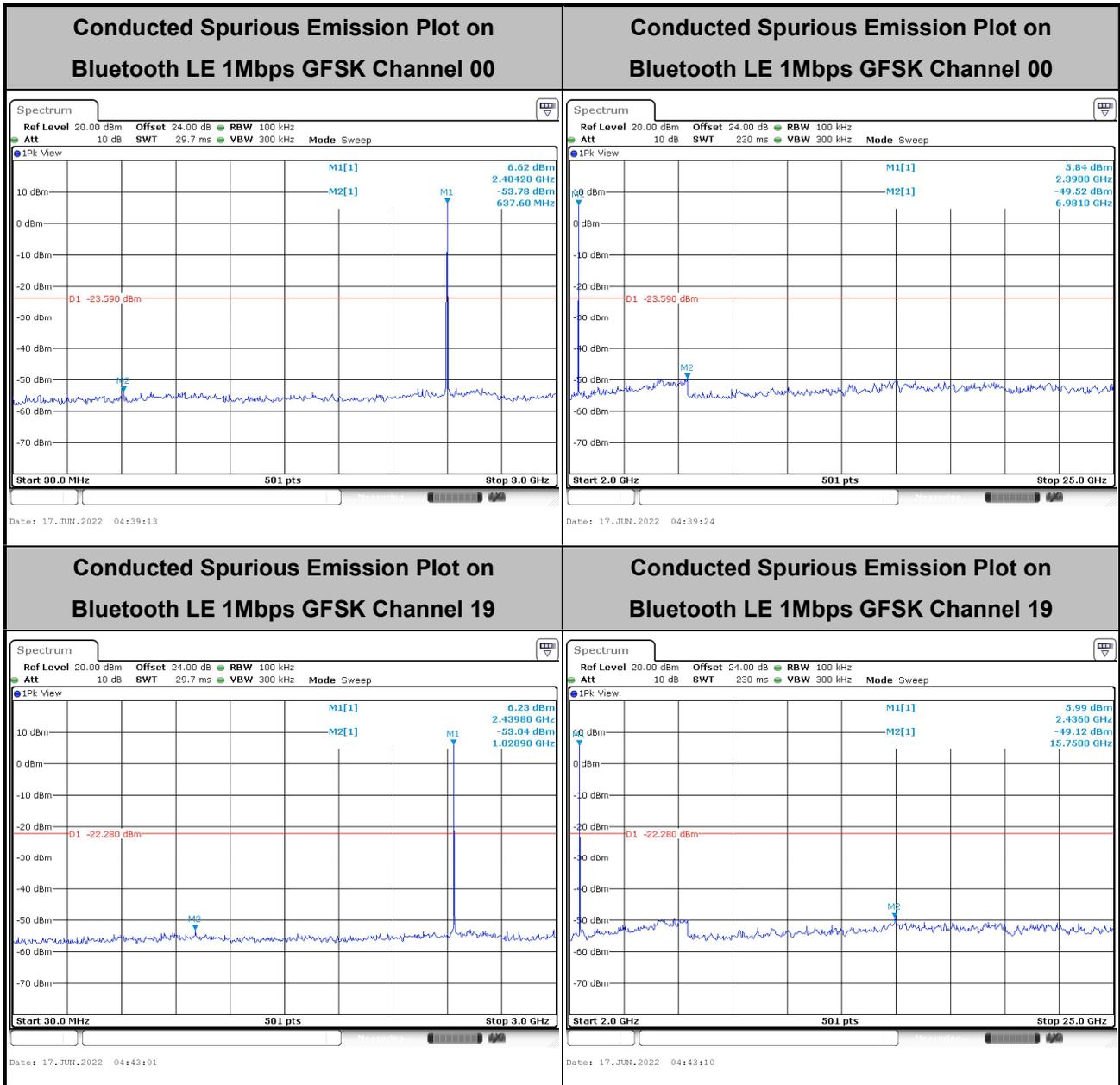
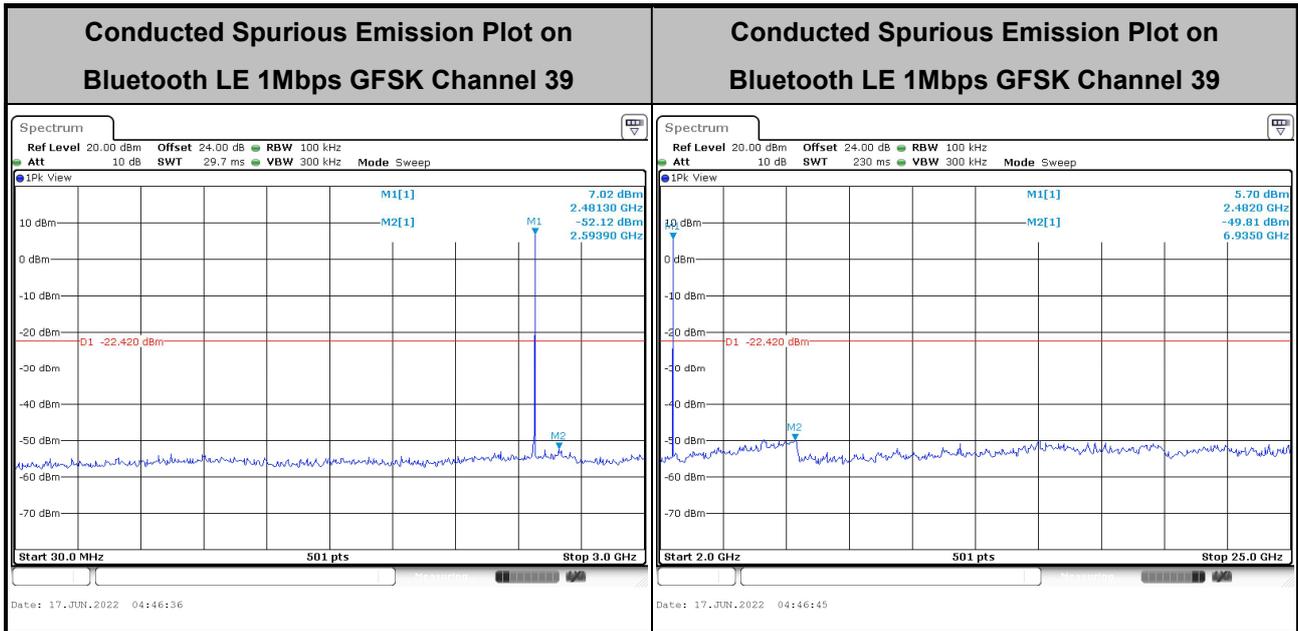




### 3.4.6 Test Result of Conducted Spurious Emission Plots

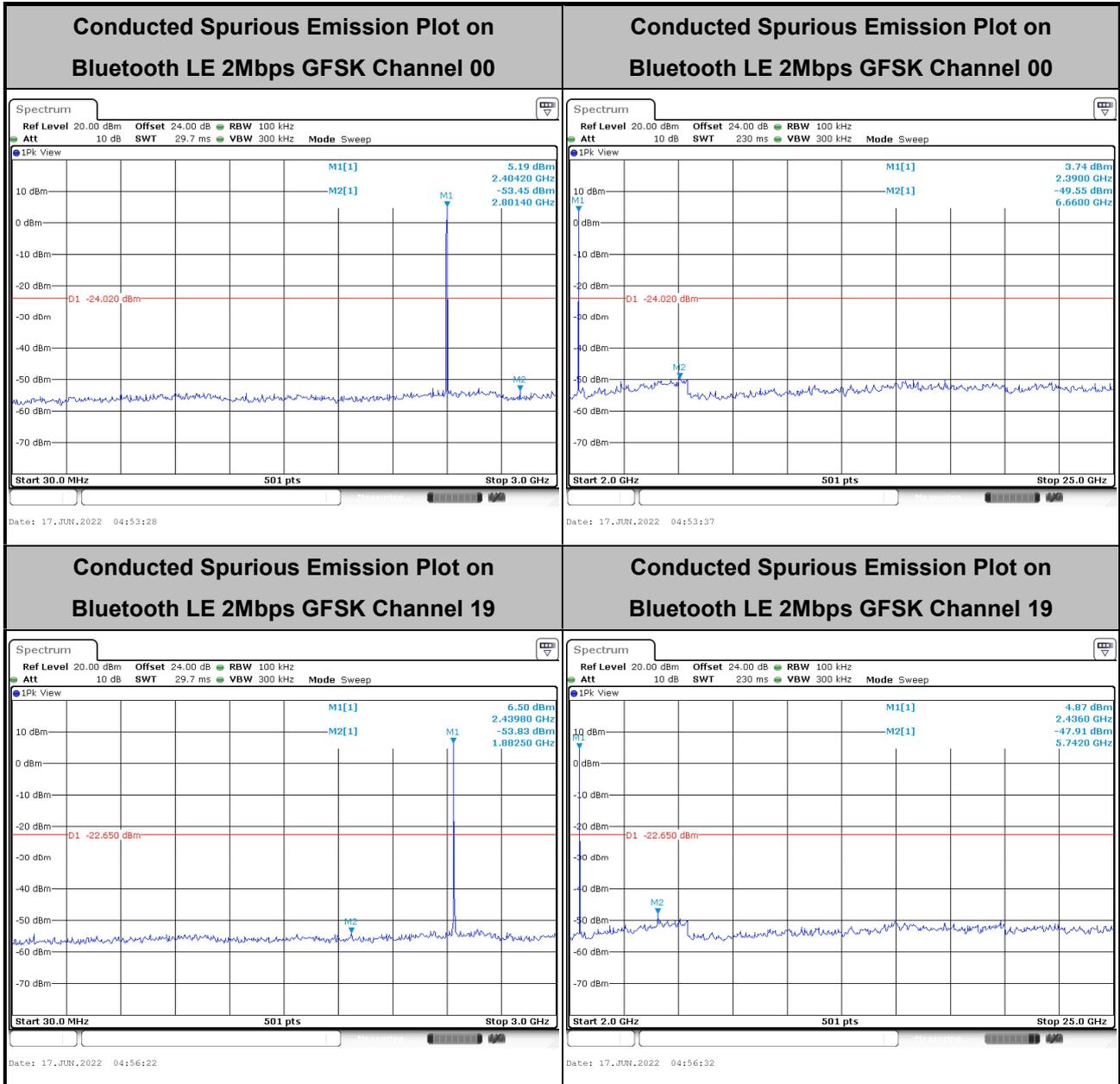
<1Mbps>

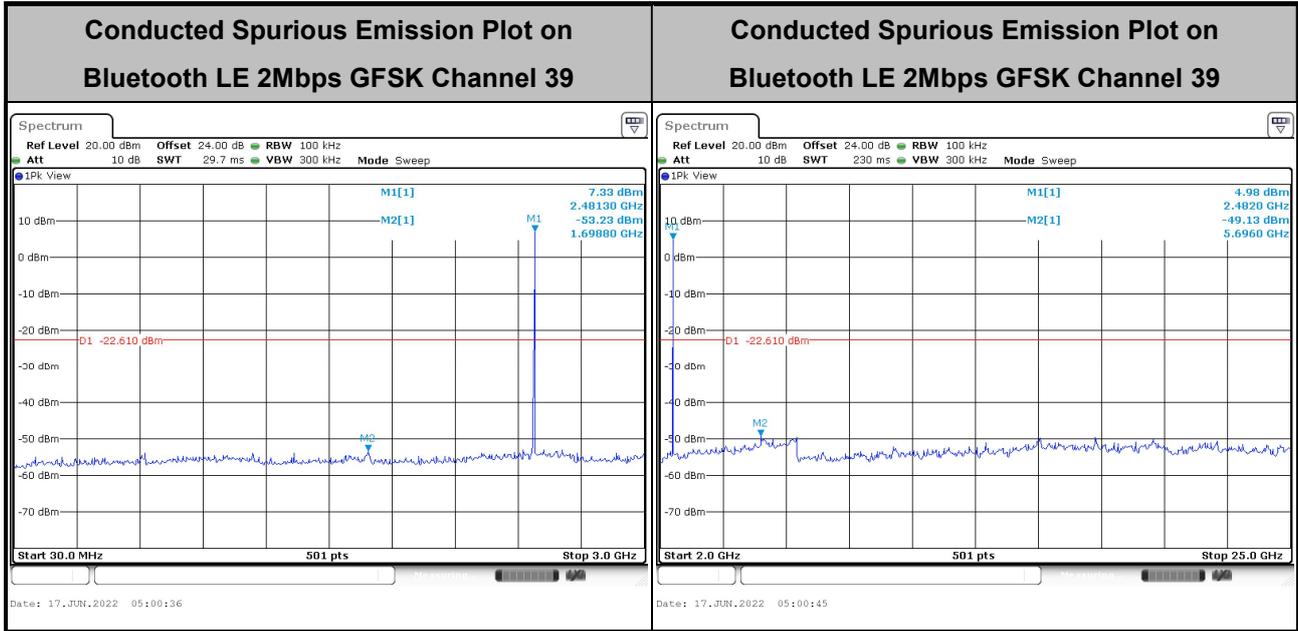






<2Mbps>







### 3.5 Radiated Band Edges and Spurious Emission Measurement

#### 3.5.1 Limit of Radiated Band Edges and Spurious Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device is measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (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

#### 3.5.2 Measuring Instruments

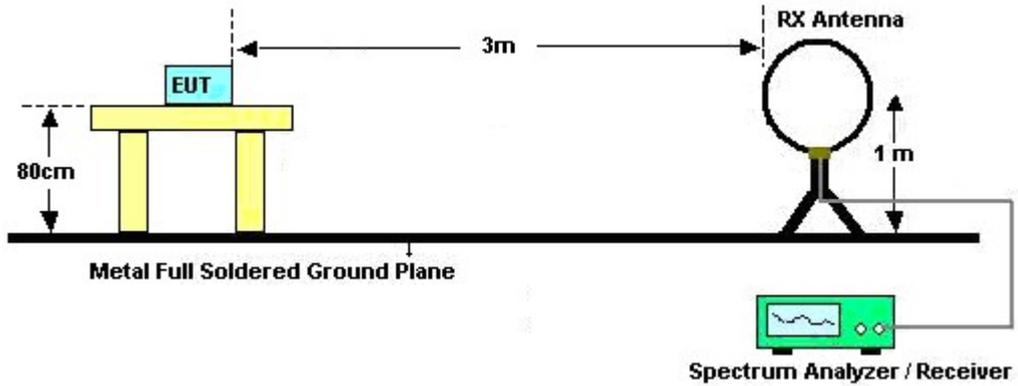
Please refer to the measuring equipment list in this test report.

**3.5.3 Test Procedures**

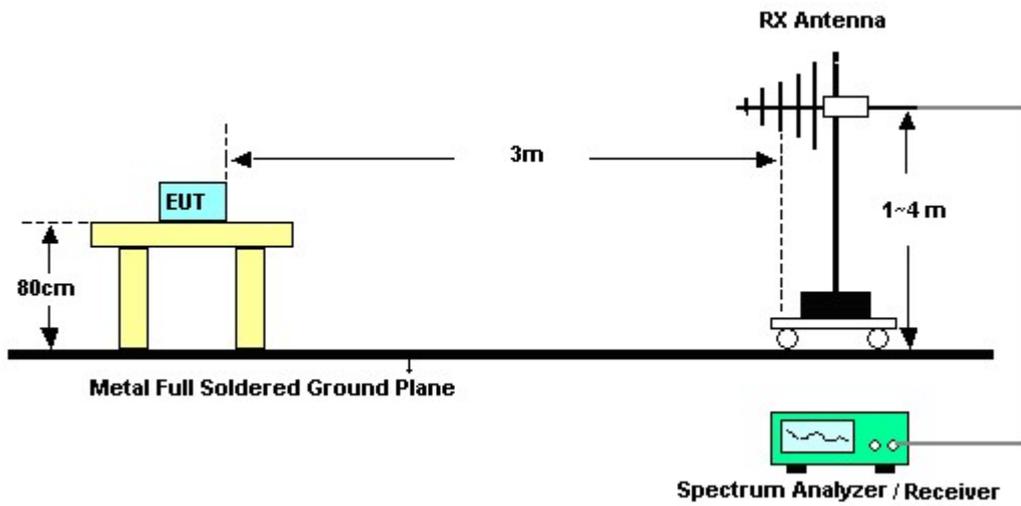
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
4. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.
7. Radiated testing above 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading for scanning all frequencies. When there is no suspected emission found and the harmonic emission level is with at least 6 dB margin against average limit line, the position is marked as “-“.
8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW = 100 kHz for  $f < 1$  GHz; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW = 3 MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW  $\geq 1/T$ , when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

### 3.5.4 Test Setup

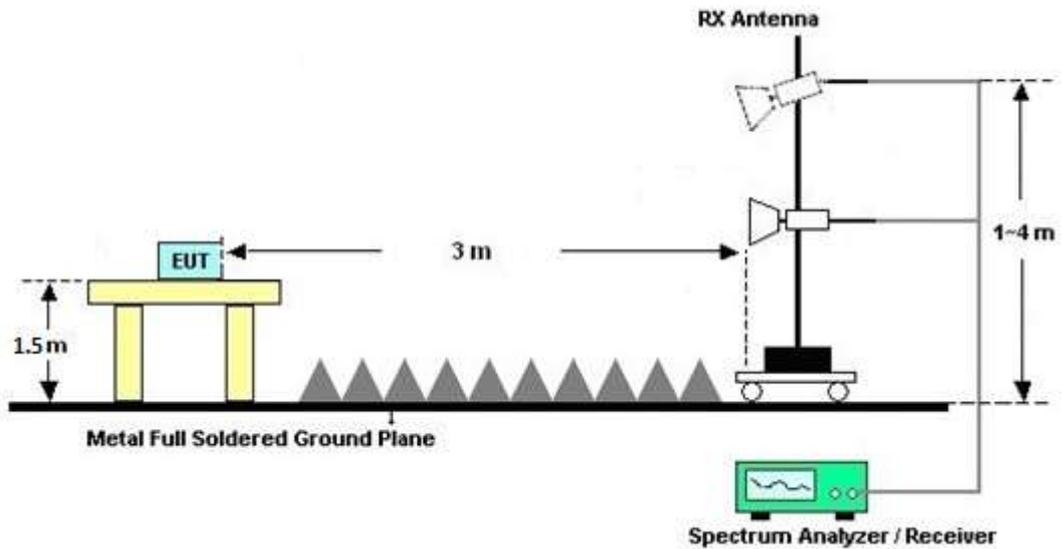
For radiated test below 30MHz



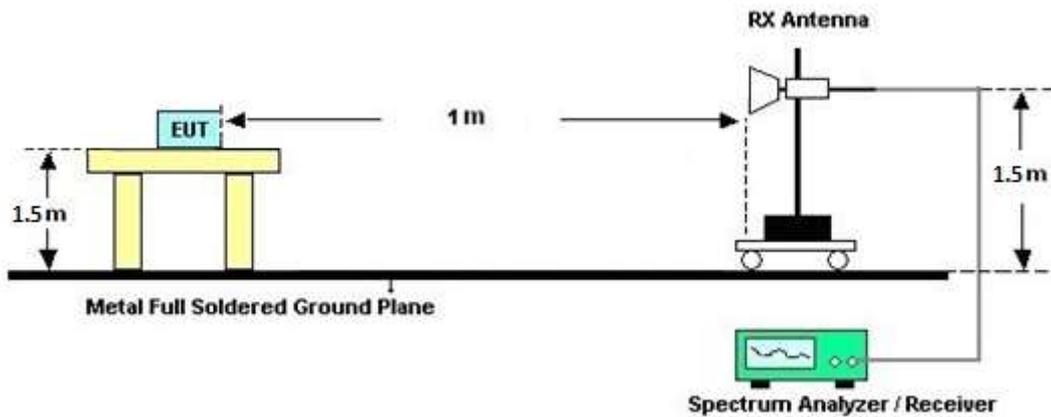
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



### 3.5.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which starts from 9 kHz to 30 MHz, is pre-scanned and the result which is 20 dB lower than the limit line is not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result comes out very similar.

### 3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

### 3.5.7 Duty Cycle

Please refer to Appendix E.

### 3.5.8 Test Result of Radiated Spurious Emission (30 MHz ~ 10th Harmonic)

Please refer to Appendix C and D.



### 3.6 AC Conducted Emission Measurement

#### 3.6.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency.

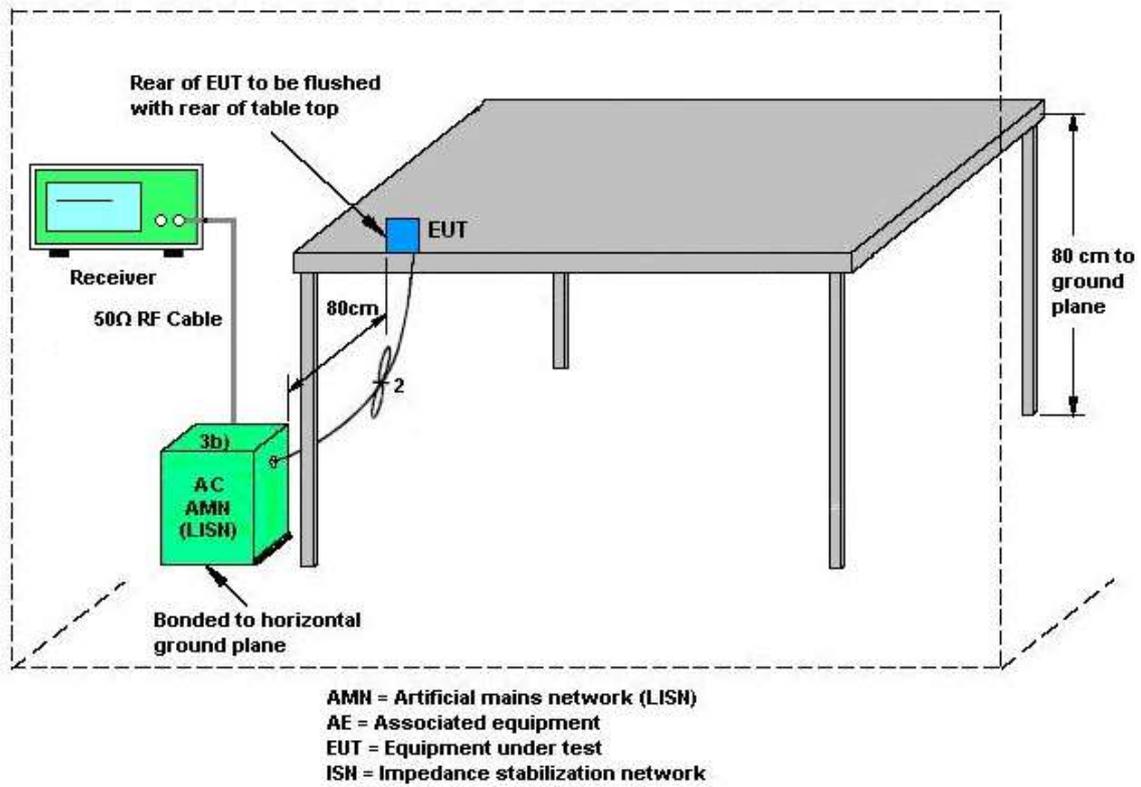
#### 3.6.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

#### 3.6.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

### 3.6.4 Test Setup



### 3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



## **3.7 Antenna Requirements**

### **3.7.1 Standard Applicable**

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

### **3.7.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.7.3 Antenna Gain**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Jun. 03, 2022~ Jun. 17, 2022	Nov. 15, 2022	Conducted (TH05-HY)
USB Power Sensor	DARE	RPR3006W	16I00054SNO 12 (NO:113)	10MHz~6GHz	Dec. 16, 2021	Jun. 03, 2022~ Jun. 17, 2022	Dec. 15, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Aug. 30, 2021	Jun. 03, 2022~ Jun. 17, 2022	Aug. 29, 2022	Conducted (TH05-HY)
Switch Control Mainframe	E-IUSTRUMENT	ETF-1405-0	EC1900067 (BOX7)	N/A	Aug. 12, 2021	Jun. 03, 2022~ Jun. 17, 2022	Aug. 11, 2022	Conducted (TH05-HY)
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Jun. 02, 2022	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 02, 2022	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 29, 2021	Jun. 02, 2022	Oct. 28, 2022	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 16, 2022	Jun. 02, 2022	Mar. 15, 2023	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 16, 2022	Jun. 02, 2022	Feb. 15, 2023	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Oct. 21, 2021	Jun. 02, 2022	Oct. 20, 2022	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI7	100724	9kHz~7GHz	Feb. 24, 2022	Jun. 02, 2022	Feb. 23, 2023	Conduction (CO07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Sep. 09, 2021	Jun. 09, 2022~ Jun. 18, 2022	Sep. 08, 2022	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-0 6	41912 & 05	30MHz~1GHz	Feb. 06, 2022	Jun. 09, 2022~ Jun. 18, 2022	Feb. 05, 2023	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 27, 2021	Jun. 09, 2022~ Jun. 18, 2022	Dec. 26, 2022	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02038	1GHz~18GHz	Aug. 04, 2021	Jun. 09, 2022~ Jun. 18, 2022	Aug. 03, 2022	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Nov. 30, 2021	Jun. 09, 2022~ Jun. 18, 2022	Nov. 29, 2022	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-303	171000180005 5006	1GHz~18GHz	May 05, 2022	Jun. 09, 2022~ Jun. 18, 2022	May 04, 2023	Radiation (03CH15-HY)
Preamplifier	EM Electronics	EM01G18G	060803	1GHz-18GHz	Dec. 16, 2021	Jun. 09, 2022~ Jun. 18, 2022	Dec. 15, 2022	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060801	18-40GHz	Jun. 22, 2021	Jun. 09, 2022~ Jun. 18, 2022	Jun. 21, 2022	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY54130085	20MHz~8.4GHz	Oct. 21, 2021	Jun. 09, 2022~ Jun. 18, 2022	Oct. 20, 2022	Radiation (03CH15-HY)
Spectrum Analyzer	Keysight	N9010A	MY54200485	10Hz~44GHz	Mar. 07, 2022	Jun. 09, 2022~ Jun. 18, 2022	Mar. 06, 2023	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jun. 09, 2022~ Jun. 18, 2022	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jun. 09, 2022~ Jun. 18, 2022	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Jun. 09, 2022~ Jun. 18, 2022	N/A	Radiation (03CH15-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
RF Cable	HUBER + SUHNER	SUCOFLEX 104, 102E	MY36980/4, MY9838/4PE, 508405/2E	30MHz~18G	Nov. 15, 2021	Jun .09, 2022~ Jun. 18, 2022	Nov. 14, 2022	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	804011/2,804 012/2	30MHz-40GHz	Jan. 04, 2022	Jun .09, 2022~ Jun. 18, 2022	Jan. 03, 2023	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 10, 2022	Jun .09, 2022~ Jun. 18, 2022	Mar. 09, 2023	Radiation (03CH15-HY)
Filter	Wainwright	WLJ4-1000-153 0-6000-40ST	SN4	1.53GHz Low Pass Filter	Jul. 02, 2021	Jun .09, 2022~ Jun. 18, 2022	Jul. 01, 2022	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60 ST	SN4	3GHz High Pass Filter	Sep. 15, 2021	Jun .09, 2022~ Jun. 18, 2022	Sep. 14, 2022	Radiation (03CH15-HY)



## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.3 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.8 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.3 dB
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### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.6 dB
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**Appendix A. Test Result of Conducted Test Items**

Test Engineer:	Hank Hsu	Temperature:	21~25	°C
Test Date:	2022/6/3~2022/6/17	Relative Humidity:	51~54	%

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.055	0.722	0.50	Pass
BLE	1Mbps	1	19	2440	1.047	0.720	0.50	Pass
BLE	1Mbps	1	39	2480	1.043	0.718	0.50	Pass

**TEST RESULTS DATA**  
**Average Power Table**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	6.90	30.00	-1.27	5.63	36.00	Pass
BLE	1Mbps	1	19	2440	8.60	30.00	-1.27	7.33	36.00	Pass
BLE	1Mbps	1	39	2480	8.20	30.00	-1.27	6.93	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	6.41	-8.00	-1.27	8.00	Pass
BLE	1Mbps	1	19	2440	7.72	-6.60	-1.27	8.00	Pass
BLE	1Mbps	1	39	2480	7.58	-6.69	-1.27	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

**TEST RESULTS DATA**  
**6dB and 99% Occupied Bandwidth**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	2.098	1.259	0.50	Pass
BLE	2Mbps	1	19	2440	2.082	1.251	0.50	Pass
BLE	2Mbps	1	39	2480	2.070	1.255	0.50	Pass

**TEST RESULTS DATA**  
**Average Power Table**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	6.90	30.00	-1.27	5.63	36.00	Pass
BLE	2Mbps	1	19	2440	8.60	30.00	-1.27	7.33	36.00	Pass
BLE	2Mbps	1	39	2480	8.20	30.00	-1.27	6.93	36.00	Pass

**TEST RESULTS DATA**  
**Peak Power Density**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	5.98	-10.25	-1.27	8.00	Pass
BLE	2Mbps	1	19	2440	7.35	-8.81	-1.27	8.00	Pass
BLE	2Mbps	1	39	2480	7.39	-8.75	-1.27	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.



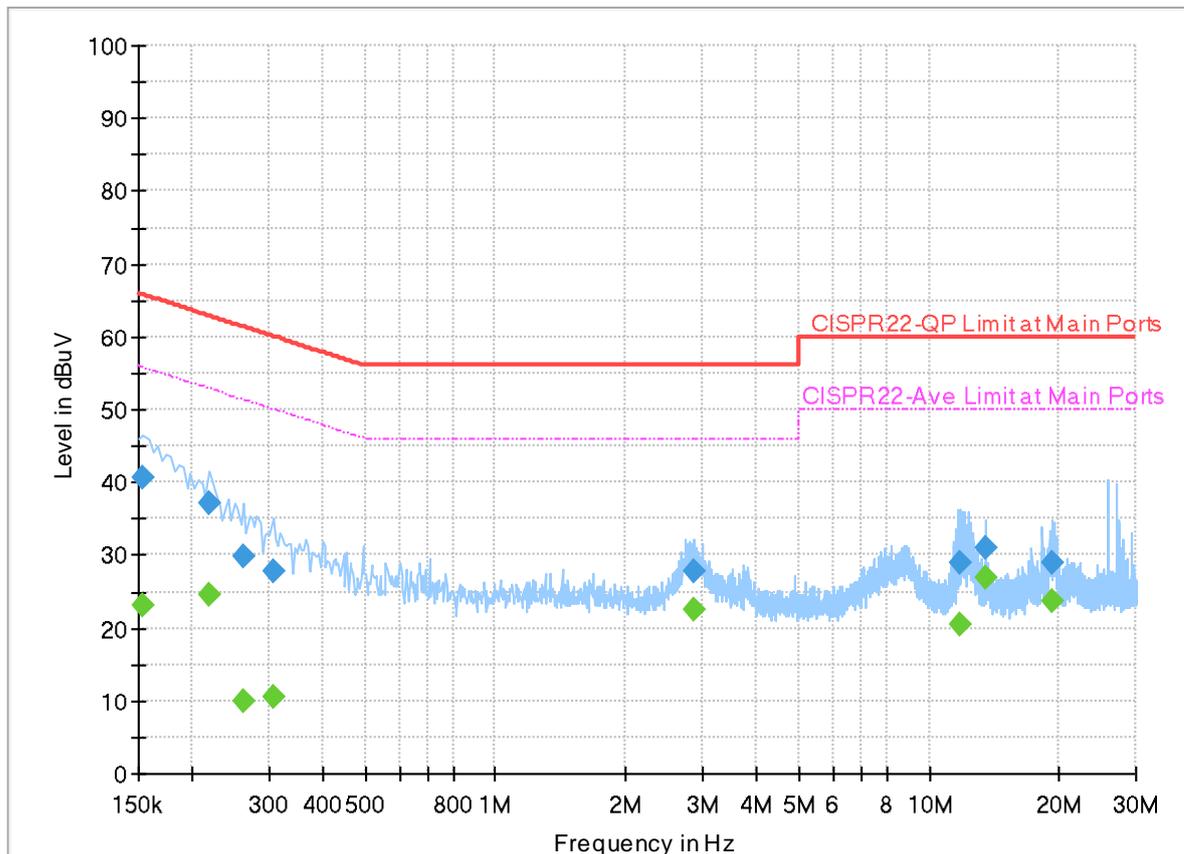
## Appendix B. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	Temperature :	21.3~25.6°C
		Relative Humidity :	48.2~57.6%

## EUT Information

Report NO : 251212  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

Full Spectrum



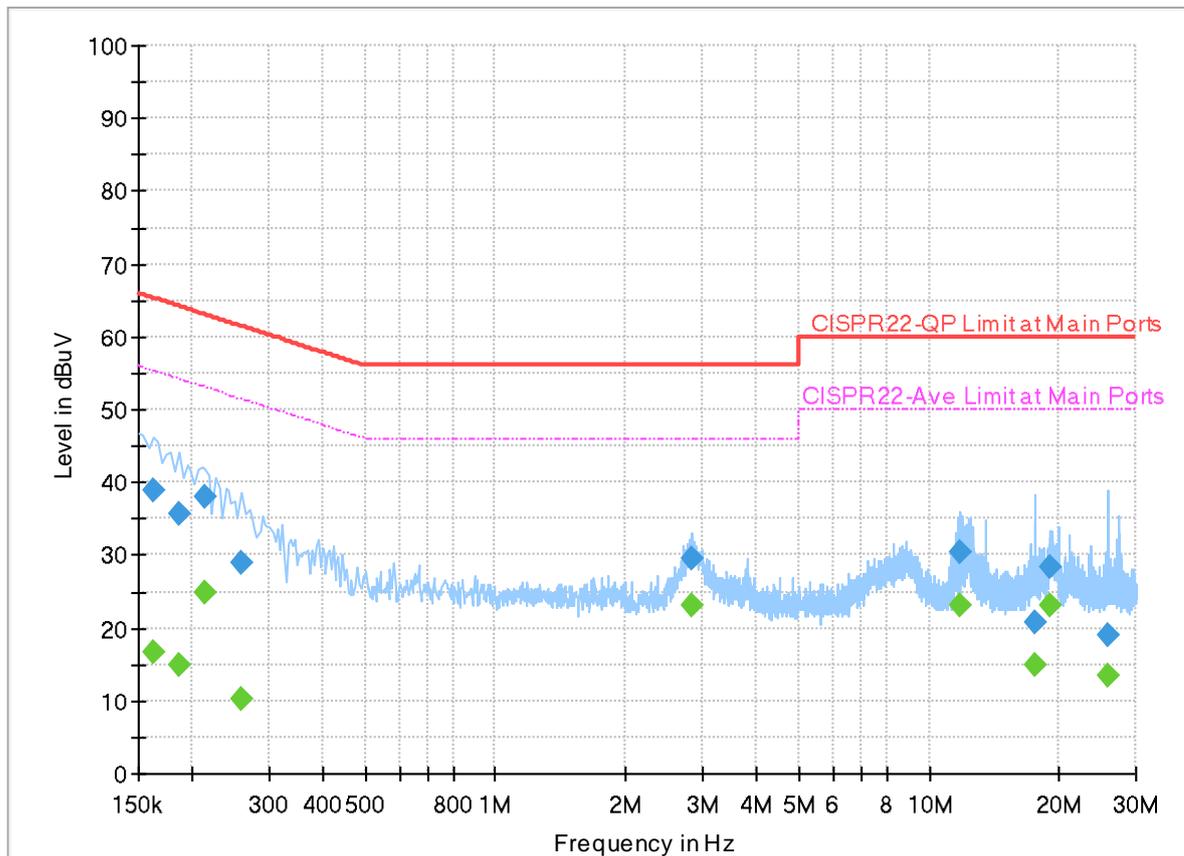
## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	23.18	55.78	32.60	L1	OFF	20.0
0.154000	40.55	---	65.78	25.23	L1	OFF	20.0
0.218000	---	24.70	52.90	28.20	L1	OFF	20.0
0.218000	37.15	---	62.90	25.75	L1	OFF	20.0
0.262000	---	9.94	51.37	41.43	L1	OFF	20.0
0.262000	29.89	---	61.37	31.48	L1	OFF	20.0
0.306000	---	10.64	50.08	39.44	L1	OFF	20.0
0.306000	27.86	---	60.08	32.22	L1	OFF	20.0
2.858000	---	22.38	46.00	23.62	L1	OFF	20.0
2.858000	27.68	---	56.00	28.32	L1	OFF	20.0
11.750000	---	20.55	50.00	29.45	L1	OFF	20.2
11.750000	29.01	---	60.00	30.99	L1	OFF	20.2
13.562000	---	26.92	50.00	23.08	L1	OFF	20.2
13.562000	31.10	---	60.00	28.90	L1	OFF	20.2
19.222000	---	23.59	50.00	26.41	L1	OFF	20.2
19.222000	29.03	---	60.00	30.97	L1	OFF	20.2

## EUT Information

Report NO : 251212  
 Test Mode : Mode 1  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.162000	---	16.65	55.36	38.71	N	OFF	20.0
0.162000	38.80	---	65.36	26.56	N	OFF	20.0
0.186000	---	15.05	54.21	39.16	N	OFF	20.0
0.186000	35.72	---	64.21	28.49	N	OFF	20.0
0.214000	---	24.83	53.05	28.22	N	OFF	20.0
0.214000	38.03	---	63.05	25.02	N	OFF	20.0
0.258000	---	10.19	51.50	41.31	N	OFF	20.0
0.258000	28.83	---	61.50	32.67	N	OFF	20.0
2.842000	---	23.14	46.00	22.86	N	OFF	20.0
2.842000	29.63	---	56.00	26.37	N	OFF	20.0
11.770000	---	23.12	50.00	26.88	N	OFF	20.2
11.770000	30.43	---	60.00	29.57	N	OFF	20.2
17.646000	---	14.82	50.00	35.18	N	OFF	20.3
17.646000	20.85	---	60.00	39.15	N	OFF	20.3
19.038000	---	22.98	50.00	27.02	N	OFF	20.3
19.038000	28.38	---	60.00	31.62	N	OFF	20.3
25.886000	---	13.44	50.00	36.56	N	OFF	20.3
25.886000	18.95	---	60.00	41.05	N	OFF	20.3



### Appendix C. Radiated Spurious Emission

Test Engineer :	Leo Lee, Bigshow Wang	Temperature :	22.1~23.1°C
		Relative Humidity :	55~60%

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 00 2402MHz		2364.6	51.24	-22.76	74	44.3	27.26	16.52	36.84	-	-	P	H	
		2387.28	40.9	-13.1	54	33.82	27.35	16.56	36.83	-	-	A	H	
	*	2402	98.6	-	-	91.45	27.4	16.58	36.83	-	-	P	H	
	*	2402	97.84	-	-	90.69	27.4	16.58	36.83	-	-	A	H	
													H	
														H
			2350.53	51.07	-22.93	74	44.22	27.2	16.5	36.85	-	-	P	V
			2383.08	40.98	-13.02	54	33.93	27.33	16.55	36.83	-	-	A	V
	*		2402	87.38	-	-	80.23	27.4	16.58	36.83	-	-	P	V
	*		2402	86.68	-	-	79.53	27.4	16.58	36.83	-	-	A	V
														V
														V



<b>BLE CH 19 2440MHz</b>		2337.2	51.41	-22.59	74	44.63	27.15	16.48	36.85	-	-	P	H
		2382.8	41	-13	54	33.95	27.33	16.55	36.83	-	-	A	H
	*	2440	102.13	-	-	94.82	27.48	16.64	36.81	-	-	P	H
	*	2440	101.44	-	-	94.13	27.48	16.64	36.81	-	-	A	H
		2498.2	51.42	-22.58	74	43.78	27.69	16.73	36.78	-	-	P	H
		2496.13	41.6	-12.4	54	33.97	27.68	16.73	36.78	-	-	A	H
		2335.28	50.83	-23.17	74	44.08	27.14	16.47	36.86	-	-	P	V
		2365.04	40.93	-13.07	54	33.99	27.26	16.52	36.84	-	-	A	V
	*	2440	97.59	-	-	90.28	27.48	16.64	36.81	-	-	P	V
	*	2440	96.94	-	-	89.63	27.48	16.64	36.81	-	-	A	V
		2499.91	51.49	-22.51	74	43.84	27.7	16.73	36.78	-	-	P	V
		2500	41.46	-12.54	54	33.81	27.7	16.73	36.78	-	-	A	V
<b>BLE CH 39 2480MHz</b>	*	2480	98.04	-	-	90.51	27.62	16.7	36.79	-	-	P	H
	*	2480	97.35	-	-	89.82	27.62	16.7	36.79	-	-	A	H
		2483.84	51.69	-22.31	74	44.13	27.64	16.71	36.79	-	-	P	H
		2490.04	41.78	-12.22	54	34.18	27.66	16.72	36.78	-	-	A	H
													H
													H
	*	2480	83.29	-	-	75.76	27.62	16.7	36.79	-	-	P	V
	*	2480	82.42	-	-	74.89	27.62	16.7	36.79	-	-	A	V
		2486.8	50.9	-23.1	74	43.33	27.65	16.71	36.79	-	-	P	V
		2484.52	41.38	-12.62	54	33.82	27.64	16.71	36.79	-	-	A	V
												V	
												V	
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz  
BLE (Harmonic @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 00 2402MHz		4804	42.01	-31.99	74	58.58	32.31	9.66	58.54	-	-	P	H	
		10635	48.21	-25.79	74	57.03	38.8	13.19	60.81	-	-	P	H	
		10635	38.24	-15.76	54	47.06	38.8	13.19	60.81	-	-	A	H	
		14499	51.36	-22.64	74	59.12	40.5	15.23	63.49	-	-	P	H	
		14499	41.37	-12.63	54	49.13	40.5	15.23	63.49	-	-	A	H	
		18000	54.74	-19.26	74	51.75	43.1	17.06	57.17	-	-	P	H	
		18000	44.72	-9.28	54	41.73	43.1	17.06	57.17	-	-	A	H	
														H
														H
														H
														H
														H
			4804	41.73	-32.27	74	58.3	32.31	9.66	58.54	-	-	P	V
			10755	48.89	-25.11	74	57.6	38.91	13.27	60.89	-	-	P	V
			10755	38.87	-15.13	54	47.58	38.91	13.27	60.89	-	-	A	V
			14490	51.28	-22.72	74	59.02	40.51	15.23	63.48	-	-	P	V
			14490	41.32	-12.68	54	49.06	40.51	15.23	63.48	-	-	A	V
			18000	54.62	-19.38	74	51.63	43.1	17.06	57.17	-	-	P	V
			18000	44.61	-9.39	54	41.62	43.1	17.06	57.17	-	-	A	V
														V
													V	
													V	
													V	
													V	



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 19 2440MHz		4880	42.39	-31.61	74	58.77	32.52	9.69	58.59	-	-	P	H	
		7320	45.8	-28.2	74	56.09	36.52	11.26	58.07	-	-	P	H	
		10755	48.38	-25.62	74	57.09	38.91	13.27	60.89	-	-	P	H	
		10755	38.35	-15.65	54	47.06	38.91	13.27	60.89	-	-	A	H	
		14499	50.5	-23.5	74	58.26	40.5	15.23	63.49	-	-	P	H	
		14499	40.5	-13.5	54	48.26	40.5	15.23	63.49	-	-	A	H	
		17940	55.31	-18.69	74	52.97	42.56	17.03	57.25	-	-	P	H	
		17940	45.3	-8.7	54	42.96	42.56	17.03	57.25	-	-	A	H	
														H
														H
														H
														H
			4880	41.88	-32.12	74	58.26	32.52	9.69	58.59	-	-	P	V
			7320	46.37	-27.63	74	56.66	36.52	11.26	58.07	-	-	P	V
			10785	48.19	-25.81	74	56.84	38.97	13.29	60.91	-	-	P	V
			10785	38.17	-15.83	54	46.82	38.97	13.29	60.91	-	-	A	V
			14499	50.56	-23.44	74	58.32	40.5	15.23	63.49	-	-	P	V
			14499	40.61	-13.39	54	48.37	40.5	15.23	63.49	-	-	A	V
			17985	55.63	-18.37	74	52.8	42.97	17.05	57.19	-	-	P	V
			17985	45.59	-8.41	54	42.76	42.97	17.05	57.19	-	-	A	V
													V	
													V	
													V	
													V	



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Over Limit ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 39 2480MHz		4960	42.74	-31.26	74	58.82	32.84	9.72	58.64	-	-	P	H	
		7440	45.25	-28.75	74	55.94	36.02	11.28	57.99	-	-	P	H	
		10785	48.34	-25.66	74	56.99	38.97	13.29	60.91	-	-	P	H	
		10785	38.31	-15.69	54	46.96	38.97	13.29	60.91	-	-	A	H	
		14499	50.99	-23.01	74	58.75	40.5	15.23	63.49	-	-	P	H	
		14499	40.99	-13.01	54	48.75	40.5	15.23	63.49	-	-	A	H	
		17820	54.38	-19.62	74	53.74	41.08	16.97	57.41	-	-	P	H	
		17820	44.34	-9.66	54	43.7	41.08	16.97	57.41	-	-	A	H	
														H
														H
														H
														H
			4960	42.81	-31.19	74	58.89	32.84	9.72	58.64	-	-	P	V
			7440	45.12	-28.88	74	55.81	36.02	11.28	57.99	-	-	P	V
			10770	48.32	-25.68	74	57	38.94	13.28	60.9	-	-	P	V
			10770	38.38	-15.62	54	47.06	38.94	13.28	60.9	-	-	A	V
			14499	50.54	-23.46	74	58.3	40.5	15.23	63.49	-	-	P	V
			14499	40.61	-13.39	54	48.37	40.5	15.23	63.49	-	-	A	V
			18000	55.33	-18.67	74	52.34	43.1	17.06	57.17	-	-	P	V
			18000	45.35	-8.65	54	42.36	43.1	17.06	57.17	-	-	A	V
													V	
													V	
													V	
													V	
<b>Remark</b>	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> <li>The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.</li> <li>The emission level close to 18GHz is checked that the average emission level is noise floor only.</li> </ol>													



<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2352.42	51.65	-22.35	74	44.79	27.21	16.5	36.85	100	124	P	H	
		2322.075	43.54	-10.46	54	36.86	27.09	16.45	36.86	100	124	A	H	
	*	2402	100.29	-	-	93.14	27.4	16.58	36.83	100	124	P	H	
	*	2402	99.08	-	-	91.93	27.4	16.58	36.83	100	124	A	H	
													H	
													H	
			2362.71	51.2	-22.8	74	44.27	27.25	16.52	36.84	400	234	P	V
			2344.44	43.45	-10.55	54	36.63	27.18	16.49	36.85	400	234	A	V
	*		2402	95.8	-	-	88.65	27.4	16.58	36.83	400	234	P	V
	*		2402	94.55	-	-	87.4	27.4	16.58	36.83	400	234	A	V
													V	
													V	
BLE CH 19 2440MHz		2368.311	50.66	-23.34	74	43.7	27.27	16.53	36.84	100	125	P	H	
		2387.292	43.07	-10.93	54	35.99	27.35	16.56	36.83	100	125	A	H	
	*	2440	102	-	-	94.69	27.48	16.64	36.81	100	125	P	H	
	*	2440	100.56	-	-	93.25	27.48	16.64	36.81	100	125	A	H	
			2488.45	51.37	-22.63	74	43.79	27.65	16.72	36.79	100	125	P	H
			2493.49	43.82	-10.18	54	36.21	27.67	16.72	36.78	100	125	A	H
			2347.278	51.3	-22.7	74	44.47	27.19	16.49	36.85	400	213	P	V
			2389.002	43.43	-10.57	54	36.34	27.36	16.56	36.83	400	213	A	V
	*		2440	95.27	-	-	87.96	27.48	16.64	36.81	400	213	P	V
	*		2440	93.93	-	-	86.62	27.48	16.64	36.81	400	213	A	V
			2497.27	51.38	-22.62	74	43.74	27.69	16.73	36.78	400	213	P	V
			2499.44	44.2	-9.8	54	36.55	27.7	16.73	36.78	400	213	A	V



<b>BLE CH 39 2480MHz</b>	*	2480	100.97	-	-	93.44	27.62	16.7	36.79	100	122	P	H
	*	2480	99.49	-	-	91.96	27.62	16.7	36.79	100	122	A	H
		2483.68	56.11	-17.89	74	48.56	27.63	16.71	36.79	100	122	P	H
		2483.76	45.01	-8.99	54	37.45	27.64	16.71	36.79	100	122	A	H
													H
													H
	*	2480	98.12	-	-	90.59	27.62	16.7	36.79	400	196	P	V
	*	2480	96.78	-	-	89.25	27.62	16.7	36.79	400	196	A	V
		2484.28	52.9	-21.1	74	45.34	27.64	16.71	36.79	400	196	P	V
		2484.08	44.8	-9.2	54	37.24	27.64	16.71	36.79	400	196	A	V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz  
BLE (Harmonic @ 3m)

BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 00 2402MHz		4804	41.32	-32.68	74	57.89	32.31	9.66	58.54	-	-	P	H	
		11115	49.86	-24.14	74	58.75	38.63	13.45	60.97	-	-	P	H	
		11115	40.09	-13.91	54	48.98	38.63	13.45	60.97	-	-	A	H	
		14490	50.12	-23.88	74	57.86	40.51	15.23	63.48	-	-	P	H	
		14490	40.35	-13.65	54	48.09	40.51	15.23	63.48	-	-	A	H	
		18000	55.58	-18.42	74	52.59	43.1	17.06	57.17	-	-	P	H	
		18000	45.91	-8.09	54	42.92	43.1	17.06	57.17	-	-	A	H	
														H
														H
														H
														H
														H
														H
			4804	42.06	-31.94	74	58.63	32.31	9.66	58.54	-	-	P	V
			11415	50	-24	74	58.2	39.06	13.54	60.8	-	-	P	V
			11415	40.27	-13.73	54	48.47	39.06	13.54	60.8	-	-	A	V
			14490	50.76	-23.24	74	58.5	40.51	15.23	63.48	-	-	P	V
			14490	41.07	-12.93	54	48.81	40.51	15.23	63.48	-	-	A	V
			17940	55.75	-18.25	74	53.41	42.56	17.03	57.25	-	-	P	V
			17940	45.97	-8.03	54	43.63	42.56	17.03	57.25	-	-	A	V
													V	
													V	
													V	
													V	
													V	



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 19 2440MHz		4880	41.86	-32.14	74	58.24	32.52	9.69	58.59	-	-	P	H	
		7320	46.38	-27.62	74	56.67	36.52	11.26	58.07	-	-	P	H	
		11445	50.98	-23.02	74	59.25	38.97	13.54	60.78	-	-	P	H	
		11445	41.19	-12.81	54	49.46	38.97	13.54	60.78	-	-	A	H	
		14490	52.08	-21.92	74	59.82	40.51	15.23	63.48	-	-	P	H	
		14490	41.44	-12.56	54	49.18	40.51	15.23	63.48	-	-	A	H	
		17970	55.77	-18.23	74	53.11	42.83	17.04	57.21	-	-	P	H	
		17970	46.05	-7.95	54	43.39	42.83	17.04	57.21	-	-	A	H	
														H
														H
														H
														H
			4880	42.09	-31.91	74	58.47	32.52	9.69	58.59	-	-	P	V
			7320	47.12	-26.88	74	57.41	36.52	11.26	58.07	-	-	P	V
			11505	50.28	-23.72	74	58.7	38.79	13.55	60.76	-	-	P	V
			11505	40.5	-13.5	54	48.92	38.79	13.55	60.76	-	-	A	V
			14475	51.07	-22.93	74	58.78	40.53	15.22	63.46	-	-	P	V
			14475	41.29	-12.71	54	49	40.53	15.22	63.46	-	-	A	V
			17925	55.58	-18.42	74	53.41	42.42	17.02	57.27	-	-	P	V
			17925	45.83	-8.17	54	43.66	42.42	17.02	57.27	-	-	A	V
													V	
													V	
													V	
													V	



BLE	Note	Frequency ( MHz )	Level ( dBμV/m )	Margin ( dB )	Limit Line ( dBμV/m )	Read Level ( dBμV )	Antenna Factor ( dB/m )	Path Loss ( dB )	Preamp Factor ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Peak Avg. ( P/A )	Pol. ( H/V )	
BLE CH 39 2480MHz		4960	42.49	-31.51	74	58.57	32.84	9.72	58.64	-	-	P	H	
		7440	44.78	-29.22	74	55.47	36.02	11.28	57.99	-	-	P	H	
		11475	50.07	-23.93	74	58.4	38.88	13.55	60.76	-	-	P	H	
		11475	40.34	-13.66	54	48.67	38.88	13.55	60.76	-	-	A	H	
		14490	50.35	-23.65	74	58.09	40.51	15.23	63.48	-	-	P	H	
		14490	40.58	-13.42	54	48.32	40.51	15.23	63.48	-	-	A	H	
		17910	56.27	-17.73	74	54.26	42.29	17.01	57.29	-	-	P	H	
		17910	46.5	-7.5	54	44.49	42.29	17.01	57.29	-	-	A	H	
														H
														H
														H
														H
			4960	42.76	-31.24	74	58.84	32.84	9.72	58.64	-	-	P	V
			7440	44.49	-29.51	74	55.18	36.02	11.28	57.99	-	-	P	V
			11460	50.42	-23.58	74	58.72	38.92	13.55	60.77	-	-	P	V
			11460	40.64	-13.36	54	48.94	38.92	13.55	60.77	-	-	A	V
			14490	50.43	-23.57	74	58.17	40.51	15.23	63.48	-	-	P	V
			14490	40.65	-13.35	54	48.39	40.51	15.23	63.48	-	-	A	V
			17940	56.37	-17.63	74	54.03	42.56	17.03	57.25	-	-	P	V
			17940	46.63	-7.37	54	44.29	42.56	17.03	57.25	-	-	A	V
													V	
													V	
													V	
													V	
<b>Remark</b>	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> <li>The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.</li> <li>The emission level close to 18GHz is checked that the average emission level is noise floor only.</li> </ol>													



Emission above 18GHz

2.4GHz BLE (SHF)

BT	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
2.4GHz BLE SHF		24544	41.75	-32.25	74	58.1	39.08	-2.17	53.26	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			23792	42.34	-31.66	74	59.59	38.8	-2.23	53.82	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V

**Remark**

- No other spurious found.
- All results are PASS against limit line.
- The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.



Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		30	25.04	-14.96	40	32.51	24.3	0.7	32.47	-	-	P	H	
		59.1	32.93	-7.07	40	52.76	11.73	0.99	32.55	-	-	P	H	
		94.02	23.93	-19.57	43.5	40.21	14.98	1.2	32.46	-	-	P	H	
		159.01	27.46	-16.04	43.5	41.72	16.5	1.69	32.45	-	-	P	H	
		744.89	34.95	-11.05	46	36.03	27.82	3.39	32.29	-	-	P	H	
		885.54	38.66	-7.34	46	37.8	28.72	3.78	31.64	-	-	P	H	
														H
														H
														H
														H
														H
														H
			30	33.03	-6.97	40	40.5	24.3	0.7	32.47	-	-	P	V
			60.07	33.55	-6.45	40	53.37	11.73	1	32.55	-	-	P	V
			160.95	25.66	-17.84	43.5	40.09	16.32	1.7	32.45	-	-	P	V
			208.48	21.09	-22.41	43.5	36.76	14.96	1.86	32.49	-	-	P	V
			729.37	36.37	-9.63	46	38.04	27.29	3.37	32.33	-	-	P	V
			885.54	37.43	-8.57	46	36.57	28.72	3.78	31.64	-	-	P	V
														V
														V
													V	
													V	
													V	

**Remark**

- No other spurious found.
- All results are PASS against limit line.
- The emission position marked as "-" means no suspected emission found and emission level has at least 6dB margin against limit or emission is noise floor only.



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



A calculation example for radiated spurious emission is shown as below:

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		( MHz )	( dBμV/m )	( dB )	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
					( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
BLE		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 00		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H
2402MHz													

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =  
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Leo Lee, Bigshow Wang	Temperature :	22.1~23.1°C
		Relative Humidity :	55~60%

### Note symbol

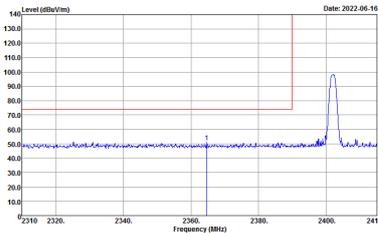
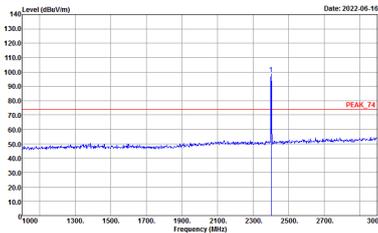
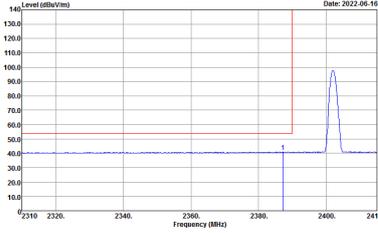
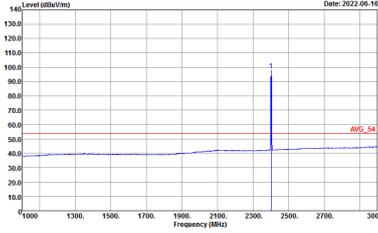
-L	Low channel location
-R	High channel location



<1Mbps>

2.4GHz 2400~2483.5MHz

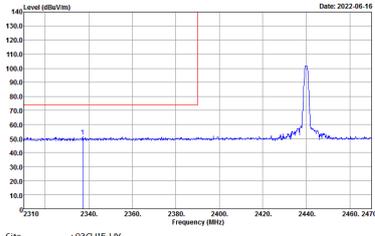
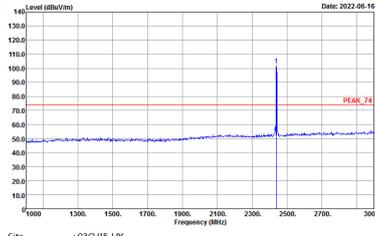
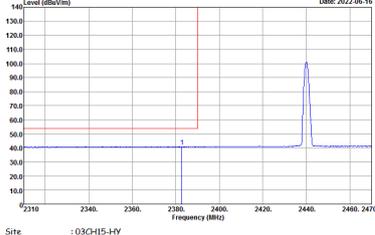
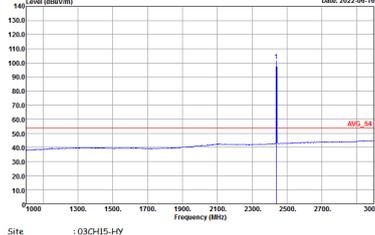
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Horizontal		Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : AVG_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

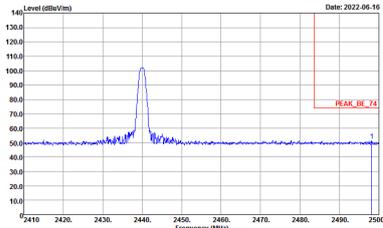
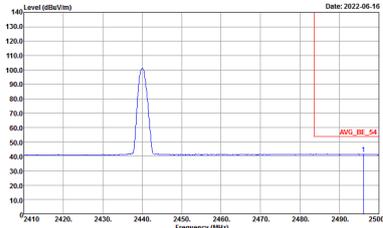


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	<p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : AVG_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>

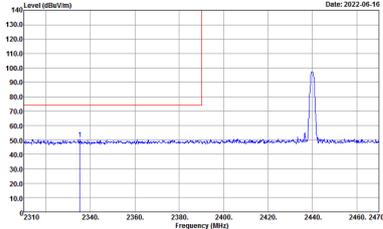
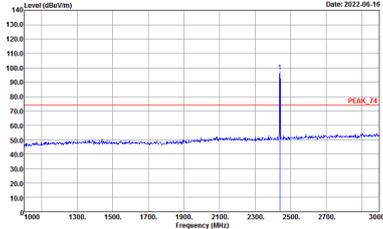
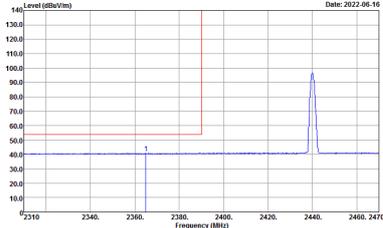
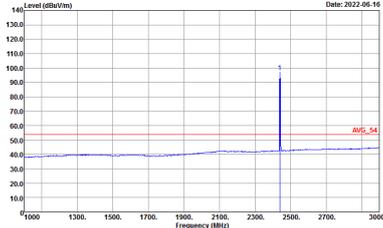


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Horizontal		Fundamental
Peak	 <p>Date: 2022-06-16</p> <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9d120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Date: 2022-06-16</p> <p>Site : 03CH15-HY Condition : PEAK_74 3m 9d120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Date: 2022-06-16</p> <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9d120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Date: 2022-06-16</p> <p>Site : 03CH15-HY Condition : AVG_54 3m 9d120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>

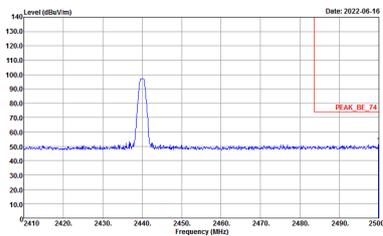
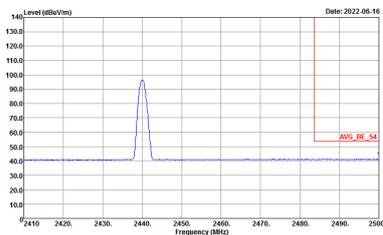


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - R		
Horizontal		Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Left blank</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	<p>Left blank</p>

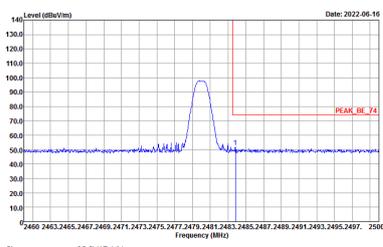
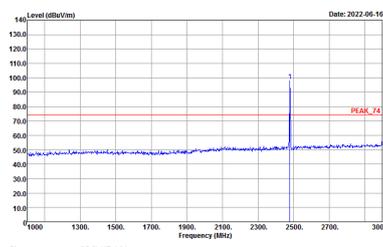
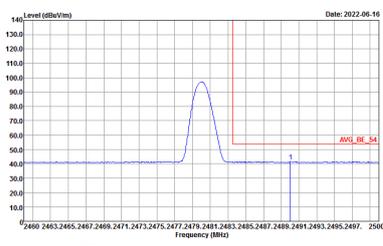
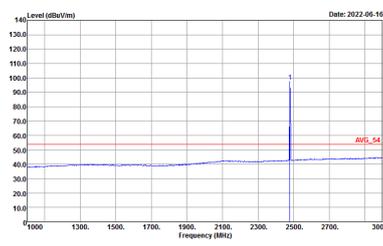


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
<p><b>Peak</b></p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Vertical Peak. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 2310 to 2470 MHz. A sharp peak is visible at approximately 2440 MHz. A red horizontal line is drawn at approximately 75 dBm/1m.</p> <p>Site : 03CH15-HY            Condition : PEAK_BE_74 3m 9D120_02038_20210804 VERTICAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Fundamental Peak. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 1000 to 3000 MHz. A sharp peak is visible at approximately 2440 MHz. A red horizontal line is labeled 'PEAK_74'.</p> <p>Site : 03CH15-HY            Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL            : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<p><b>Avg.</b></p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Vertical Avg. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 2310 to 2470 MHz. A peak is visible at approximately 2440 MHz. A red horizontal line is drawn at approximately 75 dBm/1m.</p> <p>Site : 03CH15-HY            Condition : AVG_BE_54 3m 9D120_02038_20210804 VERTICAL            : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	 <p>Level (dBm/1m) vs Frequency (MHz) plot for Fundamental Avg. The y-axis ranges from 10.0 to 140.0 dBm/1m, and the x-axis ranges from 1000 to 3000 MHz. A peak is visible at approximately 2440 MHz. A red horizontal line is labeled 'AVG_54'.</p> <p>Site : 03CH15-HY            Condition : AVG_54 3m 9D120_02038_20210804 VERTICAL            : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Left blank</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	<p>Left blank</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90I20_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 90I20_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90I20_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : AVG_54 3m 90I20_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:1000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
<p><b>Peak</b></p>	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<p><b>Avg.</b></p>	<p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : AVG_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:1.000KHz SWT:Auto</p>



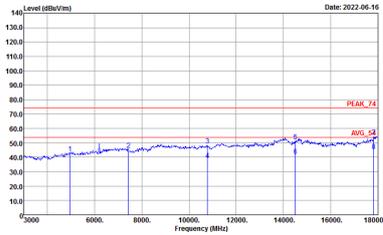
2.4GHz 2400~2483.5MHz  
BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



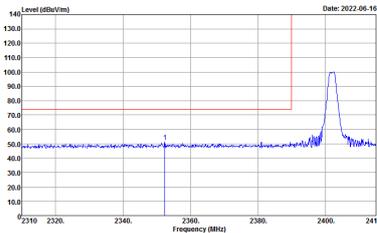
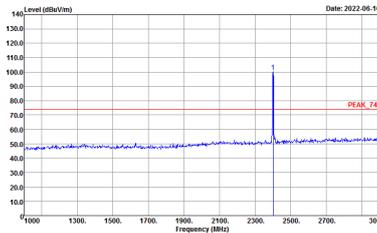
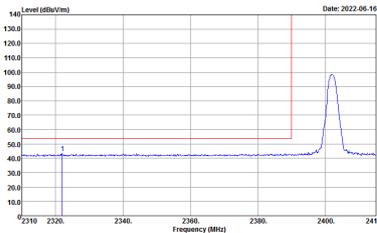
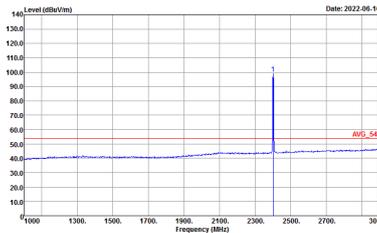
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



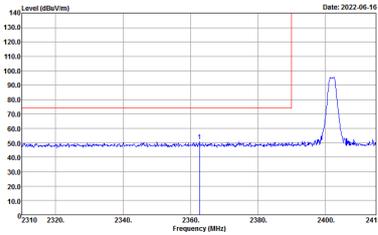
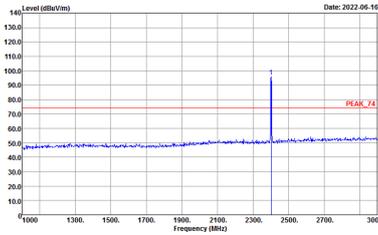
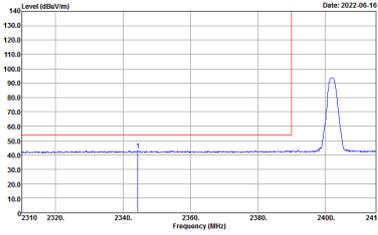
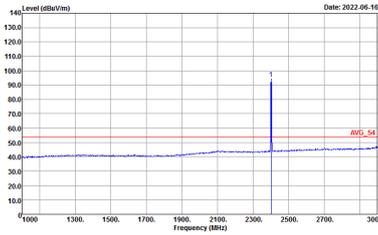
<2Mbps>

2.4GHz 2400~2483.5MHz

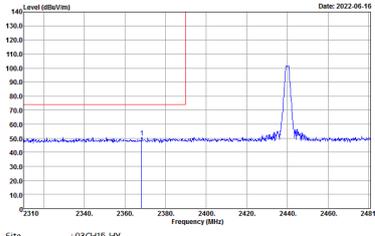
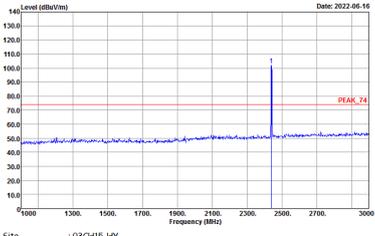
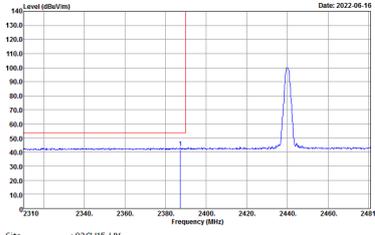
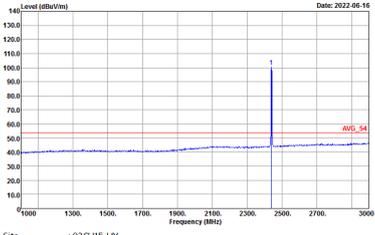
BLE (Band Edge @ 3m)

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Site Condition : 03CH15-HY : PEAK_BE_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site Condition : 03CH15-HY : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site Condition : 03CH15-HY : AVG_BE_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	 <p>Site Condition : 03CH15-HY : AVG_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>

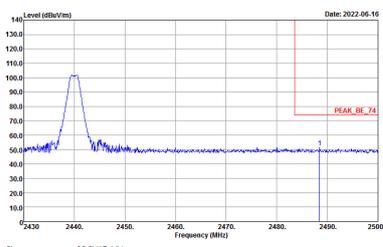
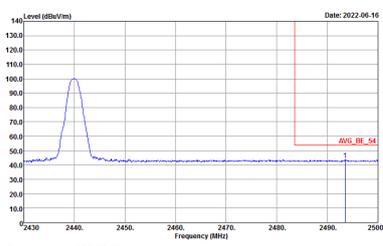


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH00 2402MHz		
Vertical		Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : AVG_54 3m 9D120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BLE CH19 2440MHz - L		
Horizontal		Fundamental
Peak	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : AVG_54 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
<b>Peak</b>	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
<b>Avg.</b>	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	Left blank

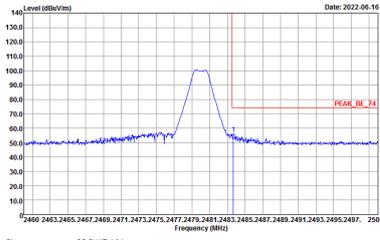
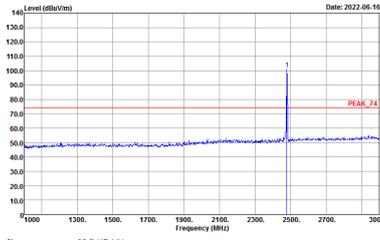
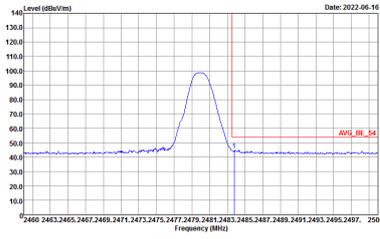
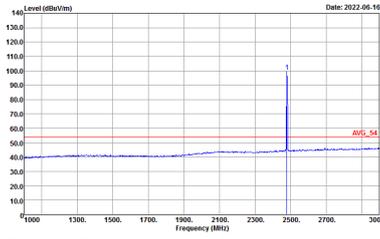


BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
<b>Peak</b>	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<b>Avg.</b>	<p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : AVG_54 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	Left blank
Avg.	<p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9d120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	Left blank



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
<p><b>Peak</b></p>	 <p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
<p><b>Avg.</b></p>	 <p>Site : 03CH15-HY Condition : AVG_BE_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	 <p>Site : 03CH15-HY Condition : AVG_54 3m 9D120_02038_20210804 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>



BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>
Avg.	<p>Site : 03CH15-HY Condition : AVG_BE_54 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>	<p>Site : 03CH15-HY Condition : AVG_54 3m 90120_02038_20210804 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto</p>



2.4GHz 2400~2483.5MHz  
BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



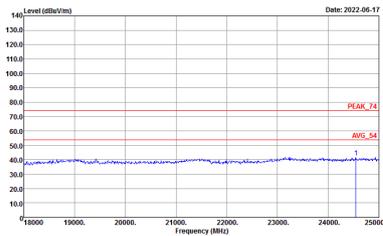
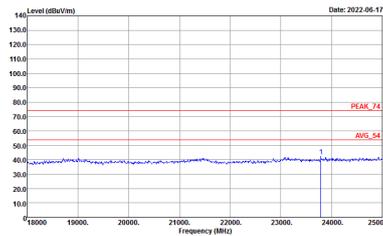
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9D120_02038_20210804 VERTICAL</p>



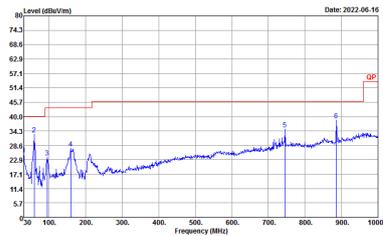
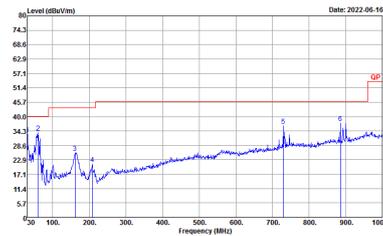
Emission above 18GHz  
2.4GHz BLE (SHF @ 1m)

BLE	2.4GHz 2400~2483.5MHz	
	BLE SHF	
	Horizontal	Vertical
<p><b>Peak</b></p> <p><b>Avg.</b></p>	 <p>Site : 03CHIS-141 Condition : PEAK_74 1m SHF ANT_9170_00993 VERTICAL</p>	 <p>Site : 03CHIS-141 Condition : PEAK_74 1m SHF ANT_9170_00993 HORIZONTAL</p>



Emission below 1GHz

2.4GHz BLE (LF)

BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 <p data-bbox="430 840 694 869">Site : 03CH15-HY Condition : QP 3m BLE LOG_41912_20220206 HORIZONTAL</p>	 <p data-bbox="901 840 1157 869">Site : 03CH15-HY Condition : QP 3m BLE LOG_41912_20220206 VERTICAL</p>



## Appendix E. Duty Cycle Plots

Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
Bluetooth –LE for 1Mbps	92.14	2321	0.43	1kHz
Bluetooth –LE for 2Mbps	31.73	198	5.05	10kHz

