

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFBDKG-WTW-P23120009

FCC ID: JNZYR0097

Product: Dialpad

Brand: Logitech, logi, logitech

Model No.: YR0097

Received Date: 2023/11/29

Test Date: 2023/12/5 ~ 2023/12/15

Issued Date: 2024/1/5

Applicant: Logitech Far East Ltd.

Address: #2 Creation Rd. 4, Science-Based Ind. Park Hsinchu Taiwan, R.O.C.

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

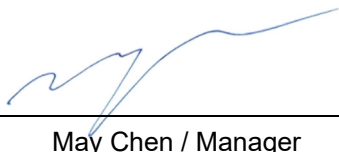
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FCC Registration / 723255 / TW2022

Designation Number:

Approved by: _____



May Chen / Manager

, Date: _____

2024/1/5

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Prepared by : Claire Kuan / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBDKG-WTW-P23120009	Original release.	2024/1/5

1 Certificate

Product: Dialpad

Brand: Logitech, logi, logitech

Test Model: YR0097

Sample Status: Engineering sample

Applicant: Logitech Far East Ltd.

Test Date: 2023/12/5 ~ 2023/12/15

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

Measurement ANSI C63.10-2013

procedure: 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	N/A	Power supply is from battery.
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -14.7 dB at 55.32 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -9.0 dB at 2390.00 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:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
RF Output Power	-	1.1 dB
Power Spectral Density	-	1.3 dB
6 dB Bandwidth	-	1050.00 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.6 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	Dialpad
Brand	Logitech, logi, logitech
Test Model	YR0097
Status of EUT	Engineering sample
Power Supply Rating	3Vdc from batteries
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2 Mbps (*Note 1)
Operating Frequency	2.402 GHz ~ 2.48 GHz (*Note 1)
Number of Channel	40 (*Note 1)
Output Power	BT_LE 1M: 3.141 mW (4.97 dBm) BT_LE 2M: 3.184 mW (5.03 dBm) logi bolt 1M: 3.126 mW (4.95 dBm) logi bolt 2M: 3.141 mW (4.97 dBm)

Note:

1. 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.
2. The EUT may have a lot of colors for marketing requirement.
3. This device has BT-LE and logi bolt functions. logi bolt is the same technology as BT-LE then enhancement secure protocol.
4. The product is supplied by alkaline batteries.
5. The EUT has two Magnetic Hall sensors as below table. They can be used in the device depending on available.

Source	PN
Main	MLX90393
2 nd	MLX90394

6. 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	Antenna Type	Connector Type
4.6	2.4~2.4835GHz	chip 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. The EUT has the following sources: Main(MLX90393) / 2nd(MLX90394) source. Pre-scan these sources of EUT and find the worst case as a representative test condition. 2. 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).
Worst Case:	1. The EUT Worst Condition: Main(MLX90393)

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 1M	0	GFSK	1Mb/s
	logi bolt 1M	19	GFSK	1Mb/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

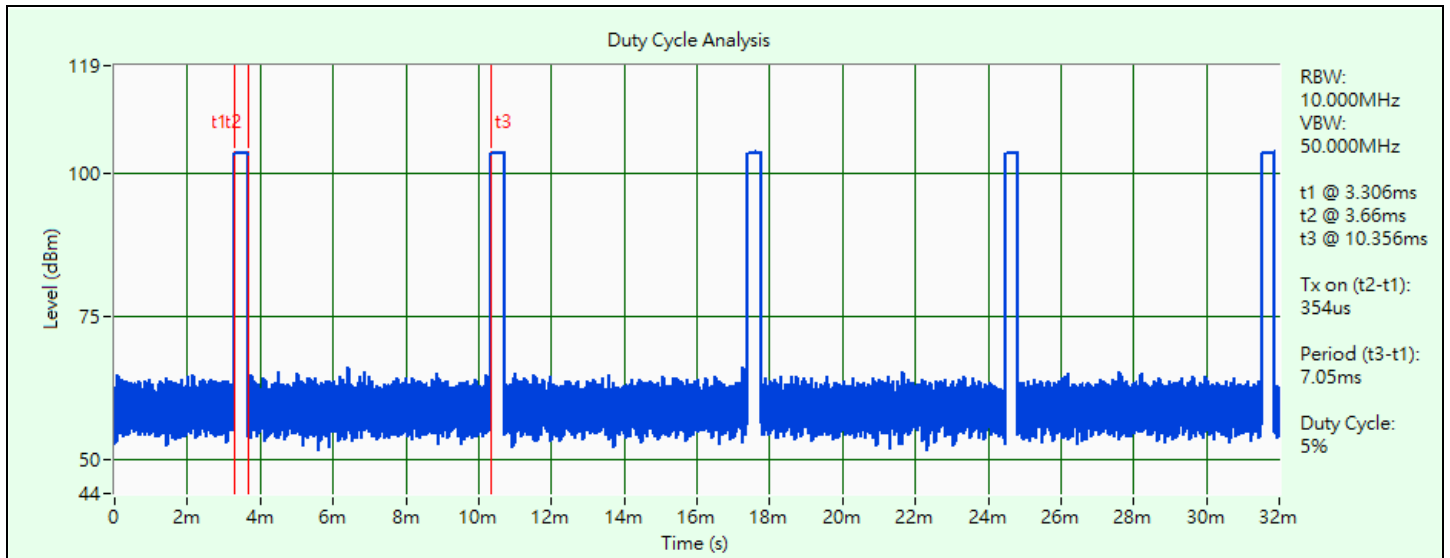
3.5 Duty Cycle of Test Signal

BT-LE 1M: Duty cycle = 0.354 ms / 7.05 ms x 100% = 5.0%, duty factor = 10 * log (1/Duty cycle) = 12.99 dB

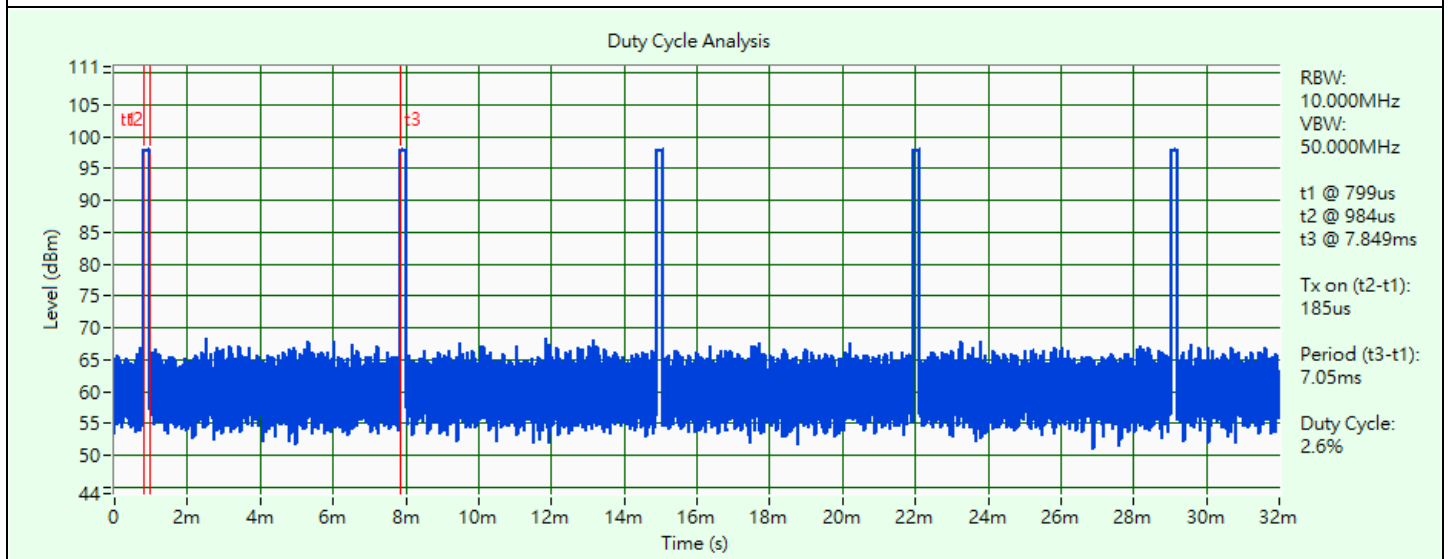
BT-LE 2M: Duty cycle = 0.185 ms / 7.05 ms x 100% = 2.6%, duty factor = 10 * log (1/Duty cycle) = 15.81 dB

logi bolt 1M: Duty cycle = 0.354 ms / 7.05 ms x 100% = 5.0%, duty factor = 10 * log (1/Duty cycle) = 12.99 dB

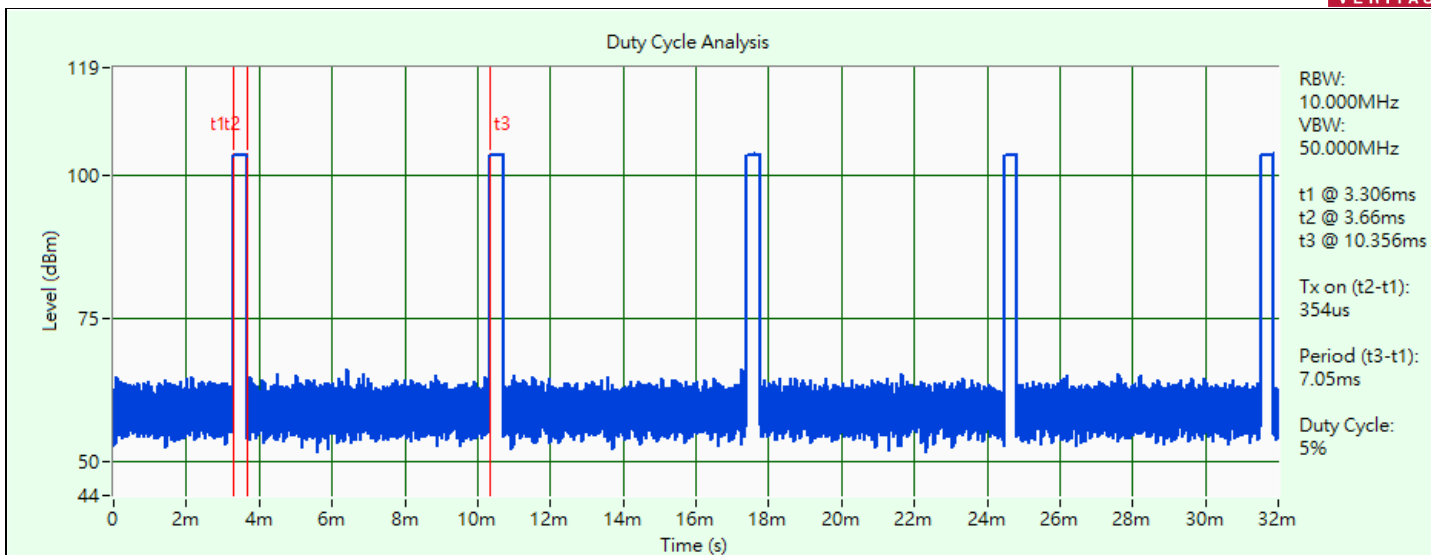
logi bolt 2M: Duty cycle = 0.185 ms / 7.05 ms x 100% = 2.6%, duty factor = 10 * log (1/Duty cycle) = 15.81 dB



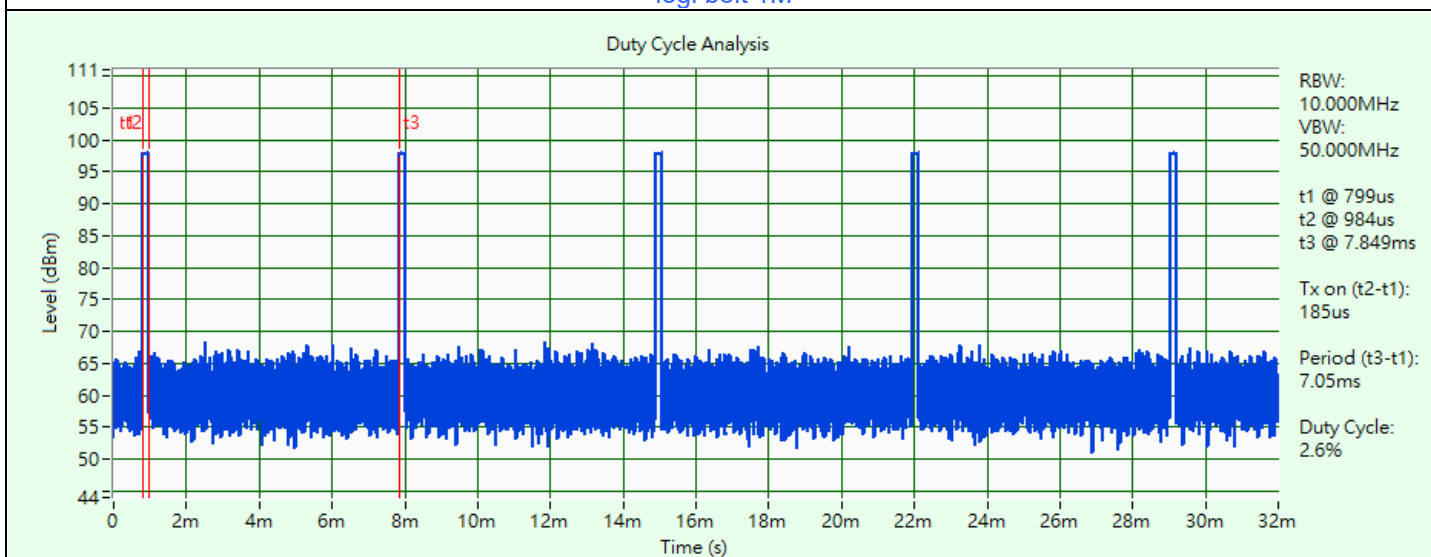
BT-LE 1M



BT-LE 2M



logi bolt 1M



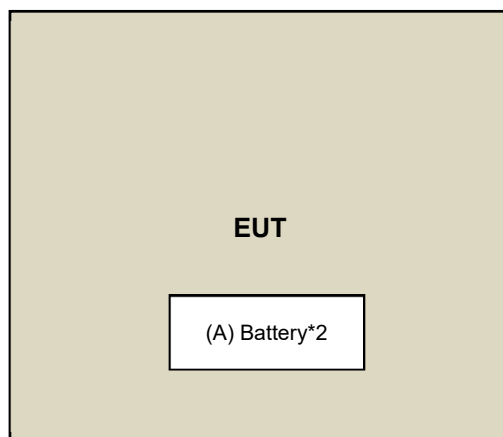
logi bolt 2M

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.

Test Item	Operation Description
RF Output Power Power Spectral Density 6 dB Bandwidth Conducted Out of Band Emissions AC Power Conducted Emissions Unwanted Emissions	BLE1M TX Modulated on channel 2402MHz BLE1M TX Modulated on channel 2440MHz BLE1M TX Modulated on channel 2480MHz BLE2M TX Modulated 2404MHz BLE2M TX Modulated 2440MHz BLE2M TX Modulated 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*2	Duracell	AAA	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	2023/6/17	2024/6/16
Pulse Power Sensor Anritsu	MA2411B	1726434	2023/6/19	2024/6/18

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/12/15

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
MXA Signal Analyzer Keysight	N9020B	MY60112409	2023/2/18	2024/2/17
Software	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/12/15

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
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2023/10/12	2024/10/11
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR3	102528	2023/2/10	2024/2/9
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2022/12/28	2023/12/27
Loop Antenna Electro-Metrics	EM-6879	264	2023/2/21	2024/2/20
MXA Signal Analyzer Keysight	N9020B	MY60112410	2023/3/6	2024/3/5
Preamplifier EMCI	EMC330N	980538	2023/4/6	2024/4/5
	EMC001340	980142	2023/5/8	2024/5/7
PXA Signal Analyzer Keysight	N9030B	MY57141948	2023/5/19	2024/5/18
RF Coaxial Cable JYEBAO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
RF Coaxial Cable PEWC	8D	966-5-1	2023/4/6	2024/4/5
		966-5-2	2023/4/6	2024/4/5
		966-5-3	2023/4/6	2024/4/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2023/12/7

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
EMI Test Receiver R&S	ESR3	102528	2023/2/10	2024/2/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2023/11/12	2024/11/11
	BBHA 9170	9170-739	2023/11/12	2024/11/11
MXA Signal Analyzer Keysight	N9020B	MY60112410	2023/3/6	2024/3/5
Preamplifier EMCI	EMC12630SE	980509	2023/4/7	2024/4/6
	EMC184045SE	980387	2023/8/9	2024/8/8
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2023/2/20	2024/2/19
	EMC102-KM-KM-1200	160924	2023/8/9	2024/8/8
	EMC104-SM-SM-1500	180503	2023/4/7	2024/4/6
	EMC104-SM-SM-2000	180501	2023/4/7	2024/4/6
	EMC104-SM-SM-6000	180506	2023/4/7	2024/4/6
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 5.
2. Tested Date: 2023/12/5 ~ 2023/12/15

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

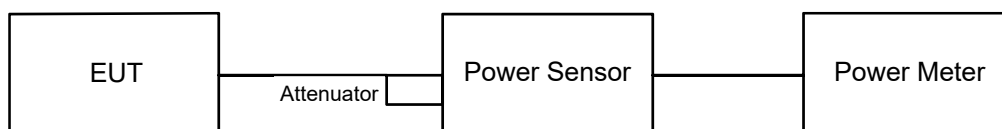
Notes:

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:

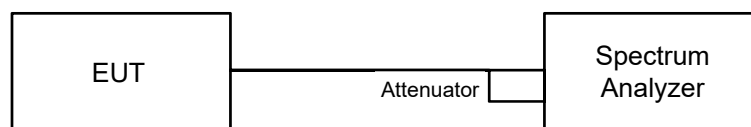
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

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

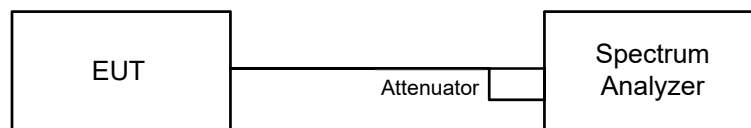


6.2.2 Test Procedure

- 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 $\geq 3 \times$ 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

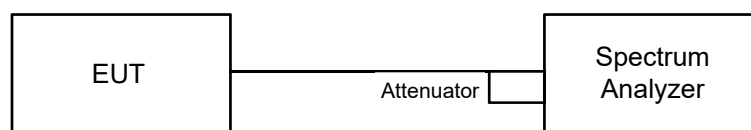


6.3.2 Test Procedure

- a. Set resolution bandwidth (RBW) = 100 kHz.
- b. Set the video bandwidth (VBW) $\geq 3 \times$ 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.

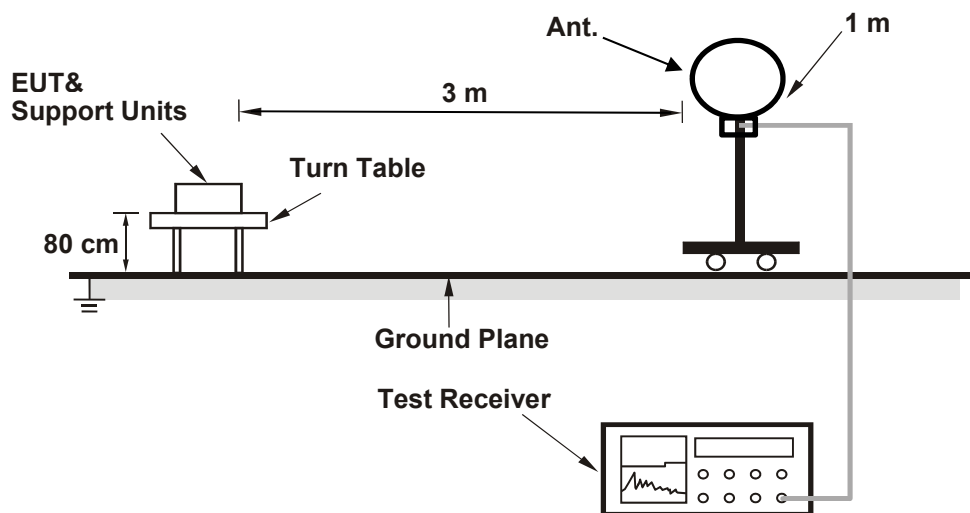
MEASUREMENT PROCEDURE OOB

- 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.

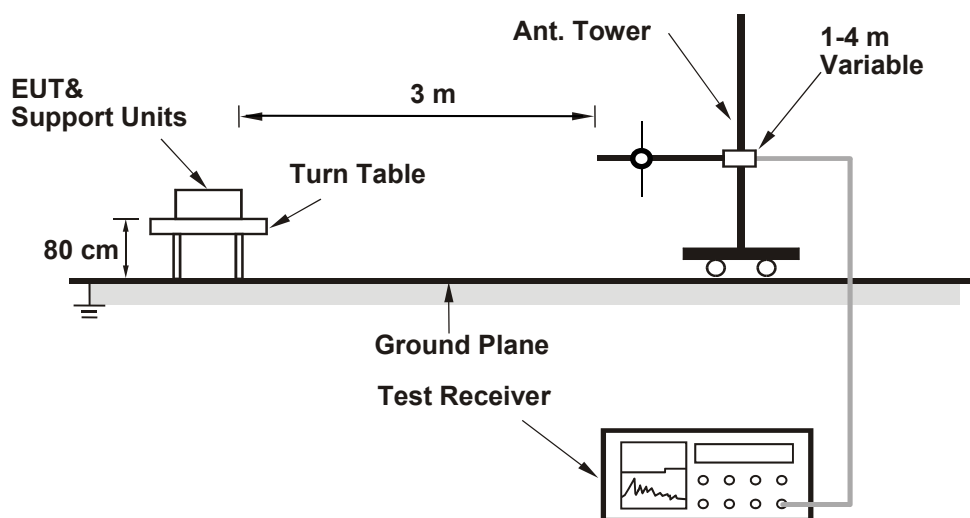
6.5 Unwanted Emissions below 1 GHz

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

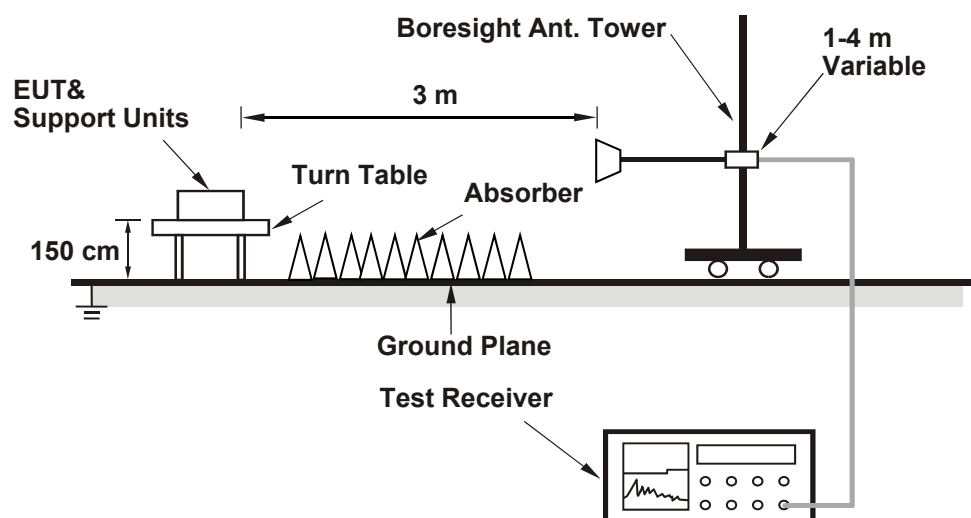
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- The test-receiver/spectrum analyzer 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:

- 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.
- For fundamental and harmonic signal measurement, according to KDB 558074 D01 15.247 Meas Guidance v05r02 section 8.1(c)(3). The spectrum analyzer settings meet the requirements of 11.12.2.4 in ANSI C63.10 for making a Peak measurement, the average value = Peak value + duty cycle correction factor. The duty cycle measurement refers to FCC 47 CFR Part 15C section 15.35 (c). For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
- 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:	3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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For Peak Power

BT-LE 1M

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
0	2402	3.141	4.97	30	Pass
19	2440	3.141	4.97	30	Pass
39	2480	2.951	4.70	30	Pass

Note: The antenna gain is 4.6 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	3.083	4.89	30	Pass
19	2440	3.184	5.03	30	Pass
38	2478	3.02	4.80	30	Pass

Note: The antenna gain is 4.6 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	3.105	4.92	30	Pass
19	2440	3.126	4.95	30	Pass
39	2480	2.938	4.68	30	Pass

Note: The antenna gain is 4.6 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	3.027	4.81	30	Pass
19	2440	3.141	4.97	30	Pass
38	2478	2.999	4.77	30	Pass

Note: The antenna gain is 4.6 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	3.013	4.79
19	2440	3.069	4.87
39	2480	2.891	4.61

BT-LE 2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	3.013	4.79
19	2440	3.02	4.80
38	2478	2.884	4.60

logi bolt 1M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	2.992	4.76
19	2440	3.02	4.80
39	2480	2.877	4.59

logi bolt 2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2404	2.992	4.76
19	2440	3.013	4.79
38	2478	2.871	4.58

7.2 Power Spectral Density

Input Power:	3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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BT-LE 1M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
0	2402	0.15	8	Pass
19	2440	-0.16	8	Pass
39	2480	0.28	8	Pass

Note: The antenna gain is 4.6 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	-7.35	8	Pass
19	2440	-7.26	8	Pass
38	2478	-6.92	8	Pass

Note: The antenna gain is 4.6 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	-0.19	8	Pass
19	2440	0.18	8	Pass
39	2480	0.13	8	Pass

Note: The antenna gain is 4.6 dBi < 6 dBi, so the power density limit shall not be reduced.

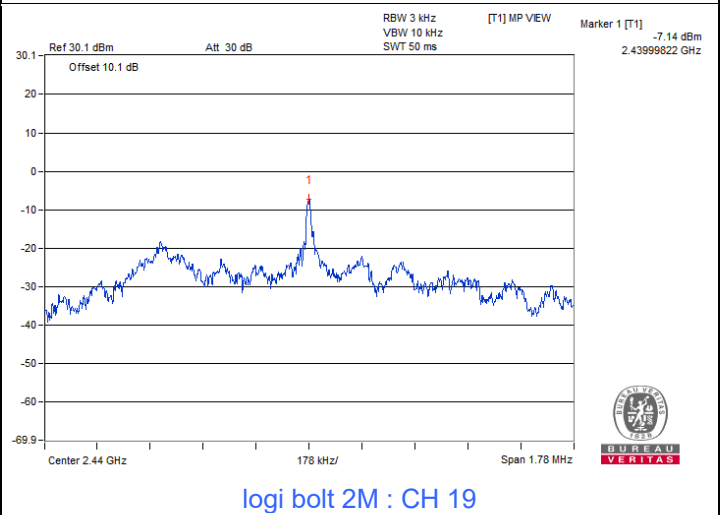
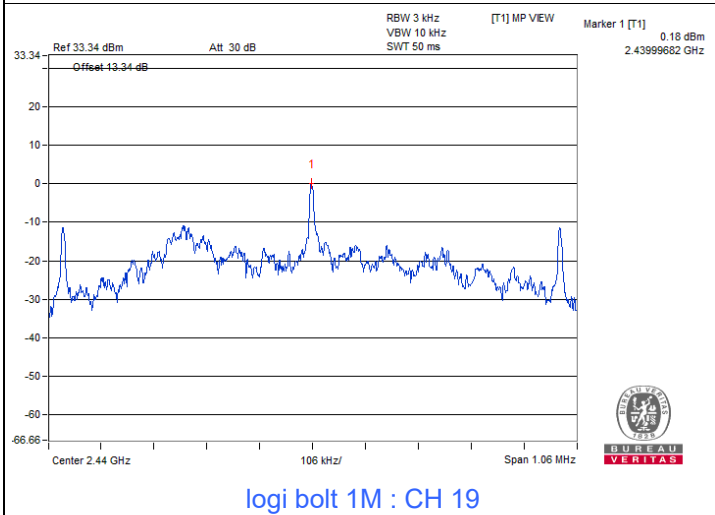
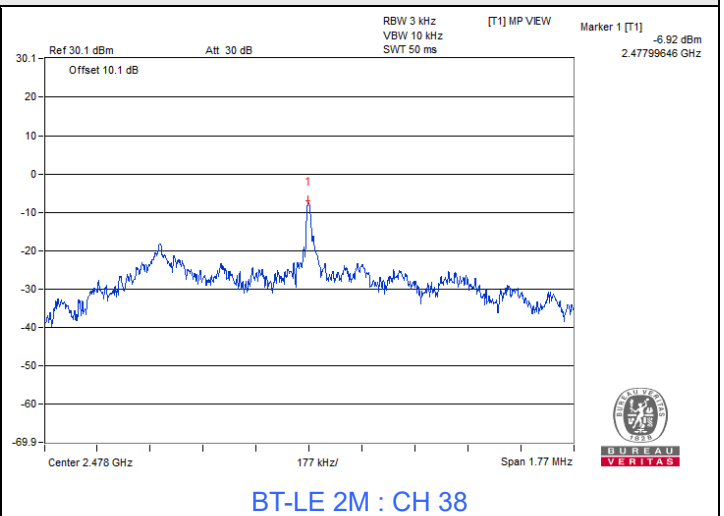
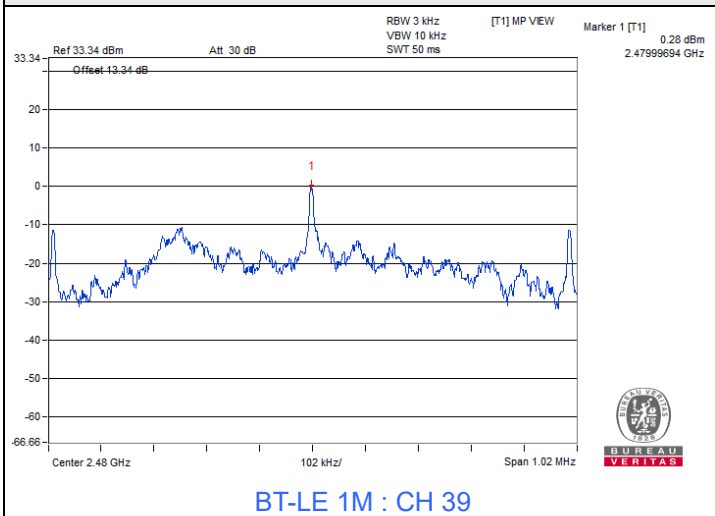
logi bolt 2M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2404	-7.52	8	Pass
19	2440	-7.14	8	Pass
38	2478	-7.26	8	Pass

Note: The antenna gain is 4.6 dBi < 6 dBi, so the power density limit shall not be reduced.



Spectrum Plot of Maximum Value



7.3 6 dB Bandwidth

Input Power:	3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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BT-LE 1M

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
0	2402	0.7	0.5	Pass
19	2440	0.69	0.5	Pass
39	2480	0.68	0.5	Pass

BT-LE 2M

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2404	1.17	0.5	Pass
19	2440	1.19	0.5	Pass
38	2478	1.18	0.5	Pass

logi bolt 1M

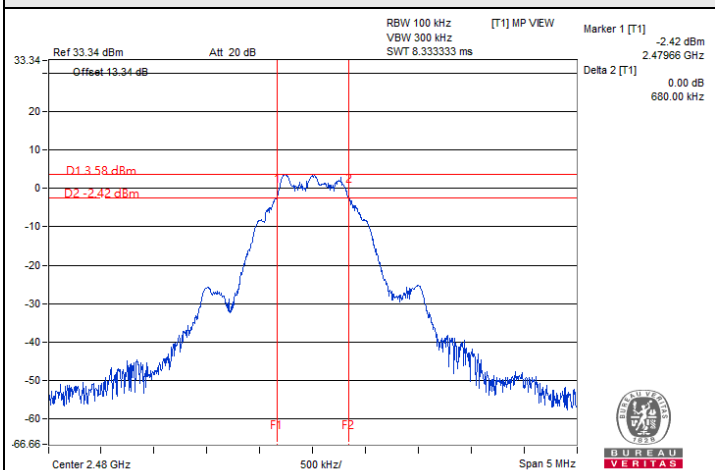
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
0	2402	0.69	0.5	Pass
19	2440	0.71	0.5	Pass
39	2480	0.68	0.5	Pass

logi bolt 2M

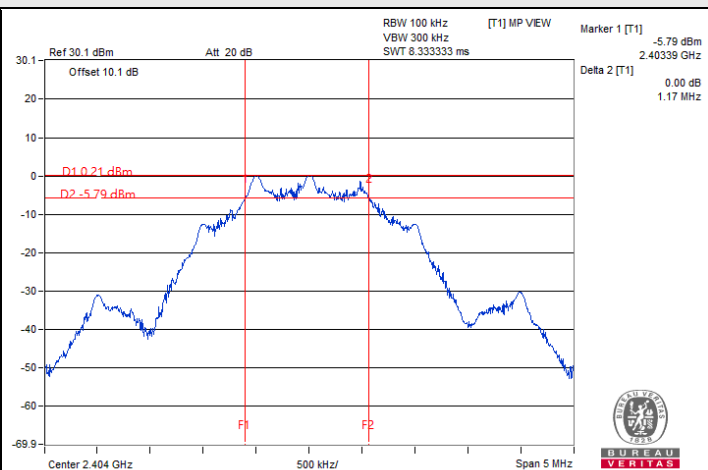
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2404	1.21	0.5	Pass
19	2440	1.19	0.5	Pass
38	2478	1.22	0.5	Pass



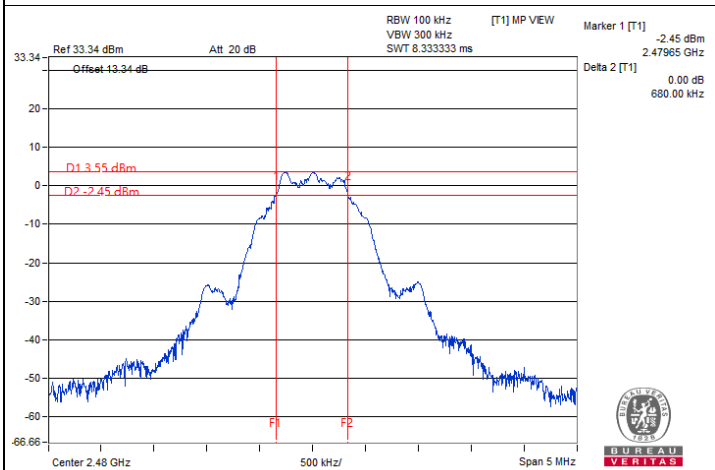
Spectrum Plot of Minimum Value



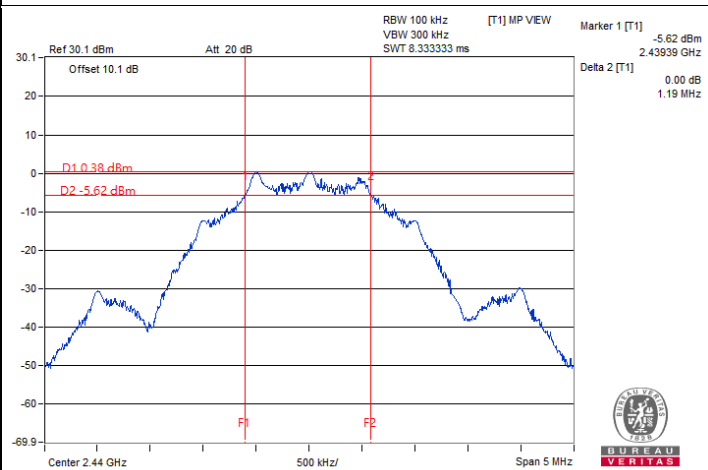
BT-LE 1M : CH 39



BT-LE 2M : CH 1



logi bolt 1M : CH 39



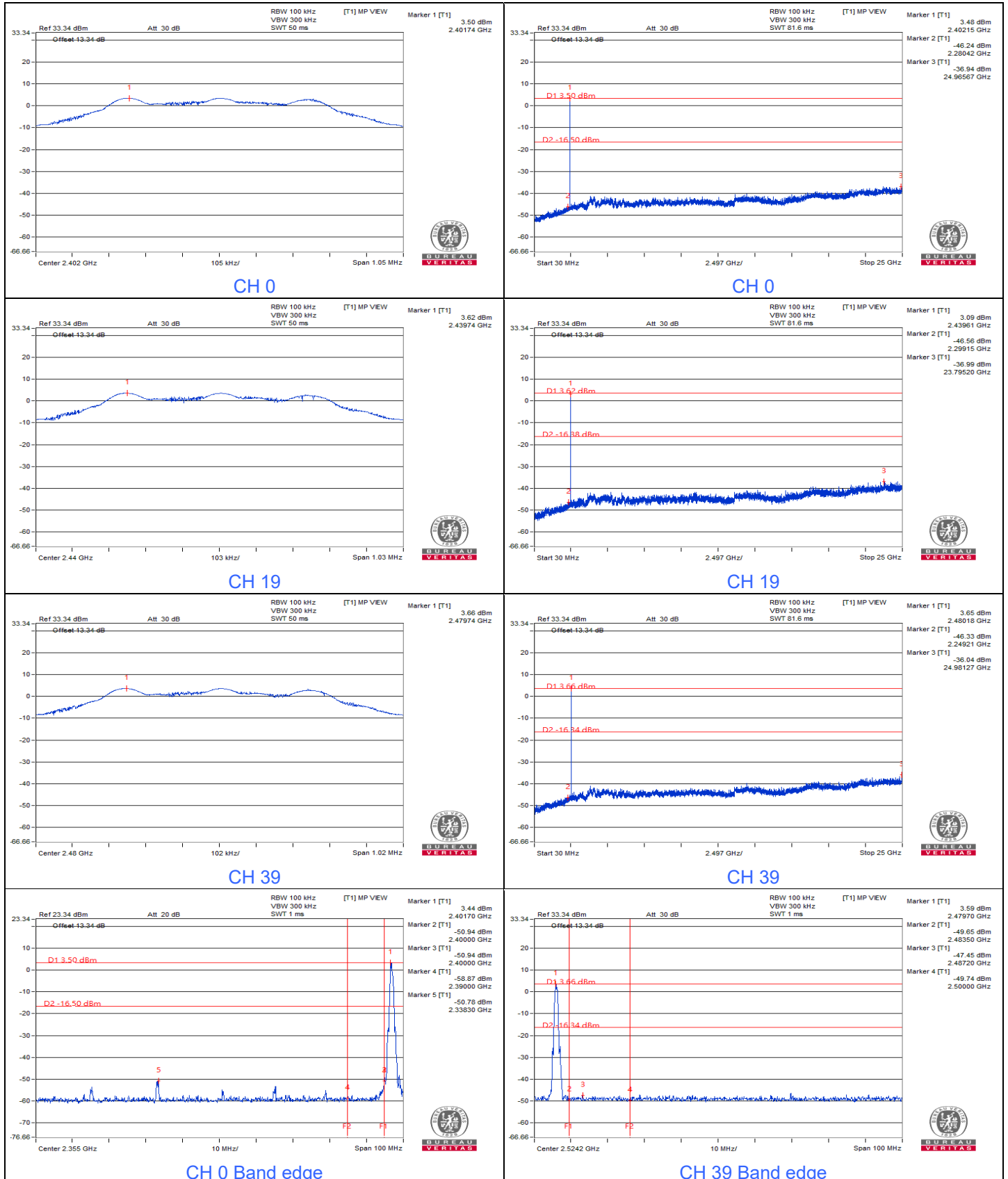
logi bolt 2M : CH 19

7.4 Conducted Out of Band Emissions

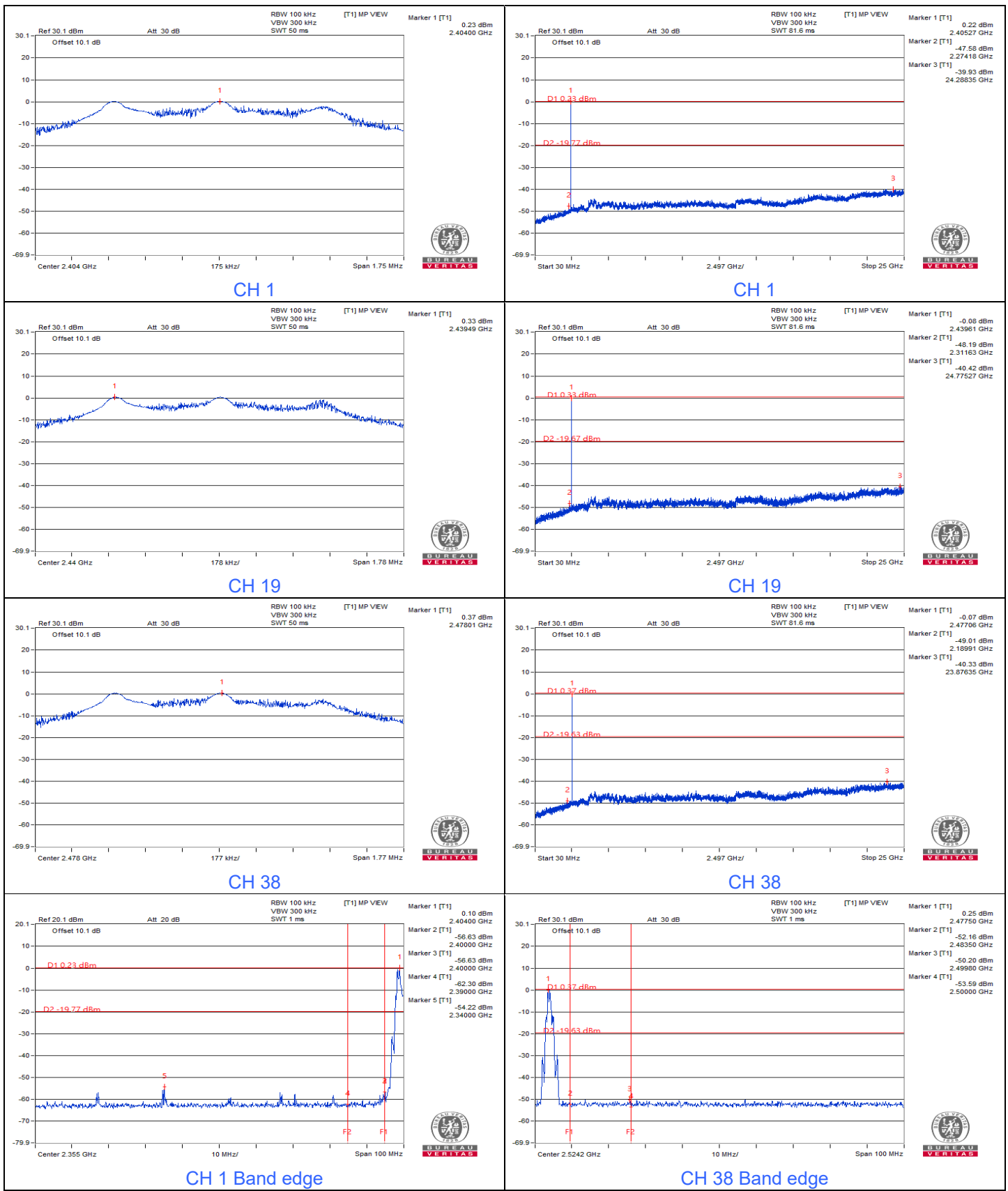
Input Power:	3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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Note: The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1

BT-LE 1M

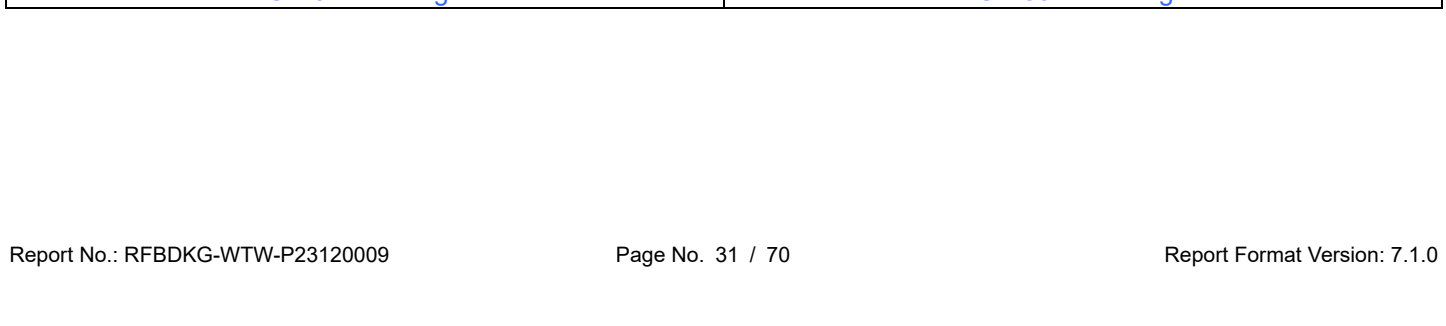
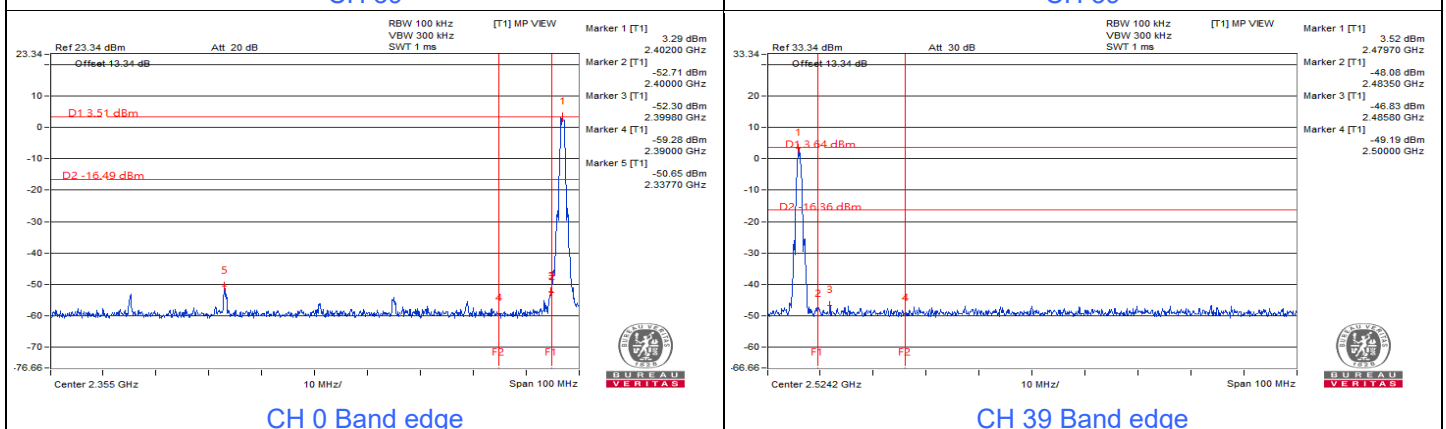
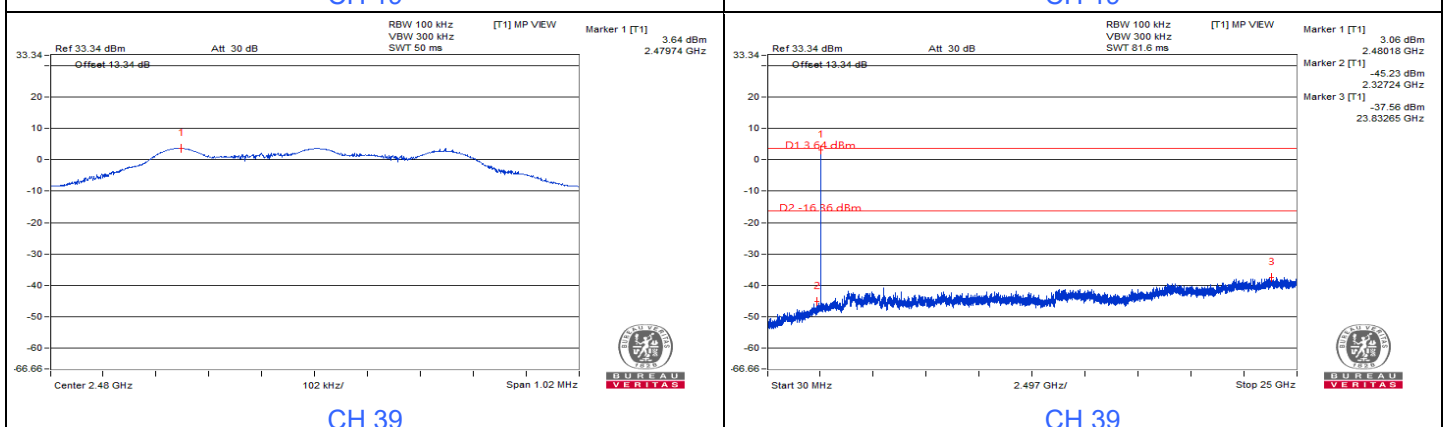
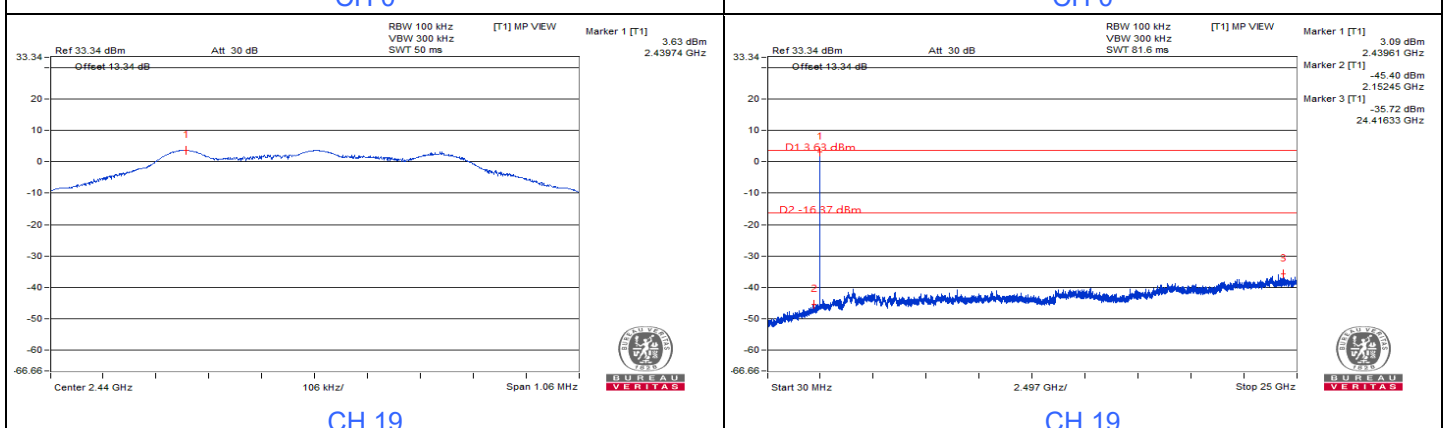
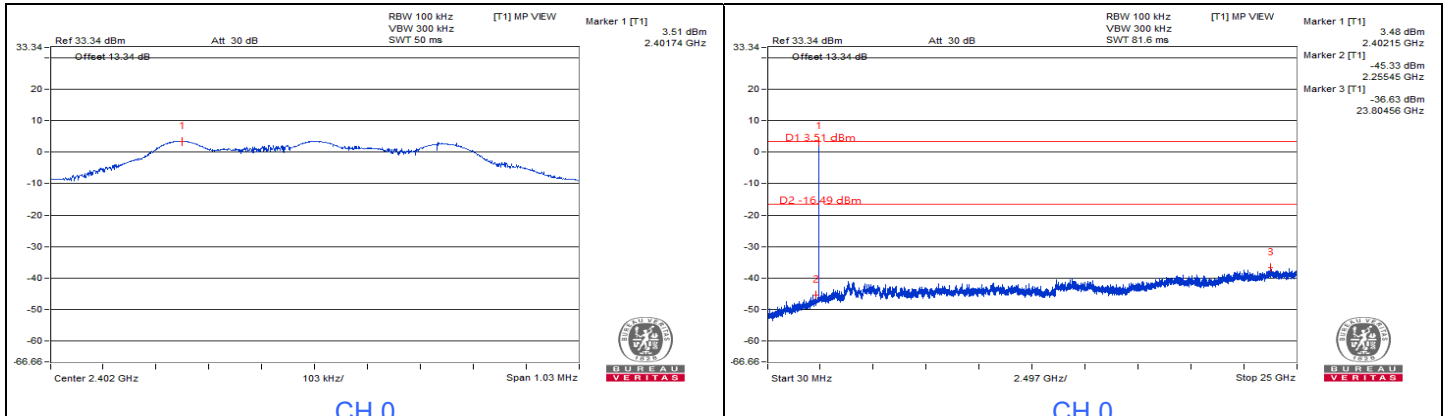


BT-LE 2M



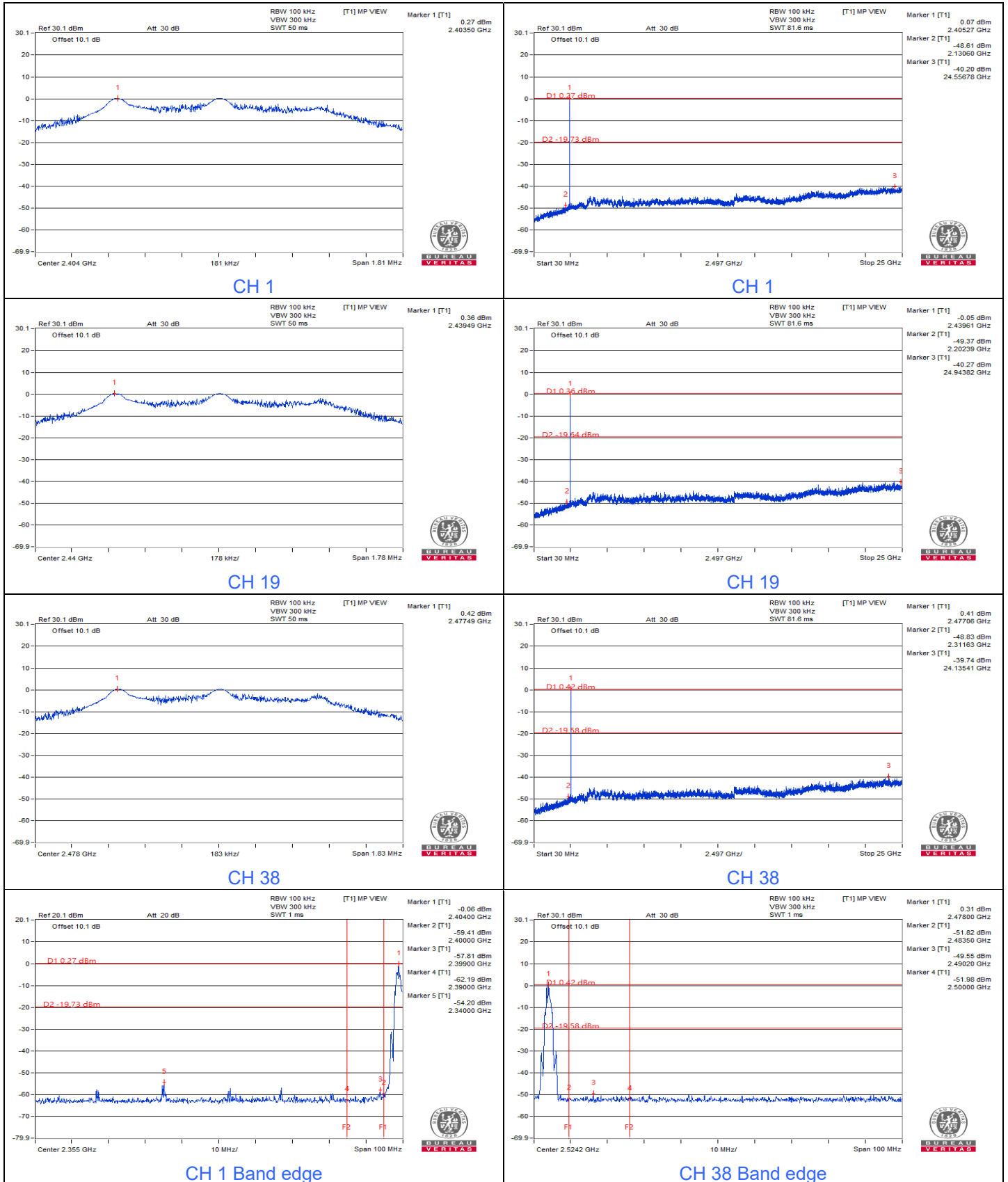


logi bolt 1M





logi bolt 2M



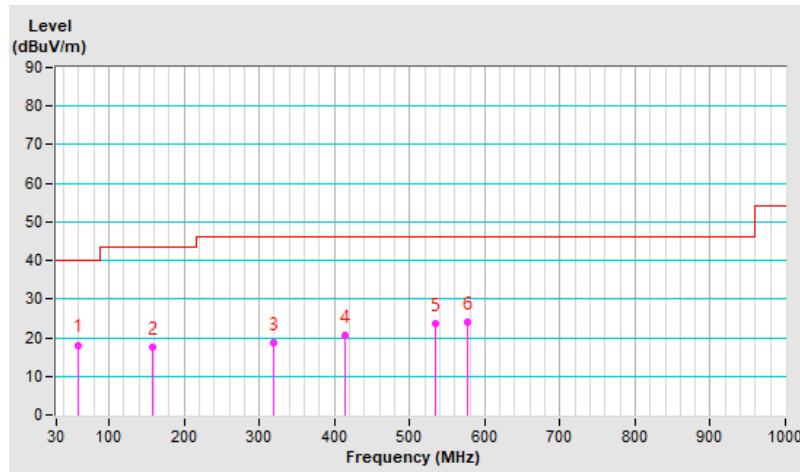
7.5 Unwanted Emissions below 1 GHz

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	3 Vdc	Environmental Conditions	23°C, 69% RH
Tested By	Louis 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	59.37	18.1 QP	40.0	-21.9	1.00 H	4	31.1	-13.0
2	157.26	17.5 QP	43.5	-26.0	2.00 H	42	29.8	-12.3
3	319.07	18.7 QP	46.0	-27.3	3.00 H	257	30.0	-11.3
4	413.53	20.4 QP	46.0	-25.6	2.00 H	116	29.6	-9.2
5	533.52	23.6 QP	46.0	-22.4	2.00 H	109	30.1	-6.5
6	576.18	24.1 QP	46.0	-21.9	3.00 H	249	29.6	-5.5

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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

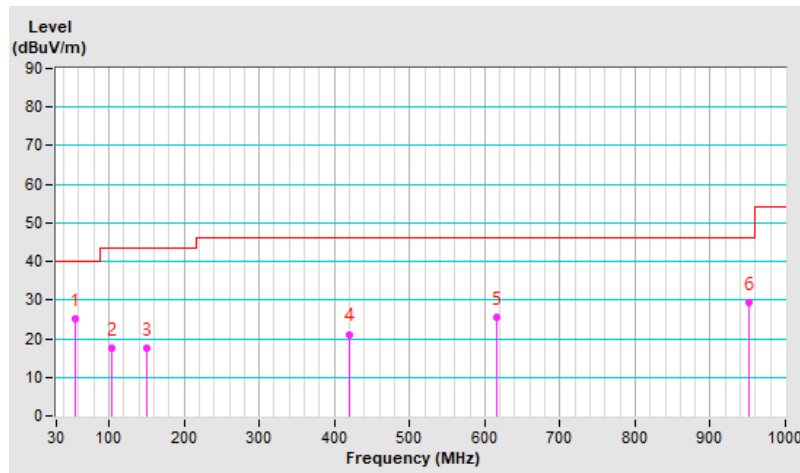


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	3 Vdc	Environmental Conditions	23°C, 69% RH
Tested By	Louis Yang		

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	55.32	25.3 QP	40.0	-14.7	1.50 V	1	38.0	-12.7
2	104.11	17.5 QP	43.5	-26.0	1.50 V	130	34.0	-16.5
3	150.72	17.6 QP	43.5	-25.9	2.00 V	46	30.0	-12.4
4	420.01	21.2 QP	46.0	-24.8	3.00 V	239	30.1	-8.9
5	614.94	25.5 QP	46.0	-20.5	3.00 V	233	30.0	-4.5
6	950.92	29.3 QP	46.0	-16.7	1.00 V	233	29.0	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 of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

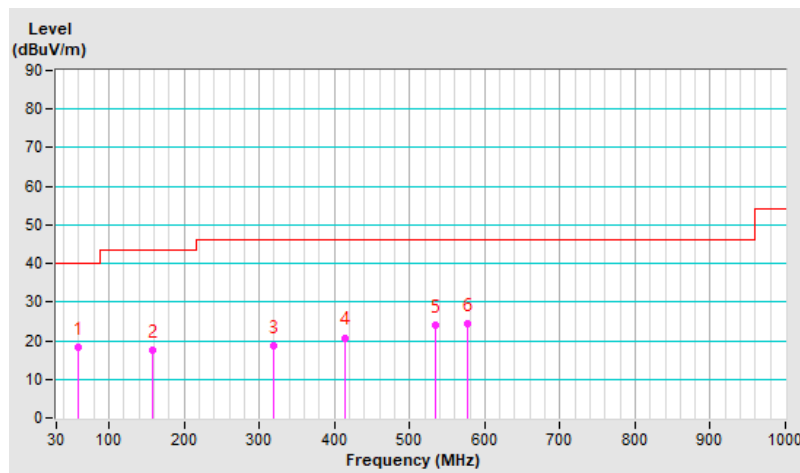


RF Mode	logi bolt 1M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	3 Vdc	Environmental Conditions	23°C, 69% RH
Tested By	Louis Yang		

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	59.54	18.2 QP	40.0	-21.8	1.00 H	1	31.2	-13.0
2	157.37	17.6 QP	43.5	-25.9	2.00 H	47	29.9	-12.3
3	318.93	18.5 QP	46.0	-27.5	3.00 H	264	29.8	-11.3
4	413.75	20.8 QP	46.0	-25.2	2.00 H	125	30.0	-9.2
5	533.94	24.0 QP	46.0	-22.0	2.00 H	103	30.5	-6.5
6	576.72	24.5 QP	46.0	-21.5	3.00 H	254	30.0	-5.5

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 frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

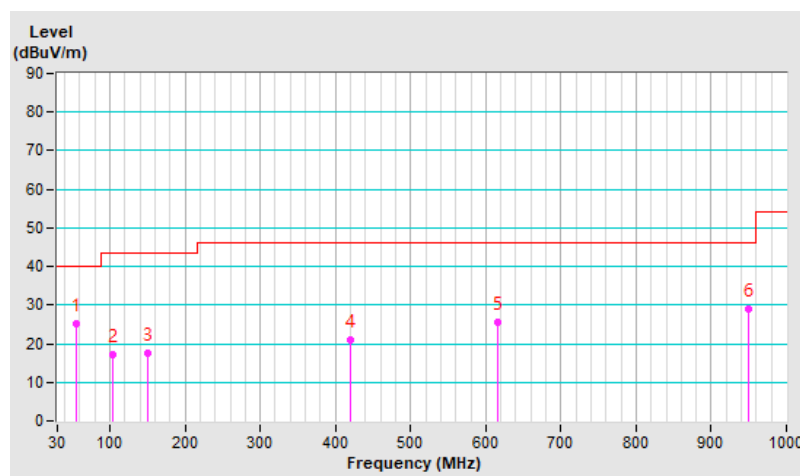


RF Mode	logi bolt 1M	Channel	CH 19 : 2440 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	3 Vdc	Environmental Conditions	23°C, 69% RH
Tested By	Louis Yang		

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	55.21	25.2 QP	40.0	-14.8	1.50 V	6	37.9	-12.7
2	103.87	17.3 QP	43.5	-26.2	1.50 V	126	33.8	-16.5
3	150.43	17.4 QP	43.5	-26.1	2.00 V	44	29.7	-12.3
4	419.51	20.9 QP	46.0	-25.1	3.00 V	242	29.9	-9.0
5	615.07	25.4 QP	46.0	-20.6	3.00 V	210	29.9	-4.5
6	950.35	29.1 QP	46.0	-16.9	1.00 V	238	28.8	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 of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.6 Unwanted Emissions above 1 GHz

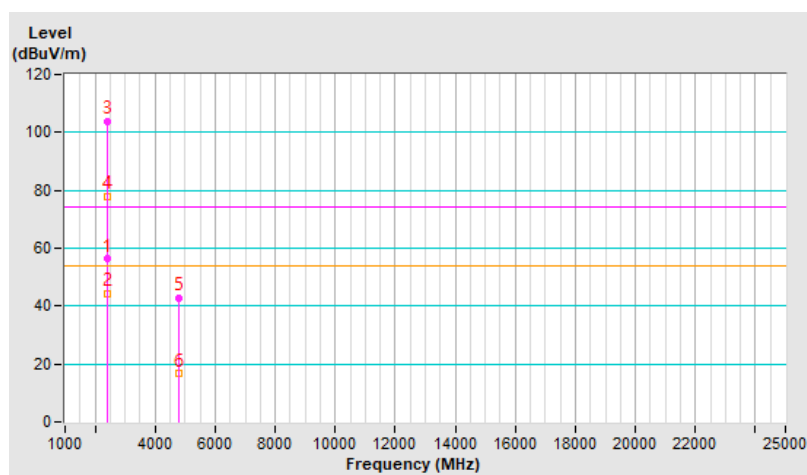
BT LE

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, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis 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	56.2 PK	74.0	-17.8	1.28 H	353	59.0	-2.8
2	2390.00	44.2 AV	54.0	-9.8	1.28 H	353	47.0	-2.8
3	*2402.00	103.8 PK			1.28 H	353	106.7	-2.9
4	*2402.00	77.8 AV			1.28 H	353	80.7	-2.9
5	4804.00	42.6 PK	74.0	-31.4	1.19 H	53	40.3	2.3
6	4804.00	16.6 AV	54.0	-37.4	1.19 H	53	14.3	2.3

Remarks:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
- 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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

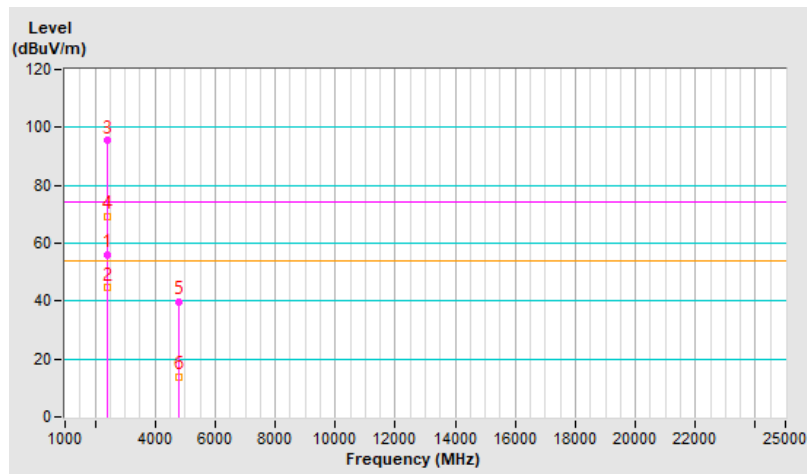


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	55.9 PK	74.0	-18.1	3.70 V	48	58.7	-2.8
2	2390.00	44.5 AV	54.0	-9.5	3.70 V	48	47.3	-2.8
3	*2402.00	95.4 PK			3.70 V	48	98.3	-2.9
4	*2402.00	69.4 AV			3.70 V	48	72.3	-2.9
5	4804.00	39.6 PK	74.0	-34.4	3.09 V	235	37.3	2.3
6	4804.00	13.6 AV	54.0	-40.4	3.09 V	235	11.3	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

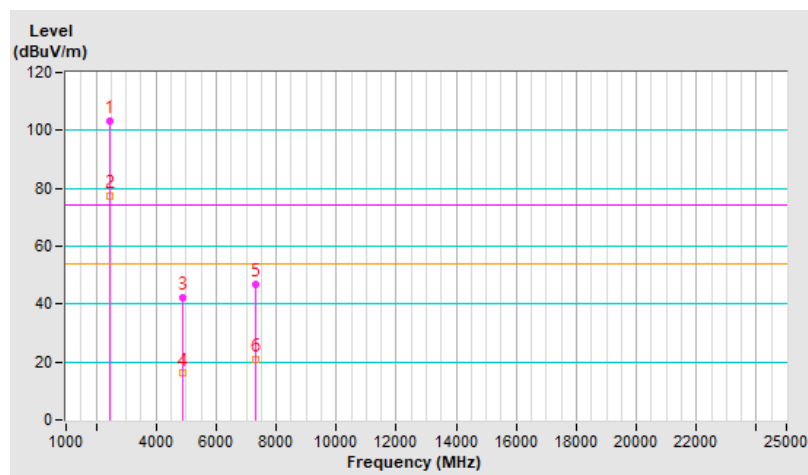


RF Mode	BT-LE 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	103.2 PK			3.23 H	348	106.0	-2.8
2	*2440.00	77.2 AV			3.23 H	348	80.0	-2.8
3	4880.00	42.1 PK	74.0	-31.9	1.25 H	43	39.9	2.2
4	4880.00	16.1 AV	54.0	-37.9	1.25 H	43	13.9	2.2
5	7320.00	46.7 PK	74.0	-27.3	1.49 H	319	38.9	7.8
6	7320.00	20.7 AV	54.0	-33.3	1.49 H	319	12.9	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

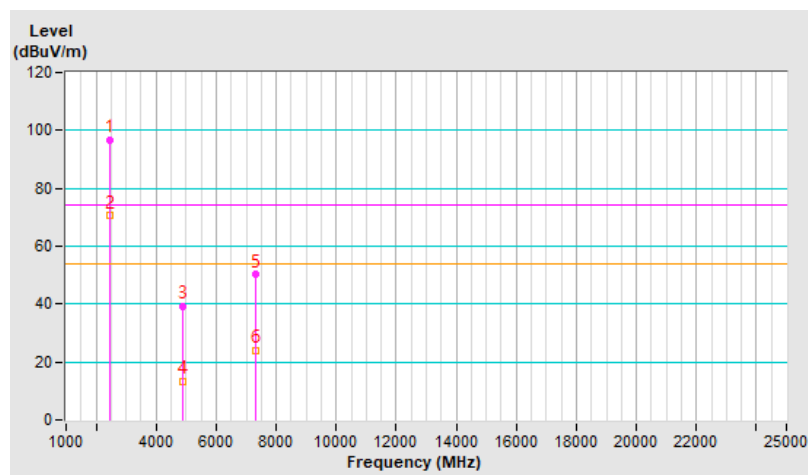


RF Mode	BT-LE 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.5 PK			3.86 V	212	99.3	-2.8
2	*2440.00	70.5 AV			3.86 V	212	73.3	-2.8
3	4880.00	39.3 PK	74.0	-34.7	4.00 V	210	37.1	2.2
4	4880.00	13.3 AV	54.0	-40.7	4.00 V	210	11.1	2.2
5	7320.00	50.1 PK	74.0	-23.9	1.15 V	323	42.3	7.8
6	7320.00	24.1 AV	54.0	-29.9	1.15 V	323	16.3	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$



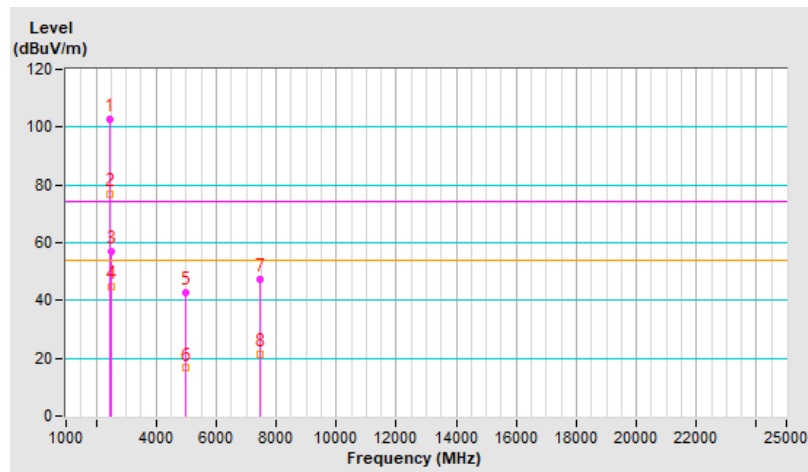
RF Mode	BT-LE 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	*2480.00	102.9 PK			1.48 H	354	105.6	-2.7
2	*2480.00	76.9 AV			1.48 H	354	79.6	-2.7
3	2483.50	57.0 PK	74.0	-17.0	1.48 H	354	59.7	-2.7
4	2483.50	44.6 AV	54.0	-9.4	1.48 H	354	47.3	-2.7
5	4960.00	42.6 PK	74.0	-31.4	1.23 H	59	40.3	2.3
6	4960.00	16.6 AV	54.0	-37.4	1.23 H	59	14.3	2.3
7	7440.00	47.3 PK	74.0	-26.7	1.39 H	300	39.5	7.8
8	7440.00	21.3 AV	54.0	-32.7	1.39 H	300	13.5	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

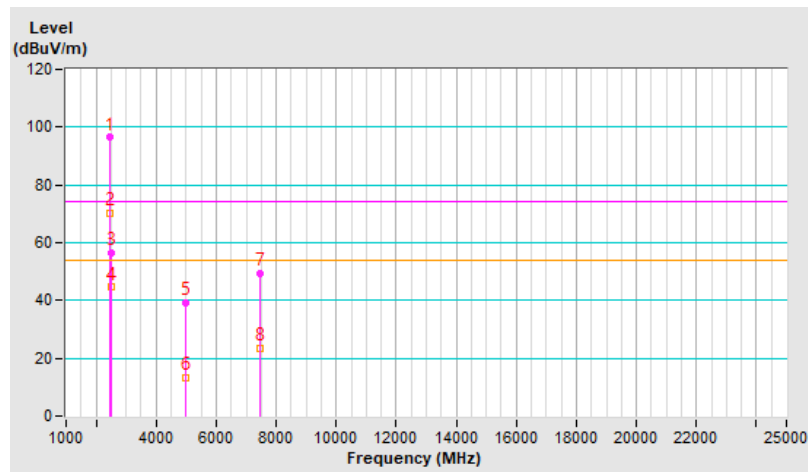


RF Mode	BT-LE 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.4 PK			3.98 V	226	99.1	-2.7
2	*2480.00	70.4 AV			3.98 V	226	73.1	-2.7
3	2483.50	56.3 PK	74.0	-17.7	3.98 V	226	59.0	-2.7
4	2483.50	44.5 AV	54.0	-9.5	3.98 V	226	47.2	-2.7
5	4960.00	39.2 PK	74.0	-34.8	3.97 V	221	36.9	2.3
6	4960.00	13.2 AV	54.0	-40.8	3.97 V	221	10.9	2.3
7	7440.00	49.5 PK	74.0	-24.5	1.12 V	334	41.7	7.8
8	7440.00	23.5 AV	54.0	-30.5	1.12 V	334	15.7	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$



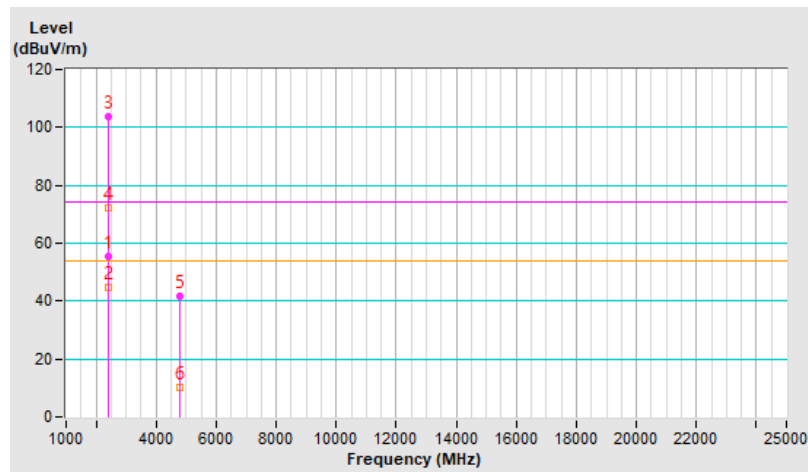
RF Mode	BT-LE 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	55.5 PK	74.0	-18.5	1.31 H	353	58.3	-2.8
2	2390.00	44.7 AV	54.0	-9.3	1.31 H	353	47.5	-2.8
3	*2404.00	103.9 PK			1.31 H	353	106.8	-2.9
4	*2404.00	72.3 AV			1.31 H	353	75.2	-2.9
5	4808.00	41.7 PK	74.0	-32.3	1.20 H	52	39.4	2.3
6	4808.00	10.1 AV	54.0	-43.9	1.20 H	52	7.8	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

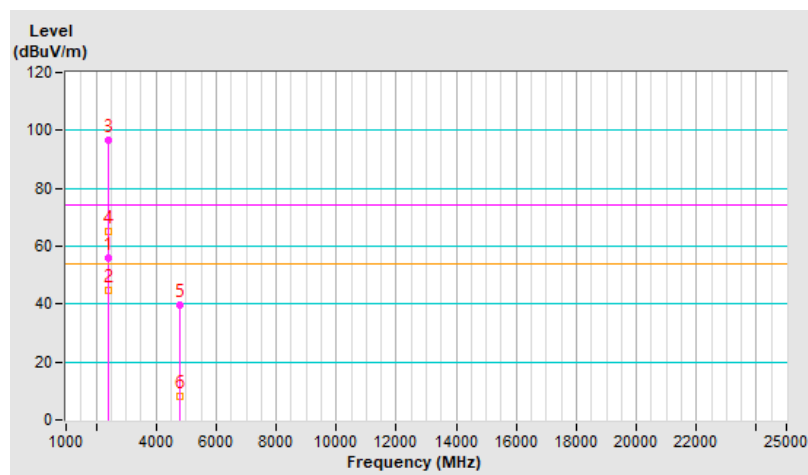


RF Mode	BT-LE 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	56.0 PK	74.0	-18.0	3.86 V	223	58.8	-2.8
2	2390.00	45.0 AV	54.0	-9.0	3.86 V	223	47.8	-2.8
3	*2404.00	96.8 PK			3.86 V	223	99.7	-2.9
4	*2404.00	65.2 AV			3.86 V	223	68.1	-2.9
5	4808.00	39.6 PK	74.0	-34.4	4.00 V	210	37.3	2.3
6	4808.00	8.0 AV	54.0	-46.0	4.00 V	210	5.7	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

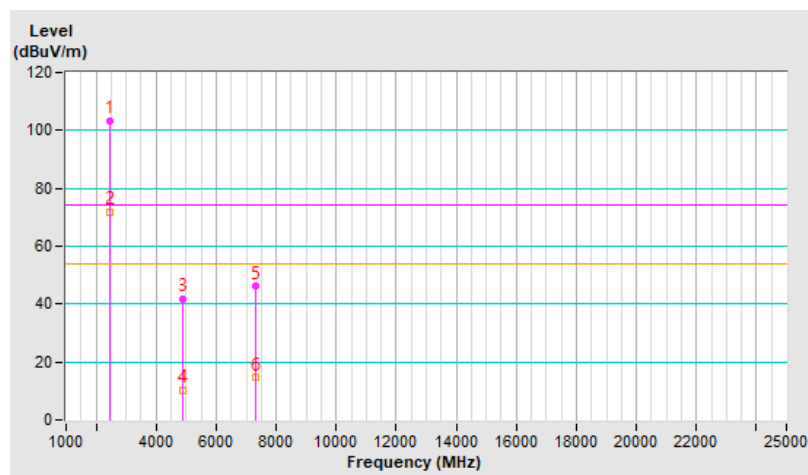


RF Mode	BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	103.4 PK			3.23 H	346	106.2	-2.8
2	*2440.00	71.8 AV			3.23 H	346	74.6	-2.8
3	4880.00	41.8 PK	74.0	-32.2	1.21 H	33	39.6	2.2
4	4880.00	10.2 AV	54.0	-43.8	1.21 H	33	8.0	2.2
5	7320.00	46.1 PK	74.0	-27.9	1.47 H	323	38.3	7.8
6	7320.00	14.5 AV	54.0	-39.5	1.47 H	323	6.7	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

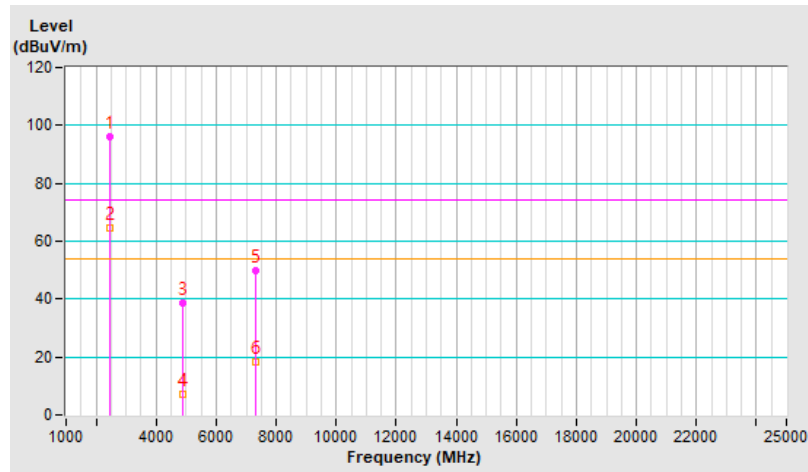


RF Mode	BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.2 PK			3.90 V	209	99.0	-2.8
2	*2440.00	64.6 AV			3.90 V	209	67.4	-2.8
3	4880.00	38.7 PK	74.0	-35.3	4.00 V	202	36.5	2.2
4	4880.00	7.1 AV	54.0	-46.9	4.00 V	202	4.9	2.2
5	7320.00	50.0 PK	74.0	-24.0	1.14 V	333	42.2	7.8
6	7320.00	18.4 AV	54.0	-35.6	1.14 V	333	10.6	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

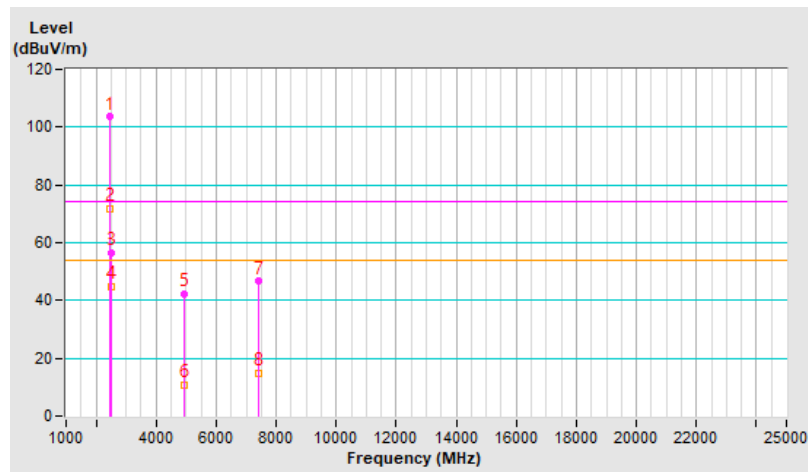


RF Mode	BT-LE 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	*2478.00	103.5 PK			1.48 H	352	106.2	-2.7
2	*2478.00	71.9 AV			1.48 H	352	74.6	-2.7
3	2483.50	56.6 PK	74.0	-17.4	1.48 H	352	59.3	-2.7
4	2483.50	44.9 AV	54.0	-9.1	1.48 H	352	47.6	-2.7
5	4956.00	42.4 PK	74.0	-31.6	1.23 H	43	40.1	2.3
6	4956.00	10.8 AV	54.0	-43.2	1.23 H	43	8.5	2.3
7	7434.00	46.6 PK	74.0	-27.4	1.47 H	318	38.8	7.8
8	7434.00	15.0 AV	54.0	-39.0	1.47 H	318	7.2	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

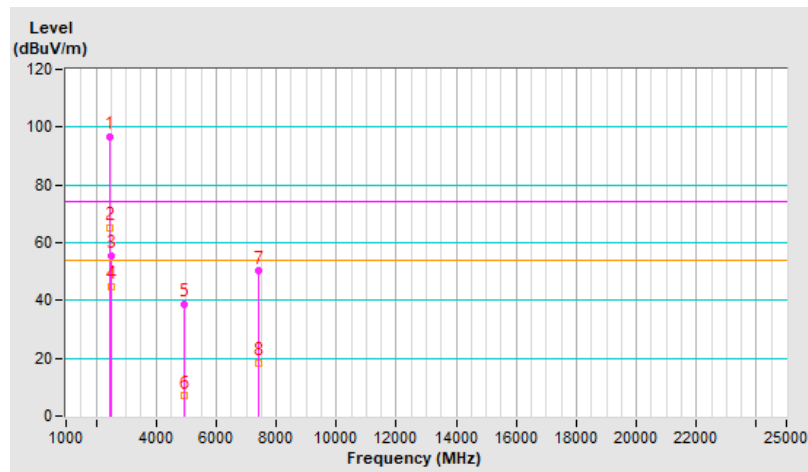


RF Mode	BT-LE 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.6 PK			4.00 V	226	99.3	-2.7
2	*2478.00	65.0 AV			4.00 V	226	67.7	-2.7
3	2483.50	55.6 PK	74.0	-18.4	4.00 V	226	58.3	-2.7
4	2483.50	44.6 AV	54.0	-9.4	4.00 V	226	47.3	-2.7
5	4956.00	38.5 PK	74.0	-35.5	3.95 V	197	36.2	2.3
6	4956.00	6.9 AV	54.0	-47.1	3.95 V	197	4.6	2.3
7	7434.00	50.1 PK	74.0	-23.9	1.09 V	312	42.3	7.8
8	7434.00	18.5 AV	54.0	-35.5	1.09 V	312	10.7	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$



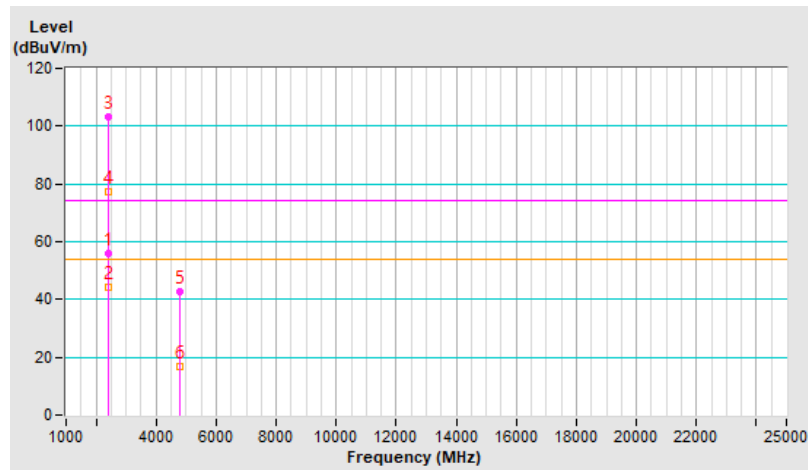
logi bolt

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, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis 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	56.1 PK	74.0	-17.9	1.29 H	358	58.9	-2.8
2	2390.00	44.1 AV	54.0	-9.9	1.29 H	358	46.9	-2.8
3	*2402.00	103.3 PK			1.29 H	358	106.2	-2.9
4	*2402.00	77.3 AV			1.29 H	358	80.2	-2.9
5	4804.00	42.7 PK	74.0	-31.3	1.21 H	50	40.4	2.3
6	4804.00	16.7 AV	54.0	-37.3	1.21 H	50	14.4	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

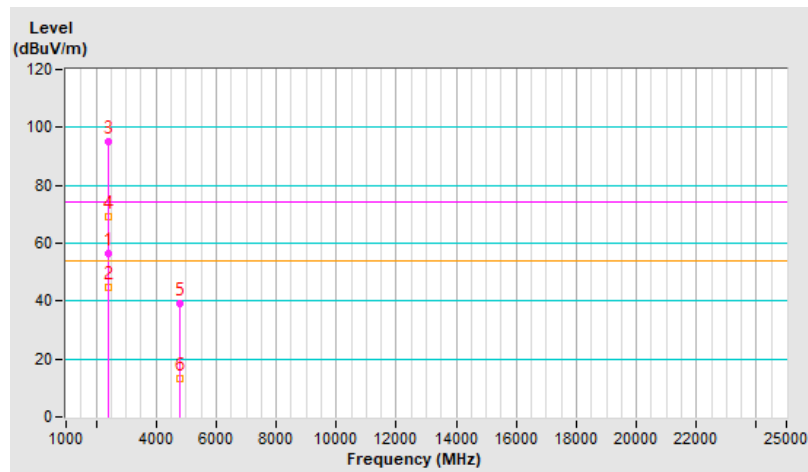


RF Mode	logi bolt 1M	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	56.3 PK	74.0	-17.7	3.71 V	51	59.1	-2.8
2	2390.00	44.7 AV	54.0	-9.3	3.71 V	51	47.5	-2.8
3	*2402.00	95.2 PK			3.71 V	51	98.1	-2.9
4	*2402.00	69.2 AV			3.71 V	51	72.1	-2.9
5	4804.00	39.3 PK	74.0	-34.7	3.05 V	242	37.0	2.3
6	4804.00	13.3 AV	54.0	-40.7	3.05 V	242	11.0	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$



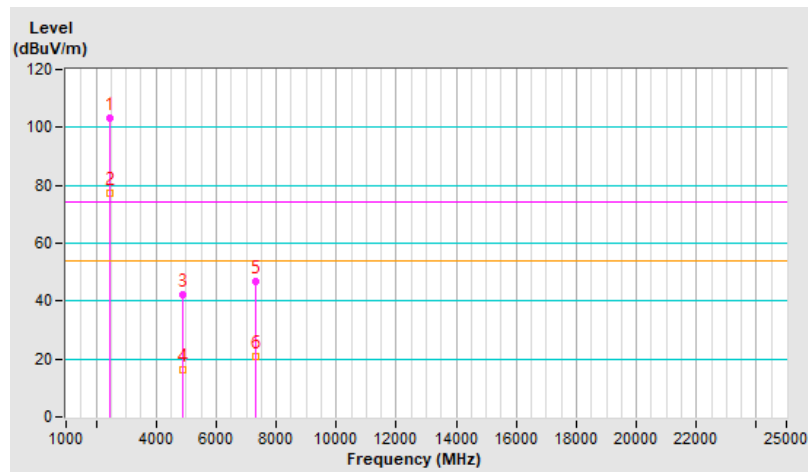
RF Mode	logi bolt 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	103.2 PK			3.22 H	346	106.0	-2.8
2	*2440.00	77.2 AV			3.22 H	346	80.0	-2.8
3	4880.00	42.3 PK	74.0	-31.7	1.30 H	28	40.1	2.2
4	4880.00	16.3 AV	54.0	-37.7	1.30 H	28	14.1	2.2
5	7320.00	46.7 PK	74.0	-27.3	1.49 H	324	38.9	7.8
6	7320.00	20.7 AV	54.0	-33.3	1.49 H	324	12.9	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

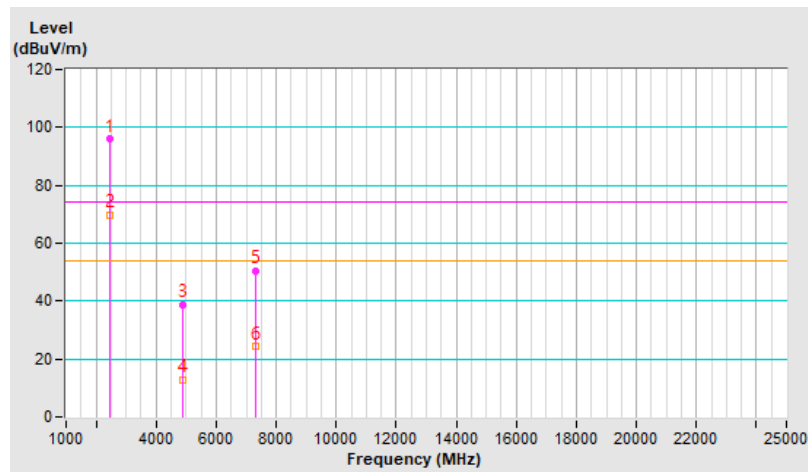


RF Mode	logi bolt 1M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	95.9 PK			3.91 V	227	98.7	-2.8
2	*2440.00	69.9 AV			3.91 V	227	72.7	-2.8
3	4880.00	38.8 PK	74.0	-35.2	4.00 V	218	36.6	2.2
4	4880.00	12.8 AV	54.0	-41.2	4.00 V	218	10.6	2.2
5	7320.00	50.2 PK	74.0	-23.8	1.11 V	326	42.4	7.8
6	7320.00	24.2 AV	54.0	-29.8	1.11 V	326	16.4	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

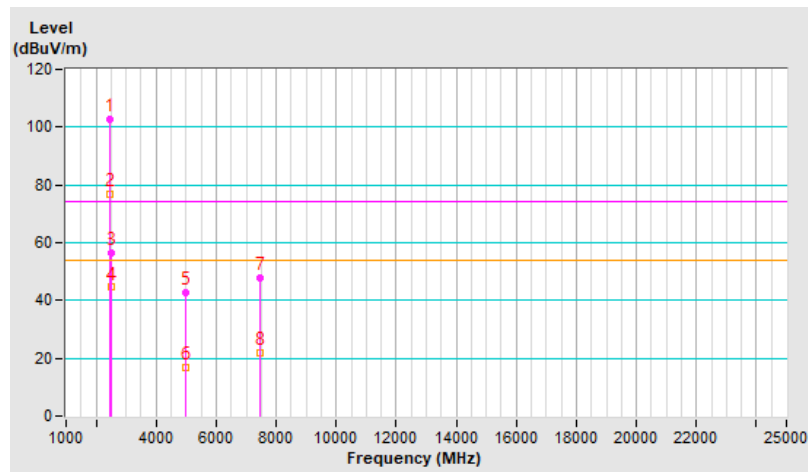


RF Mode	logi bolt 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	*2480.00	102.8 PK			1.51 H	352	105.5	-2.7
2	*2480.00	76.8 AV			1.51 H	352	79.5	-2.7
3	2483.50	56.6 PK	74.0	-17.4	1.51 H	352	59.3	-2.7
4	2483.50	44.5 AV	54.0	-9.5	1.51 H	352	47.2	-2.7
5	4960.00	42.7 PK	74.0	-31.3	1.18 H	48	40.4	2.3
6	4960.00	16.7 AV	54.0	-37.3	1.18 H	48	14.4	2.3
7	7440.00	47.7 PK	74.0	-26.3	1.40 H	303	39.9	7.8
8	7440.00	21.7 AV	54.0	-32.3	1.40 H	303	13.9	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$

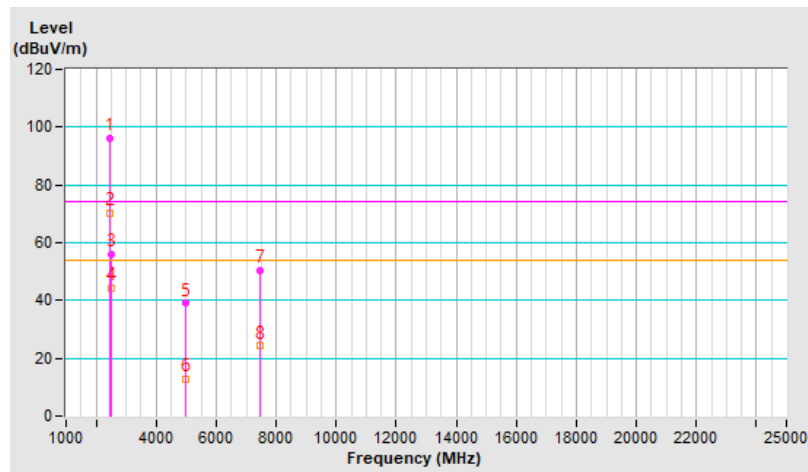


RF Mode	logi bolt 1M	Channel	CH 39 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.3 PK			4.00 V	225	99.0	-2.7
2	*2480.00	70.3 AV			4.00 V	225	73.0	-2.7
3	2483.50	56.1 PK	74.0	-17.9	4.00 V	225	58.8	-2.7
4	2483.50	44.2 AV	54.0	-9.8	4.00 V	225	46.9	-2.7
5	4960.00	38.9 PK	74.0	-35.1	3.91 V	226	36.6	2.3
6	4960.00	12.9 AV	54.0	-41.1	3.91 V	226	10.6	2.3
7	7440.00	50.2 PK	74.0	-23.8	1.11 V	318	42.4	7.8
8	7440.00	24.2 AV	54.0	-29.8	1.11 V	318	16.4	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.354 \text{ ms} / 7.05 \text{ ms}) = -26.0 \text{ dB}$



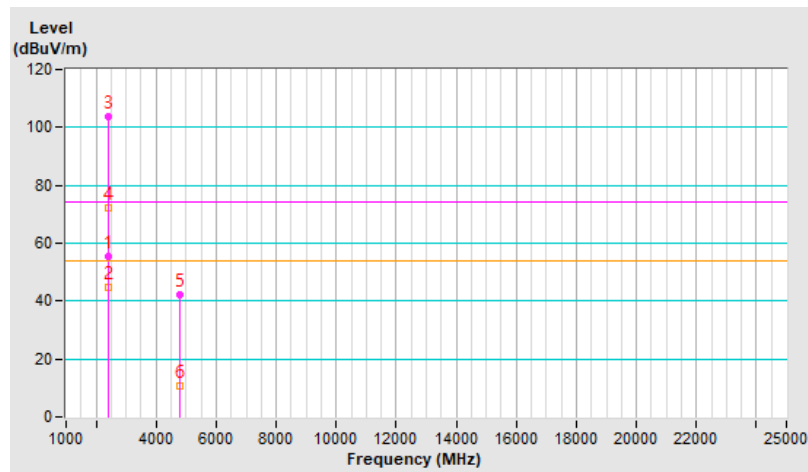
RF Mode	logi bolt 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	55.6 PK	74.0	-18.4	1.31 H	360	58.4	-2.8
2	2390.00	44.9 AV	54.0	-9.1	1.31 H	360	47.7	-2.8
3	*2404.00	103.7 PK			1.31 H	360	106.6	-2.9
4	*2404.00	72.1 AV			1.31 H	360	75.0	-2.9
5	4808.00	42.2 PK	74.0	-31.8	1.26 H	43	39.9	2.3
6	4808.00	10.6 AV	54.0	-43.4	1.26 H	43	8.3	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

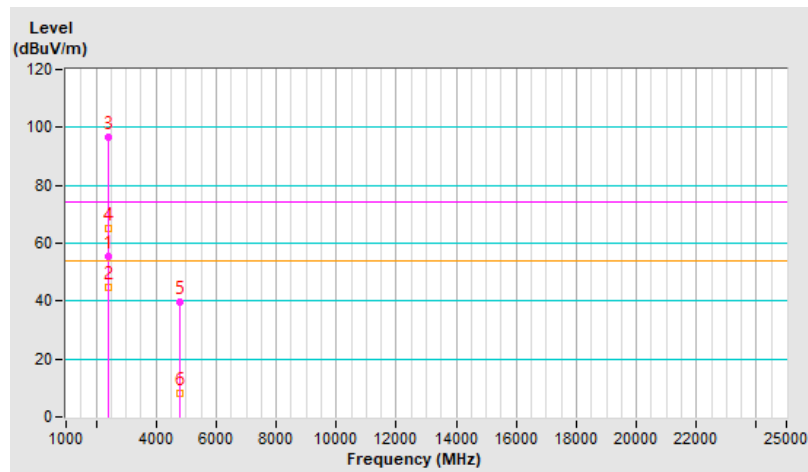


RF Mode	logi bolt 2M	Channel	CH 1 : 2404 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	55.5 PK	74.0	-18.5	3.85 V	228	58.3	-2.8
2	2390.00	44.7 AV	54.0	-9.3	3.85 V	228	47.5	-2.8
3	*2404.00	96.6 PK			3.85 V	228	99.5	-2.9
4	*2404.00	65.0 AV			3.85 V	228	67.9	-2.9
5	4808.00	39.6 PK	74.0	-34.4	3.96 V	203	37.3	2.3
6	4808.00	8.0 AV	54.0	-46.0	3.96 V	203	5.7	2.3

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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

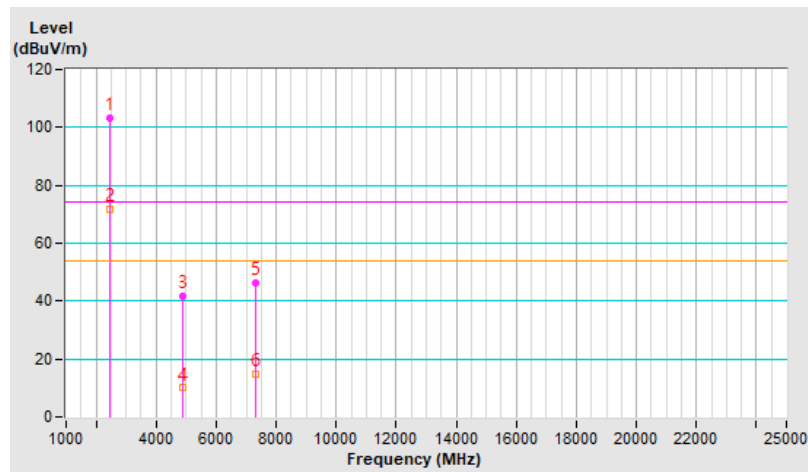


RF Mode	logi bolt 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	103.3 PK			3.24 H	351	106.1	-2.8
2	*2440.00	71.7 AV			3.24 H	351	74.5	-2.8
3	4880.00	41.6 PK	74.0	-32.4	1.26 H	37	39.4	2.2
4	4880.00	10.0 AV	54.0	-44.0	1.26 H	37	7.8	2.2
5	7320.00	46.3 PK	74.0	-27.7	1.48 H	334	38.5	7.8
6	7320.00	14.7 AV	54.0	-39.3	1.48 H	334	6.9	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

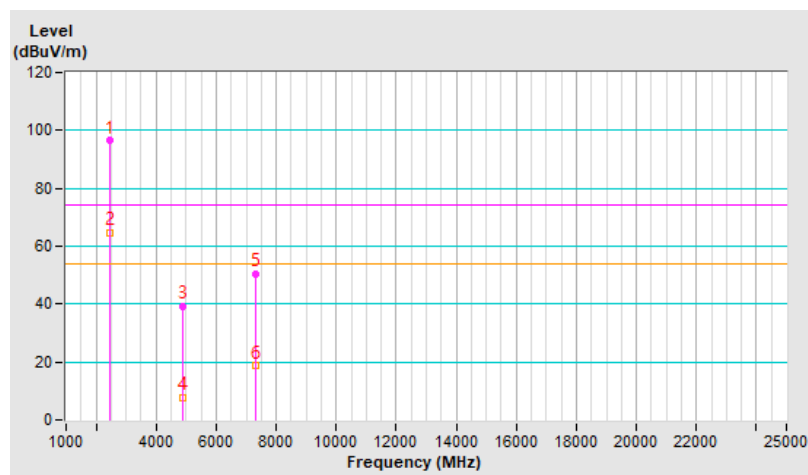


RF Mode	logi bolt 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.4 PK			3.88 V	200	99.2	-2.8
2	*2440.00	64.8 AV			3.88 V	200	67.6	-2.8
3	4880.00	39.2 PK	74.0	-34.8	4.00 V	209	37.0	2.2
4	4880.00	7.6 AV	54.0	-46.4	4.00 V	209	5.4	2.2
5	7320.00	50.2 PK	74.0	-23.8	1.15 V	327	42.4	7.8
6	7320.00	18.6 AV	54.0	-35.4	1.15 V	327	10.8	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

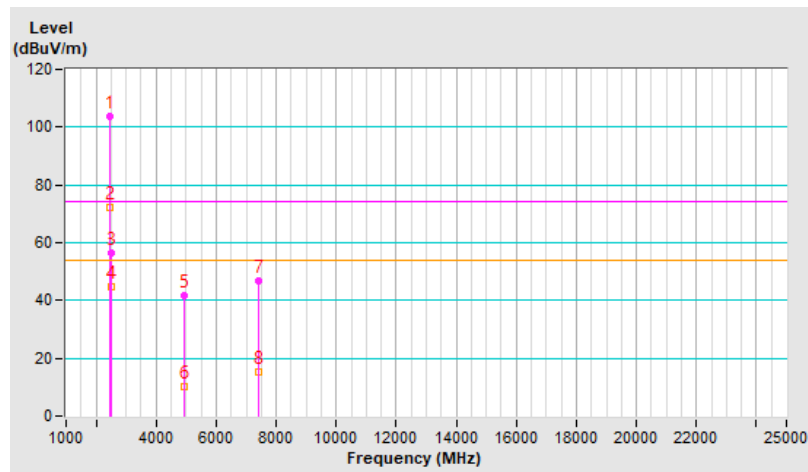


RF Mode	logi bolt 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	*2478.00	103.9 PK			1.47 H	337	106.6	-2.7
2	*2478.00	72.3 AV			1.47 H	337	75.0	-2.7
3	2483.50	56.3 PK	74.0	-17.7	1.47 H	337	59.0	-2.7
4	2483.50	44.8 AV	54.0	-9.2	1.47 H	337	47.5	-2.7
5	4956.00	41.8 PK	74.0	-32.2	1.19 H	28	39.5	2.3
6	4956.00	10.2 AV	54.0	-43.8	1.19 H	28	7.9	2.3
7	7434.00	46.9 PK	74.0	-27.1	1.42 H	318	39.1	7.8
8	7434.00	15.3 AV	54.0	-38.7	1.42 H	318	7.5	7.8

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.
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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$

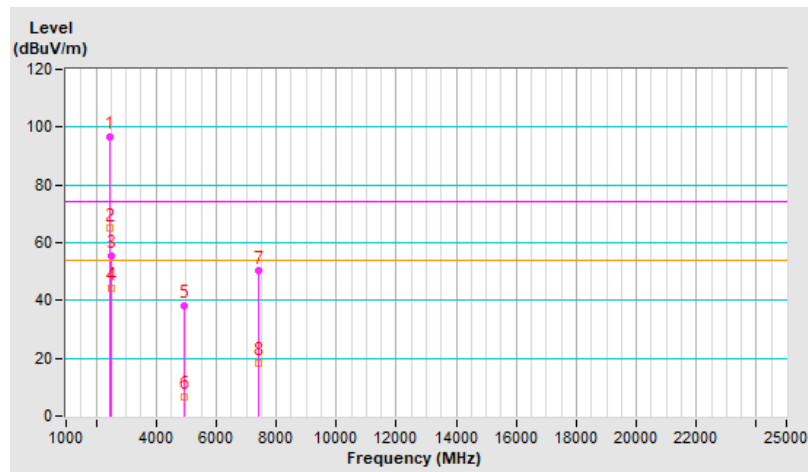


RF Mode	logi bolt 2M	Channel	CH 38 : 2478 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power	3 Vdc	Environmental Conditions	24°C, 71% RH
Tested By	Louis Yang		

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	96.5 PK			3.95 V	231	99.2	-2.7
2	*2478.00	64.9 AV			3.95 V	231	67.6	-2.7
3	2483.50	55.3 PK	74.0	-18.7	3.95 V	231	58.0	-2.7
4	2483.50	44.2 AV	54.0	-9.8	3.95 V	231	46.9	-2.7
5	4956.00	38.3 PK	74.0	-35.7	3.94 V	196	36.0	2.3
6	4956.00	6.7 AV	54.0	-47.3	3.94 V	196	4.4	2.3
7	7434.00	50.1 PK	74.0	-23.9	1.03 V	305	42.3	7.8
8	7434.00	18.5 AV	54.0	-35.5	1.03 V	305	10.7	7.8

Remarks:

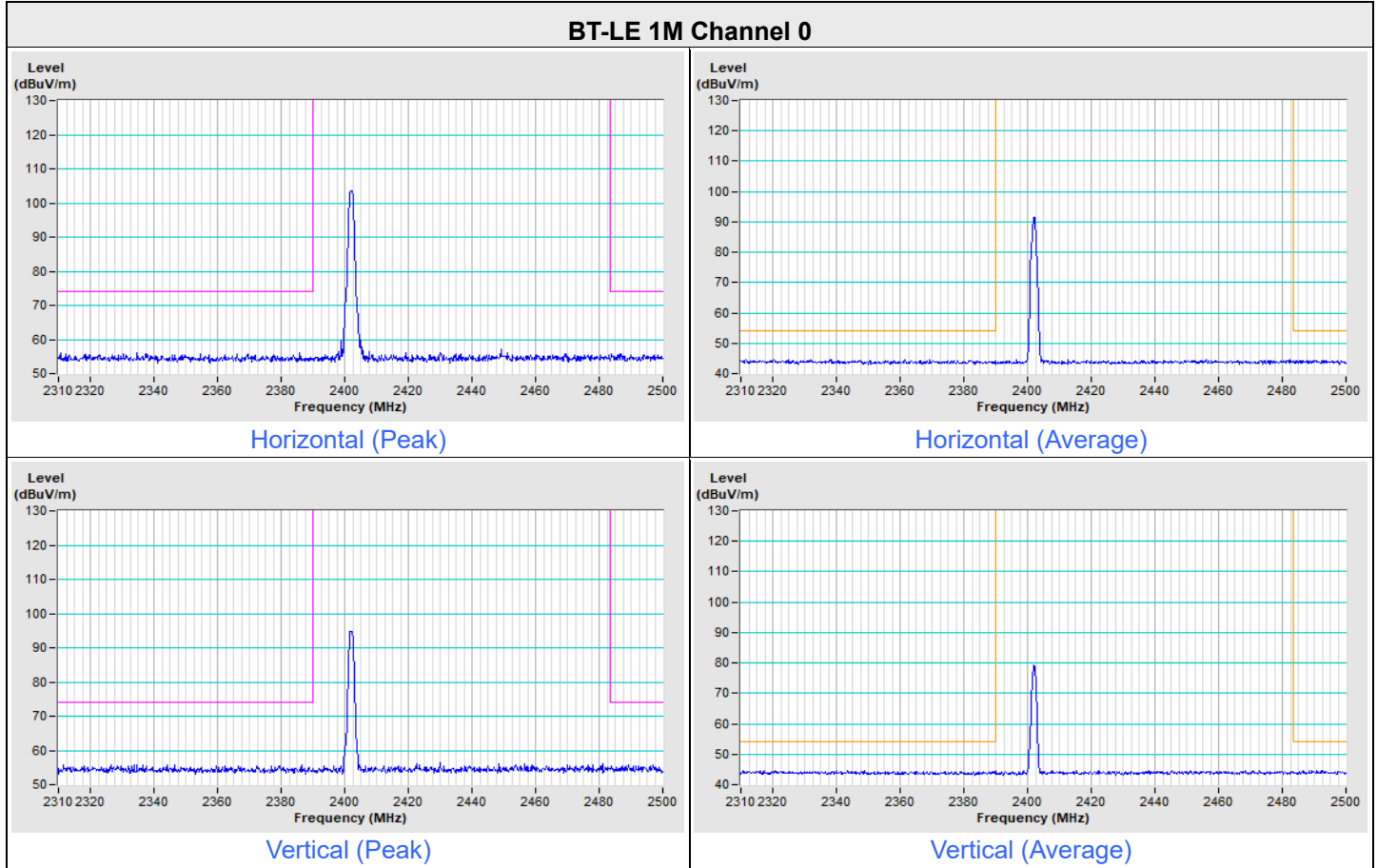
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, 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:
 $20 \log(\text{Duty cycle}) = 20 \log(0.185 \text{ ms} / 7.05 \text{ ms}) = -31.6 \text{ dB}$



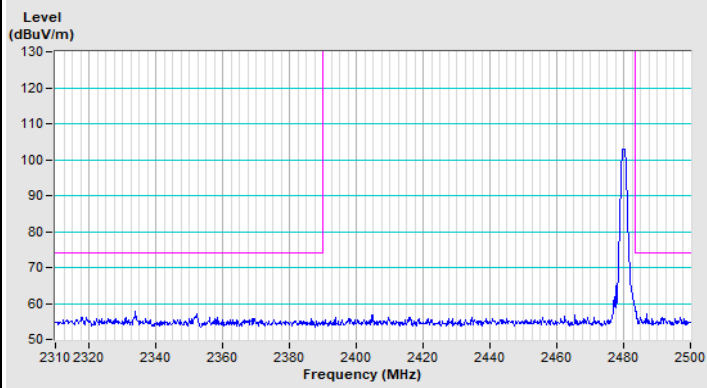
Plot of Band Edge

BT LE

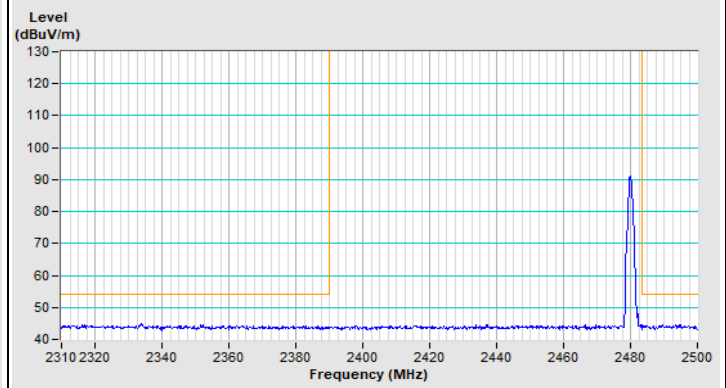
Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
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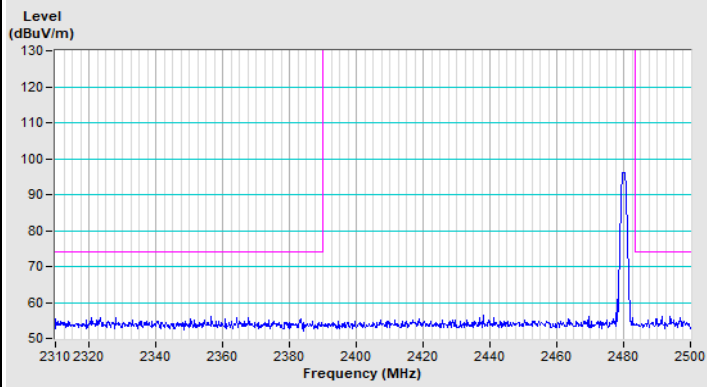
BT-LE 1M Channel 39



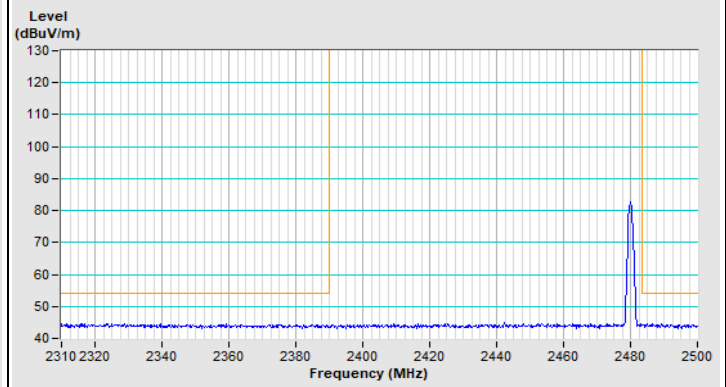
Horizontal (Peak)



Horizontal (Average)



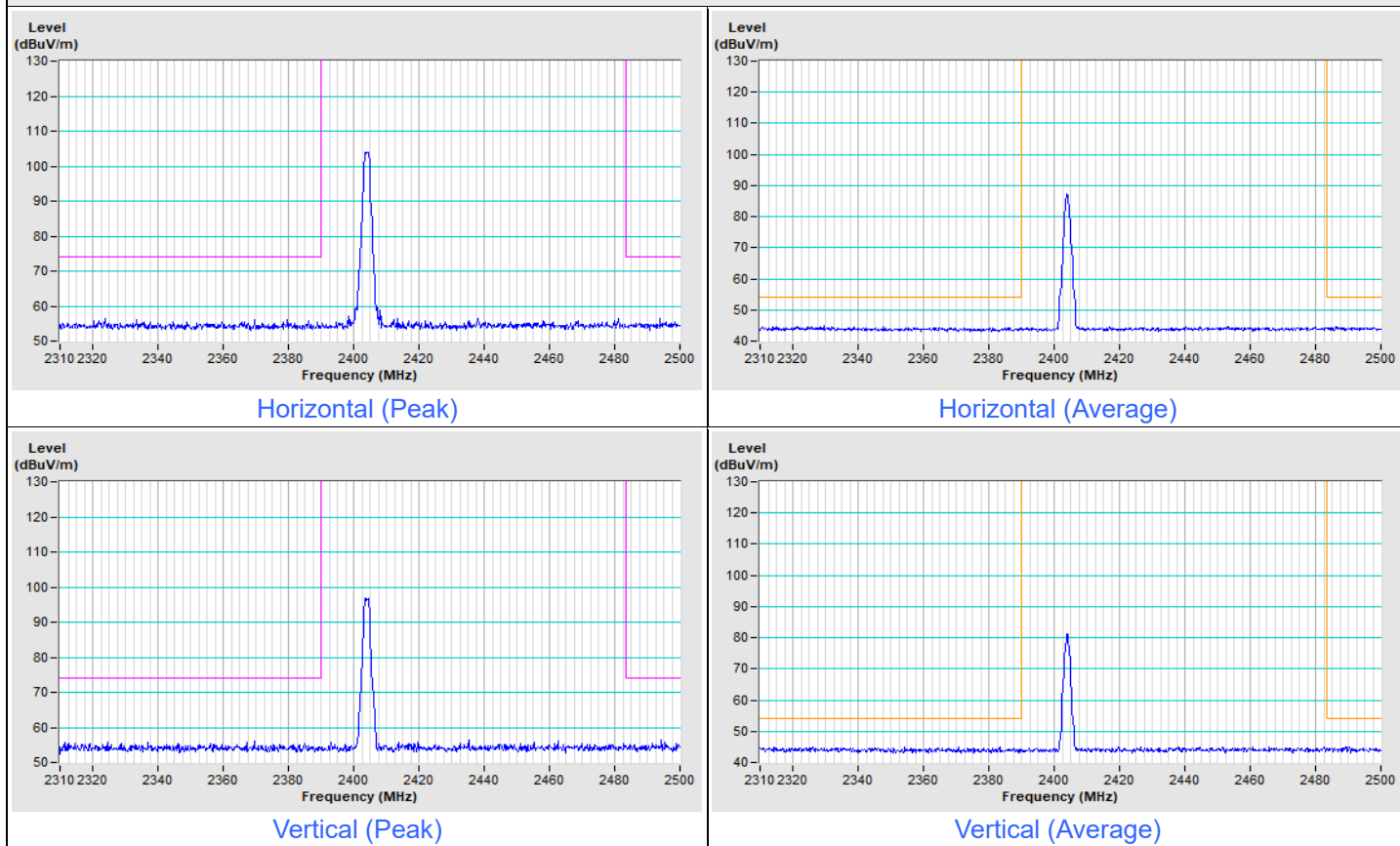
Vertical (Peak)



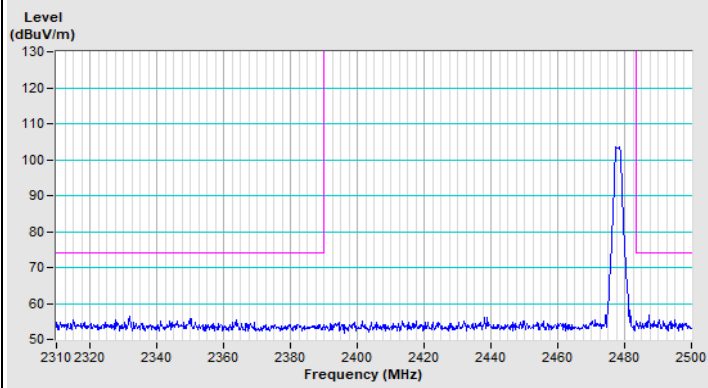
Vertical (Average)

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
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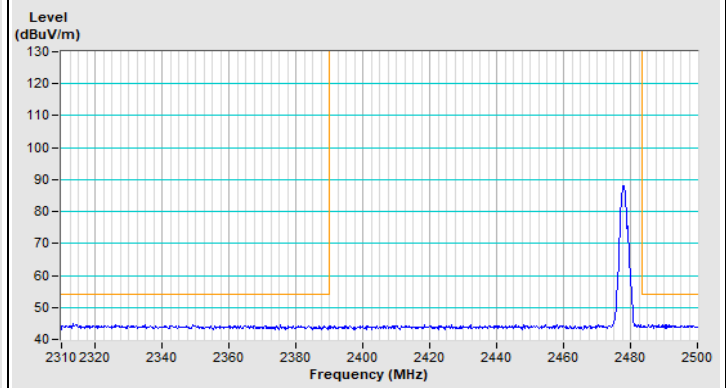
BT-LE 2M Channel 1



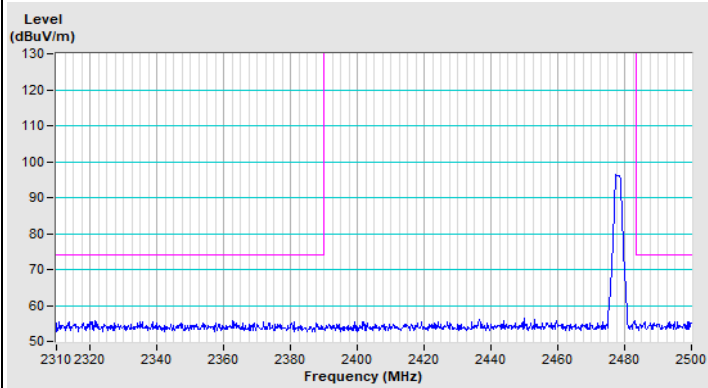
BT-LE 2M Channel 38



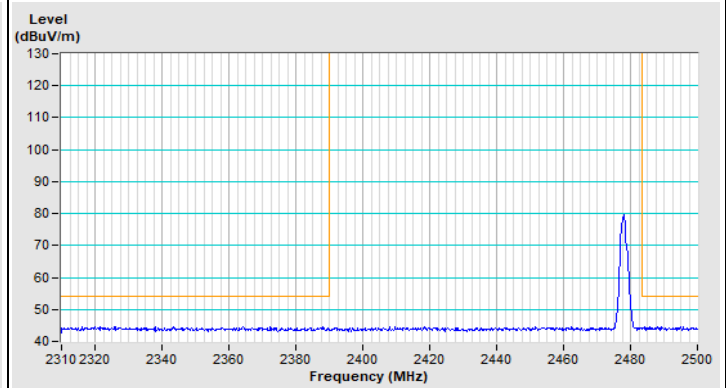
Horizontal (Peak)



Horizontal (Average)



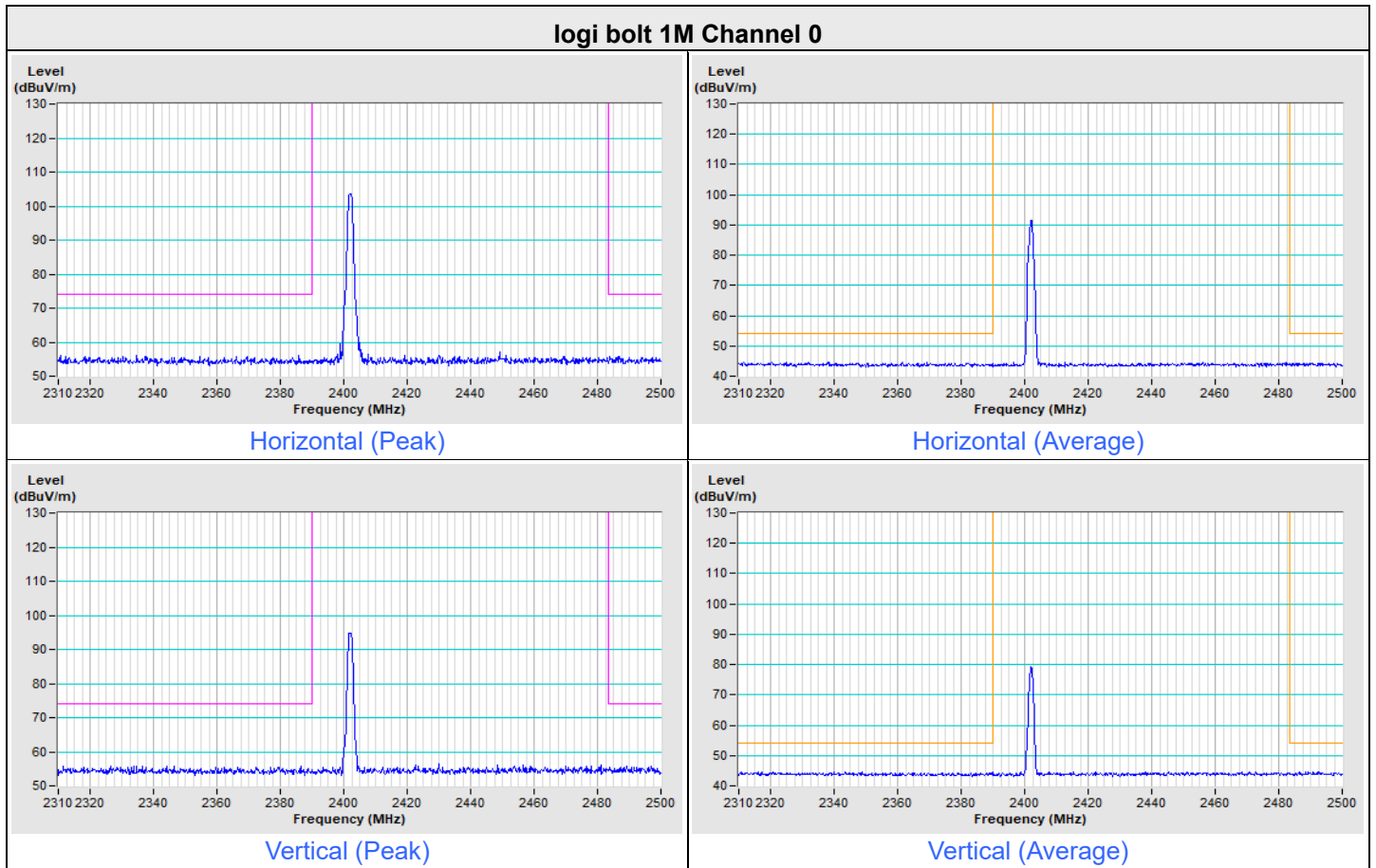
Vertical (Peak)



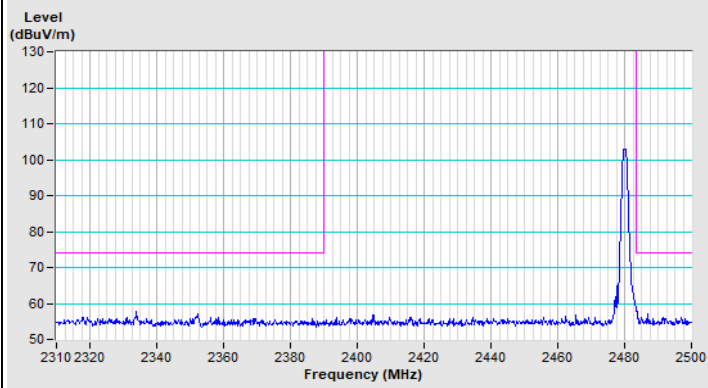
Vertical (Average)

logi bolt

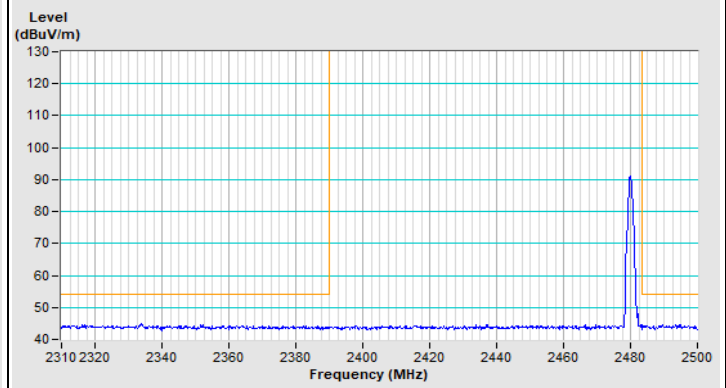
Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
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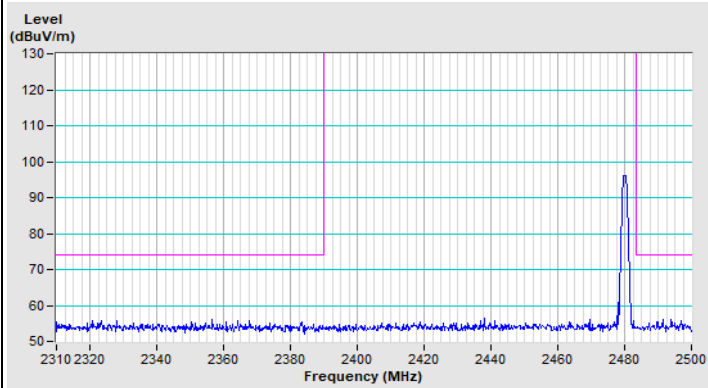
logi bolt 1M Channel 39



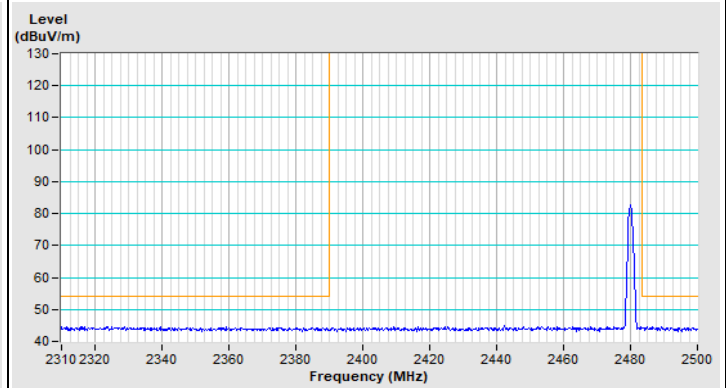
Horizontal (Peak)



Horizontal (Average)



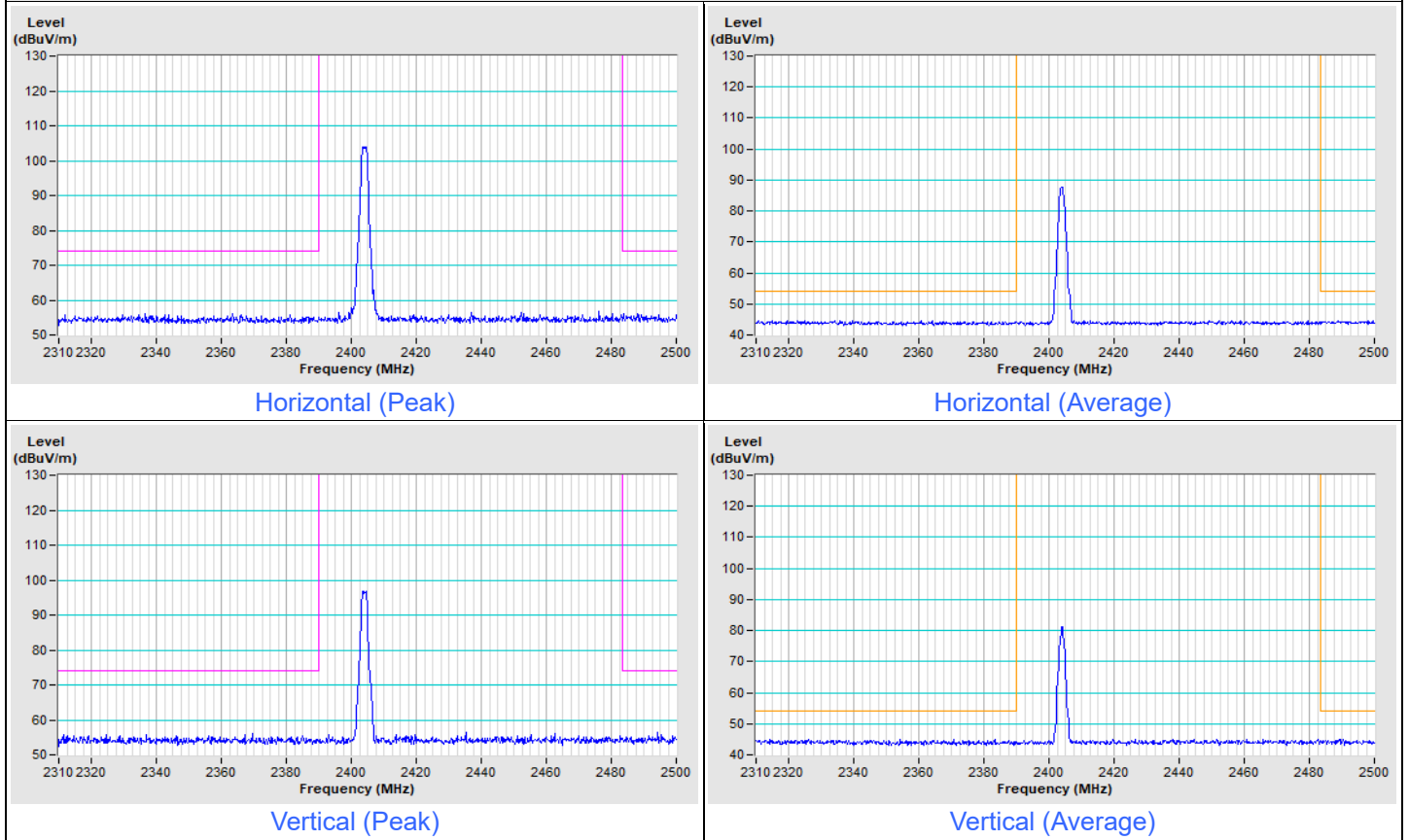
Vertical (Peak)



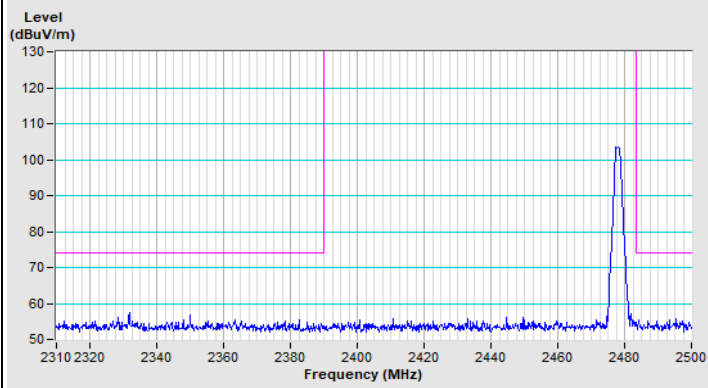
Vertical (Average)

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
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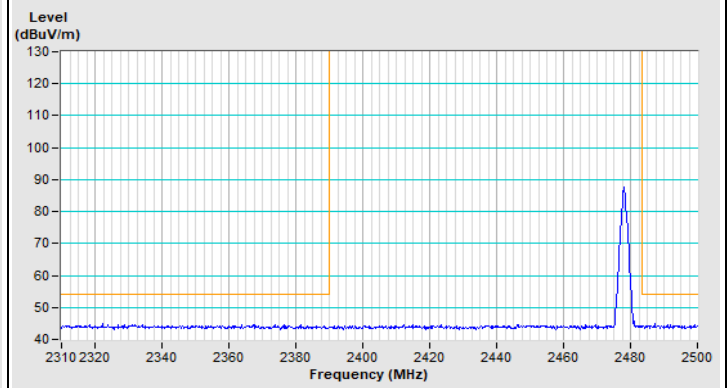
logi bolt 2M Channel 1



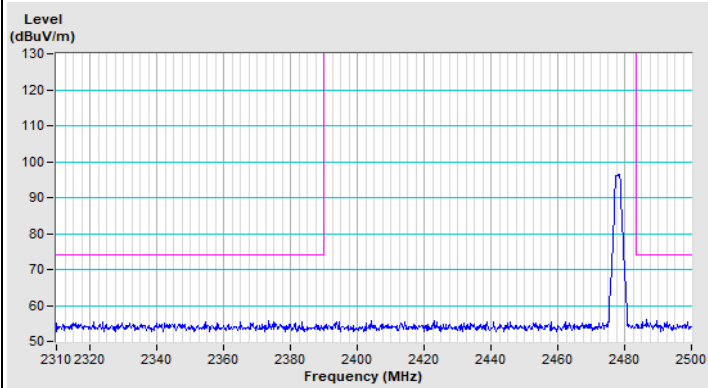
logi bolt 2M Channel 38



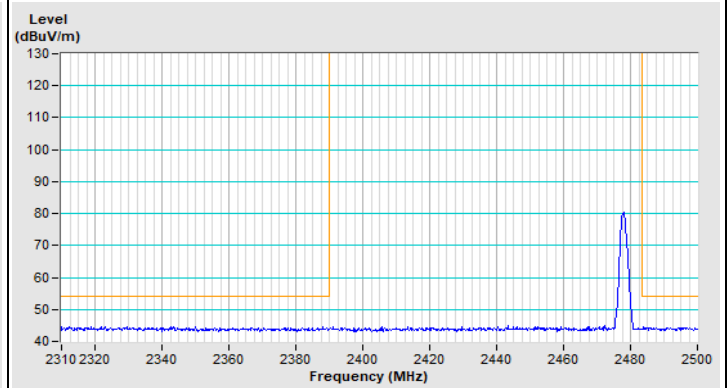
Horizontal (Peak)



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

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