

## Partial FCC Test Report

### (Spot Check)

**Report No.:** RFBGTL-WTW-P22070227-1

**FCC ID:** APYHRO00316

**Received Date:** Feb. 19, 2022

**Test Date:** Jul. 26 ~ Aug. 03, 2022

**Issued Date:** Aug. 25, 2022

**Applicant:** SHARP Corporation Mobile Communication BU

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**Manufacturer:** Sharp Corporation

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**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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33383, TAIWAN

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

Issue No.	Description	Date Issued
RFBGTL-WTW-P22070227-1	Original Release	Aug. 25, 2022



## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -28.46dB at 3.13400MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -5.9dB at 2390.00MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to Note
15.247(a)(2)	6dB bandwidth	N/A	Refer to Note
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to Note
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

### Note:

1. This report is a partial report, only spot check test items such as Radiated Emissions and Conducted Power test chosen the worst channel of original report was were performed for this report. Refer to original report for the other test data.
2. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
3. 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	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~ 1000MHz	2.92 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	Smart Phone
Brand	SHARP
Sample Status	Engineering Sample
Power Supply Rating	5.0Vdc (from adapter) 3.87Vdc (Battery)
Modulation Type	GFSK
Transfer Rate	Up to 2Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	40
Channel Spacing	2MHz
Output Power	BT LE 1M: 4.977mW BT LE 2M: 5.224mW
Antenna Type	PIFA antenna with 0 dBi gain
Antenna Connector	I-PEX
Accessory Device	Refer to Note
Cable Supplied	Refer to Note

Note:

- This report is a supplementary report to the original BV CPS report no.: RFBGTL-WTW-P22020475-3. Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Radiated emission and output power verification worst test refer to original report.
- There are differences between FCC ID: APYHRO00314 & FCC ID: APYHRO00316:

FCC ID	APYHRO00314	APYHRO00316
FM Radio	Supports	Doesn't support

- The EUT contains following support units.

Product	Brand	Model	Description
Adapter (Support unit)	Salom	XN-2QC25	Input: 100-240Vac, 50/60Hz, 0.2A Output: 5.0Vdc, 800mA
Battery	-	-	3.87Vdc, Rated 4870mAh (18.9Wh), Typ. 5000mAh (19.4Wh)
Headset (Support unit)	Ambibio	AB-HI02JS	-
USB cable (Support unit)	Luxshare-ICT	L6KU2007-CS-H	0.95m shielded cable without core

- Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
- 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 Description of Test Modes

40 channels are provided to this EUT:

Channel	Freq. (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

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	P	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement  
 RE<1G: Radiated Emission below 1GHz  
 PLC: Power Line Conducted Emission  
 P: Conducted Output Power Measurement

Note:

- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane.
- Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power channel for final testing.

#### Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
-	0 to 39	0	GFSK	1, 2

#### Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
-	0 to 39	0	GFSK	2

#### Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
-	0 to 39	0	GFSK	2

#### Conducted Output Power Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Data Rate (Mbps)
-	0 to 39	0, 19, 39	GFSK	1, 2

**Test Condition:**

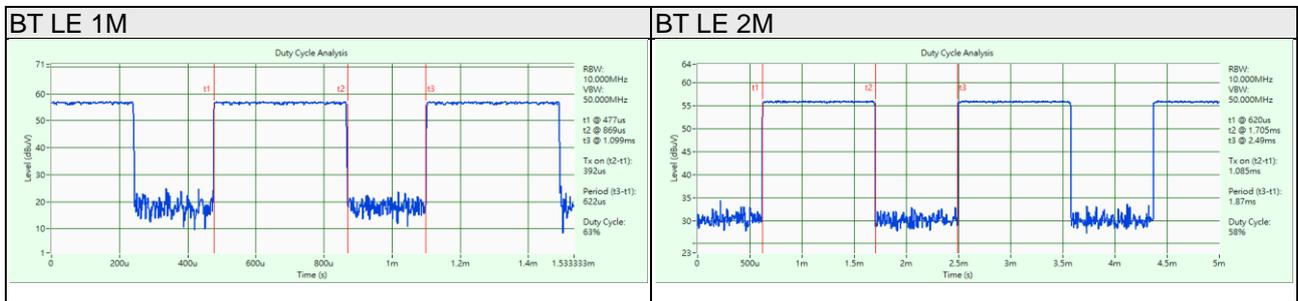
Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	16 deg. C, 64% RH	120Vac, 60Hz	Edison Lee
RE $<$ 1G	22 deg. C, 67% RH	120Vac, 60Hz	Edison Lee
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Edison Lee
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

**3.3 Duty Cycle of Test Signal**

Duty cycle of test signal is < 98%, duty factor shall be considered.

**BT LE 1M:** Duty cycle = 0.392ms/0.622ms = 0.630, Duty factor = 10 \* log(1/0.630) = 2.01

**BT LE 2M:** Duty cycle = 1.085ms/1.87ms = 0.580, Duty factor = 10 \* log(1/0.580) = 2.36



### 3.4 Description of Support Units

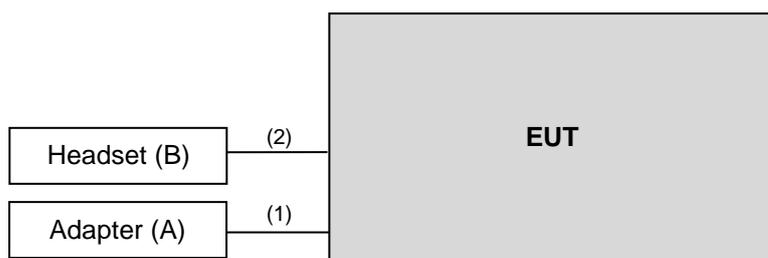
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	Salom	XN-2QC25	NA	NA	Provided by client
B	Headset	Ambibio	AB-HI02JS	NA	NA	Provided by client

Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB cable	1	0.95	Y	0	Provided by client
2	Audio cable	1	1.1	N	0	Provided by client

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and References:

**Test standard:**

**FCC Part 15, Subpart C (15.247)**

ANSI C63.10:2013

All test items have been performed and recorded as per the above standards.

**References Test Guidance:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB 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

Note:

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 1000MHz, 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 20dB under any condition of modulation.

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	ESR3	102579	Jul. 01, 2022	Jun. 30, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110462	Dec. 21, 2021	Dec. 20, 2022
BILOG Antenna SCHWARZBECK	VULB9168	995	Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-404	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2021	Sep. 15, 2022
Preamplifier EMCI	EMC330N	980783	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980810	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980787	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM- (9000+2000+1000)	201230+ 201242+ 210101	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM- NM- (9000+300+500)	201252+ 201250+ 201245	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM- (5000+3000+2000)	201261+201258+ 201249	Jan. 17, 2022	Jan. 16, 2023
Software BV CPS	ADT_Radiated_V7. 6.15.9.5	NA	NA	NA
Turn Table Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208675	NA	NA
Antenna Tower KaiTuo	NA	NA	NA	NA
Antenna Tower Controller KaiTuo	KT-2000	NA	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190 004/MY55190007/MY55 210005	Jul. 13, 2022	Jul. 12, 2023

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in WM Chamber 7.

#### 4.1.3 Test Procedures

##### For Radiated emission below 30MHz

- a. 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.
- 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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.
- f. The test-receiver system was set to peak and average detect 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:

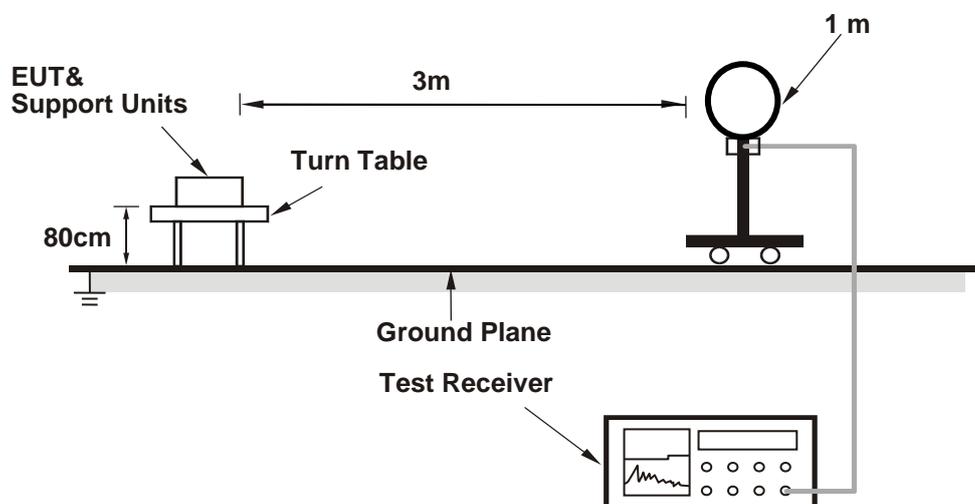
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. 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. (BT LE 1M: RBW = 1MHz, VBW = 3kHz; BT LE 2M: RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

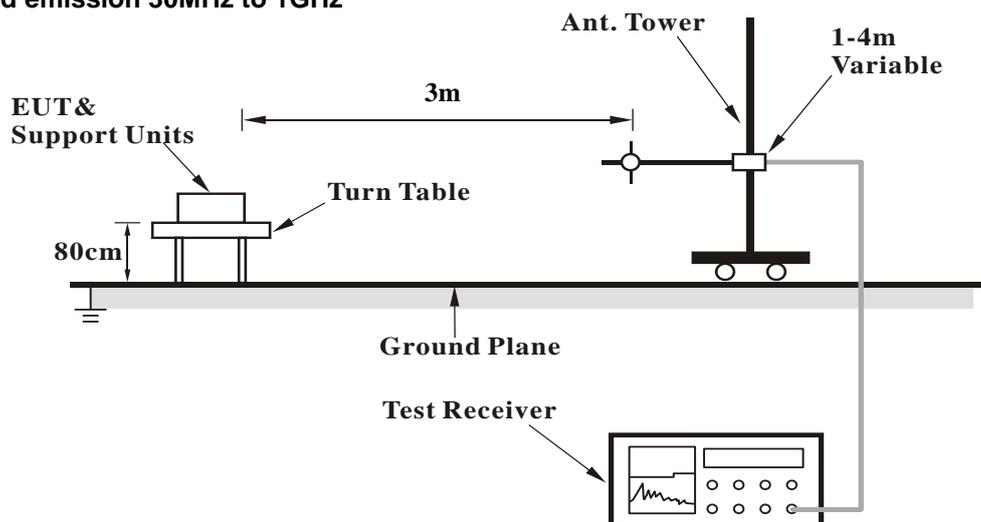
No deviation.

#### 4.1.5 Test Setup

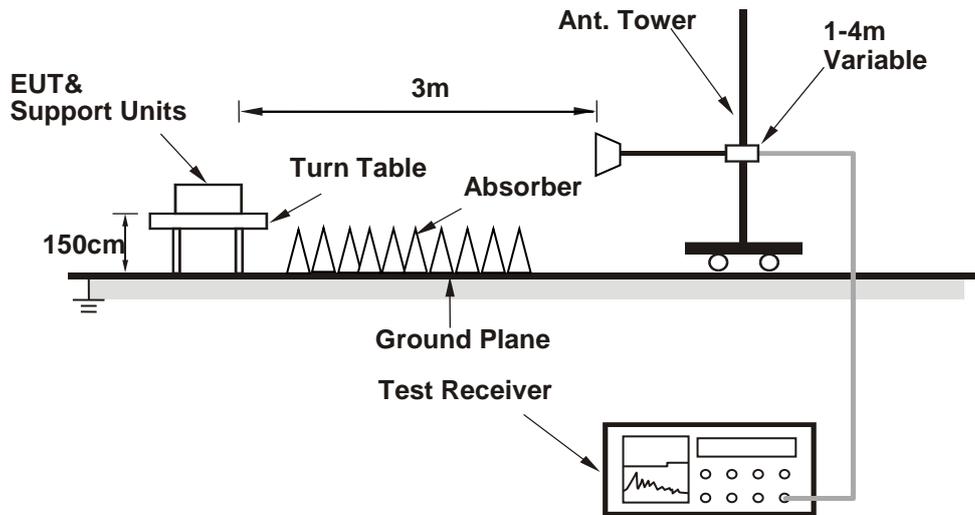
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



**For Radiated emission above 1GHz**



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

**4.1.6 EUT Operating Conditions**

- a. Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

Above 1 GHz Data:

<b>RF Mode</b>	TX BT-LE 1M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

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	56.6 PK	74.0	-17.4	1.55 H	106	24.7	31.9
2	2390.00	47.3 AV	54.0	-6.7	1.55 H	106	15.4	31.9
3	*2402.00	96.2 PK			1.55 H	106	64.2	32.0
4	*2402.00	95.1 AV			1.55 H	106	63.1	32.0
5	4804.00	47.7 PK	74.0	-26.3	1.99 H	212	45.6	2.1
6	4804.00	37.6 AV	54.0	-16.4	1.99 H	212	35.5	2.1
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	58.3 PK	74.0	-15.7	2.59 V	53	26.4	31.9
2	2390.00	47.9 AV	54.0	-6.1	2.59 V	53	16.0	31.9
3	*2402.00	98.2 PK			2.59 V	53	66.2	32.0
4	*2402.00	97.1 AV			2.59 V	53	65.1	32.0
5	4804.00	48.4 PK	74.0	-25.6	1.50 V	237	46.3	2.1
6	4804.00	38.5 AV	54.0	-15.5	1.50 V	237	36.4	2.1

**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.
5. " \* ": Fundamental frequency.

<b>RF Mode</b>	TX BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	Peak (PK) Average (AV)

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	57.4 PK	74.0	-16.6	1.50 H	105	25.5	31.9
2	2390.00	47.3 AV	54.0	-6.7	1.50 H	105	15.4	31.9
3	*2402.00	96.7 PK			1.50 H	105	64.7	32.0
4	*2402.00	94.7 AV			1.50 H	105	62.7	32.0
5	4804.00	46.5 PK	74.0	-27.5	1.92 H	233	44.4	2.1
6	4804.00	36.3 AV	54.0	-17.7	1.92 H	233	34.2	2.1

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	58.7 PK	74.0	-15.3	2.51 V	49	26.8	31.9
2	<b>2390.00</b>	<b>48.1 AV</b>	<b>54.0</b>	<b>-5.9</b>	<b>2.51 V</b>	<b>49</b>	<b>16.2</b>	<b>31.9</b>
3	*2402.00	99.2 PK			2.51 V	49	67.2	32.0
4	*2402.00	97.1 AV			2.51 V	49	65.1	32.0
5	4804.00	46.0 PK	74.0	-28.0	1.51 V	223	43.9	2.1
6	4804.00	36.6 AV	54.0	-17.4	1.51 V	223	34.5	2.1

**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.
5. " \* " : Fundamental frequency.

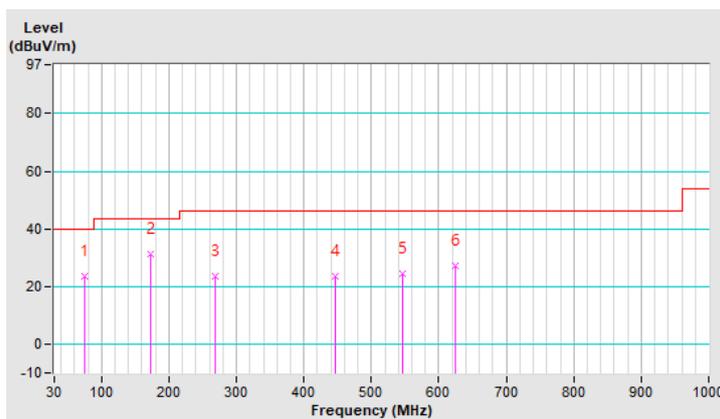
Below 1GHz worst-case data:

<b>RF Mode</b>	TX BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	9kHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

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	74.62	23.44 QP	40.00	-16.56	1.50 H	189	40.22	-16.78
2	173.56	31.46 QP	43.50	-12.04	1.00 H	98	45.50	-14.04
3	268.62	23.56 QP	46.00	-22.44	1.00 H	128	37.52	-13.96
4	447.10	23.51 QP	46.00	-22.49	1.50 H	249	32.57	-9.06
5	546.04	24.30 QP	46.00	-21.70	1.00 H	135	31.64	-7.34
6	623.64	27.14 QP	46.00	-18.86	4.00 H	337	32.62	-5.48

**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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

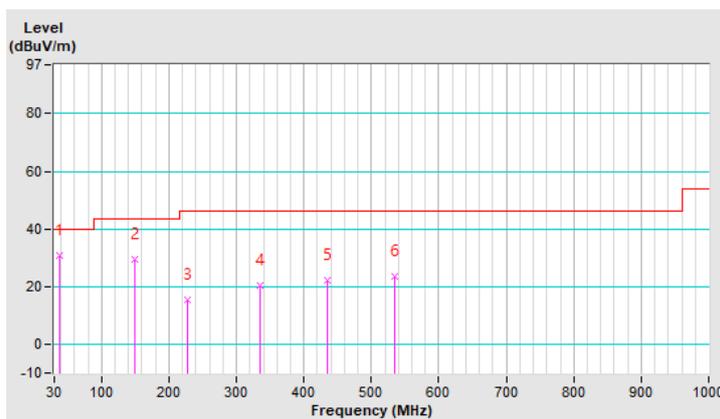


<b>RF Mode</b>	TX BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	9kHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

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	37.76	30.95 QP	40.00	-9.05	2.00 V	2	44.80	-13.85
2	148.34	29.26 QP	43.50	-14.24	1.00 V	195	42.52	-13.26
3	226.91	15.48 QP	46.00	-30.52	2.00 V	14	31.97	-16.49
4	334.58	20.38 QP	46.00	-25.62	1.00 V	14	32.28	-11.90
5	434.49	22.27 QP	46.00	-23.73	1.50 V	111	31.66	-9.39
6	534.40	23.45 QP	46.00	-22.55	1.00 V	104	31.01	-7.56

**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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

- Note: 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 0.50MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Mar. 14, 2022	Mar. 13, 2023
V-LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).  
 3. The VCCI Site Registration No. is C-12040.  
 4. Tested date: 2022/7/29

#### 4.2.3 Test Procedures

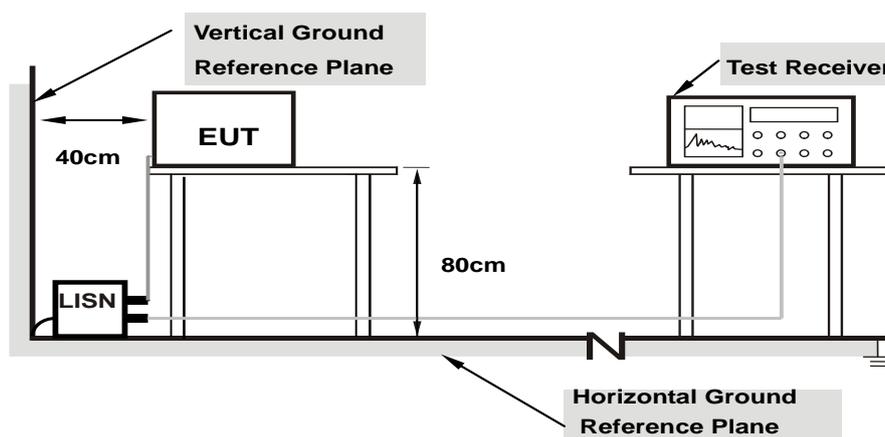
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 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).

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

#### 4.2.7 Test Results

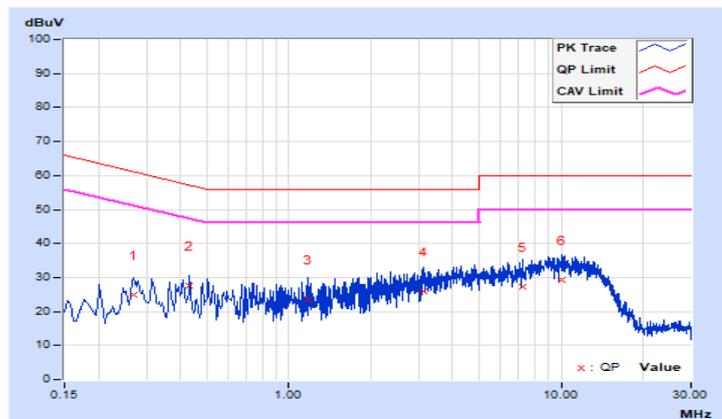
##### BT LE 2M

<b>RF Mode</b>	TX BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.26992	9.75	15.07	8.70	24.82	18.45	61.12	51.12	-36.30	-32.67
2	0.43000	9.80	17.81	8.87	27.61	18.67	57.25	47.25	-29.64	-28.58
3	1.18200	9.85	13.81	5.35	23.66	15.20	56.00	46.00	-32.34	-30.80
<b>4</b>	<b>3.13400</b>	<b>9.93</b>	<b>15.83</b>	<b>7.61</b>	<b>25.76</b>	<b>17.54</b>	<b>56.00</b>	<b>46.00</b>	<b>-30.24</b>	<b>-28.46</b>
5	7.25400	10.01	17.23	8.32	27.24	18.33	60.00	50.00	-32.76	-31.67
6	10.08200	10.06	19.29	9.16	29.35	19.22	60.00	50.00	-30.65	-30.78

#### 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

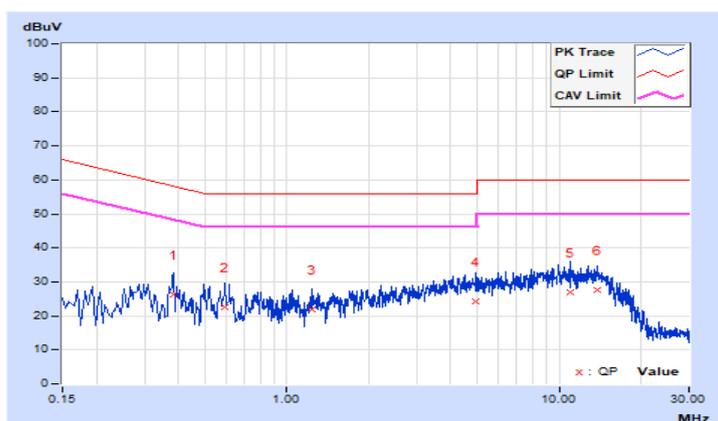


<b>RF Mode</b>	TX BT-LE 2M	<b>Channel</b>	CH 0 : 2402 MHz
<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.38200	9.80	16.37	5.88	26.17	15.68	58.24	48.24	-32.07	-32.56
2	0.59339	9.83	12.64	4.61	22.47	14.44	56.00	46.00	-33.53	-31.56
3	1.23800	9.87	11.87	3.84	21.74	13.71	56.00	46.00	-34.26	-32.29
4	4.93400	9.98	14.43	6.03	24.41	16.01	56.00	46.00	-31.59	-29.99
5	10.92600	10.07	16.97	7.60	27.04	17.67	60.00	50.00	-32.96	-32.33
6	13.88600	10.12	17.48	7.11	27.60	17.23	60.00	50.00	-32.40	-32.77

**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



### 4.3 Conducted Output Power Measurement

#### 4.3.1 Limits of Conducted Output Power Measurement

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

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedures

For 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.

For 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.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

Same as item 4.3.6.

#### 4.3.7 Test Results

##### BT LE 1M

###### Peak Power

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	<b>4.977</b>	<b>6.97</b>	30.00	Pass
19	2440	4.227	6.26	30.00	Pass
39	2480	3.999	6.02	30.00	Pass

###### Average Power

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	4.808	6.82
19	2440	3.99	6.01
39	2480	3.855	5.86

##### BT LE 2M

###### Peak Power

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	<b>5.224</b>	<b>7.18</b>	30.00	Pass
19	2440	4.325	6.36	30.00	Pass
39	2480	4.188	6.22	30.00	Pass

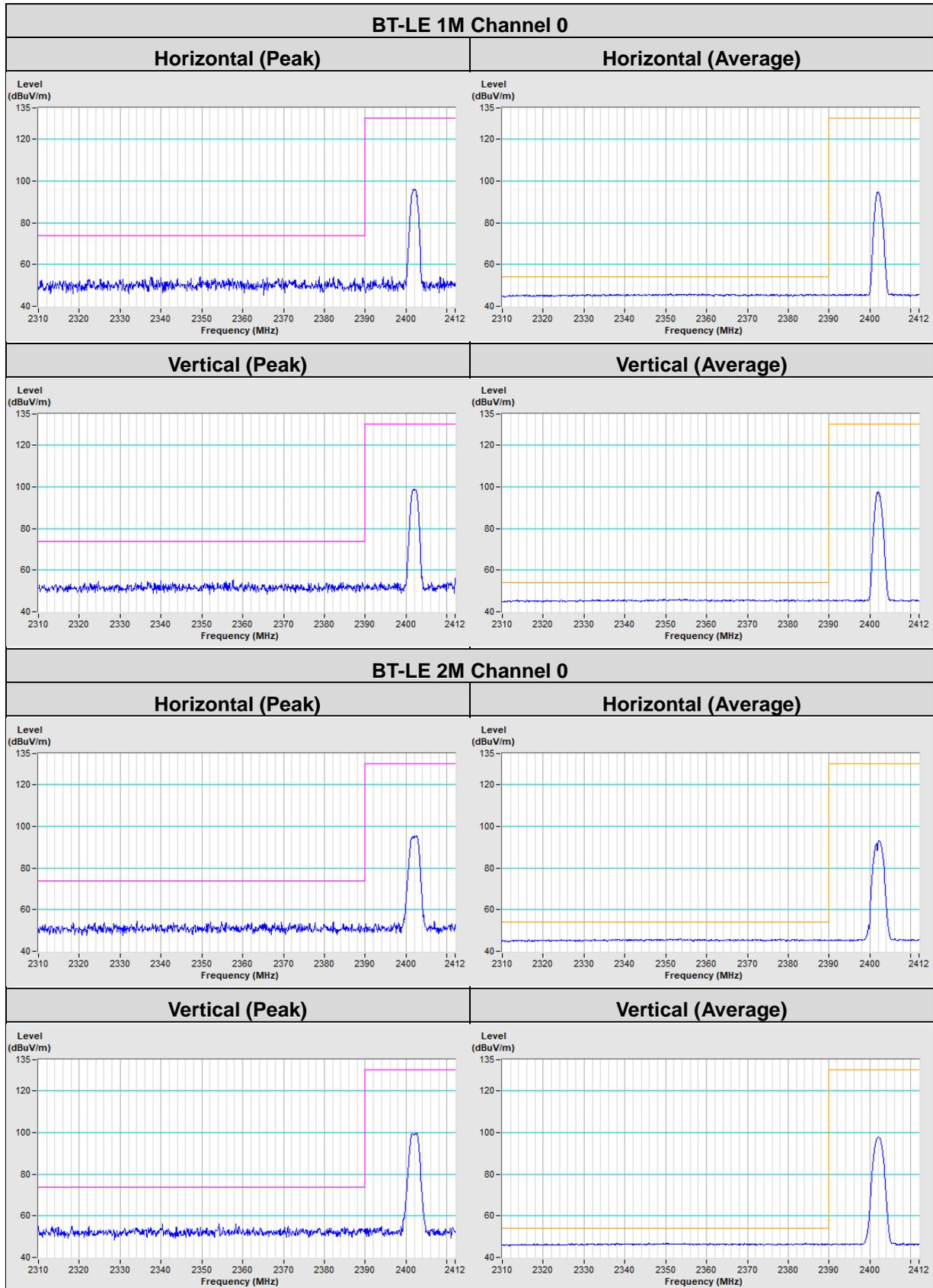
###### Average Power

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	4.742	6.76
19	2440	3.99	6.01
39	2480	3.864	5.87

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Annex A- Band Edge Measurement



## Appendix – 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 and approved 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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