

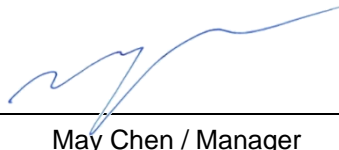
# TEST REPORT

## CERTIFICATE OF CONFORMITY

**Standard:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
**Report No.:** RFBHVI-WTW-P22120237-4  
**FCC ID:** N6C-SDMAX  
**Product:** Wireless Embedded Module  
**Brand:** Silex Technology  
**Model No.:** SX-SDMAX  
**Received Date:** 2022/12/7  
**Test Date:** 2023/1/3 ~ 2023/2/13  
**Issued Date:** 2023/4/20

**Applicant:** Silex Technology, Inc.  
**Address:** 2-3-1 Hikaridai, Seika-cho, Soraku-gun, Kyoto 619-0237, Japan  
**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 /** 723255 / TW2022  
**Designation Number:**

Approved by: \_\_\_\_\_



May Chen / Manager

, Date: \_\_\_\_\_

2023/4/20

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Prepared by : Claire Kuan / Specialist

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## Release Control Record

Issue No.	Description	Date Issued
RFBHVI-WTW-P22120237-4	Original release.	2023/4/20

## 1 Certificate

**Product:** Wireless Embedded Module

**Brand:** Silex Technology

**Test Model:** SX-SDMAX

**Sample Status:** Engineering sample

**Applicant:** Silex Technology, Inc.

**Test Date:** 2023/1/3 ~ 2023/2/13

**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	Pass	Minimum passing margin is -10.76 dB at 27.94371 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -9.1 dB at 65.11 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -21.4 dB at 7320.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) not a standard connector.

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) (±)
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.5 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.5 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 Embedded Module
Brand	Silex Technology
Test Model	SX-SDMAX
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	GFSK
Modulation Technology	DTS
Transfer Rate	Up to 2 Mbps
Operating Frequency	2.402 GHz ~ 2.48 GHz
Number of Channel	40
Output Power	1.722 mW (2.36 dBm)

Note:

1. There are Bluetooth and WLAN (2.4 GHz & 5 GHz) technology used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (5 GHz)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. 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 NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
1	Molex	1461530050	3.18	2.4~2.4835GHz	Dipole	ipex(MHF)	50mm
			3.15	5.15~5.25GHz			
			2.75	5.25~5.35GHz			
			4.25	5.47~5.725GHz			
			3.85	5.725~5.85GHz			

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



### 3.3 Channel List

40 channels are provided for BT-LE:

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

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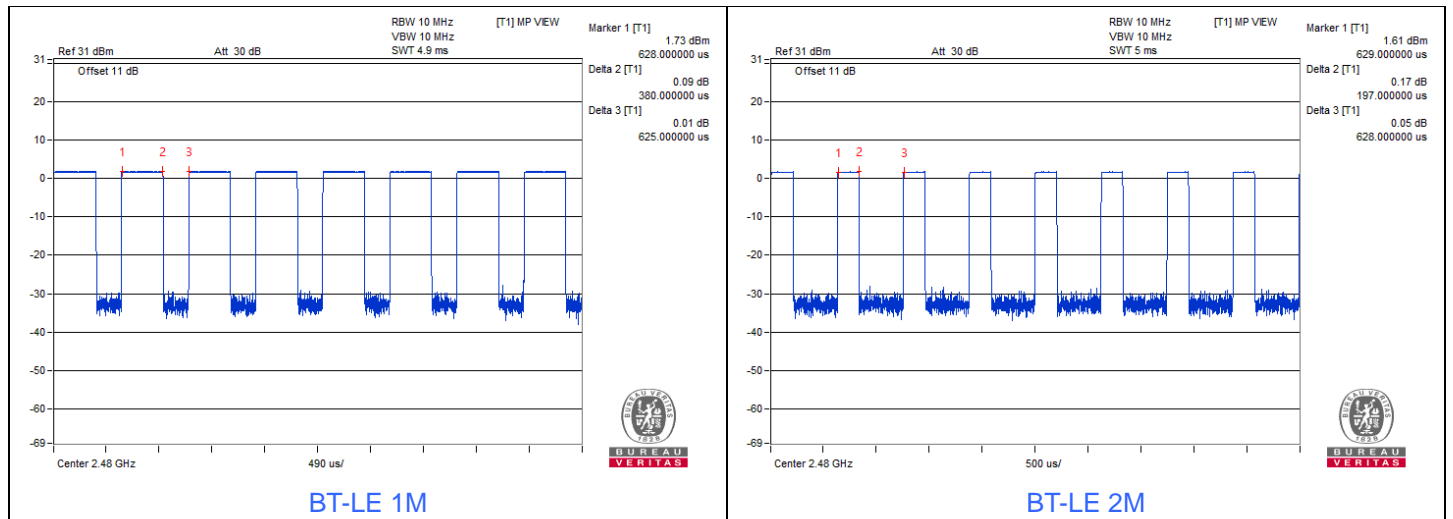
Following channel(s) was (were) selected for the final test as listed below:

Test Item	EUT Configure Mode	Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power / Power Spectral Density	A	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
		BT-LE 2M	0, 19, 39	GFSK	2Mb/s
6 dB Bandwidth / Conducted Out of Band Emissions	A	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
		BT-LE 2M	0, 19, 39	GFSK	2Mb/s
AC Power Conducted Emissions	B	BT-LE 1M	0	GFSK	1Mb/s
Unwanted Emissions below 1 GHz	A, B	BT-LE 1M	0	GFSK	1Mb/s
Unwanted Emissions above 1 GHz	A, B	BT-LE 1M	0, 19, 39	GFSK	1Mb/s
		BT-LE 2M	0, 19, 39	GFSK	2Mb/s
EUT Configure Mode:	A	Antenna Port			
	B	with 50ohm terminator			

### 3.5 Duty Cycle of Test Signal

**BT-LE 1M:** Duty cycle =  $0.38 \text{ ms} / 0.625 \text{ ms} \times 100\% = 60.8\%$ , duty factor =  $10 \cdot \log (1/\text{Duty cycle}) = 2.16 \text{ dB}$

**BT-LE 2M:** Duty cycle =  $0.197 \text{ ms} / 0.628 \text{ ms} \times 100\% = 31.4\%$ , duty factor =  $10 \cdot \log (1/\text{Duty cycle}) = 5.03 \text{ dB}$

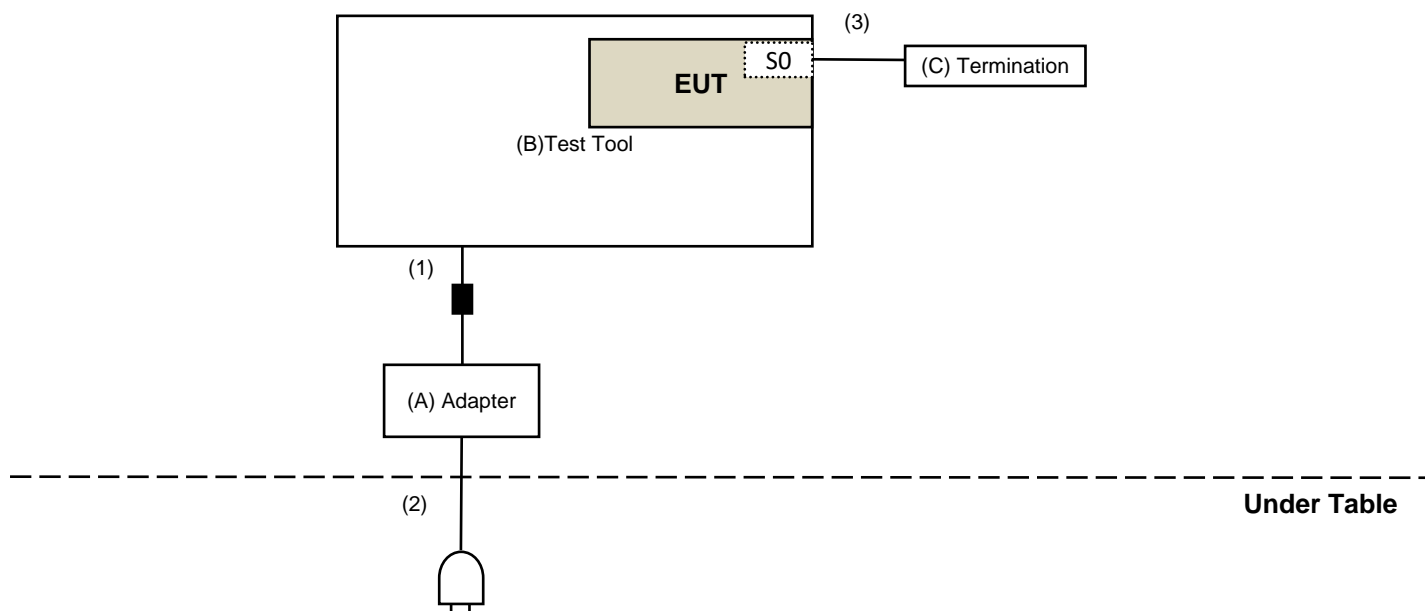


### 3.6 Test Program Used and Operation Descriptions

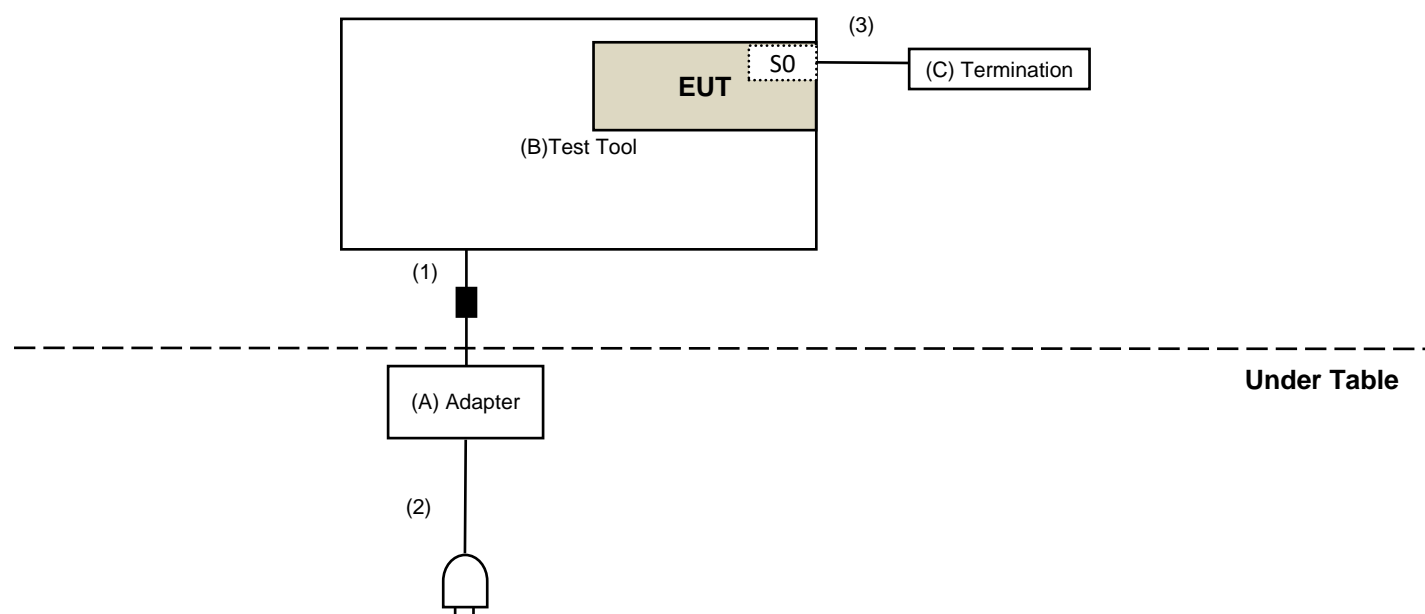
Controlling software (Tera Term Version 4.98) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

### 3.7 Connection Diagram of EUT and Peripheral Devices

#### For AC Power Conducted Emission test



#### For Unwanted Emission test



### 3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	EDACPOWER ELEC.	EA10682N-120	N/A	N/A	Supplied by applicant
B	Host Board	NXP	MCIMX8M-EVKB	N/A	N/A	Supplied by applicant
C	Termination	Marvelous	MVE5185	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.2	No	1	Supplied by applicant
2	AC Cable	1	1.5	No	0	Supplied by applicant
3	RF Cable	1	0.15	No	0	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

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/1/3

### 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: 2023/1/3

### 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 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance	N/A	EMC-01	2022/9/27	2023/9/26
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2022/10/18	2023/10/17
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2022/8/24	2023/8/23
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A
TEST RECEIVER R&S	ESCS 30	847124/029	2022/10/14	2023/10/13

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2023/2/13

#### 4.6 Unwanted Emissions below 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
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2022/12/28	2023/12/27
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	980701	2022/3/8	2023/3/7
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2022/3/8	2023/3/7
		966-4-2	2022/3/8	2023/3/7
		966-4-3	2022/3/8	2023/3/7
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2022/10/21	2023/10/20

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/2/13

#### 4.7 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-783	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980688	2022/10/4	2023/10/3
	EMC184045SE	980387	2022/12/28	2023/12/27
RF Cable-Frequency Range : 1- 26.5GHz EMCI	EMC104-SM-SM-1200	160922	2022/12/15	2023/12/14
RF Cable-Frequency range: 1- 40GHz EMCI	EMC102-KM-KM-1200	160924	2022/12/28	2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-2000	180502	2022/4/25	2023/4/24
	EMC104-SM-SM-6000	210704	2022/11/4	2023/11/3
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/2/13



## 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 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 5.6 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).

## 5.7 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

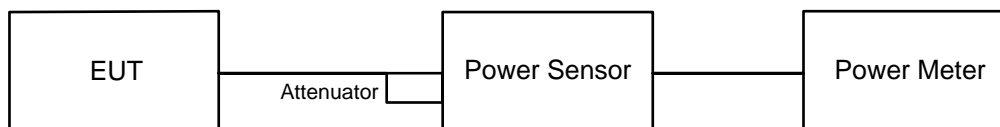
Notes:

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:

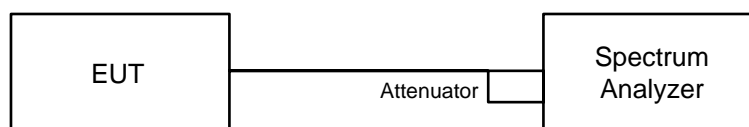
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

##### 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

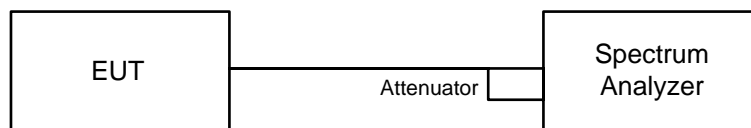


#### 6.2.2 Test Procedure

- 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

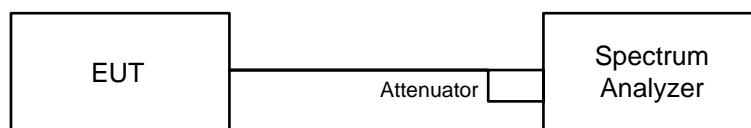


#### 6.3.2 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

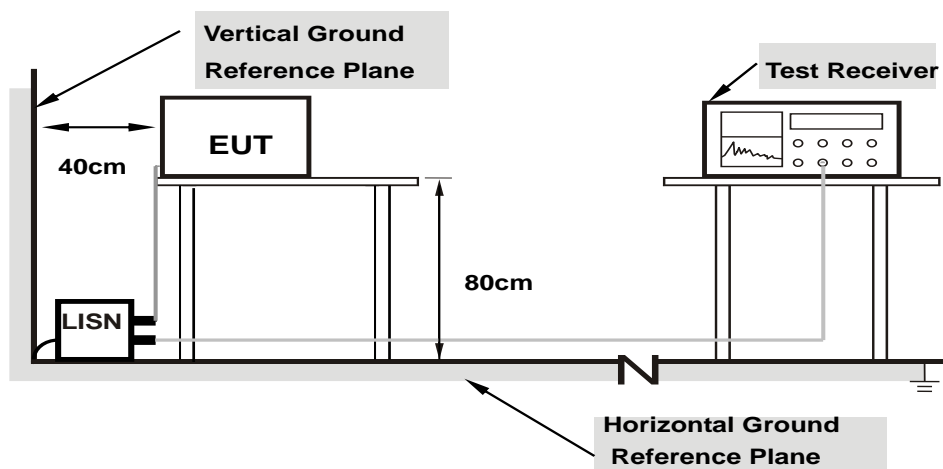
- Set the RBW = 100 kHz.
- Set the VBW  $\geq 300$  kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

##### MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW  $\geq 300$  kHz.
- Detector = peak.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

## 6.5 AC Power Conducted Emissions

### 6.5.1 Test Setup



**Note: 1.Support units were connected to second LISN.**

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

### 6.5.2 Test Procedure

- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

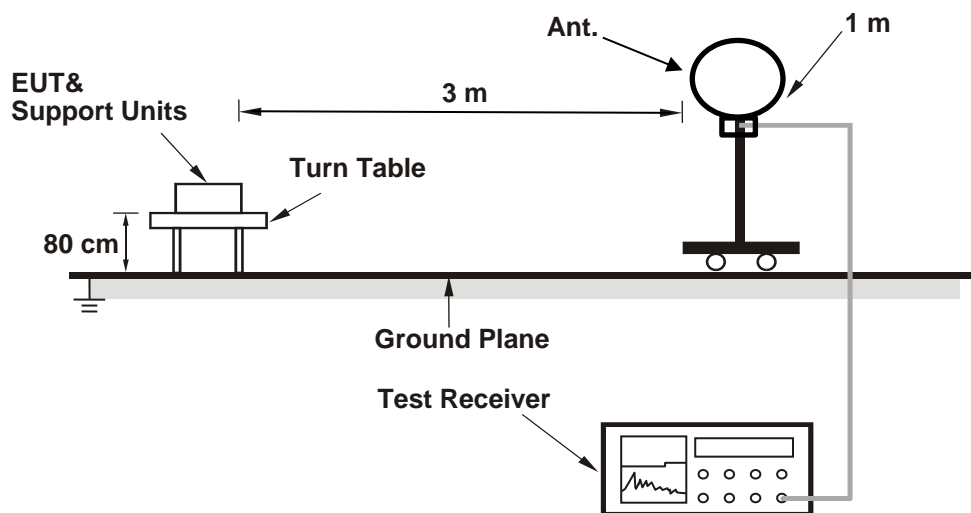
Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

## 6.6 Unwanted Emissions below 1 GHz

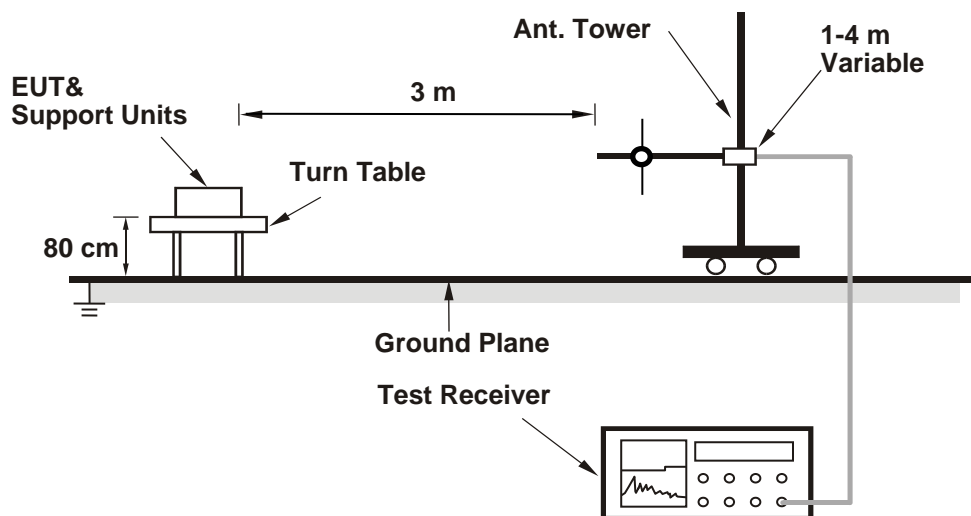
### 6.6.1 Test Setup

For radiated configuration:

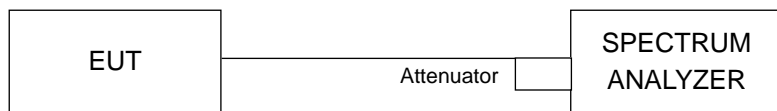
For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For conducted configuration:



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

## 6.6.2 Test Procedure

Following FCC KDB 558074 D01 DTS Meas. Guidance:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.
- d. For all of Radiation emission test

### **For Radiated emission below 30MHz**

- d-1.1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- d-1.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d-1.3. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d-1.4. 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.
- d-1.5. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.
2. KDB 414788 OATS and Chamber Correlation Justification
  - Based on FCC 15.31(f)(2) : measurements may be performed at a distance closer than that specified in the regulations; however, an attempts should be made to avoid making measurements in the near field.
  - OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

### **For Radiated emission above 30MHz**

- d-2.1. 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.
- d-2.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d-2.3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d-2.4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- d-2.5. 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.
- d-2.6. 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.

#### **Note:**

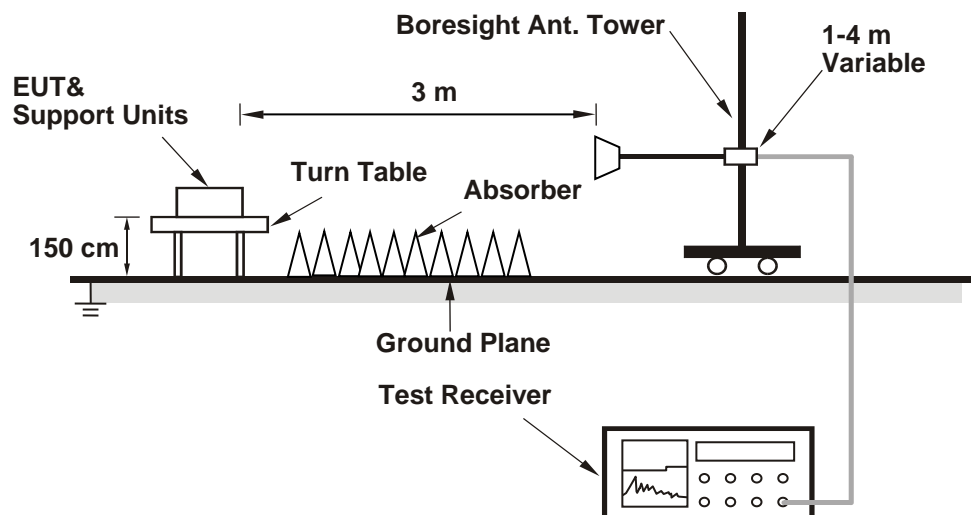
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.



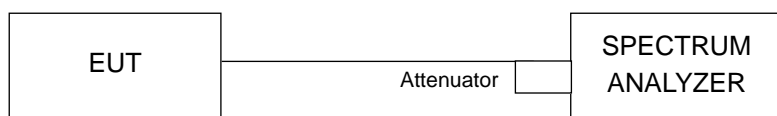
## 6.7 Unwanted Emissions above 1 GHz

### 6.7.1 Test Setup

For radiated configuration:



For conducted configuration:



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

## 6.7.2 Test Procedure

Following FCC KDB 558074 D01 DTS Meas. Guidance:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

- a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.
- b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.
- c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.
- d. For all of Radiation emission test
  - d-2.1. 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.
  - d-2.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
  - d-2.3. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
  - d-2.4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
  - d-2.5. 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.
  - d-2.6. 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.

### Note:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
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

#### Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang
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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	1.722	2.36	30	Pass
19	2440	1.706	2.32	30	Pass
39	2480	1.694	2.29	30	Pass

Note: The antenna gain is 3.18 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
0	2402	1.714	2.34	30	Pass
19	2440	1.698	2.30	30	Pass
39	2480	1.687	2.27	30	Pass

Note: The antenna gain is 3.18 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	1.679	2.25
19	2440	1.671	2.23
39	2480	1.656	2.19

##### BT-LE 2M

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	1.671	2.23
19	2440	1.66	2.20
39	2480	1.644	2.16

## 7.2 Power Spectral Density

### Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang
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### BT-LE 1M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
0	2402	-13.45	8.00	Pass
19	2440	-13.55	8.00	Pass
39	2480	-13.95	8.00	Pass

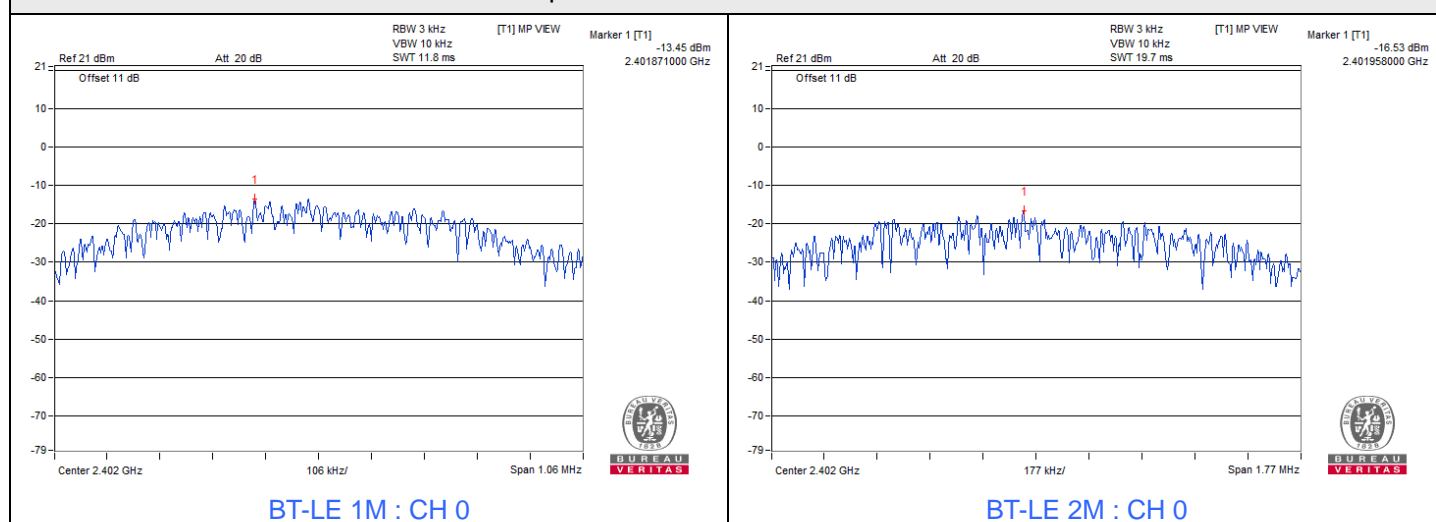
Note: The antenna gain is 3.18 dBi < 6 dBi, so the power density limit shall not be reduced.

### BT-LE 2M

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
0	2402	-16.53	8.00	Pass
19	2440	-16.64	8.00	Pass
39	2480	-17.05	8.00	Pass

Note: The antenna gain is 3.18 dBi < 6 dBi, so the power density limit shall not be reduced.

Spectrum Plot of Maximum Value



### 7.3 6 dB Bandwidth

#### Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang
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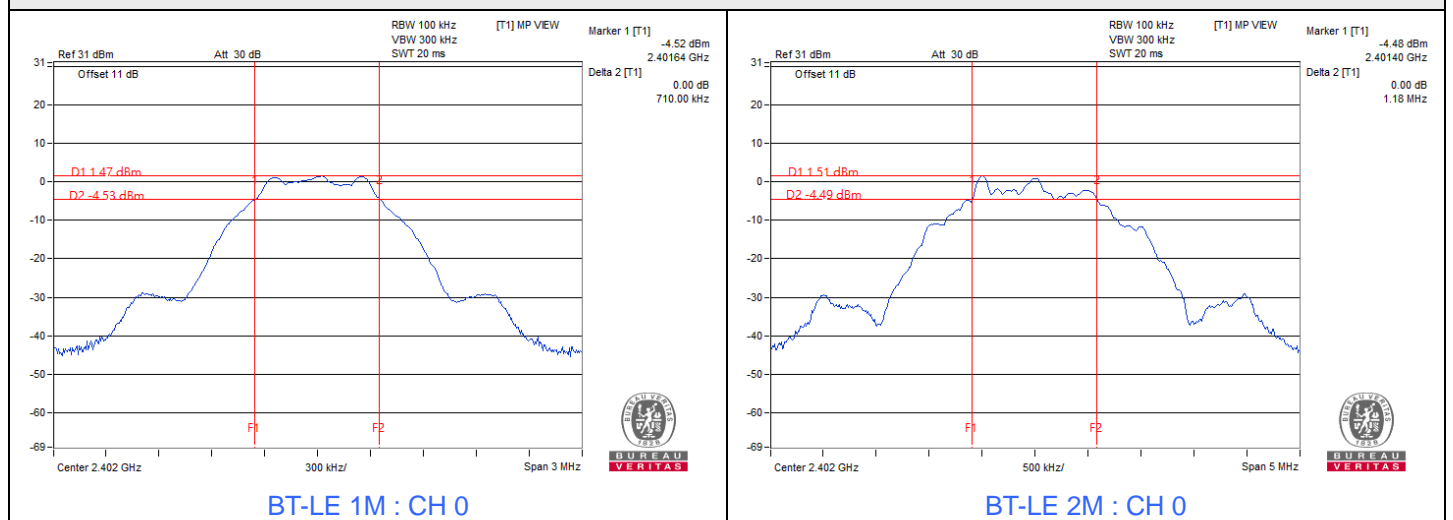
#### BT-LE 1M

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	0.72	0.5	Pass

#### BT-LE 2M

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
0	2402	1.18	0.5	Pass
19	2440	1.18	0.5	Pass
39	2480	1.18	0.5	Pass

Spectrum Plot of Minimum Value



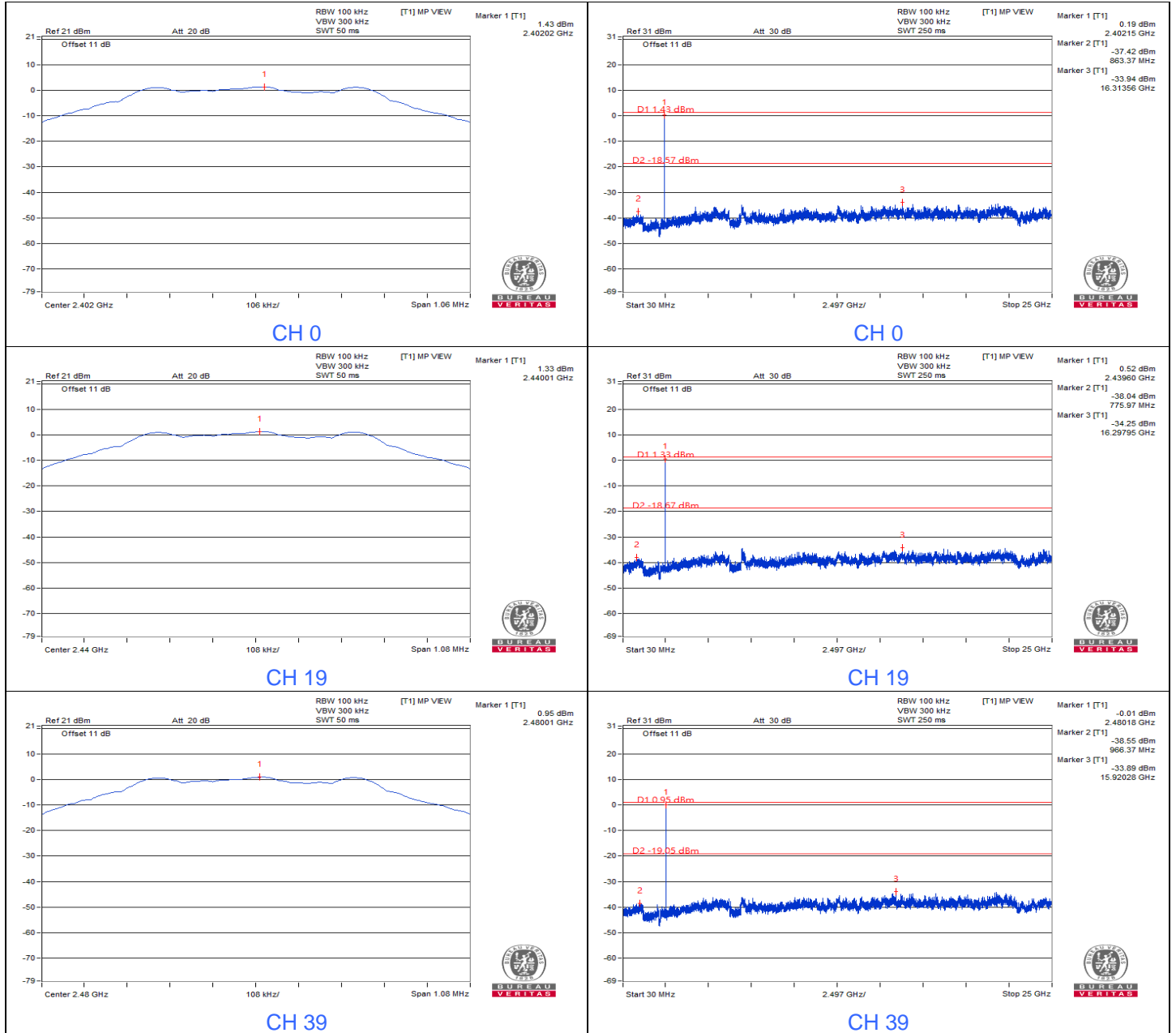


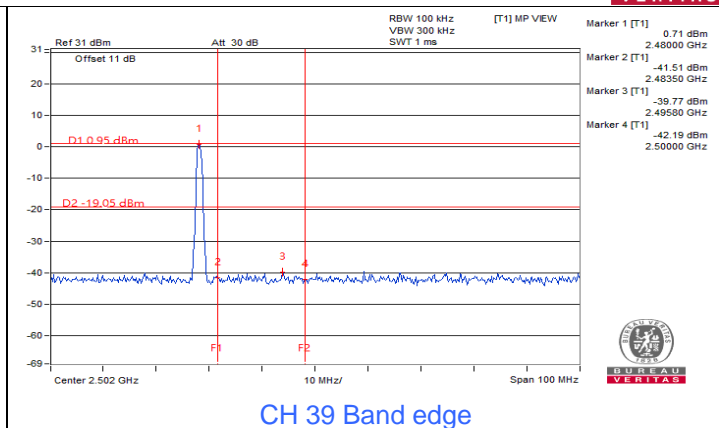
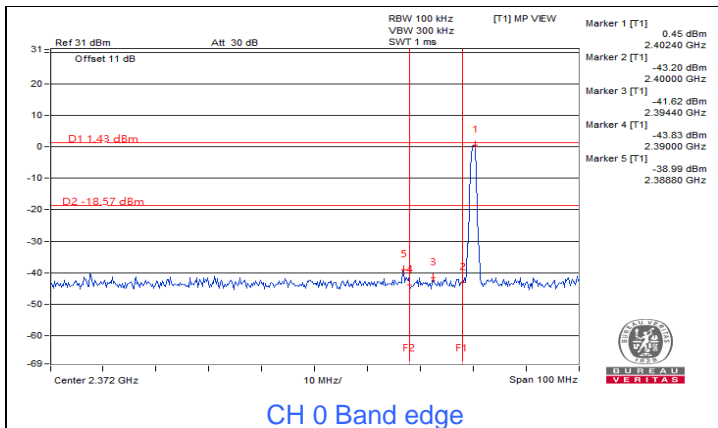
### 7.4 Conducted Out of Band Emissions

#### Mode A

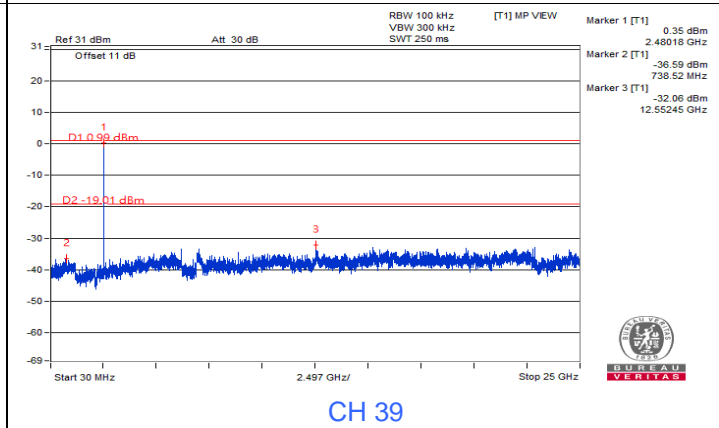
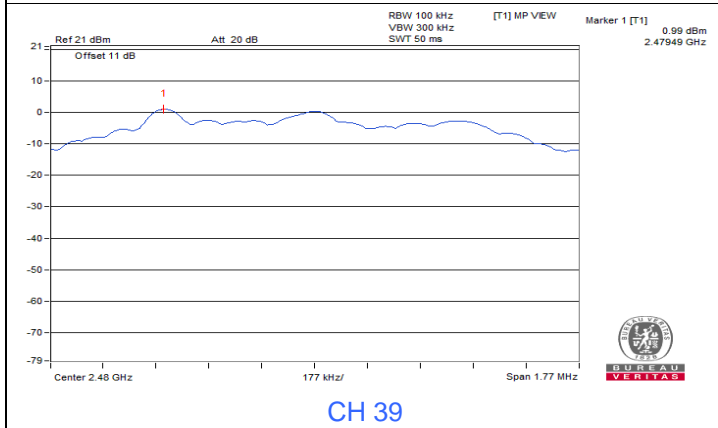
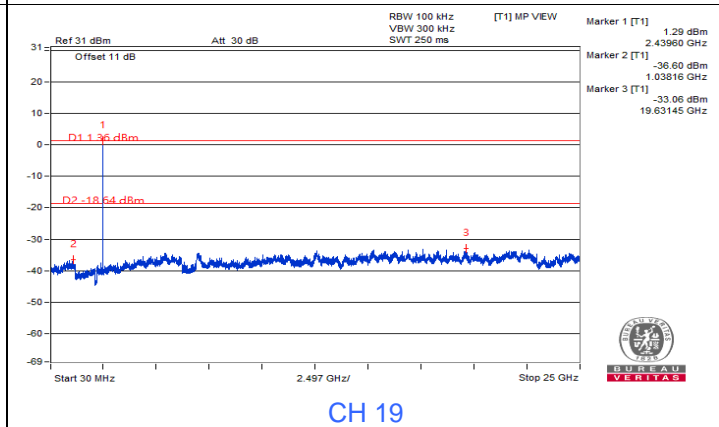
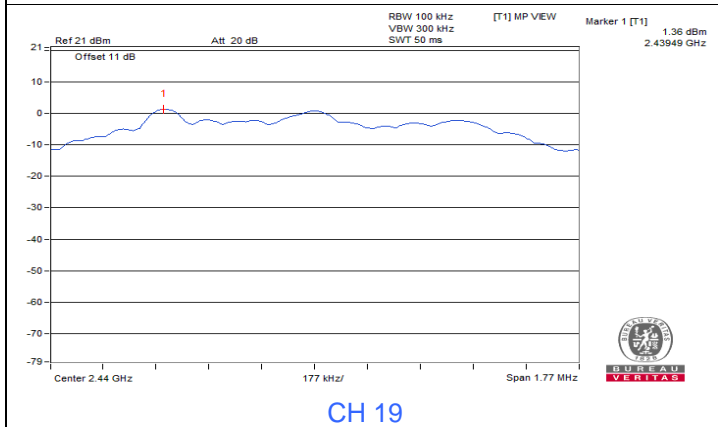
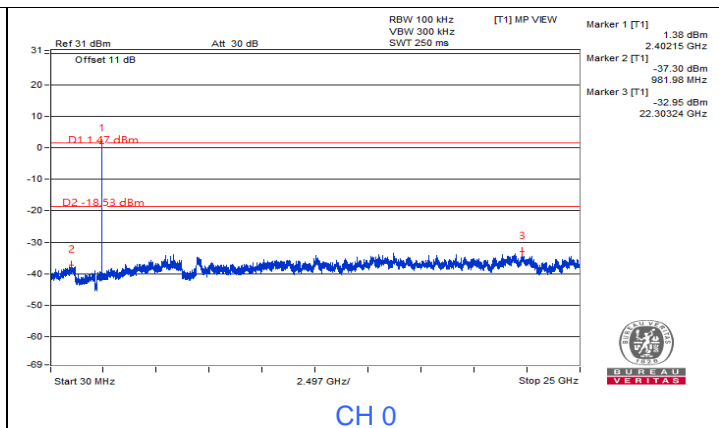
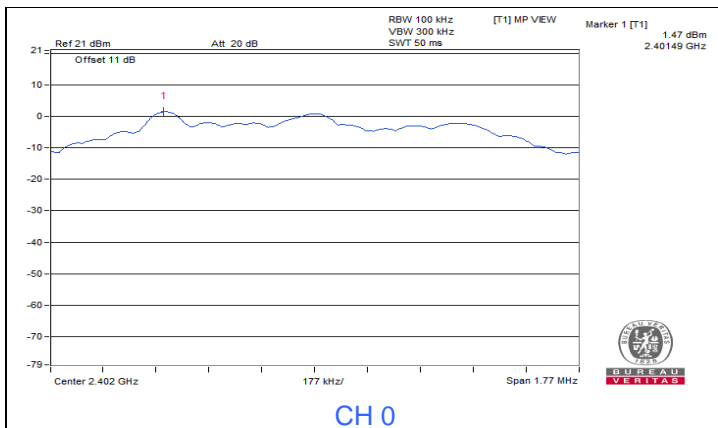
Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang
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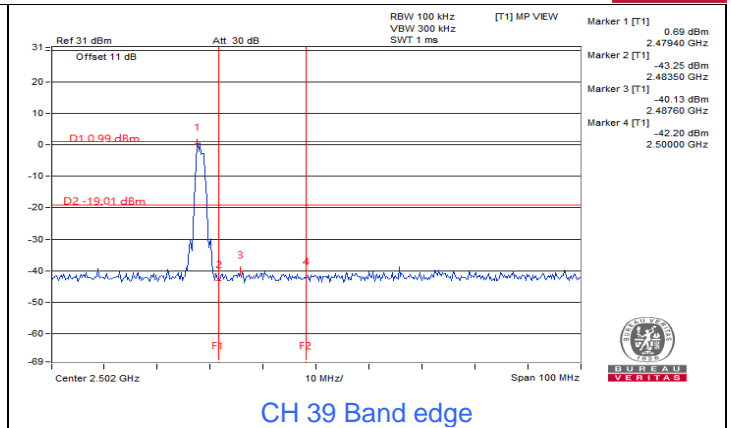
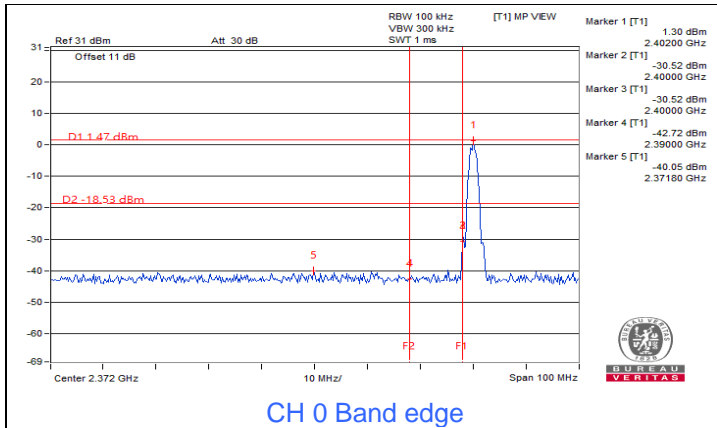
#### BT-LE 1M





BT-LE 2M







## 7.5 AC Power Conducted Emissions

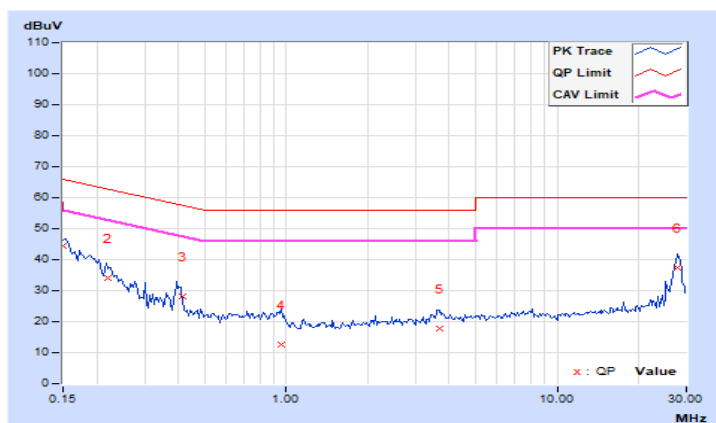
### Mode B

RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120Vac, 60Hz	Environmental Conditions	25°C, 67% RH
Tested By	Tom Yang		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15092	9.96	34.33	15.41	44.29	25.37	65.95	55.95	-21.66	-30.58
2	0.21928	9.96	24.25	6.74	34.21	16.70	62.85	52.85	-28.64	-36.15
3	0.41522	9.97	18.10	7.63	28.07	17.60	57.54	47.54	-29.47	-29.94
4	0.96159	10.00	2.53	-3.92	12.53	6.08	56.00	46.00	-43.47	-39.92
5	3.67017	10.13	7.64	-1.55	17.77	8.58	56.00	46.00	-38.23	-37.42
6	27.97125	11.23	26.34	25.73	37.57	36.96	60.00	50.00	-22.43	-13.04

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

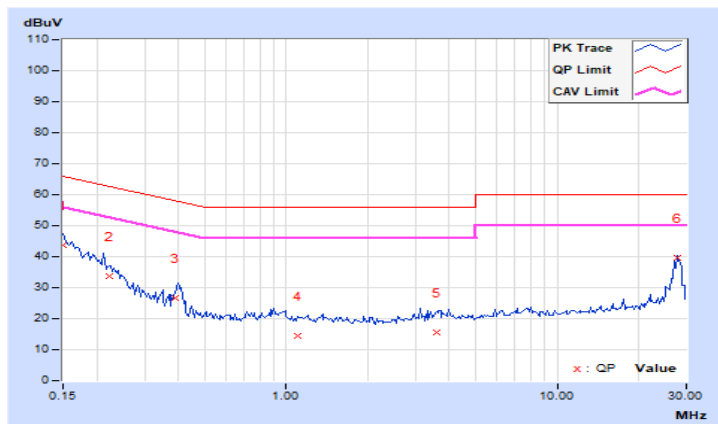


RF Mode	BT-LE 1M	Channel	CH 0 : 2402 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120Vac, 60Hz	Environmental Conditions	25°C, 67% RH
Tested By	Tom Yang		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.93	33.64	14.25	43.57	24.18	66.00	56.00	-22.43	-31.82
2	0.22159	9.94	23.77	4.63	33.71	14.57	62.76	52.76	-29.05	-38.19
3	0.38741	9.94	16.63	6.42	26.57	16.36	58.12	48.12	-31.55	-31.76
4	1.10929	9.98	4.28	-1.53	14.26	8.45	56.00	46.00	-41.74	-37.55
5	3.61054	10.08	5.52	-4.77	15.60	5.31	56.00	46.00	-40.40	-40.69
6	27.94371	10.87	28.58	28.37	39.45	39.24	60.00	50.00	-20.55	-10.76

**Remarks:**

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



## 7.6 Unwanted Emissions below 1 GHz

### Radiated versus Conducted Measurement

#### For Radiated measurement:

The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation)

#### For Conducted measurement:

The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).

### Conducted Emission Convert Formula

a.  $\text{Emission Level (dBuV/m)} = \text{EIRP Level (dBm)} - 20\log(d) + 104.8$

d = measurement distance in 3 meters.

b.  $\text{EIRP Level (dBm)} = \text{Raw Value(dBm)} + \text{Correction Factor(dB)}$

c. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal

For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands.

For the band edge the gain for the specific band may have been used.

#### Notes:

1. In restricted bands below 1000 MHz, add upper bound on ground plane reflection:

For  $f = 30 - 1000$  MHz, add 4.7 dB.

Offset = 10 dB + 1 dB(cable loss) + 4.7 dB

2. The conducted emission test was considered some factor to compute test result.

Mode A

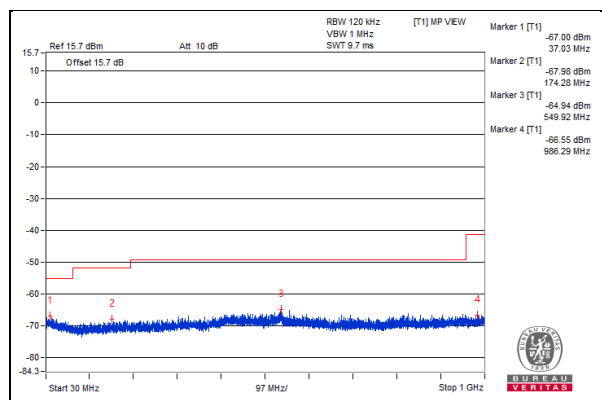
BT-LE 1M - Channel 0

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	37.03	34.08	40	-5.92	-67	5.825	-61.18
2	174.28	33.1	43.5	-10.4	-67.98	5.825	-62.16
3	345	34.23	46	-11.77	-66.85	5.825	-61.03
4	549.92	36.14	46	-9.86	-64.94	5.825	-59.12
5	605.93	34.75	46	-11.25	-66.33	5.825	-60.51
6	831.58	35.03	46	-10.97	-66.05	5.825	-60.23

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



## Mode B

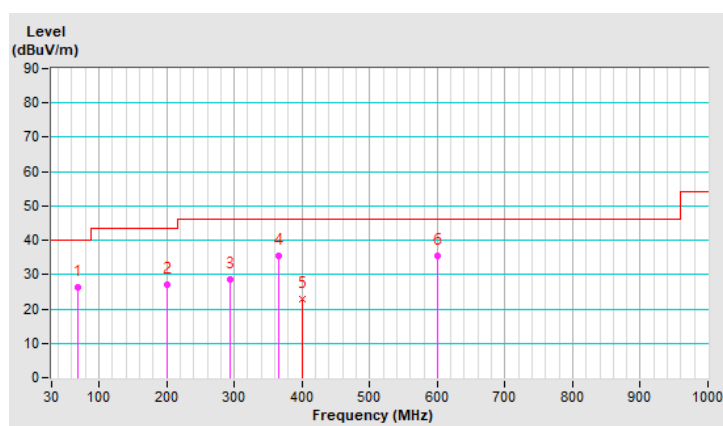
<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	30 MHz ~ 1 GHz	<b>Detector Function &amp; Bandwidth</b>	(QP) RB = 120kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	23°C, 67% RH
<b>Tested By</b>	Tom Yang		

### 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	68.22	26.4 QP	40.0	-13.6	3.00 H	68	40.8	-14.4
2	200.70	27.1 QP	43.5	-16.4	1.50 H	216	42.1	-15.0
3	293.09	28.4 QP	46.0	-17.6	1.50 H	2	39.5	-11.1
4	364.80	35.4 QP	46.0	-10.6	1.00 H	337	44.3	-8.9
5	399.99	22.7 QP	46.0	-23.3	2.00 H	337	30.6	-7.9
6	600.00	35.6 QP	46.0	-10.4	3.00 H	127	38.0	-2.4

### 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.

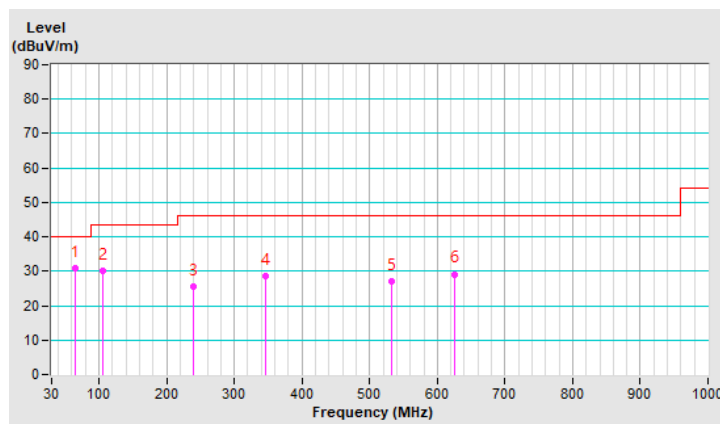


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	30 MHz ~ 1 GHz	<b>Detector Function &amp; Bandwidth</b>	(QP) RB = 120kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	23°C, 67% RH
<b>Tested By</b>	Tom Yang		

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	65.11	30.9 QP	40.0	-9.1	1.00 V	343	44.8	-13.9
2	104.74	30.2 QP	43.5	-13.3	1.00 V	179	45.9	-15.7
3	240.30	25.4 QP	46.0	-20.6	1.00 V	27	38.6	-13.2
4	347.09	28.5 QP	46.0	-17.5	1.50 V	308	38.1	-9.6
5	533.43	27.2 QP	46.0	-18.8	1.00 V	58	31.6	-4.4
6	626.43	29.2 QP	46.0	-16.8	1.00 V	57	31.0	-1.8

**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.



## 7.7 Unwanted Emissions above 1 GHz

### Radiated versus Conducted Measurement

#### For Radiated measurement:

The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation)

#### For Conducted measurement:

The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).

### Conducted Emission Convert Formula

d.  $\text{Emission Level (dBuV/m)} = \text{EIRP Level (dBm)} - 20\log(d) + 104.8$

d = measurement distance in 3 meters.

e.  $\text{EIRP Level (dBm)} = \text{Raw Value(dBm)} + \text{Correction Factor(dB)}$

f. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal

For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands.

For the band edge the gain for the specific band may have been used.

#### Notes:

1. In restricted bands below 1000 MHz, add upper bound on ground plane reflection:

For  $f = 30 - 1000$  MHz, add 4.7 dB.

2. The conducted emission test was considered some factor to compute test result.

Mode A

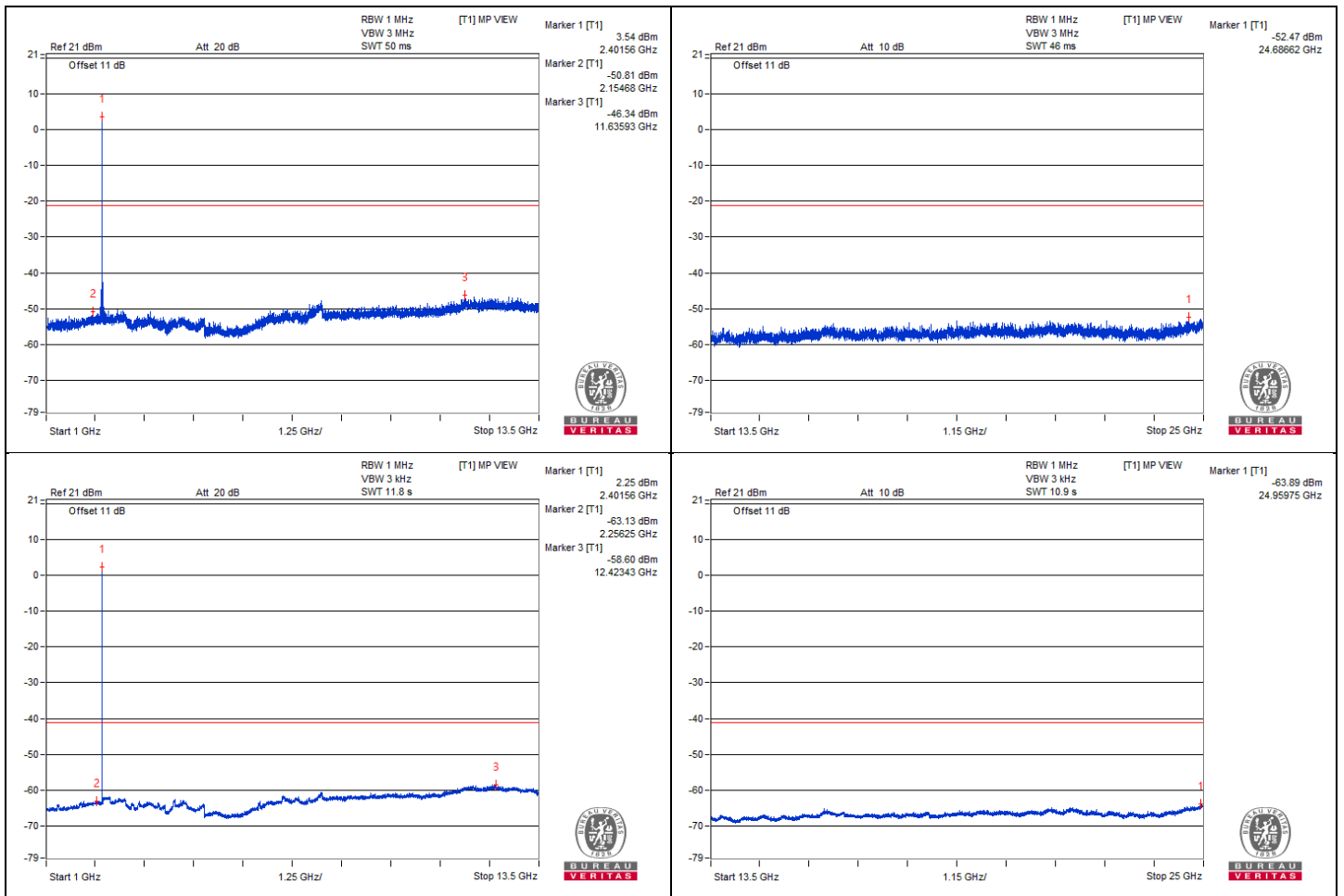
BT-LE 1M - Channel 0

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4801.56	47.48 PK	74	-26.52	-53.6	5.825	-47.78
2	4796.87	35.72 AV	54	-18.28	-65.36	5.825	-59.54

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



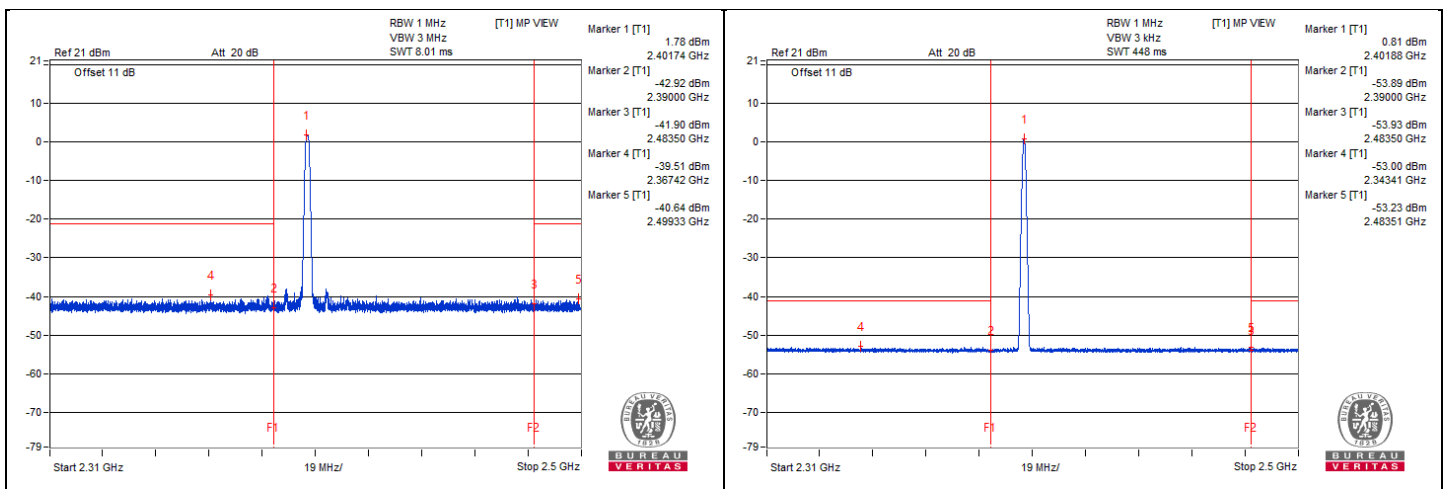


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2367.42	58.93 PK	74	-15.07	-39.51	3.18	-36.33
2	2343.41	45.44 AV	54	-8.56	-53	3.18	-49.82
3	2499.33	57.8 PK	74	-16.2	-40.64	3.18	-37.46
4	2483.51	45.21 AV	54	-8.79	-53.23	3.18	-50.05

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



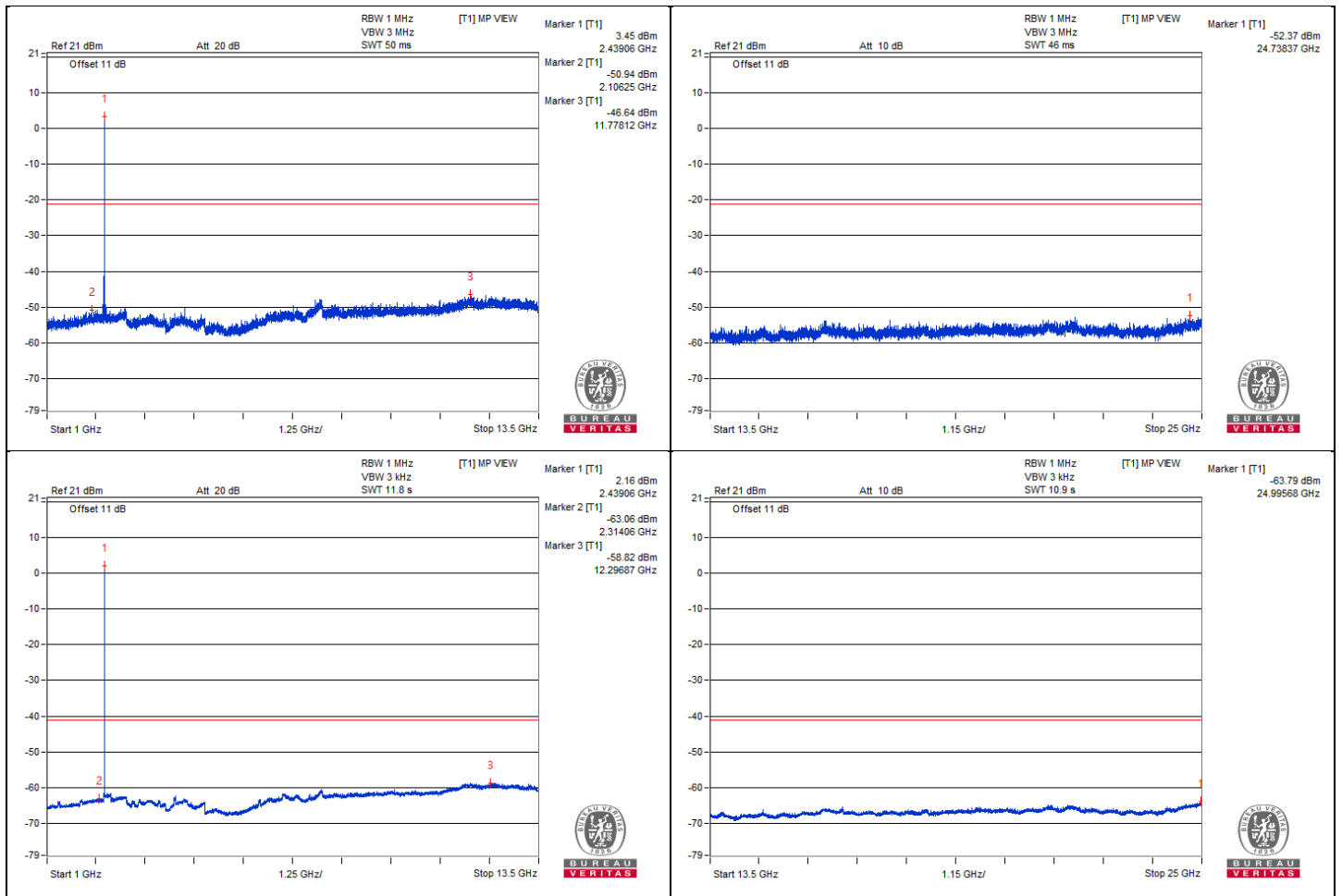
**BT-LE 1M - Channel 19**

**Conducted spurious emission table**

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4884.37	47.81 PK	74	-26.19	-53.27	5.825	-47.45
2	4885.93	36.32 AV	54	-17.68	-64.76	5.825	-58.94
3	7323.43	50.09 PK	74	-23.91	-50.99	5.825	-45.17
4	7329.68	38.87 AV	54	-15.13	-62.21	5.825	-56.39

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

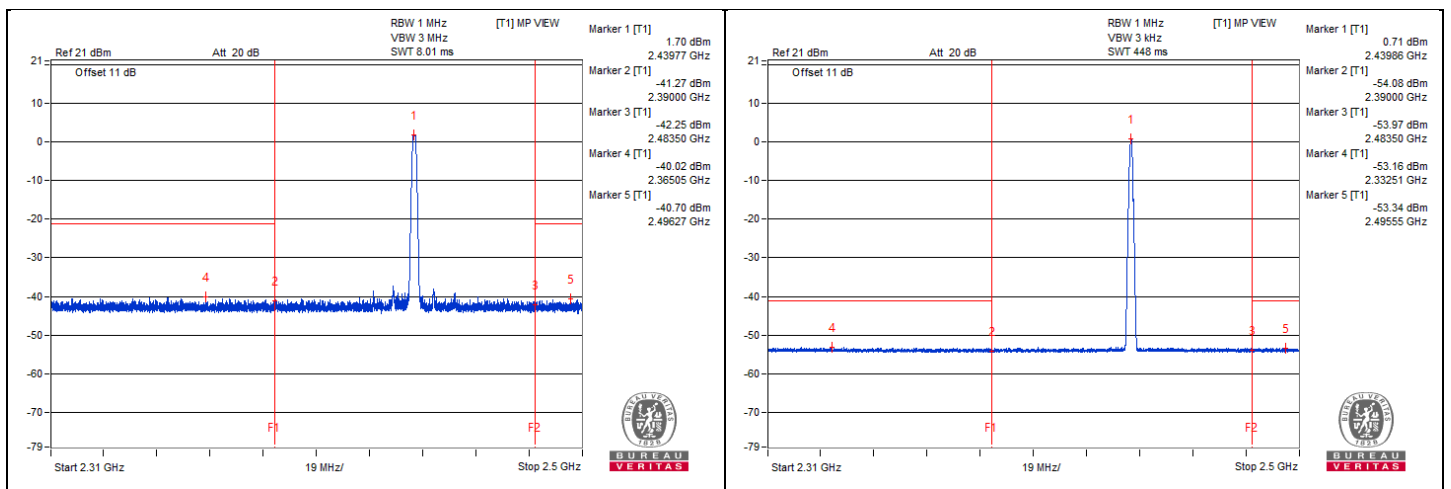


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2365.05	58.42 PK	74	-15.58	-40.02	3.18	-36.84
2	2332.51	45.28 AV	54	-8.72	-53.16	3.18	-49.98
3	2496.27	57.74 PK	74	-16.26	-40.7	3.18	-37.52
4	2495.55	45.1 AV	54	-8.9	-53.34	3.18	-50.16

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



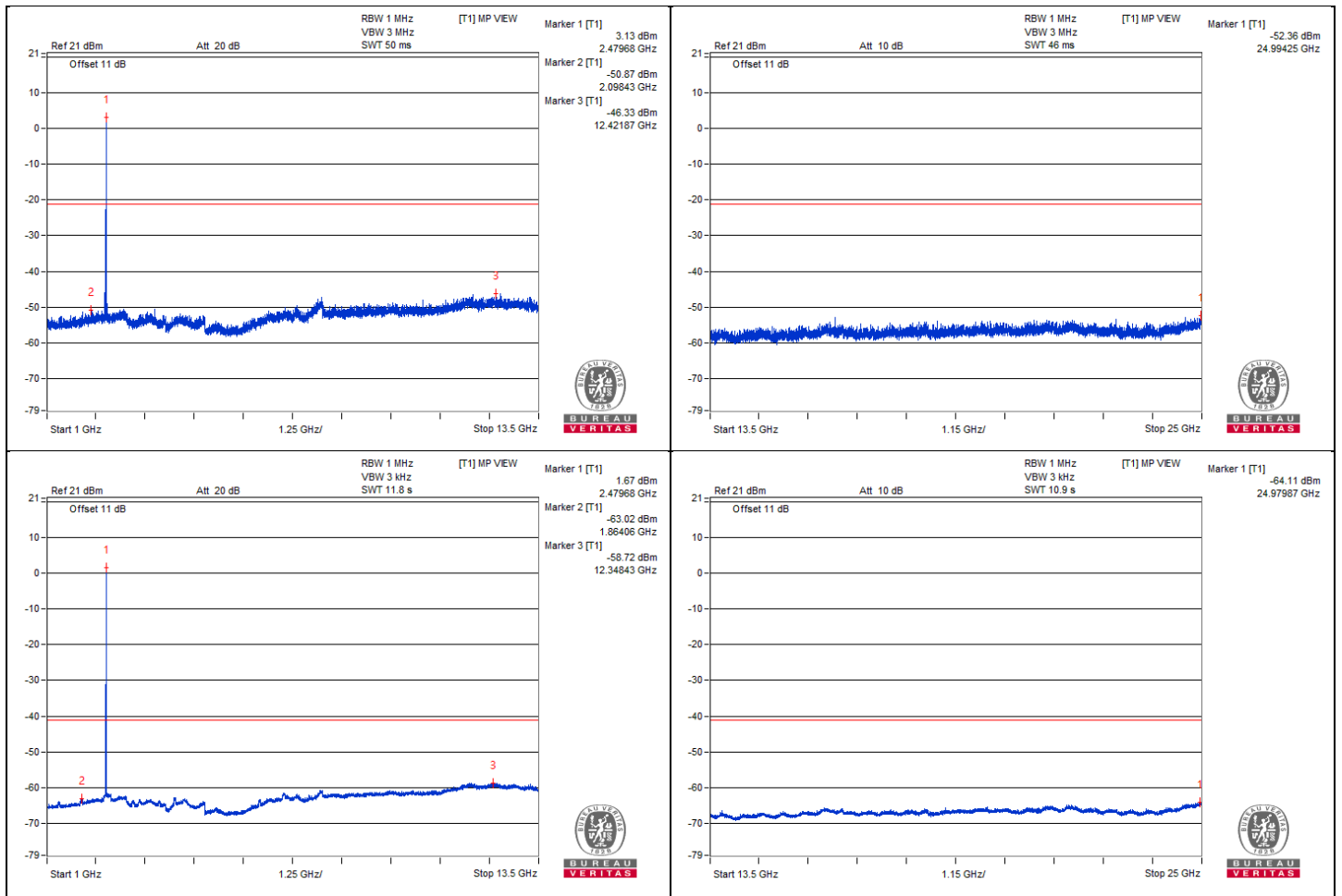
BT-LE 1M - Channel 39

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4957.81	48.71 PK	74	-25.29	-52.37	5.825	-46.55
2	4968.75	37.05 AV	54	-16.95	-64.03	5.825	-58.21
3	7445.31	50.03 PK	74	-23.97	-51.05	5.825	-45.23
4	7442.18	38.27 AV	54	-15.73	-62.81	5.825	-56.99

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

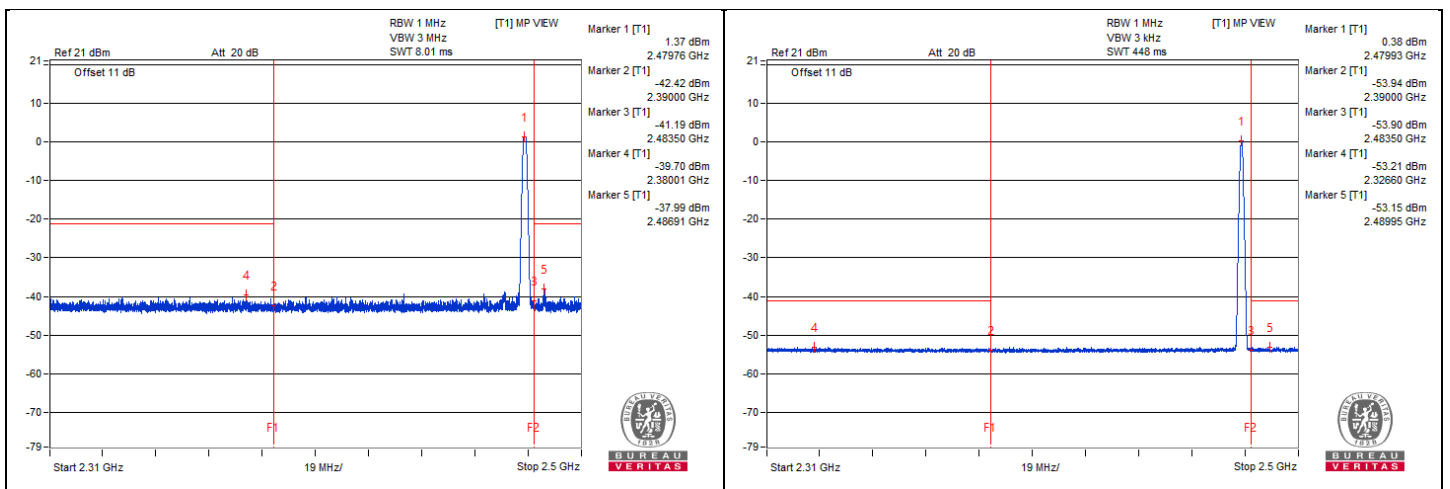


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2380.01	58.74 PK	74	-15.26	-39.7	3.18	-36.52
2	2326.6	45.23 AV	54	-8.77	-53.21	3.18	-50.03
3	2486.91	60.45 PK	74	-13.55	-37.99	3.18	-34.81
4	2489.95	45.29 AV	54	-8.71	-53.15	3.18	-49.97

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



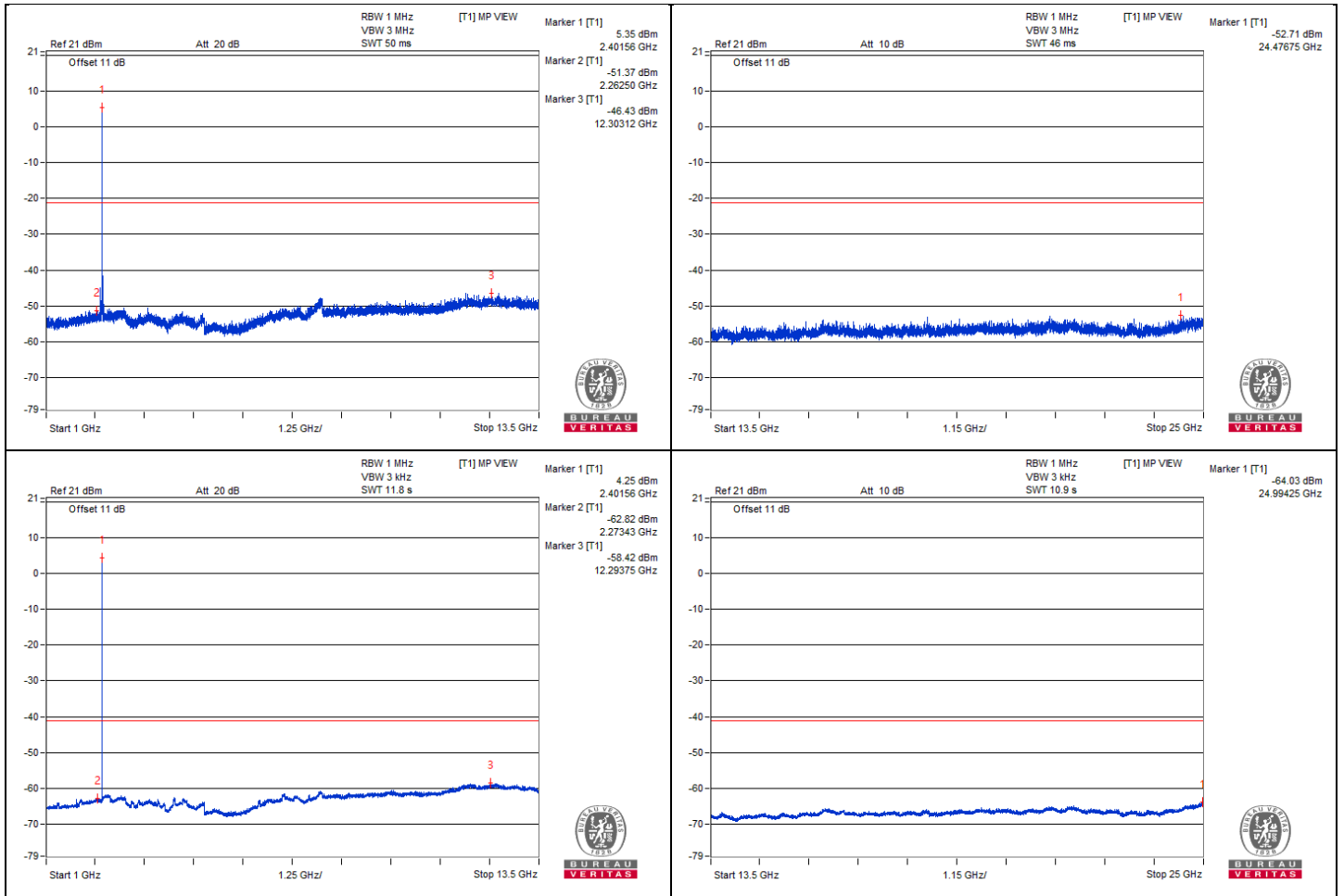
**BT-LE 2M - Channel 0**

**Conducted spurious emission table**

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4806.25	46.32 PK	74	-27.68	-54.76	5.825	-48.94
2	4807.81	36.04 AV	54	-17.96	-65.04	5.825	-59.22

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

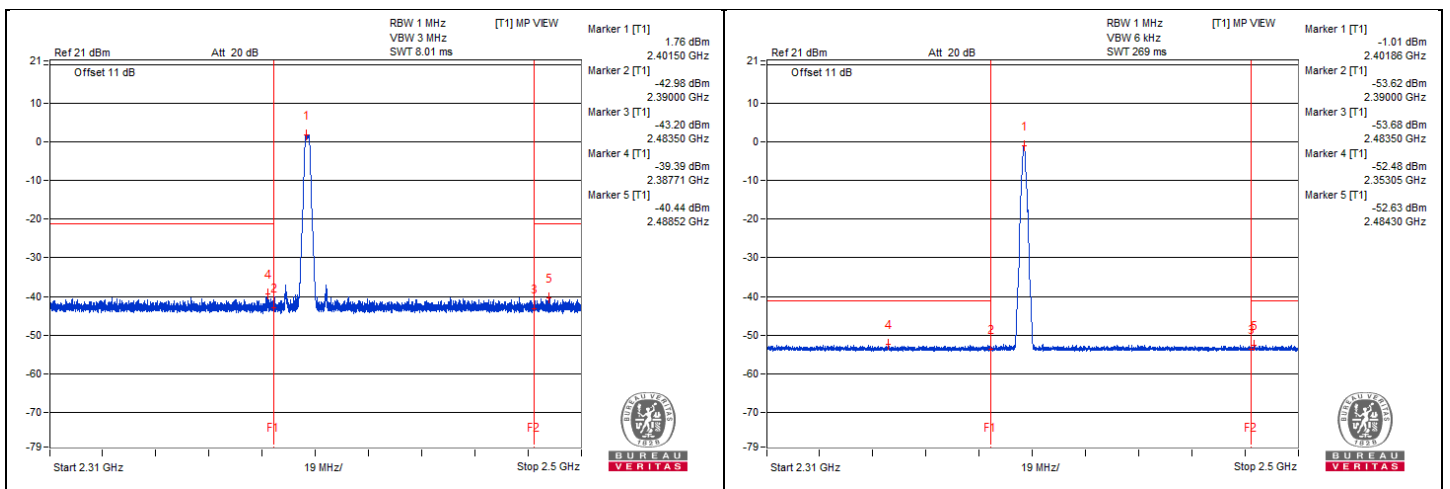


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2387.71	59.05 PK	74	-14.95	-39.39	3.18	-36.21
2	2353.05	45.96 AV	54	-8.04	-52.48	3.18	-49.30
3	2488.52	58 PK	74	-16	-40.44	3.18	-37.26
4	2484.3	45.81 AV	54	-8.19	-52.63	3.18	-49.45

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



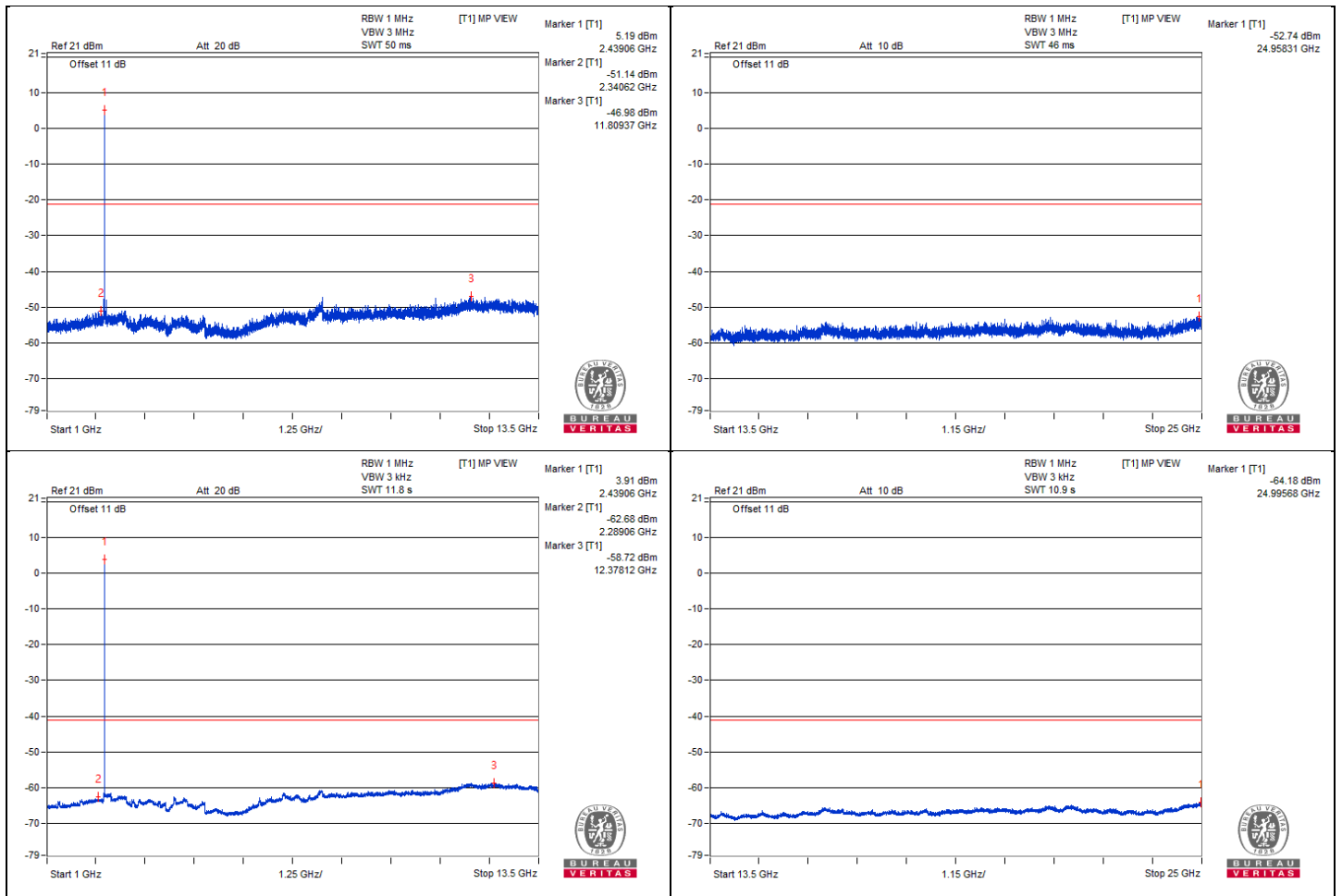
BT-LE 2M - Channel 19

Conducted spurious emission table

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4884.37	47.91 PK	74	-26.09	-53.17	5.825	-47.35
2	4881.25	36.35 AV	54	-17.65	-64.73	5.825	-58.91
3	7328.12	49.57 PK	74	-24.43	-51.51	5.825	-45.69
4	7323.43	38.84 AV	54	-15.16	-62.24	5.825	-56.42

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



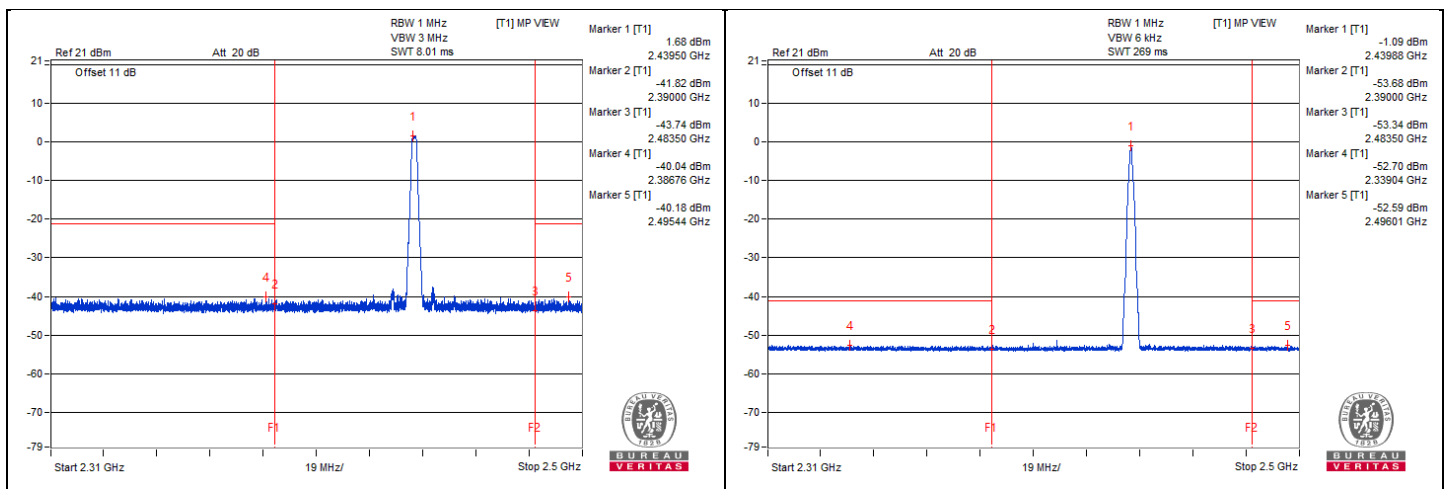


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2386.76	58.4 PK	74	-15.6	-40.04	3.18	-36.86
2	2317.05	45.89 AV	54	-8.11	-52.55	3.18	-49.37
3	2495.44	58.26 PK	74	-15.74	-40.18	3.18	-37.00
4	2496.01	45.85 AV	54	-8.15	-52.59	3.18	-49.41

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



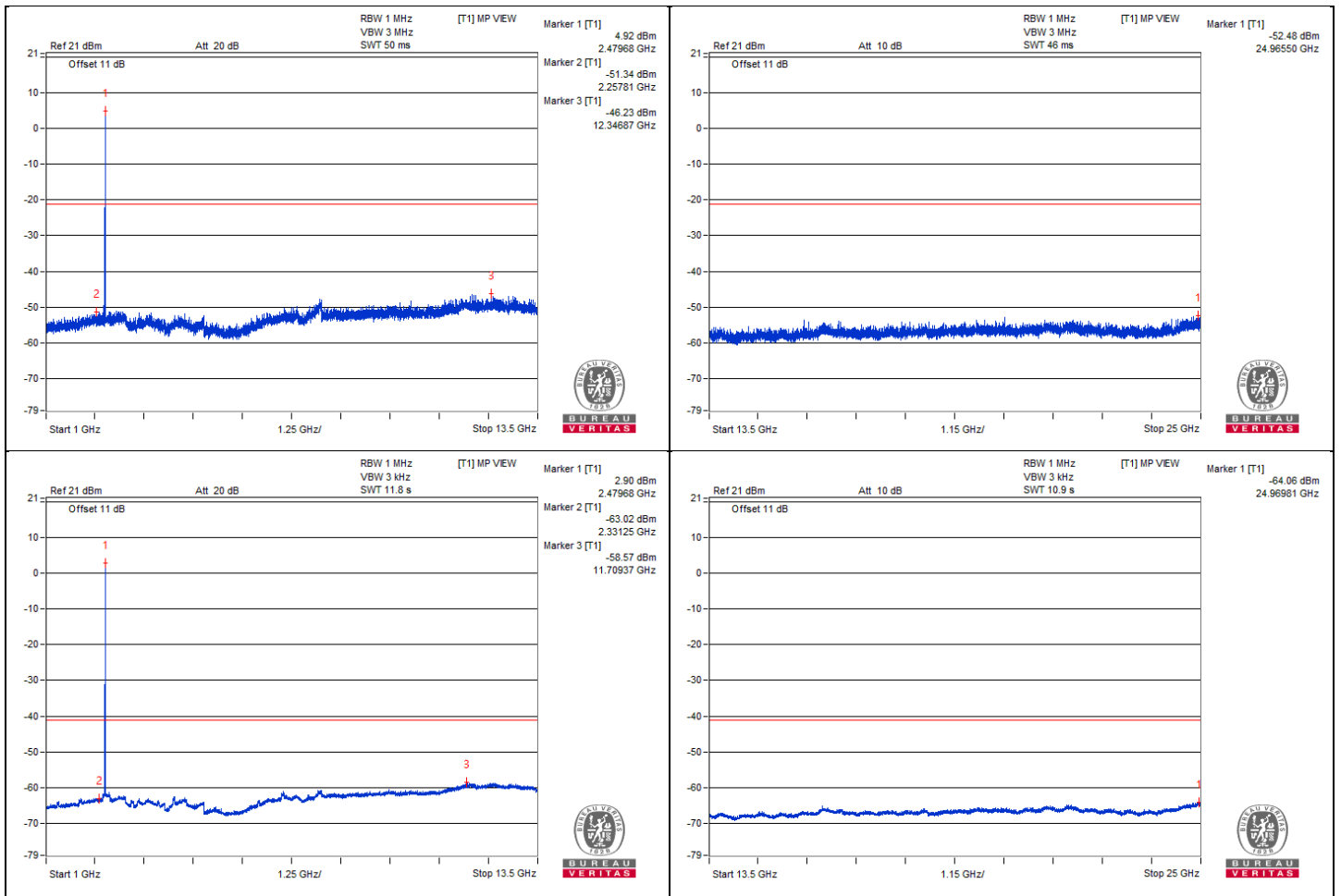
**BT-LE 2M - Channel 39**

**Conducted spurious emission table**

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	4965.62	47.91 PK	74	-26.09	-53.17	5.825	-47.35
2	4964.06	36.72 AV	54	-17.28	-64.36	5.825	-58.54
3	7450	48.74 PK	74	-25.26	-52.34	5.825	-46.52
4	7439.06	38.25 AV	54	-15.75	-62.83	5.825	-57.01

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

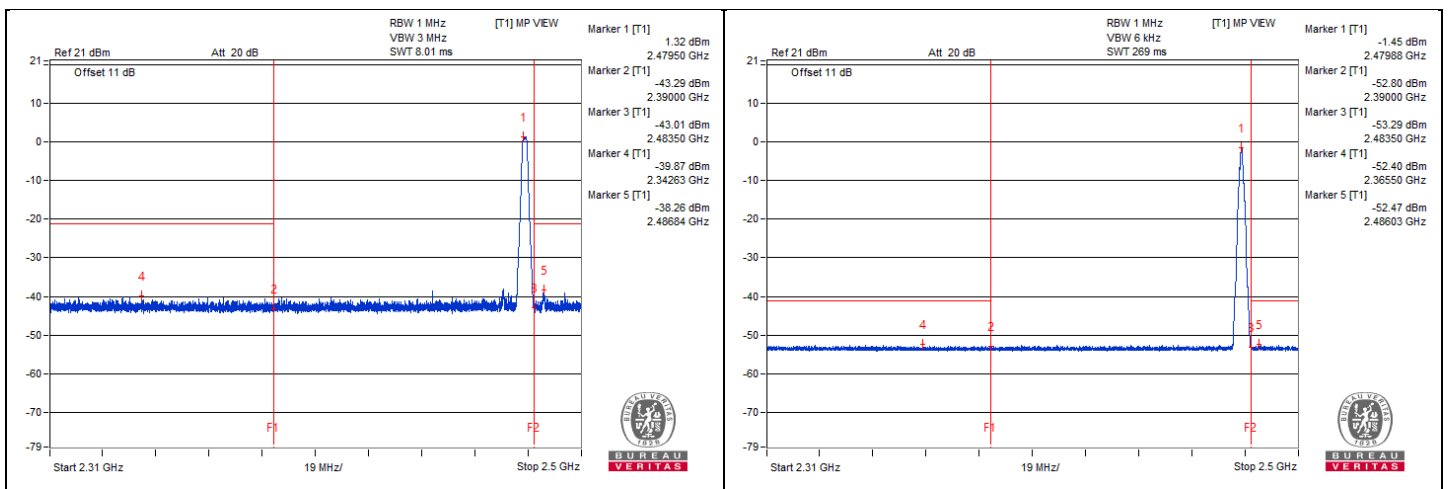


**Bandedge table**

No.	Frequency (MHz)	Emission Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Raw Value (dBm)	Correction Factor (dB)	EIRP Level (dBm)
1	2342.63	58.57 PK	74	-15.43	-39.87	3.18	-36.69
2	2365.5	46.04 AV	54	-7.96	-52.4	3.18	-49.22
3	2486.84	60.18 PK	74	-13.82	-38.26	3.18	-35.08
4	2486.03	45.97 AV	54	-8.03	-52.47	3.18	-49.29

Remarks:

1. Margin value = Emission Level – Limit value
2. The other emission levels were very low against the limit.



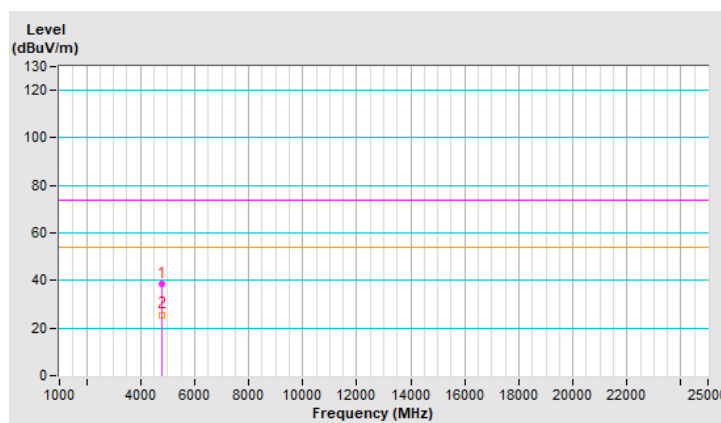
## Mode B

<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	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	4804.00	38.7 PK	74.0	-35.3	1.93 H	210	35.4	3.3
2	4804.00	25.6 AV	54.0	-28.4	1.93 H	210	22.3	3.3

### 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.

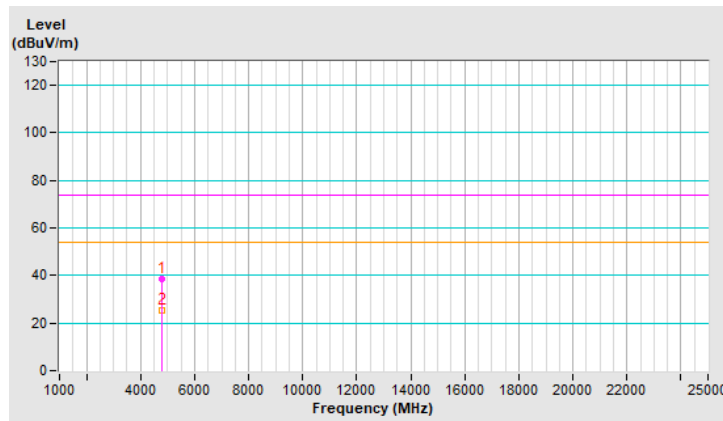


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4804.00	38.5 PK	74.0	-35.5	1.48 V	53	35.2	3.3
2	4804.00	25.2 AV	54.0	-28.8	1.48 V	53	21.9	3.3

**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.

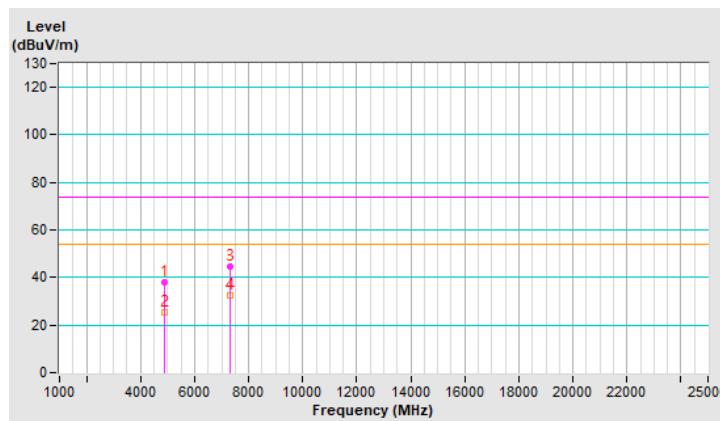


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 19 : 2440 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4880.00	38.0 PK	74.0	-36.0	1.88 H	199	34.6	3.4
2	4880.00	25.4 AV	54.0	-28.6	1.88 H	199	22.0	3.4
3	7320.00	44.8 PK	74.0	-29.2	1.60 H	133	34.7	10.1
4	7320.00	32.5 AV	54.0	-21.5	1.60 H	133	22.4	10.1

**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.

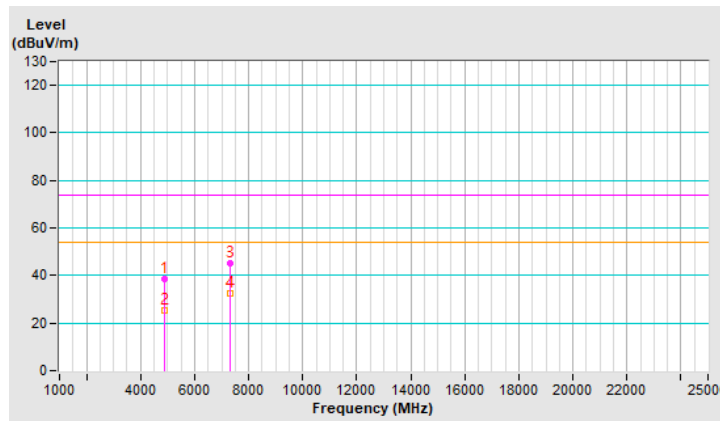


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 19 : 2440 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4880.00	38.4 PK	74.0	-35.6	1.49 V	60	35.0	3.4
2	4880.00	25.2 AV	54.0	-28.8	1.49 V	60	21.8	3.4
3	7320.00	45.1 PK	74.0	-28.9	2.04 V	257	35.0	10.1
4	7320.00	32.5 AV	54.0	-21.5	2.04 V	257	22.4	10.1

**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.

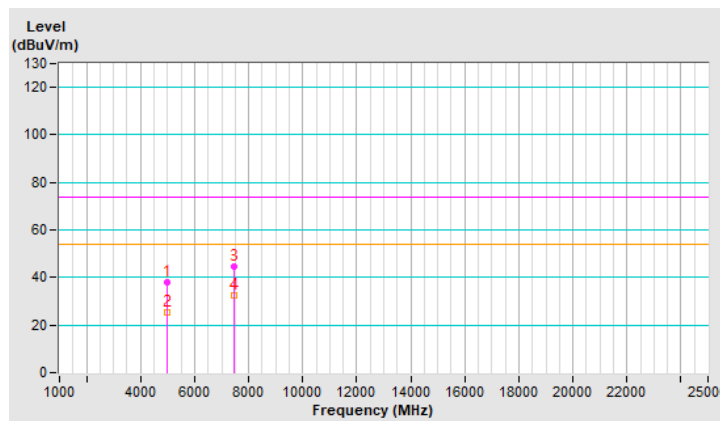


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 39 : 2480 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4960.00	38.2 PK	74.0	-35.8	1.83 H	215	34.4	3.8
2	4960.00	25.5 AV	54.0	-28.5	1.83 H	215	21.7	3.8
3	7440.00	44.8 PK	74.0	-29.2	1.58 H	134	34.5	10.3
4	7440.00	32.3 AV	54.0	-21.7	1.58 H	134	22.0	10.3

**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.



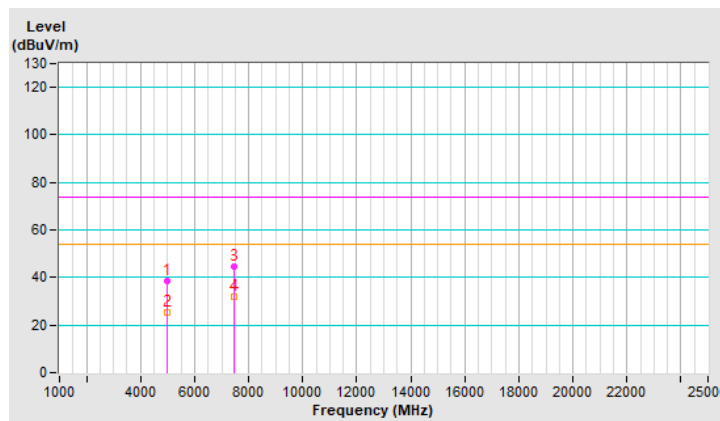


<b>RF Mode</b>	BT-LE 1M	<b>Channel</b>	CH 39 : 2480 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4960.00	38.5 PK	74.0	-35.5	1.45 V	49	34.7	3.8
2	4960.00	25.4 AV	54.0	-28.6	1.45 V	49	21.6	3.8
3	7440.00	44.6 PK	74.0	-29.4	1.99 V	288	34.3	10.3
4	7440.00	31.8 AV	54.0	-22.2	1.99 V	288	21.5	10.3

**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.

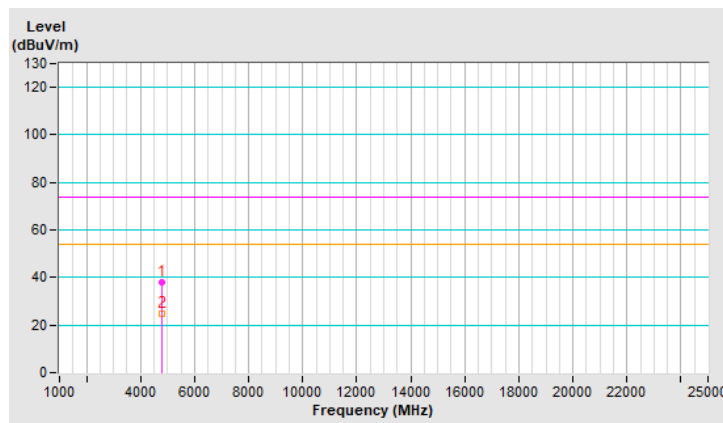


<b>RF Mode</b>	BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4804.00	37.8 PK	74.0	-36.2	1.89 H	219	34.5	3.3
2	4804.00	25.0 AV	54.0	-29.0	1.89 H	219	21.7	3.3

**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.

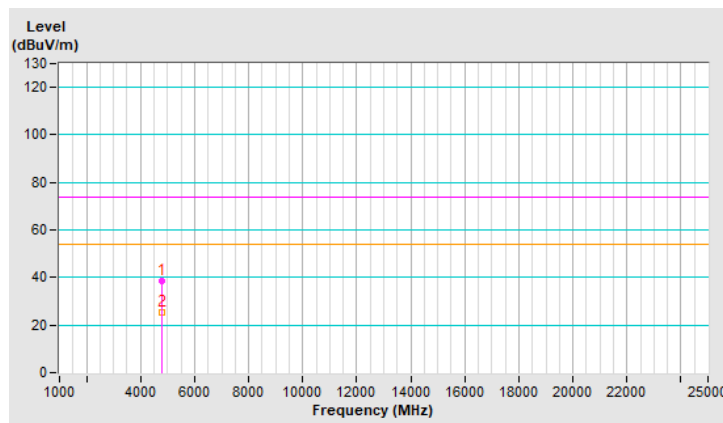


<b>RF Mode</b>	BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4804.00	38.6 PK	74.0	-35.4	1.50 V	37	35.3	3.3
2	4804.00	25.4 AV	54.0	-28.6	1.50 V	37	22.1	3.3

**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.

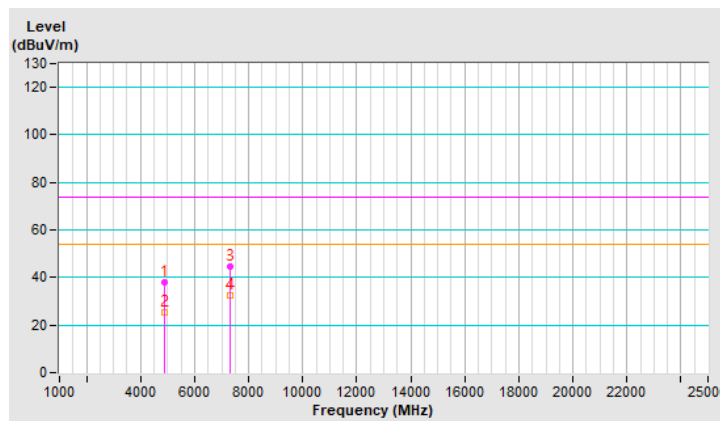


RF Mode	BT-LE 2M	Channel	CH 19 : 2440 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
Input Power (System)	120Vac, 60Hz	Environmental Conditions	25°C, 68% RH
Tested By	Tom Yang		

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	4880.00	38.2 PK	74.0	-35.8	1.83 H	215	34.8	3.4
2	4880.00	25.3 AV	54.0	-28.7	1.83 H	215	21.9	3.4
3	7320.00	44.8 PK	74.0	-29.2	1.59 H	129	34.7	10.1
4	<b>7320.00</b>	<b>32.6 AV</b>	<b>54.0</b>	<b>-21.4</b>	<b>1.59 H</b>	<b>129</b>	<b>22.5</b>	<b>10.1</b>

**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.

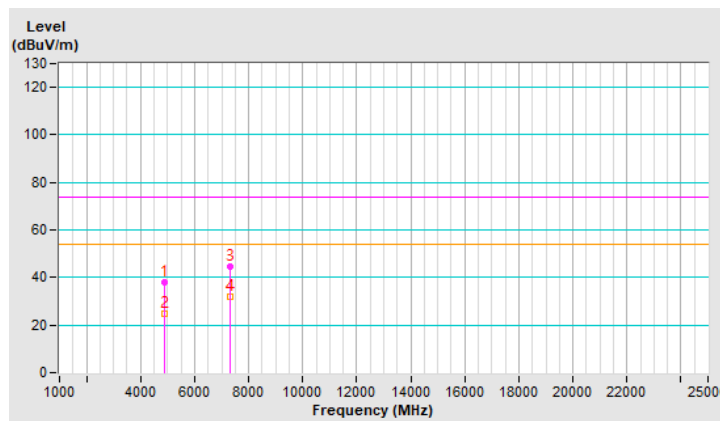


<b>RF Mode</b>	BT-LE 2M	<b>Channel</b>	CH 19 : 2440 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4880.00	38.1 PK	74.0	-35.9	1.46 V	55	34.7	3.4
2	4880.00	25.0 AV	54.0	-29.0	1.46 V	55	21.6	3.4
3	7320.00	44.8 PK	74.0	-29.2	2.02 V	287	34.7	10.1
4	7320.00	32.1 AV	54.0	-21.9	2.02 V	287	22.0	10.1

**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.

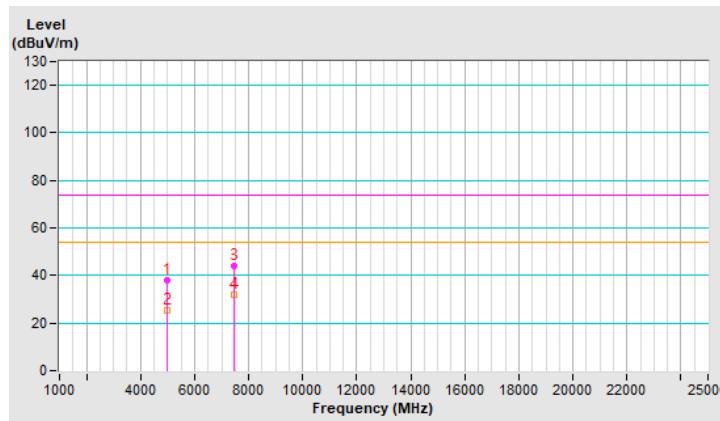


<b>RF Mode</b>	BT-LE 2M	<b>Channel</b>	CH 39 : 2480 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4960.00	38.2 PK	74.0	-35.8	1.88 H	209	34.4	3.8
2	4960.00	25.3 AV	54.0	-28.7	1.88 H	209	21.5	3.8
3	7440.00	44.2 PK	74.0	-29.8	1.56 H	125	33.9	10.3
4	7440.00	31.9 AV	54.0	-22.1	1.56 H	125	21.6	10.3

**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.

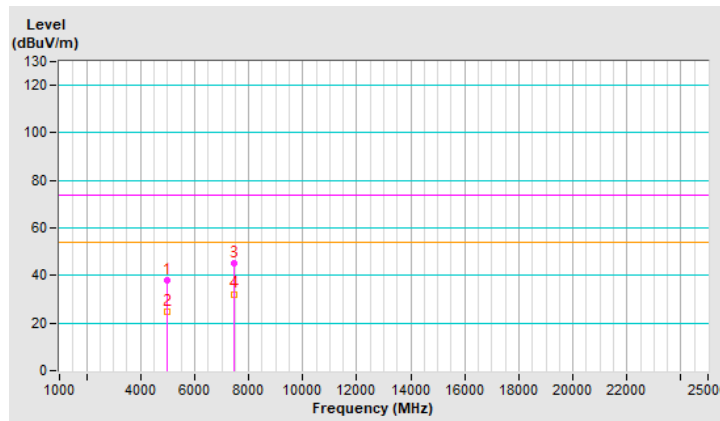


<b>RF Mode</b>	BT-LE 2M	<b>Channel</b>	CH 39 : 2480 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 5.1 kHz
<b>Input Power (System)</b>	120Vac, 60Hz	<b>Environmental Conditions</b>	25°C, 68% RH
<b>Tested By</b>	Tom Yang		

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	4960.00	38.0 PK	74.0	-36.0	1.47 V	62	34.2	3.8
2	4960.00	25.0 AV	54.0	-29.0	1.47 V	62	21.2	3.8
3	7440.00	45.0 PK	74.0	-29.0	1.98 V	273	34.7	10.3
4	7440.00	32.2 AV	54.0	-21.8	1.98 V	273	21.9	10.3

**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.



## 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.

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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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