RF TEST REPORT

Report No.:	20240317G03742X-W2
Product Name:	Cobra-SC120
HVIN:	SC120
Model No.:	SC120, SC110 Series
FCC ID:	BBOSC120
IC:	906A-SC120
Applicant:	Cobra Electronics Corporation
Address:	1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.
Dates of Testing:	03/06/2024 - 05/21/2024
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No. 43 Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. **Tel**：86 755 26627338 **Fax**：86 755 26627238

Test Report

Product.....:	Cobra-SC120
Brand Name.....:	Cobra
Trade Name .....:	Cobra
Applicant.....:	Cobra Electronics Corporation
Applicant Address.....:	1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.
Manufacturer.....:	Cobra Electronics Corporation
Manufacturer Address.....:	1701 Golf Road Suite 3-900, Rolling Meadows, IL 60008, United States.
Test Standards.....:	47 CFR Part 15 Subpart C 15.247 ANSI C63.10-2013 RSS-Gen Issue 5, Feb 2021 RSS-247 Issue 3, Aug 2023
Test Result.....:	Pass
Tested by .....:	2024.05.21 Chuiwang Zhang, Test Engineer
Reviewed by.....:	2024.05.21 Chris You, Senior Engineer
Approved by.....:	2024.05.21 Yang Fan, Manager

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Change History		
Issue	Date	Reason for change
1.0	2024.05.21	First edition

1. General Information

1.1. EUT Description

Product Name	Cobra-SC120
Model No.	SC120, SC110 Series
Hardware Version	90100S00002757
Software Version	V1.5
EUT supports Radios application	Bluetooth V5.0
Frequency Range	2402MHz~2480MHz
Channel Number	79
Bit Rate of Transmitter	1/2/3Mbps
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Test Control Software	SecureCRT
Antenna Type	Internal Antenna
Antenna Gain	1.93dBi
Power supply	DC 5V(USB)

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 2: a. When power on, the EUT will scan the whole frequency until aConnection command from the other BT devices.
b. When receiving the signal from the other BT devices, The EUT transmit aresponse signal.
c. The other devices receive the response signal and recognize it, then send aconnection command to establish the connection.
d. After the connection establish successfully, the data transmission is beginning.At the same time, the both devices will shift frequencies in synchronization per asame pseudo randomly ordered list of hopping frequencies, the hopping rate is1600 times per second.
e. The bandwidth of the receiver, which is set to a fixed width by the software.

Note 3: Bluetooth signal has 9 packages 1DH1, 1DH3, 1DH5, 2DH1, 2DH3, 2DH5, 3DH1, 3DH3, 3DH5, DH5 package is largest, we are testing DH5 in the document.

Note 4: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

Note 5: Model: SC120, SC110 Series have the same PCB board, electromagnetic emissions and electromagnetic compatibility characteristics. The below table show differences:

Model No.	Differences
SC120	With SD card
SC110 Series	Without SD card

1.2. Test Standards and Results

The purpose of the report is to conduct testing according to the following FCC/IC certification standards:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C	Radio Frequency Devices
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
3	KDB 558074 D01 15.247 Meas Guidance v05r02	Cuidance for Compliance Measurement on Digital Transmission Systems, Frequency Hopping Spread Spectrum Systems, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules
4	RSS-Gen Issue 5, Feb 2021	General Requirements for Compliance of Radio Apparatus
5	RSS-247 Issue 3, Aug 2023	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

Test detailed items/section required by FCC/IC rules and results are as below:

No.	Section in CFR 47	IC Rules	Description	Result
1	15.203 15.247(c)	RSS-GEN, 6.8 RSS-247, 5.4(f)	Antenna Requirement	PASS
2	15.247 (a)(1)(iii)	RSS-247, 5.1(d)	Number of Hopping Frequency	PASS
3	15.247 (b)(1)	RSS-247, 5.4(b)	Peak Output Power	PASS
4	15.247 (a)(1)	RSS-GEN, 6.7 RSS-247, 5.1(a)	20dB and 99% Occupied Bandwidth	PASS
5	15.247 (a)(1)	RSS-247, 5.1(b)	Carrier Frequency Separation	PASS
6	15.247 (a)(1)(iii)	RSS-247, 5.1(d)	Time of Occupancy (Dwell time)	PASS
7	15.247(d)	RSS-GEN, 6.13 RSS-247, 5.5	Conducted Band Edge and Spurious Emission	PASS
8	15.207	RSS-GEN, 8.8	AC Power Line Conducted Emission	N/A[Note 3]
9	15.205 15.209 15.247(c)	RSS-GEN, 8.9 RSS-GEN, 8.10 RSS-247, 5.5	Radiated Band Edges and Spurious Emission	PASS

Note 1: The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10-2013.

Note 2: These RF tests were performed according to the method of measurements prescribed in KDB 558074 D01 15.247 Meas Guidance v05r02.

Note 3: Not applicable, the product is only powered by car charger DC.

1.3. Frequency Hopping System Requirements

1.3.1. Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the systemhopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equallyon the average by each transmitter. The system receivers shall have input bandwidths that match the hoppingchannel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with thetransmitted signals.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels duringeach transmission. However, the system, consisting of both the transmitter and the receiver, must be designed tocomply with all of the regulations in this section should the transmitter be presented with a continuous data (orinformation) stream. In addition, a system employing short transmission bursts must comply with the definition ofa frequency hopping system and must distribute its transmissions over the minimum number of hopping channelsspecified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the systemto recognize other users within the spectrum band so that it individually andindependently chooses and adapts itshopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems inany other manner for the express purpose of avoiding the simultaneous occupancy of individual hoppingfrequencies by multiple transmitters is not permitted.

1.3.2. Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule.

This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technologycalled frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to79 bands (1 MHz each; centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitterswitches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devicesparticipating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (thefrequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconetmust know the master's device address and must synchronize their clocks with the master's clock.

Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way fora Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wirelessdevices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. TheAFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of anyidentified bad channels. The devices will then switch to alternative available "good" channels, away from theareas of interference, thus having no impact on the bandwidth used.

This device was tested with a bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for ANSI C63.10-2013 and FCC Part 15.247 rule.

Carrier Frequency and channel List:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
…	…	…	…	…	…	…	…
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

Note 1: F(MHz) = 2402+1*n (0<=n<=78).

Note 2: Channel 0, 39 &78 selected for GFSK, π/4-DQPSK and 8DPSK as Lowest, Middle and Highest Channel.

1.4. Table for Supporting Units

Support Equipment:

No.	Equipment	Brand Name	Model Name	Manufacturer	Serial No.	Note
1	Laptop	HP	TPN-Q221	HP	5CD14347QB	FCC DOC

Support Cable:

Description	Shield Type	Ferrite Core	Length
DC Power Cable	Un- shielding	/	3.5m

1.5. EUT Operation Test Setup

For RF test items, an engineering test program was provided and enable to make EUT transmitting.

1.6. Test environment and mode

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

Operating Environment	
Temperature	15°C - 35°C
Humidity	30% -60%
Atmospheric Pressure	86kPa-106kPa
Test mode:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.

1.7. Facilities and Accreditations

FCC-Registration No.: 406086

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

ISED Registration: 11185A

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.
CAB number: CN0064

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025.
The accreditation certificate number is 5721.01.

2. Test Requirement

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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.

And according to FCC 47 CFR Section 15.247(c), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

According to RSS GEN 6.8, The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list.

2.1.2. Antenna Information

Antenna Category: Internal Antenna

A internal Antenna was soldered to the antenna port of EUT via an adaptor cable, can't be removed.

Antenna General Information:

No.	EUT	Operating frequency range	Ant. Type	Ant. Gain
1	Cobra-SC120	2402-2480MHz	Internal	1.93dBi

2.1.3. Result: comply

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Number of Hopping Frequency

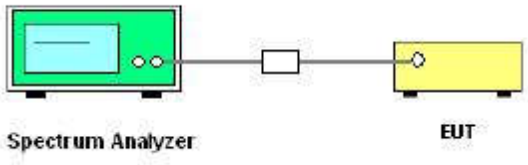
2.2.1. Limit of Number of Hopping Frequency

Frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

2.2.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.2.3. Test Setup



2.2.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.3.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

   Span: The frequency band of operation / RBW: Set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, Whichever is smaller / VBW ≥ RBW / Sweep: Auto / Detector function: Peak / Trace: Max hold / Allow the trace to stabilize.
6. The number of hopping frequency used is defined as the number of total channel.
7. Record the measurement results in the test report.

2.2.5. Test Results of Number of Hopping Frequency

Please refer to Appendix A for detail.

2.3. Maximum Conducted Output Power

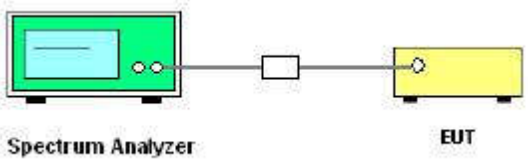
2.3.1. Limit of Maximum Conducted Output Power

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts. The e.i.r.p. shall not exceed 4 W.

2.3.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.3.3. Test Setup



2.3.4. Test Procedures

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.5.
2. The RF output of EUT was connected to Spectrum analyzer by RF cable and attenuator. The pathloss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

   Set span to be Approximately five times the 20 dB bandwidth, centered on a hopping channel / RBW > 20 dB bandwidth of the emission being measured / VBW ≥ RBW / Sweep: Auto / Detector function: Peak / Trace: Max hold / Allow trace to stabilize / Use the marker-to-peak function to set the marker to the peak of the emission.
5. Record the measurement results in the test report.

2.3.5. Test Result of Maximum Conducted Output Power

Please refer to Appendix A for detail.

2.4. 20dB and 99% Bandwidth

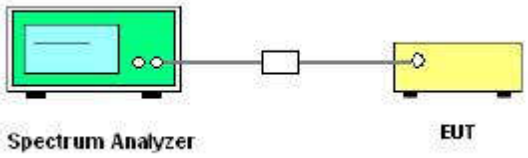
2.4.1. Definition

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1% = 20dB) taking the total RF output power.

2.4.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3. Test Setup



2.4.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.7.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the spectrum analyzer “Channel Bandwidth” function to easurement the 20dB EBW and 99% OBW.
5. For 6dB EBW Use the following spectrum analyzer settings:
   Using the X dB bandwidth mode of the instrument's automatic bandwidth measurement function, X is set to 20 dB / The spectrum analyzer center frequency is set to the EUT channel center frequency / Set span to be approximately 2 to 5 times the OBW / RBW ≥ 1% to 5% of the OBW / VBW shall be approximately three times RBW / Sweep: Auto / Detector mode: Peak / Trace mode: Max hold.
6. For 99% OBW Use the following spectrum analyzer settings:
   Set RBW = approximately 1% EBW or 1.5 times to 5.0 times the OBW, VBW ≥ 3 × RBW.
7. Record the measurement results in the test report.

2.4.5. Test Results of 20dB and 99% Bandwidth

Please refer to Appendix A for detail.

2.5. Carried Frequency Separation

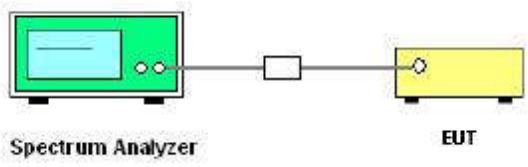
2.5.1. Limit of Carried Frequency Separation

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

2.5.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.5.3. Test Setup



2.5.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.2.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

   Span: wide enough to capture the peaks of two adjacent channels /

   RBW: Start with the RBW set to approximately 30% of the channel spacing / VBW ≥ RBW /

   Sweep: Auto / Detector function: Peak / Trace: Max hold / Allow the trace to stabilize /

   Use the marker-delta function to determine the separation between the peaks of the adjacent channels.
6. Record the measurement results in the test report.

2.5.5. Test Results of Carried Frequency Separation

Please refer to Appendix A for detail.

2.6. Dwell time

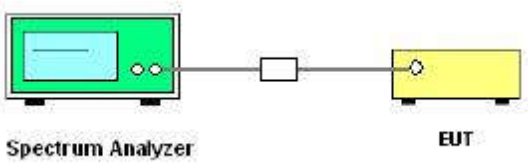
2.6.1. Limit of Dwell Time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

2.6.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.6.3. Test Setup



2.6.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.4.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Enable the EUT hopping function.
5. Use the following spectrum analyzer settings:

   Span: Zero span, centered on a hopping channel / RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel / VBW ≥ RBW / Sweep: As necessary to capture the entire dwell time per hopping channel / Detector function: Peak / Trace: Max hold.
6. Record the measurement results in the test report.

2.6.5. Test Results of Dwell Time

Please refer to Appendix A for detail.

2.7. Conducted Spurious Emissions

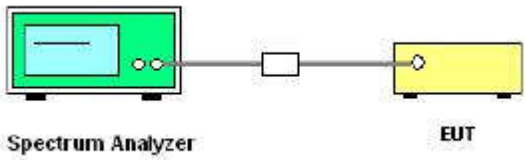
2.7.1. Limit of Conducted Spurious Emissions

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is perating, 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.

2.7.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.7.3. Test Setup



2.7.4. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.8.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

   Set the frequency range to 30MHz~25GHz / RBW: 100kHz / VBW: 300kHz / Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize / Use the peak marker function to determine the maximum amplitude level.
5. Record the measurement results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2.7.5. Test Results of Conducted Spurious Emissions

Please refer to Appendix A for detail.

2.8. Conducted Band Edge

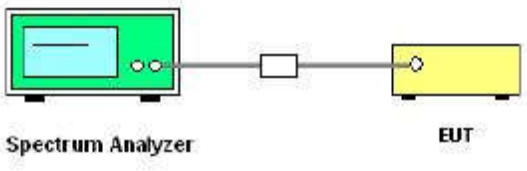
2.8.1. Limit of Conducted Band Edge

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is perating, 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.

2.8.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.8.3. Test Setup



2.8.1. Test Procedure

1. The testing follows the Measurement Procedure of ANSI C63.10-2013 Section 7.8.6.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:

   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 that fall outside of the authorized band of operation / RBW: 100kHz / VBW: 300kHz / Detector: Peak / Sweep time: Auto couple / Trace mode: Max hold / Allow trace to fully stabilize / Use the peak marker function to determine the maximum power level.
5. Enable hopping function of the EUT and then repeat step 3 and 4.
6. Record the measurement results in the test report.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

2.8.2. Test Results of Conducted Band Edge

Please refer to Appendix A for detail.

2.9. Radiated Band Edges and Spurious Emission

2.9.1. Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the frequency band in which the 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. If the transmitter uses an RMS average conducted power limit, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the estricted bands, as defi ned in §15.205(a), must also comply with the radiated emission limits specifi ed in §15.209(a).

§15.209(a) Radiated emission limits:

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 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Restricted bands of operation refer to §15.205 (a):

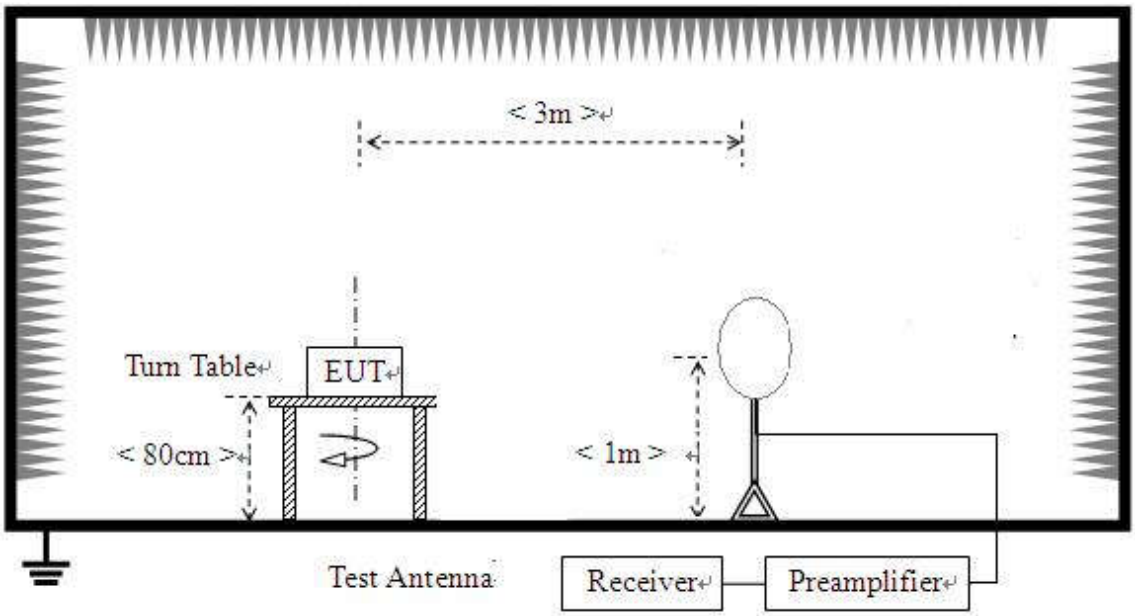
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41	/	/	/
Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. [2]Above 38.6.			

2.9.2. Measuring Instruments

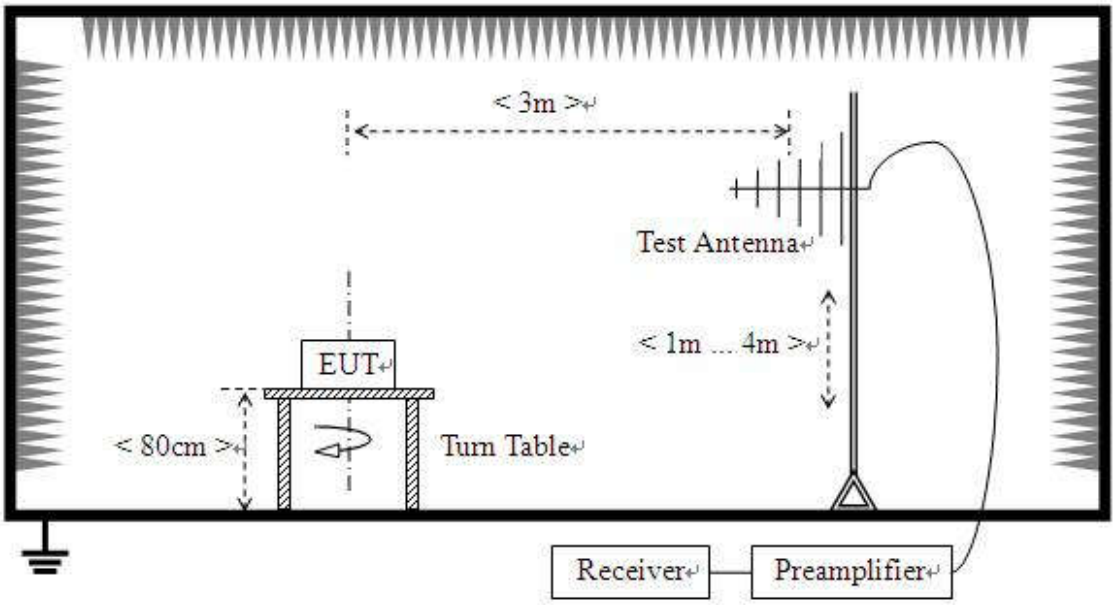
The measuring equipment is listed in the section 3 of this test report.

2.9.3. Test Setup

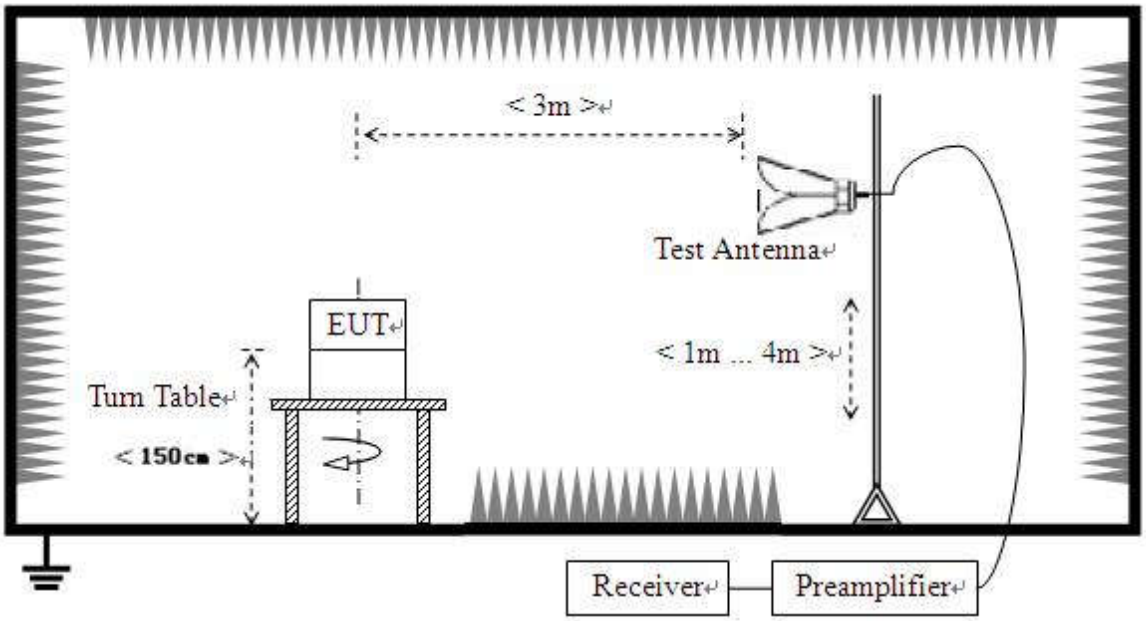
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



2.9.4. Test Procedure

1. The EUT was placed on the top of a rotating table 0.8m for below 1GHz and 1.5m for above 1GHz above the ground at a 3 meters semi-anechoic chamber.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on thetop of a variable height antenna tower.
3. Height of receiving antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported.Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then

reported in a data sheet.

7. For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T(Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

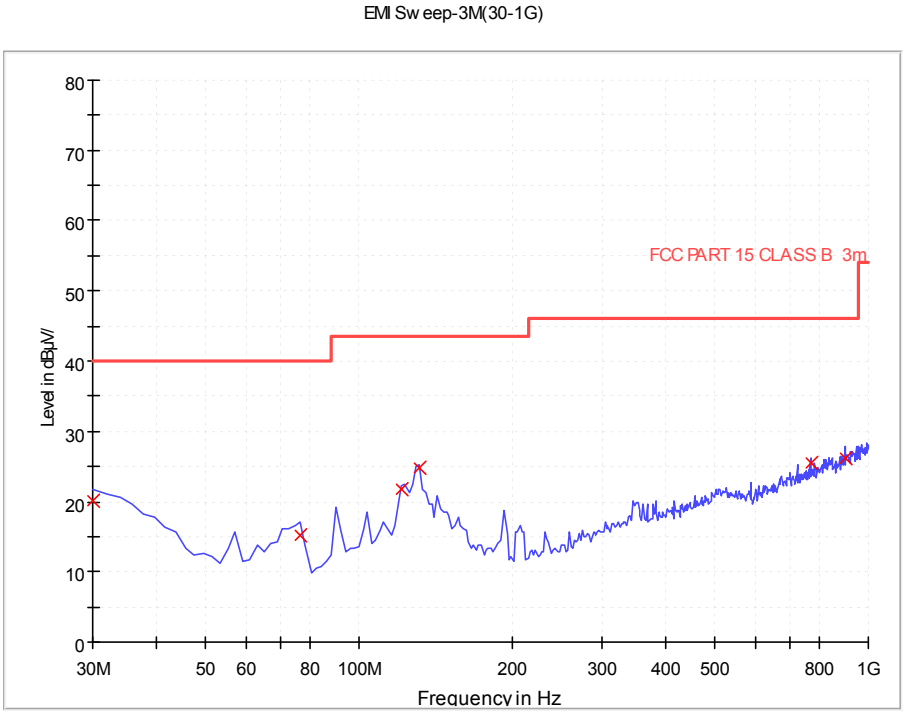
2.9.5. Test Results of Radiated Band Edge and Spurious Emission

For 9 kHz to 30MHz, The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

For 30MHz to 1GHz, All of the EUT Configure mode were tested and found DH5 2402MHz channel is the worst mode, the worst case is recorded in this report.

For 30MHz to 1000MHz

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	HuangChaoMing	Test Date:	2024.03.13
Test Mode:	BT - TX	Test Result:	Pass



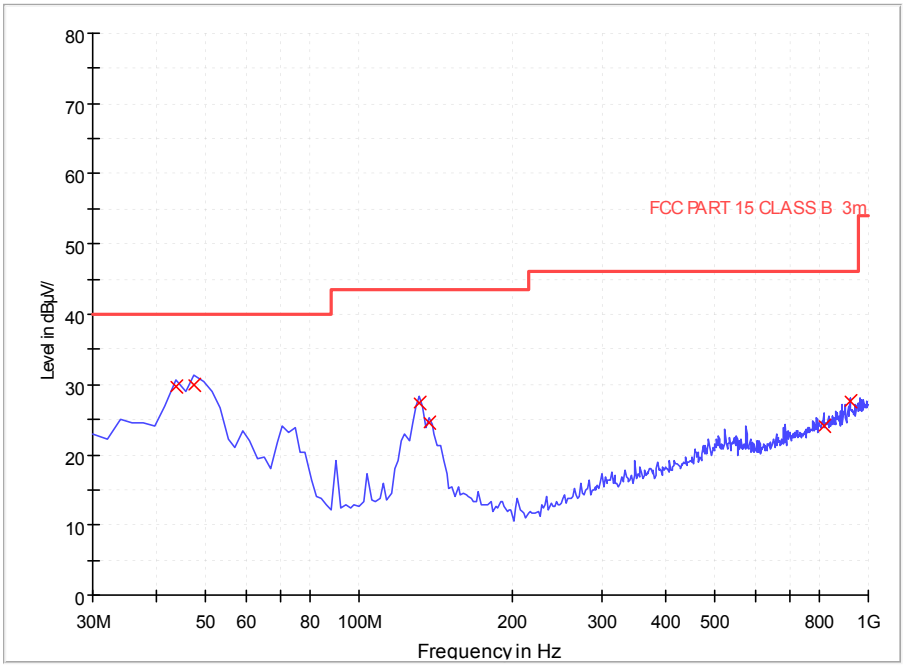
Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
30.000000	20.07	120.000	100.0	H	21.1	19.93	40.0
76.640000	15.26	120.000	100.0	H	9.2	24.74	40.0
121.360000	21.73	120.000	100.0	H	13.1	21.77	43.5
131.080000	24.78	120.000	100.0	H	13.6	18.72	43.5
770.640000	25.49	120.000	100.0	H	23.1	20.51	46.0
902.800000	26.22	120.000	100.0	H	24.4	19.78	46.0

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value - Emission Level.
4. The other emission levels were very low against the limit.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

Test site:	3M anechoic chamber	Environment:	Temp: 23℃; Humi:48%;101kPa
Operator:	HuangChaoMing	Test Date:	2024.03.13
Test Mode:	BT - TX	Test Result:	Pass

EMI Sweep-3M(30-1G)



Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Polarity	Corr. (dB/m)	Margin - QPK	Limit - QPK
43.600000	29.69	120.000	100.0	V	14.2	10.31	40.0
47.480000	30.05	120.000	100.0	V	11.7	9.95	40.0
131.080000	27.32	120.000	100.0	V	13.6	16.18	43.5
136.920000	24.47	120.000	100.0	V	13.8	19.03	43.5
817.280000	24.08	120.000	100.0	V	23.6	21.92	46.0
922.240000	27.64	120.000	100.0	V	24.7	18.36	46.0

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB).
3. Margin value = Limit value - Emission Level.
4. The other emission levels were very low against the limit.
5. Only the antenna height (from 1m to 4m) at maximum reading are recorded.

For 1GHz to 25GHz

GFSK_2402MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2390.00	51.97	74.00	-22.03	1.50	150	55.06	-3.09	Horizontal	Peak
2390.00	42.63	54.00	-11.37	1.50	150	45.72	-3.09	Horizontal	Average
4804.00	46.89	74.00	-27.11	1.50	150	45.63	1.26	Horizontal	Peak
4804.00	37.30	54.00	-16.70	1.50	150	36.04	1.26	Horizontal	Average
7206.00	52.81	74.00	-21.19	1.50	150	46.64	6.17	Horizontal	Peak
7206.00	42.79	54.00	-11.21	1.50	150	36.62	6.17	Horizontal	Average
2390.00	52.27	74.00	-21.73	1.50	200	55.36	-3.09	Vertical	Peak
2390.00	42.82	54.00	-11.18	1.50	200	45.91	-3.09	Vertical	Average
4804.00	47.40	74.00	-26.60	1.50	200	46.14	1.26	Vertical	Peak
4804.00	37.46	54.00	-16.54	1.50	200	36.20	1.26	Vertical	Average
7206.00	52.70	74.00	-21.30	1.50	200	46.53	6.17	Vertical	Peak
7206.00	42.93	54.00	-11.07	1.50	200	36.76	6.17	Vertical	Average
GFSK_2441MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
4882.00	46.99	74.00	-27.01	1.50	150	46.06	0.93	Horizontal	Peak
4882.00	37.35	54.00	-16.65	1.50	150	36.42	0.93	Horizontal	Average
7323.00	52.64	74.00	-21.36	1.50	150	47.03	5.61	Horizontal	Peak
7323.00	42.73	54.00	-11.27	1.50	150	37.12	5.61	Horizontal	Average
4882.00	47.16	74.00	-26.84	1.50	200	46.23	0.93	Vertical	Peak
4882.00	37.07	54.00	-16.93	1.50	200	36.14	0.93	Vertical	Average
7323.00	52.26	74.00	-21.74	1.50	200	46.65	5.61	Vertical	Peak
7323.00	43.04	54.00	-10.96	1.50	200	37.43	5.61	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

GFSK_2480MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2483.50	53.89	74.00	-20.11	1.50	150	58.64	-4.75	Horizontal	Peak
2483.50	43.78	54.00	-10.22	1.50	150	48.53	-4.75	Horizontal	Average
4960.00	45.93	74.00	-28.07	1.50	150	45.69	0.24	Horizontal	Peak
4960.00	35.72	54.00	-18.28	1.50	150	35.48	0.24	Horizontal	Average
7440.00	52.09	74.00	-21.91	1.50	150	46.27	5.82	Horizontal	Peak
7440.00	40.60	54.00	-13.40	1.50	150	34.78	5.82	Horizontal	Average
2483.50	54.26	74.00	-19.74	1.50	200	59.01	-4.75	Vertical	Peak
2483.50	43.84	54.00	-10.16	1.50	200	48.59	-4.75	Vertical	Average
4960.00	45.31	74.00	-28.69	1.50	200	45.07	0.24	Vertical	Peak
4960.00	35.69	54.00	-18.31	1.50	200	35.45	0.24	Vertical	Average
7440.00	50.97	74.00	-23.03	1.50	200	45.15	5.82	Vertical	Peak
7440.00	40.67	54.00	-13.33	1.50	200	34.85	5.82	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

π/4-DQPSK _2402MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2390.00	52.43	74.00	-21.57	1.50	150	55.52	-3.09	Horizontal	Peak
2390.00	42.96	54.00	-11.04	1.50	150	46.05	-3.09	Horizontal	Average
4804.00	47.21	74.00	-26.79	1.50	150	45.95	1.26	Horizontal	Peak
4804.00	37.70	54.00	-16.30	1.50	150	36.44	1.26	Horizontal	Average
7206.00	52.71	74.00	-21.29	1.50	150	46.54	6.17	Horizontal	Peak
7206.00	42.90	54.00	-11.10	1.50	150	36.73	6.17	Horizontal	Average
2390.00	52.35	74.00	-21.65	1.50	200	55.44	-3.09	Vertical	Peak
2390.00	42.79	54.00	-11.21	1.50	200	45.88	-3.09	Vertical	Average
4804.00	46.99	74.00	-27.01	1.50	200	45.73	1.26	Vertical	Peak
4804.00	37.43	54.00	-16.57	1.50	200	36.17	1.26	Vertical	Average
7206.00	52.37	74.00	-21.63	1.50	200	46.20	6.17	Vertical	Peak
7206.00	43.05	54.00	-10.95	1.50	200	36.88	6.17	Vertical	Average
π/4-DQPSK _2441MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
4882.00	47.38	74.00	-26.62	1.50	150	46.45	0.93	Horizontal	Peak
4882.00	37.08	54.00	-16.92	1.50	150	36.15	0.93	Horizontal	Average
7323.00	52.83	74.00	-21.17	1.50	150	47.22	5.61	Horizontal	Peak
7323.00	43.00	54.00	-11.00	1.50	150	37.39	5.61	Horizontal	Average
4882.00	47.17	74.00	-26.83	1.50	200	46.24	0.93	Vertical	Peak
4882.00	36.61	54.00	-17.39	1.50	200	35.68	0.93	Vertical	Average
7323.00	52.49	74.00	-21.51	1.50	200	46.88	5.61	Vertical	Peak
7323.00	42.65	54.00	-11.35	1.50	200	37.04	5.61	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

π/4-DQPSK _2480MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2483.50	54.00	74.00	-20.00	1.50	150	58.75	-4.75	Horizontal	Peak
2483.50	43.50	54.00	-10.50	1.50	150	48.25	-4.75	Horizontal	Average
4960.00	46.08	74.00	-27.92	1.50	150	45.84	0.24	Horizontal	Peak
4960.00	35.25	54.00	-18.75	1.50	150	35.01	0.24	Horizontal	Average
7440.00	51.86	74.00	-22.14	1.50	150	46.04	5.82	Horizontal	Peak
7440.00	40.11	54.00	-13.89	1.50	150	34.29	5.82	Horizontal	Average
2483.50	54.72	74.00	-19.28	1.50	200	59.47	-4.75	Vertical	Peak
2483.50	44.19	54.00	-9.81	1.50	200	48.94	-4.75	Vertical	Average
4960.00	45.77	74.00	-28.23	1.50	200	45.53	0.24	Vertical	Peak
4960.00	35.33	54.00	-18.67	1.50	200	35.09	0.24	Vertical	Average
7440.00	50.78	74.00	-23.22	1.50	200	44.96	5.82	Vertical	Peak
7440.00	40.64	54.00	-13.36	1.50	200	34.82	5.82	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

8DPSK _2402MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2390.00	52.13	74.00	-21.87	1.50	150	55.22	-3.09	Horizontal	Peak
2390.00	43.24	54.00	-10.76	1.50	150	46.33	-3.09	Horizontal	Average
4804.00	47.44	74.00	-26.56	1.50	150	46.18	1.26	Horizontal	Peak
4804.00	37.86	54.00	-16.14	1.50	150	36.60	1.26	Horizontal	Average
7206.00	53.20	74.00	-20.80	1.50	150	47.03	6.17	Horizontal	Peak
7206.00	42.61	54.00	-11.39	1.50	150	36.44	6.17	Horizontal	Average
2390.00	52.48	74.00	-21.52	1.50	200	55.57	-3.09	Vertical	Peak
2390.00	42.47	54.00	-11.53	1.50	200	45.56	-3.09	Vertical	Average
4804.00	46.85	74.00	-27.15	1.50	200	45.59	1.26	Vertical	Peak
4804.00	36.95	54.00	-17.05	1.50	200	35.69	1.26	Vertical	Average
7206.00	52.03	74.00	-21.97	1.50	200	45.86	6.17	Vertical	Peak
7206.00	43.54	54.00	-10.46	1.50	200	37.37	6.17	Vertical	Average
8DPSK _2441MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
4882.00	47.69	74.00	-26.31	1.50	150	46.76	0.93	Horizontal	Peak
4882.00	36.80	54.00	-17.20	1.50	150	35.87	0.93	Horizontal	Average
7323.00	52.72	74.00	-21.28	1.50	150	47.11	5.61	Horizontal	Peak
7323.00	42.55	54.00	-11.45	1.50	150	36.94	5.61	Horizontal	Average
4882.00	47.50	74.00	-26.50	1.50	200	46.57	0.93	Vertical	Peak
4882.00	36.52	54.00	-17.48	1.50	200	35.59	0.93	Vertical	Average
7323.00	52.56	74.00	-21.44	1.50	200	46.95	5.61	Vertical	Peak
7323.00	42.42	54.00	-11.58	1.50	200	36.81	5.61	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

8DPSK _2480MHz									
Frequency (MHz)	Emssion Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV/m)	Correction Factor (dB/m)	Polarity	Detector
2483.50	53.78	74.00	-20.22	1.50	150	58.53	-4.75	Horizontal	Peak
2483.50	43.40	54.00	-10.60	1.50	150	48.15	-4.75	Horizontal	Average
4960.00	45.91	74.00	-28.09	1.50	150	45.67	0.24	Horizontal	Peak
4960.00	35.29	54.00	-18.71	1.50	150	35.05	0.24	Horizontal	Average
7440.00	51.70	74.00	-22.30	1.50	150	45.88	5.82	Horizontal	Peak
7440.00	39.97	54.00	-14.03	1.50	150	34.15	5.82	Horizontal	Average
2483.50	54.23	74.00	-19.77	1.50	200	58.98	-4.75	Vertical	Peak
2483.50	44.46	54.00	-9.54	1.50	200	49.21	-4.75	Vertical	Average
4960.00	45.99	74.00	-28.01	1.50	200	45.75	0.24	Vertical	Peak
4960.00	35.00	54.00	-19.00	1.50	200	34.76	0.24	Vertical	Average
7440.00	50.32	74.00	-23.68	1.50	200	44.50	5.82	Vertical	Peak
7440.00	40.75	54.00	-13.25	1.50	200	34.93	5.82	Vertical	Average

Remark:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)

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

3. Margin value = Emission Level – Limit value

4.The emission levels of other frequencies are very lower than the limit and not show in test report.

5.Tnly the antenna height (from 1m to 4m) and turntable angle (from 0 degrees to 360 degrees) at maximum reading are recorded.

2.10. AC Power Line Conducted Emission

2.10.1. Limit of AC Power Line Conducted Emission

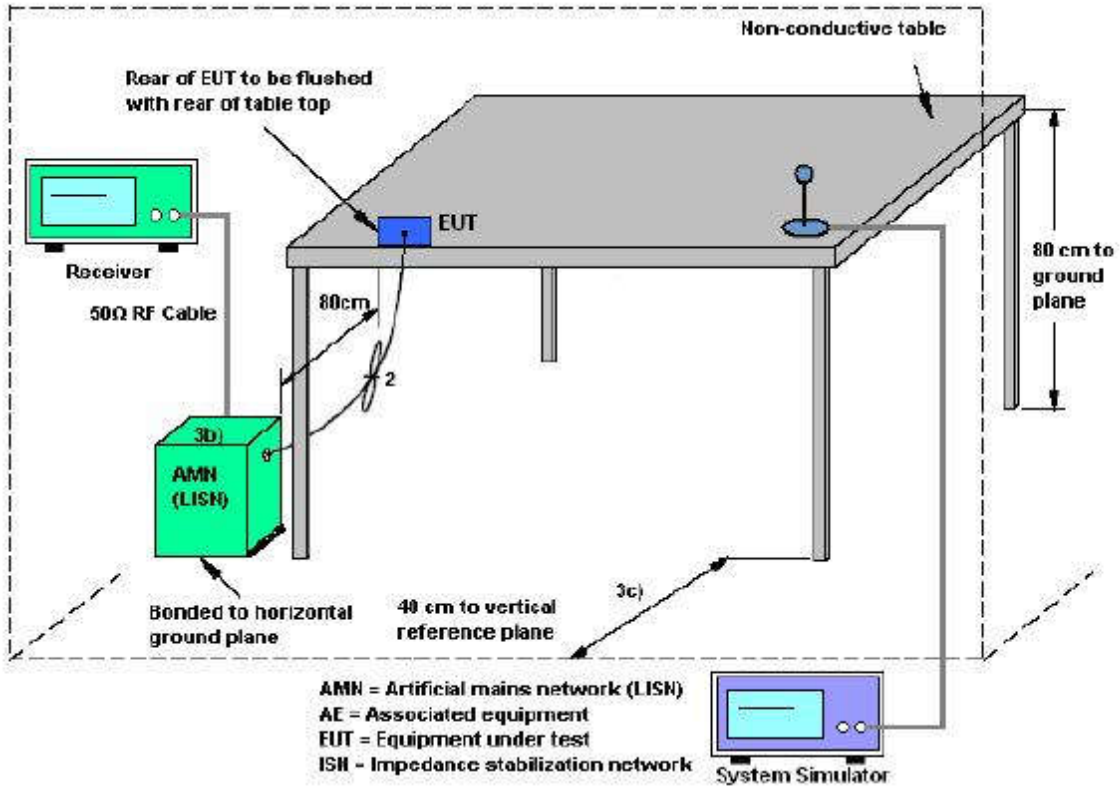
For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

2.10.2. Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.10.3. Test Setup



2.10.4. Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 micrometry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

2.10.5. Test Results of AC Power Line Conducted Emission

Not applicable, the product is only powered by car charger DC.

3. List of measuring equipment

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	5M Anechoic Chamber	Albatross	SAC-5MAC 12.8x6.8x6.4m	A0304210	2022.06.09	2026.06.08
2	EMI Test Receiver	ROHDE&SCHWARZ	ESW26	A180502935	2023.06.08	2024.06.07
3	Loop Antenna	Schwarz beck	HFH2-Z2	A0304220	2022.05.02	2025.05.01
4	Broadband antenna (30MHz~1GHz)	R&S	HL562	A0304224	2023.06.08	2024.06.07
5	EMI Horn Ant. (1-18G)	ETC	MCTD-1209	A150402241	2023.05.16	2026.05.15
6	Horn antenna (18GHz~26.5GHz)	AR	AT4510	A0804450	2023.06.01	2024.05.31
7	Amplifier 30M~1GHz	MILMEGA	80RF1000-10004	A140101634	2023.10.20	2024.10.19
8	Amplifier 1G~18GHz	MILMEGA	AS0104R-800/400	A160302517	2023.10.20	2024.10.19
9	Spectrum Analyzer	KEYSIGHT	N9030A	A160702554	2024.01.18	2025.01.17
10	Test Receiver	R&S	ESIB7	A0501375	2024.02.28	2025.02.27
11	Broadband Ant.	ETC	MCTD 2786	A150402240	2023.05.22	2026.05.21
12	3M Anechoic Chamber	Albatross	SAC-3MAC 9*6*6m	A0412375	2024.02.27	2027.02.26
13	Temperature chamber	ESPEC	SU-642	A150802409	2024.02.22	2025.02.21
14	Test Receiver	KEYSIGHT	N9038A	A141202036	2023.06.12	2024.06.11
15	LISN	ROHDE&SCHWARZ	ENV216	A140701847	2023.06.08	2024.06.07

4. Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence . The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of AC Power Line Conducted Emission Measurement (150kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	2.8dB

Uncertainty of Radiated Emission Measurement (9kHz~30MHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.5dB

Uncertainty of Radiated Emission Measurement (30MHz~1GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	3.91dB

Uncertainty of Radiated Emission Measurement (1GHz~18GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.5dB

Uncertainty of Radiated Emission Measurement (18GHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	4.9dB

Uncertainty of RF Conducted Measurement (9kHz~40GHz)

Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	1.2dB

Uncertainty of Occupied Bandwidth Measurement

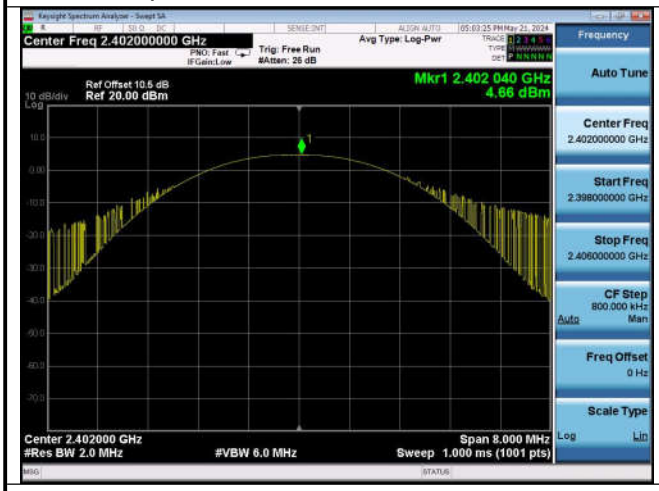
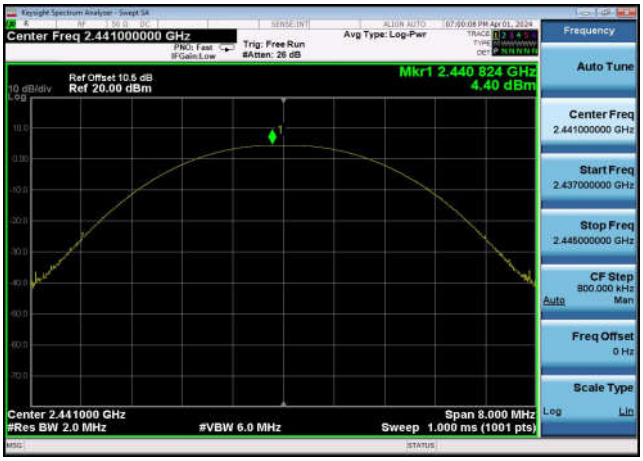
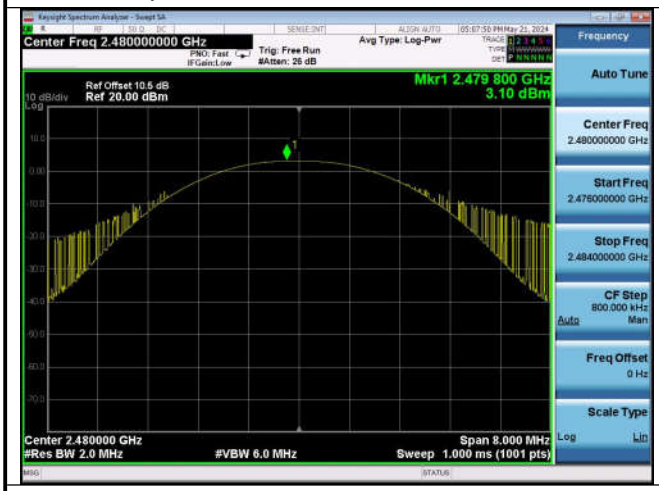
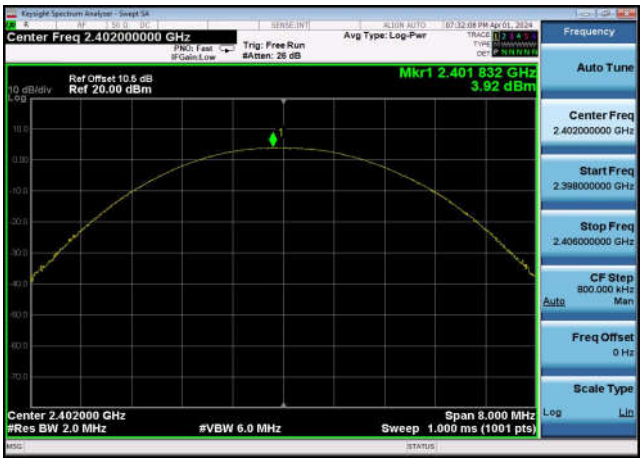
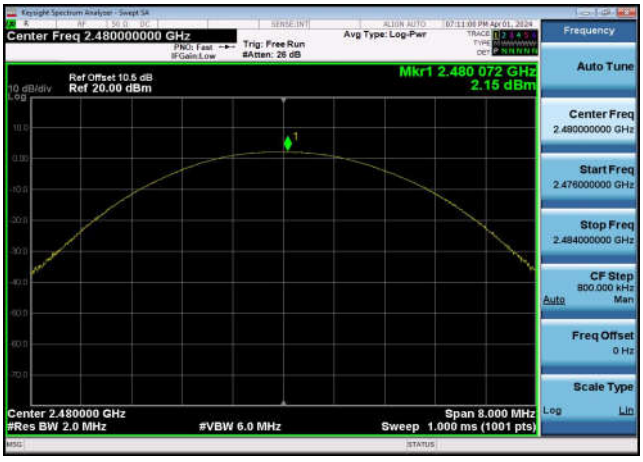
Measuring Uncertainty for a level of confidence of 95%(U=2Uc(y))	1.2%

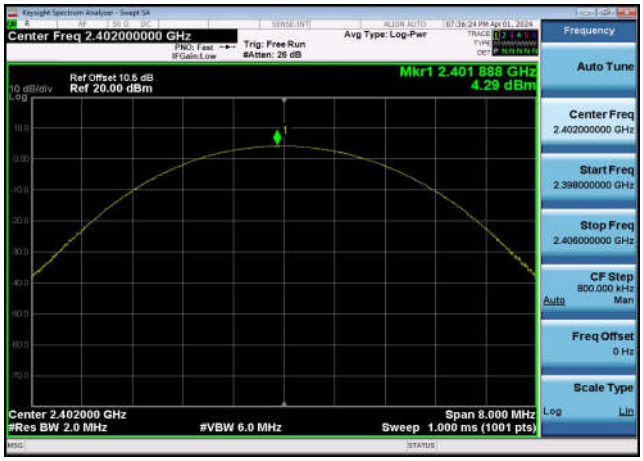
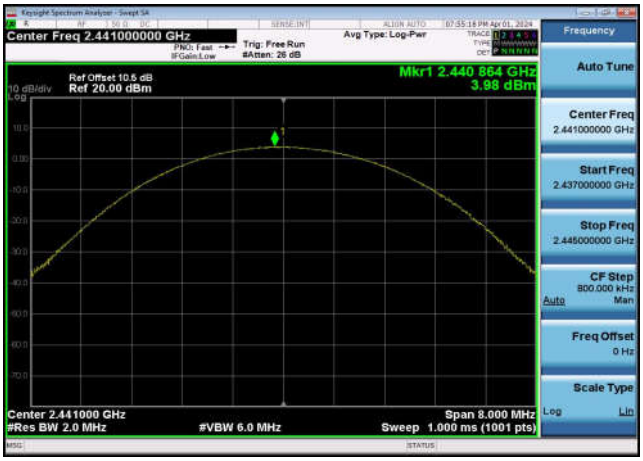
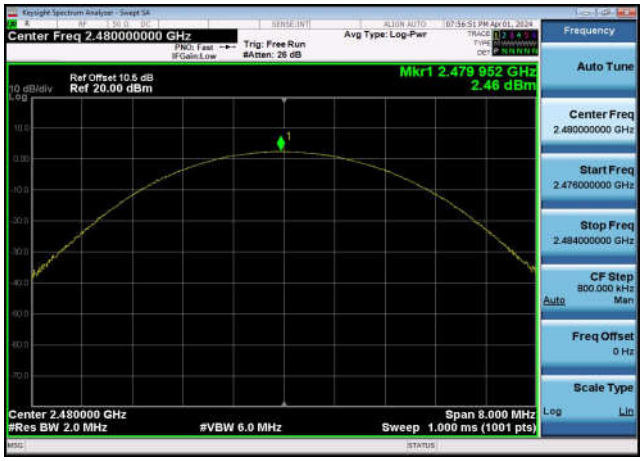
Appendix A

RF Output Power
Test Result and Data

BT Maximum Output Power								
Mode	Test Frequency	Packet Type	Power (dBm)	Ant. Gain (dBi)	EIRP (dBm)	Power Limit (dBm)	EIRP Limit (dBm)	Result
GFSK	2402	DH5	4.66	1.93	6.59	30	36.02	Pass
GFSK	2441	DH5	4.40	1.93	6.33	30	36.02	Pass
GFSK	2480	DH5	3.10	1.93	5.03	30	36.02	Pass
π/4-DQPSK	2402	2DH5	3.92	1.93	5.85	21	36.02	Pass
π/4-DQPSK	2441	2DH5	3.79	1.93	5.72	21	36.02	Pass
π/4-DQPSK	2480	2DH5	2.15	1.93	4.08	21	36.02	Pass
8DPSK	2402	3DH5	4.29	1.93	6.22	21	36.02	Pass
8DPSK	2441	3DH5	3.99	1.93	5.92	21	36.02	Pass
8DPSK	2480	3DH5	2.46	1.93	4.39	21	36.02	Pass

Note: EIRP = Conducted Power + Ant. Gain.

Output Power：GFSK,2402MHz,DH5	Output Power：GFSK,2441MHz,DH5
	
Output Power：GFSK,2480MHz,DH5	**Output Power：DQPSK,2402MHz,2DH5**
	
Output Power：DQPSK,2441MHz,2DH5	**Output Power：DQPSK,2480MHz,2DH5**
	

Output Power：8DPSK,2402MHz,3DH5	Output Power：8DPSK,2441MHz,3DH5
	
Output Power：8DPSK,2480MHz,3DH5	
	

20dB and 99% Bandwidth

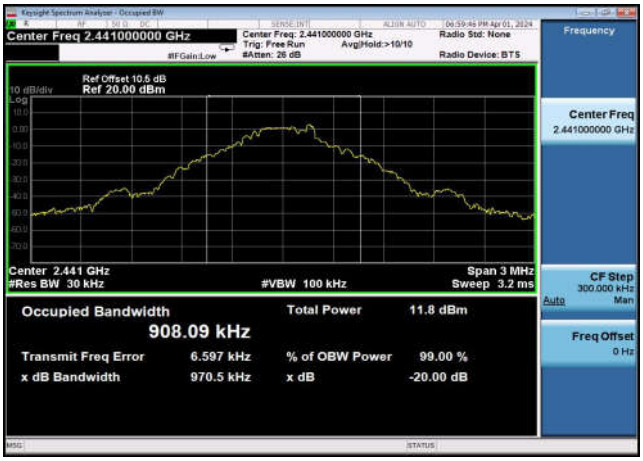
Test Result and Data

BT Occupied 20dB Bandwidth				
Mode	Test Frequency	Packet Type	20dB EBW(kHz)	Result
GFSK	2402	DH5	923.788	Pass
GFSK	2441	DH5	970.5	Pass
GFSK	2480	DH5	1007.495	Pass
π/4-DQPSK	2402	2DH5	1364.399	Pass
π/4-DQPSK	2441	2DH5	1368.592	Pass
π/4-DQPSK	2480	2DH5	1366.167	Pass
8DPSK	2402	3DH5	1332.476	Pass
8DPSK	2441	3DH5	1316.647	Pass
8DPSK	2480	3DH5	1316.789	Pass

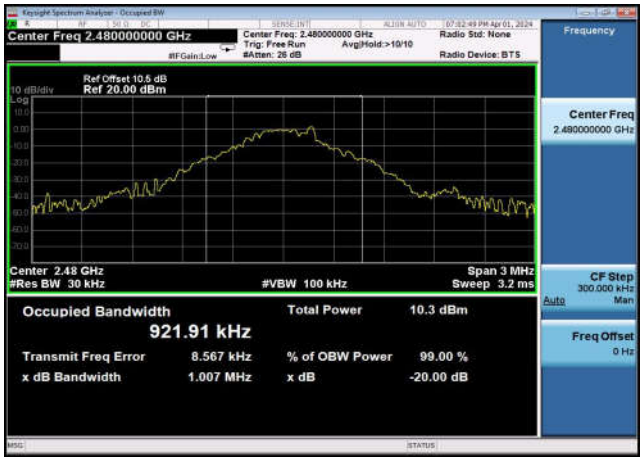
BT 99% Occupied Bandwidth				
Mode	Test Frequency	Packet Type	99% OBW (kHz)	Result
GFSK	2402	DH5	918.42	Pass
GFSK	2441	DH5	907.45	Pass
GFSK	2480	DH5	910.95	Pass
DQPSK	2402	2DH5	1221.3	Pass
DQPSK	2441	2DH5	1236.5	Pass
DQPSK	2480	2DH5	1233.0	Pass
8DPSK	2402	3DH5	1213.5	Pass
8DPSK	2441	3DH5	1237.5	Pass
8DPSK	2480	3DH5	1226.4	Pass

20dB Bandwidth：GFSK,2402MHz,DH5

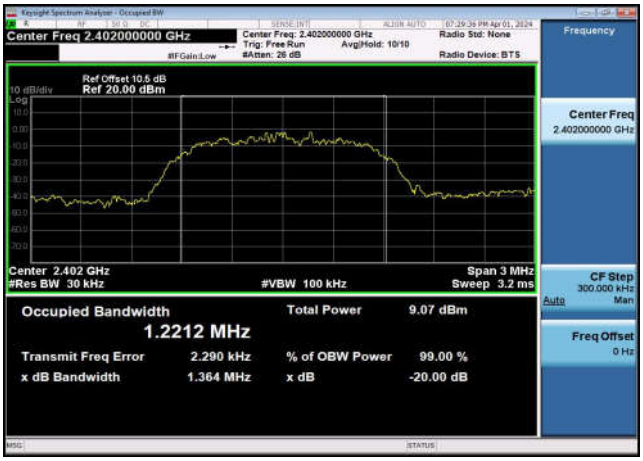
20dB Bandwidth：GFSK,2441MHz,DH5



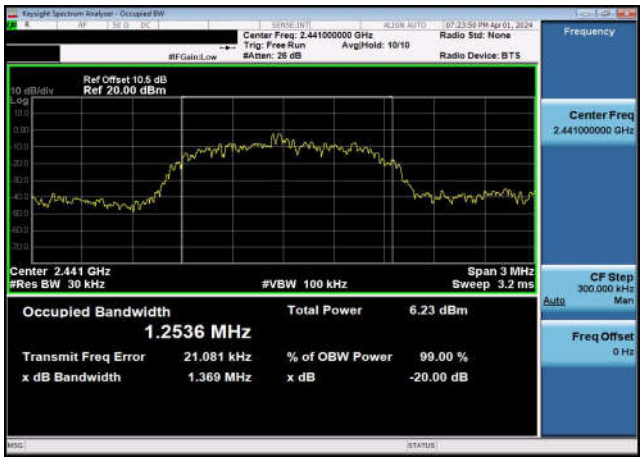
20dB Bandwidth：GFSK,2480MHz,DH5



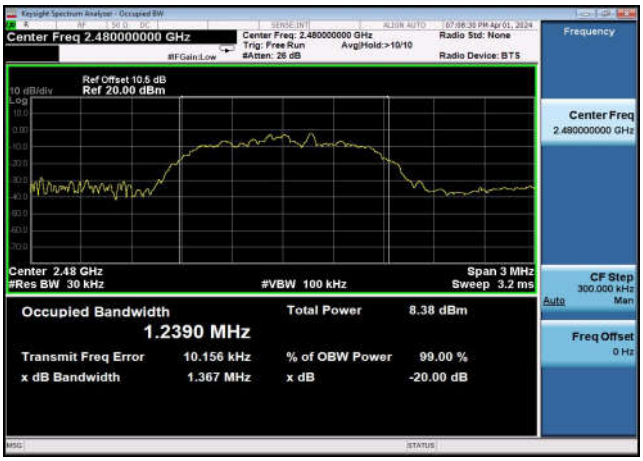
20dB Bandwidth：DQPSK,2402MHz,2DH5

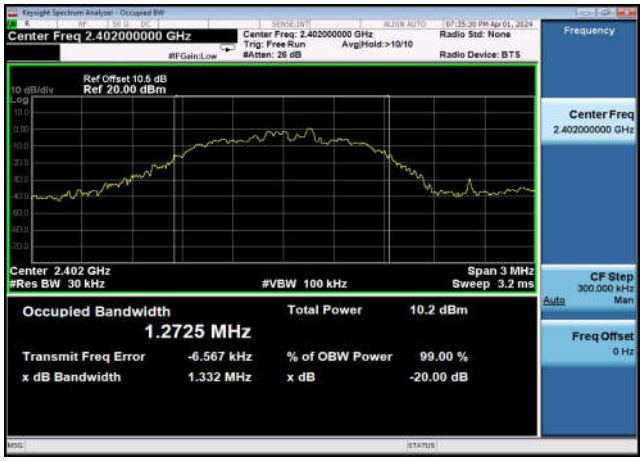
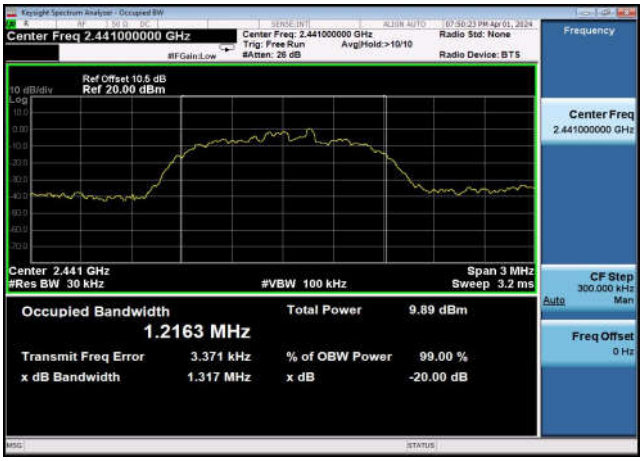
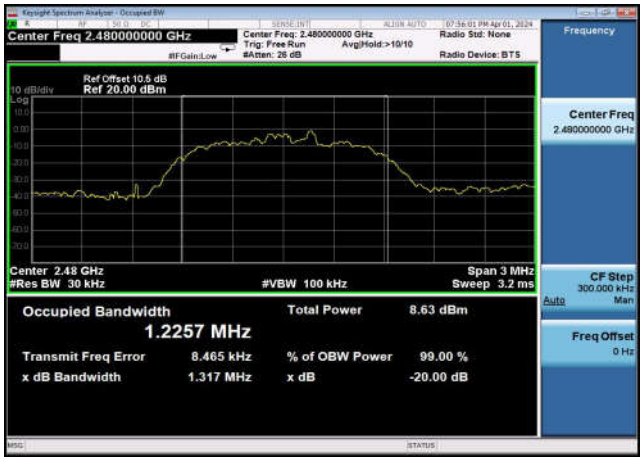


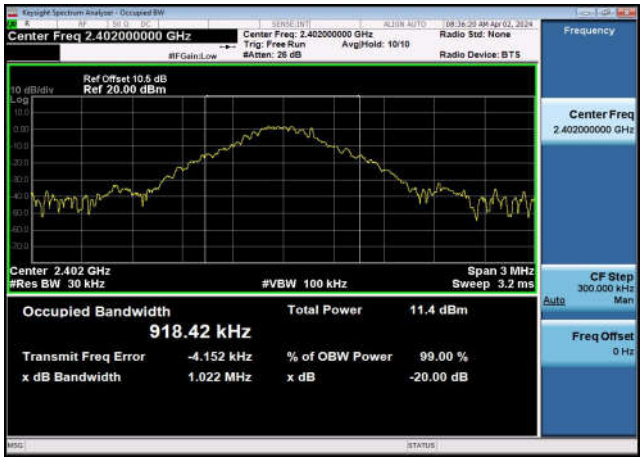
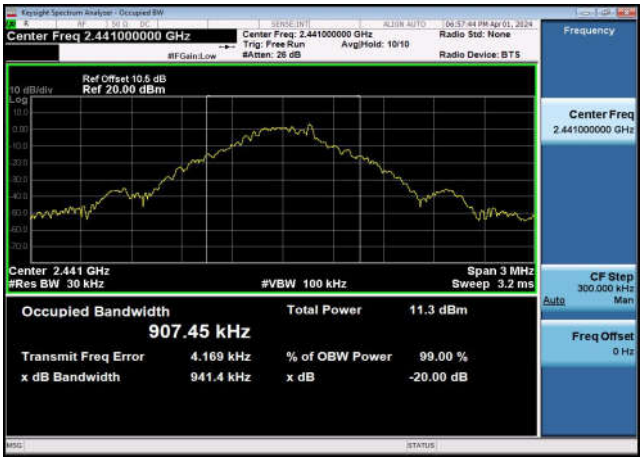
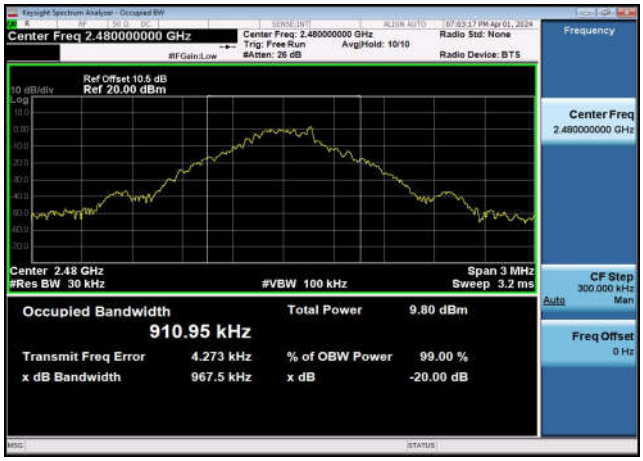
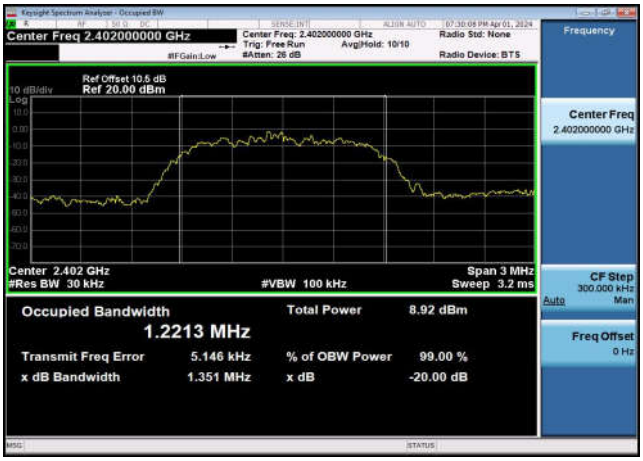
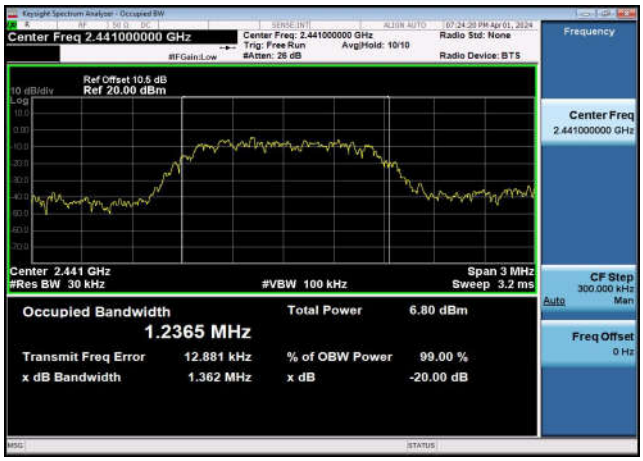
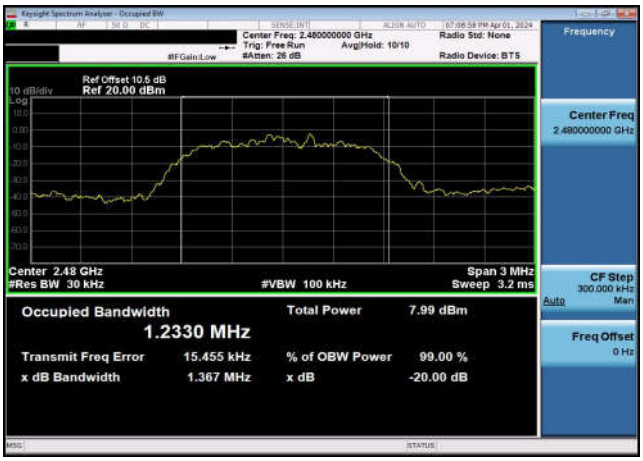
20dB Bandwidth：DQPSK,2441MHz,2DH5

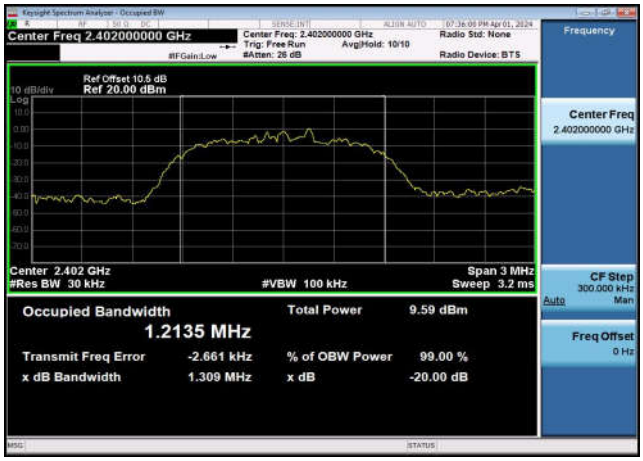
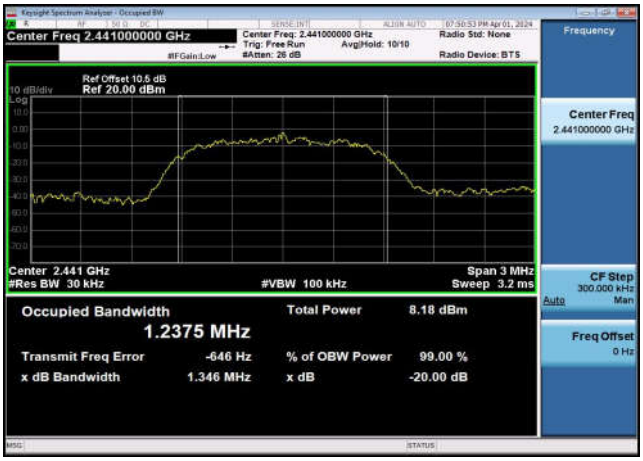
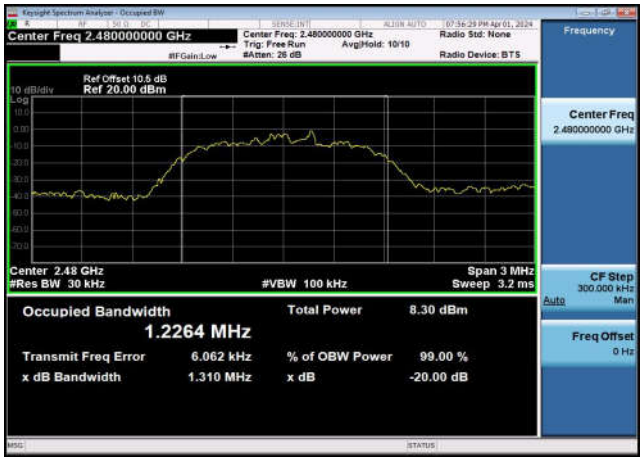


20dB Bandwidth：DQPSK,2480MHz,2DH5

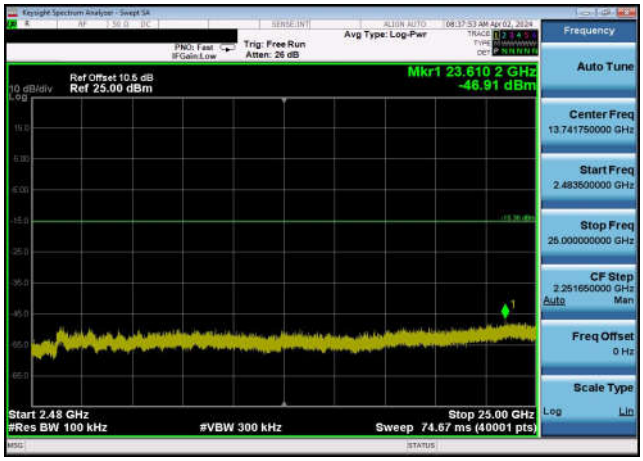
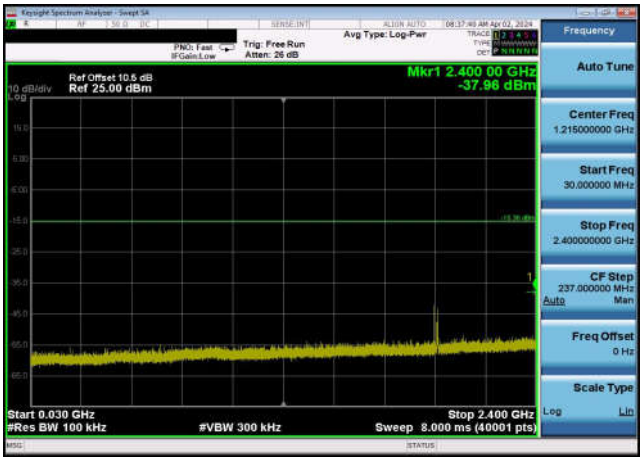
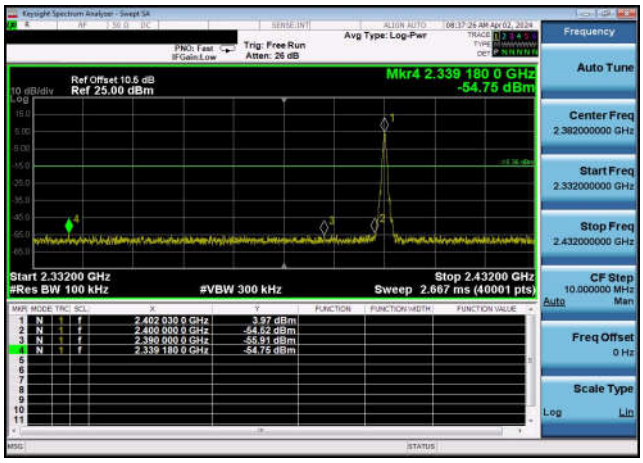
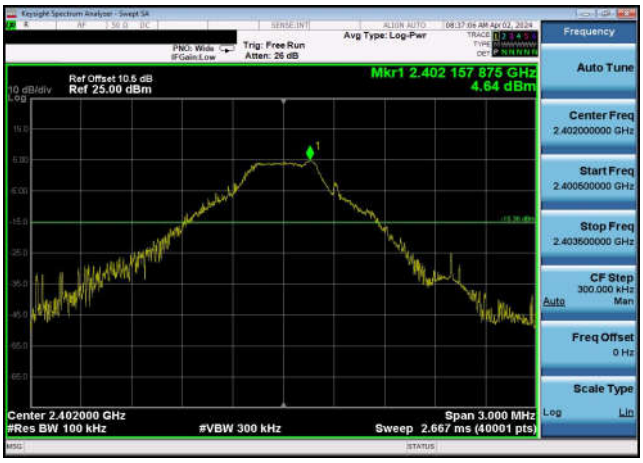
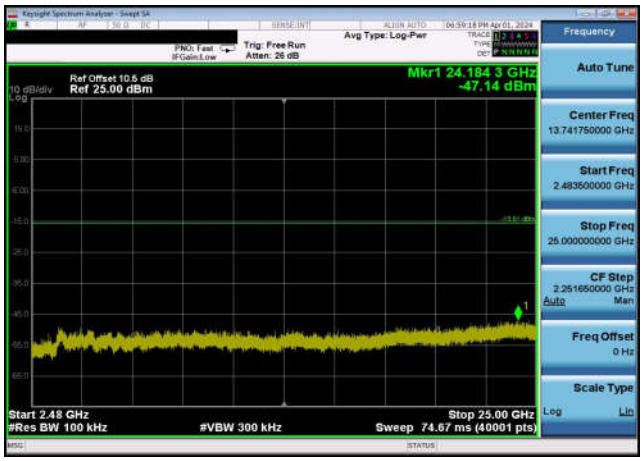
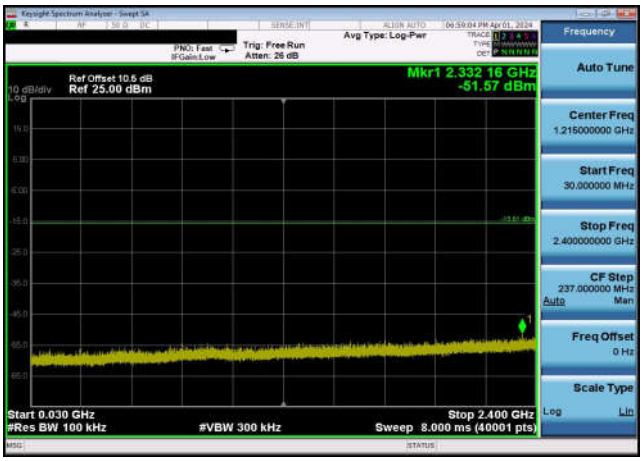


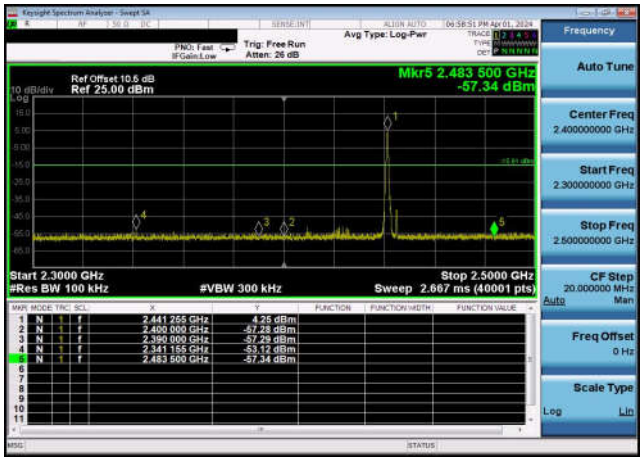
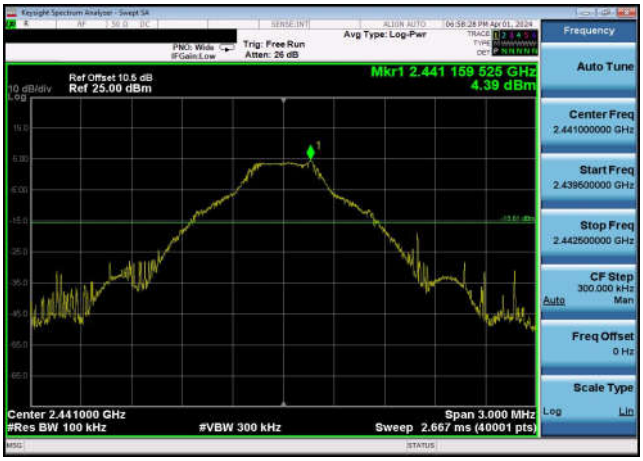
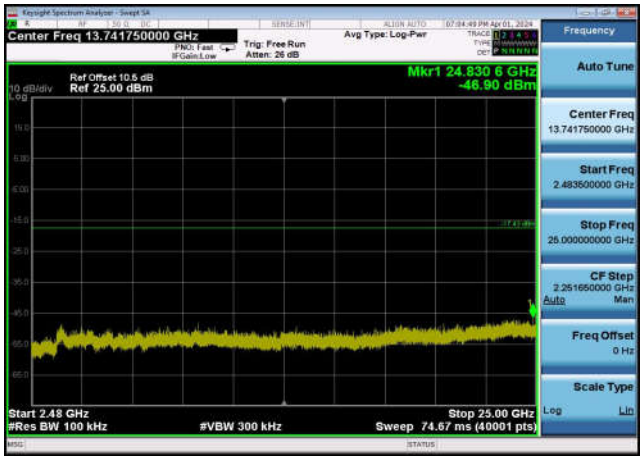
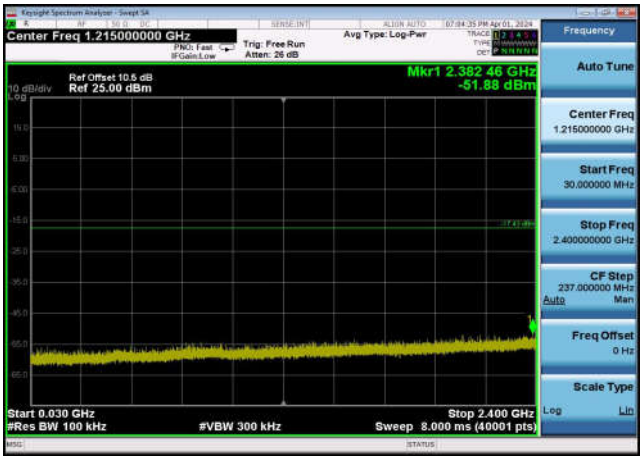
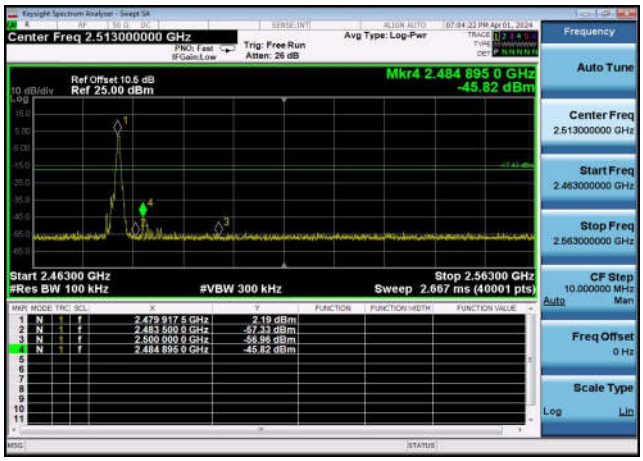
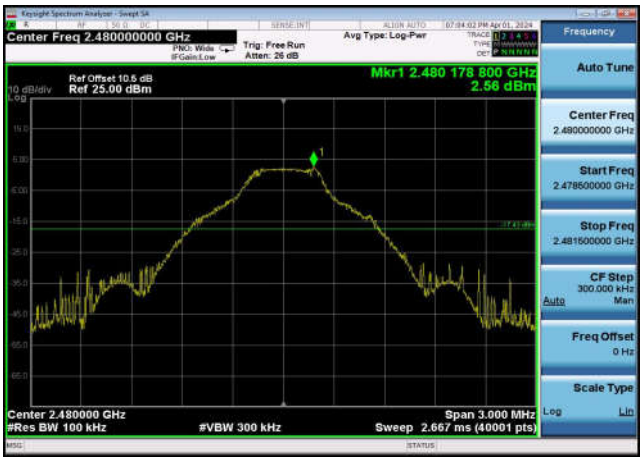
20dB Bandwidth：8DPSK,2402MHz,3DH5	20dB Bandwidth：8DPSK,2441MHz,3DH5
	
20dB Bandwidth：8DPSK,2480MHz,3DH5	
	

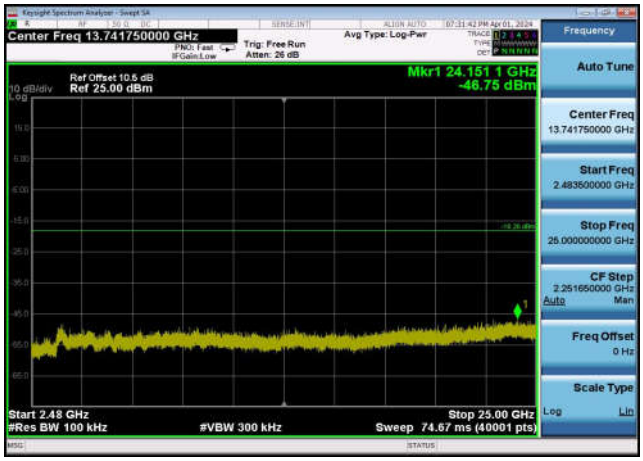
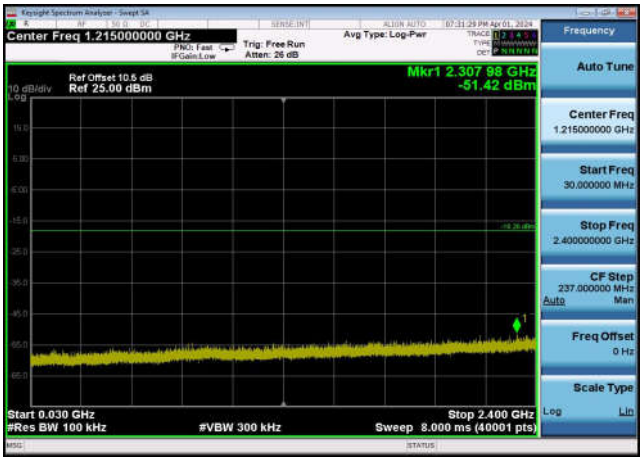
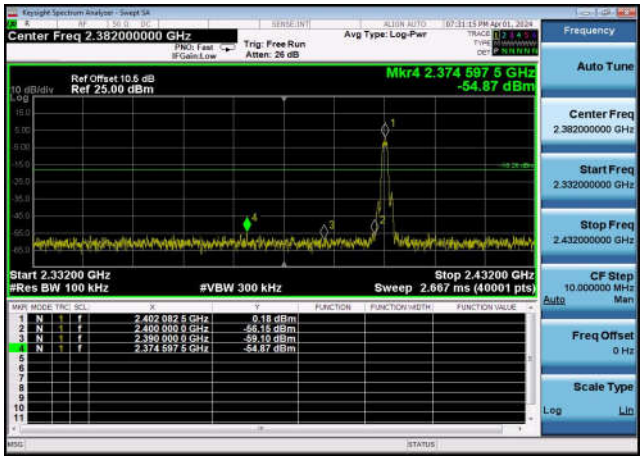
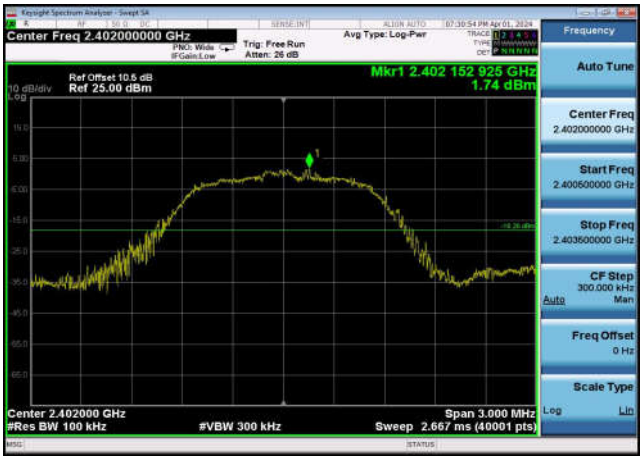
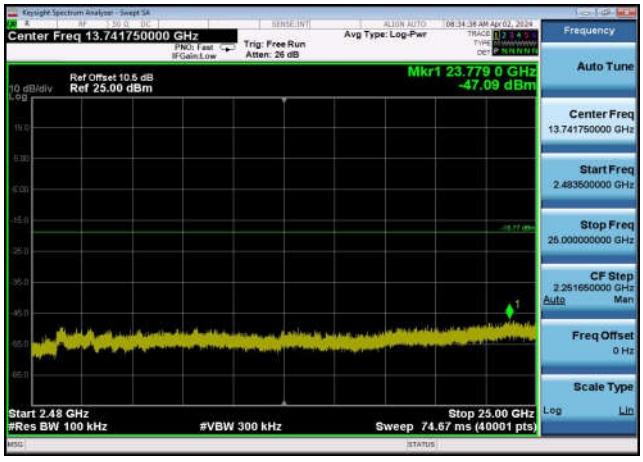
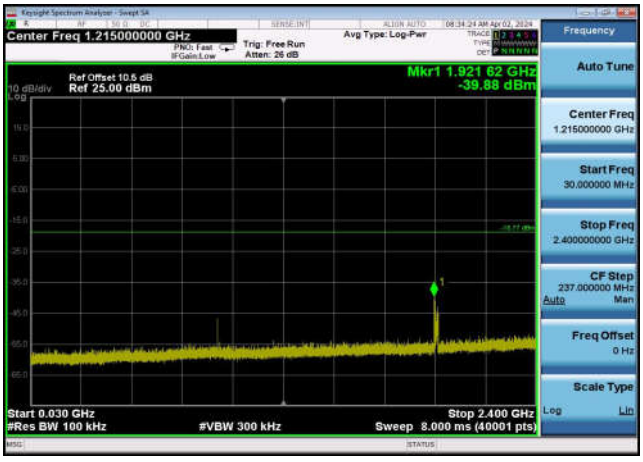
99% Bandwidth：GFSK,2402MHz,DH5	99% Bandwidth：GFSK,2441MHz,DH5
	
99% Bandwidth：GFSK,2480MHz,DH5	99% Bandwidth：DQPSK,2402MHz,2DH5
	
99% Bandwidth：DQPSK,2441MHz,2DH5	99% Bandwidth：DQPSK,2480MHz,2DH5
	

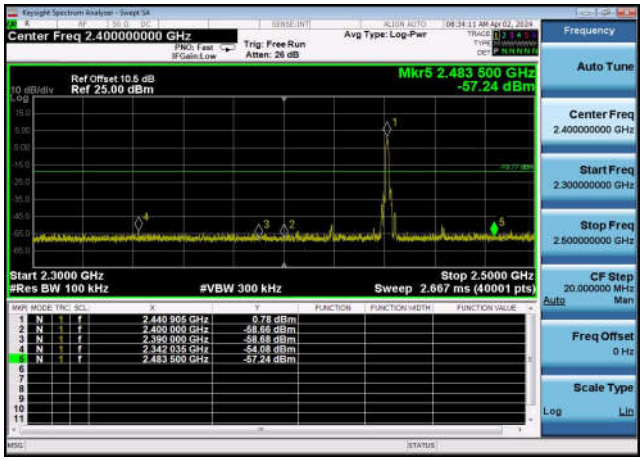
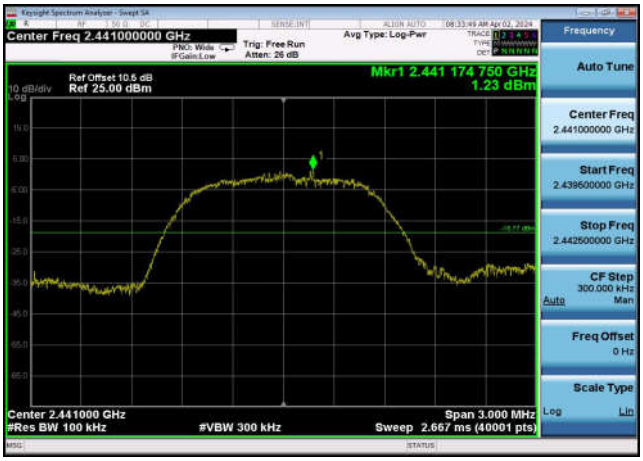
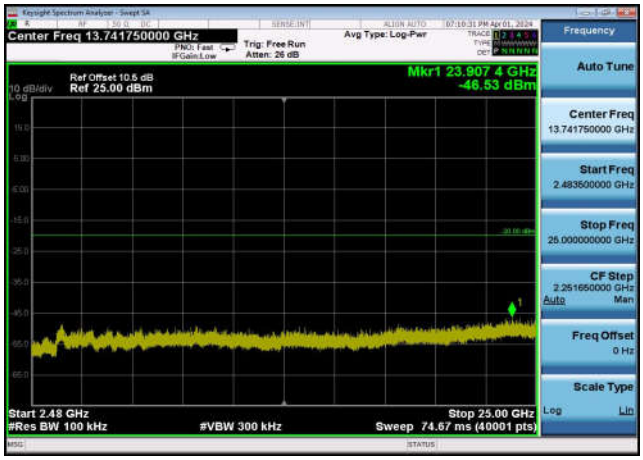
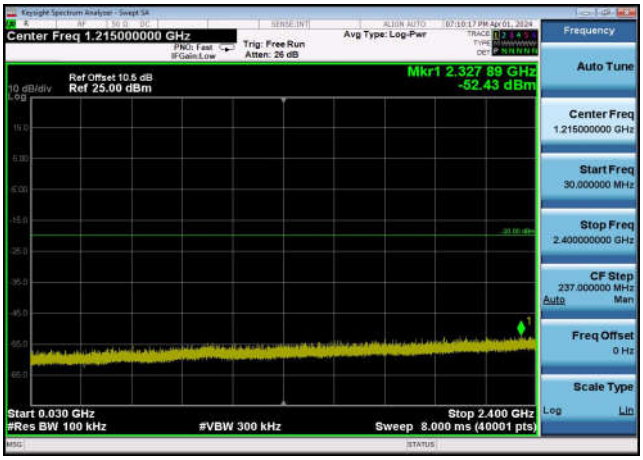
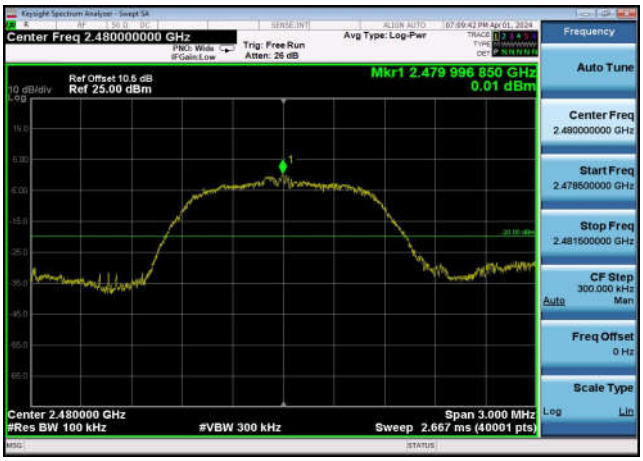
99% Bandwidth：8DPSK,2402MHz,3DH5	99% Bandwidth：8DPSK,2441MHz,3DH5
	
99% Bandwidth：8DPSK,2480MHz,3DH5	
	

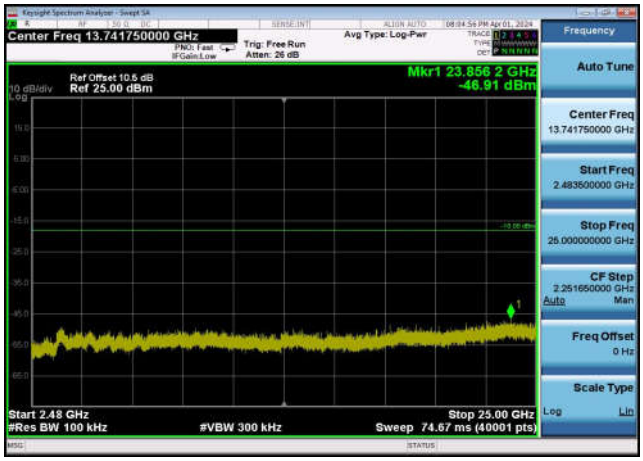
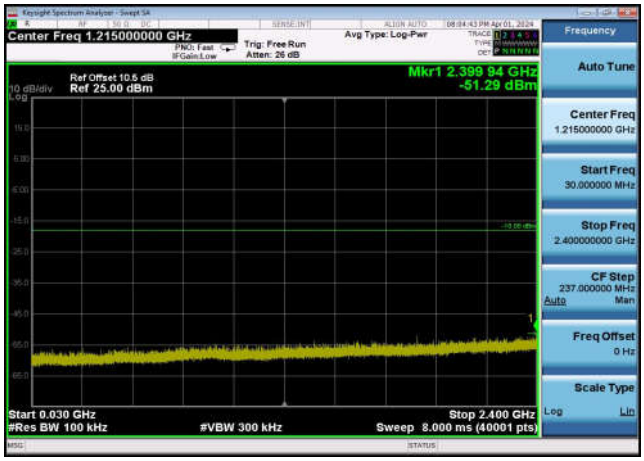
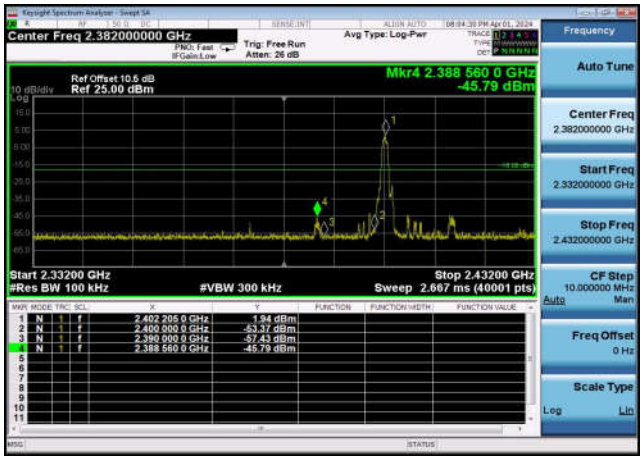
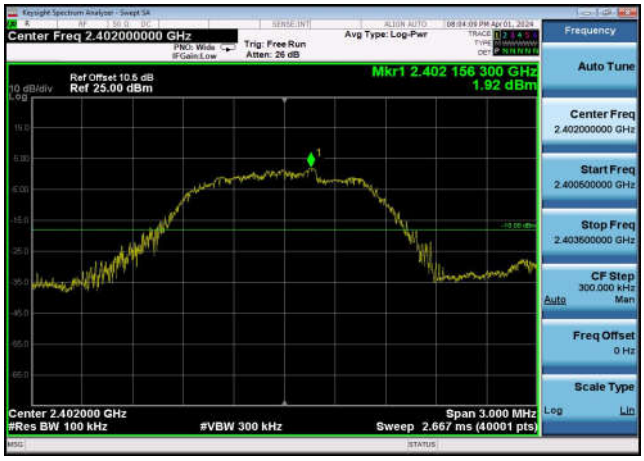
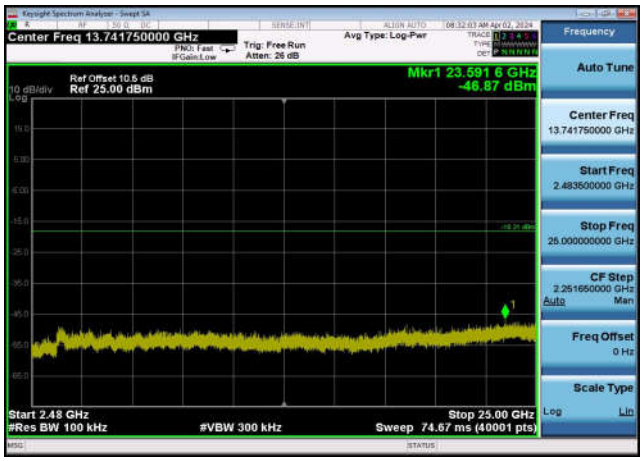
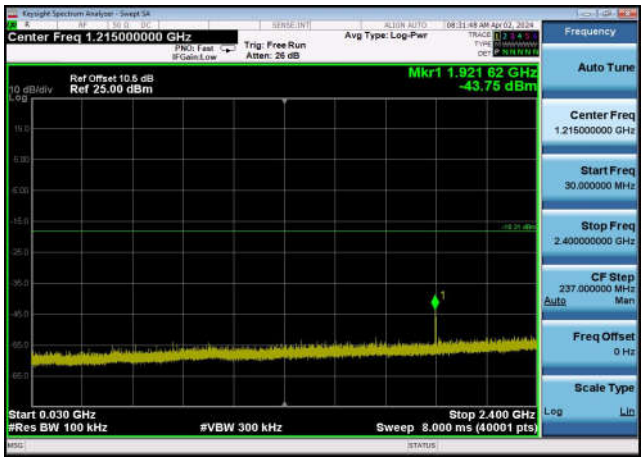
Transmitter Spurious Emission and Bandedge

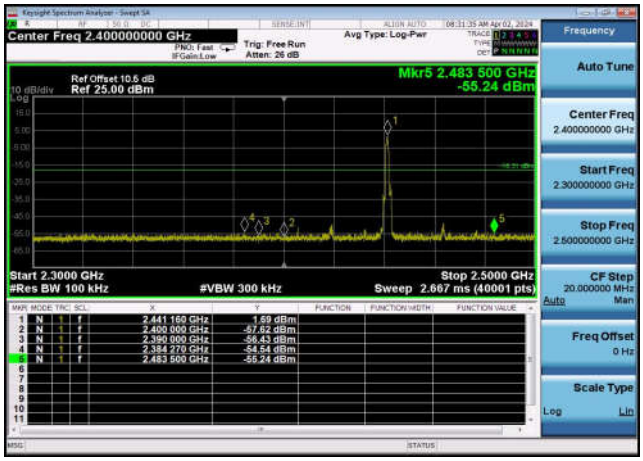
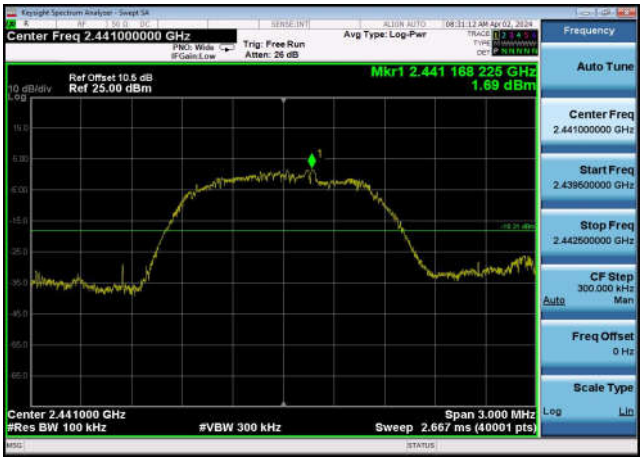
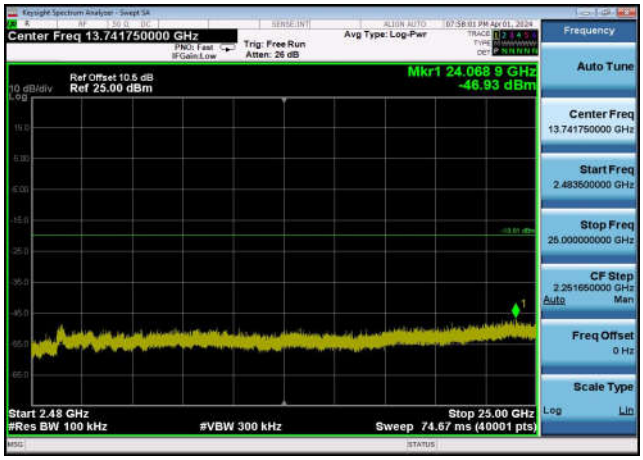
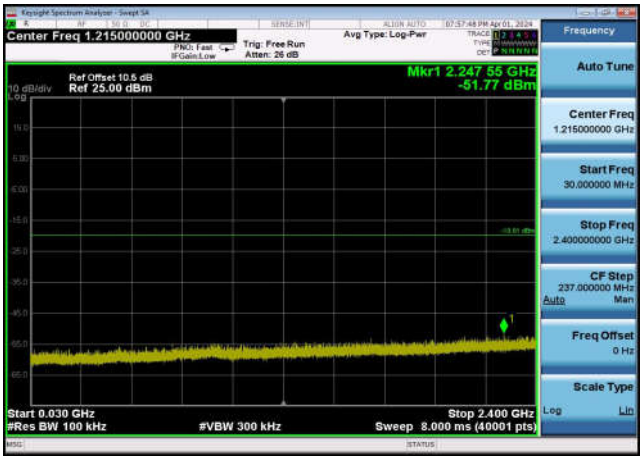
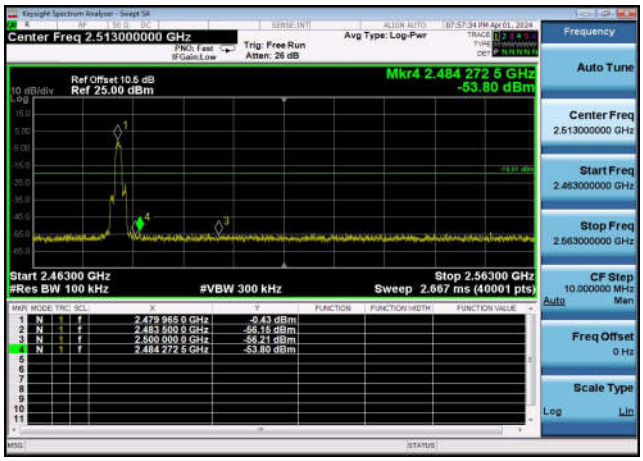
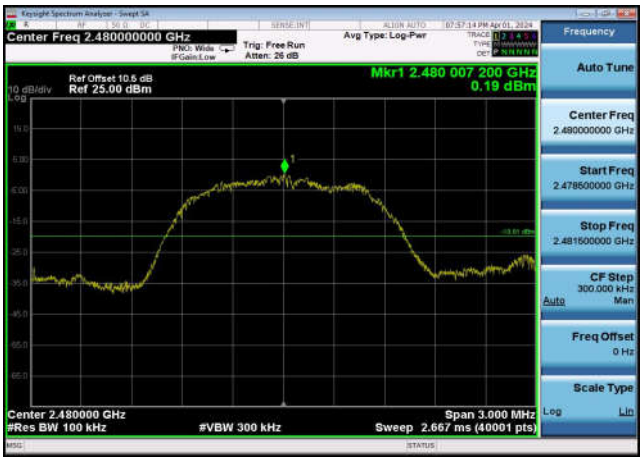
Conducted Emission：GFSK,2402,DH5 ,2483.5MHz~25000MHz	Conducted Emission：GFSK,2402,DH5 ,30MHz~2400MHz
	
Conducted Emission：GFSK,2402,DH5 ,Band Edge HoppingOFF	Conducted Emission：GFSK,2402,DH5 ,Reference Level
	
Conducted Emission：GFSK,2441,DH5 ,2483.5MHz~25000MHz	Conducted Emission：GFSK,2441,DH5 ,30MHz~2400MHz
	

Conducted Emission：GFSK,2441,DH5 ,Band Edge HoppingOFF	Conducted Emission：GFSK,2441,DH5 ,Reference Level
	
Conducted Emission：GFSK,2480,DH5 ,2483.5MHz~25000MHz	Conducted Emission：GFSK,2480,DH5 ,30MHz~2400MHz
	
Conducted Emission：GFSK,2480,DH5 ,Band Edge HoppingOFF	Conducted Emission：GFSK,2480,DH5 ,Reference Level
	

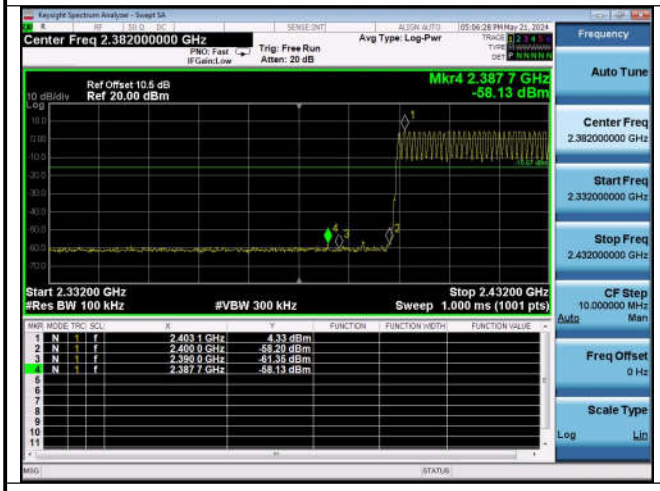
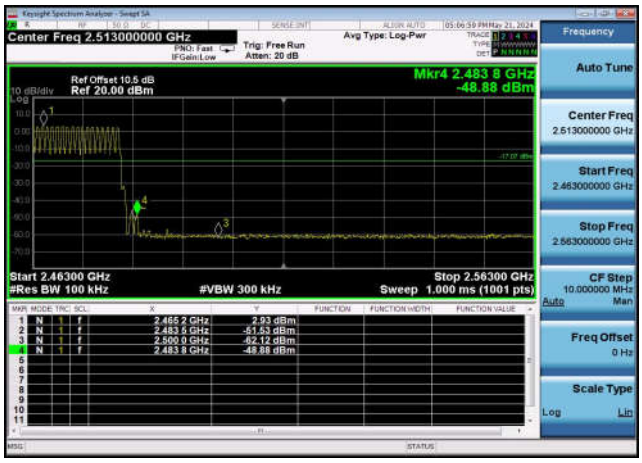
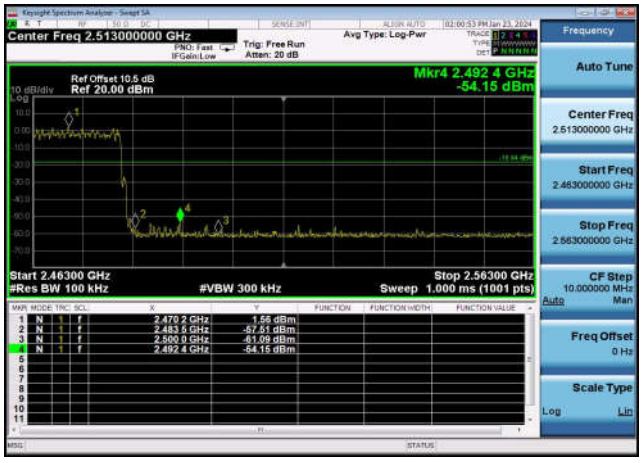
Conducted Emission：DQPSK,2402,2DH5 ,2483.5MHz~25000MHz	Conducted Emission：DQPSK,2402,2DH5 ,30MHz~2400MHz
	
Conducted Emission：DQPSK,2402,2DH5 ,Band Edge HoppingOFF	Conducted Emission：DQPSK,2402,2DH5 ,Reference Level
	
Conducted Emission：DQPSK,2441,2DH5 ,2483.5MHz~25000MHz	Conducted Emission：DQPSK,2441,2DH5 ,30MHz~2400MHz
	

Conducted Emission：DQPSK,2441,2DH5 ,Band Edge HoppingOFF	Conducted Emission：DQPSK,2441,2DH5 ,Reference Level
	
Conducted Emission：DQPSK,2480,2DH5 ,2483.5MHz~25000MHz	Conducted Emission：DQPSK,2480,2DH5 ,30MHz~2400MHz
	
Conducted Emission：DQPSK,2480,2DH5 ,Band Edge HoppingOFF	Conducted Emission：DQPSK,2480,2DH5 ,Reference Level
	

Conducted Emission：8DPSK,2402,3DH5 ,2483.5MHz~25000MHz	Conducted Emission：8DPSK,2402,3DH5 ,30MHz~2400MHz
	
Conducted Emission：8DPSK,2402,3DH5 ,Band Edge HoppingOFF	Conducted Emission：8DPSK,2402,3DH5 ,Reference Level
	
Conducted Emission：8DPSK,2441,3DH5 ,2483.5MHz~25000MHz	Conducted Emission：8DPSK,2441,3DH5 ,30MHz~2400MHz
	

Conducted Emission：8DPSK,2441,3DH5 ,Band Edge HoppingOFF	Conducted Emission：8DPSK,2441,3DH5 ,Reference Level
	
Conducted Emission：8DPSK,2480,3DH5 ,2483.5MHz~25000MHz	Conducted Emission：8DPSK,2480,3DH5 ,30MHz~2400MHz
	
Conducted Emission：8DPSK,2480,3DH5 ,Band Edge HoppingOFF	Conducted Emission：8DPSK,2480,3DH5 ,Reference Level
	

Hopping On Mode
Test Result and Data

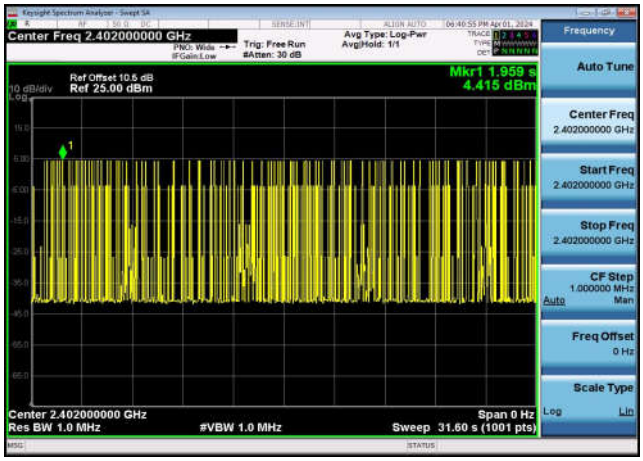
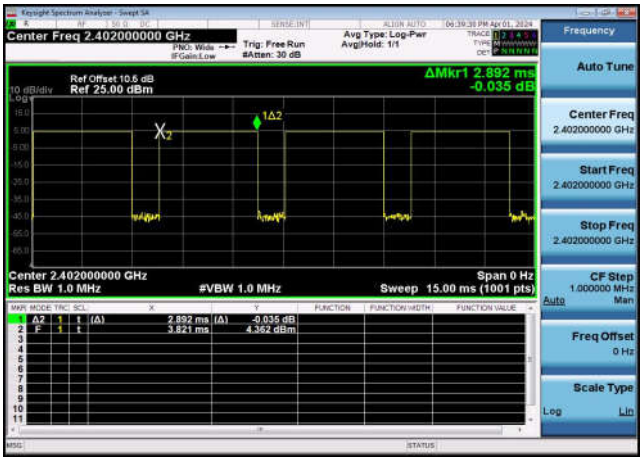
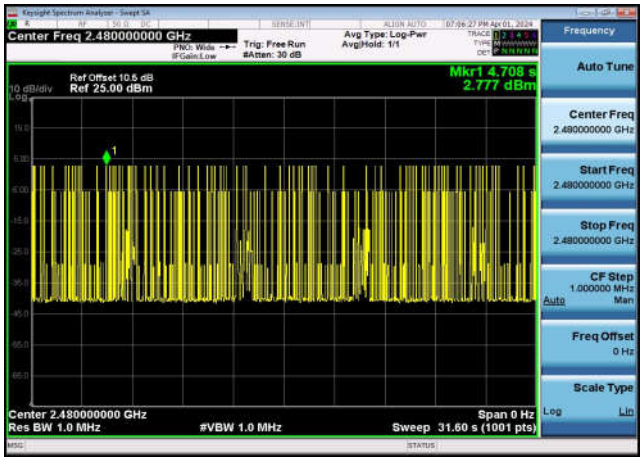
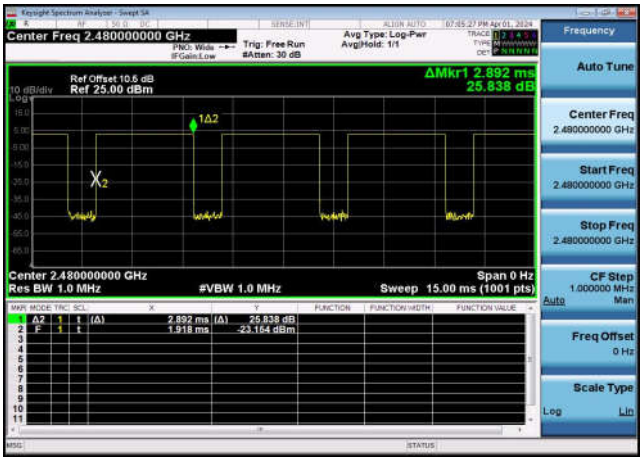
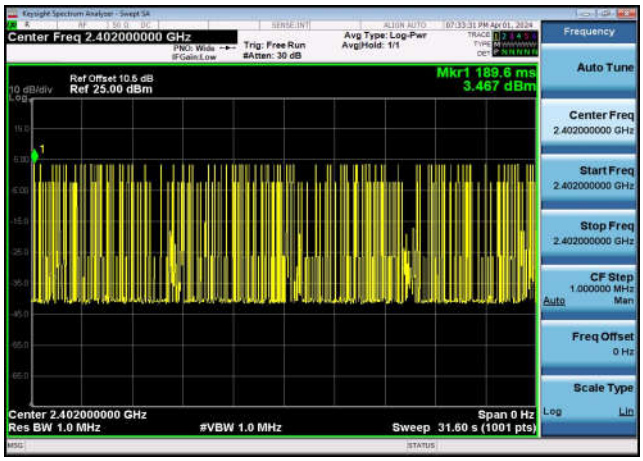
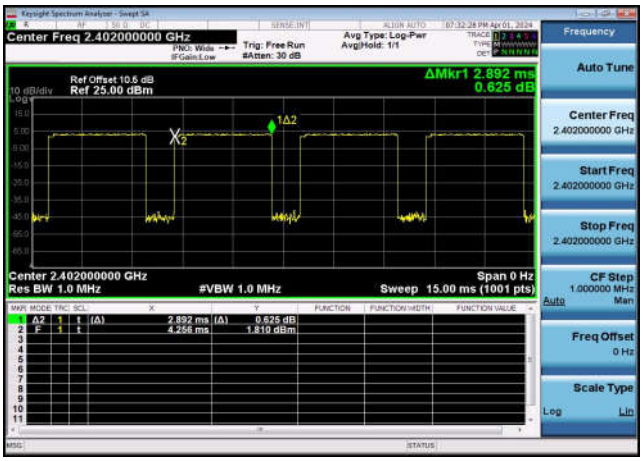
Conducted Emission：GFSK,2402,DH5 ,Band Edge	Conducted Emission：GFSK,2480,DH5 ,Band Edge
	
Conducted Emission：DQPSK,2402,2DH5 ,Band Edge	Conducted Emission：DQPSK,2480,2DH5 ,Band Edge
	
Conducted Emission：8DPSK,2402,3DH5 ,Band Edge	Conducted Emission：8DPSK,2480,3DH5 ,Band Edge
	

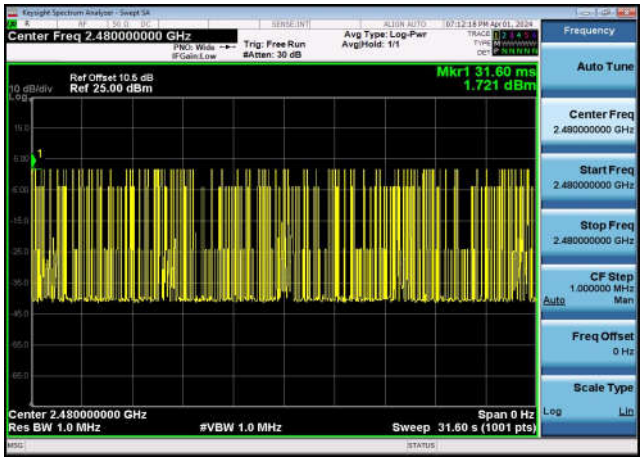
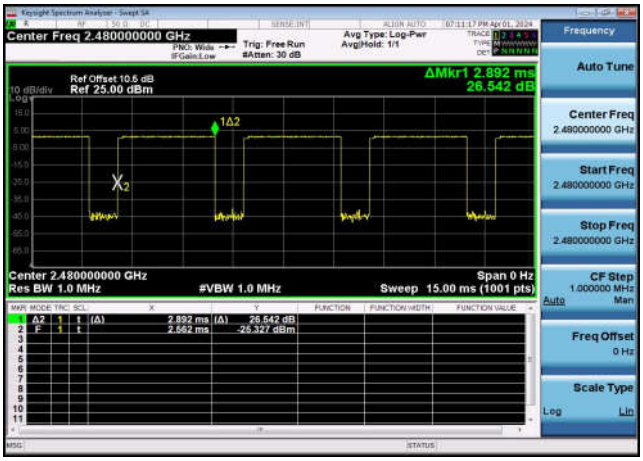
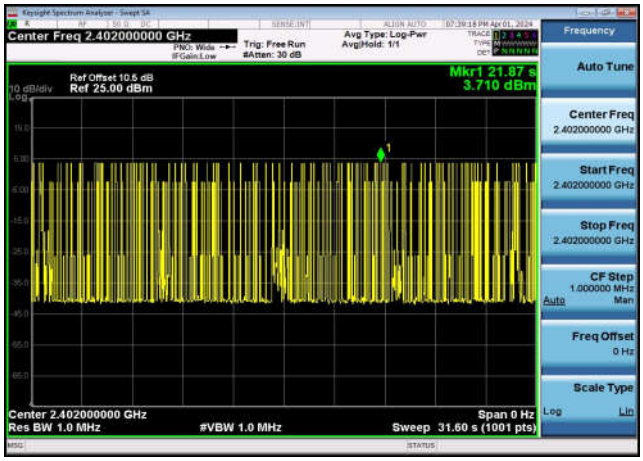
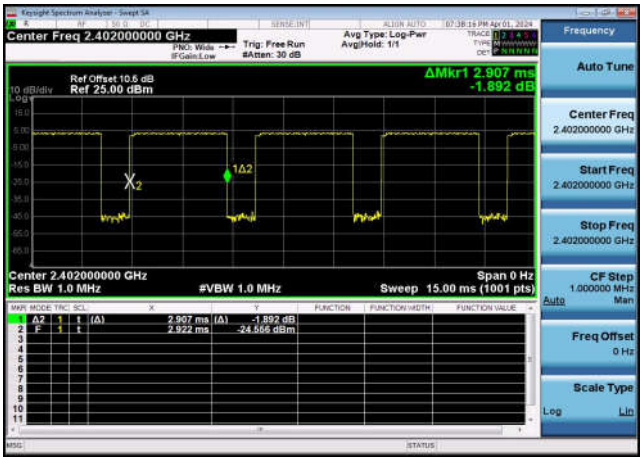
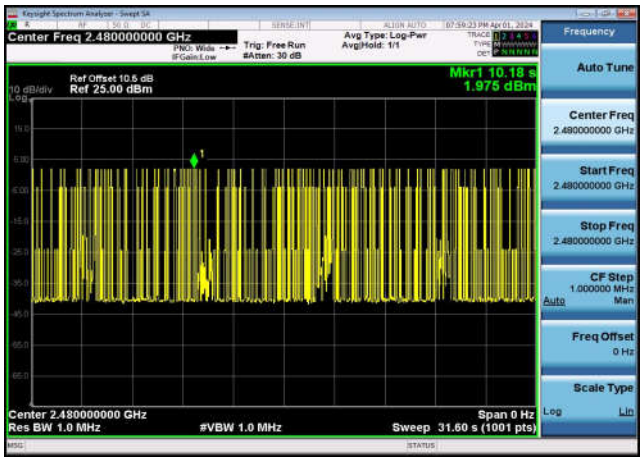
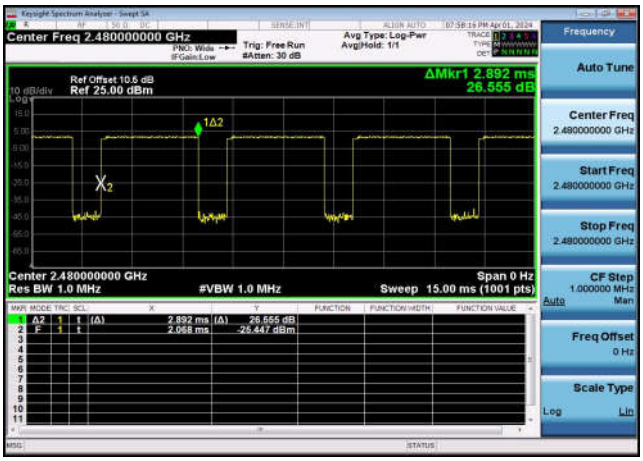
Dwell Time

Test Result and Data

BT Dwell Time						
Mode	Test Frequency	Packet Type	Transmission Time(ms)	Number	Dwell Time(ms)	Result
GFSK	2402	DH5	2.89	102	295	Pass
GFSK	2480	DH5	2.89	78	225.58	Pass
DQPSK	2402	2DH5	2.89	88	254.51	Pass
DQPSK	2480	2DH5	2.89	92	266.07	Pass
8DPSK	2402	3DH5	2.91	95	276.17	Pass
8DPSK	2480	3DH5	2.89	99	286.32	Pass

Note: Each channel has been tested and only the worst channel is reported.

GFSK,2402,DH5,Transmission Number	GFSK,2402,DH5,Transmission Time
	
GFSK,2480,DH5,Transmission Number	GFSK,2480,DH5,Transmission Time
	
DQPSK,2402,2DH5,Transmission Number	DQPSK,2402,2DH5,Transmission Time
	

DQPSK,2480,2DH5,Transmission Number	DQPSK,2480,2DH5,Transmission Time
	
8DPSK,2402,3DH5,Transmission Number	8DPSK,2402,3DH5,Transmission Time
	
8DPSK,2480,3DH5,Transmission Number	8DPSK,2480,3DH5,Transmission Time
	

Carrier Frequency Separation
Test Result and Data

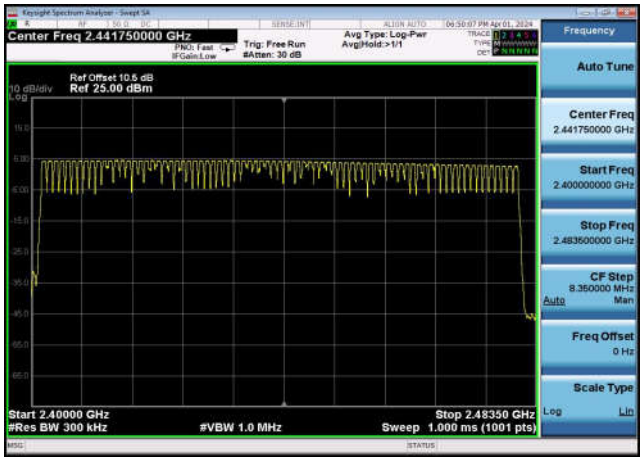
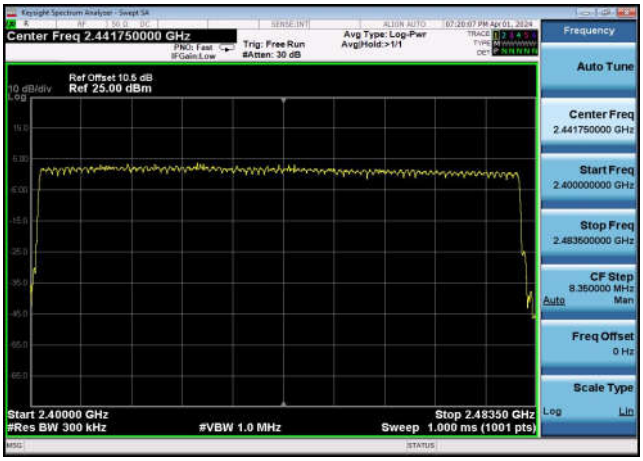
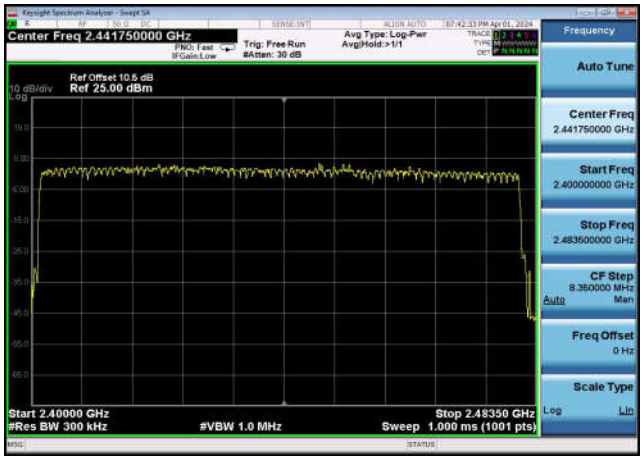
BT Carrier Frequency Separation						
Mode	Test Frequency	Packet Type	Range (MHz~MHz)	Sepration (kHz)	Limit (kHz)	Result
GFSK	Hopping	DH5	2401.5MHz~2403.5MHz	1080.92	≥ 923.788	Pass
GFSK	Hopping	DH5	2440.5MHz~2442.5MHz	1005	≥ 971.953	Pass
GFSK	Hopping	DH5	2478.5MHz~2480.5MHz	1102.9	≥ 1007.495	Pass
π/4-DQPSK	Hopping	2DH5	2401.5MHz~2403.5MHz	1006.99	≥ 909.599	Pass
π/4-DQPSK	Hopping	2DH5	2440.5MHz~2442.5MHz	1244.76	≥ 912.395	Pass
π/4-DQPSK	Hopping	2DH5	2478.5MHz~2480.5MHz	1184.82	≥ 910.778	Pass
8DPSK	Hopping	3DH5	2401.5MHz~2403.5MHz	1044.96	≥ 888.317	Pass
8DPSK	Hopping	3DH5	2440.5MHz~2442.5MHz	989.01	≥ 877.765	Pass
8DPSK	Hopping	3DH5	2478.5MHz~2480.5MHz	993.01	≥ 877.859	Pass

GFSK,HoppingDH5,2401.5~2403.5	GFSK,HoppingDH5,2440.5~2442.5
	
GFSK,HoppingDH5,2478.5~2480.5	DQPSK,Hopping2DH5,2401.5~2403.5
	
DQPSK,Hopping2DH5,2440.5~2442.5	DQPSK,Hopping2DH5,2478.5~2480.5
	

8DPSK,Hopping3DH5,2401.5~2403.5	8DPSK,Hopping3DH5,2440.5~2442.5
	
8DPSK,Hopping3DH5,2478.5~2480.5	
	

Hopping Channel Numbers
Test Result and Data

BT Number Of Hopping Channels					
Mode	Test Frequency	Packet Type	Test Range(MHz~MHz)	Limit	Result
GFSK	Hopping	DH5	2400~2483.5	≥15	Pass
pi/4DQPSK	Hopping	2DH5	2400~2483.5	≥15	Pass
8DPSK	Hopping	3DH5	2400~2483.5	≥15	Pass

Number Of Hopping Channels：GFSK ,HoppingMhz,DH5__2400~2483.5	Number Of Hopping Channels：DQPSK ,HoppingMhz,2DH5__2400~2483.5
	
Number Of Hopping Channels：8DPSK ,HoppingMhz,3DH5__2400~2483.5	
	

END OF REPORT