

低功率射頻器材技術規範測試報告

報告編號:

RTBGOY-WTW-P20090391

申請者

Fossil Group, Inc.

產品名稱

Smart Watch

型號

DW11M2

製造廠商

Fossil Group, Inc.

商標或廠牌

MICHAEL KORS

該產品樣品試驗

國家通訊傳播委員會低功率射頻器材技術規範

依據之試驗標準

109 年 7 月 1 日修訂

試驗結果

合格

香港商立德國際商品試驗有限公司桃園分公司 林口實驗室

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報告簽署人簽章:



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報告發行紀錄

Issue No.	Description	Date Issued
RTBGOY-WTW-P20090391	Original release	109 年 10 月 22 日

證 明 書

發行日期：109 年 10 月 22 日

產 品 名 稱：Smart Watch
商 標：MICHAEL KORS
型 號：DW11M2
申 請 者：Fossil Group, Inc.
量 測 規 範：低功率射頻器材技術規範 LP0002 (修訂日期：109 年 7 月 1 日)
ANSI C63.10-2013

香港商立德國際商品試驗有限公司桃園分公司在此證明上述待測設備樣品一組(型號：DW11M2)，收件日期 109 年 01 月 22 日，於 109 年 07 月 21 日至 109 年 09 月 10 日，已在本公司的標準測試場地完成量測。報告中所描述之測試結果和待測設備的架構組合，均根據樣品實際的量測情況作詳實的記錄。

立德桃園分公司依“低功率射頻器材技術規範”及“電信管制射頻器材審驗管理辦法”製作測試結果報告。

特 此 證 明 ！

報告製作者： 王秀眉，日期： 109 年 10 月 22 日

王秀眉 / 專員

審 核 者： 邱碧民，日期： 109 年 10 月 22 日

邱碧民 / 高級專案工程師

香港商立德國際商品試驗有限公司桃園分公司

實驗室地址：新北市林口區嘉寶里 14 鄰 47-2 號

此份報告不得摘錄複製，除全份複製外，需經實驗室書面同意。



1 低功率射頻器材量測記錄表

申請廠商: Fossil Group, Inc.

製造廠商: Fossil Group, Inc.

申請廠商地址: 901 S. Central Expressway, Richardson, Tx 75080, USA

產品名稱: Smart Watch

廠牌: MICHAEL KORS

型號: DW11M2

量測單位名稱: 香港商立德國際商品試驗有限公司桃園分公司

林口實驗室華亞檢測部

量測單位地址: 桃園市龜山區文化里華亞二路 19 號

量測單位認可編號: TAF 2021 (9 kHz ~ 40 GHz)

量測規範: 低功率射頻器材技術規範 LP0002 (修訂日期: 109 年 7 月 1 日)
ANSI C63.10-2013

WLAN 2.4 GHz 頻段概要

項次	量測項目	規 範	量測結果判定
1	帶外發射	低功率射頻器材技術規範4.10.1.5節	合格
2	電源線傳導干擾	低功率射頻器材技術規範3.3節	合格
3	6 dB 頻寬	低功率射頻器材技術規範4.10.1.6節	合格
4	峰值傳導輸出功率	低功率射頻器材技術規範4.10.1.2節	合格
5	功率頻譜密度	低功率射頻器材技術規範4.10.1.6節	合格

Bluetooth EDR 頻段概要

項次	量測項目	規 範	量測結果判定
1	帶外發射	低功率射頻器材技術規範 4.10.1.5	合格
2	電源線傳導干擾	低功率射頻器材技術規範 3.3 節	合格
3	20 dB 頻寬	低功率射頻器材技術規範 4.10.1.6 節	Note
4	峰值傳導輸出功率	低功率射頻器材技術規範 4.10.1.2 節	合格
5	跳頻頻道數之量測	低功率射頻器材技術規範 4.10.1.6 節	合格
6	跳頻頻道間隔之量測	低功率射頻器材技術規範 4.10.1.6 節	合格
7	每一頻道停留時間之量測	低功率射頻器材技術規範 4.10.1.6 節	合格

Note : 此頻寬測試值為跳頻頻道間隔之量測參考值。

Bluetooth LE 频段概要

項次	量測項目	規 範	量測結果判定
1	帶外發射	低功率射頻器材技術規範 4.10.1.5 節	合格
2	電源線傳導干擾	低功率射頻器材技術規範 3.3 節	合格
3	6 dB 頻寬	低功率射頻器材技術規範 4.10.1.6 節	合格
4	峰值傳導輸出功率	低功率射頻器材技術規範 4.10.1.2 節	合格
5	功率頻譜密度	低功率射頻器材技術規範 4.10.1.6 節	合格

NFC 频段概要

項次	量測項目	規 範	量測結果判定
1	主波發射	低功率射頻器材技術規範 4.2.1.1 節	合格
1	不必要之發射	低功率射頻器材技術規範 3.6 節, 4.2.1.2 節	合格
2	電源線傳導干擾	低功率射頻器材技術規範 3.3 節	合格
3	天線之要求	低功率射頻器材技術規範 3.2 節	合格
4	頻率容許差度	低功率射頻器材技術規範 4.2.1.3 節	合格

最大暴露允許值(Maximum Permissible Exposure , MPE)

項次	量測項目	規 範	量測結果判定
1	電波暴露量	低功率射頻器材技術規範 6.20.2 節	合格

備註：量測結果之判定不考慮量測不確定度的貢獻。

2 一般敘述

2.1 待測設備

產品名稱：	Smart Watch	
型號：	DW11M2	
額定電源：	5 Vdc (adapter or host equipment) 3.85 Vdc (battery)	
調變方式：	Wireless LAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	Bluetooth EDR	GFSK, $\pi/4$ -DQPSK, 8DPSK
	Bluetooth LE	GFSK
	NFC	ASK
傳輸速率：	Wireless LAN	802.11b: 11.0/ 5.5/ 2.0/ 1.0 Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 72.2 Mbps
	Bluetooth EDR	1/ 2/ 3 Mbps
	Bluetooth LE	1 Mbps
	NFC	Type A: 106 kbit/s
載波頻率：	Wireless LAN	2.4 GHz: 2412 ~ 2472 MHz
	Bluetooth EDR	2402 ~ 2480 MHz
	Bluetooth LE	2402 ~ 2480 MHz
	NFC	13.56 MHz
頻道數：	Wireless LAN	2.4 GHz: 802.11b, 802.11g, 802.11n (HT20): 13
	Bluetooth EDR	79
	Bluetooth LE	40
	NFC	1
發射功率：	Wireless LAN	2.4 GHz: 802.11b: 18.83 dBm 802.11g: 19.70 dBm 802.11n (HT20): 19.62 dBm
	Bluetooth EDR	11.37 dBm
	Bluetooth LE	2.35 dBm
發射功率 (電場強度)：	NFC	12.53 dBuV/m (於 30 公尺距離) (QP)
天線種類：	見註 2	
電源線類別：	N/A	
信號線類別：	見註 3	
配件：	見註 3	

註：

1. 此待測物之技術的種類為1Tx / 1Rx之組合。

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11a	1TX
802.11n (HT20)	1TX

2. 此待測設備搭配測試的天線，其資料如下：

	頻帶 (MHz)	天線型式	天線型號	商標	接頭型式	增益 (dBi)
WLAN	2412 ~ 2472	Loop	N/A	N/A	N/A	-4.99
Bluetooth	2402 ~ 2480				N/A	-4.99
NFC	13.56	Loop	N/A	N/A	N/A	-

3. 待測設備主要內裝元件及配件如下。

配件	廠牌	型號	規格
Battery	TIANJIN LISHEN	DAAL402326SA	3.85 Vdc, 300 mAh
Charging Dock	SIMULA	CB846E-6040-102	0.95 m shielded cable w/o core

4. 此報告中，場強輻射量測經過評估後以下列測試模式進行最終量測。

量測項目	發射	接收
2412 ~ 2472 MHz		
1 GHz 以上量測	802.11b: Ch 1, 6, 11, 12, 13 802.11g: Ch 1, 6, 11, 12, 13 802.11n (HT20): Ch 1, 6, 11, 12, 13	802.11g: Ch 13
其它不必要之訊號	802.11g: Ch 13	802.11g: Ch 13
2402 ~ 2480 MHz (Bluetooth EDR)		
1 GHz 以上量測	GFSK: Ch 0, 39, 78 8DPSK: Ch 0, 39, 78	GFSK: Ch 39
其它不必要之訊號	GFSK: Ch 39	GFSK: Ch 39
2402 ~ 2480 MHz (Bluetooth LE)		
1 GHz 以上量測	Ch 0, 19, 39	Ch 0
其它不必要之訊號	Ch 0	Ch 0
NFC		
1 GHz 以上量測	Ch 1	Ch 1
其它不必要之訊號	Ch 1	Ch 1

5. 此報告中傳輸模式，場強輻射量測及電源線傳導干擾量測之外的測試項目，以DSSS調變技術和OFDM調變技術分別進行測試並記錄最終量測結果於報告中。

6. Bluetooth EDR傳輸模式DH1、DH3及DH5皆經過預測試，其中以DH5的傳輸模式具有較大干擾雜訊，因此僅以此傳輸模式進行最終量測。

7. Bluetooth LE傳輸模式，場強輻射量測及電源線傳導干擾量測之外的測試項目，以GFSK調變技術進行測試並記錄最終量測結果於報告中。

8. NFC傳輸模式Type A具有較大干擾雜訊，因此僅以此傳輸模式進行最終量測。

9. 此報告中，測試模式評估如下

(1) 電源線傳導干擾量測經預掃後以模式4具有較大干擾值，故以其模式進行最終測試。

(2) 場強輻射量測以模式1~4評估完整測試。

模式	測試狀態
1	TX/RX BT + Charging dock + Adapter
2	TX/RX BT LE + Charging dock + Adapter
3	TX/RX 2.4G + Charging dock + Adapter
4	TX/RX NFC + Charging dock + Adapter

10. 此待測設備，經評估三個正交軸方位評估測試擺設方式：平躺、垂直、側放，其各擺放最大干擾值之位置如下表，故以此擺放方式進行最終量測，並將測試結果紀錄。

	WLAN 2.4 GHz	Bluetooth EDR	Bluetooth LE	NFC
擺放方式	垂直	垂直	垂直	垂直

11. Duty cycle of test signal.

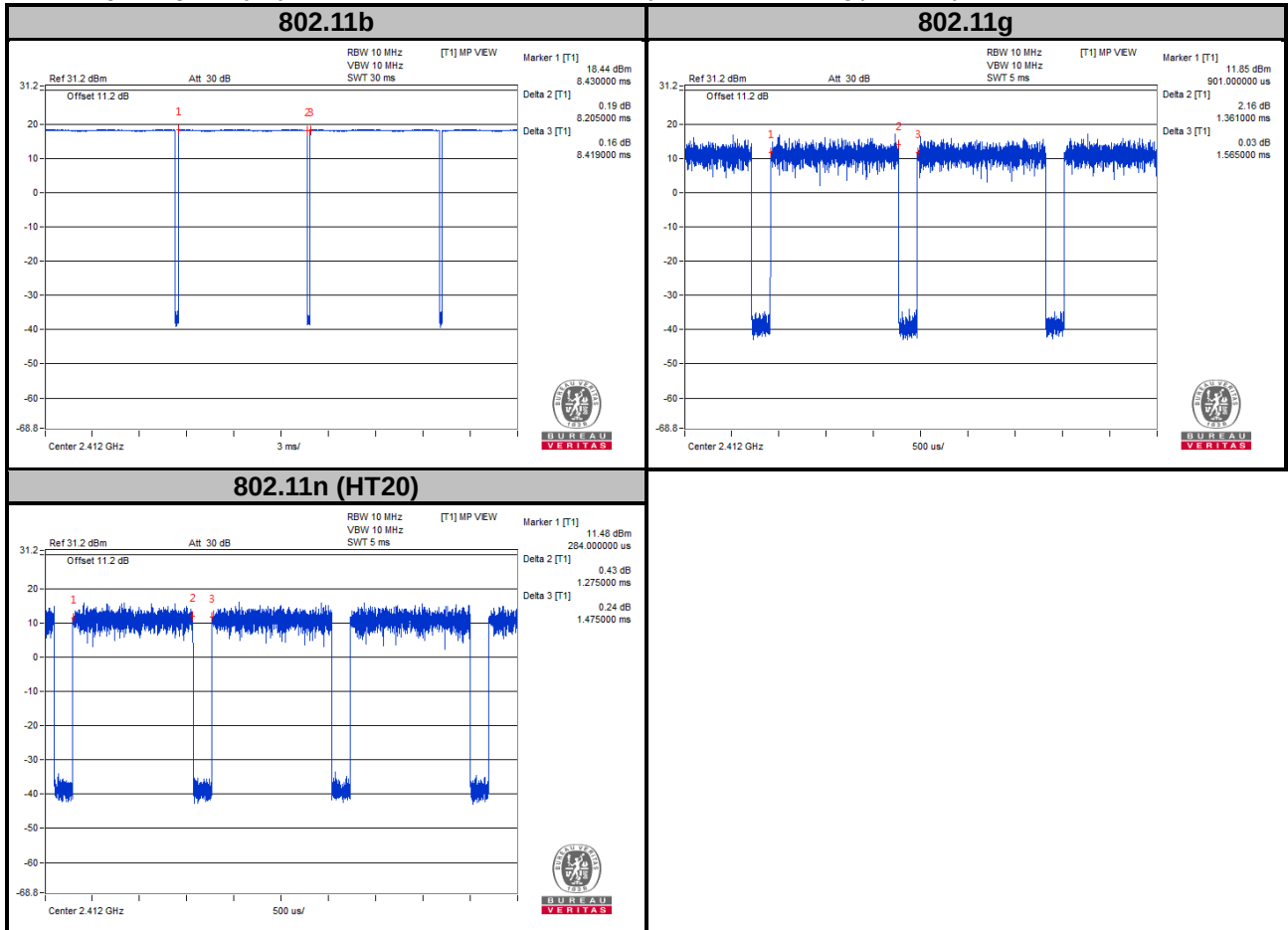
Duty cycle of test signal is < 98 %, duty factor is required.

2.4 GHz 频段

802.11b: Duty cycle = $8.205/8.419 = 0.975$, Duty factor = $10 * \log(1/0.975) = 0.11$

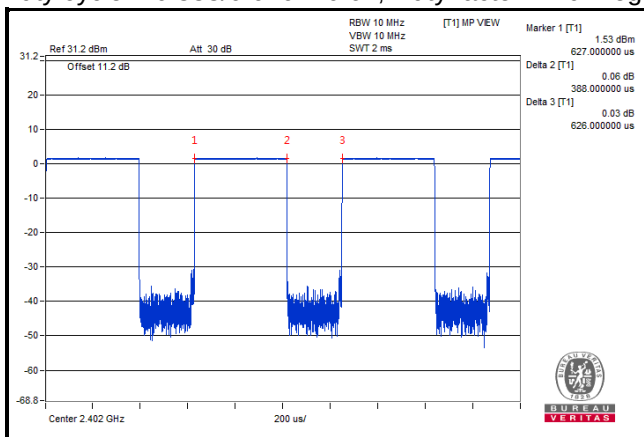
802.11g: Duty cycle = $1.361/1.565 = 0.87$, Duty factor = $10 * \log(1/0.87) = 0.61$

802.11n (HT20): Duty cycle = $1.275/1.475 = 0.864$, Duty factor = $10 * \log(1/0.864) = 0.63$



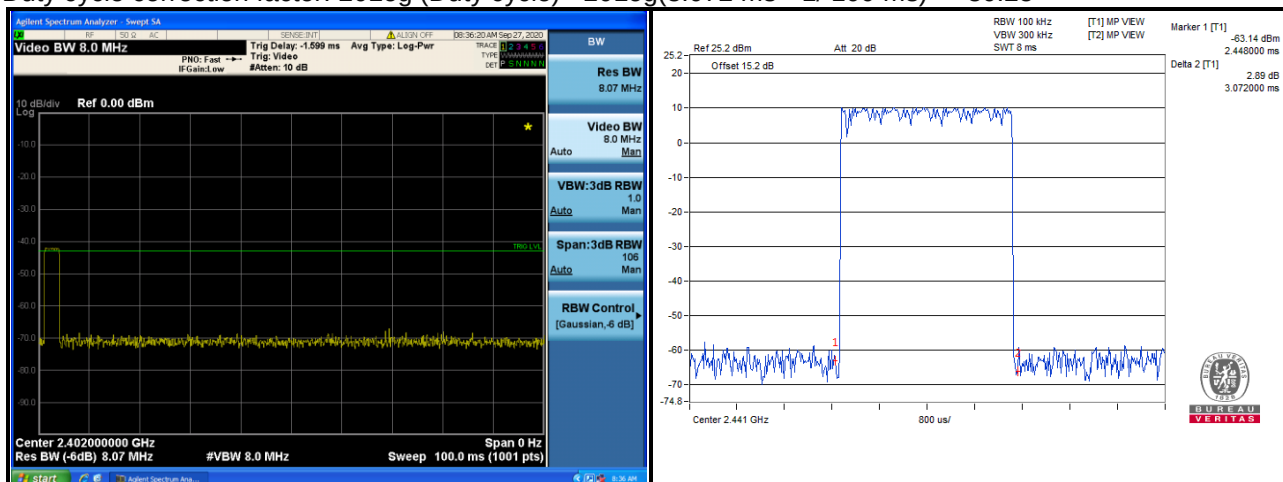
BT LE 频段

Duty cycle = $0.388/0.626 = 0.62$, Duty factor = $10 * \log(1/0.62) = 2.08$



BT EDR 频段

Duty cycle correction factor: $20\text{Log}(\text{Duty cycle}) = 20\text{Log}(3.072 \text{ ms} * 1 / 100 \text{ ms}) = -30.25$



此裝置各頻道的中心頻率如下：

2.4 GHz 頻段：

802.11b, 802.11g, 802.11n (HT20):

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
01	2412	08	2447
02	2417	09	2452
03	2422	10	2457
04	2427	11	2462
05	2432	12	2467
06	2437	13	2472
07	2442		

Bluetooth EDR 頻段：

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
0	2402	17	2419	34	2436	51	2453	68	2470
1	2403	18	2420	35	2437	52	2454	69	2471
2	2404	19	2421	36	2438	53	2455	70	2472
3	2405	20	2422	37	2439	54	2456	71	2473
4	2406	21	2423	38	2440	55	2457	72	2474
5	2407	22	2424	39	2441	56	2458	73	2475
6	2408	23	2425	40	2442	57	2459	74	2476
7	2409	24	2426	41	2443	58	2460	75	2477
8	2410	25	2427	42	2444	59	2461	76	2478
9	2411	26	2428	43	2445	60	2462	77	2479
10	2412	27	2429	44	2446	61	2463	78	2480
11	2413	28	2430	45	2447	62	2464		
12	2414	29	2431	46	2448	63	2465		
13	2415	30	2432	47	2449	64	2466		
14	2416	31	2433	48	2450	65	2467		
15	2417	32	2434	49	2451	66	2468		
16	2418	33	2435	50	2452	67	2469		

Bluetooth LE 頻段:

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
0	2402	8	2418	16	2434	24	2450	32	2466
1	2404	9	2420	17	2436	25	2452	33	2468
2	2406	10	2422	18	2438	26	2454	34	2470
3	2408	11	2424	19	2440	27	2456	35	2472
4	2410	12	2426	20	2442	28	2458	36	2474
5	2412	13	2428	21	2444	29	2460	37	2476
6	2414	14	2430	22	2446	30	2462	38	2478
7	2416	15	2432	23	2448	31	2464	39	2480

NFC 頻段:

頻道	對應頻率 (MHz)
1	13.56

詳細之規格請參考使用說明書。

2.2 輔助測試之週邊設備描述

待測設備於受測時均接上其所屬的配件或一般用途之相關設備；下列輔助設備或配件測試中所使用的配備，以形成一個代表待測物實際運作的受測系統。

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	Adapter	ASUS	AD827M	N/A	N/A	provided by lab
B	Bluetooth Tester	R&S	CBT	100980	N/A	--

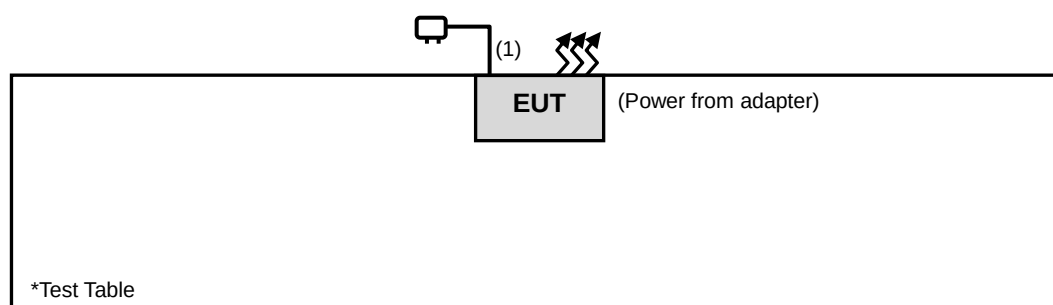
No.	Signal Cable Description Of The Above Support Units
1	0.95m shielded cable (provided by client)

NOTE:

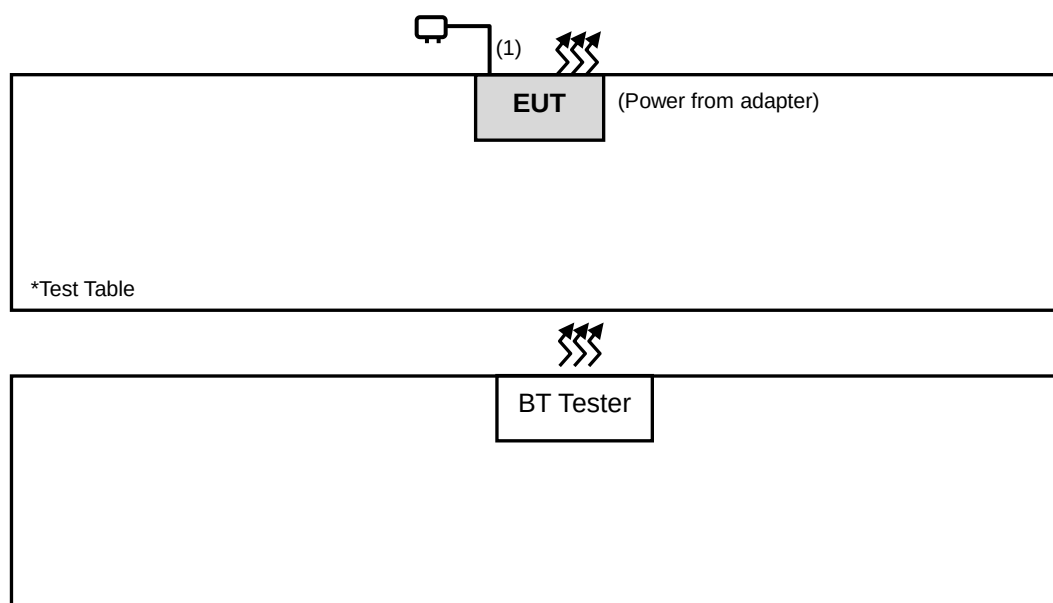
1. All power cords of the above support units are non shielded (1.8m).
2. 本案器材以申請者切結提供的隨貨配件，與實驗室提供的測試配件併同檢測。

2.3 測試架構圖

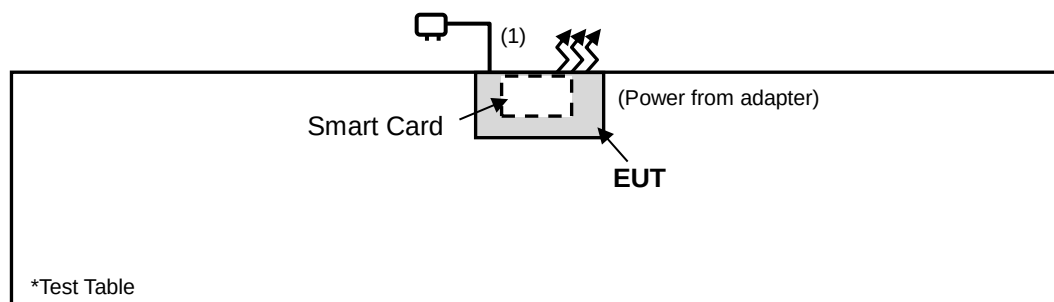
<WLAN & Bluetooth LE>



<Bluetooth EDR>



<NFC>



3 適用規範

3.1 規範要求和參考

► Bluetooth LE 頻段部份：

(1) 傳導之規定

依據國家通訊傳播委員會低功率射頻器材技術規範之 3.3 節，電源傳導干擾之限制要求如下：

頻率(MHz)	傳導限制值 (dBuV)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66-56 (註)	56-46 (註)
0.5-5	56	46
5-30	60	50

(註)：隨頻率之對數遞減。

(2) 帶外發射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.5 節之要求，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 4.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。此外，落於 3.5 禁用頻段之輻射發射，應符合 3.6 之規定。

頻率(MHz)	電場強度(微伏特/公尺, uV/m)	測距(公尺)
$0.009 \leq f \leq 0.490$	$2,400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24,000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(3) 天線之規定

天線規格不受第 3.2 節規定之限制。

(4) 天線增益之要求

低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1 節(3)之規定如下：

(A) 進行固定式點對點操作時，其發射天線之方向性增益超過 6 dBi，每超過 3 dBi，最大傳導輸出功率限制值應降低 1 dB。

(B) 天線以多向波束發射方式(含同時發射或循序發射)將訊號導向多個接收機或接收機群組時，應符合下列規定：

(a) 非同時發射多向波束者，所有載波或頻道傳輸至所有天線陣列或陣列群之總和傳導輸出功率應符合 4.10.1.2 之功率限制值。如天線/天線陣列群之方向性增益超過 6 dBi，每超過 3 dBi，總和傳導輸出功率限制值應降低 1 dB。方向性增益值應計算如下：

(i) 方向性增益值 = $10\log(\text{天線陣列之單元數目}) + \text{各單元中最高之方向性增益值}$ 。

(ii) 天線陣列間之遮蔽效應或波束干涉損失能充分佐證時，方向性增益得低於(i)計算數值。

(b) 同時發射多向波束於相同或不同頻道者，其每一波束功率應符合(a)之功率限制值。如發射波束有重疊現象，功率應降低，以確保總和傳導輸出功率符合(a)之限制值。同時發射的所有波束總和傳導輸出功率不大於(a) 總和傳導輸出功率限制值加 8 dB。方向性增益值計算同(a)。

(c) 發射機之天線具備單向波束功能者，應符合(1)(A)及(3)後段之規定。

除(A)及(B)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率限制值。

(5) 6 dB 頻寬之要求

對使用數位調變技術(digital modulation techniques)系統之低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，6 dB 頻寬至少應有 500 kHz。

(6) 峰值傳導輸出功率之要求

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.2 節之規定：

數位調變技術系統：1 W(含)以下。

(7) 功率頻譜密度之要求

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，在使用頻率範圍之任一 3 kHz 頻寬內，由發射機傳導至天線之功率頻譜密度在任意傳輸期間內，皆小於或等於 8 毫分貝(dBm)，且應依 4.10.1.3 之方式降低功率頻譜密度限制值。

(8) 電波暴露量之評估

依據國家通訊傳播委員會低功率射頻器材技術規範 6.20.2 節之規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符合電波暴露量之要求。

限制值如下：

(1) 職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	6
3 - 30	1842/f	4.89/f	*900/f ²	6
30 - 300	61.4	0.163	1.0	6
300 - 1,500	---	---	f/300	6
1,500 - 100,000	---	---	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

(2) 一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	30
3 - 30	1842/f	4.89/f	*180/f ²	30
30 - 300	27.5	0.073	1.0	30
300 - 1,500	---	---	f/1500	30
1,500 - 100,000	---	---	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

►WLAN 頻段部份:

(9) 傳導之規定

依據國家通訊傳播委員會低功率射頻器材技術規範之 3.3 節，電源傳導干擾之限制要求如下:

頻率(MHz)	傳導限制值 (dBuV)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66-56 (註)	56-46 (註)
0.5-5	56	46
5-30	60	50

(註): 隨頻率之對數遞減。

(10) 帶外發射之規定

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.5 節之要求，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 4.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。

(2)在 1 GHz 以下不必要之發射，應符合 3.6 之規定。此外，落於 3.5 禁用頻段之輻射發射，應符合 3.6 之規定。

頻率(MHz)	電場強度(微伏特/公尺, uV/m)	測距(公尺)
$0.009 \leq f \leq 0.490$	$2,400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24,000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(11) 天線之規定

天線規格不受第 3.2 節規定之限制。

(12) 天線增益之要求

低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.3 節及 5.7.3 節之規定如下：

(1) 操作於 2.400~2.4835 GHz 頻段：

- (A) 進行固定式點對點操作時，其發射天線之方向性增益超過 6 dBi，每超過 3 dBi，最大傳導輸出功率限制值應降低 1 dB。
- (B) 天線以多向波束發射方式(含同時發射或循序發射)將訊號導向多個接收機或接收機群組時，應符合下列規定：
 - (a) 非同時發射多向波束者，所有載波或頻道傳輸至所有天線陣列或陣列群之總和傳導輸出功率應符合 4.10.1.2 之功率限制值。如天線/天線陣列群之方向性增益超過 6 dBi，每超過 3 dBi，總和傳導輸出功率限制值應降低 1 dB。方向性增益值應計算如下：
 - (i) 方向性增益值 = $10\log(\text{天線陣列之單元數目}) + \text{各單元中最高之方向性增益值}$ 。
 - (ii) 天線陣列間之遮蔽效應或波束干涉損失能充分佐證時，方向性增益得低於(i)計算數值。
 - (b) 同時發射多向波束於相同或不同頻道者，其每一波束功率應符合(a)之功率限制值。如發射波束有重疊現象，功率應降低，以確保總和傳導輸出功率符合(a)之限制值。同時發射的所有波

束總和傳導輸出功率不大於(a) 總和傳導輸出功率限制值加 8 dB。方向性增益值計算同(a)。

(c) 發射機之天線具備單向波束功能者，應符合(1)(A)及(3)後段之規定。

除(A)及(B)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率限制值。

(13) 6 dB 頻寬之要求

(1) 操作於 2.400~2.4835 GHz 頻段：

對使用數位調變技術(digital modulation techniques)系統之低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，6 dB 頻寬至少應有 500 kHz。

(14) 傳導輸出功率之要求

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.2 節之規定：

數位調變技術系統：1 W(含)以下。

(15) 功率頻譜密度之要求

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，在使用頻率範圍之任一 3 kHz 頻寬內，由發射機傳導至天線之功率頻譜密度在任意傳輸期間內，皆小於或等於 8 毫分貝(dBm)，且應依 3.10.1.3 之方式降低功率頻譜密度限制值。

(16) 無線資訊傳輸設備必須擁有安全功能之要求

依據國家通訊傳播委員會低功率射頻器材技術規範 5.7.7.3 節之規定，無線資訊傳輸設備必須擁有安全功能，以保護未經授權之一方更改軟體。製造商應提出符合本節規定之相關證明文件或符合性聲明。

(17) 依據國家通訊傳播委員會低功率射頻器材技術規範 5.7.7.4 節之規定，製造商必須在操作於 U-NII 頻段上之數位調變系統中提供安全功能，使第三方團體無法重寫程式，使其操作於非經認證之設定。該軟體必須避免發射機操作於非經認證之頻率、輸出功率、調變形式或其他射頻參數。製造商可使用私有網路，只有經授權的用戶能下載軟體、進行軟體式電子簽章或硬體式的韌體更新，新的軟體可以被合法的載入到設備中，同時又能符合上述事項，並於應用程式中描述設備授權的方法。

(18) 依據國家通訊傳播委員會低功率射頻器材技術規範 5.7.7.5 節之規定，製造商必須確保 DFS 功能無法被無線資訊傳輸設備之操作者取消。

(19) 電波暴露量之評估

依據國家通訊傳播委員會低功率射頻器材技術規範 6.20.2 節之規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符合電波暴露量之要求。

限制值如下：

(1) 職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	6
3 - 30	1842/f	4.89/f	*900/f ²	6
30 - 300	61.4	0.163	1.0	6
300 - 1,500	---	---	f/300	6
1,500 - 100,000	---	---	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

(2) 一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	30
3 - 30	1842/f	4.89/f	*180/f ²	30
30 - 300	27.5	0.073	1.0	30
300 - 1,500	---	---	f/1500	30
1,500 - 100,000	---	---	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

► Bluetooth EDR 頻段部分：

(20) 傳導之規定

依據國家通訊傳播委員會低功率射頻器材技術規範之 3.3 節，電源傳導干擾之限制要求如下：

頻率(MHz)	傳導限制值 (dBuV)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66-56 (註)	56-46 (註)
0.5-5	56	46
5-30	60	50

(註)：隨頻率之對數遞減。

(21) 帶外發射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.5 節之要求，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 4.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。此外，落於 3.5 禁用頻段之輻射發射，應符合 3.6 之規定。

頻率(MHz)	電場強度(微伏特/公尺, uV/m)	測距(公尺)
$0.009 \leq f \leq 0.490$	$2,400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24,000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(22) 天線之規定

天線規格不受第 3.2 節規定之限制。

(23) 天線增益之要求

低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.3 節之規定如下：

- (A) 進行固定式點對點操作時，其發射天線之方向性增益超過 6 dBi，每超過 3 dBi，最大傳導輸出功率限制值應降低 1 dB。
- (B) 天線以多向波束發射方式(含同時發射或循序發射)將訊號導向多個接收機或接收機群組時，應符合下列規定：
- (a) 非同時發射多向波束者，所有載波或頻道傳輸至所有天線陣列或陣列群之總和傳導輸出功率應符合 4.10.1.2 之功率限制值。如天線/天線陣列群之方向性增益超過 6 dBi，每超過 3 dBi，總和傳導輸出功率限制值應降低 1 dB。方向性增益值應計算如下：
 - (i) 方向性增益值 = $10\log(\text{天線陣列之單元數目}) + \text{各單元中最高之方向性增益值}$ 。
 - (ii) 天線陣列間之遮蔽效應或波束干涉損失能充分佐證時，方向性增益得低於(i)計算數值。
 - (b) 同時發射多向波束於相同或不同頻道者，其每一波束功率應符合(a)之功率限制值。如發射波束有重疊現象，功率應降低，以確保總和傳導輸出功率符合(a)之限制值。同時發射的所有波束總和傳導輸出功率不大於(a)總和傳導輸出功率限制值加 8 dB。方向性增益值計算同(a)。
 - (c) 發射機之天線具備單向波束功能者，應符合(1)(A)及(3)後段之規定。
- 除(A)及(B)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率限制值。

(24) 峰值傳導輸出功率之要求

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.2 節之規定：

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 4.10.1.6 (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。

(25) 跳頻頻道數之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，操作於 2400-2483.5 MHz 之展頻跳頻系統，須使用至少 15 個無重疊的頻道。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

(26) 跳頻頻道間隔之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，跳頻系統之載波頻率頻道間隔應大於或等於 25 kHz 或跳頻頻道之 20 dB 頻寬，兩者取較寬者。但操作頻率為 2400 MHz~2483.5 MHz 頻段且輸出功率應小於或等於 125 mW 跳頻系統，其載波頻率頻道間隔不得小於 25 kHz 或跳頻頻道 20 dB 頻寬之三分之二，兩者取較寬者。系統之跳頻頻道應依虛擬亂數排列，在各頻率之跳頻頻道上跳躍。每一發射機必須均等的使用每一頻率。系統接收機應具有與發射機跳躍頻道頻寬相匹配之輸入頻寬，且應隨所發射之訊號同步偏移接收頻率。

(27) 每一頻道停留時間之量測

依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之規定，操作於 2400 MHz~2483.5 MHz 之展頻跳頻系統，須使用至少 15 個無重疊的頻道，在 0.4 秒乘以跳頻頻道數之週期內，任一頻率占用之平均時間應小於或等於 0.4 秒。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

(28) 電波暴露量之評估

依據國家通訊傳播委員會低功率射頻器材技術規範 6.20.2 節之規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符合電波暴露量之要求。

限制值如下：

(1) 職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	6
3 - 30	1842/f	4.89/f	*900/f ²	6
30 - 300	61.4	0.163	1.0	6
300 - 1,500	---	---	f/300	6
1,500 - 100,000	---	---	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

(2) 一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3 - 3.0	614	1.63	*100	30
3 - 30	1842/f	4.89/f	*180/f ²	30
30 - 300	27.5	0.073	1.0	30

300 - 1,500	---	---	$f/1500$	30
1,500 – 100,000	---	---	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：MHz。

► NFC 頻段部分：

(29) 傳導之規定

依據國家通訊傳播委員會低功率射頻器材技術規範之 3.3 節，電源傳導干擾之限制要求如下：

頻率(MHz)	傳導限制值 (dBuV)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66-56 (註)	56-46 (註)
0.5-5	56	46
5-30	60	50

(註)：隨頻率之對數遞減。

(30) 主波發射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.2.1.1 節之要求，距器材 30 公尺處之主波電場強度應小於或等於 15848 uV/m。

(31) 不必要之發射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.2.1.2 節之要求，應符合第 2.8 節之規定：

頻率(MHz)	電場強度(微伏特/公尺, uV/m)	測距(公尺)
$0.009 \leq f \leq 0.490$	$2,400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24,000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(32) 頻率容許差度之規定

依據國家通訊傳播委員會低功率射頻器材技術規範 4.2.1.3 節之要求，應維持在主波頻率之 $\pm 0.01\%$ 以內。在正常供應電壓下，溫度在攝氏零下二十度至攝氏五十度間變化；及在攝氏二十度下，供應電壓在額定值之 $\pm 15\%$ 內變化時。以電池作業，應以新電池測試，須符合第 6.18 節之規定。

(33) 天線之規定

低功率射頻器材之發射機或收發信機所使用之天線，除本規範章節中另有規定外，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。

參考國際標準指南：

KDB 558074

3.2 限制使用之頻帶

除本規範另有規定外，任何低功率射頻器材之主波皆不得使用下表所列各頻段之頻率；低功率射頻器材落於下表所列頻段之混附發射，其電場強度必須符合 3.6 之限制規定。

頻率(兆赫)	頻率(兆赫)	頻率(兆赫)
0.090~0.110	240.00~285.00	3332.0~3339.0
0.490~0.510	322.00~335.40	3345.8~3358.0
2.172~2.198	399.90~410.00	3500.0~4400.0
3.013~3.033	485.00~510.00	4500.0~5250.0
4.115~4.198	608.00~614.00	5350.0~5460.0
5.670~5.690	703.00~748.00	7250.0~7750.0
6.200~6.300	758.00~803.00	8025.0~8500.0
8.230~8.400	825.00~915.00	9000.0~9200.0
12.265~12.600	930.00~1240.0	9300.0~9500.0
13.340~13.430	1300.0~1427.0	10600~12700
14.965~15.020	1435.0~1626.5	13250~13400
16.700~16.755	1660.0~1785.0	14470~14500
19.965~20.020	1805.0~1880.0	15350~16200
25.500~25.700	1885.0~1900.0	17700~21400
37.475~38.275	1905.0~1985.0	22010~23120
73.500~75.400	2010.0~2025.0	23600~24000
108.00~138.00	2110.0~2170.0	31200~31800
149.90~150.05	2200.0~2300.0	36430~36500
156.70~156.90	2310.0~2390.0	38600 以上
162.01~167.17	2483.5~2900.0	
167.72~173.20	3260.0~3267.0	

2.4 GHz 頻段測試紀錄結果

4 帶外發射之量測

4.1 適用標準

請見本報告 3.1 節第(10)的規定。

4.2 量測方法

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線從離地 1 米至 4 米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

Note: 對於 1 GHz 以上場強輻射的測試，待測物則置於 1.5 米高的非金屬桌面

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz ;

Average

802.11b 為 RBW = 1 MHz, VBW = 200 Hz

802.11g 為 RBW = 1 MHz, VBW = 1 kHz

802.11n (HT20) 為 RBW = 1 MHz, VBW = 1 kHz

接收諧波：

Below 1 GHz

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz ; Average 為 RBW = 1 MHz, VBW = 3 MHz ; Detector: RMS ; Sweep time: Auto ; Trace count: trace average of at least 100 traces.

其它不必要之訊號

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

4.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2020	Mar. 17, 2021
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 12, 2019	Dec. 11, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 08, 2019	Nov. 07, 2020
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Loop Antenna	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier EMCI	EMC001340	980201	Oct. 14, 2019	Oct. 13, 2020
Bluetooth Tester R&S	CBT	100946	Aug. 09, 2018 Aug. 06, 2020	Aug. 08, 2020 Aug. 05, 2022
Preamplifier EMCI	EMC 012645	980115	Oct. 08, 2019	Oct. 07, 2020
Preamplifier EMCI	EMC 184045	980116	Oct. 08, 2019	Oct. 07, 2020
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 07, 2020
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019 Sep. 01, 2020	Sep. 03, 2020 Aug. 31, 2021
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019 Sep. 01, 2020	Sep. 03, 2020 Aug. 31, 2021
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000&3000	140811+170717	Oct. 08, 2019	Oct. 07, 2020
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 08, 2019	Oct. 07, 2020
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 07, 2020
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

NOTE:

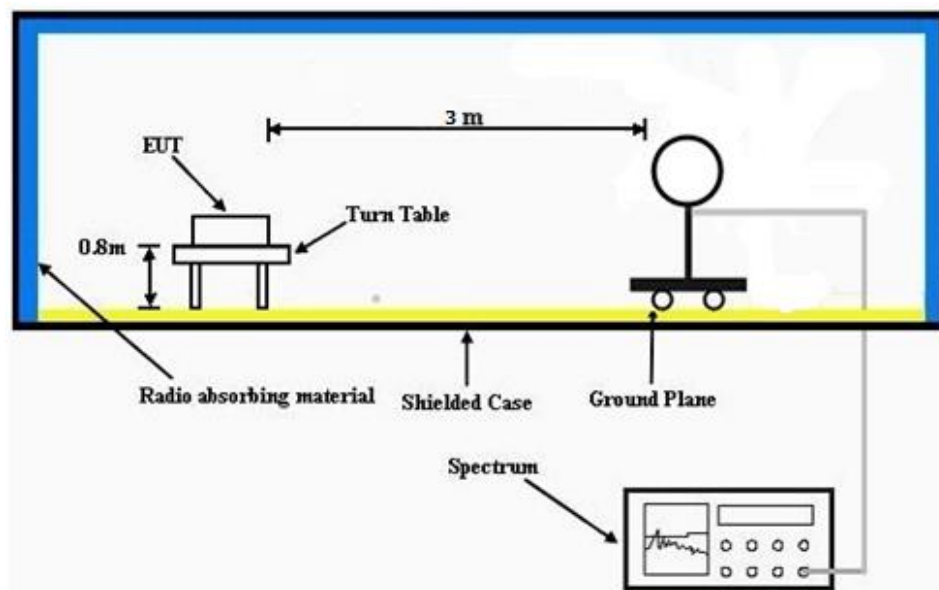
1. The calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.

5. The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

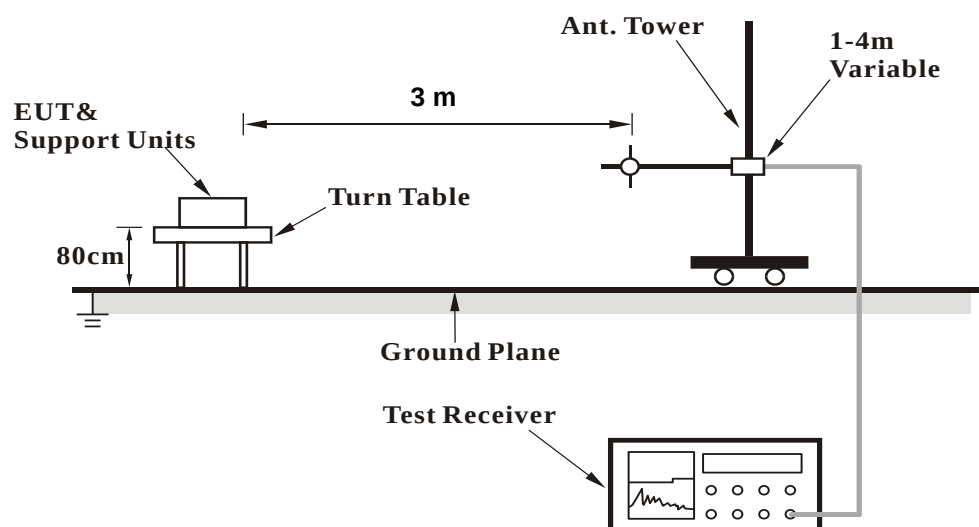
Measurement	Frequency	Uncertainty
Radiated emissions	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~1000 MHz	2.95 dB
	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

4.4 測試配置

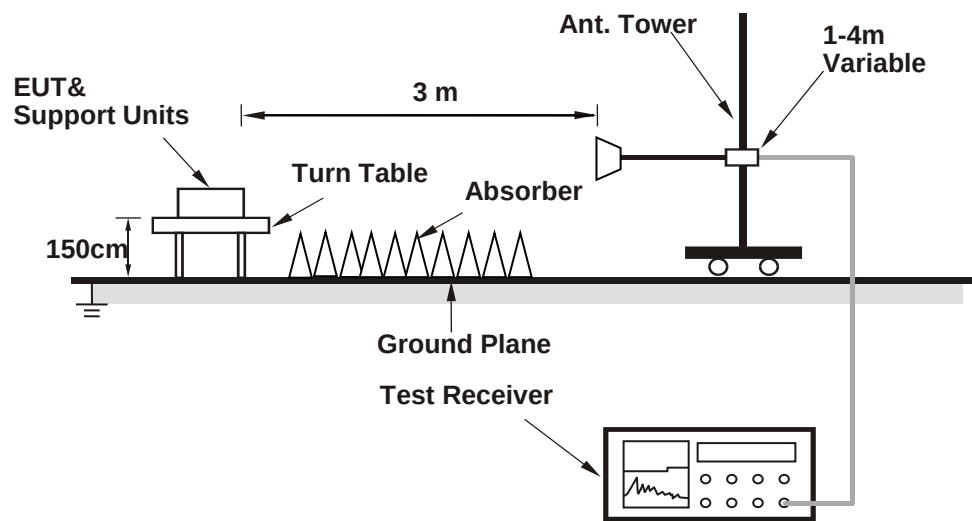
<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



4.5 場強度之計算

場強之計算公式如下：

結果值 Emission level (dBuV/m) = 機器讀值 Raw Value (dBuV) +校正因子 Correction Factor (dB/m)

餘裕度 Margin(dB) = 結果值 Emission level (dBuV/m)-限制值 Limit value (dBuV/m)

量測結果請見下頁。

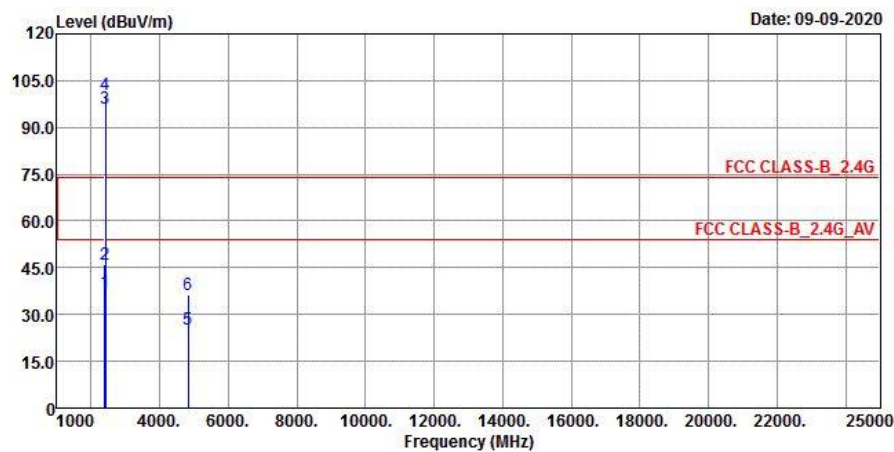
4.6 量測結果

4.6.1 發射諧波

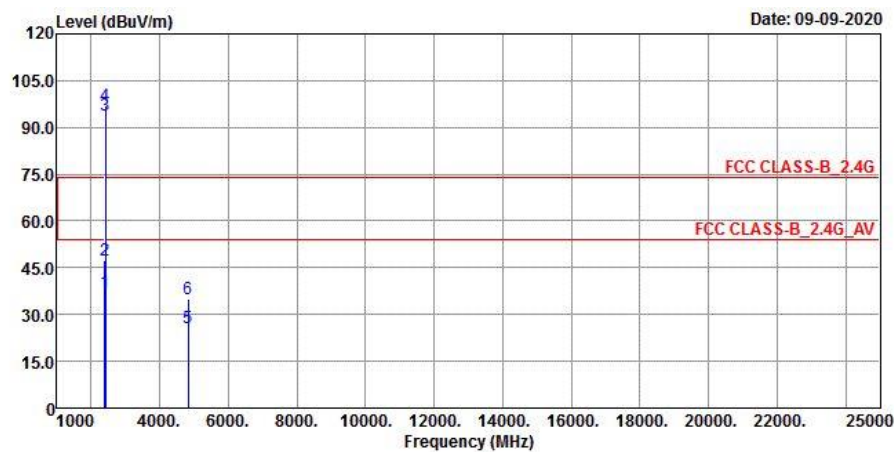
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



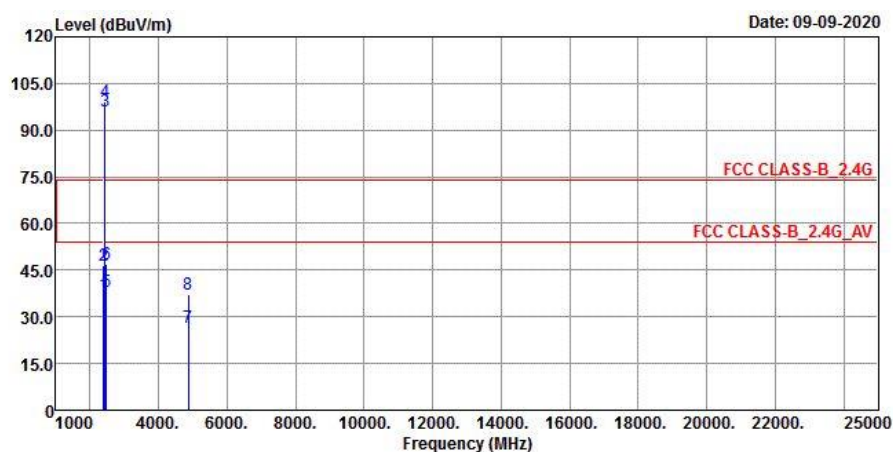
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	37.35	43.27	-5.92	54	-16.65	102	353	Average
2390	46.23	52.15	-5.92	74	-27.77	102	353	Peak
2412	96.02	101.97	-5.95	-----	-----	102	353	Average
2412	100.34	106.29	-5.95	-----	-----	102	353	Peak
4824	25.4	41.02	-15.62	54	-28.6	154	253	Average
4824	36.33	51.95	-15.62	74	-37.67	154	253	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.622	37.04	42.93	-5.89	54	-16.96	262	300	Average
2387.622	47.34	53.23	-5.89	74	-26.66	262	300	Peak
2412	94.08	100.03	-5.95	-----	-----	262	300	Average
2412	97.19	103.14	-5.95	-----	-----	262	300	Peak
4824	25.54	41.16	-15.62	54	-28.46	162	285	Average
4824	34.85	50.47	-15.62	74	-39.15	162	285	Peak

Remarks:

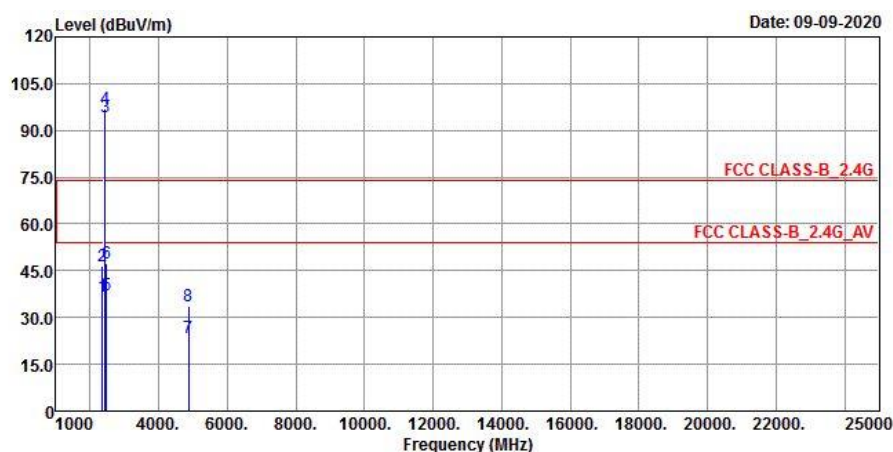
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



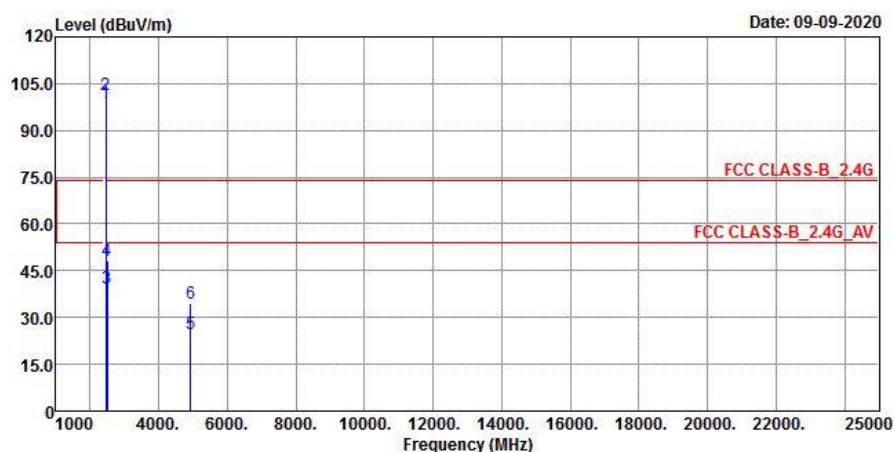
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	37.07	42.99	-5.92	54	-16.93	101	352	Average
2390	46.66	52.58	-5.92	74	-27.34	101	352	Peak
2437	96.15	102.04	-5.89	-----	-----	101	352	Average
2437	99.02	104.91	-5.89	-----	-----	101	352	Peak
2483.5	38.08	43.78	-5.7	54	-15.92	101	352	Average
2483.5	47.06	52.76	-5.7	74	-26.94	101	352	Peak
4874	26.45	42.01	-15.56	54	-27.55	192	264	Average
4874	37.37	52.93	-15.56	74	-36.63	192	264	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2361.11	36.62	42.45	-5.83	54	-17.38	263	326	Average
2361.11	46.41	52.24	-5.83	74	-27.59	263	326	Peak
2437	94.45	100.34	-5.89	-----	-----	263	326	Average
2437	97.05	102.94	-5.89	-----	-----	263	326	Peak
2483.5	37.12	42.82	-5.7	54	-16.88	263	326	Average
2483.5	47.21	52.91	-5.7	74	-26.79	263	326	Peak
4874	23.59	39.15	-15.56	54	-30.41	162	151	Average
4874	33.58	49.14	-15.56	74	-40.42	162	151	Peak

Remarks:

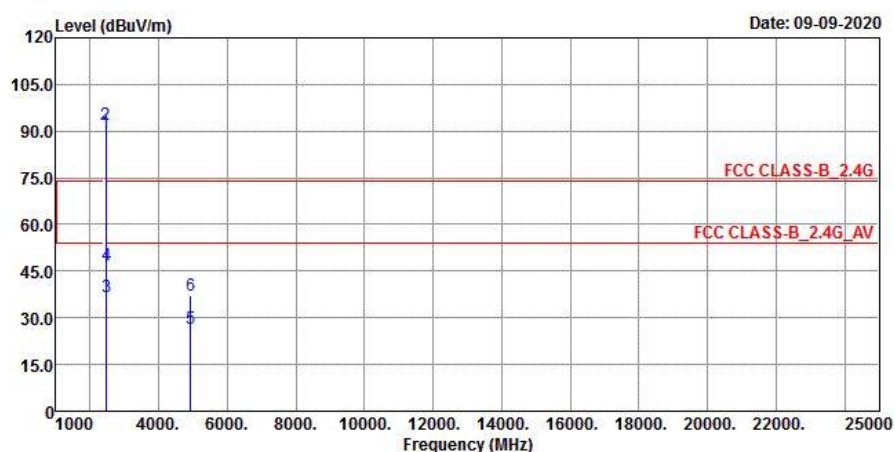
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



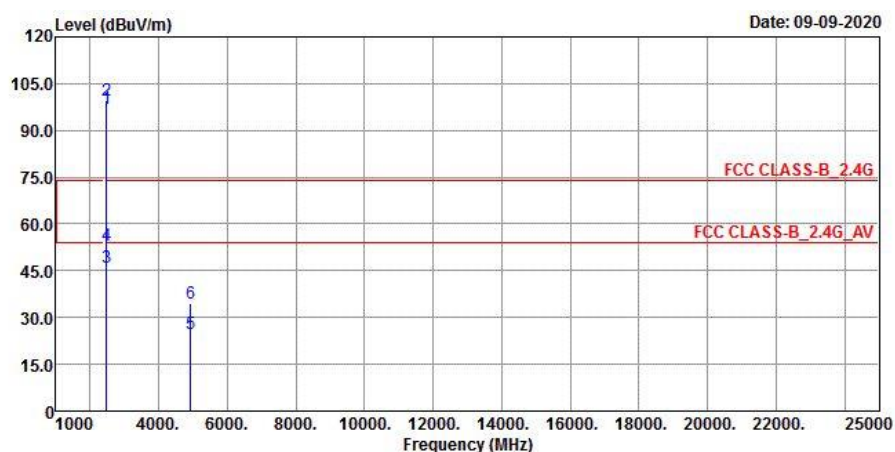
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	98.58	104.39	-5.81	-----	-----	118	350	Average
2462	101.37	107.18	-5.81	-----	-----	118	350	Peak
2487.422	39.43	45.13	-5.7	54	-14.57	118	350	Average
2487.422	48.08	53.78	-5.7	74	-25.92	118	350	Peak
4924	24.64	40.15	-15.51	54	-29.36	132	162	Average
4924	34.73	50.24	-15.51	74	-39.27	132	162	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	89.32	95.13	-5.81	-----	-----	258	337	Average
2462	91.94	97.75	-5.81	-----	-----	258	337	Peak
2483.5	36.71	42.41	-5.7	54	-17.29	258	337	Average
2483.5	47.12	52.82	-5.7	74	-26.88	258	337	Peak
4924	26.64	42.15	-15.51	54	-27.36	147	132	Average
4924	37	52.51	-15.51	74	-37	147	132	Peak

Remarks:

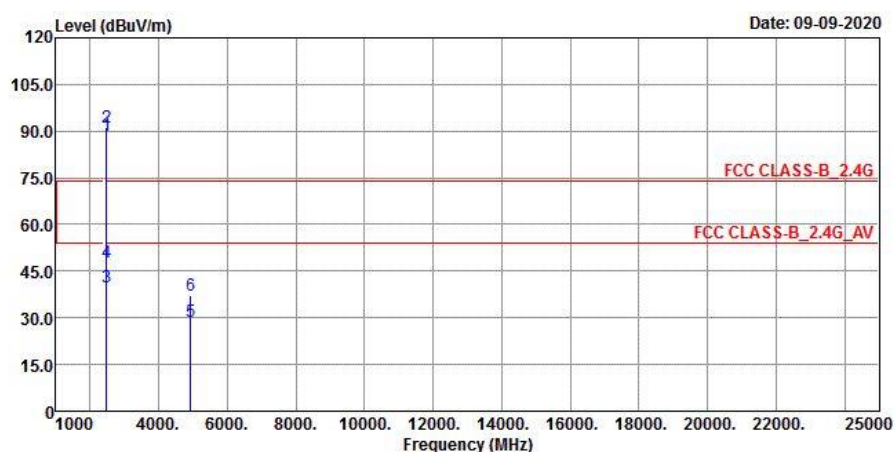
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2462 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



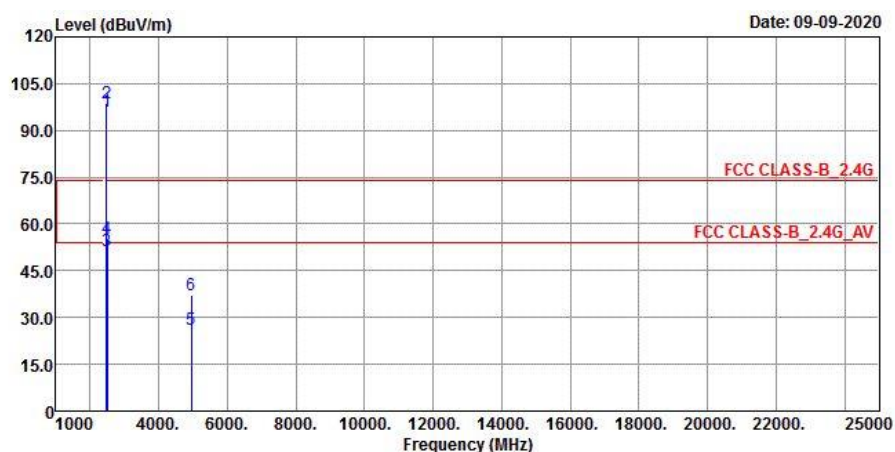
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	96.89	102.61	-5.72	-----	-----	119	353	Average
2467	99.75	105.47	-5.72	-----	-----	119	353	Peak
2483.5	46.18	51.88	-5.7	54	-7.82	119	353	Average
2483.5	53.16	58.86	-5.7	74	-20.84	119	353	Peak
4934	24.65	40.16	-15.51	54	-29.35	105	132	Average
4934	34.73	50.24	-15.51	74	-39.27	105	132	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	88.53	94.25	-5.72	-----	-----	254	334	Average
2467	91.03	96.75	-5.72	-----	-----	254	334	Peak
2483.5	39.9	45.6	-5.7	54	-14.1	254	334	Average
2483.5	47.89	53.59	-5.7	74	-26.11	254	334	Peak
4934	28.64	44.15	-15.51	54	-25.36	147	162	Average
4934	37	52.51	-15.51	74	-37	147	162	Peak

Remarks:

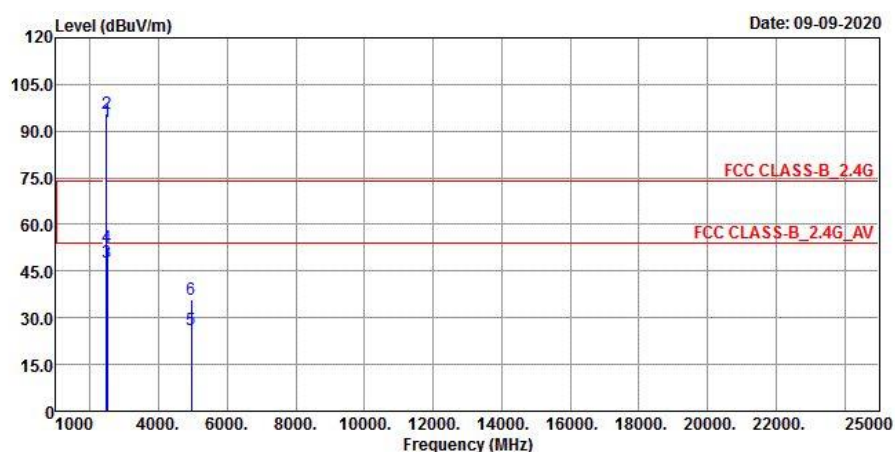
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2467 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	96.21	101.92	-5.71	-----	-----	117	351	Average
2472	98.78	104.49	-5.71	-----	-----	117	351	Peak
2486.738	51.18	56.88	-5.7	54	-2.82	117	351	Average
2486.738	55.14	60.84	-5.7	74	-18.86	117	351	Peak
4944	26.05	41.54	-15.49	54	-27.95	145	152	Average
4944	37.38	52.87	-15.49	74	-36.62	145	152	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	92.91	98.62	-5.71	-----	-----	253	336	Average
2472	95.61	101.32	-5.71	-----	-----	253	336	Peak
2486.51	47.96	53.66	-5.7	54	-6.04	253	336	Average
2486.51	52.81	58.51	-5.7	74	-21.19	253	336	Peak
4944	26.04	41.53	-15.49	54	-27.96	132	265	Average
4944	35.65	51.14	-15.49	74	-38.35	132	265	Peak

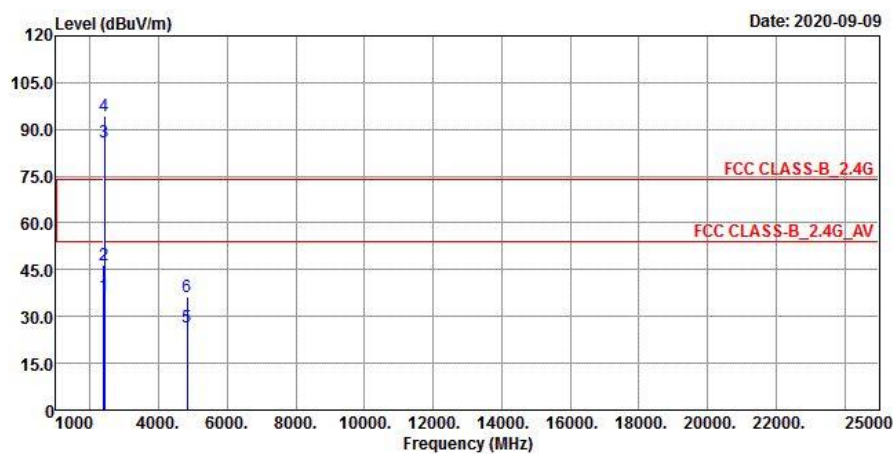
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2472 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

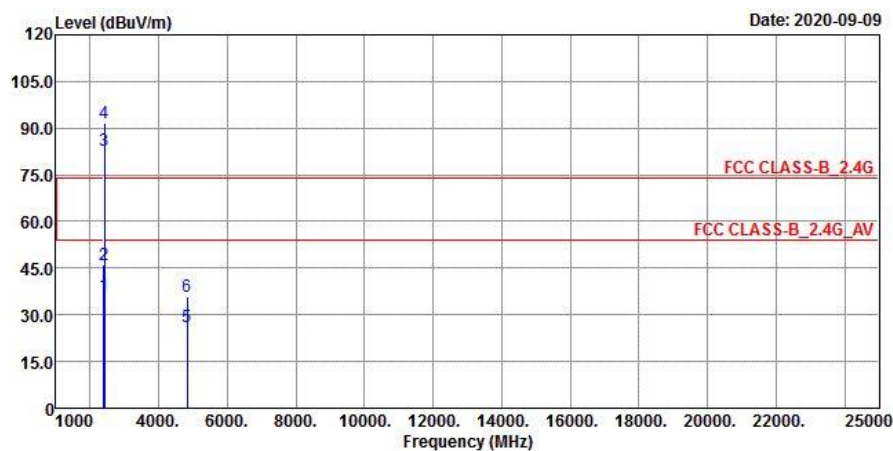
802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



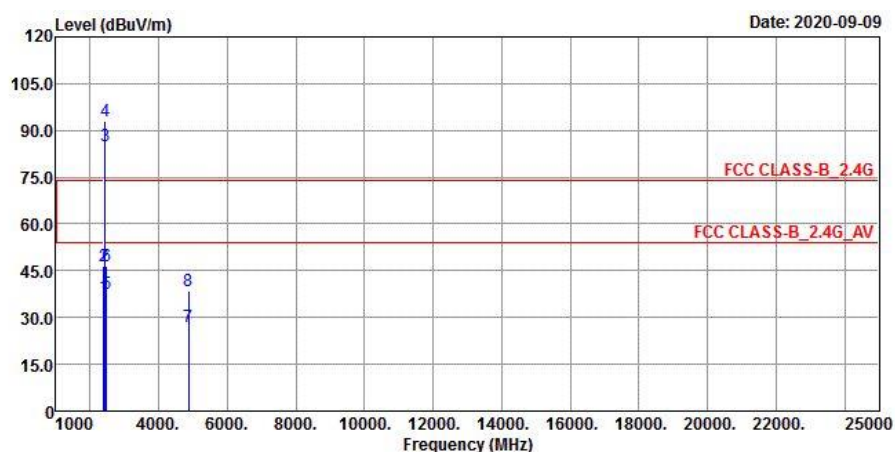
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.77	42.69	-5.92	54	-17.23	301	8	Average
2390	46.33	52.25	-5.92	74	-27.67	301	8	Peak
2412	85.97	91.92	-5.95	-----	-----	301	8	Average
2412	94.14	100.09	-5.95	-----	-----	301	8	Peak
4824	26.45	42.07	-15.62	54	-27.55	103	121	Average
4824	36.33	51.95	-15.62	74	-37.67	103	121	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.49	42.41	-5.92	54	-17.51	118	284	Average
2390	46.23	52.15	-5.92	74	-27.77	118	284	Peak
2412	83.01	88.96	-5.95	-----	-----	118	284	Average
2412	91.79	97.74	-5.95	-----	-----	118	284	Peak
4825	26.16	41.77	-15.61	54	-27.84	163	247	Average
4825	35.85	51.46	-15.61	74	-38.15	163	247	Peak

Remarks:

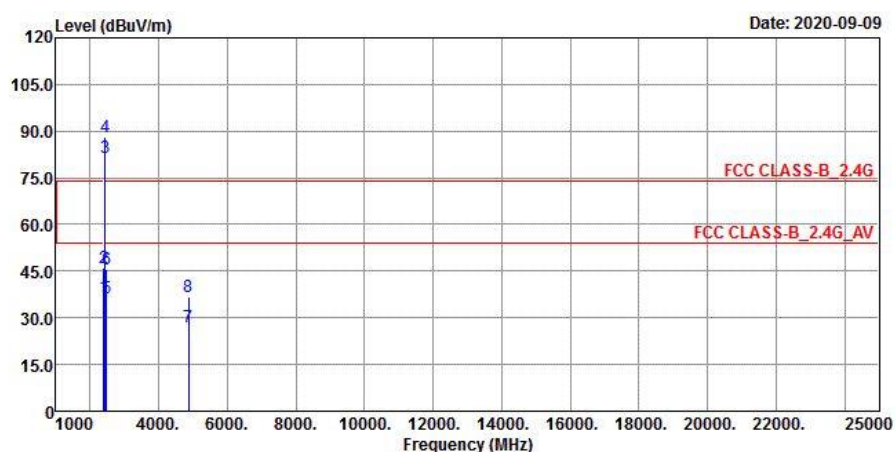
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



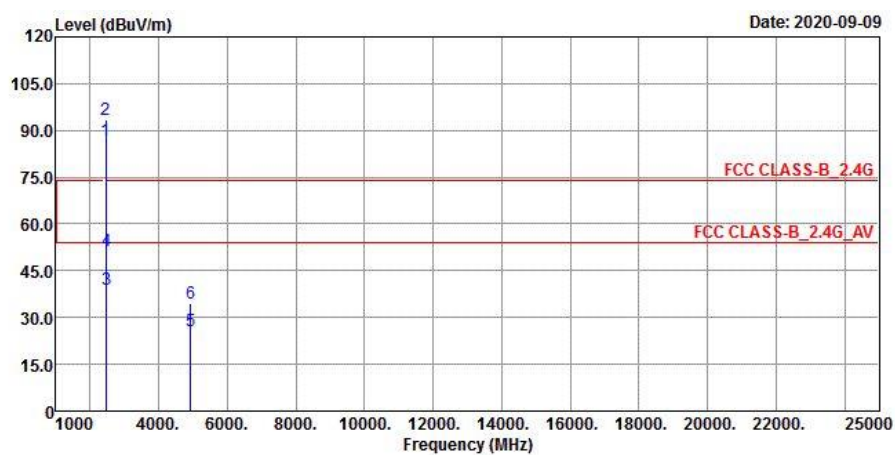
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.7	42.62	-5.92	54	-17.3	241	9	Average
2390	46.66	52.58	-5.92	74	-27.34	241	9	Peak
2437	85.09	90.98	-5.89	-----	-----	241	9	Average
2437	93.1	98.99	-5.89	-----	-----	241	9	Peak
2483.5	37.47	43.17	-5.7	54	-16.53	241	9	Average
2483.5	46.52	52.22	-5.7	74	-27.48	241	9	Peak
4874	26.83	42.39	-15.56	54	-27.17	115	121	Average
4874	38.37	53.93	-15.56	74	-35.63	115	121	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.6	42.52	-5.92	54	-17.4	110	281	Average
2390	46.16	52.08	-5.92	74	-27.84	110	281	Peak
2437	81.44	87.33	-5.89	-----	-----	110	281	Average
2437	88.13	94.02	-5.89	-----	-----	110	281	Peak
2483.5	36.51	42.21	-5.7	54	-17.49	110	281	Average
2483.5	45.57	51.27	-5.7	74	-28.43	110	281	Peak
4874	26.98	42.54	-15.56	54	-27.02	102	109	Average
4874	36.58	52.14	-15.56	74	-37.42	102	109	Peak

Remarks:

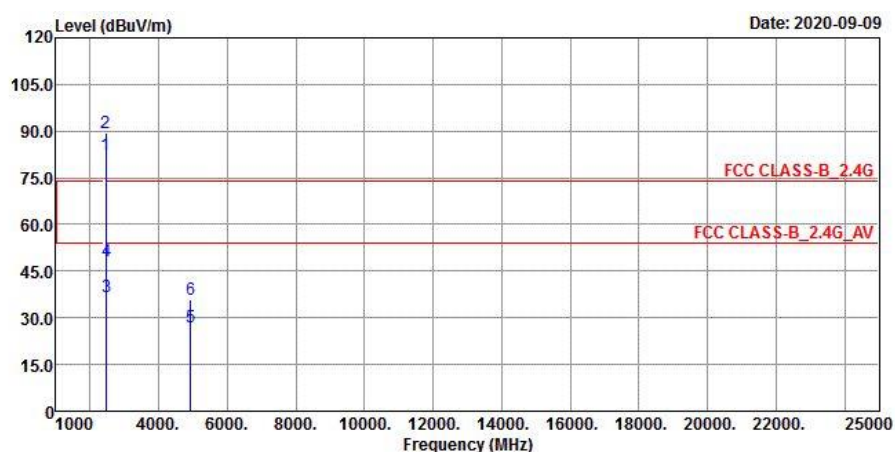
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



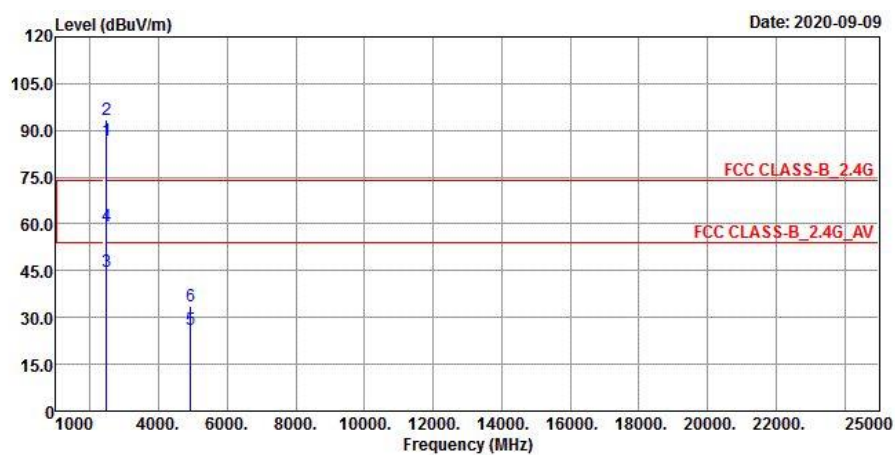
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	86.66	92.47	-5.81	-----	-----	265	5	Average
2462	93.56	99.37	-5.81	-----	-----	265	5	Peak
2483.5	38.95	44.65	-5.7	54	-15.05	265	5	Average
2483.5	51.56	57.26	-5.7	74	-22.44	265	5	Peak
4924	25.56	41.07	-15.51	54	-28.44	118	163	Average
4924	34.73	50.24	-15.51	74	-39.27	118	163	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	82.16	87.97	-5.81	-----	-----	145	290	Average
2462	89.48	95.29	-5.81	-----	-----	145	290	Peak
2483.5	36.91	42.61	-5.7	54	-17.09	145	290	Average
2483.5	48.14	53.84	-5.7	74	-25.86	145	290	Peak
4924	26.94	42.45	-15.51	54	-27.06	104	63	Average
4924	36	51.51	-15.51	74	-38	104	63	Peak

Remarks:

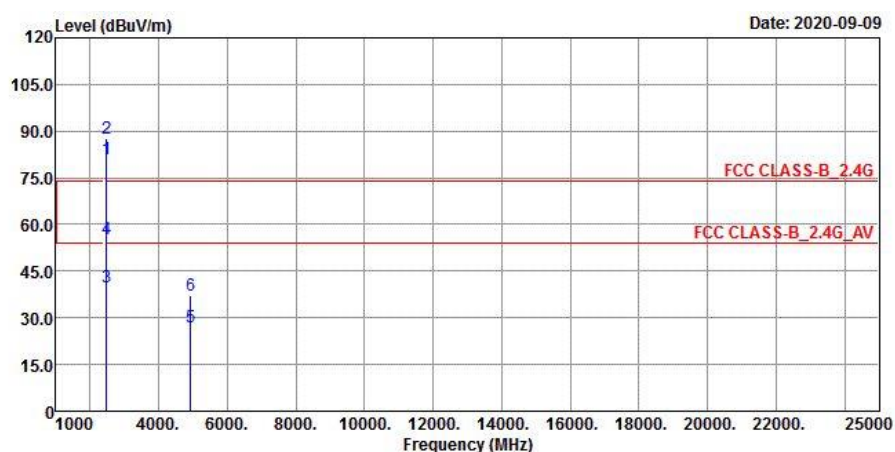
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2462 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



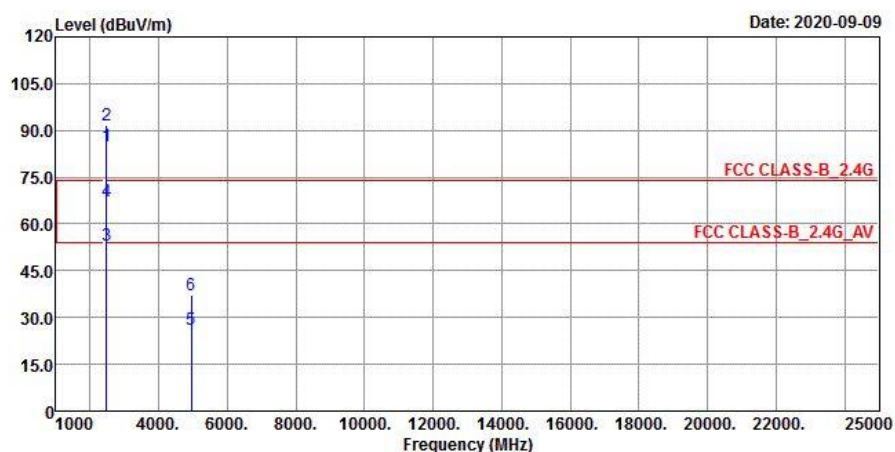
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	86.65	92.37	-5.72	-----	-----	165	6	Average
2467	93.22	98.94	-5.72	-----	-----	165	6	Peak
2483.5	44.63	50.33	-5.7	54	-9.37	165	6	Average
2483.5	59.21	64.91	-5.7	74	-14.79	165	6	Peak
4934	26.06	41.57	-15.51	54	-27.94	138	12	Average
4934	33.73	49.24	-15.51	74	-40.27	138	12	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	81.16	86.88	-5.72	-----	-----	126	290	Average
2467	87.71	93.43	-5.72	-----	-----	126	290	Peak
2483.5	40	45.7	-5.7	54	-14	126	290	Average
2483.5	55.37	61.07	-5.7	74	-18.63	126	290	Peak
4934	27.08	42.59	-15.51	54	-26.92	126	301	Average
4934	37	52.51	-15.51	74	-37	126	301	Peak

Remarks:

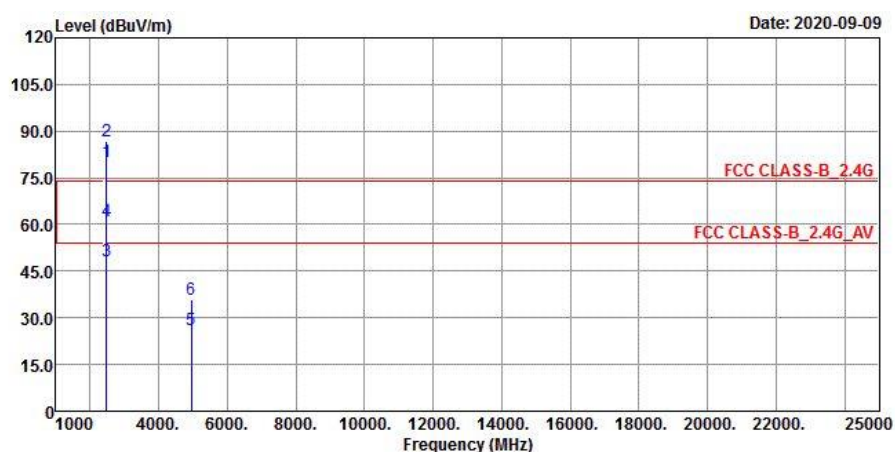
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2467 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	84.97	90.68	-5.71	-----	-----	325	8	Average
2472	91.62	97.33	-5.71	-----	-----	325	8	Peak
2483.5	53.2	58.9	-5.7	54	-0.8	325	8	Average
2483.5	67.11	72.81	-5.7	74	-6.89	325	8	Peak
4944	25.94	41.43	-15.49	54	-28.06	100	139	Average
4944	37.38	52.87	-15.49	74	-36.62	100	139	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	80.23	85.94	-5.71	-----	-----	127	290	Average
2472	86.88	92.59	-5.71	-----	-----	127	290	Peak
2483.5	48.07	53.77	-5.7	54	-5.93	127	290	Average
2483.5	61.09	66.79	-5.7	74	-12.91	127	290	Peak
4944	26.04	41.53	-15.49	54	-27.96	115	209	Average
4944	35.65	51.14	-15.49	74	-38.35	115	209	Peak

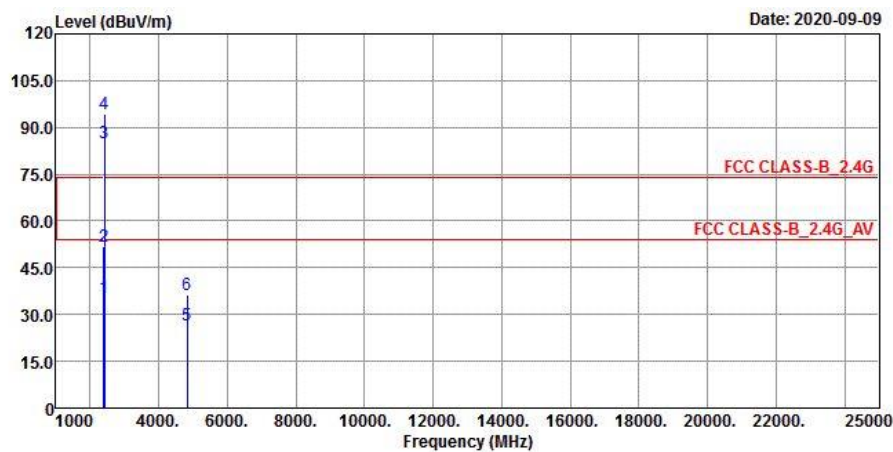
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2472 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

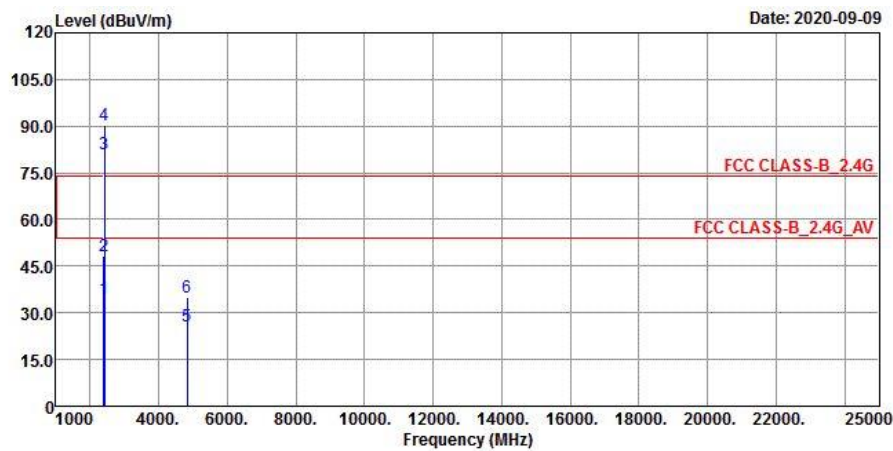
802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



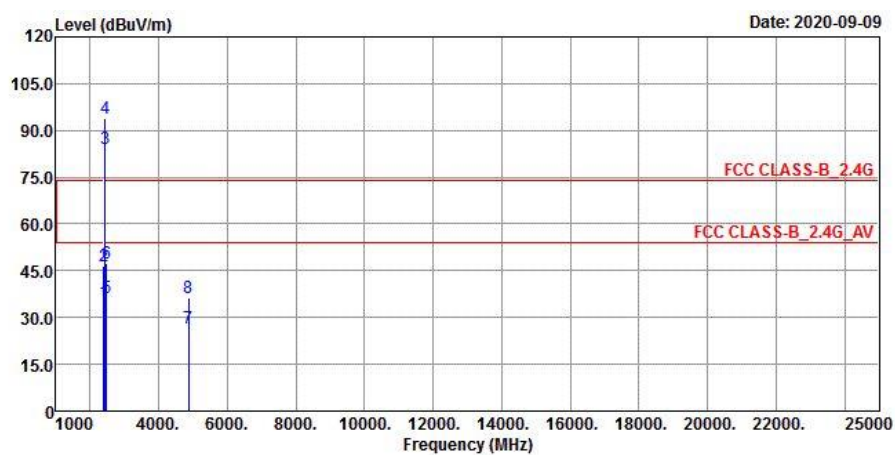
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	35.64	41.56	-5.92	54	-18.36	194	38	Average
2390	51.82	57.74	-5.92	74	-22.18	194	38	Peak
2412	84.89	90.84	-5.95	-----	-----	194	38	Average
2412	94.49	100.44	-5.95	-----	-----	194	38	Peak
4824	26.57	42.19	-15.62	54	-27.43	109	78	Average
4824	36.33	51.95	-15.62	74	-37.67	109	78	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	34.67	40.59	-5.92	54	-19.33	117	285	Average
2390	48.36	54.28	-5.92	74	-25.64	117	285	Peak
2412	80.88	86.83	-5.95	-----	-----	117	285	Average
2412	90.37	96.32	-5.95	-----	-----	117	285	Peak
4824	25.49	41.11	-15.62	54	-28.51	122	163	Average
4824	34.85	50.47	-15.62	74	-39.15	122	163	Peak

Remarks:

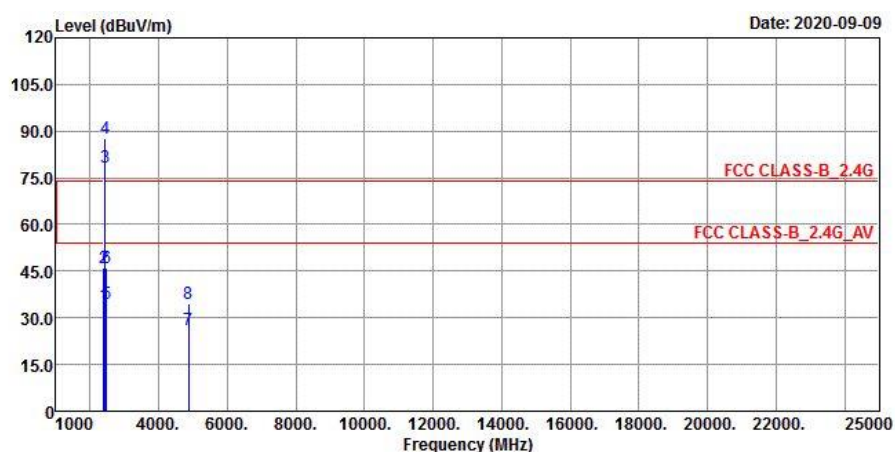
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



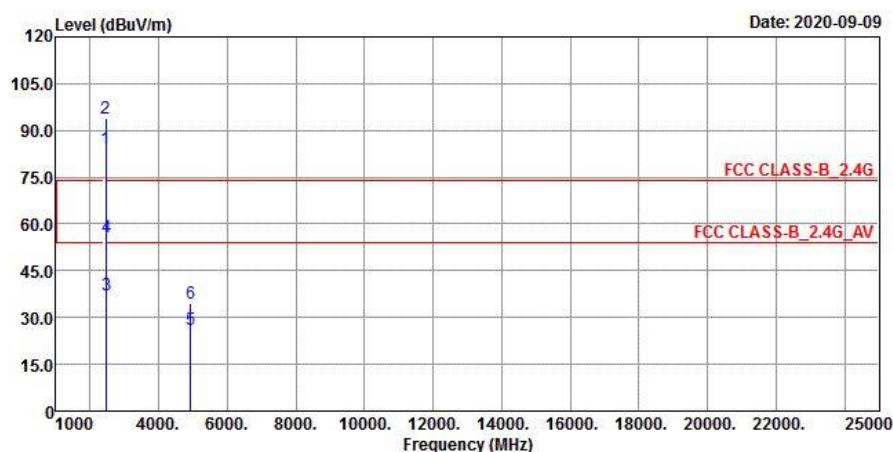
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	35	40.92	-5.92	54	-19	224	36	Average
2390	46.59	52.51	-5.92	74	-27.41	224	36	Peak
2437	84.23	90.12	-5.89	-----	-----	224	36	Average
2437	94.05	99.94	-5.89	-----	-----	224	36	Peak
2483.5	36.49	42.19	-5.7	54	-17.51	224	36	Average
2483.5	47.46	53.16	-5.7	74	-26.54	224	36	Peak
4874	26.56	42.12	-15.56	54	-27.44	154	126	Average
4874	36.37	51.93	-15.56	74	-37.63	154	126	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	33.94	39.86	-5.92	54	-20.06	105	284	Average
2390	46.02	51.94	-5.92	74	-27.98	105	284	Peak
2437	78.29	84.18	-5.89	-----	-----	105	284	Average
2437	87.62	93.51	-5.89	-----	-----	105	284	Peak
2483.5	34.32	40.02	-5.7	54	-19.68	105	284	Average
2483.5	45.88	51.58	-5.7	74	-28.12	105	284	Peak
4874	26.13	41.69	-15.56	54	-27.87	105	24	Average
4874	34.58	50.14	-15.56	74	-39.42	105	24	Peak

Remarks:

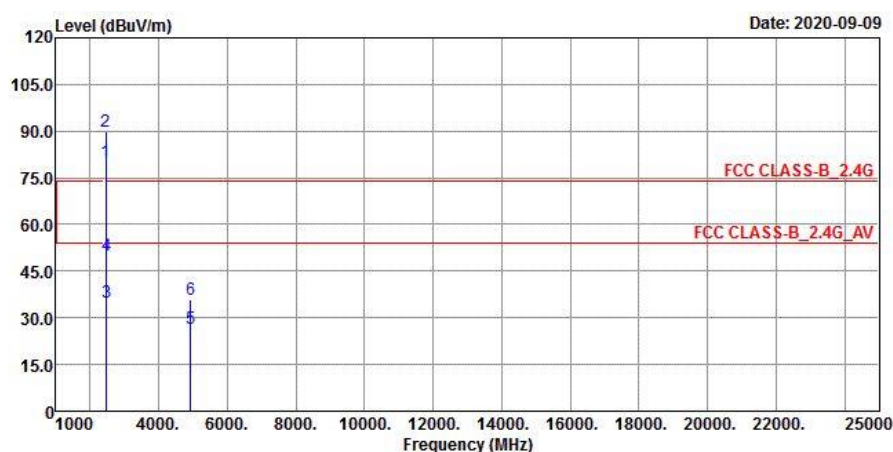
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



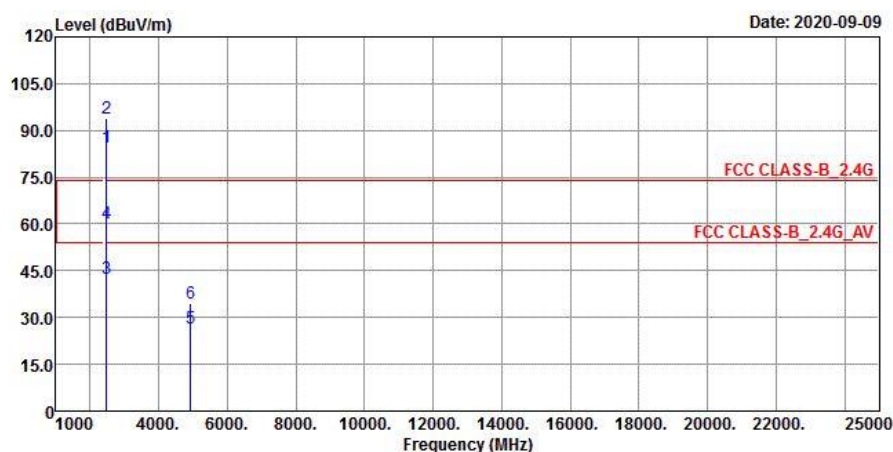
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	84.08	89.89	-5.81	-----	-----	189	36	Average
2462	93.81	99.62	-5.81	-----	-----	189	36	Peak
2483.5	37.1	42.8	-5.7	54	-16.9	189	36	Average
2483.5	55.58	61.28	-5.7	74	-18.42	189	36	Peak
4924	26.01	41.52	-15.51	54	-27.99	106	358	Average
4924	34.73	50.24	-15.51	74	-39.27	106	358	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	79.97	85.78	-5.81	-----	-----	140	289	Average
2462	89.96	95.77	-5.81	-----	-----	140	289	Peak
2483.5	34.9	40.6	-5.7	54	-19.1	140	289	Average
2483.5	50.21	55.91	-5.7	74	-23.79	140	289	Peak
4924	26.79	42.3	-15.51	54	-27.21	164	182	Average
4924	36	51.51	-15.51	74	-38	164	182	Peak

Remarks:

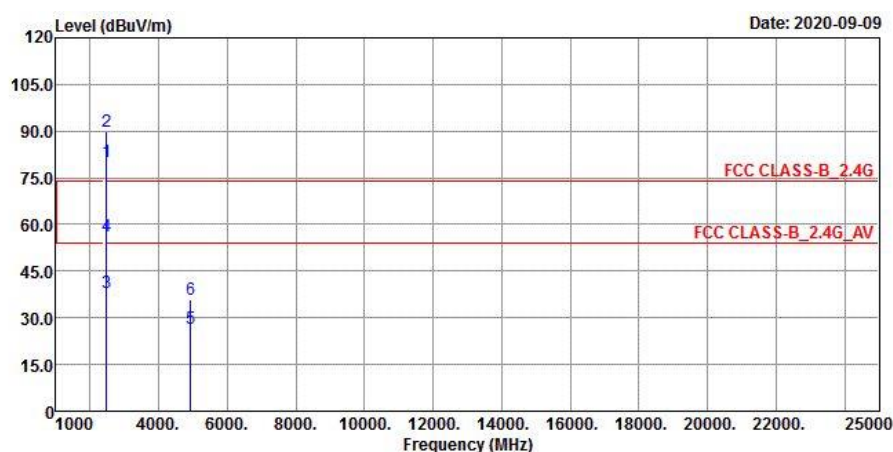
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2462 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 12	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



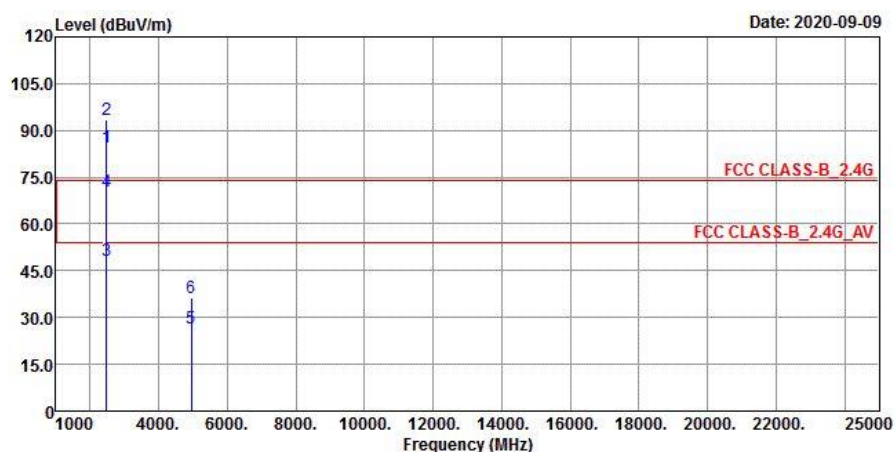
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	84.68	90.4	-5.72	-----	-----	166	5	Average
2467	93.81	99.53	-5.72	-----	-----	166	5	Peak
2483.5	42.33	48.03	-5.7	54	-11.67	166	5	Average
2483.5	60.14	65.84	-5.7	74	-13.86	166	5	Peak
4934	26.46	41.97	-15.51	54	-27.54	121	279	Average
4934	34.73	50.24	-15.51	74	-39.27	121	279	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2467	80.11	85.83	-5.72	-----	-----	124	286	Average
2467	89.74	95.46	-5.72	-----	-----	124	286	Peak
2483.5	38.21	43.91	-5.7	54	-15.79	124	286	Average
2483.5	56.21	61.91	-5.7	74	-17.79	124	286	Peak
4934	26.56	42.07	-15.51	54	-27.44	107	255	Average
4934	36	51.51	-15.51	74	-38	107	255	Peak

Remarks:

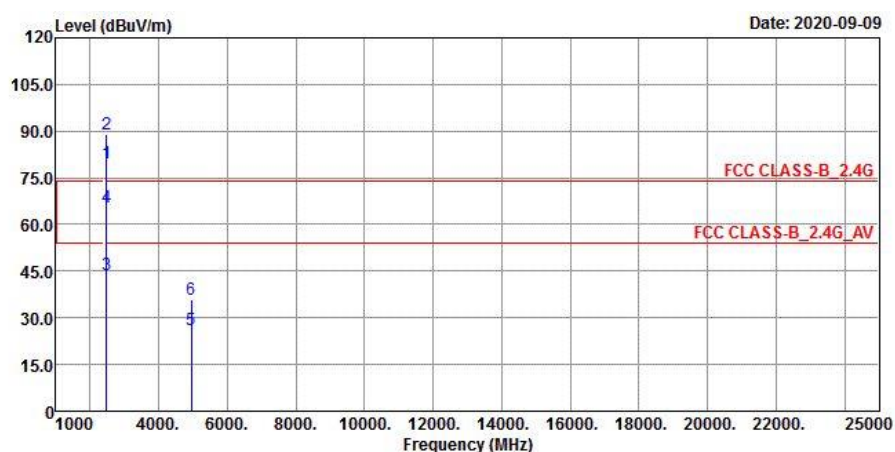
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2467 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	84.42	90.13	-5.71	-----	-----	162	38	Average
2472	93.54	99.25	-5.71	-----	-----	162	38	Peak
2483.5	48.14	53.84	-5.7	54	-5.86	162	38	Average
2483.5	70.44	76.14	-5.7	74	-3.56	162	38	Peak
4944	26.6	42.09	-15.49	54	-27.4	145	162	Average
4944	36.38	51.87	-15.49	74	-37.62	145	162	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2472	79.71	85.42	-5.71	-----	-----	125	292	Average
2472	89.13	94.84	-5.71	-----	-----	125	292	Peak
2483.5	43.95	49.65	-5.7	54	-10.05	125	292	Average
2483.5	65.49	71.19	-5.7	74	-8.51	125	292	Peak
4944	26.29	41.78	-15.49	54	-27.71	137	161	Average
4944	35.65	51.14	-15.49	74	-38.35	137	161	Peak

Remarks:

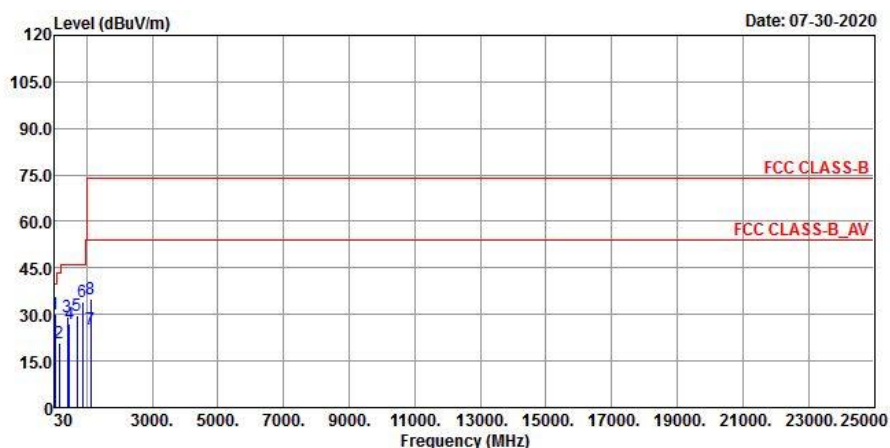
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2472 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

4.6.2 接收諧波

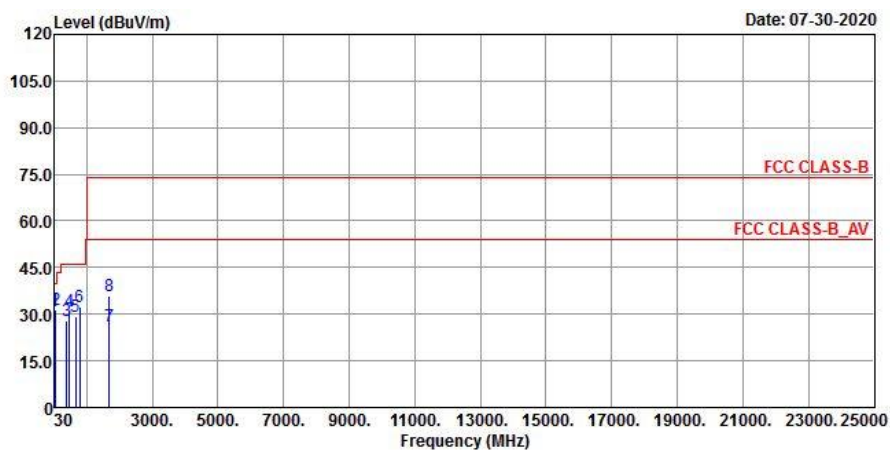
802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	30 MHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	30.17	42.09	-11.92	40	-9.83	194	165	QP
167.74	20.85	33.01	-12.16	43.5	-22.65	164	132	QP
420.91	29.08	36.55	-7.47	46	-16.92	154	184	QP
476.2	27.05	32.93	-5.88	46	-18.95	124	165	QP
709	29.45	29.93	-0.48	46	-16.55	147	195	QP
869.05	33.89	31.26	2.63	46	-12.11	132	165	QP
1116	25.16	50.26	-25.1	54	-28.84	154	256	Average
1116	35.19	60.29	-25.1	74	-38.81	154	256	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	31.16	43.08	-11.92	40	-8.84	165	295	QP
63.95	31.39	44.11	-12.72	40	-8.61	147	152	QP
395.69	28.06	36.51	-8.45	46	-17.94	102	231	QP
473.29	30.94	36.87	-5.93	46	-15.06	194	165	QP
667.29	29.13	30.47	-1.34	46	-16.87	165	121	QP
785.63	32.33	30.78	1.55	46	-13.67	147	152	QP
1691	25.99	50.21	-24.22	54	-28.01	254	298	Average
1691	36.07	60.29	-24.22	74	-37.93	254	298	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

4.6.3 其它不必要之訊號

9 kHz ~ 30 MHz Data:

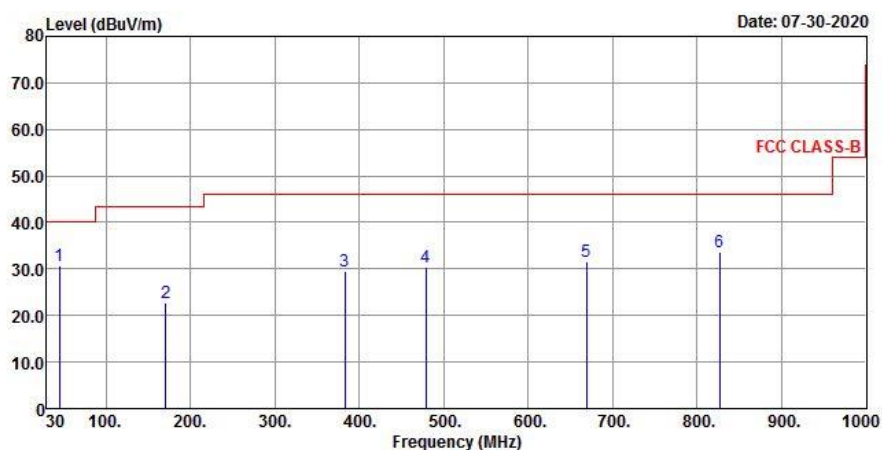
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

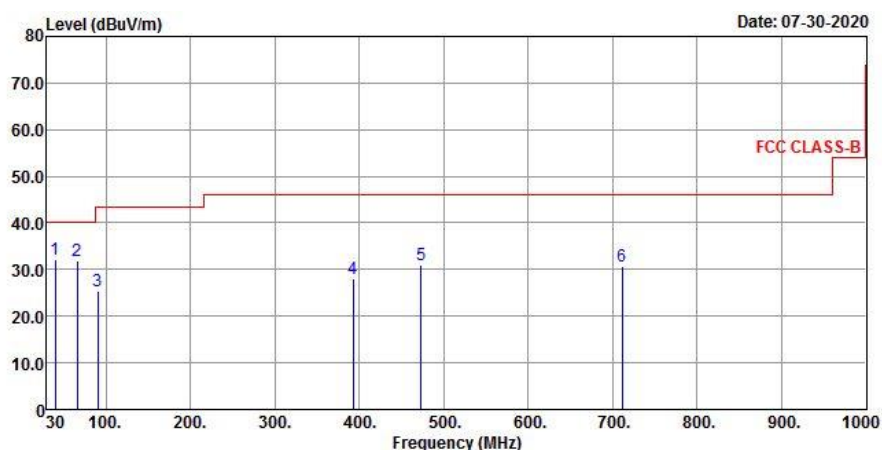
802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 13	Frequency Range	30 MHz ~ 1 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



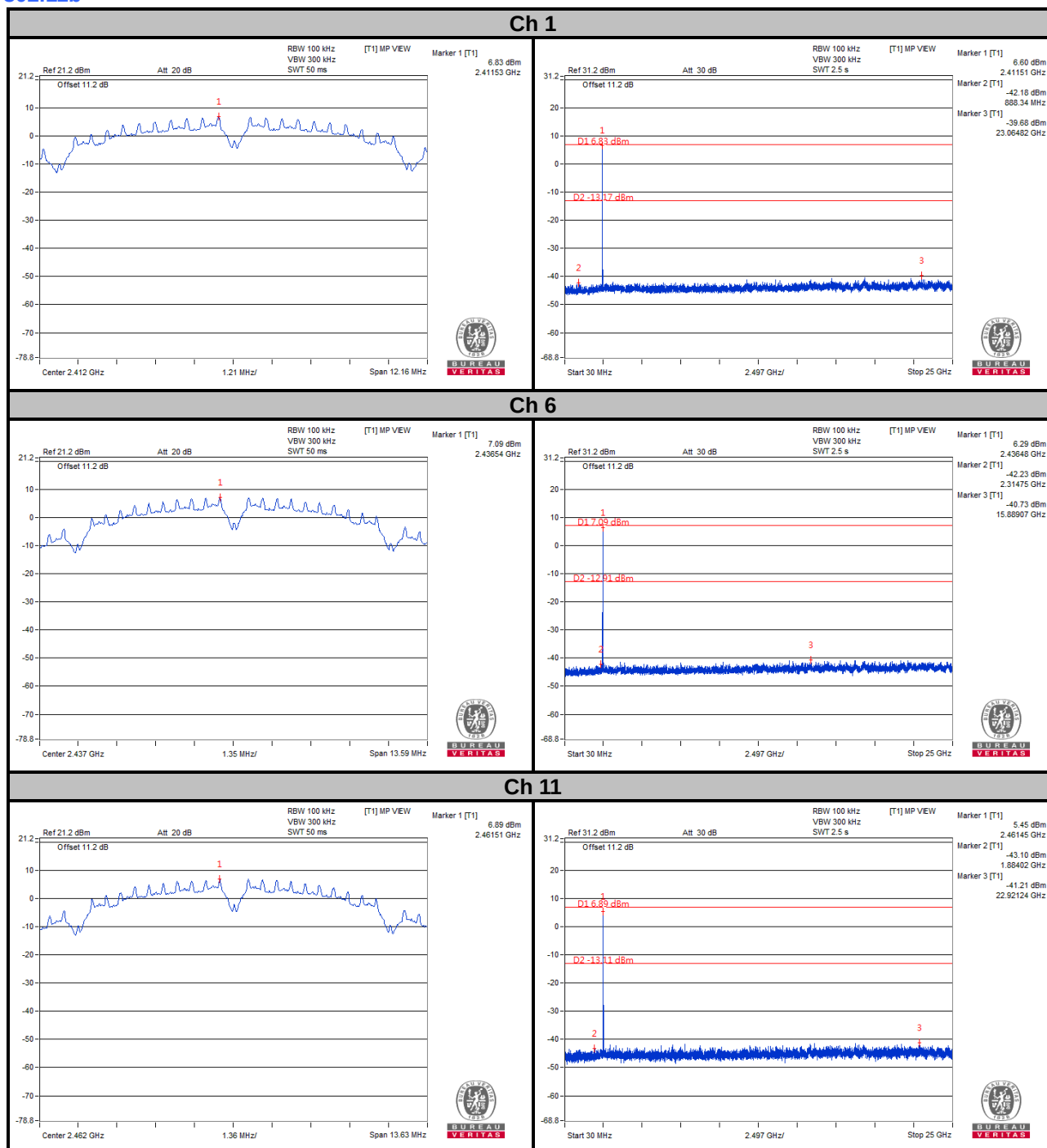
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
44.55	30.65	42.52	-11.87	40	-9.35	165	231	QP
170.65	22.62	34.96	-12.34	43.5	-20.88	147	185	QP
383.08	29.39	38.07	-8.68	46	-16.61	194	165	QP
479.11	30.49	36.32	-5.83	46	-15.51	102	245	QP
669.23	31.45	32.76	-1.31	46	-14.55	165	231	QP
826.37	33.76	31.54	2.22	46	-12.24	145	185	QP
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
39.7	32.2	44.45	-12.25	40	-7.8	165	231	QP
65.89	31.99	45.37	-13.38	40	-8.01	154	184	QP
90.14	25.32	42.85	-17.53	43.5	-18.18	102	295	QP
392.78	28.16	36.68	-8.52	46	-17.84	147	162	QP
473.29	30.94	36.87	-5.93	46	-15.06	132	165	QP
710.94	30.79	31.24	-0.45	46	-15.21	147	152	QP

Remarks:

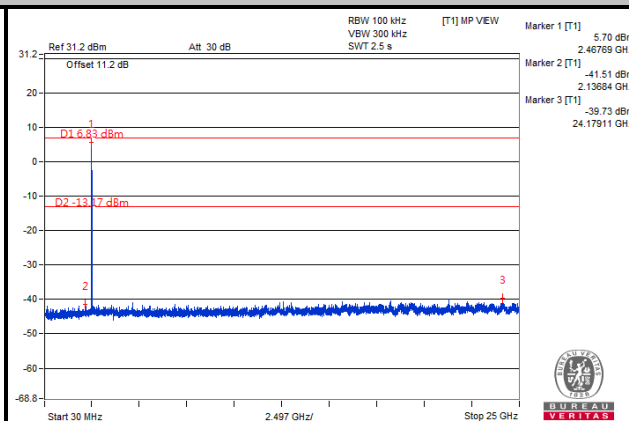
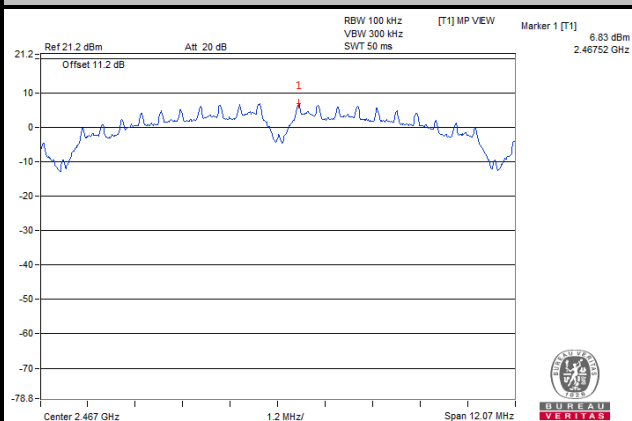
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

4.7 帶外發射之量測 (傳導)

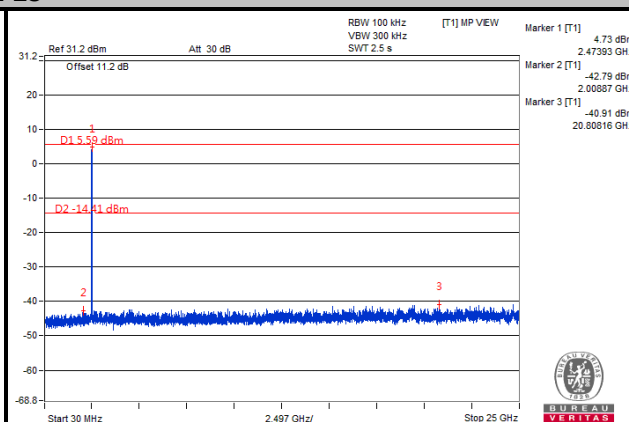
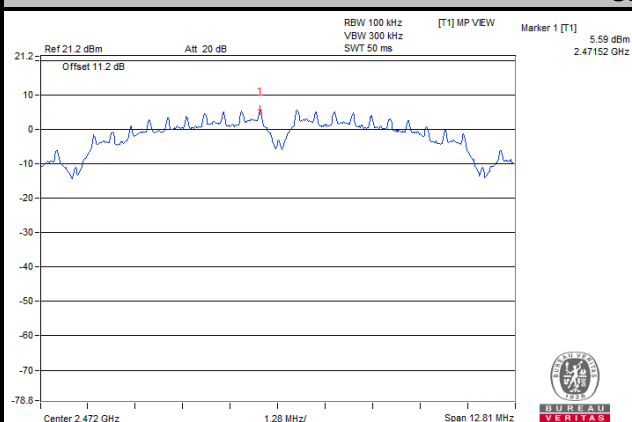
802.11b



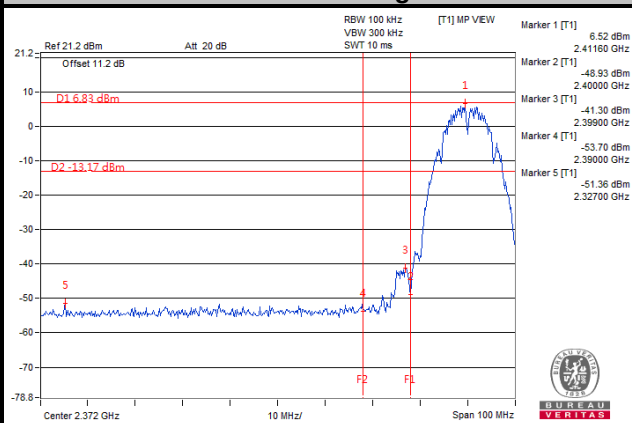
Ch 12



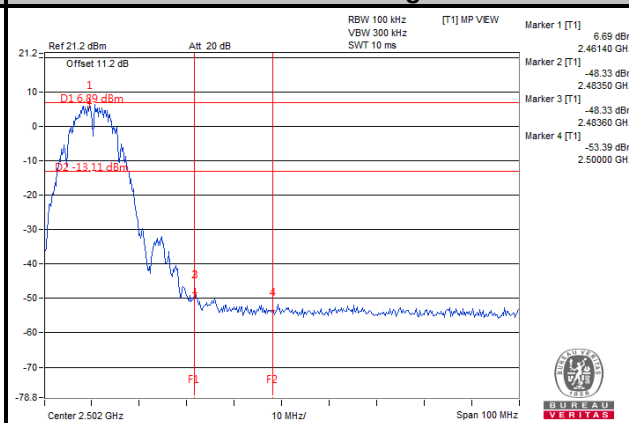
Ch 13

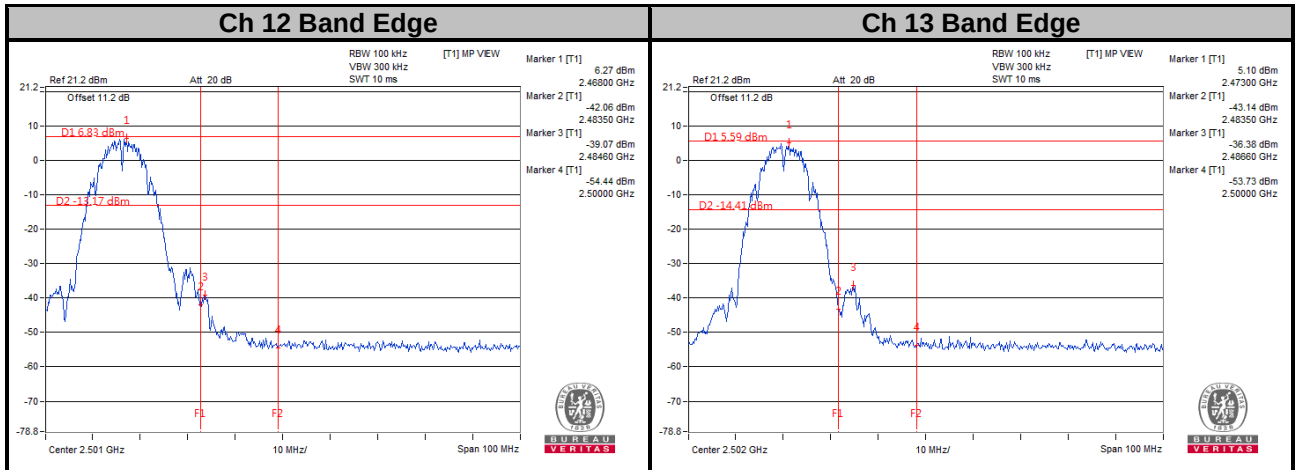


Ch 1 Band Edge

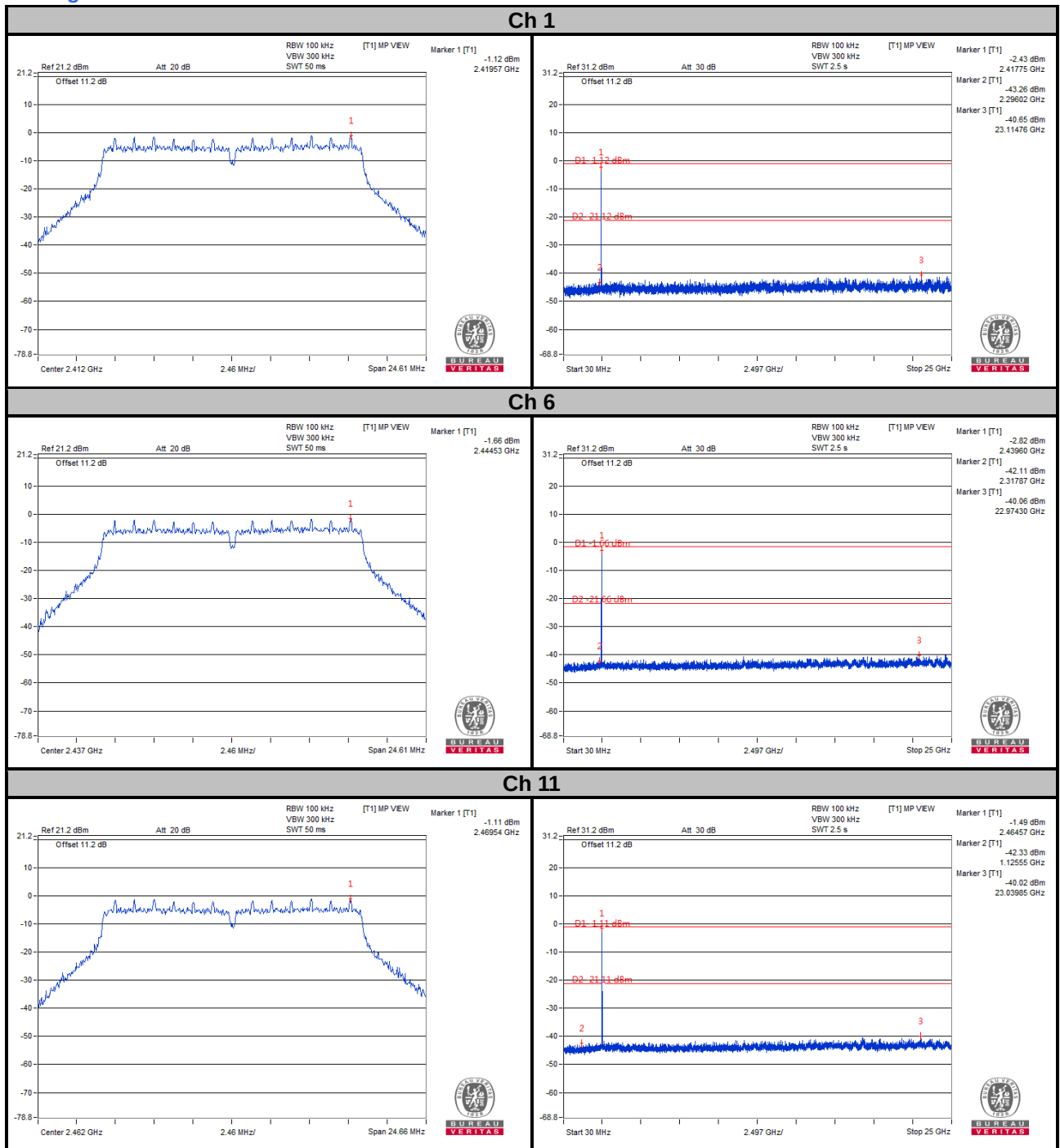


Ch 11 Band Edge

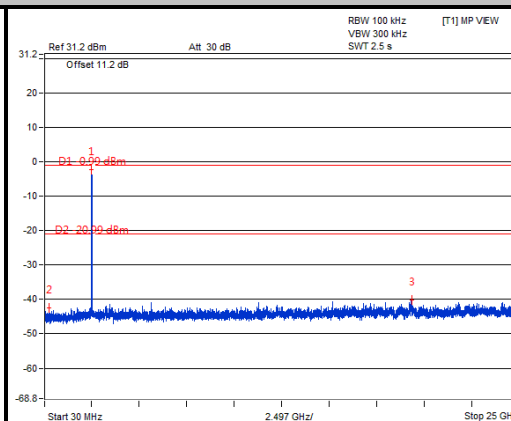
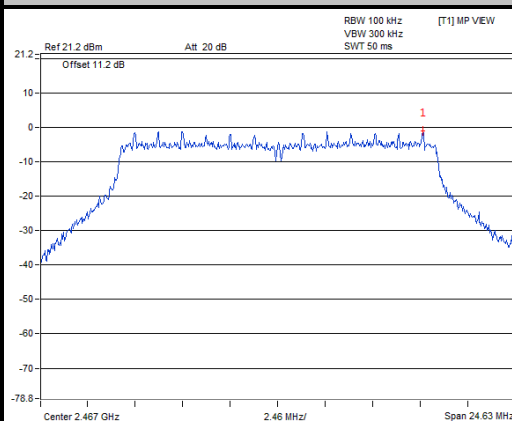




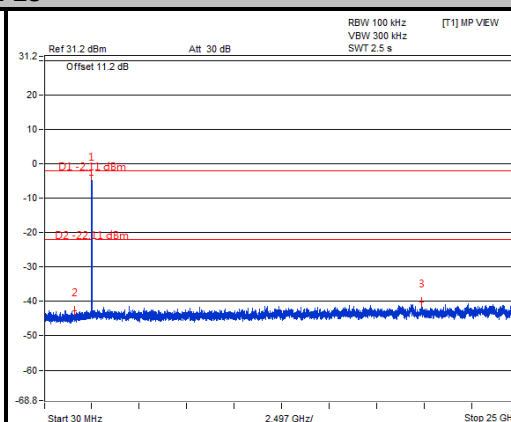
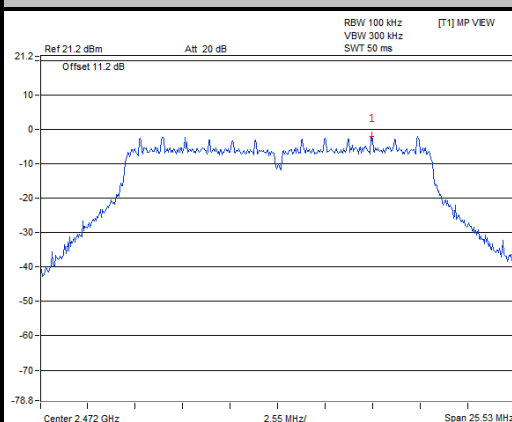
802.11g



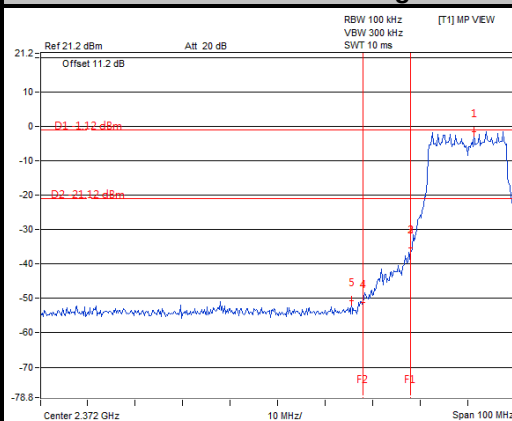
Ch 12



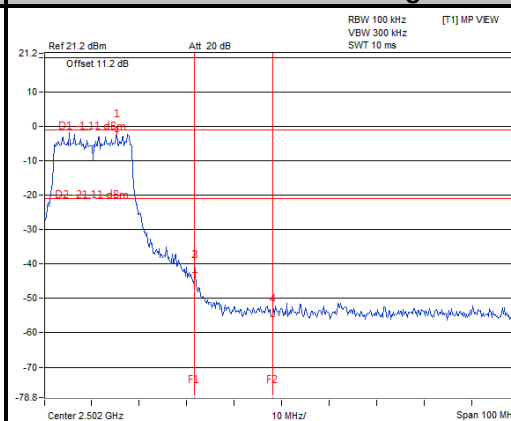
Ch 13

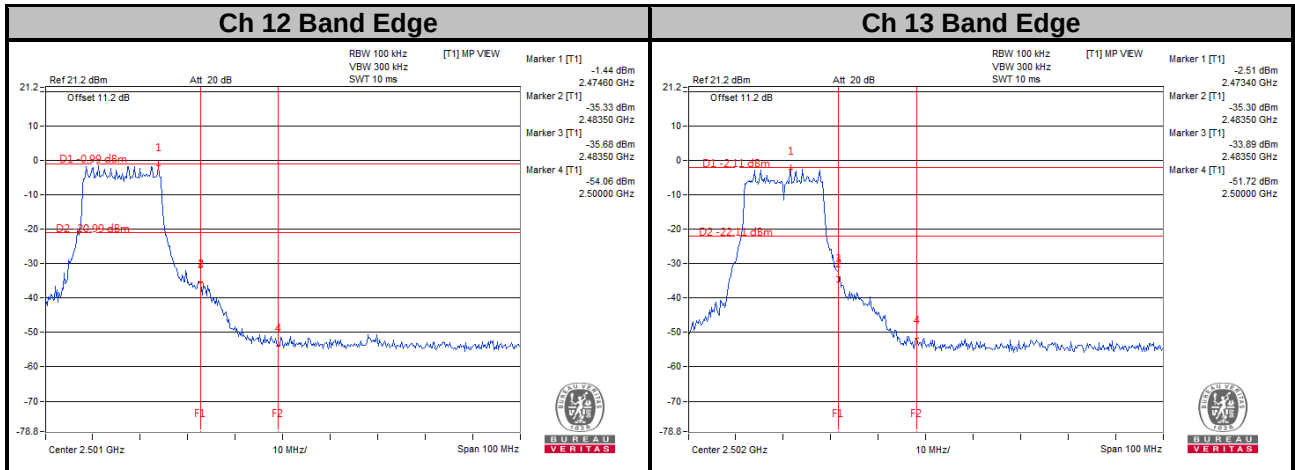


Ch 1 Band Edge

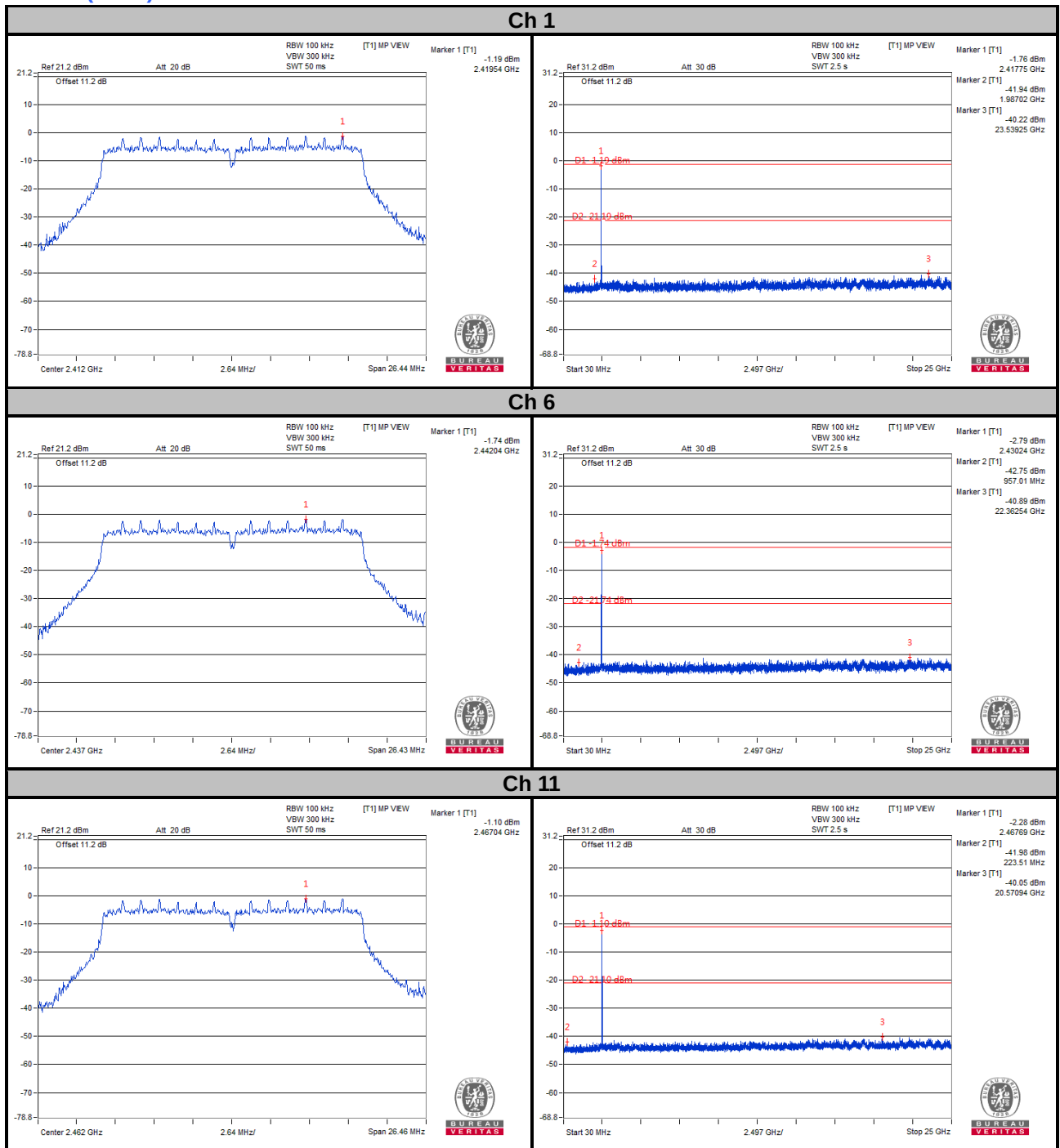


Ch 11 Band Edge

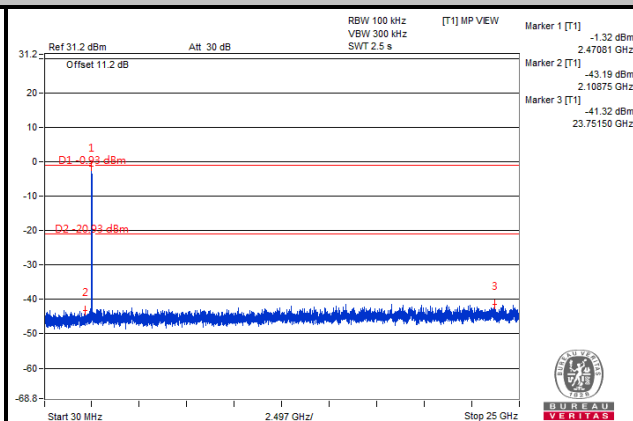
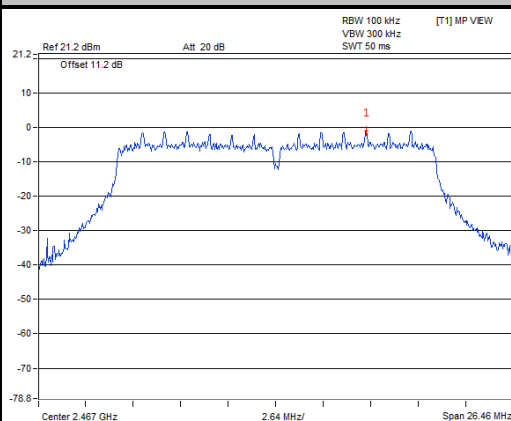




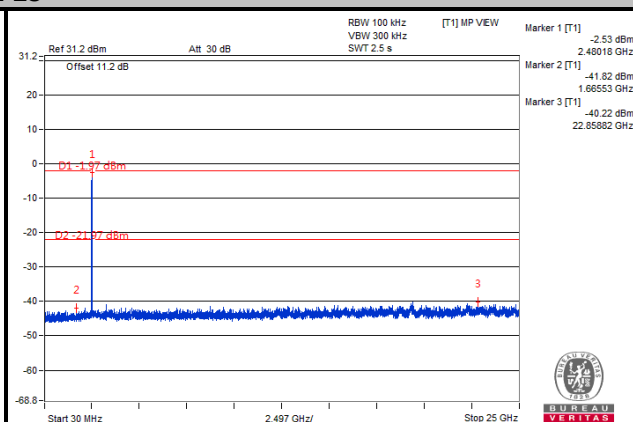
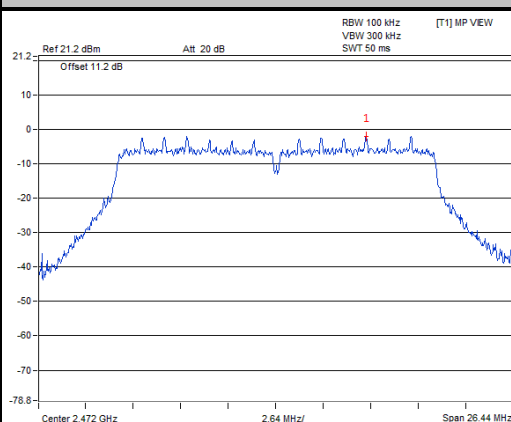
802.11n (HT20)



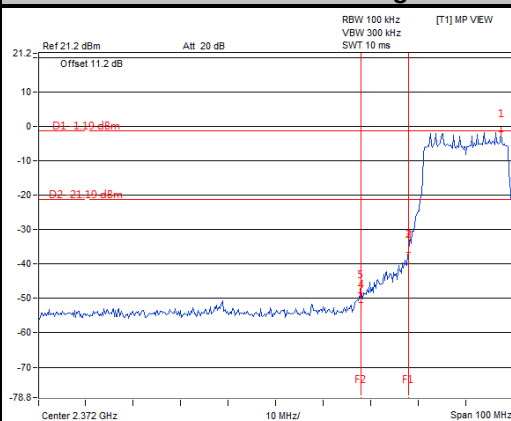
Ch 12



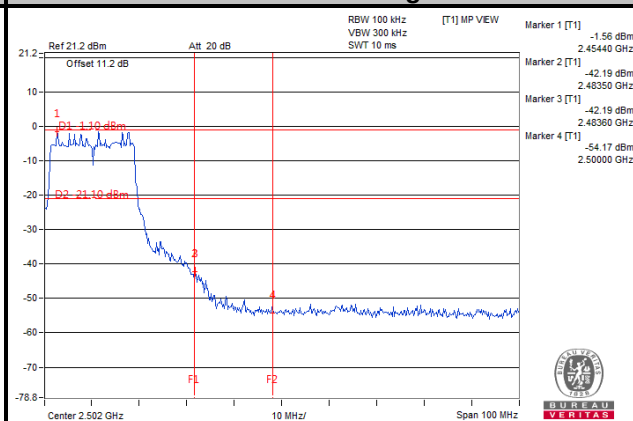
Ch 13

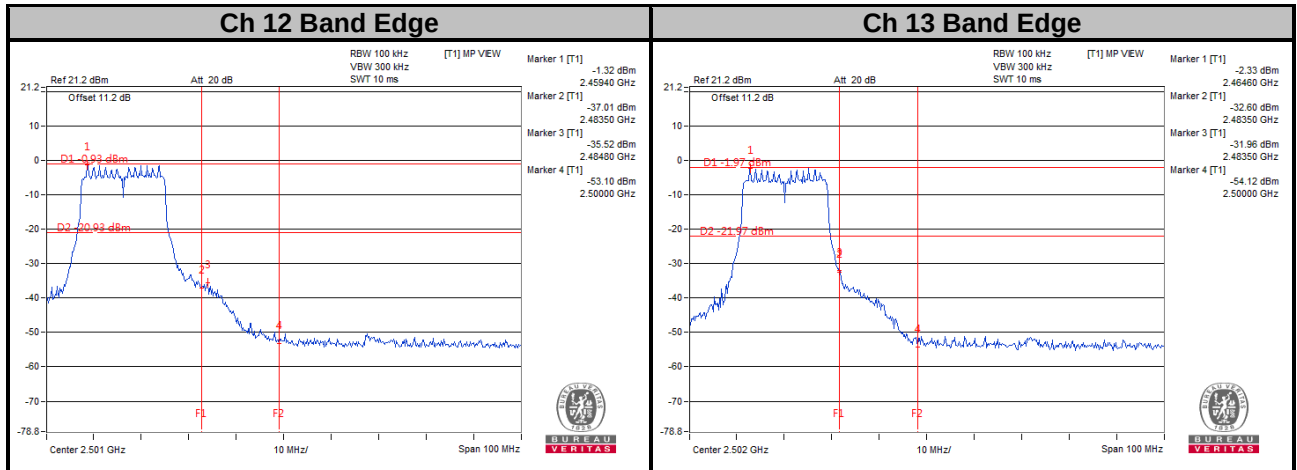


Ch 1 Band Edge



Ch 11 Band Edge





4.8 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

5 6 dB 頻寬之要求

5.1 適用標準

請見本報告 3.1 節第(13)項的規定。

5.2 量測方法

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算最大輸出功率峰值減 6 dB 的最大頻率範圍。

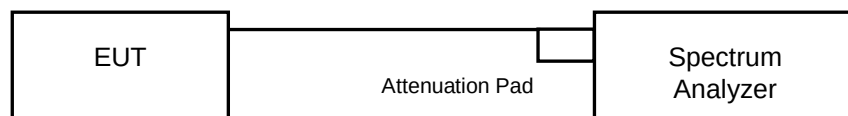
5.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

5.4 測試配置



5.5 量測結果

操作模式	發射	測試日期	109 年 08 月 03 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	8.12	0.5	Pass
6	2437	8.13	0.5	Pass
11	2462	8.14	0.5	Pass
12	2467	8.59	0.5	Pass
13	2472	8.13	0.5	Pass

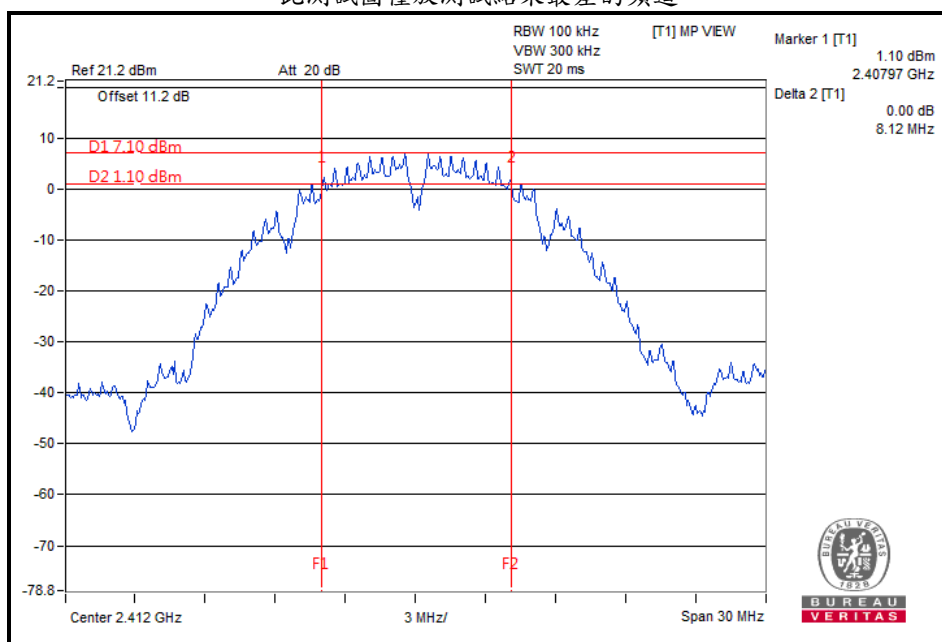
802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.45	0.5	Pass
6	2437	16.46	0.5	Pass
11	2462	16.44	0.5	Pass
12	2467	16.45	0.5	Pass
13	2472	16.42	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.64	0.5	Pass
6	2437	17.65	0.5	Pass
11	2462	17.66	0.5	Pass
12	2467	17.65	0.5	Pass
13	2472	17.64	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



5.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

6 峰值傳導輸出功率之量測

6.1 適用標準

請見本報告 3.1 節第(12)及(14)項的規定。

6.2 量測方法

- 將待測物輸出經由衰減器接到功率計上。
- 設定待測物處於連續發射狀態。
- 計算其輸出功率峰值。

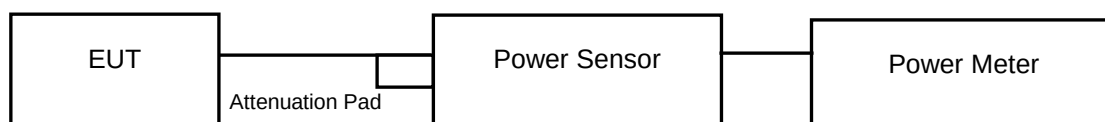
6.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Sep. 03, 2020
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Sep. 03, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 1.393 dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.
- Measurement Bandwidth of ML2495A is 160 MHz greater than 6 dB bandwidth of emission.

6.4 測試配置



6.5 量測結果

操作模式	發射	測試日期	109 年 08 月 03 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	71.45	18.54	38.459	15.85	30	Pass
6	2437	76.384	18.83	39.264	15.94	30	Pass
11	2462	67.453	18.29	36.813	15.66	30	Pass
12	2467	72.778	18.62	39.264	15.94	30	Pass
13	2472	66.222	18.21	35.563	15.51	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	87.498	19.42	12.417	10.94	30	Pass
6	2437	85.507	19.32	11.324	10.54	30	Pass
11	2462	88.105	19.45	12.331	10.91	30	Pass
12	2467	93.325	19.70	12.388	10.93	30	Pass
13	2472	63.241	18.01	9.226	9.65	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	86.896	19.39	11.722	10.69	30	Pass
6	2437	83.56	19.22	11.429	10.58	30	Pass
11	2462	91.622	19.62	12.417	10.94	30	Pass
12	2467	89.536	19.52	12.503	10.97	30	Pass
13	2472	84.333	19.26	12.218	10.87	30	Pass

6.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

7 功率頻譜密度之量測

7.1 適用標準

請見本報告 3.1 節第(15)項的規定。

7.2 量測方法

- 將待測物之天線埠經由適當之衰減直接連至測試儀器。
- 設定解析頻寬為 3 kHz，視訊頻寬為 10 kHz，掃描時間為 auto
- 掃描頻寬設於足夠觀察發射機所產生的主頻信號，並找到最大的峰值準位。

7.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

7.4 測試配置



7.5 量測結果

操作模式	發射	測試日期	109 年 08 月 03 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-7.94	8	Pass
6	2437	-7.44	8	Pass
11	2462	-7.69	8	Pass
12	2467	-7.96	8	Pass
13	2472	-7.75	8	Pass

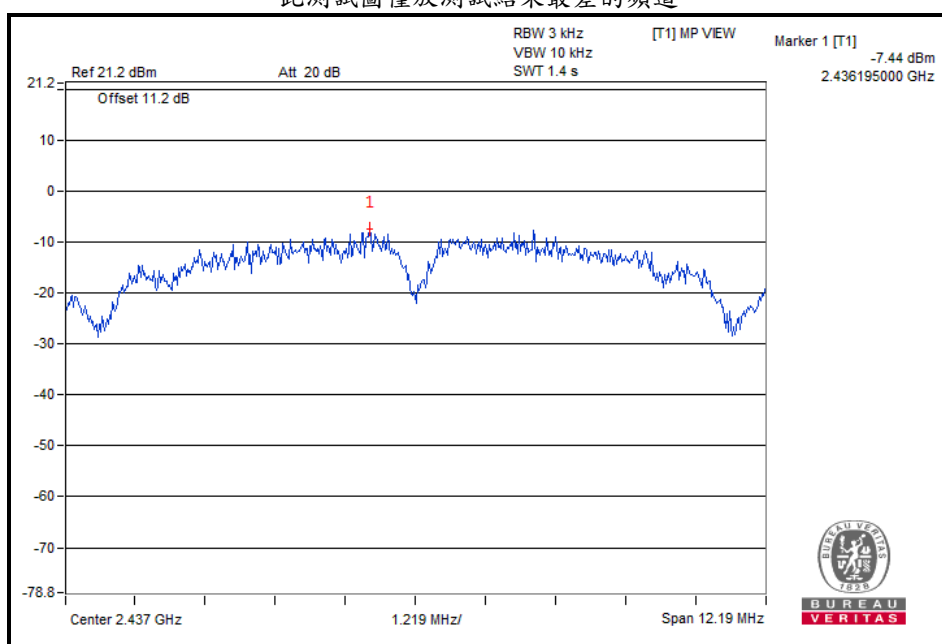
802.11g

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-15.45	8	Pass
6	2437	-15.17	8	Pass
11	2462	-15.55	8	Pass
12	2467	-15.55	8	Pass
13	2472	-16.66	8	Pass

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-15.24	8	Pass
6	2437	-15.68	8	Pass
11	2462	-15.33	8	Pass
12	2467	-15.11	8	Pass
13	2472	-15.59	8	Pass

**此測試圖僅放測試結果最差的頻道。



7.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

BLUETOOTH EDR 頻段測試紀錄結果

8 帶外發射之量測

8.1 適用標準

請見本報告 3.1 節第(21)項的規定。

8.2 量測方法

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線從離地 1 米至 4 米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

Note: 對於 1 GHz 以上場強輻射的測試，待測物則置於 1.5 米高的非金屬桌面。

發射諧波:

Peak 為 RBW = 1 MHz, VBW = 3 MHz ;

For Fundamental and Harmonic signal:

Average 為 RBW = 1 MHz, VBW = Peak Value + Duty Cycle Correction Factor

Duty Cycle = $(3.072 \times 1) / 100 = 0.0372$, Correction Factor = $20 \log (\text{Duty Cycle}) = 20 \log (0.0372) = -30.25$,

Duty cycle photo refer 本報告 2.1 章節 註 11

For other signal:

Average 為 RBW = 1 MHz, VBW = 3 MHz ; Detector: RMS ; Sweep time: Auto ; Trace count: trace average of at least 100 traces.

接收諧波:

Below 1 GHz

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz ; Average 為 RBW = 1 MHz, VBW = 3 MHz ; Detector: RMS ; Sweep time: Auto ; Trace count: trace average of at least 100 traces.

其它不必要之訊號

Peak 為 RBW = 120 kHz, VBW = 360 kHz ; Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

8.3 量測儀器

同 4.3 節

8.4 測試配置

同 4.4 節

8.5 場強度之計算

同 4.5 節

量測結果請見下頁。

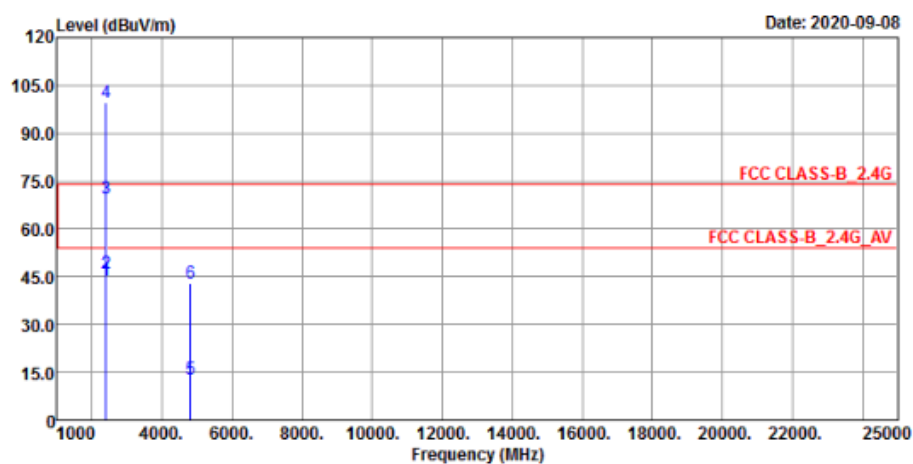
8.6 量測結果

8.6.1 發射諧波

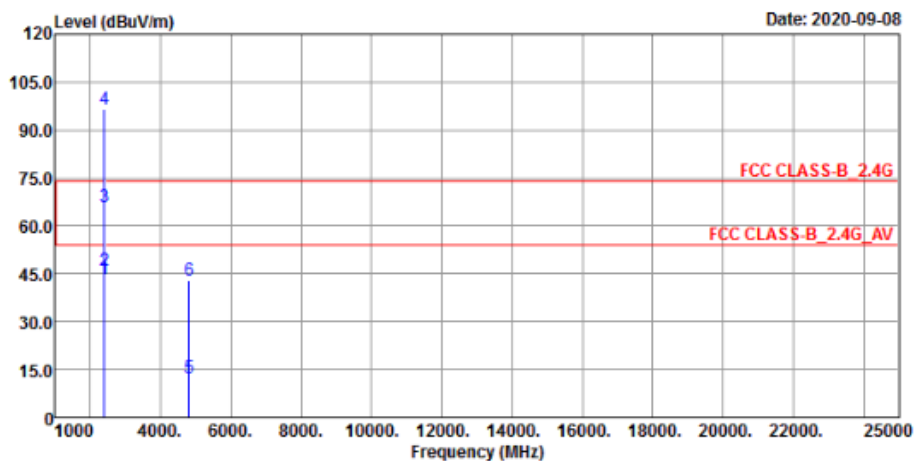
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



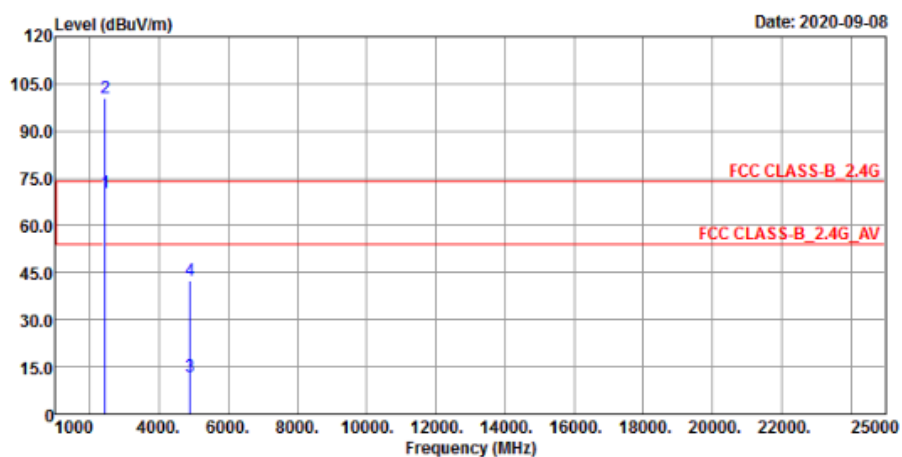
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.76	12.16	31.6	54	-10.24	162	3	Average
2390	46.1	52.02	-5.92	74	-27.9	162	3	Peak
2402	69.48	75.42	-5.94	-----	-----	162	3	Average
2402	99.73	105.67	-5.94	-----	-----	162	3	Peak
4804	12.82	28.46	-15.64	54	-41.18	214	195	Average
4804	43.07	58.71	-15.64	74	-30.93	214	195	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.51	11.91	31.6	54	-10.49	184	285	Average
2390	45.88	51.8	-5.92	74	-28.12	184	285	Peak
2402	66.11	72.05	-5.94	-----	-----	184	285	Average
2402	96.36	102.3	-5.94	-----	-----	184	285	Peak
4804	12.57	28.21	-15.64	54	-41.43	115	198	Average
4804	42.82	58.46	-15.64	74	-31.18	115	198	Peak

Remarks:

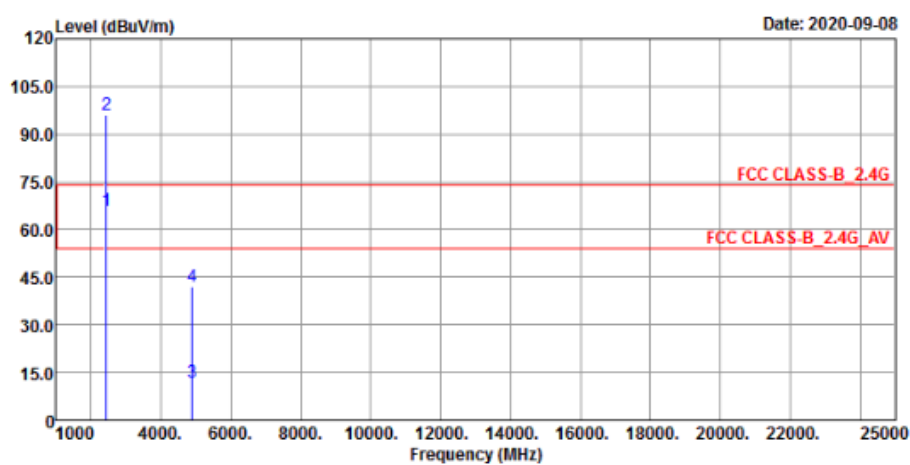
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



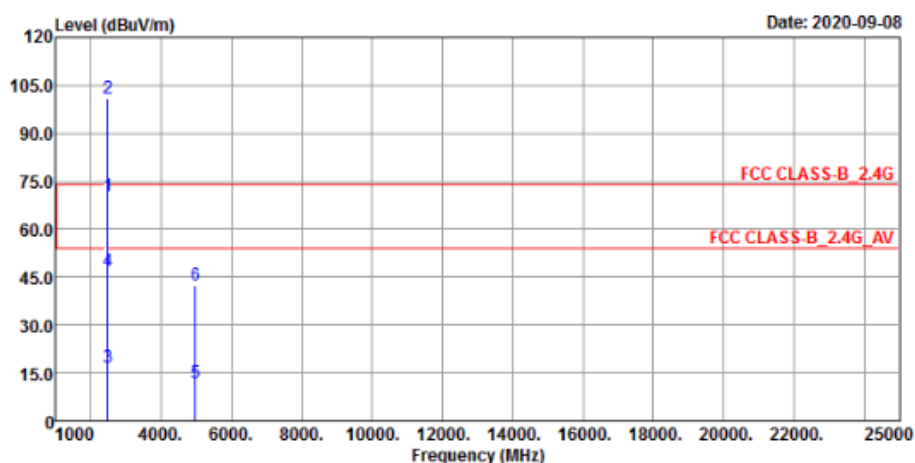
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2441	70.29	76.1	-5.81	-----	-----	163	359	Average
2441	100.54	106.35	-5.81	-----	-----	163	359	Peak
4882	12.12	27.68	-15.56	54	-41.88	184	161	Average
4882	42.37	57.93	-15.56	74	-31.63	184	161	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2441	65.83	71.64	-5.81	-----	-----	107	292	Average
2441	96.08	101.89	-5.81	-----	-----	107	292	Peak
4882	11.76	27.32	-15.56	54	-42.24	204	158	Average
4882	42.01	57.57	-15.56	74	-31.99	204	158	Peak

Remarks:

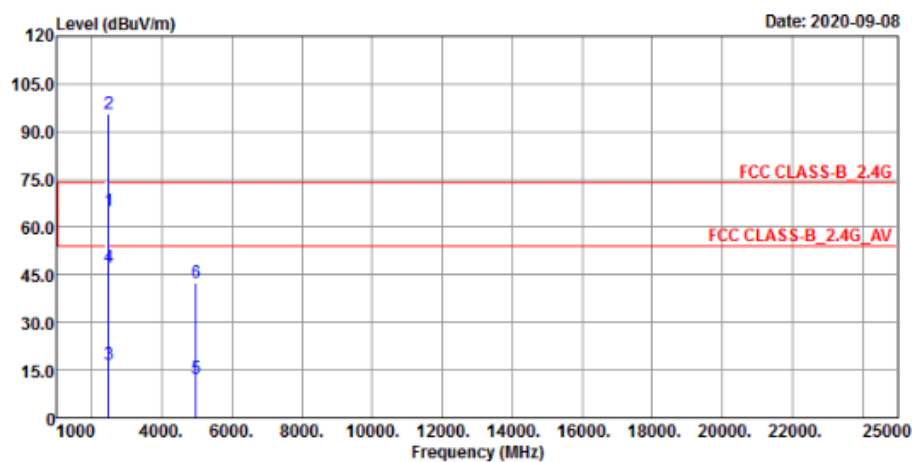
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	70.61	76.31	-5.7	-----	-----	186	358	Average
2480	100.86	106.56	-5.7	-----	-----	186	358	Peak
2483.5	16.81	22.51	-5.7	74	-57.19	186	358	Average
2483.5	47.06	52.76	-5.7	74	-26.94	186	358	Peak
4960	12.17	27.62	-15.45	54	-41.83	199	88	Average
4960	42.42	57.87	-15.45	74	-31.58	199	88	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	65.2	70.9	-5.7	-----	-----	123	88	Average
2480	95.45	101.15	-5.7	-----	-----	123	88	Peak
2483.5	16.94	22.64	-5.7	74	-57.06	123	88	Average
2483.5	47.19	52.89	-5.7	74	-26.81	123	88	Peak
4960	12.24	27.69	-15.45	54	-41.76	174	238	Average
4960	42.49	57.94	-15.45	74	-31.51	174	238	Peak

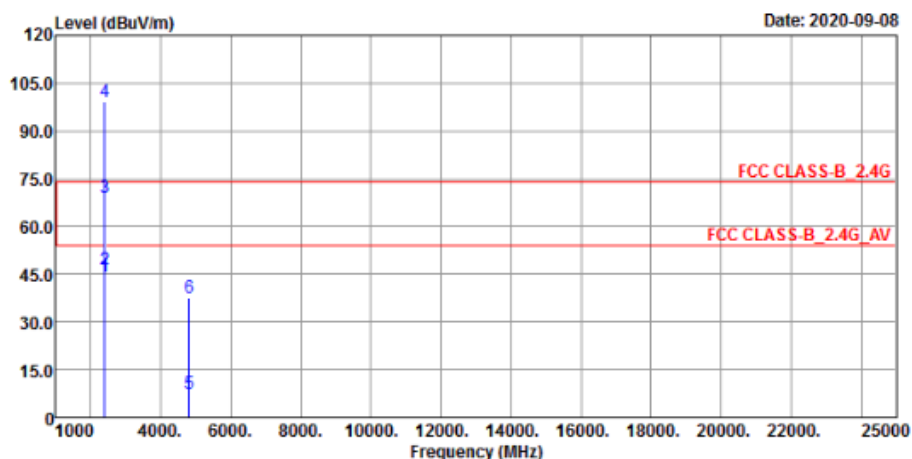
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

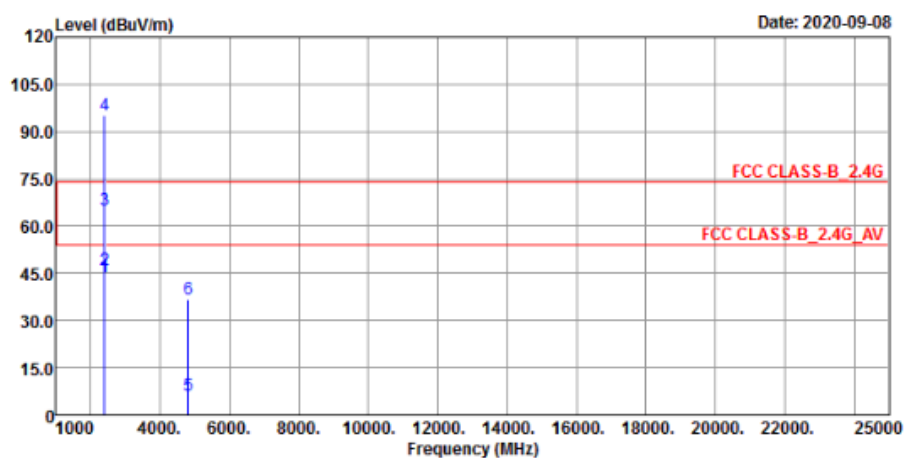
8DPSK

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



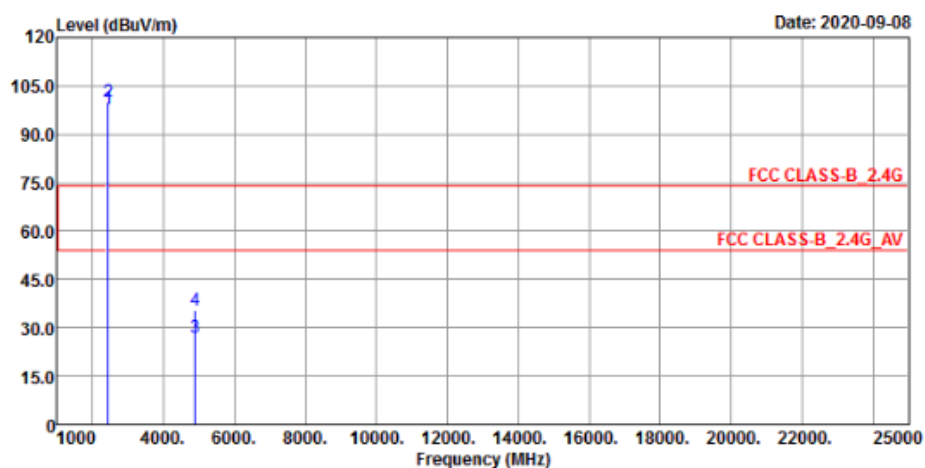
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	44.34	12.74	31.6	54	-9.66	160	360	Average
2390	46.55	52.47	-5.92	74	-27.45	160	360	Peak
2402	69.02	74.96	-5.94	-----	-----	160	360	Average
2402	99.27	105.21	-5.94	-----	-----	160	360	Peak
4804	7.35	22.99	-15.64	54	-46.65	105	344	Average
4804	37.6	53.24	-15.64	74	-36.4	105	344	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	43.96	12.36	31.6	54	-10.04	102	93	Average
2390	45.85	51.77	-5.92	74	-28.15	102	93	Peak
2402	64.96	70.9	-5.94	-----	-----	102	93	Average
2402	95.21	101.15	-5.94	-----	-----	102	93	Peak
4804	6.32	21.96	-15.64	54	-47.68	116	202	Average
4804	36.57	52.21	-15.64	74	-37.43	116	202	Peak

Remarks:

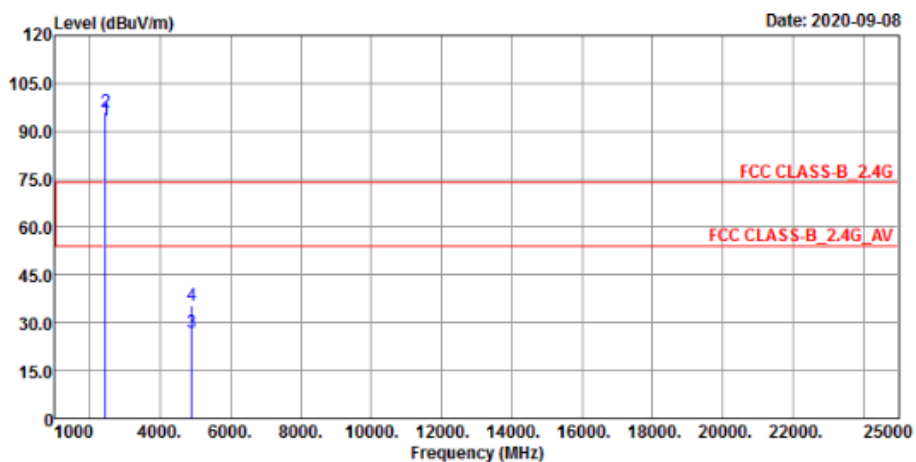
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



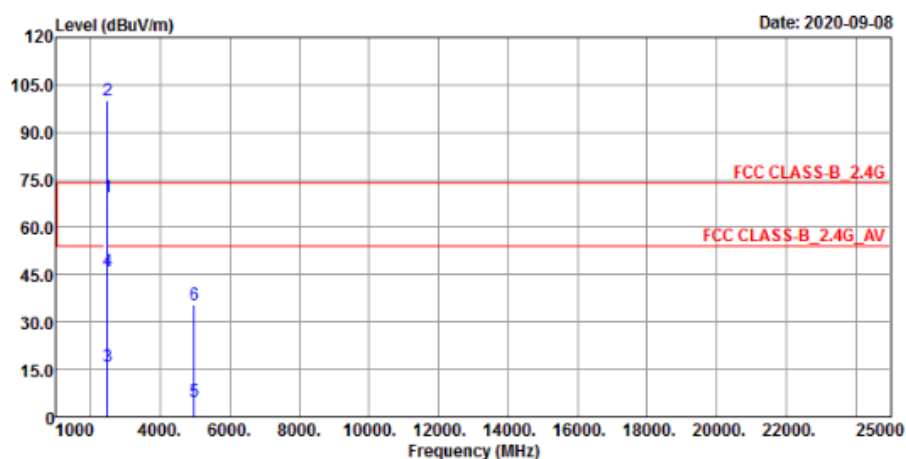
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2441	69.9	75.71	-5.81	-----	-----	194	359	Average
2441	100.15	105.96	-5.81	-----	-----	194	359	Peak
4882	5.24	20.8	-15.56	54	-48.76	132	154	Average
4882	35.49	51.05	-15.56	74	-38.51	132	154	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2441	66	71.81	-5.81	-----	-----	127	288	Average
2441	96.25	102.06	-5.81	-----	-----	127	288	Peak
4882	5.28	20.84	-15.56	54	-48.72	127	158	Average
4882	35.53	51.09	-15.56	74	-38.47	127	158	Peak

Remarks:

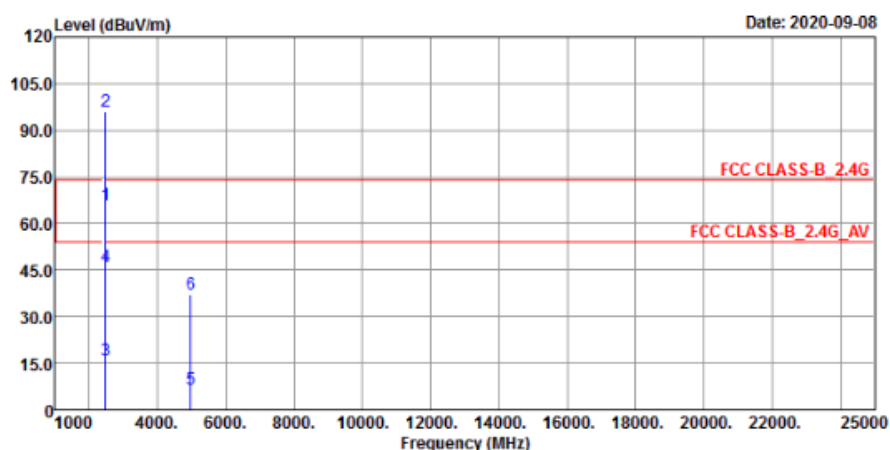
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 78	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Cyril Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	69.7	75.4	-5.7	-----	-----	188	360	Average
2480	99.95	105.65	-5.7	-----	-----	188	360	Peak
2483.5	16.02	21.72	-5.7	74	-57.98	188	360	Average
2483.5	46.27	51.97	-5.7	74	-27.73	188	360	Peak
4960	5.09	20.54	-15.45	54	-48.91	104	182	Average
4960	35.34	50.79	-15.45	74	-38.66	104	182	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	65.86	71.56	-5.7	-----	-----	122	287	Average
2480	96.11	101.81	-5.7	-----	-----	122	287	Peak
2483.5	15.88	21.58	-5.7	74	-58.12	122	287	Average
2483.5	46.13	51.83	-5.7	74	-27.87	122	287	Peak
4960	6.76	22.21	-15.45	54	-47.24	138	209	Average
4960	37.01	52.46	-15.45	74	-36.99	138	209	Peak

Remarks:

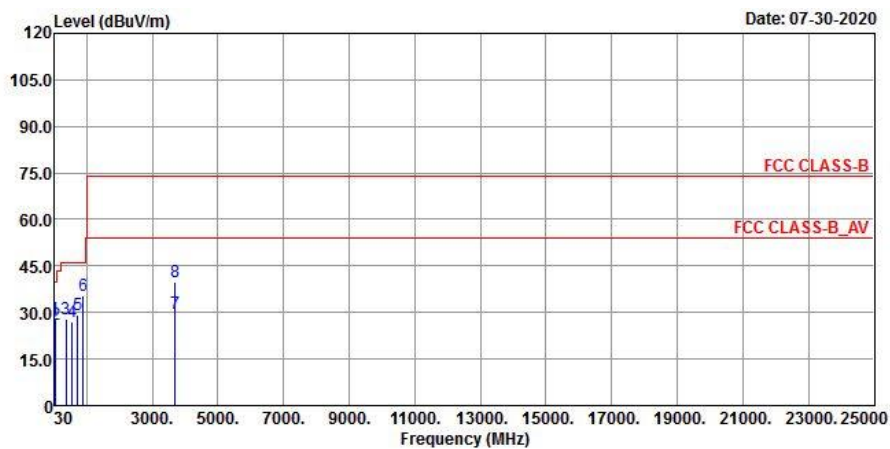
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

8.6.2 接收諧波

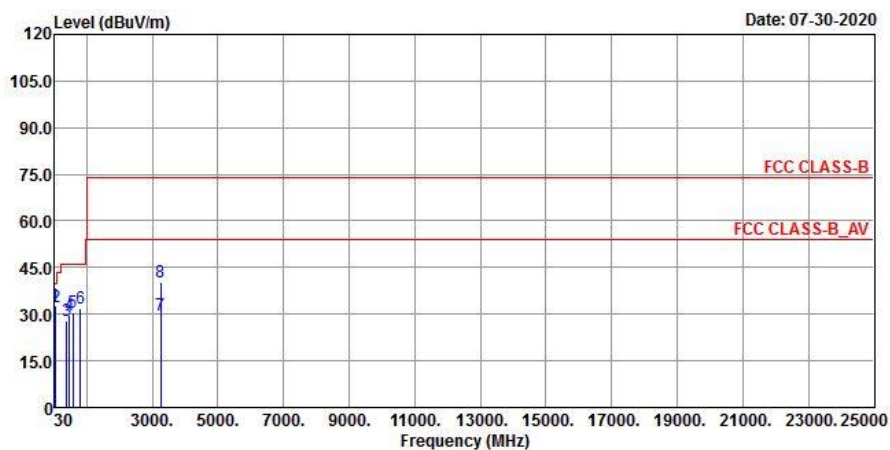
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	30 MHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
45.52	27.96	39.74	-11.78	40	-12.04	145	162	QP
52.31	25.94	37.76	-11.82	40	-14.06	132	165	QP
378.23	28.07	36.84	-8.77	46	-17.93	111	184	QP
561.56	27.08	31.16	-4.08	46	-18.92	102	254	QP
721.61	29.34	29.49	-0.15	46	-16.66	132	165	QP
889.42	35.26	32.5	2.76	46	-10.74	147	152	QP
3698	29.64	48.62	-18.98	54	-24.36	121	225	Average
3698	39.79	58.77	-18.98	74	-34.21	121	225	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
45.52	32.88	44.66	-11.78	40	-7.12	165	124	QP
65.89	32.41	45.79	-13.38	40	-7.59	147	152	QP
395.69	27.75	36.2	-8.45	46	-18.25	102	231	QP
475.23	29.88	35.78	-5.9	46	-16.12	165	295	QP
579.02	30.47	33.91	-3.44	46	-15.53	147	152	QP
815.7	31.79	29.74	2.05	46	-14.21	132	265	QP
3261	29.72	49.52	-19.8	54	-24.28	165	121	Average
3261	40.12	59.92	-19.8	74	-33.88	165	121	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

8.6.3 其它不必要之訊號

9 kHz ~ 30 MHz Data:

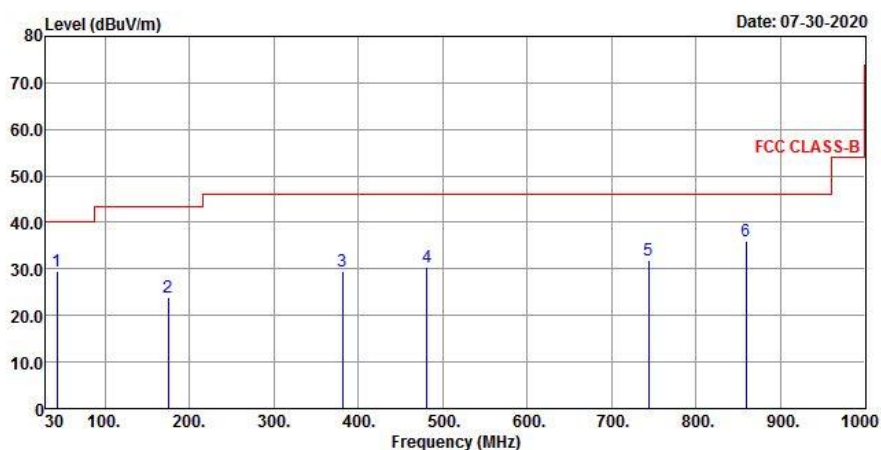
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

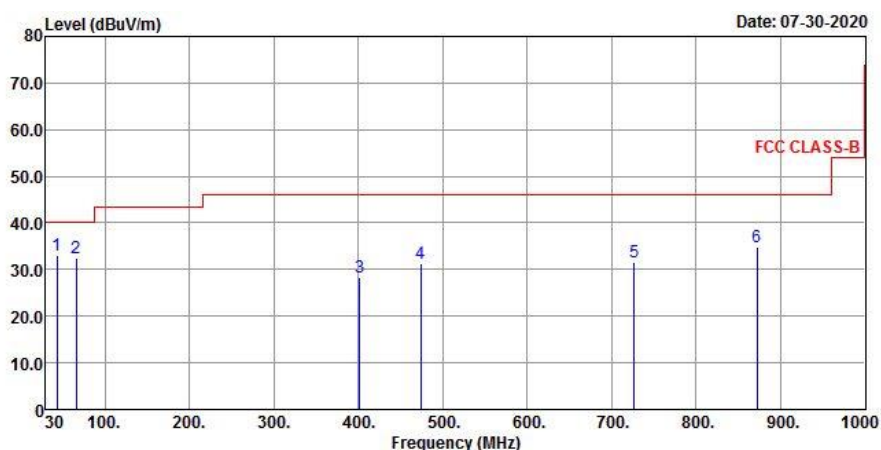
GFSK

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	30 MHz ~ 1 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Quask-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical



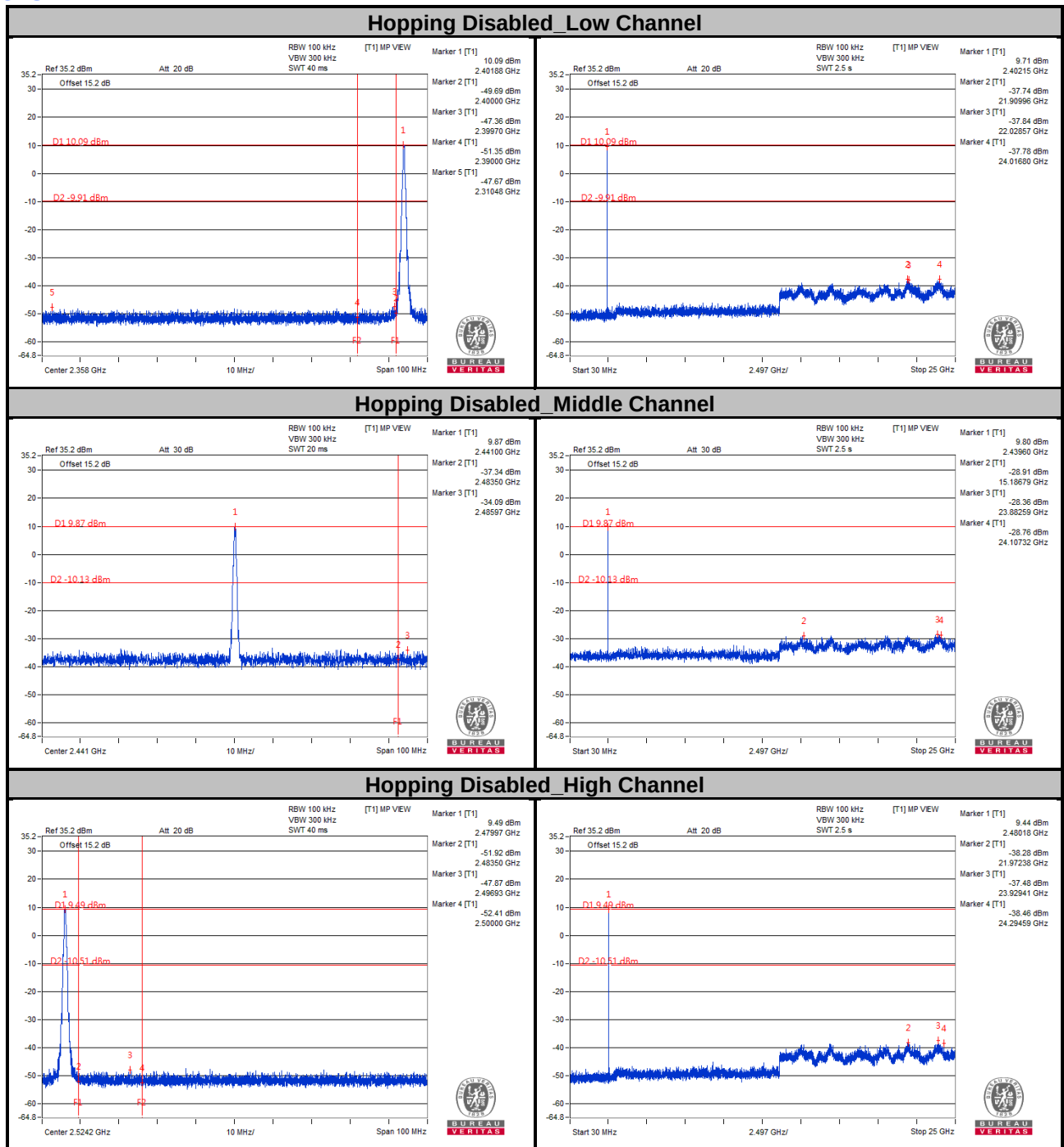
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	29.38	41.3	-11.92	40	-10.62	145	162	QP
174.53	23.77	36.5	-12.73	43.5	-19.73	102	298	QP
381.14	29.44	38.15	-8.71	46	-16.56	111	162	QP
481.05	30.31	36.11	-5.8	46	-15.69	132	284	QP
743.92	31.92	30.99	0.93	46	-14.08	152	132	QP
859.35	36.07	33.48	2.59	46	-9.93	165	284	QP
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	33.08	45	-11.92	40	-6.92	123	165	QP
65.89	32.41	45.79	-13.38	40	-7.59	147	152	QP
401.51	28.45	36.77	-8.32	46	-17.55	195	285	QP
474.26	31.19	37.11	-5.92	46	-14.81	164	251	QP
726.46	31.7	31.58	0.12	46	-14.3	132	147	QP
871.96	34.78	32.08	2.7	46	-11.22	185	264	QP

Remarks:

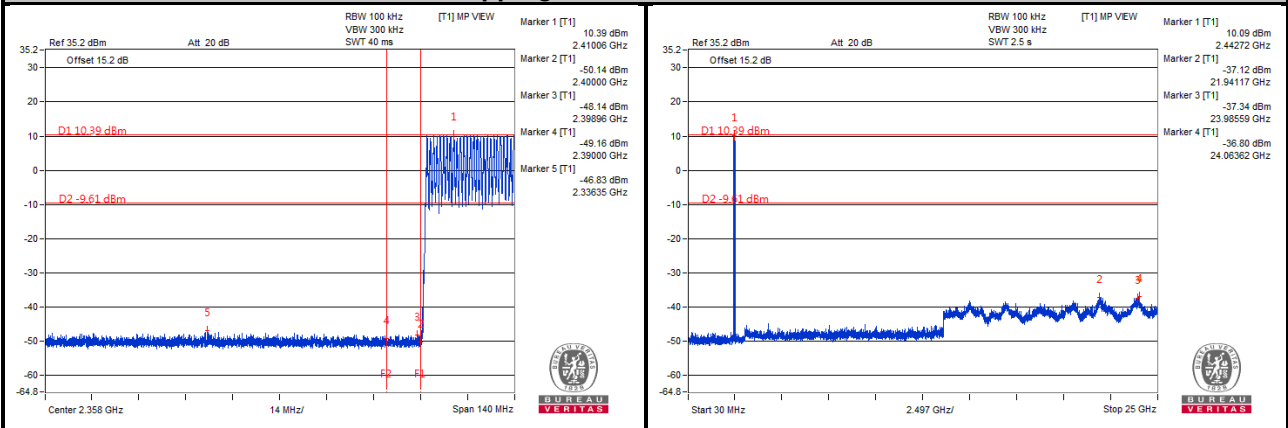
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

8.7 帶外發射之量測 (傳導)

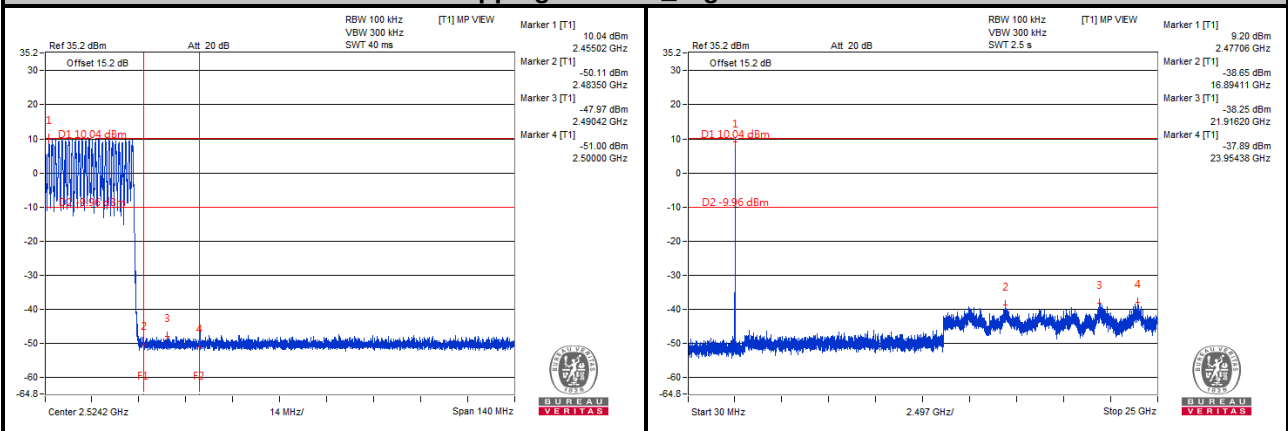
GFSK



Hopping Enabled_Low Channel

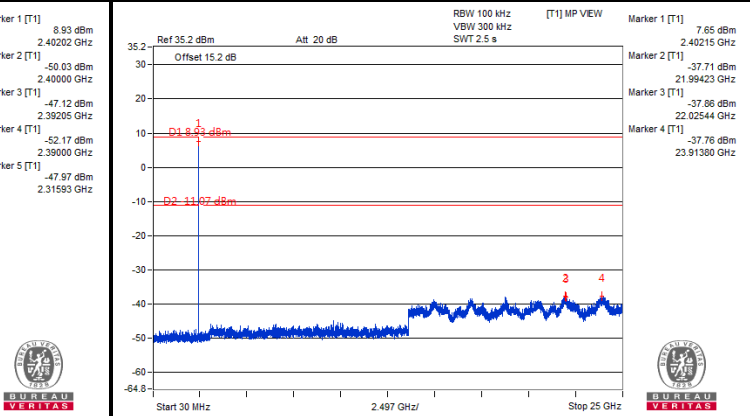
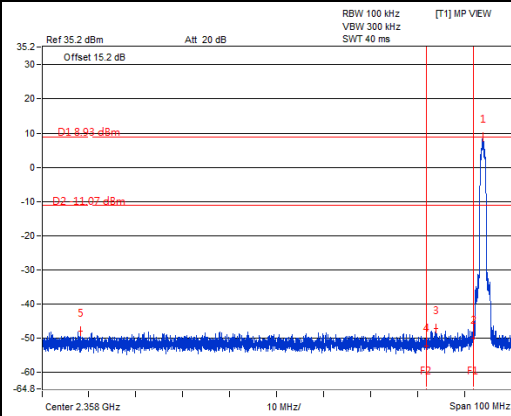


Hopping Enabled_High Channel

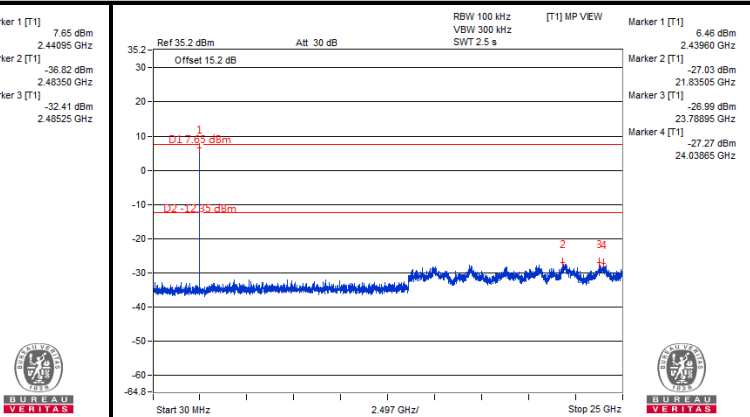
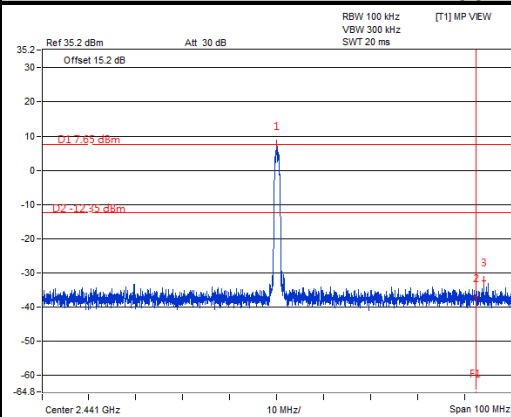


8DPSK

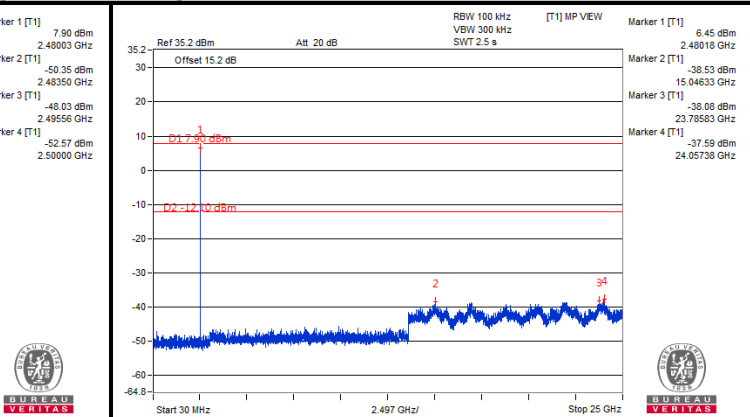
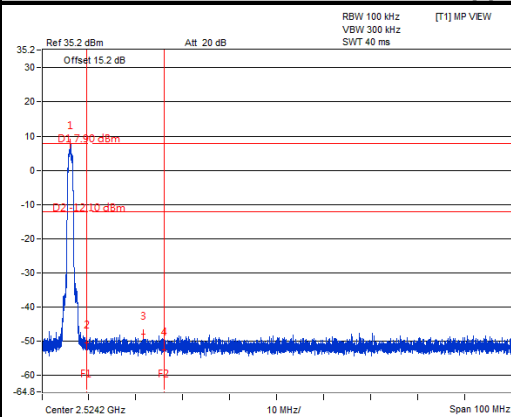
Hopping Disabled_Low Channel



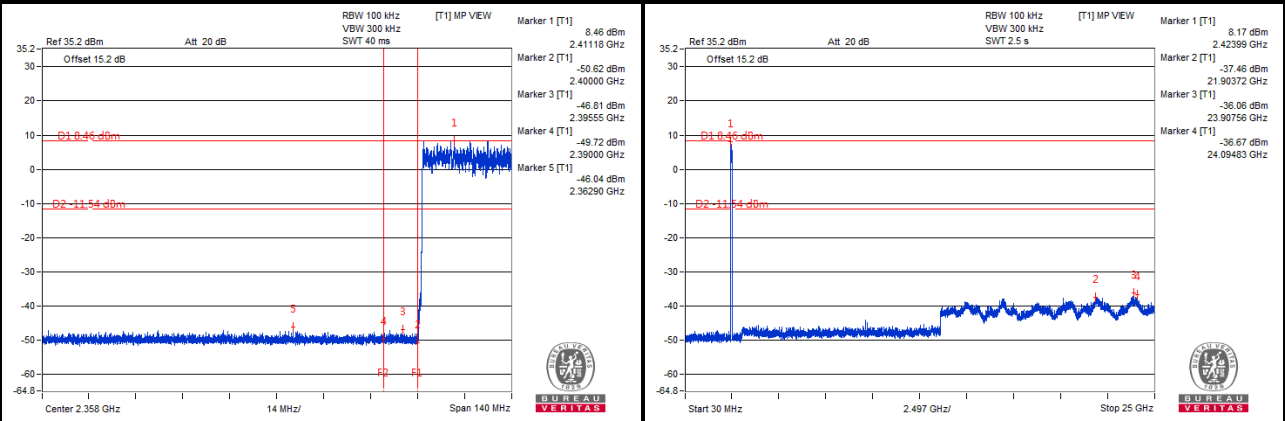
Hopping Disabled Middle Channel



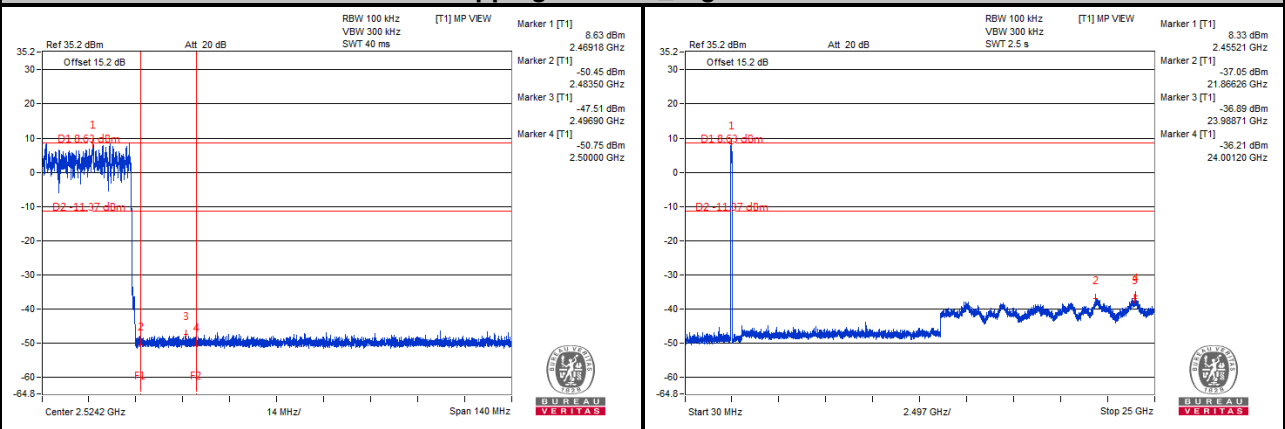
Hopping Disabled_High Channel



Hopping Enabled_Low Channel



Hopping Enabled_High Channel



8.8 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

9 20 dB 頻寬之要求

9.1 適用標準

請見本報告 3.1 節第(26)項的規定。

9.2 量測方法

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算由最大輸出功率峰值減 20 dB 的最大頻率範圍。

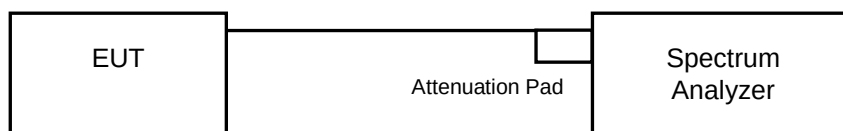
9.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2019

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

9.4 測試配置



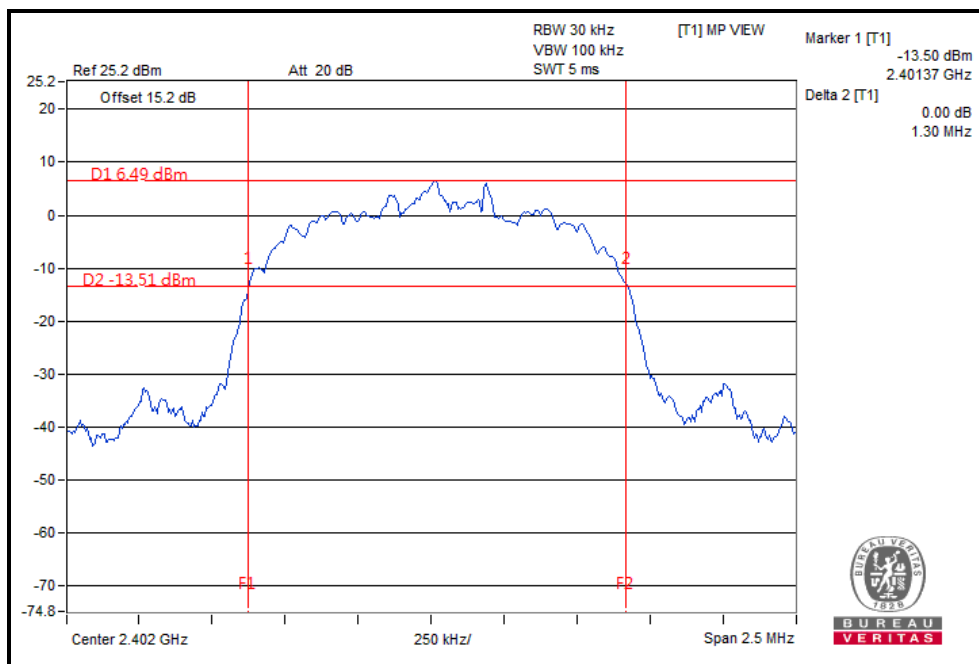
9.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

Channel	Channel Frequency (MHz)	20 dB Bandwidth (MHz)		>= 25 kHz
		GFSK	8DPSK	
0	2402	0.96	1.30	Yes
39	2441	0.97	1.30	Yes
78	2480	0.97	1.30	Yes

註：對操作於 2400~2483.5 MHz 頻段的跳頻系統技術之低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之(1)(A)條規定，跳頻系統之載波頻率頻道間隔應至少 25 千赫(kHz)或跳頻頻道之 20 dB 頻寬之三分之二，兩者取較寬者。依據上述條文之規定，對操作於 2400~2483.5 MHz 頻段的跳頻產品之頻寬乃為該產品載波頻率頻道間隔的判定限制之一。

**此測試圖僅放測試結果最差的頻道。



9.6 量測結果判定

依據測試數據結果，三分之二 20 dB 頻寬值乃為此產品之載波頻率頻道間隔的判定限制值。

10 峰值傳導輸出功率之量測

10.1 適用標準

請見本報告 3.1 節第(24)項的規定。

10.2 量測方法

- 將待測物輸出接到功率計上。
- 設定待測物處於連續發射狀態。
- 量測待測物輸出功率峰值。

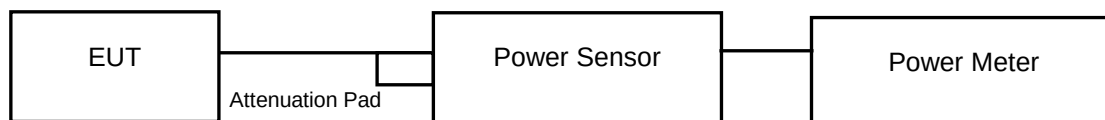
10.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Sep. 03, 2020
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Sep. 03, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 1.393 dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

10.4 測試配置



10.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

Channel	Channel Frequency (MHz)	Peak Power Output (dBm)		Peak Power Limit (dBm)	Pass / Fail
		GFSK	8DPSK		
0	2402	10.99	11.37	21	Pass
39	2441	10.86	11.25	21	Pass
78	2480	10.37	10.83	21	Pass

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Average Power Limit (dBm)	Pass / Fail
		GFSK	8DPSK		
0	2402	10.65	8.36	21	Pass
39	2441	10.48	8.18	21	Pass
78	2480	10.09	7.77	21	Pass

註：待測物操作頻率為 2400 MHz~2483.5 MHz 頻段，且輸出功率小於或等於 125 mW，其載波頻率頻道間隔不小於跳頻頻道 20 dB 頻寬之三分之二，參考 12.5 節量測結果。

10.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

11 跳頻頻道數之量測

11.1 適用標準

請見本報告 3.1 節第(25)項的規定。

11.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW = 100 kHz，VBW = 300 kHz，量測跳頻頻道數。

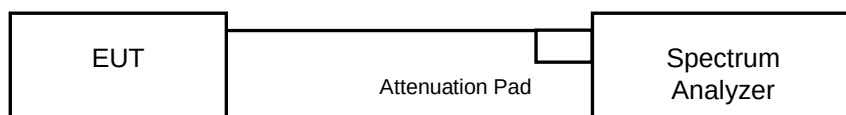
11.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

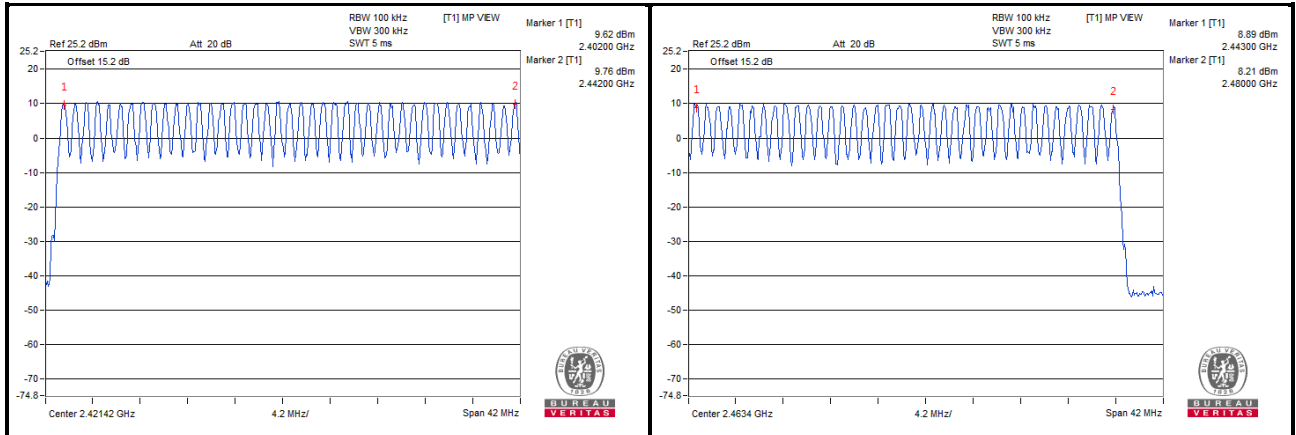
11.4 測試配置



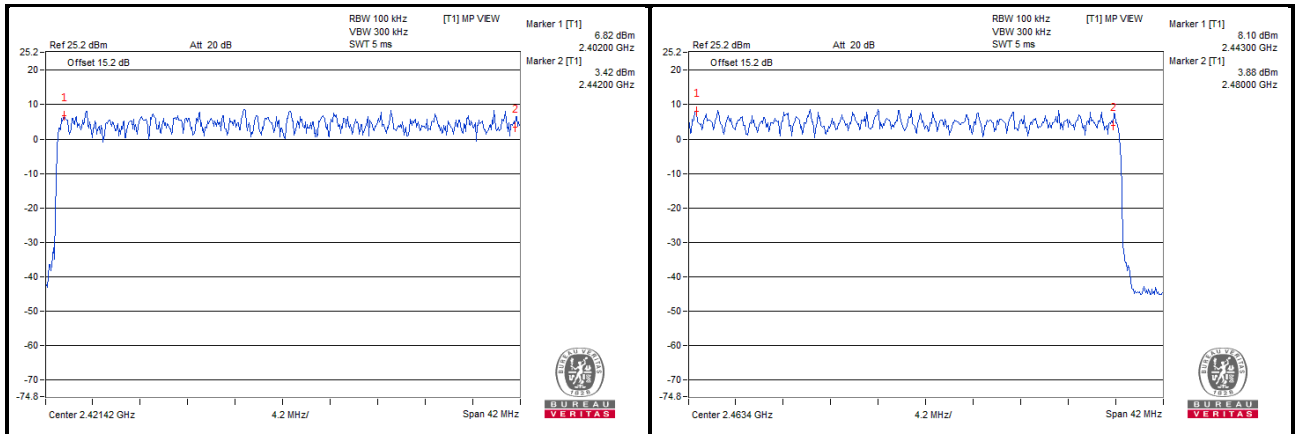
11.5 量測結果

其掃描圖請參閱下圖。跳頻頻道數共有 79 個，符合至少 15 個的規定。

GFSK



8DPSK



11.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

12 跳頻頻道間隔之量測

12.1 適用標準

請見本報告 3.1 節第(26)項規定。

12.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 設定 RBW = 30 kHz，VBW = 100 kHz，量測相鄰兩個頻道間的間隔。

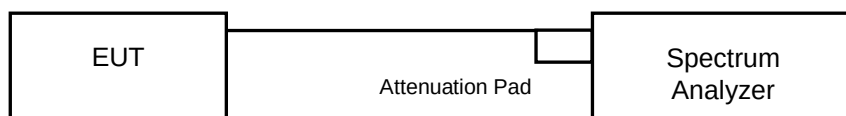
12.3 量測場強輻射之儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

12.4 測試配置



12.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

GFSK

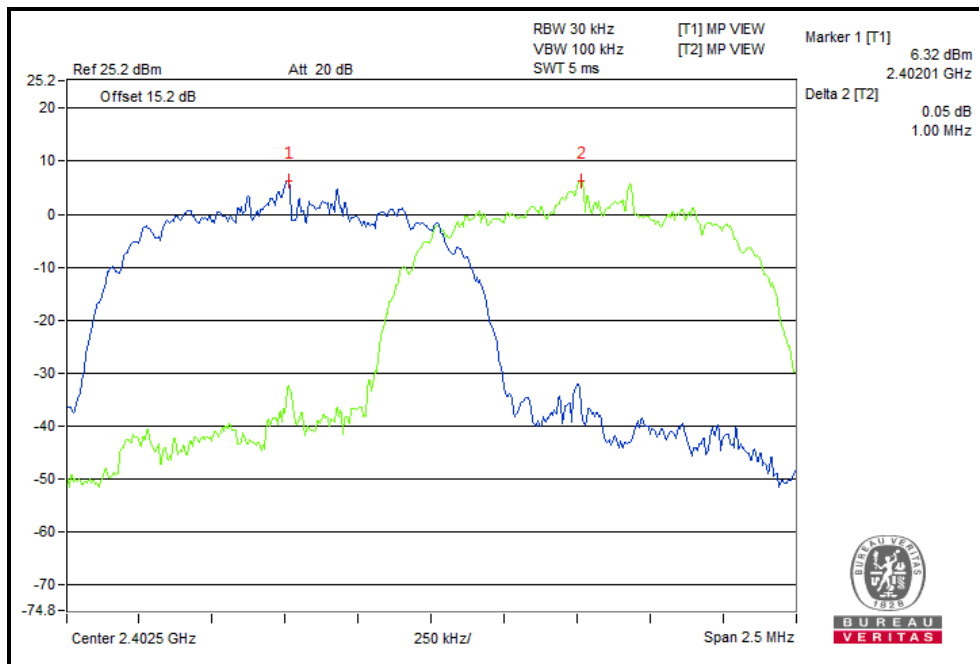
Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	0.96	0.64	Pass
39	2441	1.00	0.97	0.65	Pass
78	2480	1.00	0.97	0.65	Pass

8DPSK

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.00	1.30	0.87	Pass
39	2441	1.00	1.30	0.87	Pass
78	2480	1.00	1.30	0.87	Pass

本項測試的 limit 為至少為三分之二 20 dB 頻寬。

**此測試圖僅放測試結果最差的頻道。



12.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

13 每一頻道停留時間之量測

13.1 適用標準

請見本報告 3.1 節第(27)項的規定。

13.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於正常傳輸跳頻模式下。
- 設定 RBW = 100 kHz，VBW = 300 kHz，量測在不同傳輸模式下的頻道停留時間。

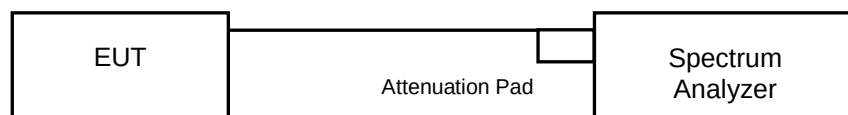
13.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

13.4 測試配置



13.5 量測結果

GFSK

Mode	Number of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (sec)
DH1	50 (times / 5 sec) * 6.32 = 316 times	0.438	138.41	0.4
DH3	27 (times / 5 sec) * 6.32 = 170.64 times	1.72	293.5	0.4
DH5	17 (times / 5 sec) * 6.32 = 107.44 times	3.008	323.18	0.4

註:因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch 39 作為代表。

其掃描圖請參閱下方



8DPSK

Mode	Number of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (sec)
3DH1	50 (times / 5 sec) * 6.32 = 316 times	0.48	151.68	0.4
3DH3	26 (times / 5 sec) * 6.32 = 164.32 times	1.72	282.63	0.4
3DH5	18 (times / 5 sec) * 6.32 = 113.76 times	3.024	344.01	0.4

註:因為 Bluetooth 每秒跳 1600 次，會平均落在每個頻道，所以僅測試 Ch 39 作為代表。

其掃描圖請參閱下方



13.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

BLUETOOTH LE 頻段測試紀錄結果

14 帶外發射之量測

14.1 適用標準

請見本報告 3.1 節第(2)項的規定。

14.2 量測方法

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線從離地 1 米至 4 米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

Note: 對於 1 GHz 以上場強輻射的測試，待測物則置於 1.5 米高的非金屬桌面。

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz；

Average 為 RBW = 1 MHz, VBW = 3 kHz

接收諧波：

Below 1 GHz

Peak 為 RBW = 120 kHz, VBW = 360 kHz；Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz；Average 為 RBW = 1 MHz, VBW = 3 MHz(RMS)

其它不必要之訊號

Peak 為 RBW = 120 kHz, VBW = 360 kHz；Quasi-Peak 為 RBW = 120 kHz, VBW = 120 kHz

14.3 量測儀器

同 4.3 節

14.4 測試配置

同 4.4 節

14.5 場強度之計算

同 4.5 節

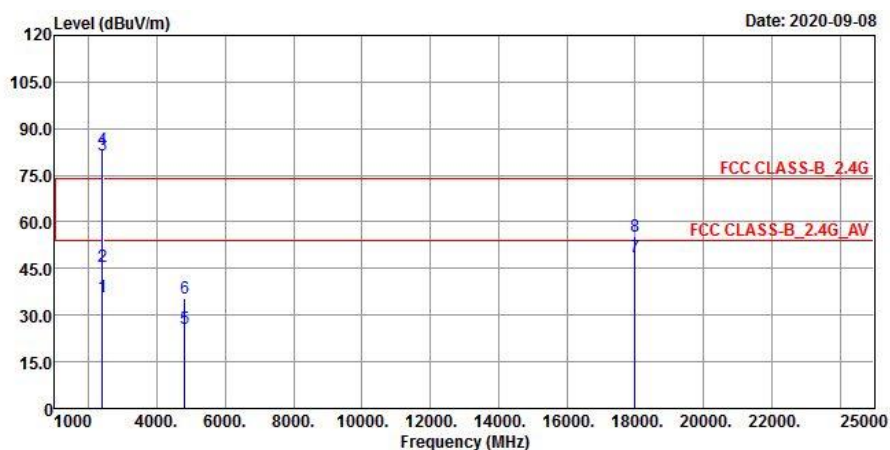
量測結果請見下頁。

14.6 量測結果

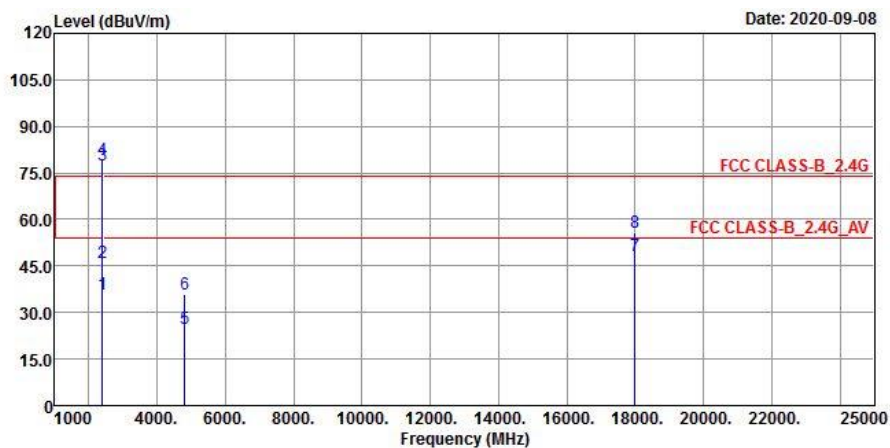
14.6.1 發射諧波

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Horizontal



Vertical



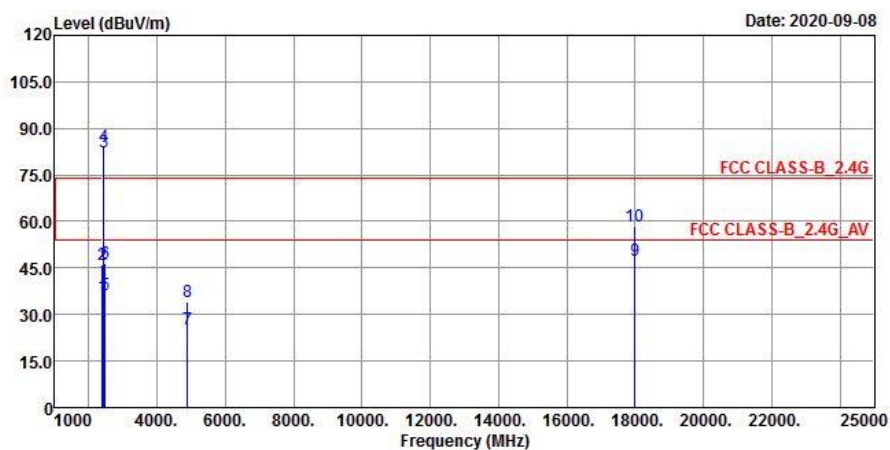
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	35.79	41.71	-5.92	54	-18.21	314	354	Average
2390	45.58	51.5	-5.92	74	-28.42	314	354	Peak
2402	81.63	87.57	-5.94	-----	-----	314	354	Average
2402	83.13	89.07	-5.94	-----	-----	314	354	Peak
4804	25.89	41.53	-15.64	54	-28.11	105	134	Average
4804	35.4	51.04	-15.64	74	-38.6	105	134	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	35.88	41.8	-5.92	54	-18.12	204	340	Average
2390	45.96	51.88	-5.92	74	-28.04	204	340	Peak
2402	77.27	83.21	-5.94	-----	-----	204	340	Average
2402	79.07	85.01	-5.94	-----	-----	204	340	Peak
4804	25	40.64	-15.64	54	-29	125	147	Average
4804	35.99	51.63	-15.64	74	-38.01	125	147	Peak

Remarks:

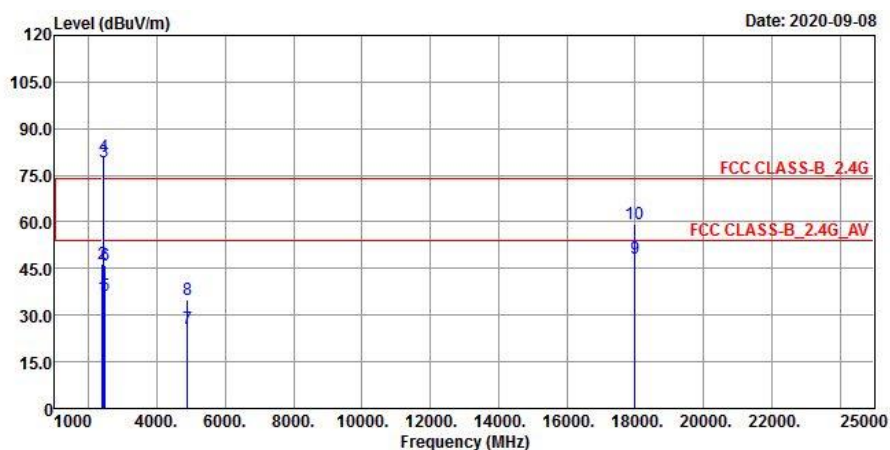
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Horizontal



Vertical



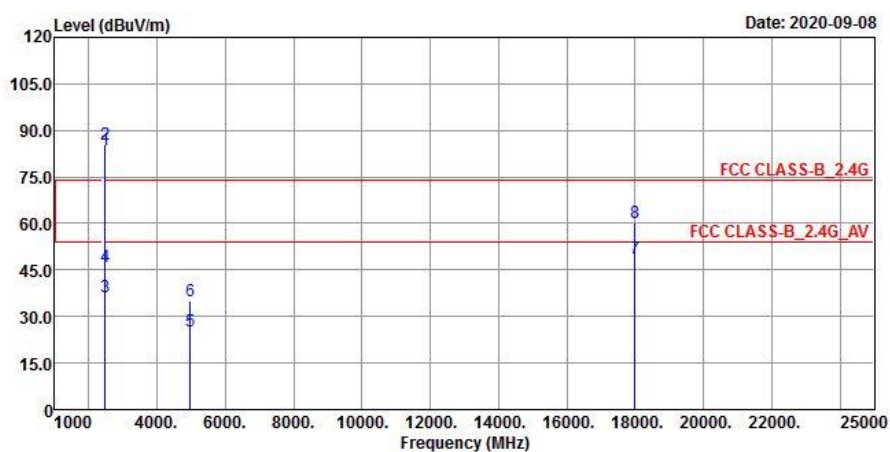
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.06	41.98	-5.92	54	-17.94	317	355	Average
2390	46.07	51.99	-5.92	74	-27.93	317	355	Peak
2440	82.36	88.24	-5.88	-----	-----	317	355	Average
2440	83.93	89.81	-5.88	-----	-----	317	355	Peak
2483.5	36.12	41.82	-5.7	54	-17.88	317	355	Average
2483.5	46.33	52.03	-5.7	74	-27.67	317	355	Peak
4880	25.08	40.64	-15.56	54	-28.92	124	137	Average
4880	34.06	49.62	-15.56	74	-39.94	124	137	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.07	41.99	-5.92	54	-17.93	204	274	Average
2390	46.39	52.31	-5.92	74	-27.61	204	274	Peak
2440	79.07	84.95	-5.88	-----	-----	204	274	Average
2440	81.05	86.93	-5.88	-----	-----	204	274	Peak
2483.5	36.13	41.83	-5.7	54	-17.87	204	274	Average
2483.5	45.88	51.58	-5.7	74	-28.12	204	274	Peak
4880	25.48	41.04	-15.56	54	-28.52	124	155	Average
4880	34.99	50.55	-15.56	74	-39.01	124	155	Peak

Remarks:

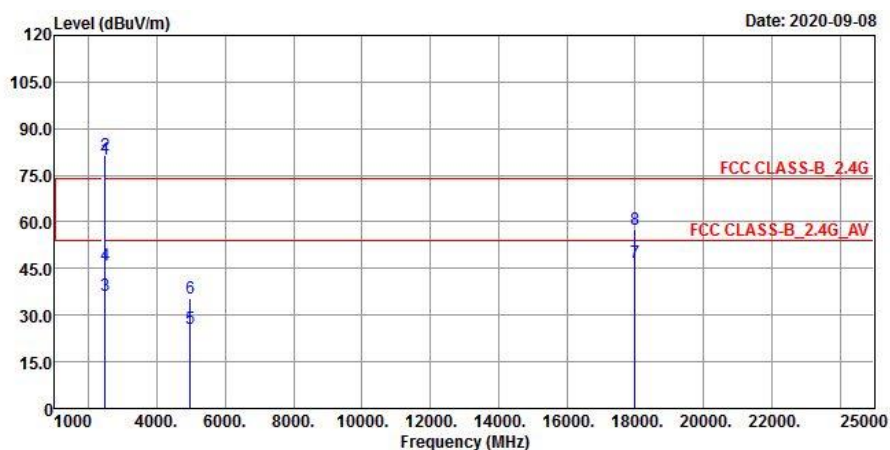
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2440 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	83.8	89.5	-5.7	-----	-----	319	352	Average
2480	85.32	91.02	-5.7	-----	-----	319	352	Peak
2483.5	36.23	41.93	-5.7	54	-17.77	319	352	Average
2483.5	46.17	51.87	-5.7	74	-27.83	319	352	Peak
4960	25.19	40.64	-15.45	54	-28.81	125	180	Average
4960	35.09	50.54	-15.45	74	-38.91	125	180	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	80.22	85.92	-5.7	-----	-----	202	279	Average
2480	81.64	87.34	-5.7	-----	-----	202	279	Peak
2483.5	36.1	41.8	-5.7	54	-17.9	202	279	Average
2483.5	45.96	51.66	-5.7	74	-28.04	202	279	Peak
4960	25.72	41.17	-15.45	54	-28.28	124	138	Average
4960	35.29	50.74	-15.45	74	-38.71	124	138	Peak

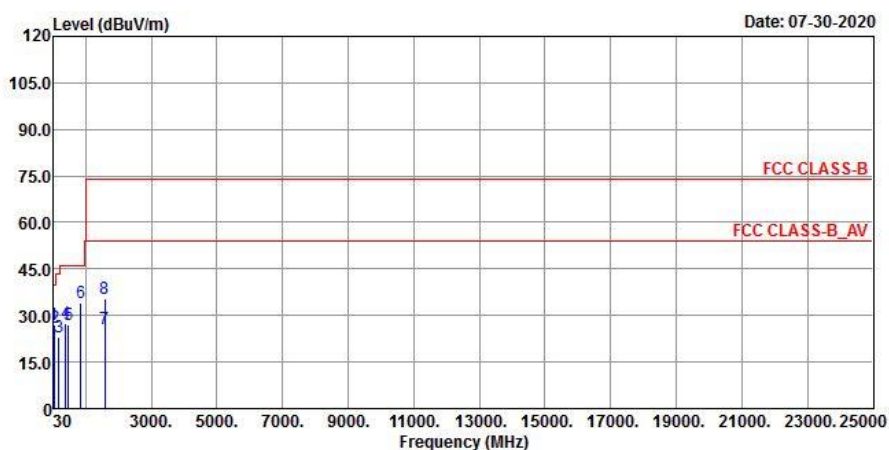
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

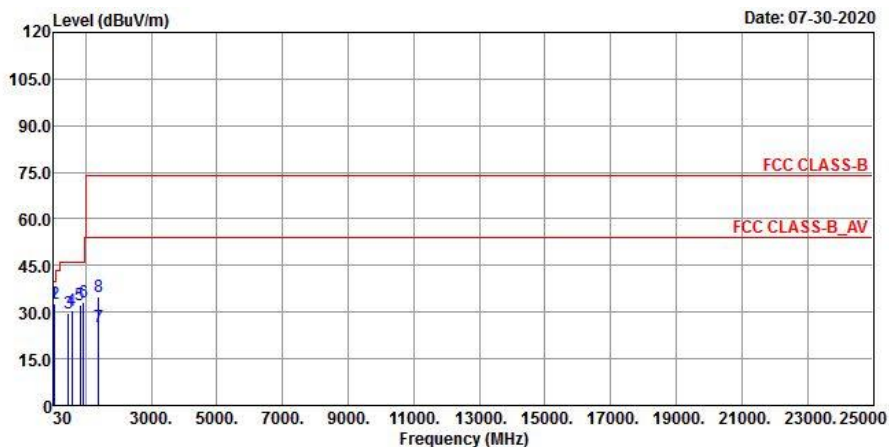
14.6.2 接收諧波

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	30 MHz ~ 25 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Above 1 GHz: Peak (PK) & Average (AV) Below 1 GHz: Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyoung Wang

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
42.61	27.02	39	-11.98	40	-12.98	165	231	QP
52.31	26.34	38.16	-11.82	40	-13.66	147	195	QP
176.47	22.81	35.79	-12.98	43.5	-20.69	102	264	QP
382.11	27.6	36.3	-8.7	46	-18.4	154	184	QP
484.93	26.97	32.73	-5.76	46	-19.03	109	231	QP
843.83	34.27	31.86	2.41	46	-11.73	147	152	QP
1586	25.48	49.85	-24.37	54	-28.52	145	252	Average
1586	35.28	59.65	-24.37	74	-38.72	145	252	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
40.67	32.6	44.66	-12.06	40	-7.4	145	162	QP
64.92	32.56	45.82	-13.26	40	-7.44	147	195	QP
473.29	29.52	35.45	-5.93	46	-16.48	132	261	QP
579.02	30.7	34.14	-3.44	46	-15.3	158	147	QP
837.04	32.19	29.86	2.33	46	-13.81	102	214	QP
938.89	33.2	29.73	3.47	46	-12.8	165	291	QP
1401	25.25	49.96	-24.71	54	-28.75	198	225	Average
1401	34.96	59.67	-24.71	74	-39.04	198	225	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

14.6.3 其它不必要之訊號

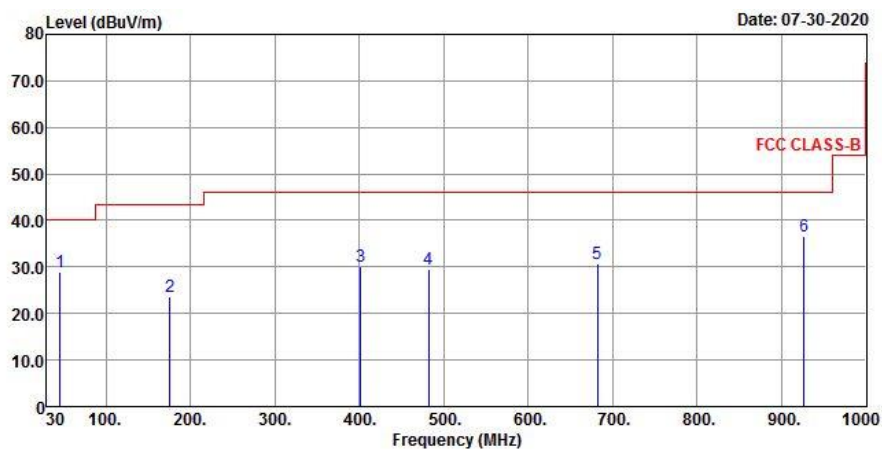
9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

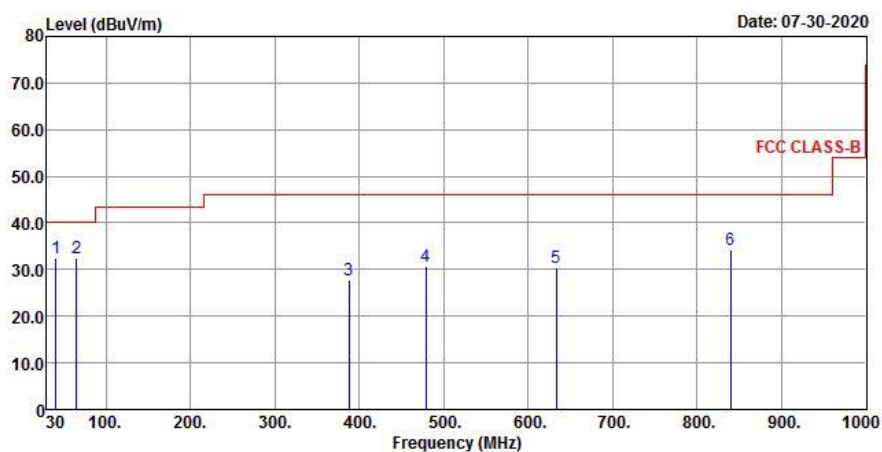
30 MHz ~ 1 GHz Data:

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	30 MHz ~ 1 GHz
Input Power	110 Vac, 60 Hz	Detector Function	Peak (PK) or Quasi-Peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Horizontal



Vertical

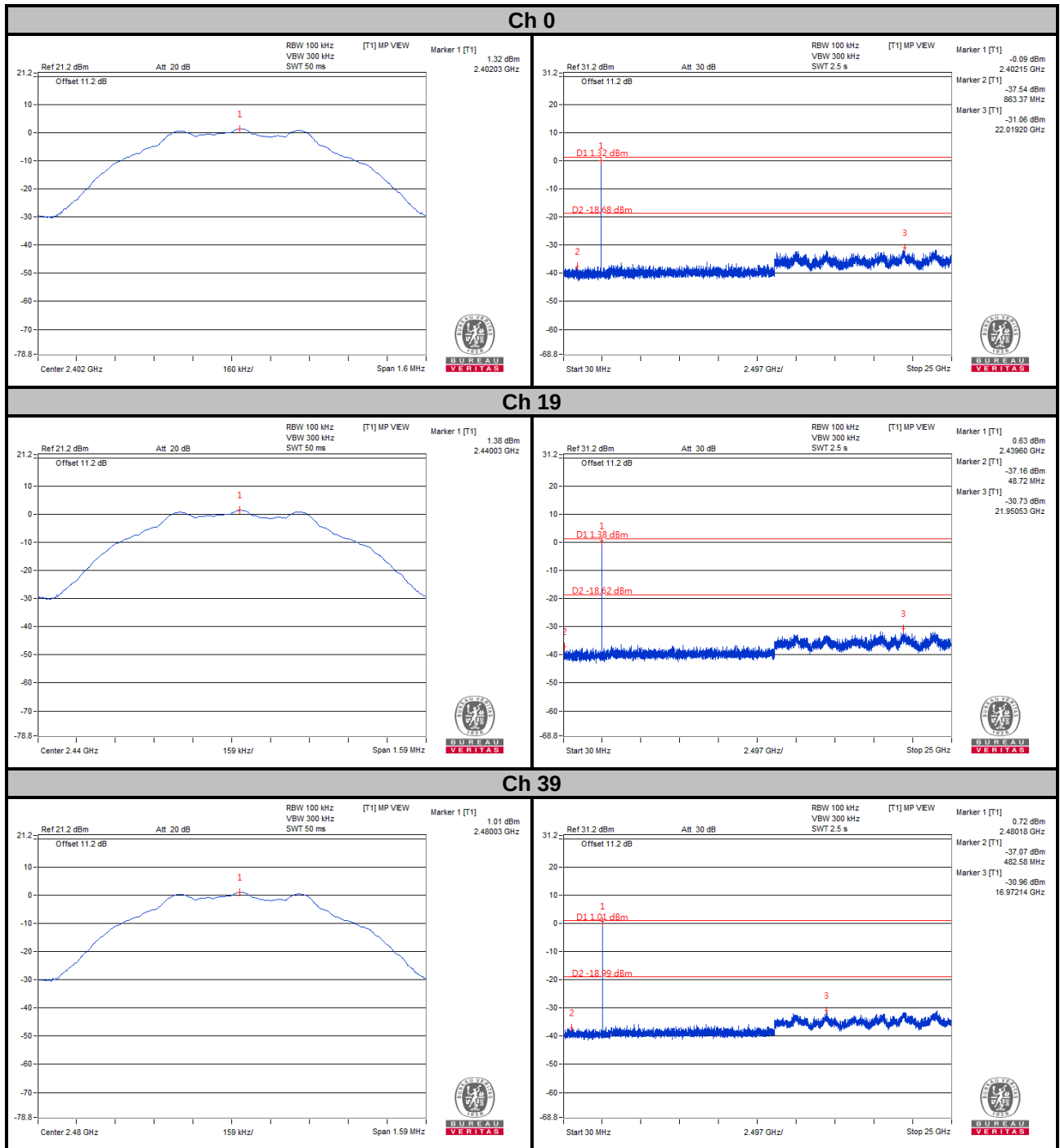


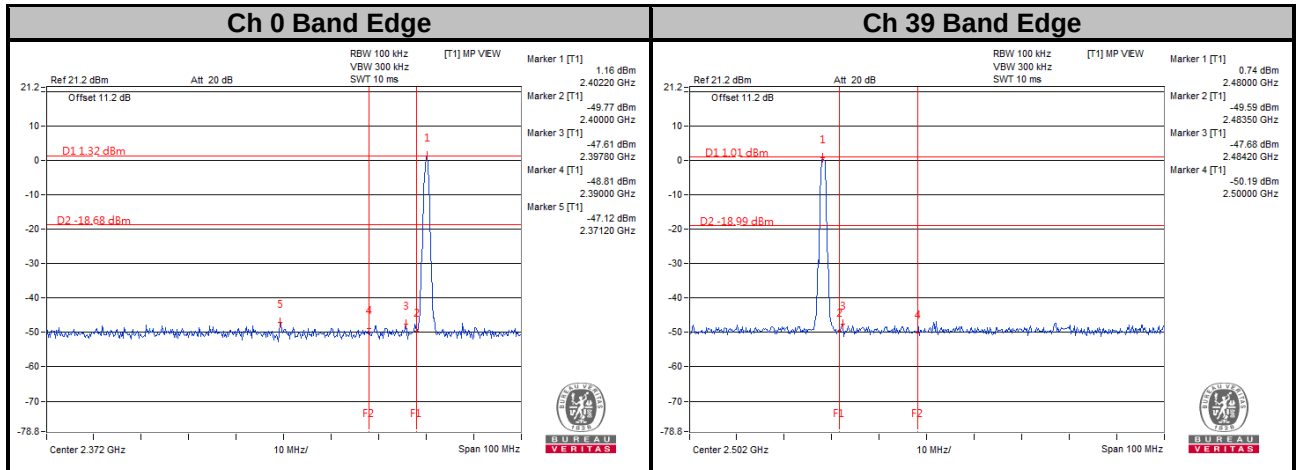
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
45.52	28.93	40.71	-11.78	40	-11.07	165	111	QP
175.5	23.72	36.56	-12.84	43.5	-19.78	147	152	QP
401.51	30.2	38.52	-8.32	46	-15.8	195	285	QP
482.02	29.39	35.19	-5.8	46	-16.61	132	165	QP
681.84	30.61	31.6	-0.99	46	-15.39	102	285	QP
926.28	36.53	33.16	3.37	46	-9.47	147	152	QP
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
40.67	32.6	44.66	-12.06	40	-7.4	132	265	QP
64.92	32.56	45.82	-13.26	40	-7.44	147	152	QP
387.93	27.76	36.36	-8.6	46	-18.24	198	254	QP
479.11	30.74	36.57	-5.83	46	-15.26	102	231	QP
633.34	30.34	32.09	-1.75	46	-15.66	165	247	QP
839.95	34.12	31.73	2.39	46	-11.88	158	165	QP

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

14.7 帶外發射之量測 (傳導)





14.8 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

15 6 dB 頻寬之要求

15.1 適用標準

請見本報告 3.1 節第(5)項的規定。

15.2 量測方法

- 將待測物輸出經由衰減器接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 計算由最大輸出功率峰值減 6 dB 的最大頻率範圍。

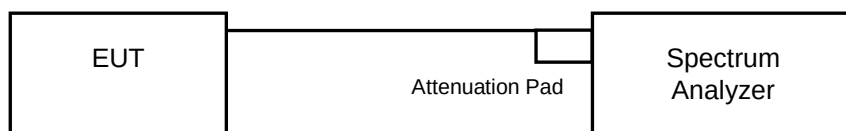
15.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

15.4 測試配置

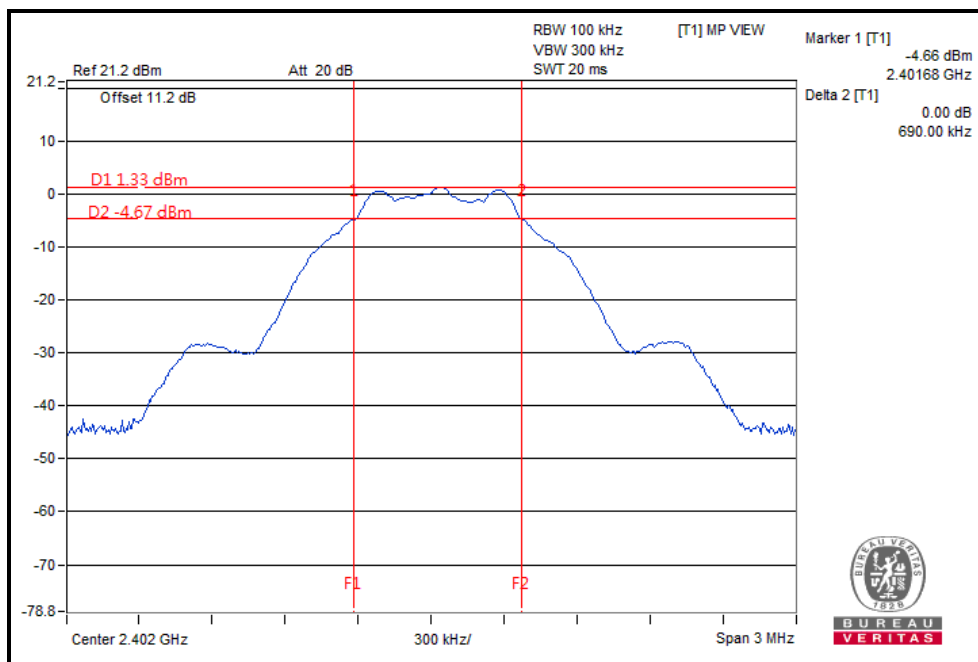


15.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.69	0.5	Pass
19	2440	0.69	0.5	Pass
39	2480	0.69	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



15.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

16 峰值傳導輸出功率之量測

16.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

16.2 量測方法

- 將待測物輸出經由衰減器接到功率計上。
- 設定待測物處於連續發射狀態。
- 計算其輸出功率峰值。

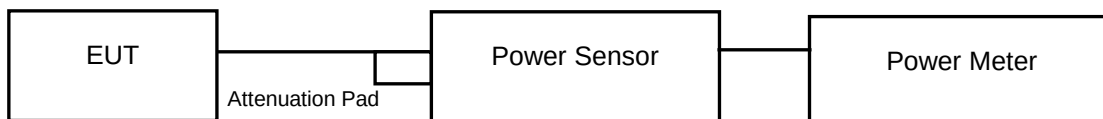
16.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Sep. 03, 2020
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Sep. 03, 2020

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 1.393 dB, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

16.4 測試配置



16.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
0	2402	1.702	2.31	1.542	1.88	30	Pass
19	2440	1.718	2.35	1.567	1.95	30	Pass
39	2480	1.629	2.12	1.496	1.75	30	Pass

16.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

17 功率頻譜密度之量測

17.1 適用標準

請見本報告 3.1 節第(7)項的規定。

17.2 量測方法

- 將待測物之天線埠經由適當之衰減直接連至測試儀器。
- 設定解析頻寬為 3 kHz，視訊頻寬為 10 kHz，掃描時間為 auto。
- 掃描頻寬設於足夠觀察發射機所產生的主頻信號，並找到最大的峰值準位。
- 其峰值位準必須不大於 8 dBm。

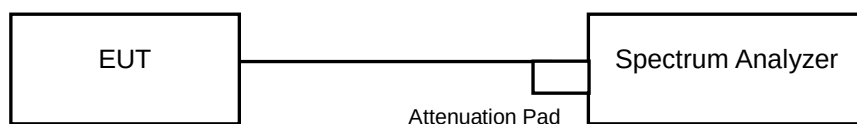
17.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021

Note:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

17.4 測試配置

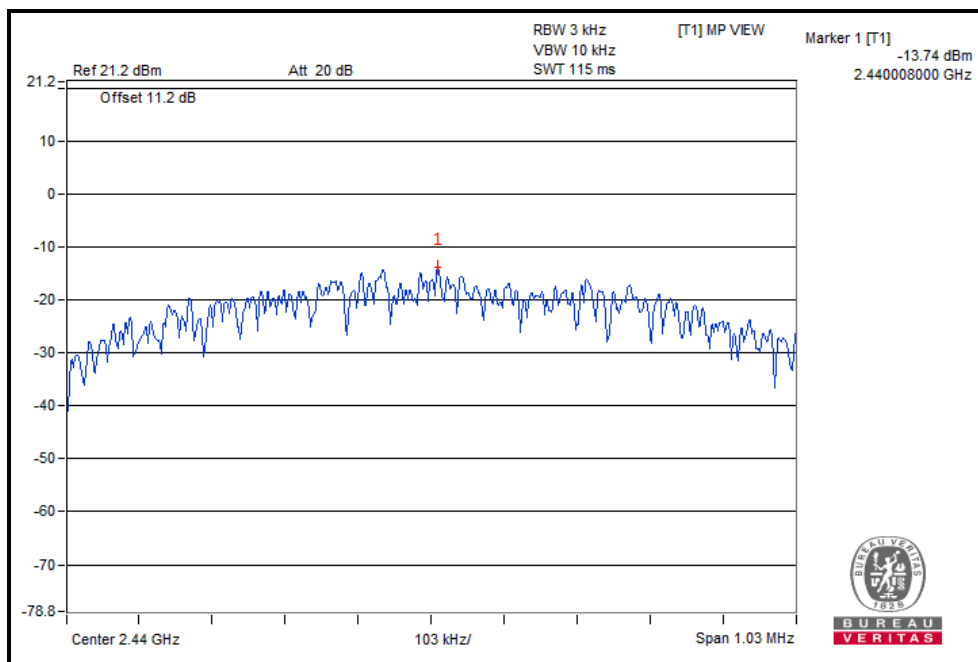


17.5 量測結果

操作模式	發射	測試日期	109 年 07 月 21 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Wayne Lin		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	2402	-13.79	8	Pass
19	2440	-13.74	8	Pass
39	2480	-14.09	8	Pass

**此測試圖僅放測試結果最差的頻道。



17.6 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

NFC 頻段測試紀錄結果

18 主波發射之量測

18.1 適用標準

請見本報告 3.1 節第(30)項規定。

18.2 量測方法

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線分別置於 Parallel、Perpendicular、Ground-parallel 極化各執行測試一次，以紀錄最大場強值。

Measurement Instrument Setting

The following table is the setting of receiver

Frequency Range	Setting
9 kHz ~ 150 kHz	Quasi-Peak: RBW = 200 Hz
150 kHz ~ 30 MHz	Quasi-Peak: RBW = 9 kHz or 10 kHz
30 MHz ~ 1000 MHz	Peak: RBW = 120 kHz; Quasi-Peak: RBW = 120 kHz

18.3 量測儀器

同 4.3 節

18.4 測試配置

同 4.34 節

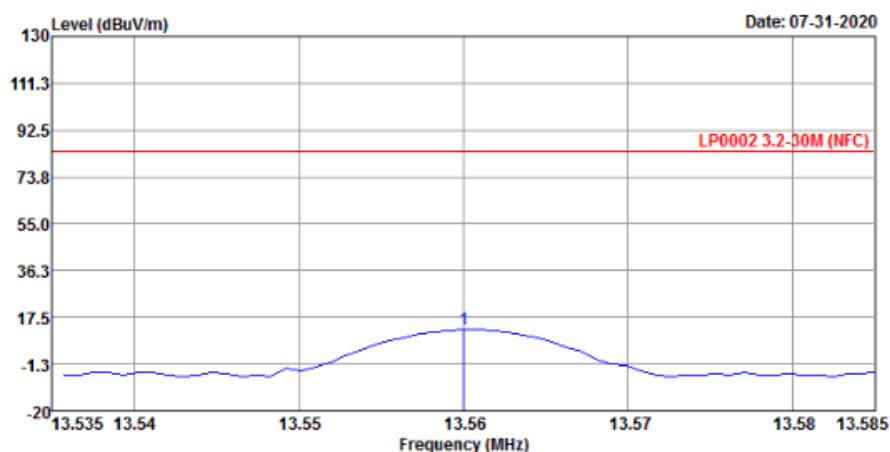
18.5 場強度之計算

同 4.35 節

量測結果請見下頁。

18.6 量測結果

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Frequency Range	13.553 ~ 13.567 MHz
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

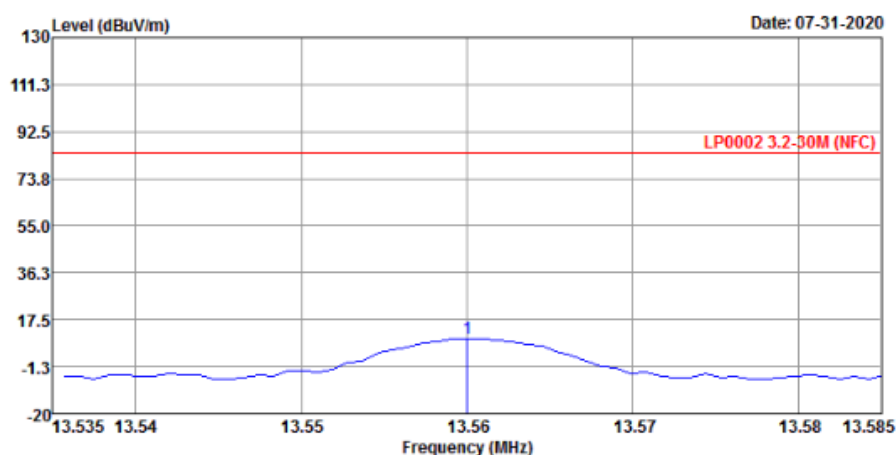


Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
13.56	12.53	31.16	-18.63	84	-71.47	100	360	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Frequency Range	13.553 ~ 13.567 MHz
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

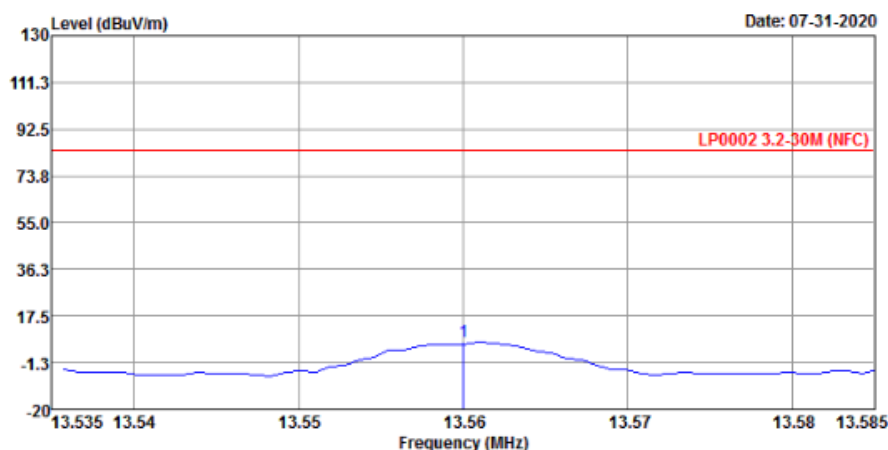


Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
13.56	9.76	28.39	-18.63	84	-74.24	100	0	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Frequency Range	13.553 ~ 13.567 MHz
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
13.56	6.91	25.54	-18.63	84	-77.09	100	360	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

18.7 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

19 不必要之發射量測

19.1 適用標準

請見本報告 3.1 節第(31)項規定。

19.2 量測方法

9 kHz ~ 30 MHz 量測：

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線分別置於 Parallel、Perpendicular、Ground-parallel 極化各執行測試一次，以紀錄最大場強值。

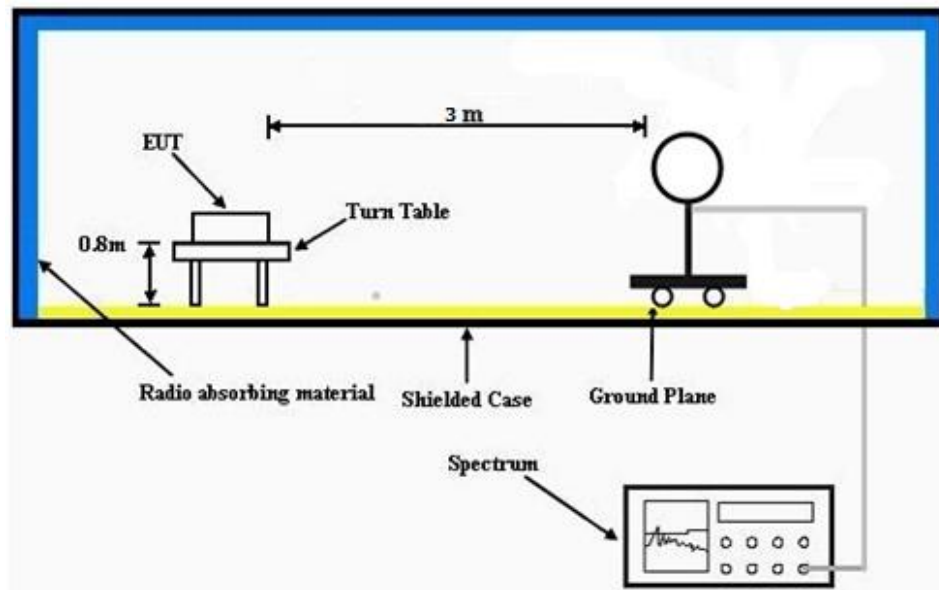
30 MHz ~ 1 GHz 量測：

在電波暗室，將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態。接收天線置於 3 米距離。桌面要 360 度旋轉，另外接收天線從離地 1 米至 4 米升降變化，以找出最大的輻射電場強度，接收天線分別置於水平、垂直極化各執行測試一次。

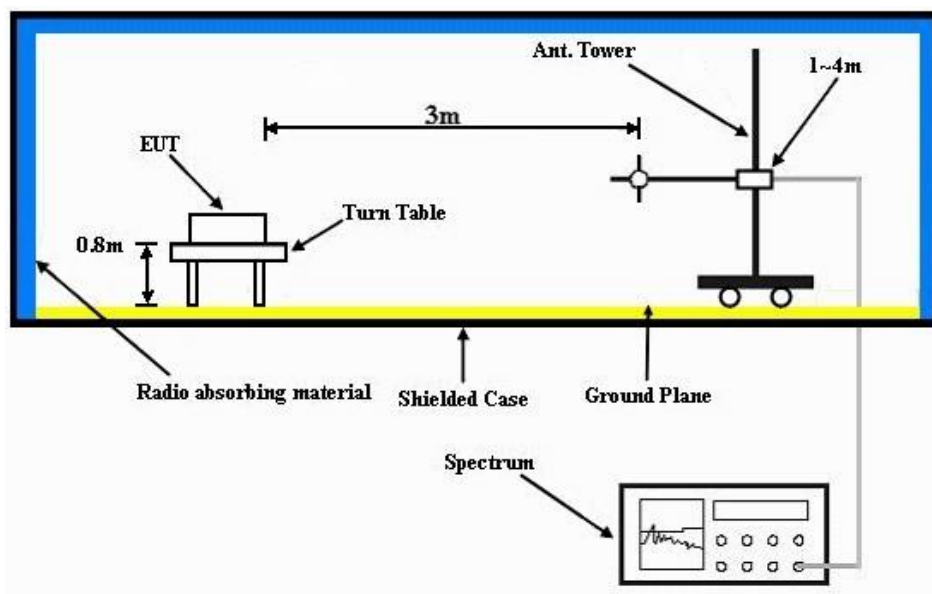
19.3 量測儀器

同 4.3 節

19.4 測試配置



9 kHz ~ 30 MHz



30 MHz ~ 1 GHz

19.5 場強度之計算

場強之計算公式如下：

結果值 Emission level (dBuV/m) = 機器讀值 Raw Value (dBuV) + 校正因子 Correction Factor (dB/m)

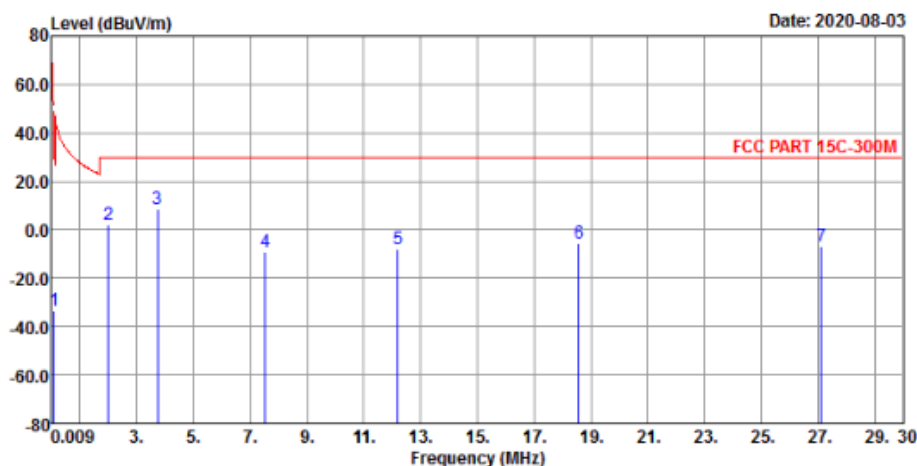
餘裕度 Margin(dB) = 結果值 Emission level (dBuV/m) - 限制值 Limit value (dBuV/m)

量測結果請見下頁。

19.6 量測結果

<Below 30 MHz>

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Transmitter
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyong Wang		

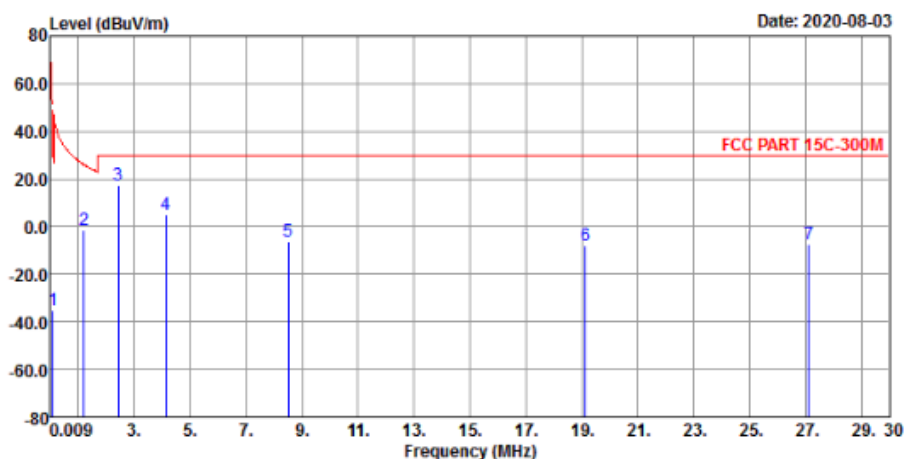


Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.09656	-33.18	27.47	-60.65	27.9	-61.08	100	211	QP
2.001	1.94	22.45	-20.51	29.54	-27.6	100	111	QP
3.732	8.79	29.15	-20.36	29.54	-20.75	100	165	QP
7.523	-9.11	10.15	-19.26	29.54	-38.65	100	132	QP
12.209	-7.78	10.91	-18.69	29.54	-37.32	100	111	QP
18.597	-5.48	12.96	-18.44	29.54	-35.02	100	102	QP
27.12	-6.55	11.7	-18.25	29.54	-36.09	100	147	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Transmitter
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

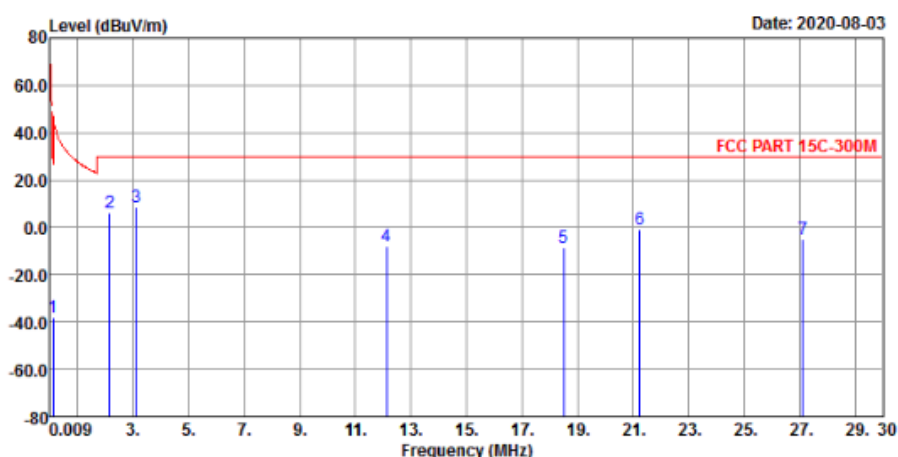


Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.09501	-35.25	25.38	-60.63	28.04	-63.29	100	105	QP
1.195	-1.66	18.62	-20.28	26.05	-27.71	100	145	QP
2.419	17.57	38.17	-20.6	29.54	-11.97	100	156	QP
4.15	5.15	25.34	-20.19	29.54	-24.39	100	102	QP
8.508	-5.97	13.09	-19.06	29.54	-35.51	100	197	QP
19.135	-8.1	10.32	-18.42	29.54	-37.64	100	111	QP
27.12	-7.21	11.04	-18.25	29.54	-36.75	100	146	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Transmitter
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

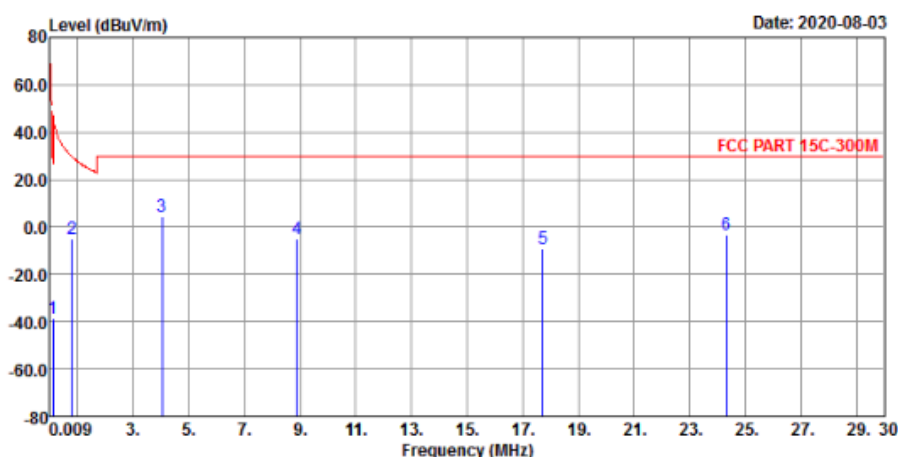


Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.10742	-38.18	22.49	-60.67	26.98	-65.16	100	144	QP
2.15	6.47	27.02	-20.55	29.54	-23.07	100	145	QP
3.105	8.39	29.04	-20.65	29.54	-21.15	100	102	QP
12.12	-7.88	10.81	-18.69	29.54	-37.42	100	165	QP
18.508	-8.74	9.71	-18.45	29.54	-38.28	100	182	QP
21.254	-0.76	17.61	-18.37	29.54	-30.3	100	195	QP
27.12	-5.1	13.15	-18.25	29.54	-34.64	100	145	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Receiver
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

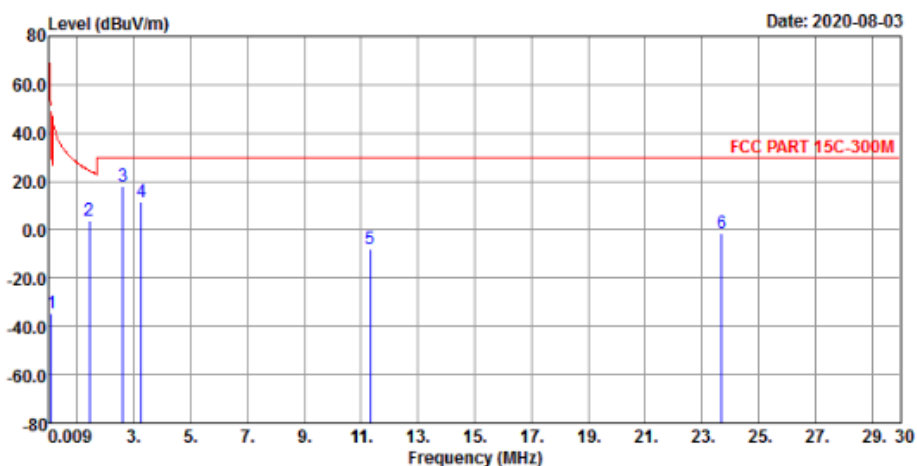


Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.1053	-38.58	22.1	-60.68	27.15	-65.73	100	152	QP
0.8067	-4.97	15.23	-20.2	29.47	-34.44	100	145	QP
4.031	4.16	24.39	-20.23	29.54	-25.38	100	132	QP
8.896	-5.14	13.85	-18.99	29.54	-34.68	100	111	QP
17.732	-8.91	9.56	-18.47	29.54	-38.45	100	102	QP
24.329	-3.28	15.02	-18.3	29.54	-32.82	100	164	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Receiver
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

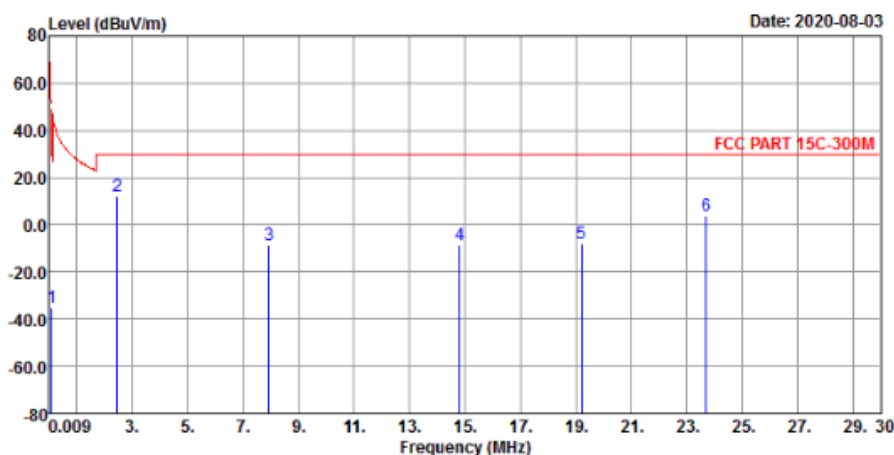


Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.09825	-34.49	26.19	-60.68	27.75	-62.24	100	111	QP
1.434	4.05	24.41	-20.36	24.47	-20.42	100	145	QP
2.598	18.04	38.67	-20.63	29.54	-11.5	100	132	QP
3.254	11.54	32.11	-20.57	29.54	-18	100	165	QP
11.314	-7.95	10.78	-18.73	29.54	-37.49	100	111	QP
23.702	-1.32	17	-18.32	29.54	-30.86	100	195	QP

Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
 Perpendicular: loop antenna 與 EUT 垂直
 Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Receiver
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		



Antenna Polarity & Test Distance: Loop Antenna Ground-parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.09755	-35.06	25.61	-60.67	27.81	-62.87	100	24	QP
2.448	12.01	32.62	-20.61	29.54	-17.53	100	14	QP
7.941	-8.74	10.43	-19.17	29.54	-38.28	100	132	QP
14.806	-8.27	10.3	-18.57	29.54	-37.81	100	182	QP
19.224	-7.92	10.5	-18.42	29.54	-37.46	100	241	QP
23.702	4.04	22.36	-18.32	29.54	-25.5	100	154	QP

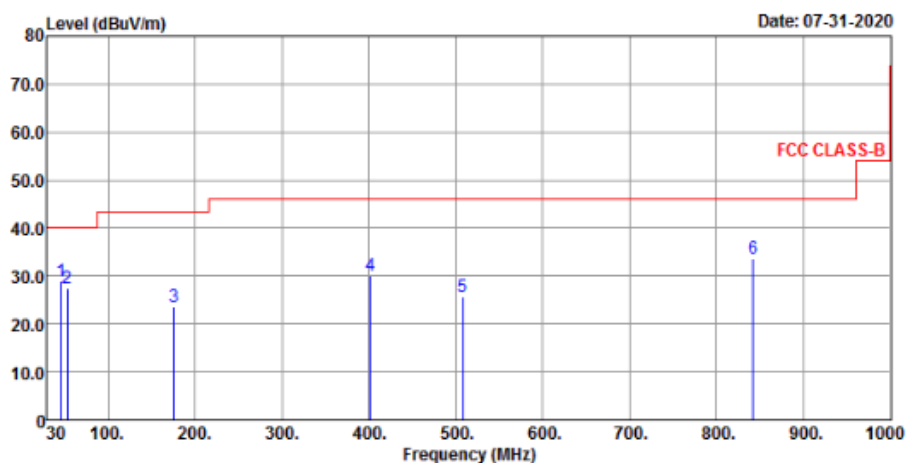
Note:

- Emission level (dBuV/m) = Read Level (dBuV) + Factor (dB/m)
- The other emission levels were very low against the limit.
- Margin value = Emission level - Limit value
- 當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值
 $\text{Limit @ 3 m} = \text{Limit @ 300 m} + 40\log(300 / 3) = \text{Limit @ 300 m} + 80$
 $\text{Limit @ 3 m} = \text{Limit @ 30 m} + 40\log(30 / 3) = \text{Limit @ 30 m} + 40$
- Parallel: loop antenna 面向 EUT
Perpendicular: loop antenna 與 EUT 垂直
Ground-parallel: loop antenna 與地面平行
- The factor value already contains the test distance interpolation coefficient.

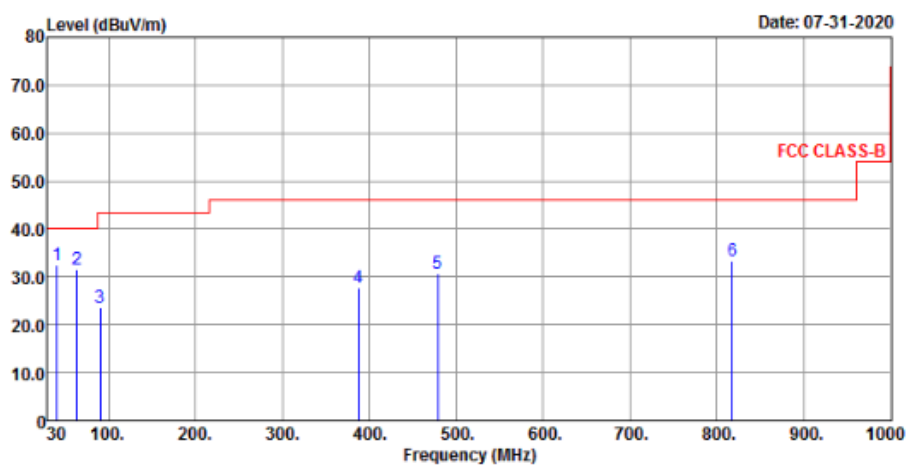
<Above 30 MHz>

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Transmitter
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyoung Wang		

Horizontal



Vertical



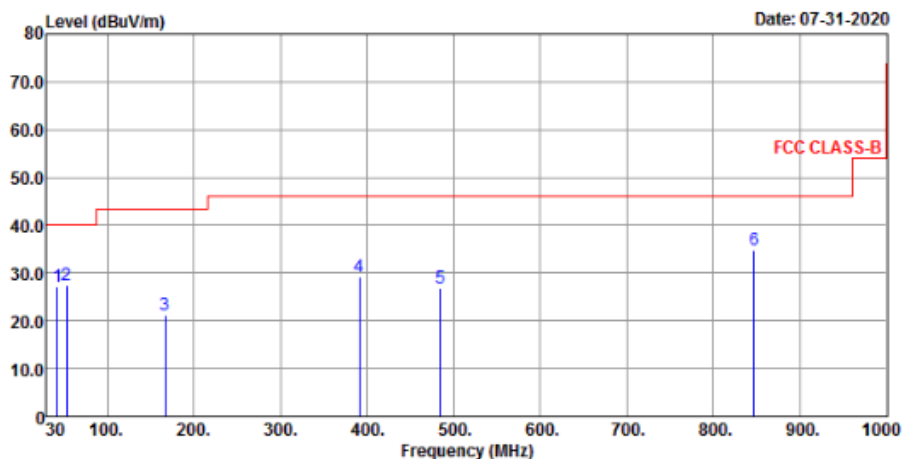
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
45.52	28.93	40.71	-11.78	40	-11.07	145	132	QP
53.28	27.45	39.3	-11.85	40	-12.55	165	295	QP
175.5	23.72	36.56	-12.84	43.5	-19.78	147	152	QP
401.51	30.2	38.52	-8.32	46	-15.8	165	132	QP
508.21	25.69	30.98	-5.29	46	-20.31	102	214	QP
841.89	33.68	31.27	2.41	46	-12.32	152	132	QP
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
40.67	32.6	44.66	-12.06	40	-7.4	154	132	QP
63.95	31.45	44.17	-12.72	40	-8.55	165	295	QP
90.14	23.67	41.2	-17.53	43.5	-19.83	111	154	QP
387.93	27.76	36.36	-8.6	46	-18.24	102	231	QP
479.11	30.74	36.57	-5.83	46	-15.26	145	152	QP
817.64	33.5	31.39	2.11	46	-12.5	174	152	QP

Remarks:

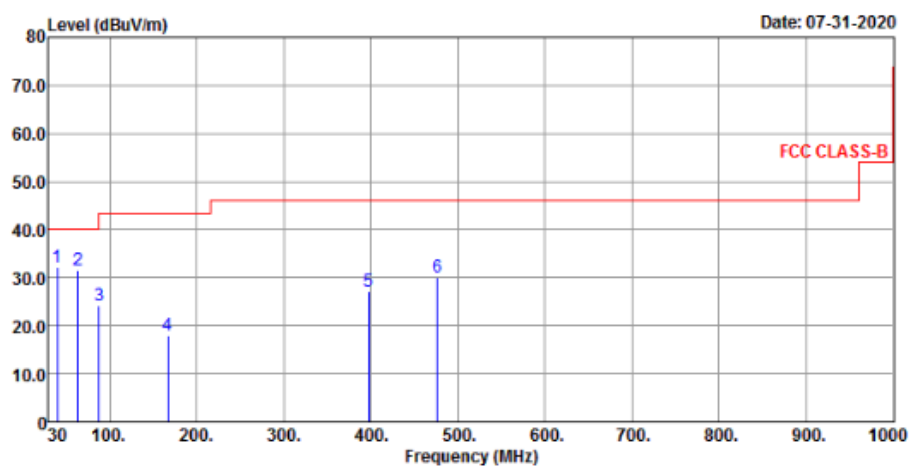
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Input Power	110 Vac, 60 Hz	Operating Method	Receiver
Environmental Conditions	25 deg. C, 65 % RH	Detector Function	Quasi-Peak (QP)
Tested By	Jisyong Wang		

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
42.61	27.02	39	-11.98	40	-12.98	145	132	QP
53.28	27.45	39.3	-11.85	40	-12.55	111	195	QP
166.77	21.34	33.5	-12.16	43.5	-22.16	102	265	QP
390.84	29.34	37.9	-8.56	46	-16.66	147	152	QP
484.93	26.97	32.73	-5.76	46	-19.03	132	165	QP
846.74	34.8	32.37	2.43	46	-11.2	102	265	QP
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
39.7	32.16	44.41	-12.25	40	-7.84	165	132	QP
63.95	31.45	44.17	-12.72	40	-8.55	147	152	QP
88.2	24.1	41.6	-17.5	43.5	-19.4	102	265	QP
166.77	18	30.16	-12.16	43.5	-25.5	147	152	QP
397.63	27.07	35.49	-8.42	46	-18.93	132	265	QP
476.2	30.17	36.05	-5.88	46	-15.83	147	152	QP

Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

19.7 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

20 天線之要求

20.1 適用標準

請見本報告 3.1 節第(33)項的規定。

20.2 天線規格

此待測物使用 Loop 天線，無使用天線接頭。

20.3 結果判定

符合低功率射頻器材技術規範之要求。

21 頻率容許差度之量測

21.1 適用標準

請見本報告 3.1 節第(32)項的規定。

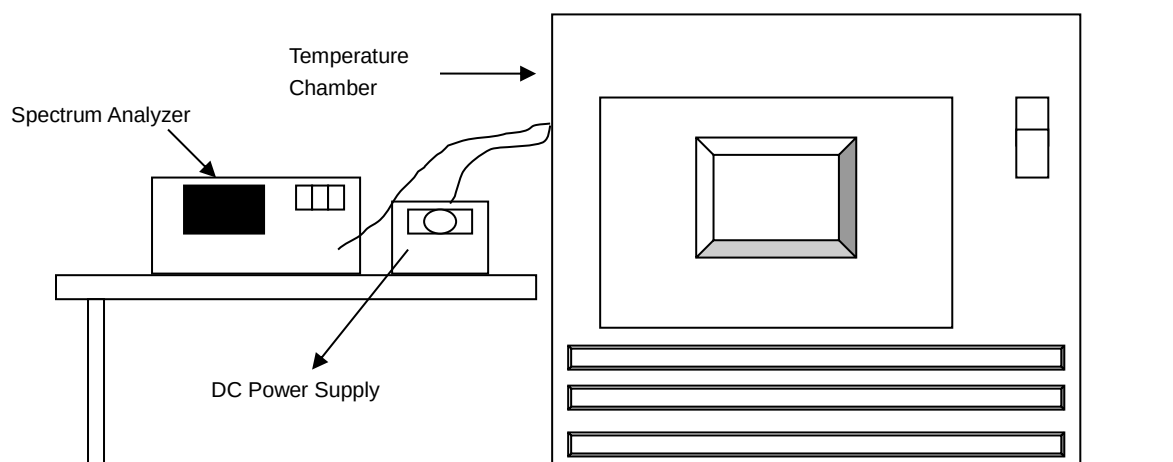
21.2 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
Temperature & Humidity Chamber	GTH-120-40- CP-AR	MAA1306-019	Sep. 06, 2019	Sep. 05, 2020
Power Supply Anritsu	33010D	807748	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The measurement uncertainty is 207 Hz, which is calculated as per the document ETSI TR 100 028. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of $k=2$.

21.3 測試配置



21.4 量測結果

操作模式	發射	測試日期	109 年 07 月 24 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Tim Chen		

AFC Frequency Error vs. Temperature Limit : $\pm 0.01\%$									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	5	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029	13.56004	0.00029
40	5	13.56001	0.00007	13.56001	0.00007	13.56001	0.00007	13.56001	0.00007
30	5	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044	13.55994	-0.00044
20	5	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007
10	5	13.55999	-0.00007	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007
0	5	13.55995	-0.00037	13.55995	-0.00037	13.55995	-0.00037	13.55996	-0.00029
-10	5	13.56005	0.00037	13.56005	0.00037	13.56005	0.00037	13.56005	0.00037
-20	5	13.55995	-0.00037	13.55995	-0.00037	13.55994	-0.00044	13.55995	-0.00037

AFC Frequency Error vs. Voltage Limit : $\pm 0.01\%$									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	5.75	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007
	5	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007
	4.25	13.55998	-0.00015	13.55998	-0.00015	13.55998	-0.00015	13.55999	-0.00007

註 1：此待測物電源輸入使用 Dummy Battery 進行測試

註 2：此電壓為客戶宣告

21.5 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

22 電源線傳導干擾之量測

22.1 適用標準

請見本報告 3.1 節第(1)項的規定。

22.2 量測方法

將待測物置於 0.8 米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由 0.15 MHz 至 30 MHz 之間之電源線傳導放射強度。

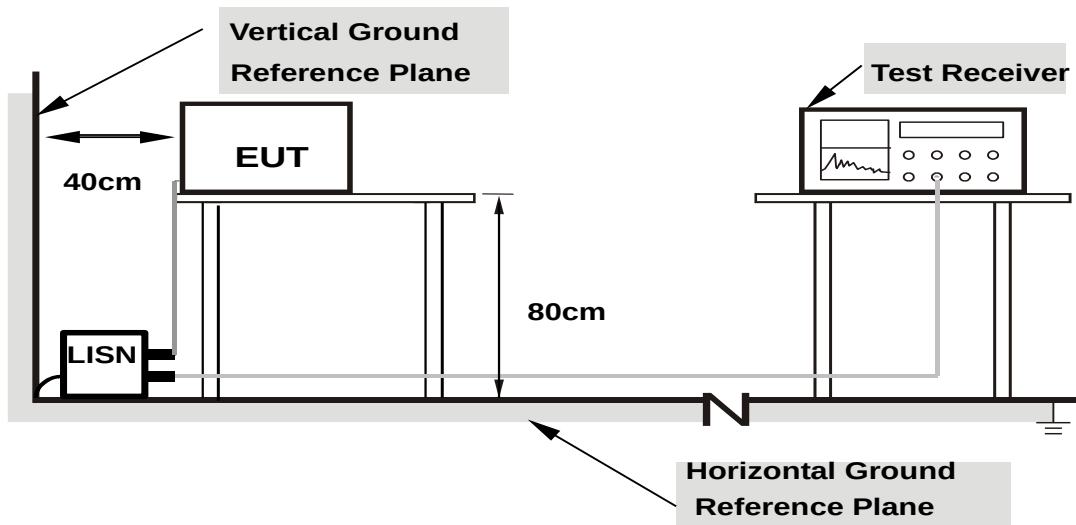
22.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Feb. 17, 2020	Feb. 16, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 20, 2020	Jan. 19, 2021
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Conf_ V7.3.7.4	NA	NA	NA

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
3. The VCCI Site Registration No. is C-12047.
4. The measurement uncertainty is 2.79 dB, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

22.4 測試配置



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

22.5 干擾值之計算

餘裕度 Margin(dB)= 結果值 Emission level (dBuV)-限制值 Limit value (dBuV)

電源傳導干擾電壓之計算公式如下

結果值 Emission level (dBuV)=校正因子 Correction Factor (dB)+儀器讀值 Reading value (dBuV)

其中校正因子 Correction Factor (dB)為：

饋線損失+電源阻抗模擬網路損失

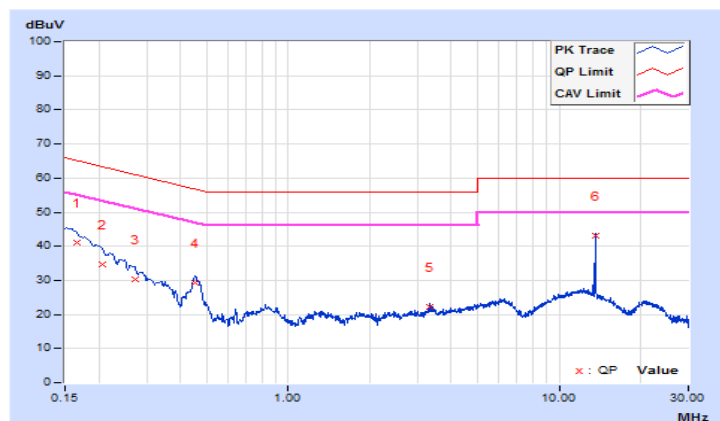
22.6 量測結果

量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/29
測試模式	TX/RX NFC + USB Cable + Adapter		

量測電源端點：火線 (L1)										
No	頻率 (MHz)	修正因子 (dB)	量測讀值 (dBuV)		干擾值 (dBuV)		限制值 (dBuV)		餘裕 (dB)	
			準峰值	平均值	準峰值	平均值	準峰值	平均值	準峰值	平均值
1	0.16575	10.16	31.04	26.02	41.20	36.18	65.17	55.17	-23.97	-18.99
2	0.20625	10.17	24.48	17.92	34.65	28.09	63.35	53.35	-28.70	-25.26
3	0.27150	10.18	20.18	16.42	30.36	26.60	61.07	51.07	-30.71	-24.47
4	0.45304	10.21	19.23	12.63	29.44	22.84	56.82	46.82	-27.38	-23.98
5	3.33150	10.36	11.90	8.15	22.26	18.51	56.00	46.00	-33.74	-27.49
6	13.56000	10.51	32.52	30.35	43.03	40.86	60.00	50.00	-16.97	-9.14

附註：

1. 其它頻率的干擾值對限制值而言非常低，所以未記錄。
2. 餘裕值(dB) = 干擾值(dBuV) - 限制值(dBuV)
3. 干擾值(dBuV) = 修正因子(dB) + 量測讀值(dBuV)

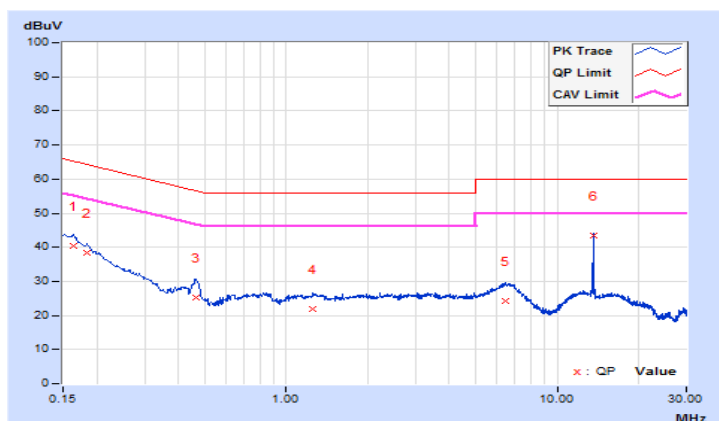


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/29
測試模式	TX/RX NFC + USB Cable + Adapter		

量測電源端點：中性線 (N)										
No	頻率 (MHz)	修正因子 (dB)	量測讀值 (dBuV)		干擾值 (dBuV)		限制值 (dBuV)		餘裕 (dB)	
			準峰值	平均值	準峰值	平均值	準峰值	平均值	準峰值	平均值
1	0.16307	10.12	30.23	25.01	40.35	35.13	65.31	55.31	-24.96	-20.18
2	0.18364	10.13	28.31	22.32	38.44	32.45	64.32	54.32	-25.88	-21.87
3	0.46271	10.19	15.09	9.01	25.28	19.20	56.64	46.64	-31.36	-27.44
4	1.24800	10.25	11.62	6.45	21.87	16.70	56.00	46.00	-34.13	-29.30
5	6.42975	10.46	13.79	8.66	24.25	19.12	60.00	50.00	-35.75	-30.88
6	13.56000	10.64	32.65	30.54	43.29	41.18	60.00	50.00	-16.71	-8.82

附註：

1. 其它頻率的干擾值對限制值而言非常低，所以未記錄。
2. 餘裕值(dB) = 干擾值(dBuV) - 限制值(dBuV)
3. 干擾值(dBuV) = 修正因子(dB) + 量測讀值(dBuV)



22.7 量測結果判定

依據測試數據結果，符合低功率射頻器材技術規範之要求。

23 電波暴露量之評估

23.1 適用標準

請見本報告 3.1 節第(8)&(19)&(28)項的規定。

23.2 評估方法

a) 以 6.5 節所測得的最大輸出功率值再加上待測物天線的增益值(Gain)帶入下面公式換算出待測物所輻射的功率密度。

b) $P_d = (P_{out} * G) / (4 * \pi * r^2)$

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

23.3 評估結果

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Pass/Fail
WLAN 2412 ~ 2472	15.94	-4.99	20	0.002	1	Pass

24 待測物照片

請參照 BV CPS 報告編號：BGOY-WTW-P20090391

25 檢測實驗室基本資料

立德國際商品試驗有限公司桃園分公司提供產業界最佳的檢測以及諮詢服務。
本公司為 ISO/IEC 17025 認可實驗室。

如您有任何問題或建議，請與下列實驗室聯絡：

林口 EMC / RF 實驗室：

Tel: 886-2-26052180

Fax: 886-2-26051924

新竹 EMC / RF 及通訊實驗室：

Tel: 886-3-6668565

Fax: 886-3-6668323

華亞 EMC / RF / Safety 實驗室：

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

您也可以我們的網站內找到各實驗室的地圖。

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