

FCC - TEST REPORT

Report Number	:	68.950.24.1411.01	Date of Issue:	2025-03-28
Model/HVIN	:	P1		
Product Type	:	Art Projector		
Applicant	:	SKRIVER INTERNATIONAL TRADLING LIMIED		
Address	:	19H MAXGRAND PLAZA NO 3 TAI YAU STREET SAN PO Kong		
		KL, Hong Kong, China		
Manufacturer	:	SKRIVER INTERNATIONAL TRADLING LIMIED		
Address	:	19H MAXGRAND PLAZA NO 3 TAI YAU STREET SAN PO Kong		
		KL, Hong Kong, China		
Factory	:	SKRIVER INTERNATIONAL TRADLING LIMIED		
Address	:	19H MAXGRAND PLAZA NO 3 TAI YAU STREET SAN PO Kong		
		KL, Hong Kong, China		
Test Result	:	☒ Positive ☐ Negative		
Total pages including Appendices	:	73		

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, Guankou Erlu, Nantou,
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

3 Description of the Equipment Under Test

Product:	Art Projector
Model No.:	P1
Brand name:	Caydo
FCC ID:	2BKPL-P1
Rating:	Powered by external adaptor: Adaptor Input: 100-240V~50/60Hz, 1.5A Max Output: 19V $\overline{\text{---}}$ 2.5A
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	79
Modulation:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Antenna Type:	FPC Antenna
Antenna	Gain: 1.88dBi
Description of the EUT:	EUT is a Art Projector which supports Bluetooth (BR+EDR+BLE), Wi-Fi operated at 2.4GHz and 5GHz. Only Bluetooth (BR+EDR) is included in this report.

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

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

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

5 Summary of Test Results

Technical Requirements			
FCC Part 15 Subpart C			
Test Condition		Test Site	Test Result
§15.207	Conducted emission AC power port	Site 1	Pass
§15.247(b)(1)	Conducted peak output power	Site 1	Pass
§15.247(a)(1)	20dB bandwidth	Site 1	Pass
§15.247(a)(1)	Carrier channel frequency separation	Site 1	Pass
§15.247(a)(1)(iii)	Number of hopping frequencies	Site 1	Pass
§15.247(a)(1)(iii)	Dwell Time - Average Time of Occupancy	Site 1	Pass
§15.247(d)	Spurious RF conducted emissions	Site 1	Pass
§15.247(d)	Band edge	Site 1	Pass
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	Pass
§15.203	Antenna requirement	See note 2	Pass

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a FPC antenna, which gain is 1.88dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2BKPL-P1, complies with Section 15.209, 15.247, 15.207, 15.205 of the FCC Part 15, Subpart C rules.

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: 2024-10-21

Testing Start Date: 2024-10-21

Testing End Date: 2025-03-24

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

Reviewed by:

Prepared by:

Tested by:


John Zhi
Section Manager



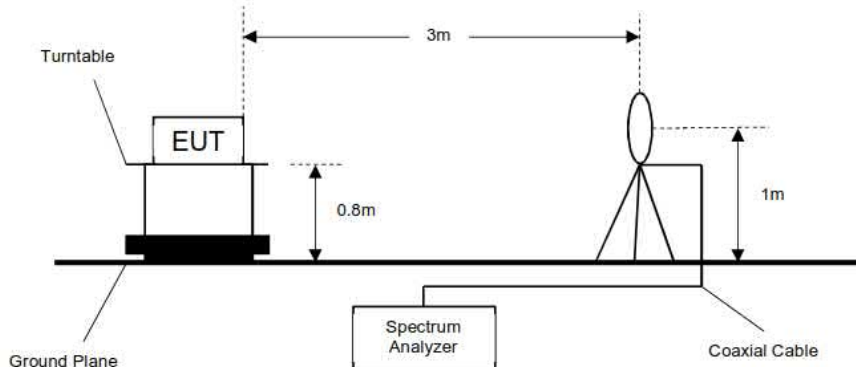

Hayden Hu
Project Engineer


Carry Cai
Test Engineer

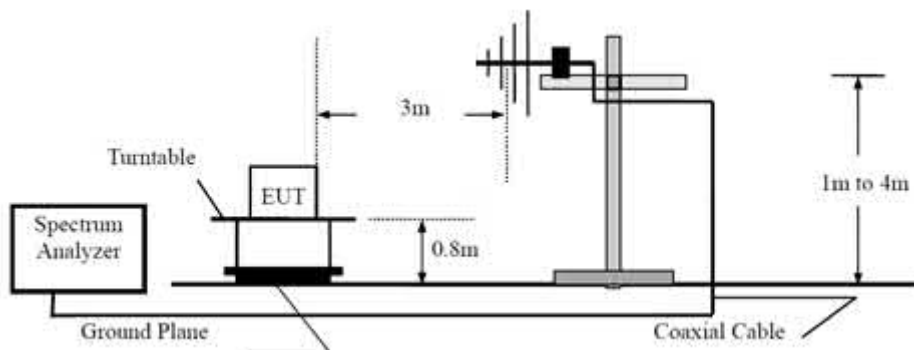
7 Test Setups

7.1 Radiated test setups

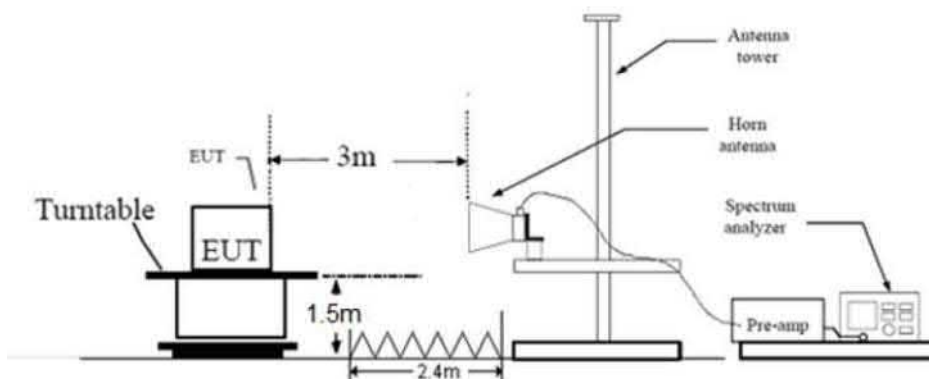
9KHz - 30MHz



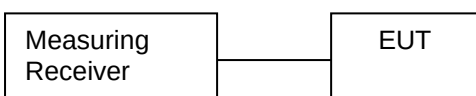
30MHz - 1GHz



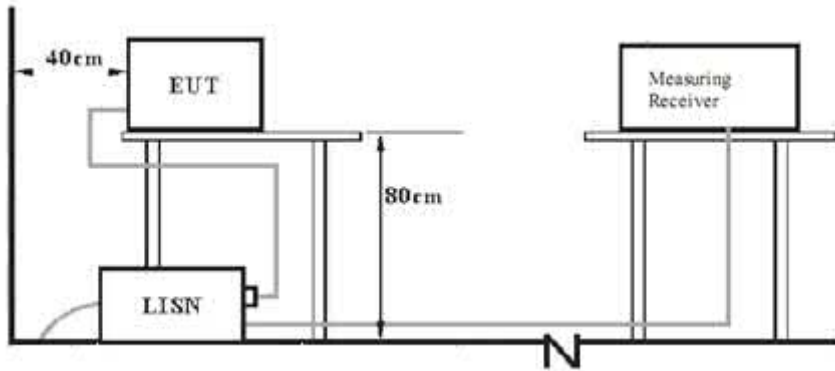
Above 1GHz



7.3 Conducted RF test setups



7.4 AC Power Line Conducted Emission test setups



8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model NO.	S/N
Computer	HP	TPN-CA16	L25298-002
Adaptor	Dong Guan City GangQi Electronic Co.,Ltd	GQ48-190250-AU	---
Serial port board	---	---	---

Cables Used During Test:

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

Test software information:

Test Software Version	SecureCRT	
Modulation	Setting TX Power	Packet Type
GFSK	Default	PRBS9
$\pi/4$ -DQPSK	Default	PRBS9
8DPSK	Default	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.

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

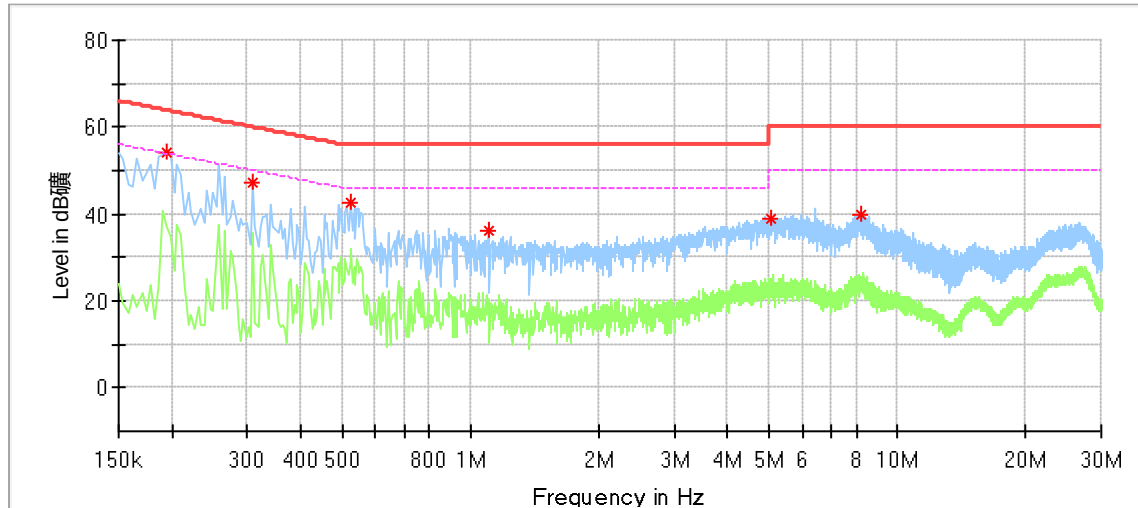
According to §15.207, conducted emissions limit as below:

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

*Decreasing linearly with logarithm of the frequency

Conducted Emission

Product Type : Art Projector
 M/N : P1
 Operating Condition : Transmission
 Test Specification : Line
 Comment : AC 120V/60Hz



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.194000	54.23	---	63.86	9.63	L1	9.67
0.310000	47.15	---	59.97	12.82	L1	9.67
0.526000	42.63	---	56.00	13.37	L1	9.69
1.102000	36.02	---	56.00	19.98	L1	9.70
5.034000	38.73	---	60.00	21.27	L1	9.82
8.206000	39.90	---	60.00	20.10	L1	9.90

Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---	---	---

Remark:

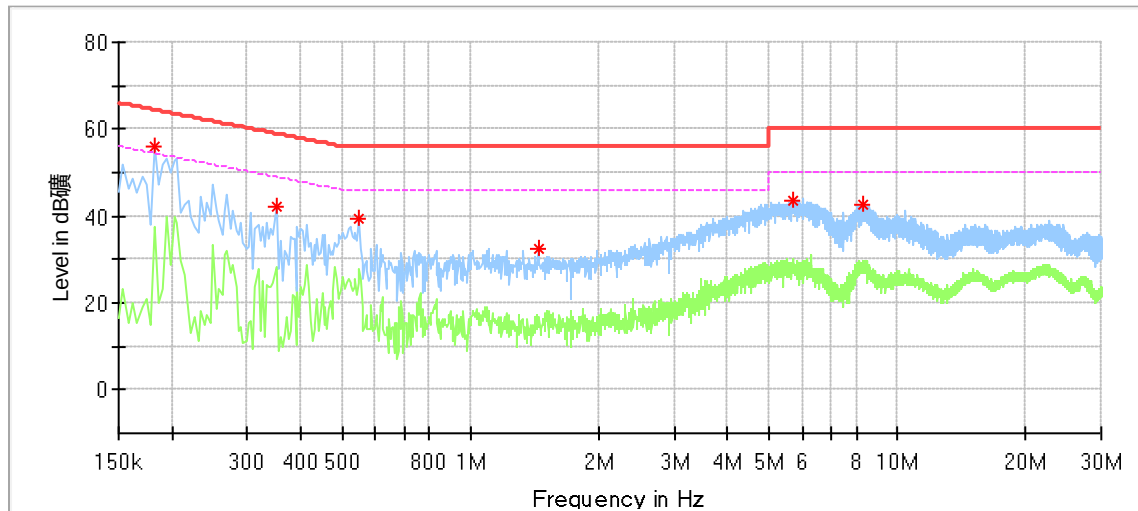
Max Peak= Read level + Corrector factor

Correct factor=cable loss + LISN factor

EUT has more than one typical operation, only the worst test mode will be recorded in this report.

Conducted Emission

Product Type : Art Projector
 M/N : P1
 Operating Condition : Transmission
 Test Specification : Power Line, Neutral
 Comment : AC 120V/60Hz



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.182000	56.12	---	64.39	8.27	N	9.67
0.350000	42.26	---	58.96	16.71	N	9.67
0.550000	39.48	---	56.00	16.52	N	9.68
1.442000	32.40	---	56.00	23.60	N	9.70
5.674000	43.50	---	60.00	16.50	N	9.82
8.266000	42.77	---	60.00	17.23	N	9.89

Final Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
---	---	---	---	---	---	---

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)

9.2 Conducted Peak Output Power

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

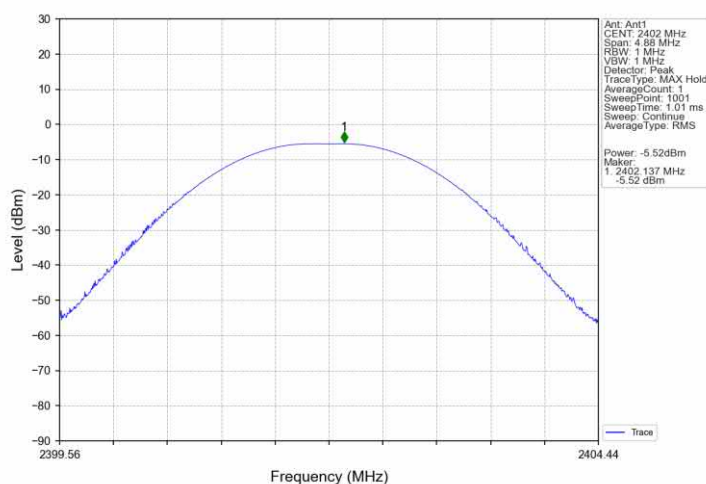
According to §15.247 (b) (1), conducted peak output power limit as below:

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

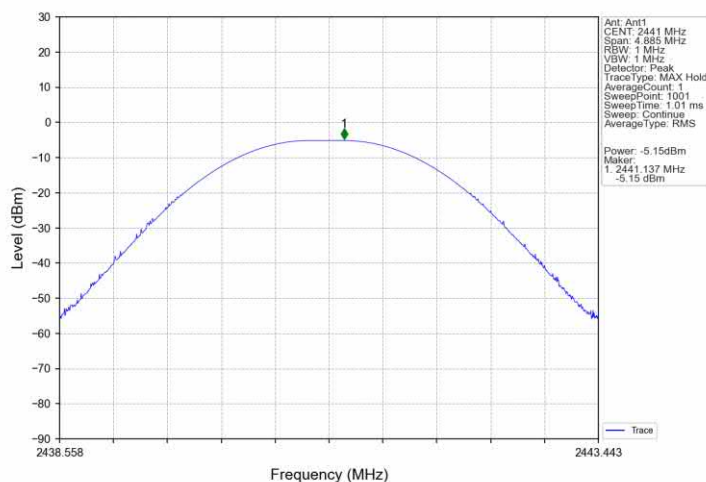
Conducted Peak Output Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-5.52	<=30	Pass
		2441	DH5	-5.15	<=30	Pass
		2480	DH5	-4.63	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-7.21	<=30	Pass
		2441	2DH5	-6.82	<=30	Pass
		2480	2DH5	-4.83	<=30	Pass
8DPSK	SISO	2402	3DH5	-5.91	<=30	Pass
		2441	3DH5	-5.31	<=30	Pass
		2480	3DH5	-5.00	<=30	Pass

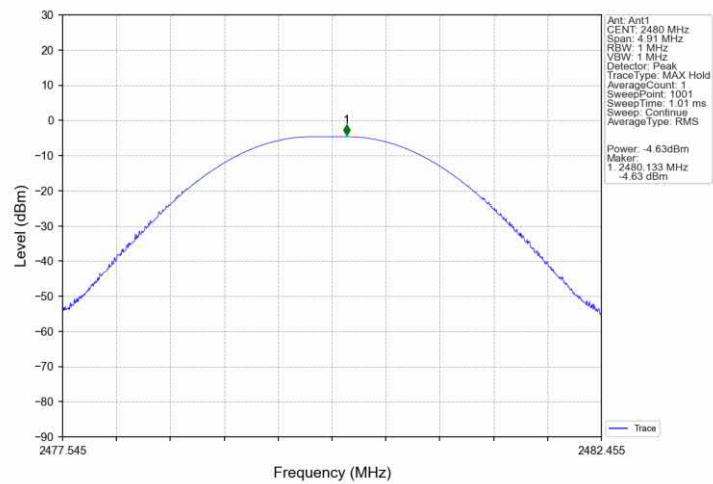
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



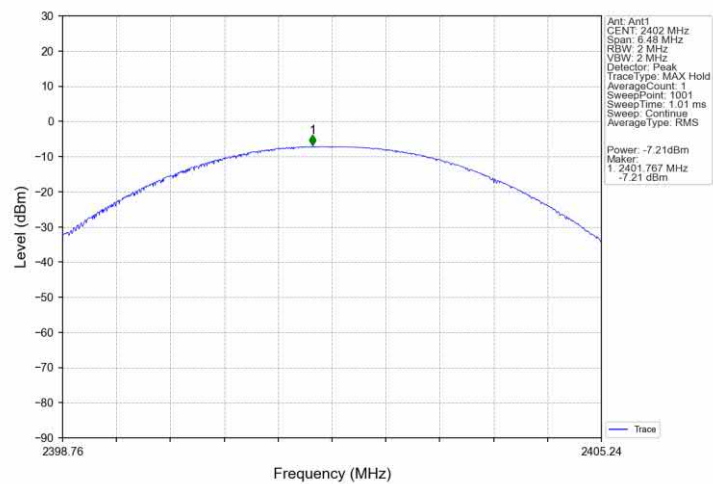
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



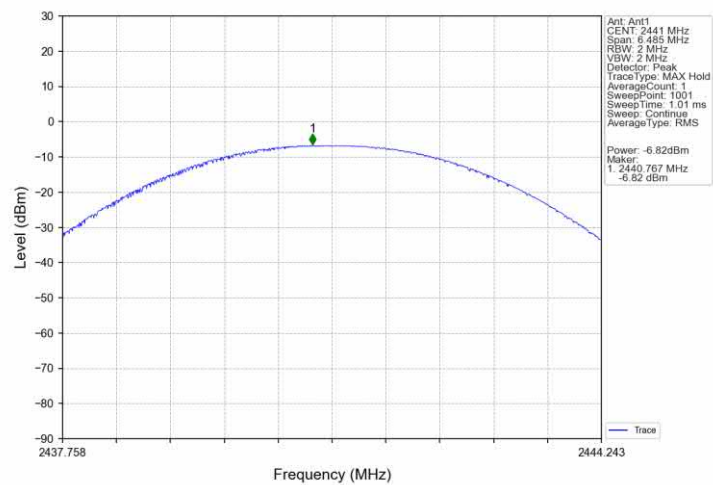
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



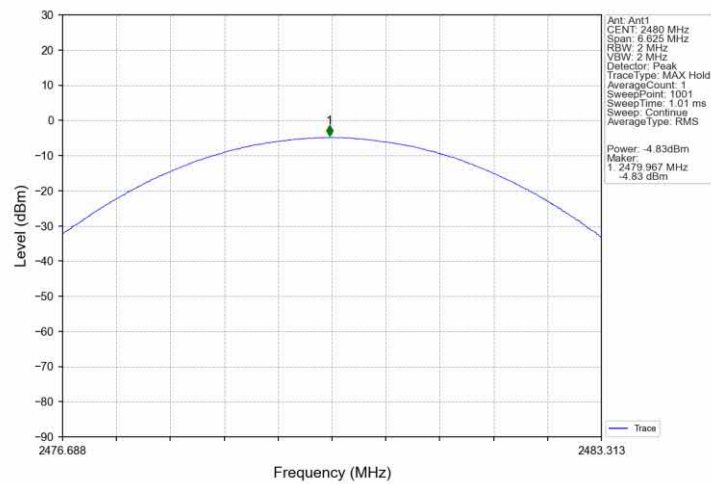
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



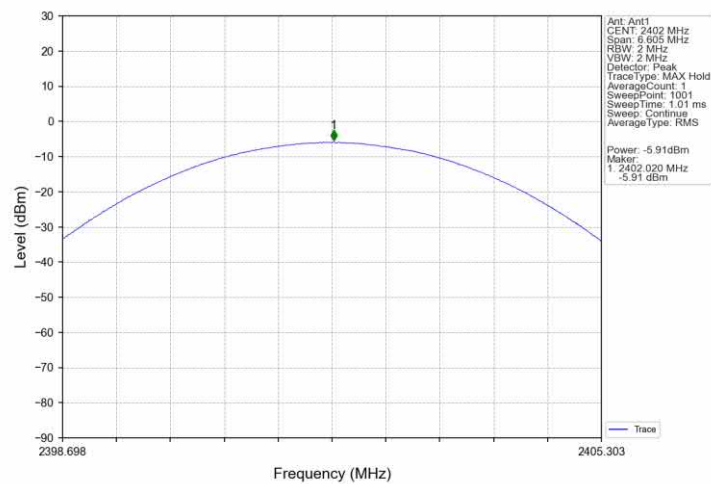
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



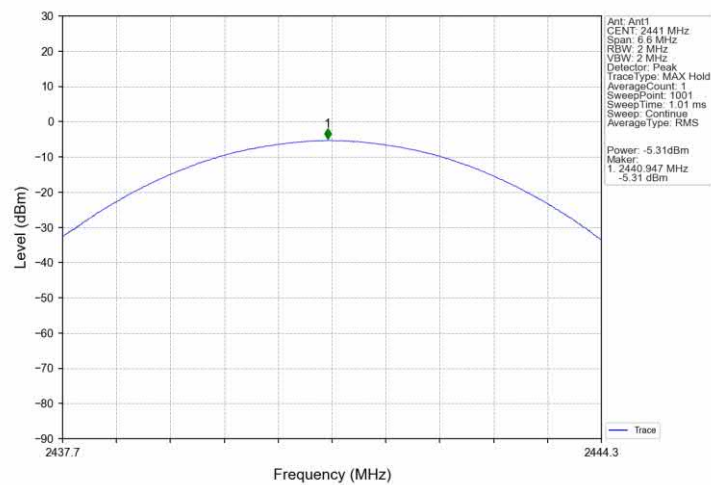
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



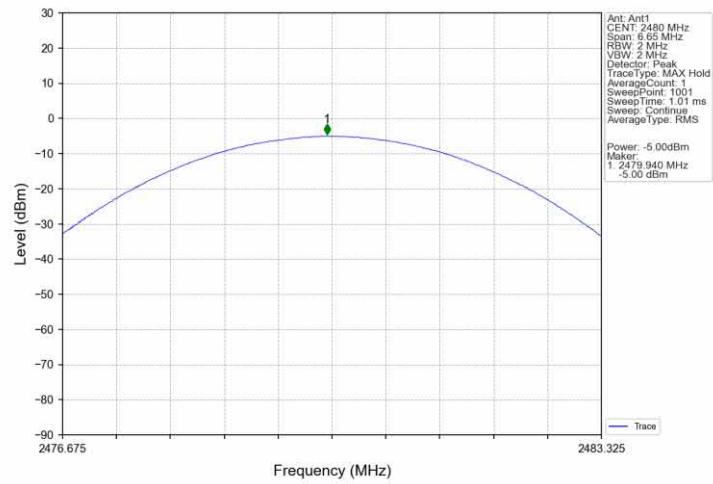
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



9.3 20 dB 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 $\geq$ 1% to 5% of the 20 dB bandwidth/99% OBW, VBW $\geq$ 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 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

According to §15.247(a)(1), 20 dB Bandwidth limit as below:

Limit [kHz]

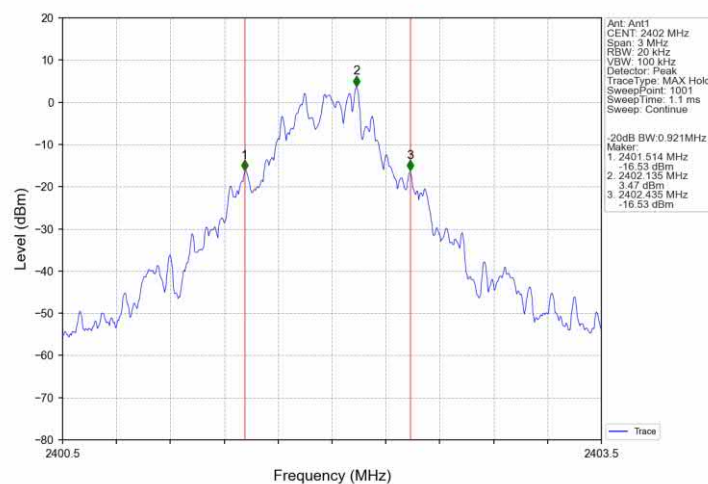
N/A

20 dB bandwidth

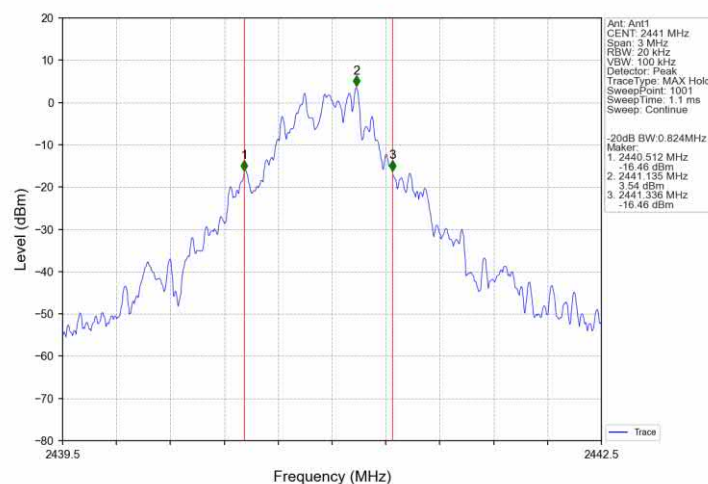
Test result

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.921	/	Pass
		2441	DH5	1	0.824	/	Pass
		2480	DH5	1	0.824	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.297	/	Pass
		2441	2DH5	1	1.297	/	Pass
		2480	2DH5	1	1.297	/	Pass
8DPSK	SISO	2402	3DH5	1	1.221	/	Pass
		2441	3DH5	1	1.220	/	Pass
		2480	3DH5	1	1.219	/	Pass

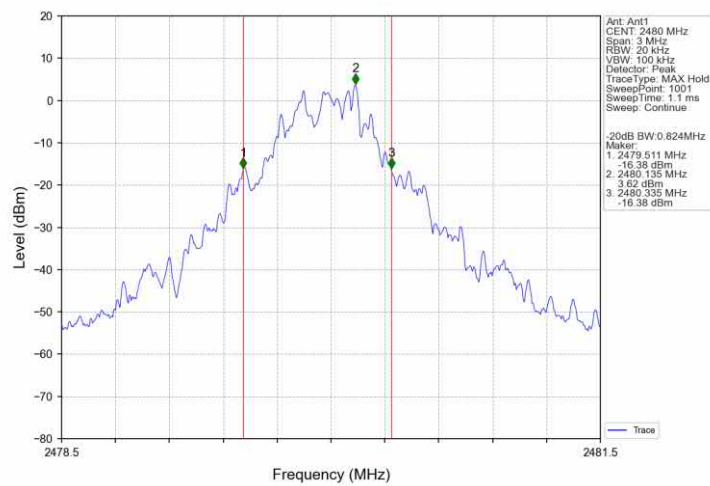
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



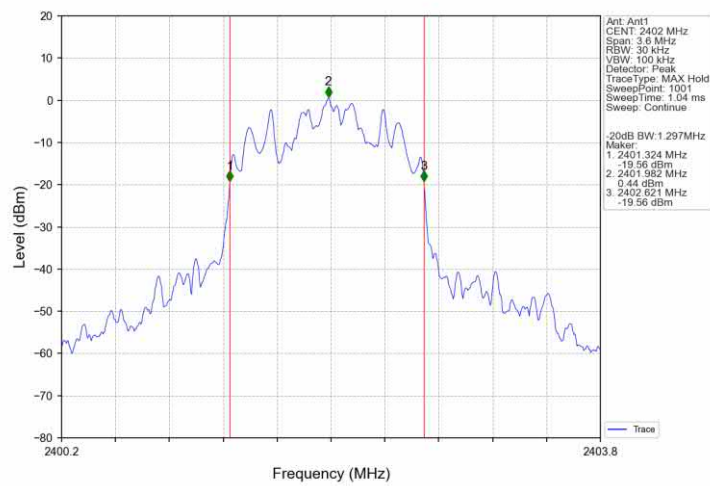
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



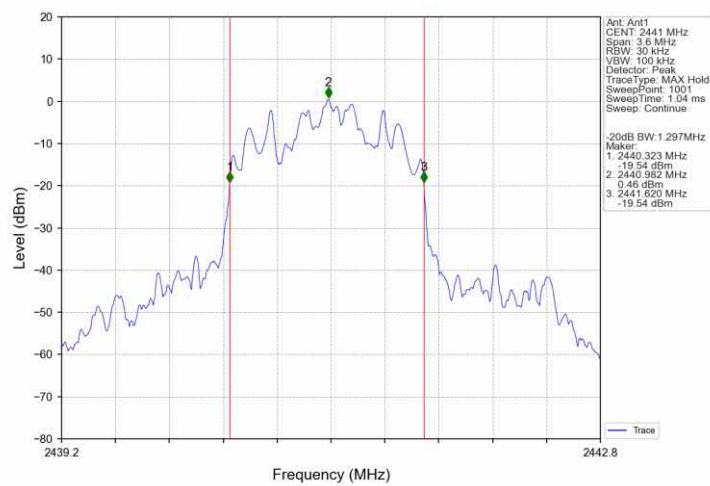
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



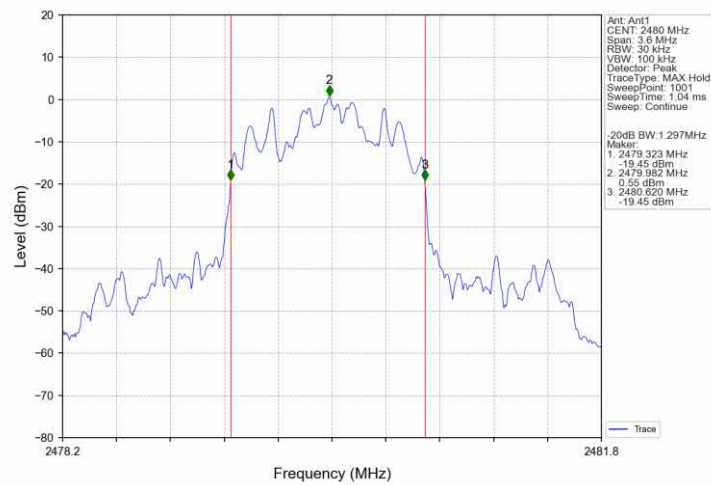
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



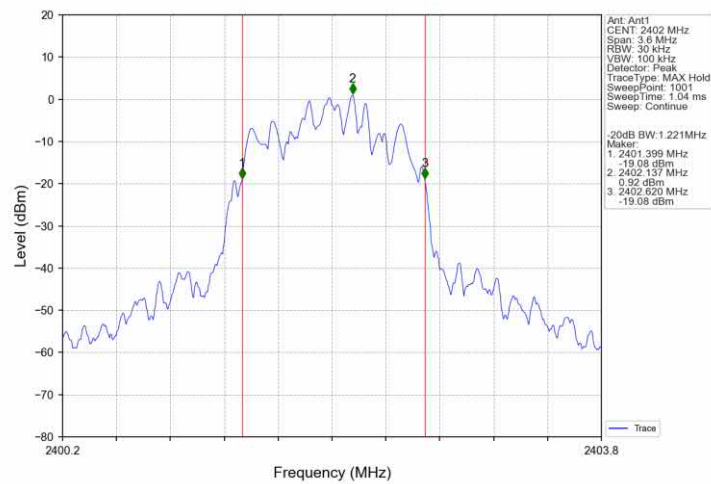
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



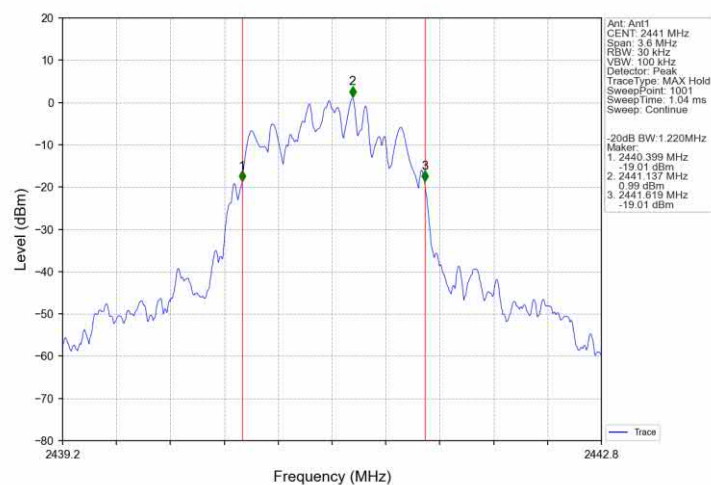
Pi/4DQPSK 2DH5_HCH 2480MHz_Ant1_NTNV



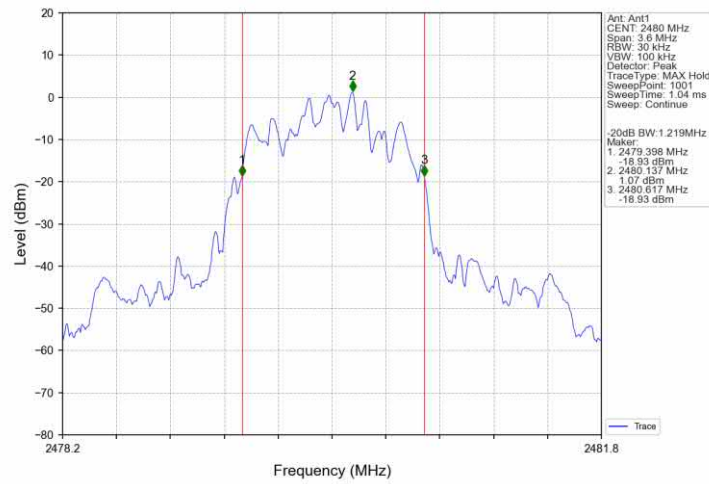
8DPSK 3DH5_LCH 2402MHz_Ant1_NTNV



8DPSK 3DH5_MCH 2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



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 $\geq$ 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

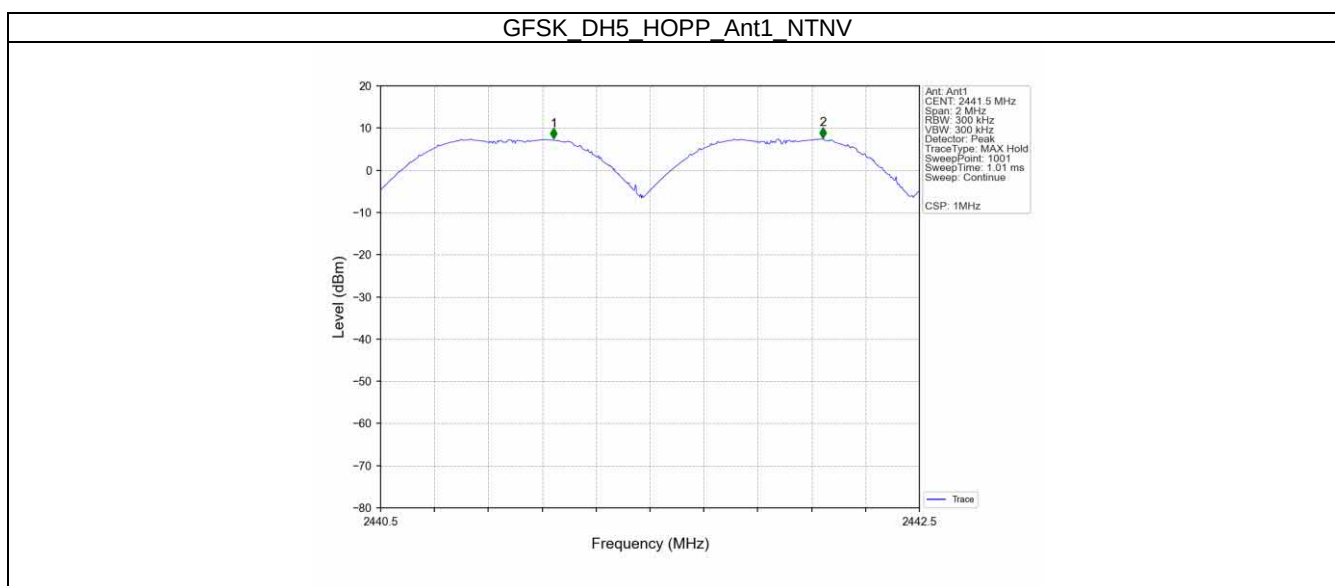
According to §15.247(a)(1), Carrier Frequency Separation limit as below:

**Limit
kHz**

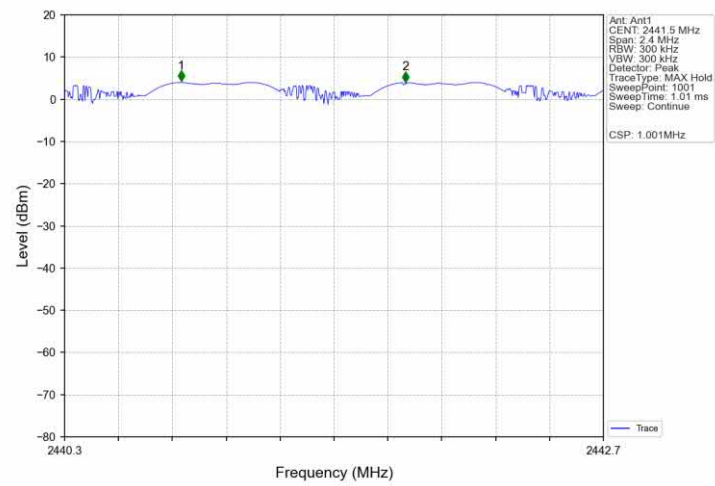
$\geq 25\text{kHz}$ or $2/3$ of the 20 dB bandwidth which is greater

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

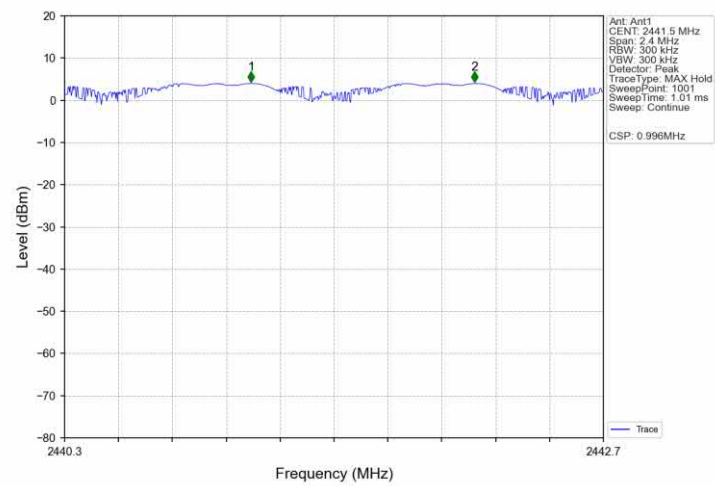
Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.921	≥ 0.614	Pass
PI/4DQPSK	SISO	HOPP	2DH5	1.001	1.297	≥ 0.865	Pass
8DPSK	SISO	HOPP	3DH5	0.996	1.221	≥ 0.814	Pass



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



9.5 Number of Hopping Frequencies

Test Method

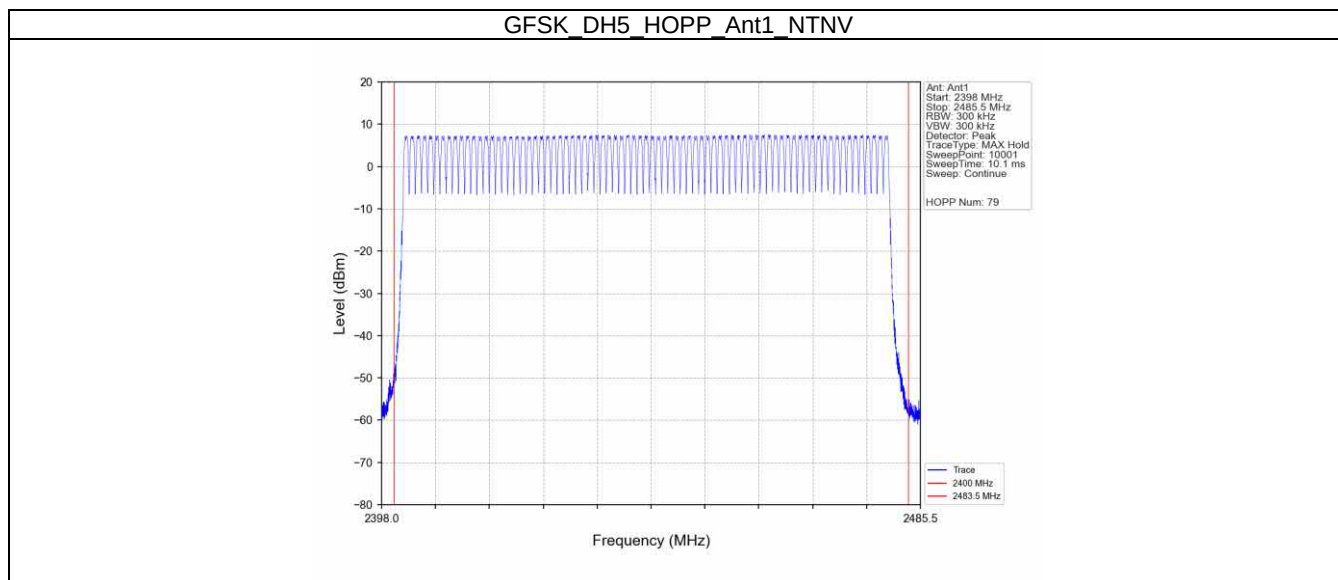
1. The RF output of EUT was connected to the spectrum analyzer by RF cable. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit to hopping mode.
3. Use the following spectrum analyzer settings:
Span = the frequency band of 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 $\geq$ 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

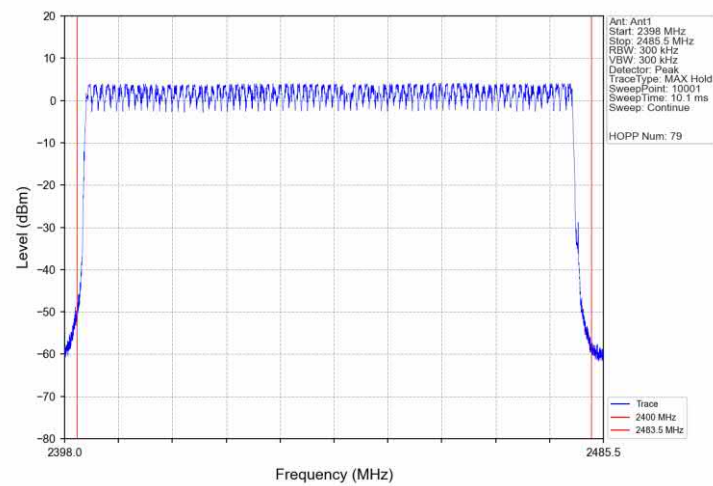
According to §15.247(a)(1)(iii), Number of Hopping Frequencies limit as below:

$$\frac{\text{Limit number}}{\geq 15}$$

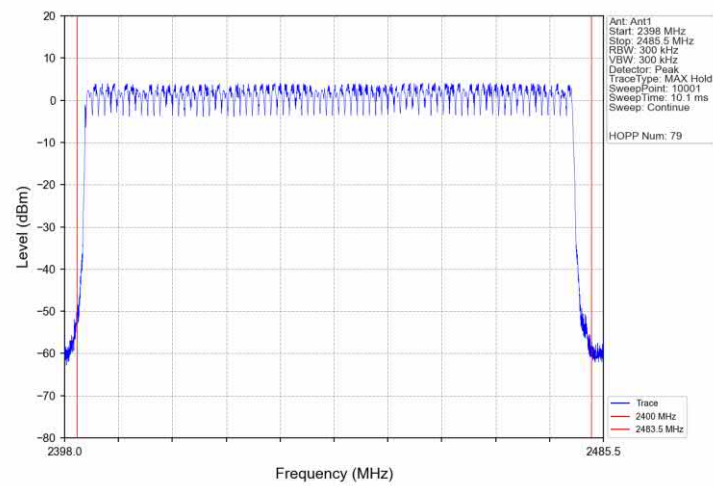
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	≥ 15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	≥ 15	Pass
8DPSK	SISO	HOPP	3DH5	79	≥ 15	Pass



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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 $\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$, 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

According to §15.247(a)(1)(iii), Dwell Time limit as below:

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.

Dwell Time

Dwell time

The maximum dwell time shall be 0.4 s.

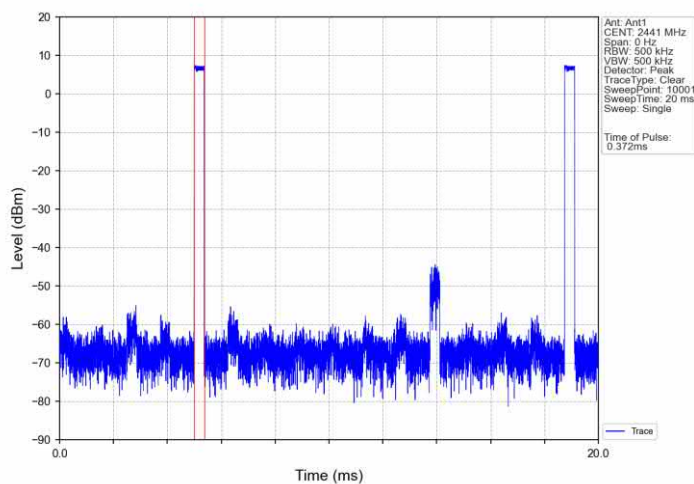
According to the Bluetooth Core Specification,

The duration for dwell time calculation: $0.4 \text{ [s]} * \text{hopping number} = 0.4 \text{ [s]} * 79 \text{ [ch]} = 31.6 \text{ [s]}$

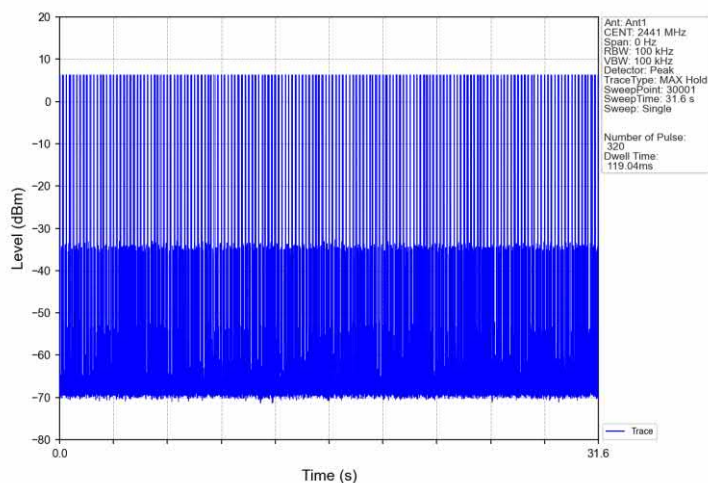
The Dwell Time = Burst Width * Total Hops.

Mode	TX Type	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	SISO	HOPP	DH1	0.372	31.600	320	119.040	<=400	Pass
			DH3	1.630	31.600	158	257.540	<=400	Pass
			DH5	2.876	31.600	100	287.600	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.382	31.600	320	122.240	<=400	Pass
			2DH3	1.634	31.600	154	251.636	<=400	Pass
			2DH5	2.884	31.600	101	291.284	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.384	31.600	319	122.496	<=400	Pass
			3DH3	1.634	31.600	167	272.878	<=400	Pass
			3DH5	2.884	31.600	106	305.704	<=400	Pass

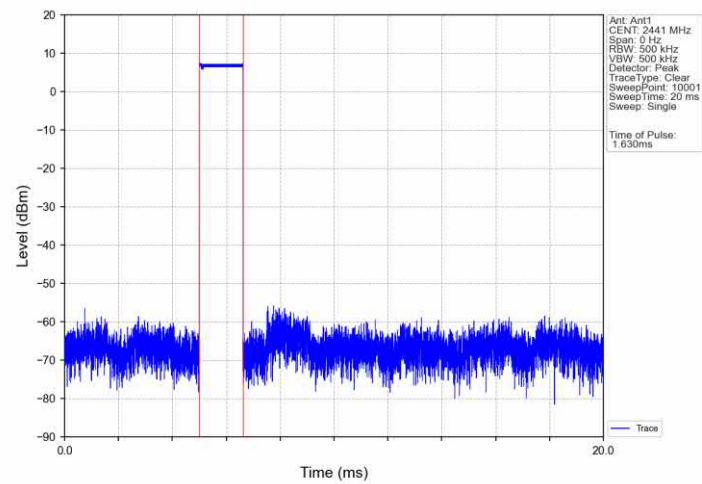
GFSK_DH1_HOPP_Ant1_NTNV



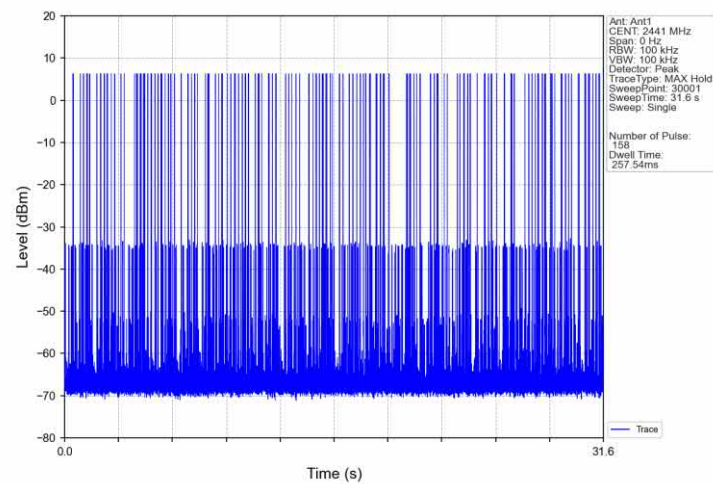
GFSK_DH1_HOPP_Ant1_NTNV



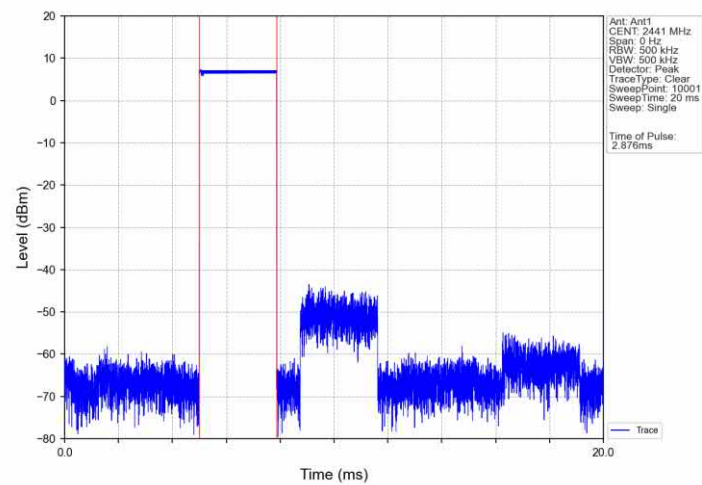
GFSK_DH3_HOPP_Ant1_NTNV



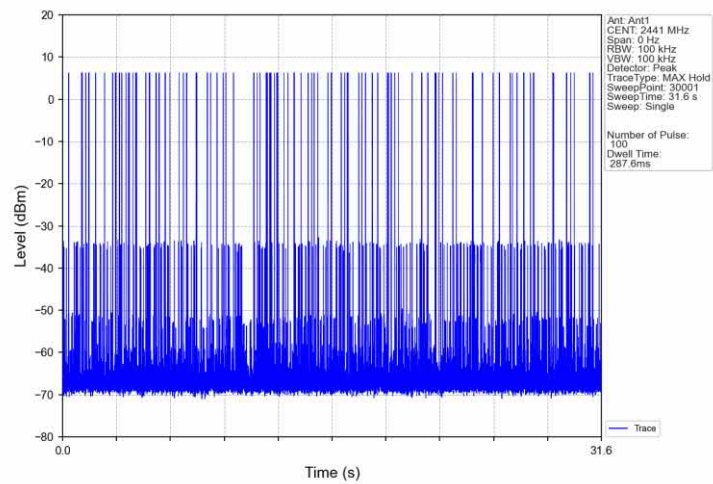
GFSK_DH3_HOPP_Ant1_NTNV



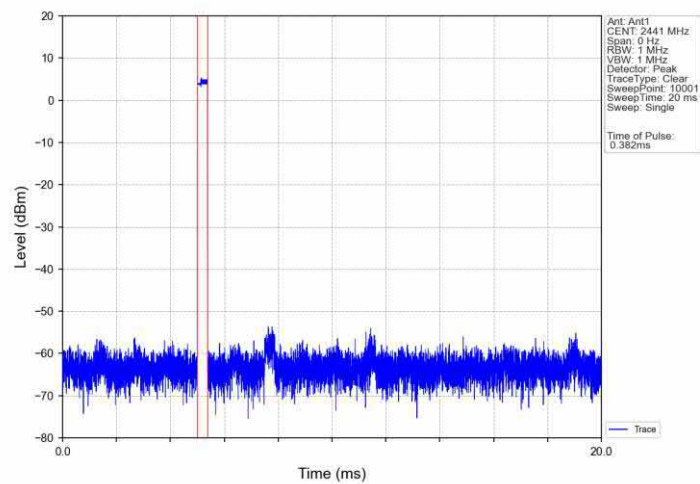
GFSK_DH5_HOPP_Ant1_NTNV



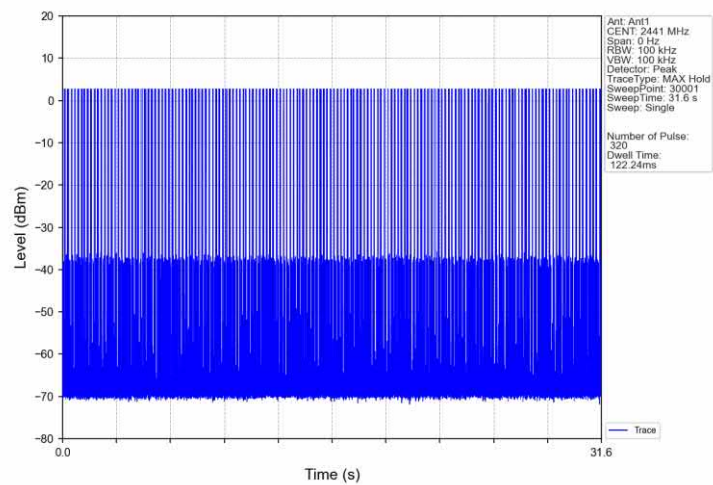
GFSK_DH5_HOPP_Ant1_NTNV



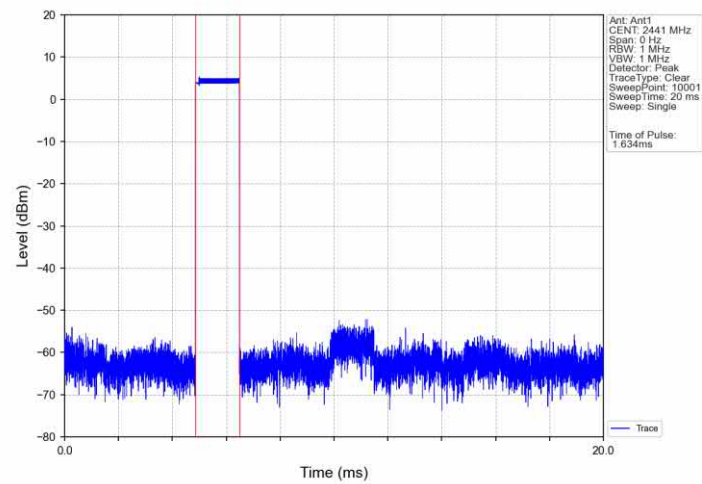
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



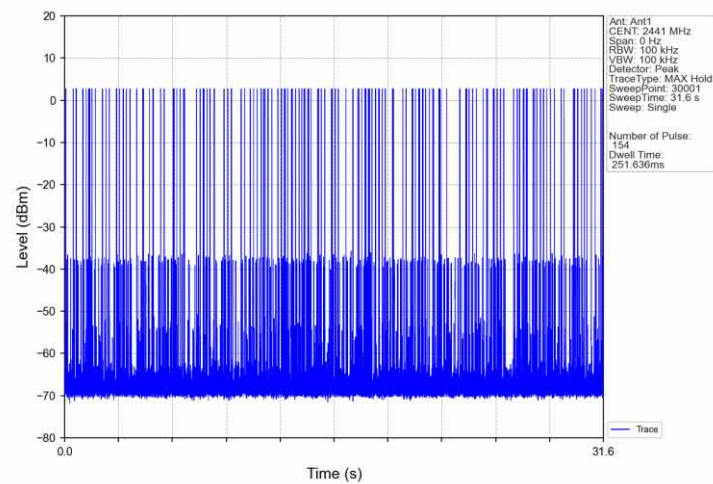
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



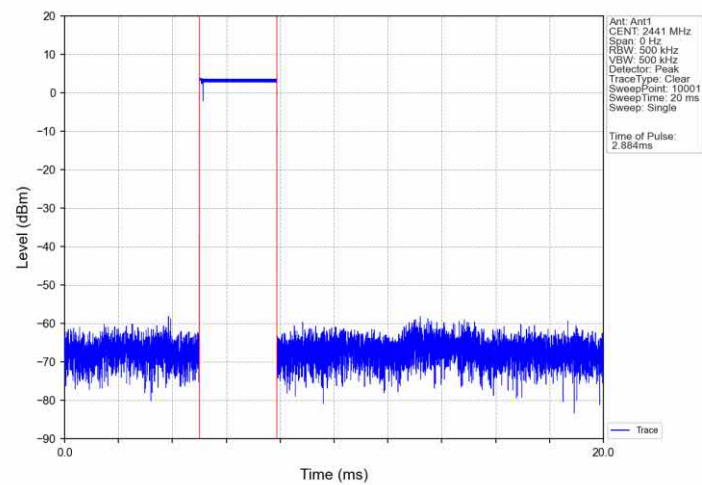
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



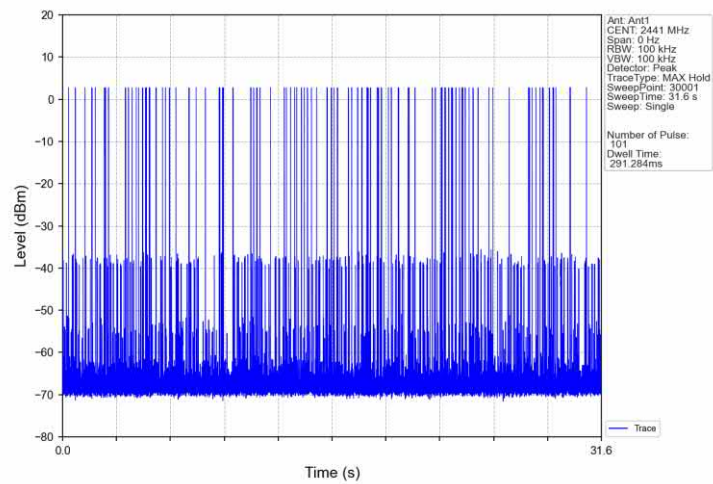
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV



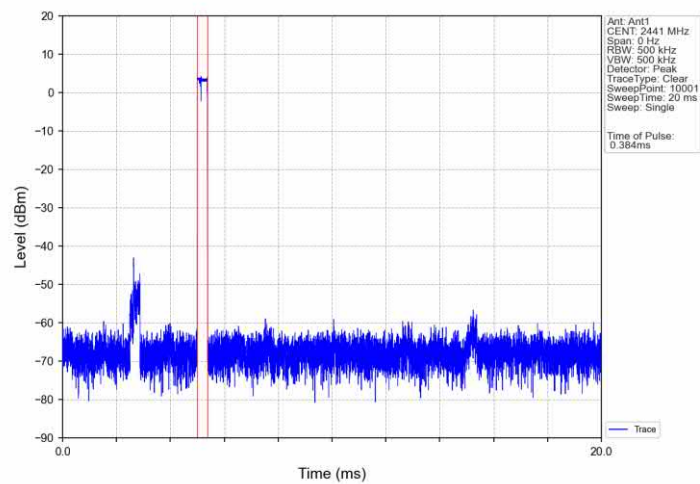
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



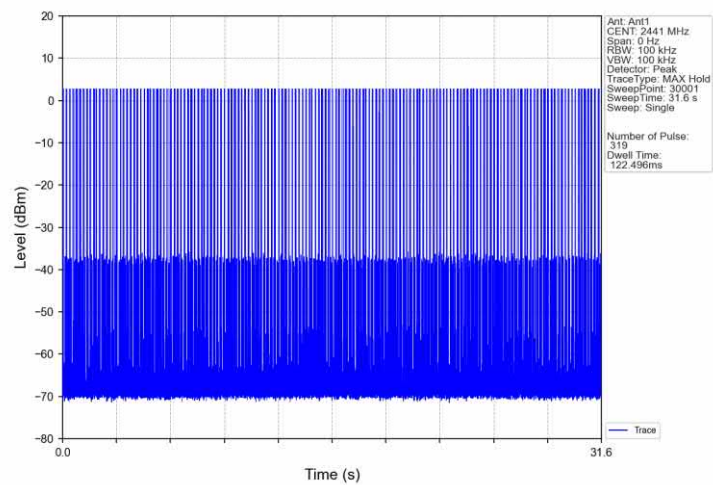
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



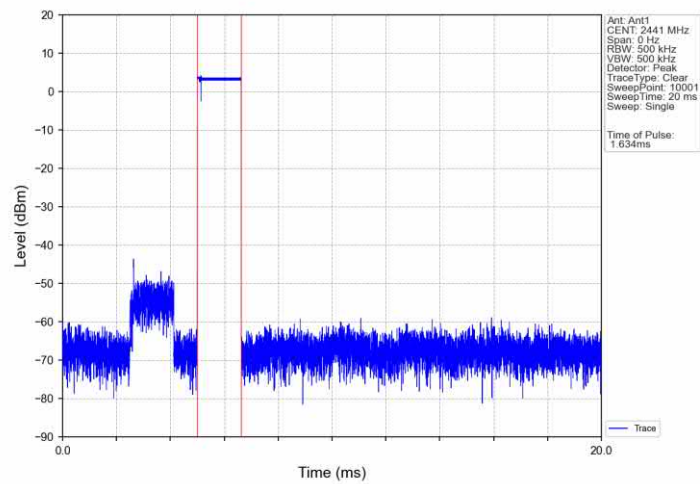
8DPSK_3DH1_HOPP_Ant1_NTNV



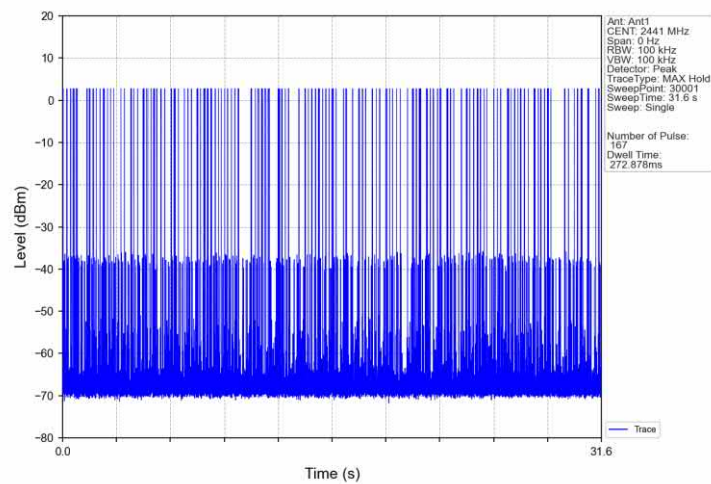
8DPSK_3DH1_HOPP_Ant1_NTNV



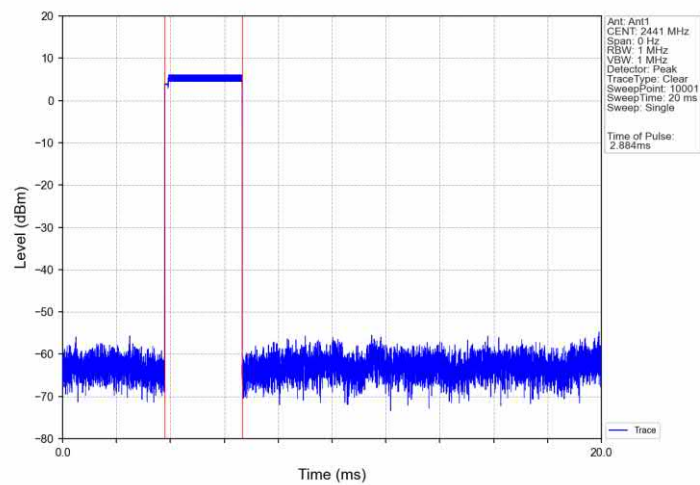
8DPSK_3DH3_HOPP_Ant1_NTNV



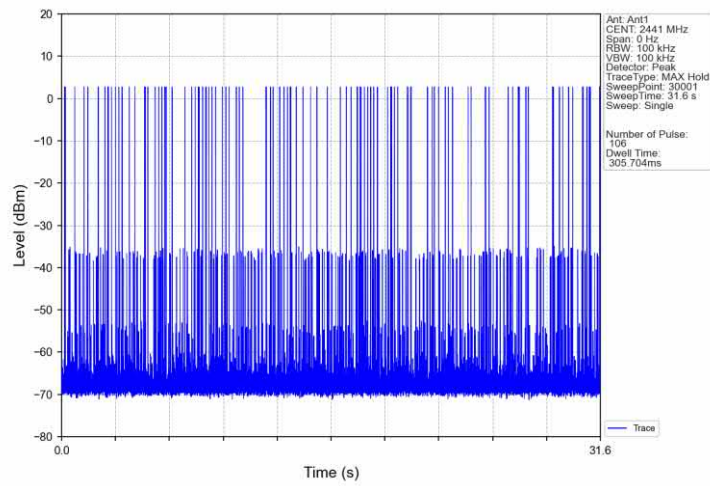
8DPSK_3DH3_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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

According to §15.247(d), Spurious RF Conducted Emissions limit as below:

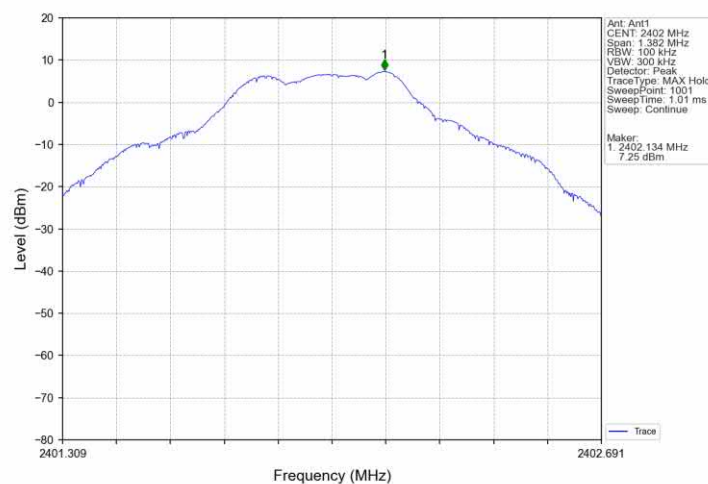
Frequency Range MHz	Limit (dBc)
30-25000	-20

Spurious RF Conducted Emissions

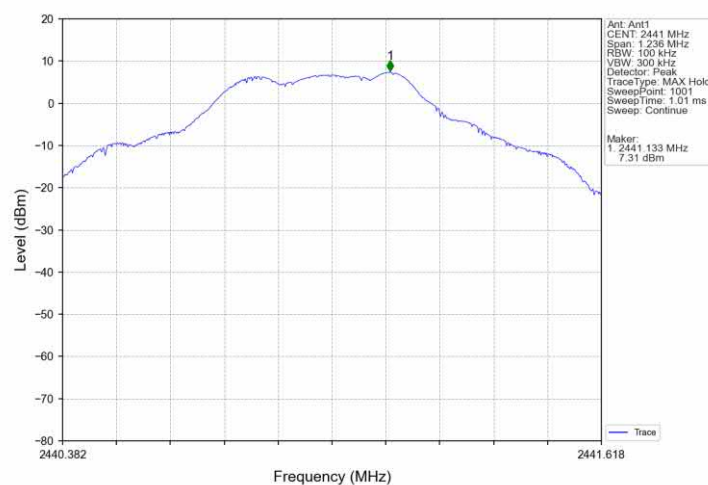
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	7.25	-12.75	Pass
		2441	DH5	1	7.31	-12.69	Pass
		2480	DH5	1	7.40	-12.60	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	3.83	-16.17	Pass
		2441	2DH5	1	3.89	-16.11	Pass
		2480	2DH5	1	3.98	-16.02	Pass
8DPSK	SISO	2402	3DH5	1	3.84	-16.16	Pass
		2441	3DH5	1	3.90	-16.10	Pass
		2480	3DH5	1	3.98	-16.02	Pass

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

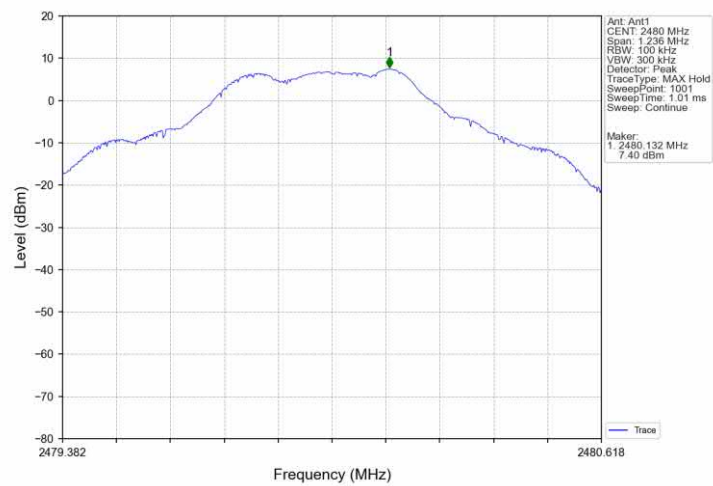
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



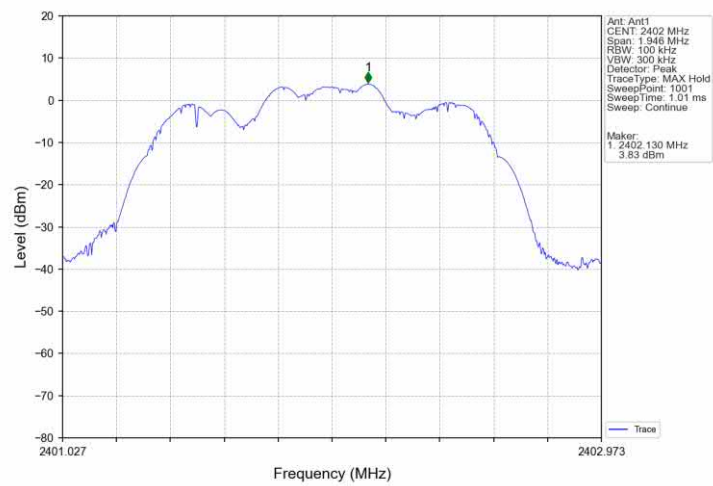
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



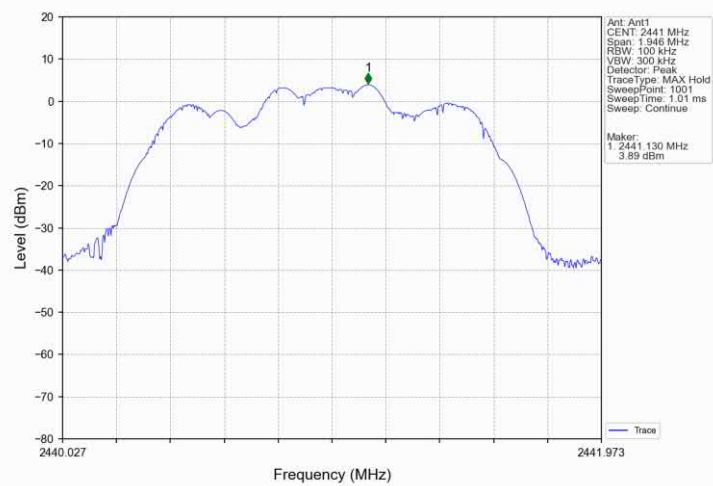
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



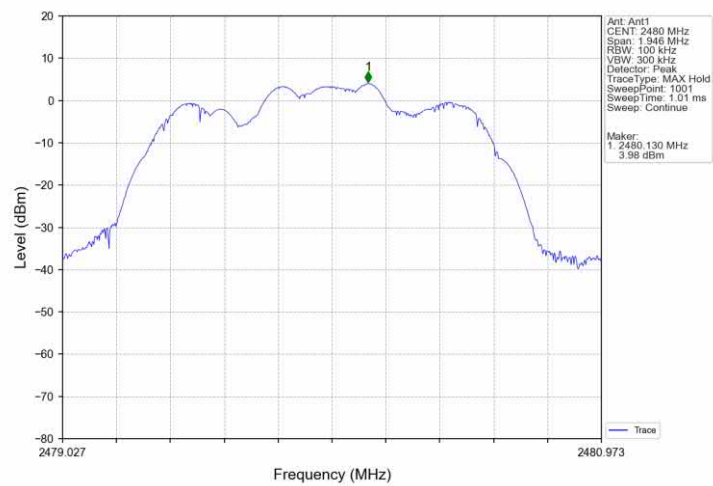
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



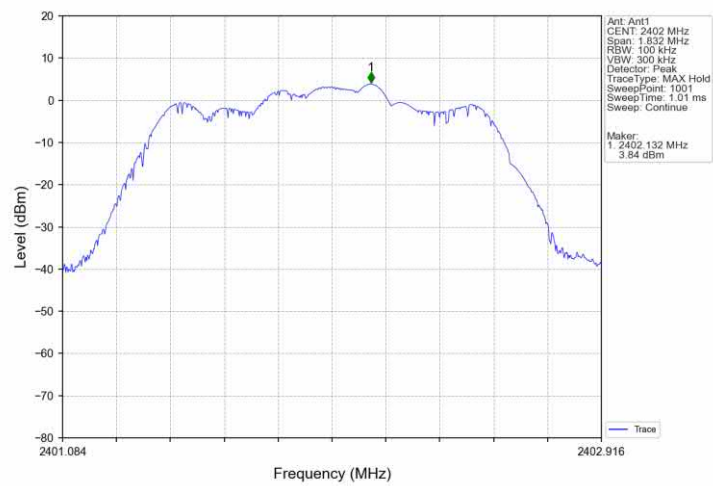
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



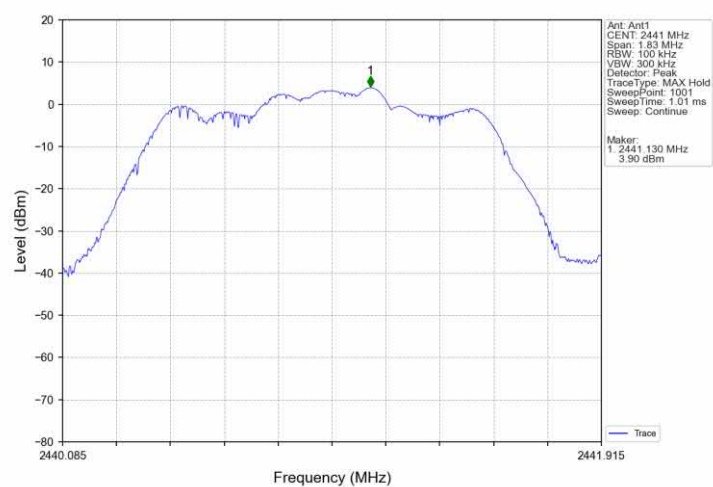
Pi/4DQPSK 2DH5 HCH 2480MHz Ant1 NTN



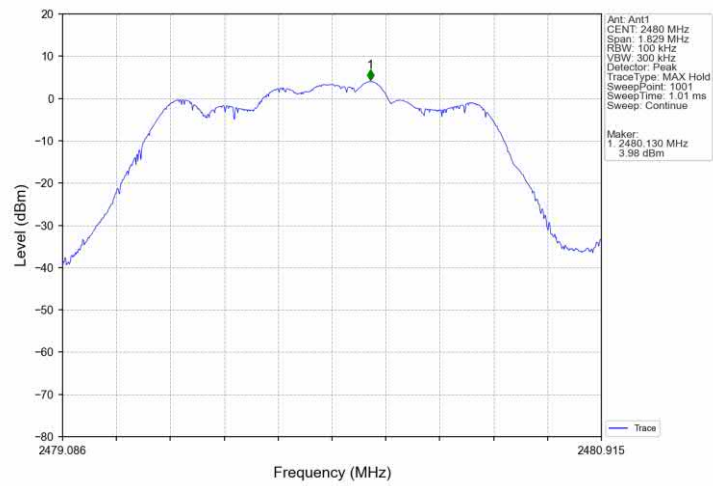
8DPSK 3DH5 LCH 2402MHz Ant1 NTN



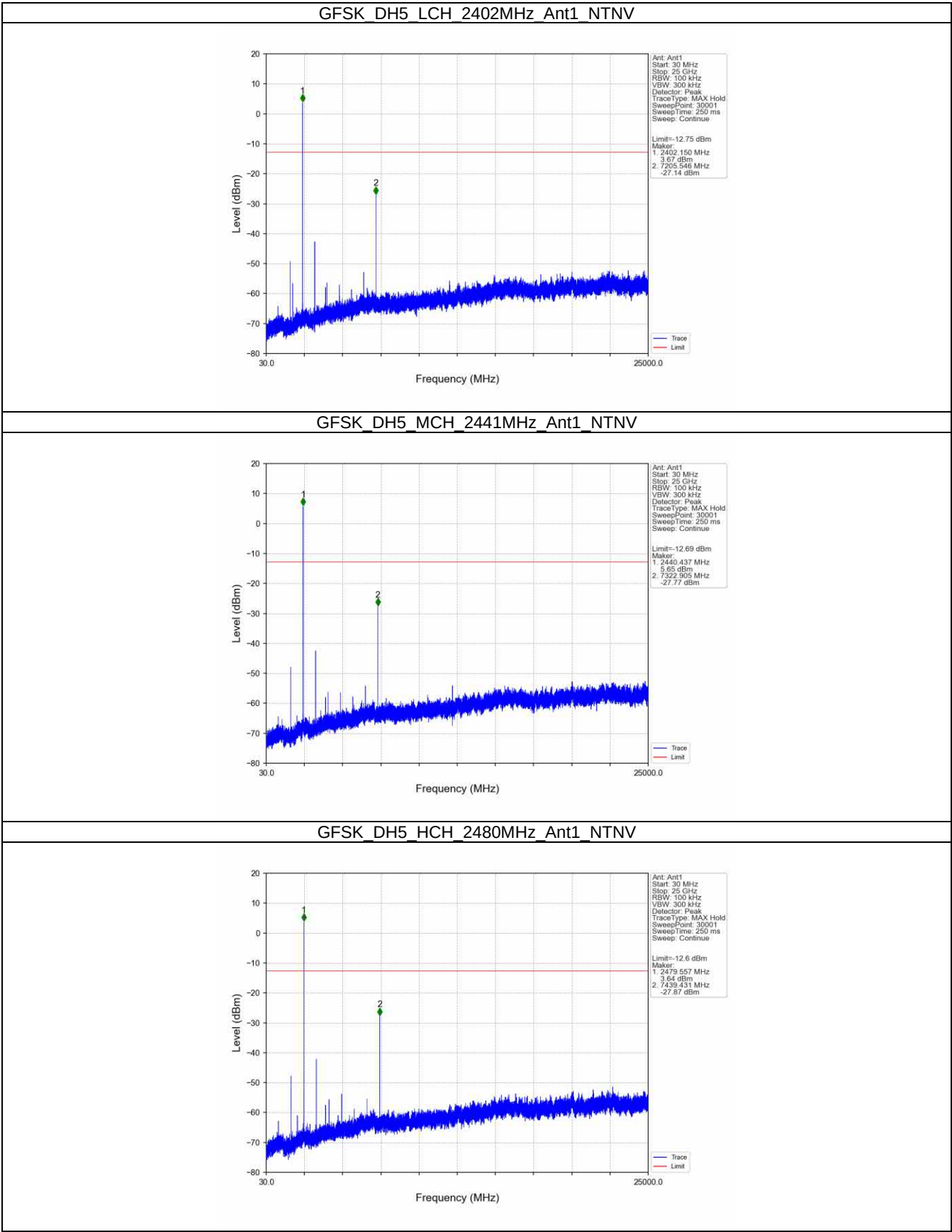
8DPSK 3DH5 MCH 2441MHz Ant1 NTN



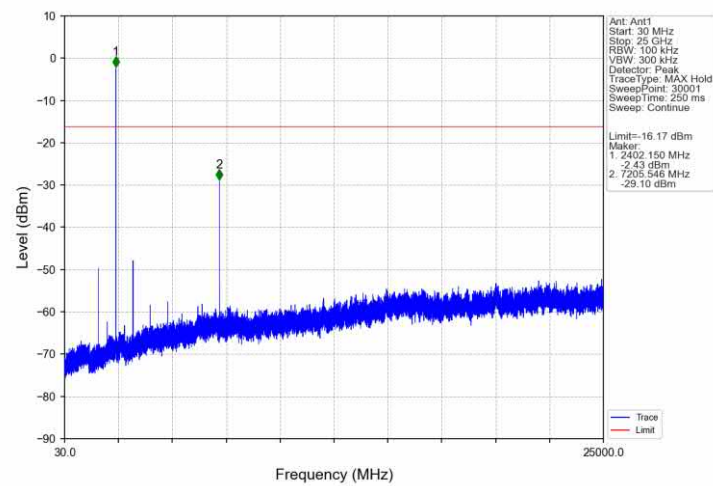
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



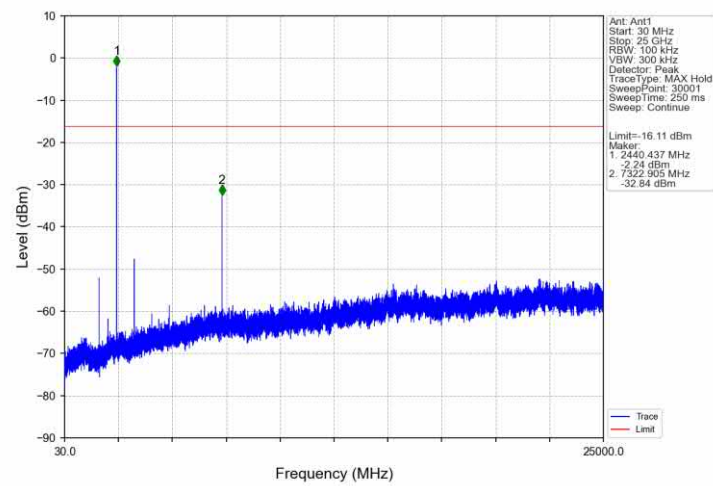
CSE :



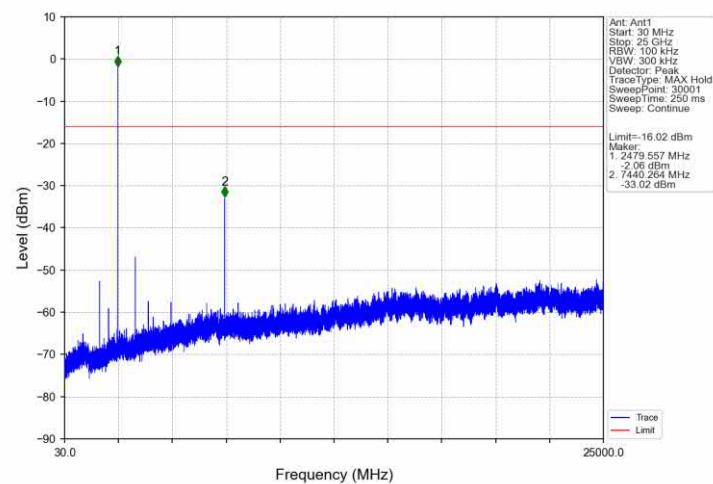
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



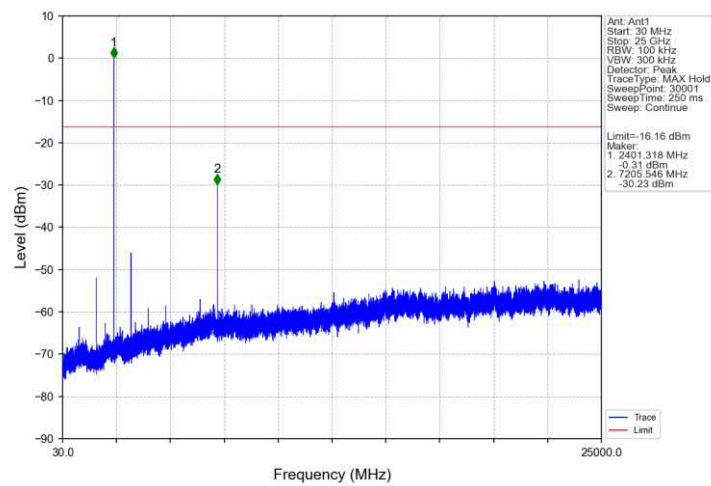
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



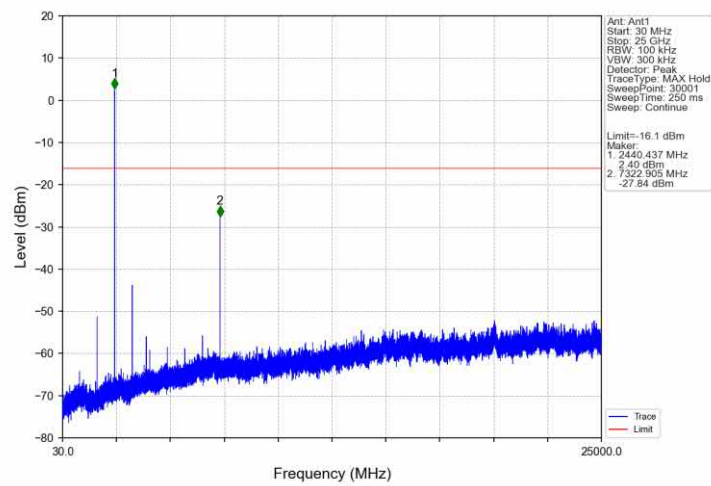
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



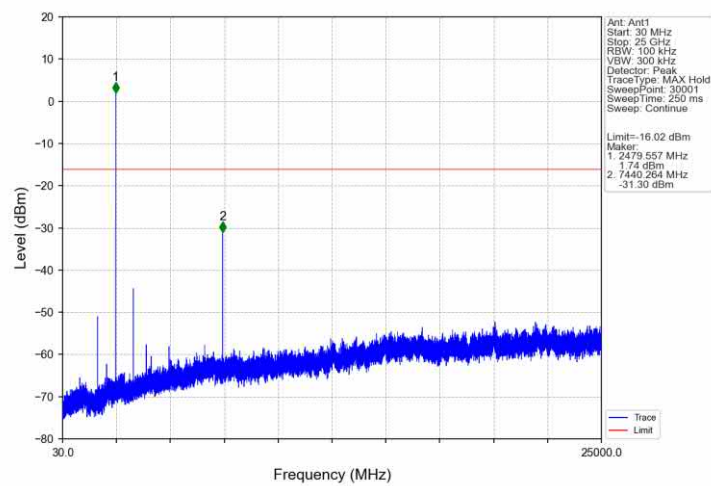
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



9.8 Band Edge Testing

Test Method

1. The RF output of EUT was connected to the test receiver 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. Set the EUT to the lowest frequency channel.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector, Trace: Max hold, Sweep time: Coupled, 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. Allow the trace to stabilize.
4. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.
5. Set the EUT to the highest frequency channel and repeat step 2) to 4)
6. Enable the EUT hopping mode, repeat the test.

Limit:

According to §15.247(d), Band Edge limit as below:

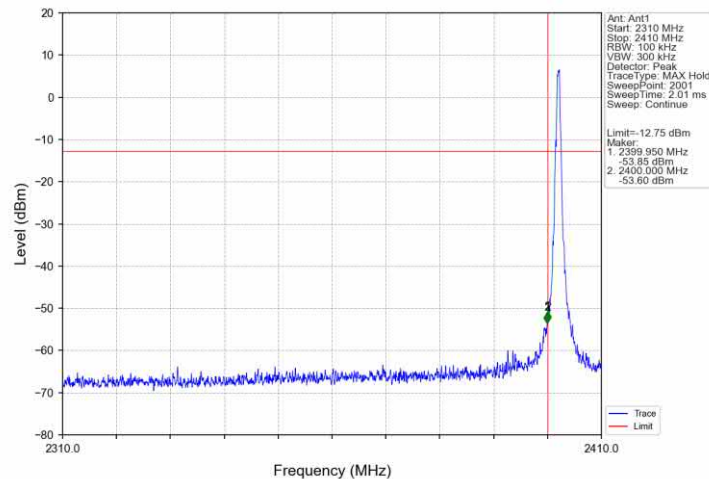
In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

Band Edge

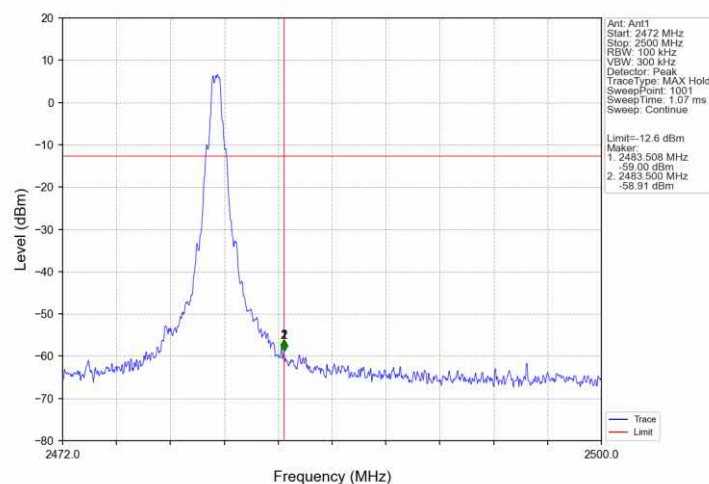
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	7.25	-12.75	Pass
		2441	DH5	1	7.31	-12.69	Pass
		2480	DH5	1	7.40	-12.60	Pass
		HOPP	DH5	1	7.34	-12.66	Pass
		HOPP	DH5	1	7.34	-12.66	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	3.83	-16.17	Pass
		2441	2DH5	1	3.89	-16.11	Pass
		2480	2DH5	1	3.98	-16.02	Pass
		HOPP	2DH5	1	4.07	-15.93	Pass
		HOPP	2DH5	1	4.07	-15.93	Pass
8DPSK	SISO	2402	3DH5	1	3.84	-16.16	Pass
		2441	3DH5	1	3.90	-16.10	Pass
		2480	3DH5	1	3.98	-16.02	Pass
		HOPP	3DH5	1	4.02	-15.98	Pass
		HOPP	3DH5	1	4.02	-15.98	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.

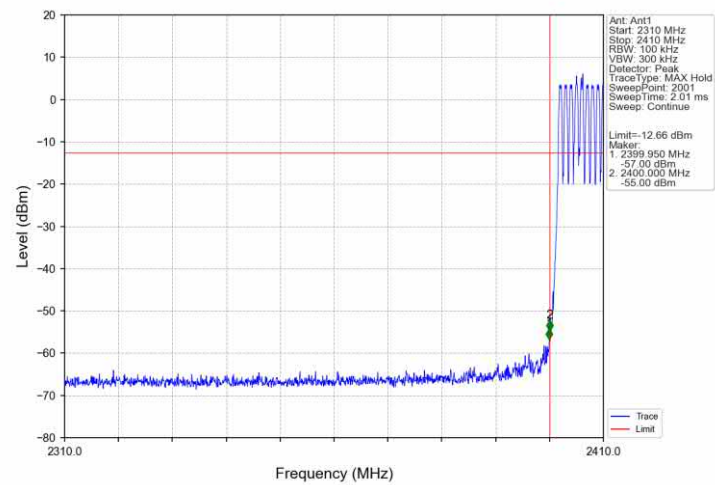
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



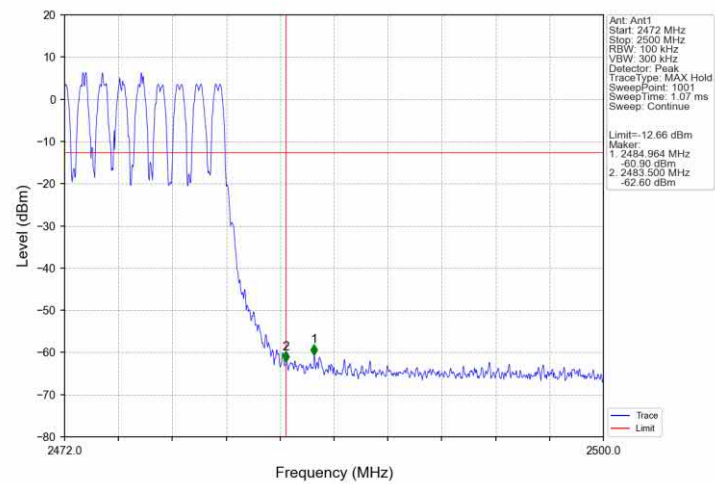
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



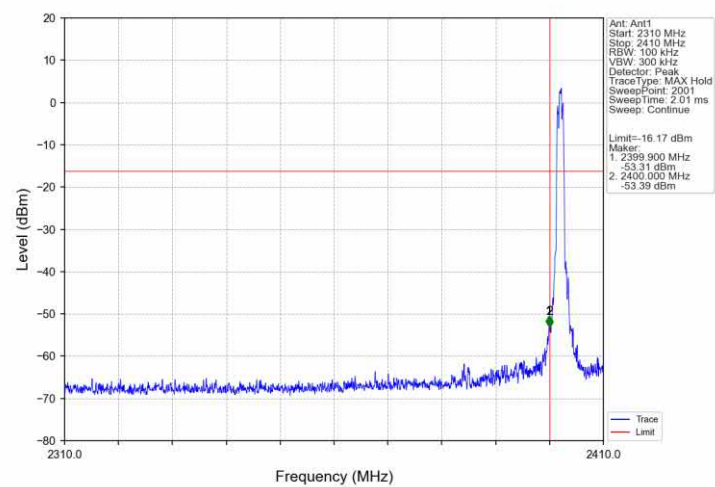
GFSK_DH5_HOPP_Ant1_NTNV



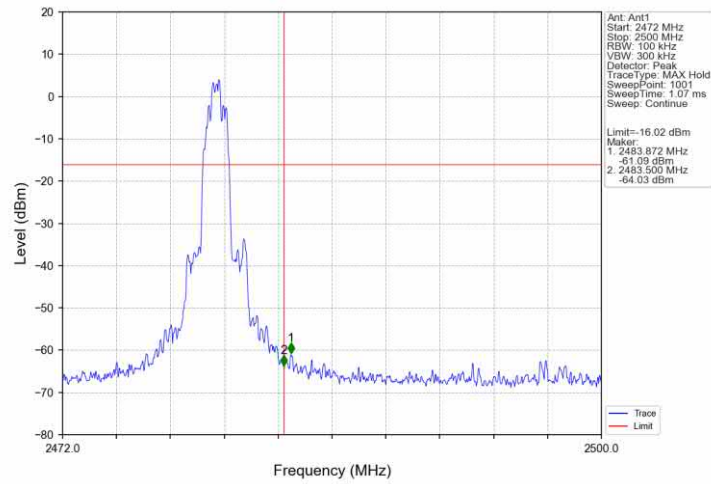
GFSK_DH5_HOPP_Ant1_NTNV



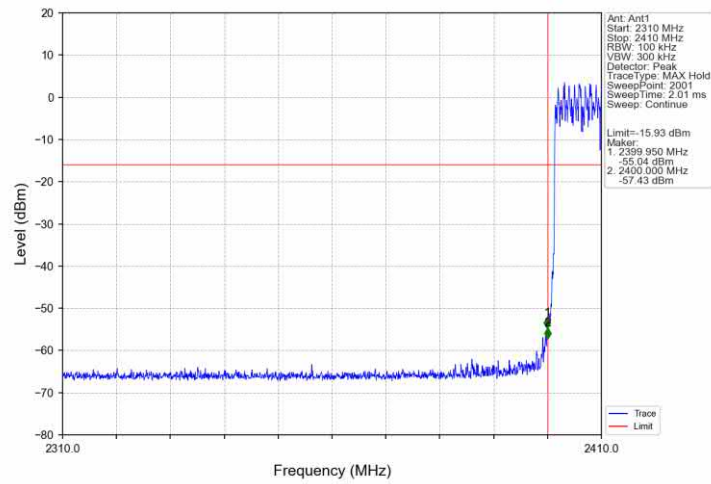
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



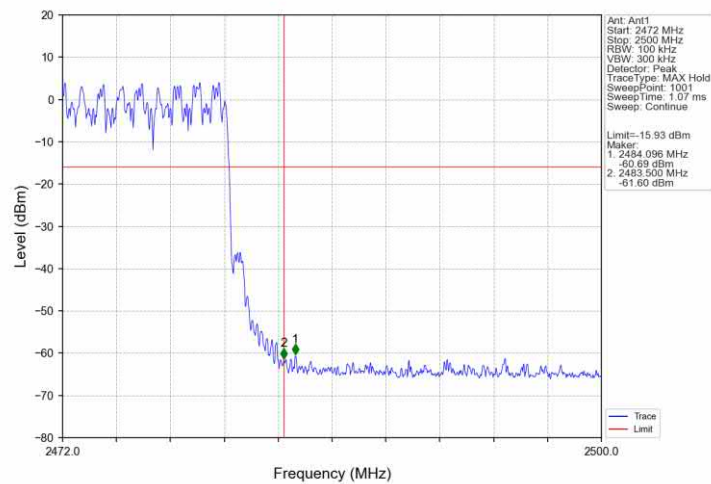
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



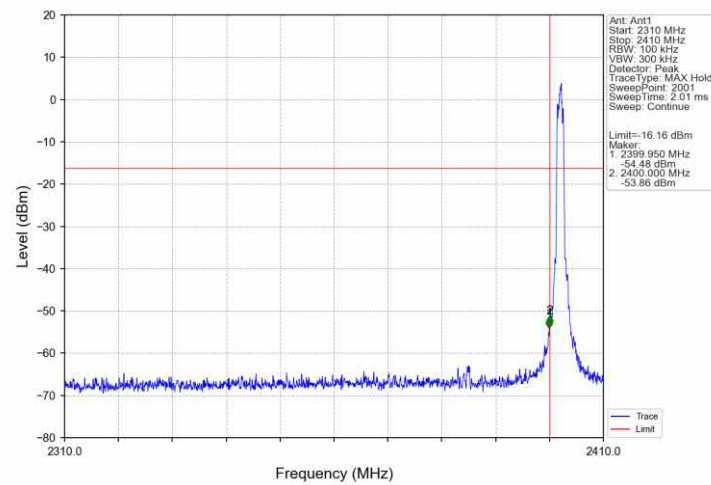
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



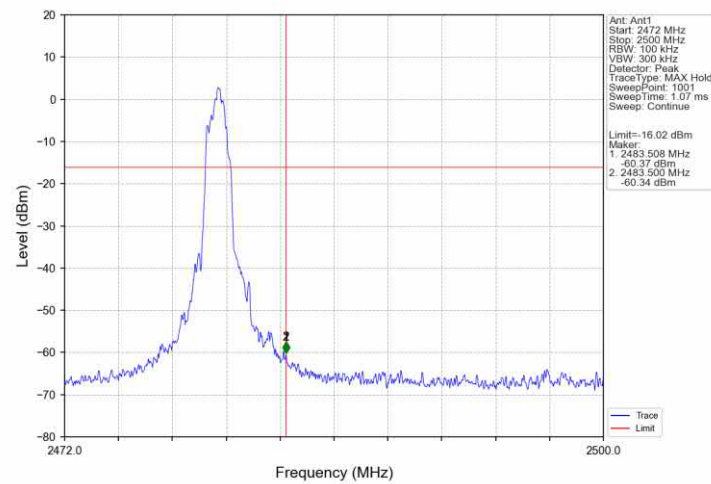
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



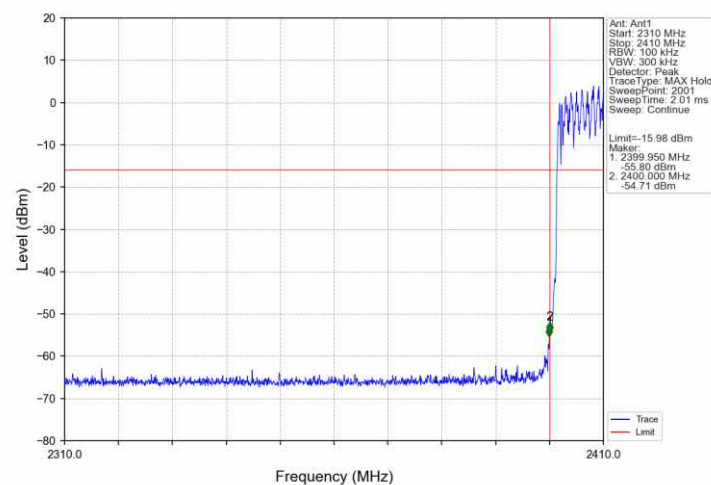
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



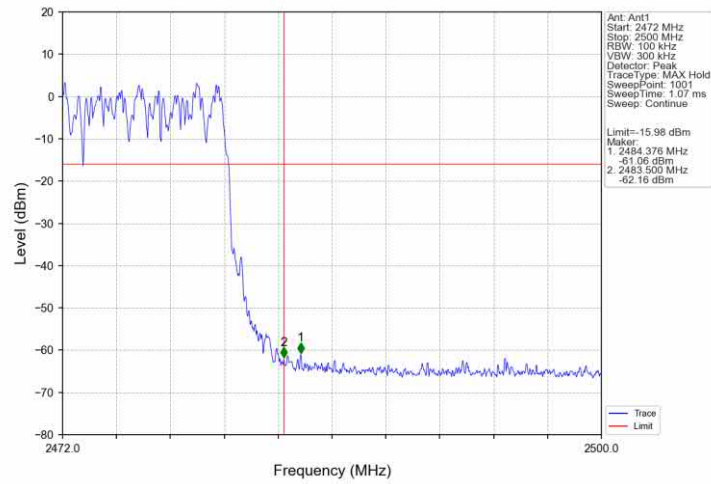
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



9.9 Spurious Radiated Emissions for Transmitter

Test Method

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
4. The height of 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.
5. 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.
6. Use the following test receiver settings According to C63.10:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz to 120KHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = QP; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle $< 98\%$) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($20\log(1/\text{duty cycle})$).

The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle $> 98\%$) for Average detection (AV) at frequency above 1GHz.

7. Repeat above procedures until all frequencies measured were complete.

Spurious Radiated Emissions for Transmitter

Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength $\mu\text{V/m}$	Field Strength $\text{dB}\mu\text{V/m}$	Detector	Measurement distance meters
0.009-0.490	2400/F(kHz)	48.5-13.8	AV	300
0.490-1.705	24000/F(kHz)	33.8-23.0	QP	30
1.705-30	30	29.5	QP	30
30-88	100	40	QP	3
88-216	150	43.5	QP	3
216-960	200	46	QP	3
960-1000	500	54	QP	3
Above 1000	500	54	AV	3
Above 1000	5000	74	PK	3

Note 1: $\text{Limit } 3\text{m}(\text{dB}\mu\text{V/m}) = \text{Limit } 300\text{m}(\text{dB}\mu\text{V/m}) + 40\text{Log}(300\text{m}/3\text{m})$ (Below 30MHz)

Note 2: $\text{Limit } 3\text{m}(\text{dB}\mu\text{V/m}) = \text{Limit } 30\text{m}(\text{dB}\mu\text{V/m}) + 40\text{Log}(30\text{m}/3\text{m})$ (Below 30MHz)

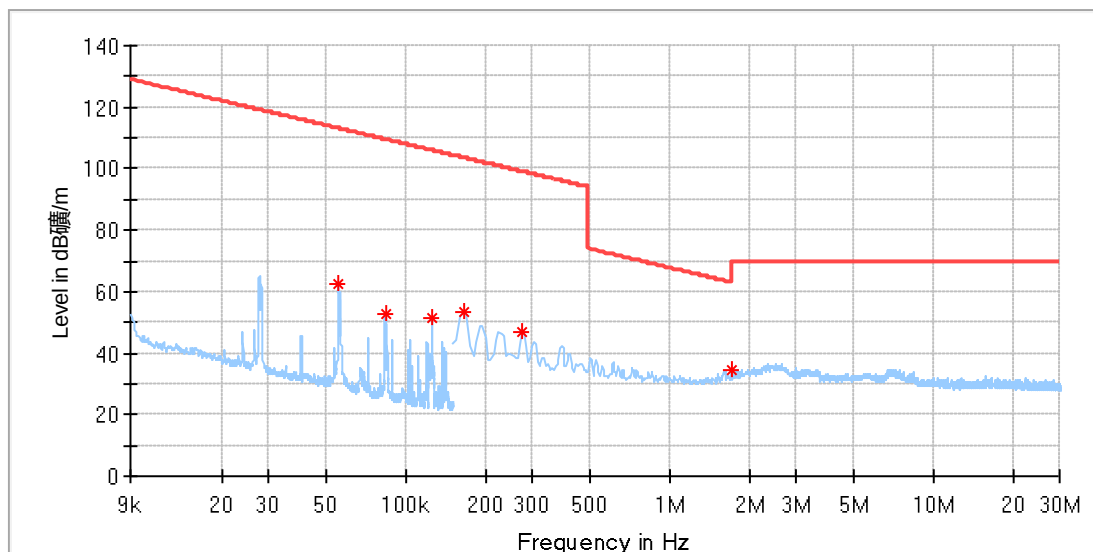
Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

All test modes at test frequencies from 9KHz to 1GHz were evaluated in the report, but only the only poor case test results were listed.

Transmitting spurious emission test result as below:

Test data_9KHz to 30MHz---DH5-2402MHz

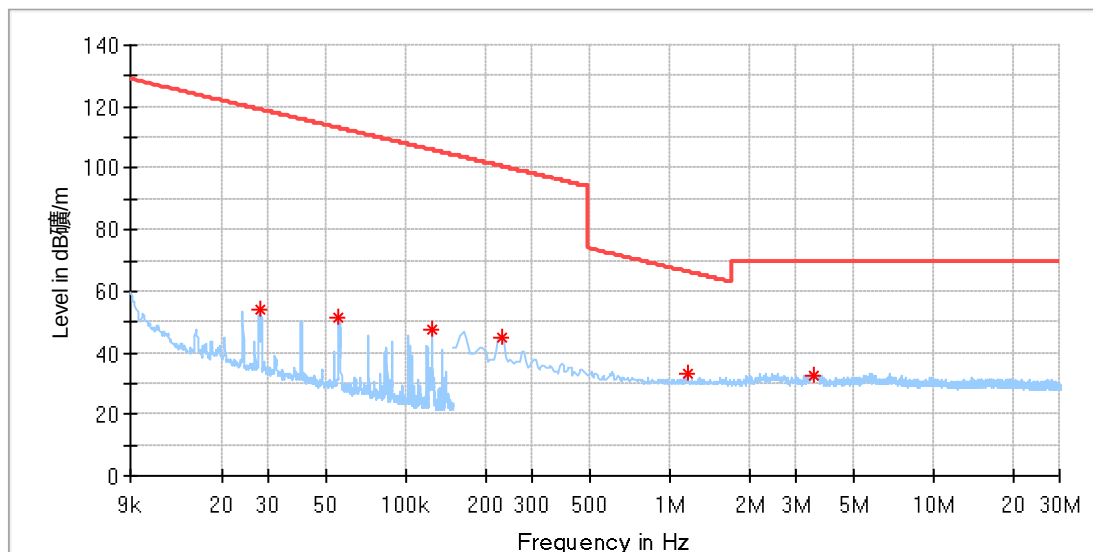


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.055483	62.68	113.07	50.39	H	209.0	19.92
0.083448	52.64	109.50	56.86	H	145.0	19.92
0.124620	51.43	105.99	54.56	H	292.0	19.92
0.164925	53.65	103.54	49.89	H	277.0	19.89
0.274375	46.84	99.08	52.24	H	208.0	19.90
1.702200	34.19	63.01	28.83	H	1.0	20.02

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
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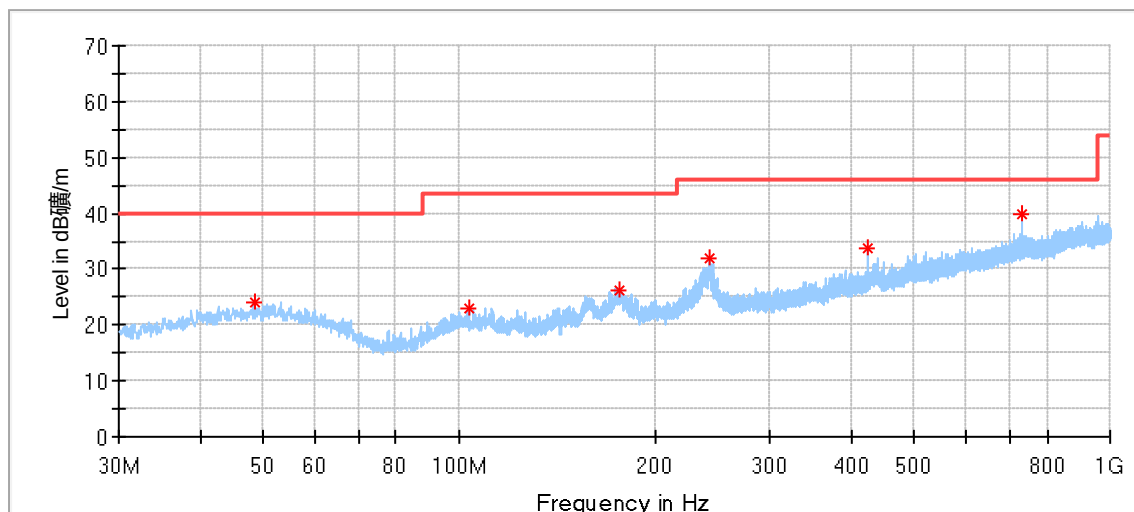
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.027753	54.06	119.14	65.08	V	286.0	19.88
0.055577	51.26	113.06	61.80	V	278.0	19.92
0.124620	47.53	105.99	58.46	V	0.0	19.92
0.229600	44.73	100.64	55.90	V	266.0	19.88
1.164900	33.00	66.36	33.36	V	109.0	19.94
3.498175	32.84	70.00	37.16	V	232.0	20.13

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
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Test data_30MHz to 1000MHz---DH5-2402MHz

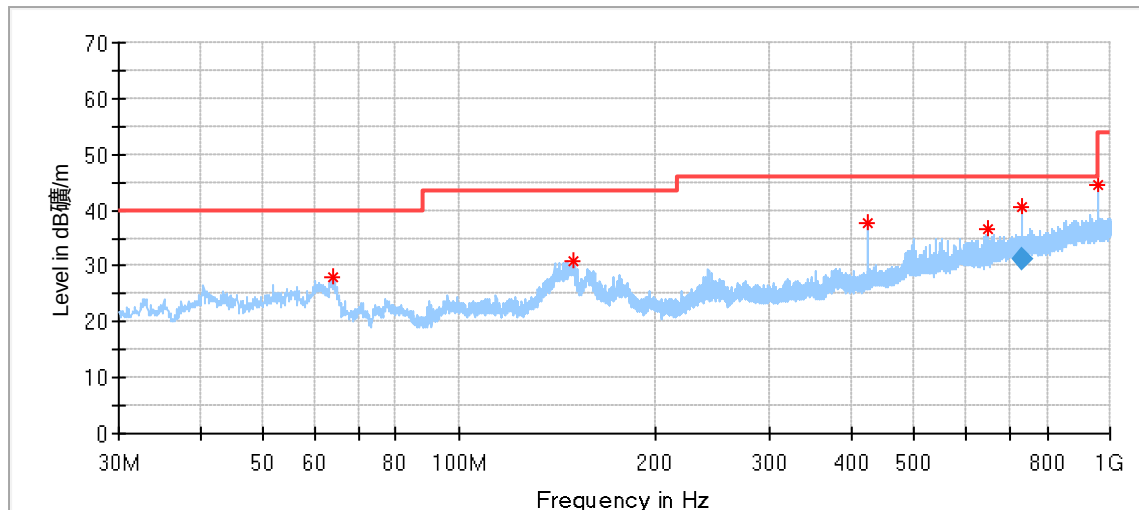


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
48.430000	23.91	40.00	16.09	200.0	H	0.0	18.17
103.342778	22.94	43.50	20.56	200.0	H	174.0	15.93
175.769444	26.37	43.50	17.13	200.0	H	75.0	13.77
242.591667	31.89	46.00	14.11	200.0	H	227.0	17.28
424.520556	33.72	46.00	12.28	200.0	H	0.0	21.67
733.519444	39.82	46.00	6.18	200.0	H	99.0	27.08

Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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Critical_Freqs

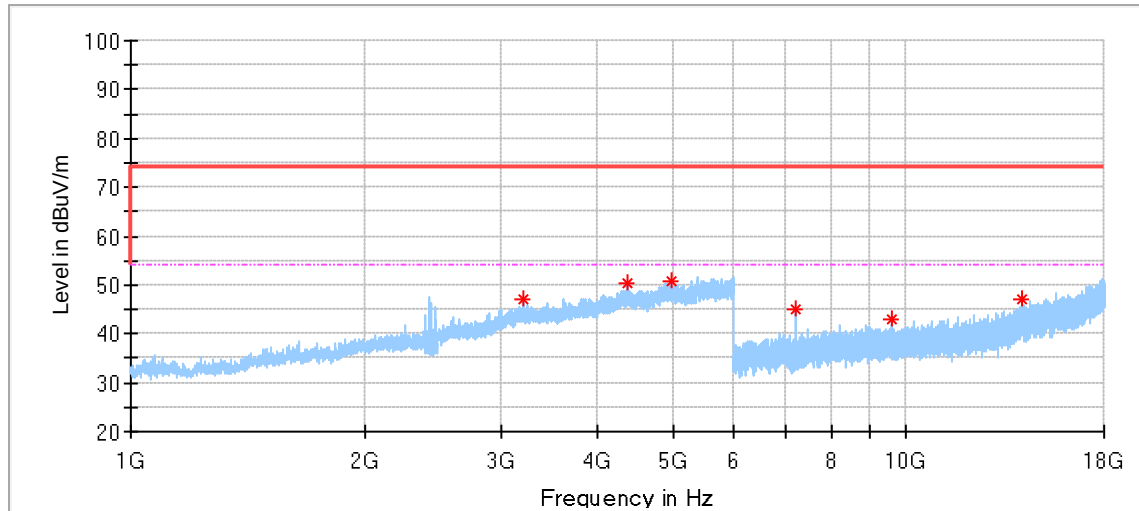
Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
64.057778	27.82	40.00	12.18	100.0	V	60.0	15.73
150.280000	31.00	43.50	12.50	100.0	V	228.0	12.68
424.520556	37.53	46.00	8.47	100.0	V	351.0	21.67
651.231111	36.48	46.00	9.52	100.0	V	175.0	25.26
733.519444	40.51	46.00	5.49	100.0	V	20.0	27.08
960.068333	44.47	54.00	9.53	100.0	V	259.0	29.58

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
733.519444	31.29	46.00	14.71	100.0	V	20.0	27.08

Test data 1GHz to 18GHz:

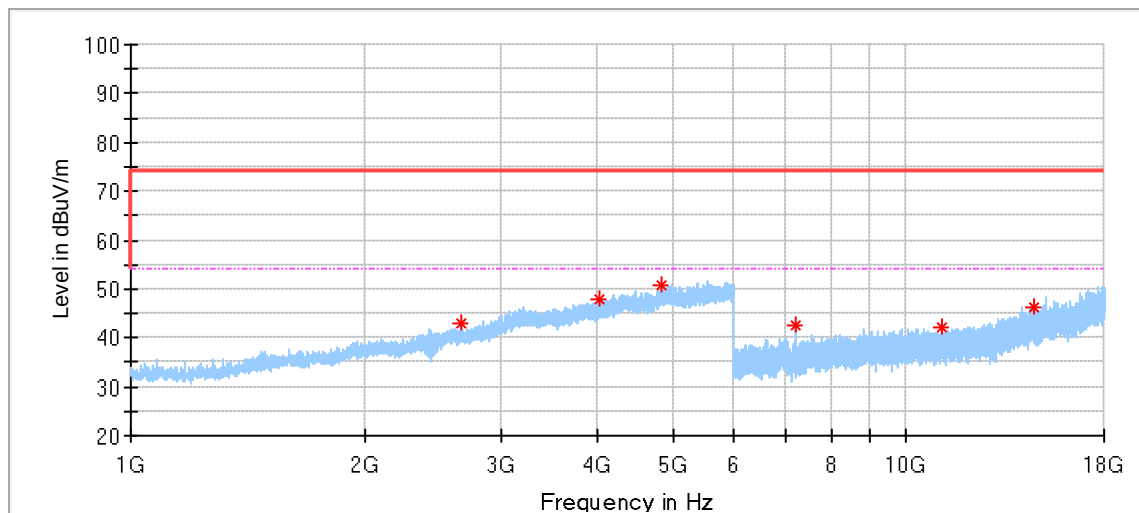
DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3203.000000	47.14	74.00	26.86	150.0	H	347.0	0.01
4362.000000	50.23	74.00	23.77	150.0	H	286.0	3.94
4971.000000	50.66	74.00	23.34	150.0	H	163.0	5.85
7206.000000	45.01	74.00	28.99	150.0	H	332.0	9.12
9564.500000	42.90	74.00	31.10	150.0	H	132.0	12.82
14075.500000	46.91	74.00	27.09	150.0	H	306.0	18.04

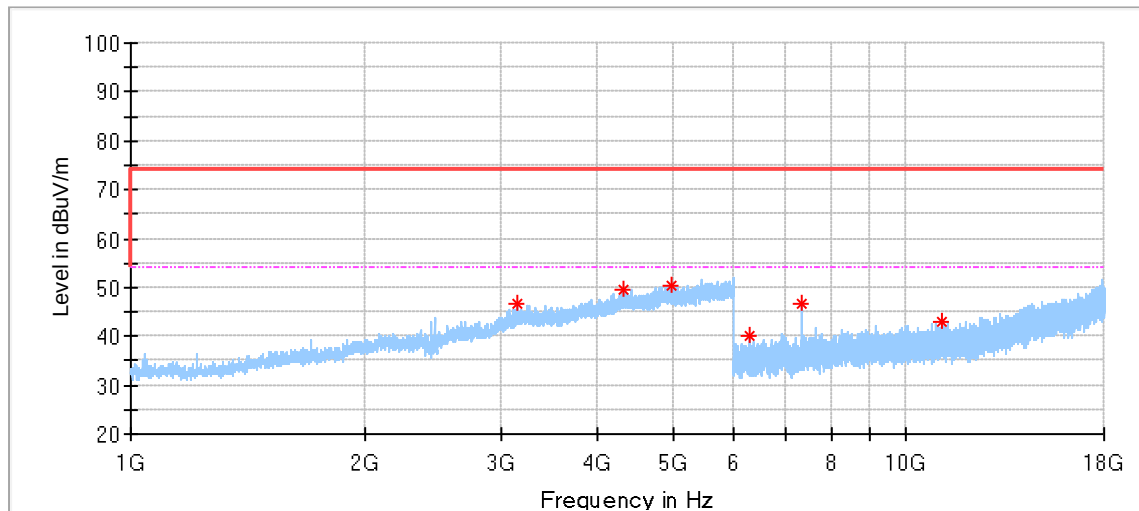
DH5_2402MHz - Vertical:



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2666.000000	43.16	74.00	30.84	150.0	V	167.0	-3.59
4021.000000	48.05	74.00	25.95	150.0	V	3.0	2.15
4837.500000	50.66	74.00	23.34	150.0	V	250.0	5.40
7205.500000	42.37	74.00	31.63	150.0	V	181.0	9.12
11117.500000	42.12	74.00	31.88	150.0	V	329.0	14.04
14660.000000	46.42	74.00	27.58	150.0	V	31.0	18.85

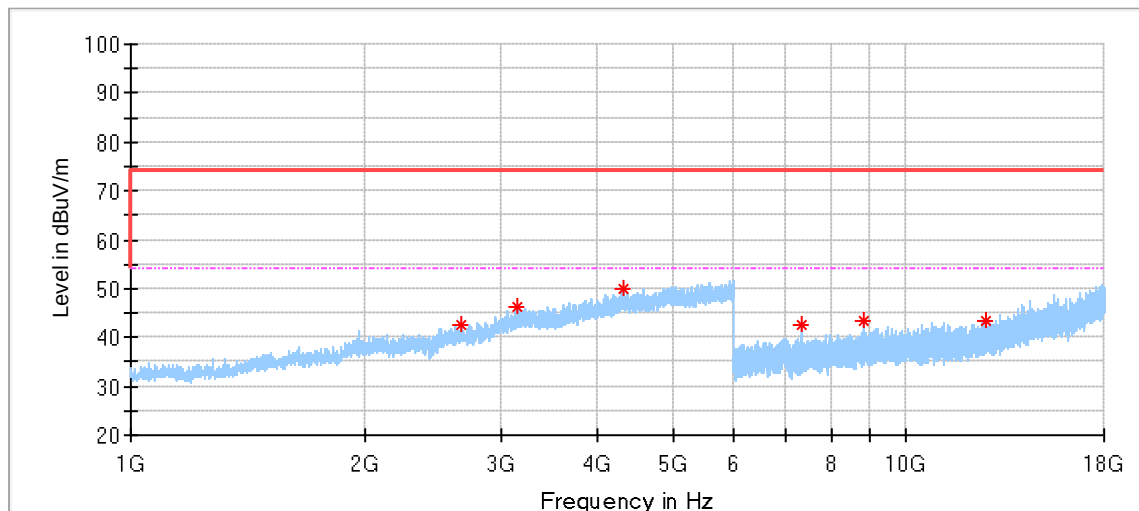
DH5_2441MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3158.500000	46.47	74.00	27.53	150.0	H	213.0	-0.25
4328.000000	49.68	74.00	24.32	150.0	H	237.0	4.10
4968.500000	50.52	74.00	23.48	150.0	H	225.0	5.86
6284.000000	40.25	74.00	33.75	150.0	H	31.0	8.04
7323.000000	46.69	74.00	27.31	150.0	H	321.0	9.53
11104.000000	42.89	74.00	31.11	150.0	H	262.0	14.03

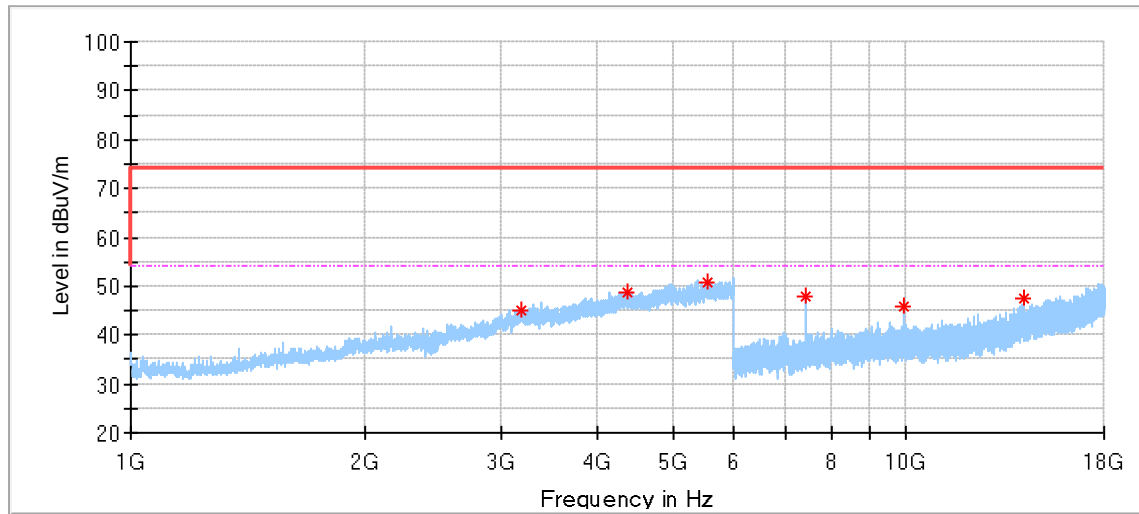
DH5_2441MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2665.000000	42.40	74.00	31.60	150.0	V	163.0	-3.60
3155.000000	46.46	74.00	27.54	150.0	V	0.0	-0.28
4330.500000	49.76	74.00	24.24	150.0	V	261.0	4.09
7323.000000	42.42	74.00	31.58	150.0	V	206.0	9.53
8792.500000	43.28	74.00	30.72	150.0	V	108.0	12.19
12702.000000	43.53	74.00	30.47	150.0	V	108.0	15.04

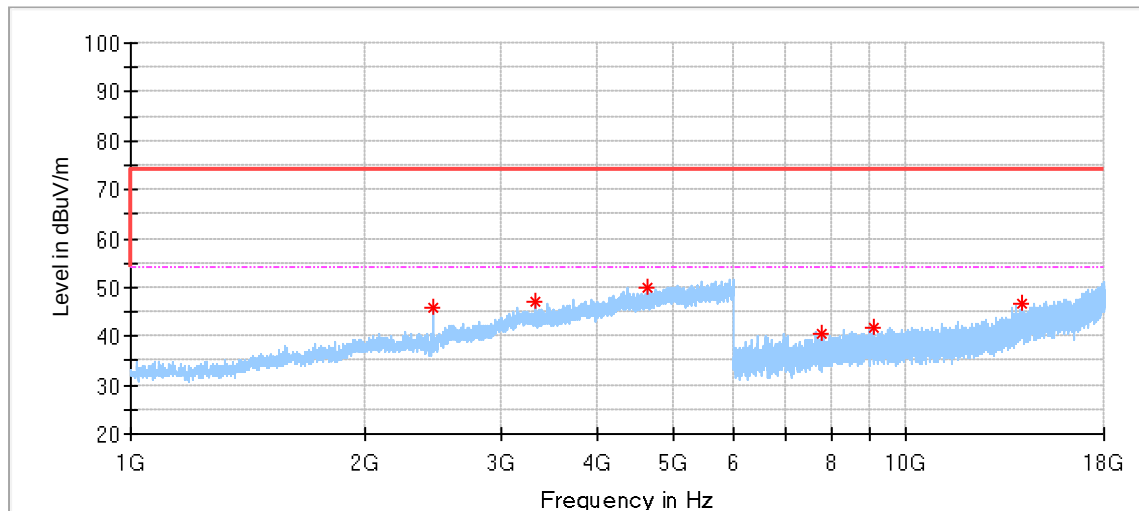
DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3183.500000	45.22	74.00	28.78	150.0	H	168.0	-0.09
4360.000000	48.60	74.00	25.40	150.0	H	13.0	3.94
5531.500000	50.90	74.00	23.10	150.0	H	0.0	7.04
7440.000000	47.87	74.00	26.14	150.0	H	282.0	9.66
9920.000000	45.90	74.00	28.10	150.0	H	134.0	13.04
14157.000000	47.59	74.00	26.41	150.0	H	208.0	17.94

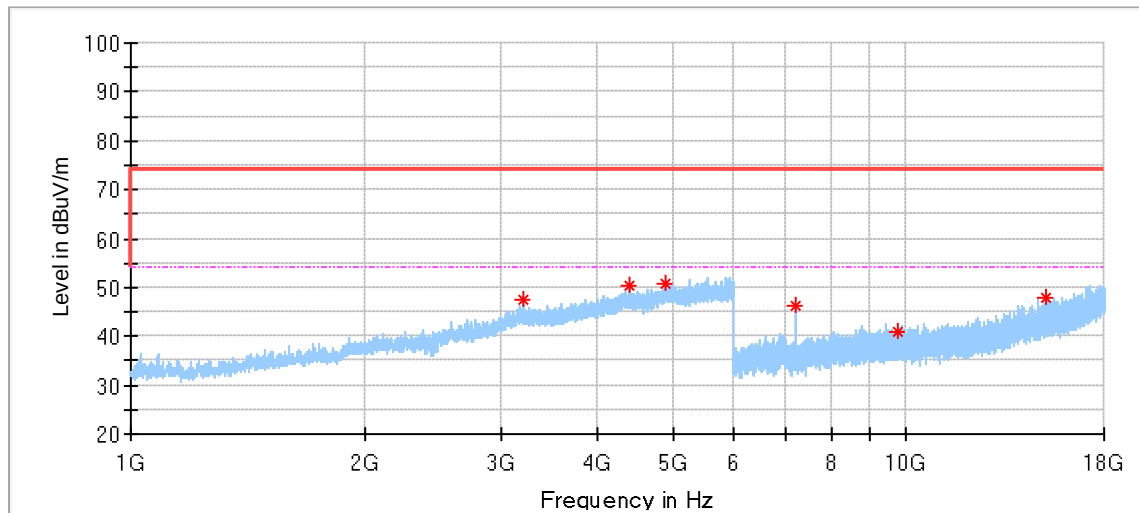
DH5_2480MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2455.000000	45.65	74.00	28.35	150.0	V	0.0	-4.56
3320.000000	47.15	74.00	26.85	150.0	V	0.0	-0.01
4627.500000	49.98	74.00	24.02	150.0	V	326.0	4.10
7780.000000	40.62	74.00	33.38	150.0	V	152.0	10.32
9094.000000	41.72	74.00	32.28	150.0	V	249.0	12.31
14145.500000	46.63	74.00	27.37	150.0	V	301.0	17.97

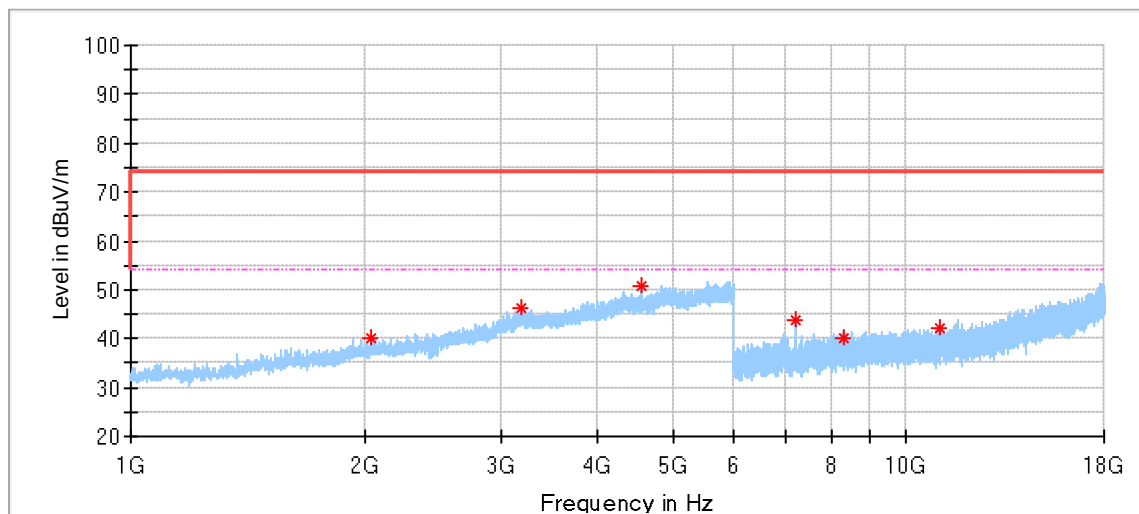
3DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3202.500000	47.48	74.00	26.52	150.0	H	13.0	0.01
4401.500000	50.38	74.00	23.62	150.0	H	253.0	3.89
4884.000000	50.89	74.00	23.11	150.0	H	253.0	5.71
7206.000000	46.13	74.00	27.87	150.0	H	329.0	9.12
9728.500000	40.84	74.00	33.16	150.0	H	108.0	12.73
15179.000000	47.72	74.00	26.28	150.0	H	133.0	19.80

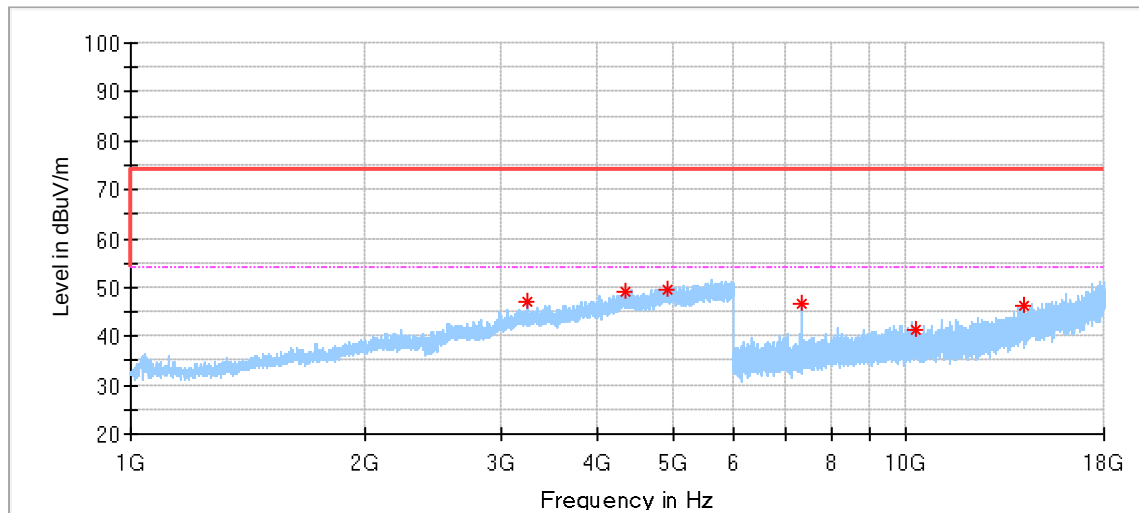
3DH5_2402MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2039.500000	39.98	74.00	34.02	150.0	V	92.0	-5.89
3185.500000	46.18	74.00	27.82	150.0	V	169.0	-0.07
4553.500000	50.60	74.00	23.40	150.0	V	8.0	4.04
7205.500000	43.77	74.00	30.23	150.0	V	206.0	9.12
8316.000000	39.91	74.00	34.09	150.0	V	108.0	11.22
11081.000000	42.18	74.00	31.82	150.0	V	32.0	13.94

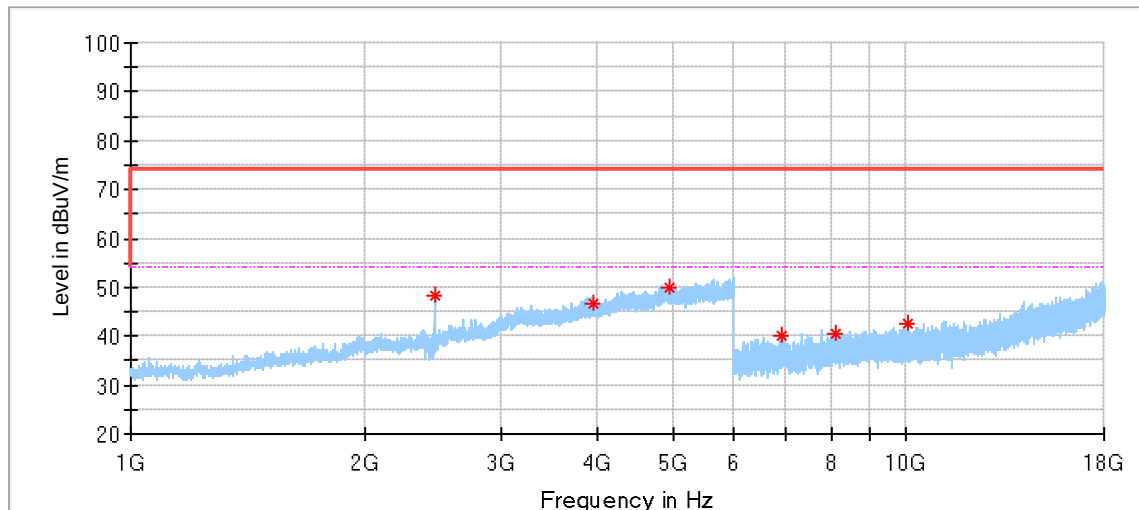
3DH5_2441MHz - Horizontal:



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3255.000000	47.08	74.00	26.92	150.0	H	0.0	-0.22
4356.500000	49.20	74.00	24.80	150.0	H	131.0	3.97
4916.000000	49.64	74.00	24.36	150.0	H	95.0	5.82
7323.000000	46.82	74.00	27.18	150.0	H	351.0	9.53
10297.000000	41.46	74.00	32.54	150.0	H	31.0	13.11
14151.000000	46.46	74.00	27.54	150.0	H	82.0	17.96

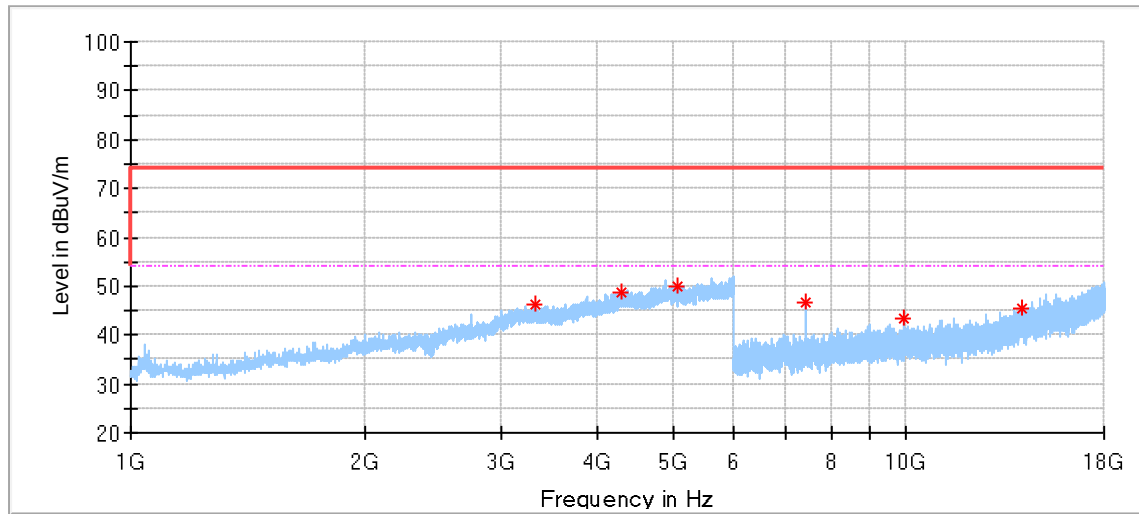
3DH5_2441MHz - Vertical:



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2463.500000	48.13	74.00	25.87	150.0	V	136.0	-4.56
3960.000000	46.86	74.00	27.14	150.0	V	1.0	2.05
4964.000000	50.13	74.00	23.87	150.0	V	87.0	5.88
6892.000000	39.96	74.00	34.04	150.0	V	56.0	9.04
8133.500000	40.36	74.00	33.64	150.0	V	155.0	11.14
10031.500000	42.45	74.00	31.55	150.0	V	352.0	12.98

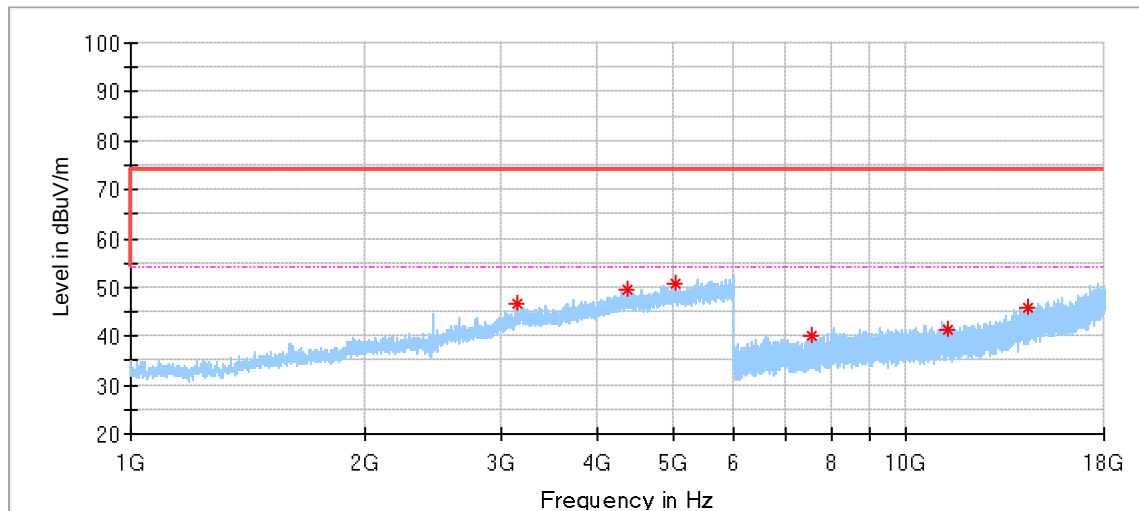
3DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3324.500000	46.15	74.00	27.85	150.0	H	160.0	0.01
4294.000000	48.65	74.00	25.35	150.0	H	280.0	3.92
5081.500000	49.97	74.00	24.03	150.0	H	268.0	5.82
7440.000000	46.50	74.00	27.50	150.0	H	329.0	9.66
9920.000000	43.51	74.00	30.49	150.0	H	152.0	13.04
14069.500000	45.42	74.00	28.58	150.0	H	54.0	18.03

3DH5_2480MHz - Vertical:

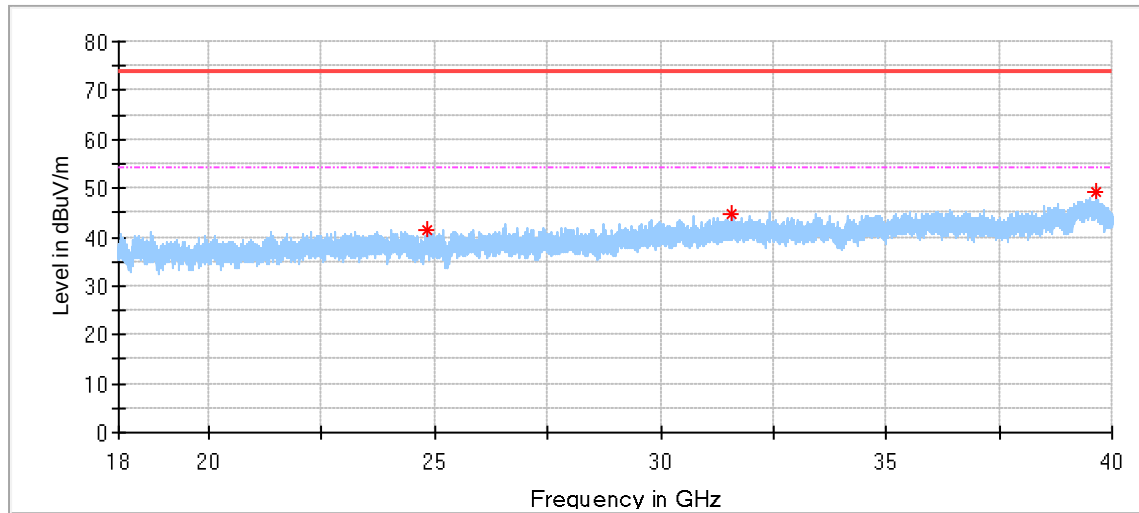


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3151.000000	46.47	74.00	27.53	150.0	V	267.0	-0.30
4366.500000	49.66	74.00	24.34	150.0	V	243.0	3.93
5043.000000	50.69	74.00	23.31	150.0	V	219.0	5.68
7570.000000	40.16	74.00	33.84	150.0	V	54.0	10.05
11329.500000	41.50	74.00	32.50	150.0	V	7.0	14.34
14316.500000	45.71	74.00	28.29	150.0	V	249.0	17.82

Test data 18GHz to 40GHz:

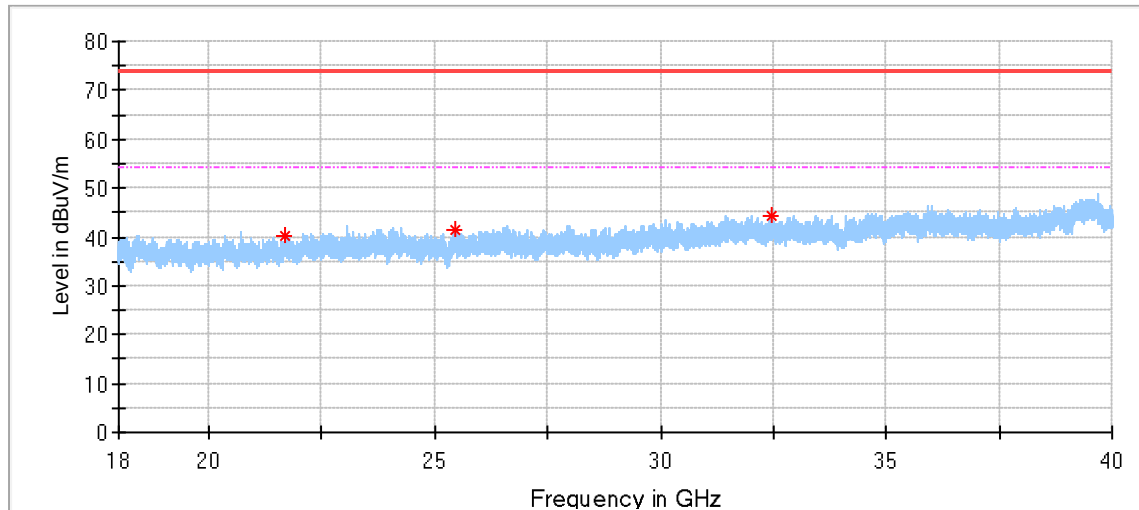
DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
24824.812500	41.56	74.00	32.44	150.0	H	45.0	-0.28
31556.812500	44.68	74.00	29.32	150.0	H	30.0	1.49
39627.375000	49.21	74.00	24.79	150.0	H	100.0	5.63

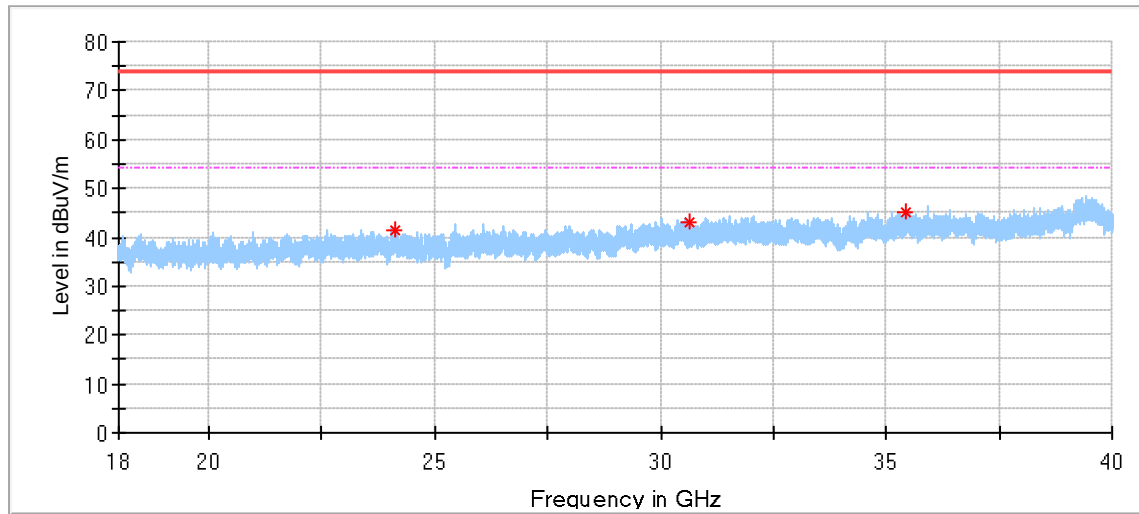
DH5_2402MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
21693.937500	40.12	74.00	33.88	150.0	V	0.0	-1.76	---
25462.812500	41.51	74.00	32.49	150.0	V	0.0	0.46	---
32471.875000	44.37	74.00	29.63	150.0	V	195.0	0.87	---

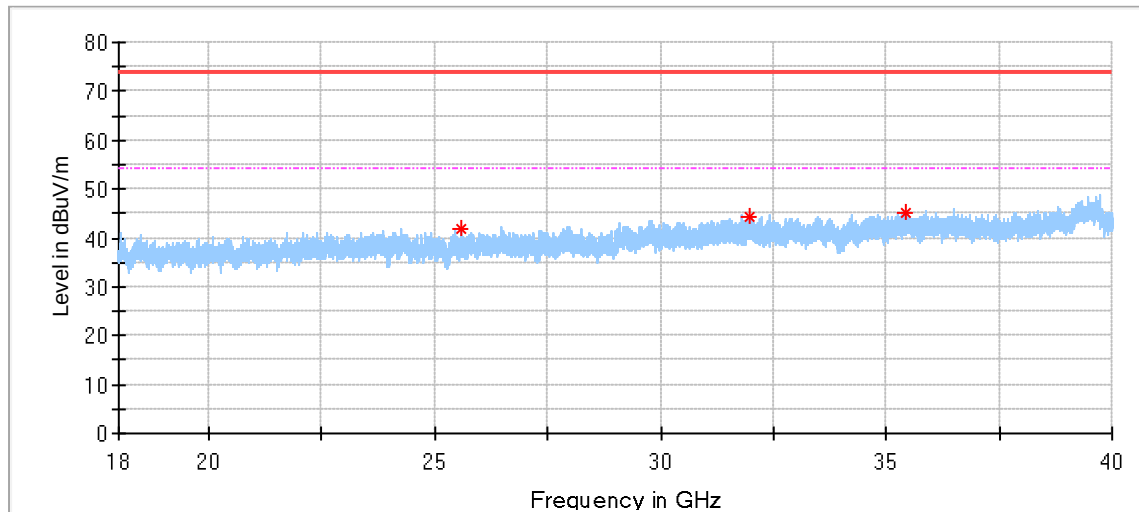
DH5_2441MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
24125.625000	41.46	74.00	32.54	150.0	H	46.0	-0.18	---
30658.250000	43.08	74.00	30.92	150.0	H	5.0	0.83	---
35446.687500	45.14	74.00	28.86	150.0	H	246.0	2.92	---

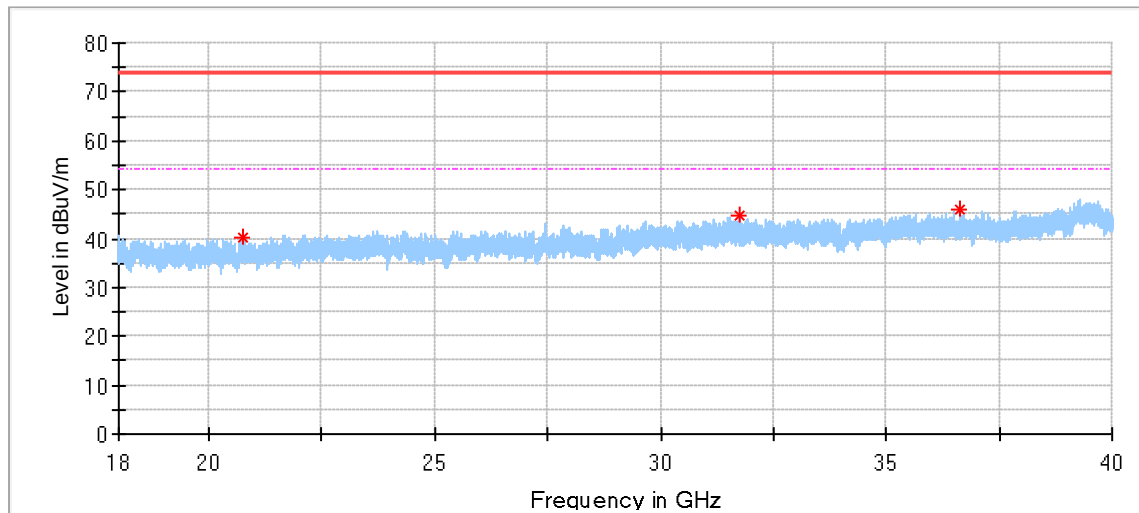
DH5_2441MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
25598.250000	41.93	74.00	32.07	150.0	V	0.0	0.66	---
31988.562500	44.25	74.00	29.75	150.0	V	222.0	1.69	---
35414.375000	45.29	74.00	28.71	150.0	V	19.0	2.79	---

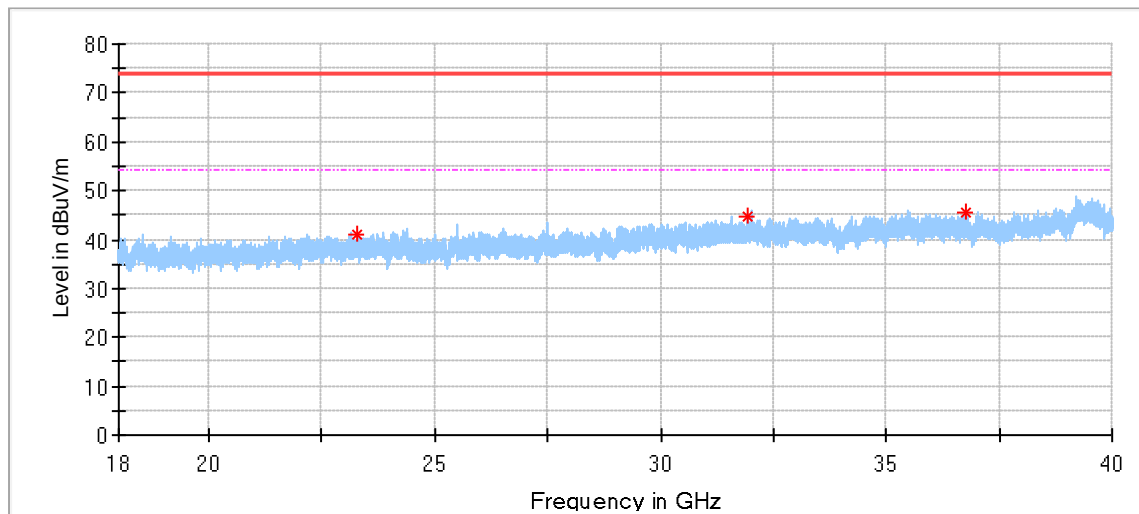
DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
20740.375000	40.33	74.00	33.67	150.0	H	19.0	-2.73	---
31760.312500	44.88	74.00	29.12	150.0	H	155.0	1.39	---
36637.437500	46.08	74.00	27.92	150.0	H	0.0	2.31	---

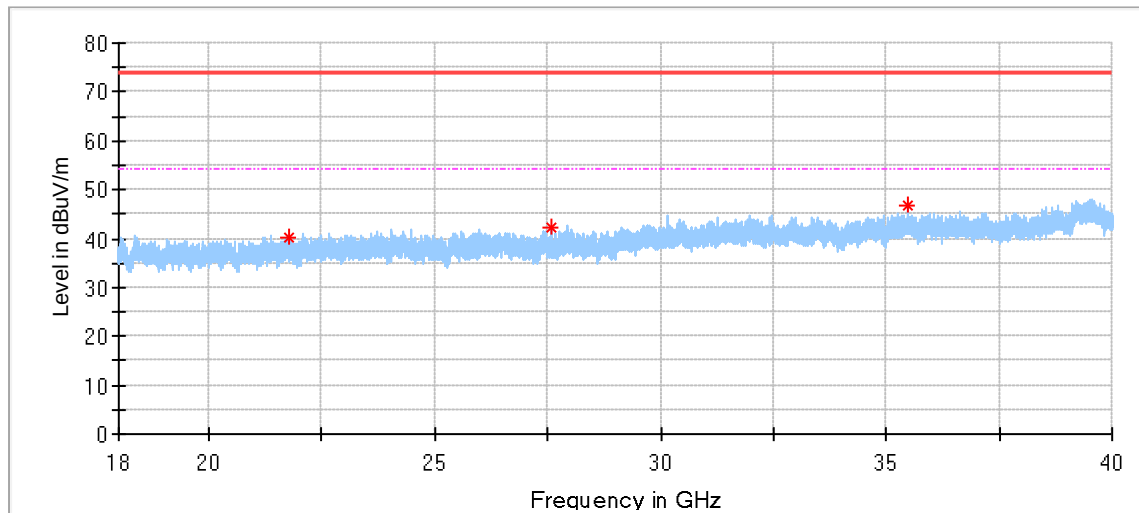
DH5_2480MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
23282.062500	40.86	74.00	33.14	150.0	V	248.0	-0.53	---
31919.812500	44.87	74.00	29.13	150.0	V	98.0	1.60	---
36770.125000	45.35	74.00	28.65	150.0	V	30.0	2.42	---

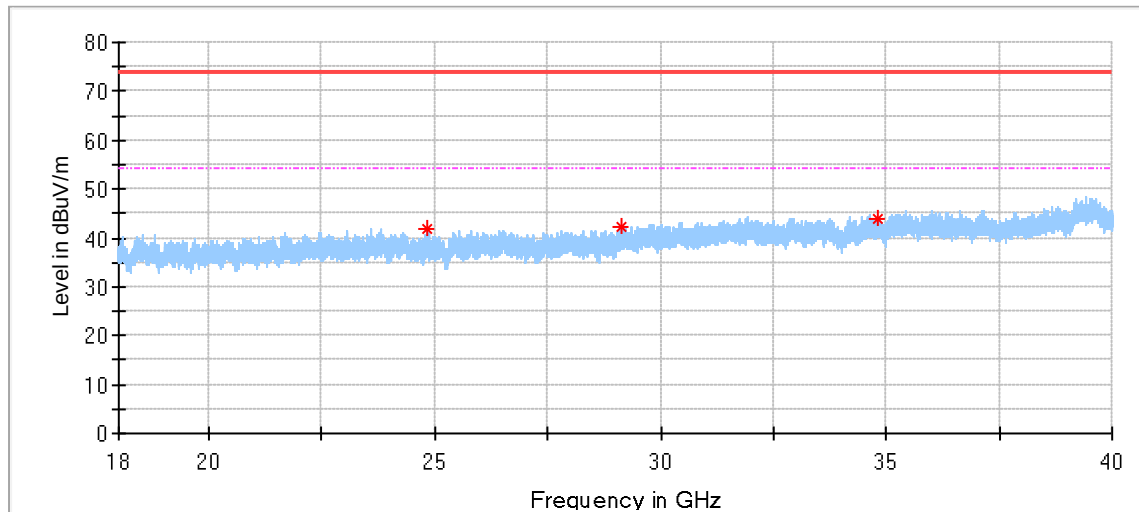
3DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
21750.312500	40.40	74.00	33.60	150.0	H	263.0	-1.71	---
27592.687500	42.08	74.00	31.92	150.0	H	0.0	0.95	---
35483.812500	46.83	74.00	27.17	150.0	H	289.0	3.06	---

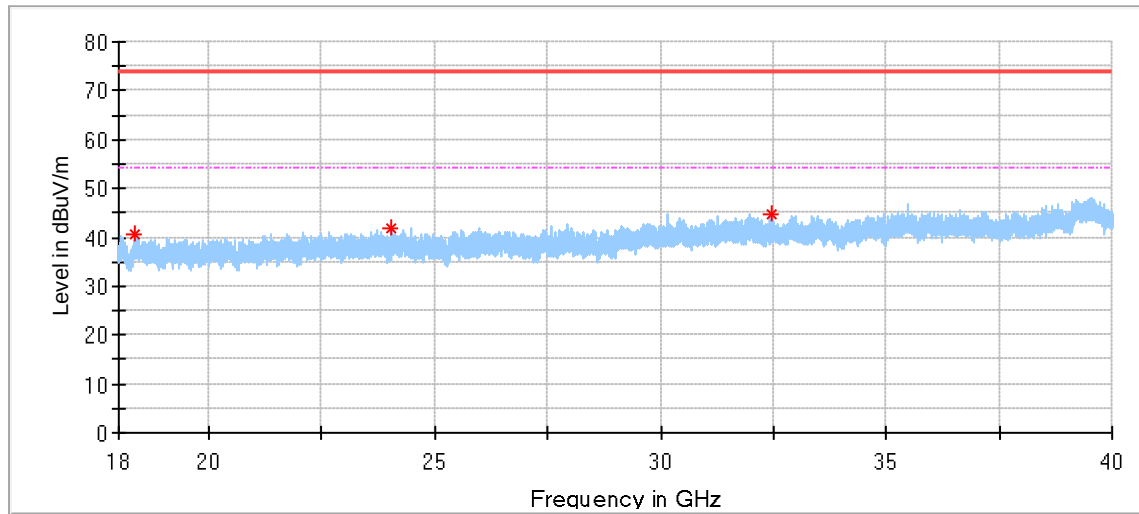
3DH5_2402MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
24815.187500	41.88	74.00	32.12	150.0	V	196.0	-0.28	---
29153.312500	42.34	74.00	31.66	150.0	V	289.0	0.53	---
34811.437500	44.08	74.00	29.92	150.0	V	18.0	1.79	---

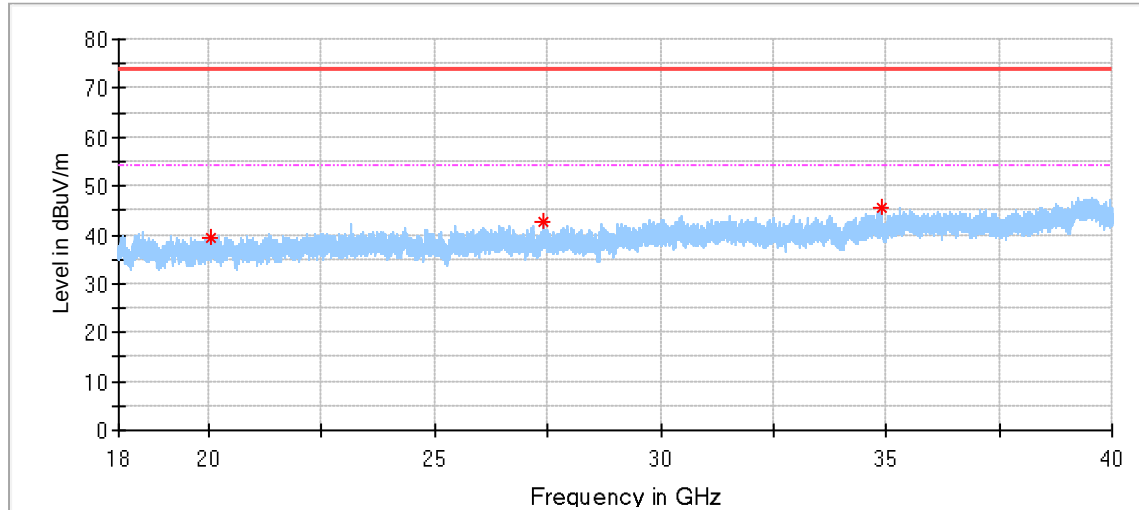
3DH5_2441MHz - Horizontal:



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
18373.312500	40.52	74.00	33.48	150.0	H	180.0	-4.53	---
24021.125000	41.72	74.00	32.28	150.0	H	73.0	-0.21	---
32441.625000	44.84	74.00	29.16	150.0	H	60.0	0.97	---

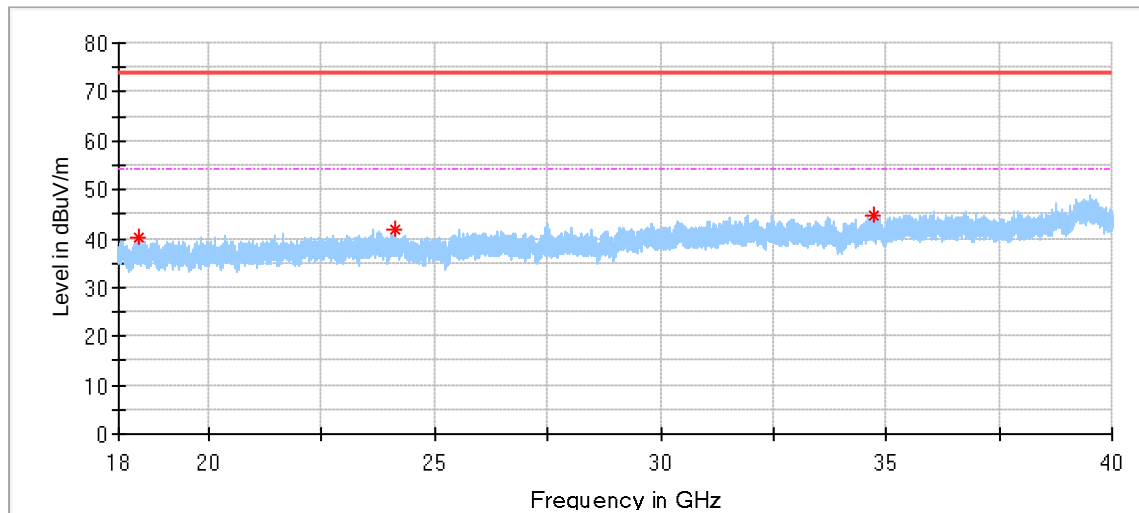
3DH5_2441MHz - Vertical:



Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
20057.000000	39.34	74.00	34.66	150.0	V	0.0	-3.71	---
27407.750000	42.83	74.00	31.17	150.0	V	17.0	0.88	---
34881.562500	45.73	74.00	28.27	150.0	V	154.0	1.97	---

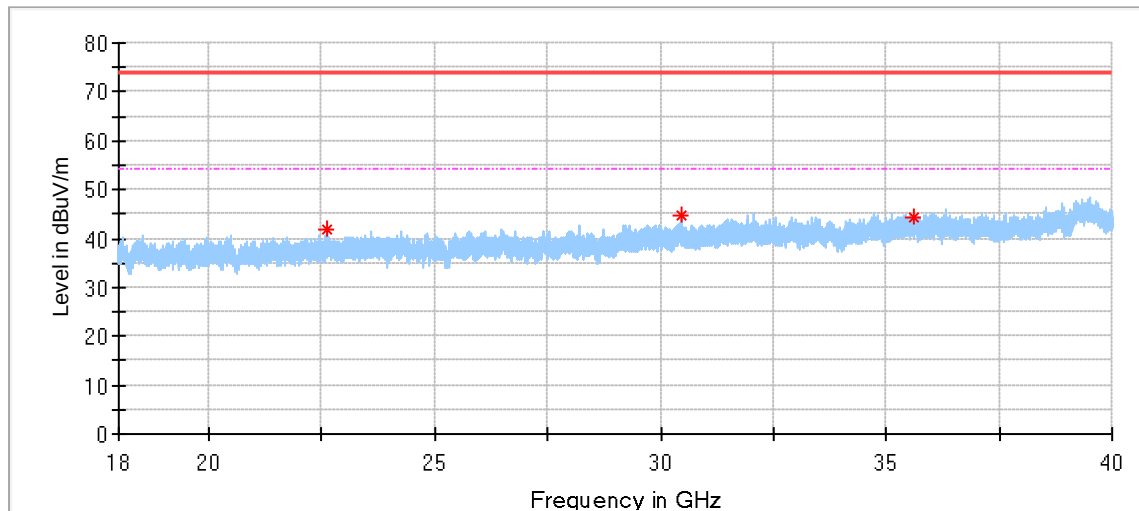
3DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
18422.812500	40.14	74.00	33.86	150.0	H	85.0	-4.48	---
24114.625000	41.99	74.00	32.01	150.0	H	58.0	-0.18	---
34719.312500	44.62	74.00	29.38	150.0	H	138.0	1.65	---

3DH5_2480MHz - Vertical:

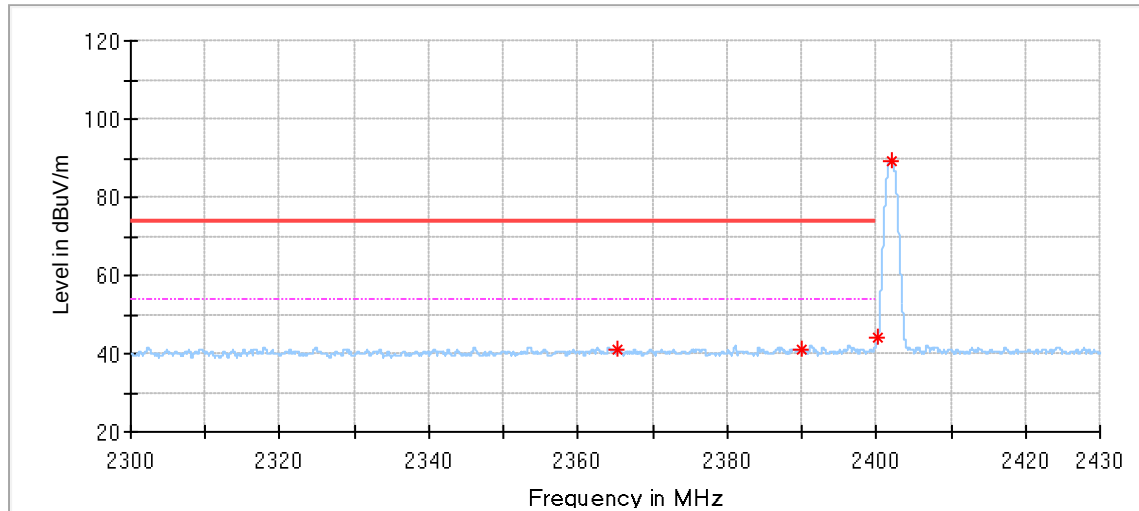


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
22624.125000	41.70	74.00	32.30	150.0	V	168.0	-0.80	---
30449.937500	44.61	74.00	29.39	150.0	V	248.0	0.98	---
35629.562500	44.18	74.00	29.82	150.0	V	345.0	2.69	---

Emissions at Restricted Band:

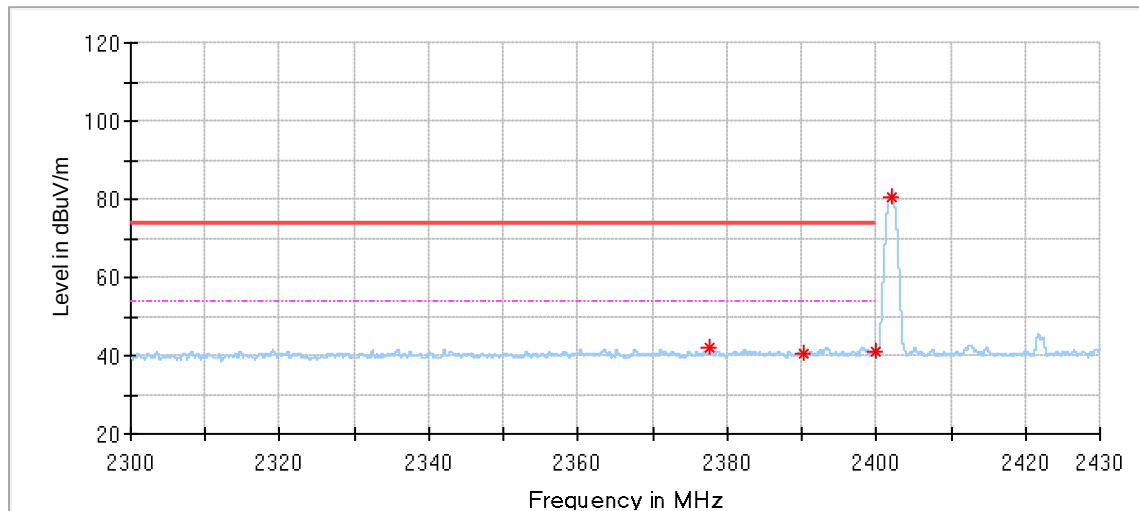
DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2365.247000	41.24	74.00	32.76	150.0	H	56.0	-5.78
2390.025000	41.27	74.00	32.73	150.0	H	46.0	-5.42
2400.217000	43.86	---	---	150.0	H	321.0	-5.26
2402.076000	89.27	---	---	150.0	H	321.0	-5.23

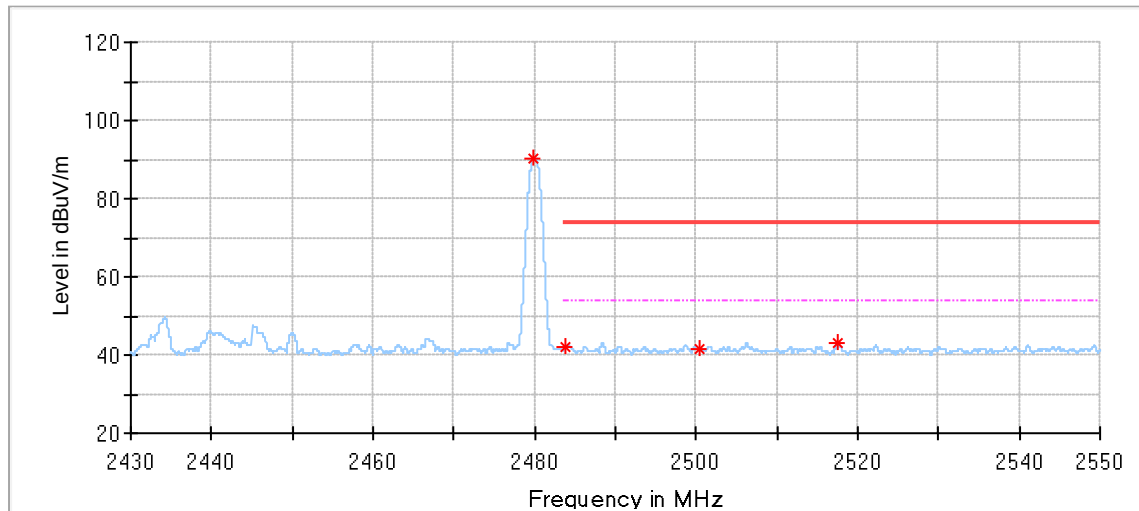
DH5_2402MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2377.714000	41.97	74.00	32.03	150.0	V	247.0	-5.62
2390.246000	40.68	74.00	33.32	150.0	V	204.0	-5.41

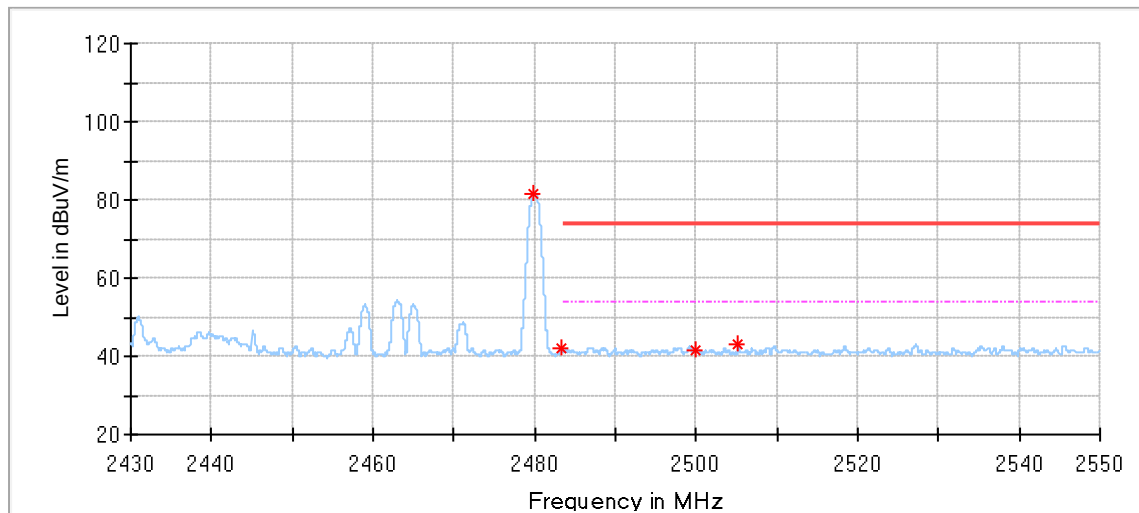
DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.868000	41.89	74.00	32.11	150.0	H	348.0	-4.91
2500.416000	41.55	74.00	32.45	150.0	H	80.0	-4.88
2517.456000	42.86	74.00	31.14	150.0	H	284.0	-4.83

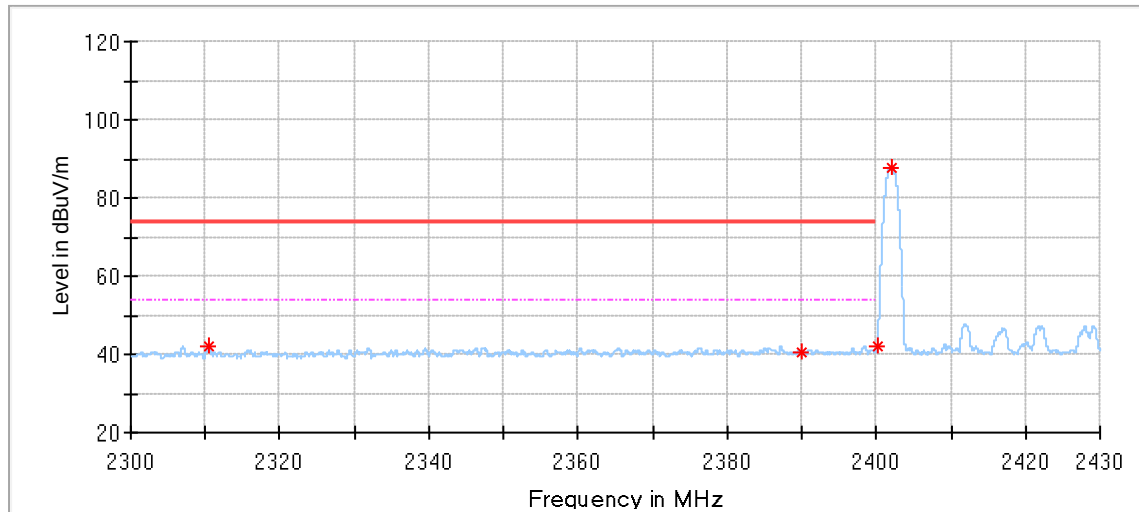
DH5_2480MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.304000	41.95	---	---	150.0	V	227.0	-4.91
2499.960000	41.42	74.00	32.58	150.0	V	227.0	-4.88
2505.036000	43.01	74.00	30.99	150.0	V	312.0	-4.87

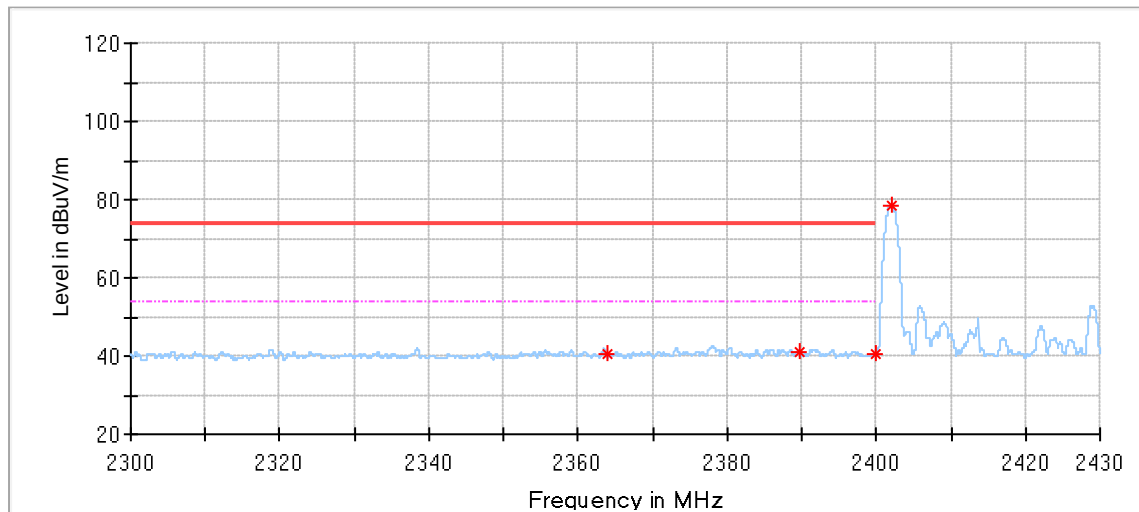
3DH5_2402MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2310.465000	42.20	74.00	31.80	150.0	H	151.0	-5.69
2389.999000	40.69	74.00	33.31	150.0	H	257.0	-5.42

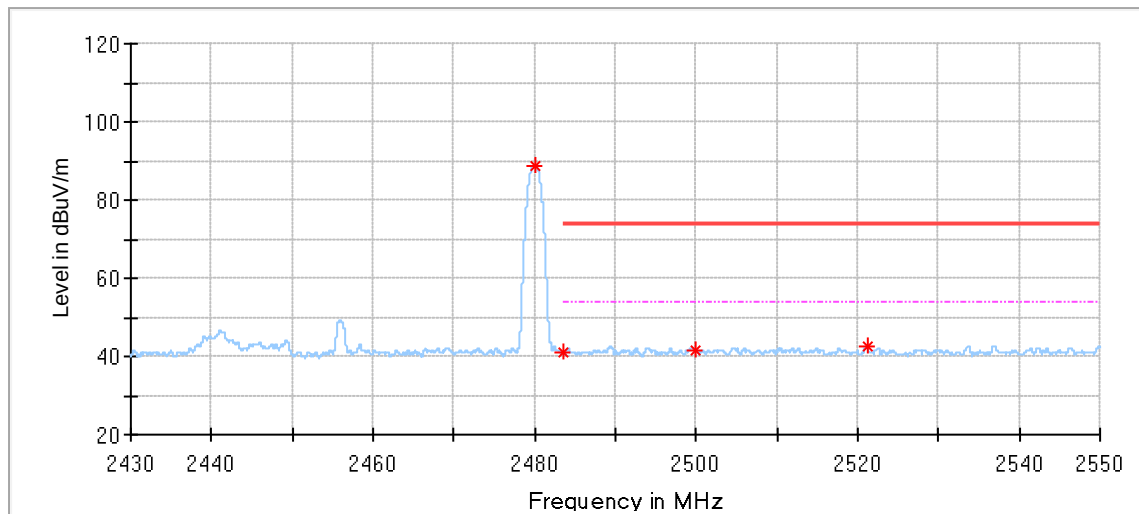
3DH5_2402MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2364.051000	40.63	74.00	33.37	150.0	V	271.0	-5.79
2389.791000	41.10	74.00	32.90	150.0	V	292.0	-5.42

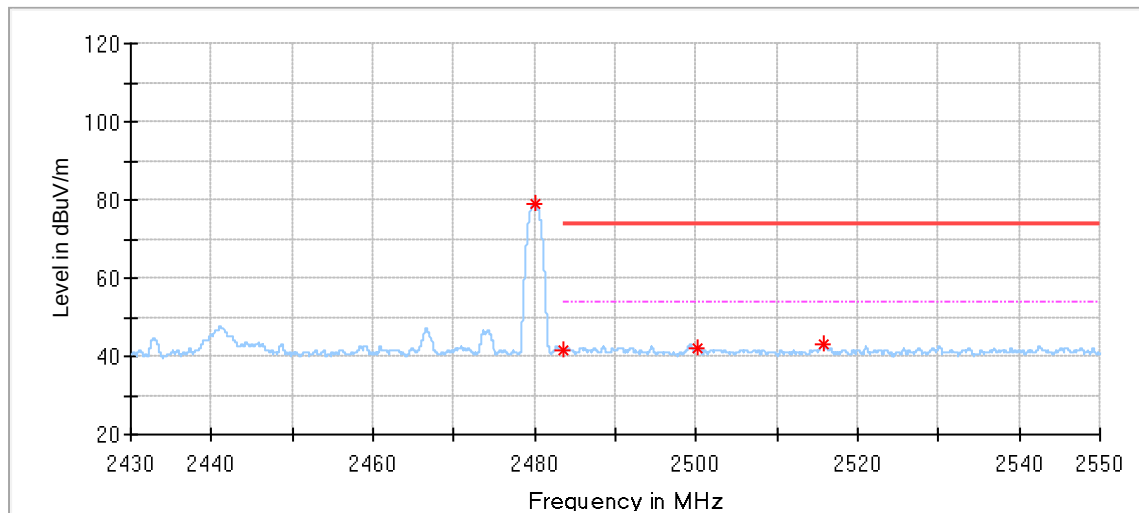
3DH5_2480MHz - Horizontal:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.508000	41.05	74.00	32.95	150.0	H	296.0	-4.91
2499.960000	41.57	74.00	32.43	150.0	H	80.0	-4.88
2521.164000	42.37	74.00	31.63	150.0	H	254.0	-4.82

3DH5_2480MHz - Vertical:



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.508000	41.59	74.00	32.41	150.0	V	239.0	-4.91
2500.176000	42.24	74.00	31.76	150.0	V	218.0	-4.88
2515.740000	42.90	74.00	31.10	150.0	V	0.0	-4.84

Remark:

Corrected Amplitude = Read level + Corrector factor

Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain

Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

10 Test Equipment List

Radiated Emission Test (9kHz-30MHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 7	68-4-74-19-001	102176	1	2025-5-13
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	1	2025-7-24
Cable	HUBER-SUHNER	RG214	68-4-90-14-001-A21	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #1	68-4-90-14-001	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A	N/A

Radiated Emission Test (30MHz-1GHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2025-5-13
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	1	2026-2-11
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	1	2025-5-11
Cable	OUQIAO	18DLB5-NMNM-7000	68-4-90-19-006-A22	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

Radiated Emission Test (1GHz-18GHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2025-5-13
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	1	2026-3-10
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	1	2025-5-11
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-002	100746	1	2025-5-11
Cable	OUQIAO	18DLB5-NMNM-7000	68-4-90-19-006-A22	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

Radiated Emission Test (18GHz-40GHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2025-5-13
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2025-7-2
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2025-7-17
Cable	JUNFLON	MWX241	68-4-90-19-006-A21	----	----	----
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	3	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-19-002	102590	1	2025-5-13
LISN	Rohde & Schwarz	ENV216	68-4-87-19-001	102472	1	2025-5-12
LISN	Rohde & Schwarz	ENV4200	68-4-87-14-001	100249	1	2025-5-13
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2025-5-11
Cable	OUQIAO	RG142	68-4-90-19-005-A20	----	----	----
Test software	Rohde & Schwarz	EMC32	68-4-90-19-005-A01	Version10.35.02	N/A	N/A
Shielding Room	TDK	CSR #2	68-4-90-19-005	----	3	2025-10-15

RF Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	1	2025-5-11
RF Meas. and Switch Matrix Unit	TST PASS	TSCB3023R2	68-4-93-23-001	2811685c	1	2025-5-11
Cable	JUNFLON	J12J103539	68-4-90-19-003-A20	----	----	----
Test software	TST PASS	TST PASS	68-4-93-23-001-A03	Version 2.0	N/A	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	3	2025-10-15

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission in new shielding room (68-4-90-19-005) 150kHz-30MHz	3.14dB
Uncertainty for Radiated Emission in 3m chamber (68-4-90-14-001) 9kHz-30MHz	4.69dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 30MHz-1000MHz	Horizontal: 4.80dB Vertical: 5.91dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 1000MHz-18000MHz	Horizontal: 5.40dB Vertical: 5.40dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) above 18000MHz	Horizontal: 5.10dB Vertical: 5.10dB
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.31dB Frequency test involved: 0.6×10^{-8} or 1%

Measurement Uncertainty Decision Rule:

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2023, clause 4.4.3 and 4.5.1.

---END OF REPORT---