



TEST Report

Applicant: Shenzhen Yunmei Industrial Co., Ltd.

Address of Applicant: Room 205, 2nd Floor, No. 44, Taoyuan Road, Huangtian Community, Hangcheng Street, Baoan District, Shenzhen

Manufacturer : Shenzhen Meiyu Electronic Technology Co., Ltd.

Address of Manufacturer : 7th Floor, Building A3, Donghua Industrial Park, Sanwei, Baoan Avenue, Sanwei Community, Xixiang Street, Baoan District, Shenzhen

Equipment Under Test (EUT)

Product Name: MP3 Player

Model No.: M3

Series model: D50, D51, D22, D53, D20, D23, D26, D28, X50, X52, X55, X56, X58, M30, M31, M32, M33, M36

Trade Mark: N/A

FCC ID: 2A4U6-M3

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: Feb.16,2022

Date of Test: Feb.16,2022~Feb.22,2022

Date of report issued: Feb.22,2022

Test Result : PASS *

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



Report No.: HTT202202150F01

1. Version

| Version No. | Date | Description |
|-------------|-------------|-------------|
| 00 | Feb.22,2022 | Original |
| | | |
| | | |
| | | |
| | | |

Tested/ Prepared By

Ervin Xu

Date:

Feb.22,2022

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Bruce Zhu

Date:

Feb.22,2022

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Date:

Feb.22,2022

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3. 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)(iii) | Pass |
| Dwell Time | 15.247 (a)(1)(iii) | 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 | 30~1000MHz | 3.45 dB | (1) |
| Radiated Emission | 1~6GHz | 3.54 dB | (1) |
| Radiated Emission | 6~40GHz | 5.38 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 2.66 dB | (1) |
| Occupied Bandwidth | | ±3% | (1) |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.



Report No.: HTT202202150F01

4. General Information

4.1. General Description of EUT

| | |
|--|--|
| Product Name: | MP3 Player |
| Model No.: | M3 |
| Series model: | D50, D51, D22, D53, D20, D23, D26, D28, X50, X52, X55, X56, X58, M30, M31, M32, M33, M36 |
| Test sample(s) ID: | HTT202202150-1(Engineer sample) HTT202202150-2(Normal sample) |
| Operation Frequency: | 2402MHz~2480MHz |
| Channel numbers: | 79 |
| Channel separation: | 1MHz |
| Modulation type: | GFSK, $\pi/4$ -DQPSK, 8-DPSK |
| Antenna Type: | PCB Antenna |
| Antenna gain: | 1dBi |
| Power supply: | DC 3.7V/360mAh Form Battery and DC 5V From External Circuit |
| Adapter Information (auxiliary test equipment supplied by test Lab) | Mode: CD122 Input: AC100-240V, 50/60Hz, 500mA Output: DC 5V, 2A |



| 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 |



4.2. Test mode

| | |
|--|---|
| Transmitting mode | Keep the EUT in continuously transmitting mode. |
| <i>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.</i> | |

4.3. Description of Support Units

| |
|-------|
| None. |
|-------|

4.4. Deviation from Standards

| |
|-------|
| None. |
|-------|

4.5. Abnormalities from Standard Conditions

| |
|-------|
| None. |
|-------|

4.6. 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. |

4.7. Test Location

| |
|---|
| All tests were performed at: |
| 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 Tel: 0755-23595200 Fax: 0755-23595201 |

4.8. Additional Instructions

| | |
|-------------------|---|
| Test Software | Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode |
| Power level setup | Default |

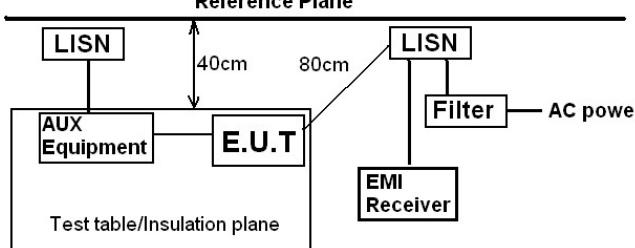


5. Test Instruments list

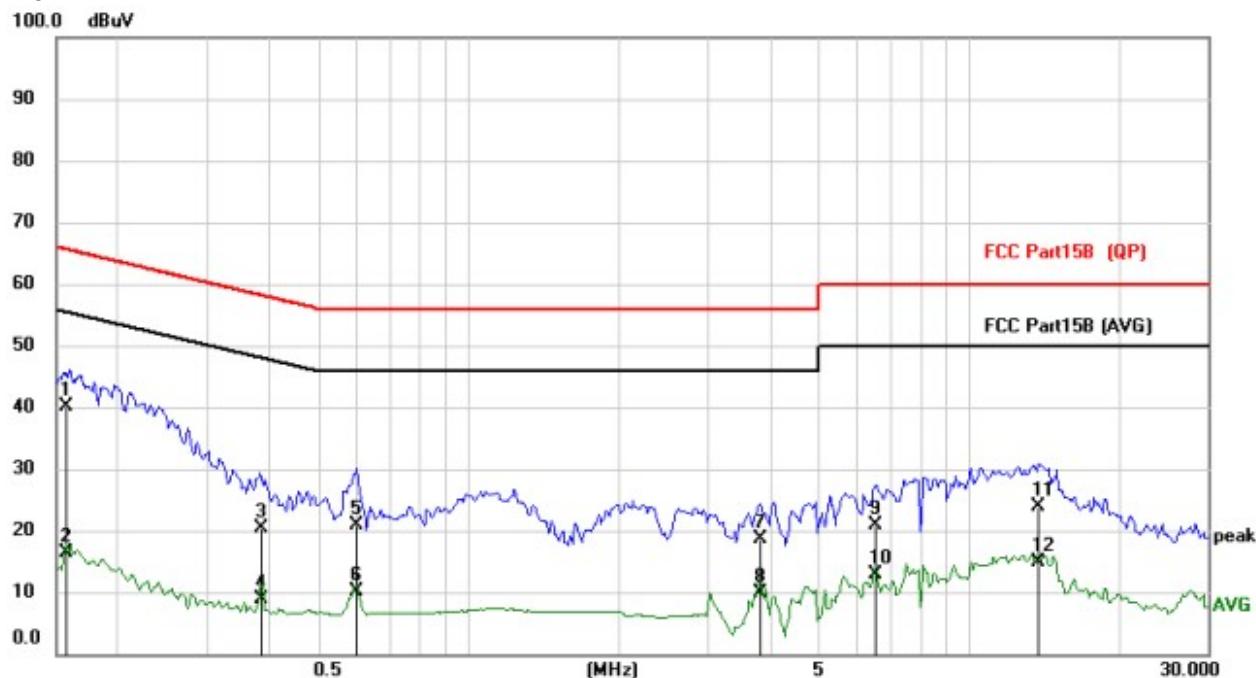
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Date (mm-dd-yy) | Cal.Due date (mm-dd-yy) |
|------|----------------------------------|-------------------------------------|--------------------|---------------|---------------------|-------------------------|
| 1 | 3m Semi- Anechoic 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&Schwarz | ESCI7 | HTT-E022 | May 21 2021 | May 20 2022 |
| 4 | Spectrum Analyzer | Rohde&Schwarz | 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 |

6. Test results and Measurement Data

6.1. 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: | <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> | | | 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 |
| 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: | <p style="text-align: center;">Reference Plane</p>  <p><i>Remark</i> <i>E.U.T: Equipment Under Test</i> <i>LISN: Line Impedance Stabilization Network</i> <i>Test table height=0.8m</i></p> | | | | | | | | | | | | | | | | |
| Test procedure: | <ol style="list-style-type: none"> 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 | | | | | | | | | | | | | | | | |

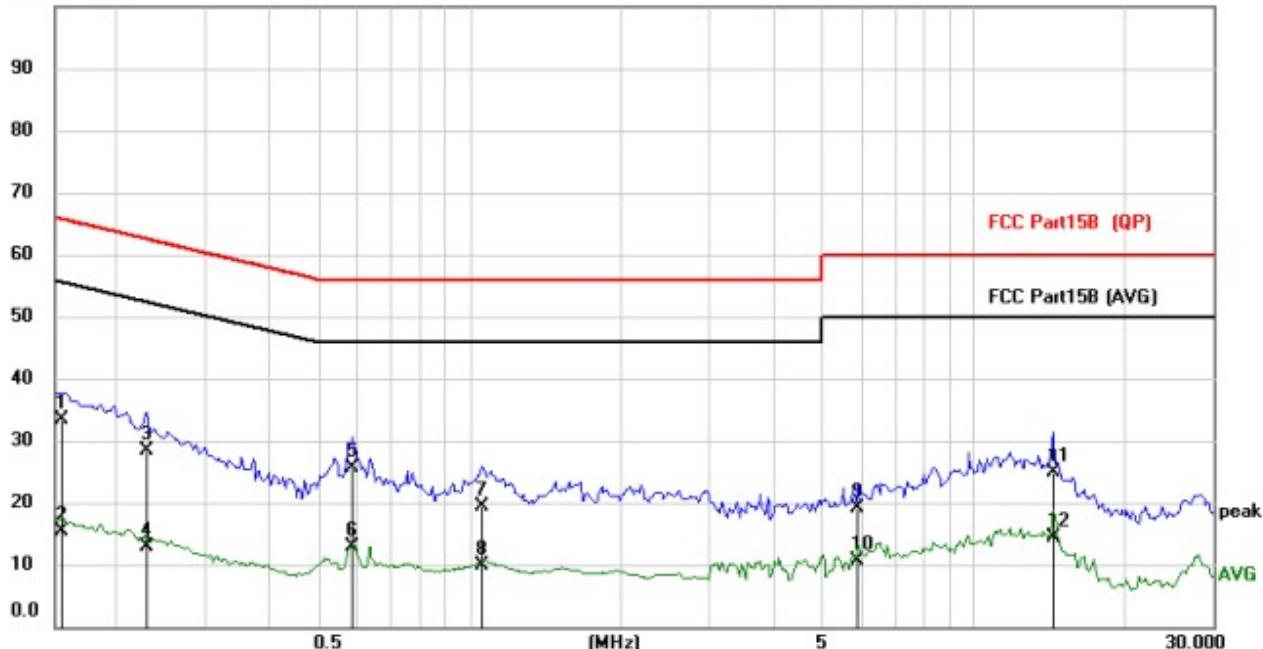
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:
Line:


| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|
| | | | Level | Factor | ment | | | |
| | | MHz | dBuV | dB | dBuV | dBuV | dB | |
| 1 | * | 0.1578 | 29.90 | 10.26 | 40.16 | 65.58 | -25.42 | QP |
| 2 | | 0.1578 | 6.22 | 10.26 | 16.48 | 55.58 | -39.10 | AVG |
| 3 | | 0.3852 | 10.08 | 10.29 | 20.37 | 58.17 | -37.80 | QP |
| 4 | | 0.3852 | -1.34 | 10.29 | 8.95 | 48.17 | -39.22 | AVG |
| 5 | | 0.5985 | 10.33 | 10.50 | 20.83 | 56.00 | -35.17 | QP |
| 6 | | 0.5985 | -0.36 | 10.50 | 10.14 | 46.00 | -35.86 | AVG |
| 7 | | 3.8307 | 7.73 | 10.86 | 18.59 | 56.00 | -37.41 | QP |
| 8 | | 3.8307 | -0.96 | 10.86 | 9.90 | 46.00 | -36.10 | AVG |
| 9 | | 6.5217 | 10.05 | 10.92 | 20.97 | 60.00 | -39.03 | QP |
| 10 | | 6.5217 | 2.06 | 10.92 | 12.98 | 50.00 | -37.02 | AVG |
| 11 | | 13.7523 | 11.77 | 12.03 | 23.80 | 60.00 | -36.20 | QP |
| 12 | | 13.7523 | 2.76 | 12.03 | 14.79 | 50.00 | -35.21 | AVG |

Neutral:

100.0 dBuV

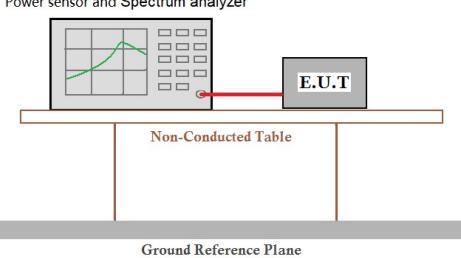


| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over |
|-----|-----|---------|---------|---------|----------|-------|------------|
| | | | Level | Factor | ment | | |
| | | MHz | dBuV | dB | dBuV | dB | Detector |
| 1 | | 0.1548 | 23.11 | 10.26 | 33.37 | 65.74 | -32.37 QP |
| 2 | | 0.1548 | 5.23 | 10.26 | 15.49 | 55.74 | -40.25 AVG |
| 3 | | 0.2280 | 18.22 | 10.21 | 28.43 | 62.52 | -34.09 QP |
| 4 | | 0.2280 | 2.64 | 10.21 | 12.85 | 52.52 | -39.67 AVG |
| 5 | * | 0.5868 | 15.22 | 10.48 | 25.70 | 56.00 | -30.30 QP |
| 6 | | 0.5868 | 2.43 | 10.48 | 12.91 | 46.00 | -33.09 AVG |
| 7 | | 1.0587 | 8.52 | 10.80 | 19.32 | 56.00 | -36.68 QP |
| 8 | | 1.0587 | -0.99 | 10.80 | 9.81 | 46.00 | -36.19 AVG |
| 9 | | 5.9133 | 8.24 | 10.91 | 19.15 | 60.00 | -40.85 QP |
| 10 | | 5.9133 | -0.17 | 10.91 | 10.74 | 50.00 | -39.26 AVG |
| 11 | | 14.4660 | 12.76 | 12.13 | 24.89 | 60.00 | -35.11 QP |
| 12 | | 14.4660 | 2.28 | 12.13 | 14.41 | 50.00 | -35.59 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

6.2. Conducted Peak Output Power

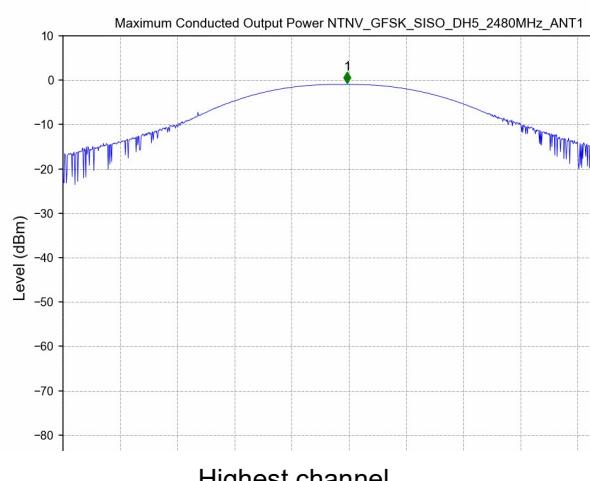
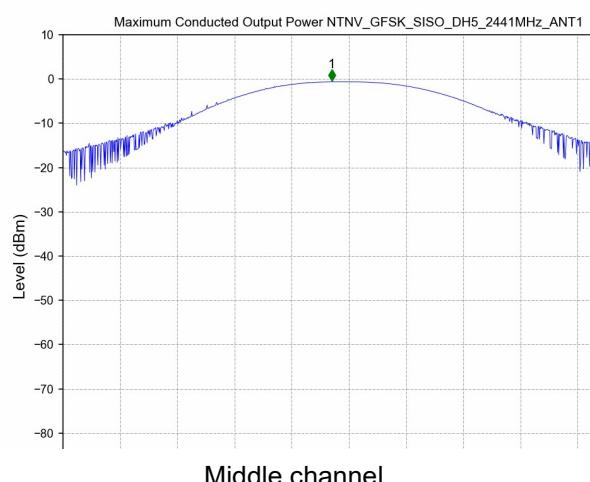
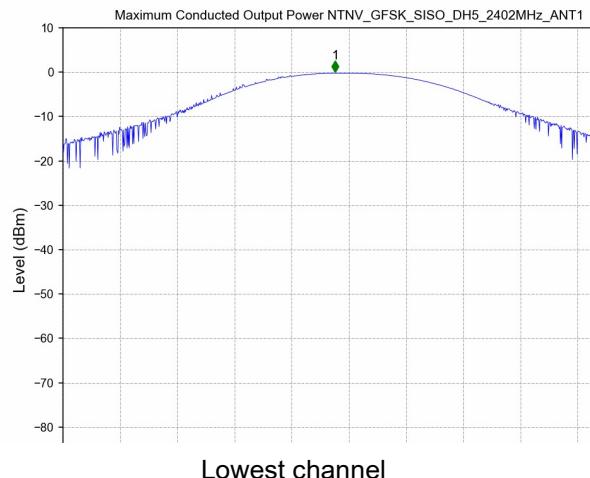
| | | | | | | |
|-------------------|--|-------|---------|-----|---------|----------|
| Test Requirement: | FCC Part15 C Section 15.247 (b)(3) | | | | | |
| Test Method: | ANSI C63.10:2013 | | | | | |
| Limit: | 30dBm(for GFSK),20.97dBm(for EDR) | | | | | |
| Test setup: | <p>Power sensor and Spectrum analyzer</p>  | | | | | |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.2 for details | | | | | |
| Test results: | Pass | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

Measurement Data

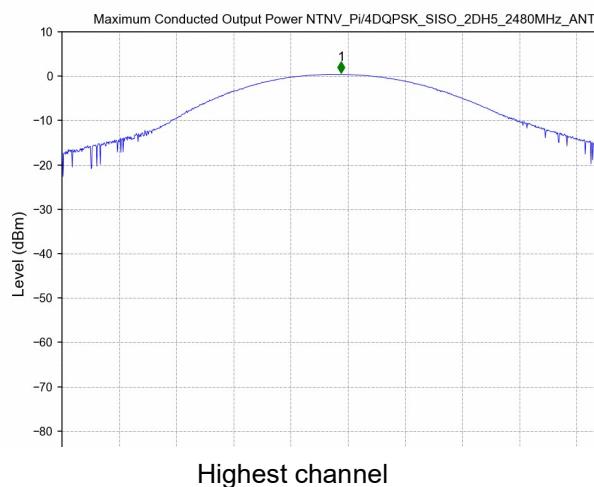
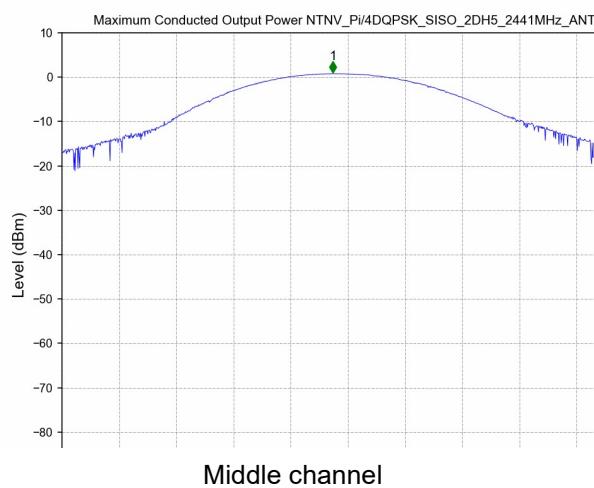
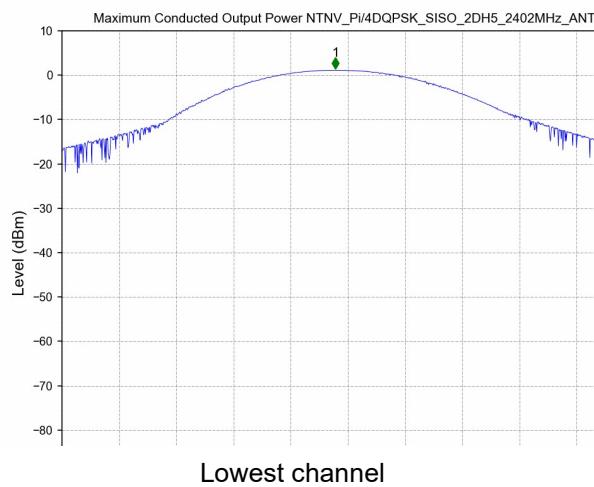
| Mode | Test channel | Peak Output Power (dBm) | Limit (dBm) | Result |
|-----------|--------------|-------------------------|-------------|--------|
| GFSK | Lowest | -0.26 | 30.00 | Pass |
| | Middle | -0.64 | | |
| | Highest | -0.95 | | |
| π/4-DQPSK | Lowest | 1.12 | 20.97 | Pass |
| | Middle | 0.77 | | |
| | Highest | 0.40 | | |
| 8-DPSK | Lowest | 1.11 | 20.97 | Pass |
| | Middle | 0.79 | | |
| | Highest | 0.43 | | |

Test plot as follows:

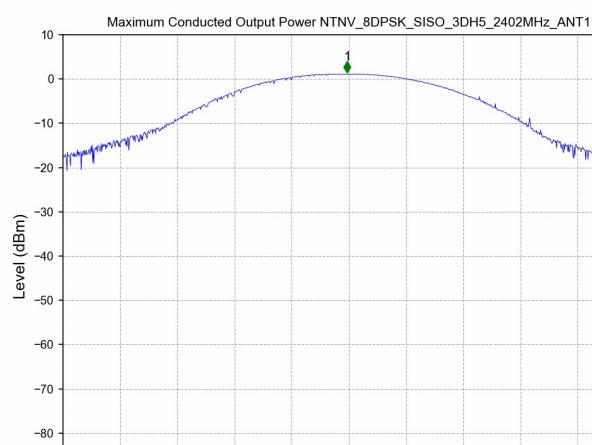
| Test mode: | GFSK mode |
|------------|-----------|
|------------|-----------|



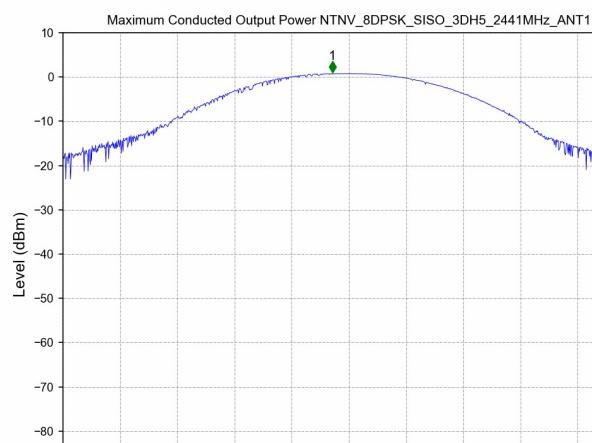
Test mode:

 $\pi/4$ -DQPSK mode

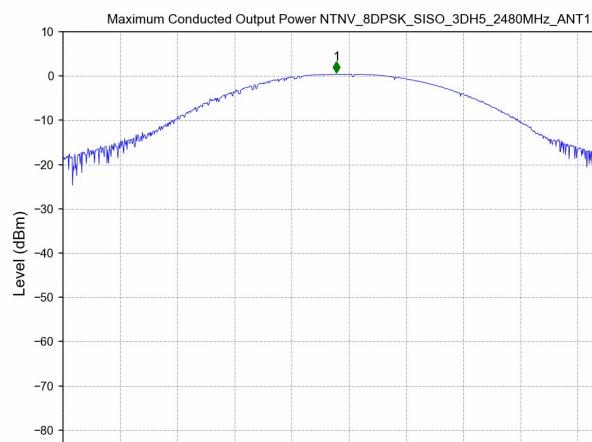
| | |
|------------|-------------|
| Test mode: | 8-DPSK mode |
|------------|-------------|



Lowest channel

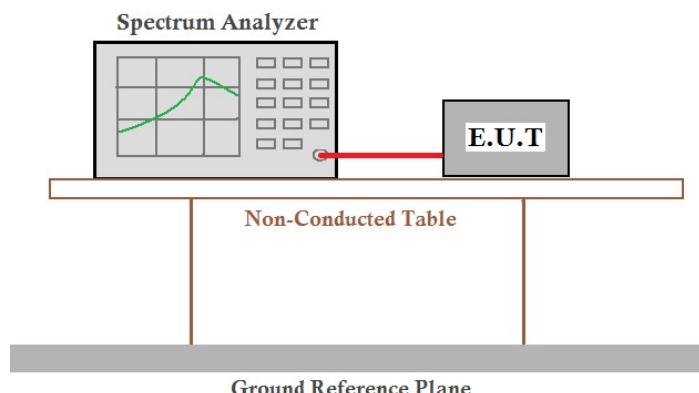


Middle channel



Highest channel

6.3. 20dB Emission Bandwidth

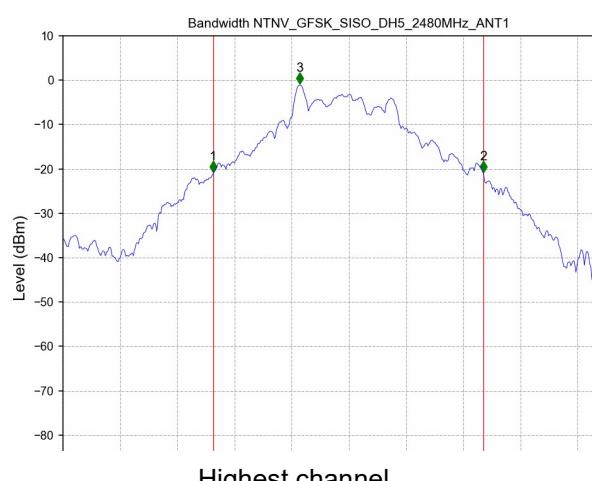
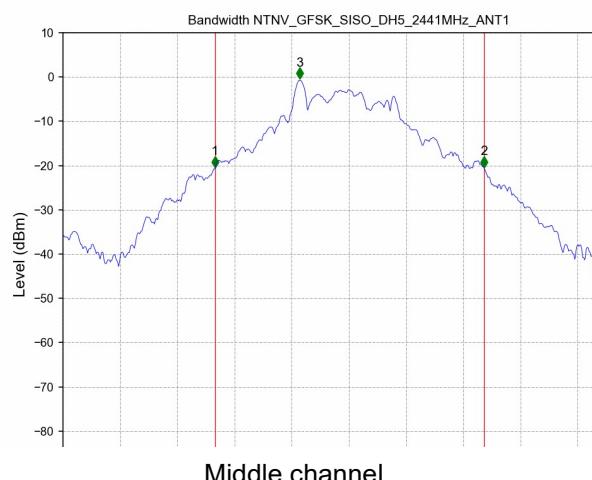
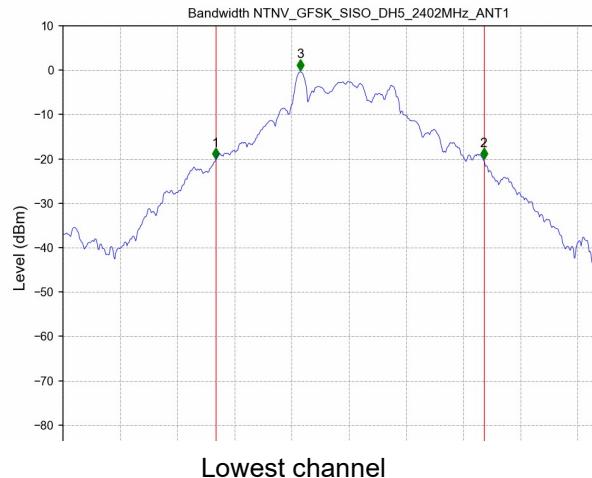
| | | | | | | |
|-------------------|--|-------|---------|-----|---------|----------|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(2) | | | | | |
| Test Method: | ANSI C63.10:2013 | | | | | |
| Limit: | N/A | | | | | |
| Test setup: |  | | | | | |
| Test Instruments: | Refer to section 6.0 for details | | | | | |
| Test mode: | Refer to section 5.2 for details | | | | | |
| Test results: | Pass | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

Measurement Data

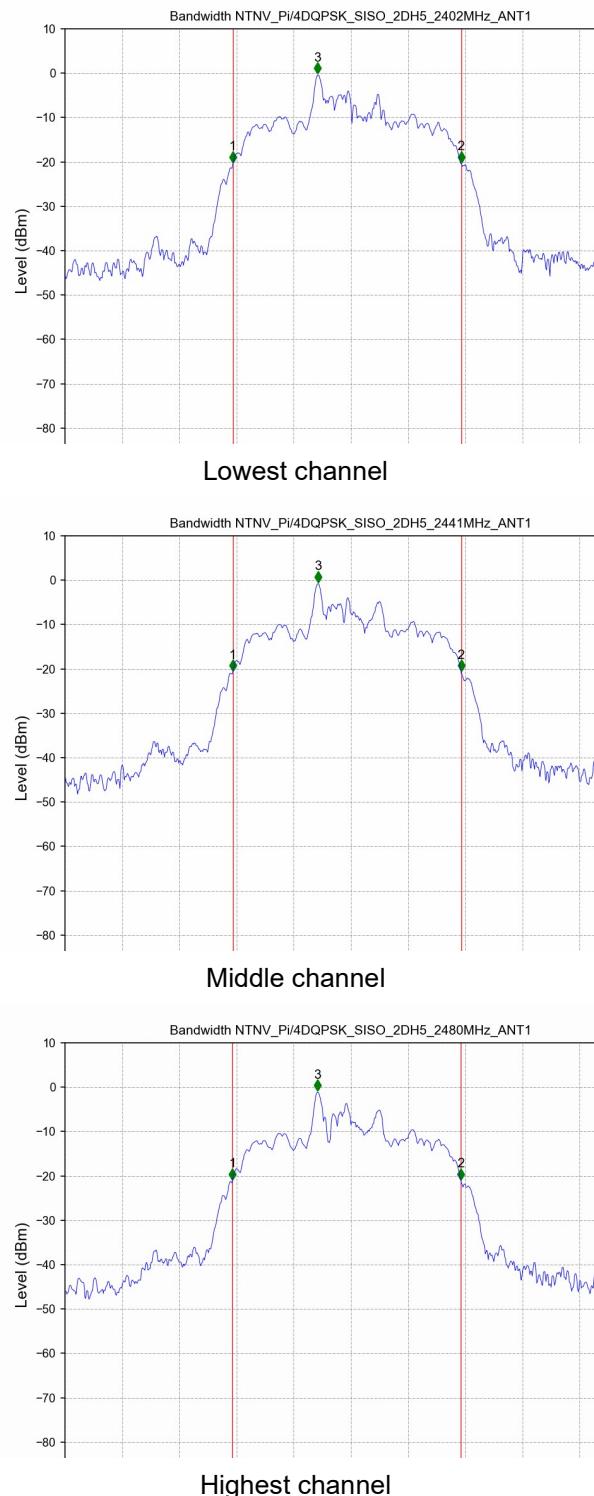
| Mode | Test channel | 20dB Emission Bandwidth (MHz) | Result |
|----------------|--------------|-------------------------------|--------|
| GFSK | Lowest | 0.938 | Pass |
| | Middle | 0.941 | |
| | Highest | 0.945 | |
| $\pi/4$ -DQPSK | Lowest | 1.197 | Pass |
| | Middle | 1.198 | |
| | Highest | 1.199 | |
| 8-DPSK | Lowest | 1.205 | Pass |
| | Middle | 1.238 | |
| | Highest | 1.207 | |

Test plot as follows:

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

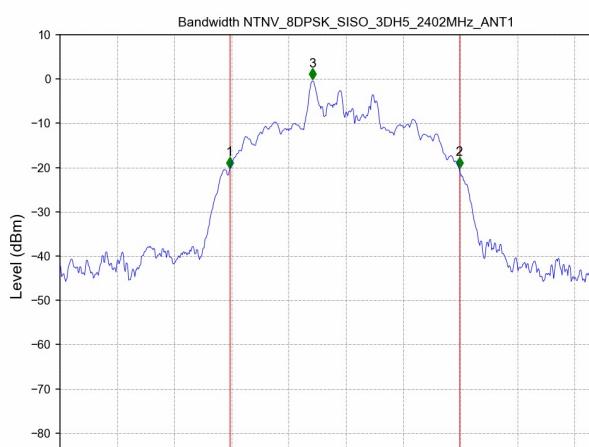


Test mode:

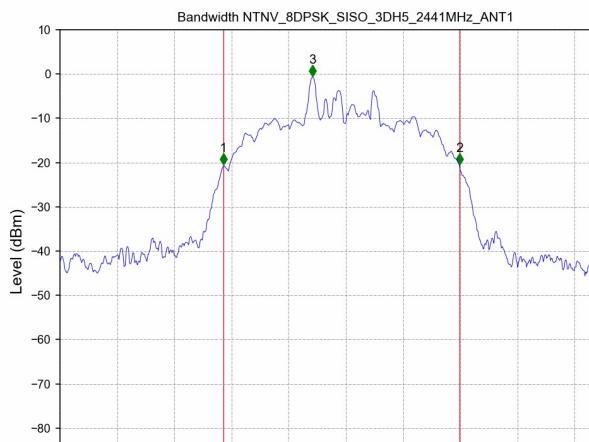
 $\pi/4$ -DQPSK mode


Test mode:

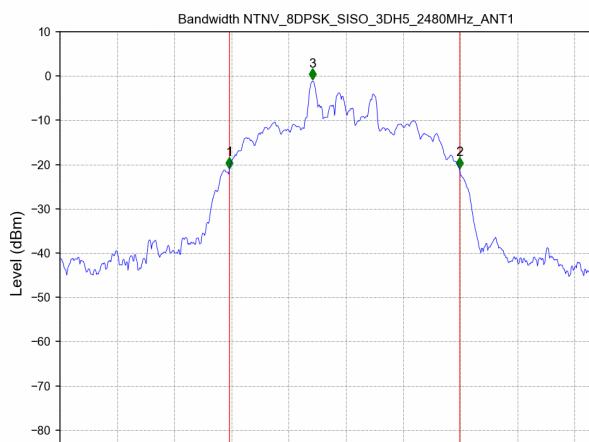
8-DPSK mode



Lowest channel

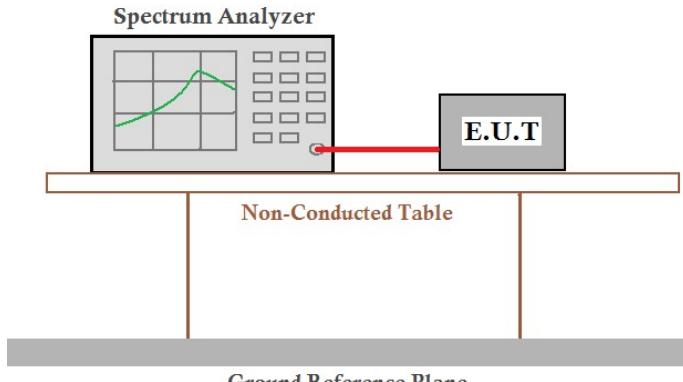


Middle channel



Highest channel

6.4. Frequencies Separation

| | | | | | | |
|-------------------|---|-------|---------|-----|---------|----------|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1) | | | | | |
| Test Method: | ANSI C63.10:2013 | | | | | |
| Receiver setup: | RBW=300KHz, VBW=300KHz, detector=Peak | | | | | |
| Limit: | GFSK: 20dB bandwidth $\pi/4$ -DQPSK : 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 | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

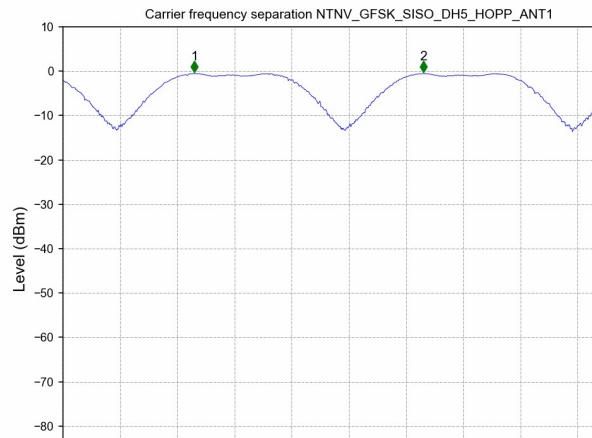
Measurement Data

| Mode | Test channel | Frequencies Separation (MHz) | Limit (kHz) | Result |
|----------------|--------------|------------------------------|-----------------------------------|--------|
| GFSK | Middle | 1.000 | 25KHz or 2/3*20dB bandwidth | Pass |
| $\pi/4$ -DQPSK | Middle | 0.954 | 25KHz or 2/3*20dB bandwidth | Pass |
| 8-DPSK | Middle | 0.999 | 25KHz or 2/3*20dB bandwidth | Pass |

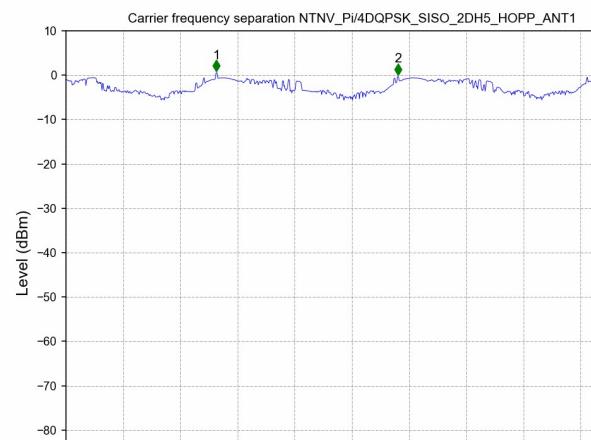
Remark: We have tested all mode at high, middle and low channel, and recorded worst case at middle

Test plot as follows:

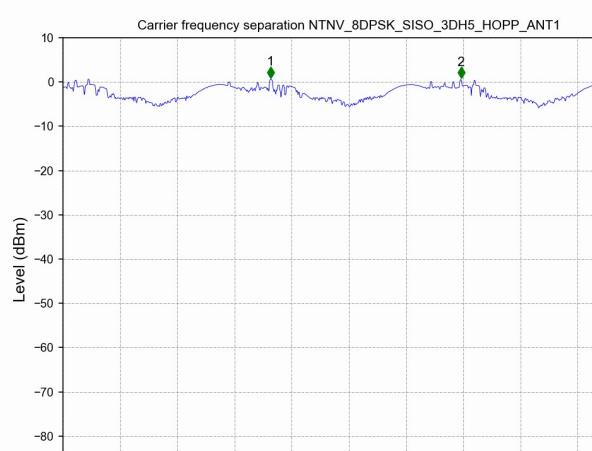
| | |
|------------------|------|
| Modulation mode: | GFSK |
|------------------|------|



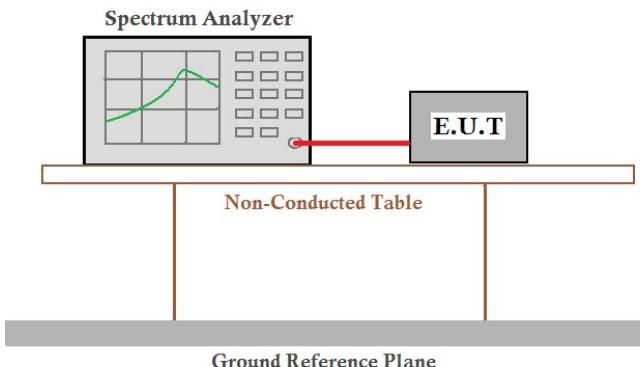
| | |
|------------|----------------|
| Test mode: | $\pi/4$ -DQPSK |
|------------|----------------|



| | |
|------------------|--------|
| Modulation mode: | 8-DPSK |
|------------------|--------|



6.5. Hopping Channel Number

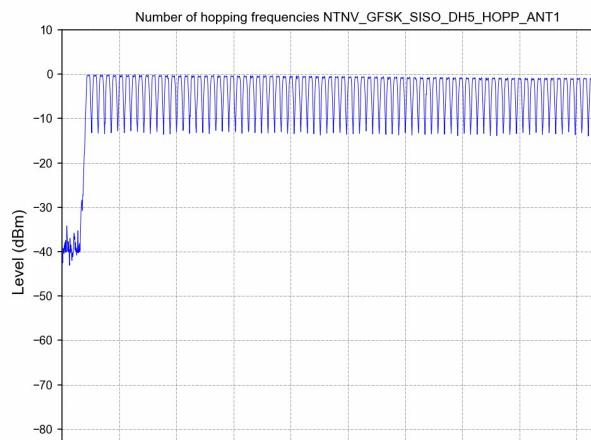
| | | | | | | |
|-------------------|--|-------|---------|-----|---------|----------|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) | | | | | |
| Test Method: | ANSI C63.10:2013 | | | | | |
| Receiver setup: | RBW=300kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak | | | | | |
| 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 | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

Measurement Data:

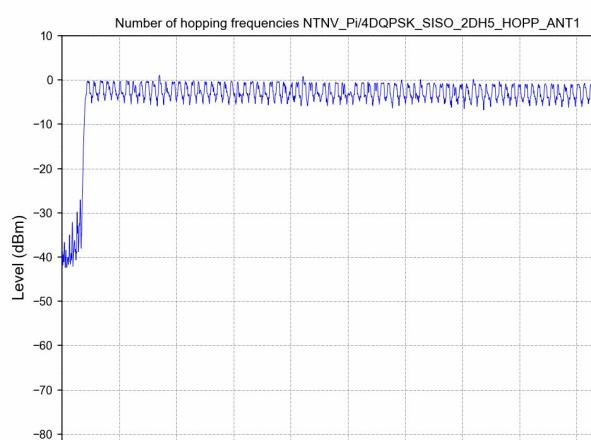
| Mode | Hopping channel numbers | Limit | Result |
|----------------|-------------------------|-----------|--------|
| GFSK | 79 | | Pass |
| $\pi/4$ -DQPSK | 79 | ≥ 15 | Pass |
| 8-DPSK | 79 | | Pass |

Test plot as follows:

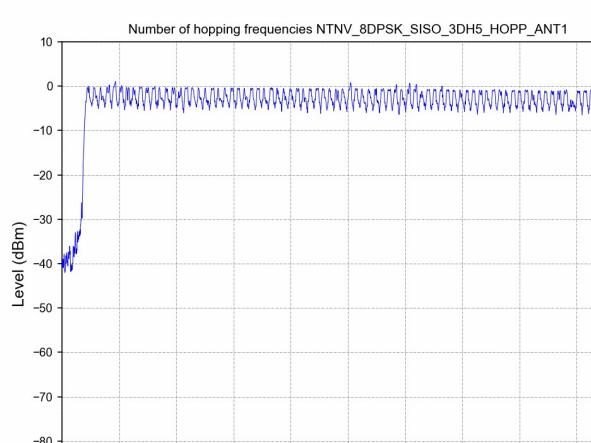
| | |
|------------|------|
| Test mode: | GFSK |
|------------|------|



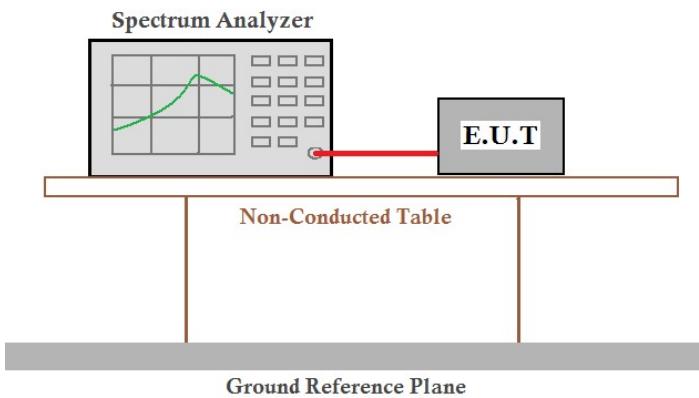
| | |
|------------|----------------|
| Test mode: | $\pi/4$ -DQPSK |
|------------|----------------|



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



6.6. Dwell Time

| | | | | | | |
|-------------------|--|-------|---------|-----|---------|----------|
| Test Requirement: | FCC Part15 C Section 15.247 (a)(1)(iii) | | | | | |
| Test Method: | ANSI C63.10:2013 | | | | | |
| Receiver setup: | RBW=910KHz, VBW=910KHz, 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 | | | | | |
| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

**Measurement Data****GFSK mode:**

| Frequency | Packet | Pulse time (ms) | Dwell time(ms) | Limit(ms) | Result |
|-----------|--------|-----------------|----------------|-----------|--------|
| Hopping | DH1 | 0.453 | 144.960 | 400 | Pass |
| Hopping | DH3 | 1.672 | 265.848 | 400 | Pass |
| Hopping | DH5 | 2.957 | 319.356 | 400 | Pass |

Note:We have tested all mode at high,middle and low channel, and recorded worst case at middle channel.

Dwell time=Pulse time (ms) \times (1600 \div 2 \div 79) \times 31.6 Second for DH1, 2-DH1, 3-DH1

Dwell time=Pulse time (ms) \times (1600 \div 4 \div 79) \times 31.6 Second for DH3, 2-DH3, 3-DH3

Dwell time=Pulse time (ms) \times (1600 \div 6 \div 79) \times 31.6 Second for DH5, 2-DH5, 3-DH5

 $\pi/4$ -DQPSK mode:

| Frequency | Packet | Pulse time (ms) | Dwell time(ms) | Limit(ms) | Result |
|-----------|--------|-----------------|----------------|-----------|--------|
| Hopping | 2DH1 | 0.458 | 146.560 | 400 | Pass |
| Hopping | 2DH3 | 1.709 | 254.641 | 400 | Pass |
| Hopping | 2DH5 | 2.909 | 287.991 | 400 | Pass |

Note:We have tested all mode at high,middle and low channel, and recorded worst case at middle channel.

Dwell time=Pulse time (ms) \times (1600 \div 2 \div 79) \times 31.6 Second for DH1, 2-DH1, 3-DH1

Dwell time=Pulse time (ms) \times (1600 \div 4 \div 79) \times 31.6 Second for DH3, 2-DH3, 3-DH3

Dwell time=Pulse time (ms) \times (1600 \div 6 \div 79) \times 31.6 Second for DH5, 2-DH5, 3-DH5

8-DPSK mode:

| Frequency | Packet | Pulse time (ms) | Dwell time(ms) | Limit(ms) | Result |
|-----------|--------|-----------------|----------------|-----------|--------|
| Hopping | 3DH1 | 0.457 | 146.240 | 400 | Pass |
| Hopping | 3DH3 | 1.709 | 263.186 | 400 | Pass |
| Hopping | 3DH5 | 2.959 | 307.736 | 400 | Pass |

Note:We have tested all mode at high,middle and low channel, and recorded worst case at middle channel.

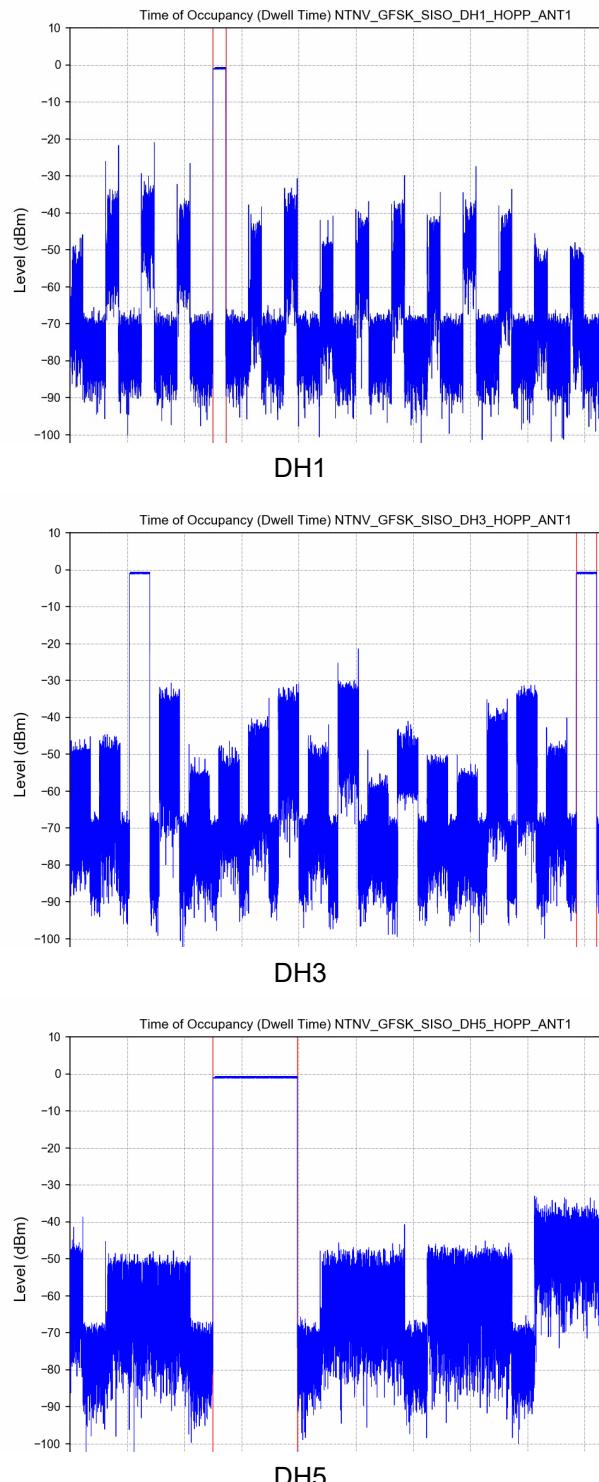
Dwell time=Pulse time (ms) \times (1600 \div 2 \div 79) \times 31.6 Second for DH1, 2-DH1, 3-DH1

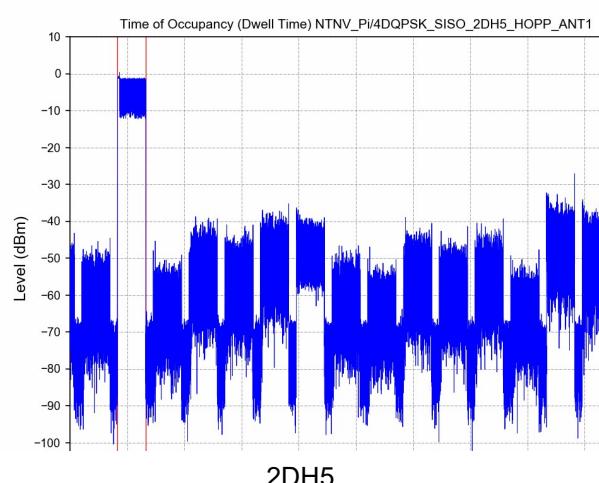
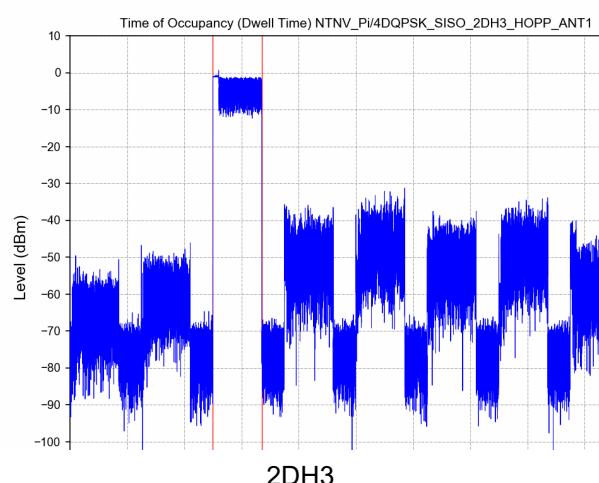
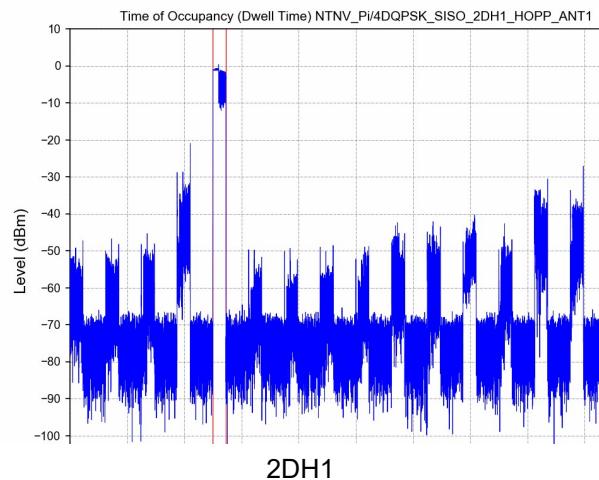
Dwell time=Pulse time (ms) \times (1600 \div 4 \div 79) \times 31.6 Second for DH3, 2-DH3, 3-DH3

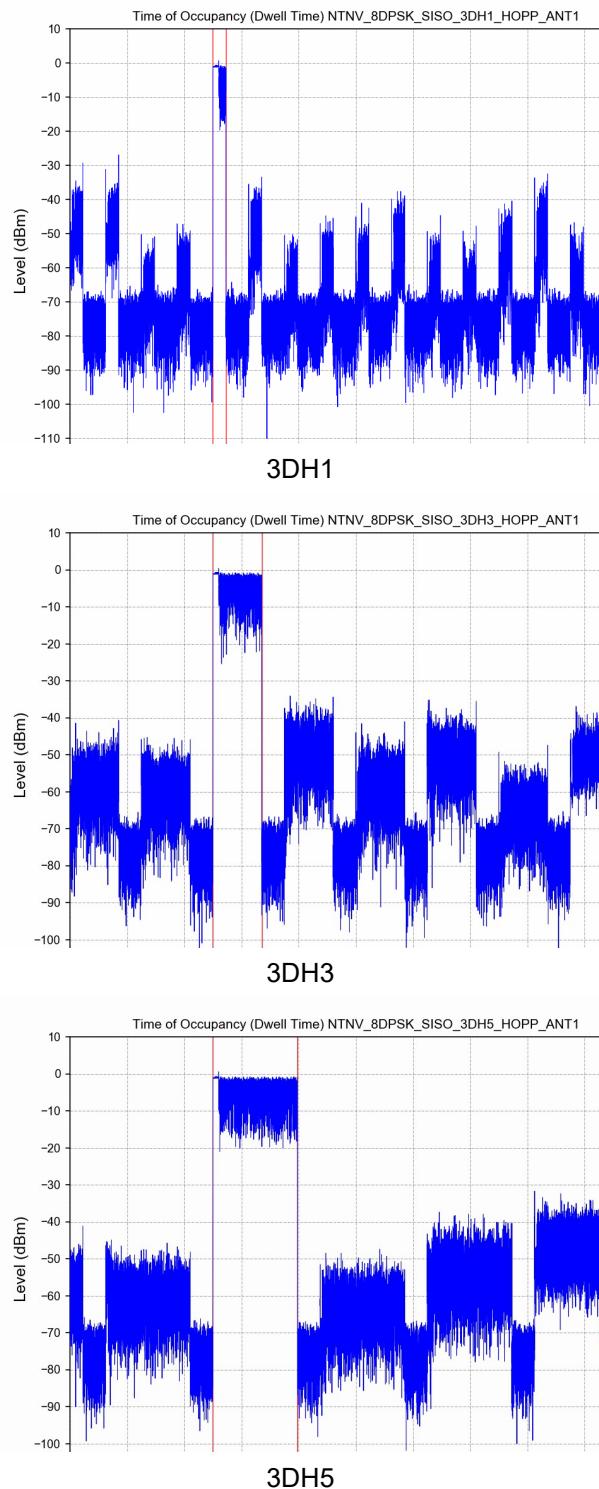
Dwell time=Pulse time (ms) \times (1600 \div 6 \div 79) \times 31.6 Second for DH5, 2-DH5, 3-DH5

Test plot as follows:

GFSK mode

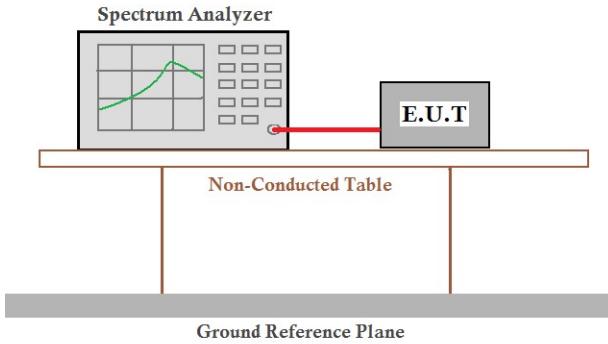


$\pi/4$ -DQPSK mode

8-DPSK mode

6.7. Band Edge

6.7.1. 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 environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |

Test plot as follows:
GFSK Mode:
