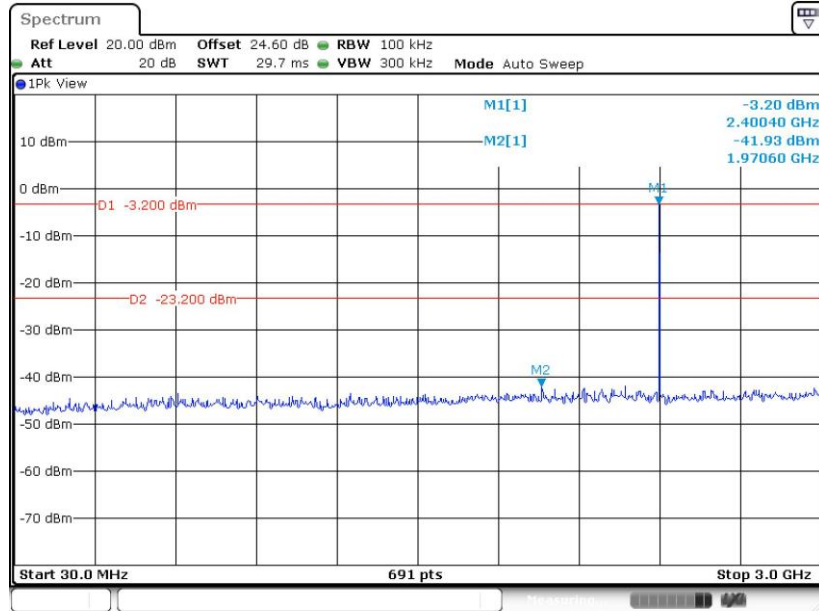




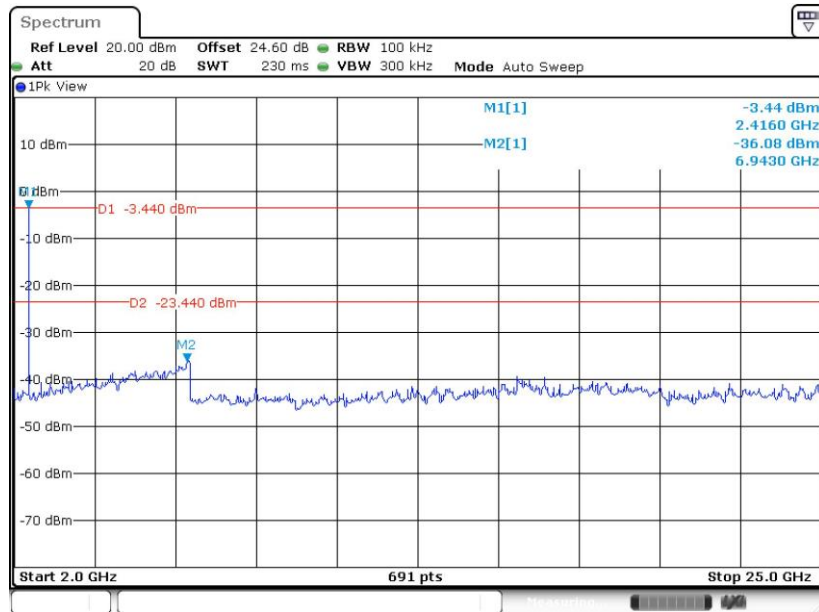
<3Mbps>

CSE Plot on Ch 00 between 30MHz ~ 3 GHz



Date: 27.FEB.2019 16:17:44

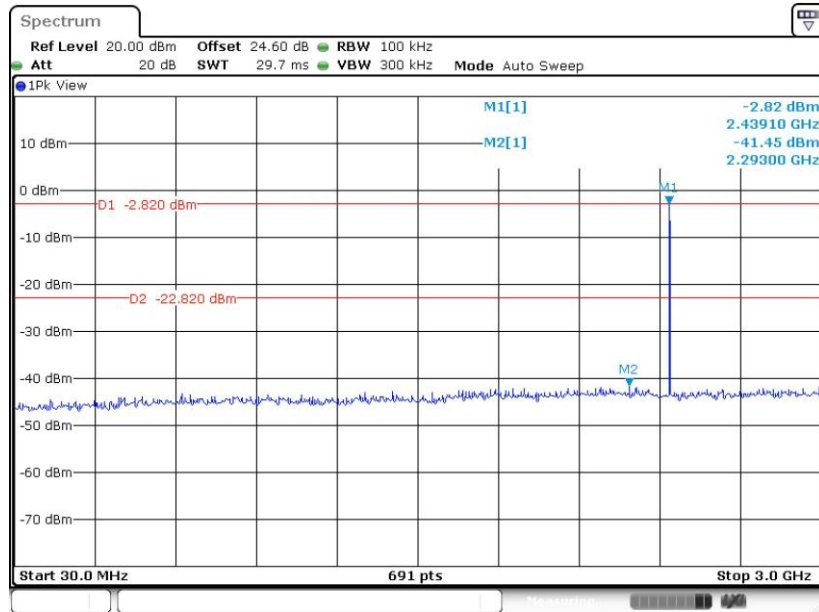
CSE Plot on Ch 00 between 2 GHz ~ 25 GHz



Date: 27.FEB.2019 16:18:18

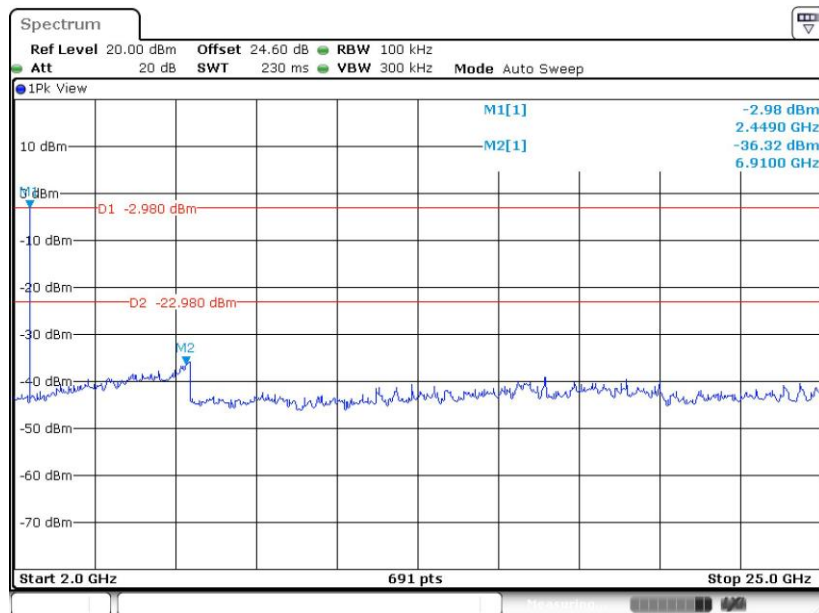


CSE Plot on Ch 39 between 30MHz ~ 3 GHz



Date: 27.FEB.2019 16:10:17

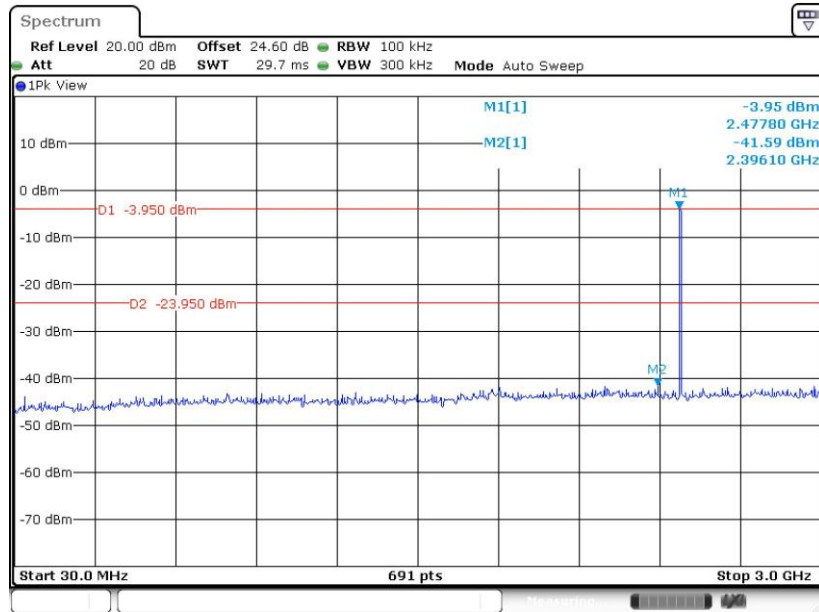
CSE Plot on Ch 39 between 2 GHz ~ 25 GHz



Date: 27.FEB.2019 16:11:49

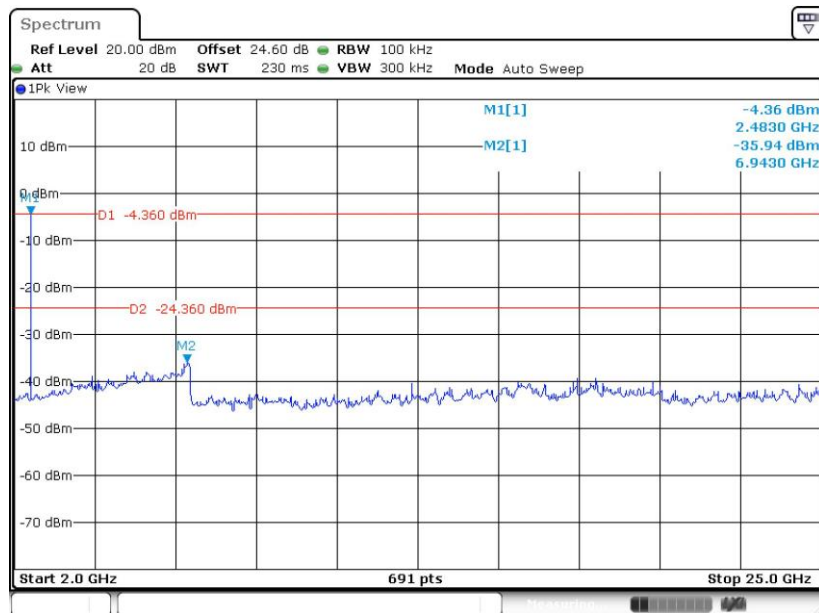


CSE Plot on Ch 78 between 30MHz ~ 3 GHz



Date: 27.FEB.2019 16:00:58

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz



Date: 27.FEB.2019 16:02:16



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.



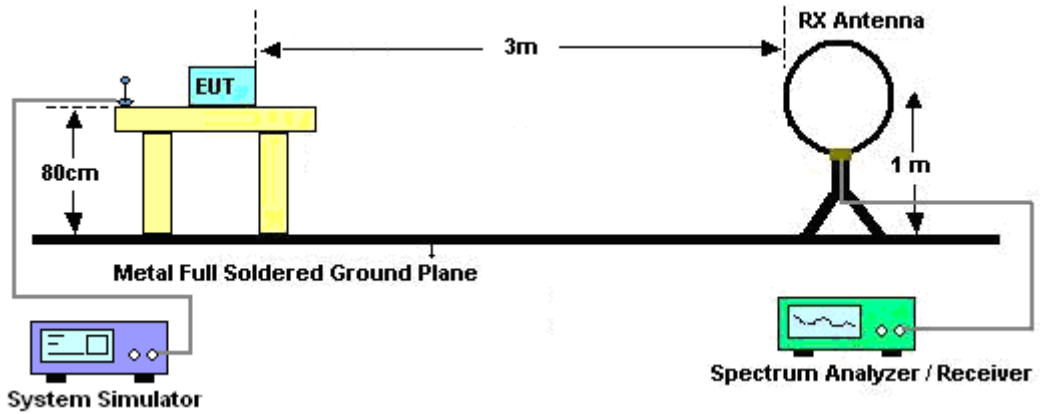
3.8.3 Test Procedures

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 $f < 1 \text{ GHz}$, RBW=1MHz for $f > 1\text{GHz}$; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
 - (3) For average measurement: use duty cycle correction factor method per 15.35(c).
Duty cycle = On time/100 milliseconds
On time = $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$
Where N_1 is number of type 1 pulses, L_1 is length of type 1 pulses, etc.
Average Emission Level = Peak Emission Level + $20 * \log(\text{Duty cycle})$
6. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

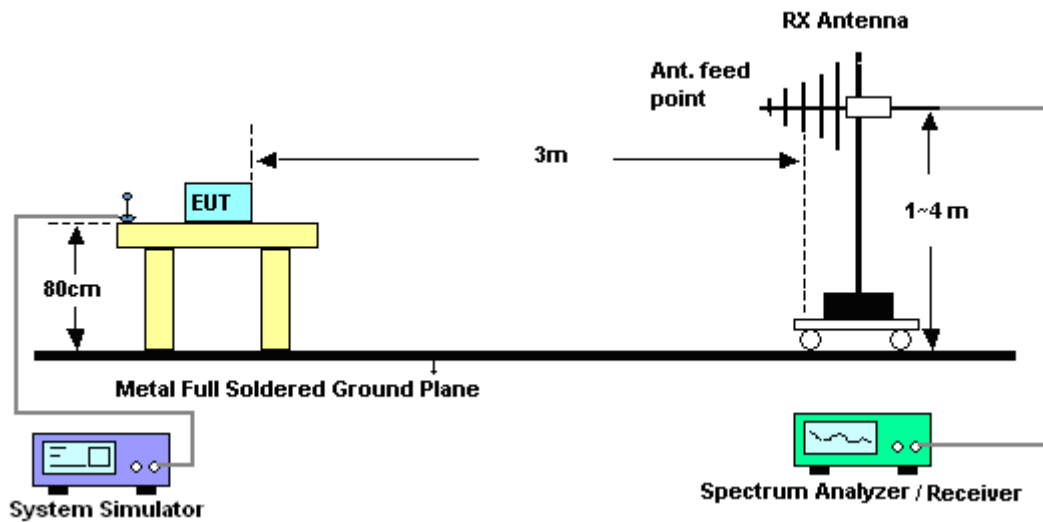
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.76dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals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

3.8.4 Test Setup

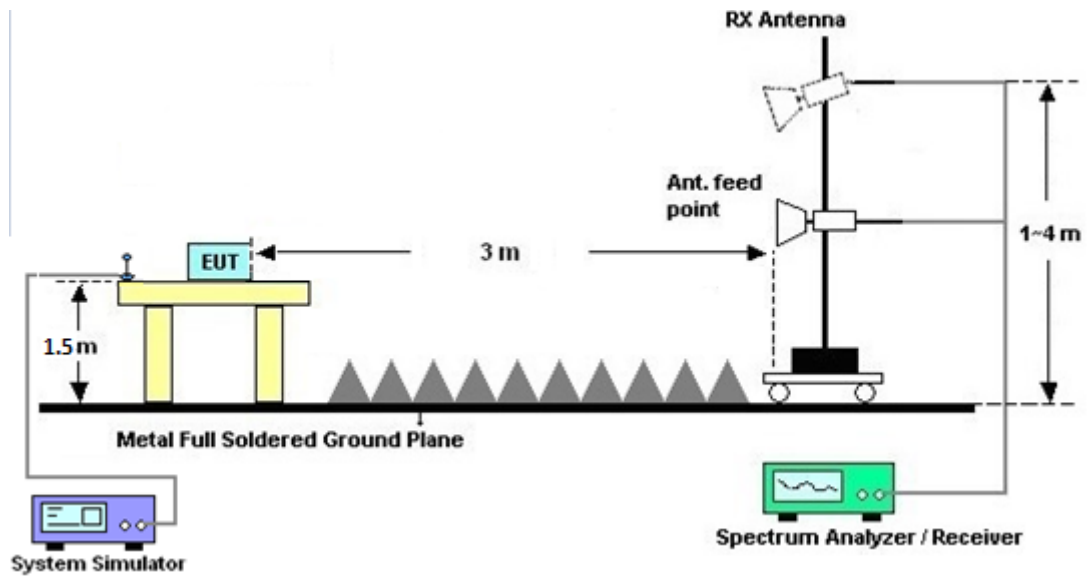
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

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

3.8.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C and D.

3.8.7 Duty Cycle

Please refer to Appendix E.

3.8.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C and D.



3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

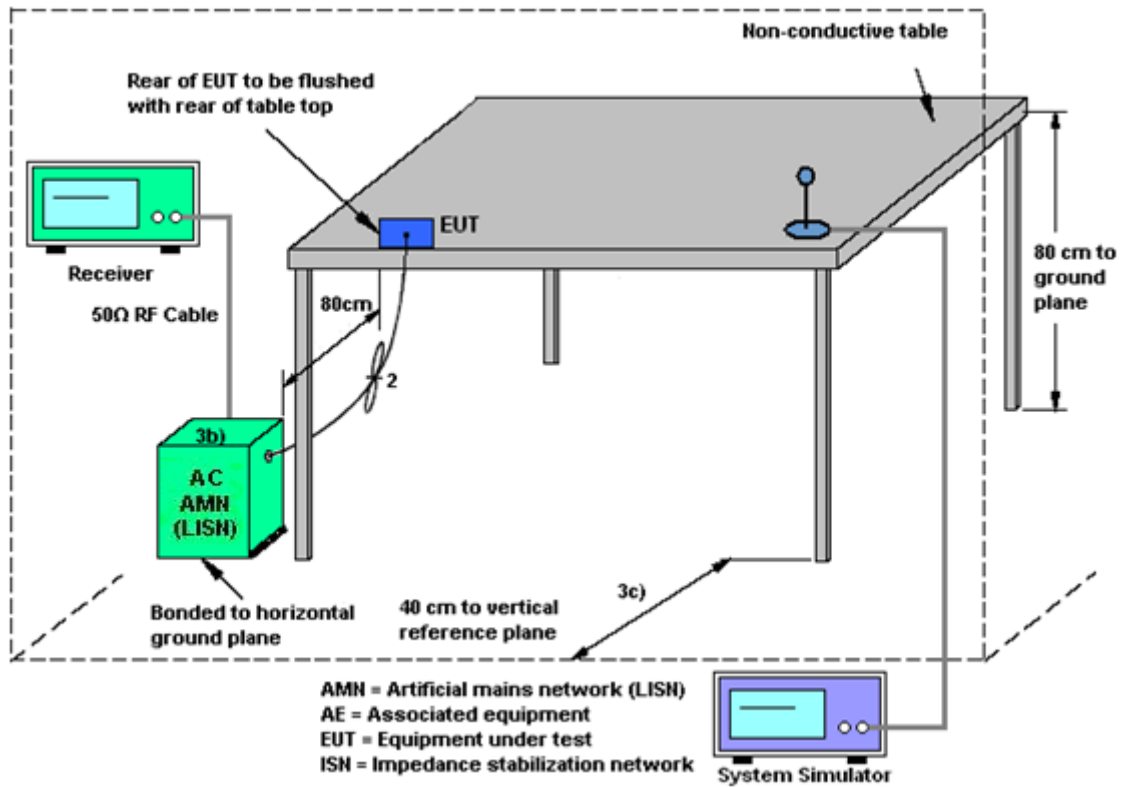
3.9.2 Measuring Instruments

See list of measuring equipment of this test report.

3.9.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Please refer to Appendix B.



3.10 Antenna Requirements

3.10.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.10.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.10.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	DTM-303A	TP157075	N/A	Mar. 06, 2018	Feb. 01, 2019~ Feb. 28, 2019	Mar. 05, 2019	Conducted (TH05-HY)
Power Meter	Agilent	E4416A	GB4129234 4	N/A	Dec. 27, 2018	Feb. 01, 2019~ Feb. 28, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US40441548	50MHz~18GHz	Dec. 27, 2018	Feb. 01, 2019~ Feb. 28, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSV 30	100895	9kHz~30GHz	Apr. 20, 2018	Feb. 01, 2019~ Feb. 28, 2019	Apr. 19, 2019	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Apr. 17, 2018	Feb. 01, 2019~ Feb. 28, 2019	Apr. 16, 2019	Conducted (TH05-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890094	1V~20V 0.5A~5A	Oct. 02, 2018	Feb. 01, 2019~ Feb. 28, 2019	Oct. 01, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Feb. 21, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Nov. 12, 2018	Feb. 21, 2019	Nov. 11, 2019	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 06, 2018	Feb. 21, 2019	Mar. 05, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 14, 2018	Feb. 21, 2019	Nov. 13, 2019	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 09, 2018	Feb. 21, 2019	Nov. 08, 2019	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Feb. 21, 2019	N/A	Conduction (CO05-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Sep. 14, 2018	Feb. 21, 2019	Sep. 13, 2019	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Nov. 08, 2018	Feb. 21, 2019	Nov. 07, 2019	Conduction (CO05-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Mar. 29, 2018	Feb. 20, 2019~ Feb. 22, 2019	Mar. 28, 2019	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&0080 0N1D01N-06	37059&01	30MHz~1GHz	Oct. 13, 2018	Feb. 20, 2019~ Feb. 22, 2019	Oct. 12, 2019	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 19, 2018	Feb. 20, 2019~ Feb. 22, 2019	Oct. 18, 2019	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA91705 76	18GHz ~ 40GHz	May 08, 2018	Feb. 20, 2019~ Feb. 22, 2019	May 07, 2019	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 26, 2018	Feb. 20, 2019~ Feb. 22, 2019	Mar. 25, 2019	Radiation (03CH12-HY)
Preamplifier	Agilent	8449B	3008A02375	1GHz~26.5GHz	May 28, 2018	Feb. 20, 2019~ Feb. 22, 2019	May 27, 2019	Radiation (03CH12-HY)
Preamplifier	Jet-Power	JPA0118-55- 303K	1710001800 054002	1GHz~18GHz	Apr. 17, 2018	Feb. 20, 2019~ Feb. 22, 2019	Apr. 16, 2019	Radiation (03CH12-HY)
Preamplifier	MITEQ	TTA1840-35- HG	1864481	18GHz ~ 40GHz	Aug. 24, 2018	Feb. 20, 2019~ Feb. 22, 2019	Aug. 23, 2019	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	FSV30	103738	9kHz~30GHz	May 22, 2018	Feb. 20, 2019~ Feb. 22, 2019	May 21, 2019	Radiation (03CH12-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	TECPEL	DTM-303B	TP161243	N/A	May 12, 2018	Feb. 20, 2019~ Feb. 22, 2019	May 11, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WLKS1200-12 SS	SN2	1.2GHz Low Pass	Mar. 21, 2018	Feb. 20, 2019~ Feb. 22, 2019	Mar. 20, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-270 0-3000-18000- 60ST	SN2	3GHz High Pass	Mar. 21, 2018	Feb. 20, 2019~ Feb. 22, 2019	Mar. 20, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0058/126E	30M-18G	Mar. 14, 2018	Feb. 20, 2019~ Feb. 22, 2019	Mar. 13, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 16, 2018	Feb. 20, 2019~ Feb. 22, 2019	Oct. 15, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 16, 2018	Feb. 20, 2019~ Feb. 22, 2019	Oct. 15, 2019	Radiation (03CH12-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Feb. 20, 2019~ Feb. 22, 2019	N/A	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500- B	N/A	1m~4m	N/A	Feb. 20, 2019~ Feb. 22, 2019	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Feb. 20, 2019~ Feb. 22, 2019	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Feb. 20, 2019~ Feb. 22, 2019	N/A	Radiation (03CH12-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% ($U = 2Uc(y)$)	5.10
---	------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.70
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Appendix A. Test Result of Conducted Test Items

Test Engineer:	Shiming Liu / Kai Liao	Temperature:	21~25	°C
Test Date:	2019/2/1 ~ 2019/2/28	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 Limit (MHz)	Pass/Fail
DH	1Mbps	1	0	2402	0.923	0.831	0.999	0.6153	Pass
DH	1Mbps	1	39	2441	0.926	0.851	0.847	0.6173	Pass
DH	1Mbps	1	78	2480	0.926	0.854	0.847	0.6173	Pass
2DH	2Mbps	1	0	2402	1.285	1.166	1.133	0.8567	Pass
2DH	2Mbps	1	39	2441	1.268	1.164	1.237	0.8453	Pass
2DH	2Mbps	1	78	2480	1.272	1.166	1.081	0.8480	Pass
3DH	3Mbps	1	0	2402	1.233	1.152	1.068	0.8220	Pass
3DH	3Mbps	1	39	2441	1.229	1.149	1.146	0.8193	Pass
3DH	3Mbps	1	78	2480	1.233	1.152	1.064	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	12.16	20.97	Pass
	39	1	12.49	20.97	Pass
	78	1	11.37	20.97	Pass
2DH5	0	1	10.62	20.97	Pass
	39	1	11.05	20.97	Pass
	78	1	9.93	20.97	Pass
3DH5	0	1	10.93	20.97	Pass
	39	1	11.20	20.97	Pass
	78	1	9.99	20.97	Pass

TEST RESULTS DATA				
Average Power Table				
(Reporting Only)				
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	10.98	5.15
	39	1	11.35	5.15
	78	1	10.12	5.15
2DH1	0	1	7.43	5.11
	39	1	7.71	5.11
	78	1	6.36	5.11
3DH1	0	1	7.40	5.08
	39	1	7.68	5.08
	78	1	6.35	5.08

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



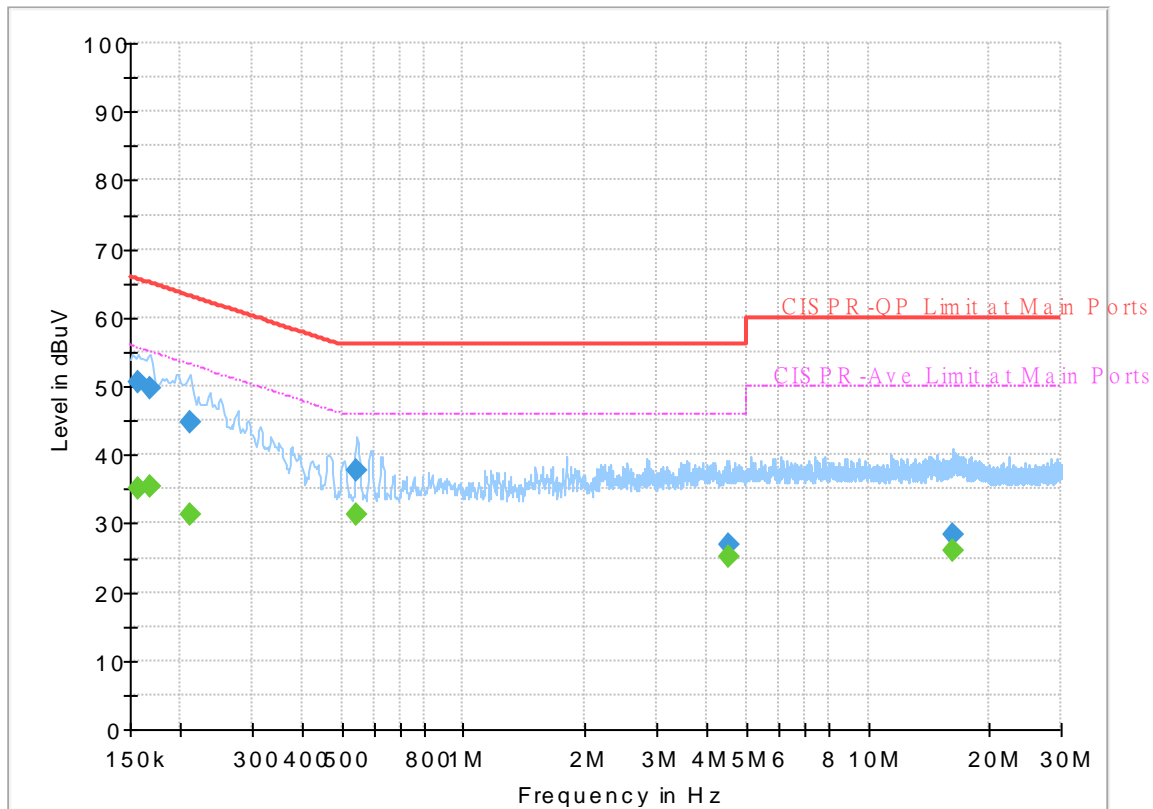
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Jimmy Chang	Temperature :	24~26°C
		Relative Humidity :	51~53%

EUT Information

Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



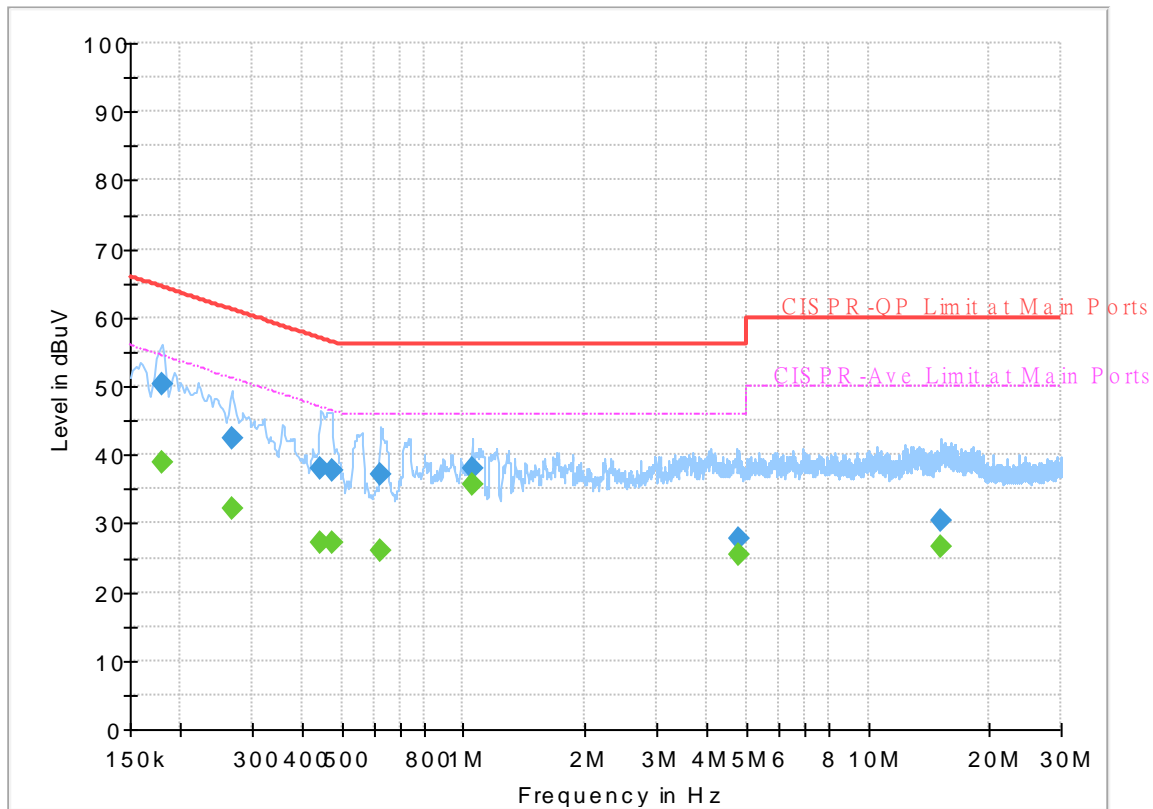
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.156750	---	35.09	55.63	20.54	L1	OFF	19.5
0.156750	50.72	---	65.63	14.91	L1	OFF	19.5
0.168000	---	35.43	55.06	19.63	L1	OFF	19.5
0.168000	49.74	---	65.06	15.32	L1	OFF	19.5
0.210750	---	31.33	53.18	21.85	L1	OFF	19.5
0.210750	44.84	---	63.18	18.34	L1	OFF	19.5
0.546000	---	31.23	46.00	14.77	L1	OFF	19.5
0.546000	37.58	---	56.00	18.42	L1	OFF	19.5
4.512750	---	25.06	46.00	20.94	L1	OFF	19.7
4.512750	26.96	---	56.00	29.04	L1	OFF	19.7
16.188000	---	25.95	50.00	24.05	L1	OFF	20.1
16.188000	28.30	---	60.00	31.70	L1	OFF	20.1

EUT Information

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)
0.179250	---	38.82	54.52	15.70	N	OFF	19.5
0.179250	50.18	---	64.52	14.34	N	OFF	19.5
0.267000	---	32.30	51.21	18.91	N	OFF	19.5
0.267000	42.29	---	61.21	18.92	N	OFF	19.5
0.444750	---	27.06	46.97	19.91	N	OFF	19.5
0.444750	37.90	---	56.97	19.07	N	OFF	19.5
0.474000	---	27.28	46.44	19.16	N	OFF	19.5
0.474000	37.83	---	56.44	18.61	N	OFF	19.5
0.624750	---	25.96	46.00	20.04	N	OFF	19.6
0.624750	37.28	---	56.00	18.72	N	OFF	19.6
1.050000	---	35.74	46.00	10.26	N	OFF	19.6
1.050000	37.99	---	56.00	18.01	N	OFF	19.6
4.769250	---	25.32	46.00	20.68	N	OFF	19.7
4.769250	27.66	---	56.00	28.34	N	OFF	19.7
15.177750	---	26.73	50.00	23.27	N	OFF	20.1
15.177750	30.47	---	60.00	29.53	N	OFF	20.1



Appendix C. Radiated Spurious Emission

Test Engineer :	Jack Cheng, Lance Chiang, and Chuan Chu	Temperature :	22~24°C
		Relative Humidity :	52~60%

2.4GHz 2400~2483.5MHz

BT 1Mbps (Band Edge @ 3m)

BT	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BT CH00 2402MHz		2381.715	49.05	-24.95	74	48.02	27.54	6.64	33.15	275	60	P	H	
		2381.715	24.29	-29.71	54	-	-	-	-	-	-	A	H	
	*	2402	96.31	-	-	95.31	27.5	6.67	33.17	275	60	P	H	
	*	2402	71.55	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2356.41	49.22	-24.78	74	48.15	27.59	6.6	33.12	298	49	P	V
			2356.41	24.46	-29.54	54	-	-	-	-	-	-	A	V
	*		2402	103.35	-	-	102.35	27.5	6.67	33.17	298	49	P	V
	*		2402	78.59	-	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		2335.76	49.17	-24.83	74	48	27.69	6.57	33.09	300	59	P	H	
		2335.76	24.41	-29.59	54	-	-	-	-	-	-	A	H	
	*	2441	97.78	-	-	96.85	27.42	6.73	33.22	300	59	P	H	
	*	2441	73.02	-	-	-	-	-	-	-	-	A	H	
			2496.15	48.8	-25.2	74	47.97	27.31	6.81	33.29	300	59	P	H
			2496.15	24.04	-29.96	54	-	-	-	-	-	-	A	H
			2316.3	48.62	-25.38	74	47.35	27.8	6.54	33.07	294	18	P	V
			2316.3	23.86	-30.14	54	-	-	-	-	-	-	A	V
	*		2441	104.81	-	-	103.88	27.42	6.73	33.22	294	18	P	V
	*		2441	80.05	-	-	-	-	-	-	-	-	A	V
			2495.31	49.55	-24.45	74	48.71	27.31	6.81	33.28	294	18	P	V
			2495.31	24.79	-29.21	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	94.78	-	-	93.92	27.34	6.79	33.27	290	59	P	H
	*	2480	70.02	-	-	-	-	-	-	-	-	A	H
		2483.56	48.99	-25.01	74	48.14	27.33	6.79	33.27	290	59	P	H
		2483.56	24.23	-29.77	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	101.95	-	-	101.09	27.34	6.79	33.27	309	43	P	V
	*	2480	77.19	-	-	-	-	-	-	-	-	A	V
		2483.6	54.74	-19.26	74	53.89	27.33	6.79	33.27	309	43	P	V
		2483.6	29.98	-24.02	54	-	-	-	-	-	-	A	V
													V
													V
Remark	<ol style="list-style-type: none"> 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	40.13	-33.87	74	55.19	31.1	10.42	56.58	100	0	P	H	
		4804	15.37	-38.63	54	-	-	-	-	-	-	A	H	
													H	
													H	
		4804	39.31	-34.69	74	54.37	31.1	10.42	56.58	100	0	P	V	
		4804	14.55	-39.45	54	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		4882	39.98	-34.02	74	54.96	31.1	10.47	56.55	100	0	P	H	
		4882	15.22	-38.78	54	-	-	-	-	-	-	A	H	
		7323	45.54	-28.46	74	52.42	36.55	12.78	56.21	100	0	P	H	
		7323	20.78	-33.22	54	-	-	-	-	-	-	A	H	
		4882	38.18	-35.82	74	53.16	31.1	10.47	56.55	100	0	P	V	
		4882	13.42	-40.58	54	-	-	-	-	-	-	-	A	V
		7323	45	-29	74	51.88	36.55	12.78	56.21	100	0	P	V	
		7323	20.24	-33.76	54	-	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	40.42	-33.58	74	55.11	31.32	10.51	56.52	100	0	P	H	
		4960	15.66	-38.34	54	-	-	-	-	-	-	A	H	
		7440	44.46	-29.54	74	51.35	36.38	12.8	56.07	100	0	P	H	
		7440	19.7	-34.3	54	-	-	-	-	-	-	A	H	
		4960	38.78	-35.22	74	53.47	31.32	10.51	56.52	100	0	P	V	
		4960	14.02	-39.98	54	-	-	-	-	-	-	-	A	V
		7440	45.4	-28.6	74	52.29	36.38	12.8	56.07	100	0	P	V	
		7440	20.64	-33.36	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 2Mbps (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)	
BT CH00 2402MHz		2315.355	49.53	-24.47	74	48.25	27.81	6.54	33.07	277	56	P	H	
		2315.355	24.74	-29.26	54	-	-	-	-	-	-	A	H	
	*	2402	94.94	-	-	93.94	27.5	6.67	33.17	277	56	P	H	
	*	2402	70.15	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2380.665	49.94	-24.06	74	48.91	27.54	6.64	33.15	305	29	P	V
			2380.665	25.15	-32.85	54	-	-	-	-	-	-	A	V
	*	2402	103.45	-	-	102.45	27.5	6.67	33.17	305	29	P	V	
	*	2402	78.66	-	-	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		2348.22	49.75	-24.25	74	48.66	27.61	6.59	33.11	259	53	P	H	
		2348.22	24.96	-29.04	54	-	-	-	-	-	-	A	H	
	*	2441	96.55	-	-	95.62	27.42	6.73	33.22	259	53	P	H	
	*	2441	71.76	-	-	-	-	-	-	-	-	A	H	
			2500	49.15	-24.85	74	48.32	27.3	6.82	33.29	259	53	P	H
			2500	24.36	-29.64	54	-	-	-	-	-	-	A	H
			2313.22	49.71	-24.29	74	48.42	27.82	6.54	33.07	328	53	P	V
			2313.22	24.92	-29.08	54	-	-	-	-	-	-	A	V
	*	2441	104.09	-	-	103.16	27.42	6.73	33.22	328	53	P	V	
	*	2441	79.3	-	-	-	-	-	-	-	-	-	A	V
			2484.04	50.1	-23.9	74	49.25	27.33	6.79	33.27	328	53	P	V
			2484.04	25.31	-28.69	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	94.58	-	-	93.72	27.34	6.79	33.27	290	54	P	H
	*	2480	69.79	-	-	-	-	-	-	-	-	A	H
		2483.56	53.16	-20.84	74	52.31	27.33	6.79	33.27	290	54	P	H
		2483.56	28.37	-25.63	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	102	-	-	101.14	27.34	6.79	33.27	316	36	P	V
	*	2480	77.21	-	-	-	-	-	-	-	-	A	V
		2483.52	59.85	-14.15	74	59	27.33	6.79	33.27	316	36	P	V
		2483.52	35.06	-18.94	54	-	-	-	-	-	-	A	V
													V
													V
Remark	<ol style="list-style-type: none"> 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	39.76	-34.24	74	54.82	31.1	10.42	56.58	100	0	P	H	
		4804	14.97	-39.03	54	-	-	-	-	-	-	A	H	
													H	
													H	
		4804	39.29	-34.71	74	54.35	31.1	10.42	56.58	100	0	P	V	
		4804	14.5	-39.5	54	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		4882	38.74	-35.26	74	53.72	31.1	10.47	56.55	100	0	P	H	
		4882	13.95	-40.05	54	-	-	-	-	-	-	A	H	
		7323	44.14	-29.86	74	51.02	36.55	12.78	56.21	100	0	P	H	
		7323	19.35	-34.65	54	-	-	-	-	-	-	A	H	
		4882	38.3	-35.7	74	53.28	31.1	10.47	56.55	100	0	P	V	
		4882	13.51	-40.49	54	-	-	-	-	-	-	A	V	
		7323	44.82	-29.18	74	51.7	36.55	12.78	56.21	100	0	P	V	
		7323	20.03	-33.97	54	-	-	-	-	-	-	A	V	
BT CH 78 2480MHz		4960	40.5	-33.5	74	55.19	31.32	10.51	56.52	100	0	P	H	
		4960	15.71	-38.29	54	-	-	-	-	-	-	A	H	
		7440	45.66	-28.34	74	52.55	36.38	12.8	56.07	100	0	P	H	
		7440	20.87	-33.13	54	-	-	-	-	-	-	A	H	
		4960	39.63	-34.37	74	54.32	31.32	10.51	56.52	100	0	P	V	
		4960	14.84	-39.16	54	-	-	-	-	-	-	A	V	
		7440	45.65	-28.35	74	52.54	36.38	12.8	56.07	100	0	P	V	
		7440	20.86	-33.14	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.	
		(MHz)	(dBμV/m)	(dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)	
2.4GHz BT LF		30.27	23.17	-16.83	40	28.08	24.57	0.7	30.18	-	-	P	H	
		151.23	23.97	-19.53	43.5	35.68	16.86	1.8	30.37	-	-	P	H	
		178.23	25.44	-18.06	43.5	38.74	15.04	2	30.34	-	-	P	H	
		758.5	30.35	-15.65	46	27.95	27.93	3.86	29.39	-	-	P	H	
		868.4	32.12	-13.88	46	28.1	29.06	4.15	29.19	-	-	P	H	
		948.2	34.18	-11.82	46	28.23	30.52	4.43	29	100	0	P	H	
														H
														H
														H
														H
														H
														H
			45.39	34.1	-5.9	40	47.33	16.25	0.93	30.41	100	0	P	V
			89.13	25.21	-18.29	43.5	39.82	14.49	1.34	30.44	-	-	P	V
			178.77	26.37	-17.13	43.5	39.67	15.04	2	30.34	-	-	P	V
			748.7	30.99	-15.01	46	28.69	27.88	3.83	29.41	-	-	P	V
			855.8	33.14	-12.86	46	29.3	28.94	4.11	29.21	-	-	P	V
			953.1	35	-11	46	28.84	30.7	4.44	28.98	-	-	P	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 3Mbps (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	(H/V)	
					(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)		
BT CH00 2402MHz		2380.035	50.01	-23.99	74	48.98	27.54	6.64	33.15	308	51	P	H	
		2380.035	25.22	-28.78	54	-	-	-	-	-	-	A	H	
	*	2402	94.49	-	-	93.49	27.5	6.67	33.17	308	51	P	H	
	*	2402	69.7	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2332.05	49.97	-24.03	74	48.78	27.71	6.57	33.09	304	35	P	V
			2332.05	25.18	-28.82	54	-	-	-	-	-	-	A	V
	*	2402	103.45	-	-	102.45	27.5	6.67	33.17	304	35	P	V	
	*	2402	78.66	-	-	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		2353.26	49.5	-24.5	74	48.42	27.59	6.6	33.11	290	53	P	H	
		2353.26	24.71	-29.29	54	-	-	-	-	-	-	A	H	
	*	2441	95.87	-	-	94.94	27.42	6.73	33.22	290	53	P	H	
	*	2441	71.08	-	-	-	-	-	-	-	-	A	H	
			2490.34	49.78	-24.22	74	48.94	27.32	6.8	33.28	290	53	P	H
			2490.34	24.99	-29.01	54	-	-	-	-	-	-	A	H
			2366.7	50.08	-23.92	74	49.02	27.57	6.62	33.13	294	30	P	V
			2366.7	25.29	-28.71	54	-	-	-	-	-	-	A	V
	*	2441	104.45	-	-	103.52	27.42	6.73	33.22	294	30	P	V	
	*	2441	79.66	-	-	-	-	-	-	-	-	-	A	V
			2494.89	48.76	-25.24	74	47.92	27.31	6.81	33.28	294	30	P	V
			2494.89	23.97	-30.03	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	94.17	-	-	93.31	27.34	6.79	33.27	285	53	P	H
	*	2480	69.38	-	-	-	-	-	-	-	-	A	H
		2483.68	51.68	-22.32	74	50.83	27.33	6.79	33.27	285	53	P	H
		2483.68	26.89	-27.11	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	102.03	-	-	101.17	27.34	6.79	33.27	314	35	P	V
	*	2480	77.24	-	-	-	-	-	-	-	-	A	V
		2483.56	59.14	-14.86	74	58.29	27.33	6.79	33.27	314	35	P	V
		2483.56	34.35	-19.65	54	-	-	-	-	-	-	A	V
													V
													V
Remark	<ol style="list-style-type: none"> 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	41.43	-32.57	74	56.49	31.1	10.42	56.58	100	0	P	H	
		4804	16.64	-37.36	54	-	-	-	-	-	-	A	H	
													H	
													H	
		4804	39.8	-34.2	74	54.86	31.1	10.42	56.58	100	0	P	V	
		4804	15.01	-38.99	54	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		4882	38.83	-35.17	74	53.81	31.1	10.47	56.55	100	0	P	H	
		4882	14.04	-39.96	54	-	-	-	-	-	-	A	H	
		7323	44.72	-29.28	74	51.6	36.55	12.78	56.21	100	0	P	H	
		7323	19.93	-34.07	54	-	-	-	-	-	-	A	H	
		4882	40.79	-33.21	74	55.77	31.1	10.47	56.55	100	0	P	V	
		4882	16	-38	54	-	-	-	-	-	-	A	V	
		7323	44.91	-29.09	74	51.79	36.55	12.78	56.21	100	0	P	V	
		7323	20.12	-33.88	54	-	-	-	-	-	-	A	V	
BT CH 78 2480MHz		4960	39.67	-34.33	74	54.36	31.32	10.51	56.52	100	0	P	H	
		4960	14.88	-39.12	54	-	-	-	-	-	-	A	H	
		7440	46.2	-27.8	74	53.09	36.38	12.8	56.07	100	0	P	H	
		7440	21.41	-32.59	54	-	-	-	-	-	-	A	H	
		4960	38.7	-35.3	74	53.39	31.32	10.51	56.52	100	0	P	V	
		4960	13.91	-40.09	54	-	-	-	-	-	-	A	V	
		7440	46	-28	74	52.89	36.38	12.8	56.07	100	0	P	V	
		7440	21.21	-32.79	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	Peak or Average
H/V	Horizontal or Vertical



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.
		(MHz)	(dBμV/m)	(dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (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”.



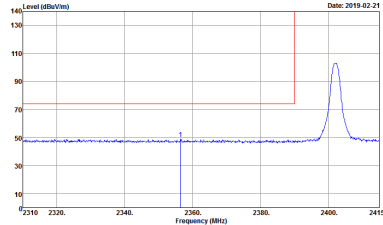
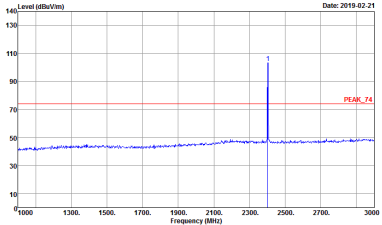
Appendix D. Radiated Spurious Emission Plots

Test Engineer :	Jack Cheng, Lance Chiang, and Chuan Chu	Temperature :	22~24°C
		Relative Humidity :	52~60%

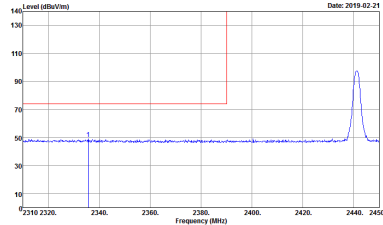
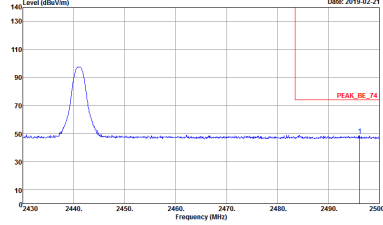
2.4GHz 2400~2483.5MHz
BT 1Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH12-HY Condition : PEAK_95_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto Detector : Peak</p>

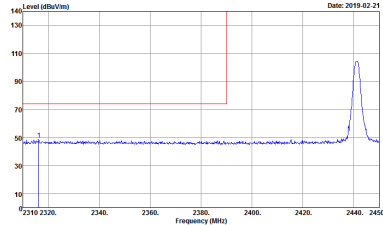
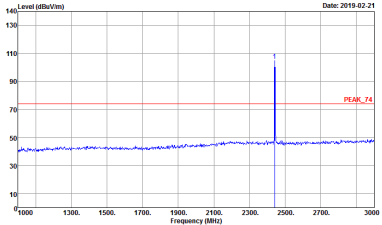
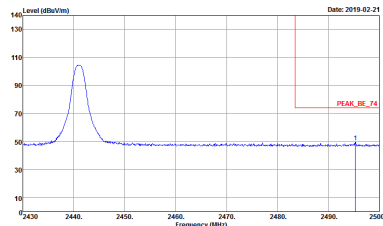


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p data-bbox="430 683 813 728">Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p data-bbox="909 683 1292 728">Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>

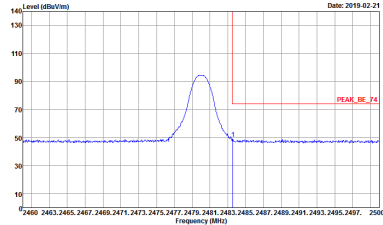
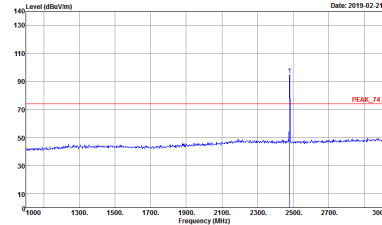


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	Left blank

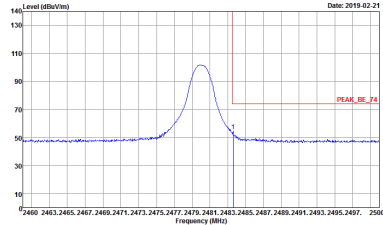
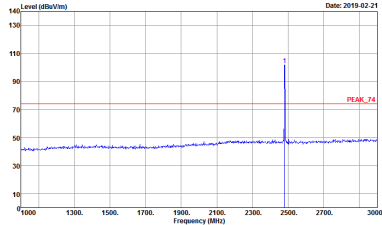


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	Left blank



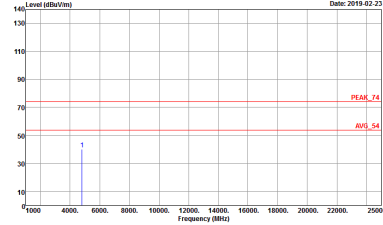
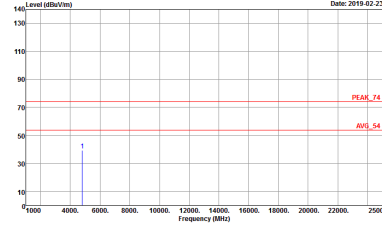
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH12-HV Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH12-HV Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>



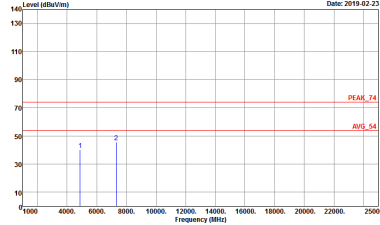
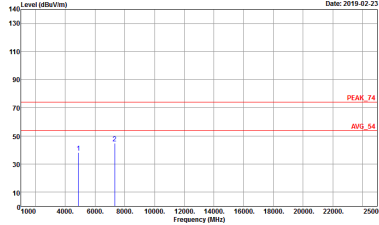
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL RBW:3000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak</p>



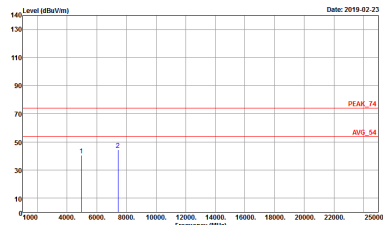
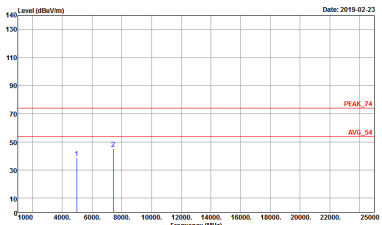
2.4GHz 2400~2483.5MHz
BT 1Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



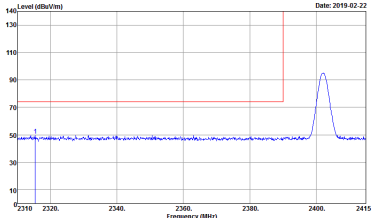
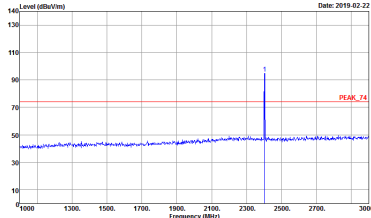
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



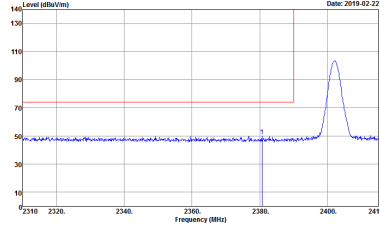
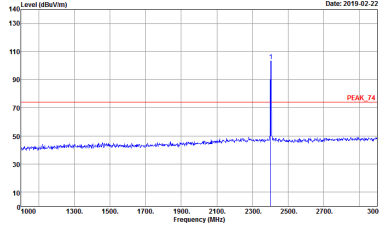
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-11Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-11Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



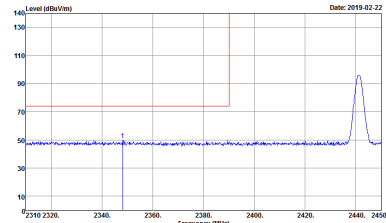
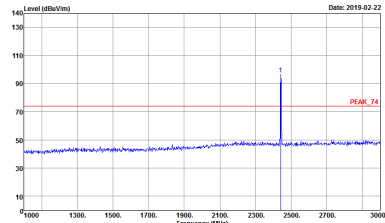
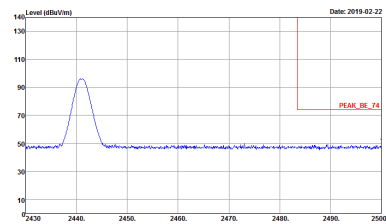
2.4GHz 2400~2483.5MHz
BT 2Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto</p>

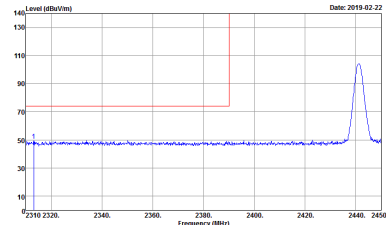
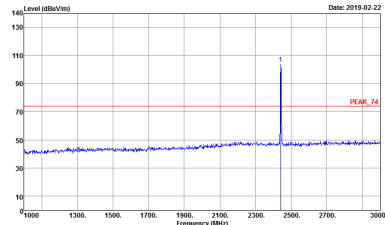
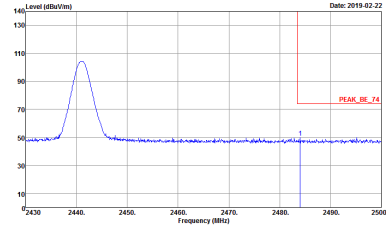


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p data-bbox="430 683 810 728">Date: 2019-02-22 Site : 03CH12-11Y Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p data-bbox="906 683 1286 728">Date: 2019-02-22 Site : 03CH12-11Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>

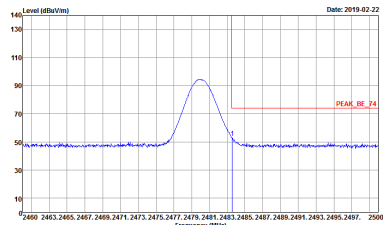
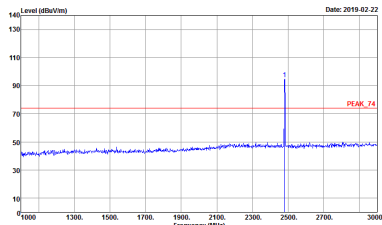


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 <p data-bbox="427 678 710 719">Date: 2019-02-22 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p data-bbox="903 678 1185 719">Date: 2019-02-22 Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
Peak	 <p data-bbox="427 1355 710 1395">Date: 2019-02-22 Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank

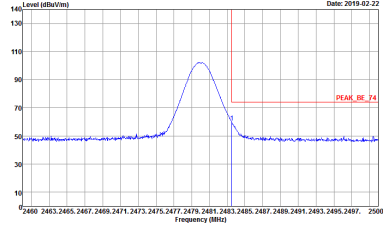
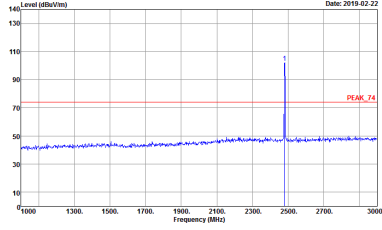


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	<p style="text-align: center;">Vertical</p>  <p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p style="text-align: center;">Fundamental</p>  <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
<p style="text-align: center;">Peak</p>	 <p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p style="text-align: center;">Left blank</p>



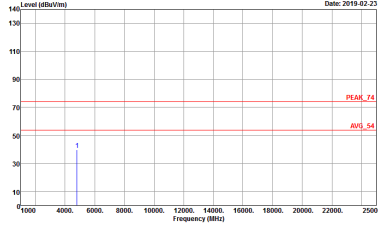
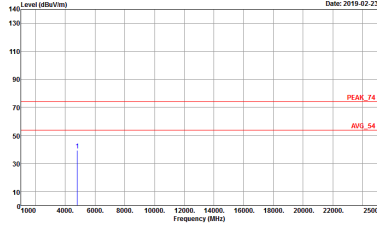
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-14Y Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-14Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



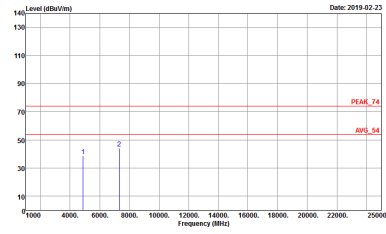
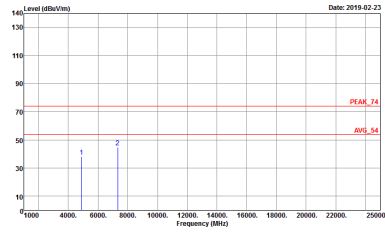
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-14Y Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-14Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



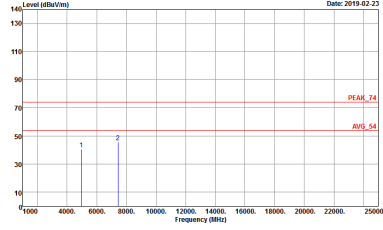
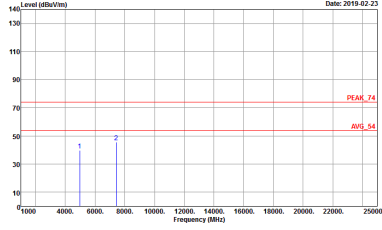
2.4GHz 2400~2483.5MHz
BT 2Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>

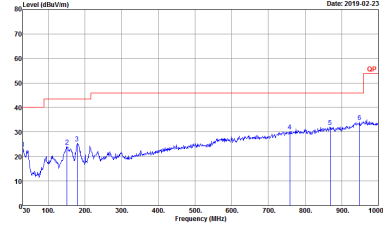
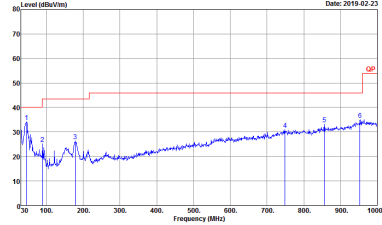


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



Emission below 1GHz

2.4GHz BT (LF)

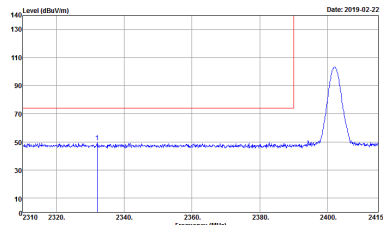
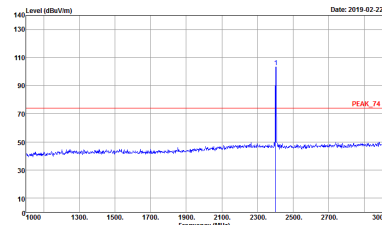
BT	2.4GHz 2400~2483.5MHz BT LF	
	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH12-1HY Condition : QP 3m BILO6_6111D_37059 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1HY Condition : QP 3m BILO6_6111D_37059 VERTICAL Detector : Peak</p>



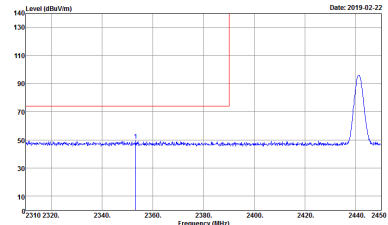
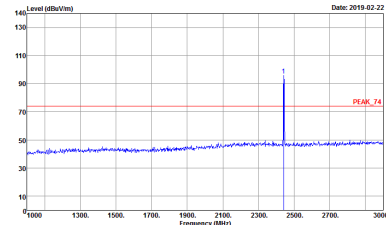
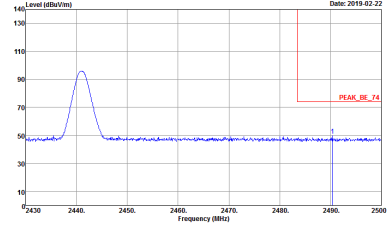
2.4GHz 2400~2483.5MHz
BT 3Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	<p>Site : 03CH12-HY Condition : PEAK_9E_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>

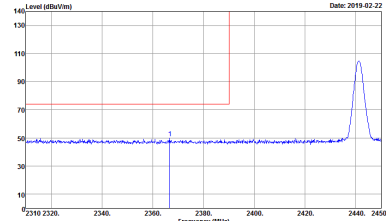
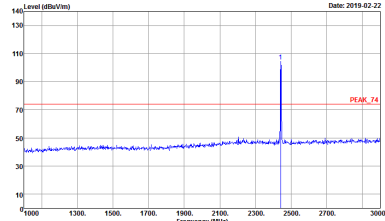
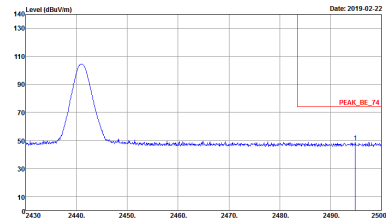


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH12-14Y Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Site : 03CH12-14Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>

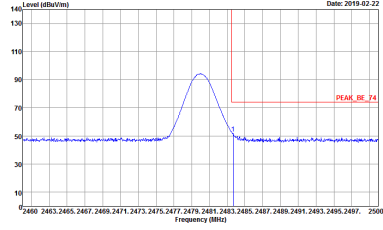
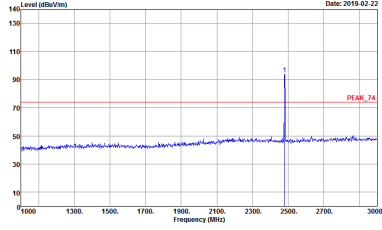


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	<p data-bbox="555 405 671 432">Horizontal</p>  <p data-bbox="427 678 707 719">Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p data-bbox="1011 405 1163 432">Fundamental</p>  <p data-bbox="900 678 1179 719">Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
<p data-bbox="292 768 352 795">Peak</p>	 <p data-bbox="427 1361 707 1402">Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	<p data-bbox="1034 1447 1142 1473">Left blank</p>

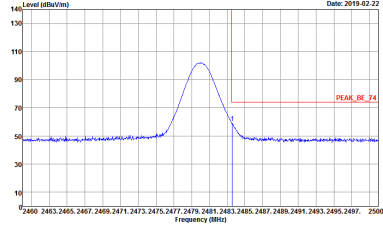
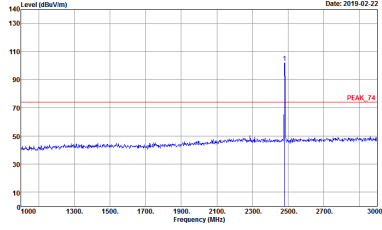


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Site : 03CH2-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>
Peak	 <p>Site : 03CH2-HY Condition : PEAK_BE_74 3m HORN_91200_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	Left blank



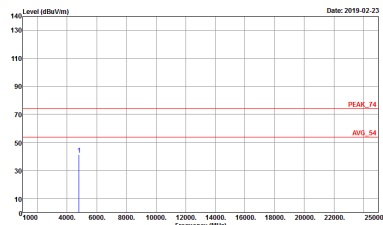
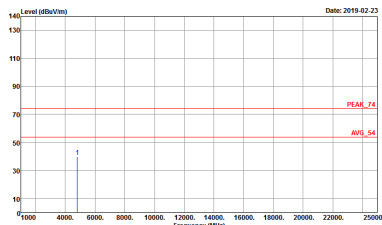
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-11Y Condition : PEAK_BE_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Date: 2019-02-22</p> <p>Site : 03CH12-11Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



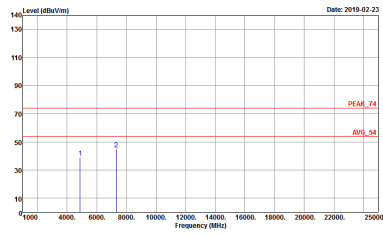
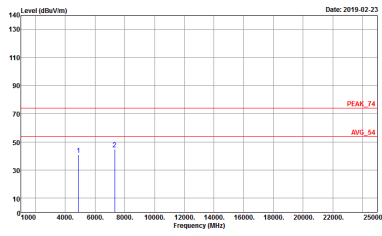
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 <p>Site : 03CH12-14Y Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>	 <p>Site : 03CH12-14Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto</p>



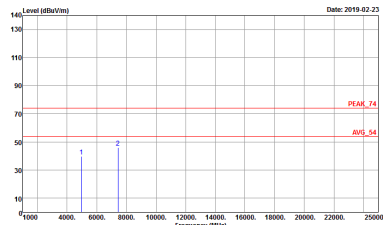
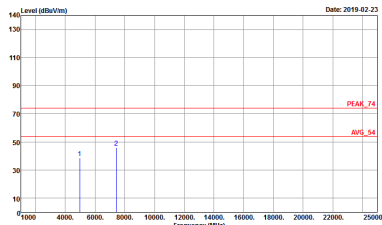
2.4GHz 2400~2483.5MHz
BT 3Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



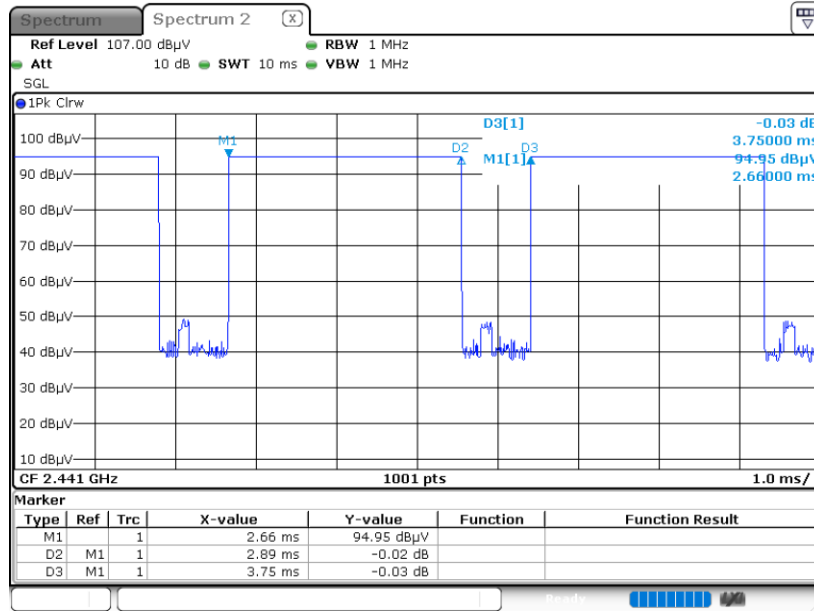
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 HORIZONTAL Detector : Peak</p>	 <p>Site : 03CH12-1Y Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL Detector : Peak</p>



Appendix E. Duty Cycle Plots

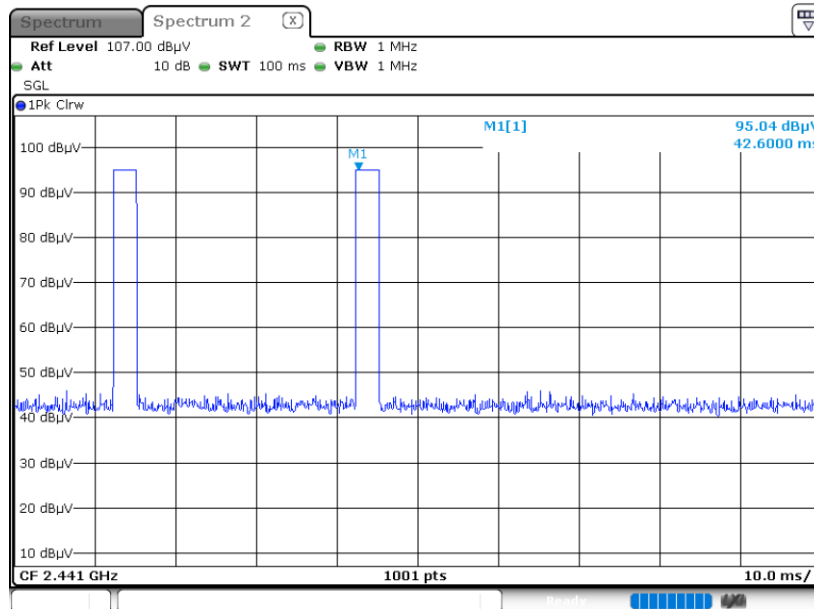
<1Mbps>

DH5 on time (One Pulse) Plot on Channel 39



Date: 21.FEB.2019 16:55:22

on time (Count Pulses) Plot on Channel 39



Date: 21.FEB.2019 16:57:44

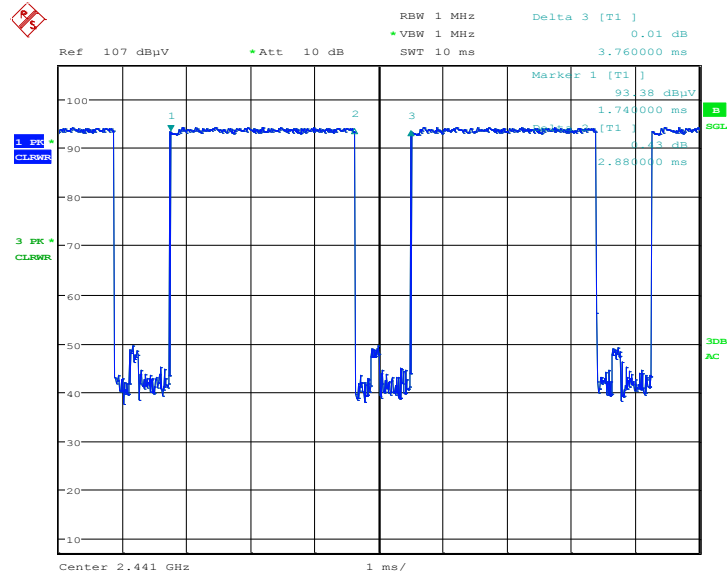
Note:

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.



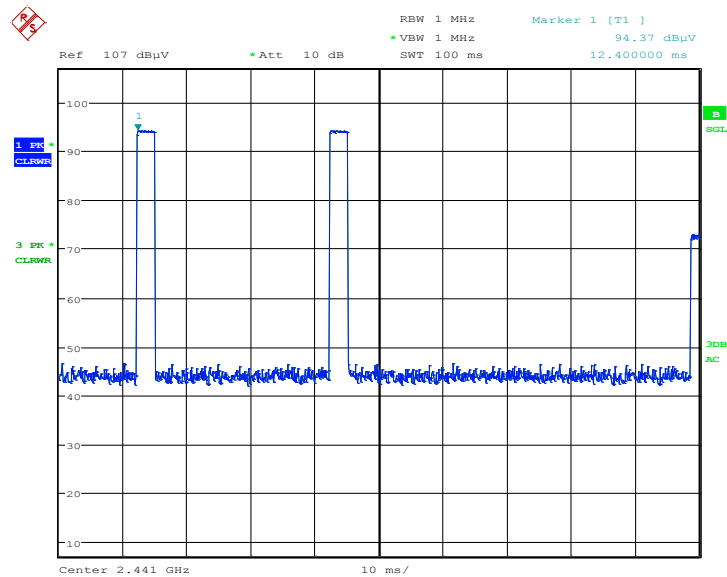
<2Mbps>

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



Date: 22.FEB.2019 18:57:52

on time (Count Pulses) Plot on Channel 39



Date: 22.FEB.2019 18:54:30

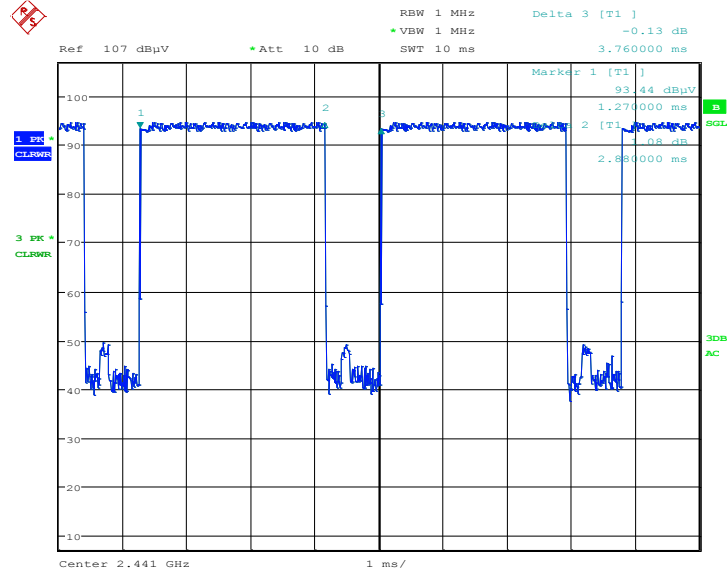
Note:

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



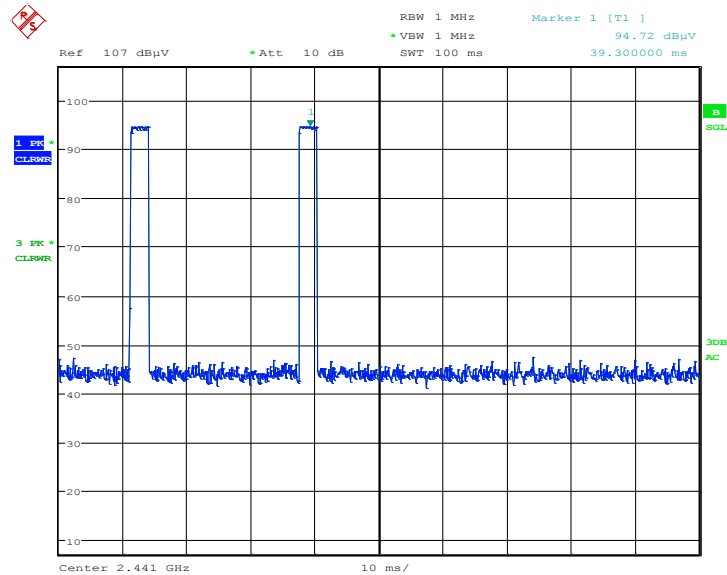
<3Mbps>

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



Date: 22.FEB.2019 18:50:12

on time (Count Pulses) Plot on Channel 39



Date: 22.FEB.2019 18:52:07

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. 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

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

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period. $[100\text{ms} / 57.6\text{ms}] = 2$ hops

Thus, the maximum possible ON time:

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

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

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

—————THE END—————