FCC/ISED - TEST REPORT

Report Number	:	**68.950.24.1187.01**	Date of Issue:	**2024-12-11**
Model/HVIN	:	**CGB-V1-STCHA, CGB-V1-STCHB, CGB-V1-JAKSA, CGB-V1-DEDPA**		
Product Type	:	TWS Earphones		
Applicant	:	Exquisite Gaming Limited		
Address	:	Electra House, 1a Gilbred Road, Colchester, Essex, CO2 7LR, United Kingdom		
Manufacturer	:	Exquisite Gaming Limited		
Address	:	Electra House, 1a Gilbred Road, Colchester, Essex, CO2 7LR, United Kingdom		
Factory	:	Shantou Storm Electronic Technology Co, Ltd		
Address	:	6/F, NO.2, Four Lane, Jiangjunyang Xianbo Village, Gurao Town, Chaoyang District, Shantou, Guangdong, China		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**79**		

Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District Shenzhen 518052 P.R. China
Telephone:	+86 755 8828 6998
Fax:	+86 755 828 5299
FCC Registration No.:	514049
FCC Designation Number:	CN5009
IC Registration No.:	10320A
ISED CAB identifier:	CN0077

3 Description of the Equipment Under Test

Product:	TWS Earphones
Model no.:	CGB-V1-STCHA, CGB-V1-STCHB, CGB-V1-JAKSA, CGB-V1-DEDPA
Hardware Version Identification No. (HVIN)	CGB-V1-STCHA, CGB-V1-STCHB, CGB-V1-JAKSA, CGB-V1-DEDPA
Product Marketing Name (PMN)	CGbuds
Brand name:	CGbuds
FCC ID:	2BLK2-CGBEXG1
IC:	33148-CGBEXG1
Options and accessories:	N/A
Earphones Rating:	Battery: 3.7V⎓30mAh
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type:	Bipolar Antenna
Antenna	Gain: 2.67dBi
Description of the EUT:	The Equipment Under Test (EUT) is a TWS Earphones which support Bluetooth function.

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2023 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators
RSS-Gen Issue 5, April 2018 Amendment 1, March 2019 + Amendment 2, February 2021	General Requirements for Compliance of Radio Apparatus
RSS-247 Issue 3 August 2023	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

All the test methods were according to KDB 558074 D01 15.247 Meas Guidance v05r02 Measurement Guidance and ANSI C63.10-2020.

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5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C/ RSS-247 Issue 3/RSS-Gen Issue 5			
Test Condition		Test Site	Test Result
§15.207& RSS-Gen 8.8	Conducted emission AC power port	Site 1	Pass
§15.247(b)(1)	Conducted peak output power	Site 1	Pass
RSS-247 5.4(b)	Conducted peak output power and Equivalent Isotropic Radiated Power	Site 1	Pass
§15.247(a)(1) & RSS-247 5.1(a) & RSS-Gen 6.7	20dB bandwidth and 99% occupied bandwidth	Site 1	Pass
§15.247(a)(1) & RSS-247 5.1(b)	Carrier channel frequency separation	Site 1	Pass
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Number of hopping frequencies	Site 1	Pass
§15.247(a)(1)(iii) & RSS-247 5.1(d)	Dwell Time - Average Time of Occupancy	Site 1	Pass
§15.247(d) & RSS-247 5.5	Spurious RF conducted emissions	Site 1	Pass
§15.247(d) & RSS-247 5.5	Band edge	Site 1	Pass
§15.247(d) & §15.209 &§15.205 &RSS-247 5.5 & RSS-Gen 6.13	Spurious radiated emissions for transmitter	Site 1	Pass
§15.203 & RSS-Gen 6.8	Antenna requirement	See note 2	Pass

Note 1: N/A=Not Applicable.
Note 2: The EUT uses a Bipolar Antenna, which gain is 2.67dBi. In accordance to §15.203 & RSS-Gen 6.8, it is considered sufficiently to comply with the provisions of this section.

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6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2BLK2-CGBEXG1, IC: 33148-CGBEXG1, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C rules and RSS-247, RSS-GEN.

SUMMARY:

All tests according to the regulations cited on page 5 were.

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date:	2024-09-12
Testing Start Date:	2024-09-12
Testing End Date:	2024-12-10

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:	Prepared by:	Tested by:
John Zhi Section Manager	Hayden Hu Project Engineer	Carry Cai Test Engineer

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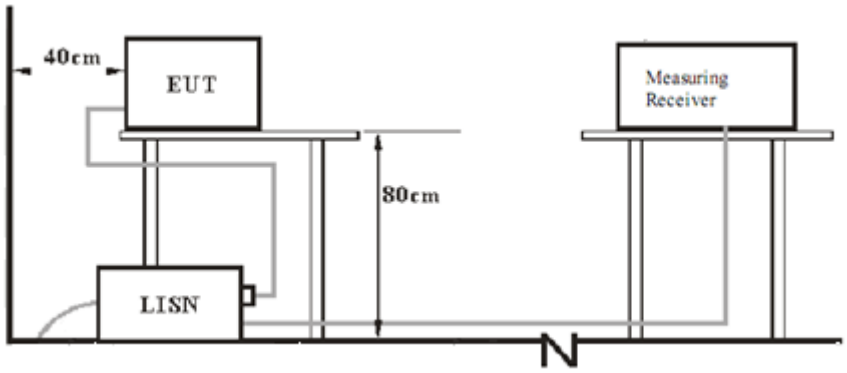
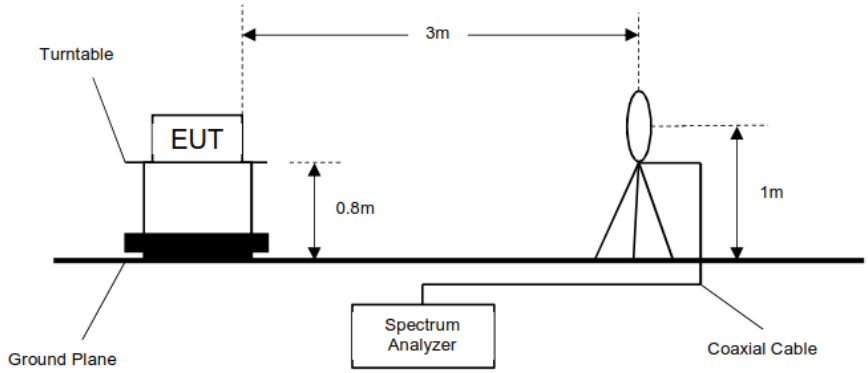
7 Test Setups

7.1 AC Power Line Conducted Emission test setups

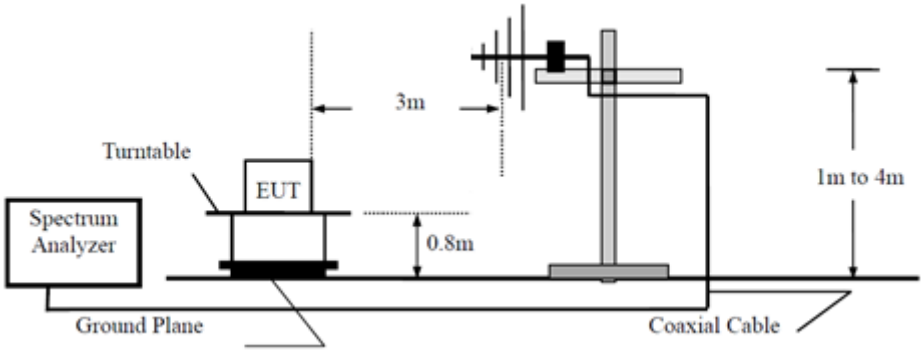


7.2 Radiated test setups

9KHz - 30MHz



30MHz - 1GHz



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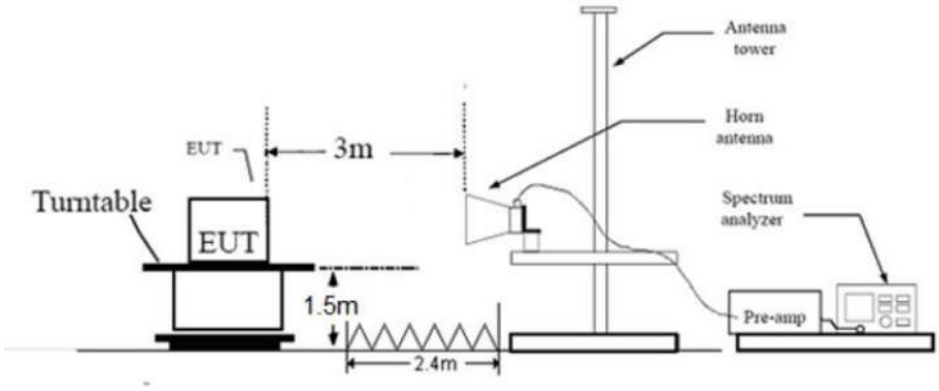
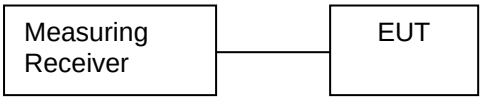
Above 1GHz



7.3 Conducted RF test setups



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8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model NO.	S/N
Adapter	Apple	A1443	---
Notebook	LENOVO	X220	---
Charging Base	Exquisite Gaming Limited	---	---

Cables Used During Test:

Cable	Length	Shielded/unshielded	With / without ferrite
---	---	---	---

Test software information:

Test Software Version	FCC_assist1.0.4	
Modulation	Setting TX Power	Packet Type
GFSK	10	PRBS9
π/4-DQPSK	10	PRBS9
8DPSK	10	PRBS9

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

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9 Technical Requirement

9.1 Conducted Emission

Test Method

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 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. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. 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.

Limit

Frequency MHz	QP Limit dBµV	AV Limit dBµV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

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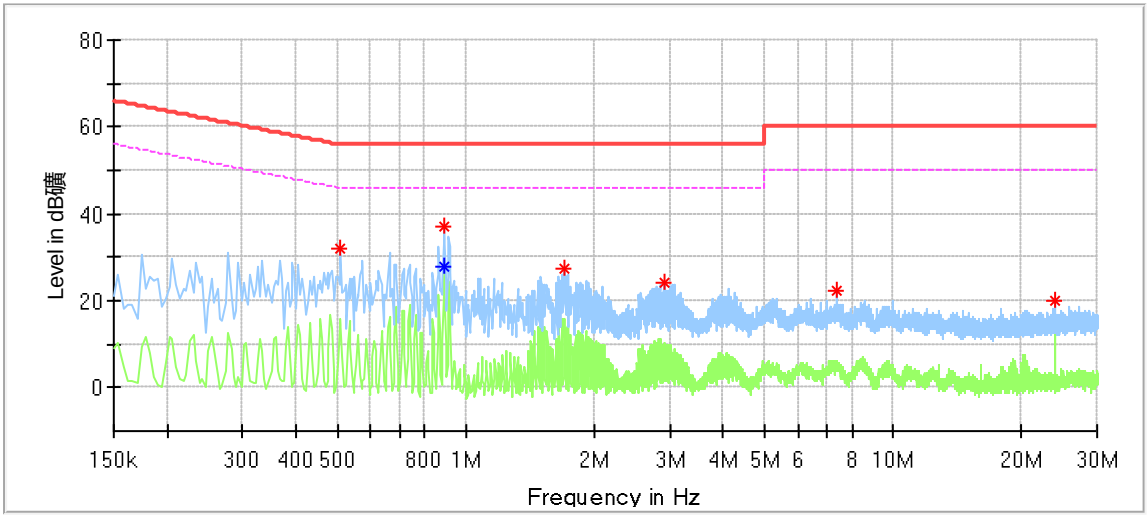
Conducted Emission

Product Type	:	TWS Earphones
M/N	:	CGB-V1-STCHA
Operating Condition	:	Charging + Transmitting
Test Specification	:	Line
Comment	:	AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.510000	32.01	---	56.00	23.99	L1	9.69
0.890000	---	27.84	46.00	18.16	L1	9.70
0.890000	36.99	---	56.00	19.01	L1	9.70
1.702000	27.43	---	56.00	28.57	L1	9.72
2.922000	24.05	---	56.00	31.95	L1	9.76
7.386000	22.11	---	60.00	37.89	L1	9.89
24.002000	19.94	---	60.00	40.06	L1	10.13

Remark:

*Level=Reading Level + Correction Factor
**Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

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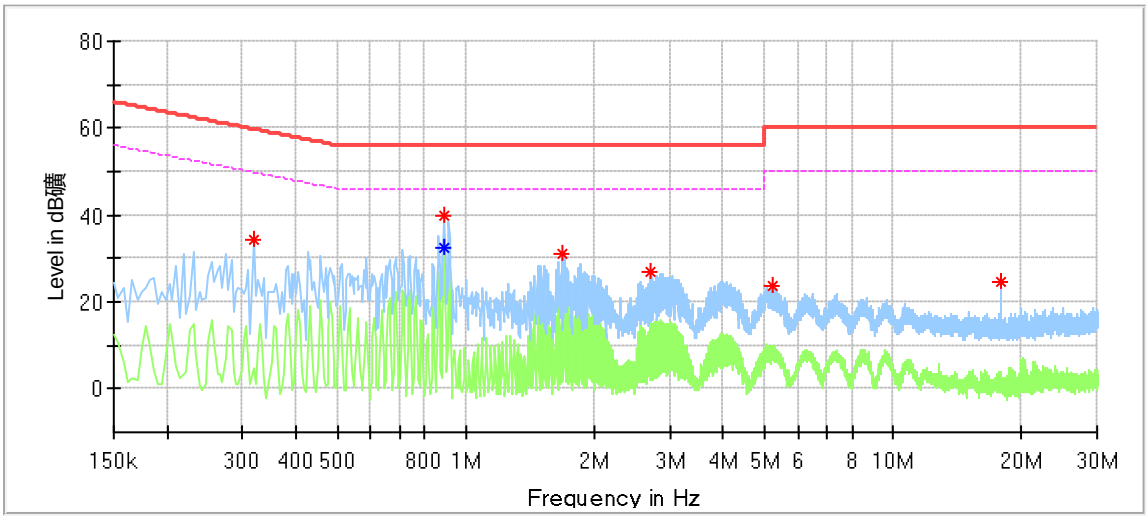
Conducted Emission

Product Type	:	TWS Earphones
M/N	:	CGB-V1-STCHA
Operating Condition	:	Charging + Transmitting
Test Specification	:	Neutral
Comment	:	AC 120V/60Hz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.318000	34.20	---	59.76	25.56	N	9.67
0.890000	---	32.32	46.00	13.68	N	9.66
0.890000	39.98	---	56.00	16.02	N	9.66
1.678000	31.02	---	56.00	24.98	N	9.70
2.718000	26.71	---	56.00	29.29	N	9.73
5.234000	23.54	---	60.00	36.47	N	9.80
17.878000	24.75	---	60.00	35.25	N	10.09

Remark:

*Level=Reading Level + Correction Factor
**Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

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9.2 Conducted Peak Output Power & EIRP

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following test receiver settings:
   Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel
   RBW > the 20dB bandwidth of the emission being measured, VBW≥RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power and record the results in the test report.
5. Repeat above procedures until all frequencies measured were complete.

Limits

According to §15.247 (b) (1) & RSS-247 5.4(b), conducted peak output power limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤1	≤30

According to & RSS-247 5.4(b), EIRP limit as below:

Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤4	≤36

Remark: EIRP=Conducted output power + Antenna Gain

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Conducted Peak Output Power & EIRP

Bluetooth Mode GFSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Antenna Gain dBi	EIRP dBm	Result
Low channel 2402MHz	0.08	2.67	2.75	Pass
Middle channel 2441MHz	-1.01	2.67	1.66	Pass
High channel 2480MHz	-2.64	2.67	0.03	Pass

Bluetooth Mode π/4-DQPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Antenna Gain dBi	EIRP dBm	Result
Low channel 2402MHz	0.56	2.67	3.23	Pass
Middle channel 2441MHz	-0.51	2.67	2.16	Pass
High channel 2480MHz	-2.07	2.67	0.60	Pass

Bluetooth Mode 8DPSK modulation Test Result

Frequency MHz	Conducted Peak Output Power dBm	Antenna Gain dBi	EIRP dBm	Result
Low channel 2402MHz	0.73	2.67	3.40	Pass
Middle channel 2441MHz	-0.35	2.67	2.32	Pass
High channel 2480MHz	-1.90	2.67	0.77	Pass

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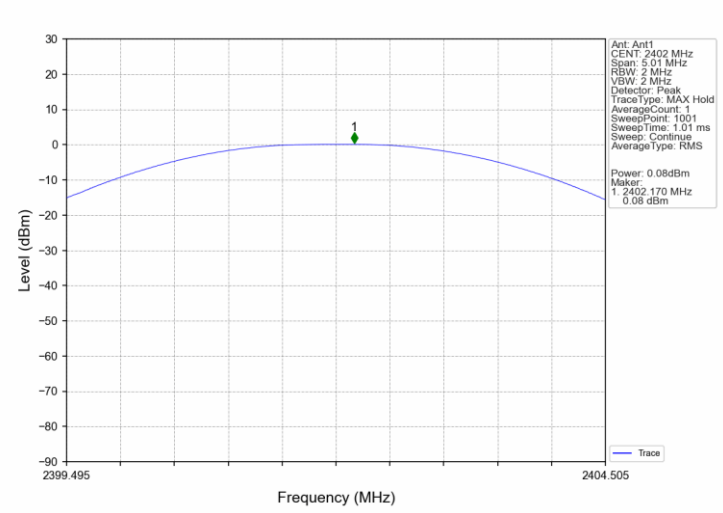
DH5_Ant1_2402



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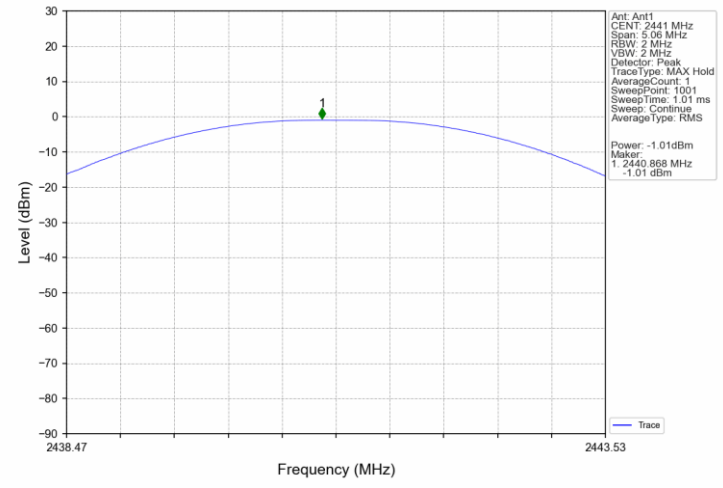

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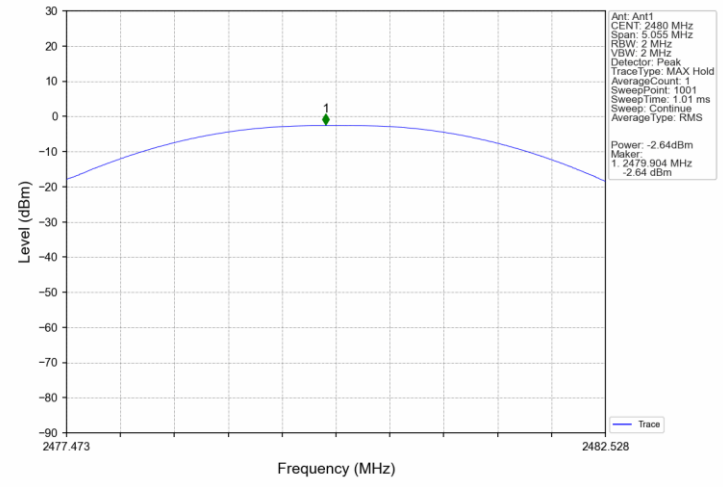

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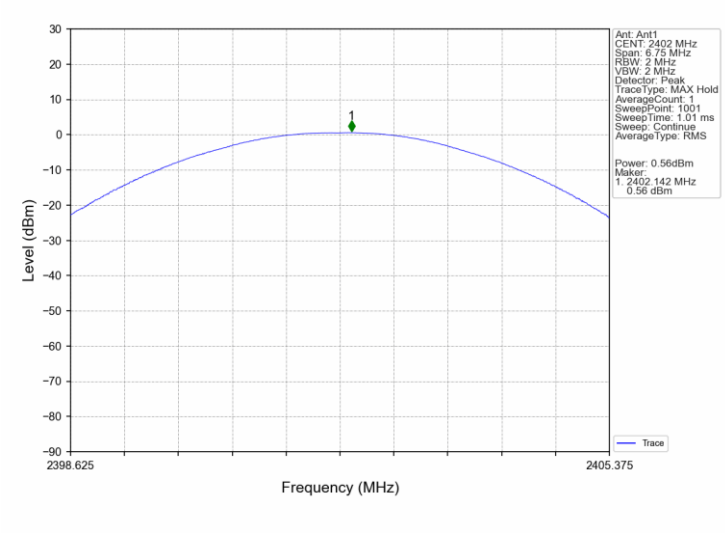
2DH5_Ant1_2402



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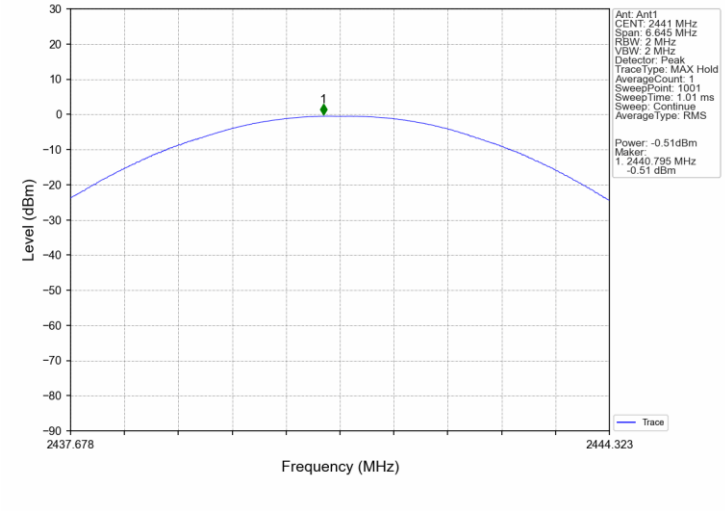

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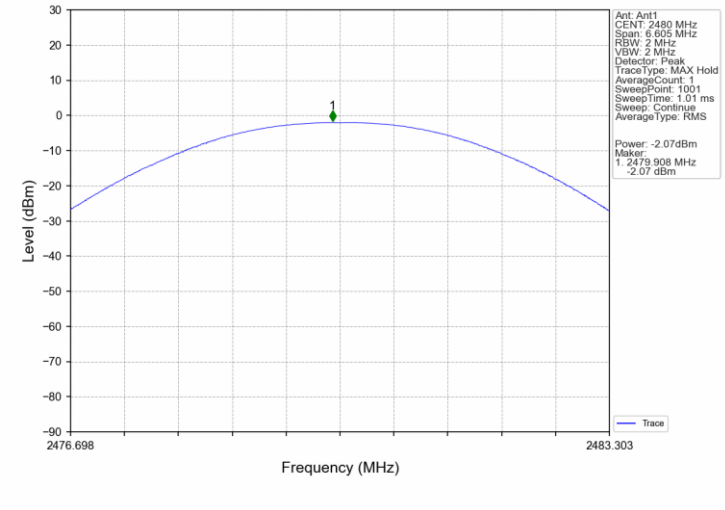

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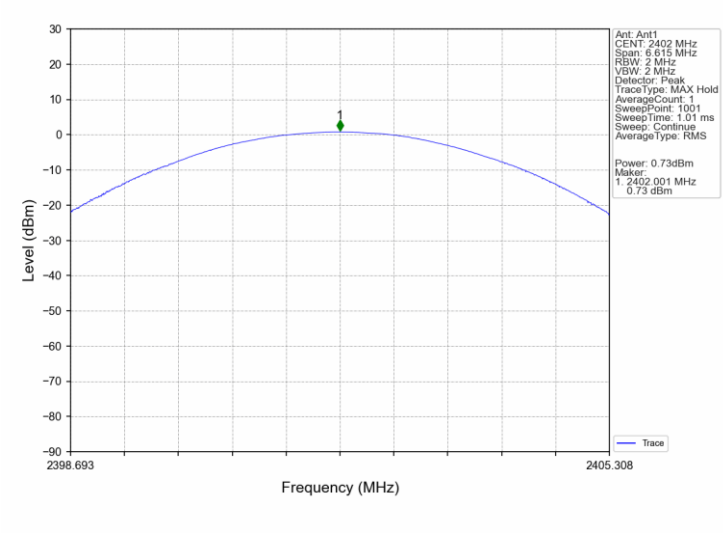

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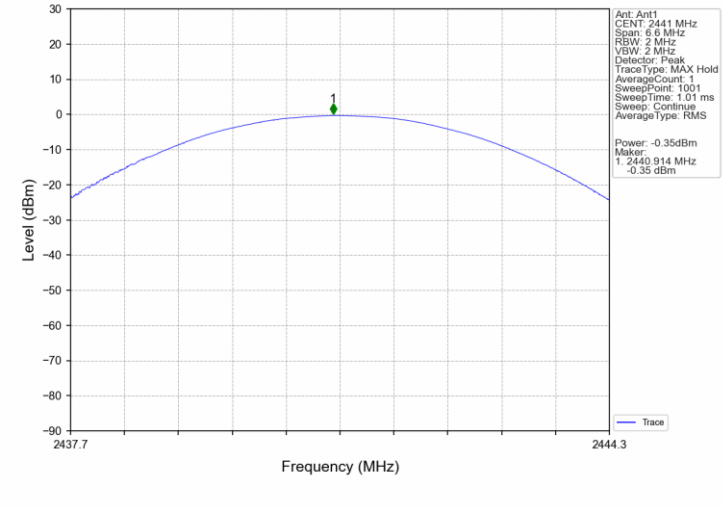

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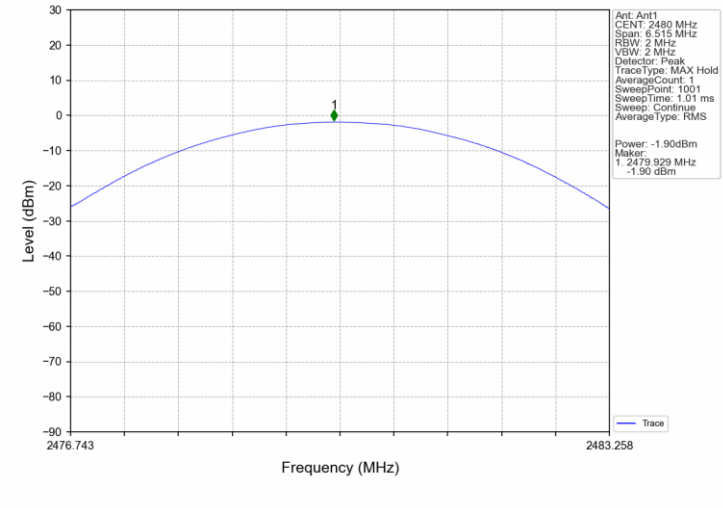

9.3 20 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Use the following test receiver settings:
   Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
   RBW = 1% to 5% of the OBW, VBW≥3RBW,
   Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Measure the frequency difference of two frequencies that were attenuated 20 dB/99% OBW from the reference level. Record the frequency difference as the emission bandwidth. Record the results.
5. Repeat above procedures until all frequencies measured were complete.

Limit

Limit [kHz]
N/A

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20 dB bandwidth and 99% Occupied Bandwidth

Test result

TestMode	Frequency MHz	20 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz	Result
GFSK	2402	1.002	0.908	--	Pass
GFSK	2441	1.012	0.920	--	Pass
GFSK	2480	1.011	0.918	--	Pass
π/4-DQPSK	2402	1.350	1.264	--	Pass
π/4-DQPSK	2441	1.329	1.248	--	Pass
π/4-DQPSK	2480	1.321	1.224	--	Pass
8DPSK	2402	1.323	1.241	--	Pass
8DPSK	2441	1.320	1.233	--	Pass
8DPSK	2480	1.303	1.218	--	Pass

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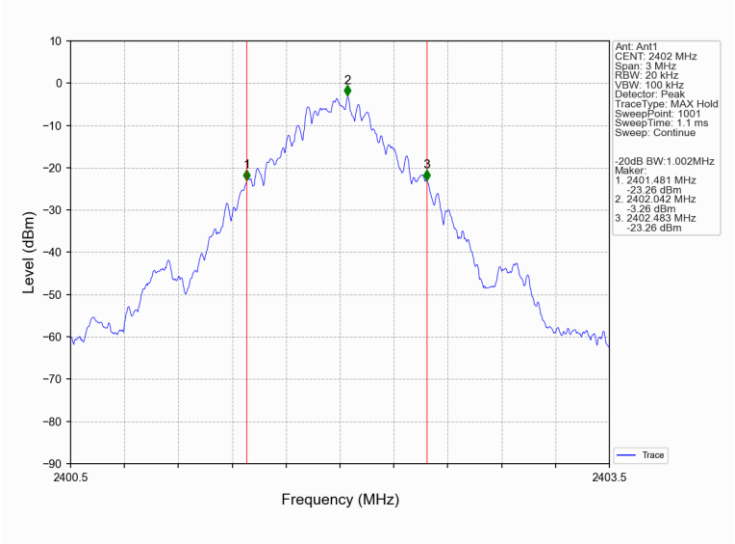
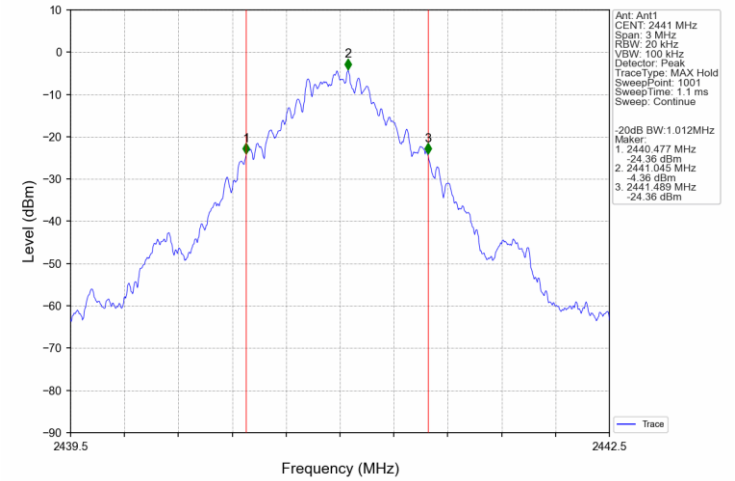
20 dB Bandwidth

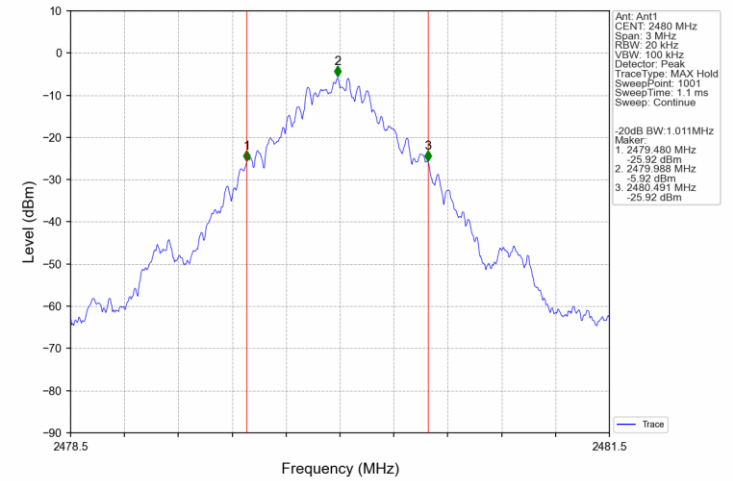
DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480



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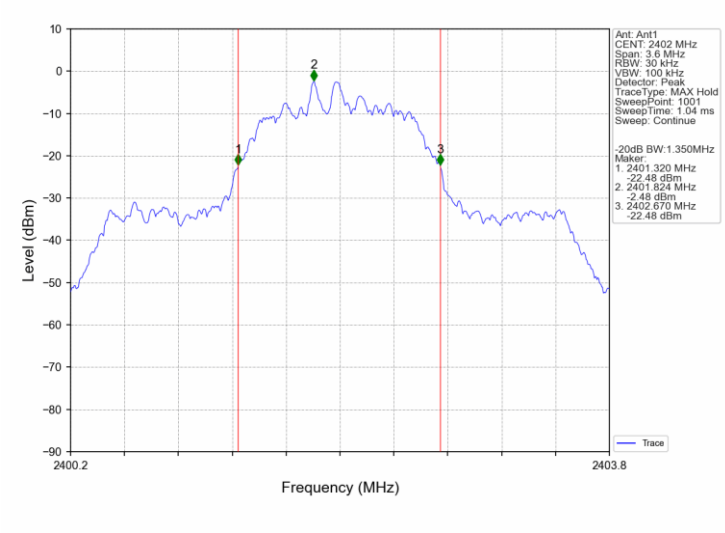
2DH5_Ant1_2402


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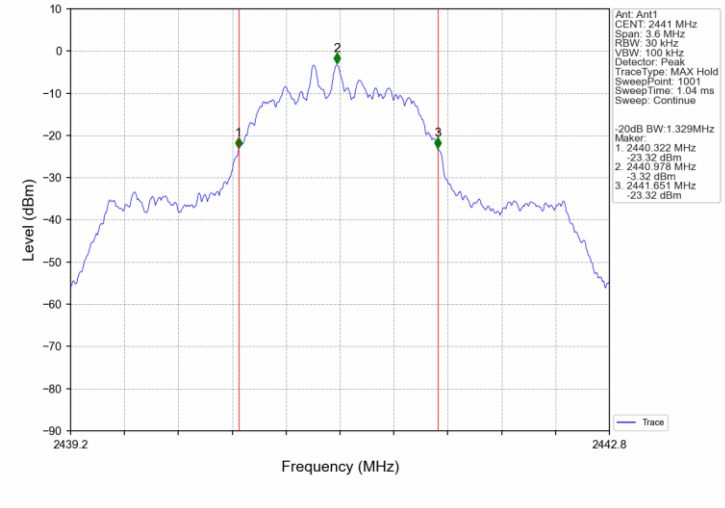

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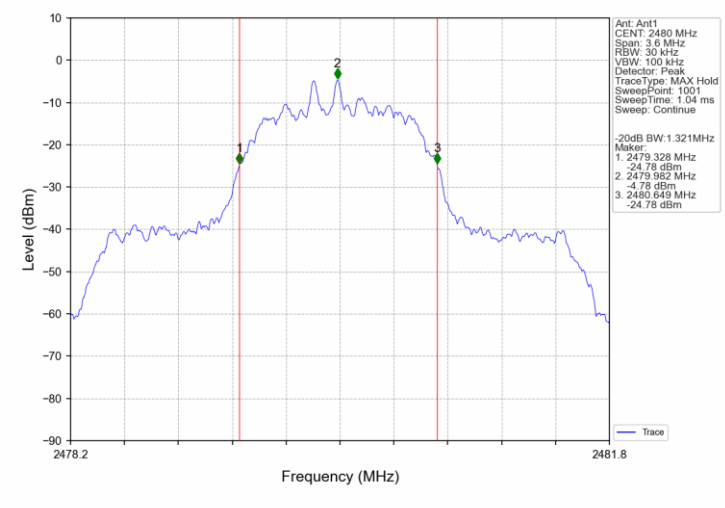

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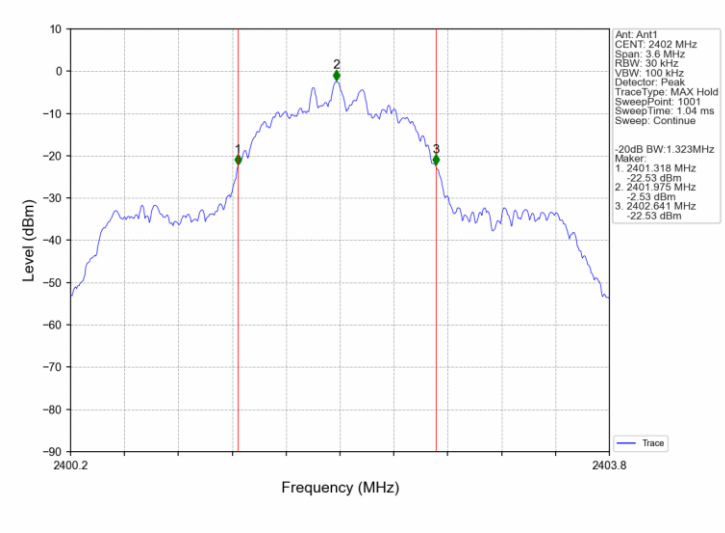

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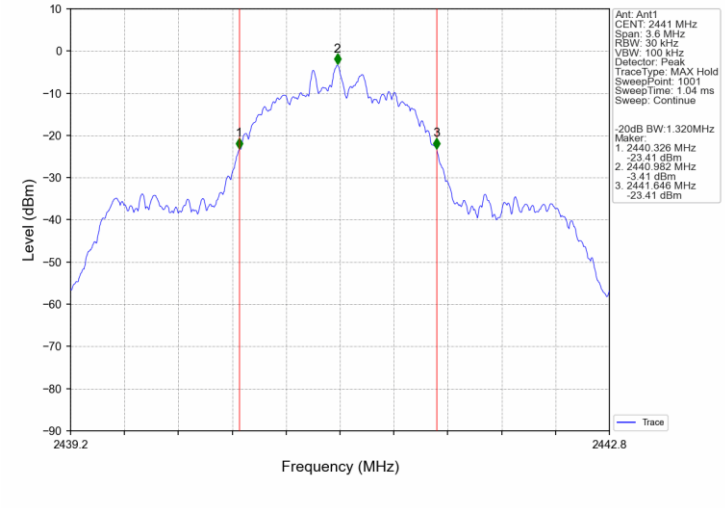

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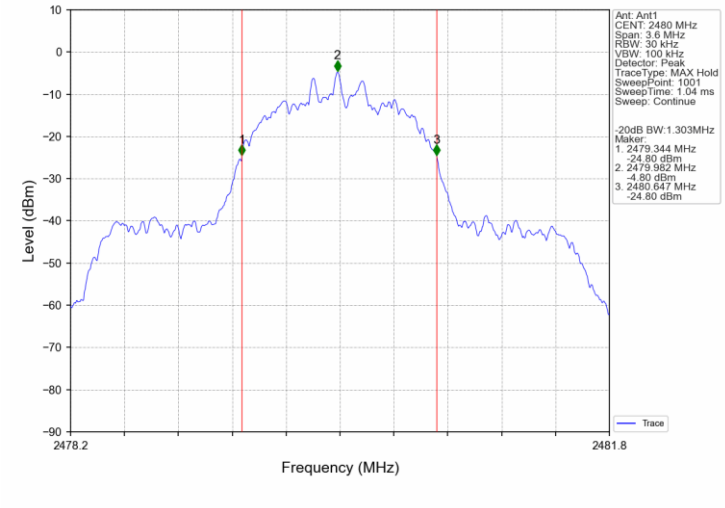
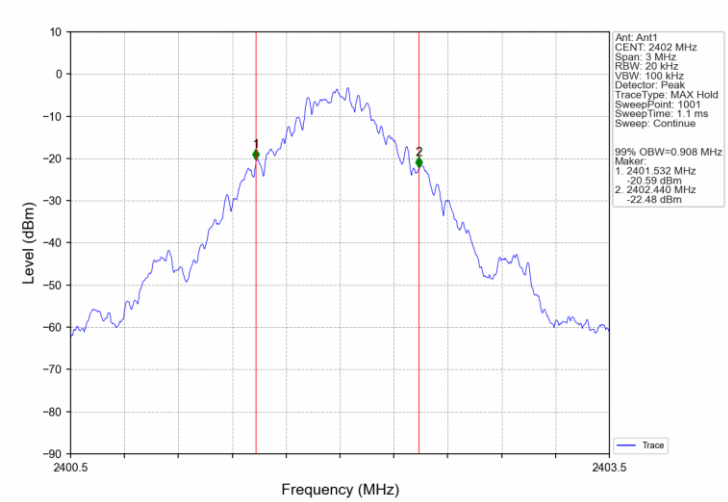
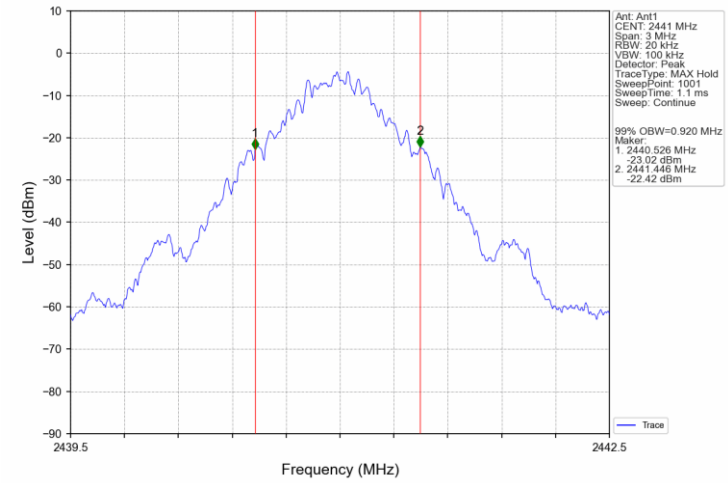


99% Occupied Bandwidth

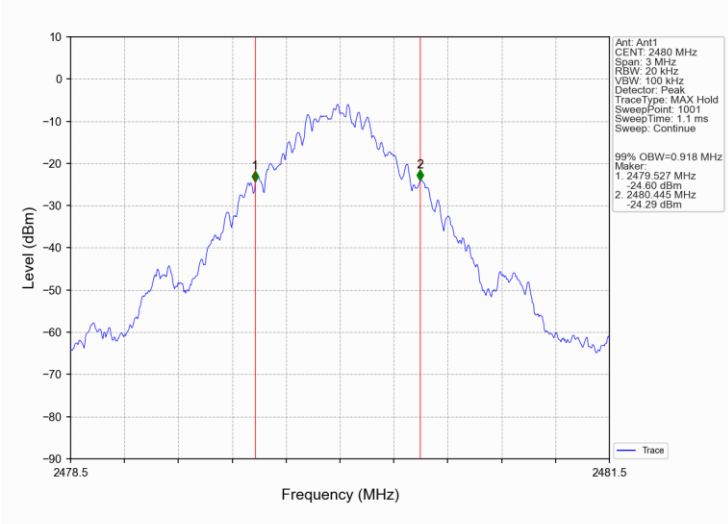
DH5_Ant1_2402



DH5_Ant1_2441



DH5_Ant1_2480



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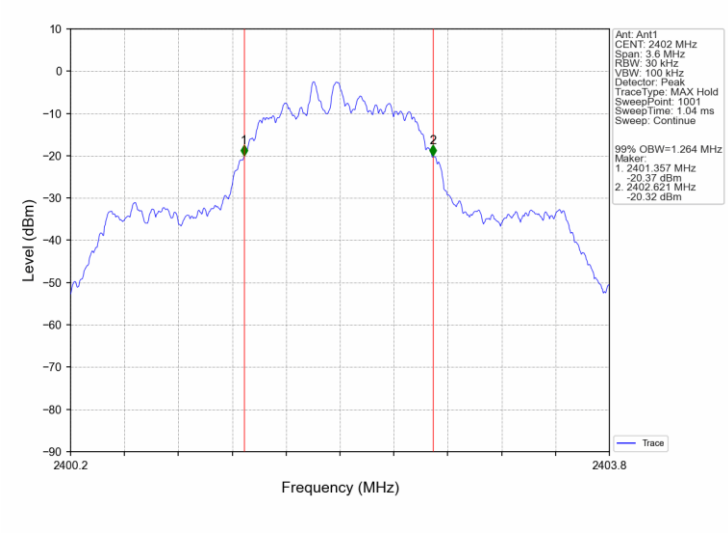
2DH5_Ant1_2402


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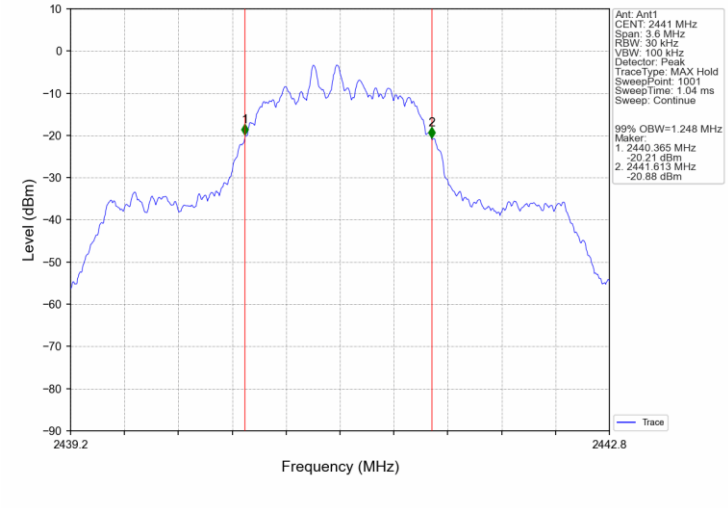

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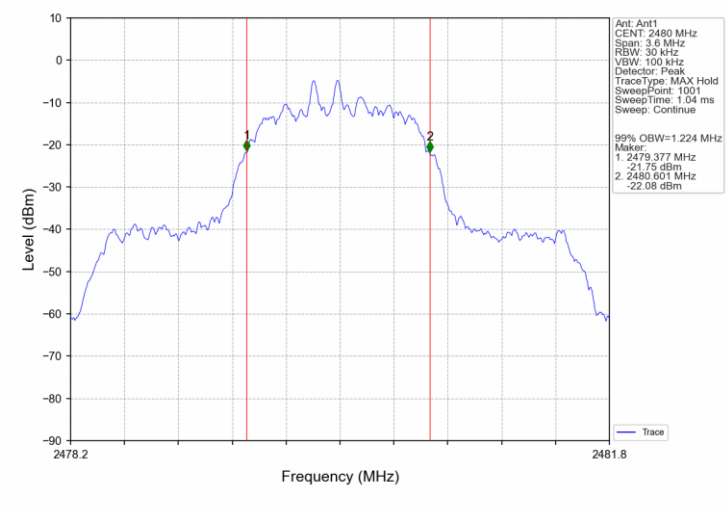

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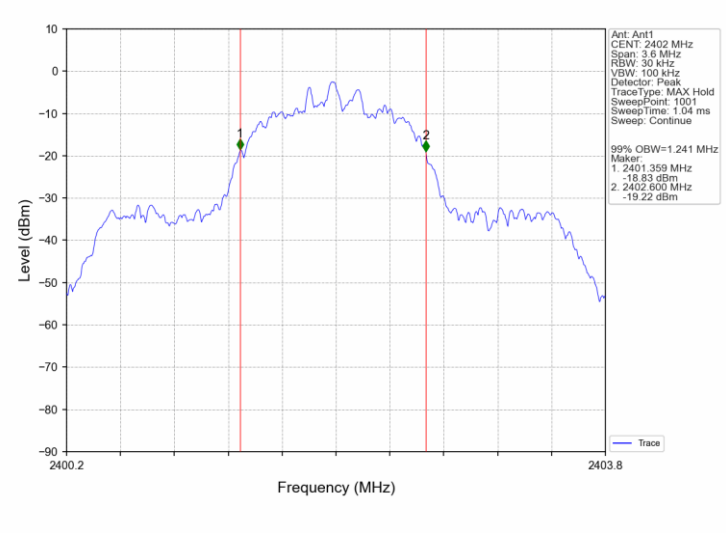
3DH5_Ant1_2402

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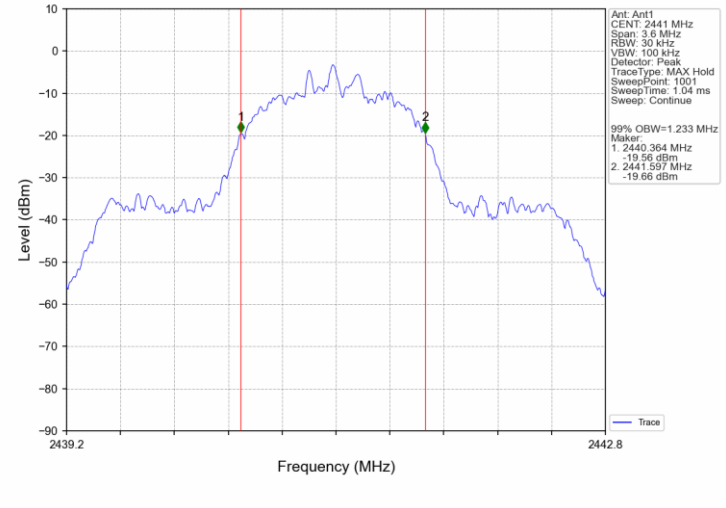
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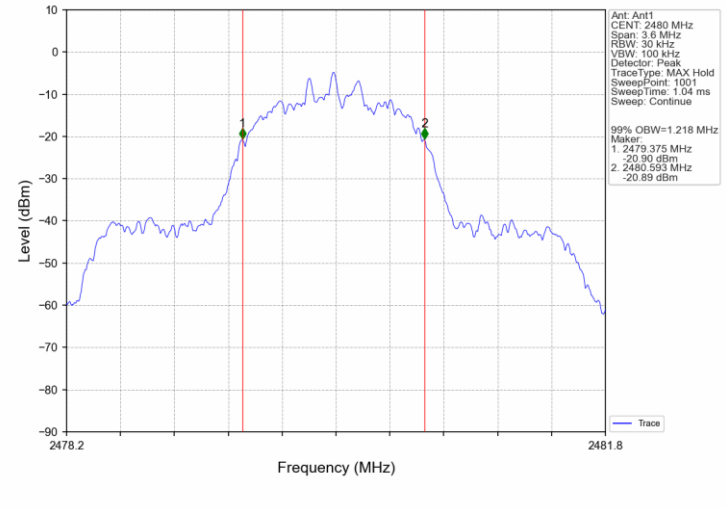

9.4 Carrier Frequency Separation

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. 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; adjust as necessary to best identify the center of each individual channel. VBW ≥RBW, Sweep = auto, Detector function = peak.
4. By using the Max-Hold function record the separation of two adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function. Record the results.
6. Repeat above procedures until all frequencies measured were complete.

Limit

Limit kHz
⩾25KHz or 2/3 of the 20 dB bandwidth which is greater

Limit

Modulation	Frequency MHz	2/3 of 20 dB Bandwidth kHz
GFSK	2441	675
π/4-DQPSK	2441	900
8DPSK	2441	882

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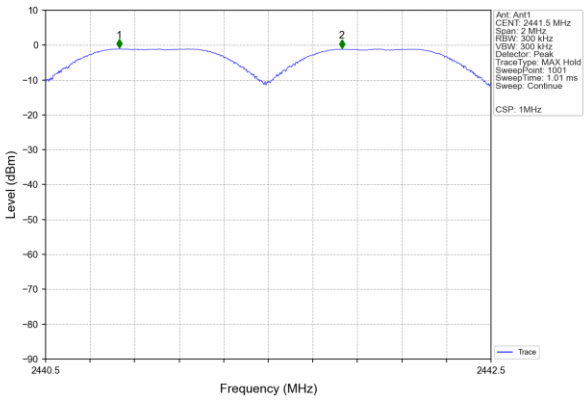
Carrier Frequency Separation

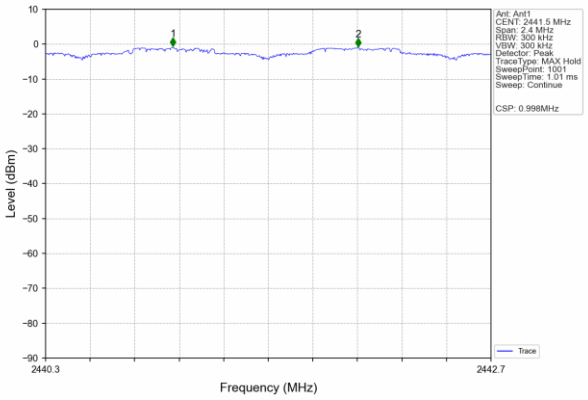
Test result: The measurement was performed with the typical configuration (normal hopping status).

Modulation	Frequency MHz	Carrier Frequency Separation MHz	Result
GFSK	2441	1.000	Pass
π/4-DQPSK	2441	0.998	Pass
8DPSK	2441	1.001	Pass

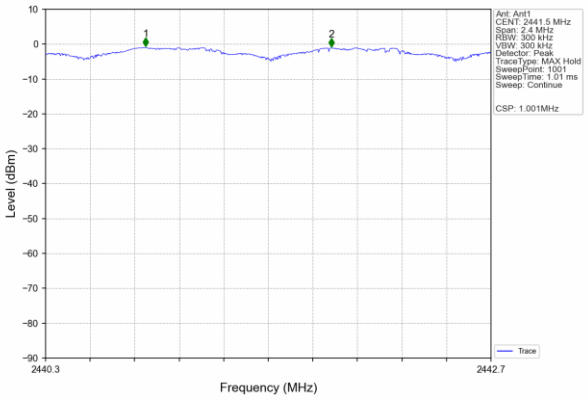
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop



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9.5 Number of Hopping Frequencies

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
   Span = the frequency band of operation, 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, VBW ≥RBW, Sweep = auto, Detector function = peak, Trace=Max hold.
4. Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

Limit

Limit number
⩾ 15

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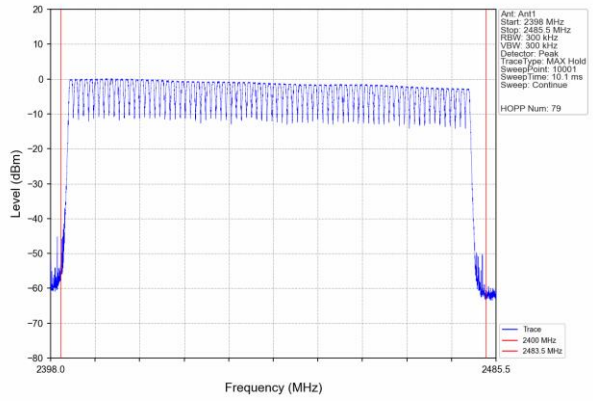
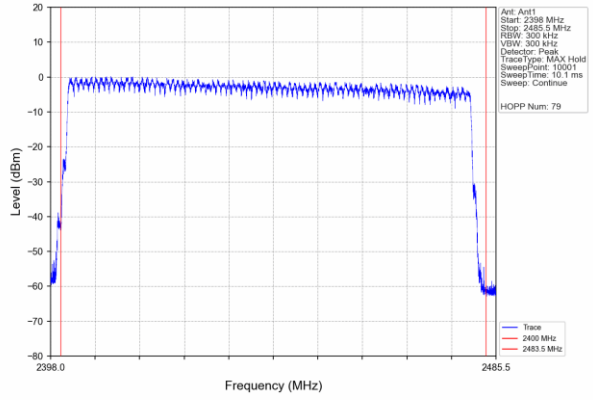
Number of Hopping Frequencies

Number of hopping frequencies	Result
79	Pass

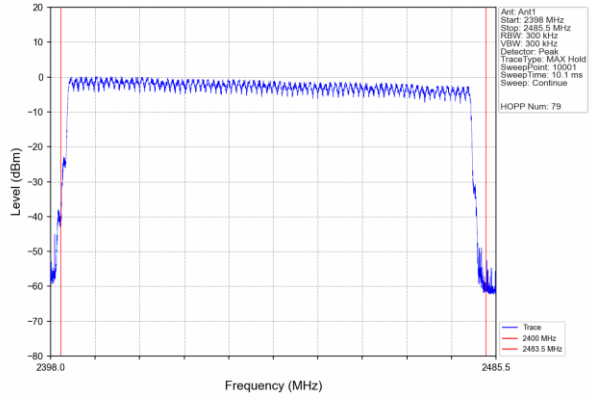
DH5_Ant1_Hop



2DH5_Ant1_Hop



3DH5_Ant1_Hop



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9.6 Dwell Time

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Span: Zero span, centered on a hopping channel.
4. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
5. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
6. Detector function: Peak.
7. Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

Limit

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

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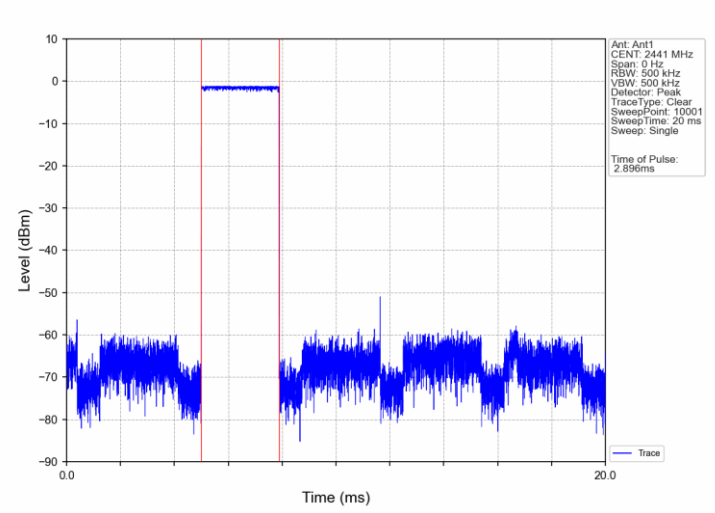
Dwell Time

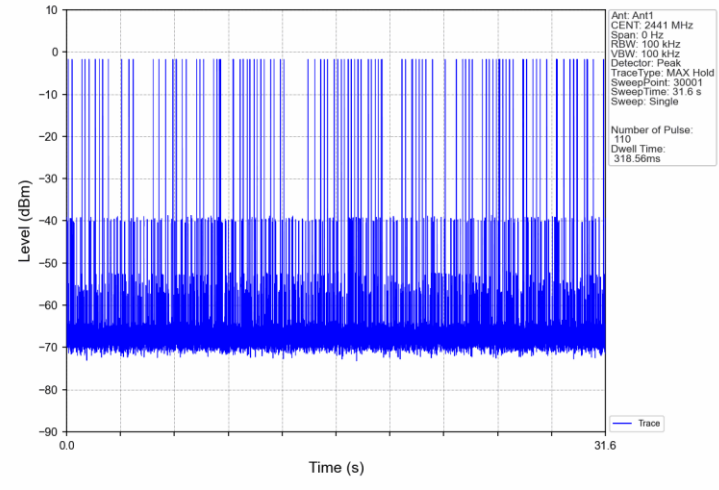
Dwell time

The maximum dwell time shall be 0.4 s.
The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s]
The Dwell Time = Burst Width * Total Hops.

Mode	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	HOPP	DH1	2.896	31.600	110	318.560	<=400	Pass
		DH3	1.648	31.600	156	257.088	<=400	Pass
		DH5	2.896	31.600	110	318.560	<=400	Pass
Pi/4DQPSK	HOPP	2DH1	0.396	31.600	319	126.324	<=400	Pass
		2DH3	1.654	31.600	155	256.370	<=400	Pass
		2DH5	2.902	31.600	122	354.044	<=400	Pass
8DPSK	HOPP	3DH1	0.394	31.600	321	126.474	<=400	Pass
		3DH3	1.652	31.600	168	277.536	<=400	Pass
		3DH5	2.902	31.600	116	336.632	<=400	Pass

DH1_Ant1_Hop





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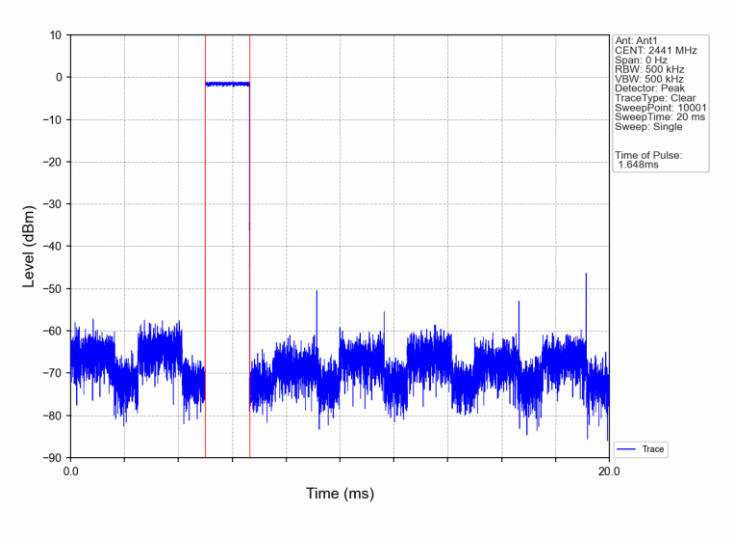
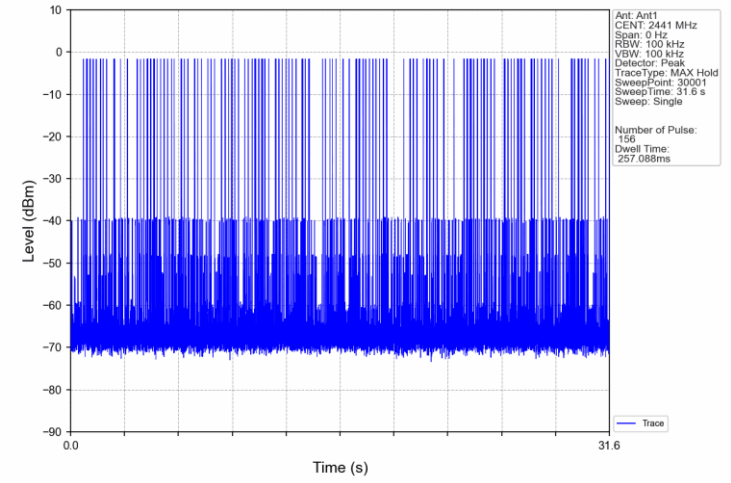
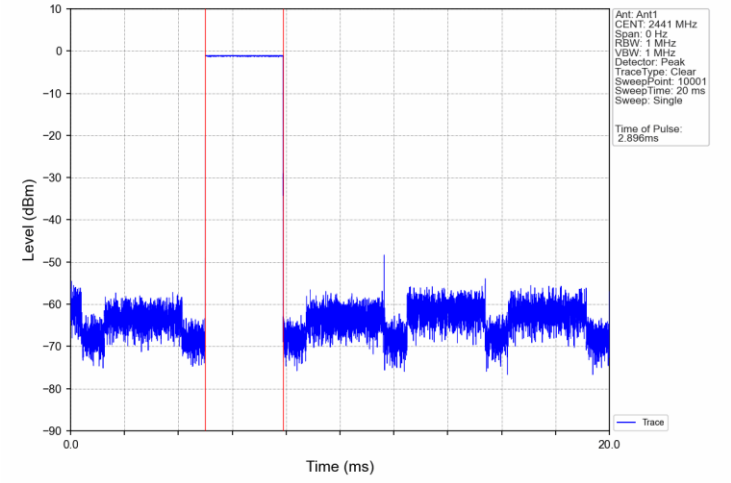
DH3_Ant1_Hop





DH5_Ant1_Hop



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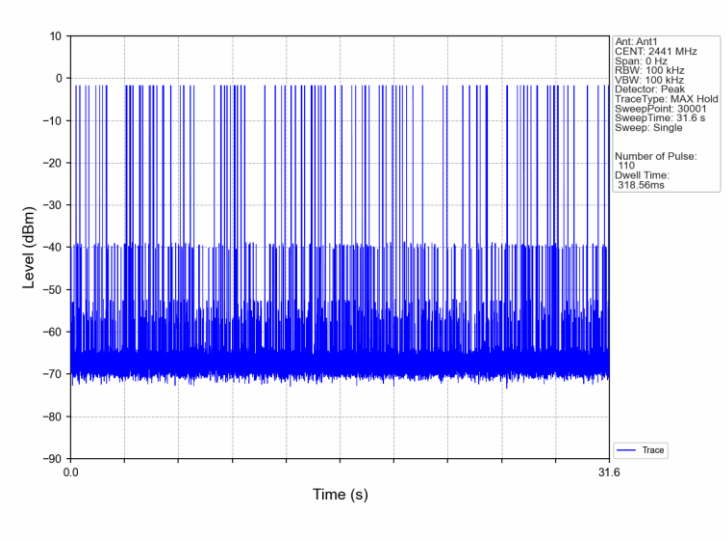
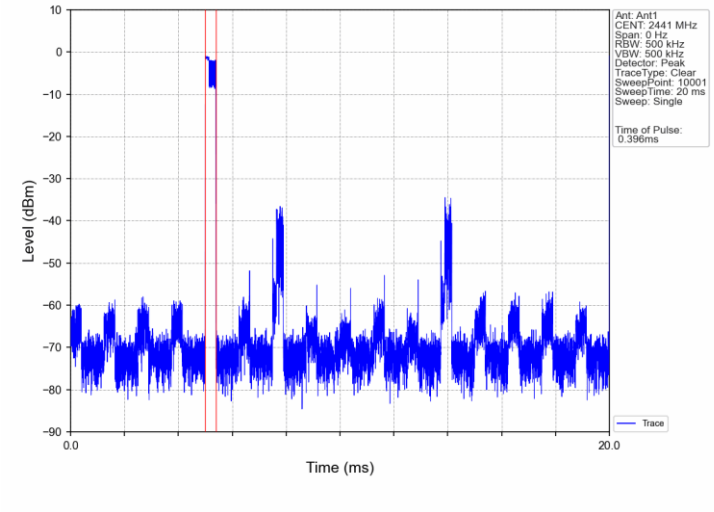
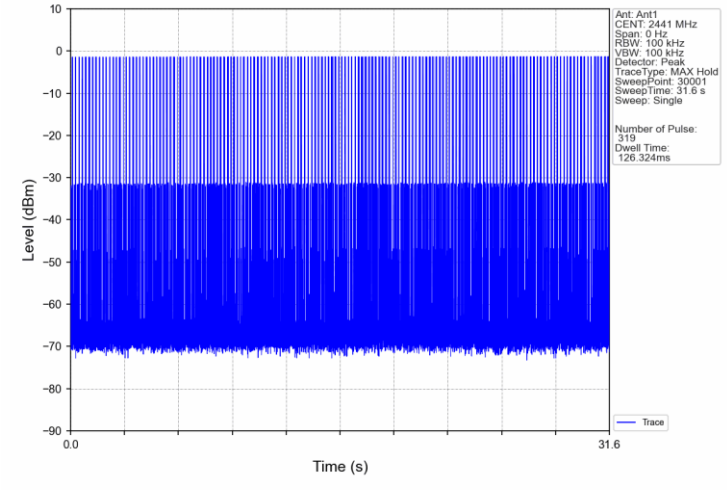


2DH1_Ant1_Hop





2DH3_Ant1_Hop

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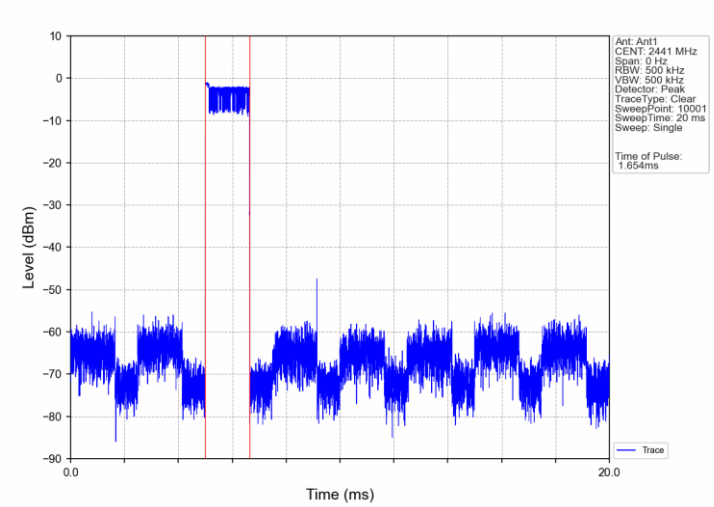
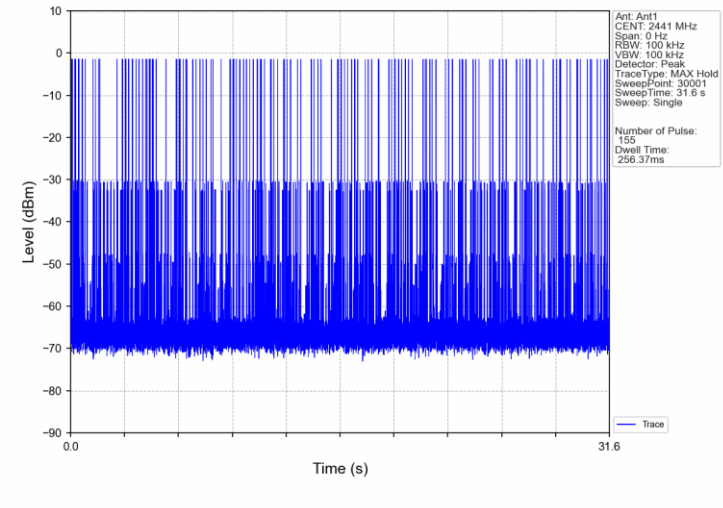
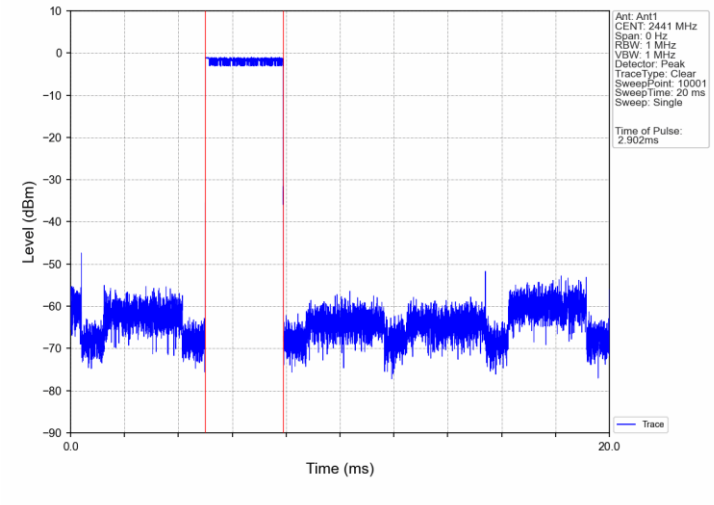




2DH5_Ant1_Hop



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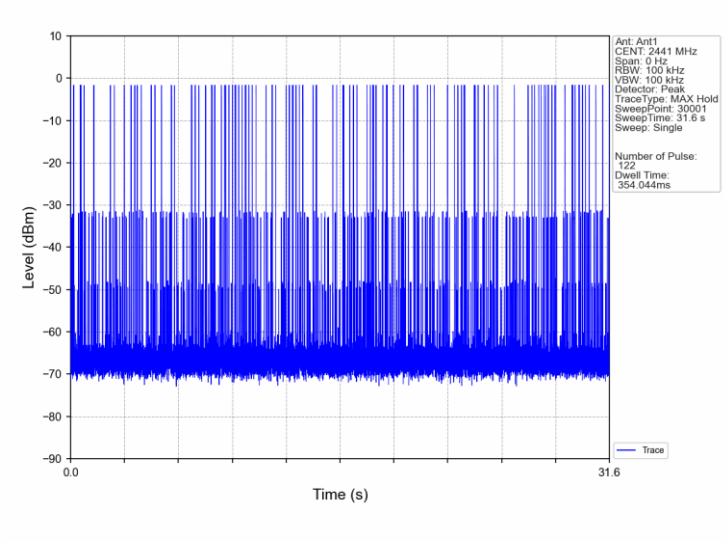
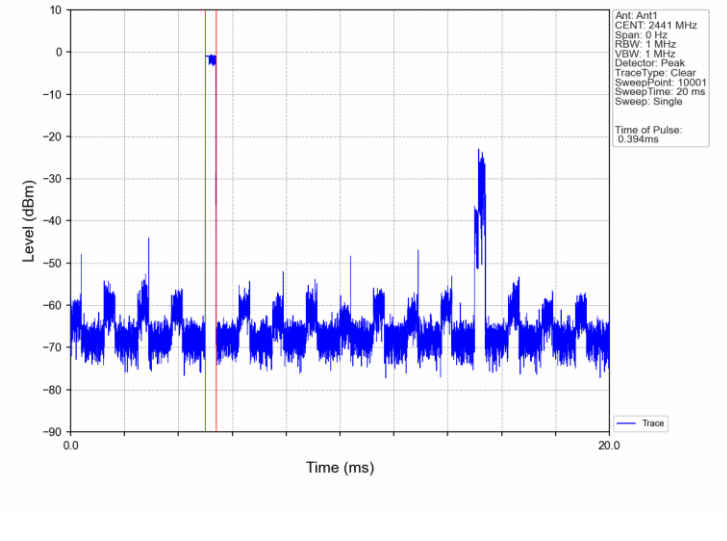
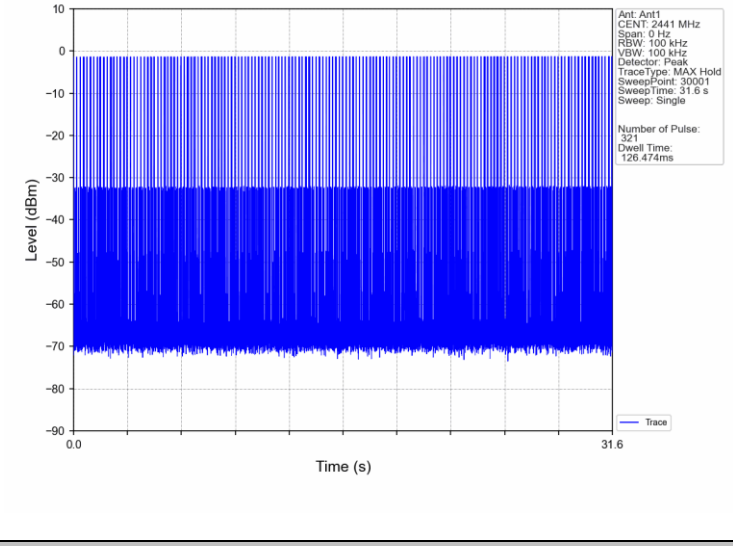


3DH1_Ant1_Hop





3DH3_Ant1_Hop

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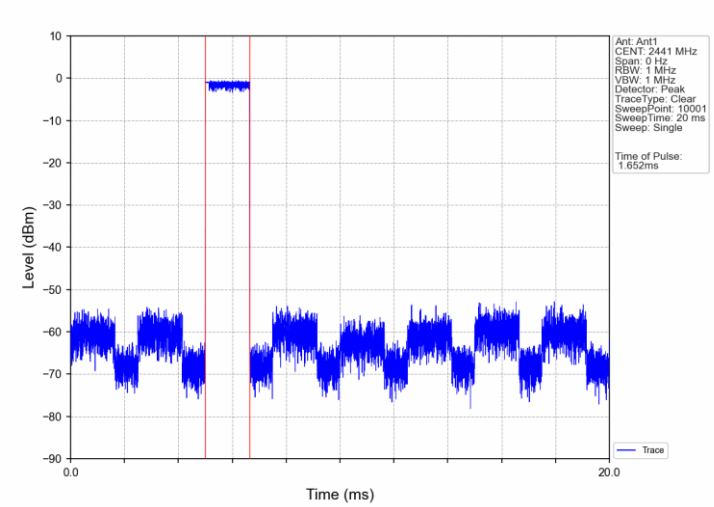
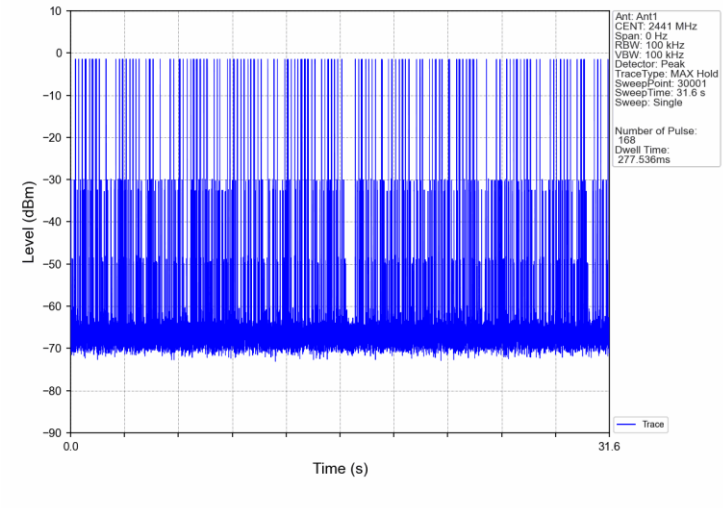
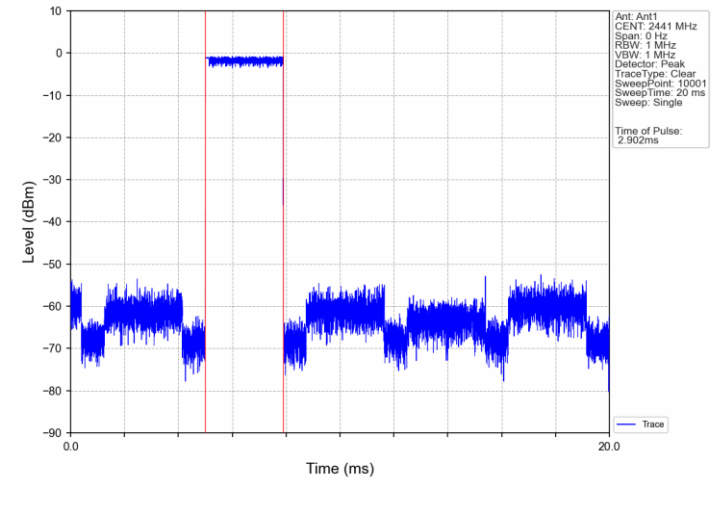




3DH5_Ant1_Hop



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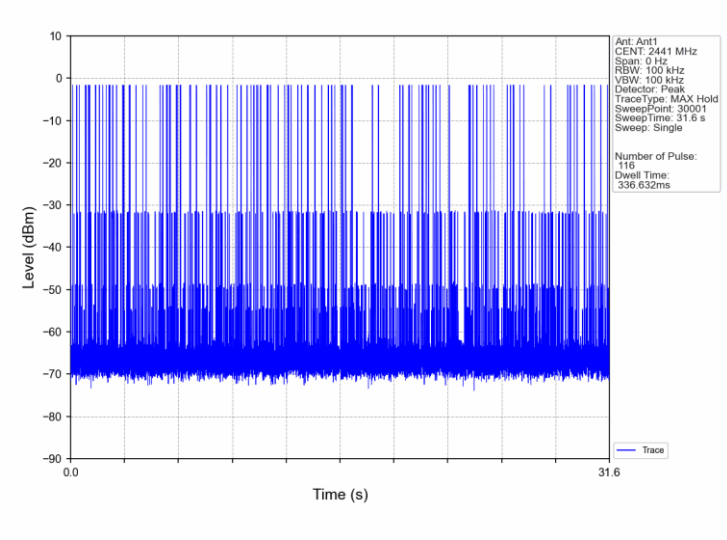

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9.7 Spurious RF Conducted Emissions

Test Method

1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector, Sweep = auto, Span = wide enough to capture the peak level of the in-band emission and all spurious emissions, Trace = max hold. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

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Spurious RF Conducted Emissions

Ref:

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-0.10
		2441	DH5	1	-1.24
		2480	DH5	1	-2.86
		HOPP	DH5	1	-0.17
					-0.17
Pi/4DQPSK	SISO	2402	2DH5	1	-0.06
		2441	2DH5	1	-1.14
		2480	2DH5	1	-2.82
		HOPP	2DH5	1	-0.04
					-0.04
8DPSK	SISO	2402	3DH5	1	-0.06
		2441	3DH5	1	-1.20
		2480	3DH5	1	-2.85
		HOPP	3DH5	1	0.13
					0.13
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.					

CSE:

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-0.10	-20.10	Pass
		2441	DH5	1	-1.24	-21.24	Pass
		2480	DH5	1	-2.86	-22.86	Pass
		HOPP	DH5	1	-0.17	-20.17	Pass
					-0.17	-20.17	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-0.06	-20.06	Pass
		2441	2DH5	1	-1.14	-21.14	Pass
		2480	2DH5	1	-2.82	-22.82	Pass
		HOPP	2DH5	1	-0.04	-20.04	Pass
					-0.04	-20.04	Pass
8DPSK	SISO	2402	3DH5	1	-0.06	-20.06	Pass
		2441	3DH5	1	-1.20	-21.20	Pass
		2480	3DH5	1	-2.85	-22.85	Pass
		HOPP	3DH5	1	0.13	-19.87	Pass
					0.13	-19.87	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.							

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