FCC - TEST REPORT

Report Number	: **68.950.23.1005.01**	Date of Issue:	**2024-1-17**
Model	: **TG-S7A, TG-S7E, TG-S7H, TG-S7J, TG-S8A, TG-S8E, TG-S8H, TG-S8J, TG-S9A, TG-S9E, TG-S9H, TG-S9J**		
Product Type	: Multi-functional AI Translation Pen		
Applicant	: Zhongshan Tess Gift Co., Ltd.		
Address	: #B106, 760 Creative Park, 12 Minying West Road, Shiqi District, Zhongshan, Guangdong, China		
Manufacturer	: Zhongshan Tess Gift Co., Ltd.		
Address	: #B106, 760 Creative Park, 12 Minying West Road, Shiqi District, Zhongshan, Guangdong, China		
Factory	: Zhongshan Tess Gift Co., Ltd.		
Address	: #B106, 760 Creative Park, 12 Minying West Road, Shiqi District, Zhongshan, Guangdong, China		
Test Result	: ■ **Positive** ☐ Negative		
Total pages including Appendices	: **38**		

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1 Table of Contents

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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 8828 5299
FCC Registration No.:	514049
FCC Designation Number:	CN5009

3 Description of the Equipment Under Test

Product:	Multi-functional AI Translation Pen
Model no.:	TG-S7A, TG-S7E, TG-S7H, TG-S7J, TG-S8A, TG-S8E, TG-S8H, TG-S8J, TG-S9A, TG-S9E, TG-S9H, TG-S9J
Hardware Version Identification No. (HVIN)	TG-S7A, TG-S7E, TG-S7H, TG-S7J, TG-S8A, TG-S8E, TG-S8H, TG-S8J, TG-S9A, TG-S9E, TG-S9H, TG-S9J
Product Marketing Name (PMN)	Multi-functional AI Translation Pen
Brand name:	TESS GIFT
FCC ID:	2BHDR-13EA2BHDR
Options and accessories:	N/A
Rating:	5VDC, 1A by external Type-C input or by 4.2VDC, 1200mAh battery
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	FPC
Antenna Gain:	1.65dBi
Description of the EUT:	The EUT is a Multi-functional AI Translation Pen which supports BT, BLE and 2.4G Wi-Fi functions. All models use the same Bluetooth & Wi-Fi RF module and antenna the difference among the models is the software version, the model: TG-S7A was chosen as the representative model to perform full tests, and the other models were deemed to fulfil relevant requirements without further testing. Only Bluetooth Low Energy 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.

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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

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			
Test Condition		Test Result	Test Site
§15.207	Conducted emission AC power port	Pass	Site 1
§15.247 (b) (3)	Conducted output power	Pass	Site 1
§15.247(e)	Power spectral density	Pass	Site 1
§15.247(a)(2)	6dB bandwidth	Pass	Site 1
§15.247(a)(1)	20dB Occupied bandwidth	N/A	--
§15.247(a)(1)	Carrier frequency separation	N/A	--
§15.247(a)(1)(iii)	Number of hopping frequencies	N/A	--
§15.247(a)(1)(iii)	Dwell Time	N/A	--
§15.247(d)	Spurious RF conducted emissions	Pass	Site 1
§15.247(d)	Band edge	Pass	Site 1
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Pass	Site 1
§15.203	Antenna requirement	Pass See note 2	--

Note 1: N/A=Not Applicable.
Note 2: The EUT use a FPC antenna, which gain is 1.65dBi. In accordance to §15.203, 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: 2BHDR-13EA2BHDR, complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C.

The EUT supports Bluetooth Low Energy/Bluetooth BR+EDR/Wi-Fi functions and the TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHz Wi-Fi.

Note: The report is for Bluetooth Low Energy only.

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:	2023-11-22
Testing Start Date:	2023-11-23
Testing End Date:	2024-1-8

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

Reviewed by:	Prepared by:	Tested by:
John Zhi	Lynn Huang	Carry Cai
Project Manager	Project Engineer	Test Engineer

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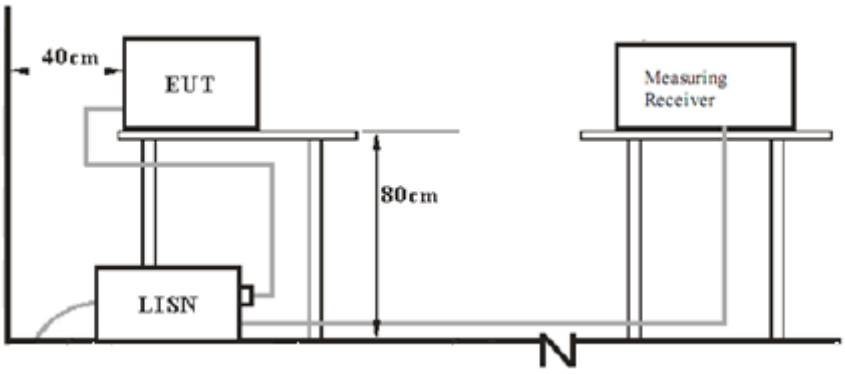
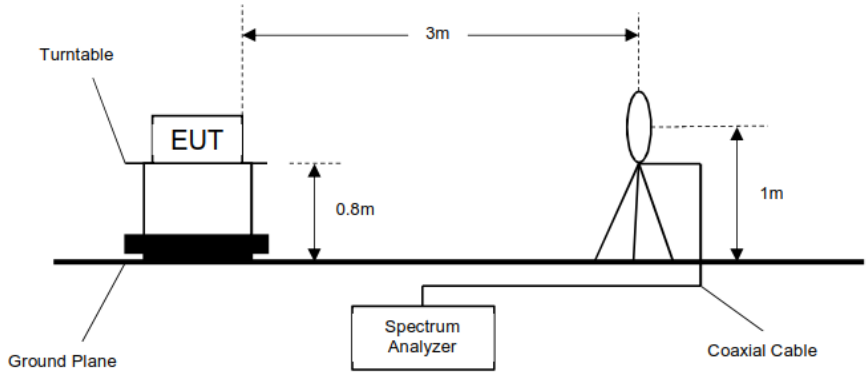
7 Test Setups

7.1 AC Power Line Conducted Emission test setups

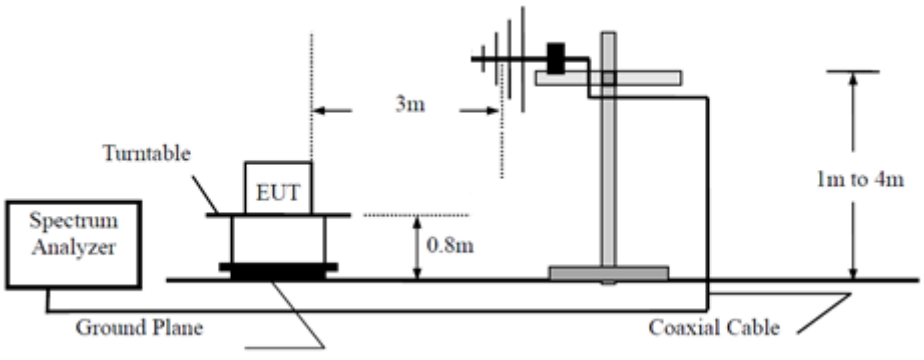


7.2 Radiated test setups

9kHz - 30MHz



30MHz - 1GHz



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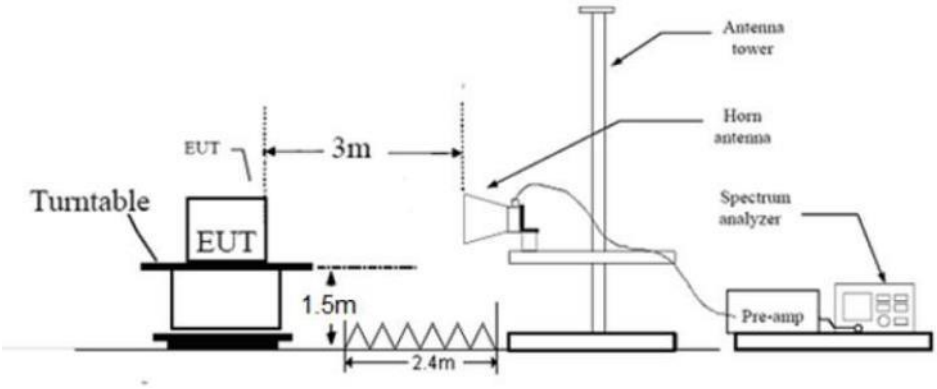
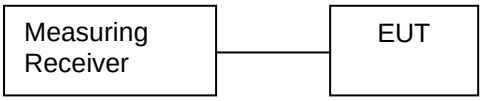
Above 1GHz



7.3 Conducted RF test setup



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8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model NO.	S/N
Notebook	LENOVO	X220	429044C

Cables Used During Test:

Cable	Length	Shielded/unshielded	With / without ferrite
USB Cable	100cm	Unshielded	without ferrite

Test software information:

1. For MT7663BSN Module:

Test Software Version	cmd.exe	
Modulation	Setting TX Power	Packet Type
GFSK_1M	0	PRBS9
GFSK_2M	0	PRBS9

2. For ESP32-S3-WROOM-1U Module:

Test Software Version	EspRFTestTool_v3.6_Manual.exe	
Modulation	Setting TX Attenuation Level	Packet Type
GFSK_1M	10	PRBS9
GFSK_2M	10	PRBS9

The system was configured to non-hopping mode, testing channel 0, 19, 39.

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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

According to §15.207 conducted emissions limit as below:

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

*Decreasing linearly with logarithm of the frequency

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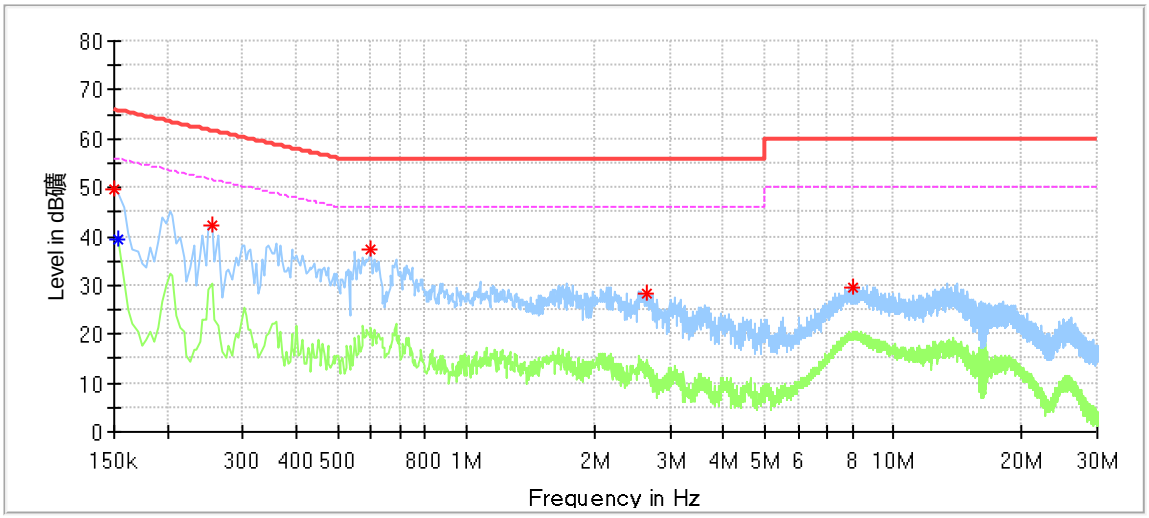
Conducted Emission

Product Type	:	Multi-functional AI Translation Pen
M/N	:	TG-S7A
Operating Condition	:	Transmit mode
Test Specification	:	Line
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.150000	49.69	---	66.00	16.31	L1	9.52
0.154000	---	39.20	55.78	16.58	L1	9.52
0.254000	42.38	---	61.63	19.25	L1	9.56
0.598000	37.20	---	56.00	18.80	L1	9.60
2.634000	28.29	---	56.00	27.71	L1	9.64
8.018000	29.56	---	60.00	30.44	L1	9.88

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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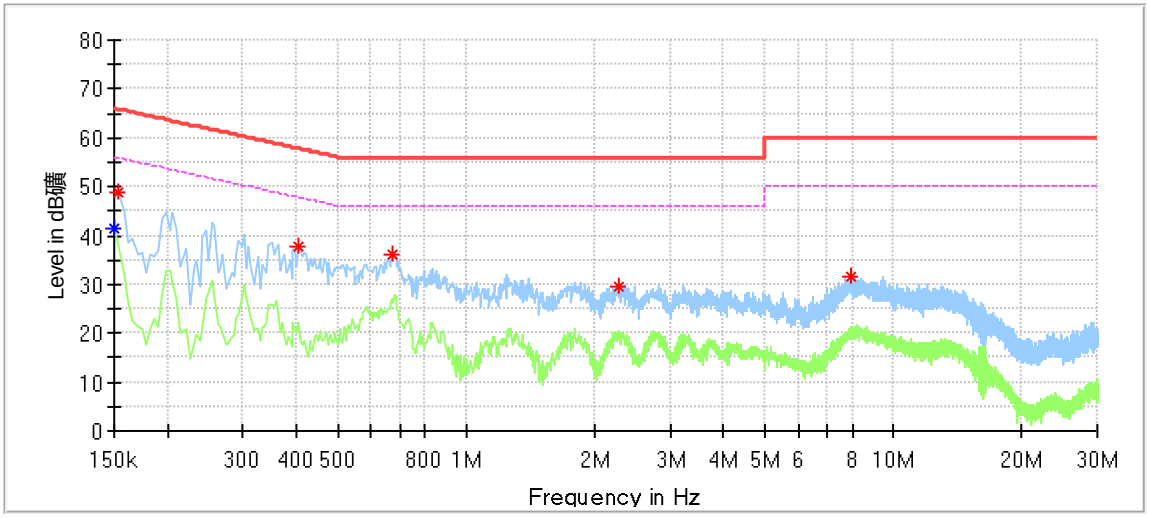
Conducted Emission

Product Type	:	Multi-functional AI Translation Pen
M/N	:	TG-S7A
Operating Condition	:	Transmit mode
Test Specification	:	Neutral
Comment	:	AC 120V/60Hz



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.150000	---	41.49	56.00	14.51	N	9.55
0.154000	48.66	---	65.78	17.13	N	9.55
0.406000	37.82	---	57.73	19.91	N	9.61
0.674000	36.13	---	56.00	19.87	N	9.63
2.266000	29.43	---	56.00	26.57	N	9.66
7.942000	31.70	---	60.00	28.30	N	9.90

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

Test Method

1. The EUT was placed on 0.8m height table, 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

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

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Conducted Peak Output Power & EIRP

For MT7663BSN Module:

Frequency MHz	Mode	Conducted Peak Output Power dBm	Result
Bottom channel 2402MHz	LE 1M	4.30	Pass
Middle channel 2440MHz	LE 1M	4.27	Pass
Top channel 2480MHz	LE 1M	4.03	Pass

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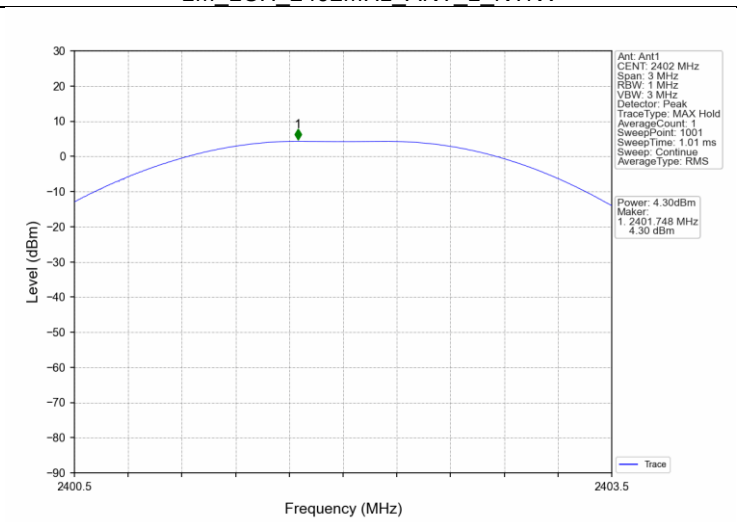
Test Graphs:

1M_LCH_2402MHz_ANT_1_NTNV

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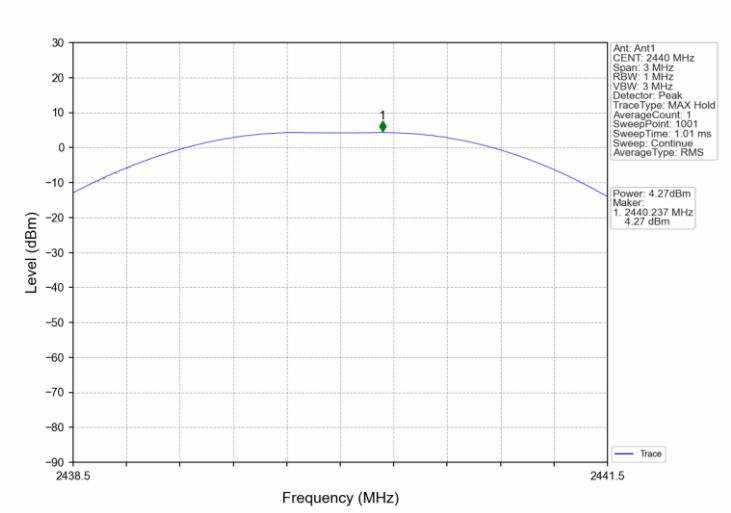
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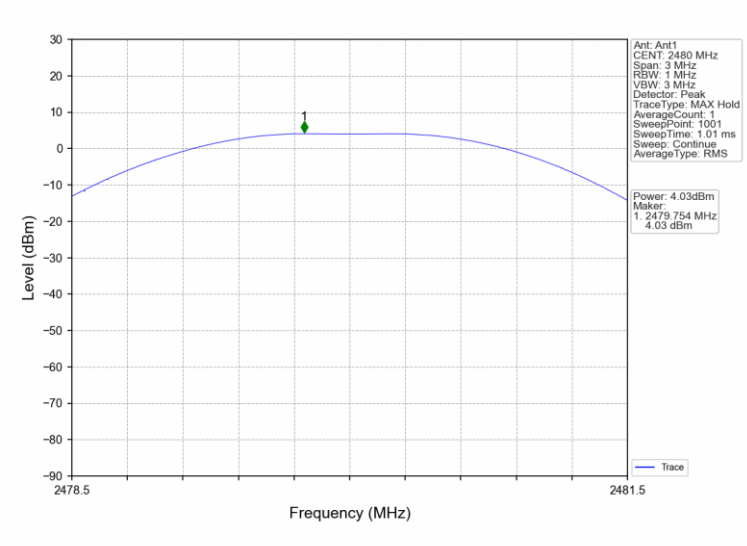

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9.3 Power Spectral Density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
4. Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
5. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
6. Repeat above procedures until other frequencies measured were completed.

Limit

According to §15.247(e), power spectral density limit as below:

Limit [dBm]
≤8

Test result

Frequency MHz	Mode	Power spectral density dBm/3kHz	Result
Bottom channel 2402MHz	LE 1M	-11.31	Pass
Middle channel 2440MHz	LE 1M	-11.31	Pass
Top channel 2480MHz	LE 1M	-11.56	Pass

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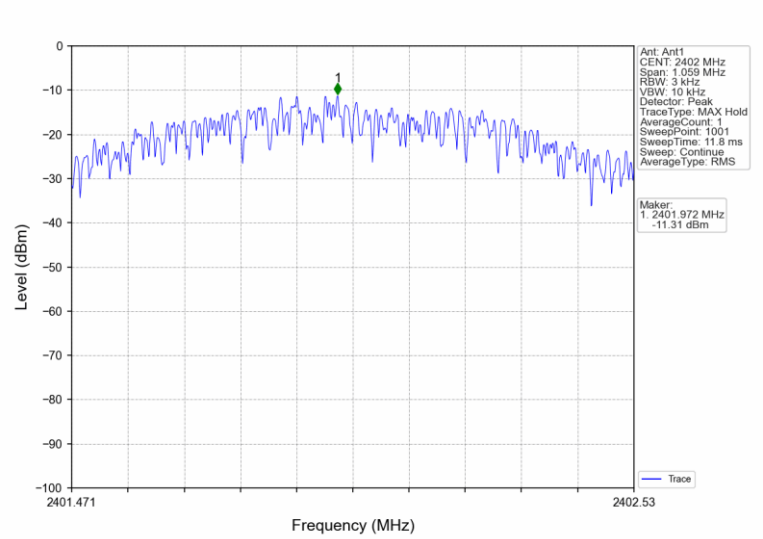
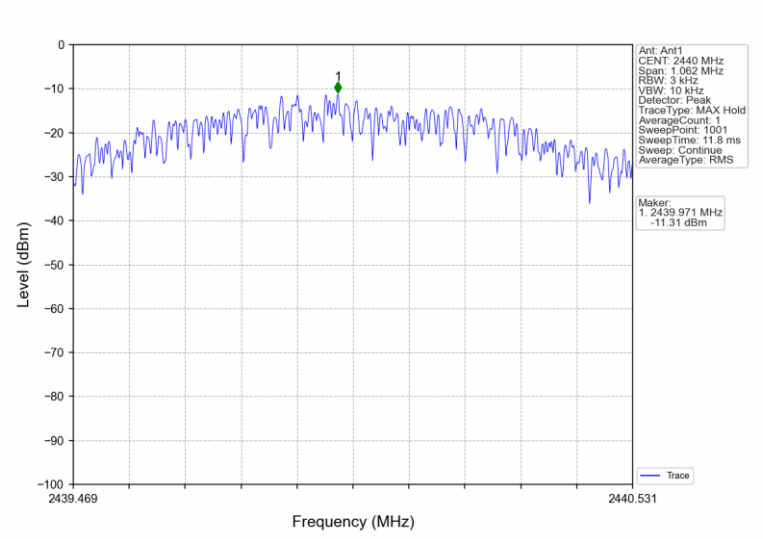
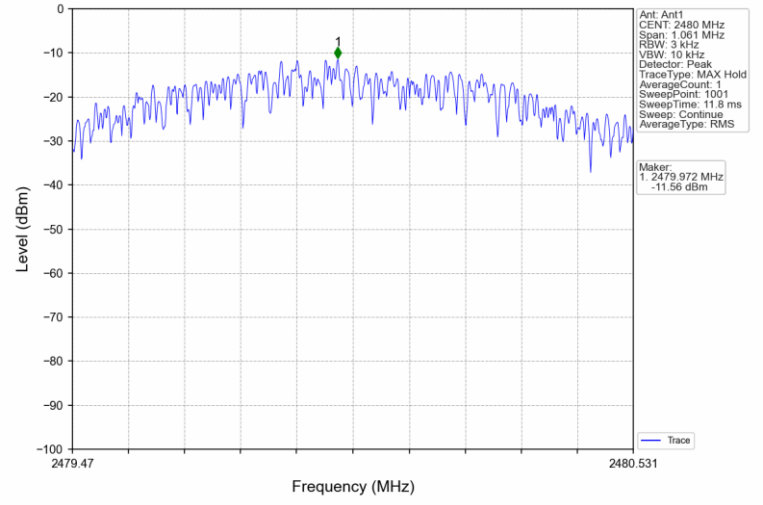
Test Graphs:

1M_LCH_2402MHz_ANT_1_NTNV

1M_MCH_2440MHz_ANT_1_NTNV

1M_HCH_2480MHz_ANT_1_NTNV


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9.4 6 dB Bandwidth

Test Method

1. The RF output of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Set to the maximum power setting, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
   RBW=100KHz, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Use the automatic bandwidth measurement capability of an instrument, use the X dB bandwidth mode with X set to 6 dB.
5. Allow the trace to stabilize, record the 6 dB Bandwidth value.

Limit

According to §15.247(a)(2), 6 dB Bandwidth limit as below:

Limit [kHz]
≥500

Test result

Frequency MHz	Mode	6dB bandwidth MHz	Result
Bottom channel 2402MHz	LE 1M	0.706	Pass
Middle channel 2440MHz	LE 1M	0.708	Pass
Top channel 2480MHz	LE 1M	0.707	Pass

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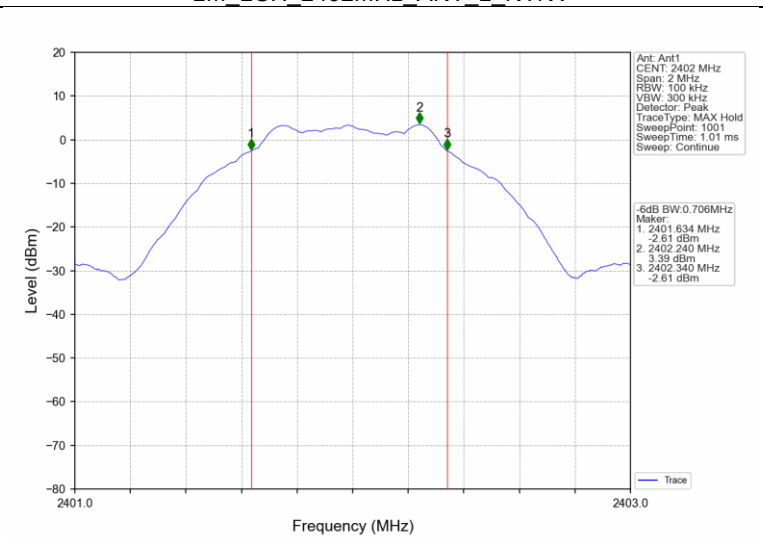
Test Graphs:

1M_LCH_2402MHz_ANT_1_NTNV

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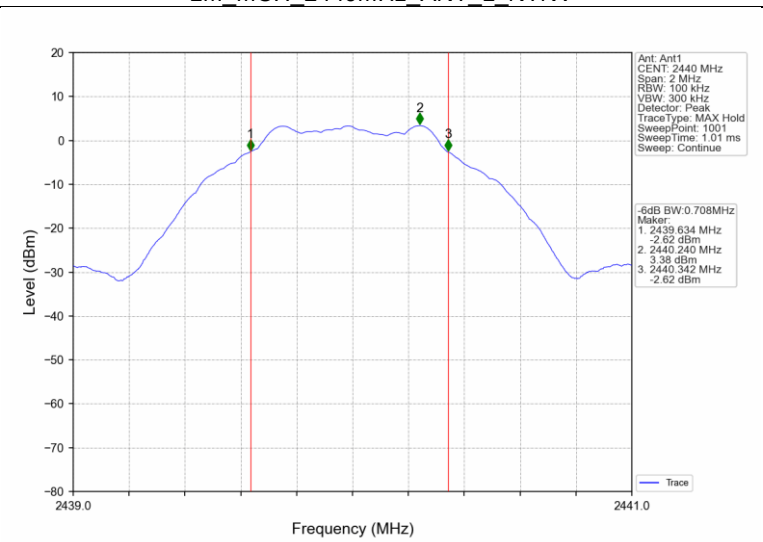
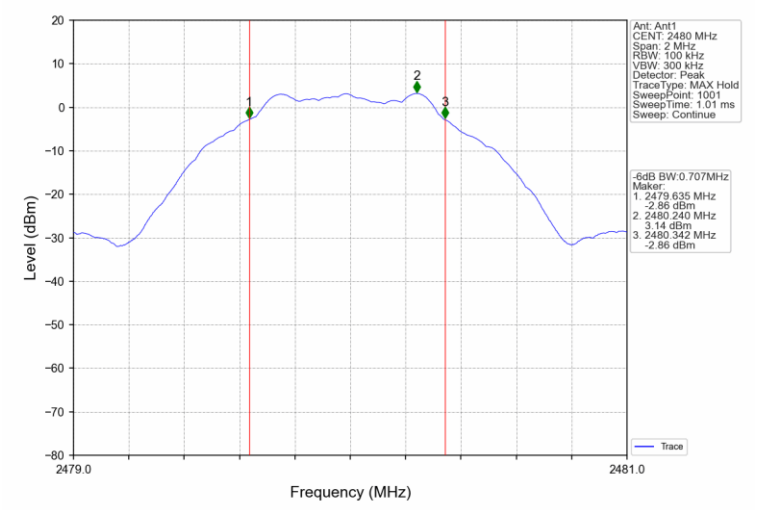

1M_HCH_2480MHz_ANT_1_NTNV


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9.5 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, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
5. The level displayed must comply with the limit specified in this Section. Submit these plots.
6. Repeat above procedures until all frequencies measured were complete.

Limit

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

In any 100 kHz 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB.

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

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Spurious RF conducted emissions

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	3.41
		2440	1	3.39
		2480	1	3.15
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.				

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	3.41	-16.59	Pass
		2440	1	3.41	-16.59	Pass
		2480	1	3.41	-16.59	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.						

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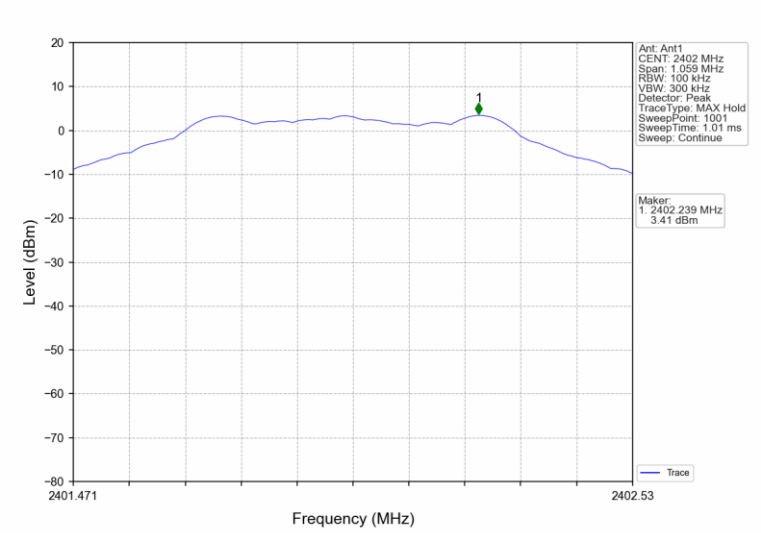
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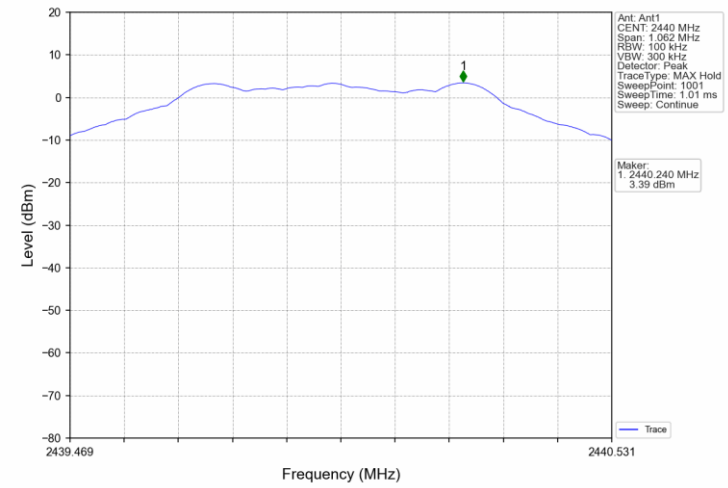
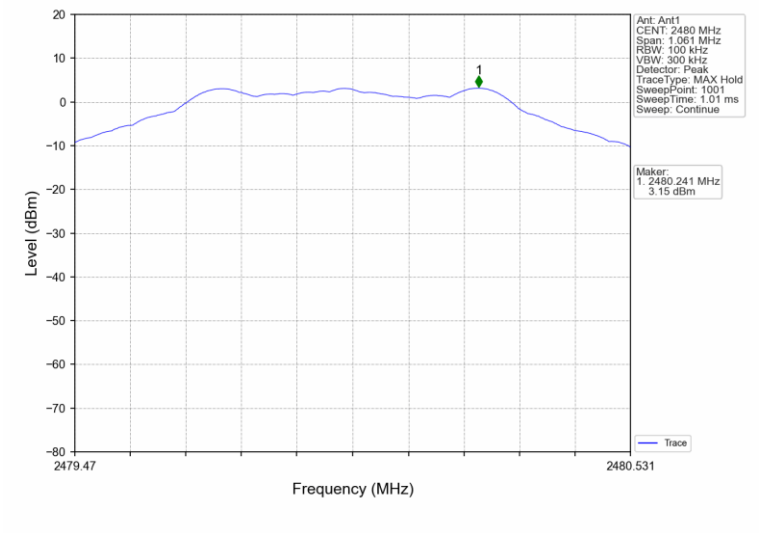

1M_HCH_2480MHz_ANT_1_NTNV


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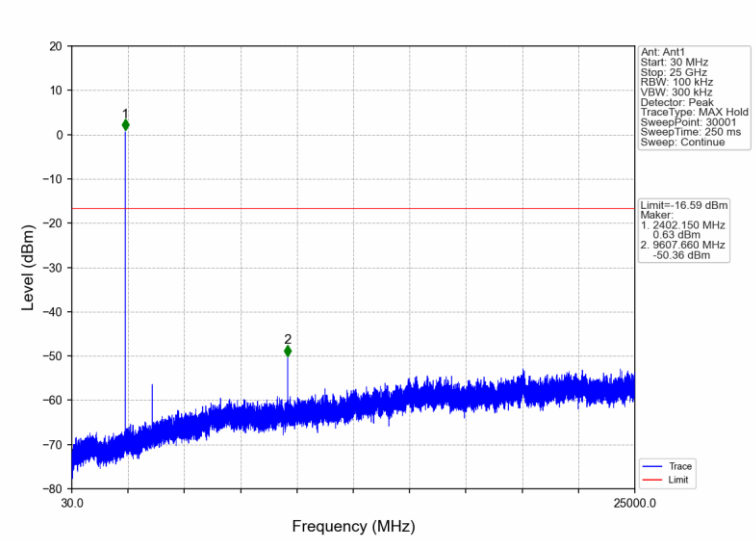
1M_LCH_2402MHz_ANT_1_NTNV

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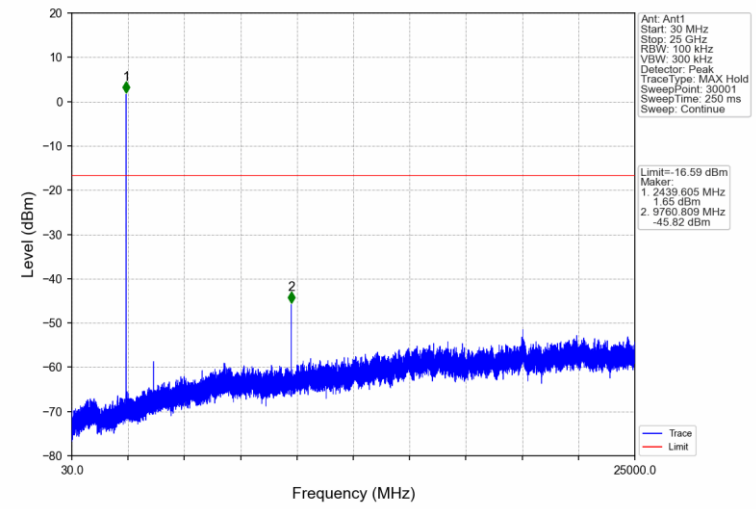
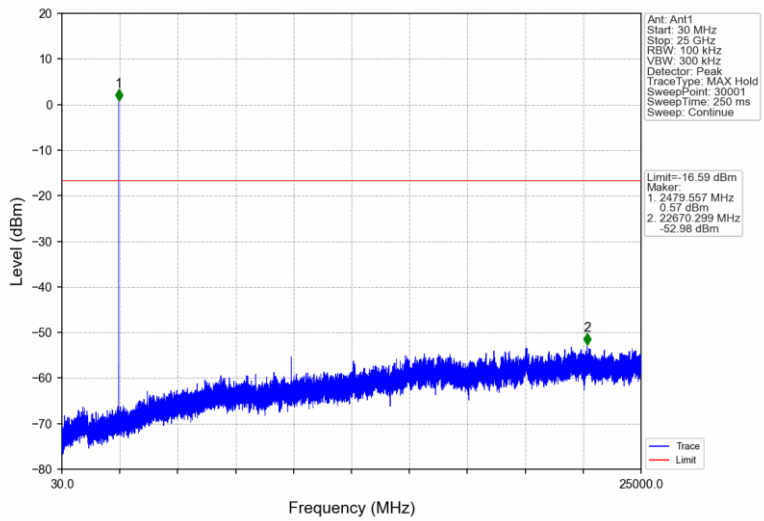

1M_HCH_2480MHz_ANT_1_NTNV


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9.6 Band Edge

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, the instrument center frequency is set to the nominal EUT channel center frequency enable the EUT transmit continuously.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious
   RBW = 100 kHz, VBW≥3RBW, Sweep = auto, Detector function = peak, Trace = max hold
4. Allow the trace to stabilize, use the peak and delta measurement to record the result.
5. The level displayed must comply with the limit specified in this Section.
6. Repeat above procedures until all frequencies measured were complete and submit all the plots.

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

In any 100 kHz 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB.

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

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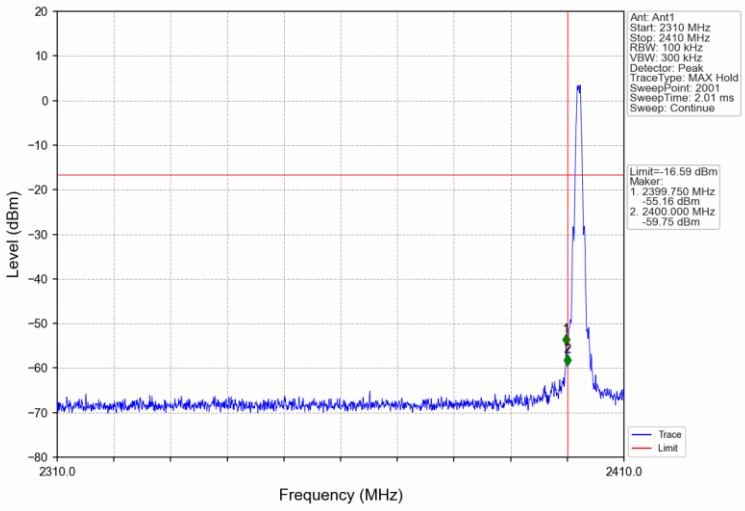
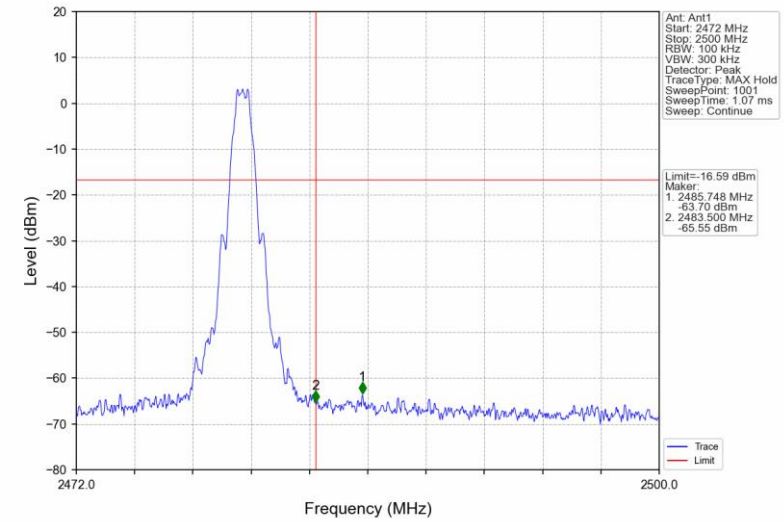
Band edge testing

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	3.41	<=-16.59	Pass
		2440	1	3.41	<=-16.59	Pass
		2480	1	3.41	<=-16.59	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.						

1M_LCH_2402MHz_ANT_1_NTNV



1M_HCH_2480MHz_ANT_1_NTNV



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9.7 Spurious Radiated Emissions for Transmitter

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3: 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.
4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5: Use the following spectrum analyzer settings According to C63.10:
For Below 1GHz
Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100kHz to 120kHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1MHz.
b) VBW \ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)
e) Sweep time = auto.
f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)
g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty

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cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Limit

In any 100 kHz 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under § 15.247(b)(3), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in§ 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

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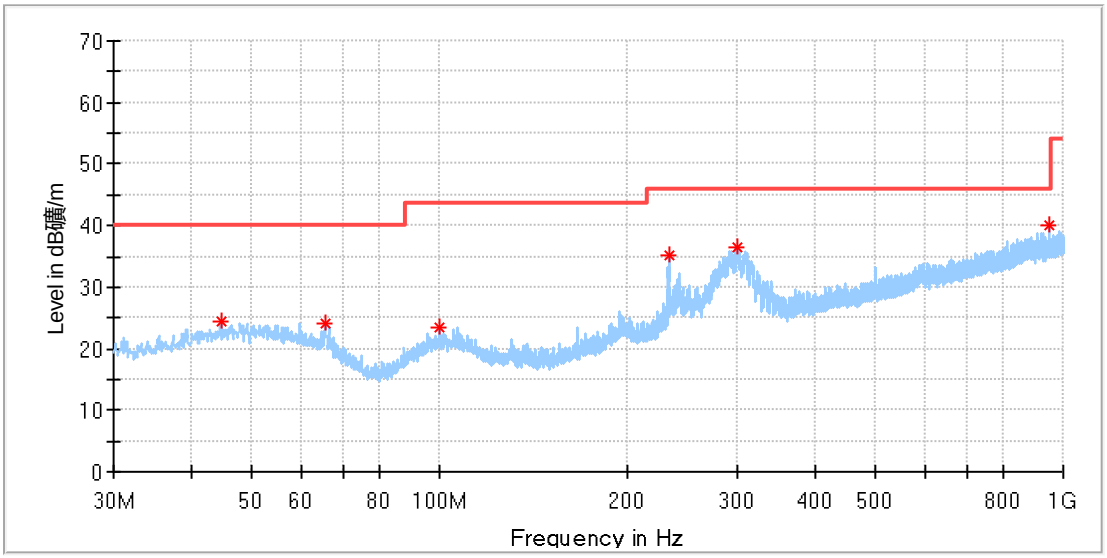
Spurious radiated emissions for transmitter

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.

Transmitting spurious emission test result as below:

Test data_30MHz to 1000MHz:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
44.731875	24.43	40.00	15.57	200.0	H	0.0	20.41
65.708125	24.20	40.00	15.80	100.0	H	359.0	18.03
99.961250	23.46	43.50	20.04	200.0	H	0.0	18.94
233.154375	35.16	46.00	10.84	100.0	H	264.0	19.78
300.569375	36.42	46.00	9.58	100.0	H	356.0	21.33
948.286875	40.06	46.00	5.94	100.0	H	78.0	32.20

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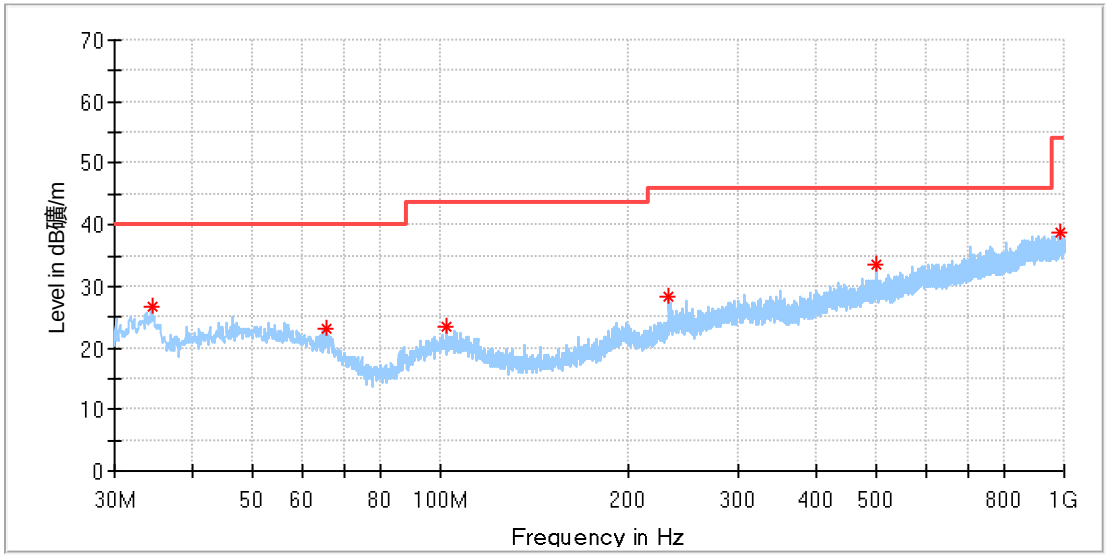

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.425625	26.76	40.00	13.24	100.0	V	151.0	17.21
65.465625	23.02	40.00	16.98	100.0	V	0.0	18.12
102.265000	23.41	43.50	20.09	100.0	V	73.0	19.14
232.548125	28.42	46.00	17.58	100.0	V	210.0	19.76
499.783125	33.63	46.00	12.37	100.0	V	7.0	25.92
987.814375	38.59	54.00	15.41	100.0	V	243.0	32.60

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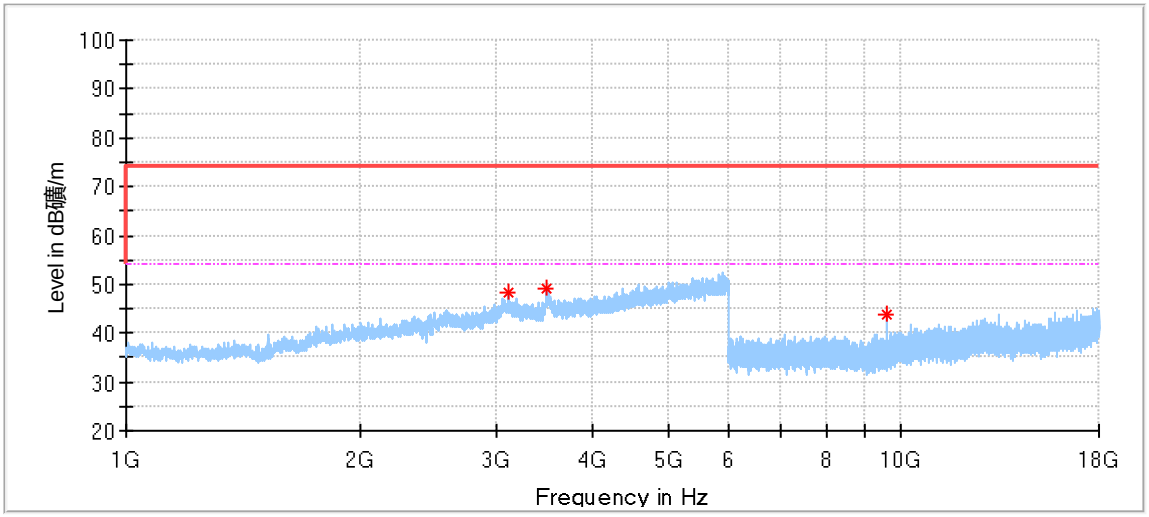
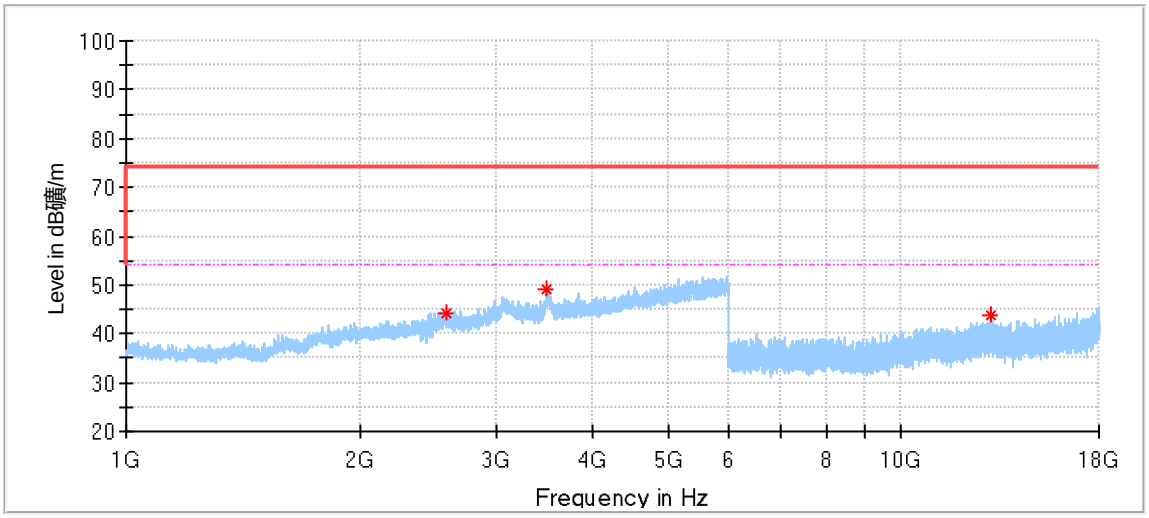
Test data 1GHz to 18GHz:

BLE_1M_Low Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3112.500000	48.32	74.00	25.68	150.0	H	313.0	1.47
3481.500000	49.19	74.00	24.81	150.0	H	358.0	3.07
9608.000000	43.83	74.00	30.17	150.0	H	13.0	8.87



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2596.500000	44.24	74.00	29.76	150.0	V	324.0	-1.06
3493.500000	48.94	74.00	25.06	150.0	V	96.0	3.99
13067.500000	43.84	74.00	30.16	150.0	V	327.0	13.05

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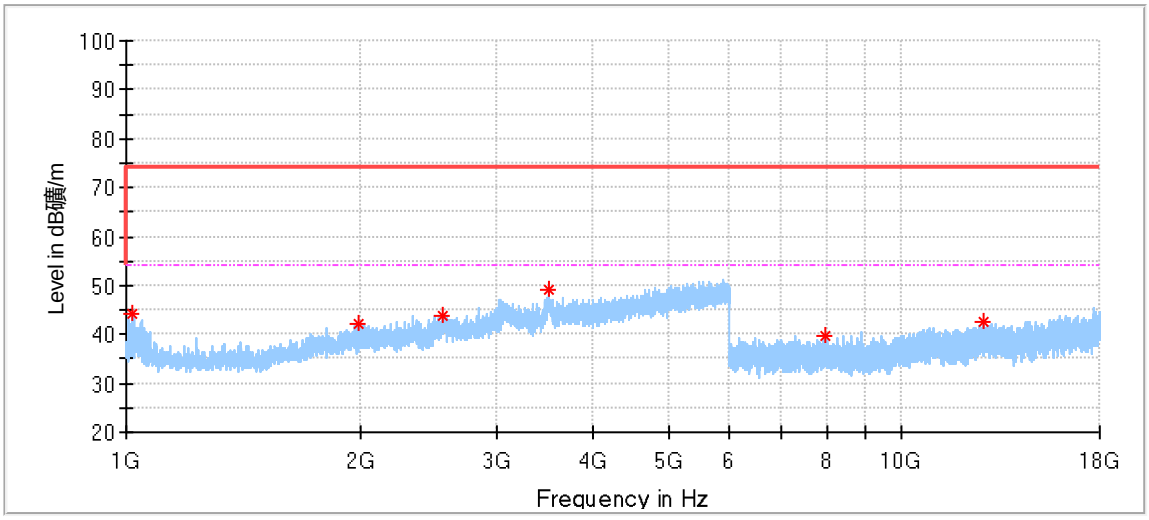
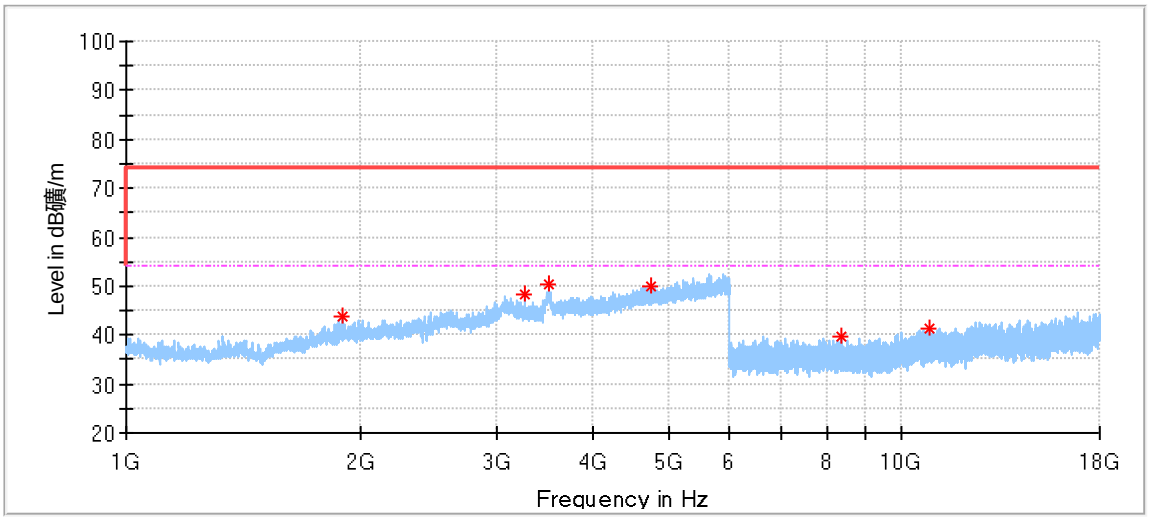
BLE_1M_Middle Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
1018.500000	44.39	74.00	29.61	150.0	H	202.0	-8.05	---
1994.500000	41.95	74.00	32.05	150.0	H	143.0	-4.08	---
2553.500000	43.59	74.00	30.41	150.0	H	123.0	-1.33	---
3499.500000	49.33	74.00	24.67	150.0	H	222.0	4.44	---
7989.500000	39.56	74.00	34.44	150.0	H	359.0	7.43	---
12771.500000	42.48	74.00	31.52	150.0	H	179.0	12.95	---



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Corr. (dB)
1900.500000	43.96	74.00	30.04	150.0	V	170.0	-4.84	---
3272.000000	48.43	74.00	25.57	150.0	V	222.0	0.43	---
3500.000000	50.33	74.00	23.67	150.0	V	27.0	4.48	---
4743.500000	49.94	74.00	24.06	150.0	V	211.0	4.61	---
8352.000000	39.60	74.00	34.40	150.0	V	51.0	7.42	---
10883.000000	41.42	74.00	32.58	150.0	V	305.0	10.83	---

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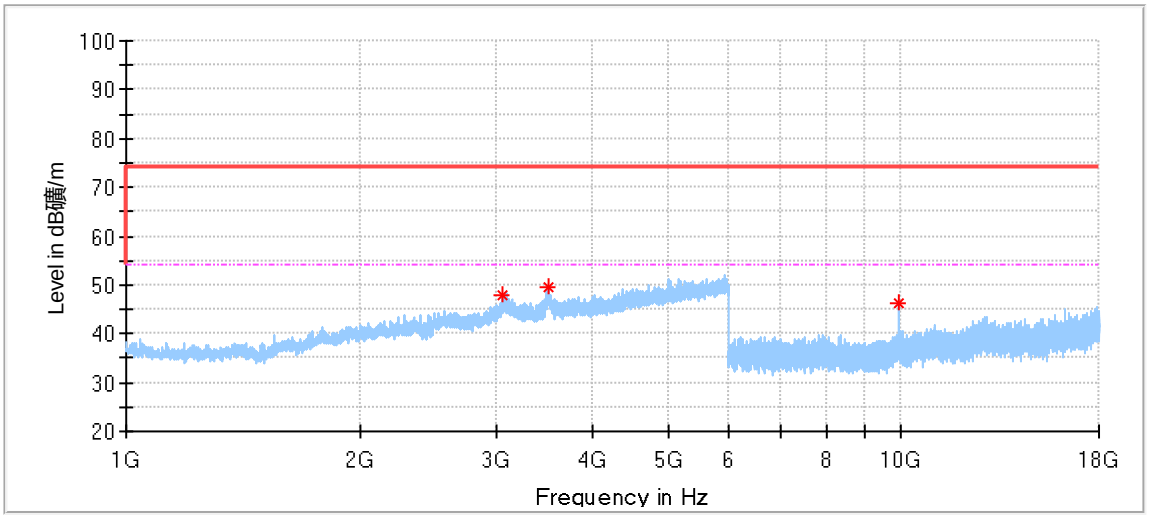
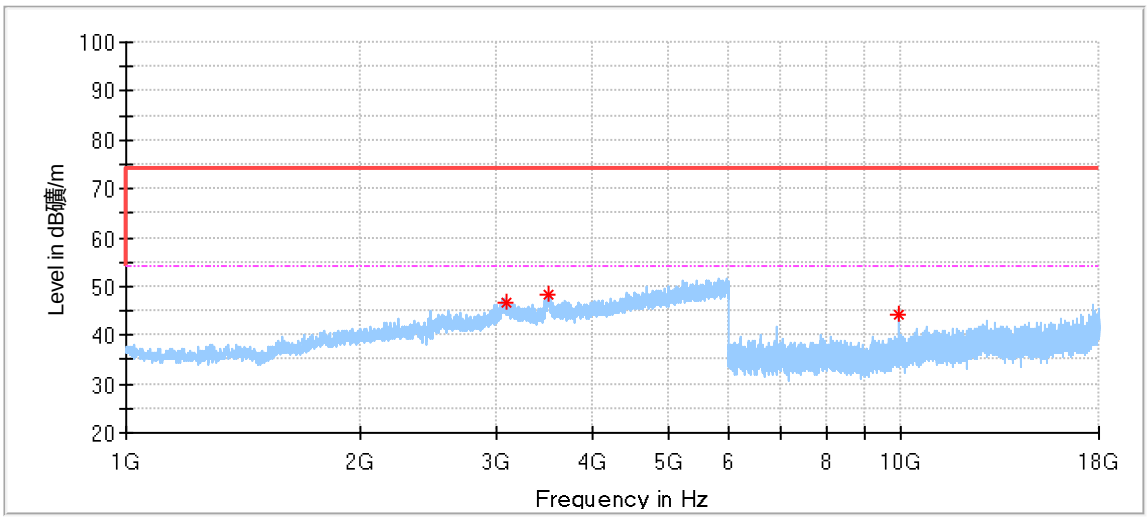
BLE_1M_Hight Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3063.500000	47.74	74.00	26.26	150.0	H	54.0	1.59
3502.500000	49.69	74.00	24.31	150.0	H	351.0	4.36
9920.000000	46.10	74.00	27.90	150.0	H	15.0	9.39



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
3094.500000	46.82	74.00	27.18	150.0	V	0.0	1.61
3499.500000	48.50	74.00	25.50	150.0	V	0.0	4.44
9921.000000	44.16	74.00	29.84	150.0	V	58.0	9.39

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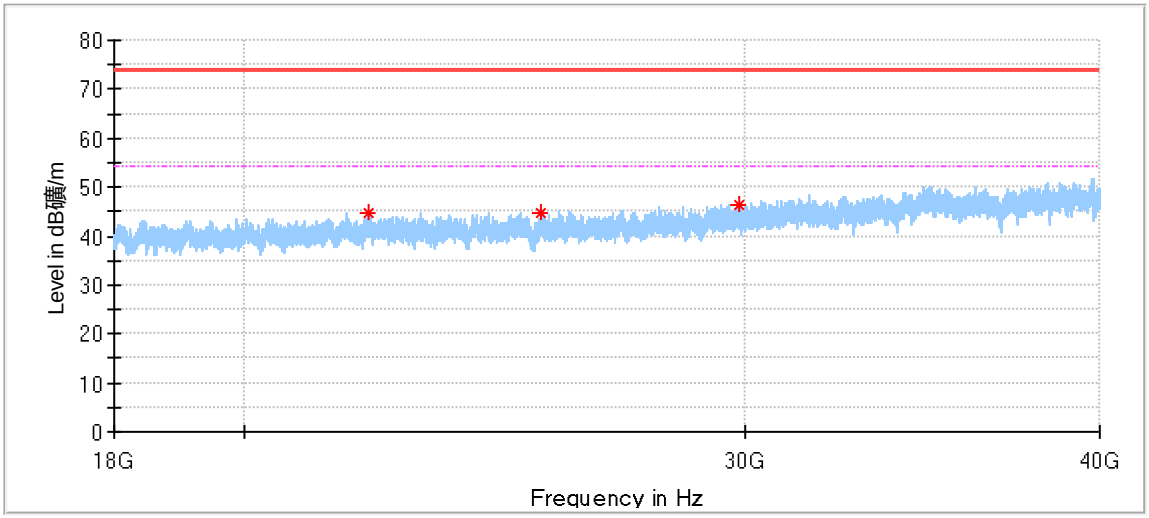
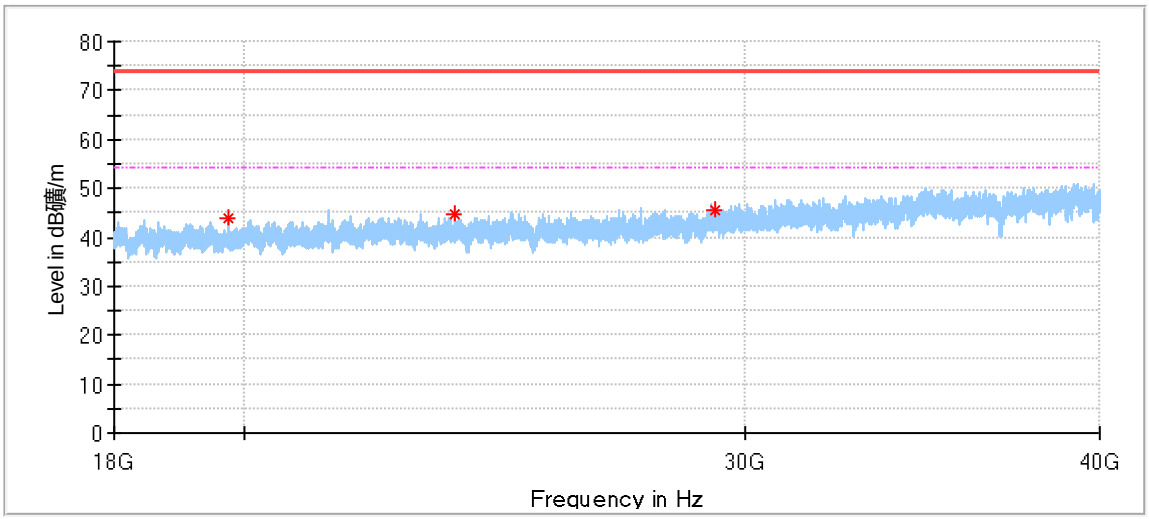
Test data 18GHz to 40GHz:

BLE_1M_Low Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
22119.500000	44.53	74.00	29.47	150.0	H	185.0	2.0
25451.125000	44.89	74.00	29.11	150.0	H	14.0	3.5
29862.812500	46.29	74.00	27.71	150.0	H	107.0	3.7



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
19746.937500	43.92	74.00	30.08	150.0	V	0.0	-0.6
23718.625000	44.64	74.00	29.36	150.0	V	65.0	2.4
29280.500000	45.56	74.00	28.44	150.0	V	215.0	3.8

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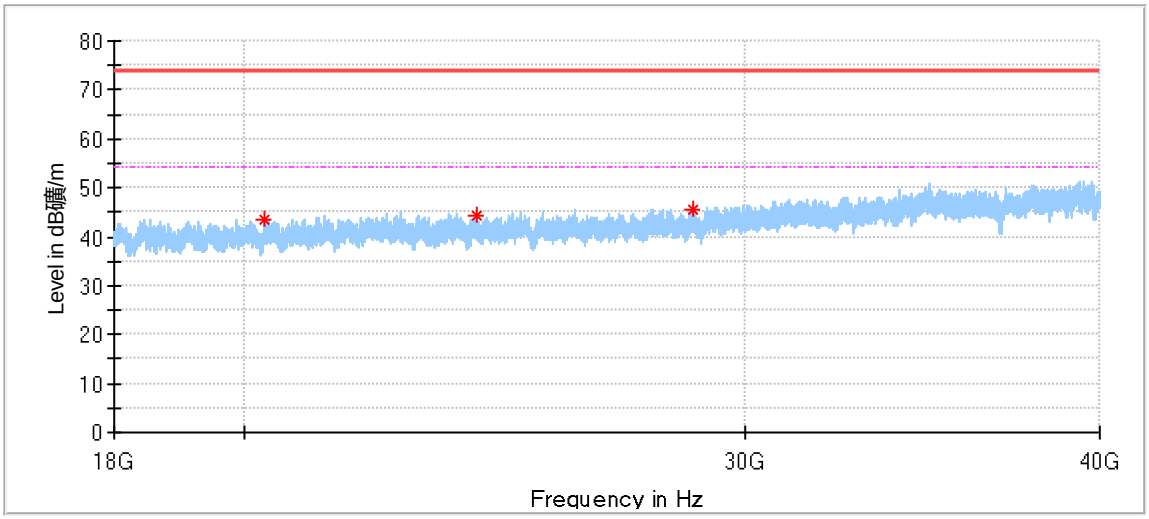
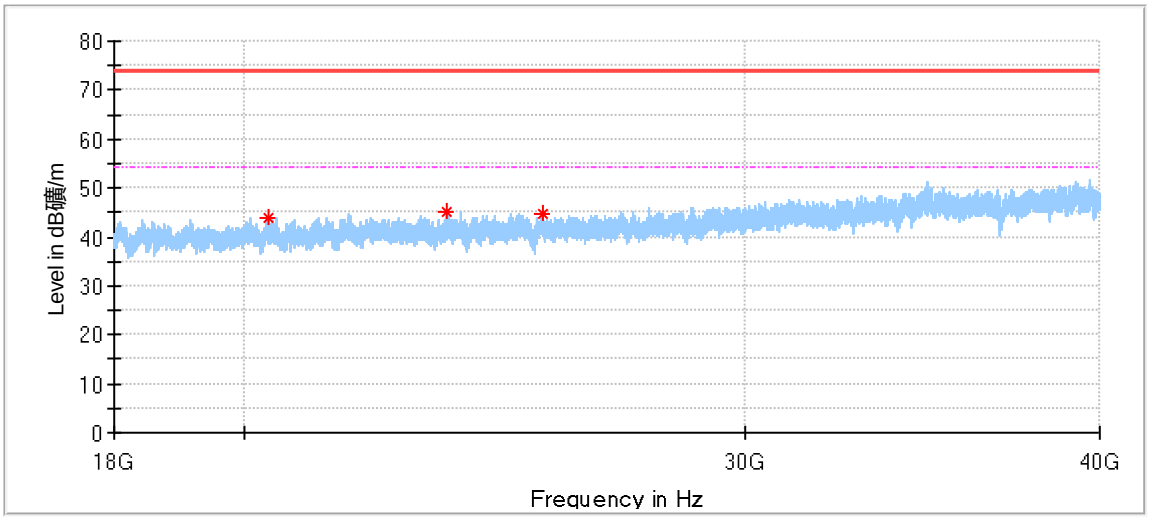
BLE_1M_Middle Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
20332.000000	43.30	74.00	30.70	150.0	H	93.0	0.0
24133.187500	44.33	74.00	29.67	150.0	H	170.0	2.6
28776.562500	45.53	74.00	28.47	150.0	H	246.0	3.8



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
20395.250000	43.74	74.00	30.26	150.0	V	207.0	0.1
23574.250000	45.11	74.00	28.89	150.0	V	207.0	2.2
25475.875000	44.89	74.00	29.11	150.0	V	31.0	3.5

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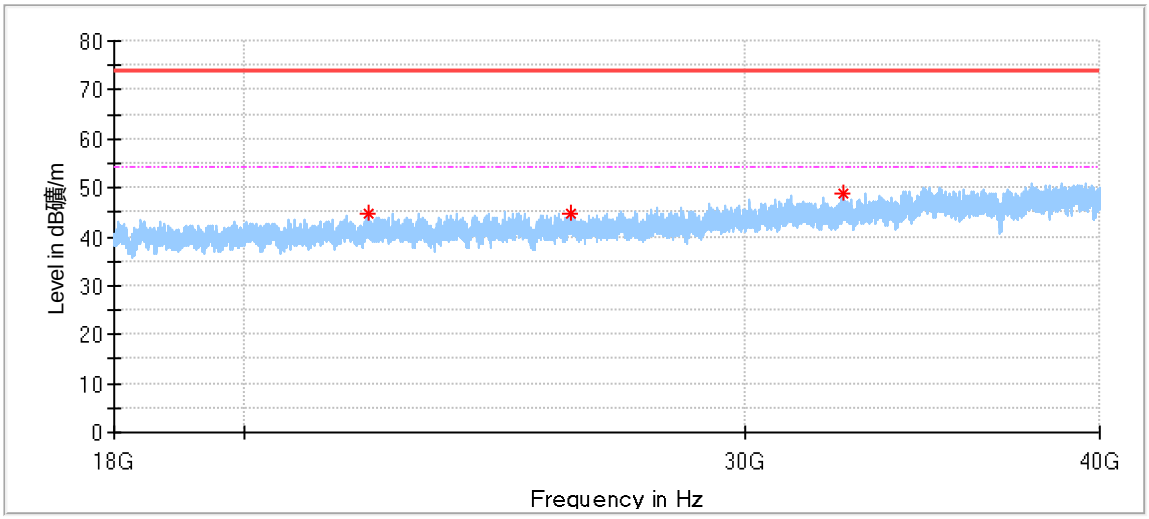
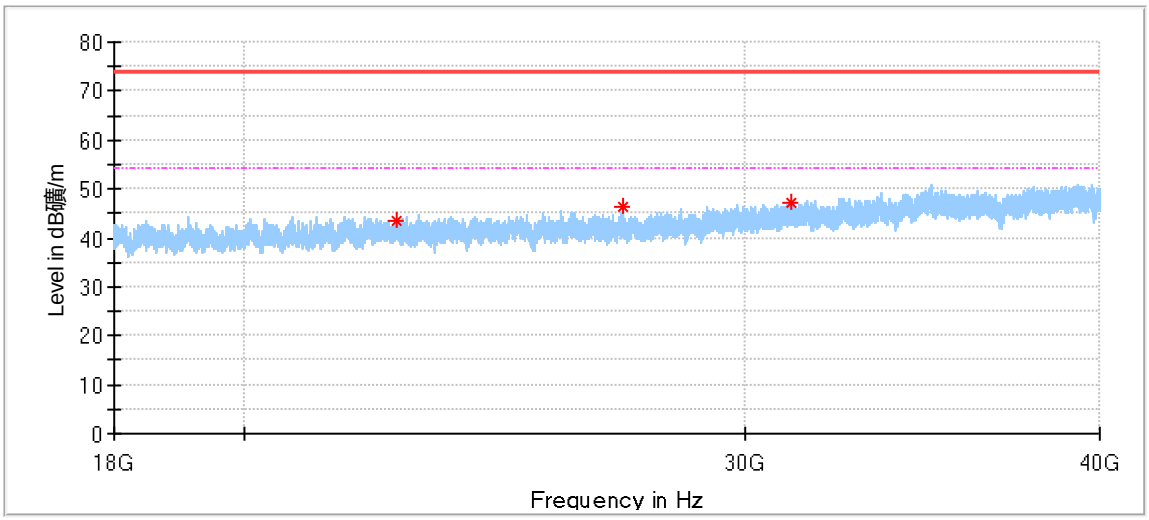
BLE_1M_Hight Channel:



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
22127.062500	44.90	74.00	29.10	150.0	H	63.0	2.0
26045.125000	44.76	74.00	29.24	150.0	H	78.0	3.5
32495.937500	48.63	74.00	25.37	150.0	H	295.0	5.3



Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
22614.500000	43.34	74.00	30.66	150.0	V	99.0	2.3
27166.437500	46.24	74.00	27.76	150.0	V	347.0	3.9
31147.062500	47.09	74.00	26.91	150.0	V	254.0	4.0

Remark:

(1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

(2) Data of measurement within frequency range 9kHz-30MHz are the noise floor or attenuated more than 20dB below the permissible limits or the field strength is too small to be measured, so test data does not present in this report.

(3) Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

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10 Test Equipment List

List of Test Instruments

Conducted Emission 2# 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	2024-5-19
LISN	Rohde & Schwarz	ENV216	68-4-87-19-001	102472	1	2024-5-20
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2024-5-19
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

Radiated Emission Test 1# Test

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	2024-5-20
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	1	2024-8-7
3m Semi-anechoic chamber	TDK	SAC-3 #1	68-4-90-14-001	----	3	2024-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-14-001-A10	Version10.35.02	N/A	N/A

Radiated Emission 2# Test

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	2024-5-20
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	1	2024-3-5
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	1	2024-4-26
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	1	2024-5-19
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2024-7-11
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2024-8-1
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	1	2024-5-19
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	2	2024-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

RF Conducted 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	2024-5-19
Test software	TST PASS	System for BT/WIFI	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

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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 (for test using AMN ENV216)	3.15dB
Uncertainty for Radiated Emission in 3m chamber (68-4-90-14-001) 9kHz-30MHz	4.70dB
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 30MHz-1000MHz	Horizontal: 4.63dB; Vertical: 4.78dB;
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 1000MHz-18000MHz	Horizontal: 5.38dB; Vertical: 5.38dB;
Uncertainty for Radiated Emission in new 3m chamber (68-4-90-19-006) 18GHz-40GHz	Horizontal: 5.29dB; Vertical: 5.29dB;
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 4.3.3 and 4.3.4.

THE END

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