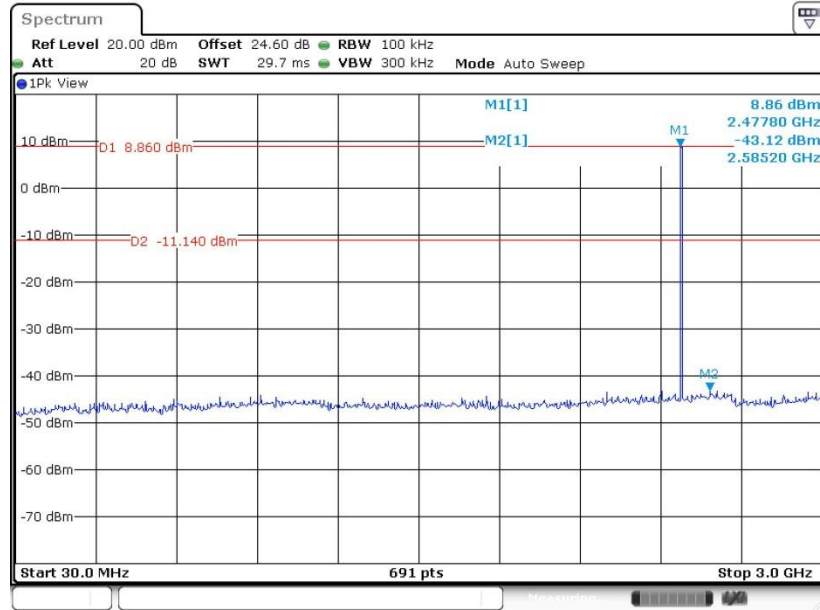


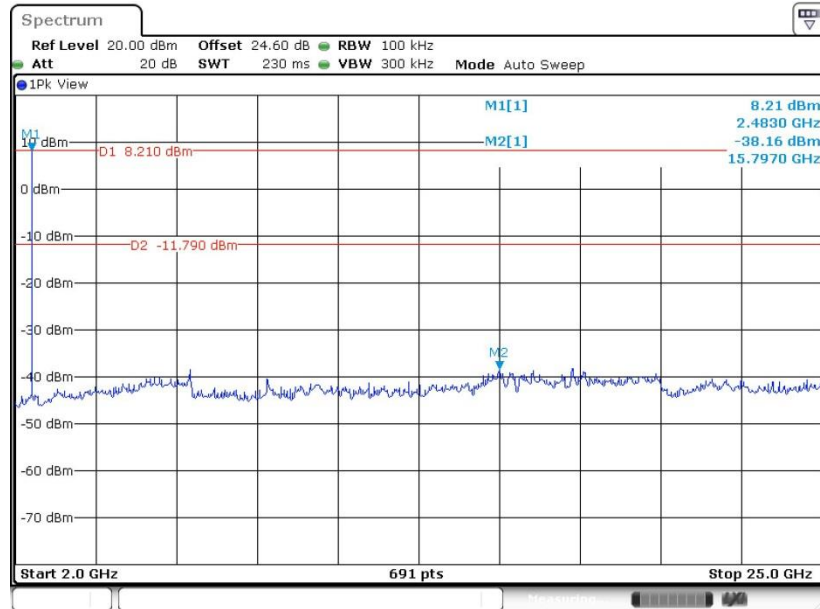


CSE Plot on Ch 78 between 30MHz ~ 3 GHz



Date: 12.DEC.2019 13:36:18

CSE Plot on Ch 78 between 2 GHz ~ 25 GHz



Date: 12.DEC.2019 13:36:47



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.



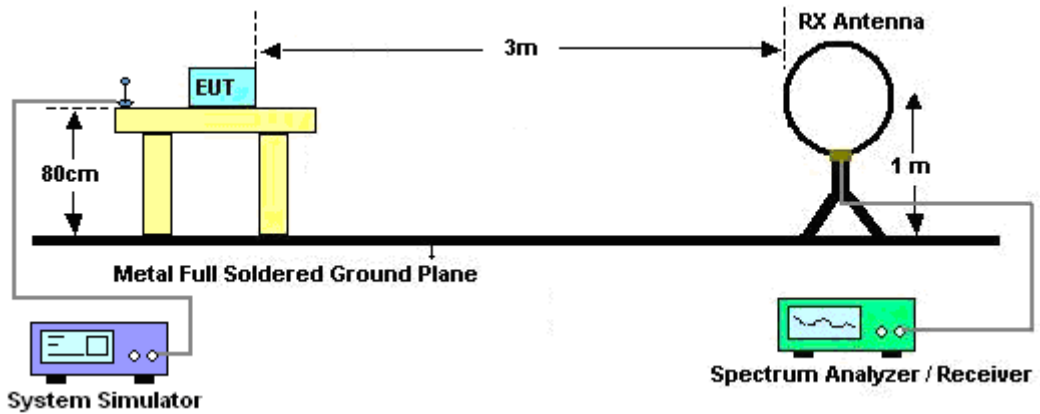
3.8.3 Test Procedures

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.

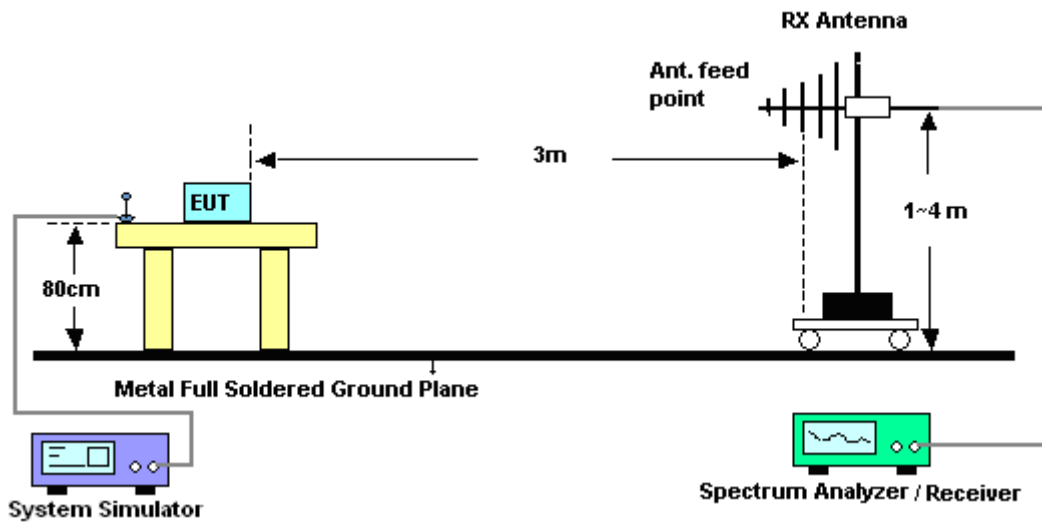
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.76dB) derived from $20 \log(\text{dwell time}/100\text{ms})$. This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals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

3.8.4 Test Setup

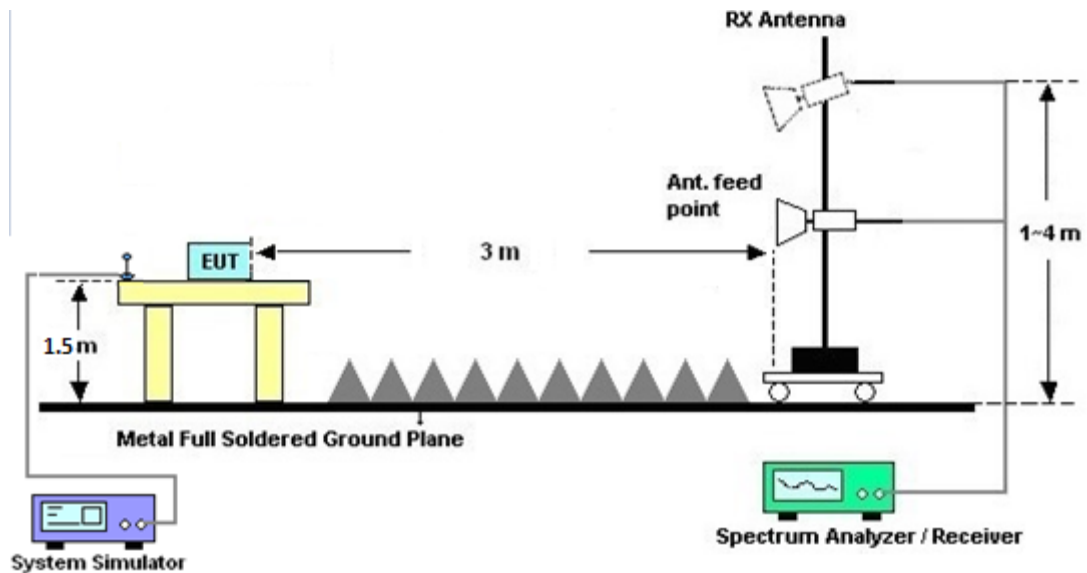
For radiated emissions below 30MHz



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 (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.

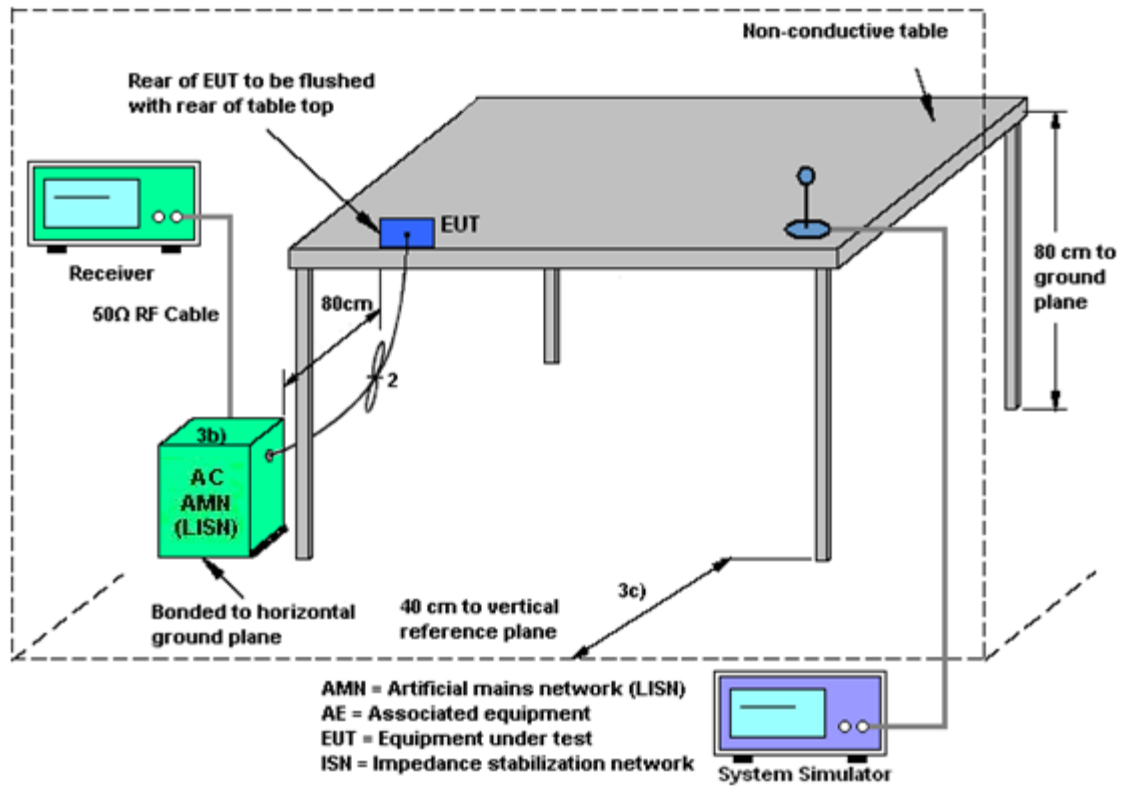
3.9.2 Measuring Instruments

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
Preamplifier	EMCE	EMC184045 B	980192	18GHz ~ 40GHz	Aug. 01, 2019	Jan. 04, 2020~ Jan. 07, 2020	Jul. 31, 2020	Radiation (03CH11-HY)
Amplifier	SONOMA	310N	187312	9kHz~1GHz	Dec. 03, 2019	Jan. 04, 2020~ Jan. 07, 2020	Dec. 02, 2020	Radiation (03CH11-HY)
Bilog Antenna	TESEQ	CBL 6111D & N-6-06	35414 & AT-N0602	30MHz~1GHz	Oct. 12, 2019	Jan. 04, 2020~ Jan. 07, 2020	Oct. 11, 2020	Radiation (03CH11-HY)
Horn Antenna	SCHWARZBE CK	BBHA 9120 D	9120D-1326	1GHz ~ 18GHz	Nov. 04, 2019	Jan. 04, 2020~ Jan. 07, 2020	Nov. 03, 2020	Radiation (03CH11-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Jan. 11, 2019	Jan. 04, 2020~ Jan. 07, 2020	Jan. 10, 2020	Radiation (03CH11-HY)
Preamplifier	Keysight	83017A	MY5327008 0	1GHz~26.5GHz	Nov. 13, 2019	Jan. 04, 2020~ Jan. 07, 2020	Nov. 12, 2020	Radiation (03CH11-HY)
Spectrum Analyzer	Keysight	N9010A	MY5420048 6	10Hz ~ 44GHz	Oct. 28, 2019	Jan. 04, 2020~ Jan. 07, 2020	Oct. 27, 2020	Radiation (03CH11-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Jan. 04, 2020~ Jan. 07, 2020	N/A	Radiation (03CH11-HY)
Antenna Mast	EMEC	AM-BS-4500 -B	N/A	1~4m	N/A	Jan. 04, 2020~ Jan. 07, 2020	N/A	Radiation (03CH11-HY)
Turn Table	EMEC	TT 2000	N/A	0~360 Degree	N/A	Jan. 04, 2020~ Jan. 07, 2020	N/A	Radiation (03CH11-HY)
Preamplifier	Jet-Power	JAP0010180 0-30-10P	1601185500 04	1GHz~18GHz	Apr. 16, 2019	Jan. 04, 2020~ Jan. 07, 2020	Apr. 15, 2020	Radiation (03CH11-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA91705 76	18GHz- 40GHz	May 14, 2019	Jan. 04, 2020~ Jan. 07, 2020	May 13, 2020	Radiation (03CH11-HY)
EMI Test Receiver	Keysight	N9038A(MX E)	MY5542017 0	20MHz~8.4GHz	Mar. 08, 2019	Jan. 04, 2020~ Jan. 07, 2020	Mar. 07, 2020	Radiation (03CH11-HY)
Software	Audix	E3 6.2009-8-24	RK-001053	N/A	N/A	Jan. 04, 2020~ Jan. 07, 2020	N/A	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4P E	9kHz-30MHz	Mar. 13, 2019	Jan. 04, 2020~ Jan. 07, 2020	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz-40GHz	Mar. 13, 2019	Jan. 04, 2020~ Jan. 07, 2020	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4P E	30M-18G	Mar. 13, 2019	Jan. 04, 2020~ Jan. 07, 2020	Mar. 12, 2020	Radiation (03CH11-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz-40GHz	Mar. 13, 2019	Jan. 04, 2020~ Jan. 07, 2020	Mar. 12, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WLK4-1000- 1530-8000-4 0SS	SN11	1.53G Low Pass	Sep. 15, 2019	Jan. 04, 2020~ Jan. 07, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Filter	Wainwright	WHKX12-27 00-3000-180 00-60SS	SN3	3GHz High Pass Filter	Sep. 15, 2019	Jan. 04, 2020~ Jan. 07, 2020	Sep. 14, 2020	Radiation (03CH11-HY)
Hygrometer	TECEPEL	DTN-303B	TP140325	N/A	Nov. 07, 2019	Jan. 04, 2020~ Jan. 07, 2020	Nov. 06, 2020	Radiation (03CH11-HY)



Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H2	41410069	N/A	Jun. 17, 2019	Dec. 06, 2019~ Dec. 13, 2019	Jun. 16, 2020	Conducted (TH05-HY)
Power Meter	Agilent	E4416A	GB4129234 4	N/A	Dec. 27, 2018	Dec. 06, 2019~ Dec. 13, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Power Sensor	Agilent	E9327A	US4044154 8	50MHz~18GHz	Dec. 27, 2018	Dec. 06, 2019~ Dec. 13, 2019	Dec. 26, 2019	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz~40GHz	Jul. 15, 2019	Dec. 06, 2019~ Dec. 13, 2019	Jul. 14, 2020	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1208382	N/A	Mar. 27, 2019	Dec. 06, 2019~ Dec. 13, 2019	Mar. 26, 2020	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 31, 2019	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Nov. 15, 2019	Dec. 31, 2019	Nov. 14, 2020	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Mar. 19, 2019	Dec. 31, 2019	Mar. 18, 2020	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 20, 2019	Dec. 31, 2019	Nov. 19, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Dec. 31, 2019	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2019	Dec. 31, 2019	Jan. 02, 2020	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2019	Dec. 31, 2019	Jan. 02, 2020	Conduction (CO05-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.00
---	------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	3.12
---	------

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Derek Hsu	Temperature:	21~25	°C
Test Date:	2019/12/6-2019/12/13	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	0.918	0.845	0.999	0.6117	Pass
DH	1Mbps	1	39	2441	0.918	0.842	0.999	0.6117	Pass
DH	1Mbps	1	78	2480	0.918	0.845	1.003	0.6117	Pass
2DH	2Mbps	1	0	2402	1.272	1.166	1.142	0.8481	Pass
2DH	2Mbps	1	39	2441	1.272	1.164	0.968	0.8481	Pass
2DH	2Mbps	1	78	2480	1.276	1.166	0.942	0.8509	Pass
3DH	3Mbps	1	0	2402	1.233	1.155	1.142	0.8220	Pass
3DH	3Mbps	1	39	2441	1.233	1.146	1.025	0.8220	Pass
3DH	3Mbps	1	78	2480	1.229	1.155	1.107	0.8191	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	12.50	30.00	Pass
	39	1	13.02	30.00	Pass
	78	1	12.00	30.00	Pass
2DH1	0	1	11.99	20.97	Pass
	39	1	12.41	20.97	Pass
	78	1	11.41	20.97	Pass
3DH1	0	1	12.15	20.97	Pass
	39	1	12.76	20.97	Pass
	78	1	11.70	20.97	Pass

TEST RESULTS DATA				
Average Power Table (Reporting Only)				
DH	CH.	NTX	Average Power (dBm)	Duty Factor (dB)
DH1	0	1	12.33	5.18
	39	1	12.90	5.18
	78	1	11.82	5.18
2DH1	0	1	10.26	5.12
	39	1	10.63	5.12
	78	1	9.51	5.12
3DH1	0	1	10.27	5.08
	39	1	10.64	5.08
	78	1	9.53	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



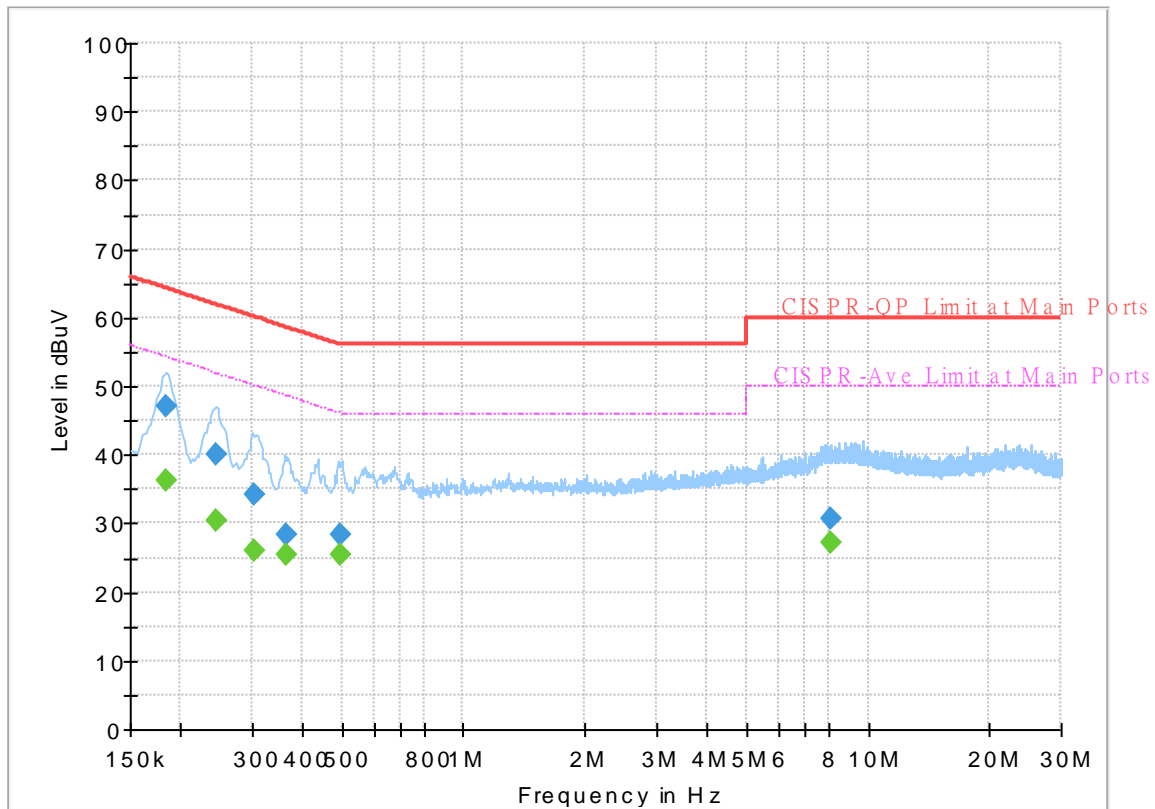
Appendix B. AC Conducted Emission Test Results

Test Engineer :	Howard Huang	Temperature :	22~25°C
		Relative Humidity :	45~52%

EUT Information

Report NO : 901524-02
 Test Mode : Mode 1
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



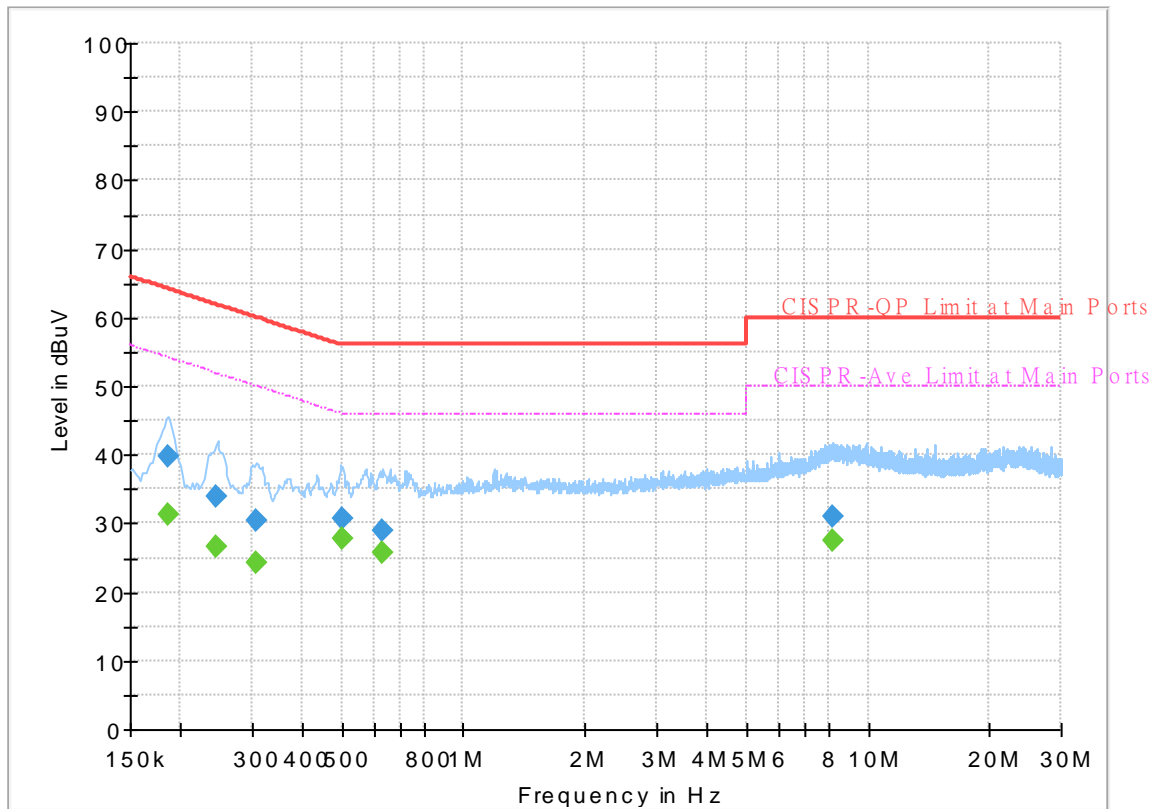
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.184560	---	36.39	54.28	17.89	L1	OFF	19.5
0.184560	47.21	---	64.28	17.07	L1	OFF	19.5
0.243960	---	30.42	51.96	21.54	L1	OFF	19.5
0.243960	40.03	---	61.96	21.93	L1	OFF	19.5
0.305250	---	25.89	50.10	24.21	L1	OFF	19.5
0.305250	34.07	---	60.10	26.03	L1	OFF	19.5
0.363930	---	25.33	48.64	23.31	L1	OFF	19.5
0.363930	28.46	---	58.64	30.18	L1	OFF	19.5
0.494250	---	25.55	46.10	20.55	L1	OFF	19.5
0.494250	28.50	---	56.10	27.60	L1	OFF	19.5
8.066580	---	27.28	50.00	22.72	L1	OFF	19.8
8.066580	30.78	---	60.00	29.22	L1	OFF	19.8

EUT Information

Report NO : 901524-02
 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)
0.185640	---	31.24	54.23	22.99	N	OFF	19.5
0.185640	39.86	---	64.23	24.37	N	OFF	19.5
0.244770	---	26.73	51.93	25.20	N	OFF	19.5
0.244770	33.94	---	61.93	27.99	N	OFF	19.5
0.307590	---	24.33	50.04	25.71	N	OFF	19.5
0.307590	30.32	---	60.04	29.72	N	OFF	19.5
0.501180	---	27.66	46.00	18.34	N	OFF	19.6
0.501180	30.68	---	56.00	25.32	N	OFF	19.6
0.627630	---	25.82	46.00	20.18	N	OFF	19.6
0.627630	28.99	---	56.00	27.01	N	OFF	19.6
8.209500	---	27.51	50.00	22.49	N	OFF	19.9
8.209500	31.08	---	60.00	28.92	N	OFF	19.9



Appendix C. Radiated Spurious Emission

Test Engineer :	Cookie Ku, Fu Chen, and Troye Hsieh	Temperature :	20.1~26.3°C
		Relative Humidity :	46.3~68.9%

<1Mbps>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	(dB)	Limit	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	Line	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH00 2402MHz		2340.45	43.94	-30.06	74	42.92	27.62	6.65	33.25	360	24	P	H
		2340.45	19.18	-34.82	54	-	-	-	-	-	-	A	H
	*	2402	107.76	-	-	106.77	27.5	6.72	33.23	360	24	P	H
	*	2402	83	-	-	-	-	-	-	-	-	A	H
		2376.045	43.55	-30.45	74	42.55	27.55	6.69	33.24	290	259	P	V
		2376.045	18.79	-35.21	54	-	-	-	-	-	-	A	V
	*	2402	108.59	-	-	107.6	27.5	6.72	33.23	290	259	P	V
	*	2402	83.83	-	-	-	-	-	-	-	-	A	V
BT CH 39 2441MHz		2336.74	43.15	-30.85	74	42.12	27.63	6.65	33.25	355	22	P	H
		2336.74	18.39	-35.61	54	-	-	-	-	-	-	A	H
	*	2441	107.68	-	-	106.72	27.42	6.76	33.22	355	22	P	H
	*	2441	82.92	-	-	-	-	-	-	-	-	A	H
		2490.2	43.61	-30.39	74	42.77	27.24	6.81	33.21	355	22	P	H
		2490.2	18.85	-35.15	54	-	-	-	-	-	-	A	H
		2329.74	44.69	-29.31	74	43.66	27.64	6.64	33.25	106	60	P	V
		2329.74	19.93	-34.07	54	-	-	-	-	-	-	A	V
	*	2441	108.36	-	-	107.4	27.42	6.76	33.22	106	60	P	V
	*	2441	83.6	-	-	-	-	-	-	-	-	A	V
		2496.92	43.22	-30.78	74	42.4	27.21	6.82	33.21	106	60	P	V
		2496.92	18.46	-35.54	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	105.87	-	-	105	27.28	6.8	33.21	308	22	P	H
	*	2480	81.11	-	-	-	-	-	-	-	-	A	H
		2483.52	52.75	-21.25	74	51.88	27.27	6.81	33.21	308	22	P	H
		2483.52	27.99	-26.01	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	106.28	-	-	105.41	27.28	6.8	33.21	100	59	P	V
	*	2480	81.52	-	-	-	-	-	-	-	-	A	V
		2483.52	54.33	-19.67	74	53.46	27.27	6.81	33.21	100	59	P	V
		2483.52	29.57	-24.43	54	-	-	-	-	-	-	A	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH 00 2402MHz		4804	42.33	-31.67	74	61.18	31	11.07	60.92	100	0	P	H
		4804	17.57	-36.43	54	-	-	-	-	-	-	A	H
													H
													H
		4804	42.36	-31.64	74	61.21	31	11.07	60.92	100	0	P	V
		4804	17.6	-36.4	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	40.91	-33.09	74	59.63	31	11.13	60.85	100	0	P	H
		4882	16.15	-37.85	54	-	-	-	-	-	-	A	H
		7323	42.3	-31.7	74	53.06	36.5	13.66	60.92	100	0	P	H
		7323	17.54	-36.46	54	-	-	-	-	-	-	A	H
		4882	40.01	-33.99	74	58.73	31	11.13	60.85	100	0	P	V
		4882	15.25	-38.75	54	-	-	-	-	-	-	A	V
		7323	42.04	-31.96	74	52.8	36.5	13.66	60.92	100	0	P	V
		7323	17.28	-36.72	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	40.34	-33.66	74	58.77	31.14	11.19	60.76	100	0	P	H
		4960	15.58	-38.42	54	-	-	-	-	-	-	A	H
		7440	43.44	-30.56	74	54.36	36.38	13.61	60.91	100	0	P	H
		7440	18.68	-35.32	54	-	-	-	-	-	-	A	H
		4960	41.05	-32.95	74	59.48	31.14	11.19	60.76	100	0	P	V
		4960	16.29	-37.71	54	-	-	-	-	-	-	A	V
		7440	42.97	-31.03	74	53.89	36.38	13.61	60.91	100	0	P	V
		7440	18.21	-35.79	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)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
2.4GHz BT LF		30	21.21	-18.79	40	28.71	24.15	0.77	32.42	-	-	P	H	
		115.36	21.61	-21.89	43.5	35.6	16.98	1.44	32.41	-	-	P	H	
		179.38	23.94	-19.56	43.5	39.82	14.76	1.91	32.55	-	-	P	H	
		922.4	32.18	-13.82	46	30.34	29.01	4.26	31.43	-	-	P	H	
		945.68	32.8	-13.2	46	29.75	29.85	4.33	31.13	-	-	P	H	
		959.26	32.93	-13.07	46	28.87	30.64	4.37	30.95	100	0	P	H	
													H	
													H	
													H	
													H	
													H	
													H	
			30.97	28.56	-11.44	40	36.34	23.86	0.78	32.42	100	0	P	V
			38.73	26.05	-13.95	40	37.68	20	0.84	32.47	-	-	P	V
			48.43	24.6	-15.4	40	41.52	14.67	0.94	32.53	-	-	P	V
			881.66	32.61	-13.39	46	31.22	29.03	4.17	31.81	-	-	P	V
			942.77	32.74	-13.26	46	29.89	29.69	4.33	31.17	-	-	P	V
			958.29	33.21	-12.79	46	29.24	30.57	4.36	30.96	-	-	P	V
													V	
													V	
												V		
												V		
												V		
												V		
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



<2Mbps>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
BT CH00 2402MHz		2389.905	44.06	-29.94	74	43.06	27.52	6.71	33.23	358	23	P	H	
		2389.905	19.3	-34.7	54	-	-	-	-	-	-	A	H	
	*	2402	106.99	-	-	106	27.5	6.72	33.23	358	23	P	H	
	*	2402	82.23	-	-	-	-	-	-	-	-	A	H	
													H	
														H
			2336.145	43.55	-30.45	74	42.52	27.63	6.65	33.25	110	63	P	V
			2336.145	18.79	-35.21	54	-	-	-	-	-	-	A	V
	*		2402	107.25	-	-	106.26	27.5	6.72	33.23	110	63	P	V
	*		2402	82.49	-	-	-	-	-	-	-	-	A	V
													V	
													V	
BT CH 39 2441MHz		2314.06	44.72	-29.28	74	43.68	27.67	6.62	33.25	354	24	P	H	
		2314.06	19.96	-34.04	54	-	-	-	-	-	-	A	H	
	*	2441	106.66	-	-	105.7	27.42	6.76	33.22	354	24	P	H	
	*	2441	81.9	-	-	-	-	-	-	-	-	A	H	
			2492.23	43.5	-30.5	74	42.66	27.23	6.82	33.21	354	24	P	H
			2492.23	18.74	-35.26	54	-	-	-	-	-	-	A	H
			2366.7	44.34	-29.66	74	43.33	27.57	6.68	33.24	104	60	P	V
			2366.7	19.58	-34.42	54	-	-	-	-	-	-	A	V
	*		2441	107.76	-	-	106.8	27.42	6.76	33.22	104	60	P	V
	*		2441	83	-	-	-	-	-	-	-	-	A	V
			2493.49	42.79	-31.21	74	41.95	27.23	6.82	33.21	104	60	P	V
			2493.49	18.03	-35.97	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	105.25	-	-	104.38	27.28	6.8	33.21	350	28	P	H	
	*	2480	80.49	-	-	-	-	-	-	-	-	A	H	
		2483.64	50.65	-23.35	74	49.78	27.27	6.81	33.21	350	28	P	H	
		2483.64	25.89	-28.11	54	-	-	-	-	-	-	A	H	
													H	
													H	
	*	2480	105.96	-	-	105.09	27.28	6.8	33.21	100	60	P	V	
	*	2480	81.2	-	-	-	-	-	-	-	-	-	A	V
		2483.52	51.36	-22.64	74	50.49	27.27	6.81	33.21	100	60	P	V	
		2483.52	26.6	-27.4	54	-	-	-	-	-	-	A	V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH 00 2402MHz		4804	42.78	-31.22	74	61.63	31	11.07	60.92	100	0	P	H
		4804	18.02	-35.98	54	-	-	-	-	-	-	A	H
													H
													H
		4804	40.78	-33.22	74	59.63	31	11.07	60.92	100	0	P	V
		4804	16.02	-37.98	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	40.9	-33.1	74	59.62	31	11.13	60.85	100	0	P	H
		4882	16.14	-37.86	54	-	-	-	-	-	-	A	H
		7323	43.41	-30.59	74	54.17	36.5	13.66	60.92	100	0	P	H
		7323	18.65	-35.35	54	-	-	-	-	-	-	A	H
		4882	40.84	-33.16	74	59.56	31	11.13	60.85	100	0	R	P
		4882	16.08	-37.92	54	-	-	-	-	-	-	P	V
		7323	43.37	-30.63	74	54.13	36.5	13.66	60.92	100	0	A	V
		7323	18.61	-35.39	54	-	-	-	-	-	-	P	V
BT CH 78 2480MHz		4960	40.84	-33.16	74	59.27	31.14	11.19	60.76	100	0	P	H
		4960	16.08	-37.92	54	-	-	-	-	-	-	A	H
		7440	42.78	-31.22	74	53.7	36.38	13.61	60.91	100	0	P	H
		7440	18.02	-35.98	54	-	-	-	-	-	-	A	H
		4960	40.77	-33.23	74	59.2	31.14	11.19	60.76	100	0	P	V
		4960	16.01	-37.99	54	-	-	-	-	-	-	A	V
		7440	42.65	-31.35	74	53.57	36.38	13.61	60.91	100	0	P	V
		7440	17.89	-36.11	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



<3Mbps>

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
BT CH00 2402MHz		2377.41	43.75	-30.25	74	42.75	27.55	6.69	33.24	327	19	P	H	
		2377.41	18.99	-35.01	54	-	-	-	-	-	-	A	H	
	*	2402	107.47	-	-	106.48	27.5	6.72	33.23	327	19	P	H	
	*	2402	82.71	-	-	-	-	-	-	-	-	A	H	
													H	
													H	
			2363.235	44.68	-29.32	74	43.67	27.57	6.68	33.24	275	242	P	V
			2363.235	19.92	-34.08	54	-	-	-	-	-	-	A	V
	*		2402	106.93	-	-	105.94	27.5	6.72	33.23	275	242	P	V
	*		2402	82.17	-	-	-	-	-	-	-	-	A	V
													V	
													V	
BT CH 39 2441MHz		2348.08	43.36	-30.64	74	42.34	27.6	6.66	33.24	353	18	P	H	
		2348.08	18.6	-35.4	54	-	-	-	-	-	-	A	H	
	*	2441	106.1	-	-	105.14	27.42	6.76	33.22	353	18	P	H	
	*	2441	81.34	-	-	-	-	-	-	-	-	A	H	
			2491.11	43.02	-30.98	74	42.17	27.24	6.82	33.21	353	18	P	H
			2491.11	18.26	-35.74	54	-	-	-	-	-	-	A	H
			2349.2	44.2	-29.8	74	43.18	27.6	6.66	33.24	258	240	P	V
			2349.2	19.44	-34.56	54	-	-	-	-	-	-	A	V
	*		2441	105.94	-	-	104.98	27.42	6.76	33.22	258	240	P	V
	*		2441	81.18	-	-	-	-	-	-	-	-	A	V
			2489.64	43.14	-30.86	74	42.3	27.24	6.81	33.21	258	240	P	V
			2489.64	18.38	-35.62	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	105.81	-	-	104.94	27.28	6.8	33.21	274	339	P	H	
	*	2480	81.05	-	-	-	-	-	-	-	-	A	H	
		2483.56	51.56	-22.44	74	50.69	27.27	6.81	33.21	274	339	P	H	
		2483.56	26.8	-27.2	54	-	-	-	-	-	-	A	H	
													H	
													H	
	*	2480	105.18	-	-	104.31	27.28	6.8	33.21	141	234	P	V	
	*	2480	80.42	-	-	-	-	-	-	-	-	-	A	V
		2483.56	50.27	-23.73	74	49.4	27.27	6.81	33.21	141	234	P	V	
		2483.56	25.51	-28.49	54	-	-	-	-	-	-	A	V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
BT CH 00 2402MHz		4804	41.97	-32.03	74	60.82	31	11.07	60.92	100	0	P	H	
		4804	17.21	-36.79	54	-	-	-	-	-	-	A	H	
													H	
													H	
		4804	41.18	-32.82	74	60.03	31	11.07	60.92	100	0	P	V	
		4804	16.42	-37.58	54	-	-	-	-	-	-	-	A	V
														V
														V
BT CH 39 2441MHz		4882	40.48	-33.52	74	59.2	31	11.13	60.85	100	0	P	H	
		4882	15.72	-38.28	54	-	-	-	-	-	-	A	H	
		7323	42.58	-31.42	74	53.34	36.5	13.66	60.92	100	0	P	H	
		7323	17.82	-36.18	54	-	-	-	-	-	-	A	H	
		4882	40.28	-33.72	74	59	31	11.13	60.85	100	0	P	V	
		4882	15.52	-38.48	54	-	-	-	-	-	-	-	A	V
		7323	42.01	-31.99	74	52.77	36.5	13.66	60.92	100	0	P	V	
		7323	17.25	-36.75	54	-	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	40.08	-33.92	74	58.51	31.14	11.19	60.76	100	0	P	H	
		4960	15.32	-38.68	54	-	-	-	-	-	-	A	H	
		7440	43.13	-30.87	74	54.05	36.38	13.61	60.91	100	0	P	H	
		7440	18.37	-35.63	54	-	-	-	-	-	-	A	H	
		4960	40.08	-33.92	74	58.51	31.14	11.19	60.76	100	0	P	V	
		4960	15.32	-38.68	54	-	-	-	-	-	-	A	V	
		7440	42.46	-31.54	74	53.38	36.38	13.61	60.91	100	0	P	V	
		7440	17.7	-36.3	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)	(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 :	Cookie Ku, Fu Chen, and Troye Hsieh	Temperature :	20.1~26.3°C
		Relative Humidity :	46.3~68.9%

Note symbol

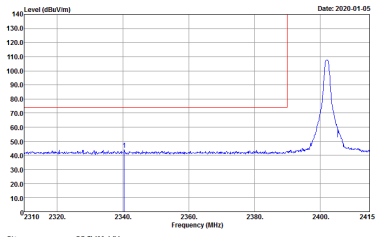
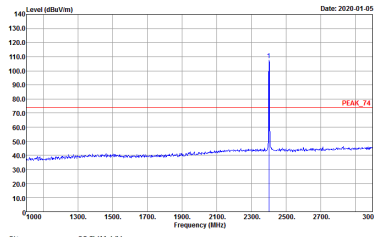
-L	Low channel location
-R	High channel location



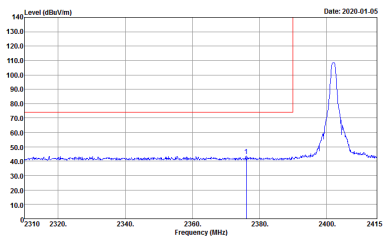
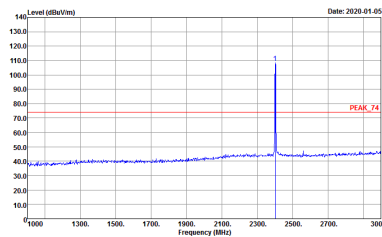
<1Mbps>

2.4GHz 2400~2483.5MHz

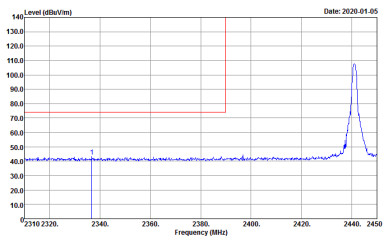
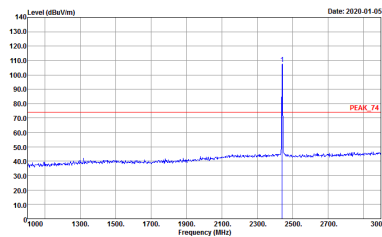
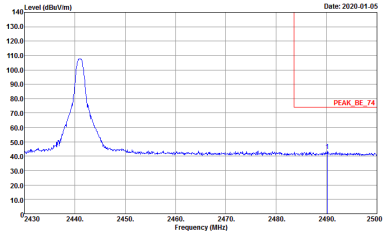
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-4Y Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-4Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

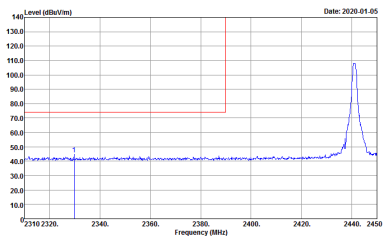
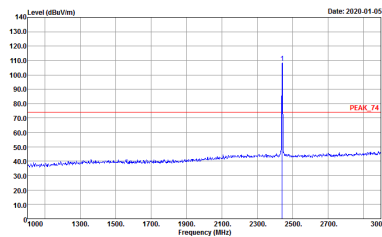
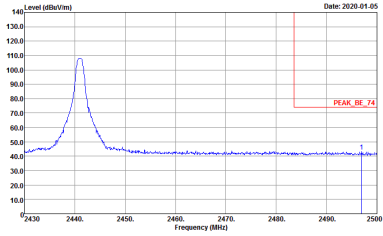


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH00 2402MHz		
Vertical		Fundamental
Peak	 <p data-bbox="430 728 702 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1173 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

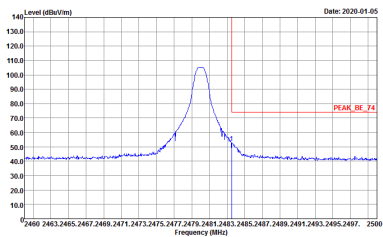
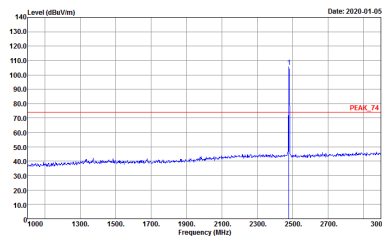


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
Horizontal		Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank

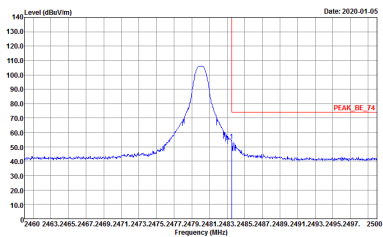
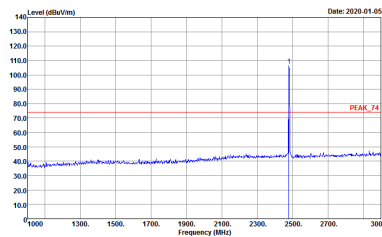


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
Vertical		Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Horizontal		Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

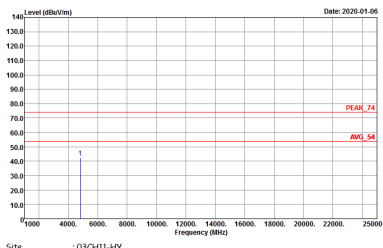
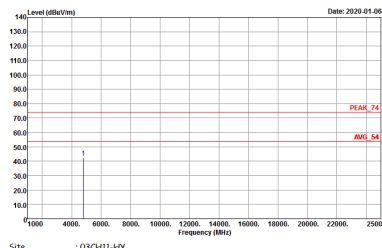


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Vertical		Fundamental
Peak	 <p data-bbox="430 728 813 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1284 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
<p>Peak Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH39 2441MHz		
Horizontal		Vertical
<p>Peak</p> <p>Avg.</p>	<p>Horizontal spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks labeled '1' and '2' at approximately 4.5 MHz and 6.5 MHz respectively. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the peak level at approximately 74 dBuV/m, and another red line indicates the average level at approximately 54 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Vertical spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks labeled '1' and '2' at approximately 4.5 MHz and 6.5 MHz respectively. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the peak level at approximately 74 dBuV/m, and another red line indicates the average level at approximately 54 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>

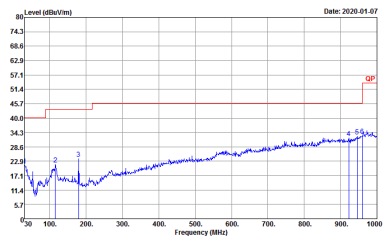
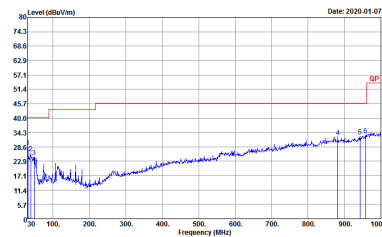


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH78 2480MHz		
Horizontal		Vertical
<p>Peak</p> <p>Avg.</p>	<p>Site : 03CH11-1F Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Site : 03CH11-1F Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



Emission below 1GHz

2.4GHz BT (LF)

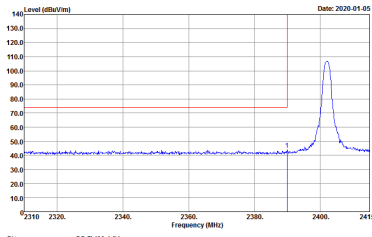
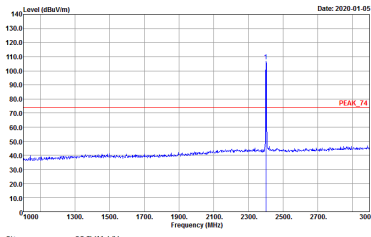
BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 <p>Site : 03CH11-HY Condition : QP 3m BT-LOG-6111D-LF_ETC HORIZONTAL Detector : Peak Project : 901524-02</p>	 <p>Site : 03CH11-HY Condition : QP 3m BT-LOG-6111D-LF_ETC VERTICAL Detector : Peak Project : 901524-02</p>



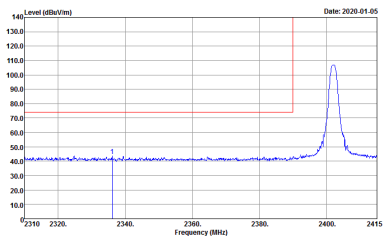
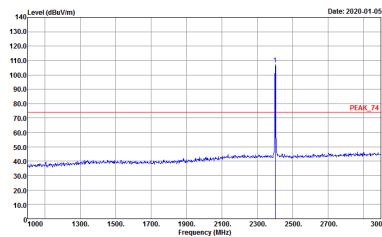
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2.4GHz 2400~2483.5MHz

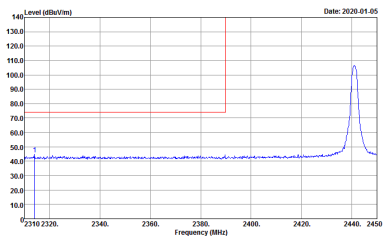
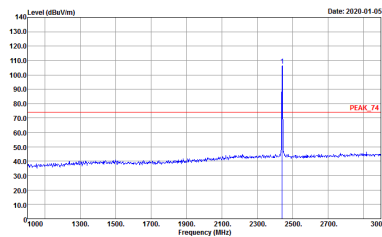
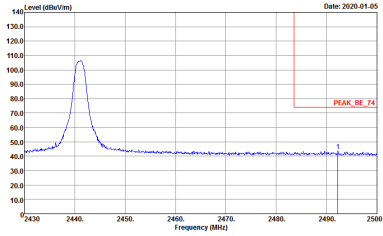
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-4Y Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-4Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

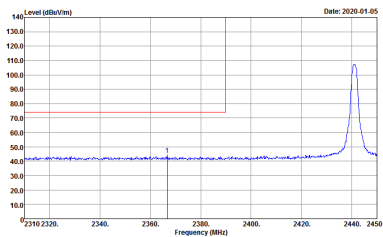
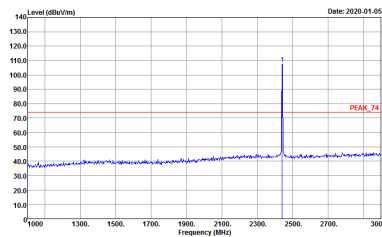
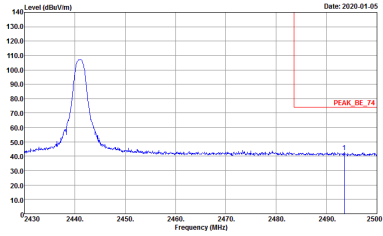


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH00 2402MHz		
Vertical		Fundamental
Peak	 <p data-bbox="430 728 702 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1173 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

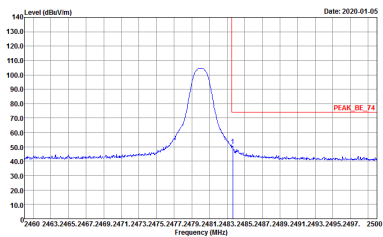
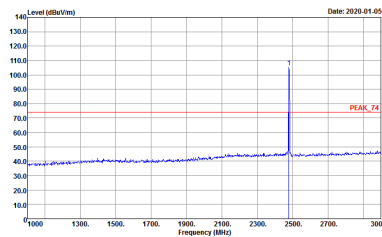


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
Horizontal		Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank

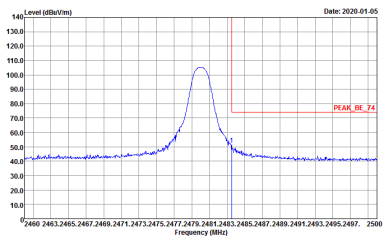
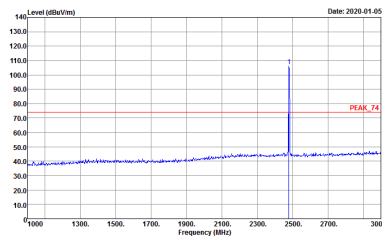


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
Vertical		Fundamental
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-05</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Horizontal		Fundamental
Peak	 <p data-bbox="430 728 813 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1284 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

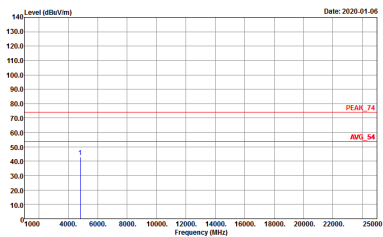
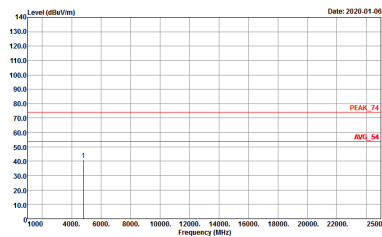


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Vertical		Fundamental
Peak	 <p data-bbox="430 728 813 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1284 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
<p>Peak Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH39 2441MHz		
Horizontal		Vertical
<p>Peak</p> <p>Avg.</p>	<p>Horizontal spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks at approximately 4.8 MHz and 7.2 MHz. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the PEAK level at 74 dBuV/m, and another red horizontal line indicates the AVG level at 54 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Vertical spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks at approximately 4.8 MHz and 7.2 MHz. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the PEAK level at 74 dBuV/m, and another red horizontal line indicates the AVG level at 54 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



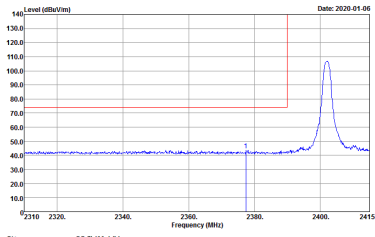
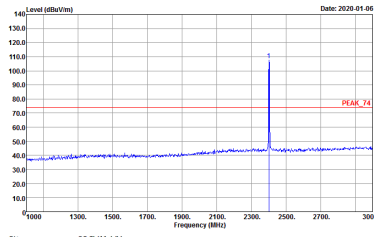
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	<p>Site : 03CH11-1F Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Site : 03CH11-1F Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



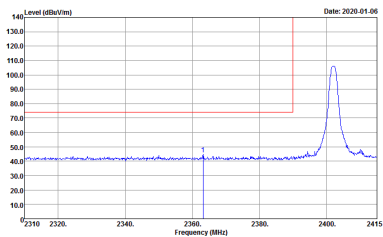
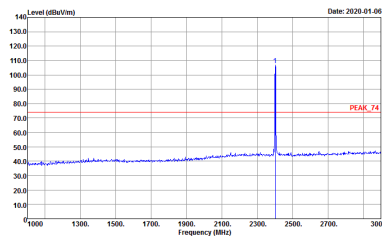
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2.4GHz 2400~2483.5MHz

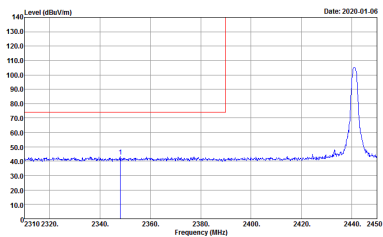
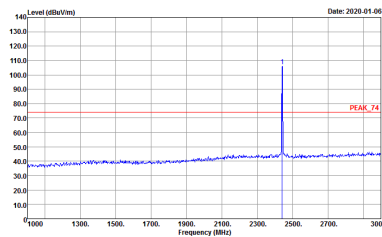
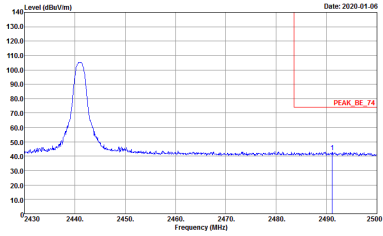
BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-4Y Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-4Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

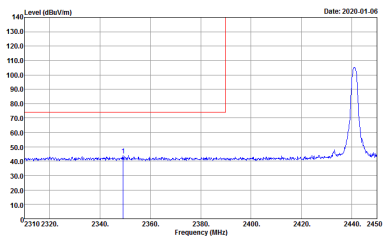
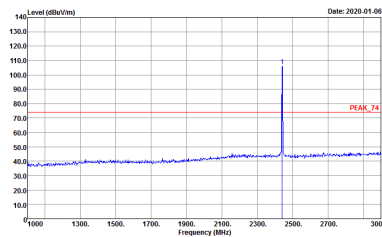
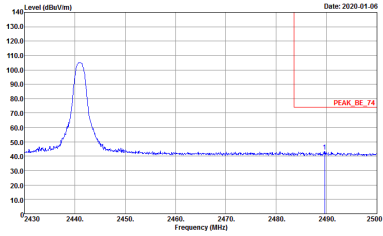


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH00 2402MHz		
	Vertical	Fundamental
Peak	 <p>Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

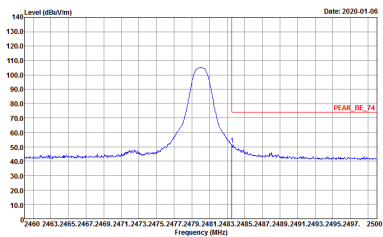
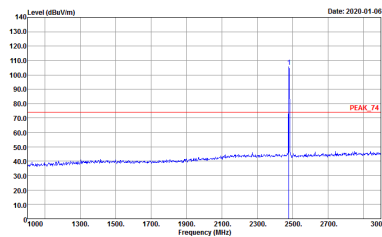


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank

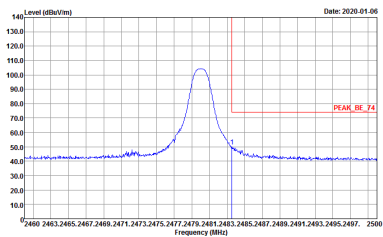
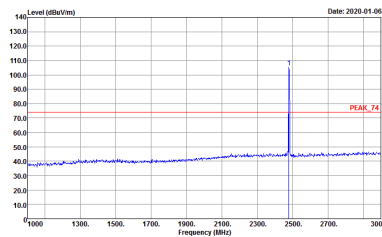


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH39 2441MHz		
Vertical		Fundamental
Peak	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>
Peak	 <p>Date: 2020-01-06</p> <p>Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Horizontal		Fundamental
Peak	 <p data-bbox="430 728 813 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1284 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>

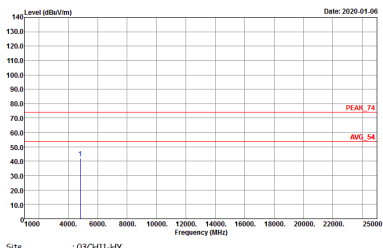
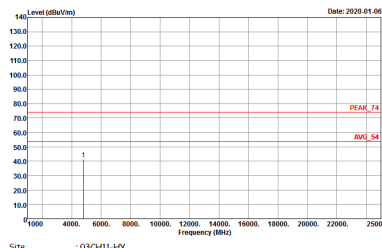


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
BT CH78 2480MHz		
Vertical		Fundamental
Peak	 <p data-bbox="430 728 813 795">Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>	 <p data-bbox="901 728 1284 795">Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 901524-02</p>



2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	 <p>Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
BT CH39 2441MHz		
Horizontal		Vertical
Peak Avg.	<p>Horizontal spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks at approximately 4.41 MHz and 6.82 MHz. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the peak level at approximately 74 dBuV/m, and another red line indicates the average level at approximately 54 dBuV/m.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Vertical spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks at approximately 4.41 MHz and 6.82 MHz. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. A red horizontal line indicates the peak level at approximately 74 dBuV/m, and another red line indicates the average level at approximately 54 dBuV/m.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>

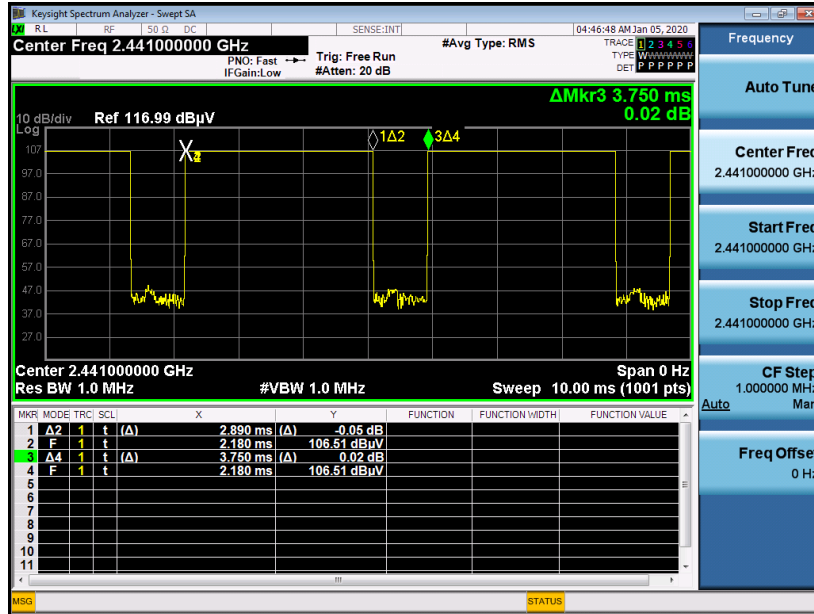


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
<p>Peak</p> <p>Avg.</p>	<p>Horizontal spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks labeled '1' and '2' at approximately 5.5 MHz and 6.5 MHz respectively. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. Two horizontal red lines indicate levels: 'PEAK_74' at approximately 75 dBuV/m and 'AVG_54' at approximately 55 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 901524-02</p>	<p>Vertical spectrum plot showing Level (dBuV/m) vs Frequency (MHz). The plot displays two distinct peaks labeled '1' and '2' at approximately 5.5 MHz and 6.5 MHz respectively. The y-axis ranges from 0 to 140 dBuV/m, and the x-axis ranges from 0 to 25000 MHz. Two horizontal red lines indicate levels: 'PEAK_74' at approximately 75 dBuV/m and 'AVG_54' at approximately 55 dBuV/m. The plot is dated 2020-01-06.</p> <p>Site : 03CH11-11Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 901524-02</p>

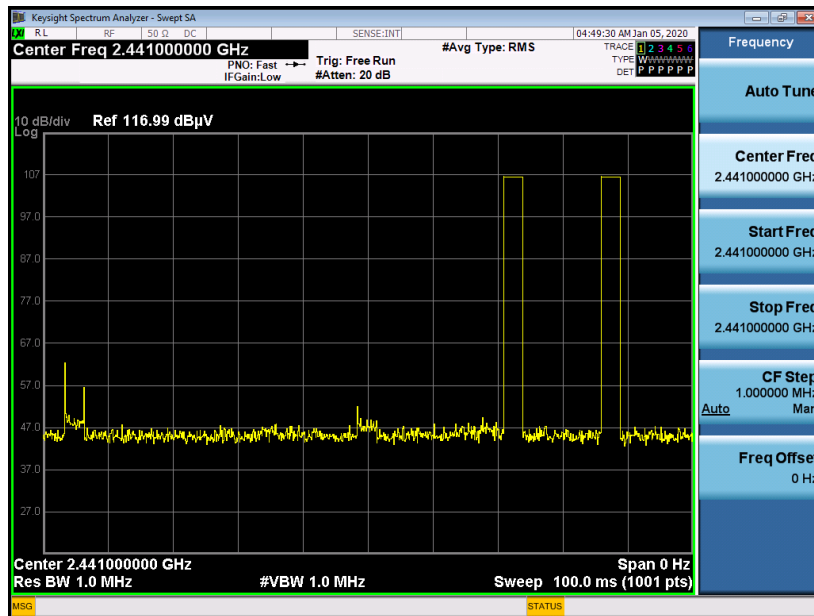
Appendix E. Duty Cycle Plots

<1Mbps>

DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39



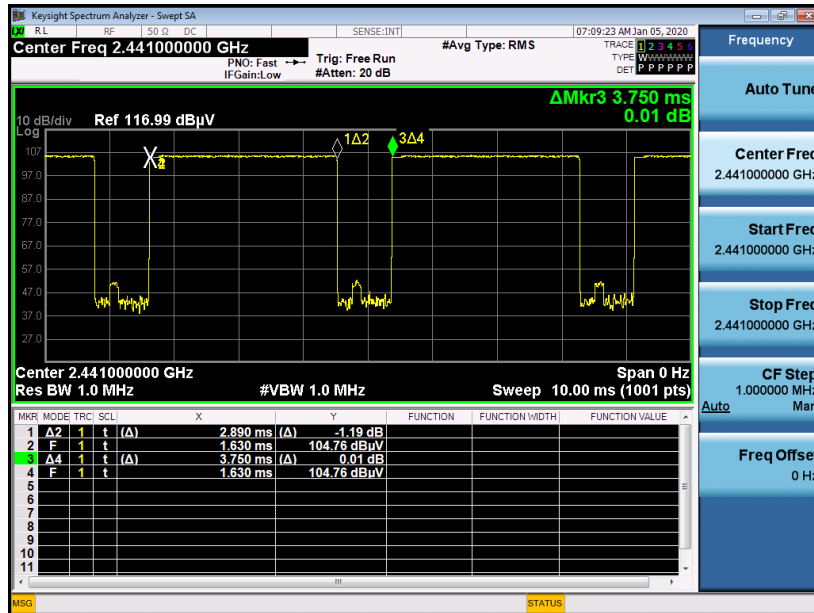
Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.89 / 100 = 5.78 \%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

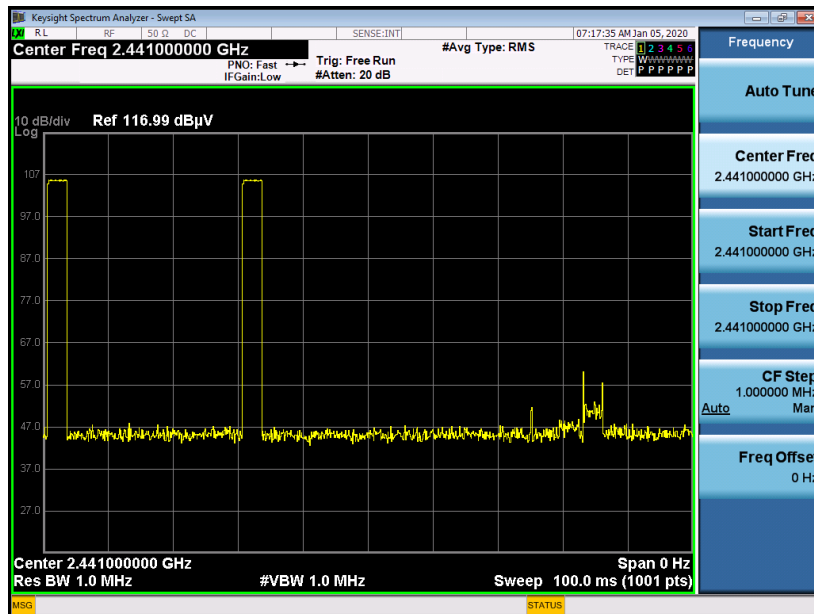


<2Mbps>

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



on time (Count Pulses) Plot on Channel 39

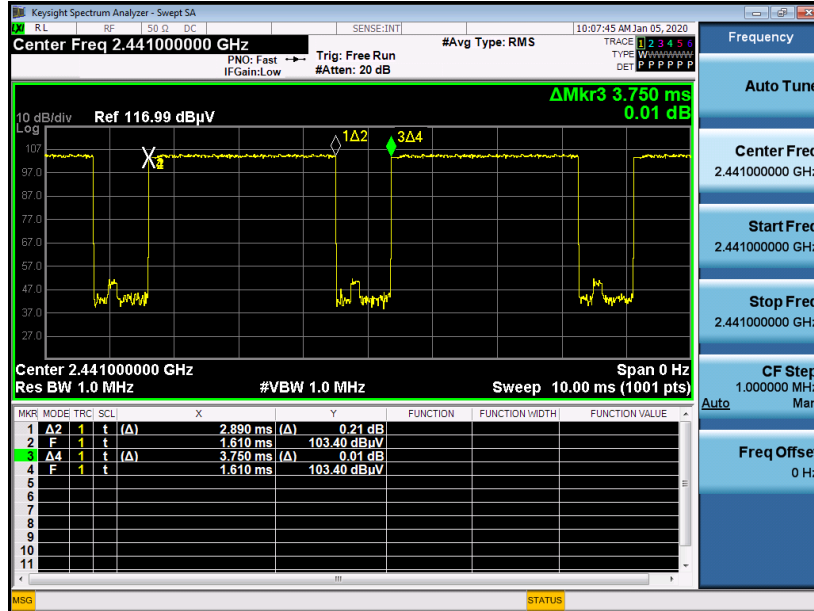


Note:

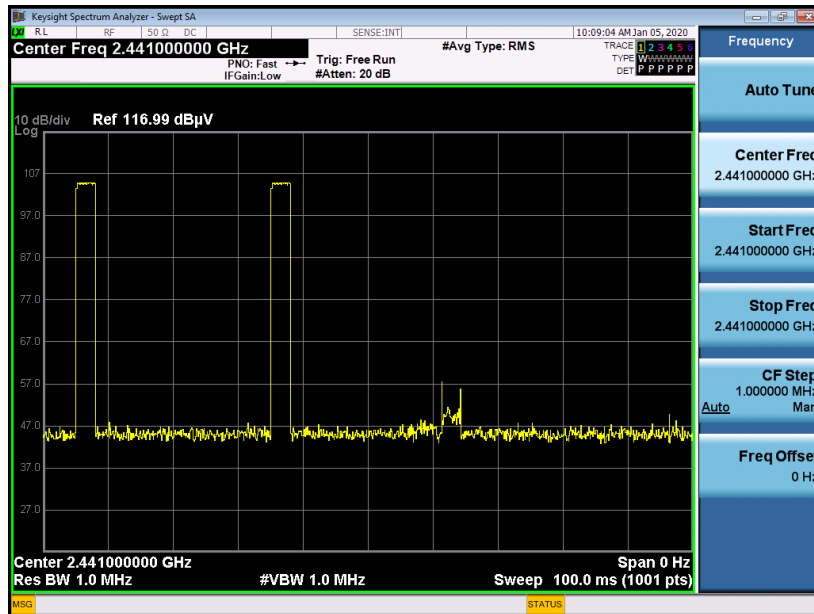
1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.89 / 100 = 5.78\%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. 2DH5 has the highest duty cycle worst case and is reported.

<3Mbps>

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



on time (Count Pulses) Plot on Channel 39



Note:

1. Worst case Duty cycle = on time/100 milliseconds = $2 * 2.89 / 100 = 5.78\%$
2. Worst case Duty cycle correction factor = $20 * \log(\text{Duty cycle}) = -24.76 \text{ dB}$
3. 3DH5 has the highest duty cycle worst case and is reported.



Duty Cycle Correction Factor Consideration for AFH mode:

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

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

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—————