Appendix A. Radiated Spurious Emission

Test Engineer :	Derreck Chen, Nick Yu and Ken Wu	Temperature :	23~25°C
rest Engineer:	Defreck Cheff, Nick fu and Keff Wu	Relative Humidity :	46~49%

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)	(dB _µ V)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
		2389.11	47.28	-26.72	74	41.62	32.18	7.75	34.27	100	38	Р	Н
		2353.56	35.24	-18.76	54	29.68	32.13	7.68	34.25	100	38	Α	Н
	*	2401.753	94.56	ı	-	88.93	32.18	7.75	34.3	100	38	Р	Н
	*	2402.004	93.88	-	-	88.25	32.18	7.75	34.3	100	38	Α	Н
BLE													Н
CH 00													Н
2402MHz		2384.34	48.17	-25.83	74	42.53	32.16	7.75	34.27	103	27	Р	V
2-102111112		2376.51	35.37	-18.63	54	29.8	32.16	7.68	34.27	103	27	Α	V
	*	2402.171	92.61	1	-	86.98	32.18	7.75	34.3	103	27	Р	V
	*	2401.92	91.95	-	-	86.32	32.18	7.75	34.3	103	27	Α	V
													V
													V
		2364.27	47.18	-26.82	74	41.64	32.13	7.68	34.27	100	28	Р	Н
		2364.63	35.22	-18.78	54	29.68	32.13	7.68	34.27	100	28	Α	Н
	*	2440.247	97.3	-	-	91.58	32.24	7.83	34.35	100	28	Р	Н
	*	2439.997	96.63	-	-	90.91	32.24	7.83	34.35	100	28	Р	Н
DI E		2496.44	47.83	-26.17	74	42.1	32.3	7.91	34.48	100	28	Р	Н
BLE CH 19		2489.6	35.3	-18.7	54	29.52	32.3	7.91	34.43	100	28	Α	Н
2440MHz		2336.91	47.23	-26.77	74	41.74	32.11	7.6	34.22	105	24	Р	V
ZTTOIVII IZ		2318.55	35.23	-18.77	54	29.76	32.09	7.6	34.22	105	24	Α	V
	*	2440.164	93.38	-	-	87.66	32.24	7.83	34.35	105	24	Р	V
	*	2439.997	92.69	-	-	86.97	32.24	7.83	34.35	105	24	Р	V
		2492.48	48.8	-25.2	74	43.07	32.3	7.91	34.48	105	24	Р	V
		2499.2	35.21	-18.79	54	29.48	32.3	7.91	34.48	105	24	Α	V

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		T					<u> </u>			l			
	*	2479.909	96.17	-	-	90.41	32.28	7.91	34.43	114	32	Р	Н
	*	2480.076	95.47	-	-	89.71	32.28	7.91	34.43	114	32	Α	Н
		2484.44	47.86	-26.14	74	42.1	32.28	7.91	34.43	114	32	Р	Н
		2484.12	36.56	-17.44	54	30.8	32.28	7.91	34.43	114	32	Α	Н
D. F.													Н
BLE													Н
CH 39 2480MHz	*	2479.826	93.27	-	-	87.51	32.28	7.91	34.43	100	27	Р	V
2400W112	*	2480.076	92.56	-	-	86.8	32.28	7.91	34.43	100	27	Α	V
		2492.12	48.1	-25.9	74	42.37	32.3	7.91	34.48	100	27	Р	V
		2486.32	35.54	-18.46	54	29.78	32.28	7.91	34.43	100	27	Α	V
													V
													V
	1. N	o other spurious	found.										
Remark	2. Al	II results are PA	SS against l	Peak and	Average lim	nit line.							

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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)
		4806	41.98	-32.02	74	565.72	-500	11.11	34.85	100	0	Р	Н
													Н
													Н
BLE													Н
CH 00		4806	41.9	-32.1	74	565.64	-500	11.11	34.85	100	0	Р	٧
2402MHz													٧
													V
													V
		4878	42.33	-31.67	74	565.97	-500	11.21	34.85	100	0	Р	Н
		7320	43.78	-30.22	74	564.43	-500	15.08	35.73	100	0	Р	Н
													Н
BLE													Н
CH 19 2440MHz		4878	41.64	-32.36	74	565.28	-500	11.21	34.85	100	0	Р	V
244UWITIZ		7320	43.7	-30.3	74	564.35	-500	15.08	35.73	100	0	Р	V
													V
													V
		4960	41.81	-32.19	74	54.78	34.37	11.32	58.66	100	0	Р	Н
		7440	43.28	-30.72	74	50.4	35.6	15.13	57.85	100	0	Р	Н
													Н
BLE													Н
CH 39		4959	41.66	-32.34	74	54.63	34.37	11.32	58.66	100	0	Р	V
2480MHz		7440	43.12	-30.88	74	50.24	35.6	15.13	57.85	100	0	Р	V
													V
													V
	1. No	o other spurious	s found	•		•	•		•	•	•	•	
Remark		results are PA		Peak and	l Average lim	it line							
	F. /\"	130ano aro 17	.co against i	Jun and	vorago iliti								

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15C Emission below 1GHz

2.4GHz BLE (LF)

	(MI 77. 18: 228 399 799	79 1.2 .45 9.4	(dBµV/m) 27.12 26.95 35.74 29.56 30.94	Limit (dB) -12.88 -16.55 -10.26 -16.44	Line (dBμV/m) 40 43.5 46 46	Level (dΒμV) 49.36 46.3 53.76	Factor (dB/m) 6.9 8.88 10.02	Loss (dB) 2.06 2.69	Factor (dB) 31.2 30.92	Pos (cm)	Pos (deg)	Avg. (P/A) P	(H/V) H
	77. 18. 228 399 799	79 1.2 .45 9.4	27.12 26.95 35.74 29.56 30.94	-12.88 -16.55 -10.26	40 43.5 46	49.36 46.3	6.9 8.88	2.06	31.2		(deg)	Р	Н
	18 ⁻ 228 399 799	1.2 .45 9.4	26.95 35.74 29.56 30.94	-16.55 -10.26	43.5 46	46.3	8.88	2.69	30.92				
	228 399 799	.45 9.4 9.1	35.74 29.56 30.94	-10.26	46							Р	Н
	399 799	9.4	29.56 30.94			53.76	10.02	0.00					
	799	9.1	30.94	-16.44	16			2.96	31	162	35	Р	Н
					40	41.04	15.9	3.52	30.9			Р	Н
	960	0.1		-15.06	46	34.63	21.99	4.62	30.3			Р	Н
		l I	39.21	-14.79	54	39.93	24.7	4.94	30.36			Р	Н
													Н
													Н
													Н
													Н
2.4GHz													Н
BLE													Н
LF	78.	06	26.2	-13.8	40	48.41	6.93	2.06	31.2			Р	V
	167	7.7	30.96	-12.54	43.5	49.74	9.74	2.61	31.13	201	54	Р	V
	229	.53	27.18	-18.82	46	45.12	10.1	2.96	31			Р	V
	400	0.8	25.11	-20.89	46	36.56	15.93	3.52	30.9			Р	V
	599	9.6	30.84	-15.16	46	37.77	19.59	4.08	30.6			Р	V
	840	0.4	28.12	-17.88	46	30.6	23.2	4.7	30.38			Р	V
													V
													V
													V
													V
													V
													V

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Note symbol

*	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.
P/A	Peak or Average
H/V	Horizontal or Vertical

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A calculation example for radiated spurious emission is shown as below:

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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)	(dB _µ V)	(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	Р	Н
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	Α	Н

1. Level($dB\mu V/m$) =

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

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

For Peak Limit @ 2390MHz:

- 1. Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 54.51(dB\mu V) 35.86 (dB)$
- $= 55.45 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level($dB\mu V/m$) Limit Line($dB\mu V/m$)
- $= 55.45(dB\mu V/m) 74(dB\mu V/m)$
- = -18.55(dB)

For Average Limit @ 2390MHz:

- Level(dBµV/m)
- = Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBµV) Preamp Factor(dB)
- $= 32.22(dB/m) + 4.58(dB) + 42.6(dB\mu V) 35.86 (dB)$
- $= 43.54 (dB\mu V/m)$
- 2. Over Limit(dB)
- = Level($dB\mu V/m$) Limit Line($dB\mu V/m$)
- $= 43.54(dB\mu V/m) 54(dB\mu V/m)$
- = -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".

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