

低功率射頻電機測試報告

報告編號:

RT190408C22

申請者

鴻海精密工業股份有限公司

產品名稱

AIoT Module Z01-01 (WLAN)

型號

FPWB-A008BBKZ

系列型號

N/A

製造廠商

鴻海精密工業股份有限公司

商標或廠牌

SHARP

該產品樣品試驗

國家通訊傳播委員會低功率射頻電機技術規範

依據之試驗標準

107 年 1 月修訂

試驗結果

合格

香港商立德國際商品試驗有限公司桃園分公司 林口實驗室

日期 108 年 04 月 26 日

報告簽署人簽章:



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報告發行紀錄

Issue No.	Description	Date Issued
RT190408C22	Original release	108 年 04 月 26 日

證 明 書

發行日期：108 年 04 月 26 日

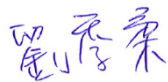
產 品 名 稱：AIoT Module Z01-01 (WLAN)
商 標：SHARP
型 號：FPWB-A008BBKZ
申 請 者：鴻海精密工業股份有限公司
量 測 規 範：低功率射頻電機技術規範 LP0002
ANSI C63.10-2013

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：FPWB-A008BBKZ)為 RT170508C11 之系列報告，其差異為移除 Codec 和更新型號，故僅帶外發射和電源線傳導干擾重新測試，其他測試項目沿用原報告。原案收件日期 106 年 05 月 08 日，於 106 年 05 月 15 日、108 年 04 月 16 日和 108 年 04 月 25 日，已在本公司的標準測試場地完成量測。報告中所描述之測試結果和待測設備的架構組合，均根據樣品實際的量測情況作詳實的記錄。

立德桃園分公司依“低功率射頻電機技術規範”、“低功率電波輻射性電機管理辦法”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：

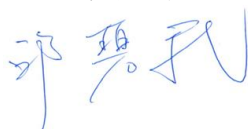


劉季柔 / 專員

， 日 期：

108 年 04 月 26 日

審 核 者：



邱碧民 / 專案工程師

， 日 期：

108 年 04 月 26 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 低功率射頻電機量測記錄表

申請廠商：鴻海精密工業股份有限公司

製造廠商：鴻海精密工業股份有限公司

申請廠商地址：23679 新北市土城區民生街 4-1 號

產品名稱：AloT Module Z01-01 (WLAN)

廠牌：SHARP

型號：FPWB-A008BBKZ

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：低功率射頻電機技術規範 LP0002

ANSI C63.10-2013

KDB 558074

WLAN 2.4 GHz 頻段概要

項次	量測項目	規 範	量測結果判定
1	帶外發射	低功率射頻電機技術規範 3.10.1.5 節	合格
2	電源線傳導干擾	低功率射頻電機技術規範 2.3 節	合格
3	6 dB 頻寬	低功率射頻電機技術規範 3.10.1.6 節	合格
4	峰值傳導輸出功率	低功率射頻電機技術規範 3.10.1.2 節	合格
5	功率頻譜密度	低功率射頻電機技術規範 3.10.1.6 節	合格

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

項次	量測項目	規 範	量測結果判定
1	電波暴露量	低功率射頻電機技術規範第 5.20.2 節	合格

備註：量測結果之判定不考慮量測不確定度的貢獻。

2 一般敘述

2.1 待測設備

產品名稱：	AloT Module Z01-01 (WLAN)	
型號：	FPWB-A008BBKZ	
額定電源：	5 Vdc (Power Supply)	
調變方式：	Wireless LAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
傳輸速率：	Wireless LAN	802.11b: 11.0/ 5.5/ 2.0/ 1.0 Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 72.2 Mbps
載波頻率：	Wireless LAN	2.4 GHz: 2412 ~ 2462 MHz
頻道數：	Wireless LAN	2.4 GHz: 802.11b, 802.11g, 802.11n (HT20): 11
發射功率：	Wireless LAN	802.11b: 20.65 dBm 802.11g: 24.49 dBm 802.11n (HT20): 24.88 dBm
天線種類：	見註 2	
電源線類別：	N/A	
信號線類別：	N/A	
配件：	N/A	

註：

1. 此待測物之技術的種類為1Tx / 1Rx之組合。

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

2. 此待測設備搭配測試的天線，其資料如下：

	頻帶 (MHz)	天線型式	天線型號	商標	接頭型式	增益 (dBi)
WLAN	2412 ~ 2462	PCB	N/A	N/A	N/A	2

3. 此待測設備搭配使用之配件請參閱產品照編號: 190408C22

4. 此報告中，場強輻射量測經過評估後以下列測試模式進行最終量測。

量測項目	發射	接收
2412 ~ 2462 MHz		
1 GHz 以上量測	802.11b: Ch 1, 6, 11 802.11g: Ch 1, 6, 11 802.11n (HT20): Ch 1, 6, 11	802.11g: Ch 11
其它不必要之訊號	802.11g: Ch 11	802.11g: Ch 11

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

6. 此報告中，測試模式評估如下

(1) 電源線傳導干擾量測以其模式進行最終測試。

(2) 場強輻射量測以其模式評估完整測試。

模式	測試狀態
1	WLAN 2.4G + DC Power supply

7. 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，其中以側放擺放有最大干擾值，故以此擺放方式進行最終量測，並將測試結果紀錄。

8. Duty cycle of test signal.

2.4 GHz 頻段

802.11b: Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11g: Duty cycle = $2.064/2.210 = 0.934$, Duty factor = $10 * \log(1/0.934) = 0.30$

802.11n (HT20): Duty cycle = $1.929/2.053 = 0.940$, Duty factor = $10 * \log(1/0.940) = 0.27$



此裝置各頻道的中心頻率如下：

2.4 GHz 頻段：

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

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

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。

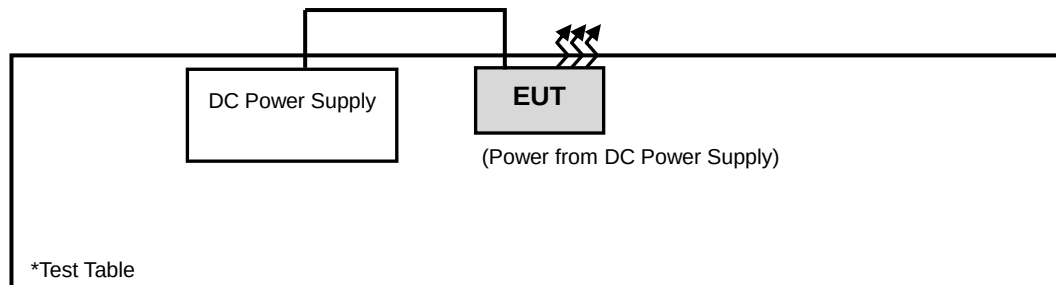
No.	Product	Brand	Model No.	Serial No.	FCC ID
1	DC Power Supply	Topward	33010D	807748	N/A

No.	Signal Cable Description Of The Above Support Units
1	N/A

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

2.3 測試架構圖



3 適用規範

3.1 規範要求

►WLAN 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電機技術規範之 2.3 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

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.5 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 3.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 dB。

在 1 GHz 以下不必要之發射，應符合 2.8 之規定。此外，落於 2.7 禁用頻段之輻射發射，應符合 2.8 之規定。

頻率(兆赫)	電場強度(微伏/公尺)	測距(公尺)
0.009 - 0.490 (含)	2,400/頻率(千赫)	300
0.490 (不含) - 1.705 (含)	24,000/頻率(千赫)	30
1.705 (不含) - 30 (不含)	30	30
30 (含) - 88 (含)	100	3
88 (不含)- 216 (含)	150	3
216 (不含)- 960 (含)	200	3
960 (不含)以上	500	3

(3) 天線之規定

天線規格不受第 2.2 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電機技術規範 3.10.1.3 節及 4.7.3 節之規定如下：

(1) 操作於 2.400~2.4835 GHz 頻段：

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

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

(a) 非同時發射多向波束者，所有載波或頻道傳輸至所有天線陣列或陣列群之總和傳導輸出功率應符合 3.10.1.2 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

(1) 操作於 2.400~2.4835 GHz 頻段：

對使用數位調變技術(digital modulation techniques)系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之規定，6 dB 頻寬至少應有 500 kHz。

(2) 操作於 5.725~5.850 GHz 頻段：

依據國家通訊傳播委員會低功率射頻電機技術規範 4.7.5 節之規定，其 6 dB 頻寬至少應有 500 kHz。

(6) 傳導輸出功率之要求

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.2 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

(1) 操作於 2.4000~2.4835 GHz band:

依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之規定，在使用頻率範圍之任一 3 kHz 頻寬內，由發射機傳導至天線之功率頻譜密度在任意傳輸期間內，皆小於或等於 8 毫分貝(dBm)，且應依 3.10.1.3 之方式降低功率頻譜密度限制值。

(8) 電波暴露量之評估

依據國家通訊傳播委員會低功率射頻電機技術規範 5.20.2 節之規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符電波暴露量之要求。

限制值如下：

(1) 職業性/可控制之暴露

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

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

(2) 一般人/不可控制之暴露

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

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

3.2 限制使用之頻帶

除本規範另有規定外，任何低功率射頻電機之主波皆不得使用下表所列各頻段之頻率；低功率射頻電機落於下表所列頻段之混附發射，其電場強度必須符合 2.8 之限制規定。

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

2.4 GHz 頻段測試紀錄結果

4 帶外發射之量測

4.1 適用標準

請見本報告 3.1 節第(2)的規定。

4.2 量測方法

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

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

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz ;

Average

802.11b 為 RBW = 1 MHz, VBW = 10 Hz

802.11g 為 RBW = 1 MHz, VBW = 1 kHz

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

接收諧波：

Below 1 GHz

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

Above 1 GHz:

Peak 為 RBW = 1 MHz, VBW = 3 MHz ; Average 為 RBW = 1 MHz, VBW = 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

4.3 量測儀器

測試日期: 108 年 04 月 16 日

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 13, 2018	Dec. 12, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 25, 2018	Nov. 24, 2019
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 16, 2018	Apr. 15, 2019
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier EMCI	EMC001340	980201	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-80 00&3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-10 00(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable Woken	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
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:

- The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
- The test was performed in HwaYa Chamber 10.
- The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
- The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
- The IC Site Registration No. is 7450F-10.
- The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level using a coverage factor of k=2.

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

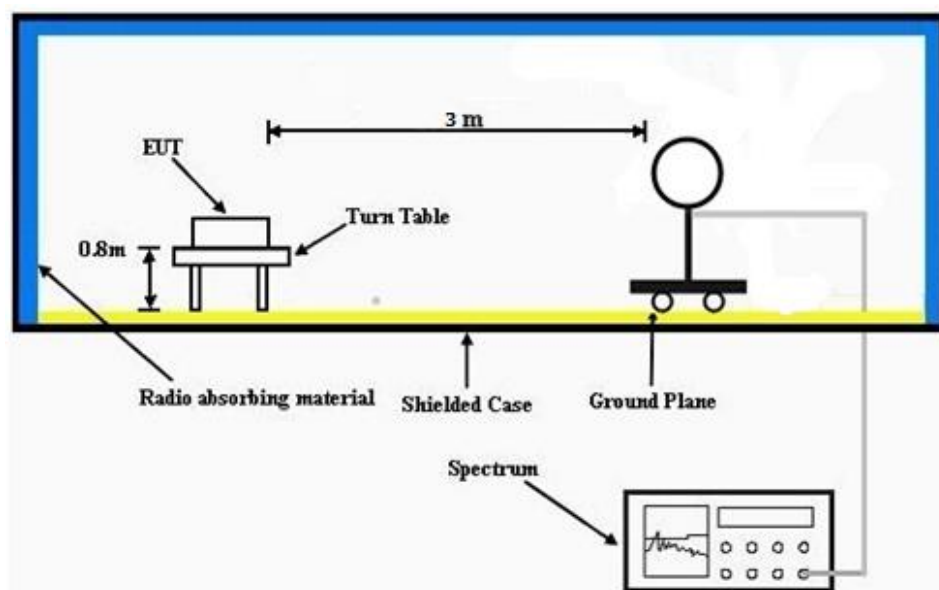
測試日期: 106 年 05 月 15 日

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

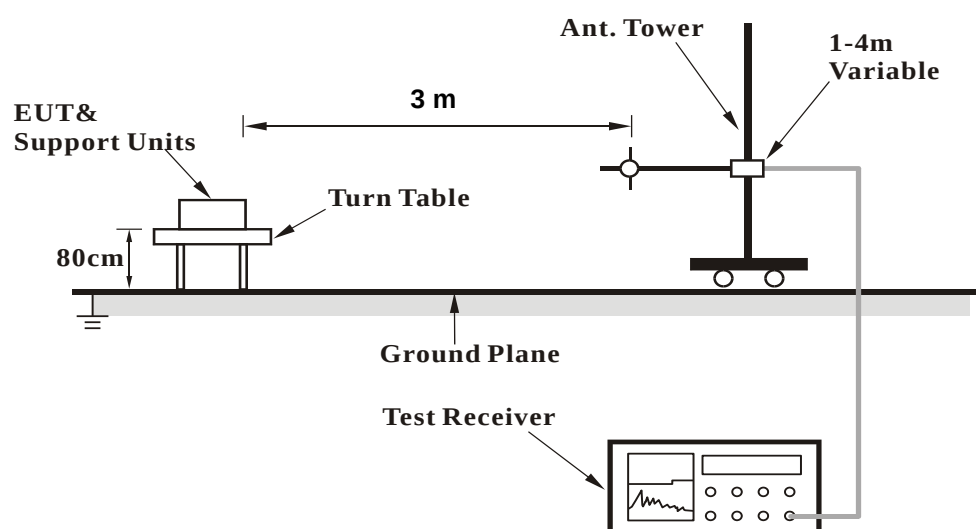
- NOTE: 1. The calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 690701.
5. The IC Site Registration No. is IC7450F-10.

4.4 測試配置

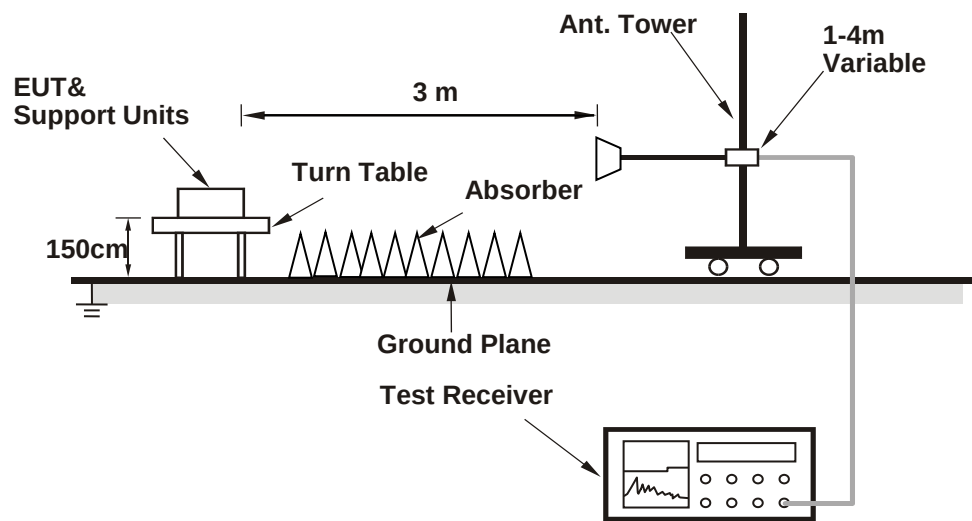
<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



4.5 場強度之計算

場強之計算公式如下：

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

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

量測結果請見下頁。

4.6 量測結果

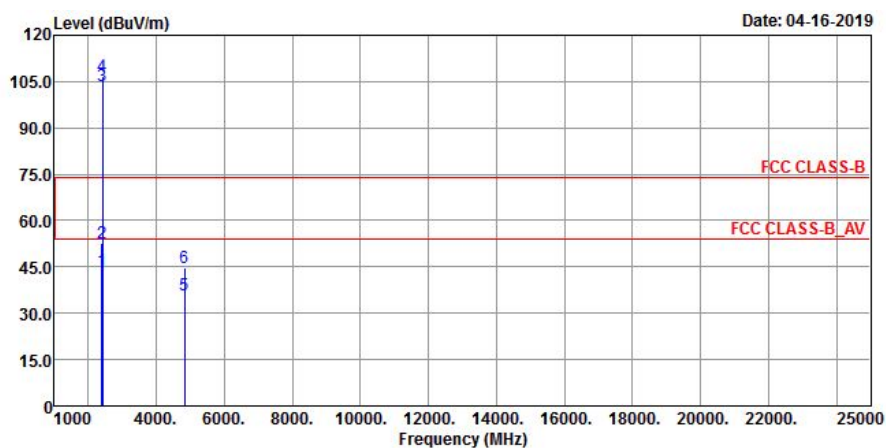
4.6.1 發射諧波

調變技術: DSSS

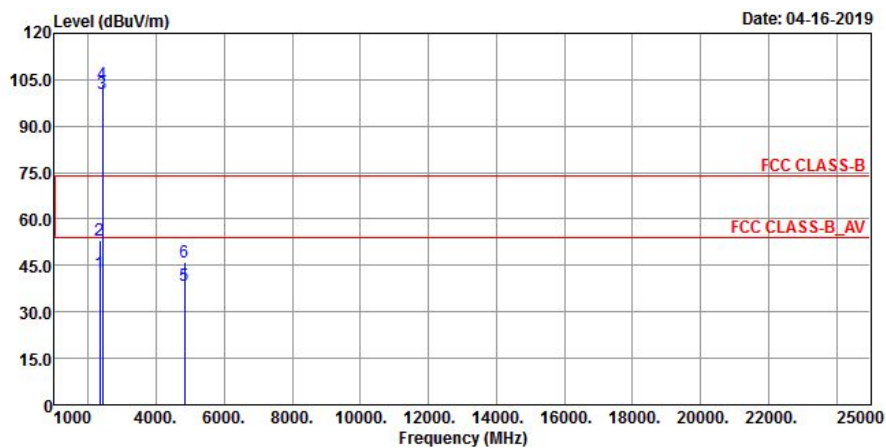
802.11b

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

Horizontal



Vertical



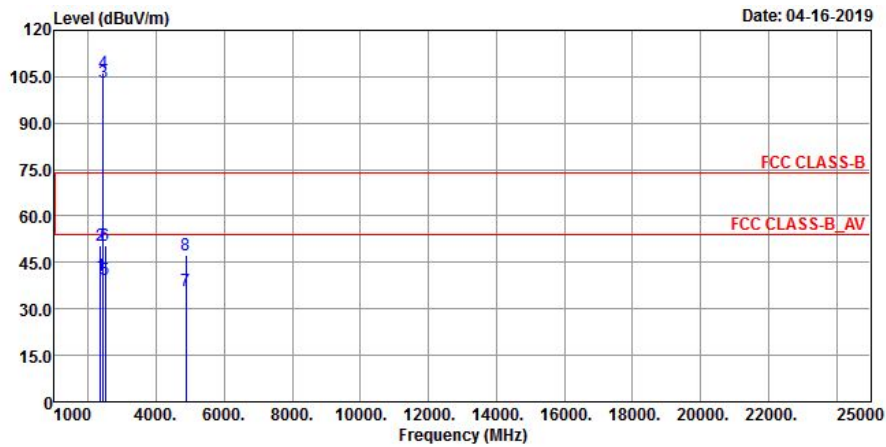
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387	43.74	48.72	-4.98	54	-10.26	118	81	Average
2387	52.65	57.63	-4.98	74	-21.35	118	81	Peak
2412	103.66	108.67	-5.01			118	81	Average
2412	106.71	111.72	-5.01			118	81	Peak
4824	35.96	50.34	-14.38	54	-18.04	100	82	Average
4824	44.63	59.01	-14.38	74	-29.37	100	82	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
2333.52	42.49	47.08	-4.59	54	-11.51	100	359	Average
2333.52	53.26	57.85	-4.59	74	-20.74	100	359	Peak
2412	100.61	105.62	-5.01			100	359	Average
2412	103.52	108.53	-5.01			100	359	Peak
4824	38.63	53.01	-14.38	54	-15.37	100	164	Average
4824	46.13	60.51	-14.38	74	-27.87	100	164	Peak

Remarks:

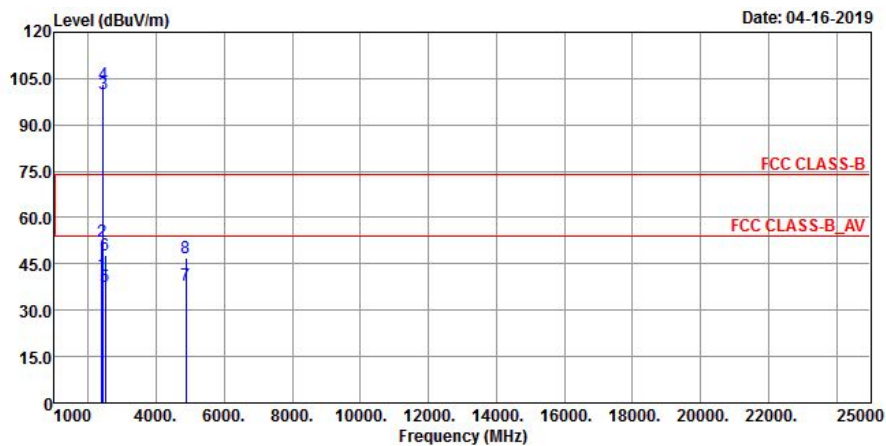
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



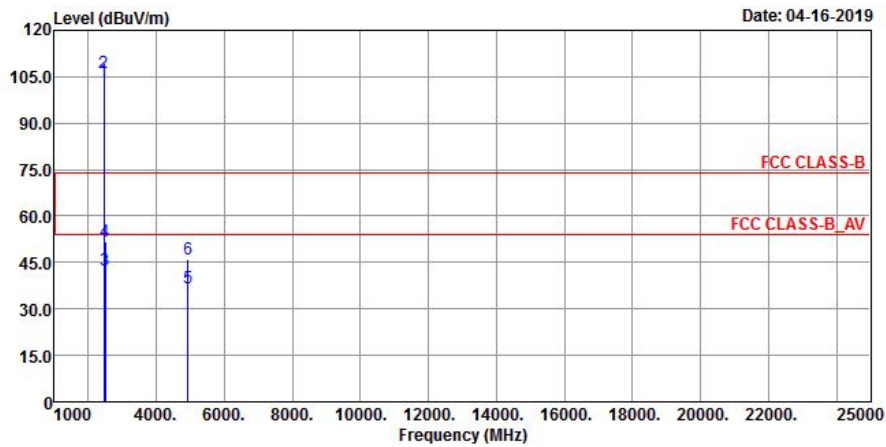
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2355.92	40.67	45.48	-4.81	54	-13.33	100	81	Average
2355.92	50.44	55.25	-4.81	74	-23.56	100	81	Peak
2437	103.38	108.36	-4.98			100	81	Average
2437	106.31	111.29	-4.98			100	81	Peak
2500	39.55	44.33	-4.78	54	-14.45	100	81	Average
2500	50.59	55.37	-4.78	74	-23.41	100	81	Peak
4874	35.94	50.02	-14.08	54	-18.06	108	99	Average
4874	47.35	61.43	-14.08	74	-26.65	108	99	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
2389.94	41.62	46.62	-5	54	-12.38	100	3	Average
2389.94	52.08	57.08	-5	74	-21.92	100	3	Peak
2437	100.18	105.16	-4.98			100	3	Average
2437	103.34	108.32	-4.98			100	3	Peak
2484.08	37.75	42.6	-4.85	54	-16.25	100	3	Average
2484.08	47.74	52.59	-4.85	74	-26.26	100	3	Peak
4874	37.94	52.02	-14.08	54	-16.06	104	159	Average
4874	46.99	61.07	-14.08	74	-27.01	104	159	Peak

Remarks:

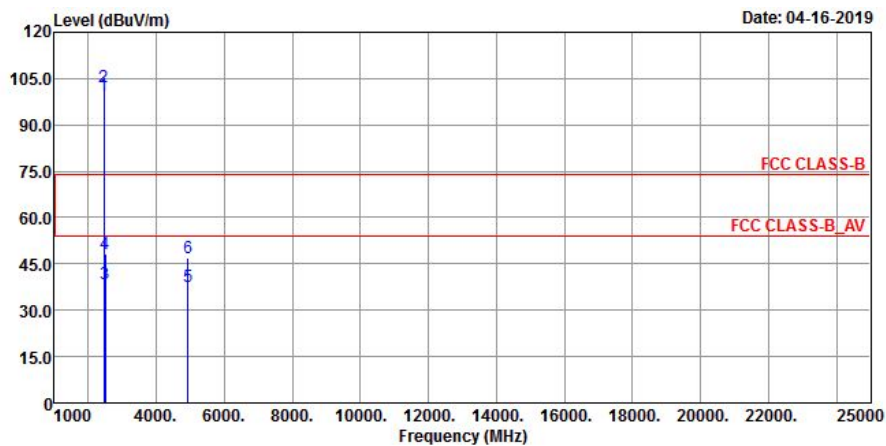
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	103.54	108.45	-4.91			138	76	Average
2462	106.46	111.37	-4.91			138	76	Peak
2487.72	42.52	47.37	-4.85	54	-11.48	138	76	Average
2487.72	51.89	56.74	-4.85	74	-22.11	138	76	Peak
4924	36.6	50.56	-13.96	54	-17.4	108	101	Average
4924	45.85	59.81	-13.96	74	-28.15	108	101	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.66	104.57	-4.91			100	4	Average
2462	102.51	107.42	-4.91			100	4	Peak
2487.12	38.52	43.37	-4.85	54	-15.48	100	4	Average
2487.12	48.23	53.08	-4.85	74	-25.77	100	4	Peak
4924	37.6	51.56	-13.96	54	-16.4	100	168	Average
4924	46.72	60.68	-13.96	74	-27.28	100	168	Peak

Remarks:

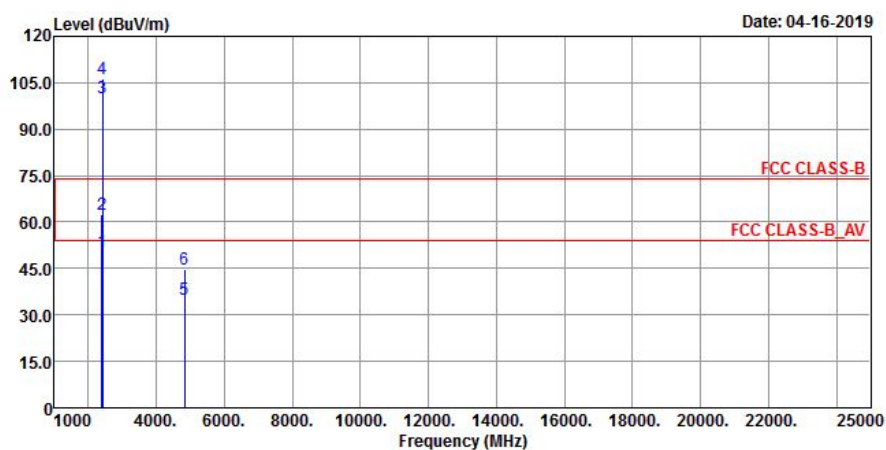
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2462 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

調變技術: OFDM

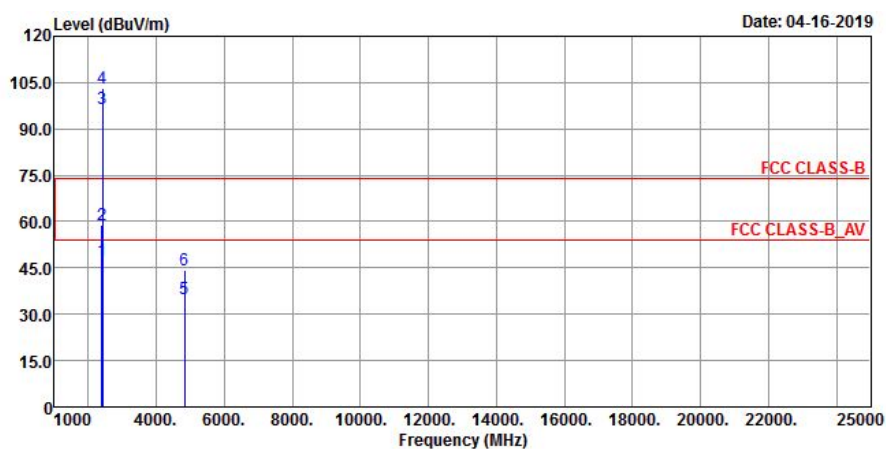
802.11g

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

Horizontal



Vertical



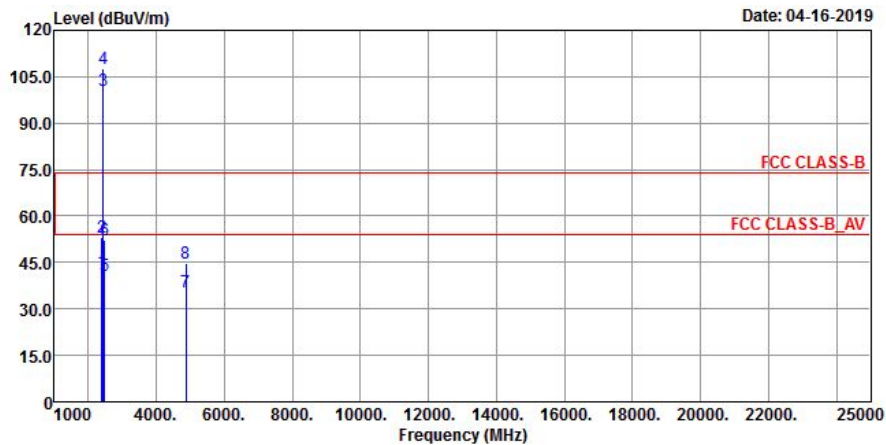
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	50.41	55.41	-5	54	-3.59	119	82	Average
2389.94	62.43	67.43	-5	74	-11.57	119	82	Peak
2412	99.91	104.92	-5.01			119	82	Average
2412	106.43	111.44	-5.01			119	82	Peak
4824	35.06	49.44	-14.38	54	-18.94	155	149	Average
4824	44.92	59.3	-14.38	74	-29.08	155	149	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
2389.8	47.17	52.17	-5	54	-6.83	100	0	Average
2389.8	58.91	63.91	-5	74	-15.09	100	0	Peak
2412	96.57	101.58	-5.01			100	0	Average
2412	103.18	108.19	-5.01			100	0	Peak
4824	34.8	49.18	-14.38	54	-19.2	125	301	Average
4824	44.21	58.59	-14.38	74	-29.79	125	301	Peak

Remarks:

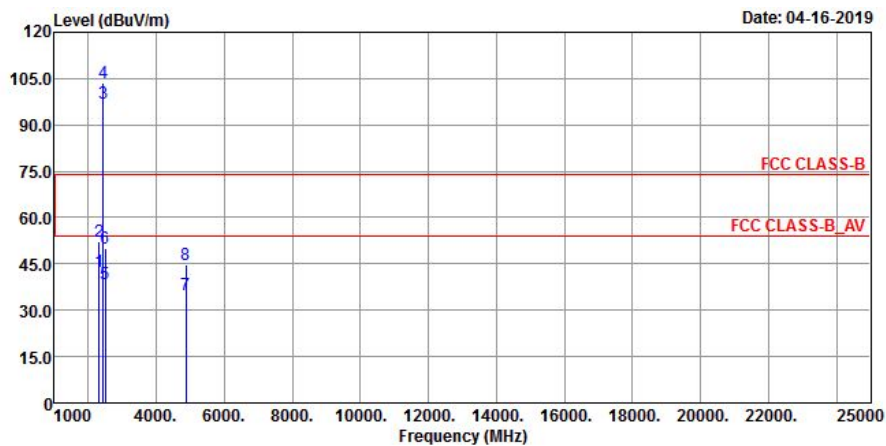
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



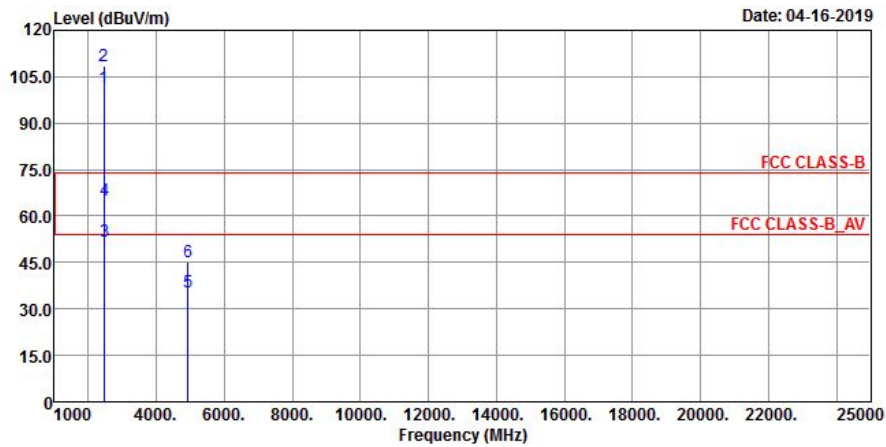
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.66	41.95	46.93	-4.98	54	-12.05	122	79	Average
2389.66	52.96	57.94	-4.98	74	-21.04	122	79	Peak
2437	100.7	105.68	-4.98			122	79	Average
2437	107.39	112.37	-4.98			122	79	Peak
2483.76	40.53	45.38	-4.85	54	-13.47	122	79	Average
2483.76	52.07	56.92	-4.85	74	-21.93	122	79	Peak
4874	35.37	49.45	-14.08	54	-18.63	193	204	Average
4874	44.92	59	-14.08	74	-29.08	193	204	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
2310.98	42.43	46.89	-4.46	54	-11.57	100	360	Average
2310.98	52.19	56.65	-4.46	74	-21.81	100	360	Peak
2437	97.01	64.53	32.48			100	360	Average
2437	103.5	71.02	32.48			100	360	Peak
2492.76	38.55	43.33	-4.78	54	-15.45	100	360	Average
2492.76	49.86	54.64	-4.78	74	-24.14	100	360	Peak
4874	35.13	49.21	-14.08	54	-18.87	186	193	Average
4874	44.79	58.87	-14.08	74	-29.21	186	193	Peak

Remarks:

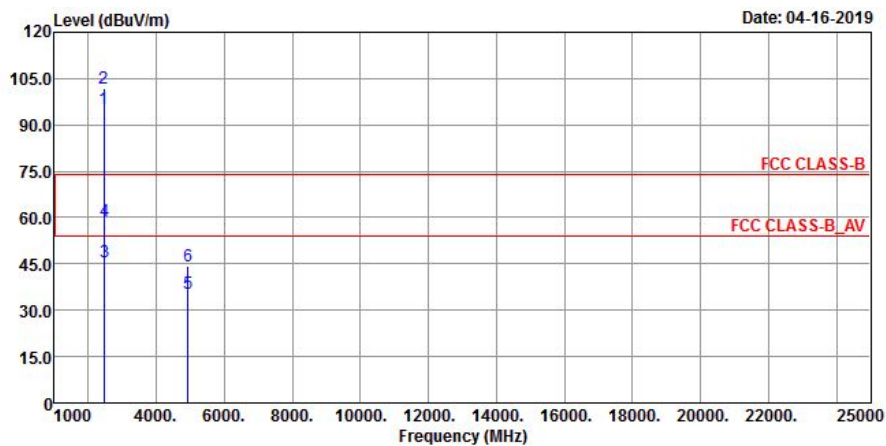
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	101.24	106.15	-4.91			116	78	Average
2462	108.42	113.33	-4.91			116	78	Peak
2483.56	51.7	56.55	-4.85	54	-2.3	116	78	Average
2483.56	65.1	69.95	-4.85	74	-8.9	116	78	Peak
4924	35.61	49.57	-13.96	54	-18.39	139	184	Average
4924	45.07	59.03	-13.96	74	-28.93	139	184	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	95.23	100.14	-4.91			100	354	Average
2462	101.84	106.75	-4.91			100	354	Peak
2483.64	45.58	50.43	-4.85	54	-8.42	100	354	Average
2483.64	58.97	63.82	-4.85	74	-15.03	100	354	Peak
4924	35.32	49.28	-13.96	54	-18.68	164	257	Average
4924	44.28	58.24	-13.96	74	-29.72	164	257	Peak

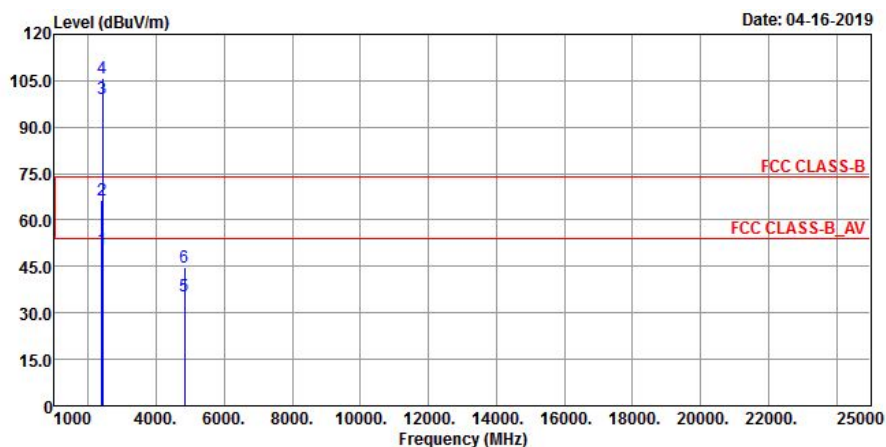
Remarks:

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

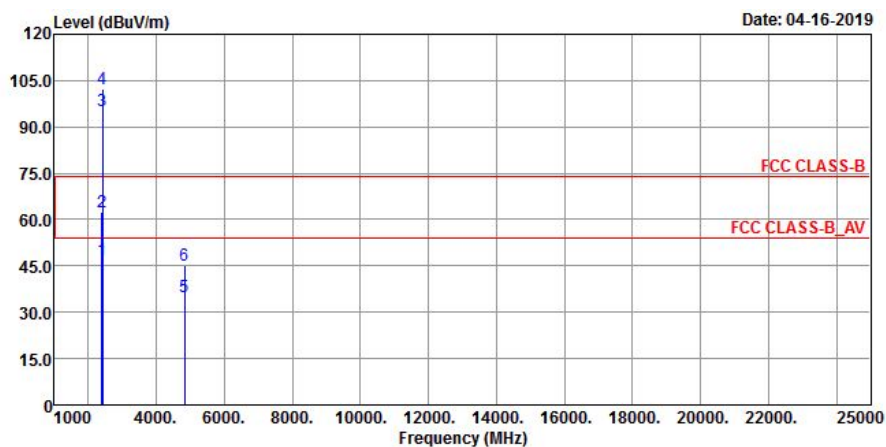
802.11n (HT20)

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

Horizontal



Vertical



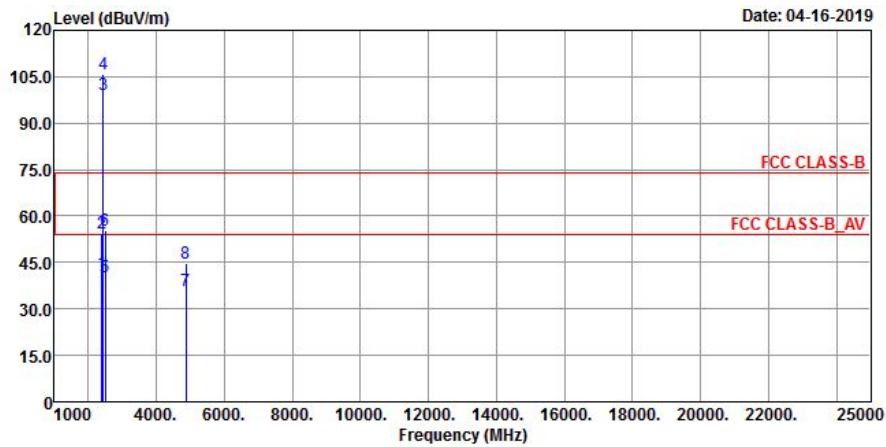
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	50.62	55.62	-5	54	-3.38	117	82	Average
2389.94	66.43	71.43	-5	74	-7.57	117	82	Peak
2412	99.06	104.07	-5.01			117	82	Average
2412	105.73	110.74	-5.01			117	82	Peak
4824	35.24	49.62	-14.38	54	-18.76	171	128	Average
4824	44.58	58.96	-14.38	74	-29.42	171	128	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
2389.94	46.98	51.98	-5	54	-7.02	100	359	Average
2389.94	62.6	67.6	-5	74	-11.4	100	359	Peak
2412	95.33	100.34	-5.01			100	359	Average
2412	102.11	107.12	-5.01			100	359	Peak
4824	35.03	49.41	-14.38	54	-18.97	153	110	Average
4824	45.09	59.47	-14.38	74	-28.91	153	110	Peak

Remarks:

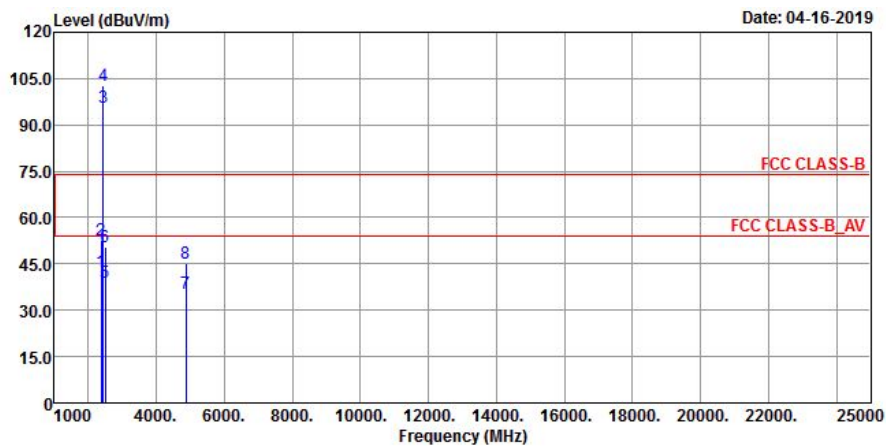
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2412 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



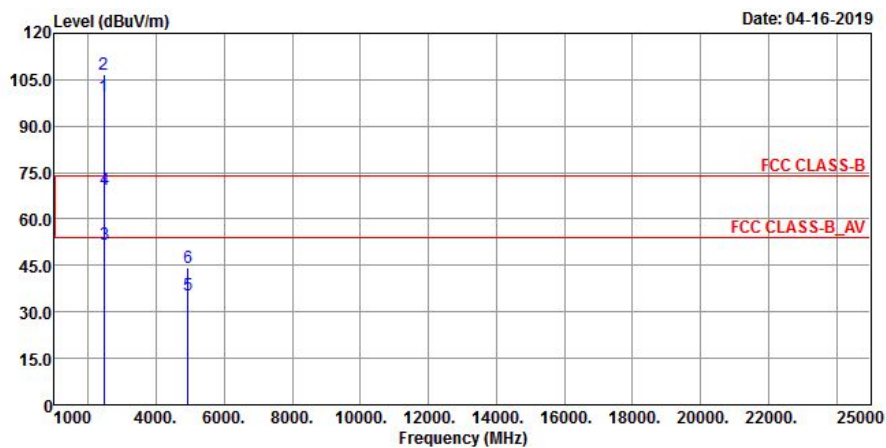
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.52	41.47	46.45	-4.98	54	-12.53	122	79	Average
2389.52	54.26	59.24	-4.98	74	-19.74	122	79	Peak
2437	99.36	104.34	-4.98			122	79	Average
2437	106.01	110.99	-4.98			122	79	Peak
2491	40.15	45	-4.85	54	-13.85	122	79	Average
2491	55.53	60.38	-4.85	74	-18.47	122	79	Peak
4874	35.68	49.76	-14.08	54	-18.32	162	103	Average
4874	44.71	58.79	-14.08	74	-29.29	162	103	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
2365.44	42.65	47.47	-4.82	54	-11.35	100	359	Average
2365.44	52.77	57.59	-4.82	74	-21.23	100	359	Peak
2437	95.54	100.52	-4.98			100	359	Average
2437	102.66	107.64	-4.98			100	359	Peak
2484.56	38.8	43.65	-4.85	54	-15.2	100	359	Average
2484.56	50.58	55.43	-4.85	74	-23.42	100	359	Peak
4874	35.27	49.35	-14.08	54	-18.73	149	221	Average
4874	45	59.08	-14.08	74	-29	149	221	Peak

Remarks:

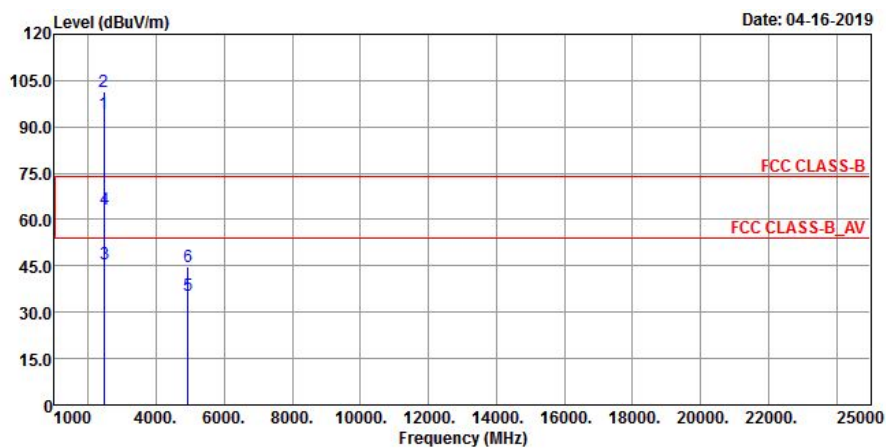
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level – Limit value
2. 2437 MHz: Fundamental Frequency.
3. The other emission levels were very low against the limit.

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

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.52	104.43	-4.91			115	79	Average
2462	106.89	111.8	-4.91			115	79	Peak
2483.6	51.66	56.51	-4.85	54	-2.34	115	79	Average
2483.6	69.53	74.38	-4.85	74	-4.47	115	79	Peak
4924	35.56	49.52	-13.96	54	-18.44	162	113	Average
4924	44.13	58.09	-13.96	74	-29.87	162	113	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	94.33	99.24	-4.91			100	345	Average
2462	101.27	106.18	-4.91			100	345	Peak
2483.64	45.68	50.53	-4.85	54	-8.32	100	345	Average
2483.64	63.44	68.29	-4.85	74	-10.56	100	345	Peak
4924	35.3	49.26	-13.96	54	-18.7	137	195	Average
4924	44.81	58.77	-13.96	74	-29.19	137	195	Peak

Remarks:

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

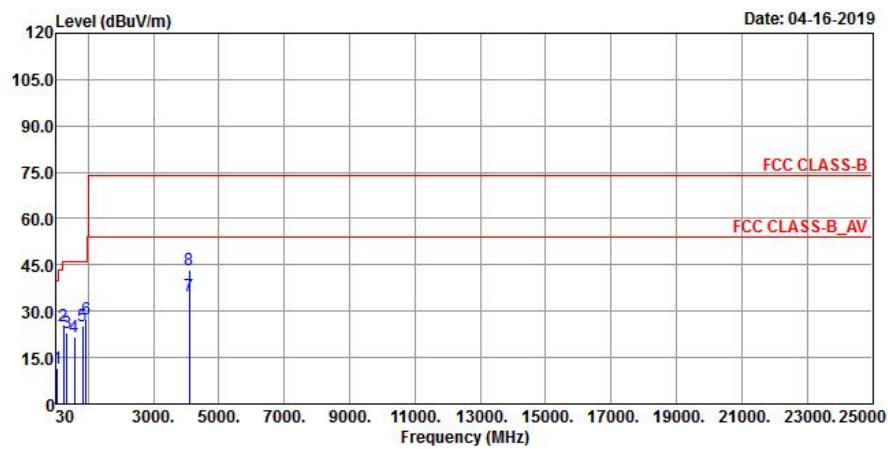
4.6.2 接收諧波

調變技術: OFDM

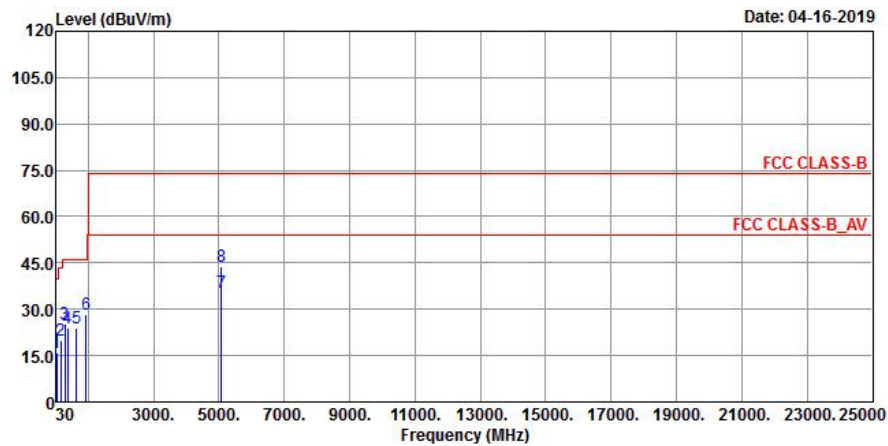
802.11g

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	Thomas Wei

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
62.01	11.59	30.26	-18.67	40	-28.41	188	203	Peak
247.28	25.14	42.87	-17.73	46	-20.86	169	147	Peak
349.13	23.1	37.93	-14.83	46	-22.9	183	202	Peak
579.02	21.91	31.24	-9.33	46	-24.09	191	55	Peak
822.49	25.32	30.19	-4.87	46	-20.68	177	319	Peak
945.68	27.34	30.09	-2.75	46	-18.66	102	158	Peak
4100	34.81	51.43	-16.62	54	-19.19	185	237	Average
4100	43.43	60.05	-16.62	74	-30.57	185	237	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
44.55	16.11	33.12	-17.01	40	-23.89	106	248	Peak
170.65	19.96	37.54	-17.58	43.5	-23.54	116	309	Peak
278.32	25.09	41.85	-16.76	46	-20.91	121	108	Peak
365.62	23.78	38.77	-14.99	46	-22.22	102	94	Peak
641.1	23.71	32.17	-8.46	46	-22.29	136	299	Peak
937.92	28.37	31.15	-2.78	46	-17.63	106	224	Peak
5080	35.61	49.25	-13.64	54	-18.39	161	207	Average
5080	43.85	57.49	-13.64	74	-30.15	161	207	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp 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.

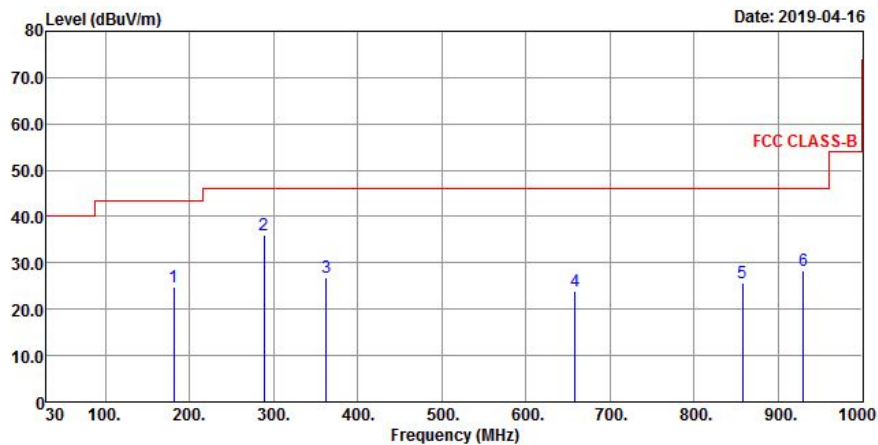
30 MHz ~ 1 GHz Data:

調變技術: OFDM

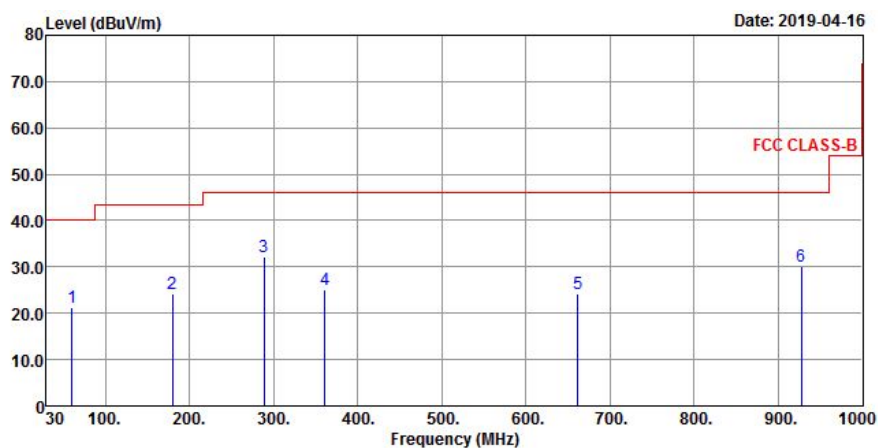
802.11g

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
181.32	24.87	43.46	-18.59	43.5	-18.63	168	241	Peak
288.99	36	52.79	-16.79	46	-10	199	147	Peak
362.71	26.79	41.65	-14.86	46	-19.21	213	144	Peak
658.56	23.99	31.72	-7.73	46	-22.01	173	92	Peak
857.41	25.61	29.77	-4.16	46	-20.39	188	336	Peak
930.16	28.25	31.1	-2.85	46	-17.75	202	14	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
60.07	21.3	39.43	-18.13	40	-18.7	105	21	Peak
179.38	24.09	42.48	-18.39	43.5	-19.41	116	347	Peak
288.99	32.22	49.01	-16.79	46	-13.78	122	205	Peak
360.77	25.1	39.87	-14.77	46	-20.9	133	309	Peak
661.47	24.15	31.76	-7.61	46	-21.85	126	158	Peak
927.25	29.99	32.98	-2.99	46	-16.01	111	229	Peak

Remarks:

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

4.7 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

5 6 dB 頻寬之要求

5.1 適用標準

請見本報告 3.1 節第(5)項的規定。

5.2 量測方法

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

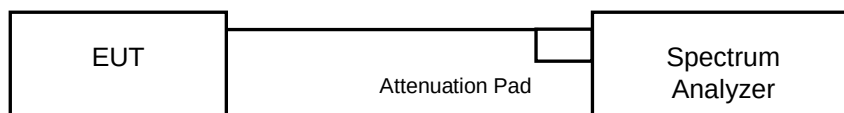
5.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017

Note:

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

5.4 測試配置



5.5 量測結果

操作模式	發射	測試日期	106 年 05 月 15 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	林冠澤		

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.06	0.5	Pass
6	2437	9.08	0.5	Pass
11	2462	9.08	0.5	Pass

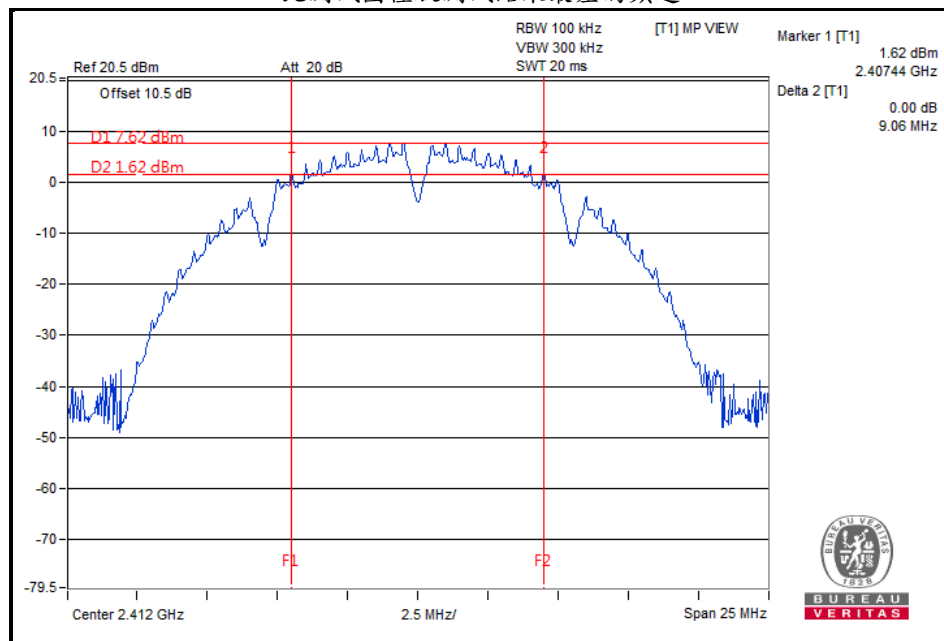
802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.36	0.5	Pass
6	2437	16.36	0.5	Pass
11	2462	16.36	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.11	0.5	Pass
6	2437	17.12	0.5	Pass
11	2462	17.36	0.5	Pass

**此測試圖僅放測試結果最差的頻道。



5.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

6 峰值傳導輸出功率之量測

6.1 適用標準

請見本報告 3.1 節第(4)及(6)項的規定。

6.2 量測方法

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

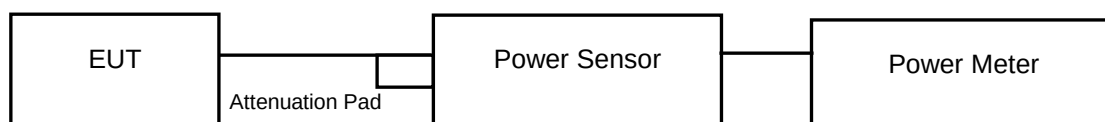
6.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017

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.

6.4 測試配置



6.5 量測結果

操作模式	發射	測試日期	106 年 05 月 15 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	林冠澤		

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	116.145	20.65	30	Pass
6	2437	114.815	20.60	30	Pass
11	2462	111.173	20.46	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	281.19	24.49	30	Pass
6	2437	271.019	24.33	30	Pass
11	2462	268.534	24.29	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	307.61	24.88	30	Pass
6	2437	279.254	24.46	30	Pass
11	2462	306.902	24.87	30	Pass

6.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

7 功率頻譜密度之量測

7.1 適用標準

請見本報告 3.1 節第(7)項的規定。

7.2 量測方法

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

7.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Spectrum Analyzer R&S	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017

Note:

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

7.4 測試配置



7.5 量測結果

操作模式	發射	測試日期	106 年 05 月 15 日
量測場地溫度	25 °C	量測場地濕度	60 % RH
測試者	林冠澤		

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-7.55	8	Pass
6	2437	-7.98	8	Pass
11	2462	-7.91	8	Pass

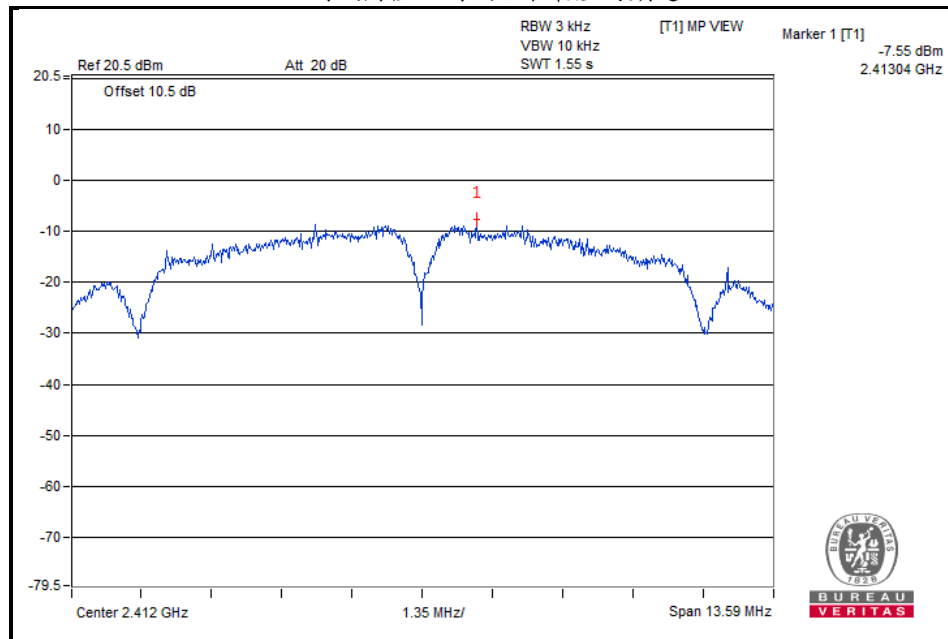
802.11g

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-13.11	8	Pass
6	2437	-13.47	8	Pass
11	2462	-13.17	8	Pass

802.11n (HT20)

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-13.34	8	Pass
6	2437	-13.59	8	Pass
11	2462	-13.61	8	Pass

**此測試圖僅放測試結果最差的頻道。



7.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

8 電源線傳導干擾之量測

8.1 適用標準

請見本報告 3.1 節第錯誤! 找不到參照來源。項的規定。

8.2 量測方法

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

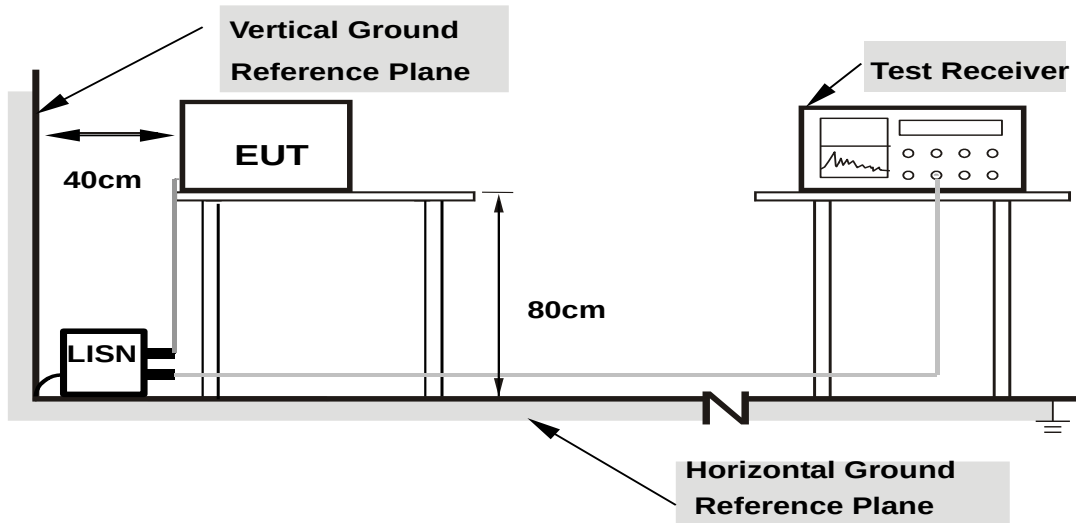
8.3 量測儀器

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
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 1.
3. The VCCI Site Registration No. is C-12040.
4. The measurement uncertainty is 2.44 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.

8.4 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

8.5 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

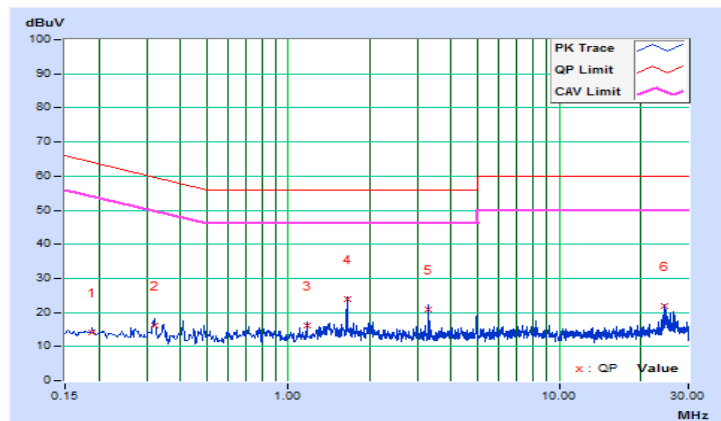
8.6 量測結果

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	Thomas Wei	測試日期	2019/4/25

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	0.18910	9.68	4.48	0.01	14.16	9.69	64.08	54.08	-49.92	-44.39
2	0.32187	9.68	6.46	0.07	16.14	9.75	59.66	49.66	-43.52	-39.91
3	1.17442	9.68	6.48	0.02	16.16	9.70	56.00	46.00	-39.84	-36.30
4	1.65144	9.69	14.13	0.94	23.82	10.63	56.00	46.00	-32.18	-35.37
5	3.30537	9.73	11.08	0.02	20.81	9.75	56.00	46.00	-35.19	-36.25
6	24.53276	9.94	12.08	0.15	22.02	10.09	60.00	50.00	-37.98	-39.91

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)

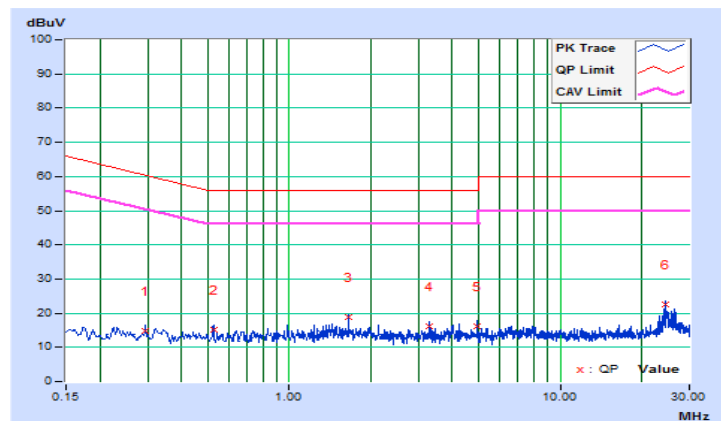


量測頻率範圍	150kHz ~ 30MHz	檢測器與頻寬	準峰值 (QP) / 平均值 (AV), 9kHz
量測電壓值	110Vac, 60Hz	量測場地溫濕度	25°C, 65%RH
測試者	Thomas Wei	測試日期	2019/4/26

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	0.29467	9.66	5.22	0.06	14.88	9.72	60.39	50.39	-45.51	-40.67
2	0.52544	9.65	5.44	0.17	15.09	9.82	56.00	46.00	-40.91	-36.18
3	1.65144	9.66	9.04	2.73	18.70	12.39	56.00	46.00	-37.30	-33.61
4	3.30146	9.70	6.56	2.46	16.26	12.16	56.00	46.00	-39.74	-33.84
5	4.95148	9.74	6.37	0.06	16.11	9.80	56.00	46.00	-39.89	-36.20
6	24.34899	10.02	12.56	9.98	22.58	20.00	60.00	50.00	-37.42	-30.00

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)



8.7 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

9 電波暴露量之評估

9.1 適用標準

請見本報告 3.1 節第(8)項的規定。

9.2 評估方法

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

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

where

P_d = power density in mW/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

9.3 評估結果

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Pass / Fail
2412-2462	24.88	2	20	0.097	1	Pass

10 待測物照片

請參照 BV CPS 報告編號：190408C22

11 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: 886-3-5935343

Fax: 886-3-5935342

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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