



Appendix C. Radiated Spurious Emission

Test Engineer :	Hao Hsu, Ken Wu, and Chuan Zhu	Temperature :	21~26°C
		Relative Humidity :	51~56%

2.4GHz 2400~2483.5MHz

BT 1Mbps (Band Edge @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH00 2402MHz		2332.26	44.91	-29.09	74	43.84	27.67	6.49	33.09	100	213	P	H
		2332.26	20.15	-33.85	54	-	-	-	-	-	-	A	H
	*	2402	95.74	-	-	94.92	27.4	6.59	33.17	100	213	P	H
	*	2402	70.98	-	-	-	-	-	-	-	-	A	H
													H
													H
		2367.33	44.6	-29.4	74	43.66	27.53	6.54	33.13	100	7	P	V
		2367.33	19.84	-34.16	54	-	-	-	-	-	-	A	V
	*	2402	102.39	-	-	101.57	27.4	6.59	33.17	100	7	P	V
	*	2402	77.63	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2369.92	43.6	-30.4	74	42.67	27.52	6.54	33.13	130	24	P	H
		2369.92	18.84	-35.16	54	-	-	-	-	-	-	A	H
	*	2441	93.85	-	-	93.13	27.32	6.62	33.22	130	24	P	H
	*	2441	69.09	-	-	-	-	-	-	-	-	A	H
		2497.83	43.9	-30.1	74	43.22	27.3	6.67	33.29	130	24	P	H
		2497.83	19.14	-34.86	54	-	-	-	-	-	-	A	H
		2365.44	44.13	-29.87	74	43.18	27.54	6.54	33.13	100	5	P	V
		2365.44	19.37	-34.63	54	-	-	-	-	-	-	A	V
	*	2441	101.53	-	-	100.81	27.32	6.62	33.22	100	5	P	V
	*	2441	76.77	-	-	-	-	-	-	-	-	A	V
		2487.61	44.24	-29.76	74	43.56	27.3	6.66	33.28	100	5	P	V
		2487.61	19.48	-34.52	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	93.57	-	-	92.89	27.3	6.65	33.27	101	24	P	H
	*	2480	68.81	-	-	-	-	-	-	-	-	A	H
		2484.52	44.28	-29.72	74	43.59	27.3	6.66	33.27	101	24	P	H
		2484.52	19.52	-34.48	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	100.35	-	-	99.67	27.3	6.65	33.27	123	360	P	V
	*	2480	75.59	-	-	-	-	-	-	-	-	A	V
		2483.52	51.05	-22.95	74	50.36	27.3	6.66	33.27	123	360	P	V
		2483.52	26.29	-27.71	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 1Mbps (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH 00 2402MHz		4804	38.18	-35.82	74	55.59	31.1	10.07	58.58	100	0	P	H
		4804	13.42	-40.58	54	-	-	-	-	-	-	A	H
													H
													H
		4804	38.66	-35.34	74	56.07	31.1	10.07	58.58	100	0	P	V
		4804	13.9	-40.1	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	38.12	-35.88	74	55.48	31.04	10.15	58.55	100	0	P	H
		4882	13.36	-40.64	54	-	-	-	-	-	-	A	H
		7323	43.08	-30.92	74	52.86	36.55	12.48	58.81	100	0	P	H
		7323	18.32	-35.68	54	-	-	-	-	-	-	A	H
		4882	38.31	-35.69	74	55.67	31.04	10.15	58.55	100	0	P	V
		4882	13.55	-40.45	54	-	-	-	-	-	-	A	V
		7323	42.55	-31.45	74	52.33	36.55	12.48	58.81	100	0	P	V
		7323	17.79	-36.21	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	39.15	-34.85	74	56.12	31.32	10.22	58.51	100	0	P	H
		4960	14.39	-39.61	54	-	-	-	-	-	-	A	H
		7440	42.65	-31.35	74	52.36	36.48	12.47	58.66	100	0	P	H
		7440	17.89	-36.11	54	-	-	-	-	-	-	A	H
		4960	39.45	-34.55	74	56.42	31.32	10.22	58.51	100	0	P	V
		4960	14.69	-39.31	54	-	-	-	-	-	-	A	V
		7440	42.51	-31.49	74	52.22	36.48	12.47	58.66	100	0	P	V
		7440	17.75	-36.25	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 (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)
2.4GHz BT LF		99.66	26.53	-16.97	43.5	41.97	15.64	1.4	32.48	-	-	P	H
		156.36	27.26	-16.24	43.5	41.45	16.53	1.71	32.43	-	-	P	H
		295.95	29.81	-16.19	46	40.88	19.02	2.28	32.37	-	-	P	H
		444.2	29.41	-16.59	46	36.16	22.86	2.74	32.35	-	-	P	H
		738.9	29.67	-16.33	46	30.78	27.65	3.6	32.36	-	-	P	H
		959.4	33.14	-12.86	46	29.11	30.97	4.18	31.12	100	0	P	H
													H
													H
													H
													H
													H
													H
		31.89	26.37	-13.63	40	34.91	23.18	0.77	32.49	-	-	P	V
		39.99	28.32	-11.68	40	40.91	19.04	0.86	32.49	100	0	P	V
		65.1	23.65	-16.35	40	43.41	11.61	1.12	32.49	-	-	P	V
		443.5	26.07	-19.93	46	32.83	22.85	2.74	32.35	-	-	P	V
		770.4	30.75	-15.25	46	31.46	27.87	3.69	32.27	-	-	P	V
		953.8	33.19	-12.81	46	29.45	30.74	4.16	31.16	-	-	P	V
													V
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													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



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

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH00 2402MHz		2367.435	44.91	-29.09	74	43.97	27.53	6.54	33.13	100	213	P	H
		2367.435	20.15	-33.85	54	-	-	-	-	-	-	A	H
	*	2402	94.89	-	-	94.07	27.4	6.59	33.17	100	213	P	H
	*	2402	70.13	-	-	-	-	-	-	-	-	A	H
													H
													H
		2387.7	43.79	-30.21	74	42.93	27.45	6.57	33.16	100	7	P	V
		2387.7	19.03	-34.97	54	-	-	-	-	-	-	A	V
	*	2402	101.46	-	-	100.64	27.4	6.59	33.17	100	7	P	V
	*	2402	76.7	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2324.7	43.97	-30.03	74	42.87	27.7	6.48	33.08	130	24	P	H
		2324.7	19.21	-34.79	54	-	-	-	-	-	-	A	H
	*	2441	92.33	-	-	91.61	27.32	6.62	33.22	130	24	P	H
	*	2441	67.57	-	-	-	-	-	-	-	-	A	H
		2485.16	43.39	-30.61	74	42.7	27.3	6.66	33.27	130	24	P	H
		2485.16	18.63	-35.37	54	-	-	-	-	-	-	A	H
		2385.74	44.13	-29.87	74	43.25	27.46	6.57	33.15	100	5	P	V
		2385.74	19.37	-34.63	54	-	-	-	-	-	-	A	V
	*	2441	100.17	-	-	99.45	27.32	6.62	33.22	100	5	P	V
	*	2441	75.41	-	-	-	-	-	-	-	-	A	V
		2493.63	44.23	-29.77	74	43.55	27.3	6.66	33.28	100	5	P	V
		2493.63	19.47	-34.53	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	92.74	-	-	92.06	27.3	6.65	33.27	101	24	P	H
	*	2480	67.98	-	-	-	-	-	-	-	-	A	H
		2485.52	44.11	-29.89	74	43.42	27.3	6.66	33.27	101	24	P	H
		2485.52	19.35	-34.65	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	99.47	-	-	98.79	27.3	6.65	33.27	123	360	P	V
	*	2480	74.71	-	-	-	-	-	-	-	-	A	V
		2483.56	48.15	-25.85	74	47.46	27.3	6.66	33.27	123	360	P	V
		2483.56	23.39	-30.61	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 2Mbps (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH 00 2402MHz		4804	38.41	-35.59	74	55.82	31.1	10.07	58.58	100	0	P	H
		4804	13.65	-40.35	54	-	-	-	-	-	-	A	H
													H
													H
		4804	39.2	-34.8	74	56.61	31.1	10.07	58.58	100	0	P	V
		4804	14.44	-39.56	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	37.73	-36.27	74	55.09	31.04	10.15	58.55	100	0	P	H
		4882	12.97	-41.03	54	-	-	-	-	-	-	A	H
		7323	42.27	-31.73	74	52.05	36.55	12.48	58.81	100	0	P	H
		7323	17.51	-36.49	54	-	-	-	-	-	-	A	H
		4882	38.34	-35.66	74	55.7	31.04	10.15	58.55	100	0	P	V
		4882	13.58	-40.42	54	-	-	-	-	-	-	A	V
		7323	42.31	-31.69	74	52.09	36.55	12.48	58.81	100	0	P	V
		7323	17.55	-36.45	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	39.13	-34.87	74	56.1	31.32	10.22	58.51	100	0	P	H
		4960	14.37	-39.63	54	-	-	-	-	-	-	A	H
		7440	43.79	-30.21	74	53.5	36.48	12.47	58.66	100	0	P	H
		7440	19.03	-34.97	54	-	-	-	-	-	-	A	H
		4960	38.4	-35.6	74	55.37	31.32	10.22	58.51	100	0	P	V
		4960	13.64	-40.36	54	-	-	-	-	-	-	A	V
		7440	42.84	-31.16	74	52.55	36.48	12.47	58.66	100	0	P	V
		7440	18.08	-35.92	54	-	-	-	-	-	-	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



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

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH00 2402MHz		2369.955	44.26	-29.74	74	43.33	27.52	6.54	33.13	100	213	P	H
		2369.955	19.5	-34.5	54	-	-	-	-	-	-	A	H
	*	2402	94.99	-	-	94.17	27.4	6.59	33.17	100	213	P	H
	*	2402	70.23	-	-	-	-	-	-	-	-	A	H
													H
													H
		2321.97	43.65	-30.35	74	42.55	27.71	6.47	33.08	100	7	P	V
		2321.97	18.89	-35.11	54	-	-	-	-	-	-	A	V
	*	2402	102.08	-	-	101.26	27.4	6.59	33.17	100	7	P	V
	*	2402	77.32	-	-	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		2387.42	43.75	-30.25	74	42.88	27.45	6.57	33.15	130	24	P	H
		2387.42	18.99	-35.01	54	-	-	-	-	-	-	A	H
	*	2441	92.75	-	-	92.03	27.32	6.62	33.22	130	24	P	H
	*	2441	67.99	-	-	-	-	-	-	-	-	A	H
		2497.55	43.79	-30.21	74	43.11	27.3	6.67	33.29	130	24	P	H
		2497.55	19.03	-34.97	54	-	-	-	-	-	-	A	H
		2321.76	43.66	-30.34	74	42.56	27.71	6.47	33.08	100	5	P	V
		2321.76	18.9	-35.1	54	-	-	-	-	-	-	A	V
	*	2441	100.41	-	-	99.69	27.32	6.62	33.22	100	5	P	V
	*	2441	75.65	-	-	-	-	-	-	-	-	A	V
		2493.49	43.46	-30.54	74	42.78	27.3	6.66	33.28	100	5	P	V
		2493.49	18.7	-35.3	54	-	-	-	-	-	-	A	V



BT CH 78 2480MHz	*	2480	92.7	-	-	92.02	27.3	6.65	33.27	101	24	P	H
	*	2480	67.94	-	-	-	-	-	-	-	-	A	H
		2483.84	44.2	-29.8	74	43.51	27.3	6.66	33.27	101	24	P	H
		2483.84	19.44	-34.56	54	-	-	-	-	-	-	A	H
													H
													H
	*	2480	99.4	-	-	98.72	27.3	6.65	33.27	123	360	P	V
	*	2480	74.64	-	-	-	-	-	-	-	-	A	V
		2483.5	48.26	-25.74	74	47.57	27.3	6.66	33.27	123	360	P	V
		2483.5	23.5	-30.5	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 3Mbps (Harmonic @ 3m)

BT	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BT CH 00 2402MHz		4804	38.35	-35.65	74	55.76	31.1	10.07	58.58	100	0	P	H
		4804	13.59	-40.41	54	-	-	-	-	-	-	A	H
													H
													H
		4804	38.09	-35.91	74	55.5	31.1	10.07	58.58	100	0	P	V
		4804	13.33	-40.67	54	-	-	-	-	-	-	A	V
													V
													V
BT CH 39 2441MHz		4882	38.42	-35.58	74	55.78	31.04	10.15	58.55	100	0	P	H
		4882	13.66	-40.34	54	-	-	-	-	-	-	A	H
		7323	42.14	-31.86	74	51.92	36.55	12.48	58.81	100	0	P	H
		7323	17.38	-36.62	54	-	-	-	-	-	-	A	H
		4882	38.76	-35.24	74	56.12	31.04	10.15	58.55	100	0	P	V
		4882	14	-40	54	-	-	-	-	-	-	A	V
		7323	41.87	-32.13	74	51.65	36.55	12.48	58.81	100	0	P	V
		7323	17.11	-36.89	54	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		4960	39.68	-34.32	74	56.65	31.32	10.22	58.51	100	0	P	H
		4960	14.92	-39.08	54	-	-	-	-	-	-	A	H
		7440	42.36	-31.64	74	52.07	36.48	12.47	58.66	100	0	P	H
		7440	17.6	-36.4	54	-	-	-	-	-	-	A	H
		4960	38.97	-35.03	74	55.94	31.32	10.22	58.51	100	0	P	V
		4960	14.21	-39.79	54	-	-	-	-	-	-	A	V
		7440	42.64	-31.36	74	52.35	36.48	12.47	58.66	100	0	P	V
		7440	17.88	-36.12	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.
				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BT CH 00 2402MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
2. Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

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



Appendix D. Radiated Spurious Emission Plots

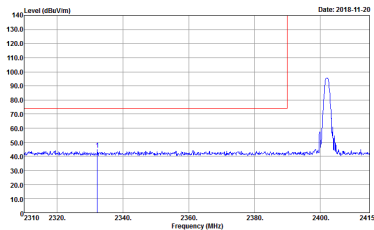
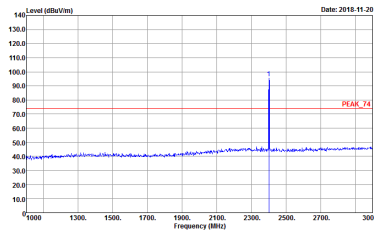
Test Engineer :	Hao Hsu, Ken Wu, and Chuan Zhu	Temperature :	21~26°C
		Relative Humidity :	51~56%

Note symbol

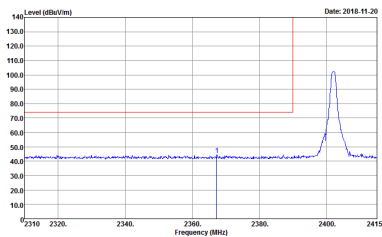
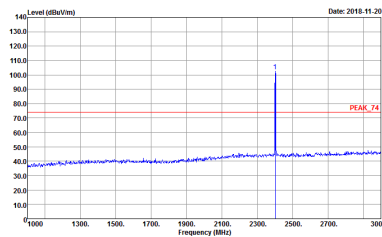
-L	Low channel location
-R	High channel location



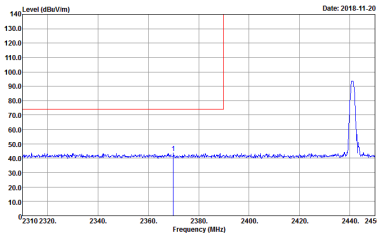
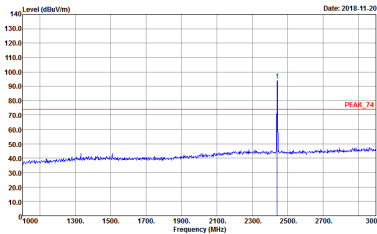
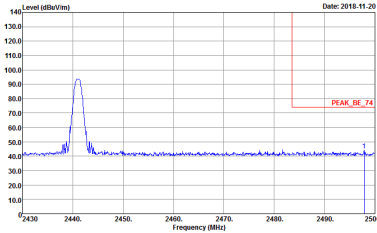
2.4GHz 2400~2483.5MHz
BT 1Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01

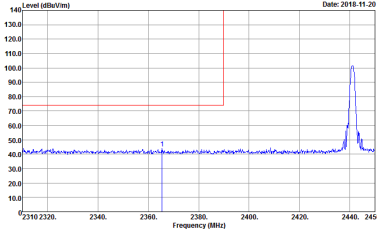
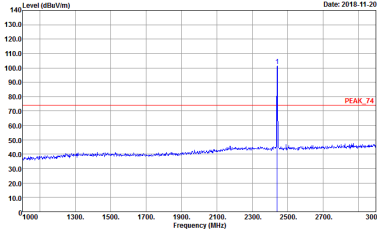
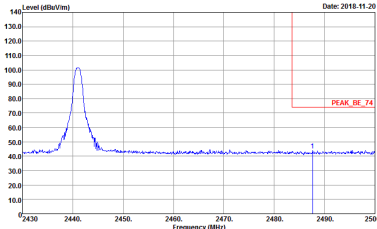


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m	
		BT CH39 2441MHz	
	Horizontal	Fundamental	
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Left blank	



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01

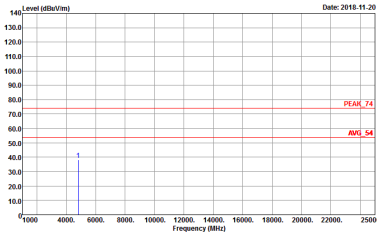
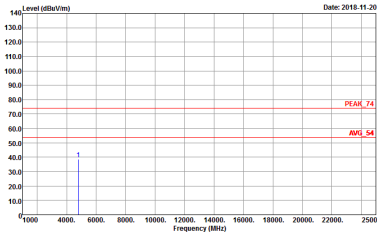


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	Level (dBuV/m) Date: 2018-11-20 2460 2463.2465.2467.2469.2471.2473.2475.2477.2479.2481.2483.2485.2487.2489.2491.2493.2495.2497. 2500 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 1000 1300. 1500. 1700. 1900. 2100. 2300. 2500. 2700. 3000 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



2.4GHz 2400~2483.5MHz

BT 1Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 881333-01

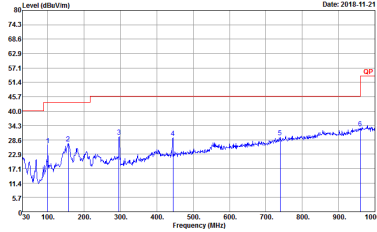
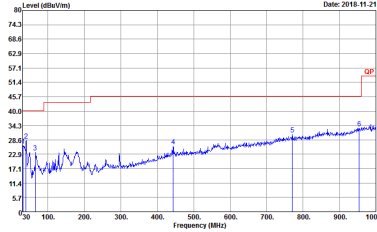


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01



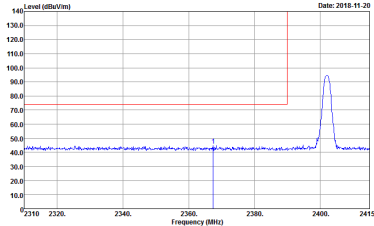
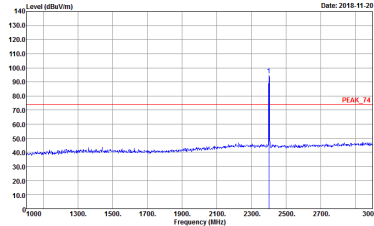
Emission below 1GHz

2.4GHz BT (LF)

BT	2.4GHz 2400~2483.5MHz	
	BT LF	
	Horizontal	Vertical
QP / Peak	 Site : 03CH11-HY Condition : QP 3m BT-LOG 6111D-LF_ETC HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : QP 3m BT-LOG 6111D-LF_ETC VERTICAL Detector : Peak Project : 881333-01



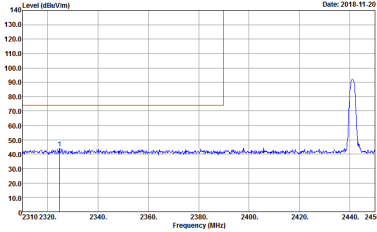
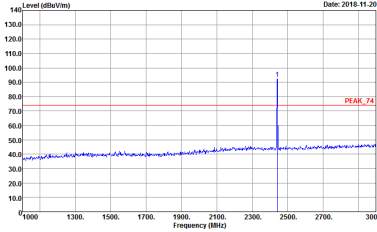
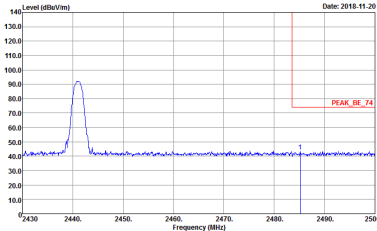
2.4GHz 2400~2483.5MHz
BT 2Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : RBW:1000.0000Hz VBW:3000.0000Hz SWT:Auto Project : 881333-01

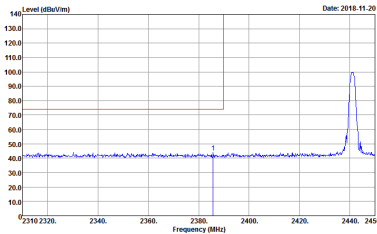
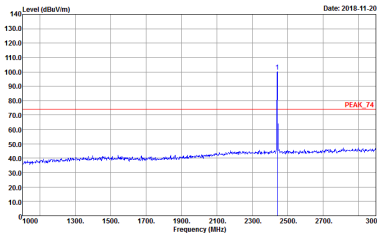
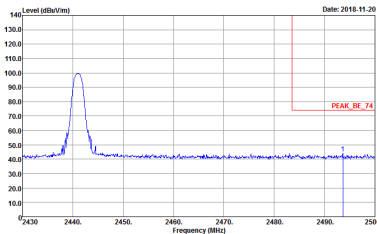


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Left blank



BT		2.4GHz 2400~2483.5MHz Band Edge @ 3m	
		BT CH39 2441MHz	
	Vertical	Fundamental	
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	Left blank	



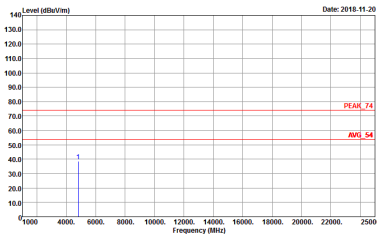
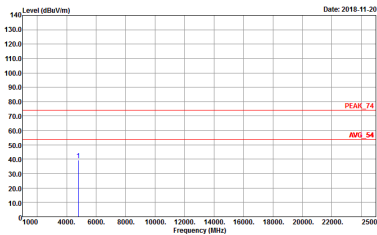
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Level (dBuV/m) Date: 2018-11-20 2460 2463.2465.2467.2469.2471.2473.2475.2477.2479.2481.2483.2485.2487.2489.2491.2493.2495.2497. 2500 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 1000 1300. 1500. 1700. 1900. 2100. 2300. 2500. 2700. 3000 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



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

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-11-20 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01

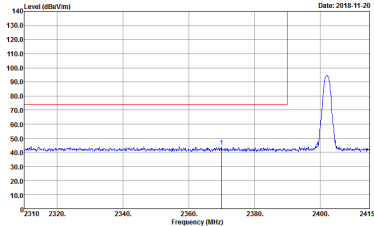
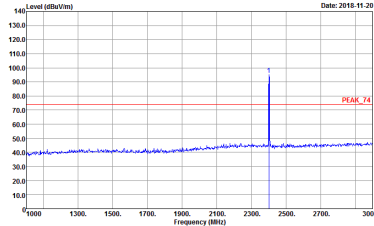


BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBu/V/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBu/V/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01

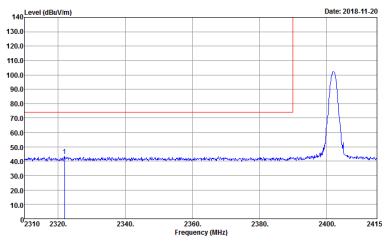
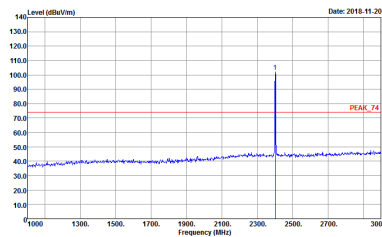


2.4GHz 2400~2483.5MHz

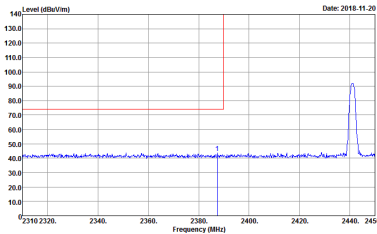
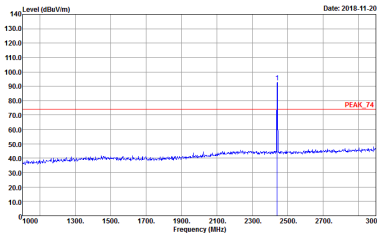
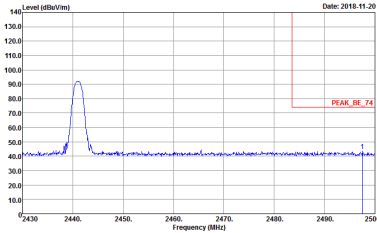
BT 3Mbps (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH00 2402MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Horizontal	Fundamental
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01
Peak	 Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	Left blank

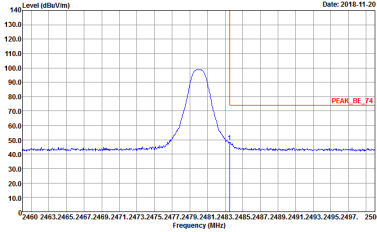
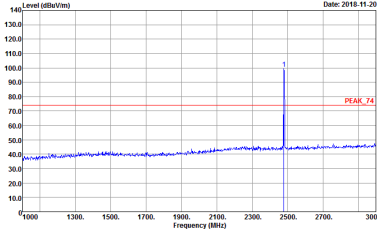


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH39 2441MHz	
	Vertical	Fundamental
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01
Peak	Site : 03CH11-HY Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01	Left blank



BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Horizontal	Fundamental
Peak	Level (dBuV/m) Date: 2018-11-20 2460 2463.2465.2467.2469.2471.2473.2475.2477.2479.2481.2483.2485.2487.2489.2491.2493.2495.2497. 2500 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 1000 1300. 1500. 1700. 1900. 2100. 2300. 2500. 2700. 3000 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01

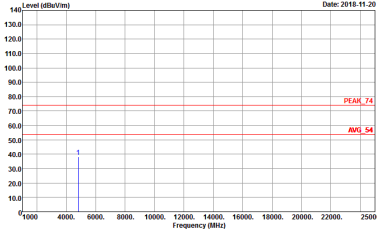
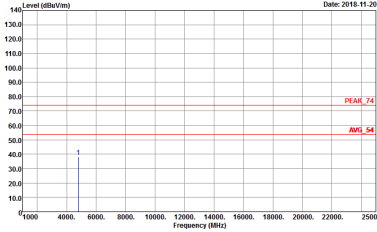


BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
	BT CH78 2480MHz	
	Vertical	Fundamental
Peak	 Site : 03CH11-14Y Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01	 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 91200-HF VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 881333-01



2.4GHz 2400~2483.5MHz

BT 3Mbps (Harmonic @ 3m)

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH00 2402MHz	
	Horizontal	Vertical
Peak Avg.	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF HORIZONTAL Detector : Peak Project : 881333-01	 Site : 03CH11-HY Condition : PEAK_74 3m HORN 91200-HF VERTICAL Detector : Peak Project : 881333-01



BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH39 2441MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBuV/m) Date: 2018-11-20 Frequency (MHz) Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 881333-01



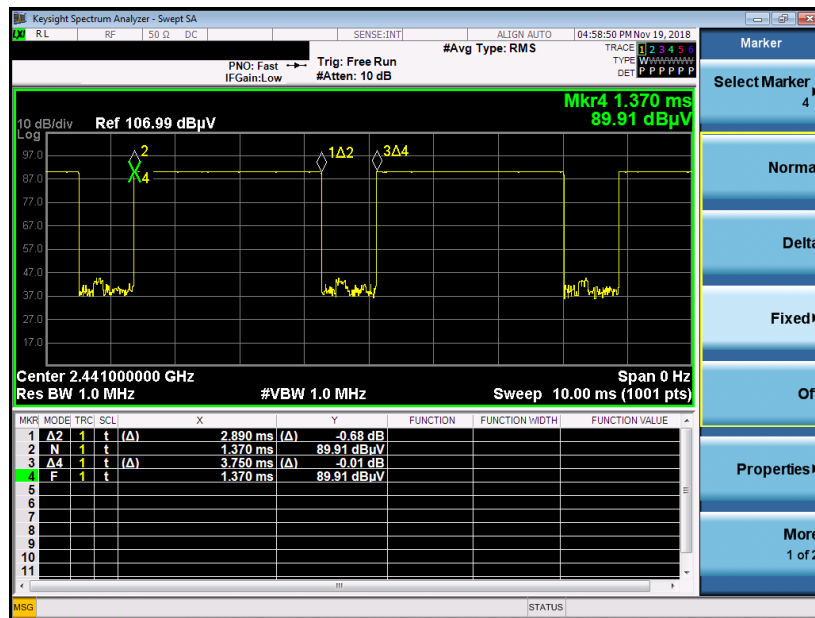
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
	BT CH78 2480MHz	
	Horizontal	Vertical
Peak Avg.	Level (dBu/V/m) Date: 2018-11-20 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL Detector : Peak Project : 881333-01	Level (dBu/V/m) Date: 2018-11-20 Site : 03CH11-14Y Condition : PEAK_74 3m HORN 9120D-HF VERTICAL Detector : Peak Project : 881333-01



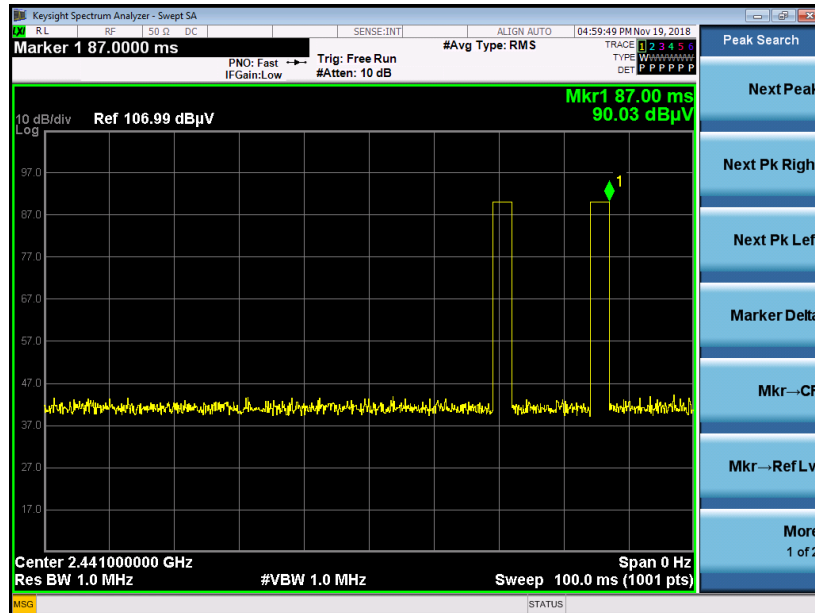
Appendix E. Duty Cycle Plots

<1Mbps>

DH5 on time (One Pulse) Plot on Channel 39



on time (Count Pulses) Plot on Channel 39

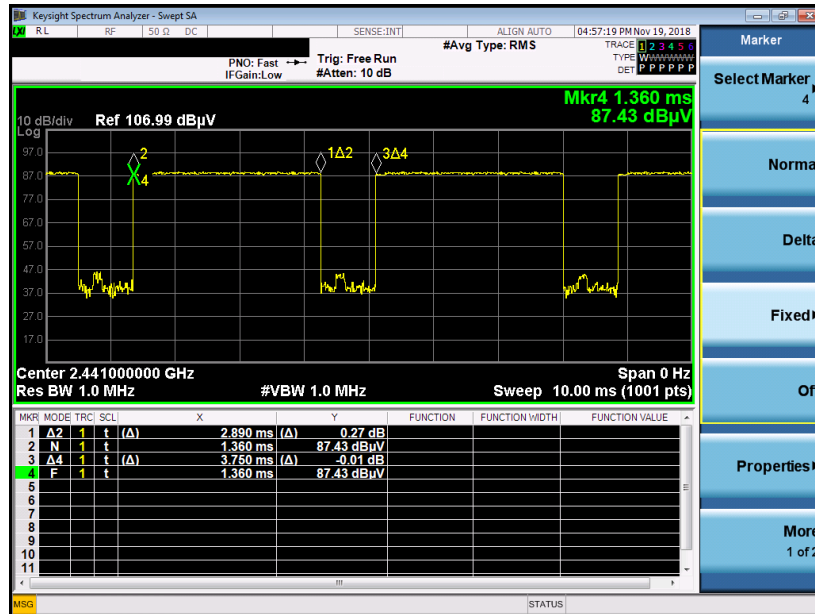
**Note:**

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.

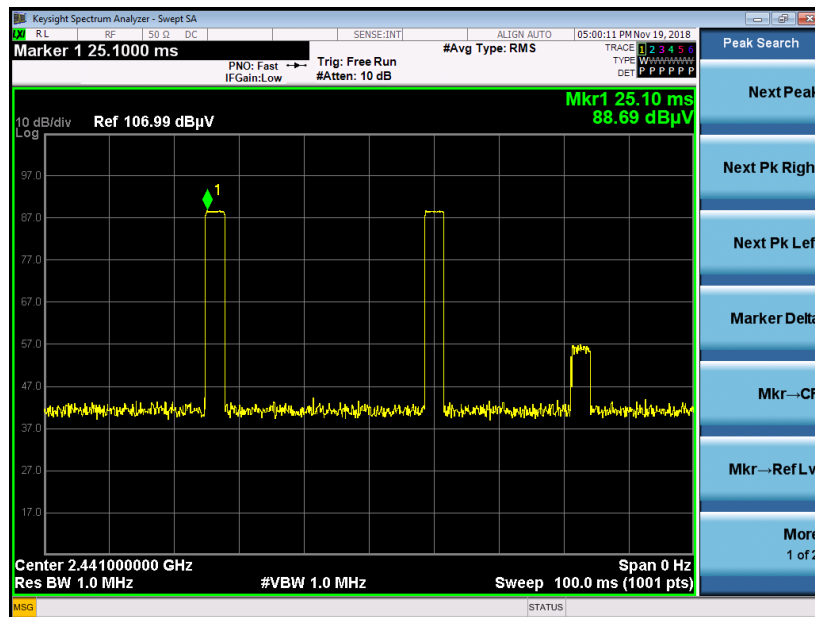


<2Mbps>

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



on time (Count Pulses) Plot on Channel 39



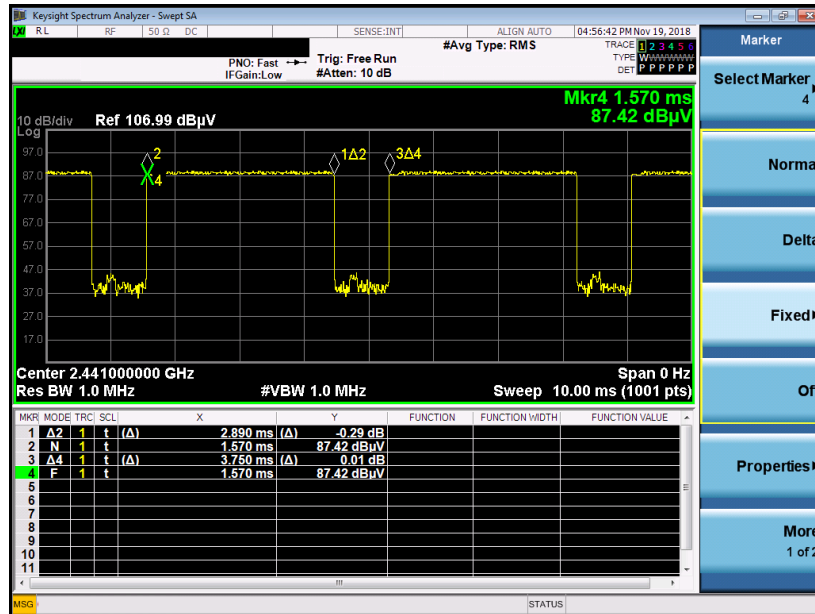
Note:

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.

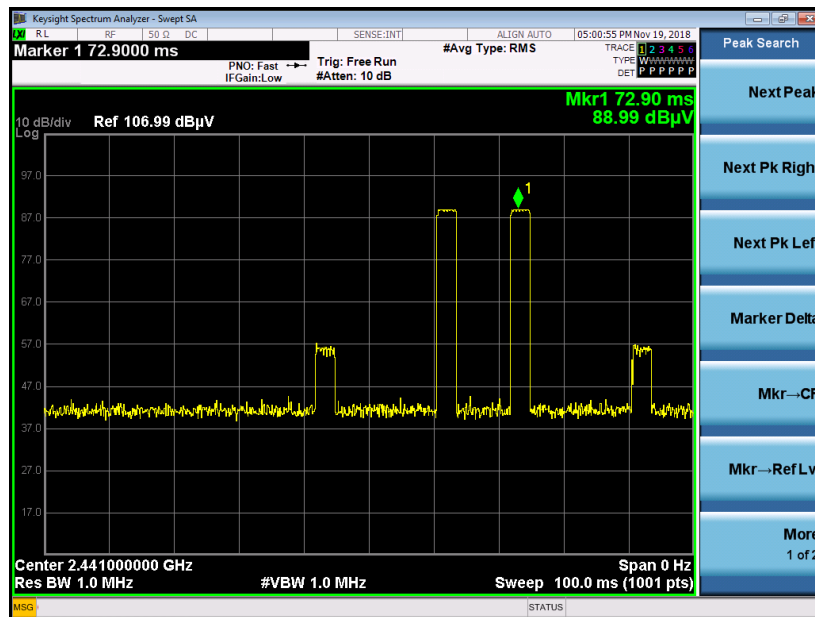


<3Mbps>

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. $[100\text{ms} / 57.6\text{ms}] = 2 \text{ hops}$

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—————