

## TEST REPORT

**Product** : uKit Robot  
**Trade mark** : UBTECH  
**Model/Type reference** : ERUB101, ERUwxyy  
**Serial Number** : N/A  
**Report Number** : EED32L00034201  
**FCC ID** : 2AHJX-UKITERU  
**Date of Issue** : Apr. 02, 2019  
**Test Standards** : 47 CFR Part 15 Subpart C  
**Test result** : PASS

Prepared for:

**UBTECH ROBOTICS CORP LTD**

**16th and 22nd Floor, Block C1, Nanshan I Park, No.1001 Xueyuan Road,  
Nanshan District, Shenzhen City, P.R.CHINA**

Prepared by:

**Centre Testing International Group Co., Ltd.  
Hongwei Industrial Zone, Bao'an 70 District,  
Shenzhen, Guangdong, China**

**TEL: +86-755-3368 3668**

**FAX: +86-755-3368 3385**

Tested By:

*Jay Zheng*

Jay Zheng

Compiled by:

*Kevin Lan*

Kevin Lan

Reviewed by:

*Ware Xin*

Ware Xin

Approved by:

*Kevin Yang*

Kevin Yang

Date:

Apr. 02, 2019



Check No.: 3096316262

## 2 Version

| Version No. | Date          | Description |
|-------------|---------------|-------------|
| 00          | Apr. 02, 2019 | Original    |
|             |               |             |
|             |               |             |

### 3 Test Summary

| Test Item                               | Test Requirement                                                               | Test method      | Result |
|-----------------------------------------|--------------------------------------------------------------------------------|------------------|--------|
| Antenna Requirement                     | 47 CFR Part 15 Subpart C Section 15.203/15.247 (c)                             | ANSI C63.10-2013 | PASS   |
| AC Power Line Conducted Emission        | 47 CFR Part 15 Subpart C Section 15.207                                        | ANSI C63.10-2013 | PASS   |
| Conducted Peak Output Power             | 47 CFR Part 15 Subpart C Section 15.247 (b)(1)                                 | ANSI C63.10-2013 | PASS   |
| 20dB Occupied Bandwidth                 | 47 CFR Part 15 Subpart C Section 15.247 (a)(1)                                 | ANSI C63.10-2013 | PASS   |
| Carrier Frequencies Separation          | 47 CFR Part 15 Subpart C Section 15.247 (a)(1)                                 | ANSI C63.10-2013 | PASS   |
| Hopping Channel Number                  | 47 CFR Part 15 Subpart C Section 15.247 (b)                                    | ANSI C63.10-2013 | PASS   |
| Dwell Time                              | 47 CFR Part 15 Subpart C Section 15.247 (a)(1)                                 | ANSI C63.10-2013 | PASS   |
| Pseudorandom Frequency Hopping Sequence | 47 CFR Part 15 Subpart C Section 15.247(b)(4)&TCB Exclusion List (7 July 2002) | ANSI C63.10-2013 | PASS   |
| RF Conducted Spurious Emissions         | 47 CFR Part 15 Subpart C Section 15.247(d)                                     | ANSI C63.10-2013 | PASS   |
| Radiated Spurious emissions             | 47 CFR Part 15 Subpart C Section 15.205/15.209                                 | ANSI C63.10-2013 | PASS   |

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested samples and the sample information are provided by the client.

Model No.: ERUB101, ERUwxyy

Only the model ERUB101 was tested, ERUwxyy(" w "can be a-z, indicating the product version; "x" can be 0-9, indicating the product category; "y" can be 0-9, indicating the product attributes.).All models are identical in interior structure, electrical circuits and components, only different from model name and color.

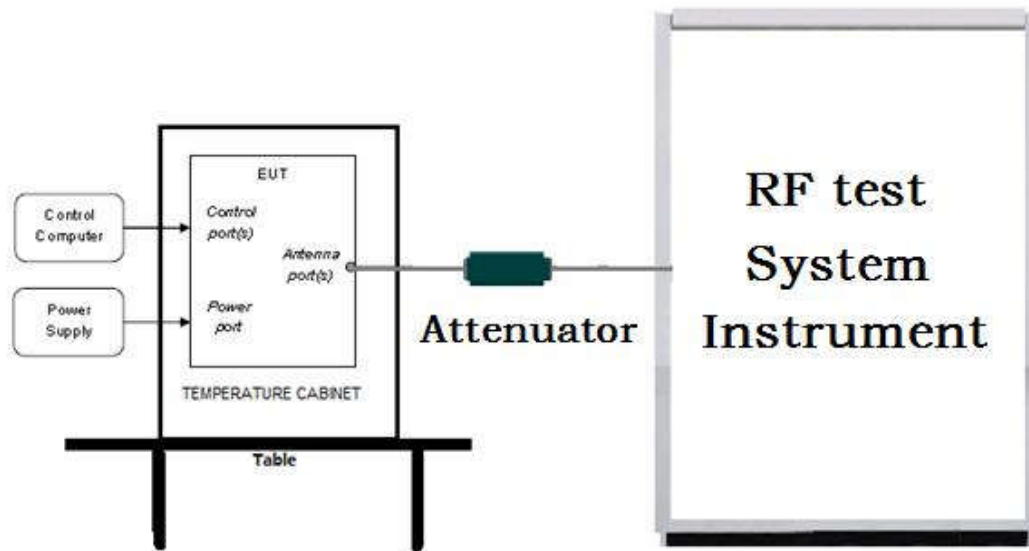
## 4 Content

|                                                                            |           |
|----------------------------------------------------------------------------|-----------|
| <b>1 COVER PAGE.....</b>                                                   | <b>1</b>  |
| <b>2 VERSION.....</b>                                                      | <b>2</b>  |
| <b>3 TEST SUMMARY.....</b>                                                 | <b>3</b>  |
| <b>4 CONTENT.....</b>                                                      | <b>4</b>  |
| <b>5 TEST REQUIREMENT.....</b>                                             | <b>5</b>  |
| 5.1 TEST SETUP.....                                                        | 5         |
| 5.1.1 For Conducted test setup.....                                        | 5         |
| 5.1.2 For Radiated Emissions test setup.....                               | 5         |
| 5.1.3 For Conducted Emissions test setup.....                              | 6         |
| 5.2 TEST ENVIRONMENT.....                                                  | 6         |
| 5.3 TEST CONDITION.....                                                    | 6         |
| <b>6 GENERAL INFORMATION.....</b>                                          | <b>7</b>  |
| 6.1 CLIENT INFORMATION.....                                                | 7         |
| 6.2 GENERAL DESCRIPTION OF EUT.....                                        | 7         |
| 6.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD.....                 | 7         |
| 6.4 DESCRIPTION OF SUPPORT UNITS.....                                      | 8         |
| 6.5 TEST LOCATION.....                                                     | 8         |
| 6.6 DEVIATION FROM STANDARDS.....                                          | 8         |
| 6.7 ABNORMALITIES FROM STANDARD CONDITIONS.....                            | 8         |
| 6.8 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....                       | 8         |
| 6.9 MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2).....              | 9         |
| <b>7 EQUIPMENT LIST.....</b>                                               | <b>10</b> |
| <b>8 RADIO TECHNICAL REQUIREMENTS SPECIFICATION.....</b>                   | <b>14</b> |
| Appendix A): 20dB Occupied Bandwidth.....                                  | 15        |
| Appendix B): Carrier Frequency Separation.....                             | 19        |
| Appendix C): Dwell Time.....                                               | 23        |
| Appendix D): Hopping Channel Number.....                                   | 27        |
| Appendix E): Conducted Peak Output Power.....                              | 29        |
| Appendix F): Band-edge for RF Conducted Emissions.....                     | 33        |
| Appendix G): RF Conducted Spurious Emissions.....                          | 38        |
| Appendix H): Pseudorandom Frequency Hopping Sequence.....                  | 45        |
| Appendix I): Antenna Requirement.....                                      | 46        |
| Appendix J): AC Power Line Conducted Emission.....                         | 47        |
| Appendix K): Restricted bands around fundamental frequency (Radiated)..... | 50        |
| Appendix L): Radiated Spurious Emissions.....                              | 64        |
| <b>PHOTOGRAPHS OF TEST SETUP.....</b>                                      | <b>72</b> |
| <b>PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS.....</b>                      | <b>74</b> |

## 5 Test Requirement

### 5.1 Test setup

#### 5.1.1 For Conducted test setup



#### 5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

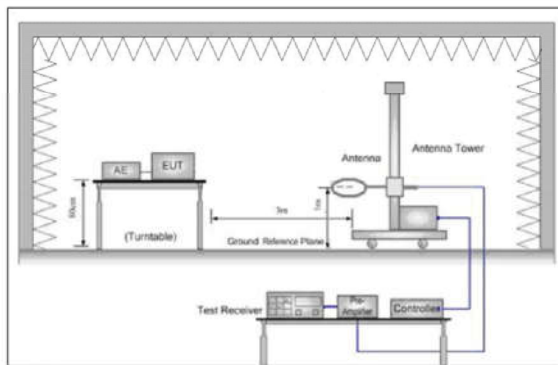


Figure 1. Below 30MHz

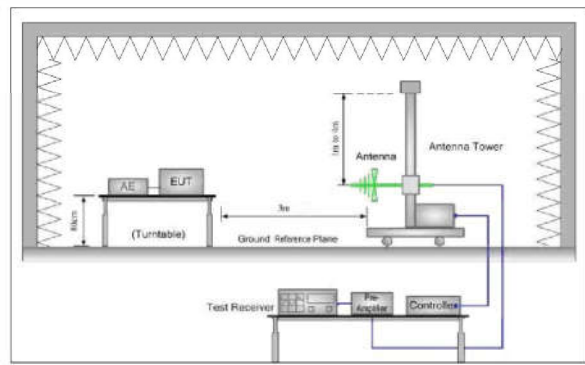


Figure 2. 30MHz to 1GHz

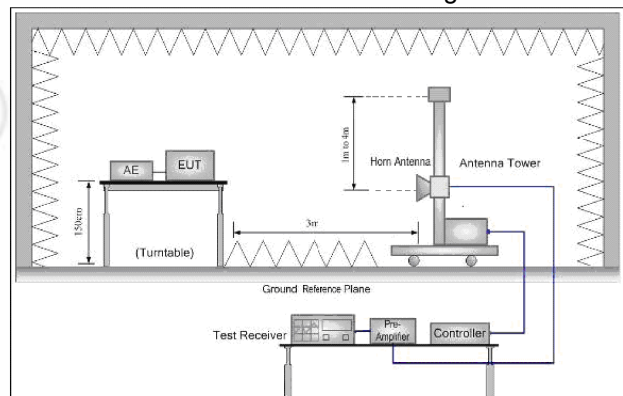
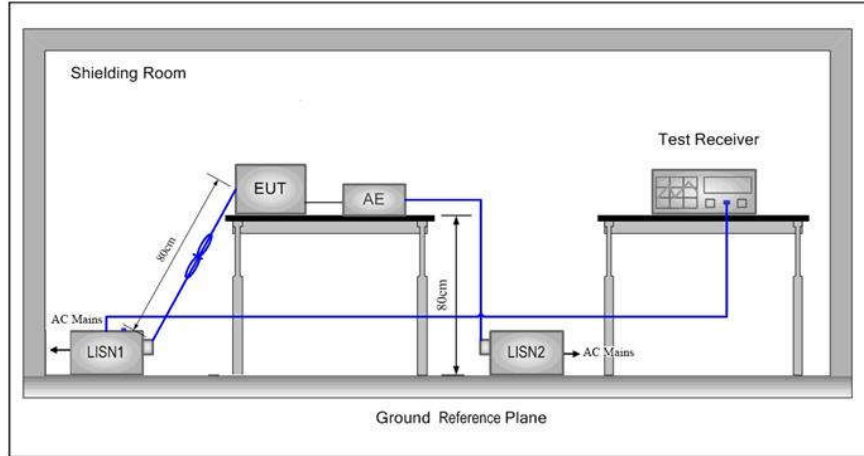


Figure 3. Above 1GHz

### 5.1.3 For Conducted Emissions test setup

#### Conducted Emissions setup



## 5.2 Test Environment

| Operating Environment for RF test: |        |
|------------------------------------|--------|
| Temperature:                       | 26°C   |
| Humidity:                          | 54% RH |
| Atmospheric Pressure:              | 101kPa |

## 5.3 Test Condition

| Test Mode                                   | Tx              | RF Channel |            |           |
|---------------------------------------------|-----------------|------------|------------|-----------|
|                                             |                 | Low(L)     | Middle(M)  | High(H)   |
| GFSK/ $\pi$ /4DQPSK/<br>8DPSK(DH1,DH3, DH5) | 2402MHz~2480MHz | Channel 1  | Channel 40 | Channel79 |
|                                             |                 | 2402MHz    | 2441MHz    | 2480MHz   |

TX mode: The EUT transmitted the continuous signal at the specific channel(s).  
Charging mode: Charging the EUT through charger.

Test mode:

**Pre-scan under all rate at Lowest channel 1**

| Mode       | GFSK   |        |        |
|------------|--------|--------|--------|
| packets    | 1-DH1  | 1-DH3  | 1-DH5  |
| Power(dBm) | -1.987 | -1.980 | -1.971 |

| Mode       | $\pi$ /4DQPSK |        |        |
|------------|---------------|--------|--------|
| packets    | 2-DH1         | 2-DH3  | 2-DH5  |
| Power(dBm) | -1.701        | -1.694 | -1.690 |
| Mode       | 8DPSK         |        |        |
| packets    | 3-DH1         | 3-DH3  | 3-DH5  |
| Power(dBm) | -1.519        | -1.512 | -1.503 |

Through Pre-scan, 1-DH5 packet the power is the worst case of GFSK, 2-DH5 packet the power is the worst case of  $\pi$ /4DQPSK, 3-DH5 packet the power is the worst case of 8DPSK.

## 6 General Information

### 6.1 Client Information

|                          |                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------|
| Applicant:               | UBTECH ROBOTICS CORP LTD                                                                                          |
| Address of Applicant:    | 16th and 22nd Floor, Block C1, Nanshan I Park, No.1001 Xueyuan Road, Nanshan District, Shenzhen City, P.R.CHINA   |
| Manufacturer:            | UBTECH ROBOTICS CORP LTD                                                                                          |
| Address of Manufacturer: | 16th and 22nd Floor, Block C1, Nanshan I Park, No.1001 Xueyuan Road, Nanshan District, Shenzhen City, P.R.CHINA   |
| Factory:                 | UBTECH ROBOTICS CORP LTD BAOAN BRANCH                                                                             |
| Address of Factory:      | 1-2 Floor, B Block, Huilongda Industry Park, Shilongzai, Shiyuan Street, Baoan District, Shenzhen City, P.R.CHINA |

### 6.2 General Description of EUT

|                                  |                                |                                                                                    |
|----------------------------------|--------------------------------|------------------------------------------------------------------------------------|
| Product Name:                    | uKit Robot                     |                                                                                    |
| Model No.:                       | ERUB101, ERUwxyy               |                                                                                    |
| Test Model No.:                  | ERUB101                        |                                                                                    |
| Trade mark:                      | UBTECH                         |                                                                                    |
| EUT Supports Radios application: | BT 4.0 Dual mode, 2402-2480MHz |                                                                                    |
| Power Supply:                    | AC Adapter                     | Model: PS1012-096HIB100<br>Input: 100-240V~ 50/60Hz, 0.4A<br>Output: 9.6V --- 1.0A |
|                                  | Battery                        | Lithium-ion Ploymer Battery:1200mAh 7.4V                                           |
| Sample Received Date:            | Feb. 28, 2019                  |                                                                                    |
| Sample tested Date:              | Mar. 13, 2019 to Mar. 28, 2019 |                                                                                    |

### 6.3 Product Specification subjective to this standard

|                                     |                                         |         |           |         |           |         |           |
|-------------------------------------|-----------------------------------------|---------|-----------|---------|-----------|---------|-----------|
| Operation Frequency:                | 2402MHz~2480MHz                         |         |           |         |           |         |           |
| Bluetooth Version:                  | 3.0+EDR                                 |         |           |         |           |         |           |
| Modulation Technique:               | Frequency Hopping Spread Spectrum(FHSS) |         |           |         |           |         |           |
| Modulation Type:                    | GFSK, $\pi/4$ DQPSK, 8DPSK              |         |           |         |           |         |           |
| Number of Channel:                  | 79                                      |         |           |         |           |         |           |
| Hopping Channel Type:               | Adaptive Frequency Hopping systems      |         |           |         |           |         |           |
| Hardware Version:                   | 1.5(manufacturer declare)               |         |           |         |           |         |           |
| Software Version:                   | 1.77(manufacturer declare)              |         |           |         |           |         |           |
| Test Power Grade:                   | N/A                                     |         |           |         |           |         |           |
| Test Software of EUT:               | ISRT_V2.1.26.4392(manufacturer declare) |         |           |         |           |         |           |
| Antenna Type:                       | PCB antenna                             |         |           |         |           |         |           |
| Antenna Gain:                       | 1dBi                                    |         |           |         |           |         |           |
| Test Voltage:                       | AC 120V, 60Hz                           |         |           |         |           |         |           |
| 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 |    |         |

#### 6.4 Description of Support Units

The EUT has been tested independently.

#### 6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

#### 6.6 Deviation from Standards

None.

#### 6.7 Abnormalities from Standard Conditions

None.

#### 6.8 Other Information Requested by the Customer

None.

## 6.9 Measurement Uncertainty (95% confidence levels, k=2)

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Radio Frequency                 | $7.9 \times 10^{-8}$    |
| 2   | RF power, conducted             | 0.46dB (30MHz-1GHz)     |
|     |                                 | 0.55dB (1GHz-18GHz)     |
| 3   | Radiated Spurious emission test | 4.3dB (30MHz-1GHz)      |
|     |                                 | 4.5dB (1GHz-12.75GHz)   |
| 4   | Conduction emission             | 3.5dB (9kHz to 150kHz)  |
|     |                                 | 3.1dB (150kHz to 30MHz) |
| 5   | Temperature test                | 0.64°C                  |
| 6   | Humidity test                   | 3.8%                    |
| 7   | DC power voltages               | 0.026%                  |

## 7 Equipment List

| RF test system                   |                   |                                  |               |                        |                            |
|----------------------------------|-------------------|----------------------------------|---------------|------------------------|----------------------------|
| Equipment                        | Manufacturer      | Model No.                        | Serial Number | Cal. Date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| Signal Generator                 | Keysight          | E8257D                           | MY53401106    | 03-01-2019             | 02-29-2020                 |
| Spectrum Analyzer                | Keysight          | N9010A                           | MY54510339    | 03-01-2019             | 02-29-2020                 |
| Signal Generator                 | Keysight          | N5182B                           | MY53051549    | 03-01-2019             | 02-29-2020                 |
| High-pass filter                 | Sinoscite         | FL3CX03WG1<br>8NM12-0398-0<br>02 | ---           | 01-09-2019             | 01-08-2020                 |
| High-pass filter                 | MICRO-TRO<br>NICS | SPA-F-63029-4                    | ---           | 01-09-2019             | 01-08-2020                 |
| DC Power                         | Keysight          | E3642A                           | MY54426035    | 03-01-2019             | 02-29-2020                 |
| PC-1                             | Lenovo            | R4960d                           | ---           | 03-01-2019             | 02-29-2020                 |
| BT&WI-FI Automatic control       | R&S               | OSP120                           | 101374        | 03-01-2019             | 02-29-2020                 |
| RF control unit                  | JS Tonscend       | JS0806-2                         | 15860006      | 03-01-2019             | 02-29-2020                 |
| RF control unit                  | JS Tonscend       | JS0806-1                         | 15860004      | 03-01-2019             | 02-29-2020                 |
| RF control unit                  | JS Tonscend       | JS0806-4                         | 158060007     | 03-01-2019             | 02-29-2020                 |
| BT&WI-FI Automatic test software | JS Tonscend       | JS1120-2                         | ---           | 03-01-2019             | 02-29-2020                 |
| Temperature/ Humidity Indicator  | biaozhi           | HM10                             | 1804186       | 10-12-2018             | 10-11-2019                 |

| Conducted disturbance Test            |              |                             |                |                        |                            |
|---------------------------------------|--------------|-----------------------------|----------------|------------------------|----------------------------|
| Equipment                             | Manufacturer | Model No.                   | Serial Number  | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| Receiver                              | R&S          | ESCI                        | 100435         | 05-25-2018             | 05-24-2019                 |
| Temperature/<br>Humidity<br>Indicator | Defu         | TH128                       | /              | 07-02-2018             | 07-01-2019                 |
| Communication<br>test set             | Agilent      | E5515C                      | GB47050<br>534 | 03-01-2019             | 02-29-2020                 |
| Communication<br>test set             | R&S          | CMW500                      | 102898         | 01-18-2019             | 01-17-2020                 |
| LISN                                  | R&S          | ENV216                      | 100098         | 05-10-2018             | 05-10-2019                 |
| LISN                                  | schwarzbeck  | NNLK8121                    | 8121-529       | 05-10-2018             | 05-10-2019                 |
| Voltage Probe                         | R&S          | ESH2-Z3<br>0299.7810.5<br>6 | 100042         | 06-13-2017             | 06-11-2020                 |
| Current Probe                         | R&S          | EZ-17<br>816.2063.03        | 100106         | 05-30-2018             | 05-29-2019                 |
| ISN                                   | TESEQ        | ISN T800                    | 30297          | 01-06-2019             | 01-15-2020                 |

| 3M Semi/full-anechoic Chamber    |                  |                          |               |                        |                            |
|----------------------------------|------------------|--------------------------|---------------|------------------------|----------------------------|
| Equipment                        | Manufacturer     | Model No.                | Serial Number | Cal. date (mm-dd-yyyy) | Cal. Due date (mm-dd-yyyy) |
| 3M Chamber & Accessory Equipment | TDK              | SAC-3                    | ---           | 06-04-2016             | 06-03-2019                 |
| TRILOG Broadband Antenna         | Schwarzbeck      | VULB9163                 | 9163-401      | 12-21-2018             | 12-20-2019                 |
| TRILOG Broadband Antenna         | Schwarzbeck      | VULB9163                 | 9163-618      | 07-30-2018             | 07-29-2019                 |
| Microwave Preamplifier           | Agilent          | 8449B                    | 3008A02425    | 08-21-2018             | 08-20-2019                 |
| Microwave Preamplifier           | Tonscend         | EMC051845 SE             | 980380        | 01-16-2019             | 01-15-2020                 |
| Horn Antenna                     | Schwarzbeck      | BBHA 9120D               | 9120D-1869    | 04-25-2018             | 04-23-2021                 |
| Horn Antenna                     | ETS-LINDGREN     | 3117                     | 00057410      | 06-05-2018             | 06-03-2021                 |
| Double ridge horn antenna        | A.H.SYSTEMS      | SAS-574                  | 374           | 06-05-2018             | 06-04-2021                 |
| Pre-amplifier                    | A.H.SYSTEMS      | PAP-1840-60              | 6041.6041     | 08-08-2018             | 08-07-2019                 |
| Loop Antenna                     | ETS              | 6502                     | 00071730      | 06-22-2017             | 06-21-2019                 |
| Spectrum Analyzer                | R&S              | FSP40                    | 100416        | 05-11-2018             | 05-10-2019                 |
| Receiver                         | R&S              | ESCI                     | 100435        | 05-25-2018             | 05-24-2019                 |
| Receiver                         | R&S              | ESCI7                    | 100938-003    | 11-23-2018             | 11-22-2019                 |
| Multi device Controller          | maturo           | NCD/070/10711112         | ---           | 01-09-2019             | 01-08-2020                 |
| LISN                             | schwarzbeck      | NNBM8125                 | 81251547      | 05-11-2018             | 05-10-2019                 |
| LISN                             | schwarzbeck      | NNBM8125                 | 81251548      | 05-11-2018             | 05-10-2019                 |
| Signal Generator                 | Agilent          | E4438C                   | MY45095744    | 03-01-2019             | 02-29-2020                 |
| Signal Generator                 | Keysight         | E8257D                   | MY53401106    | 03-01-2019             | 02-29-2020                 |
| Temperature/Humidity Indicator   | Shanghai qixiang | HM10                     | 1804298       | 10-12-2018             | 10-11-2019                 |
| Communication test set           | Agilent          | E5515C                   | GB47050534    | 03-01-2019             | 02-29-2020                 |
| Cable line                       | Fulai(7M)        | SF106                    | 5219/6A       | 01-09-2019             | 01-08-2020                 |
| Cable line                       | Fulai(6M)        | SF106                    | 5220/6A       | 01-09-2019             | 01-08-2020                 |
| Cable line                       | Fulai(3M)        | SF106                    | 5216/6A       | 01-09-2019             | 01-08-2020                 |
| Cable line                       | Fulai(3M)        | SF106                    | 5217/6A       | 01-09-2019             | 01-08-2020                 |
| Communication test set           | R&S              | CMW500                   | 104466        | 01-18-2019             | 01-17-2020                 |
| High-pass filter                 | Sinoscite        | FL3CX03WG18NM12-0398-002 | ---           | 01-09-2019             | 01-08-2020                 |
| High-pass filter                 | MICRO-TRONICS    | SPA-F-63029-4            | ---           | 01-09-2019             | 01-08-2020                 |
| band rejection filter            | Sinoscite        | FL5CX01CA09CL12-0395-001 | ---           | 01-09-2019             | 01-08-2020                 |
| band rejection filter            | Sinoscite        | FL5CX01CA08CL12-0393-001 | ---           | 01-09-2019             | 01-08-2020                 |
| band rejection filter            | Sinoscite        | FL5CX02CA04CL12-0396-002 | ---           | 01-09-2019             | 01-08-2020                 |
| band rejection filter            | Sinoscite        | FL5CX02CA03CL12-0394-001 | ---           | 01-09-2019             | 01-08-2020                 |

| 3M full-anechoic Chamber       |               |                   |               |                          |                            |
|--------------------------------|---------------|-------------------|---------------|--------------------------|----------------------------|
| Equipment                      | Manufacturer  | Model No.         | Serial Number | Cal. date (mm-dd-yyyy)   | Cal. Due date (mm-dd-yyyy) |
| RSE Automatic test software    | JS Tonscend   | JS36-RSE          | 10166         | 06-20-2018               | 06-19-2019                 |
| Receiver                       | Keysight      | N9038A            | MY57290136    | 03-28-2018<br>03-27-2019 | 03-27-2019<br>03-25-2020   |
| Spectrum Analyzer              | Keysight      | N9020B            | MY57111112    | 03-28-2018<br>03-27-2019 | 03-27-2019<br>03-25-2020   |
| Spectrum Analyzer              | Keysight      | N9030B            | MY57140871    | 03-28-2018<br>03-27-2019 | 03-27-2019<br>03-25-2020   |
| Loop Antenna                   | Schwarzbeck   | FMZB 1519B        | 1519B-075     | 04-25-2018               | 04-23-2021                 |
| Loop Antenna                   | Schwarzbeck   | FMZB 1519B        | 1519B-076     | 04-25-2018               | 04-23-2021                 |
| TRILOG Broadband Antenna       | Schwarzbeck   | VULB 9163         | 9163-1148     | 04-25-2018               | 04-23-2021                 |
| Horn Antenna                   | Schwarzbeck   | BBHA 9170         | 9170-832      | 04-25-2018               | 04-23-2021                 |
| Horn Antenna                   | Schwarzbeck   | BBHA 9170         | 9170-829      | 04-25-2018               | 04-23-2021                 |
| Communication Antenna          | Schwarzbeck   | CLSA 0110L        | 1014          | 02-15-2018               | 02-14-2019                 |
| Biconical antenna              | Schwarzbeck   | VUBA 9117         | 9117-381      | 04-25-2018               | 04-23-2021                 |
| Horn Antenna                   | ETS-LINDGR EN | 3117              | 00057407      | 07-10-2018               | 07-08-2021                 |
| Preamplifier                   | EMCI          | EMC184055SE       | 980596        | 06-20-2018               | 06-19-2019                 |
| Communication test set         | R&S           | CMW500            | 102898        | 01-18-2019               | 01-17-2020                 |
| Preamplifier                   | EMCI          | EMC001330         | 980563        | 06-20-2018               | 06-19-2019                 |
| Preamplifier                   | Agilent       | 8449B             | 3008A02425    | 08-21-2018               | 08-20-2019                 |
| Temperature/Humidity Indicator | biaozhi       | GM1360            | EE1186631     | 05-02-2018               | 05-01-2019                 |
| Signal Generator               | KEYSIGHT      | E8257D            | MY53401106    | 03-13-2018               | 03-12-2019                 |
| Fully Anechoic Chamber         | TDK           | FAC-3             | ---           | 01-17-2018               | 01-15-2021                 |
| Filter bank                    | JS Tonscend   | JS0806-F          | 188060094     | 04-10-2018               | 04-08-2021                 |
| Cable line                     | Times         | SFT205-NMSM-2.50M | 394812-0001   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMSM-2.50M | 394812-0002   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMSM-2.50M | 394812-0003   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMSM-2.50M | 393495-0001   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | EMC104-NMNM-1000  | SN160710      | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMSM-3.00M | 394813-0001   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMNM-1.50M | 381964-0001   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | SFT205-NMSM-7.00M | 394815-0001   | 01-09-2019               | 01-08-2020                 |
| Cable line                     | Times         | HF160-KMKM-3.00M  | 393493-0001   | 01-09-2019               | 01-08-2020                 |

## 8 Radio Technical Requirements Specification

### Reference documents for testing:

| No. | Identity         | Document Title                                                     |
|-----|------------------|--------------------------------------------------------------------|
| 1   | FCC Part15C      | Subpart C-Intentional Radiators                                    |
| 2   | ANSI C63.10-2013 | American National Standard for Testing Unlicensed Wireless Devices |

### Test Results List:

| Test requirement                  | Test method | Test item                                                          | Verdict | Note        |
|-----------------------------------|-------------|--------------------------------------------------------------------|---------|-------------|
| Part15C Section 15.247 (a)(1)     | ANSI 63.10  | 20dB Occupied Bandwidth                                            | PASS    | Appendix A) |
| Part15C Section 15.247 (a)(1)     | ANSI 63.10  | Carrier Frequencies Separation                                     | PASS    | Appendix B) |
| Part15C Section 15.247 (a)(1)     | ANSI 63.10  | Dwell Time                                                         | PASS    | Appendix C) |
| Part15C Section 15.247 (b)        | ANSI 63.10  | Hopping Channel Number                                             | PASS    | Appendix D) |
| Part15C Section 15.247 (b)(1)     | ANSI 63.10  | Conducted Peak Output Power                                        | PASS    | Appendix E) |
| Part15C Section 15.247(d)         | ANSI 63.10  | Band-edge for RF Conducted Emissions                               | PASS    | Appendix F) |
| Part15C Section 15.247(d)         | ANSI 63.10  | RF Conducted Spurious Emissions                                    | PASS    | Appendix G) |
| Part15C Section 15.247 (a)(1)     | ANSI 63.10  | Pseudorandom Frequency Hopping Sequence                            | PASS    | Appendix H) |
| Part15C Section 15.203/15.247 (c) | ANSI 63.10  | Antenna Requirement                                                | PASS    | Appendix I) |
| Part15C Section 15.207            | ANSI 63.10  | AC Power Line Conducted Emission                                   | PASS    | Appendix J) |
| Part15C Section 15.205/15.209     | ANSI 63.10  | Restricted bands around fundamental frequency (Radiated) Emission) | PASS    | Appendix K) |
| Part15C Section 15.205/15.209     | ANSI 63.10  | Radiated Spurious Emissions                                        | PASS    | Appendix L) |

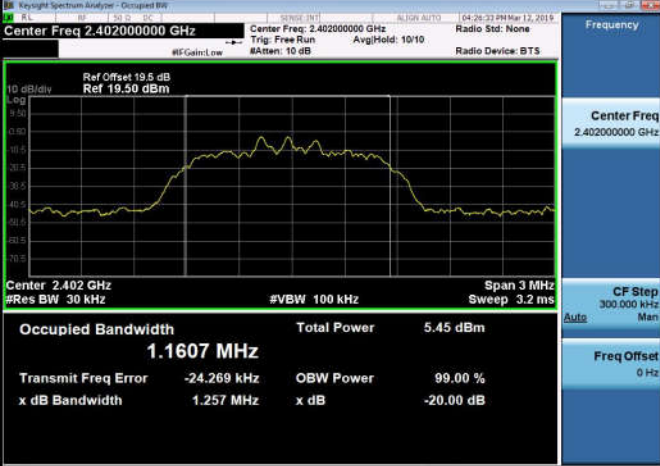
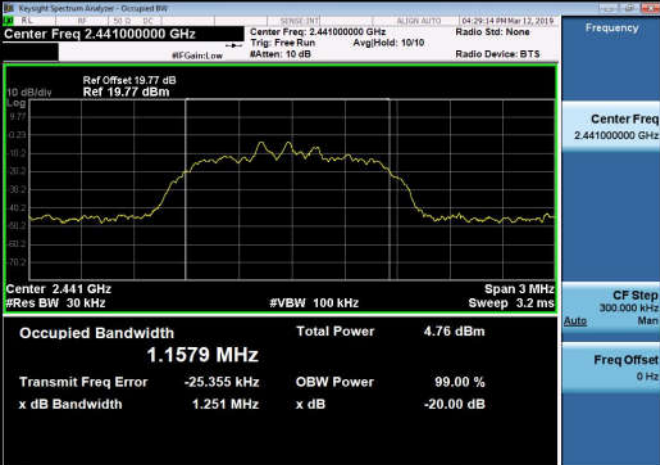
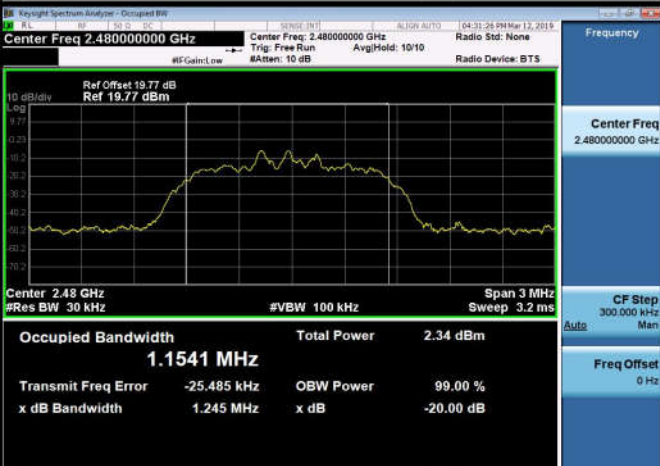
## Appendix A): 20dB Occupied Bandwidth

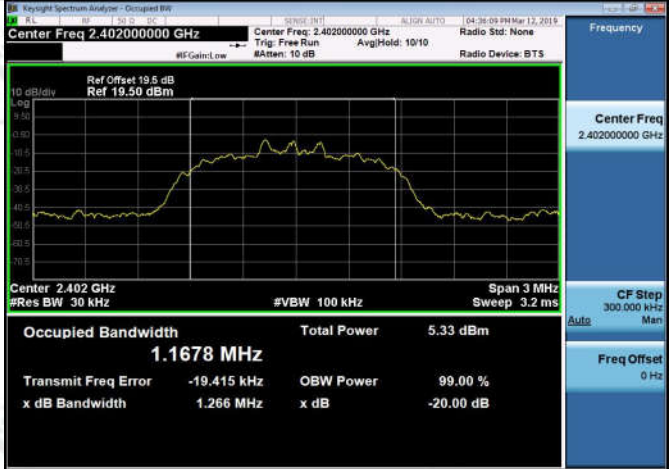
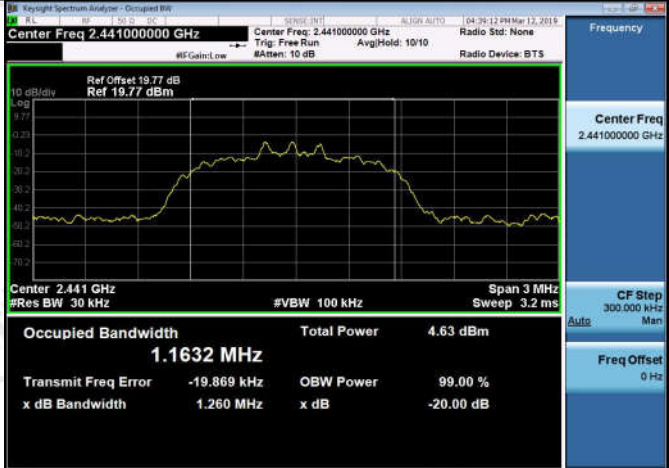
### Test Result

| Mode          | Channel. | 20dB Bandwidth [MHz] | 99% OBW [MHz] | Verdict |
|---------------|----------|----------------------|---------------|---------|
| GFSK          | LCH      | 0.9555               | 0.88974       | PASS    |
| GFSK          | MCH      | 0.9514               | 0.88634       | PASS    |
| GFSK          | HCH      | 0.9530               | 0.87991       | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.257                | 1.1607        | PASS    |
| $\pi/4$ DQPSK | MCH      | 1.251                | 1.1579        | PASS    |
| $\pi/4$ DQPSK | HCH      | 1.245                | 1.1541        | PASS    |
| 8DPSK         | LCH      | 1.266                | 1.1678        | PASS    |
| 8DPSK         | MCH      | 1.260                | 1.1632        | PASS    |
| 8DPSK         | HCH      | 1.258                | 1.1545        | PASS    |

## Test Graph



|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><math>\pi/4</math>DQPSK/LCH</p> |  <p>Center Freq 2.402000000 GHz</p> <p>Center Freq: 2.402000000 GHz</p> <p>Trig: Free Run</p> <p>Avg/Hold: 10/10</p> <p>Radio Device: BTS</p> <p>Ref Offset 19.5 dB</p> <p>Ref 19.50 dBm</p> <p>Center 2.402 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 3 MHz</p> <p>Sweep 3.2 ms</p> <p>Occupied Bandwidth 1.1607 MHz</p> <p>Total Power 5.45 dBm</p> <p>Transmit Freq Error -24.269 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.257 MHz</p> <p>x dB -20.00 dB</p>   |
| <p><math>\pi/4</math>DQPSK/MCH</p> |  <p>Center Freq 2.441000000 GHz</p> <p>Center Freq: 2.441000000 GHz</p> <p>Trig: Free Run</p> <p>Avg/Hold: 10/10</p> <p>Radio Device: BTS</p> <p>Ref Offset 19.77 dB</p> <p>Ref 19.77 dBm</p> <p>Center 2.441 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 3 MHz</p> <p>Sweep 3.2 ms</p> <p>Occupied Bandwidth 1.1579 MHz</p> <p>Total Power 4.76 dBm</p> <p>Transmit Freq Error -25.355 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.251 MHz</p> <p>x dB -20.00 dB</p> |
| <p><math>\pi/4</math>DQPSK/HCH</p> |  <p>Center Freq 2.480000000 GHz</p> <p>Center Freq: 2.480000000 GHz</p> <p>Trig: Free Run</p> <p>Avg/Hold: 10/10</p> <p>Radio Device: BTS</p> <p>Ref Offset 19.77 dB</p> <p>Ref 19.77 dBm</p> <p>Center 2.48 GHz</p> <p>#Res BW 30 kHz</p> <p>#VBW 100 kHz</p> <p>Span 3 MHz</p> <p>Sweep 3.2 ms</p> <p>Occupied Bandwidth 1.1541 MHz</p> <p>Total Power 2.34 dBm</p> <p>Transmit Freq Error -25.485 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.245 MHz</p> <p>x dB -20.00 dB</p> |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8DPSK/LCH |  <p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 19.5 dB<br/>Ref 19.50 dBm</p> <p>Center 2.402 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1678 MHz</p> <p>Total Power 5.33 dBm</p> <p>Transmit Freq Error -19.415 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.266 MHz</p> <p>x dB -20.00 dB</p>   |
| 8DPSK/MCH |  <p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 19.77 dB<br/>Ref 19.77 dBm</p> <p>Center 2.441 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1632 MHz</p> <p>Total Power 4.63 dBm</p> <p>Transmit Freq Error -19.869 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.260 MHz</p> <p>x dB -20.00 dB</p> |
| 8DPSK/HCH |  <p>KeySight Spectrum Analyzer - Occupied BW</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 19.77 dB<br/>Ref 19.77 dBm</p> <p>Center 2.48 GHz<br/>#Res BW 30 kHz</p> <p>Occupied Bandwidth 1.1545 MHz</p> <p>Total Power 2.39 dBm</p> <p>Transmit Freq Error -21.567 kHz</p> <p>OBW Power 99.00 %</p> <p>x dB Bandwidth 1.258 MHz</p> <p>x dB -20.00 dB</p> |

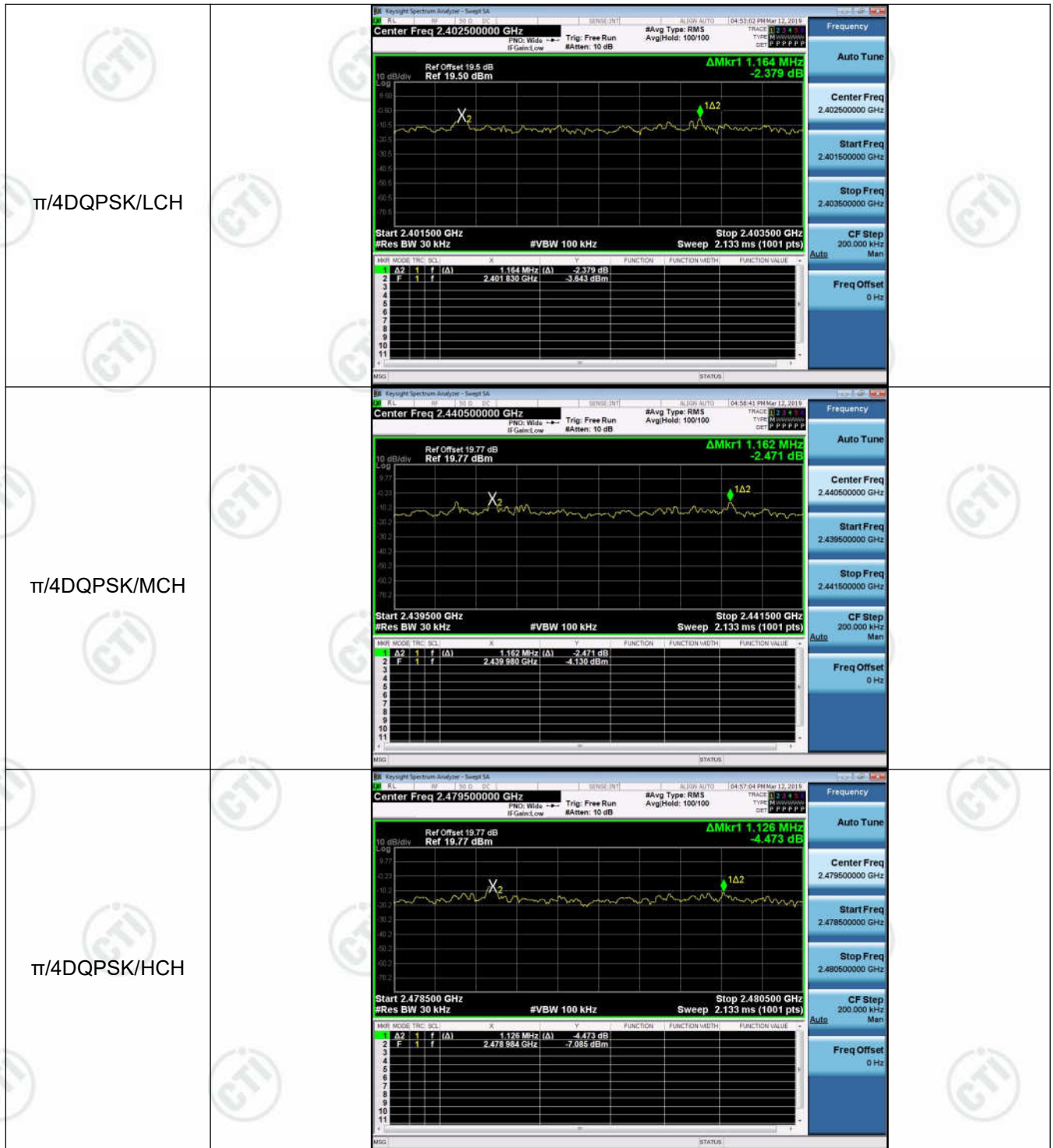
## Appendix B): Carrier Frequency Separation

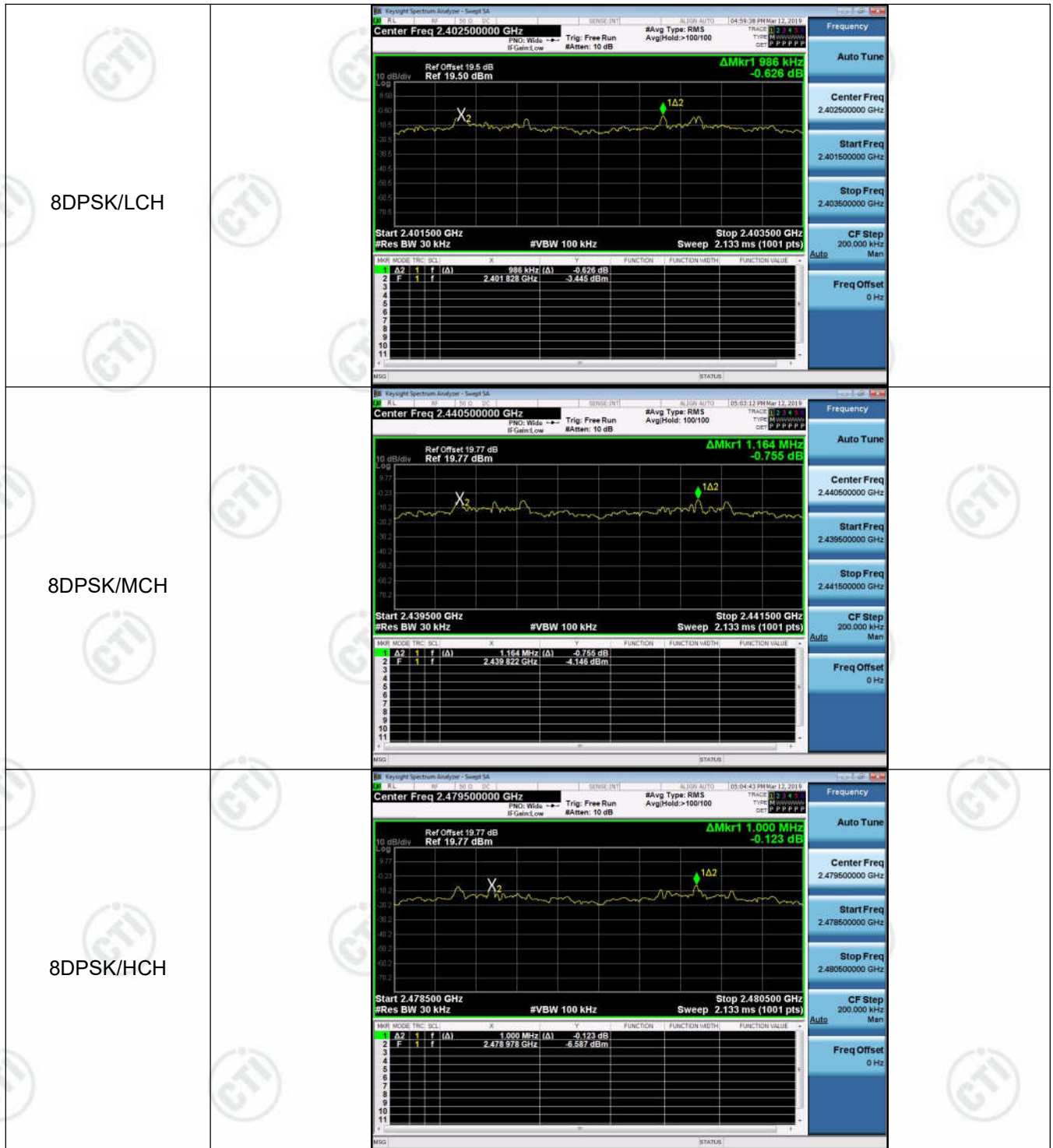
Result Table

| Mode          | Channel. | Carrier Frequency Separation [MHz] | Verdict |
|---------------|----------|------------------------------------|---------|
| GFSK          | LCH      | 1.152                              | PASS    |
| GFSK          | MCH      | 0.990                              | PASS    |
| GFSK          | HCH      | 1.162                              | PASS    |
| $\pi/4$ DQPSK | LCH      | 1.164                              | PASS    |
| $\pi/4$ DQPSK | MCH      | 1.162                              | PASS    |
| $\pi/4$ DQPSK | HCH      | 1.126                              | PASS    |
| 8DPSK         | LCH      | 0.986                              | PASS    |
| 8DPSK         | MCH      | 1.164                              | PASS    |
| 8DPSK         | HCH      | 1.000                              | PASS    |

## Test Graph







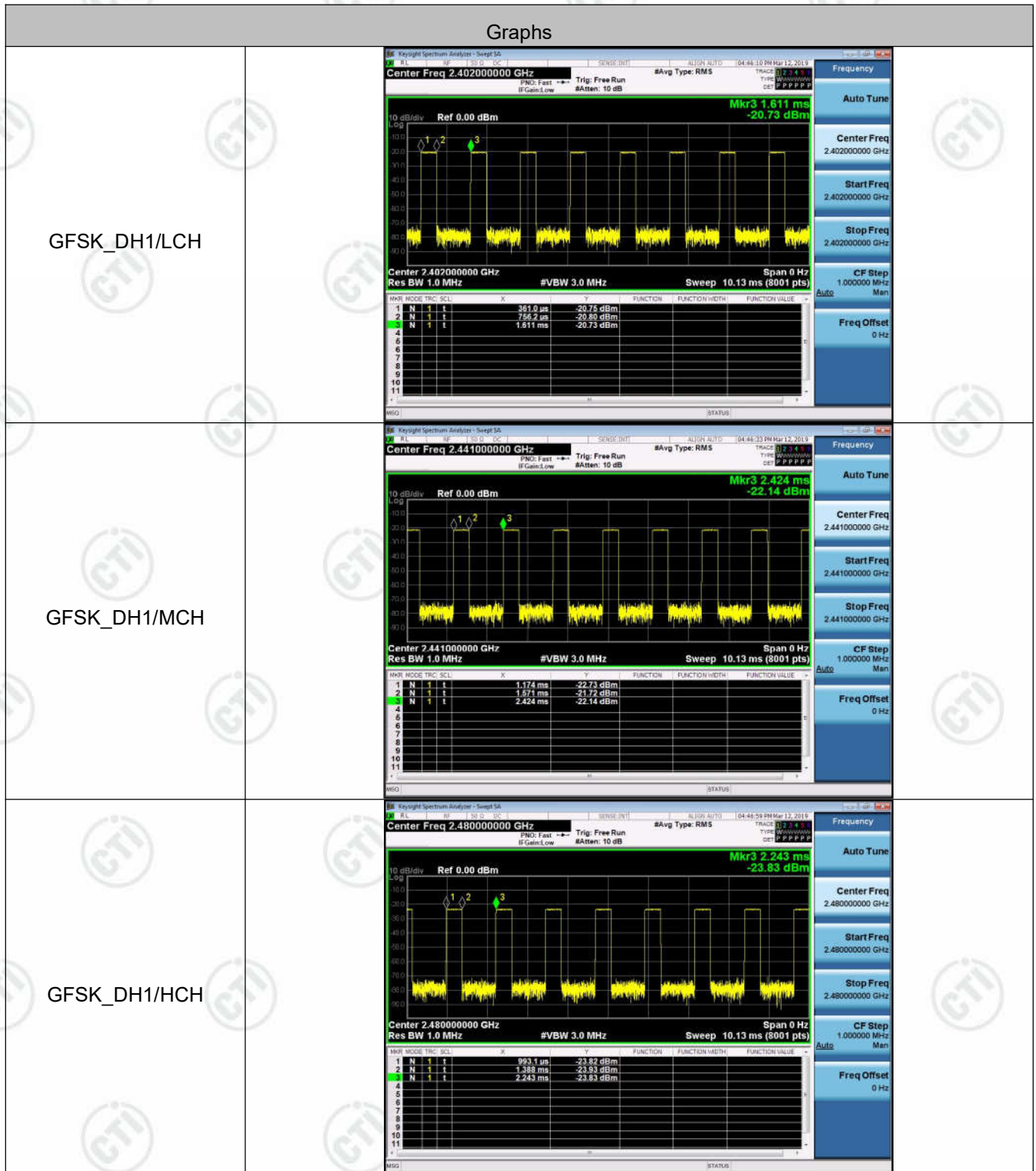
## Appendix C): Dwell Time

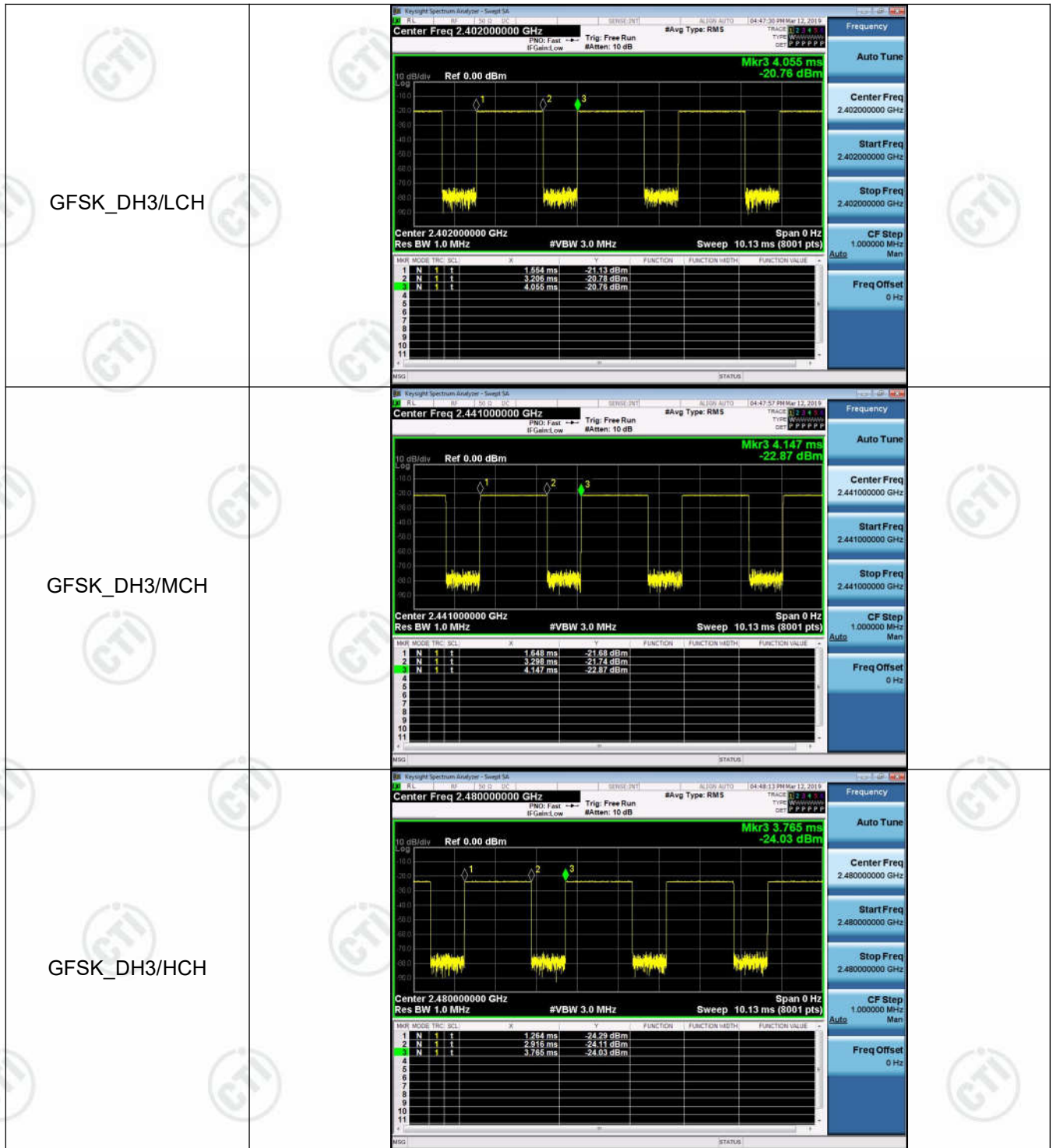
### Result Table

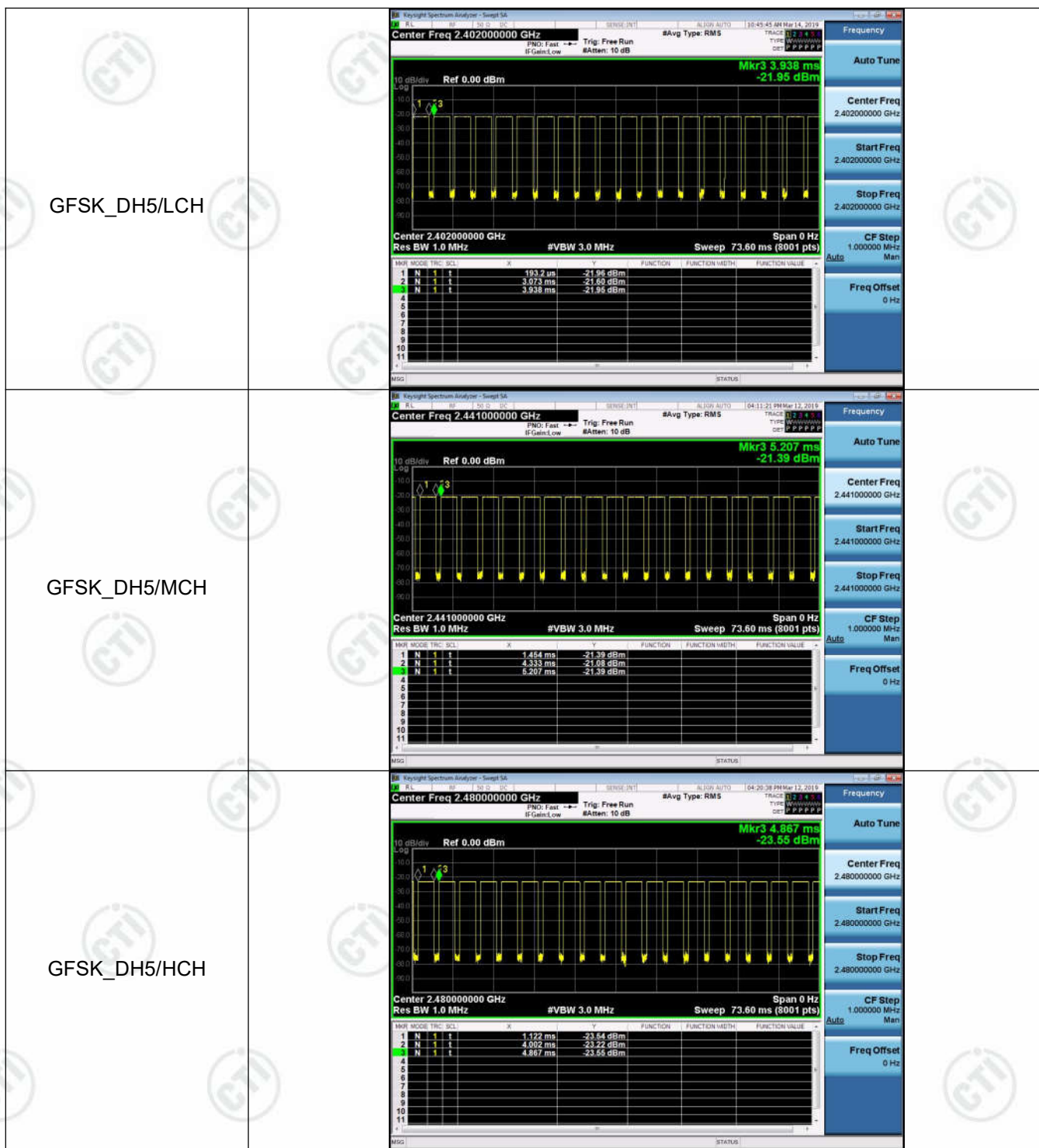
| Mode | Packet | Channel | Burst Width<br>[ms/hop/ch] | Total<br>Hops[hop*ch] | Dwell<br>Time[s] | Duty<br>Cycle [%] | Verdict |
|------|--------|---------|----------------------------|-----------------------|------------------|-------------------|---------|
| GFSK | DH1    | LCH     | 0.3952                     | 320                   | 0.126            | 0.32              | PASS    |
| GFSK | DH1    | MCH     | 0.39647                    | 320                   | 0.127            | 0.32              | PASS    |
| GFSK | DH1    | HCH     | 0.395203                   | 320                   | 0.126            | 0.32              | PASS    |
| GFSK | DH3    | LCH     | 1.65173                    | 160                   | 0.264            | 0.66              | PASS    |
| GFSK | DH3    | MCH     | 1.65047                    | 160                   | 0.264            | 0.66              | PASS    |
| GFSK | DH3    | HCH     | 1.65174                    | 160                   | 0.264            | 0.66              | PASS    |
| GFSK | DH5    | LCH     | 2.8796                     | 106.7                 | 0.307            | 0.77              | PASS    |
| GFSK | DH5    | MCH     | 2.8796                     | 106.7                 | 0.307            | 0.77              | PASS    |
| GFSK | DH5    | HCH     | 2.8796                     | 106.7                 | 0.307            | 0.77              | PASS    |

Remark : All modes are tested, only the worst mode GFSK is reported.

## Test Graph





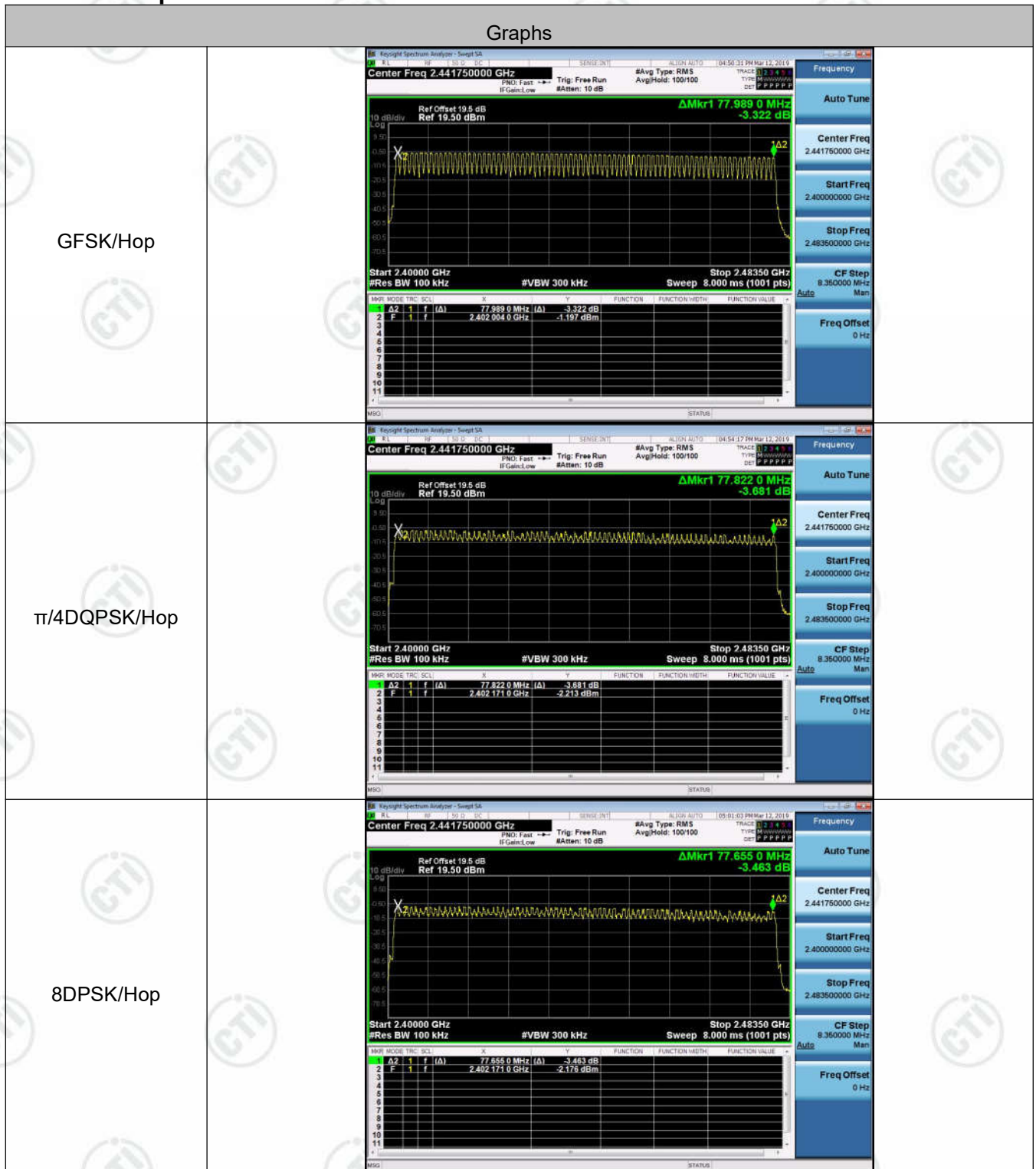


## Appendix D): Hopping Channel Number

### Result Table

| Mode          | Channel. | Number of Hopping Channel | Verdict |
|---------------|----------|---------------------------|---------|
| GFSK          | Hop      | 79                        | PASS    |
| $\pi/4$ DQPSK | Hop      | 79                        | PASS    |
| 8DPSK         | Hop      | 79                        | PASS    |

## Test Graph



## Appendix E): Conducted Peak Output Power

Result Table

| Mode          | Channel. | Maximum Peak Output Power [dBm] | Verdict |
|---------------|----------|---------------------------------|---------|
| GFSK          | LCH      | -1.971                          | PASS    |
| GFSK          | MCH      | -1.008                          | PASS    |
| GFSK          | HCH      | -3.035                          | PASS    |
| $\pi/4$ DQPSK | LCH      | -1.690                          | PASS    |
| $\pi/4$ DQPSK | MCH      | -2.274                          | PASS    |
| $\pi/4$ DQPSK | HCH      | -4.550                          | PASS    |
| 8DPSK         | LCH      | -1.503                          | PASS    |
| 8DPSK         | MCH      | -2.188                          | PASS    |
| 8DPSK         | HCH      | -4.447                          | PASS    |

## Test Graph



|                                    |                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------|
| <p><math>\pi/4</math>DQPSK/LCH</p> |    |
| <p><math>\pi/4</math>DQPSK/MCH</p> |   |
| <p><math>\pi/4</math>DQPSK/HCH</p> |  |

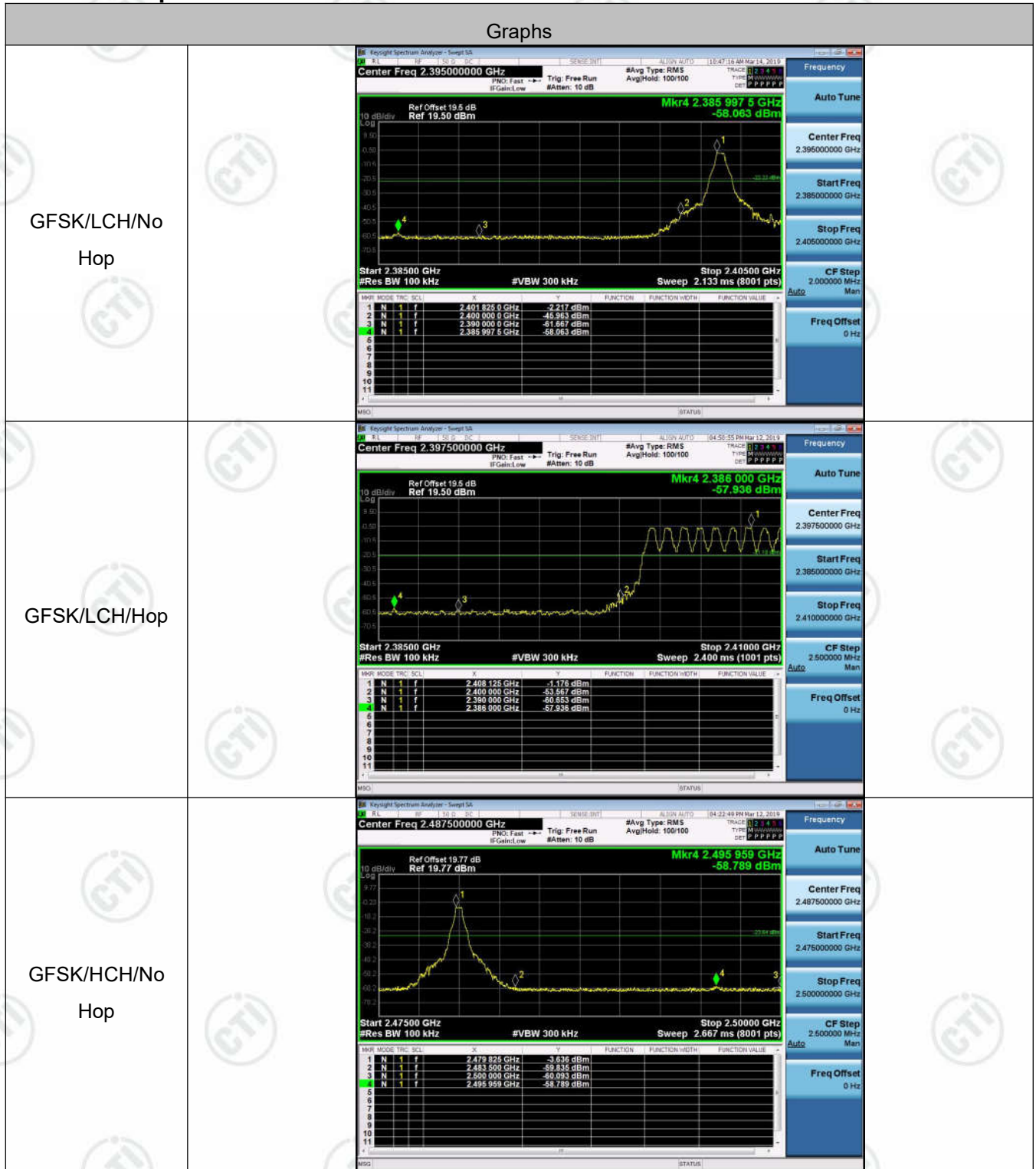
|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8DPSK/LCH |  <p>Keyight Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.402000000 GHz</p> <p>Ref Offset 19.5 dB<br/>Ref 19.50 dBm</p> <p>Mkr1 2.402 007 500 GHz<br/>-1.503 dBm</p> <p>Center 2.402000 GHz #Res BW 2.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.402000000 GHz</p> <p>Start Freq 2.399500000 GHz</p> <p>Stop Freq 2.404500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Freq Offset 0 Hz</p>    |
| 8DPSK/MCH |  <p>Keyight Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.441000000 GHz</p> <p>Ref Offset 19.77 dB<br/>Ref 19.77 dBm</p> <p>Mkr1 2.441 042 500 GHz<br/>-2.188 dBm</p> <p>Center 2.441000 GHz #Res BW 2.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.441000000 GHz</p> <p>Start Freq 2.438500000 GHz</p> <p>Stop Freq 2.443500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Freq Offset 0 Hz</p>  |
| 8DPSK/HCH |  <p>Keyight Spectrum Analyzer - Swept SA</p> <p>Center Freq 2.480000000 GHz</p> <p>Ref Offset 19.77 dB<br/>Ref 19.77 dBm</p> <p>Mkr1 2.479 973 750 GHz<br/>-4.447 dBm</p> <p>Center 2.480000 GHz #Res BW 2.0 MHz #VBW 8.0 MHz Sweep 1.067 ms (8001 pts)</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.480000000 GHz</p> <p>Start Freq 2.477500000 GHz</p> <p>Stop Freq 2.482500000 GHz</p> <p>CF Step 500.000 kHz</p> <p>Freq Offset 0 Hz</p> |

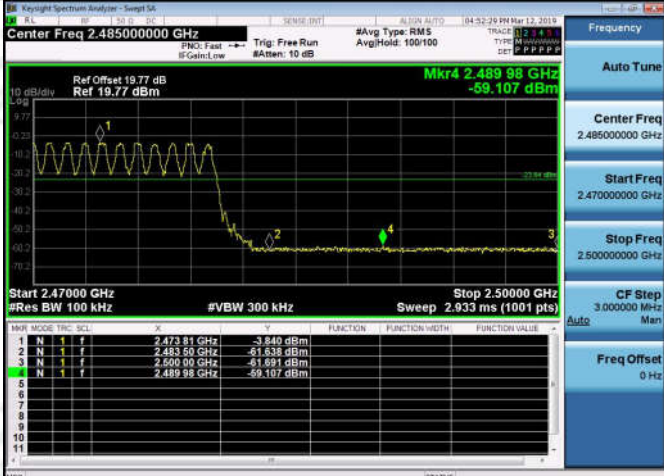
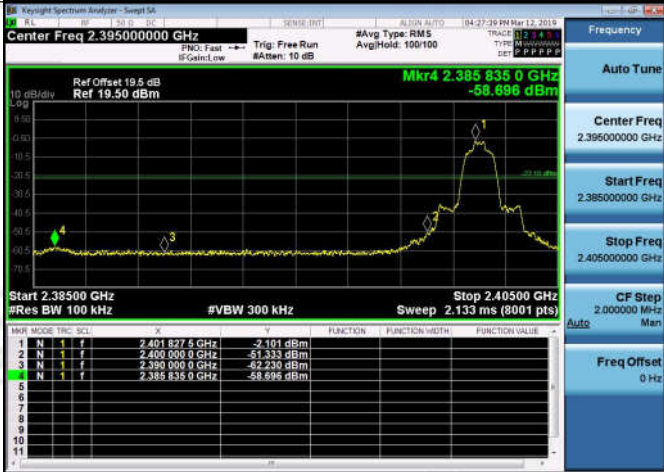
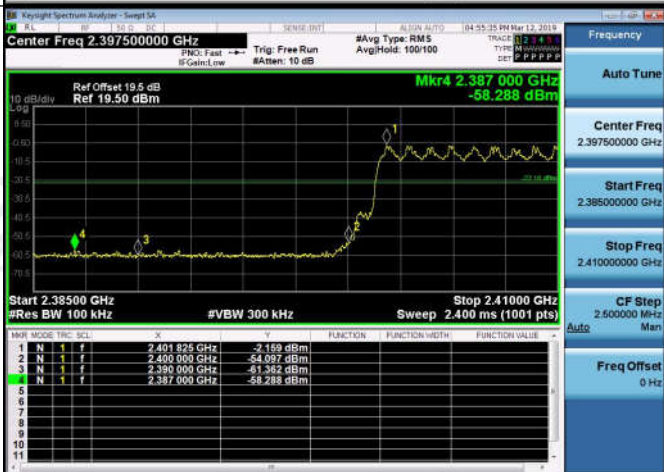
## Appendix F): Band-edge for RF Conducted Emissions

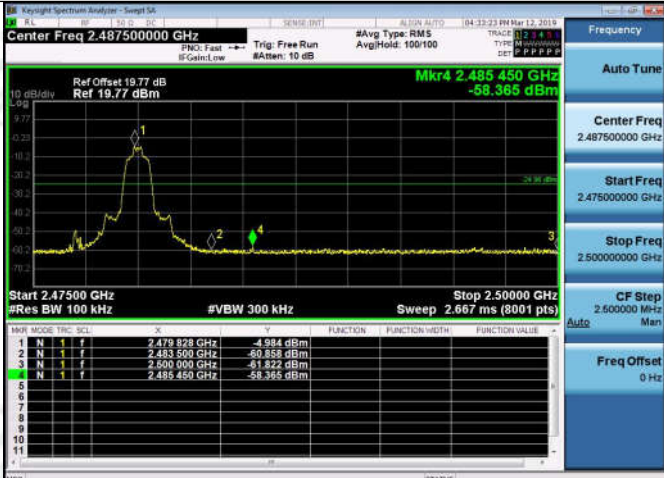
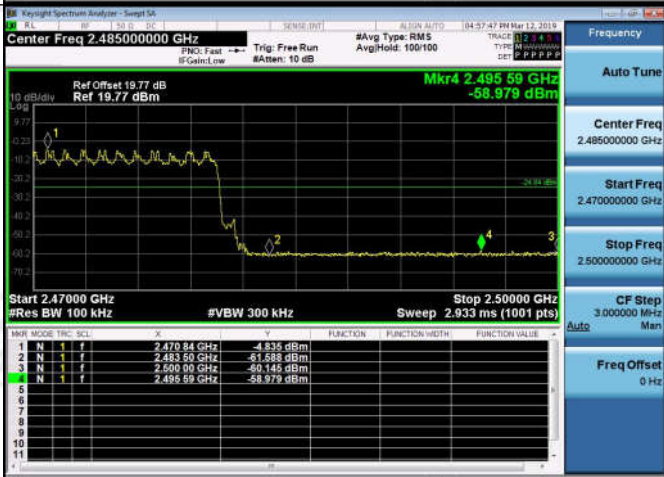
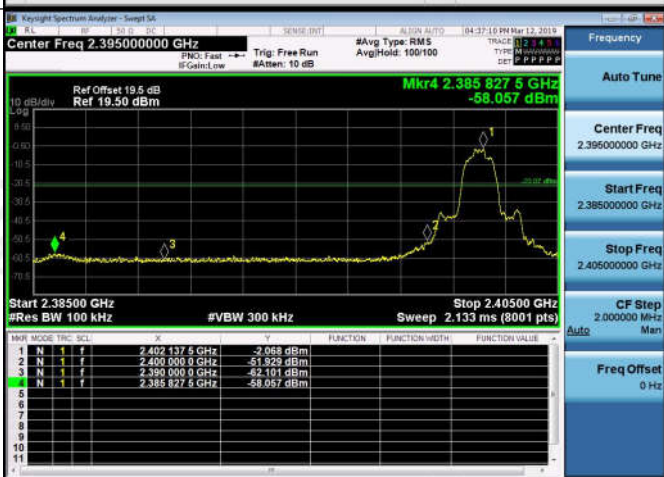
Result Table

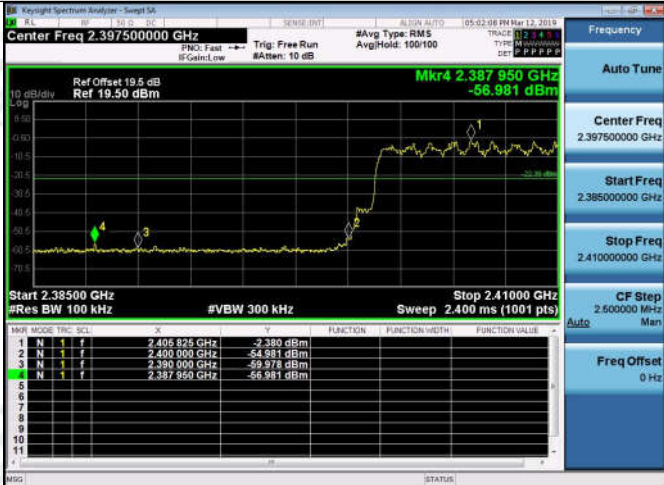
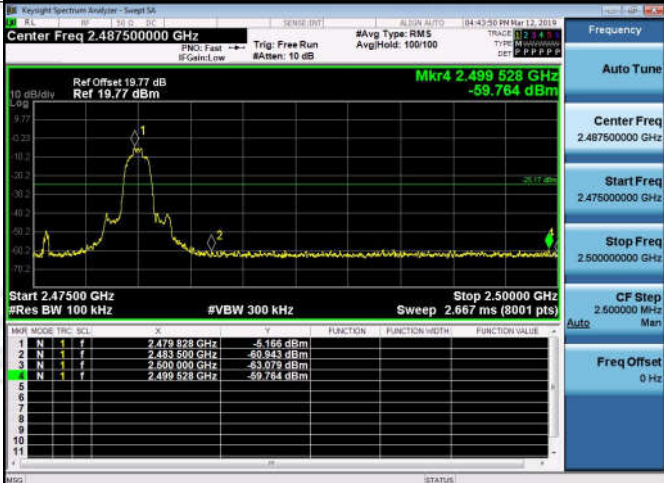
| Mode          | Channel | Carrier Frequency [MHz] | Carrier Power [dBm] | Frequency Hopping | Max Spurious Level [dBm] | Limit [dBm] | Verdict |
|---------------|---------|-------------------------|---------------------|-------------------|--------------------------|-------------|---------|
| GFSK          | LCH     | 2402                    | -2.217              | Off               | -58.063                  | -22.22      | PASS    |
|               |         |                         | -1.176              | On                | -57.936                  | -21.18      | PASS    |
| GFSK          | HCH     | 2480                    | -3.636              | Off               | -58.789                  | -23.64      | PASS    |
|               |         |                         | -3.840              | On                | -59.107                  | -23.84      | PASS    |
| $\pi/4$ DQPSK | LCH     | 2402                    | -2.101              | Off               | -58.696                  | -22.1       | PASS    |
|               |         |                         | -2.159              | On                | -58.288                  | -22.16      | PASS    |
| $\pi/4$ DQPSK | HCH     | 2480                    | -4.984              | Off               | -58.365                  | -24.98      | PASS    |
|               |         |                         | -4.835              | On                | -58.979                  | -24.84      | PASS    |
| 8DPSK         | LCH     | 2402                    | -2.068              | Off               | -58.057                  | -22.07      | PASS    |
|               |         |                         | -2.380              | On                | -56.981                  | -22.38      | PASS    |
| 8DPSK         | HCH     | 2480                    | -5.166              | Off               | -59.764                  | -25.17      | PASS    |
|               |         |                         | -3.871              | On                | -44.135                  | -23.87      | PASS    |

## Test Graph



| GFSK/HCH/Hop                 |  <table><thead><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>2.47381 GHz</td><td>-3.840 dBm</td></tr><tr><td>2</td><td>N</td><td>2.48350 GHz</td><td>-61.838 dBm</td></tr><tr><td>3</td><td>N</td><td>2.48998 GHz</td><td>-61.691 dBm</td></tr><tr><td>4</td><td>N</td><td>2.48998 GHz</td><td>-59.107 dBm</td></tr></tbody></table>       | MARK          | MODE        | FREQ | POWER | 1 | N | 2.47381 GHz   | -3.840 dBm | 2 | N | 2.48350 GHz  | -61.838 dBm | 3 | N | 2.48998 GHz  | -61.691 dBm | 4 | N | 2.48998 GHz  | -59.107 dBm |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|------|-------|---|---|---------------|------------|---|---|--------------|-------------|---|---|--------------|-------------|---|---|--------------|-------------|
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FREQ          | POWER       |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.47381 GHz   | -3.840 dBm  |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.48350 GHz   | -61.838 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.48998 GHz   | -61.691 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.48998 GHz   | -59.107 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| $\pi/4$ DQPSK/LCH/<br>No Hop |  <table><thead><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>2.4018275 GHz</td><td>-2.101 dBm</td></tr><tr><td>2</td><td>N</td><td>2.400000 GHz</td><td>-51.333 dBm</td></tr><tr><td>3</td><td>N</td><td>2.390000 GHz</td><td>-62.230 dBm</td></tr><tr><td>4</td><td>N</td><td>2.385835 GHz</td><td>-58.696 dBm</td></tr></tbody></table> | MARK          | MODE        | FREQ | POWER | 1 | N | 2.4018275 GHz | -2.101 dBm | 2 | N | 2.400000 GHz | -51.333 dBm | 3 | N | 2.390000 GHz | -62.230 dBm | 4 | N | 2.385835 GHz | -58.696 dBm |
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FREQ          | POWER       |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.4018275 GHz | -2.101 dBm  |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.400000 GHz  | -51.333 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.390000 GHz  | -62.230 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.385835 GHz  | -58.696 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| $\pi/4$ DQPSK/LCH/<br>Hop    |  <table><thead><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>2.401825 GHz</td><td>-2.159 dBm</td></tr><tr><td>2</td><td>N</td><td>2.400000 GHz</td><td>-54.097 dBm</td></tr><tr><td>3</td><td>N</td><td>2.390000 GHz</td><td>-61.362 dBm</td></tr><tr><td>4</td><td>N</td><td>2.387000 GHz</td><td>-58.288 dBm</td></tr></tbody></table> | MARK          | MODE        | FREQ | POWER | 1 | N | 2.401825 GHz  | -2.159 dBm | 2 | N | 2.400000 GHz | -54.097 dBm | 3 | N | 2.390000 GHz | -61.362 dBm | 4 | N | 2.387000 GHz | -58.288 dBm |
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FREQ          | POWER       |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.401825 GHz  | -2.159 dBm  |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.400000 GHz  | -54.097 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.390000 GHz  | -61.362 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.387000 GHz  | -58.288 dBm |      |       |   |   |               |            |   |   |              |             |   |   |              |             |   |   |              |             |

| $\pi/4$ DQPSK/HCH/<br>No Hop |  <table><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr><tr><td>1</td><td>N</td><td>2.479 828 GHz</td><td>-4.984 dBm</td></tr><tr><td>2</td><td>N</td><td>2.483 500 GHz</td><td>-60.858 dBm</td></tr><tr><td>3</td><td>N</td><td>2.490 000 GHz</td><td>-61.822 dBm</td></tr><tr><td>4</td><td>N</td><td>2.485 450 GHz</td><td>-58.365 dBm</td></tr></table>           | MARK            | MODE        | FREQ | POWER | 1 | N | 2.479 828 GHz   | -4.984 dBm | 2 | N | 2.483 500 GHz   | -60.858 dBm | 3 | N | 2.490 000 GHz   | -61.822 dBm | 4 | N | 2.485 450 GHz   | -58.365 dBm |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|------|-------|---|---|-----------------|------------|---|---|-----------------|-------------|---|---|-----------------|-------------|---|---|-----------------|-------------|
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FREQ            | POWER       |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.479 828 GHz   | -4.984 dBm  |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.483 500 GHz   | -60.858 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.490 000 GHz   | -61.822 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.485 450 GHz   | -58.365 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| $\pi/4$ DQPSK/HCH/<br>Hop    |  <table><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr><tr><td>1</td><td>N</td><td>2.470 84 GHz</td><td>-4.835 dBm</td></tr><tr><td>2</td><td>N</td><td>2.483 50 GHz</td><td>-61.588 dBm</td></tr><tr><td>3</td><td>N</td><td>2.500 00 GHz</td><td>-60.145 dBm</td></tr><tr><td>4</td><td>N</td><td>2.495 59 GHz</td><td>-58.979 dBm</td></tr></table>              | MARK            | MODE        | FREQ | POWER | 1 | N | 2.470 84 GHz    | -4.835 dBm | 2 | N | 2.483 50 GHz    | -61.588 dBm | 3 | N | 2.500 00 GHz    | -60.145 dBm | 4 | N | 2.495 59 GHz    | -58.979 dBm |
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FREQ            | POWER       |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.470 84 GHz    | -4.835 dBm  |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.483 50 GHz    | -61.588 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.500 00 GHz    | -60.145 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.495 59 GHz    | -58.979 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 8DPSK/LCH/No<br>Hop          |  <table><tr><th>MARK</th><th>MODE</th><th>FREQ</th><th>POWER</th></tr><tr><td>1</td><td>N</td><td>2.402 137 5 GHz</td><td>-2.068 dBm</td></tr><tr><td>2</td><td>N</td><td>2.400 000 0 GHz</td><td>-61.929 dBm</td></tr><tr><td>3</td><td>N</td><td>2.390 000 0 GHz</td><td>-62.101 dBm</td></tr><tr><td>4</td><td>N</td><td>2.385 827 5 GHz</td><td>-58.057 dBm</td></tr></table> | MARK            | MODE        | FREQ | POWER | 1 | N | 2.402 137 5 GHz | -2.068 dBm | 2 | N | 2.400 000 0 GHz | -61.929 dBm | 3 | N | 2.390 000 0 GHz | -62.101 dBm | 4 | N | 2.385 827 5 GHz | -58.057 dBm |
| MARK                         | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FREQ            | POWER       |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 1                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.402 137 5 GHz | -2.068 dBm  |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 2                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.400 000 0 GHz | -61.929 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 3                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.390 000 0 GHz | -62.101 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |
| 4                            | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2.385 827 5 GHz | -58.057 dBm |      |       |   |   |                 |            |   |   |                 |             |   |   |                 |             |   |   |                 |             |

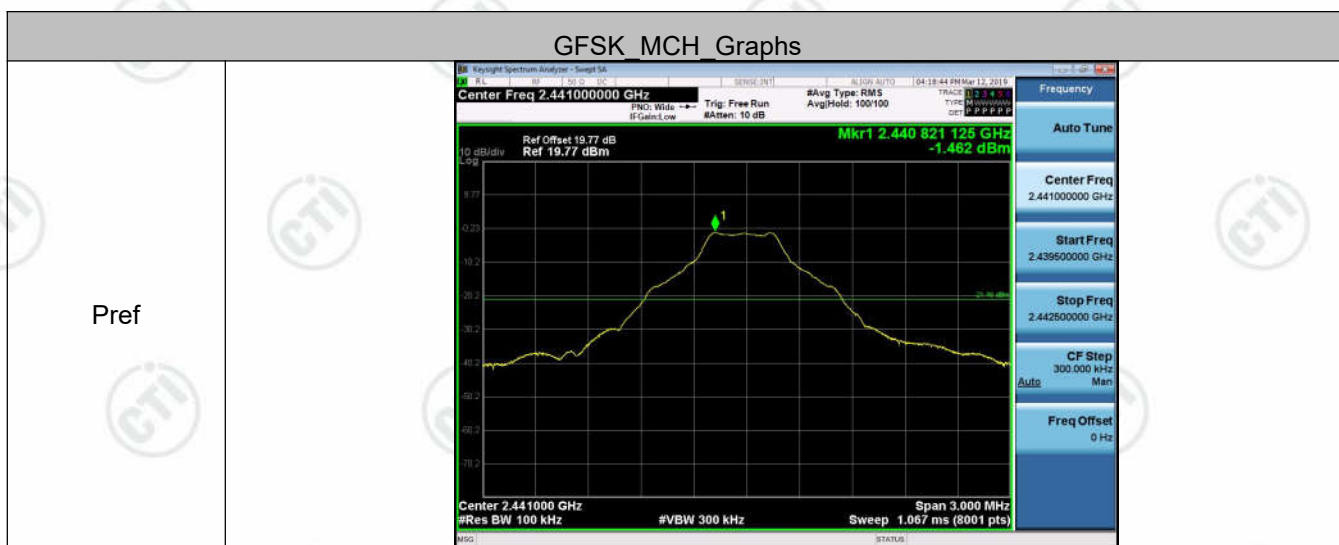
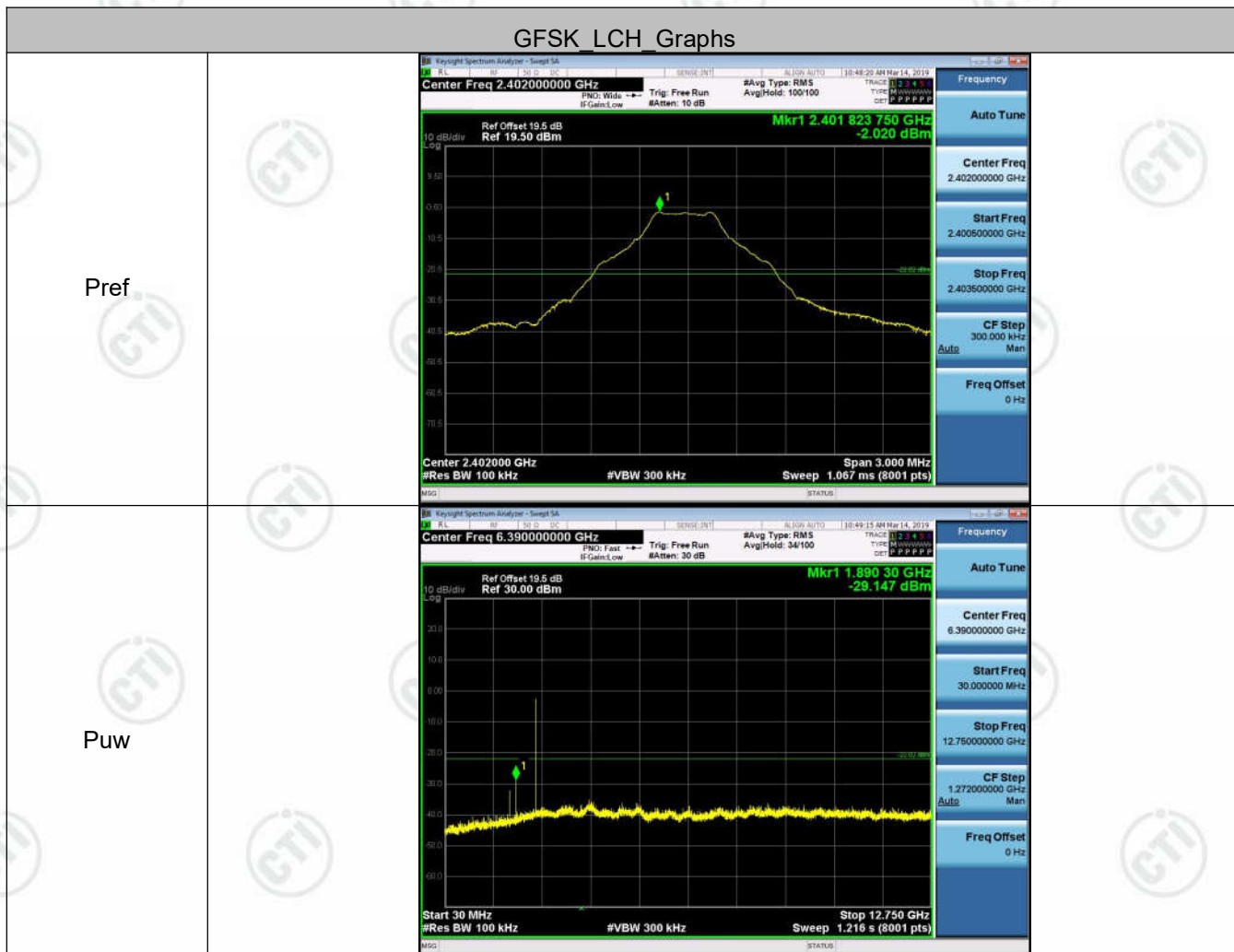
| 8DPSK/LCH/Hop    |  <table><tr><th>MARK</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.405825 GHz</td><td>-2.380 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400000 GHz</td><td>-54.981 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.380000 GHz</td><td>-59.975 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.387550 GHz</td><td>-55.981 dBm</td><td></td><td></td><td></td></tr></table>  | MARK | MODE | TRIG         | SCL         | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | N | 1 | f | 2.405825 GHz | -2.380 dBm |  |  |  | 2 | N | 1 | f | 2.400000 GHz | -54.981 dBm |  |  |  | 3 | N | 1 | f | 2.380000 GHz | -59.975 dBm |  |  |  | 4 | N | 1 | f | 2.387550 GHz | -55.981 dBm |  |  |  |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|--------------|-------------|----------|----------------|----------------|----------------|----------------|---|---|---|---|--------------|------------|--|--|--|---|---|---|---|--------------|-------------|--|--|--|---|---|---|---|--------------|-------------|--|--|--|---|---|---|---|--------------|-------------|--|--|--|
| MARK             | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X            | Y           | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 1                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.405825 GHz | -2.380 dBm  |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 2                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.400000 GHz | -54.981 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 3                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.380000 GHz | -59.975 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 4                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.387550 GHz | -55.981 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 8DPSK/HCH/No Hop |  <table><tr><th>MARK</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.479828 GHz</td><td>-5.166 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483300 GHz</td><td>-50.243 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.500000 GHz</td><td>-53.079 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.499528 GHz</td><td>-59.764 dBm</td><td></td><td></td><td></td></tr></table> | MARK | MODE | TRIG         | SCL         | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | N | 1 | f | 2.479828 GHz | -5.166 dBm |  |  |  | 2 | N | 1 | f | 2.483300 GHz | -50.243 dBm |  |  |  | 3 | N | 1 | f | 2.500000 GHz | -53.079 dBm |  |  |  | 4 | N | 1 | f | 2.499528 GHz | -59.764 dBm |  |  |  |
| MARK             | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X            | Y           | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 1                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.479828 GHz | -5.166 dBm  |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 2                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.483300 GHz | -50.243 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 3                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.500000 GHz | -53.079 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 4                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.499528 GHz | -59.764 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 8DPSK/HCH/Hop    |  <table><tr><th>MARK</th><th>MODE</th><th>TRIG</th><th>SCL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.47183 GHz</td><td>-3.671 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.48350 GHz</td><td>-59.390 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.50000 GHz</td><td>-59.307 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.49019 GHz</td><td>-44.135 dBm</td><td></td><td></td><td></td></tr></table>    | MARK | MODE | TRIG         | SCL         | X        | Y              | FUNCTION       | FUNCTION WIDTH | FUNCTION VALUE | 1 | N | 1 | f | 2.47183 GHz  | -3.671 dBm |  |  |  | 2 | N | 1 | f | 2.48350 GHz  | -59.390 dBm |  |  |  | 3 | N | 1 | f | 2.50000 GHz  | -59.307 dBm |  |  |  | 4 | N | 1 | f | 2.49019 GHz  | -44.135 dBm |  |  |  |
| MARK             | MODE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TRIG | SCL  | X            | Y           | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 1                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.47183 GHz  | -3.671 dBm  |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 2                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.48350 GHz  | -59.390 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 3                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.50000 GHz  | -59.307 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |
| 4                | N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1    | f    | 2.49019 GHz  | -44.135 dBm |          |                |                |                |                |   |   |   |   |              |            |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |   |   |   |   |              |             |  |  |  |

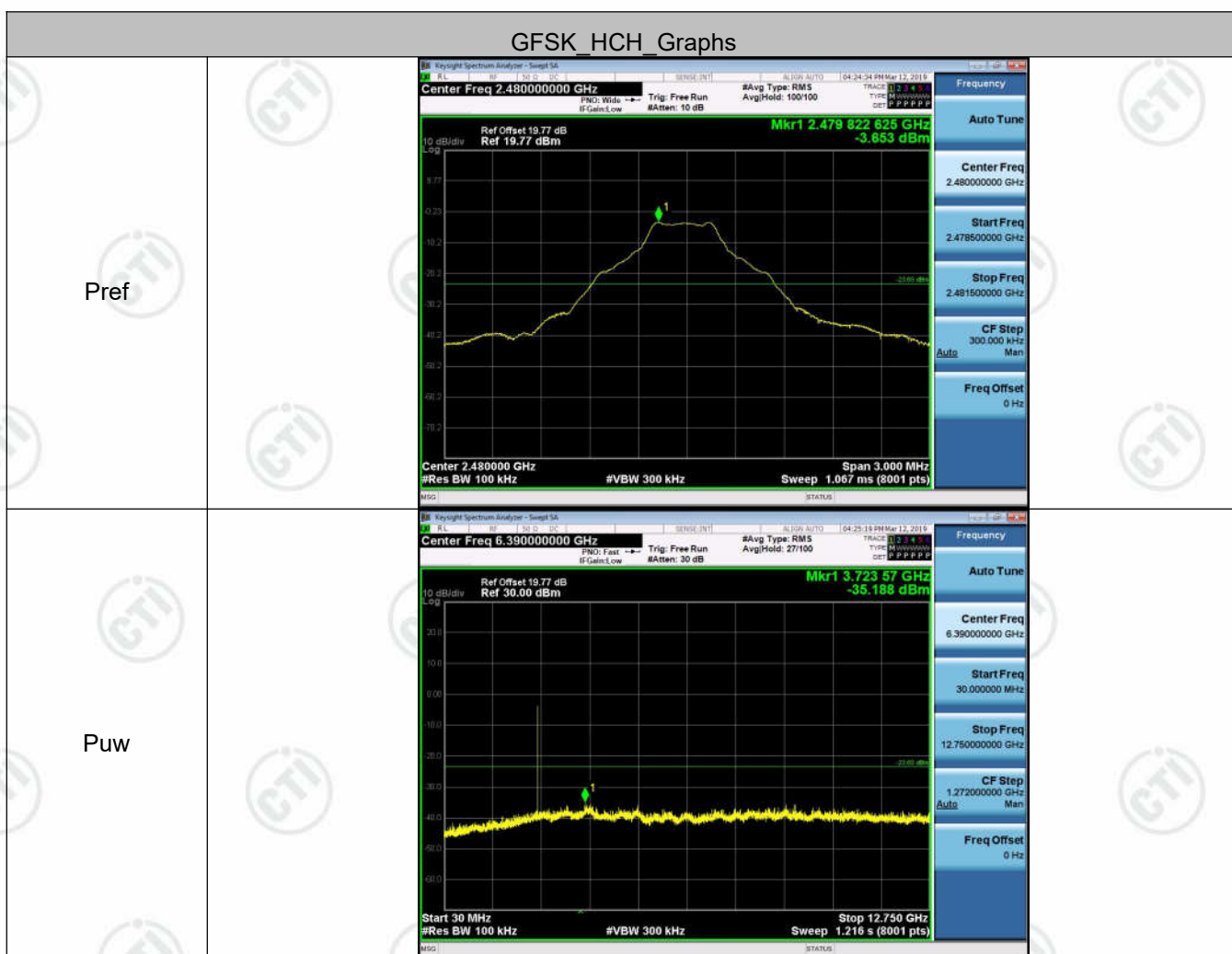
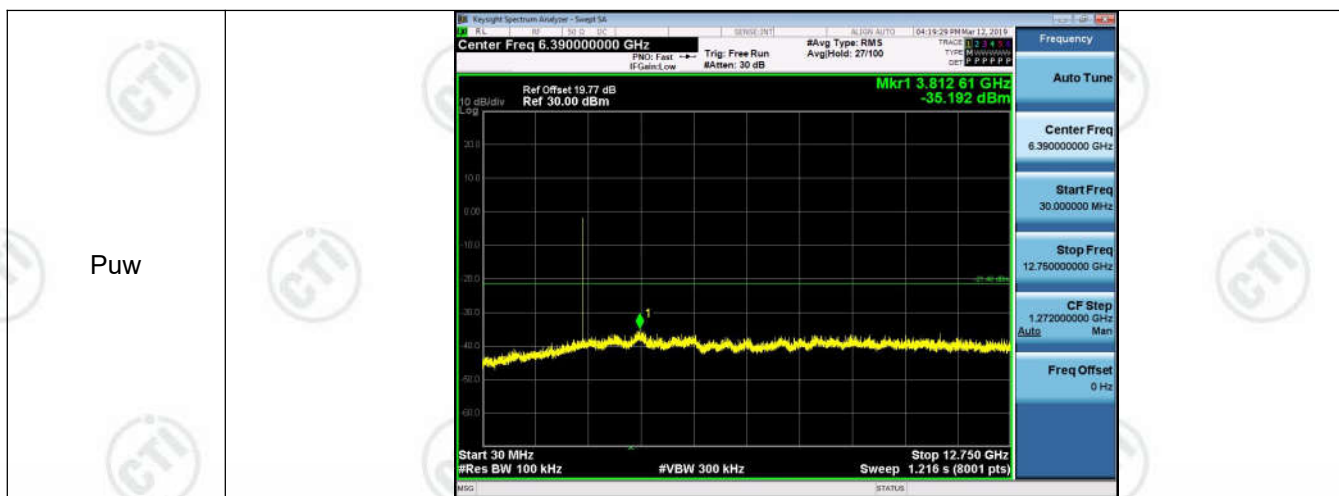
## Appendix G): RF Conducted Spurious Emissions

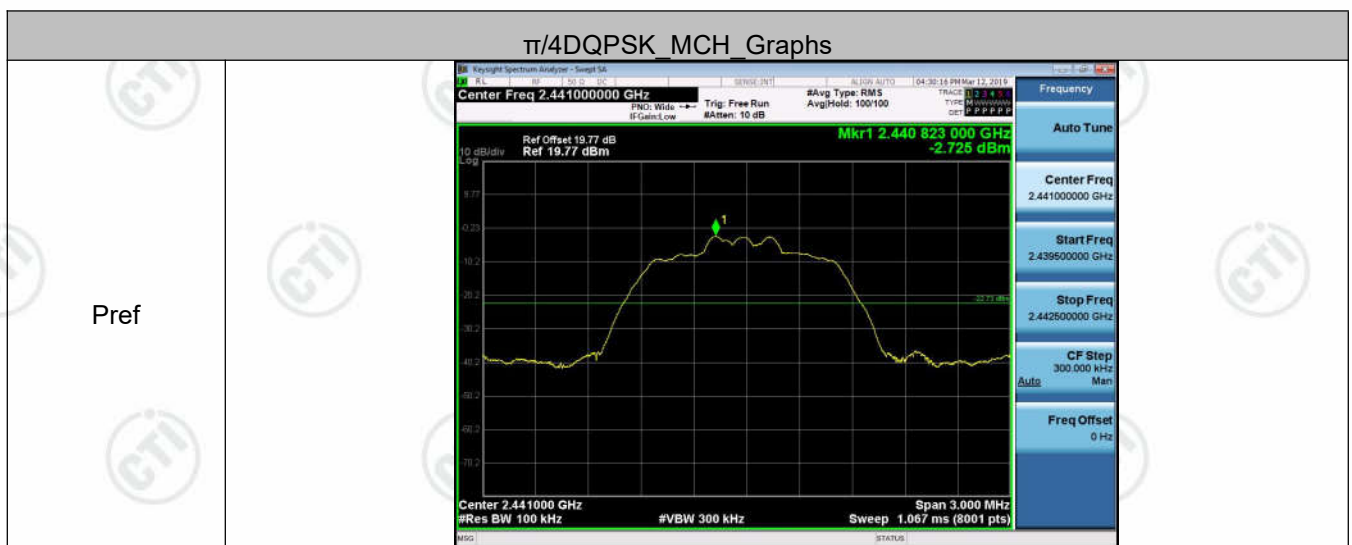
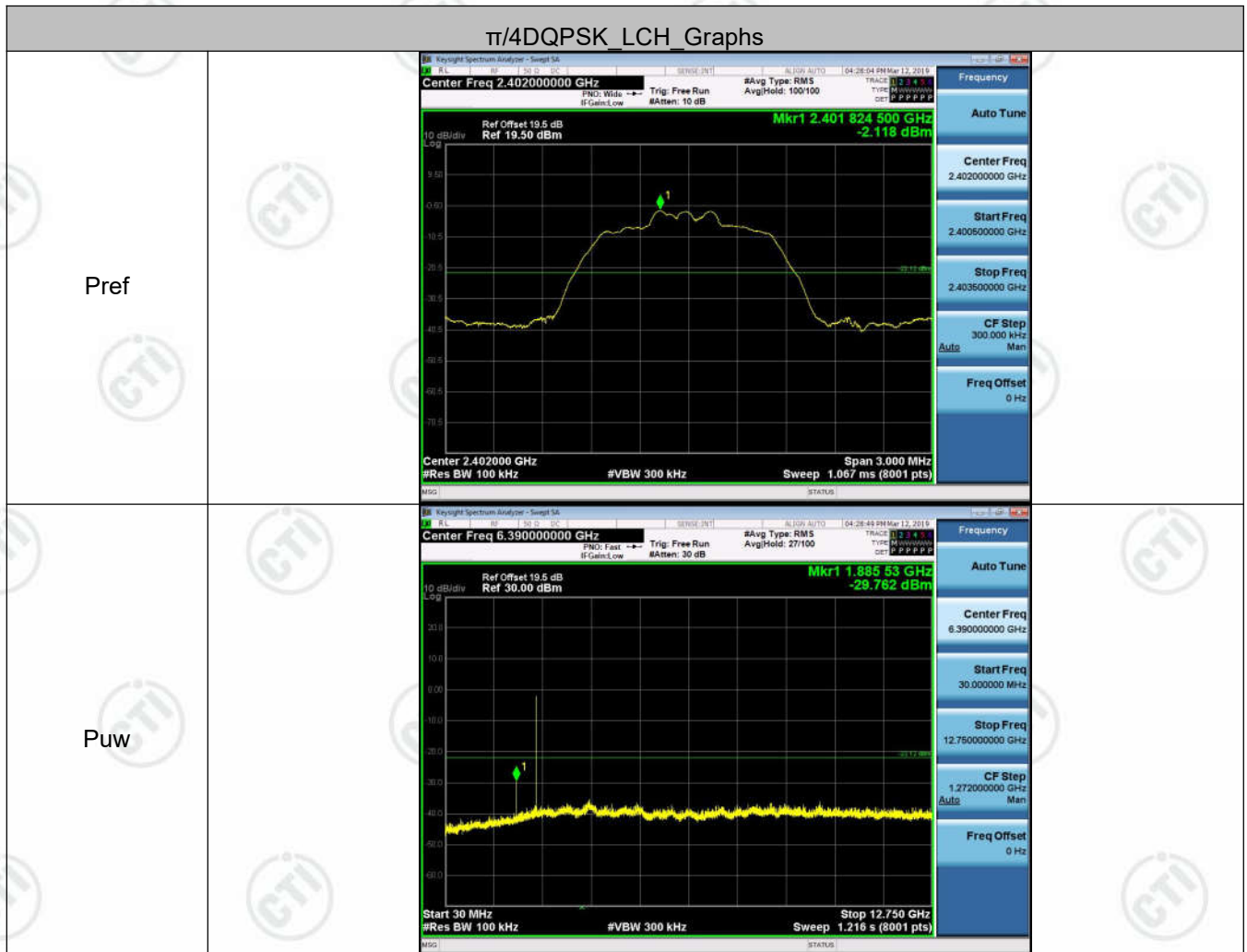
Result Table

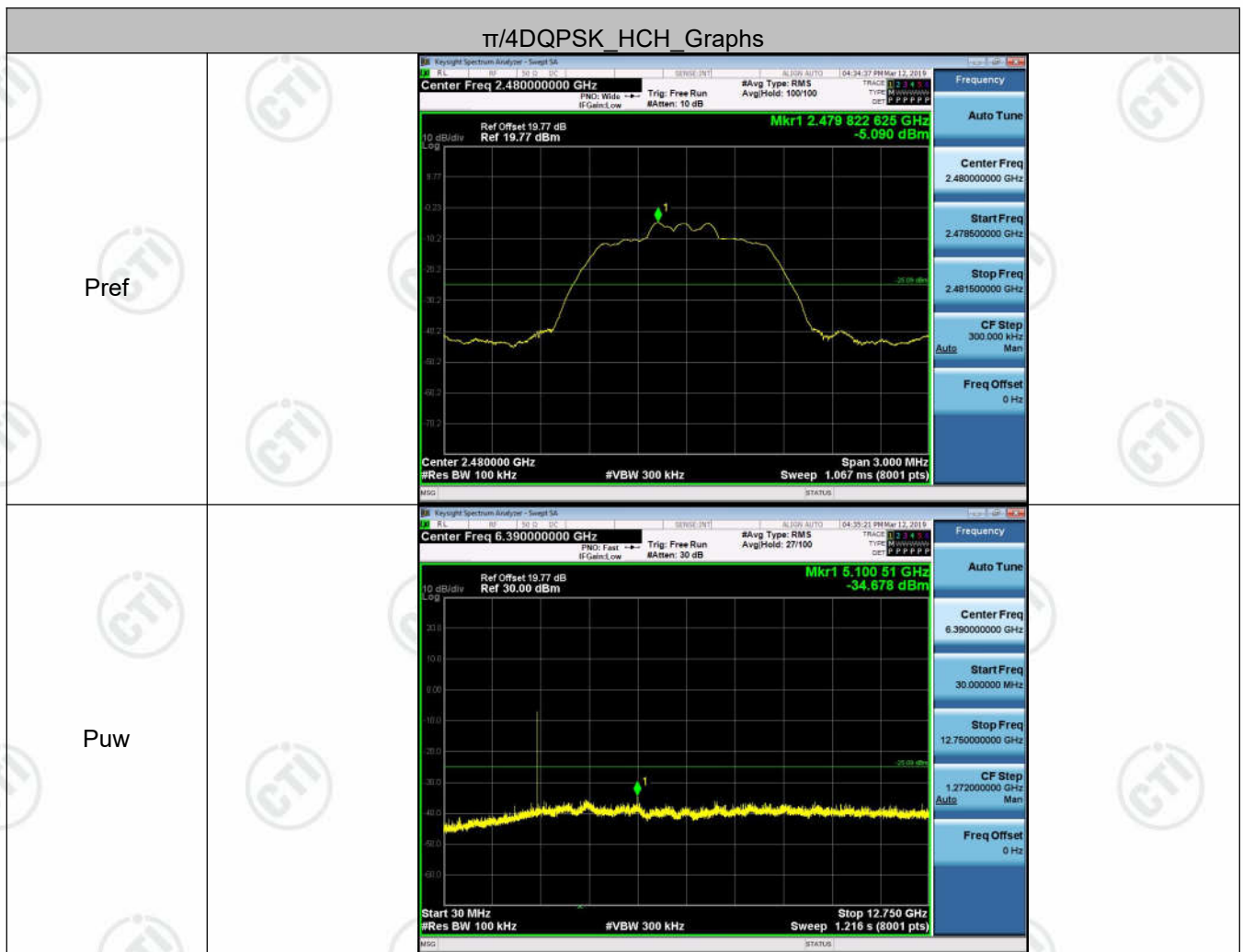
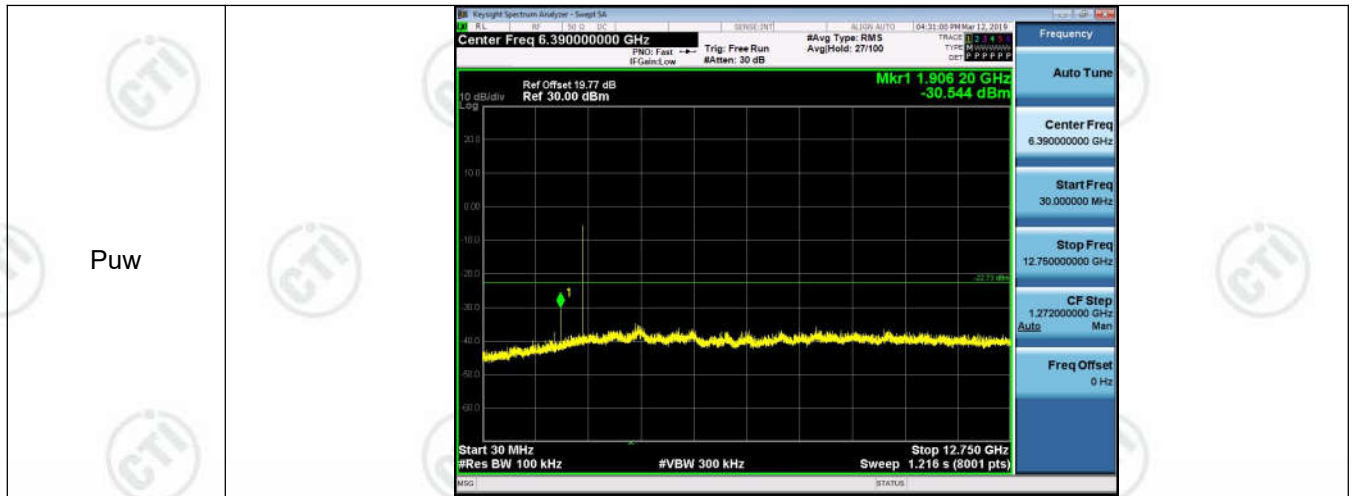
| Mode          | Channel | Pref [dBm] | Puw[dBm] | Verdict |
|---------------|---------|------------|----------|---------|
| GFSK          | LCH     | -2.02      | <Limit   | PASS    |
| GFSK          | MCH     | -1.462     | <Limit   | PASS    |
| GFSK          | HCH     | -3.653     | <Limit   | PASS    |
| $\pi/4$ DQPSK | LCH     | -2.118     | <Limit   | PASS    |
| $\pi/4$ DQPSK | MCH     | -2.725     | <Limit   | PASS    |
| $\pi/4$ DQPSK | HCH     | -5.09      | <Limit   | PASS    |
| 8DPSK         | LCH     | -2.126     | <Limit   | PASS    |
| 8DPSK         | MCH     | -2.858     | <Limit   | PASS    |
| 8DPSK         | HCH     | -5.156     | <Limit   | PASS    |

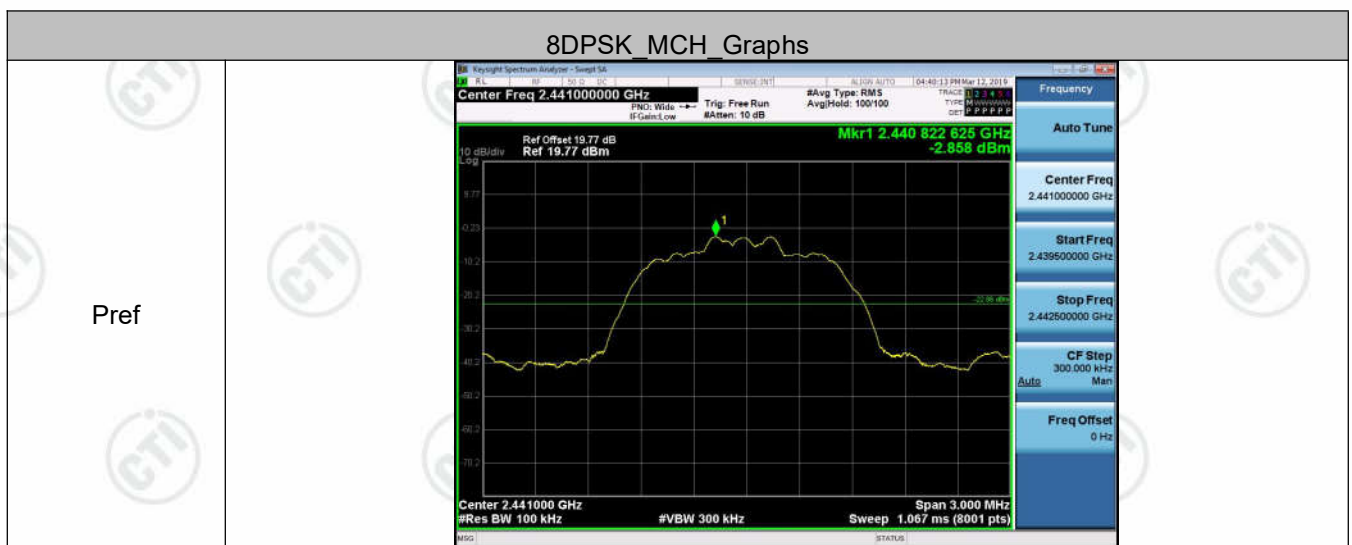
## Test Graph

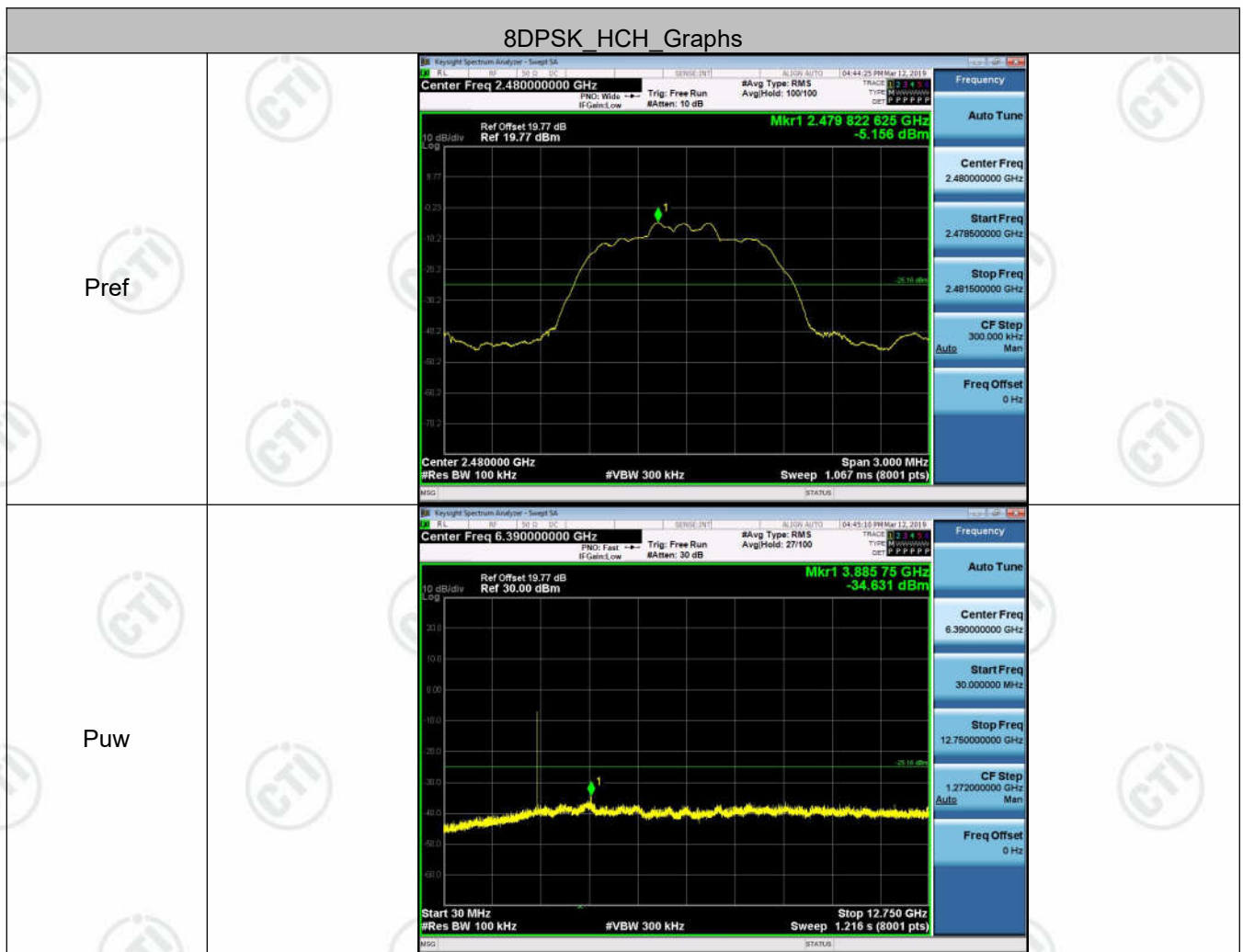
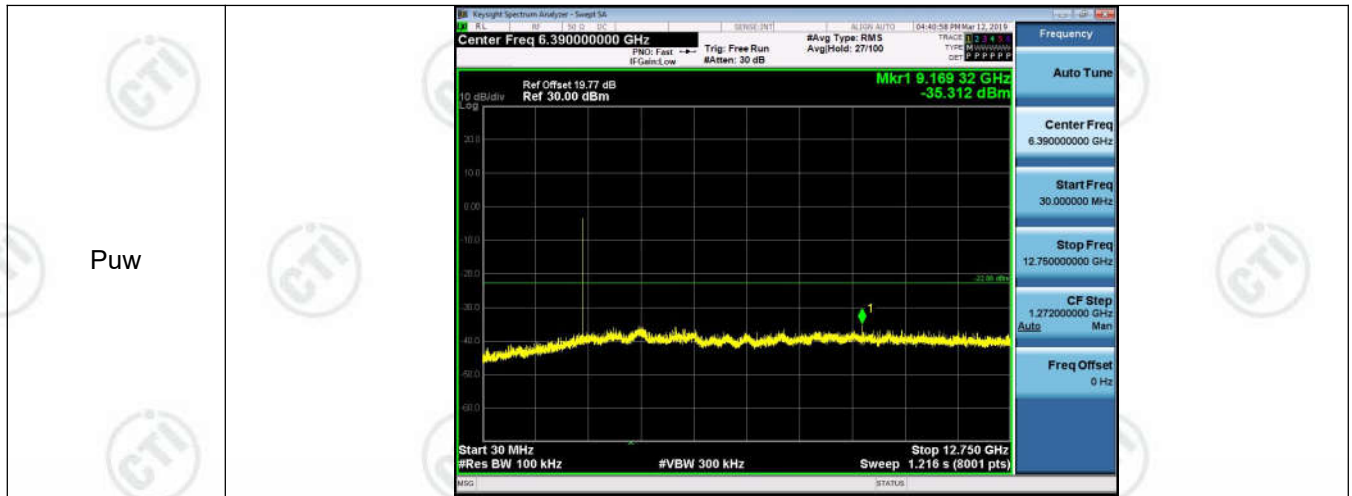




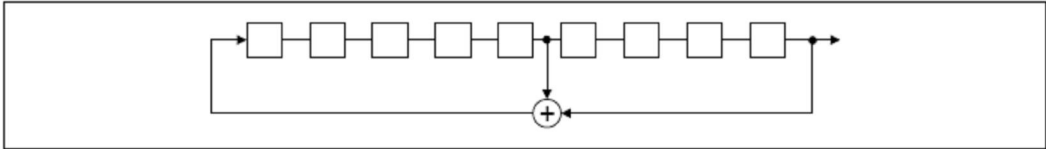








## Appendix H): Pseudorandom Frequency Hopping Sequence

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| <b>Test Requirement:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>47 CFR Part 15C Section 15.247 (a)(1) requirement:</b> |
| <p>Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.</p> <p>Alternatively, Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.</p> |                                                           |
| <b>EUT Pseudorandom Frequency Hopping Sequence</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                           |
| <p>The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES; i.e. the shift register is initialized with nine ones.</p> <ul style="list-style-type: none"> <li>• Number of shift register stages: 9</li> <li>• Length of pseudo-random sequence: <math>2^9 - 1 = 511</math> bits</li> <li>• Longest sequence of zeros: 8 (non-inverted signal)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                           |
| <p><i>Linear Feedback Shift Register for Generation of the PRBS sequence</i></p> <p>An example of Pseudorandom Frequency Hopping Sequence as follow:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                           |
| <p>Each frequency used equally on the average by each transmitter.</p> <p>The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                           |
| <p>The device does not have the ability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                           |

## Appendix I): Antenna Requirement

### 15.203 requirement:

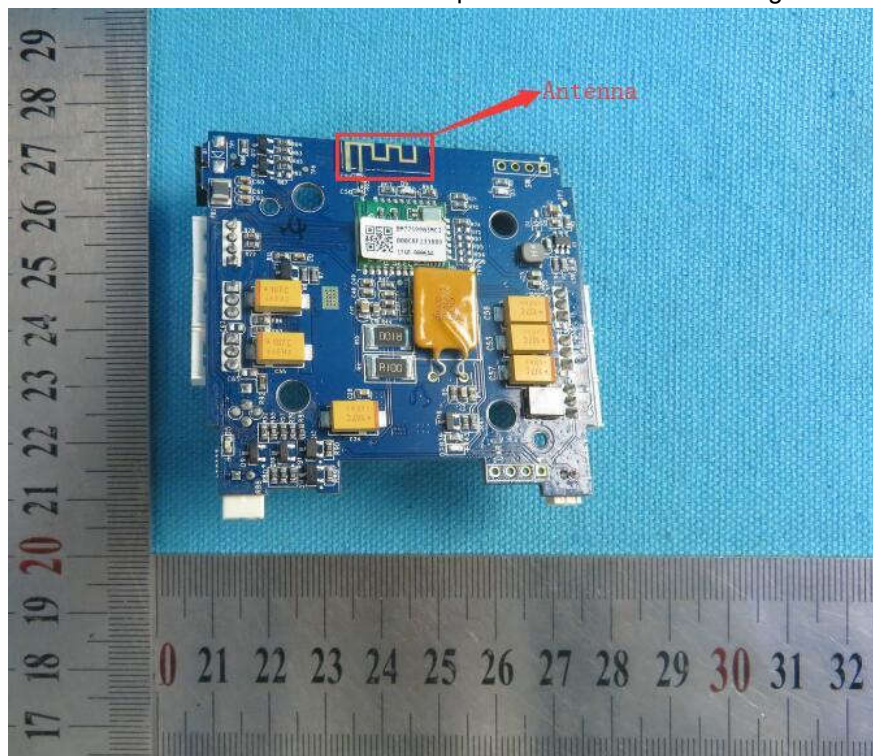
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### 15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### EUT Antenna:

The antenna is PCB antenna and no consideration of replacement. The best case gain of the antenna is 1dBi.



## Appendix J): AC Power Line Conducted Emission

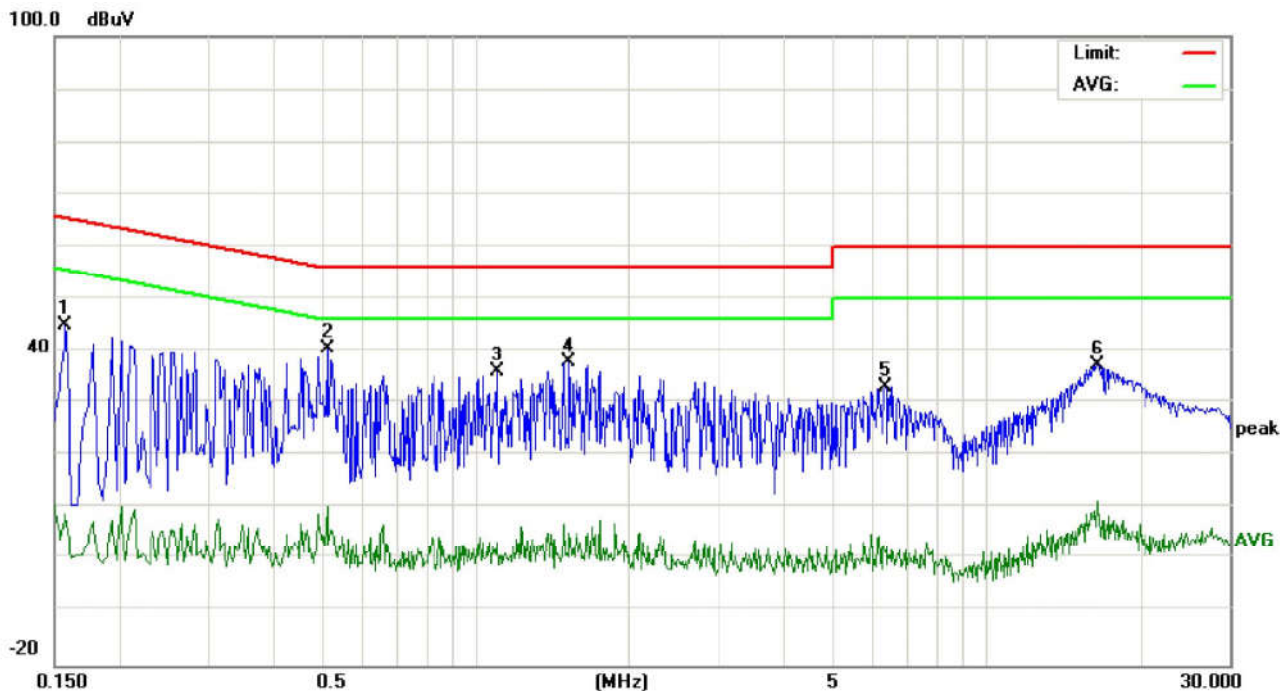
| Test Procedure:       | Test frequency range :150KHz-30MHz<br>1)The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3)The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.<br>5) 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 on conducted measurement. |             |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------|-----------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|
| Limit:                | <table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBμV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><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></table> <p>* The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.<br/>NOTE : The lower limit is applicable at the transition frequency</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                | Frequency range (MHz) | Limit (dBμV) |  | 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 (dBμV)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
|                       | Quasi-peak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Average     |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.15-0.5              | 66 to 56*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 56 to 46*   |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 0.5-5                 | 56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 46          |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| 5-30                  | 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 50          |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Charging mode:        | Charging the EUT through charger.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |
| Test Ambient:         | Temp.: 22°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Humid.: 53% | Press.: 101kPa |                       |              |  |            |         |          |           |           |       |    |    |      |    |    |

### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

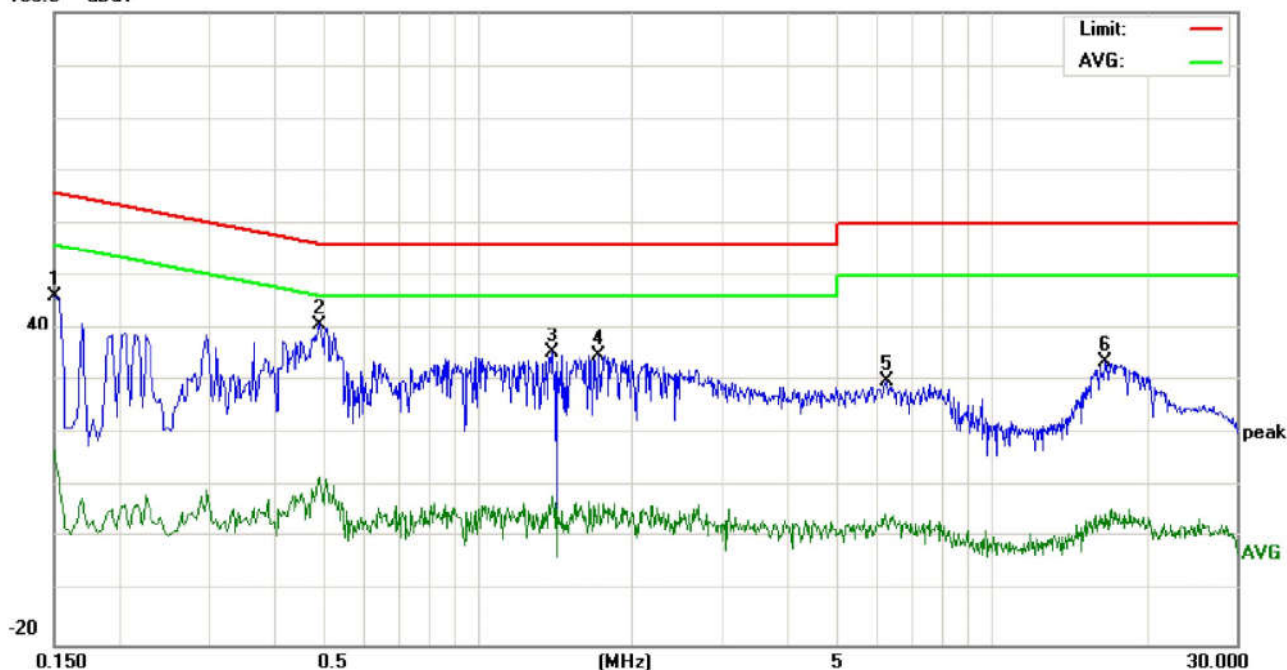
Live line:



| No. | Freq.<br>MHz | Reading_Level<br>(dBuV) |    |       | Correct<br>Factor<br>dB | Measurement<br>(dBuV) |    |       | Limit<br>(dBuV) |       | Margin<br>(dB) |        | P/F | Comment |
|-----|--------------|-------------------------|----|-------|-------------------------|-----------------------|----|-------|-----------------|-------|----------------|--------|-----|---------|
|     |              | Peak                    | QP | AVG   |                         | peak                  | QP | AVG   | QP              | AVG   | QP             | AVG    |     |         |
| 1   | 0.1580       | 34.98                   |    | -1.01 | 9.91                    | 44.89                 |    | 8.90  | 65.56           | 55.56 | -20.67         | -46.66 | P   |         |
| 2   | 0.5140       | 30.48                   |    | 0.41  | 9.91                    | 40.39                 |    | 10.32 | 56.00           | 46.00 | -15.61         | -35.68 | P   |         |
| 3   | 1.1019       | 26.16                   |    | -6.66 | 9.80                    | 35.96                 |    | 3.14  | 56.00           | 46.00 | -20.04         | -42.86 | P   |         |
| 4   | 1.5220       | 27.91                   |    | -4.79 | 9.76                    | 37.67                 |    | 4.97  | 56.00           | 46.00 | -18.33         | -41.03 | P   |         |
| 5   | 6.3700       | 23.27                   |    | -8.18 | 9.74                    | 33.01                 |    | 1.56  | 60.00           | 50.00 | -26.99         | -48.44 | P   |         |
| 6   | 16.4860      | 27.27                   |    | 1.26  | 9.96                    | 37.23                 |    | 11.22 | 60.00           | 50.00 | -22.77         | -38.78 | P   |         |

Neutral line:

100.0 dBuV



| No. | Freq.<br>MHz | Reading_Level<br>(dBuV) |    |       | Correct<br>Factor<br>dB | Measurement<br>(dBuV) |    |       | Limit<br>(dBuV) |       | Margin<br>(dB) |        | P/F | Comment |
|-----|--------------|-------------------------|----|-------|-------------------------|-----------------------|----|-------|-----------------|-------|----------------|--------|-----|---------|
|     |              | Peak                    | QP | AVG   |                         | peak                  | QP | AVG   | QP              | AVG   | QP             | AVG    |     |         |
| 1   | 0.1500       | 36.34                   |    | 7.03  | 9.91                    | 46.25                 |    | 16.94 | 65.99           | 55.99 | -19.74         | -39.05 | P   |         |
| 2   | 0.4940       | 31.01                   |    | 1.93  | 9.89                    | 40.90                 |    | 11.82 | 56.10           | 46.10 | -15.20         | -34.28 | P   |         |
| 3   | 1.3900       | 25.49                   |    | -2.66 | 9.77                    | 35.26                 |    | 7.11  | 56.00           | 46.00 | -20.74         | -38.89 | P   |         |
| 4   | 1.7180       | 25.04                   |    | -3.90 | 9.75                    | 34.79                 |    | 5.85  | 56.00           | 46.00 | -21.21         | -40.15 | P   |         |
| 5   | 6.2900       | 20.17                   |    | -6.84 | 9.74                    | 29.91                 |    | 2.90  | 60.00           | 50.00 | -30.09         | -47.10 | P   |         |
| 6   | 16.6500      | 23.51                   |    | -5.31 | 9.96                    | 33.47                 |    | 4.65  | 60.00           | 50.00 | -26.53         | -45.35 | P   |         |

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

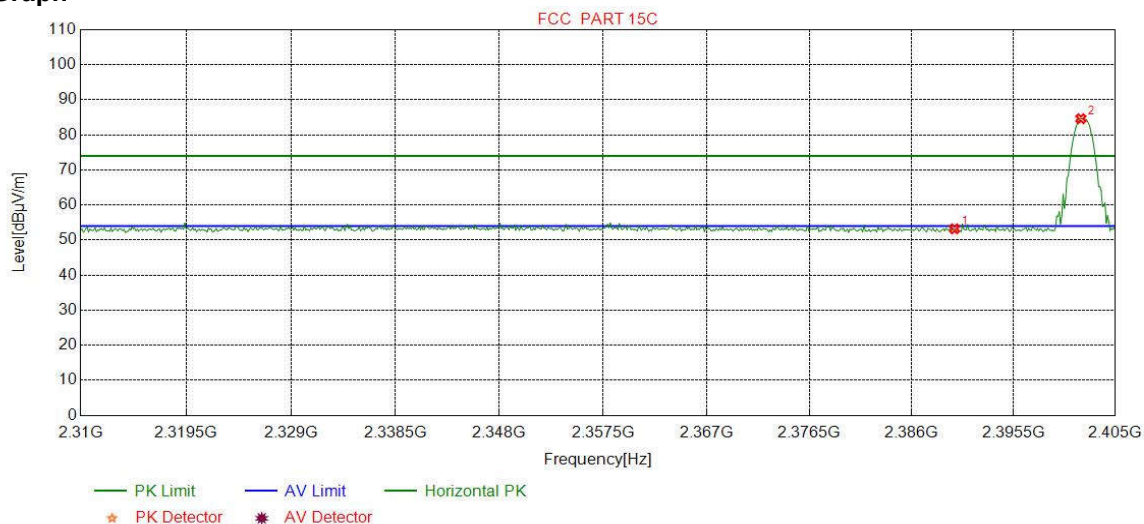
## Appendix K): Restricted bands around fundamental frequency (Radiated)

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                  |        |            |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------|--------|------------|
| Receiver Setup: | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Detector           | RBW              | VBW    | Remark     |
|                 | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Quasi-peak         | 120kHz           | 300kHz | Quasi-peak |
|                 | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Peak               | 1MHz             | 3MHz   | Peak       |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Peak               | 1MHz             | 10Hz   | Average    |
| Test Procedure: | <p><b>Below 1GHz test procedure as below:</b></p> <ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>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.</li> <li>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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li> </ol> <p><b>Above 1GHz test procedure as below:</b></p> <ol style="list-style-type: none"> <li>Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter( Above 18GHz the distance is 1 meter and table is 1.5 meter).</li> <li>b. Test the EUT in the lowest channel , the Highest channel</li> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</li> <li>Repeat above procedures until all frequencies measured was complete.</li> </ol> |                    |                  |        |            |
| Limit:          | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Limit (dBμV/m @3m) | Remark           |        |            |
|                 | 30MHz-88MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 40.0               | Quasi-peak Value |        |            |
|                 | 88MHz-216MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 43.5               | Quasi-peak Value |        |            |
|                 | 216MHz-960MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 46.0               | Quasi-peak Value |        |            |
|                 | 960MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 54.0               | Quasi-peak Value |        |            |
|                 | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 54.0               | Average Value    |        |            |
|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 74.0               | Peak Value       |        |            |
| Test Ambient:   | Temp.: 24°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Humid.: 56%        | Press.: 101kPa   |        |            |

**Test plot as follows:**

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2402 |
| Remark: | Peak              |          |      |

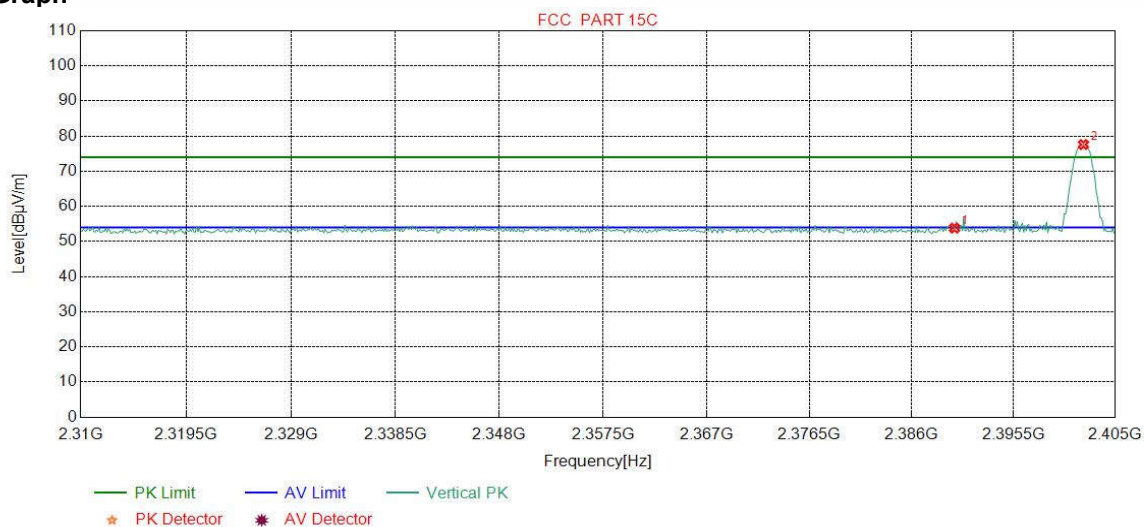
**Test Graph**



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity   |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|------------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 50.02          | 53.20          | 74.00          | 20.80       | Pass   | Horizontal |
| 2  | 2401.7897   | 32.26           | 13.31           | -42.43          | 81.47          | 84.61          | 74.00          | -10.61      | Pass   | Horizontal |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2402 |
| Remark: | Peak              |          |      |

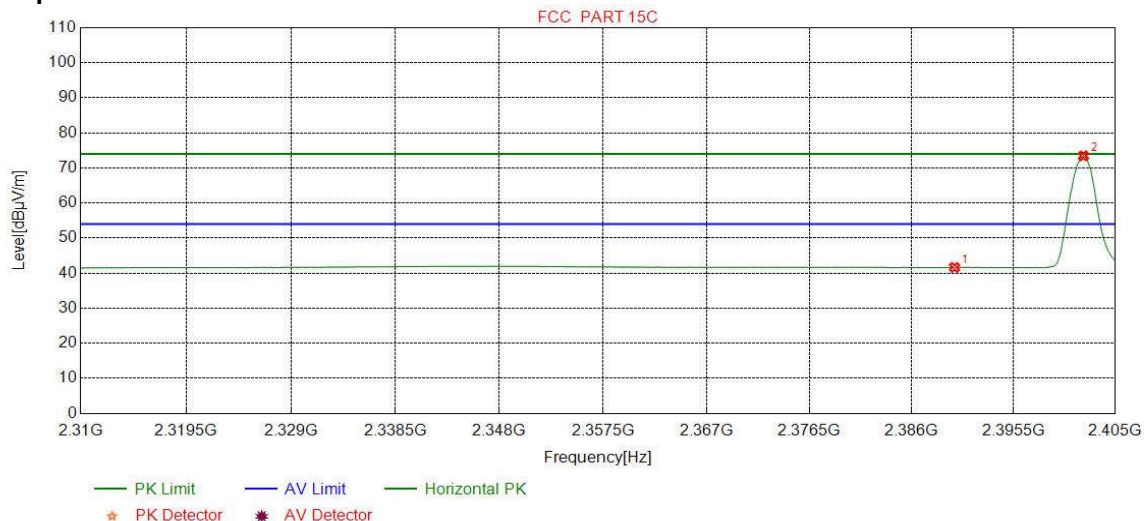
**Test Graph**



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|----------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 50.64          | 53.82          | 74.00          | 20.18       | Pass   | Vertical |
| 2  | 2402.0275   | 32.26           | 13.31           | -42.43          | 74.46          | 77.60          | 74.00          | -3.60       | Pass   | Vertical |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2402 |
| Remark: | AV                |          |      |

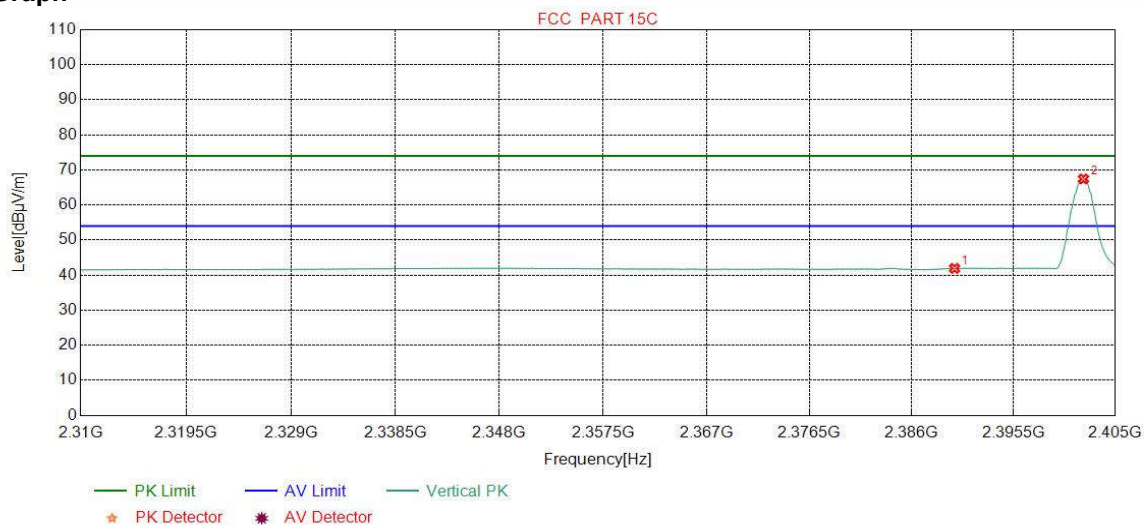
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity   |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|------------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 38.44          | 41.62          | 54.00          | 12.38       | Pass   | Horizontal |
| 2  | 2402.0275   | 32.26           | 13.31           | -42.43          | 70.31          | 73.45          | 54.00          | -19.45      | Pass   | Horizontal |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2402 |
| Remark: | AV                |          |      |

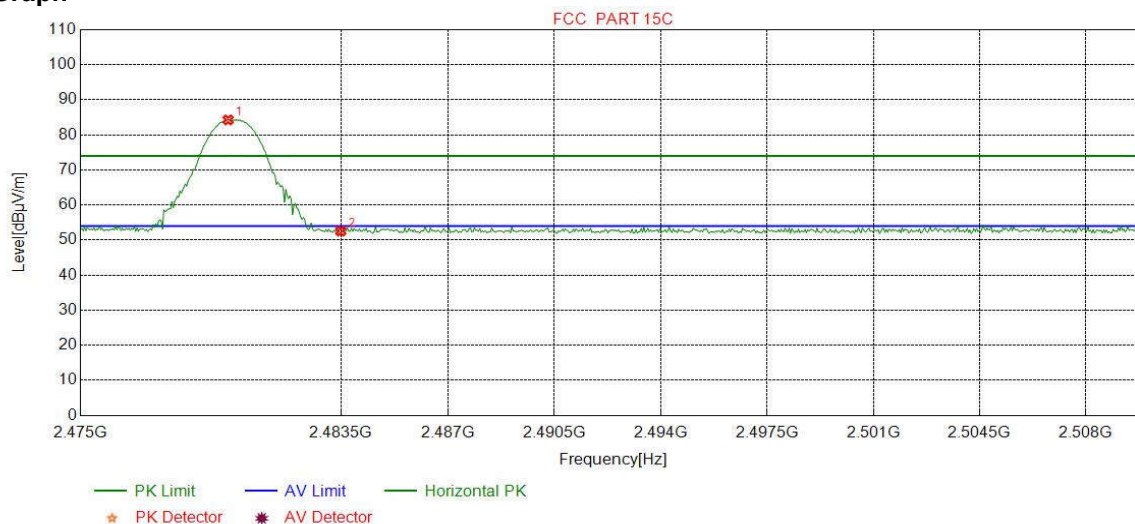
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|----------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 38.73          | 41.91          | 54.00          | 12.09       | Pass   | Vertical |
| 2  | 2402.0275   | 32.26           | 13.31           | -42.43          | 64.28          | 67.42          | 54.00          | -13.42      | Pass   | Vertical |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2480 |
| Remark: | Peak              |          |      |

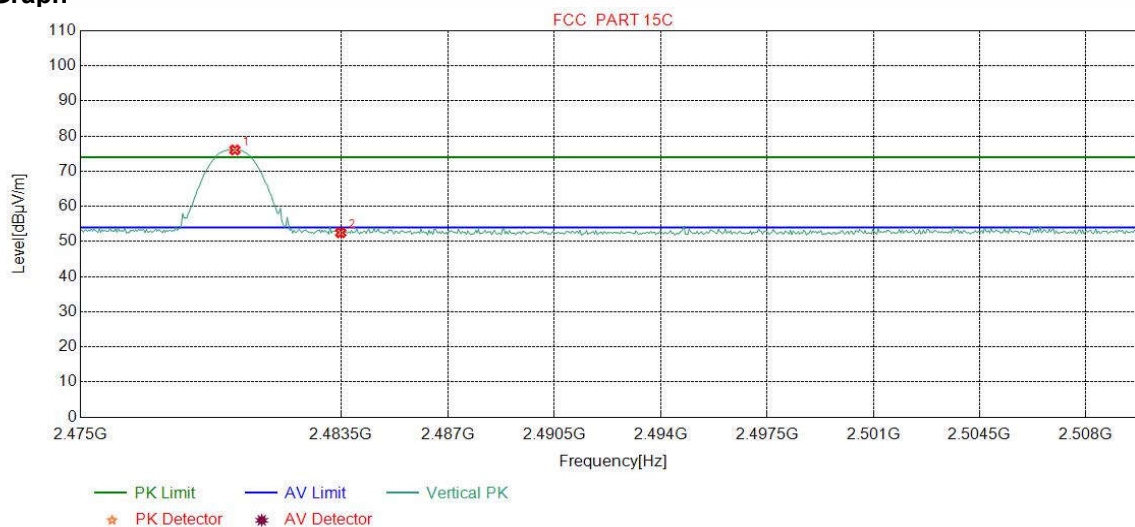
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity   |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|------------|
| 1  | 2479.8185   | 32.37           | 13.39           | -42.39          | 80.90          | 84.27          | 74.00          | -10.27      | Pass   | Horizontal |
| 2  | 2483.5000   | 32.38           | 13.38           | -42.40          | 49.17          | 52.53          | 74.00          | 21.47       | Pass   | Horizontal |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2480 |
| Remark: | Peak              |          |      |

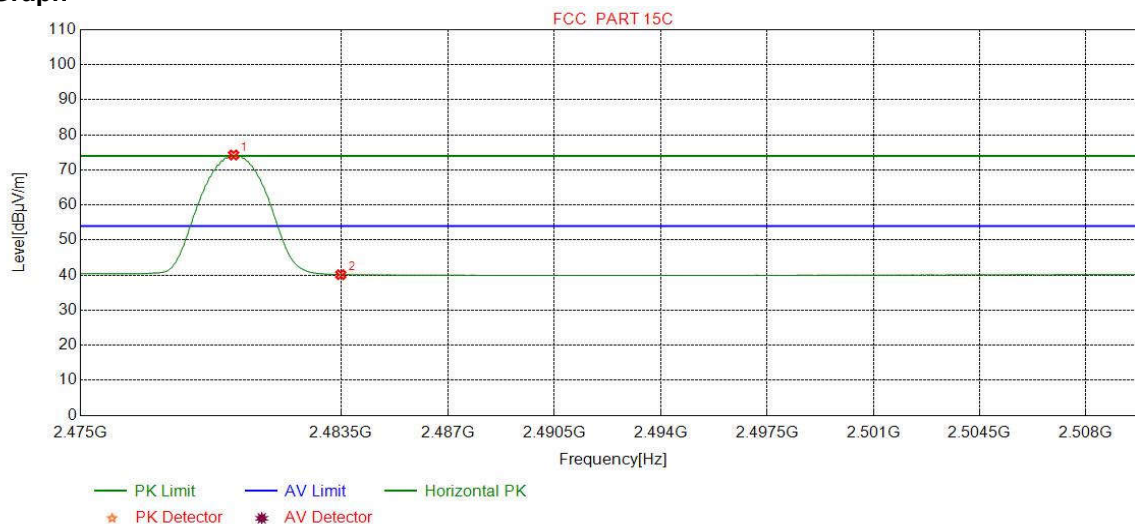
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|----------|
| 1  | 2480.0375   | 32.37           | 13.39           | -42.39          | 72.69          | 76.06          | 74.00          | -2.06       | Pass   | Vertical |
| 2  | 2483.5000   | 32.38           | 13.38           | -42.40          | 49.12          | 52.48          | 74.00          | 21.52       | Pass   | Vertical |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2480 |
| Remark: | AV                |          |      |

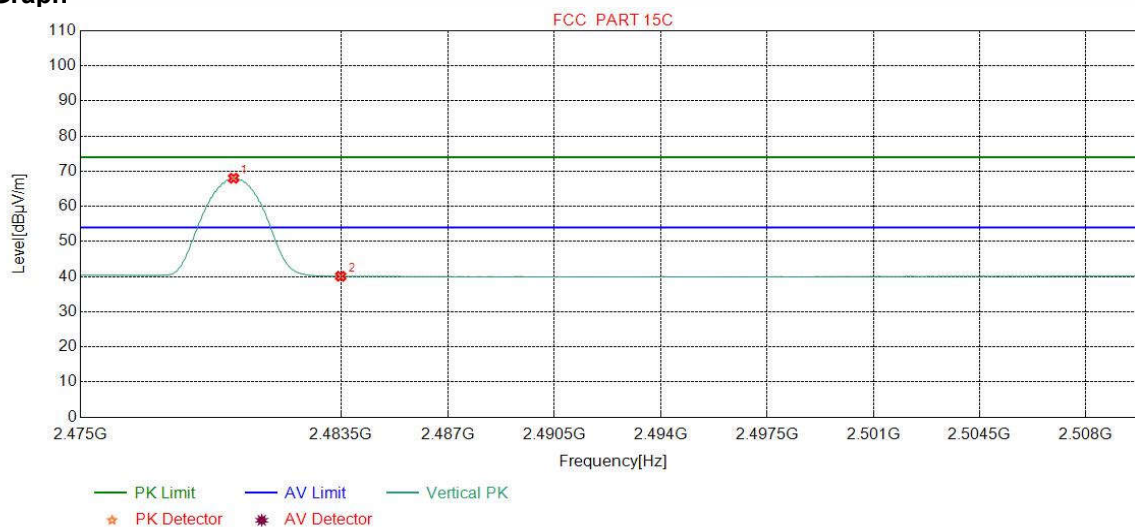
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity   |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|------------|
| 1  | 2479.9937   | 32.37           | 13.39           | -42.39          | 70.89          | 74.26          | 54.00          | -20.26      | Pass   | Horizontal |
| 2  | 2483.5000   | 32.38           | 13.38           | -42.40          | 36.77          | 40.13          | 54.00          | 13.87       | Pass   | Horizontal |

|         |                   |          |      |
|---------|-------------------|----------|------|
| Mode:   | GFSK Transmitting | Channel: | 2480 |
| Remark: | AV                |          |      |

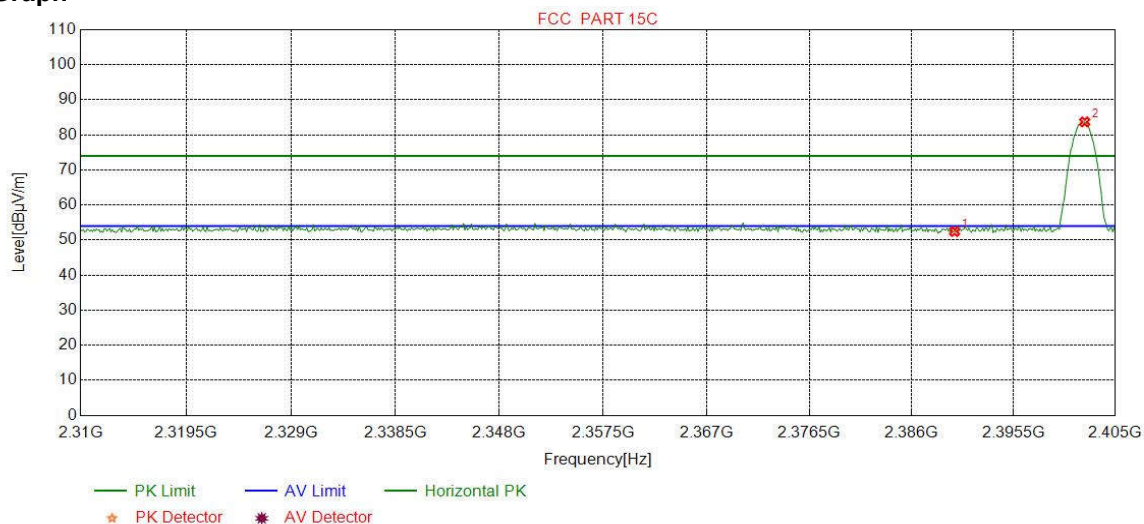
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|----------|
| 1  | 2479.9937   | 32.37           | 13.39           | -42.39          | 64.65          | 68.02          | 54.00          | -14.02      | Pass   | Vertical |
| 2  | 2483.5000   | 32.38           | 13.38           | -42.40          | 36.74          | 40.10          | 54.00          | 13.90       | Pass   | Vertical |

|         |                            |          |      |
|---------|----------------------------|----------|------|
| Mode:   | $\pi/4$ DQPSK Transmitting | Channel: | 2402 |
| Remark: | Peak                       |          |      |

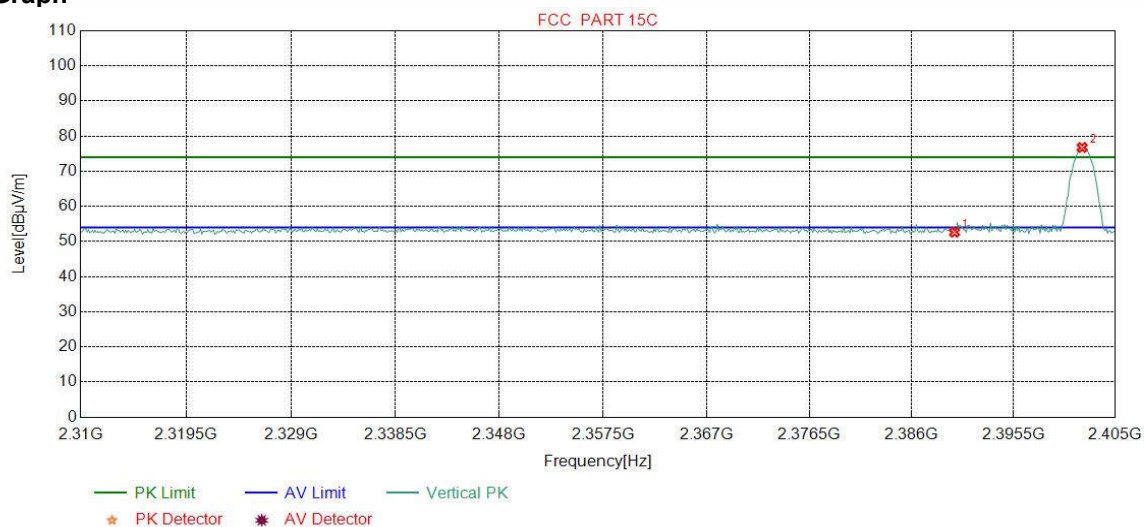
### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity   |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|------------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 49.24          | 52.42          | 74.00          | 21.58       | Pass   | Horizontal |
| 2  | 2402.1464   | 32.26           | 13.31           | -42.43          | 80.56          | 83.70          | 74.00          | -9.70       | Pass   | Horizontal |

|         |                            |          |      |
|---------|----------------------------|----------|------|
| Mode:   | $\pi/4$ DQPSK Transmitting | Channel: | 2402 |
| Remark: | Peak                       |          |      |

### Test Graph



| NO | Freq. [MHz] | Ant Factor [dB] | Cable loss [dB] | Pream gain [dB] | Reading [dBμV] | Level [dBμV/m] | Limit [dBμV/m] | Margin [dB] | Result | Polarity |
|----|-------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------|--------|----------|
| 1  | 2390.0000   | 32.25           | 13.37           | -42.44          | 49.44          | 52.62          | 74.00          | 21.38       | Pass   | Vertical |
| 2  | 2401.9086   | 32.26           | 13.31           | -42.43          | 73.63          | 76.77          | 74.00          | -2.77       | Pass   | Vertical |