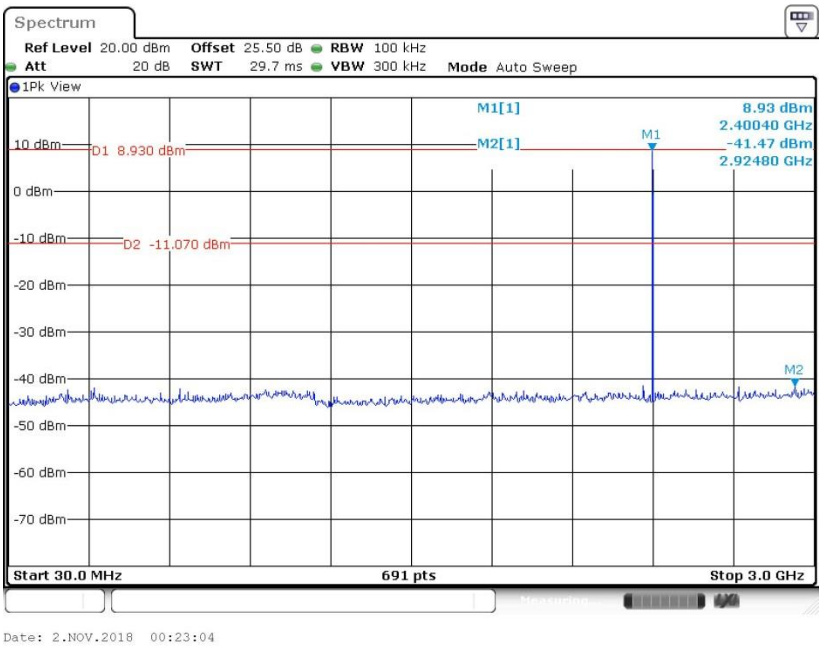
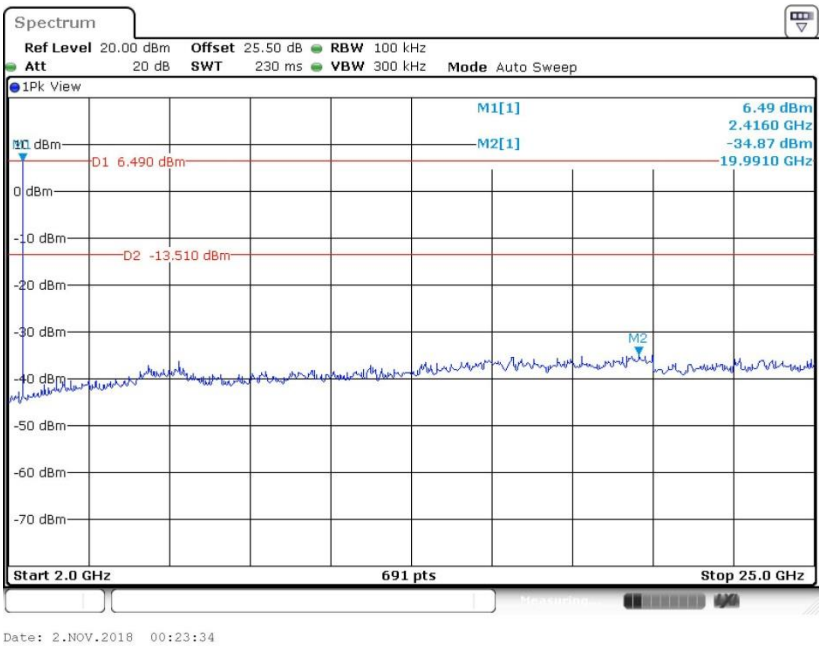
<2Mbps>

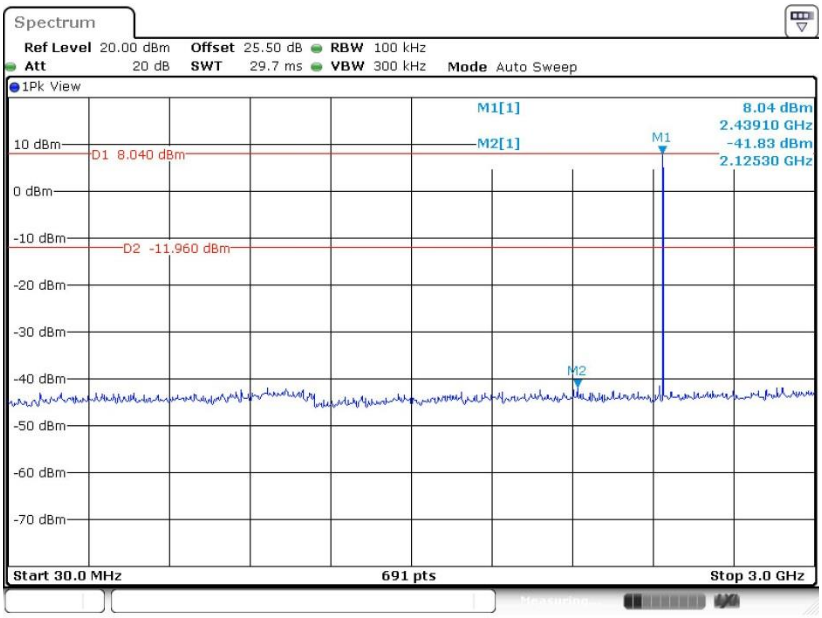
CSE Plot on Ch 00 between 30MHz ~ 3 GHz



CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

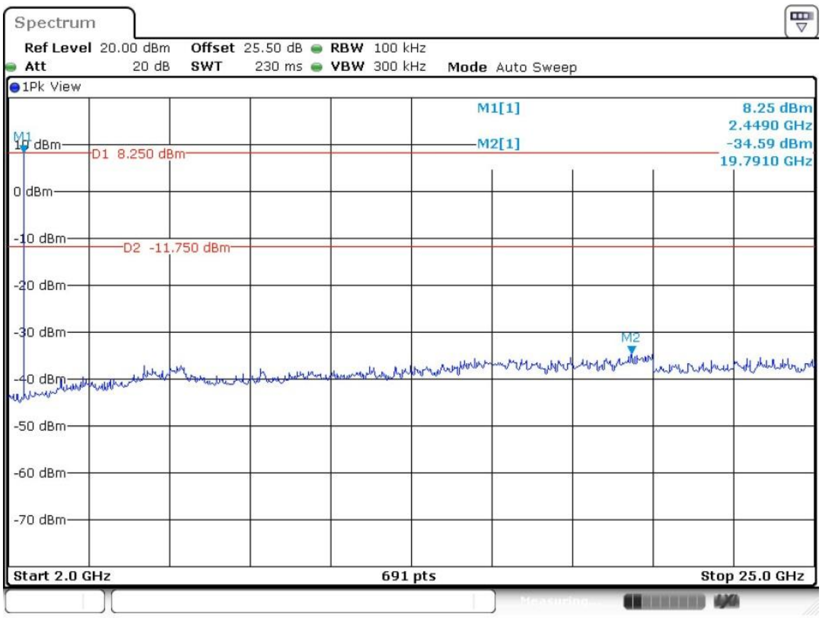


CSE Plot on Ch 39 between 30MHz ~ 3 GHz



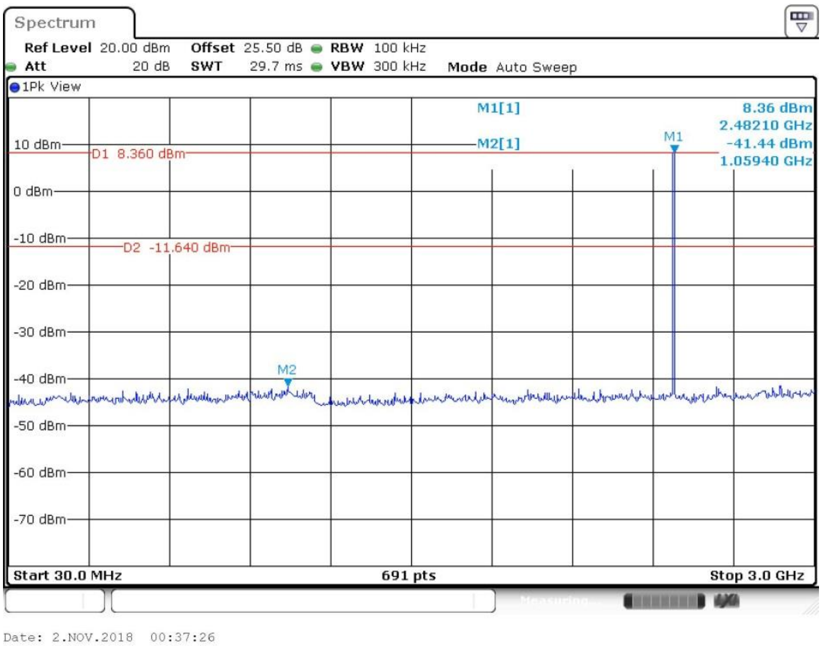
Date: 2.NOV.2018 00:29:00

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

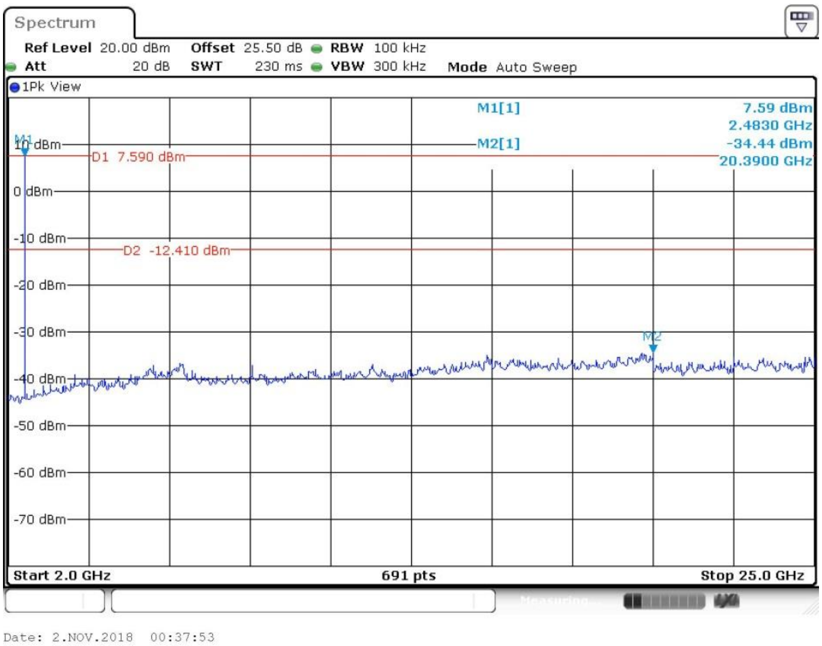


Date: 2.NOV.2018 00:29:27

CSE Plot on Ch 78 between 30MHz ~ 3 GHz

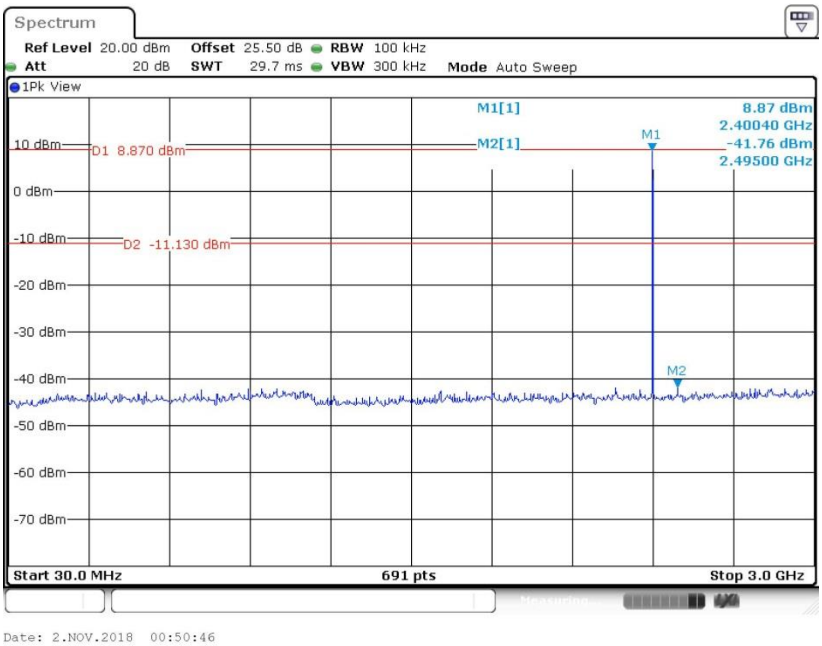


CSE Plot on Ch 78 between 2 GHz ~ 25 GHz

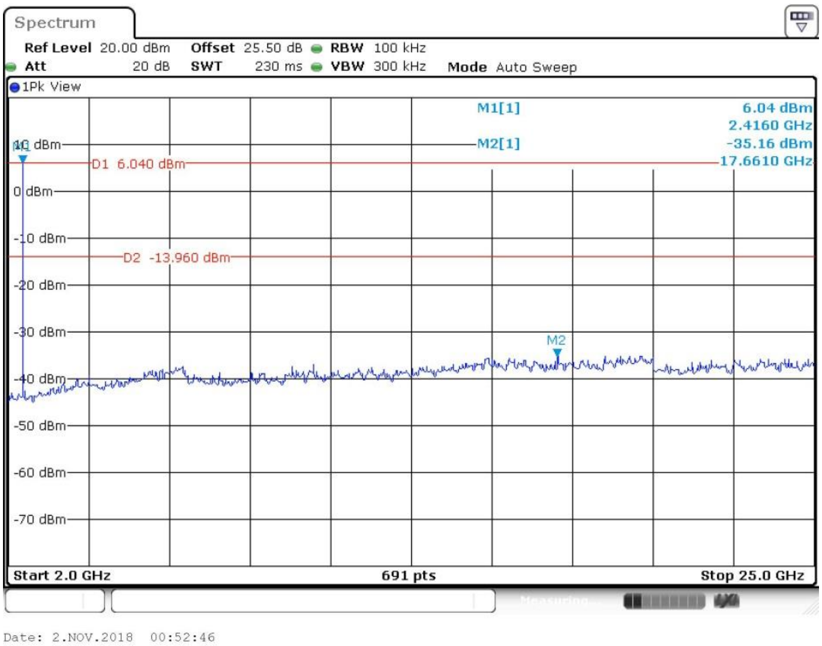


<3Mbps>

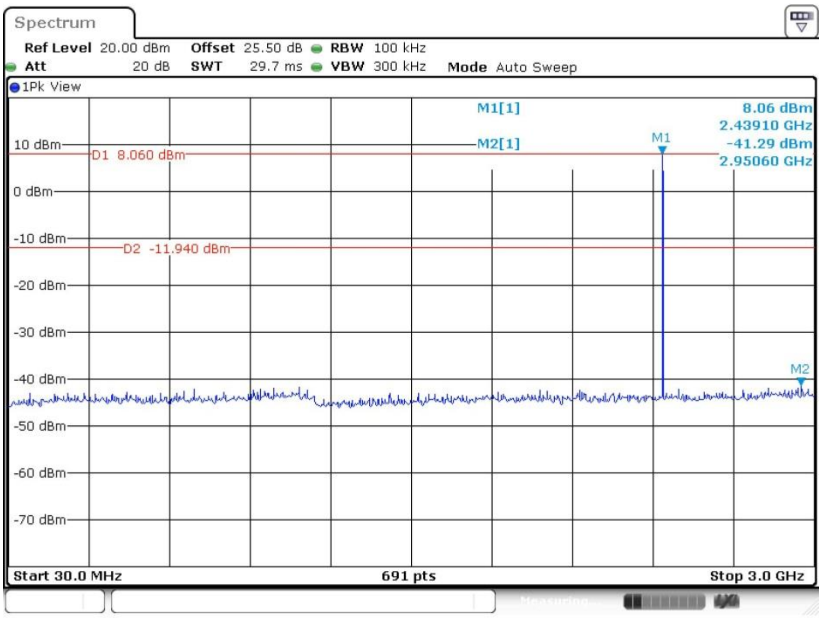
CSE Plot on Ch 00 between 30MHz ~ 3 GHz



CSE Plot on Ch 00 between 2 GHz ~ 25 GHz

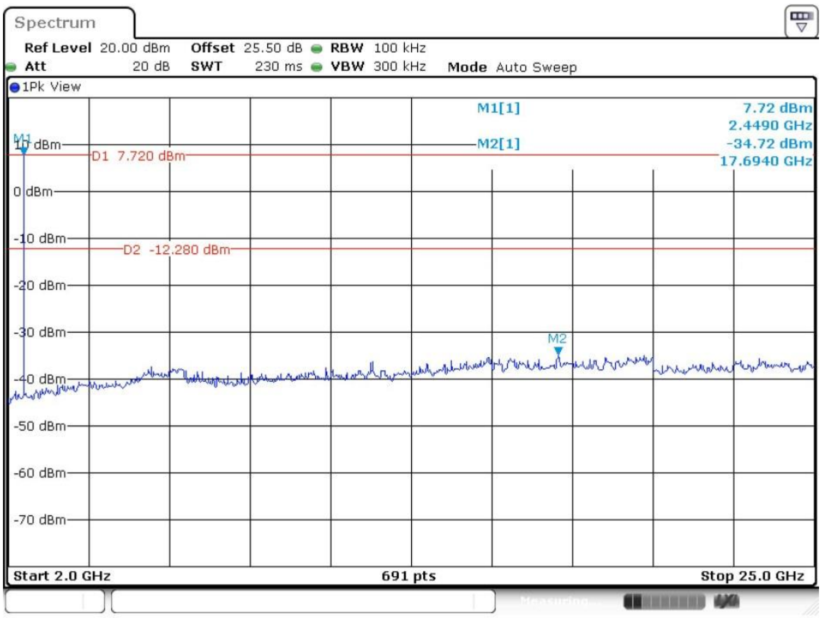


CSE Plot on Ch 39 between 30MHz ~ 3 GHz



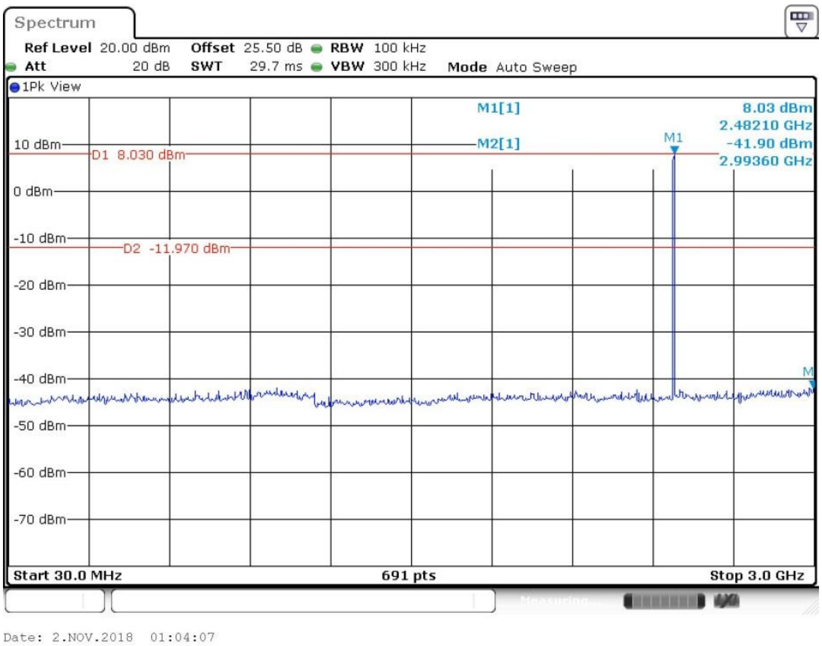
Date: 2.NOV.2018 00:57:53

CSE Plot on Ch 39 between 2 GHz ~ 25 GHz

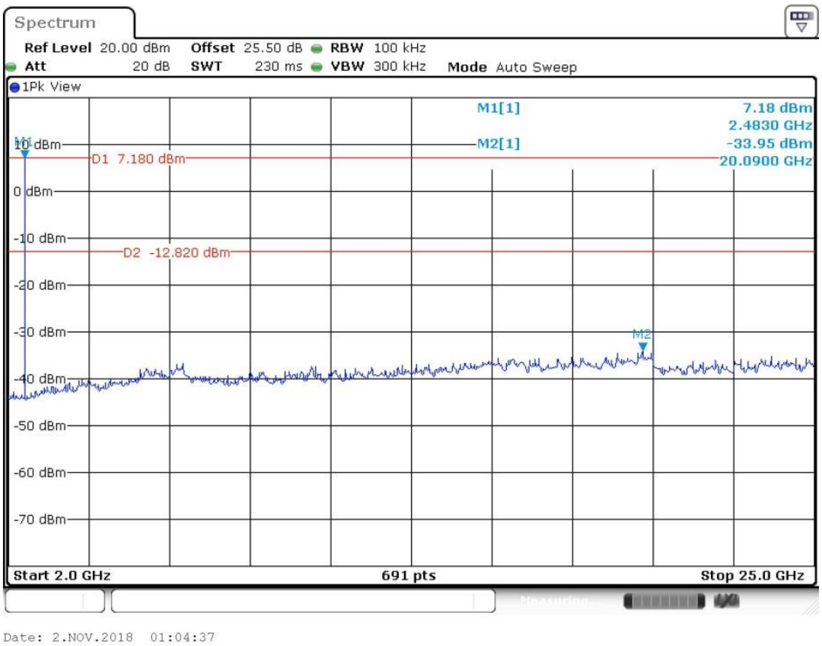


Date: 2.NOV.2018 00:58:20

CSE Plot on Ch 78 between 30MHz ~ 3 GHz



CSE Plot on Ch 78 between 2 GHz ~ 25 GHz



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.

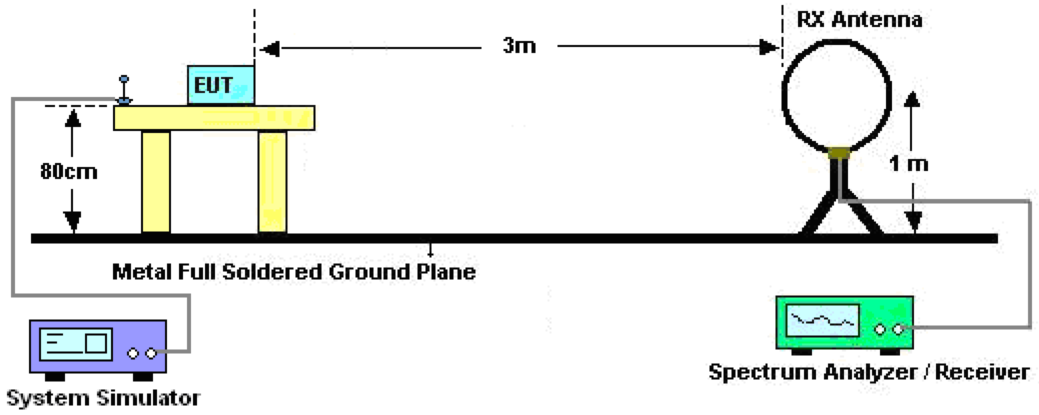
3.8.3 Test Procedures

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>1GHz ; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3) For average measurement: use duty cycle correction factor method per 15.35(c).
   Duty cycle = On time/100 milliseconds
   On time = $N_1*L_1+N_2*L_2+...+N_{n-1}*LN_{n-1}+N_n*L_n$
   Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
   Average Emission Level = Peak Emission Level + 20*log(Duty cycle)
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. 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.

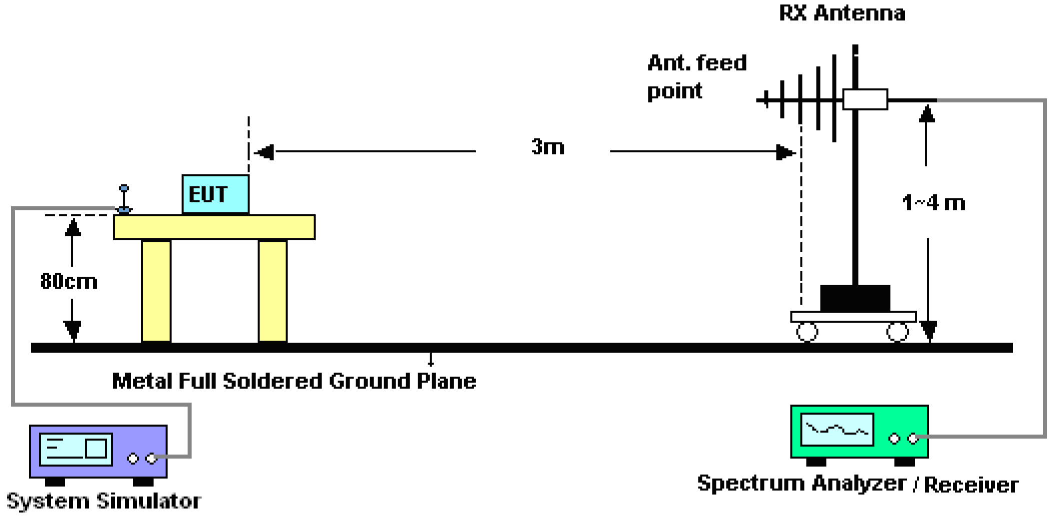
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.79dB) derived from 20log (dwell time/100ms). This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

3.8.4 Test Setup

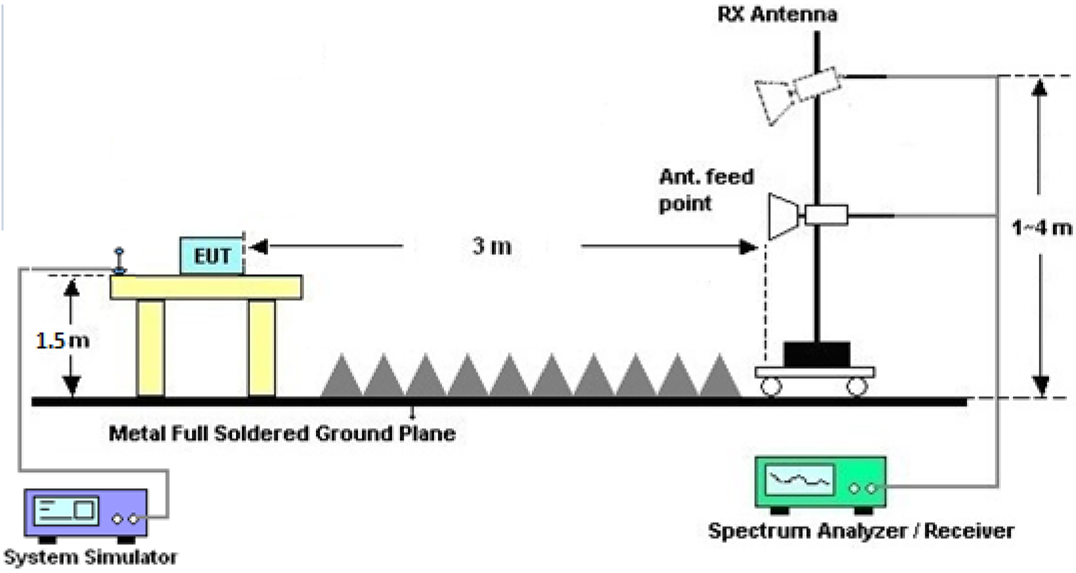
For radiated emissions below 30MHz



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 ~ 10^{th} 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 (dBμV)	
	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.

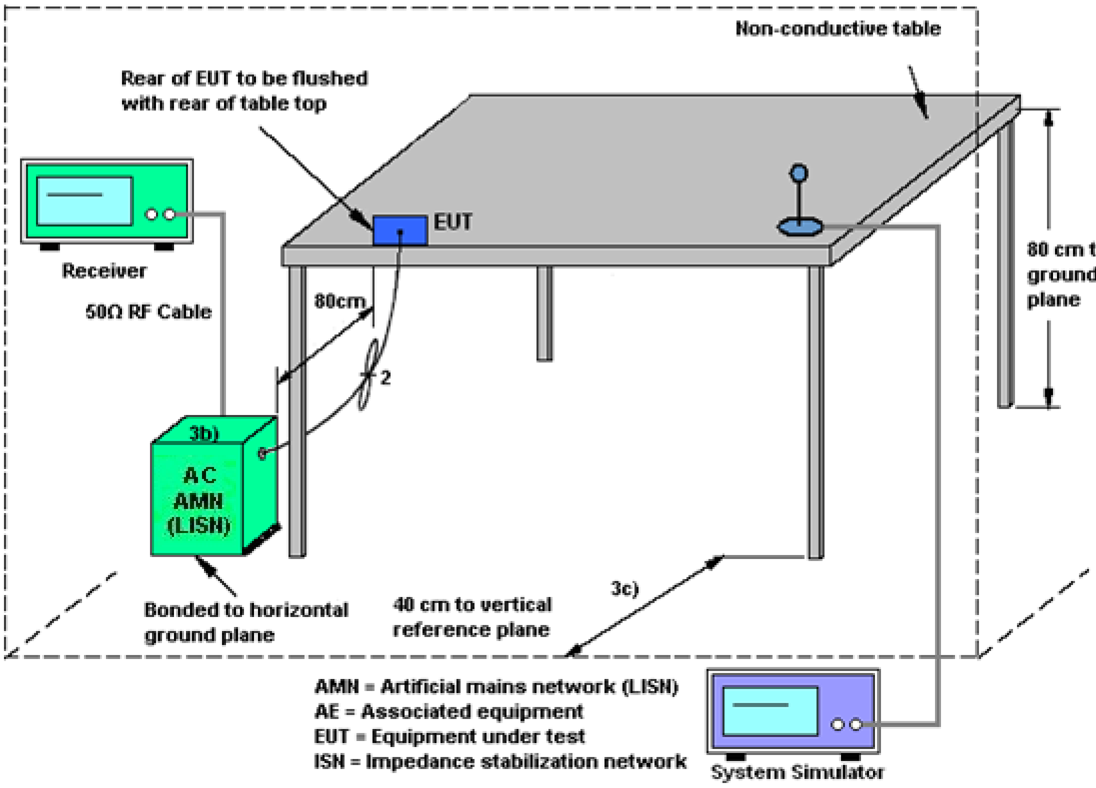
3.9.2 Measuring Instruments

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
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 29, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 29, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 29, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 29, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Oct. 24, 2018 ~ Oct. 27, 2018	Nov. 22, 2018	Radiation (03CH15-HY)
Preamplifier	Jet-Power	JPA0118-55-30 3	1710001800 0550006	1GHz~18GHz	Jul. 10, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Jul. 09, 2019	Radiation (03CH15-HY)
Amplifier	SONOMA	310N	363440	9kHz~1GHz	Dec. 26, 2017	Oct. 24, 2018 ~ Oct. 27, 2018	Dec. 25, 2018	Radiation (03CH15-HY)
Bilog Antenna	TESEQ	CBL6111D&008 00N1D01N-06	41912&05	30MHz to 1GHz	Jan. 10, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Jan. 09, 2019	Radiation (03CH15-HY)
EMI Test Receiver	Keysight	N9038A (MXE)	MY5413008 5	20Hz ~ 8.4GHz	Oct. 31, 2017	Oct. 24, 2018 ~ Oct. 27, 2018	Oct. 30, 2018	Radiation (03CH15-HY)
Horn Antenna	SCHWARZBEC K	BBHA 9120D	9120D-1620	1G~18GHz	Oct. 17, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Oct. 16, 2019	Radiation (03CH15-HY)
Preamplifier	Keysight	83017A	MY5327019 5	1GHz~26.5GHz	Aug. 23, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Aug. 22, 2019	Radiation (03CH15-HY)
Spectrum Analyzer	Agilent	E4446A	MY5018013 6	3Hz~44GHz	Apr. 25, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Apr. 24, 2019	Radiation (03CH15-HY)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Oct. 24, 2018 ~ Oct. 27, 2018	N/A	Radiation (03CH15-HY)
Turn Table	ChainTek	T-200-S-1	N/A	0~360 Degree	N/A	Oct. 24, 2018 ~ Oct. 27, 2018	N/A	Radiation (03CH15-HY)
SHF-EHF Horn Antenna	SCHWARZBEC K	BBHA 9170	BBHA91705 84	18GHz- 40GHz	Nov. 27, 2017	Oct. 24, 2018 ~ Oct. 27, 2018	Nov. 26, 2018	Radiation (03CH15-HY)
Software	Audix	E3 6.2009-8-24	RK-000451	N/A	N/A	Oct. 24, 2018 ~ Oct. 27, 2018	N/A	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER / MTJ Cooperation	SUCOFLEX 104 / 000000-MT18A-100	MY36980/4, MY9838/4P E, D3210	30MHz~1GHz	Mar. 15, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Mar. 14, 2019	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER / MTJ Cooperation	SUCOFLEX 104 / 000000-MT18A-100	MY36980/4, MY9838/4P E, D3210	1GHz~18GHz	Mar. 15, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Mar. 14, 2019	Radiation (03CH15-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30M~40GHz	Mar. 14, 2018	Oct. 24, 2018 ~ Oct. 27, 2018	Mar. 13, 2019	Radiation (03CH15-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Agilent	E4416A	GB41292344	N/A	Dec. 20, 2017	Oct. 18, 2018 ~ Nov. 02, 2018	Dec. 19, 2018	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Dec. 20, 2017	Oct. 18, 2018 ~ Nov. 02, 2018	Dec. 19, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2017	Oct. 18, 2018 ~ Nov. 02, 2018	Nov. 20, 2018	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101397	10Hz~40GHz	Nov. 09, 2017	Oct. 18, 2018 ~ Nov. 02, 2018	Nov. 08, 2018	Conducted (TH05-HY)
BT Base Station (Measure)	Rohde & Schwarz	CBT	101136	BT 3.0	Sep. 27, 2018	Oct. 18, 2018 ~ Nov. 02, 2018	Sep. 26, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Oct. 18, 2018 ~ Nov. 02, 2018	Feb. 28, 2019	Conducted (TH05-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))	**2.2**

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.5**

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

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

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Howard Lin and Derek Hsu	Temperature:	21~25	°C
Test Date:	2018/10/18~2018/11/02	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	0.920	0.822	1.003	0.6136	Pass
DH	1Mbps	1	39	2441	0.923	0.845	0.999	0.6155	Pass
DH	1Mbps	1	78	2480	0.918	0.845	0.999	0.6117	Pass
2DH	2Mbps	1	0	2402	1.259	1.164	1.003	0.8393	Pass
2DH	2Mbps	1	39	2441	1.259	1.164	1.142	0.8393	Pass
2DH	2Mbps	1	78	2480	1.229	1.166	1.046	0.8191	Pass
3DH	3Mbps	1	0	2402	1.229	1.149	1.142	0.8191	Pass
3DH	3Mbps	1	39	2441	1.233	1.152	1.155	0.8220	Pass
3DH	3Mbps	1	78	2480	1.233	1.149	1.077	0.8220	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	**12.47**	20.97	Pass
	39	1	11.90	20.97	Pass
	78	1	11.33	20.97	Pass
2DH1	0	1	**11.95**	20.97	Pass
	39	1	11.84	20.97	Pass
	78	1	10.82	20.97	Pass
3DH1	0	1	**12.24**	20.97	Pass
	39	1	11.82	20.97	Pass
	78	1	11.09	20.97	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	**12.26**	5.16
	39	1	11.74	5.16
	78	1	11.14	5.16
2DH1	0	1	**9.74**	5.12
	39	1	8.92	5.12
	78	1	9.08	5.12
3DH1	0	1	**9.72**	5.12
	39	1	8.84	5.12
	78	1	9.06	5.12

TEST RESULTS DATA
Number of Hopping Frequency

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

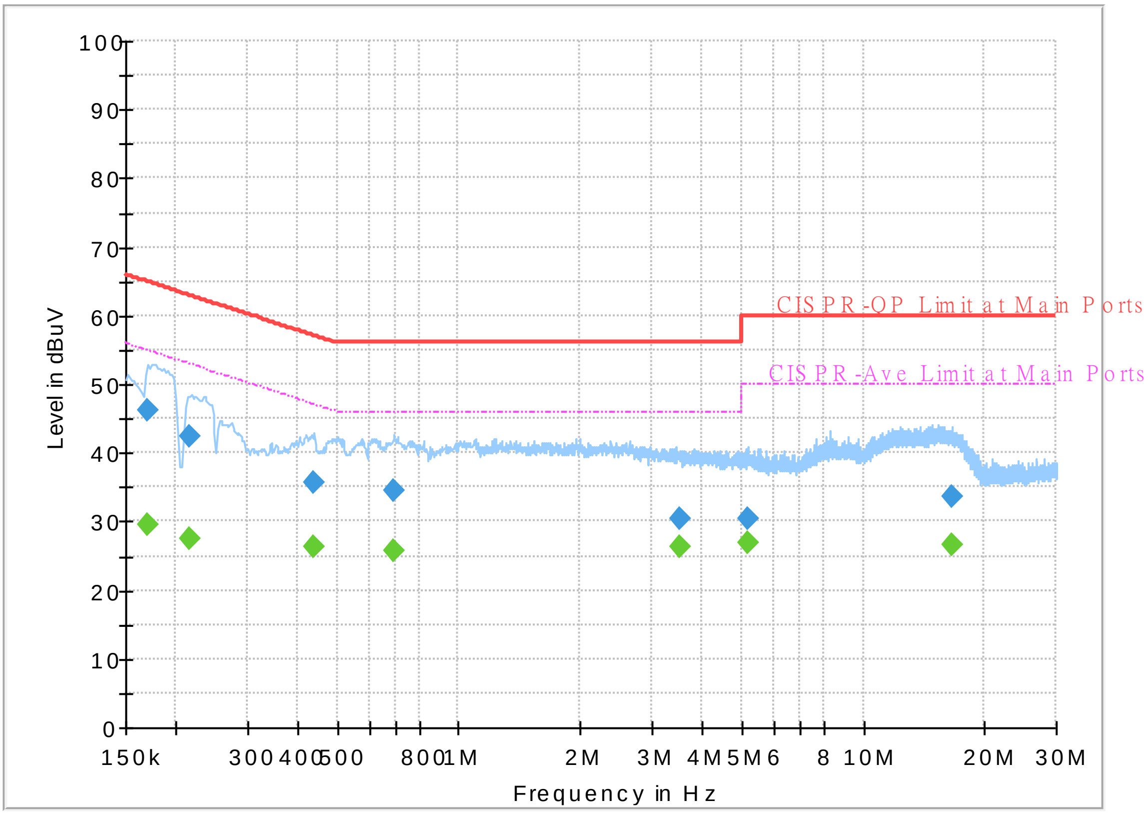
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	**Temperature :**	24~26℃
		Relative Humidity :	51~53%

EUT Information

Report NO : 8O0518
Test Mode : Mode 1
Test Voltage : 120Vac/60Hz
Phase : Line

Full Spectrum

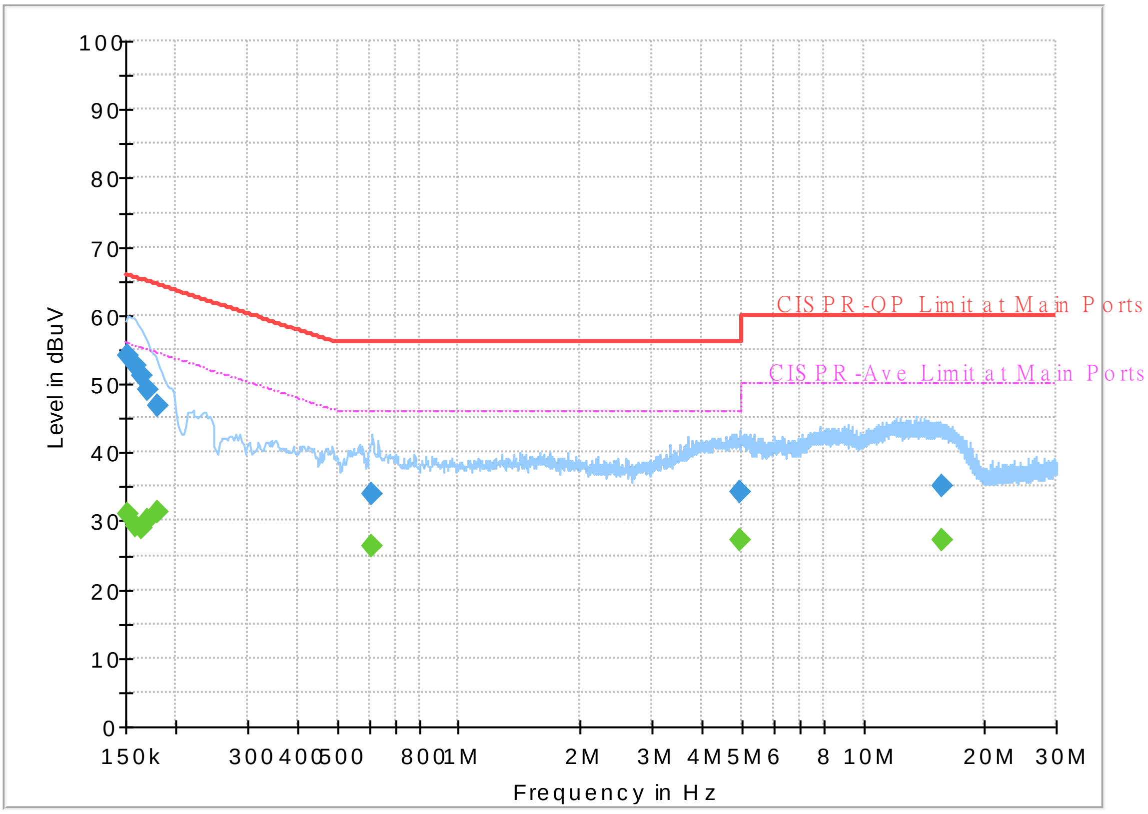


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170250	---	29.55	54.95	25.40	L1	OFF	19.5
0.170250	46.09	---	64.95	18.86	L1	OFF	19.5
0.215250	---	27.61	53.00	25.39	L1	OFF	19.5
0.215250	42.33	---	63.00	20.67	L1	OFF	19.5
0.440250	---	26.43	47.06	20.63	L1	OFF	19.5
0.440250	35.54	---	57.06	21.52	L1	OFF	19.5
0.690000	---	25.76	46.00	20.24	L1	OFF	19.6
0.690000	34.41	---	56.00	21.59	L1	OFF	19.6
3.516000	---	26.40	46.00	19.60	L1	OFF	19.7
3.516000	30.48	---	56.00	25.52	L1	OFF	19.7
5.172000	---	26.83	50.00	23.17	L1	OFF	19.7
5.172000	30.32	---	60.00	29.68	L1	OFF	19.7
16.658250	---	26.71	50.00	23.29	L1	OFF	20.1
16.658250	33.60	---	60.00	26.40	L1	OFF	20.1

EUT Information

Report NO :	8O0518
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	30.90	55.88	24.98	N	OFF	19.5
0.152250	53.97	---	65.88	11.91	N	OFF	19.5
0.159000	---	29.38	55.52	26.14	N	OFF	19.5
0.159000	52.66	---	65.52	12.86	N	OFF	19.5
0.163500	---	28.92	55.28	26.36	N	OFF	19.5
0.163500	51.22	---	65.28	14.06	N	OFF	19.5
0.170250	---	30.02	54.95	24.93	N	OFF	19.5
0.170250	49.14	---	64.95	15.81	N	OFF	19.5
0.179250	---	31.23	54.52	23.29	N	OFF	19.5
0.179250	46.72	---	64.52	17.80	N	OFF	19.5
0.609000	---	26.18	46.00	19.82	N	OFF	19.6
0.609000	33.90	---	56.00	22.10	N	OFF	19.6
4.967250	---	27.23	46.00	18.77	N	OFF	19.7
4.967250	34.08	---	56.00	21.92	N	OFF	19.7
15.598500	---	27.32	50.00	22.68	N	OFF	20.1
15.598500	35.02	---	60.00	24.98	N	OFF	20.1

Appendix C. Radiated Spurious Emission

Test Engineer :	Watt Tseng, Karl Hou, and Big-show Wang	Temperature :	23~26°C
		Relative Humidity :	51~59%

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		2372.58	44.1	-29.9	74	41.5	27.63	5.83	30.86	381	331	P	H
		2372.58	19.31	-34.69	54	-	-	-	-	-	-	A	H
	*	2402	103.28	-	-	100.66	27.6	5.87	30.85	381	331	P	H
	*	2402	78.49	-	-	-	-	-	-	-	-	A	H
													H
													H
		2357.46	43.39	-30.61	74	40.79	27.67	5.81	30.88	386	230	P	V
		2357.46	18.6	-35.4	54	-	-	-	-	-	-	A	V
	*	2402	101.26	-	-	98.64	27.6	5.87	30.85	386	230	P	V
	*	2402	76.47	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2384.62	43.82	-30.18	74	41.2	27.63	5.85	30.86	363	328	P	H
		2384.62	19.03	-34.97	54	-	-	-	-	-	-	A	H
	*	2441	103.77	-	-	101.07	27.6	5.93	30.83	363	328	P	H
	*	2441	78.98	-	-	-	-	-	-	-	-	A	H
		2499.09	42.64	-31.36	74	40.04	27.4	6.01	30.81	363	328	P	H
		2499.09	17.85	-36.15	54	-	-	-	-	-	-	A	H
		2377.34	43.46	-30.54	74	40.85	27.63	5.84	30.86	400	302	P	V
		2377.34	18.67	-35.33	54	-	-	-	-	-	-	A	V
	*	2441	96.81	-	-	94.11	27.6	5.93	30.83	400	302	P	V
	*	2441	72.02	-	-	-	-	-	-	-	-	A	V
		2498.04	42.73	-31.27	74	40.13	27.4	6.01	30.81	400	302	P	V
		2498.04	17.94	-36.06	54	-	-	-	-	-	-	A	V

BT CH 78 2480MHz	*	2480	103.25	-	-	100.62	27.47	5.98	30.82	356	328	P	H
	*	2480	78.46	-	-	-	-	-	-	-	-	A	H
		2483.6	51.35	-22.65	74	48.71	27.47	5.99	30.82	356	328	P	H
		2483.6	26.56	-27.44	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	99.89	-	-	97.26	27.47	5.98	30.82	400	226	P	V
	*	2480	75.1	-	-	-	-	-	-	-	-	A	V
		2483.6	49.35	-24.65	74	46.71	27.47	5.99	30.82	400	226	P	V
		2483.6	24.56	-29.44	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	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	37.66	-36.34	74	55.96	31.3	8.44	58.04	100	0	P	H
		4804	12.87	-41.13	54	-	-	-	-	-	-	A	H
													H
													H
		4804	37.93	-36.07	74	56.23	31.3	8.44	58.04	100	0	P	V
		4804	13.14	-40.86	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	36.96	-37.04	74	55.1	31.3	8.21	58.11	100	0	P	H
		4882	12.17	-41.83	54	-	-	-	-	-	-	A	H
		7323	42.84	-31.16	74	53.68	36.23	10.79	58.34	100	0	P	H
		7323	18.05	-35.95	54	-	-	-	-	-	-	A	H
		4882	36.8	-37.2	74	54.94	31.3	8.21	58.11	100	0	P	V
		4882	12.01	-41.99	54	-	-	-	-	-	-	A	V
		7323	41.88	-32.12	74	52.72	36.23	10.79	58.34	100	0	P	V
		7323	17.09	-36.91	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	37.91	-36.09	74	55.71	31.47	8.9	58.17	100	0	P	H
		4960	13.12	-40.88	54	-	-	-	-	-	-	A	H
		7440	42.04	-31.96	74	52.42	36.6	11.33	58.31	100	0	P	H
		7440	17.25	-36.75	54	-	-	-	-	-	-	A	H
		4960	37.26	-36.74	74	55.06	31.47	8.9	58.17	100	0	P	V
		4960	12.47	-41.53	54	-	-	-	-	-	-	A	V
		7440	42.73	-31.27	74	53.11	36.6	11.33	58.31	100	0	P	V
		7440	17.94	-36.06	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	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BT LF		70.23	26.85	-13.15	40	45.94	12.41	1.1	32.6	100	0	P	H
		102.9	28.17	-15.33	43.5	43.11	16.32	1.31	32.57	-	-	P	H
		200.64	27.9	-15.6	43.5	43.52	15.05	1.87	32.54	-	-	P	H
		486.2	31.65	-14.35	46	37.52	23.98	2.7	32.55	-	-	P	H
		865.6	31.7	-14.3	46	30.72	29.19	3.67	31.88	-	-	P	H
		972.7	34.66	-19.34	54	31	30.78	3.96	31.08	-	-	P	H
													H
													H
													H
													H
													H
													H
		70.23	32.91	-7.09	40	52	12.41	1.1	32.6	100	0	P	V
		96.69	25.99	-17.51	43.5	41.63	15.63	1.3	32.57	-	-	P	V
		197.67	24.8	-18.7	43.5	40.5	14.97	1.87	32.54	-	-	P	V
		508.6	29.32	-16.68	46	34.92	24.17	2.78	32.55	-	-	P	V
		749.4	29.66	-16.34	46	30.58	28.12	3.32	32.36	-	-	P	V
		975.5	33.27	-20.73	54	29.67	30.7	3.96	31.06	-	-	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	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		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)

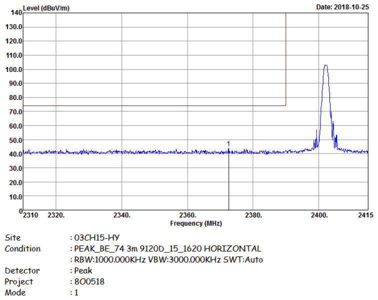
Both peak and average measured complies with the limit line, so test result is “PASS”.

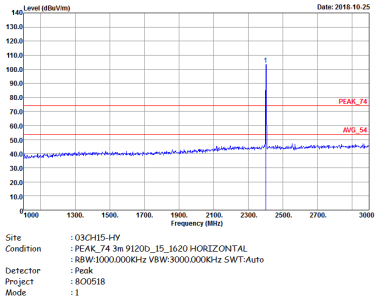
Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Watt Tseng, Karl Hou and Big-show Wang	**Temperature :**	23~26°C
		Relative Humidity :	51~59%

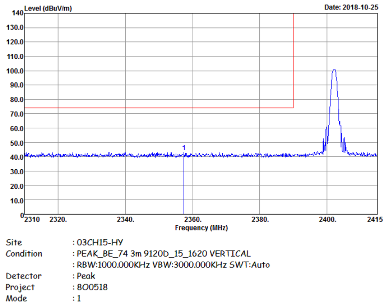
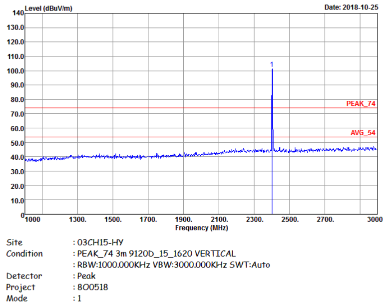
2.4GHz 2400~2483.5MHz

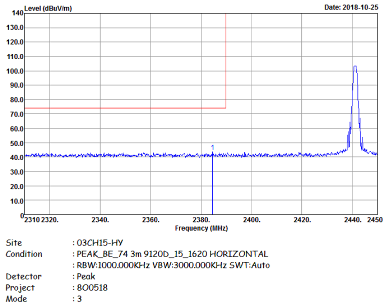
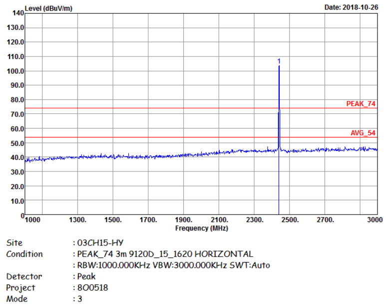
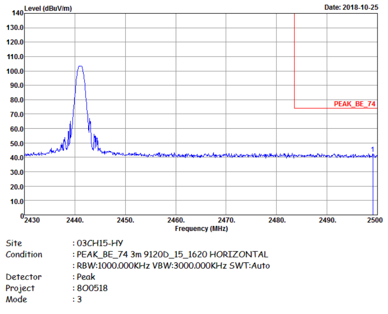
BT (Band Edge @ 3m)

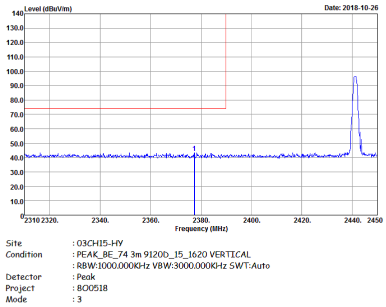
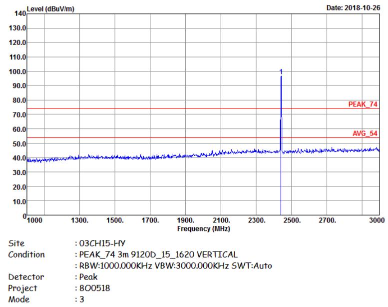
<table>
<tr><th>BT</th><th colspan="2">2.4GHz 2400~2483.5MHz Band Edge @ 3m</th></tr>
<tr><td></td><td colspan="2">BT CH00 2402MHz</td></tr>
<tr><td></td><td>Horizontal</td><td>Fundamental</td></tr>
<tr><td>Peak</td><td>


</td><td>


</td></tr>
</table>

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		
Peak		Left blank

<table>
<tr><td>BT</td><td colspan="2">2.4GHz 2400~2483.5MHz Band Edge @ 3m</td></tr>
<tr><td></td><td colspan="2">BT CH39 2441MHz</td></tr>
<tr><td></td><td>Vertical</td><td>Fundamental</td></tr>
<tr><td>Peak</td><td>
</td><td>
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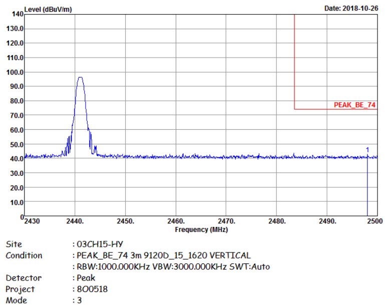
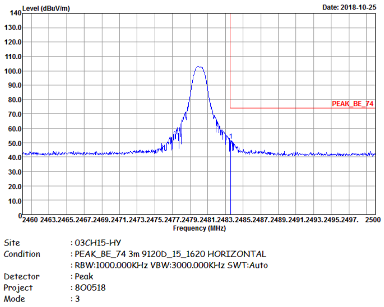
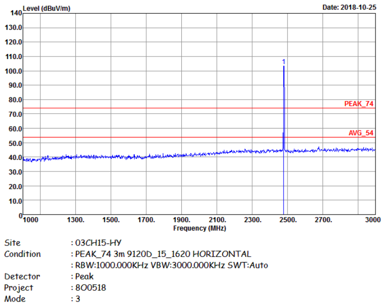
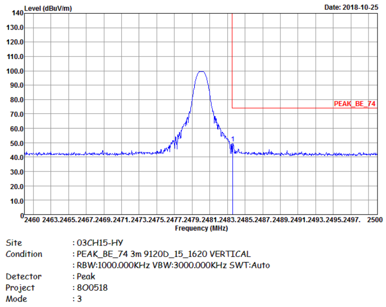
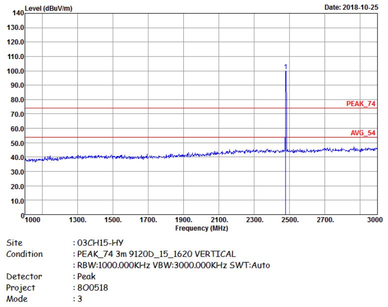
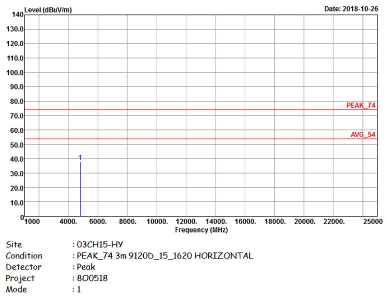
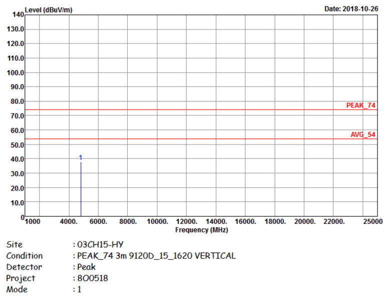
<tr><td>Peak</td><td>
</td><td>Left blank</td></tr>
</table>

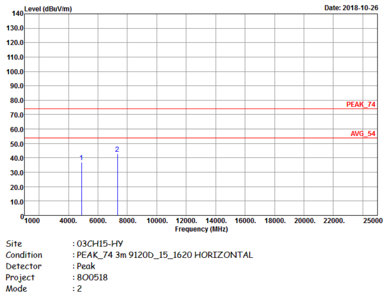
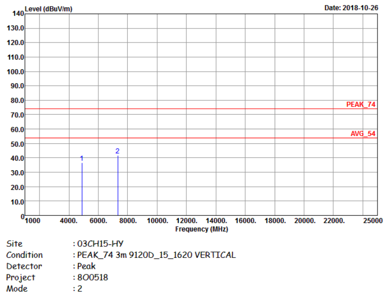
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak		

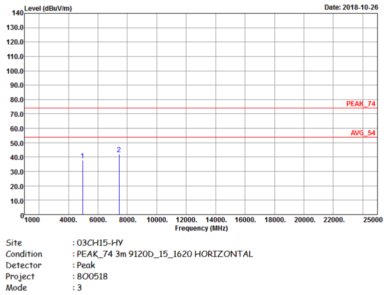
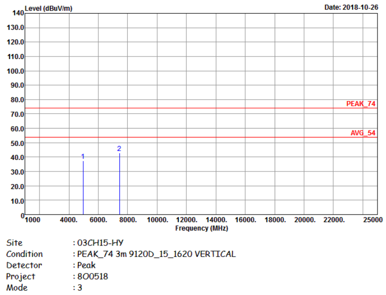
<table>
<tr><th>BT</th><th colspan="2">2.4GHz 2400~2483.5MHz Band Edge @ 3m</th></tr>
<tr><th></th><th colspan="2">BT CH78 2480MHz</th></tr>
<tr><td></td><td>Vertical</td><td>Fundamental</td></tr>
<tr><td>Peak</td><td>
</td><td>
</td></tr>
</table>

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

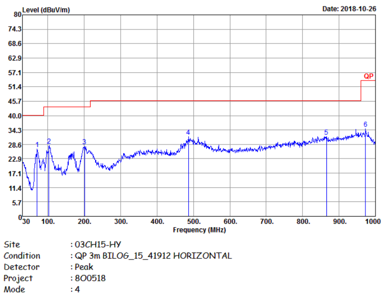
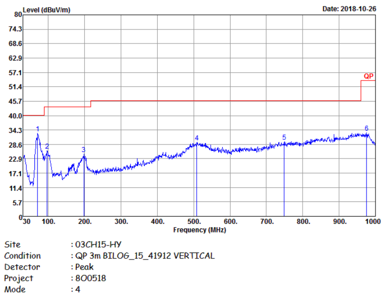
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.		

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.		

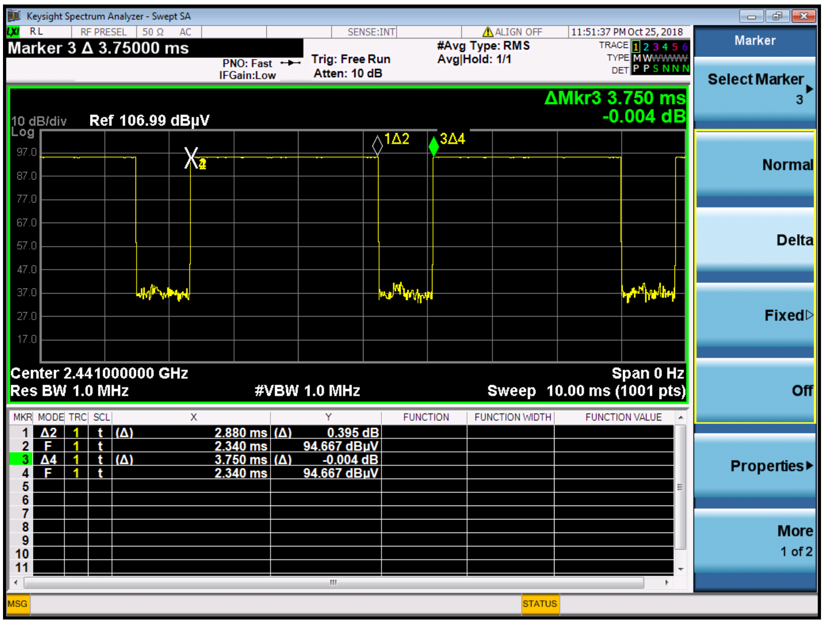
Emission below 1GHz

2.4GHz BT (LF)

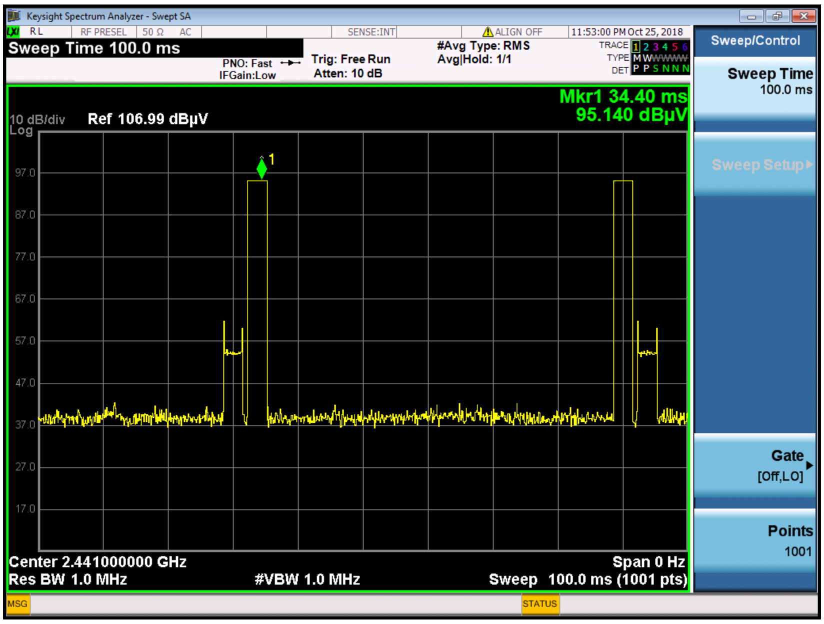
BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak		

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 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 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

2.88 ms x 20 channels = 57.6 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:

2.88 ms x 2 = 5.76 ms

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

20 x log(5.76 ms/100ms) = -24.79 dB