



## Appendix A. Radiated Spurious Emission

Test Engineer :	Stan Hsieh, Ken Wu, Nick Yu, and James Chiu	Temperature :	21~23°C
		Relative Humidity :	47~49%

### 15C 2.4GHz 2400~2483.5MHz

#### BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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 )
BLE CH 00 2402MHz		2355	49.95	-24.05	74	44.39	32.13	7.68	34.25	202	142	P	H
		2379.75	37.04	-16.96	54	31.47	32.16	7.68	34.27	202	142	A	H
	*	2402.171	101.3	-	-	95.67	32.18	7.75	34.3	202	142	P	H
	*	2402.004	100.6	-	-	94.97	32.18	7.75	34.3	202	142	A	H
													H
													H
		2389.29	49.31	-24.69	74	43.65	32.18	7.75	34.27	112	223	P	V
		2377.32	37.28	-16.72	54	31.71	32.16	7.68	34.27	112	223	A	V
	*	2402.254	101.77	-	-	96.14	32.18	7.75	34.3	112	223	P	V
	*	2402.004	101.08	-	-	95.45	32.18	7.75	34.3	112	223	A	V
													V
													V
BLE CH 19 2440MHz		2354.01	49.56	-24.44	74	44	32.13	7.68	34.25	174	145	P	H
		2378.4	37.11	-16.89	54	31.54	32.16	7.68	34.27	174	145	A	H
	*	2440.331	101.69	-	-	95.97	32.24	7.83	34.35	174	145	P	H
	*	2439.997	100.99	-	-	95.27	32.24	7.83	34.35	174	145	A	H
		2494.2	49.65	-24.35	74	43.92	32.3	7.91	34.48	174	145	P	H
		2488.2	37.19	-16.81	54	31.41	32.3	7.91	34.43	174	145	A	H
		2369.13	49.6	-24.4	74	44.03	32.16	7.68	34.27	114	221	P	V
		2364.99	37.19	-16.81	54	31.65	32.13	7.68	34.27	114	221	A	V
	*	2440.331	102.81	-	-	97.09	32.24	7.83	34.35	114	221	P	V
	*	2439.997	102.11	-	-	96.39	32.24	7.83	34.35	114	221	A	V
		2488.8	50.33	-23.67	74	44.55	32.3	7.91	34.43	114	221	P	V
		2491.56	37.2	-16.8	54	31.42	32.3	7.91	34.43	114	221	A	V



<b>BLE CH 39 2480MHz</b>	*	2480.327	100.92	-	-	95.16	32.28	7.91	34.43	198	144	P	H
	*	2479.993	100.2	-	-	94.44	32.28	7.91	34.43	198	144	A	H
		2483.6	50.21	-23.79	74	44.45	32.28	7.91	34.43	198	144	P	H
		2483.52	37.78	-16.22	54	32.02	32.28	7.91	34.43	198	144	A	H
													H
													H
	*	2479.826	102.97	-	-	97.21	32.28	7.91	34.43	104	207	P	V
	*	2479.993	102.23	-	-	96.47	32.28	7.91	34.43	104	207	A	V
		2484.24	50.97	-23.03	74	45.21	32.28	7.91	34.43	104	207	P	V
		2483.52	38.19	-15.81	54	32.43	32.28	7.91	34.43	104	207	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.
				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)
BLE CH 00 2402MHz		4804	54.69	-19.31	74	68.29	34.25	11.11	58.96	179	303	P	H
		4804	50.52	-3.48	54	64.12	34.25	11.11	58.96	179	303	A	H
													H
													H
		4806	49.14	-24.86	74	62.74	34.25	11.11	58.96	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4878	55.12	-18.88	74	68.44	34.3	11.21	58.83	164	313	P	H
		4878	51.58	-2.42	54	64.9	34.3	11.21	58.83	164	313	A	H
		7320	56.95	-17.05	74	64.01	35.6	15.08	57.74	105	314	P	H
		7320	50.72	-3.28	54	57.78	35.6	15.08	57.74	105	314	A	H
		4878	49.84	-24.16	74	63.16	34.3	11.21	58.83	100	0	P	V
		7320	56.86	-17.14	74	63.92	35.6	15.08	57.74	102	325	P	V
		7320	50.71	-3.29	54	57.77	35.6	15.08	57.74	102	325	A	V
													V
BLE CH 39 2480MHz		4962	56.86	-17.14	74	69.83	34.37	11.32	58.66	178	319	P	H
		4962	53.02	-0.98	54	65.99	34.37	11.32	58.66	178	319	A	H
		7440	54.44	-19.56	74	61.56	35.6	15.13	57.85	100	314	P	H
		7440	50.21	-3.79	54	57.33	35.6	15.13	57.85	100	314	A	H
		4962	50.23	-23.77	74	63.2	34.37	11.32	58.66	100	0	P	V
		7440	55.19	-18.81	74	62.31	35.6	15.13	57.85	142	347	P	V
		7440	52.1	-1.9	54	59.22	35.6	15.13	57.85	142	347	A	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)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	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 BLE LF		42.96	22.61	-17.39	40	40.14	11.9	1.77	31.2	105	52	P	H
		125.04	20.6	-22.9	43.5	37.72	11.6	2.38	31.1			P	H
		200.1	19.14	-24.36	43.5	38.45	9.1	2.69	31.1			P	H
		374.9	24.14	-21.86	46	36.77	15	3.39	31.02			P	H
		717.9	16.27	-29.73	46	20.94	21.32	4.41	30.4			P	H
		869.1	18.34	-27.66	46	21.02	23.02	4.66	30.36			P	H
													H
													H
													H
													H
													H
													H
		49.98	24.96	-15.04	40	45.99	8.4	1.77	31.2	119	154	P	V
		125.04	22.75	-20.75	43.5	39.87	11.6	2.38	31.1			P	V
		273.54	13.01	-32.99	46	27.95	12.86	3.16	30.96			P	V
		366.5	17.49	-28.51	46	30.34	14.83	3.39	31.07			P	V
		624.8	21.47	-24.53	46	27.51	20.29	4.22	30.55			P	V
		865.6	22.22	-23.78	46	24.83	23.1	4.66	30.37			P	V
													V
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													V
Remark	1. No other spurious found. 2. All results are PASS against 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 per 15.209(c).
!	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 CH 01 2412MHz		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. 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”.**