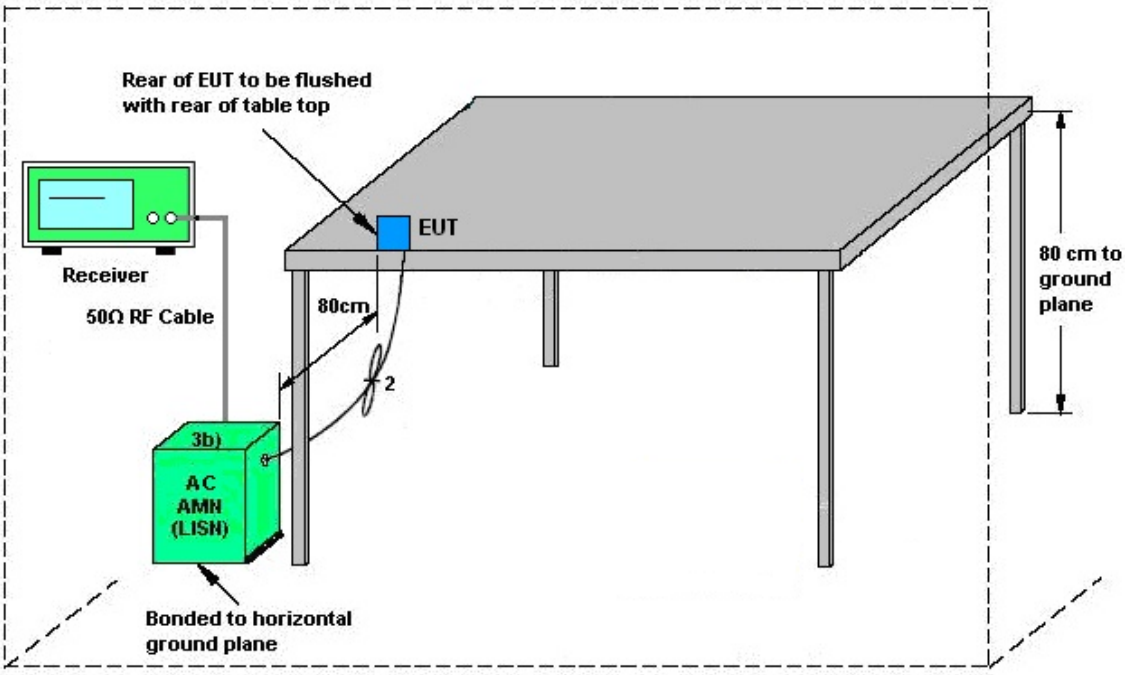
3.6.4 Test Setup



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

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 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	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Jul. 14, 2020	Nov. 16, 2020~ Dec. 10, 2020	Jul. 13, 2021	Radiation (03CH13-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1241	1GHz~18GHz	Jul. 15, 2020	Nov. 16, 2020~ Dec. 10, 2020	Jul. 14, 2021	Radiation (03CH13-HY)
Hygrometer	TECPEL	DTM-303B	TP150115	N/A	N/A	Nov. 16, 2020~ Dec. 10, 2020	N/A	Radiation (03CH13-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1590074	1GHz~18GHz	May 19, 2020	Nov. 16, 2020~ Dec. 10, 2020	May 18, 2021	Radiation (03CH13-HY)
Preamplifier	Keysight	83017A	MY53270147	1GHz~26.5GHz	Oct. 28, 2020	Nov. 16, 2020~ Dec. 10, 2020	Oct. 27, 2021	Radiation (03CH13-HY)
Spectrum Analyzer	Keysight	N9010A	MY55370526	10Hz~44GHz	Mar. 20, 2020	Nov. 16, 2020~ Dec. 10, 2020	Mar. 19, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY9837/4PE	9kHz~30MHz	Mar. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY2859/2	30MHz~40GHz	Mar. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	MY4274/2	30MHz~40GHz	Mar. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 126E	0030/126E	30MHz~18GHz	Feb. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Feb. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	804793/4	30MHz~18GHz	Feb. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Feb. 11, 2021	Radiation (03CH13-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24961/4	30MHz~18GHz	Feb. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Feb. 11, 2021	Radiation (03CH13-HY)
Controller	EMEC	EM1000	N/A	Control Turn table & Ant Mast	N/A	Nov. 16, 2020~ Dec. 10, 2020	N/A	Radiation (03CH13-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Nov. 16, 2020~ Dec. 10, 2020	N/A	Radiation (03CH13-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Nov. 16, 2020~ Dec. 10, 2020	N/A	Radiation (03CH13-HY)
Software	AUDIX	E3 6.2009-8-24c	RK-001124	N/A	N/A	Nov. 16, 2020~ Dec. 10, 2020	N/A	Radiation (03CH13-HY)
EMI Test Receiver	Keysight	N9038A(MXE)	MY53290045	20MHz~8.4GHz	Jan. 18, 2020	Nov. 16, 2020~ Dec. 10, 2020	Jan. 17, 2021	Radiation (03CH13-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170576	18GHz~40GHz	May 22, 2020	Nov. 16, 2020~ Dec. 10, 2020	May 21, 2021	Radiation (03CH13-HY)
Preamplifier	EMEC	EM18G40G	0600789	18GHz~40GHz	Jul. 31, 2020	Nov. 16, 2020~ Dec. 10, 2020	Jul. 30, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX8-5872.5-6750-18000-40ST	SN5	6.75GHz High Pass Filter	Mar. 12, 2020	Nov. 16, 2020~ Dec. 10, 2020	Mar. 11, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WLK4-1000-1530-8000-40SS	SN12	1.53GHz Low Pass Filter	Sep. 15, 2020	Nov. 16, 2020~ Dec. 10, 2020	Sep. 14, 2021	Radiation (03CH13-HY)
Filter	Wainwright	WHKX12-2700-3000-18000-60SS	SN2	3GHz High Pass Filter	Jul. 13, 2020	Nov. 16, 2020~ Dec. 10, 2020	Jul. 12, 2021	Radiation (03CH13-HY)

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Nov. 15, 2020~ Dec. 03, 2020	Mar. 01, 2021	Conducted (TH05-HY)
Power Sensor	DARE	RPR3006W	16I00054SNO10	10MHz~6GHz	Dec. 23, 2019	Nov. 15, 2020~ Dec. 03, 2020	Dec. 22, 2020	Conducted (TH05-HY)
Signal Analyzer	Rohde & Schwarz	FSV40	101566	10Hz ~ 40GHz	Jul. 22, 2020	Nov. 15, 2020~ Dec. 03, 2020	Jul. 21, 2021	Conducted (TH05-HY)
Switch Box & RF Cable	EM Electronics	EMSW18SE	SW200302	N/A	Mar. 17, 2020	Nov. 15, 2020~ Dec. 03, 2020	Mar. 16, 2021	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Nov. 18, 2020	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 11, 2020	Nov. 18, 2020	Sep. 10, 2021	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 20, 2019	Nov. 18, 2020	Nov. 19, 2020	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Nov. 18, 2020	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 02, 2020	Nov. 18, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 02, 2020	Nov. 18, 2020	Jan. 01, 2021	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34893241	N/A	Mar. 02, 2020	Nov. 18, 2020	Mar. 01, 2021	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))	2.3

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Hank Hsu	Temperature:	21~25	°C
Test Date:	2020/11/15~2020/12/3	Relative Humidity:	51~54	%

<Ant. 5>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.019	0.678	0.50	Pass
BLE	1Mbps	1	19	2440	1.017	0.672	0.50	Pass
BLE	1Mbps	1	39	2480	1.017	0.674	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	6.00	30.00	-1.35	4.65	36.00	Pass
BLE	1Mbps	1	19	2440	6.80	30.00	-1.35	5.45	36.00	Pass
BLE	1Mbps	1	39	2480	5.30	30.00	-1.35	3.95	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	5.75	-8.47	-1.35	8.00	Pass
BLE	1Mbps	1	19	2440	6.46	-7.83	-1.35	8.00	Pass
BLE	1Mbps	1	39	2480	4.71	-9.48	-1.35	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

Report Number : FR0N0303B

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	1.998	1.168	0.50	Pass
BLE	2Mbps	1	19	2440	1.998	1.156	0.50	Pass
BLE	2Mbps	1	39	2480	1.998	1.176	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	6.30	30.00	-1.35	4.95	36.00	Pass
BLE	2Mbps	1	19	2440	7.00	30.00	-1.35	5.65	36.00	Pass
BLE	2Mbps	1	39	2480	5.60	30.00	-1.35	4.25	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	5.85	-11.24	-1.35	8.00	Pass
BLE	2Mbps	1	19	2440	6.63	-10.60	-1.35	8.00	Pass
BLE	2Mbps	1	39	2480	5.03	-12.07	-1.35	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

<Ant. 7>

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	1Mbps	1	0	2402	1.017	0.678	0.50	Pass
BLE	1Mbps	1	19	2440	1.017	0.674	0.50	Pass
BLE	1Mbps	1	39	2480	1.017	0.674	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	1Mbps	1	0	2402	4.40	30.00	-1.87	2.53	36.00	Pass
BLE	1Mbps	1	19	2440	5.00	30.00	-1.87	3.13	36.00	Pass
BLE	1Mbps	1	39	2480	4.30	30.00	-1.87	2.43	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	1Mbps	1	0	2402	4.25	-9.94	-1.87	8.00	Pass
BLE	1Mbps	1	19	2440	4.98	-9.29	-1.87	8.00	Pass
BLE	1Mbps	1	39	2480	4.22	-10.01	-1.87	8.00	Pass

Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

Report Number : FR0N0303B

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
BLE	2Mbps	1	0	2402	1.998	1.168	0.50	Pass
BLE	2Mbps	1	19	2440	1.998	1.156	0.50	Pass
BLE	2Mbps	1	39	2480	1.998	1.172	0.50	Pass

TEST RESULTS DATA
Average Power Table

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
BLE	2Mbps	1	0	2402	4.60	30.00	-1.87	2.73	36.00	Pass
BLE	2Mbps	1	19	2440	5.10	30.00	-1.87	3.23	36.00	Pass
BLE	2Mbps	1	39	2480	4.40	30.00	-1.87	2.53	36.00	Pass

TEST RESULTS DATA
Peak Power Density

Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /100kHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
BLE	2Mbps	1	0	2402	4.42	-12.65	-1.87	8.00	Pass
BLE	2Mbps	1	19	2440	5.22	-11.94	-1.87	8.00	Pass
BLE	2Mbps	1	39	2480	4.36	-12.71	-1.87	8.00	Pass

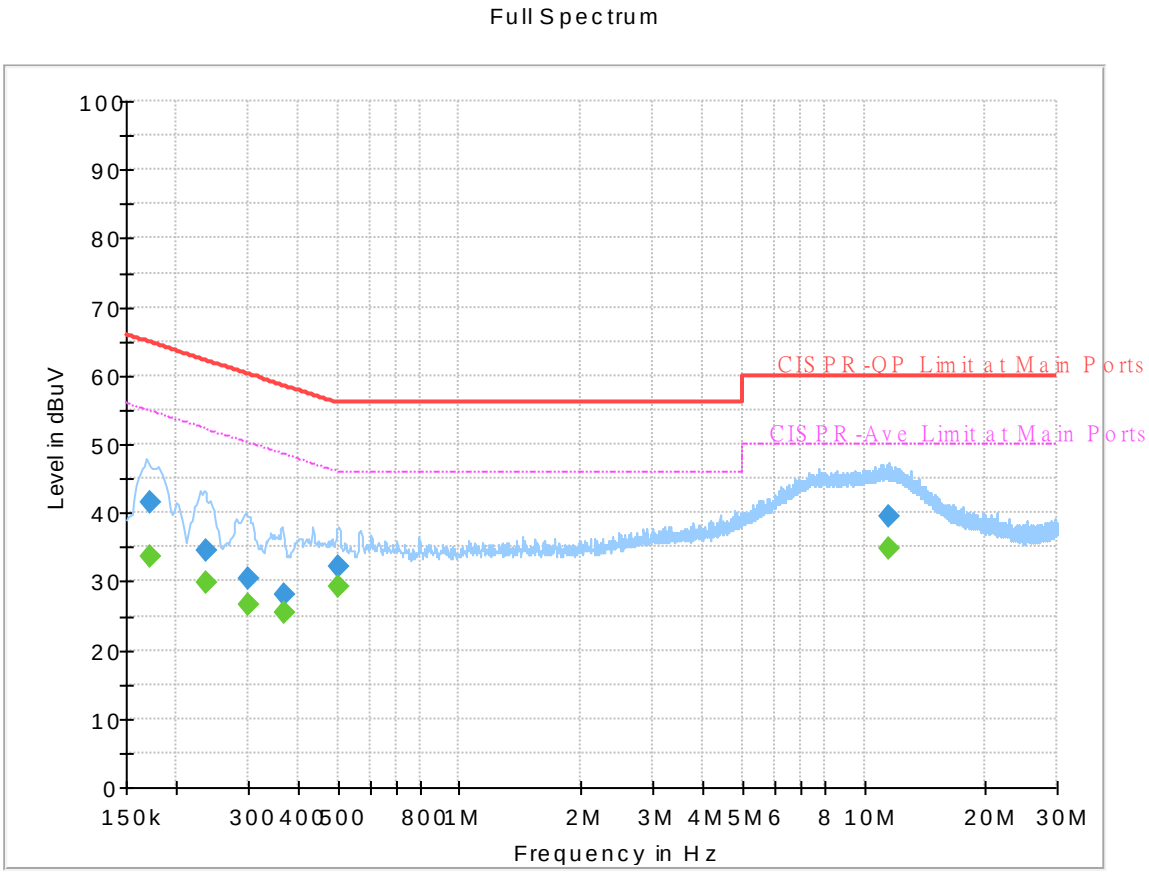
Note: PSD (dBm/ 100kHz) is a reference level used for Conducted Band Edges and Conducted Spurious Emission 30dBc limit.

Appendix B. AC Conducted Emission Test Results

Test Engineer :	Tom Lee	**Temperature :**	23~26℃
		Relative Humidity :	40~50%

EUT Information

Report NO :	0N0303
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

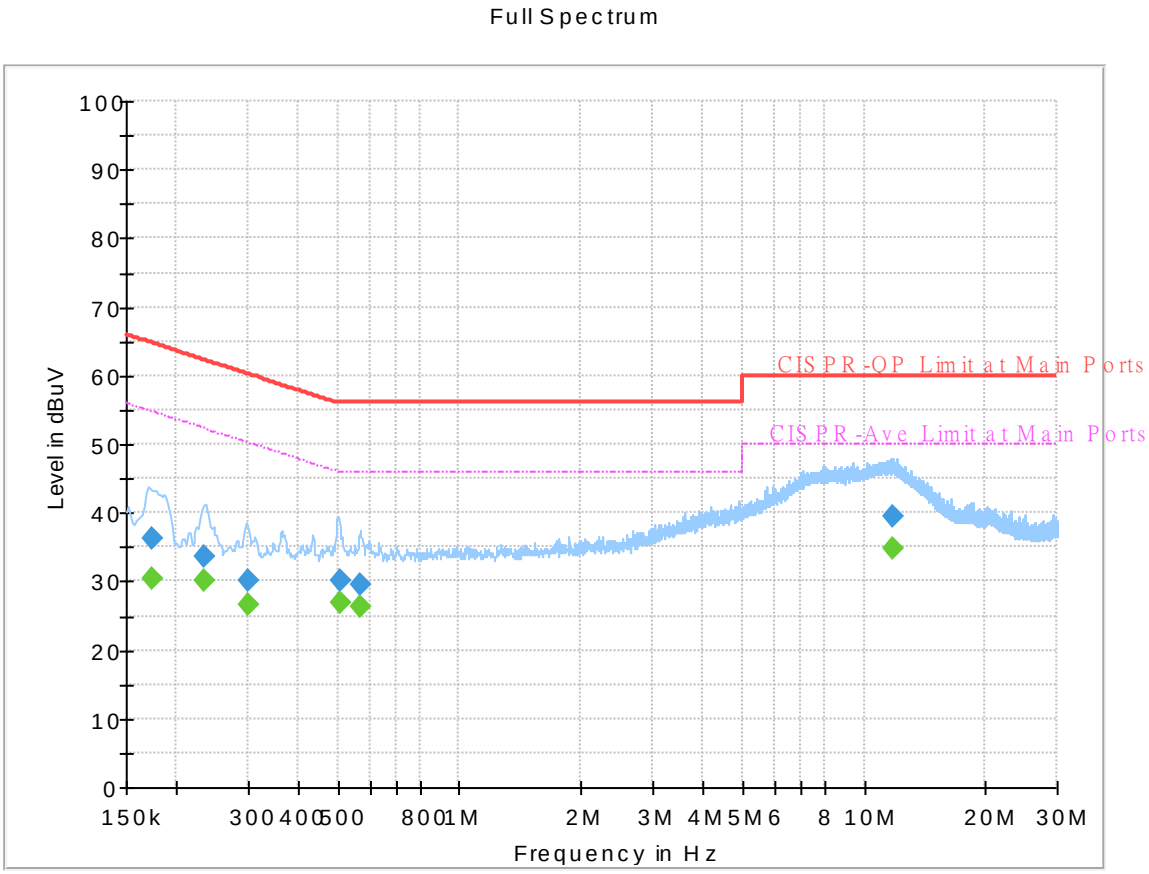


Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.172500	---	33.60	54.84	21.24	L1	OFF	19.4
0.172500	41.49	---	64.84	23.35	L1	OFF	19.4
0.237750	---	29.96	52.17	22.21	L1	OFF	19.4
0.237750	34.51	---	62.17	27.66	L1	OFF	19.4
0.299940	---	26.68	50.24	23.56	L1	OFF	19.4
0.299940	30.56	---	60.24	29.68	L1	OFF	19.4
0.367440	---	25.41	48.56	23.15	L1	OFF	19.4
0.367440	28.21	---	58.56	30.35	L1	OFF	19.4
0.501450	---	29.29	46.00	16.71	L1	OFF	19.5
0.501450	32.03	---	56.00	23.97	L1	OFF	19.5
11.534100	---	34.79	50.00	15.21	L1	OFF	20.0
11.534100	39.42	---	60.00	20.58	L1	OFF	20.0

EUT Information

Report NO :	0N0303
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174750	---	30.50	54.73	24.23	N	OFF	19.5
0.174750	36.35	---	64.73	28.38	N	OFF	19.5
0.233250	---	30.21	52.33	22.12	N	OFF	19.5
0.233250	33.49	---	62.33	28.84	N	OFF	19.5
0.299400	---	26.67	50.26	23.59	N	OFF	19.5
0.299400	30.00	---	60.26	30.26	N	OFF	19.5
0.505680	---	26.78	46.00	19.22	N	OFF	19.5
0.505680	30.13	---	56.00	25.87	N	OFF	19.5
0.571830	---	26.36	46.00	19.64	N	OFF	19.5
0.571830	29.65	---	56.00	26.35	N	OFF	19.5
11.748750	---	34.91	50.00	15.09	N	OFF	20.1
11.748750	39.51	---	60.00	20.49	N	OFF	20.1

Appendix C. Radiated Spurious Emission

Test Engineer :	Daniel Lee, Jacky Hong and Wilson Wu	Temperature :	20~25°C
		Relative Humidity :	50~60%

<Ant. 5>

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2368.38	54.72	-19.28	74	40.94	27.66	13.97	27.85	112	299	P	H
		2316.825	45.15	-8.85	54	31.32	27.77	13.92	27.86	112	299	A	H
	*	2402	99.08	-	-	85.32	27.6	14	27.84	112	299	P	H
	*	2402	98.59	-	-	84.83	27.6	14	27.84	112	299	A	H
													H
		2384.655	54.82	-19.18	74	41.04	27.63	13.99	27.84	318	51	P	V
		2319.765	45.25	-8.75	54	31.43	27.76	13.92	27.86	318	51	A	V
	*	2402	94.39	-	-	80.63	27.6	14	27.84	318	51	P	V
	*	2402	94.28	-	-	80.52	27.6	14	27.84	318	51	A	V
													V
BLE CH 19 2440MHz		2372.44	54.62	-19.38	74	40.84	27.66	13.97	27.85	114	303	P	H
		2362.22	45.33	-8.67	54	31.54	27.68	13.96	27.85	114	303	A	H
	*	2440	100.77	-	-	87.04	27.52	14.04	27.83	114	303	P	H
	*	2440	99.6	-	-	85.87	27.52	14.04	27.83	114	303	A	H
		2493.91	54.34	-19.66	74	40.58	27.5	14.08	27.82	114	303	P	H
		2499.65	45.19	-8.81	54	31.42	27.5	14.09	27.82	114	303	A	H
		2326.8	55.03	-18.97	74	41.2	27.75	13.93	27.85	395	3	P	V
		2387.84	45.3	-8.7	54	31.53	27.62	13.99	27.84	395	3	A	V
	*	2440	96.68	-	-	82.95	27.52	14.04	27.83	395	3	P	V
	*	2440	95.73	-	-	82	27.52	14.04	27.83	395	3	A	V
		2490.34	54.92	-19.08	74	41.16	27.5	14.08	27.82	395	3	P	V
		2491.04	45.38	-8.62	54	31.62	27.5	14.08	27.82	395	3	A	V

BLE CH 39 2480MHz	*	2480	100.22	-	-	86.47	27.5	14.07	27.82	116	304	P	H
	*	2480	98.26	-	-	84.51	27.5	14.07	27.82	116	304	A	H
		2497.64	54.19	-19.81	74	40.42	27.5	14.09	27.82	116	304	P	H
		2485	45.18	-8.82	54	31.42	27.5	14.08	27.82	116	304	A	H
													H
													H
	*	2480	94.28	-	-	80.53	27.5	14.07	27.82	332	13	P	V
	*	2480	93.64	-	-	79.89	27.5	14.07	27.82	332	13	A	V
		2498.6	54.88	-19.12	74	41.11	27.5	14.09	27.82	332	13	P	V
		2487.2	45.13	-8.87	54	31.37	27.5	14.08	27.82	332	13	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

BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	38.02	-35.98	74	57.42	31.11	6.98	57.49	100	0	P	H
													H
													H
													H
		4804	38.88	-35.12	74	58.28	31.11	6.98	57.49	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	37.94	-36.06	74	57.08	31.2	6.99	57.33	100	0	P	H
		7320	43.87	-30.13	74	55.89	36.76	8.32	57.1	100	0	P	H
													H
													H
		4880	37.71	-36.29	74	56.85	31.2	6.99	57.33	100	0	P	V
		7320	44.16	-29.84	74	56.18	36.76	8.32	57.1	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	38.66	-35.34	74	57.4	31.42	7	57.16	100	0	P	H
		7440	44.52	-29.48	74	56.65	36.82	8.33	57.28	100	0	P	H
													H
													H
		4960	38.89	-35.11	74	57.63	31.42	7	57.16	100	0	P	V
		7440	43.68	-30.32	74	55.81	36.82	8.33	57.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2365.125	55.13	-18.87	74	41.34	27.67	13.97	27.85	112	301	P	H
		2376.99	46.58	-7.42	54	32.79	27.65	13.98	27.84	112	301	A	H
	*	2402	100.19	-	-	86.43	27.6	14	27.84	112	301	P	H
	*	2402	98.42	-	-	84.66	27.6	14	27.84	112	301	A	H
													H
													H
		2353.26	54.5	-19.5	74	40.7	27.69	13.96	27.85	312	52	P	V
		2374.89	46.91	-7.09	54	33.13	27.65	13.98	27.85	312	52	A	V
	*	2402	95.04	-	-	81.28	27.6	14	27.84	312	52	P	V
	*	2402	93.17	-	-	79.41	27.6	14	27.84	312	52	A	V
													V
													V
BLE CH 19 2440MHz		2358.16	54.2	-19.8	74	40.41	27.68	13.96	27.85	115	311	P	H
		2373.7	46.74	-7.26	54	32.96	27.65	13.98	27.85	115	311	A	H
	*	2440	100.67	-	-	86.94	27.52	14.04	27.83	115	311	P	H
	*	2440	99.51	-	-	85.78	27.52	14.04	27.83	115	311	A	H
		2498.04	55	-19	74	41.23	27.5	14.09	27.82	115	311	P	H
		2485.37	46.46	-7.54	54	32.7	27.5	14.08	27.82	115	311	A	H
		2377.48	54.99	-19.01	74	41.2	27.65	13.98	27.84	397	11	P	V
		2379.02	46.58	-7.42	54	32.8	27.64	13.98	27.84	397	11	A	V
	*	2440	96.65	-	-	82.92	27.52	14.04	27.83	397	11	P	V
	*	2440	95.09	-	-	81.36	27.52	14.04	27.83	397	11	A	V
		2490.41	54.24	-19.76	74	40.48	27.5	14.08	27.82	397	11	P	V
		2483.83	46.78	-7.22	54	33.02	27.5	14.08	27.82	397	11	A	V

BLE CH 39 2480MHz	*	2480	99.25	-	-	85.5	27.5	14.07	27.82	115	304	P	H
	*	2480	98.82	-	-	85.07	27.5	14.07	27.82	115	304	A	H
		2490.84	54.86	-19.14	74	41.1	27.5	14.08	27.82	115	304	P	H
		2483.72	47.08	-6.92	54	33.32	27.5	14.08	27.82	115	304	A	H
													H
													H
	*	2480	94.34	-	-	80.59	27.5	14.07	27.82	378	13	P	V
	*	2480	92.79	-	-	79.04	27.5	14.07	27.82	378	13	A	V
		2490.84	54.74	-19.26	74	40.98	27.5	14.08	27.82	378	13	P	V
		2498.84	47.1	-6.9	54	33.33	27.5	14.09	27.82	378	13	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

BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	38.81	-35.19	74	58.21	31.11	6.98	57.49	100	0	P	H
													H
													H
													H
		4804	38.59	-35.41	74	57.99	31.11	6.98	57.49	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	37.92	-36.08	74	57.06	31.2	6.99	57.33	100	0	P	H
		7320	43.84	-30.16	74	55.86	36.76	8.32	57.1	100	0	P	H
													H
													H
		4880	37.42	-36.58	74	56.56	31.2	6.99	57.33	100	0	P	V
		7320	43.84	-30.16	74	55.86	36.76	8.32	57.1	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	39.03	-34.97	74	57.77	31.42	7	57.16	100	0	P	H
		7440	43.99	-30.01	74	56.12	36.82	8.33	57.28	100	0	P	H
													H
													H
		4960	39.15	-34.85	74	57.89	31.42	7	57.16	100	0	P	V
		7440	44.17	-29.83	74	56.3	36.82	8.33	57.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		119.24	28.1	-15.4	43.5	41.74	17.55	0.96	32.15	-	-	P	H
		263.77	32.5	-13.5	46	43.42	19.79	1.4	32.11	-	-	P	H
		504.33	33.05	-12.95	46	39.61	24.02	1.93	32.51	-	-	P	H
		551.86	36.19	-9.81	46	41.02	25.58	1.99	32.4	100	0	P	H
		600.36	34.06	-11.94	46	38.78	25.5	2.07	32.29	-	-	P	H
		943.74	32.32	-13.68	46	30.55	30.17	2.68	31.08	-	-	P	H
													H
													H
													H
													H
													H
													H
		30.97	24.56	-15.44	40	32.1	24.21	0.48	32.23	-	-	P	V
		119.24	28.34	-15.16	43.5	41.98	17.55	0.96	32.15	-	-	P	V
		504.33	29.34	-16.66	46	35.9	24.02	1.93	32.51	-	-	P	V
		551.86	31.92	-14.08	46	36.75	25.58	1.99	32.4	-	-	P	V
		666.32	30.53	-15.47	46	33.93	26.26	2.19	31.85	-	-	P	V
		943.74	31.98	-14.02	46	30.21	30.17	2.68	31.08	100	0	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

<Ant. 7>

<1Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2374.68	54.41	-19.59	74	40.63	27.65	13.98	27.85	212	50	P	H
		2377.725	45.24	-8.76	54	31.46	27.64	13.98	27.84	212	50	A	H
	*	2402	96.93	-	-	83.17	27.6	14	27.84	212	50	P	H
	*	2402	96.41	-	-	82.65	27.6	14	27.84	212	50	A	H
													H
													H
		2349.48	54.83	-19.17	74	41.03	27.7	13.95	27.85	146	79	P	V
		2360.925	45.35	-8.65	54	31.56	27.68	13.96	27.85	146	79	A	V
	*	2402	96.58	-	-	82.82	27.6	14	27.84	146	79	P	V
	*	2402	96.05	-	-	82.29	27.6	14	27.84	146	79	A	V
													V
													V
BLE CH 19 2440MHz		2331	54.72	-19.28	74	40.9	27.74	13.93	27.85	327	47	P	H
		2322.32	45.34	-8.66	54	31.51	27.76	13.93	27.86	327	47	A	H
	*	2440	99.22	-	-	85.49	27.52	14.04	27.83	327	47	P	H
	*	2440	98.48	-	-	84.75	27.52	14.04	27.83	327	47	A	H
		2485.58	54.54	-19.46	74	40.78	27.5	14.08	27.82	327	47	P	H
		2484.11	45.49	-8.51	54	31.73	27.5	14.08	27.82	327	47	A	H
		2358.16	55.58	-18.42	74	41.79	27.68	13.96	27.85	100	122	P	V
		2313.36	45.16	-8.84	54	31.33	27.77	13.92	27.86	100	122	A	V
	*	2440	99.28	-	-	85.55	27.52	14.04	27.83	100	122	P	V
	*	2440	98.47	-	-	84.74	27.52	14.04	27.83	100	122	A	V
		2499.93	54.24	-19.76	74	40.47	27.5	14.09	27.82	100	122	P	V
		2498.11	45.36	-8.64	54	31.59	27.5	14.09	27.82	100	122	A	V

BLE CH 39 2480MHz	*	2480	99.47	-	-	85.72	27.5	14.07	27.82	250	54	P	H
	*	2480	98.94	-	-	85.19	27.5	14.07	27.82	250	54	A	H
		2486.2	54.63	-19.37	74	40.87	27.5	14.08	27.82	250	54	P	H
		2493.72	45.18	-8.82	54	31.42	27.5	14.08	27.82	250	54	A	H
													H
													H
	*	2480	100.61	-	-	86.86	27.5	14.07	27.82	100	115	P	V
	*	2480	100.18	-	-	86.43	27.5	14.07	27.82	100	115	A	V
		2494.96	54.72	-19.28	74	40.95	27.5	14.09	27.82	100	115	P	V
		2484	45.32	-8.68	54	31.56	27.5	14.08	27.82	100	115	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

BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	38.25	-35.75	74	57.65	31.11	6.98	57.49	100	0	P	H
													H
													H
													H
		4804	38.7	-35.3	74	58.1	31.11	6.98	57.49	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	37.53	-36.47	74	56.67	31.2	6.99	57.33	100	0	P	H
		7320	44.24	-29.76	74	56.26	36.76	8.32	57.1	100	0	P	H
													H
													H
		4880	38.06	-35.94	74	57.2	31.2	6.99	57.33	100	0	P	V
		7320	44.1	-29.9	74	56.12	36.76	8.32	57.1	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	38.82	-35.18	74	57.56	31.42	7	57.16	100	0	P	H
		7440	44.25	-29.75	74	56.38	36.82	8.33	57.28	100	0	P	H
													H
													H
		4960	38.48	-35.52	74	57.22	31.42	7	57.16	100	0	P	V
		7440	43.77	-30.23	74	55.9	36.82	8.33	57.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

<2Mbps>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		2371.845	54.14	-19.86	74	40.36	27.66	13.97	27.85	277	52	P	H
		2337.3	46.89	-7.11	54	33.07	27.73	13.94	27.85	277	52	A	H
	*	2402	98.04	-	-	84.28	27.6	14	27.84	277	52	P	H
	*	2402	96.89	-	-	83.13	27.6	14	27.84	277	52	A	H
													H
													H
		2336.04	54.39	-19.61	74	40.57	27.73	13.94	27.85	144	81	P	V
		2318.82	47.4	-6.6	54	33.58	27.76	13.92	27.86	144	81	A	V
	*	2402	96.91	-	-	83.15	27.6	14	27.84	144	81	P	V
	*	2402	95.52	-	-	81.76	27.6	14	27.84	144	81	A	V
													V
													V
BLE CH 19 2440MHz		2381.26	54.01	-19.99	74	40.23	27.64	13.98	27.84	236	47	P	H
		2313.22	46.91	-7.09	54	33.08	27.77	13.92	27.86	236	47	A	H
	*	2440	99.33	-	-	85.6	27.52	14.04	27.83	236	47	P	H
	*	2440	97.9	-	-	84.17	27.52	14.04	27.83	236	47	A	H
		2487.12	54.43	-19.57	74	40.67	27.5	14.08	27.82	236	47	P	H
		2494.96	46.92	-7.08	54	33.15	27.5	14.09	27.82	236	47	A	H
		2368.94	54.7	-19.3	74	40.92	27.66	13.97	27.85	100	79	P	V
		2312.24	46.7	-7.3	54	32.86	27.78	13.92	27.86	100	79	A	V
	*	2440	98.58	-	-	84.85	27.52	14.04	27.83	100	79	P	V
	*	2440	97.14	-	-	83.41	27.52	14.04	27.83	100	79	A	V
		2497.27	54.24	-19.76	74	40.47	27.5	14.09	27.82	100	79	P	V
		2491.18	46.62	-7.38	54	32.86	27.5	14.08	27.82	100	79	A	V

BLE CH 39 2480MHz	*	2480	100.65	-	-	86.9	27.5	14.07	27.82	260	47	P	H
	*	2480	99.11	-	-	85.36	27.5	14.07	27.82	260	47	A	H
		2488.28	54.66	-19.34	74	40.9	27.5	14.08	27.82	260	47	P	H
		2490.44	47.23	-6.77	54	33.47	27.5	14.08	27.82	260	47	A	H
													H
													H
	*	2480	99.94	-	-	86.19	27.5	14.07	27.82	100	82	P	V
	*	2480	98.65	-	-	84.9	27.5	14.07	27.82	100	82	A	V
		2497.4	54.98	-19.02	74	41.21	27.5	14.09	27.82	100	82	P	V
		2494.6	47.4	-6.6	54	33.63	27.5	14.09	27.82	100	82	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

BLE (Harmonic @ 3m)

BLE	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)
BLE CH 00 2402MHz		4804	37.84	-36.16	74	57.24	31.11	6.98	57.49	100	0	P	H
													H
													H
													H
		4804	38.08	-35.92	74	57.48	31.11	6.98	57.49	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	38.61	-35.39	74	57.75	31.2	6.99	57.33	100	0	P	H
		7320	43.5	-30.5	74	55.52	36.76	8.32	57.1	100	0	P	H
													H
													H
		4880	37.5	-36.5	74	56.64	31.2	6.99	57.33	100	0	P	V
		7320	43.52	-30.48	74	55.54	36.76	8.32	57.1	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	39.1	-34.9	74	57.84	31.42	7	57.16	100	0	P	H
		7440	43.31	-30.69	74	55.44	36.82	8.33	57.28	100	0	P	H
													H
													H
		4960	39.23	-34.77	74	57.97	31.42	7	57.16	100	0	P	V
		7440	44.09	-29.91	74	56.22	36.82	8.33	57.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		118.27	28.63	-14.87	43.5	42.35	17.47	0.96	32.15	-	-	P	H
		263.77	32.57	-13.43	46	43.49	19.79	1.4	32.11	-	-	P	H
		504.33	32.29	-13.71	46	38.85	24.02	1.93	32.51	-	-	P	H
		551.86	36.5	-9.5	46	41.33	25.58	1.99	32.4	100	0	P	H
		600.36	34.68	-11.32	46	39.4	25.5	2.07	32.29	-	-	P	H
		941.8	32.87	-13.13	46	31.25	30.04	2.68	31.1	-	-	P	H
													H
													H
													H
													H
													H
													H
		30.97	24.52	-15.48	40	32.06	24.21	0.48	32.23	-	-	P	V
		118.27	27.87	-15.63	43.5	41.59	17.47	0.96	32.15	-	-	P	V
		332.64	27.02	-18.98	46	37.45	19.88	1.57	31.88	-	-	P	V
		504.33	30.56	-15.44	46	37.12	24.02	1.93	32.51	-	-	P	V
		551.86	32.29	-13.71	46	37.12	25.58	1.99	32.4	100	0	P	V
		949.56	32.19	-13.81	46	30.01	30.5	2.69	31.01	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

<WPC Charging Mode>

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 39 2480MHz	*	2480	92.41	-	-	78.66	27.5	14.07	27.82	253	231	P	H
	*	2480	91.01	-	-	77.26	27.5	14.07	27.82	253	231	A	H
		2484.24	54.55	-19.45	74	40.79	27.5	14.08	27.82	253	231	P	H
		2496.48	46.66	-7.34	54	32.89	27.5	14.09	27.82	253	231	A	H
													H
													H
	*	2480	92.73	-	-	78.98	27.5	14.07	27.82	372	150	P	V
	*	2480	91.53	-	-	77.78	27.5	14.07	27.82	372	150	A	V
		2493.28	54.32	-19.68	74	40.56	27.5	14.08	27.82	372	150	P	V
		2486.68	46.62	-7.38	54	32.86	27.5	14.08	27.82	372	150	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

BLE (Harmonic @ 3m)

BLE	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)
BLE CH 39 2480MHz		4960	37.87	-36.13	74	56.61	31.42	7	57.16	100	0	P	H
		7440	43.35	-30.65	74	55.48	36.82	8.33	57.28	100	0	P	H
													H
													H
		4960	38.1	-35.9	74	56.84	31.42	7	57.16	100	0	P	V
		7440	43.22	-30.78	74	55.35	36.82	8.33	57.28	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BLE (LF)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz BLE LF		138.64	26.01	-17.49	43.5	39.46	17.71	1.03	32.19	-	-	P	H
		263.77	31.11	-14.89	46	42.03	19.79	1.4	32.11	-	-	P	H
		332.64	27.95	-18.05	46	38.38	19.88	1.57	31.88	-	-	P	H
		551.86	35.19	-10.81	46	40.02	25.58	1.99	32.4	100	0	P	H
		600.36	32.78	-13.22	46	37.5	25.5	2.07	32.29	-	-	P	H
		949.56	32.41	-13.59	46	30.23	30.5	2.69	31.01	-	-	P	H
													H
													H
													H
													H
													H
													H
		30.97	27.64	-12.36	40	35.18	24.21	0.48	32.23	100	0	P	V
		171.62	27.83	-15.67	43.5	43.34	15.58	1.16	32.25	-	-	P	V
		331.67	29.53	-16.47	46	39.99	19.85	1.57	31.88	-	-	P	V
		504.33	29.86	-16.14	46	36.42	24.02	1.93	32.51	-	-	P	V
		733.25	31.41	-14.59	46	33.09	27.73	2.33	31.74	-	-	P	V
		954.41	32.05	-13.95	46	29.61	30.68	2.7	30.94	-	-	P	V
													V
													V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE 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 :	Daniel Lee, Jacky Hong and Wilson Wu	**Temperature :**	20~25°C
		Relative Humidity :	50~60%

Note symbol

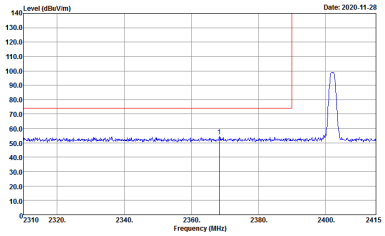
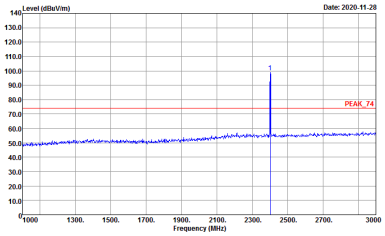
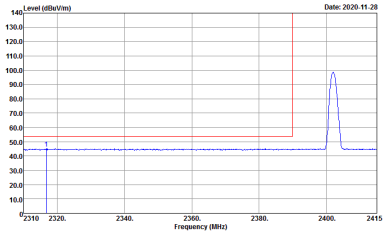
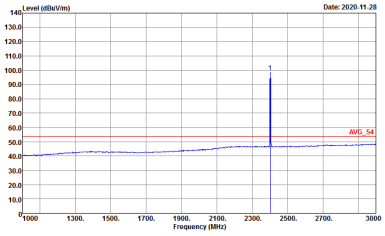
-L	**Low channel location**
-R	**High channel location**

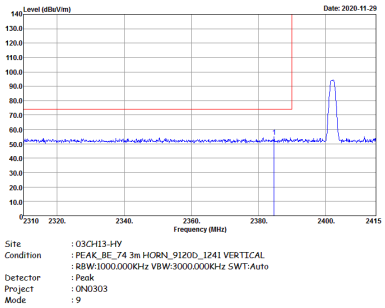
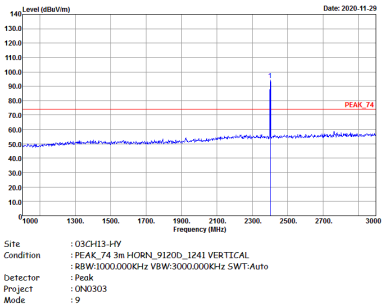
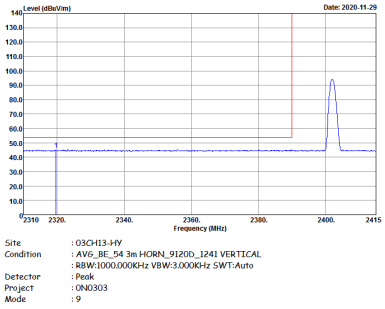
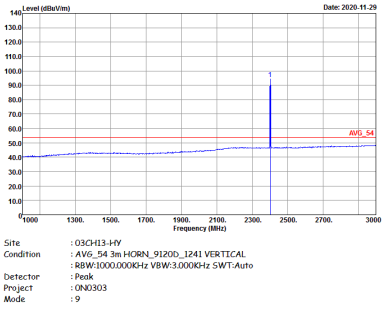
<Ant. 5>

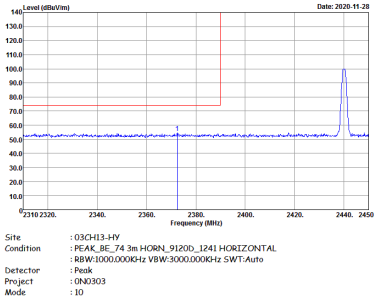
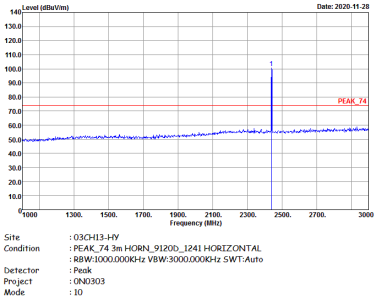
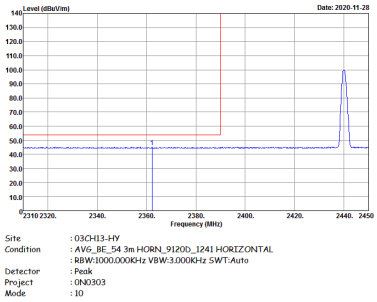
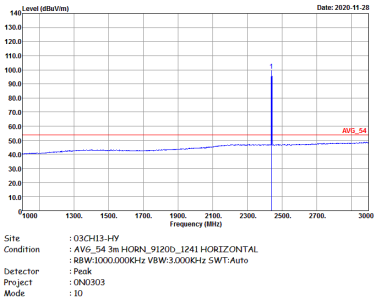
<1Mbps>

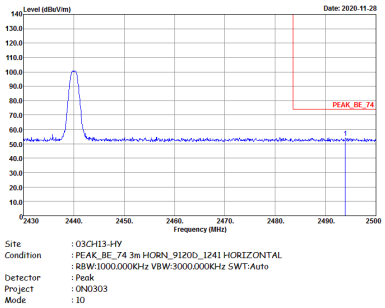
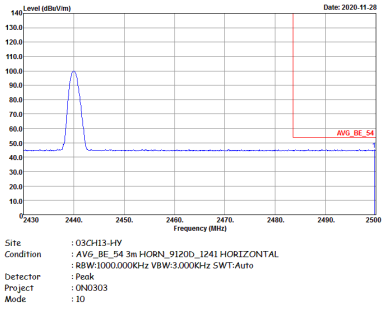
2.4GHz 2400~2483.5MHz

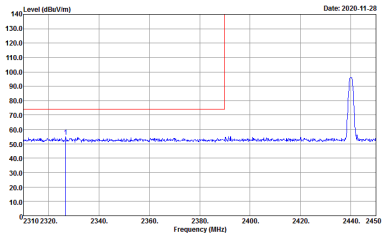
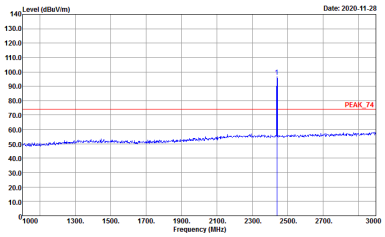
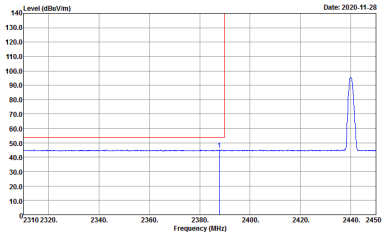
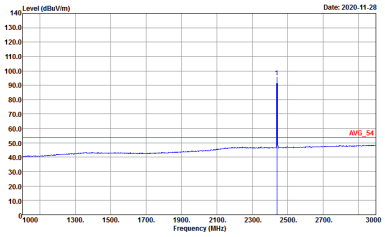
BLE (Band Edge @ 3m)

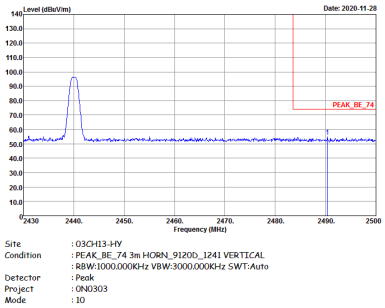
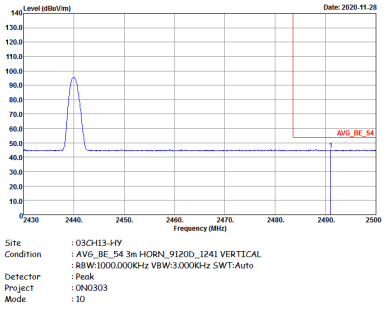
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 9	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 9
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 9	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 9

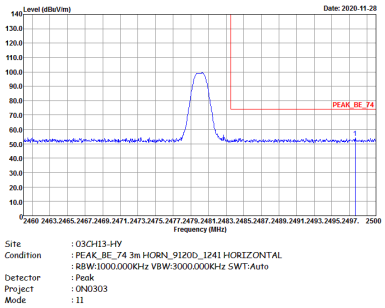
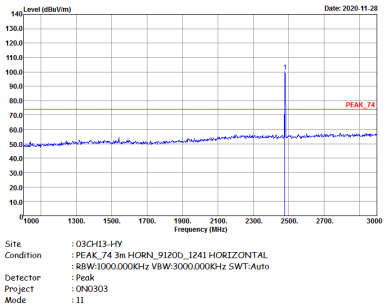
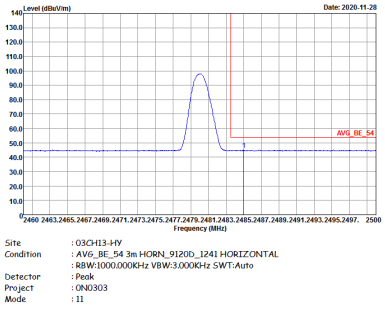
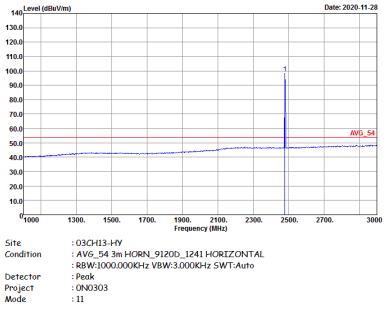
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak		
Avg		

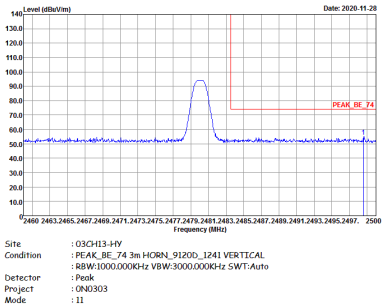
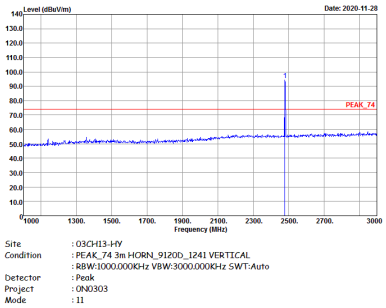
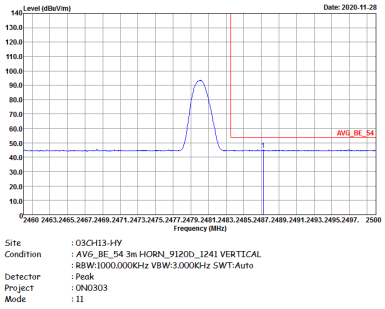
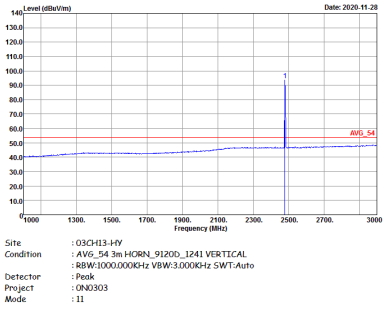
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak		
Avg.		

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak		
Avg.		

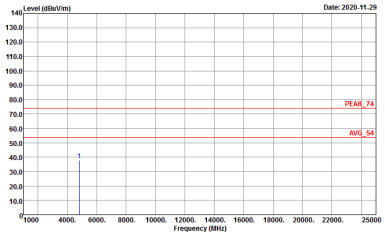
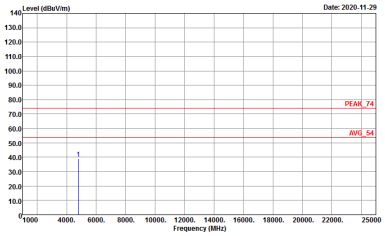
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

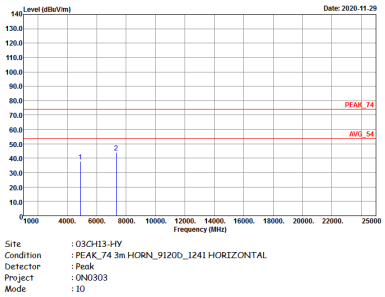
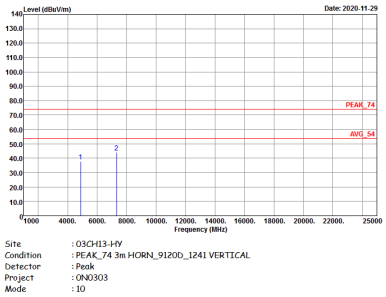
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak		
Avg.		

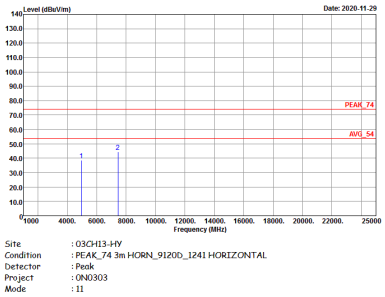
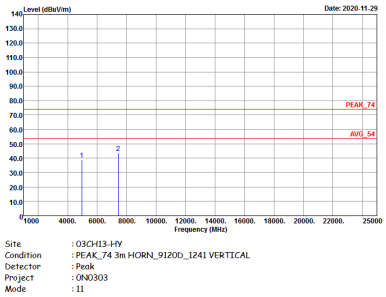
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 9	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 9

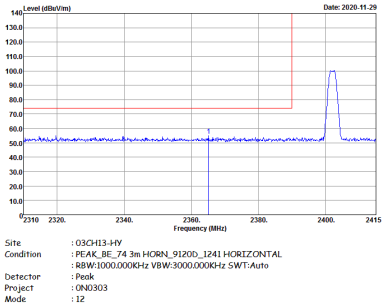
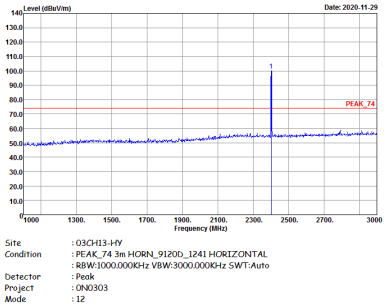
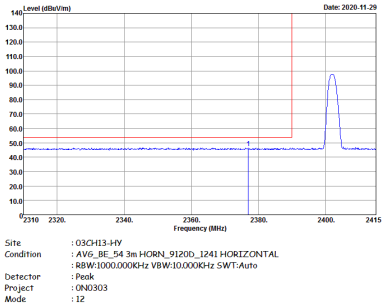
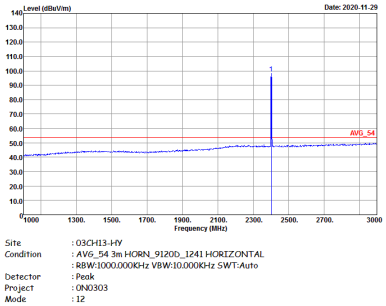
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.		

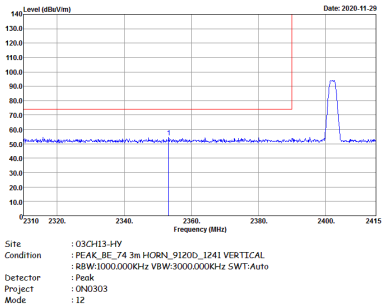
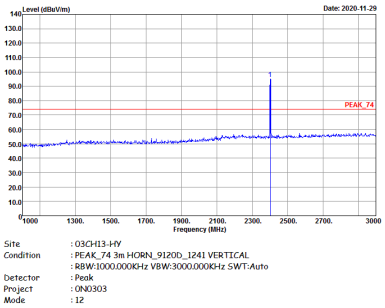
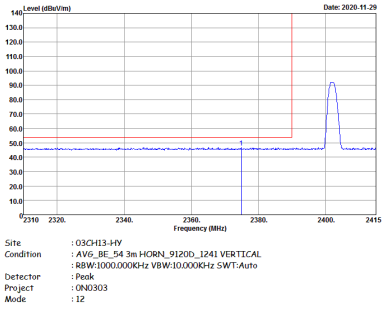
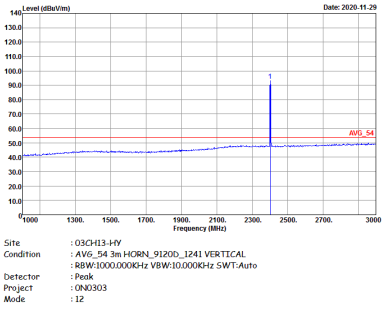
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak		

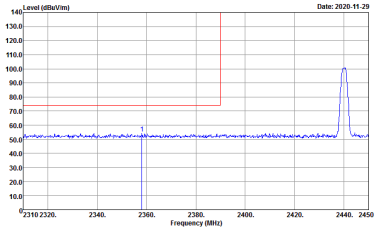
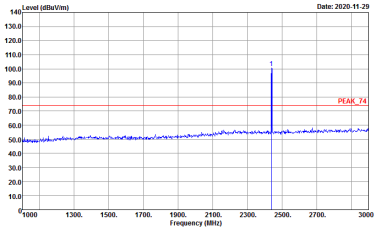
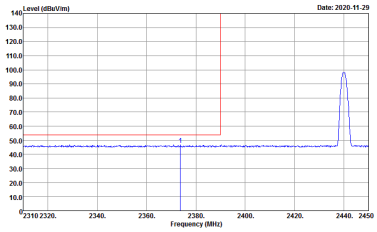
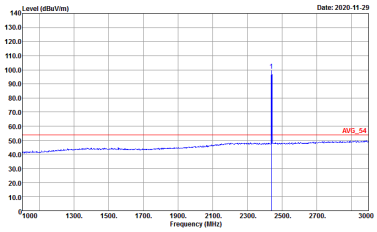
<2Mbps>

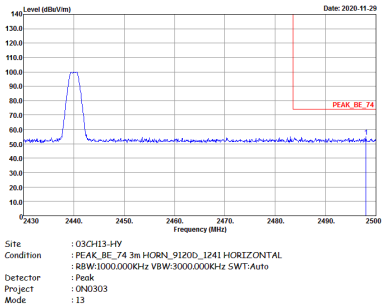
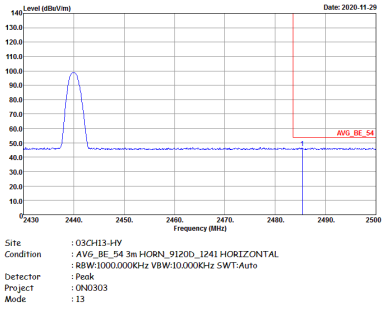
2.4GHz 2400~2483.5MHz

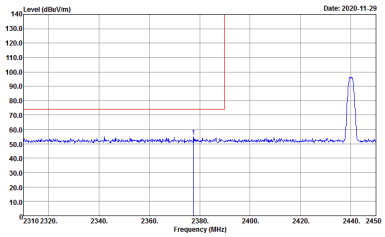
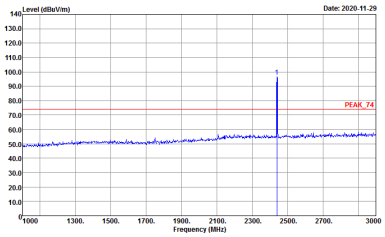
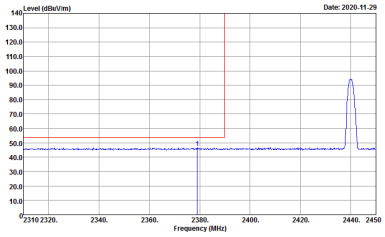
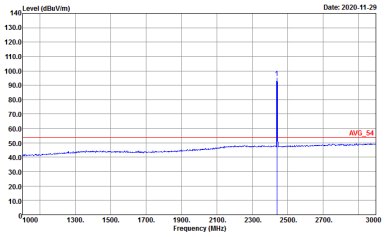
BLE (Band Edge @ 3m)

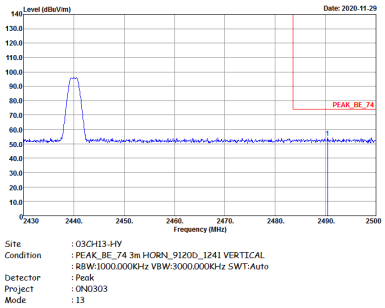
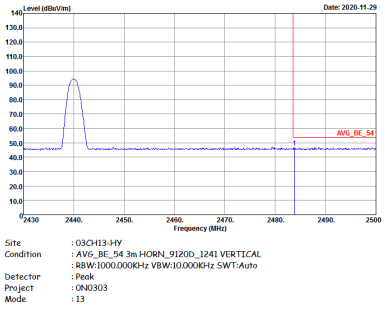
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak		
Avg.		

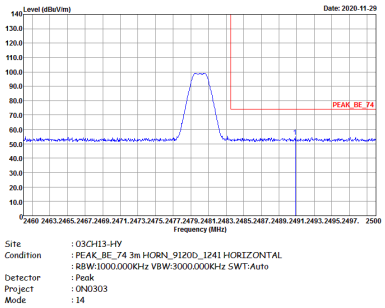
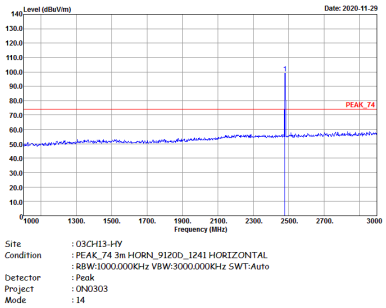
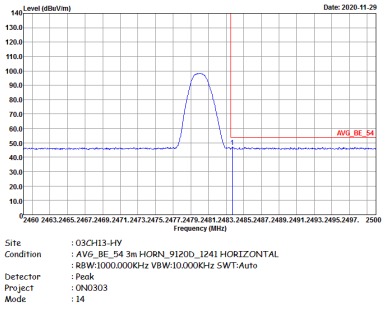
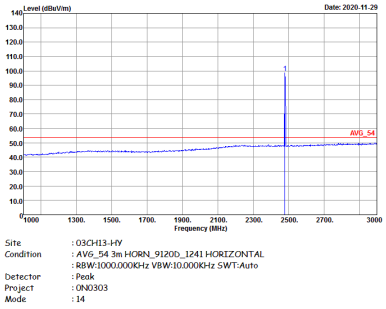
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak		
Avg		

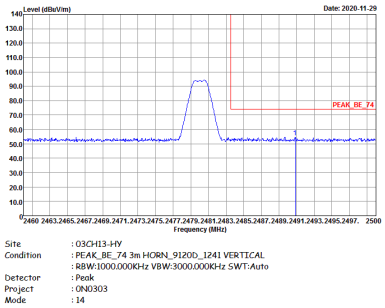
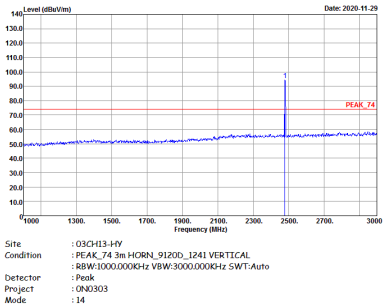
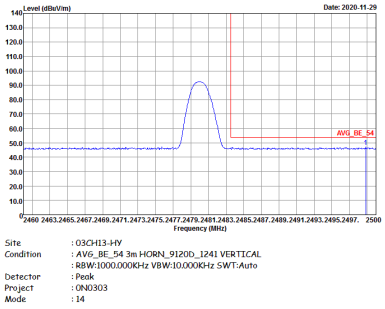
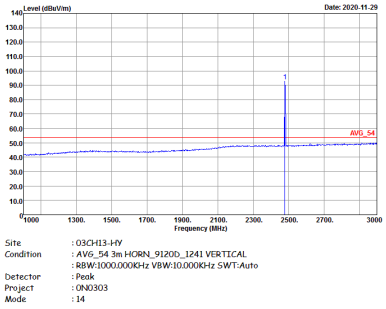
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 13	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 13
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 13	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 13

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak		
Avg.		

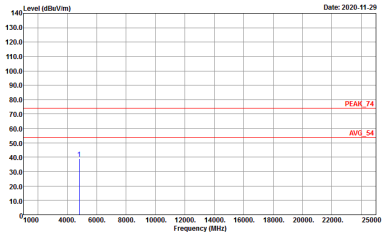
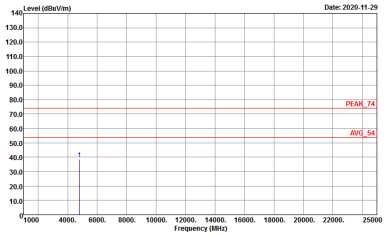
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

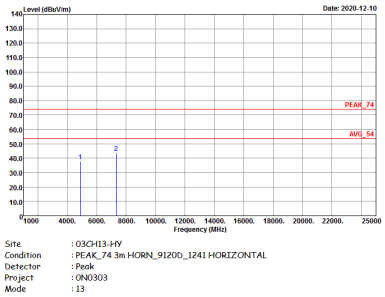
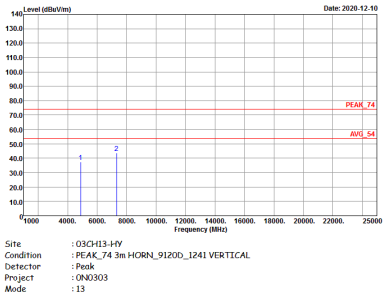
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak		
Avg.		

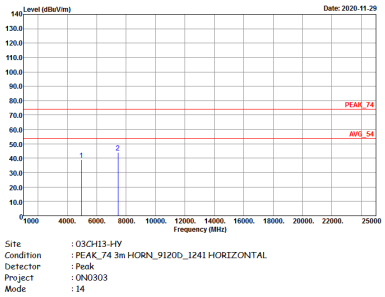
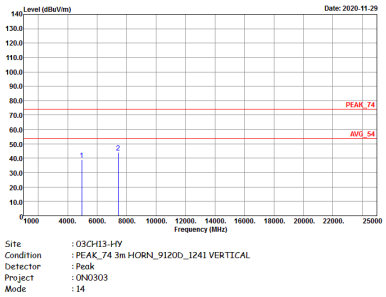
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak		
Avg.		

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

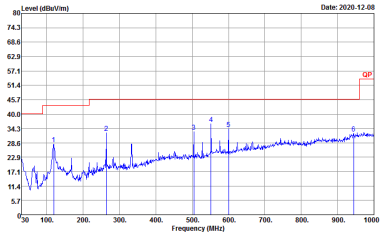
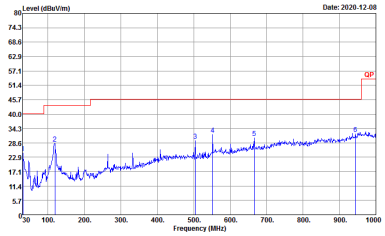
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 12	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 12

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.		

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak		

Emission below 1GHz

2.4GHz BLE (LF)

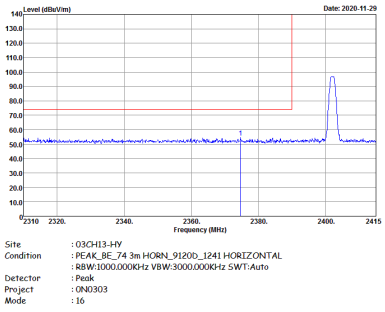
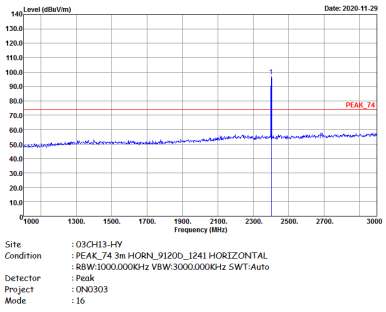
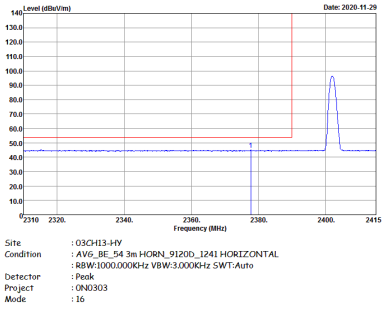
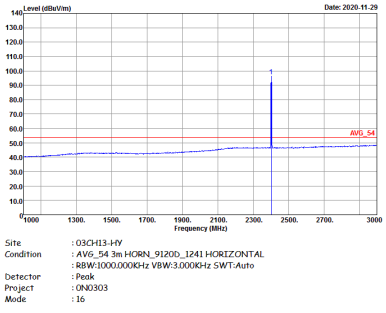
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH13-HY Condition : QP 3m BILOG_40103 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 15	 Site : 03CH13-HY Condition : QP 3m BILOG_40103 VERTICAL Detector : Peak Project : 0N0303 Mode : 15

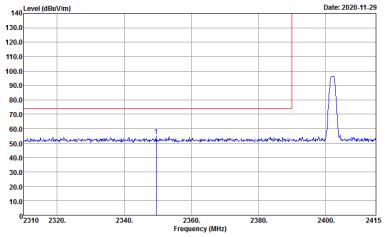
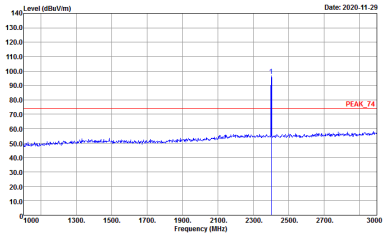
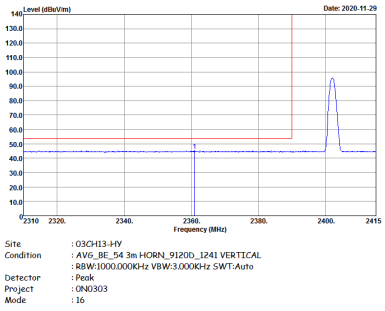
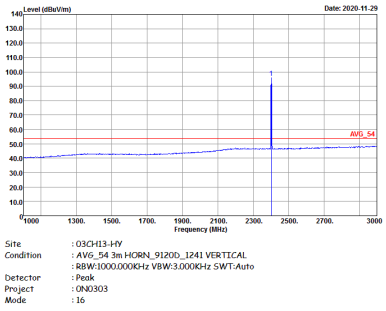
<Ant. 7>

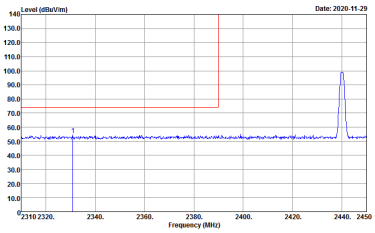
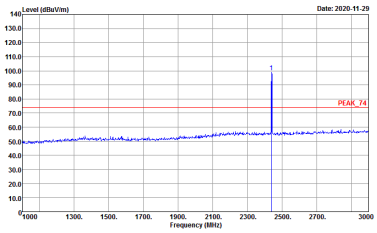
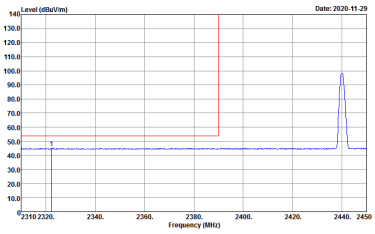
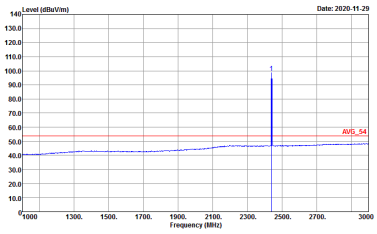
<1Mbps>

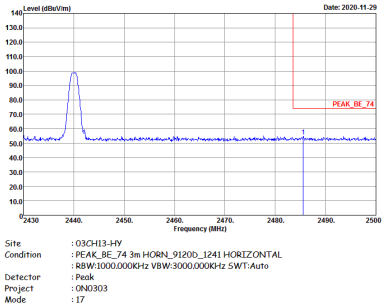
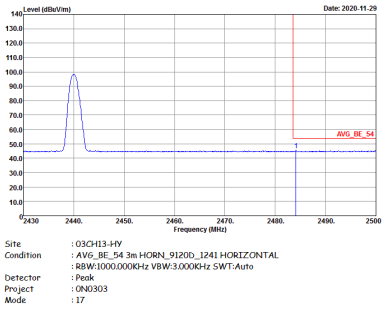
2.4GHz 2400~2483.5MHz

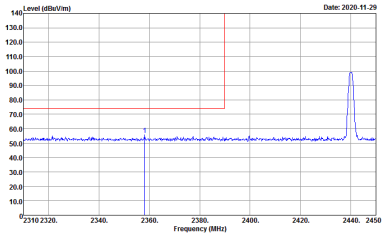
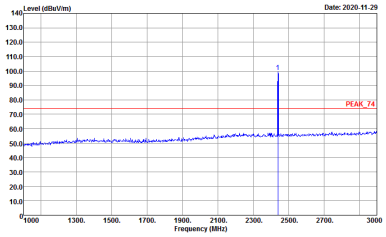
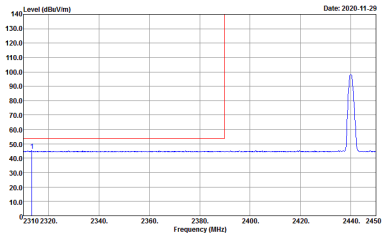
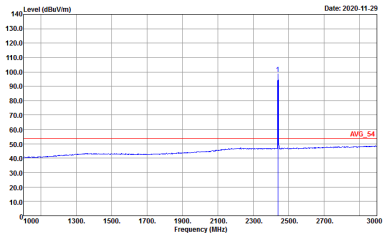
BLE (Band Edge @ 3m)

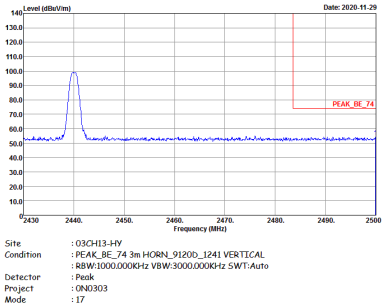
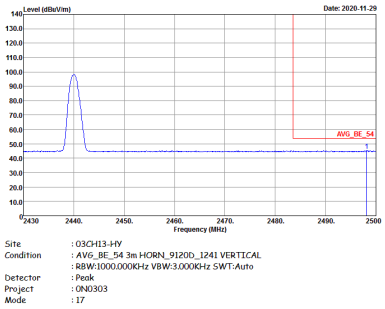
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak		
Avg.		

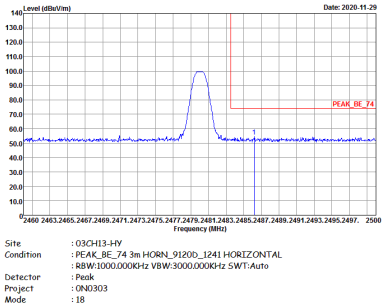
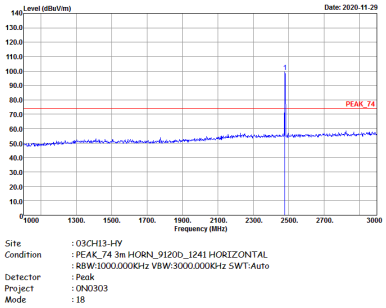
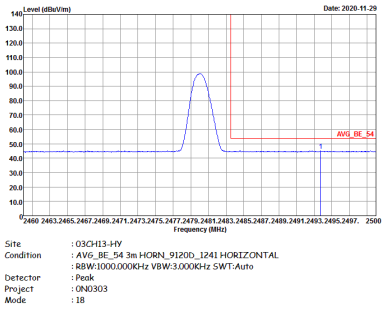
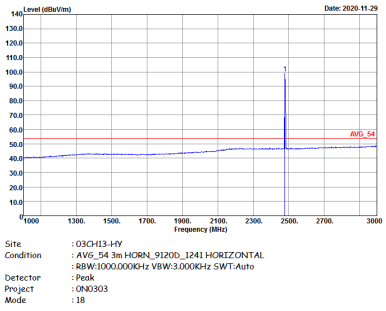
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak		
Avg		

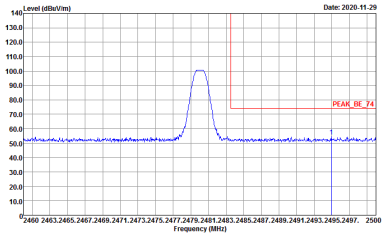
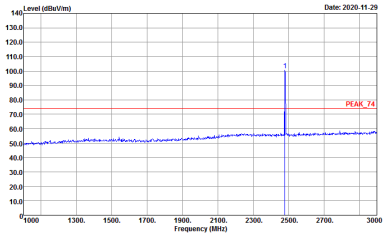
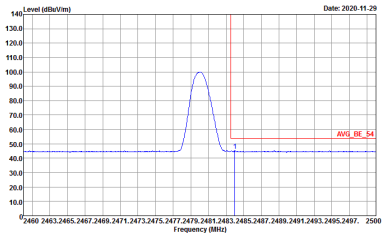
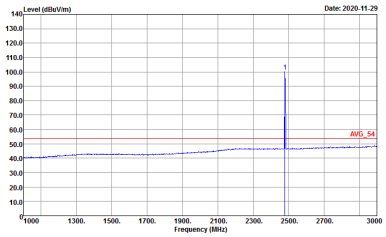
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 17

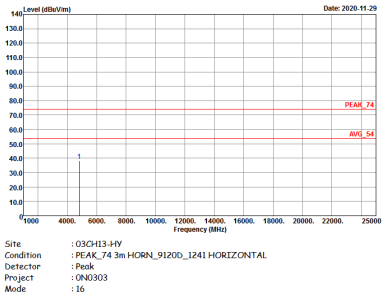
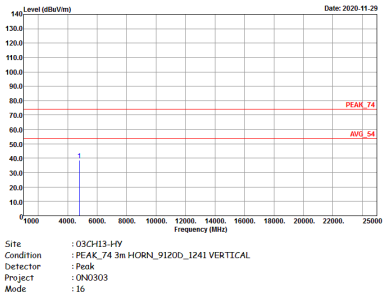
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

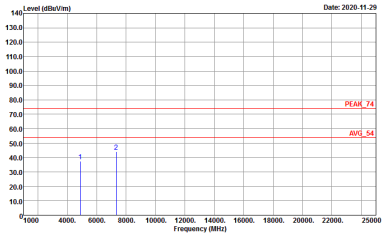
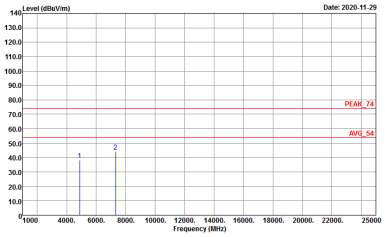
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak		
Avg.		

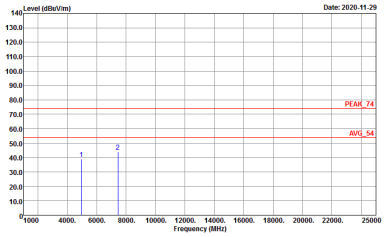
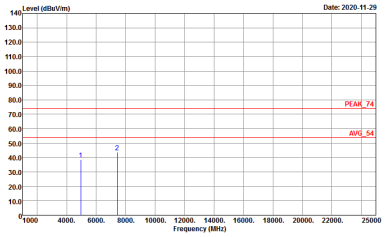
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 18	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 18
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 18	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 18

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 16	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 16

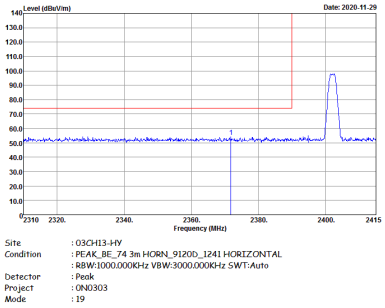
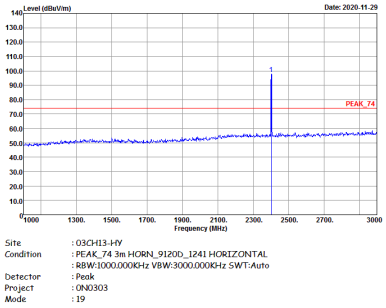
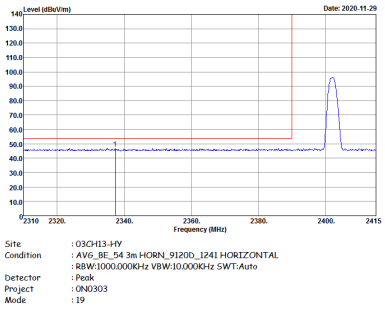
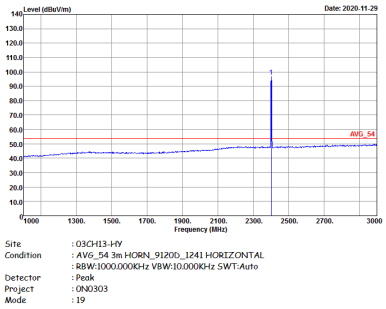
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 17	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 17

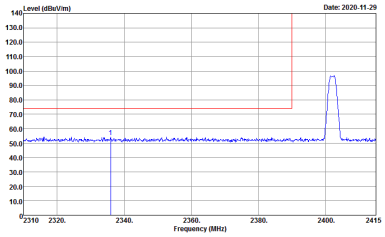
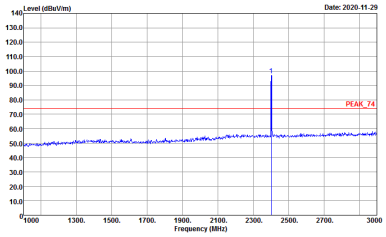
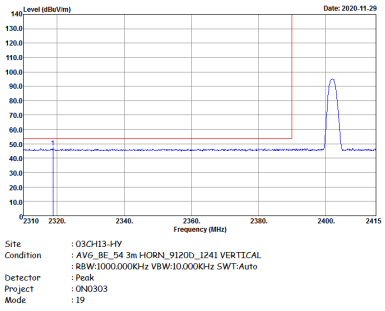
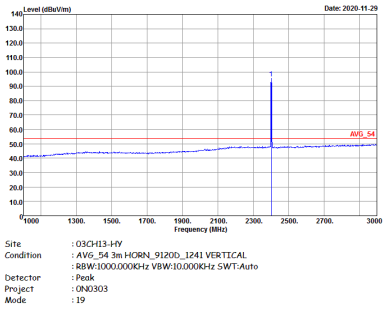
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 18	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 18

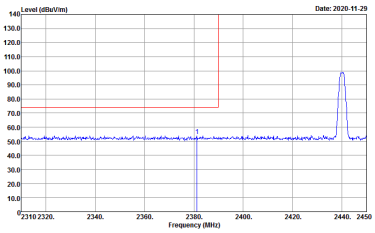
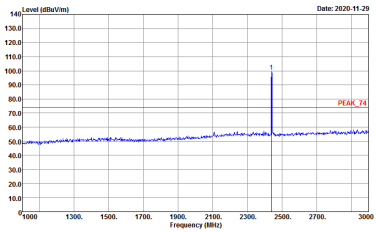
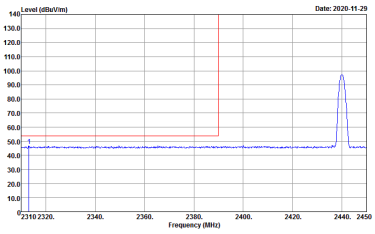
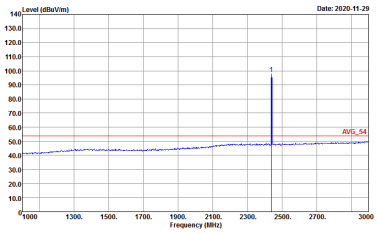
<2Mbps>

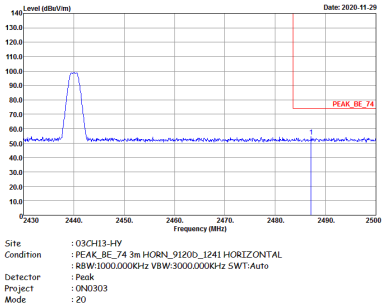
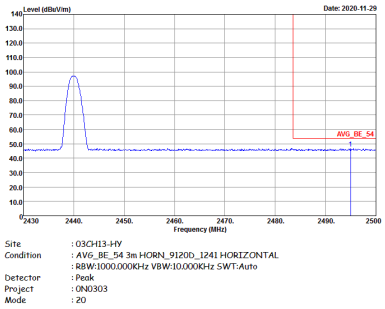
2.4GHz 2400~2483.5MHz

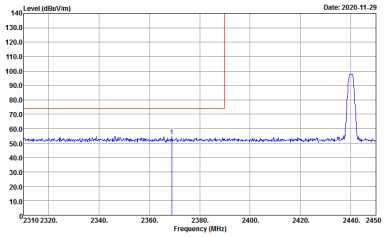
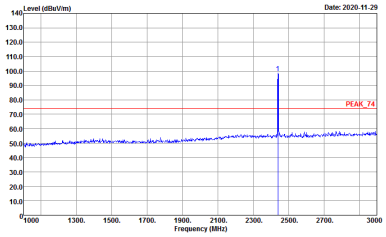
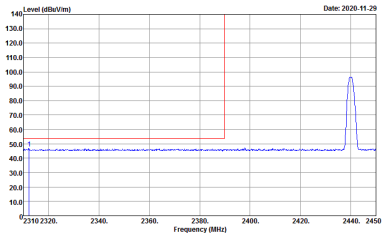
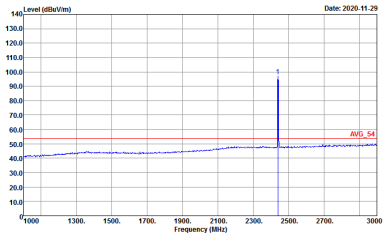
BLE (Band Edge @ 3m)

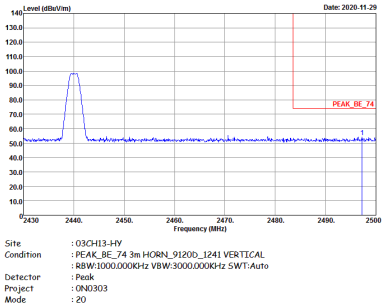
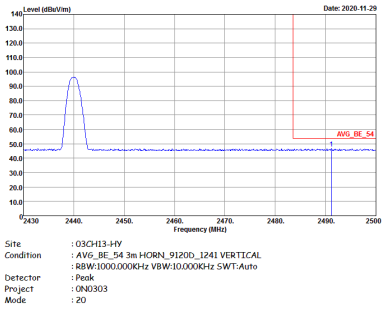
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Fundamental
Peak		
Avg.		

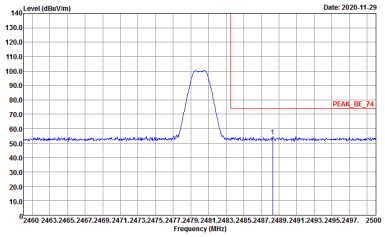
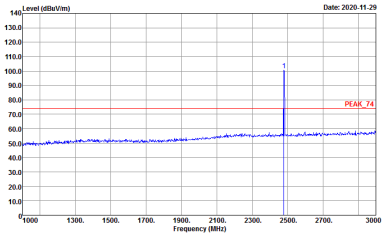
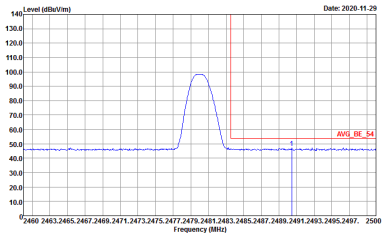
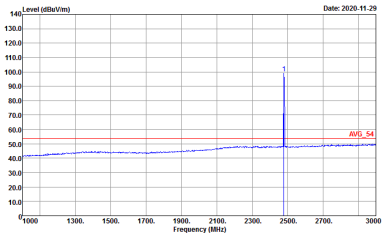
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH00 2402MHz	
	Vertical	Fundamental
Peak		
Avg		

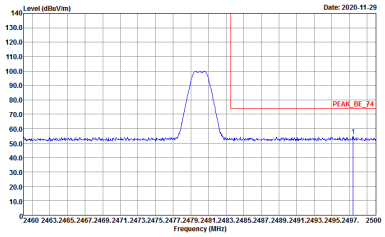
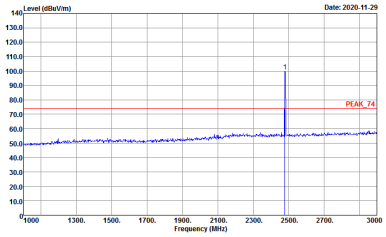
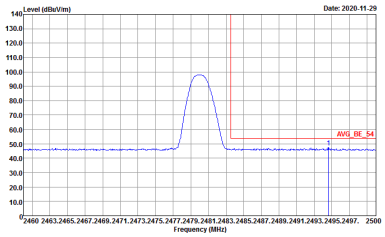
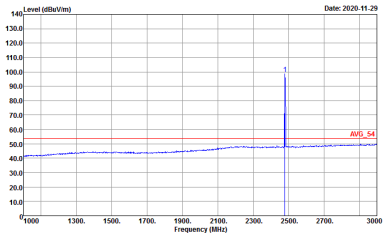
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 20	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 20
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 20	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 20

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Horizontal	Fundamental
Peak		Left blank
Avg.		Left blank

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - L	
	Vertical	Fundamental
Peak		
Avg.		

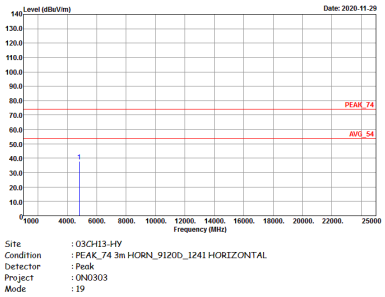
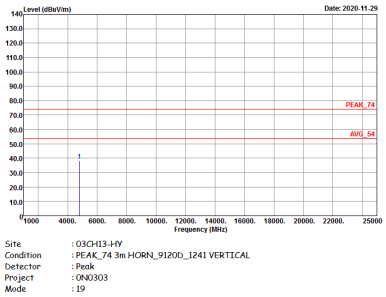
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH19 2440MHz - R	
	Vertical	Fundamental
Peak		Left blank
Avg.		Left blank

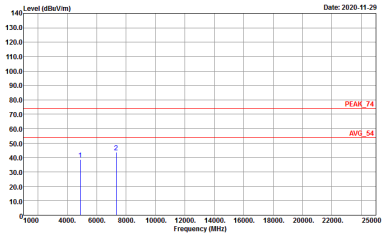
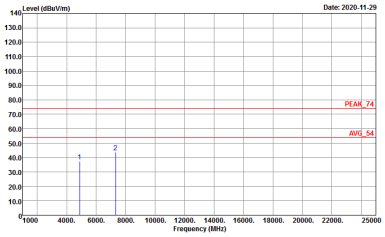
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 HORIZONTAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21

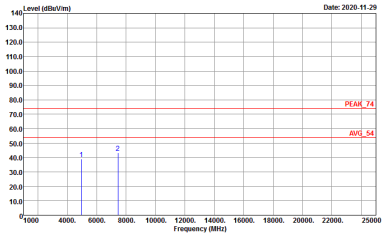
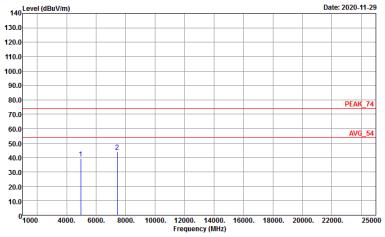
BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 21

2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

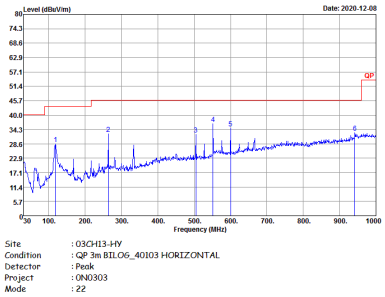
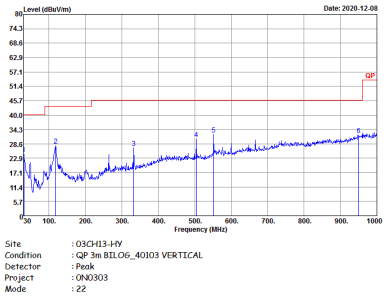
BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 19	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 19

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH19 2440MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : 20	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : 20

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 HORIZONTAL Detector : Peak Project : 0N0303 Mode : Z1	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL Detector : Peak Project : 0N0303 Mode : Z1

Emission below 1GHz

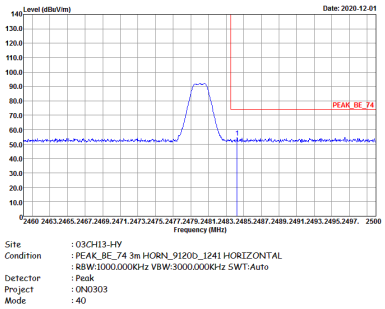
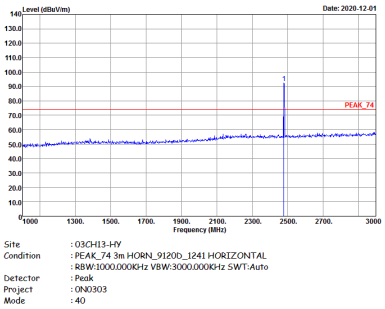
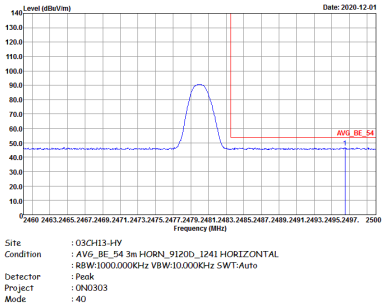
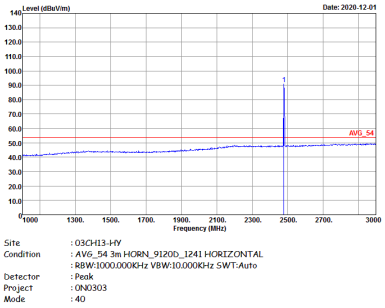
2.4GHz BLE (LF)

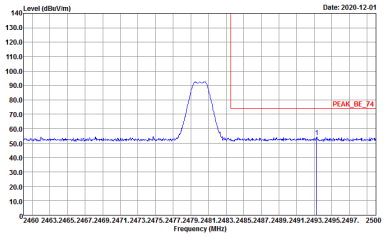
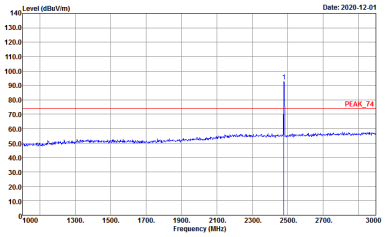
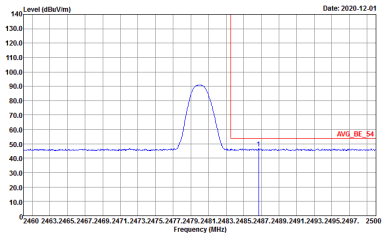
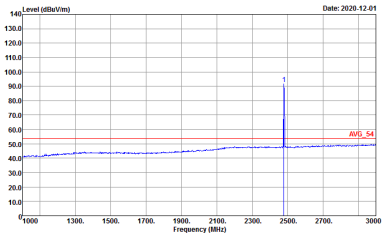
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak		

<WPC Charging Mode>

2.4GHz 2400~2483.5MHz

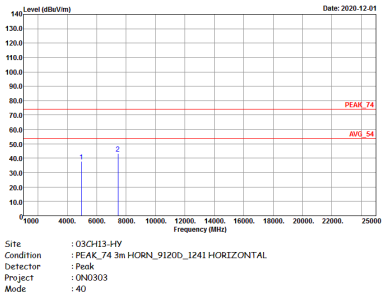
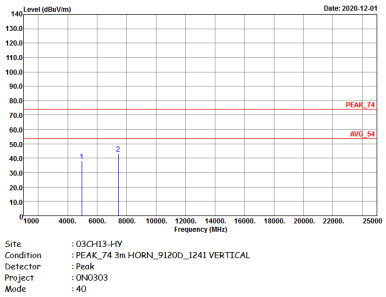
BLE (Band Edge @ 3m

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Fundamental
Peak		
Avg.		

BLE	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BLE CH39 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH13-HY Condition : PEAK_BE_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 40	 Site : 03CH13-HY Condition : PEAK_74 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 40
Avg.	 Site : 03CH13-HY Condition : AVG_BE_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 40	 Site : 03CH13-HY Condition : AVG_54 3m HORN_9120D_1241 VERTICAL : RBW:1000.000KHz VBW:10.000KHz SWT:Auto Detector : Peak Project : 0N0303 Mode : 40

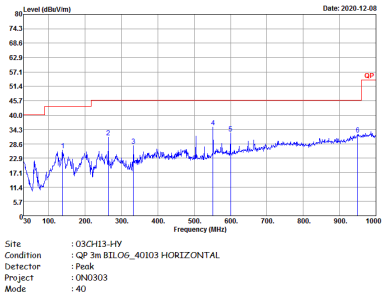
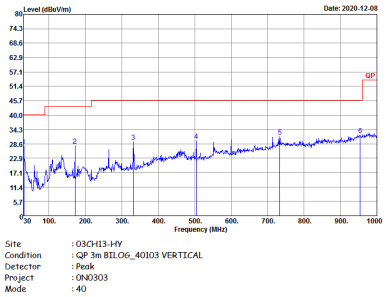
2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BLE CH39 2480MHz	
	Horizontal	Vertical
Peak		

Emission below 1GHz

2.4GHz BLE (LF)

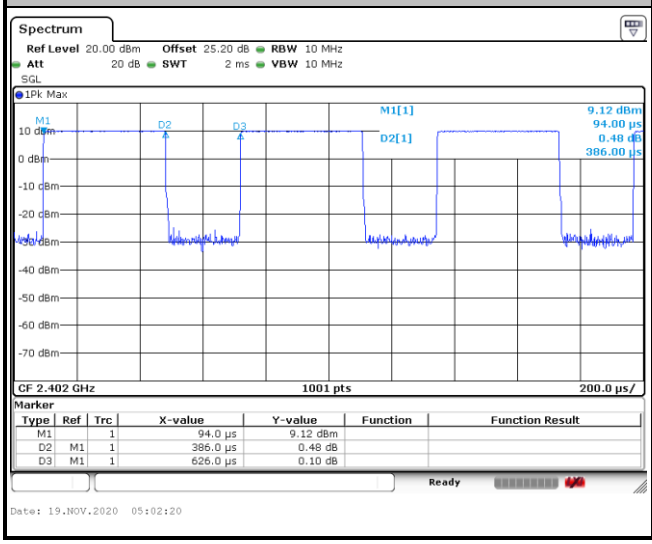
BLE	2.4GHz 2400~2483.5MHz	
	BLE LF	
	Horizontal	Vertical
QP / Peak		

Appendix E. Duty Cycle Plots

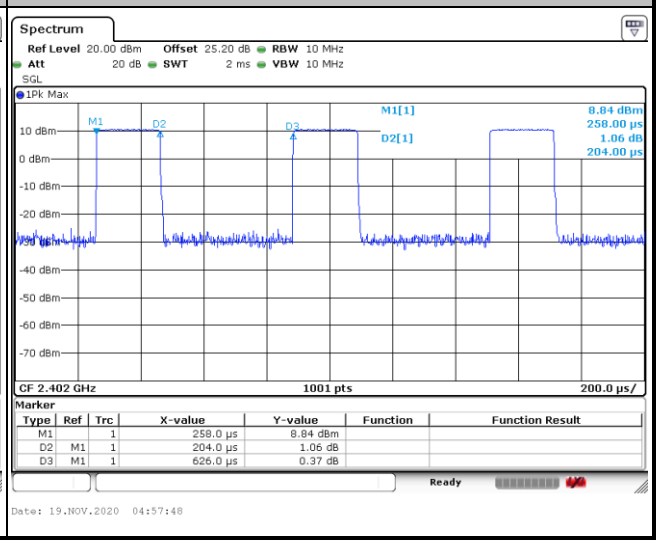
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
5	Bluetooth –LE for 1Mbps	61.66	386	2.59	3kHz	2.10
5	Bluetooth –LE for 2Mbps	32.59	204	4.90	10kHz	4.87
7	Bluetooth –LE for 1Mbps	61.98	388	2.58	3kHz	2.08
7	Bluetooth –LE for 2Mbps	32.27	202	4.95	10kHz	4.91

<Ant. 5>

Bluetooth – LE for 1Mbps

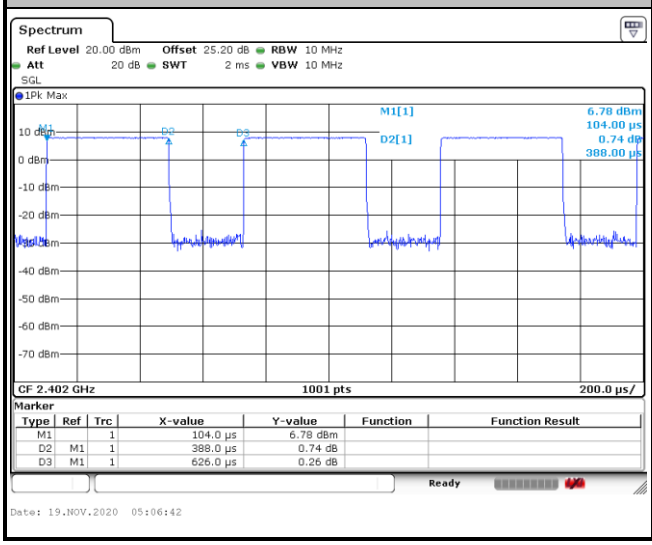
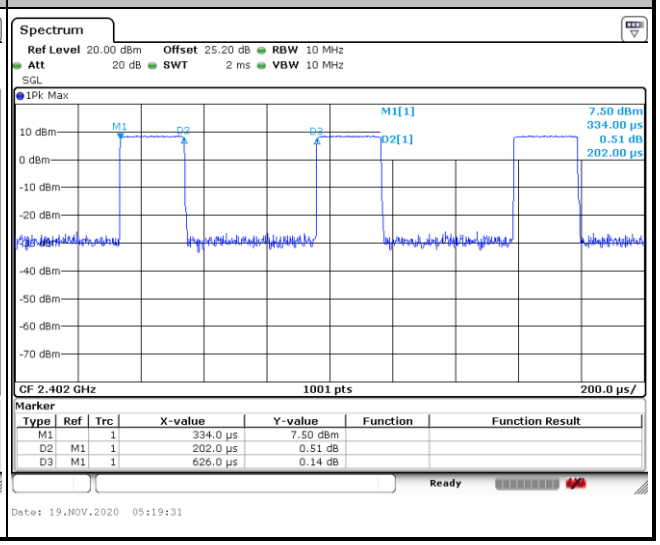


Bluetooth – LE for 2Mbps



<Ant. 7>

Bluetooth – LE for 1Mbps



Bluetooth – LE for 2Mbps