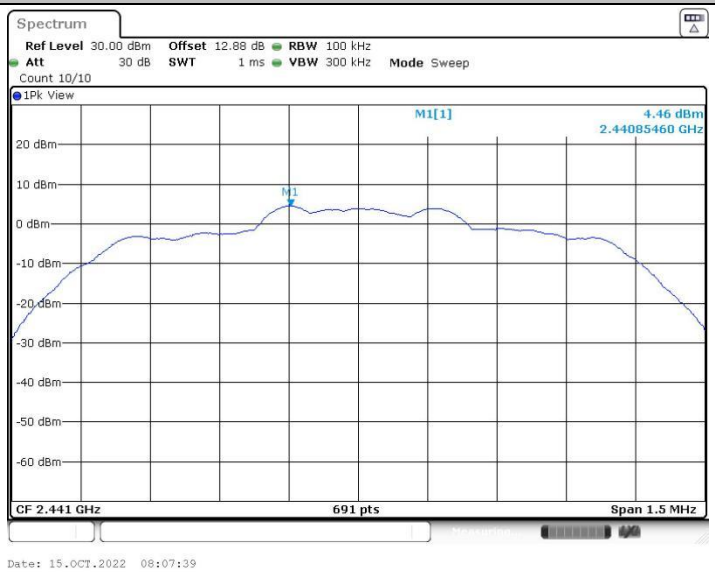
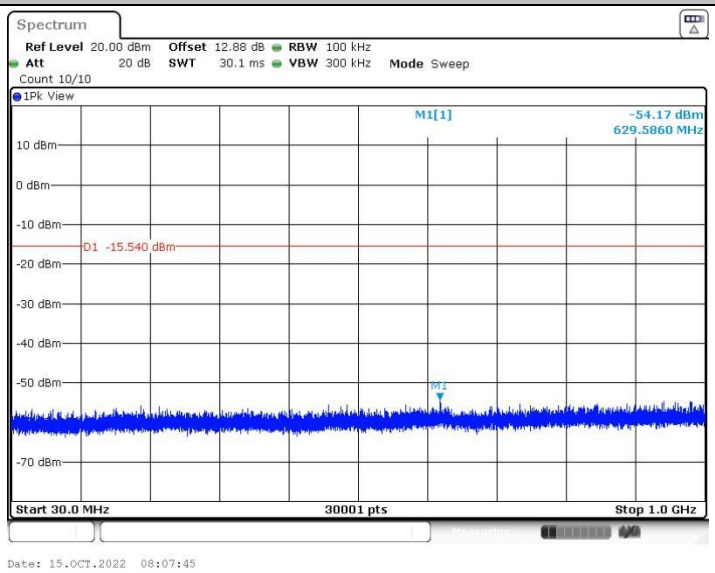
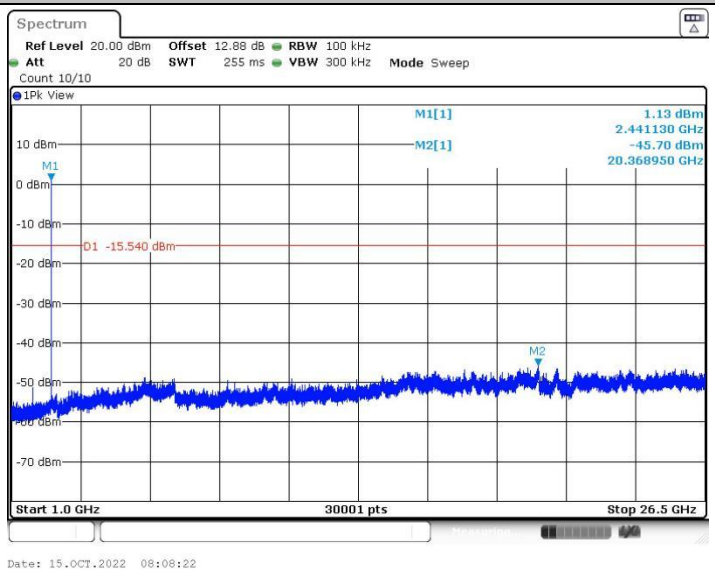
2DH1_Ant1_2441_0~Reference



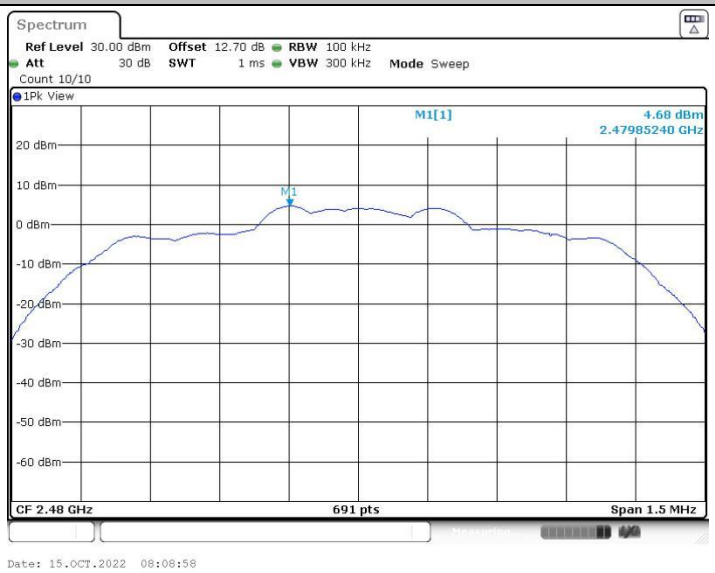
2DH1_Ant1_2441_30~1000



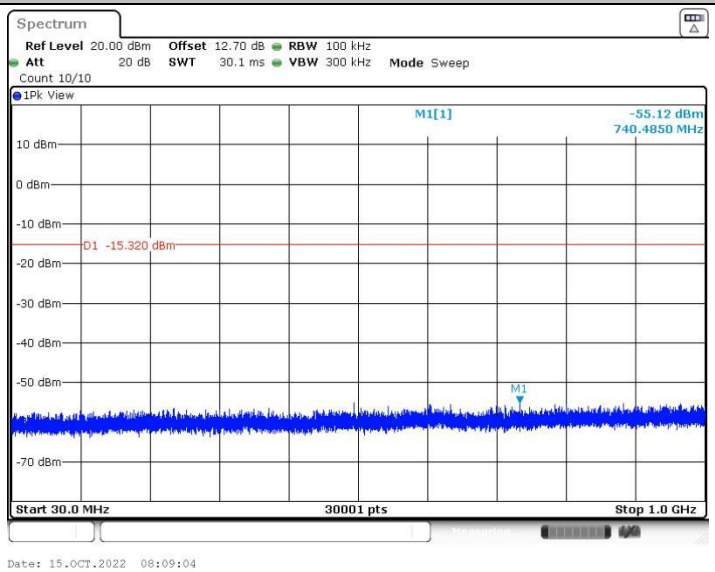
2DH1_Ant1_2441_1000~26500



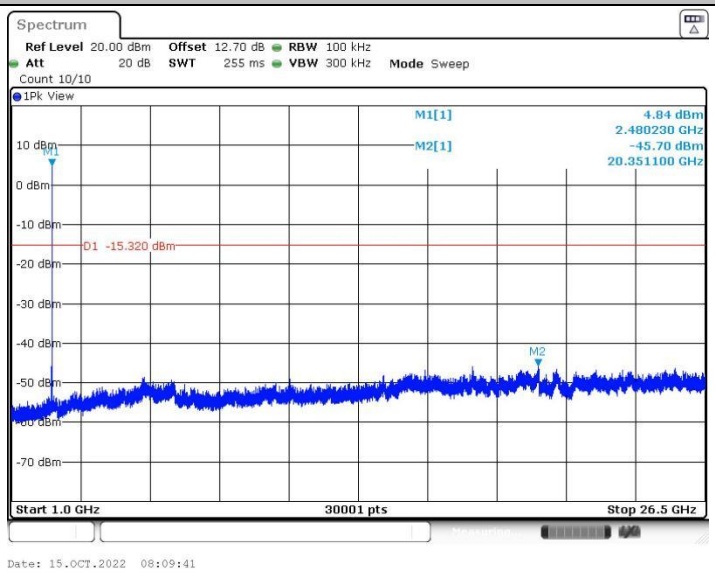
2DH1_Ant1_2480_0~Reference



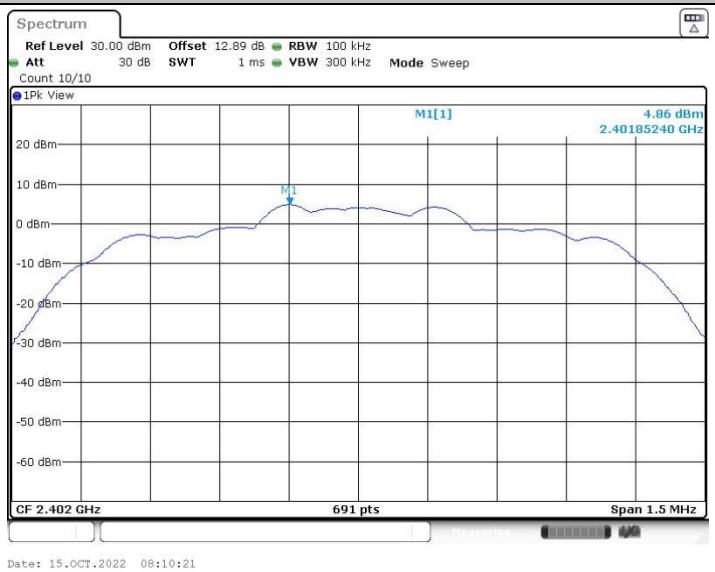
2DH1_Ant1_2480_30~1000



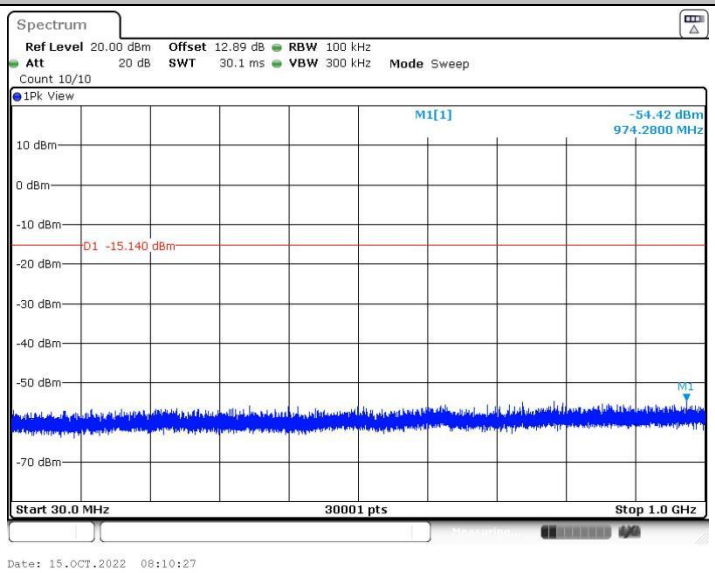
2DH1_Ant1_2480_1000~26500



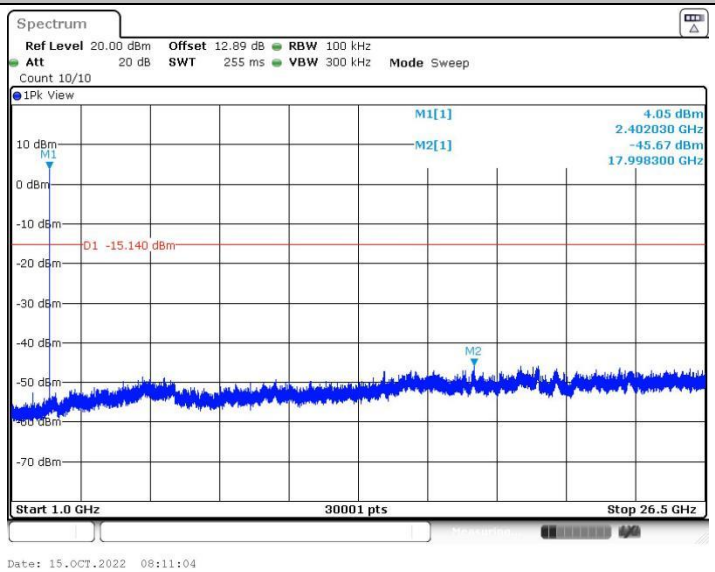
3DH1_Ant1_2402_0~Reference



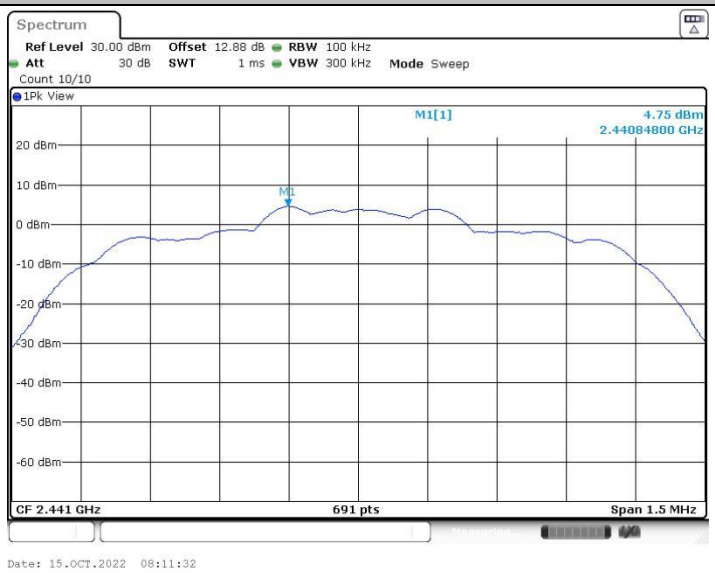
3DH1_Ant1_2402_30~1000



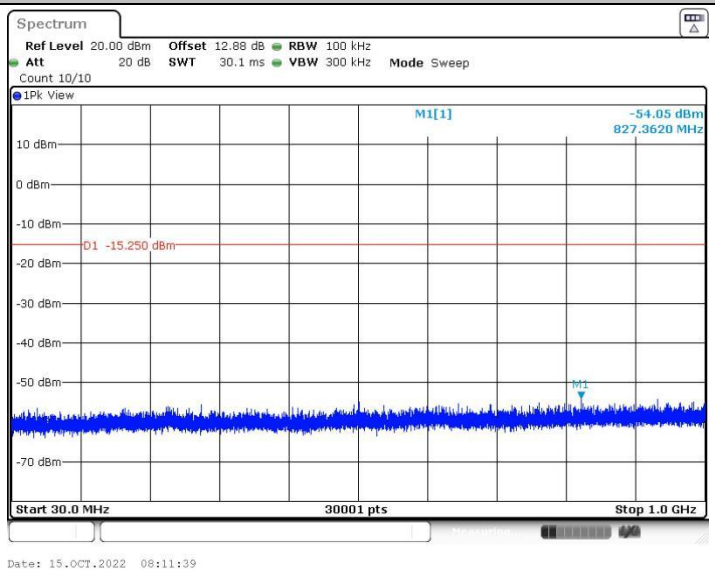
3DH1_Ant1_2402_1000~26500



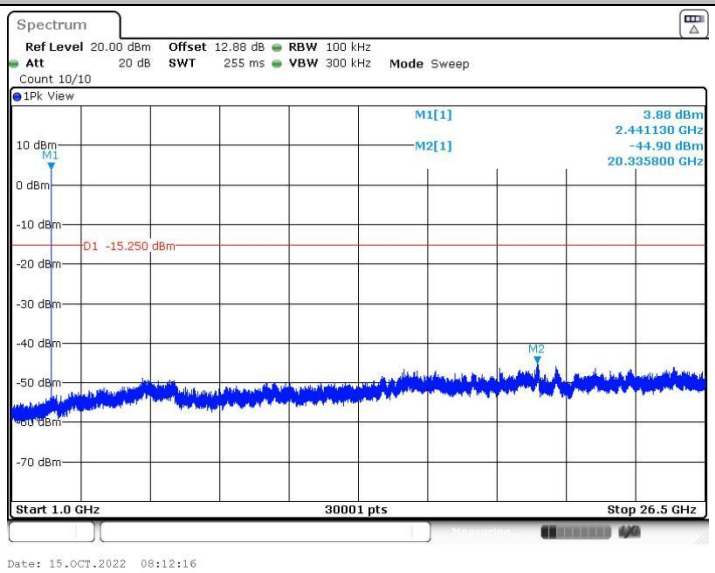
3DH1_Ant1_2441_0~Reference



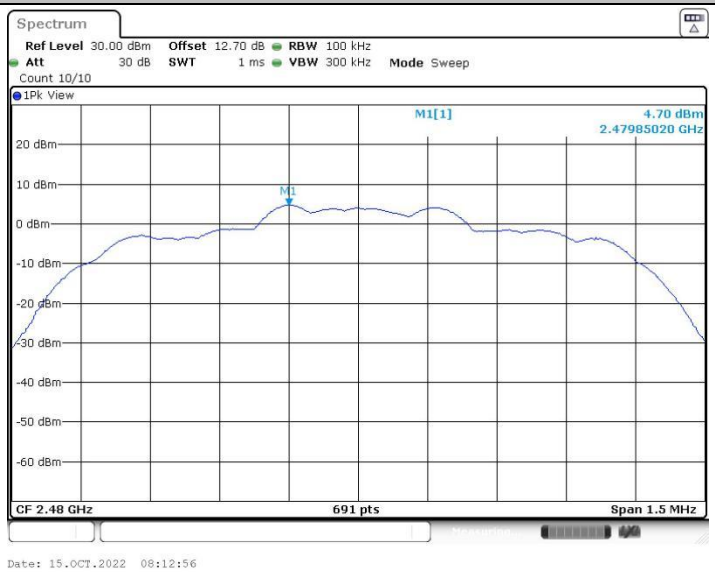
3DH1_Ant1_2441_30~1000



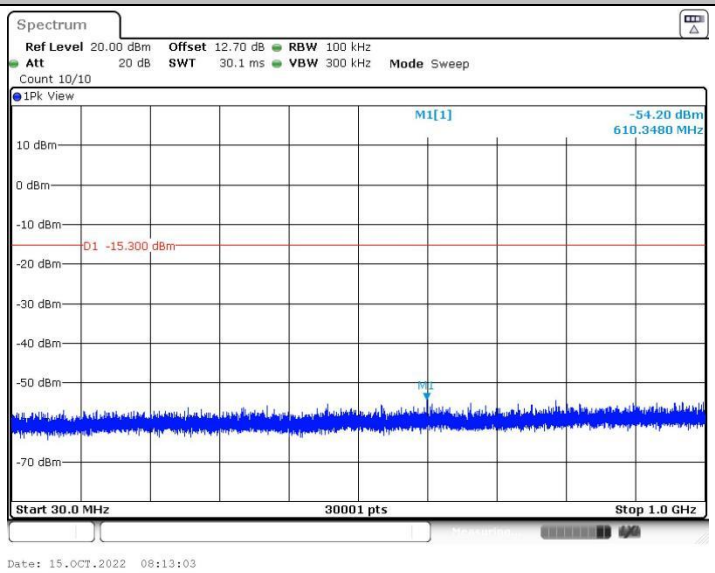
3DH1_Ant1_2441_1000~26500



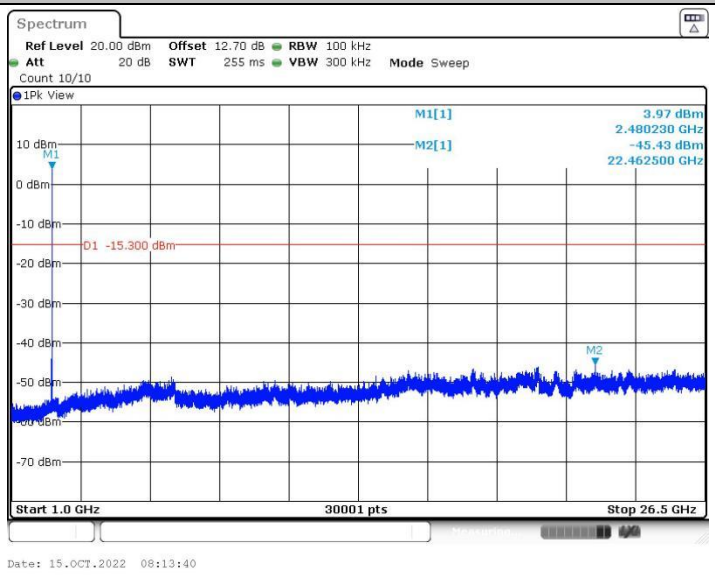
3DH1_Ant1_2480_0~Reference



3DH1_Ant1_2480_30~1000



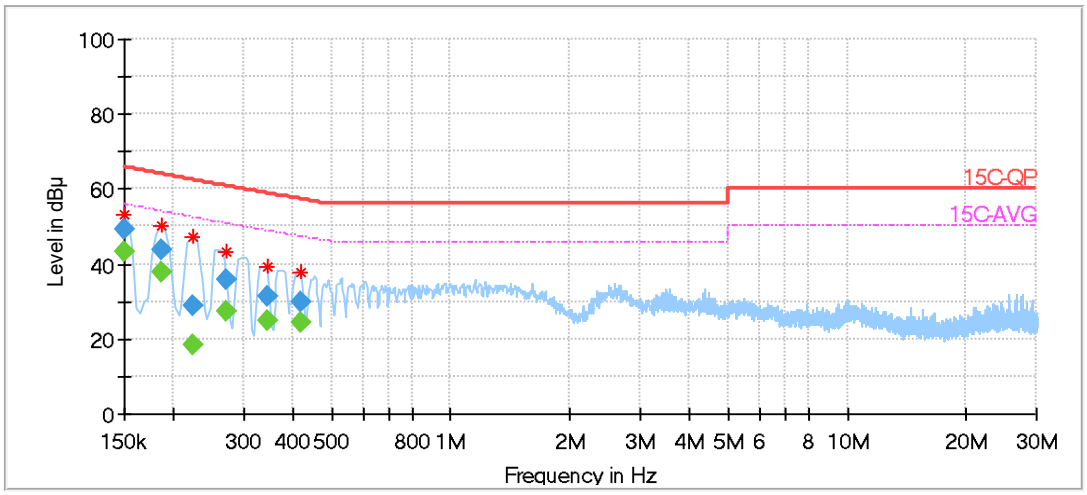
3DH1_Ant1_2480_1000~26500



Appendix B. AC Conducted Emission Test Results

Test Engineer :	Amos	**Temperature :**	24.2~25.6℃
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

Full Spectrum

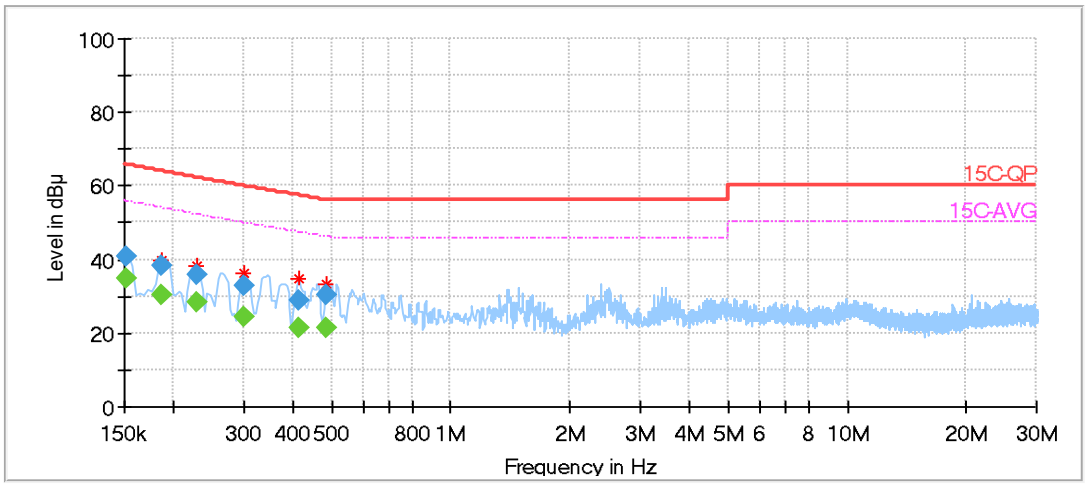


Final_Result

Frequency (MHz)	Quasi Peak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	43.49	56.00	12.51	L1	OFF	20.1
0.150000	49.10	---	66.00	16.90	L1	OFF	20.1
0.187312	---	37.68	54.00	16.32	L1	OFF	20.0
0.187312	43.63	---	64.03	20.40	L1	OFF	20.0
0.223856	---	18.23	52.45	34.22	L1	OFF	20.0
0.223856	28.65	---	62.49	33.84	L1	OFF	20.0
0.270169	---	27.51	50.87	23.36	L1	OFF	19.9
0.270169	35.92	---	60.91	24.99	L1	OFF	19.9
0.345562	---	24.89	48.86	23.97	L1	OFF	19.9
0.345562	31.56	---	58.90	27.33	L1	OFF	19.9
0.420188	---	24.42	47.33	22.90	L1	OFF	19.8
0.420188	29.96	---	57.35	27.39	L1	OFF	19.8

Test Engineer :	Amos	**Temperature :**	24.2~25.6℃
		Relative Humidity :	37~39%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	35.01	55.86	20.85	N	OFF	20.2
0.152250	40.59	---	65.87	25.28	N	OFF	20.2
0.187312	---	30.43	54.00	23.57	N	OFF	20.2
0.187312	38.26	---	64.03	25.77	N	OFF	20.2
0.229126	---	28.11	52.26	24.14	N	OFF	20.1
0.229126	35.82	---	62.29	26.47	N	OFF	20.1
0.301500	---	24.41	49.96	25.55	N	OFF	20.0
0.301500	32.85	---	60.00	27.15	N	OFF	20.0
0.414919	---	21.62	47.42	25.80	N	OFF	19.9
0.414919	28.96	---	57.44	28.48	N	OFF	19.9
0.487294	---	21.49	46.19	24.71	N	OFF	19.9
0.487294	30.58	---	56.20	25.62	N	OFF	19.9

Note: Margin (dB) = Peak/Average (dBµV) – Limit (dBµV)

Appendix C. Radiated Spurious Emission

Test Engineer :	Carry Xu	Temperature :	22~23°C
		Relative Humidity :	41~42%

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
		(MHz)	(dBμV/m)	Limit (dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Avg. (P/A)	(H/V)
BT CH00 2402MHz		2389.04	47.95	-26.05	74	44.96	32.4	7.1	36.51	119	125	P	H
	*	2389.04	23.16	-30.84	54	-	-	-	-	-	-	A	H
		2402	103.41	-	-	100.39	32.4	7.13	36.51	119	125	P	H
		2402	78.62	-	-	-	-	-	-	-	-	A	H
		2379.29	47.54	-26.46	74	44.68	32.31	7.1	36.55	400	71	P	V
	*	2379.29	22.75	-31.25	54	-	-	-	-	-	-	A	V
		2402	98.22	-	-	95.2	32.4	7.13	36.51	400	71	P	V
		2402	73.43	-	-	-	-	-	-	-	-	A	V
BT CH 78 2480MHz		2490.82	47.14	-26.86	74	44.69	32.33	7.25	37.13	100	120	P	H
	*	2490.82	22.35	-31.65	54	-	-	-	-	-	-	A	H
		2480	100.69	-	-	98.12	32.34	7.25	37.02	100	120	P	H
		2480	75.90	-	-	-	-	-	-	-	-	A	H
		2484.04	48.82	-25.18	74	46.25	32.34	7.25	37.02	374	299	P	V
	*	2484.04	24.03	-29.97	54	-	-	-	-	-	-	A	V
		2480	97.48	-	-	94.91	32.34	7.25	37.02	374	299	P	V
		2480	72.69	-	-	-	-	-	-	-	-	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 (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		4800	38.8	-35.2	74	59.85	34	10.2	65.25	300	0	P	H
		4800	39.15	-34.85	74	60.2	34	10.2	65.25	100	0	P	V
BT CH 39 2441MHz		4875	39.63	-34.37	74	60.62	34	10.29	65.28	300	0	P	H
		7320	41.15	-32.85	74	59.39	35.77	12.72	66.73	300	0	P	H
		4875	39.24	-34.76	74	60.23	34	10.29	65.28	100	0	P	V
		7320	41.85	-32.15	74	60.09	35.77	12.72	66.73	100	0	P	V
BT CH 78 2480MHz		4965	39.64	-34.36	74	60.55	34	10.41	65.32	300	0	P	H
		7440	40.82	-33.18	74	59.38	35.79	12.79	67.14	300	0	P	H
		4965	40.01	-33.99	74	60.92	34	10.41	65.32	100	0	P	V
		7440	40.54	-33.46	74	59.1	35.79	12.79	67.14	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz BT (LF)

BT	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
				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 BT LF		49.4	24.8	-15.2	40	41.35	15.38	1.05	32.98			P	H
		88.2	27.55	-15.95	43.5	43.21	15.6	1.42	32.68			P	H
		127.97	30.97	-12.53	43.5	44.32	17.77	1.72	32.84			P	H
		150.28	31.41	-12.09	43.5	44.86	17.5	1.85	32.8			P	H
		749.74	34.86	-11.14	46	36.87	26.5	4.19	32.7			P	H
		831.22	32.38	-13.62	46	33.45	27.09	4.4	32.56			P	H
		30	35.01	-4.99	40	41.5	25.5	0.71	32.7			P	V
		51.34	37.33	-2.67	40	54.46	14.84	1.07	33.04			P	V
		87.23	33.72	-6.28	40	49.62	15.4	1.42	32.72			P	V
		139.61	33.89	-9.61	43.5	47.28	17.63	1.8	32.82			P	V
		549.92	31.99	-14.01	46	35.11	25.9	3.58	32.6			P	V
		826.37	30.8	-15.2	46	31.9	27.06	4.39	32.55			P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

Note symbol

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

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

BT	Note	Frequency	Level	Over	Limit	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".

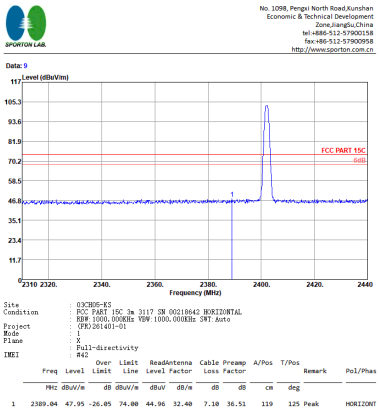
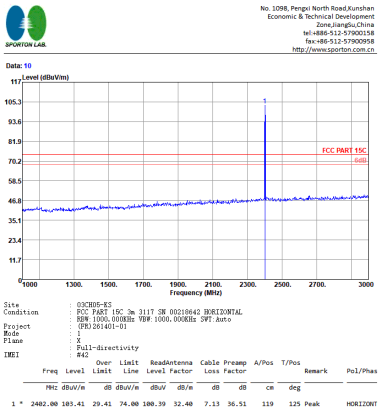
Appendix D. Radiated Spurious Emission Plots

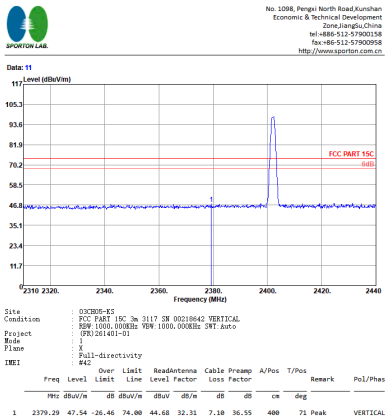
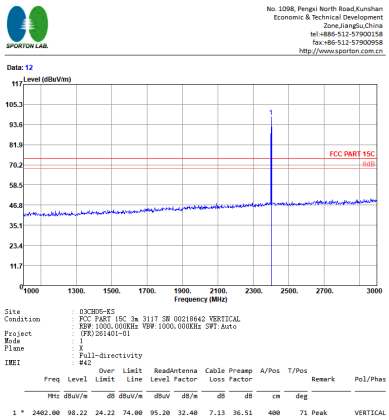
Note symbol

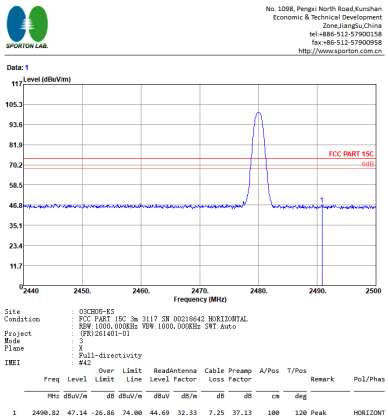
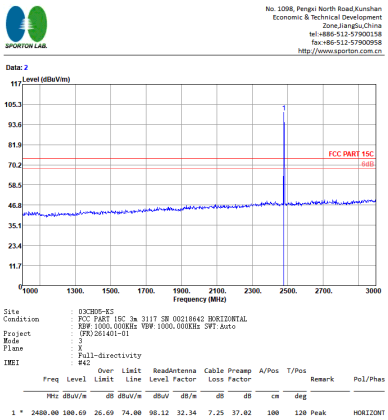
-L	**Low channel location**
-R	**High channel location**

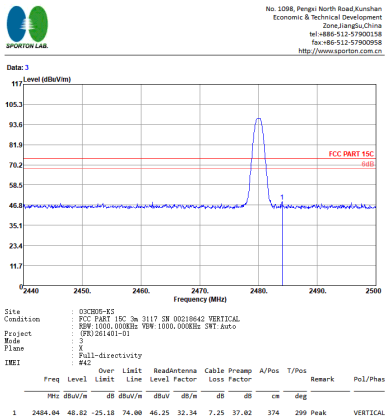
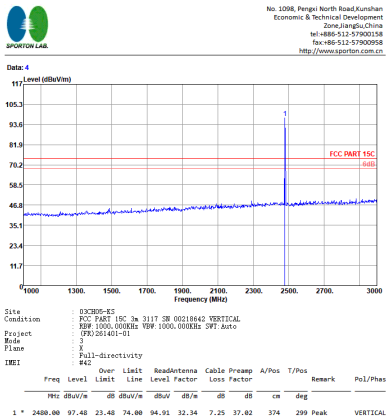
2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
1	Horizontal	Fundamental
Peak		

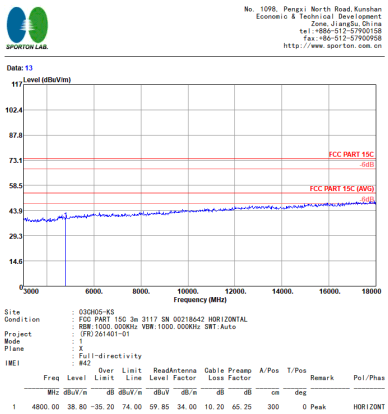
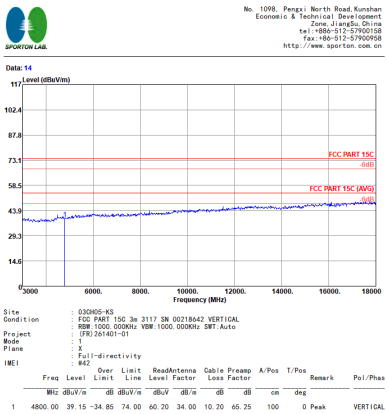
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH00 2402MHz	
1	Vertical	Fundamental
Peak		

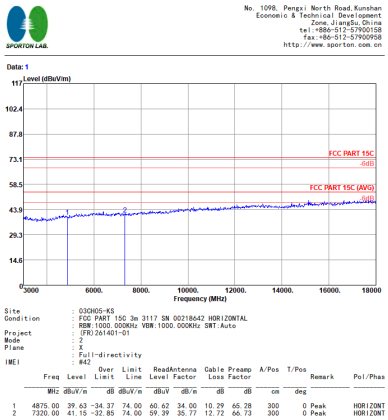
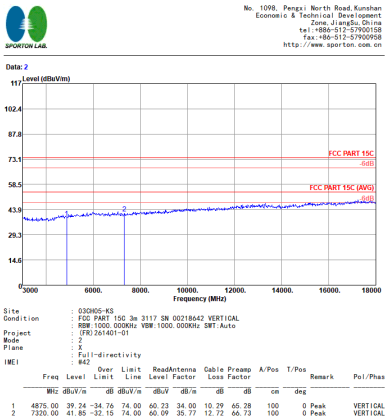
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
1	Horizontal	Fundamental
Peak	 Site : D3CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 3 Plane : X Full-directivity IMEI : #42 Freq Level Over Limit Limit Line ReadAntenna Level factor Cable Loss factor Preamp factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 2490.82 47.14 -26.86 74.00 44.69 32.33 7.25 37.13 100 120 Peak HORIZONT	 Site : D3CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 3 Plane : X Full-directivity IMEI : #42 Freq Level Over Limit Limit Line ReadAntenna Level factor Cable Loss factor Preamp factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 * 2480.00 100.69 26.69 74.00 98.12 32.34 7.25 37.02 100 120 Peak HORIZONT

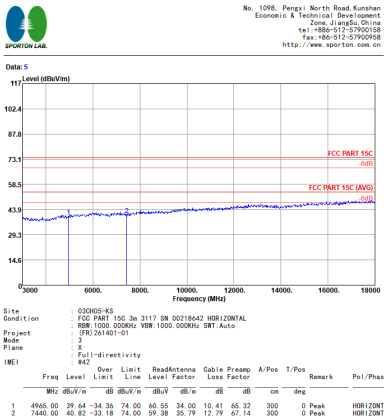
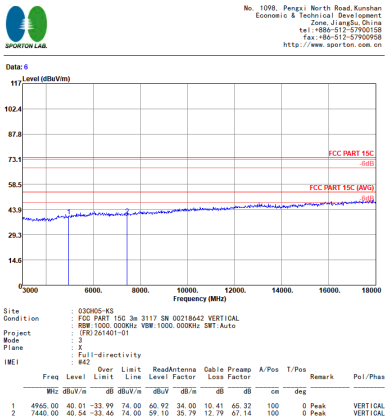
BT	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
ANT	BT CH78 2480MHz	
1	Vertical	Fundamental
Peak		

2.4GHz 2400~2483.5MHz

BT (Harmonic @ 3m)

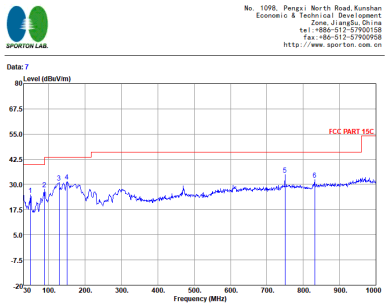
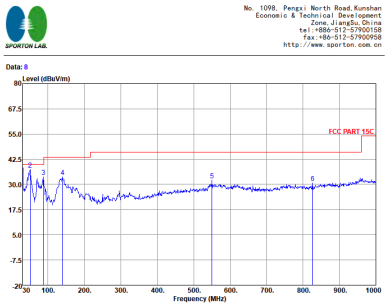
BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH00 2402MHz	
1	Horizontal	Vertical
Peak Avg.		

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH39 2441MHz	
1	Horizontal	Vertical
Peak Avg.	 Site : 03CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 HORIZONTAL : RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 2 Plane : X : Full-directivity IMEI : #42 Freq Level Over Limit Limit Read Antenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4875.00 39.63 -34.37 74.00 60.62 34.00 10.29 65.28 300 0 Peak HORIZONT 2 7320.00 41.15 -32.85 74.00 59.39 35.77 12.72 66.73 300 0 Peak HORIZONT	 Site : 03CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 VERTICAL : RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 2 Plane : X : Full-directivity IMEI : #42 Freq Level Over Limit Limit Read Antenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4875.00 39.24 -34.76 74.00 60.23 34.00 10.29 65.28 100 0 Peak VERTICAL 2 7320.00 41.85 -32.15 74.00 60.09 35.77 12.72 66.73 100 0 Peak VERTICAL

BT	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
ANT	BT CH78 2480MHz	
1	Horizontal	Vertical
Peak Avg.	 Data: 5 Site : 03CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 HORIZONTAL RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 3 Plane : X IMEI : Full-directivity : #42 Freq Level Over Limit Limit ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4965.00 39.64 -34.36 74.00 60.55 34.00 10.41 65.32 300 0 Peak HORIZONT 2 7440.00 40.82 -33.18 74.00 59.38 35.79 12.79 67.14 300 0 Peak HORIZONT	 Data: 6 Site : 03CH05-KS Condition : FCC PART 15C 3m 3117 SN 00218642 VERTICAL RBW:1000.000KHz VBW:1000.000KHz SWT:Auto Project : (FR)261401-01 Mode : 3 Plane : X IMEI : Full-directivity : #42 Freq Level Over Limit Limit ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 4965.00 40.01 -33.99 74.00 60.92 34.00 10.41 65.32 100 0 Peak VERTICAL 2 7440.00 40.54 -33.46 74.00 59.10 35.79 12.79 67.14 100 0 Peak VERTICAL

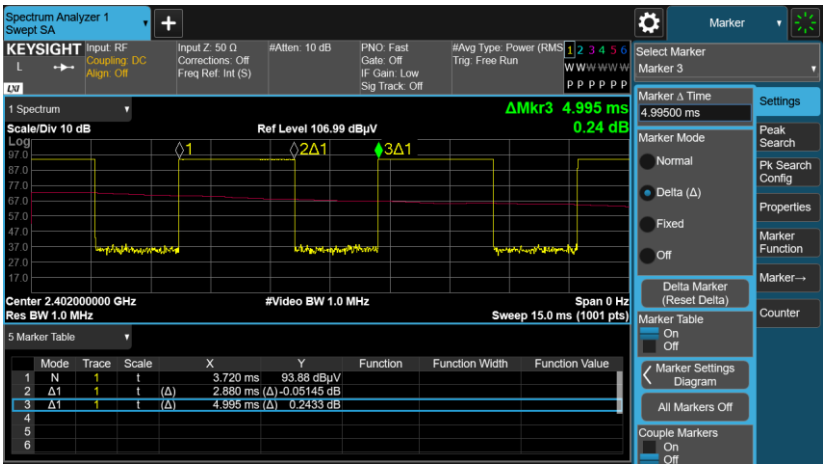
Emission below 1GHz

2.4GHz BT (LF)

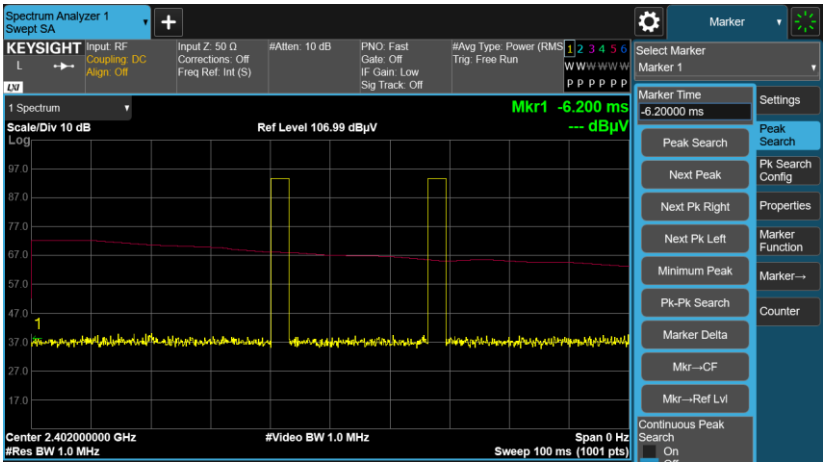
BT	2.4GHz 2400~2483.5MHz	
ANT	BT LF	
1	Horizontal	Vertical
QP / Peak	 Site : 03CH05-KS Condition : FCC PART 15C 3m CBL6111D SN23188 HORIZONTAL : RBW:100.000KHz VBW:300.000KHz SWT:Auto Project : (FR)261401-01 mode : 3 Plane : X : Full-directivity IMEI : #42 Powersetting : Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 49.40 24.80 -15.20 40.00 41.35 15.38 1.05 32.98 --- --- Peak HORIZONT 2 88.20 27.55 -15.95 43.50 43.21 15.60 1.42 32.68 --- --- Peak HORIZONT 3 127.97 30.97 -12.53 43.50 44.32 17.77 1.72 32.84 --- --- Peak HORIZONT 4 150.28 31.41 -12.09 43.50 44.86 17.50 1.85 32.80 --- --- Peak HORIZONT 5 749.74 34.86 -11.14 46.00 36.87 26.50 4.19 32.70 --- --- Peak HORIZONT 6 831.22 32.38 -13.62 46.00 33.45 27.09 4.40 32.56 --- --- Peak HORIZONT	 Site : 03CH05-KS Condition : FCC PART 15C 3m CBL6111D SN23188 VERTICAL : RBW:100.000KHz VBW:300.000KHz SWT:Auto Project : (FR)261401-01 mode : 3 IMEI : X : Full-directivity : #42 Freq Level Over Limit Limit Line ReadAntenna Level Factor Cable Loss Preamp Factor A/Pos T/Pos Remark Pol/Phas MHz dBuV/m dB dBuV/m dBuV dB/m dB dB cm deg 1 30.00 35.01 -4.99 40.00 41.50 25.50 0.71 32.70 --- --- Peak VERTICAL 2 51.34 37.33 -2.67 40.00 54.46 14.84 1.07 33.04 --- --- Peak VERTICAL 3 87.23 33.72 -6.28 40.00 49.62 15.40 1.42 32.72 --- --- Peak VERTICAL 4 139.61 33.89 -9.61 43.50 47.28 17.63 1.80 32.82 --- --- Peak VERTICAL 5 549.92 31.99 -14.01 46.00 35.11 25.90 3.58 32.60 --- --- Peak VERTICAL 6 826.37 30.80 -15.20 46.00 31.90 27.06 4.39 32.55 --- --- Peak VERTICAL	

Appendix E. Duty Cycle Plots

DH5 on time (One Pulse) Plot on Channel 00



DH5 on time (Count Pulses) Plot on Channel 00



Note:

1. Worst case Duty cycle = on time/100 milliseconds = 2 * 2.88 / 100 = 5.76 %
2. Worst case Duty cycle correction factor = 20*log(Duty cycle) = -24.79 dB
3. DH5 has the highest duty cycle worst case and is reported.