

NCC

低功率射頻電機型式試驗報告

產品名稱: Aruba 500 接入點
型號: APIN0504, APIN0505
廠牌: aruba / Hewlett Packard Enterprise
商標:  / 
申請者: 慧與科技股份有限公司
申請者地址: 臺北市南港區經貿二路 66 號 10 樓之 1
測試標準: LP0002 (107 年版)
參考法規: ANSI C63.10-2013
測試結果: 符合
測試日期: 2019.06.03 ~ 2019.07.14
發行日期: 2019.09.24

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(柯文凱)

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修訂紀錄

報告編號	版本	描述	發行日期
1906TW0102-T4	1.0	Original Report	2019-09-24

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1. 一般資訊

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實驗室	台灣曼瑞檢測科技有限公司
實驗室地址	33377 台灣桃園市龜山區復興二路 38 號
實驗室資訊	<ol style="list-style-type: none">1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.
實驗室測試環境條件	溫度 (°C) : 20-35 / 濕度 (%RH) : 30-65

2. 產品資訊

2.1. 待測物裝置資料

產品名稱	Aruba 500 接入點
產品型號	APIN0504, APIN0505
待測物額定電壓	AC Adapter or POE input
無線規格	802.11a/b/g/n/ac/ax
頻率範圍	For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40/ax-HE40: 5190~5230MHz, 5270~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80/ax-HE80: 5210MHz, 5290MHz, 5530MHz, 5610 MHz, 5690MHz, 5775MHz
調變模式	802.11a/n/ac: OFDM 802.11ax: OFDMA
傳輸速率	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps 802.11ax: up to 2402Mbps
配件	
POE Adapter	MFR: Microsemi Corp Analog Mixed Signal Group Model: PD-9001GR/AT/AC INPUT: 100 - 240V ~ 50/60Hz, 0.67A OUTPUT: 55VDC 0.6A
AC Adapter 1#	MFR: Asian Power Devices Inc. Model: DB-48A12 INPUT: 100 - 240V ~ 50/60Hz, 1.5A OUTPUT: 12VDC 4A
AC Adapter 2#	Model: ADH-36BR B INPUT: 100 - 240V ~ 50/60Hz, 1.0A OUTPUT: 12VDC 3A
AC Adapter 3#	MFR: Shenzhen ENG Electronics Co., Ltd. P/N: SDI30-12-U-P209-C1 Model: SDI30-12-U INPUT: 100 - 240V ~ 50/60Hz, 1.0A OUTPUT: 12VDC 2.5A

Note: The difference between models is that EUT use different antenna and appearance, APIN0504 use some external antennas, but APIN0505 use internal antenna, other hardware and software are the same.

2.2. 通道清單

802.11a/n-HT20/ac-VHT20/ax-HE20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--

802.11n-HT40/ac-VHT40/ax-HE40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz

802.11ac-VHT80/ax-HE80

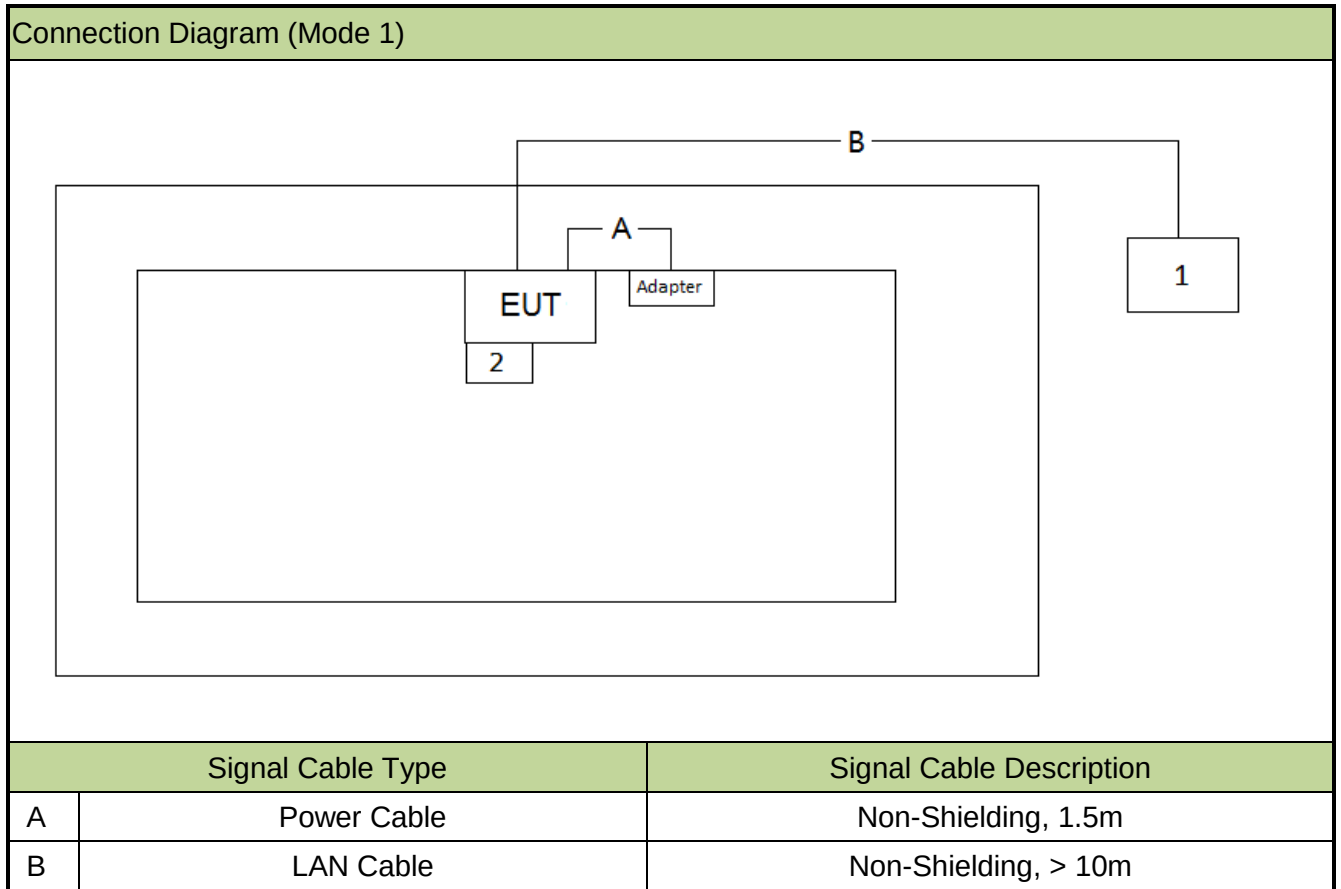
Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	138	5690 MHz	155	5775 MHz

2.3. 測試模式

Mode 1: 發射器 802.11a (6Mbps)
Mode 2: 發射器 802.11ac-VHT20 (MCS0)
Mode 3: 發射器 802.11ac-VHT40 (MCS0)
Mode 4: 發射器 802.11ac-VHT80 (MCS0)
Mode 5: 發射器 802.11ax-HE20 (MCS0)
Mode 6: 發射器 802.11ax-HE40 (MCS0)
Mode 7: 發射器 802.11ax-HE80 (MCS0)

Note: 802.11n and 802.11ac have same modulation type, using same power parameter, after the assessment, we only showed worst case 802.11ac test data in this report.

2.4. 測試系統組合圖



2.5. 測試周邊

Item	待測物名稱	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	E430c	N/A	Non-Shielded, 1.8m
2	USB Dongle	藍科芯	青花 16G	--	--

2.6. 待測裝置測試時之典型操作程式

1.	Setup the EUT and simulators as shown on 2.4
2.	Turn on the power of all equipment.
3.	Execute "telnet.exe" program.
4.	Configure the test channel and the data rate.
5.	Start to test.

3. 量測不確定度

電源傳導量測-電源線 (Conducted Emission- Power Line)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.53dB
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.92dB (Below 30M)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.25dB (30M~1G)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.40dB (1G~18G)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.45dB (18G~40G)
頻率誤差量測 (Frequency Error)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 78.4\text{Hz}$
傳導功率量測 (Conducted Power)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.84\text{dB}$
傳導干擾量測 (Conducted Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 2.65\text{ dB}$
佔用頻寬量測 (Occupied Bandwidth)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.3%
溫度 / 濕度 (Temp. / Humidity)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.82^\circ\text{C} / \pm 3\%$

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

4. 測試設備明細

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2020/3/25
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2020/4/25
8-Wire ISN (T8)	R&S	ENY81	MRTTWA00018	1 year	2020/4/23
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2020/5/29
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2020/5/30

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2020/4/29
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2020/6/4
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2020/4/22
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2020/4/23
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2020/4/24
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2020/4/24
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2020/3/25
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/10/30
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2020/4/22
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2020/5/30

Conducted Test Equipment - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/10/30
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06457	1 year	2020/7/19
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2020/4/22
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2020/5/30

Software	Version	Function
e3	9.160520a	EMI Test Software
EMI	Quietek	V3

5. 測試結果

章節	量測項目	限制值	測試結果	測試數據
2.3	電源傳導	低功率射頻電機技術規範 2.3 節	符合	第 5.1 章節
4.7.2(1)(2)(3)	峰值傳導輸出功率	參考第 5.2 章節	符合	第 5.2 章節
2.2 及 4.7.8	天線之要求	低功率射頻電機技術規範 2.2 節及 4.7.8 節	符合	第 5.3 章節
4.7.3	操作頻帶外的峰值 發射	低功率射頻電機技術規範 4.7.3 節	符合	第 5.4 章節
2.8 及 4.7.3	輻射電場強度	低功率射頻電機技術規範 2.8 節	符合	第 5.5 章節
4.7.5	26dB 佔用頻寬	N/A	符合	第 5.6 章節
4.7.5	6dB 佔用頻寬	$\geq 500\text{KHz}$	符合	第 5.7 章節
4.7.2(1)(2)(3)	功率頻譜密度	參考第 5.8 章節	符合	第 5.8 章節
4.7.4	發射功率控制	至少具有 6dB 低於平均 EIRP 值 30dBm 的能力	符合	第 5.9 章節
4.7.7	頻率穩定性	操作頻帶	符合	第 5.10 章節

5.1. 電源端點干擾測試

5.1.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範之第 2.3 節，以市電為電源之低功率射頻電機，其傳導回電源線上頻率自 150kHz 至 30MHz 之射頻電壓(在電源端子每一電源線對接地點)應小於或等於下表所列之限值。測量時應經過 50 微亨利(μH)及 50 歐姆(Ω)之電源線阻抗模擬網路(LISN)。頻率重疊處，以較低限值為準。

Frequency 頻率範圍 (MHz)	傳導限制值(dBuV)	
	準尖峰值	平均值
0.15 - 0.50	66-56 ^(註)	56-46 ^(註)
0.50 - 5.0	56	46
5.0 - 30	60	50

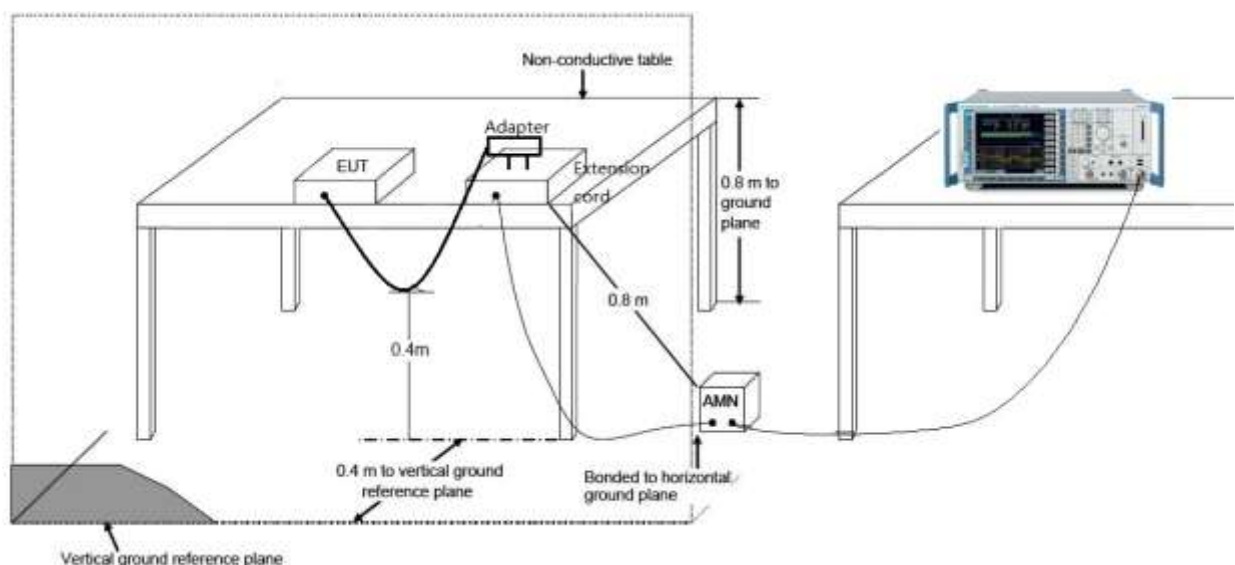
註:隨頻率之對數遞減

5.1.2. 量測方法

待測物置於高 80 公分之非導體桌面（落地型產品置於地上），將待測物之電源線接至電源阻抗網路器(LISN)，同時保持待測物至 LISN 距 80 公分，並將電源線多餘部份以 30 至 40 公分之八字形捆綁於電源線中央並離地 40cm，於在正常工作狀態下，執行待測物之火線(Line)及地線(neutral)各一次量測。電源端點場強之測量範圍由 0.15MHz –30MHz，所量測之讀值皆為準尖峰值(Quasi-Peak Value)及平均值(Average Value)。場強接收機之解析頻寬為 9kHz。

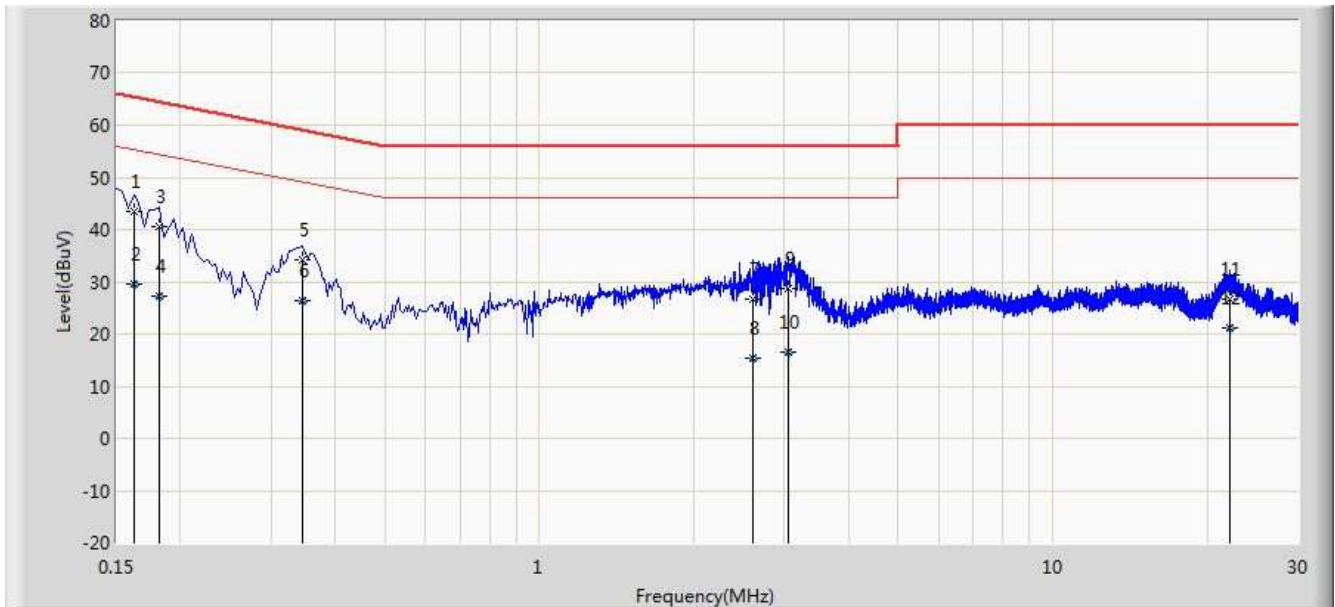
備註：經初測驗證過，電源端點干擾測試對測試頻道數並無差異，因此檢附其中一個測試頻道之測試數。

5.1.3. 測試架構圖



5.1.4. 電源端點測試結果

Site: SR2	Time: 2019/07/10 - 13:27
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-L1 (Filter ON)	Polarity: Line
EUT: Aruba 500 接入點 (APIN0504)	Power: AC 110V/60Hz
Test Mode 1	

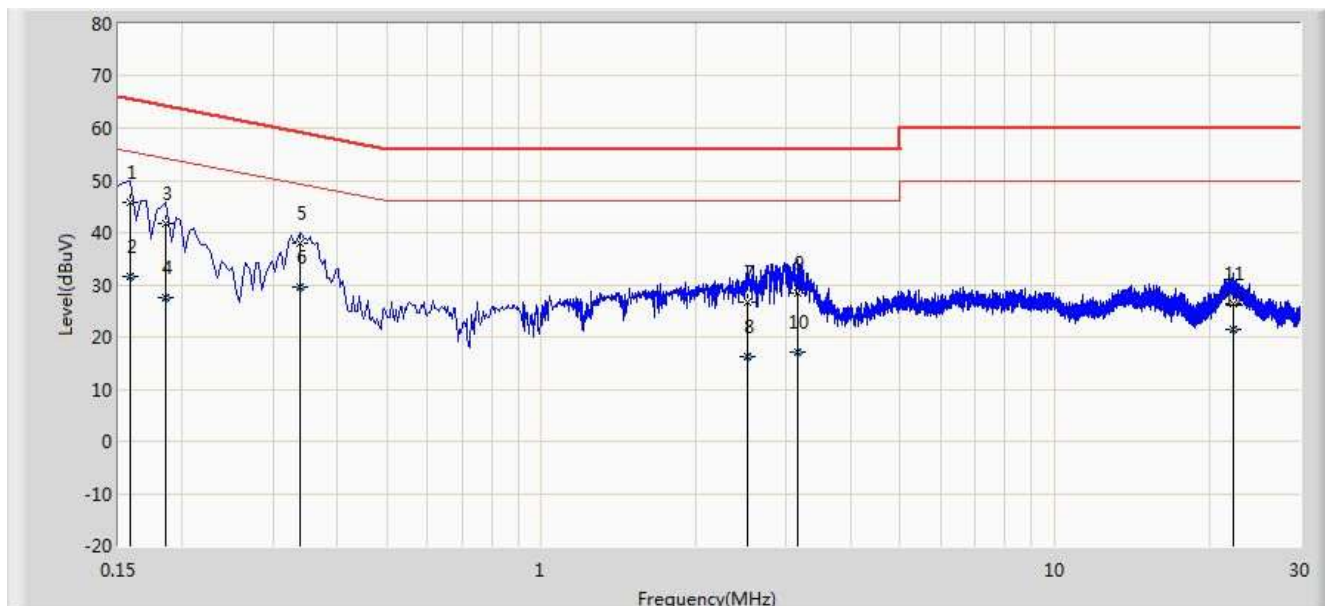


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.162	43.543	33.446	-21.818	65.361	10.097	QP
2			0.162	29.499	19.402	-25.862	55.361	10.097	AV
3			0.182	40.523	30.475	-23.870	64.394	10.048	QP
4			0.182	27.171	17.123	-27.223	54.394	10.048	AV
5			0.346	34.211	24.170	-24.847	59.058	10.041	QP
6			0.346	26.508	16.467	-22.550	49.058	10.041	AV
7			2.606	26.525	16.672	-29.475	56.000	9.853	QP
8			2.606	15.231	5.378	-30.769	46.000	9.853	AV
9			3.058	28.831	18.970	-27.169	56.000	9.861	QP
10			3.058	16.631	6.770	-29.369	46.000	9.861	AV
11			22.106	26.625	16.463	-33.375	60.000	10.162	QP
12			22.106	21.298	11.136	-28.702	50.000	10.162	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2019/07/10 - 13:35
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-N (Filter ON)	Polarity: Neutral
EUT: Aruba 500 接入點 (APIN0504)	Power: AC 110V/60Hz
Test Mode 1	

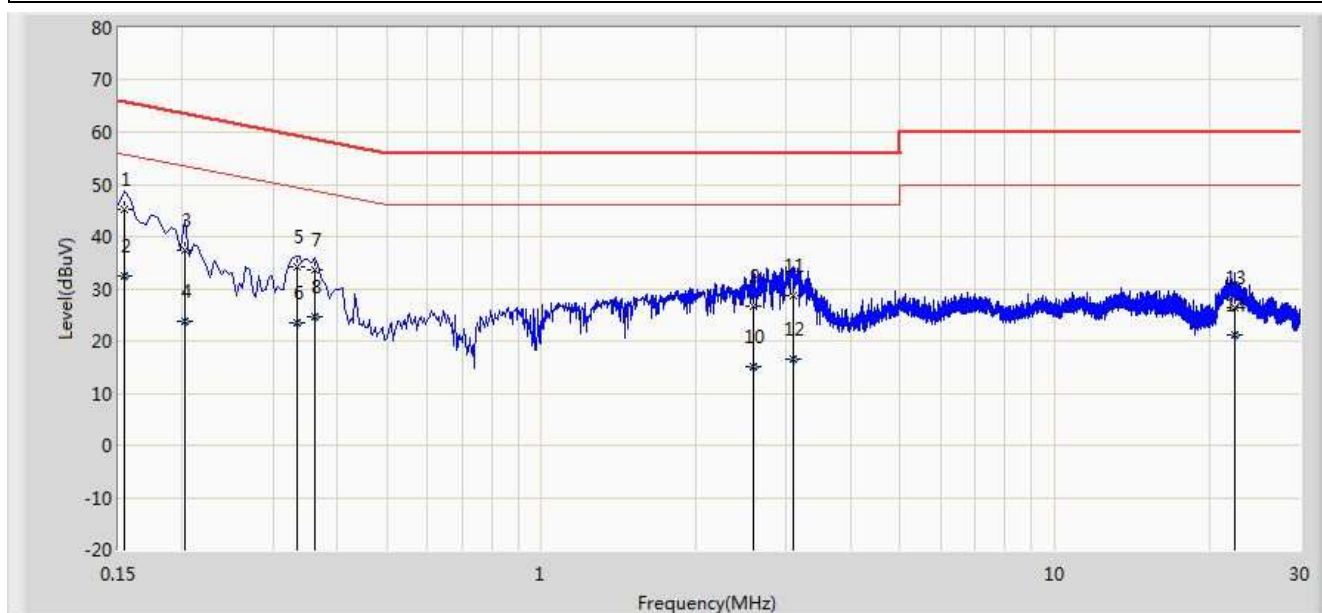


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	45.770	35.481	-19.798	65.568	10.290	QP
2			0.158	31.459	21.169	-24.110	55.568	10.290	AV
3			0.186	41.605	31.570	-22.608	64.213	10.035	QP
4			0.186	27.549	17.514	-26.665	54.213	10.035	AV
5			0.338	38.038	27.972	-21.214	59.252	10.066	QP
6			0.338	29.430	19.364	-19.822	49.252	10.066	AV
7			2.526	26.681	16.821	-29.319	56.000	9.860	QP
8			2.526	16.206	6.346	-29.794	46.000	9.860	AV
9			3.162	28.450	18.587	-27.550	56.000	9.863	QP
10			3.162	17.141	7.278	-28.859	46.000	9.863	AV
11			22.242	26.506	16.287	-33.494	60.000	10.218	QP
12			22.242	21.373	11.155	-28.627	50.000	10.218	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2019/07/10 - 13:39
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-L1 (Filter ON)	Polarity: Line
EUT: Aruba 500 接入點 (APIN0505)	Power: AC 110V/60Hz
Test Mode 1	

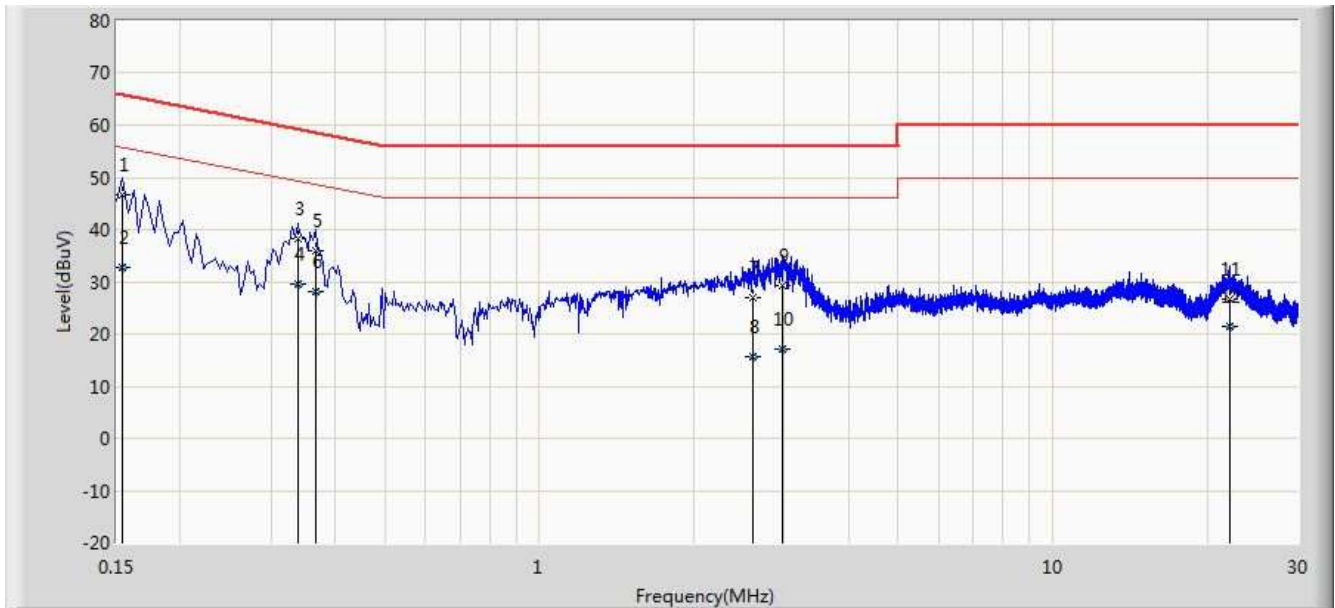


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.154	45.287	34.548	-20.494	65.781	10.740	QP
2			0.154	32.447	21.707	-23.335	55.781	10.740	AV
3			0.202	37.252	27.259	-26.276	63.528	9.993	QP
4			0.202	23.637	13.645	-29.891	53.528	9.993	AV
5			0.334	34.262	24.231	-25.089	59.351	10.031	QP
6			0.334	23.414	13.383	-25.937	49.351	10.031	AV
7			0.362	33.720	23.666	-24.962	58.682	10.055	QP
8			0.362	24.666	14.611	-24.017	48.682	10.055	AV
9			2.586	26.668	16.815	-29.332	56.000	9.853	QP
10			2.586	15.216	5.363	-30.784	46.000	9.853	AV
11			3.094	28.696	18.837	-27.304	56.000	9.859	QP
12			3.094	16.594	6.735	-29.406	46.000	9.859	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2019/07/10 - 13:44
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-N (Filter ON)	Polarity: Neutral
EUT: Aruba 500 接入點 (APIN0505)	Power: AC 110V/60Hz
Test Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.154	46.593	35.877	-19.188	65.781	10.716	QP
2			0.154	32.818	22.102	-22.964	55.781	10.716	AV
3			0.338	38.150	28.084	-21.102	59.252	10.066	QP
4			0.338	29.547	19.481	-19.705	49.252	10.066	AV
5			0.366	35.826	25.739	-22.765	58.591	10.087	QP
6			0.366	28.125	18.038	-20.466	48.591	10.087	AV
7			2.606	26.816	16.959	-29.184	56.000	9.857	QP
8			2.606	15.741	5.884	-30.259	46.000	9.857	AV
9			2.982	29.327	19.461	-26.673	56.000	9.866	QP
10			2.982	17.032	7.166	-28.968	46.000	9.866	AV
11			22.186	26.669	16.449	-33.331	60.000	10.219	QP
12			22.186	21.431	11.211	-28.569	50.000	10.219	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

5.2. 功率限制值

5.2.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範之第 4.7.3 節：

使用於 5.15 GHz~5.25 GHz 頻段，供室外操作使用，最大傳導輸出功率應小於或等於 1 W。

使用頻率於 5.25 GHz~5.35 GHz 與 5.470 GHz~5.725 GHz 頻段，最大傳導輸出功率應小於或等於 250 mW 或 $11\text{dBm} + 10\log B$ (B 是 26 dB 發射頻寬，單位 MHz) 之較小者。

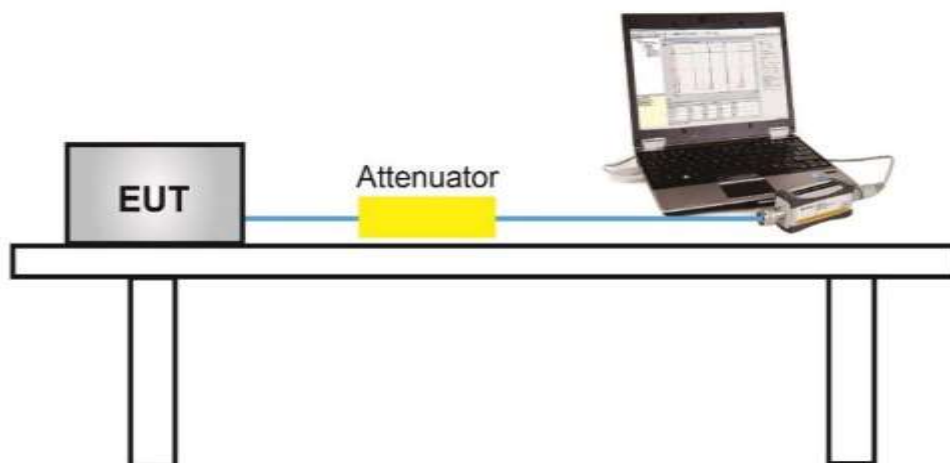
使用頻率於 5.725 GHz~5.850 GHz 頻段，最大傳導輸出功率應小於或等於 1 W。

使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。

5.2.2. 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀 RF 輸入端，峰值發射功率必須使用依據均方根等效電壓校準之儀器量測於任何連續傳輸之時段，量測結果須依儀器限制(如偵測器反應時間、相較於發射頻寬有限之解析頻寬能力，靈敏度等)調整得出正確之峰值量測或使用峰值功率表。

5.2.3. 測試架構圖



5.2.4. 功率限制值測試結果

Power output test was verified over all data rates of each mode shown as below table, and then choose the maximum power output (grey marker) for final test of each channel.

For Ant 0 / Ant 0 + 1 port of APIN0504 (Antenna M/N: AP-ANT-20W):

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate/ MCS	Average Power (dBm)
802.11a	20	36	5180	6Mbps	18.15
				24Mbps	17.72
				54Mbps	17.33
802.11ac	20	36	5180	MCS0	18.47
				MCS4	17.93
				MCS8	17.50
802.11ac	40	38	5190	MCS0	15.08
				MCS4	14.77
				MCS9	14.32
802.11ac	80	42	5210	MCS0	16.95
				MCS4	16.63
				MCS9	16.28
802.11ax	20	36	5180	MCS0	17.36
				MCS5	16.93
				MCS11	16.44
802.11ax	40	38	5190	MCS0	17.12
				MCS5	16.91
				MCS11	16.54
802.11ax	80	42	5210	MCS0	17.08
				MCS5	16.60
				MCS11	16.21

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/06/26 ~ 2019/07/03
待測物型號	APIN0504		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11a	6Mbps	36	5180	18.15	18.05	21.11	≤ 30.00	Pass
11a	6Mbps	44	5220	18.09	18.26	21.19	≤ 30.00	Pass
11a	6Mbps	48	5240	18.23	18.21	21.23	≤ 30.00	Pass
11a	6Mbps	52	5260	18.28	18.42	21.36	≤ 23.98	Pass
11a	6Mbps	60	5300	18.15	18.38	21.28	≤ 23.98	Pass
11a	6Mbps	64	5320	18.28	18.11	21.21	≤ 23.98	Pass
11a	6Mbps	100	5500	15.22	15.30	18.27	≤ 23.98	Pass
11a	6Mbps	120	5600	18.18	18.34	21.27	≤ 23.98	Pass
11a	6Mbps	140	5700	15.87	15.52	18.71	≤ 23.98	Pass
11a	6Mbps	144	5720	18.48	18.12	21.31	≤ 22.95	Pass
11a	6Mbps	149	5745	18.35	18.25	21.31	≤ 30.00	Pass
11a	6Mbps	157	5785	18.42	18.23	21.34	≤ 30.00	Pass
11a	6Mbps	165	5825	18.45	18.36	21.42	≤ 30.00	Pass
11ac-VHT20	MCS0	36	5180	18.47	18.29	21.39	≤ 30.00	Pass
11ac-VHT20	MSC0	44	5220	18.35	18.48	21.43	≤ 30.00	Pass
11ac-VHT20	MCS0	48	5240	18.44	18.33	21.40	≤ 30.00	Pass
11ac-VHT20	MSC0	52	5260	18.15	18.41	21.29	≤ 23.98	Pass
11ac-VHT20	MCS0	60	5300	18.18	18.27	21.24	≤ 23.98	Pass
11ac-VHT20	MSC0	64	5320	18.10	18.07	21.10	≤ 23.98	Pass
11ac-VHT20	MCS0	100	5500	16.27	16.15	19.22	≤ 23.98	Pass
11ac-VHT20	MSC0	120	5600	18.28	18.48	21.39	≤ 23.98	Pass
11ac-VHT20	MCS0	140	5700	14.14	14.04	17.10	≤ 23.98	Pass
11ac-VHT20	MCS0	144	5720	18.48	18.05	21.28	≤ 22.95	Pass
11ac-VHT20	MCS0	149	5745	18.44	18.22	21.34	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	18.28	18.38	21.34	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	18.22	18.18	21.21	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11ac-VHT40	MCS0	38	5190	15.08	15.55	18.33	≤ 30.00	Pass
11ac-VHT40	MCS0	46	5230	17.73	18.42	21.10	≤ 30.00	Pass
11ac-VHT40	MCS0	54	5270	17.75	18.30	21.04	≤ 23.98	Pass
11ac-VHT40	MCS0	62	5310	15.81	17.25	19.60	≤ 23.98	Pass
11ac-VHT40	MCS0	102	5510	16.10	16.21	19.17	≤ 23.98	Pass
11ac-VHT40	MCS0	118	5590	17.93	18.46	21.21	≤ 23.98	Pass
11ac-VHT40	MCS0	134	5670	16.71	16.54	19.64	≤ 23.98	Pass
11ac-VHT40	MCS0	142	5710	18.47	17.94	21.22	≤ 23.98	Pass
11ac-VHT40	MCS0	151	5755	18.25	18.16	21.22	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	18.24	18.13	21.20	≤ 30.00	Pass
11ac-VHT80	MCS0	42	5210	16.95	16.94	19.96	≤ 30.00	Pass
11ac-VHT80	MCS0	58	5290	15.64	15.75	18.71	≤ 23.98	Pass
11ac-VHT80	MCS0	106	5530	15.69	16.11	18.92	≤ 23.98	Pass
11ac-VHT80	MCS0	122	5610	17.57	18.19	20.90	≤ 23.98	Pass
11ac-VHT80	MCS0	138	5690	18.24	18.44	21.35	≤ 23.98	Pass
11ac-VHT80	MCS0	155	5775	18.24	18.03	21.15	≤ 30.00	Pass
11ax-HE20	MCS0	36	5180	17.36	17.09	20.24	≤ 30.00	Pass
11ax-HE20	MCS0	44	5220	18.28	18.32	21.31	≤ 30.00	Pass
11ax-HE20	MCS0	48	5240	18.32	18.33	21.34	≤ 30.00	Pass
11ax-HE20	MCS0	52	5260	18.34	18.47	21.42	≤ 23.98	Pass
11ax-HE20	MCS0	60	5300	18.33	18.42	21.39	≤ 23.98	Pass
11ax-HE20	MCS0	64	5320	18.26	18.25	21.27	≤ 23.98	Pass
11ax-HE20	MCS0	100	5500	15.86	15.95	18.92	≤ 23.98	Pass
11ax-HE20	MCS0	120	5600	18.13	18.43	21.29	≤ 23.98	Pass
11ax-HE20	MCS0	140	5700	13.72	13.21	16.48	≤ 23.98	Pass
11ax-HE20	MCS0	144	5720	18.35	17.89	21.14	≤ 22.94	Pass
11ax-HE20	MCS0	149	5745	18.27	18.22	21.26	≤ 30.00	Pass
11ax-HE20	MCS0	157	5785	18.24	18.46	21.36	≤ 30.00	Pass
11ax-HE20	MCS0	165	5825	18.27	18.28	21.29	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11ax-HE40	MCS0	38	5190	17.12	17.20	20.17	≤ 30.00	Pass
11ax-HE40	MCS0	46	5230	17.67	18.41	21.07	≤ 30.00	Pass
11ax-HE40	MCS0	54	5270	18.00	18.28	21.15	≤ 23.98	Pass
11ax-HE40	MCS0	62	5310	14.89	15.56	18.25	≤ 23.98	Pass
11ax-HE40	MCS0	102	5510	13.72	13.30	16.53	≤ 23.98	Pass
11ax-HE40	MCS0	118	5590	17.76	18.25	21.02	≤ 23.98	Pass
11ax-HE40	MCS0	134	5670	17.62	17.59	20.62	≤ 23.98	Pass
11ax-HE40	MCS0	142	5710	18.48	18.37	21.44	≤ 23.98	Pass
11ax-HE40	MCS0	151	5755	18.34	18.35	21.36	≤ 30.00	Pass
11ax-HE40	MCS0	159	5795	18.22	18.18	21.21	≤ 30.00	Pass
11ax-HE80	MCS0	42	5210	17.08	16.93	20.02	≤ 30.00	Pass
11ax-HE80	MCS0	58	5290	16.84	17.14	20.00	≤ 23.98	Pass
11ax-HE80	MCS0	106	5530	14.57	14.81	17.70	≤ 23.98	Pass
11ax-HE80	MCS0	122	5610	17.99	18.45	21.24	≤ 23.98	Pass
11ax-HE80	MCS0	138	5690	18.05	18.29	21.18	≤ 23.98	Pass
11ax-HE80	MCS0	155	5775	18.30	18.06	21.19	≤ 30.00	Pass

Note 1: The Total Average Power (dBm) = $10 \cdot \log \{10^{(\text{Ant 0 Average Power} / 10)} + 10^{(\text{Ant 1 Average Power} / 10)}\}$.

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2018/06/20
待測物型號	APIN0505		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11a	6Mbps	36	5180	17.05	17.30	20.19	≤ 30.00	Pass
11a	6Mbps	44	5220	18.21	17.99	21.11	≤ 30.00	Pass
11a	6Mbps	48	5240	18.28	18.04	21.17	≤ 30.00	Pass
11a	6Mbps	52	5260	15.38	15.27	18.34	≤ 23.98	Pass
11a	6Mbps	60	5300	15.56	15.37	18.48	≤ 23.98	Pass
11a	6Mbps	64	5320	15.64	15.37	18.52	≤ 23.98	Pass
11a	6Mbps	100	5500	15.17	15.06	18.13	≤ 23.98	Pass
11a	6Mbps	120	5600	15.93	15.74	18.85	≤ 23.98	Pass
11a	6Mbps	140	5700	15.47	15.21	18.35	≤ 23.98	Pass
11a	6Mbps	144	5720	15.23	15.20	18.23	≤ 22.95	Pass
11a	6Mbps	149	5745	18.03	18.22	21.14	≤ 30.00	Pass
11a	6Mbps	157	5785	18.27	18.08	21.19	≤ 30.00	Pass
11a	6Mbps	165	5825	18.10	18.13	21.13	≤ 30.00	Pass
11ac-VHT20	MCS0	36	5180	18.03	18.11	21.08	≤ 30.00	Pass
11ac-VHT20	MSC0	44	5220	18.38	18.10	21.25	≤ 30.00	Pass
11ac-VHT20	MCS0	48	5240	18.29	18.04	21.18	≤ 30.00	Pass
11ac-VHT20	MSC0	52	5260	16.23	15.96	19.11	≤ 23.98	Pass
11ac-VHT20	MCS0	60	5300	16.34	15.93	19.15	≤ 23.98	Pass
11ac-VHT20	MSC0	64	5320	16.47	16.05	19.28	≤ 23.98	Pass
11ac-VHT20	MCS0	100	5500	16.20	16.35	19.29	≤ 23.98	Pass
11ac-VHT20	MSC0	120	5600	16.68	16.27	19.49	≤ 23.98	Pass
11ac-VHT20	MCS0	140	5700	15.75	15.78	18.78	≤ 23.98	Pass
11ac-VHT20	MCS0	144	5720	16.62	16.48	19.56	≤ 22.95	Pass
11ac-VHT20	MCS0	149	5745	18.12	18.33	21.24	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	18.29	18.43	21.37	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	18.26	18.18	21.23	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11ac-VHT40	MCS0	38	5190	17.31	17.23	20.28	≤ 30.00	Pass
11ac-VHT40	MCS0	46	5230	18.35	17.96	21.17	≤ 30.00	Pass
11ac-VHT40	MCS0	54	5270	18.30	18.17	21.25	≤ 23.98	Pass
11ac-VHT40	MCS0	62	5310	17.59	17.56	20.59	≤ 23.98	Pass
11ac-VHT40	MCS0	102	5510	16.26	16.05	19.17	≤ 23.98	Pass
11ac-VHT40	MCS0	118	5590	18.32	18.03	21.19	≤ 23.98	Pass
11ac-VHT40	MCS0	134	5670	16.68	17.68	20.22	≤ 23.98	Pass
11ac-VHT40	MCS0	142	5710	18.11	18.07	21.10	≤ 23.98	Pass
11ac-VHT40	MCS0	151	5755	18.04	18.05	21.06	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	18.15	18.14	21.16	≤ 30.00	Pass
11ac-VHT80	MCS0	42	5210	17.44	17.26	20.36	≤ 30.00	Pass
11ac-VHT80	MCS0	58	5290	17.74	17.83	20.80	≤ 23.98	Pass
11ac-VHT80	MCS0	106	5530	15.80	15.78	18.80	≤ 23.98	Pass
11ac-VHT80	MCS0	122	5610	17.96	17.98	20.98	≤ 23.98	Pass
11ac-VHT80	MCS0	138	5690	18.17	18.07	21.13	≤ 23.98	Pass
11ac-VHT80	MCS0	155	5775	18.16	18.15	21.17	≤ 30.00	Pass
11ax-HE20	MCS0	36	5180	18.15	17.74	20.96	≤ 30.00	Pass
11ax-HE20	MCS0	44	5220	18.31	18.14	21.24	≤ 30.00	Pass
11ax-HE20	MCS0	48	5240	18.31	18.00	21.17	≤ 30.00	Pass
11ax-HE20	MCS0	52	5260	16.64	16.27	19.47	≤ 23.98	Pass
11ax-HE20	MCS0	60	5300	16.70	16.39	19.56	≤ 23.98	Pass
11ax-HE20	MCS0	64	5320	16.83	16.46	19.66	≤ 23.98	Pass
11ax-HE20	MCS0	100	5500	16.74	16.66	19.71	≤ 23.98	Pass
11ax-HE20	MCS0	120	5600	17.12	16.74	19.94	≤ 23.98	Pass
11ax-HE20	MCS0	140	5700	13.53	14.17	16.87	≤ 23.98	Pass
11ax-HE20	MCS0	144	5720	16.97	16.89	19.94	≤ 22.94	Pass
11ax-HE20	MCS0	149	5745	18.25	18.14	21.21	≤ 30.00	Pass
11ax-HE20	MCS0	157	5785	18.21	18.04	21.14	≤ 30.00	Pass
11ax-HE20	MCS0	165	5825	18.30	18.24	21.28	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 Average Power (dBm)	Ant 1 Average Power (dBm)	Total Average Power (dBm)	Average Power Limit (dBm)	Result
11ax-HE40	MCS0	38	5190	17.95	17.94	20.96	≤ 30.00	Pass
11ax-HE40	MCS0	46	5230	18.37	17.72	21.07	≤ 30.00	Pass
11ax-HE40	MCS0	54	5270	18.33	18.29	21.32	≤ 23.98	Pass
11ax-HE40	MCS0	62	5310	18.04	17.86	20.96	≤ 23.98	Pass
11ax-HE40	MCS0	102	5510	16.61	16.39	19.51	≤ 23.98	Pass
11ax-HE40	MCS0	118	5590	18.33	18.14	21.25	≤ 23.98	Pass
11ax-HE40	MCS0	134	5670	17.35	18.39	20.91	≤ 23.98	Pass
11ax-HE40	MCS0	142	5710	18.19	18.35	21.28	≤ 23.98	Pass
11ax-HE40	MCS0	151	5755	18.09	18.13	21.12	≤ 30.00	Pass
11ax-HE40	MCS0	159	5795	18.17	18.16	21.18	≤ 30.00	Pass
11ax-HE80	MCS0	42	5210	17.39	17.36	20.39	≤ 30.00	Pass
11ax-HE80	MCS0	58	5290	17.08	17.16	20.13	≤ 23.98	Pass
11ax-HE80	MCS0	106	5530	16.29	16.10	19.21	≤ 23.98	Pass
11ax-HE80	MCS0	122	5610	17.73	18.16	20.96	≤ 23.98	Pass
11ax-HE80	MCS0	138	5690	18.11	17.96	21.05	≤ 23.98	Pass
11ax-HE80	MCS0	155	5775	18.11	18.09	21.11	≤ 30.00	Pass

Note 1: The Total Average Power (dBm) = $10 \cdot \log \{10^{(\text{Ant 0 Average Power} / 10)} + 10^{(\text{Ant 1 Average Power} / 10)}\}$.

5.3. 天線之要求

5.3.1. 適用標準

低功率射頻電機之發射機或收發信機所使用之天線，應為全固定、半固定式或以獨特之耦合(unique coupling)方式連接機體。製造者可設計供使用者因損壞而替換之天線，但不得設計或使用原認證以外之天線或可供引接各類電纜之標準天線插座或電氣連接頭，如：BNC、F type、N type、M type、UG type、RCA、SMA、SMB...等及其他各類工業或通訊標準接頭。

5.3.2. 天線樣式

型號APIN0504 使用半固定式天線，使用Reverse SMA介面。

Antenna No.	Directionality /TYPE	Frequency Band (GHz)	Model No.	Max Peak Gain (dBi)	BF Dir Gain (dBi)	CDD Dir Gain (dBi)	
						For Power	For PSD
Wi-Fi External Antenna List (2.4GHz 2*2 MIMO, 5GHz 2*2 MIMO)							
1	Omni/Dipole	2.4	AP-ANT-1W	3.8	6.81	3.8	6.81
		5		5.8	8.81	5.8	8.81
2	Omni/Panel	2.4	AP-ANT-13B	2.3	5.31	2.3	5.31
		5		4.0	7.01	4.0	7.01
3	Omni/Dipole	2.4	AP-ANT-19	3.0	6.01	3.0	6.01
		5		6.0	9.01	6.0	9.01
4	Omni/Dipole	2.4	AP-ANT-20W	2.0	5.01	2.0	5.01
		5		2.0	5.01	2.0	5.01
5	Omni/Panel	2.4	AP-ANT-40	4.0	7.01	4.0	7.01
		5		5.0	8.01	5.0	8.01
6 (Note 3)	Directional/ Panel	2.4	AP-ANT-25A	5.0	5.0	5.0	8.01
		5		5.0	5.0	5.0	8.01
7 (Note 3)	Directional/ Panel	2.4	AP-ANT-28	7.5	7.5	7.5	10.51
		5		7.5	7.5	7.5	10.51
Bluetooth & ZigBee Internal Antenna							
PIFA		2.4		3.3			

型號APIN0505 使用全固定式天線

Directionality/ TYPE	Frequency Band (GHz)	Max Peak Gain (dBi)	BF Dir Gain (dBi)	CDD Dir Gain (dBi)	
				For Power	For PSD
Wi-Fi Internal Antenna List (2.4GHz 2*2 MIMO, 5GHz 2*2 MIMO)					
Omni/PIFA	2.4	4.29	7.08	4.29	7.08
Omni/PIFA	5	5.63	8.64	5.63	8.64
Bluetooth & ZigBee Internal Antenna					
PIFA	2.4	3.3			

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.
If all antennas have the same gain, G_{ANT} , Directional gain = $G_{ANT} + \text{Array Gain}$, where Array Gain is as follows.
 - For power spectral density (PSD) measurements on all devices,
Array Gain = $10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01$;
 - For power measurements on IEEE 802.11 devices,
Array Gain = 0 dB for $N_{ANT} \leq 4$;
2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain = $G_{ANT} + \text{Array Gain}$, BF Gain was declared by the applicant.
3. Two type antennas are cross polarized, the detail refer to antenna specification.
4. For APIN0504, low gain antenna AP-ANT-20W was selected to perform all RF testing that can got maximum power setting. High gain Omni antenna AP-ANT-19 & AP-ANT-40 and directional antenna AP-ANT-28 were selected to perform radiated spurious emission and band edge testing. High gain antenna power setting will be reduced according to difference value of antenna gain declared by applicant.
For APIN0505, its directional gain was declared by the applicant, the detail refers to antenna specification.

5.4. 26dB 佔用頻寬

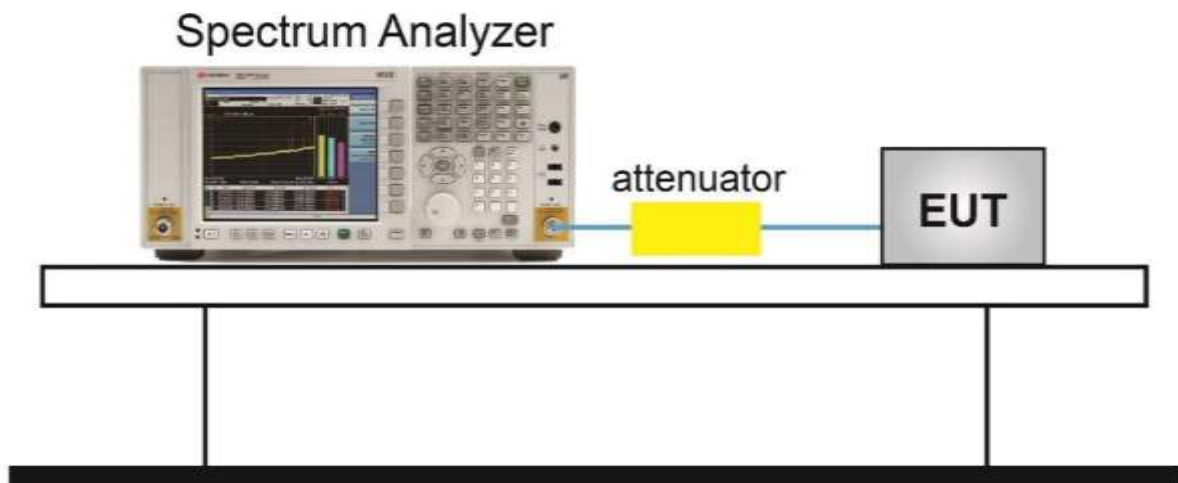
5.4.1. 適用標準

N/A

5.4.2. 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，峰值發射功率必須使用依據均方根等效電壓校準之儀器量測於任何連續傳輸之時段，量測結果須依儀器限制(如偵測器反應時間、相較於發射頻寬有限之解析頻寬能力，靈敏度等)調整得出正確之峰值量測或使用峰值功率表。

5.4.3. 測試架構圖



5.4.4. 26dB 佔用頻寬測試結果

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/06/05 ~ 2019/07/24
待測物型號	APIN0504		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 0 / Ant 0 + 1					
802.11a	6Mbps	36	5180	21.00	16.70
802.11a	6Mbps	44	5220	21.22	16.72
802.11a	6Mbps	48	5240	20.81	16.73
802.11a	6Mbps	52	5260	21.25	16.73
802.11a	6Mbps	60	5300	21.09	16.73
802.11a	6Mbps	64	5320	21.19	16.67
802.11a	6Mbps	100	5500	21.18	16.67
802.11a	6Mbps	120	5600	21.36	16.72
802.11a	6Mbps	140	5700	21.33	16.66
802.11a	6Mbps	144	5720	21.18	16.66
802.11a	6Mbps	149	5745	21.66	16.68
802.11a	6Mbps	157	5785	21.70	16.75
802.11a	6Mbps	165	5825	21.72	16.82
802.11ac-VHT20	MCS0	36	5180	21.59	17.87
802.11ac-VHT20	MCS0	44	5220	21.28	17.82
802.11ac-VHT20	MCS0	48	5240	21.05	17.84
802.11ac-VHT20	MCS0	52	5260	21.45	17.83
802.11ac-VHT20	MCS0	60	5300	21.46	17.82
802.11ac-VHT20	MCS0	64	5320	21.66	17.85
802.11ac-VHT20	MCS0	100	5500	21.90	17.80
802.11ac-VHT20	MCS0	120	5600	21.57	17.85
802.11ac-VHT20	MCS0	140	5700	21.52	17.82
802.11ac-VHT20	MCS0	144	5720	21.34	17.79
802.11ac-VHT20	MCS0	149	5745	21.15	17.82
802.11ac-VHT20	MCS0	157	5785	21.60	17.87
802.11ac-VHT20	MCS0	165	5825	21.93	17.93

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 0 / Ant 0 + 1					
802.11ac-VHT40	MCS0	38	5190	40.00	36.29
802.11ac-VHT40	MCS0	46	5230	39.99	36.36
802.11ac-VHT40	MCS0	54	5270	39.90	36.33
802.11ac-VHT40	MCS0	62	5310	39.15	36.30
802.11ac-VHT40	MCS0	102	5510	39.75	36.29
802.11ac-VHT40	MCS0	118	5590	39.59	36.29
802.11ac-VHT40	MCS0	134	5670	39.33	36.32
802.11ac-VHT40	MCS0	142	5710	39.58	36.28
802.11ac-VHT40	MCS0	151	5755	39.82	36.30
802.11ac-VHT40	MCS0	159	5795	39.33	36.39
802.11ac-VHT80	MCS0	42	5210	81.52	75.82
802.11ac-VHT80	MCS0	58	5290	80.67	75.72
802.11ac-VHT80	MCS0	106	5530	80.58	75.74
802.11ac-VHT80	MCS0	122	5610	80.50	75.71
802.11ac-VHT80	MCS0	138	5690	81.10	75.76
802.11ac-VHT80	MCS0	155	5775	80.48	75.88
802.11ax-HE20	MCS0	36	5180	21.14	19.06
802.11ax-HE20	MCS0	44	5220	21.10	19.01
802.11ax-HE20	MCS0	48	5240	21.42	18.99
802.11ax-HE20	MCS0	52	5260	21.33	19.05
802.11ax-HE20	MCS0	60	5300	21.23	19.05
802.11ax-HE20	MCS0	64	5320	21.51	19.08
802.11ax-HE20	MCS0	100	5500	21.31	19.05
802.11ax-HE20	MCS0	116	5580	21.36	19.12
802.11ax-HE20	MCS0	140	5700	21.29	19.01
802.11ax-HE20	MCS0	144	5720	21.49	19.10
802.11ax-HE20	MCS0	149	5745	21.25	19.06
802.11ax-HE20	MCS0	157	5785	23.02	19.04
802.11ax-HE20	MCS0	165	5825	22.70	19.14

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 0 / Ant 0 + 1					
802.11ax-HE40	MCS0	38	5190	39.61	37.56
802.11ax-HE40	MCS0	46	5230	39.69	37.56
802.11ax-HE40	MCS0	54	5270	39.75	37.54
802.11ax-HE40	MCS0	62	5310	39.65	37.55
802.11ax-HE40	MCS0	102	5510	39.72	37.63
802.11ax-HE40	MCS0	110	5550	39.69	37.60
802.11ax-HE40	MCS0	134	5670	39.74	37.60
802.11ax-HE40	MCS0	142	5710	39.82	37.61
802.11ax-HE40	MCS0	151	5755	39.87	37.67
802.11ax-HE40	MCS0	159	5795	39.83	37.68
802.11ax-HE80	MCS0	42	5210	81.79	77.08
802.11ax-HE80	MCS0	58	5290	80.97	76.86
802.11ax-HE80	MCS0	106	5530	81.17	77.08
802.11ax-HE80	MCS0	138	5690	80.77	77.02
802.11ax-HE80	MCS0	155	5775	81.15	76.96

802.11a 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 36 (5180MHz)



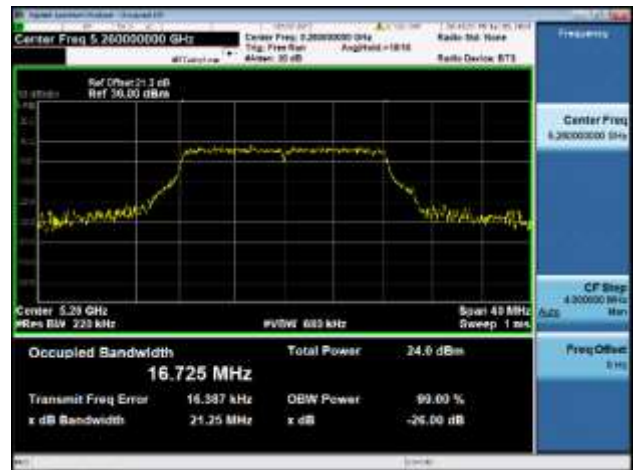
Channel 44 (5220MHz)



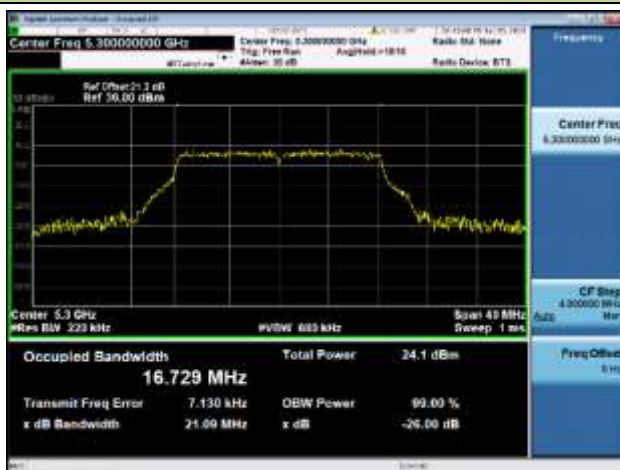
Channel 48 (5240MHz)



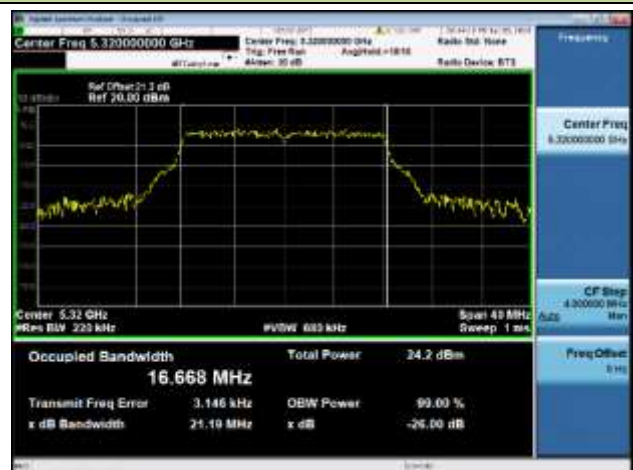
Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)



802.11a 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 100 (5500MHz)



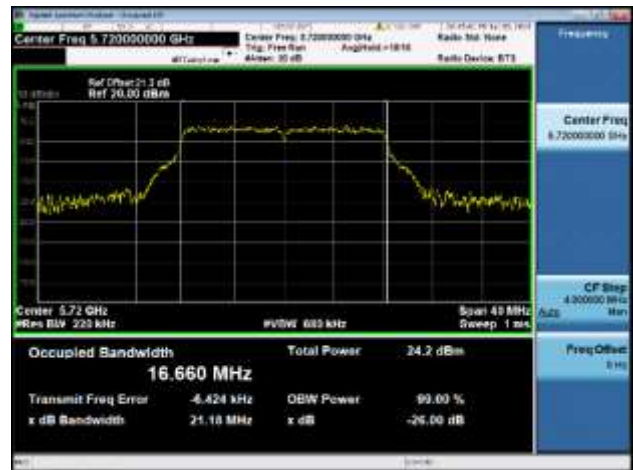
Channel 116 (5580MHz)



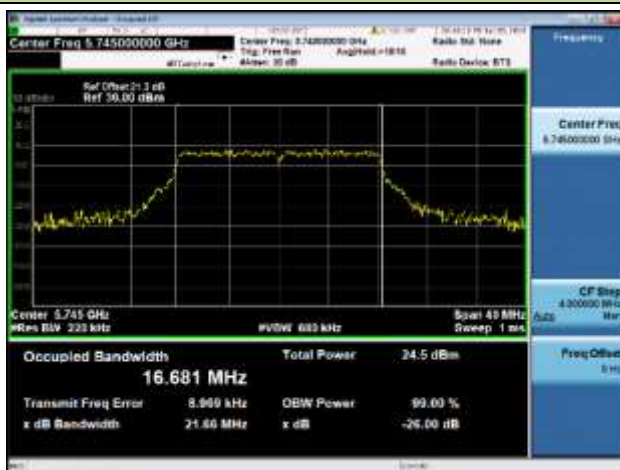
Channel 140 (5700MHz)



Channel 144 (5720MHz)



Channel 149 (5745MHz)

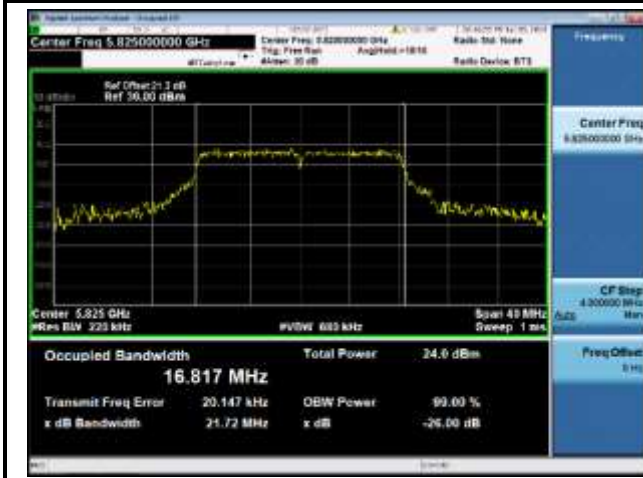


Channel 157 (5785MHz)



802.11a 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 165 (5825MHz)

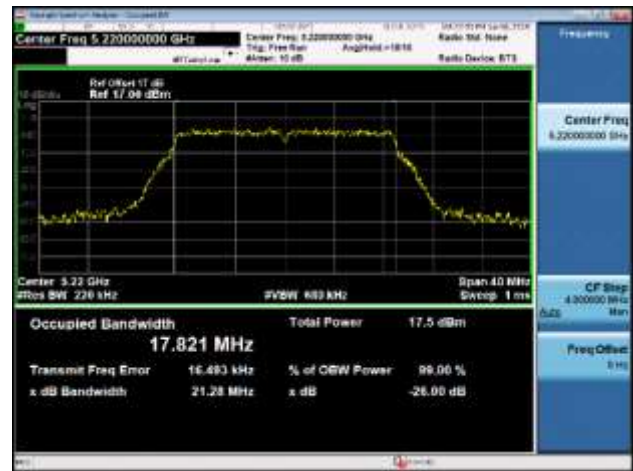


802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 36 (5180MHz)



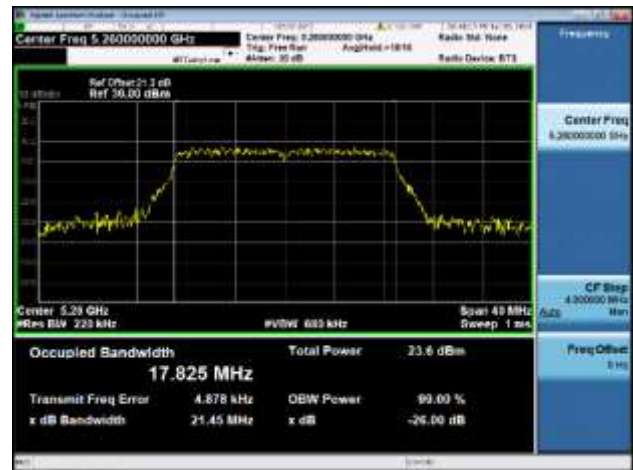
Channel 44 (5220MHz)



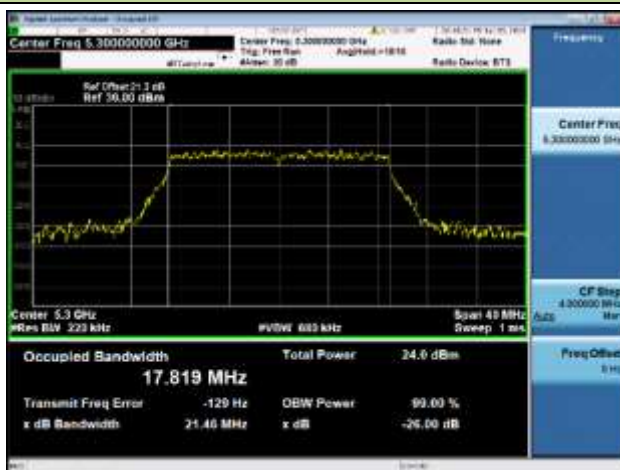
Channel 48 (5240MHz)



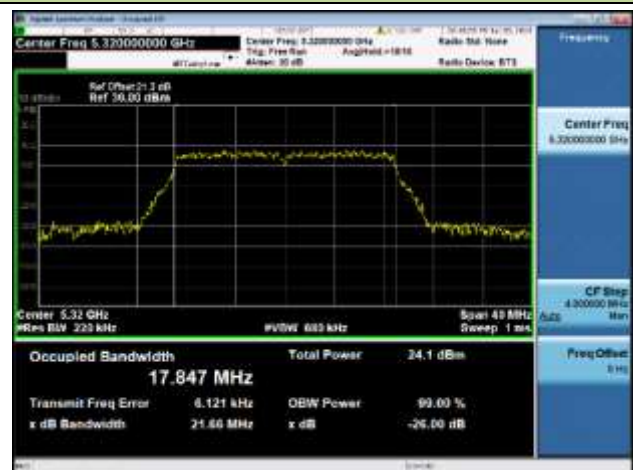
Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)

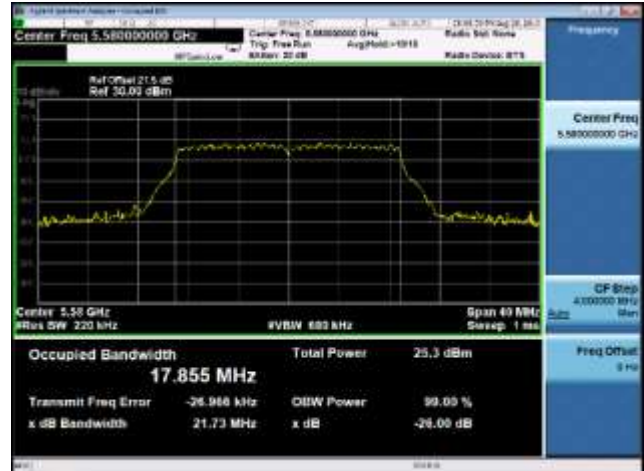


802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 100 (5500MHz)



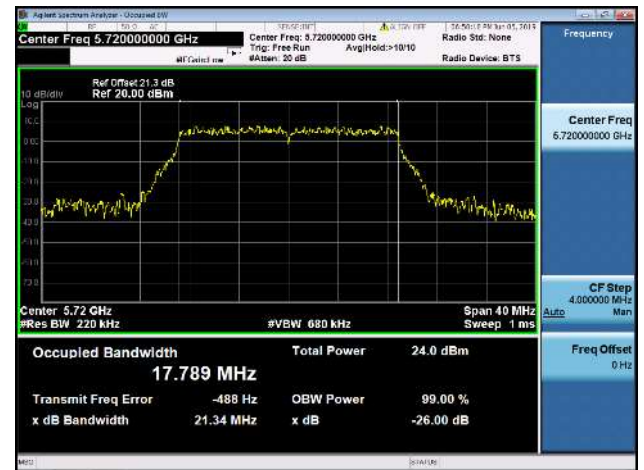
Channel 116 (5580MHz)



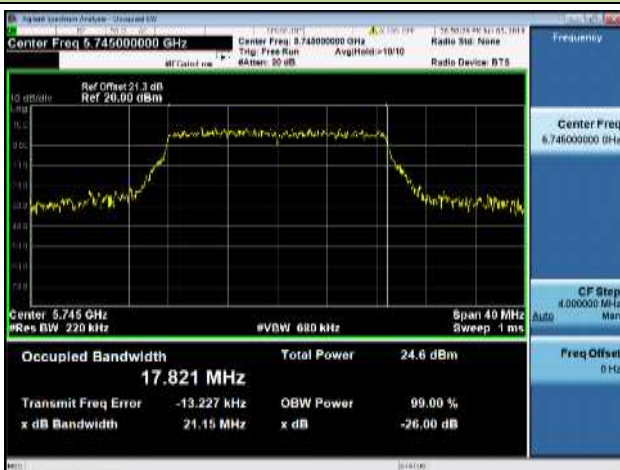
Channel 140 (5700MHz)



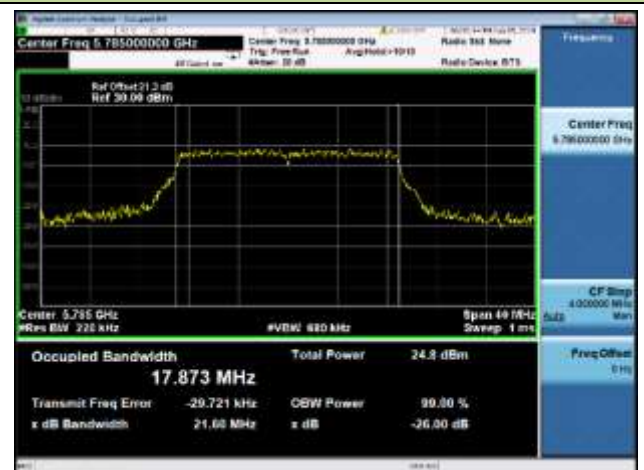
Channel 144 (5720MHz)



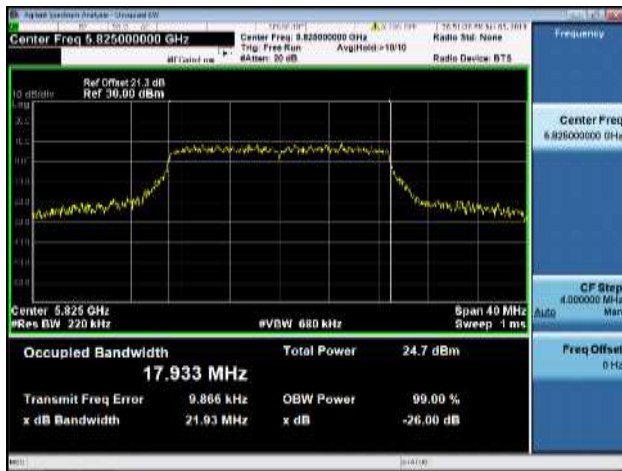
Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

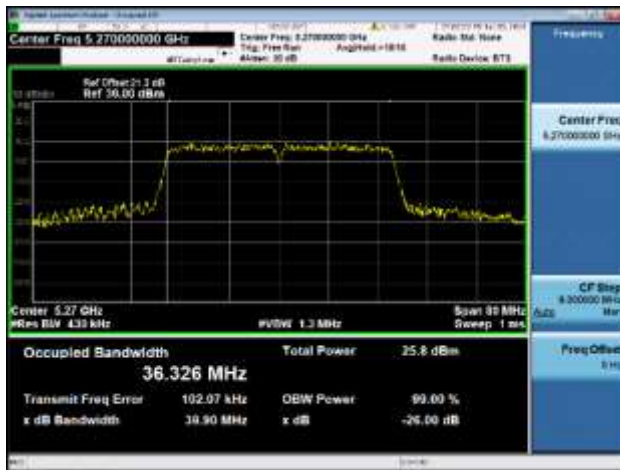
Channel 38 (5190MHz)



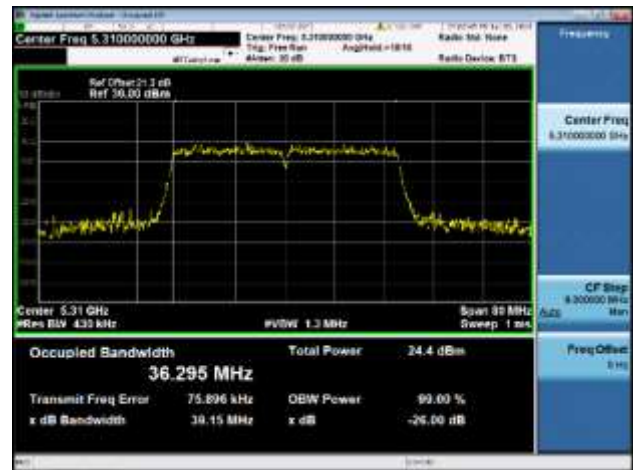
Channel 46 (5230MHz)



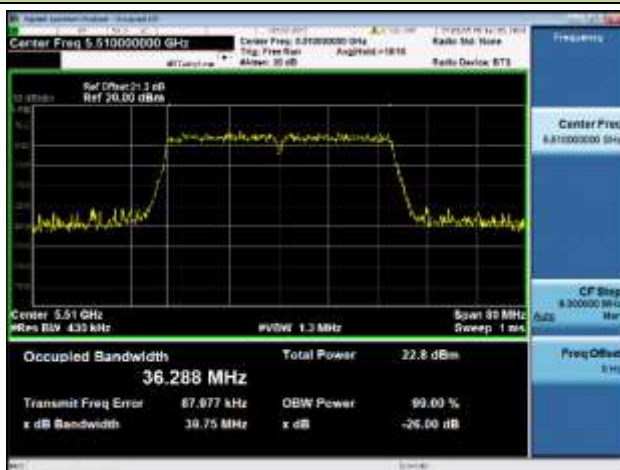
Channel 54 (5270MHz)



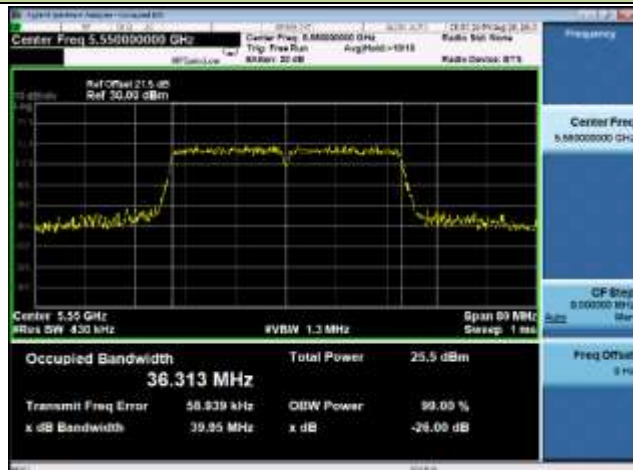
Channel 62 (5310MHz)



Channel 102 (5510MHz)

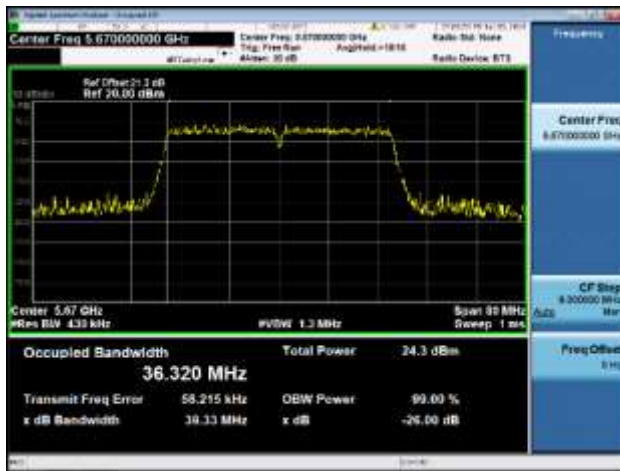


Channel 110 (5550MHz)

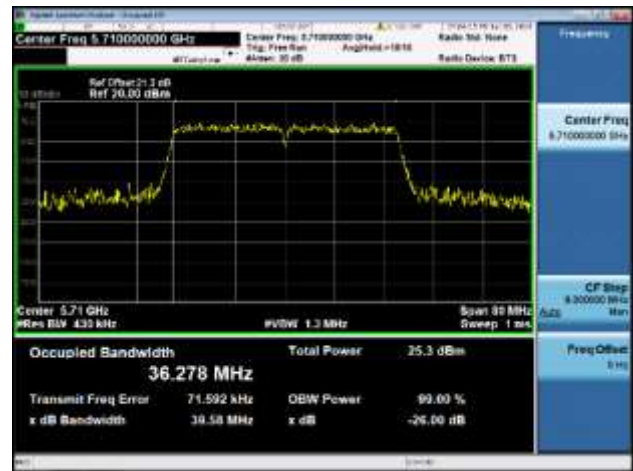


802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

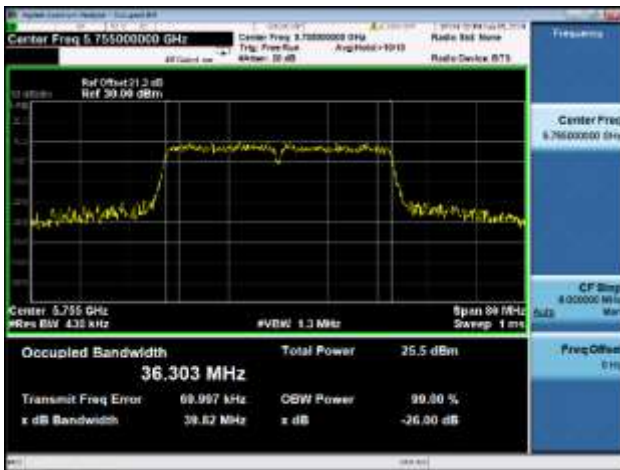
Channel 134 (5670MHz)



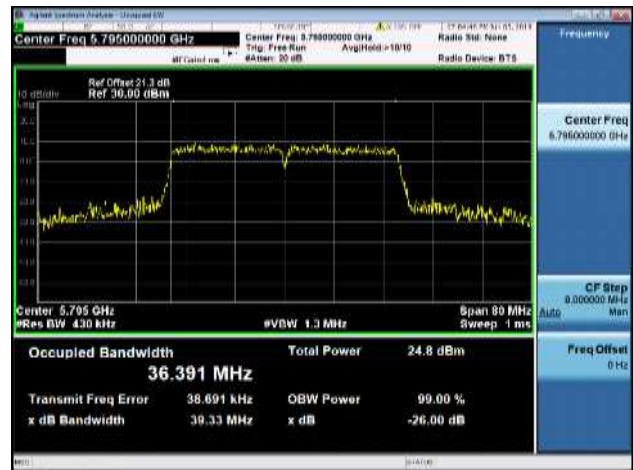
Channel 142 (5710MHz)



Channel 151 (5755MHz)



Channel 151 (5795MHz)



802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

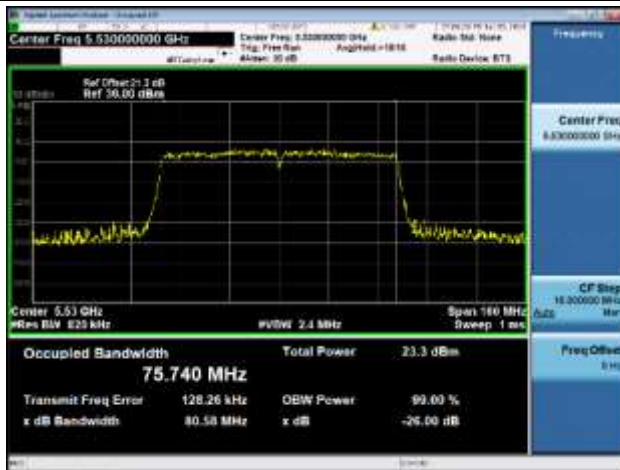
Channel 42 (5210MHz)



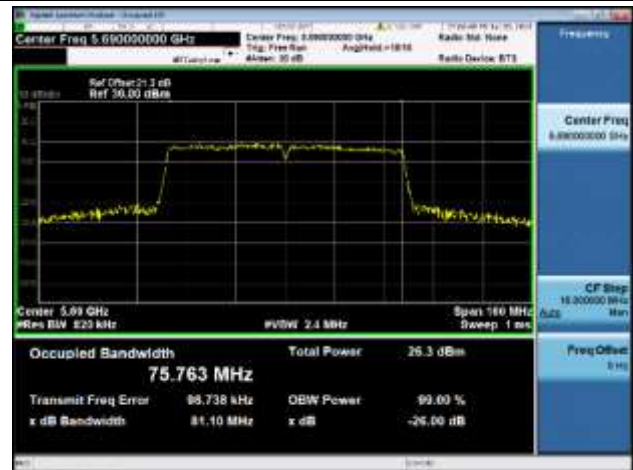
Channel 58 (5290MHz)



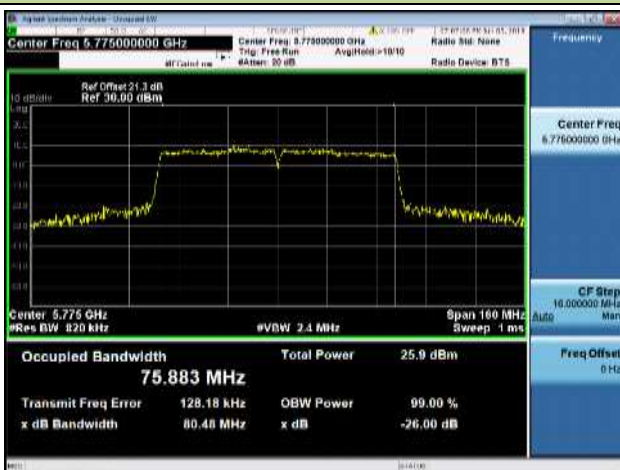
Channel 106 (5530MHz)



Channel 138 (5690MHz)

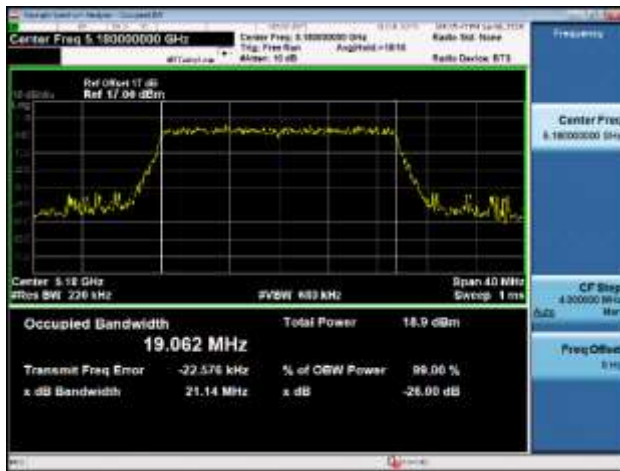


Channel 155 (5775MHz)

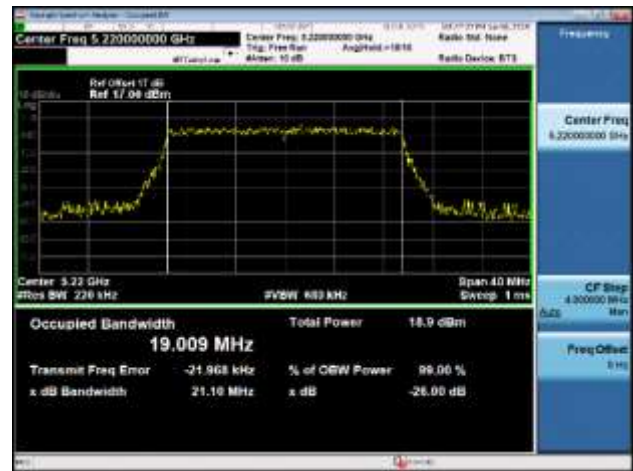


802.11ax-HE20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 36 (5180MHz)



Channel 44 (5220MHz)



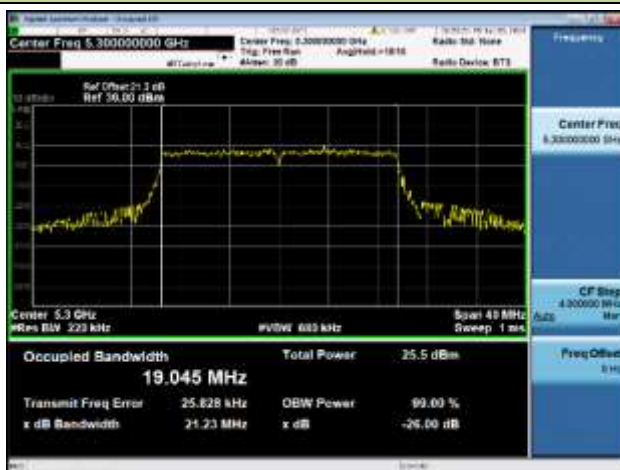
Channel 48 (5240MHz)



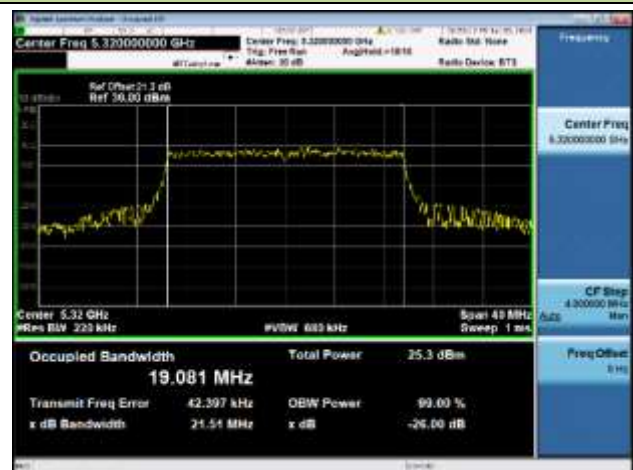
Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)



802.11ax-HE20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

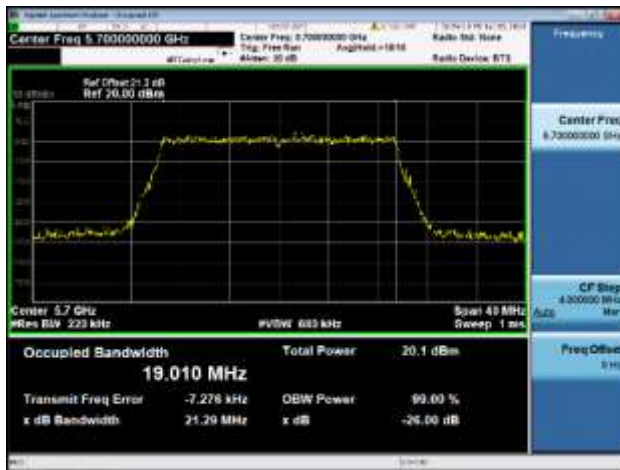
Channel 100 (5500MHz)



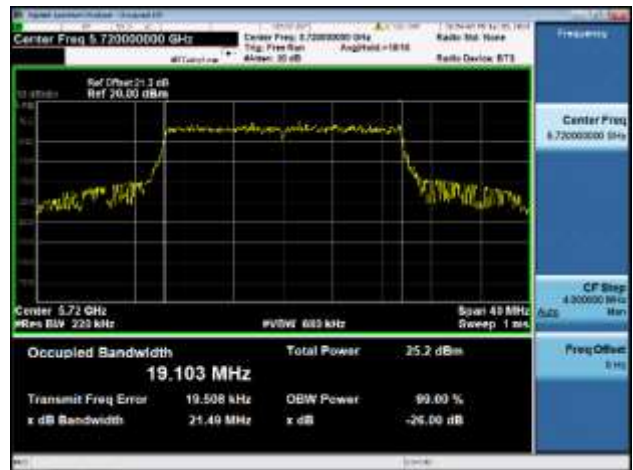
Channel 116 (5580MHz)



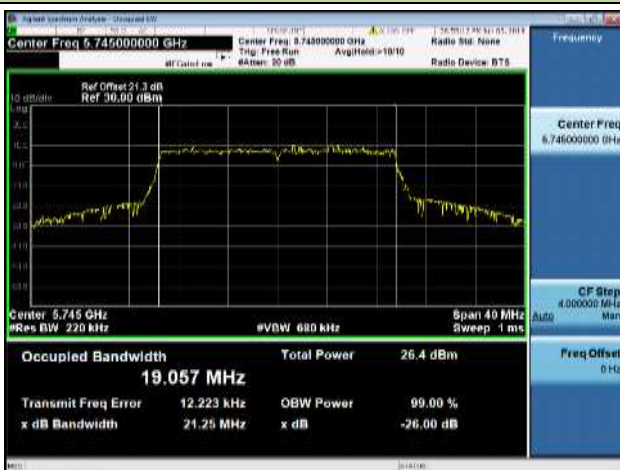
Channel 140 (5700MHz)



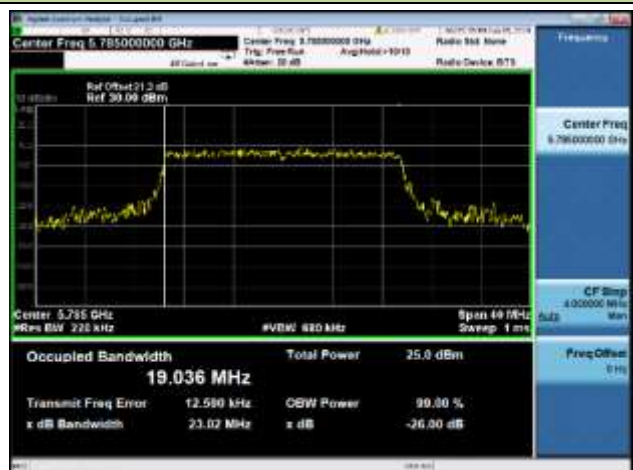
Channel 144 (5720MHz)



Channel 149 (5745MHz)

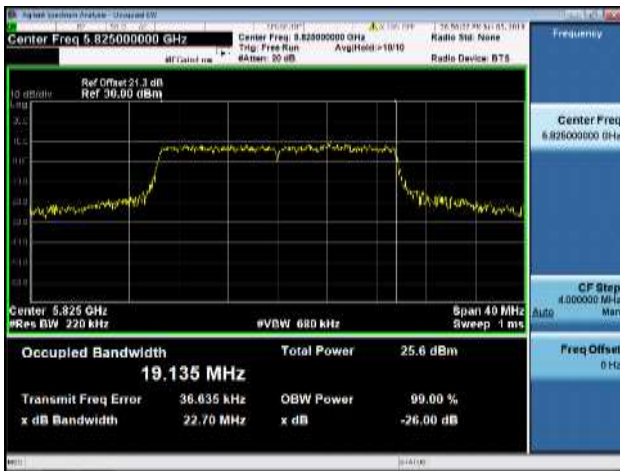


Channel 157 (5785MHz)



802.11ax-HE20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ax-HE40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

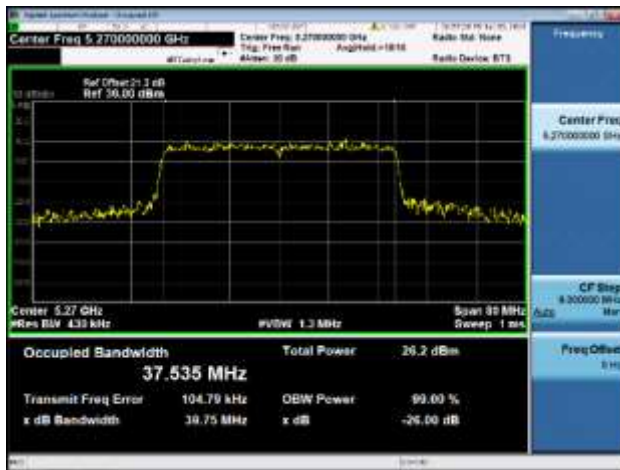
Channel 38 (5190MHz)



Channel 46 (5230MHz)



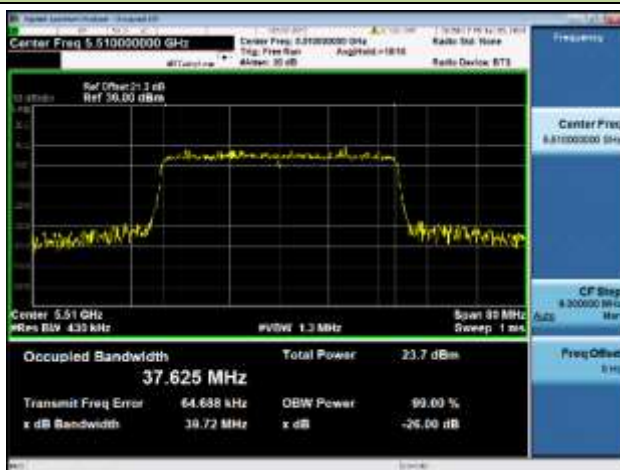
Channel 54 (5270MHz)



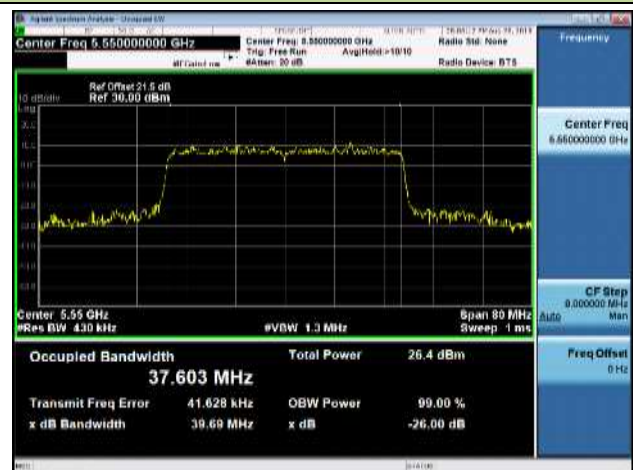
Channel 62 (5310MHz)



Channel 102 (5510MHz)



Channel 110 (5550MHz)

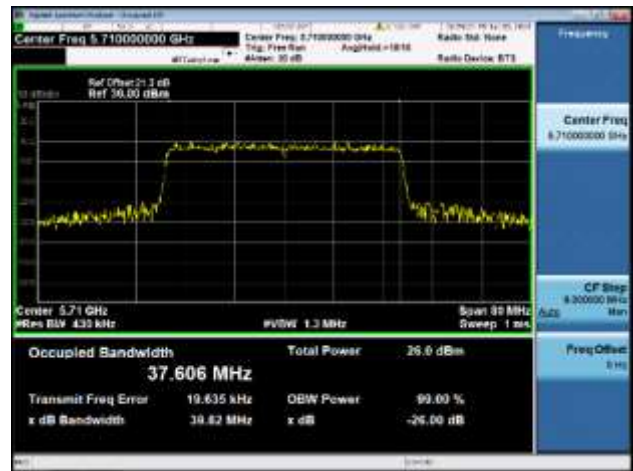


802.11ax-HE40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

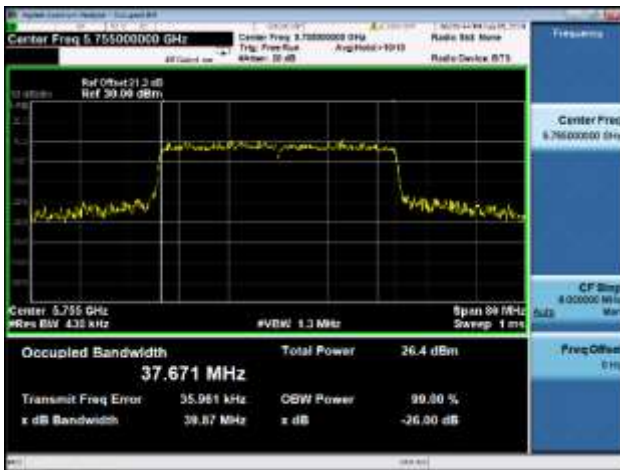
Channel 134 (5670MHz)



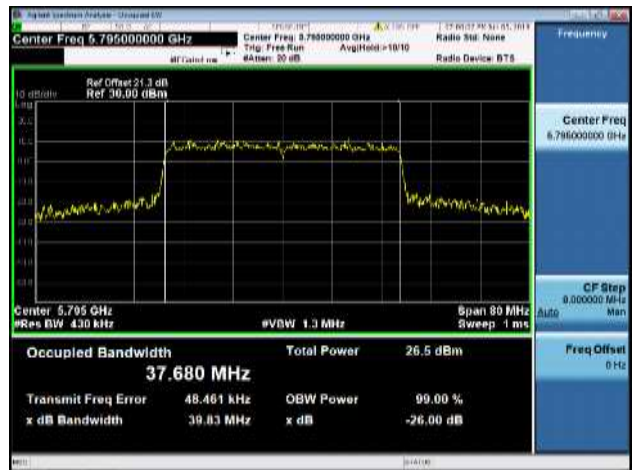
Channel 142 (5710MHz)



Channel 151 (5755MHz)

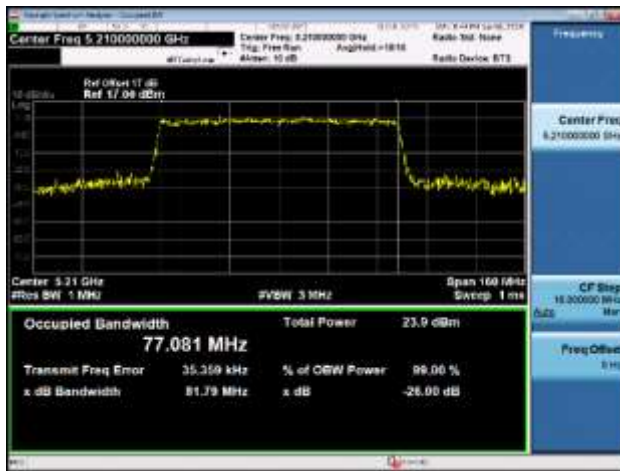


Channel 159 (5795MHz)



802.11ax-HE80 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

Channel 42 (5210MHz)



Channel 58 (5290MHz)



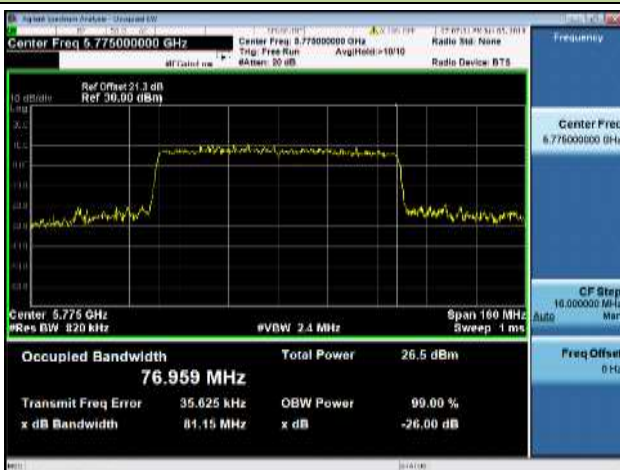
Channel 106 (5530MHz)



Channel 138 (5690MHz)



Channel 155 (5775MHz)



5.5. 6dB 佔用頻寬

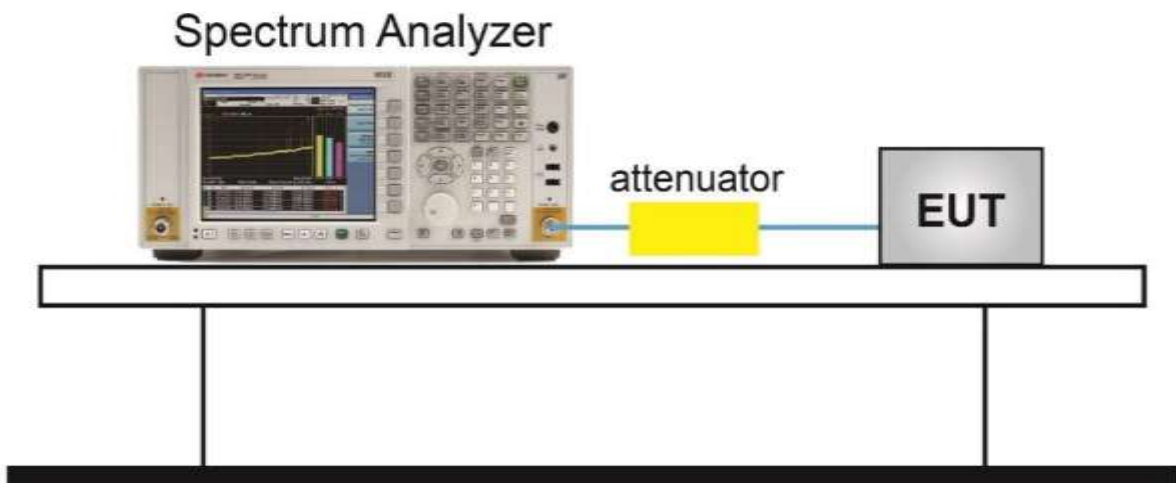
5.5.1. 適用標準

在 5.725 GHz~5.850 GHz 頻段操作之設備，其 6 dB 頻寬至少應有 500 kHz。

5.5.2. 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，峰值發射功率必須使用依據均方根等效電壓校準之儀器量測於任何連續傳輸之時段，量測結果須依儀器限制(如偵測器反應時間、相較於發射頻寬有限之解析頻寬能力，靈敏度等)調整得出正確之峰值量測或使用峰值功率表。

5.5.3. 測試架構圖



5.5.4. 6dB 佔用頻寬測試結果

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/06/05
待測物型號	APIN0504		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Ant 0/ Ant 0 + 1						
802.11a	6Mbps	149	5745	16.41	≥0.5	Pass
802.11a	6Mbps	157	5785	16.38	≥0.5	Pass
802.11a	6Mbps	165	5825	16.36	≥0.5	Pass
802.11ac-VHT20	MCS0	149	5745	17.62	≥0.5	Pass
802.11ac-VHT20	MCS0	157	5785	17.60	≥0.5	Pass
802.11ac-VHT20	MCS0	165	5825	17.62	≥0.5	Pass
802.11ac-VHT40	MCS0	151	5755	36.38	≥0.5	Pass
802.11ac-VHT40	MCS0	159	5795	36.38	≥0.5	Pass
802.11ac-VHT80	MCS0	155	5775	75.85	≥0.5	Pass
802.11ax-HE20	MCS0	149	5745	18.99	≥0.5	Pass
802.11ax-HE20	MCS0	157	5785	18.95	≥0.5	Pass
802.11ax-HE20	MCS0	165	5825	18.99	≥0.5	Pass
802.11ax-HE40	MCS0	151	5755	36.97	≥0.5	Pass
802.11ax-HE40	MCS0	159	5795	37.63	≥0.5	Pass
802.11ax-HE80	MCS0	155	5775	76.59	≥0.5	Pass

802.11a 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

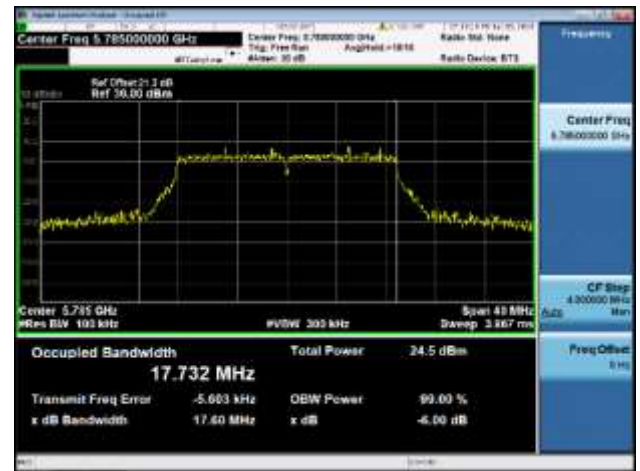


802.11ac-VHT20 6dB Bandwidth - Ant 0 / Ant 0 + 1

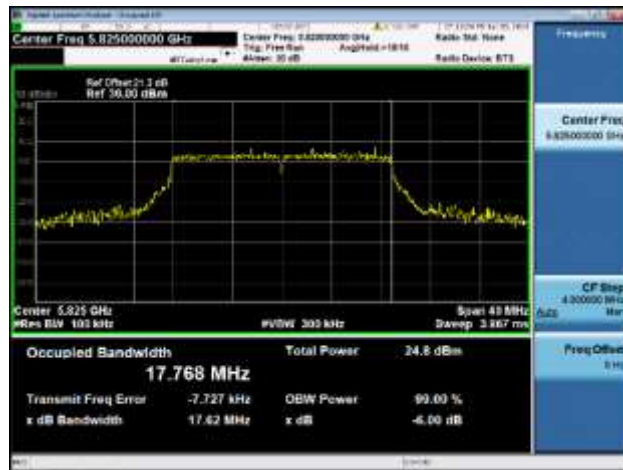
Channel 149 (5745MHz)



Channel 157 (5785MHz)

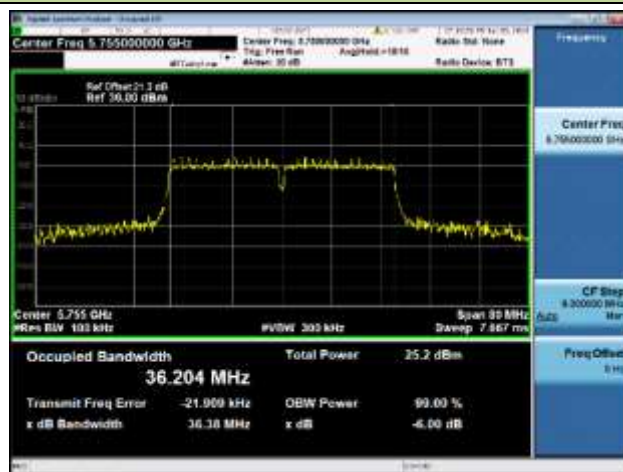


Channel 165 (5825MHz)

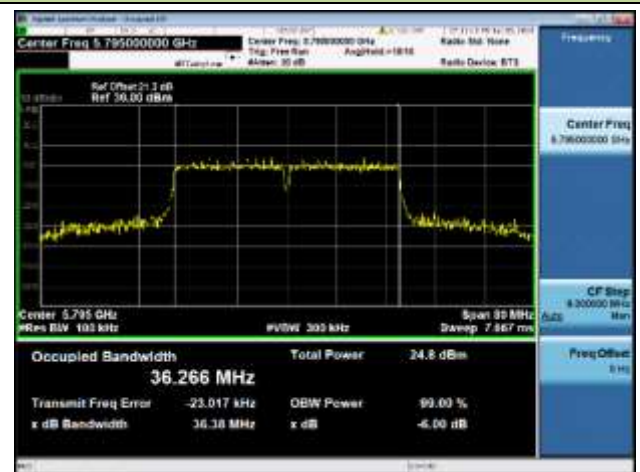


802.11ac-VHT40 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 151 (5755MHz)

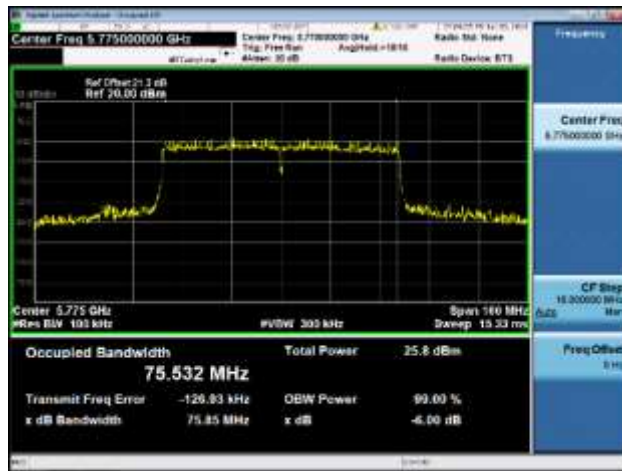


Channel 159 (5795MHz)



802.11ac-VHT80 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 155 (5775MHz)

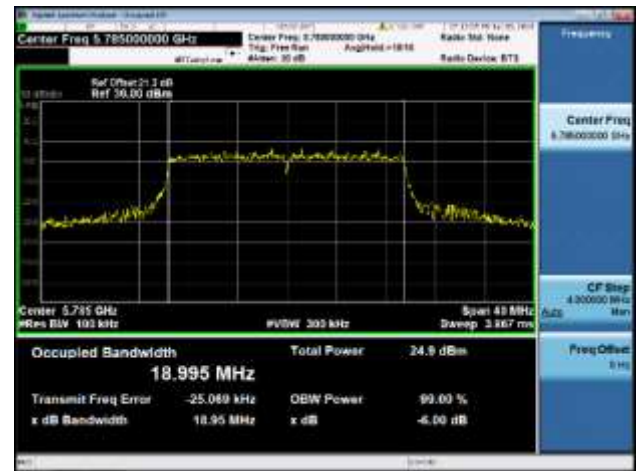


802.11ax-HE20 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 149 (5745MHz)



Channel 157 (5785MHz)

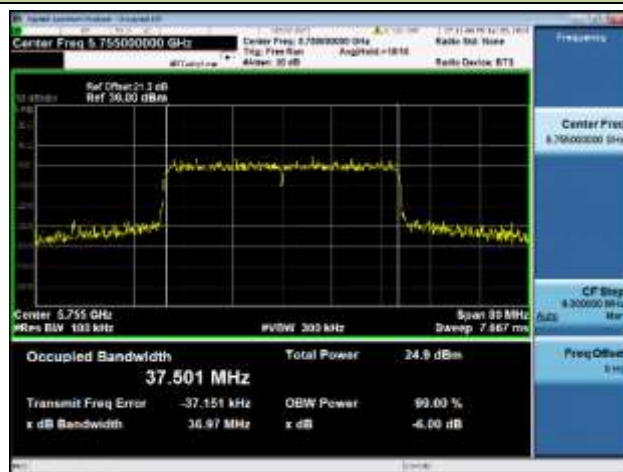


Channel 165 (5825MHz)

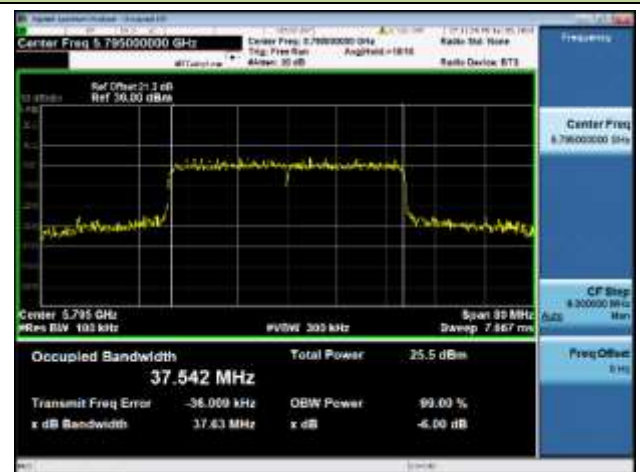


802.11ax-HE40 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 151 (5755MHz)

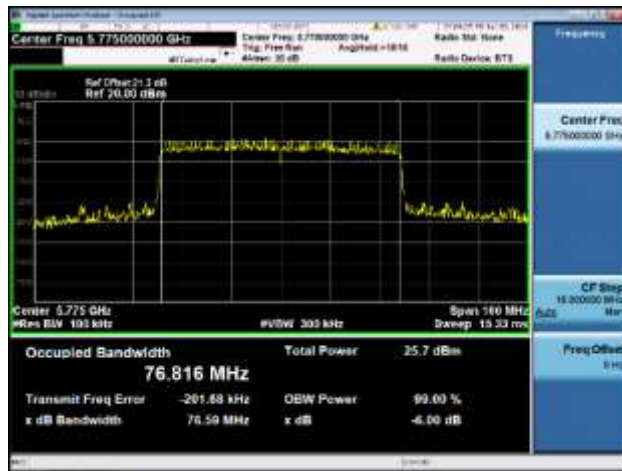


Channel 159 (5795MHz)



802.11ax-HE80 6dB Bandwidth - Ant 0 / Ant 0 + 1

Channel 155 (5775MHz)



5.6. 最大功率頻譜密度

5.6.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範之第4.7.2(1)(2)(3)節

使用於5.15 GHz~5.25 GHz 頻段，供室內操作使用，在任何1 MHz 頻帶中最大功率頻譜密度應小於或等於17 dBm。

使用頻率於5.25 GHz~5.35 GHz 與5.470 GHz~5.725 GHz 頻段，最大功率頻譜密度在任何1 MHz 頻帶中應小於或等於11 dBm。

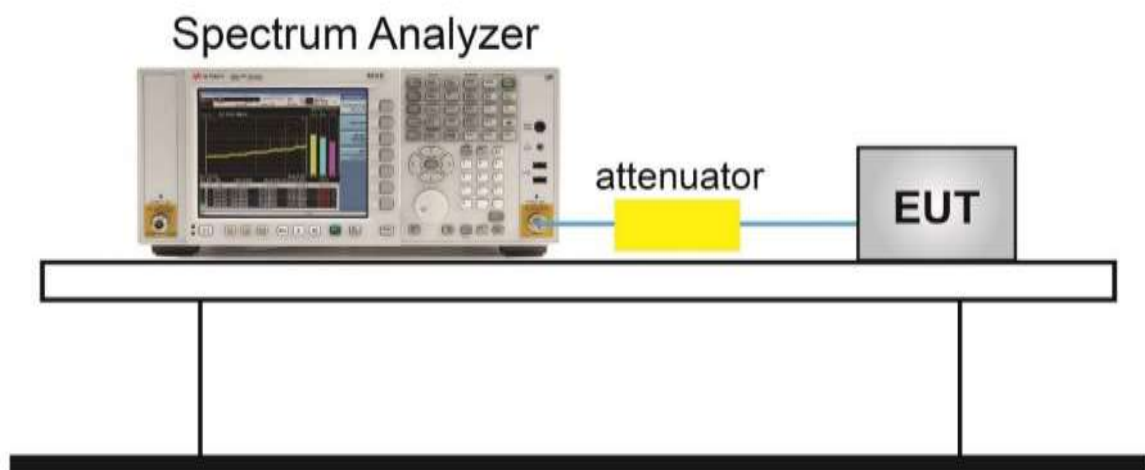
使用頻率於5.725 GHz~5.850 GHz 頻段，在任何500 kHz 頻帶中最大功率頻譜密度應小於或等於30 dBm。

使用超過6 dBi 方向增益之發射天線時，應依超過6 dBi 天線方向增益的dBi 總量，等量減少最大功率頻譜密度。

5.6.2. 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，量測定於1MHz/500kHz頻寬。

5.6.3. 測試架構圖



5.6.4. 峰值功率頻譜密度測試結果

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/06/03 ~ 2019/07/05
待測物型號	APIN0504	量測項目	功率頻譜密度 (UNII-Band 1 & 2a & 2c)

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	6.26	6.33	94.49	9.31	≤ 17.00	Pass
11a	6Mbps	44	5220	6.22	6.57	94.49	9.41	≤ 17.00	Pass
11a	6Mbps	48	5240	6.63	6.60	94.49	9.62	≤ 17.00	Pass
11a	6Mbps	52	5260	7.39	7.12	94.49	10.51	≤ 11.00	Pass
11a	6Mbps	60	5300	7.12	7.25	94.49	10.44	≤ 11.00	Pass
11a	6Mbps	64	5320	7.16	7.19	94.49	10.43	≤ 11.00	Pass
11a	6Mbps	100	5500	3.43	3.51	94.49	6.72	≤ 11.00	Pass
11a	6Mbps	120	5600	7.09	7.40	94.24	10.52	≤ 11.00	Pass
11a	6Mbps	140	5700	4.96	4.44	94.49	7.97	≤ 11.00	Pass
11a	6Mbps	144	5720	7.69	7.18	94.49	10.70	≤ 11.00	Pass
11ac-VHT20	MCS0	36	5180	7.09	6.77	98.21	9.95	≤ 17.00	Pass
11ac-VHT20	MCS0	44	5220	6.87	6.86	98.21	9.87	≤ 17.00	Pass
11ac-VHT20	MCS0	48	5240	6.98	7.15	98.21	10.08	≤ 17.00	Pass
11ac-VHT20	MCS0	52	5260	6.49	6.87	98.21	9.70	≤ 11.00	Pass
11ac-VHT20	MCS0	60	5300	6.78	6.94	98.21	9.87	≤ 11.00	Pass
11ac-VHT20	MCS0	64	5320	6.69	7.14	98.21	9.93	≤ 11.00	Pass
11ac-VHT20	MCS0	100	5500	5.27	4.89	98.21	8.09	≤ 11.00	Pass
11ac-VHT20	MCS0	120	5600	6.93	7.37	98.26	10.17	≤ 11.00	Pass
11ac-VHT20	MCS0	140	5700	3.63	3.76	98.21	6.71	≤ 11.00	Pass
11ac-VHT20	MCS0	144	5720	7.57	7.24	98.21	10.42	≤ 11.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11ac-VHT40	MCS0	38	5190	1.07	1.62	96.64	4.37	≤ 17.00	Pass
11ac-VHT40	MCS0	46	5230	3.38	4.31	96.64	6.88	≤ 17.00	Pass
11ac-VHT40	MCS0	54	5270	3.44	4.29	96.64	7.04	≤ 11.00	Pass
11ac-VHT40	MCS0	62	5310	2.30	2.84	96.64	5.74	≤ 11.00	Pass
11ac-VHT40	MCS0	102	5510	1.90	1.69	96.64	4.95	≤ 11.00	Pass
11ac-VHT40	MCS0	118	5590	3.80	4.49	96.72	7.31	≤ 11.00	Pass
11ac-VHT40	MCS0	134	5670	3.14	2.77	96.64	6.12	≤ 11.00	Pass
11ac-VHT40	MCS0	142	5710	4.49	4.16	96.64	7.49	≤ 11.00	Pass
11ac-VHT80	MCS0	42	5210	-0.71	-0.98	93.70	2.17	≤ 17.00	Pass
11ac-VHT80	MCS0	58	5290	-0.67	-0.37	93.70	2.77	≤ 11.00	Pass
11ac-VHT80	MCS0	106	5530	-1.68	-1.13	93.70	1.90	≤ 11.00	Pass
11ac-VHT80	MCS0	122	5610	0.76	1.22	93.74	4.29	≤ 11.00	Pass
11ac-VHT80	MCS0	138	5690	1.03	1.19	93.70	4.40	≤ 11.00	Pass
11ax-HE20	MCS0	36	5180	6.10	5.63	97.36	8.88	≤ 17.00	Pass
11ax-HE20	MCS0	44	5220	6.39	6.50	97.36	9.46	≤ 17.00	Pass
11ax-HE20	MCS0	48	5240	6.87	6.85	97.36	9.87	≤ 17.00	Pass
11ax-HE20	MCS0	52	5260	6.60	6.93	97.36	9.90	≤ 11.00	Pass
11ax-HE20	MCS0	60	5300	6.93	6.93	97.36	10.05	≤ 11.00	Pass
11ax-HE20	MCS0	64	5320	6.97	7.13	97.36	10.18	≤ 11.00	Pass
11ax-HE20	MCS0	100	5500	4.27	4.69	97.36	7.61	≤ 11.00	Pass
11ax-HE20	MCS0	120	5600	6.78	7.49	97.24	10.28	≤ 11.00	Pass
11ax-HE20	MCS0	140	5700	2.60	2.16	97.36	5.51	≤ 11.00	Pass
11ax-HE20	MCS0	144	5720	7.20	6.80	97.36	10.13	≤ 11.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11ax-HE40	MCS0	38	5190	1.92	1.82	94.94	4.88	≤ 17.00	Pass
11ax-HE40	MCS0	46	5230	3.53	4.13	94.94	6.85	≤ 17.00	Pass
11ax-HE40	MCS0	54	5270	3.73	4.01	94.94	7.11	≤ 11.00	Pass
11ax-HE40	MCS0	62	5310	1.60	2.36	94.94	5.23	≤ 11.00	Pass
11ax-HE40	MCS0	102	5510	0.43	-0.29	94.94	3.32	≤ 11.00	Pass
11ax-HE40	MCS0	118	5590	3.52	4.46	95.81	7.21	≤ 11.00	Pass
11ax-HE40	MCS0	134	5670	3.08	3.24	94.94	6.40	≤ 11.00	Pass
11ax-HE40	MCS0	142	5710	4.52	4.23	94.94	7.61	≤ 11.00	Pass
11ax-HE80	MCS0	42	5210	-0.49	-0.46	91.14	2.53	≤ 17.00	Pass
11ax-HE80	MCS0	58	5290	-0.55	-0.13	91.14	3.08	≤ 11.00	Pass
11ax-HE80	MCS0	106	5530	-2.29	-2.00	91.14	1.27	≤ 11.00	Pass
11ax-HE80	MCS0	122	5610	1.02	1.81	92.21	4.80	≤ 11.00	Pass
11ax-HE80	MCS0	138	5690	0.62	1.10	91.14	4.28	≤ 11.00	Pass

Note 1: When EUT duty cycle ≥ 98%, the total PSD (dBm/MHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/MHz).

Note 2: When EUT duty cycle < 98%, the total PSD (dBm/MHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/MHz) + $10 \cdot \log (1/\text{Duty Cycle})$.

Note 3: For 5150 - 5250MHz Band: PSD Limit (dBm/MHz) = 17dBm/MHz.

For 5250 - 5350 and 5470 - 5725MHz Band: PSD Limit (dBm/MHz) = 11dBm/MHz.

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/06/03 ~ 2019/07/03
待測物型號	APIN0504	量測項目	功率頻譜密度 (UNII-Band 3)

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/100kHz)	Ant 1 PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
11a	6Mbps	149	5745	-1.50	-1.27	94.49	6.99	8.86	≤ 30.00	Pass
11a	6Mbps	157	5785	-1.26	-1.34	94.49	6.99	8.95	≤ 30.00	Pass
11a	6Mbps	165	5825	-1.21	-1.65	94.49	6.99	8.82	≤ 30.00	Pass
11ac-VHT20	MCS0	149	5745	-0.93	-1.42	98.21	6.99	8.91	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	-1.78	-1.35	98.21	6.99	8.52	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	-1.49	-1.50	98.21	6.99	8.58	≤ 30.00	Pass
11ac-VHT40	MCS0	151	5755	-4.49	-4.05	96.64	6.99	5.89	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	-4.31	-4.48	96.64	6.99	5.75	≤ 30.00	Pass
11ac-VHT80	MCS0	155	5775	-7.06	-6.90	93.70	6.99	3.30	≤ 30.00	Pass
11ax-HE20	MCS0	149	5745	-2.82	-2.71	97.36	6.99	7.35	≤ 30.00	Pass
11ax-HE20	MCS0	157	5785	-2.37	-2.62	97.36	6.99	7.62	≤ 30.00	Pass
11ax-HE20	MCS0	165	5825	-2.74	-2.90	97.36	6.99	7.30	≤ 30.00	Pass
11ax-HE40	MCS0	151	5755	-4.98	-5.38	94.94	6.99	5.05	≤ 30.00	Pass
11ax-HE40	MCS0	159	5795	-5.45	-5.51	94.94	6.99	4.75	≤ 30.00	Pass
11ax-HE80	MCS0	155	5775	-7.23	-7.60	91.14	6.99	2.99	≤ 30.00	Pass

Note 1: When EUT duty cycle ≥ 98%, the total PSD (dBm/500KHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/100KHz) + Constant Factor.

Note 2: When EUT duty cycle < 98%, the total PSD (dBm/500KHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/100KHz) + Constant Factor + $10 \cdot \log (1/\text{Duty Cycle})$.

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2018/07/01
待測物型號	APIN0505	量測項目	功率頻譜密度 (UNII-Band 1 & 2a & 2c)

Test Mode	Data Rate/MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	5.82	6.06	93.36	8.95	≤ 14.36	Pass
11a	6Mbps	44	5220	7.80	7.50	93.36	10.66	≤ 14.36	Pass
11a	6Mbps	48	5240	8.05	7.97	93.36	11.02	≤ 14.36	Pass
11a	6Mbps	52	5260	4.84	4.51	93.36	7.99	≤ 8.36	Pass
11a	6Mbps	60	5300	4.87	4.22	93.36	7.87	≤ 8.36	Pass
11a	6Mbps	64	5320	4.71	4.40	93.36	7.87	≤ 8.36	Pass
11a	6Mbps	100	5500	4.63	4.56	93.36	7.90	≤ 8.36	Pass
11a	6Mbps	120	5600	4.63	4.53	94.48	7.84	≤ 8.36	Pass
11a	6Mbps	140	5700	4.59	4.53	93.36	7.87	≤ 8.36	Pass
11a	6Mbps	144	5720	4.51	4.66	93.36	7.90	≤ 8.36	Pass
11ac-VHT20	MCS0	36	5180	8.07	8.07	98.21	11.08	≤ 14.36	Pass
11ac-VHT20	MCS0	44	5220	8.48	8.19	98.21	11.35	≤ 14.36	Pass
11ac-VHT20	MCS0	48	5240	8.36	8.24	98.21	11.31	≤ 14.36	Pass
11ac-VHT20	MCS0	52	5260	5.09	4.73	98.21	7.92	≤ 8.36	Pass
11ac-VHT20	MCS0	60	5300	5.14	4.69	98.21	7.93	≤ 8.36	Pass
11ac-VHT20	MCS0	64	5320	5.15	4.88	98.21	8.02	≤ 8.36	Pass
11ac-VHT20	MCS0	100	5500	5.06	4.85	98.21	7.97	≤ 8.36	Pass
11ac-VHT20	MCS0	120	5600	5.16	4.88	98.26	8.17	≤ 8.36	Pass
11ac-VHT20	MCS0	140	5700	4.62	4.41	98.21	7.53	≤ 8.36	Pass
11ac-VHT20	MCS0	144	5720	5.31	4.72	98.21	8.03	≤ 8.36	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11ac-VHT40	MCS0	38	5190	3.22	2.90	96.40	6.07	≤ 14.36	Pass
11ac-VHT40	MCS0	46	5230	4.97	4.64	96.40	7.82	≤ 14.36	Pass
11ac-VHT40	MCS0	54	5270	4.71	4.82	96.40	7.93	≤ 8.36	Pass
11ac-VHT40	MCS0	62	5310	3.50	3.44	96.40	6.64	≤ 8.36	Pass
11ac-VHT40	MCS0	102	5510	2.02	1.82	96.40	5.09	≤ 8.36	Pass
11ac-VHT40	MCS0	118	5590	4.30	4.60	96.57	7.61	≤ 8.36	Pass
11ac-VHT40	MCS0	134	5670	2.63	3.54	96.40	6.28	≤ 8.36	Pass
11ac-VHT40	MCS0	142	5710	4.11	4.88	96.40	7.68	≤ 8.36	Pass
11ac-VHT80	MCS0	42	5210	0.29	0.26	92.83	3.28	≤ 14.36	Pass
11ac-VHT80	MCS0	58	5290	0.78	0.58	92.83	4.01	≤ 8.36	Pass
11ac-VHT80	MCS0	106	5530	-1.24	-1.42	92.83	2.00	≤ 8.36	Pass
11ac-VHT80	MCS0	122	5610	1.32	1.89	93.67	4.91	≤ 8.36	Pass
11ac-VHT80	MCS0	138	5690	1.31	1.90	92.83	4.95	≤ 8.36	Pass
11ax-HE20	MCS0	36	5180	7.08	7.19	97.23	10.15	≤ 14.36	Pass
11ax-HE20	MCS0	44	5220	7.57	7.41	97.23	10.50	≤ 14.36	Pass
11ax-HE20	MCS0	48	5240	7.97	7.53	97.23	10.77	≤ 14.36	Pass
11ax-HE20	MCS0	52	5260	4.99	4.61	97.23	7.94	≤ 8.36	Pass
11ax-HE20	MCS0	60	5300	5.14	4.63	97.23	8.03	≤ 8.36	Pass
11ax-HE20	MCS0	64	5320	4.87	4.56	97.23	7.85	≤ 8.36	Pass
11ax-HE20	MCS0	100	5500	4.94	4.70	97.23	7.95	≤ 8.36	Pass
11ax-HE20	MCS0	120	5600	5.13	4.53	97.24	7.97	≤ 8.36	Pass
11ax-HE20	MCS0	140	5700	2.47	3.30	97.23	6.04	≤ 8.36	Pass
11ax-HE20	MCS0	144	5720	4.87	4.77	97.23	7.95	≤ 8.36	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/MHz)	Ant 1 PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11ax-HE40	MCS0	38	5190	3.22	2.98	95.27	6.11	≤ 14.36	Pass
11ax-HE40	MCS0	46	5230	4.79	4.38	95.27	7.60	≤ 14.36	Pass
11ax-HE40	MCS0	54	5270	4.82	5.14	95.27	8.20	≤ 8.36	Pass
11ax-HE40	MCS0	62	5310	4.18	3.52	95.27	7.08	≤ 8.36	Pass
11ax-HE40	MCS0	102	5510	2.18	1.84	95.27	5.23	≤ 8.36	Pass
11ax-HE40	MCS0	118	5590	4.44	4.50	95.61	7.68	≤ 8.36	Pass
11ax-HE40	MCS0	134	5670	2.67	3.96	95.27	6.58	≤ 8.36	Pass
11ax-HE40	MCS0	142	5710	4.51	4.90	95.27	7.93	≤ 8.36	Pass
11ax-HE80	MCS0	42	5210	0.17	0.13	91.17	3.16	≤ 14.36	Pass
11ax-HE80	MCS0	58	5290	0.21	0.10	91.17	3.57	≤ 8.36	Pass
11ax-HE80	MCS0	106	5530	-0.88	-0.97	91.17	2.48	≤ 8.36	Pass
11ax-HE80	MCS0	122	5610	0.46	1.21	92.38	4.21	≤ 8.36	Pass
11ax-HE80	MCS0	138	5690	1.44	1.99	91.17	5.13	≤ 8.36	Pass

Note 1: When EUT duty cycle ≥ 98%, the total PSD (dBm/MHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/MHz).

Note 2: When EUT duty cycle < 98%, the total PSD (dBm/MHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/MHz) + $10 \cdot \log (1/\text{Duty Cycle})$.

Note 3: For 5150 - 5250MHz Band: PSD Limit (dBm/MHz) = 17 – (6 – 8.64) = 14.36 dBm/MHz.

For 5250 - 5350 and 5470 - 5725MHz Band: PSD Limit (dBm/MHz) = 11 – (6 – 8.64) = 8.36 dBm/MHz.

待測物名稱	Aruba 500 接入點	溫度	24°C
測試工程師	Kevin Ker	濕度	59%
測試場地	SR1	測試日期	2019/07/01 ~ 2019/07/03
待測物型號	APIN0505	量測項目	功率頻譜密度 (UNII-Band 3)

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Ant 0 PSD (dBm/100kHz)	Ant 1 PSD (dBm/100kHz)	Duty Cycle (%)	Constant Factor	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Result
11a	6Mbps	149	5745	-0.42	-0.44	93.36	6.99	2.58	≤ 27.36	Pass
11a	6Mbps	157	5785	-1.02	-0.21	93.36	6.99	2.42	≤ 27.36	Pass
11a	6Mbps	165	5825	-0.82	-0.26	93.36	6.99	2.48	≤ 27.36	Pass
11ac-VHT20	MCS0	149	5745	-0.26	-0.83	98.21	6.99	2.48	≤ 27.36	Pass
11ac-VHT20	MCS0	157	5785	-0.32	-0.53	98.21	6.99	2.58	≤ 27.36	Pass
11ac-VHT20	MCS0	165	5825	-0.50	-0.33	98.21	6.99	2.60	≤ 27.36	Pass
11ac-VHT40	MCS0	151	5755	-3.62	-3.45	96.40	6.99	-0.52	≤ 27.36	Pass
11ac-VHT40	MCS0	159	5795	-3.46	-3.24	96.40	6.99	-0.33	≤ 27.36	Pass
11ac-VHT80	MCS0	155	5775	-5.42	-5.90	92.83	6.99	-2.64	≤ 27.36	Pass
11ax-HE20	MCS0	149	5745	-2.03	-1.71	97.23	6.99	1.14	≤ 27.36	Pass
11ax-HE20	MCS0	157	5785	-1.41	-1.93	97.23	6.99	1.35	≤ 27.36	Pass
11ax-HE20	MCS0	165	5825	-2.05	-1.47	97.23	6.99	1.26	≤ 27.36	Pass
11ax-HE40	MCS0	151	5755	-4.49	-4.85	95.27	6.99	-1.66	≤ 27.36	Pass
11ax-HE40	MCS0	159	5795	-4.34	-4.58	95.27	6.99	-1.45	≤ 27.36	Pass
11ax-HE80	MCS0	155	5775	-6.61	-7.33	91.17	6.99	-3.95	≤ 27.36	Pass

Note 1: When EUT duty cycle ≥ 98%, the total PSD (dBm/500KHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/100KHz) + Constant Factor.

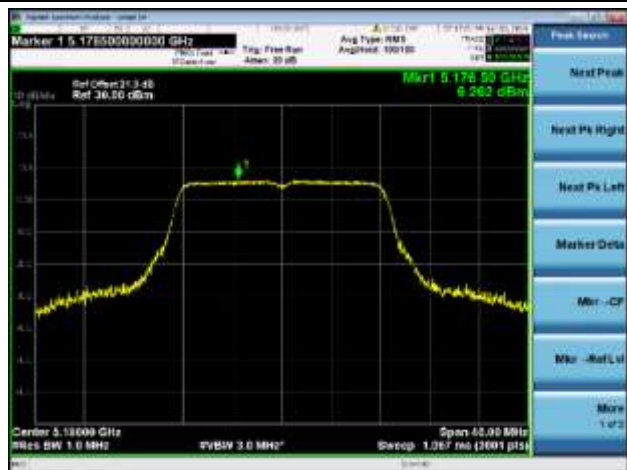
Note 2: When EUT duty cycle < 98%, the total PSD (dBm/500KHz) = $10 \cdot \log \{10^{(\text{Ant 0 PSD}/10)} + 10^{(\text{Ant 1 PSD}/10)}\}$ (dBm/100KHz) + Constant Factor + $10 \cdot \log (1/\text{Duty Cycle})$.

Note 3: PSD Limit (dBm/500kHz) = 30dBm/500kHz - (8.64dBi - 6dBi) = 27.36dBm/500kHz.

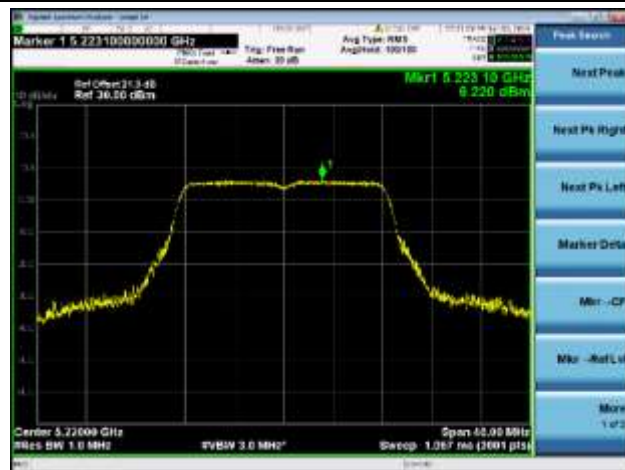
待測物名稱	Aruba 500 接入點	溫度	25°C
測試工程師	Kevin Ker	濕度	54%
測試場地	SR1	測試日期	2019/06/05 ~ 2019/06/11
待測物型號	APIN0504		

802.11a Power Spectral Density - Ant 0 / Ant 0 + 1

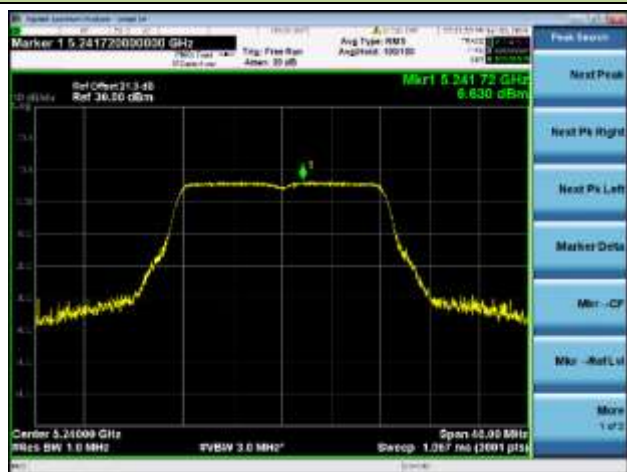
Channel 36 (5180MHz)



Channel 44 (5220MHz)

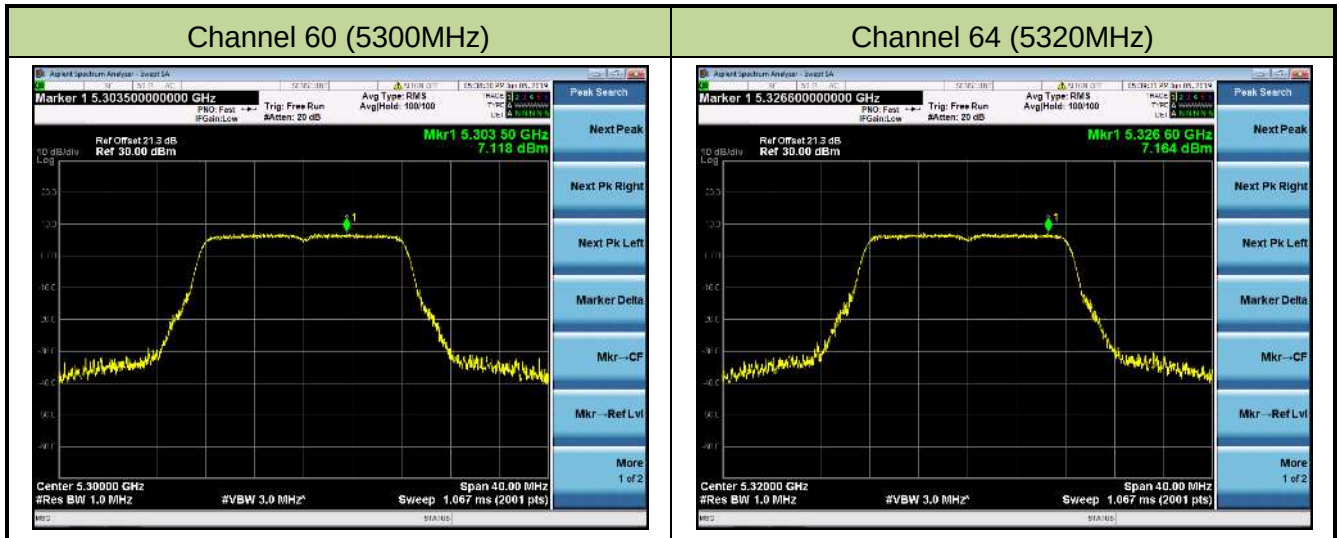


Channel 48 (5240MHz)



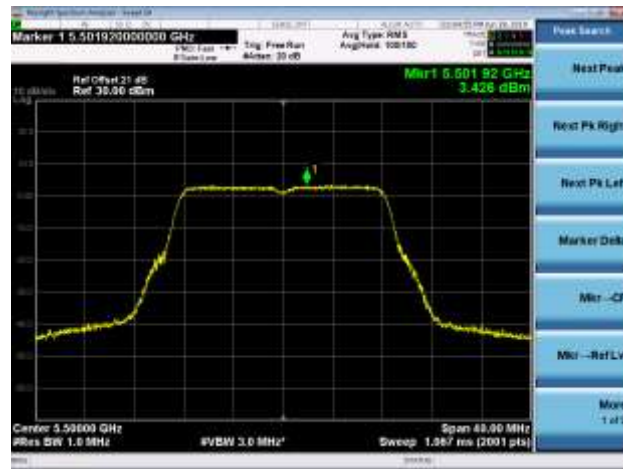
Channel 52 (5260MHz)



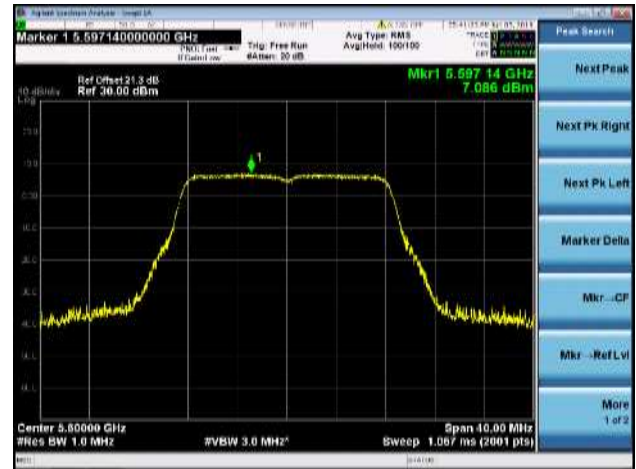


802.11a Power Spectral Density - Ant 0 / Ant 0 + 1

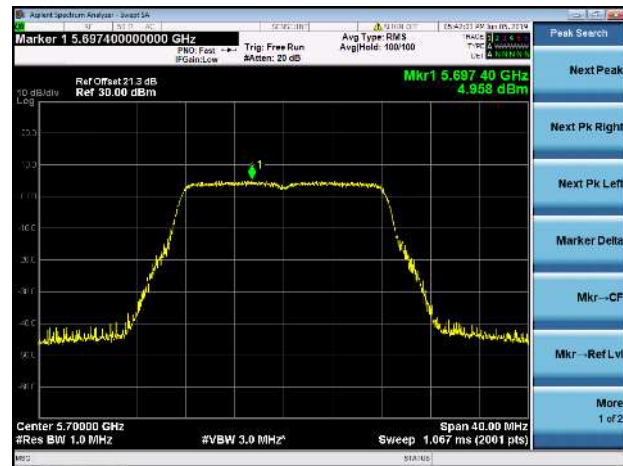
Channel 100 (5500MHz)



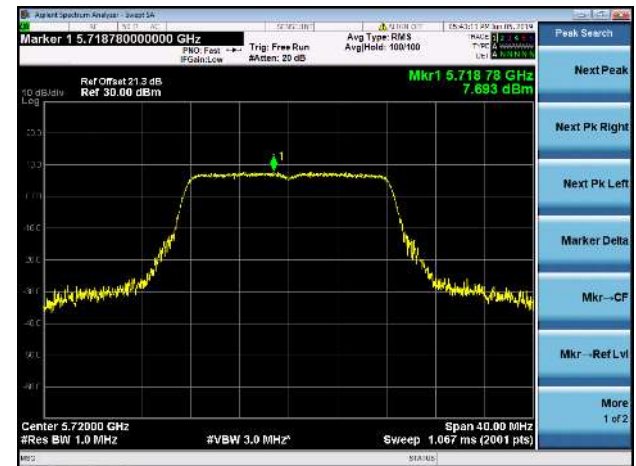
Channel 120 (5600MHz)



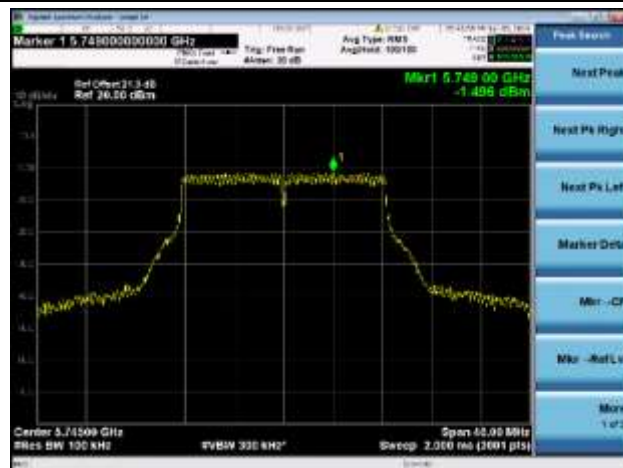
Channel 140 (5700MHz)



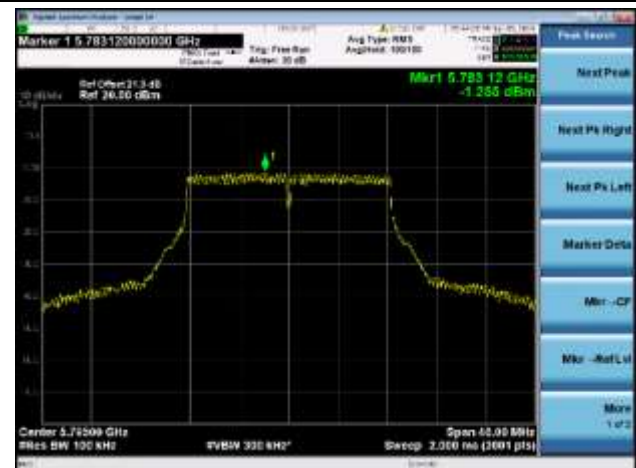
Channel 144 (5720MHz)



Channel 149 (5745MHz)

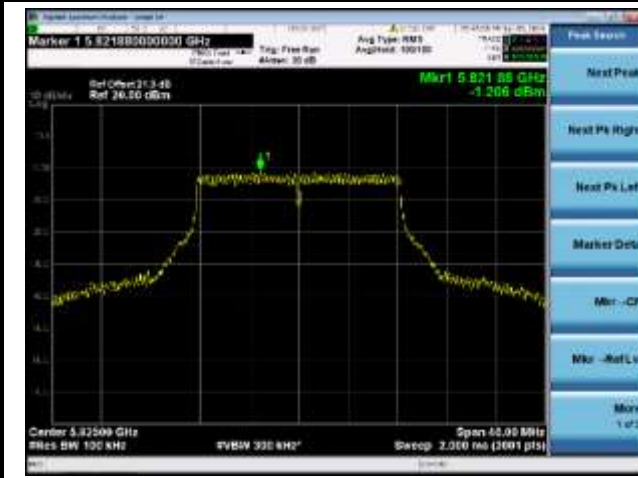


Channel 157 (5785MHz)



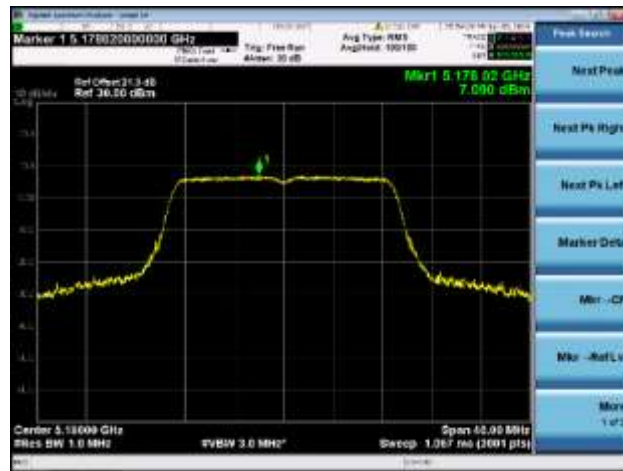
802.11a Power Spectral Density - Ant 0 / Ant 0 + 1

Channel 165 (5825MHz)

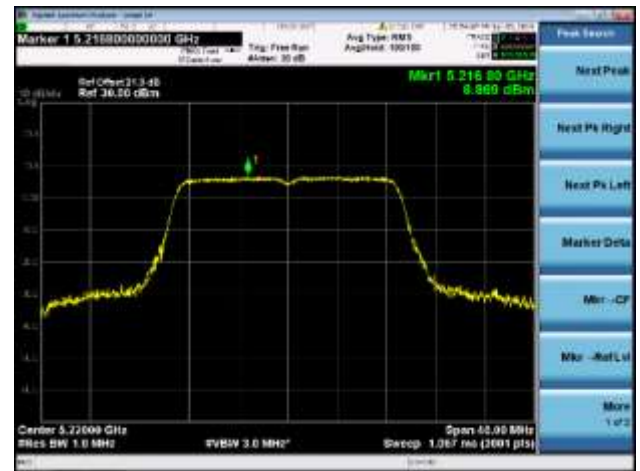


802.11ac-VHT20 Power Spectral Density - Ant 0 / Ant 0 + 1

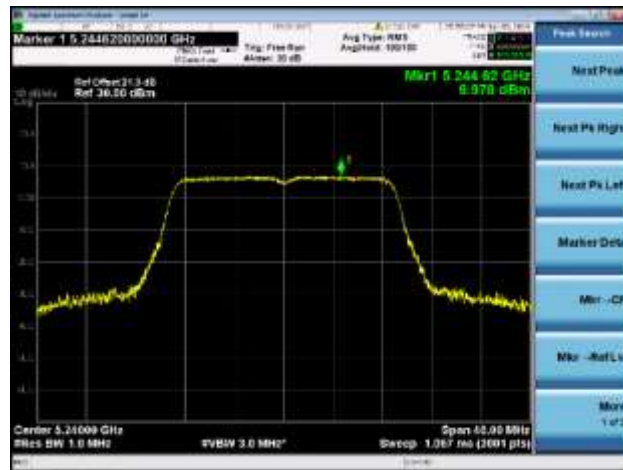
Channel 36 (5180MHz)



Channel 44 (5220MHz)



Channel 48 (5240MHz)



Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)

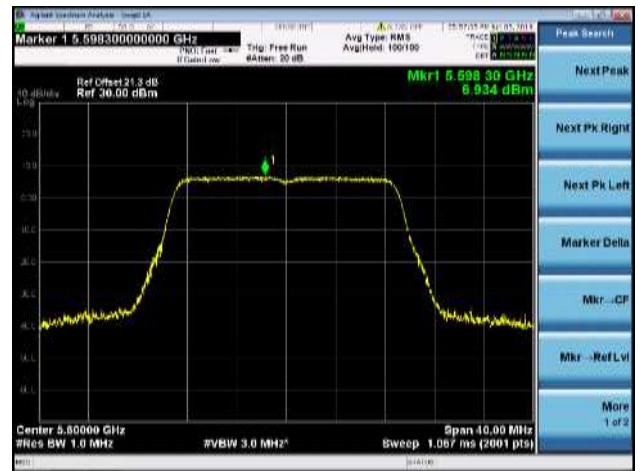


802.11ac-VHT20 Power Spectral Density - Ant 0 / Ant 0 + 1

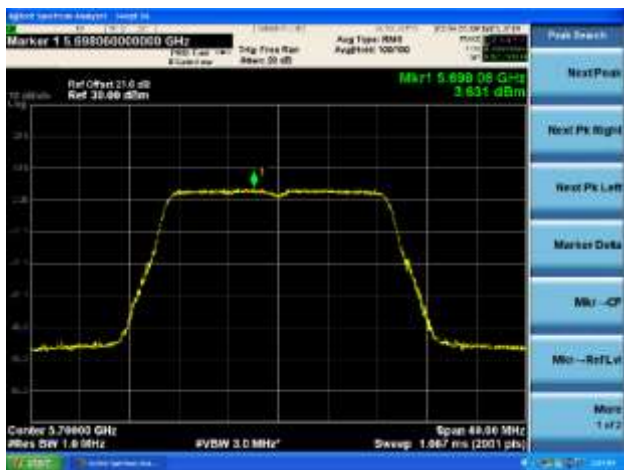
Channel 100 (5500MHz)



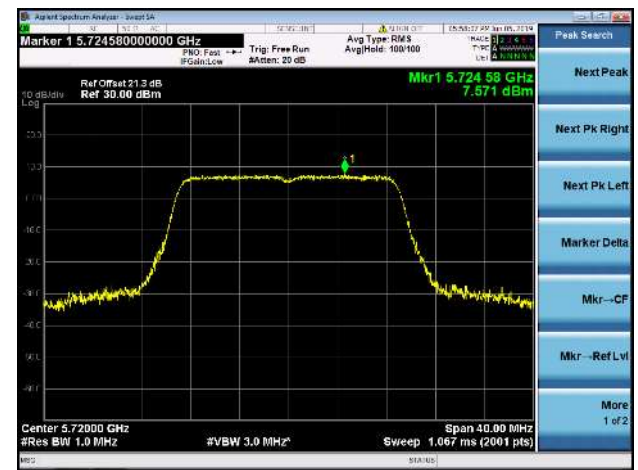
Channel 120 (5600MHz)



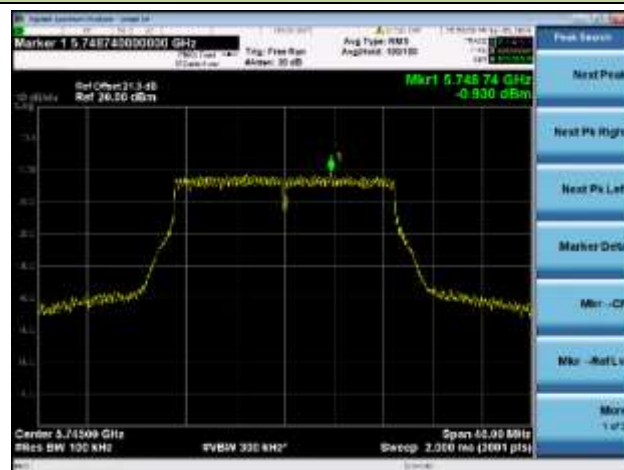
Channel 140 (5700MHz)



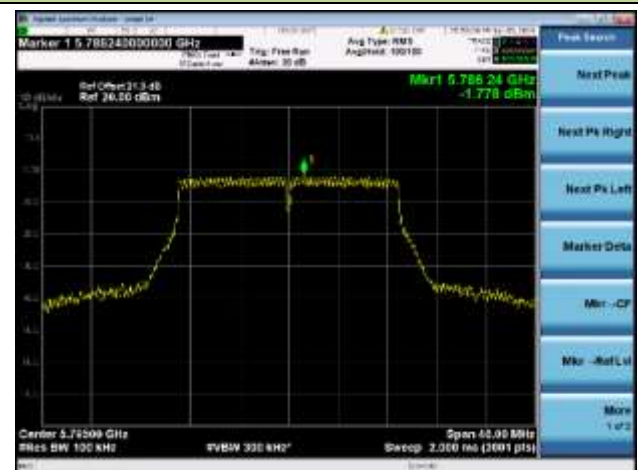
Channel 144 (5720MHz)



Channel 149 (5745MHz)



Channel 157 (5785MHz)



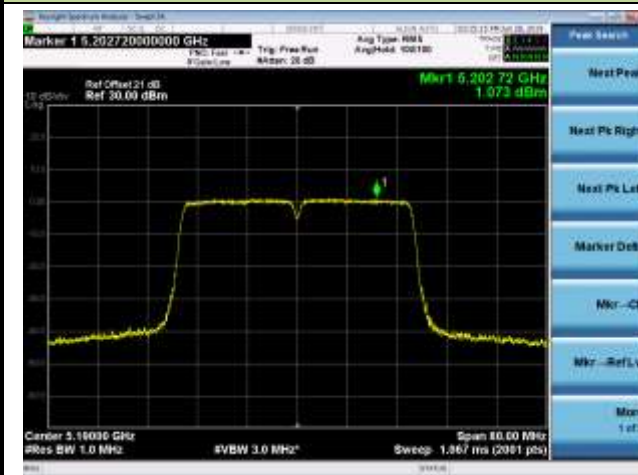
802.11ac-VHT20 Power Spectral Density - Ant 0 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ac-VHT40 Power Spectral Density - Ant 0 / Ant 0 + 1

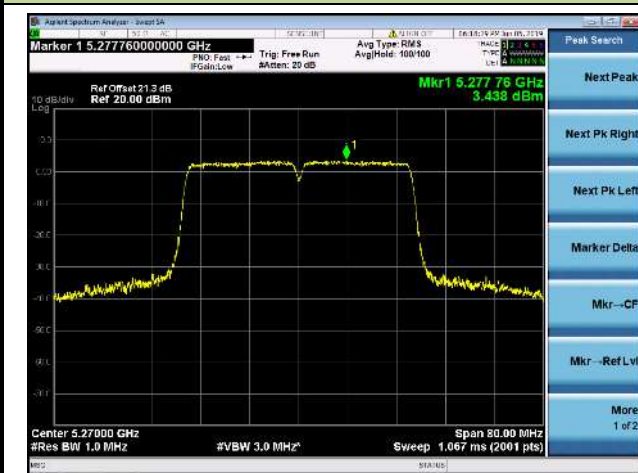
Channel 38 (5190MHz)



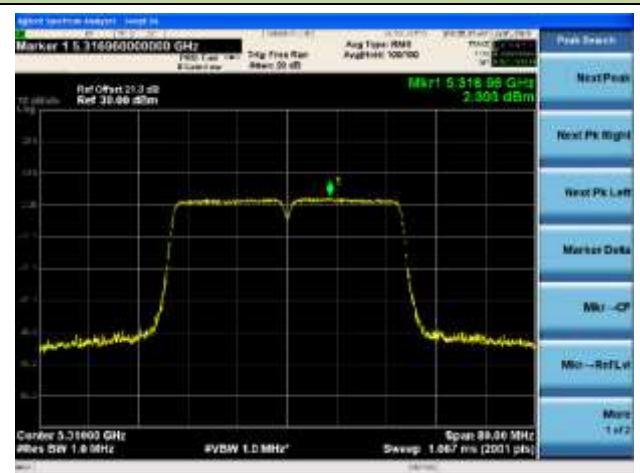
Channel 46 (5230MHz)



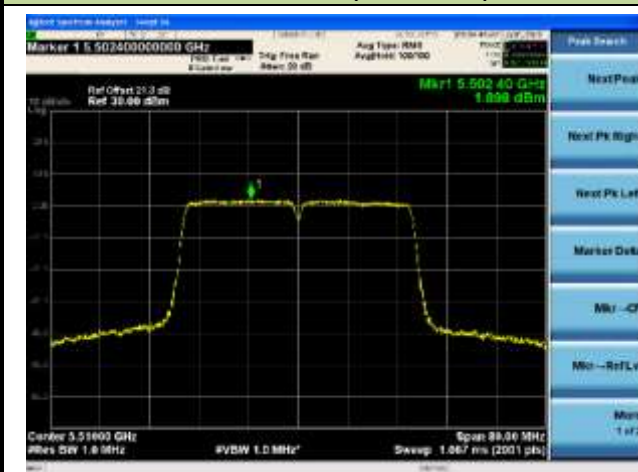
Channel 54 (5270MHz)



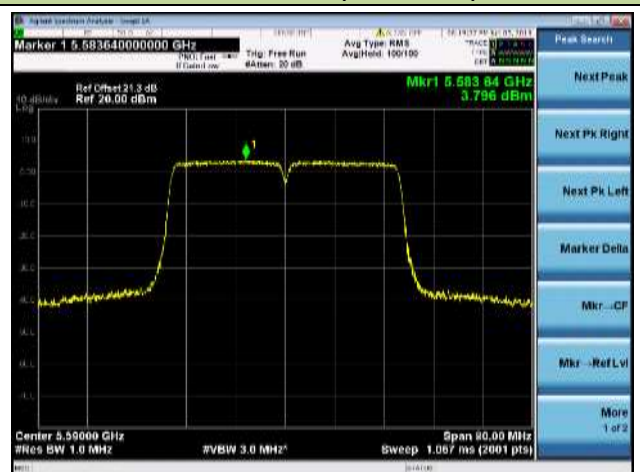
Channel 62 (5310MHz)



Channel 102 (5510MHz)

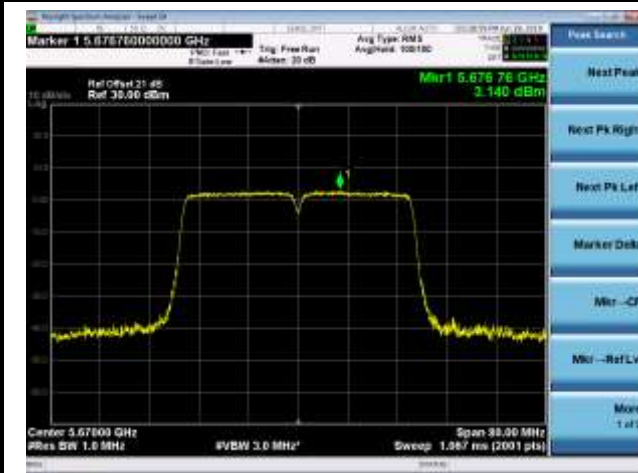


Channel 118 (5590MHz)



802.11ac-VHT40 Power Spectral Density - Ant 0 / Ant 0 + 1

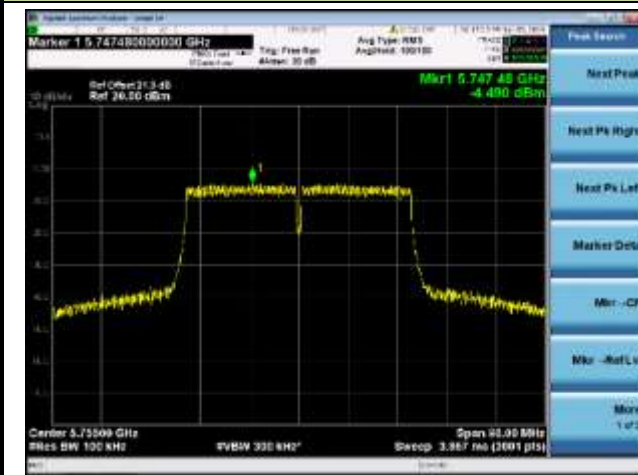
Channel 134 (5670MHz)



Channel 142 (5710MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)

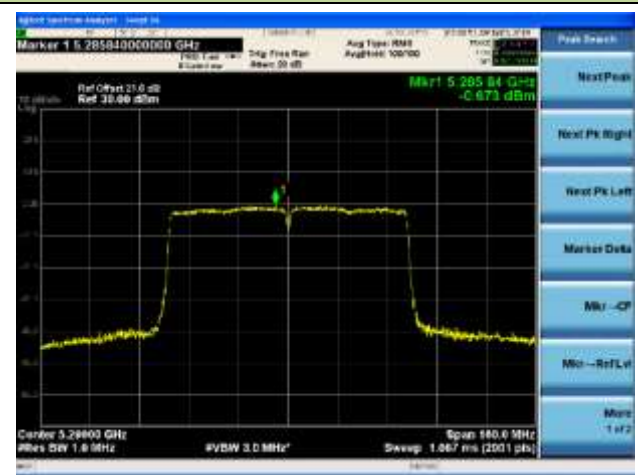


802.11ac-VHT80 Power Spectral Density - Ant 0 / Ant 0 + 1

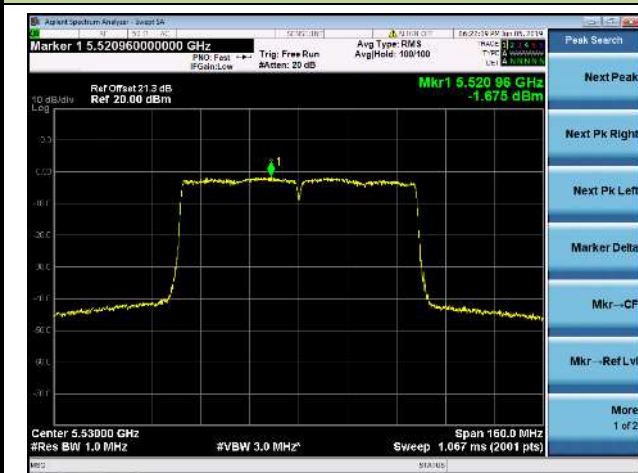
Channel 42 (5210MHz)



Channel 58 (5290MHz)



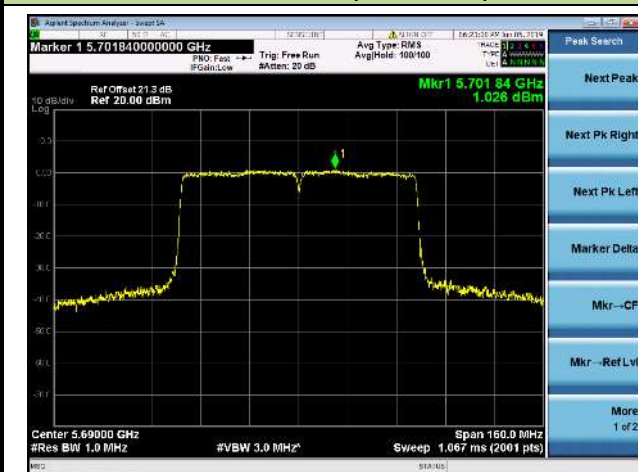
Channel 106 (5530MHz)



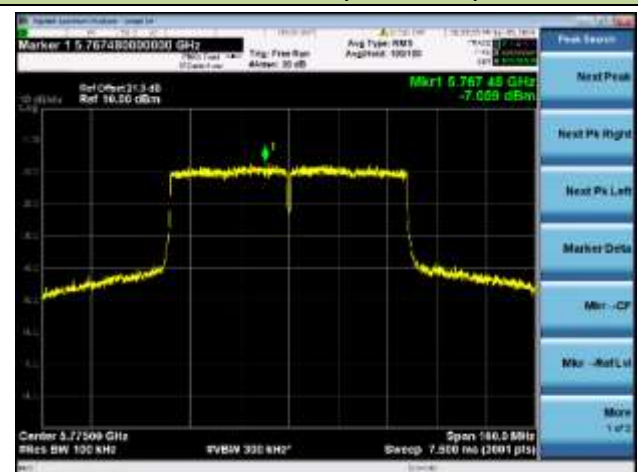
Channel 122 (5610MHz)



Channel 138 (5690MHz)

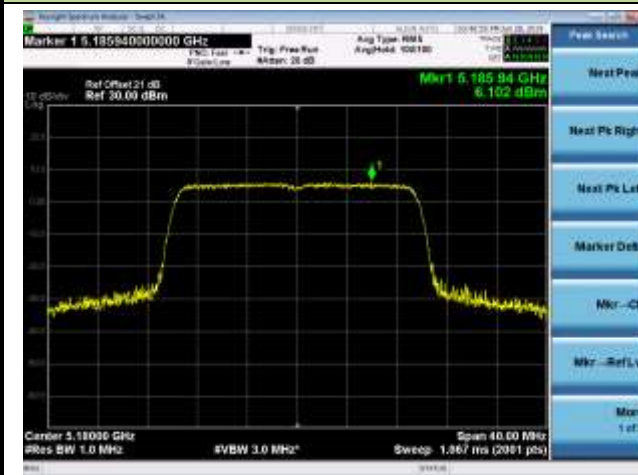


Channel 155 (5775MHz)



802.11ax-HE20 Power Spectral Density - Ant 0 / Ant 0 + 1

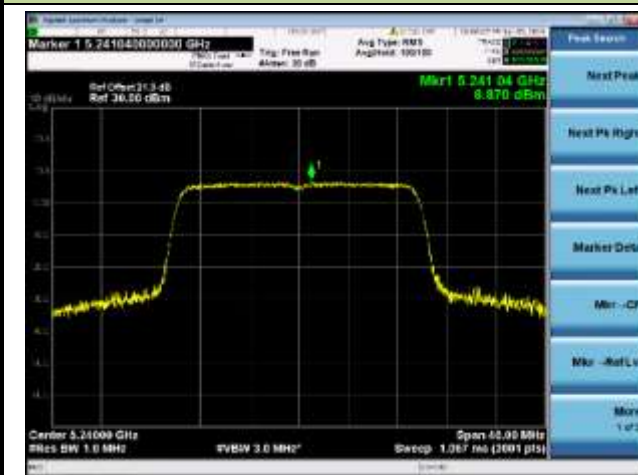
Channel 36 (5180MHz)



Channel 44 (5220MHz)



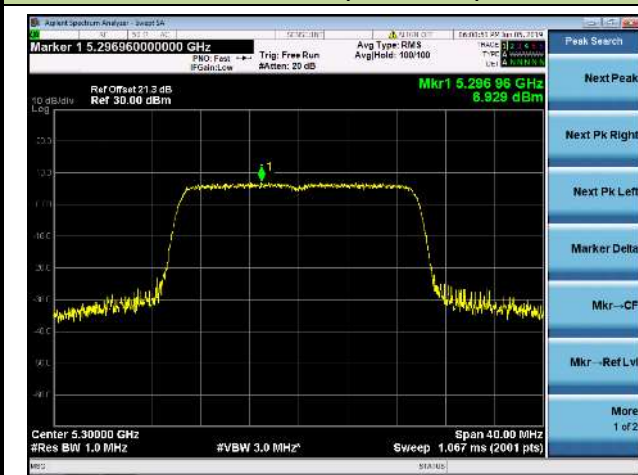
Channel 48 (5240MHz)



Channel 52 (5260MHz)



Channel 60 (5300MHz)

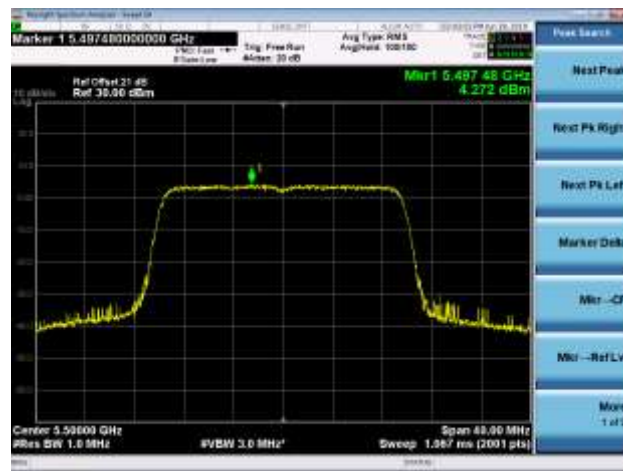


Channel 64 (5320MHz)



802.11ax-HE20 Power Spectral Density - Ant 0 / Ant 0 + 1

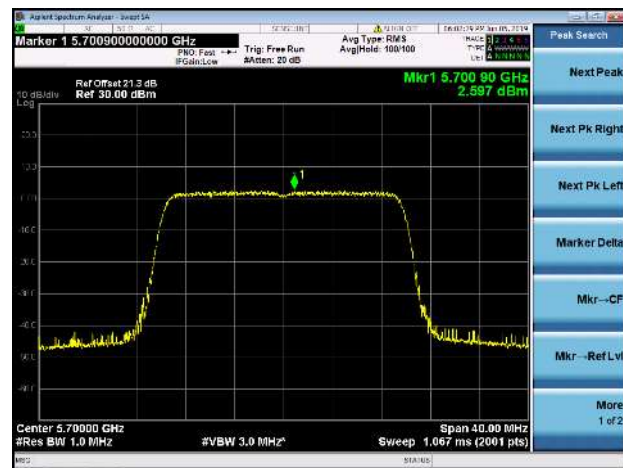
Channel 100 (5500MHz)



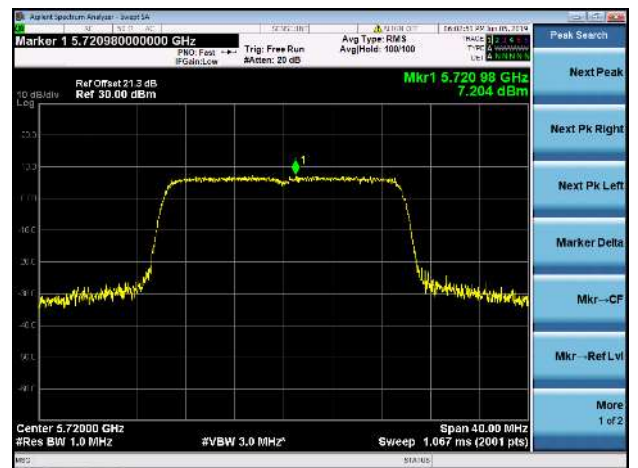
Channel 120 (5600MHz)



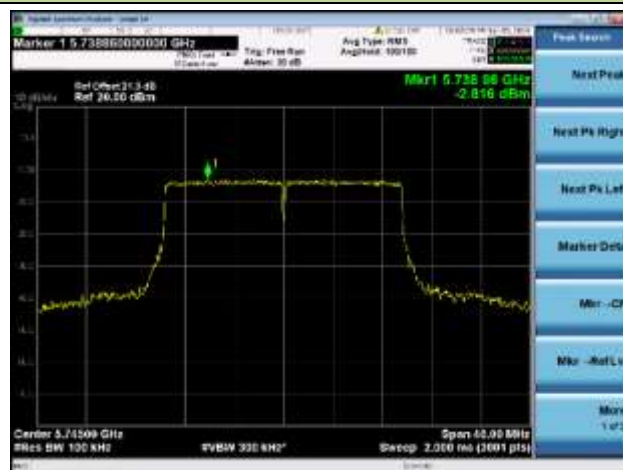
Channel 140 (5700MHz)



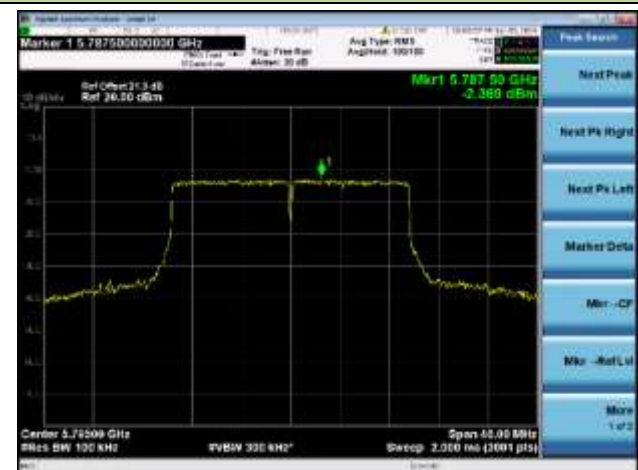
Channel 144 (5720MHz)



Channel 149 (5745MHz)

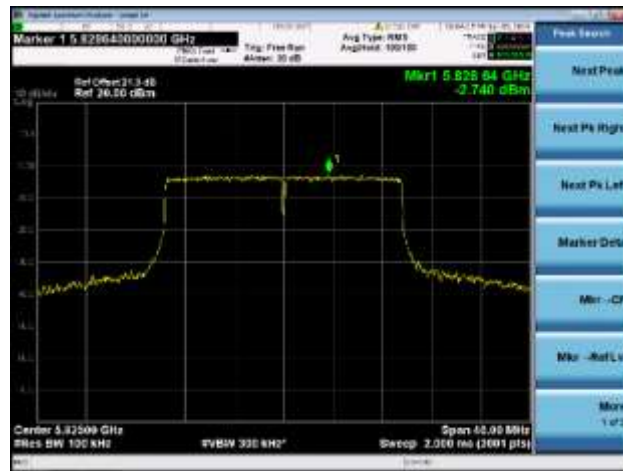


Channel 157 (5785MHz)



802.11ax-HE20 Power Spectral Density - Ant 0 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ax-HE40 Power Spectral Density - Ant 0 / Ant 0 + 1

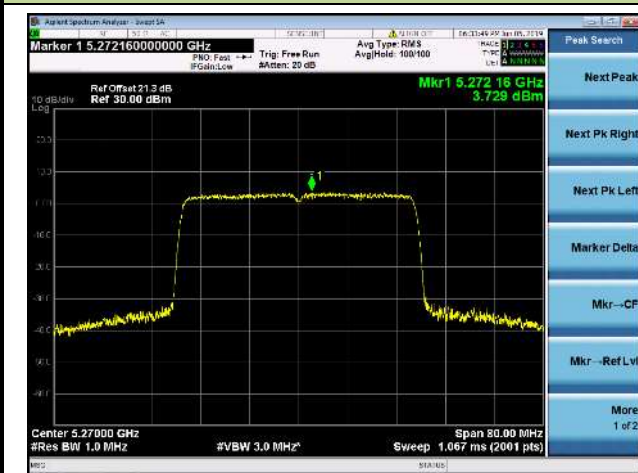
Channel 38 (5190MHz)



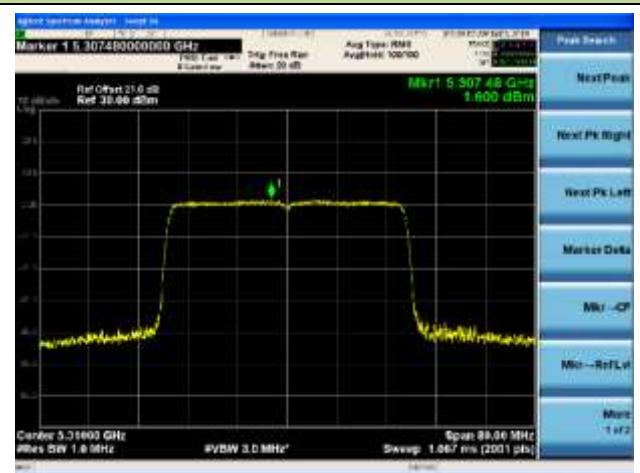
Channel 46 (5230MHz)



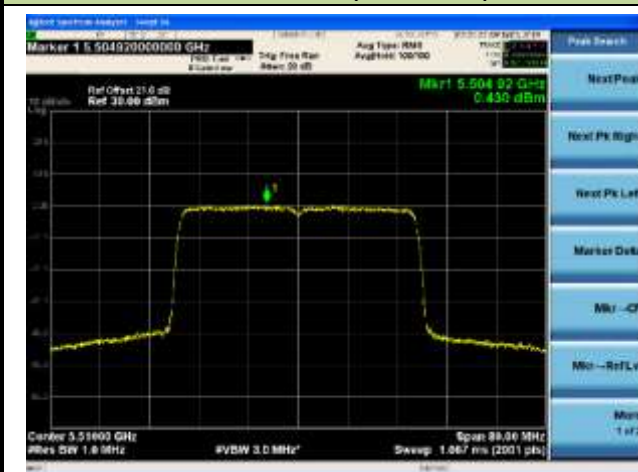
Channel 54 (5270MHz)



Channel 62 (5310MHz)



Channel 102 (5510MHz)



Channel 118 (5590MHz)



802.11ax-HE40 Power Spectral Density - Ant 0 / Ant 0 + 1

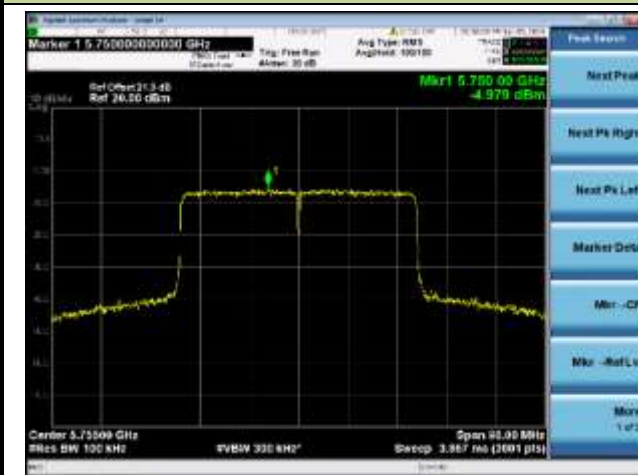
Channel 134 (5670MHz)



Channel 142 (5710MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)



802.11ax-HE80 Power Spectral Density - Ant 0 / Ant 0 + 1

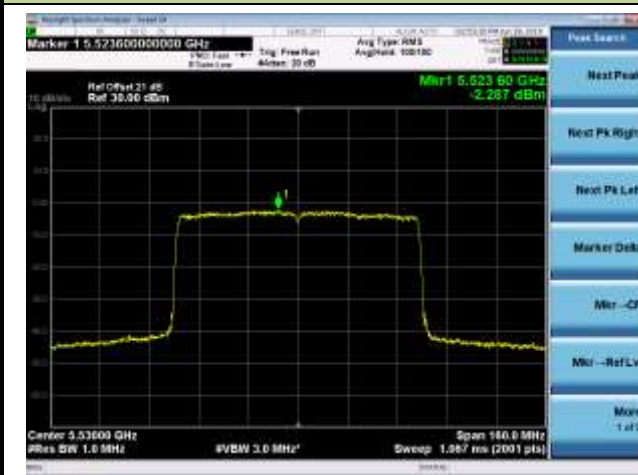
Channel 42 (5210MHz)



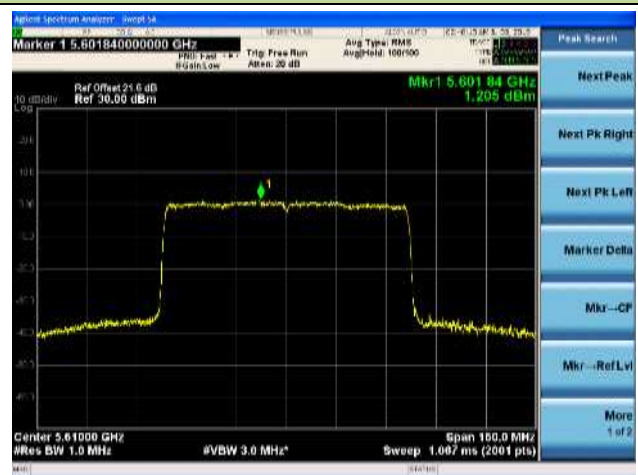
Channel 58 (5290MHz)



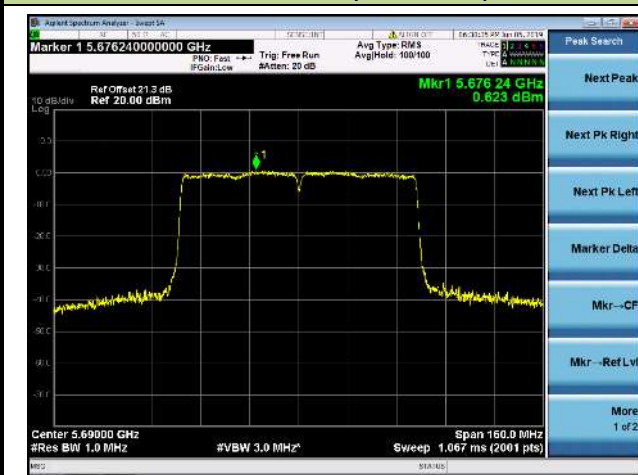
Channel 106 (5530MHz)



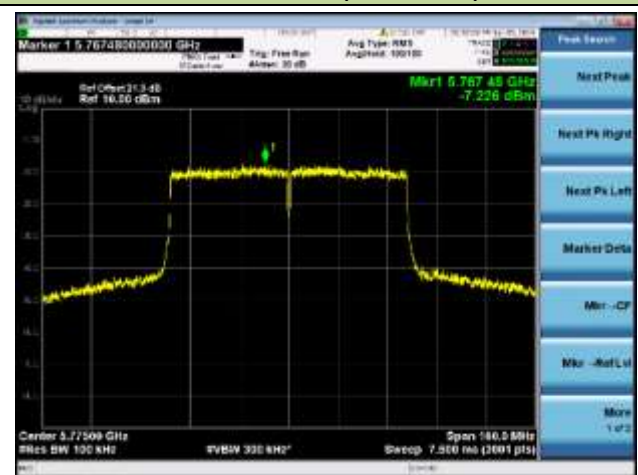
Channel 122 (5610MHz)



Channel 138 (5690MHz)

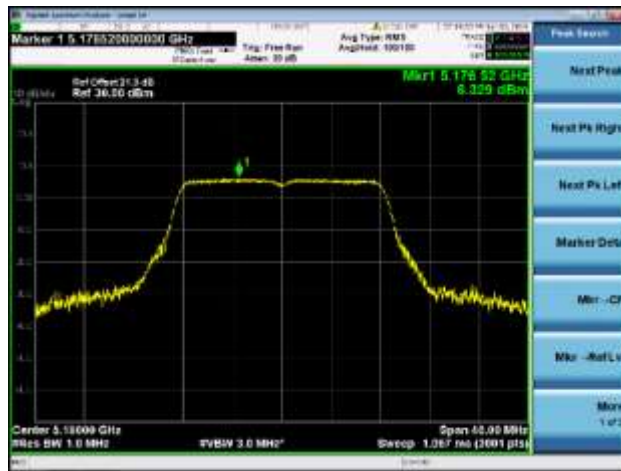


Channel 155 (5775MHz)

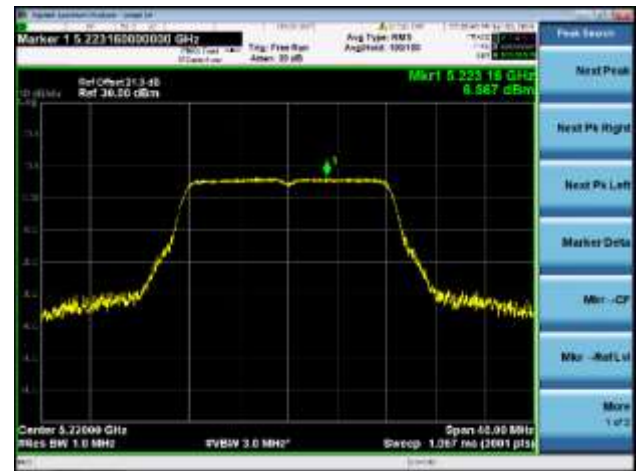


802.11a Power Spectral Density - Ant 1 / Ant 0 + 1

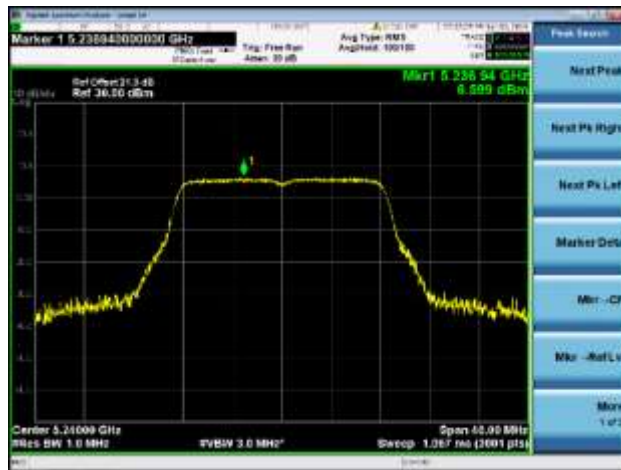
Channel 36 (5180MHz)



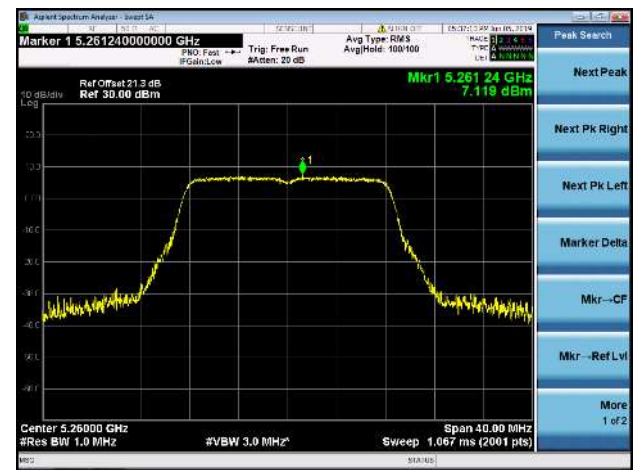
Channel 44 (5220MHz)



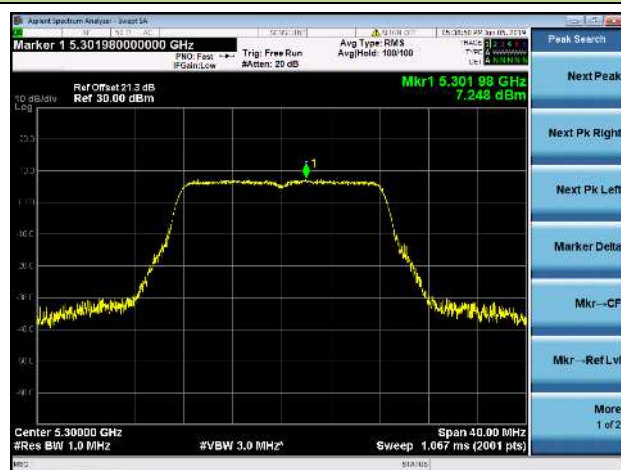
Channel 48 (5240MHz)



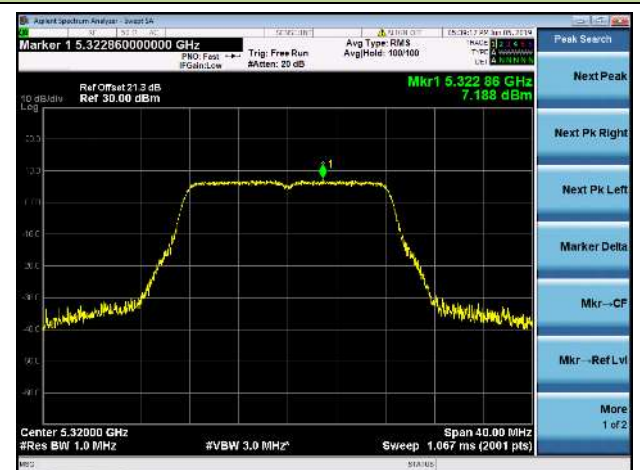
Channel 52 (5260MHz)



Channel 60 (5300MHz)

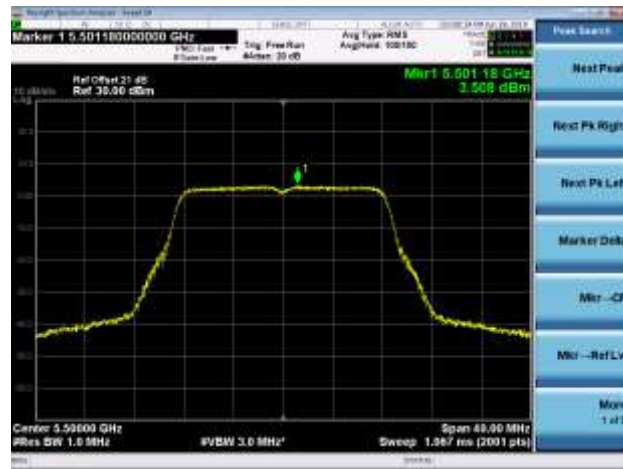


Channel 64 (5320MHz)

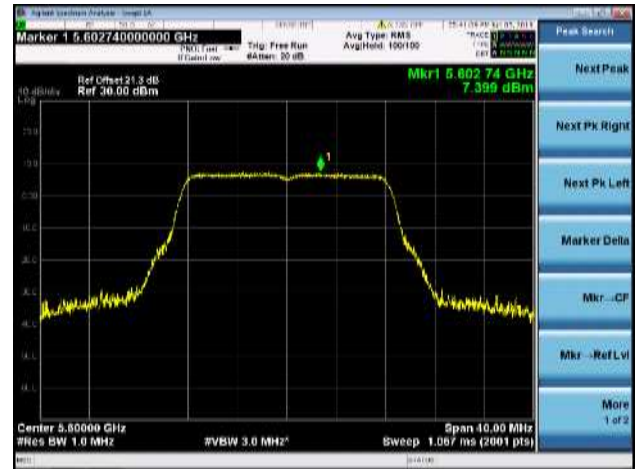


802.11a Power Spectral Density - Ant 1 / Ant 0 + 1

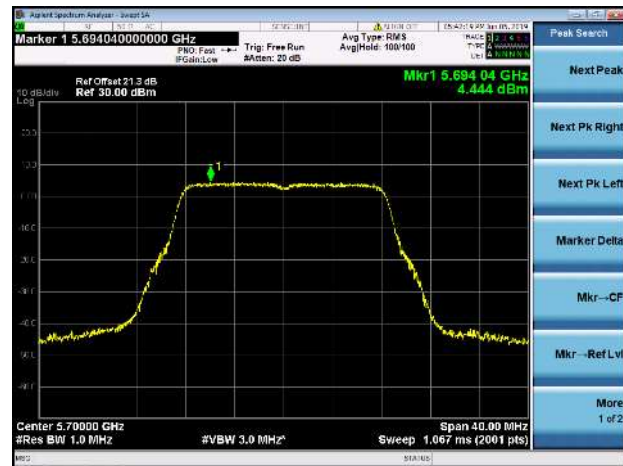
Channel 100 (5500MHz)



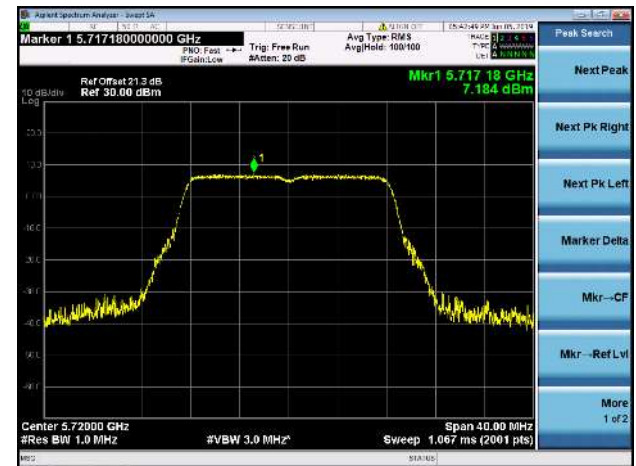
Channel 120 (5600MHz)



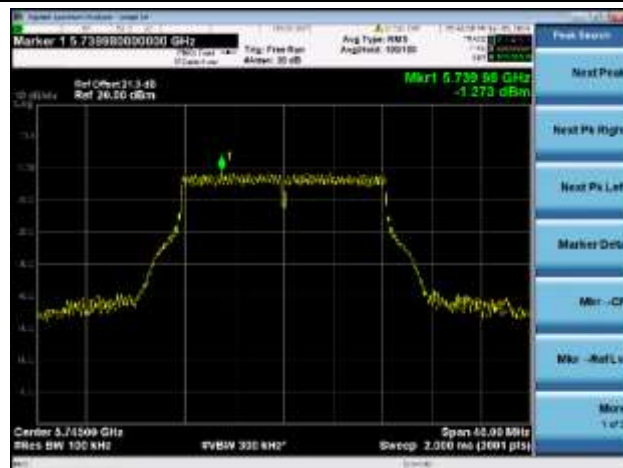
Channel 140 (5700MHz)



Channel 144 (5720MHz)



Channel 149 (5745MHz)

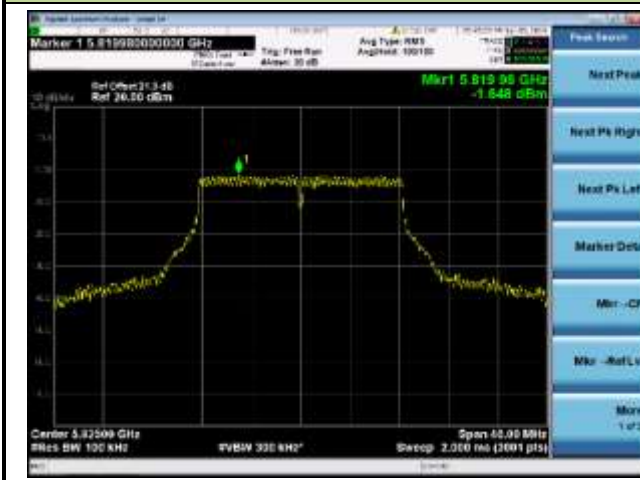


Channel 157 (5785MHz)



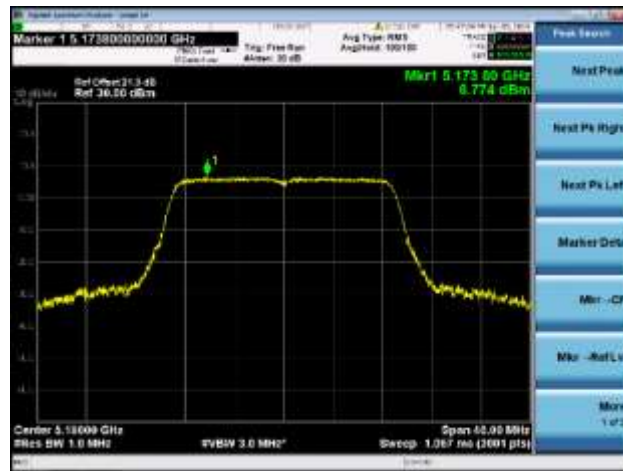
802.11a Power Spectral Density - Ant 1 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ac-VHT20 Power Spectral Density - Ant 1 / Ant 0 + 1

Channel 36 (5180MHz)



Channel 44 (5220MHz)



Channel 48 (5240MHz)



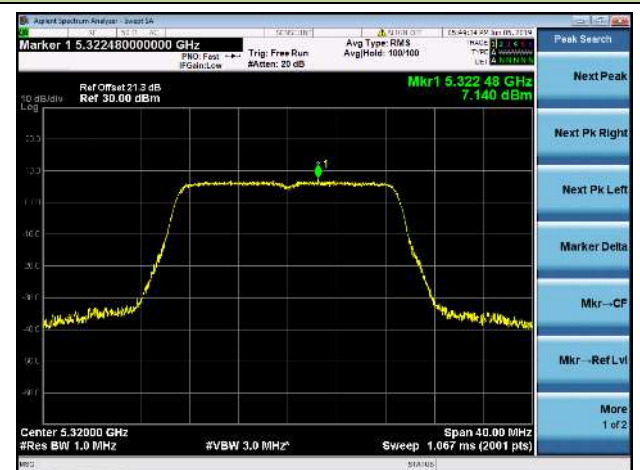
Channel 52 (5260MHz)



Channel 60 (5300MHz)



Channel 64 (5320MHz)

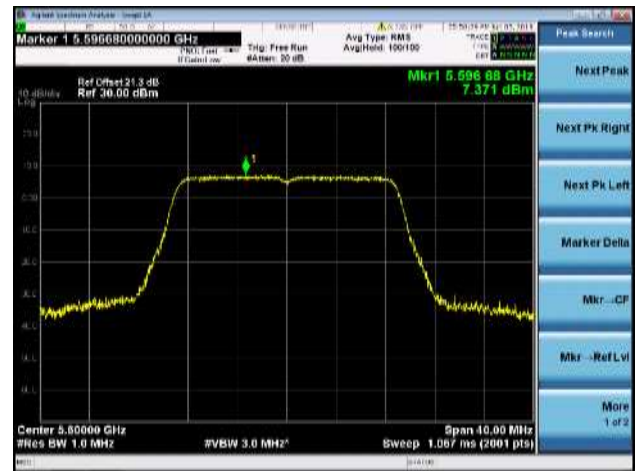


802.11ac-VHT20 Power Spectral Density - Ant 1 / Ant 0 + 1

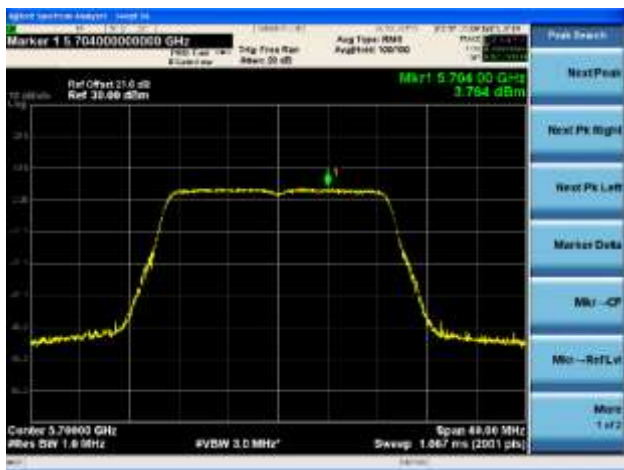
Channel 100 (5500MHz)



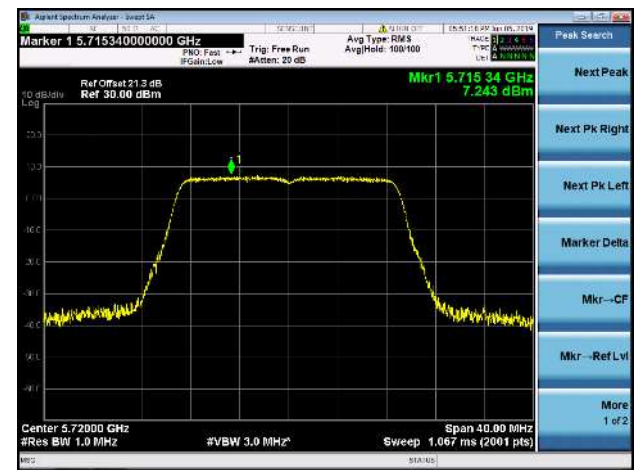
Channel 120 (5600MHz)



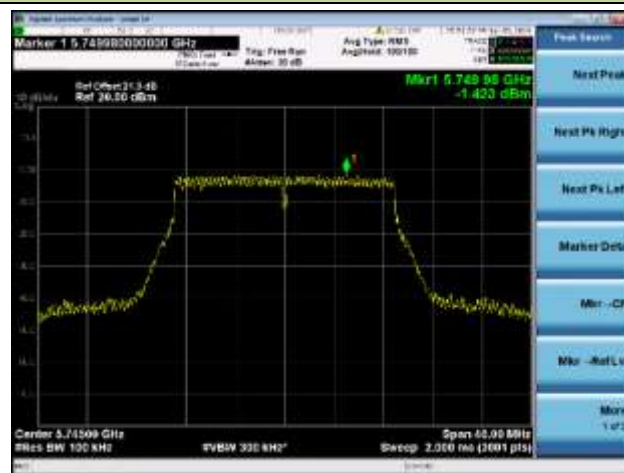
Channel 140 (5700MHz)



Channel 144 (5720MHz)



Channel 149 (5745MHz)



Channel 157 (5785MHz)



802.11ac-VHT20 Power Spectral Density - Ant 1 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ac-VHT40 Power Spectral Density - Ant 1 / Ant 0 + 1

Channel 38 (5190MHz)



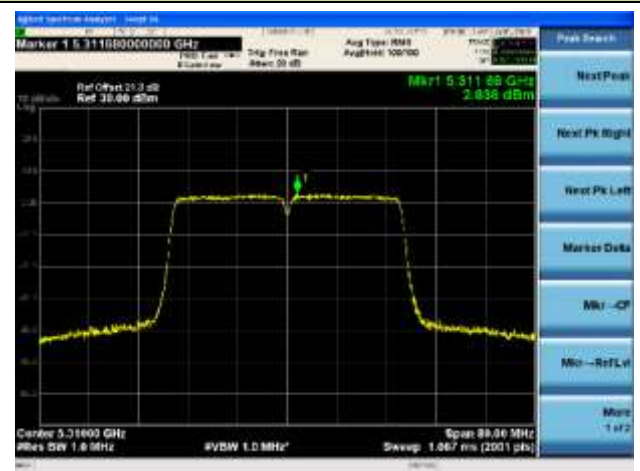
Channel 46 (5230MHz)



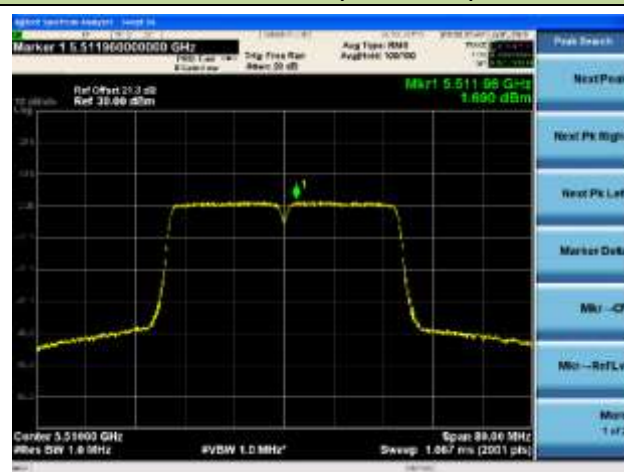
Channel 54 (5270MHz)



Channel 62 (5310MHz)



Channel 102 (5510MHz)



Channel 118 (5590MHz)



802.11ac-VHT40 Power Spectral Density - Ant 1 / Ant 0 + 1

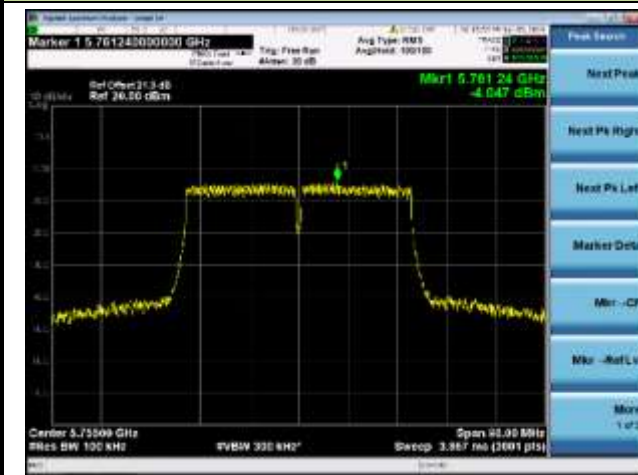
Channel 134 (5670MHz)



Channel 142 (5710MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)

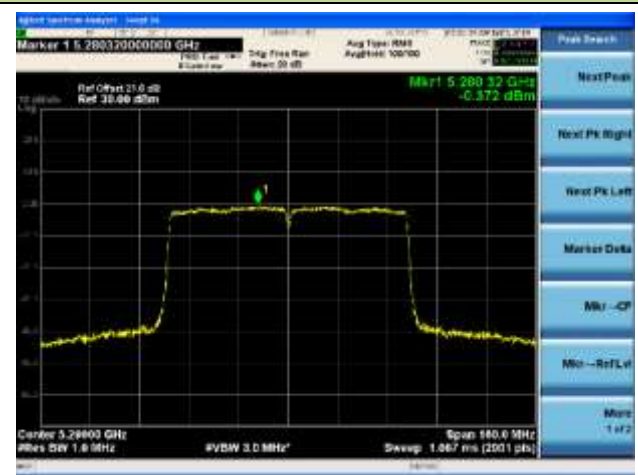


802.11ac-VHT80 Power Spectral Density - Ant 1 / Ant 0 + 1

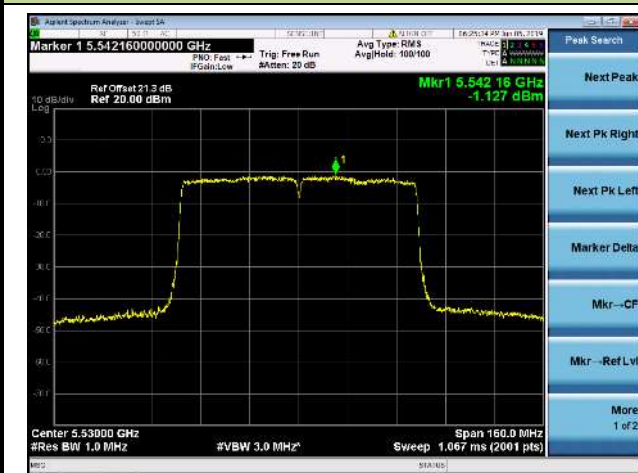
Channel 42 (5210MHz)



Channel 58 (5290MHz)



Channel 106 (5530MHz)



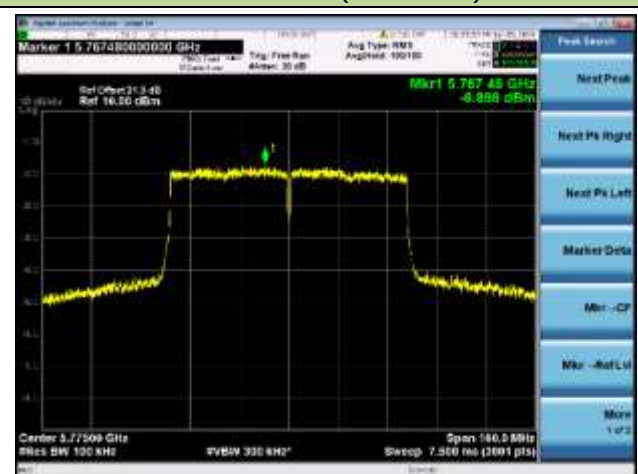
Channel 122 (5610MHz)



Channel 138 (5690MHz)

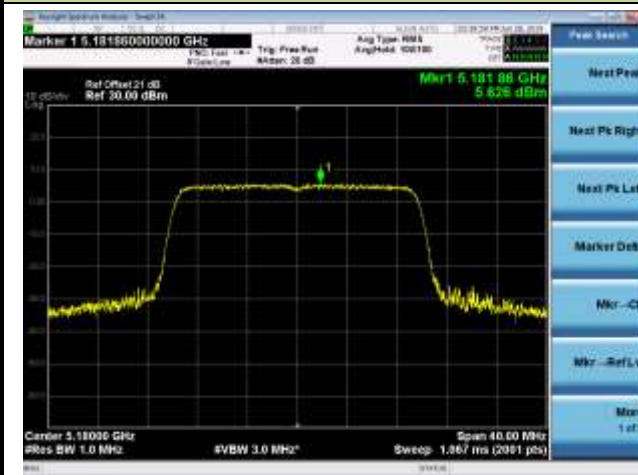


Channel 155 (5775MHz)



802.11ax-HE20 Power Spectral Density - Ant 1 / Ant 0 + 1

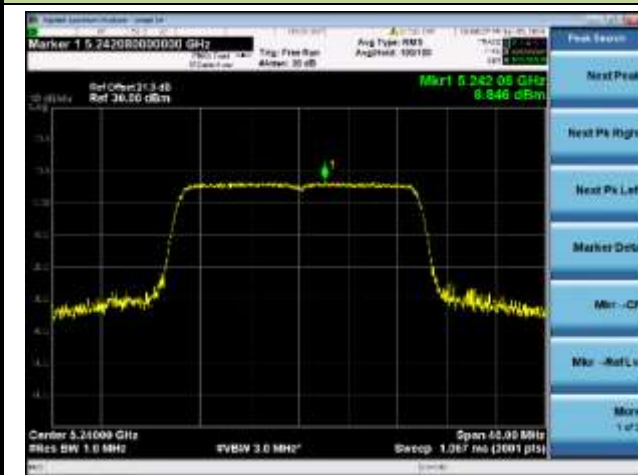
Channel 36 (5180MHz)



Channel 44 (5220MHz)



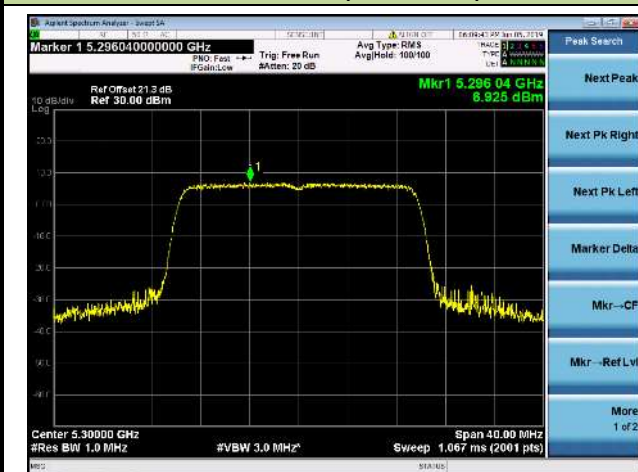
Channel 48 (5240MHz)



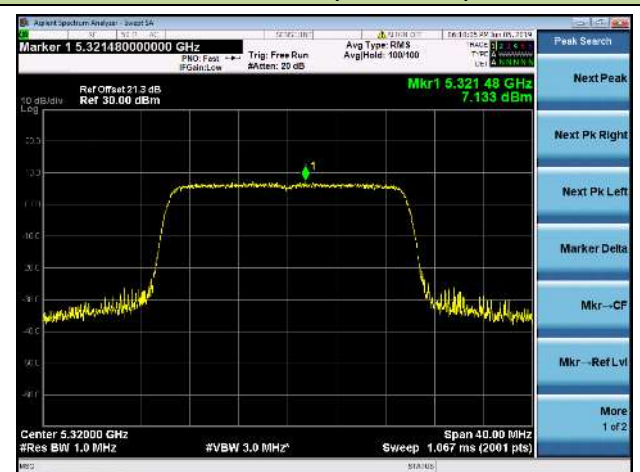
Channel 52 (5260MHz)



Channel 60 (5300MHz)

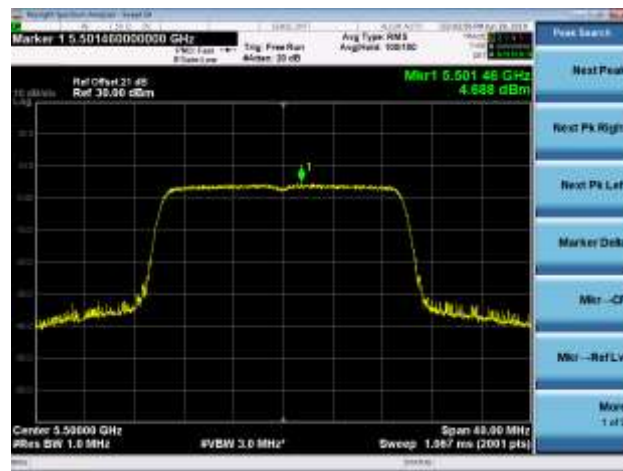


Channel 64 (5320MHz)



802.11ax-HE20 Power Spectral Density - Ant 1 / Ant 0 + 1

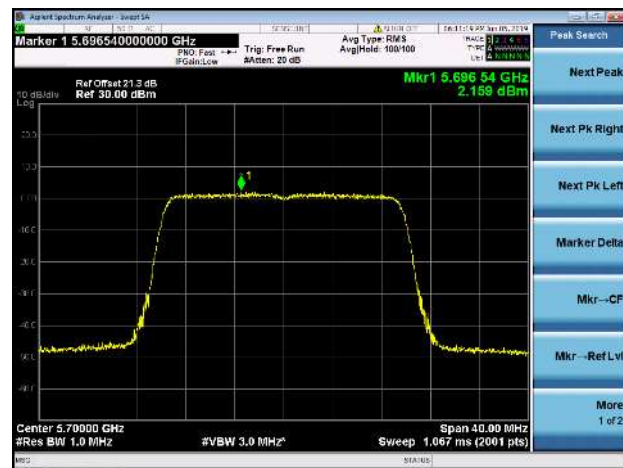
Channel 100 (5500MHz)



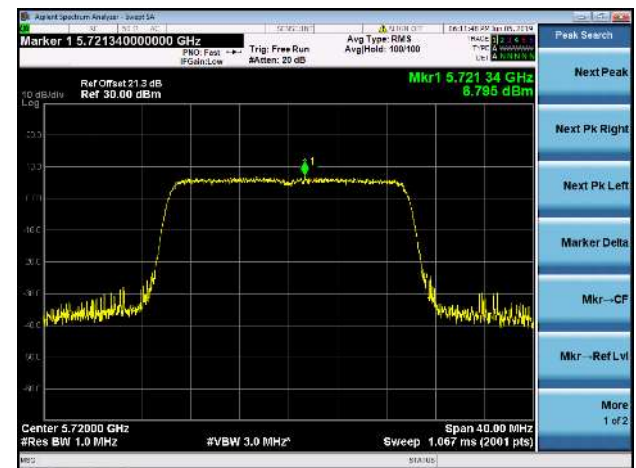
Channel 120 (5600MHz)



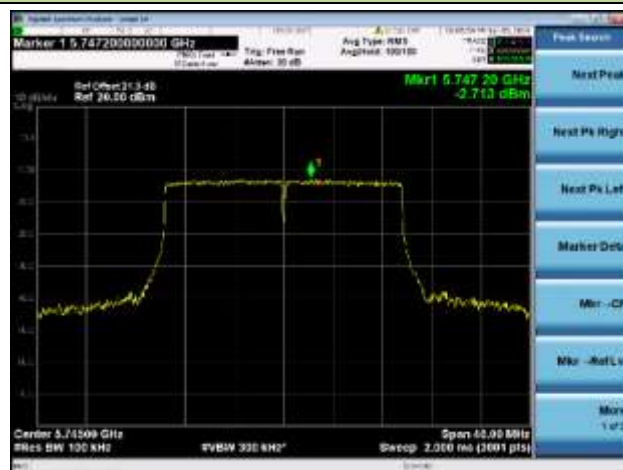
Channel 140 (5700MHz)



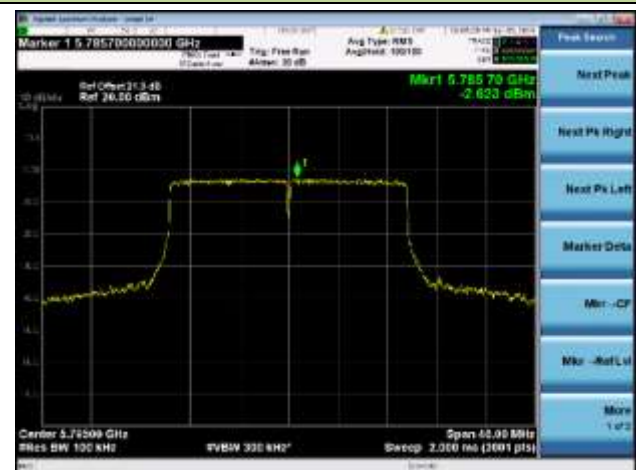
Channel 144 (5720MHz)



Channel 149 (5745MHz)

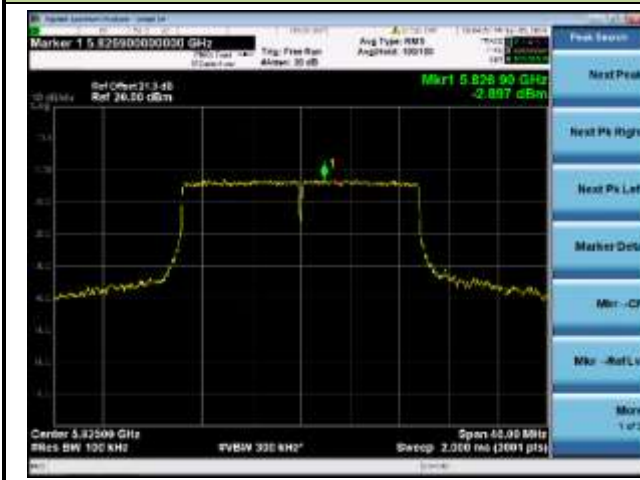


Channel 157 (5785MHz)



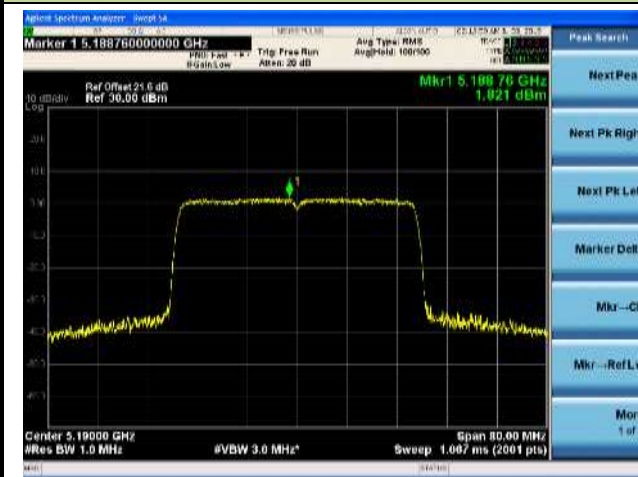
802.11ax-HE20 Power Spectral Density - Ant 1 / Ant 0 + 1

Channel 165 (5825MHz)



802.11ax-HE40 Power Spectral Density - Ant 0 / Ant 0 + 1

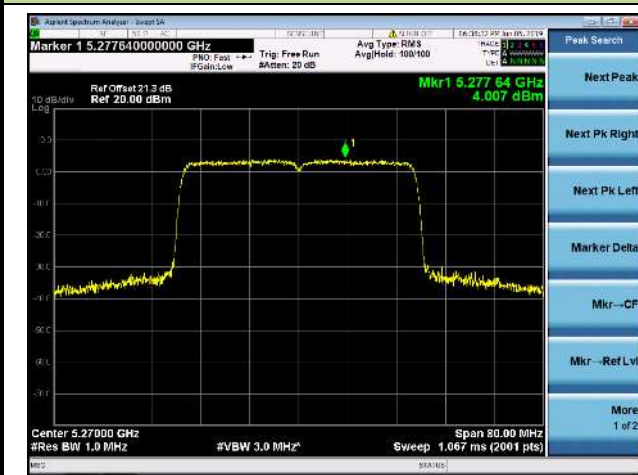
Channel 38 (5190MHz)



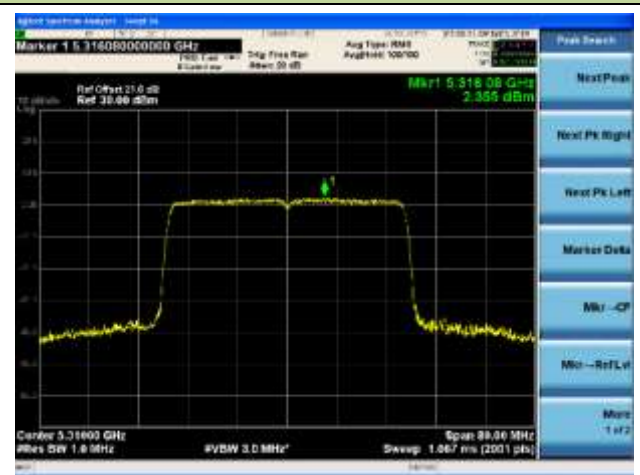
Channel 46 (5230MHz)



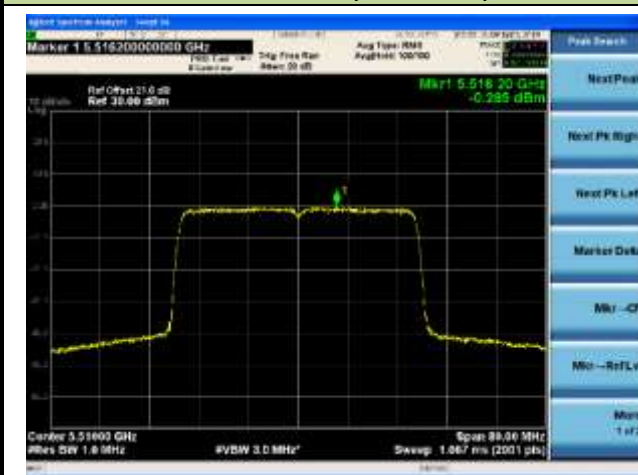
Channel 54 (5270MHz)



Channel 62 (5310MHz)



Channel 102 (5510MHz)

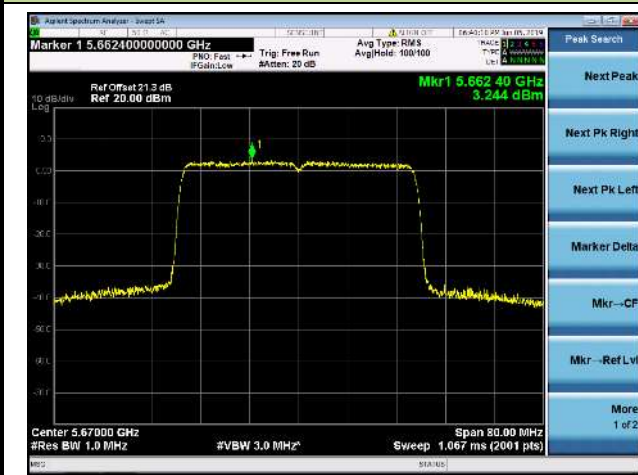


Channel 118 (5590MHz)



802.11ax-HE40 Power Spectral Density - Ant 0 / Ant 0 + 1

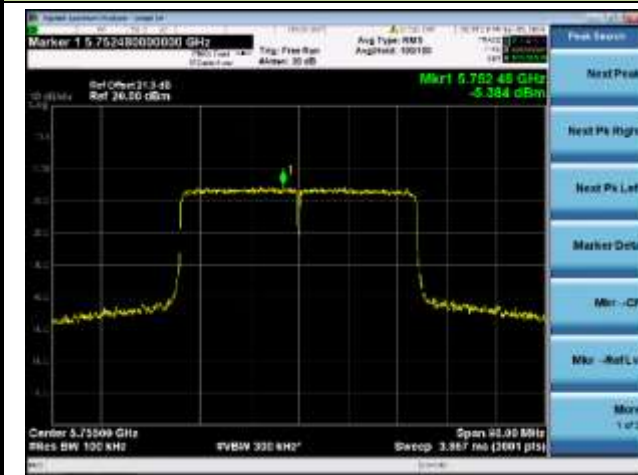
Channel 134 (5670MHz)



Channel 142 (5710MHz)



Channel 151 (5755MHz)

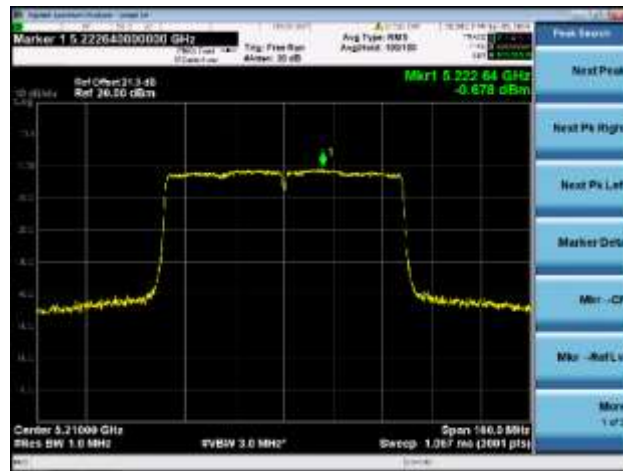


Channel 159 (5795MHz)



802.11ax-HE80 Power Spectral Density - Ant 1 / Ant 0 + 1

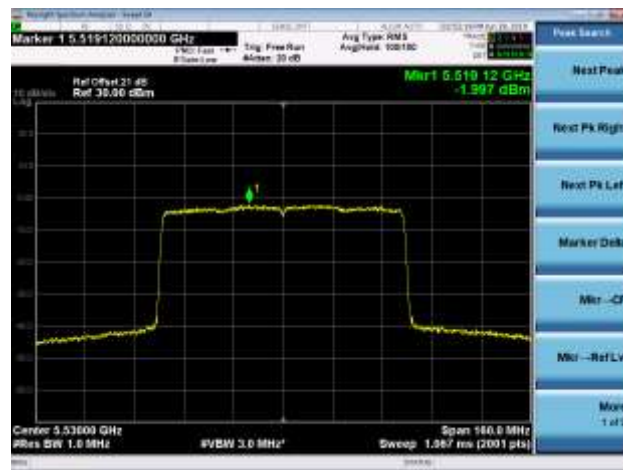
Channel 42 (5210MHz)



Channel 58 (5290MHz)



Channel 106 (5530MHz)



Channel 122 (5610MHz)



Channel 138 (5690MHz)



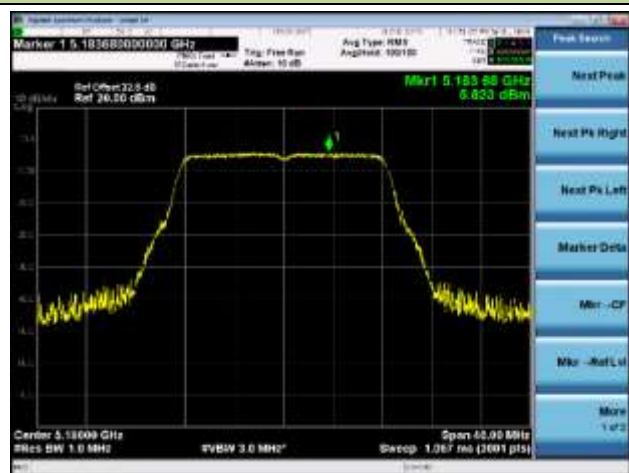
Channel 155 (5775MHz)



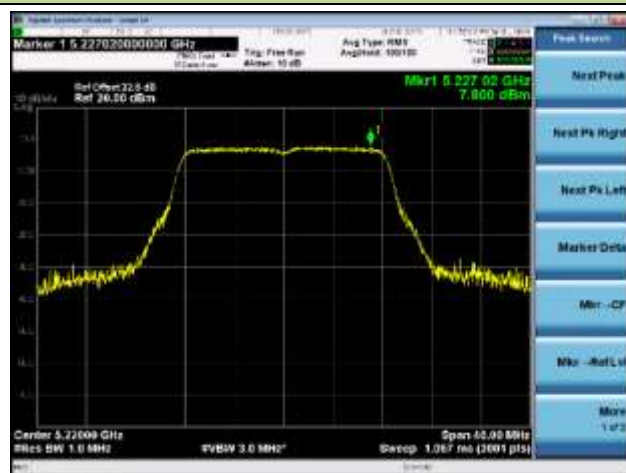
待測物名稱	Aruba 500 接入點	溫度	25°C
測試工程師	Kevin Ker	濕度	54%
測試場地	SR1	測試日期	2019/06/24 ~ 2019/07/02
待測物型號	APIN0505		

802.11a Power Spectral Density - Ant 0 / Ant 0 + 1

Channel 36 (5180MHz)



Channel 44 (5220MHz)



Channel 48 (5240MHz)



Channel 52 (5260MHz)

