

附錄一

受測裝置之測試結果

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1. 場強輻射之量測

對受測物裝置之其他不必要之發射(測至 40GHz)依下列測試模式分別於電波暗室內進行量測，選擇低、中、高頻率來進行量測，並將下列測試模式之測試數據隨案件所附。所得讀值資料請見章節 1.1 ~1.2：

Wireless LAN 模式

支援 IEEE 802.11a/n/ac，依測試要求評估低、中、高頻率，並檢附三頻率之最差模式於此測試報告中。

測試機型：內建擴大器功能機型

模式	動作狀態	基本頻率		量測頻率範圍
802.11a	發射	UNII Band IV	5785MHz*	30-1000MHz
				1000-40000MHz
802.11n-HT20	發射	UNII Band IV	5825MHz	1000-40000MHz
802.11n-HT40	發射	UNII Band IV	5755MHz	1000-40000MHz
802.11ac-VHT80	發射	UNII Band IV	5775MHz	1000-40000MHz
---	接收	UNII Band IV	5785MHz*	30-1000MHz
				1000-40000MHz

測試機型：外接擴大器功能機型

模式	動作狀態	基本頻率		量測頻率範圍
802.11a	發射	UNII Band IV	5785MHz*	30-1000MHz
				1000-40000MHz
802.11n-HT20	發射	UNII Band IV	5825MHz	1000-40000MHz
802.11n-HT40	發射	UNII Band IV	5755MHz	1000-40000MHz
802.11ac-VHT80	發射	UNII Band IV	5775MHz	1000-40000MHz
---	接收	UNII Band IV	5785MHz*	30-1000MHz
				1000-40000MHz

註：*：經評估後，以最差頻率進行 30-1000MHz 量測。

測試日期	2020/04/21~29	環境溫/濕度	22~23°C/46~62%
測試電壓	DC 12V (經直流電源供應器電)	測試人員	Sam Chang

1.1. 30-1000MHz 頻率範圍，其他不必要發射量測

Mode	802.11a	Frequency	TX 5785MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
185.200	15.01	3.39	25.92	39.05	31.53	43.50	11.97	Peak
252.130	18.72	4.04	25.77	42.97	39.96	46.00	6.04	Peak
480.080	23.20	6.75	27.10	34.67	37.52	46.00	8.48	Peak
597.450	24.77	7.03	27.48	30.17	34.49	46.00	11.51	Peak
863.230	26.57	8.50	27.24	29.04	36.87	46.00	9.13	Peak
964.110	27.21	9.00	26.95	28.47	37.73	54.00	16.27	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
50.370	14.52	1.65	26.50	45.15	34.82	40.00	5.18	Peak
96.930	16.09	2.39	26.33	35.67	27.82	43.50	15.68	Peak
257.950	18.80	4.10	25.76	33.00	30.14	46.00	15.86	Peak
480.080	23.20	6.75	27.10	33.83	36.68	46.00	9.32	Peak
597.450	24.77	7.03	27.48	33.98	38.30	46.00	7.70	Peak
935.980	27.03	8.88	27.04	29.63	38.50	46.00	7.50	Peak

Mode	Wireless LAN	Frequency	RX 5785MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
184.230	15.00	3.38	25.92	38.79	31.25	43.50	12.25	Peak
256.980	18.79	4.09	25.76	41.77	38.89	46.00	7.11	Peak
513.060	23.68	6.94	27.26	31.65	35.01	46.00	10.99	Peak
745.860	25.51	7.85	27.46	29.49	35.39	46.00	10.61	Peak
890.390	26.76	8.66	27.17	29.18	37.43	46.00	8.57	Peak
956.350	27.15	8.97	26.95	28.91	38.08	46.00	7.92	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
49.400	14.82	1.64	26.50	44.72	34.68	40.00	5.32	Peak
94.990	15.74	2.37	26.33	35.52	27.30	43.50	16.20	Peak
256.010	18.77	4.08	25.77	32.76	29.84	46.00	16.16	Peak
599.390	24.80	7.03	27.48	32.25	36.60	46.00	9.40	Peak
866.140	26.59	8.52	27.24	29.28	37.15	46.00	8.85	Peak
960.230	27.17	8.98	26.95	28.79	37.99	54.00	16.01	Peak

Mode	802.11a	Frequency	TX 5785MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
194.900	15.23	3.50	25.88	40.33	33.18	43.50	10.32	Peak
245.340	18.38	3.97	25.78	47.16	43.73	46.00	2.27	Peak
480.080	23.20	6.75	27.10	30.77	33.62	46.00	12.38	Peak
597.450	24.77	7.03	27.48	30.09	34.41	46.00	11.59	Peak
755.560	25.63	7.90	27.45	30.08	36.16	46.00	9.84	Peak
932.100	27.01	8.86	27.04	28.86	37.69	46.00	8.31	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
49.400	14.82	1.64	26.50	45.18	35.14	40.00	4.86	Peak
246.310	18.44	3.98	25.78	37.25	33.89	46.00	12.11	Peak
431.580	22.39	6.31	26.78	32.55	34.47	46.00	11.53	Peak
597.450	24.77	7.03	27.48	31.10	35.42	46.00	10.58	Peak
869.050	26.61	8.54	27.24	29.82	37.73	46.00	8.27	Peak
932.100	27.01	8.86	27.04	29.81	38.64	46.00	7.36	Peak

Mode	Wireless LAN	Frequency	RX 5785MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
246.310	18.44	3.98	25.78	46.46	43.10	46.00	2.90	Peak
393.750	21.69	5.93	26.50	29.26	30.38	46.00	15.62	Peak
480.080	23.20	6.75	27.10	30.13	32.98	46.00	13.02	Peak
715.790	25.19	7.70	27.49	28.34	33.74	46.00	12.26	Peak
806.970	26.16	8.17	27.39	29.00	35.94	46.00	10.06	Peak
958.290	27.17	8.98	26.95	27.85	37.05	46.00	8.95	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
50.370	14.52	1.65	26.50	45.26	34.93	40.00	5.07	Peak
248.250	18.59	4.00	25.78	36.17	32.98	46.00	13.02	Peak
523.730	23.84	6.95	27.29	30.88	34.38	46.00	11.62	Peak
838.010	26.40	8.35	27.30	29.26	36.71	46.00	9.29	Peak
923.370	26.96	8.82	27.07	29.88	38.59	46.00	7.41	Peak
942.770	27.07	8.91	27.01	29.16	38.13	46.00	7.87	Peak

1.2. 1000MHz 以上頻率範圍，其他不必要發射量測

頻率範圍量測至 40GHz，其他未列在報告上乃因訊號太小無法量測。

Mode	802.11a	Frequency	TX 5785MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	29.55	50.67	54.00	3.33	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	30.23	51.35	54.00	2.65	Peak

Mode	802.11n-HT20	Frequency	TX 5825MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	29.99	51.11	54.00	2.89	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	30.34	51.46	54.00	2.54	Peak

Mode	802.11n-HT40	Frequency	TX 5755MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11510.000	40.10	15.49	34.64	29.21	50.16	54.00	3.84	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11510.000	40.10	15.49	34.64	30.72	51.67	54.00	2.33	Peak

Mode	802.11ac-VHT80	Frequency	TX 5775MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	40.15	15.52	34.65	30.21	51.23	54.00	2.77	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	40.15	15.52	34.65	29.94	50.96	54.00	3.04	Peak

Mode	---	Frequency	RX 5785MHz
測試機型	內建擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.54	15.58	34.66	30.63	50.09	54.00	3.91	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.54	15.58	34.66	30.57	50.03	54.00	3.97	Peak

Mode	802.11a	Frequency	TX 5785MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11570.000	40.17	15.53	34.65	30.42	51.47	54.00	2.53	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11570.000	40.17	15.53	34.65	29.92	50.97	54.00	3.03	Peak

Mode	802.11n-HT20	Frequency	TX 5825MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	30.16	51.28	54.00	2.72	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	40.20	15.58	34.66	30.82	51.94	54.00	2.06	Peak

Mode	802.11n-HT40	Frequency	TX 5755MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11510.000	40.10	15.49	34.64	29.90	50.85	54.00	3.15	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11510.000	40.10	15.49	34.64	29.76	50.71	54.00	3.29	Peak

Mode	802.11ac-VHT80	Frequency	TX 5775MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	40.15	15.52	34.65	30.11	51.13	54.00	2.87	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	40.15	15.52	34.65	31.72	52.74	54.00	1.26	Peak

Mode	---	Frequency	RX 5785MHz
測試機型	外接擴大器功能機型		

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.54	15.58	34.66	30.74	50.20	54.00	3.80	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.54	15.58	34.66	30.36	49.82	54.00	4.18	Peak

2. 最大輸出功率及 6dB 頻寬之量測

測試日期	2020/04/17	環境溫/濕度	23°C/46%
測試電壓	DC 12V (經電源供應器電)	電纜損失	3.84dB
測試機型	內建擴大器功能機型	測試人員	Sam Chang
Simultaneous Factor10 log(n) (Note: "n" is antenna number)	802.11a: 0 802.11n-HT20/n-HT40/ac-VHT80: 3		
Duty Cycle	802.11a: 0.935 802.11n-HT20: 0.934 802.11n-HT40: 0.869 802.11ac-VHT80: 0.780		

2.1. 最大輸出功率及 26dB/6dB 頻寬

模式 802.11a (MIMO)	測試頻率	發射頻寬(MHz)		Average輸出功率(dBm)		10 log (1/X)	Average 輸出功率 (dBm)	限制值 (dBm)	限制值 (11dBm+10 log B)
	(MHz)	6dB	99%	Chain 0	Chain 1				
UNII Band IV	5745	16.31	16.461	12.500	11.400	0.294	15.29	29.08	N/A
	5785	16.32	16.449	12.780	11.350		15.43		
	5825	16.35	16.452	12.840	11.110		15.36		

模式 802.11n-HT20 (MIMO)	測試頻率	發射頻寬(MHz)		Average輸出功率(dBm)		10 log (1/X)	Average 輸出功率 (dBm)	限制值 (dBm)	限制值 (11dBm+10 log B)
	(MHz)	6dB	99%	Chain 0	Chain 1				
UNII Band IV	5745	17.15	17.621	12.460	11.330	0.297	15.24	29.08	N/A
	5785	17.59	17.645	12.660	11.190		15.29		
	5825	17.58	17.662	12.820	10.970		15.30		

模式 802.11n-HT40 (MIMO)	測試頻率	發射頻寬(MHz)		Average輸出功率(dBm)		10 log (1/X)	Average 輸出功率 (dBm)	限制值 (dBm)	限制值 (11dBm+10 log B)
	(MHz)	6dB	99%	Chain 0	Chain 1				
UNII Band IV	5755	35.97	36.048	11.700	10.750	0.608	14.87	29.08	N/A
	5795	35.98	36.018	11.790	10.570		14.84		

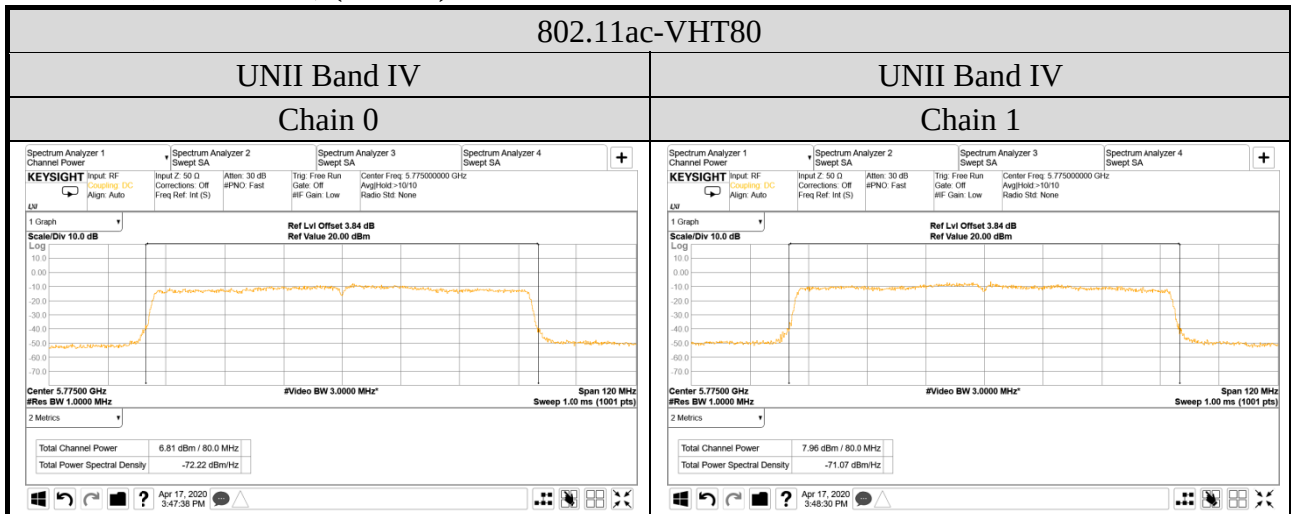
模式 802.11ac-VHT80 (MIMO)	測試頻率	發射頻寬(MHz)		Average輸出功率(dBm)		10 log (1/X)	Average 輸出功率 (dBm)	限制值 (dBm)	限制值 (11dBm+10 log B)
	(MHz)	6dB	99%	Chain 0	Chain 1				
UNII Band IV	5775	75.88	75.347	6.810	7.960	1.079	11.51	29.08	N/A

註 1: 當 Duty cycle<98%，最大輸出功率必需要加上 duty cycle factor 10log(1/x)。(x=duty cycle, B=26dB 發射頻寬)

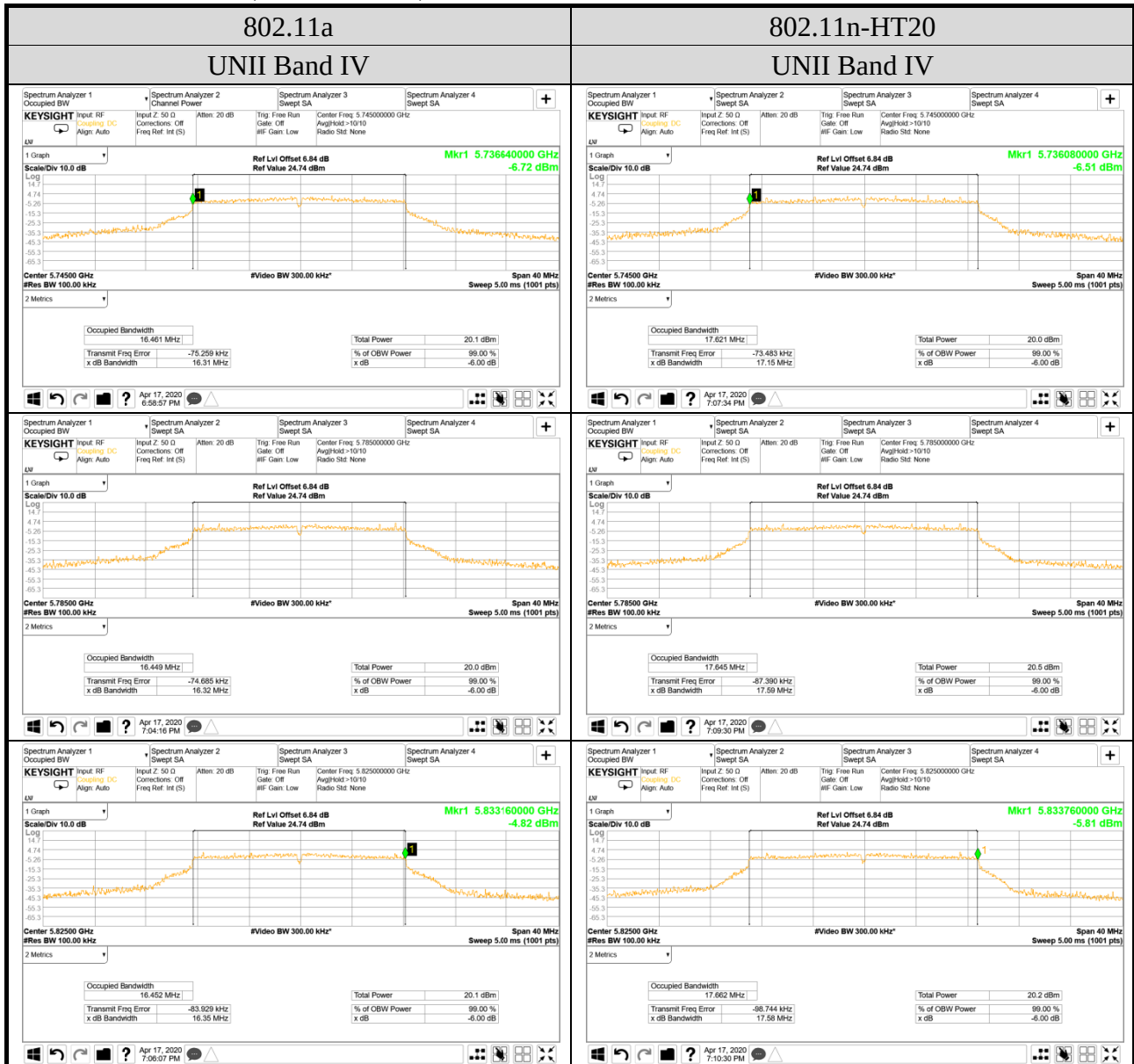
註 2: 天線增益超過 6dBi，依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率，故限制值為
 $30 - [(6.92-6)] = 29.08\text{dBm}$

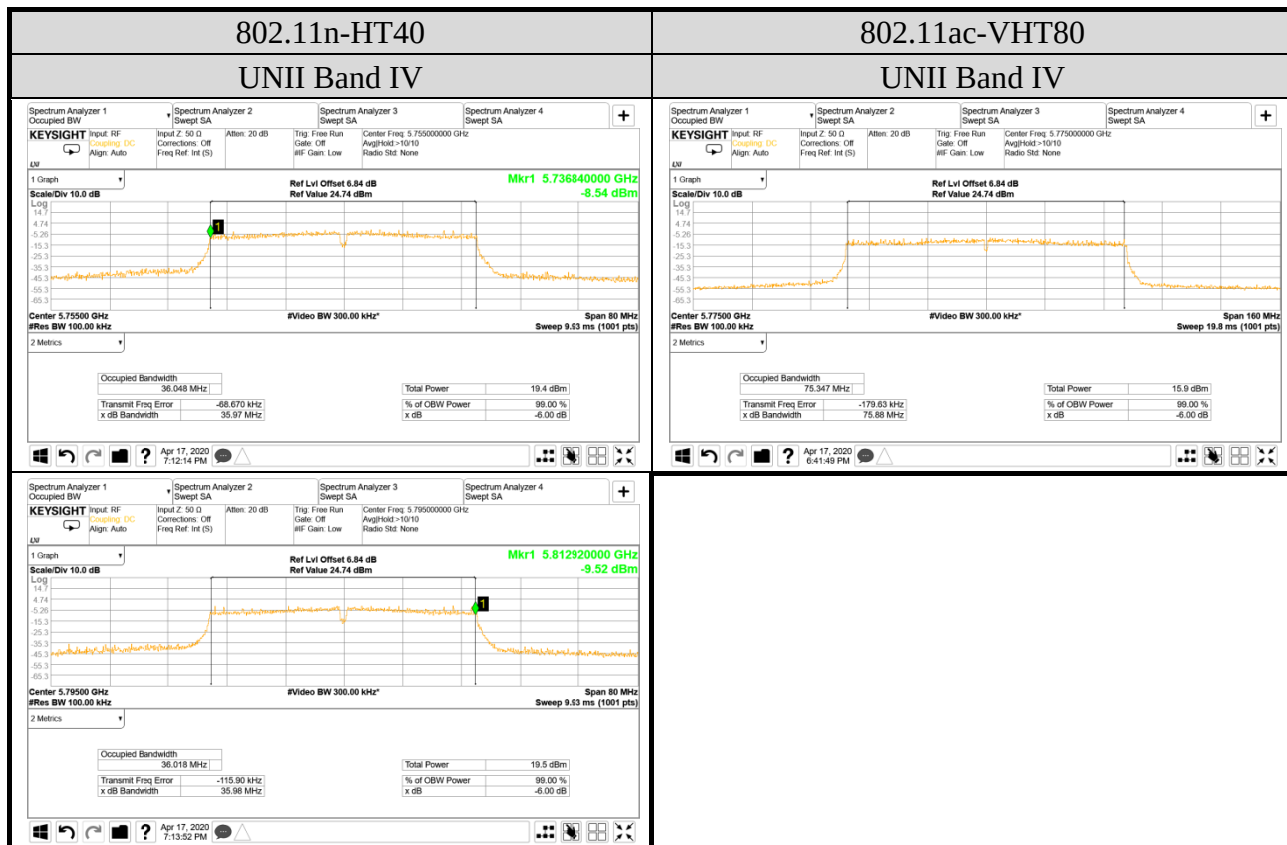
2.2. 最大輸出功率及6dB頻寬之量測圖

● 最大輸出功率(平均值)



● 6dB頻寬 (UNII Band IV)





3. 峰值功率頻譜密度之量測

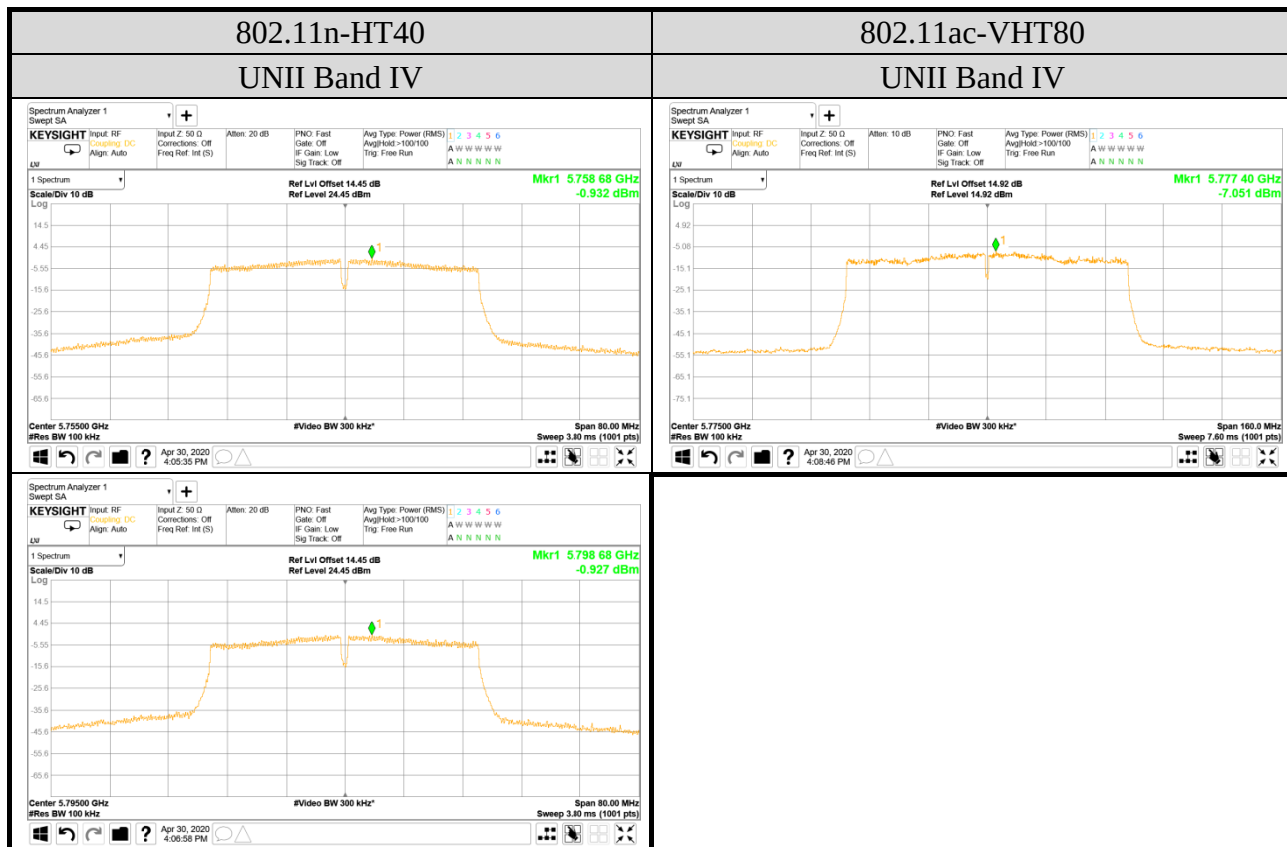
測試日期	2020/04/30	環境溫/濕度	24°C/57%
測試電壓	DC 12V (經電源供應器電)	電纜損失	3.84dB
測試機型	內建擴大器功能機型	測試人員	Sam Chang
Simultaneous Factor10 log(n) (Note: "n" is antenna number)	802.11a: 0 802.11n-HT20/n-HT40/ac-VHT80: 3		
Duty Cycle	802.11a: 0.935 802.11n-HT20: 0.934 802.11n-HT40: 0.869 802.11ac-VHT80: 0.780		

3.1. 峰值功率頻譜密度

模式	UNII Band	測試頻率 (MHz)	峰值功率頻譜密度 (dBm/500kHz)	限制值
802.11a	IV	5745	3.112	29.08dBm/500 kHz
		5785	3.297	
		5825	3.217	
802.11n- HT20	IV	5745	2.979	
		5785	2.723	
		5825	3.050	
802.11n- HT40	IV	5755	-0.932	
		5795	-0.927	
802.11ac- VHT80	IV	5775	-7.051	

註 1: BWCF 6.99dB (100kHz converted to 500kHz) has been included in the test result.

註 2: 天線增益超過 6dBi，依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大功率頻譜密度，故限制值為 30- [(6.92-6)]=29.08dBm



4. 頻帶邊緣之 RF 傳導發射之量測

測試日期	2020/04/30	環境溫/濕度	23°C/46%
測試電壓	DC 12V (經電源供應器電)	電纜損失	3.84dB
測試機型	內建擴大器功能機型	測試人員	Sam Chang
Simultaneous Factor10 log(n) (Note: "n" is antenna number)	802.11a: 0 802.11n-HT20/n-HT40/ac-VHT80: 3		
Duty Cycle	802.11a: 0.935 802.11n-HT20: 0.934 802.11n-HT40: 0.869 802.11ac-VHT80: 0.780		

