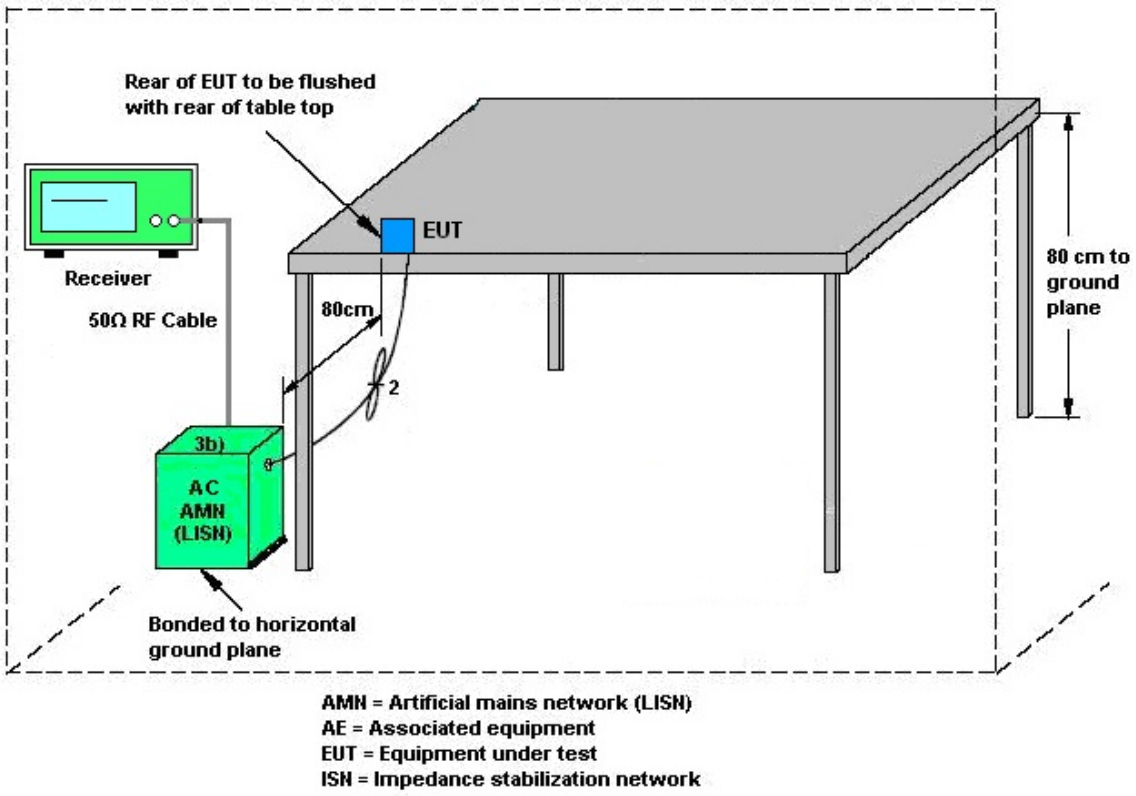
3.9.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

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	608-H2	41410069	N/A	Jun. 17, 2019	Nov. 21, 2019~ Dec. 02. 2019	Jun. 16, 2020	Conducted (TH05-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Dec. 27, 2018	Nov. 21, 2019~ Dec. 02. 2019	Dec. 26, 2019	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Dec. 27, 2018	Nov. 21, 2019~ Dec. 02. 2019	Dec. 26, 2019	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Jul. 15, 2019	Nov. 21, 2019~ Dec. 02. 2019	Jul. 14, 2020	Conducted (TH05-HY)
BT Base Station	Rohde & Schwarz	CBT	100815	BT 3.0	Feb. 13, 2019	Nov. 21, 2019~ Dec. 02. 2019	Feb. 12, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1208382	N/A	Mar. 27, 2019	Nov. 21, 2019~ Dec. 02. 2019	Mar. 26, 2020	Conducted (TH05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	37059&01	30MHz~1GHz	Oct. 12, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Oct. 11, 2020	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Nov. 09, 2018	Oct. 12, 2019 ~ Nov. 07, 2019	Nov. 08, 2019	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-02037	1GHz ~ 18GHz	Oct. 28, 2019	Nov. 07, 2019 ~ Dec. 03, 2019	Oct. 27, 2020	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 14, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	May 13, 2020	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 25, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Mar. 24, 2020	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 27, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	May 26, 2020	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA00101800-30-10P	16011180002	1GHz~18GHz	Aug. 01, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Jul. 31, 2020	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz~40GHz	Dec. 06, 2018	Oct. 12, 2019 ~ Dec. 03, 2019	Dec. 05, 2019	Radiation (03CH12-HY)
Spectrum Analyzer	Keysight	N9010A	MY553705276	10Hz~44GHz	Mar. 19, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Mar. 18, 2020	Radiation (03CH12-HY)
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	Jun. 17, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Jun. 16, 2020	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12SS	SN1	1.2 GHz Lowpass	Mar. 22, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Mar. 21, 2020	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60ST	SN2	3GHz High Pass	Jul. 15, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Jul. 14, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Feb. 26, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Feb. 25, 2020	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Feb. 26, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Feb. 25, 2020	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Oct. 12, 2019 ~ Dec. 03, 2019	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 12, 2019 ~ Dec. 03, 2019	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 12, 2019 ~ Dec. 03, 2019	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Oct. 12, 2019 ~ Dec. 03, 2019	N/A	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800N1D01N-06	37059&01	30MHz~1GHz	Oct. 12, 2019	Oct. 12, 2019 ~ Dec. 03, 2019	Oct. 11, 2020	Radiation (03CH12-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 28, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 15, 2019	Nov. 28, 2019	Nov. 14, 2020	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 19, 2019	Nov. 28, 2019	Mar. 18, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 20, 2019	Nov. 28, 2019	Nov. 19, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Nov. 28, 2019	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Dec. 31, 2018	Nov. 28, 2019	Dec. 30, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Dec. 31, 2018	Nov. 28, 2019	Dec. 30, 2019	Conduction (CO05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.20**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.1**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7**

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Derek Hsu / Ethan Lin	Temperature:	21~25	°C
Test Date:	2019/11/21~2019/12/02	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	0.999	0.912	0.682	0.6657	Pass
DH	1Mbps	1	39	2441	1.042	0.915	0.994	0.6947	Pass
DH	1Mbps	1	78	2480	1.039	0.912	0.994	0.6927	Pass
2DH	2Mbps	1	0	2402	1.350	1.204	0.955	0.9001	Pass
2DH	2Mbps	1	39	2441	1.355	1.207	0.999	0.9031	Pass
2DH	2Mbps	1	78	2480	1.355	1.204	1.012	0.9031	Pass
3DH	3Mbps	1	0	2402	1.311	1.184	0.999	0.8741	Pass
3DH	3Mbps	1	39	2441	1.311	1.187	1.151	0.8741	Pass
3DH	3Mbps	1	78	2480	1.316	1.187	1.003	0.8770	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
DH1	0	1	**8.11**	20.97	Pass
	39	1	7.25	20.97	Pass
	78	1	6.40	20.97	Pass
2DH1	0	1	**6.72**	20.97	Pass
	39	1	6.40	20.97	Pass
	78	1	5.31	20.97	Pass
3DH1	0	1	**6.80**	20.97	Pass
	39	1	6.42	20.97	Pass
	78	1	5.40	20.97	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	**7.22**	5.10
	39	1	6.24	5.10
	78	1	4.90	5.10
2DH1	0	1	**3.56**	5.05
	39	1	3.01	5.05
	78	1	1.92	5.05
3DH1	0	1	**3.58**	5.05
	39	1	3.02	5.05
	78	1	1.95	5.05

TEST RESULTS DATA
Number of Hopping Frequency

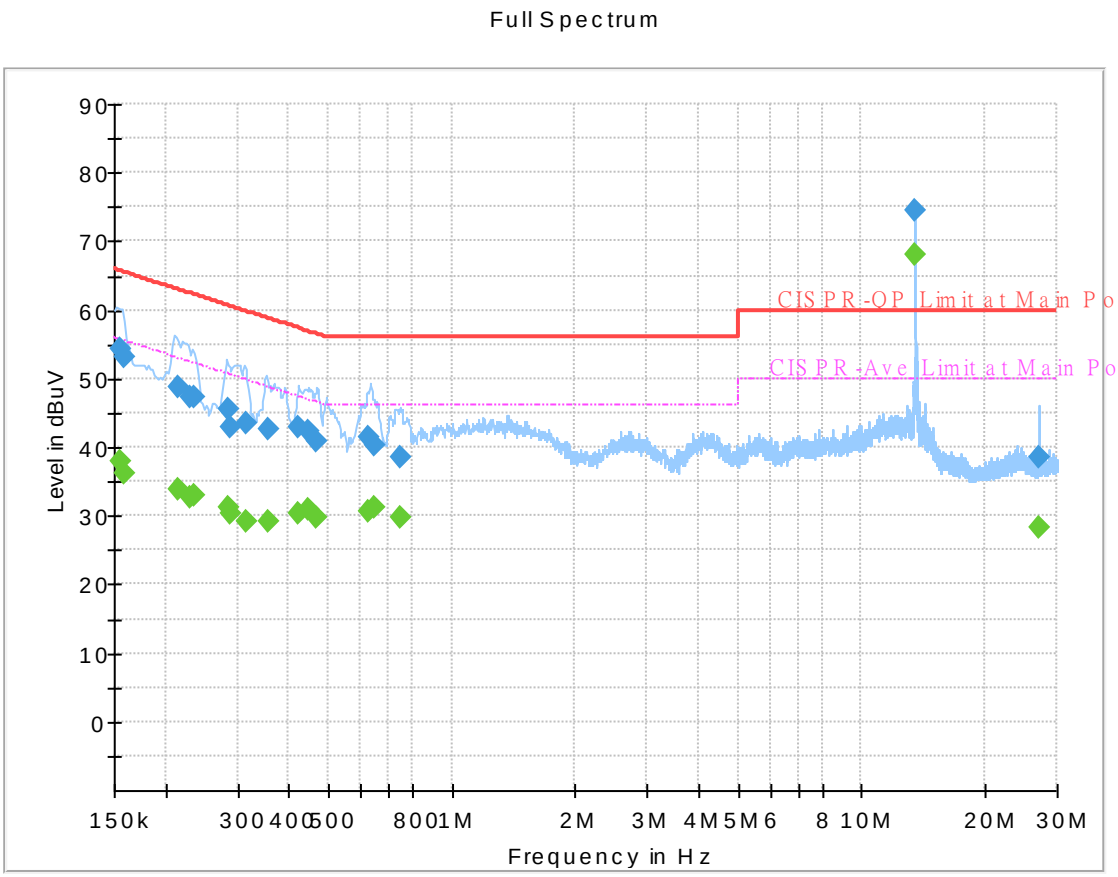
Number of Hopping (Channel)	Adaptive Frequency Hopping (Channel)	Limits (Channel)	Pass/Fail
79	20	> 15	Pass

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	**Temperature :**	24.9~26.1℃
		Relative Humidity :	48~55%

Original

Report NO :	832801-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line



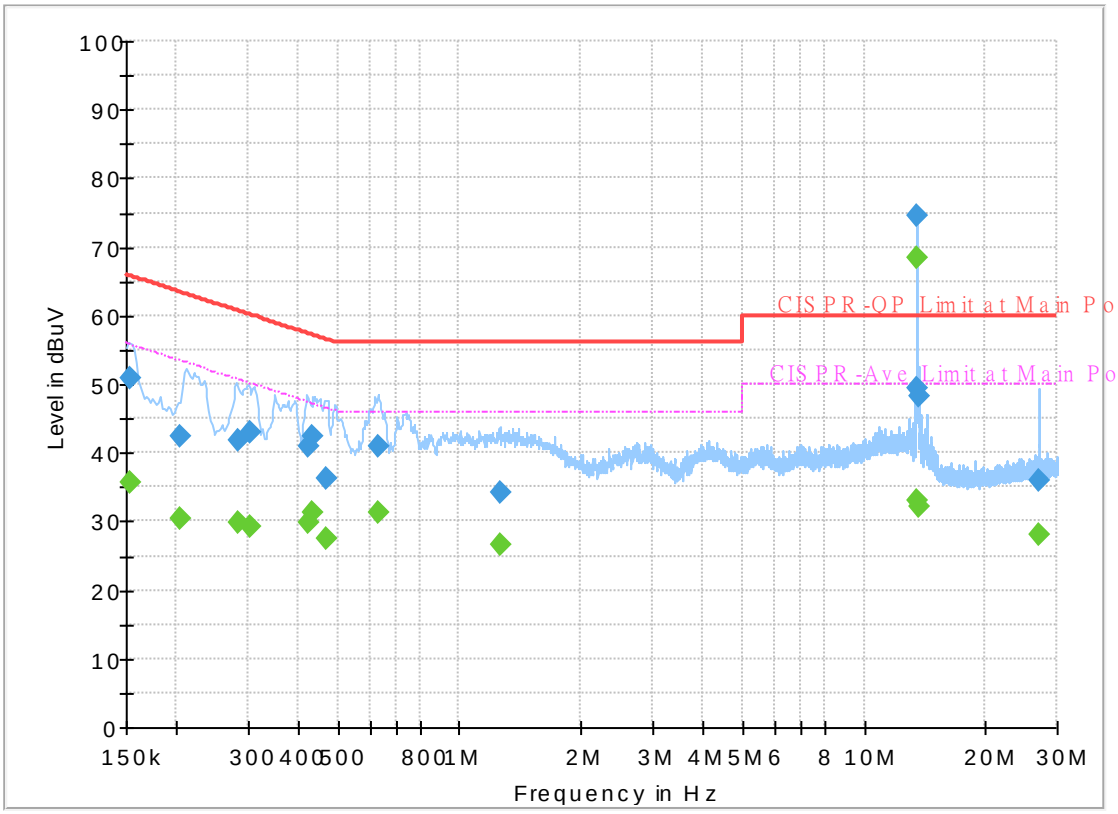
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	54.23	---	65.75	11.52	L1	OFF	19.5
0.154500	---	37.81	55.75	17.94	L1	OFF	19.5
0.158640	53.18	---	65.54	12.36	L1	OFF	19.5
0.158640	---	36.20	55.54	19.34	L1	OFF	19.5
0.215250	---	33.79	53.00	19.21	L1	OFF	19.5
0.215250	48.86	---	63.00	14.14	L1	OFF	19.5
0.228750	---	32.83	52.50	19.67	L1	OFF	19.5
0.228750	47.17	---	62.50	15.33	L1	OFF	19.5
0.233970	---	32.97	52.31	19.34	L1	OFF	19.5
0.233970	47.19	---	62.31	15.12	L1	OFF	19.5
0.285000	---	31.18	50.67	19.49	L1	OFF	19.5
0.285000	45.51	---	60.67	15.16	L1	OFF	19.5
0.289500	---	30.29	50.54	20.25	L1	OFF	19.5
0.289500	42.91	---	60.54	17.63	L1	OFF	19.5
0.316500	---	29.33	49.80	20.47	L1	OFF	19.5
0.316500	43.57	---	59.80	16.23	L1	OFF	19.5
0.357000	---	29.11	48.80	19.69	L1	OFF	19.5
0.357000	42.74	---	58.80	16.06	L1	OFF	19.5
0.422970	---	30.46	47.39	16.93	L1	OFF	19.5
0.422970	42.89	---	57.39	14.50	L1	OFF	19.5
0.448170	---	31.02	46.91	15.89	L1	OFF	19.5

0.448170	42.32	---	56.91	14.59	L1	OFF	19.5
0.467250	---	29.85	46.56	16.71	L1	OFF	19.5
0.467250	40.86	---	56.56	15.70	L1	OFF	19.5
0.627000	---	30.60	46.00	15.40	L1	OFF	19.5
0.627000	41.47	---	56.00	14.53	L1	OFF	19.5
0.649500	---	31.21	46.00	14.79	L1	OFF	19.5
0.649500	40.22	---	56.00	15.78	L1	OFF	19.5
0.750750	---	29.77	46.00	16.23	L1	OFF	19.5
0.750750	38.58	---	56.00	17.42	L1	OFF	19.5
13.560000	---	68.13	50.00	-18.13	L1	OFF	20.0
13.560000	74.44	---	60.00	-14.44	L1	OFF	20.0
27.114810	---	28.40	50.00	21.60	L1	OFF	20.3
27.114810	38.62	---	60.00	21.38	L1	OFF	20.3

Report NO :	832801-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



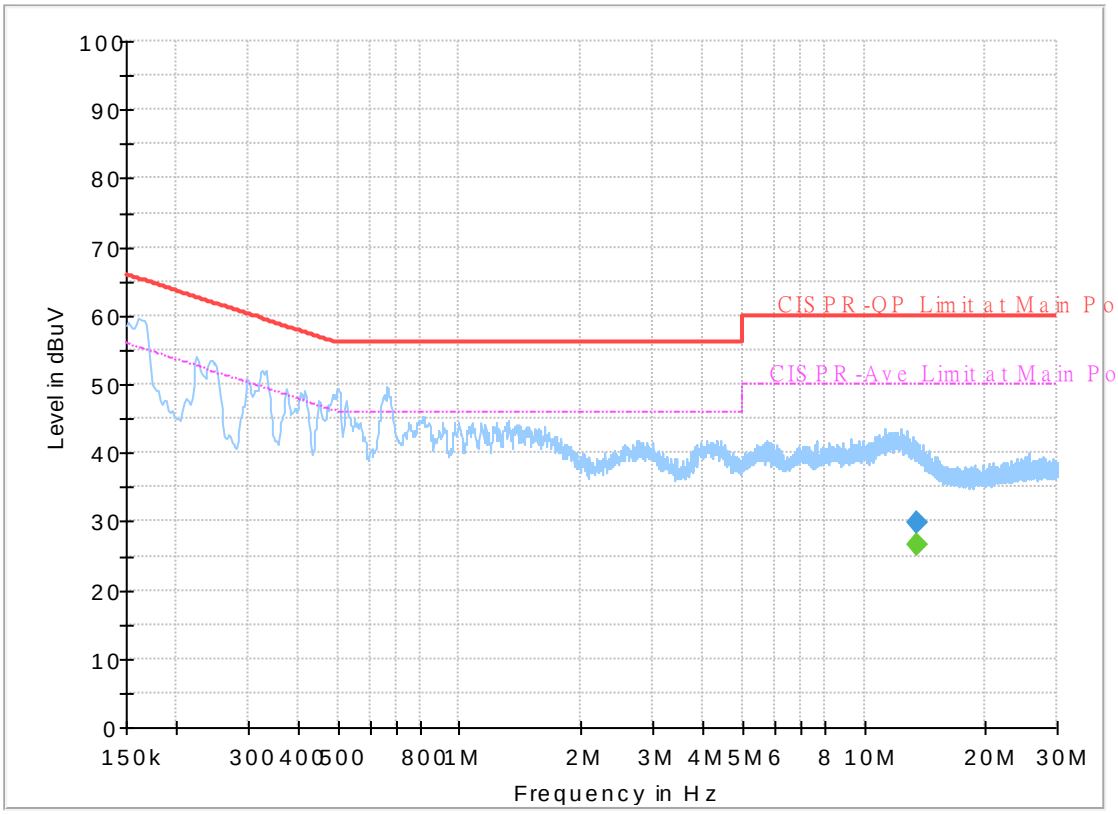
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152970	---	35.65	55.84	20.19	N	OFF	19.5
0.152970	50.89	---	65.84	14.95	N	OFF	19.5
0.204000	---	30.40	53.45	23.05	N	OFF	19.5
0.204000	42.26	---	63.45	21.19	N	OFF	19.5
0.283740	---	29.86	50.71	20.85	N	OFF	19.5
0.283740	41.77	---	60.71	18.94	N	OFF	19.5
0.305250	---	29.11	50.10	20.99	N	OFF	19.5
0.305250	43.04	---	60.10	17.06	N	OFF	19.5
0.424500	---	29.75	47.36	17.61	N	OFF	19.5
0.424500	40.90	---	57.36	16.46	N	OFF	19.5
0.433500	---	31.16	47.19	16.03	N	OFF	19.5
0.433500	42.33	---	57.19	14.86	N	OFF	19.5
0.471210	---	27.42	46.49	19.07	N	OFF	19.6
0.471210	36.18	---	56.49	20.31	N	OFF	19.6
0.629430	---	31.17	46.00	14.83	N	OFF	19.6
0.629430	41.03	---	56.00	14.97	N	OFF	19.6
1.261500	---	26.68	46.00	19.32	N	OFF	19.6
1.261500	34.22	---	56.00	21.78	N	OFF	19.6
13.487100	---	33.11	50.00	16.89	N	OFF	20.1
13.487100	49.37	---	60.00	10.63	N	OFF	20.1
13.560000	---	68.31	50.00	-18.31	N	OFF	20.1
13.560000	74.63	---	60.00	-14.63	N	OFF	20.1
13.629750	---	32.12	50.00	17.88	N	OFF	20.1
13.629750	48.30	---	60.00	11.70	N	OFF	20.1
27.114000	---	28.01	50.00	21.99	N	OFF	20.5
27.114000	36.03	---	60.00	23.97	N	OFF	20.5

Terminal

Report NO :	832801-05
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum

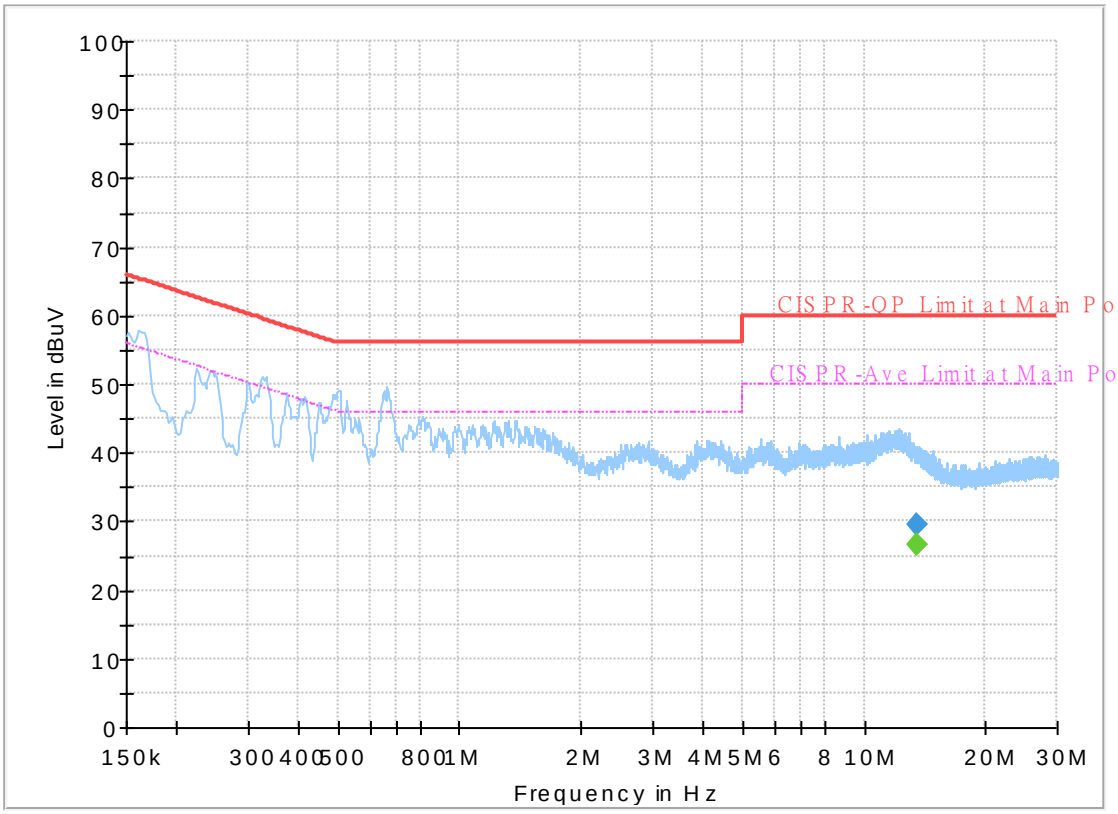


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
13.560000	---	26.52	50.00	23.48	L1	OFF	20.0
13.560000	29.90	---	60.00	30.10	L1	OFF	20.0

Report NO :	832801-05
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)
13.560000	---	26.48	50.00	23.52	N	OFF	20.1
13.560000	29.58	---	60.00	30.42	N	OFF	20.1

Appendix C. Radiated Spurious Emission

Test Engineer :	Jack Cheng, Lance Chiang, and Chuan Chu	Temperature :	19.2~26.8°C
		Relative Humidity :	53.5~69%

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2386.545	45.73	-28.27	74	44.76	27.53	6.59	33.15	297	305	P	H
		2386.545	20.97	-33.03	54	-	-	-	-	-	-	A	H
	*	2402	102.3	-	-	101.36	27.5	6.61	33.17	297	305	P	H
	*	2402	77.54	-	-	-	-	-	-	-	-	A	H
													H
													H
		2351.58	45.7	-28.3	74	44.66	27.6	6.55	33.11	102	354	P	V
		2351.58	20.94	-33.06	54	-	-	-	-	-	-	A	V
	*	2402	103.46	-	-	102.52	27.5	6.61	33.17	102	354	P	V
	*	2402	78.7	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2315.04	45.57	-28.43	74	44.39	27.74	6.51	33.07	289	311	P	H
		2315.04	20.81	-33.19	54	-	-	-	-	-	-	A	H
	*	2441	102.49	-	-	101.64	27.42	6.65	33.22	289	311	P	H
	*	2441	77.73	-	-	-	-	-	-	-	-	A	H
		2484.25	45.08	-28.92	74	44.34	27.33	6.68	33.27	289	311	P	H
		2484.25	20.32	-33.68	54	-	-	-	-	-	-	A	H
		2358.44	45.98	-28.02	74	44.96	27.58	6.56	33.12	100	354	P	V
		2358.44	21.22	-32.78	54	-	-	-	-	-	-	A	V
	*	2441	103.56	-	-	102.72	27.42	6.64	33.22	100	354	P	V
	*	2441	78.8	-	-	-	-	-	-	-	-	A	V
		2494.12	45.29	-28.71	74	44.57	27.31	6.69	33.28	100	354	P	V
		2494.12	20.53	-33.47	54	-	-	-	-	-	-	A	V

BT CH 78 2480MHz	*	2480	99.27	-	-	98.52	27.34	6.68	33.27	291	305	P	H
	*	2480	74.51	-	-	-	-	-	-	-	-	A	H
		2484.28	47.24	-26.76	74	46.5	27.33	6.68	33.27	291	305	P	H
		2484.28	22.48	-31.52	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	101.44	-	-	100.69	27.34	6.68	33.27	100	356	P	V
	*	2480	76.68	-	-	-	-	-	-	-	-	A	V
		2484.04	48.46	-25.54	74	47.72	27.33	6.68	33.27	100	356	P	V
		2484.04	23.7	-30.3	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 (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	37.66	-36.34	74	59.05	31.1	10.07	62.56	100	0	P	H
		4804	12.9	-41.1	54	-	-	-	-	-	-	A	H
													H
													H
		4804	37.41	-36.59	74	58.8	31.1	10.07	62.56	100	0	P	V
		4804	12.65	-41.35	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	39.91	-34.09	74	61.31	31.1	10.08	62.58	100	0	P	H
		4882	15.15	-38.85	54	-	-	-	-	-	-	A	H
		7323	45.3	-28.7	74	59.96	36.39	12.51	63.56	100	0	P	H
		7323	20.54	-33.46	54	-	-	-	-	-	-	A	H
		4882	38.6	-35.4	74	60	31.1	10.08	62.58	100	0	P	V
		4882	13.84	-40.16	54	-	-	-	-	-	-	A	V
		7323	44.7	-29.3	74	59.36	36.39	12.51	63.56	100	0	P	V
		7323	19.94	-34.06	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	38.17	-35.83	74	59.44	31.24	10.08	62.59	100	0	P	H
		4960	13.41	-40.59	54	-	-	-	-	-	-	A	H
		7440	43.01	-30.99	74	57.59	36.4	12.61	63.59	100	0	P	H
		7440	18.25	-35.75	54	-	-	-	-	-	-	A	H
		4960	37.64	-36.36	74	58.91	31.24	10.08	62.59	100	0	P	V
		4960	12.88	-41.12	54	-	-	-	-	-	-	A	V
		7440	43.15	-30.85	74	57.73	36.4	12.61	63.59	100	0	P	V
		7440	18.39	-35.61	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	26.88	-13.12	40	31.91	24.31	0.84	30.18	-	-	P	H
		105.66	33.73	-9.77	43.5	46.21	16.43	1.51	30.42	-	-	P	H
		228.85	34.47	-11.53	46	46.81	15.88	2.05	30.27	-	-	P	H
		733.25	39.05	-6.95	46	36.8	27.7	3.99	29.44	-	-	P	H
		848.68	39.34	-6.66	46	35.25	28.95	4.36	29.22	-	-	P	H
		893.3	39.97	-6.03	46	35.64	28.99	4.49	29.15	100	0	P	H
													H
													H
													H
													H
													H
													H
		30	33.82	-6.18	40	38.85	24.31	0.84	30.18	100	0	P	V
		228.85	36.91	-9.09	46	49.25	15.88	2.05	30.27	-	-	P	V
		236.61	34.86	-11.14	46	46.38	16.66	2.07	30.25	-	-	P	V
		745.86	38.33	-7.67	46	35.66	28.04	4.04	29.41	-	-	P	V
		890.39	39.79	-6.21	46	35.52	28.95	4.47	29.15	-	-	P	V
		893.3	38.76	-7.24	46	34.43	28.99	4.49	29.15	-	-	P	V
													V
													V
													V
													V
													V
													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	**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

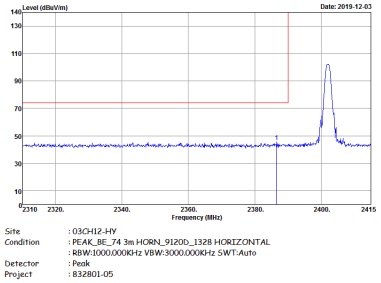
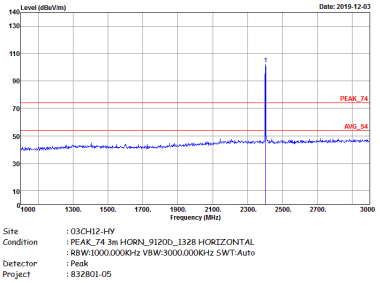
Test Engineer :	Jack Cheng, Lance Chiang, and Chuan Chu	Temperature :	19.2~26.8°C
		Relative Humidity :	53.5~69%

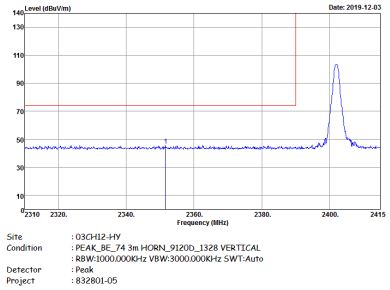
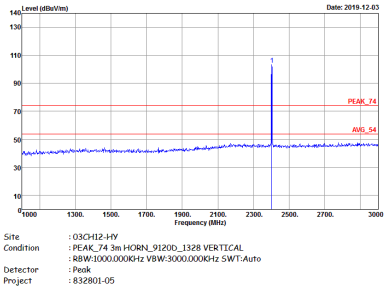
Note symbol

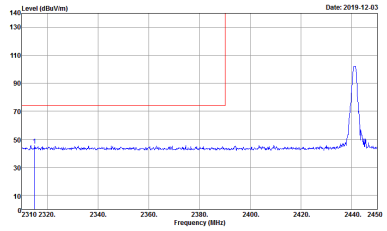
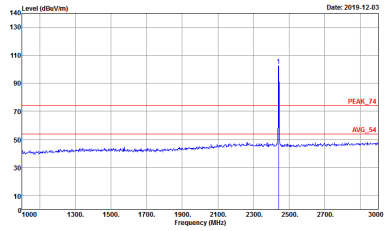
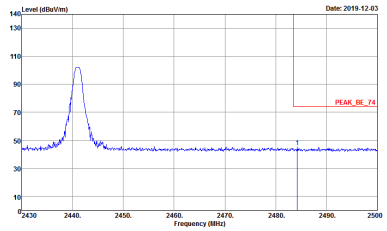
-L	**Low channel location**
-R	**High channel location**

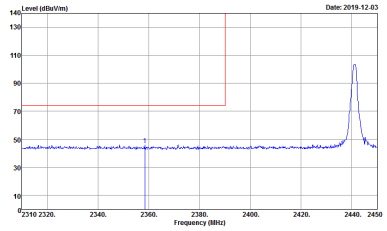
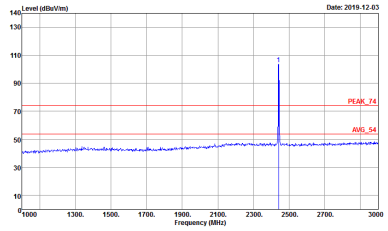
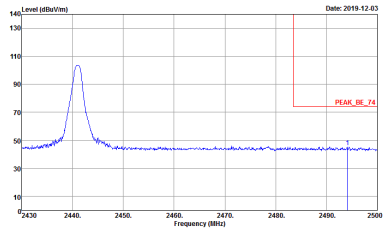
2.4GHz 2400~2483.5MHz

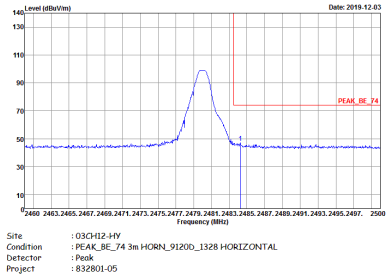
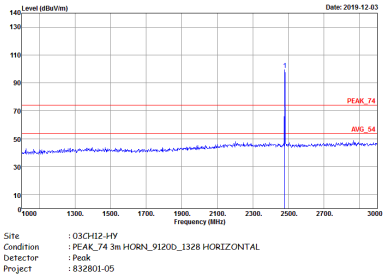
BT (Band Edge @ 3m)

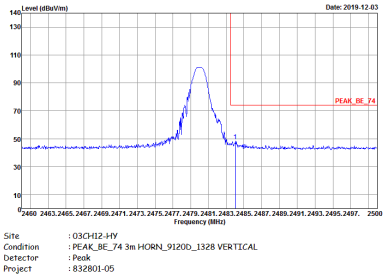
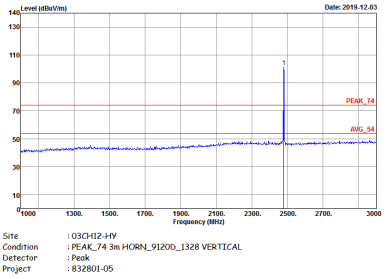
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak		

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak		

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05	Left blank

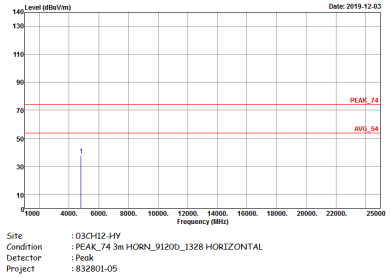
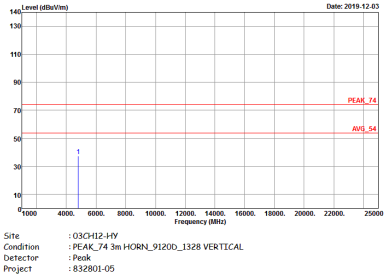
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05	 Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05
Peak	 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 832801-05	Left blank

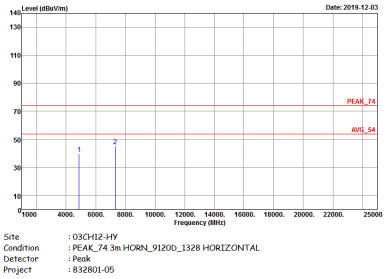
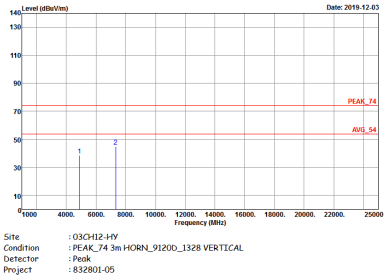
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak		

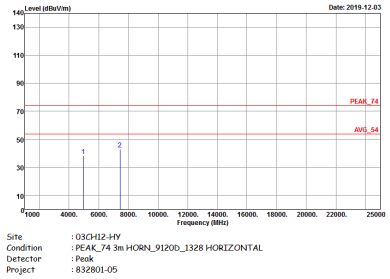
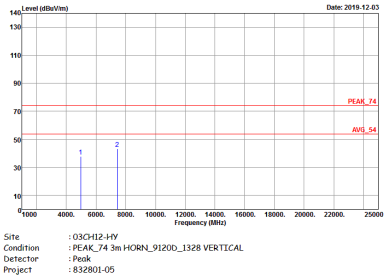
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak		

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

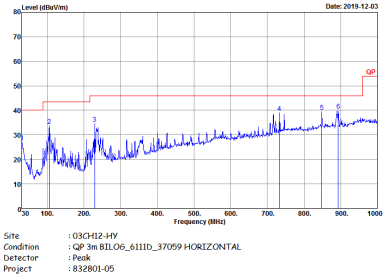
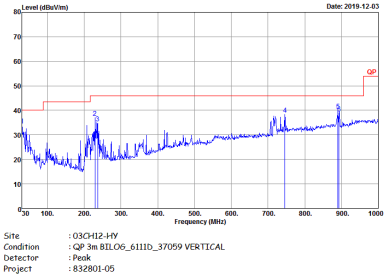
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.		

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.		

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.		

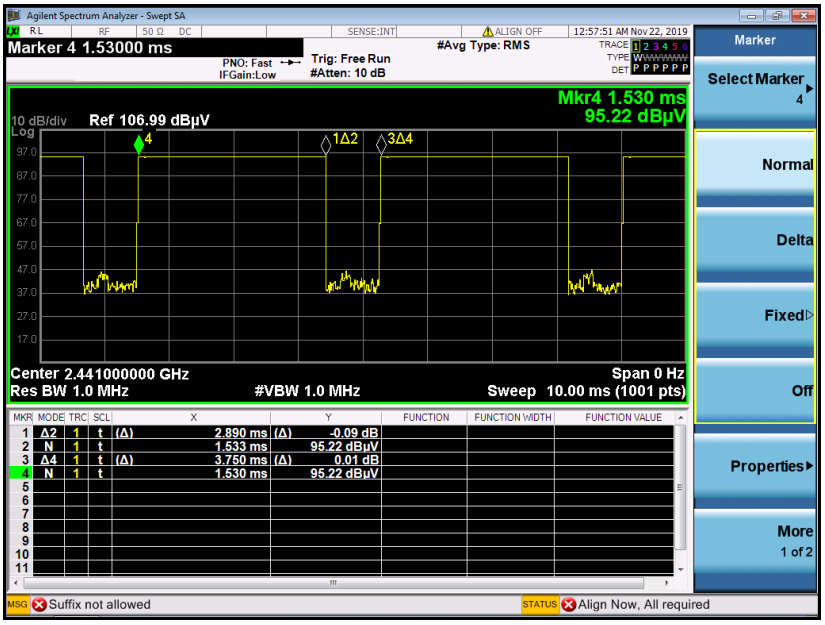
Emission below 1GHz

2.4GHz BT (LF)

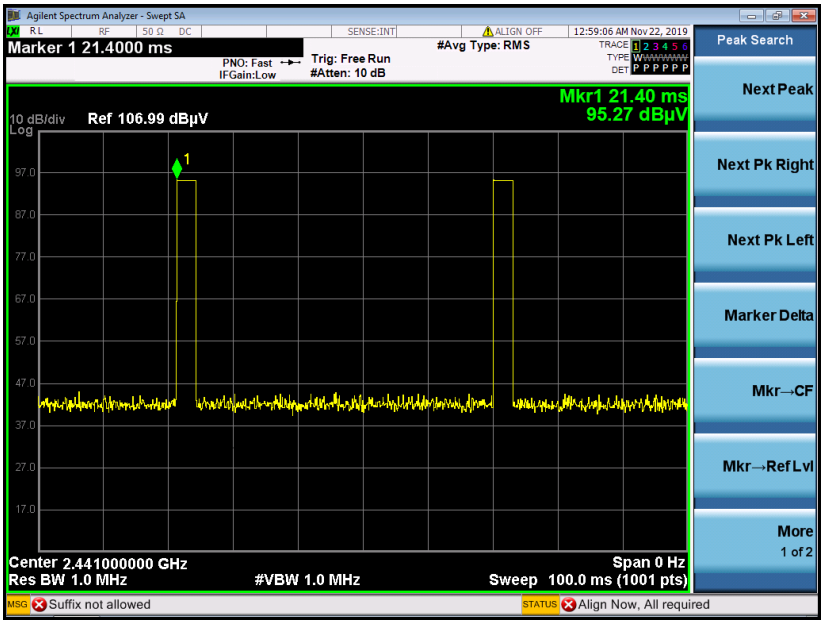
BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak		

Appendix E. Duty Cycle Plots

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 * 2.89 / 100 = 5.78 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.76 dB
3. DH5 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

2.89 ms x 20 channels = 57.8 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. [100ms / 57.6ms] = 2 hops

Thus, the maximum possible ON time:

2.89 ms x 2 = 5.78 ms

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

20 x log(5.78 ms/100ms) = -24.76 dB