

NCC

低功率射頻電機型式試驗報告

產品名稱: ACCESS POINT
型號: APINH503
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: 2020.07.09
測試日期: 2020.07.15 ~ 2020.08.10

測試工程師:



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(柯承志)



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 95054, 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, 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	ACCESS POINT
產品型號	APINH503
藍牙版本	v5.0 single mode, BLE only
頻率範圍	2402 ~ 2480 MHz
調變模式	GFSK
傳輸速率	1Mbps & 2Mbps
軟件版本	V100
測試產品序列號	CNKHKSL02B
操作溫度	0 ~ 40 °C
待測物額定電壓	AC Adapter or POE input
操作環境	Indoor Use

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。

2.2. 通道清單

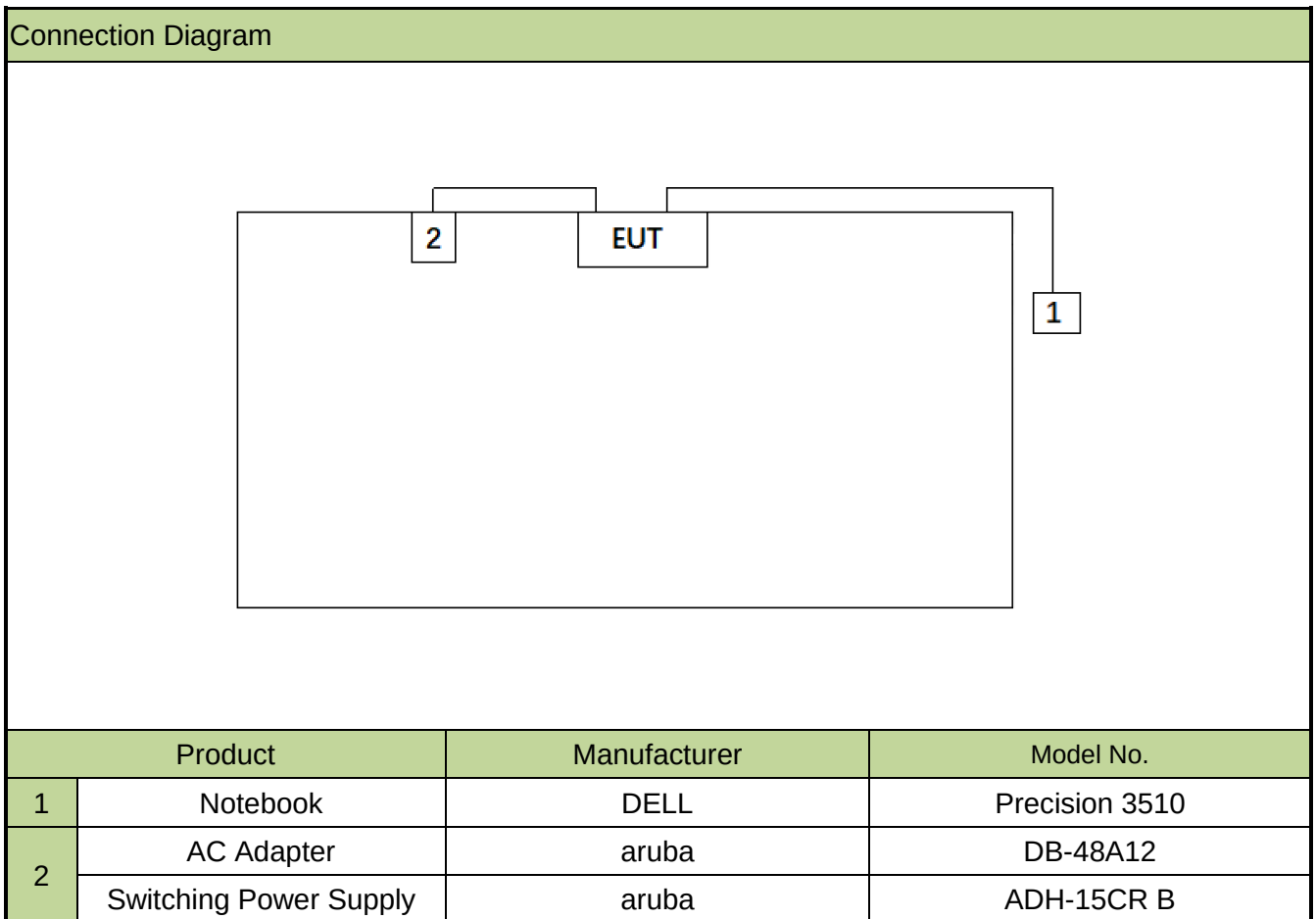
Bluetooth-LE

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	--	--	--	--

2.3. 測試模式

Mode 1: 發射器 BLE - 1Mbps
Mode 2: 發射器 BLE - 2Mbps
Mode 3: Normal Mode

2.4. 測試系統組合圖



Note 1: The test utility software used during testing was “telnet.exe” and command was provided by the manufacturer.

2.5. 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% ($U=2U_c(y)$): $\pm 0.84\text{dB}$
傳導幹擾量測 (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	2021/3/26
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2021/4/24
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
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2021/5/28

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2021/4/27
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2020/9/4
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
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2021/3/24
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/3/25
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2020/10/2
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2021/6/16

Conducted Test Equipment - SR2

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
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2020/10/2
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/7/11
Attenuator	WTI	218FS-20	MRTTWE00026	1 year	2021/05/30
Attenuator	WTI	218FS-10	MRTTWE00027	1 year	2021/05/30
Attenuator	WTI	218FS-06	MRTTWE00028	1 year	2021/05/30
溫度/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2021/5/28

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
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。

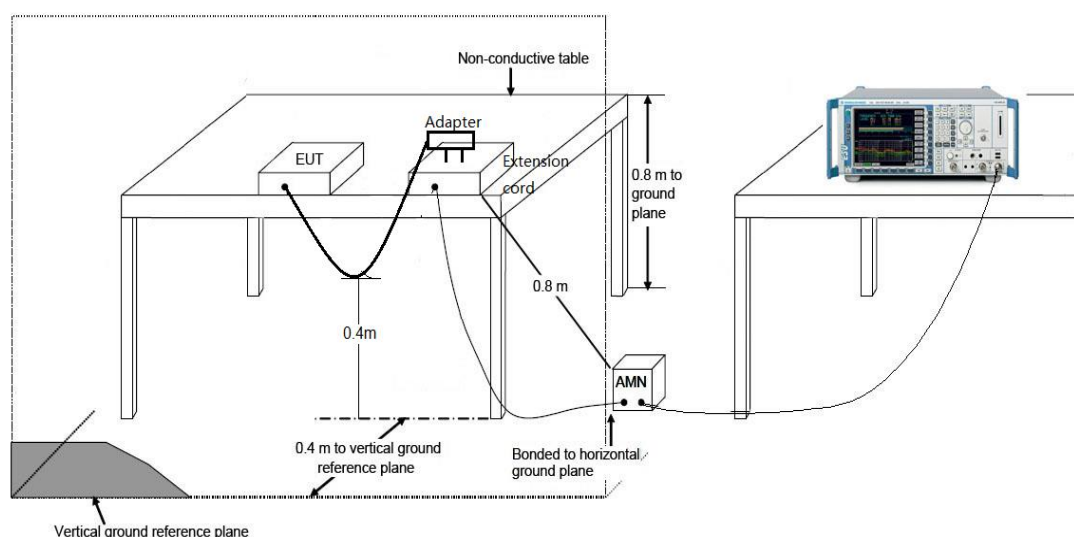
5.1.2. 限制要求

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

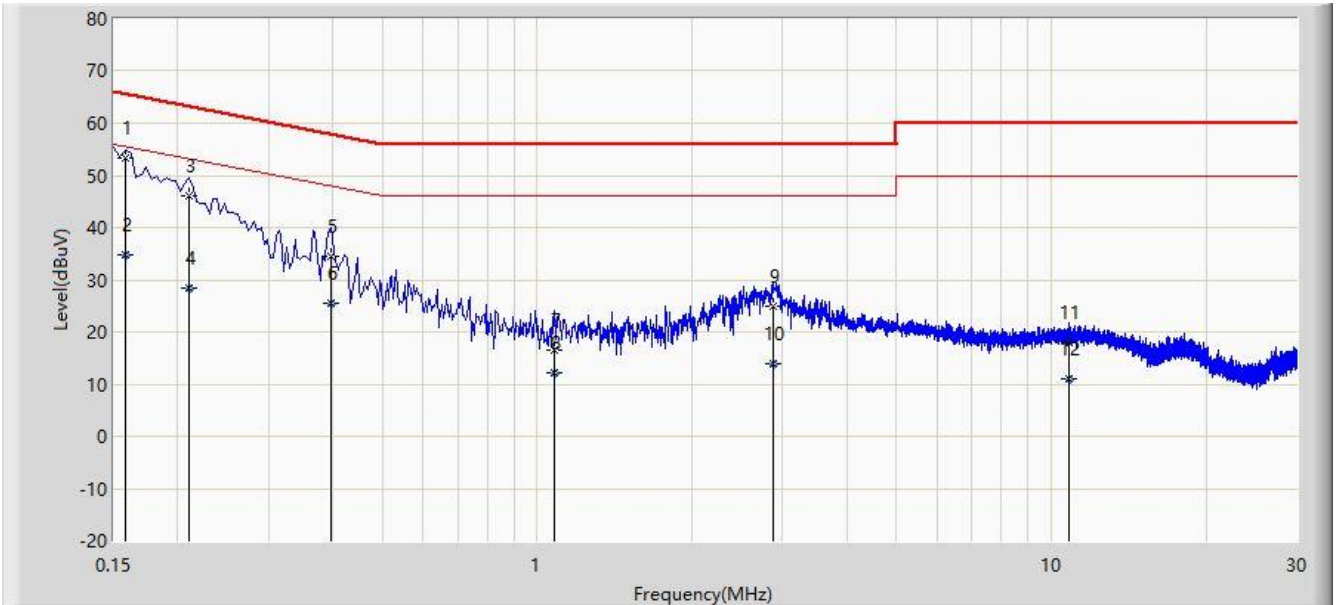
註:隨頻率之對數遞減

5.1.3. 測試架構圖



5.1.4. 電源端點測試結果

Site: SR2	Time: 2020/08/06 - 14:51
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-L1 (Filter ON)	Polarity: Line
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 1	

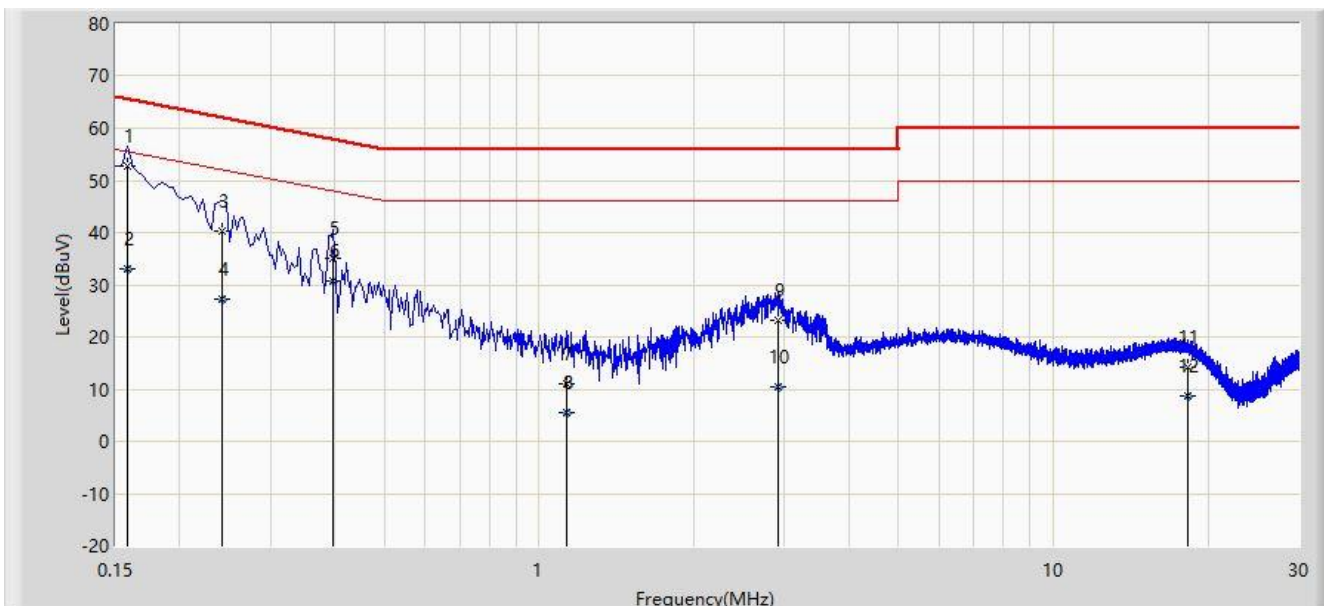


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	53.238	43.658	-12.330	65.568	9.580	QP
2			0.158	34.799	25.219	-20.769	55.568	9.580	AV
3			0.210	46.121	36.541	-17.084	63.205	9.580	QP
4			0.210	28.317	18.737	-24.888	53.205	9.580	AV
5			0.398	34.610	25.030	-23.285	57.895	9.580	QP
6			0.398	25.418	15.838	-22.477	47.895	9.580	AV
7			1.078	16.619	7.028	-39.381	56.000	9.591	QP
8			1.078	12.101	2.510	-33.899	46.000	9.591	AV
9			2.878	24.902	15.298	-31.098	56.000	9.604	QP
10			2.878	13.917	4.313	-32.083	46.000	9.604	AV
11			10.846	17.945	8.273	-42.055	60.000	9.672	QP
12			10.846	10.922	1.250	-39.078	50.000	9.672	AV

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

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

Site: SR2	Time: 2020/08/06 - 16:06
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-N (Filter ON)	Polarity: Neutral
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode 1	



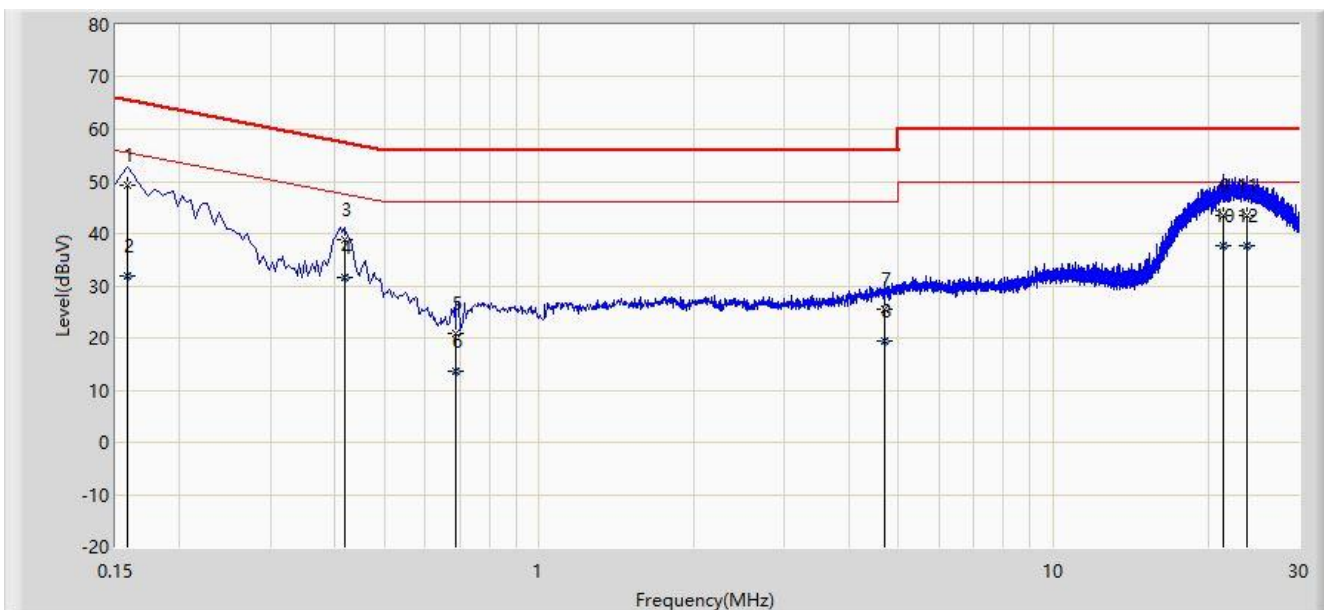
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1		*	0.158	52.694	43.104	-12.874	65.568	9.590	QP
2			0.158	32.941	23.351	-22.627	55.568	9.590	AV
3			0.242	40.245	30.655	-21.782	62.027	9.590	QP
4			0.242	27.373	17.783	-24.654	52.027	9.590	AV
5			0.398	35.050	25.460	-22.845	57.895	9.590	QP
6			0.398	30.869	21.279	-17.026	47.895	9.590	AV
7			1.130	10.899	1.299	-45.101	56.000	9.600	QP
8			1.130	5.650	-3.950	-40.350	46.000	9.600	AV
9			2.910	23.117	13.508	-32.883	56.000	9.609	QP
10			2.910	10.442	0.833	-35.558	46.000	9.609	AV
11			18.206	14.259	4.505	-45.741	60.000	9.754	QP
12			18.206	8.774	-0.980	-41.226	50.000	9.754	AV

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

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

Normal Operation Test Data

Site: SR2	Time: 2020/08/08 - 19:36
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-L1 (Filter ON)	Polarity: Line
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 1, DC Adapter Power On	

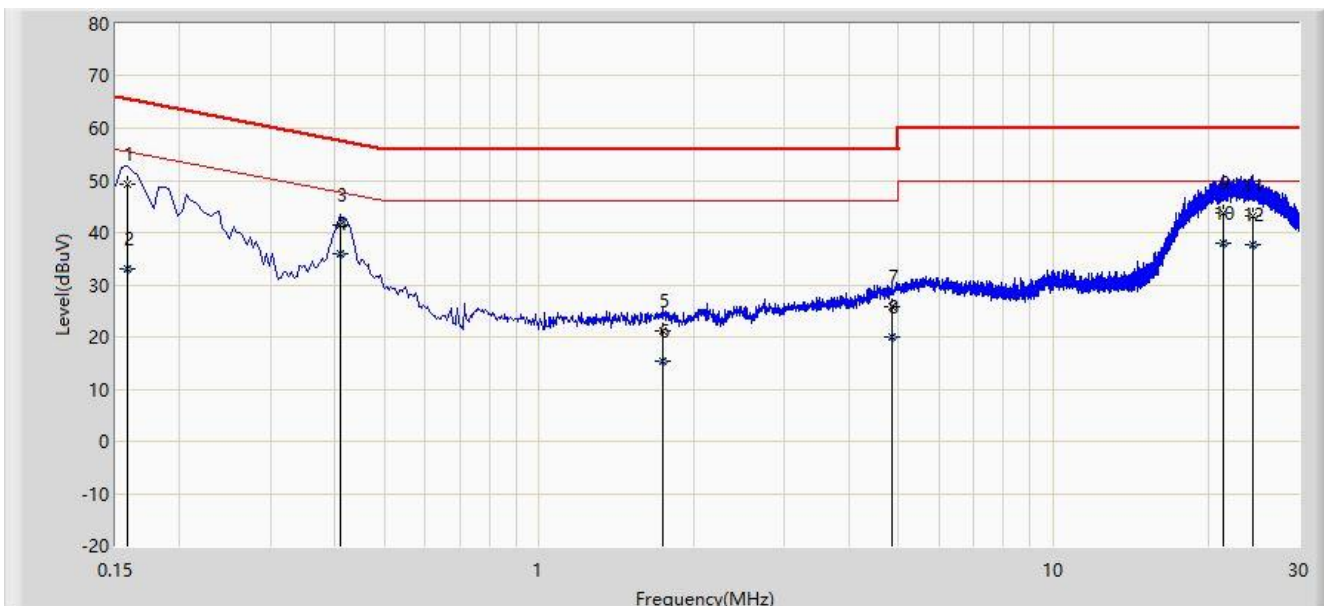


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.158	49.366	39.786	-16.202	65.568	9.580	QP
2			0.158	31.928	22.348	-23.640	55.568	9.580	AV
3			0.418	38.702	29.122	-18.786	57.488	9.580	QP
4			0.418	31.471	21.891	-16.017	47.488	9.580	AV
5			0.690	20.917	11.332	-35.083	56.000	9.585	QP
6			0.690	13.624	4.039	-32.376	46.000	9.585	AV
7			4.710	25.651	16.034	-30.349	56.000	9.617	QP
8			4.710	19.389	9.772	-26.611	46.000	9.617	AV
9			21.338	43.465	33.767	-16.535	60.000	9.698	QP
10			21.338	37.643	27.945	-12.357	50.000	9.698	AV
11			23.806	43.616	33.903	-16.384	60.000	9.713	QP
12		*	23.806	37.773	28.060	-12.227	50.000	9.713	AV

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

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

Site: SR2	Time: 2020/08/08 - 19:37
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-N (Filter ON)	Polarity: Neutral
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 1, DC Adapter Power On	

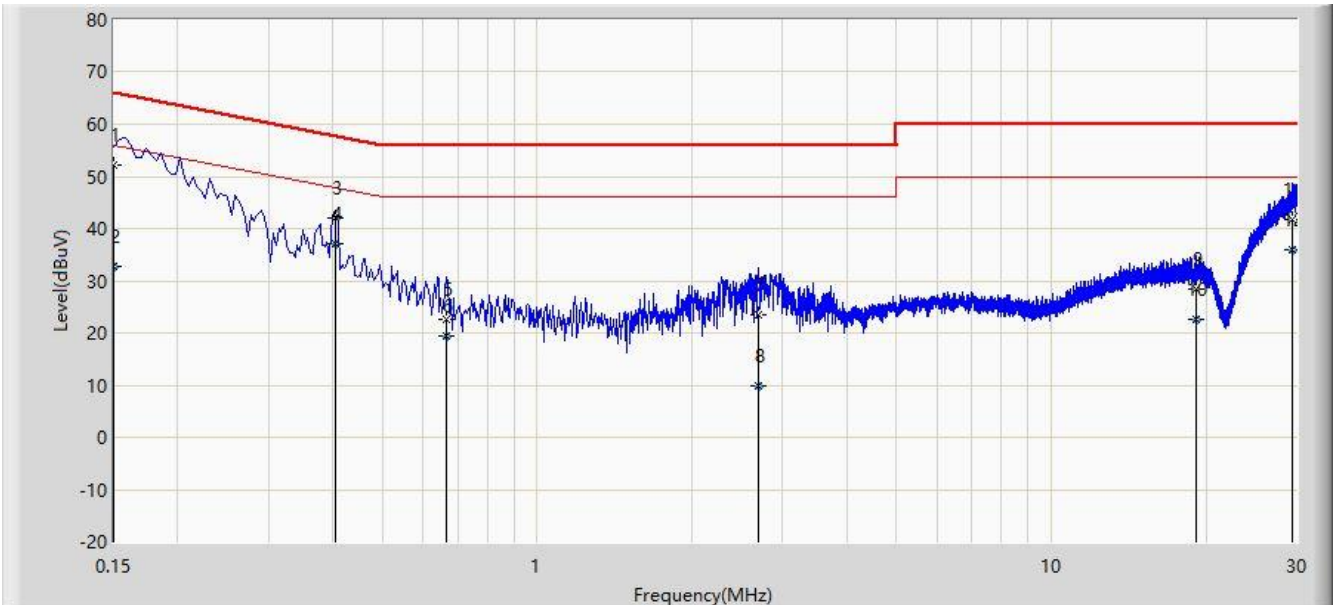


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.158	49.389	39.799	-16.179	65.568	9.590	QP
2			0.158	33.126	23.536	-22.442	55.568	9.590	AV
3			0.410	41.436	31.846	-16.212	57.648	9.590	QP
4		*	0.410	36.035	26.445	-11.613	47.648	9.590	AV
5			1.734	21.015	11.415	-34.985	56.000	9.600	QP
6			1.734	15.432	5.832	-30.568	46.000	9.600	AV
7			4.862	25.703	16.074	-30.297	56.000	9.629	QP
8			4.862	20.144	10.515	-25.856	46.000	9.629	AV
9			21.346	43.738	33.955	-16.262	60.000	9.783	QP
10			21.346	37.959	28.176	-12.041	50.000	9.783	AV
11			24.354	43.333	33.519	-16.667	60.000	9.814	QP
12			24.354	37.568	27.754	-12.432	50.000	9.814	AV

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

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

Site: SR2	Time: 2020/08/08 - 19:37
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-L1 (Filter ON)	Polarity: Line
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 2, PoE Injector Power On	

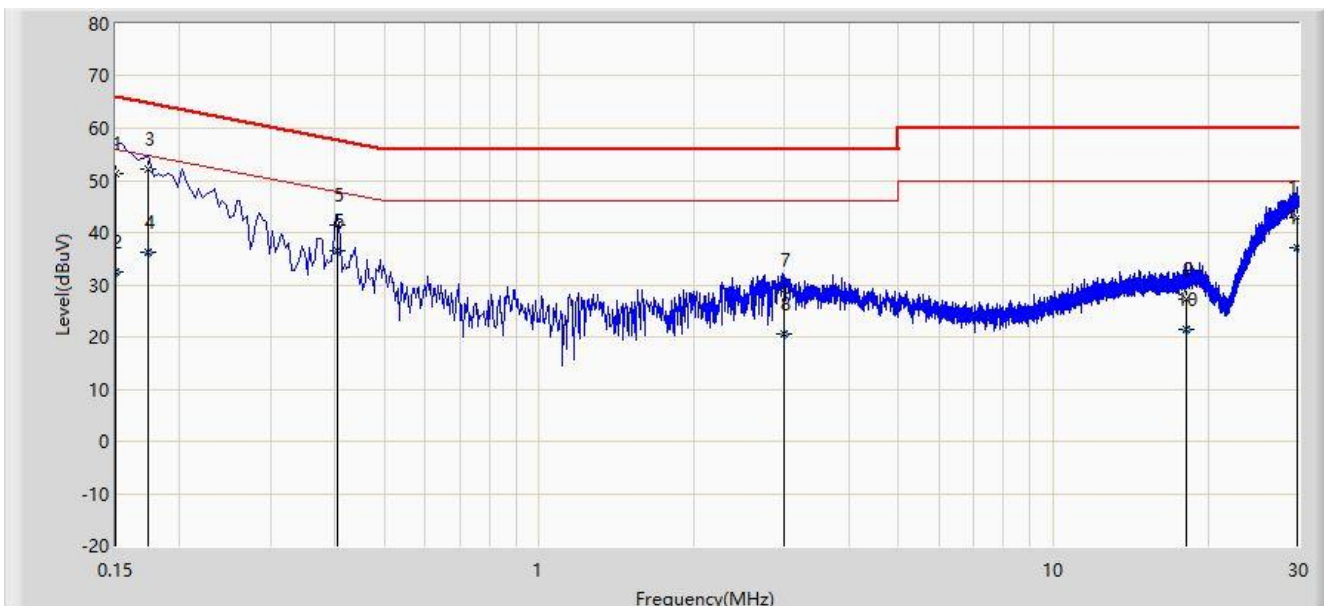


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	52.043	42.463	-13.957	66.000	9.580	QP
2			0.150	32.843	23.263	-23.157	56.000	9.580	AV
3			0.406	41.969	32.389	-15.761	57.730	9.580	QP
4		*	0.406	37.122	27.542	-10.608	47.730	9.580	AV
5			0.666	22.752	13.168	-33.248	56.000	9.584	QP
6			0.666	19.561	9.977	-26.439	46.000	9.584	AV
7			2.698	23.616	14.013	-32.384	56.000	9.603	QP
8			2.698	9.866	0.263	-36.134	46.000	9.603	AV
9			19.078	28.417	18.729	-31.583	60.000	9.688	QP
10			19.078	22.677	12.989	-27.323	50.000	9.688	AV
11			29.418	41.768	32.021	-18.232	60.000	9.747	QP
12			29.418	36.059	26.312	-13.941	50.000	9.747	AV

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

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

Site: SR2	Time: 2020/08/08 - 19:37
Limit: NCC LP0002_CE_0.15MHz-30MHz	Engineer: Kevin Ker
Probe: CE_ENV216-N (Filter ON)	Polarity: Neutral
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 2, PoE Injector Power On	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.150	51.228	41.638	-14.772	66.000	9.590	QP
2			0.150	32.411	22.821	-23.589	56.000	9.590	AV
3			0.174	52.302	42.712	-12.465	64.767	9.590	QP
4			0.174	36.288	26.698	-18.479	54.767	9.590	AV
5			0.406	41.494	31.904	-16.236	57.730	9.590	QP
6		*	0.406	36.423	26.833	-11.307	47.730	9.590	AV
7			2.994	29.025	19.415	-26.975	56.000	9.610	QP
8			2.994	20.681	11.071	-25.319	46.000	9.610	AV
9			18.106	27.330	17.577	-32.670	60.000	9.753	QP
10			18.106	21.594	11.841	-28.406	50.000	9.753	AV
11			29.882	42.771	32.902	-17.229	60.000	9.869	QP
12			29.882	36.976	27.107	-13.024	50.000	9.869	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

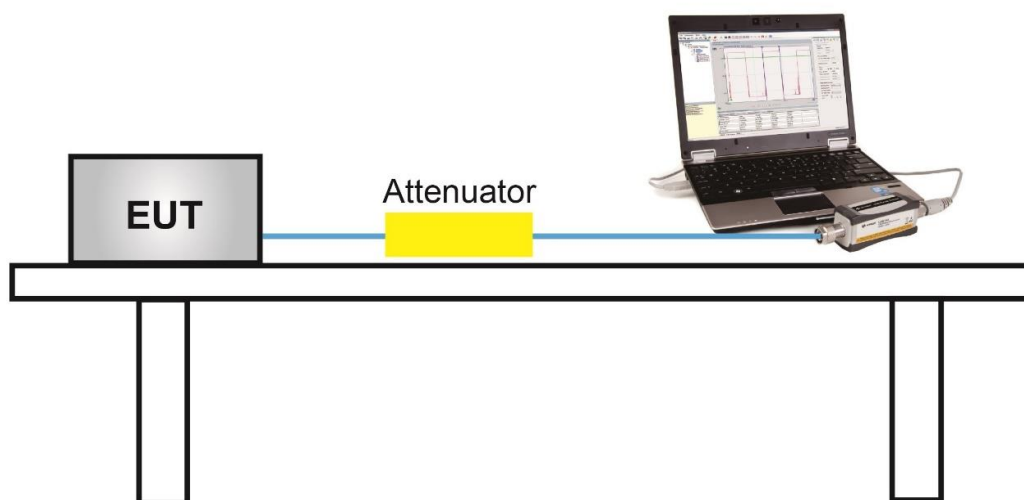
國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.2節，峰值傳導輸出功率：

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	2020/07/15
待測物型號	APINH503	溫度 / 濕度	27°C / 65%
測試場地	SR2	測試工程師	Eric Lin

Test Result of Peak Output Power

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1	00	2402	8.39	≤ 30.00	Pass
BLE	1	19	2440	8.35	≤ 30.00	Pass
BLE	1	39	2480	8.17	≤ 30.00	Pass
BLE	2	00	2402	8.40	≤ 30.00	Pass
BLE	2	19	2440	8.36	≤ 30.00	Pass
BLE	2	39	2480	8.18	≤ 30.00	Pass

Note: E.I.R.P (dBm) = Max Peak Power (dBm) + Antenna Gain (dBi) = 8.40 dBm + 2.49 dBi = 10.89 dBm.

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1	00	2402	8.00	≤ 30.00	Pass
BLE	1	19	2440	8.00	≤ 30.00	Pass
BLE	1	39	2480	7.80	≤ 30.00	Pass
BLE	2	00	2402	8.02	≤ 30.00	Pass
BLE	2	19	2440	7.97	≤ 30.00	Pass
BLE	2	39	2480	7.78	≤ 30.00	Pass

Note: E.I.R.P (dBm) = Max Peak Power (dBm) + Antenna Gain (dBi) = 8.02 dBm + 2.49 dBi = 10.51 dBm.

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

Antenna Type (Brand: Aruba M/N: AP503H P2)	Frequency Band (GHz)	Max Peak Gain (dBi)	BF Directional Gain (dBi)	CDD Directional Gain (dBi)	
				For Power	For PSD
Wi-Fi Internal Antenna (2.4GHz 2*2 MIMO, 5GHz 2*2 MIMO)					
PIFA	2.4	1.73	4.71	1.73	4.71
	5	5.04	8.05	5.04	8.05
Bluetooth / ZigBee Internal Antenna					
Monopole	2.4	2.49			

Note:

- 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 $N_{ANT} \leq 4$;
- 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.
- Antenna type and antenna gain are provided by the manufacturer.

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。

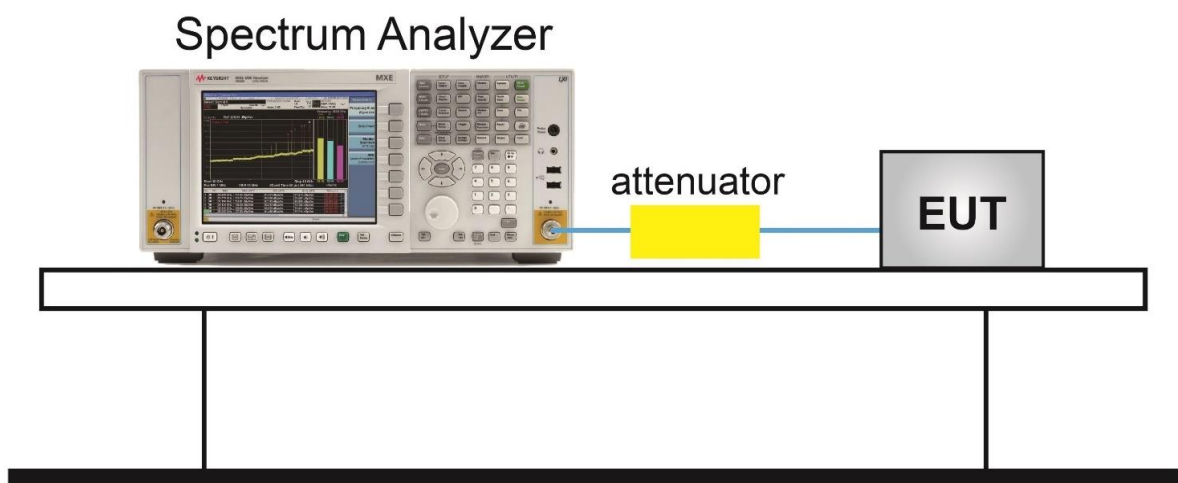
5.4.2. 限制要求

依據國家通訊傳播委員會低功率射頻電機技術規範之第 3.10.1.5 節規定。

帶外發射限制：操作頻帶範圍外之任意 100 kHz 內，發射機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 kHz 內的射頻功率，其衰減值限制如下：

- (1) 輸出功率以附件二之峰值輸出功率方式測量者，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 3.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。

5.4.3. 測試架構圖



5.4.4. 帶外輻射測試結果

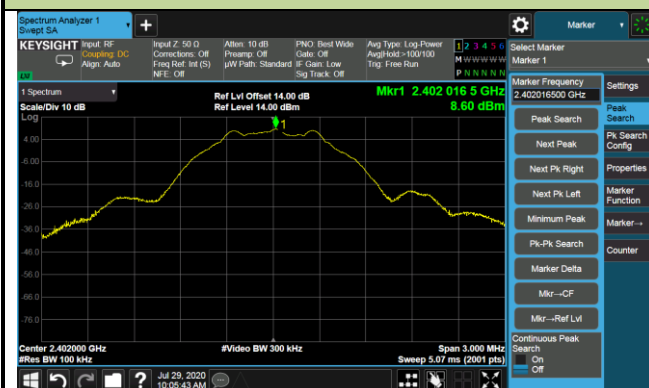
待測物名稱	ACCESS POINT	測試日期	2020/07/29
待測物型號	APINH503	溫度 / 濕度	27°C / 65%
測試場地	SR2	測試工程師	Eric Lin

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
BLE	1	00	2402	20dBc	Pass
BLE	1	19	2440	20dBc	Pass
BLE	1	39	2480	20dBc	Pass
BLE	2	00	2402	20dBc	Pass
BLE	2	19	2440	20dBc	Pass
BLE	2	39	2480	20dBc	Pass

BLE Out-of-Band Emissions – 1Mbps

Channel 00 (2402MHz)

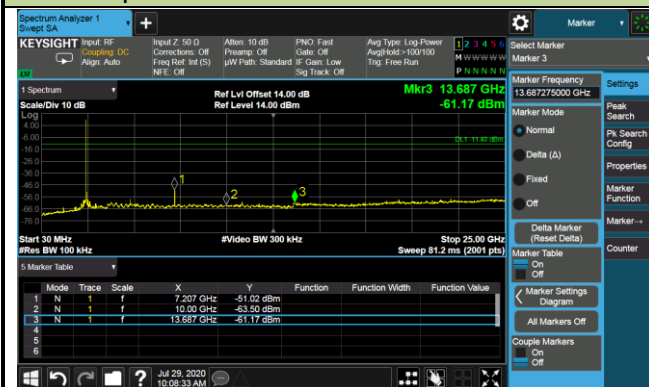
100kHz PSD reference Level



Low Band Edge



Spurious Emission 30MHz ~ 25GHz

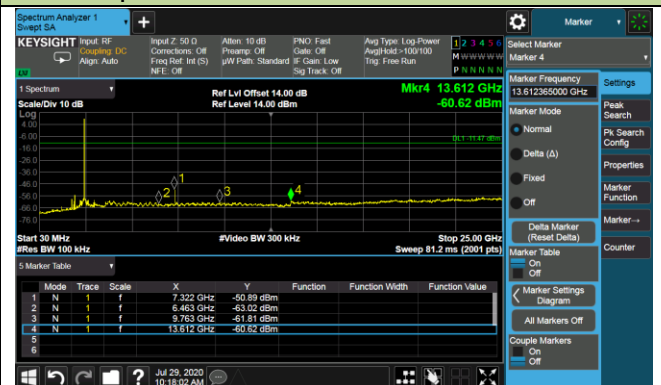


Channel 19 (2440MHz)

100kHz PSD reference Level

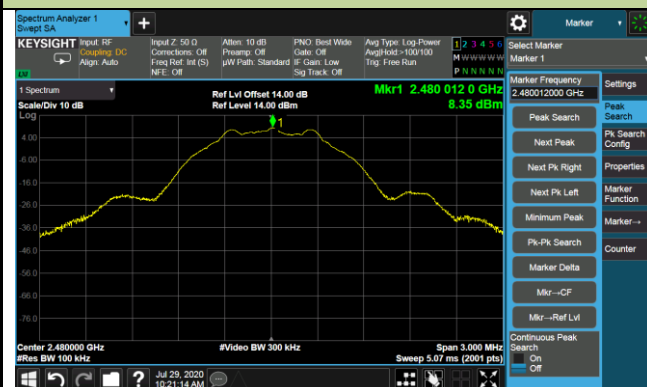


Spurious Emission 30MHz ~ 25GHz



Channel 39 (2480MHz)

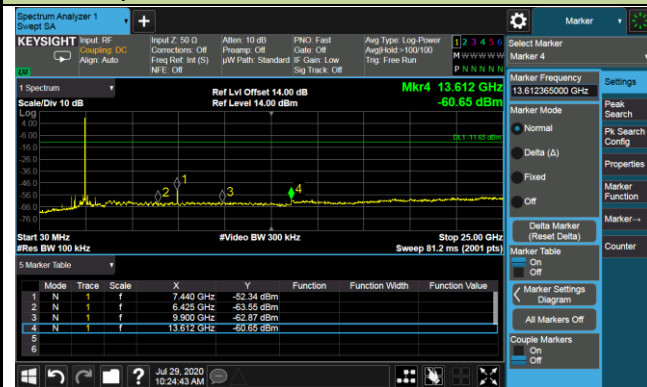
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



BLE Out-of-Band Emissions – 2Mbps

Channel 00 (2402MHz)

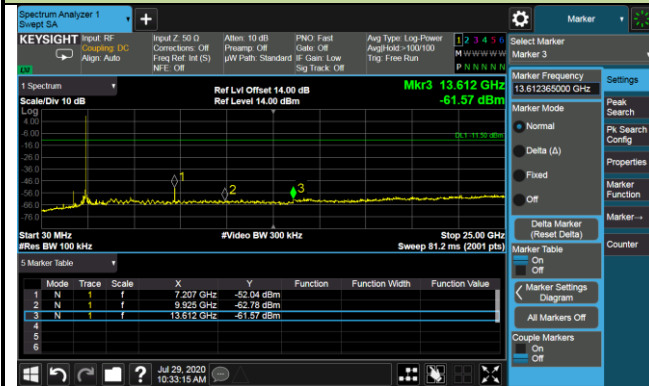
100kHz PSD reference Level



Low Band Edge



Spurious Emission 30MHz ~ 25GHz



Channel 19 (2440MHz)

100kHz PSD reference Level



Spurious Emission 30MHz ~ 25GHz



Channel 39 (2480MHz)

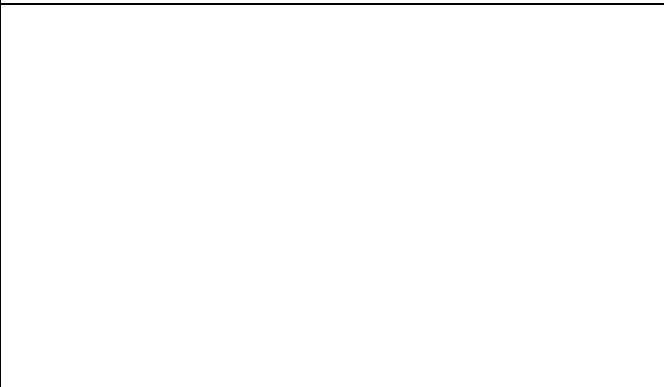
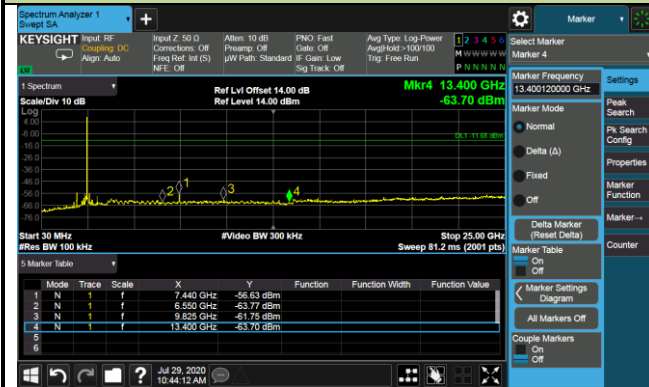
100kHz PSD reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



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

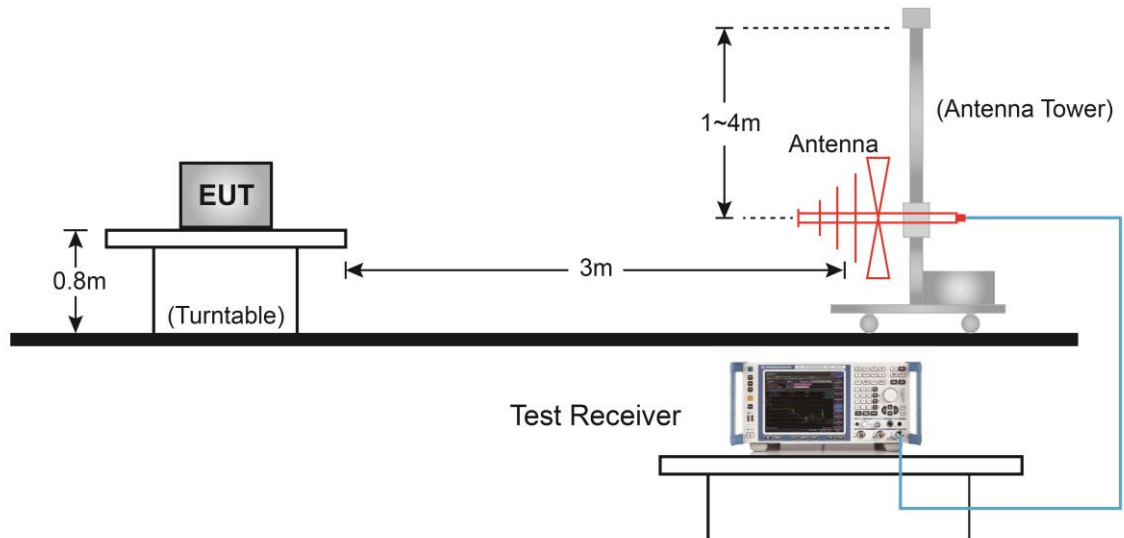
其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

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

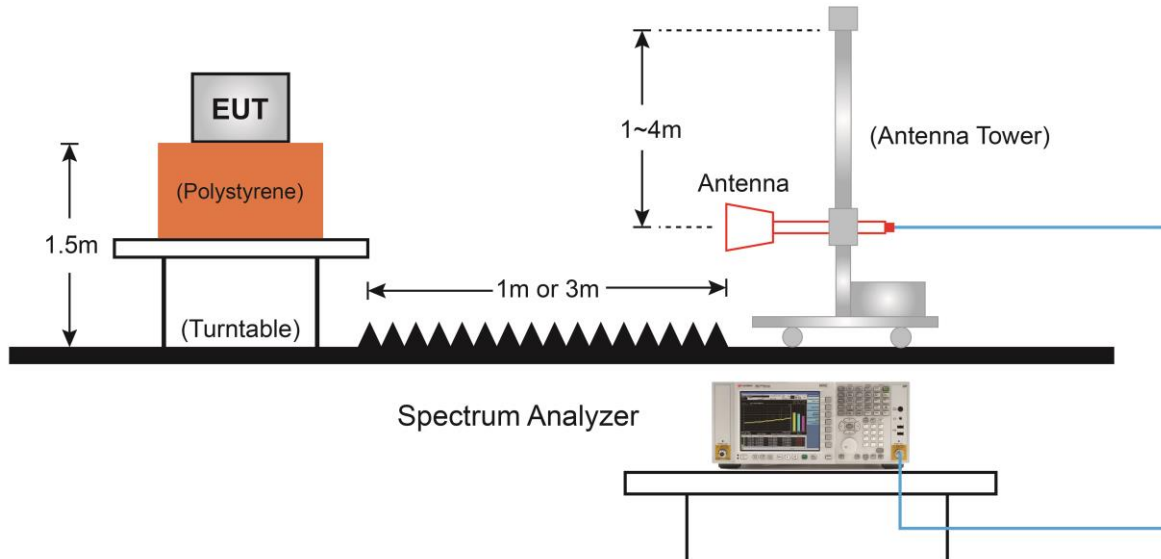
上表規定之電場強度，頻率在 9-90kHz 千赫(kHz)、110-490 千赫(kHz)以及 1000 兆赫(MHz)以上之發射，其量測以平均值檢波器為基準，且須符合低功率射頻電機技術規範第 5.15.2 節之規定；其他頻率之發射，應以 CISPR 準峰值(quasi-peak) 檢波器測量；非以上表所指定之距離測量時須符合低功率射頻電機技術規範第 5.5 節之規定，而輻射發射之量測頻率範圍須符合低功率射頻電機技術規範第 5.14 節之規定。

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 1Mbps	Test Channel	00
Remark	1. Average measurement was not performed if peak level lower than average limit. 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
	3966.5	34.3	0.8	35.1	74.0	-38.9	Peak	Horizontal
	5003.5	33.3	3.8	37.1	74.0	-36.9	Peak	Horizontal
*	6219.0	32.5	6.9	39.4	74.0	-34.6	Peak	Horizontal
*	9636.0	29.9	14.7	44.6	74.0	-29.4	Peak	Horizontal
	3898.5	34.3	0.5	34.8	74.0	-39.2	Peak	Vertical
	4850.5	32.8	3.4	36.2	74.0	-37.8	Peak	Vertical
*	6006.5	32.2	5.9	38.1	74.0	-35.9	Peak	Vertical
*	9653.0	30.4	14.7	45.1	74.0	-28.9	Peak	Vertical

Note 1: "*" means test frequency didn't fall into restricted band.

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 1Mbps	Test Channel	19
Remark	1. Average measurement was not performed if peak level lower than average limit. 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
	4043.0	34.1	1.0	35.1	74.0	-38.9	Peak	Horizontal
	4697.5	34.4	3.0	37.4	74.0	-36.6	Peak	Horizontal
*	6550.5	30.9	8.3	39.2	74.0	-34.8	Peak	Horizontal
*	8794.5	29.3	13.2	42.5	74.0	-31.5	Peak	Horizontal
	4043.0	34.1	1.0	35.1	74.0	-38.9	Peak	Vertical
	4850.5	33.3	3.4	36.7	74.0	-37.3	Peak	Vertical
*	6355.0	31.1	7.5	38.6	74.0	-35.4	Peak	Vertical
*	9772.0	30.8	14.9	45.7	74.0	-28.3	Peak	Vertical

Note 1: "*" means test frequency didn't fall into restricted band.

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 1Mbps	Test Channel	39
Remark	1. Average measurement was not performed if peak level lower than average limit. 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
	3873.0	34.8	0.4	35.2	74.0	-38.8	Peak	Horizontal
	4833.5	33.3	3.4	36.7	74.0	-37.3	Peak	Horizontal
*	6219.0	31.9	6.9	38.8	74.0	-35.2	Peak	Horizontal
*	8735.0	29.0	13.0	42.0	74.0	-32.0	Peak	Horizontal
	4111.0	33.4	1.3	34.7	74.0	-39.3	Peak	Vertical
	4672.0	33.4	3.0	36.4	74.0	-37.6	Peak	Vertical
*	6380.5	31.2	7.6	38.8	74.0	-35.2	Peak	Vertical
*	8616.0	30.4	12.7	43.1	74.0	-30.9	Peak	Vertical

Note 1: "*" means test frequency didn't fall into restricted band.

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 2Mbps	Test Channel	00
Remark	1. Average measurement was not performed if peak level lower than average limit. 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	33.8	0.5	34.3	74.0	-39.7	Peak	Horizontal
	4842.0	32.8	3.4	36.2	74.0	-37.8	Peak	Horizontal
*	6261.5	31.7	7.0	38.7	74.0	-35.3	Peak	Horizontal
*	9636.0	30.6	14.7	45.3	74.0	-28.7	Peak	Horizontal
	4043.0	34.9	1.0	35.9	74.0	-38.1	Peak	Vertical
	5071.5	33.9	3.8	37.7	74.0	-36.3	Peak	Vertical
*	6635.5	31.0	8.7	39.7	74.0	-34.3	Peak	Vertical
*	10426.5	29.0	16.8	45.8	74.0	-28.2	Peak	Vertical

Note 1: "*" means test frequency didn't fall into restricted band.

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 2Mbps	Test Channel	19
Remark	1. Average measurement was not performed if peak level lower than average limit. 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
	4026.0	33.5	1.0	34.5	74.0	-39.5	Peak	Horizontal
	4935.5	32.6	3.6	36.2	74.0	-37.8	Peak	Horizontal
*	6244.5	31.5	7.0	38.5	74.0	-35.5	Peak	Horizontal
*	8701.0	30.0	12.9	42.9	74.0	-31.1	Peak	Horizontal
	4043.0	33.6	1.0	34.6	74.0	-39.4	Peak	Vertical
	4791.0	33.4	3.2	36.6	74.0	-37.4	Peak	Vertical
*	6312.5	31.8	7.3	39.1	74.0	-34.9	Peak	Vertical
*	8692.5	30.8	12.9	43.7	74.0	-30.3	Peak	Vertical

Note 1: "*" means test frequency didn't fall into restricted band.

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	Test Engineer	Kevin Ker
Test Site	AC1	Test Date	2020/07/24
Test Mode	BLE - 2Mbps	Test Channel	39
Remark	1. Average measurement was not performed if peak level lower than average limit. 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
	3941.0	33.8	0.7	34.5	74.0	-39.5	Peak	Horizontal
	4910.0	32.7	3.5	36.2	74.0	-37.8	Peak	Horizontal
*	6100.0	32.0	6.3	38.3	74.0	-35.7	Peak	Horizontal
*	8726.5	30.6	13.0	43.6	74.0	-30.4	Peak	Horizontal
	3873.0	34.4	0.4	34.8	74.0	-39.2	Peak	Vertical
	4927.0	33.2	3.6	36.8	74.0	-37.2	Peak	Vertical
*	6533.5	31.3	8.2	39.5	74.0	-34.5	Peak	Vertical
*	8667.0	30.7	12.9	43.6	74.0	-30.4	Peak	Vertical

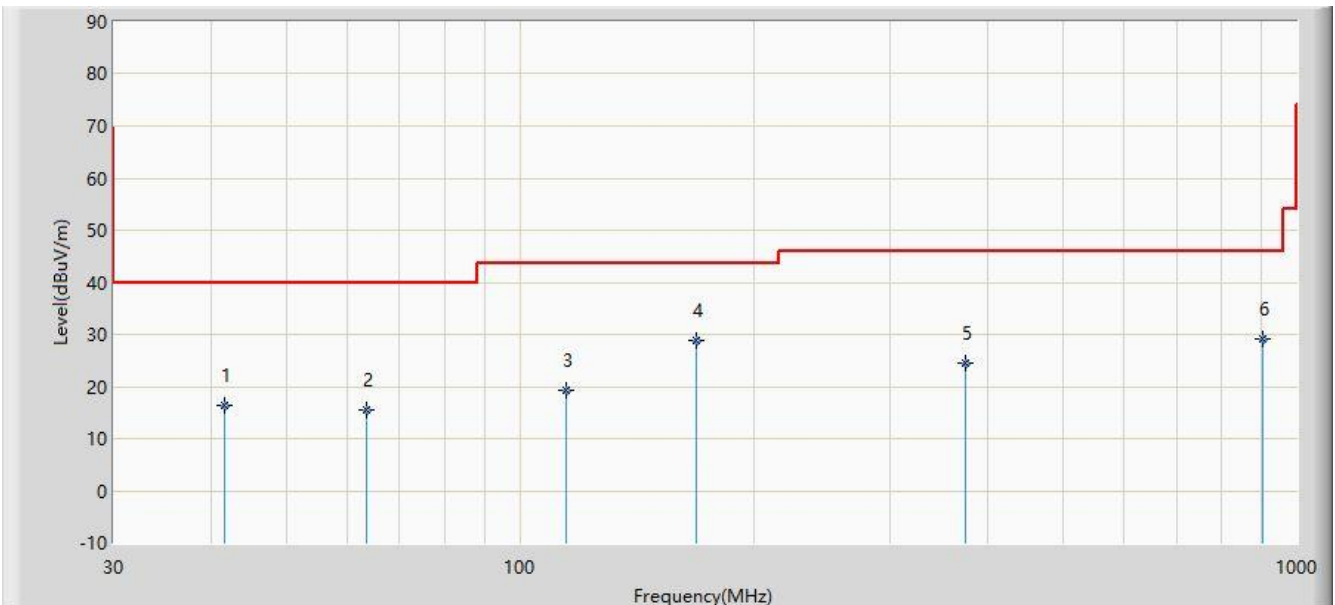
Note 1: "*" means test frequency didn't fall into restricted band.

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

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

The Result of Radiated Spurious Emission below 1GHz:

Site: AC1	Time: 2020/08/06 - 01:44
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Kevin Ker
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by Bluetooth LE(1Mbps) at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			41.640	16.404	-4.500	-23.596	40.000	20.904	QP
2			63.465	15.386	-3.465	-24.614	40.000	18.851	QP
3			114.875	19.351	1.500	-24.149	43.500	17.850	QP
4		*	168.710	28.865	12.545	-14.635	43.500	16.320	QP
5			374.835	24.447	0.654	-21.553	46.000	23.793	QP
6			903.485	28.990	-2.500	-17.010	46.000	31.490	QP

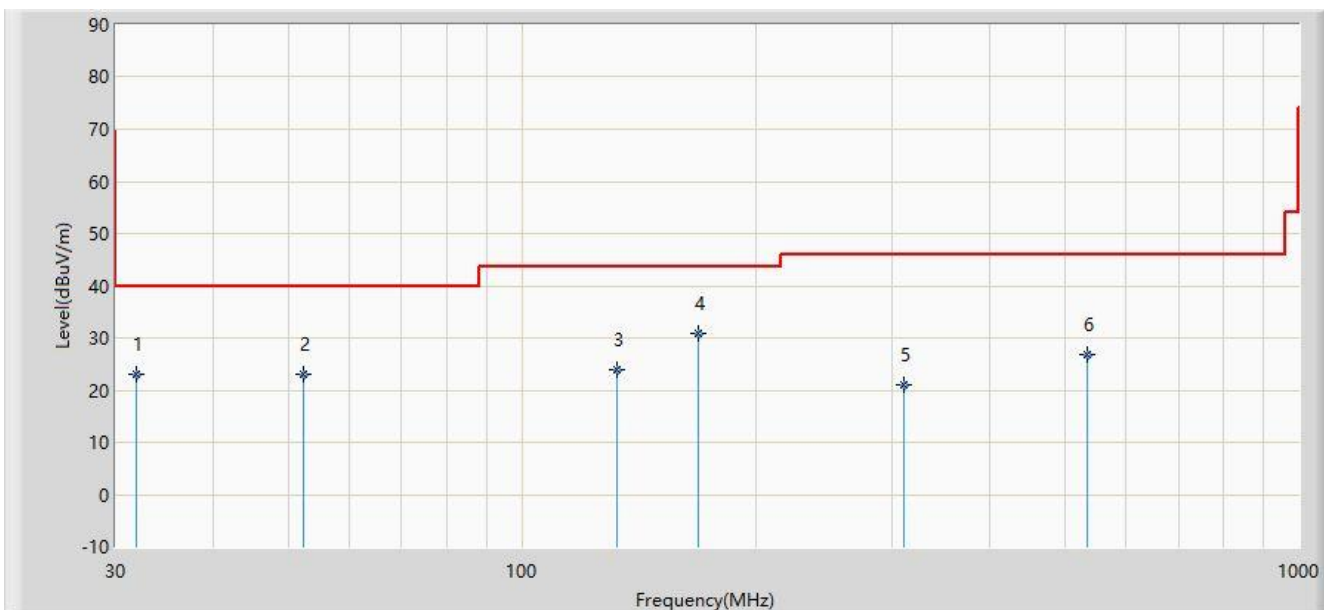
Note 1: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

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

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 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.

Note3: 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: 2020/08/06 - 01:45
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Kevin Ker
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by Bluetooth LE(1Mbps) at Channel 2440MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			31.940	23.029	4.645	-16.971	40.000	18.384	QP
2			52.310	22.940	1.650	-17.060	40.000	21.290	QP
3			132.820	23.769	7.940	-19.731	43.500	15.829	QP
4		*	168.710	30.880	14.560	-12.620	43.500	16.320	QP
5			310.330	20.880	-0.940	-25.120	46.000	21.820	QP
6			534.400	26.814	0.450	-19.186	46.000	26.364	QP

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

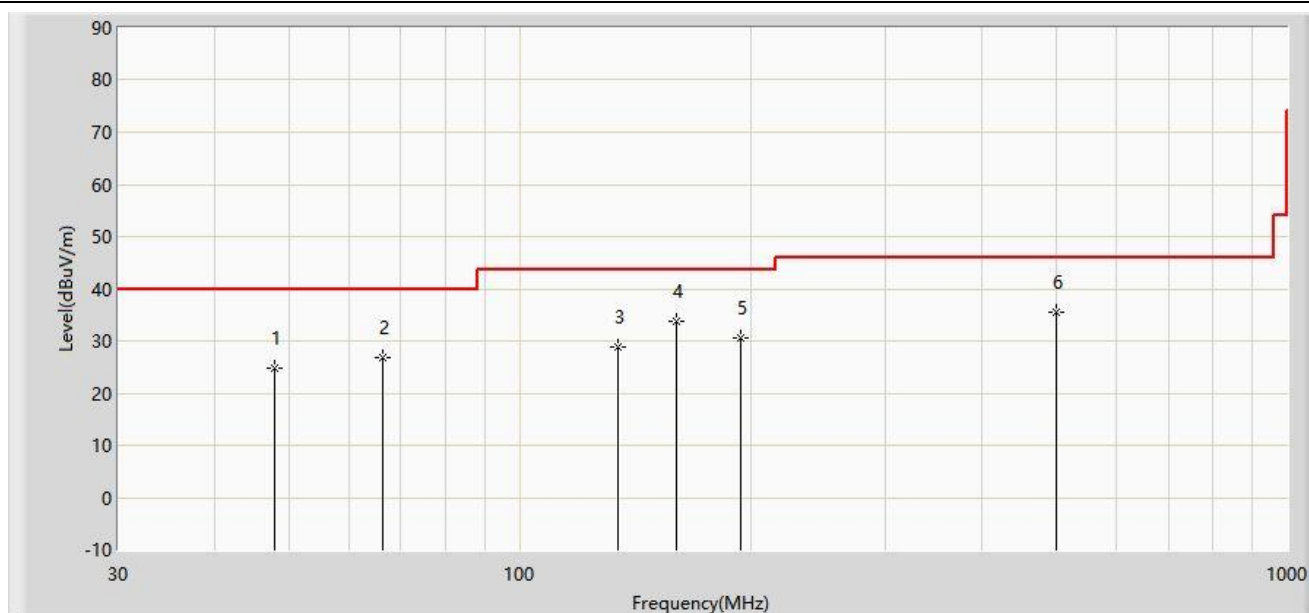
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 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.

Note3: 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 Result of Normal Operation

Site: AC1	Time: 2020/08/10 - 20:50
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Kevin Ker
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 1, DC Adapter Power On	

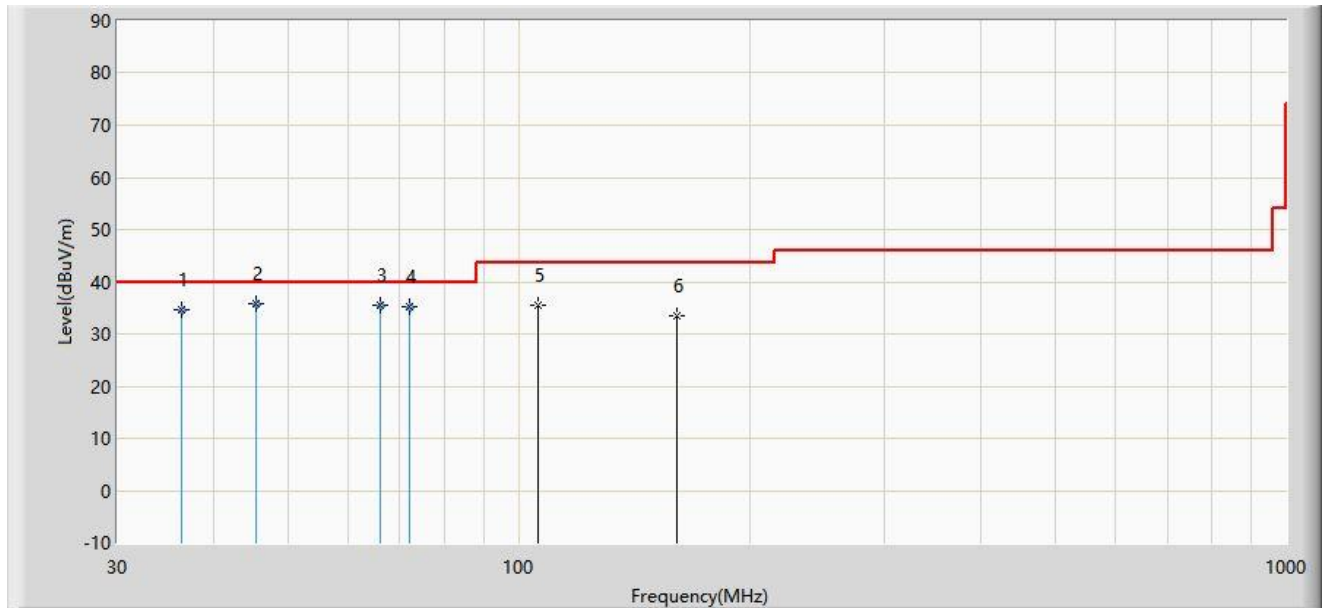


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1			47.945	24.722	3.180	-15.278	40.000	21.543	N/A	N/A	PK
2			66.375	26.741	8.949	-13.259	40.000	17.792	N/A	N/A	PK
3			134.275	28.915	13.167	-14.585	43.500	15.747	N/A	N/A	PK
4		*	159.980	33.683	17.567	-9.817	43.500	16.116	N/A	N/A	PK
5			194.415	30.459	11.640	-13.041	43.500	18.819	N/A	N/A	PK
6			499.965	35.603	9.787	-10.397	46.000	25.816	N/A	N/A	PK

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

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

Site: AC1	Time: 2020/08/10 - 20:50
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Kevin Ker
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 1, DC Adapter Power On	

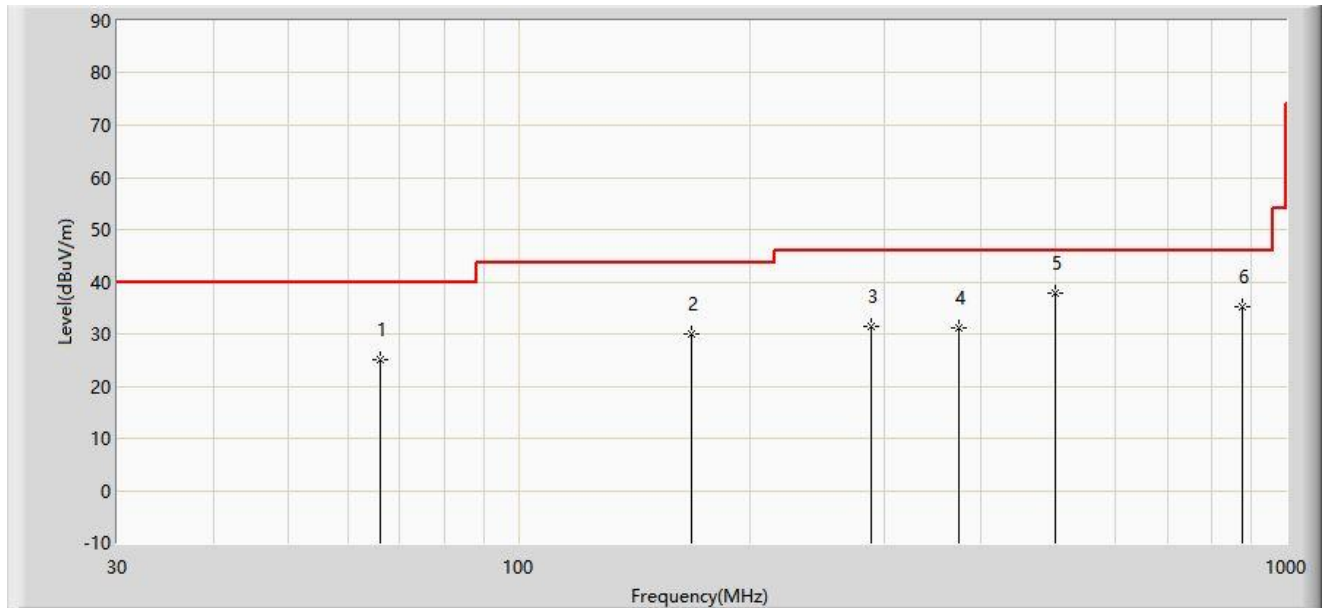


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1			36.310	34.570	15.120	-5.430	40.000	19.449	100	23	QP
2		*	45.510	35.745	14.320	-4.255	40.000	21.425	100	46.7	QP
3			65.890	35.529	17.560	-4.471	40.000	17.969	100	324	QP
4			72.180	35.292	19.350	-4.708	40.000	15.942	105	214	QP
5			106.145	35.396	16.318	-8.104	43.500	19.077	N/A	N/A	PK
6			160.465	33.503	17.375	-9.997	43.500	16.128	N/A	N/A	PK

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

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

Site: AC1	Time: 2020/08/10 - 20:50
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Kevin Ker
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 2, PoE Injector Power On	

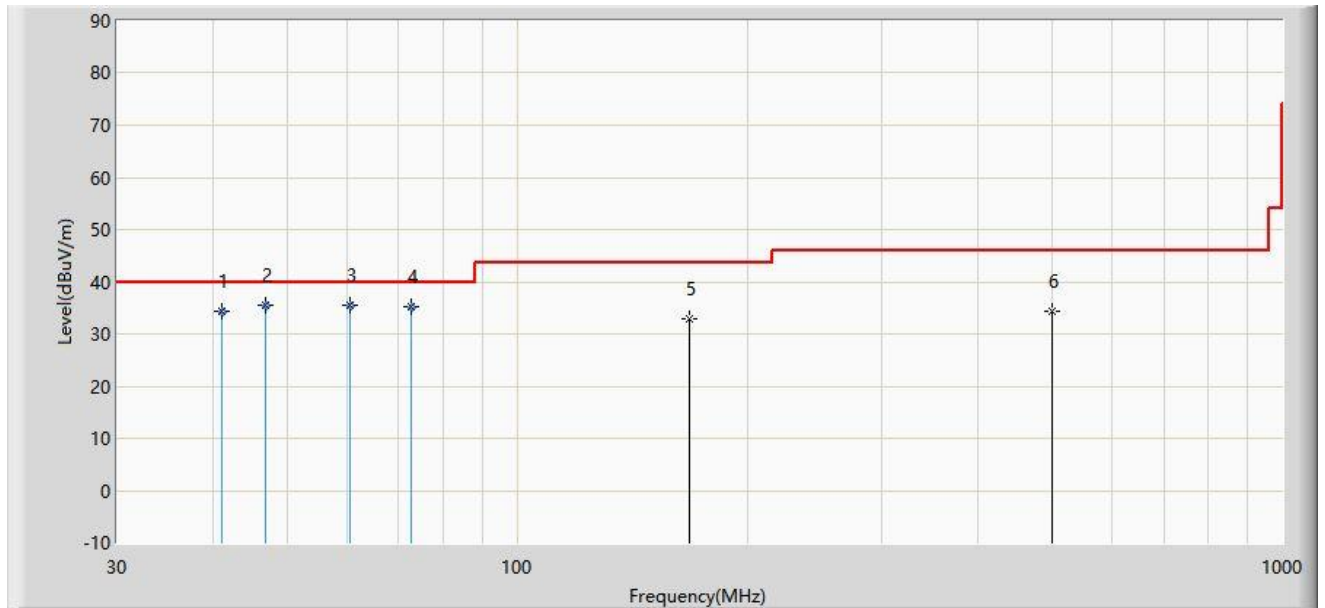


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1			65.890	25.186	7.217	-14.814	40.000	17.969	N/A	N/A	PK
2			168.225	30.086	13.777	-13.414	43.500	16.310	N/A	N/A	PK
3			287.535	31.378	10.167	-14.622	46.000	21.210	N/A	N/A	PK
4			374.835	31.289	7.496	-14.711	46.000	23.793	N/A	N/A	PK
5		*	499.965	37.736	11.920	-8.264	46.000	25.816	N/A	N/A	PK
6			875.355	35.101	3.722	-10.899	46.000	31.379	N/A	N/A	PK

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

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

Site: AC1	Time: 2020/08/10 - 20:50
Limit: NCC LP0002_30MHz-1GHz_QP	Engineer: Antony Yang
Probe: VULB 9162 (30MHz~8GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Note: Mode 2, PoE Injector Power On	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Type
1			41.150	34.281	13.450	-5.719	40.000	20.831	102	231	QP
2			46.960	35.385	13.890	-4.615	40.000	21.495	100	158	QP
3		*	60.530	35.628	15.710	-4.372	40.000	19.919	100	312	QP
4			72.650	35.167	19.340	-4.833	40.000	15.828	100	54.2	QP
5			168.225	32.854	16.545	-10.646	43.500	16.310	N/A	N/A	PK
6			499.965	34.453	8.637	-11.547	46.000	25.816	N/A	N/A	PK

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

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

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）

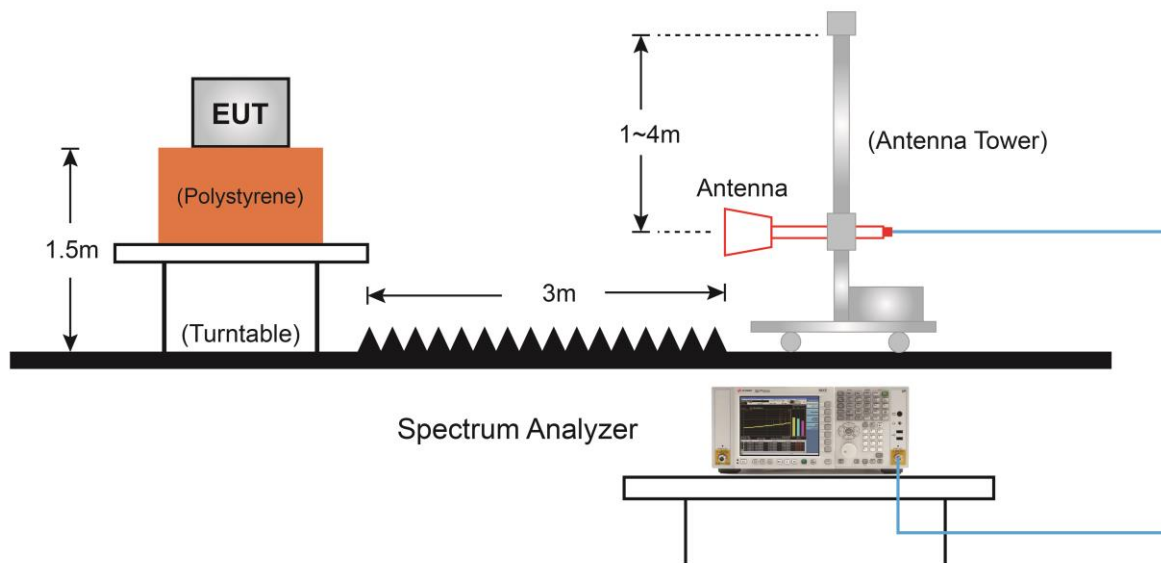
- (1) 任一頻率小於或等於1000 MHz 之訊號,使用CISPR準峰值檢波器
- (2) 任一頻率大於1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加20 dB。

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

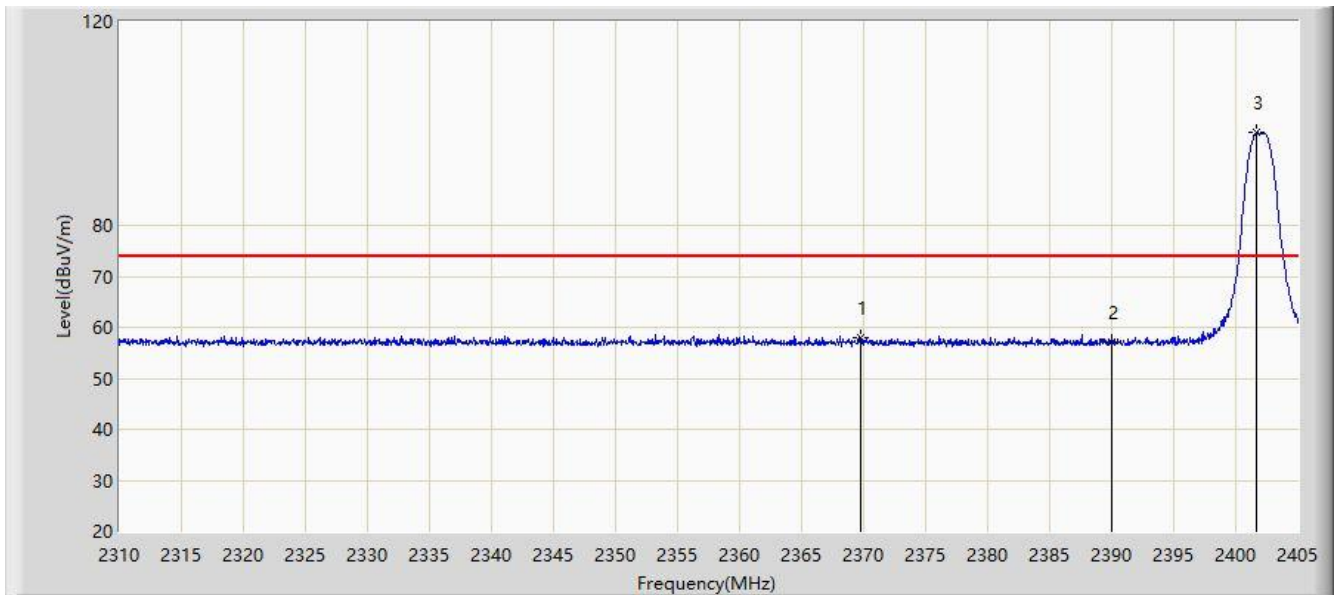
頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)
0.090~0.110	25.500~25.700	703.00~748.00	2310.0~2390.0	13250~13400
0.490~0.510	37.475~38.275	758.00~803.00	2483.5~2900.0	14470~14500
2.172~2.198	73.500~75.400	825.00~915.00	3260.0~3267.0	15350~16200
3.013~3.033	108.00~138.00	930.00~1240.0	3332.0~3339.0	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: 2020/07/26 - 11:39
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2402MHz	

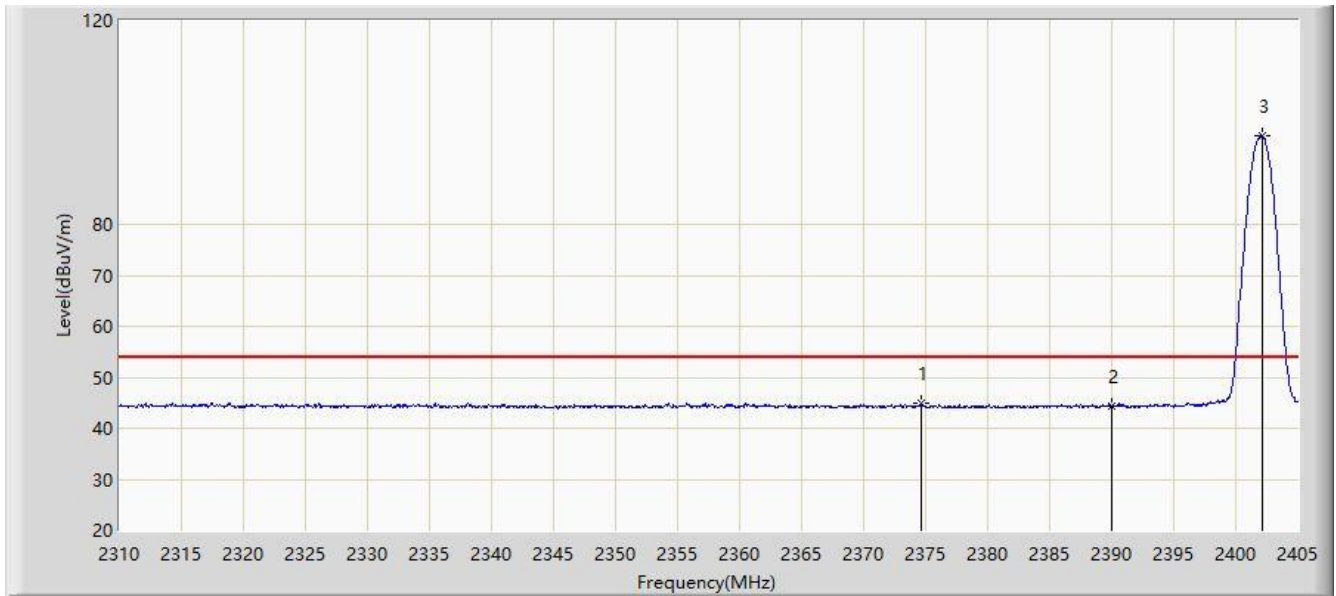


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2369.802	58.081	25.874	-15.919	74.000	32.207	PK
2			2390.000	57.089	24.793	-16.911	74.000	32.296	PK
3		*	2401.675	98.131	65.784	N/A	N/A	32.347	PK

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

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

Site: AC1	Time: 2020/07/26 - 11:59
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2402MHz	

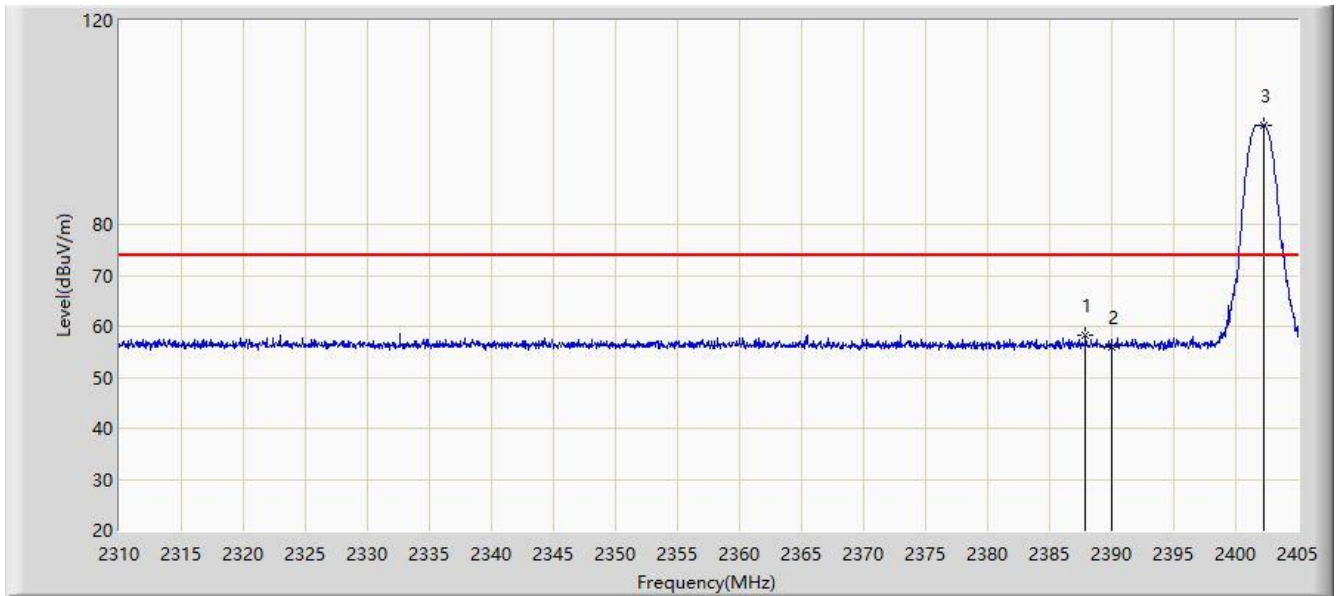


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2374.695	44.795	12.567	-9.205	54.000	32.228	AV
2			2390.000	44.273	11.977	-9.727	54.000	32.296	AV
3		*	2402.150	97.291	64.942	N/A	N/A	32.349	AV

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

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

Site: AC1	Time: 2020/07/26 - 12:04
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2402MHz	

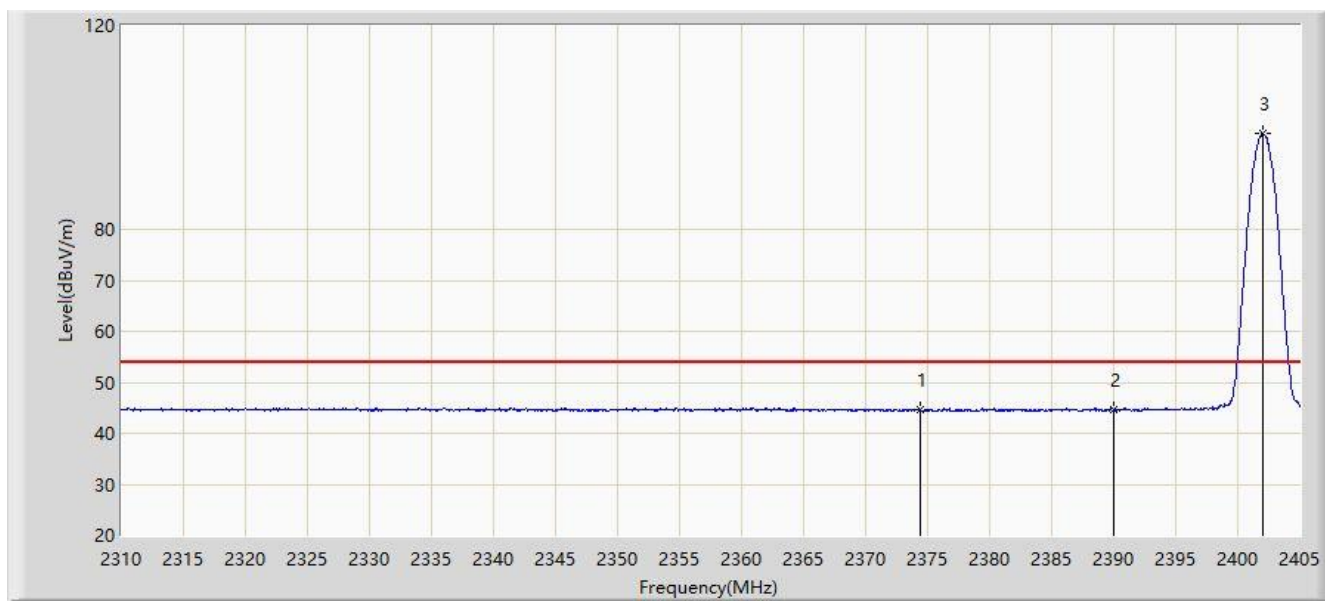


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2387.900	58.237	25.950	-15.763	74.000	32.287	PK
2			2390.000	55.953	23.657	-18.047	74.000	32.296	PK
3		*	2402.292	99.511	67.161	N/A	N/A	32.350	PK

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

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

Site: AC1	Time: 2020/07/26 - 12:04
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2402MHz	

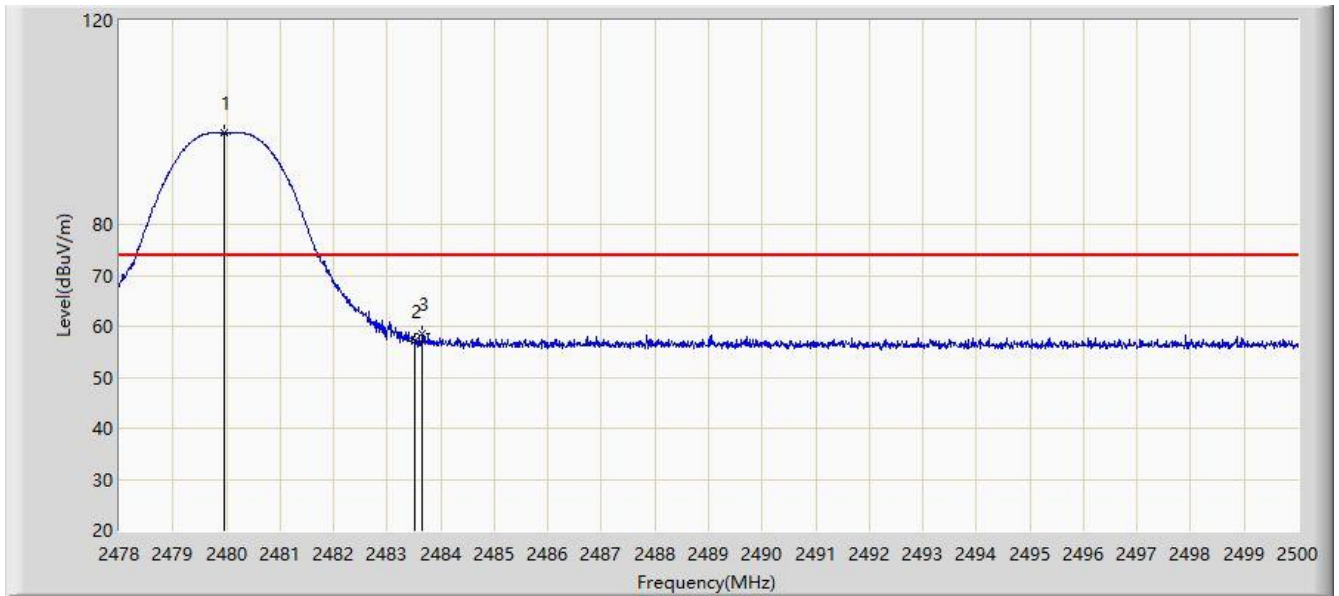


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2374.363	44.739	12.512	-9.261	54.000	32.227	AV
2			2390.000	44.639	12.343	-9.361	54.000	32.296	AV
3		*	2402.008	98.778	66.429	N/A	N/A	32.348	AV

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

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

Site: AC1	Time: 2020/07/26 - 12:11
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2480MHz	

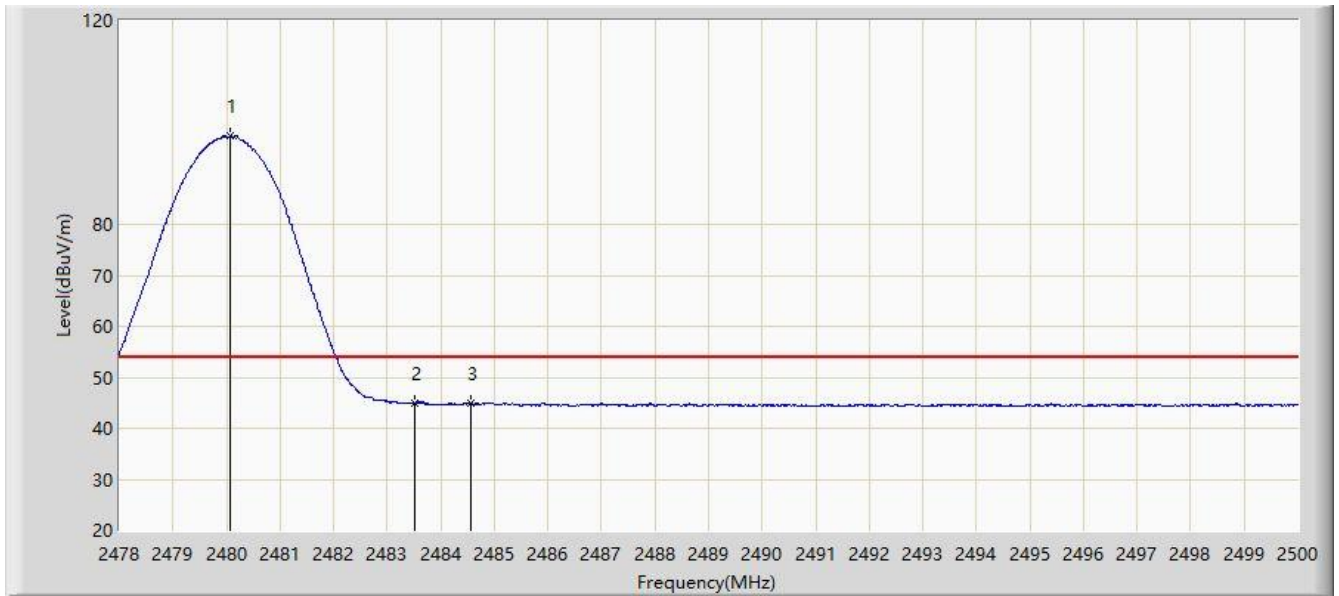


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.969	97.881	65.189	N/A	N/A	32.692	PK
2			2483.500	57.100	24.392	-16.900	74.000	32.707	PK
3			2483.665	58.411	25.703	-15.589	74.000	32.709	PK

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

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

Site: AC1	Time: 2020/07/26 - 12:16
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2480MHz	

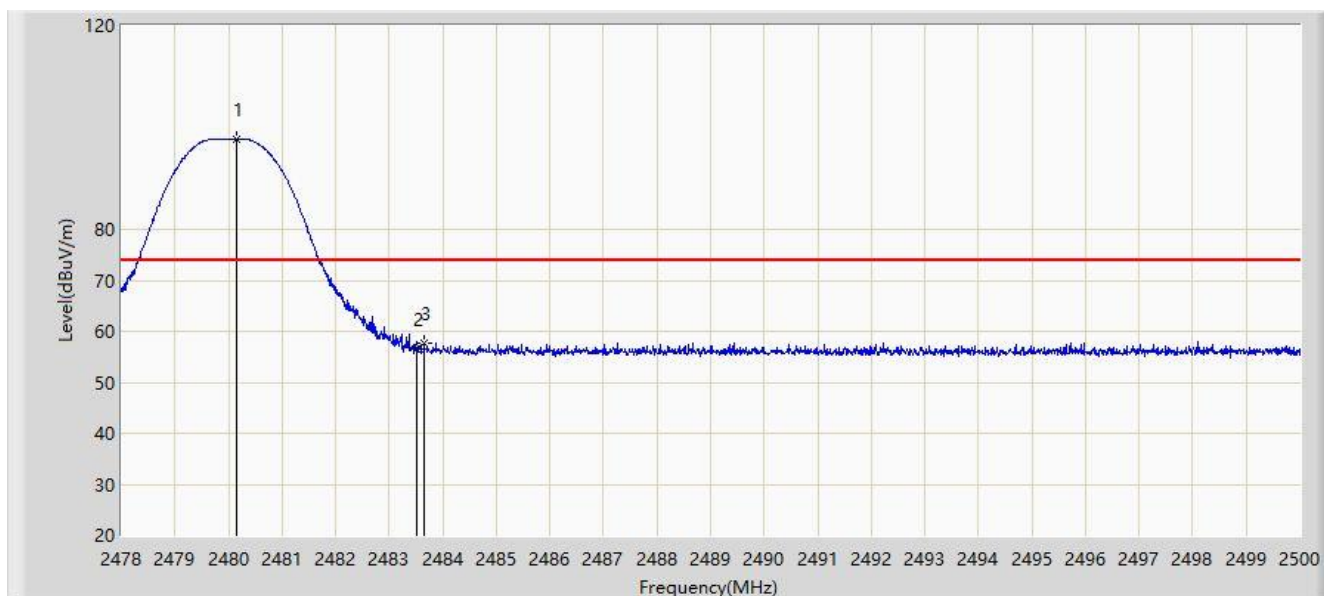


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.079	97.256	64.563	N/A	N/A	32.692	AV
2			2483.500	44.888	12.180	-9.112	54.000	32.707	AV
3			2484.556	45.003	12.291	-8.997	54.000	32.713	AV

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

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

Site: AC1	Time: 2020/07/26 - 12:19
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2480MHz	

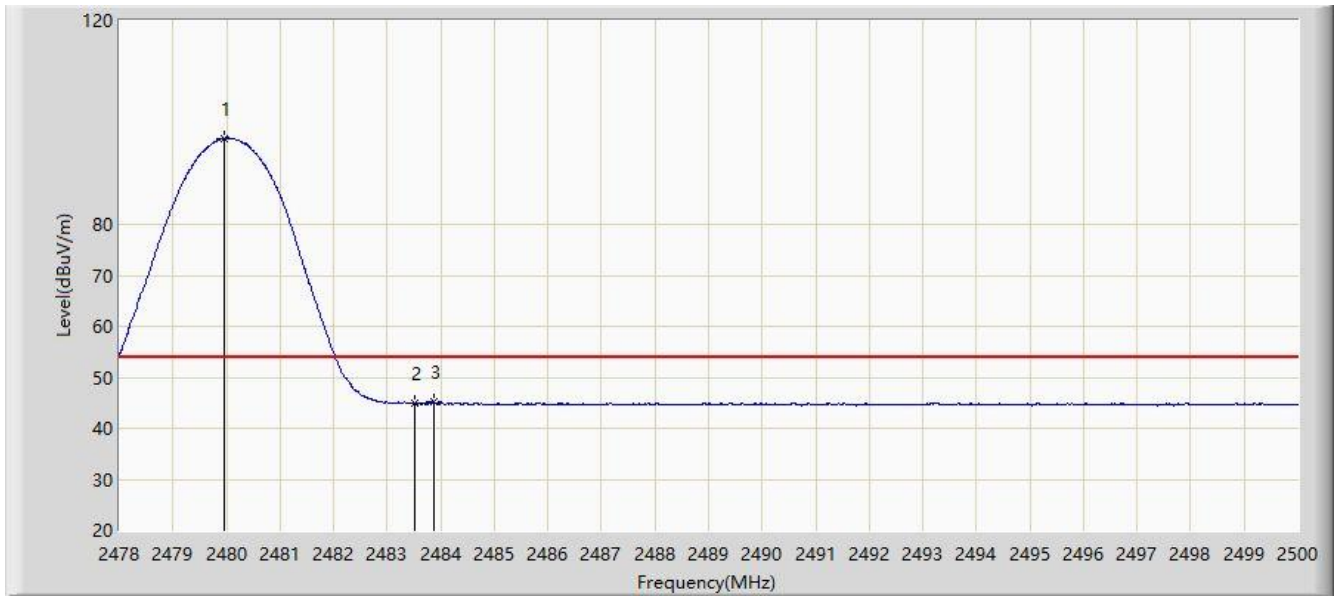


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.145	97.648	64.955	N/A	N/A	32.693	PK
2			2483.500	56.659	23.951	-17.341	74.000	32.707	PK
3			2483.654	57.778	25.070	-16.222	74.000	32.709	PK

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

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

Site: AC1	Time: 2020/07/26 - 12:19
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (1Mbps) at Channel 2480MHz	

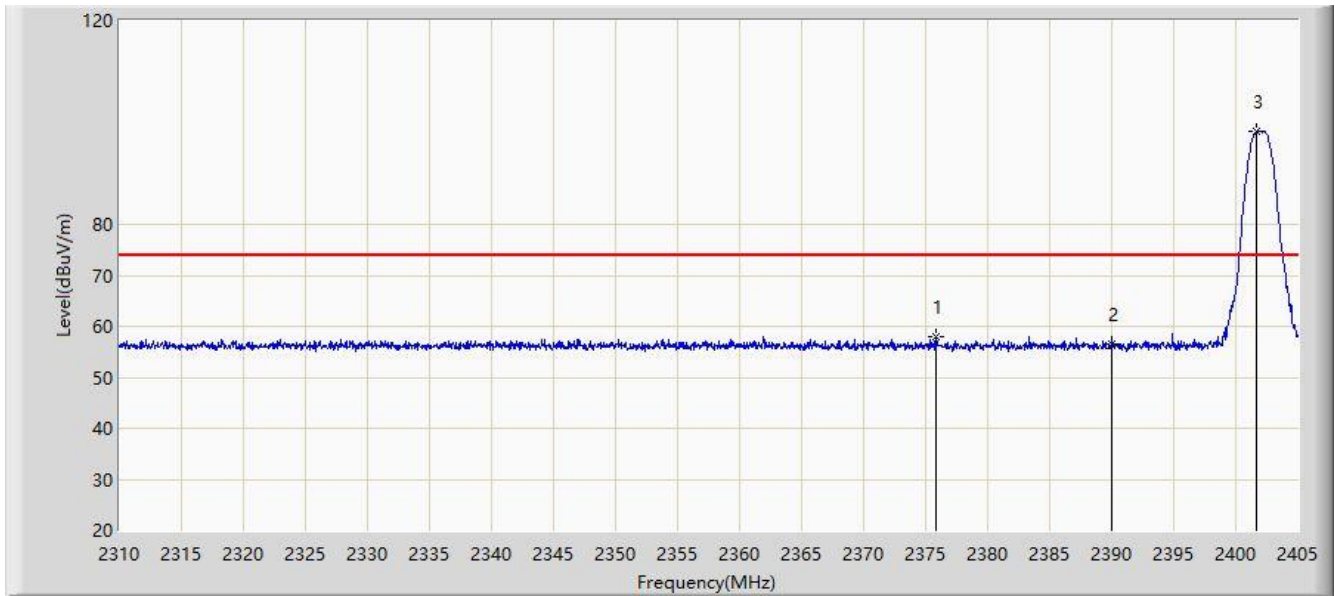


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.947	96.872	64.180	N/A	N/A	32.692	AV
2			2483.500	44.791	12.083	-9.209	54.000	32.707	AV
3			2483.874	45.185	12.476	-8.815	54.000	32.709	AV

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

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

Site: AC1	Time: 2020/07/26 - 13:05
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2402MHz	

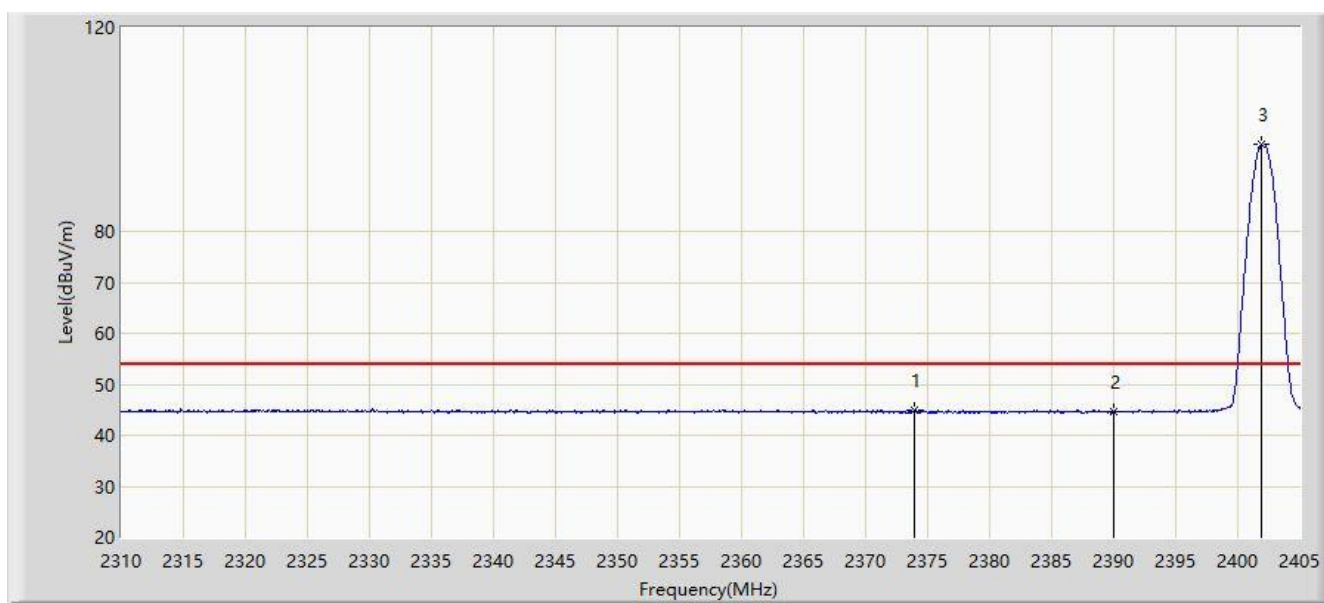


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2375.788	57.991	25.758	-16.009	74.000	32.233	PK
2			2390.000	56.403	24.107	-17.597	74.000	32.296	PK
3		*	2401.675	98.243	65.896	N/A	N/A	32.347	PK

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

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

Site: AC1	Time: 2020/07/26 - 13:09
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2402MHz	

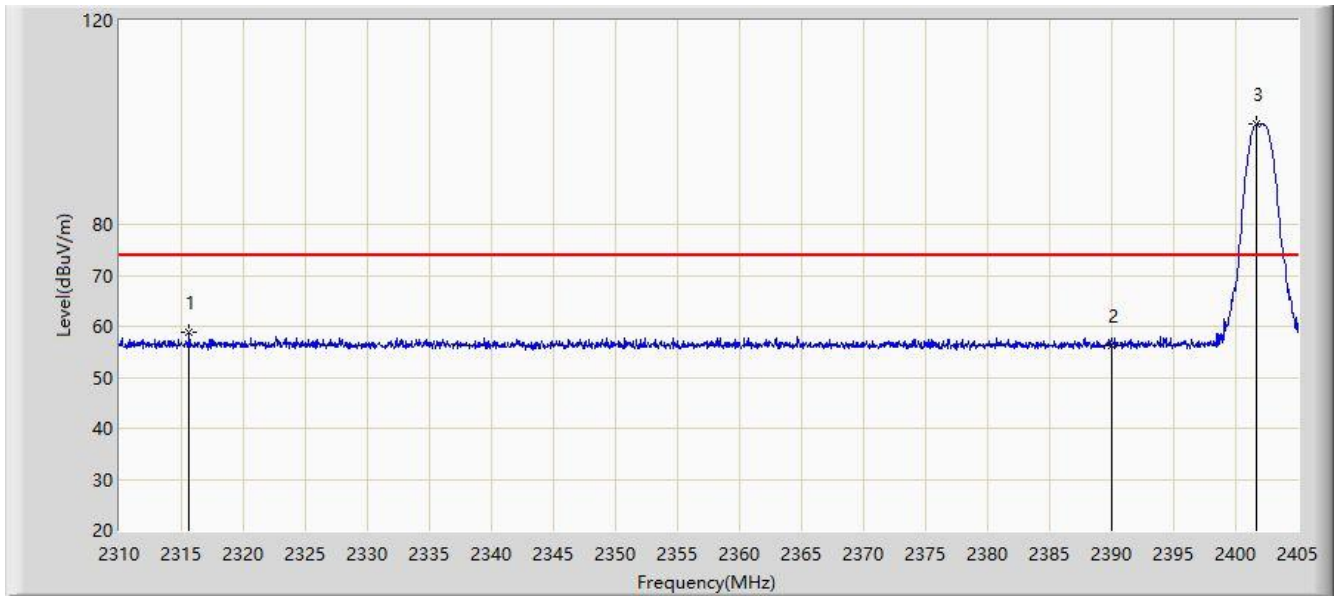


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2373.982	45.050	12.825	-8.950	54.000	32.225	AV
2			2390.000	44.572	12.276	-9.428	54.000	32.296	AV
3		*	2401.960	97.200	64.851	N/A	N/A	32.348	AV

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

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

Site: AC1	Time: 2020/07/26 - 13:12
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2402MHz	

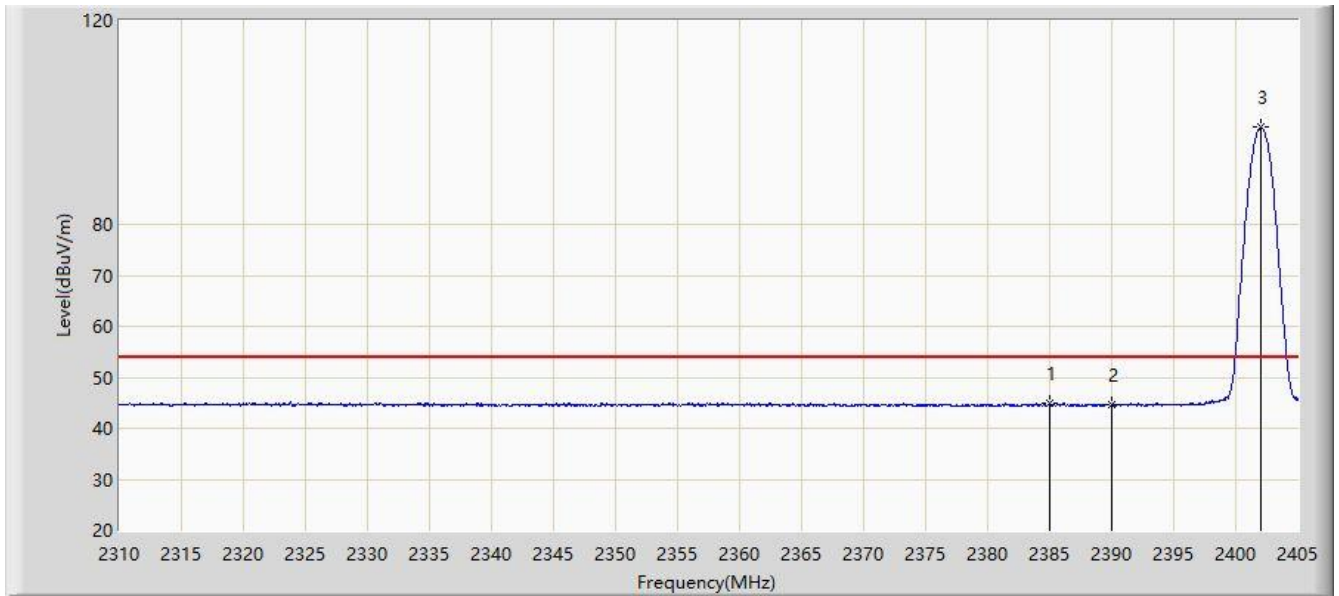


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2315.653	58.967	26.998	-15.033	74.000	31.969	PK
2			2390.000	56.104	23.808	-17.896	74.000	32.296	PK
3		*	2401.722	99.694	67.346	N/A	N/A	32.348	PK

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

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

Site: AC1	Time: 2020/07/26 - 13:15
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2402MHz	

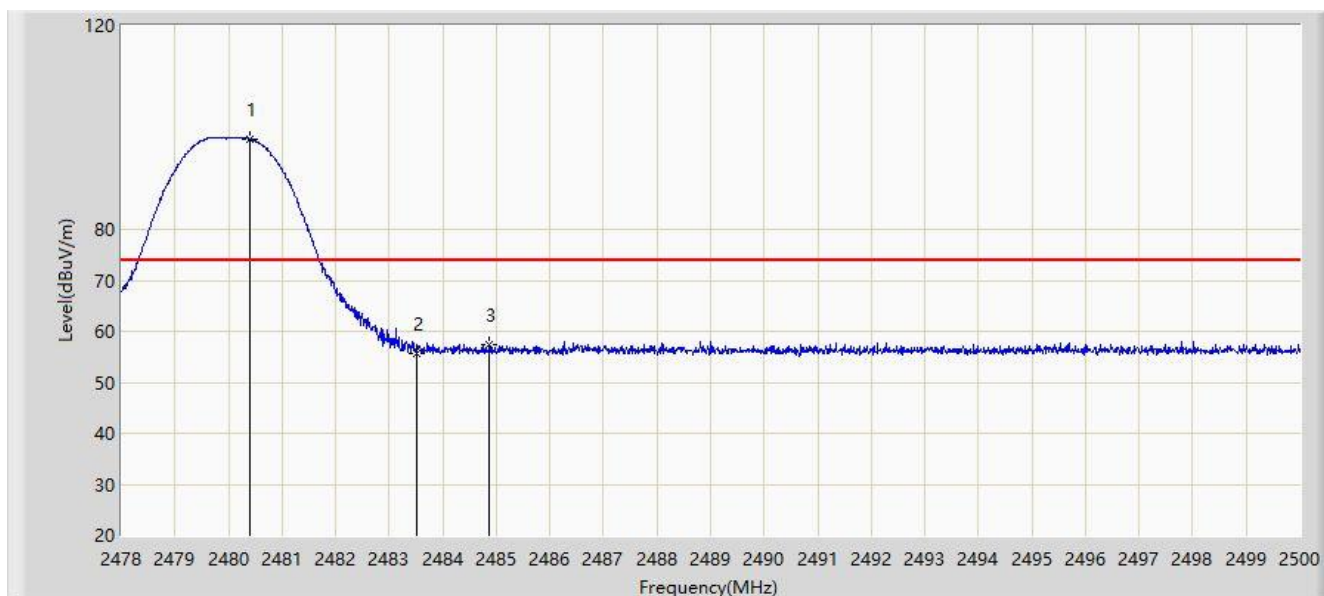


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2385.002	45.010	12.736	-8.990	54.000	32.274	AV
2			2390.000	44.582	12.286	-9.418	54.000	32.296	AV
3		*	2402.055	99.055	66.706	N/A	N/A	32.349	AV

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

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

Site: AC1	Time: 2020/07/26 - 13:17
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2480MHz	

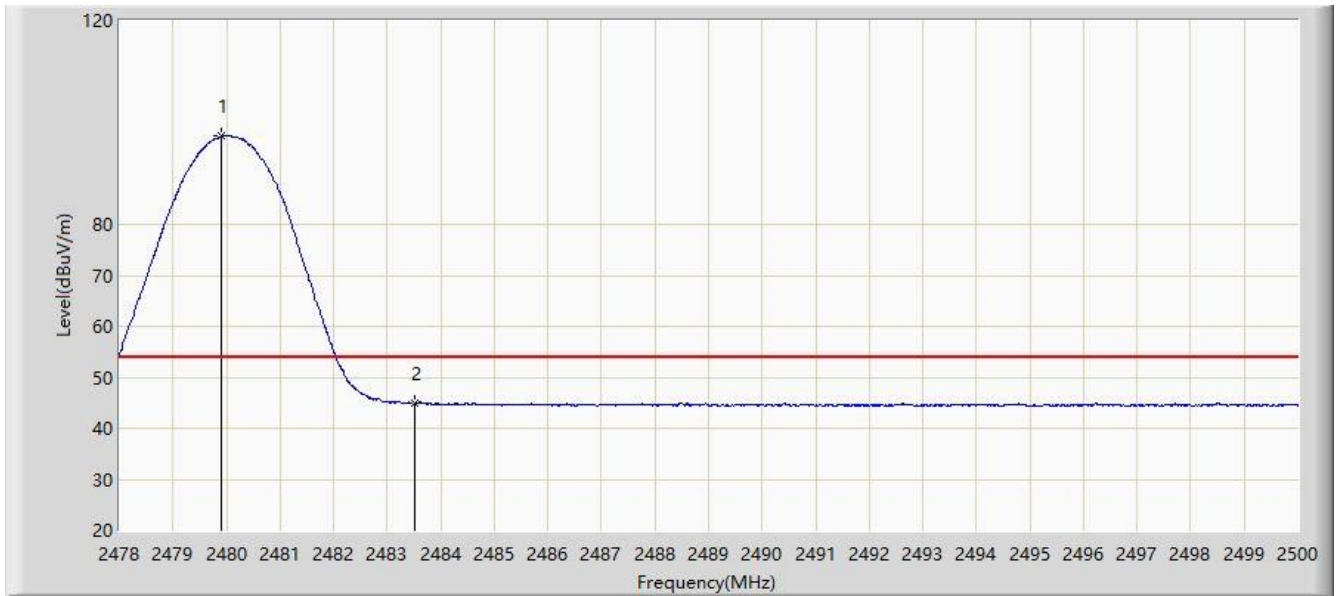


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.398	97.795	65.101	N/A	N/A	32.694	PK
2			2483.500	55.626	22.918	-18.374	74.000	32.707	PK
3			2484.875	57.453	24.739	-16.547	74.000	32.714	PK

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

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

Site: AC1	Time: 2020/07/26 - 13:20
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Horizontal
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2480MHz	

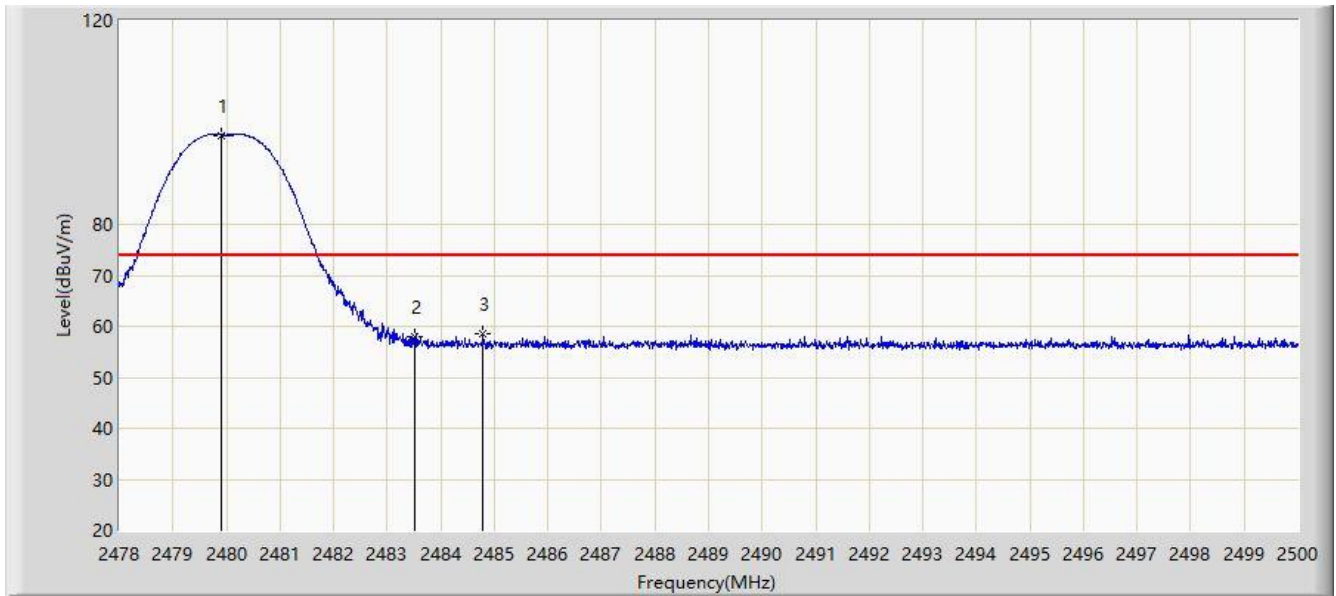


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.903	97.494	64.802	N/A	N/A	32.692	AV
2			2483.500	44.938	12.230	-9.062	54.000	32.707	AV

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

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

Site: AC1	Time: 2020/07/26 - 13:23
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2480MHz	

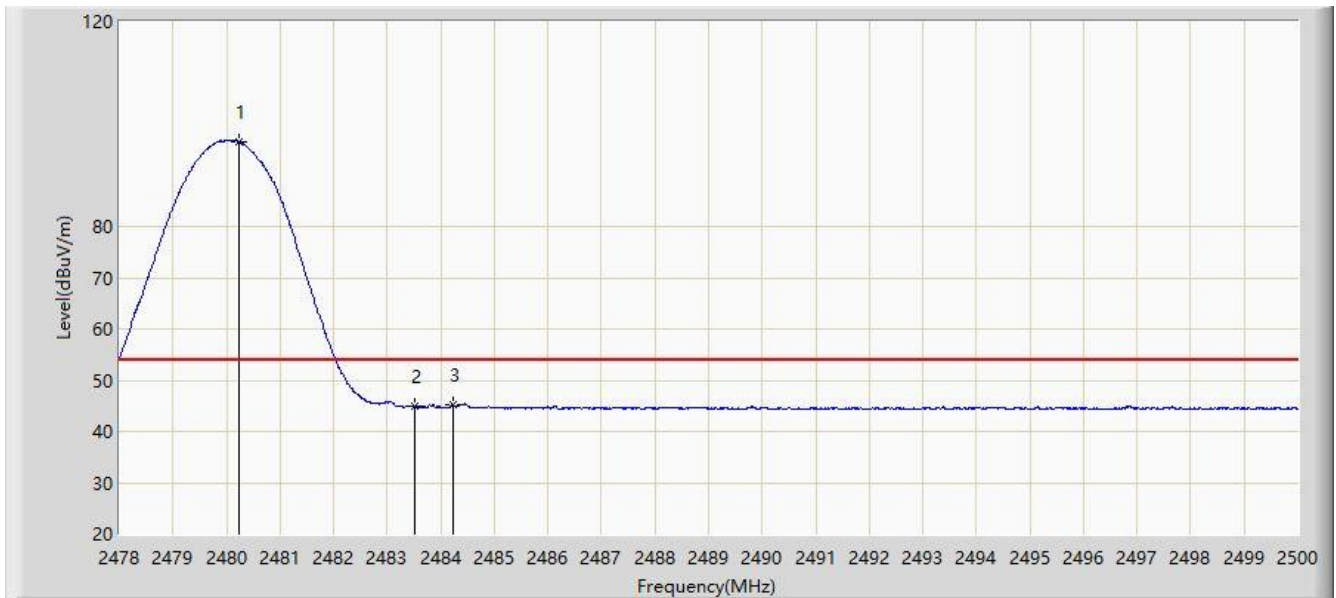


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2479.903	97.529	64.837	N/A	N/A	32.692	PK
2			2483.500	58.086	25.378	-15.914	74.000	32.707	PK
3			2484.787	58.429	25.716	-15.571	74.000	32.713	PK

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

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

Site: AC1	Time: 2020/07/26 - 13:26
Limit: NCC LP0002_1GHz-40GHz	Engineer: Kevin Ker
Probe: BBHA 9120D (1GHz~18GHz)	Polarity: Vertical
EUT: ACCESS POINT	Power: AC 110V/60Hz
Test Mode: Transmit by BLE (2Mbps) at Channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2480.244	96.580	63.887	N/A	N/A	32.693	AV
2			2483.500	44.915	12.207	-9.085	54.000	32.707	AV
3			2484.226	45.311	12.600	-8.689	54.000	32.711	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

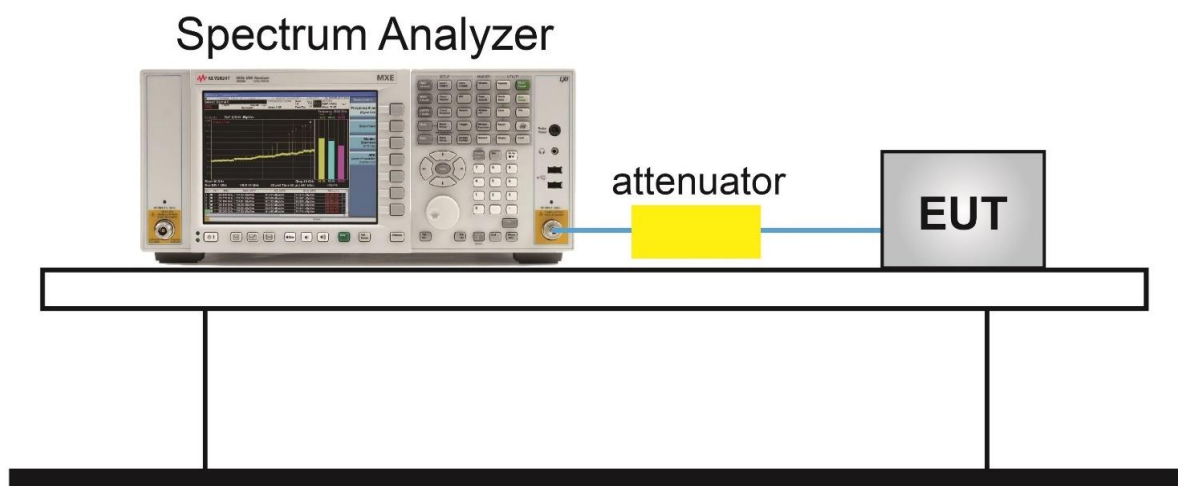
待測物之天線埠經由適當之衰減直接連至頻譜分析儀 RF 輸入端，設定頻譜分析儀之解析度頻寬為 100kHz，視訊頻寬不小於解析度頻寬，頻率掃描範圍(SPAN)遠大於解析度頻寬。

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。

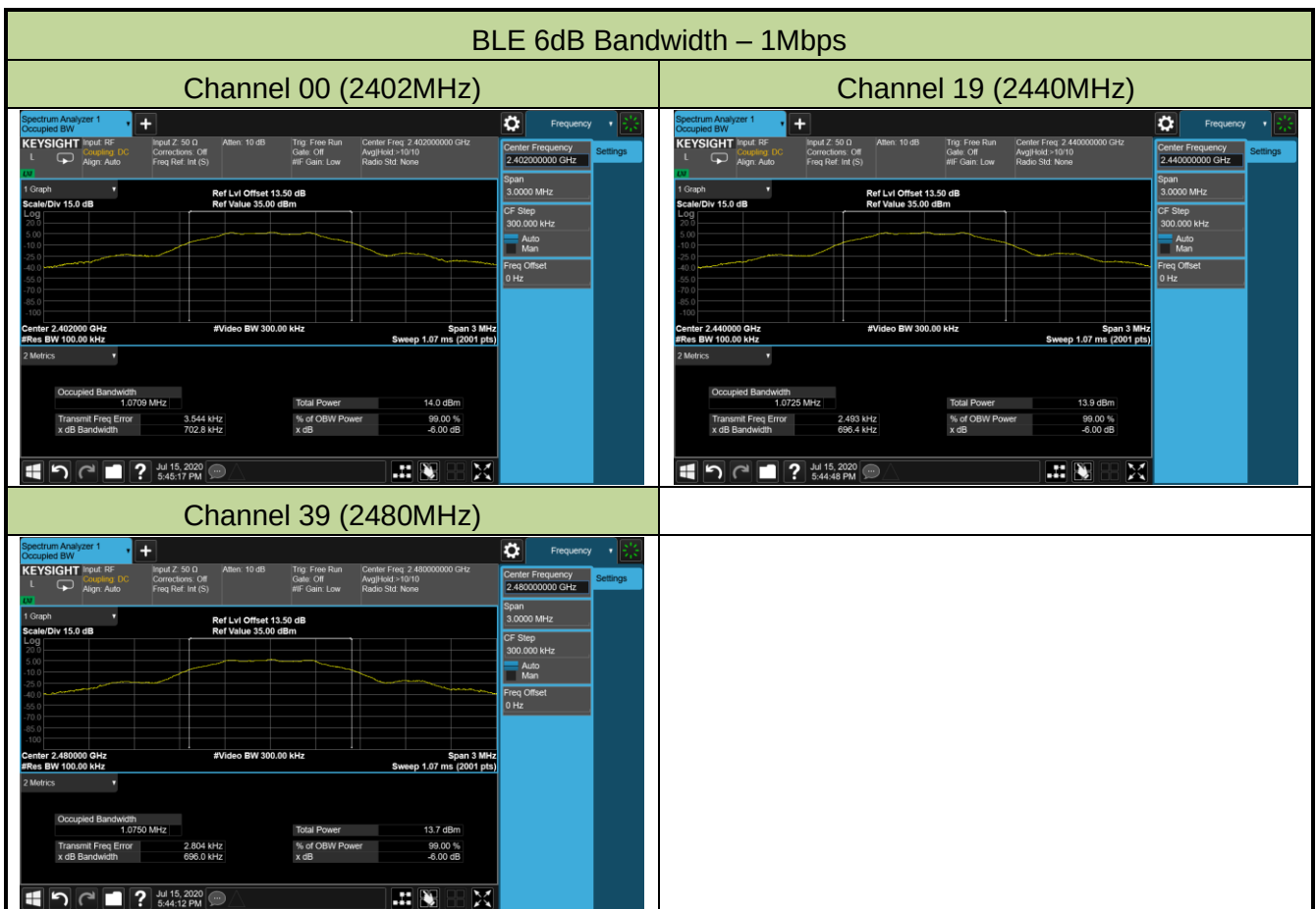
5.7.3. 測試架構圖



5.7.4. 佔用頻寬測試結果

待測物名稱	ACCESS POINT	測試日期	2020/07/15
待測物型號	APINH503	溫度 / 濕度	27°C / 65%
測試場地	SR2	測試工程師	Eric Lin

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
BLE	1	00	2402	0.703	≥ 0.5	Pass
BLE	1	19	2440	0.696	≥ 0.5	Pass
BLE	1	39	2480	0.696	≥ 0.5	Pass
BLE	2	00	2402	1.152	≥ 0.5	Pass
BLE	2	19	2440	1.143	≥ 0.5	Pass
BLE	2	39	2480	1.156	≥ 0.5	Pass



BLE 6dB Bandwidth – 2Mbps

Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



5.8. 發射電功率頻譜密度

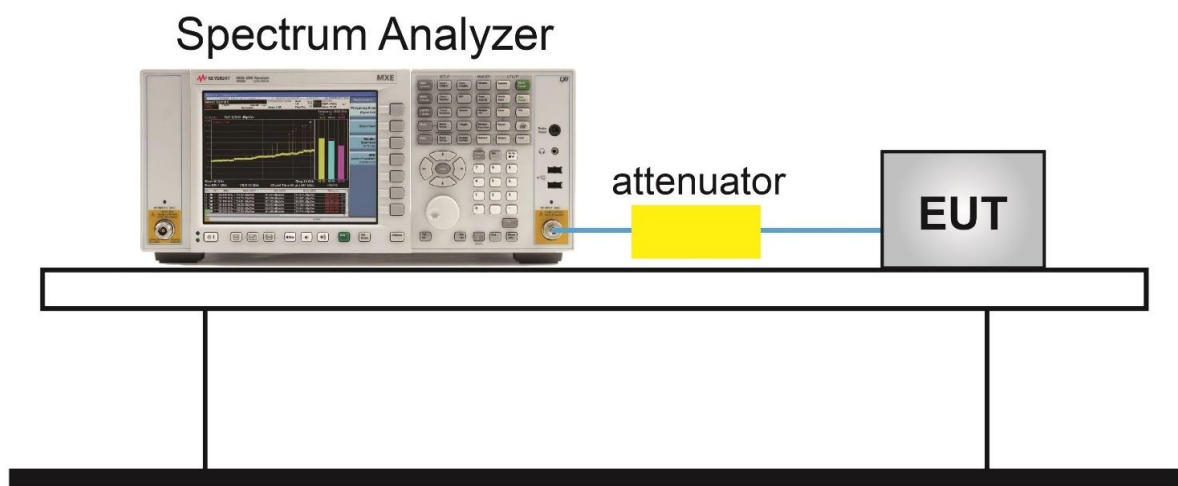
5.8.1. 量測方法

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。

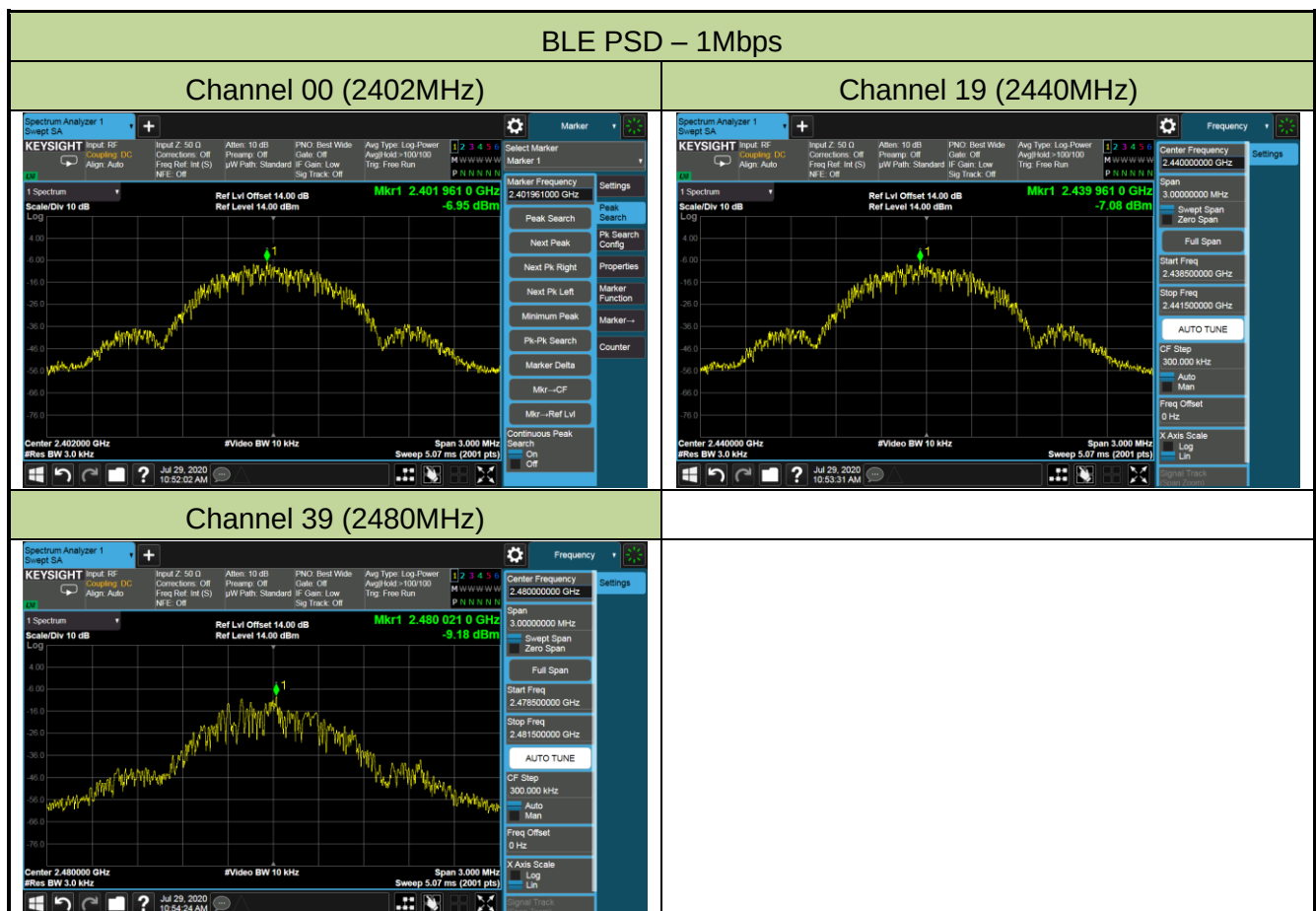
5.8.3. 測試架構圖



5.8.4. 功率頻譜密度量測結果

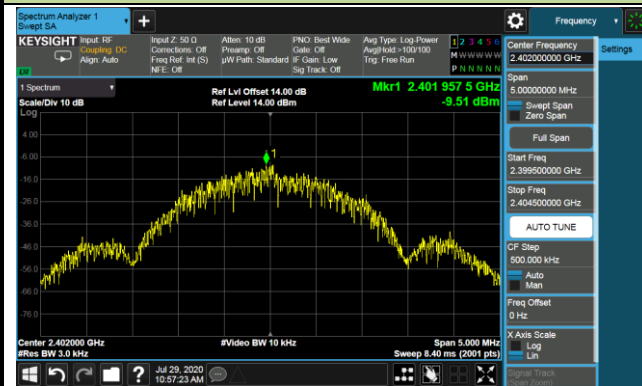
待測物名稱	ACCESS POINT	溫度	27°C
待測物型號	APINH503	濕度	65%
測試場地	SR2	測試日期	2020/07/29
測試項目	Power Spectral Density	測試工程師	Eric Lin

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1	00	2402	-6.95	≤ 8.00	Pass
BLE	1	19	2440	-7.08	≤ 8.00	Pass
BLE	1	39	2480	-9.18	≤ 8.00	Pass
BLE	2	00	2402	-9.51	≤ 8.00	Pass
BLE	2	19	2440	-9.61	≤ 8.00	Pass
BLE	2	39	2480	-10.03	≤ 8.00	Pass

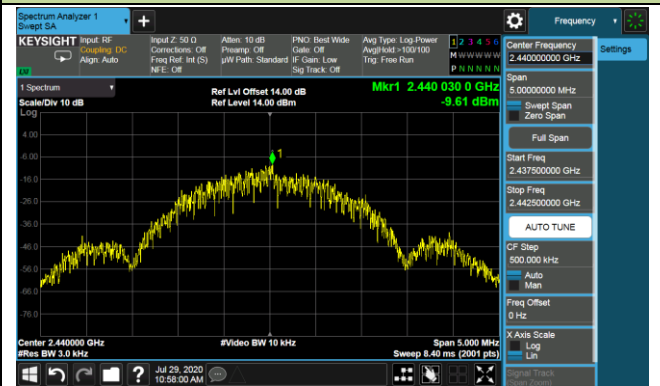


BLE PSD – 2Mbps

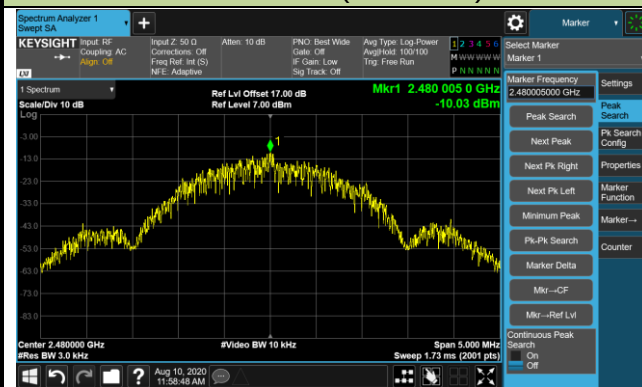
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



結束