



Appendix A. Radiated Spurious Emission

Test Engineer :	Karl Hou, Kyle Jhuang and Jet Lui	Temperature :	25~26°C
		Relative Humidity :	50~51%

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		2363.73	52.27	-21.73	74	48.65	32.7	4.6	33.68	100	350	P	H	
		2330.25	40.47	-13.53	54	37	32.62	4.55	33.7	100	350	A	H	
	*	2402	101.83	-	-	98.09	32.77	4.62	33.65	100	350	P	H	
	*	2402	100.88	-	-	97.14	32.77	4.62	33.65	100	350	A	H	
													H	
														H
			2333.76	51.66	-22.34	74	48.17	32.62	4.57	33.7	109	31	P	V
			2373	40.32	-13.68	54	36.65	32.73	4.6	33.66	109	31	A	V
	*		2402	95.1	-	-	91.36	32.77	4.62	33.65	109	31	P	V
	*		2402	94.15	-	-	90.41	32.77	4.62	33.65	109	31	A	V
														V
														V
BLE CH 19 2440MHz		2340.6	51.57	-22.43	74	48.03	32.66	4.57	33.69	100	351	P	H	
		2369.4	40.28	-13.72	54	36.61	32.73	4.6	33.66	100	351	A	H	
	*	2440	106.19	-	-	102.22	32.89	4.68	33.6	100	351	P	H	
	*	2440	105.35	-	-	101.38	32.89	4.68	33.6	100	351	A	H	
			2488.32	51.6	-22.4	74	47.43	33	4.73	33.56	100	351	P	H
			2486.28	40.75	-13.25	54	36.63	32.96	4.73	33.57	100	351	A	H
			2355.72	50.88	-23.12	74	47.29	32.7	4.57	33.68	130	233	P	V
			2384.79	40.36	-13.64	54	36.67	32.73	4.62	33.66	130	233	A	V
	*		2440	98.03	-	-	94.06	32.89	4.68	33.6	130	233	P	V
	*		2440	97.15	-	-	93.18	32.89	4.68	33.6	130	233	A	V
			2490.2	51.31	-22.69	74	47.14	33	4.73	33.56	130	233	P	V
			2490.6	40.99	-13.01	54	36.82	33	4.73	33.56	130	233	A	V



BLE CH 39 2480MHz	*	2480	97.98	-	-	93.86	32.96	4.73	33.57	146	9	P	H
	*	2480	97	-	-	92.88	32.96	4.73	33.57	146	9	A	H
		2487.12	51.22	-22.78	74	47.1	32.96	4.73	33.57	146	9	P	H
		2496	40.75	-13.25	54	36.58	33	4.73	33.56	146	9	A	H
													H
													H
	*	2480	94.89	-	-	90.77	32.96	4.73	33.57	103	230	P	V
	*	2480	93.99	-	-	89.87	32.96	4.73	33.57	103	230	A	V
		2490	51.49	-22.51	74	47.32	33	4.73	33.56	103	230	P	V
		2491.28	40.7	-13.3	54	36.53	33	4.73	33.56	103	230	A	V
													V
													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.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
BLE CH 00 2402MHz		4803	40.11	-33.89	74	57.19	35.04	6.52	58.64	100	0	P	H
													H
													H
													H
		4803	40.54	-33.46	74	57.62	35.04	6.52	58.64	100	0	P	V
													V
													V
BLE CH 19 2440MHz		4881	41.05	-32.95	74	57.97	35.02	6.58	58.52	100	0	P	H
		7320	42.9	-31.1	74	56.45	36.4	8.24	58.19	100	0	P	H
													H
													H
		4881	40.76	-33.24	74	57.68	35.02	6.58	58.52	100	0	P	V
		7320	42.06	-31.94	74	55.61	36.4	8.24	58.19	100	0	P	V
													V
BLE CH 39 2480MHz		4959	40.37	-33.63	74	57.11	35.01	6.61	58.36	100	0	P	H
		7440	42.44	-31.56	74	56.02	36.47	8.36	58.41	100	0	P	H
													H
													H
		4959	40.18	-33.82	74	56.92	35.01	6.61	58.36	100	0	P	V
		7440	43.16	-30.84	74	56.74	36.47	8.36	58.41	100	0	P	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		100.47	27.96	-15.54	43.5	48.2	10.44	1.1	31.78			P	H	
	!	249.78	40.3	-5.7	46	58.03	12.4	1.64	31.77	125	186	P	H	
		253.02	39.98	-6.02	46	57.25	12.85	1.65	31.77			P	H	
		323.1	33.46	-12.54	46	49.87	13.52	1.84	31.77			P	H	
		342	31.79	-14.21	46	47.53	14.16	1.88	31.78			P	H	
		731.9	33.14	-12.86	46	40.47	21.96	2.71	32			P	H	
														H
														H
														H
														H
														H
														H
		!	30.54	36.25	-3.75	40	48.98	18.38	0.71	31.82	112	220	P	V
			46.2	28.13	-11.87	40	49.44	9.7	0.79	31.8			P	V
			246.54	31.6	-14.4	46	49.74	12	1.63	31.77			P	V
			316.8	30.9	-15.1	46	47.48	13.37	1.82	31.77			P	V
			731.9	37.59	-8.41	46	44.92	21.96	2.71	32			P	V
			756.4	35.41	-10.59	46	42.42	22.2	2.76	31.97			P	V
														V
														V
													V	
													V	
													V	
													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



Note symbol for Part 15C rule

15C 2.4GHz 2400~2483.5MHz

15C band 4 - 5725~5850MHz

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency per 15.209(c).
!	Test result is over limit line.
@	Frequency falls in non-restricted band is passed and tested by conducted band edges and spurious emission measurement in the test report.
#	Peak measured value is under 20dB and complies with the average limit, so it is unnecessary to perform an average measurement per clause 6.5.4.2 of ANSI C63.10.
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”.