



Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~24°C
		Relative Humidity :	47~50%

**15C 2.4GHz 2400~2483.5MHz
BLE (Band Edge @ 3m)**

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)	
BLE CH 00 2402MHz		2389.02	52.5	-21.5	74	48.35	31.94	6.73	34.52	140	1	P	H	
		2337.9	39.6	-14.4	54	35.61	31.91	6.6	34.52	140	1	A	H	
	*	2402	92.4	-	-	88.25	31.94	6.73	34.52	140	1	P	H	
	*	2402	91.24	-	-	87.09	31.94	6.73	34.52	140	1	A	H	
													H	
													H	
			2359.59	51.96	-22.04	74	47.89	31.92	6.67	34.52	100	75	P	V
			2389.56	39.42	-14.58	54	35.27	31.94	6.73	34.52	100	75	A	V
	*		2402	87.83	-	-	83.68	31.94	6.73	34.52	100	75	P	V
	*		2402	86.63	-	-	82.48	31.94	6.73	34.52	100	75	A	V
													V	
BLE CH 19 2440MHz		2388.12	52.2	-21.8	74	48.05	31.94	6.73	34.52	185	3	P	H	
		2375.97	39.65	-14.35	54	35.57	31.93	6.67	34.52	185	3	A	H	
	*	2440	90.75	-	-	86.5	31.97	6.8	34.52	185	3	P	H	
	*	2440	89.6	-	-	85.35	31.97	6.8	34.52	185	3	A	H	
			2490.08	52.11	-21.89	74	47.75	32	6.87	34.51	185	3	P	H
			2484.32	39.64	-14.36	54	35.29	31.99	6.87	34.51	185	3	A	H
			2370.66	52.3	-21.7	74	48.22	31.93	6.67	34.52	268	108	P	V
			2376.06	39.67	-14.33	54	35.59	31.93	6.67	34.52	268	108	A	V
	*		2440	89.67	-	-	85.42	31.97	6.8	34.52	268	108	P	V
	*		2440	88.48	-	-	84.23	31.97	6.8	34.52	268	108	A	V
			2494.8	52.57	-21.43	74	48.21	32	6.87	34.51	268	108	P	V
			2488.84	39.62	-14.38	54	35.26	32	6.87	34.51	268	108	A	V



BLE CH 39 2480MHz	*	2479.742	86.6	-	-	82.25	31.99	6.87	34.51	285	334	P	H
	*	2479.993	85.36	-	-	81.01	31.99	6.87	34.51	285	334	P	H
		2484.04	51.96	-22.04	74	47.61	31.99	6.87	34.51	285	334	P	H
		2483.52	40.32	-13.68	54	35.97	31.99	6.87	34.51	285	334	A	H
													H
													H
	*	2480	86.21	-	-	81.86	31.99	6.87	34.51	260	109	P	V
	*	2480	84.99	-	-	80.64	31.99	6.87	34.51	260	109	A	V
		2488.68	51.69	-22.31	74	47.33	32	6.87	34.51	260	109	P	V
		2483.52	40.38	-13.62	54	36.03	31.99	6.87	34.51	260	109	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
WIFI 802.11b (Harmonic @ 3m)

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)	
BLE CH 00 2402MHz		4806	49.61	-24.39	74	62.76	34.35	10.13	57.63	100	0	P	H	
													H	
													H	
													H	
		4806	49.78	-24.22	74	62.93	34.35	10.13	57.63	100	0	P	V	
														V
														V
														V
BLE CH 19 2440MHz		4884	49.95	-24.05	74	62.91	34.4	10.18	57.54	100	0	P	H	
		7323	40.9	-33.1	74	51.94	35.73	12.36	59.13	100	0	P	H	
													H	
													H	
		4881	50.78	-23.22	74	63.74	34.4	10.18	57.54	100	0	P	V	
		7323	40.36	-33.64	74	51.4	35.73	12.36	59.13	100	0	P	V	
														V
														V
BLE CH 39 2480MHz		4959	52.82	-21.18	74	65.56	34.47	10.23	57.44	100	355	P	H	
		4959	51.65	-2.35	54	64.39	34.47	10.23	57.44	100	355	A	H	
		7440	44.66	-29.34	74	55.58	35.71	12.62	59.25	100	0	P	H	
													H	
		4959	51.65	-22.35	74	64.39	34.47	10.23	57.44	274	304	P	V	
		4959	50.22	-3.78	54	62.96	34.47	10.23	57.44	274	304	A	V	
		7440	42.33	-31.67	74	53.25	35.71	12.62	59.25	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)

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)	
2.4GHz BLE LF		118.56	22.68	-20.82	43.5	41.1	12.12	1.21	31.75	-	-	P	H	
		170.4	23.71	-19.79	43.5	44.09	9.76	1.61	31.75	-	-	P	H	
		262.2	28.18	-17.82	46	44.4	13.72	1.79	31.73	-	-	P	H	
		391	35.97	-10.03	46	50.09	15.53	2.16	31.81	-	-	P	H	
		496	39.41	-6.59	46	51.15	17.75	2.44	31.93	111	212	P	H	
		650	38.38	-7.62	46	48.12	19.5	2.8	32.04	-	-	P	H	
														H
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														H
														H
			80.76	21.76	-18.24	40	45.43	7.1	0.99	31.76	-	-	P	V
			175.8	23.16	-20.34	43.5	43.83	9.55	1.53	31.75	-	-	P	V
			230.34	27.32	-18.68	46	47.09	10.32	1.65	31.74	-	-	P	V
			454	37.58	-8.42	46	50.12	17.02	2.32	31.88	100	212	P	V
			518.4	37.1	-8.9	46	48.55	17.99	2.51	31.95	-	-	P	V
			673.1	36.42	-9.58	46	46.14	19.47	2.84	32.03	-	-	P	V
														V
													V	
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													V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.													



Note symbol for Part 15C rule

*	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

- 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”.