



### Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Pang	Temperature :	22~25°C
		Relative Humidity :	42~45%

15C 2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)	
BLE CH 00 2402MHz		2382.81	51.44	-22.56	74	47.99	31.93	6.17	34.65	118	118	P	H	
		2383.44	40.49	-13.51	54	37.04	31.93	6.17	34.65	118	118	A	H	
	*	2402.254	92.67	-	-	89.16	31.94	6.21	34.64	118	118	P	H	
	*	2402.004	91.68	-	-	88.17	31.94	6.21	34.64	118	118	A	H	
													H	
														H
			2373.81	51.23	-22.77	74	47.78	31.93	6.17	34.65	100	109	P	V
			2367.51	40.47	-13.53	54	37.03	31.92	6.17	34.65	100	109	A	V
	*		2402.254	91.51	-	-	88	31.94	6.21	34.64	100	109	P	V
	*		2402.004	90.48	-	-	86.97	31.94	6.21	34.64	100	109	A	V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
BLE CH 19 2440MHz		2335.02	51.21	-22.79	74	47.85	31.91	6.1	34.65	110	6	P	H
		2370.12	40.4	-13.6	54	36.95	31.93	6.17	34.65	110	6	A	H
	*	2439.746	95.65	-	-	92.08	31.97	6.24	34.64	110	6	P	H
	*	2440.08	94.64	-	-	91.07	31.97	6.24	34.64	110	6	A	H
		2488.6	51.09	-22.91	74	47.42	32	6.3	34.63	110	6	P	H
		2489.72	40.92	-13.08	54	37.25	32	6.3	34.63	110	6	A	H
		2369.67	51.62	-22.38	74	48.17	31.93	6.17	34.65	102	76	P	V
		2349.69	40.8	-13.2	54	37.4	31.91	6.14	34.65	102	76	A	V
	*	2439.746	91.85	-	-	88.28	31.97	6.24	34.64	102	76	P	V
	*	2440.08	90.83	-	-	87.26	31.97	6.24	34.64	102	76	A	V
		2497.2	50.82	-23.18	74	47.11	32	6.34	34.63	102	76	P	V
		2483.52	40.56	-13.44	54	36.9	31.99	6.3	34.63	102	76	A	V
BLE CH 39 2480MHz	*	2480	92.2	-	-	88.54	31.99	6.3	34.63	108	14	P	H
	*	2480.076	91.16	-	-	87.5	31.99	6.3	34.63	108	14	A	H
		2497.84	51.69	-22.31	74	47.98	32	6.34	34.63	108	14	P	H
		2488.56	40.62	-13.38	54	36.95	32	6.3	34.63	108	14	A	H
													H
													H
	*	2479.826	89.85	-	-	86.19	31.99	6.3	34.63	100	117	P	V
	*	2480.076	88.69	-	-	85.03	31.99	6.3	34.63	100	117	A	V
		2492.92	51.34	-22.66	74	47.63	32	6.34	34.63	100	117	P	V
		2494.48	40.57	-13.43	54	36.86	32	6.34	34.63	100	117	A	V
												V	
												V	
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15C 2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)	
BLE CH 00 2402MHz		4803	40.06	-33.94	74	58.05	34.35	8.52	60.86	100	0	P	H	
													H	
													H	
													H	
		4803	40.37	-33.63	74	58.36	34.35	8.52	60.86	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4881	41.59	-32.41	74	59.11	34.4	8.77	60.69	100	0	P	H	
		7320	44.02	-29.98	74	56.87	35.73	11.95	60.53	100	0	P	H	
													H	
													H	
		4881	40.63	-33.37	74	58.15	34.4	8.77	60.69	100	0	P	V	
		7320	44.16	-29.84	74	57.01	35.73	11.95	60.53	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4959	41.05	-32.95	74	58.04	34.47	9.02	60.48	100	0	P	H	
		7440	43.04	-30.96	74	55.9	35.71	12.01	60.58	100	0	P	H	
													H	
													H	
		4959	40.84	-33.16	74	57.83	34.47	9.02	60.48	100	0	P	V	
		7440	43.14	-30.86	74	56	35.71	12.01	60.58	100	0	P	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15C Emission below 1GHz

2.4GHz BLE (LF @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
1		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		95.34	26.99	-16.51	43.5	47.56	10.1	1.08	31.75	112	321	P	H	
		111	24.26	-19.24	43.5	42.72	12.13	1.16	31.75	-	-	P	H	
		182.55	19.64	-23.86	43.5	40.75	9.18	1.46	31.75	-	-	P	H	
		455.4	28.32	-17.68	46	40.8	17.08	2.32	31.88	-	-	P	H	
		546.4	26.3	-19.7	46	36.41	19.34	2.54	31.99	-	-	P	H	
		956.6	25.2	-20.8	46	31.49	21.36	3.35	31	-	-	P	H	
														H
														H
														H
														H
														H
														H
			61.05	24.32	-15.68	40	48.71	6.5	0.88	31.77	100	235	P	V
			257.34	23.73	-22.27	46	40.24	13.45	1.77	31.73	-	-	P	V
			290.55	20.73	-25.27	46	37.56	13.02	1.87	31.72	-	-	P	V
			657	23.96	-22.04	46	33.76	19.43	2.81	32.04	-	-	P	V
			763.4	24.07	-21.93	46	32.83	20.17	3.05	31.98	-	-	P	V
			889.4	25.08	-20.92	46	32.42	20.9	3.34	31.58	-	-	P	V
														V
														V
													V	
													V	
													V	
													V	
<b>Remark</b>	1. No other spurious found. 2. All results are PASS against limit line.													



15C 2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)
BLE CH 19 2440MHz		2388.75	51.64	-22.36	74	48.18	31.94	6.17	34.65	106	202	P	H
		2389.38	40.46	-13.54	54	37	31.94	6.17	34.65	106	202	A	H
	*	2439.746	88.67	-	-	85.1	31.97	6.24	34.64	106	202	P	H
	*	2440.08	87.62	-	-	84.05	31.97	6.24	34.64	106	202	A	H
		2499.12	51.16	-22.84	74	47.45	32	6.34	34.63	106	202	P	H
		2493.64	40.55	-13.45	54	36.84	32	6.34	34.63	106	202	A	H
		2322.24	51.33	-22.67	74	47.98	31.9	6.1	34.65	100	125	P	V
		2388.48	40.38	-13.62	54	36.92	31.94	6.17	34.65	100	125	A	V
	*	2439.746	91.65	-	-	88.08	31.97	6.24	34.64	100	125	P	V
	*	2440.08	90.66	-	-	87.09	31.97	6.24	34.64	100	125	A	V
		2484.88	50.99	-23.01	74	47.33	31.99	6.3	34.63	100	125	P	V
		2491.24	40.79	-13.21	54	37.12	32	6.3	34.63	100	125	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

15C 2.4GHz 2400~2483.5MHz

BLE (Harmonic @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	(P/A)	(H/V)	
BLE CH 19 2440MHz		4881	42.59	-31.41	74	60.11	34.4	8.77	60.69	100	0	P	H	
		7320	45.02	-28.98	74	57.87	35.73	11.95	60.53	100	0	P	H	
													H	
													H	
		4881	43.63	-30.37	74	61.15	34.4	8.77	60.69	100	0	P	V	
		7320	46.16	-27.84	74	59.01	35.73	11.95	60.53	100	0	P	V	
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



**Note symbol**

*	<b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is <b>over limit</b> line.
P/A	<b>Peak</b> or <b>Average</b>
H/V	<b>Horizontal</b> or <b>Vertical</b>



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1+2		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable 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)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable 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)
- 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”.