TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: **47 CFR FCC Part 15, Subpart C (Section 15.247)**

Report No.: RFBDKG-WTW-P22110022

FCC ID: JNZMR0103

Product: Wireless Mouse

Brand: Logitech

Model No.: MR0103

Received Date: 2022/11/1

Test Date: 2022/11/14 ~ 2022/12/14

Issued Date: 2022/12/27

Applicant: Logitech Far East Ltd.

Address: 7700 Gateway Boulevard Newark California United States

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

FCC Registration / Designation Number: 723255 / TW2022

Approved by: _____ , **Date:** **2022/12/27**

May Chen / Manager

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Prepared by : Luna Yu / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBDKG-WTW-P22110022	Original release.	2022/12/27

1 Certificate

Product:	Wireless Mouse
Brand:	Logitech
Test Model:	MR0103
Sample Status:	Engineering sample
Applicant:	Logitech Far East Ltd.
Test Date:	2022/11/14 ~ 2022/12/14
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	NA	Power supply is 1.5 Vdc from battery.
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -9.9 dB at 62.66 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -4.1 dB at 2351.00, 2352.00 MHz
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Parameter	Specification	Expanded Uncertainty (k=2) (±)
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.5 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	Wireless Mouse
Brand	Logitech
Test Model	MR0103
Status of EUT	Engineering sample
Power Supply Rating	1.5 Vdc from battery
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2 Mbps (Note 3)
Operating Frequency	2.402 ~ 2.480 GHz (Note 3)
Number of Channel	40 (Note 3)
Output Power	**BT-LE function:** BT-LE 1M: 3.811 mW (5.81 dBm) BT-LE 2M: 3.819 mW (5.82 dBm) **logi bolt function:** logi bolt-1M: 3.802 mW (5.80 dBm) logi bolt-2M: 3.802 mW (5.80 dBm)

Note:

1. The EUT may have a lot of colors for marketing requirement.
2. This device has BT-LE and logi bolt functions. logi bolt is the same technology as BT-LE then enhancement secure protocol.
3. BT-LE technique supports 1Mbps and 2Mbps data rates, both have been evaluated in this test report. Refer to "**section 3.3 Channel List**" for more detail specification.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Net Gain (dBi)	Frequency range (GHz)	Antenna Type	Connector Type
2.56	2.4 ~ 2.4835	Monopole Antenna	none

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Channel List

BT-LE & logi bolt channels:

RF Channel	RF Center Frequency	Channel Index	Channels Type for BT 5.x		Channels Type for BT 4.x
			Maximum Data Rate 2Mbps	Maximum Data Rate 1Mbps	Maximum Data Rate 1Mbps
0	2402 MHz	37		●	●
1	2404 MHz	0	●		●
2	2406 MHz	1	●		●
3	2408 MHz	2	●		●
4	2410 MHz	3	●		●
5	2412 MHz	4	●		●
6	2414 MHz	5	●		●
7	2416 MHz	6	●		●
8	2418 MHz	7	●		●
9	2420 MHz	8	●		●
10	2422 MHz	9	●		●
11	2424 MHz	10	●		●
12	2426 MHz	38		●	●
13	2428 MHz	11	●		●
14	2430 MHz	12	●		●
15	2432 MHz	13	●		●
16	2434 MHz	14	●		●
17	2436 MHz	15	●		●
18	2438 MHz	16	●		●
19	2440 MHz	17	●		●
20	2442 MHz	18	●		●
21	2444 MHz	19	●		●
22	2446 MHz	20	●		●
23	2448 MHz	21	●		●
24	2450 MHz	22	●		●
25	2452 MHz	23	●		●
26	2454 MHz	24	●		●
27	2456 MHz	25	●		●
28	2458 MHz	26	●		●
29	2460 MHz	27	●		●
30	2462 MHz	28	●		●
31	2464 MHz	29	●		●
32	2466 MHz	30	●		●
33	2468 MHz	31	●		●
34	2470 MHz	32	●		●
35	2472 MHz	33	●		●
36	2474 MHz	34	●		●
37	2476 MHz	35	●		●
38	2478 MHz	36	●		●
39	2480 MHz	39		●	●

3.4 Test Mode Applicability and Tested Channel Detail

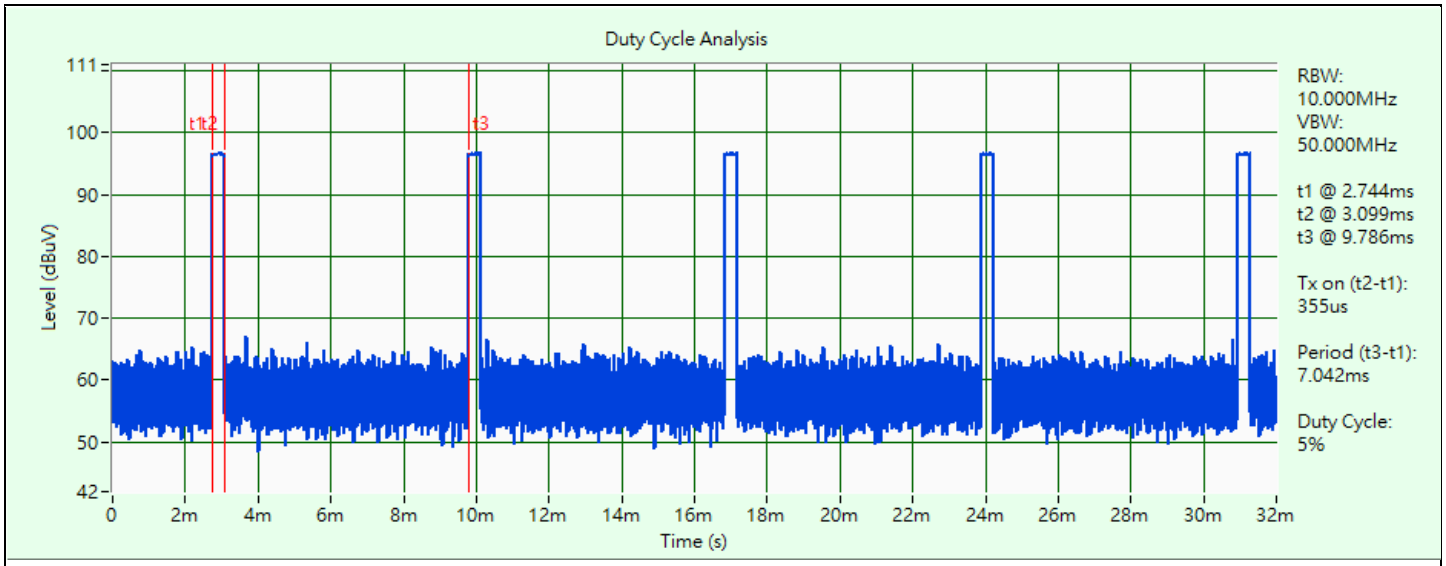
Pre-Scan:	1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below:

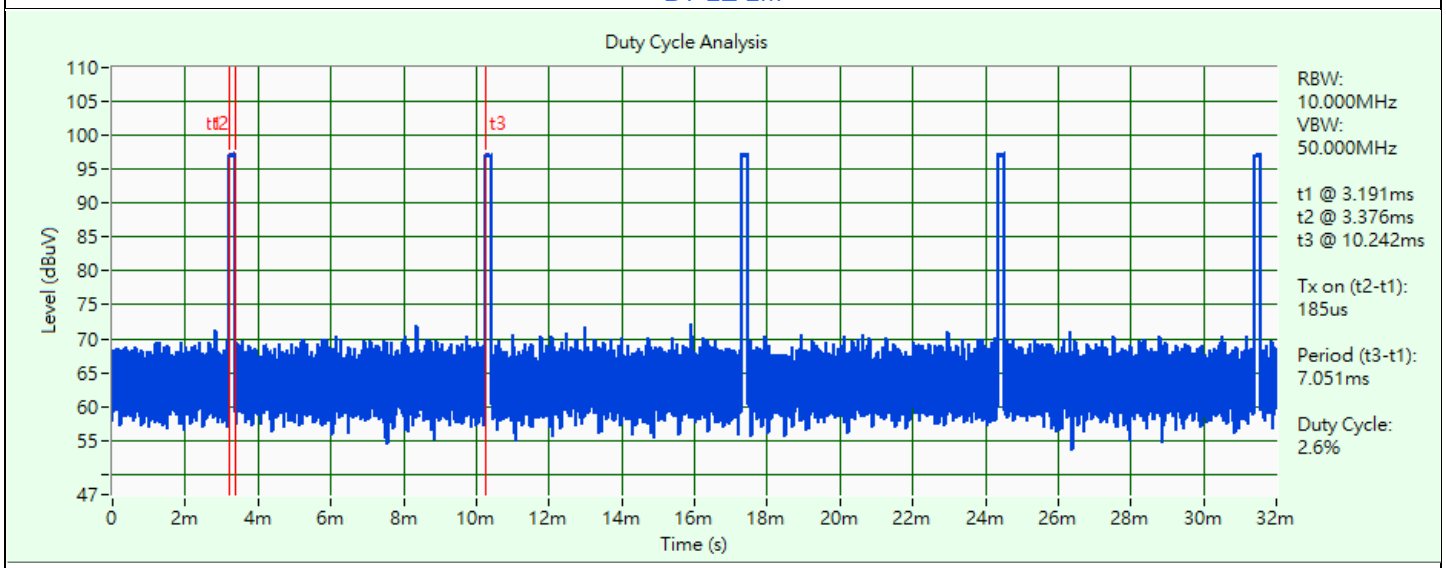
Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power / Power Spectral Density	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
	logi bolt-1M	0, 19, 39	GFSK	1Mb/s
	logi bolt-2M	1, 19, 38	GFSK	2Mb/s
6 dB Bandwidth / Conducted Out of Band Emissions	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
	logi bolt-1M	0, 19, 39	GFSK	1Mb/s
	logi bolt-2M	1, 19, 38	GFSK	2Mb/s
Unwanted Emissions below 1 GHz	BT-LE 2M	19	GFSK	2Mb/s
	logi bolt-2M	19	GFSK	2Mb/s
Unwanted Emissions above 1 GHz	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
	BT-LE 2M	1, 19, 38	GFSK	2Mb/s
	logi bolt-1M	0, 19, 39	GFSK	1Mb/s
	logi bolt-2M	1, 19, 38	GFSK	2Mb/s

3.5 Duty Cycle of Test Signal

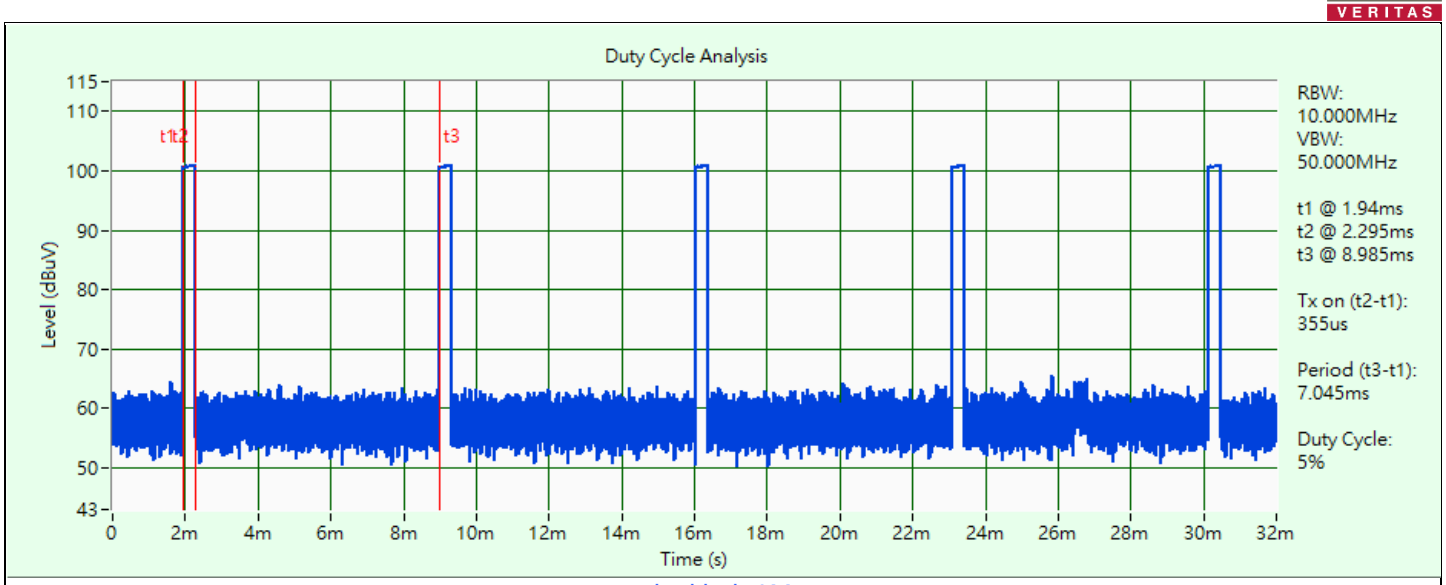
BT-LE 1M: Duty cycle = 0.355 ms / 7.042 ms x 100% = 5.0%, duty factor = 10 * log (1/Duty cycle) = 12.97 dB
BT-LE 2M: Duty cycle = 0.185 ms / 7.051 ms x 100% = 2.6%, duty factor = 10 * log (1/Duty cycle) = 15.81 dB
logi bolt-1M: Duty cycle = 0.355 ms / 7.045 ms x 100% = 5.0%, duty factor = 10 * log (1/Duty cycle) = 12.98 dB
logi bolt-2M: Duty cycle = 0.185 ms / 7.05 ms x 100% = 2.6%, duty factor = 10 * log (1/Duty cycle) = 15.81 dB



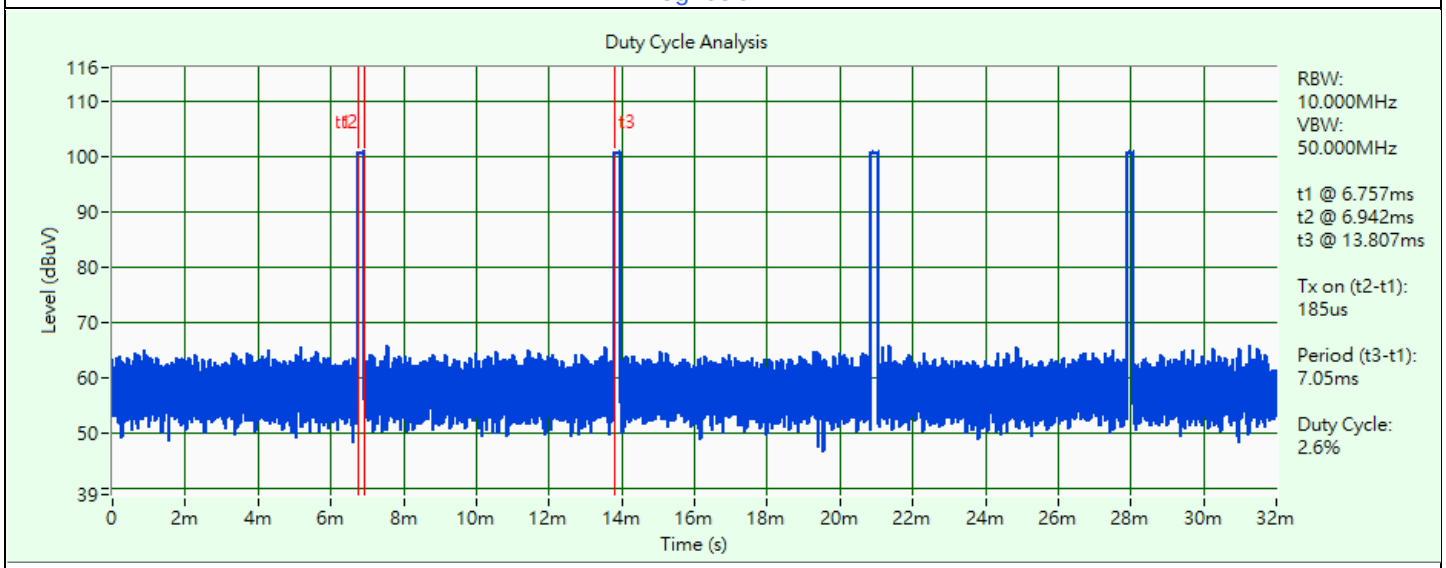
BT-LE 1M



BT-LE 2M



logi bolt-1M



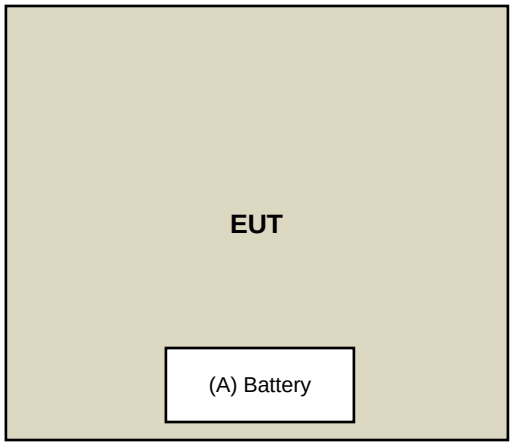
logi bolt-2M

3.6 Test Program Used and Operation Descriptions

Controlling software (RF Sample with Receiver [Number Lock]) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

Operation Description
◆ BLE1M TX Modulated on channel 2402MHz ◆ BLE1M TX Modulated on channel 2440MHz ◆ BLE1M TX Modulated on channel 2480MHz ◆ BLE2M TX Modulated on channel 2404MHz ◆ BLE2M TX Modulated on channel 2440MHz ◆ BLE2M TX Modulated on channel 2478MHz

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Battery	Duracell	AA	N/A	N/A	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2022/11/14

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2022/11/14

4.3 6 dB Bandwidth

Refer to section 4.2 to get information of the instruments.

4.4 Conducted Out of Band Emissions

Refer to section 4.2 to get information of the instruments.

4.5 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bilog Antenna Schwarzbeck	VULB 9168	9168-0842	2022/10/24	2023/10/23
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2022/1/10	2023/1/9
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
Pre_Amplifier EMCI	EMC330N	980538	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-5-1	2022/4/25	2023/4/24
		966-5-2	2022/4/25	2023/4/24
		966-5-3	2022/4/25	2023/4/24
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
		LOOPCAB-002	2022/1/6	2023/1/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Test Receiver R&S	ESR3	102528	2022/2/25	2023/2/24

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2022/12/14

4.6 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980509	2022/4/25	2023/4/24
	EMC184045SE	980387	2022/1/10	2023/1/9
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-1500	180503	2022/4/25	2023/4/24
	EMC104-SM-SM-2000	180501	2022/4/25	2023/4/24
	EMC104-SM-SM-6000	180506	2022/4/25	2023/4/24
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Test Receiver R&S	ESR3	102528	2022/2/25	2023/2/24

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2022/11/17 ~ 2022/11/29

5 Limits of Test Items

5.1 RF Output Power

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)

5.2 Power Spectral Density

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz.

5.3 6 dB Bandwidth

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

5.4 Conducted Out of Band Emissions

Below 20 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

5.5 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.6 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

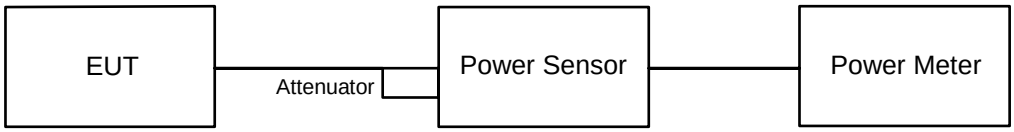
Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup



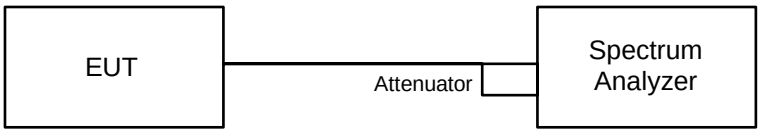
6.1.2 Test Procedure

Peak Power:
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average Power:
Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

6.2 Power Spectral Density

6.2.1 Test Setup

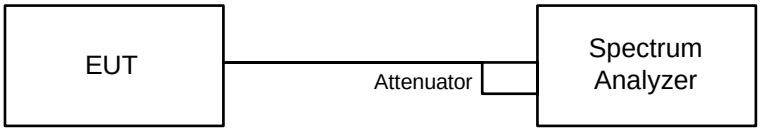


6.2.2 Test Procedure

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz.
d. Set the VBW ≥ 3 × RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.

6.3 6 dB Bandwidth

6.3.1 Test Setup

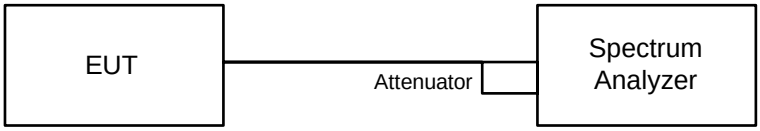


6.3.2 Test Procedure

a. Set resolution bandwidth (RBW) = 100 kHz.
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.4 Conducted Out of Band Emissions

6.4.1 Test Setup



6.4.2 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

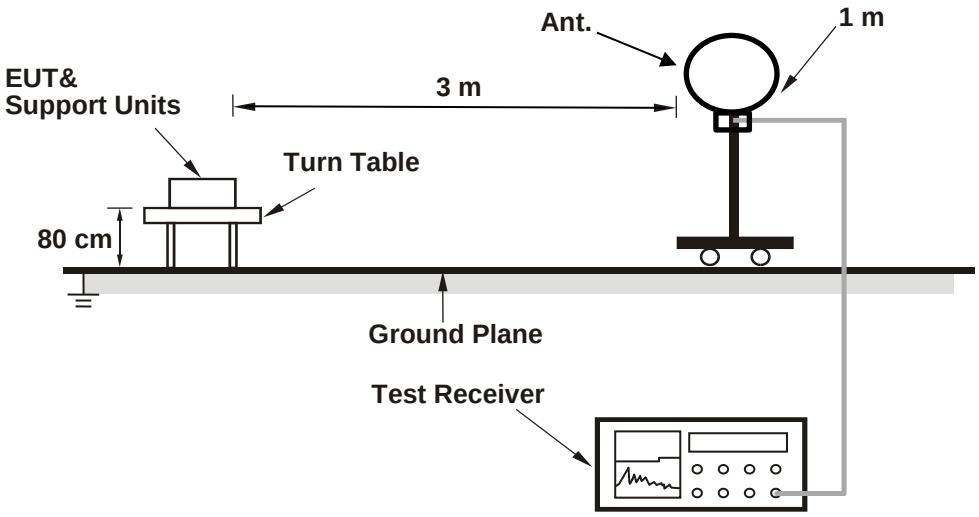
MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

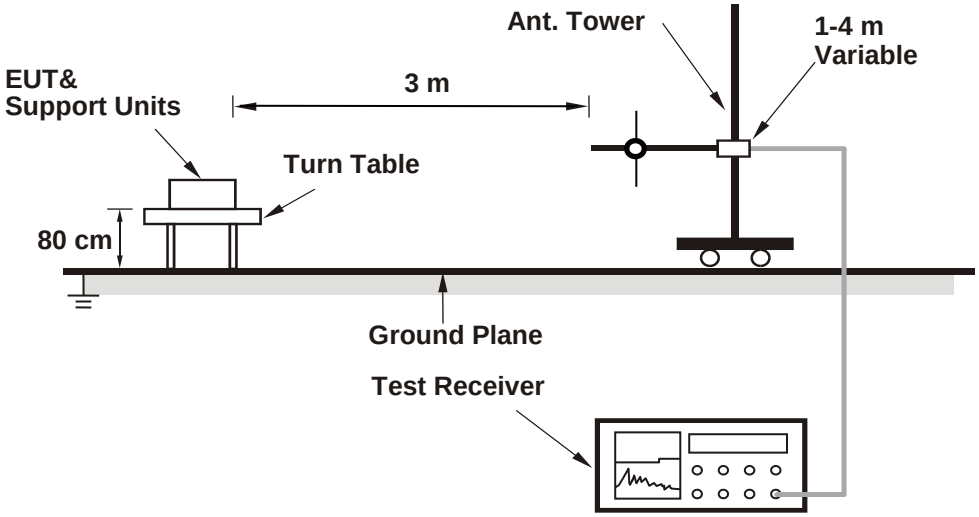
6.5 Unwanted Emissions below 1 GHz

6.5.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.5.2 Test Procedure

For Radiated emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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.

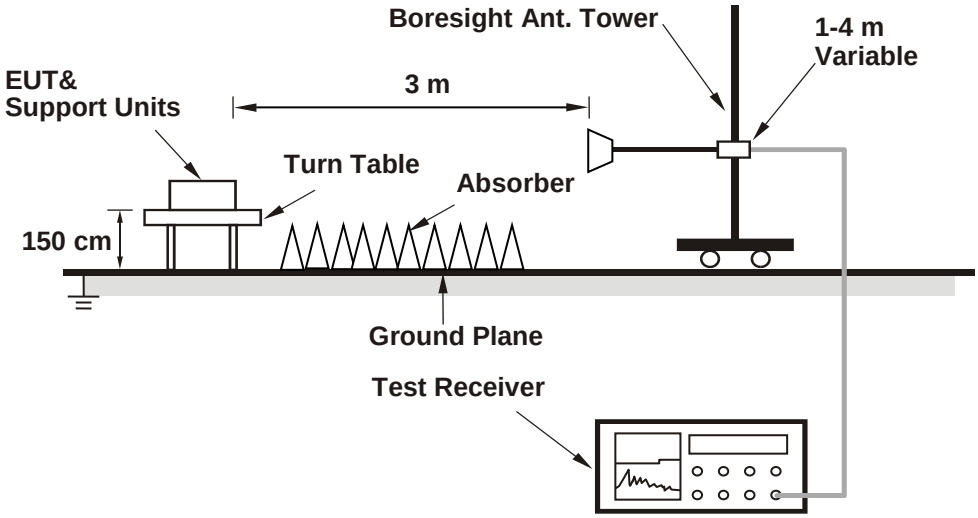
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.6 Unwanted Emissions above 1 GHz

6.6.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.6.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. 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.

d. 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.

e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. According to ANSI C63.10 section 6.6.4 and 4.1.4.2.2. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	1.5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	John Peng

For Peak Power

BT-LE 1M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
0	2402	3.664	5.64	30	Pass
19	2440	3.811	5.81	30	Pass
39	2480	3.811	5.81	30	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the output power limit shall not be reduced.

BT-LE 2M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2404	3.673	5.65	30	Pass
19	2440	3.811	5.81	30	Pass
38	2478	3.819	5.82	30	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the output power limit shall not be reduced.

logi bolt-1M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
0	2402	3.656	5.63	30	Pass
19	2440	3.802	5.80	30	Pass
39	2480	3.793	5.79	30	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the output power limit shall not be reduced.

logi bolt-2M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2404	3.664	5.64	30	Pass
19	2440	3.802	5.80	30	Pass
38	2478	3.802	5.80	30	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the output power limit shall not be reduced.

For Average Power

BT-LE 1M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	3.639	5.61
19	2440	3.793	5.79
39	2480	3.784	5.78

BT-LE 2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	3.656	5.63
19	2440	3.793	5.79
38	2478	3.784	5.78

logi bolt-1M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	3.631	5.60
19	2440	3.776	5.77
39	2480	3.758	5.75

logi bolt-2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	3.656	5.63
19	2440	3.784	5.78
38	2478	3.776	5.77

7.2 Power Spectral Density

Input Power:	1.5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	John Peng

BT-LE 1M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
0	2402	2.27	8.00	Pass
19	2440	2.80	8.00	Pass
39	2480	2.59	8.00	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the power density limit shall not be reduced.

BT-LE 2M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2404	-1.64	8.00	Pass
19	2440	-1.14	8.00	Pass
38	2478	-1.59	8.00	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the power density limit shall not be reduced.

logi bolt-1M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
0	2402	2.64	8.00	Pass
19	2440	3.19	8.00	Pass
39	2480	3.08	8.00	Pass

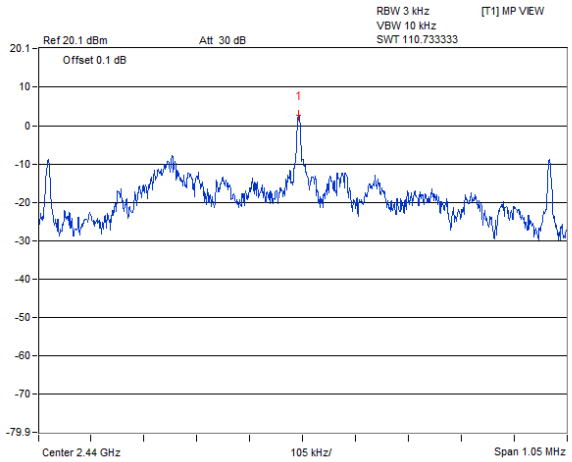
Note: The antenna gain is 2.56 dBi < 6 dBi, so the power density limit shall not be reduced.

logi bolt-2M

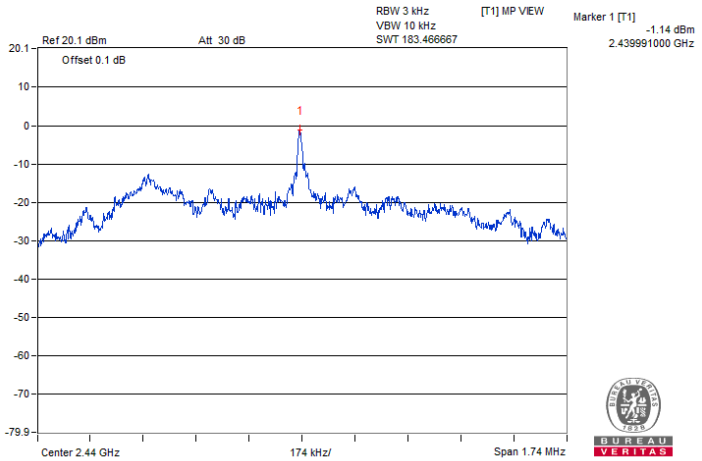
Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2404	-1.24	8.00	Pass
19	2440	-1.58	8.00	Pass
38	2478	-1.56	8.00	Pass

Note: The antenna gain is 2.56 dBi < 6 dBi, so the power density limit shall not be reduced.

Spectrum Plot of Maximum Value



BT-LE 1M : CH 19



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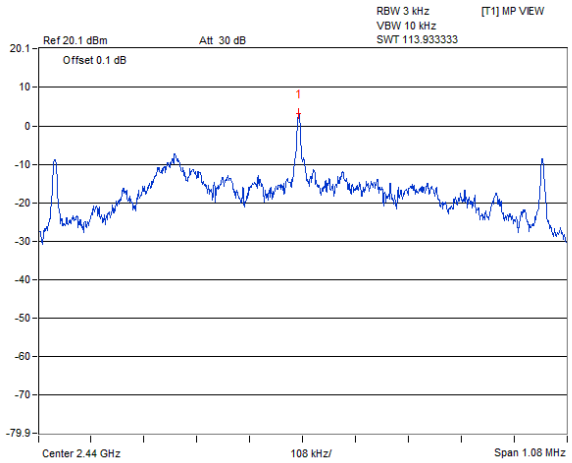
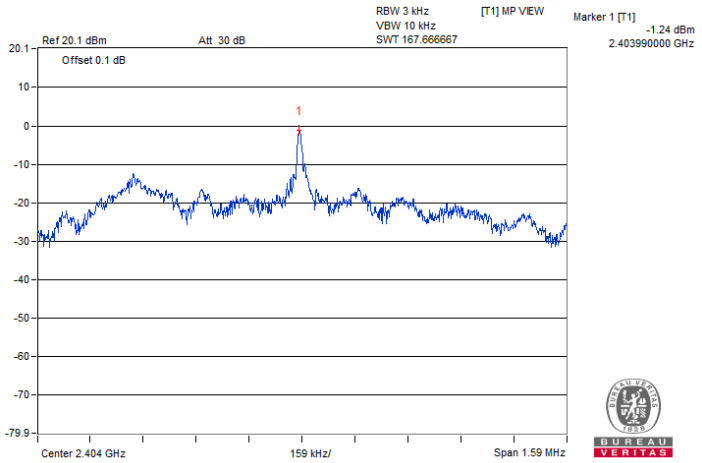


logi bolt-1M : CH 19



logi bolt-2M : CH 1

7.3 6 dB Bandwidth

Input Power:	1.5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	John Peng

BT-LE 1M

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
0	2402	0.71	0.5	Pass
19	2440	0.7	0.5	Pass
39	2480	0.69	0.5	Pass

BT-LE 2M

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2404	1.13	0.5	Pass
19	2440	1.16	0.5	Pass
38	2478	1.12	0.5	Pass

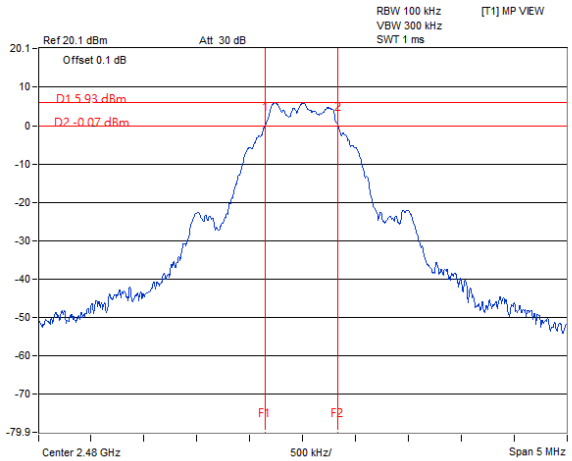
logi bolt-1M

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
0	2402	0.71	0.5	Pass
19	2440	0.72	0.5	Pass
39	2480	0.71	0.5	Pass

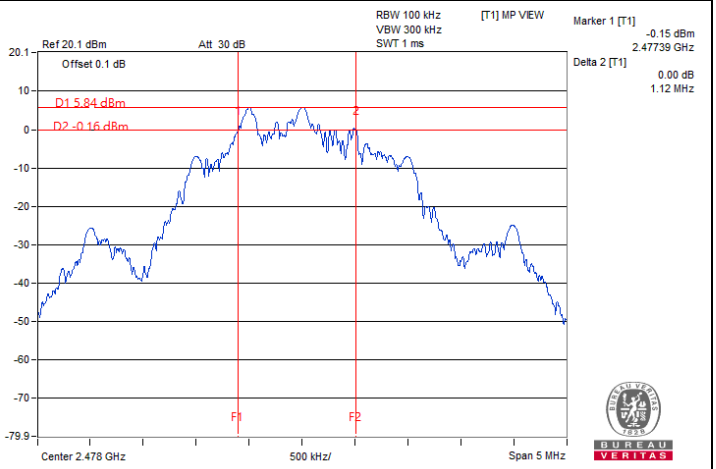
logi bolt-2M

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2404	1.06	0.5	Pass
19	2440	1.04	0.5	Pass
38	2478	1.21	0.5	Pass

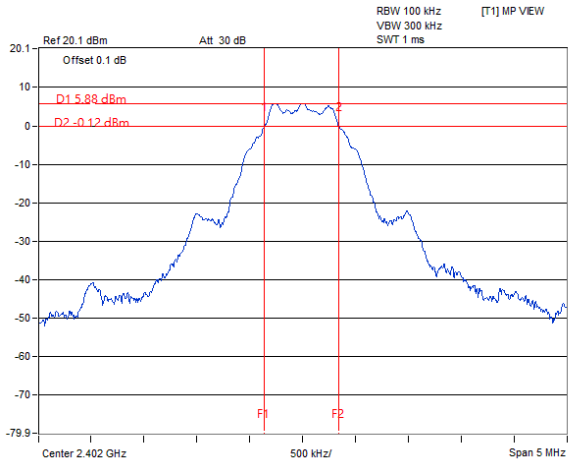
Spectrum Plot of Minimum Value



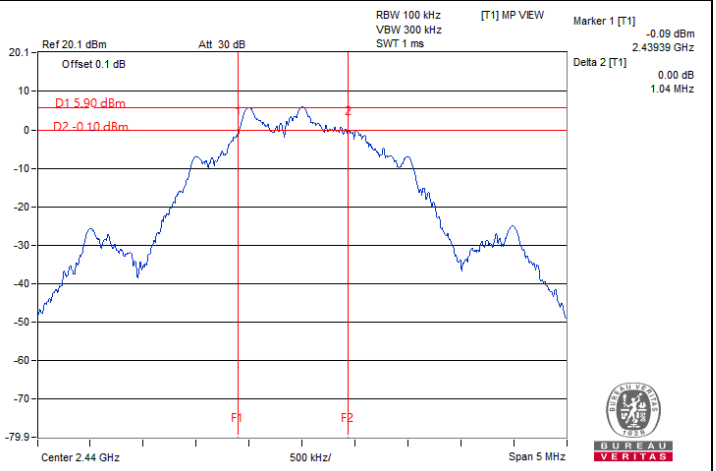
BT-LE 1M : CH 39



BT-LE 2M : CH 38



logi bolt-1M : CH 0

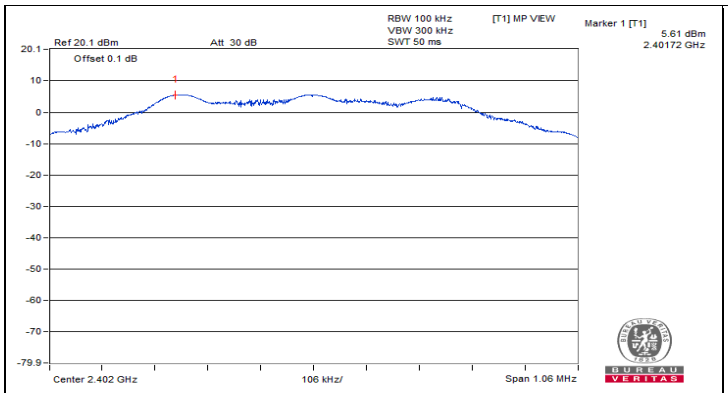


logi bolt-2M : CH 19

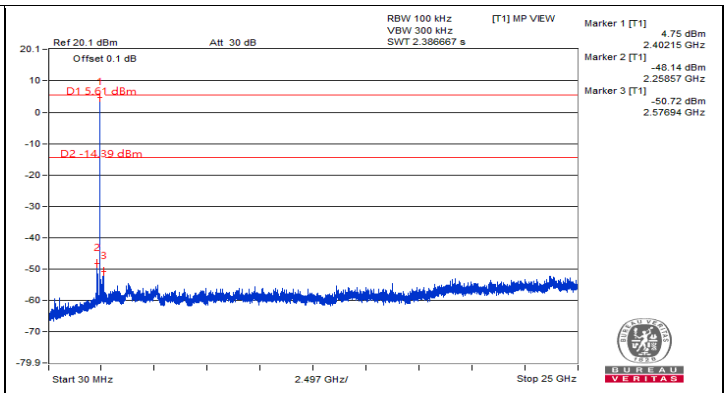
7.4 Conducted Out of Band Emissions

Input Power:	1.5 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	John Peng

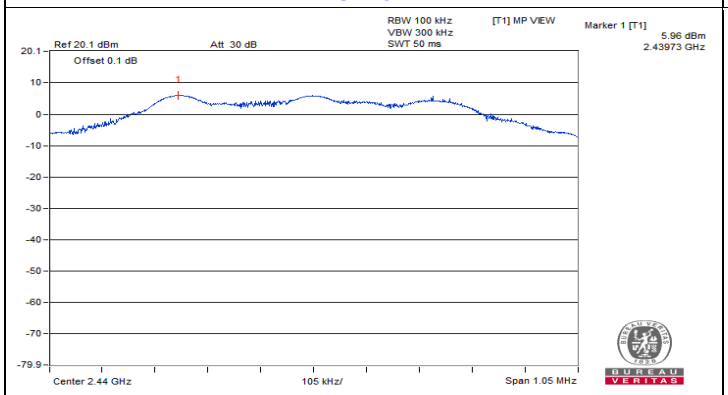
BT-LE 1M



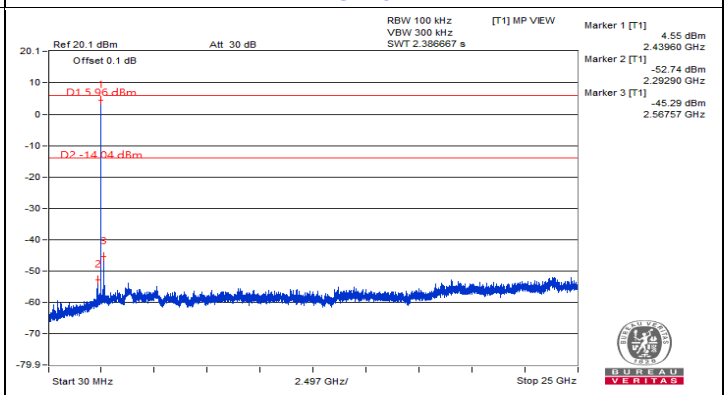
CH 0



CH 0



CH 19



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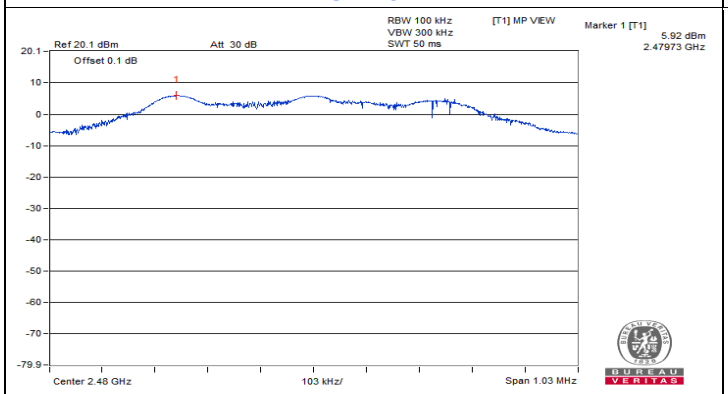
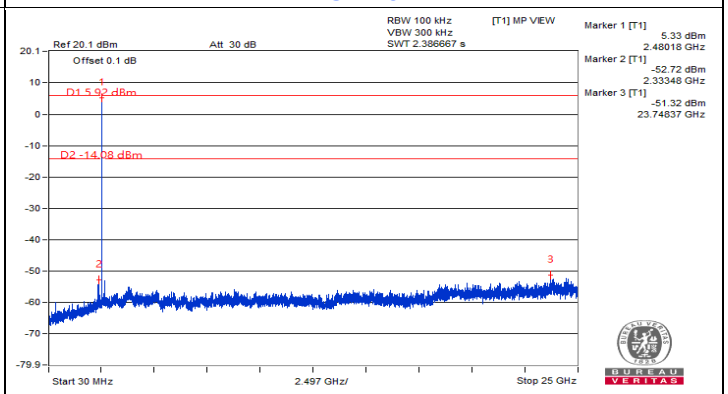


CH 39



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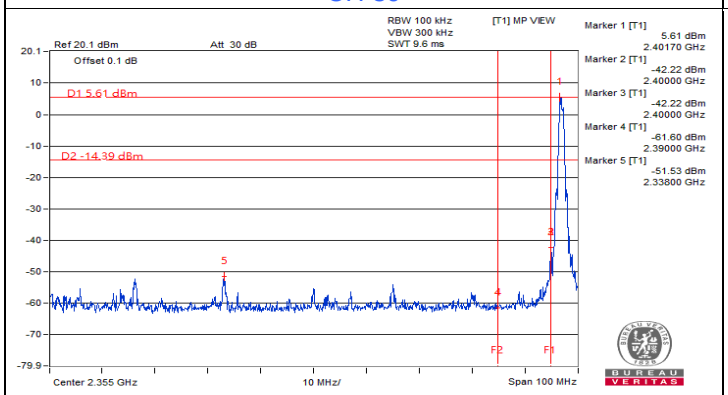
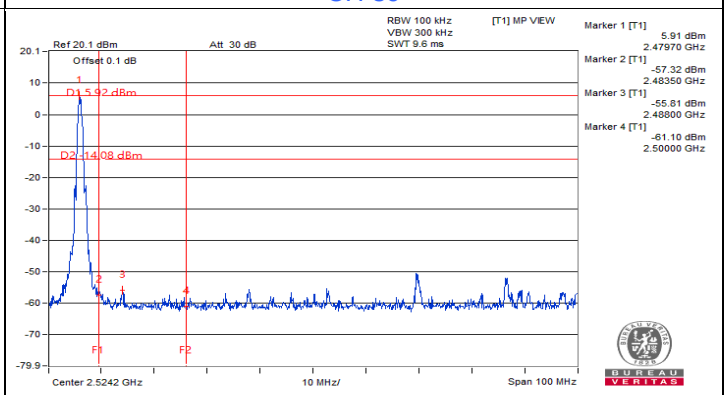
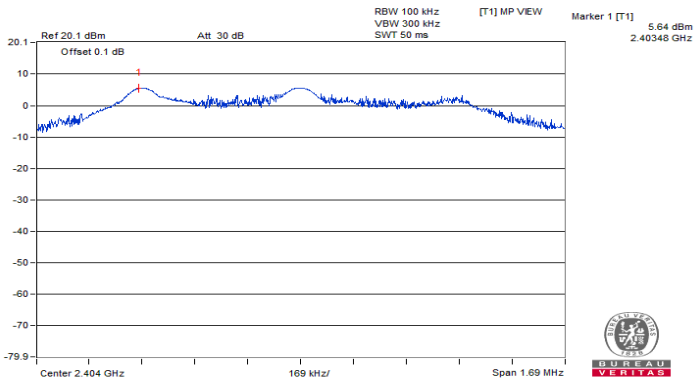


CH 0 Band edge

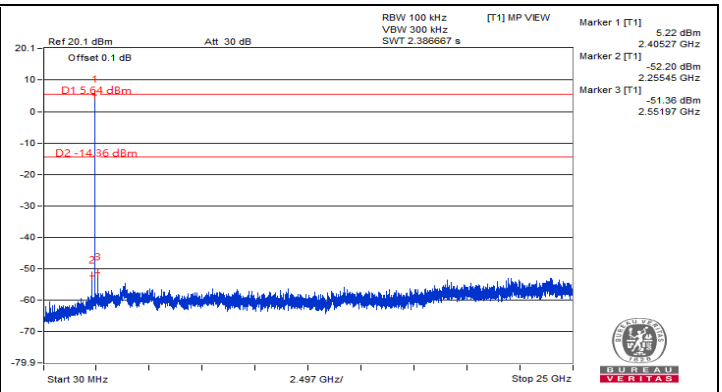


CH 39 Band edge

BT-LE 2M



CH 1



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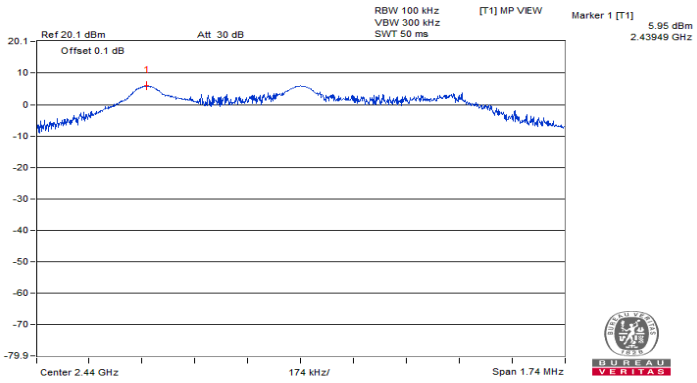

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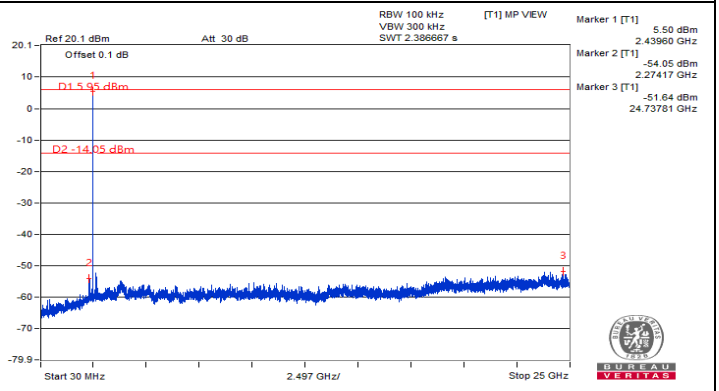

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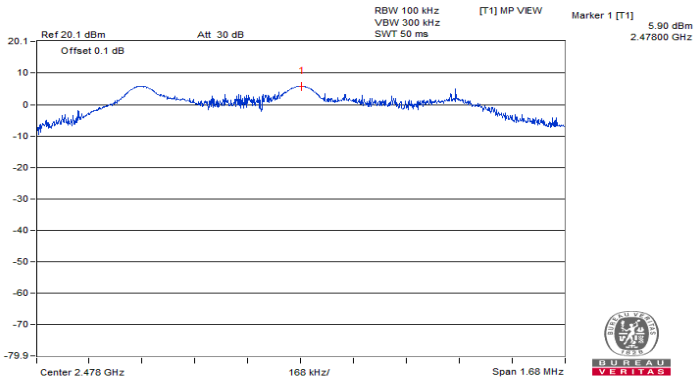
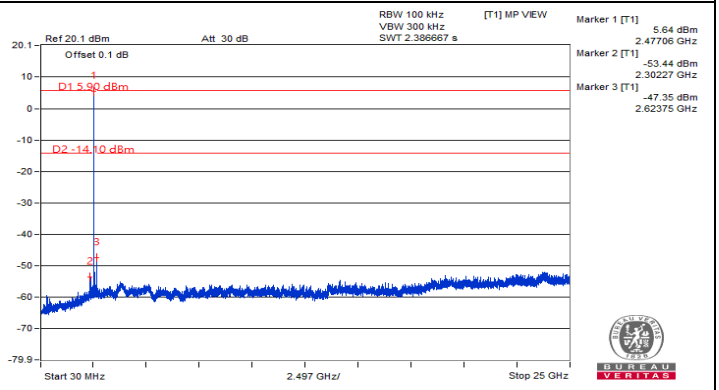


CH 38



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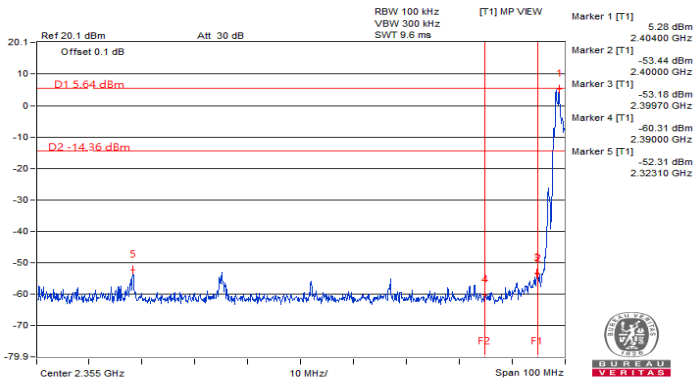
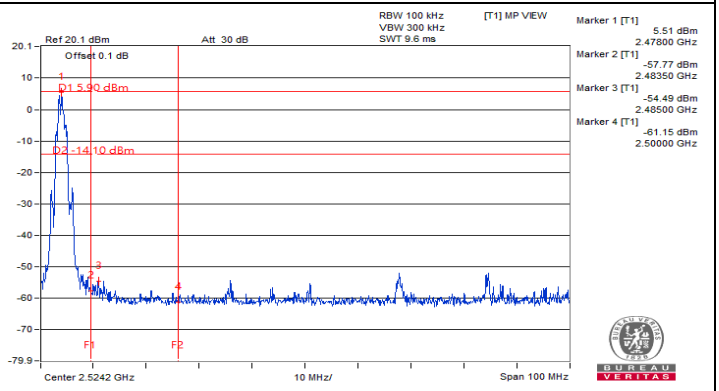
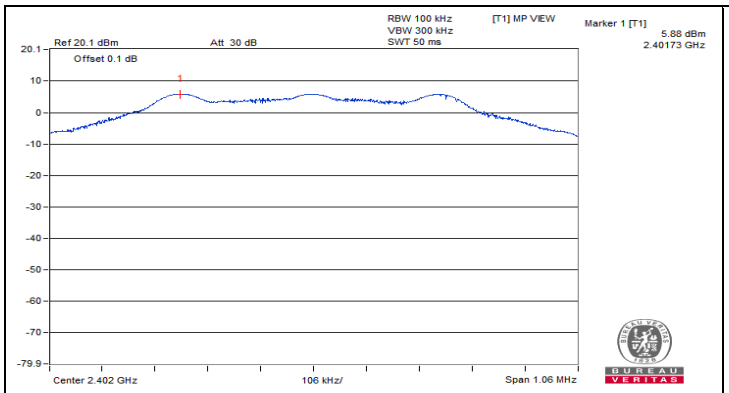


CH 1 Band edge

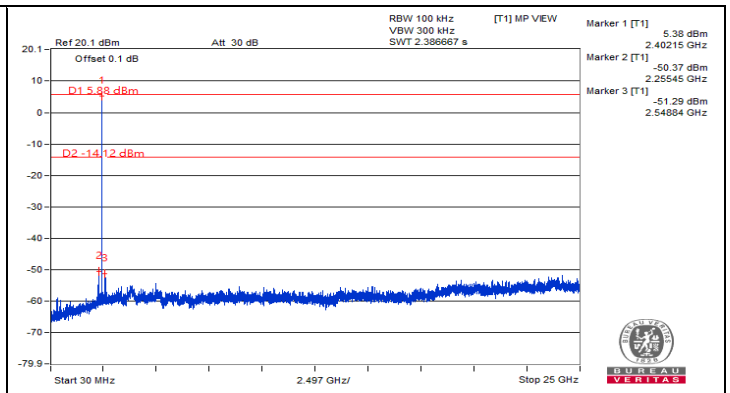


CH 38 Band edge

logi bolt-1M



CH 0



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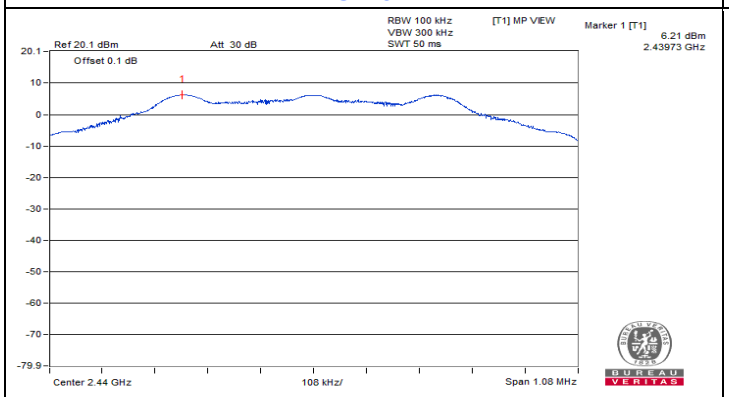
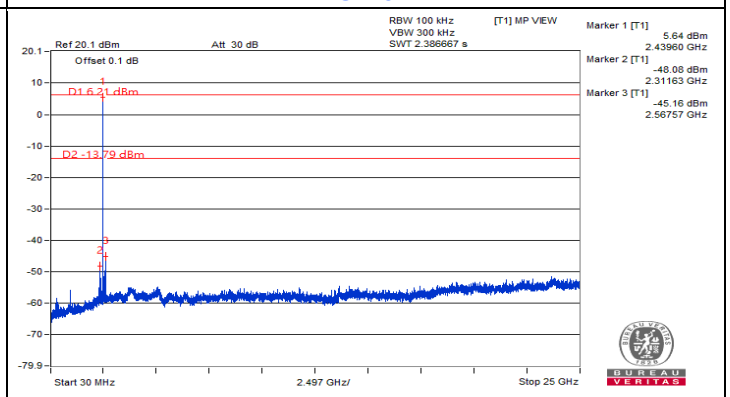
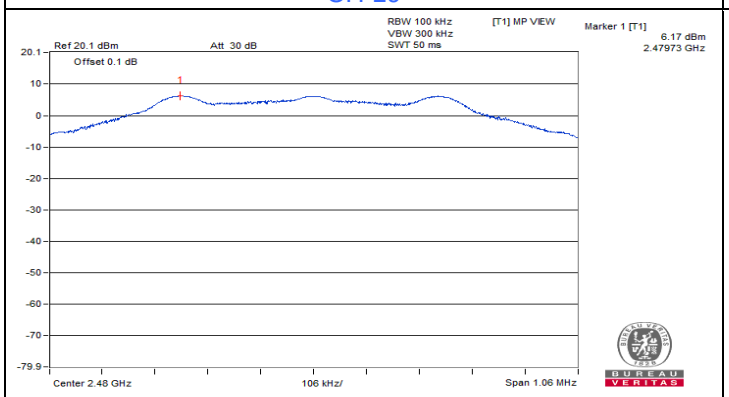


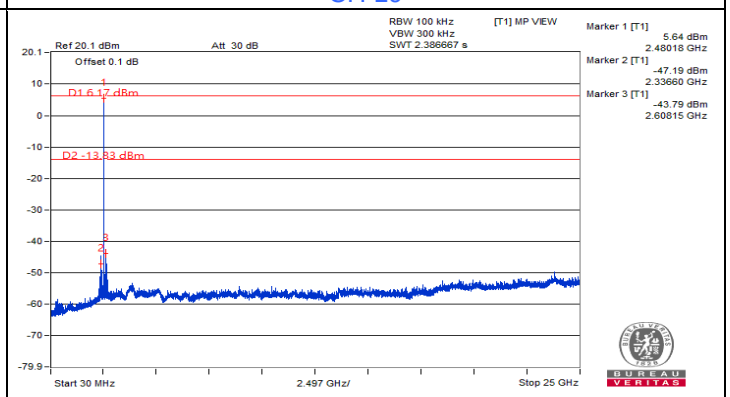
CH 19



CH 19



CH 39



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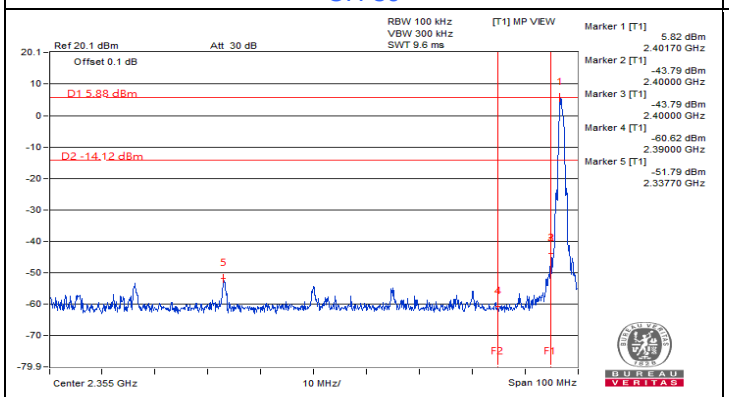
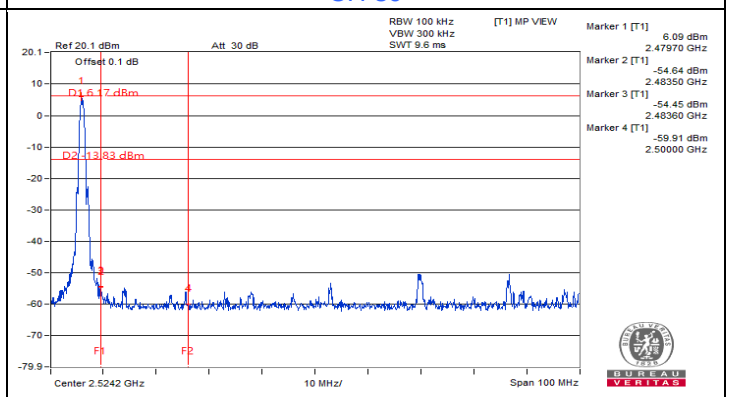
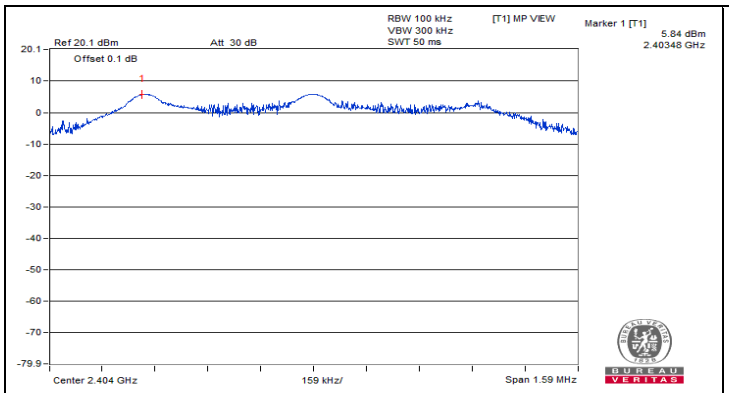


CH 0 Band edge

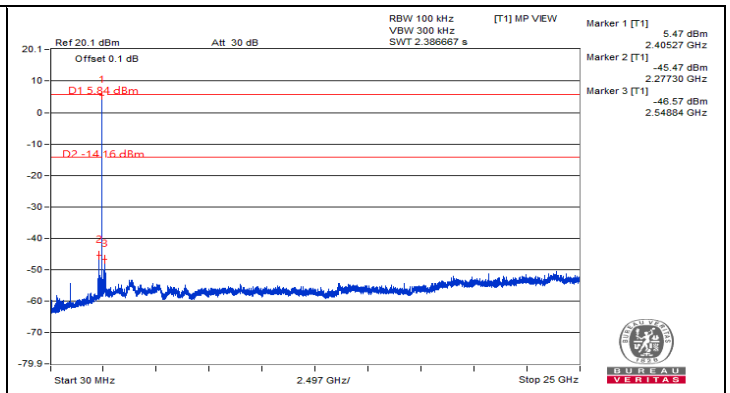


CH 39 Band edge

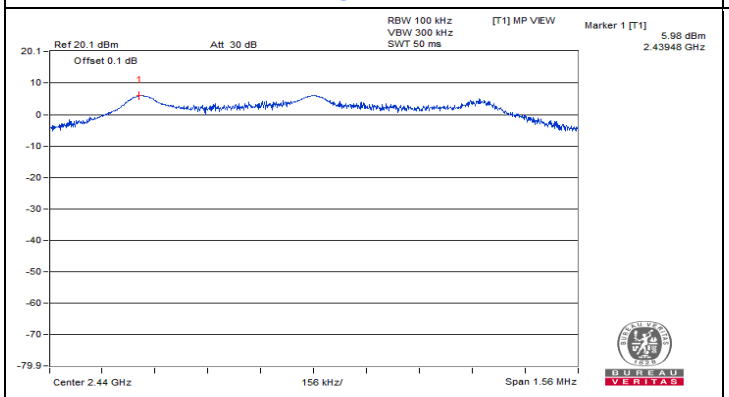
logi bolt-2M



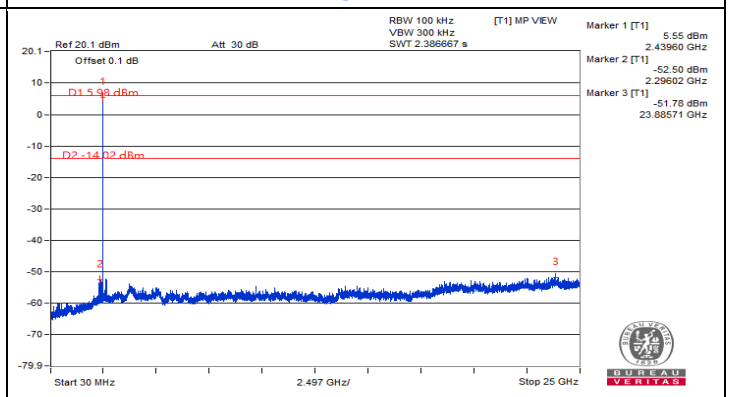
CH 1



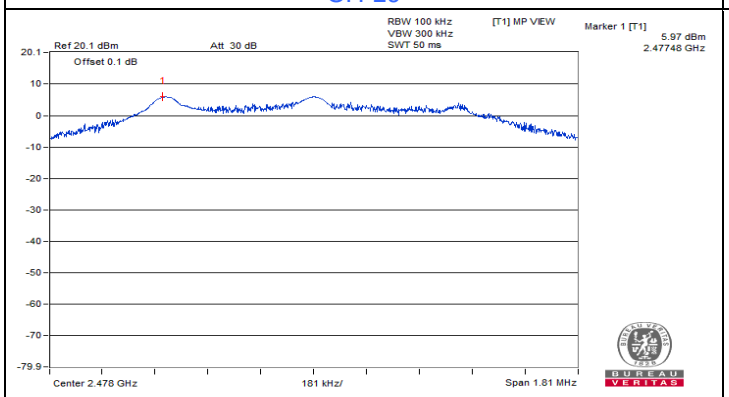
CH 1



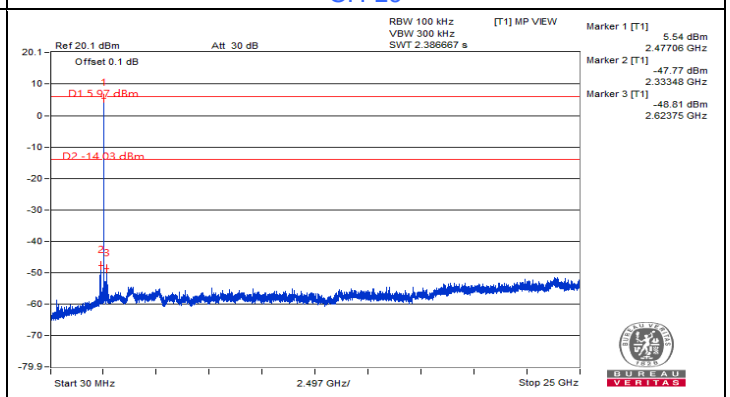
CH 19



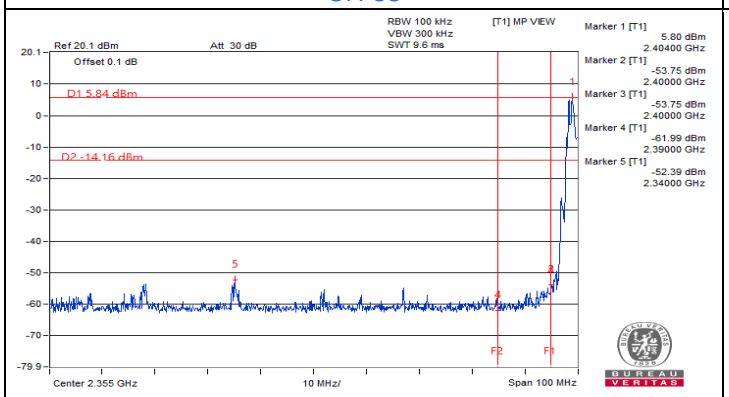
CH 19



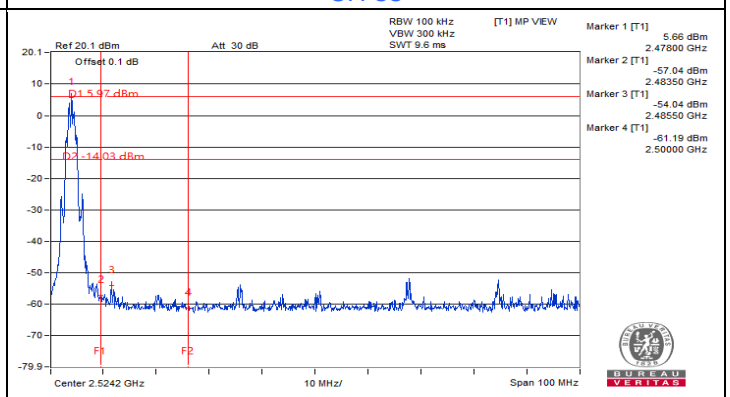
CH 38



CH 38



CH 1 Band edge



CH 38 Band edge

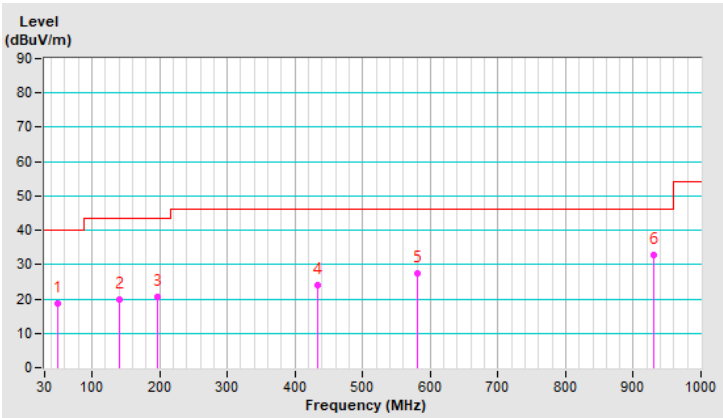
7.5 Unwanted Emissions below 1 GHz

RF Mode	BT-LE 2M	**Channel**	CH 19：2440 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	1.5 Vdc	**Environmental Conditions**	25°C, 65% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	49.08	18.5 QP	40.0	-21.5	3.00 H	331	26.7	-8.2
2	140.87	19.7 QP	43.5	-23.8	3.00 H	158	28.1	-8.4
3	196.19	20.6 QP	43.5	-22.9	1.00 H	210	31.7	-11.1
4	432.82	24.0 QP	46.0	-22.0	3.00 H	119	28.1	-4.1
5	580.57	27.6 QP	46.0	-18.4	1.00 H	276	28.7	-1.1
6	930.18	32.8 QP	46.0	-13.2	3.00 H	142	28.0	4.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

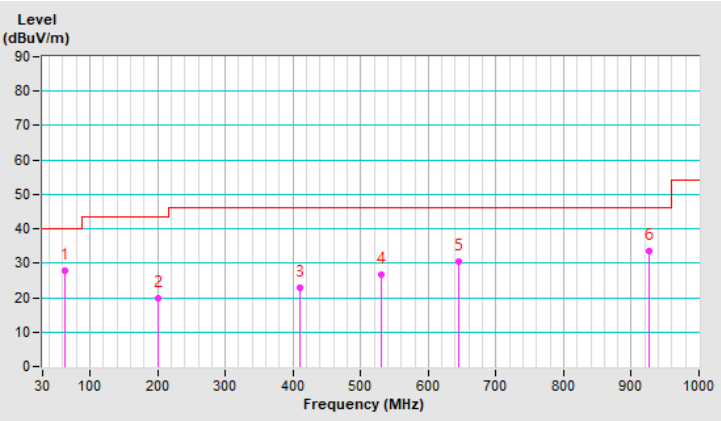


RF Mode	BT-LE 2M	Channel	CH 19：2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 65% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	63.76	27.7 QP	40.0	-12.3	3.00 V	0	37.1	-9.4
2	199.75	19.9 QP	43.5	-23.6	3.00 V	167	31.1	-11.2
3	409.80	23.0 QP	46.0	-23.0	1.00 V	135	28.0	-5.0
4	529.79	26.8 QP	46.0	-19.2	3.00 V	225	28.9	-2.1
5	644.37	30.4 QP	46.0	-15.6	3.00 V	107	30.0	0.4
6	925.48	33.6 QP	46.0	-12.4	3.00 V	292	28.8	4.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

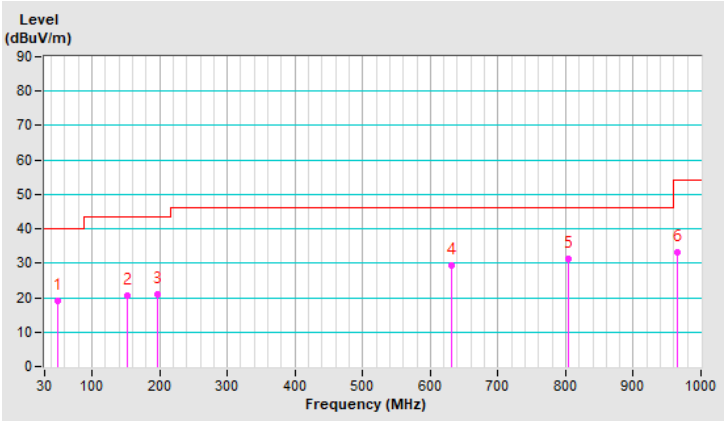


RF Mode	logi bolt-2M	**Channel**	CH 19：2440 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	1.5 Vdc	**Environmental Conditions**	25°C, 65% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	49.84	19.1 QP	40.0	-20.9	2.00 H	262	27.3	-8.2
2	152.85	20.6 QP	43.5	-22.9	3.00 H	0	28.8	-8.2
3	196.11	21.0 QP	43.5	-22.5	1.00 H	0	32.1	-11.1
4	631.98	29.2 QP	46.0	-16.8	1.50 H	270	29.1	0.1
5	804.69	31.3 QP	46.0	-14.7	3.00 H	91	28.5	2.8
6	965.15	33.1 QP	54.0	-20.9	3.00 H	167	27.7	5.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

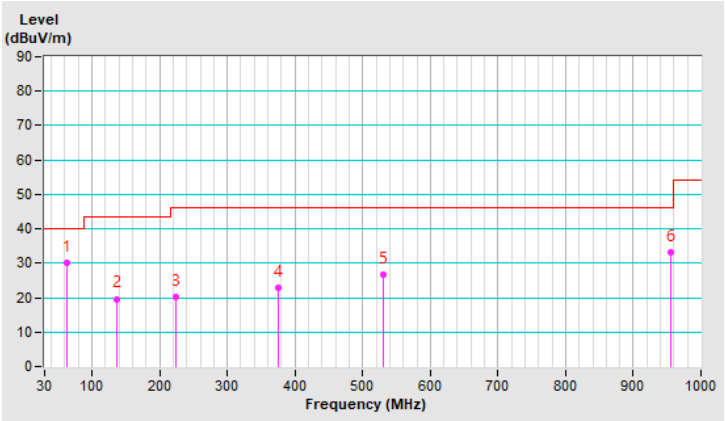


RF Mode	logi bolt-2M	**Channel**	CH 19：2440 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	1.5 Vdc	**Environmental Conditions**	25°C, 65% RH
Tested By	Nelson Teng		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	**62.66**	**30.1 QP**	**40.0**	**-9.9**	**1.00 V**	**167**	**39.2**	**-9.1**
2	135.78	19.6 QP	43.5	-23.9	2.50 V	129	28.3	-8.7
3	224.41	20.3 QP	46.0	-25.7	3.00 V	344	31.6	-11.3
4	376.19	22.8 QP	46.0	-23.2	1.00 V	215	28.5	-5.7
5	529.82	26.7 QP	46.0	-19.3	3.00 V	164	28.8	-2.1
6	954.82	33.3 QP	46.0	-12.7	3.00 V	360	28.1	5.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



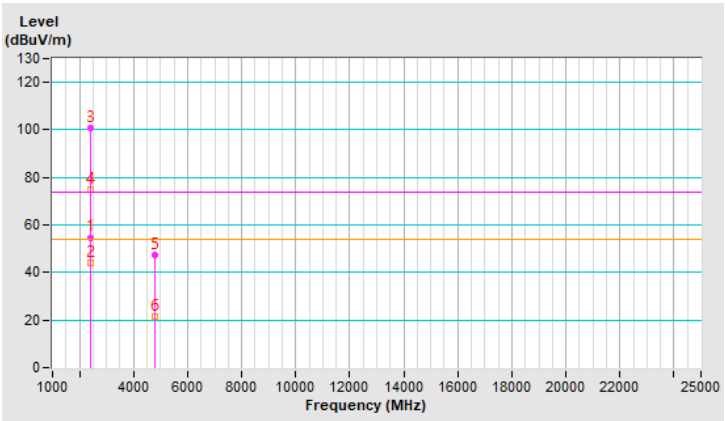
7.6 Unwanted Emissions above 1 GHz

RF Mode	BT-LE 1M	**Channel**	CH 0：2402 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	**Environmental Conditions**	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2390.00	54.8 PK	74.0	-19.2	1.00 H	48	60.5	-5.7
2	2390.00	43.9 AV	54.0	-10.1	1.00 H	48	49.6	-5.7
3	*2402.00	100.7 PK			1.00 H	48	106.4	-5.7
4	*2402.00	74.8 AV			1.00 H	48	80.5	-5.7
5	4804.00	47.2 PK	74.0	-26.8	1.08 H	114	46.9	0.3
6	4804.00	21.3 AV	54.0	-32.7	1.08 H	114	21.0	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

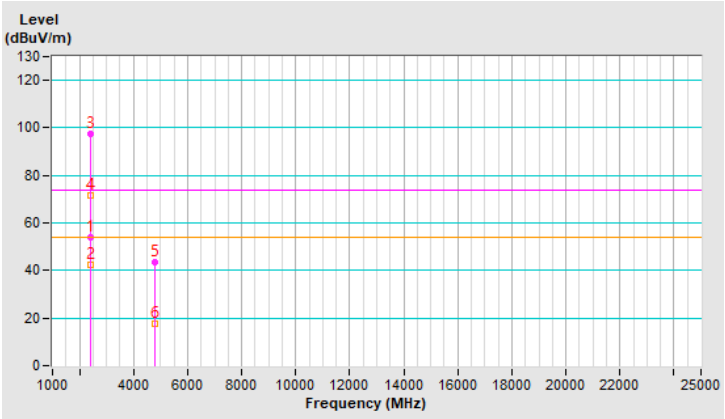


RF Mode	BT-LE 1M	Channel	CH 0：2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.1 PK	74.0	-19.9	3.76 V	139	59.8	-5.7
2	2390.00	42.6 AV	54.0	-11.4	3.76 V	139	48.3	-5.7
3	*2402.00	97.3 PK			3.76 V	139	103.0	-5.7
4	*2402.00	71.4 AV			3.76 V	139	77.1	-5.7
5	4804.00	43.6 PK	74.0	-30.4	1.08 V	5	43.3	0.3
6	4804.00	17.7 AV	54.0	-36.3	1.08 V	5	17.4	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

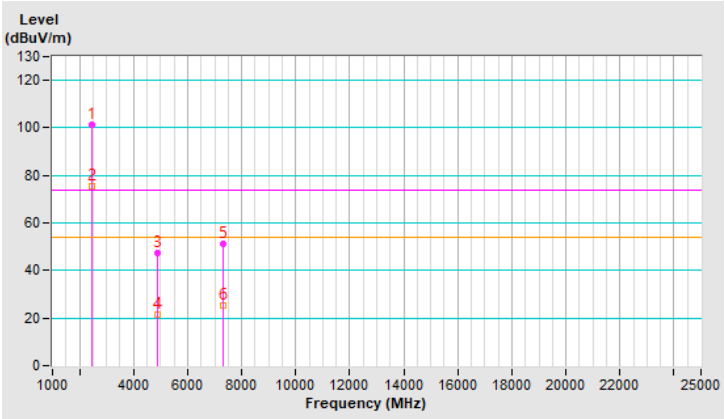


RF Mode	BT-LE 1M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	101.5 PK			1.07 H	54	107.2	-5.7
2	*2440.00	75.6 AV			1.07 H	54	81.3	-5.7
3	4880.00	47.2 PK	74.0	-26.8	1.03 H	99	46.9	0.3
4	4880.00	21.3 AV	54.0	-32.7	1.03 H	99	21.0	0.3
5	7320.00	51.4 PK	74.0	-22.6	1.00 H	107	44.5	6.9
6	7320.00	25.5 AV	54.0	-28.5	1.00 H	107	18.6	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

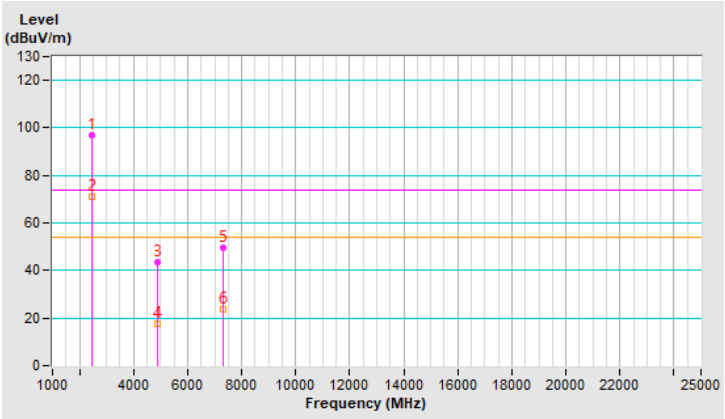


RF Mode	BT-LE 1M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	97.1 PK			3.85 V	125	102.8	-5.7
2	*2440.00	71.2 AV			3.85 V	125	76.9	-5.7
3	4880.00	43.7 PK	74.0	-30.3	1.00 V	357	43.4	0.3
4	4880.00	17.8 AV	54.0	-36.2	1.00 V	357	17.5	0.3
5	7320.00	49.6 PK	74.0	-24.4	1.05 V	125	42.7	6.9
6	7320.00	23.7 AV	54.0	-30.3	1.05 V	125	16.8	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

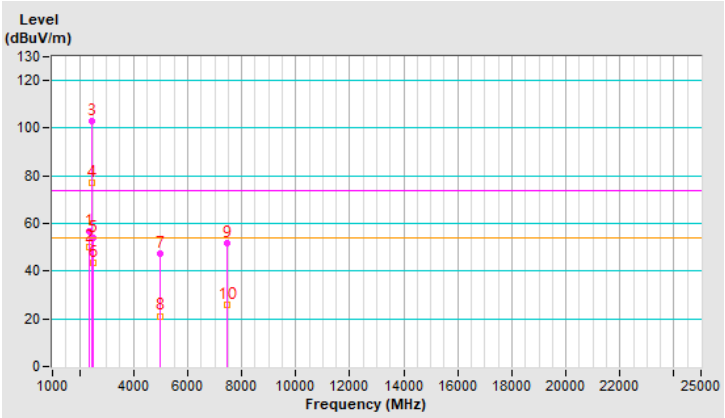


RF Mode	BT-LE 1M	Channel	CH 39：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2352.00	56.8 PK	74.0	-17.2	1.05 H	45	62.4	-5.6
2	**2352.00**	**49.9 AV**	**54.0**	**-4.1**	**1.05 H**	**45**	**55.5**	**-5.6**
3	*2480.00	103.1 PK			1.05 H	45	108.8	-5.7
4	*2480.00	77.2 AV			1.05 H	45	82.9	-5.7
5	2483.50	54.1 PK	74.0	-19.9	1.05 H	45	59.8	-5.7
6	2483.50	43.3 AV	54.0	-10.7	1.05 H	45	49.0	-5.7
7	4960.00	47.1 PK	74.0	-26.9	1.06 H	114	46.6	0.5
8	4960.00	21.2 AV	54.0	-32.8	1.06 H	114	20.7	0.5
9	7440.00	51.9 PK	74.0	-22.1	1.03 H	98	44.5	7.4
10	7440.00	26.0 AV	54.0	-28.0	1.03 H	98	18.6	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

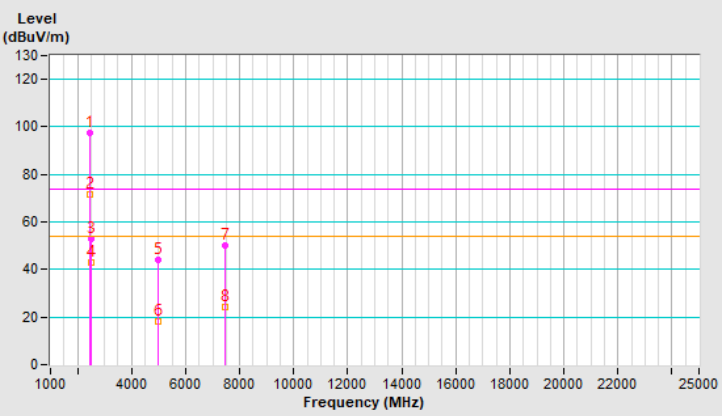


RF Mode	BT-LE 1M	Channel	CH 39：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	97.6 PK			3.80 V	139	103.3	-5.7
2	*2480.00	71.7 AV			3.80 V	139	77.4	-5.7
3	2483.50	52.9 PK	74.0	-21.1	3.80 V	139	58.6	-5.7
4	2483.50	42.9 AV	54.0	-11.1	3.80 V	139	48.6	-5.7
5	4960.00	44.0 PK	74.0	-30.0	1.02 V	352	43.5	0.5
6	4960.00	18.1 AV	54.0	-35.9	1.02 V	352	17.6	0.5
7	7440.00	50.1 PK	74.0	-23.9	1.01 V	137	42.7	7.4
8	7440.00	24.2 AV	54.0	-29.8	1.01 V	137	16.8	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.042 ms) = -25.9 dB

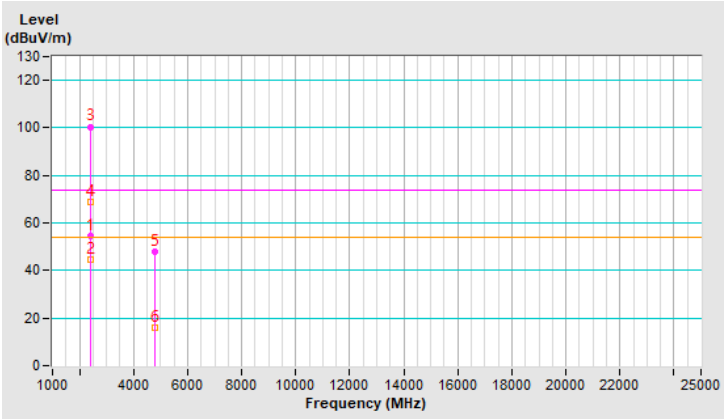


RF Mode	BT-LE 2M	Channel	CH 1：2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.4 PK	74.0	-19.6	1.07 H	43	60.1	-5.7
2	2390.00	44.6 AV	54.0	-9.4	1.07 H	43	50.3	-5.7
3	*2404.00	100.5 PK			1.07 H	43	106.2	-5.7
4	*2404.00	68.9 AV			1.07 H	43	74.6	-5.7
5	4808.00	47.8 PK	74.0	-26.2	1.07 H	108	47.6	0.2
6	4808.00	16.2 AV	54.0	-37.8	1.07 H	108	16.0	0.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

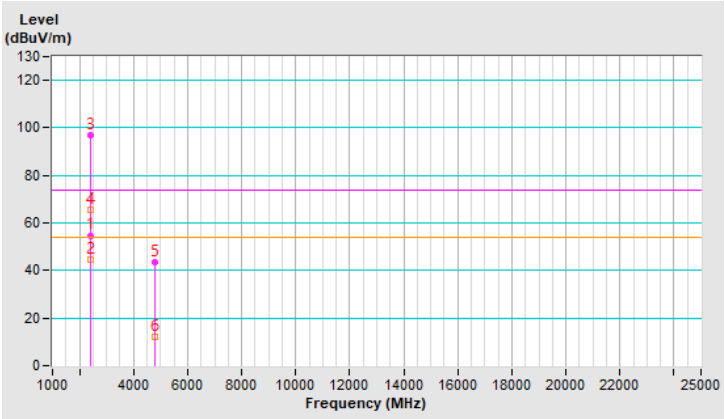


RF Mode	BT-LE 2M	Channel	CH 1：2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.8 PK	74.0	-19.2	3.78 V	137	60.5	-5.7
2	2390.00	44.8 AV	54.0	-9.2	3.78 V	137	50.5	-5.7
3	*2404.00	97.0 PK			3.78 V	137	102.7	-5.7
4	*2404.00	65.4 AV			3.78 V	137	71.1	-5.7
5	4808.00	43.7 PK	74.0	-30.3	1.01 V	6	43.5	0.2
6	4808.00	12.1 AV	54.0	-41.9	1.01 V	6	11.9	0.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

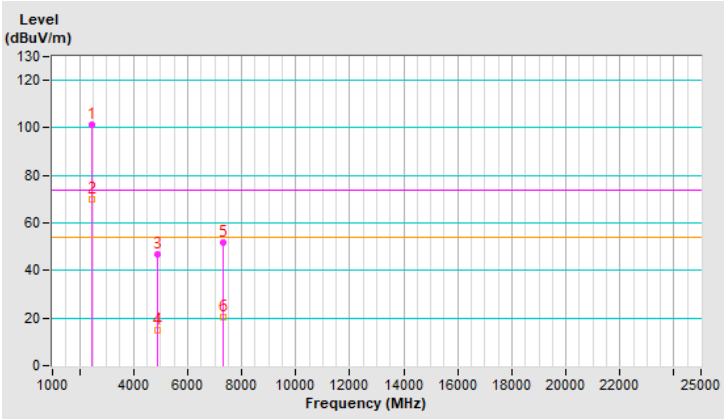


RF Mode	BT-LE 2M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	101.3 PK			1.07 H	47	107.0	-5.7
2	*2440.00	69.7 AV			1.07 H	47	75.4	-5.7
3	4880.00	46.6 PK	74.0	-27.4	1.01 H	113	46.3	0.3
4	4880.00	15.0 AV	54.0	-39.0	1.01 H	113	14.7	0.3
5	7320.00	52.0 PK	74.0	-22.0	1.00 H	97	45.1	6.9
6	7320.00	20.4 AV	54.0	-33.6	1.00 H	97	13.5	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

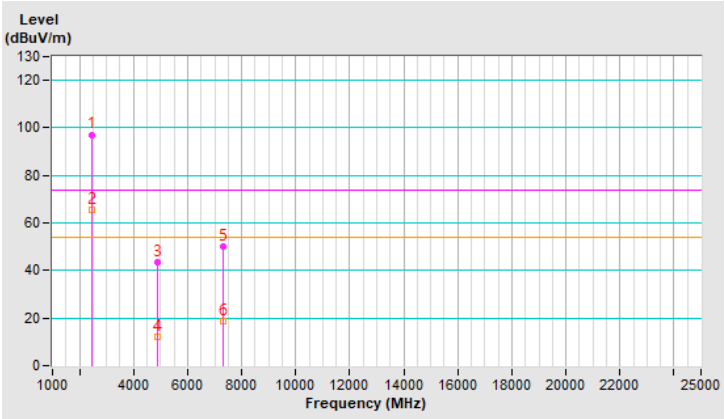


RF Mode	BT-LE 2M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	97.2 PK			3.78 V	143	102.9	-5.7
2	*2440.00	65.6 AV			3.78 V	143	71.3	-5.7
3	4880.00	43.7 PK	74.0	-30.3	1.00 V	1	43.4	0.3
4	4880.00	12.1 AV	54.0	-41.9	1.00 V	1	11.8	0.3
5	7320.00	50.2 PK	74.0	-23.8	1.02 V	150	43.3	6.9
6	7320.00	18.6 AV	54.0	-35.4	1.02 V	150	11.7	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

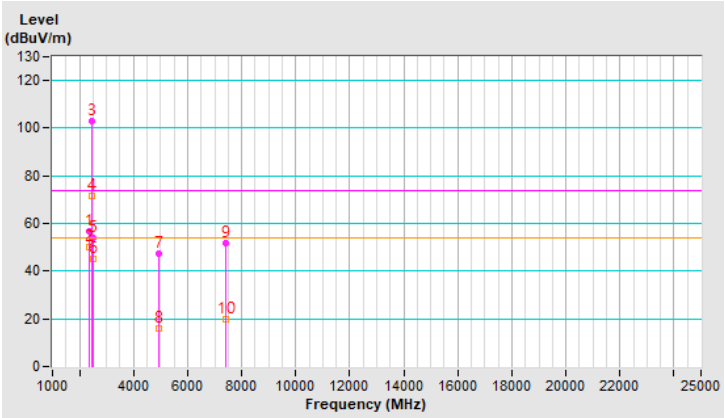


RF Mode	BT-LE 2M	Channel	CH 38：2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2351.00	56.7 PK	74.0	-17.3	1.02 H	45	62.3	-5.6
2	**2351.00**	**49.9 AV**	**54.0**	**-4.1**	**1.02 H**	**45**	**55.5**	**-5.6**
3	*2478.00	103.0 PK			1.02 H	45	108.7	-5.7
4	*2478.00	71.4 AV			1.02 H	45	77.1	-5.7
5	2483.50	53.8 PK	74.0	-20.2	1.02 H	45	59.5	-5.7
6	2483.50	45.2 AV	54.0	-8.8	1.02 H	45	50.9	-5.7
7	4956.00	47.4 PK	74.0	-26.6	1.09 H	104	46.9	0.5
8	4956.00	15.8 AV	54.0	-38.2	1.09 H	104	15.3	0.5
9	7434.00	51.6 PK	74.0	-22.4	1.03 H	113	44.3	7.3
10	7434.00	20.0 AV	54.0	-34.0	1.03 H	113	12.7	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

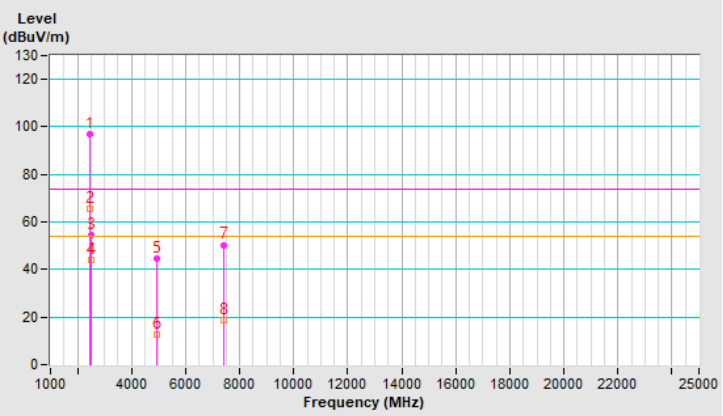


RF Mode	BT-LE 2M	Channel	CH 38：2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2478.00	96.9 PK			3.79 V	139	102.6	-5.7
2	*2478.00	65.3 AV			3.79 V	139	71.0	-5.7
3	2483.50	54.7 PK	74.0	-19.3	3.79 V	139	60.4	-5.7
4	2483.50	44.1 AV	54.0	-9.9	3.79 V	139	49.8	-5.7
5	4956.00	44.4 PK	74.0	-29.6	1.07 V	4	43.9	0.5
6	4956.00	12.8 AV	54.0	-41.2	1.07 V	4	12.3	0.5
7	7434.00	50.4 PK	74.0	-23.6	1.00 V	145	43.1	7.3
8	7434.00	18.8 AV	54.0	-35.2	1.00 V	145	11.5	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.051 ms) = -31.6 dB

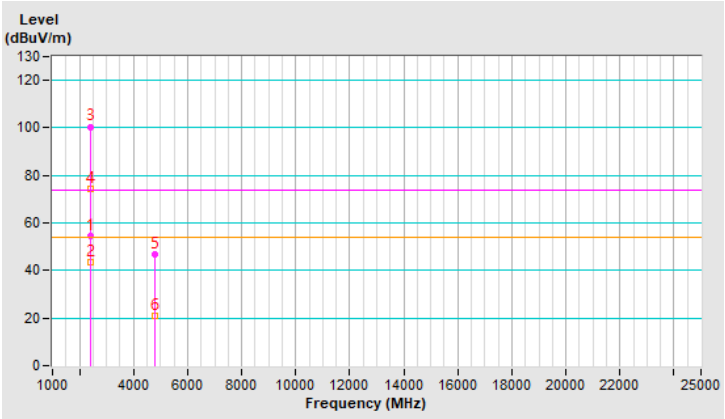


RF Mode	logi bolt-1M	Channel	CH 0：2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.6 PK	74.0	-19.4	1.05 H	42	60.3	-5.7
2	2390.00	43.6 AV	54.0	-10.4	1.05 H	42	49.3	-5.7
3	*2402.00	100.5 PK			1.05 H	42	106.2	-5.7
4	*2402.00	74.5 AV			1.05 H	42	80.2	-5.7
5	4804.00	46.8 PK	74.0	-27.2	1.07 H	122	46.5	0.3
6	4804.00	20.8 AV	54.0	-33.2	1.07 H	122	20.5	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

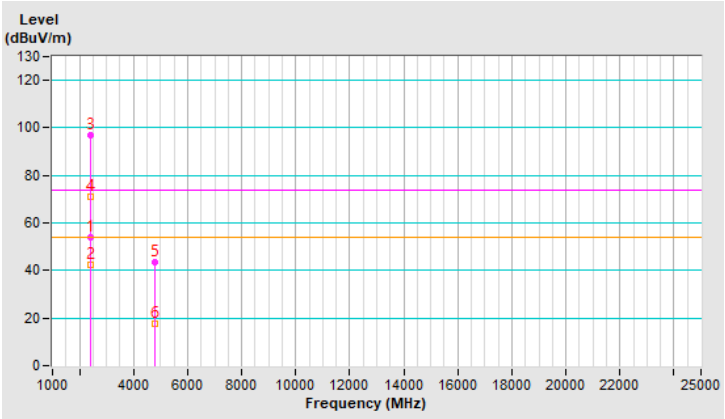


RF Mode	logi bolt-1M	Channel	CH 0：2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.2 PK	74.0	-19.8	3.74 V	134	59.9	-5.7
2	2390.00	42.5 AV	54.0	-11.5	3.74 V	134	48.2	-5.7
3	*2402.00	96.8 PK			3.74 V	134	102.5	-5.7
4	*2402.00	70.8 AV			3.74 V	134	76.5	-5.7
5	4804.00	43.6 PK	74.0	-30.4	1.02 V	9	43.3	0.3
6	4804.00	17.6 AV	54.0	-36.4	1.02 V	9	17.3	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

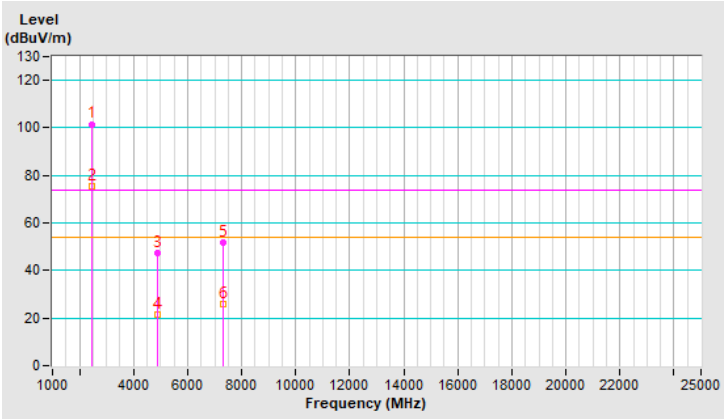


RF Mode	logi bolt-1M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	101.6 PK			1.09 H	55	107.3	-5.7
2	*2440.00	75.6 AV			1.09 H	55	81.3	-5.7
3	4880.00	47.5 PK	74.0	-26.5	1.05 H	111	47.2	0.3
4	4880.00	21.5 AV	54.0	-32.5	1.05 H	111	21.2	0.3
5	7320.00	51.8 PK	74.0	-22.2	1.03 H	93	44.9	6.9
6	7320.00	25.8 AV	54.0	-28.2	1.03 H	93	18.9	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

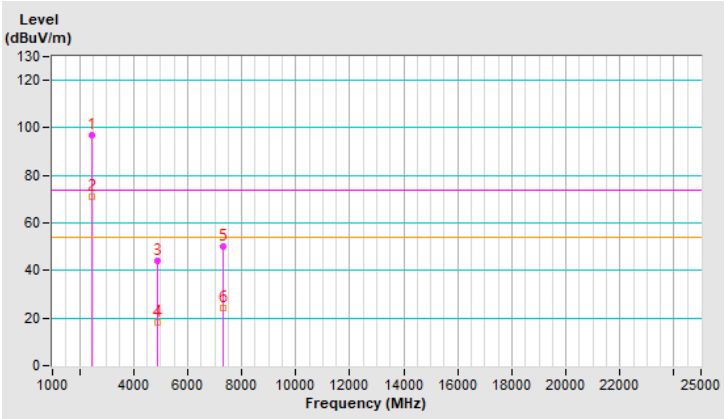


RF Mode	logi bolt-1M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	97.1 PK			3.88 V	129	102.8	-5.7
2	*2440.00	71.1 AV			3.88 V	129	76.8	-5.7
3	4880.00	44.1 PK	74.0	-29.9	1.00 V	11	43.8	0.3
4	4880.00	18.1 AV	54.0	-35.9	1.00 V	11	17.8	0.3
5	7320.00	50.2 PK	74.0	-23.8	1.11 V	128	43.3	6.9
6	7320.00	24.2 AV	54.0	-29.8	1.11 V	128	17.3	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

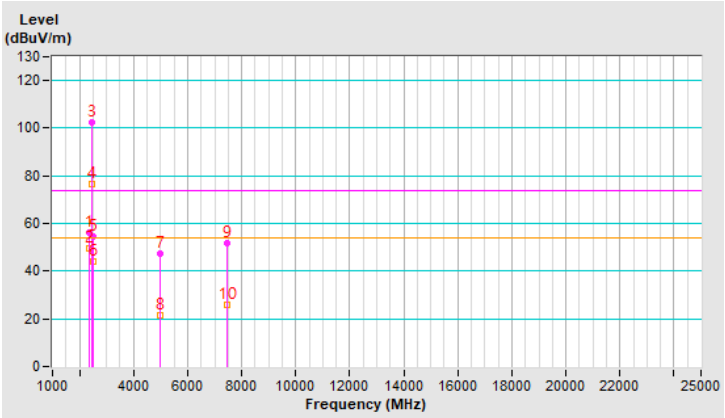


RF Mode	logi bolt-1M	Channel	CH 39：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2351.70	56.4 PK	74.0	-17.6	1.02 H	42	62.0	-5.6
2	2351.70	49.7 AV	54.0	-4.3	1.02 H	42	55.3	-5.6
3	*2480.00	102.5 PK			1.02 H	42	108.2	-5.7
4	*2480.00	76.5 AV			1.02 H	42	82.2	-5.7
5	2483.50	54.5 PK	74.0	-19.5	1.02 H	42	60.2	-5.7
6	2483.50	43.8 AV	54.0	-10.2	1.02 H	42	49.5	-5.7
7	4960.00	47.4 PK	74.0	-26.6	1.07 H	110	46.9	0.5
8	4960.00	21.4 AV	54.0	-32.6	1.07 H	110	20.9	0.5
9	7440.00	52.0 PK	74.0	-22.0	1.04 H	85	44.6	7.4
10	7440.00	26.0 AV	54.0	-28.0	1.04 H	85	18.6	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

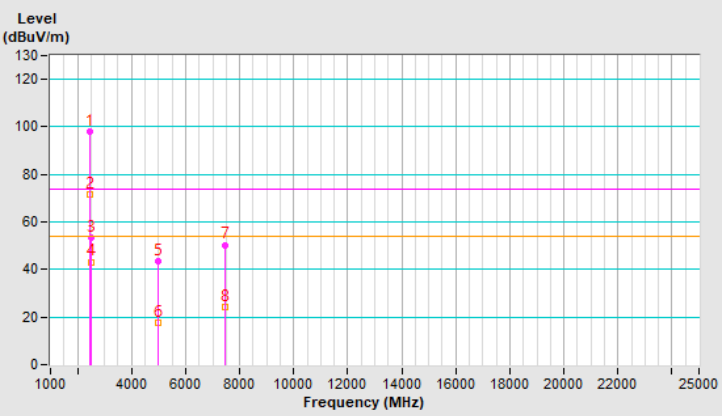


RF Mode	logi bolt-1M	Channel	CH 39：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2480.00	97.8 PK			3.76 V	140	103.5	-5.7
2	*2480.00	71.8 AV			3.76 V	140	77.5	-5.7
3	2483.50	53.2 PK	74.0	-20.8	3.76 V	140	58.9	-5.7
4	2483.50	43.2 AV	54.0	-10.8	3.76 V	140	48.9	-5.7
5	4960.00	43.7 PK	74.0	-30.3	1.01 V	356	43.2	0.5
6	4960.00	17.7 AV	54.0	-36.3	1.01 V	356	17.2	0.5
7	7440.00	50.4 PK	74.0	-23.6	1.00 V	123	43.0	7.4
8	7440.00	24.4 AV	54.0	-29.6	1.00 V	123	17.0	7.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.355 ms / 7.045 ms) = -26.0 dB

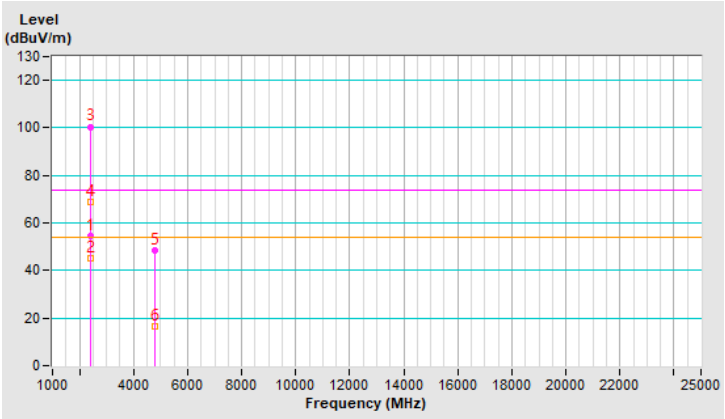


RF Mode	logi bolt-2M	Channel	CH 1：2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.6 PK	74.0	-19.4	1.11 H	38	60.3	-5.7
2	2390.00	44.9 AV	54.0	-9.1	1.11 H	38	50.6	-5.7
3	*2404.00	100.5 PK			1.11 H	38	106.2	-5.7
4	*2404.00	68.9 AV			1.11 H	38	74.6	-5.7
5	4808.00	48.2 PK	74.0	-25.8	1.06 H	106	48.0	0.2
6	4808.00	16.6 AV	54.0	-37.4	1.06 H	106	16.4	0.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB

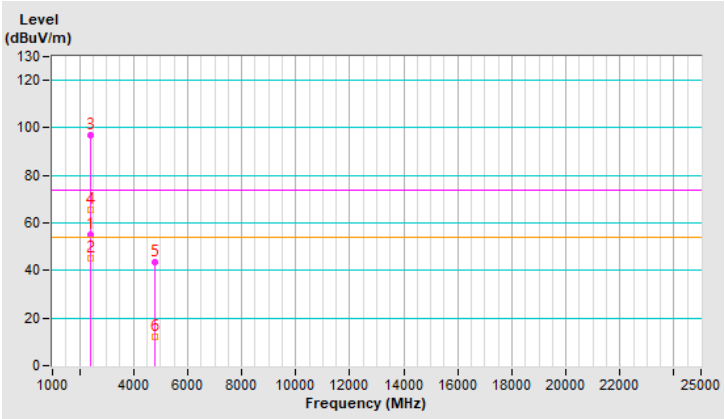


RF Mode	logi bolt-2M	Channel	CH 1：2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	3.77 V	124	60.9	-5.7
2	2390.00	44.9 AV	54.0	-9.1	3.77 V	124	50.6	-5.7
3	*2404.00	97.1 PK			3.77 V	124	102.8	-5.7
4	*2404.00	65.5 AV			3.77 V	124	71.2	-5.7
5	4808.00	43.5 PK	74.0	-30.5	1.07 V	5	43.3	0.2
6	4808.00	11.9 AV	54.0	-42.1	1.07 V	5	11.7	0.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB

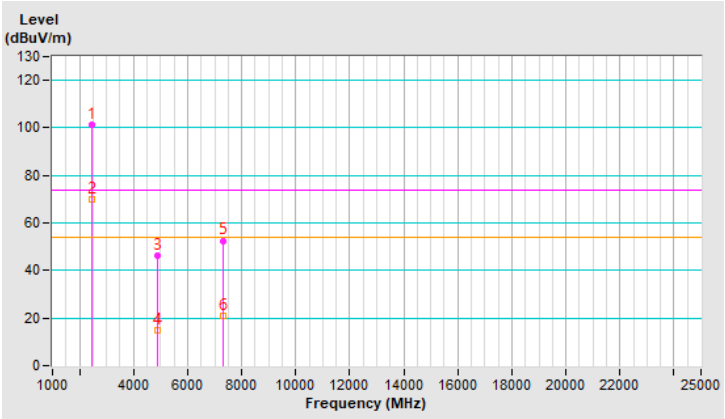


RF Mode	logi bolt-2M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	101.3 PK			1.05 H	44	107.0	-5.7
2	*2440.00	69.7 AV			1.05 H	44	75.4	-5.7
3	4880.00	46.4 PK	74.0	-27.6	1.00 H	117	46.1	0.3
4	4880.00	14.8 AV	54.0	-39.2	1.00 H	117	14.5	0.3
5	7320.00	52.6 PK	74.0	-21.4	1.03 H	82	45.7	6.9
6	7320.00	21.0 AV	54.0	-33.0	1.03 H	82	14.1	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB

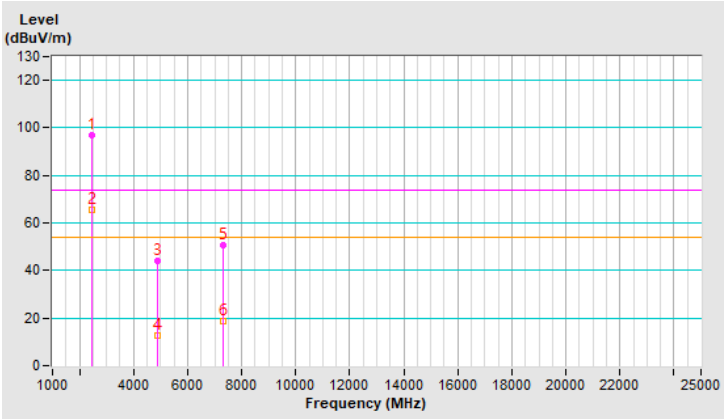


RF Mode	logi bolt-2M	Channel	CH 19：2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2440.00	96.9 PK			3.81 V	141	102.6	-5.7
2	*2440.00	65.3 AV			3.81 V	141	71.0	-5.7
3	4880.00	44.0 PK	74.0	-30.0	1.02 V	13	43.7	0.3
4	4880.00	12.4 AV	54.0	-41.6	1.02 V	13	12.1	0.3
5	7320.00	50.5 PK	74.0	-23.5	1.09 V	142	43.6	6.9
6	7320.00	18.9 AV	54.0	-35.1	1.09 V	142	12.0	6.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB

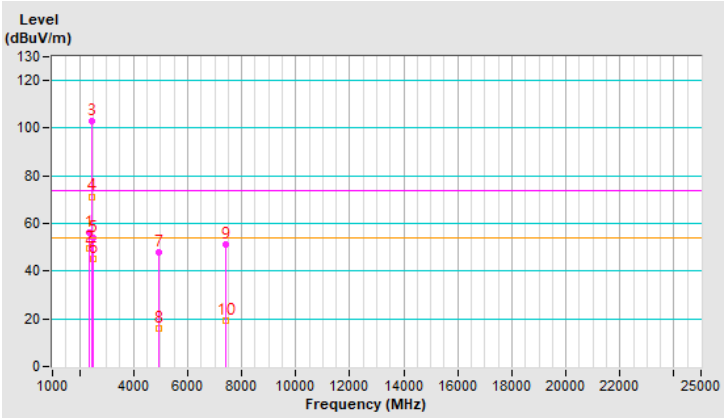


RF Mode	logi bolt-2M	Channel	CH 38：2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2351.50	56.4 PK	74.0	-17.6	1.01 H	51	62.0	-5.6
2	2351.50	49.7 AV	54.0	-4.3	1.01 H	51	55.3	-5.6
3	*2478.00	102.9 PK			1.01 H	51	108.6	-5.7
4	*2478.00	71.3 AV			1.01 H	51	77.0	-5.7
5	2483.50	53.8 PK	74.0	-20.2	1.01 H	51	59.5	-5.7
6	2483.50	45.3 AV	54.0	-8.7	1.01 H	51	51.0	-5.7
7	4956.00	47.8 PK	74.0	-26.2	1.06 H	94	47.3	0.5
8	4956.00	16.2 AV	54.0	-37.8	1.06 H	94	15.7	0.5
9	7434.00	51.0 PK	74.0	-23.0	1.00 H	122	43.7	7.3
10	7434.00	19.4 AV	54.0	-34.6	1.00 H	122	12.1	7.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB

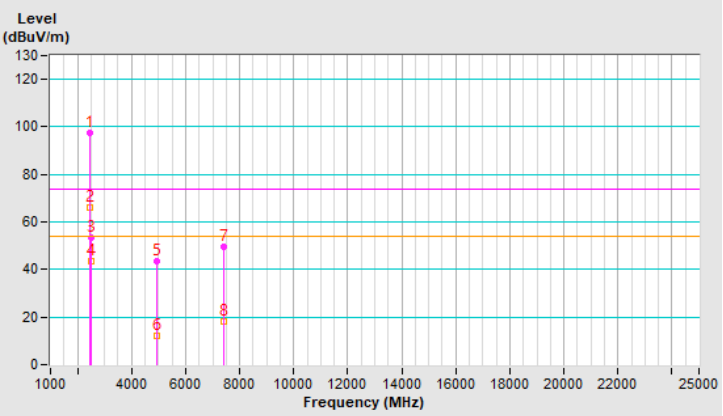


RF Mode	logi bolt-2M	Channel	CH 38：2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power	1.5 Vdc	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2478.00	97.5 PK			3.78 V	152	103.2	-5.7
2	*2478.00	65.9 AV			3.78 V	152	71.6	-5.7
3	2483.50	53.2 PK	74.0	-20.8	3.78 V	152	58.9	-5.7
4	2483.50	43.4 AV	54.0	-10.6	3.78 V	152	49.1	-5.7
5	4956.00	43.5 PK	74.0	-30.5	1.00 V	6	43.0	0.5
6	4956.00	11.9 AV	54.0	-42.1	1.00 V	6	11.4	0.5
7	7434.00	49.8 PK	74.0	-24.2	1.07 V	133	42.5	7.3
8	7434.00	18.2 AV	54.0	-35.8	1.07 V	133	10.9	7.3

Remarks:

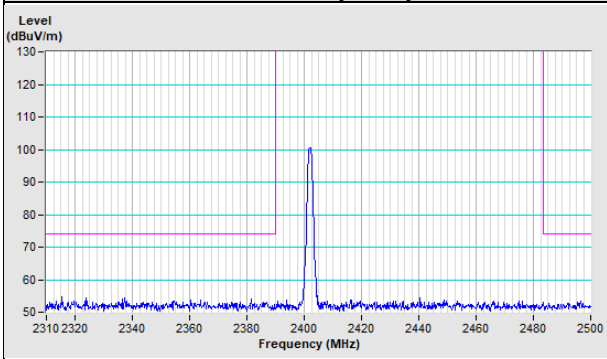
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
   20 log(Duty cycle) = 20 log(0.185 ms / 7.05 ms) = -31.6 dB



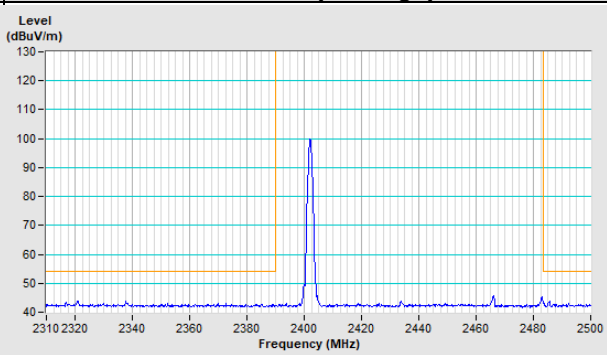
Plot of Band Edge

BT-LE 1M Channel 0

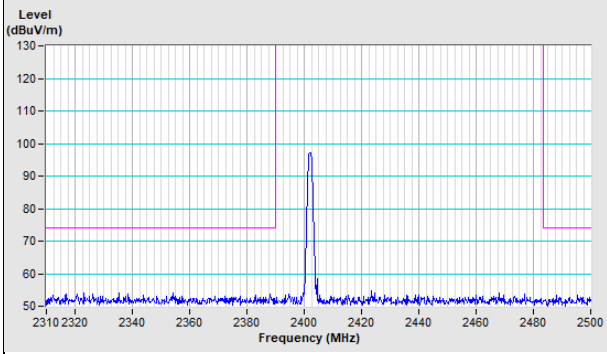
Horizontal (Peak)



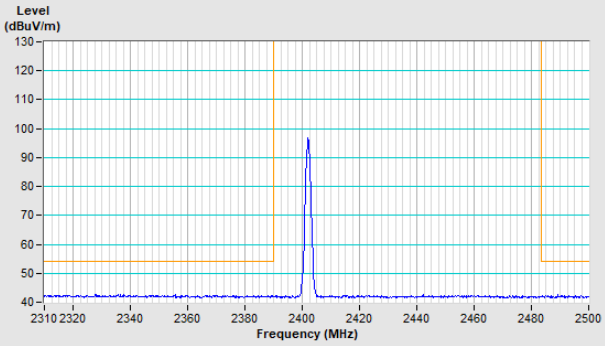
Horizontal (Average)



Vertical (Peak)

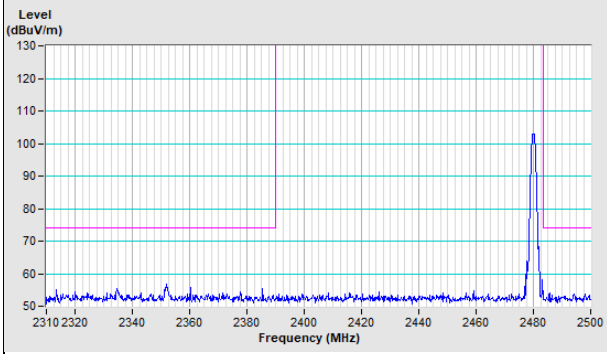


Vertical (Average)

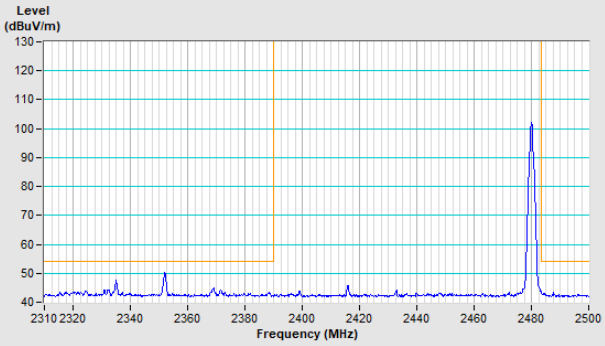


BT-LE 1M Channel 39

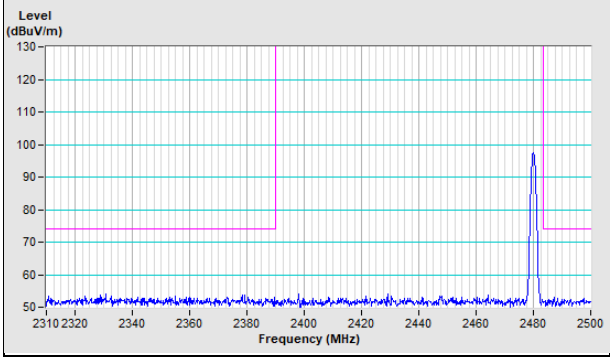
Horizontal (Peak)



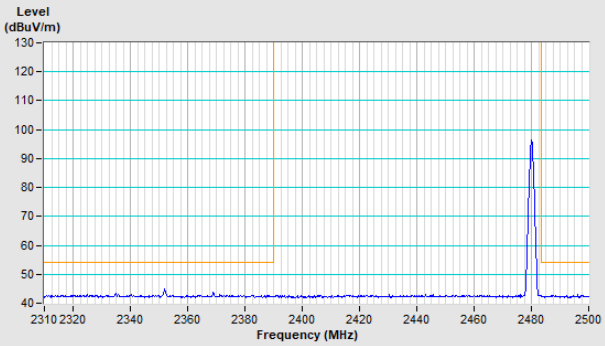
Horizontal (Average)



Vertical (Peak)

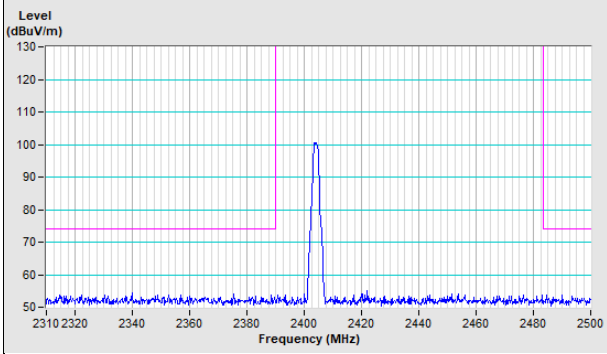


Vertical (Average)

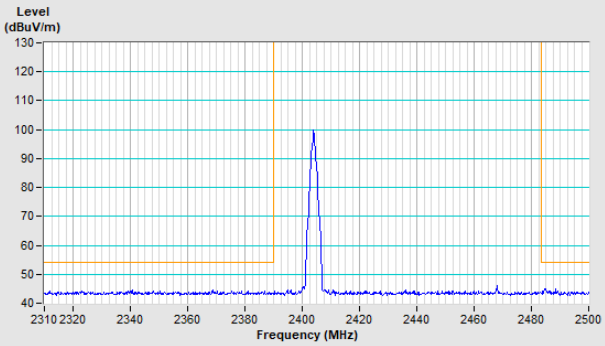


BT-LE 2M Channel 1

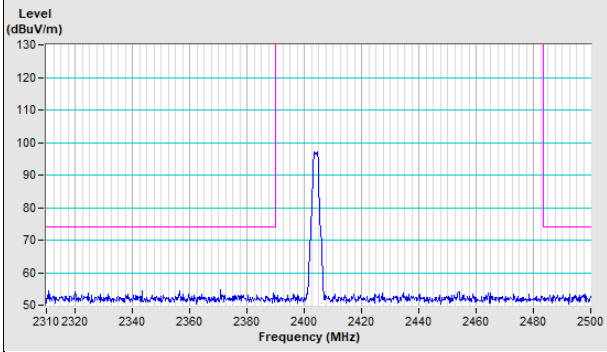
Horizontal (Peak)



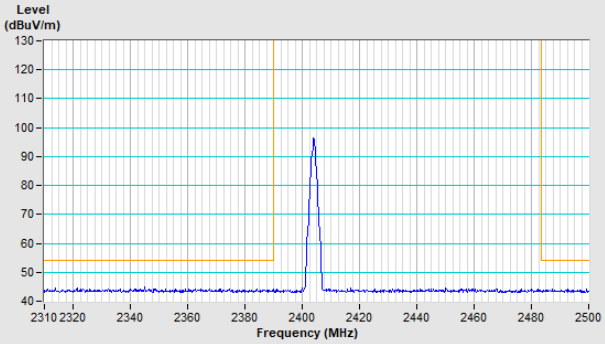
Horizontal (Average)



Vertical (Peak)

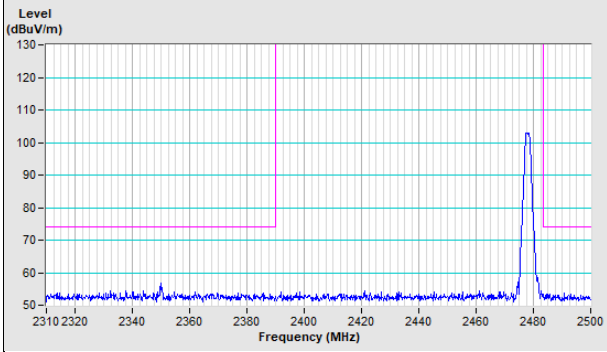


Vertical (Average)

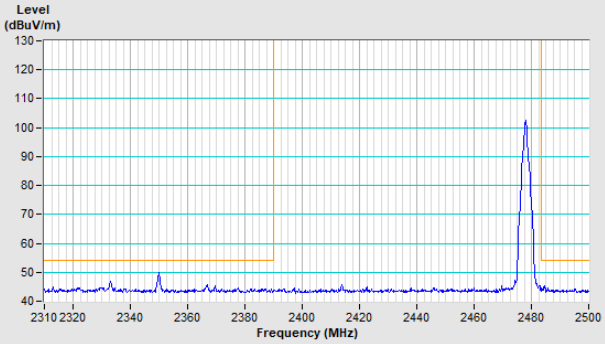


BT-LE 2M Channel 38

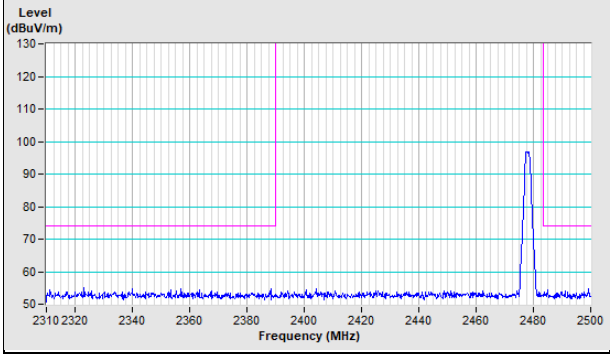
Horizontal (Peak)



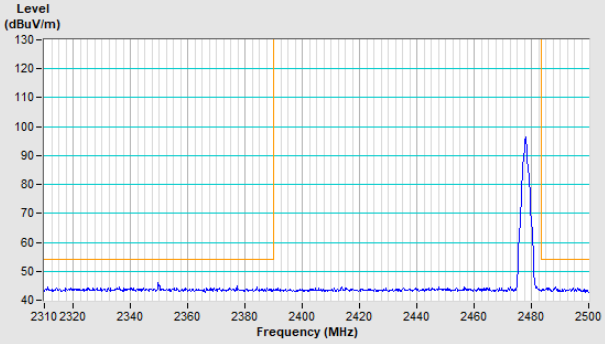
Horizontal (Average)



Vertical (Peak)

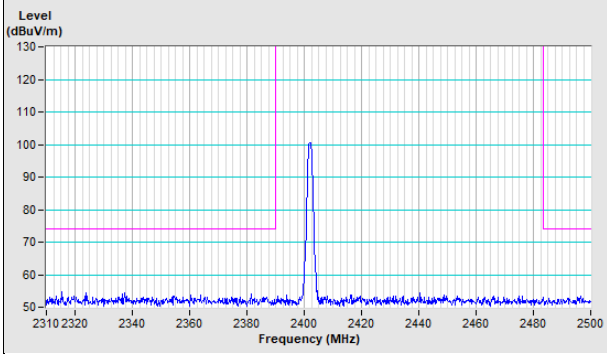


Vertical (Average)

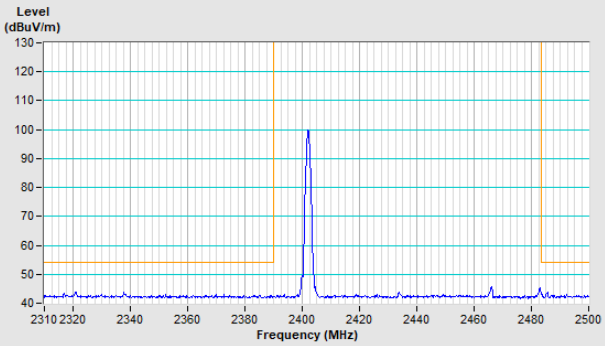


logi bolt-1M Channel 0

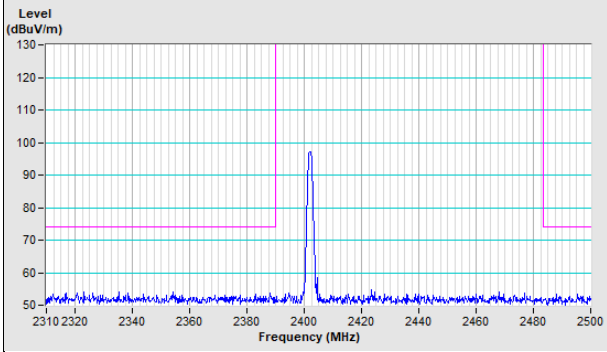
Horizontal (Peak)



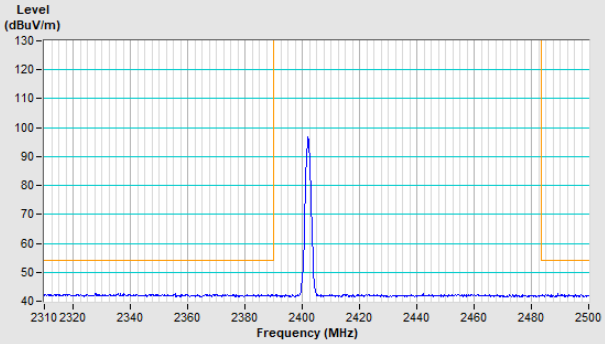
Horizontal (Average)



Vertical (Peak)

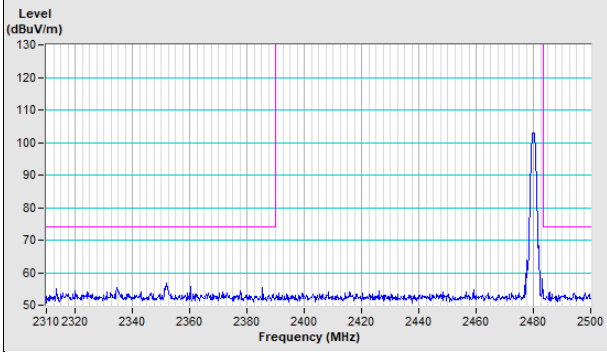


Vertical (Average)

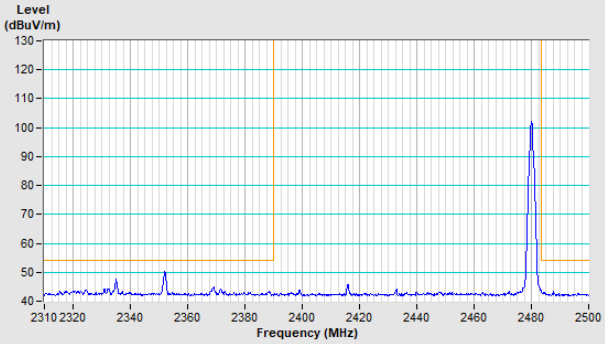


logi bolt-1M Channel 39

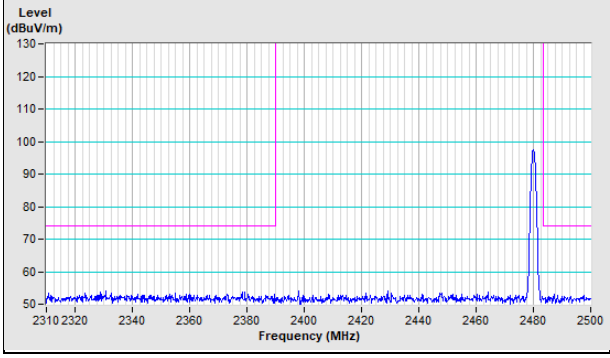
Horizontal (Peak)



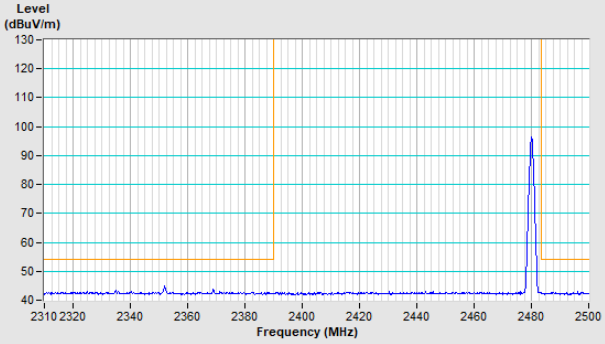
Horizontal (Average)



Vertical (Peak)

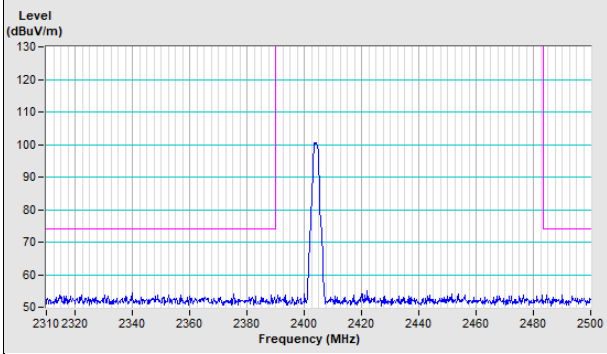


Vertical (Average)

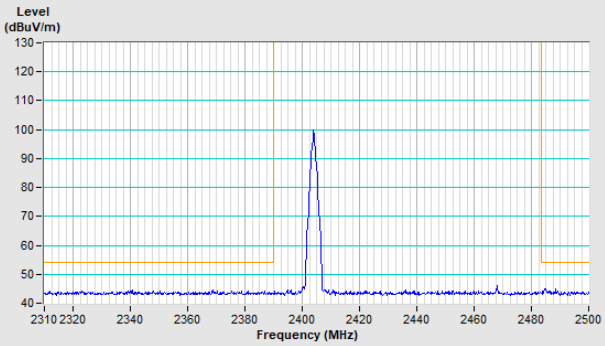


logi bolt-2M Channel 1

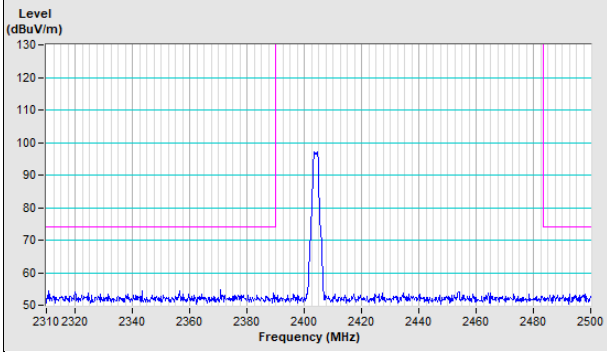
Horizontal (Peak)



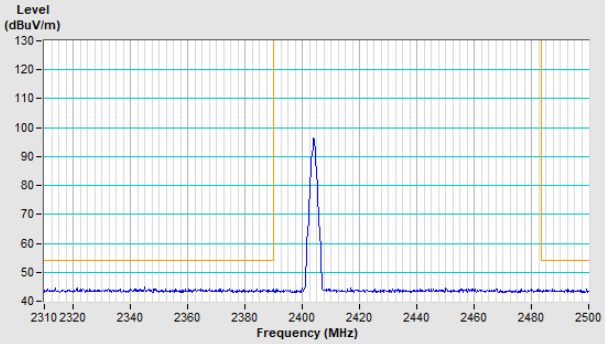
Horizontal (Average)



Vertical (Peak)

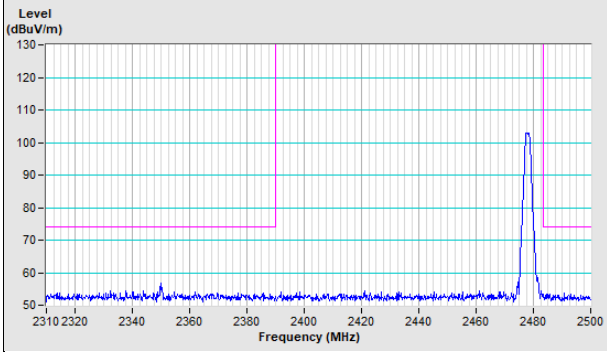


Vertical (Average)

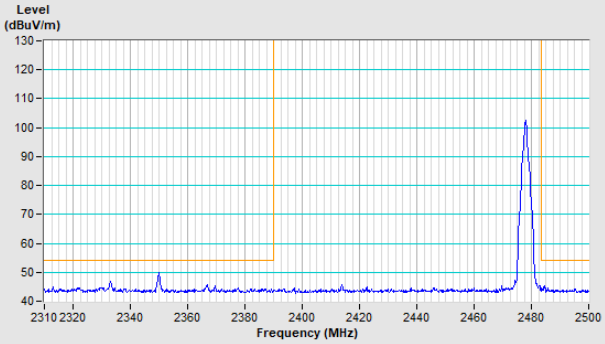


logi bolt-2M Channel 38

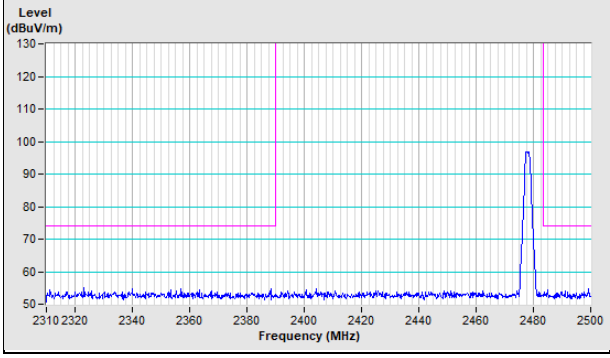
Horizontal (Peak)



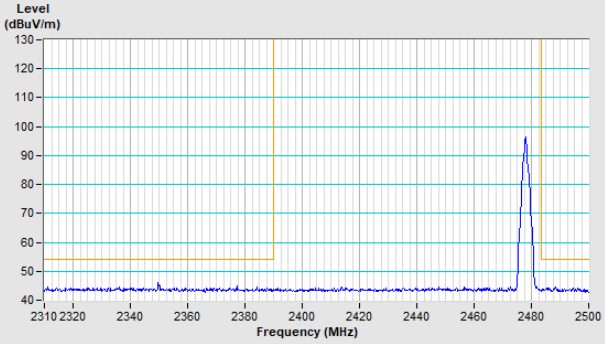
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Email: service.adt@bureauveritas.com
Web Site: http://ee.bureauveritas.com.tw

The address and road map of all our labs can be found in our web site also.

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