



Appendix B. Radiated Spurious Emission

Test Engineer :	Kyle Jhuang, Wilson Wu and Alex Jeng	Temperature :	24.5~25.0°C
		Relative Humidity :	50~58%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		2350.74	53.03	-20.97	74	50.38	27.03	6.91	31.29	121	342	P	H
		2388.54	43.08	-10.92	54	40.23	27.15	6.98	31.28	121	342	A	H
	*	2402	93.64	-	-	90.78	27.15	6.98	31.27	121	342	P	H
	*	2402	93.14	-	-	90.28	27.15	6.98	31.27	121	342	A	H
													H
													H
		2377.41	52.43	-21.57	74	49.64	27.11	6.96	31.28	130	111	P	V
		2370.795	43.12	-10.88	54	40.33	27.11	6.96	31.28	130	111	A	V
	*	2402	89.02	-	-	86.16	27.15	6.98	31.27	130	111	P	V
	*	2402	88.61	-	-	85.75	27.15	6.98	31.27	130	111	A	V
													V
													V
BLE CH 19 2440MHz		2352	52.29	-21.71	74	49.58	27.07	6.93	31.29	118	342	P	H
		2389.24	43.12	-10.88	54	40.27	27.15	6.98	31.28	118	342	A	H
	*	2440	93.38	-	-	90.33	27.28	7.03	31.26	118	342	P	H
	*	2440	92.67	-	-	89.62	27.28	7.03	31.26	118	342	A	H
		2498.53	52.99	-21.01	74	49.74	27.4	7.09	31.24	118	342	P	H
		2491.95	43.55	-10.45	54	40.3	27.4	7.09	31.24	118	342	A	H
		2322.46	53.41	-20.59	74	50.83	26.99	6.89	31.3	153	117	P	V
		2360.96	42.92	-11.08	54	40.21	27.07	6.93	31.29	153	117	A	V
	*	2440	89.03	-	-	85.98	27.28	7.03	31.26	153	117	P	V
	*	2440	88.22	-	-	85.17	27.28	7.03	31.26	153	117	A	V
		2487.61	52.7	-21.3	74	49.46	27.4	7.09	31.25	153	117	P	V
		2497.83	43.38	-10.62	54	40.13	27.4	7.09	31.24	153	117	A	V



BLE	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 39 2480MHz	*	2480	92.89	-	-	89.71	27.36	7.07	31.25	109	343	P	H
	*	2480	92.04	-	-	88.86	27.36	7.07	31.25	109	343	A	H
		2497.88	52.62	-21.38	74	49.37	27.4	7.09	31.24	109	343	P	H
		2494.56	43.41	-10.59	54	40.16	27.4	7.09	31.24	109	343	A	H
													H
													H
	*	2480	88.03	-	-	84.85	27.36	7.07	31.25	100	128	P	V
	*	2480	87.24	-	-	84.06	27.36	7.07	31.25	100	128	A	V
		2489.52	52.15	-21.85	74	48.91	27.4	7.09	31.25	100	128	P	V
		2493.68	43.57	-10.43	54	40.32	27.4	7.09	31.24	100	128	A	V
													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)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
BLE CH 00 2402MHz		4804	36.08	-37.92	74	51.39	31.2	10.06	56.57	100	0	P	H
													H
													H
													H
		4804	36.22	-37.78	74	51.53	31.2	10.06	56.57	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4880	35.65	-38.35	74	50.7	31.31	10.11	56.47	100	0	P	H
		7320	41.9	-32.1	74	50.23	36.32	12.57	57.22	100	0	P	H
													H
													H
		4880	36.59	-37.41	74	51.64	31.31	10.11	56.47	100	0	P	V
		7320	40.63	-33.37	74	48.96	36.32	12.57	57.22	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4960	36.4	-37.6	74	51.14	31.44	10.17	56.35	100	0	P	H
		7440	41.89	-32.11	74	49.85	36.66	12.8	57.42	100	0	P	H
													H
													H
		4960	36.53	-37.47	74	51.27	31.44	10.17	56.35	100	0	P	V
		7440	41.82	-32.18	74	49.78	36.66	12.8	57.42	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 (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
2.4GHz BLE LF		59.97	27.66	-12.34	40	46.93	11.8	0.84	31.91	100	51	P	H
		130.98	29.43	-14.07	43.5	42.39	17.71	1.2	31.87	-	-	P	H
		296.22	19.29	-26.71	46	29.77	19.46	1.81	31.75	-	-	P	H
		503	24.58	-21.42	46	29.92	24.02	2.5	31.86	-	-	P	H
		749.4	28.32	-17.68	46	29.78	27.4	3.12	31.98	-	-	P	H
		944	31.91	-14.09	46	29.68	29.96	3.44	31.17	-	-	P	H
													H
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													H
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													H
													H
													H
		54.03	36.73	-3.27	40	54.24	13.6	0.81	31.92	100	88	P	V
		158.52	32.15	-11.35	43.5	45.73	16.94	1.32	31.84	-	-	P	V
		259.5	20.8	-25.2	46	31.04	19.8	1.73	31.77	-	-	P	V
		498.8	24.53	-21.47	46	29.94	23.96	2.49	31.86	-	-	P	V
		672.4	27.31	-18.69	46	30.49	25.88	2.95	32.01	-	-	P	V
		948.9	31.69	-14.31	46	29.3	30.08	3.44	31.13	-	-	P	V
													V
												V	
												V	
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												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	Peak or Average
H/V	Horizontal or Vertical

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

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. 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)

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) + 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)

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”.