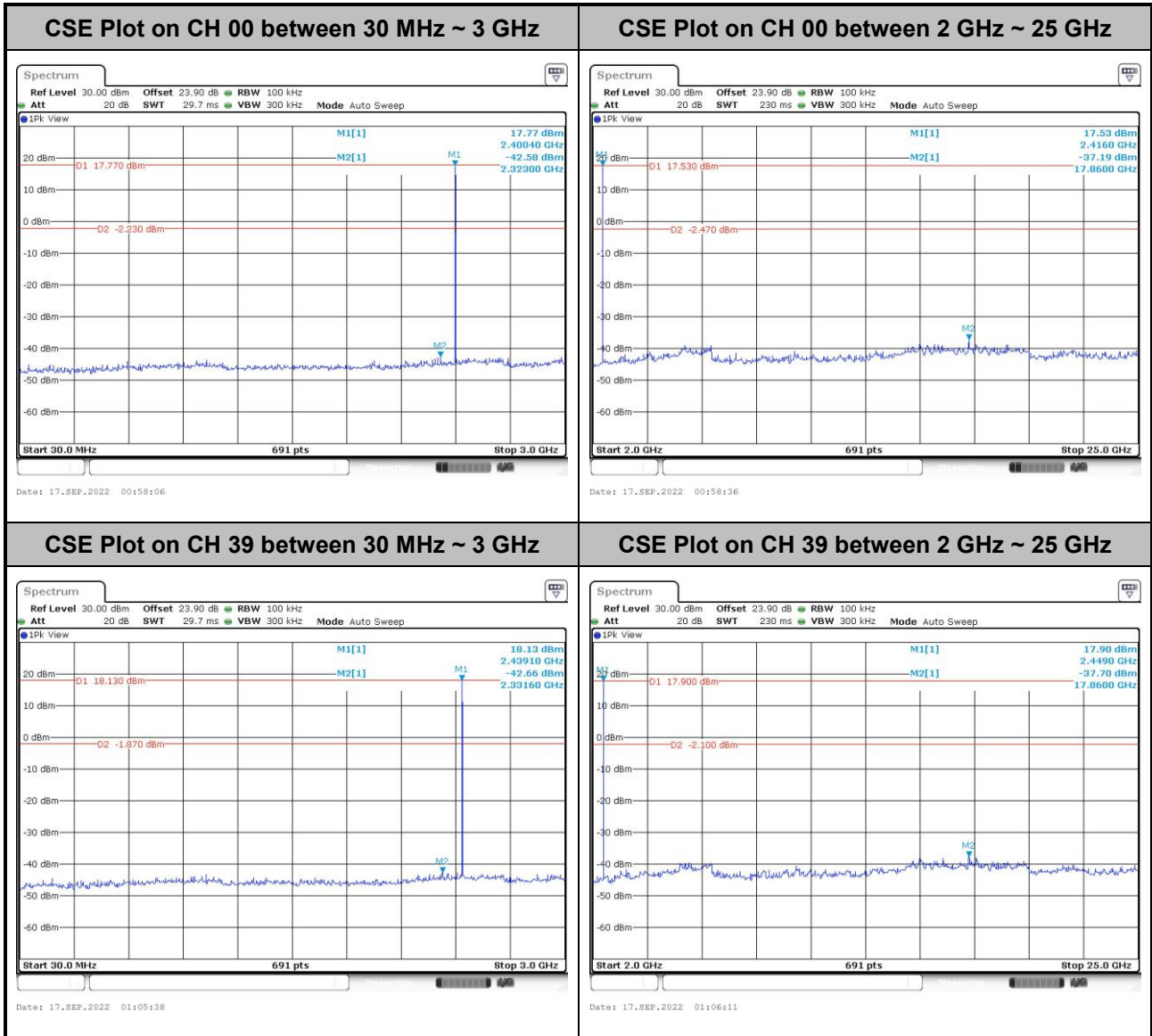
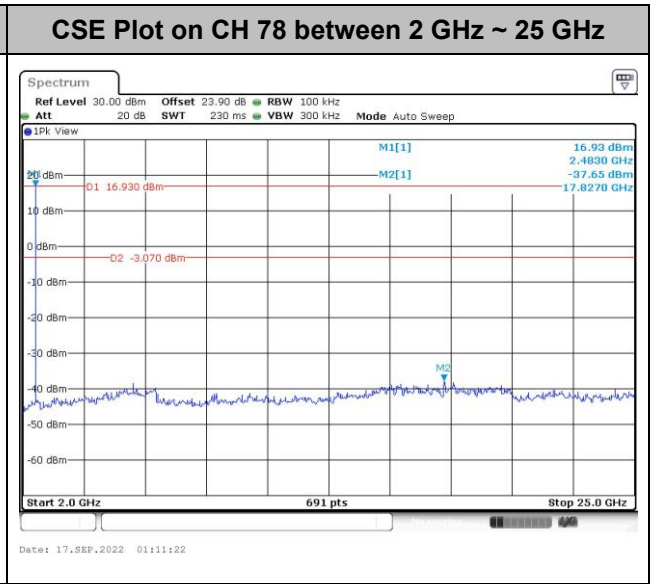
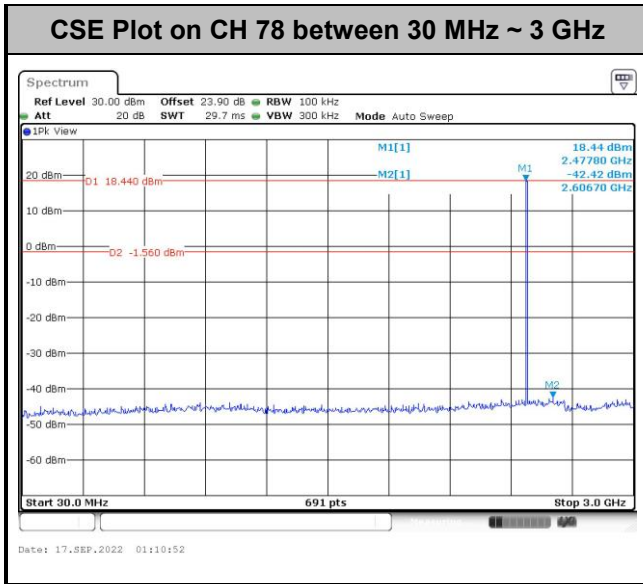




<Ant. 3>

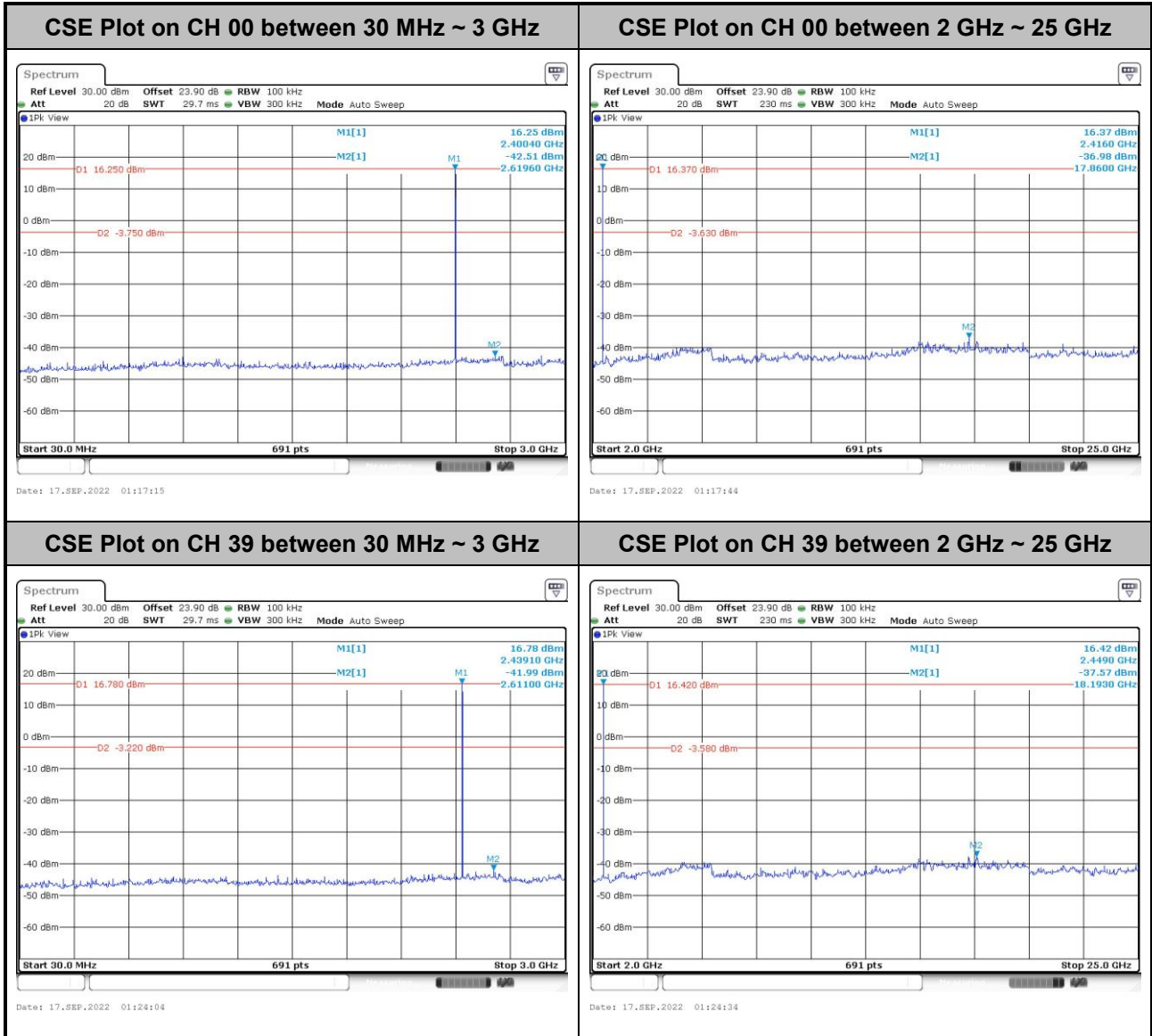
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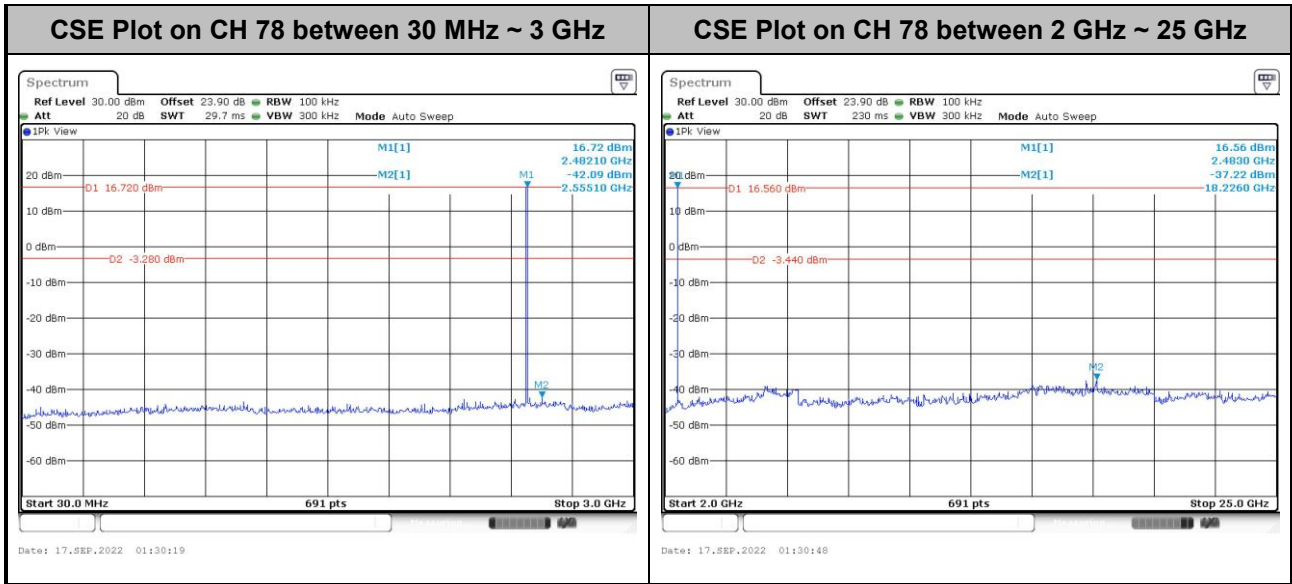






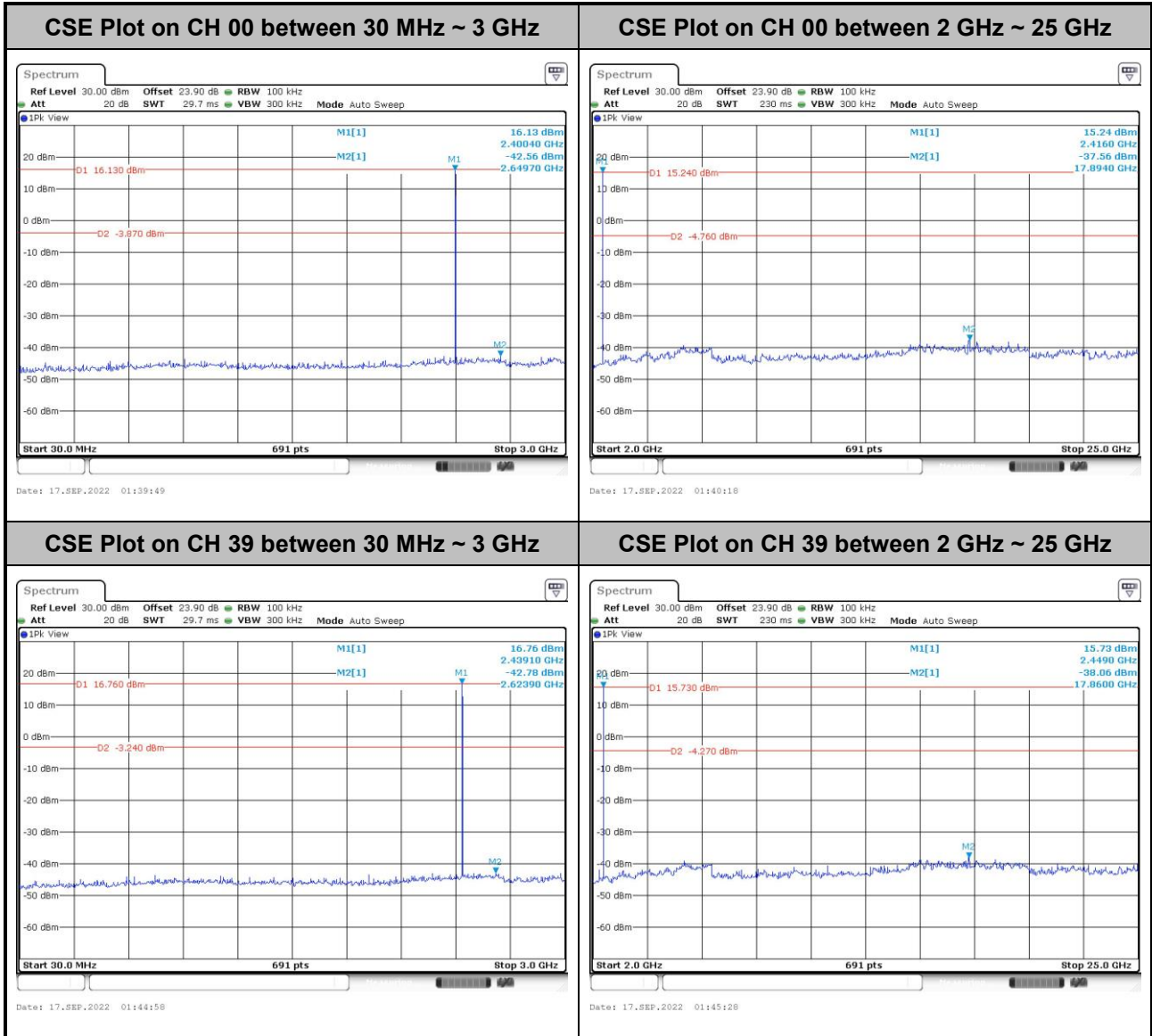
<2Mbps>

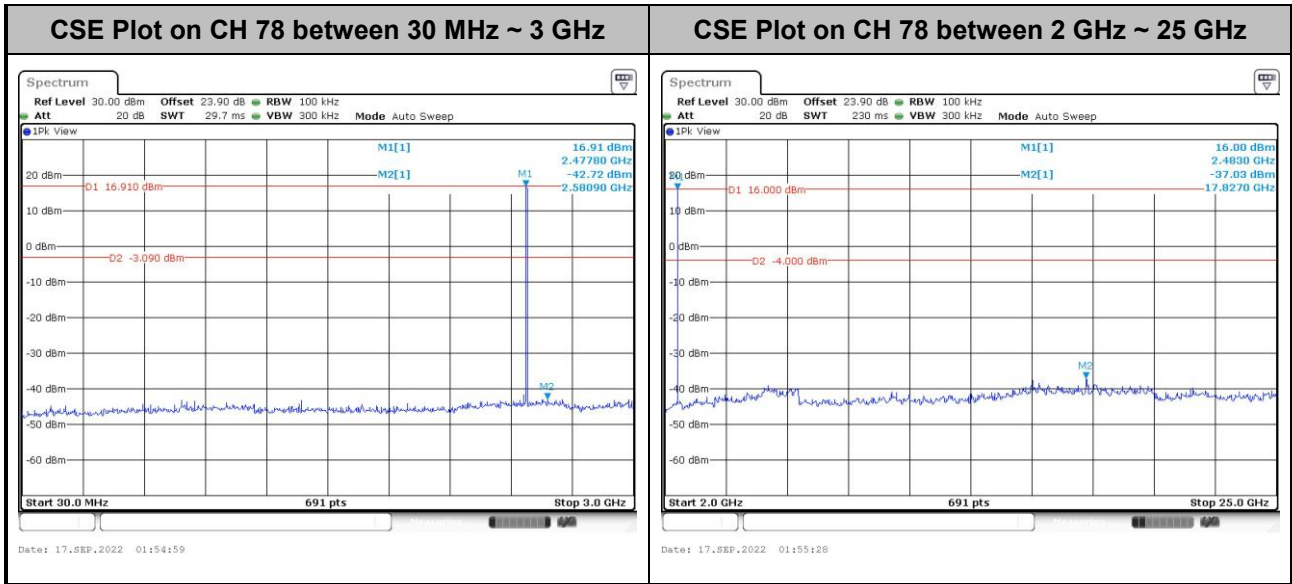






<3Mbps>







### 3.8 Radiated Band Edges and Spurious Emission Measurement

#### 3.8.1 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. 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

#### 3.8.2 Measuring Instruments

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



### 3.8.3 Test Procedures

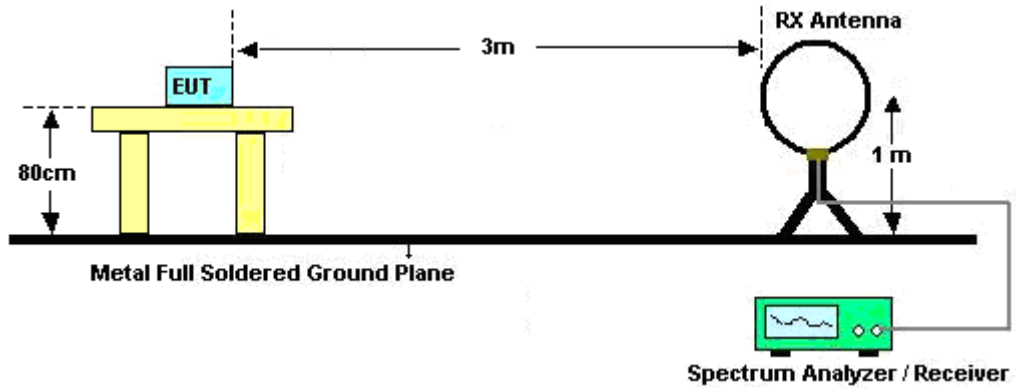
1. The EUT is placed on a turntable with 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz respectively above ground.
2. The EUT is set 3 meters away from the receiving antenna, which is mounted on the top of a variable height antenna tower.
3. For each suspected emission, the 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 to comply with the guidelines.
4. Set the maximum power setting and enable the EUT to transmit continuously.
5. 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, RBW = 1 MHz for  $f > 1$  GHz ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 * \log$  (Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. 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 “-“.
8. 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 “-“.

Note: The average levels are calculated from the peak level corrected with duty cycle correction factor (-24.76dB) derived from  $20 \log$  (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

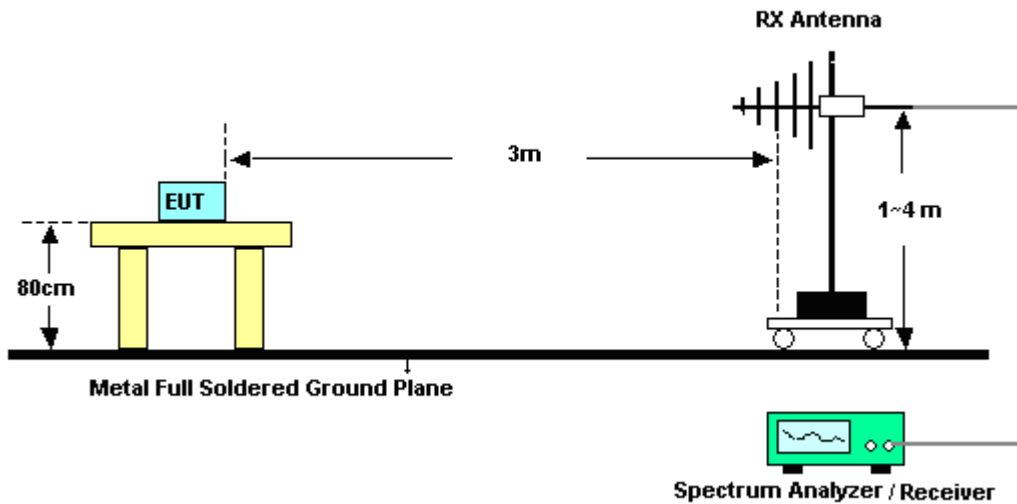


### 3.8.4 Test Setup

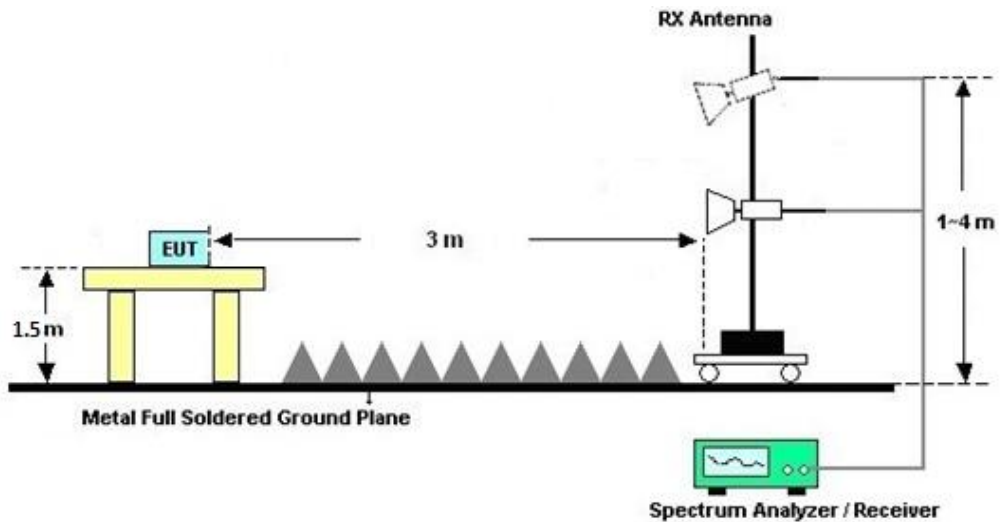
For radiated test below 30MHz



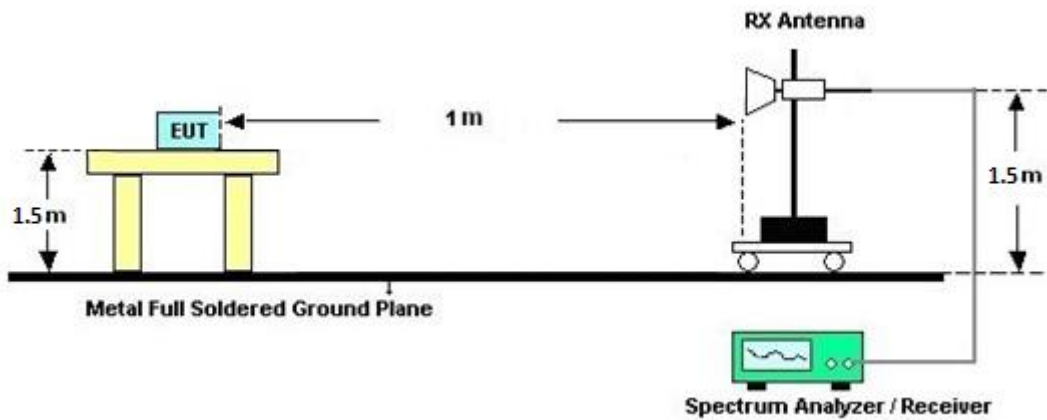
For radiated test from 30MHz to 1GHz



For radiated test from 1GHz to 18GHz



For radiated test above 18GHz



### 3.8.5 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.

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

Please refer to Appendix C and D.

### 3.8.7 Duty Cycle

Please refer to Appendix E.

### 3.8.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix C and D.



### 3.9 AC Conducted Emission Measurement

#### 3.9.1 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.

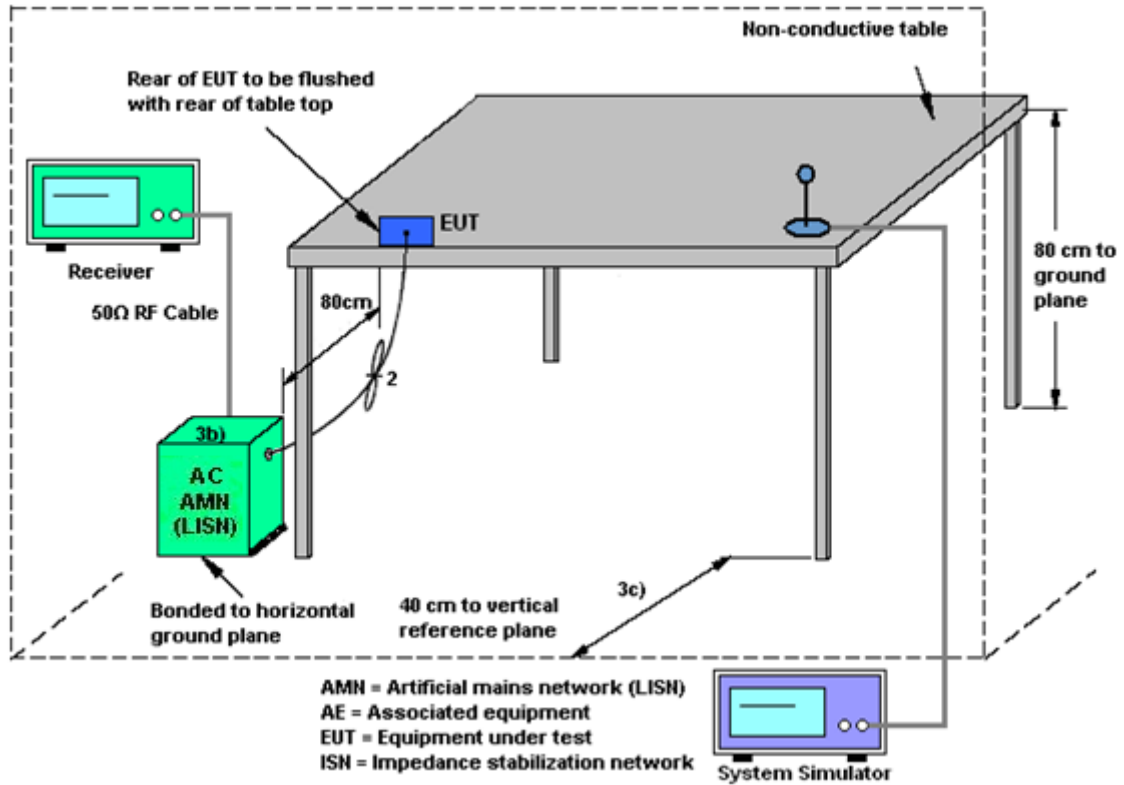
#### 3.9.2 Measuring Instruments

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

#### 3.9.3 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.

### 3.9.4 Test Setup



### 3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



## **3.10 Antenna Requirements**

### **3.10.1 Standard Applicable**

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.

### **3.10.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.



## 4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	May 13, 2022	Sep. 15, 2022~ Oct. 05, 2022	May 12, 2023	Radiation (03CH16-HY)
Preamplifier	EMEC	EM18G40G	060801	18GHz~40GHz	Jun. 28, 2022	Sep. 15, 2022~ Oct. 05, 2022	Jun. 27, 2023	Radiation (03CH16-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00993	18GHz-40GHz	Nov. 30, 2021	Sep. 15, 2022~ Oct. 05, 2022	Nov. 29, 2022	Radiation (03CH16-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1522	1GHz~18GHz	Mar. 10, 2022	Sep. 15, 2022~ Oct. 05, 2022	Mar. 09, 2023	Radiation (03CH16-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00802N1D01N -06	47020 & 06	30MHz~1GHz	Oct. 09, 2021	Sep. 15, 2022~ Oct. 05, 2022	Oct. 08, 2022	Radiation (03CH16-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Sep. 15, 2022~ Oct. 05, 2022	N/A	Radiation (03CH16-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Sep. 15, 2022~ Oct. 05, 2022	N/A	Radiation (03CH16-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Sep. 15, 2022~ Oct. 05, 2022	N/A	Radiation (03CH16-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY57290111	3Hz~26.5GHz	Dec. 15, 2021	Sep. 15, 2022~ Oct. 05, 2022	Dec. 14, 2022	Radiation (03CH16-HY)
Software	Audix	E3 6.2009-8-24	RK-001136	N/A	N/A	Sep. 15, 2022~ Oct. 05, 2022	N/A	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	805935/4	N/A	Aug. 09, 2022	Sep. 15, 2022~ Oct. 05, 2022	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	802434/4	N/A	Aug. 09, 2022	Sep. 15, 2022~ Oct. 05, 2022	Aug. 08, 2023	Radiation (03CH16-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	EC-A5-300-5 757	N/A	Aug. 09, 2022	Sep. 15, 2022~ Oct. 05, 2022	Aug. 08, 2023	Radiation (03CH16-HY)
Amplifier	SONOMA	310N	371607	9kHz~1GHz	Jul. 04, 2022	Sep. 15, 2022~ Oct. 05, 2022	Jul. 03, 2023	Radiation (03CH16-HY)
Preamplifier	EMEC	EM1G18G	060812	1GHz~18GHz	Dec. 27, 2021	Sep. 15, 2022~ Oct. 05, 2022	Dec. 26, 2022	Radiation (03CH16-HY)
Preamplifier	Keysight	83017A	MY53270264	1GHz~26.5GHz	Dec. 09, 2021	Sep. 15, 2022~ Oct. 05, 2022	Dec. 08, 2022	Radiation (03CH16-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 16, 2021	Sep. 16, 2022~ Sep. 17, 2022	Nov. 15, 2022	Conducted (TH05-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 30, 2021	Sep. 16, 2022~ Sep. 17, 2022	Sep. 29, 2022	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	0846202	300MHz~40GHz	Sep. 30, 2021	Sep. 16, 2022~ Sep. 17, 2022	Sep. 29, 2022	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101905	10Hz - 40GHz(amp)	Aug. 03, 2022	Sep. 16, 2022~ Sep. 17, 2022	Aug. 02, 2023	Conducted (TH05-HY)



Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Sep. 21, 2022	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Sep. 21, 2022	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 29, 2021	Sep. 21, 2022	Oct. 28, 2022	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 16, 2022	Sep. 21, 2022	Mar. 15, 2023	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Feb. 16, 2022	Sep. 21, 2022	Feb. 15, 2023	Conduction (CO07-HY)
Four-Line V-Network	TESEQ	NNB 52	36122	N/A	Mar. 04, 2022	Sep. 21, 2022	Mar. 03, 2023	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Oct. 21, 2021	Sep. 21, 2022	Oct. 20, 2022	Conduction (CO07-HY)



## 5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.3 dB
---	--------

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	6.5 dB
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### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.6 dB
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### Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.5 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
---	--------



## Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu	Temperature:	21~25	°C
Test Date:	2022/9/16~2022/9/17	Relative Humidity:	51~54	%

&lt;Ant.4&gt;

**TEST RESULTS DATA****20dB and 99% Occupied Bandwidth and Hopping Channel Separation**

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	0.874	0.802	0.999	0.5827	Pass
DH	1Mbps	1	39	2441	0.874	0.805	1.003	0.5827	Pass
DH	1Mbps	1	78	2480	0.874	0.799	0.999	0.5827	Pass
2DH	2Mbps	1	0	2402	1.268	1.166	0.999	0.8451	Pass
2DH	2Mbps	1	39	2441	1.263	1.164	1.003	0.8423	Pass
2DH	2Mbps	1	78	2480	1.263	1.166	0.999	0.8423	Pass
3DH	3Mbps	1	0	2402	1.255	1.152	1.003	0.8365	Pass
3DH	3Mbps	1	39	2441	1.255	1.149	1.003	0.8365	Pass
3DH	3Mbps	1	78	2480	1.250	1.149	0.999	0.8336	Pass

**TEST RESULTS DATA****Dwell Time**

Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time (hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH5	79	106.670	2.90	0.31	0.4	Pass
2DH5 (AFH)	20	53.330	2.90	0.15	0.4	Pass

**TEST RESULTS DATA****Peak Power Table**

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH1	0	1	18.73	30.00	Pass
	39	1	19.04	30.00	Pass
	78	1	<b>19.18</b>	30.00	Pass
2DH1	0	1	19.02	20.97	Pass
	39	1	19.47	20.97	Pass
	78	1	<b>19.49</b>	20.97	Pass
3DH1	0	1	19.38	20.97	Pass
	39	1	19.86	20.97	Pass
	78	1	<b>19.90</b>	20.97	Pass

**TEST RESULTS DATA****Average Power Table  
(Reporting Only)**

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	18.44	5.21
	39	1	18.66	5.21
	78	1	<b>18.83</b>	5.21
2DH1	0	1	16.52	5.12
	39	1	16.87	5.12
	78	1	<b>16.99</b>	5.12
3DH1	0	1	16.60	5.15
	39	1	16.95	5.15
	78	1	<b>17.05</b>	5.15

**TEST RESULTS DATA****Number of Hopping Frequency**

Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

<Ant.3>

<b>TEST RESULTS DATA</b>									
<b>20dB and 99% Occupied Bandwidth and Hopping Channel Separation</b>									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	20db BW (MHz)	99% Bandwidth (MHz)	Hopping Channel Separation Measurement (MHz)	Hopping Channel Separation Measurement Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	0.874	0.802	1.307	0.5827	Pass
DH	1Mbps	1	39	2441	0.874	0.805	1.307	0.5827	Pass
DH	1Mbps	1	78	2480	0.874	0.802	1.007	0.5827	Pass
2DH	2Mbps	1	0	2402	1.268	1.166	0.999	0.8451	Pass
2DH	2Mbps	1	39	2441	1.263	1.164	1.003	0.8423	Pass
2DH	2Mbps	1	78	2480	1.263	1.166	0.999	0.8423	Pass
3DH	3Mbps	1	0	2402	1.255	1.149	1.298	0.8365	Pass
3DH	3Mbps	1	39	2441	1.255	1.149	1.003	0.8365	Pass
3DH	3Mbps	1	78	2480	1.250	1.149	1.303	0.8336	Pass

<b>TEST RESULTS DATA</b>						
<b>Dwell Time</b>						
Mod.	Hopping Channel Number Rate	Hops Over Occupancy Time (hops)	Package Transfer Time (msec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH5	79	106.670	2.88	0.31	0.4	Pass
DH5 (AFH)	20	53.330	2.88	0.15	0.4	Pass

<b>TEST RESULTS DATA</b>					
<b>Peak Power Table</b>					
DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH1	0	1	18.20	30.00	Pass
	39	1	18.65	30.00	Pass
	78	1	<b>18.69</b>	30.00	Pass
2DH1	0	1	18.62	20.97	Pass
	39	1	19.15	20.97	Pass
	78	1	<b>19.18</b>	20.97	Pass
3DH1	0	1	18.99	20.97	Pass
	39	1	19.58	20.97	Pass
	78	1	<b>19.60</b>	20.97	Pass

<b>TEST RESULTS DATA</b>				
<b>Average Power Table (Reporting Only)</b>				
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	18.01	5.18
	39	1	18.31	5.18
	78	1	<b>18.33</b>	5.18
2DH1	0	1	16.51	5.15
	39	1	16.60	5.15
	78	1	<b>16.65</b>	5.15
3DH1	0	1	16.52	5.15
	39	1	16.65	5.15
	78	1	<b>16.68</b>	5.15

<b>TEST RESULTS DATA</b>			
<b>Number of Hopping Frequency</b>			
Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass



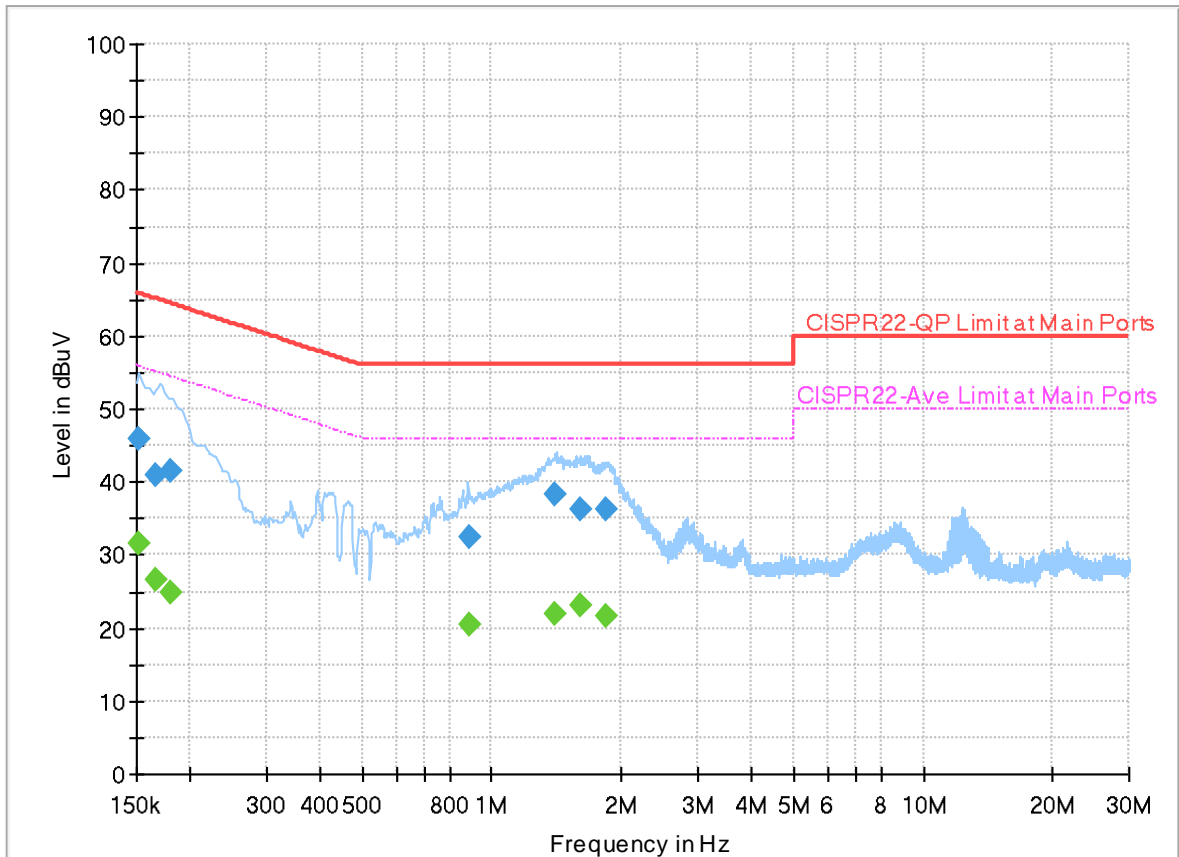
## Appendix B. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	Temperature :	23.1~26.7°C
		Relative Humidity :	49.1~56.9%

# EUT Information

Report NO : 280208-01  
 Test Mode : Mode 2  
 Test Voltage : 120Vac/60Hz  
 Phase : Line

Full Spectrum



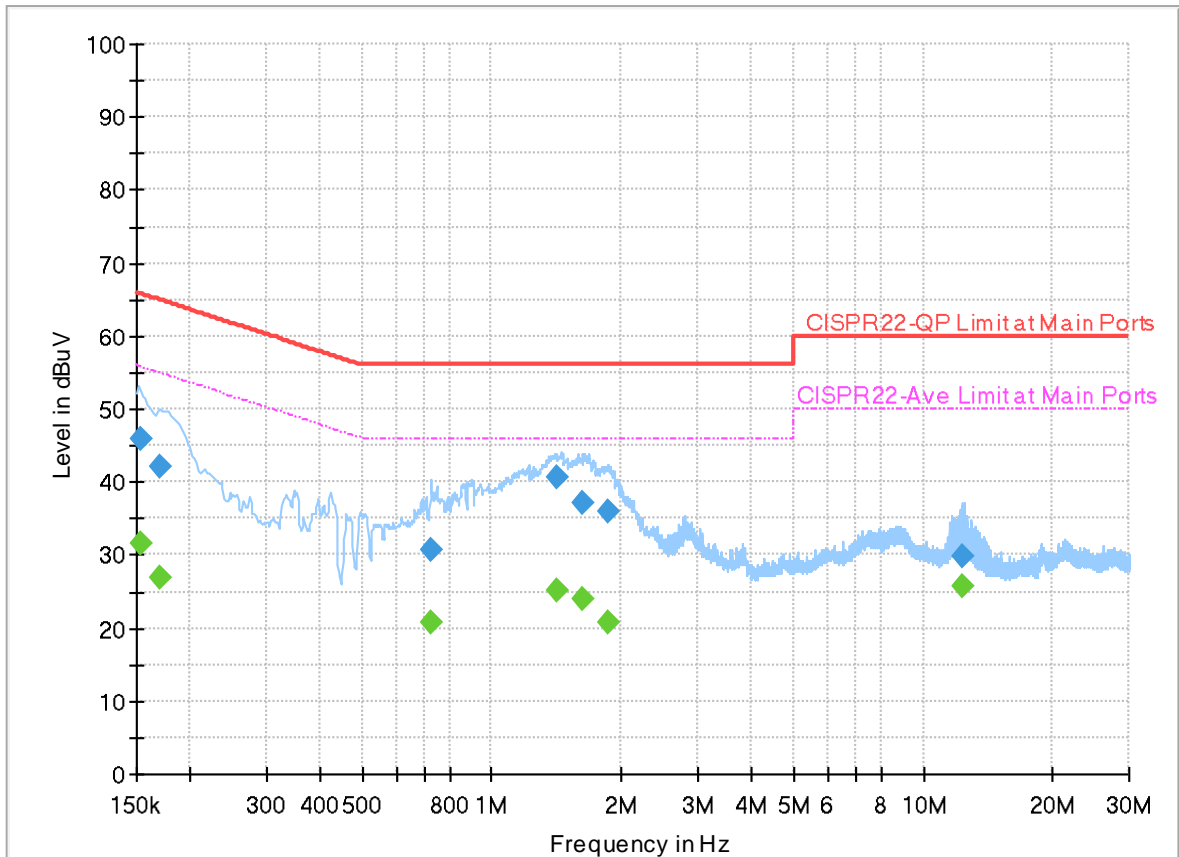
## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152093	---	31.57	55.89	24.32	L1	OFF	20.0
0.152093	45.91	---	65.89	19.98	L1	OFF	20.0
0.166380	---	26.62	55.14	28.52	L1	OFF	20.0
0.166380	40.94	---	65.14	24.20	L1	OFF	20.0
0.180150	---	24.99	54.48	29.49	L1	OFF	20.0
0.180150	41.63	---	64.48	22.85	L1	OFF	20.0
0.883140	---	20.32	46.00	25.68	L1	OFF	20.0
0.883140	32.42	---	56.00	23.58	L1	OFF	20.0
1.403250	---	22.03	46.00	23.97	L1	OFF	20.0
1.403250	38.34	---	56.00	17.66	L1	OFF	20.0
1.609980	---	23.03	46.00	22.97	L1	OFF	20.0
1.609980	36.30	---	56.00	19.70	L1	OFF	20.0
1.844250	---	21.68	46.00	24.32	L1	OFF	20.0
1.844250	36.19	---	56.00	19.81	L1	OFF	20.0

# EUT Information

Report NO : 280208-01  
 Test Mode : Mode 2  
 Test Voltage : 120Vac/60Hz  
 Phase : Neutral

Full Spectrum



## Final\_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154320	---	31.68	55.76	24.08	N	OFF	20.0
0.154320	45.84	---	65.76	19.92	N	OFF	20.0
0.170790	---	26.98	54.92	27.94	N	OFF	20.0
0.170790	42.21	---	64.92	22.71	N	OFF	20.0
0.726000	---	20.72	46.00	25.28	N	OFF	20.0
0.726000	30.69	---	56.00	25.31	N	OFF	20.0
1.410810	---	25.29	46.00	20.71	N	OFF	20.0
1.410810	40.62	---	56.00	15.38	N	OFF	20.0
1.625370	---	24.06	46.00	21.94	N	OFF	20.0
1.625370	37.19	---	56.00	18.81	N	OFF	20.0
1.852890	---	20.86	46.00	25.14	N	OFF	20.0
1.852890	35.93	---	56.00	20.07	N	OFF	20.0
12.309000	---	25.86	50.00	24.14	N	OFF	20.2
12.309000	29.89	---	60.00	30.11	N	OFF	20.2



### Appendix C. Radiated Spurious Emission

Test Engineer :	Andy Yang, Karl Hou and Steven Wu	Temperature :	15~25°C
		Relative Humidity :	50~65%

<Ant.4>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	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 )	
BT CH00 2402MHz		2353.995	45.85	-28.15	74	41.35	27.22	7.36	30.08	118	117	P	H	
		2353.995	21.09	-32.91	54	-	-	-	-	-	-	A	H	
	*	2402	115.11	-	-	110.31	27.41	7.46	30.07	118	117	P	H	
	*	2402	90.35	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2387.28	46.32	-27.68	74	41.61	27.35	7.43	30.07	345	86	P	V
			2387.28	21.56	-32.44	54	-	-	-	-	-	-	A	V
	*		2402	111.74	-	-	106.94	27.41	7.46	30.07	345	86	P	V
	*		2402	86.98	-	-	-	-	-	-			A	V
														V
														V



<b>BT CH 39 2441MHz</b>		2373.7	45.3	-28.7	74	40.69	27.29	7.4	30.08	106	103	P	H	
		2373.7	20.54	-33.46	54	-	-	-	-	-	-	A	H	
	*	2441	114.79	-	-	109.77	27.56	7.52	30.06	106	103	P	H	
	*	2441	90.03	-	-	-	-	-	-			A	H	
		2490.62	46.88	-27.12	74	41.48	27.84	7.6	30.04	106	103	P	H	
		2490.62	22.12	-31.88	54	-	-	-	-	-	-	A	H	
		2317.84	46.12	-27.88	74	41.78	27.14	7.29	30.09	373	83	P	V	
		2317.84	21.36	-32.64	54	-	-	-	-	-	-	A	V	
	*	2441	112.1	-	-	107.08	27.56	7.52	30.06	373	83	P	V	
	*	2441	87.34	-	-	-	-	-	-	-	-	A	V	
		2486.98	46.96	-27.04	74	41.59	27.82	7.59	30.04	373	83	P	V	
		2486.98	22.2	-31.8	54	-	-	-	-			A	V	
	<b>BT CH 78 2480MHz</b>	*	2480	113.49	-	-	108.18	27.78	7.58	30.05	100	103	P	H
		*	2480	88.73	-	-	-	-	-	-			A	H
		2483.52	55.64	-18.36	74	50.29	27.8	7.59	30.04	100	103	P	H	
		2483.52	30.88	-23.12	54	-	-	-	-	-	-	A	H	
													H	
													H	
*		2480	110.83	-	-	105.52	27.78	7.58	30.05	400	84	P	V	
*		2480	86.07	-	-	-	-	-	-	-	-	A	V	
		2483.76	52.16	-21.84	74	46.81	27.8	7.59	30.04	400	84	P	V	
		2483.76	27.4	-26.6	54	-	-	-	-	-	-	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  
BT (Harmonic @ 3m)

BT	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 )	
BT CH 00 2402MHz		4804	42.05	-31.95	74	64.6	32.32	11.3	66.17	-	-	P	H	
		4804	17.29	-36.71	54	-	-	-	-	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4804	43.07	-30.93	74	65.62	32.32	11.3	66.17	-	-	P	V
			4804	18.31	-35.69	54	-	-	-	-	-	-	A	V
														V
														V
														V
														V
														V
														V
													V	





BT	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)	
BT CH 39 2441MHz		4882	41.86	-32.14	74	63.88	32.73	11.36	66.11	-	-	P	H	
		4882	17.1	-36.9	54	-	-	-	-	-	-	A	H	
		7323	44.46	-29.54	74	59.64	37.06	13.48	65.72	-	-	P	H	
		7323	19.7	-34.3	54	-	-	-	-	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4882	40.17	-33.83	74	62.19	32.73	11.36	66.11	-	-	P	V
			4882	15.41	-38.59	54	-	-	-	-	-	-	A	V
			7323	46.05	-27.95	74	61.23	37.06	13.48	65.72	-	-	P	V
			7323	21.29	-32.71	54	-	-	-	-	-	-	A	V
														V
														V
														V
														V
													V	
													V	
													V	



BT	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 )	
BT CH 78 2480MHz		4960	45.49	-28.51	74	67.02	33.12	11.41	66.06	-	-	P	H	
		4960	20.73	-33.27	54	-	-	-	-	-	-	A	H	
		7440	44.71	-29.29	74	60.55	36.46	13.49	65.79	-	-	P	H	
		7440	19.95	-34.05	54	-	-	-	-	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	42.96	-31.04	74	64.49	33.12	11.41	66.06	-	-	P	V
			4960	18.2	-35.8	54	-	-	-	-	-	-	A	V
			7440	44	-30	74	59.84	36.46	13.49	65.79	-	-	P	V
			7440	19.24	-34.76	54	-	-	-	-	-	-	A	V
														V
														V
														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> </ol>													



Emission above 18GHz

2.4GHz BT (SHF)

BT	Note	Frequency	Level	Over	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 BT SHF		24096	39.55	-34.45	74	57.19	38.84	-2.86	53.62	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			23520	39.76	-34.24	74	57.94	38.8	-2.99	53.99	-	-	P
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
													V
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against limit line. 3. 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 BT (LF)

BT	Note	Frequency	Level	Over	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 BT LF		33.88	21.21	-18.79	40	30.03	22.77	0.61	32.2	-	-	P	H	
		94.99	33.69	-9.81	43.5	49.25	15.2	1.5	32.26	-	-	P	H	
		177.44	32.21	-11.29	43.5	47.22	15.23	2.08	32.32	-	-	P	H	
		414.12	23.46	-22.54	46	30.21	22.54	3.13	32.42	-	-	P	H	
		634.31	27.71	-18.29	46	30.09	26.32	3.91	32.61	-	-	P	H	
		958.29	33.31	-12.69	46	28.91	30.83	4.83	31.26	-	-	P	H	
														H
														H
														H
														H
														H
														H
			64.92	24.79	-15.21	40	43.93	12	1.15	32.29	-	-	P	V
			94.99	28.89	-14.61	43.5	44.45	15.2	1.5	32.26	-	-	P	V
			180.35	27.61	-15.89	43.5	42.77	15.05	2.11	32.32	-	-	P	V
			438.37	24.07	-21.93	46	30.21	23.07	3.24	32.45	-	-	P	V
			686.69	27.55	-18.45	46	29.72	26.36	4.04	32.57	-	-	P	V
			950.53	34.56	-11.44	46	30.52	30.57	4.8	31.33	-	-	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.



<Ant.3>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over Limit	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 )	
BT CH00 2402MHz		2324.805	46.06	-27.94	74	41.65	27.2	7.3	30.09	121	139	P	H	
		2324.805	21.3	-32.7	54	-	-	-	-	-	-	A	H	
	*	2402	113.91	-	-	109.11	27.41	7.46	30.07	121	139	P	H	
	*	2402	89.15	-	-	-	-	-	-	-	-	A	H	
													H	
													H	
			2318.4	46.11	-27.89	74	41.71	27.2	7.29	30.09	341	92	P	V
			2318.4	21.35	-32.65	54	-	-	-	-	-	-	A	V
	*		2402	111.73	-	-	106.93	27.41	7.46	30.07	341	92	P	V
	*		2402	86.97	-	-	-	-	-	-	-	-	A	V
													V	
													V	
BT CH 39 2441MHz		2385.32	45.5	-28.5	74	40.8	27.34	7.43	30.07	360	253	P	H	
		2385.32	20.74	-33.26	54	-	-	-	-	-	-	A	H	
	*	2441	114.12	-	-	109.01	27.65	7.52	30.06	360	253	P	H	
	*	2441	89.36	-	-	-	-	-	-	-	-	A	H	
			2486.49	46.8	-27.2	74	41.4	27.85	7.59	30.04	360	253	P	H
			2486.49	22.04	-31.96	54	-	-	-	-	-	-	A	H
			2337.44	45.47	-28.53	74	41.03	27.2	7.33	30.09	366	134	P	V
			2337.44	20.71	-33.29	54	-	-	-	-	-	-	A	V
	*		2441	109.97	-	-	104.86	27.65	7.52	30.06	366	134	P	V
	*		2441	85.21	-	-	-	-	-	-	-	-	A	V
			2488.87	46.26	-27.74	74	40.85	27.86	7.59	30.04	366	134	P	V
			2488.87	21.5	-32.5	54	-	-	-	-	-	-	A	V



<b>BT CH 78 2480MHz</b>	*	2480	116.69	-	-	111.34	27.82	7.58	30.05	359	28	P	H
	*	2480	91.93	-	-	-	-	-	-	-	-	A	H
		2483.52	67.71	-6.29	74	62.33	27.83	7.59	30.04	359	28	P	H
		2483.52	42.95	-11.05	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	114.17	-	-	108.82	27.82	7.58	30.05	400	119	P	V
	*	2480	89.41	-	-	-	-	-	-	-	-	A	V
		2483.68	55.47	-18.53	74	50.09	27.83	7.59	30.04	400	119	P	V
		2483.68	30.71	-23.29	54	-	-	-	-	-	-	A	V
													V
													V
<b>Remark</b>	<ol style="list-style-type: none"> <li>1. No other spurious found.</li> <li>2. All results are PASS against Peak and Average limit line.</li> </ol>												



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

BT	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 )	
BT CH 00 2402MHz		4804	44.26	-29.74	74	66.81	32.32	11.3	66.17	-	-	P	H	
		4804	19.5	-34.5	54	-	-	-	-	-	-	A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4804	41.4	-32.6	74	63.95	32.32	11.3	66.17	-	-	P	V
			4804	16.64	-37.36	54	-	-	-	-	-	-	A	V
														V
														V
														V
														V
														V
														V
													V	
													V	







BT	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 )	
BT CH 78 2480MHz		4960	44.28	-29.72	74	65.81	33.12	11.41	66.06	-	-	P	H	
		4960	19.52	-34.48	54	-	-	-	-	-	-	A	H	
		7440	43.96	-30.04	74	59.8	36.46	13.49	65.79	-	-	P	H	
		7440	19.2	-34.8	54	-	-	-	-			A	H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
													H	
			4960	43.14	-30.86	74	64.67	33.12	11.41	66.06	-	-	P	V
			4960	18.38	-35.62	54	-	-	-	-	-	-	A	V
			7440	43.46	-30.54	74	59.3	36.46	13.49	65.79	-	-	P	V
			7440	18.7	-35.3	54	-	-	-	-	-	-	A	V
														V
														V
														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> </ol>													



Emission below 18GHz

2.4GHz BT (SHF)

BT	Note	Frequency	Level	Over	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 BT SHF		23592	39.77	-34.23	74	57.88	38.8	-2.97	53.94	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
													H
			24416	40.59	-33.41	74	57.77	39.03	-2.84	53.37	-	-	P
													V
													V
													V
													V
													V
													V
													V
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													V
													V
													V
Remark	<ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against 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> </ol>												



Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over Limit	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 )	
2.4GHz BT LF		32.91	20.9	-19.1	40	29.53	22.97	0.59	32.19	-	-	P	H	
		94.99	33.17	-10.33	43.5	48.73	15.2	1.5	32.26	-	-	P	H	
		177.44	31.78	-11.72	43.5	46.79	15.23	2.08	32.32	-	-	P	H	
		429.64	23.7	-22.3	46	29.94	23	3.2	32.44	-	-	P	H	
		746.83	30.03	-15.97	46	30.11	28.09	4.25	32.42	-	-	P	H	
		957.32	35.25	-10.75	46	30.9	30.79	4.83	31.27	-	-	P	H	
														H
														H
														H
														H
														H
			62.01	24.74	-15.26	40	43.97	11.96	1.12	32.31	-	-	P	V
			94.02	28.45	-15.05	43.5	44.2	15.03	1.49	32.27	-	-	P	V
			180.35	28.27	-15.23	43.5	43.43	15.05	2.11	32.32	-	-	P	V
			424.79	23.46	-22.54	46	29.74	22.98	3.17	32.43	-	-	P	V
			660.5	28.21	-17.79	46	30.64	26.19	3.98	32.6	-	-	P	V
			939.86	33.91	-12.09	46	30.31	30.24	4.78	31.42	-	-	P	V
														V
													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 limit line.</li> <li>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.</li> </ol>													



**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:

BT	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 )
BT CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H

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)

**Peak measured complies with the limit line, so test result is “PASS”.**



## Appendix D. Radiated Spurious Emission Plots

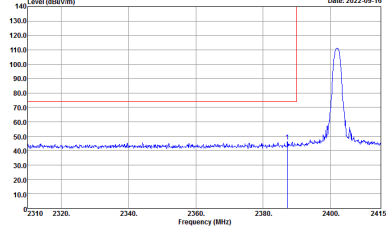
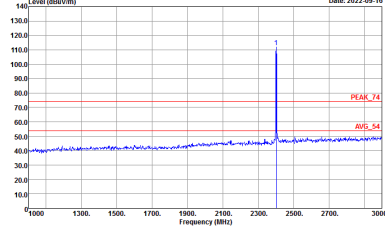
Test Engineer :	Andy Yang, Karl Hou and Steven Wu	Temperature :	15~25°C
		Relative Humidity :	50~65%

### 2.4GHz 2400~2483.5MHz

### BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4	Horizontal	Fundamental
Peak	<p>Site : 03CH15-HY Condition : PEAK_BE_74 3m 9120D_02114_210804 HORIZONTAL</p>	<p>Site : 03CH15-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL</p>



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
4	Vertical	Fundamental
Peak	 <p>Site : :03CH16-HY Condition : :PEAK_BE_74 3m 9120D_02114_210804 VERTICAL</p>	 <p>Site : :03CH16-HY Condition : :PEAK_74 3m 9120D_02114_210804 VERTICAL</p>



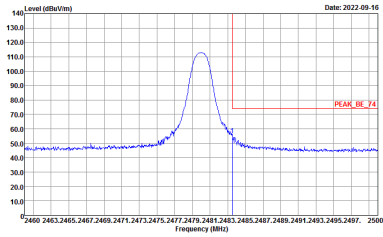
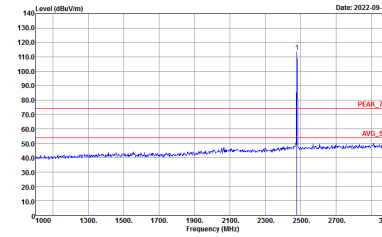
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4	Horizontal	Fundamental
Peak	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_02114_210804 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 HORIZONTAL</p>
Peak	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_02114_210804 HORIZONTAL</p>	Left blank





BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
4	Vertical	Fundamental
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_02114_210804 VERTICAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_02114_210804 VERTICAL</p>
Peak	<p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_02114_210804 VERTICAL</p>	Left blank



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH78 2480MHz</b>	
<b>4</b>	<b>Horizontal</b>	<b>Fundamental</b>
<b>Peak</b>	 <p>Site : :03CH16-HY Condition : :PEAK_BE_74 3m 9120D_02114_210804 HORIZONTAL</p>	 <p>Site : :03CH16-HY Condition : :PEAK_74 3m 9120D_02114_210804 HORIZONTAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH78 2480MHz</b>	
<b>4</b>	<b>Vertical</b>	<b>Fundamental</b>
<b>Peak</b>	<p>Site : :03CH16-HY Condition : :PEAK_BE_74 3m 9120D_02114_210804 VERTICAL</p>	<p>Site : :03CH16-HY Condition : :PEAK_74 3m 9120D_02114_210804 VERTICAL</p>



2.4GHz 2400~2483.5MHz

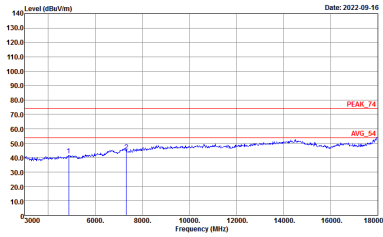
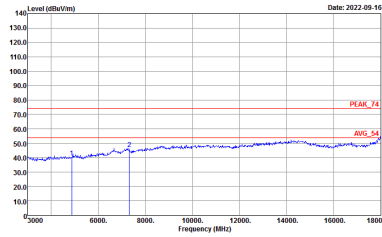
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
4	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 VERTICAL</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
4	Horizontal	Vertical
<p>14.47G ~14.5G Avg.</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p>17.7G ~18G Avg</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>

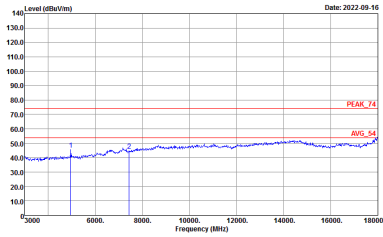
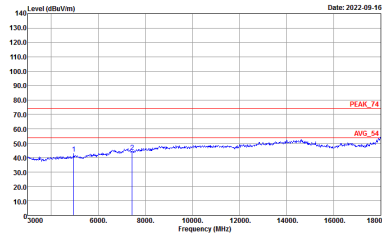


<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH39 2441MHz</b>	
<b>4</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak Avg.</b>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 VERTICAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH39 2441MHz</b>	
<b>4</b>	<b>Horizontal</b>	<b>Vertical</b>
<p><b>14.47G</b> <b>~14.5G</b> <b>Avg.</b></p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p><b>17.7G</b> <b>~18G</b> <b>Avg</b></p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH78 2480MHz</b>	
<b>4</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak Avg.</b>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>





BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
4	Horizontal	Vertical
<p>14.47G ~14.5G Avg.</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p>17.7G ~18G Avg</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>



Emission after 18GHz  
2.4GHz BT (SHF @ 1m)

BT	2.4GHz 2400~2483.5MHz	
ANT	BT SHF	
4	Horizontal	Vertical
<b>Peak</b> <b>Avg.</b>	<p>Site : 03CH16-HY Condition : PEAK_74 1m SHF ANT_9170_00993 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 1m SHF ANT_9170_00993 VERTICAL</p>



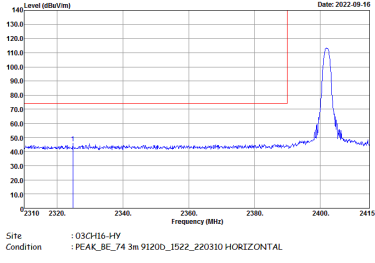
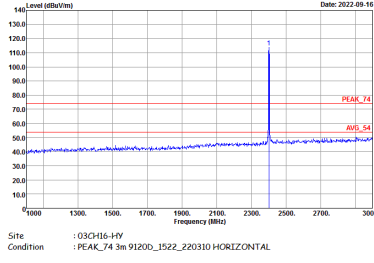
Emission below 1GHz  
2.4GHz BT (LF)

<b>BT</b>	<b>2.4GHz 2400~2483.5MHz</b>	
<b>ANT</b>	<b>BT LF</b>	
<b>4</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>QP / Peak</b>	<p>Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 VERTICAL</p>



2.4GHz 2400~2483.5MHz

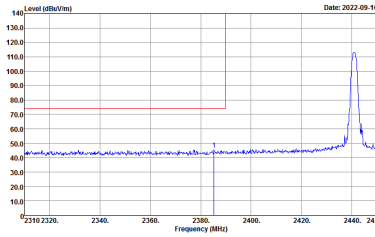
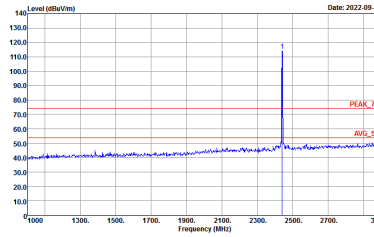
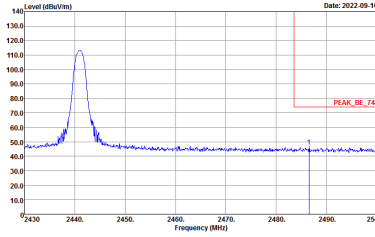
BT (Band Edge @ 3m)

<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH00 2402MHz</b>	
<b>3</b>	<b>Horizontal</b>	<b>Fundamental</b>
<b>Peak</b>	 <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 HORIZONTAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH00 2402MHz</b>	
<b>3</b>	<b>Vertical</b>	<b>Fundamental</b>
<b>Peak</b>	<p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 VERTICAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH39 2441MHz	
3	Horizontal	Fundamental
Peak	 <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 HORIZONTAL</p>
Peak	 <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 HORIZONTAL</p>	Left blank



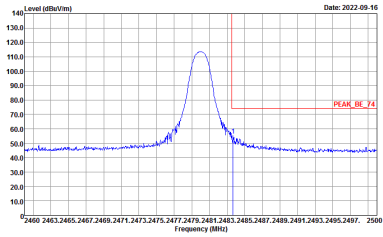
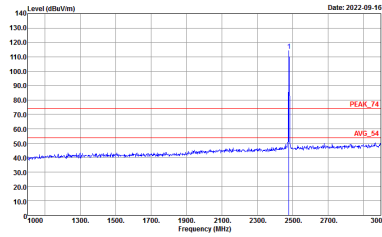
<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH39 2441MHz</b>	
<b>3</b>	<b>Vertical</b>	<b>Fundamental</b>
<b>Peak</b>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 VERTICAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>
<b>Peak</b>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 VERTICAL</p>	<b>Left blank</b>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Band Edge @ 3m</b>	
<b>ANT</b>	<b>BT CH78 2480MHz</b>	
<b>3</b>	<b>Horizontal</b>	<b>Fundamental</b>
<b>Peak</b>	<p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 HORIZONTAL</p>



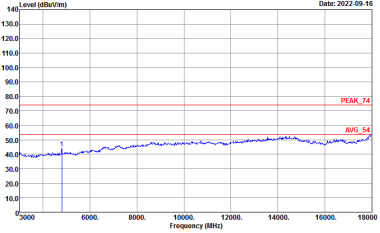
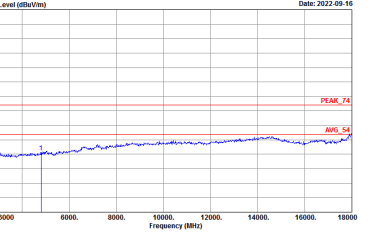


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
3	Vertical	Fundamental
Peak	 <p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_BE_74 3m 9120D_1522_220310 VERTICAL</p>	 <p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
3	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : PEAK_74 3m 91200_1522_220310 VERTICAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH00 2402MHz</b>	
<b>3</b>	<b>Horizontal</b>	<b>Vertical</b>
<p><b>14.47G</b> <b>~14.5G</b> <b>Avg.</b></p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p><b>17.7G</b> <b>~18G</b> <b>Avg</b></p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH39 2441MHz</b>	
<b>3</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak Avg.</b>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>

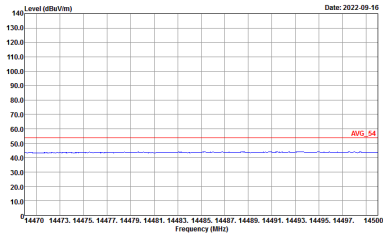
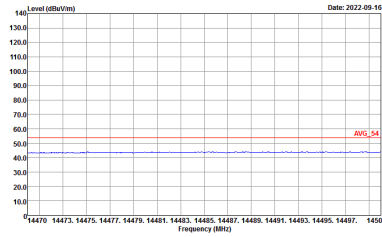
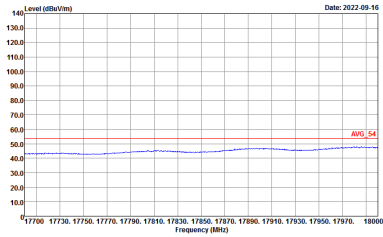
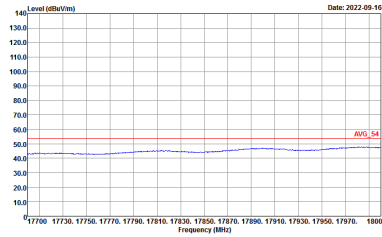


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH39 2441MHz	
3	Horizontal	Vertical
<p>14.47G ~14.5G Avg.</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p>17.7G ~18G Avg</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	<p>Date: 2022-09-16</p> <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>



<b>BT</b>	<b>2.4GHz 2400~2483.5MHz Harmonic @ 3m</b>	
<b>ANT</b>	<b>BT CH78 2480MHz</b>	
<b>3</b>	<b>Horizontal</b>	<b>Vertical</b>
<b>Peak Avg.</b>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 HORIZONTAL</p>	<p>Site : 03CH16-HY Condition : PEAK_74 3m 9120D_1522_220310 VERTICAL</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
3	Horizontal	Vertical
<p>14.47G ~14.5G Avg.</p>	 <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>
<p>17.7G ~18G Avg</p>	 <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : AV6_54 3m 91200_1522_220310 VERTICAL</p>



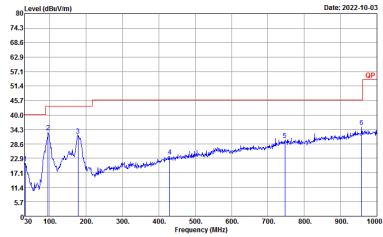
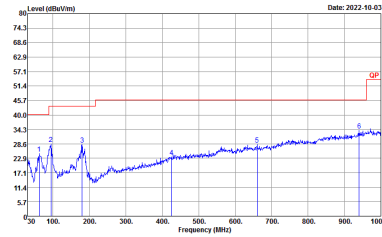
Emission after 18GHz  
2.4GHz BT (SHF @ 1m)

BT	2.4GHz 2400~2483.5MHz	
ANT	BT SHF	
3	Horizontal	Vertical
Peak Avg.		





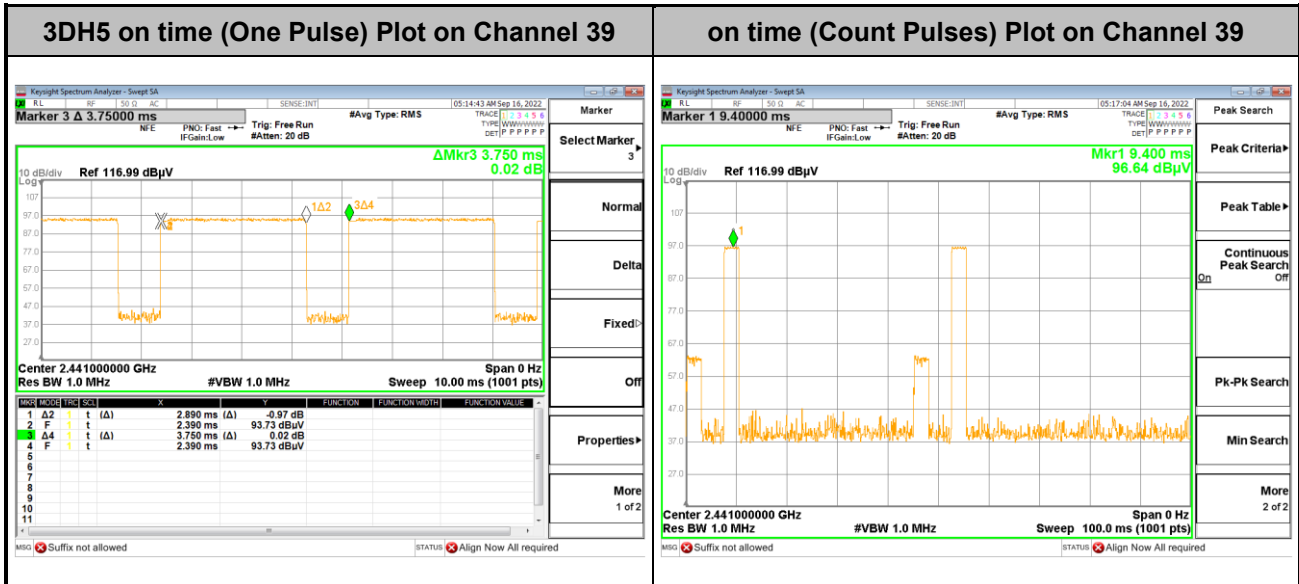
Emission below 1GHz  
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
ANT	BT LF	
3	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 HORIZONTAL</p>	 <p>Site : 03CH16-HY Condition : QP 3m BIL06_47020_211009 VERTICAL</p>



# Appendix E. Duty Cycle Plots

<Ant. 4>



**Note:**

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.89 / 100 = 5.78 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. 3DH5 has the highest duty cycle worst case and is reported.

### Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.89 \text{ ms} \times 20 \text{ channels} = 57.8 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100 \text{ ms} / 57.8 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

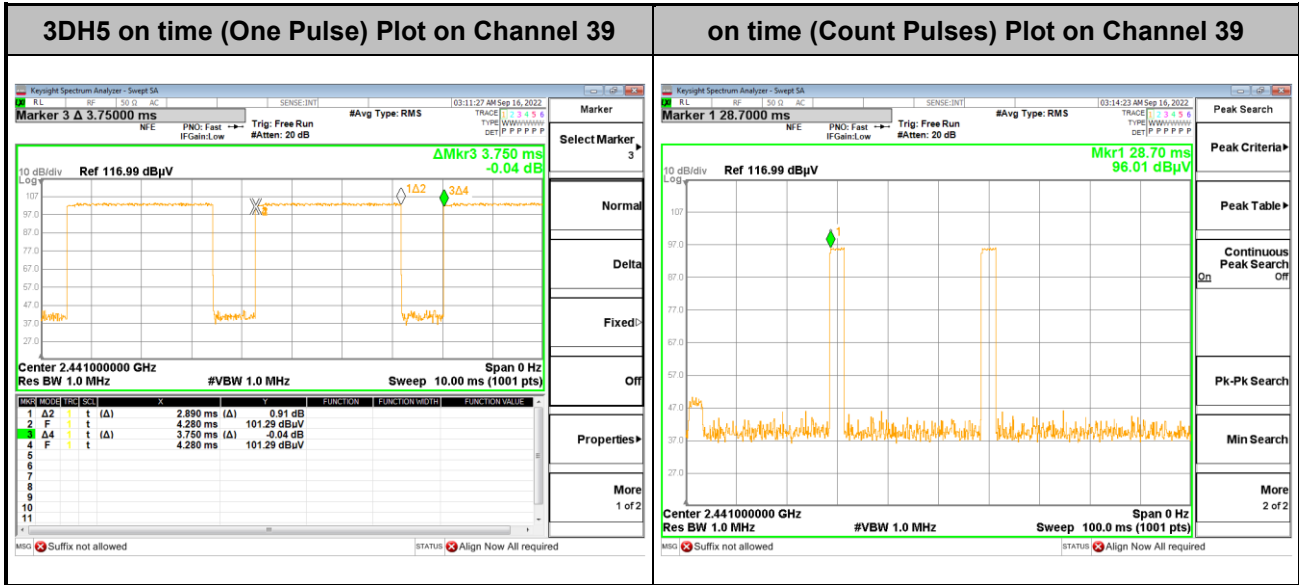
$$2.89 \text{ ms} \times 2 = 5.78 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.78 \text{ ms}/100 \text{ ms}) = -24.76 \text{ dB}$$



<Ant. 3>



**Note:**

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.89 / 100 = 5.78 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. 3DH5 has the highest duty cycle worst case and is reported.

**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the on time period to have DH5 packet completing one hopping sequence is

$$2.89 \text{ ms} \times 20 \text{ channels} = 57.8 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100 \text{ ms} / 57.8 \text{ ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.89 \text{ ms} \times 2 = 5.78 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.78 \text{ ms}/100 \text{ ms}) = -24.76 \text{ dB}$$

—————THE END—————