * | | | | | 74.00 | | Horizontal |
| 14646.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4882.00 | 24.85 | 31.85 | 8.67 | 32.12 | 33.25 | 54.00 | -20.75 | Vertical |
| 7323.00 | 19.65 | 36.37 | 11.72 | 31.89 | 35.85 | 54.00 | -18.15 | Vertical |
| 9764.00 | 18.83 | 38.35 | 14.25 | 31.62 | 39.81 | 54.00 | -14.19 | Vertical |
| 12205.00 | * | | | | | 54.00 | | Vertical |
| 14646.00 | * | | | | | 54.00 | | Vertical |
| 4882.00 | 28.90 | 31.85 | 8.67 | 32.12 | 37.30 | 54.00 | -16.70 | Horizontal |
| 7323.00 | 21.72 | 36.37 | 11.72 | 31.89 | 37.92 | 54.00 | -16.08 | Horizontal |
| 9764.00 | 18.43 | 38.35 | 14.25 | 31.62 | 39.41 | 54.00 | -14.59 | Horizontal |
| 12205.00 | * | | | | | 54.00 | | Horizontal |
| 14646.00 | * | | | | | 54.00 | | Horizontal |

| Test channel: | Highest channel |
|---|---|

**Peak value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4960.00 | 35.41 | 31.93 | 8.73 | 32.16 | 43.91 | 74.00 | -30.09 | Vertical |
| 7440.00 | 30.57 | 36.59 | 11.79 | 31.78 | 47.17 | 74.00 | -26.83 | Vertical |
| 9920.00 | 30.35 | 38.81 | 14.38 | 31.88 | 51.66 | 74.00 | -22.34 | Vertical |
| 12400.00 | * | | | | | 74.00 | | Vertical |
| 14880.00 | * | | | | | 74.00 | | Vertical |
| 4960.00 | 39.31 | 31.93 | 8.73 | 32.16 | 47.81 | 74.00 | -26.19 | Horizontal |
| 7440.00 | 32.16 | 36.59 | 11.79 | 31.78 | 48.76 | 74.00 | -25.24 | Horizontal |
| 9920.00 | 29.59 | 38.81 | 14.38 | 31.88 | 50.90 | 74.00 | -23.10 | Horizontal |
| 12400.00 | * | | | | | 74.00 | | Horizontal |
| 14880.00 | * | | | | | 74.00 | | Horizontal |

**Average value:**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|---|---|---|---|---|---|---|---|---|
| 4960.00 | 24.61 | 31.93 | 8.73 | 32.16 | 33.11 | 54.00 | -20.89 | Vertical |
| 7440.00 | 19.49 | 36.59 | 11.79 | 31.78 | 36.09 | 54.00 | -17.91 | Vertical |
| 9920.00 | 18.69 | 38.81 | 14.38 | 31.88 | 40.00 | 54.00 | -14.00 | Vertical |
| 12400.00 | * | | | | | 54.00 | | Vertical |
| 14880.00 | * | | | | | 54.00 | | Vertical |
| 4960.00 | 28.63 | 31.93 | 8.73 | 32.16 | 37.13 | 54.00 | -16.87 | Horizontal |
| 7440.00 | 21.54 | 36.59 | 11.79 | 31.78 | 38.14 | 54.00 | -15.86 | Horizontal |
| 9920.00 | 18.26 | 38.81 | 14.38 | 31.88 | 39.57 | 54.00 | -14.43 | Horizontal |
| 12400.00 | * | | | | | 54.00 | | Horizontal |
| 14880.00 | * | | | | | 54.00 | | Horizontal |

*Remarks:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *"*", means this data is the too weak instrument of signal is unable to test.*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *The test data shows only the worst case GFSK mode*

# 8 Test Setup Photo

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

# 9 EUT Constructional Details

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

------End------