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NCC

低功率射頻電機型式試驗報告

產品名稱 : ACCESS POINT
型號 : APIN0518
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
接收日期 : 2019.12.23
測試日期 : 2019.12.25 ~ 2020.07.01

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本測試報告僅對實驗室所受測之樣品負責
本測試報告非經本公司同意不可局部複製使用

修訂紀錄

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1. 一般資訊

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
製造商	Hewlett Packard Enterprise Company
製造商地址	3333 Scott Blvd, Santa Clara, CA 94089, USA
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	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 (Designation Number: TW3261), 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
測試樣品 SN 號	Radiated sample S/N: DE29AO005B, Conducted sample S/N: DE29AO005B

2. 產品描述

2.1. 產品資訊

產品名稱	ACCESS POINT
產品型號	APIN0518
Wi-Fi 規格	802.11a/b/g/n/ac/ax
藍牙版本	v5.0 single mode
Zigbee 規格	802.15.4
軟件版本	V1.02
工作溫度	-40 ~ 65 °C
待測物額定電壓	PoE input

Note:

1. 系列差異說明：系列型號與主型號差異為廠牌不同,其硬體電路及軟體與主型號相同。該產品亦符合同系列產品技術規格及射頻性能相同。
- 2.The applicant provided one PoE adapter (Manufacturer: MICROSEMI & Model: PD-9001GR/AT/AC) for approval testing, it is not for sale.

2.2. 產品規格

頻率範圍	2402 ~ 2480 MHz
調變模式	GFSK
傳輸速率	1Mbps

Bluetooth-LE

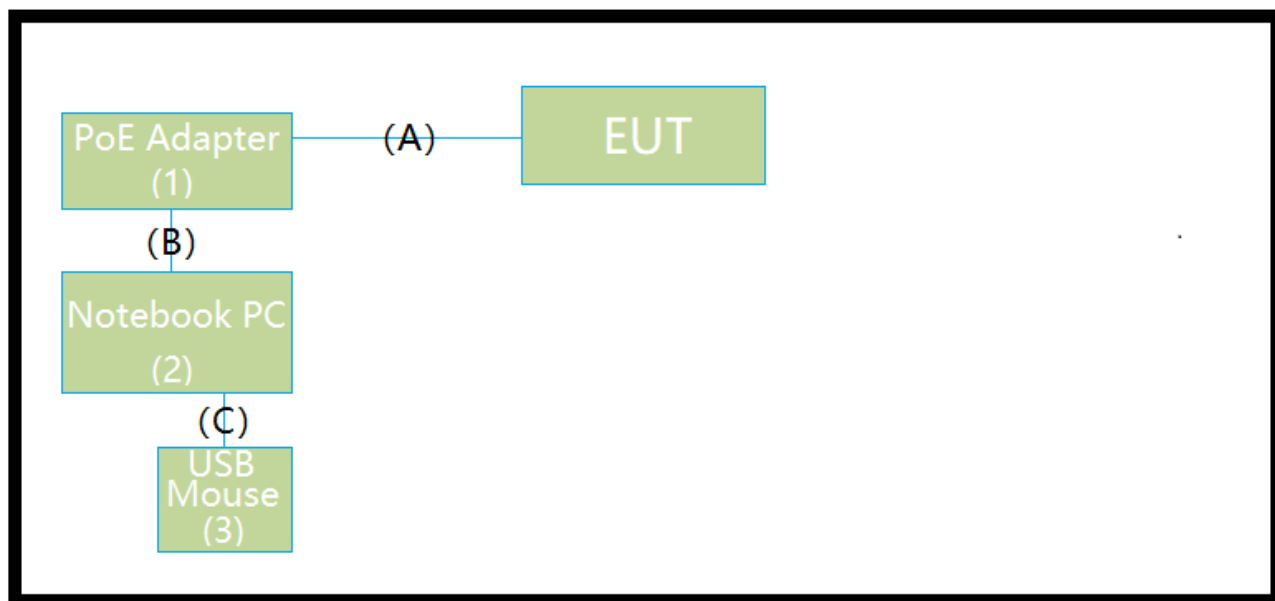
Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	N/A	N/A	N/A	N/A

2.3. 測試模式

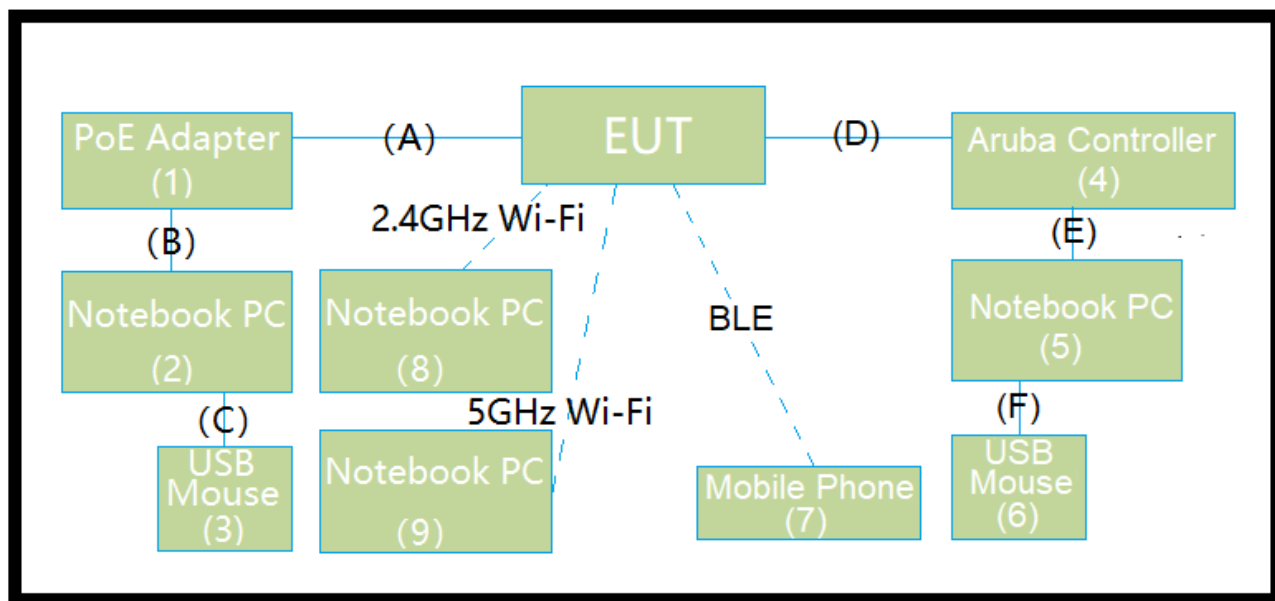
Test Mode	Mode 1: 發射器 - Bluetooth-LE
	Mode 2: Normal Mode

2.4. 測試配置

待測物測試配置圖 (Mode 1)



待測物測試配置圖 (Mode 2)



Signal Cable Type		Signal Cable Description
A	LAN Cable	Non-Shielding, >10m
B	LAN Cable	Non-Shielding, 1.5m
C	USB Mouse Cable	Shielded, 1.6m
D	LAN Cable	Non-Shielding, >10m
E	LAN Cable	Non-Shielding, 1.5m
F	USB Mouse Cable	Shielded, 1.6m

2.5. 測試周邊

待測裝置測試時，其搭配系統測試時之週邊裝置包括如下：

Mode 1 ~ 2

No.	周邊名稱	廠牌	型號	序號	檢磁	電源線
1	PoE Adapter	MICROSEMI	PD-9001GR/AT/AC	N/A	N/A	N/A
2	Notebook	Lenovo	X230i	N/A	N/A	Non-Shielded, 1.8m
3	USB Mouse	Dell	MS111-L	N/A	N/A	N/A
4	Aruba Controller	ARUBA NETWORKS, INC	ARCN7008	CGCWJSP01S	N/A	Non-Shielded, 1.8m
5	Notebook	Lenovo	X201	N/A	N/A	Non-Shielded, 1.8m
6	USB Mouse	Dell	MS111-L	N/A	N/A	N/A
7	Mobile Phone	Apple	A1700	N/A	N/A	N/A
8	Notebook	Lenovo	T460	N/A	N/A	Non-Shielded, 1.8m
9	Notebook	Lenovo	X230	N/A	N/A	Non-Shielded, 1.8m

2.6. 待測裝置測試時之典型操作程式

1.	Turn on the power of all equipment.
2.	Mode 1: Make the EUT powered by POE Adapter on E1 port, communicate with PC and make the PC execute "telnet.exe" program, configure the test channel and the data rate. Mode 2: Make the EUT powered by POE Adapter on E1 port, communicate with PC & E0 port communicate with PC via Controller by LAN Cable, communicate with PC via 2.4GHz & 5GHz Wi-Fi and communicate with mobile phone by Bluetooth
3.	Start to test.

3. 測試設備明細

電源端及電信端傳導干擾量測設備 / Conducted Emissions and Impedance Stabilization Network - SR2 :

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2021/3/26
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2021/4/24
8-Wire ISN (T8-Cat6)	R&S	ENY81 CA6	MRTTWA00017	1 year	2021/5/25
8-Wire ISN (T8)	R&S	ENY81	MRTTWA00018	1 year	2021/5/25
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2021/5/26
Conducted Cable	Rosnol	N1C50-RG400-B1C50-500CM	MRTTWE00013	1 year	2021/6/21

輻射干擾測設備 / Radiated Disturbance - AC1 :

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2020/9/4
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2021/4/27
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2021/4/24
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2021/4/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2021/4/24
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2021/4/24
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2021/3/24
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2021/3/25
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2020/10/2
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/7/14
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2021/6/16
Cable	Rosnol	K1K50-UP026 4-K1K50-4M	MRTTWE00012	1 year	2021/6/20

RF 傳導量測設備：

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2021/4/24
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2021/3/26
Wideband Radio Communication Taster	R&S	CMW 500	MRTTWA00041	1 year	2021/1/7
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2020/10/2
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/7/14
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2021/3/24
Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTTWA00036	1 year	2021/6/09

測試軟體 / Test Software:

Software	Version	Function
e3	9.160520a	EMI Test Software
EMI	V 3	EMI Test Software

4. 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% ($U=2U_c(y)$): 0.15MHz~30MHz: $\pm 2.53\text{dB}$
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~30MHz: $\pm 3.92\text{dB}$ 30MHz~1GHz: $\pm 4.25\text{dB}$ 1GHz~18GHz: $\pm 4.40\text{dB}$ 18GHz~40GHz: $\pm 4.45\text{dB}$
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% ($U=2U_c(y)$): $\pm 0.82^\circ\text{C} / \pm 3\%$
直流電源 (DC Voltage)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.3\%$

5. 測試結果

產品名稱 ACCESS POINT
型號 APIN0518

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
3.10.1.2	峰值傳導輸出功率	$\leq 30.00\text{dBm}$	符合	第 5.2 章節
3.10.1.3	天線之要求	低功率射頻電機技術規範 3.10.1.3 節	符合	第 5.3 章節
3.10.1.5	帶外發射限制	$\leq 20\text{dBc (Peak)}$	符合	第 5.4 章節
2.7	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
2.7	頻帶邊緣	$\leq 74\text{dBuV/m (Peak)}$ $\leq 54\text{dBuV/m (Average)}$	符合	第 5.6 章節
3.10.1.6(2)(A)	佔用頻寬	$\geq 500\text{kHz}$	符合	第 5.7 章節
3.10.1.6(2)(B)	功率頻譜密度	$\leq 8\text{dBm/3kHz}$	符合	第 5.8 章節

備註：符合性的判定是基於測試結果符合規範的限制值或客戶的宣告要求，測試結果的判定是不考慮測量不確定度的值。

5.1. 電源傳導測試

5.1.1. 量測方法

待測物放置於1m*2m*0.8m之非導體桌面並離垂直牆面40cm（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明顯差異，因此檢附其中一個測試頻道之測試數。

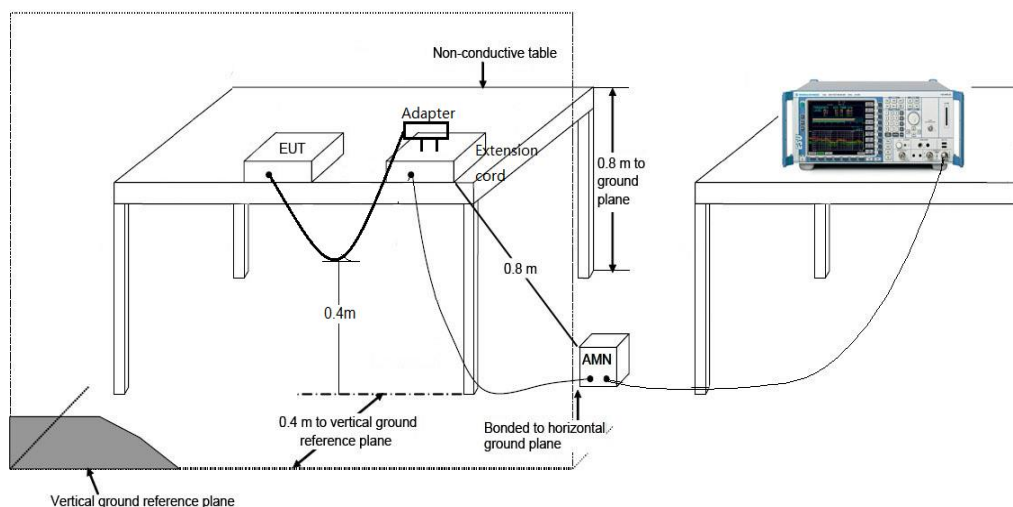
5.1.2. 限制要求

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

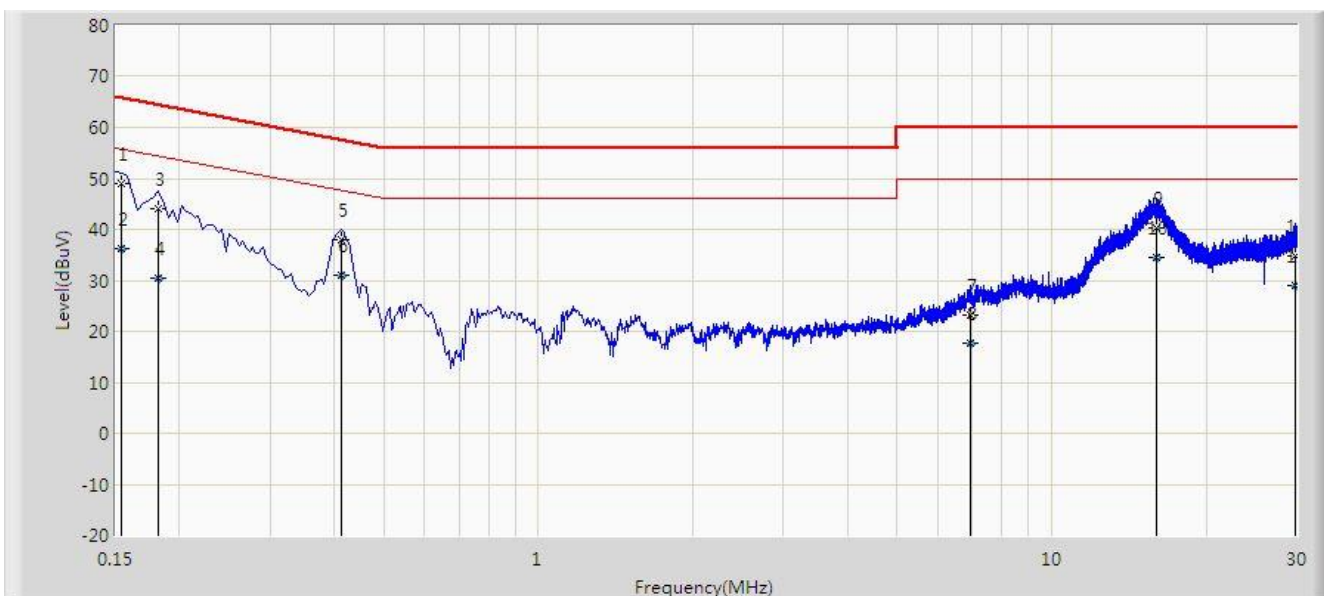
註：隨頻率之對數遞減

5.1.3. 測試架構圖



5.1.4. 電源傳導測試結果

Site: SR2	Time: 2020/05/18 - 13:51
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 1	

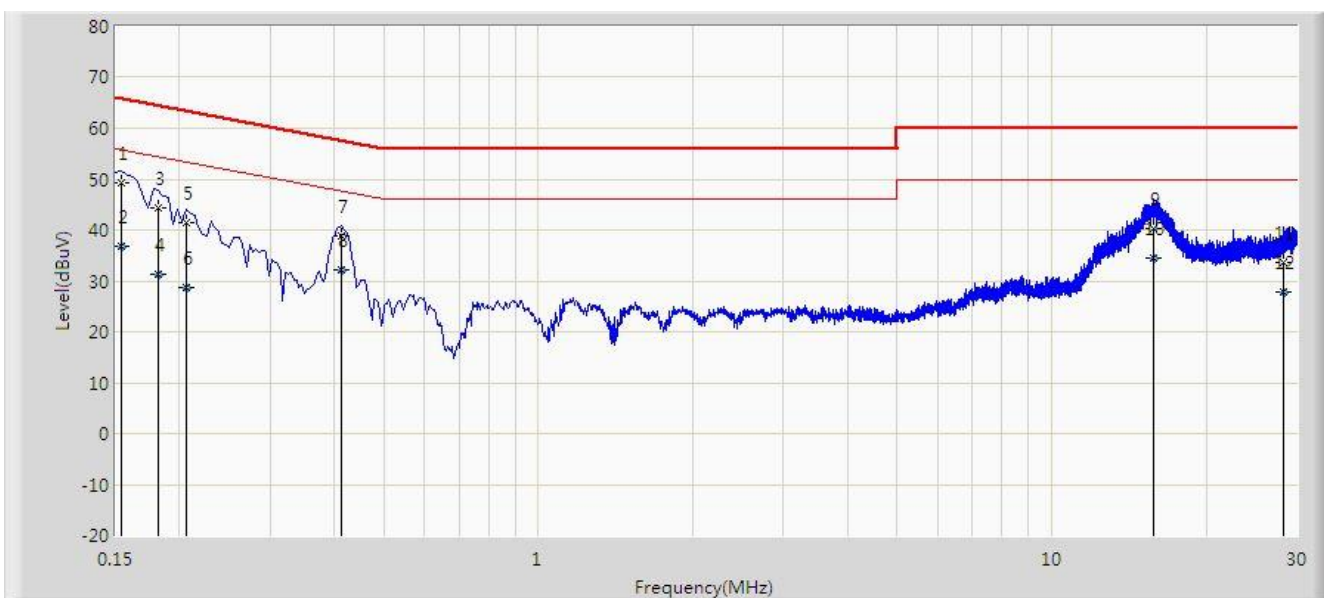


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1			0.154	49.108	39.463	-16.674	65.781	9.645	QP
2			0.154	36.239	26.594	-19.543	55.781	9.645	AV
3			0.182	44.142	34.486	-20.252	64.394	9.657	QP
4			0.182	30.527	20.870	-23.867	54.394	9.657	AV
5			0.414	37.837	28.118	-19.731	57.568	9.719	QP
6			0.414	30.957	21.238	-16.611	47.568	9.719	AV
7			6.958	23.230	12.899	-36.770	60.000	10.331	QP
8			6.958	17.659	7.328	-32.341	50.000	10.331	AV
9			15.990	40.287	29.980	-19.713	60.000	10.307	QP
10		*	15.990	34.451	24.144	-15.549	50.000	10.307	AV
11			29.886	34.680	24.110	-25.320	60.000	10.570	QP
12			29.886	28.919	18.349	-21.081	50.000	10.570	AV

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

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

Site: SR2	Time: 2020/05/18 - 13:56
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 1	

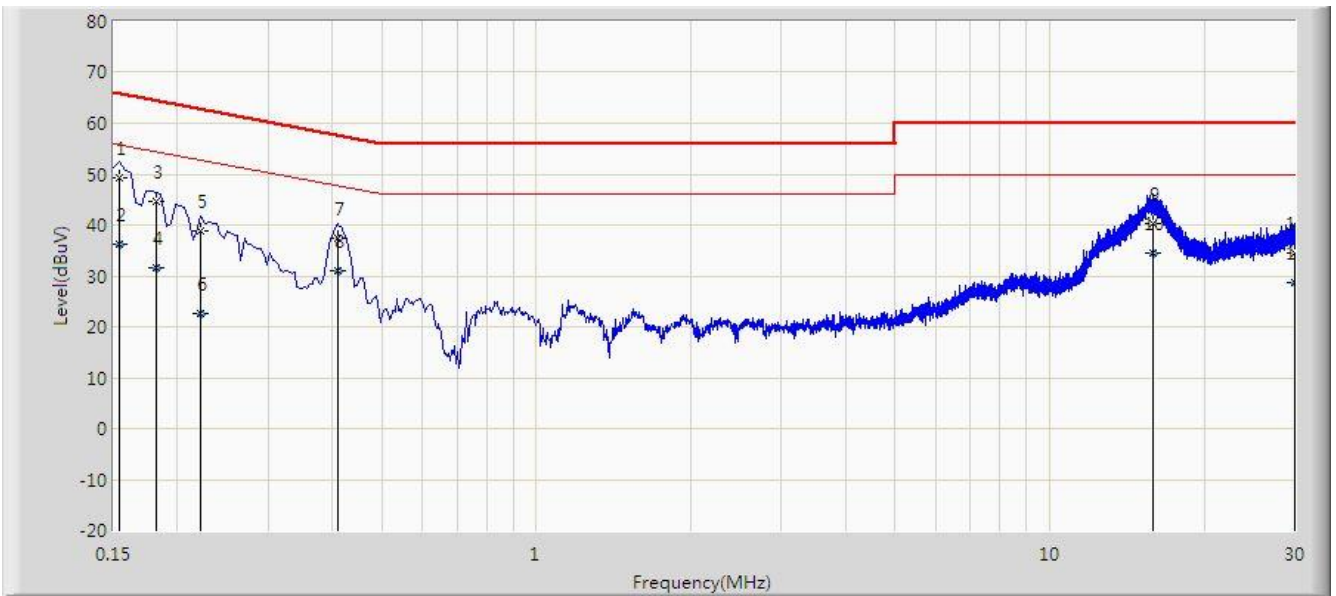


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.154	49.262	39.658	-16.519	65.781	9.605	QP
2			0.154	36.904	27.300	-18.877	55.781	9.605	AV
3			0.182	44.355	34.739	-20.039	64.394	9.617	QP
4			0.182	31.432	21.816	-22.962	54.394	9.617	AV
5			0.206	41.479	31.855	-21.886	63.365	9.624	QP
6			0.206	28.811	19.187	-24.554	53.365	9.624	AV
7			0.414	38.893	29.254	-18.674	57.568	9.639	QP
8		*	0.414	32.152	22.513	-15.416	47.568	9.639	AV
9			15.746	40.305	30.106	-19.695	60.000	10.198	QP
10			15.746	34.411	24.212	-15.589	50.000	10.198	AV
11			28.182	33.666	23.153	-26.334	60.000	10.513	QP
12			28.182	27.823	17.311	-22.177	50.000	10.513	AV

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

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

Site: SR2	Time: 2020/05/18 - 13:15
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 2	

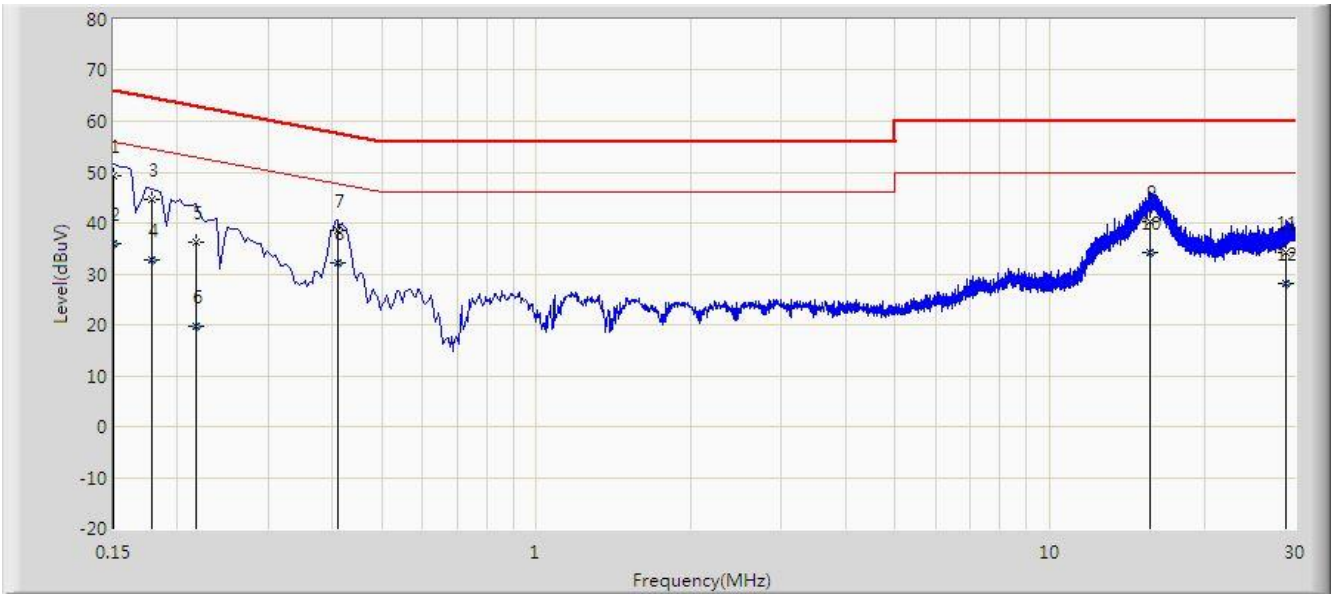


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.154	49.175	39.531	-16.606	65.781	9.645	QP
2			0.154	36.105	26.460	-19.676	55.781	9.645	AV
3			0.182	44.681	35.024	-19.713	64.394	9.657	QP
4			0.182	31.688	22.031	-22.706	54.394	9.657	AV
5			0.222	38.716	29.053	-24.028	62.744	9.663	QP
6			0.222	22.712	13.048	-30.032	52.744	9.663	AV
7			0.410	37.438	27.720	-20.210	57.648	9.717	QP
8			0.410	30.950	21.232	-16.698	47.648	9.717	AV
9			15.894	40.301	29.997	-19.699	60.000	10.303	QP
10		*	15.894	34.537	24.234	-15.463	50.000	10.303	AV
11			29.918	34.604	24.034	-25.396	60.000	10.570	QP
12			29.918	28.833	18.263	-21.167	50.000	10.570	AV

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

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

Site: SR2	Time: 2020/05/18 - 13:20
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	49.203	39.600	-16.797	66.000	9.603	QP
2			0.150	35.985	26.382	-20.015	56.000	9.603	AV
3			0.178	44.741	35.126	-19.837	64.578	9.615	QP
4			0.178	32.878	23.263	-21.701	54.578	9.615	AV
5			0.218	36.307	26.680	-26.588	62.895	9.627	QP
6			0.218	19.804	10.177	-33.091	52.895	9.627	AV
7			0.410	38.536	28.898	-19.112	57.648	9.638	QP
8		*	0.410	32.071	22.432	-15.578	47.648	9.638	AV
9			15.658	40.317	30.126	-19.683	60.000	10.191	QP
10			15.658	34.323	24.133	-15.677	50.000	10.191	AV
11			28.902	34.063	23.508	-25.937	60.000	10.555	QP
12			28.902	28.220	17.666	-21.780	50.000	10.555	AV

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

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

5.2. 峰值傳導輸出功率

5.2.1. 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，設定頻譜分析儀之解析度頻寬大於6dB發射頻寬或使用峰值功率表。除使用上述測量方式外，並得使用以最大傳導輸出功率作為測量方式。

5.2.2. 限制要求

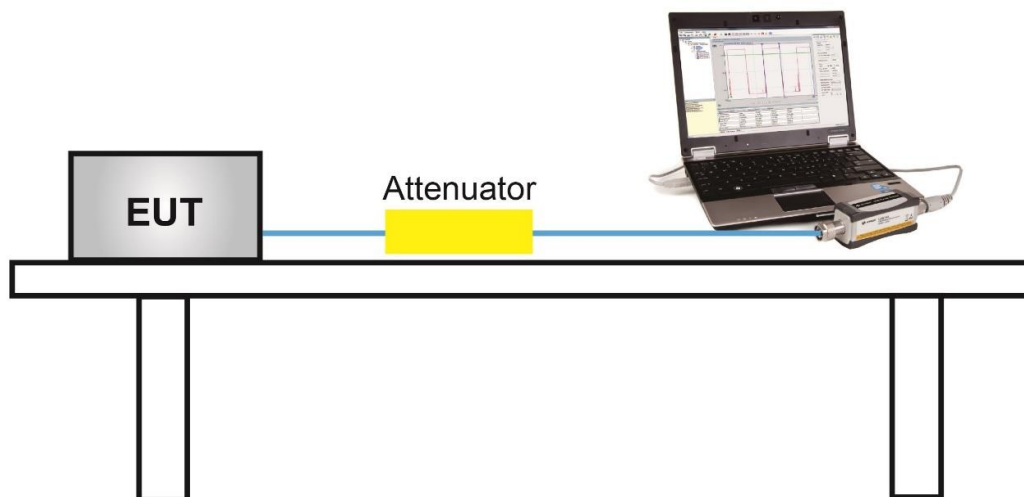
國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.2節，峰值傳導輸出功率：

操作於 2400 MHz~2483.5 MHz 者

- (A) 至少使用75 個跳頻頻道之跳頻系統：1 W(含)以下。
- (B) 除(A)外，依 3.10.1.6 (1)(A)(a)之跳頻系統：0.125 W(含)以下。
- (C) 數位調變技術系統：1 W(含) 以下。

除使用附件二之峰值輸出功率測量方式外，並得使用以最大傳導輸出功率(Maximum Conducted Output Power)作為測量方式。

5.2.3. 測試架構圖



5.2.4. 峰值傳導輸出功率測試結果

待測物名稱	ACCESS POINT	測試日期	2020/1/19
待測物型號	APIN0518	溫度 / 濕度	27°C / 65%
測試場地 / 測試工程師	AC1 / Kevin		

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
Bluetooth-LE	00	2402	7.09	≤ 30
Bluetooth-LE	19	2440	7.30	≤ 30
Bluetooth-LE	39	2480	7.42	≤ 30

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)
Bluetooth-LE	00	2402	7.01	≤ 30
Bluetooth-LE	19	2440	7.23	≤ 30
Bluetooth-LE	39	2480	7.35	≤ 30

備註：此 Average Power 量測值僅用於 Health 評估。

5.3. 天線之要求

5.3.1. 限制要求

依據國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.4節規定，天線之規格可不受下述規定之限制。

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

此 ACCESS POINT 其天線檢附天線規格書

Antenna No.	Antenna 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 4*4 MIMO)							
1	Omni	2.4	AP-ANT-40	4.0	7.01	4.0	7.01
		5		5.0	11.02	5.0	11.02
2	Omni	2.4	AP-ANT-19	3.0	6.01	3.0	6.01
		5		6.0	12.02	6.0	12.02
3	Omni	2.4	AP-ANT-1W	3.8	6.81	3.8	6.81
		5		5.8	11.82	5.8	11.82
4	Omni	2.4	AP-ANT-13B	2.3	5.31	2.3	5.31
		5		4.0	10.02	4.0	10.02
5	Omni	2.4	AP-ANT-20W	2.0	5.01	2.0	5.01
		5		2.0	8.02	2.0	8.02
6	Omni	2.4	AP-ANT-22	2.0	5.01	2.0	5.01
		5		4.0	10.02	4.0	10.02
7	Omni	2.4	AP-ANT-16	3.9	6.91	3.9	6.91
		5		4.7	10.72	4.7	10.72
8 (Note 3)	Directional	2.4	AP-ANT-45	4.5	4.5	4.5	4.5
		5		5.5	8.51	5.5	8.51
9 (Note 3)	Directional	2.4	AP-ANT-48	8.5	8.5	8.5	8.5
		5		8.5	11.51	8.5	11.51
10 (Note 3)	Directional	2.4	ANT-2x2-2314	14.0	14.0	14.0	14.0
11 (Note 3)	Directional	5	ANT-4x4-5314	14.0	17.01	14.0	17.01
12 (Note 3)	Directional	5	ANT-3x3-5712	11.5	14.51	11.5	14.51
13 (Note 3)	Directional	2.4	AP-ANT-25A	5.0	5.0	5.0	5.0
		5		5.0	8.01	5.0	8.01
14 (Note 3)	Directional	2.4	AP-ANT-28	7.5	7.5	7.5	7.5
		5		7.5	10.51	7.5	10.51
Bluetooth / ZigBee Internal Antenna (ANT-518)							
PCB		2.4		4.2			

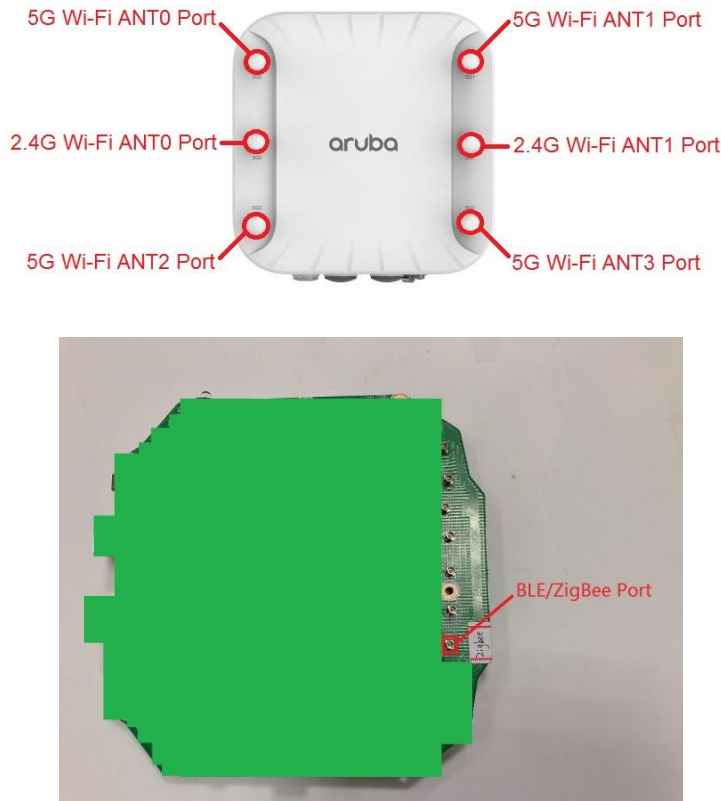
Note:

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,

$$\text{Array Gain} = 10 \log (N_{ANT} / N_{SS}) \text{ dB} = 3.01;$$
 - For power measurements on IEEE 802.11 devices,

$$\text{Array Gain} = 0 \text{ dB for } N_{ANT} \leq 4;$$
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 = $G_{ANT} + \text{BF Gain}$, BF Gain was declared by the applicant.
3. These antennas have Cross-Polarized design, only each two outputs driving a pair of antennas that are cross-polarized, the detail see the antenna specification.

5.3.3. Description of Antenna RF Port

Antenna RF Port						
--	2.4GHz RF Port		5GHz RF Port			
Software Control Port	Ant 0	Ant 1	Ant 0	Ant 1	Ant 2	Ant 3
 The diagram shows the physical layout of the antenna ports on the device. The top part shows the external ports on the white casing, labeled with red lines: 5G Wi-Fi ANT0 Port, 5G Wi-Fi ANT1 Port, 2.4G Wi-Fi ANT0 Port, 2.4G Wi-Fi ANT1 Port, 5G Wi-Fi ANT2 Port, and 5G Wi-Fi ANT3 Port. The bottom part shows the internal circuitry with a green PCB, where a red line points to the BLE/ZigBee Port.						

5.4. 帶外發射限制

5.4.1. 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，

- (1) 頻率掃描範圍足以檢測頻帶內的發射波峰位準以及由受測物產生之最低頻率到第 10 次諧波的所有混附發射，通常需要分幾段以涵蓋全部頻率範圍。
- (2) 解析頻寬為 100 kHz，視訊頻寬不小於解析頻寬。
- (3) 掃描時間為自動，檢波功能為峰值，訊號軌跡為最大保留(Max Hold)。
- (4) 將標記設定於任何欲紀錄之波峰上，所顯示之位準值必須符合指定之限制值。

備註

解析頻寬設置為 1.3 MHz 是為了提供量測速度。

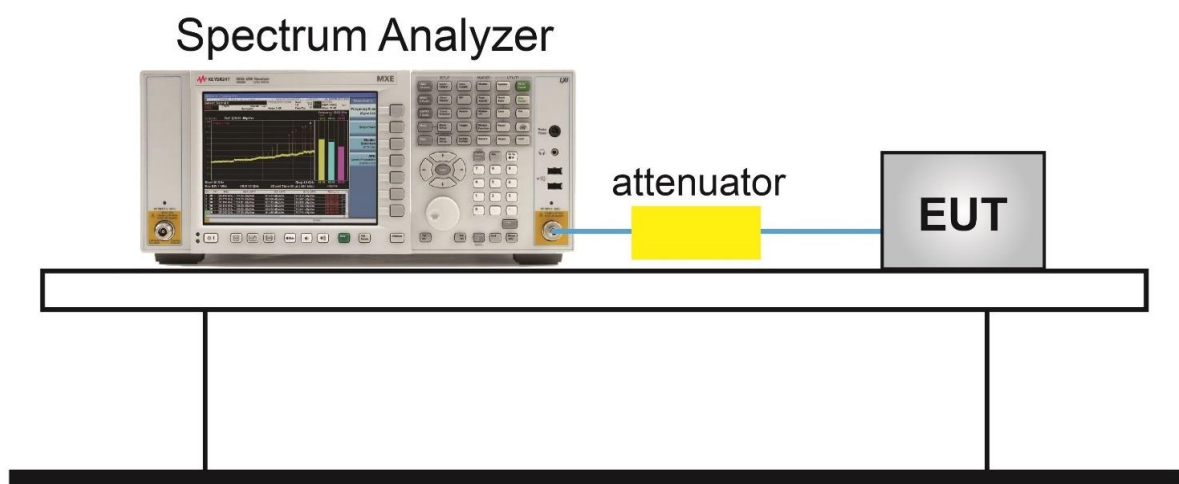
使用限值還是法規定義的基於解析頻寬 100 kHz 情形下主波下降 20dB,如果量測波形接近限值，我們會使用降低解析頻寬方式作驗證。

5.4.2. 限制要求

使用頻帶範圍外之任意 100 千赫 (kHz)內，發射器所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫 (kHz)內的射頻功率，衰減值限制如下：

- (1) 輸出功率以低功率射頻電機技術規範附件二之峰值輸出功率方式量測者，至少須衰減 20 dB，可使用射頻傳導或輻射方式測量。
- (2) 輸出功率以數位調變技術系統之最大傳導輸出功率量測方式者，至少須衰減 30 dB。
- (3) 若落於禁用頻段之輻射發射，應符合低功率射頻電機技術規範第 2.8 節之規定。

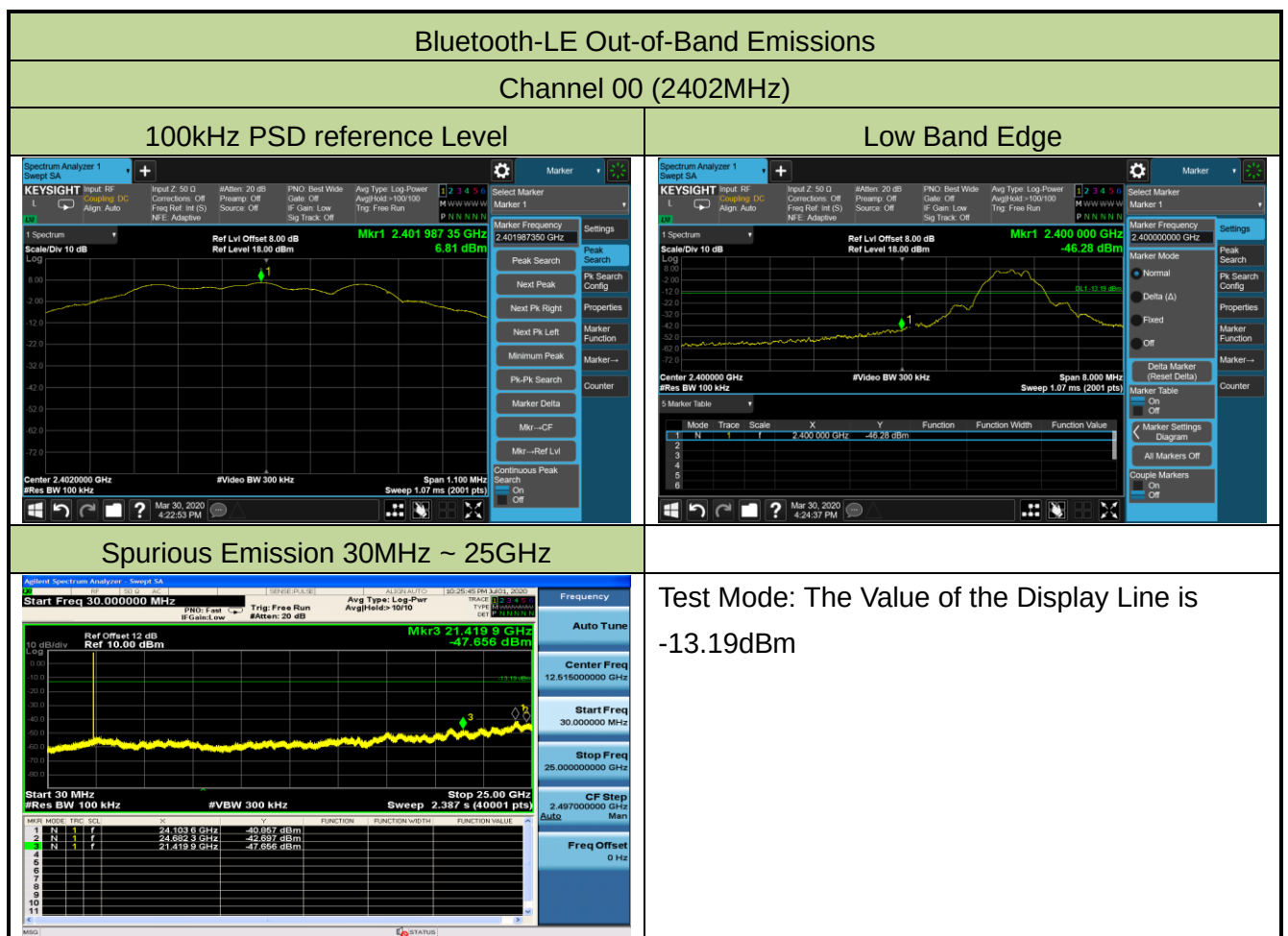
5.4.3. 測試架構圖



5.4.4. 帶外輻射測試結果

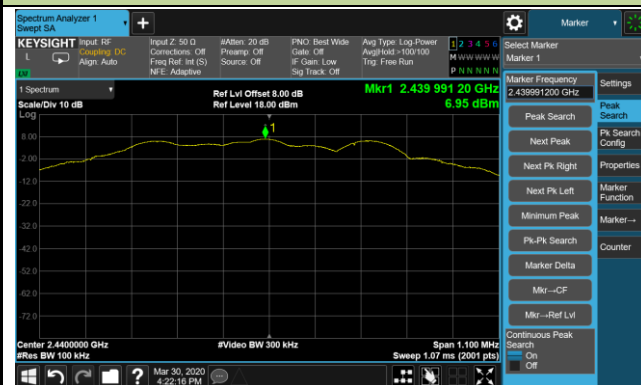
待測物名稱	ACCESS POINT	測試日期	2020/03/30
待測物型號	APIN0518	溫度 / 濕度	27°C / 65%
測試場地	SR2	測試工程師	Kevin Ker

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
Bluetooth-LE	1	00	2402	20dBc	Pass
Bluetooth-LE	1	19	2440	20dBc	Pass
Bluetooth-LE	1	39	2480	20dBc	Pass

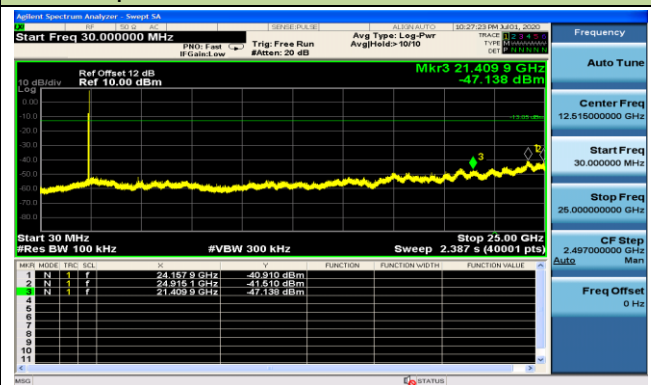


Channel 19 (2440MHz)

100kHz PSD reference Level



Spurious Emission 30MHz ~ 25GHz



Test Mode: The Value of the Display Line is -13.05dBm

Channel 39 (2480MHz)

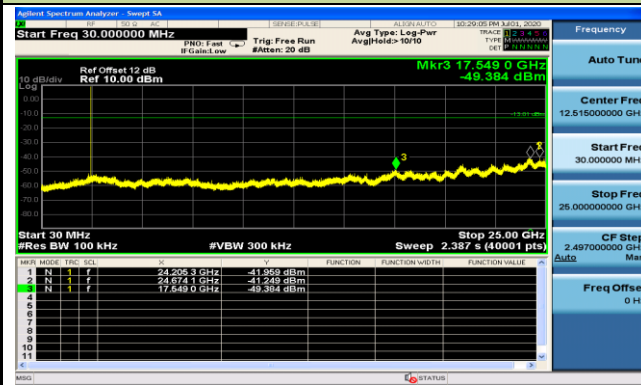
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



Test Mode: The Value of the Display Line is -13.01dBm

5.5. 輻射電場強度

5.5.1. 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可 360 度旋轉，接收天線置於距待測物 3m 距離，高度可在 1 至 4 公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水準及垂直極化方向各量測一次。（待測物擺設方式根據 ANSI C63.10-2013 版本，待測物放置桌中心，1G 以下擺設高度為 80cm/1G 以上擺設高度為 150cm）

- (1) 任一頻率小於或等於 1000 MHz 之訊號,使用 CISPR 準峰值檢波器
- (2) 任一頻率大於 1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含 1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加 20 dB。

5.5.2. 限制要求

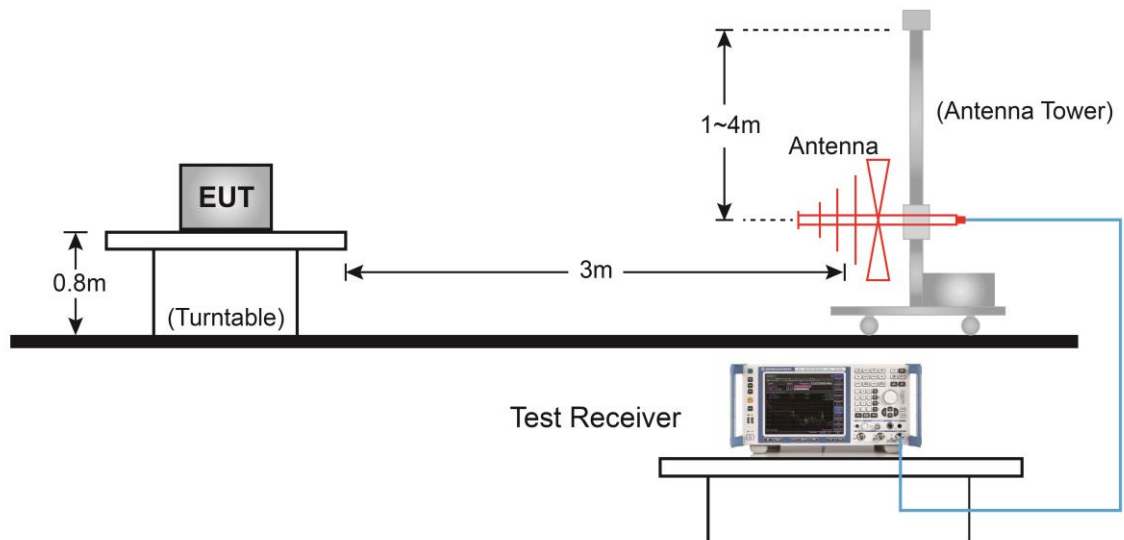
其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

頻 率 (MHz)	電場強度(uV/m)	測距(m)
0.009 - 0.490(含)	2,400/f(KHz)	300
0.490 (不含) - 1.705 (含)	24,000/f(KHz)	30
1.705(不含) - 30 (不含)	30	30
30 (含) - 88 (含)	100	3
88 (不含) - 216 (含)	150	3
216 (不含) - 960 (含)	200	3
960 (不含)以上	500	3

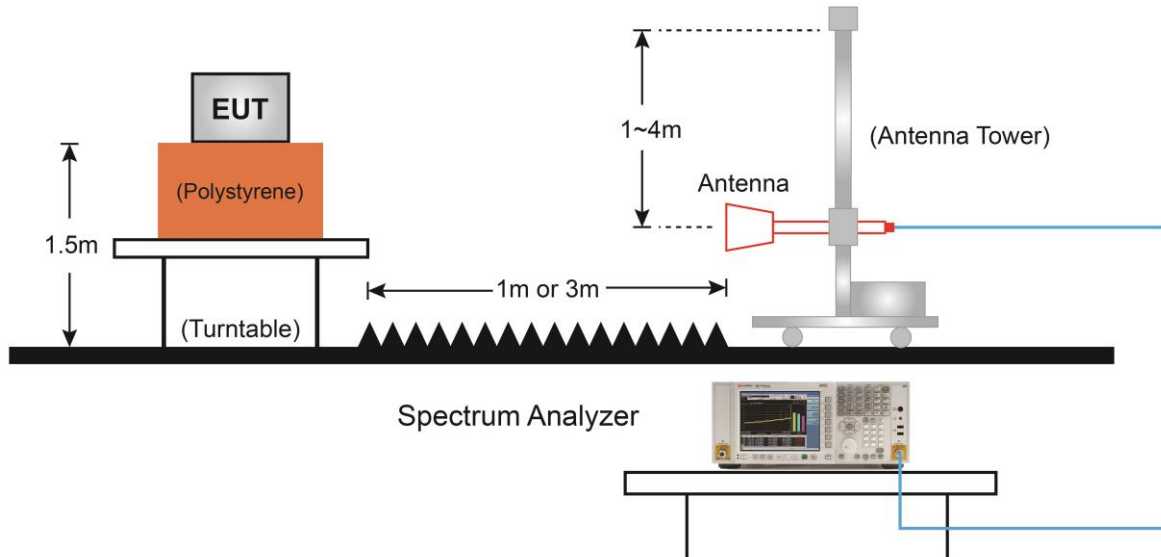
上表規定之電場強度，頻率在 9-90kHz 千赫(kHz)、110-490 千赫(kHz)以及 1000 兆赫(MHz)以上之發射，其量測以平均值檢波器為基準，且須符合低功率射頻電機技術規範第 5.15.2 節之規定；其他頻率之發射，應以 CISPR 準峰值(quasi-peak) 檢波器測量；非以上表所指定之距離測量時須符合低功率射頻電機技術規範第 5.5 節之規定，而輻射發射之量測頻率範圍須符合低功率射頻電機技術規範第 5.14 節之規定。

5.5.3. 測試架構圖

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.5.4. 輻射電場強度測試結果

Product	ACCESS POINT	Temperature	25°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	AC1	Test Date	2020/03/31
Model No.	APIN0518	Test Channel	00
Remark	1. Average measurement was not performed if peak level lower than average limit. So the margin was calculated using the average limit for emissions fall within the restricted bands. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3890.0	42.2	-0.2	42.0	54.0	-12.0	Peak	Horizontal
	4876.0	39.9	3.3	43.2	54.0	-10.8	Peak	Horizontal
*	5913.0	38.9	5.5	44.4	79.8	-35.4	Peak	Horizontal
*	6686.5	36.7	8.8	45.5	79.8	-34.3	Peak	Horizontal
	4230.0	40.0	1.2	41.2	54.0	-12.8	Peak	Vertical
	4952.5	39.6	3.5	43.1	54.0	-10.9	Peak	Vertical
*	6032.0	37.6	5.9	43.5	79.8	-36.3	Peak	Vertical
*	6508.0	37.6	7.7	45.3	79.8	-34.5	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (99.80dBμV/m) or LP0002 clause 2.8 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	ACCESS POINT	Temperature	25°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	AC1	Test Date	2020/03/31
Model No.	APIN0518	Test Channel	19
Remark	1. Average measurement was not performed if peak level lower than average limit. So the margin was calculated using the average limit for emissions fall within the restricted bands. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3907.0	40.9	-0.2	40.7	54.0	-13.3	Peak	Horizontal
	4876.0	39.8	3.3	43.1	54.0	-10.9	Peak	Horizontal
*	5845.0	38.5	5.2	43.7	80.1	-36.4	Peak	Horizontal
*	6508.0	37.6	7.7	45.3	80.1	-34.8	Peak	Horizontal
	3796.5	41.6	-0.5	41.1	54.0	-12.9	Peak	Vertical
	4799.5	38.9	3.1	42.0	54.0	-12.0	Peak	Vertical
*	6134.0	38.2	6.3	44.5	80.1	-35.6	Peak	Vertical
*	6797.0	36.5	9.4	45.9	80.1	-34.2	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (100.1dBμV/m) or LP0002 clause 2.8 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	ACCESS POINT	Temperature	25°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	AC1	Test Date	2020/03/31
Model No.	APIN0518	Test Channel	39
Remark	1. Average measurement was not performed if peak level lower than average limit. So the margin was calculated using the average limit for emissions fall within the restricted bands. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

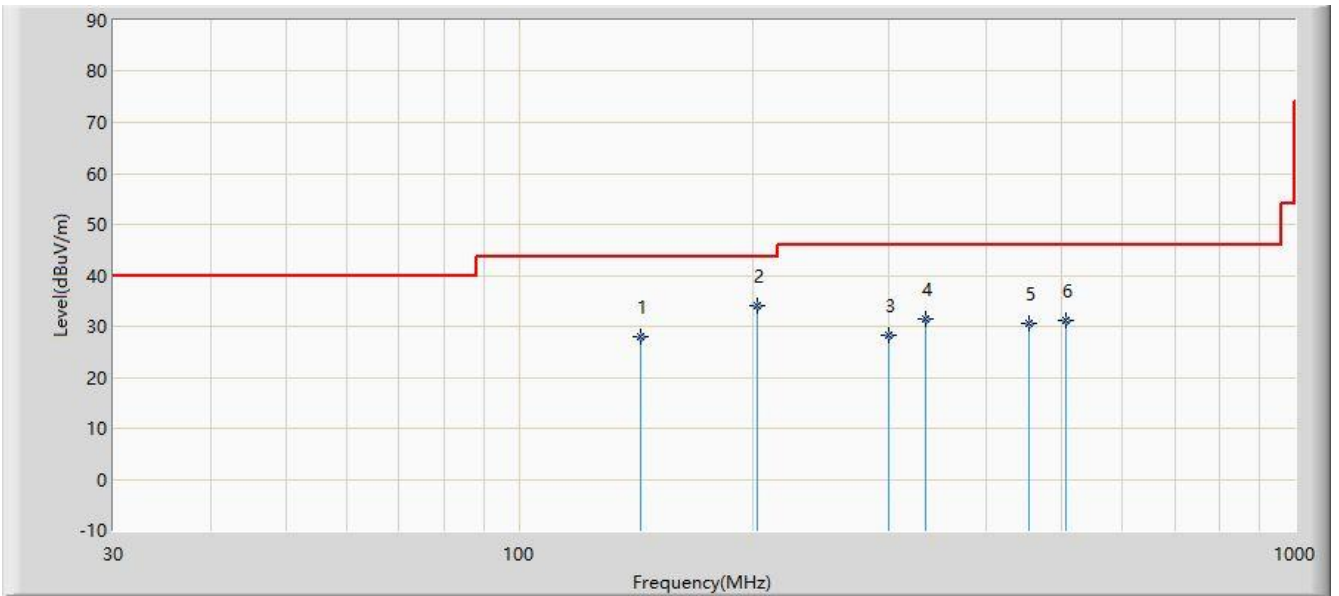
Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	3975.0	41.9	0.0	41.9	54.0	-12.1	Peak	Horizontal
	4876.0	39.5	3.3	42.8	54.0	-11.2	Peak	Horizontal
*	5938.5	38.7	5.6	44.3	80.7	-36.4	Peak	Horizontal
*	6712.0	36.2	8.9	45.1	80.7	-35.6	Peak	Horizontal
	3898.5	41.1	-0.2	40.9	54.0	-13.1	Peak	Vertical
	4808.0	39.7	3.2	42.9	54.0	-11.1	Peak	Vertical
*	5913.0	38.6	5.5	44.1	80.7	-36.6	Peak	Vertical
*	6593.0	37.6	8.2	45.8	80.7	-34.9	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (100.7dBμV/m) or LP0002 clause 2.8 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Site: AC1	Time: 2020/05/26 - 19:43
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: AC2_VULB9162_0.03-7GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode 2	

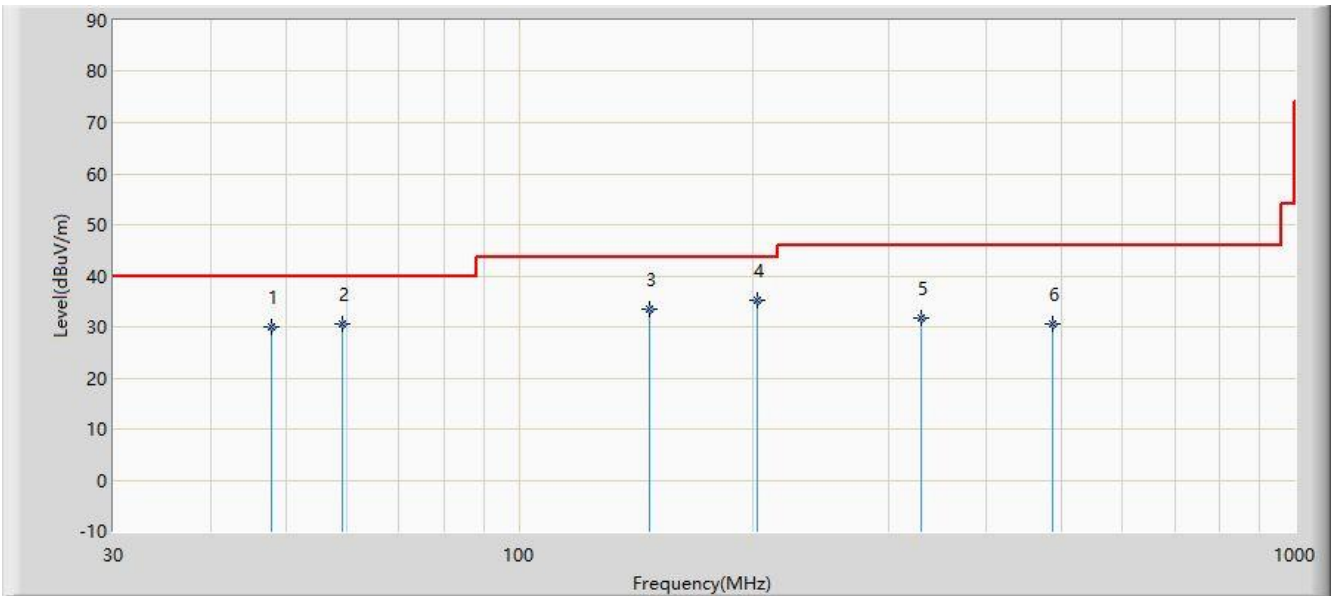


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			143.490	28.077	20.050	-15.423	43.500	8.027	QP
2		*	202.660	34.103	22.850	-9.397	43.500	11.253	QP
3			300.150	28.147	14.860	-17.853	46.000	13.287	QP
4			333.610	31.413	17.030	-14.587	46.000	14.383	QP
5			453.890	30.633	14.380	-15.367	46.000	16.253	QP
6			506.270	31.197	14.020	-14.803	46.000	17.177	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/05/26 - 19:45
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: AC2_VULB9162_0.03-7GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode 2	

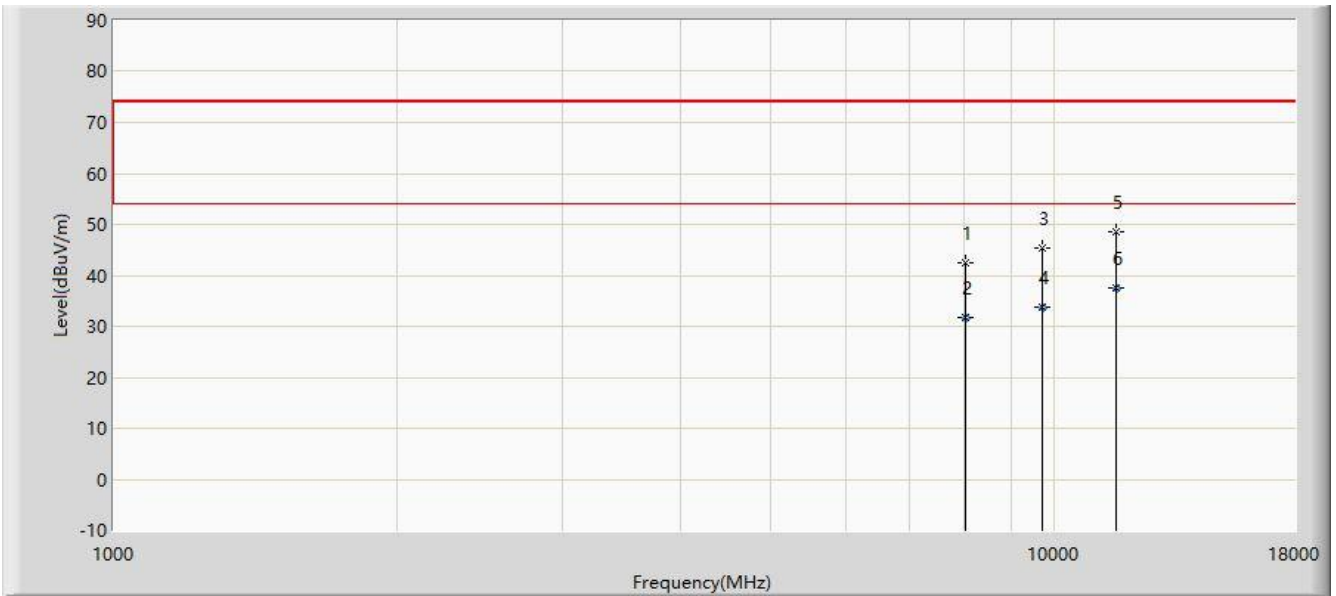


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			47.950	29.935	15.960	-10.065	40.000	13.975	QP
2			59.100	30.529	17.600	-9.471	40.000	12.929	QP
3			147.370	33.560	25.500	-9.940	43.500	8.060	QP
4		*	202.660	35.283	24.030	-8.217	43.500	11.253	QP
5			330.210	31.637	17.400	-14.363	46.000	14.237	QP
6			487.350	30.583	13.500	-15.417	46.000	17.083	QP

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/05/26 - 19:54
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode 2	



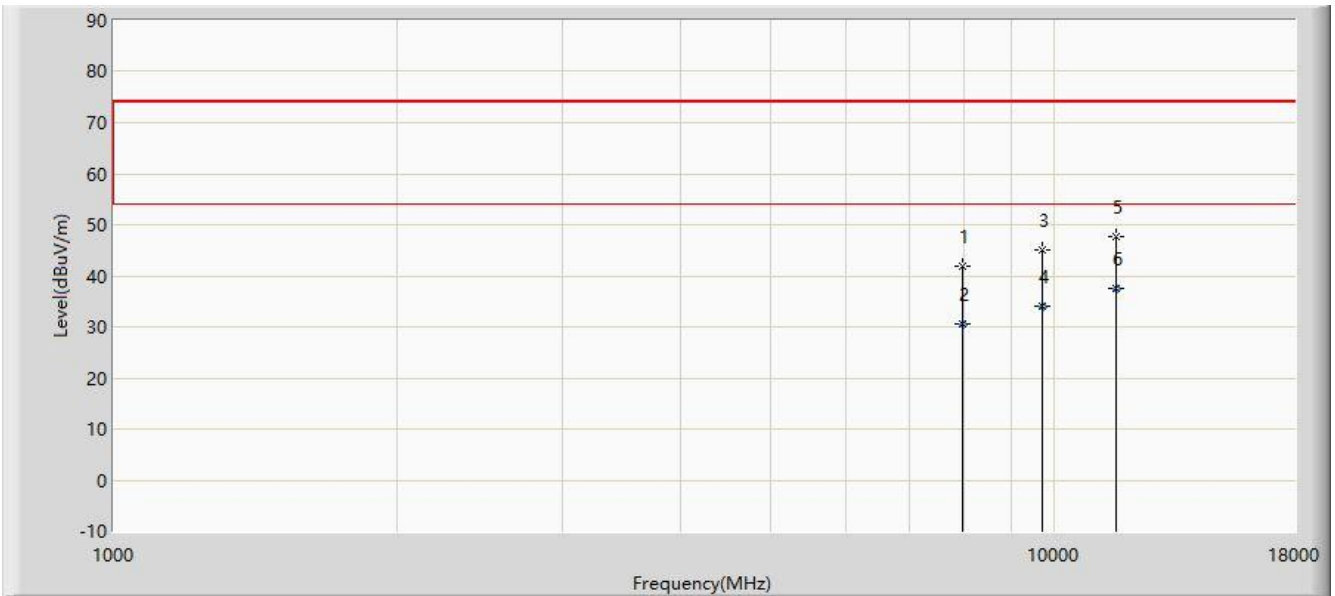
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			8055.000	42.346	32.183	-31.654	74.000	10.163	PK
2			8055.000	31.643	21.480	-22.357	54.000	10.163	AV
3			9712.500	45.309	32.954	-28.691	74.000	12.355	PK
4			9712.500	33.825	21.470	-20.175	54.000	12.355	AV
5			11625.000	48.425	31.108	-25.575	74.000	17.317	PK
6		*	11625.000	37.497	20.180	-16.503	54.000	17.317	AV

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Site: AC1	Time: 2020/05/26 - 19:55
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode 2	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			7987.000	41.939	31.917	-32.061	74.000	10.022	PK
2			7987.000	30.522	20.500	-23.478	54.000	10.022	AV
3			9712.500	45.105	32.750	-28.895	74.000	12.355	PK
4			9712.500	33.935	21.580	-20.065	54.000	12.355	AV
5			11642.000	47.761	30.151	-26.239	74.000	17.610	PK
6		*	11642.000	37.650	20.040	-16.350	54.000	17.610	AV

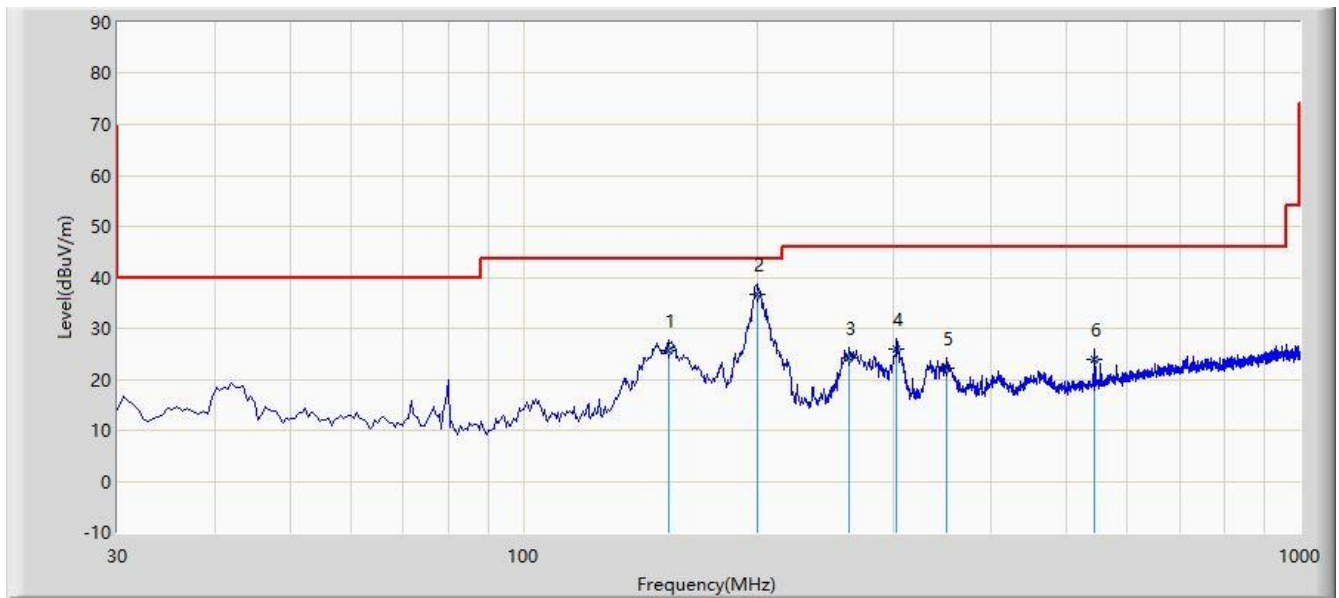
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB).

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

The Worst Case of Radiated Emission below 1GHz:

Site: AC1	Time: 2020/05/10 - 14:43
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: VULB 9162 30MHz-8GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Worse Case Mode: Transmit by Bluetooth-LE at Channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			153.675	25.597	9.697	-17.903	43.500	15.901	QP
2		*	199.750	36.767	17.822	-6.733	43.500	18.945	QP
3			262.800	24.079	3.470	-21.921	46.000	20.609	QP
4			302.570	25.942	4.438	-20.058	46.000	21.504	QP
5			350.585	22.270	-1.168	-23.730	46.000	23.438	QP
6			544.585	24.045	-2.479	-21.955	46.000	26.524	QP

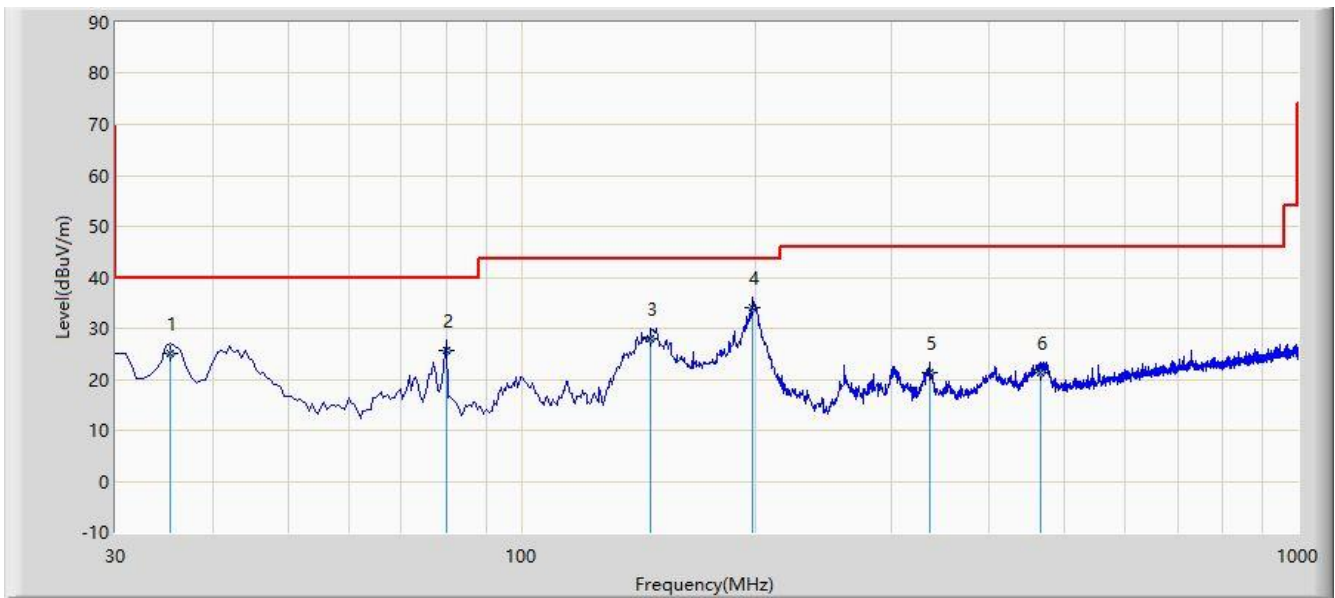
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Note 3: 經初測驗證過，1GHz 以下輻射干擾測試對測試頻道數並無差異，故僅檢附最差狀況之測試頻道。

Site: AC1	Time: 2020/05/10 - 14:49
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: VULB 9162 30MHz-8GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Worse Case Mode: Transmit by Bluetooth-LE at Channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			35.335	25.009	5.870	-14.991	40.000	19.139	QP
2			79.955	25.700	11.538	-14.300	40.000	14.162	QP
3			146.885	28.000	12.333	-15.500	43.500	15.667	QP
4		*	198.750	34.102	15.181	-9.398	43.500	18.921	QP
5			335.550	21.323	-1.520	-24.677	46.000	22.843	QP
6			466.015	21.322	-3.866	-24.678	46.000	25.188	QP

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

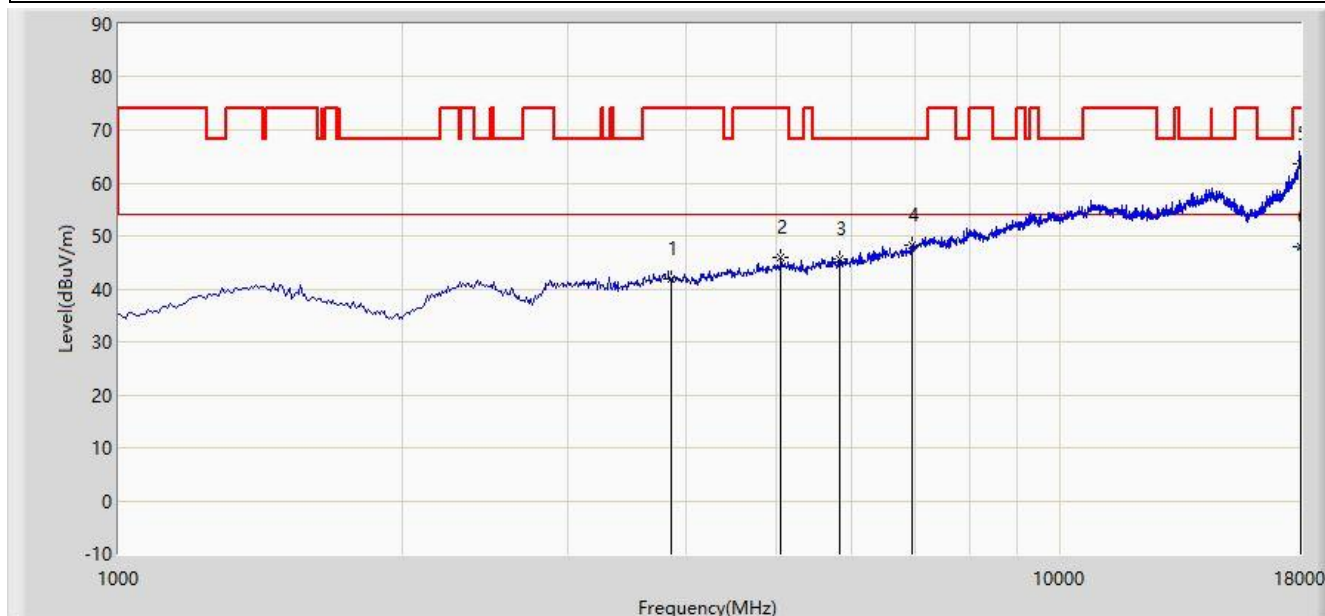
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Note 3: 經初測驗證過，1GHz 以下輻射干擾測試對測試頻道數並無差異，故僅檢附最差狀況之測試頻道。

The Worst Case of Radiated Emission above 1GHz:

Site: AC1	Time: 2020/03/31 - 09:16
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT (APEX0575)	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	



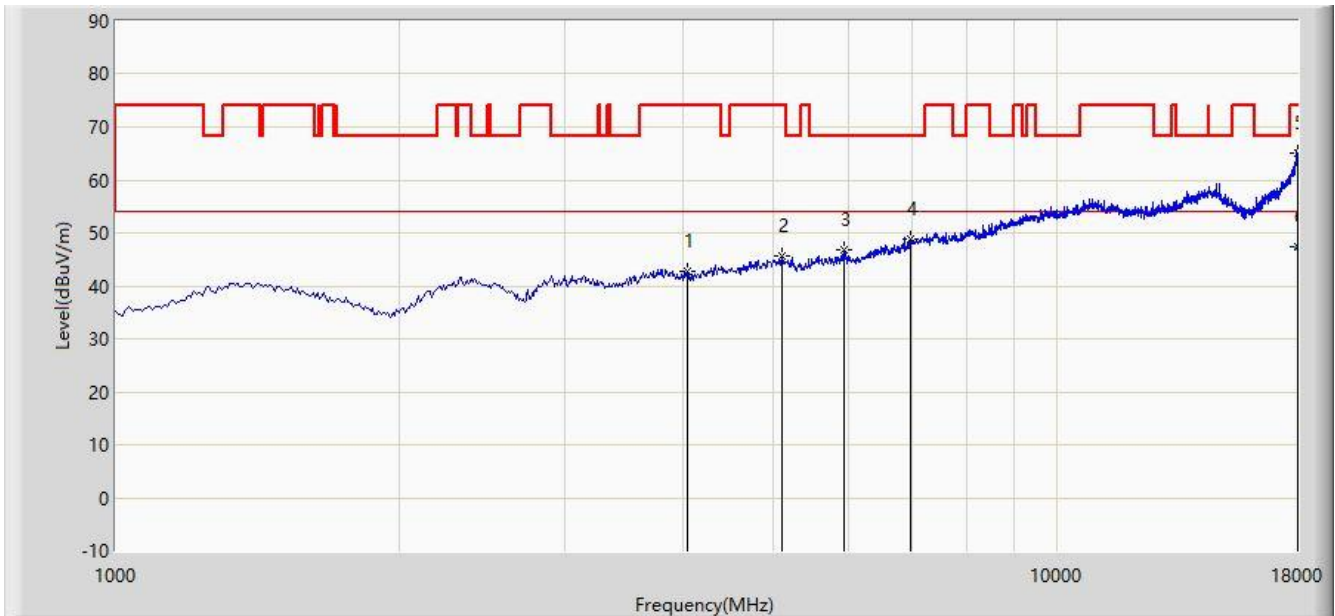
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			3864.500	41.754	42.032	-32.246	74.000	-0.278	PK
2			5054.500	46.083	42.497	-27.917	74.000	3.585	PK
3			5828.000	45.747	40.617	-22.453	68.200	5.130	PK
4			6958.500	48.254	37.895	-19.946	68.200	10.359	PK
5			18000.000	63.641	32.171	-10.359	74.000	31.470	PK
6		*	18000.000	47.960	16.490	-6.040	54.000	31.470	AV

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 2: The amplitude of spurious emissions (frequency range 9kHz ~ 30MHz, 18GHz ~ 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: AC1	Time: 2020/03/31 - 10:50
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT (APEX0575)	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			4043.000	42.652	42.360	-31.348	74.000	0.292	PK
2			5097.000	45.712	42.101	-28.288	74.000	3.611	PK
3			5930.000	46.918	41.397	-21.282	68.200	5.521	PK
4			6984.000	48.899	38.392	-19.301	68.200	10.507	PK
5			18000.000	65.206	33.736	-8.794	74.000	31.470	PK
6		*	18000.000	47.490	16.020	-6.510	54.000	31.470	AV

Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 2: The amplitude of spurious emissions (frequency range 9kHz ~ 30MHz, 18GHz ~ 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

5.6. 頻帶邊緣

5.6.1. 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可360度旋轉，接收天線置於距待測物3m距離，高度可在1至4公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水準及垂直極化方向各量測一次。（待測物擺設方式根據 ANSI C63.10-2013版，待測物放置桌中心，1G以下擺設高度為80cm/1G以上擺設高度為150cm）

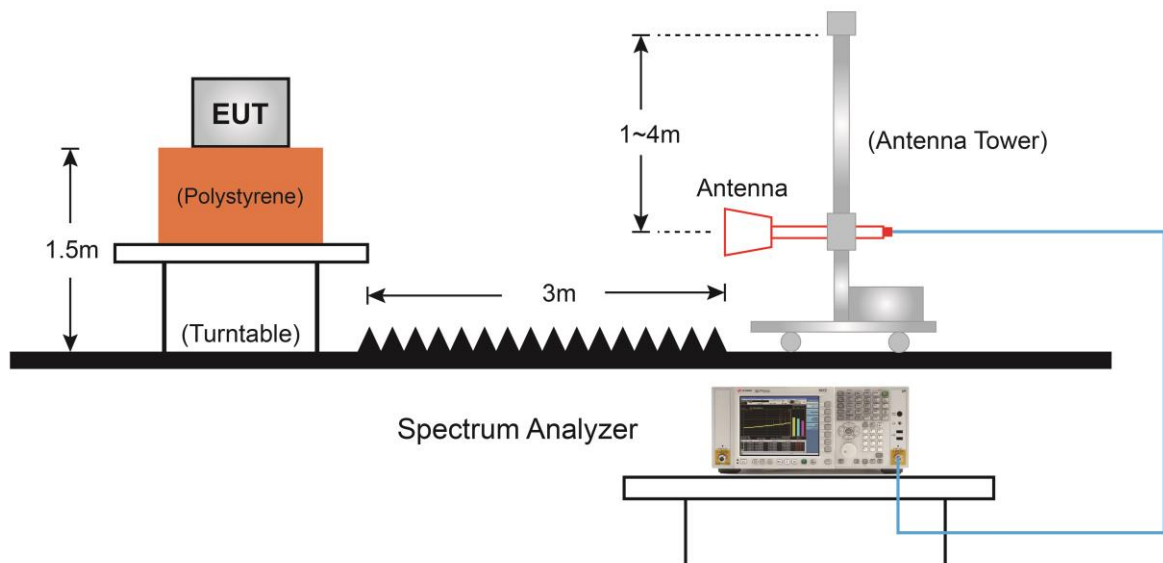
- (1) 任一頻率小於或等於1000 MHz 之訊號,使用CISPR準峰值檢波器
- (2) 任一頻率大於1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加20 dB。

5.6.2. 限制要求

除低功率射頻電機技術規範另有規定外，任何低功率射頻電機之主波皆不得使用下表所列各頻段之頻率低功率射頻電機落於下表所列頻帶內之混附發射，其電場強度必須符合低功率射頻電機技術規範之第2.8節限制規定

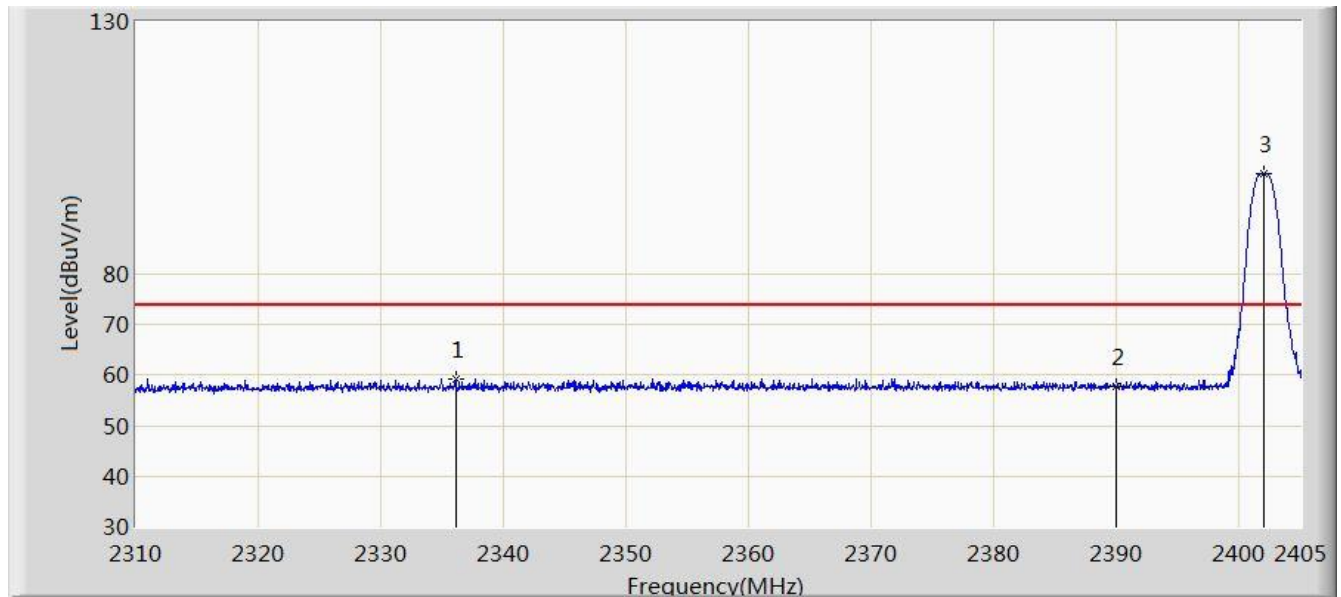
頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)
0.090~0.110	25.500~25.700	703.00~748.00	2310.0~2390.0	13250~13400
0.490~0.510	37.475~38.275	758.00~803.00	2483.5~2900.0	14470~14500
2.172~2.198	73.500~75.400	825.00~915.00	3260.0~3267.0	15350~16200
3.013~3.033	108.00~138.00	930.00~1240.0	3332.0~3339.0	17700~21400
4.115~4.198	149.90~150.05	1300.0~1427.0	3345.8~3358.0	22010~23120
5.670~5.690	156.70~156.90	1435.0~1626.5	3500.0~4400.0	23600~24000
6.200~6.300	162.01~167.17	1660.0~1785.0	4500.0~5250.0	31200~31800
8.230~8.400	167.72~173.20	1805.0~1880.0	5350.0~5460.0	36430~36500
12.265~12.600	240.00~285.00	1885.0~1900.0	7250.0~7750.0	38600 以上
13.340~13.430	322.00~335.40	1905.0~1985.0	8025.0~8500.0	
14.965~15.020	399.90~410.00	2010.0~2025.0	9000.0~9200.0	
16.700~16.755	485.00~510.00	2110.0~2170.0	9300.0~9500.0	
19.965~20.020	608.00~614.00	2200.0~2300.0	10600~12700	

5.6.3. 測試架構圖



5.6.4. 頻帶邊緣測試結果

Site: AC1	Time: 2020/03/31 - 00:56
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	

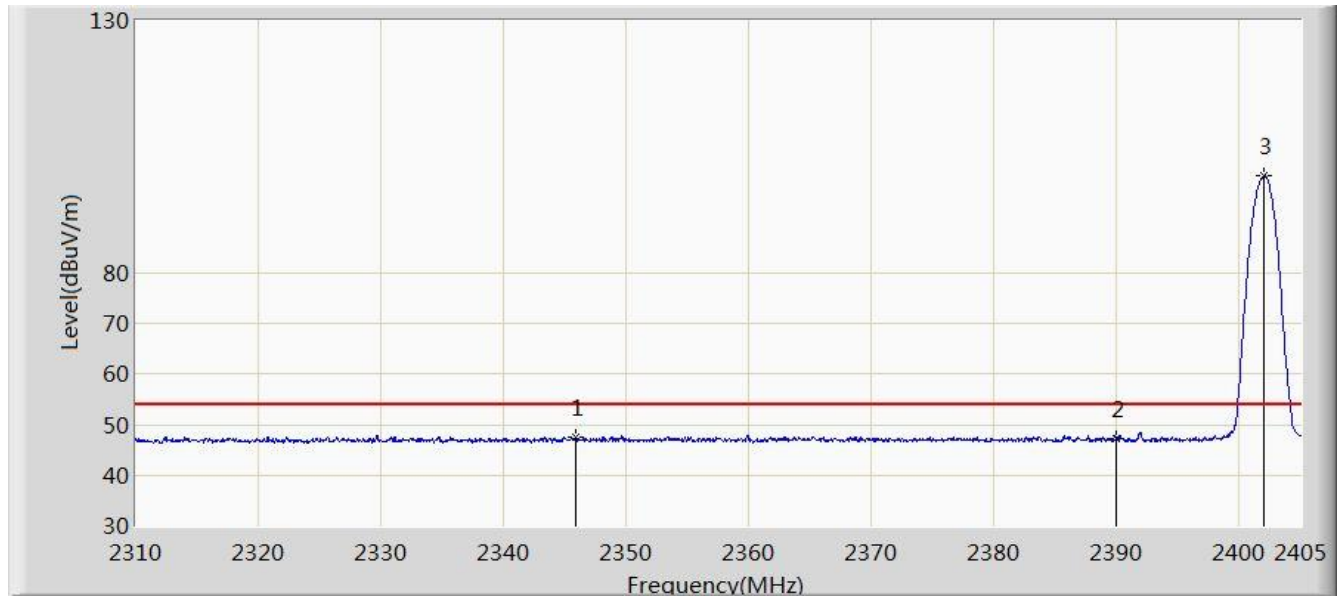


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2336.125	59.352	27.326	-14.648	74.000	32.026	PK
2			2390.000	57.659	25.385	-16.341	74.000	32.274	PK
3		*	2402.008	99.799	67.470	N/A	N/A	32.329	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 00:58
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	

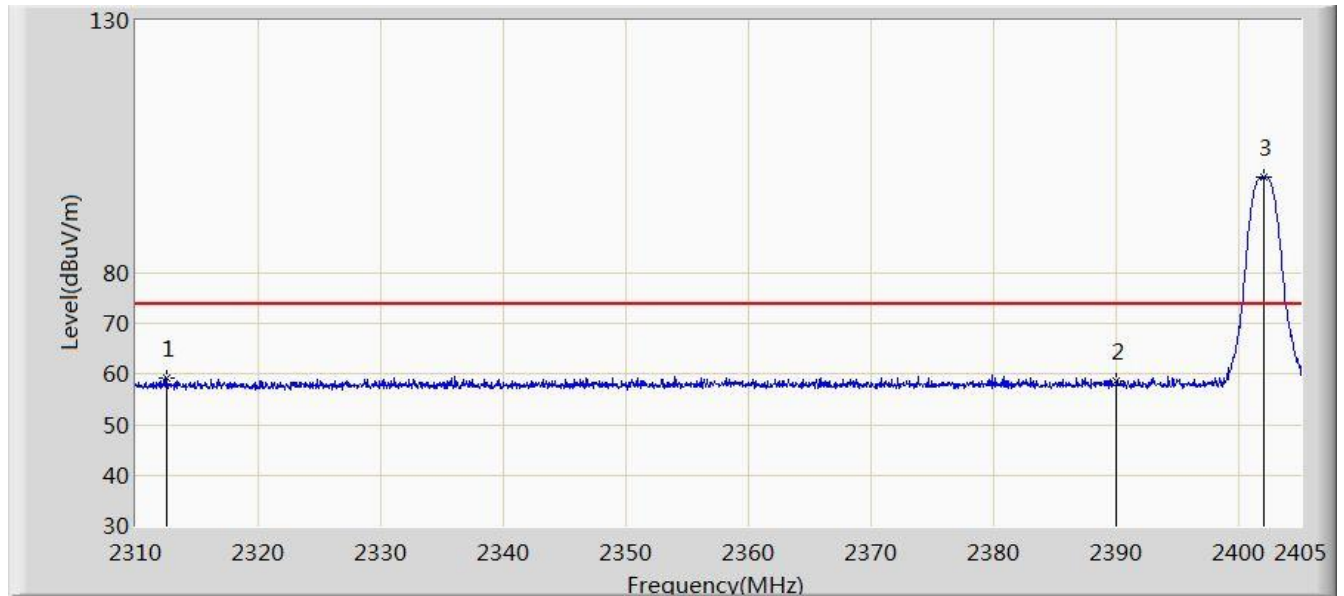


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2345.910	47.604	15.533	-6.396	54.000	32.071	AV
2			2390.000	47.276	15.002	-6.724	54.000	32.274	AV
3		*	2402.008	99.180	66.851	N/A	N/A	32.329	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 00:58
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	

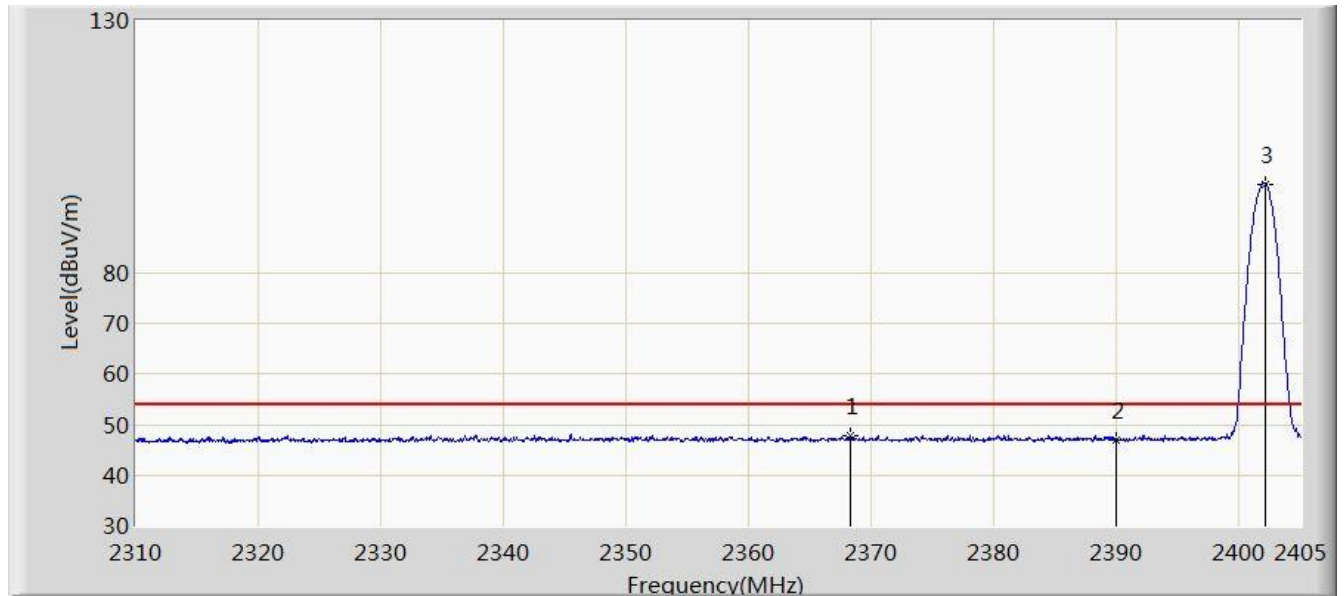


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2312.518	59.244	27.326	-14.756	74.000	31.918	PK
2			2390.000	58.553	26.279	-15.447	74.000	32.274	PK
3		*	2402.008	98.896	66.567	N/A	N/A	32.329	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 01:01
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2402MHz	

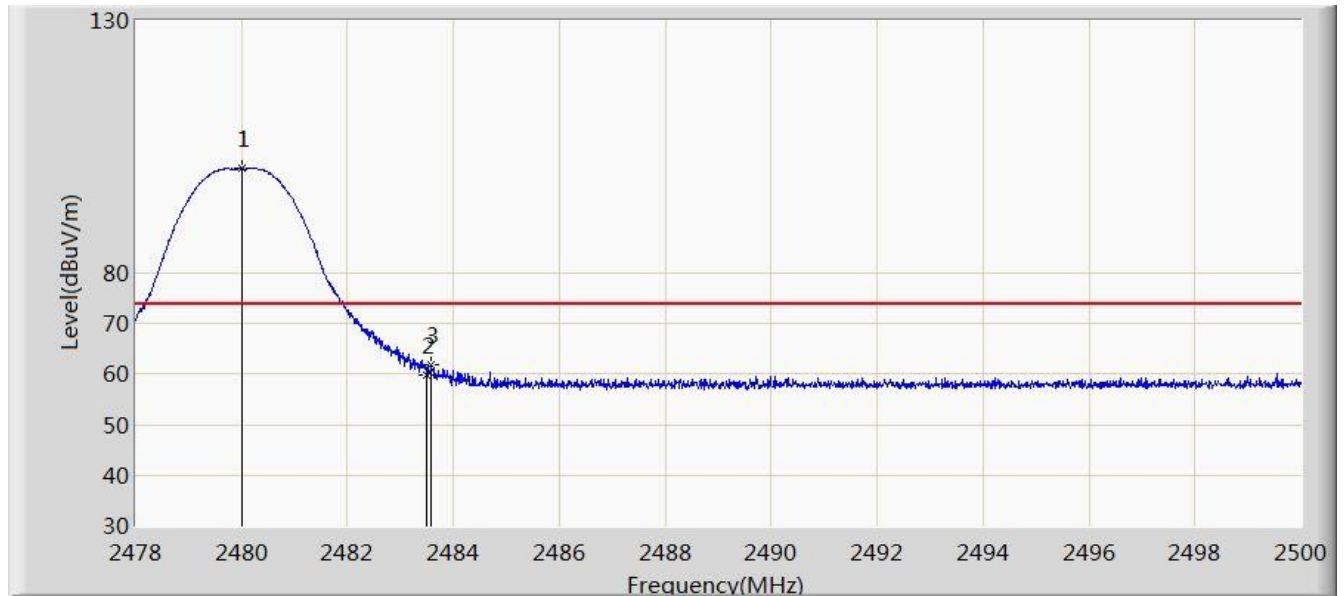


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2368.282	47.943	15.769	-6.057	54.000	32.174	AV
2			2390.000	46.914	14.640	-7.086	54.000	32.274	AV
3		*	2402.150	97.628	65.298	N/A	N/A	32.329	AV

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 01:02
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2480MHz	

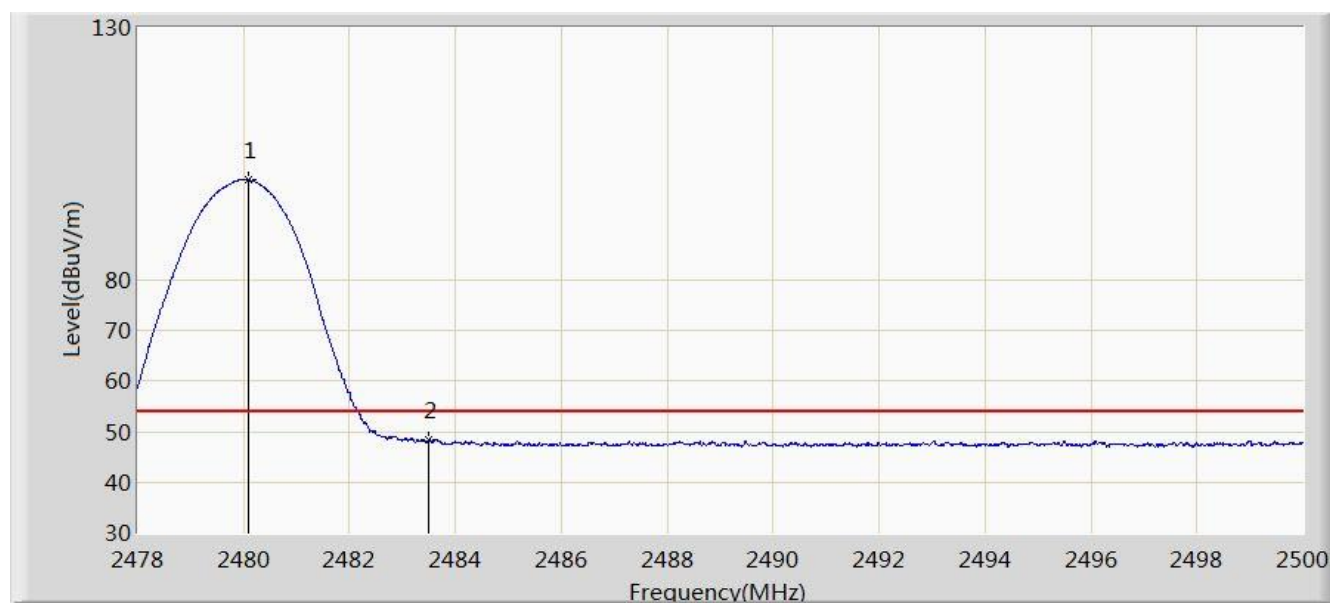


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.002	100.685	67.997	N/A	N/A	32.688	PK
2			2483.500	59.766	27.062	-14.234	74.000	32.704	PK
3			2483.577	61.773	29.068	-12.227	74.000	32.704	PK

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 01:04
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Horizontal
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2480MHz	

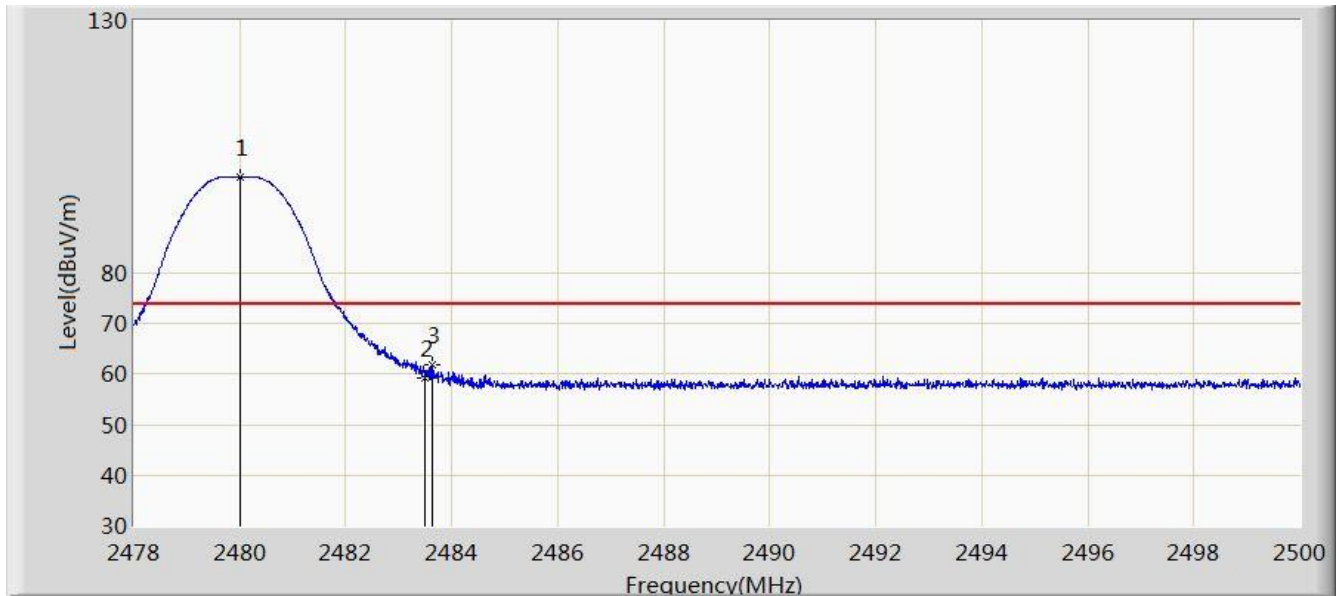


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.079	99.836	67.147	N/A	N/A	32.689	AV
2			2483.500	48.344	15.640	-5.656	54.000	32.704	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 01:04
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2480MHz	

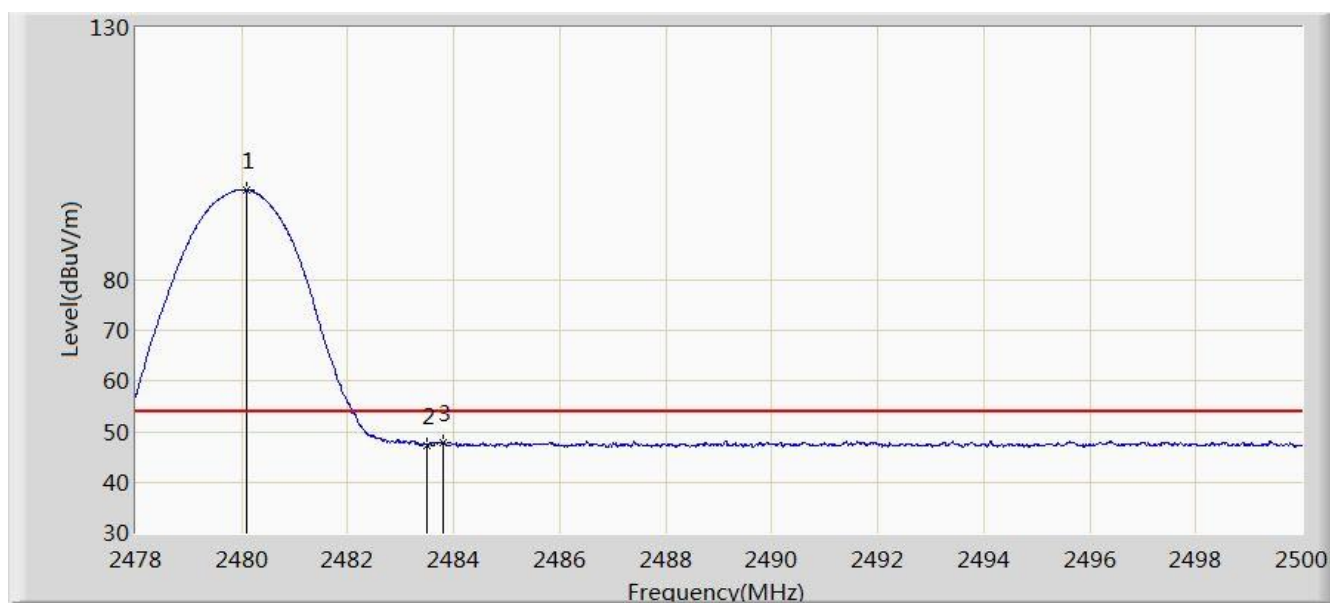


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.002	99.033	66.345	N/A	N/A	32.688	PK
2			2483.500	59.262	26.558	-14.738	74.000	32.704	PK
3			2483.621	61.773	29.068	-12.227	74.000	32.705	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: AC1	Time: 2020/03/31 - 01:08
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D_1-18GHz	Polarity: Vertical
EUT: ACCESS POINT	Power: By PoE Injector
Test Mode: Transmit by Bluetooth-LE at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.079	97.883	65.194	N/A	N/A	32.689	AV
2			2483.500	47.302	14.598	-6.698	54.000	32.704	AV
3			2483.808	47.930	15.224	-6.070	54.000	32.706	AV

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

5.7. 6dB 佔用頻寬

5.7.1. 量測方法

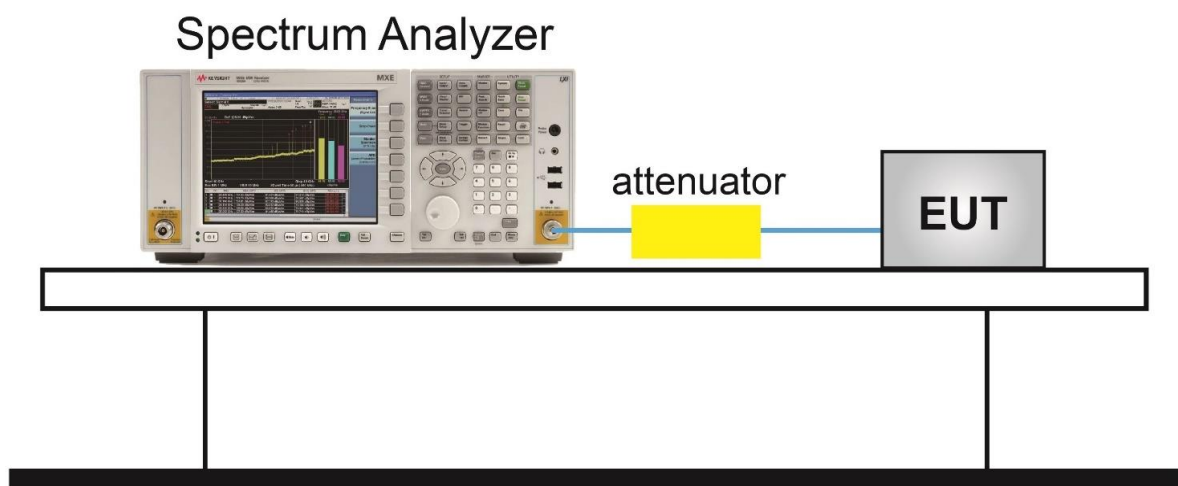
待測物之天線埠經由適當之衰減直接連至頻譜分析儀 RF 輸入端，設定頻譜分析儀之解析度頻寬為 100kHz，視訊頻寬不小於解析度頻寬，頻率掃描範圍(SPAN)遠大於解析度頻寬。

待測物應在正常發射狀態下量測。

5.7.2. 限制要求

依據國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.6(2)(A)節之要求，6dB頻寬至少應有 500kHz。

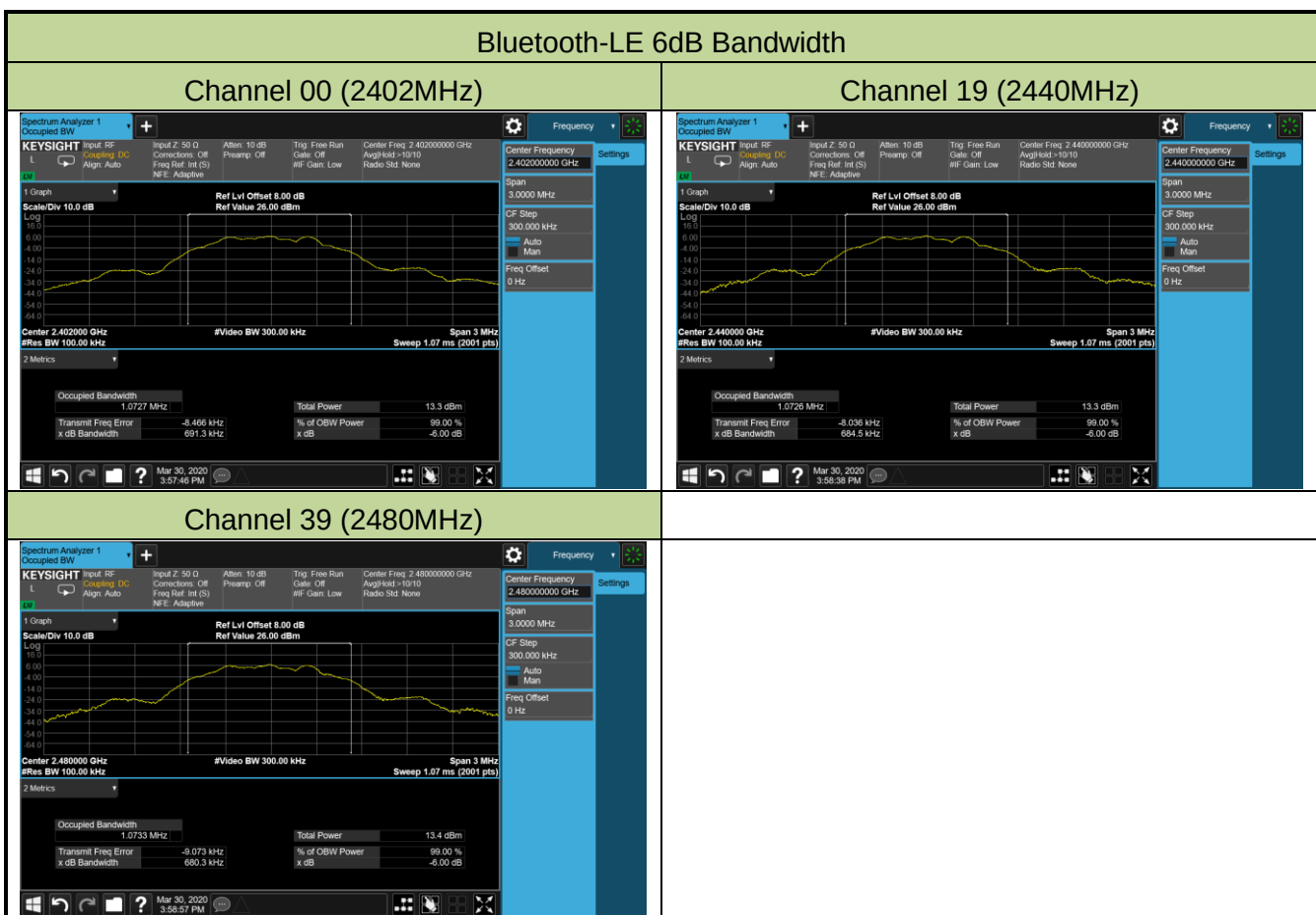
5.7.3. 測試架構圖



5.7.4. 佔用頻寬測試結果

待測物名稱	ACCESS POINT	測試日期	2020/03/30
待測物型號	APIN0518	溫度 / 濕度	27°C / 65%
測試場地	SR2	測試工程師	Kevin Ker

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
Bluetooth-LE	1	00	2402	0.69	≥ 0.5	Pass
Bluetooth-LE	1	19	2440	0.68	≥ 0.5	Pass
Bluetooth-LE	1	39	2480	0.68	≥ 0.5	Pass



5.8. 發射電功率頻譜密度

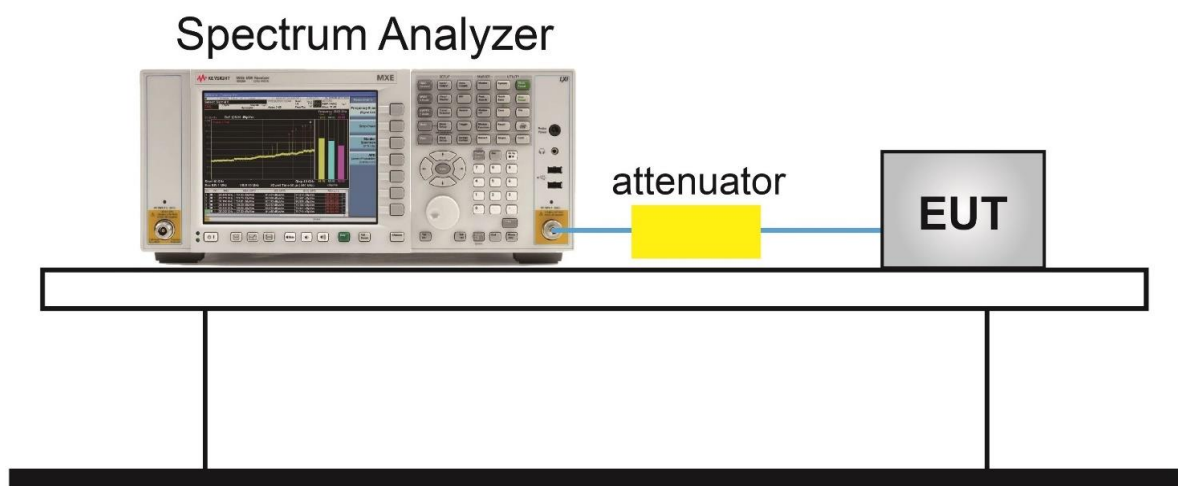
5.8.1. 量測方法

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。找出發射峰值並擴展於通帶內，設定頻譜分析儀之解析度頻寬為 3kHz，視訊頻寬大於解析度頻寬，掃瞄時間為頻率掃瞄範圍除以 3kHz。
($\text{SWEEP TIME} = \text{SPAN}/3\text{kHz}$)。

5.8.2. 限制要求

依據國家通訊傳播委員會低功率射頻電機技術規範之第 3.10.1.6(2)(B)節，在使用頻率範圍之任意 3 千赫(kHz)頻寬內，由發射機傳導至天線之峰值發射電功率密度在任意期間內，皆不得大於 8dBm。

5.8.3. 測試架構圖

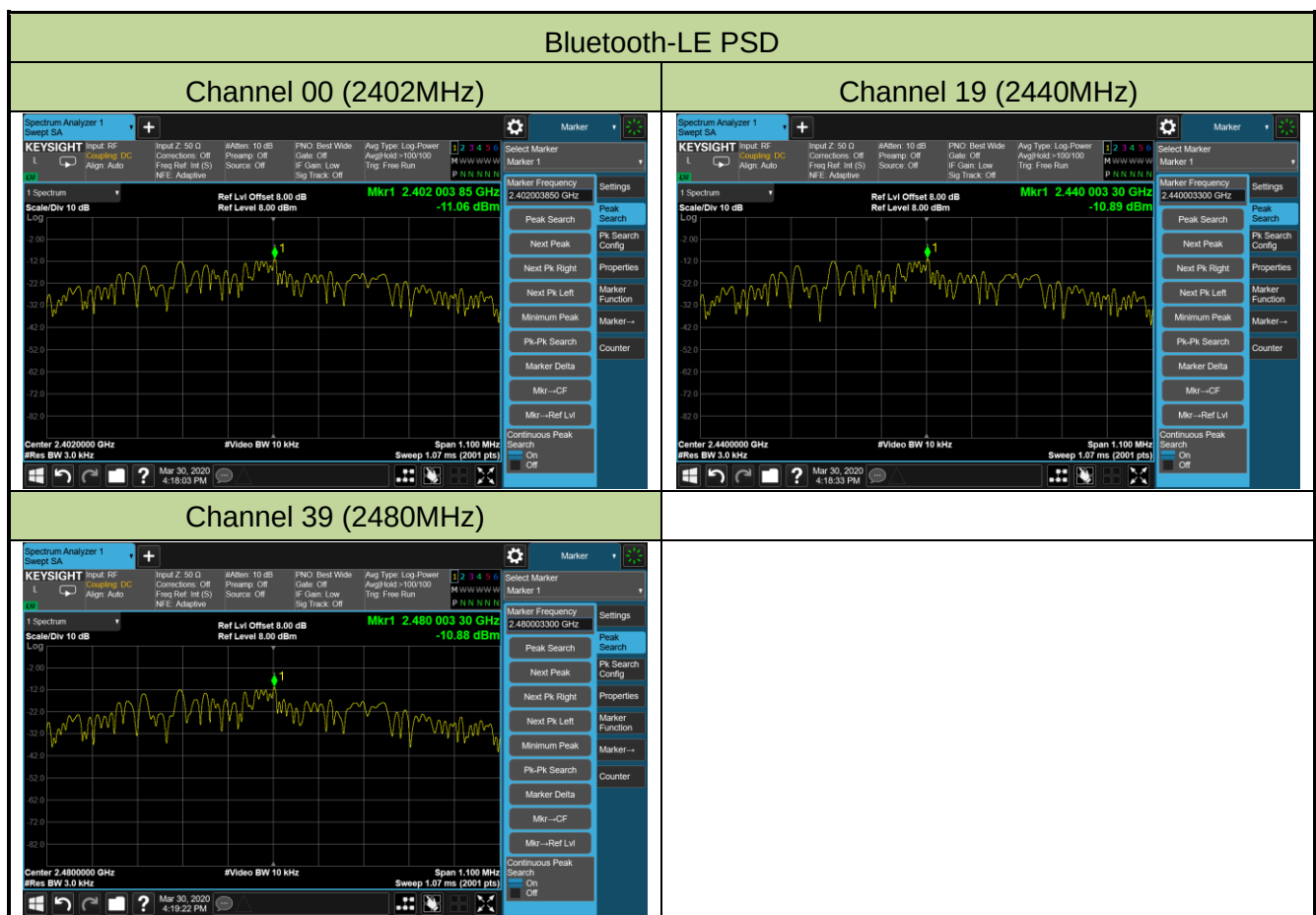


5.8.4. 功率頻譜密度量測結果

待測物名稱	ACCESS POINT	溫度	27°C
待測物型號	APIN0518	濕度	65%
測試場地	SR2	測試日期	2020/03/30
測試項目	Power Spectral Density	測試工程師	Kevin Ker

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
Bluetooth-LE	1	00	2402	-11.06	≤ 5.60	Pass
Bluetooth-LE	1	19	2440	-10.89	≤ 5.60	Pass
Bluetooth-LE	1	39	2480	-10.88	≤ 5.60	Pass

Note: Limit = 8dBm/3kHz - (8.4dBi - 6dBi) = 5.6dBm/3kHz.



The End