



Appendix A. Radiated Spurious Emission

Test Engineer :	Donny Tang	Temperature :	22~25°C
		Relative Humidity :	40~44%

15E Band 4 - 5725~5850MHz

WIFI 802.11a (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11a CH 149 5745MHz		5722.68	60.23	-13.77	74	49.93	35.13	9.16	33.99	101	298	P	H	
		5724.76	44.67	-9.33	54	34.37	35.13	9.16	33.99	101	298	A	H	
	*	5747	103.01	-	-	92.64	35.14	9.22	33.99	101	298	P	H	
	*	5747	92.45	-	-	82.08	35.14	9.22	33.99	101	298	A	H	
													H	
													H	
													H	
													H	
			5724.76	65.12	-8.88	74	54.82	35.13	9.16	33.99	107	349	P	V
			5725	45.88	-8.12	54	35.58	35.13	9.16	33.99	107	349	A	V
	*		5743	105.99	-	-	95.62	35.14	9.22	33.99	107	349	P	V
	*		5743	95.74	-	-	85.37	35.14	9.22	33.99	107	349	A	V
														V
														V



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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11a CH 157 5785MHz		5722.44	54.29	-19.71	74	43.99	35.13	9.16	33.99	101	297	P	H	
		5717.48	43.17	-10.83	54	32.88	35.12	9.16	33.99	101	297	A	H	
	*	5783	102.45	-	-	92.01	35.17	9.27	34	101	297	P	H	
	*	5783	92.53	-	-	82.09	35.17	9.27	34	101	297	A	H	
		5881.52	54.38	-19.62	74	43.79	35.23	9.36	34	101	297	P	H	
		5851.68	43.35	-10.65	54	32.79	35.21	9.35	34	101	297	A	H	
														H
														H
			5706.28	54.12	-19.88	74	43.83	35.12	9.16	33.99	104	192	P	V
			5717.64	43.25	-10.75	54	32.95	35.13	9.16	33.99	104	192	A	V
	*		5787	106.17	-	-	95.67	35.18	9.32	34	104	192	P	V
	*		5787	95.4	-	-	84.9	35.18	9.32	34	104	192	A	V
			5852.32	54.48	-19.52	74	43.92	35.21	9.35	34	104	192	P	V
			5852.72	43.48	-10.52	54	32.92	35.21	9.35	34	104	192	A	V
														V
														V



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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 165 5825MHz	*	5827	100.94	-	-	90.4	35.2	9.34	34	100	297	P	H
	*	5827	90.52	-	-	79.98	35.2	9.34	34	100	297	A	H
		5887.2	54.43	-19.57	74	43.82	35.23	9.38	34	100	297	P	H
		5877.12	43.71	-10.29	54	33.12	35.23	9.36	34	100	297	A	H
													H
													H
													H
													H
	*	5823	104.88	-	-	94.35	35.19	9.34	34	104	194	P	V
	*	5823	94.65	-	-	84.12	35.19	9.34	34	104	194	A	V
		5877.2	55.16	-18.84	74	44.57	35.23	9.36	34	104	194	P	V
		5877.6	44.64	-9.36	54	34.05	35.23	9.36	34	104	194	A	V
													V
													V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 4 5725~5850MHz

WIFI 802.11a (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		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz		11490	44.19	-29.81	74	50.17	38.09	14.45	58.52	100	0	P	H
		17232	47.12	-26.88	74	46.6	41.11	18.01	58.6	100	0	P	H
													H
													H
		11490	45.31	-28.69	74	51.29	38.09	14.45	58.52	100	0	P	V
		17232	47.72	-26.28	74	47.2	41.11	18.01	58.6	100	0	P	V
													V
													V
802.11a CH 157 5785MHz		11570	45.47	-28.53	74	51.23	38.2	14.58	58.54	100	0	P	H
		17352	48.2	-25.8	74	47.69	41.02	18.09	58.6	100	0	P	H
													H
													H
		11570	44.42	-29.58	74	50.18	38.2	14.58	58.54	100	0	P	V
		17352	48.28	-25.72	74	47.77	41.02	18.09	58.6	100	0	P	V
													V
													V
802.11a CH 165 5825MHz		11650	44.57	-29.43	74	50.17	38.29	14.69	58.58	100	0	P	H
		17472	48.45	-25.55	74	47.93	40.93	18.19	58.6	100	0	P	H
													H
													H
		11650	45.34	-28.66	74	50.94	38.29	14.69	58.58	100	0	P	V
		17472	48.15	-25.85	74	47.63	40.93	18.19	58.6	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT20 CH 149 5745MHz		5725	63.5	-10.5	74	53.2	35.13	9.16	33.99	102	297	P	H	
		5725	45.24	-8.76	54	34.94	35.13	9.16	33.99	102	297	A	H	
	*	5747	102.54	-	-	92.17	35.14	9.22	33.99	102	297	P	H	
	*	5747	92.14	-	-	81.77	35.14	9.22	33.99	102	297	A	H	
													H	
													H	
													H	
													H	
			5724.92	64.87	-9.13	74	54.57	35.13	9.16	33.99	106	189	P	V
			5725	47.11	-6.89	54	36.81	35.13	9.16	33.99	106	189	A	V
	*		5743	106.7	-	-	96.33	35.14	9.22	33.99	106	189	P	V
	*		5743	95.84	-	-	85.47	35.14	9.22	33.99	106	189	A	V
													V	
													V	



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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 165 5825MHz	*	5827	101.14	-	-	90.61	35.19	9.34	34	100	298	P	H
	*	5827	90.56	-	-	80.03	35.19	9.34	34	100	298	A	H
		5855.04	54.46	-19.54	74	43.89	35.22	9.35	34	100	298	P	H
		5876.88	44.02	-9.98	54	33.43	35.23	9.36	34	100	298	A	H
													H
													H
													H
													H
	*	5823	105.41	-	-	94.88	35.19	9.34	34	103	181	P	V
	*	5823	94.76	-	-	84.23	35.19	9.34	34	103	181	A	V
		5878.4	55.66	-18.34	74	45.07	35.23	9.36	34	103	181	P	V
		5876.56	44.92	-9.08	54	34.33	35.23	9.36	34	103	181	A	V
													V
													V
													V
												V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 4 5725~5850MHz

WIFI 802.11n HT20 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 149 5745MHz		11490	44.2	-29.8	74	50.18	38.09	14.45	58.52	100	0	P	H
		17232	47.25	-26.75	74	46.73	41.11	18.01	58.6	100	0	P	H
													H
													H
		11490	45.26	-28.74	74	51.24	38.09	14.45	58.52	100	0	P	V
		17232	47.38	-26.62	74	46.86	41.11	18.01	58.6	100	0	P	V
													V
802.11n HT20 CH 157 5785MHz		11570	45.77	-28.23	74	51.53	38.2	14.58	58.54	100	0	P	H
		17352	48.11	-25.89	74	47.6	41.02	18.09	58.6	100	0	P	H
													H
													H
		11570	45.96	-28.04	74	51.72	38.2	14.58	58.54	100	0	P	V
		17352	48.09	-25.91	74	47.58	41.02	18.09	58.6	100	0	P	V
													V
802.11n HT20 CH 165 5825MHz		11650	45.32	-28.68	74	50.92	38.29	14.69	58.58	100	0	P	H
		17472	47.3	-26.7	74	46.78	40.93	18.19	58.6	100	0	P	H
													H
													H
		11650	45.68	-28.32	74	51.28	38.29	14.69	58.58	100	0	P	V
		17472	47.81	-26.19	74	47.29	40.93	18.19	58.6	100	0	P	V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT40 CH 151 5755MHz		5724.04	63.27	-10.73	74	52.97	35.13	9.16	33.99	100	4	P	H	
		5724.92	46.12	-7.88	54	35.82	35.13	9.16	33.99	100	4	A	H	
	*	5755	98.36	-	-	87.97	35.16	9.22	33.99	100	4	P	H	
	*	5755	87.92	-	-	77.53	35.16	9.22	33.99	100	4	A	H	
		5883.04	53.54	-20.46	74	42.95	35.23	9.36	34	100	4	P	H	
		5857.76	43.16	-10.84	54	32.58	35.22	9.36	34	100	4	A	H	
														H
														H
			5725	65.76	-8.24	74	55.46	35.13	9.16	33.99	109	329	P	V
			5723.8	46.37	-7.63	54	36.07	35.13	9.16	33.99	109	329	A	V
	*		5755	100.17	-	-	89.78	35.16	9.22	33.99	109	329	P	V
	*		5755	89.23	-	-	78.84	35.16	9.22	33.99	109	329	A	V
			5868.96	53.61	-20.39	74	43.03	35.22	9.36	34	109	329	P	V
			5860.8	43.23	-10.77	54	32.65	35.22	9.36	34	109	329	A	V
														V
														V



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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11n HT40 CH 159 5795MHz		5699.88	54.09	-19.91	74	43.86	35.11	9.11	33.99	101	296	P	H	
		5691.8	43.03	-10.97	54	32.8	35.11	9.11	33.99	101	296	A	H	
	*	5795	99.28	-	-	88.78	35.18	9.32	34	101	296	P	H	
	*	5795	89.56	-	-	79.06	35.18	9.32	34	101	296	A	H	
		5868.96	53.66	-20.34	74	43.08	35.22	9.36	34	101	296	P	H	
		5857.44	43.16	-10.84	54	32.59	35.22	9.35	34	101	296	A	H	
														H
														H
		5702.84	53.83	-20.17	74	43.59	35.12	9.11	33.99	103	182	P	V	
		5689.56	43.14	-10.86	54	32.91	35.11	9.11	33.99	103	182	A	V	
	*	5795	101.67	-	-	91.17	35.18	9.32	34	103	182	P	V	
	*	5795	91.76	-	-	81.26	35.18	9.32	34	103	182	A	V	
		5888.8	53.52	-20.48	74	42.9	35.24	9.38	34	103	182	P	V	
		5850.96	43.21	-10.79	54	32.65	35.21	9.35	34	103	182	A	V	
														V
													V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15E Band 4 5725~5850MHz

WIFI 802.11n HT40 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT40 CH 151 5755MHz		11510	44.51	-29.49	74	50.43	38.1	14.48	58.5	100	0	P	H
		17265	47.67	-26.33	74	47.15	41.09	18.03	58.6	100	0	P	H
													H
													H
802.11n HT40 CH 159 5795MHz		11510	44.28	-29.72	74	50.2	38.1	14.48	58.5	100	0	P	V
		17265	48.41	-25.59	74	47.89	41.09	18.03	58.6	100	0	P	V
													V
													V
802.11n HT40 CH 159 5795MHz		11590	43.17	-30.83	74	48.92	38.22	14.58	58.55	100	0	P	H
		17385	48.15	-25.85	74	47.63	40.99	18.13	58.6	100	0	P	H
													H
													H
802.11n HT40 CH 159 5795MHz		11590	44.74	-29.26	74	50.49	38.22	14.58	58.55	100	0	P	V
		17385	47.77	-26.23	74	47.25	40.99	18.13	58.6	100	0	P	V
													V
													V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



15E Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11ac VHT80 CH 155 5775MHz		5725	64.53	-9.47	74	54.23	35.13	9.16	33.99	102	297	P	H	
		5724.84	45.78	-8.22	54	35.48	35.13	9.16	33.99	102	297	A	H	
	*	5775	95.79	-	-	85.35	35.17	9.27	34	102	297	P	H	
	*	5775	85.31	-	-	74.87	35.17	9.27	34	102	297	A	H	
		5853.2	54.22	-19.78	74	43.66	35.21	9.35	34	102	297	P	H	
		5856.48	43.31	-10.69	54	32.74	35.22	9.35	34	102	297	A	H	
														H
														H
			5725	65.74	-8.26	74	55.44	35.13	9.16	33.99	104	174	P	V
			5724.52	46.73	-7.27	54	36.43	35.13	9.16	33.99	104	174	A	V
	*		5775	98.29	-	-	87.85	35.17	9.27	34	104	174	P	V
	*		5775	88.53	-	-	78.09	35.17	9.27	34	104	174	A	V
			5858.56	54.93	-19.07	74	44.35	35.22	9.36	34	104	174	P	V
			5854.4	43.58	-10.42	54	33.01	35.22	9.35	34	104	174	A	V
														V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15E Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
802.11ac VHT80 CH 155 5775MHz		11550	43.06	-30.94	74	48.87	38.17	14.55	58.53	100	0	P	H	
		17325	48.75	-25.25	74	48.23	41.05	18.07	58.6	100	0	P	H	
													H	
													H	
			11550	44.14	-29.86	74	49.95	38.17	14.55	58.53	100	0	P	V
			17325	49.46	-24.54	74	48.94	41.05	18.07	58.6	100	0	P	V
														V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.													



15E Emission below 1GHz
5GHz WIFI 802.11a (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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)	
5GHz 802.11a LF		60.24	19.89	-20.11	40	44.19	6.6	0.87	31.77			P	H	
		101.55	21.52	-21.98	43.5	41.04	11.12	1.11	31.75			P	H	
		182.55	24.72	-18.78	43.5	45.83	9.18	1.46	31.75	173	205	P	H	
		364.4	22.58	-23.42	46	37.4	14.85	2.11	31.78			P	H	
		546.4	22.12	-23.88	46	32.23	19.34	2.54	31.99			P	H	
		769	25.1	-20.9	46	33.91	20.11	3.05	31.97			P	H	
														H
														H
														H
														H
														H
														H
														H
			34.86	27.81	-12.19	40	43.41	15.5	0.69	31.79	100	67	P	V
			41.34	24.75	-15.25	40	44.21	11.58	0.75	31.79			P	V
			87.24	23.91	-16.09	40	46.51	8.12	1.04	31.76			P	V
			455.4	24.01	-21.99	46	36.49	17.08	2.32	31.88			P	V
			546.4	26.4	-19.6	46	36.51	19.34	2.54	31.99			P	V
			769	24.72	-21.28	46	33.53	20.11	3.05	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

*	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



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		(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”.