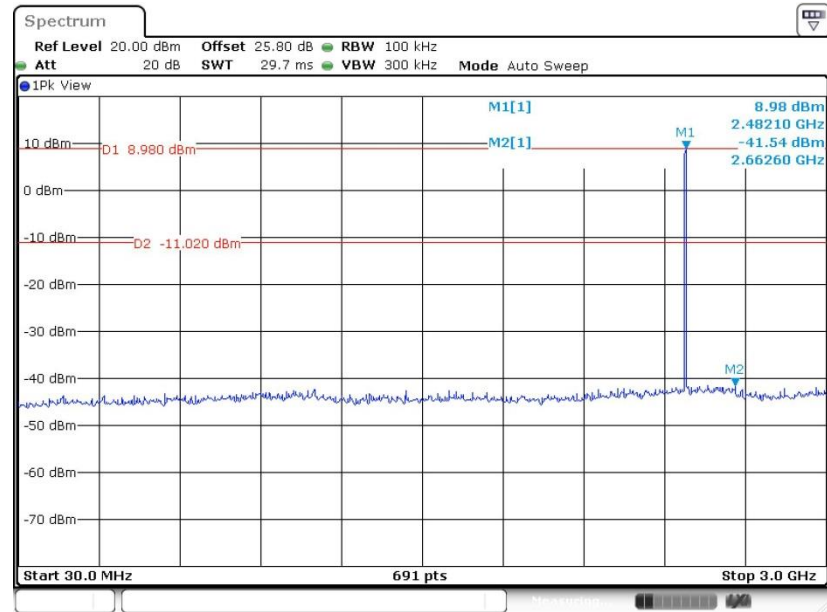
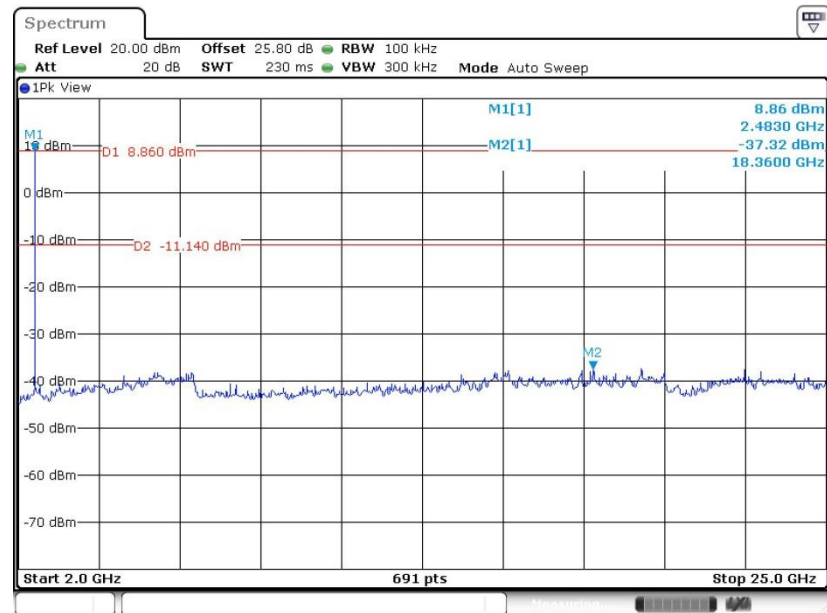


CSE Plot on Ch 78 between 30MHz ~ 3 GHz


Date: 16.SEP.2019 13:08:13

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz


Date: 16.SEP.2019 13:08:41

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

See list of measuring equipment of this test report.

3.8.3 Test Procedures

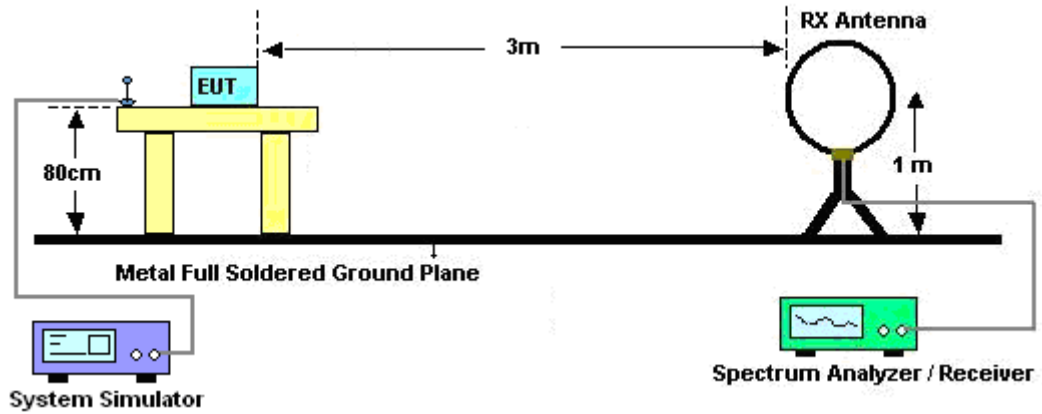
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. For each suspected emission, the EUT was 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 to the maximum power setting and enable the EUT 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=1MHz 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
$$\text{On time} = N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$$

Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

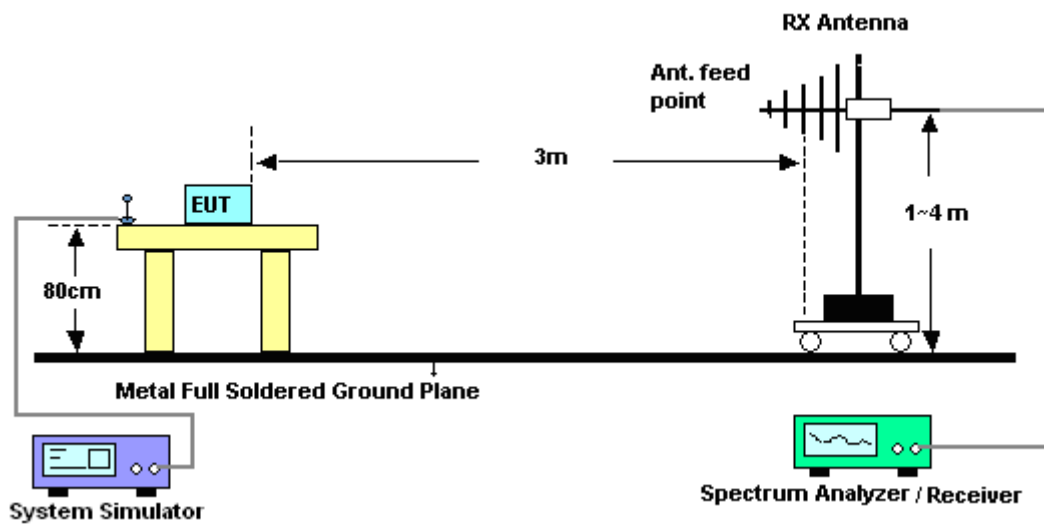
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB for Sample 1, Sample 2, Sample 3)(-24.73dB for Sample 4) derived from $20\log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, 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

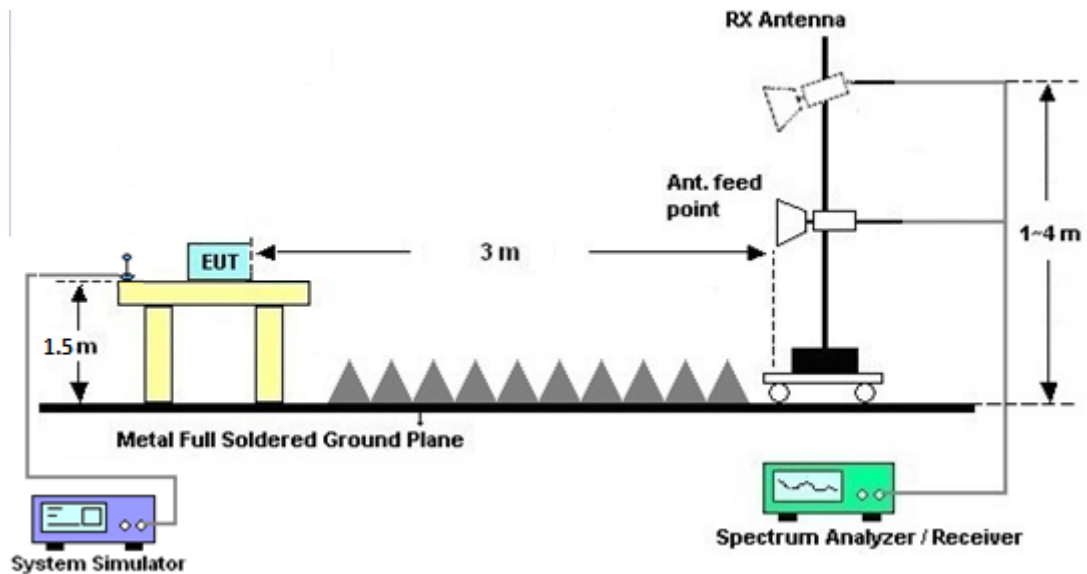
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came 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 ~ 10th 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 μ 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.

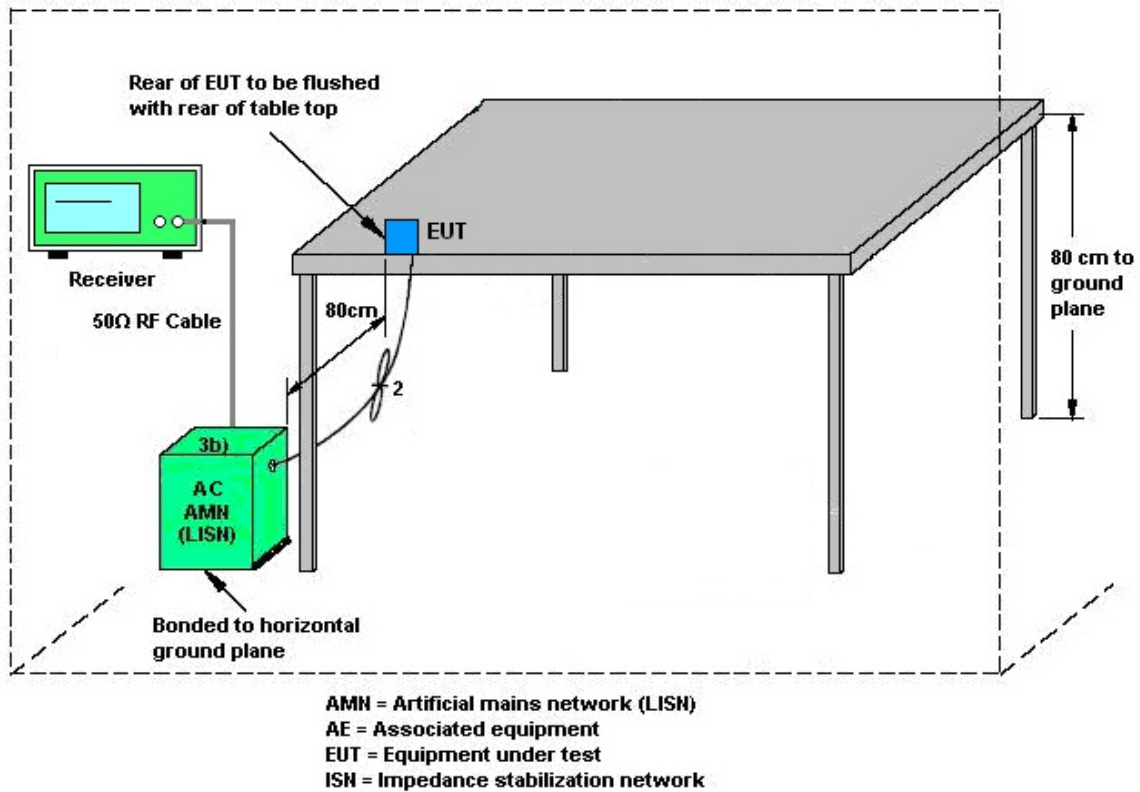
3.9.2 Measuring Instruments

See list of measuring equipment of this test report.

3.9.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was 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 should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) 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

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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.

3.10.3 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	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Sensor	DARE	RPR3006W	RPR6W-1901027	10MHz~6GHz	Jun. 27, 2019	Sep. 16, 2019	Jun. 26, 2020	Conducted (TH01-CA)
Power Sensor	Anritsu	MA2411B	1726149	300MHz~40GHz	Aug. 15, 2019	Sep. 16, 2019	Aug. 14, 2020	Conducted (TH01-CA)
Power Meter	Anritsu	ML2495A	1804004	N/A	Aug. 14, 2019	Sep. 16, 2019	Aug. 13, 2020	Conducted (TH01-CA)
Spectrum Analyzer	Rohde & Schwarz	FSV 40	101545	10Hz~40GHz	May 17, 2019	Sep. 16, 2019	May 16, 2020	Conducted (TH01-CA)
Switch Box & RF Cable	EM	EMSW18	SW1070902	N/A	Apr. 07, 2019	Sep. 16, 2019	Apr. 06, 2020	Conducted (TH01-CA)
LISN	TESEQ	NNB51	47407	N/A	Jun. 26, 2019	Aug. 20, 2019	Jun. 25, 2020	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9KHz~7GHz	Jun. 27, 2019	Aug. 20, 2019	Jun. 26, 2020	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F-N00412	N/A	Jun. 11, 2019	Aug. 20, 2019	Jun. 10, 2020	Conduction (CO01-CA)
Test Software	EMC32	N/A	N/A	N/A	N/A	Aug. 20, 2019	N/A	Conduction (CO01-CA)
Bilog Antenna	TESEQ	6111D	50392	30MHz~1GHz	May 15, 2019	Aug. 09, 2019~Sep. 12, 2019	May 14, 2020	Radiation (03CH02-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	01894	1GHz~18GHz	Jul. 22, 2019	Aug. 09, 2019~Sep. 12, 2019	Jul. 21, 2020	Radiation (03CH02-CA)
Amplifier	SONOMA	310N	372241	N/A	Jul. 26, 2019	Aug. 09, 2019~Sep. 12, 2019	Jul. 25, 2020	Radiation (03CH02-CA)
Preamplifier	Keysight	83017A	MY53270321	1GHz~26.5GHz	Sep. 27, 2018	Aug. 09, 2019~Sep. 12, 2019	Sep. 26, 2019	Radiation (03CH02-CA)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055007	1GHz~18GHz	Apr. 01, 2019	Aug. 09, 2019~Sep. 12, 2019	Mar. 31, 2020	Radiation (03CH02-CA)
EMI Test Receiver	R&S	ESU26	100049	20Hz~26.5GHz	Jul. 31, 2019	Aug. 09, 2019~Sep. 12, 2019	Jul. 30, 2020	Radiation (03CH02-CA)
Filter	Wainwright	WLK12-1200-1272-11000-40SS	SN2	1.2G Low Pass	Aug. 02, 2019	Aug. 09, 2019~Sep. 12, 2019	Aug. 01, 2020	Radiation (03CH02-CA)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN10	3G Highpass	Aug. 02, 2019	Aug. 09, 2019~Sep. 12, 2019	Aug. 01, 2020	Radiation (03CH02-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Aug. 09, 2019~Sep. 12, 2019	N/A	Radiation (03CH02-CA)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Aug. 09, 2019~Sep. 12, 2019	N/A	Radiation (03CH02-CA)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	1.7
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.4
--	-----

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	6.5
--	-----

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	6.3
--	-----

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Jordan Huang	Temperature:	21~25	°C
Test Date:	2019/9/16	Relative Humidity:	51~54	%

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	0.952	0.889	0.999	0.6348	Pass
DH	1Mbps	1	39	2441	0.952	0.886	1.164	0.6348	Pass
DH	1Mbps	1	78	2480	0.955	0.886	0.994	0.6367	Pass
2DH	2Mbps	1	0	2402	1.276	1.169	0.999	0.8509	Pass
2DH	2Mbps	1	39	2441	1.276	1.169	1.168	0.8509	Pass
2DH	2Mbps	1	78	2480	1.281	1.169	1.033	0.8539	Pass
3DH	3Mbps	1	0	2402	1.294	1.172	1.164	0.8625	Pass
3DH	3Mbps	1	39	2441	1.289	1.169	1.007	0.8596	Pass
3DH	3Mbps	1	78	2480	1.294	1.175	1.164	0.8625	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
Nomal	79	106.67	2.90	0.31	0.4	Pass
AFH	20	53.33	2.90	0.15	0.4	Pass

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

DH	CH.	NTX	Peak Power (dBm)	Power Limit (dBm)	Test Result
DH5	0	1	11.10	20.97	Pass
	39	1	11.11	20.97	Pass
	78	1	11.52	20.97	Pass
2DH5	0	1	10.75	20.97	Pass
	39	1	10.79	20.97	Pass
	78	1	11.22	20.97	Pass
3DH5	0	1	10.96	20.97	Pass
	39	1	11.10	20.97	Pass
	78	1	11.58	20.97	Pass

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

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH5	0	1	10.04	1.17
	39	1	10.08	1.17
	78	1	10.64	1.17
2DH5	0	1	7.84	1.18
	39	1	7.91	1.18
	78	1	8.51	1.18
3DH5	0	1	7.82	1.19
	39	1	7.91	1.19
	78	1	8.51	1.19

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

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



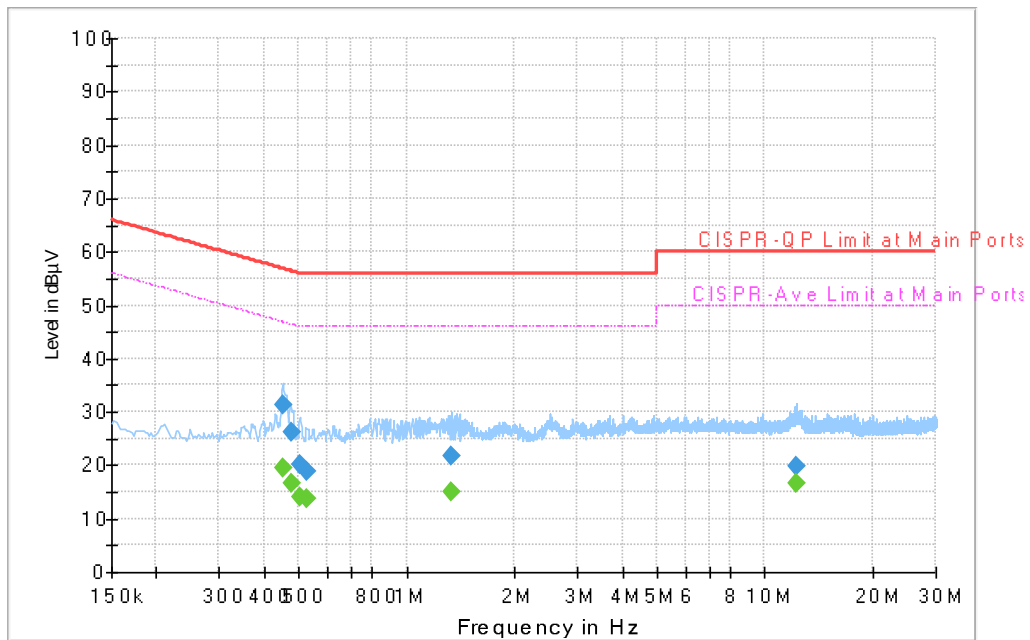
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Eric Jeng	Temperature :	22~25°C
		Relative Humidity :	52~55%

EUT Information

Test Site : CO01-CA
 Project No : 190805001
 TestMode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



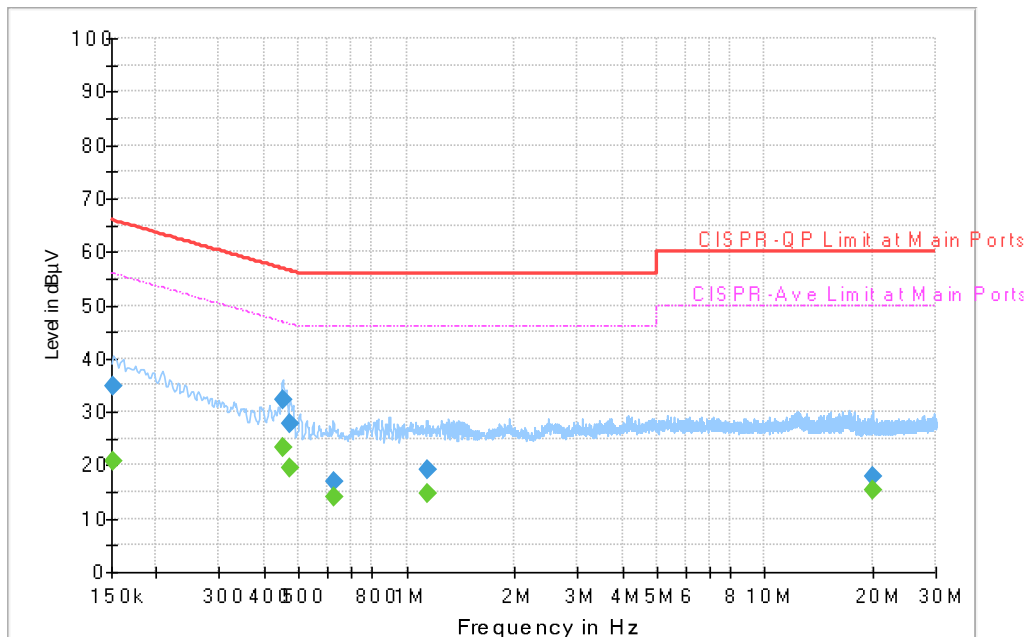
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.451572	---	19.43	46.85	27.42	L1	OFF	20.0
0.451572	31.34	---	56.85	25.51	L1	OFF	20.0
0.475080	---	16.74	46.43	29.69	L1	OFF	20.0
0.475080	26.07	---	56.43	30.36	L1	OFF	20.0
0.505878	---	14.06	46.00	31.94	L1	OFF	20.0
0.505878	20.13	---	56.00	35.87	L1	OFF	20.0
0.525228	---	13.70	46.00	32.30	L1	OFF	20.0
0.525228	18.76	---	56.00	37.24	L1	OFF	20.0
1.336884	---	14.89	46.00	31.11	L1	OFF	20.0
1.336884	21.87	---	56.00	34.13	L1	OFF	20.0
12.297948	---	16.72	50.00	33.28	L1	OFF	20.2
12.297948	19.91	---	60.00	40.09	L1	OFF	20.2

EUT Information

Test Site : CO01-CA
 Project No : 190805001
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.151418	---	20.85	55.92	35.07	N	OFF	20.0
0.151418	34.86	---	65.92	31.06	N	OFF	20.0
0.451410	---	23.23	46.85	23.62	N	OFF	20.0
0.451410	32.16	---	56.85	24.69	N	OFF	20.0
0.472920	---	19.51	46.46	26.95	N	OFF	20.0
0.472920	27.95	---	56.46	28.51	N	OFF	20.0
0.627000	---	13.99	46.00	32.01	N	OFF	20.0
0.627000	16.92	---	56.00	39.08	N	OFF	20.0
1.139280	---	14.65	46.00	31.35	N	OFF	20.0
1.139280	19.06	---	56.00	36.94	N	OFF	20.0
19.954500	---	15.33	50.00	34.67	N	OFF	20.3
19.954500	17.76	---	60.00	42.24	N	OFF	20.3



Appendix C. Radiated Spurious Emission

Test Engineer :	HAO SYU	Temperature :	23~26°C
		Relative Humidity :	41~49%

<Sample 1>

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 CH 78 2480MHz	*	2480	88.28	-	-	84.35	27.56	7.49	31.12	358	71	P	H
	*	2480	63.49	-	-	-	-	-	-	-	-	A	H
		2486.8	48.05	-25.95	74	44.09	27.58	7.5	31.12	358	71	P	H
		2486.8	23.26	-30.74	54	-	-	-	-	-	-	A	H
	*	2480	104.65	-	-	100.68	27.6	7.49	31.12	100	300	P	V
	*	2480	79.86	-	-	-	-	-	-	-	-	A	V
		2483.52	50.98	-23.02	74	46.99	27.61	7.5	31.12	100	300	P	V
		2483.52	26.19	-27.81	54	-	-	-	-	-	-	A	V
Remark	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	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 CH 78 2480MHz		4960	40.86	-33.14	74	57.17	31.44	11.44	59.19	100	0	P	H
		4960	16.07	-37.93	54	-	-	-	-	-	-	A	H
		7440	44.68	-29.32	74	53.3	36.27	14.23	59.12	100	0	P	H
		7440	19.89	-34.11	54	-	-	-	-	-	-	A	H
		4960	45.44	-28.56	74	61.52	31.67	11.44	59.19	100	0	P	V
		4960	20.65	-33.35	54	-	-	-	-	-	-	A	V
		7440	46.01	-27.99	74	54.56	36.34	14.23	59.12	100	0	P	V
		7440	21.22	-32.78	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		30.97	21.68	-18.32	40	28.85	24.31	0.95	32.43	-	-	P	H
		259.89	19.99	-26.01	46	29.42	20.18	2.83	32.44	-	-	P	H
		474.26	24.84	-21.16	46	30.36	23.59	3.59	32.7	-	-	P	H
		670.2	29.28	-16.72	46	31.38	26.5	4.25	32.85	-	-	P	H
		753.62	30.34	-15.66	46	30.48	28.13	4.47	32.74	-	-	P	H
		959.26	34.53	-11.47	46	29.86	30.99	5.08	31.4	-	-	P	H
		32.91	22.24	-17.76	40	30.07	23.62	0.98	32.43	-	-	P	V
		141.55	17.06	-26.44	43.5	29.79	17.6	2.07	32.4	-	-	P	V
		427.7	23.61	-22.39	46	30.01	22.9	3.34	32.64	-	-	P	V
		568.35	27.38	-18.62	46	30.4	26.1	3.7	32.82	-	-	P	V
		791.45	30.43	-15.57	46	30.27	28.17	4.58	32.59	-	-	P	V
		953.44	34.18	-11.82	46	29.74	30.87	5.03	31.46	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Sample 2>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 78 2480MHz	*	2480	88.41	-	-	84.48	27.56	7.49	31.12	399	57	P	H
	*	2480	63.62	-	-	-	-	-	-	-	-	A	H
		2499.04	47.29	-26.71	74	43.26	27.62	7.52	31.11	399	57	P	H
		2499.04	22.5	-31.5	54	-	-	-	-	-	-	A	H
	*	2480	104.33	-	-	100.36	27.6	7.49	31.12	104	297	P	V
	*	2480	79.54	-	-	-	-	-	-	-	-	A	V
		2483.56	50.33	-23.67	74	46.34	27.61	7.5	31.12	104	297	P	V
		2483.56	25.54	-28.46	54	-	-	-	-	-	-	A	V
Remark	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	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl 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 CH 78 2480MHz		4960	40.84	-33.16	74	57.15	31.44	11.44	59.19	100	0	P	H
		4960	16.05	-37.95	54	-	-	-	-	-	-	A	H
		7440	45.17	-28.83	74	53.79	36.27	14.23	59.12	100	0	P	H
		7440	20.38	-33.62	54	-	-	-	-	-	-	A	H
		4960	41.76	-32.24	74	57.84	31.67	11.44	59.19	100	0	P	V
		4960	16.97	-37.03	54	-	-	-	-	-	-	A	V
		7440	46.27	-27.73	74	54.82	36.34	14.23	59.12	100	0	P	V
		7440	21.48	-32.52	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz
2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		31.94	20.54	-19.46	40	28.21	23.83	0.97	32.47	-	-	P	H
		123.12	16.97	-26.53	43.5	29.99	17.6	1.8	32.42	-	-	P	H
		425.76	22.05	-23.95	46	28.32	22.9	3.32	32.49	-	-	P	H
		570.29	25.91	-20.09	46	28.68	26.09	3.71	32.57	-	-	P	H
		745.86	29.57	-16.43	46	29.31	28.2	4.46	32.4	-	-	P	H
		950.53	33.02	-12.98	46	28.36	30.81	5.01	31.16	100	0	P	H
		30.97	21.72	-18.28	40	28.93	24.31	0.95	32.47	-	-	P	V
		237.58	16.16	-29.84	46	28.87	17.01	2.69	32.41	-	-	P	V
		424.79	21.69	-24.31	46	27.99	22.89	3.3	32.49	-	-	P	V
		613.94	25.75	-20.25	46	28.7	25.68	3.94	32.57	-	-	P	V
		724.52	29.29	-16.71	46	29.9	27.37	4.46	32.44	-	-	P	V
		949.56	32.93	-13.07	46	28.31	30.79	5.01	31.18	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Sample 3>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2382.135	46.36	-27.64	74	42.93	27.27	7.33	31.17	230	4	P	H
		2382.135	21.57	-32.43	54	-	-	-	-	-	-	A	H
	*	2402	100.69	-	-	97.17	27.32	7.36	31.16	230	4	P	H
	*	2402	75.9	-	-	-	-	-	-	-	-	A	H
		2383.71	51.69	-22.31	74	48.18	27.34	7.34	31.17	100	247	P	V
		2383.71	26.9	-27.1	54	-	-	-	-	-	-	A	V
	*	2402	103.61	-	-	100.02	27.39	7.36	31.16	100	247	P	V
	*	2402	78.82	-	-	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		2376.78	51.51	-22.49	74	48.11	27.25	7.33	31.18	292	28	P	H
		2376.78	26.72	-27.28	54	-	-	-	-	-	-	A	H
	*	2441	90.94	-	-	87.21	27.44	7.43	31.14	292	28	P	H
	*	2441	66.15	-	-	-	-	-	-	-	-	A	H
		2498.67	51.49	-22.51	74	47.46	27.62	7.52	31.11	292	28	P	H
		2498.67	26.7	-27.3	54	-	-	-	-	-	-	A	H
		2381.96	51.6	-22.4	74	48.11	27.33	7.33	31.17	101	299	P	V
		2381.96	26.81	-27.19	54	-	-	-	-	-	-	A	V
	*	2441	104.61	-	-	100.83	27.49	7.43	31.14	101	299	P	V
	*	2441	79.82	-	-	-	-	-	-	-	-	A	V
		2497.69	51.86	-22.14	74	47.8	27.65	7.52	31.11	101	299	P	V
		2497.69	27.07	-26.93	54	-	-	-	-	-	-	A	V



FCC RADIO TEST REPORT

Report No. : FR190805001A

BT CH 78 2480MHz	*	2480	90.02	-	-	86.09	27.56	7.49	31.12	361	354	P	H
	*	2480	65.23	-	-	-	-	-	-	-	-	A	H
		2495.48	47.34	-26.66	74	43.32	27.61	7.52	31.11	361	354	P	H
		2495.48	22.55	-31.45	54	-	-	-	-	-	-	A	H
	*	2480	104.53	-	-	100.56	27.6	7.49	31.12	100	300	P	V
	*	2480	79.74	-	-	-	-	-	-	-	-	A	V
		2483.68	53.81	-20.19	74	49.82	27.61	7.5	31.12	100	300	P	V
		2483.68	29.02	-24.98	54	-	-	-	-	-	-	A	V
Remark	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	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 CH 00 2402MHz		4804	39.56	-34.44	74	55.64	31.22	11.86	59.16	100	0	P	H
		4804	14.77	-39.23	54	-	-	-	-	-	-	A	H
		4804	39.64	-34.36	74	55.58	31.36	11.86	59.16	100	0	P	V
		4804	14.85	-39.15	54	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		4960	38.75	-35.25	74	55.06	31.44	11.44	59.19	100	0	P	H
		4960	13.96	-40.04	54	-	-	-	-	-	-	A	H
		7440	44.98	-29.02	74	53.6	36.27	14.23	59.12	100	0	P	H
		7440	20.19	-33.81	54	-	-	-	-	-	-	A	H
		4960	39.63	-34.37	74	55.71	31.67	11.44	59.19	100	0	P	V
		4960	14.84	-39.16	54	-	-	-	-	-	-	A	V
		7440	45.11	-28.89	74	53.66	36.34	14.23	59.12	100	0	P	V
		7440	20.32	-33.68	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	39.14	-34.86	74	55.45	31.44	11.44	59.19	100	0	P	H
		4960	14.35	-39.65	54	-	-	-	-	-	-	A	H
		7440	45.74	-28.26	74	54.36	36.27	14.23	59.12	100	0	P	H
		7440	20.95	-33.05	54	-	-	-	-	-	-	A	H
		4960	40.65	-33.35	74	56.73	31.67	11.44	59.19	100	0	P	V
		4960	15.86	-38.14	54	-	-	-	-	-	-	A	V
		7440	47.05	-26.95	74	55.6	36.34	14.23	59.12	100	0	P	V
		7440	22.26	-31.74	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz
2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		71.71	17.11	-22.89	40	35.48	12.57	1.51	32.45	-	-	P	H
		258.92	18.2	-27.8	46	27.78	20.01	2.82	32.41	-	-	P	H
		403.45	20.42	-25.58	46	27.84	21.94	3.11	32.47	-	-	P	H
		576.11	26.07	-19.93	46	29.03	25.88	3.74	32.58	-	-	P	H
		749.74	29.06	-16.94	46	28.79	28.2	4.46	32.39	-	-	P	H
		935.98	32.79	-13.21	46	28.8	30.34	4.99	31.34	100	0	P	H
		31.94	22.55	-17.45	40	30.22	23.83	0.97	32.47	-	-	P	V
		70.74	23.88	-16.12	40	42.33	12.47	1.53	32.45	-	-	P	V
		334.58	19.44	-26.56	46	29.11	19.89	2.87	32.43	-	-	P	V
		570.29	25.46	-20.54	46	28.23	26.09	3.71	32.57	-	-	P	V
		741.98	28.83	-17.17	46	28.69	28.08	4.46	32.4	-	-	P	V
		958.29	32.36	-13.64	46	27.42	30.97	5.06	31.09	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Sample 4>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 78 2480MHz	*	2480	94	-	-	90.07	27.56	7.49	31.12	287	23	P	H
	*	2480	69.27	-	-	-	-	-	-	-	-	A	H
		2494.04	47.36	-26.64	74	43.35	27.6	7.52	31.11	287	23	P	H
		2494.04	22.63	-31.37	54	-	-	-	-	-	-	A	H
	*	2480	105.36	-	-	101.39	27.6	7.49	31.12	100	302	P	V
	*	2480	80.63	-	-	-	-	-	-	-	-	A	V
		2483.8	53.34	-20.66	74	49.35	27.61	7.5	31.12	100	302	P	V
		2483.8	28.61	-25.39	54	-	-	-	-	-	-	A	V
Remark	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	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preampl 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 CH 78 2480MHz		4960	40.08	-33.92	74	56.39	31.44	11.44	59.19	100	0	P	H
		4960	15.35	-38.65	54	-	-	-	-	-	-	A	H
		7440	45.5	-28.5	74	54.12	36.27	14.23	59.12	100	0	P	H
		7440	20.77	-33.23	54	-	-	-	-	-	-	A	H
		4960	41.73	-32.27	74	57.81	31.67	11.44	59.19	100	0	P	V
		4960	17	-37	54	-	-	-	-	-	-	A	V
		7440	44.67	-29.33	74	53.22	36.34	14.23	59.12	100	0	P	V
		7440	19.94	-34.06	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz
2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		140.58	15.41	-28.09	43.5	28.16	17.6	2.07	32.42	-	-	P	H
		265.71	19.24	-26.76	46	28.69	20.13	2.83	32.41	-	-	P	H
		472.32	23.27	-22.73	46	28.65	23.55	3.59	32.52	-	-	P	H
		652.74	26.78	-19.22	46	28.75	26.45	4.14	32.56	-	-	P	H
		741.01	29.11	-16.89	46	29.01	28.04	4.46	32.4	-	-	P	H
		958.29	31.36	-14.64	46	26.42	30.97	5.06	31.09	100	0	P	H
		132.82	15.89	-27.61	43.5	28.67	17.7	1.95	32.43			P	V
		264.74	18.56	-27.44	46	27.86	20.29	2.82	32.41			P	V
		476.2	23.04	-22.96	46	28.38	23.6	3.59	32.53			P	V
		638.19	27.43	-18.57	46	29.48	26.46	4.06	32.57			P	V
		794.36	29.28	-16.72	46	28.78	28.11	4.6	32.21			P	V
		953.44	32.51	-13.49	46	27.75	30.87	5.03	31.14	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

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

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”.



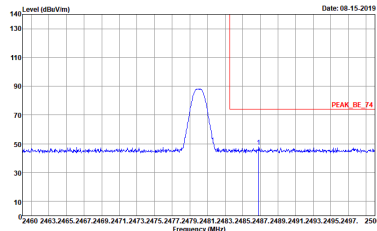
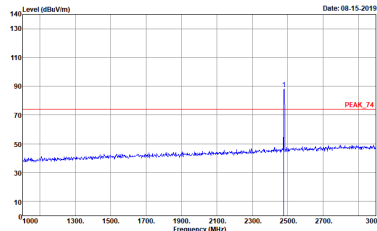
Appendix D. Radiated Spurious Emission Plots

Test Engineer :	HAO SYU	Temperature :	23~26°C
		Relative Humidity :	41~49%

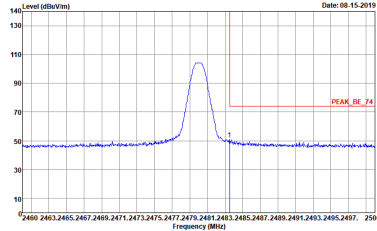
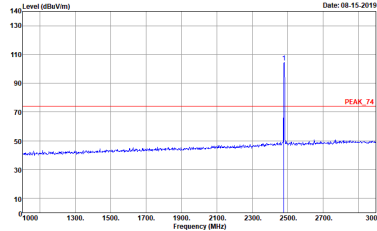
<Sample 1>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-4F_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 11 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-4F_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 11 Plane : Y_StandAlone



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : II Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : II Plane : Y_StandAlone

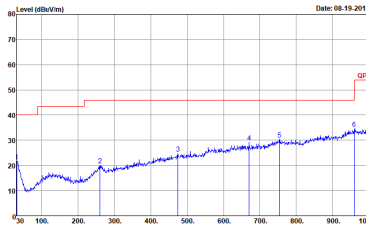
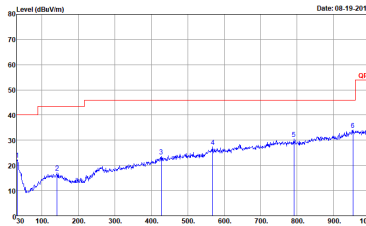


2.4GHz 2400~2483.5MHz

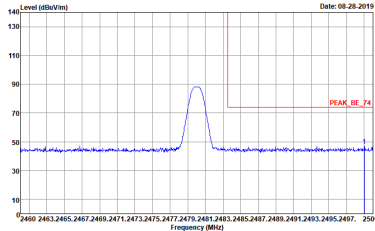
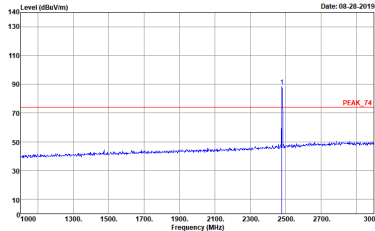
BT (Harmonic @ 3m)

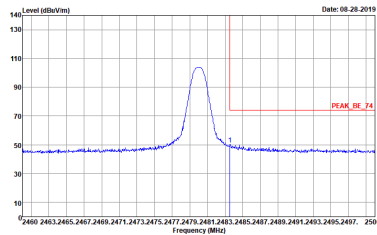
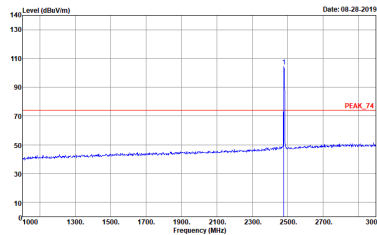
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 11 Plane : Y_StandAlone	Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 11 Plane : Y_StandAlone

Emission below 1GHz
2.4GHz BT (LF)

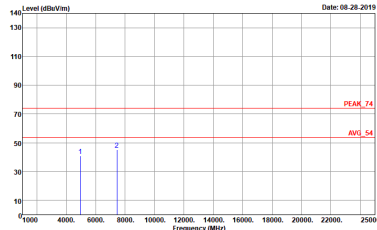
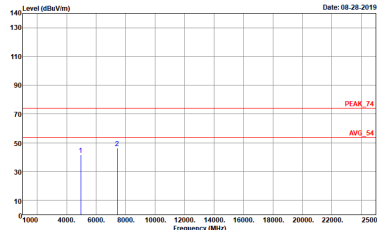
BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH02-CA Condition : QP 3m BTLOG 6111D-LF_50392 HORIZONTAL Detector : Peak Project : 190805001 Mode : 19	 Site : 03CH02-CA Condition : QP 3m BTLOG 6111D-LF_50392 VERTICAL Detector : Peak Project : 190805001 Mode : 19

<Sample 2>
2.4GHz 2400~2483.5MHz
BT (Band Edge @ 3m)

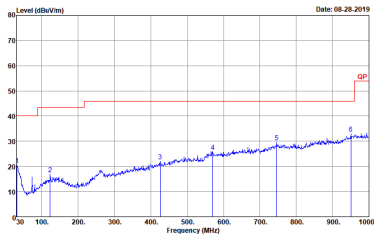
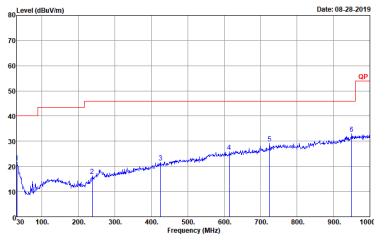
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 HORIZONTAL RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto Detector : Peak Project : 190805001 Mode : 10 Plane : -Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto Detector : Peak Project : 190805001 Mode : 10 Plane : -Y_StandAlone

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 10 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 10 Plane : Y_StandAlone

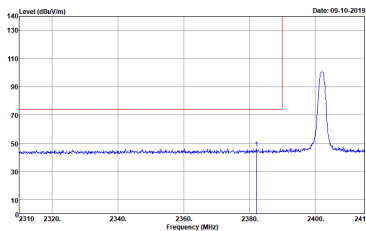
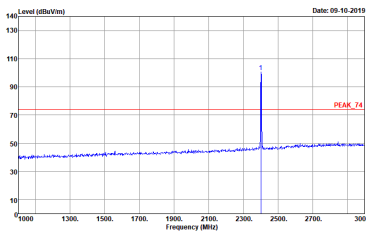
2.4GHz 2400~2483.5MHz
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 10 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 10 Plane : Y_StandAlone

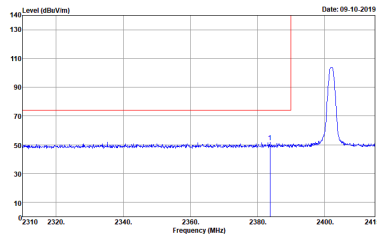
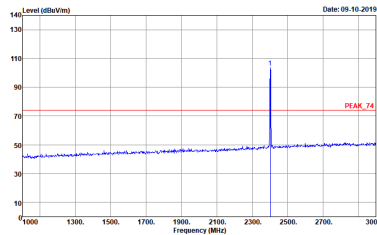
Emission below 1GHz
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH02-CA Condition : QP 3m B1LOG 6111D-LF_50392 HORIZONTAL Detector : Peak Project : 190805001 Mode : 18	 Site : 03CH02-CA Condition : QP 3m B1LOG 6111D-LF_50392 VERTICAL Detector : Peak Project : 190805001 Mode : 18

<Sample 3>
2.4GHz 2400~2483.5MHz
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone

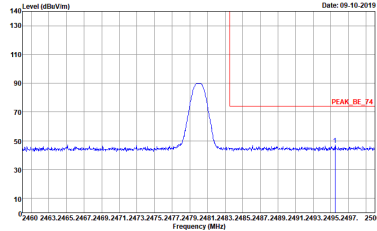
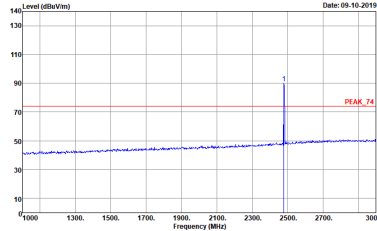


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : Y_StandAlone	Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : Y_StandAlone
Peak	Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : Y_StandAlone	Left blank

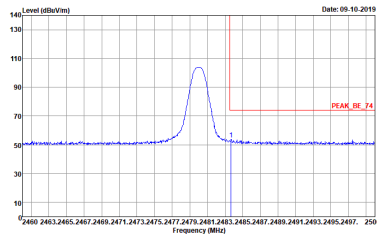
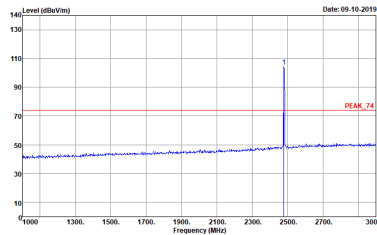


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : V_StandAlone	Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : V_StandAlone
Peak	Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : Z Plane : V_StandAlone	Left blank

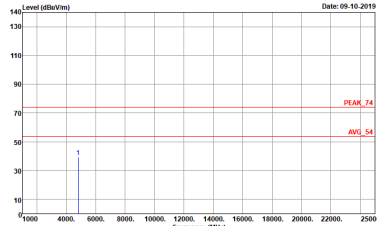
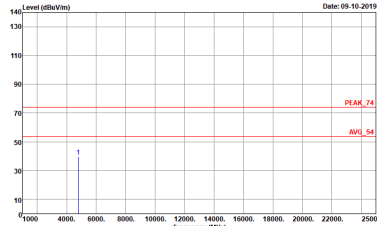


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JF_01894 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JF_01894 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone

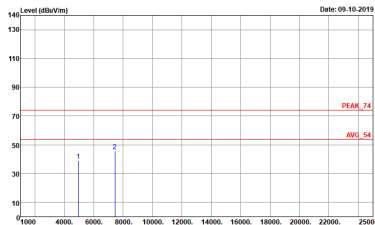
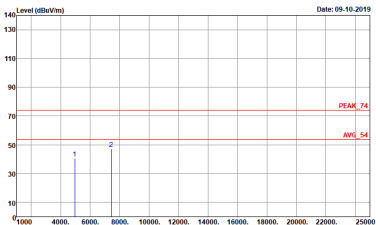
2.4GHz 2400~2483.5MHz
BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 1 Plane : Y_StandAlone

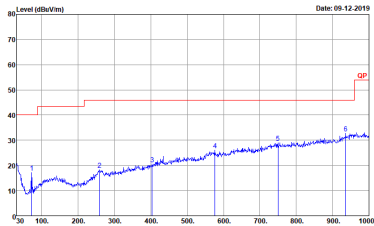
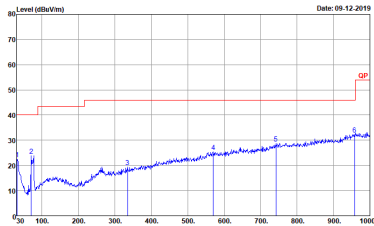


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 09-11-2019 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 2 Plane : Y_StandAlone	Level (dBuV/m) Date: 09-11-2019 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 2 Plane : Y_StandAlone

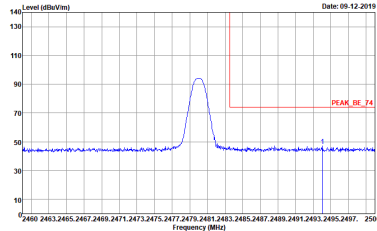
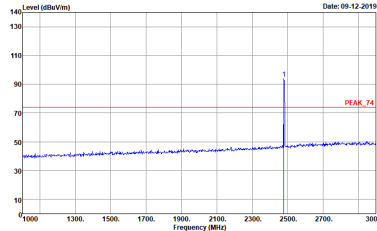


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 9120D-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 3 Plane : Y_StandAlone

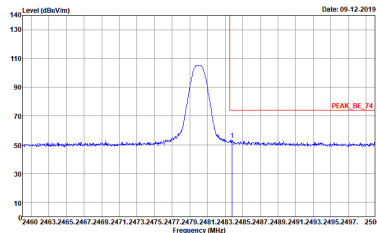
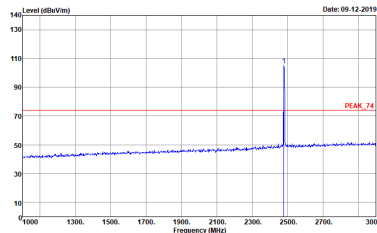
Emission below 1GHz
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH02-CA Condition : QP 3m BTLOG 6111D-LF_50392 HORIZONTAL Detector : Peak Project : 190805001 Mode : 16 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : QP 3m BTLOG 6111D-LF_50392 VERTICAL Detector : Peak Project : 190805001 Mode : 16 Plane : Y_StandAlone

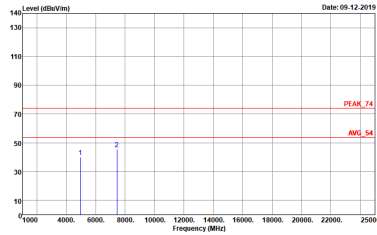
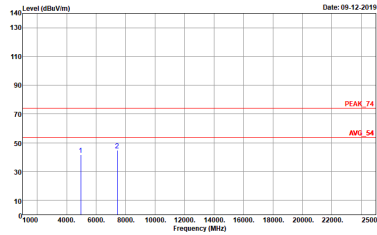
<Sample 4>
2.4GHz 2400~2483.5MHz
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 12 Plane : -Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 12 Plane : -Y_StandAlone



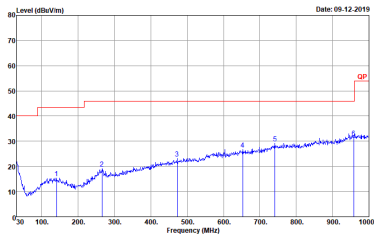
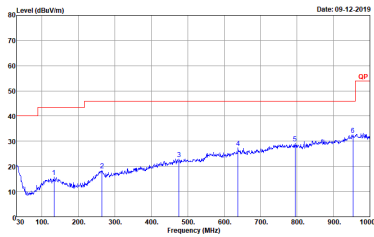
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH02-CA Condition : PEAK_BE_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 12 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-JHF_01894 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 190805001 Mode : 12 Plane : Y_StandAlone

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

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 HORIZONTAL Detector : Peak Project : 190805001 Mode : 12 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : PEAK_74 3m HORN 91200-HF_01894 VERTICAL Detector : Peak Project : 190805001 Mode : 12 Plane : Y_StandAlone

Emission below 1GHz

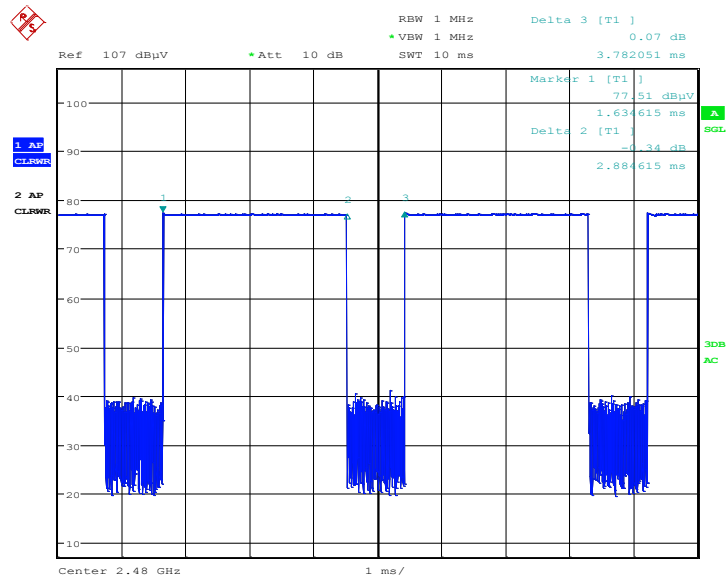
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH02-CA Condition : QP 3m B1LOG 6111D-LF_50392 HORIZONTAL Detector : Peak Project : 190805001 Mode : 20 Plane : Y_StandAlone	 Site : 03CH02-CA Condition : QP 3m B1LOG 6111D-LF_50392 VERTICAL Detector : Peak Project : 190805001 Mode : 20 Plane : Y_StandAlone

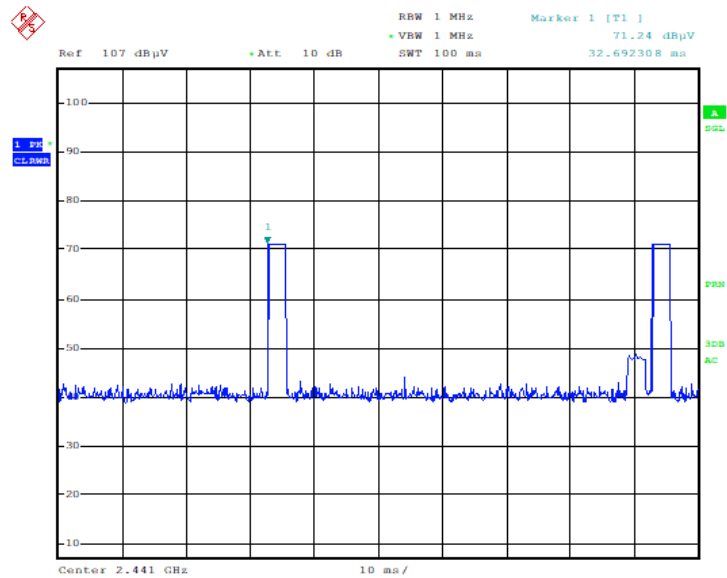
Appendix E. Duty Cycle Plots

<Sample 1>

3DH5 on time (One Pulse) Plot on Channel 39

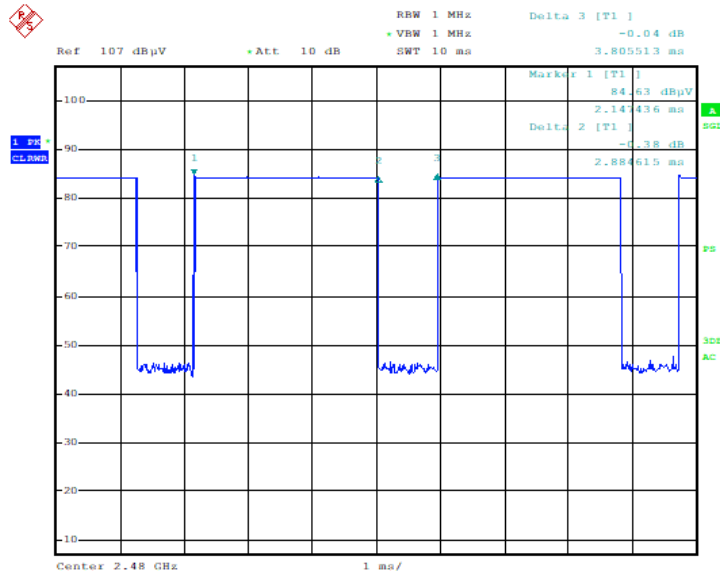


on time (Count Pulses) Plot on Channel 39

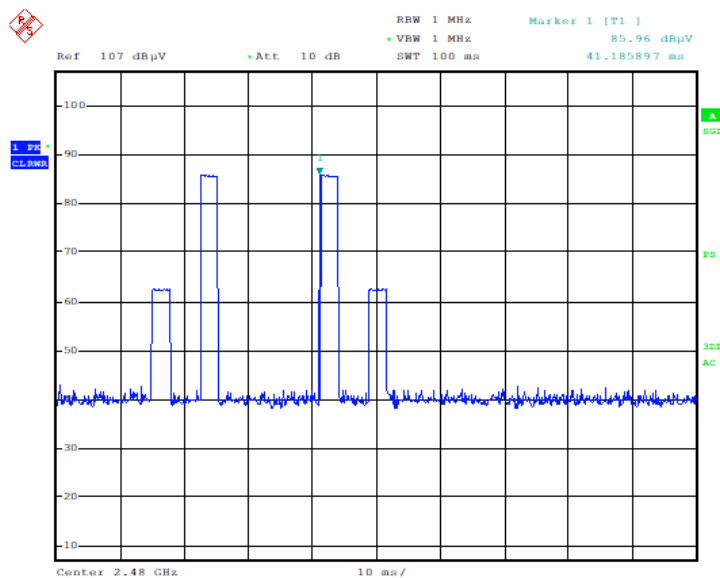


<Sample 2>

3DH5 on time (One Pulse) Plot on Channel 39

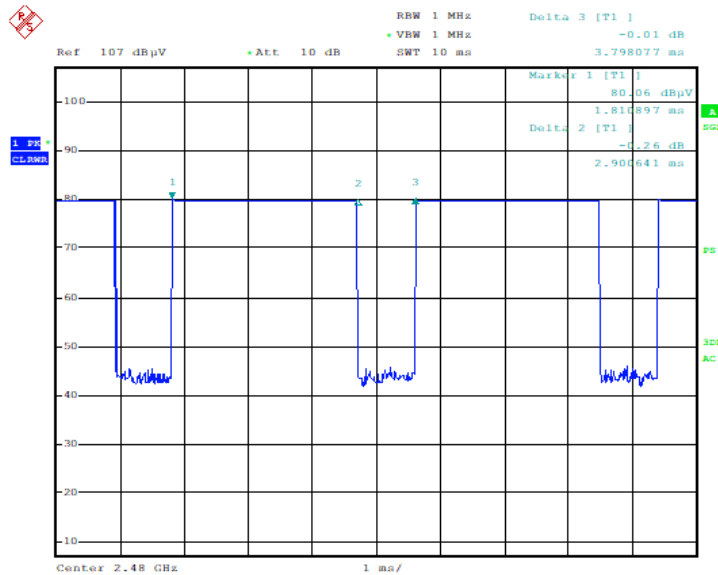


on time (Count Pulses) Plot on Channel 39

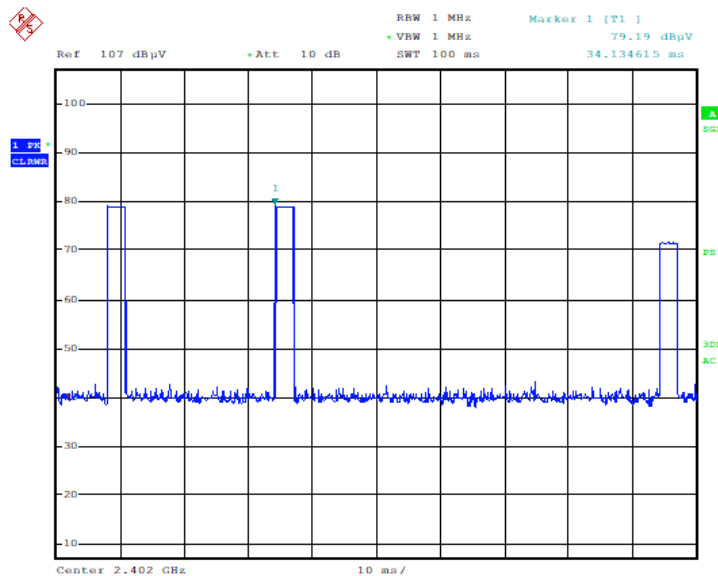


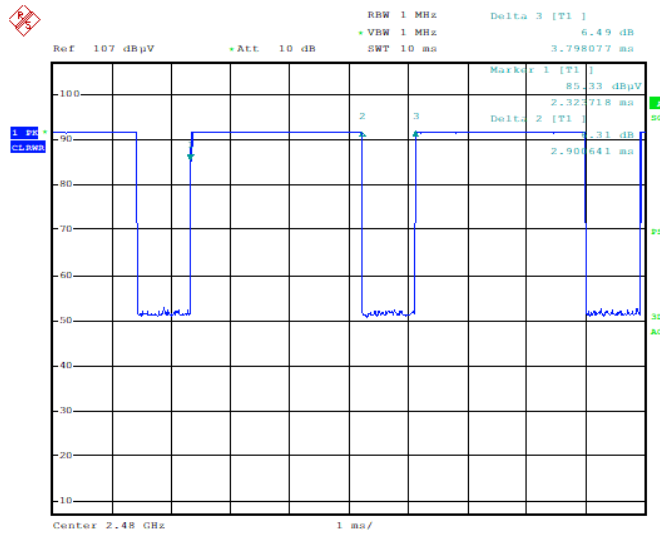
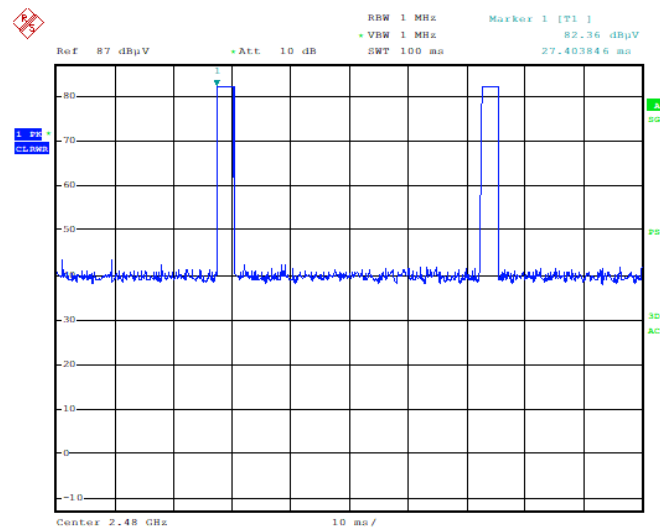
<Sample 3>

3DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39



<Sample 4>
3DH5 on time (One Pulse) Plot on Channel 39

on time (Count Pulses) Plot on Channel 39

Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.88 / 100 = 5.76 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.79 \text{ dB}$
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 period to have DH5 packet completing one hopping sequence is

$$2.88 \text{ ms} \times 20 \text{ channels} = 57.6 \text{ ms}$$

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. $[100\text{ms} / 57.6\text{ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.88 \text{ ms} \times 2 = 5.76 \text{ ms}$$

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

$$20 \times \log(5.76 \text{ ms}/100\text{ms}) = -24.79 \text{ dB}$$

————THE END————