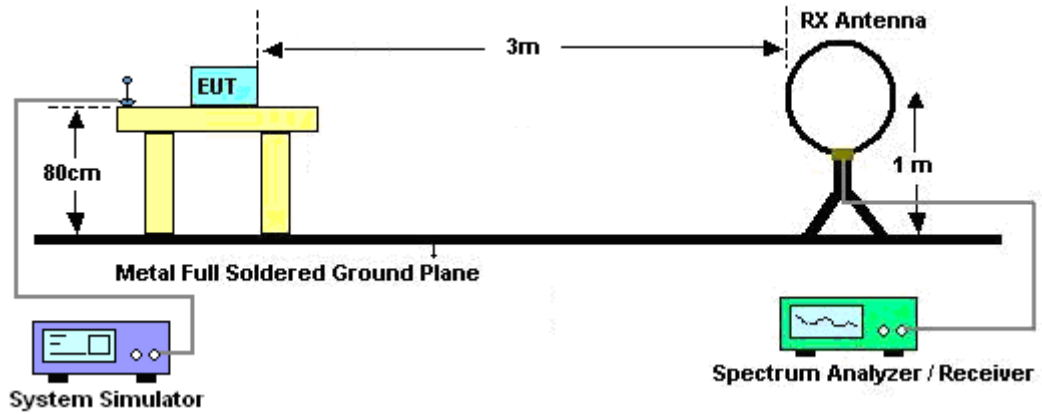
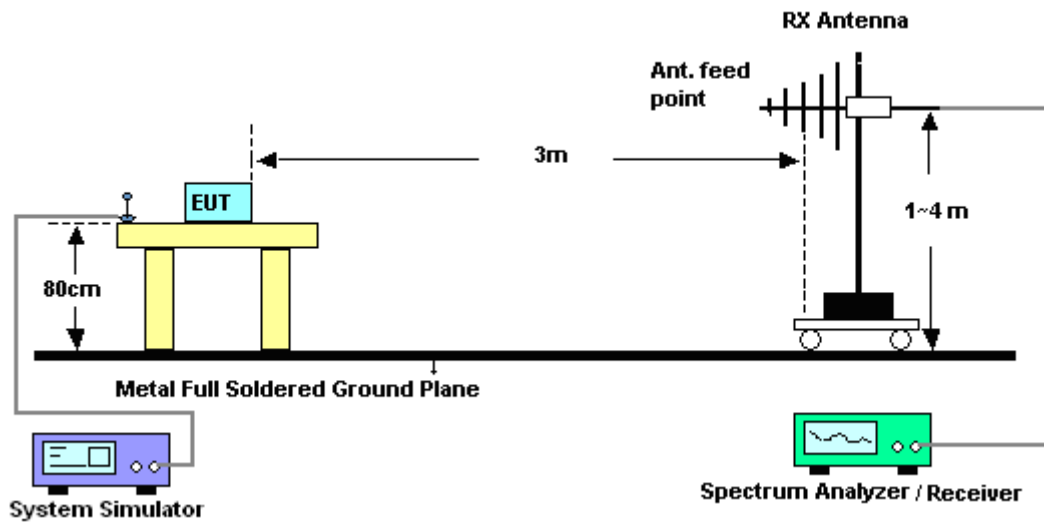


3.8.4 Test Setup

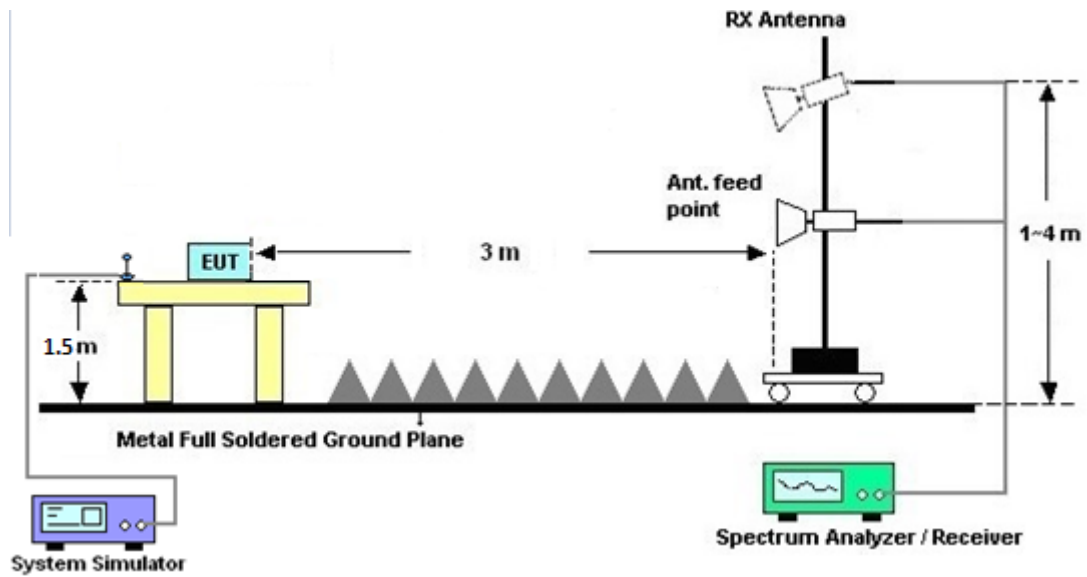
For radiated emissions below 30MHz



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.

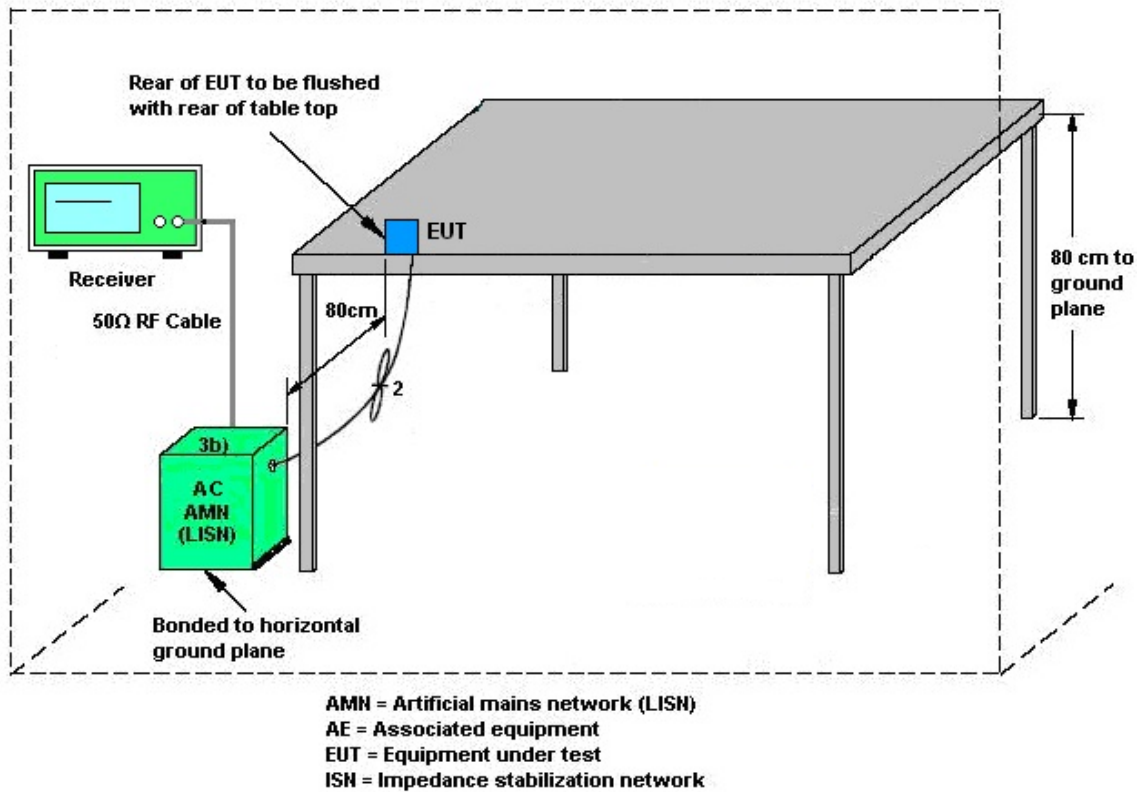
3.9.2 Measuring Instruments

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
Hygrometer	Testo	DTM-303A	TP157075	N/A	Nov. 05, 2018	May 31, 2019~ Jun. 19, 2019	Nov. 04, 2019	Conducted (TH05-HY)
Power Meter	Agilent	E4416A	GB4129234 4	N/A	Dec. 27, 2018	May 31, 2019~ Jun. 19, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Dec. 27, 2018	May 31, 2019~ Jun. 19, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 13, 2018	May 31, 2019~ Jun. 19, 2019	Nov. 12, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1208382	N/A	Mar. 27, 2019	May 31, 2019~ Jun. 19, 2019	Mar. 26, 2020	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 13, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 12, 2018	Jun. 13, 2019	Nov. 11, 2019	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 19, 2019	Jun. 13, 2019	Mar. 18, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	Jun. 13, 2019	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	Jun. 13, 2019	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 13, 2019	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Dec. 31, 2018	Jun. 13, 2019	Dec. 30, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Dec. 31, 2018	Jun. 13, 2019	Dec. 30, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jan. 07, 2019	Jun. 13, 2019~ Jun. 19, 2019	Jan. 06, 2020	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D& 00800N1D0 1N-06	41912&05	30MHz to 1GHz	Feb. 12, 2019	Jun. 13, 2019~ Jun. 19, 2019	Feb. 11, 2020	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120D	9120D-1620	1G~18GHz	Oct. 17, 2018	Jun. 13, 2019~ Jun. 19, 2019	Oct. 16, 2019	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA91705 84	18GHz- 40GHz	Dec. 05, 2018	Jun. 13, 2019~ Jun. 19, 2019	Dec. 04, 2019	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 28, 2018	Jun. 13, 2019~ Jun. 19, 2019	Dec. 27, 2019	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JAP0010180 0-30-10P	1601185500 04	1GHz~18GHz	Apr. 16, 2019	Jun. 13, 2019~ Jun. 19, 2019	Apr. 15, 2020	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY5327019 5	1GHz~26.5GHz	Aug. 23, 2018	Jun. 13, 2019~ Jun. 19, 2019	Aug. 22, 2019	Radiation (03CH15-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 06, 2018	Jun. 13, 2019~ Jun. 19, 2019	Dec. 05, 2019	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY5413008 5	20Hz ~ 8.4GHz	Nov. 01, 2018	Jun. 13, 2019~ Jun. 19, 2019	Oct. 31, 2019	Radiation (03CH15-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECEPEL	DTM-302	SN1	N/A	Jul. 22, 2018	Jun. 13, 2019~ Jun. 19, 2019	Jul. 21, 2019	Radiation (03CH15-HY)
Filter	Wainwright	WLK4-1000- 1530-8000-4 0SS	SN11	1G Low Pass	Sep. 16, 2018	Jun. 13, 2019~ Jun. 19, 2019	Sep. 15, 2019	Radiation (03CH15-HY)
Filter	Wainwright	WHKX12-27 00-3000-180 00-60ST	SN1	3 GHz Highpass	Sep. 16, 2018	Jun. 13, 2019~ Jun. 19, 2019	Sep. 15, 2019	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY36980/4	30M-18G	Apr. 15, 2019	Jun. 13, 2019~ Jun. 19, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9838/4	30M-18G	Apr. 15, 2019	Jun. 13, 2019~ Jun. 19, 2019	Apr. 14, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY802430/4	30M~18GHz	May 13, 2019	Jun. 13, 2019~ Jun. 19, 2019	May 12, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Jun. 13, 2019~ Jun. 19, 2019	Mar. 12, 2020	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Jun. 13, 2019~ Jun. 19, 2019	Mar. 12, 2020	Radiation (03CH15-HY)
Controller	ChainTek	3000-1	N/A	Control Turn table & Ant Mast	N/A	Jun. 13, 2019~ Jun. 19, 2019	N/A	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jun. 13, 2019~ Jun. 19, 2019	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Jun. 13, 2019~ Jun. 19, 2019	N/A	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24(k5)	RK-000451	N/A	N/A	Jun. 13, 2019~ Jun. 19, 2019	N/A	Radiation (03CH15-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.20
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.20
--	------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.50
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.20
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Howard Lin	Temperature:	21~25	°C
Test Date:	2019/5/31~2019/6/19	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	0.935	0.854	1.003	0.6233	Pass
DH	1Mbps	1	39	2441	0.932	0.848	1.003	0.6213	Pass
DH	1Mbps	1	78	2480	0.932	0.848	1.012	0.6213	Pass
2DH	2Mbps	1	0	2402	1.246	1.169	0.999	0.8307	Pass
2DH	2Mbps	1	39	2441	1.246	1.169	0.999	0.8307	Pass
2DH	2Mbps	1	78	2480	1.246	1.166	0.999	0.8307	Pass
3DH	3Mbps	1	0	2402	1.220	1.155	1.003	0.8133	Pass
3DH	3Mbps	1	39	2441	1.220	1.152	0.999	0.8133	Pass
3DH	3Mbps	1	78	2480	1.216	1.149	1.007	0.8104	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	2.88	0.31	0.4	Pass
AFH	20	53.33	2.88	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	12.69	20.97	Pass
	39	1	13.10	20.97	Pass
	78	1	12.00	20.97	Pass
2DH1	0	1	11.61	20.97	Pass
	39	1	11.97	20.97	Pass
	78	1	10.91	20.97	Pass
3DH1	0	1	11.87	20.97	Pass
	39	1	12.30	20.97	Pass
	78	1	11.27	20.97	Pass

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

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH5	0	1	12.63	1.16
	39	1	13.08	1.16
	78	1	11.90	1.16
2DH1	0	1	9.60	5.12
	39	1	9.87	5.12
	78	1	8.75	5.12
3DH1	0	1	9.50	5.07
	39	1	9.83	5.07
	78	1	8.78	5.07

TEST RESULTS DATA**Number of Hopping Frequency**

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



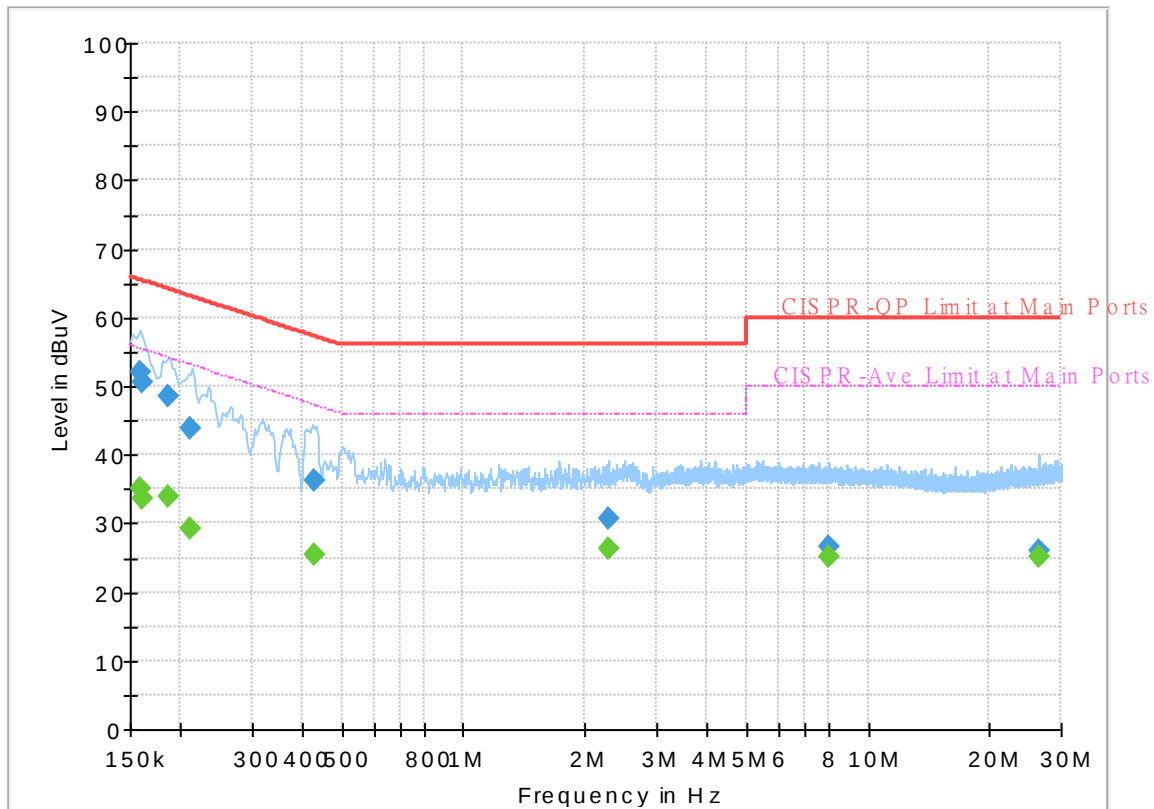
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	Temperature :	24~26℃
		Relative Humidity :	53~55%

EUT Information

Report NO : 932517-01
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum



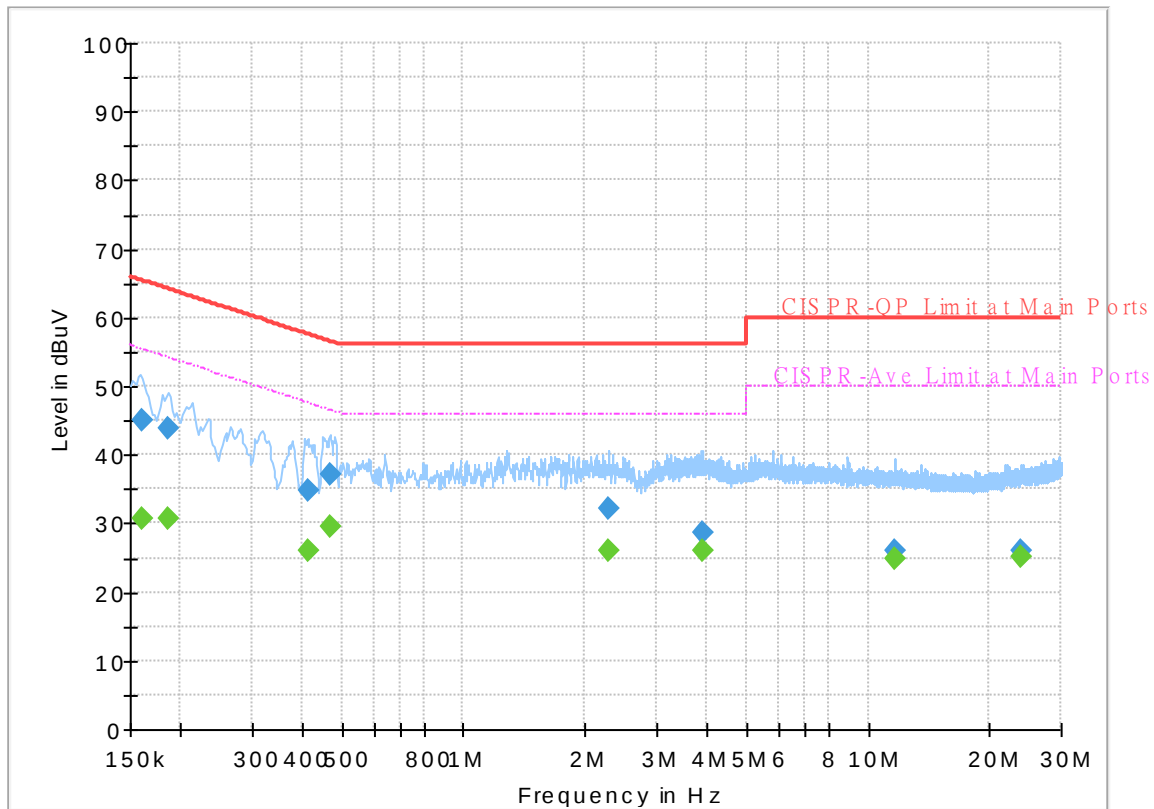
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	35.11	55.52	20.41	L1	OFF	19.5
0.159000	51.95	---	65.52	13.57	L1	OFF	19.5
0.161250	---	33.53	55.40	21.87	L1	OFF	19.5
0.161250	50.65	---	65.40	14.75	L1	OFF	19.5
0.186000	---	33.98	54.21	20.23	L1	OFF	19.5
0.186000	48.62	---	64.21	15.59	L1	OFF	19.5
0.210750	---	29.36	53.18	23.82	L1	OFF	19.5
0.210750	43.93	---	63.18	19.25	L1	OFF	19.5
0.426750	---	25.31	47.32	22.01	L1	OFF	19.5
0.426750	36.15	---	57.32	21.17	L1	OFF	19.5
2.289750	---	26.33	46.00	19.67	L1	OFF	19.5
2.289750	30.61	---	56.00	25.39	L1	OFF	19.5
8.018250	---	25.25	50.00	24.75	L1	OFF	19.8
8.018250	26.48	---	60.00	33.52	L1	OFF	19.8
26.540250	---	25.28	50.00	24.72	L1	OFF	20.4
26.540250	26.14	---	60.00	33.86	L1	OFF	20.4

EUT Information

Report NO : 932517-01
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.161250	---	30.74	55.40	24.66	N	OFF	19.5
0.161250	44.97	---	65.40	20.43	N	OFF	19.5
0.186000	---	30.84	54.21	23.37	N	OFF	19.5
0.186000	43.74	---	64.21	20.47	N	OFF	19.5
0.413250	---	26.16	47.58	21.42	N	OFF	19.5
0.413250	34.70	---	57.58	22.88	N	OFF	19.5
0.469500	---	29.43	46.52	17.09	N	OFF	19.5
0.469500	37.06	---	56.52	19.46	N	OFF	19.5
2.287500	---	26.11	46.00	19.89	N	OFF	19.5
2.287500	32.07	---	56.00	23.93	N	OFF	19.5
3.880500	---	25.89	46.00	20.11	N	OFF	19.7
3.880500	28.66	---	56.00	27.34	N	OFF	19.7
11.602500	---	24.91	50.00	25.09	N	OFF	20.0
11.602500	25.94	---	60.00	34.06	N	OFF	20.0
23.833500	---	25.13	50.00	24.87	N	OFF	20.5
23.833500	26.14	---	60.00	33.86	N	OFF	20.5



Appendix C. Radiated Spurious Emission

Test Engineer :	Karl Hou and BigShow Wang	Temperature :	24~26°C
		Relative Humidity :	45~65%

2.4GHz 2400~2483.5MHz

BT 1Mbps (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		2369.325	44.72	-29.28	74	41.88	27.63	6.21	31	100	278	P	H
		2369.325	19.93	-34.07	54	-	-	-	-	-	-	A	H
	*	2402	105.78	-	-	102.92	27.6	6.25	30.99	100	278	P	H
	*	2402	80.99	-	-	-	-	-	-	-	-	A	H
													H
		2328.9	44.21	-29.79	74	41.3	27.77	6.16	31.02	393	232	P	V
		2328.9	19.42	-34.58	54	-	-	-	-	-	-	A	V
	*	2402	104.04	-	-	101.18	27.6	6.25	30.99	393	232	P	V
	*	2402	79.25	-	-	-	-	-	-	-	-	A	V
													V
BT CH 39 2441MHz		2369.5	44.23	-29.77	74	41.39	27.63	6.21	31	126	273	P	H
		2369.5	19.44	-34.56	54	-	-	-	-	-	-	A	H
	*	2441	105.43	-	-	102.51	27.6	6.29	30.97	126	273	P	H
	*	2441	80.64	-	-	-	-	-	-	-	-	A	H
		2485.51	44.25	-29.75	74	41.39	27.47	6.34	30.95	126	273	P	H
		2485.51	19.46	-34.54	54	-	-	-	-	-	-	A	H
		2333.8	44.75	-29.25	74	41.84	27.77	6.16	31.02	378	234	P	V
		2333.8	19.96	-34.04	54	-	-	-	-	-	-	A	V
	*	2441	103.95	-	-	101.03	27.6	6.29	30.97	378	234	P	V
	*	2441	79.16	-	-	-	-	-	-	-	-	A	V
		2495.03	44.18	-29.82	74	41.37	27.4	6.35	30.94	378	234	P	V
		2495.03	19.39	-34.61	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	102.51	-	-	99.66	27.47	6.33	30.95	100	276	P	H
	*	2480	77.72	-	-	-	-	-	-	-	-	A	H
		2483.52	49.87	-24.13	74	47.02	27.47	6.33	30.95	100	276	P	H
		2483.52	25.08	-28.92	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	101.08	-	-	98.23	27.47	6.33	30.95	363	231	P	V
	*	2480	76.29	-	-	-	-	-	-	-	-	A	V
		2483.6	49.46	-24.54	74	46.61	27.47	6.33	30.95	363	231	P	V
		2483.6	24.67	-29.33	54	-	-	-	-	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
BT 1Mbps (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	38.76	-35.24	74	56.09	31.3	9.59	58.22	100	0	P	H
		4804	13.97	-40.03	54	-	-	-	-	-	-	A	H
													H
													H
		4804	38.86	-35.14	74	56.19	31.3	9.59	58.22	100	0	P	V
		4804	14.07	-39.93	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	39.18	-34.82	74	56.58	31.3	9.57	58.27	100	0	P	H
		4882	14.39	-39.61	54	-	-	-	-	-	-	A	H
		7323	43.74	-30.26	74	54.43	36.23	11.66	58.58	100	0	P	H
		7323	18.95	-35.05	54	-	-	-	-	-	-	A	H
		4882	38.15	-35.85	74	55.55	31.3	9.57	58.27	100	0	P	V
		4882	13.36	-40.64	54	-	-	-	-	-	-	A	V
		7323	43.69	-30.31	74	54.38	36.23	11.66	58.58	100	0	P	V
		7323	18.9	-35.1	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	38.78	-35.22	74	56.07	31.47	9.56	58.32	100	0	P	H
		4960	13.99	-40.01	54	-	-	-	-	-	-	A	H
		7440	45.07	-28.93	74	55.3	36.6	11.7	58.53	100	0	P	H
		7440	20.28	-33.72	54	-	-	-	-	-	-	A	H
		4960	38.76	-35.24	74	56.05	31.47	9.56	58.32	100	0	P	V
		4960	13.97	-40.03	54	-	-	-	-	-	-	A	V
		7440	45.2	-28.8	74	55.43	36.6	11.7	58.53	100	0	P	V
		7440	20.41	-33.59	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	23.33	-16.67	40	30.05	25.2	0.7	32.62	100	0	P	H
		124.09	22.69	-20.81	43.5	36.15	17.6	1.45	32.51	-	-	P	H
		211.39	19.46	-24.04	43.5	34.88	15.12	1.96	32.5	-	-	P	H
		282.2	22.62	-23.38	46	33.98	18.89	2.28	32.53	-	-	P	H
		492.69	26.17	-19.83	46	32.06	23.85	2.83	32.57	-	-	P	H
		910.76	35.24	-10.76	46	33.51	29.32	3.97	31.56	-	-	P	H
													H
													H
													H
													H
													H
													H
													H
		30	25.2	-14.8	40	31.92	25.2	0.7	32.62	-	-	P	V
		122.15	25.64	-17.86	43.5	39.11	17.6	1.44	32.51	-	-	P	V
		280.26	20.31	-25.69	46	31.76	18.81	2.27	32.53	-	-	P	V
		586.78	27.43	-18.57	46	30.88	25.96	3.19	32.6	-	-	P	V
		764.29	30.96	-15.04	46	31.17	28.49	3.57	32.27	-	-	P	V
		851.59	32.12	-13.88	46	31.01	29.2	3.82	31.91	100	0	P	V
													V
													V
													V
													V
													V
												V	
												V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



2.4GHz 2400~2483.5MHz

BT 2Mbps (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		2346.225	44.43	-29.57	74	41.56	27.7	6.18	31.01	100	274	P	H
		2346.225	19.64	-34.36	54	-	-	-	-	-	-	A	H
	*	2402	104.84	-	-	101.98	27.6	6.25	30.99	100	274	P	H
	*	2402	80.05	-	-	-	-	-	-	-	-	A	H
													H
													H
		2383.5	44.43	-29.57	74	41.56	27.63	6.23	30.99	392	233	P	V
		2383.5	19.64	-34.36	54	-	-	-	-	-	-	A	V
	*	2402	103.14	-	-	100.28	27.6	6.25	30.99	392	233	P	V
	*	2402	78.35	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2345.56	45.4	-28.6	74	42.53	27.7	6.18	31.01	123	272	P	H
		2345.56	20.61	-33.39	54	-	-	-	-	-	-	A	H
	*	2441	104.31	-	-	101.39	27.6	6.29	30.97	123	272	P	H
	*	2441	79.52	-	-	-	-	-	-	-	-	A	H
		2489.36	44.46	-29.54	74	41.66	27.4	6.34	30.94	123	272	P	H
		2489.36	19.67	-34.33	54	-	-	-	-	-	-	A	H
		2380.98	44.66	-29.34	74	41.79	27.63	6.23	30.99	377	232	P	V
		2380.98	19.87	-34.13	54	-	-	-	-	-	-	A	V
	*	2441	102.8	-	-	99.88	27.6	6.29	30.97	377	232	P	V
	*	2441	78.01	-	-	-	-	-	-	-	-	A	V
		2499.02	44.23	-29.77	74	41.42	27.4	6.35	30.94	377	232	P	V
		2499.02	19.44	-34.56	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	101.41	-	-	98.56	27.47	6.33	30.95	100	258	P	H
	*	2480	76.62	-	-	-	-	-	-	-	-	A	H
		2483.6	48.85	-25.15	74	46	27.47	6.33	30.95	100	258	P	H
		2483.6	24.06	-29.94	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	100.7	-	-	97.85	27.47	6.33	30.95	363	236	P	V
	*	2480	75.91	-	-	-	-	-	-	-	-	A	V
		2483.76	45.1	-28.9	74	42.25	27.47	6.33	30.95	363	236	P	V
		2483.76	20.31	-33.69	54	-	-	-	-	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
BT 2Mbps (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	39.45	-34.55	74	56.78	31.3	9.59	58.22	100	0	P	H
		4804	14.66	-39.34	54	-	-	-	-	-	-	A	H
													H
													H
		4804	38.43	-35.57	74	55.76	31.3	9.59	58.22	100	0	P	V
		4804	13.64	-40.36	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	39.02	-34.98	74	56.42	31.3	9.57	58.27	100	0	P	H
		4882	14.23	-39.77	54	-	-	-	-	-	-	A	H
		7323	44	-30	74	54.69	36.23	11.66	58.58	100	0	P	H
		7323	19.21	-34.79	54	-	-	-	-	-	-	A	H
		4882	38.1	-35.9	74	55.5	31.3	9.57	58.27	100	0	P	V
		4882	13.31	-40.69	54	-	-	-	-	-	-	A	V
		7323	43.69	-30.31	74	54.38	36.23	11.66	58.58	100	0	P	V
		7323	18.9	-35.1	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	38.6	-35.4	74	55.89	31.47	9.56	58.32	100	0	P	H
		4960	13.81	-40.19	54	-	-	-	-	-	-	A	H
		7440	44.97	-29.03	74	55.2	36.6	11.7	58.53	100	0	P	H
		7440	20.18	-33.82	54	-	-	-	-	-	-	A	H
		4960	38.24	-35.76	74	55.53	31.47	9.56	58.32	100	0	P	V
		4960	13.45	-40.55	54	-	-	-	-	-	-	A	V
		7440	44.6	-29.4	74	54.83	36.6	11.7	58.53	100	0	P	V
		7440	19.81	-34.19	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 3Mbps (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		2321.13	43.76	-30.24	74	40.86	27.77	6.15	31.02	100	276	P	H
		2321.13	19	-35	54	-	-	-	-	-	-	A	H
	*	2402	105.03	-	-	102.17	27.6	6.25	30.99	100	276	P	H
	*	2402	80.27	-	-	-	-	-	-	-	-	A	H
													H
													H
		2384.55	44.49	-29.51	74	41.62	27.63	6.23	30.99	393	233	P	V
		2384.55	19.73	-34.27	54	-	-	-	-	-	-	A	V
	*	2402	103.19	-	-	100.33	27.6	6.25	30.99	393	233	P	V
	*	2402	78.43	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2372.58	44.58	-29.42	74	41.74	27.63	6.21	31	126	273	P	H
		2372.58	19.82	-34.18	54	-	-	-	-	-	-	A	H
	*	2441	104.69	-	-	101.77	27.6	6.29	30.97	126	273	P	H
	*	2441	79.93	-	-	-	-	-	-	-	-	A	H
		2495.73	44.58	-29.42	74	41.77	27.4	6.35	30.94	126	273	P	H
		2495.73	19.82	-34.18	54	-	-	-	-	-	-	A	H
		2359.7	44.32	-29.68	74	41.45	27.67	6.2	31	376	231	P	V
		2359.7	19.56	-34.44	54	-	-	-	-	-	-	A	V
	*	2441	102.95	-	-	100.03	27.6	6.29	30.97	376	231	P	V
	*	2441	78.19	-	-	-	-	-	-	-	-	A	V
		2492.79	42.9	-31.1	74	40.1	27.4	6.34	30.94	376	231	P	V
		2492.79	18.14	-35.86	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	101.7	-	-	98.85	27.47	6.33	30.95	100	275	P	H
	*	2480	76.94	-	-	-	-	-	-	-	-	A	H
		2483.68	48.59	-25.41	74	45.74	27.47	6.33	30.95	100	275	P	H
		2483.68	23.83	-30.17	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	98.4	-	-	95.55	27.47	6.33	30.95	353	235	P	V
	*	2480	73.64	-	-	-	-	-	-	-	-	A	V
		2483.52	47.59	-26.41	74	44.74	27.47	6.33	30.95	353	235	P	V
		2483.52	22.83	-31.17	54	-	-	-	-	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
BT 3Mbps (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	38.93	-35.07	74	56.26	31.3	9.59	58.22	100	0	P	H
		4804	14.17	-39.83	54	-	-	-	-	-	-	A	H
													H
													H
		4804	39.55	-34.45	74	56.88	31.3	9.59	58.22	100	0	P	V
		4804	14.79	-39.21	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	38.98	-35.02	74	56.38	31.3	9.57	58.27	100	0	P	H
		4882	14.22	-39.78	54	-	-	-	-	-	-	A	H
		7323	43.67	-30.33	74	54.36	36.23	11.66	58.58	100	0	P	H
		7323	18.91	-35.09	54	-	-	-	-	-	-	A	H
		4882	39	-35	74	56.4	31.3	9.57	58.27	100	0	P	V
		4882	14.24	-39.76	54	-	-	-	-	-	-	A	V
		7323	43.81	-30.19	74	54.5	36.23	11.66	58.58	100	0	P	V
		7323	19.05	-34.95	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	38.34	-35.66	74	55.63	31.47	9.56	58.32	100	0	P	H
		4960	13.58	-40.42	54	-	-	-	-	-	-	A	H
		7440	44.91	-29.09	74	55.14	36.6	11.7	58.53	100	0	P	H
		7440	20.15	-33.85	54	-	-	-	-	-	-	A	H
		4960	39.43	-34.57	74	56.72	31.47	9.56	58.32	100	0	P	V
		4960	14.67	-39.33	54	-	-	-	-	-	-	A	V
		7440	44.77	-29.23	74	55	36.6	11.7	58.53	100	0	P	V
		7440	20.01	-33.99	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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	P eak or A verage
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 :	Karl Hou and BigShow Wang	Temperature :	24~26°C
		Relative Humidity :	45~65%

2.4GHz 2400~2483.5MHz

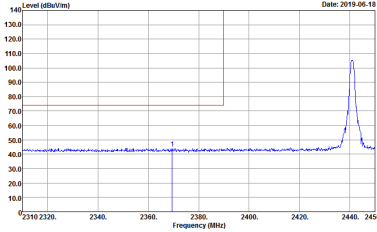
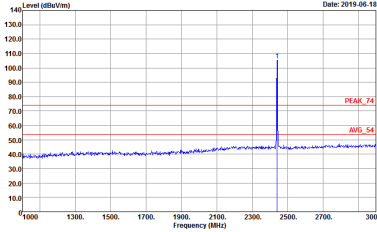
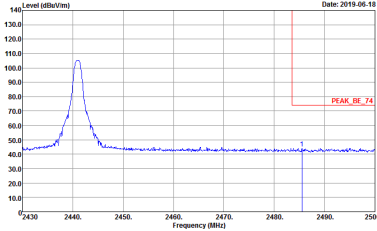
BT 1Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	Site : 03CH15-HV Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 1	Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 1

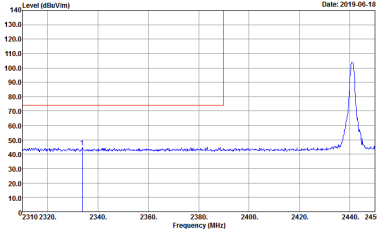
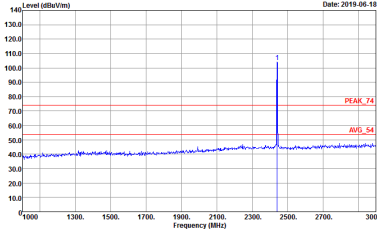
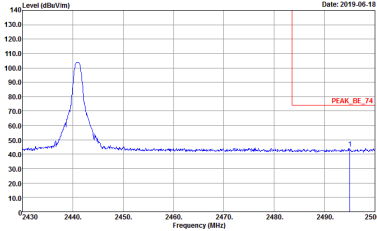


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 1	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 1



BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m	
		BT CH39 2441MHz	
	Horizontal	Fundamental	
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 2	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 2	
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 2	Left blank	



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 2	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 2
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 2	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Level (dBm/Vm) Date: 2019-06-18 2460 2463.2465 2467 2469 2471 2473 2475 2477 2479 2481 2483 2485 2487 2489 2491 2493 2495 2497 2500 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Project : 932517-01 Mode : 3	Level (dBm/Vm) Date: 2019-06-18 1000 1300 1600 1900 2100 2300 2500 2700 3000 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : Peak Project : 932517-01 Mode : 3

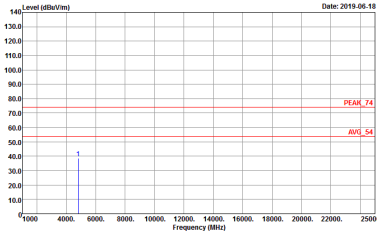
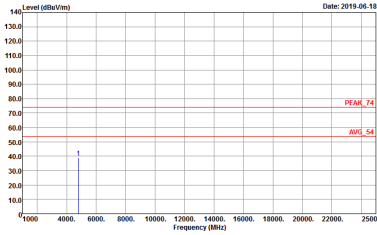


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	Level (dBm/Vm) Date: 2019-06-18 PEAK_BE_74 Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 3	Level (dBm/Vm) Date: 2019-06-18 PEAK_74 Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 3



2.4GHz 2400~2483.5MHz

BT 1Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 1	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 1



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 2	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 2

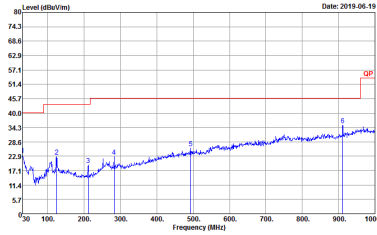
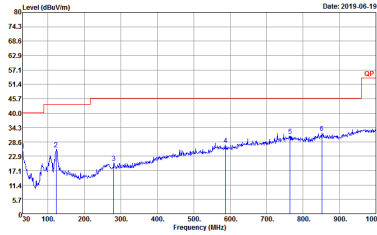


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 3	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 3



Emission below 1GHz

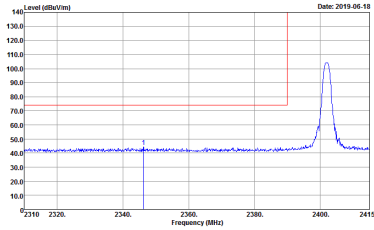
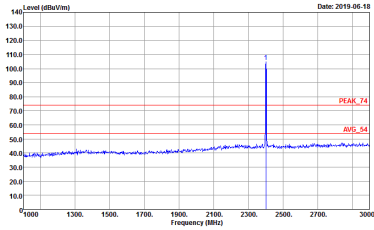
2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH15-HY Condition : QP 3m BTLOG_15_41912 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 10	 Site : 03CH15-HY Condition : QP 3m BTLOG_15_41912 VERTICAL Detector : Peak Project : 932517-01 Mode : 10



2.4GHz 2400~2483.5MHz

BT 2Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH15-HV Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 4	 Site : 03CH15-HV Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 932517-01 Mode : 4

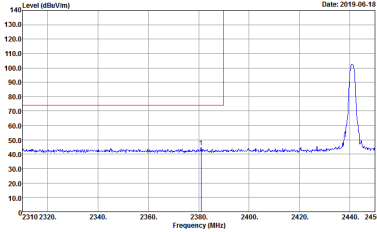
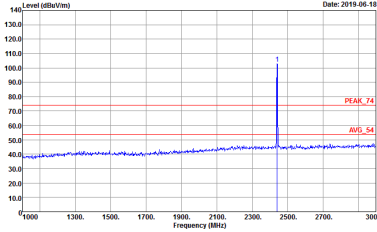
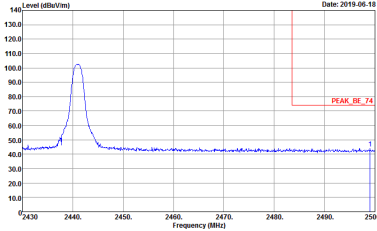


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 4	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 4



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 5	Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 5
Peak	Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 5	Left blank



BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m	
		BT CH39 2441MHz	
	Vertical	Fundamental	
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 5	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 5	
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 5	Left blank	



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Level (dBm/Vm) Date: 2019-06-18 2460 2463.2465 2467 2469 2471 2473 2475 2477 2479 2481 2483 2485 2487 2489 2491 2493 2495 2497 2500 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 6	Level (dBm/Vm) Date: 2019-06-18 1000 1300 1600 1900 2200 2500 2800 3000 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 6



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	Level (dBm/100kHz) Date: 2019-06-18 PEAK_BE_74 Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 6	Level (dBm/100kHz) Date: 2019-06-18 PEAK_74 AVG_54 Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 6



2.4GHz 2400~2483.5MHz

BT 2Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 4	Level (dBuV/m) Date: 2019-06-19 Frequency (MHz) Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 4



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : S	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : S

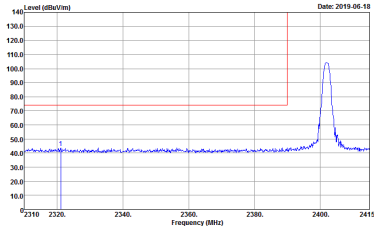
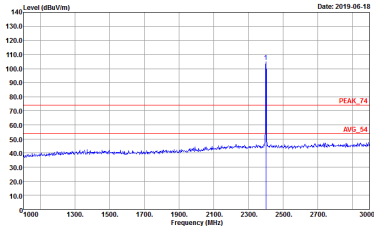


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 6	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 6



2.4GHz 2400~2483.5MHz

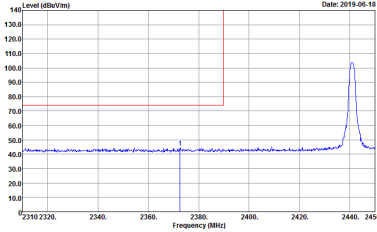
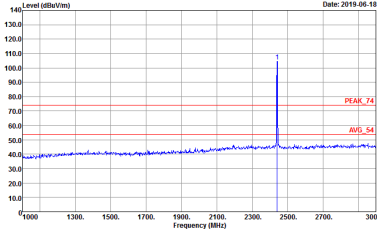
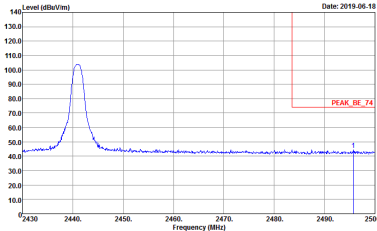
BT 3Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH15-HV Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 7	 Site : 03CH15-HV Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 7

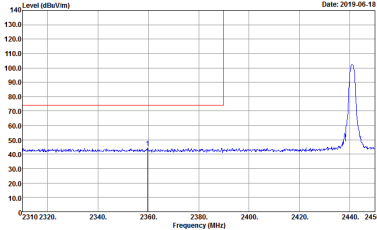
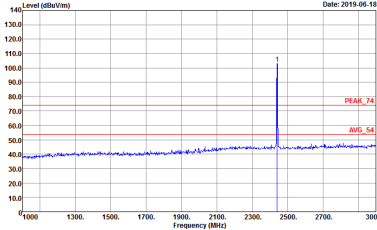
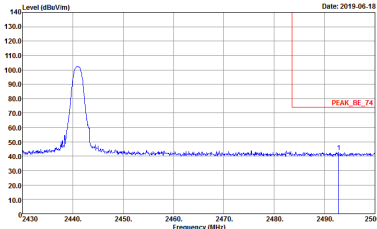


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 7	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 7



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 8	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 8
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 8	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 8	 Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 8
Peak	 Site : 03CH15-HY Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 8	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Level (dBm/Vm) Date: 2019-06-18 2460 2463.2465 2467 2469 2471 2473 2475 2477 2479 2481 2483 2485 2487 2489 2491 2493 2495 2497 2500 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 9	Level (dBm/Vm) Date: 2019-06-18 1000 1300 1600 1900 2100 2300 2500 2700 3000 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 9



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	Level (dBm/Vm) Date: 2019-06-18 2460 2463.2465.2467.2469.2471.2473.2475.2477.2479.2481.2483.2485.2487.2489.2491.2493.2495.2497. 2500 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_BE_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 9	Level (dBm/Vm) Date: 2019-06-18 1000 1300. 1500. 1700. 1900. 2100. 2300. 2500. 2700. 3000 Frequency (MHz) Site : 03CH15-14Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Project : 932517-01 Mode : 9



2.4GHz 2400~2483.5MHz

BT 3Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 7	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-HY Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 7



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 8	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 8



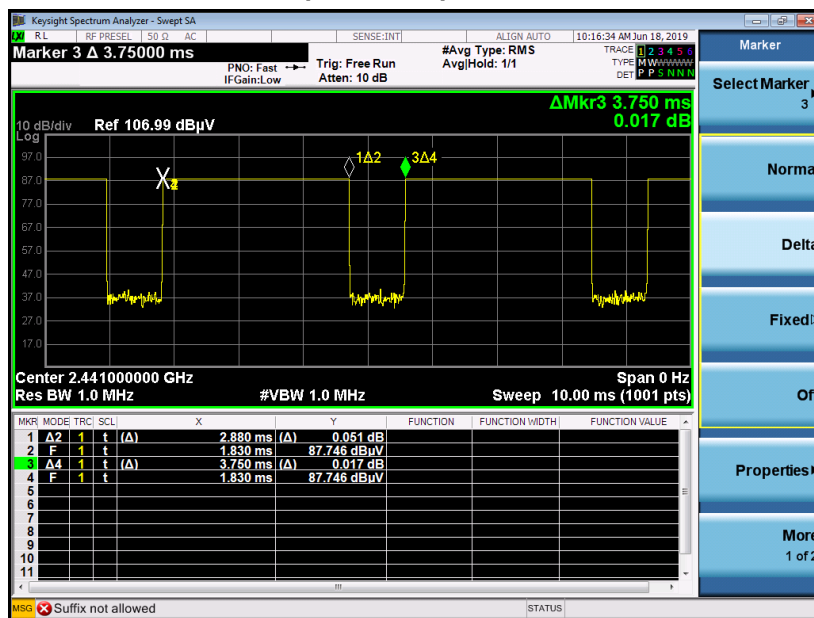
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 HORIZONTAL Detector : Peak Project : 932517-01 Mode : 8	Level (dBuV/m) Date: 2019-06-18 Frequency (MHz) Site : 03CH15-11Y Condition : PEAK_74 3m 91200_15_1620 VERTICAL Detector : Peak Project : 932517-01 Mode : 8



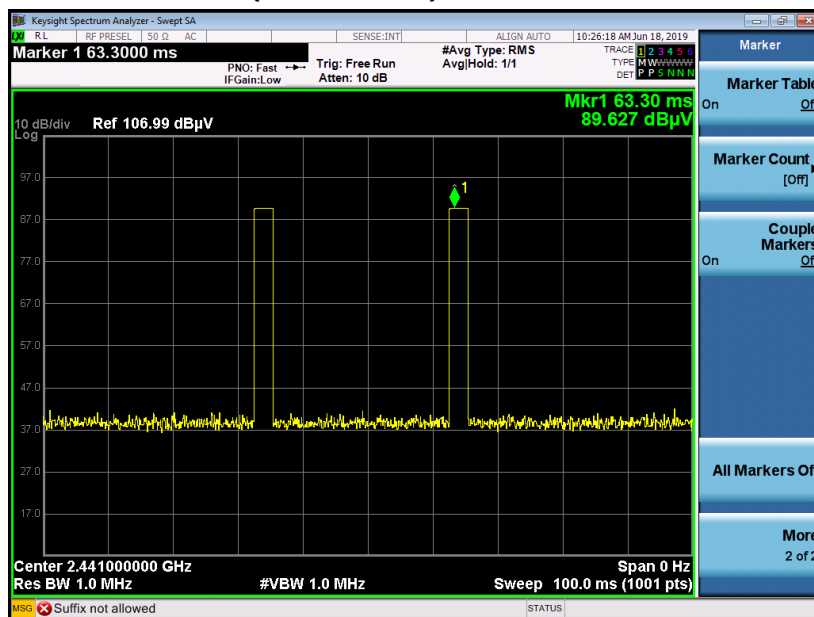
Appendix E. Duty Cycle Plots

<1Mbps>

DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39

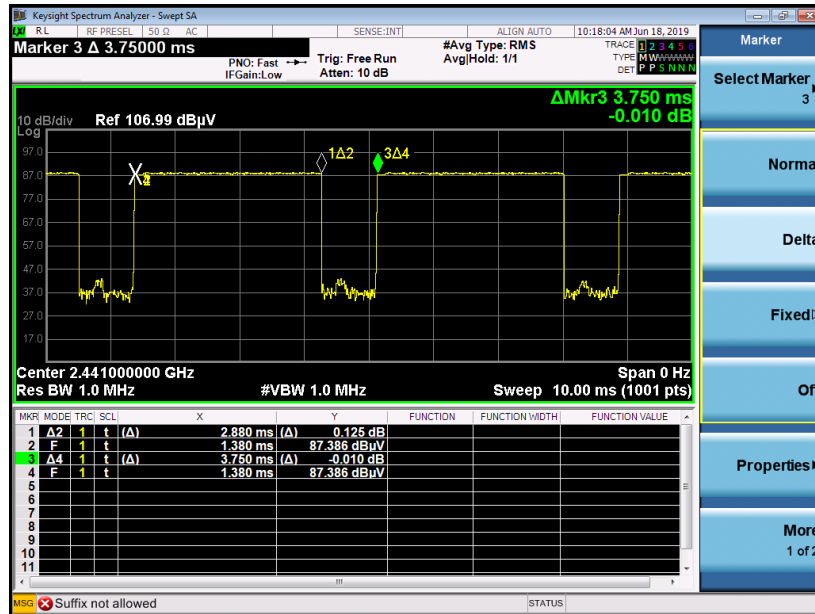
**Note:**

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. DH5 has the highest duty cycle worst case and is reported.

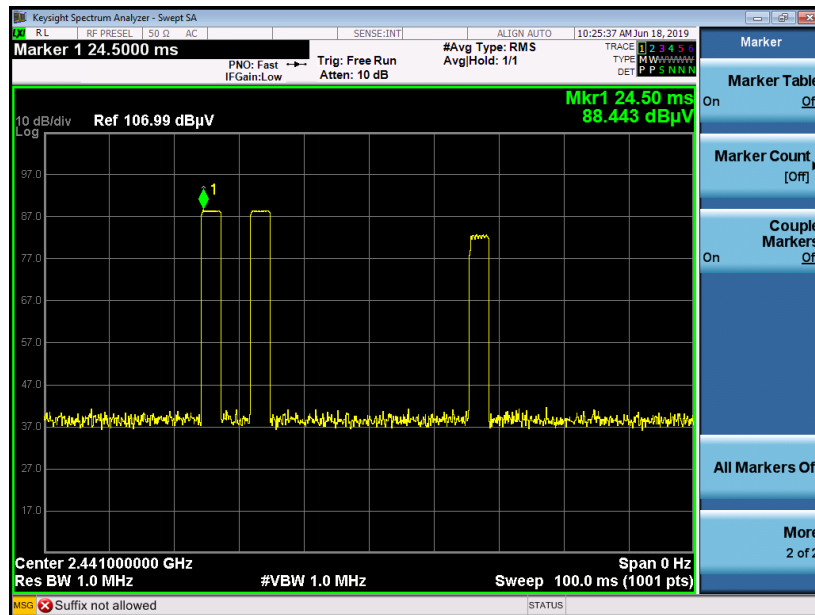


<2Mbps>

2DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39



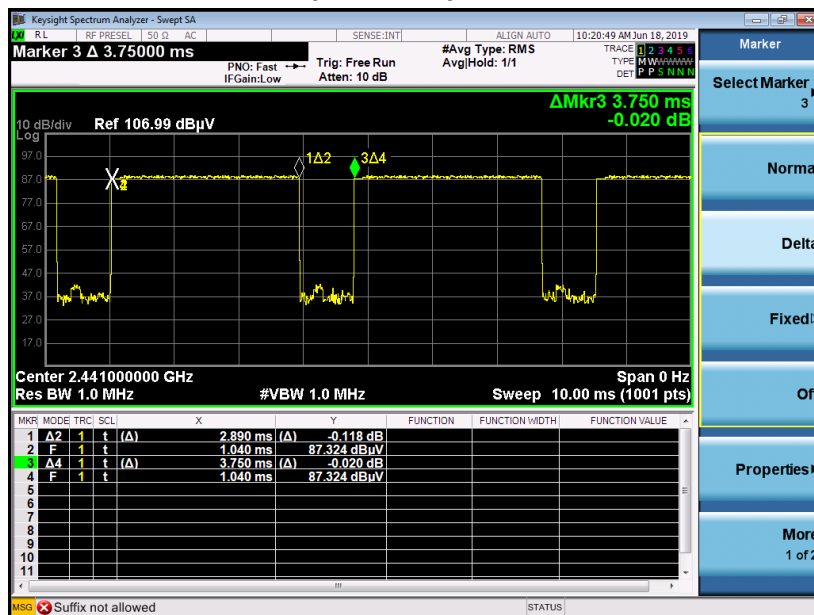
Note:

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. 2DH5 has the highest duty cycle worst case and is reported.

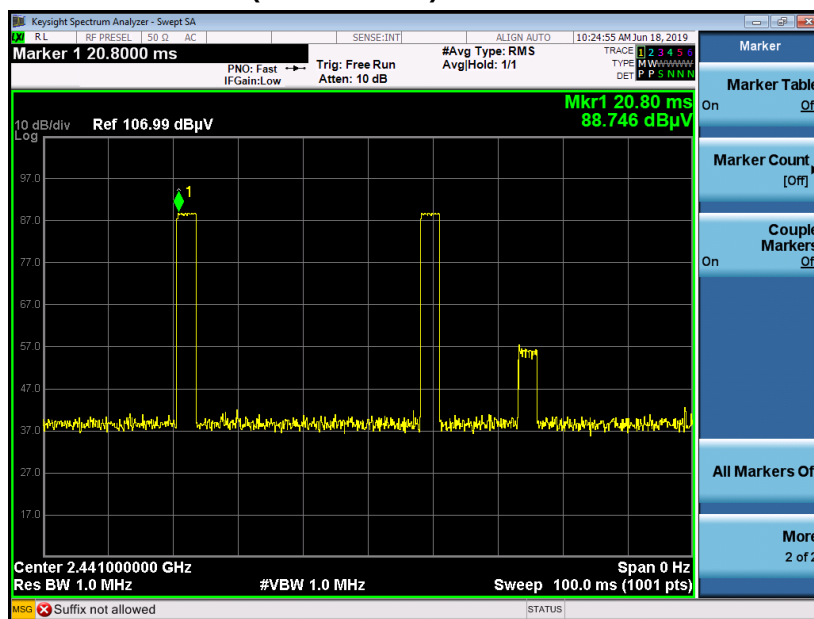


<3Mbps>

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 = $2 * 2.89 / 100 = 5.78\%$
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 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—————