



## Appendix A. Radiated Spurious Emission

Test Engineer :	Citta Ke, Kyle Jhuang, Karl Hou and Nick Yu	Temperature :	21~22°C
		Relative Humidity :	49~50%

2.4GHz 2400~2483.5MHz

BLE (Band Edge @ 3m)

BLE	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
		( MHz )	( dBµV/m )	( dB )	Limit Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.		
					( dBµV/m )	( dBµV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
BLE CH 00 2402MHz		2381.64	53.37	-20.63	74	47.34	33.04	6.65	33.66	107	293	P	H	
		2344.83	42.52	-11.48	54	36.53	33.09	6.59	33.69	107	293	A	H	
	*	2402	85.45	-	-	79.43	33.02	6.65	33.65	107	293	P	H	
	*	2402	84.48	-	-	78.46	33.02	6.65	33.65	107	293	A	H	
													H	
														H
			2375.79	53.21	-20.79	74	47.18	33.04	6.65	33.66	236	269	P	V
			2361.57	42.5	-11.5	54	36.52	33.07	6.59	33.68	236	269	A	V
	*		2402	90.59	-	-	84.57	33.02	6.65	33.65	236	269	P	V
	*		2402	89.46	-	-	83.44	33.02	6.65	33.65	236	269	A	V
														V
													V	
BLE CH 19 2440MHz		2329.71	53.17	-20.83	74	47.17	33.11	6.59	33.7	100	327	P	H	
		2351.04	42.57	-11.43	54	36.58	33.09	6.59	33.69	100	327	A	H	
	*	2440	85.8	-	-	79.74	32.96	6.7	33.6	100	327	P	H	
	*	2440	84.83	-	-	78.77	32.96	6.7	33.6	100	327	A	H	
			2486.76	52.96	-21.04	74	46.85	32.92	6.76	33.57	100	327	P	H
			2490.8	42.37	-11.63	54	36.22	32.9	6.81	33.56	100	327	A	H
			2344.2	53.69	-20.31	74	47.7	33.09	6.59	33.69	219	256	P	V
			2329.17	42.55	-11.45	54	36.55	33.11	6.59	33.7	219	256	A	V
	*		2440	91.32	-	-	85.26	32.96	6.7	33.6	219	256	P	V
	*		2440	90.09	-	-	84.03	32.96	6.7	33.6	219	256	A	V
			2499.4	53.82	-20.18	74	47.67	32.9	6.81	33.56	219	256	P	V
		2484.56	42.51	-11.49	54	36.4	32.92	6.76	33.57	219	256	A	V	



<b>BLE CH 39 2480MHz</b>	*	2480	85.86	-	-	79.75	32.92	6.76	33.57	100	322	P	H
	*	2480	84.7	-	-	78.59	32.92	6.76	33.57	100	322	A	H
		2485.88	54.25	-19.75	74	48.14	32.92	6.76	33.57	100	322	P	H
		2490.32	42.56	-11.44	54	36.41	32.9	6.81	33.56	100	322	A	H
													H
													H
	*	2480	90.47	-	-	84.36	32.92	6.76	33.57	208	285	P	V
	*	2480	89.59	-	-	83.48	32.92	6.76	33.57	208	285	A	V
		2496.96	53.66	-20.34	74	47.51	32.9	6.81	33.56	208	285	P	V
		2484.64	42.43	-11.57	54	36.32	32.92	6.76	33.57	208	285	A	V
													V
													V

<b>Remark</b>	<ol style="list-style-type: none"> <li>1. No other spurious found.</li> <li>2. All results are PASS against Peak and Average limit line.</li> </ol>
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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	39.42	-34.58	74	55.9	32.51	9.65	58.64	100	0	P	H
													H
													H
													H
		4803	39.35	-34.65	74	55.83	32.51	9.65	58.64	100	0	P	V
													V
													V
													V
BLE CH 19 2440MHz		4881	40.38	-33.62	74	56.58	32.58	9.74	58.52	100	0	P	H
		7320	42.13	-31.87	74	54.4	34.07	11.85	58.19	100	0	P	H
													H
													H
		4881	41.02	-32.98	74	57.22	32.58	9.74	58.52	100	0	P	V
		7320	41.49	-32.51	74	53.76	34.07	11.85	58.19	100	0	P	V
													V
													V
BLE CH 39 2480MHz		4959	39.11	-34.89	74	54.97	32.67	9.83	58.36	100	0	P	H
		7440	40.72	-33.28	74	52.98	34.09	12.06	58.41	100	0	P	H
													H
													H
		4959	40.61	-33.39	74	56.47	32.67	9.83	58.36	100	0	P	V
		7440	41.7	-32.3	74	53.96	34.09	12.06	58.41	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	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.	
		( MHz )	( dBμV/m )	( dB )	( dBμV/m )	( dBμV )	( dB/m )	( dB )	( dB )	( cm )	( deg )	( P/A )	( H/V )	
2.4GHz BLE LF		61.86	19.08	-20.92	40	42.36	5.94	1.22	30.44			P	H	
		105.87	32.95	-10.55	43.5	51.22	10.66	1.48	30.41	100	0	P	H	
		207.12	24.63	-18.87	43.5	43.89	9.17	1.89	30.32			P	H	
		431.6	18.96	-27.04	46	29.3	16.92	2.68	29.94			P	H	
		495.3	18.08	-27.92	46	26.99	17.95	2.96	29.82			P	H	
		783	22.79	-23.21	46	26.4	22.07	3.72	29.4			P	H	
														H
														H
														H
														H
														H
														H
														H
			78.87	28.33	-11.67	40	50.54	7	1.22	30.43	105	100	P	V
			164.46	23.55	-19.95	43.5	42.4	9.8	1.71	30.36			P	V
			267.87	17.5	-28.5	46	32.47	13.1	2.14	30.21			P	V
			319.6	18.74	-27.26	46	33.16	13.4	2.3	30.12			P	V
			431.6	19.83	-26.17	46	30.17	16.92	2.68	29.94			P	V
			815.9	24.3	-21.7	46	27.38	22.48	3.78	29.34			P	V
														V
													V	
													V	
													V	
													V	
													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		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”.**