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FCC BT REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
October 17, 2023

Test Site/Location:
74, Seoicheon-ro 578 beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2310-FC059

FCC ID:	**A3LSMS926B**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-S926B/DS
Additional Model:	SM-S926B
EUT Type:	Mobile phone
Max. RF Output Power:	Ant.1: 16.647 dBm (46.21 mW) Ant.2: 17.256 dBm (53.16 mW) Dual Ant.1+ Ant.2: 14.702 dBm (29.53 mW)
Frequency Range:	2402 MHz– 2480 MHz (Bluetooth)
Modulation type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS)
FCC Rule Part(s):	Part 15 subpart C 15.247

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance

REVIEWED BY

Report prepared by : Kyung Jun Woo
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

Test Report Statement:
The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2310-FC059	October 17, 2023	- First Approval Report

Table of Contents

REVIEWED BY 2
1. EUT DESCRIPTION 5
ANTENNA CONFIGURATIONS 6
2. Requirements for Bluetooth transmitter(15.247) 7
3. TEST METHODOLOGY 7
EUT CONFIGURATION 7
EUT EXERCISE 8
GENERAL TEST PROCEDURES 8
DESCRIPTION OF TEST MODES 8
4. INSTRUMENT CALIBRATION 9
5. FACILITIES AND ACCREDITATIONS 9
FACILITIES 9
EQUIPMENT 9
6. ANTENNA REQUIREMENTS 9
7. MEASUREMENT UNCERTAINTY 10
8. DESCRIPTION OF TESTS 11
9. SUMMARY OF TEST RESULTS 29
10. TEST RESULT 30
10.1 PEAK POWER 30
10.2 BAND EDGES 39
10.3 FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99 % BW) 49
10.4 NUMBER OF HOPPING FREQUENCY 65
10.5 TIME OF OCCUPANCY (DWELL TIME) 70
10.6 SPURIOUS EMISSIONS 82
10.6.1 CONDUCTED SPURIOUS EMISSIONS 82
10.6.2 RADIATED SPURIOUS EMISSIONS 84
10.6.3 RADIATED RESTRICTED BAND EDGES 107
10.7 POWERLINE CONDUCTED EMISSIONS 115
11. LIST OF TEST EQUIPMENT 117
12. ANNEX A_ TEST SETUP PHOTO 119

1. EUT DESCRIPTION

Model	SM-S926B/DS
Additional Model	SM-S926B
EUT Type	Mobile phone
Power Supply	DC 3.88 V
Frequency Range	2 402 MHz ~ 2 480 MHz
Max. RF Output Power	Ant.1: 16.647 dBm (46.21 mW) Ant.2: 17.256 dBm (53.16 mW) Dual Ant.1+ Ant.2: 14.702 dBm (29.53 mW)
BT Operating Mode	Normal, EDR, AFH
Modulation Type	GFSK(Normal), π/4DQPSK and 8DPSK(EDR)
Modulation Technique	FHSS
Number of Channels	79 Channels, Minimum 20 Channels(AFH)
Date(s) of Tests	August 30, 2023 ~ October 13, 2023
Serial number	Radiated: R3CW70NE10P Conducted : 7414f9c84c0f7ece

ANTENNA CONFIGURATIONS

1. Below Tables are the possible configurations.

Configurations	SISO		Dual BT
	Ant1(Core-0)	Ant2(Core-1)	Ant1 & Ant2
Bluetooth	O	O	O

Amp.	SISO		Dual BT
	Ant1(Core-0)	Ant2(Core-1)	Ant1 & Ant2
ePA Mode	O	O	X
iPA Mode	X	X	O

Note:

O = Support, X = Not Support

2. This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the 2.4 GHz and 5 GHz or 6 GHz Bands simultaneously on each antenna.

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test Case
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on					Scenario1
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on			
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on		Scenario2
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on		
Dual Bluetooth + 5 GHz WiFi MIMO			on	on			on	on	Scenario3
Dual Bluetooth + 6 GHz WiFi MIMO					on	on	on	on	

2. Requirements for Bluetooth transmitter(15.247)

This Bluetooth module has been tested by a Bluetooth Qualification Lab, and we confirm the following:

1) This system is hopping pseudo-randomly.
2) Each frequency is used equally on the average by each transmitter.
3) The receiver input bandwidths that match the hopping channel bandwidths of their corresponding transmitters
4) The receiver shifts frequencies in synchronization with the transmitted signals.
   - 15.247(g): The system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this Section 15.247 should the transmitter be presented with a continuous data (or information) stream.
   - 15.247(h): The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3. TEST METHODOLOGY

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Device (ANSI C63.10-2013, KDB 558074) is used in the measurement of the test device.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013). To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120 kHz for frequencies below 1 GHz or 1 MHz for frequencies above 1 GHz. For average measurements above 1 GHz, the analyzer was set to peak detector and add the D.C.C.F calculations.

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil,

Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 31, 2022 (CAB identifier: KR0032).

EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section."

(1) The antennas of this E.U.T are permanently attached.

(2) The E.U.T Complies with the requirement of §15.203

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, k=2)

8. DESCRIPTION OF TESTS

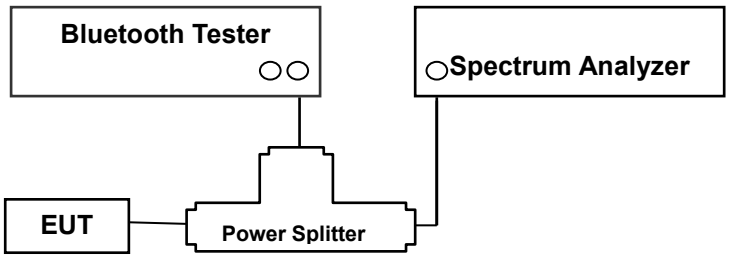
8.1. Conducted Maximum Peak Output Power

Limit

The maximum peak output power of the intentional radiator shall not exceed the following:

1. For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 W. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 W.
2. 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.

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.5 in ANSI 63.10-2013& Procedure 10(b)(6)(i) in KDB 558074 v05r02)

1) Span: approximately 5 times the 20 dB bandwidth, centered on a hopping channel
2) RBW> the 20 dB bandwidth of the emission being measured
3) VBW ≥ RBW
4) Sweep = Auto
5) Detector = Peak
6) Trace = Max hold

Dual BT Sample Calulation.

Ex) Ant 1 : 11.58 dBm Ant 2 : 12.08 dBm

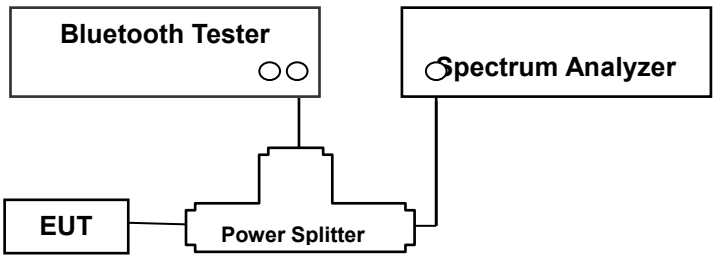
Dual BT(Ant. 1 + Ant. 2) = 11.58 dBm + 12.08 dBm) = (14.387 mW + 16.143 mW) = 30.53 mW = 14.88 dBm

8.2. Conducted Band Edge(Out of Band Emissions)

Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Configuration



Test Procedure

This test is performed with hopping off and hopping on.

The Spectrum Analyzer is set to (6.10.4 in ANSI 63.10-2013& Procedure 8.5 and 8.6 in KDB 558074 v05r02)

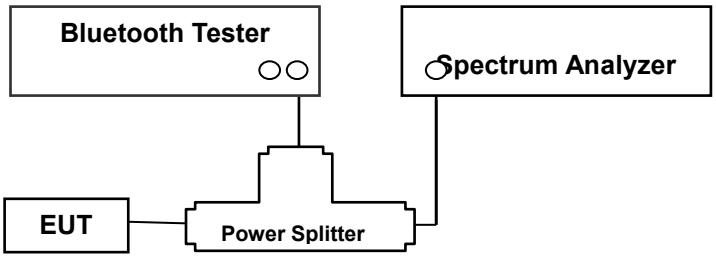
1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation
2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
3) Attenuation: Auto (at least 10 dB preferred).
4) Sweep time: Coupled.
5) RBW: 100 kHz
6) VBW: 300 kHz
7) Detector: Peak
8) Trace: Max hold

8.3. Frequency Separation & 20 dB Bandwidth

Limit

According to §15.247(a)(1), 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.

Test Configuration



Test Procedure(Frequency Separation)

The Channel Separation test is performed with hopping on.
And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.2 in ANSI 63.10-2013 & Procedure 10(b)(6)(iii) in KDB 558074 v05r02)

1) Span: Wide enough to capture the peaks of two adjacent channels
2) RBW: Start with the RBW set to approximately 30 % of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3) VBW ≥ RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize.
8) Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

Test Procedure (20 dB Bandwidth)

And the 20 dB Bandwidth test is performed with hopping off.

The Spectrum Analyzer is set to (6.9.2 in ANSI 63.10-2013)

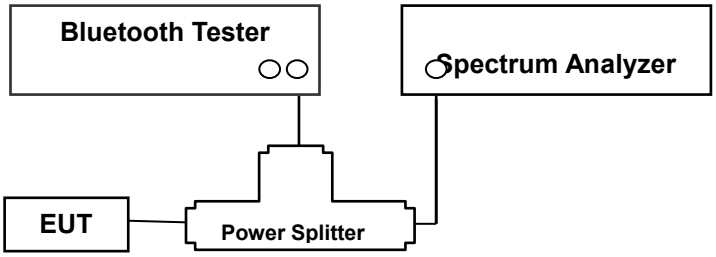
1) Span: Set between two times and five times the OBW
2) RBW: 1 % to 5 % of the OBW.
3) VBW ≥ 3 x RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) All the trace to stabilize.

8.4. Number of Hopping Frequencies

Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



Test Procedure

The Bluetooth frequency hopping function of the EUT was enabled.

The Spectrum Analyzer is set to (7.8.3 in ANSI 63.10-2013 & Procedure 10(b)(4) in KDB 558074 v05r02)

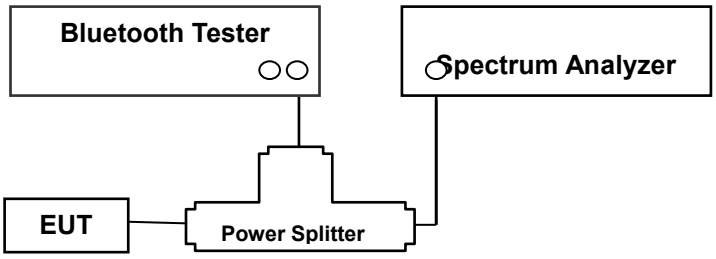
1) Span: the frequency band of operation
2) RBW: To identify clearly the individual channels, set the RBW to less than 30 % of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3) VBW ≥ RBW
4) Sweep: Auto
5) Detector: Peak
6) Trace: Max hold
7) Allow the trace to stabilize.

8.5. Time of Occupancy

Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



Test Procedure

This test is performed with hopping off.

The Spectrum Analyzer is set to (7.8.4 in ANSI 63.10-2013& Procedure 10(b)(6)(iv) in KDB 558074 v05r02)

1) Span: Zero span, centered on a hopping channel
2) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3) Sweep = as necessary to capture the entire dwell time per hopping channel
4) Detector: Peak
5) Trace: Max hold

The marker-delta function was used to determine the dwell time.

Sample Calculation

The following calculation process is not relevant to our measurement results. It is just an example.

(1) Non-AFH Mode

- DH 5 (GFSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (1600/6)/79 x 31.6 = 308.27 (ms)

(2) AFH Mode

- DH 5 (GFSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 2-DH 5 (π/4DQPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)
- 3-DH 5 (8DPSK) : 2.890 x (800/6)/20 x 8.0 = 154.13 (ms)

Note :

DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving.

Then the system makes worst case 1600/6 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.667 times of appearance.

Each tx-time per appearance of DH5 is 2.890 ms.

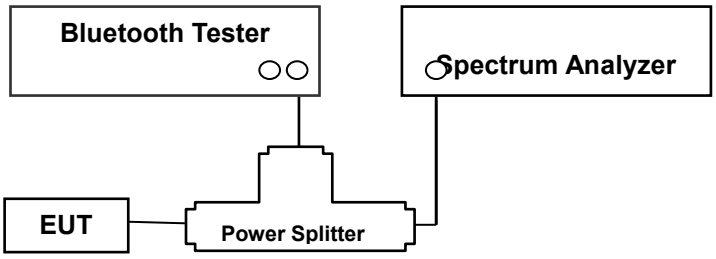
Dwell time = Tx-time x 106.667 = 308.27 (ms)

8.6. Conducted Spurious Emissions

Limit

Conducted > 20 dBc

Test Configuration



Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to (7.8.8 in ANSI 63.10-2013& Procedure 8.5 and 8.6 in KDB 558074 v05r02)

1) Span:30 MHz to 10 times the operating frequency in GHz.
2) RBW: 100 kHz
3) VBW: 300 kHz
4) Sweep: Coupled
5) Detector: Peak

Measurements are made over the 30 MHz to 25 GHz range with the transmitter set to the lowest, middle, and highest channels.

This test is performed with hopping off.

Factors for frequency

Freq(MHz)	Factor(dB)
30	16.98
100	17.06
200	17.14
300	17.27
400	17.33
500	17.35
600	17.35
700	17.39
800	17.43
900	17.46
1 000	17.50
2 000	17.77
2 400	17.74
2 500	17.74
3 000	17.98
4 000	18.16
5 000	18.36
6 000	18.36
7 000	18.47
8 000	18.46
9 000	18.65
10 000	18.77
11 000	18.90
12 000	19.04
13 000	19.13
14 000	19.25
15 000	19.36
16 000	19.44
17 000	19.56
18 000	19.58
19 000	19.57
20 000	19.62
21 000	19.65
22 000	19.72
23 000	19.88
24 000	19.89
25 000	19.91
26 000	19.97

Note : 1. 2400 ~ 2500 MHz is fundamental frequency range.

2. Factor = Cable loss(2 EA) + Splitter loss(6 dB)

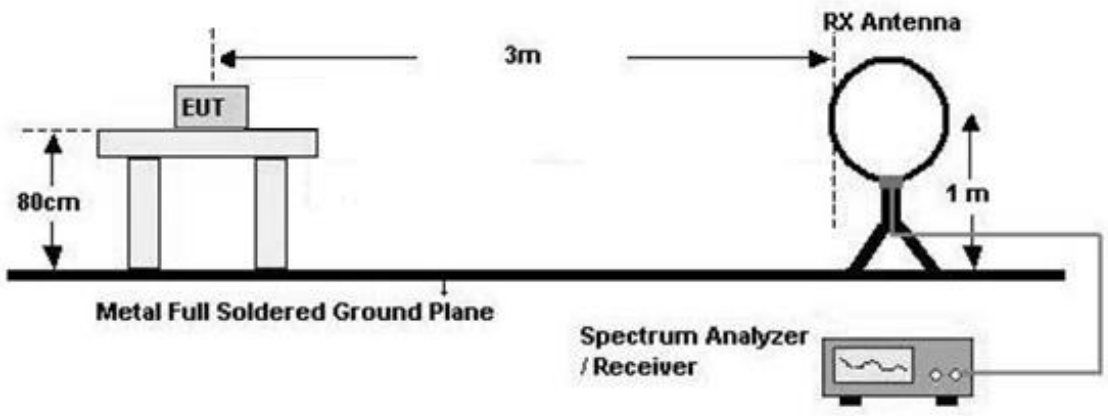
8.7. Radiated Test

Limit

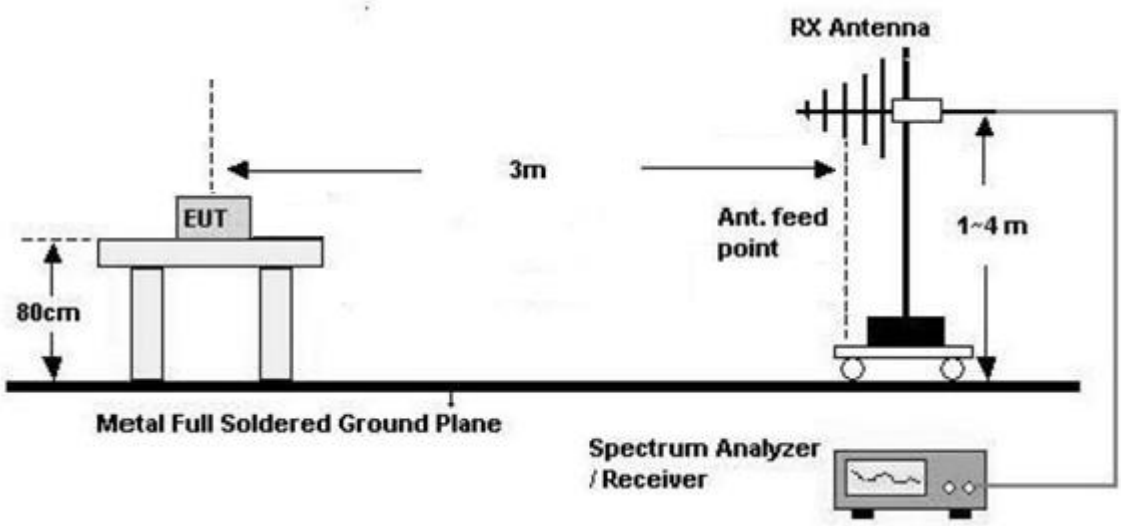
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

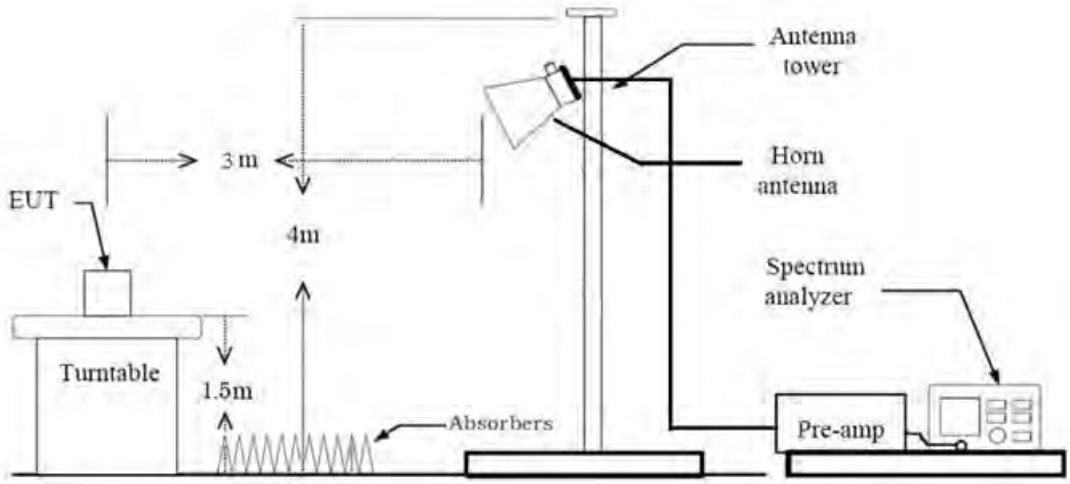
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) =40log(3 m/300 m)= - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) =40log(3 m/30 m)= - 40 dB
   Measurement Distance : 3 m

8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW

9.Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
   - Measured Frequency Range : 30 MHz – 1 GHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 100 kHz
   - VBW ≥ 3 x RBW

   (2) Measurement Type(Quasi-peak):
   - Measured Frequency Range : 30 MHz – 1 GHz
   - Detector = Quasi-Peak
   - RBW = 120 kHz

   ※In general, (1) is used mainly

7.Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)

8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond

the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting

(1) Measurement Type(Peak):

- Measured Frequency Range : 1 GHz – 25 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 1 MHz
- VBW ≥ 3 x RBW

(2) Measurement Type(Average):

- Average value of pulsed emissions
- Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission and pulsed operation is employed, the average measurement shall determine from the peak field strength after correcting for the worst-case duty cycle as described in Number.14 (On Page. 23)

◆ Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7314 dB

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
11. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
12. Total

(1)Measurement(Peak)

= Measured Value(Peak)

(2)Measurement(Avg)

= Measured Value(Peak) + D.C.C.F(AFH)

- We apply to the offset in range 1 GHz - 18 GHz
- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp.Gain(A.G)

Test Procedure of Radiated Restricted Band Edge

1. Radiated test is performed with hopping off.
2. The EUT is placed on a turntable, which is 1.5 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak):
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 1 MHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Average):
      - Average value of pulsed emissions
      - Unless otherwise specified, when the radiated emission limits are expressed in terms of the average value of the emission and pulsed operation is employed, the average measurement shall determine from the peak field strength after correcting for the worst-case duty cycle as described in Number.14 (On Page. 23)
   ◆ Duty Cycle Correction(AFH) = 20log (Worst Case Dwell Time/ 100ms) dB = -24.7314 dB
9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total
   (1)Measurement(Peak)
      = Measured Value(Peak)
   (2)Measurement(Avg)
      = Measured Value(Peak) + D.C.C.F(AFH)
   - We apply to the offset in range 1 GHz - 18 GHz
   - The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)

8.8. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.
5. The EUT is the device operating below 30MHz.
   - For unterminated the Antenna, the AC line conducted tests are performed with the antenna connected
   - For terminated the Antenna, the AC line conducted tests are performed with a dummy load connected to the EUT antenna output terminal.

Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

8.9. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone etc)
   - Worstcase : Stand alone
2. EUT Axis
   (1) Ant.1
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : X
   (2) Ant.2
      - Radiated Spurious Emissions : Y
      - Radiated Restricted Band Edge : Y
   (3) Dual Ant.1+ Ant.2
      - Radiated Spurious Emissions : X
      - Radiated Restricted Band Edge :Y
3. All data rate of operation were investigated and the test results are worst case in highest datarate of each mode.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5
4. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
5. SM-S926B/DS, SM-S926B were tested and the worst case results are reported.

(Worst case : SM-S926B/DS)

Radiated test(DBS)

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, Keyboard, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : X, Y
3. All of RSDB Scenario were investigated and the worst case configuration results are reported.

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5 GHz WiFi Ant.1	5 GHz WiFi Ant.2	6 GHz WiFi Ant.1	6 GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test Case
2.4 GHz WiFi MIMO + 5 GHz WiFi MIMO	on	on	on	on					Scenario1
2.4 GHz WiFi MIMO + 6 GHz WiFi MIMO	on	on			on	on			
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO		on	on	on			on		Scenario2
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 6 GHz WiFi MIMO		on			on	on	on		
Dual Bluetooth + 5 GHz WiFi MIMO			on	on			on	on	Scenario3
Dual Bluetooth + 6 GHz WiFi MIMO					on	on	on	on	

4. The RSDB mode test investigated both intermodulation and radiated spurious emissions.
   And the worst results were reported.
   - Worst result: Radiated spurious emissions
   - Intermodulation: No signals are generated.
   - Radiated spurious emissions: cf. Section 10.6.2.

5. The following tables show the worst case configurations determined during testing.
(Worst case: The lowest margin condition the channels and modes were selected for test.)

RSDB Scenario 2	Description	Bluetooth Emission	2.4GHz Emission	5 GHz Emission
Bluetooth ANT.1 + 2.4 GHz WiFi ANT.2 + 5 GHz WiFi MIMO	Antenna	ANT1	ANT2	Ant All
	Channel	39	11	100
	Data Rate	1 Mbps	1 Mbps	6 Mbps
	Mode	GFSK	802.11b	802.11a

Note : DTS, UNII RSDB Data refer to [DTS], [UNII] Test Report

RSDB Scenario 3	Description	Bluetooth Emission	5 GHz Emission
Dual Bluetooth + 5 GHz WiFi MIMO	Antenna	Dual	Ant All
	Channel	0	100
	Data Rate	1 Mbps	6 Mbps
	Mode	GFSK	802.11a

Note : UNII RSDB Data refer to [UNII] Test Report

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone+ External accessories(Earphone,etc)+Travel Adapter
     Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter
2. SM-S926B/DS, SM-S926B were tested and the worst case results are reported.
   (Worst case : SM-S926B/DS)

Conducted test

1. The EUT was configured with data rate of highest power.
   - GFSK : DH5
   - π/4DQPSK : 2-DH5
   - 8DPSK : 3-DH5
2. AFH & Non-AFH were tested and the worst case results are reported.
   (Worst case : Non-AFH)
3. SM-S926B/DS, SM-S926B were tested and the worst case results are reported.
(Worst case : SM-S926B/DS)

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
20 dB Bandwidth	§15.247(a)(1)	N/A	Conducted	PASS
Occupied Bandwidth	N/A	N/A		N/A
Conducted Maximum Peak Output Power	§15.247(b)(1)	<0.125 W		PASS
Carrier Frequency Separation	§15.247(a)(1)	>25 kHz or >2/3 of the 20 dB BW		PASS
Number of Hopping Frequencies	§15.247(a)(1)(iii)	≥ 15		PASS
Time of Occupancy	§15.247(a)(1)(iii)	<400 ms		PASS
Conducted Spurious Emissions	§15.247(d)	> 20 dB for all out-of band emissions		PASS
Band Edge (Out of Band Emissions)	§15.247(d)	> 20 dB for all out-of band emissions		PASS
AC Power line Conducted Emissions	§15.207(a)	cf. Section 8.8		PASS
Radiated Spurious Emissions	§15.247(d), 15.205, 15.209	cf. Section 8.7	Radiated	PASS
Radiated Restricted Band Edge	§15.247(d), 15.205, 15.209	cf. Section 8.7		PASS

Note: Average Power data refer to SAR report

10. TEST RESULT

10.1 PEAK POWER

[Ant.1]

Channel	Frequency (MHz)	Output Power (GFSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	15.380	34.51	125
Mid	2441	15.623	36.50	
High	2480	16.647	46.21	

Channel	Frequency (MHz)	Output Power (8DPSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	13.938	24.76	125
Mid	2441	14.539	28.44	
High	2480	15.591	36.23	

Channel	Frequency (MHz)	Output Power (π/4DQPSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	13.375	21.75	125
Mid	2441	14.020	25.23	
High	2480	14.933	31.14	

[Ant.2]

Channel	Frequency (MHz)	Output Power (GFSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	15.581	36.15	125
Mid	2441	15.557	35.95	
High	2480	17.256	53.16	

Channel	Frequency (MHz)	Output Power (8DPSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	14.490	28.12	125
Mid	2441	14.713	29.60	
High	2480	16.220	41.88	

Channel	Frequency (MHz)	Output Power (π/4DQPSK)		Limit (mW)
		(dBm)	(mW)	
Low	2402	14.014	25.20	125
Mid	2441	14.150	26.00	
High	2480	15.675	36.94	

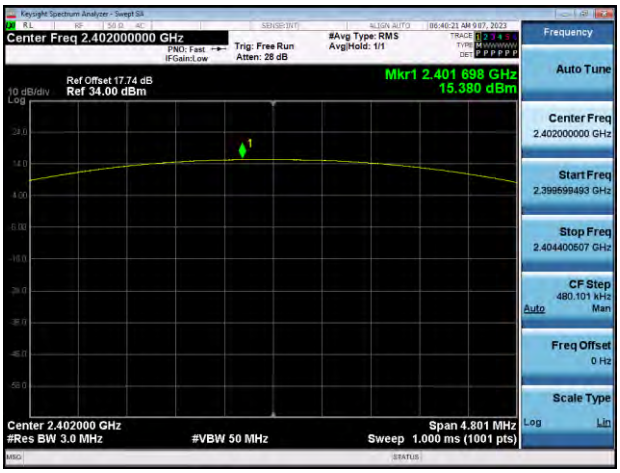
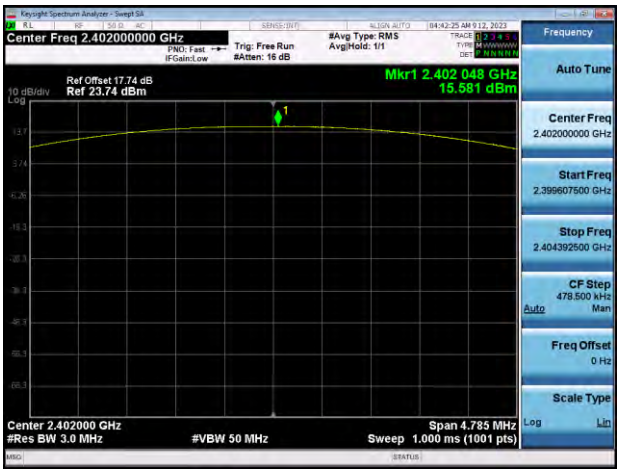
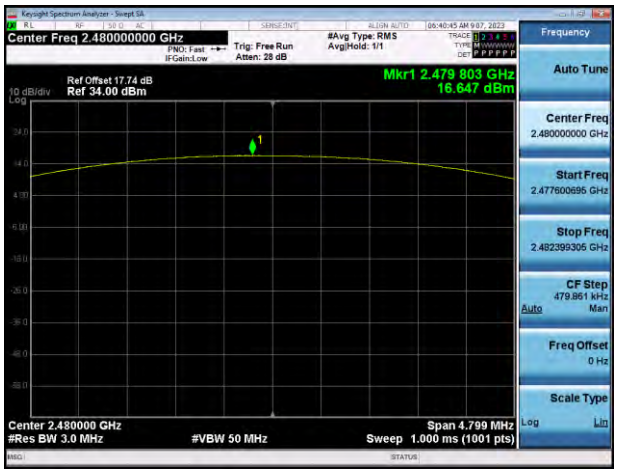
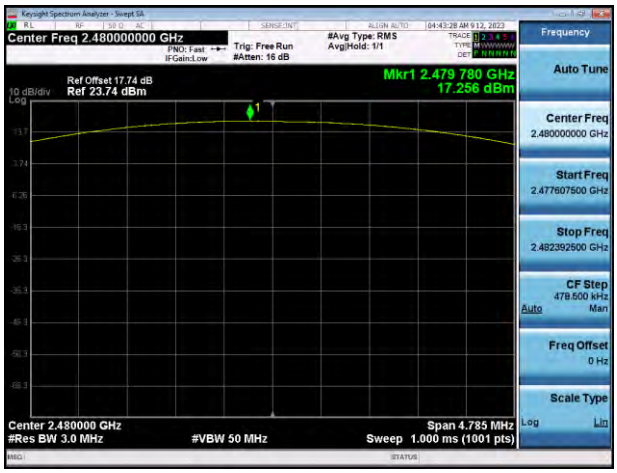
[Dual Ant.1 + Ant. 2]

Channel	Frequency (MHz)	GFSK						Limit (mW)
		Dual Ant. 1		Dual Ant. 2		Dual(Ant. 1 + Ant. 2)		
		(dBm)	(mW)	(dBm)	(mW)	(dBm)	(mW)	
Low	2402	12.017	15.91	11.341	13.62	14.702	29.53	125
Mid	2441	11.820	15.21	11.153	13.04	14.510	28.25	
High	2480	10.955	12.46	11.754	14.98	14.383	27.44	

Channel	Frequency (MHz)	8DPSK						Limit (mW)
		Dual Ant. 1		Dual Ant. 2		Dual(Ant. 1 + Ant. 2)		
		(dBm)	(mW)	(dBm)	(mW)	(dBm)	(mW)	
Low	2402	11.735	14.91	11.341	13.62	14.553	28.53	125
Mid	2441	11.238	13.30	10.424	11.03	13.860	24.32	
High	2480	10.861	12.19	10.764	11.92	13.823	24.12	

Channel	Frequency (MHz)	π/4DQPSK						Limit (mW)
		Dual Ant. 1		Dual Ant. 2		Dual(Ant. 1 + Ant. 2)		
		(dBm)	(mW)	(dBm)	(mW)	(dBm)	(mW)	
Low	2402	11.260	13.37	10.896	12.29	14.092	25.66	125
Mid	2441	10.706	11.77	10.030	10.07	13.391	21.83	
High	2480	10.294	10.70	10.126	10.29	13.221	20.99	

▣ TEST PLOTS

ANT.1 GFSK : Peak Power (CH.0)	ANT.2 GFSK : Peak Power (CH.0)
	
ANT.1 GFSK : Peak Power (CH.39)	**ANT.2 GFSK : Peak Power (CH.39)**
	
ANT.1 GFSK : Peak Power (CH.78)	**ANT.2 GFSK : Peak Power (CH.78)**
	

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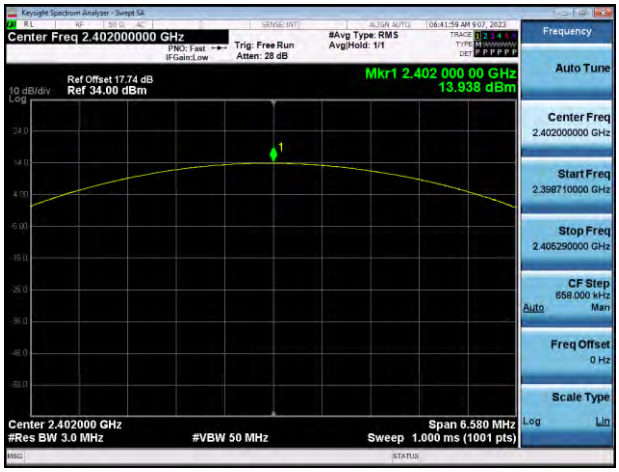	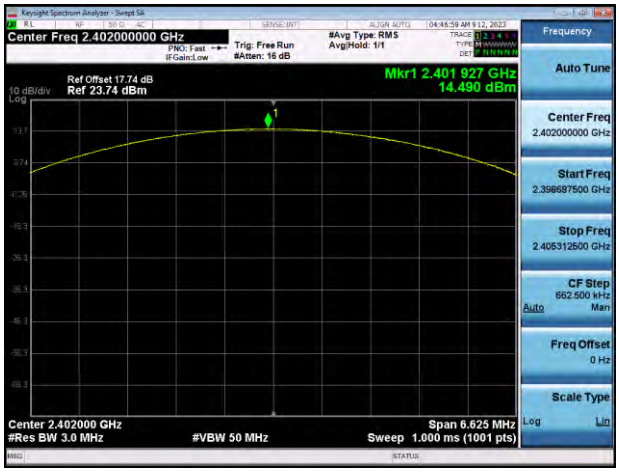
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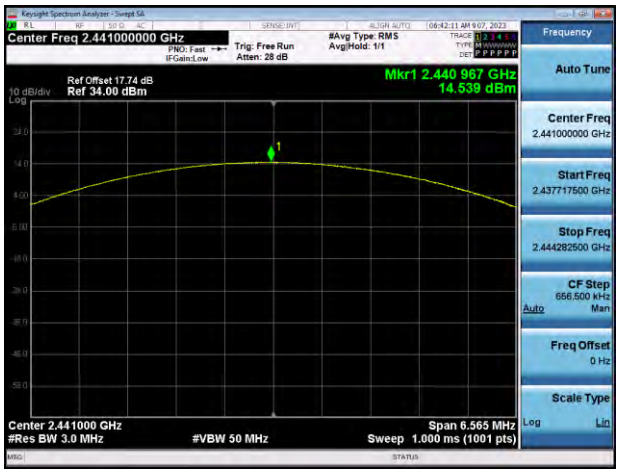	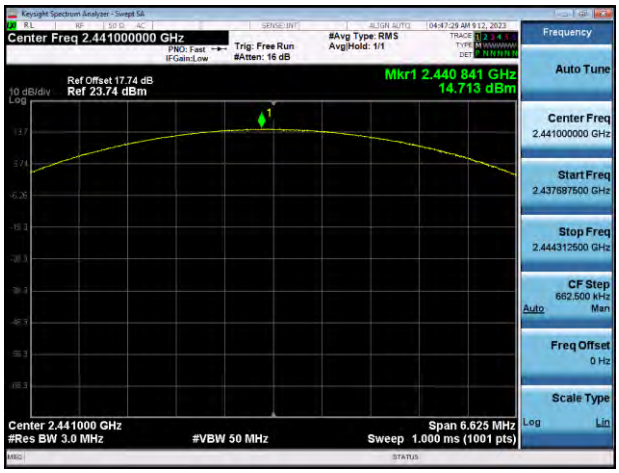
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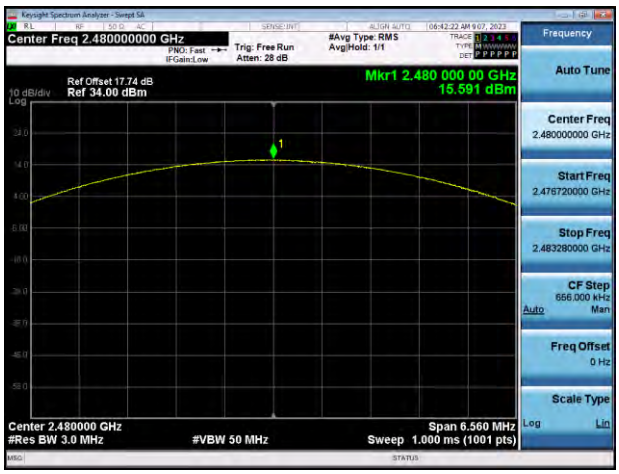
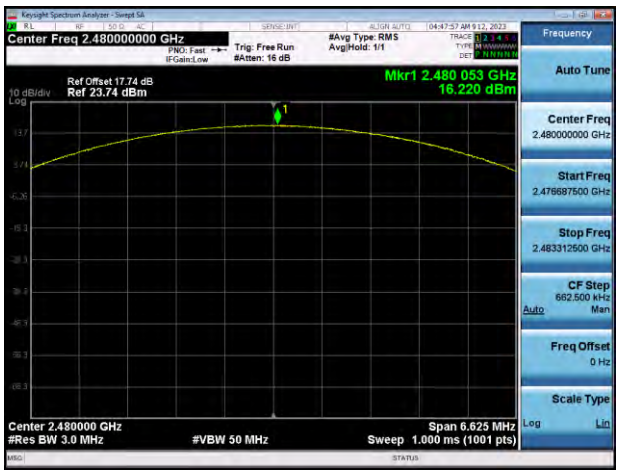
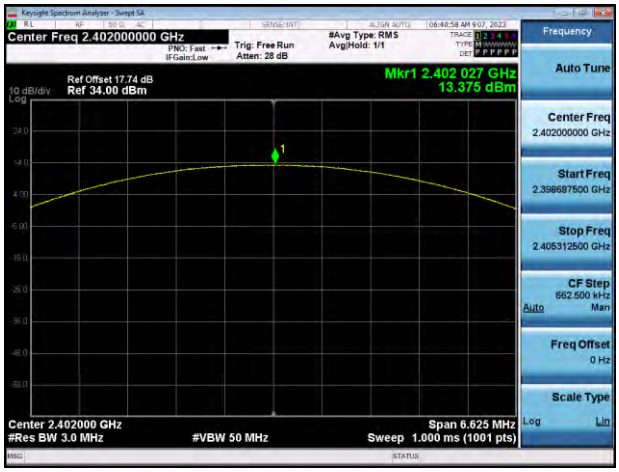
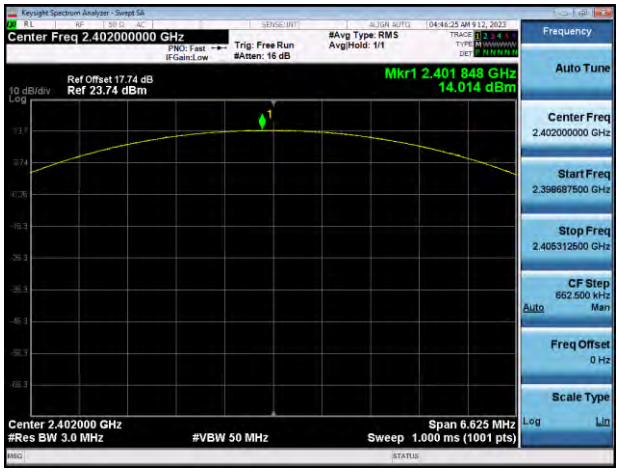
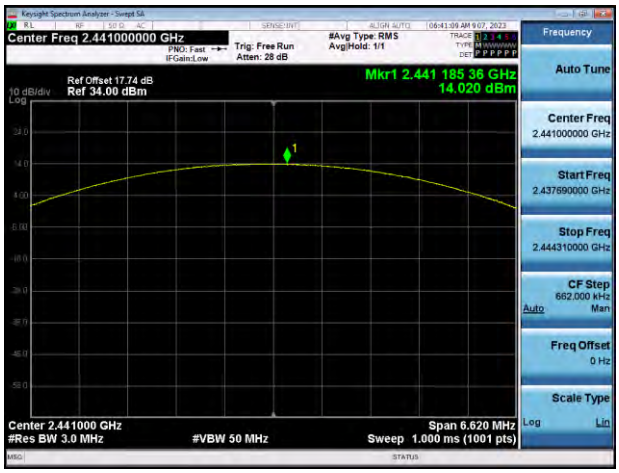
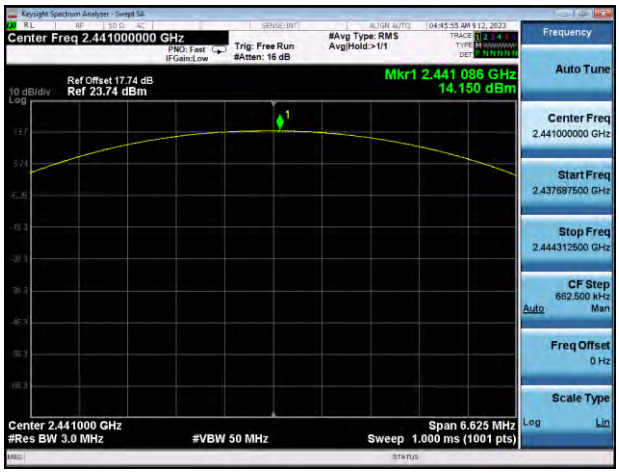
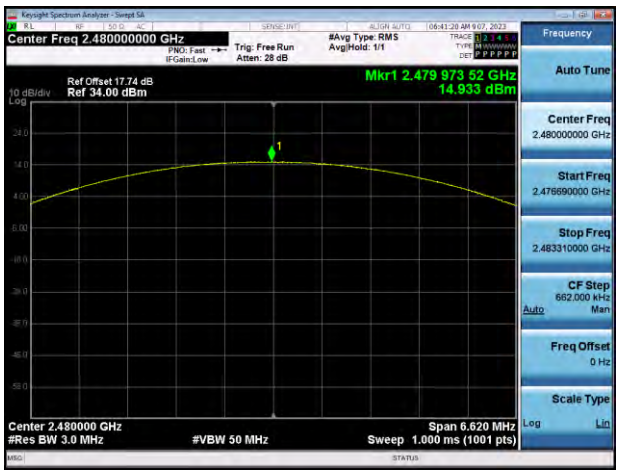
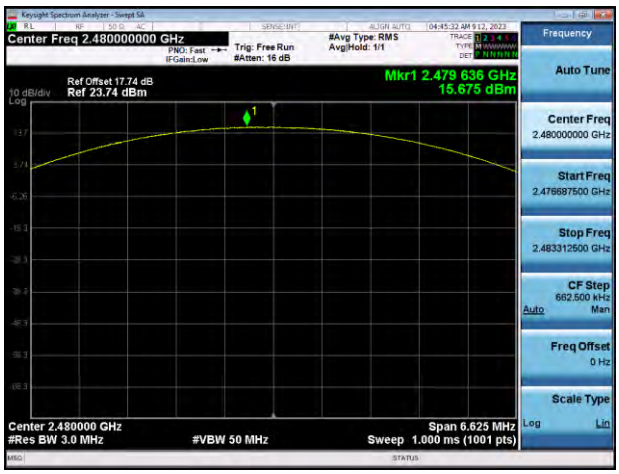
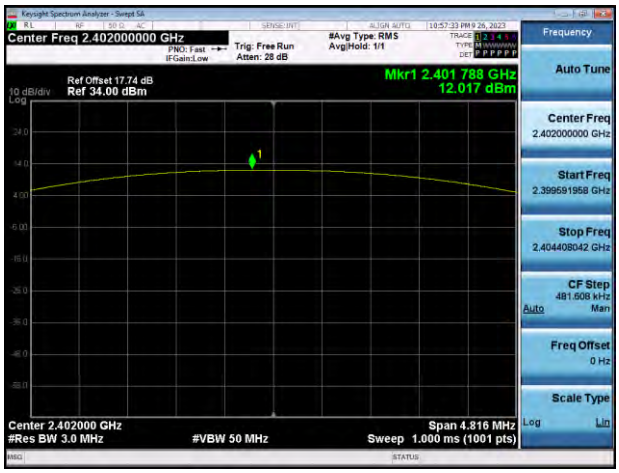
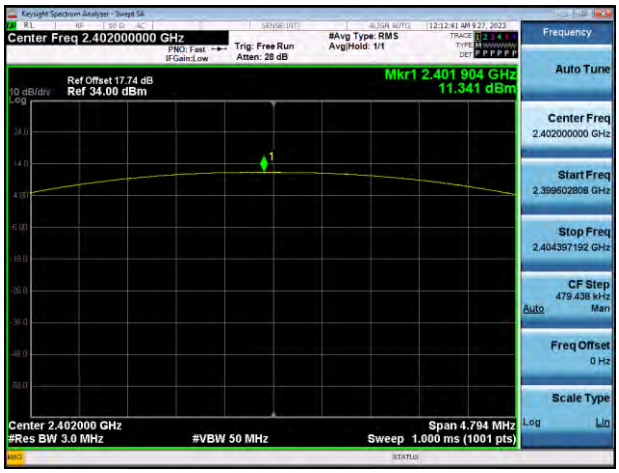
	

ANT.1 π/4DQPSK : Peak Power (CH.0)	ANT.2 π/4DQPSK : Peak Power (CH.0)
	
ANT.1 π/4DQPSK : Peak Power (CH.39)	**ANT.2 π/4DQPSK : Peak Power (CH.39)**
	
ANT.1 π/4DQPSK : Peak Power (CH.78)	**ANT.2 π/4DQPSK : Peak Power (CH.78)**
	

[Dual ANT]

Dual ANT.1 GFSK : Peak Power (CH.0)	Dual ANT.2 GFSK : Peak Power (CH.0)
	
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	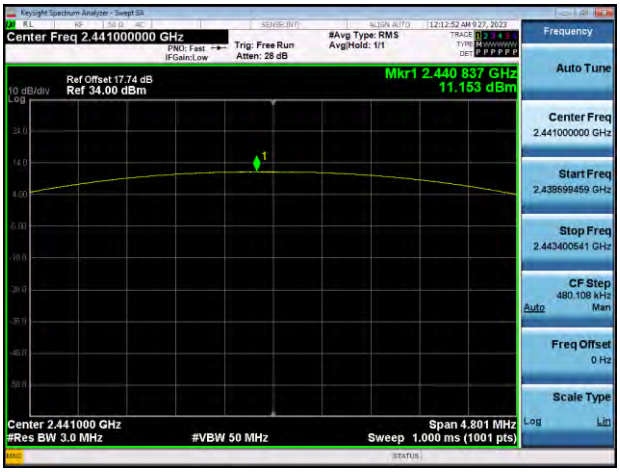
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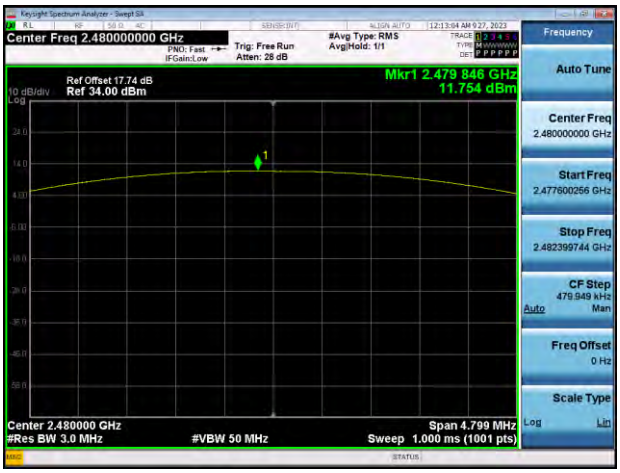
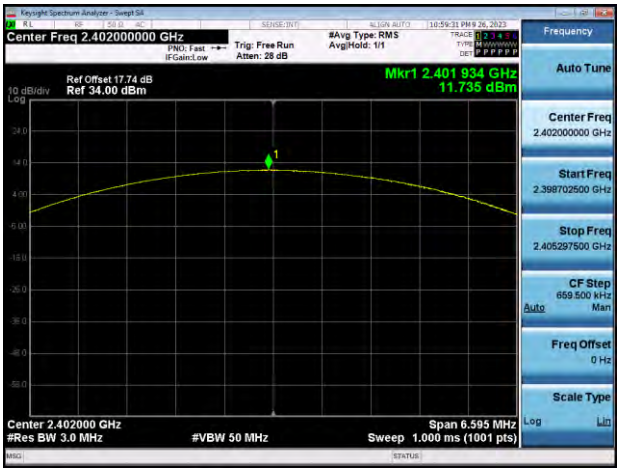
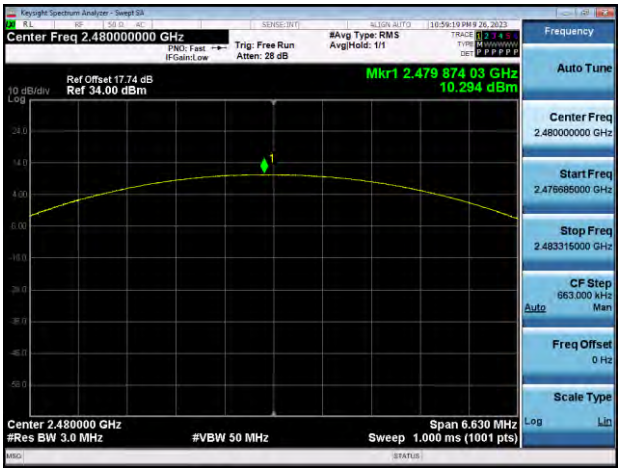
	

Dual ANT.1 8DPSK : Peak Power (CH.0)	Dual ANT.2 8DPSK : Peak Power (CH.0)
	
Dual ANT.1 8DPSK : Peak Power (CH.39)	**Dual ANT.2 8DPSK : Peak Power (CH.39)**
	
Dual ANT.1 8DPSK : Peak Power (CH.78)	**Dual ANT.2 8DPSK : Peak Power (CH.78)**
	

Dual ANT.1 π/4DQPSK : Peak Power (CH.0)	Dual ANT.2 π/4DQPSK : Peak Power (CH.0)
	
Dual ANT.1 π/4DQPSK : Peak Power (CH.39)	**Dual ANT.2 π/4DQPSK : Peak Power (CH.39)**
	
Dual ANT.1 π/4DQPSK : Peak Power (CH.78)	**Dual ANT.2 π/4DQPSK : Peak Power (CH.78)**
	

10.2 BAND EDGES

[Ant.1]

Without hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	56.846	52.448	53.305	20
Upper	58.863	54.797	54.937	

With hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	57.180	52.902	52.144	20
Upper	58.485	53.199	54.040	

[Ant.2]

Without hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	56.034	53.960	53.331	20
Upper	59.154	55.387	54.691	

With hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	56.427	52.974	52.109	20
Upper	58.900	54.061	54.439	

[Dual Ant.1]

Without hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	53.959	48.703	48.643	20
Upper	54.005	49.908	50.169	

With hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	53.609	49.931	50.124	20
Upper	52.855	49.392	49.621	

[Dual Ant.2]

Without hopping

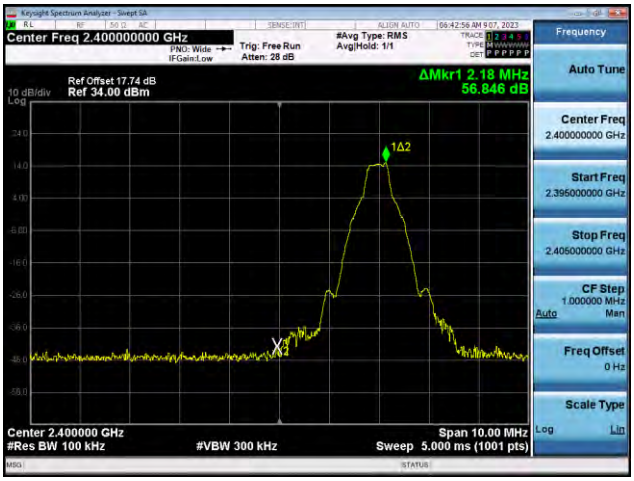
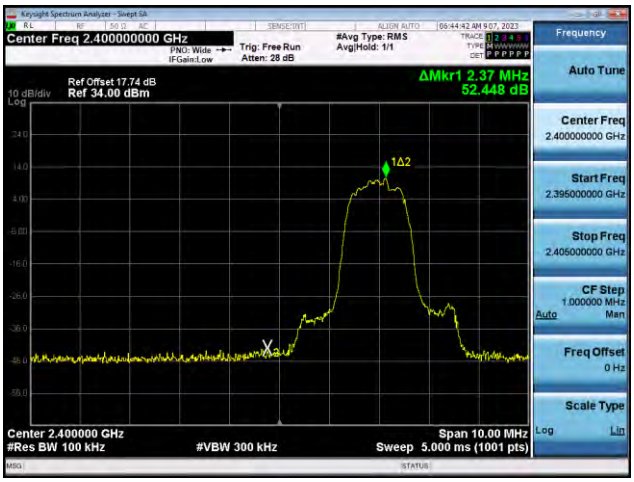
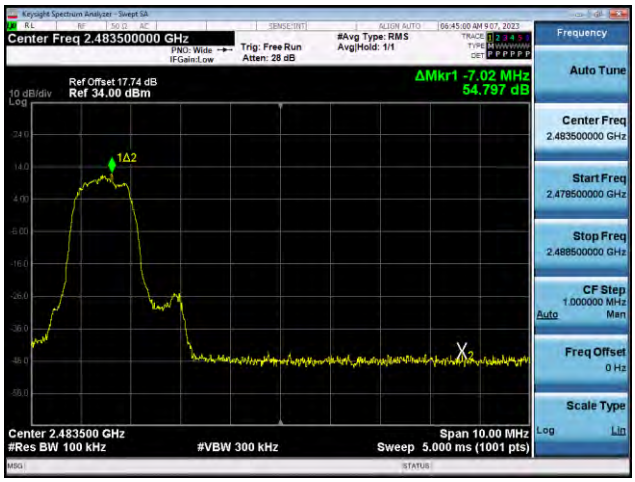
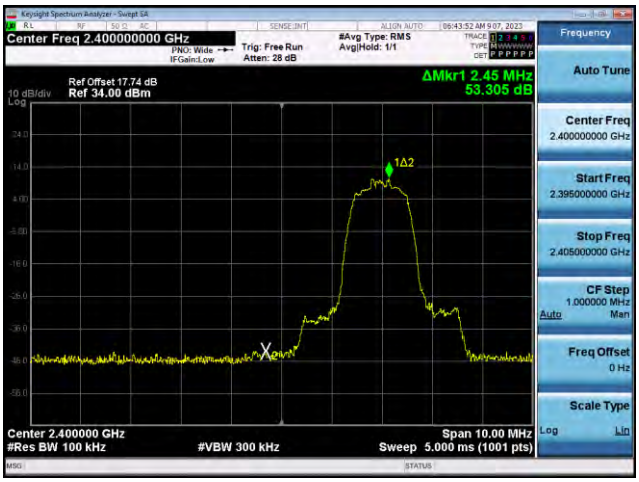
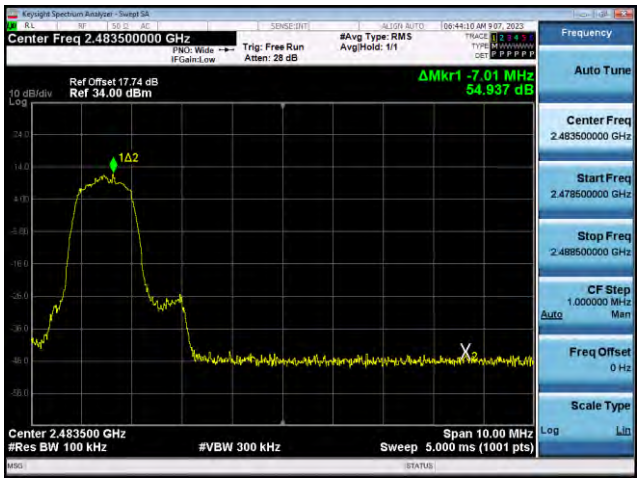
Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	54.061	45.350	42.593	20
Upper	54.647	50.363	50.689	

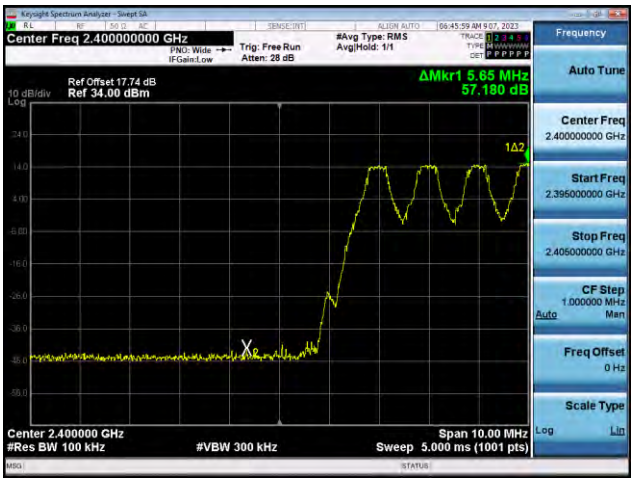
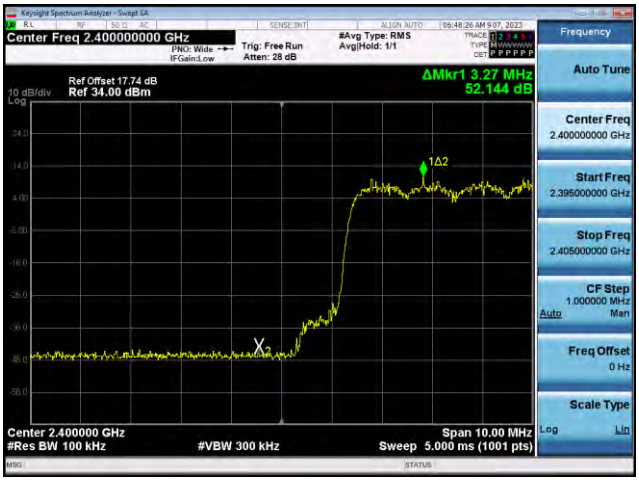
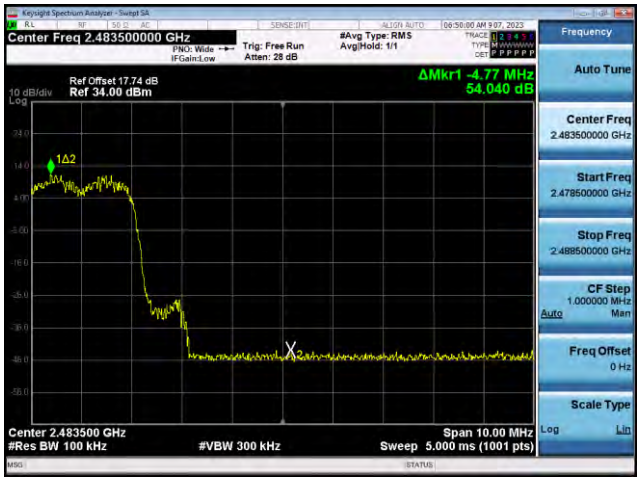
With hopping

Outside Frequency Band	GFSK (dB)	8DPSK (dB)	π/4DQPSK (dB)	Limit (dBc)
Lower	53.327	44.122	44.568	20
Upper	53.662	50.205	50.017	

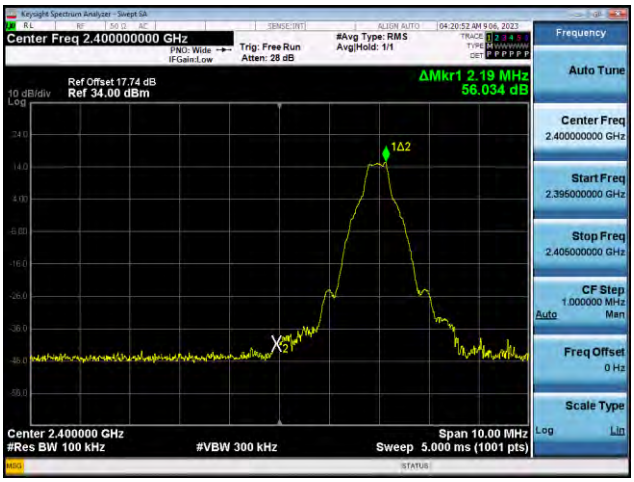
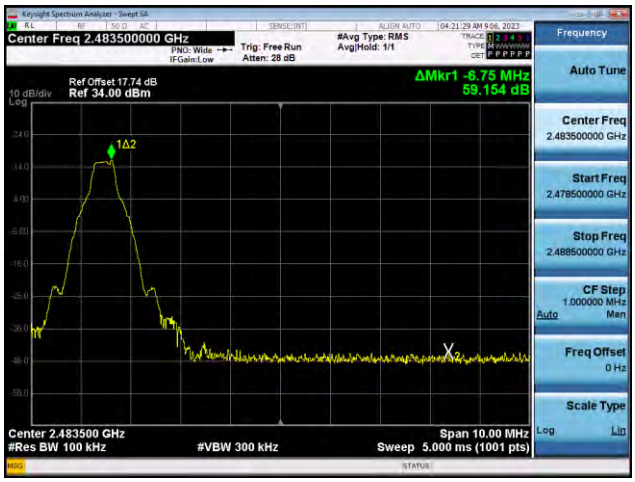
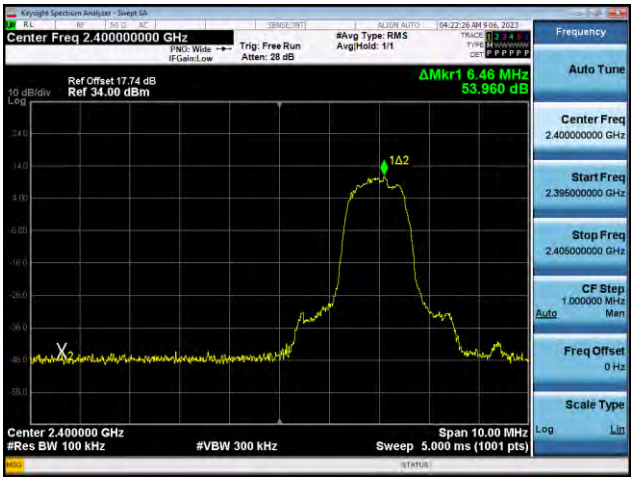
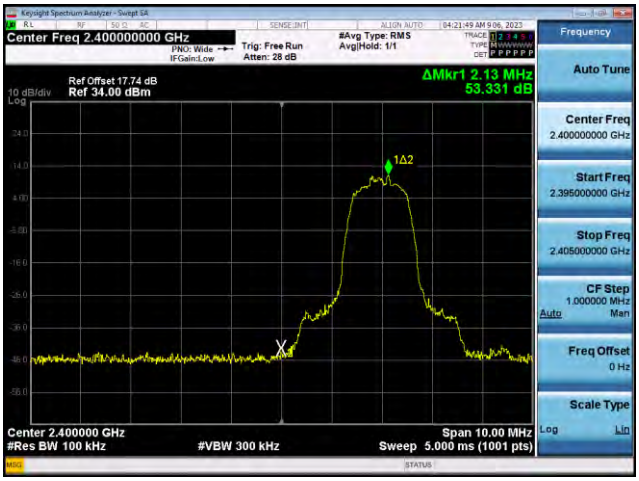
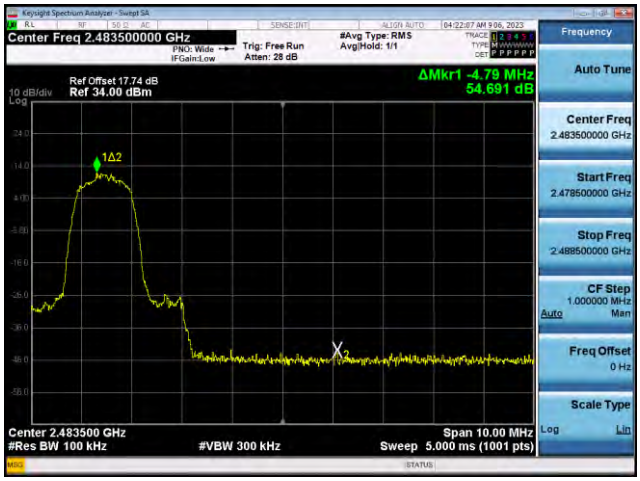
▣ TEST PLOTS

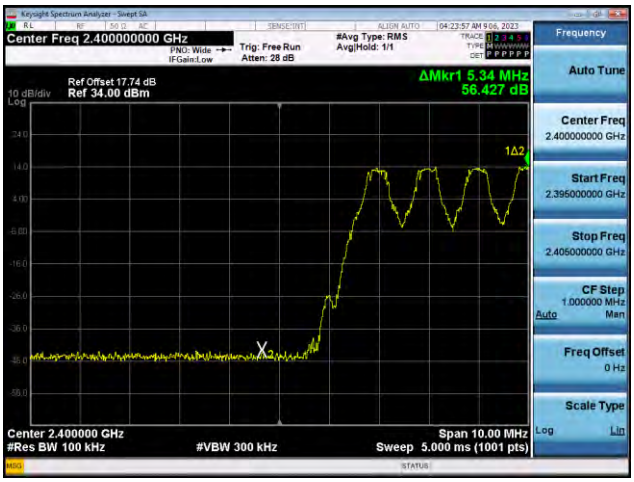
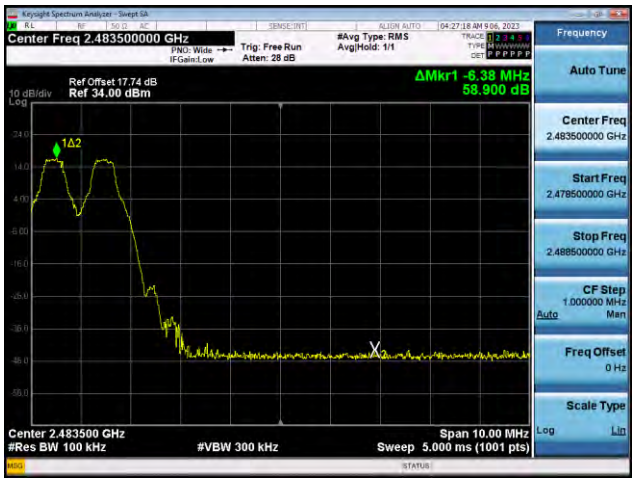
[ANT.1]

GFSK(without hopping) Band Edge(CH.0)	GFSK(without hopping) Band Edge(CH.78)
	
8DPSK(without hopping) Band Edge(CH.0)	**8DPSK(without hopping) Band Edge(CH.78)**
	
π/4DQPSK(without hopping) Band Edge(CH.0)	**π/4DQPSK (without hopping) Band Edge(CH.78)**
	

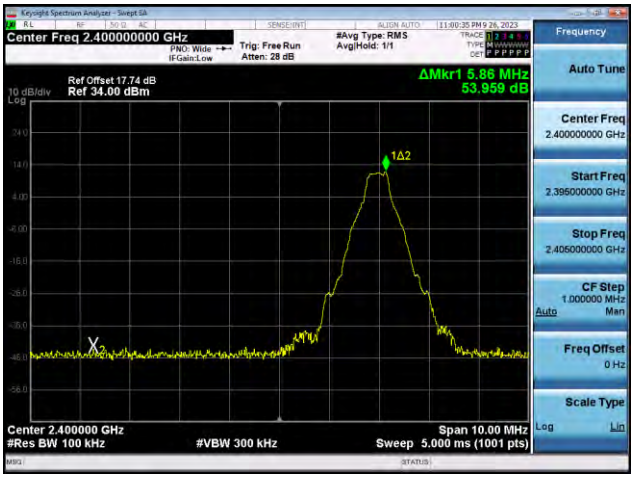
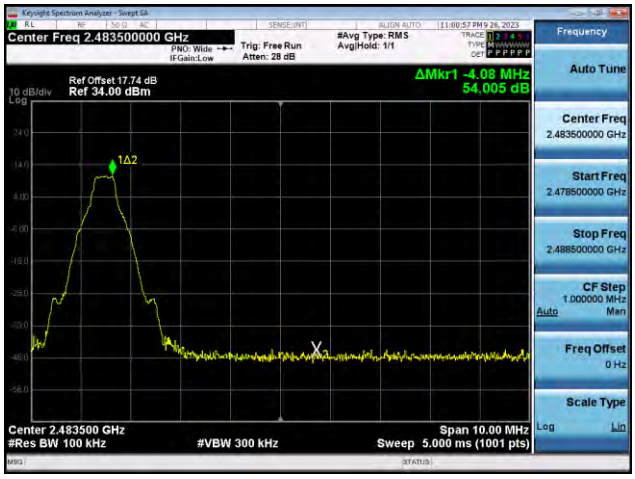
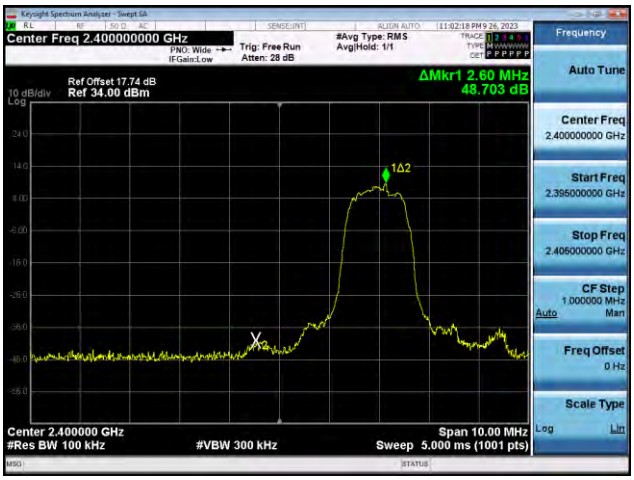
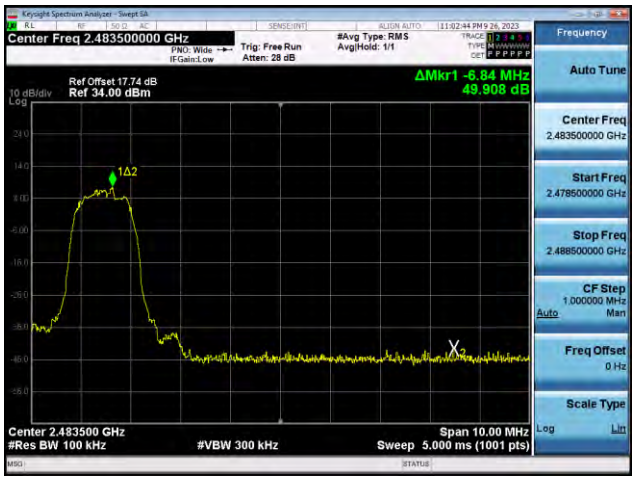
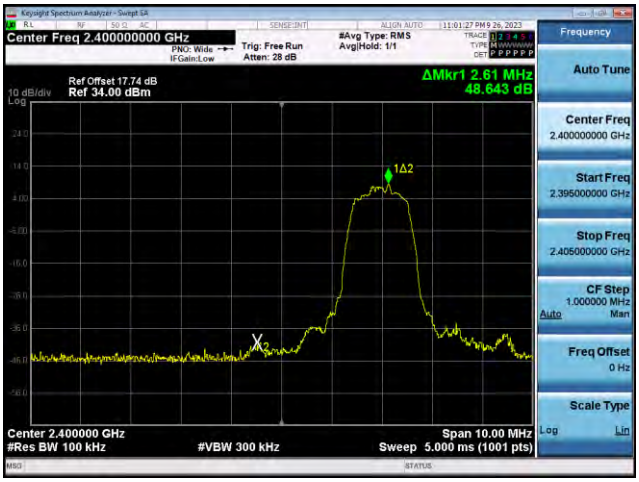
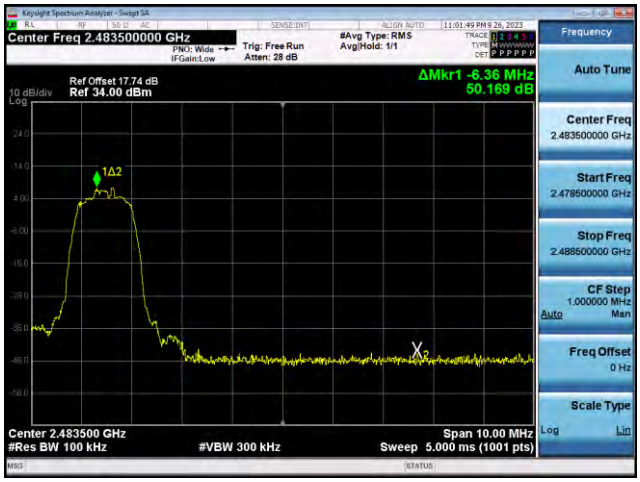
GFSK(with hopping) Band Edge(CH.0)	GFSK(with hopping) Band Edge(CH.78)
	
8DPSK(with hopping) Band Edge(CH.0)	**8DPSK(with hopping) Band Edge(CH.78)**
	
π/4DQPSK(with hopping) Band Edge(CH.0)	**π/4DQPSK (with hopping) Band Edge(CH.78)**
	

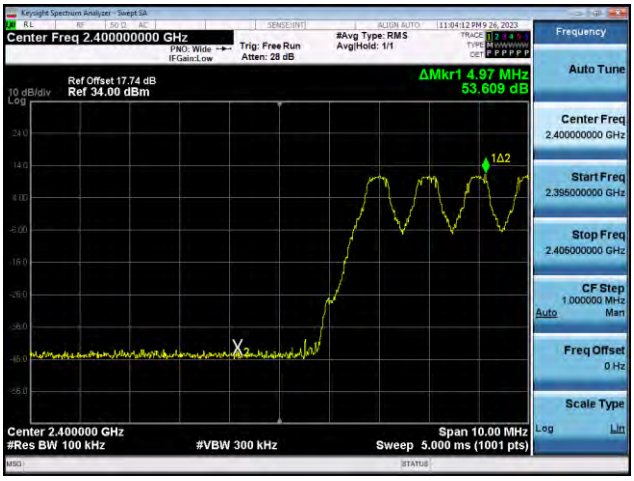
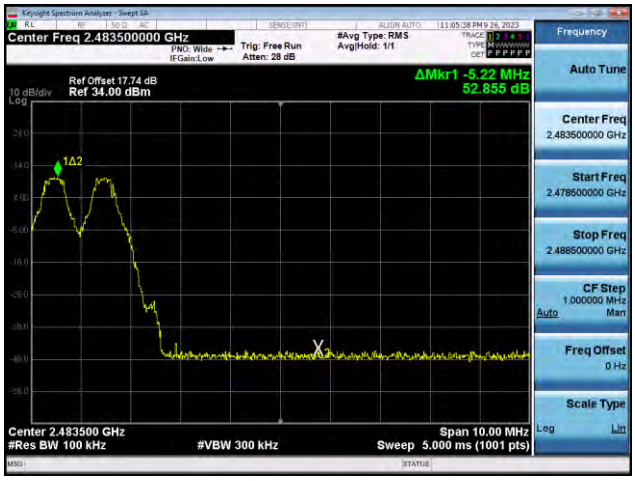
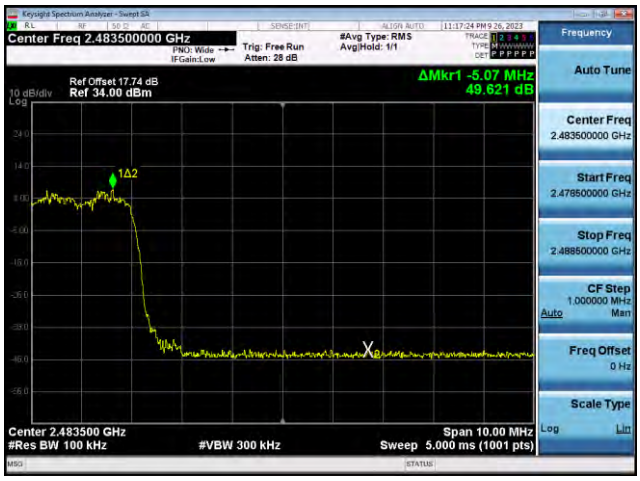
[ANT.2]

GFSK(without hopping) Band Edge(CH.0)	GFSK(without hopping) Band Edge(CH.78)
	
8DPSK(without hopping) Band Edge(CH.0)	**8DPSK(without hopping) Band Edge(CH.78)**
	
π/4DQPSK(without hopping) Band Edge(CH.0)	**π/4DQPSK (without hopping) Band Edge(CH.78)**
	

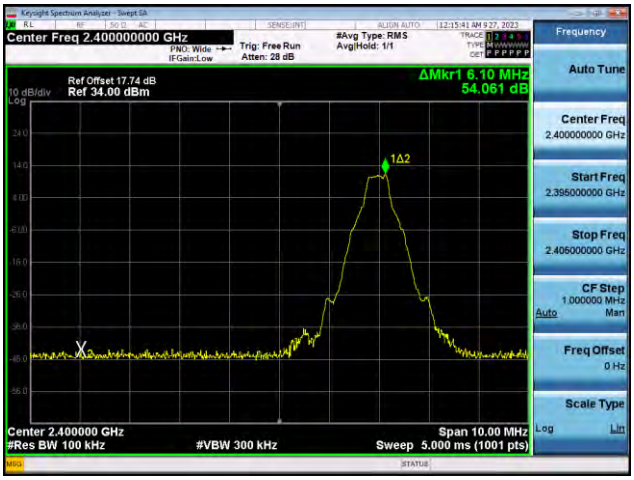
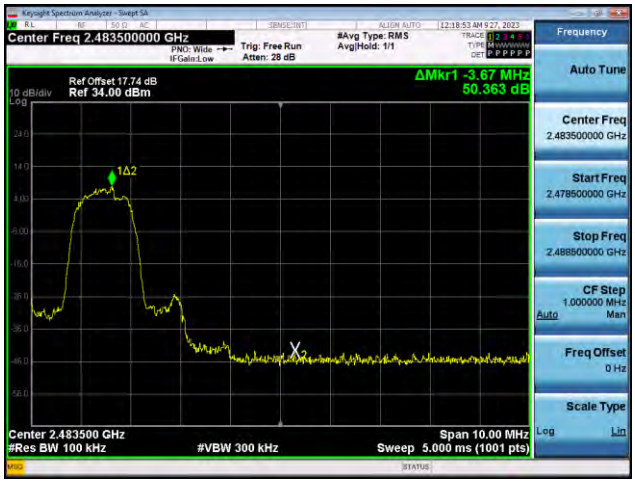
GFSK(with hopping) Band Edge(CH.0)	GFSK(with hopping) Band Edge(CH.78)
	
8DPSK(with hopping) Band Edge(CH.0)	**8DPSK(with hopping) Band Edge(CH.78)**
	
π/4DQPSK(with hopping) Band Edge(CH.0)	**π/4DQPSK (with hopping) Band Edge(CH.78)**
	

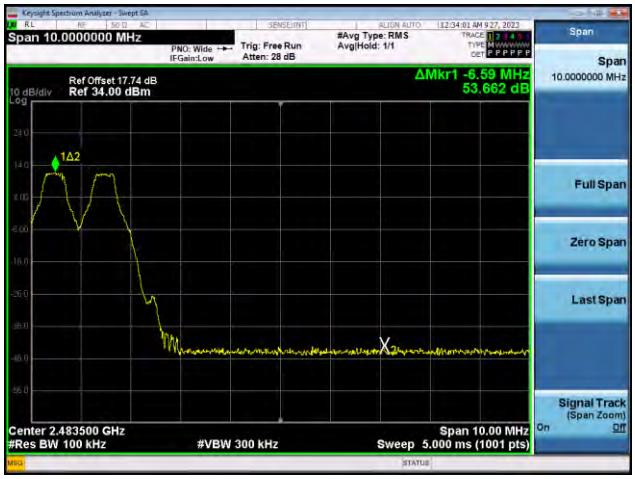
[Dual ANT.1]

GFSK(without hopping) Band Edge(CH.0)	GFSK(without hopping) Band Edge(CH.78)
	
8DPSK(without hopping) Band Edge(CH.0)	**8DPSK(without hopping) Band Edge(CH.78)**
	
π/4DQPSK(without hopping) Band Edge(CH.0)	**π/4DQPSK (without hopping) Band Edge(CH.78)**
	

GFSK(with hopping) Band Edge(CH.0)	GFSK(with hopping) Band Edge(CH.78)
	
8DPSK(with hopping) Band Edge(CH.0)	**8DPSK(with hopping) Band Edge(CH.78)**
	
π/4DQPSK(with hopping) Band Edge(CH.0)	**π/4DQPSK (with hopping) Band Edge(CH.78)**
	

[Dual ANT.2]

GFSK(without hopping) Band Edge(CH.0)	GFSK(without hopping) Band Edge(CH.78)
	
8DPSK(without hopping) Band Edge(CH.0)	**8DPSK(without hopping) Band Edge(CH.78)**
	
π/4DQPSK(without hopping) Band Edge(CH.0)	**π/4DQPSK (without hopping) Band Edge(CH.78)**
	

GFSK(with hopping) Band Edge(CH.0)	GFSK(with hopping) Band Edge(CH.78)
	
8DPSK(with hopping) Band Edge(CH.0)	**8DPSK(with hopping) Band Edge(CH.78)**
	
π/4DQPSK(with hopping) Band Edge(CH.0)	**π/4DQPSK (with hopping) Band Edge(CH.78)**
	

10.3 FREQUENCY SEPARATION / OCCUPIED BANDWIDTH (99 % BW)

[Ant.1]

99 % BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	857.20	1184.0	1182.0
CH.39	856.03	1182.9	1177.2
CH.78	855.94	1183.1	1180.2

20 dB BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	960.2	1316	1325
CH.39	957.8	1313	1324
CH.78	959.7	1312	1324

Channel Separation(kHz)			Limit
GFSK	**8DPSK**	**π/4DQPSK**	**(kHz)**
998	998	998	>25 kHz or >2/3 of the 20 dB BW

[Ant.2]

99 % BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	856.80	1181.5	1180.0
CH.39	851.82	1183.2	1177.7
CH.78	851.10	1186.4	1178.6

20 dB BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	957.1	1312	1324
CH.39	955.1	1313	1325
CH.78	957.0	1313	1323

Channel Separation(kHz)			Limit
GFSK	**8DPSK**	**π/4DQPSK**	**(kHz)**
998	1001	994	>25 kHz or >2/3 of the 20 dB BW

[Dual Ant.1]

99 % BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	876.58	1188.1	1183.3
CH.39	862.98	1186.3	1181.5
CH.78	860.34	1186.2	1179.5

20 dB BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	963.2	1319	1329
CH.39	956.1	1317	1327
CH.78	958.0	1315	1326

Channel Separation(kHz)			Limit
GFSK	**8DPSK**	**π/4DQPSK**	**(kHz)**
998	994	994	>25 kHz or >2/3 of the 20 dB BW

[Dual Ant.2]

99 % BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	863.32	1195.6	1195.5
CH.39	864.62	1195.1	1184.8
CH.78	867.04	1191.4	1187.6

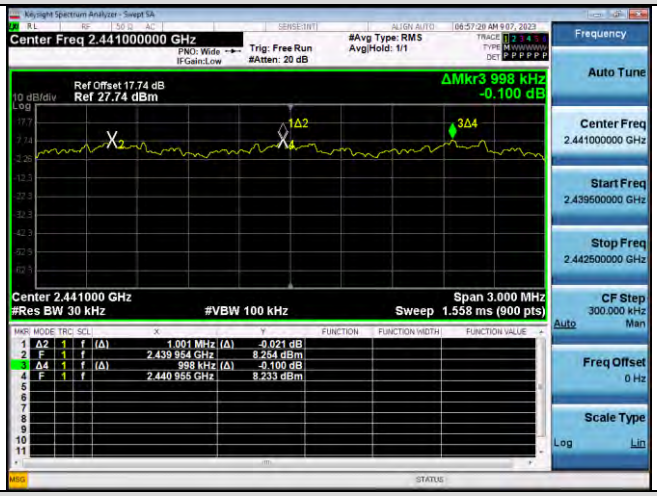
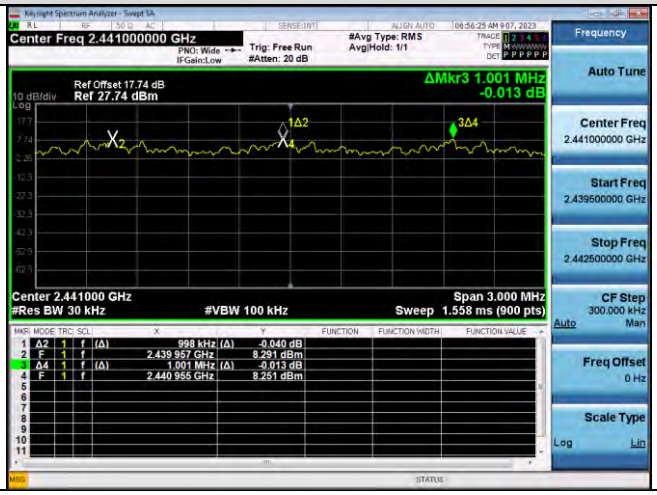
20 dB BW (kHz)			
Channel	**GFSK**	**8DPSK**	**π/4DQPSK**
CH.0	958.9	1318	1327
CH.39	960.2	1316	1332
CH.78	959.9	1314	1320

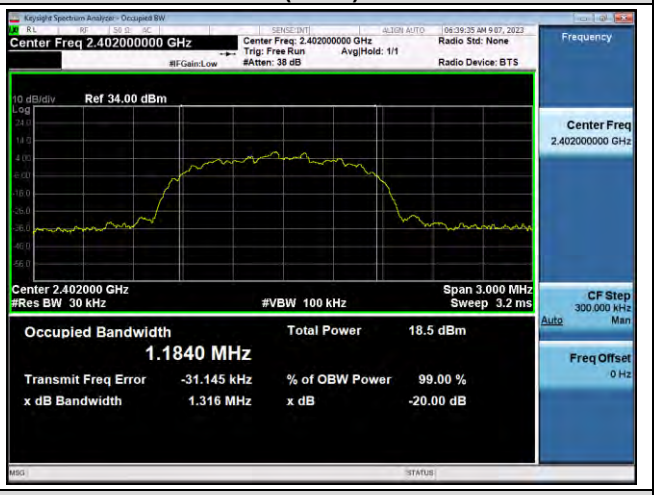
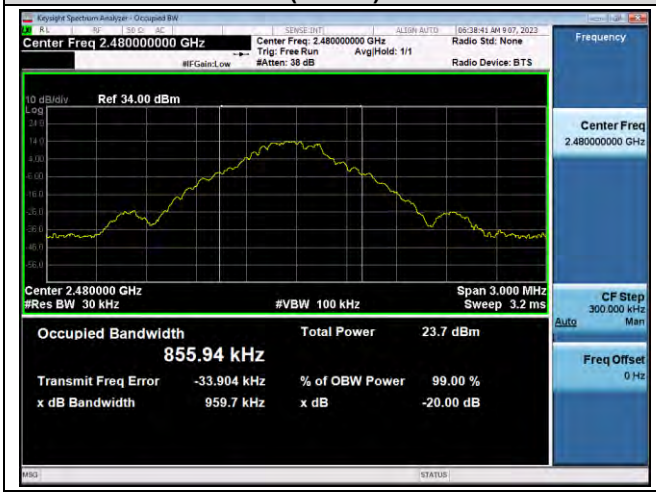
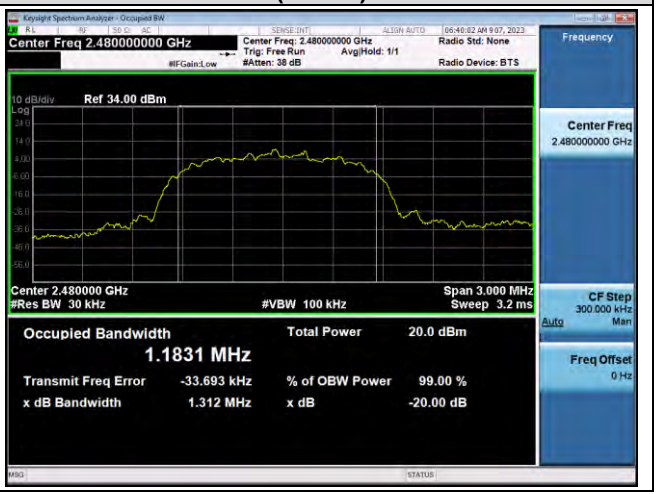
Channel Separation(kHz)			Limit
GFSK	**8DPSK**	**π/4DQPSK**	**(kHz)**
997	993	993	>25 kHz or >2/3 of the 20 dB BW

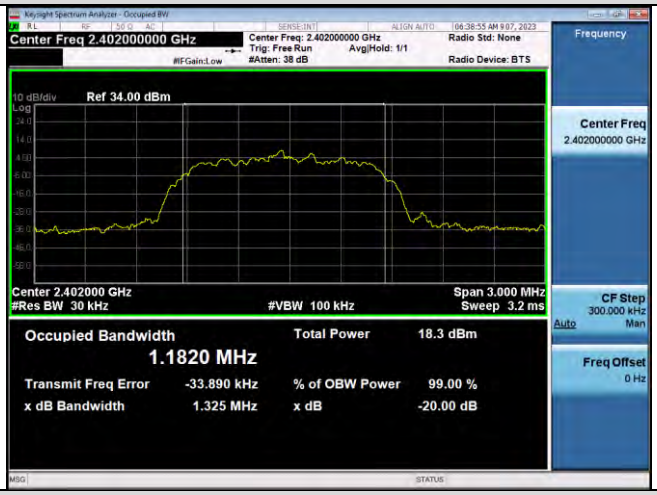
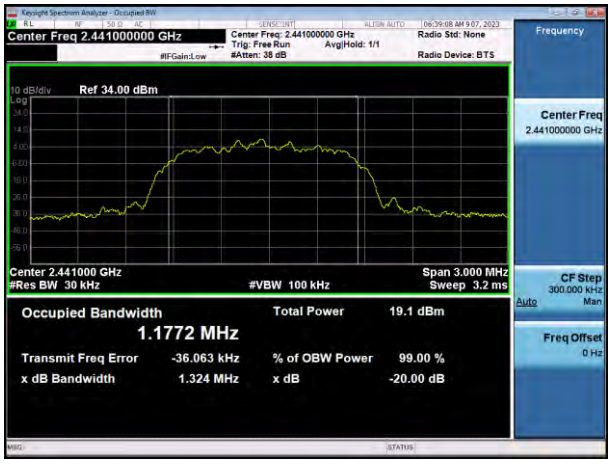
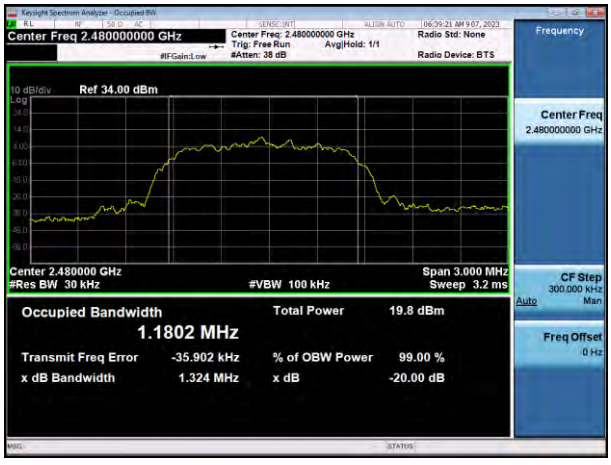
▣ TEST PLOTS

[Ant.1]

Test Plots (GFSK) Channel Separation

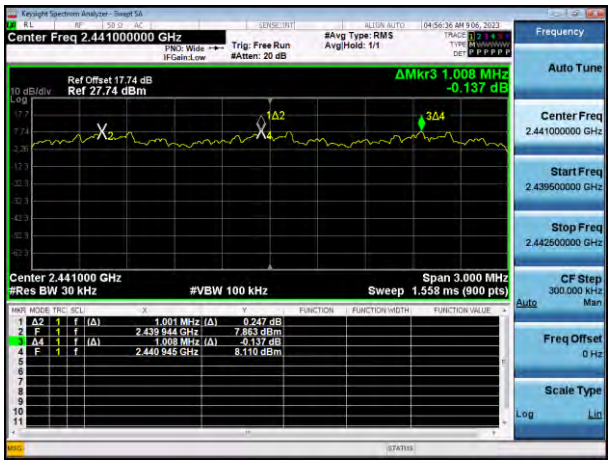
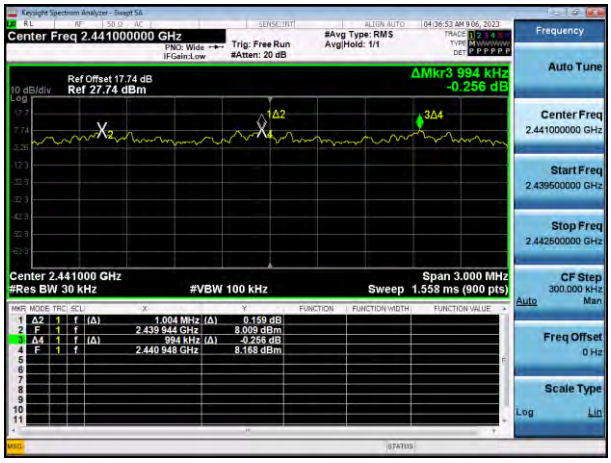
Test Plots (8DPSK) Channel Separation

Test Plots (π/4DQPSK) Channel Separation


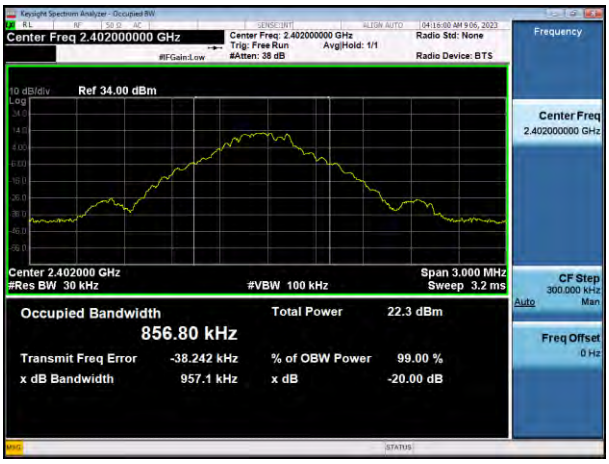
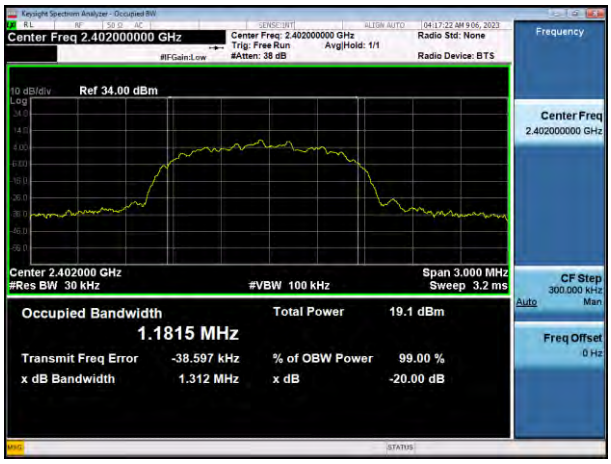
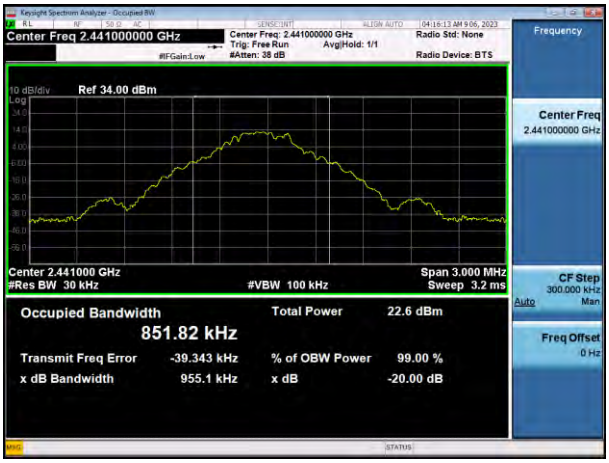
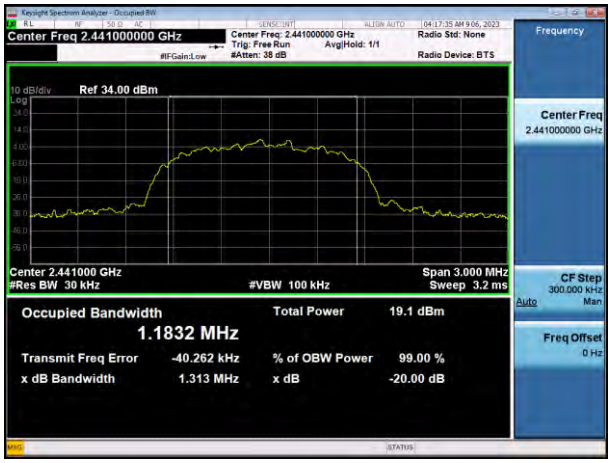
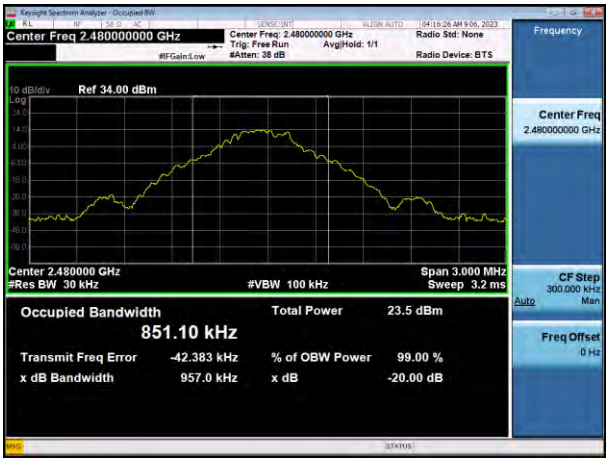
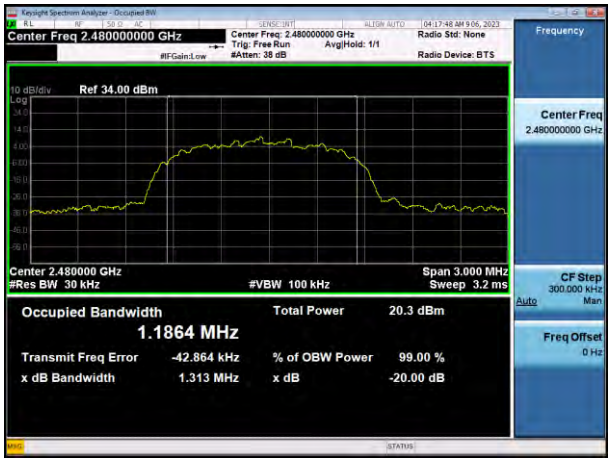
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)	(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)**
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)**
	

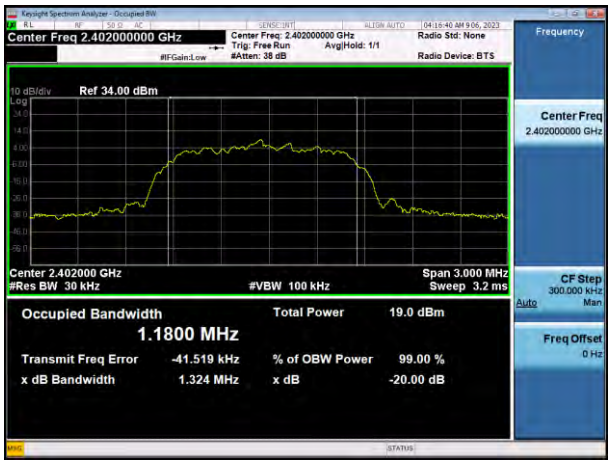
(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)


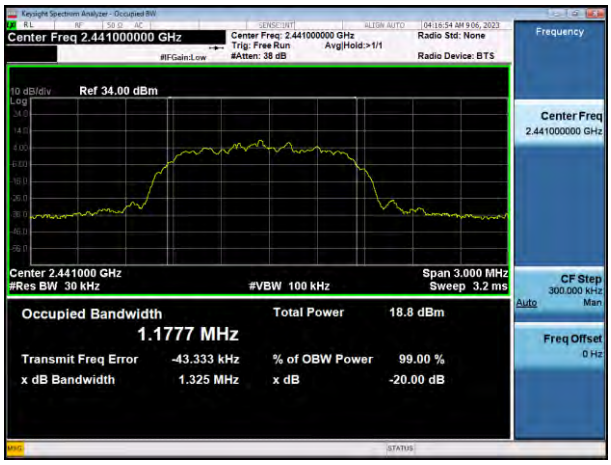
[Ant.2]

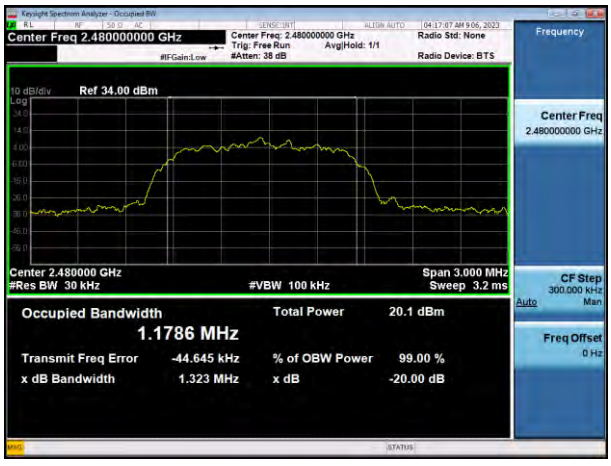
Test Plots (GFSK) Channel Separation

Test Plots (8DPSK) Channel Separation

Test Plots (π/4DQPSK) Channel Separation


(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)	(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)**
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)**
	

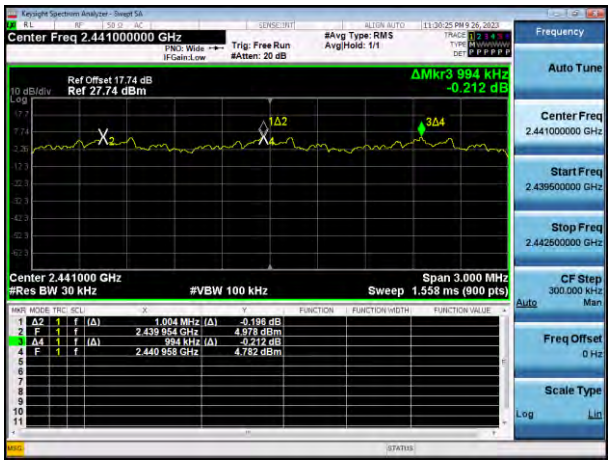
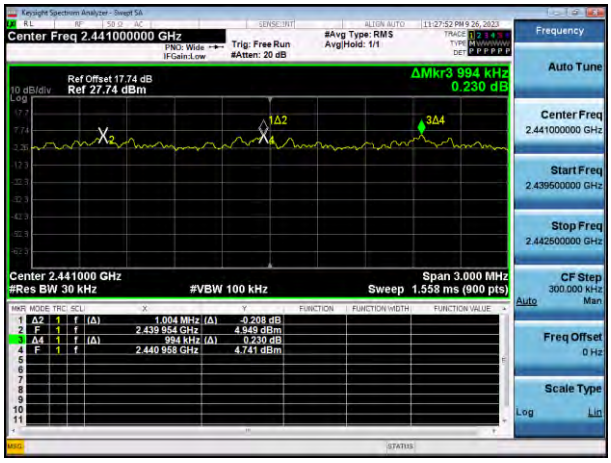
(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)


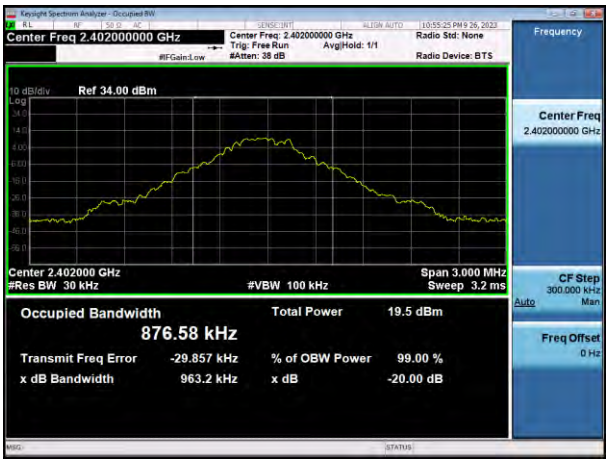
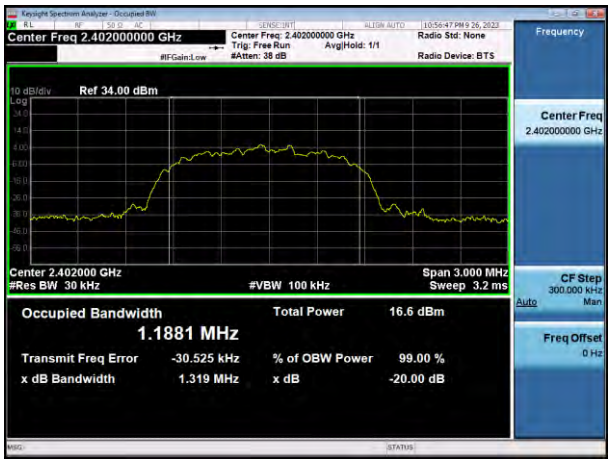
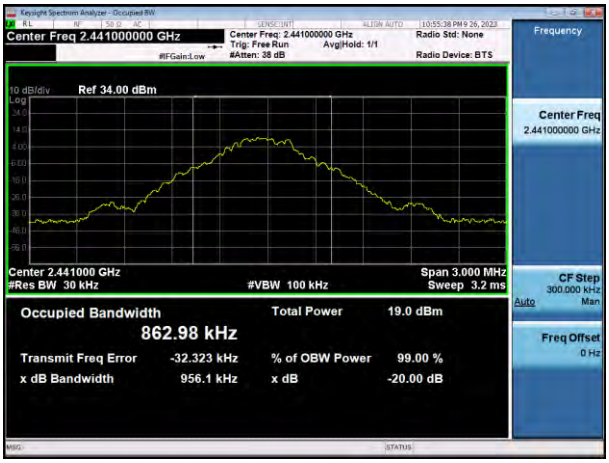
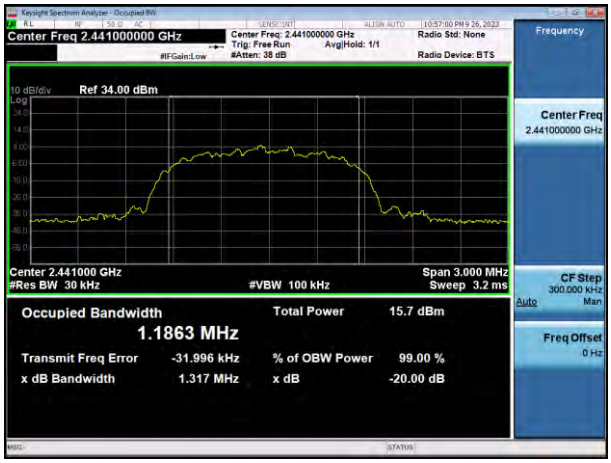
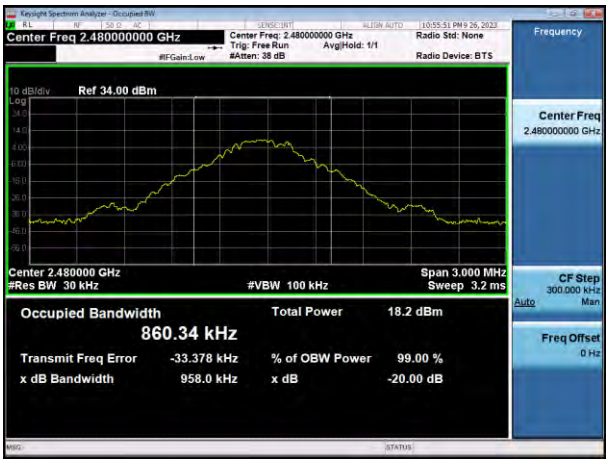
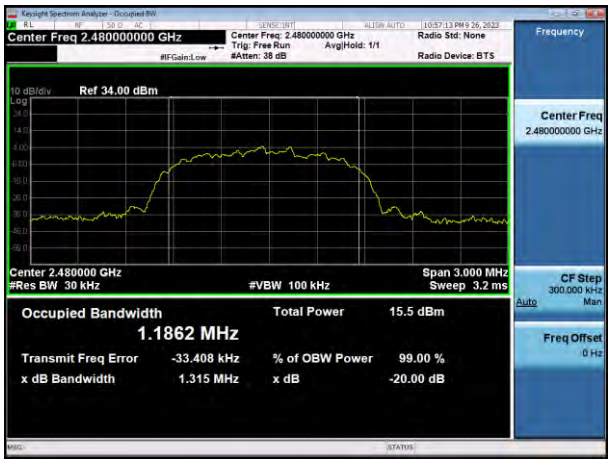
(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)


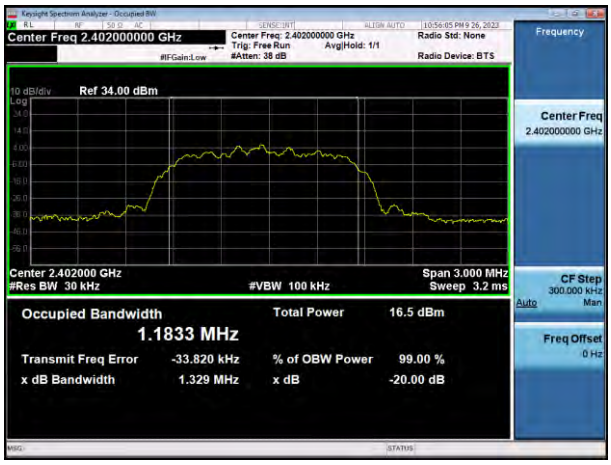
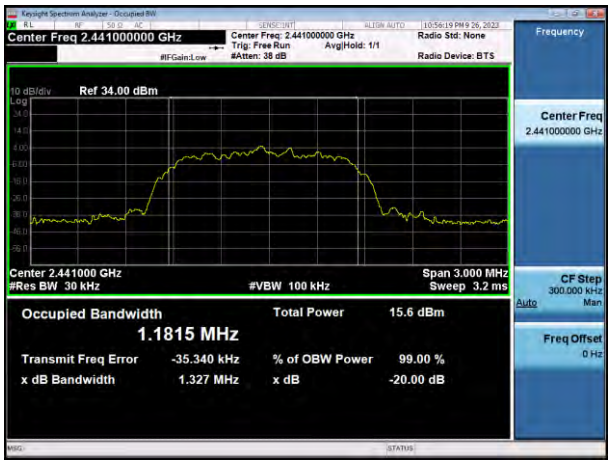
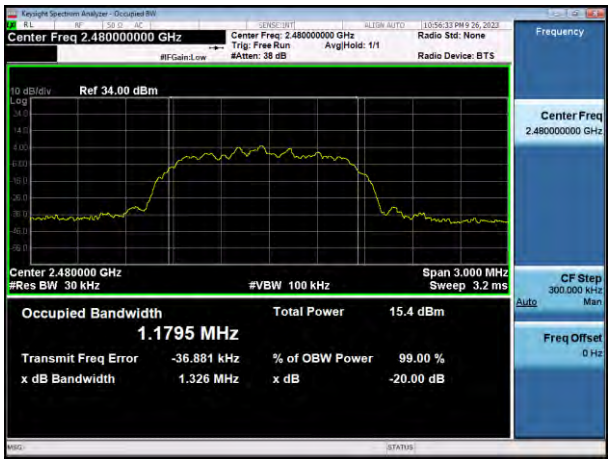
(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)


[Dual Ant.1]

Test Plots (GFSK) Channel Separation

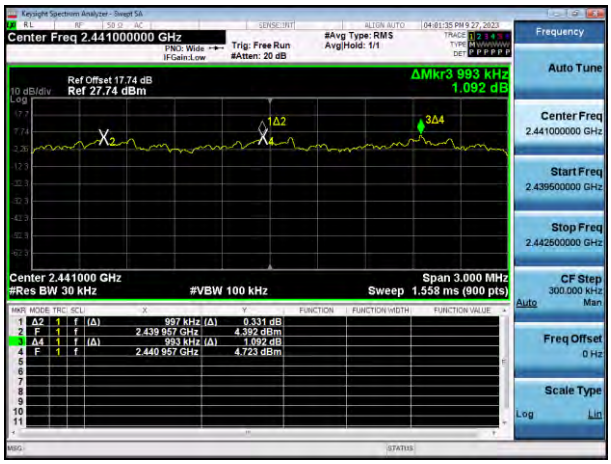
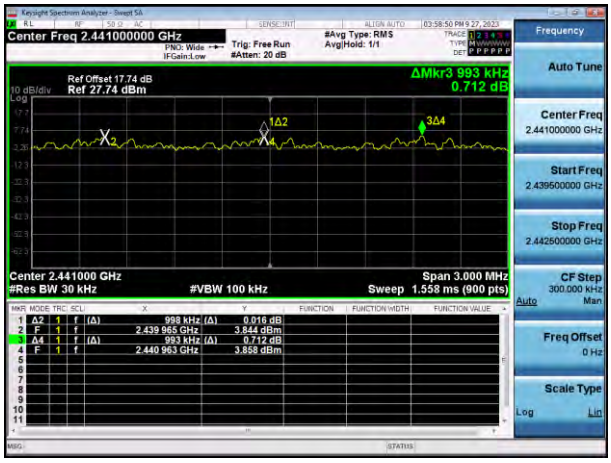
Test Plots (8DPSK) Channel Separation

Test Plots (π/4DQPSK) Channel Separation


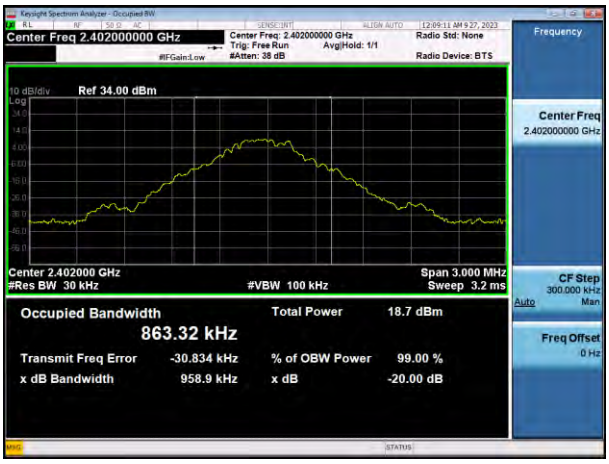
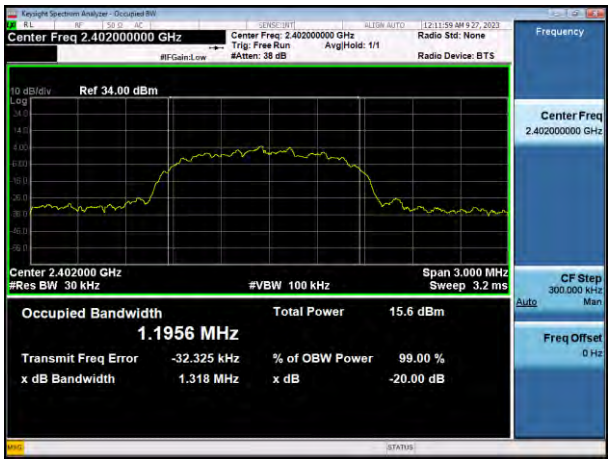
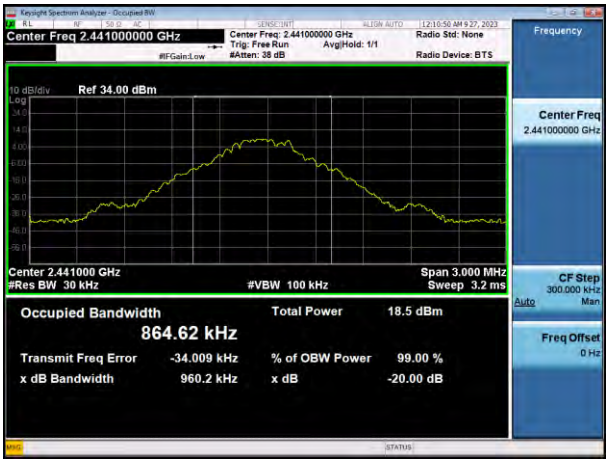
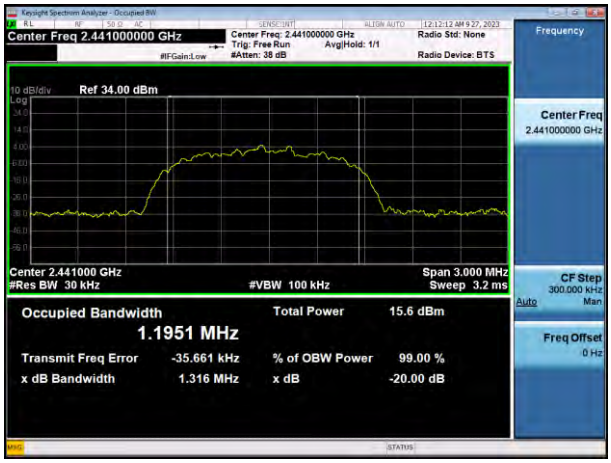
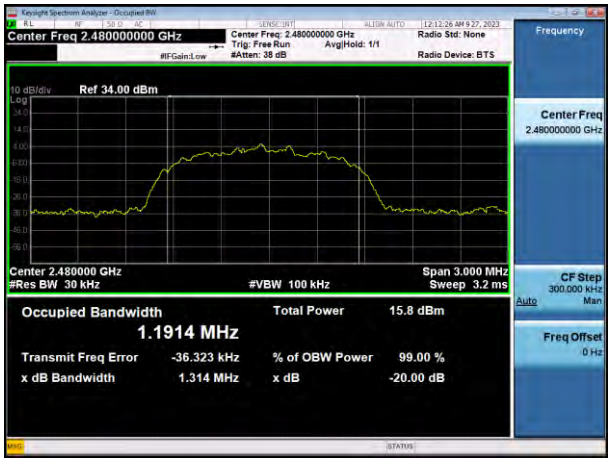
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)	(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)**
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)**
	

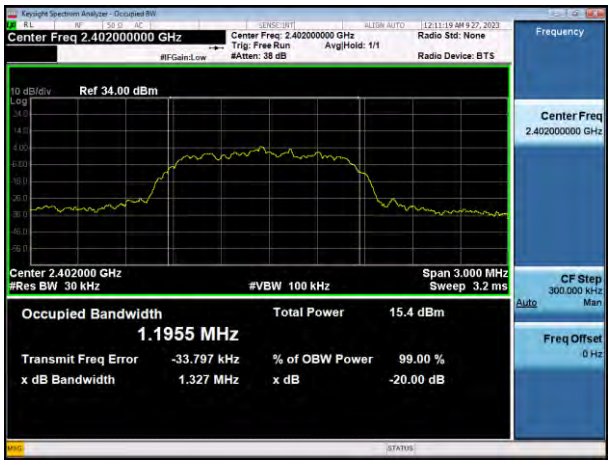
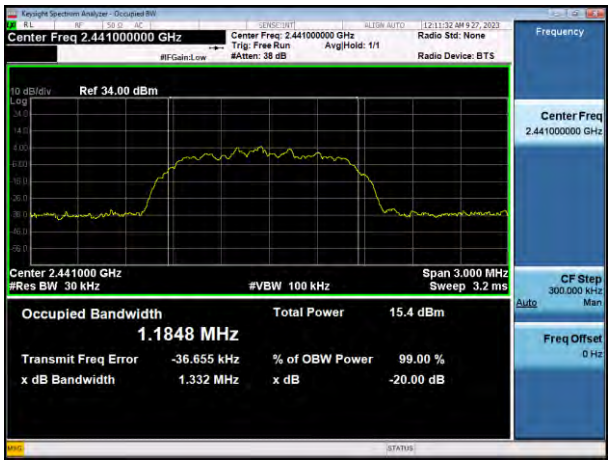
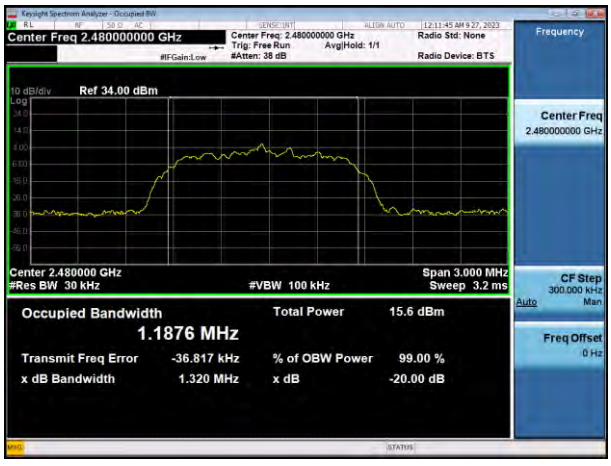
(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)


[Dual Ant.2]

Test Plots (GFSK) Channel Separation

Test Plots (8DPSK) Channel Separation

Test Plots (π/4DQPSK) Channel Separation


(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)	(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)**
	
(GFSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)	**(8DPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)**
	

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.0)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.39)

(π/4DQPSK) 20 dB Bandwidth & Occupied Bandwidth (CH.78)


10.4 NUMBER OF HOPPING FREQUENCY

[Ant.1]

Result (No. of CH)			Limit
GFSK	8DPSK	π/4DQPSK	
79	79	79	>15

[Ant.2]

Result (No. of CH)			Limit
GFSK	8DPSK	π/4DQPSK	
79	79	79	>15

[Dual Ant.1]

Result (No. of CH)			Limit
GFSK	8DPSK	π/4DQPSK	
79	79	79	>15

[Dual Ant.2]

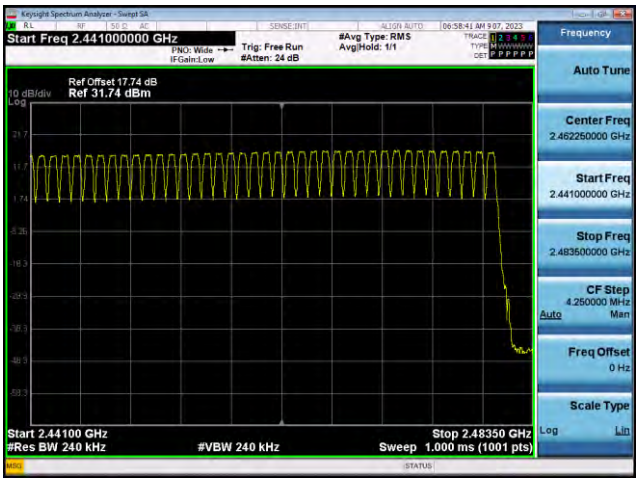
Result (No. of CH)			Limit
GFSK	8DPSK	π/4DQPSK	
79	79	79	>15

Note :

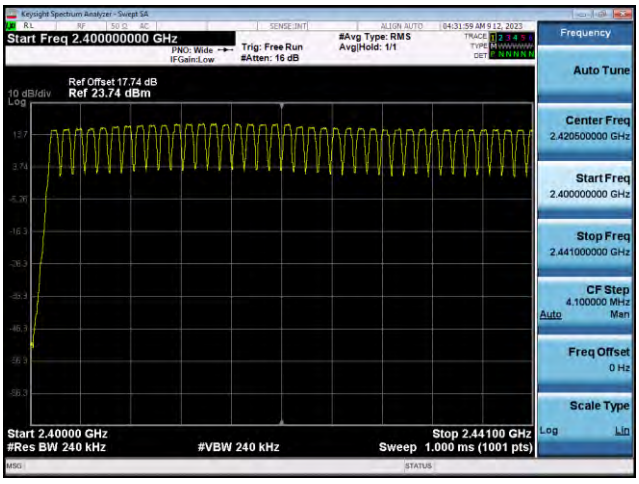
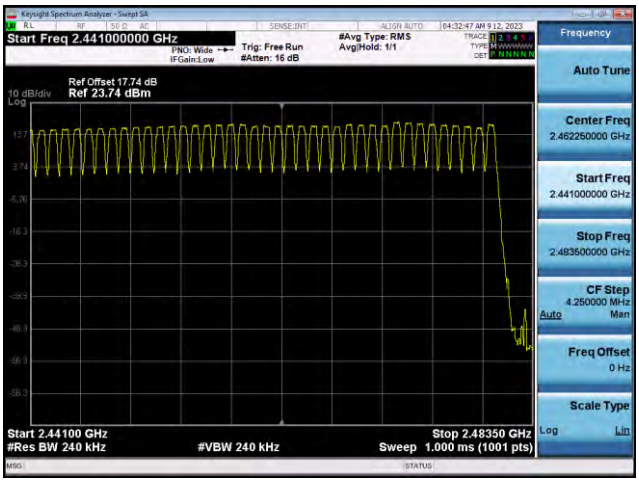
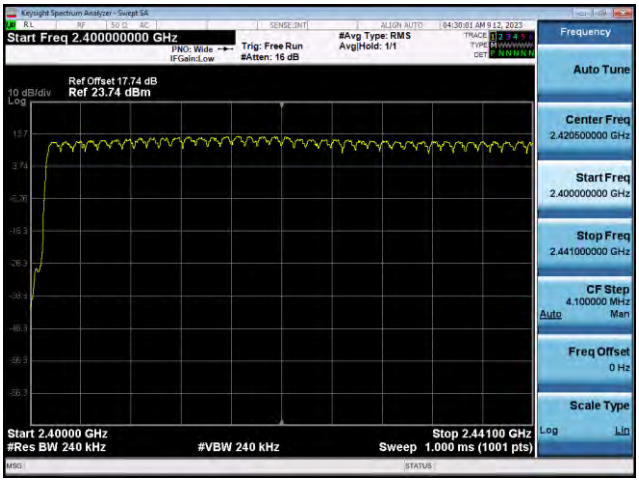
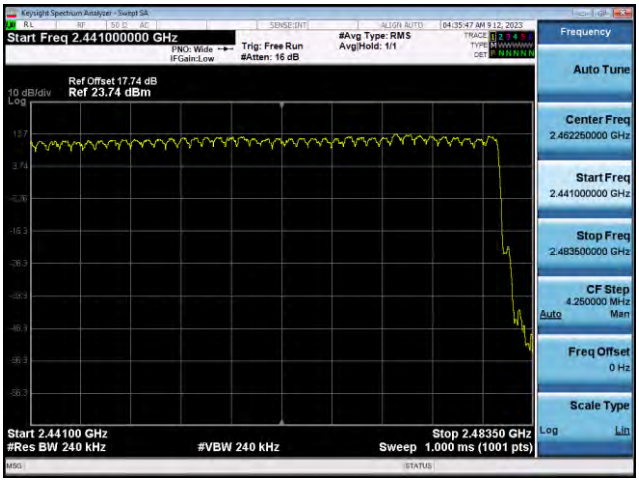
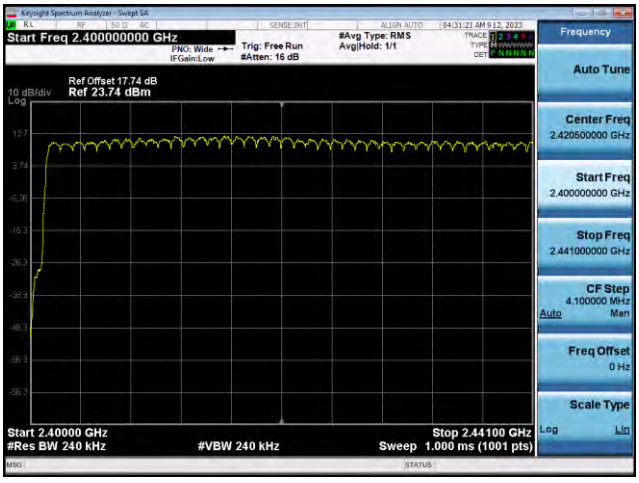
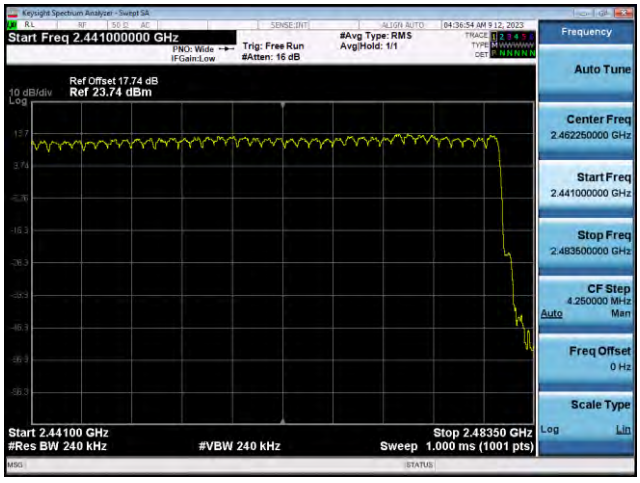
In case of AFH mode, minimum number of hopping channels is 20.

▣ TEST PLOTS

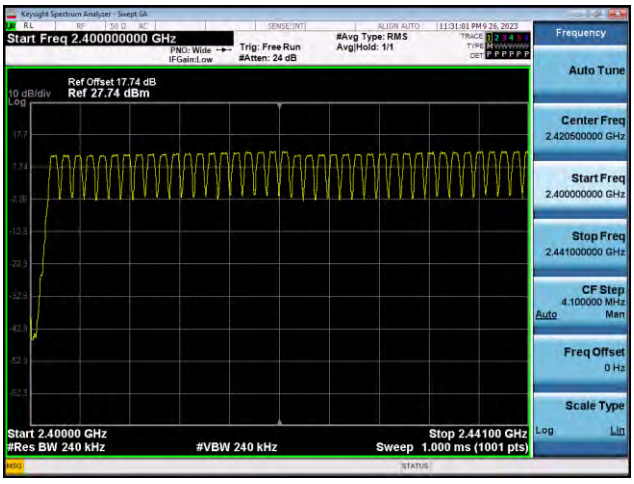
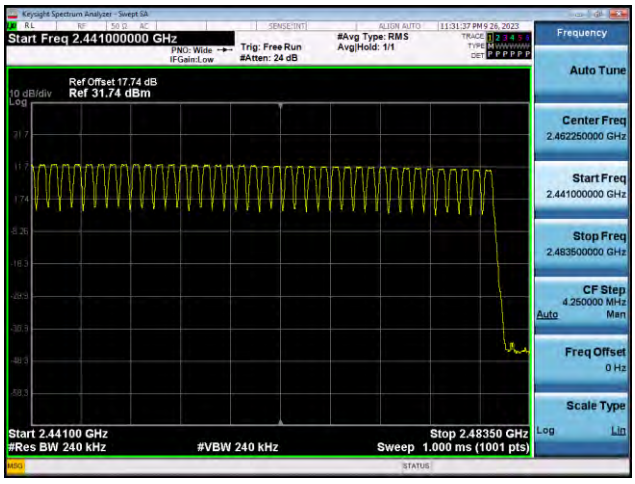
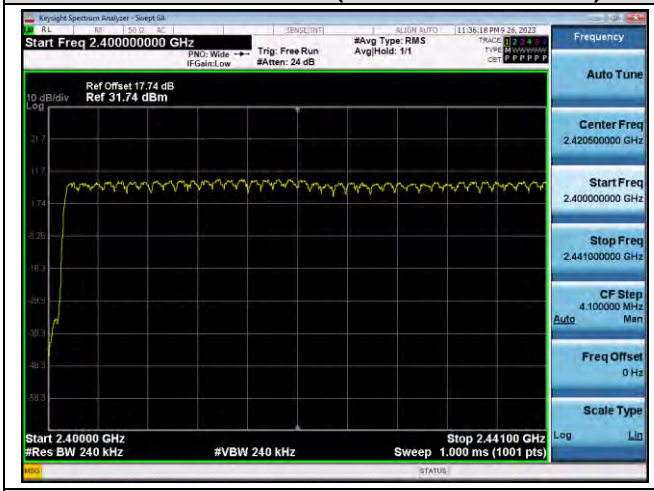
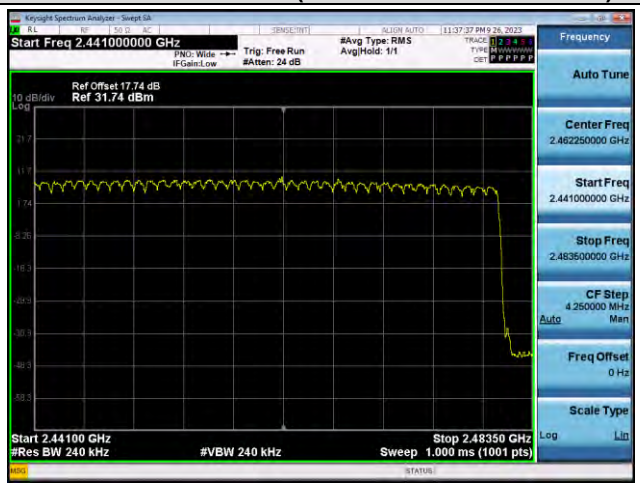
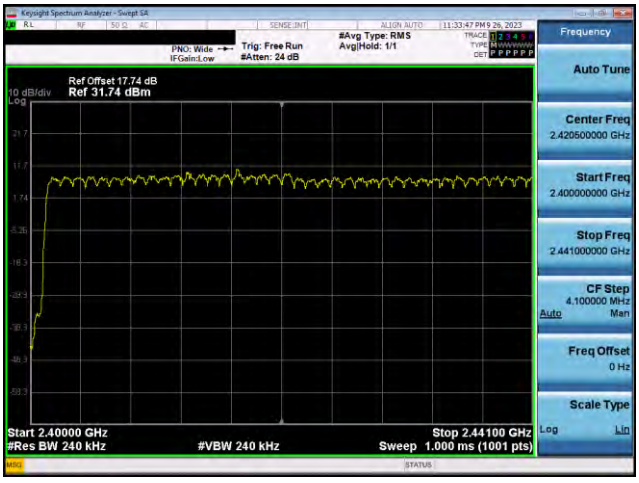
[ANT1]

ANT.1 GFSK Number of Channels (2.4 GHz - 2.441 GHz)	ANT.1 GFSK Number of Channels (2.441 GHz - 2.483.5 GHz)
	
ANT.1 8DPSK Number of Channels (2.4 GHz - 2.441 GHz)	**ANT.1 8DPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	
ANT.1 π/4DQPSK Number of Channels (2.4 GHz - 2.441 GHz)	**ANT.1 π/4DQPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	

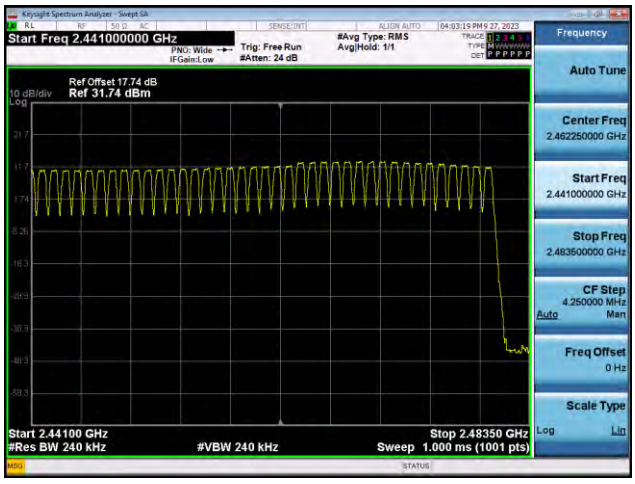
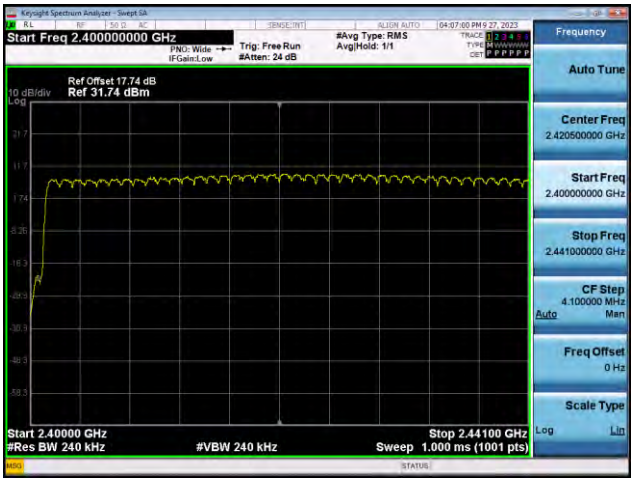
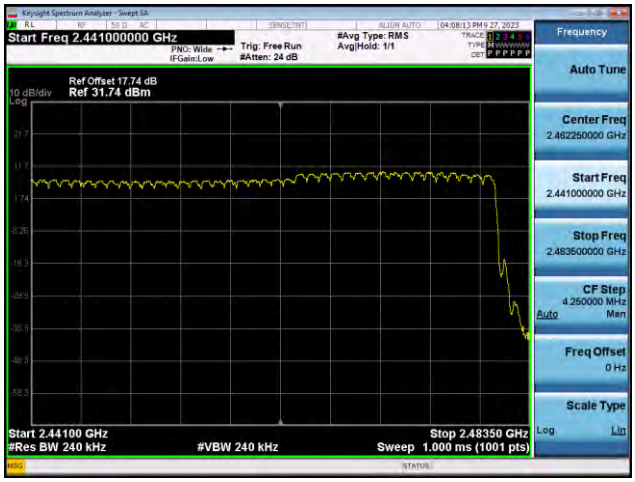
[ANT2]

ANT.2 GFSK Number of Channels (2.4 GHz - 2.441 GHz)	ANT.2 GFSK Number of Channels (2.441 GHz - 2.483.5 GHz)
	
ANT.2 8DPSK Number of Channels (2.4 GHz - 2.441 GHz)	**ANT.2 8DPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	
ANT.2 π/4DQPSK Number of Channels (2.4 GHz - 2.441 GHz)	**ANT.2 π/4DQPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	

[Dual ANT1]

Dual ANT.1 GFSK Number of Channels (2.4 GHz - 2.441 GHz)	Dual ANT.1 GFSK Number of Channels (2.441 GHz - 2.483.5 GHz)
	
Dual ANT.1 8DPSK Number of Channels (2.4 GHz - 2.441 GHz)	**Dual ANT.1 8DPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	
Dual ANT.1 π/4DQPSK Number of Channels (2.4 GHz - 2.441 GHz)	**Dual ANT.1 π/4DQPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	

[Dual ANT2]

Dual ANT.2 GFSK Number of Channels (2.4 GHz - 2.441 GHz)	Dual ANT.2 GFSK Number of Channels (2.441 GHz - 2.483.5 GHz)
	
Dual ANT.2 8DPSK Number of Channels (2.4 GHz - 2.441 GHz)	**Dual ANT.2 8DPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	
Dual ANT.2 π/4DQPSK Number of Channels (2.4 GHz - 2.441 GHz)	**Dual ANT.2 π/4DQPSK Number of Channels (2.441 GHz - 2.483.5 GHz)**
	

10.5 TIME OF OCCUPANCY (DWELL TIME)

[Ant.1]

	Channel	GFSK	8DPSK	π/4DQPSK
Pulse Time (ms)	Low	2.890	2.890	2.890
	Mid	2.890	2.890	2.890
	High	2.890	2.895	2.890

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	308.27	308.27	308.27	31.6	400
	Mid	308.27	308.27	308.27	31.6	
	High	308.27	308.80	308.27	31.6	

AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	154.13	154.13	154.13	8.0	400
	Mid	154.13	154.13	154.13	8.0	
	High	154.13	154.40	154.13	8.0	

[Ant.2]

	Channel	GFSK	8DPSK	π/4DQPSK
Pulse Time (ms)	Low	2.890	2.890	2.885
	Mid	2.885	2.895	2.885
	High	2.890	2.895	2.890

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	308.27	308.27	307.73	31.6	400
	Mid	307.73	308.80	307.73	31.6	
	High	308.27	308.80	308.27	31.6	

AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	154.13	154.13	153.87	8.0	400
	Mid	153.87	154.40	153.87	8.0	
	High	154.13	154.40	154.13	8.0	

[Dual Ant.1]

	Channel	GFSK	8DPSK	π/4DQPSK
Pulse Time (ms)	Low	2.885	2.890	2.890
	Mid	2.890	2.890	2.885
	High	2.890	2.890	2.890

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	307.73	308.27	308.27	31.6	400
	Mid	308.27	308.27	307.73	31.6	
	High	308.27	308.27	308.27	31.6	

AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	153.87	154.13	154.13	8.0	400
	Mid	154.13	154.13	153.87	8.0	
	High	154.13	154.13	154.13	8.0	

[Dual Ant.2]

	Channel	GFSK	8DPSK	π/4DQPSK
Pulse Time (ms)	Low	2.890	2.890	2.885
	Mid	2.890	2.890	2.890
	High	2.885	2.890	2.890

Non-AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	308.27	308.27	307.73	31.6	400
	Mid	308.27	308.27	308.27	31.6	
	High	307.73	308.27	308.27	31.6	

AFH Mode

	Channel	GFSK	8DPSK	π/4DQPSK	Period Time (s)	Limit (ms)
Total of Dwell (ms)	Low	154.13	154.13	153.87	8.0	400
	Mid	154.13	154.13	154.13	8.0	
	High	153.87	154.13	154.13	8.0	