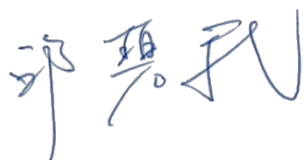


低功率射頻器材技術規範測試報告

報告編號.	RTBFRX-WTW-P21040774
申請者	u-blox AG
產品名稱	Bluetooth LE & Passive NFC tag module
型號	NINA-B406
系列型號	NINA-B416
製造廠商	u-blox AG
商標或廠牌	u-blox
該產品樣品試驗 依據之試驗標準	國家通訊傳播委員會低功率射頻器材技術規範 109 年 7 月 1 日訂定
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
日期 110 年 09 月 11 日

報告簽署人簽章:



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報告發行紀錄

Issue No.	Description	Date Issued
RTBFRX-WTW-P21040774	Original release	110 年 09 月 11 日

證 明 書

發行日期：110 年 09 月 11 日

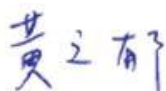
產 品 名 稱：Bluetooth LE & Passive NFC tag module
商 標：u-blox
型 號：NINA-B406
系 列 型 號：NINA-B416
申 請 者：u-blox AG
量 測 規 範：低功率射頻器材技術規範 LP0002 (訂定日期：109 年 7 月 1 日)
ANSI C63.10-2013

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：NINA-B406、系列型號：NINA-B416)，收件日期 109 年 07 月 08 日，於 109 年 07 月 17 日至 110 年 08 月 25 日已在本公司的標準測試場地完成量測。型號: NINA-B406 與 NINA-B416 之差異請見本報告 2.1 章節註 1，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辦法”製作測試結果報告。

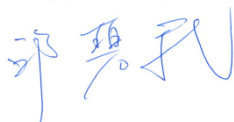
特 此 證 明 ！

報告製作者：


黃之郁 / 專員

， 日 期：110 年 09 月 11 日

審 核 者：


邱碧民 / 高級工程師

， 日 期：110 年 09 月 11 日

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: u-blox AG

製造廠商: u-blox AG

申請廠商地址: Zuercherstrasse 68, 8800 Thalwil, Switzerland

產品名稱: Bluetooth LE & Passive NFC tag module

廠牌: u-blox

型號: NINA-B406

系列型號: NINA-B416

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 (訂定日期: 109 年 7 月 1 日)
ANSI C63.10-2013

Bluetooth LE 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

ANT+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

Zigbee 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

Thread 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

NFC 頻段概要 (Rx only)

項次	量測項目	規 範	量測結果判定
1	不必要之發射	低功率射頻器材技術規範 3.6 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

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：		Bluetooth LE & Passive NFC tag module	
型號：		NINA-B406	
系列型號：		NINA-B416	
額定電源：		1.7Vdc to 3.6Vdc (3.3V nominal)	
調變方式：	NINA-B406	Bluetooth LE 4.0	GFSK
		Bluetooth LE 5.0	GFSK
		ANT+	GFSK
		Zigbee	O-QPSK
		Thread	O-QPSK
		NFC (Rx only)	ASK
	NINA-B416	Bluetooth LE 4.0	GFSK
		Bluetooth LE 5.0	GFSK
		NFC (Rx only)	ASK
傳輸速率：	NINA-B406	Bluetooth LE 4.0	1 Mbps
		Bluetooth LE 5.0	2 Mbps
		ANT+	1 Mbps
		ANT+	2 Mbps
		Zigbee	250 kbps
		Thread	250 kbps
	NINA-B416	Bluetooth LE 4.0	1 Mbps
		Bluetooth LE 5.0	2 Mbps
載波頻率：	NINA-B406	Bluetooth LE 4.0	2402 ~ 2480 MHz
		Bluetooth LE 5.0	2402 ~ 2480 MHz
		ANT+	2403 ~ 2480 MHz
		Zigbee	2405 ~ 2475
		Thread	2405 ~ 2475
		NFC (Rx only)	13.56 MHz
	NINA-B416	Bluetooth LE 4.0	2402 ~ 2480 MHz
		Bluetooth LE 5.0	2402 ~ 2480 MHz
頻道數：	NINA-B406	Bluetooth LE 4.0	40
		Bluetooth LE 5.0	40
		ANT+	78
		Zigbee	15
		Thread	15
		NFC (Rx only)	1
	NINA-B416	Bluetooth LE 4.0	40
		Bluetooth LE 5.0	40
		NFC (Rx only)	1

發射功率：	NINA-B406	Bluetooth LE 4.0	7.78 dBm
		Bluetooth LE 5.0	7.68 dBm
		Zigbee	8.35 dBm
		Thread	8.35 dBm
		ANT+ (1M)	8.33 dBm
		ANT+ (2M)	8.32 dBm
	NINA-B416	Bluetooth LE 4.0	7.78 dBm
		Bluetooth LE 5.0	7.68 dBm
天線種類：	見註 2		
電源線類別：	N/A		
信號線類別：	見註 5		
配件：	見註 5		

註：

1. 此待測設備所有型號如下：

商標	型號	差異說明
u-blox	NINA-B406 (主型號)	Module SW with internal antenna Support following wireless function: BLE IEEE 802.15.4 (Thread and Zigbee) ANT+ NFC (Rx only)
	NINA-B416 (系列型號)	OEM SW with internal antenna support following wireless function: BLE NFC (Rx only)
Note: 僅以NINA-B406做完整測試		

2. 此待測設備搭配測試的天線，其資料如下：

Brand	Model	Antenna Gain(dBi)	Frequency range	Antenna Type	Connecter Type
ProAnt	u-blox PCB trace antenna	3	2400~2483MHz	PCB	N/A
u-blox	EMMY-W1 Rev.B	-	13.56MHz	Loop	N/A

3. 上述天線的規格資訊由申請者聲明，實驗室不承擔任何責任。

4. 此待測設備搭配使用之配件請參閱產品照編號: BFRX-WTW-P21040774，測試照片請參照BV CPS編號: BFRX-WTW-P21040774_TSup。

5. 輔助測試之週邊設備如下。非隨貨配件之照片請參閱附件 (BV CPS報告編號: BFRX-WTW-P21040774_SU)。

配件	廠牌	型號	規格
Test Fixture	Ublox	NA	Serial No.:UBXH60-000448
Adapter	ASUS	AD827M	I/P 100-240 Vac, 0.5A,50/60Hz O/P: 5 Vdc, 2A or 15Vdc, 1.2A
USB Cable	KYOCERA	KYO6750USB	0.95m non shielded without core
Note: 本案以實驗室提供的測試配件併同檢驗。			

6. 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
2402 ~ 2480 MHz (Bluetooth LE 4.0)		
1 GHz 以上量測	Ch 0, 19, 39	--
2402 ~ 2480 MHz (Bluetooth LE 5.0)		
1 GHz 以上量測	Ch 0, 19, 39	Ch 39
其它不必要之訊號	Ch 39	Ch 39
13.56 MHz (NFC)		
1 GHz 以上量測	--	--
其它不必要之訊號	--	Ch 1
ANT+ (1M)		
1 GHz 以上量測	Ch 1, 39, 78	--
ANT+ (2M)		
1 GHz 以上量測	Ch 1, 39, 78	Ch 78
其它不必要之訊號	Ch 78	Ch 78
Zigbee		
1 GHz 以上量測	Ch 11, 17, 25	Ch 11
其它不必要之訊號	Ch 11	Ch 11
Thread		
1 GHz 以上量測	Ch 11, 17, 25	Ch 11
其它不必要之訊號	Ch 11	Ch 11

7. 電源線傳導干擾量測模式如下。

模式	測試狀態
1	TX/RX + BT LE + Adapter
2	TX/RX + BT LE + NB + Adapter
3	TX/RX + ANT+ + Adapter
4	TX/RX + ANT+ + NB + Adapter
5	TX/RX + Zigbee + Adapter
6	TX/RX + Zigbee + NB + Adapter
7	RX + NFC + Adapter
8	RX + NFC + NB + Adapter
9	TX/RX + Thread + Adapter
10	TX/RX + Thread + NB + Adapter

8. 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。

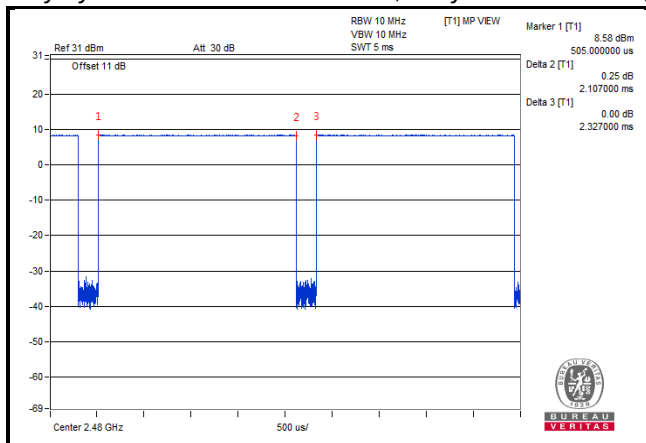
9. 此待測設備，經評估三個正交軸方位評估測試擺設方式：平躺、垂直、側放，其各擺放最大干擾值之位置如下表，故以此擺放方式進行最終量測，並將測試結果紀錄。

	Bluetooth LE	NFC	ANT+	Zigbee	Thread
擺放方式	側放	垂直	側放	側放	側放

10. Duty cycle of test signal.

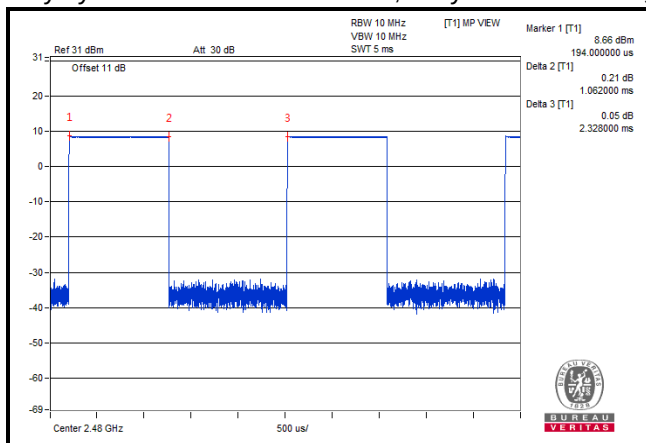
<LE 4.0>

Duty cycle = $2.107/2.327 = 0.905$, Duty factor = $10 * \log(1/0.905) = 0.43$



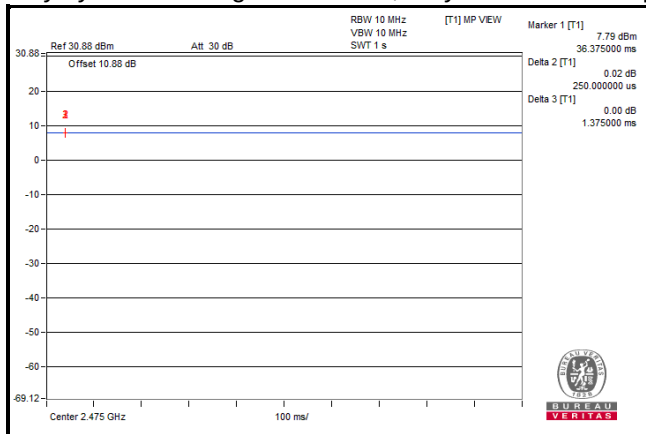
<LE 5.0>

Duty cycle = $1.062/2.328 = 0.456$, Duty factor = $10 * \log(1/0.456) = 3.41$



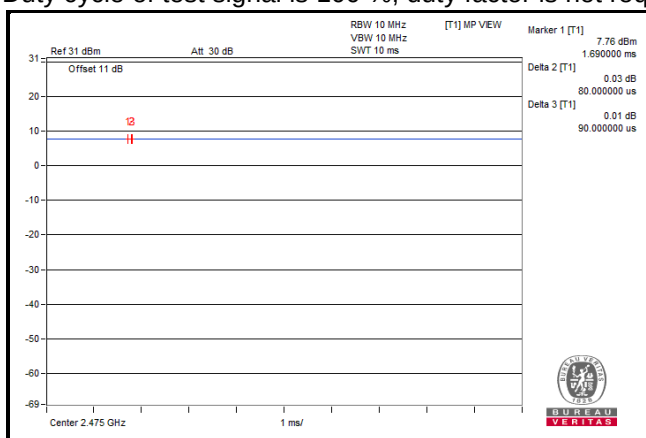
<Zigbee>

Duty cycle of test signal is 100 %, duty factor is not required.



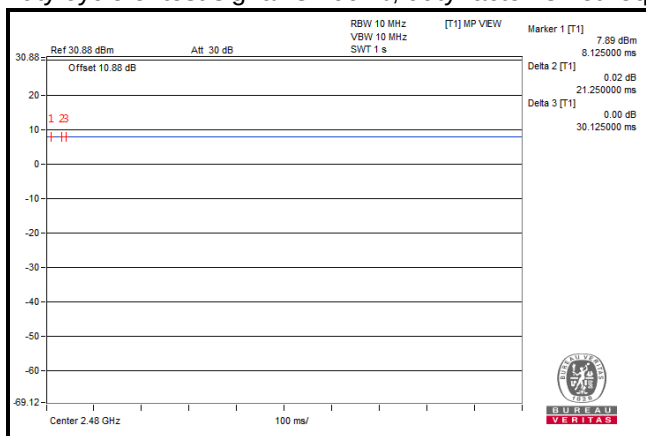
<Thread>

Duty cycle of test signal is 100 %, duty factor is not required.



<ANT+>

Duty cycle of test signal is 100 %, duty factor is not required.



此裝置各頻道的中心頻率如下：

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

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

Zigbee 頻段:

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440		

Thread 頻段:

頻道	對應頻率 (MHz)	頻道	對應頻率 (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440		

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
A	Test Fixture	Ublox	NA	UBXH60-000448	NA
B	Smart Phone	ASUS	Max Plus ZB570TL	N/A	MSQX018D
C	Adapter	ASUS	AD827M	NA	NA
D	Notebook	DELL	Inspiron 14R	8LRKKW1	NA

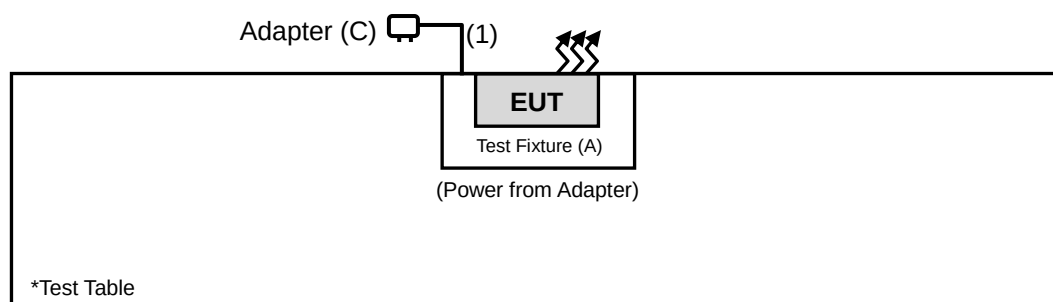
No.	Signal Cable Description Of The Above Support Units
1	USB Cable: 0.95m non shielded without core
2	Power Cable: 1.5m non shielded without core

2.3 測試架構圖

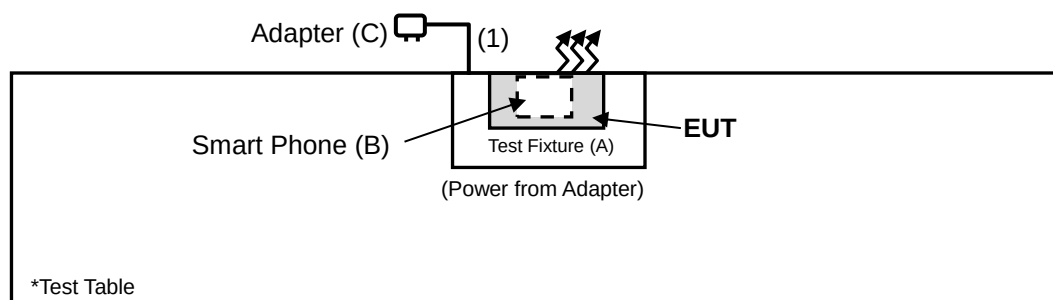
場強輻射量測

電源線傳導干擾量測

<Bluetooth LE / ANT+ / Zigbee / Thread>

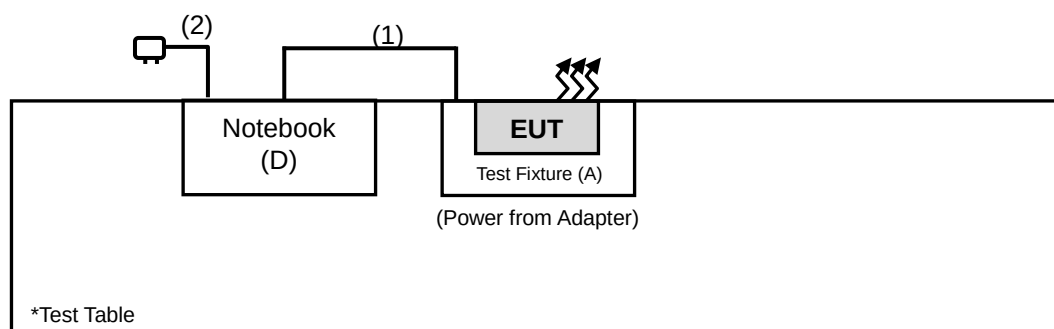


<NFC>

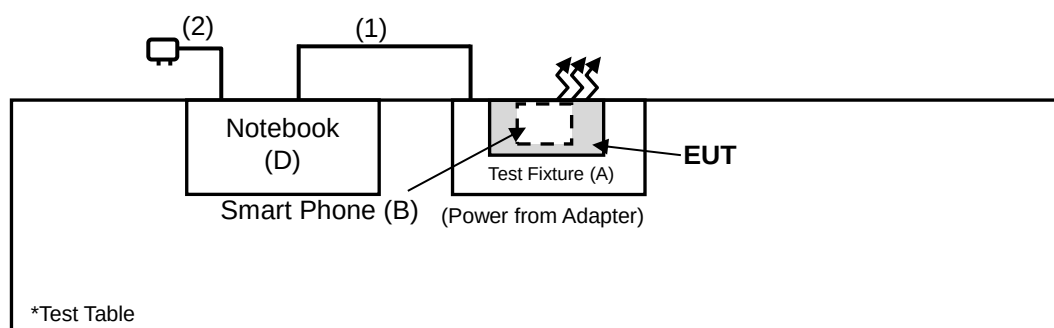


電源線傳導干擾量測

<Bluetooth LE / ANT+ / Zigbee / Thread>



<NFC>



3 適用規範

3.1 規範要求

► Bluetooth LE/ANT+/Zigbee/Thread 頻段部分：

(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 4.10.1.3 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。

(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，6dB 頻寬至少應有 500kHz。

(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。

►NFC 頻段部分：

(8) 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。

(9) 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。

(10) 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 3.6 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(kHz)	300
$0.490 < f \leq 1.705$	24,000/f(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) 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

(12) 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。

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	

BLUETOOTH LE 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(2)項的規定。

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 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 = 3MHz (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

4.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 16, 2020	Apr. 15, 2021
			Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 12, 2019	Dec. 11, 2020
			Dec. 07, 2020	Dec. 06, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 16, 2020	Apr. 15, 2021
			Apr. 12, 2021	Apr. 11, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 24, 2019	Nov. 23, 2020
			Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 08, 2019	Nov. 05, 2020
			Nov. 06, 2020	Nov. 05, 2021
Fixed Attenuator WORKEN	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
			Apr. 13, 2021	Apr. 12, 2022
Loop Antenna	HLA 6121	24745	Sep. 17, 2019	Sep. 16, 2020
			Sep. 17, 2020	Sep. 16, 2021
Preamplifier EMCI	EMC001340	980201	Oct. 21, 2019	Oct. 20, 2020
			Oct. 21, 2020	Oct. 20, 2021
Bluetooth Tester	CBT	100946	Aug. 09, 2018	Aug. 05, 2020
			Aug. 06, 2020	Aug. 05, 2022
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 06, 2020
			Oct. 07, 2020	Oct. 06, 2021
Power Meter Anritsu	ML2495A	1012010	Sep. 04, 2019	Aug. 31, 2020
			Sep. 01, 2020	Aug. 31, 2021
Power Sensor Anritsu	MA2411B	1315050	Sep. 04, 2019	Aug. 31, 2020
			Sep. 01, 2020	Aug. 31, 2021
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000&3000	140811+170717	Oct. 08, 2019	Oct. 06, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 08, 2019	Oct. 06, 2020
			Oct. 07, 2020	Oct. 06, 2021
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 06, 2020
			Oct. 07, 2020	Oct. 06, 2021
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
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:

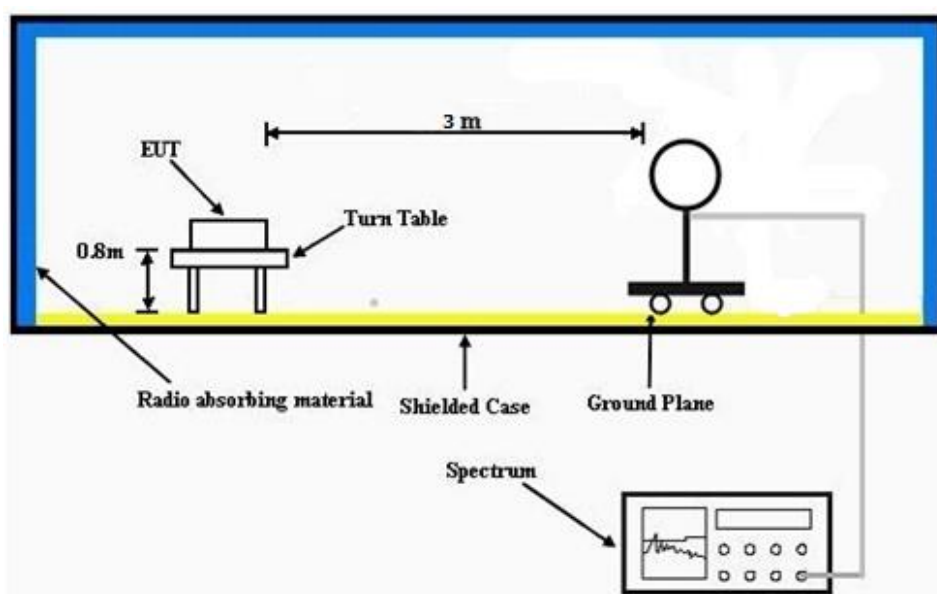
1. The calibration interval of the above test instruments is 12/24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.

3. 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 $k=2$.

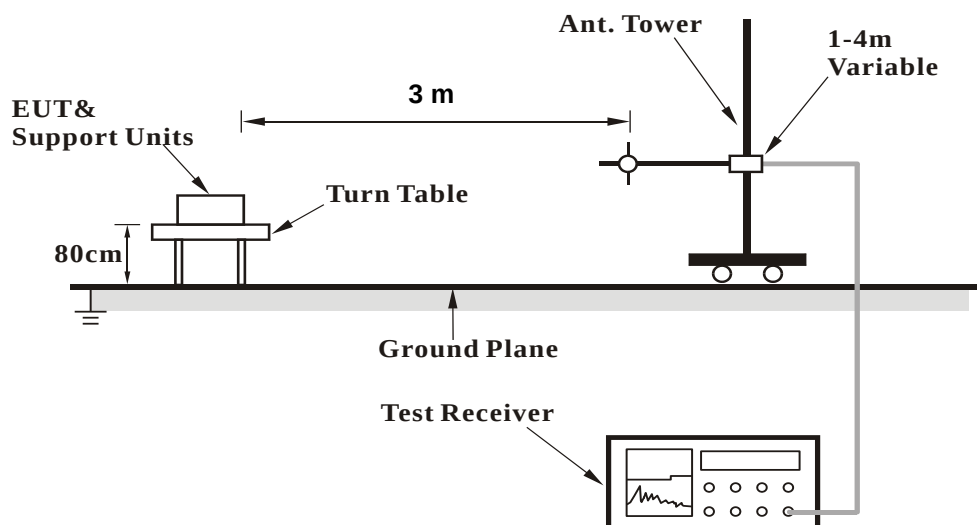
Measurement	Frequency	Uncertainty
Radiated emissions	9kHz~30MHz	2.44 dB
	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

4.4 測試配置

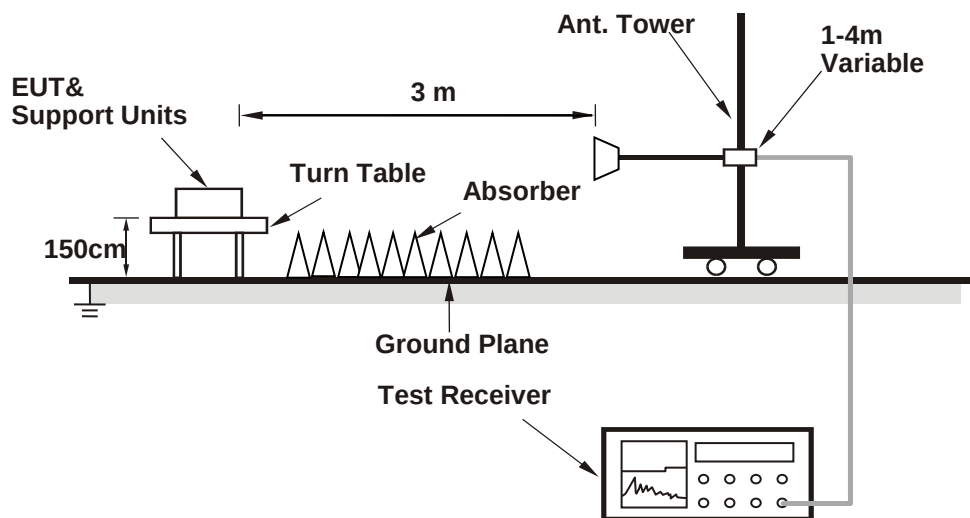
<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



4.5 場強度之計算

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。

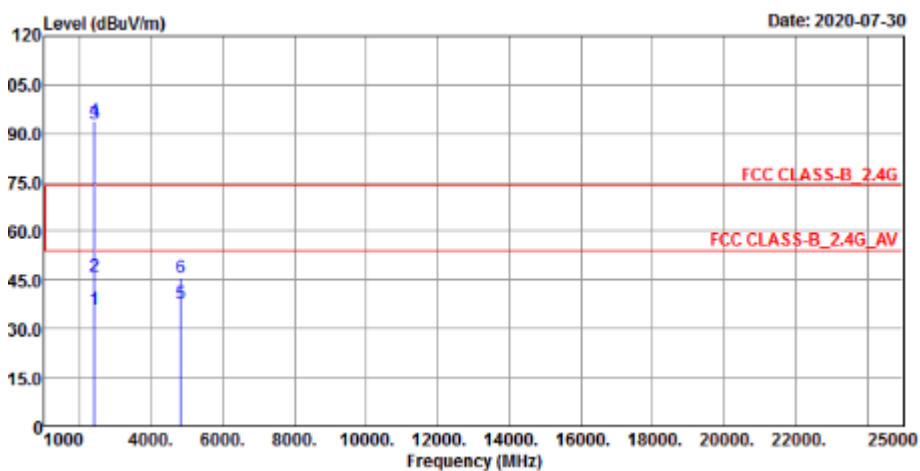
4.6 量測結果

4.6.1 發射諧波

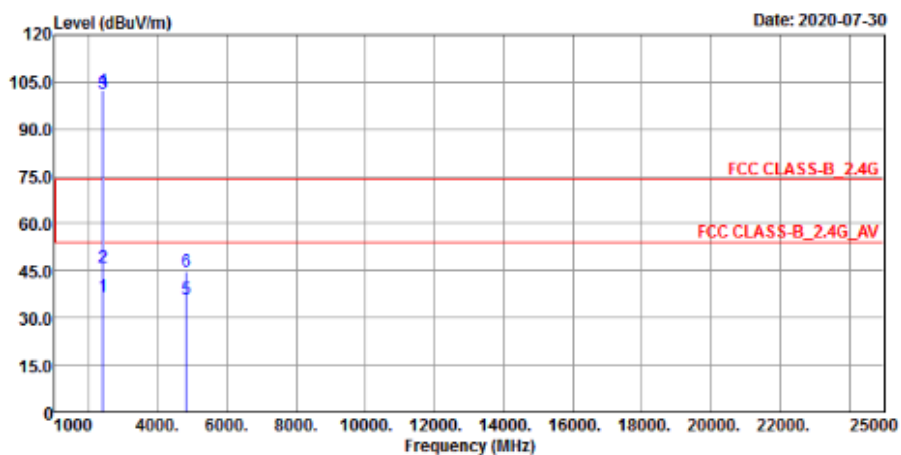
<LE 4.0>

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



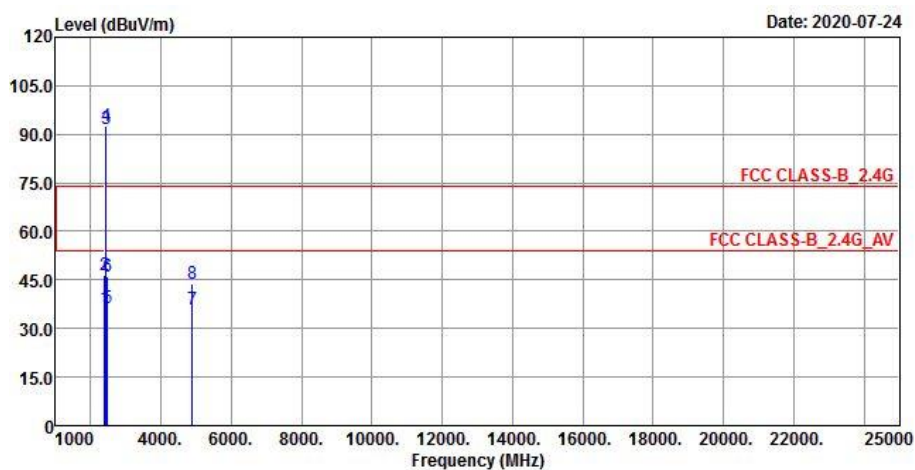
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	35.99	41.91	-5.92	54	-18.01	126	256	Average
2390	46.11	52.03	-5.92	74	-27.89	126	256	Peak
2402	93.01	98.95	-5.94	-----	-----	126	256	Average
2402	93.84	99.78	-5.94	-----	-----	126	256	Peak
4804	37.52	53.16	-15.64	54	-16.48	121	257	Average
4804	45.45	61.09	-15.64	74	-28.55	121	257	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	36.96	42.88	-5.92	54	-17.04	102	107	Average
2390	46.23	52.15	-5.92	74	-27.77	102	107	Peak
2402	101.54	107.48	-5.94	-----	-----	102	107	Average
2402	102.36	108.3	-5.94	-----	-----	102	107	Peak
4804	36.05	51.69	-15.64	54	-17.95	248	126	Average
4804	44.52	60.16	-15.64	74	-29.48	248	126	Peak

Remarks:

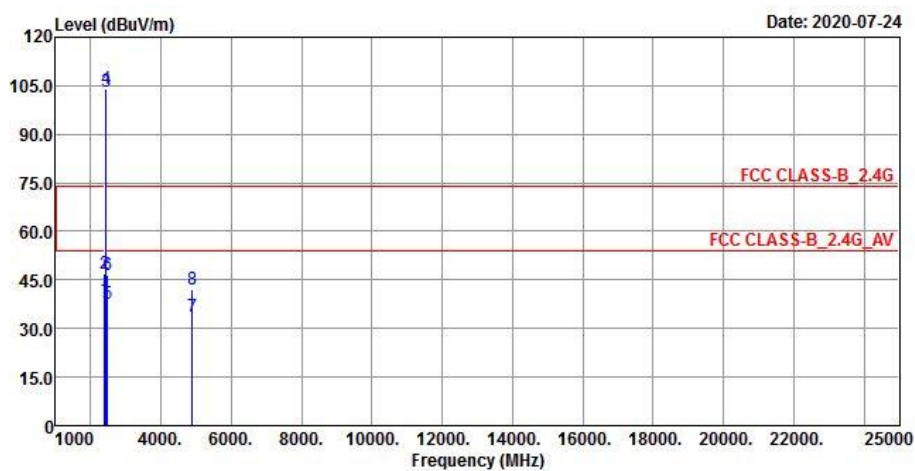
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	Cyril Chen

Horizontal



Vertical



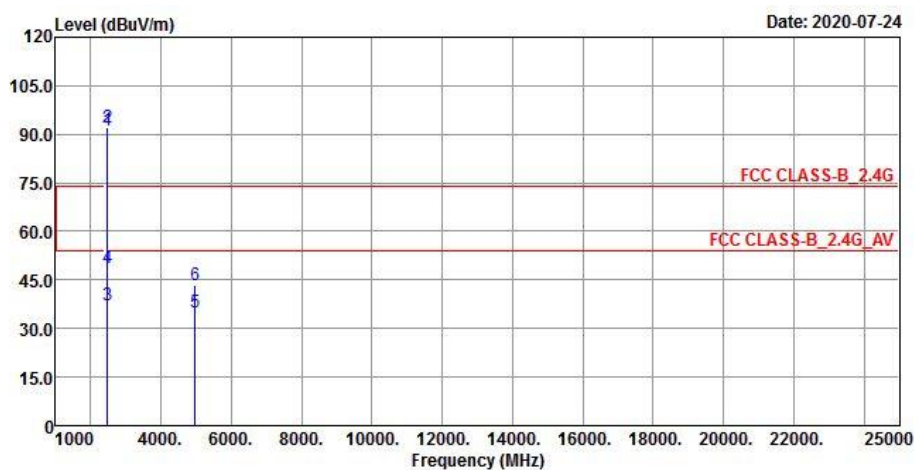
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.26	42.18	-5.92	54	-17.74	129	265	Average
2390	46.39	52.31	-5.92	74	-27.61	129	265	Peak
2440	91.74	97.62	-5.88	-----	-----	129	265	Average
2440	92.67	98.55	-5.88	-----	-----	129	265	Peak
2483.5	36.32	42.02	-5.7	54	-17.68	129	265	Average
2483.5	46.14	51.84	-5.7	74	-27.86	129	265	Peak
4880	35.69	51.25	-15.56	54	-18.31	134	248	Average
4880	44.05	59.61	-15.56	74	-29.95	134	248	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	38.84	44.76	-5.92	54	-15.16	100	114	Average
2390	46.88	52.8	-5.92	74	-27.12	100	114	Peak
2440	103	108.88	-5.88	-----	-----	100	114	Average
2440	103.87	109.75	-5.88	-----	-----	100	114	Peak
2483.5	37.55	43.25	-5.7	54	-16.45	100	114	Average
2483.5	46.64	52.34	-5.7	74	-27.36	100	114	Peak
4880	33.8	49.36	-15.56	54	-20.2	124	227	Average
4880	41.89	57.45	-15.56	74	-32.11	124	227	Peak

Remarks:

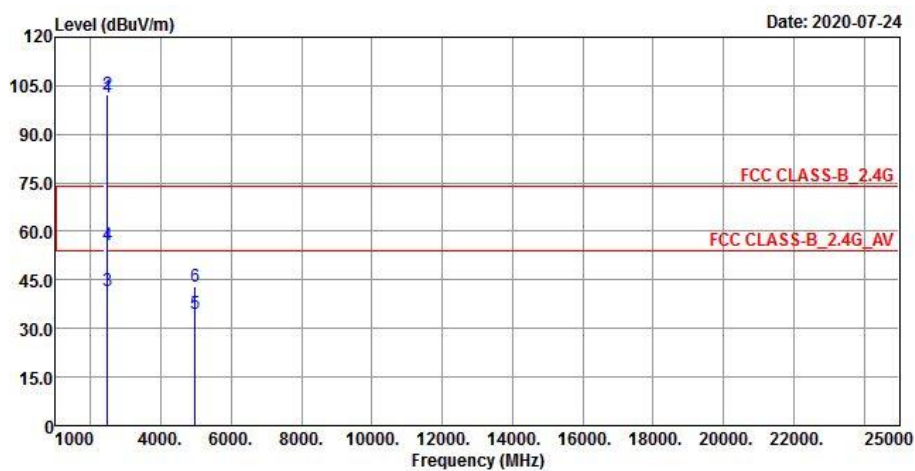
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2440 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	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	91.06	96.76	-5.7	-----	-----	100	264	Average
2480	91.96	97.66	-5.7	-----	-----	100	264	Peak
2483.5	36.98	42.68	-5.7	54	-17.02	100	264	Average
2483.5	48.49	54.19	-5.7	74	-25.51	100	264	Peak
4960	35.1	50.55	-15.45	54	-18.9	124	278	Average
4960	43.61	59.06	-15.45	74	-30.39	124	278	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	101.47	107.17	-5.7	-----	-----	124	294	Average
2480	102.32	108.02	-5.7	-----	-----	124	294	Peak
2483.5	41.47	47.17	-5.7	54	-12.53	124	294	Average
2483.5	55.72	61.42	-5.7	74	-18.28	124	294	Peak
4960	34.57	50.02	-15.45	54	-19.43	154	284	Average
4960	43.11	58.56	-15.45	74	-30.89	154	284	Peak

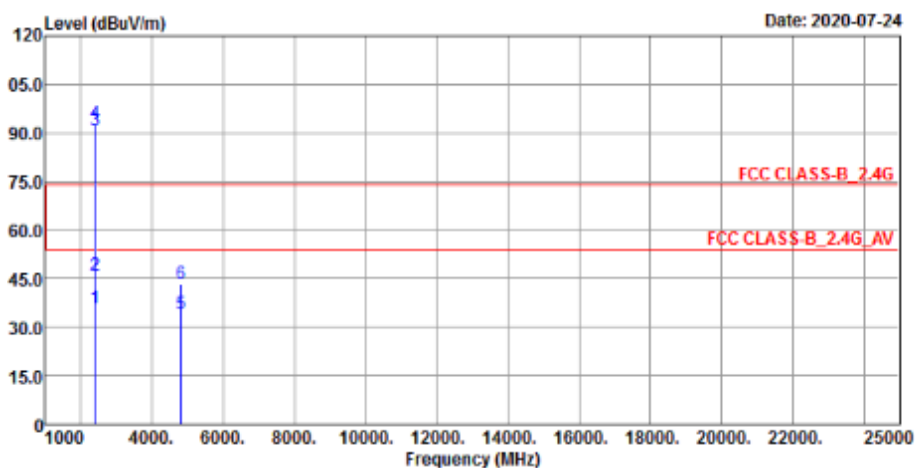
Remarks:

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.

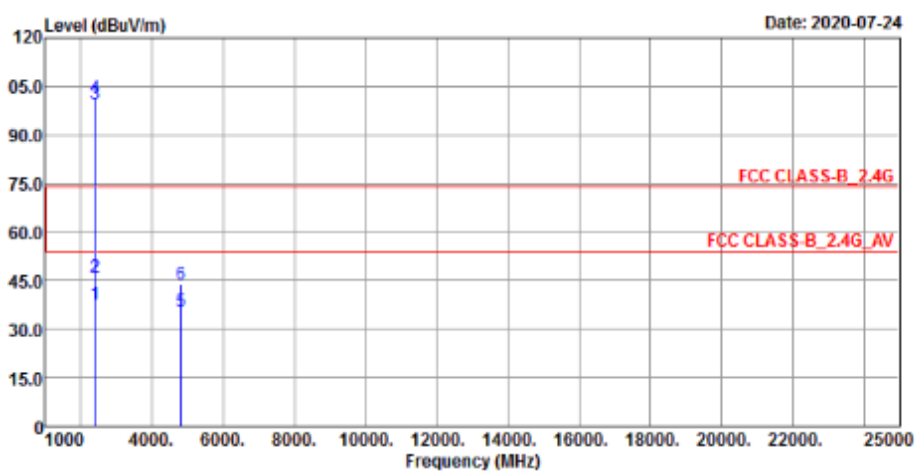
<LE 5.0>

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



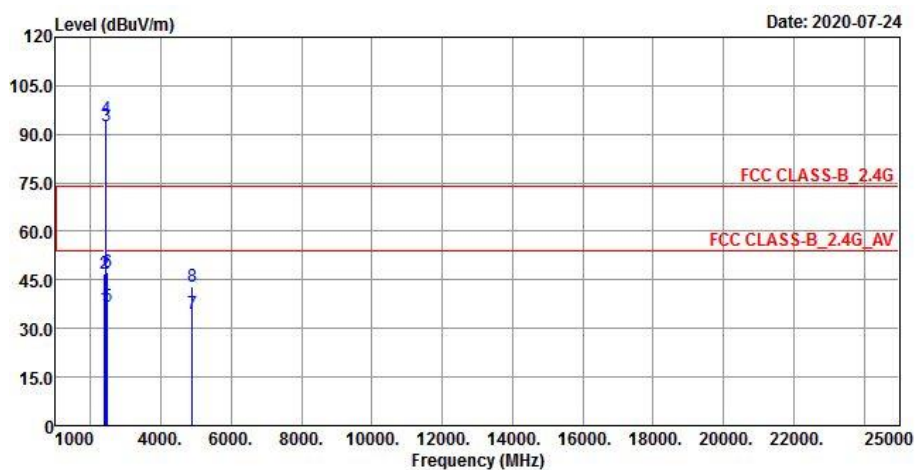
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.09	42.01	-5.92	54	-17.91	100	351	Average
2390	46.12	52.04	-5.92	74	-27.88	100	351	Peak
2402	90.9	96.84	-5.94	-----	-----	100	351	Average
2402	92.77	98.71	-5.94	-----	-----	100	351	Peak
4804	34.1	49.74	-15.64	54	-19.9	121	273	Average
4804	43.33	58.97	-15.64	74	-30.67	121	273	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	37.45	43.37	-5.92	54	-16.55	120	219	Average
2390	46.2	52.12	-5.92	74	-27.8	120	219	Peak
2402	99.44	105.38	-5.94	-----	-----	120	219	Average
2402	101.3	107.24	-5.94	-----	-----	120	219	Peak
4804	35.53	51.17	-15.64	54	-18.47	151	199	Average
4804	43.87	59.51	-15.64	74	-30.13	151	199	Peak

Remarks:

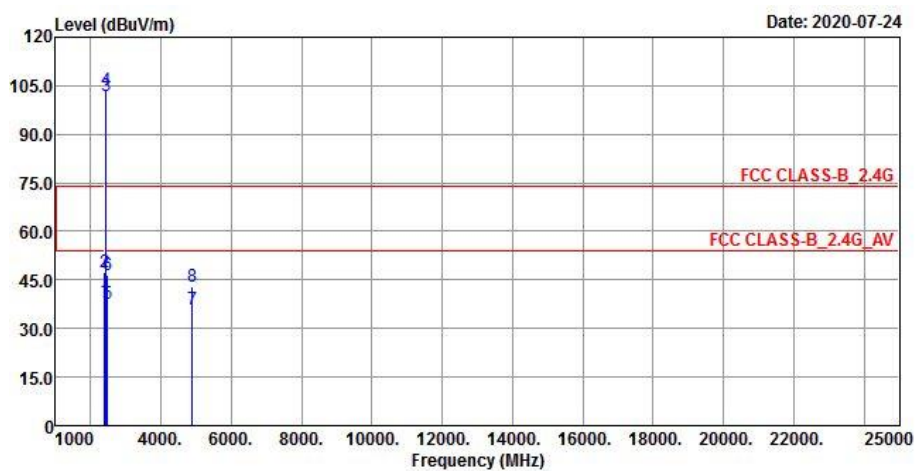
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	Cyril Chen

Horizontal



Vertical



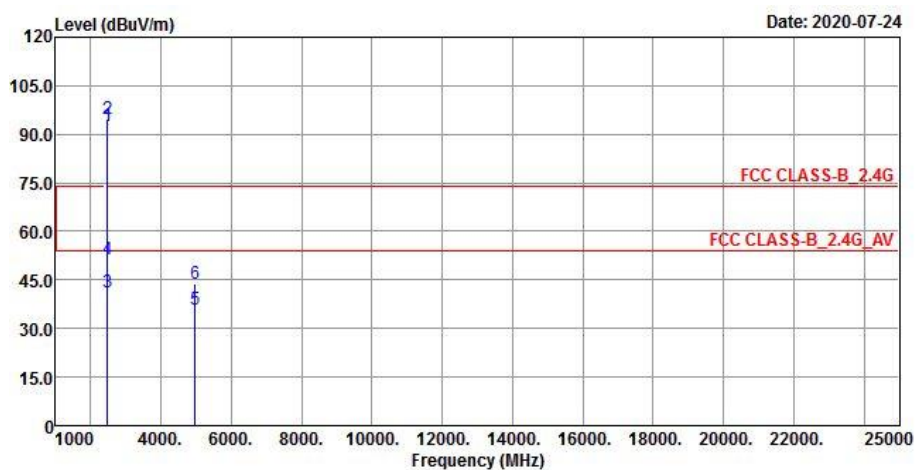
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	36.45	42.37	-5.92	54	-17.55	100	182	Average
2390	46.9	52.82	-5.92	74	-27.1	100	182	Peak
2440	92.7	98.58	-5.88	-----	-----	100	182	Average
2440	94.71	100.59	-5.88	-----	-----	100	182	Peak
2483.5	36.57	42.27	-5.7	54	-17.43	100	182	Average
2483.5	47.59	53.29	-5.7	74	-26.41	100	182	Peak
4880	34.45	50.01	-15.56	54	-19.55	120	126	Average
4880	42.83	58.39	-15.56	74	-31.17	120	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	38.44	44.36	-5.92	54	-15.56	100	108	Average
2390	47.55	53.47	-5.92	74	-26.45	100	108	Peak
2440	101.72	107.6	-5.88	-----	-----	100	108	Average
2440	103.68	109.56	-5.88	-----	-----	100	108	Peak
2483.5	37.51	43.21	-5.7	54	-16.49	100	108	Average
2483.5	46.69	52.39	-5.7	74	-27.31	100	108	Peak
4880	35.74	51.3	-15.56	54	-18.26	128	157	Average
4880	43.14	58.7	-15.56	74	-30.86	128	157	Peak

Remarks:

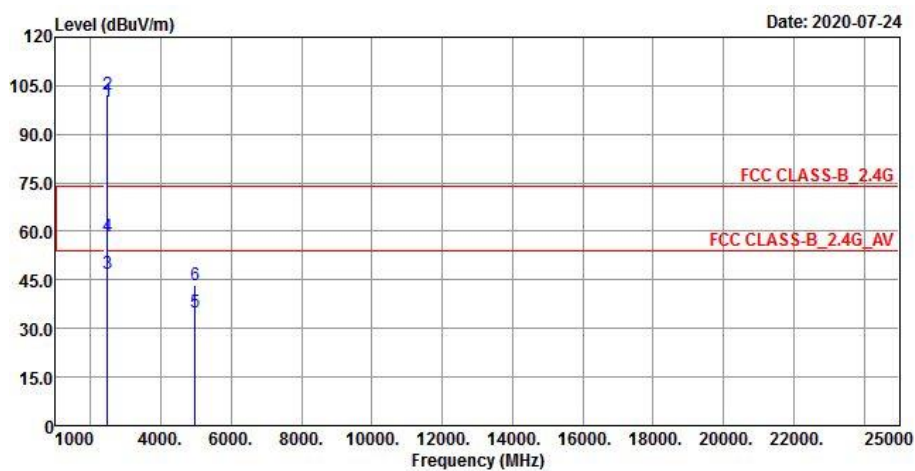
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2440 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	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	92.68	98.38	-5.7	-----	-----	227	338	Average
2480	94.78	100.48	-5.7	-----	-----	227	338	Peak
2483.5	41.06	46.76	-5.7	54	-12.94	227	338	Average
2483.5	51.46	57.16	-5.7	74	-22.54	227	338	Peak
4960	35.81	51.26	-15.45	54	-18.19	104	134	Average
4960	43.67	59.12	-15.45	74	-30.33	104	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
2480	100.23	105.93	-5.7	-----	-----	112	315	Average
2480	102.34	108.04	-5.7	-----	-----	112	315	Peak
2483.5	46.78	52.48	-5.7	54	-7.22	112	315	Average
2483.5	58.66	64.36	-5.7	74	-15.34	112	315	Peak
4960	34.85	50.3	-15.45	54	-19.15	124	181	Average
4960	43.39	58.84	-15.45	74	-30.61	124	181	Peak

Remarks:

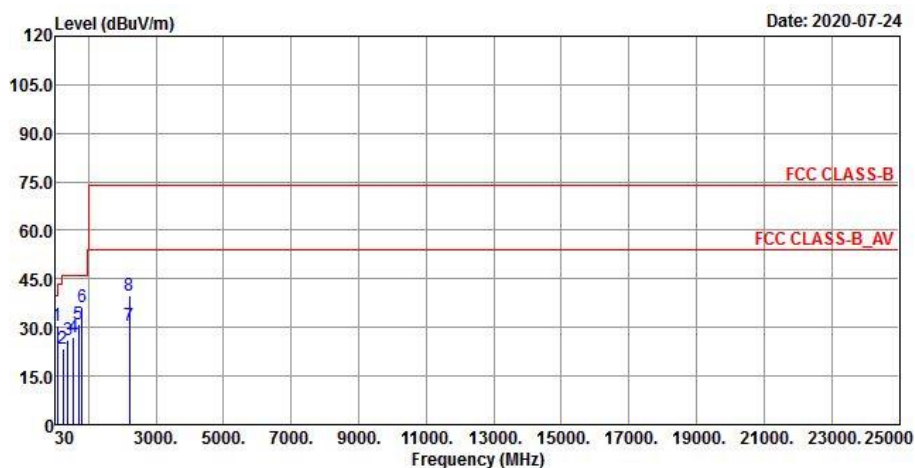
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2480 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

4.6.2 接收諧波

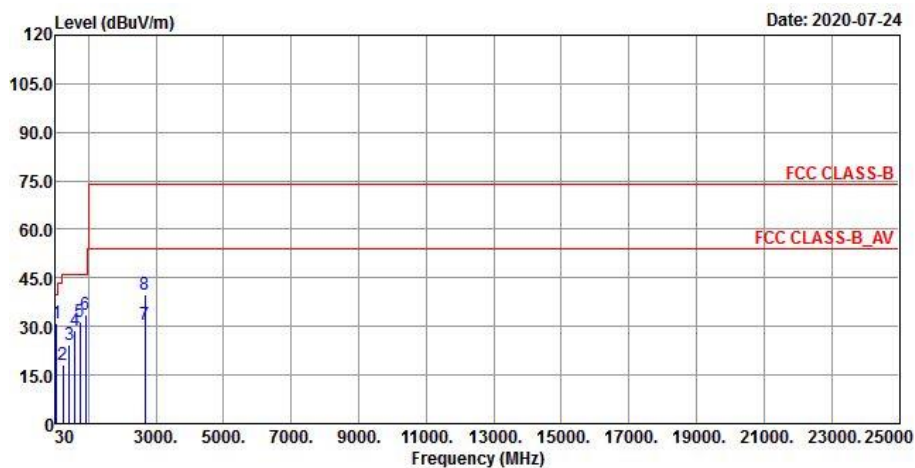
<LE 5.0>

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	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
77.53	30.69	46.56	-15.87	40	-9.31	111	238	QP
235.64	23.28	36.97	-13.69	46	-22.72	287	104	QP
399.57	26.07	34.43	-8.36	46	-19.93	184	197	QP
549.92	27.2	31.67	-4.47	46	-18.8	174	89	QP
696.39	31.13	31.84	-0.71	46	-14.87	124	325	QP
800.18	36.22	34.56	1.66	46	-9.78	154	258	QP
2213.635	30.73	51.35	-20.62	54	-23.27	152	241	Average
2213.635	39.86	60.48	-20.62	74	-34.14	152	241	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
48.43	31.02	42.73	-11.71	40	-8.98	105	241	QP
253.1	18.08	31.01	-12.93	46	-27.92	182	324	QP
425.76	24.27	31.53	-7.26	46	-21.73	235	119	QP
597.45	28.63	31.43	-2.8	46	-17.37	104	108	QP
752.65	31.43	30.44	0.99	46	-14.57	275	258	QP
917.55	33.51	30.25	3.26	46	-12.49	220	187	QP
2673.524	30.54	50.84	-20.3	54	-23.46	105	237	Average
2673.524	39.74	60.04	-20.3	74	-34.26	105	237	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:

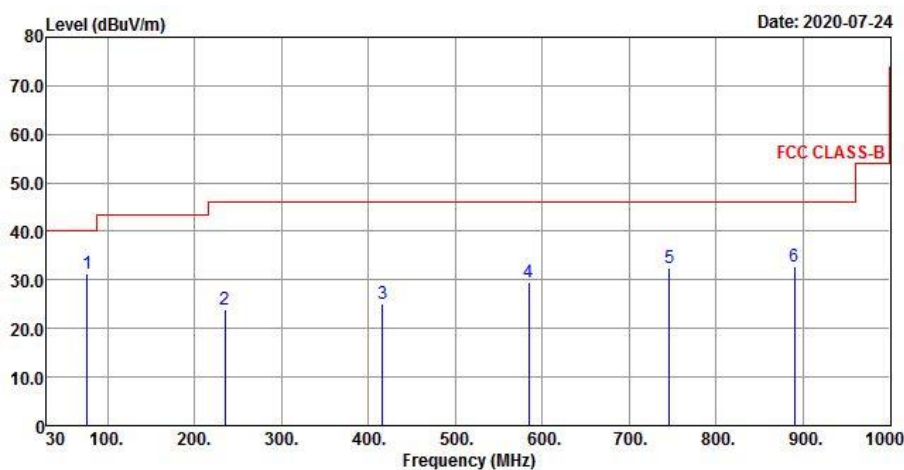
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

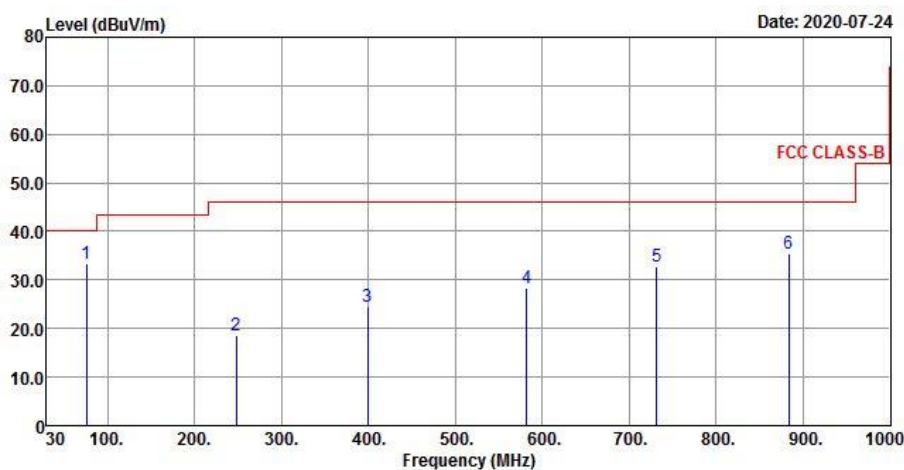
<LE 5.0>

EUT Test Condition		Measurement Detail	
Channel	Channel 39	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	Cyril Chen

Horizontal



Vertical



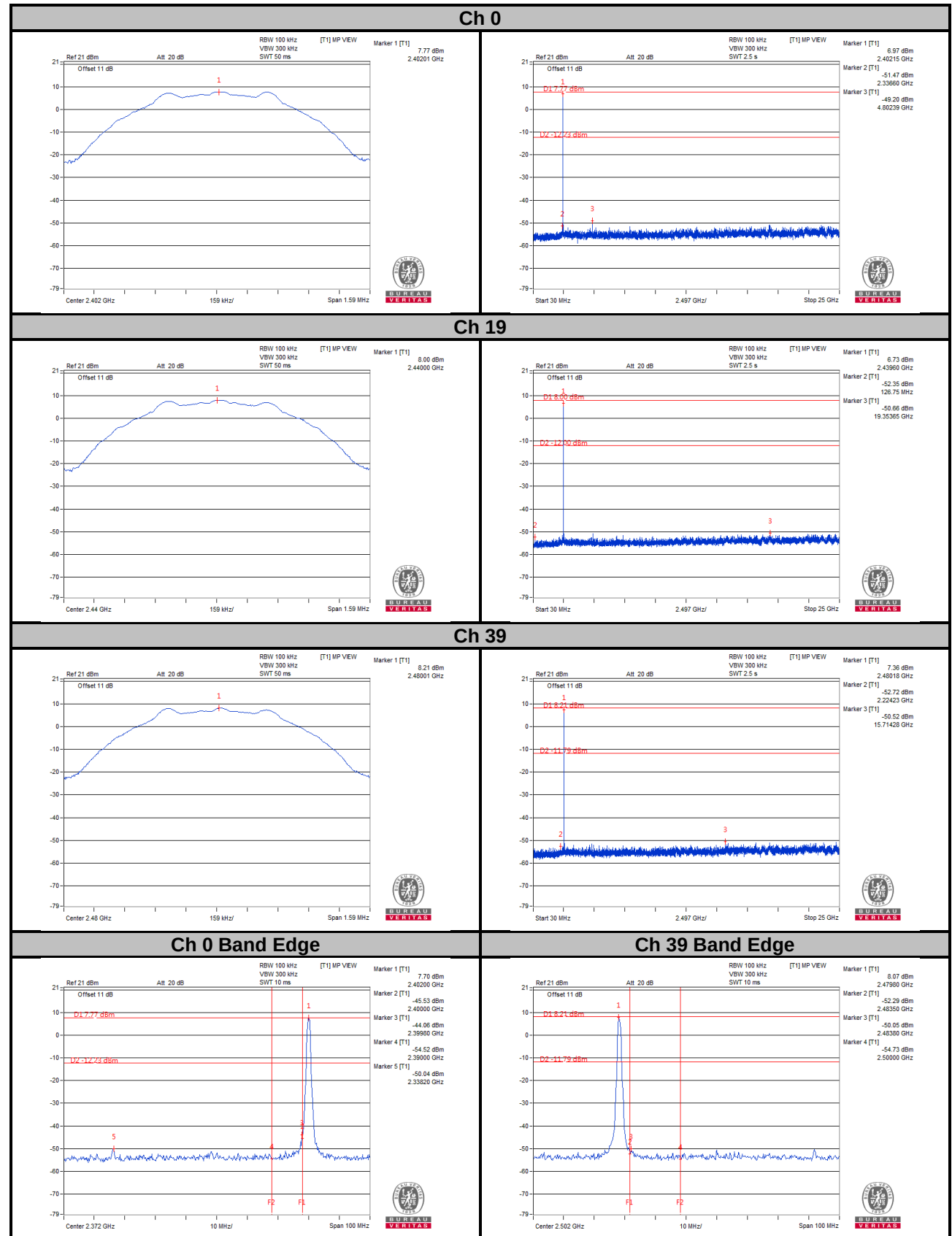
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
76.56	31.24	46.87	-15.63	40	-8.76	184	237	QP
234.67	24.04	37.83	-13.79	46	-21.96	224	351	QP
416.06	25.17	32.94	-7.77	46	-20.83	108	287	QP
584.84	29.57	32.78	-3.21	46	-16.43	237	255	QP
745.86	32.38	31.43	0.95	46	-13.62	184	155	QP
890.39	32.89	30.11	2.78	46	-13.11	248	118	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
75.59	33.44	48.76	-15.32	40	-6.56	187	254	QP
248.25	18.71	31.76	-13.05	46	-27.29	154	87	QP
399.57	24.46	32.82	-8.36	46	-21.54	248	110	QP
581.93	28.28	31.6	-3.32	46	-17.72	214	236	QP
731.31	32.84	32.41	0.43	46	-13.16	134	184	QP
883.6	35.51	32.76	2.75	46	-10.49	151	238	QP

Remarks:

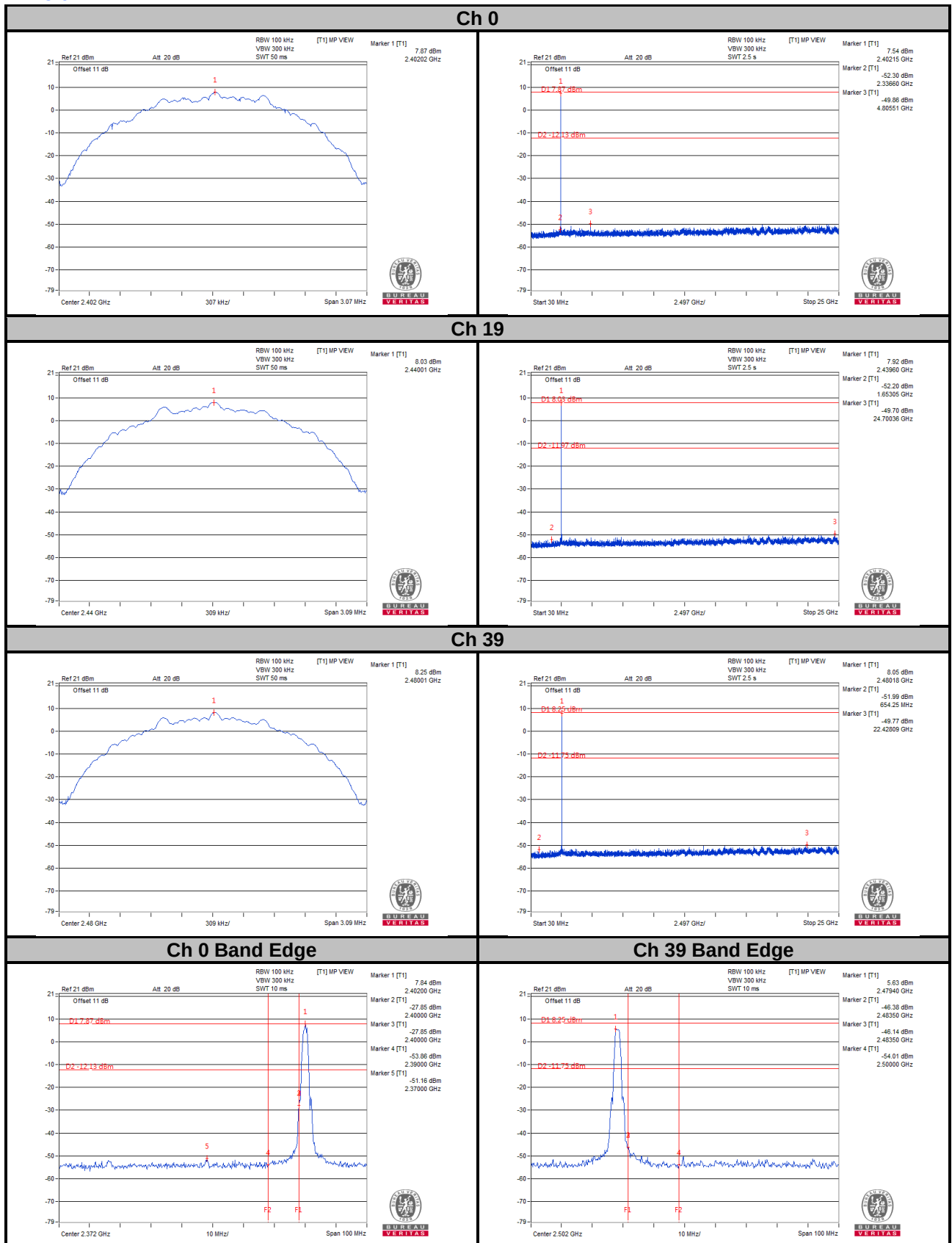
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. The other emission levels were very low against the limit.

4.7 帶外發射之量測 (傳導)

<LE 4.0>



<LE 5.0>



5 電源線傳導干擾之量測

5.1 適用標準

請見本報告3.1節第(1)項的規定。

5.2 量測方法

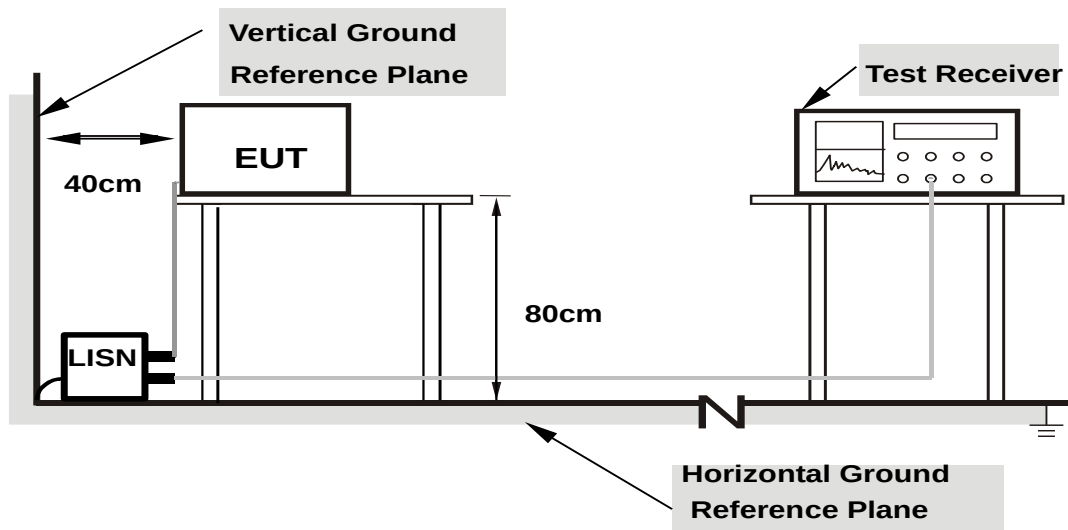
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

5.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
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/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 20, 2020	Jan. 19, 2021
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Cond_ 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.
3. The VCCI Site Registration No. is C-2047.
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.
5. Test Date: 2020/07/21

5.4 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

5.5 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

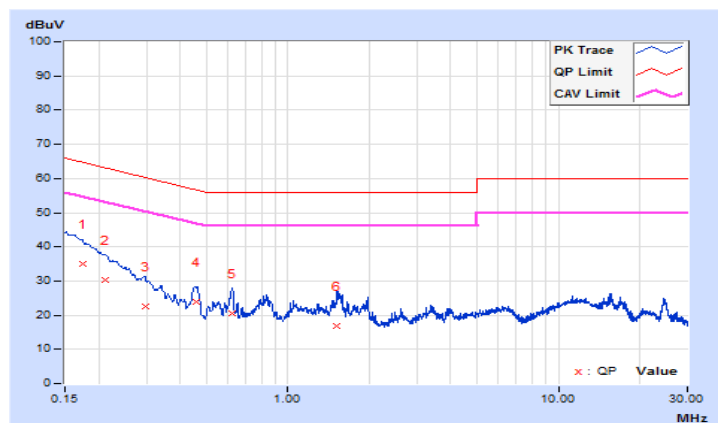
5.6 量測結果

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	Jisyoung Wang	測試日期	2020/7/21
測試模式	Mode 1		

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	0.17475	10.16	24.76	21.40	34.92	31.56	64.73	54.73	-29.81	-23.17
2	0.21011	10.17	20.28	15.54	30.45	25.71	63.20	53.20	-32.75	-27.49
3	0.29616	10.18	12.38	10.16	22.56	20.34	60.35	50.35	-37.79	-30.01
4	0.45600	10.21	13.60	8.37	23.81	18.58	56.77	46.77	-32.96	-28.19
5	0.62025	10.22	10.32	3.14	20.54	13.36	56.00	46.00	-35.46	-32.64
6	1.51125	10.28	6.64	4.64	16.92	14.92	56.00	46.00	-39.08	-31.08

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)

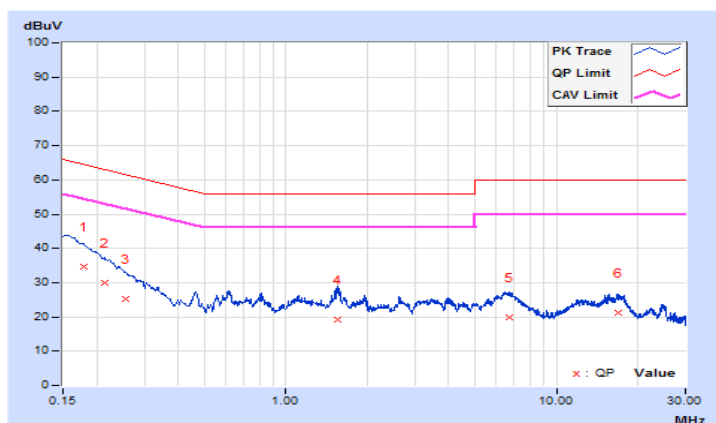


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 1		

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	0.17925	10.13	24.41	16.48	34.54	26.61	64.52	54.52	-29.98	-27.91
2	0.21291	10.13	19.83	13.99	29.96	24.12	63.09	53.09	-33.13	-28.97
3	0.25575	10.14	15.22	13.04	25.36	23.18	61.57	51.57	-36.21	-28.39
4	1.55625	10.26	9.02	5.87	19.28	16.13	56.00	46.00	-36.72	-29.87
5	6.69975	10.47	9.51	5.02	19.98	15.49	60.00	50.00	-40.02	-34.51
6	17.00700	10.73	10.38	8.02	21.11	18.75	60.00	50.00	-38.89	-31.25

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)

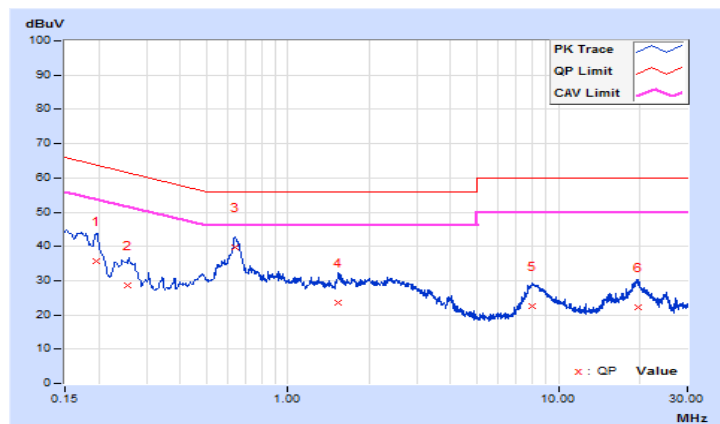


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 2		

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	0.19669	10.17	25.37	18.81	35.54	28.98	63.75	53.75	-28.21	-24.77
2	0.25680	10.18	18.46	14.91	28.64	25.09	61.53	51.53	-32.89	-26.44
3	0.63688	10.22	29.46	21.61	39.68	31.83	56.00	46.00	-16.32	-14.17
4	1.53825	10.28	13.43	7.36	23.71	17.64	56.00	46.00	-32.29	-28.36
5	8.02050	10.45	12.24	6.37	22.69	16.82	60.00	50.00	-37.31	-33.18
6	19.67100	10.61	11.46	5.70	22.07	16.31	60.00	50.00	-37.93	-33.69

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)

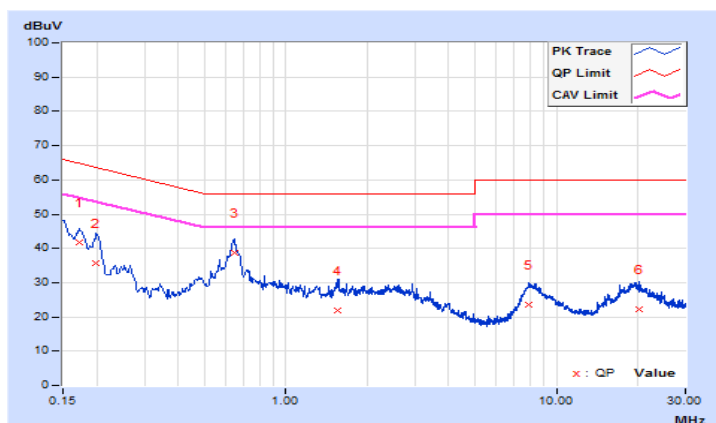


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 2		

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	0.17237	10.12	31.58	25.13	41.70	35.25	64.85	54.85	-23.15	-19.60
2	0.19931	10.13	25.70	20.89	35.83	31.02	63.64	53.64	-27.81	-22.62
3	0.64275	10.20	28.47	20.81	38.67	31.01	56.00	46.00	-17.33	-14.99
4	1.56290	10.26	11.79	5.62	22.05	15.88	56.00	46.00	-33.95	-30.12
5	7.92150	10.51	13.03	7.47	23.54	17.98	60.00	50.00	-36.46	-32.02
6	20.15475	10.81	11.58	5.69	22.39	16.50	60.00	50.00	-37.61	-33.50

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)



5.7 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。

6 6 dB 頻寬之要求

6.1 適用標準

請見本報告 3.1 節第(5)項的規定。

6.2 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。

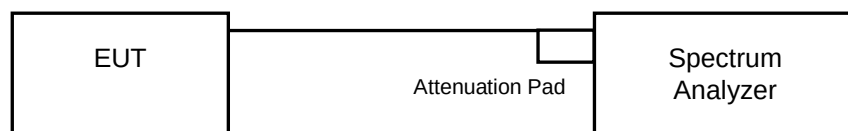
6.3 量測儀器

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.

6.4 測試配置



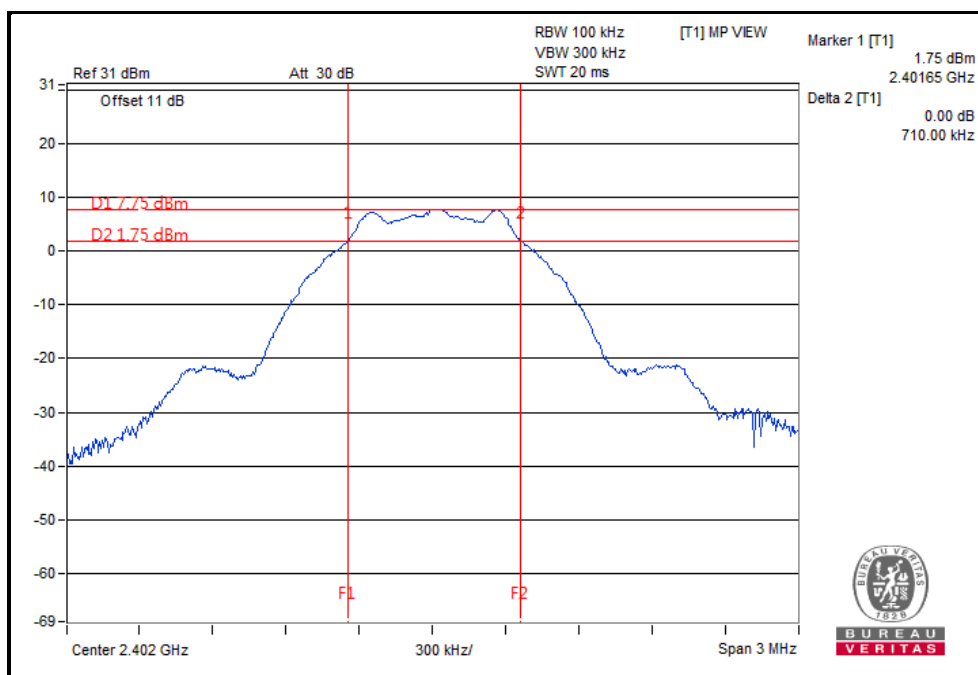
6.5 量測結果

<LE 4.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.71	0.5	Pass
19	2440	0.72	0.5	Pass
39	2480	0.73	0.5	Pass

**此測試圖僅放測試結果最差的頻道。

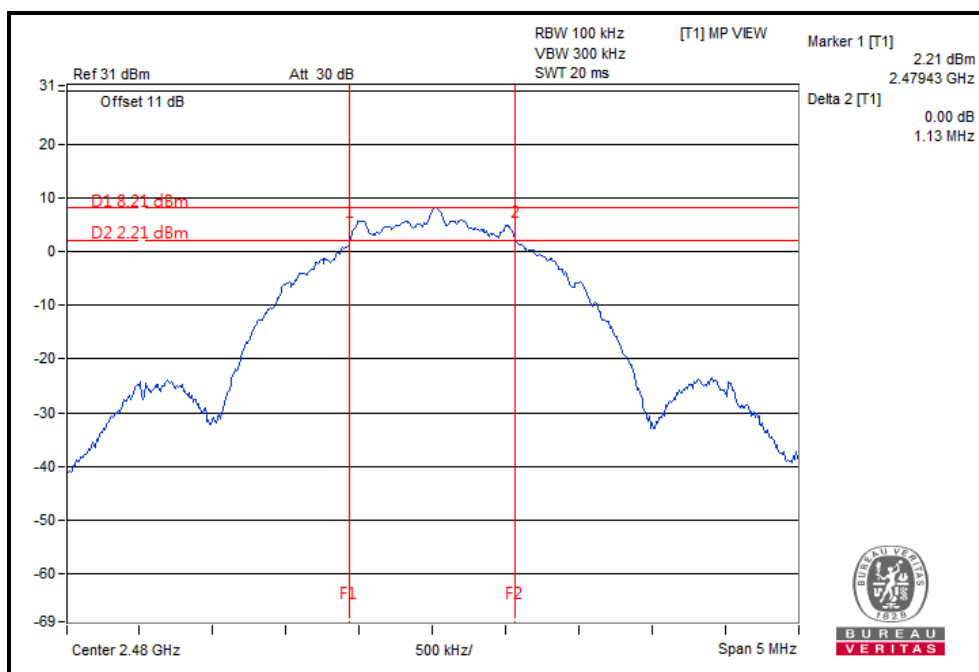


<LE 5.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	1.17	0.5	Pass
19	2440	1.15	0.5	Pass
39	2480	1.13	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



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 峰值傳導輸出功率之量測

7.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

7.2 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。

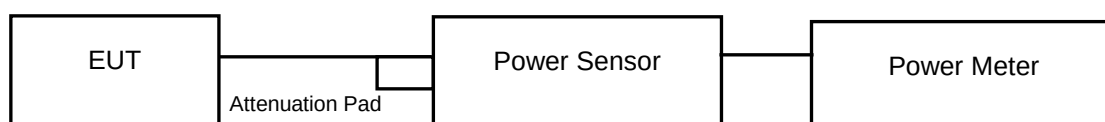
7.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Dec. 10, 2019	Dec. 09, 2020
Power Sensor Anritsu	MA2411B	1207325	Dec. 10, 2019	Dec. 09, 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 65 MHz greater than 6 dB bandwidth of emission.

7.4 測試配置



7.5 量測結果

<LE 4.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
0	2402	5.585	7.47	30	Pass
19	2440	5.998	7.78	30	Pass
39	2480	5.848	7.67	30	Pass

<LE 5.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
0	2402	5.534	7.43	30	Pass
19	2440	5.861	7.68	30	Pass
39	2480	5.781	7.62	30	Pass

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。

8 功率頻譜密度之量測

8.1 適用標準

請見本報告 3.1 節第(7)項的規定。

8.2 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。

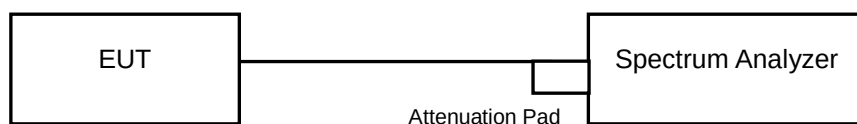
8.3 量測儀器

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.

8.4 測試配置



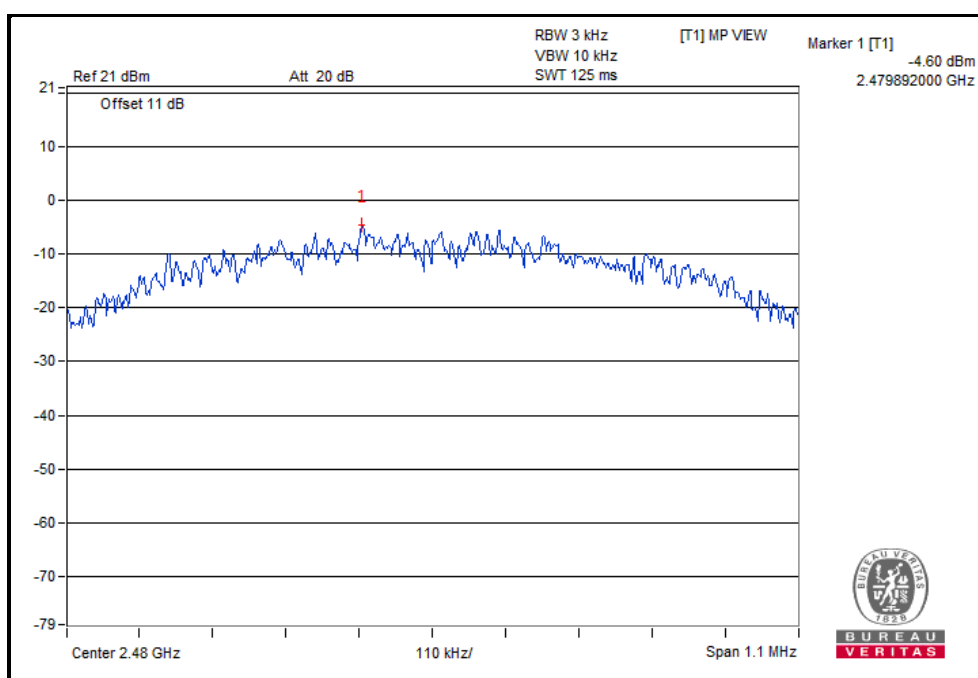
8.5 量測結果

<LE 4.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	2402	-5.00	8	Pass
19	2440	-6.18	8	Pass
39	2480	-4.60	8	Pass

**此測試圖僅放測試結果最差的頻道。

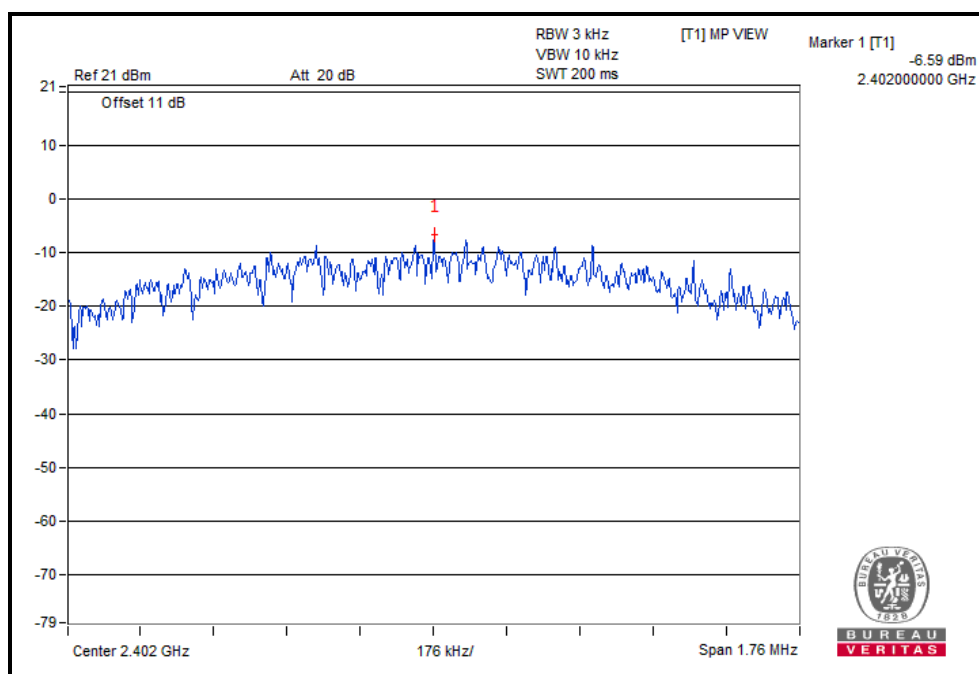


<LE 5.0>

操作模式	發射	測試日期	109 年 07 月 28 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Getaz Yang		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	2402	-6.59	8	Pass
19	2440	-7.93	8	Pass
39	2480	-8.67	8	Pass

**此測試圖僅放測試結果最差的頻道。



8.6 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。

ANT+頻段測試紀錄結果

9 場強輻射及開放頻帶邊緣之量測

9.1 適用標準

請見本報告 3.1 節第(2)項的規定。

9.2 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 = 10 Hz

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 = 1 kHz

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

9.3 量測儀器

同 4.3 節

9.4 測試配置

同 4.4 節

9.5 場強度之計算

同 4.5 節

量測結果請見下頁。

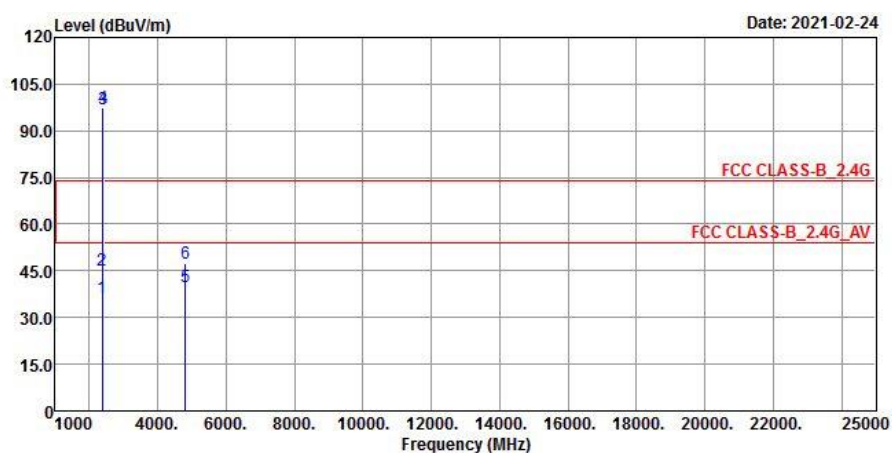
9.6 量測結果

9.6.1 發射諧波

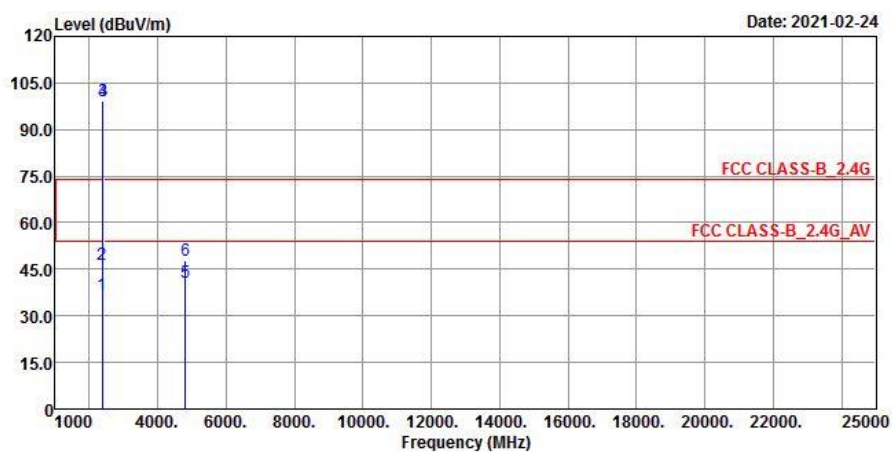
1M

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	Tim Chen

Horizontal



Vertical



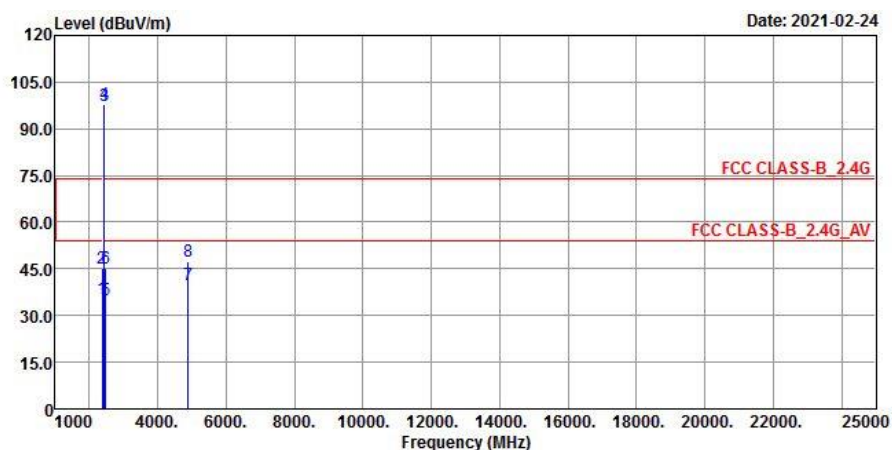
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2370.996	36.31	43.31	-7	54	-17.69	360	316	Average
2370.996	45.26	52.26	-7	74	-28.74	360	316	Peak
2403	96.92	103.97	-7.05	-----	-----	360	316	Average
2403	97.21	104.26	-7.05	-----	-----	360	316	Peak
4806	39.92	55.73	-15.81	54	-14.08	219	65	Average
4806	47.32	63.13	-15.81	74	-26.68	219	65	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
2371.098	36.87	43.87	-7	54	-17.13	180	347	Average
2371.098	46.4	53.4	-7	74	-27.6	180	347	Peak
2403	99.12	106.17	-7.05	-----	-----	180	347	Average
2403	99.4	106.45	-7.05	-----	-----	180	347	Peak
4806	40.62	56.43	-15.81	54	-13.38	353	360	Average
4806	47.66	63.47	-15.81	74	-26.34	353	360	Peak

Remarks:

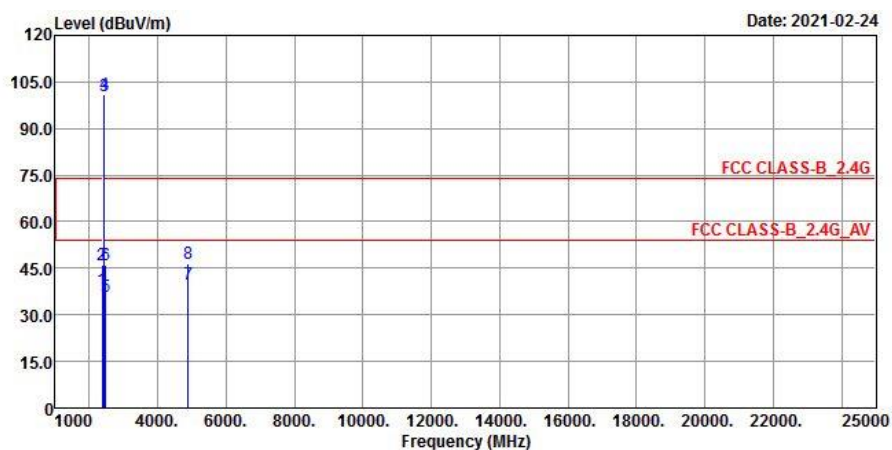
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 2403 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

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



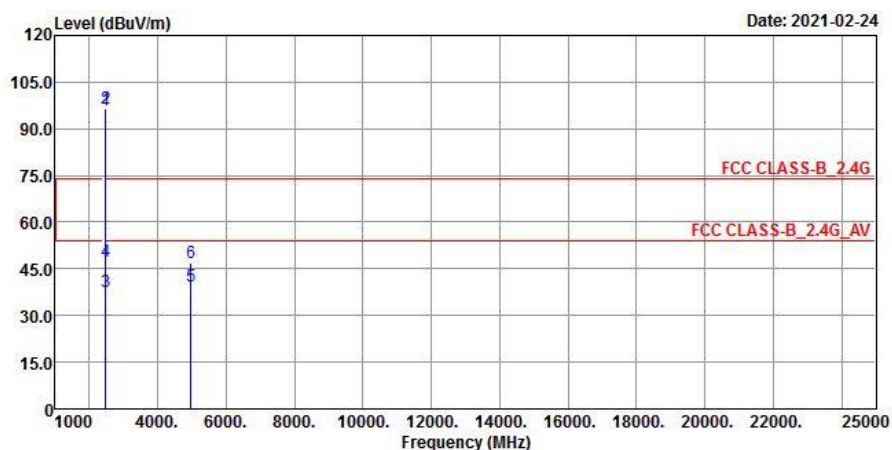
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2376.88	35.6	42.6	-7	54	-18.4	388	317	Average
2376.88	45.16	52.16	-7	74	-28.84	388	317	Peak
2441	97.55	104.48	-6.93	-----	-----	388	317	Average
2441	97.83	104.76	-6.93	-----	-----	388	317	Peak
2483.5	34.77	41.63	-6.86	54	-19.23	388	317	Average
2483.5	44.99	51.85	-6.86	74	-29.01	388	317	Peak
4882	40.04	55.98	-15.94	54	-13.96	211	73	Average
4882	47.27	63.21	-15.94	74	-26.73	211	73	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
2377.07	38.14	45.14	-7	54	-15.86	142	313	Average
2377.07	45.95	52.95	-7	74	-28.05	142	313	Peak
2441	100.55	107.48	-6.93	-----	-----	142	313	Average
2441	100.83	107.76	-6.93	-----	-----	142	313	Peak
2483.5	35.76	42.62	-6.86	54	-18.24	142	313	Average
2483.5	46.15	53.01	-6.86	74	-27.85	142	313	Peak
4882	39.77	55.71	-15.94	54	-14.23	351	347	Average
4882	46.4	62.34	-15.94	74	-27.6	351	347	Peak

Remarks:

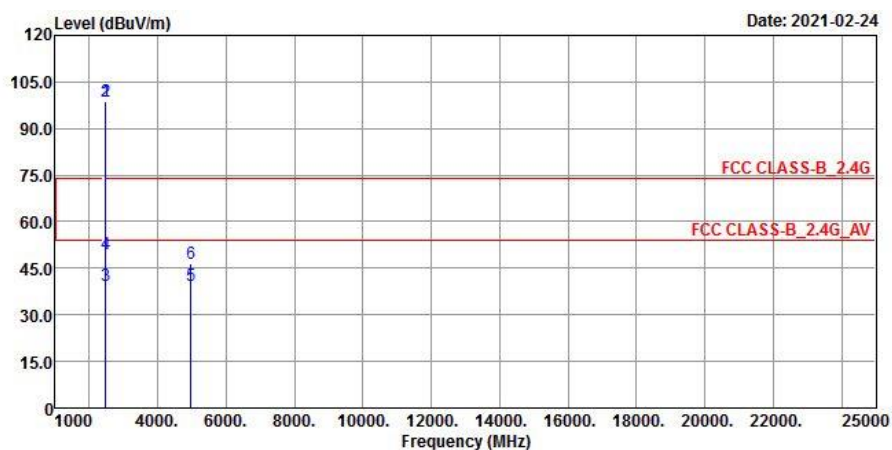
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	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	96.05	102.91	-6.86	-----	-----	276	296	Average
2480	96.41	103.27	-6.86	-----	-----	276	296	Peak
2483.5	37.64	44.5	-6.86	54	-16.36	276	296	Average
2483.5	47.35	54.21	-6.86	74	-26.65	276	296	Peak
4960	39.42	55.12	-15.7	54	-14.58	223	69	Average
4960	46.87	62.57	-15.7	74	-27.13	223	69	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	98.68	105.54	-6.86	-----	-----	249	338	Average
2480	98.94	105.8	-6.86	-----	-----	249	338	Peak
2483.5	39.21	46.07	-6.86	54	-14.79	249	338	Average
2483.5	49.57	56.43	-6.86	74	-24.43	249	338	Peak
4960	39.46	55.16	-15.7	54	-14.54	348	322	Average
4960	46.61	62.31	-15.7	74	-27.39	348	322	Peak

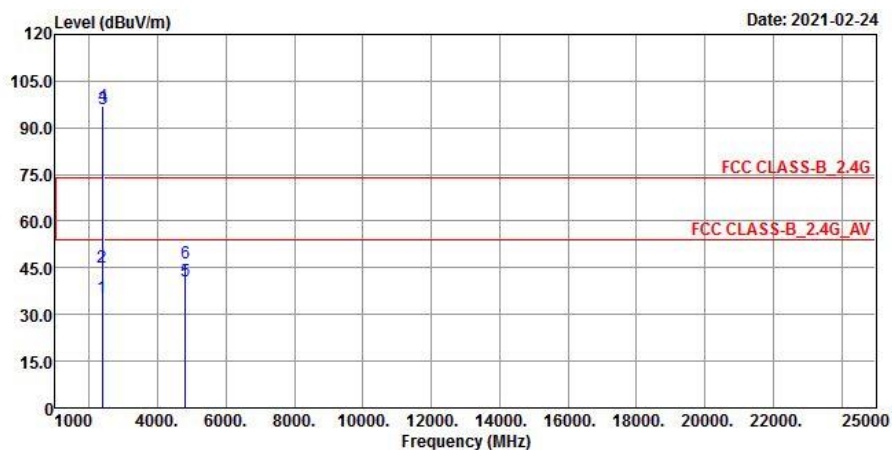
Remarks:

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

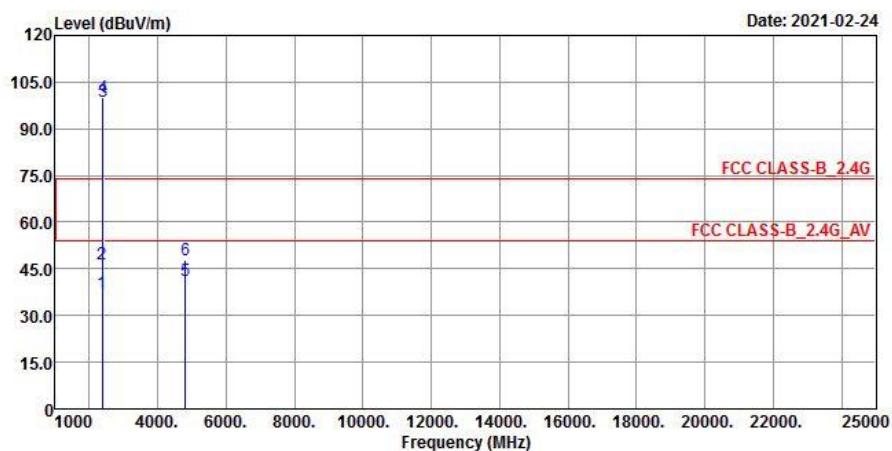
2M

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	Tim Chen

Horizontal



Vertical



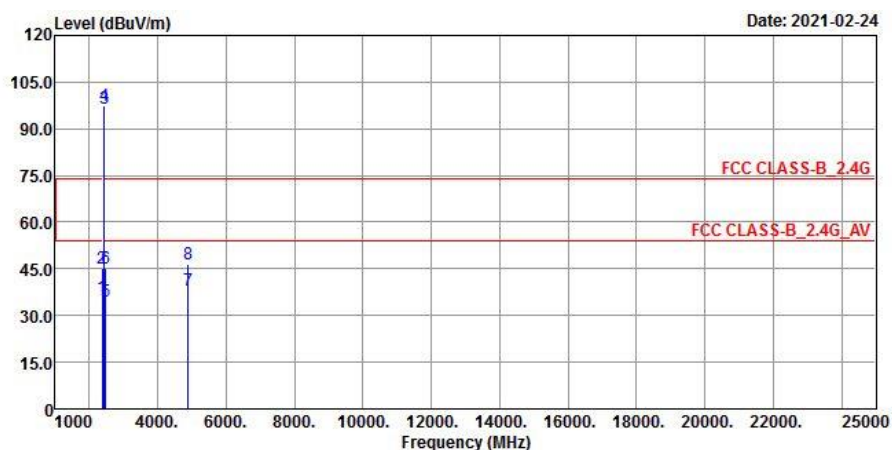
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2371.098	35.5	42.5	-7	54	-18.5	362	316	Average
2371.098	45.21	52.21	-7	74	-28.79	362	316	Peak
2403	96	103.05	-7.05	-----	-----	362	316	Average
2403	96.95	104	-7.05	-----	-----	362	316	Peak
4806	40.56	56.37	-15.81	54	-13.44	205	72	Average
4806	46.54	62.35	-15.81	74	-27.46	205	72	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
2370.894	36.98	43.98	-7	54	-17.02	176	346	Average
2370.894	46.3	53.3	-7	74	-27.7	176	346	Peak
2403	98.93	105.98	-7.05	-----	-----	176	346	Average
2403	99.86	106.91	-7.05	-----	-----	176	346	Peak
4806	41.11	56.92	-15.81	54	-12.89	351	355	Average
4806	47.92	63.73	-15.81	74	-26.08	351	355	Peak

Remarks:

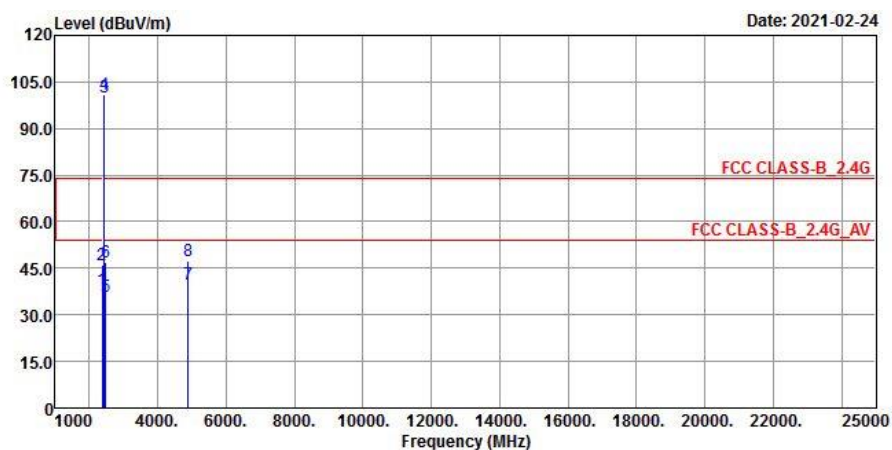
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 2403 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

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



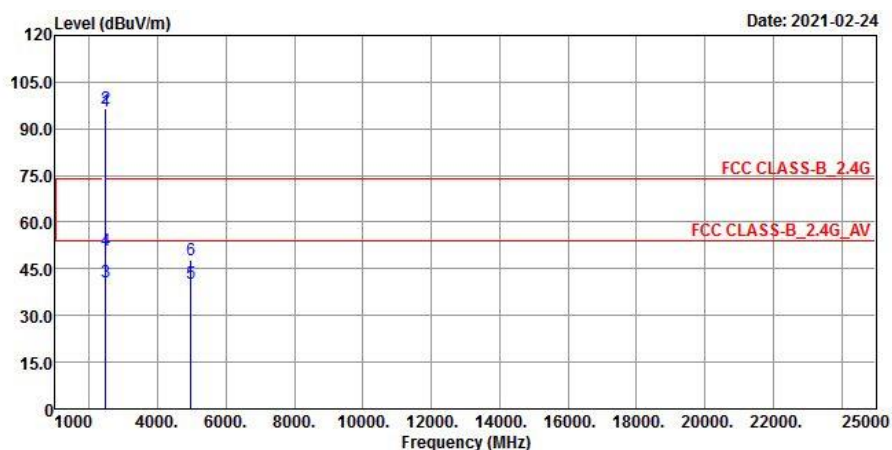
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2377.07	35.65	42.65	-7	54	-18.35	354	314	Average
2377.07	45.27	52.27	-7	74	-28.73	354	314	Peak
2441	96.61	103.54	-6.93	-----	-----	354	314	Average
2441	97.52	104.45	-6.93	-----	-----	354	314	Peak
2483.5	34.62	41.48	-6.86	54	-19.38	354	314	Average
2483.5	45.33	52.19	-6.86	74	-28.67	354	314	Peak
4882	38.25	54.19	-15.94	54	-15.75	210	61	Average
4882	46.63	62.57	-15.94	74	-27.37	210	61	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
2377.07	38.01	45.01	-7	54	-15.99	138	316	Average
2377.07	46.19	53.19	-7	74	-27.81	138	316	Peak
2441	100.08	107.01	-6.93	-----	-----	138	316	Average
2441	101.05	107.98	-6.93	-----	-----	138	316	Peak
2483.5	35.77	42.63	-6.86	54	-18.23	138	316	Average
2483.5	46.87	53.73	-6.86	74	-27.13	138	316	Peak
4882	39.73	55.67	-15.94	54	-14.27	352	353	Average
4882	47.21	63.15	-15.94	74	-26.79	352	353	Peak

Remarks:

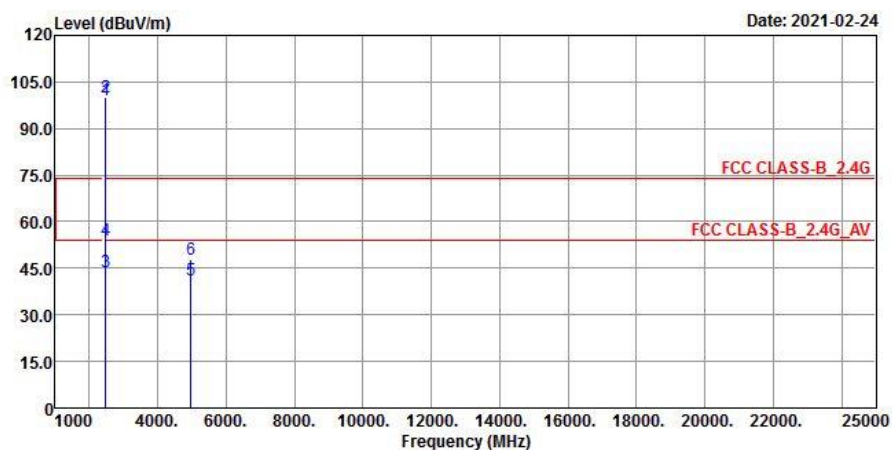
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2441 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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	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	95.6	102.46	-6.86	-----	-----	378	314	Average
2480	96.52	103.38	-6.86	-----	-----	378	314	Peak
2483.5	40.94	47.8	-6.86	54	-13.06	378	314	Average
2483.5	51.13	57.99	-6.86	74	-22.87	378	314	Peak
4960	40.42	56.12	-15.7	54	-13.58	222	77	Average
4960	47.97	63.67	-15.7	74	-26.03	222	77	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	99.18	106.04	-6.86	-----	-----	144	327	Average
2480	100.12	106.98	-6.86	-----	-----	144	327	Peak
2483.5	43.65	50.51	-6.86	54	-10.35	144	327	Average
2483.5	53.83	60.69	-6.86	74	-20.17	144	327	Peak
4960	41.21	56.91	-15.7	54	-12.79	348	357	Average
4960	47.98	63.68	-15.7	74	-26.02	348	357	Peak

Remarks:

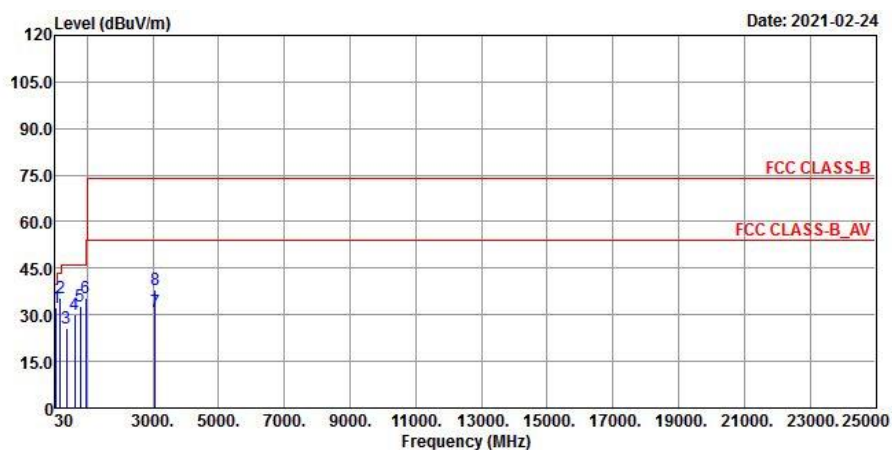
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 2480 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

9.6.2 接收諧波

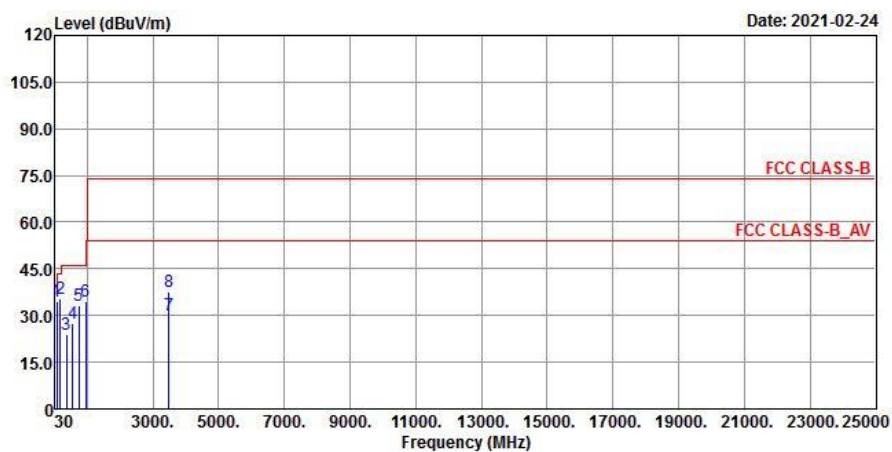
2M

EUT Test Condition		Measurement Detail	
Channel	Channel 78	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	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
62.98	32.42	45.84	-13.42	40	-7.58	158	269	QP
191.99	35.63	51.43	-15.8	43.5	-7.87	174	295	QP
365.62	25.86	35.36	-9.5	46	-20.14	245	164	QP
612	30.25	32.71	-2.46	46	-15.75	281	194	QP
780.78	32.75	32.25	0.5	46	-13.25	155	36	QP
956.35	35.34	31.99	3.35	46	-10.66	159	283	QP
3074	30.78	51.48	-20.7	54	-23.22	116	238	Average
3074	38.01	58.71	-20.7	74	-35.99	116	238	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
71.71	34.42	49.62	-15.2	40	-5.58	169	247	QP
185.2	35.56	50.74	-15.18	43.5	-7.94	146	297	QP
365.62	23.89	33.39	-9.5	46	-22.11	255	166	QP
559.62	27.53	31.59	-4.06	46	-18.47	176	294	QP
743.92	33.2	33.14	0.06	46	-12.8	108	55	QP
958.29	34.66	31.27	3.39	46	-11.34	224	191	QP
3482	30.25	50.44	-20.19	54	-23.75	203	159	Average
3482	37.44	57.63	-20.19	74	-36.56	203	159	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.

9.6.3 其它不必要之訊號

9 kHz ~ 30 MHz Data:

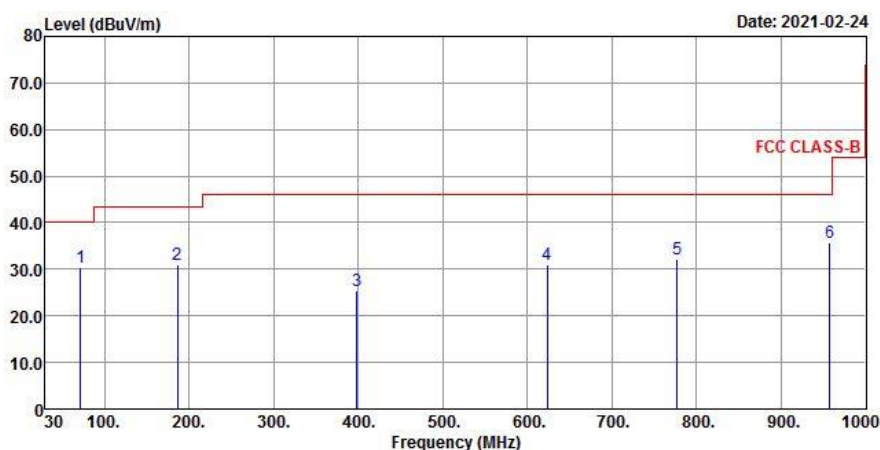
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Data:

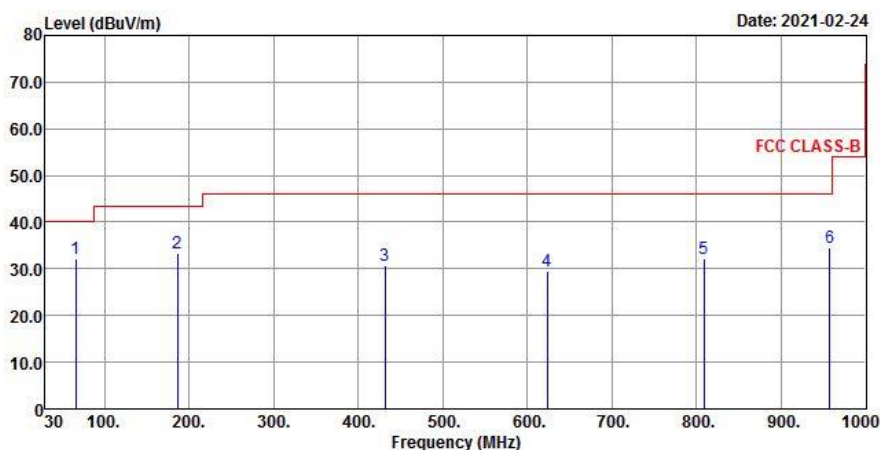
2M

EUT Test Condition		Measurement Detail	
Channel	Channel 78	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	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
71.71	30.52	45.72	-15.2	40	-9.48	125	248	QP
186.17	31.02	46.29	-15.27	43.5	-12.48	157	273	QP
398.6	25.27	33.99	-8.72	46	-20.73	208	309	QP
623.64	30.93	33.1	-2.17	46	-15.07	117	245	QP
776.9	32.29	31.83	0.46	46	-13.71	199	23	QP
957.32	35.76	32.39	3.37	46	-10.24	220	84	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
65.89	32.29	46.43	-14.14	40	-7.71	111	251	QP
186.17	33.41	48.68	-15.27	43.5	-10.09	145	267	QP
431.58	30.58	38.24	-7.66	46	-15.42	132	305	QP
623.64	29.44	31.61	-2.17	46	-16.56	255	18	QP
808.91	32.25	31.44	0.81	46	-13.75	268	344	QP
957.32	34.47	31.1	3.37	46	-11.53	169	76	QP

Remarks:

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

9.7 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。

10 電源線傳導干擾之量測

10.1 適用標準

請見本報告3.1節第(8)項的規定。

10.2 量測方法

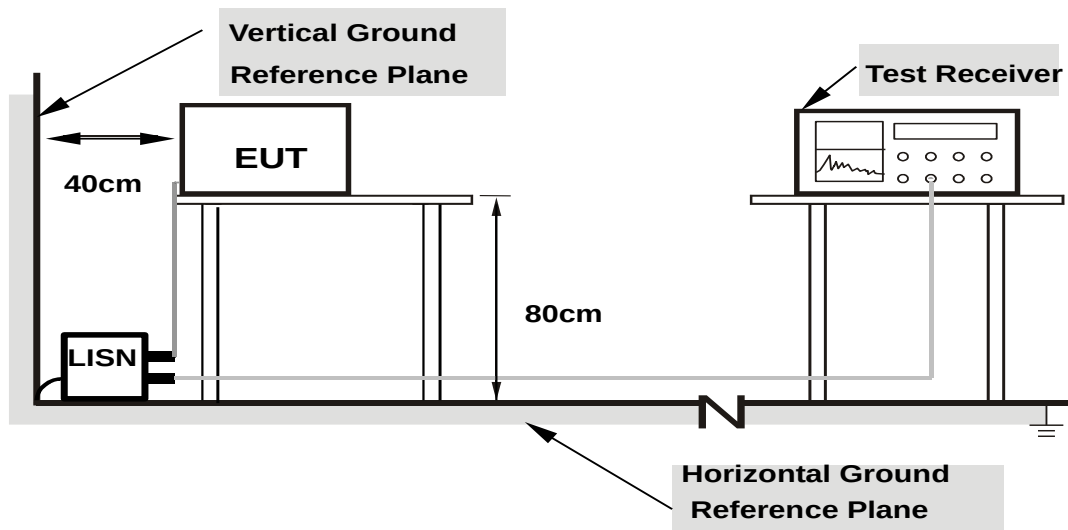
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

10.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Jan. 06, 2021	Jan. 05, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 18, 2021	Jan. 17, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 18, 2020	Aug. 17, 2021
Software ADT	BV ADT_Cond_ 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.
3. The VCCI Site Registration No. is C-2047.
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.
5. Test Date: 2021/02/25

10.4 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

10.5 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

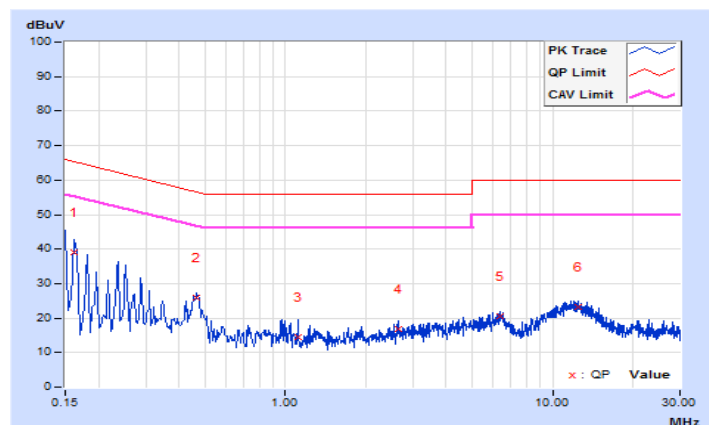
10.6 量測結果

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	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/24
測試模式	Mode 3		

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	0.16173	10.09	28.88	4.68	38.97	14.77	65.37	55.37	-26.40	-40.60
2	0.46669	10.19	15.61	3.66	25.80	13.85	56.57	46.57	-30.77	-32.72
3	1.11186	10.26	4.22	0.73	14.48	10.99	56.00	46.00	-41.52	-35.01
4	2.65240	10.32	6.37	0.25	16.69	10.57	56.00	46.00	-39.31	-35.43
5	6.40209	10.42	10.03	1.26	20.45	11.68	60.00	50.00	-39.55	-38.32
6	12.43522	10.53	12.67	1.80	23.20	12.33	60.00	50.00	-36.80	-37.67

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)

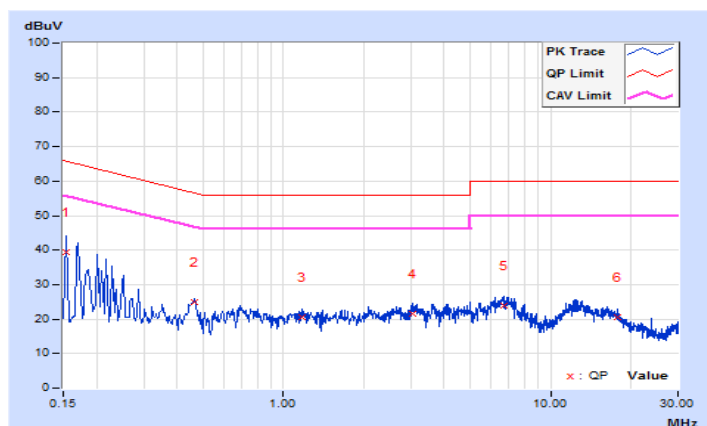


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/24
測試模式	Mode 3		

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	0.15391	10.10	29.15	5.98	39.25	16.08	65.79	55.79	-26.54	-39.71
2	0.46280	10.21	14.76	2.01	24.97	12.22	56.64	46.64	-31.67	-34.42
3	1.18224	10.29	10.40	1.48	20.69	11.77	56.00	46.00	-35.31	-34.23
4	3.06295	10.38	11.18	1.64	21.56	12.02	56.00	46.00	-34.44	-33.98
5	6.69534	10.51	13.28	1.52	23.79	12.03	60.00	50.00	-36.21	-37.97
6	17.81929	10.83	9.81	0.50	20.64	11.33	60.00	50.00	-39.36	-38.67

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)

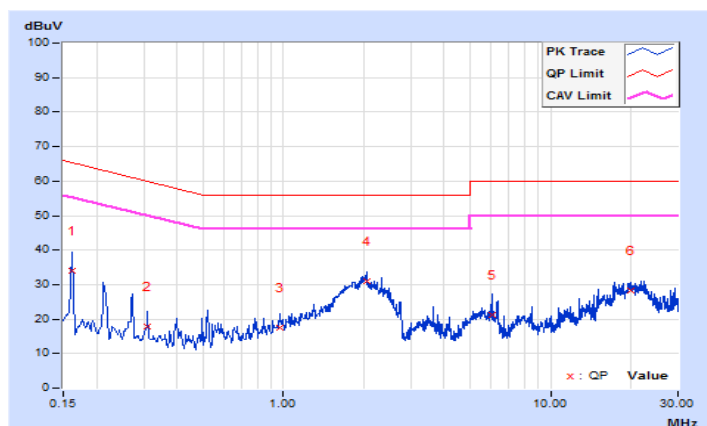


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/25
測試模式	Mode 4		

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	0.16173	10.07	23.98	1.45	34.05	11.52	65.37	55.37	-31.32	-43.85
2	0.31021	10.09	7.73	0.77	17.82	10.86	59.96	49.96	-42.14	-39.10
3	0.96719	10.14	7.27	0.01	17.41	10.15	56.00	46.00	-38.59	-35.85
4	2.05026	10.16	20.73	13.03	30.89	23.19	56.00	46.00	-25.11	-22.81
5	6.03846	10.25	11.04	0.80	21.29	11.05	60.00	50.00	-38.71	-38.95
6	20.02453	10.45	17.68	11.18	28.13	21.63	60.00	50.00	-31.87	-28.37

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)

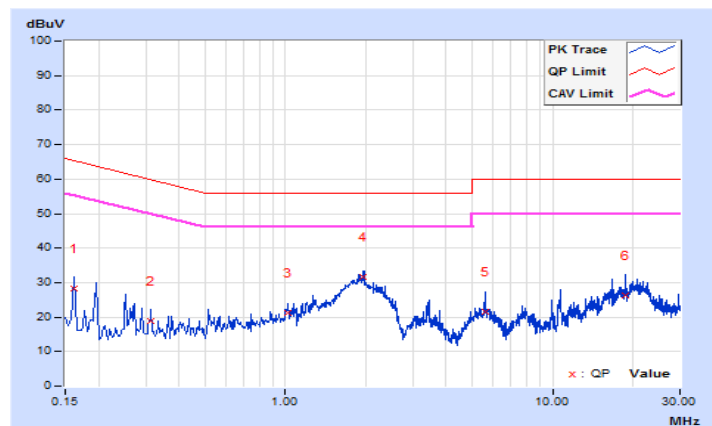


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/25
測試模式	Mode 4		

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	0.16173	10.08	18.25	5.12	28.33	15.20	65.37	55.37	-37.04	-40.17
2	0.31422	10.09	8.85	2.68	18.94	12.77	59.86	49.86	-40.92	-37.09
3	1.02193	10.15	11.21	3.93	21.36	14.08	56.00	46.00	-34.64	-31.92
4	1.95642	10.17	21.61	14.21	31.78	24.38	56.00	46.00	-24.22	-21.62
5	5.60836	10.30	11.40	3.44	21.70	13.74	60.00	50.00	-38.30	-36.26
6	18.71077	10.62	15.68	7.63	26.30	18.25	60.00	50.00	-33.70	-31.75

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)



10.7 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。

11 6 dB 頻寬之要求

11.1 適用標準

請見本報告 3.1 節第(5)項的規定。

11.2 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。

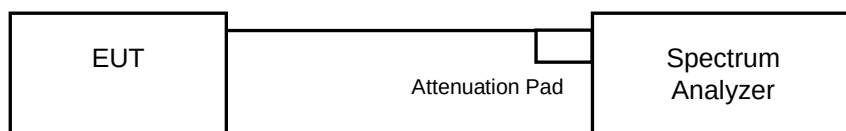
11.3 量測儀器

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



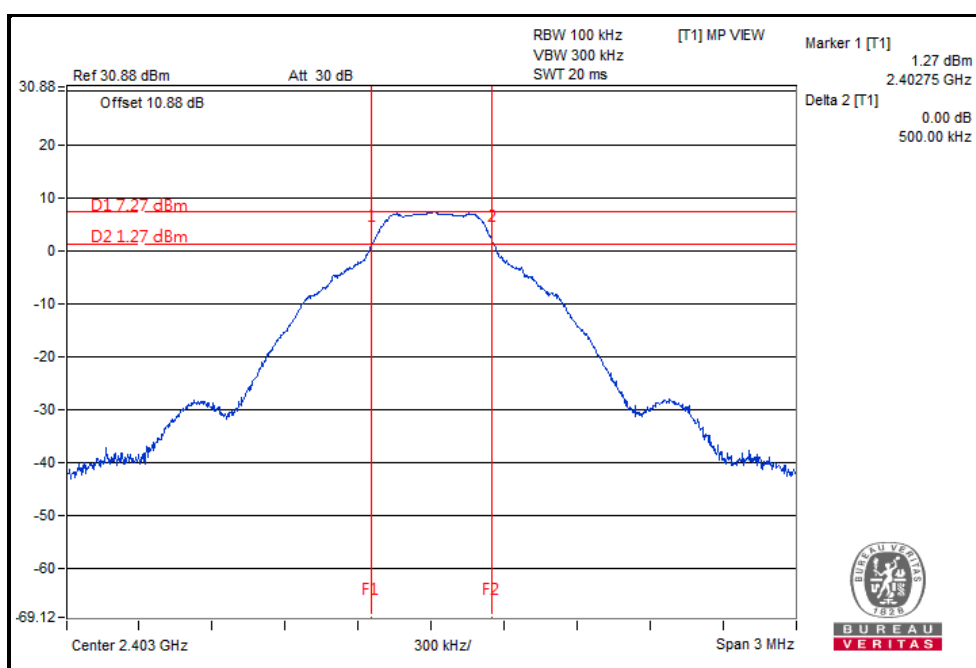
11.5 量測結果

<1M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2403	0.50	0.5	Pass
39	2441	0.50	0.5	Pass
78	2480	0.50	0.5	Pass

**此測試圖僅放測試結果最差的頻道。

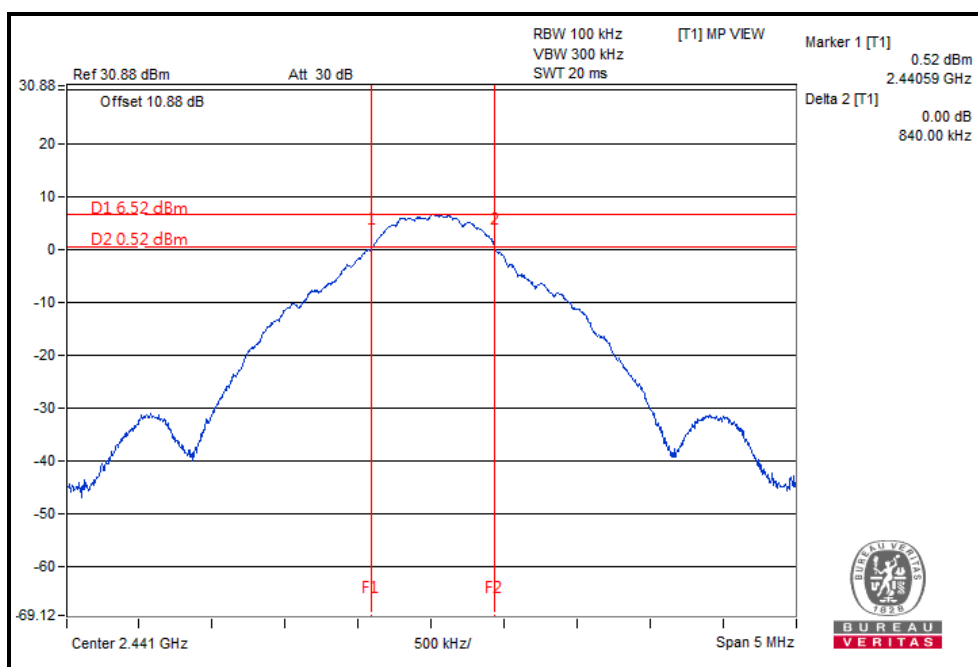


<2M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2403	0.91	0.5	Pass
39	2441	0.84	0.5	Pass
78	2480	0.91	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



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 峰值傳導輸出功率之量測

12.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

12.2 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。

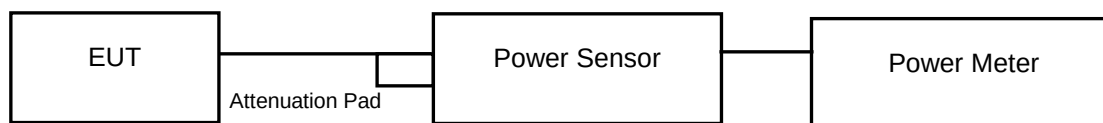
12.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Dec. 09, 2020	Dec. 08, 2021
Power Sensor Anritsu	MA2411B	1207325	Dec. 09, 2020	Dec. 08, 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 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 65 MHz greater than 6 dB bandwidth of emission.
- Test date: 2021/03/02

12.4 測試配置



12.5 量測結果

<1M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2403	6.745	8.29	30	Pass
39	2441	6.808	8.33	30	Pass
78	2480	6.761	8.30	30	Pass

<2M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2403	6.776	8.31	30	Pass
39	2441	6.792	8.32	30	Pass
78	2480	6.745	8.29	30	Pass

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 功率頻譜密度之量測

13.1 適用標準

請見本報告 3.1 節第(7)項的規定。

13.2 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。

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



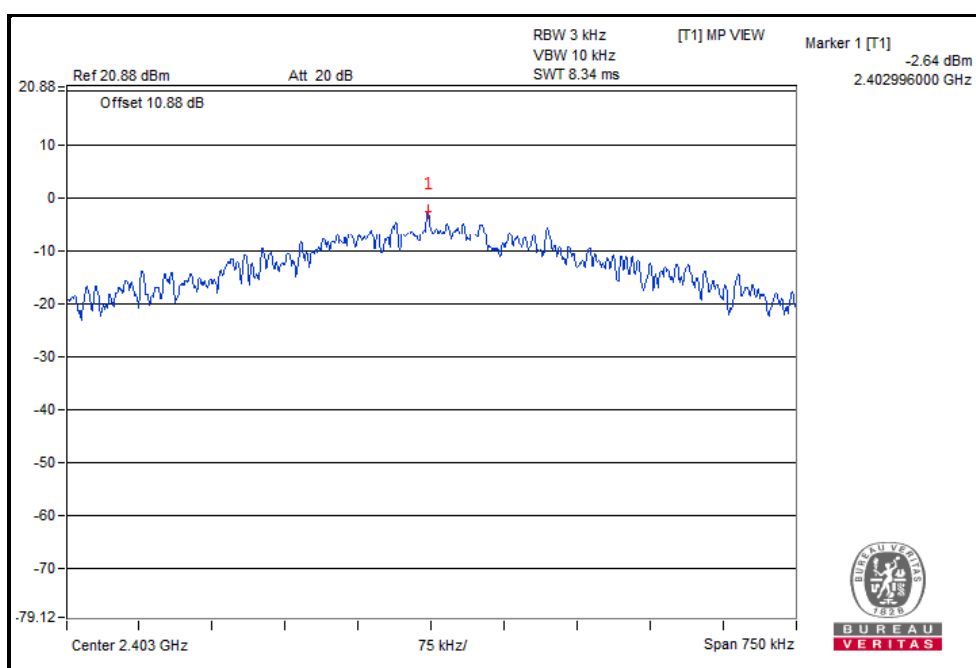
13.5 量測結果

<1M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2403	-2.64	8	Pass
39	2441	-3.25	8	Pass
78	2480	-2.84	8	Pass

**此測試圖僅放測試結果最差的頻道。

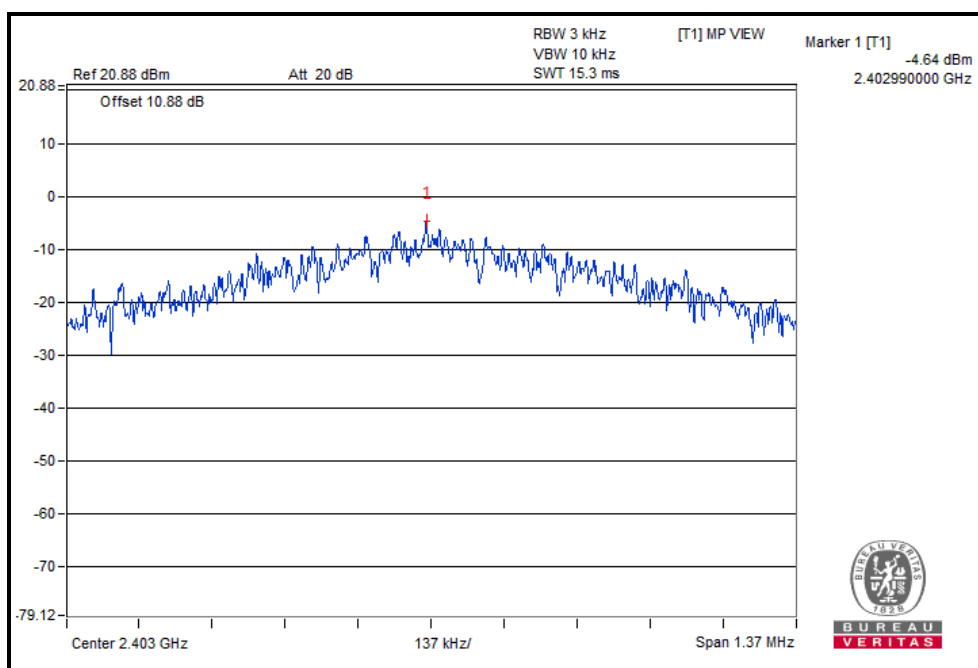


<2M>

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	Vincent Huang		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2403	-4.64	8	Pass
39	2441	-5.20	8	Pass
78	2480	-5.27	8	Pass

**此測試圖僅放測試結果最差的頻道。



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。

Zigbee 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 = 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 (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

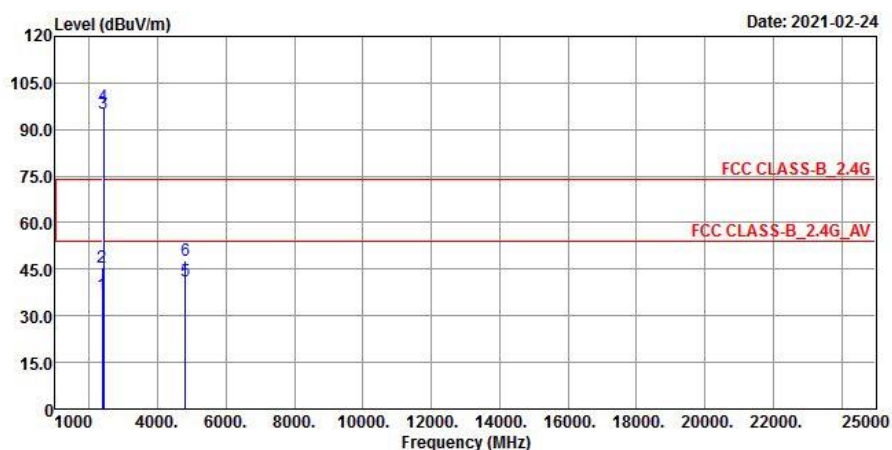
量測結果請見下頁。

14.6 量測結果

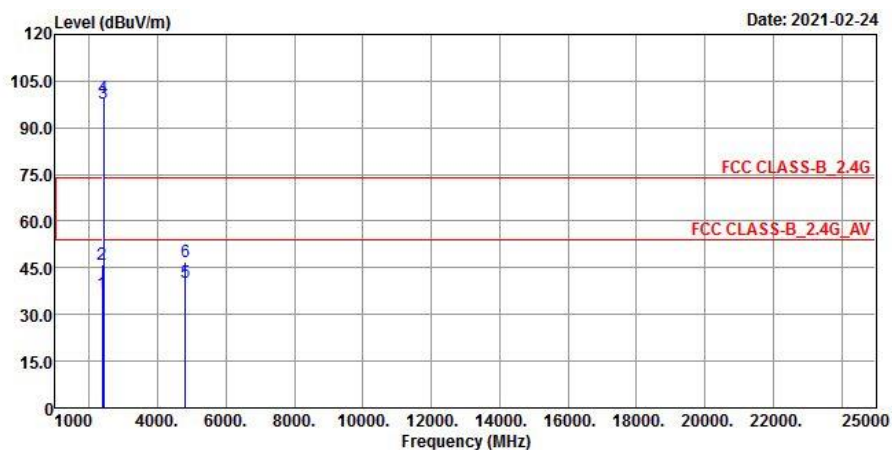
14.6.1 發射諧波

EUT Test Condition		Measurement Detail	
Channel	Channel 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	Tim Chen

Horizontal



Vertical



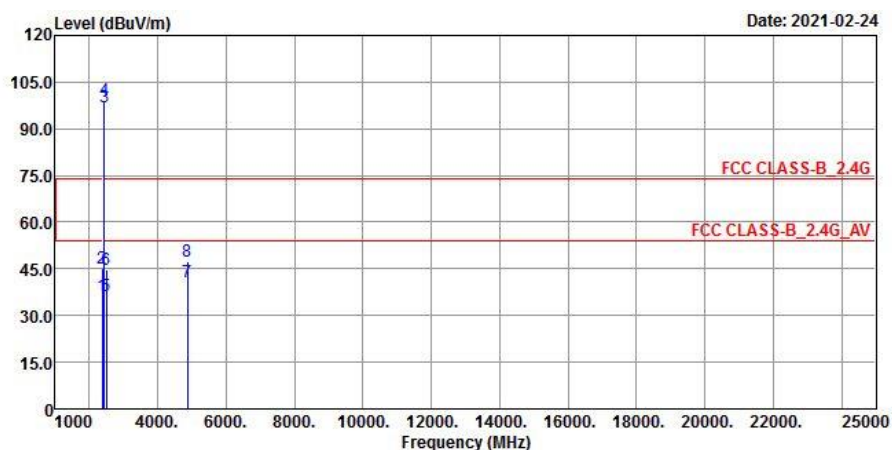
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2373	36.54	43.54	-7	54	-17.46	300	302	Average
2373	45.75	52.75	-7	74	-28.25	300	302	Peak
2405	95.42	102.47	-7.05	-----	-----	300	302	Average
2405	97.4	104.45	-7.05	-----	-----	300	302	Peak
4810	41.34	57.15	-15.81	54	-12.66	168	325	Average
4810	47.81	63.62	-15.81	74	-26.19	168	325	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
2373	36.67	43.67	-7	54	-17.33	300	327	Average
2373	45.86	52.86	-7	74	-28.14	300	327	Peak
2405	97.78	104.83	-7.05	-----	-----	300	327	Average
2405	99.66	106.71	-7.05	-----	-----	300	327	Peak
4810	40.43	56.24	-15.81	54	-13.57	163	79	Average
4810	47.02	62.83	-15.81	74	-26.98	163	79	Peak

Remarks:

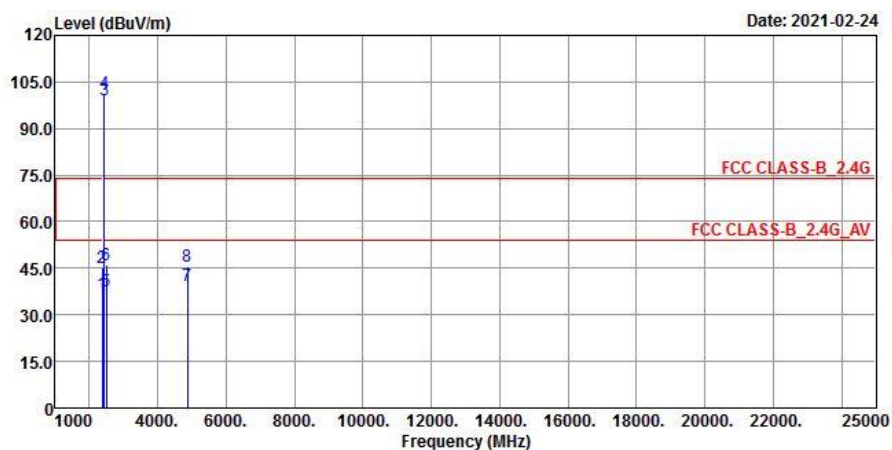
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 2405 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 17	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



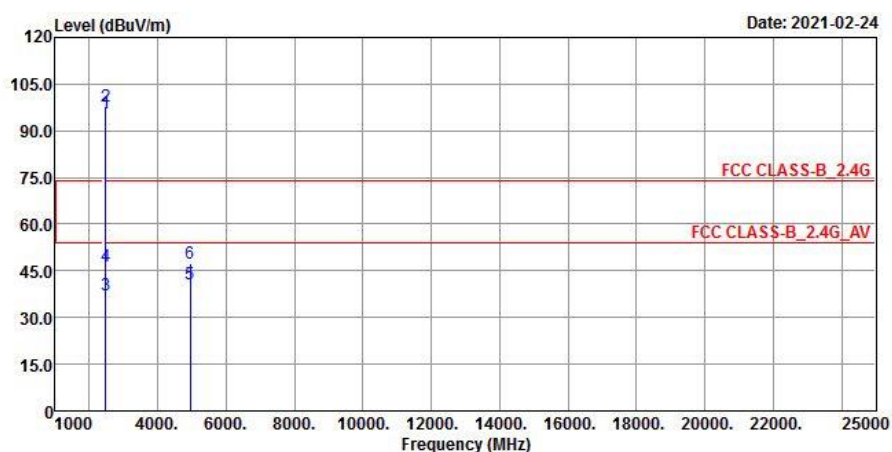
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2371	36.45	43.45	-7	54	-17.55	314	300	Average
2371	45.21	52.21	-7	74	-28.79	314	300	Peak
2435	96.95	103.94	-6.99	-----	-----	314	300	Average
2435	99.02	106.01	-6.99	-----	-----	314	300	Peak
2499	36.1	42.9	-6.8	54	-17.9	314	300	Average
2499	44.83	51.63	-6.8	74	-29.17	314	300	Peak
4870	40.66	56.6	-15.94	54	-13.34	243	102	Average
4870	47.33	63.27	-15.94	74	-26.67	243	102	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
2371	36.91	43.91	-7	54	-17.09	291	344	Average
2371	45.02	52.02	-7	74	-28.98	291	344	Peak
2435	99.37	106.36	-6.99	-----	-----	291	344	Average
2435	101.36	108.35	-6.99	-----	-----	291	344	Peak
2499	37.81	44.61	-6.8	54	-16.19	291	344	Average
2499	45.85	52.65	-6.8	74	-28.15	291	344	Peak
4870	39.21	55.15	-15.94	54	-14.79	170	61	Average
4870	45.58	61.52	-15.94	74	-28.42	170	61	Peak

Remarks:

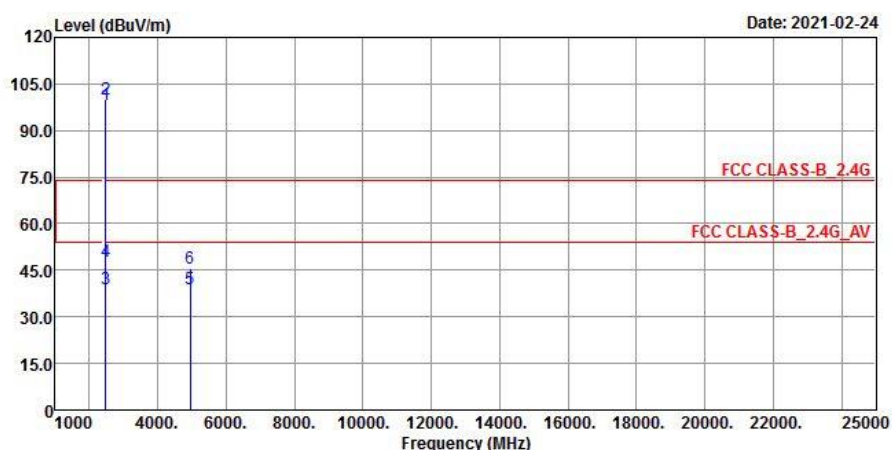
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2435 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 25	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
2475	95.79	102.65	-6.86	-----	-----	308	299	Average
2475	97.92	104.78	-6.86	-----	-----	308	299	Peak
2483.5	36.98	43.84	-6.86	54	-17.02	308	299	Average
2483.5	46.49	53.35	-6.86	74	-27.51	308	299	Peak
4950	40.95	56.74	-15.79	54	-13.05	129	201	Average
4950	47.37	63.16	-15.79	74	-26.63	129	201	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
2475	98.11	104.97	-6.86	-----	-----	287	344	Average
2475	100.13	106.99	-6.86	-----	-----	287	344	Peak
2483.5	38.85	45.71	-6.86	54	-15.15	287	344	Average
2483.5	47.9	54.76	-6.86	74	-26.1	287	344	Peak
4950	39.18	54.97	-15.79	54	-14.82	177	301	Average
4950	45.74	61.53	-15.79	74	-28.26	177	301	Peak

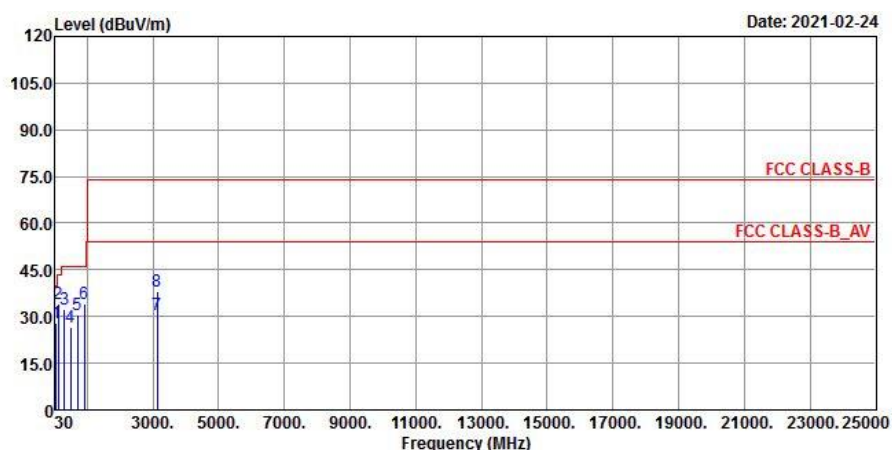
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2475 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

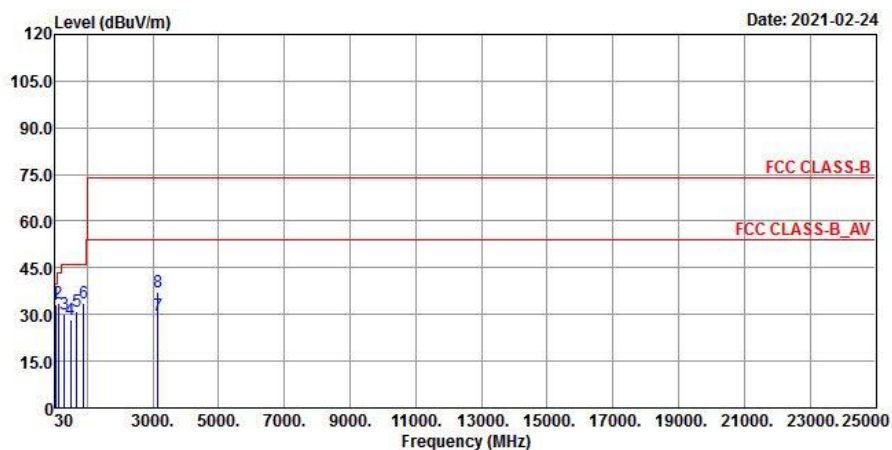
14.6.2 接收諧波

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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	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
48.43	28.11	40.59	-12.48	40	-11.89	131	265	QP
118.27	34.02	47.92	-13.9	43.5	-9.48	108	259	QP
298.69	32.33	43.76	-11.43	46	-13.67	248	167	QP
504.33	26.51	32.05	-5.54	46	-19.49	118	234	QP
710.94	30.71	31.78	-1.07	46	-15.29	108	37	QP
925.31	34.02	31.07	2.95	46	-11.98	242	152	QP
3125	30.76	51.07	-20.31	54	-23.24	184	231	Average
3125	37.99	58.3	-20.31	74	-36.01	184	231	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
38.73	33.17	45.92	-12.75	40	-6.83	107	239	QP
119.24	33.52	47.32	-13.8	43.5	-9.98	178	245	QP
298.69	29.99	41.42	-11.43	46	-16.01	274	38	QP
498.51	28.37	34.05	-5.68	46	-17.63	195	301	QP
692.51	31.01	32.3	-1.29	46	-14.99	226	108	QP
899.12	33.85	31.71	2.14	46	-12.15	211	303	QP
3159	29.86	50.12	-20.26	54	-24.14	237	154	Average
3159	37.07	57.33	-20.26	74	-36.93	237	154	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

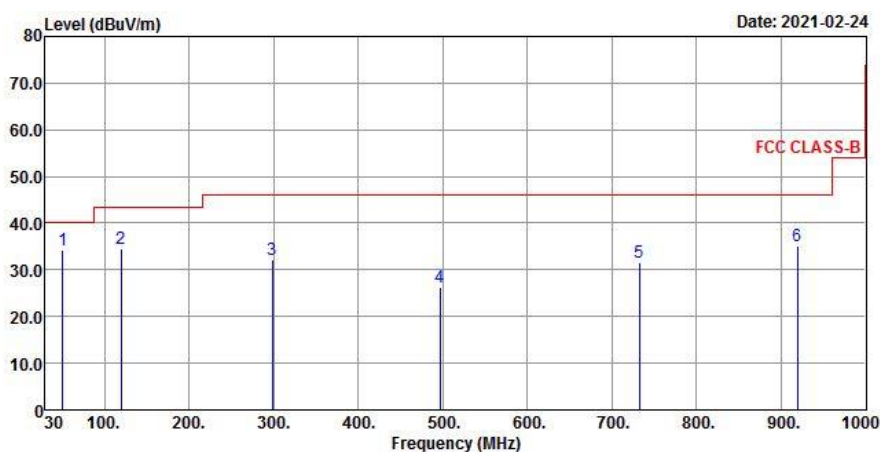
9 kHz ~ 30 MHz Data:

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

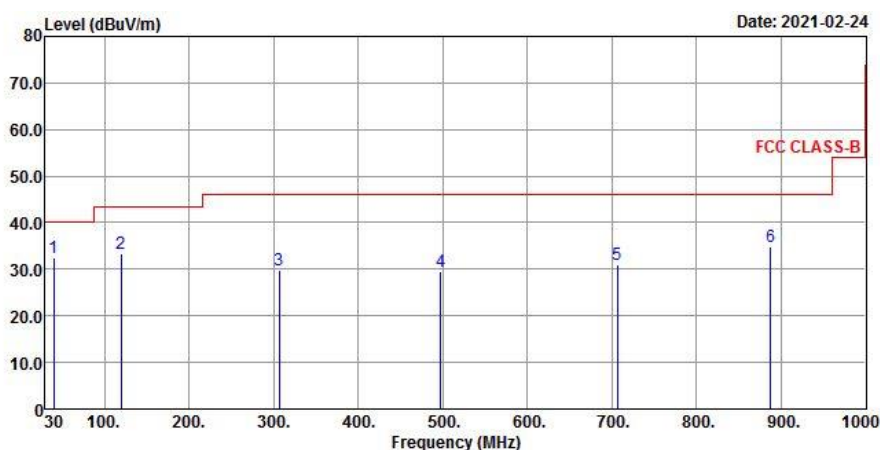
30 MHz ~ 1 GHz Data:

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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	Tim Chen

Horizontal



Vertical

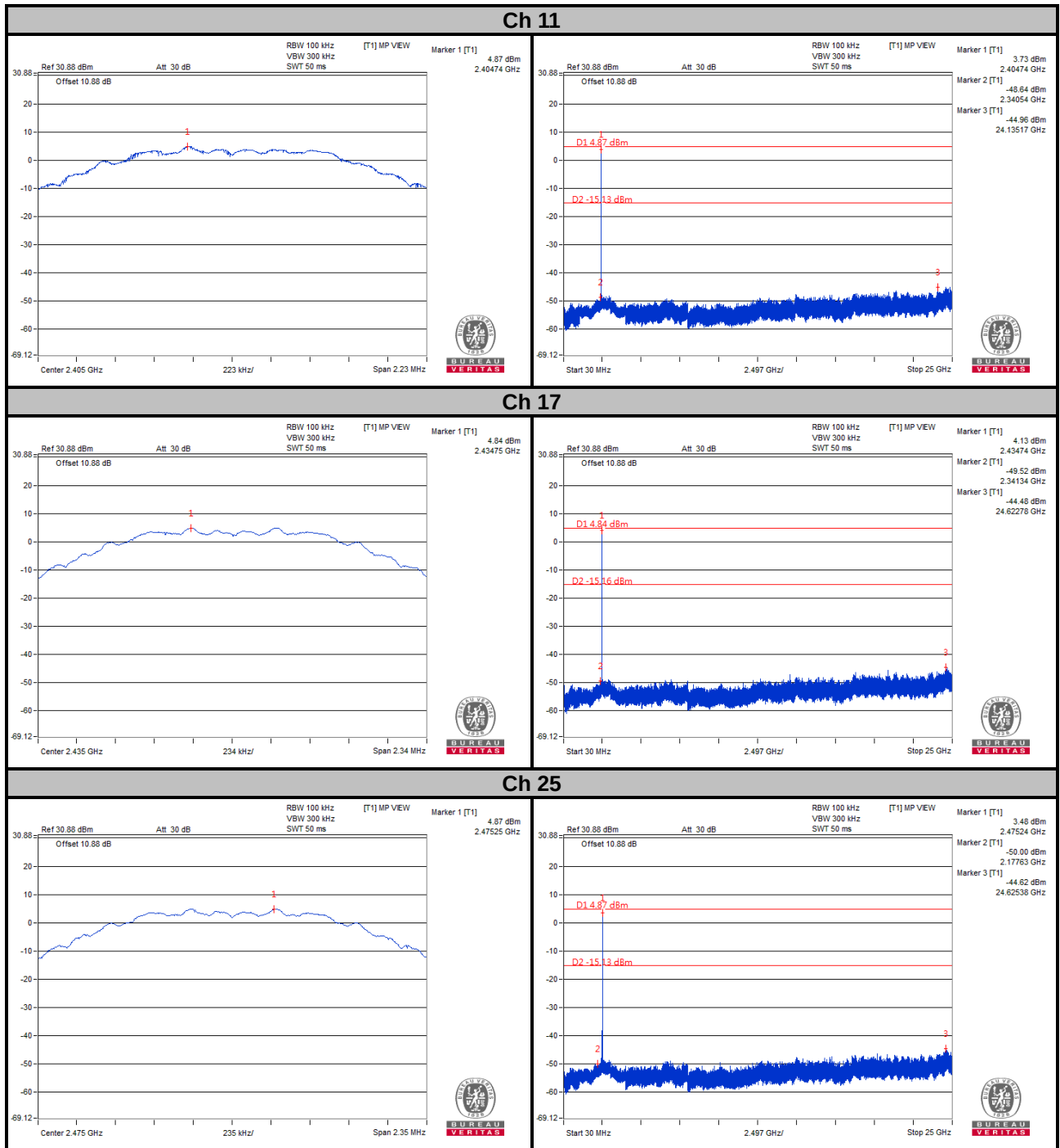


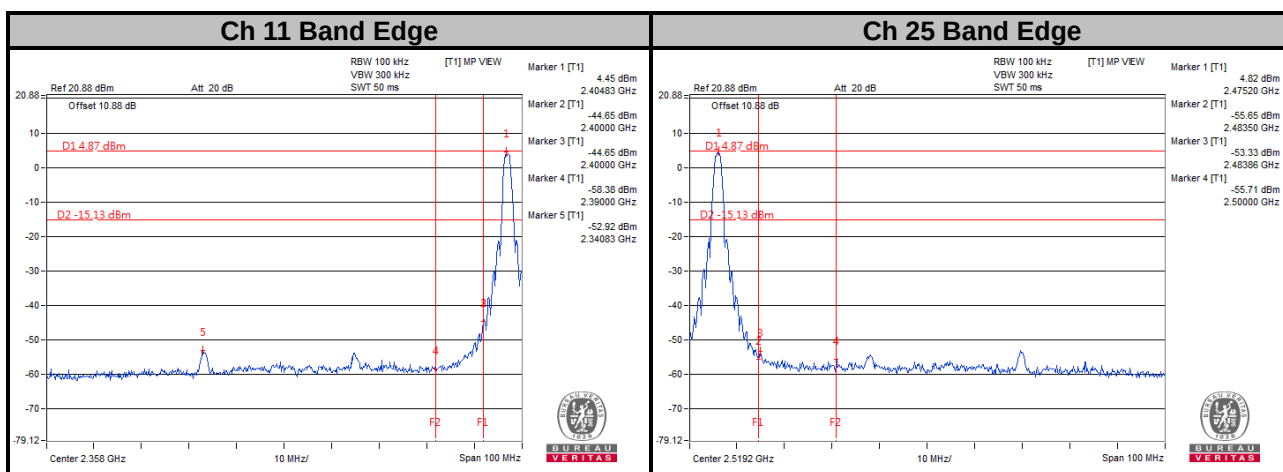
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
50.37	34.35	46.91	-12.56	40	-5.65	131	129	QP
119.24	34.54	48.34	-13.8	43.5	-8.96	168	221	QP
298.69	32.21	43.64	-11.43	46	-13.79	166	208	QP
496.57	26.34	32.06	-5.72	46	-19.66	264	111	QP
732.28	31.68	32.03	-0.35	46	-14.32	241	45	QP
919.49	35.09	32.31	2.78	46	-10.91	199	231	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	32.58	45.55	-12.97	40	-7.42	155	139	QP
119.24	33.46	47.26	-13.8	43.5	-10.04	172	301	QP
306.45	29.79	40.98	-11.19	46	-16.21	130	216	QP
497.54	29.59	35.29	-5.7	46	-16.41	204	162	QP
706.09	30.91	32.05	-1.14	46	-15.09	113	161	QP
887.48	34.78	32.81	1.97	46	-11.22	178	94	QP

Remarks:

- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 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 電源線傳導干擾之量測

15.1 適用標準

請見本報告3.1節第(1)項的規定。

15.2 量測方法

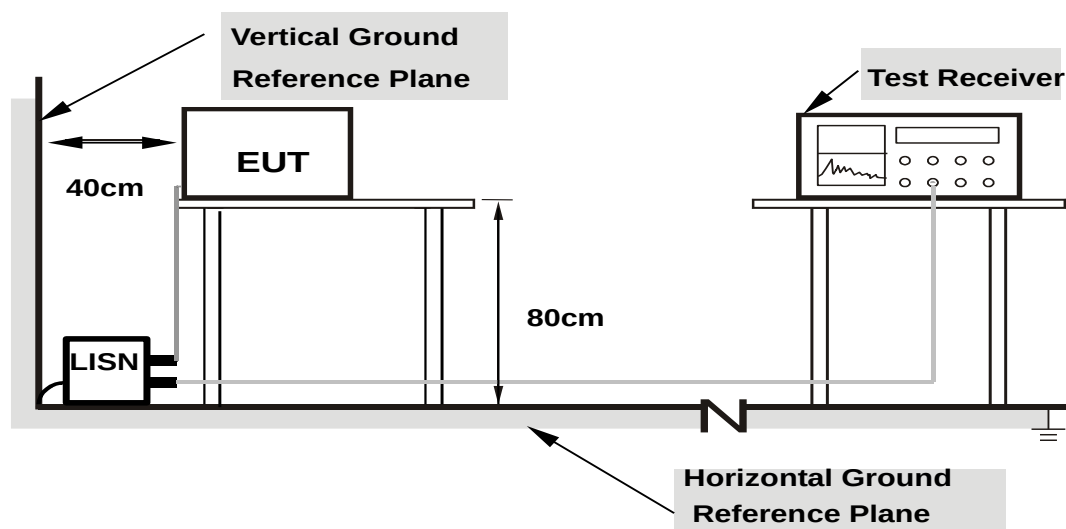
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

15.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Jan. 06, 2021	Jan. 05, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 18, 2021	Jan. 17, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 18, 2020	Aug. 17, 2021
Software ADT	BV ADT_Cond_ 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.
3. The VCCI Site Registration No. is C-2047.
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.
5. Test Date: 2021/02/25

15.4 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

15.5 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

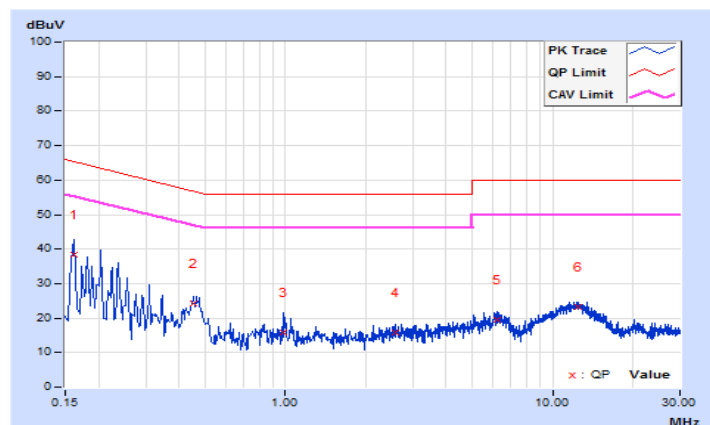
15.6 量測結果

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	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/24
測試模式	Mode 5		

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	0.16173	10.09	28.18	5.62	38.27	15.71	65.37	55.37	-27.10	-39.66
2	0.45498	10.19	14.15	2.12	24.34	12.31	56.78	46.78	-32.44	-34.47
3	0.97892	10.26	5.49	0.37	15.75	10.63	56.00	46.00	-40.25	-35.37
4	2.59766	10.31	5.36	0.26	15.67	10.57	56.00	46.00	-40.33	-35.43
5	6.19486	10.41	9.15	1.43	19.56	11.84	60.00	50.00	-40.44	-38.16
6	12.41176	10.53	12.60	1.73	23.13	12.26	60.00	50.00	-36.87	-37.74

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)

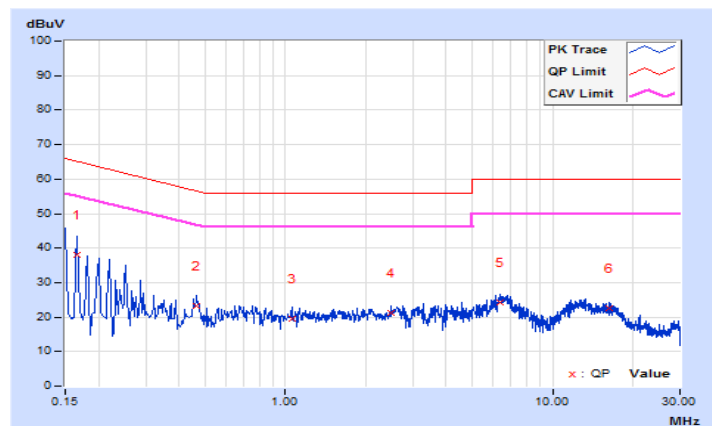


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/24
測試模式	Mode 5		

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	0.16564	10.10	28.04	5.25	38.14	15.35	65.18	55.18	-27.04	-39.83
2	0.46280	10.21	12.90	2.10	23.11	12.31	56.64	46.64	-33.53	-34.33
3	1.05712	10.28	9.20	1.88	19.48	12.16	56.00	46.00	-36.52	-33.84
4	2.49991	10.35	10.89	1.86	21.24	12.21	56.00	46.00	-34.76	-33.79
5	6.40209	10.50	13.81	0.81	24.31	11.31	60.00	50.00	-35.69	-38.69
6	16.39996	10.79	11.62	1.17	22.41	11.96	60.00	50.00	-37.59	-38.04

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)

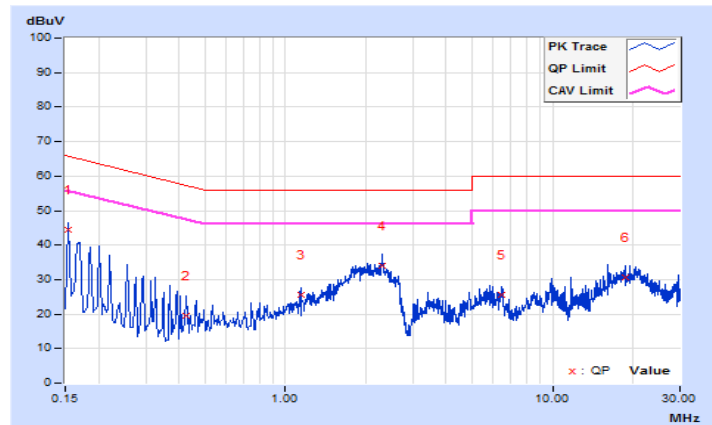


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/25
測試模式	Mode 6		

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	0.15391	10.07	34.33	8.73	44.40	18.80	65.79	55.79	-21.39	-36.99
2	0.42761	10.09	9.38	2.59	19.47	12.68	57.30	47.30	-37.83	-34.62
3	1.13923	10.14	15.54	2.45	25.68	12.59	56.00	46.00	-30.32	-33.41
4	2.29268	10.17	23.96	14.44	34.13	24.61	56.00	46.00	-21.87	-21.39
5	6.46074	10.26	15.26	5.35	25.52	15.61	60.00	50.00	-34.48	-34.39
6	18.65994	10.43	20.23	13.96	30.66	24.39	60.00	50.00	-29.34	-25.61

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)

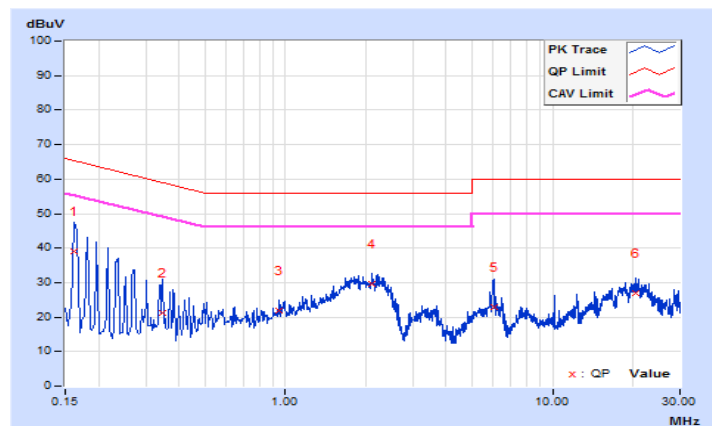


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	24°C, 65%RH
測試者	Tim Chen	測試日期	2021/2/25
測試模式	Mode 6		

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	0.16173	10.08	29.07	7.77	39.15	17.85	65.37	55.37	-26.22	-37.52
2	0.34550	10.09	11.21	1.16	21.30	11.25	59.07	49.07	-37.77	-37.82
3	0.94373	10.15	11.60	3.86	21.75	14.01	56.00	46.00	-34.25	-31.99
4	2.12064	10.18	19.48	12.52	29.66	22.70	56.00	46.00	-26.34	-23.30
5	6.02673	10.31	12.75	1.84	23.06	12.15	60.00	50.00	-36.94	-37.85
6	20.51328	10.64	16.42	10.56	27.06	21.20	60.00	50.00	-32.94	-28.80

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)



15.7 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。

16 6 dB 頻寬之要求

16.1 適用標準

請見本報告 3.1 節第(5)項的規定。

16.2 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。

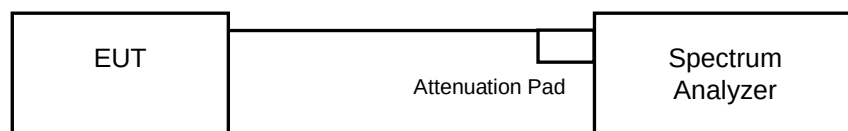
16.3 量測儀器

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.

16.4 測試配置

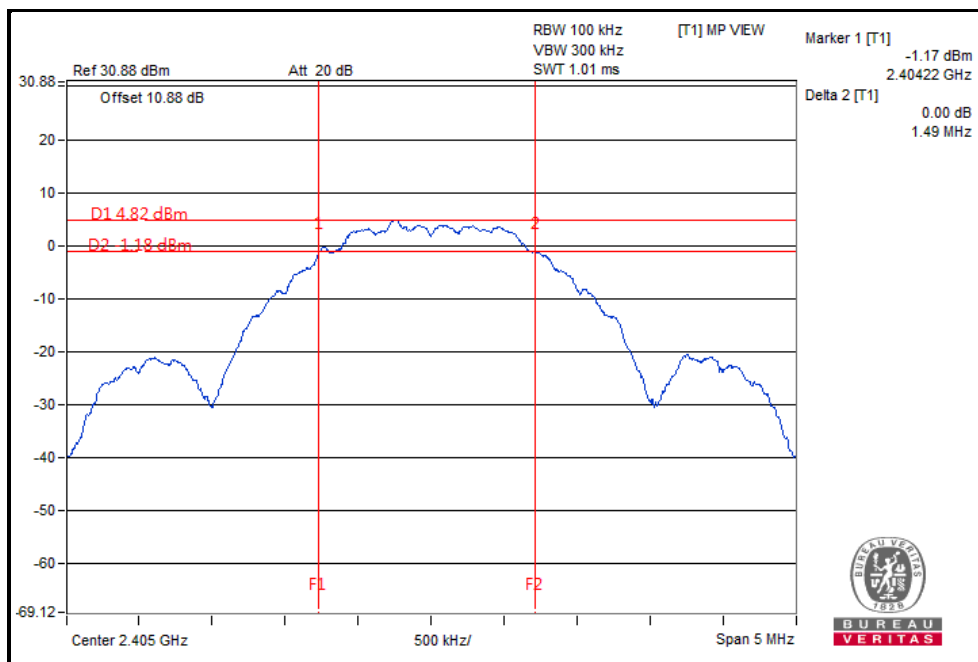


16.5 量測結果

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	黃文勝		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.49	0.5	Pass
17	2435	1.56	0.5	Pass
25	2475	1.57	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



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 峰值傳導輸出功率之量測

17.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

17.2 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。

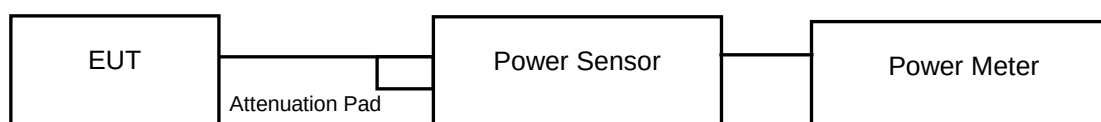
17.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Dec. 09, 2020	Dec. 08, 2021
Power Sensor Anritsu	MA2411B	1207325	Dec. 09, 2020	Dec. 08, 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 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.
- Test date: 2021/03/02

17.4 測試配置



17.5 量測結果

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	黃文勝		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
11	2405	6.776	8.31	30	Pass
17	2435	6.839	8.35	30	Pass
25	2475	6.792	8.32	30	Pass

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。

18 功率頻譜密度之量測

18.1 適用標準

請見本報告 3.1 節第(7)項的規定。

18.2 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 / per 3kHz。

18.3 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.

18.4 測試配置

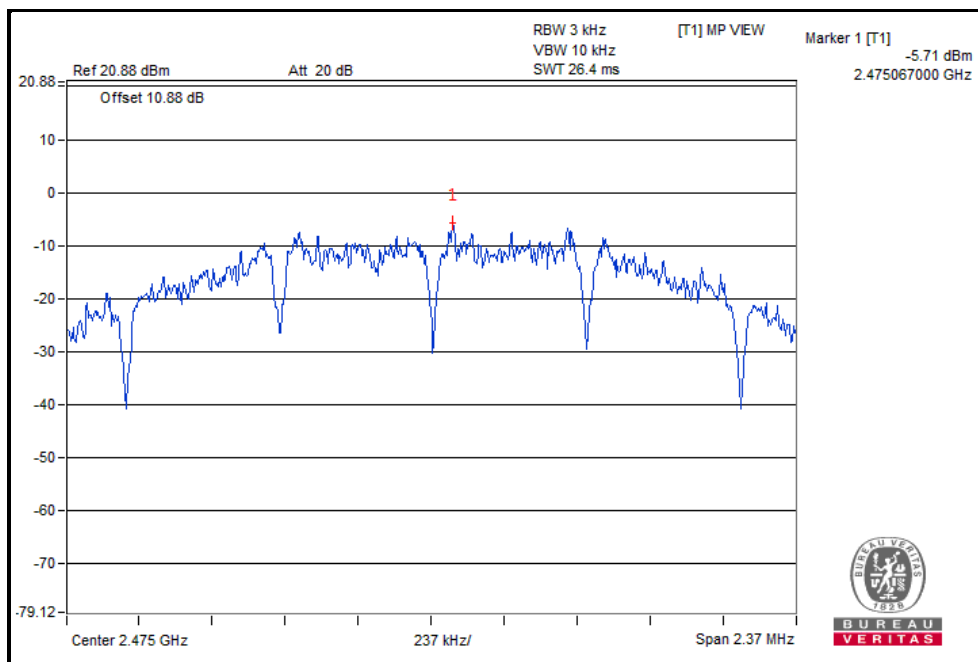


18.5 量測結果

操作模式	發射	測試日期	110 年 03 月 02 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	黃文勝		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
11	2405	-6.53	8	Pass
17	2435	-6.11	8	Pass
25	2475	-5.71	8	Pass

**此測試圖僅放測試結果最差的頻道。



18.6 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。

Thread 頻段測試紀錄結果

19 帶外發射之量測

19.1 適用標準

請見本報告 3.1 節第(2)項的規定。

19.2 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 = 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 (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

19.3 量測儀器

同 4.3 節

19.4 測試配置

同 4.4 節

19.5 場強度之計算

同 4.5 節

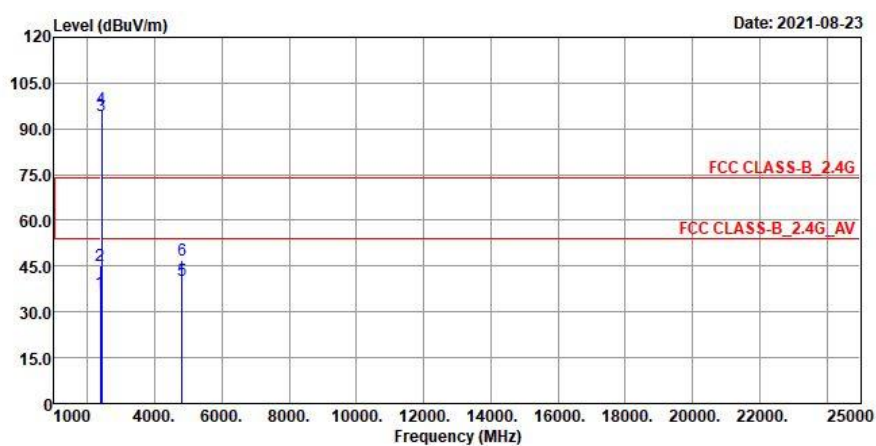
量測結果請見下頁。

19.6 量測結果

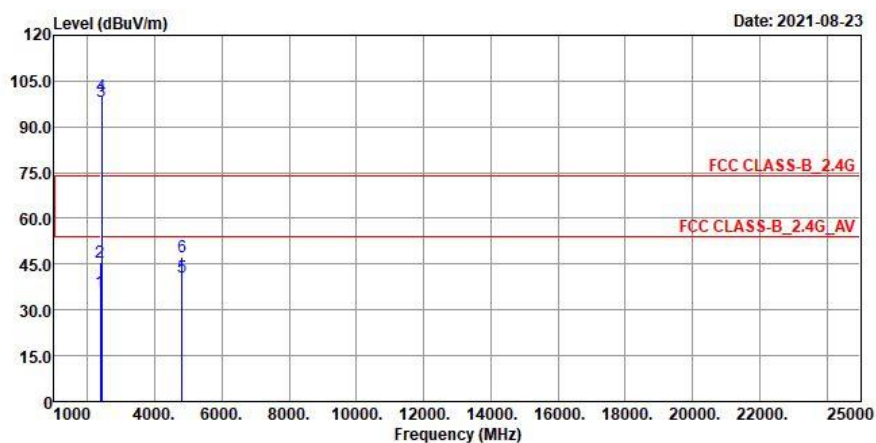
19.6.1 發射諧波

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	Cookie Ku

Horizontal



Vertical



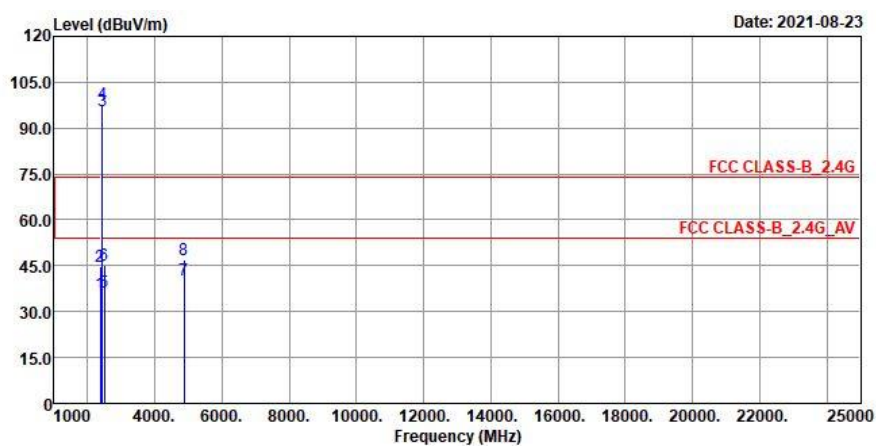
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2373	36.12	43.12	-7	54	-17.88	293	315	Average
2373	45.34	52.34	-7	74	-28.66	293	315	Peak
2405	94.24	101.29	-7.05	-----	-----	293	315	Average
2405	96.45	103.5	-7.05	-----	-----	293	315	Peak
4810	40.47	56.28	-15.81	54	-13.53	152	289	Average
4810	46.88	62.69	-15.81	74	-27.12	152	289	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
2373	35.8	42.8	-7	54	-18.2	285	311	Average
2373	45.48	52.48	-7	74	-28.52	285	311	Peak
2405	98.21	105.26	-7.05	-----	-----	285	311	Average
2405	100.22	107.27	-7.05	-----	-----	285	311	Peak
4810	40.69	56.5	-15.81	54	-13.31	179	83	Average
4810	47.35	63.16	-15.81	74	-26.65	179	83	Peak

Remarks:

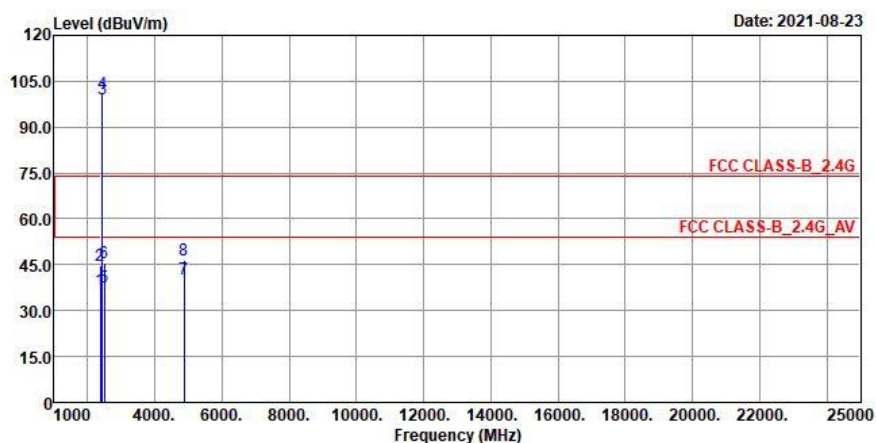
- Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
- 2405 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 17	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	Cookie Ku

Horizontal



Vertical



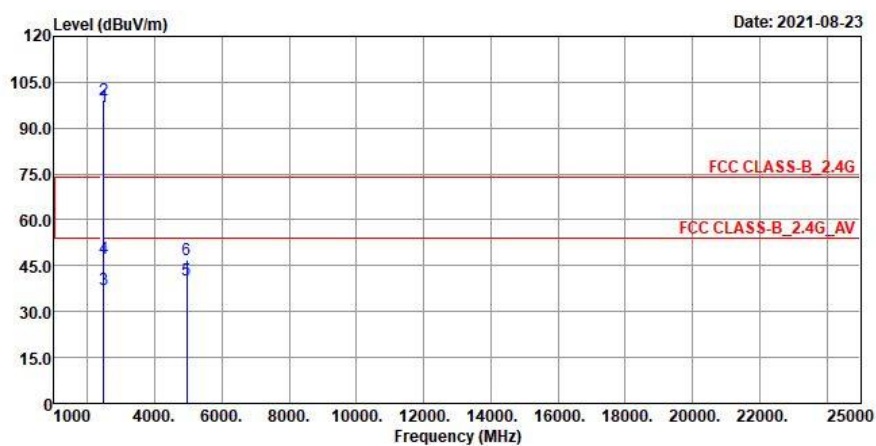
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2371	36.03	43.03	-7	54	-17.97	301	296	Average
2371	44.54	51.54	-7	74	-29.46	301	296	Peak
2435	95.7	102.69	-6.99	-----	-----	301	296	Average
2435	97.91	104.9	-6.99	-----	-----	301	296	Peak
2499	36.2	43	-6.8	54	-17.8	301	296	Average
2499	45.11	51.91	-6.8	74	-28.89	301	296	Peak
4870	40.11	56.05	-15.94	54	-13.89	239	117	Average
4870	46.9	62.84	-15.94	74	-27.1	239	117	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
2371	36.68	43.68	-7	54	-17.32	306	338	Average
2371	44.5	51.5	-7	74	-29.5	306	338	Peak
2435	98.99	105.98	-6.99	-----	-----	306	338	Average
2435	101.01	108	-6.99	-----	-----	306	338	Peak
2499	37.43	44.23	-6.8	54	-16.57	306	338	Average
2499	45.47	52.27	-6.8	74	-28.53	306	338	Peak
4870	40.1	56.04	-15.94	54	-13.9	162	87	Average
4870	46.63	62.57	-15.94	74	-27.37	162	87	Peak

Remarks:

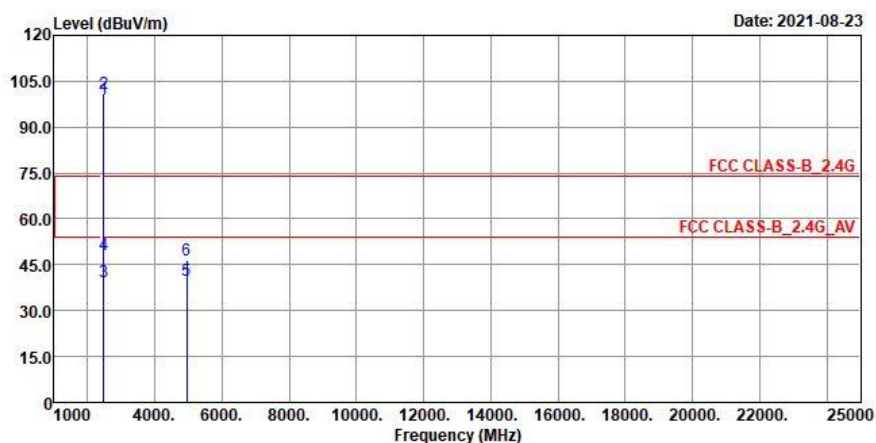
1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2435 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 25	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	Cookie Ku

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
2475	96.89	103.75	-6.86	-----	-----	312	284	Average
2475	99.15	106.01	-6.86	-----	-----	312	284	Peak
2483.5	37.37	44.23	-6.86	54	-16.63	312	284	Average
2483.5	47.56	54.42	-6.86	74	-26.44	312	284	Peak
4950	40.47	56.26	-15.79	54	-13.53	137	252	Average
4950	46.95	62.74	-15.79	74	-27.05	137	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
2475	99.16	106.02	-6.86	-----	-----	293	307	Average
2475	101.17	108.03	-6.86	-----	-----	293	307	Peak
2483.5	39.28	46.14	-6.86	54	-14.72	293	307	Average
2483.5	48.35	55.21	-6.86	74	-25.65	293	307	Peak
4950	39.95	55.74	-15.79	54	-14.05	145	283	Average
4950	46.58	62.37	-15.79	74	-27.42	145	283	Peak

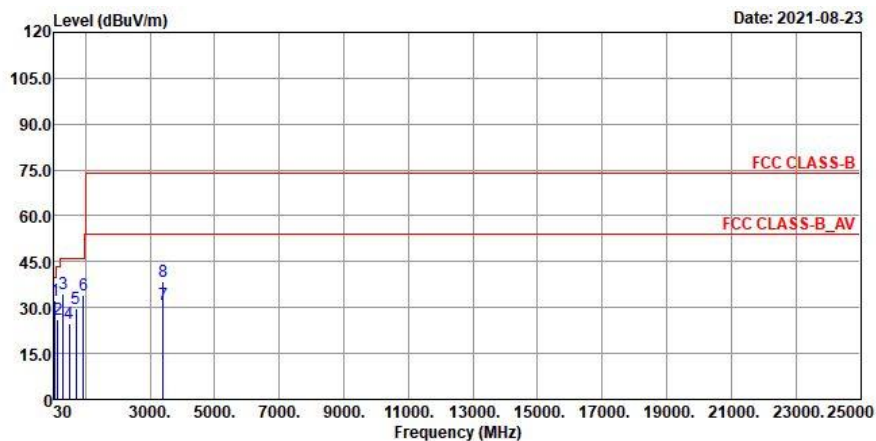
Remarks:

1. Emission Level = Read Level + Factor
Margin Value = Emission Level – Limit value
2. 2475 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

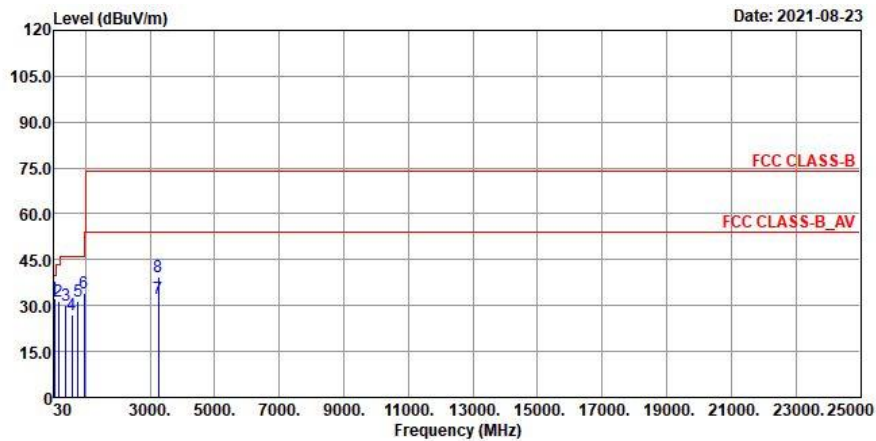
19.6.2 接收諧波

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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	Cookie Ku

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
62.98	32.45	45.87	-13.42	40	-7.55	153	296	QP
141.55	26.22	38.82	-12.6	43.5	-17.28	134	352	QP
305.48	34.65	45.87	-11.22	46	-11.35	239	187	QP
492.69	24.7	30.5	-5.8	46	-21.3	141	92	QP
703.18	29.87	31.03	-1.16	46	-16.13	137	248	QP
932.1	33.98	30.96	3.02	46	-12.02	208	35	QP
3397	31.17	51.57	-20.4	54	-22.83	146	258	Average
3397	38.34	58.74	-20.4	74	-35.66	146	258	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
46.49	32.36	44.87	-12.51	40	-7.64	148	276	QP
153.19	31.45	43.99	-12.54	43.5	-12.05	197	322	QP
382.11	30.25	39.19	-8.94	46	-15.75	187	63	QP
570.29	26.95	30.69	-3.74	46	-19.05	159	264	QP
764.29	31.61	31.33	0.28	46	-14.39	128	124	QP
950.53	34.19	30.9	3.29	46	-11.81	208	135	QP
3261	32.2	52.93	-20.73	54	-21.8	173	89	Average
3261	39.37	60.1	-20.73	74	-34.63	173	89	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.

19.6.3 其它不必要之訊號

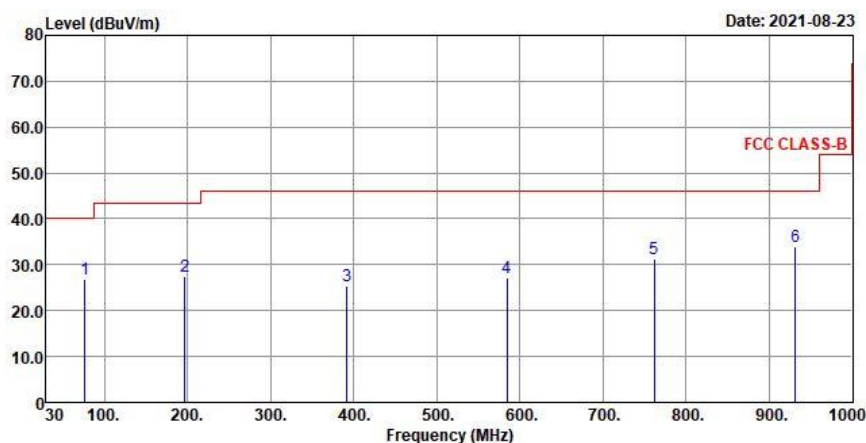
9 kHz ~ 30 MHz Data:

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

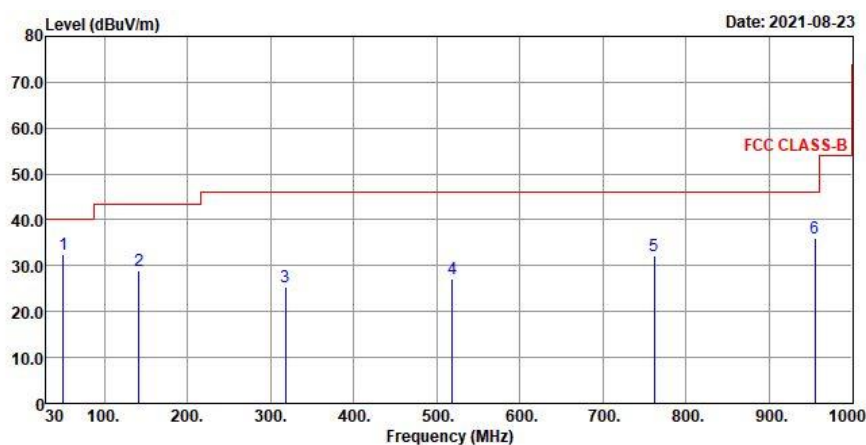
30 MHz ~ 1 GHz Data:

EUT Test Condition		Measurement Detail	
Channel	Channel 11	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	Cookie Ku

Horizontal



Vertical

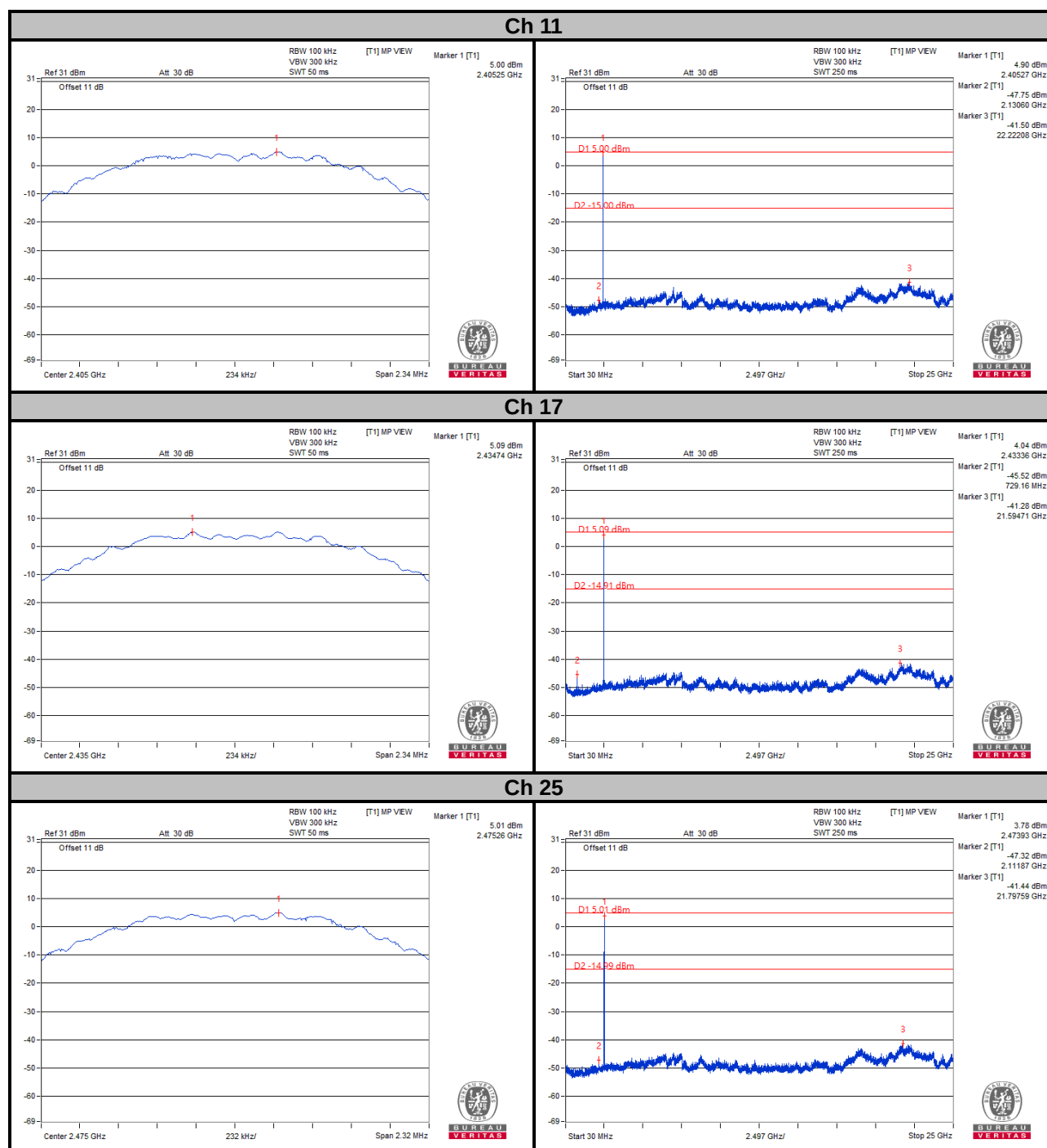


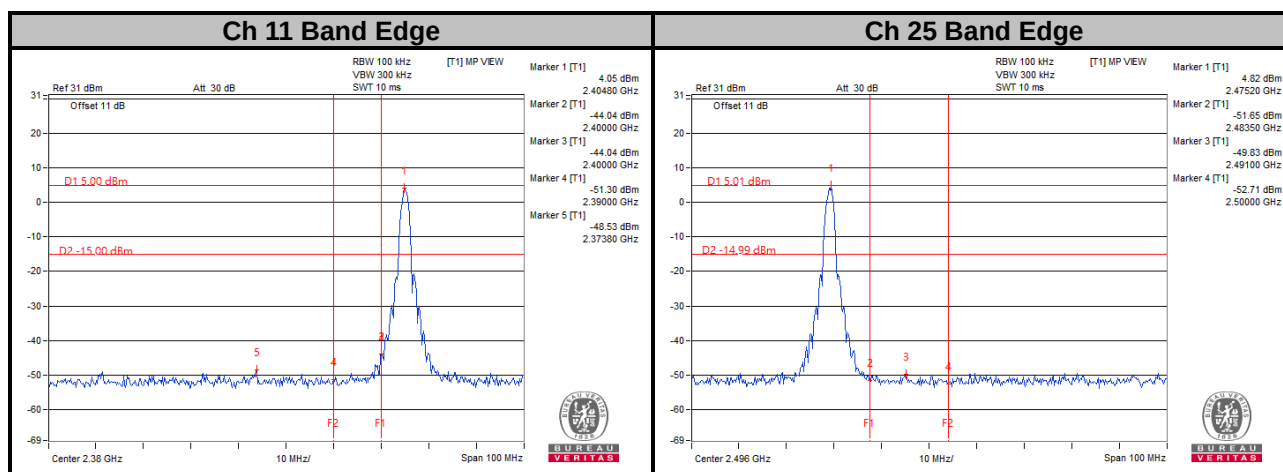
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
76.56	26.77	43.39	-16.62	40	-13.23	128	325	QP
196.84	27.4	43.3	-15.9	43.5	-16.1	241	156	QP
391.81	25.37	34.17	-8.8	46	-20.63	139	228	QP
584.84	27.03	30.3	-3.27	46	-18.97	107	125	QP
761.38	31.21	30.95	0.26	46	-14.79	167	301	QP
931.13	33.92	30.9	3.02	46	-12.08	142	183	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
50.37	32.41	44.97	-12.56	40	-7.59	256	81	QP
141.55	29.01	41.61	-12.6	43.5	-14.49	137	145	QP
318.09	25.42	36.19	-10.77	46	-20.58	194	236	QP
518.88	27.27	32.36	-5.09	46	-18.73	118	75	QP
761.38	32.14	31.88	0.26	46	-13.86	129	306	QP
955.38	35.98	32.64	3.34	46	-10.02	158	43	QP

Remarks:

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

19.7 帶外發射之量測 (傳導)





19.8 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。

20 電源線傳導干擾之量測

20.1 適用標準

請見本報告3.1節第(1)項的規定。

20.2 量測方法

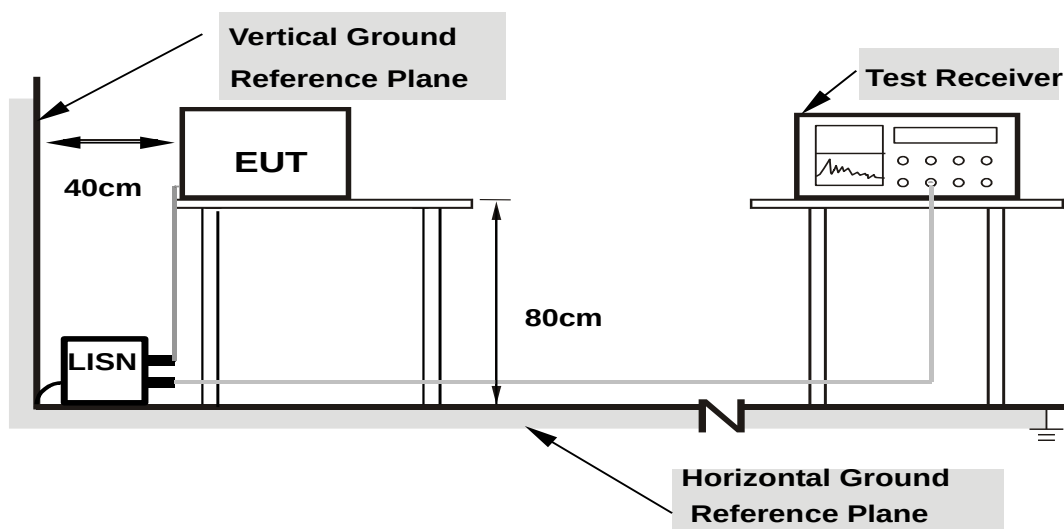
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

20.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Jan. 06, 2021	Jan. 05, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 18, 2021	Jan. 17, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 26, 2021	Apr. 25, 2022
Software ADT	BV ADT_Cond_ 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.
3. The VCCI Site Registration No. is C-2047.
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.
5. Test Date: 2021/08/24

20.4 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

20.5 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

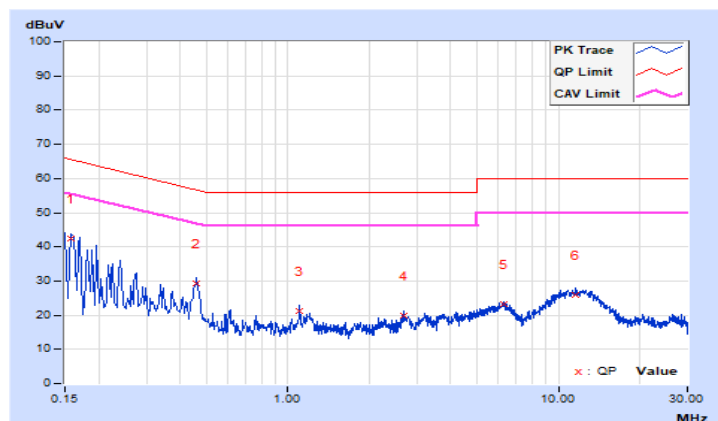
20.6 量測結果

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	23°C, 66%RH
測試者	Cookie Ku	測試日期	2021/8/24
測試模式	Mode 9		

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	0.15782	10.09	32.27	5.56	42.36	15.65	65.58	55.58	-23.22	-39.93
2	0.45889	10.19	19.19	4.49	29.38	14.68	56.71	46.71	-27.33	-32.03
3	1.10013	10.26	11.03	1.56	21.29	11.82	56.00	46.00	-34.71	-34.18
4	2.66804	10.32	9.56	1.67	19.88	11.99	56.00	46.00	-36.12	-34.01
5	6.31607	10.42	12.65	1.88	23.07	12.30	60.00	50.00	-36.93	-37.70
6	11.63367	10.51	15.58	1.85	26.09	12.36	60.00	50.00	-33.91	-37.64

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)

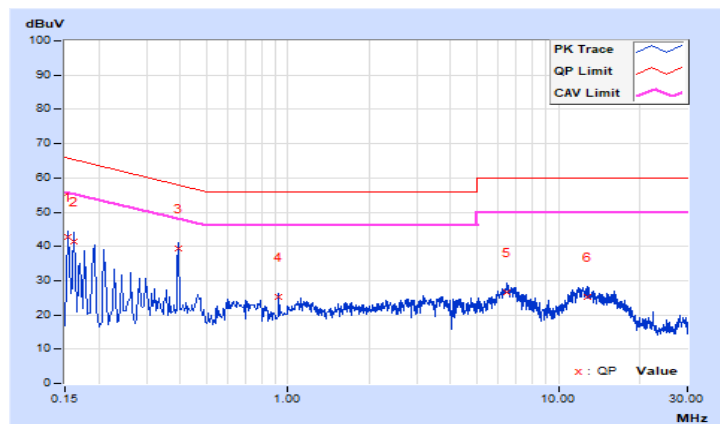


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	23°C, 66%RH
測試者	Cookie Ku	測試日期	2021/8/24
測試模式	Mode 9		

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	0.15391	10.10	32.54	7.29	42.64	17.39	65.79	55.79	-23.15	-38.40
2	0.16173	10.10	31.30	5.53	41.40	15.63	65.37	55.37	-23.97	-39.74
3	0.39242	10.20	29.29	4.11	39.49	14.31	58.01	48.01	-18.52	-33.70
4	0.92809	10.27	14.83	1.04	25.10	11.31	56.00	46.00	-30.90	-34.69
5	6.48420	10.50	16.14	1.82	26.64	12.32	60.00	50.00	-33.36	-37.68
6	12.83795	10.68	14.72	1.40	25.40	12.08	60.00	50.00	-34.60	-37.92

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)

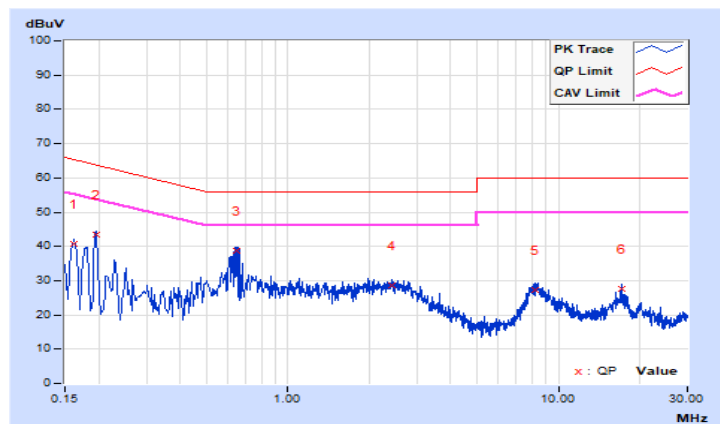


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	23°C, 66%RH
測試者	Cookie Ku	測試日期	2021/8/24
測試模式	Mode 10		

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	0.16173	10.07	30.54	15.62	40.61	25.69	65.37	55.37	-24.76	-29.68
2	0.19510	10.08	33.30	10.03	43.38	20.11	63.82	53.82	-20.44	-33.71
3	0.64266	10.11	28.58	15.54	38.69	25.65	56.00	46.00	-17.31	-20.35
4	2.41389	10.17	18.46	10.30	28.63	20.47	56.00	46.00	-27.37	-25.53
5	8.20851	10.29	16.90	7.70	27.19	17.99	60.00	50.00	-32.81	-32.01
6	17.06075	10.41	17.17	4.79	27.58	15.20	60.00	50.00	-32.42	-34.80

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)

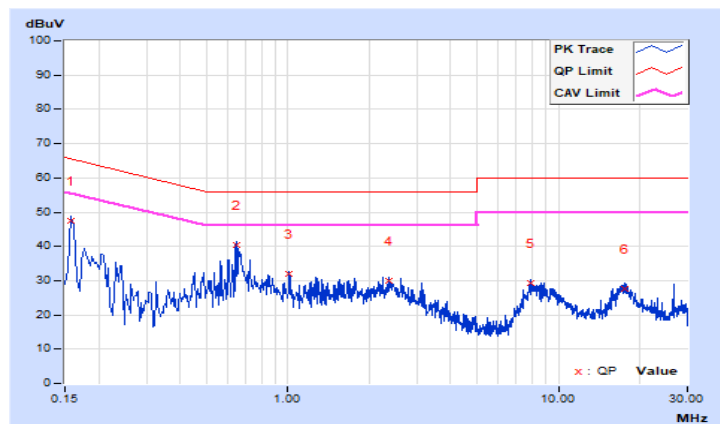


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	23°C, 66%RH
測試者	Cookie Ku	測試日期	2021/8/24
測試模式	Mode 10		

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	0.15782	10.08	37.55	19.95	47.63	30.03	65.58	55.58	-17.95	-25.55
2	0.64266	10.12	30.27	14.59	40.39	24.71	56.00	46.00	-15.61	-21.29
3	1.01020	10.15	21.75	5.87	31.90	16.02	56.00	46.00	-24.10	-29.98
4	2.37479	10.19	19.67	8.38	29.86	18.57	56.00	46.00	-26.14	-27.43
5	7.86052	10.36	18.78	8.07	29.14	18.43	60.00	50.00	-30.86	-31.57
6	17.53386	10.59	17.14	7.37	27.73	17.96	60.00	50.00	-32.27	-32.04

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)



20.7 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。

21 6 dB 頻寬之要求

21.1 適用標準

請見本報告 3.1 節第(5)項的規定。

21.2 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。

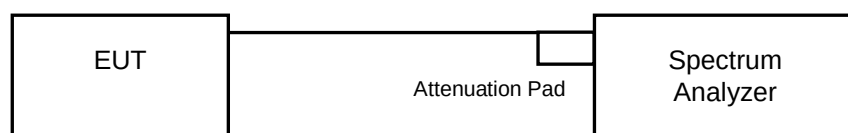
21.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022

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.
- Test date: 2021/08/25

21.4 測試配置

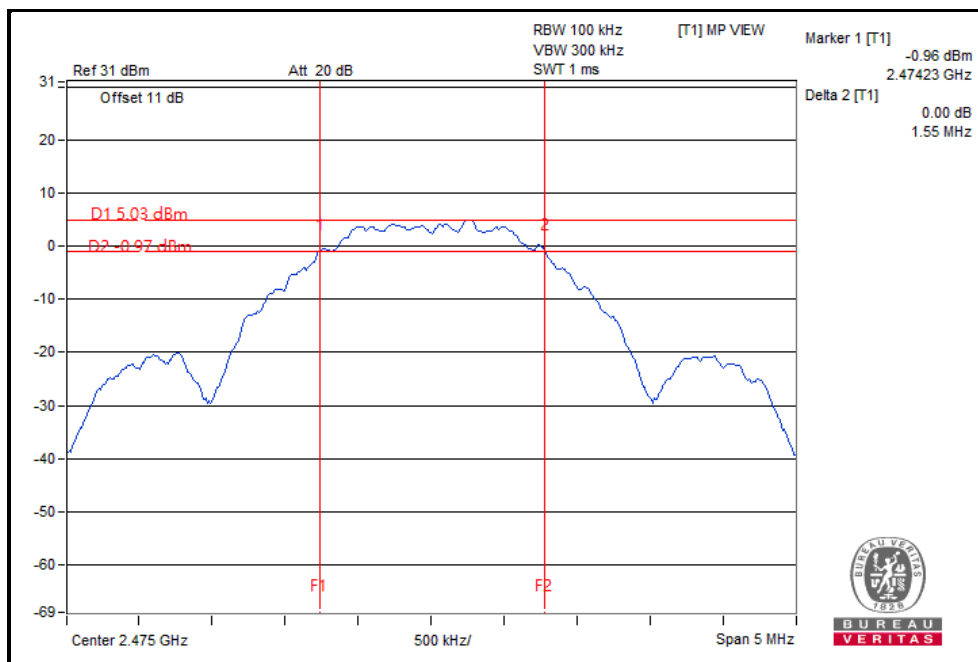


21.5 量測結果

操作模式	發射	測試日期	110 年 08 月 25 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	吳佳衡		

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
11	2405	1.56	0.5	Pass
17	2435	1.56	0.5	Pass
25	2475	1.55	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



21.6 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。

22 峰值傳導輸出功率之量測

22.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

22.2 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。

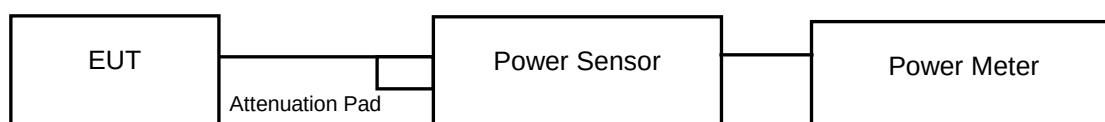
22.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Dec. 09, 2020	Dec. 08, 2021
Power Sensor Anritsu	MA2411B	1207325	Dec. 09, 2020	Dec. 08, 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 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.
- Test date: 2021/08/25

22.4 測試配置



22.5 量測結果

操作模式	發射	測試日期	110 年 08 月 25 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	吳佳衡		

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
11	2405	6.776	8.31	30	Pass
17	2435	6.839	8.35	30	Pass
25	2475	6.792	8.32	30	Pass

22.6 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。

23 功率頻譜密度之量測

23.1 適用標準

請見本報告 3.1 節第(7)項的規定。

23.2 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 / per 3kHz。

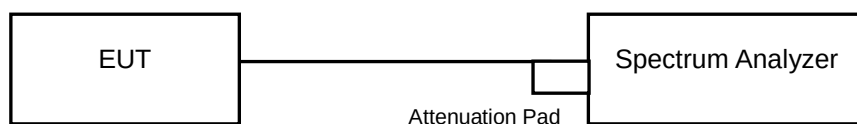
23.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022

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.
- Test date: 2021/08/25

23.4 測試配置

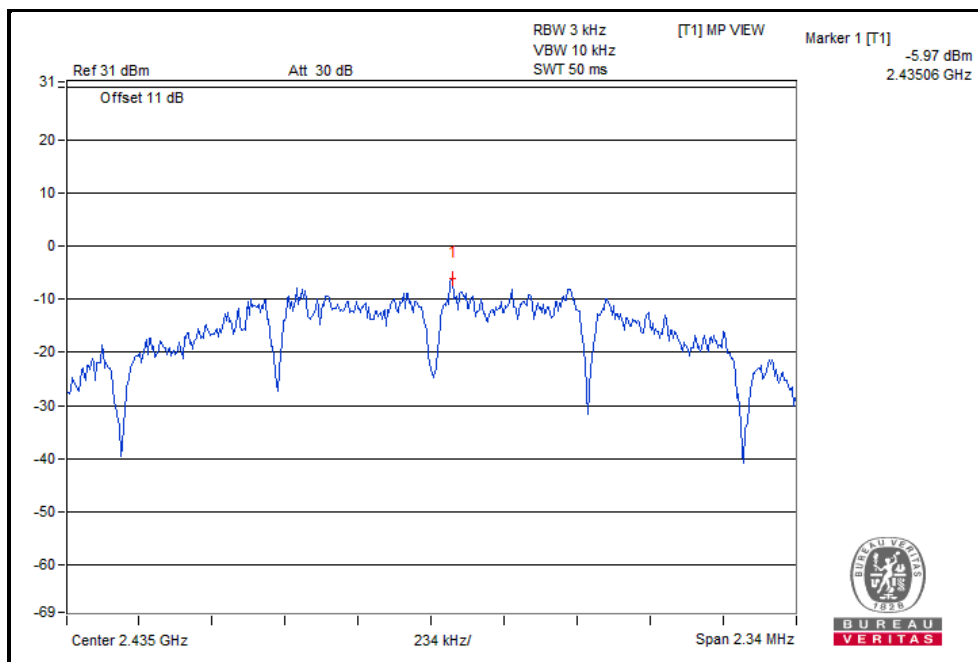


23.5 量測結果

操作模式	發射	測試日期	110 年 08 月 25 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	吳佳衡		

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
11	2405	-6.07	8	Pass
17	2435	-5.97	8	Pass
25	2475	-6.98	8	Pass

**此測試圖僅放測試結果最差的頻道。



23.6 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

24 不必要之發射量測

24.1 適用標準

請見本報告 3.1 節第(13)項規定。

24.2 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。

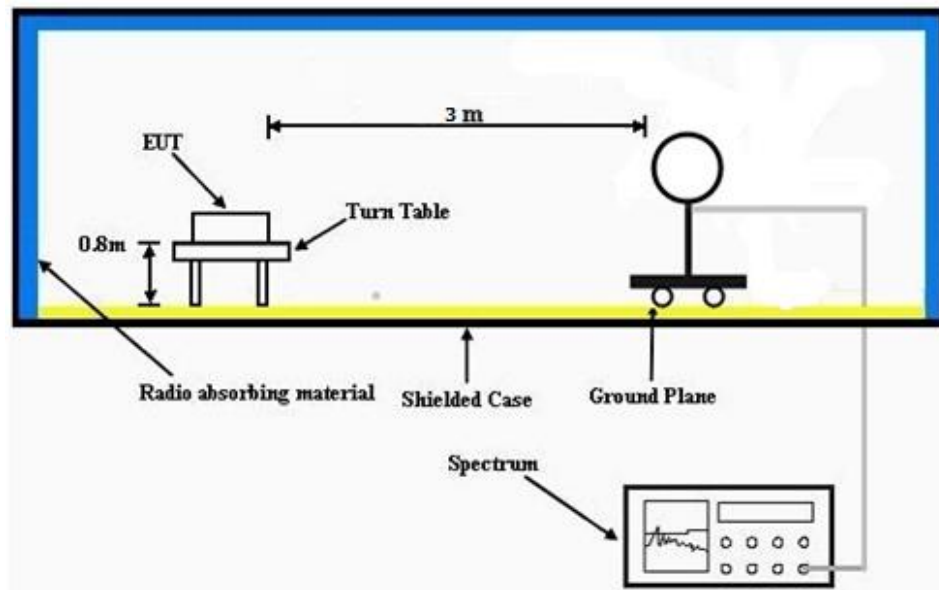
30 MHz ~ 1 GHz 量測：

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。

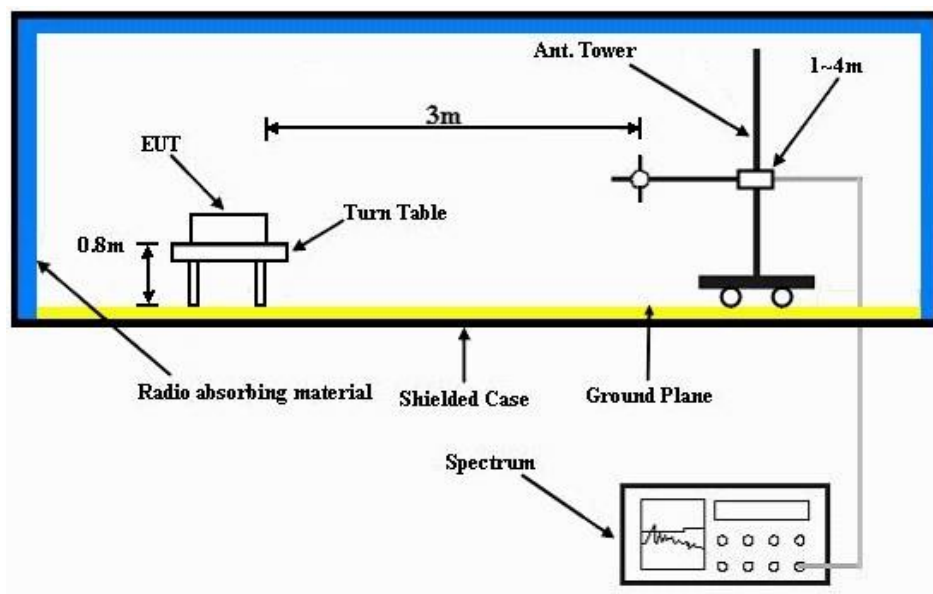
24.3 量測儀器

同 4.3 節

24.4 測試配置



9 kHz ~ 30 MHz



30 MHz ~ 1 GHz

24.5 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)

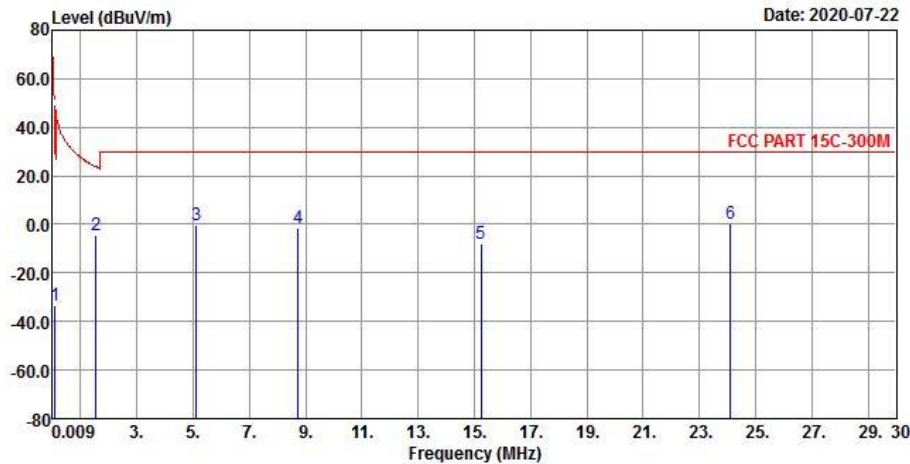
餘裕度 Margin(dB) = 結果值 Emission level (dBuV/m) - 限制值 Limit value (dBuV/m)

量測結果請見下頁。

24.6 量測結果

<Below 30 MHz>

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	Cyril Chen		

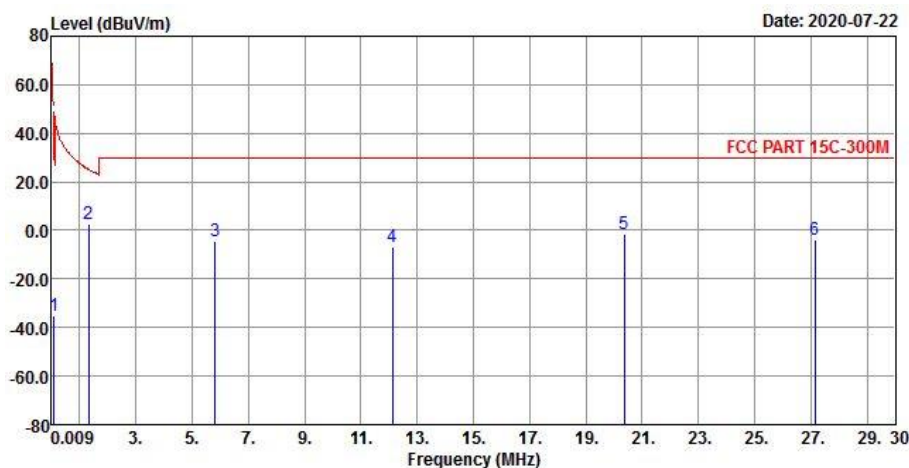


Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.10361	-33.14	27.55	-60.69	27.29	-60.43	100	154	QP
1.553	-4.47	15.93	-20.4	23.77	-28.24	100	197	QP
5.105	-0.11	19.75	-19.86	29.54	-29.65	100	146	QP
8.747	-1.52	17.5	-19.02	29.54	-31.06	100	234	QP
15.254	-8.02	10.54	-18.56	29.54	-37.56	100	187	QP
24.12	0.35	18.66	-18.31	29.54	-29.19	100	213	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
- For 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$
- Parallel: loop antenna 面向 EUT
Perpendicular: loop antenna與EUT垂直
Ground-parallel: loop antenna與地面平行

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	Cyril Chen		

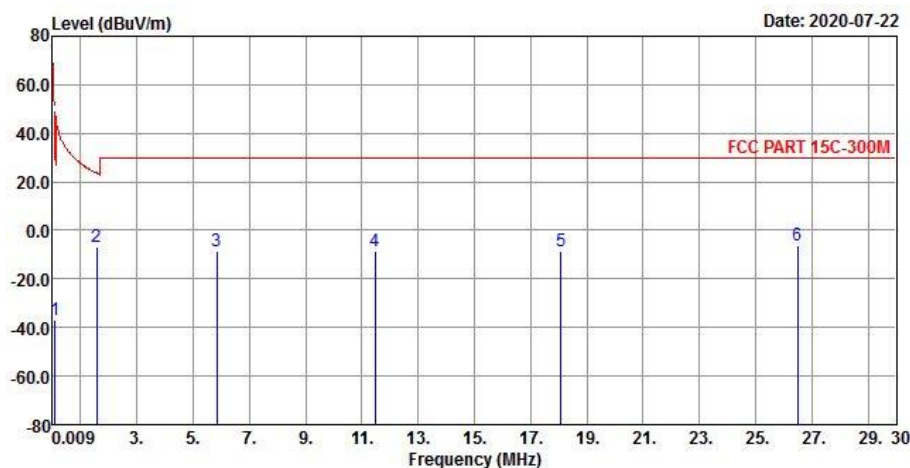


Antenna Polarity & Test Distance: Loop Antenna Perpendicular at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
0.10432	-35	25.68	-60.68	27.23	-62.23	100	185	QP
1.314	2.77	23.09	-20.32	25.22	-22.45	100	150	QP
5.822	-4.65	15.01	-19.66	29.54	-34.19	100	101	QP
12.12	-6.66	12.03	-18.69	29.54	-36.2	100	98	QP
20.358	-1.63	16.76	-18.39	29.54	-31.17	100	185	QP
27.164	-4.06	14.19	-18.25	29.54	-33.6	100	248	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
- For 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$
- Parallel: loop antenna 面向 EUT
Perpendicular: loop antenna與EUT垂直
Ground-parallel: loop antenna與地面平行

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	Cyril Chen		



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
0.09543	-37.06	23.57	-60.63	28	-65.06	100	164	QP
1.583	-6.57	13.84	-20.41	23.61	-30.18	100	198	QP
5.851	-8.45	11.21	-19.66	29.54	-37.99	100	210	QP
11.463	-8.75	9.97	-18.72	29.54	-38.29	100	87	QP
18.09	-8.67	9.79	-18.46	29.54	-38.21	100	284	QP
26.508	-6.28	11.98	-18.26	29.54	-35.82	100	199	QP

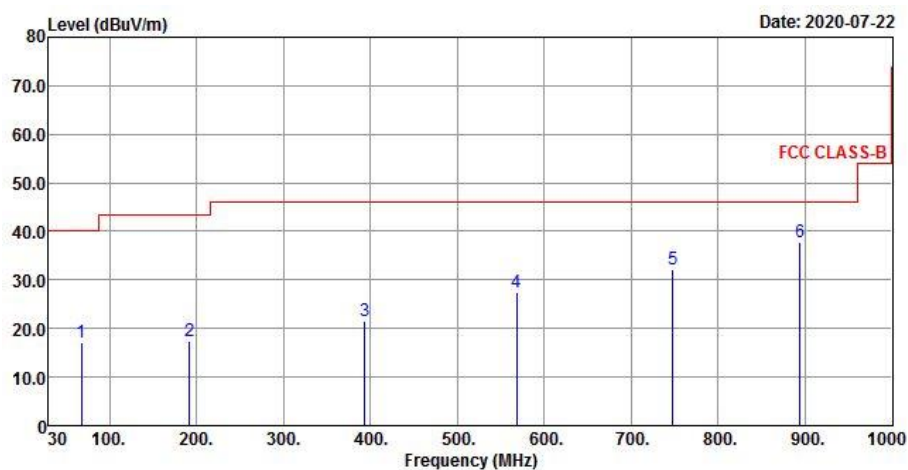
Note:

- 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
- For 0.009 ~ 0.49MHz, the measured field strength was extrapolated to distance 300 meters Distance factor@3m = $40 \cdot \log(3/300) = -80\text{dB}$
For 0.49 ~ 30MHz, the measured field strength was extrapolated to distance 30 meters Distance factor@3m = $40 \cdot \log(3/30) = -40\text{dB}$
- Parallel: loop antenna 面向 EUT
Perpendicular: loop antenna與EUT垂直
Ground-parallel: loop antenna與地面平行

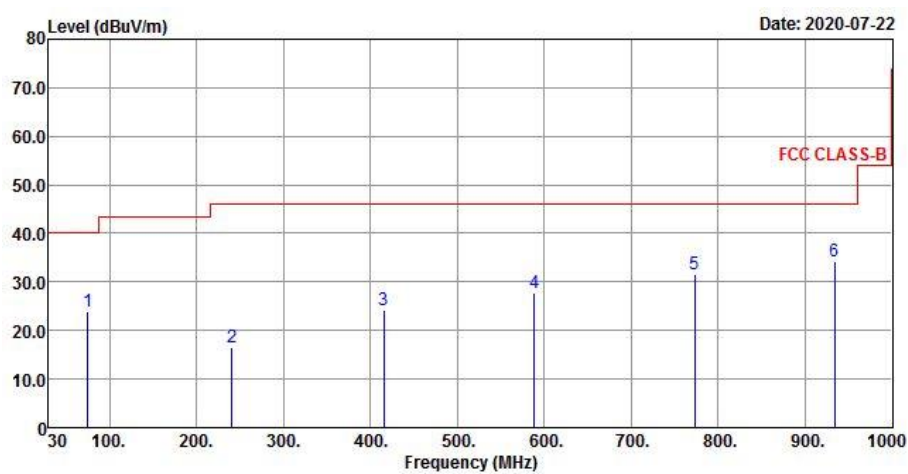
<Above 30 MHz>

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	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
67.83	17.23	30.8	-13.57	40	-22.77	200	163	QP
191.99	17.32	32.04	-14.72	43.5	-26.18	200	185	QP
393.75	21.65	30.15	-8.5	46	-24.35	200	148	QP
568	27.49	31.32	-3.83	46	-18.51	200	97	QP
747.8	32.06	31.1	0.96	46	-13.94	200	158	QP
894.27	37.77	34.89	2.88	46	-8.23	200	324	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
74.62	24	39.03	-15.03	40	-16	100	175	QP
240.49	16.67	30.01	-13.34	46	-29.33	100	108	QP
415.09	24.14	31.97	-7.83	46	-21.86	100	237	QP
588.72	27.77	30.85	-3.08	46	-18.23	100	169	QP
773.02	31.48	30.13	1.35	46	-14.52	100	184	QP
934.04	34.26	30.83	3.43	46	-11.74	100	248	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.

24.7 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。

25 電源線傳導干擾之量測

25.1 適用標準

請見本報告3.1節第(11)項的規定。

25.2 量測方法

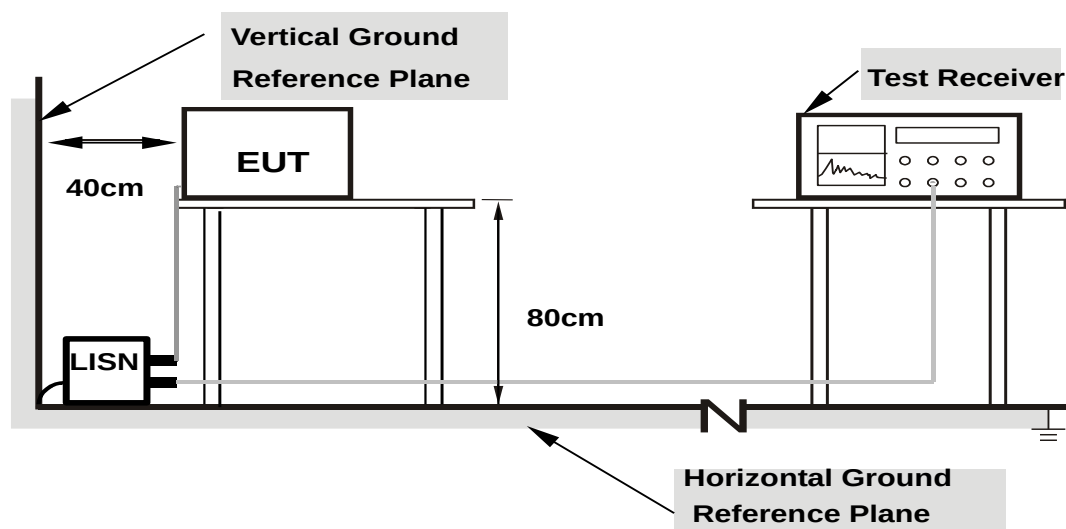
將待測物置於0.8米高的非金屬桌面，使其操作在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由0.15MHz至30MHz之間之電源線傳導放射強度。

25.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
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/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 20, 2020	Jan. 19, 2021
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Cond_ 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.
3. The VCCI Site Registration No. is C-2047.
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.
5. Test Date: 2020/7/21

25.4 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

25.5 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

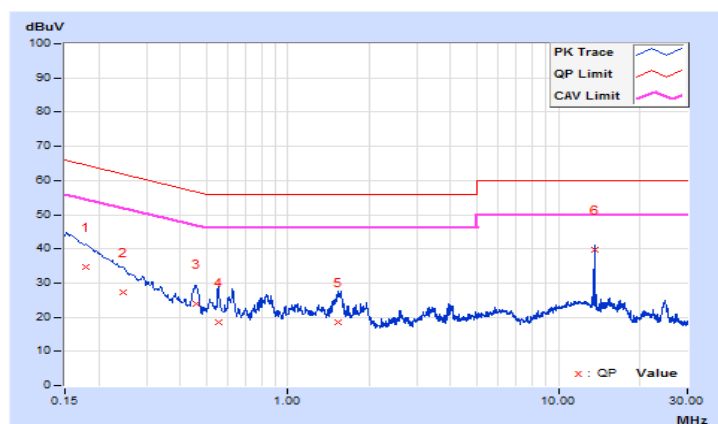
25.6 量測結果

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	Jisyoung Wang	測試日期	2020/7/21
測試模式	Mode 7		

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	0.17838	10.16	24.40	20.66	34.56	30.82	64.56	54.56	-30.00	-23.74
2	0.24675	10.18	17.26	13.62	27.44	23.80	61.87	51.87	-34.43	-28.07
3	0.45600	10.21	13.57	8.35	23.78	18.56	56.77	46.77	-32.99	-28.21
4	0.55275	10.22	8.39	7.09	18.61	17.31	56.00	46.00	-37.39	-28.69
5	1.54050	10.28	8.29	7.04	18.57	17.32	56.00	46.00	-37.43	-28.68
6	13.56000	10.51	29.30	25.20	39.81	35.71	60.00	50.00	-20.19	-14.29

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)

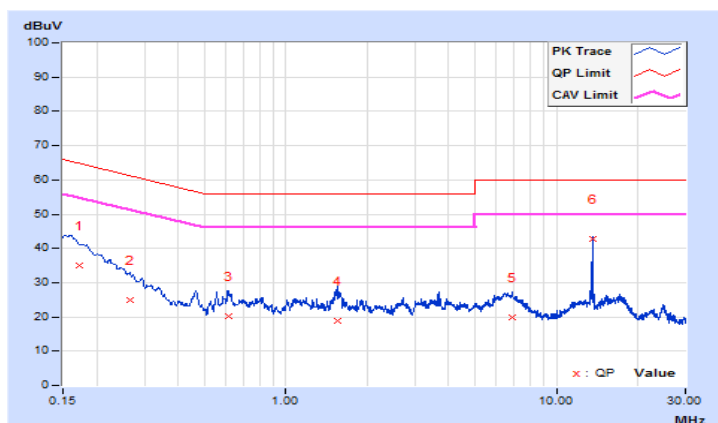


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 7		

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	0.17328	10.12	25.04	20.56	35.16	30.68	64.80	54.80	-29.64	-24.12
2	0.26475	10.15	14.91	13.99	25.06	24.14	61.28	51.28	-36.22	-27.14
3	0.61125	10.20	10.09	8.89	20.29	19.09	56.00	46.00	-35.71	-26.91
4	1.55625	10.26	8.70	7.87	18.96	18.13	56.00	46.00	-37.04	-27.87
5	6.88875	10.48	9.51	8.96	19.99	19.44	60.00	50.00	-40.01	-30.56
6	13.56000	10.64	32.19	28.93	42.83	39.57	60.00	50.00	-17.17	-10.43

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)

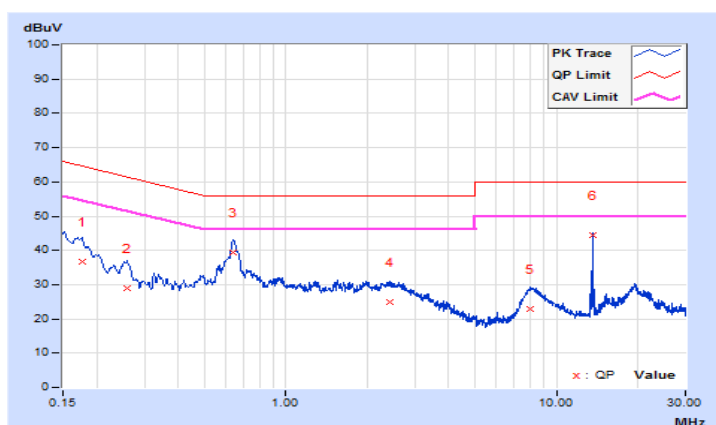


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 8		

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	0.17651	10.16	26.48	20.45	36.64	30.61	64.65	54.65	-28.01	-24.04
2	0.25800	10.18	18.84	15.76	29.02	25.94	61.50	51.50	-32.48	-25.56
3	0.63600	10.22	29.01	21.72	39.23	31.94	56.00	46.00	-16.77	-14.06
4	2.41350	10.32	14.71	8.99	25.03	19.31	56.00	46.00	-30.97	-26.69
5	8.02950	10.45	12.61	6.85	23.06	17.30	60.00	50.00	-36.94	-32.70
6	13.56000	10.51	33.93	30.96	44.44	41.47	60.00	50.00	-15.56	-8.53

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)

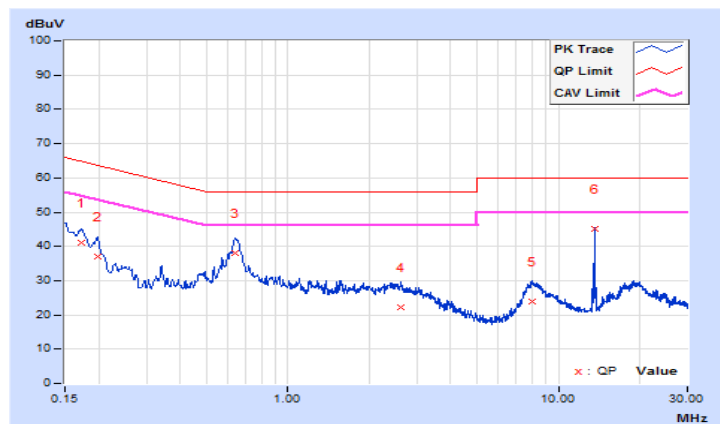


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Jisyong Wang	測試日期	2020/7/21
測試模式	Mode 8		

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	0.17237	10.12	31.06	26.47	41.18	36.59	64.85	54.85	-23.67	-18.26
2	0.19721	10.13	26.98	20.23	37.11	30.36	63.73	53.73	-26.62	-23.37
3	0.64025	10.20	27.89	20.64	38.09	30.84	56.00	46.00	-17.91	-15.16
4	2.62950	10.31	11.99	6.47	22.30	16.78	56.00	46.00	-33.70	-29.22
5	7.99350	10.51	13.23	7.68	23.74	18.19	60.00	50.00	-36.26	-31.81
6	13.56000	10.64	34.39	30.42	45.03	41.06	60.00	50.00	-14.97	-8.94

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)



26 天線之要求

26.1 適用標準

請見本報告 3.1 節第(15)項的規定。

26.2 天線規格

此待測物 Bluetooth LE / ANT+ / Zigbee / Thread 介面使用 PCB 天線，NFC 介面使用 Loop 天線，無使用天線接頭。

26.3 結果判定

符合低功率射頻器材技術規範之要求。

27 待測物照片

請參照 BV CPS 報告編號：BFRX-WTW-P21040774

28 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

您也可以在我們的網站內找到各實驗室的地圖。

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