

FCC – TEST REPORT

Report Number : **607922401202R01** Date of Issue: **April 2, 2025**

Model/HVIN : **HG12607-US**

Product Type : **20V / 4Ah Smart Battery Pack**

Applicant : Lidl US LLC.

Address : 3500 S. Clark Street, Arlington Virginia 22202, United States.

Production Facility (1) : ZHEJIANG LERA NEW ENERGY POWER TECHNOLOGY CO., LTD.

Address : No. 255 Kesheng Road, Haishu Wangchun Industrial Park, Ningbo, China

Test Result : **n Positive** o Negative

Total pages including Appendices : **46**

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, Guangdong, 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:	20V / 4Ah Smart Battery Pack
Model no.:	HG12607-US
FCC ID:	2AJ90-HG12607-US
Options and accessories:	NIL
Ratings:	Max. 20 VDC, 4.0Ah 80Wh
RF Transmission Frequency:	2402MHz-2480MHz
No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	PCB antenna
Antenna Gain:	2.54 dBi
Description of the EUT:	The EUT is a 20V / 4Ah Smart Battery Pack, supports BLE with 1M bps and 2M bps function, operates at 2402 – 2480 MHz.

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			Test Environment
			Pass	Fail	N/A	
§15.207	Conducted emission AC power port	Site 1	☒	☐	☐	T: 23.1°C H: 51.2%
§15.247 (b) (3)	Conducted peak output power	Site 1	☒	☐	☐	T: 23.4°C H: 52.7%
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	Site 1	☒	☐	☐	T: 23.4°C H: 52.7%
§15.247(e)	Power spectral density	Site 1	☒	☐	☐	T: 23.7°C H: 52.7%
§15.247(d)	Spurious RF conducted emissions	Site 1	☒	☐	☐	T: 23.8°C H: 52.7%
§15.247(d)	Band edge	Site 1	☒	☐	☐	T: 23.1°C H: 58.0%
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	Site 1	☒	☐	☐	T: 23.2°C H: 58.1%
§15.203	Antenna requirement	See note 2	☒	☐	☐	--

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a PCB Antenna, which gain is 2.54 dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.

Note 3: T :Temperature, H: Humidity

6 General Remarks

This submittal(s) (test report) is intended for FCC ID: **2AJ90-HG12607-US** complies with Section 15.207, 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C rules.

SUMMARY:

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

n - Performed

o - **Not** Performed

The Equipment under Test

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

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

Sample Received Date: March 18, 2025

Testing Start Date: March 18, 2025

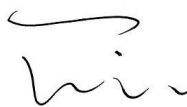
Testing End Date: March 31, 2025

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

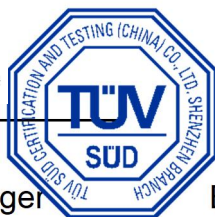
Reviewed by:

Prepared by:

Tested by:



Eric LI
Section Manager



Kevin DU
EMC Project Engineer

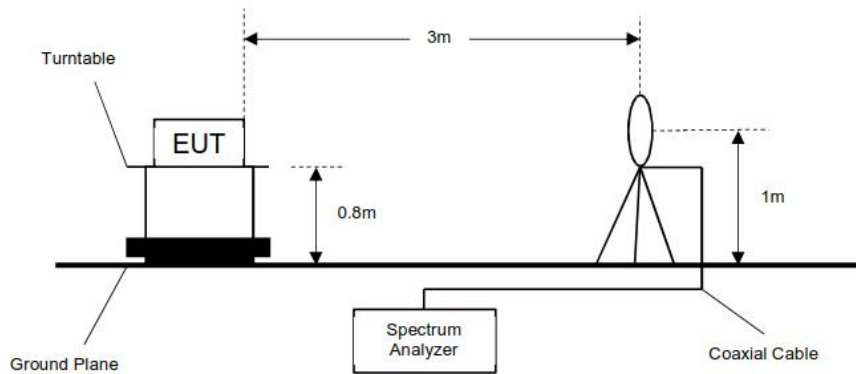


Carry Cai
Test Engineer

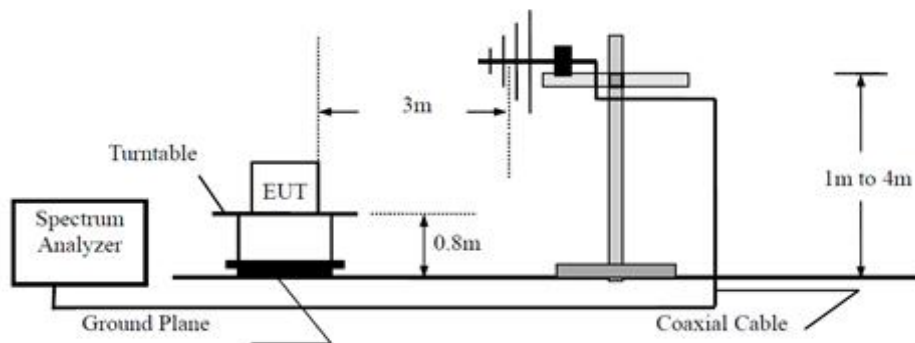
7 Test Setups

7.1 Radiated Test Setups

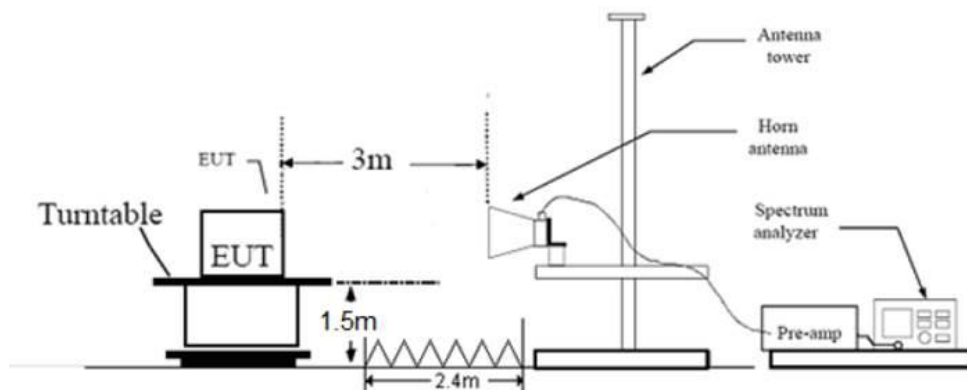
9kHz - 30MHz



Below 1GHz

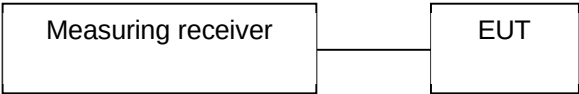


Above 1GHz

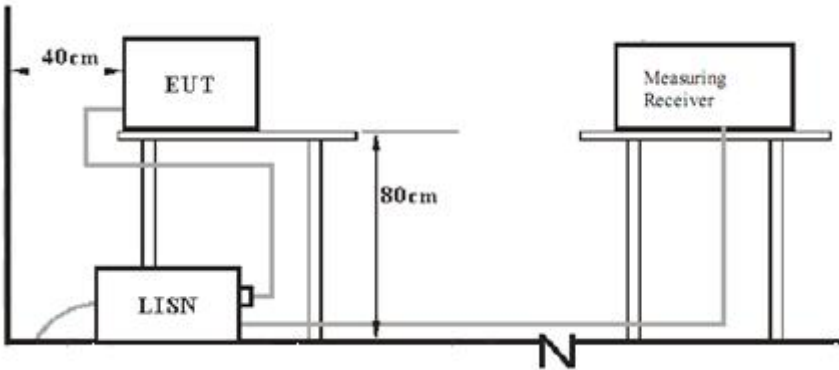




7.2 Conducted RF Test Setups



7.3 AC Power Line Conducted Emission Test Setups





8 Systems Test Configuration

Auxiliary Equipment Used during Test:

Description	Manufacturer	Model NO.	Remark
Laptop	Lenovo	X220	0A72168
---	---	---	---

Cables Used During Test:

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

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

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.

Only the worst case transmitter rate data mode is recorded in the report.

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:

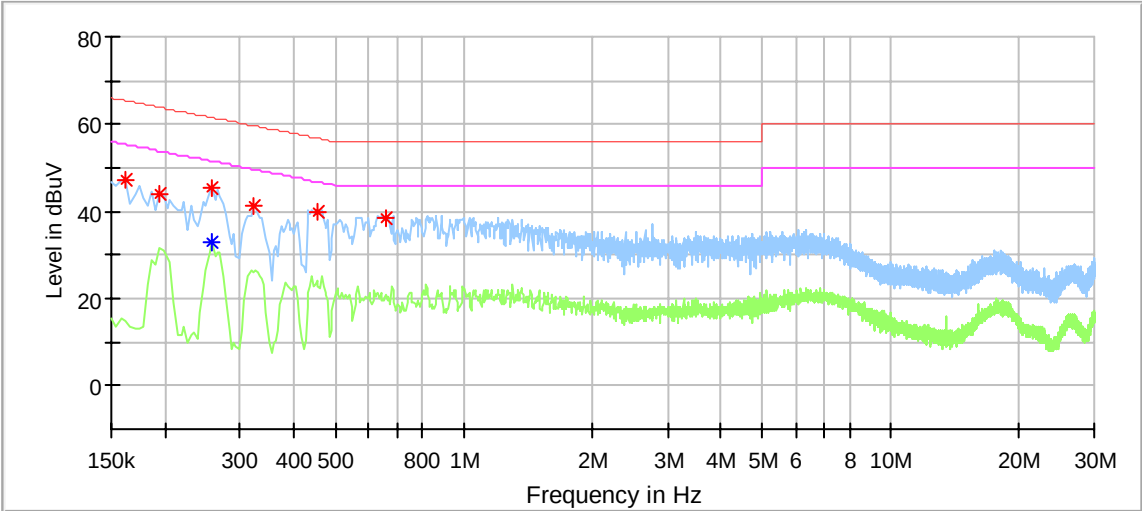
Frequency MHz	QP Limit dBμV	AV Limit dBμV
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: “*” Decreasing linearly with logarithm of the frequency



Conducted Emission

Product Type : 20V / 4Ah Smart Battery Pack
M/N : HG12607-US
Operating Condition : BLE communication mode
Test Specification : L
Comment : AC 120V/60Hz



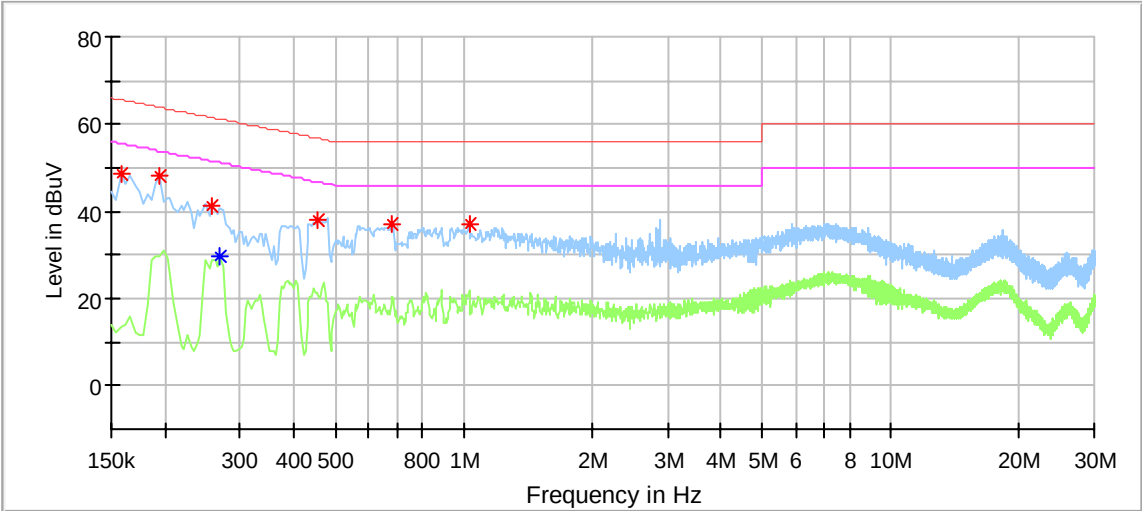
Critical Freqs

Frequency (MHz)	MaxPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.162000	47.36	---	65.36	18.00	L1	9.67
0.194000	43.96	---	63.86	19.91	L1	9.67
0.258000	---	32.70	51.50	18.80	L1	9.67
0.258000	45.56	---	61.50	15.94	L1	9.67
0.322000	41.36	---	59.66	18.29	L1	9.66
0.454000	39.99	---	56.80	16.82	L1	9.67
0.658000	38.63	---	56.00	17.37	L1	9.68



Conducted Emission

Product Type : 20V / 4Ah Smart Battery Pack
M/N : HG12607-US
Operating Condition : BLE communication mode
Test Specification : N
Comment : AC 120V/60Hz



Critical Freqs

Frequency (MHz)	MaxPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr. (dB)
0.158000	48.43	---	65.57	17.14	N	9.67
0.194000	48.15	---	63.86	15.72	N	9.66
0.258000	41.32	---	61.50	20.18	N	9.66
0.270000	---	29.85	51.12	21.27	N	9.66
0.458000	38.19	---	56.73	18.53	N	9.67
0.682000	37.24	---	56.00	18.76	N	9.67
1.030000	37.00	---	56.00	19.00	N	9.67

9.2 Conducted 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 6dB bandwidth, centered on a channel need to test,
RBW > the 6dB bandwidth of the emission being measured, 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. 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.

Limit

According to §15.247 (b) (3), conducted output power limit as below:

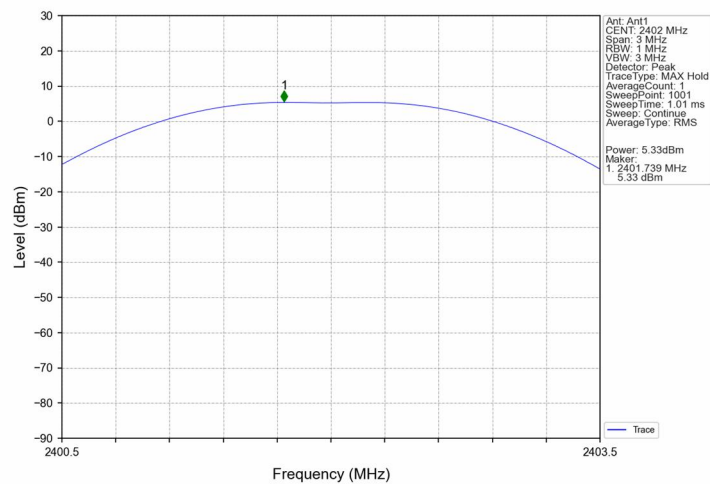
Frequency Range MHz	Limit W	Limit dBm
2400-2483.5	≤ 1	≤ 30

Test Results

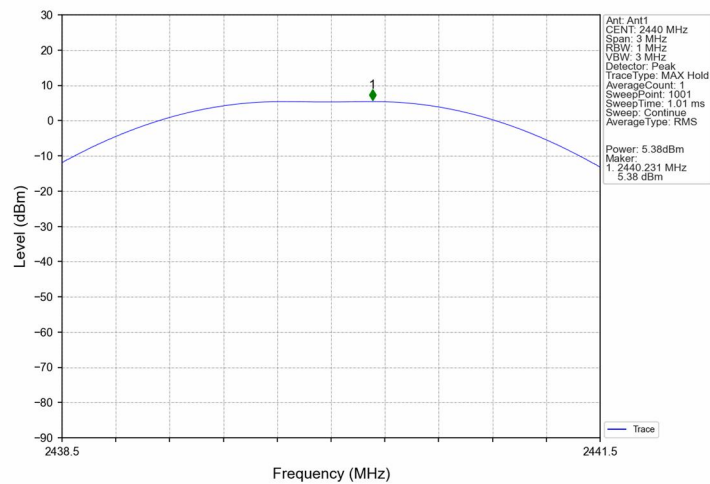
Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	5.33	≤ 30	Pass
		2440	5.38	≤ 30	Pass
		2480	5.33	≤ 30	Pass
2M	SISO	2402	5.20	≤ 30	Pass
		2440	5.27	≤ 30	Pass
		2480	5.25	≤ 30	Pass



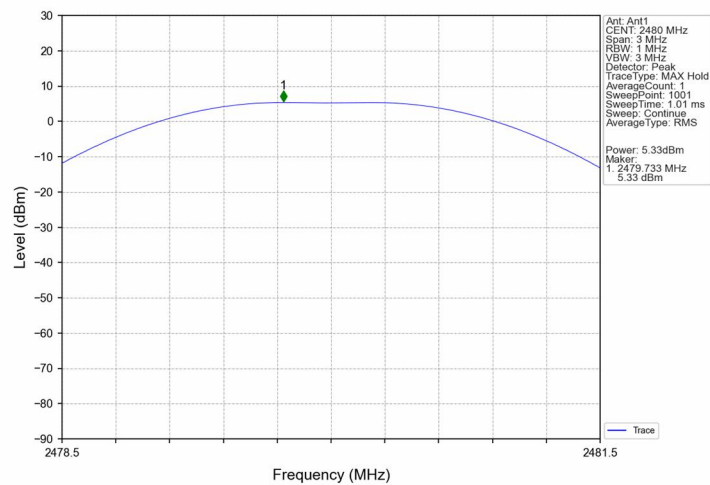
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV

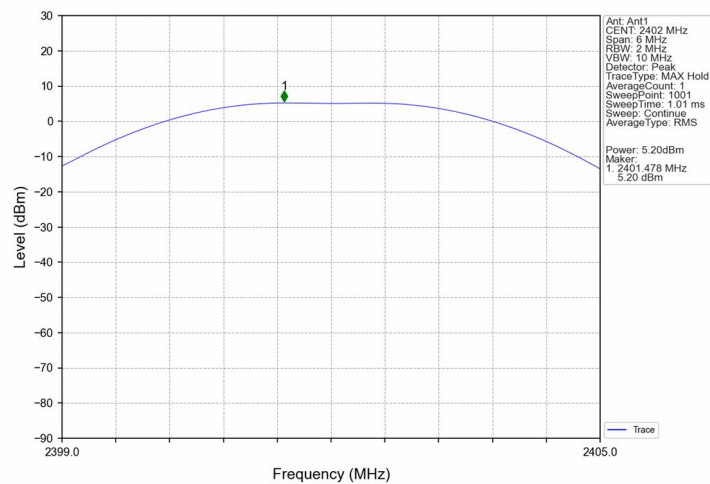


1M_HCH_2480MHz_Ant1_NTNV

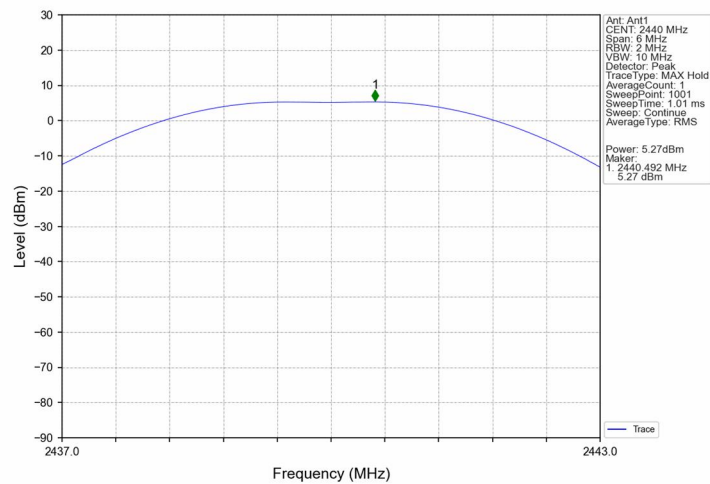




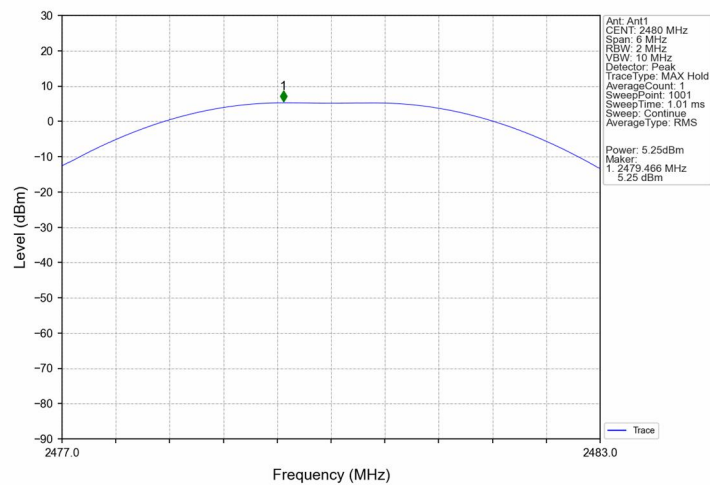
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV





9.3 6 dB Bandwidth

Test Method for 6 dB Bandwidth

- 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 center frequency to the nominal EUT channel center frequency
- 3. Set RBW =1% to 5% of the OBW but not less than 100kHz, VBW≥ 3 × RBW Detector = Peak. Trace mode = max hold. Sweep = auto Trace = max hold
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
- 5. Record the results in the test report.

Limit

6dB bandwidth Limit [kHz]

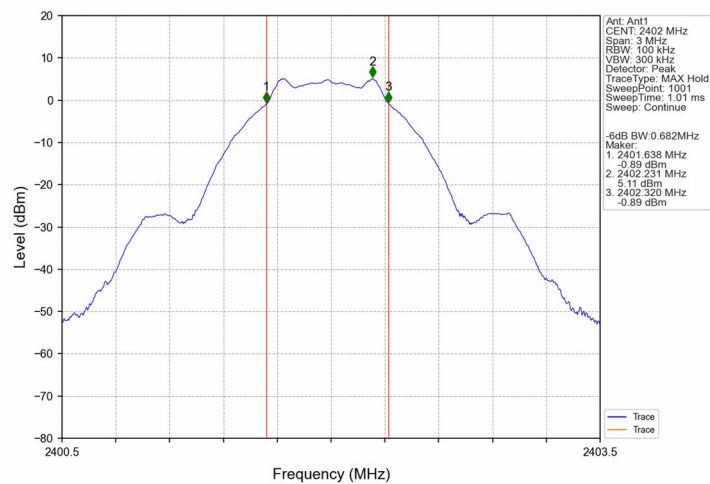
≥500

Test result for 6 dB Bandwidth

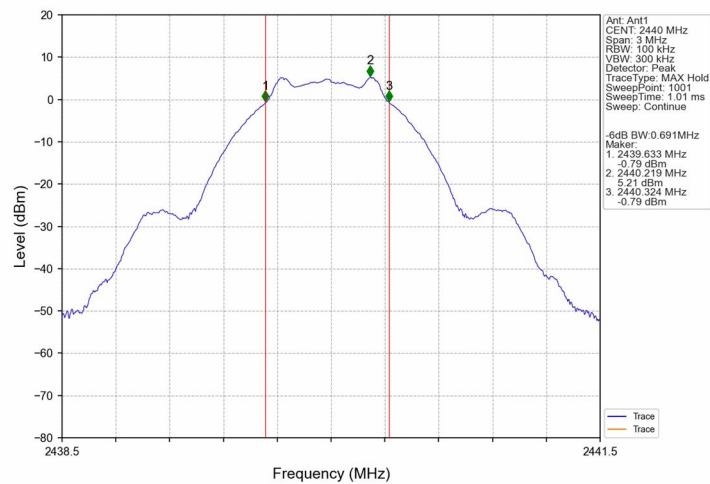
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.682	>=0.5	Pass
		2440	1	0.691	>=0.5	Pass
		2480	1	0.691	>=0.5	Pass
2M	SISO	2402	1	1.372	>=0.5	Pass
		2440	1	1.361	>=0.5	Pass
		2480	1	1.387	>=0.5	Pass



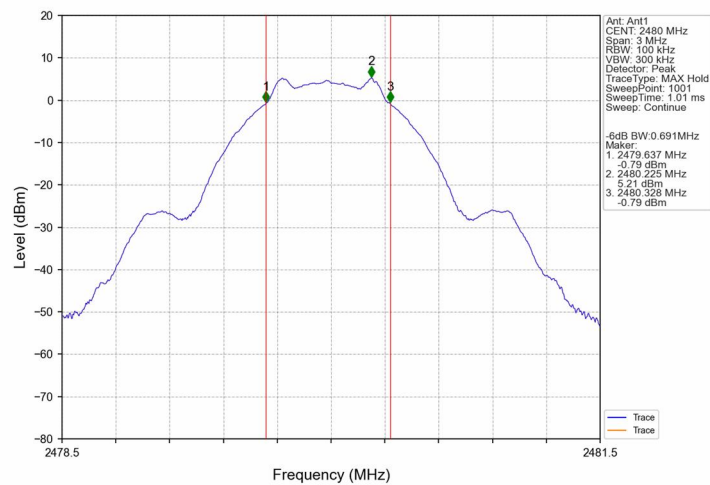
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV

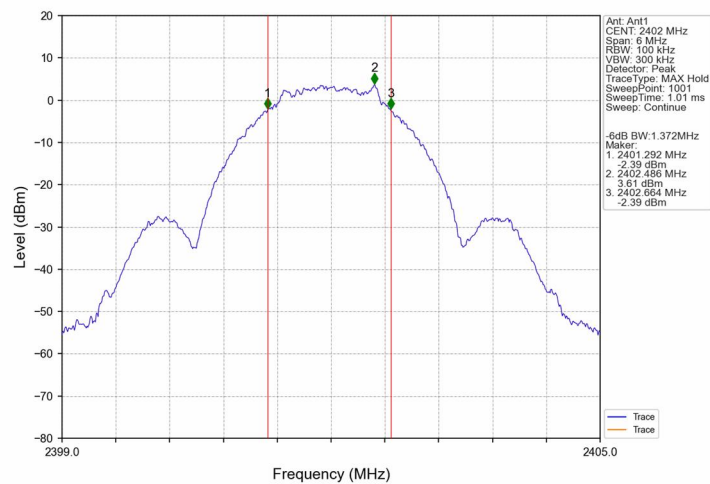


1M_HCH_2480MHz_Ant1_NTNV

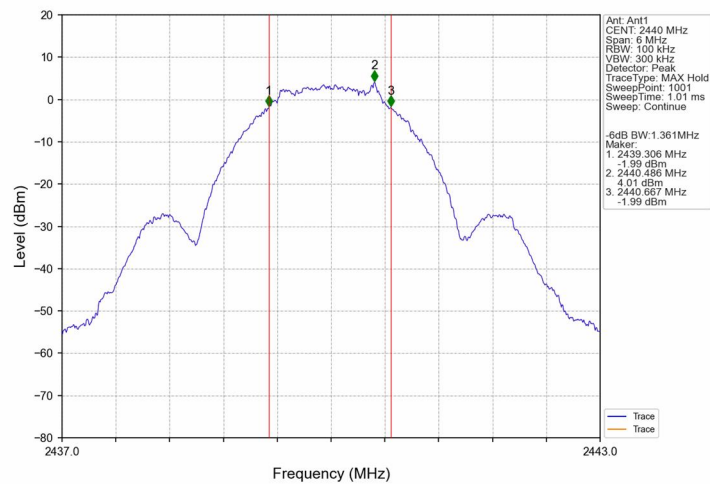




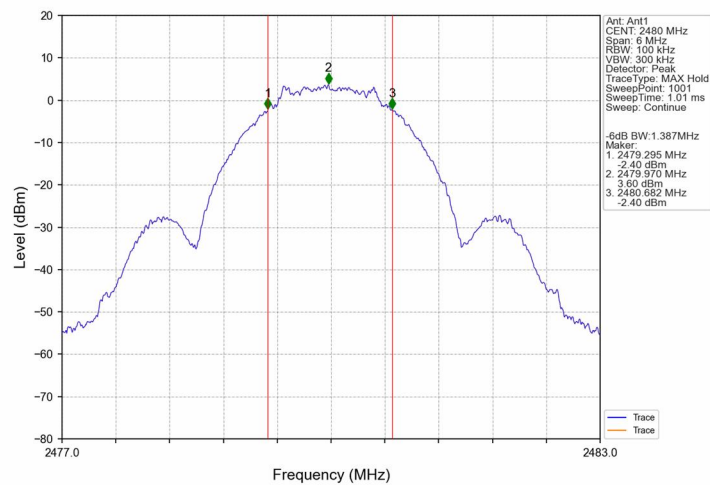
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV





9.4 Power Spectral Density

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:
- 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

Limit [dBm/3kHz]

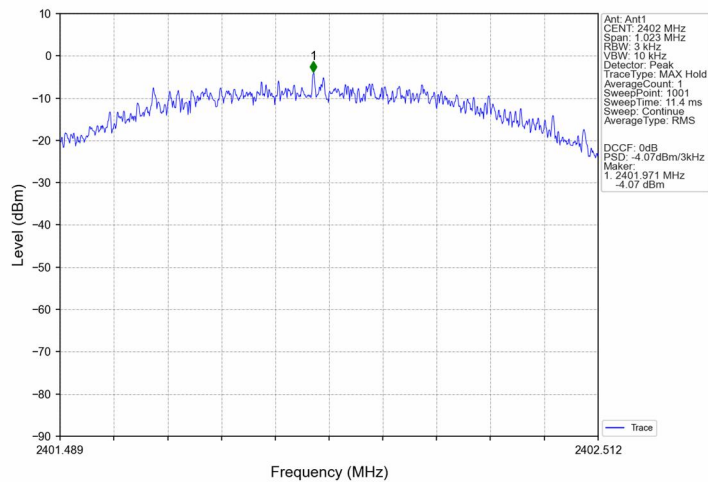
≤ 8

Test Results

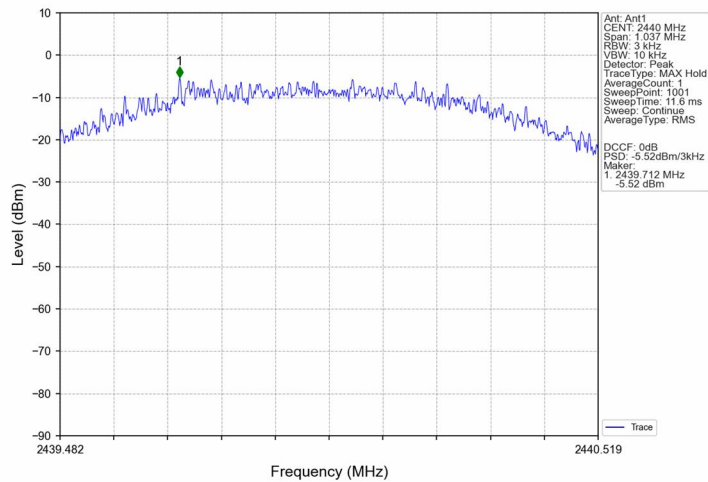
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-4.07	≤8	Pass
		2440	-5.52	≤8	Pass
		2480	-4.71	≤8	Pass
2M	SISO	2402	-9.29	≤8	Pass
		2440	-7.59	≤8	Pass
		2480	-7.59	≤8	Pass



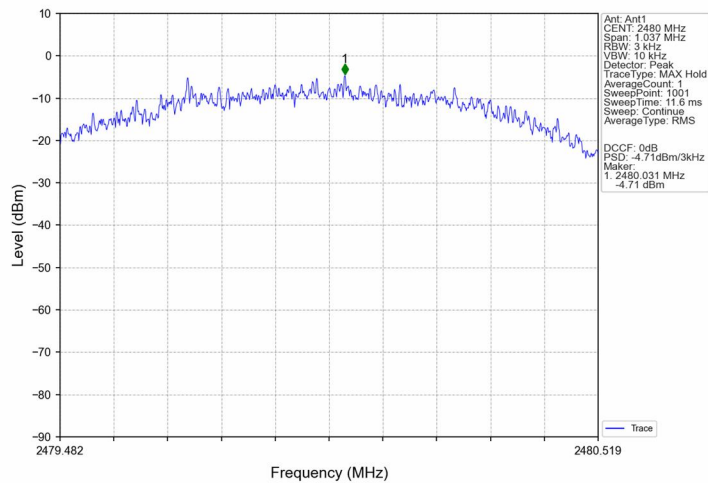
1M_LCH_2402MHz_Ant1_NTNV



1M_MCH_2440MHz_Ant1_NTNV

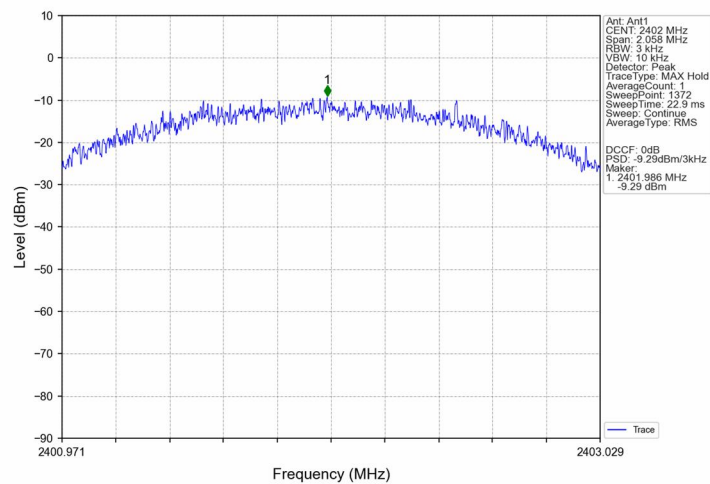


1M_HCH_2480MHz_Ant1_NTNV

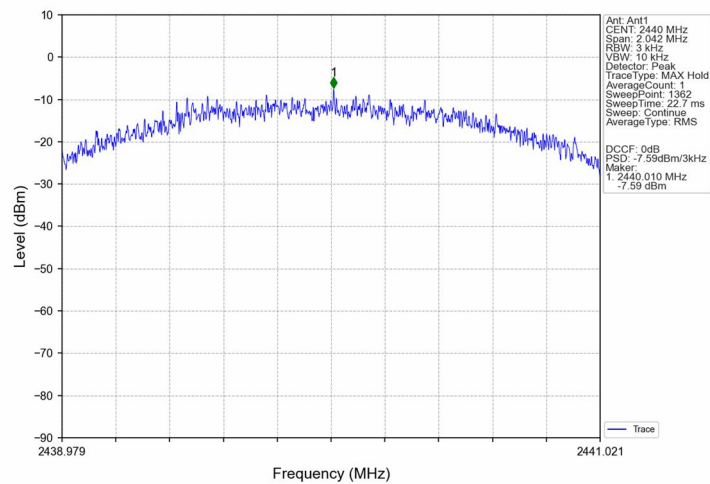




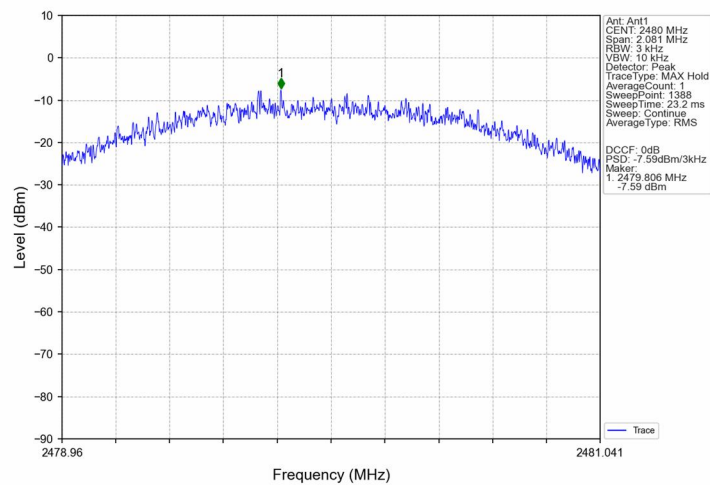
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



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

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

Test Result

Reference level:

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	5.26
		2440	1	5.23
		2480	1	5.21
2M	SISO	2402	1	3.46
		2440	1	3.62
		2480	1	3.85

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.

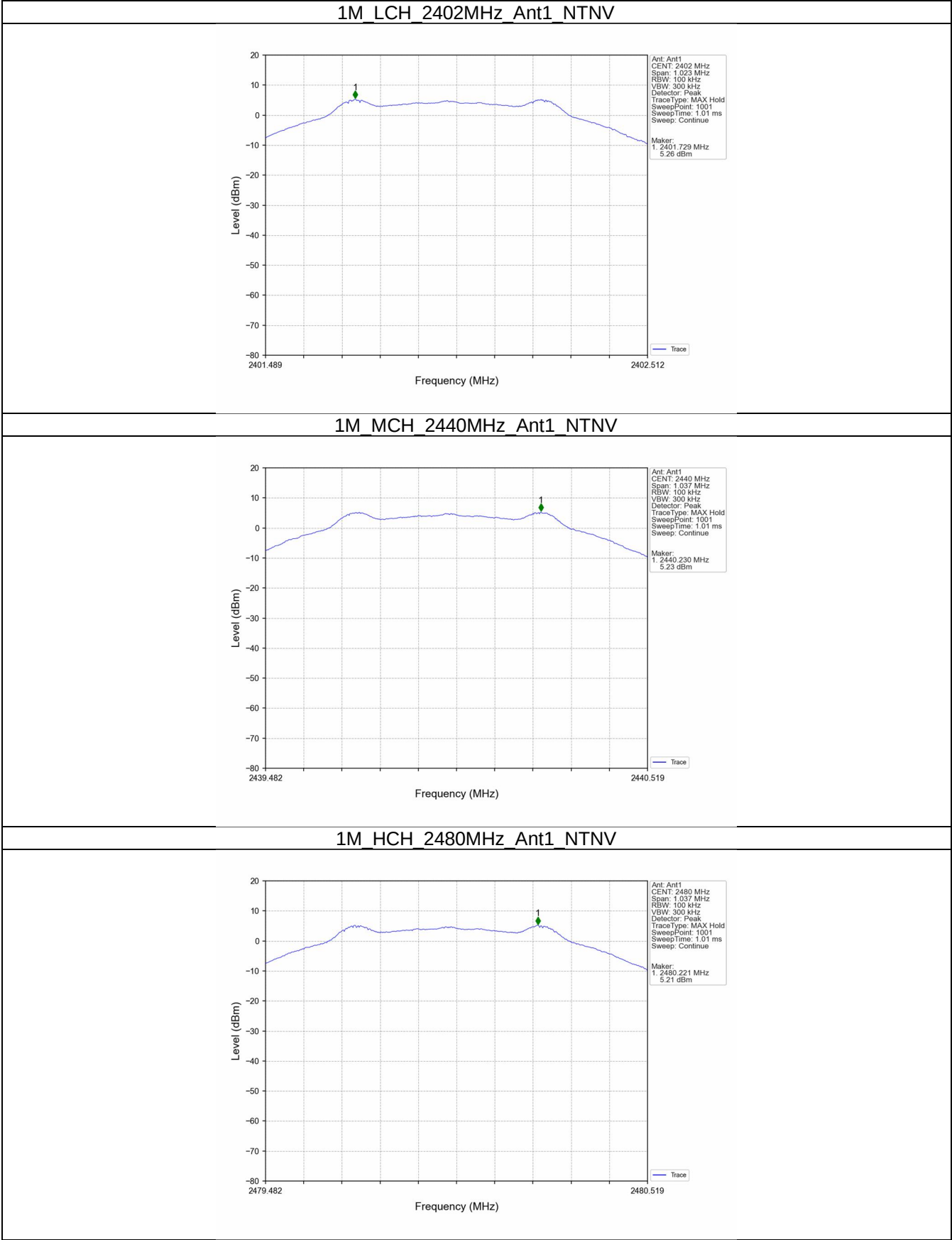
Conducted spurious emissions:

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	5.26	-14.74	Pass
		2440	1	5.23	-14.77	Pass
		2480	1	5.21	-14.79	Pass
2M	SISO	2402	1	3.46	-16.54	Pass
		2440	1	3.62	-16.38	Pass
		2480	1	3.85	-16.15	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.

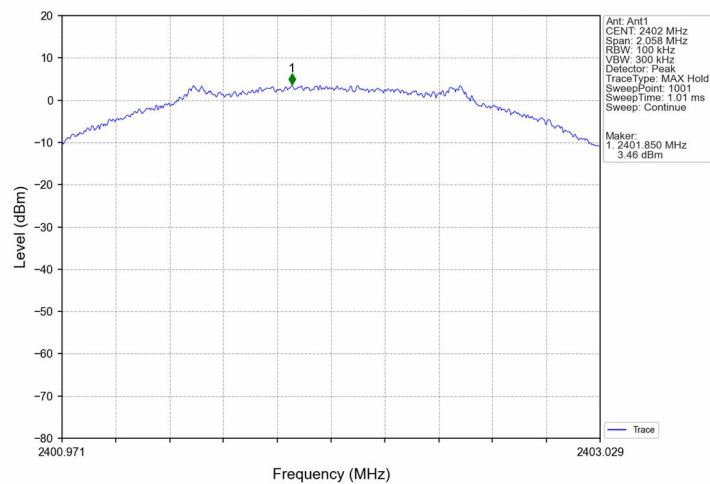


Reference level:

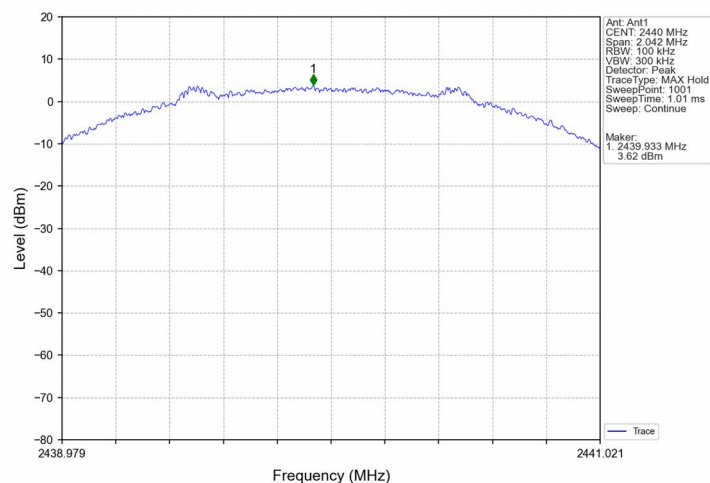




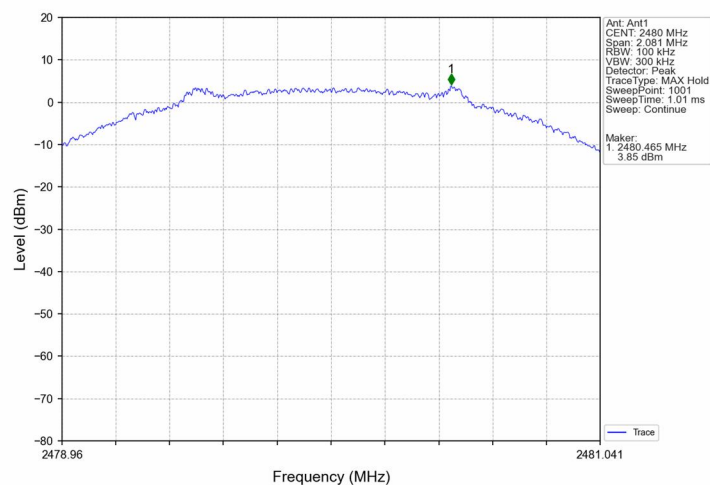
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV

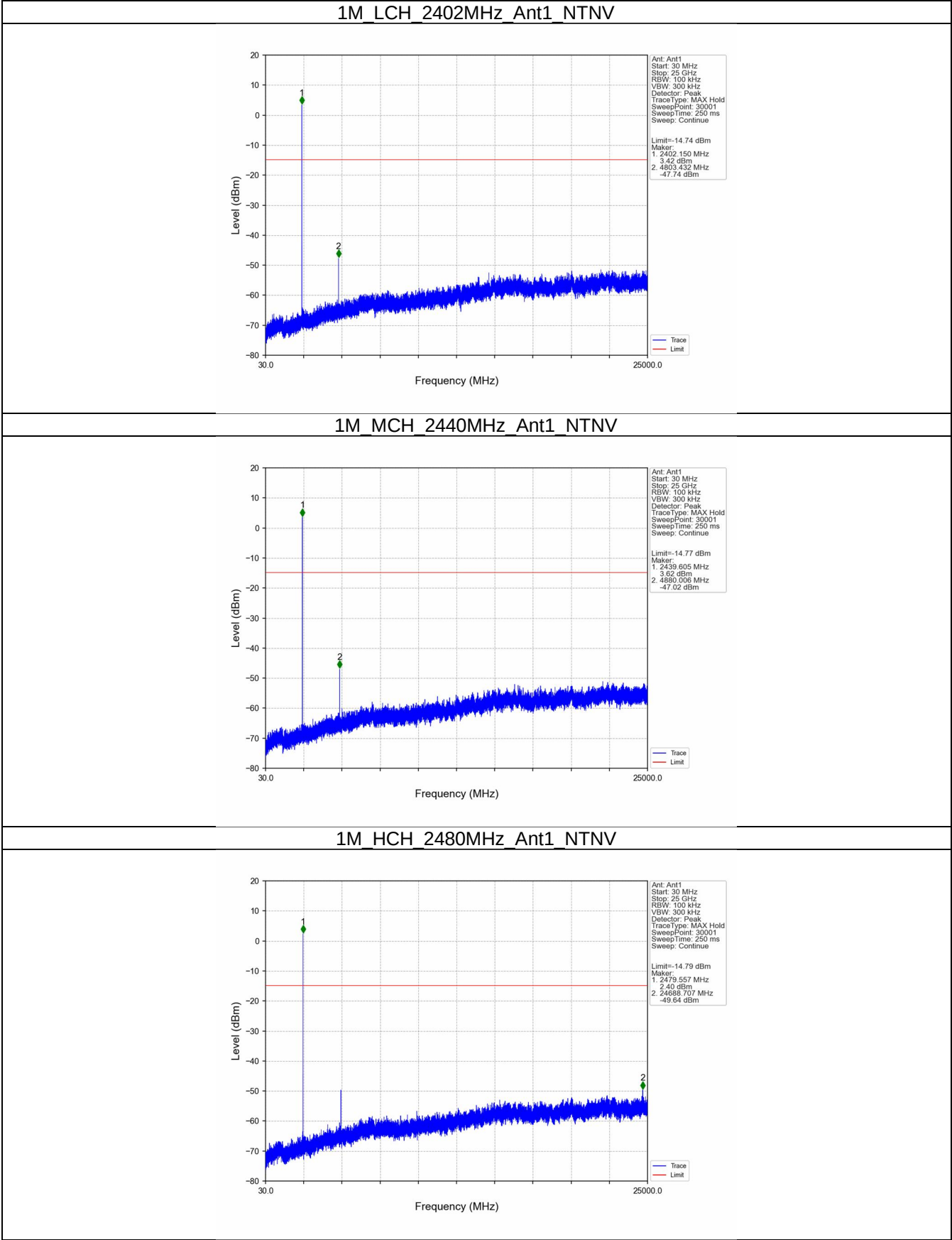


2M_HCH_2480MHz_Ant1_NTNV



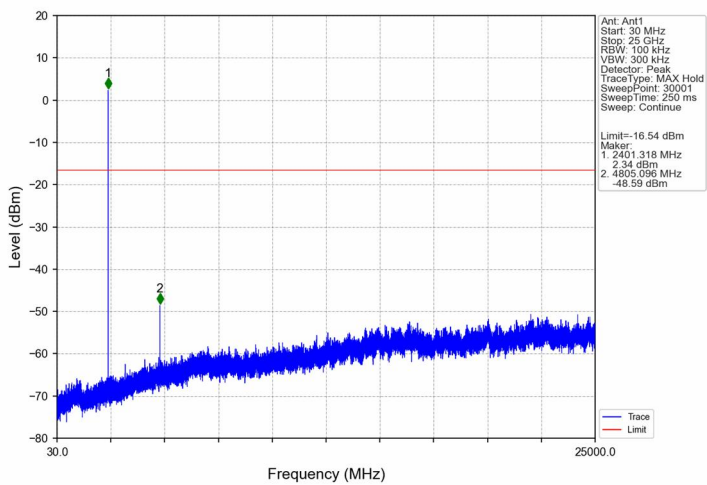


Conducted spurious emissions:

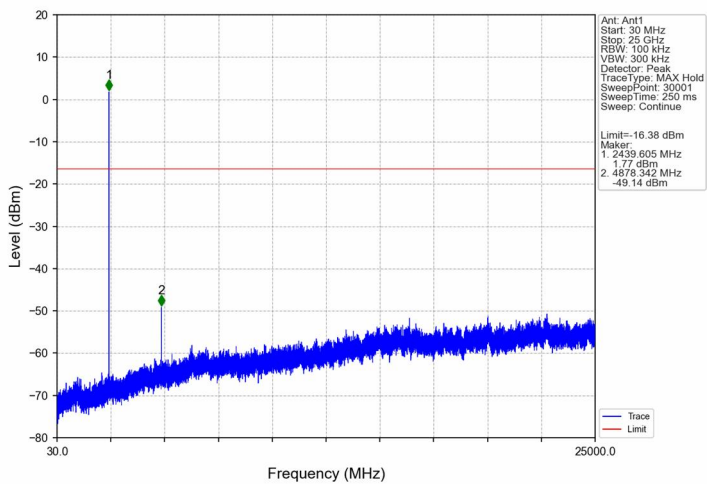




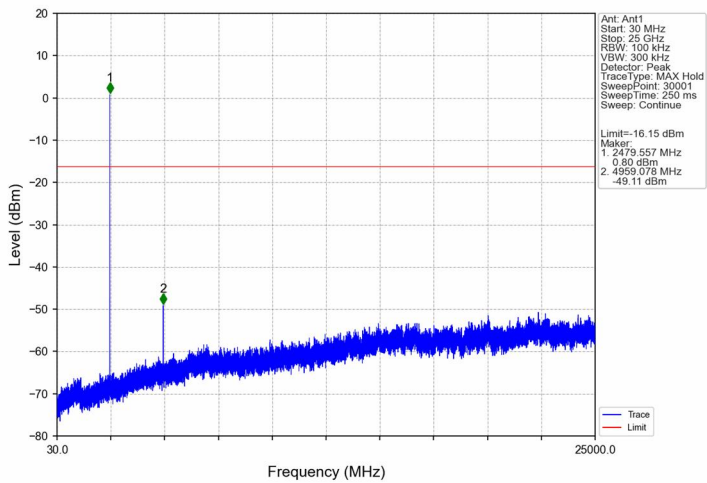
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



9.6 Band Edge Testing

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

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

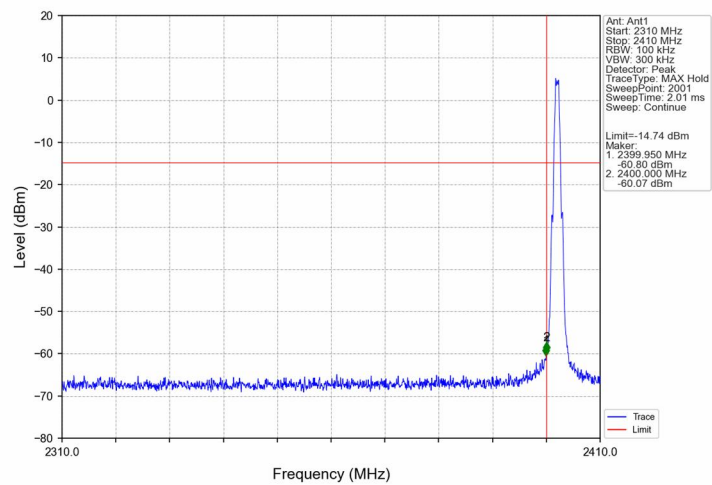
Test result

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	5.26	-14.74	Pass
		2440	1	5.23	-14.77	Pass
		2480	1	5.21	-14.79	Pass
2M	SISO	2402	1	3.46	-16.54	Pass
		2440	1	3.62	-16.38	Pass
		2480	1	3.85	-16.15	Pass

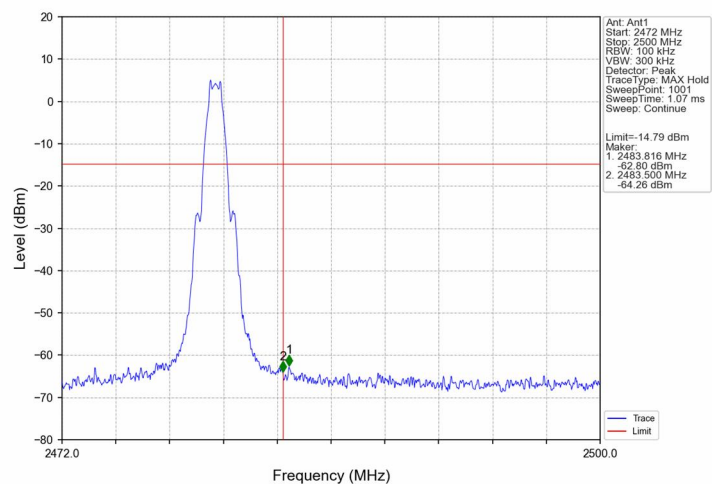
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.



1M_LCH_2402MHz_Ant1_NTNV

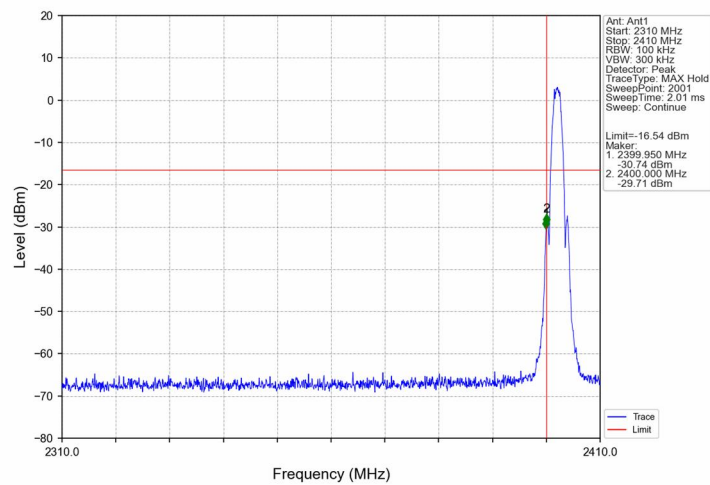


1M_HCH_2480MHz_Ant1_NTNV

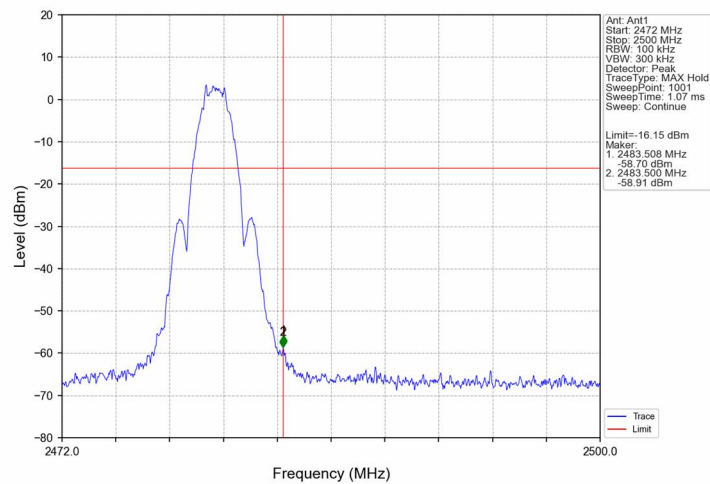




2M_LCH_2402MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



9.7 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 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:

Procedure for Unwanted Emissions Measurements Below 1000 MHz

Span = wide enough to capture the peak level of the in-band emission and all spurious
 RBW = 100 KHz 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 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(AV) at frequency above 1GHz.

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 $\mu\text{V/m}$	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: 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: 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)

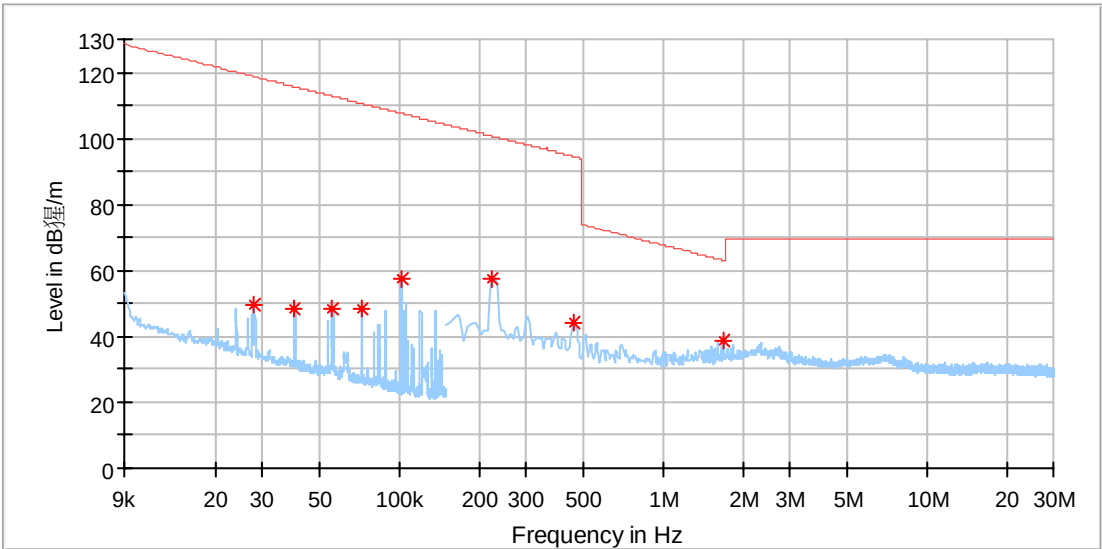


Spurious Radiated Emissions for Transmitter

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.

Transmitting spurious emission test result as below:

Test data_9kHz to 30MHz
BLE_1M_Low Channel:

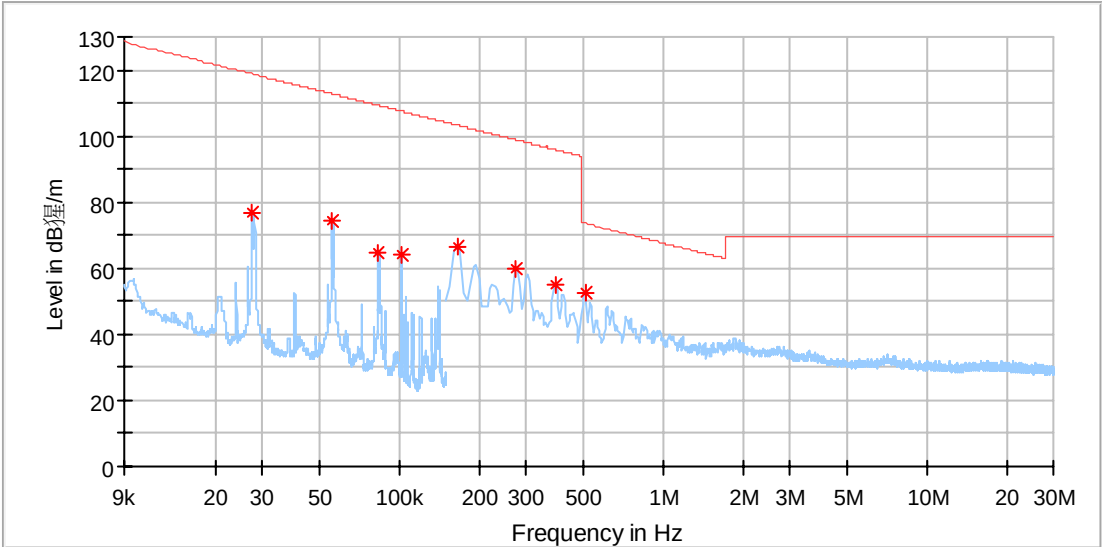


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.028082	49.29	118.62	69.33	H	13.0	19.93
0.039973	48.50	115.56	67.06	H	0.0	19.92
0.055436	48.41	112.72	64.31	H	8.0	19.96
0.071980	48.23	110.45	62.22	H	0.0	19.94
0.101543	57.56	107.46	49.90	H	261.0	19.95
0.224625	57.51	100.57	43.06	H	146.0	19.91
0.453475	44.08	94.47	50.39	H	146.0	19.95
1.682300	38.59	63.09	24.50	H	357.0	20.03



Test data_9kHz to 30MHz
BLE_1M_Low Channel:

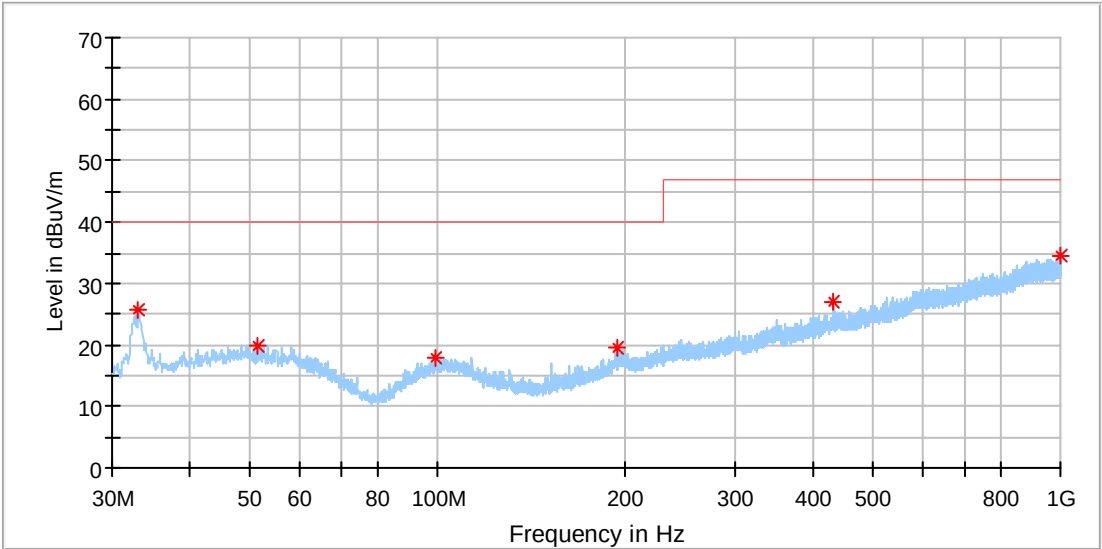


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Azimuth (deg)	Corr. (dB/m)
0.027706	76.76	118.74	41.98	V	253.0	19.93
0.055436	74.54	112.72	38.18	V	181.0	19.96
0.083166	64.68	109.20	44.52	V	205.0	19.95
0.101590	64.37	107.46	43.09	V	301.0	19.95
0.164925	66.58	103.25	36.67	V	205.0	19.92
0.274375	59.70	98.83	39.14	V	341.0	19.93
0.388800	54.95	95.81	40.86	V	325.0	19.94
0.503225	52.32	73.57	21.25	V	353.0	19.95



Test data_30MHz to 1000MHz
BLE_1M_Low Channel:

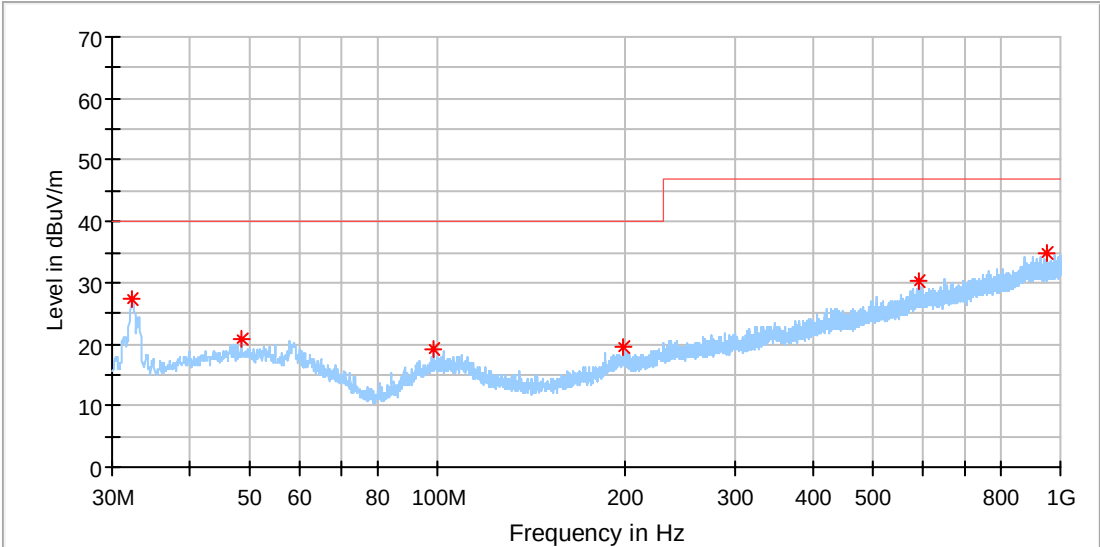


Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.091875	25.81	40.00	14.19	100.0	H	278.0	16.77
51.279375	20.02	40.00	19.98	200.0	H	337.0	20.77
99.233750	17.87	40.00	22.13	100.0	H	160.0	18.88
194.354375	19.67	40.00	20.33	200.0	H	73.0	19.07
432.610625	27.01	47.00	19.99	200.0	H	293.0	24.99
998.726875	34.51	47.00	12.49	200.0	H	278.0	32.80



Test data_30MHz to 1000MHz
BLE_1M_Low Channel:

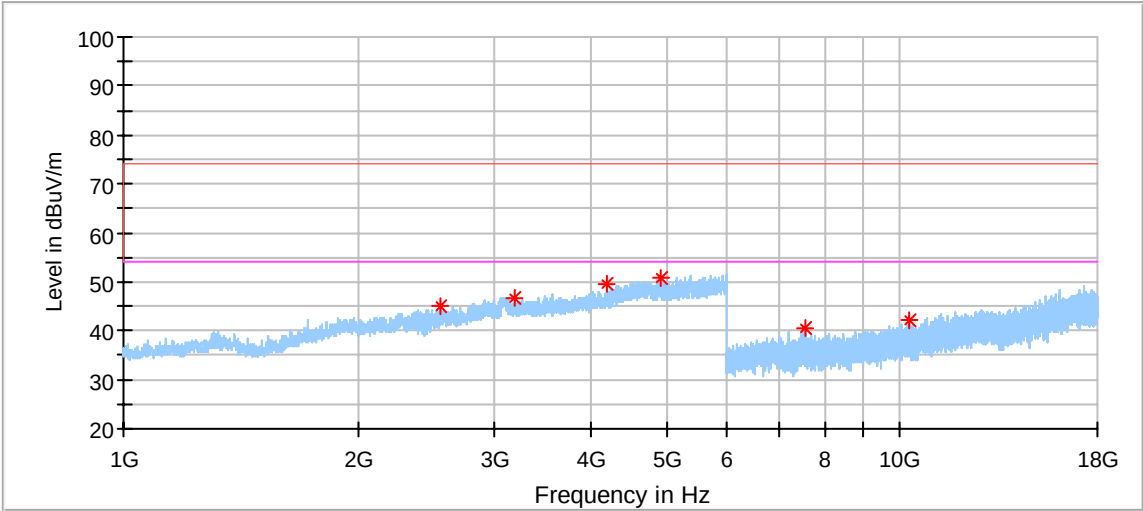


Critical_Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
32.364375	27.46	40.00	12.54	100.0	V	4.0	16.67
48.430000	20.72	40.00	19.28	100.0	V	8.0	20.77
98.748750	19.07	40.00	20.93	200.0	V	0.0	18.85
199.204375	19.68	40.00	20.32	200.0	V	0.0	19.21
592.478750	30.23	47.00	16.77	100.0	V	324.0	28.22
946.892500	34.95	47.00	12.05	200.0	V	0.0	32.41



Test data 1GHz to 18GHz:
BLE_1M_Low Channel:

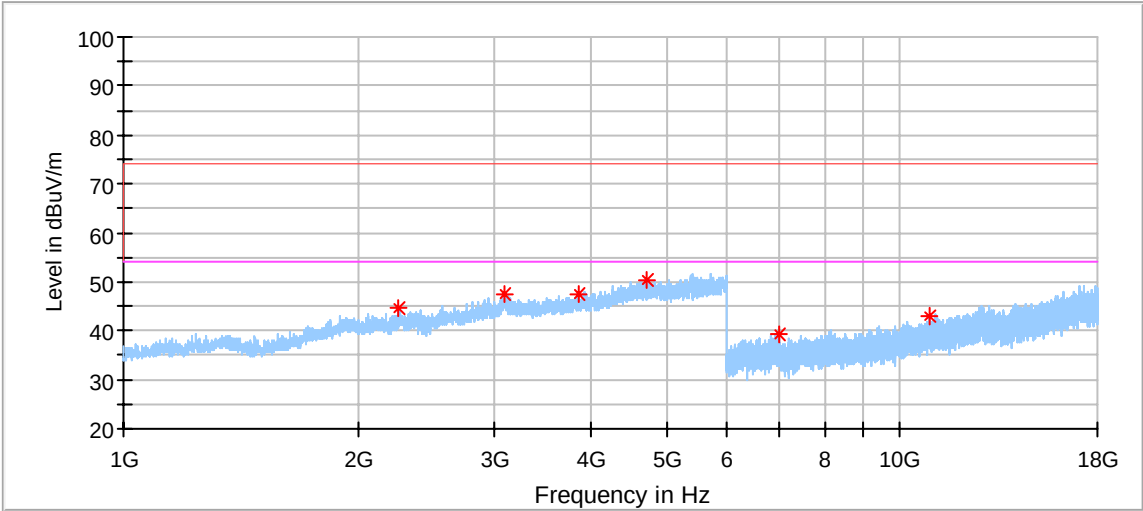


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2558.000000	45.20	74.00	28.80	150.0	H	352.0	-1.25
3187.500000	46.84	74.00	27.16	150.0	H	13.0	0.91
4200.000000	49.50	74.00	24.50	150.0	H	319.0	3.22
4913.000000	50.57	74.00	23.43	150.0	H	63.0	5.86
7547.000000	40.37	74.00	33.63	150.0	H	329.0	9.35
10290.000000	42.12	74.00	31.88	150.0	H	104.0	13.41



Test data 1GHz to 18GHz:
BLE_1M_Low Channel:

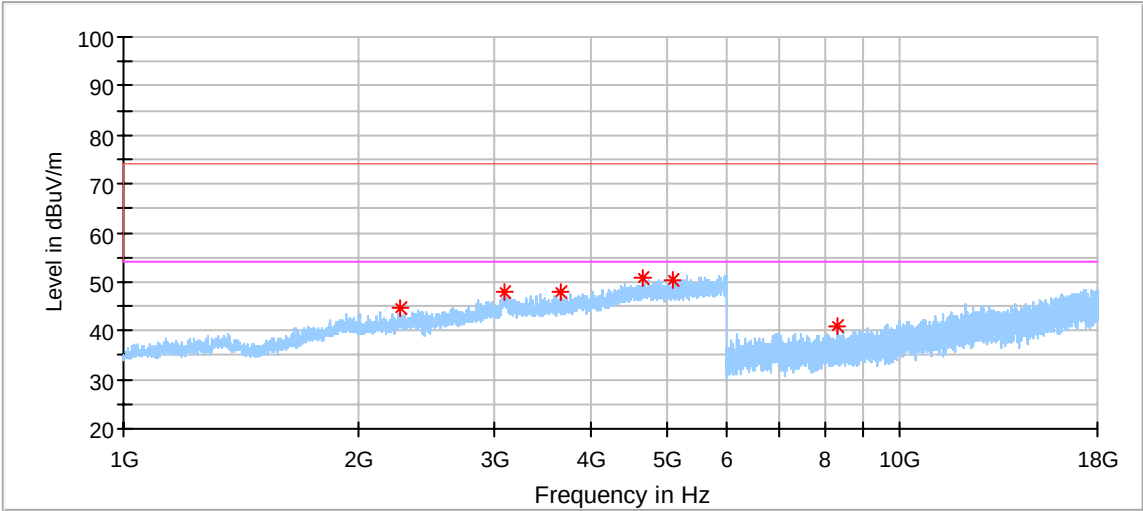


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2261.500000	44.43	74.00	29.57	150.0	V	207.0	-1.77
3090.500000	47.55	74.00	26.45	150.0	V	267.0	2.38
3862.000000	47.45	74.00	26.55	150.0	V	243.0	2.57
4720.500000	50.42	74.00	23.58	150.0	V	255.0	5.94
6996.000000	39.17	74.00	34.83	150.0	V	61.0	9.01
10915.000000	42.85	74.00	31.15	150.0	V	281.0	13.76



Test data 1GHz to 18GHz:
BLE_1M_Middle Channel:

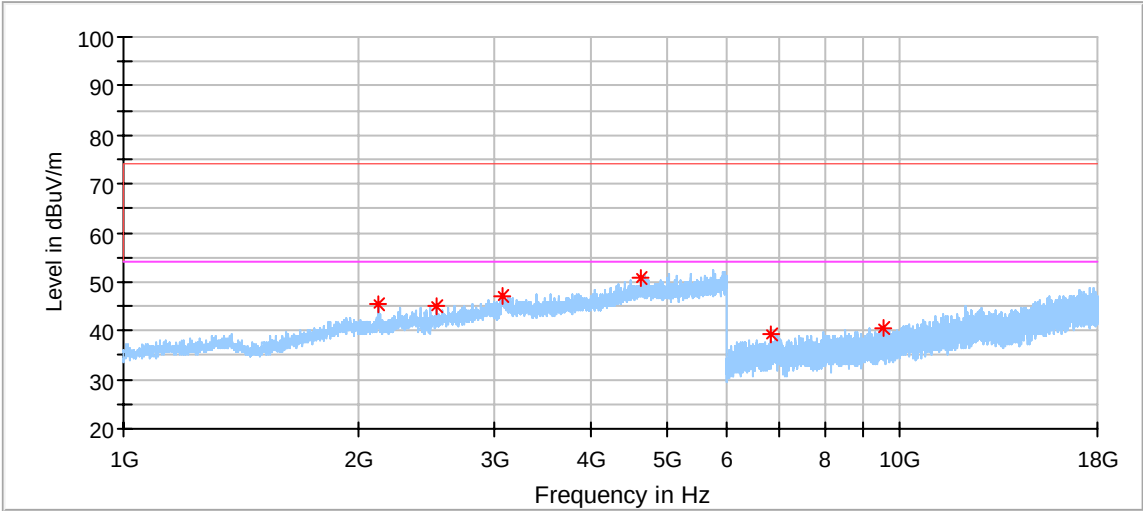


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2271.500000	44.55	74.00	29.45	150.0	H	124.0	-1.85
3088.000000	47.86	74.00	26.14	150.0	H	0.0	2.31
3655.000000	47.73	74.00	26.27	150.0	H	0.0	1.84
4679.500000	50.90	74.00	23.10	150.0	H	26.0	5.79
5088.000000	50.44	74.00	23.56	150.0	H	268.0	6.08
8288.500000	41.10	74.00	32.90	150.0	H	252.0	10.32



Test data 1GHz to 18GHz:
BLE_1M_Middle Channel:

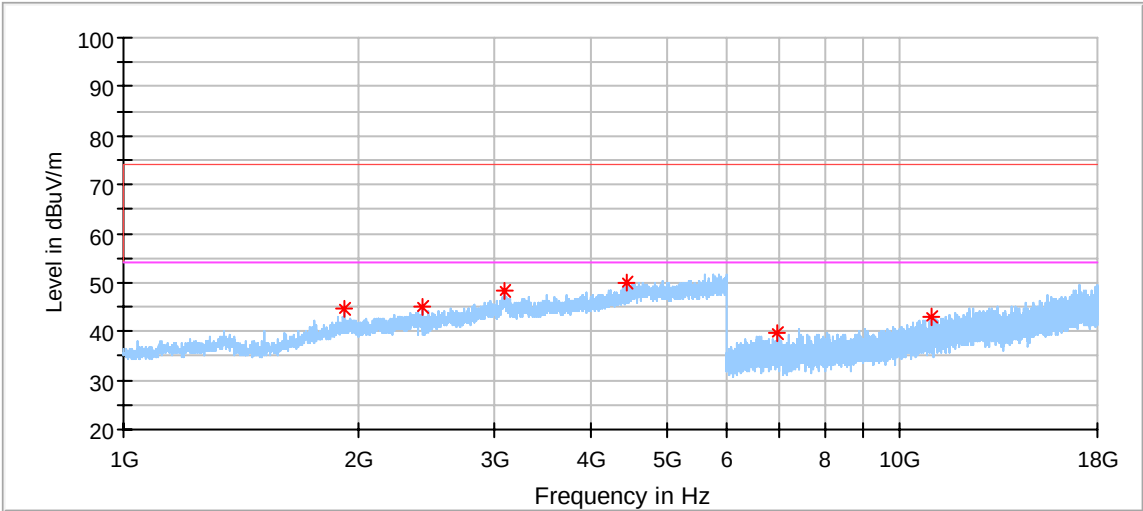


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2128.500000	45.41	74.00	28.59	150.0	V	99.0	-2.71
2529.500000	44.98	74.00	29.02	150.0	V	349.0	-1.42
3081.000000	47.02	74.00	26.98	150.0	V	4.0	2.10
4629.500000	50.79	74.00	23.21	150.0	V	171.0	5.57
6827.500000	39.44	74.00	34.56	150.0	V	304.0	8.98
9501.500000	40.68	74.00	33.32	150.0	V	78.0	12.28



Test data 1GHz to 18GHz:
BLE_1M_High Channel:

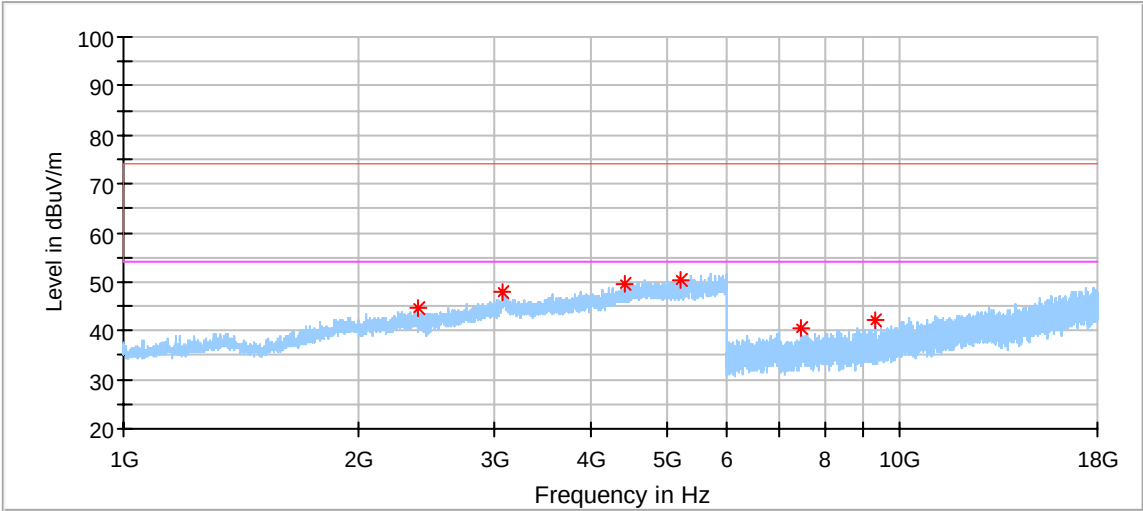


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1919.000000	44.45	74.00	29.55	150.0	H	243.0	-3.27
2425.500000	45.22	74.00	28.78	150.0	H	231.0	-0.83
3096.000000	48.26	74.00	25.74	150.0	H	255.0	2.55
4437.500000	50.00	74.00	24.00	150.0	H	314.0	4.62
6963.500000	39.77	74.00	34.23	150.0	H	179.0	9.18
10955.500000	42.91	74.00	31.09	150.0	H	203.0	13.90



Test data 1GHz to 18GHz:
BLE_1M_High Channel:

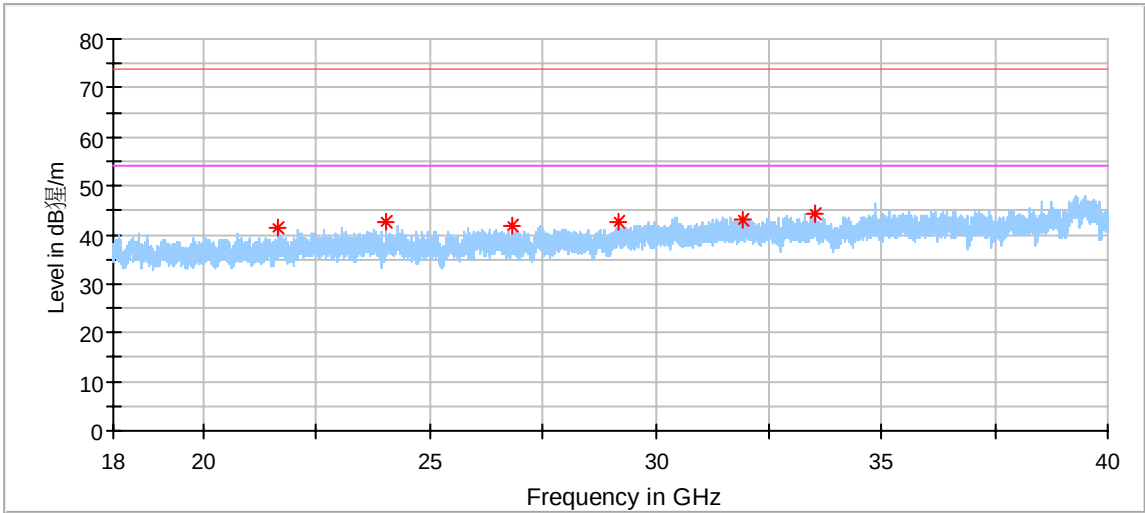


Critical Freqs

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2395.500000	44.62	74.00	29.38	150.0	V	329.0	-1.22
3079.000000	48.03	74.00	25.97	150.0	V	51.0	2.04
4435.500000	49.45	74.00	24.55	150.0	V	221.0	4.60
5222.500000	50.55	74.00	23.45	150.0	V	341.0	6.28
7476.500000	40.53	74.00	33.47	150.0	V	7.0	9.43
9292.500000	42.32	74.00	31.68	150.0	V	329.0	12.05



Test data 18GHz to 40GHz:
BLE_1M_Low Channel:

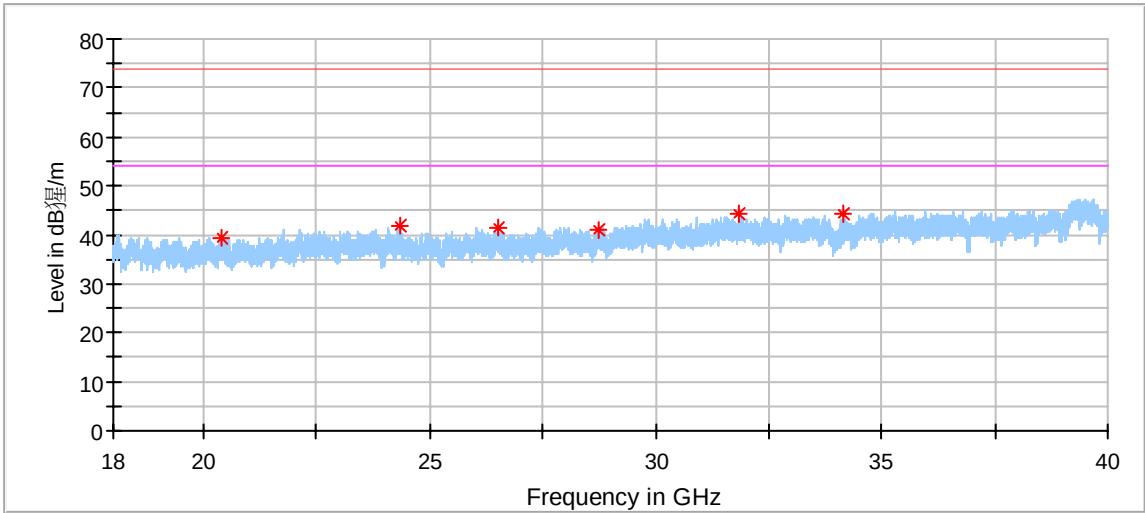


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
21658.875000	41.30	74.00	32.70	150.0	H	0.0	-1.79
24044.500000	42.51	74.00	31.49	150.0	H	167.0	-0.20
26805.500000	41.98	74.00	32.02	150.0	H	84.0	0.89
29197.312500	42.64	74.00	31.36	150.0	H	260.0	0.49
31923.250000	43.20	74.00	30.80	150.0	H	234.0	1.60
33505.187500	44.16	74.00	29.84	150.0	H	194.0	0.62



Test data 18GHz to 40GHz:
BLE_1M_Low Channel:



Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
20374.625000	39.33	74.00	34.67	150.0	V	232.0	-3.21
24330.500000	41.71	74.00	32.29	150.0	V	258.0	-0.17
26503.687500	41.58	74.00	32.42	150.0	V	205.0	1.30
28727.750000	41.22	74.00	32.78	150.0	V	178.0	0.23
31860.000000	44.41	74.00	29.59	150.0	V	85.0	1.52
34156.937500	44.35	74.00	29.65	150.0	V	98.0	0.62

Remark:

- (1) We test both rates for Low channel, Middle channel and High channel separately, only the worst case recorded in this report.
- (2) Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

10 Test Equipment List

Radiated Emission Test 1# (9kHz – 1GHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	2025-5-13
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	2025-7-2
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	2025-7-24
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	2025-5-11
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	2025-7-2
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	2025-7-17
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	2025-5-11
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A

Radiated Emission 2# Test (1GHz – 40GHz)

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	2025-5-13
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	2025-4-10
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-002	100746	2025-5-11
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	2025-7-2
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	2025-7-17
Attenuator	Mini-circuits	UNAT-6+	68-4-81-21-002	15542	2025-5-11
3m Semi-anechoic chamber	TDK	SAC-3 #2	68-4-90-19-006	----	2026-10-25
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A

Conducted RF Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	2025-5-11
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157W	68-4-93-14-003	101226/100929	2025-5-11
Power Splitter	Weinschel	1580	68-4-85-14-001	SC319	2025-5-11
10dB Attenuator	Weinschel	4M-10	68-4-81-14-003	43152	2025-5-11
10dB Attenuator	R&S	DNF	68-4-81-14-004	DNF-001	2025-5-11
10dB Attenuator	R&S	DNF	68-4-81-14-005	DNF-002	2025-5-11
10dB Attenuator	R&S	DNF	68-4-81-14-006	DNF-003	2025-5-11
10dB Attenuator	R&S	DNF	68-4-81-14-007	DNF-004	2025-5-11
Test software	Tonscend	System for BT/WIFI	68-4-74-14-006-A13	Version 2.6.77.0518	N/A
Shielding Room	TDK	TS8997	68-4-90-19-003	----	2025-10-15

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-14-001	101782	2025-5-13
LISN	Rohde & Schwarz	ENV432	68-4-87-16-001	101318	2025-5-12
Test software	Rohde & Schwarz	EMC32	68-4-90-14-003-A10	Version9.15.00	N/A
Shielding Room	TDK	CSR #1	68-4-90-19-004	----	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 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.57dB
Uncertainty for Radiated Emission in 3m chamber 9kHz-30MHz	4.70dB
Uncertainty for Radiated Emission in new 3m chamber 30MHz-1000MHz	Horizontal: 4.59dB; Vertical: 4.75dB
Uncertainty for Radiated Emission in new 3m 1000MHz-18000MHz	Horizontal: 5.08dB; Vertical: 5.09dB;
Uncertainty for Radiated Emission 18000MHz-40000MHz	Horizontal: 4.52dB; Vertical: 4.51dB
Uncertainty for Conducted RF test	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 OF REPORT---