

## 低功率射頻電機測試報告

報告編號:

RT180102C25

申請者

荷蘭商戴爾企業股份有限公司台灣分公司

產品名稱

Wi-Fi + BT Module

型號

QCNFA324

系列型號

N/A

製造廠商

Qualcomm Atheros, Inc.

商標或廠牌

Qualcomm Atheros

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

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報告發行紀錄

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# 證 明 書

發行日期：107 年 03 月 08 日

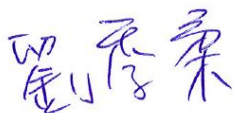
產 品 名 稱：Wi-Fi + BT Module  
商 標：Qualcomm Atheros  
型 號：QCNFA324  
申 請 者：荷蘭商戴爾企業股份有限公司台灣分公司  
量 測 規 範：低功率射頻電機技術規範 LP0002  
ANSI C63.10-2013

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：QCNFA324)為 RT140808E04 之系列報告(原證書號碼: CCAI14LP2740T2)，搭配平台(商標: DELL 型號: P73F)，僅驗證帶外發射、峰值傳導輸出功率與發射功率控制(TPC)及動態頻率選擇(DFS)。收件日期 107 年 01 月 02 日，於 107 年 01 月 06 日至 107 年 03 月 08 日，已在本公司的標準測試場地完成量測。其他測試項目請參照原模組報告 BV CPS Report No.: RT140808E04)，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 ！

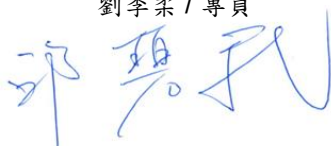
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劉季柔 / 專員

， 日 期： 107 年 03 月 08 日

審 核 者：



邱碧民 / 專案工程師

， 日 期： 107 年 03 月 08 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：荷蘭商戴爾企業股份有限公司台灣分公司

製造廠商：Qualcomm Atheros, Inc.

申請廠商地址：臺北市大安區敦化南路 2 段 218 號 20 樓

產品名稱：Wi-Fi + BT Module

廠牌：Qualcomm Atheros

型號：QCNFA324

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

KDB 662911

KDB 789033

### 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  | 輸出峰值功率 | 低功率射頻電機技術規範 3.10.1.2 節 | 合格     |

### WLAN 5.250~5.350 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 4.7.4 節             | 合格     |
| 2  | 最大傳導輸出功率                | 低功率射頻電機技術規範 4.7.3.2 節           | 合格     |
| 3  | 發射功率控制(TPC)及動態頻率選擇(DFS) | 低功率射頻電機技術規範 4.7.7.1 及 4.7.7.2 節 | 合格     |

### WLAN 5.470~5.725 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 4.7.4 節             | 合格     |
| 2  | 最大傳導輸出功率                | 低功率射頻電機技術規範 4.7.3.2 節           | 合格     |
| 3  | 發射功率控制(TPC)及動態頻率選擇(DFS) | 低功率射頻電機技術規範 4.7.7.1 及 4.7.7.2 節 | 合格     |

### WLAN 5.725~5.850 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 4.7.4 節   | 合格     |
| 2  | 最大傳導輸出功率 | 低功率射頻電機技術規範 4.7.3.3 節 | 合格     |

#### Bluetooth EDR 频段概要

| 項次 | 量測項目     | 規 範                    | 量測結果判定 |
|----|----------|------------------------|--------|
| 1  | 帶外發射     | 低功率射頻電機技術規範 3.10.1.5   | 合格     |
| 2  | 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     |

#### Bluetooth LE 频段概要

| 項次 | 量測項目     | 規 範                    | 量測結果判定 |
|----|----------|------------------------|--------|
| 1  | 帶外發射     | 低功率射頻電機技術規範 3.10.1.5 節 | 合格     |
| 2  | 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     |

## 2 一般敘述

### 2.1 待測設備

|       |                        |                                                                                                                                                                                                                                                                                                                                                       |
|-------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 產品名稱： | Wi-Fi + BT Module      |                                                                                                                                                                                                                                                                                                                                                       |
| 型號：   | QCNFA324               |                                                                                                                                                                                                                                                                                                                                                       |
| 額定電源： | 5 Vdc (Host equipment) |                                                                                                                                                                                                                                                                                                                                                       |
| 調變方式： | Wireless LAN           | CCK, DQPSK, DBPSK for DSSS<br>256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM                                                                                                                                                                                                                                                                               |
|       | Bluetooth EDR          | GFSK, $\pi/4$ -DQPSK, 8DPSK                                                                                                                                                                                                                                                                                                                           |
|       | Bluetooth LE 4.2       | GFSK                                                                                                                                                                                                                                                                                                                                                  |
| 傳輸速率： | Wireless LAN           | 802.11b: 11.0/ 5.5/ 2.0/ 1.0 Mbps<br>802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps<br>802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps<br>802.11n: 400 Mbps<br>802.11ac: 866.7 Mbps                                                                                                                                            |
|       | Bluetooth EDR          | 1/ 2/ 3 Mbps                                                                                                                                                                                                                                                                                                                                          |
|       | Bluetooth LE 4.2       | 1 Mbps                                                                                                                                                                                                                                                                                                                                                |
| 載波頻率： | Wireless LAN           | 2.4 GHz: 2412 ~ 2462 MHz<br>5.0 GHz: 5280 ~ 5320 MHz, 5500 ~ 5720 MHz,<br>5745 ~ 5825 MHz                                                                                                                                                                                                                                                             |
|       | Bluetooth EDR          | 2402 ~ 2480 MHz                                                                                                                                                                                                                                                                                                                                       |
|       | Bluetooth LE 4.2       | 2402 ~ 2480 MHz                                                                                                                                                                                                                                                                                                                                       |
| 頻道數：  | Wireless LAN           | 2.4 GHz:<br>802.11b, 802.11g, 802.11n (HT20): 11<br>802.11n (HT40): 7<br>5.0 GHz:<br>5280 ~ 5320 MHz:<br>802.11a, 802.11n (HT20): 3<br>802.11n (HT40): 1<br>5500 ~ 5720 MHz:<br>802.11a, 802.11n (HT20): 12<br>802.11n (HT40): 6<br>802.11ac (VHT80): 3<br>5745 ~ 5825 MHz:<br>802.11a, 802.11n (HT20): 5<br>802.11n (HT40): 2<br>802.11ac (VHT80): 1 |
|       | Bluetooth EDR          | 79                                                                                                                                                                                                                                                                                                                                                    |
|       | Bluetooth LE 4.2       | 40                                                                                                                                                                                                                                                                                                                                                    |
| 發射功率： | Wireless LAN           | 2.4 GHz:<br>802.11b: 23.44 dBm<br>802.11g: 26.73 dBm<br>802.11n (HT20): 26.80 dBm<br>802.11n (HT40): 22.94 dBm<br>5.0 GHz:<br>5280 ~ 5320 MHz:<br>802.11a: 16.69 dBm<br>802.11n (HT20): 16.34 dBm<br>802.11n (HT40): 13.48 dBm                                                                                                                        |

|        |                  |                                                                                                                                                                                                                                                                   |
|--------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|        |                  | 5500 ~ 5720 MHz<br>802.11a: 18.70 dBm<br>802.11n (HT20): 17.52 dBm<br>802.11n (HT40): 16.59 dBm<br>802.11ac (VHT80): 13.29 dBm<br>5745 ~ 5825 MHz:<br>802.11a: 22.77 dBm<br>802.11n (HT20): 22.76 dBm<br>802.11n (HT40): 22.51 dBm<br>802.11ac (VHT80): 20.50 dBm |
|        | Bluetooth EDR    | 10.56 dBm                                                                                                                                                                                                                                                         |
|        | Bluetooth LE 4.2 | 2.53 dBm                                                                                                                                                                                                                                                          |
| 天線種類:  | 見註 2             |                                                                                                                                                                                                                                                                   |
| 電源線類別: | N/A              |                                                                                                                                                                                                                                                                   |
| 信號線類別: | 見註 2             |                                                                                                                                                                                                                                                                   |
| 配件:    | 見註 2             |                                                                                                                                                                                                                                                                   |

註:

1. 此待測物之技術的種類為2Tx / 2Rx之組合。

| Modulation Mode  | Tx Function |
|------------------|-------------|
| 802.11b          | 2TX         |
| 802.11g          | 2TX         |
| 802.11a          | 2TX         |
| 802.11n (HT20)   | 2TX         |
| 802.11n (HT40)   | 2TX         |
| 802.11ac (VHT20) | 2TX         |
| 802.11ac (VHT40) | 2TX         |
| 802.11ac (VHT80) | 2TX         |

\* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (最終測試模式請見註4)

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      | 製造商             | 接頭型式 | 增益 (dBi) |       |        |       |
|-----------|-------------|------|-----------|-----------------|------|----------|-------|--------|-------|
|           |             |      |           |                 |      | NB       |       | Tablet |       |
|           |             |      |           |                 |      | Main     | Aux.  | Main   | Aux.  |
| WLAN      | 2412 ~ 2462 | Slot | 260-24200 | Hong Bo         | RF   | 0.66     | -0.58 | 2.83   | 2.40  |
|           | 5280 ~ 5320 |      |           |                 |      | 0.66     | -0.59 | -0.52  | 1.18  |
|           | 5500 ~ 5720 |      |           |                 |      | -0.67    | -2.32 | -2.69  | -2.65 |
|           | 5745 ~ 5825 |      |           |                 |      | -3.62    | -3.61 | -2.24  | -3.39 |
| Bluetooth | 2402 ~ 2480 |      |           |                 |      | 0.66     | -0.58 | 2.83   | 2.40  |
| WLAN      | 2412 ~ 2462 | Slot | 2195588-1 | TE Connectivity | IPEX | 2.43     | 2.82  | -2.29  | -0.38 |
|           | 5280 ~ 5320 |      |           |                 |      | -0.12    | -0.37 | 0.68   | 1.21  |
|           | 5500 ~ 5720 |      |           |                 |      | -0.19    | 0.16  | -1.10  | 0.88  |
|           | 5745 ~ 5825 |      |           |                 |      | -4.74    | -3.95 | 0.32   | -2.03 |
| Bluetooth | 2402 ~ 2480 |      |           |                 |      | 2.43     | 2.82  | -2.29  | -0.38 |

3. 此待測設備限制搭配之平台 (產品名稱: Portable Computer / 廠牌: DELL / 型號: P73F) 搭配使用之配件請參閱產品照編號: 180102C25

4. 待測設備的測試模式如下:

| 測試模式 | 描述                            |
|------|-------------------------------|
| 一    | 2Tx (Hong Bo Antenna)         |
| 二    | 2Tx (TE Connectivity Antenna) |



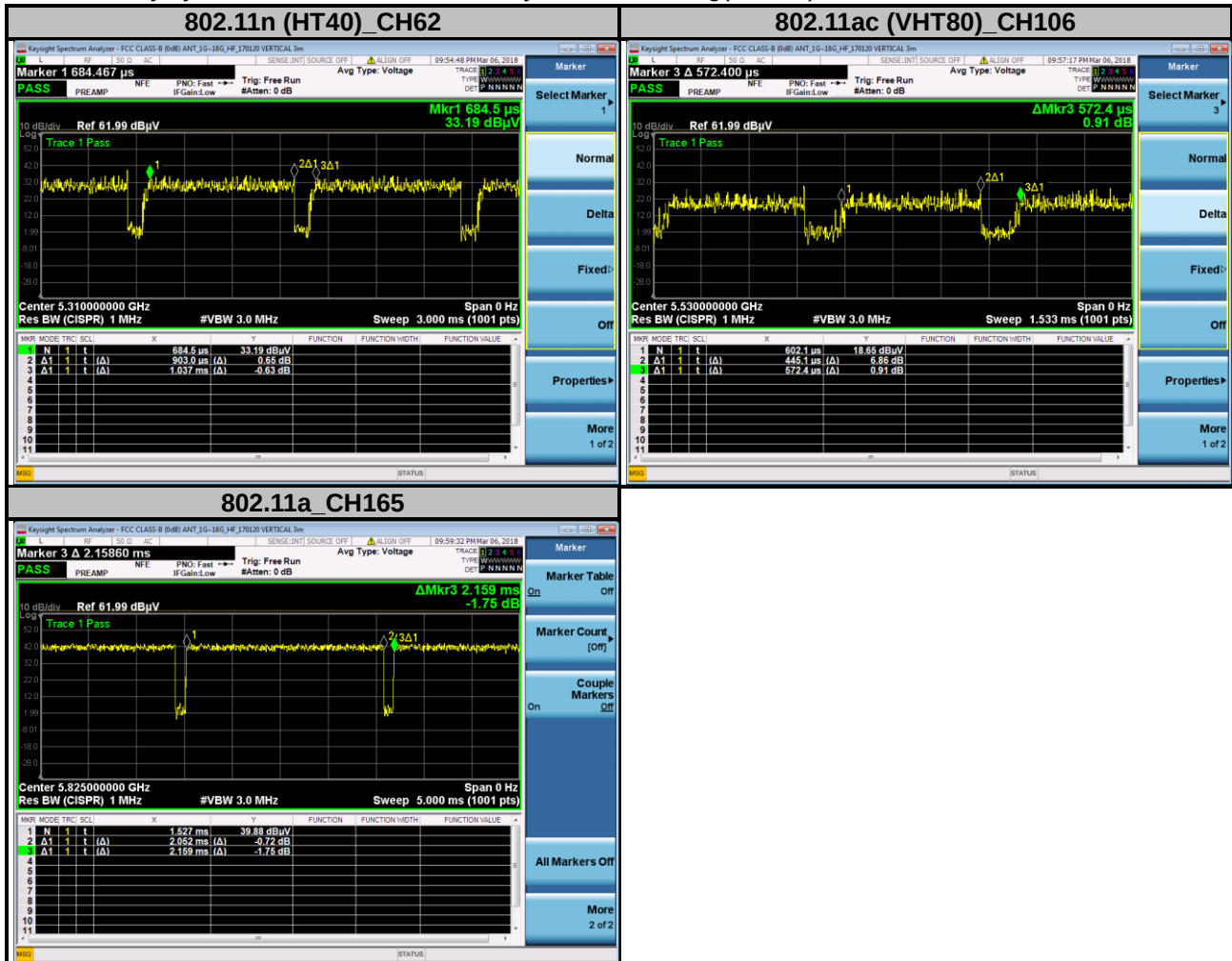
## 5 GHz频段

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

802.11n (HT40): Duty cycle =  $0.903/1.037 = 0.871$ , Duty factor =  $10 * \log(1/0.871) = 0.60$

802.11ac (VHT80): Duty cycle =  $0.4451/0.5724 = 0.778$ , Duty factor =  $10 * \log(1/0.778) = 1.09$

802.11a: Duty cycle =  $2.052/2.159 = 0.95$ , Duty factor =  $10 * \log(1/0.95) = 0.22$



## BT LE频段

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

Duty cycle =  $0.4063/0.6241 = 0.651$ , Duty factor =  $10 * \log(1/0.651) = 1.86$



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

802.11n (HT40):

| 頻道 | 對應頻率<br>(MHz) | 頻道 | 對應頻率<br>(MHz) |
|----|---------------|----|---------------|
| 03 | 2422          | 07 | 2442          |
| 04 | 2427          | 08 | 2447          |
| 05 | 2432          | 09 | 2452          |
| 06 | 2437          |    |               |

5 GHz 频段:

802.11a, 802.11n (HT20):

| 頻道  | 對應頻率<br>(MHz) | 頻道  | 對應頻率<br>(MHz) |
|-----|---------------|-----|---------------|
| 56  | 5280          | 128 | 5640          |
| 60  | 5300          | 132 | 5660          |
| 64  | 5320          | 136 | 5680          |
| 100 | 5500          | 140 | 5700          |
| 104 | 5520          | 144 | 5720          |
| 108 | 5540          | 149 | 5745          |
| 112 | 5560          | 153 | 5765          |
| 116 | 5580          | 157 | 5785          |
| 120 | 5600          | 161 | 5805          |
| 124 | 5620          | 165 | 5825          |

802.11n (HT40):

| 頻道  | 對應頻率<br>(MHz) | 頻道  | 對應頻率<br>(MHz) |
|-----|---------------|-----|---------------|
| 62  | 5310          | 134 | 5670          |
| 102 | 5510          | 142 | 5710          |
| 110 | 5550          | 151 | 5755          |
| 118 | 5590          | 159 | 5795          |
| 126 | 5630          |     |               |

802.11ac (VHT80):

| 頻道  | 對應頻率<br>(MHz) | 頻道  | 對應頻率<br>(MHz) |
|-----|---------------|-----|---------------|
| 106 | 5530          | 138 | 5690          |
| 122 | 5610          | 155 | 5775          |

Bluetooth EDR 頻段：

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

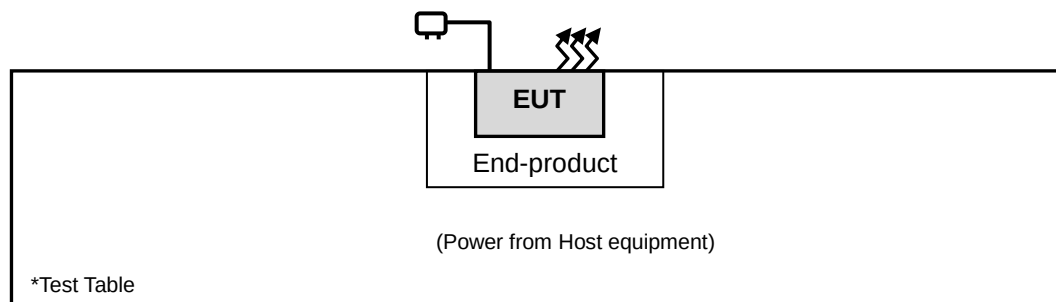
Bluetooth LE 4.2 頻段：

| 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       |

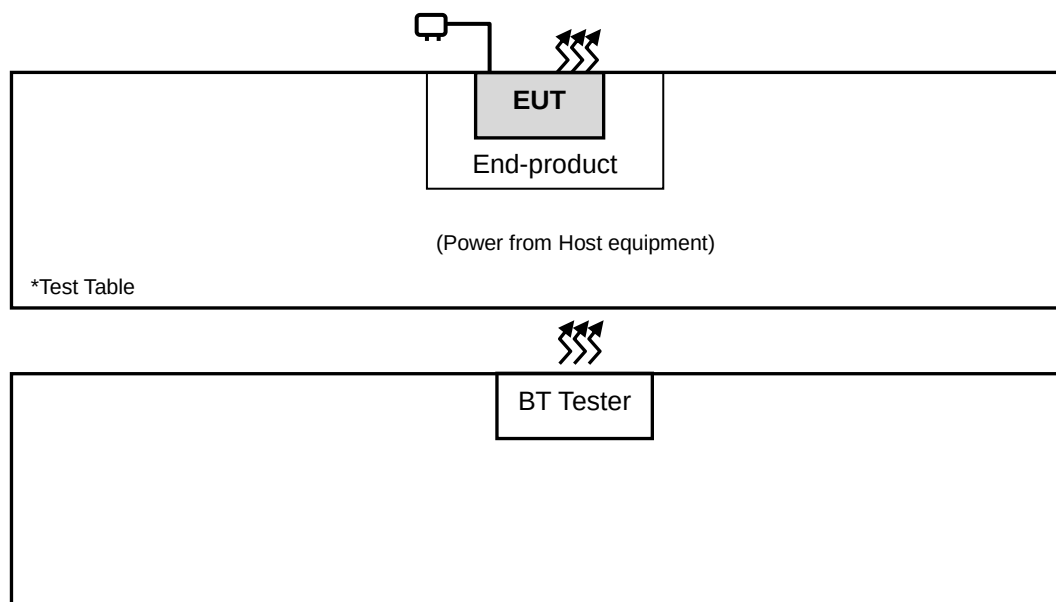
詳細之規格請參考使用說明書。

## 2.2 測試架構圖

### <WLAN & Bluetooth LE>



### <Bluetooth EDR>



### 3 適用規範

#### 3.1 規範要求

##### ► Bluetooth 4.2 LE 頻段部分：

##### (1) 帶外發射之規定

依據國家通訊傳播委員會低功率射頻電機技術規範 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。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      |

##### (2) 天線之規定

天線規格不受第 2.2 節規定之限制。

##### (3) 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 節(3)之規定如下：

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

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

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

##### (4) 峰值輸出功率之要求

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。

►WLAN 頻段部分:

(5) 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。

(2) 操作於 5.15~5.35 GHz 及 5.470~5.725 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 4.7.4.1 節之要求,帶外發射之有效等向輻射功率(EIRP)≤-27 dBm/MHz。

(3) 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 4.7.4.2 節之要求,所有頻帶邊緣向外 5 MHz 內頻率之發射,有效等向輻射功率(EIRP)≤27 dBm/MHz~15.6 dBm/MHz (以線性法計算對應之限制值);所有頻帶邊緣向外 5 MHz~25 MHz,有效等向輻射功率 35 (EIRP)≤15.6 dBm/MHz~10 dBm/MHz (以線性法計算對應之限制值);所有頻帶邊緣外 25 MHz~75 MHz,有效等向輻射功率(EIRP)≤10 dBm/MHz~-27 dBm/MHz (以線性法計算對應之限制值);所有頻帶邊緣外≥75 MHz 的頻率之發射,有效等向輻射功率(EIRP)≤-27 dBm/MHz;有關遮罩限制值詳圖 1。

在 5.725~5.850 GHz 頻段操作且天線增益大於 10 dBi 之設備於 106 年 3 月 2 日前得適用 3.10.1.5 帶外發射限制;在 5.725~5.850 GHz 頻段操作且天線增益小於等於 10 dBi 之設備於 107 年 3 月 2 日前得適用 3.10.1.5 帶外發射限制規定。

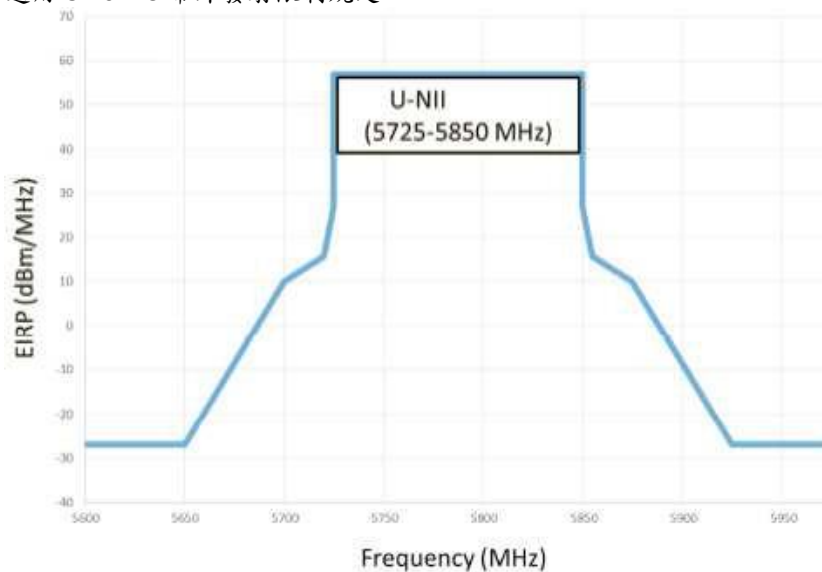


圖 1

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 |

(6) 天線之規定

天線規格不受第 2.2 節規定之限制。

(7) 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。

(2) 操作於 5.15~5.25 GHz 頻段：

- (A) 供戶外操作使用：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及最大功率頻譜密度。在水平面仰角超過 30 度時，其最大 EIRP 應小於或等於 21 dBm。
- (B) 供室內操作使用：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及最大功率頻譜密度。
- (C) 供固定式點對點操作使用：使用超過 23 dBi 方向增益之指向性天線時，應依超過 23 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率及最大功率頻譜密度。固定式點對點操作，不包括點對多點系統、全方向性應用及多台共站發射機傳送相同資訊。
- (D) 供用戶端裝置(Client Device)操作使用：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及最大功率頻譜密度。

(3) 操作於 5.25~5.35 GHz 與 5.470~5.725 GHz 頻段：

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及最大功率頻譜密度。

(4) 操作於 5.725~5.850 GHz 頻段：

- (A) 供固定式點對點操作時，使用方向增益超過 6 dBi 之發射天線，可不需對應減少發射器之傳導輸出功率限制值。
- (B) 除(A)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及最大功率頻譜密度。

(8) 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。

(2) 操作於 5.15~5.25 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 4.7.3.1 節之要求:

(A) 供戶外操作使用/供室內操作使用/供固定式點對點操作使用: 最大傳導輸出功率應小於或等於 1 W。

(B) 供用戶端裝置(Client Device)操作使用: 最大傳導輸出功率應小於或等於 250 mW。

(3) 操作於 5.25~5.35 GHz 及 5.470~5.725 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 4.7.3.2 節之規定, 最大傳導輸出功率應小於或等於 250 mW 或  $11 \text{ dBm} + 10 \log B$  (B 是 26 dB 發射頻寬, 單位 MHz)之較小者。

(4) 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 4.7.3.3 節之規定, 最大傳導輸出功率應小於或等於 1 W。

► Bluetooth EDR 頻段部分：

(9) 帶外發射之規定

依據國家通訊傳播委員會低功率射頻電機技術規範 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。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      |

(10) 天線之規定

天線規格不受第 2.2 節規定之限制。

(11) 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 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。

(12) 峰值輸出功率之要求

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：

操作於 2400 MHz~2483.5 MHz 者

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

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

### 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(5)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

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

接收諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz；Average 為 RBW = 1 MHz, VBW = 10 Hz

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

| Description & Manufacturer                     | Model No.              | Serial No.                                             | Date Of Calibration | Due Date Of Calibration |
|------------------------------------------------|------------------------|--------------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | N9038A                 | MY51210203                                             | Feb. 17, 2017       | Feb. 16, 2018           |
| Spectrum Analyzer<br>Agilent                   | N9010A                 | MY52220314                                             | Nov. 24, 2017       | Nov. 23, 2018           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168              | 9168-153                                               | Dec. 06, 2017       | Dec. 05, 2018           |
| Double Ridge Guide Horn<br>Antenna EMCO        | 3115                   | 5619                                                   | Nov. 30, 2017       | Nov. 29, 2018           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB 9168              | 9168-153                                               | Dec. 06, 2017       | Dec. 05, 2018           |
| RF signal cable<br>ETS-LINDGREN                | 5D-FB                  | Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SM S-400) | Jun. 23, 2017       | Jun. 22, 2018           |
| Loop Antenna                                   | EM-6879                | 269                                                    | Aug. 11, 2017       | Aug. 10, 2018           |
| Preamplifier<br>EMCI                           | EMC001340              | 980201                                                 | Nov. 01, 2017       | Oct. 30, 2018           |
| Bluetooth Tester                               | CBT                    | 100946                                                 | Jul. 29, 2016       | Jul. 28, 2018           |
| Preamplifier<br>EMCI                           | EMC 012645             | 980115                                                 | Oct. 20, 2017       | Oct. 19, 2018           |
| Preamplifier<br>EMCI                           | EMC 184045             | 980116                                                 | Oct. 20, 2017       | Oct. 19, 2018           |
| Preamplifier<br>EMCI                           | EMC 330H               | 980112                                                 | Oct. 13, 2017       | Oct. 12, 2018           |
| RF Coaxial Cable<br>HUBER+SUHNNER              | EMC104-SM-SM-8000&3000 | 140811+170717                                          | Oct. 20, 2017       | Oct. 19, 2018           |
| RF Coaxial Cable<br>HUBER+SUHNNER              | SUCOFLEX 104           | EMC104-SM-SM-1000(140807)                              | Oct. 20, 2017       | Oct. 19, 2018           |
| RF Coaxial Cable<br>Worken                     | 8D-FB                  | Cable-Ch10-01                                          | Oct. 20, 2017       | Oct. 19, 2018           |
| Software<br>BV ADT                             | E3<br>6.120103         | NA                                                     | NA                  | NA                      |
| Antenna Tower<br>MF                            | MFA-440H               | NA                                                     | NA                  | NA                      |
| Turn Table<br>MF                               | MFT-201SS              | NA                                                     | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802                | NA                                                     | NA                  | NA                      |

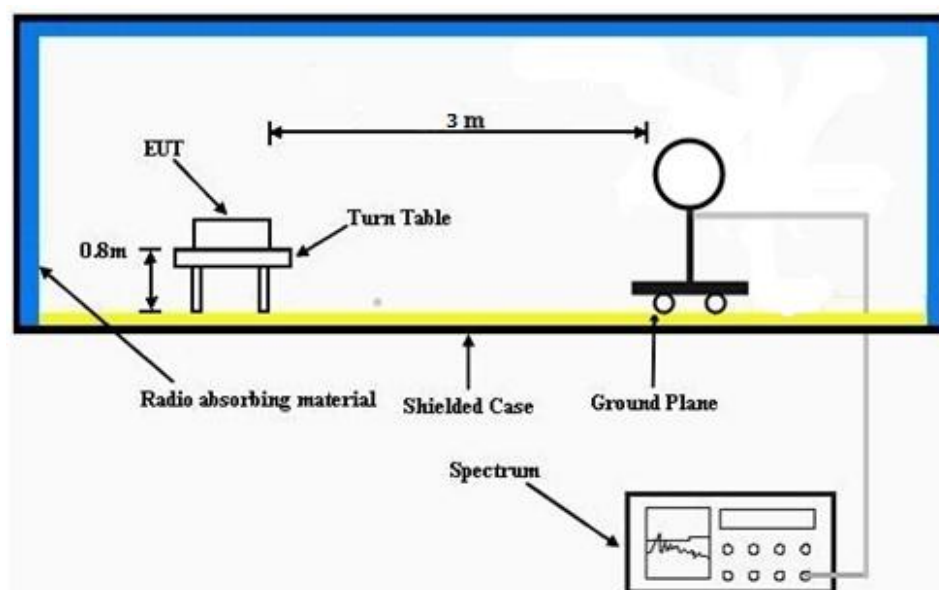
#### NOTE:

1. The calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC7450F-10.
6. 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.

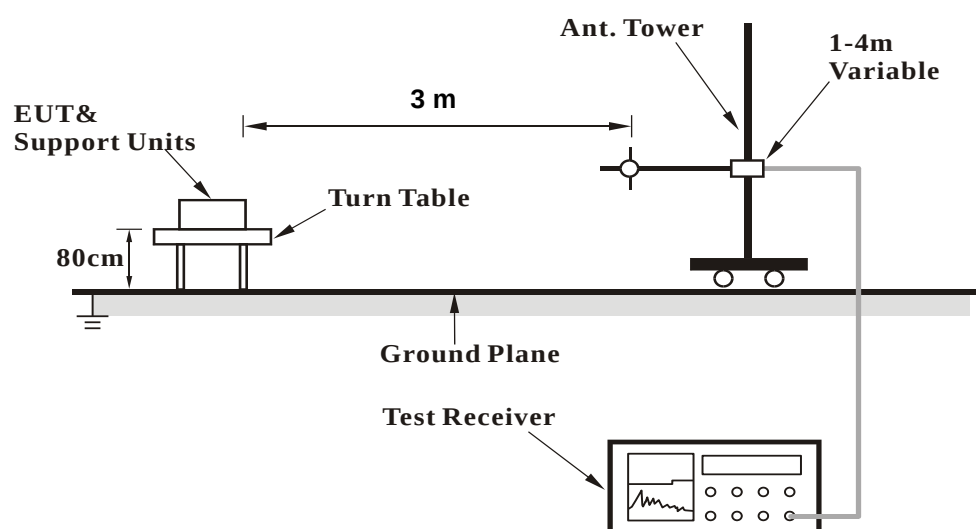
| Measurement        | Frequency         | Uncertainty |
|--------------------|-------------------|-------------|
| Radiated emissions | 30 MHz ~ 200 MHz  | 2.93 dB     |
|                    | 200 MHz ~1000 MHz | 2.95 dB     |
|                    | 1 GHz ~ 18 GHz    | 2.26 dB     |
|                    | 18 GHz ~ 40 GHz   | 1.94 dB     |

#### 4.4 測試配置

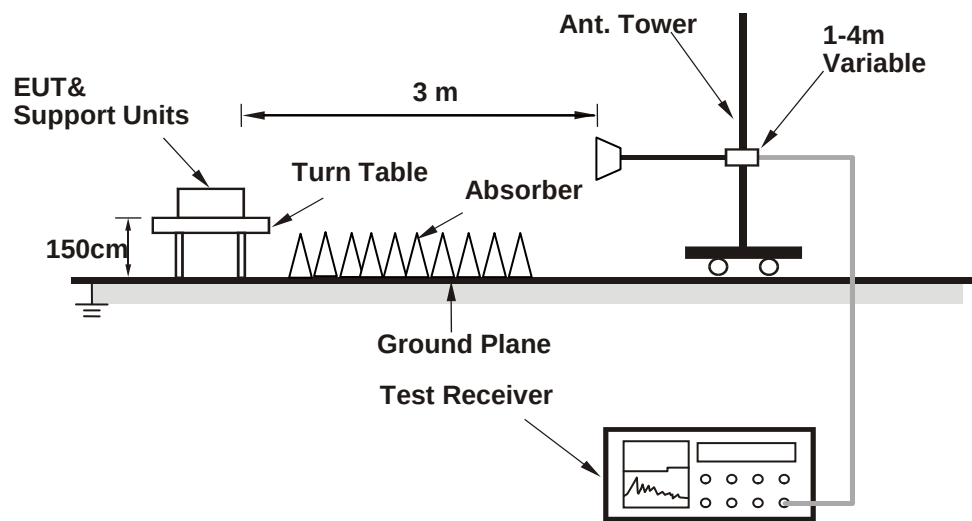
<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range below 1 GHz>



# <Frequency Range above 1 GHz>



## 4.5 場強度之計算

場強之計算公式如下：

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

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

量測結果請見下頁。

## 4.6 量測結果

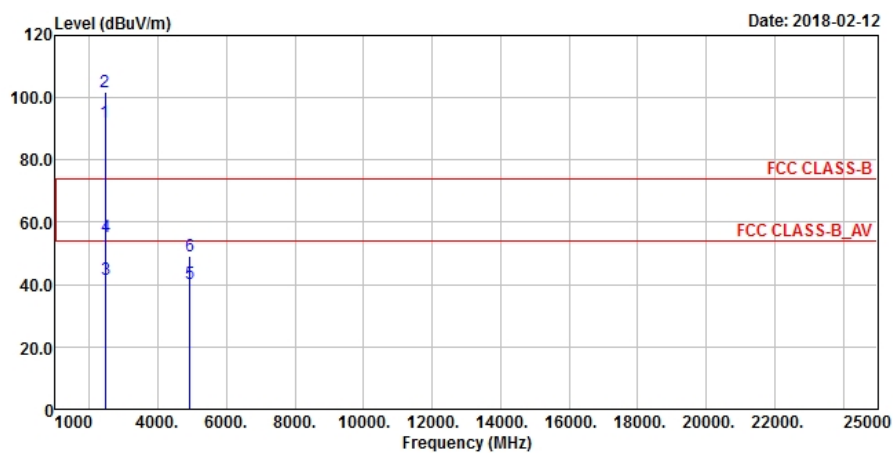
### 4.6.1 發射諧波

測試模式一

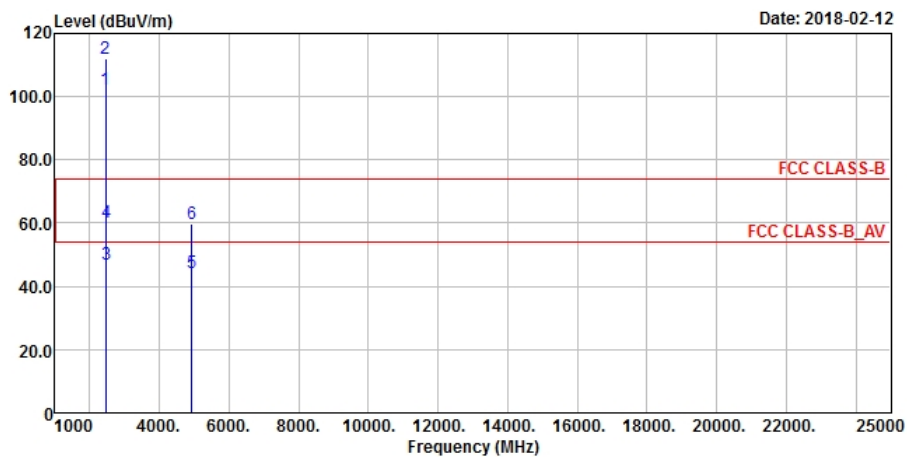
802.11n (HT20)

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

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2462                                                | 92.25                   | 97.77             |                |             | 27.46                 | 4.41            | 37.39              | 286                 | 54                   | Average |
| 2462                                                | 102.02                  | 107.54            |                |             | 27.46                 | 4.41            | 37.39              | 286                 | 54                   | Peak    |
| 2483.76                                             | 41.56                   | 46.92             | 54             | -12.44      | 27.53                 | 4.43            | 37.32              | 286                 | 54                   | Average |
| 2483.76                                             | 55.25                   | 60.61             | 74             | -18.75      | 27.53                 | 4.43            | 37.32              | 286                 | 54                   | Peak    |
| 4924                                                | 40.25                   | 54.91             | 54             | -13.75      | 31.34                 | 6.89            | 52.89              | 239                 | 65                   | Average |
| 4924                                                | 49.25                   | 63.91             | 74             | -24.75      | 31.34                 | 6.89            | 52.89              | 239                 | 65                   | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2462                                                | 102.25                  | 107.77            |                |             | 27.46                 | 4.41            | 37.39              | 234                 | 348                  | Average |
| 2462                                                | 112.23                  | 117.75            |                |             | 27.46                 | 4.41            | 37.39              | 234                 | 348                  | Peak    |
| 2483.52                                             | 47.14                   | 52.5              | 54             | -6.86       | 27.53                 | 4.43            | 37.32              | 234                 | 348                  | Average |
| 2483.52                                             | 60.25                   | 65.61             | 74             | -13.75      | 27.53                 | 4.43            | 37.32              | 234                 | 348                  | Peak    |
| 4924                                                | 44.25                   | 59.27             | 54             | -9.75       | 31.12                 | 6.89            | 53.03              | 135                 | 226                  | Average |
| 4924                                                | 59.65                   | 74.67             | 74             | -14.35      | 31.12                 | 6.89            | 53.03              | 135                 | 226                  | Peak    |

Remarks:

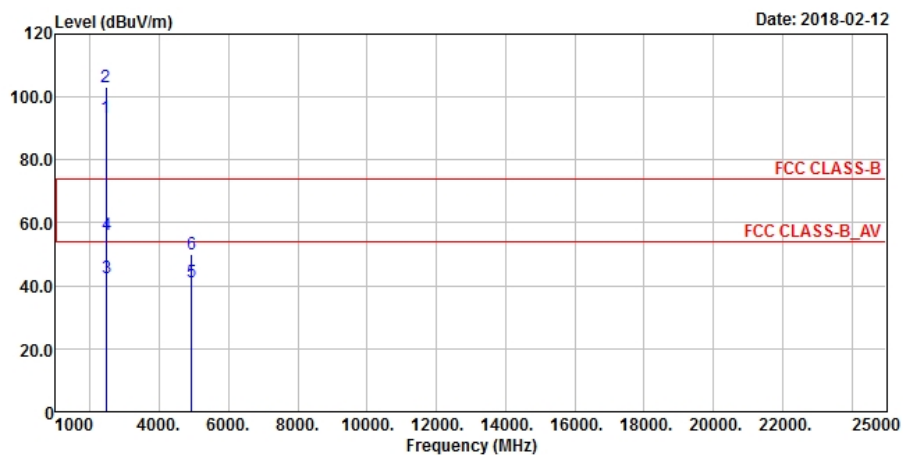
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- 2462 MHz: Fundamental Frequency.
- The other emission levels were very low against the limit.

## 測試模式二

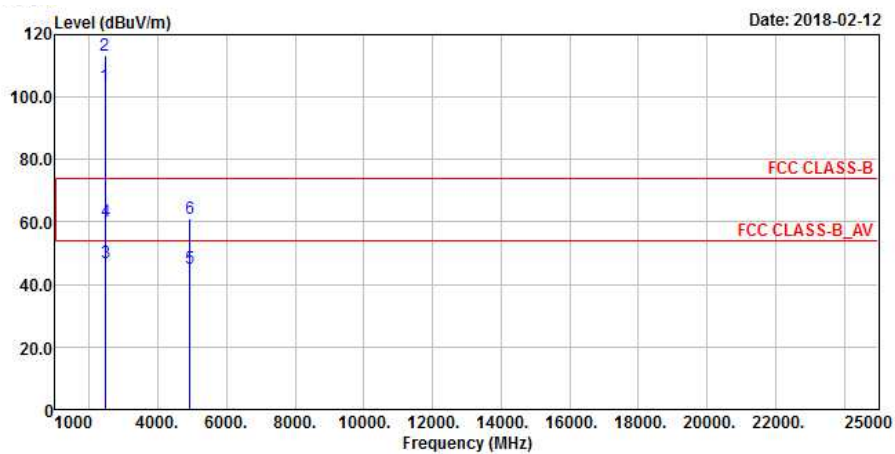
### 802.11n (HT20)

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

## Horizontal



## Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2462                                                | 93.23                   | 98.75             |                |             | 27.46                 | 4.41            | 37.39              | 111                 | 123                  | Average |
| 2462                                                | 103.12                  | 108.64            |                |             | 27.46                 | 4.41            | 37.39              | 111                 | 123                  | Peak    |
| 2483.99                                             | 42.36                   | 47.72             | 54             | -11.64      | 27.53                 | 4.43            | 37.32              | 102                 | 236                  | Average |
| 2483.99                                             | 56.37                   | 61.73             | 74             | -17.63      | 27.53                 | 4.43            | 37.32              | 102                 | 236                  | Peak    |
| 4924                                                | 40.97                   | 55.63             | 54             | -13.03      | 31.34                 | 6.89            | 52.89              | 222                 | 123                  | Average |
| 4924                                                | 49.92                   | 64.58             | 74             | -24.08      | 31.34                 | 6.89            | 52.89              | 222                 | 123                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2462                                                | 103.52                  | 109.04            |                |             | 27.46                 | 4.41            | 37.39              | 102                 | 236                  | Average |
| 2462                                                | 113.52                  | 119.04            |                |             | 27.46                 | 4.41            | 37.39              | 102                 | 236                  | Peak    |
| 2483.63                                             | 46.87                   | 52.23             | 54             | -7.13       | 27.53                 | 4.43            | 37.32              | 111                 | 165                  | Average |
| 2483.63                                             | 60.32                   | 65.68             | 74             | -13.68      | 27.53                 | 4.43            | 37.32              | 111                 | 165                  | Peak    |
| 4924                                                | 45.02                   | 60.04             | 54             | -8.98       | 31.12                 | 6.89            | 53.03              | 132                 | 165                  | Average |
| 4924                                                | 60.98                   | 76                | 74             | -13.02      | 31.12                 | 6.89            | 53.03              | 132                 | 165                  | Peak    |

Remarks:

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

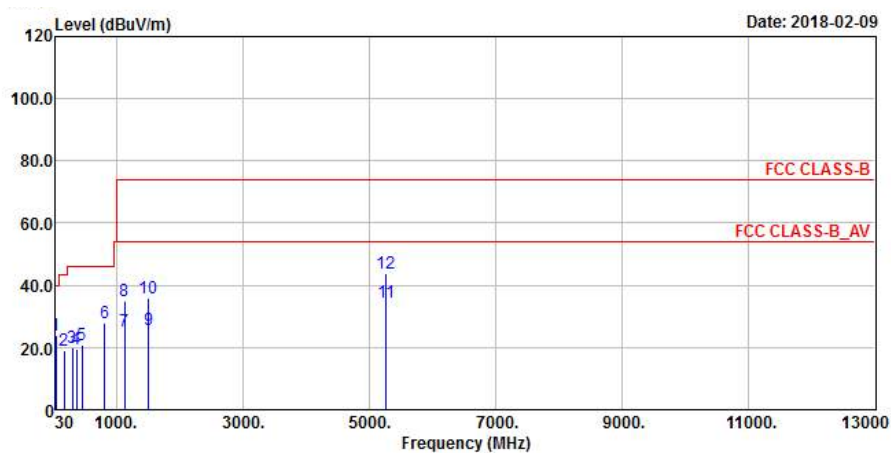
## 4.6.2 接收諧波

### 測試模式一

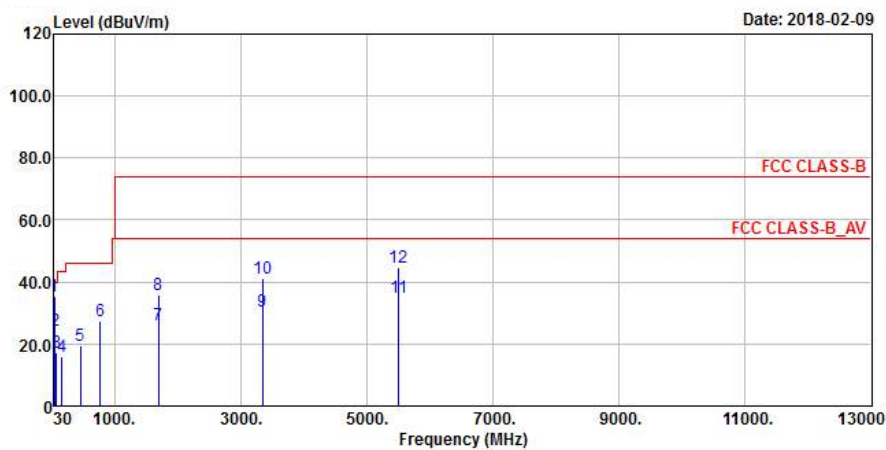
### 802.11n (HT20)

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 11         | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30.97                                               | 23.93                   | 42.46             | 40             | -16.07      | 12.14                 | 0.45            | 31.12              | 104                 | 87                   | Peak    |
| 167.74                                              | 19.16                   | 37.9              | 43.5           | -24.34      | 11.96                 | 1.06            | 31.76              | 103                 | 151                  | Peak    |
| 296.75                                              | 19.77                   | 37.07             | 46             | -26.23      | 12.85                 | 1.64            | 31.79              | 112                 | 338                  | Peak    |
| 361.74                                              | 19.47                   | 35.07             | 46             | -26.53      | 14.43                 | 1.93            | 31.96              | 122                 | 59                   | Peak    |
| 443.22                                              | 20.97                   | 34.51             | 46             | -25.03      | 16.2                  | 2.25            | 31.99              | 115                 | 223                  | Peak    |
| 804.06                                              | 28.04                   | 33.51             | 46             | -17.96      | 22.28                 | 3.69            | 31.44              | 110                 | 92                   | Peak    |
| 1115                                                | 25.16                   | 50.26             | 54             | -28.84      | 25.06                 | 3.29            | 53.45              | 154                 | 256                  | Average |
| 1115                                                | 35.19                   | 60.29             | 74             | -38.81      | 25.06                 | 3.29            | 53.45              | 154                 | 256                  | Peak    |
| 1495                                                | 25.69                   | 50.26             | 54             | -28.31      | 25.38                 | 3.82            | 53.77              | 254                 | 165                  | Average |
| 1495                                                | 35.85                   | 60.42             | 74             | -38.15      | 25.38                 | 3.82            | 53.77              | 254                 | 165                  | Peak    |
| 5255                                                | 34.47                   | 48.67             | 54             | -19.53      | 31.63                 | 7.14            | 52.97              | 154                 | 245                  | Average |
| 5255                                                | 44.02                   | 58.22             | 74             | -29.98      | 31.63                 | 7.14            | 52.97              | 154                 | 245                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30.97                                               | 35.45                   | 53.98             | 40             | -4.55       | 12.14                 | 0.45            | 31.12              | 127                 | 67                   | Peak    |
| 42.61                                               | 24.26                   | 41.26             | 40             | -15.74      | 13.58                 | 0.5             | 31.08              | 123                 | 294                  | Peak    |
| 66.86                                               | 17.09                   | 37.03             | 40             | -22.91      | 11.12                 | 0.62            | 31.68              | 138                 | 75                   | Peak    |
| 156.1                                               | 16                      | 34.05             | 43.5           | -27.5       | 12.72                 | 1               | 31.77              | 130                 | 156                  | Peak    |
| 442.25                                              | 19.51                   | 33.09             | 46             | -26.49      | 16.18                 | 2.24            | 32                 | 133                 | 15                   | Peak    |
| 765.26                                              | 27.26                   | 33.34             | 46             | -18.74      | 21.74                 | 3.56            | 31.38              | 140                 | 227                  | Peak    |
| 1690                                                | 25.99                   | 50.21             | 54             | -28.01      | 25.4                  | 4.08            | 53.7               | 254                 | 298                  | Average |
| 1690                                                | 36.07                   | 60.29             | 74             | -37.93      | 25.4                  | 4.08            | 53.7               | 254                 | 298                  | Peak    |
| 3335                                                | 30.39                   | 50.15             | 54             | -23.61      | 28.66                 | 5.67            | 54.09              | 165                 | 214                  | Average |
| 3335                                                | 41.17                   | 60.93             | 74             | -32.83      | 28.66                 | 5.67            | 54.09              | 165                 | 214                  | Peak    |
| 5500                                                | 35.02                   | 48.52             | 54             | -18.98      | 31.81                 | 7.26            | 52.57              | 114                 | 258                  | Average |
| 5500                                                | 44.9                    | 58.4              | 74             | -29.1       | 31.81                 | 7.26            | 52.57              | 114                 | 258                  | Peak    |

Remarks:

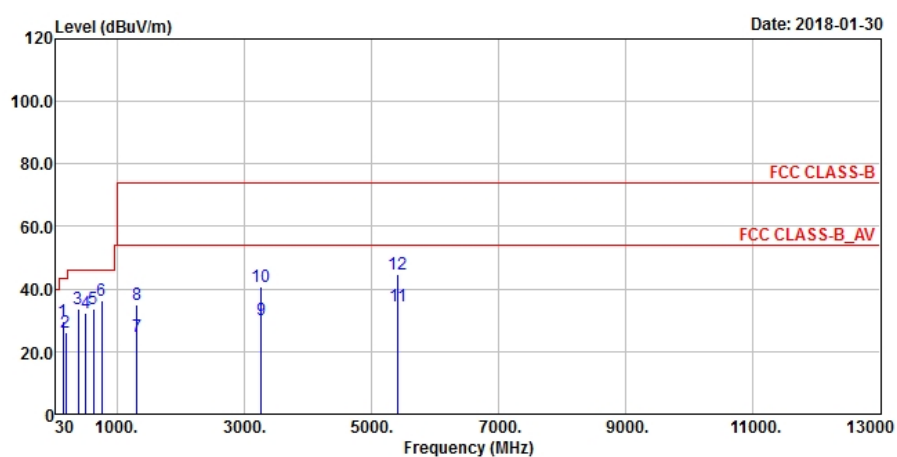
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

## 測試模式二

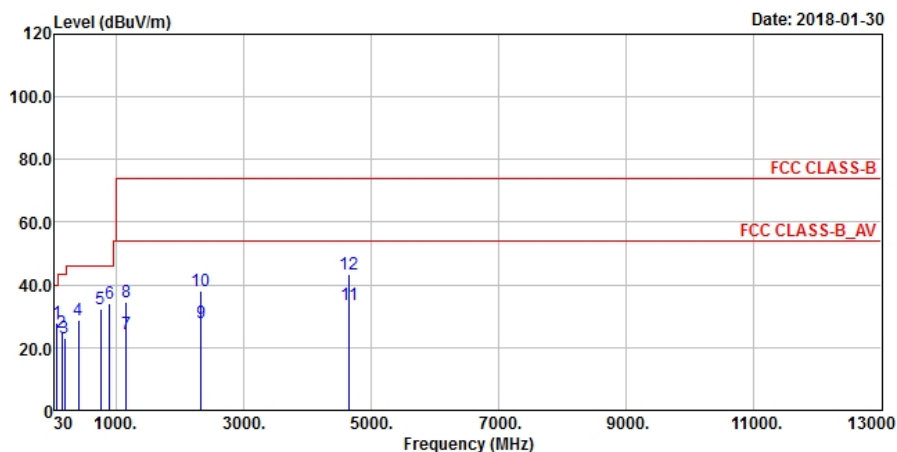
### 802.11n (HT20)

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 11         | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang                                 |

## Horizontal



## Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 136.7                                               | 29.79                   | 48.44             | 43.5           | -13.71      | 12.14                 | 0.92            | 31.71              | 145                 | 214                  | Peak    |
| 189.08                                              | 26.28                   | 46.68             | 43.5           | -17.22      | 10.12                 | 1.17            | 31.69              | 205                 | 214                  | Peak    |
| 378.23                                              | 33.84                   | 48.96             | 46             | -12.16      | 14.82                 | 2               | 31.94              | 165                 | 145                  | Peak    |
| 502.39                                              | 32.11                   | 43.82             | 46             | -13.89      | 17.37                 | 2.53            | 31.61              | 203                 | 214                  | Peak    |
| 624.61                                              | 33.51                   | 42.76             | 46             | -12.49      | 19.9                  | 3.01            | 32.16              | 198                 | 254                  | Peak    |
| 749.74                                              | 36.34                   | 42.61             | 46             | -9.66       | 21.52                 | 3.51            | 31.3               | 125                 | 124                  | Peak    |
| 1310                                                | 24.91                   | 49.64             | 54             | -29.09      | 25.22                 | 3.59            | 53.54              | 131                 | 255                  | Average |
| 1310                                                | 34.88                   | 59.61             | 74             | -39.12      | 25.22                 | 3.59            | 53.54              | 131                 | 255                  | Peak    |
| 3265                                                | 30.33                   | 50.13             | 54             | -23.67      | 28.61                 | 5.62            | 54.03              | 125                 | 265                  | Average |
| 3265                                                | 40.65                   | 60.45             | 74             | -33.35      | 28.61                 | 5.62            | 54.03              | 125                 | 265                  | Peak    |
| 5410                                                | 34.72                   | 48.52             | 54             | -19.28      | 31.74                 | 7.18            | 52.72              | 215                 | 326                  | Average |
| 5410                                                | 44.8                    | 58.6              | 74             | -29.2       | 31.74                 | 7.18            | 52.72              | 215                 | 326                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 67.83                                               | 27.77                   | 47.87             | 40             | -12.23      | 11                    | 0.63            | 31.73              | 125                 | 124                  | Peak    |
| 136.7                                               | 24.96                   | 43.61             | 43.5           | -18.54      | 12.14                 | 0.92            | 31.71              | 201                 | 145                  | Peak    |
| 188.11                                              | 22.97                   | 43.32             | 43.5           | -20.53      | 10.19                 | 1.16            | 31.7               | 123                 | 214                  | Peak    |
| 405.39                                              | 28.72                   | 43.21             | 46             | -17.28      | 15.45                 | 2.11            | 32.05              | 158                 | 145                  | Peak    |
| 749.74                                              | 32.21                   | 38.48             | 46             | -13.79      | 21.52                 | 3.51            | 31.3               | 203                 | 214                  | Peak    |
| 897.18                                              | 34.01                   | 38.52             | 46             | -11.99      | 23.47                 | 4.02            | 32                 | 201                 | 214                  | Peak    |
| 1150                                                | 24.56                   | 49.58             | 54             | -29.44      | 25.09                 | 3.35            | 53.46              | 214                 | 125                  | Average |
| 1150                                                | 34.51                   | 59.53             | 74             | -39.49      | 25.09                 | 3.35            | 53.46              | 214                 | 125                  | Peak    |
| 2325                                                | 28.05                   | 50.26             | 54             | -25.95      | 26.85                 | 4.77            | 53.83              | 147                 | 201                  | Average |
| 2325                                                | 37.88                   | 60.09             | 74             | -36.12      | 26.85                 | 4.77            | 53.83              | 147                 | 201                  | Peak    |
| 4650                                                | 33.7                    | 49.53             | 54             | -20.3       | 30.87                 | 6.68            | 53.38              | 221                 | 165                  | Average |
| 4650                                                | 43.51                   | 59.34             | 74             | -30.49      | 30.87                 | 6.68            | 53.38              | 221                 | 165                  | Peak    |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- 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.

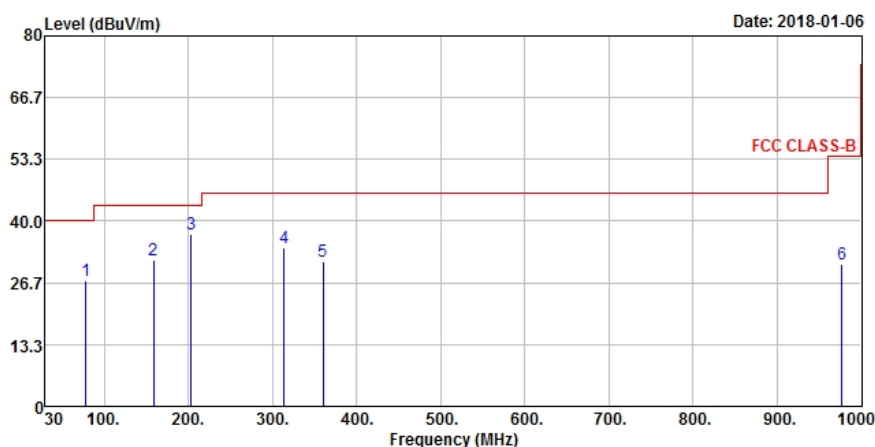
##### 30 MHz ~ 1 GHz Data:

測試模式一

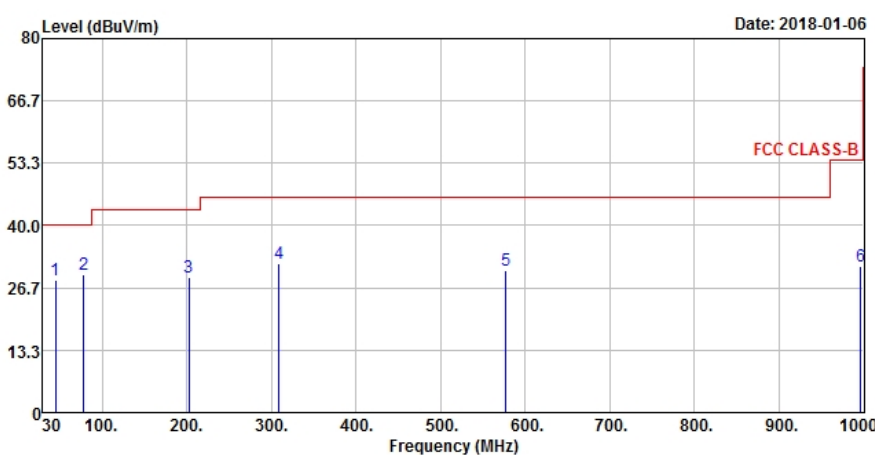
##### 802.11n (HT20)

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 11         | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang                 |

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 78.5                                                | 27.24                   | 49.53             | 40             | -12.76      | 8.61                  | 0.67            | 31.57              | 200                 | 0                    | Peak   |
| 159.01                                              | 31.56                   | 49.66             | 43.5           | -11.94      | 12.73                 | 1.02            | 31.85              | 325                 | 125                  | Peak   |
| 203.63                                              | 37.32                   | 58.25             | 43.5           | -6.18       | 9.52                  | 1.25            | 31.7               | 111                 | 185                  | Peak   |
| 314.21                                              | 34.3                    | 51.22             | 46             | -11.7       | 13.29                 | 1.72            | 31.93              | 232                 | 251                  | Peak   |
| 359.8                                               | 31.15                   | 46.82             | 46             | -14.85      | 14.38                 | 1.92            | 31.97              | 111                 | 185                  | Peak   |
| 976.72                                              | 30.84                   | 34.33             | 54             | -23.16      | 23.94                 | 4.35            | 31.78              | 111                 | 165                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 44.55                                               | 28.29                   | 45.32             | 40             | -11.71      | 13.6                  | 0.51            | 31.14              | 325                 | 265                  | Peak   |
| 78.5                                                | 29.64                   | 51.93             | 40             | -10.36      | 8.61                  | 0.67            | 31.57              | 111                 | 185                  | Peak   |
| 202.66                                              | 28.83                   | 49.83             | 43.5           | -14.67      | 9.48                  | 1.24            | 31.72              | 222                 | 251                  | Peak   |
| 309.36                                              | 31.88                   | 48.96             | 46             | -14.12      | 13.17                 | 1.69            | 31.94              | 326                 | 251                  | Peak   |
| 577.08                                              | 30.3                    | 40.53             | 46             | -15.7       | 19.08                 | 2.8             | 32.11              | 111                 | 154                  | Peak   |
| 996.12                                              | 31.33                   | 34.63             | 54             | -22.67      | 24.05                 | 4.41            | 31.76              | 111                 | 125                  | Peak   |

Remarks:

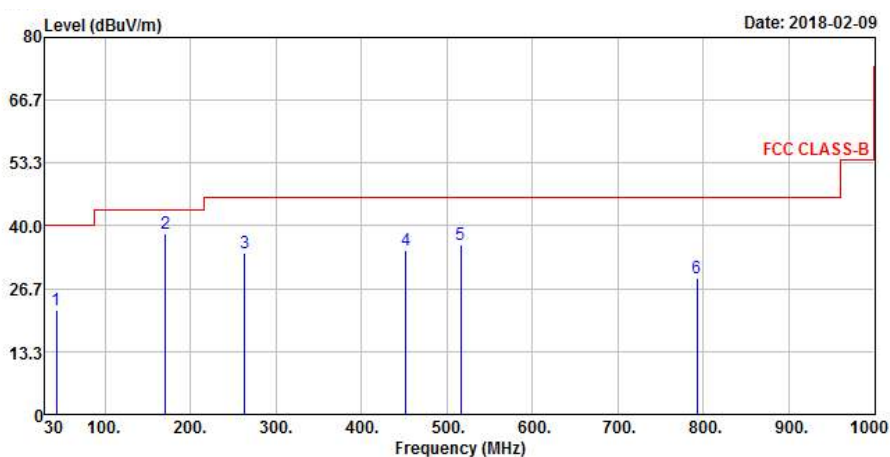
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

## 測試模式二

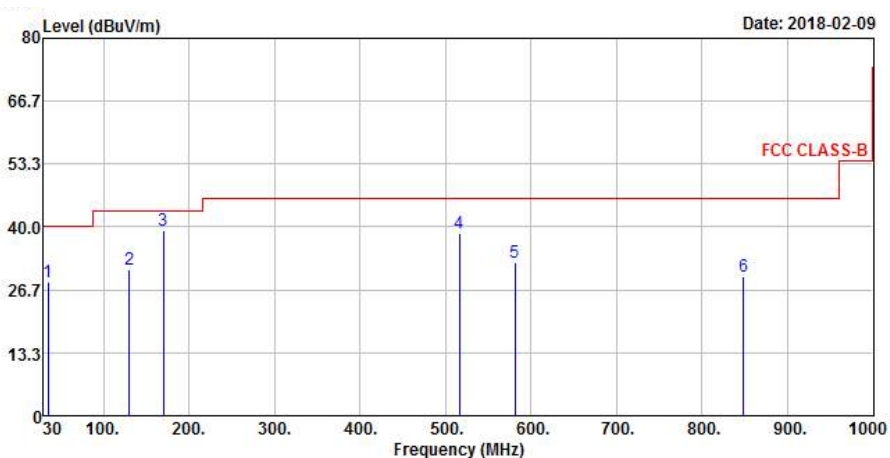
### 802.11n (HT20)

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 11         | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                   |

## Horizontal



## Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 43.58                                               | 22.21                   | 39.23             | 40             | -17.79      | 13.59                 | 0.5             | 31.11              | 136                 | 285                  | Peak   |
| 170.65                                              | 38.52                   | 57.52             | 43.5           | -4.98       | 11.67                 | 1.07            | 31.74              | 131                 | 349                  | Peak   |
| 263.77                                              | 34.1                    | 52.64             | 46             | -11.9       | 11.88                 | 1.5             | 31.92              | 134                 | 229                  | Peak   |
| 451.95                                              | 34.74                   | 48.06             | 46             | -11.26      | 16.37                 | 2.29            | 31.98              | 146                 | 131                  | Peak   |
| 515.97                                              | 35.95                   | 47.28             | 46             | -10.05      | 17.68                 | 2.57            | 31.58              | 115                 | 122                  | Peak   |
| 792.42                                              | 28.95                   | 34.6              | 46             | -17.05      | 22.12                 | 3.64            | 31.41              | 117                 | 30                   | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 34.85                                               | 28.45                   | 46.25             | 40             | -11.55      | 12.79                 | 0.47            | 31.06              | 108                 | 360                  | Peak   |
| 129.91                                              | 30.86                   | 50.17             | 43.5           | -12.64      | 11.68                 | 0.89            | 31.88              | 107                 | 328                  | Peak   |
| 169.68                                              | 39.21                   | 58.11             | 43.5           | -4.29       | 11.76                 | 1.07            | 31.73              | 119                 | 99                   | Peak   |
| 515.97                                              | 38.59                   | 49.92             | 46             | -7.41       | 17.68                 | 2.57            | 31.58              | 122                 | 286                  | Peak   |
| 580.96                                              | 32.38                   | 42.51             | 46             | -13.62      | 19.17                 | 2.82            | 32.12              | 115                 | 178                  | Peak   |
| 848.68                                              | 29.37                   | 34.55             | 46             | -16.63      | 22.85                 | 3.83            | 31.86              | 123                 | 222                  | Peak   |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- 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 峰值傳導輸出功率之量測

### 5.1 適用標準

請見本報告 3.1 節第(7)及(8)項的規定。

### 5.2 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。

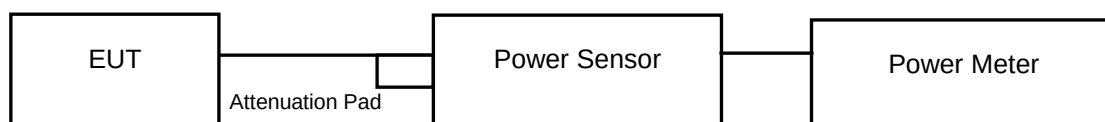
### 5.3 量測儀器

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration | Due Date Of Calibration |
|----------------------------|-----------|------------|---------------------|-------------------------|
| Power Meter<br>Anritsu     | ML2495A   | 1232002    | Dec. 07, 1017       | Dec. 06, 2018           |
| Power Sensor<br>Anritsu    | MA2411B   | 1207325    | Dec. 07, 1017       | Dec. 06, 2018           |

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.

### 5.4 測試配置



## 5.5 量測結果

|        |       |        |                 |
|--------|-------|--------|-----------------|
| 操作模式   | 發射    | 測試日期   | 107 年 03 月 08 日 |
| 量測場地溫度 | 25 °C | 量測場地濕度 | 65 % RH         |
| 測試者    | 吳俊樺   |        |                 |

### 802.11b

| Channel | Frequency (MHz) | Peak Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------|---------|------------------|-------------------|-------------|-------------|
|         |                 | Chain 0          | Chain 1 |                  |                   |             |             |
| 1       | 2412            | 20.18            | 20.22   | 209.43           | 23.21             | 30          | Pass        |
| 6       | 2437            | 20.31            | 20.54   | 220.64           | 23.44             | 30          | Pass        |
| 11      | 2462            | 20.23            | 20.59   | 219.99           | 23.42             | 30          | Pass        |

### 802.11g

| Channel | Frequency (MHz) | Peak Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------|---------|------------------|-------------------|-------------|-------------|
|         |                 | Chain 0          | Chain 1 |                  |                   |             |             |
| 1       | 2412            | 19.23            | 19.80   | 179.25           | 22.53             | 30          | Pass        |
| 6       | 2437            | 23.51            | 23.92   | 470.99           | 26.73             | 30          | Pass        |
| 11      | 2462            | 19.24            | 19.63   | 175.78           | 22.45             | 30          | Pass        |

### 802.11n (HT20)

| Channel | Frequency (MHz) | Peak Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------|---------|------------------|-------------------|-------------|-------------|
|         |                 | Chain 0          | Chain 1 |                  |                   |             |             |
| 1       | 2412            | 19.06            | 19.22   | 164.10           | 22.15             | 30          | Pass        |
| 6       | 2437            | 23.77            | 23.81   | 478.67           | 26.80             | 30          | Pass        |
| 11      | 2462            | 18.83            | 18.95   | 154.91           | 21.90             | 30          | Pass        |

### 802.11n (HT40)

| Channel | Frequency (MHz) | Peak Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------|---------|------------------|-------------------|-------------|-------------|
|         |                 | Chain 0          | Chain 1 |                  |                   |             |             |
| 3       | 2422            | 17.33            | 17.11   | 105.48           | 20.23             | 30          | Pass        |
| 6       | 2437            | 19.63            | 20.21   | 196.79           | 22.94             | 30          | Pass        |
| 9       | 2452            | 14.86            | 15.21   | 63.81            | 18.05             | 30          | Pass        |

## 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。

## U-NII-2A / U-NII-2C / U-NII-3 頻段測試紀錄結果

### 6 場強輻射及開放頻帶邊緣之量測

#### 6.1 適用標準

| 待測物操作頻帶                                                 | 適用標準                   |
|---------------------------------------------------------|------------------------|
| <input checked="" type="checkbox"/> 5.25 GHz~5.35 GHz   | 請見本報告 3.1 節第(5)項(2)的規定 |
| <input checked="" type="checkbox"/> 5.470 GHz~5.725 GHz | 請見本報告 3.1 節第(5)項(2)的規定 |
| <input checked="" type="checkbox"/> 5.725 GHz~5.850 GHz | 請見本報告 3.1 節第(5)項(3)的規定 |

#### 6.2 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

802.11a 為 RBW = 1 MHz, VBW = 1 kHz

802.11n (HT40) 為 RBW = 1 MHz, VBW = 2 kHz

802.11ac (VHT80) 為 RBW = 1 MHz, VBW = 3 kHz

接收諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz ; Average 為 RBW = 1 MHz, VBW = 10 Hz

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

#### 6.3 量測場強輻射之儀器

同 4.3 節

#### 6.4 輻射之測試配置

同 4.4 節

## 6.5 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)

\*有效等向輻射功率限制值轉換場強值如下：

| Applicable To                                                                                                        |                                     |                | Limit                                                                                                                                   |                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| 789033 D02 General UNII Test Procedure New Rules v02r01                                                              |                                     |                | Field Strength at 3 m                                                                                                                   |                                                                                                                                             |
|                                                                                                                      |                                     |                | PK: 74 (dBμV/m)                                                                                                                         | AV: 54 (dBμV/m)                                                                                                                             |
| 操作頻帶                                                                                                                 | Applicable To                       |                | EIRP Limit                                                                                                                              | Equivalent Field Strength at 3 m                                                                                                            |
| 5250~5350 MHz                                                                                                        | 技術規範 4.7.4.1 節                      |                | PK: -27 (dBm/MHz)                                                                                                                       | PK: 68.2 (dBμV/m)                                                                                                                           |
| 5470~5725 MHz                                                                                                        | 技術規範 4.7.4.1 節                      |                |                                                                                                                                         |                                                                                                                                             |
| 5725~5850 MHz                                                                                                        | <input checked="" type="checkbox"/> | 技術規範 4.7.4.2 節 | PK: -27 (dBm/MHz) <sup>*1</sup><br>PK: 10 (dBm/MHz) <sup>*2</sup><br>PK: 15.6 (dBm/MHz) <sup>*3</sup><br>PK: 27 (dBm/MHz) <sup>*4</sup> | PK: 68.2 (dBμV/m) <sup>*1</sup><br>PK: 105.2 (dBμV/m) <sup>*2</sup><br>PK: 110.8 (dBμV/m) <sup>*3</sup><br>PK: 122.2 (dBμV/m) <sup>*4</sup> |
|                                                                                                                      | <input type="checkbox"/>            | 技術規範 4.7.4.7 節 | 適用 3.10.1.5 節帶外發射限制                                                                                                                     |                                                                                                                                             |
| <sup>*1</sup> beyond 75 MHz or more above of the band edge.                                                          |                                     |                |                                                                                                                                         |                                                                                                                                             |
| <sup>*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.                                 |                                     |                |                                                                                                                                         |                                                                                                                                             |
| <sup>*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.                     |                                     |                |                                                                                                                                         |                                                                                                                                             |
| <sup>*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. |                                     |                |                                                                                                                                         |                                                                                                                                             |

備註：有效等向輻射功率限制值轉換場強之公式如下：

$$E = (30PG)^{1/2} / d$$

E: 以最寬解析頻寬所測得之最大場強值，單位：V/m。

G: 發射天線相對於全向性輻射器之數值增益。

d: 測試場強的距離，單位：m。

P: 求得之功率，單位：W。

量測結果請見下頁。

## 6.6 場強輻射之量測結果

### 6.6.1 發射諧波

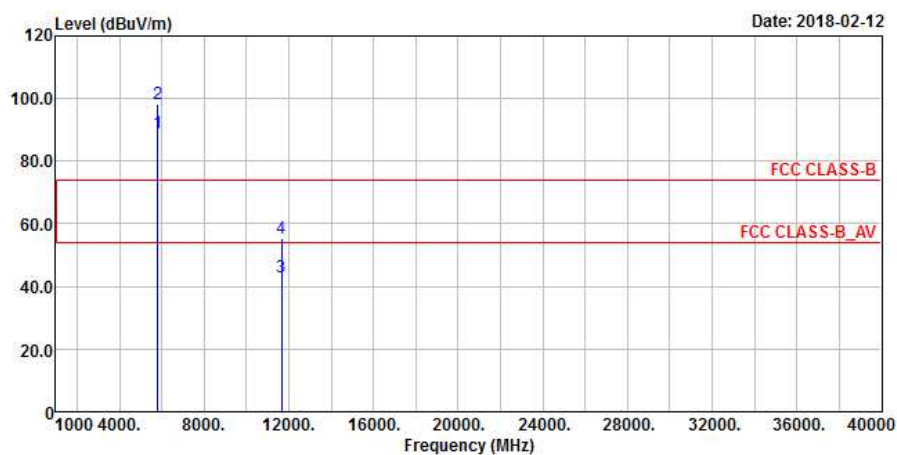
測試模式一

802.11a

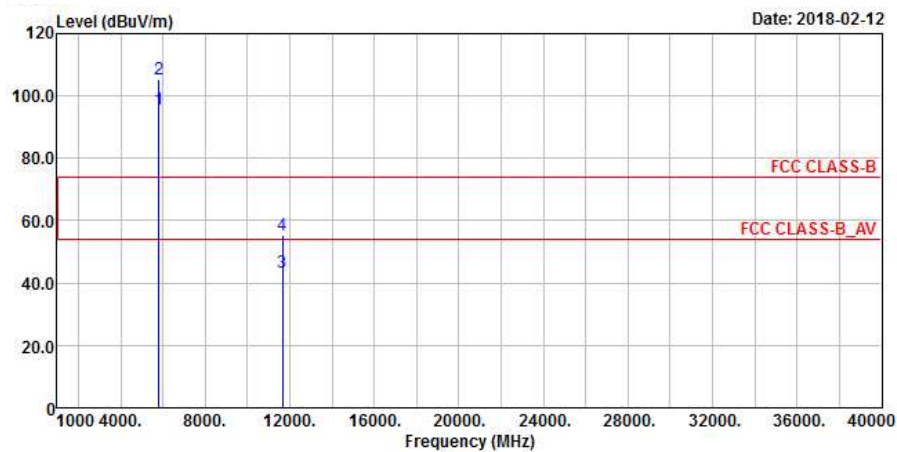
| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 165        | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang              |

### <Spurious Emission>

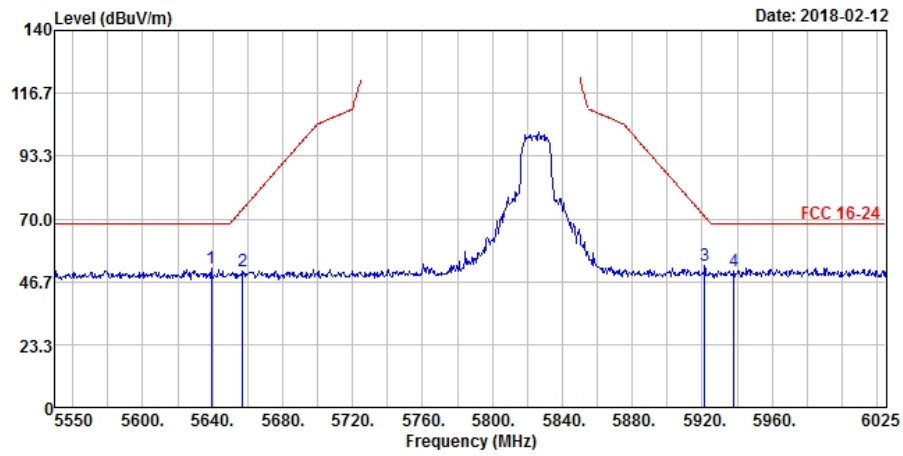
#### Horizontal



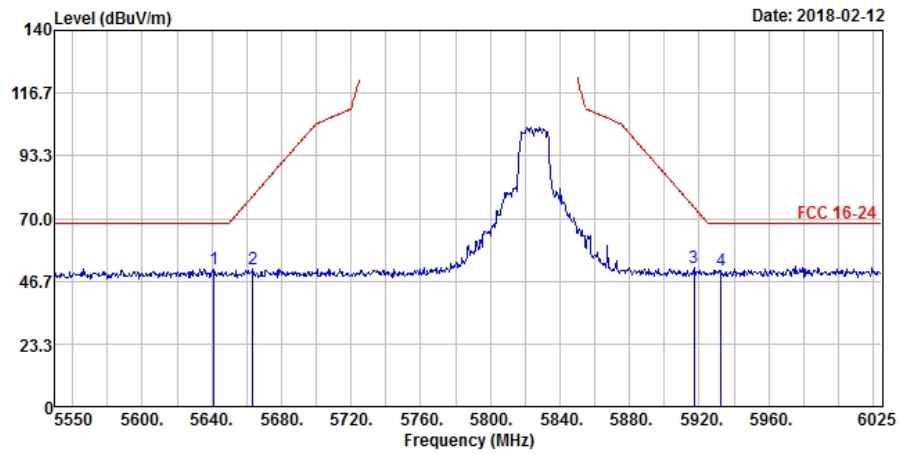
#### Vertical



# <Out of Band Emission (OOBE)> Horizontal



## Vertical



### <Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5825                                                | 89.15                   | 87.49             |                |             | 32.35                 | 6.84            | 37.53              | 133                 | 251                  | Average |
| 5825                                                | 98.47                   | 96.81             |                |             | 32.35                 | 6.84            | 37.53              | 133                 | 251                  | Peak    |
| 11650                                               | 43.09                   | 45.4              | 54             | -10.91      | 40.03                 | 10.8            | 53.14              | 102                 | 236                  | Average |
| 11650                                               | 55.19                   | 57.5              | 74             | -18.81      | 40.03                 | 10.8            | 53.14              | 102                 | 236                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5825                                                | 95.82                   | 94.16             |                |             | 32.35                 | 6.84            | 37.53              | 168                 | 40                   | Average |
| 5825                                                | 105.25                  | 103.59            |                |             | 32.35                 | 6.84            | 37.53              | 168                 | 40                   | Peak    |
| 11650                                               | 43.31                   | 45.62             | 54             | -10.69      | 40.03                 | 10.8            | 53.14              | 111                 | 145                  | Average |
| 11650                                               | 55.32                   | 57.63             | 74             | -18.68      | 40.03                 | 10.8            | 53.14              | 111                 | 145                  | Peak    |

### <Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5639.3                                              | 51.41                   | 49.95             | 68.2           | -16.79      | 32.04                 | 6.7             | 37.28              | 133                 | 251                  | Peak   |
| 5657.35                                             | 50.8                    | 49.37             | 73.66          | -22.86      | 32.06                 | 6.71            | 37.34              | 133                 | 251                  | Peak   |
| 5921.45                                             | 52.63                   | 50.78             | 70.82          | -18.19      | 32.49                 | 6.86            | 37.5               | 133                 | 251                  | Peak   |
| 5938.075                                            | 50.87                   | 48.98             | 68.2           | -17.33      | 32.52                 | 6.87            | 37.5               | 133                 | 251                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5641.2                                              | 51.17                   | 49.71             | 68.2           | -17.03      | 32.04                 | 6.7             | 37.28              | 168                 | 40                   | Peak   |
| 5663.525                                            | 51.19                   | 49.76             | 78.24          | -27.05      | 32.06                 | 6.71            | 37.34              | 168                 | 40                   | Peak   |
| 5917.175                                            | 51.56                   | 49.71             | 73.97          | -22.41      | 32.49                 | 6.86            | 37.5               | 168                 | 40                   | Peak   |
| 5932.375                                            | 50.72                   | 48.84             | 68.2           | -17.48      | 32.52                 | 6.86            | 37.5               | 168                 | 40                   | Peak   |

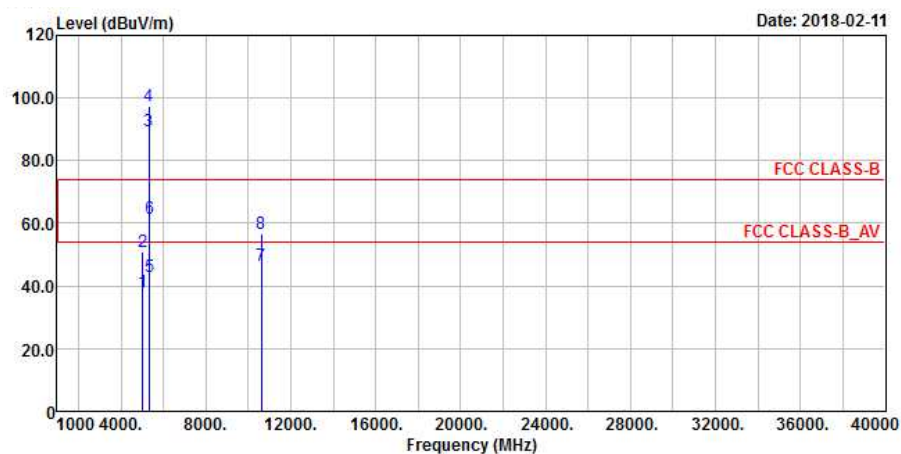
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5825 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

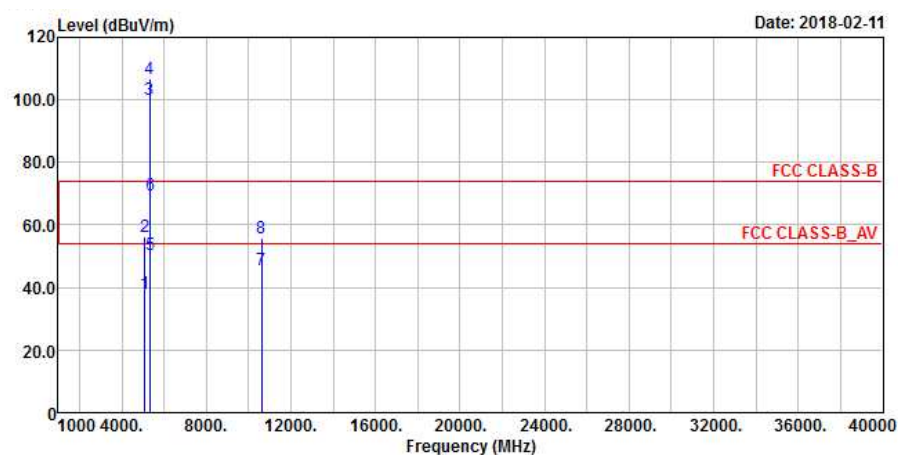
## 802.11n (HT40)

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 62         | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang              |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5038.25                                             | 38.03                   | 37.54             | 54             | -15.97      | 31.49                 | 6.24            | 37.24              | 217                 | 71                   | Average |
| 5038.25                                             | 51.08                   | 50.59             | 74             | -22.92      | 31.49                 | 6.24            | 37.24              | 217                 | 71                   | Peak    |
| 5310                                                | 89.26                   | 88.31             |                |             | 31.68                 | 6.46            | 37.19              | 217                 | 71                   | Average |
| 5310                                                | 97.49                   | 96.54             |                |             | 31.68                 | 6.46            | 37.19              | 217                 | 71                   | Peak    |
| 5351.76                                             | 43                      | 42.01             | 54             | -11         | 31.7                  | 6.47            | 37.18              | 217                 | 71                   | Average |
| 5351.76                                             | 61.55                   | 60.56             | 74             | -12.45      | 31.7                  | 6.47            | 37.18              | 217                 | 71                   | Peak    |
| 10620                                               | 46.42                   | 49.23             | 54             | -7.58       | 39.89                 | 10.39           | 53.09              | 125                 | 236                  | Average |
| 10620                                               | 56.56                   | 59.37             | 74             | -17.44      | 39.89                 | 10.39           | 53.09              | 125                 | 236                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5101.1                                              | 38.17                   | 37.63             | 54             | -15.83      | 31.53                 | 6.29            | 37.28              | 233                 | 318                  | Average |
| 5101.1                                              | 56.42                   | 55.88             | 74             | -17.58      | 31.53                 | 6.29            | 37.28              | 233                 | 318                  | Peak    |
| 5310                                                | 100.02                  | 99.07             |                |             | 31.68                 | 6.46            | 37.19              | 233                 | 318                  | Average |
| 5310                                                | 106.87                  | 105.92            |                |             | 31.68                 | 6.46            | 37.19              | 233                 | 318                  | Peak    |
| 5356.6                                              | 50.55                   | 49.56             | 54             | -3.45       | 31.7                  | 6.47            | 37.18              | 233                 | 318                  | Average |
| 5356.6                                              | 69.33                   | 68.34             | 74             | -4.67       | 31.7                  | 6.47            | 37.18              | 233                 | 318                  | Peak    |
| 10620                                               | 45.44                   | 48.25             | 54             | -8.56       | 39.89                 | 10.39           | 53.09              | 232                 | 214                  | Average |
| 10620                                               | 55.63                   | 58.44             | 74             | -18.37      | 39.89                 | 10.39           | 53.09              | 232                 | 214                  | Peak    |

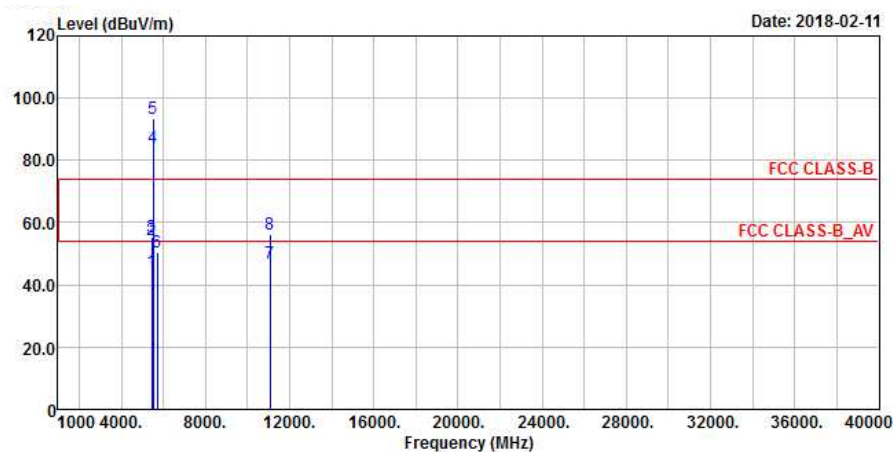
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5310 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

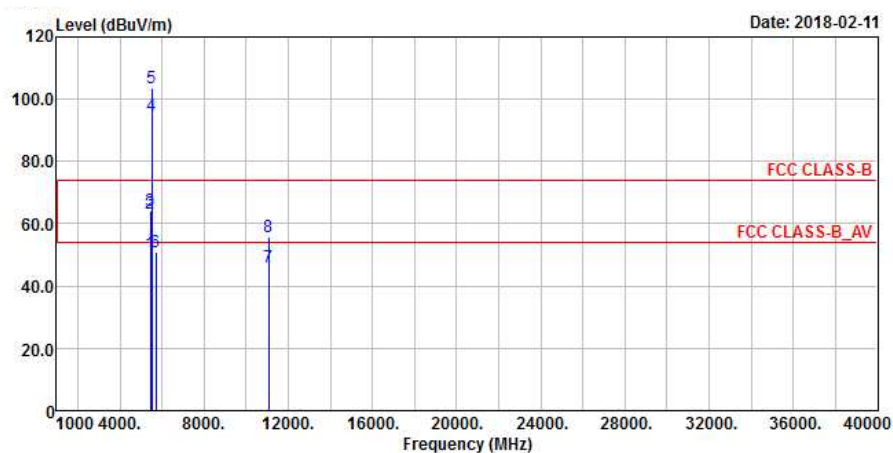
## 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 106        | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang              |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5455.12                                             | 44.15                   | 42.95             | 54             | -9.85       | 31.77                 | 6.51            | 37.08              | 199                 | 117                  | Average |
| 5455.12                                             | 54.64                   | 53.44             | 74             | -19.36      | 31.77                 | 6.51            | 37.08              | 199                 | 117                  | Peak    |
| *5465.84                                            | 55.51                   | 54.28             | 68.2           | -12.69      | 31.79                 | 6.52            | 37.08              | 199                 | 117                  | Peak    |
| 5530                                                | 83.99                   | 82.66             |                |             | 31.84                 | 6.58            | 37.09              | 199                 | 117                  | Average |
| 5530                                                | 93.6                    | 92.27             |                |             | 31.84                 | 6.58            | 37.09              | 199                 | 117                  | Peak    |
| *5729.8                                             | 50.52                   | 49.01             | 68.2           | -17.68      | 32.18                 | 6.76            | 37.43              | 199                 | 117                  | Peak    |
| 11060                                               | 46.95                   | 48.64             | 54             | -7.05       | 40.66                 | 10.44           | 52.79              | 201                 | 256                  | Average |
| 11060                                               | 56.42                   | 58.11             | 74             | -17.58      | 40.66                 | 10.44           | 52.79              | 201                 | 256                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5450.64                                             | 50.58                   | 49.38             | 54             | -3.42       | 31.77                 | 6.51            | 37.08              | 211                 | 319                  | Average |
| 5450.64                                             | 63.43                   | 62.23             | 74             | -10.57      | 31.77                 | 6.51            | 37.08              | 211                 | 319                  | Peak    |
| *5467.28                                            | 64.18                   | 62.95             | 68.2           | -4.02       | 31.79                 | 6.52            | 37.08              | 211                 | 319                  | Peak    |
| 5530                                                | 94.54                   | 93.21             |                |             | 31.84                 | 6.58            | 37.09              | 211                 | 319                  | Average |
| 5530                                                | 103.6                   | 102.27            |                |             | 31.84                 | 6.58            | 37.09              | 211                 | 319                  | Peak    |
| *5729.96                                            | 51.13                   | 49.62             | 68.2           | -17.07      | 32.18                 | 6.76            | 37.43              | 211                 | 319                  | Peak    |
| 11060                                               | 45.84                   | 47.53             | 54             | -8.16       | 40.66                 | 10.44           | 52.79              | 203                 | 256                  | Average |
| 11060                                               | 55.94                   | 57.63             | 74             | -18.06      | 40.66                 | 10.44           | 52.79              | 203                 | 256                  | Peak    |

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5530 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

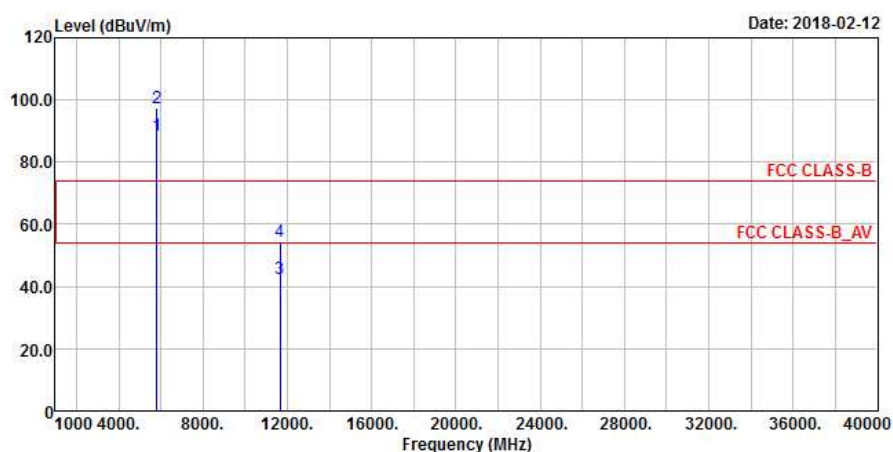
## 測試模式二

### 802.11a

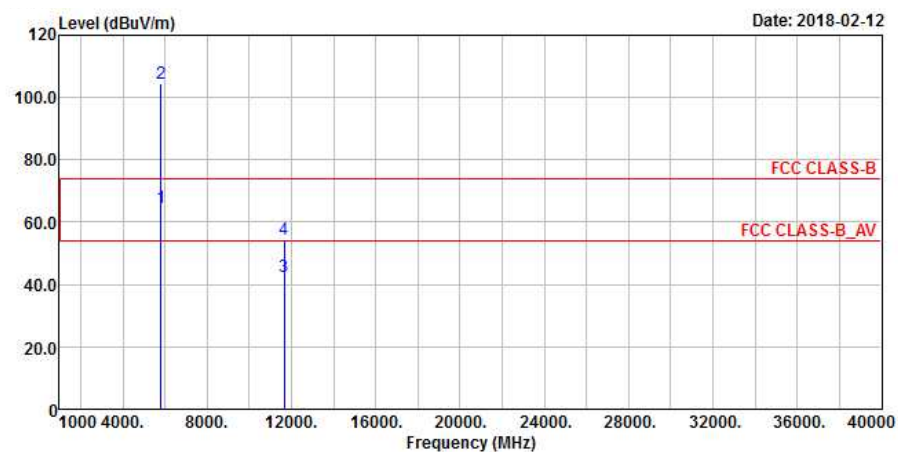
| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 165        | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang              |

## <Spurious Emission>

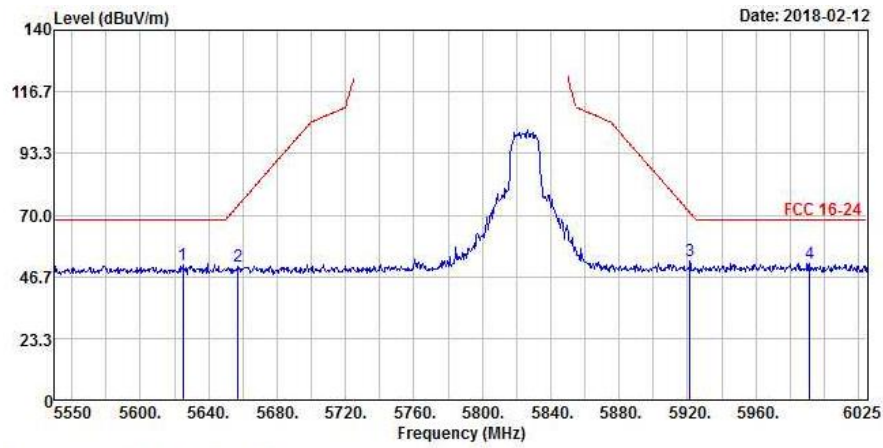
### Horizontal



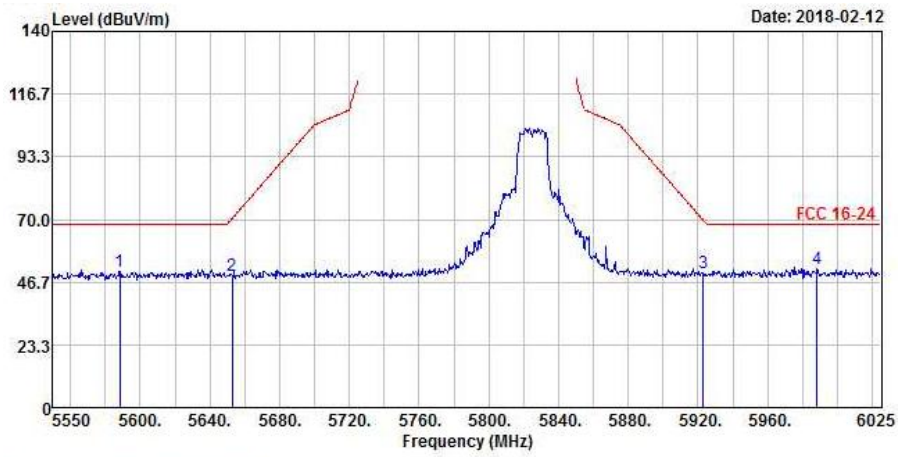
### Vertical



# <Out of Band Emission (OOBE)> Horizontal



## Vertical



### <Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5825                                                | 88.47                   | 86.81             |                |             | 32.35                 | 6.84            | 37.53              | 140                 | 253                  | Average |
| 5825                                                | 97.37                   | 95.71             |                |             | 32.35                 | 6.84            | 37.53              | 140                 | 253                  | Peak    |
| 11650                                               | 42.41                   | 44.72             | 54             | -11.59      | 40.03                 | 10.8            | 53.14              | 100                 | 233                  | Average |
| 11650                                               | 54.42                   | 56.73             | 74             | -19.58      | 40.03                 | 10.8            | 53.14              | 100                 | 233                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5825                                                | 64.47                   | 62.81             |                |             | 32.35                 | 6.84            | 37.53              | 177                 | 50                   | Average |
| 5825                                                | 104.61                  | 102.95            |                |             | 32.35                 | 6.84            | 37.53              | 177                 | 50                   | Peak    |
| 11650                                               | 42.41                   | 44.72             | 54             | -11.59      | 40.03                 | 10.8            | 53.14              | 123                 | 154                  | Average |
| 11650                                               | 54.32                   | 56.63             | 74             | -19.68      | 40.03                 | 10.8            | 53.14              | 123                 | 154                  | Peak    |

### <Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5625.05                                             | 51.2                    | 49.72             | 68.2           | -17         | 32.01                 | 6.69            | 37.22              | 140                 | 253                  | Peak   |
| 5657.35                                             | 50.8                    | 49.37             | 73.66          | -22.86      | 32.06                 | 6.71            | 37.34              | 140                 | 253                  | Peak   |
| 5921.45                                             | 52.63                   | 50.78             | 70.82          | -18.19      | 32.49                 | 6.86            | 37.5               | 140                 | 253                  | Peak   |
| 5991.275                                            | 51.85                   | 49.84             | 68.2           | -16.35      | 32.63                 | 6.89            | 37.51              | 140                 | 253                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5588.475                                            | 50.67                   | 49.22             | 68.2           | -17.53      | 31.95                 | 6.66            | 37.16              | 177                 | 50                   | Peak   |
| 5652.6                                              | 49.08                   | 47.59             | 70.13          | -21.05      | 32.06                 | 6.71            | 37.28              | 177                 | 50                   | Peak   |
| 5922.875                                            | 49.85                   | 47.97             | 69.77          | -19.92      | 32.52                 | 6.86            | 37.5               | 177                 | 50                   | Peak   |
| 5988.425                                            | 51.62                   | 49.64             | 68.2           | -16.58      | 32.6                  | 6.89            | 37.51              | 177                 | 50                   | Peak   |

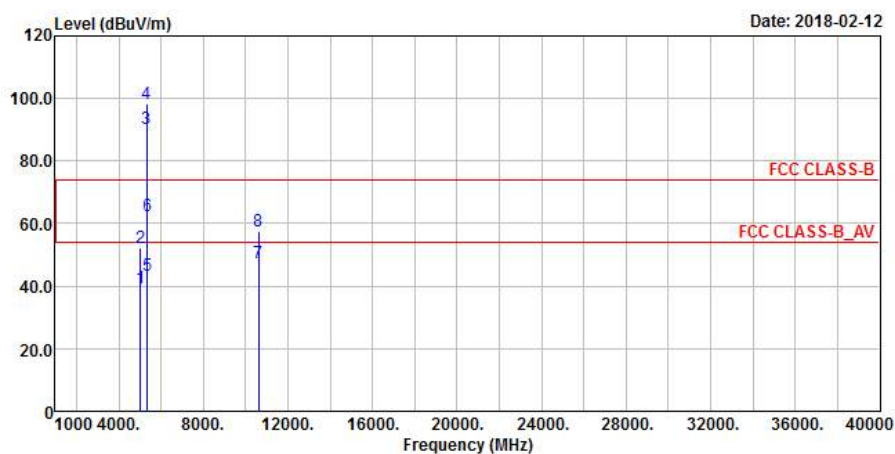
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5825 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

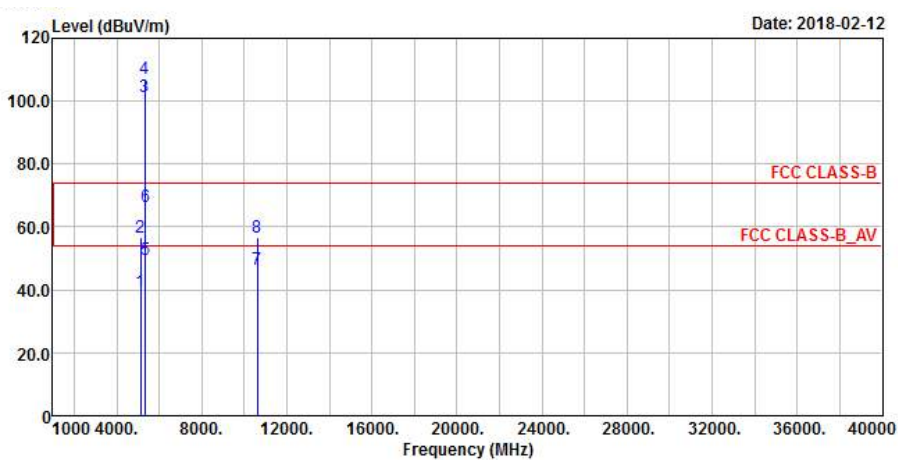
## 802.11n (HT40)

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 62         | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang              |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5039                                                | 39.52                   | 39.03             | 54             | -14.48      | 31.49                 | 6.24            | 37.24              | 123                 | 256                  | Average |
| 5039                                                | 52.12                   | 51.63             | 74             | -21.88      | 31.49                 | 6.24            | 37.24              | 123                 | 256                  | Peak    |
| 5310                                                | 90.2                    | 89.25             |                |             | 31.68                 | 6.46            | 37.19              | 147                 | 123                  | Average |
| 5310                                                | 98.23                   | 97.28             |                |             | 31.68                 | 6.46            | 37.19              | 147                 | 123                  | Peak    |
| 5351                                                | 43.5                    | 42.51             | 54             | -10.5       | 31.7                  | 6.47            | 37.18              | 222                 | 236                  | Average |
| 5351                                                | 62.3                    | 61.31             | 74             | -11.7       | 31.7                  | 6.47            | 37.18              | 222                 | 236                  | Peak    |
| 10620                                               | 47.5                    | 50.31             | 54             | -6.5        | 39.89                 | 10.39           | 53.09              | 201                 | 256                  | Average |
| 10620                                               | 57.6                    | 60.41             | 74             | -16.4       | 39.89                 | 10.39           | 53.09              | 201                 | 256                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5111                                                | 39.5                    | 38.96             | 54             | -14.5       | 31.53                 | 6.29            | 37.28              | 203                 | 201                  | Average |
| 5111                                                | 56.9                    | 56.36             | 74             | -17.1       | 31.53                 | 6.29            | 37.28              | 203                 | 201                  | Peak    |
| 5310                                                | 101.2                   | 100.25            |                |             | 31.68                 | 6.46            | 37.19              | 111                 | 165                  | Average |
| 5310                                                | 107.2                   | 106.25            |                |             | 31.68                 | 6.46            | 37.19              | 111                 | 165                  | Peak    |
| 5357                                                | 49.6                    | 48.61             | 54             | -4.4        | 31.7                  | 6.47            | 37.18              | 236                 | 251                  | Average |
| 5357                                                | 66.3                    | 65.31             | 74             | -7.7        | 31.7                  | 6.47            | 37.18              | 236                 | 251                  | Peak    |
| 10620                                               | 46.5                    | 49.31             | 54             | -7.5        | 39.89                 | 10.39           | 53.09              | 111                 | 123                  | Average |
| 10620                                               | 56.5                    | 59.31             | 74             | -17.5       | 39.89                 | 10.39           | 53.09              | 111                 | 123                  | Peak    |

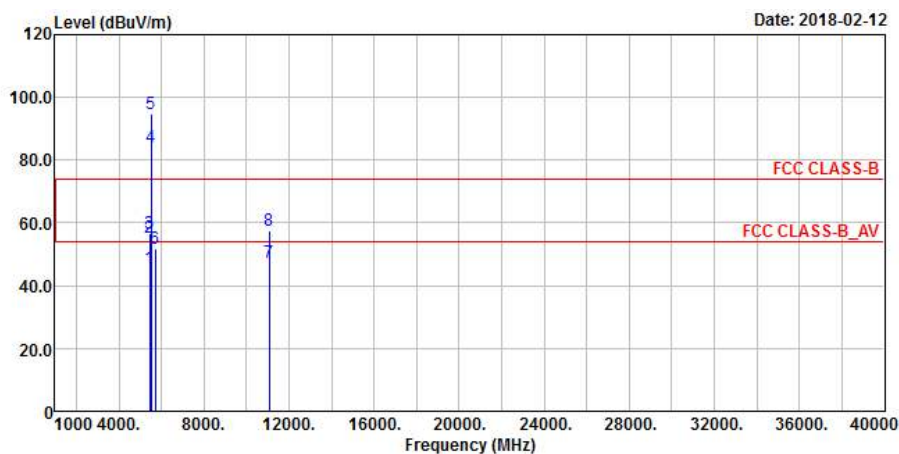
Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5310 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

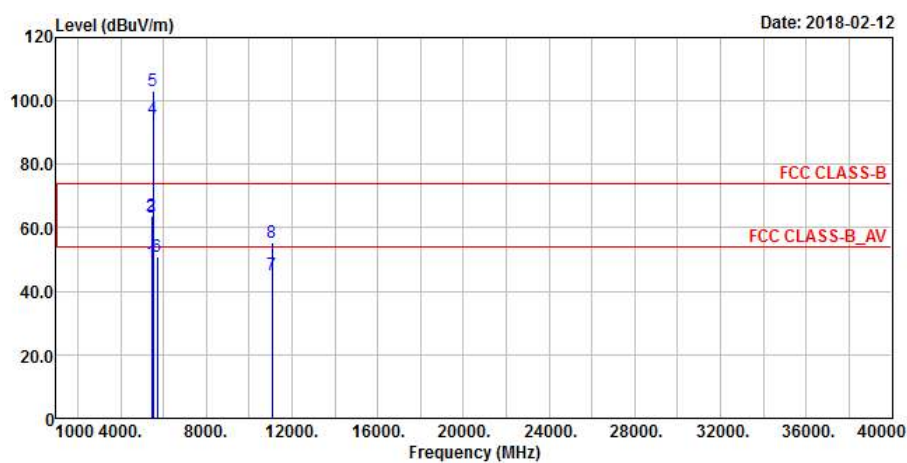
## 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 106        | Frequency Range    | 1 GHz ~ 40 GHz            |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyoung Wang             |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5456                                                | 45.5                    | 44.3              | 54             | -8.5        | 31.77                 | 6.51            | 37.08              | 201                 | 231                  | Average |
| 5456                                                | 55.3                    | 54.1              | 74             | -18.7       | 31.77                 | 6.51            | 37.08              | 201                 | 231                  | Peak    |
| *5466                                               | 56.6                    | 55.37             | 68.2           | -11.6       | 31.79                 | 6.52            | 37.08              | 222                 | 230                  | Peak    |
| 5530                                                | 84.3                    | 82.97             |                |             | 31.84                 | 6.58            | 37.09              | 111                 | 165                  | Average |
| 5530                                                | 94.6                    | 93.27             |                |             | 31.84                 | 6.58            | 37.09              | 111                 | 165                  | Peak    |
| *5729.1                                             | 51.6                    | 50.09             | 68.2           | -16.6       | 32.18                 | 6.76            | 37.43              | 185                 | 123                  | Peak    |
| 11060                                               | 47.6                    | 49.29             | 54             | -6.4        | 40.66                 | 10.44           | 52.79              | 102                 | 236                  | Average |
| 11060                                               | 57.6                    | 59.29             | 74             | -16.4       | 40.66                 | 10.44           | 52.79              | 102                 | 236                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 5451                                                | 49.01                   | 47.81             | 54             | -4.99       | 31.77                 | 6.51            | 37.08              | 111                 | 132                  | Average |
| 5451                                                | 63.9                    | 62.7              | 74             | -10.1       | 31.77                 | 6.51            | 37.08              | 111                 | 132                  | Peak    |
| *5466                                               | 63.1                    | 61.87             | 68.2           | -5.1        | 31.79                 | 6.52            | 37.08              | 222                 | 236                  | Peak    |
| 5530                                                | 94.1                    | 92.77             |                |             | 31.84                 | 6.58            | 37.09              | 102                 | 236                  | Average |
| 5530                                                | 103.2                   | 101.87            |                |             | 31.84                 | 6.58            | 37.09              | 102                 | 236                  | Peak    |
| *5728                                               | 51.01                   | 49.5              | 68.2           | -17.19      | 32.18                 | 6.76            | 37.43              | 165                 | 236                  | Peak    |
| 11060                                               | 45.3                    | 46.99             | 54             | -8.7        | 40.66                 | 10.44           | 52.79              | 201                 | 236                  | Average |
| 11060                                               | 55.2                    | 56.89             | 74             | -18.8       | 40.66                 | 10.44           | 52.79              | 201                 | 236                  | Peak    |

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 5530 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The other emission levels were very low against the limit.

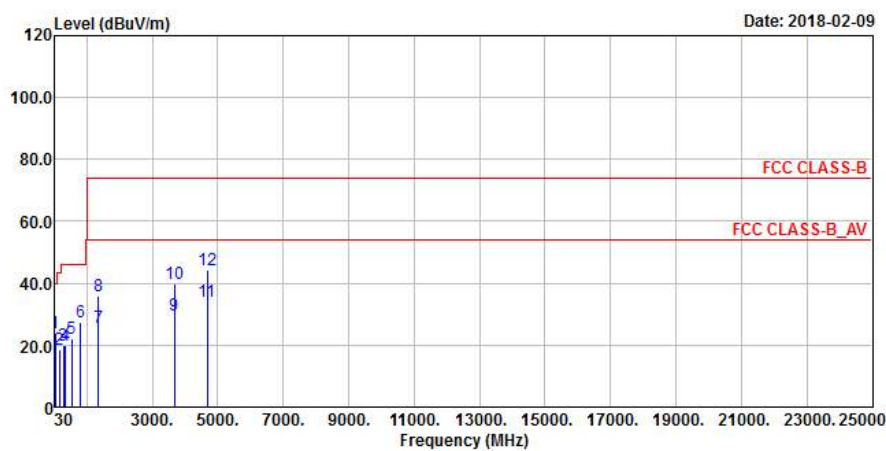
## 6.6.2 接收諧波

### 測試模式一

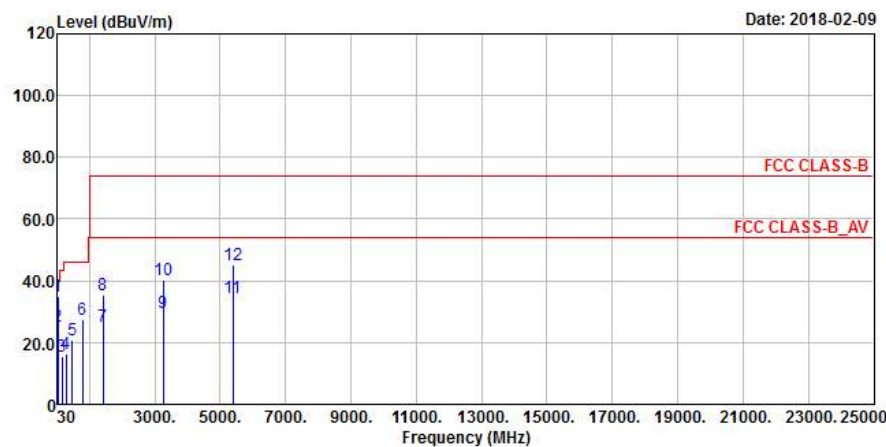
#### 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 106        | Frequency Range    | 30 MHz ~ 25 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBUV/m) | Read Level (dBUV) | Limit (dBUV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30                                                  | 23.87                   | 42.59             | 40             | -16.13      | 11.98                 | 0.44            | 31.14              | 103                 | 22                   | Peak    |
| 169.68                                              | 18.5                    | 37.4              | 43.5           | -25         | 11.76                 | 1.07            | 31.73              | 134                 | 64                   | Peak    |
| 295.78                                              | 19.83                   | 37.13             | 46             | -26.17      | 12.83                 | 1.64            | 31.77              | 129                 | 331                  | Peak    |
| 354.95                                              | 19.85                   | 35.59             | 46             | -26.15      | 14.26                 | 1.9             | 31.9               | 123                 | 110                  | Peak    |
| 547.98                                              | 22.1                    | 32.91             | 46             | -23.9       | 18.41                 | 2.69            | 31.91              | 121                 | 172                  | Peak    |
| 803.09                                              | 27.32                   | 32.81             | 46             | -18.68      | 22.27                 | 3.68            | 31.44              | 129                 | 0                    | Peak    |
| 1350                                                | 25.75                   | 50.49             | 54             | -28.25      | 25.26                 | 3.64            | 53.64              | 125                 | 212                  | Average |
| 1350                                                | 36.05                   | 60.79             | 74             | -37.95      | 25.26                 | 3.64            | 53.64              | 125                 | 212                  | Peak    |
| 3685                                                | 29.64                   | 48.65             | 54             | -24.36      | 29.09                 | 5.98            | 54.08              | 121                 | 225                  | Average |
| 3685                                                | 39.79                   | 58.8              | 74             | -34.21      | 29.09                 | 5.98            | 54.08              | 121                 | 225                  | Peak    |
| 4685                                                | 34.26                   | 49.85             | 54             | -19.74      | 30.93                 | 6.72            | 53.24              | 185                 | 221                  | Average |
| 4685                                                | 44.19                   | 59.78             | 74             | -29.81      | 30.93                 | 6.72            | 53.24              | 185                 | 221                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBUV/m) | Read Level (dBUV) | Limit (dBUV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30.97                                               | 35.19                   | 53.72             | 40             | -4.81       | 12.14                 | 0.45            | 31.12              | 121                 | 272                  | Peak    |
| 42.61                                               | 25.03                   | 42.03             | 40             | -14.97      | 13.58                 | 0.5             | 31.08              | 127                 | 99                   | Peak    |
| 157.07                                              | 15.57                   | 33.64             | 43.5           | -27.93      | 12.72                 | 1.01            | 31.8               | 105                 | 317                  | Peak    |
| 290.93                                              | 16.3                    | 33.69             | 46             | -29.7       | 12.68                 | 1.62            | 31.69              | 100                 | 333                  | Peak    |
| 476.2                                               | 21.03                   | 33.66             | 46             | -24.97      | 16.85                 | 2.39            | 31.87              | 122                 | 298                  | Peak    |
| 794.36                                              | 27.55                   | 33.17             | 46             | -18.45      | 22.15                 | 3.64            | 31.41              | 127                 | 174                  | Peak    |
| 1425                                                | 25.34                   | 50.02             | 54             | -28.66      | 25.32                 | 3.74            | 53.74              | 225                 | 229                  | Average |
| 1425                                                | 35.5                    | 60.18             | 74             | -38.5       | 25.32                 | 3.74            | 53.74              | 225                 | 229                  | Peak    |
| 3260                                                | 29.72                   | 49.52             | 54             | -24.28      | 28.61                 | 5.62            | 54.03              | 165                 | 121                  | Average |
| 3260                                                | 40.12                   | 59.92             | 74             | -33.88      | 28.61                 | 5.62            | 54.03              | 165                 | 121                  | Peak    |
| 5400                                                | 34.71                   | 48.52             | 54             | -19.29      | 31.74                 | 7.17            | 52.72              | 198                 | 229                  | Average |
| 5400                                                | 45.03                   | 58.84             | 74             | -28.97      | 31.74                 | 7.17            | 52.72              | 198                 | 229                  | Peak    |

Remarks:

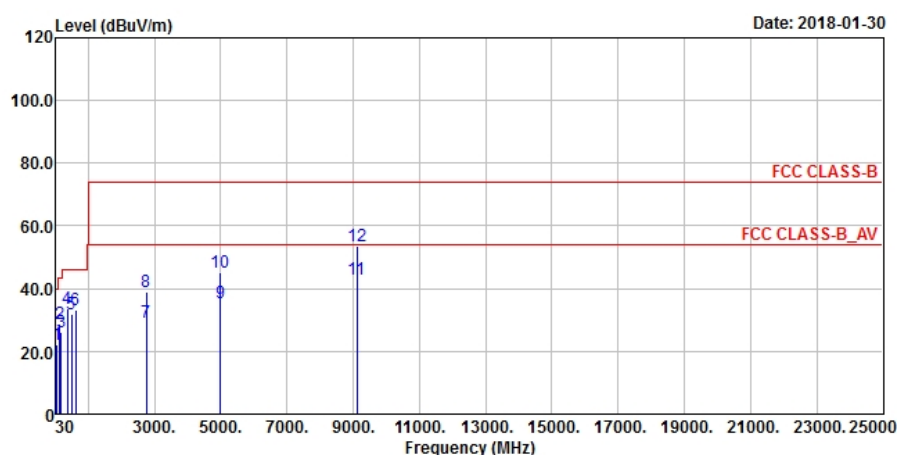
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

## 測試模式二

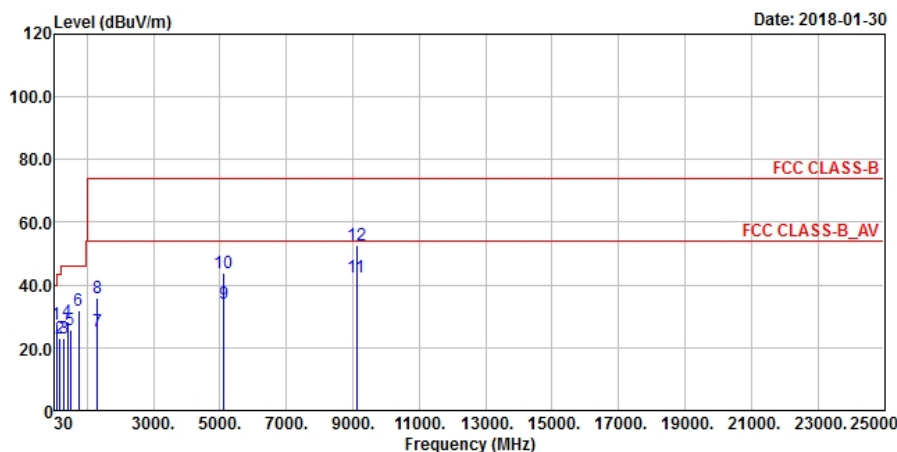
### 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 62         | Frequency Range    | 30 MHz ~ 25 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang                                 |

## Horizontal



## Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 53.28                                               | 22.35                   | 40.47             | 40             | -17.65      | 12.66                 | 0.55            | 31.33              | 123                 | 145                  | Peak    |
| 136.7                                               | 28.86                   | 47.51             | 43.5           | -14.64      | 12.14                 | 0.92            | 31.71              | 111                 | 325                  | Peak    |
| 188.11                                              | 26.29                   | 46.64             | 43.5           | -17.21      | 10.19                 | 1.16            | 31.7               | 102                 | 214                  | Peak    |
| 378.23                                              | 33.64                   | 48.76             | 46             | -12.36      | 14.82                 | 2               | 31.94              | 214                 | 122                  | Peak    |
| 504.33                                              | 32.1                    | 43.76             | 46             | -13.9       | 17.42                 | 2.53            | 31.61              | 125                 | 144                  | Peak    |
| 624.61                                              | 33.19                   | 42.44             | 46             | -12.81      | 19.9                  | 3.01            | 32.16              | 122                 | 145                  | Peak    |
| 2750                                                | 29.02                   | 49.85             | 54             | -24.98      | 28.01                 | 5.19            | 54.03              | 121                 | 214                  | Average |
| 2750                                                | 39.17                   | 60                | 74             | -34.83      | 28.01                 | 5.19            | 54.03              | 121                 | 214                  | Peak    |
| 4985                                                | 35.34                   | 49.96             | 54             | -18.66      | 31.43                 | 6.91            | 52.96              | 215                 | 114                  | Average |
| 4985                                                | 45.2                    | 59.82             | 74             | -28.8       | 31.43                 | 6.91            | 52.96              | 215                 | 114                  | Peak    |
| 9122                                                | 43.09                   | 48.25             | 54             | -10.91      | 37.72                 | 9.69            | 52.57              | 114                 | 251                  | Average |
| 9122                                                | 53.72                   | 58.88             | 74             | -20.28      | 37.72                 | 9.69            | 52.57              | 114                 | 251                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 67.83                                               | 27.6                    | 47.7              | 40             | -12.4       | 11                    | 0.63            | 31.73              | 125                 | 145                  | Peak    |
| 188.11                                              | 22.9                    | 43.25             | 43.5           | -20.6       | 10.19                 | 1.16            | 31.7               | 123                 | 245                  | Peak    |
| 313.24                                              | 22.99                   | 39.94             | 46             | -23.01      | 13.26                 | 1.72            | 31.93              | 201                 | 214                  | Peak    |
| 405.39                                              | 28.4                    | 42.89             | 46             | -17.6       | 15.45                 | 2.11            | 32.05              | 136                 | 125                  | Peak    |
| 499.48                                              | 25.74                   | 37.55             | 46             | -20.26      | 17.31                 | 2.51            | 31.63              | 111                 | 124                  | Peak    |
| 749.74                                              | 32.08                   | 38.35             | 46             | -13.92      | 21.52                 | 3.51            | 31.3               | 125                 | 124                  | Peak    |
| 1310                                                | 25.4                    | 50.13             | 54             | -28.6       | 25.22                 | 3.59            | 53.54              | 113                 | 251                  | Average |
| 1310                                                | 35.73                   | 60.46             | 74             | -38.27      | 25.22                 | 3.59            | 53.54              | 113                 | 251                  | Peak    |
| 5120                                                | 34.15                   | 48.63             | 54             | -19.85      | 31.54                 | 7.01            | 53.03              | 185                 | 212                  | Average |
| 5120                                                | 43.63                   | 58.11             | 74             | -30.37      | 31.54                 | 7.01            | 53.03              | 185                 | 212                  | Peak    |
| 9122                                                | 42.68                   | 47.84             | 54             | -11.32      | 37.72                 | 9.69            | 52.57              | 125                 | 221                  | Average |
| 9122                                                | 52.72                   | 57.88             | 74             | -21.28      | 37.72                 | 9.69            | 52.57              | 125                 | 221                  | 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.

### 6.6.3 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.

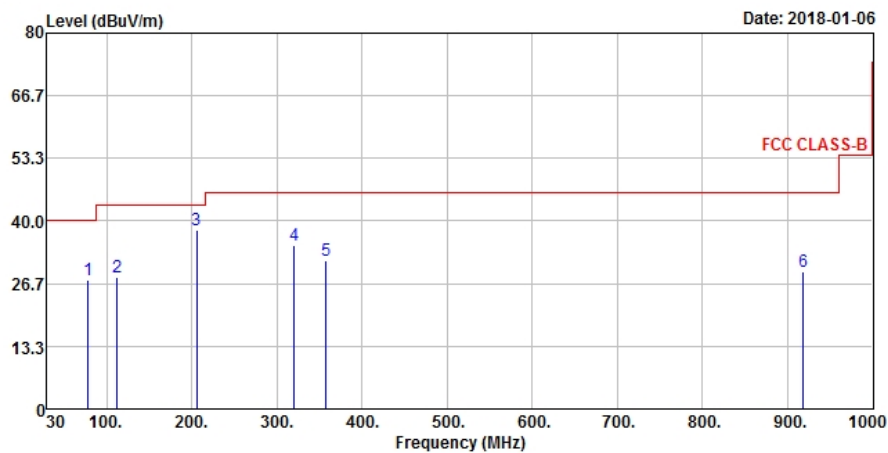
#### 30 MHz ~ 1 GHz Data:

測試模式一

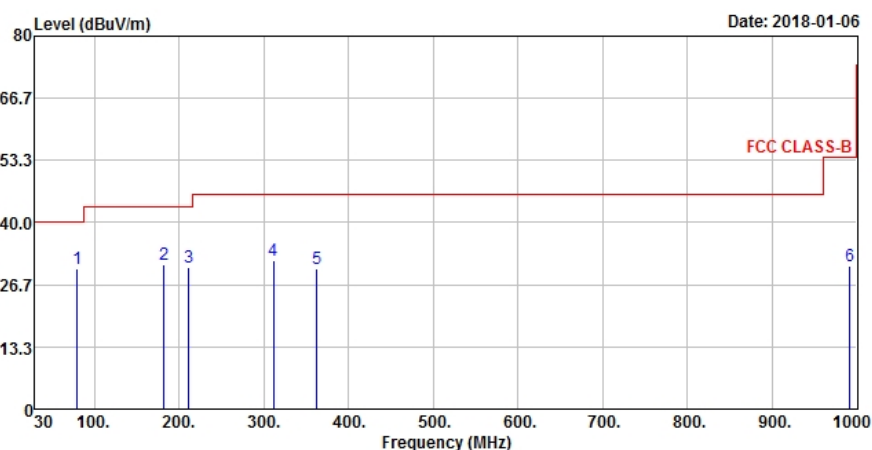
#### 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 106        | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyong Wang                 |

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 78.5                                                | 27.53                   | 49.82             | 40             | -12.47      | 8.61                  | 0.67            | 31.57              | 201                 | 125                  | Peak   |
| 112.45                                              | 28.12                   | 48.91             | 43.5           | -15.38      | 10.27                 | 0.8             | 31.86              | 201                 | 145                  | Peak   |
| 205.57                                              | 38.05                   | 58.86             | 43.5           | -5.45       | 9.6                   | 1.26            | 31.67              | 201                 | 256                  | Peak   |
| 320.03                                              | 34.92                   | 51.63             | 46             | -11.08      | 13.43                 | 1.75            | 31.89              | 111                 | 132                  | Peak   |
| 357.86                                              | 31.66                   | 47.35             | 46             | -14.34      | 14.33                 | 1.92            | 31.94              | 111                 | 145                  | Peak   |
| 918.52                                              | 29.21                   | 33.48             | 46             | -16.79      | 23.61                 | 4.13            | 32.01              | 222                 | 236                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 79.47                                               | 30.26                   | 52.76             | 40             | -9.74       | 8.37                  | 0.67            | 31.54              | 201                 | 125                  | Peak   |
| 182.29                                              | 31.01                   | 51.09             | 43.5           | -12.49      | 10.6                  | 1.13            | 31.81              | 111                 | 125                  | Peak   |
| 211.39                                              | 30.4                    | 50.86             | 43.5           | -13.1       | 9.85                  | 1.29            | 31.6               | 201                 | 125                  | Peak   |
| 311.3                                               | 31.9                    | 48.91             | 46             | -14.1       | 13.22                 | 1.71            | 31.94              | 111                 | 185                  | Peak   |
| 362.71                                              | 29.99                   | 45.56             | 46             | -16.01      | 14.45                 | 1.94            | 31.96              | 325                 | 265                  | Peak   |
| 991.27                                              | 30.59                   | 33.92             | 54             | -23.41      | 24.02                 | 4.4             | 31.75              | 111                 | 125                  | Peak   |

Remarks:

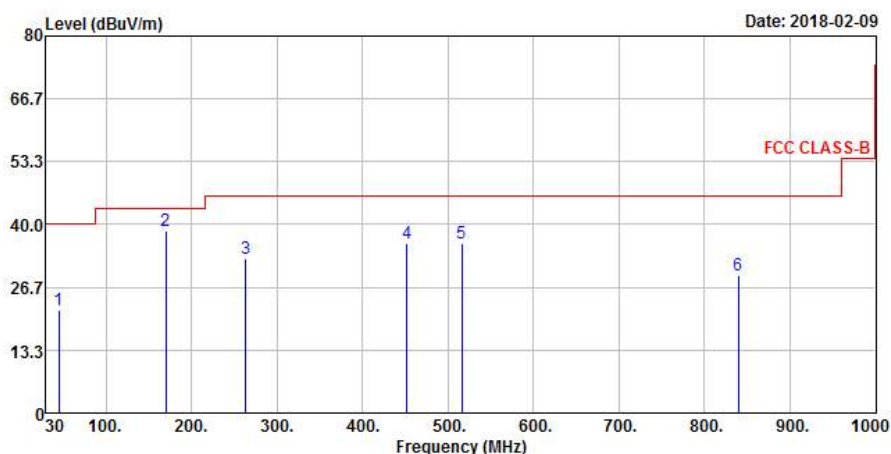
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- The other emission levels were very low against the limit.

## 測試模式二

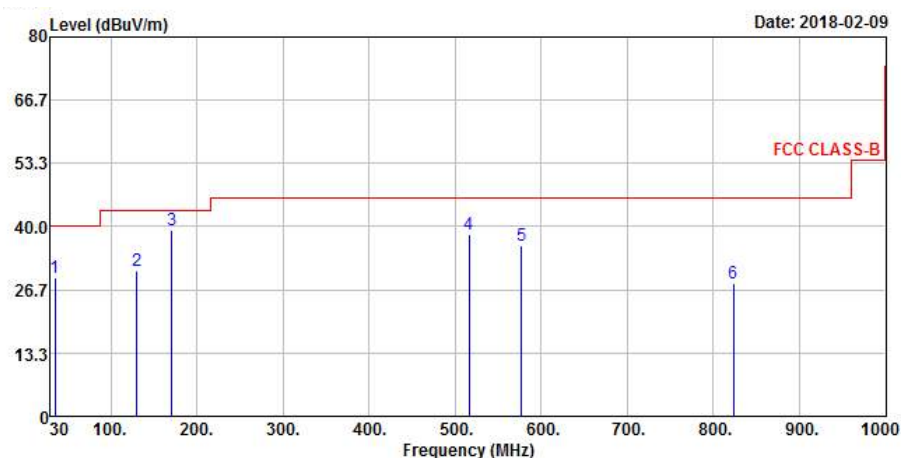
### 802.11ac (VHT80)

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 106        | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                   |

## Horizontal



## Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 44.55                                               | 21.79                   | 38.82             | 40             | -18.21      | 13.6                  | 0.51            | 31.14              | 120                 | 167                  | Peak   |
| 169.68                                              | 38.56                   | 57.46             | 43.5           | -4.94       | 11.76                 | 1.07            | 31.73              | 143                 | 86                   | Peak   |
| 263.77                                              | 32.81                   | 51.35             | 46             | -13.19      | 11.88                 | 1.5             | 31.92              | 109                 | 161                  | Peak   |
| 451.95                                              | 35.87                   | 49.19             | 46             | -10.13      | 16.37                 | 2.29            | 31.98              | 144                 | 113                  | Peak   |
| 515.97                                              | 36.12                   | 47.45             | 46             | -9.88       | 17.68                 | 2.57            | 31.58              | 103                 | 72                   | Peak   |
| 839.95                                              | 29.36                   | 34.62             | 46             | -16.64      | 22.74                 | 3.8             | 31.8               | 130                 | 19                   | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 34.85                                               | 29.18                   | 46.98             | 40             | -10.82      | 12.79                 | 0.47            | 31.06              | 150                 | 78                   | Peak   |
| 129.91                                              | 30.74                   | 50.05             | 43.5           | -12.76      | 11.68                 | 0.89            | 31.88              | 146                 | 255                  | Peak   |
| 170.65                                              | 39.34                   | 58.34             | 43.5           | -4.16       | 11.67                 | 1.07            | 31.74              | 149                 | 144                  | Peak   |
| 515.97                                              | 38.34                   | 49.67             | 46             | -7.66       | 17.68                 | 2.57            | 31.58              | 115                 | 93                   | Peak   |
| 577.08                                              | 36.12                   | 46.35             | 46             | -9.88       | 19.08                 | 2.8             | 32.11              | 100                 | 29                   | Peak   |
| 823.46                                              | 28.18                   | 33.53             | 46             | -17.82      | 22.53                 | 3.76            | 31.64              | 105                 | 302                  | Peak   |

Remarks:

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

## 6.7 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。

## 7 輸出峰值功率量測及發射頻寬之要求

### 7.1 適用標準

| 待測物操作頻帶                                                 | 適用標準                           |
|---------------------------------------------------------|--------------------------------|
| <input checked="" type="checkbox"/> 5.25 GHz~5.35 GHz   | 請見本報告 3.1 節第(7)項(3)及(8)項(3)的規定 |
| <input checked="" type="checkbox"/> 5.470 GHz~5.725 GHz | 請見本報告 3.1 節第(7)項(3)及(8)項(3)的規定 |
| <input checked="" type="checkbox"/> 5.725 GHz~5.850 GHz | 請見本報告 3.1 節第(7)項(4)及(8)項(4)的規定 |

### 7.2 量測方法

輸出峰值功率量測方法：

- 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，設置功率計的 gate 功能確保量測功率皆為 Burst on 的功率。
- 計算其輸出功率峰值。

For transmission above 5.725 GHz where the EBW crosses 5.725 GHz

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 設定頻譜掃瞄寬為 26 dB occupied bandwidth。
- 設置解析頻寬為 1 MHz，視訊頻寬為 3 倍的解析頻寬。
- 設置測試掃瞄點數要大於 2 倍的(span/RBW)。
- 設置檢波器為 RMS。
- 設置掃瞄時間為 auto。
- 設置 Trigger 模式為 free run (當 Duty cycle 大於 98 %)；設置 Trigger 模式為 Video trigger (當 Duty cycle 小於 98 %)。
- 設置 Trace mode 為 average 至少 100 次。
- 待掃描結果穩定。
- 使用頻譜的內建 band power 功能，量測 26 dB bandwidth 內最大功率值。

發射頻寬量測方法：

- 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。
- 最大輸出功率峰值減 26 dB 的最大頻率範圍。

### 7.3 量測輸出峰值功率之儀器

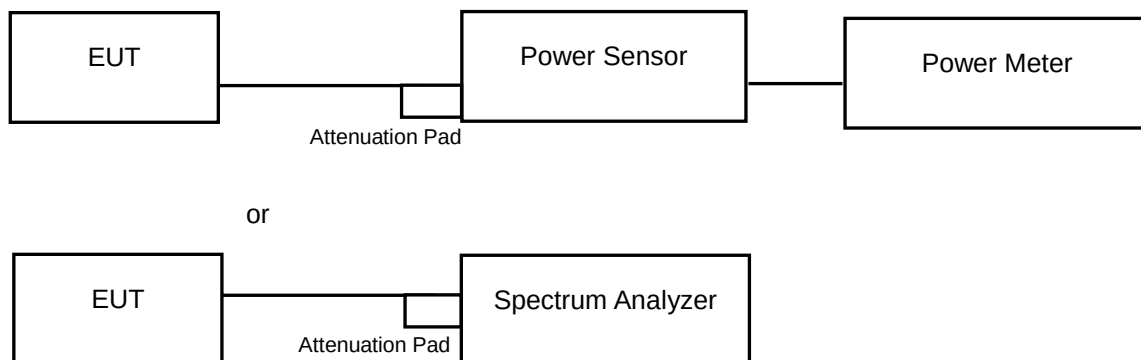
| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration | Due Date Of Calibration |
|----------------------------|-----------|------------|---------------------|-------------------------|
| Power Meter                | ML2495A   | 1232002    | Dec. 07, 2017       | Dec. 06, 2018           |
| Power Sensor               | MA2411B   | 1207325    | Dec. 07, 2017       | Dec. 06, 2018           |
| Spectrum Analyzer<br>R&S   | FSU43     | 101261     | Jan. 11, 2018       | Jan. 10, 2019           |

Note:

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

### 7.4 輸出峰值功率之測試配置

輸出峰值功率測試配置：



## 7.5 輸出峰值功率之量測結果

|        |       |        |                 |
|--------|-------|--------|-----------------|
| 操作模式   | 發射    | 測試日期   | 107 年 03 月 08 日 |
| 量測場地溫度 | 25 °C | 量測場地濕度 | 65 % RH         |
| 測試者    | 吳俊樺   |        |                 |

### 802.11a

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
|         |                 | Chain 0                       | Chain 1 |                  |                   |                   |             |
| 56      | 5280            | 13.31                         | 13.55   | 44.08            | 16.44             | 24                | Pass        |
| 60      | 5300            | 13.24                         | 13.69   | 44.47            | 16.48             | 24                | Pass        |
| 64      | 5320            | 13.65                         | 13.71   | 46.67            | 16.69             | 24                | Pass        |
| 100     | 5500            | 13.58                         | 13.91   | 47.41            | 16.76             | 24                | Pass        |
| 116     | 5580            | 15.55                         | 15.83   | 74.17            | 18.70             | 24                | Pass        |
| 120     | 5600            | 15.45                         | 15.77   | 72.83            | 18.62             | 24                | Pass        |
| 124     | 5620            | 15.49                         | 15.71   | 72.64            | 18.61             | 24                | Pass        |
| 132     | 5660            | 15.34                         | 15.88   | 72.92            | 18.63             | 24                | Pass        |
| 140     | 5700            | 13.21                         | 13.30   | 42.32            | 16.27             | 24                | Pass        |
| 144     | 5720            | 13.18                         | 13.24   | 41.88            | 16.22             | 24                | Pass        |
| 149     | 5745            | 19.53                         | 19.98   | 189.28           | 22.77             | 30                | Pass        |
| 153     | 5765            | 19.55                         | 19.81   | 185.88           | 22.69             | 30                | Pass        |
| 157     | 5785            | 19.51                         | 19.79   | 184.61           | 22.66             | 30                | Pass        |
| 161     | 5805            | 19.44                         | 19.69   | 181.01           | 22.58             | 30                | Pass        |
| 165     | 5825            | 19.23                         | 19.56   | 174.12           | 22.41             | 30                | Pass        |

### 802.11n (HT20)

| Channel | Frequency<br>(MHz) | Maximum Conducted Power<br>(dBm) |         | Total Power<br>(mW) | Total Power<br>(dBm) | Power<br>Limit (dBm) | Pass / Fail |
|---------|--------------------|----------------------------------|---------|---------------------|----------------------|----------------------|-------------|
|         |                    | Chain 0                          | Chain 1 |                     |                      |                      |             |
| 56      | 5280               | 13.15                            | 13.33   | 42.18               | 16.25                | 24                   | Pass        |
| 60      | 5300               | 13.21                            | 13.36   | 42.62               | 16.30                | 24                   | Pass        |
| 64      | 5320               | 13.25                            | 13.41   | 43.06               | 16.34                | 24                   | Pass        |
| 100     | 5500               | 13.12                            | 13.82   | 44.61               | 16.49                | 24                   | Pass        |
| 116     | 5580               | 14.33                            | 14.65   | 56.28               | 17.50                | 24                   | Pass        |
| 120     | 5600               | 14.26                            | 14.53   | 55.05               | 17.41                | 24                   | Pass        |
| 124     | 5620               | 14.27                            | 14.51   | 54.98               | 17.40                | 24                   | Pass        |
| 132     | 5660               | 14.36                            | 14.66   | 56.53               | 17.52                | 24                   | Pass        |
| 140     | 5700               | 12.96                            | 13.12   | 40.28               | 16.05                | 24                   | Pass        |
| 144     | 5720               | 12.89                            | 13.13   | 40.01               | 16.02                | 24                   | Pass        |
| 149     | 5745               | 19.65                            | 19.85   | 188.86              | 22.76                | 30                   | Pass        |
| 153     | 5765               | 19.56                            | 19.81   | 186.08              | 22.70                | 30                   | Pass        |
| 157     | 5785               | 19.48                            | 19.83   | 184.88              | 22.67                | 30                   | Pass        |
| 161     | 5805               | 19.42                            | 19.72   | 181.25              | 22.58                | 30                   | Pass        |
| 165     | 5825               | 19.41                            | 19.65   | 179.55              | 22.54                | 30                   | Pass        |

### 802.11n (HT40)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
|         |                 | Chain 0                       | Chain 1 |                  |                   |                   |             |
| 62      | 5310            | 10.53                         | 10.41   | 22.29            | 13.48             | 24                | Pass        |
| 102     | 5510            | 10.67                         | 11.29   | 25.13            | 14.00             | 24                | Pass        |
| 110     | 5550            | 13.51                         | 13.65   | 45.61            | 16.59             | 24                | Pass        |
| 118     | 5590            | 13.44                         | 13.57   | 44.83            | 16.52             | 24                | Pass        |
| 126     | 5630            | 13.41                         | 13.51   | 44.37            | 16.47             | 24                | Pass        |
| 134     | 5670            | 13.43                         | 13.69   | 45.42            | 16.57             | 24                | Pass        |
| 142     | 5710            | 13.41                         | 13.63   | 22.06            | 16.53             | 24                | Pass        |
| 151     | 5755            | 19.20                         | 19.71   | 176.72           | 22.47             | 30                | Pass        |
| 159     | 5795            | 19.23                         | 19.75   | 178.16           | 22.51             | 30                | Pass        |

### 802.11ac (VHT80)

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) |         | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
|         |                 | Chain 0                       | Chain 1 |                  |                   |                   |             |
| 106     | 5530            | 10.02                         | 10.53   | 21.34            | 13.29             | 24                | Pass        |
| 122     | 5610            | 9.98                          | 10.5    | 21.17            | 13.26             | 24                | Pass        |
| 138     | 5690            | 9.96                          | 9.98    | 19.86            | 12.98             | 24                | Pass        |
| 155     | 5775            | 17.31                         | 17.66   | 112.17           | 20.50             | 30                | Pass        |

## BLUETOOTH EDR 頻段測試紀錄結果

### 8 帶外發射之量測

#### 8.1 適用標準

請見本報告 3.1 節第(9)項的規定。

#### 8.2 量測方法

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

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

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 1 MHz；

Average

The DH5 packet was the worse case duty cycle for a transmit dwell time on a channel, based upon bluetooth theory the transmitter is on  $0.625 * 5$  per 296.25 ms per channel. Therefore, the duty cycle correlation factor be equal to:  $20\log(3.125 / 100) = -30.1 \text{ dB}$

Average value = peak reading +  $20\log(\text{duty cycle})$

接收諧波：

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

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

#### 8.3 量測儀器

同 4.3 節

#### 8.4 測試配置

同 4.4 節

#### 8.5 場強度之計算

同 4.5 節

量測結果請見下頁。

## 8.6 量測結果

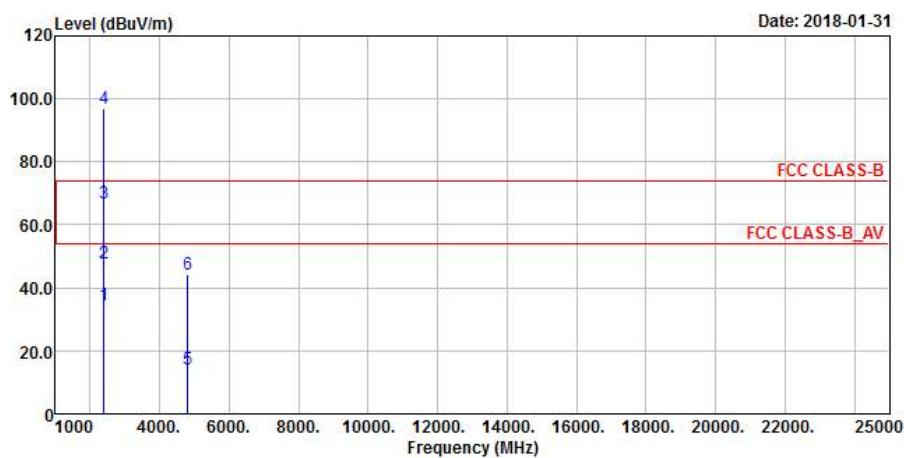
### 8.6.1 發射諧波

測試模式一

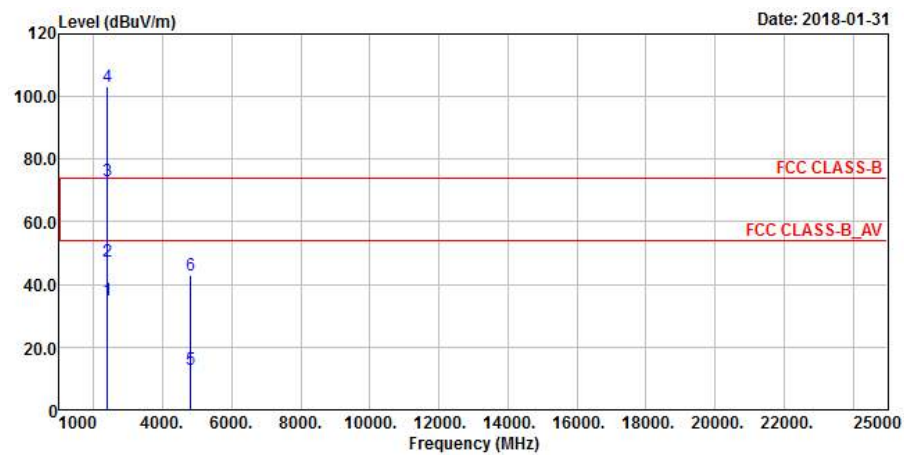
GFSK

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

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2385.88                                             | 34.57                   | 40.56             | 54             | -19.43      | 27.16                 | 4.35            | 37.5               | 274                 | 68                   | Average |
| 2385.88                                             | 47.69                   | 53.84             | 74             | -26.31      | 27.01                 | 4.33            | 37.49              | 274                 | 68                   | Peak    |
| 2402                                                | 66.72                   | 72.71             |                |             | 27.16                 | 4.37            | 37.52              | 274                 | 68                   | Average |
| 2402                                                | 96.82                   | 102.81            |                |             | 27.16                 | 4.37            | 37.52              | 274                 | 68                   | Peak    |
| 4804                                                | 14.15                   | 29.29             | 54             | -39.85      | 30.97                 | 6.79            | 52.9               | 151                 | 131                  | Average |
| 4804                                                | 44.26                   | 59.4              | 74             | -29.74      | 30.97                 | 6.79            | 52.9               | 151                 | 131                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2389.24                                             | 34.89                   | 40.87             | 54             | -19.11      | 27.16                 | 4.36            | 37.5               | 249                 | 358                  | Average |
| 2389.24                                             | 47.56                   | 53.71             | 74             | -26.44      | 27.01                 | 4.33            | 37.49              | 249                 | 358                  | Peak    |
| 2402                                                | 73.17                   | 79.16             |                |             | 27.16                 | 4.37            | 37.52              | 249                 | 358                  | Average |
| 2402                                                | 103.27                  | 109.26            |                |             | 27.16                 | 4.37            | 37.52              | 249                 | 358                  | Peak    |
| 4804                                                | 12.73                   | 28.07             | 54             | -41.27      | 30.97                 | 6.79            | 53.1               | 201                 | 105                  | Average |
| 4804                                                | 42.83                   | 58.17             | 74             | -31.17      | 30.97                 | 6.79            | 53.1               | 201                 | 105                  | Peak    |

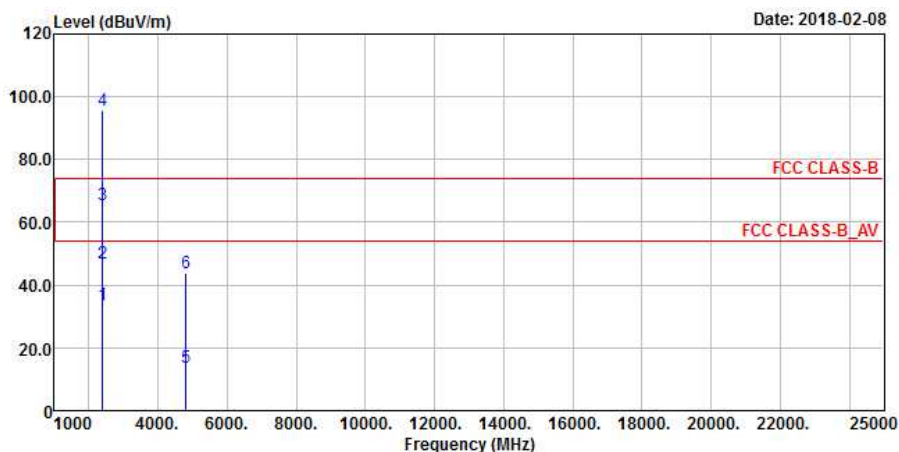
Remarks:

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

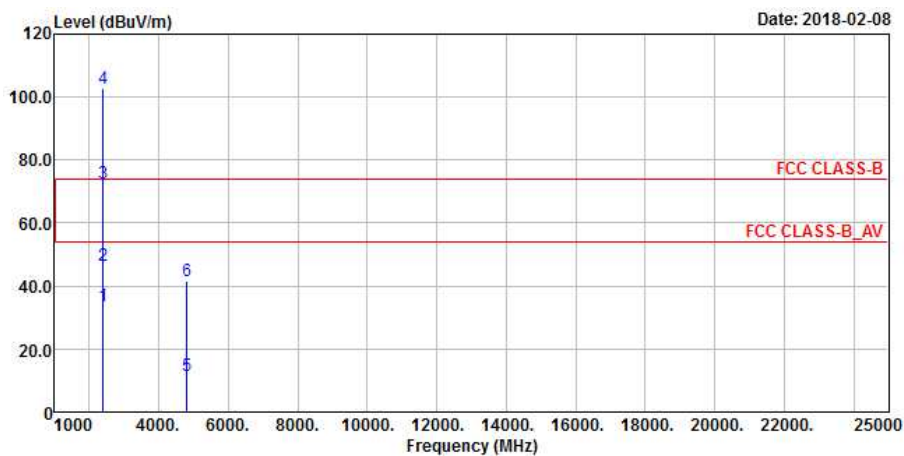
測試模式二  
GFSK

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

Horizontal



Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2389                                                | 33.71                   | 39.7              | 54             | -20.29      | 27.16                 | 4.35            | 37.5               | 225                 | 78                   | Average |
| 2389                                                | 46.89                   | 53.04             | 74             | -27.11      | 27.01                 | 4.33            | 37.49              | 225                 | 78                   | Peak    |
| 2402                                                | 65.75                   | 87.87             |                |             | 26.91                 | 4.86            | 53.89              | 225                 | 78                   | Average |
| 2402                                                | 95.85                   | 101.84            |                |             | 27.16                 | 4.37            | 37.52              | 225                 | 78                   | Peak    |
| 4804                                                | 13.75                   | 28.89             | 54             | -40.25      | 30.97                 | 6.79            | 52.9               | 150                 | 130                  | Average |
| 4804                                                | 43.85                   | 58.99             | 74             | -30.15      | 30.97                 | 6.79            | 52.9               | 150                 | 130                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2389.55                                             | 33.73                   | 39.71             | 54             | -20.27      | 27.16                 | 4.36            | 37.5               | 250                 | 360                  | Average |
| 2389.55                                             | 46.52                   | 52.67             | 74             | -27.48      | 27.01                 | 4.33            | 37.49              | 250                 | 360                  | Peak    |
| 2402                                                | 72.47                   | 78.46             |                |             | 27.16                 | 4.37            | 37.52              | 250                 | 360                  | Average |
| 2402                                                | 102.57                  | 108.56            |                |             | 27.16                 | 4.37            | 37.52              | 250                 | 360                  | Peak    |
| 4804                                                | 11.36                   | 26.7              | 54             | -42.64      | 30.97                 | 6.79            | 53.1               | 201                 | 109                  | Average |
| 4804                                                | 41.46                   | 56.8              | 74             | -32.54      | 30.97                 | 6.79            | 53.1               | 201                 | 109                  | Peak    |

Remarks:

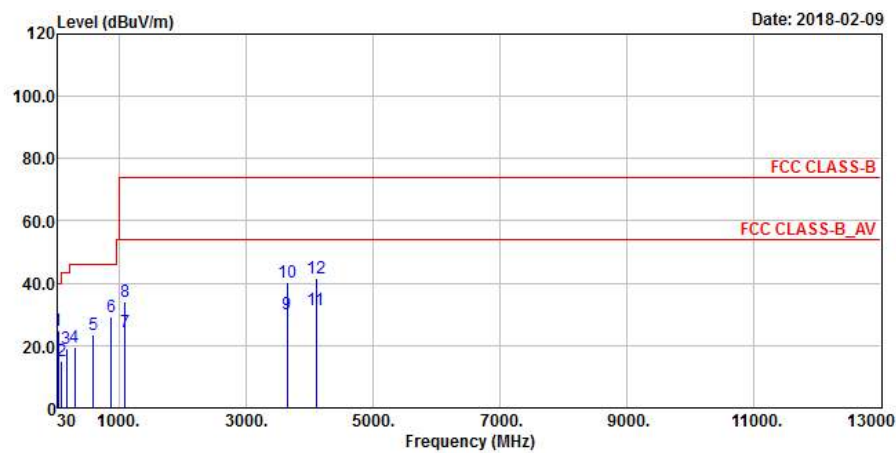
1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
2. 2402 MHz: Fundamental Frequency
3. The other emission levels were very low against the limit.

## 8.6.2 接收諧波

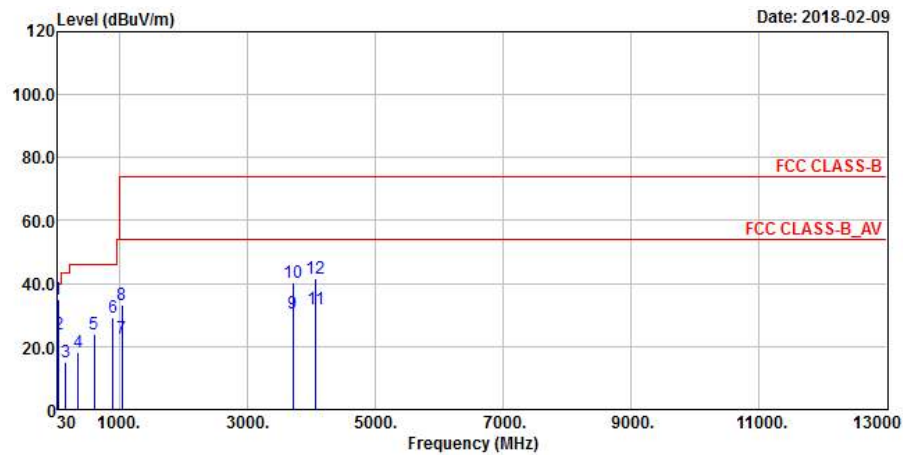
### 測試模式一

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 0          | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30                                                  | 24.97                   | 43.69             | 40             | -15.03      | 11.98                 | 0.44            | 31.14              | 111                 | 96                   | Peak    |
| 93.05                                               | 15.03                   | 37.74             | 43.5           | -28.47      | 8.53                  | 0.72            | 31.96              | 110                 | 243                  | Peak    |
| 167.74                                              | 19.13                   | 37.87             | 43.5           | -24.37      | 11.96                 | 1.06            | 31.76              | 132                 | 50                   | Peak    |
| 295.78                                              | 19.6                    | 36.9              | 46             | -26.4       | 12.83                 | 1.64            | 31.77              | 122                 | 268                  | Peak    |
| 588.72                                              | 23.65                   | 33.6              | 46             | -22.35      | 19.34                 | 2.85            | 32.14              | 135                 | 232                  | Peak    |
| 870.99                                              | 29.02                   | 33.95             | 46             | -16.98      | 23.14                 | 3.94            | 32.01              | 119                 | 341                  | Peak    |
| 1085                                                | 24.31                   | 49.41             | 54             | -29.69      | 24.94                 | 3.05            | 53.09              | 110                 | 223                  | Average |
| 1085                                                | 34.3                    | 59.4              | 74             | -39.7       | 24.94                 | 3.05            | 53.09              | 110                 | 223                  | Peak    |
| 3640                                                | 30.17                   | 49.36             | 54             | -23.83      | 29.02                 | 5.76            | 53.97              | 133                 | 56                   | Average |
| 3640                                                | 40.25                   | 59.44             | 74             | -33.75      | 29.02                 | 5.76            | 53.97              | 133                 | 56                   | Peak    |
| 4100                                                | 31.39                   | 48.92             | 54             | -22.61      | 29.8                  | 6.28            | 53.61              | 140                 | 73                   | Average |
| 4100                                                | 41.44                   | 58.97             | 74             | -32.56      | 29.8                  | 6.28            | 53.61              | 140                 | 73                   | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30.97                                               | 35.1                    | 53.63             | 40             | -4.9        | 12.14                 | 0.45            | 31.12              | 123                 | 343                  | Peak    |
| 42.61                                               | 24.01                   | 41.01             | 40             | -15.99      | 13.58                 | 0.5             | 31.08              | 138                 | 352                  | Peak    |
| 157.07                                              | 15.2                    | 33.27             | 43.5           | -28.3       | 12.72                 | 1.01            | 31.8               | 108                 | 174                  | Peak    |
| 350.1                                               | 18.29                   | 34.1              | 46             | -27.71      | 14.15                 | 1.88            | 31.84              | 135                 | 3                    | Peak    |
| 600.36                                              | 23.83                   | 33.57             | 46             | -22.17      | 19.61                 | 2.9             | 32.25              | 127                 | 114                  | Peak    |
| 890.39                                              | 29.01                   | 33.62             | 46             | -16.99      | 23.39                 | 3.99            | 31.99              | 115                 | 221                  | Peak    |
| 1030                                                | 22.78                   | 48.02             | 54             | -31.22      | 24.86                 | 2.96            | 53.06              | 108                 | 339                  | Average |
| 1030                                                | 33.13                   | 58.37             | 74             | -40.87      | 24.86                 | 2.96            | 53.06              | 108                 | 339                  | Peak    |
| 3710                                                | 30.43                   | 49.32             | 54             | -23.57      | 29.13                 | 5.87            | 53.89              | 138                 | 11                   | Average |
| 3710                                                | 40.48                   | 59.37             | 74             | -33.52      | 29.13                 | 5.87            | 53.89              | 138                 | 11                   | Peak    |
| 4070                                                | 31.81                   | 49.33             | 54             | -22.19      | 29.77                 | 6.26            | 53.55              | 132                 | 116                  | Average |
| 4070                                                | 41.73                   | 59.25             | 74             | -32.27      | 29.77                 | 6.26            | 53.55              | 132                 | 116                  | Peak    |

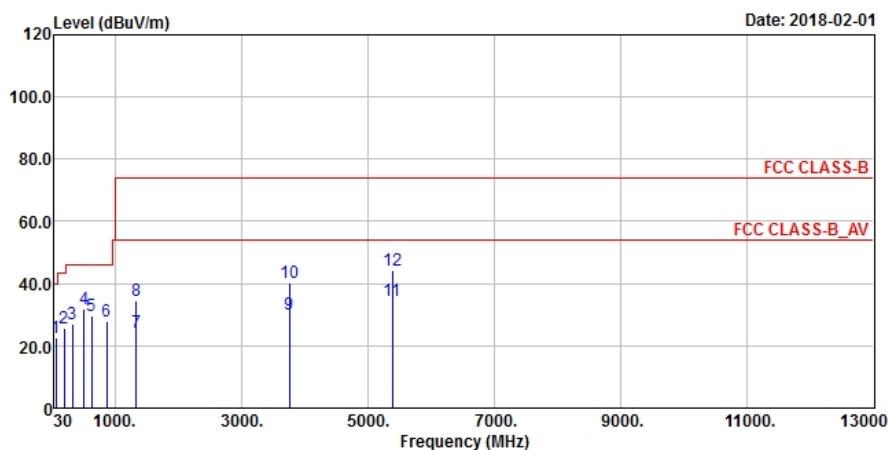
Remarks:

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

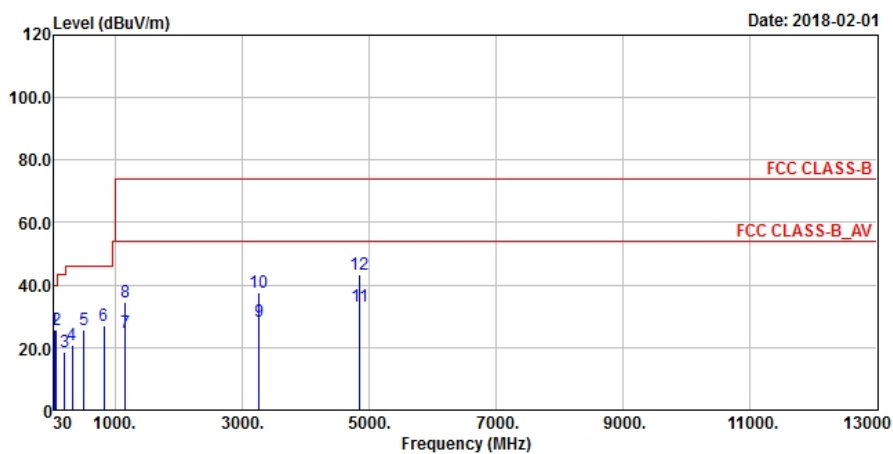
## 測試模式二

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 0          | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyoung Wang                                |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 53.28                                               | 22.46                   | 40.58             | 40             | -17.54      | 12.66                 | 0.55            | 31.33              | 200                 | 0                    | Peak    |
| 188.11                                              | 25.61                   | 45.96             | 43.5           | -17.89      | 10.19                 | 1.16            | 31.7               | 200                 | 0                    | Peak    |
| 313.24                                              | 27.16                   | 44.11             | 46             | -18.84      | 13.26                 | 1.72            | 31.93              | 200                 | 0                    | Peak    |
| 498.51                                              | 31.78                   | 43.64             | 46             | -14.22      | 17.29                 | 2.5             | 31.65              | 200                 | 0                    | Peak    |
| 618.79                                              | 29.81                   | 39.16             | 46             | -16.19      | 19.83                 | 2.98            | 32.16              | 200                 | 0                    | Peak    |
| 863.23                                              | 27.76                   | 32.75             | 46             | -18.24      | 23.04                 | 3.9             | 31.93              | 200                 | 0                    | Peak    |
| 1325                                                | 24.56                   | 49.3              | 54             | -29.44      | 25.24                 | 3.61            | 53.59              | 131                 | 255                  | Average |
| 1325                                                | 34.52                   | 59.26             | 74             | -39.48      | 25.24                 | 3.61            | 53.59              | 131                 | 255                  | Peak    |
| 3752                                                | 30.1                    | 48.89             | 54             | -23.9       | 29.2                  | 6.07            | 54.06              | 125                 | 265                  | Average |
| 3752                                                | 40.23                   | 59.02             | 74             | -33.77      | 29.2                  | 6.07            | 54.06              | 125                 | 265                  | Peak    |
| 5378                                                | 34.63                   | 48.51             | 54             | -19.37      | 31.73                 | 7.17            | 52.78              | 215                 | 326                  | Average |
| 5378                                                | 44.32                   | 58.2              | 74             | -29.68      | 31.73                 | 7.17            | 52.78              | 215                 | 326                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 38.73                                               | 25.67                   | 42.8              | 40             | -14.33      | 13.39                 | 0.48            | 31                 | 100                 | 0                    | Peak    |
| 68.8                                                | 25.85                   | 46.1              | 40             | -14.15      | 10.89                 | 0.63            | 31.77              | 100                 | 0                    | Peak    |
| 192.96                                              | 18.76                   | 39.43             | 43.5           | -24.74      | 9.84                  | 1.19            | 31.7               | 100                 | 0                    | Peak    |
| 319.06                                              | 20.76                   | 37.52             | 46             | -25.24      | 13.4                  | 1.74            | 31.9               | 100                 | 0                    | Peak    |
| 502.39                                              | 25.74                   | 37.45             | 46             | -20.26      | 17.37                 | 2.53            | 31.61              | 100                 | 0                    | Peak    |
| 813.76                                              | 26.81                   | 32.2              | 46             | -19.19      | 22.4                  | 3.72            | 31.51              | 100                 | 0                    | Peak    |
| 1151                                                | 24.63                   | 49.65             | 54             | -29.37      | 25.09                 | 3.35            | 53.46              | 214                 | 125                  | Average |
| 1151                                                | 34.65                   | 59.67             | 74             | -39.35      | 25.09                 | 3.35            | 53.46              | 214                 | 125                  | Peak    |
| 3262                                                | 28.12                   | 47.92             | 54             | -25.88      | 28.61                 | 5.62            | 54.03              | 147                 | 201                  | Average |
| 3262                                                | 37.65                   | 57.45             | 74             | -36.35      | 28.61                 | 5.62            | 54.03              | 147                 | 201                  | Peak    |
| 4852                                                | 33.12                   | 47.93             | 54             | -20.88      | 31.23                 | 6.84            | 52.88              | 221                 | 165                  | Average |
| 4852                                                | 43.51                   | 58.32             | 74             | -30.49      | 31.23                 | 6.84            | 52.88              | 221                 | 165                  | Peak    |

Remarks:

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

### 8.6.3 其它不必要之訊號

#### 9 kHz ~ 30 MHz Data:

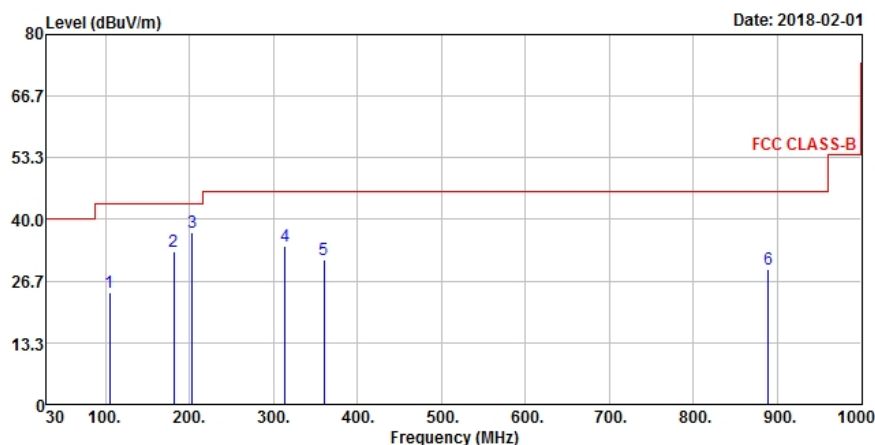
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

#### 30 MHz ~ 1 GHz Data:

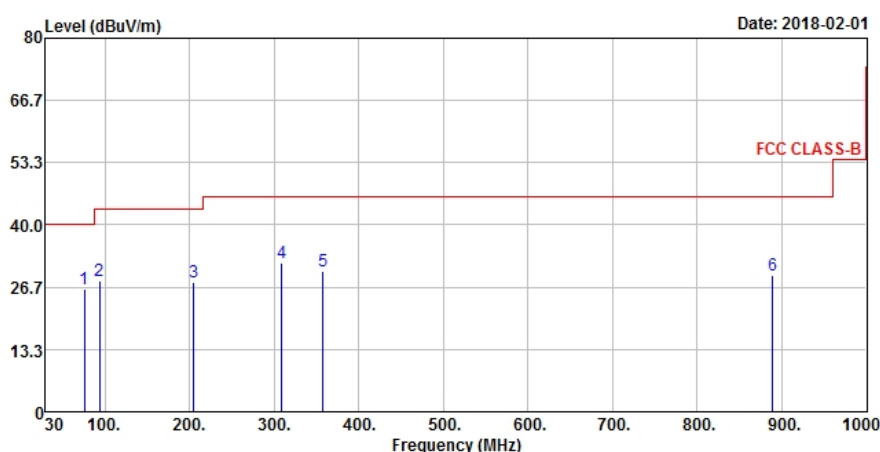
測試模式一

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

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 104.69                                              | 24.24                   | 45.84             | 43.5           | -19.26      | 9.53                  | 0.77            | 31.9               | 125                 | 123                  | Peak   |
| 181.32                                              | 33.06                   | 53.08             | 43.5           | -10.44      | 10.67                 | 1.13            | 31.82              | 111                 | 132                  | Peak   |
| 203.63                                              | 37.32                   | 58.25             | 43.5           | -6.18       | 9.52                  | 1.25            | 31.7               | 152                 | 123                  | Peak   |
| 314.21                                              | 34.3                    | 51.22             | 46             | -11.7       | 13.29                 | 1.72            | 31.93              | 165                 | 142                  | Peak   |
| 359.8                                               | 31.15                   | 46.82             | 46             | -14.85      | 14.38                 | 1.92            | 31.97              | 111                 | 132                  | Peak   |
| 889.42                                              | 29.1                    | 33.73             | 46             | -16.9       | 23.37                 | 3.99            | 31.99              | 152                 | 132                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 75.59                                               | 26.26                   | 47.92             | 40             | -13.74      | 9.33                  | 0.66            | 31.65              | 201                 | 256                  | Peak   |
| 94.02                                               | 27.98                   | 50.61             | 43.5           | -15.52      | 8.6                   | 0.73            | 31.96              | 222                 | 236                  | Peak   |
| 204.6                                               | 27.65                   | 48.53             | 43.5           | -15.85      | 9.56                  | 1.25            | 31.69              | 301                 | 256                  | Peak   |
| 309.36                                              | 31.88                   | 48.96             | 46             | -14.12      | 13.17                 | 1.69            | 31.94              | 111                 | 256                  | Peak   |
| 357.86                                              | 30                      | 45.69             | 46             | -16         | 14.33                 | 1.92            | 31.94              | 203                 | 214                  | Peak   |
| 889.42                                              | 29.2                    | 33.83             | 46             | -16.8       | 23.37                 | 3.99            | 31.99              | 111                 | 165                  | Peak   |

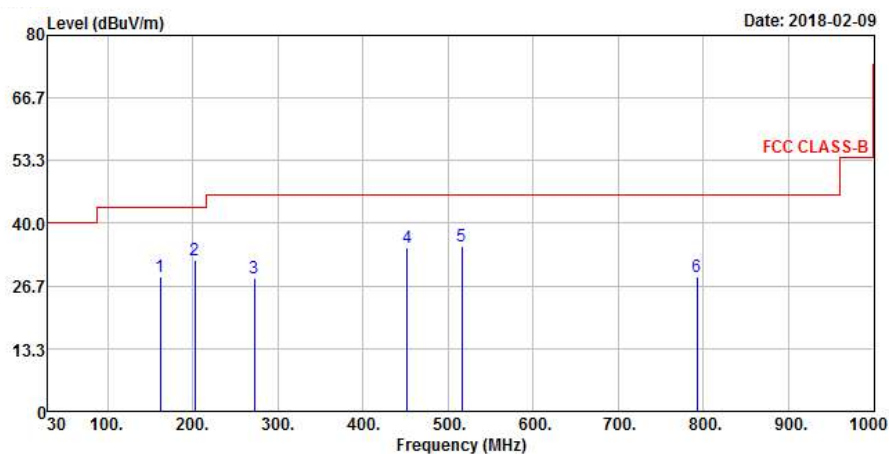
Remarks:

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

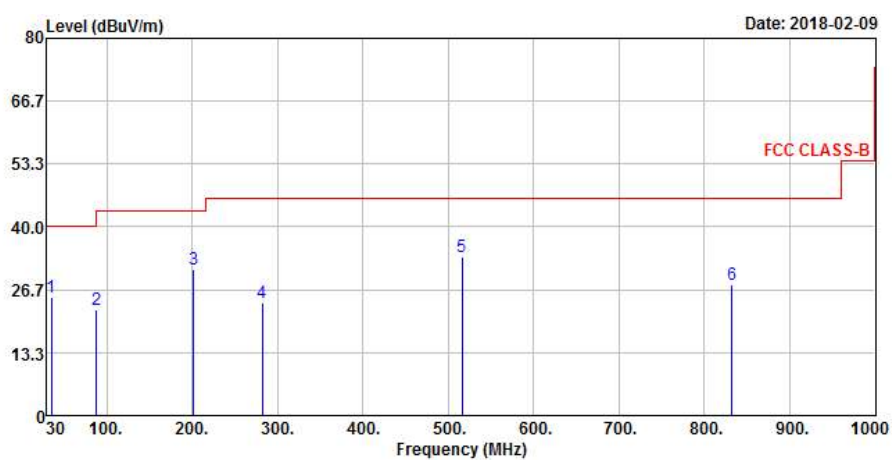
## 測試模式二

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 0          | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quask-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 161.92                                              | 28.57                   | 46.85             | 43.5           | -14.93      | 12.54                 | 1.03            | 31.85              | 113                 | 32                   | Peak   |
| 202.66                                              | 32.24                   | 53.24             | 43.5           | -11.26      | 9.48                  | 1.24            | 31.72              | 142                 | 276                  | Peak   |
| 272.5                                               | 28.4                    | 46.69             | 46             | -17.6       | 12.14                 | 1.54            | 31.97              | 108                 | 208                  | Peak   |
| 451.95                                              | 34.88                   | 48.2              | 46             | -11.12      | 16.37                 | 2.29            | 31.98              | 112                 | 144                  | Peak   |
| 515.97                                              | 35.08                   | 46.41             | 46             | -10.92      | 17.68                 | 2.57            | 31.58              | 147                 | 186                  | Peak   |
| 792.42                                              | 28.64                   | 34.29             | 46             | -17.36      | 22.12                 | 3.64            | 31.41              | 126                 | 267                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 34.85                                               | 25.15                   | 42.95             | 40             | -14.85      | 12.79                 | 0.47            | 31.06              | 128                 | 29                   | Peak   |
| 88.2                                                | 22.3                    | 45.2              | 43.5           | -21.2       | 8.27                  | 0.7             | 31.87              | 129                 | 319                  | Peak   |
| 201.69                                              | 30.85                   | 51.91             | 43.5           | -12.65      | 9.44                  | 1.24            | 31.74              | 129                 | 296                  | Peak   |
| 282.2                                               | 23.91                   | 41.69             | 46             | -22.09      | 12.42                 | 1.59            | 31.79              | 144                 | 249                  | Peak   |
| 515.97                                              | 33.62                   | 44.95             | 46             | -12.38      | 17.68                 | 2.57            | 31.58              | 117                 | 38                   | Peak   |
| 832.19                                              | 27.8                    | 33.12             | 46             | -18.2       | 22.64                 | 3.78            | 31.74              | 146                 | 275                  | Peak   |

Remarks:

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

## 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 輸出峰值功率之量測

### 9.1 適用標準

請見本報告 3.1 節第(12)項的規定。

### 9.2 量測方法

- 將待測物輸出接到頻譜分析儀上。
- 設定待測物處於連續發射狀態。
- 量測待測物輸出功率峰值。

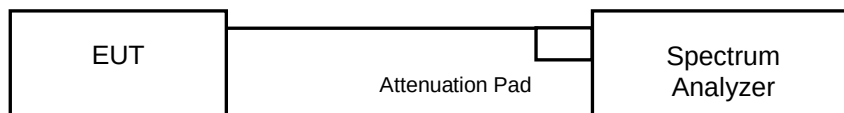
### 9.3 量測儀器

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration | Due Date Of Calibration |
|----------------------------|-----------|------------|---------------------|-------------------------|
| Spectrum Analyzer<br>R&S   | FSU43     | 101261     | Jan. 11, 2018       | Jan. 10, 2019           |

Note:

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

### 9.4 測試配置

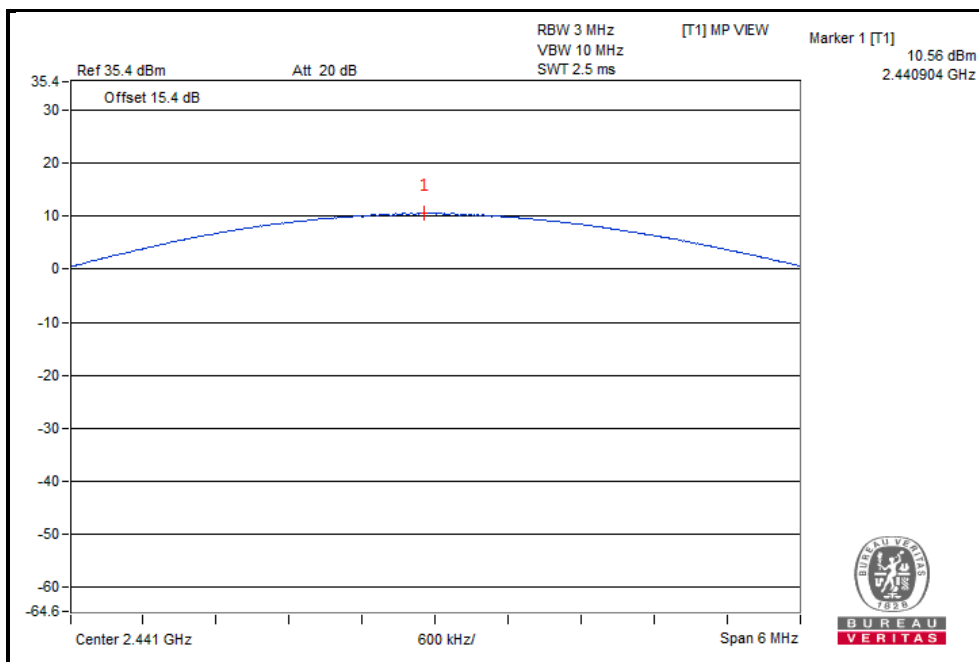


## 9.5 量測結果

|        |       |        |                 |
|--------|-------|--------|-----------------|
| 操作模式   | 發射    | 測試日期   | 107 年 03 月 08 日 |
| 量測場地溫度 | 25 °C | 量測場地濕度 | 65 % RH         |
| 測試者    | 吳俊樺   |        |                 |

| Channel | Channel Frequency (MHz) | Peak Power Output (dBm) |                |       | Peak Power Limit (dBm) | Pass / Fail |
|---------|-------------------------|-------------------------|----------------|-------|------------------------|-------------|
|         |                         | GFSK                    | $\pi$ /4-DQPSK | 8DPSK |                        |             |
| 0       | 2402                    | 10.23                   | 10.11          | 10.13 | 30                     | Pass        |
| 39      | 2441                    | 10.56                   | 10.52          | 10.51 | 30                     | Pass        |
| 78      | 2480                    | 10.53                   | 10.40          | 10.44 | 30                     | Pass        |

\*\*此測試圖僅放測試結果最差的頻道。



## 9.6 量測結果判定

依據測試數據結果，符合低功率射頻電機技術規範之要求。

## BLUETOOTH LE 4.2 頻段測試紀錄結果

### 10 帶外發射之量測

#### 10.1 適用標準

請見本報告 3.1 節第(1)項的規定。

#### 10.2 量測方法

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

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

發射諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz；

Average 為 RBW = 1 MHz, VBW = 3 kHz

接收諧波：

Peak 為 RBW = 1 MHz, VBW = 3 MHz；Average 為 RBW = 1 MHz, VBW = 10 Hz

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

#### 10.3 量測儀器

同 4.3 節

#### 10.4 測試配置

同 4.4 節

#### 10.5 場強度之計算

同 4.5 節

量測結果請見下頁。

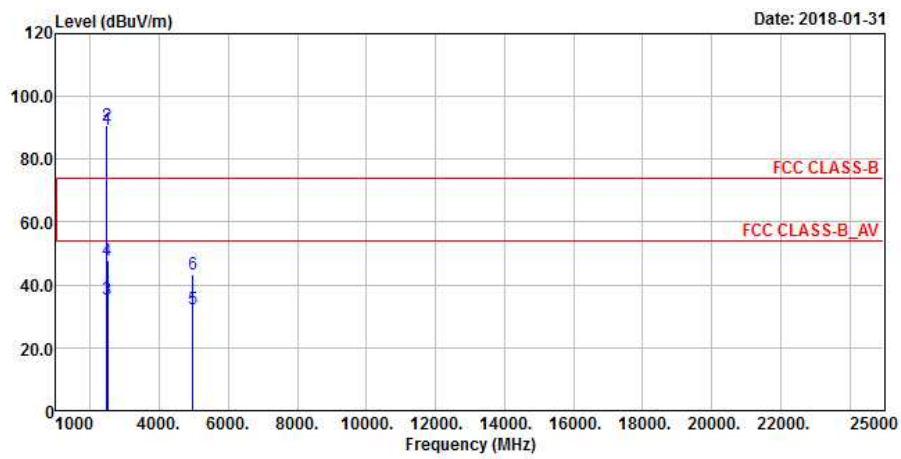
## 10.6 量測結果

### 10.6.1 發射諧波

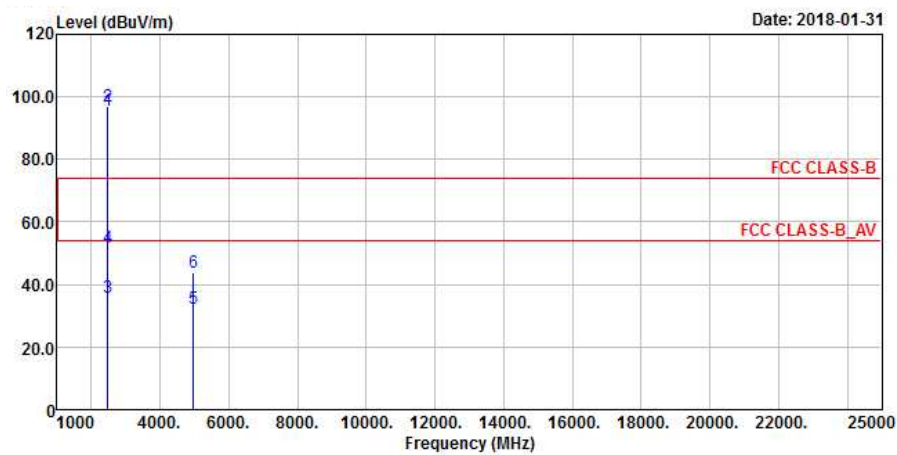
#### 測試模式一

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

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 89.6                    | 95.34             |                |             | 27.15                 | 4.43            | 37.32              | 282                 | 62                   | Average |
| 2480                                                | 90.66                   | 96.4              |                |             | 27.15                 | 4.43            | 37.32              | 282                 | 62                   | Peak    |
| 2484.36                                             | 35.61                   | 41.22             | 54             | -18.39      | 27.2                  | 4.44            | 37.25              | 282                 | 62                   | Average |
| 2484.36                                             | 48.04                   | 53.78             | 74             | -25.96      | 27.15                 | 4.43            | 37.32              | 282                 | 62                   | Peak    |
| 4960                                                | 32.35                   | 47.21             | 54             | -21.65      | 31.16                 | 6.9             | 52.92              | 150                 | 38                   | Average |
| 4960                                                | 43.5                    | 58.36             | 74             | -30.5       | 31.16                 | 6.9             | 52.92              | 150                 | 38                   | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 95.77                   | 101.51            |                |             | 27.15                 | 4.43            | 37.32              | 224                 | 338                  | Average |
| 2480                                                | 97.07                   | 102.81            |                |             | 27.15                 | 4.43            | 37.32              | 224                 | 338                  | Peak    |
| 2483.72                                             | 35.99                   | 41.73             | 54             | -18.01      | 27.15                 | 4.43            | 37.32              | 224                 | 338                  | Average |
| 2483.72                                             | 51.74                   | 57.48             | 74             | -22.26      | 27.15                 | 4.43            | 37.32              | 224                 | 338                  | Peak    |
| 4960                                                | 32.14                   | 47.12             | 54             | -21.86      | 31.16                 | 6.9             | 53.04              | 100                 | 25                   | Average |
| 4960                                                | 43.97                   | 58.95             | 74             | -30.03      | 31.16                 | 6.9             | 53.04              | 100                 | 25                   | Peak    |

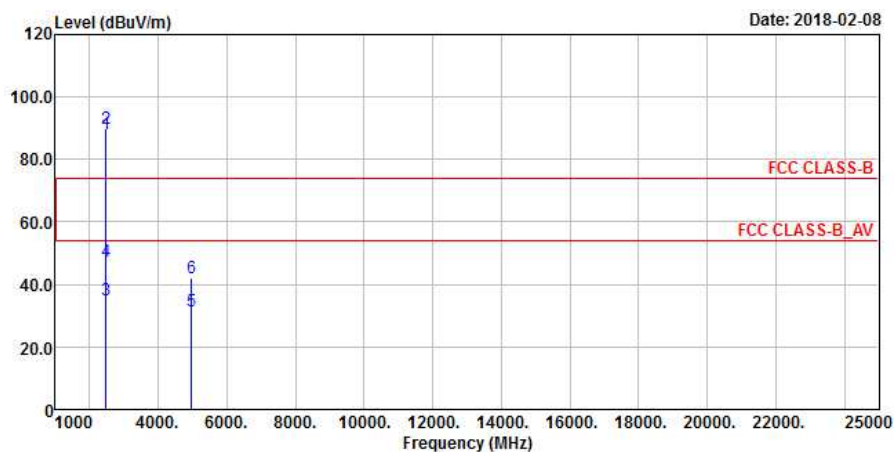
Remarks:

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

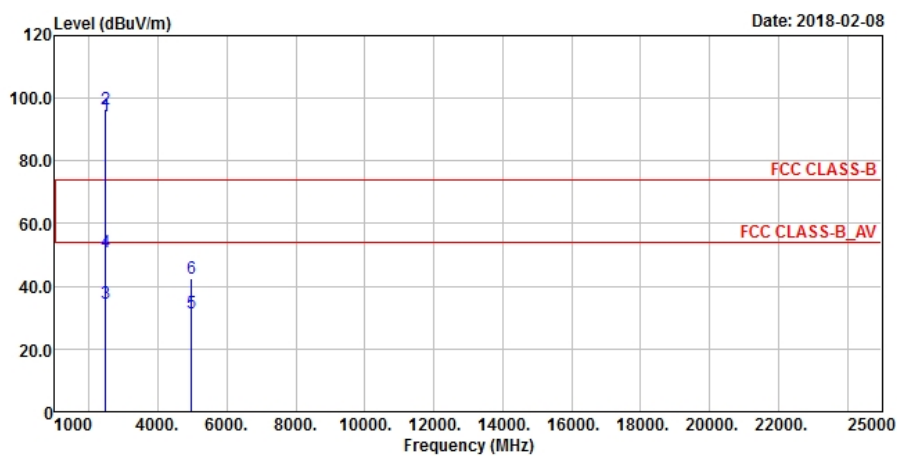
## 測試模式二

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

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 88.28                   | 94.02             |                |             | 27.15                 | 4.43            | 37.32              | 285                 | 51                   | Average |
| 2480                                                | 89.85                   | 95.59             |                |             | 27.15                 | 4.43            | 37.32              | 285                 | 51                   | Peak    |
| 2484                                                | 34.81                   | 40.42             | 54             | -19.19      | 27.2                  | 4.44            | 37.25              | 285                 | 51                   | Average |
| 2484                                                | 47.31                   | 53.05             | 74             | -26.69      | 27.15                 | 4.43            | 37.32              | 285                 | 51                   | Peak    |
| 4960                                                | 31.26                   | 46.12             | 54             | -22.74      | 31.16                 | 6.9             | 52.92              | 147                 | 62                   | Average |
| 4960                                                | 42.24                   | 57.1              | 74             | -31.76      | 31.16                 | 6.9             | 52.92              | 147                 | 62                   | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2480                                                | 94.28                   | 100.02            |                |             | 27.15                 | 4.43            | 37.32              | 200                 | 325                  | Average |
| 2480                                                | 96.62                   | 102.36            |                |             | 27.15                 | 4.43            | 37.32              | 200                 | 325                  | Peak    |
| 2483.52                                             | 34.51                   | 40.25             | 54             | -19.49      | 27.15                 | 4.43            | 37.32              | 200                 | 325                  | Average |
| 2483.52                                             | 50.75                   | 56.49             | 74             | -23.25      | 27.15                 | 4.43            | 37.32              | 200                 | 325                  | Peak    |
| 4960                                                | 31.27                   | 46.25             | 54             | -22.73      | 31.16                 | 6.9             | 53.04              | 205                 | 41                   | Average |
| 4960                                                | 42.72                   | 57.7              | 74             | -31.28      | 31.16                 | 6.9             | 53.04              | 205                 | 41                   | Peak    |

Remarks:

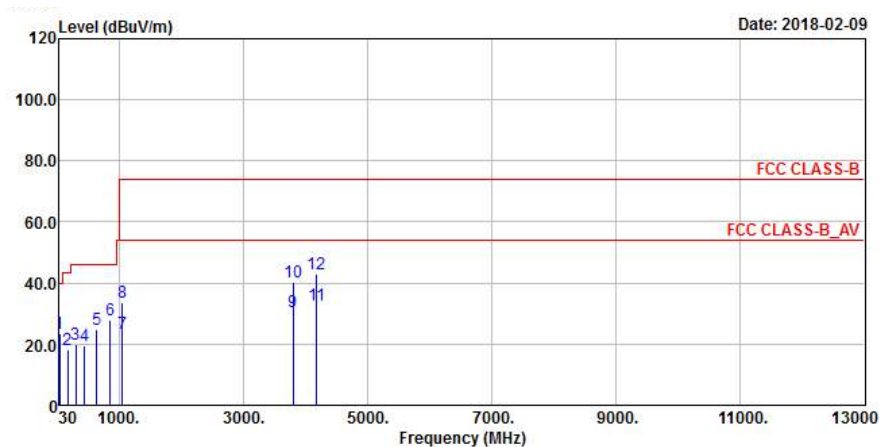
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin Value = Emission Level – Limit value
- 2480 MHz: Fundamental Frequency
- The other emission levels were very low against the limit.

## 10.6.2 接收諧波

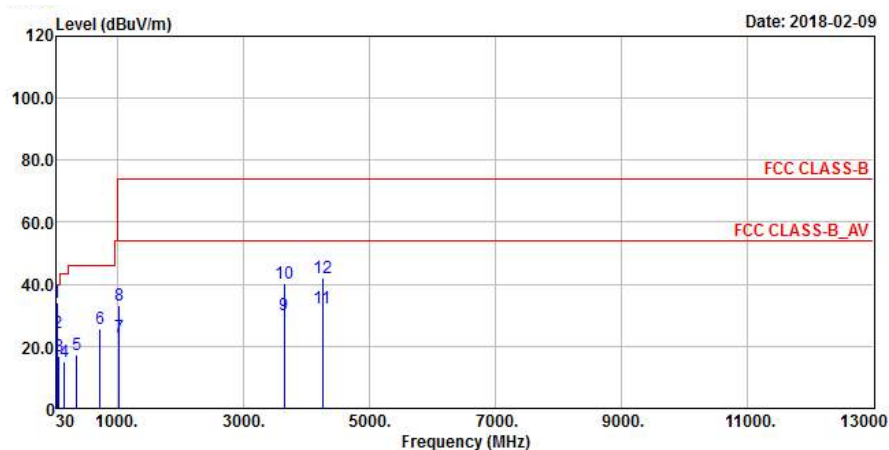
### 測試模式一

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 39         | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30                                                  | 23.3                    | 42.02             | 40             | -16.7       | 11.98                 | 0.44            | 31.14              | 103                 | 132                  | Peak    |
| 168.71                                              | 18.27                   | 37.09             | 43.5           | -25.23      | 11.86                 | 1.06            | 31.74              | 136                 | 140                  | Peak    |
| 296.75                                              | 20.02                   | 37.32             | 46             | -25.98      | 12.85                 | 1.64            | 31.79              | 101                 | 271                  | Peak    |
| 431.58                                              | 19.55                   | 33.4              | 46             | -26.45      | 15.96                 | 2.2             | 32.01              | 114                 | 234                  | Peak    |
| 636.25                                              | 24.84                   | 33.86             | 46             | -21.16      | 20.04                 | 3.05            | 32.11              | 107                 | 29                   | Peak    |
| 853.53                                              | 27.76                   | 32.87             | 46             | -18.24      | 22.91                 | 3.86            | 31.88              | 138                 | 200                  | Peak    |
| 1045                                                | 23.62                   | 48.83             | 54             | -30.38      | 24.88                 | 2.99            | 53.08              | 120                 | 245                  | Average |
| 1045                                                | 33.71                   | 58.92             | 74             | -40.29      | 24.88                 | 2.99            | 53.08              | 120                 | 245                  | Peak    |
| 3790                                                | 30.45                   | 49.05             | 54             | -23.55      | 29.27                 | 5.97            | 53.84              | 134                 | 32                   | Average |
| 3790                                                | 40.48                   | 59.08             | 74             | -33.52      | 29.27                 | 5.97            | 53.84              | 134                 | 32                   | Peak    |
| 4170                                                | 32.73                   | 50.21             | 54             | -21.27      | 29.93                 | 6.33            | 53.74              | 112                 | 202                  | Average |
| 4170                                                | 42.76                   | 60.24             | 74             | -31.24      | 29.93                 | 6.33            | 53.74              | 112                 | 202                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 30                                                  | 34.28                   | 53                | 40             | -5.72       | 11.98                 | 0.44            | 31.14              | 103                 | 121                  | Peak    |
| 43.58                                               | 24.45                   | 41.47             | 40             | -15.55      | 13.59                 | 0.5             | 31.11              | 111                 | 321                  | Peak    |
| 66.86                                               | 16.92                   | 36.86             | 40             | -23.08      | 11.12                 | 0.62            | 31.68              | 138                 | 348                  | Peak    |
| 156.1                                               | 15.03                   | 33.08             | 43.5           | -28.47      | 12.72                 | 1               | 31.77              | 109                 | 69                   | Peak    |
| 352.04                                              | 17.28                   | 33.07             | 46             | -28.72      | 14.19                 | 1.89            | 31.87              | 129                 | 16                   | Peak    |
| 722.58                                              | 25.78                   | 32.88             | 46             | -20.22      | 21.13                 | 3.41            | 31.64              | 112                 | 72                   | Peak    |
| 1020                                                | 23.23                   | 48.51             | 54             | -30.77      | 24.83                 | 2.95            | 53.06              | 122                 | 343                  | Average |
| 1020                                                | 33.25                   | 58.53             | 74             | -40.75      | 24.83                 | 2.95            | 53.06              | 122                 | 343                  | Peak    |
| 3645                                                | 30.14                   | 49.3              | 54             | -23.86      | 29.05                 | 5.76            | 53.97              | 111                 | 311                  | Average |
| 3645                                                | 40.21                   | 59.37             | 74             | -33.79      | 29.05                 | 5.76            | 53.97              | 111                 | 311                  | Peak    |
| 4245                                                | 32.11                   | 49.41             | 54             | -21.89      | 30.1                  | 6.37            | 53.77              | 119                 | 265                  | Average |
| 4245                                                | 42.17                   | 59.47             | 74             | -31.83      | 30.1                  | 6.37            | 53.77              | 119                 | 265                  | Peak    |

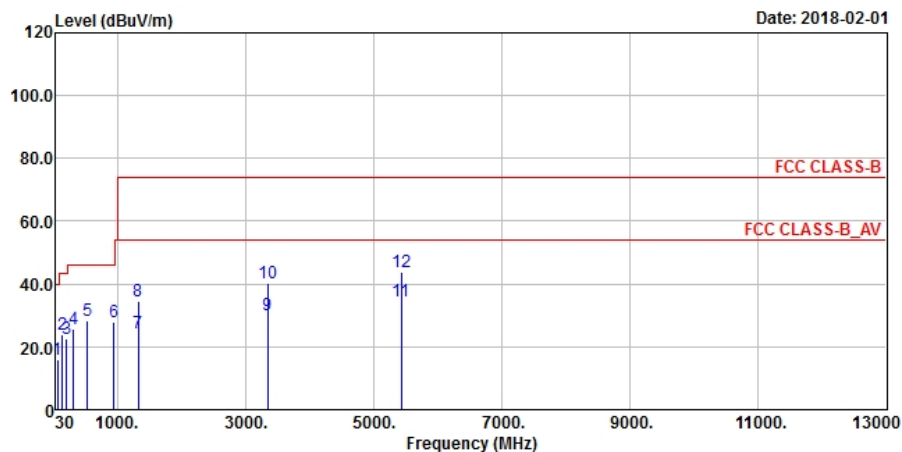
Remarks:

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.

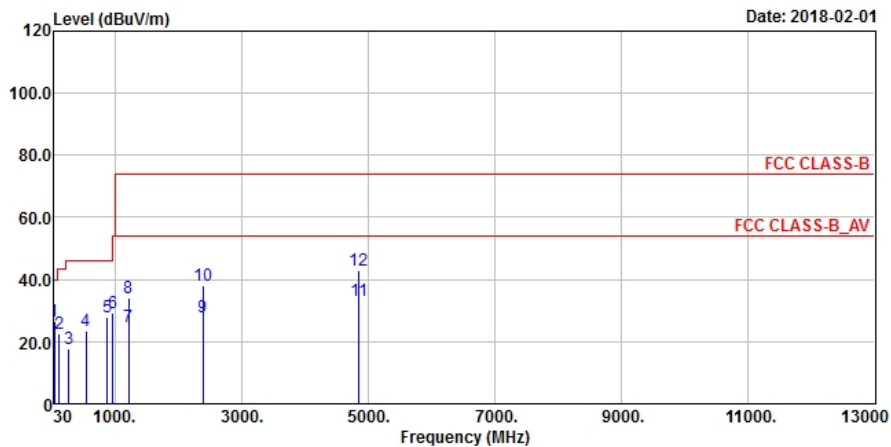
## 測試模式二

| EUT Test Condition       |                    | Measurement Detail |                                              |
|--------------------------|--------------------|--------------------|----------------------------------------------|
| Channel                  | Channel 39         | Frequency Range    | 30 MHz ~ 13 GHz                              |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Jisyoung Wang                                |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 59.1                                                | 16.05                   | 34.78             | 40             | -23.95      | 12.04                 | 0.58            | 31.35              | 200                 | 0                    | Peak    |
| 132.82                                              | 23.94                   | 42.97             | 43.5           | -19.56      | 11.88                 | 0.9             | 31.81              | 200                 | 0                    | Peak    |
| 194.9                                               | 22.6                    | 43.42             | 43.5           | -20.9       | 9.7                   | 1.2             | 31.72              | 200                 | 0                    | Peak    |
| 310.33                                              | 25.69                   | 42.74             | 46             | -20.31      | 13.2                  | 1.7             | 31.95              | 200                 | 0                    | Peak    |
| 518.88                                              | 28.46                   | 39.69             | 46             | -17.54      | 17.75                 | 2.59            | 31.57              | 200                 | 0                    | Peak    |
| 939.86                                              | 27.74                   | 31.76             | 46             | -18.26      | 23.73                 | 4.18            | 31.93              | 200                 | 0                    | Peak    |
| 1312                                                | 24.56                   | 49.28             | 54             | -29.44      | 25.22                 | 3.6             | 53.54              | 131                 | 255                  | Average |
| 1312                                                | 34.62                   | 59.34             | 74             | -39.38      | 25.22                 | 3.6             | 53.54              | 131                 | 255                  | Peak    |
| 3337                                                | 30.1                    | 49.85             | 54             | -23.9       | 28.66                 | 5.68            | 54.09              | 125                 | 265                  | Average |
| 3337                                                | 40.1                    | 59.85             | 74             | -33.9       | 28.66                 | 5.68            | 54.09              | 125                 | 265                  | Peak    |
| 5421                                                | 34.5                    | 48.28             | 54             | -19.5       | 31.75                 | 7.19            | 52.72              | 215                 | 326                  | Average |
| 5421                                                | 43.9                    | 57.68             | 74             | -30.1       | 31.75                 | 7.19            | 52.72              | 215                 | 326                  | Peak    |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 37.76                                               | 26.61                   | 43.91             | 40             | -13.39      | 13.24                 | 0.48            | 31.02              | 100                 | 0                    | Peak    |
| 108.57                                              | 22.58                   | 43.75             | 43.5           | -20.92      | 9.9                   | 0.78            | 31.85              | 100                 | 0                    | Peak    |
| 261.83                                              | 17.66                   | 36.23             | 46             | -28.34      | 11.82                 | 1.5             | 31.89              | 100                 | 0                    | Peak    |
| 532.46                                              | 23.39                   | 34.39             | 46             | -22.61      | 18.06                 | 2.64            | 31.7               | 100                 | 0                    | Peak    |
| 871.96                                              | 28.04                   | 32.95             | 46             | -17.96      | 23.15                 | 3.94            | 32                 | 100                 | 0                    | Peak    |
| 959.26                                              | 29.31                   | 33.12             | 46             | -16.69      | 23.84                 | 4.27            | 31.92              | 100                 | 0                    | Peak    |
| 1210                                                | 24.65                   | 49.56             | 54             | -29.35      | 25.13                 | 3.44            | 53.48              | 214                 | 125                  | Average |
| 1210                                                | 33.96                   | 58.87             | 74             | -40.04      | 25.13                 | 3.44            | 53.48              | 214                 | 125                  | Peak    |
| 2375                                                | 27.99                   | 49.95             | 54             | -26.01      | 27.08                 | 4.83            | 53.87              | 147                 | 201                  | Average |
| 2375                                                | 37.96                   | 59.92             | 74             | -36.04      | 27.08                 | 4.83            | 53.87              | 147                 | 201                  | Peak    |
| 4852                                                | 33.2                    | 48.01             | 54             | -20.8       | 31.23                 | 6.84            | 52.88              | 221                 | 165                  | Average |
| 4852                                                | 42.98                   | 57.79             | 74             | -31.02      | 31.23                 | 6.84            | 52.88              | 221                 | 165                  | Peak    |

Remarks:

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

### 10.6.3 其它不必要之訊號

#### 9 kHz ~ 30 MHz Data:

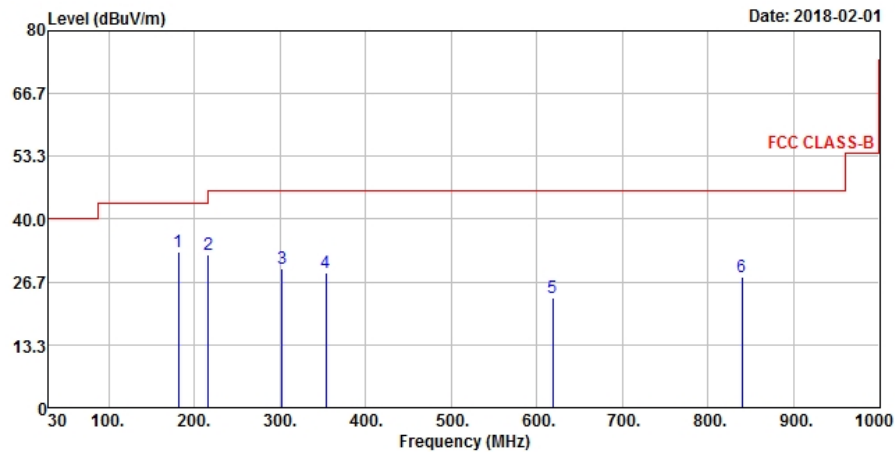
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

#### 30 MHz ~ 1 GHz Data:

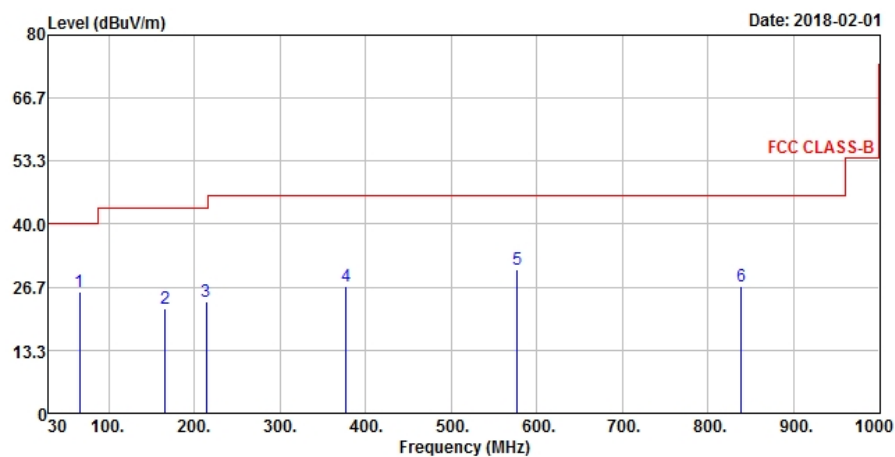
測試模式一

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

#### Horizontal



#### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 181.32                                              | 33.06                   | 53.08             | 43.5           | -10.44      | 10.67                 | 1.13            | 31.82              | 200                 | 0                    | Peak   |
| 216.24                                              | 32.44                   | 52.74             | 46             | -13.56      | 10.05                 | 1.31            | 31.66              | 200                 | 0                    | Peak   |
| 302.57                                              | 29.65                   | 46.85             | 46             | -16.35      | 13.01                 | 1.66            | 31.87              | 200                 | 0                    | Peak   |
| 353.98                                              | 28.54                   | 44.29             | 46             | -17.46      | 14.24                 | 1.9             | 31.89              | 200                 | 0                    | Peak   |
| 618.79                                              | 23.33                   | 32.68             | 46             | -22.67      | 19.83                 | 2.98            | 32.16              | 200                 | 0                    | Peak   |
| 839.95                                              | 27.74                   | 33                | 46             | -18.26      | 22.74                 | 3.8             | 31.8               | 200                 | 0                    | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 65.89                                               | 25.79                   | 45.57             | 40             | -14.21      | 11.24                 | 0.62            | 31.64              | 100                 | 0                    | Peak   |
| 165.8                                               | 22.1                    | 40.69             | 43.5           | -21.4       | 12.15                 | 1.05            | 31.79              | 100                 | 0                    | Peak   |
| 214.3                                               | 23.49                   | 43.86             | 43.5           | -20.01      | 9.97                  | 1.3             | 31.64              | 100                 | 0                    | Peak   |
| 377.26                                              | 26.92                   | 42.07             | 46             | -19.08      | 14.8                  | 1.99            | 31.94              | 100                 | 0                    | Peak   |
| 577.08                                              | 30.3                    | 40.53             | 46             | -15.7       | 19.08                 | 2.8             | 32.11              | 100                 | 0                    | Peak   |
| 838.98                                              | 27                      | 32.26             | 46             | -19         | 22.73                 | 3.8             | 31.79              | 100                 | 0                    | Peak   |

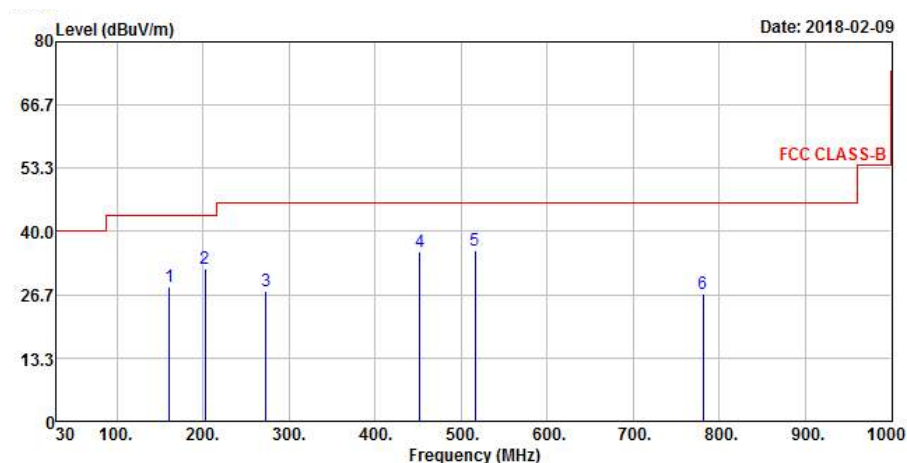
Remarks:

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

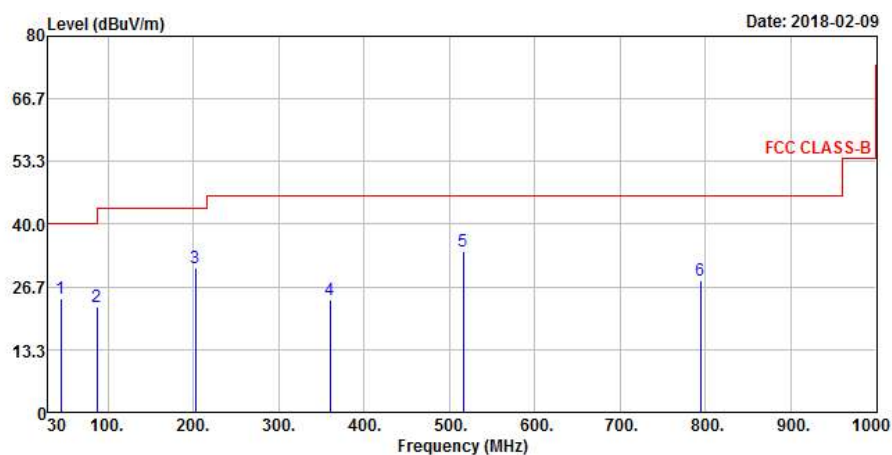
## 測試模式二

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 39         | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 110 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-Peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Getaz Yang                   |

### Horizontal



### Vertical



| Antenna Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 160.95                                              | 28.47                   | 46.67             | 43.5           | -15.03      | 12.63                 | 1.03            | 31.86              | 117                 | 23                   | Peak   |
| 202.66                                              | 32.14                   | 53.14             | 43.5           | -11.36      | 9.48                  | 1.24            | 31.72              | 120                 | 54                   | Peak   |
| 273.47                                              | 27.55                   | 45.79             | 46             | -18.45      | 12.17                 | 1.54            | 31.95              | 107                 | 194                  | Peak   |
| 451.95                                              | 35.73                   | 49.05             | 46             | -10.27      | 16.37                 | 2.29            | 31.98              | 135                 | 56                   | Peak   |
| 515.97                                              | 36.04                   | 47.37             | 46             | -9.96       | 17.68                 | 2.57            | 31.58              | 134                 | 294                  | Peak   |
| 780.78                                              | 26.9                    | 32.77             | 46             | -19.1       | 21.96                 | 3.6             | 31.43              | 121                 | 139                  | Peak   |
| Antenna Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                     | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 44.55                                               | 24.12                   | 41.15             | 40             | -15.88      | 13.6                  | 0.51            | 31.14              | 127                 | 140                  | Peak   |
| 87.23                                               | 22.31                   | 45.18             | 40             | -17.69      | 8.25                  | 0.7             | 31.82              | 105                 | 256                  | Peak   |
| 202.66                                              | 30.68                   | 51.68             | 43.5           | -12.82      | 9.48                  | 1.24            | 31.72              | 134                 | 232                  | Peak   |
| 359.8                                               | 23.91                   | 39.58             | 46             | -22.09      | 14.38                 | 1.92            | 31.97              | 100                 | 289                  | Peak   |
| 515.97                                              | 34.17                   | 45.5              | 46             | -11.83      | 17.68                 | 2.57            | 31.58              | 130                 | 280                  | Peak   |
| 794.36                                              | 28.1                    | 33.72             | 46             | -17.9       | 22.15                 | 3.64            | 31.41              | 115                 | 104                  | Peak   |

Remarks:

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

#### 10.7 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。

## 11 輸出峰值功率之量測

### 11.1 適用標準

請見本報告 3.1 節第(3)及(4)項的規定。

### 11.2 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。

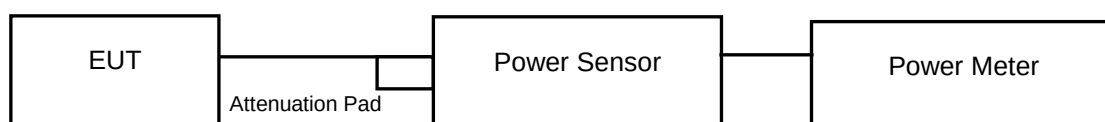
### 11.3 量測儀器

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration | Due Date Of Calibration |
|----------------------------|-----------|------------|---------------------|-------------------------|
| Power Meter<br>Anritsu     | ML2495A   | 1232002    | Dec. 07, 2017       | Dec. 06, 2018           |
| Power Sensor<br>Anritsu    | MA2411B   | 1207325    | Dec. 07, 2017       | Dec. 06, 2018           |

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.

### 11.4 測試配置



### 11.5 量測結果

|        |       |        |                 |
|--------|-------|--------|-----------------|
| 操作模式   | 發射    | 測試日期   | 107 年 03 月 08 日 |
| 量測場地溫度 | 25 °C | 量測場地濕度 | 65 % RH         |
| 測試者    | 吳俊樺   |        |                 |

| Channel | Frequency (MHz) | Peak Power (mW) | Peak Power (dBm) | Limit (dBm) | Pass / Fail |
|---------|-----------------|-----------------|------------------|-------------|-------------|
| 0       | 2402            | 1.791           | 2.53             | 30          | Pass        |
| 19      | 2440            | 1.746           | 2.42             | 30          | Pass        |
| 39      | 2480            | 1.687           | 2.27             | 30          | Pass        |

### 11.6 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。

## 12 待測物照片

請參照 BV ADT 報告編號：180102C25

## 附錄：動態頻率選擇

### 1 EUT Information

#### 1.1 Operating Frequency Bands and Mode of EUT

Table 1: Operating frequency bands and mode of EUT

| Operational Mode                                   | Operating Frequency Range |                 |
|----------------------------------------------------|---------------------------|-----------------|
|                                                    | 5250 ~ 5350 MHz           | 5470 ~ 5725 MHz |
| Client without radar detection and ad hoc function | ✓                         | ✓               |

#### 1.2 EUT Software and Firmware Version

Table 2: The EUT software/firmware version

| No. | Product           | Model No. | Software/Firmware Version |
|-----|-------------------|-----------|---------------------------|
| 1   | Wi-Fi + BT Module | QCNFA324  | 12.0.0.325                |

#### 1.3 Description of Available Antennas to the EUT

Table 3: Antenna list

| Ant No. | Ant. Brand      | Antenna Type | Operation Frequency Range (MHz) | Max. Gain (dBi) |
|---------|-----------------|--------------|---------------------------------|-----------------|
| 1       | TE Connectivity | Slot         | 5250~5350                       | -0.12           |
| 1       |                 | Slot         | 5470~5725                       | 0.16            |
| 2       | Hong Bo         | Slot         | 5250~5350                       | 0.66            |
| 2       |                 | Slot         | 5470~5725                       | -0.67           |

## 1.4 EUT Maximum Conducted Power

Table 4: The measured conducted output power

### 802.11a

| Frequency Band (MHz) | Max. Power         |                   |
|----------------------|--------------------|-------------------|
|                      | Output Power (dBm) | Output Power (mW) |
| 5250~5350            | 16.69              | 46.67             |
| 5470~5725            | 18.70              | 74.17             |

### 802.11n (HT20)

| Frequency Band (MHz) | Max. Power         |                   |
|----------------------|--------------------|-------------------|
|                      | Output Power (dBm) | Output Power (mW) |
| 5250~5350            | 16.34              | 43.06             |
| 5470~5725            | 17.52              | 56.53             |

### 802.11n (HT40)

| Frequency Band (MHz) | Max. Power         |                   |
|----------------------|--------------------|-------------------|
|                      | Output Power (dBm) | Output Power (mW) |
| 5250~5350            | 13.48              | 22.06             |
| 5470~5725            | 16.59              | 45.61             |

### 802.11ac (VHT80)

| Frequency Band (MHz) | Max. Power         |                   |
|----------------------|--------------------|-------------------|
|                      | Output Power (dBm) | Output Power (mW) |
| 5470~5725            | 13.29              | 21.34             |

## 1.5 EUT Maximum E.I.R.P. Power

Table 5: The E.I.R.P output power list

### 802.11a

| Ant No. | Frequency Band (MHz) | Max. Power         |                   |
|---------|----------------------|--------------------|-------------------|
|         |                      | Output Power (dBm) | Output Power (mW) |
| 2       | 5250~5350            | 17.35              | 54.33             |
| 1       | 5470~5725            | 18.86              | 76.91             |

### 802.11n (HT20)

| Ant No. | Frequency Band (MHz) | Max. Power         |                   |
|---------|----------------------|--------------------|-------------------|
|         |                      | Output Power (dBm) | Output Power (mW) |
| 2       | 5250~5350            | 17.00              | 50.12             |
| 1       | 5470~5725            | 17.68              | 58.61             |

### 802.11n (HT40)

| Ant No. | Frequency Band (MHz) | Max. Power         |                   |
|---------|----------------------|--------------------|-------------------|
|         |                      | Output Power (dBm) | Output Power (mW) |
| 2       | 5250~5350            | 14.14              | 25.94             |
| 1       | 5470~5725            | 16.75              | 47.32             |

### 802.11ac (VHT80)

| Ant No. | Frequency Band (MHz) | Max. Power         |                   |
|---------|----------------------|--------------------|-------------------|
|         |                      | Output Power (dBm) | Output Power (mW) |
| 1       | 5470~5725            | 13.45              | 22.13             |

### 1.6 Transmit Power Control (TPC)

U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW. Maximum EIRP of this device is 76.91 mW which less than 500 mW, therefore it's not require TPC function.

### 1.7 Statement of Manufacturer

Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user. **And the device doesn't have Ad Hoc mode on DFS frequency band.**

## 2 U-NII DFS Rule Requirements

### 2.1 Working Modes and Required Test Items

The manufacturer shall state whether the UUT is capable of operating as a Master and/or a Client. If the UUT is capable of operating in more than one operating mode then each operating mode shall be tested separately. See tables 6 and 7 for the applicability of DFS requirements for each of the operational modes.

Table 6: Applicability of DFS Requirements Prior to Use a Channel

| Requirement                     | Operational Mode |                                |                             |
|---------------------------------|------------------|--------------------------------|-----------------------------|
|                                 | Master           | Client without radar detection | Client with radar detection |
| Non-Occupancy Period            | ✓                | Not required                   | ✓                           |
| DFS Detection Threshold         | ✓                | Not required                   | ✓                           |
| Channel Availability Check Time | ✓                | Not required                   | Not required                |
| U-NII Detection Bandwidth       | ✓                | Not required                   | ✓                           |

Table 7: Applicability of DFS Requirements during Normal Operation

| Requirement                       | Operational Mode                      |                                |
|-----------------------------------|---------------------------------------|--------------------------------|
|                                   | Master or Client with radar detection | Client without radar detection |
| DFS Detection Threshold           | ✓                                     | Not required                   |
| Channel Closing Transmission Time | ✓                                     | ✓                              |
| Channel Move Time                 | ✓                                     | ✓                              |
| U-NII Detection Bandwidth         | ✓                                     | Not required                   |

| Additional requirements for devices with multiple bandwidth modes | Master or Client with radar detection | Client without radar detection                       |
|-------------------------------------------------------------------|---------------------------------------|------------------------------------------------------|
| U-NII Detection Bandwidth and Statistical Performance Check       | All BW modes must be tested           | Not required                                         |
| Channel Move Time and Channel Closing Transmission Time           | Test using widest BW mode available   | Test using the widest BW mode available for the link |
| All Other Tests                                                   | Any single BW mode                    | Not required                                         |

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and null frequencies between the bonded 20 MHz channel blocks.

## 2.2 Test Limits and Radar Signal Parameters

### Detection Threshold Values

Table 8: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

| Maximum Transmit Power                                                       | Value<br>(See Notes 1, 2, and 3) |
|------------------------------------------------------------------------------|----------------------------------|
| EIRP $\geq$ 200 milliwatt                                                    | -64 dBm                          |
| EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz                 | -62 dBm                          |
| EIRP < 200 milliwatt that do not meet the power spectral density requirement | -64 dBm                          |

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.

Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Note 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

Table 9: DFS Response Requirement Values

| Parameter                         | Value                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------|
| Non-occupancy period              | Minimum 30 minutes                                                                                         |
| Channel Availability Check Time   | 60 seconds                                                                                                 |
| Channel Move Time                 | 10 seconds<br>See Note 1.                                                                                  |
| Channel Closing Transmission Time | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second periods.<br>See Notes 1 and 2. |
| U-NII Detection Bandwidth         | Minimum 100 % of the U-NII 99 % transmission power bandwidth.<br>See Note 3                                |

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

### Parameters of DFS Test Signals

Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Table 10: Short Pulse Radar Test Waveforms

| Radar Type                  | Pulse Width (μsec) | PRI (μsec)                                                                                                                                                                                                                                                   | Number of Pulses                                                                                                                     | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|-----------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------|
| 0                           | 1                  | 1428                                                                                                                                                                                                                                                         | 18                                                                                                                                   | See Note 1                                 | See Note 1               |
| 1                           | 1                  | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a.<br>Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A. | $\text{Roundup} \left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$ | 60 %                                       | 30                       |
| 2                           | 1-5                | 150-230                                                                                                                                                                                                                                                      | 23-29                                                                                                                                | 60 %                                       | 30                       |
| 3                           | 6-10               | 200-500                                                                                                                                                                                                                                                      | 16-18                                                                                                                                | 60 %                                       | 30                       |
| 4                           | 11-20              | 200-500                                                                                                                                                                                                                                                      | 12-16                                                                                                                                | 60 %                                       | 30                       |
| Aggregate (Radar Types 1-4) |                    |                                                                                                                                                                                                                                                              |                                                                                                                                      | 80 %                                       | 120                      |

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

Table 11: Long Pulse Radar Test Waveform

| Radar Type | Pulse Width (μsec) | Chirp Width (MHz) | PRI (μsec) | Number of Pulses per Burst | Number of Bursts | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|------------|--------------------|-------------------|------------|----------------------------|------------------|--------------------------------------------|--------------------------|
| 5          | 50-100             | 5-20              | 1000-2000  | 1-3                        | 8-20             | 80 %                                       | 30                       |

Table 12: Frequency Hopping Radar Test Waveform

| Radar Type | Pulse Width (μsec) | PRI (μsec) | Pulses per Hop | Hopping Rate (kHz) | Hopping Sequence Length (msec) | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|------------|--------------------|------------|----------------|--------------------|--------------------------------|--------------------------------------------|--------------------------|
| 6          | 1                  | 333        | 9              | 0.333              | 300                            | 70 %                                       | 30                       |

### 3 Test & Support Equipment List

#### 3.1 Test Instruments

Table 1: Test Instruments List

| Description & Manufacturer | Model No.                                         | Brand       | Calibrated Until |
|----------------------------|---------------------------------------------------|-------------|------------------|
| Spectrum analyzer          | ESR                                               | R&S         | 2018/03/07       |
| Signal generator           | 8645A                                             | Agilent     | 2018/08/10       |
| Horn antenna               | BBHA 9120 D                                       | Schwarzbeck | 2018/12/13       |
| RF coaxial cable           | CA3501-3501-G.90(3m)<br>&<br>CA3501-3501-F.90(2m) | INFINET     | 2018/08/20       |

#### 3.2 Description of Support Units

Table 2: Support Unit information

| No. | Product | Brand   | Model No. | ID          | Spec.                                              |
|-----|---------|---------|-----------|-------------|----------------------------------------------------|
| 1   | Router  | NETGEAR | R7800     | PY315100319 | 5G Ant gain : 1.61dB<br>Maximum EIRP :<br>25.47dBm |

**NOTE:** This device was functioned as a ☒ Master ☐ Slave device during the DFS test.

Table 3: Software/Firmware information

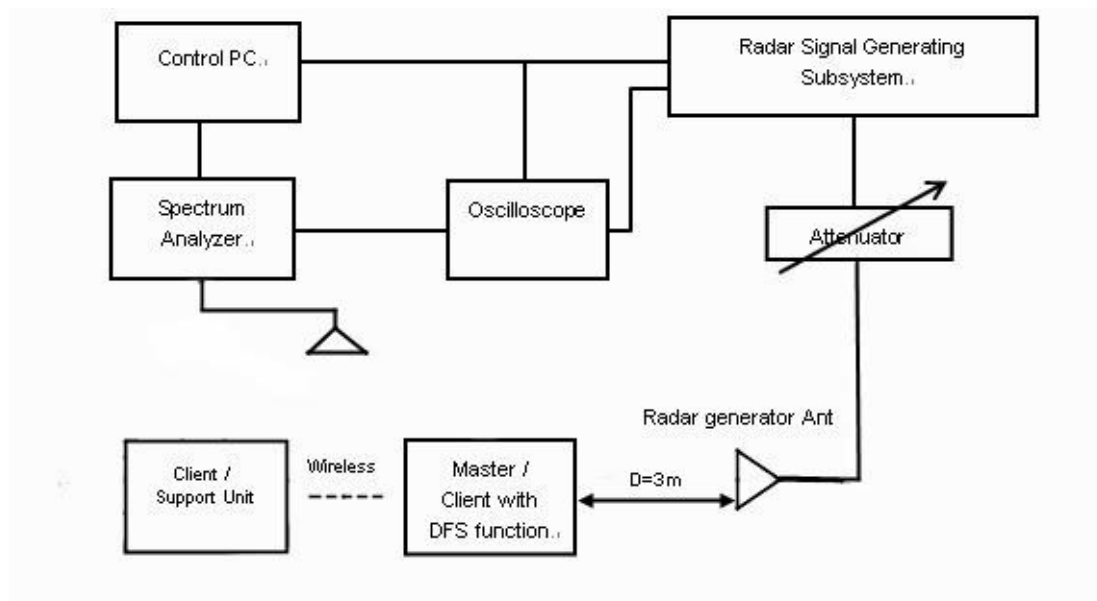
| No. | Product | Model No. | Software/Firmware Version |
|-----|---------|-----------|---------------------------|
| 1.  | Router  | R7800     | V1.0.1.30                 |

## 4 Test Procedure

### 4.1 ADT DFS Measurement System

A complete ADT DFS Measurement System consists of two subsystems: (1) the Radar Signal Generating Subsystem and (2) the Traffic Monitoring Subsystem. The control PC is necessary for generating the Radar waveforms in Table 10, 11 and 12. The traffic monitoring subsystem is specified to the type of unit under test (UUT).

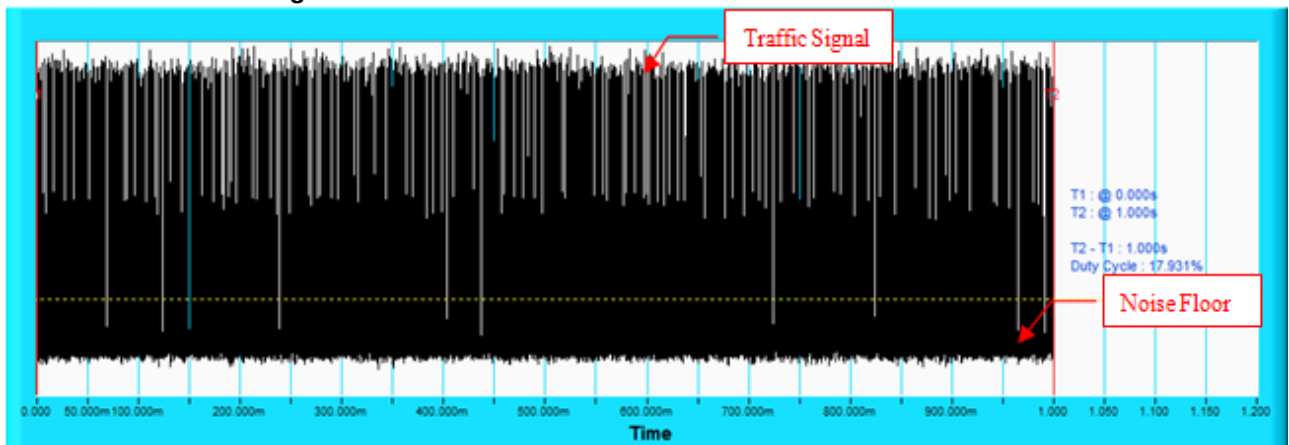
Radiated setup configuration of ADT DFS Measurement System



System testing will be performed with channel-loading using means appropriate to the data types that are used by the unlicensed device. The following requirements apply:

|   |                                                                                                                                                                            |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | a) The data file must be of a type that is typical for the device (i.e., MPEG-2, MPEG-4, WAV, MP3, MP4, AVI, etc.) and must generally be transmitting in a streaming mode. |
|   | b) Software to ping the client is permitted to simulate data transfer but must have random ping intervals.                                                                 |
| v | c) Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17 % or greater.                                                   |
|   | d) Unicast or Multicast protocols are preferable but other protocols may be used. The appropriate protocol used must be described in the test procedures.                  |

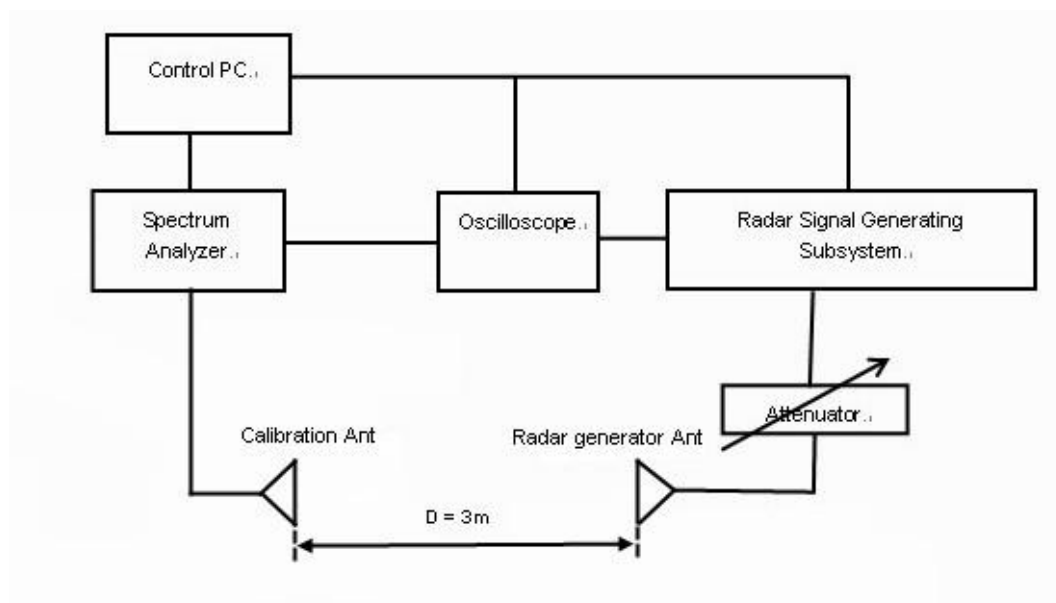
## Wireless Traffic Loading



### 4.2 Calibration of DFS Detection Threshold Level

The measured channel is 5500 MHz. The radar signal was the same as transmitted channels, and injected into the antenna of AP (master) or Client Device with Radar Detection, measured the channel closing transmission time and channel move time. The calibrated detection threshold level is set to -64 dBm. The tested level is lower than required level hence it provides margin to the limit.

Radiated setup configuration of Calibration of DFS Detection Threshold Level

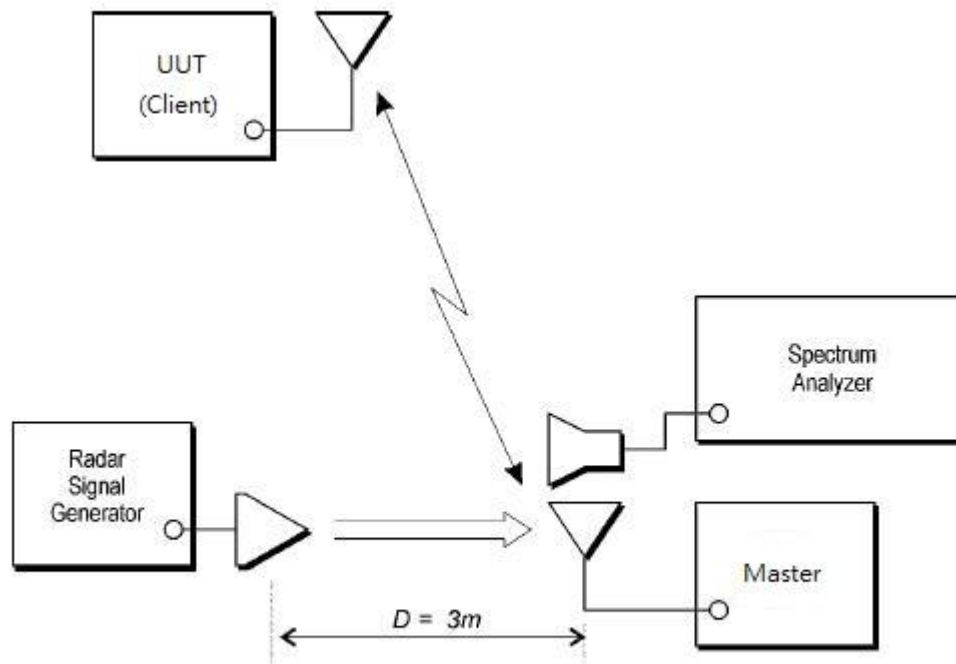


### 4.3 Deviation from Test Standard

No deviation.

### 4.4 Radiated Test Setup Configuration

#### 4.4.1 Client without Radar Detection Mode



The UUT is a U-NII Device operating in Client mode without radar detection. The radar test signals are injected into the Master Device.

## 5 Test Results

### 5.1 Summary of Test Results

| Clause | Test Parameter                    | Remarks        | Pass / Fail |
|--------|-----------------------------------|----------------|-------------|
| 4.7.7  | DFS Detection Threshold           | Not Applicable | NA          |
| 4.7.7  | Channel Availability Check Time   | Not Applicable | NA          |
| 4.7.7  | Channel Move Time                 | Applicable     | Pass        |
| 4.7.7  | Channel Closing Transmission Time | Applicable     | Pass        |
| 4.7.7  | Non- Occupancy Period             | Applicable     | Pass        |
| 4.7.7  | Uniform Spreading                 | Not Applicable | NA          |
| 4.7.7  | U-NII Detection Bandwidth         | Not Applicable | NA          |
| 4.7.7  | Non-associated test               | Applicable     | Pass        |
| 4.7.7  | Non-Co-Channel test               | Applicable     | Pass        |

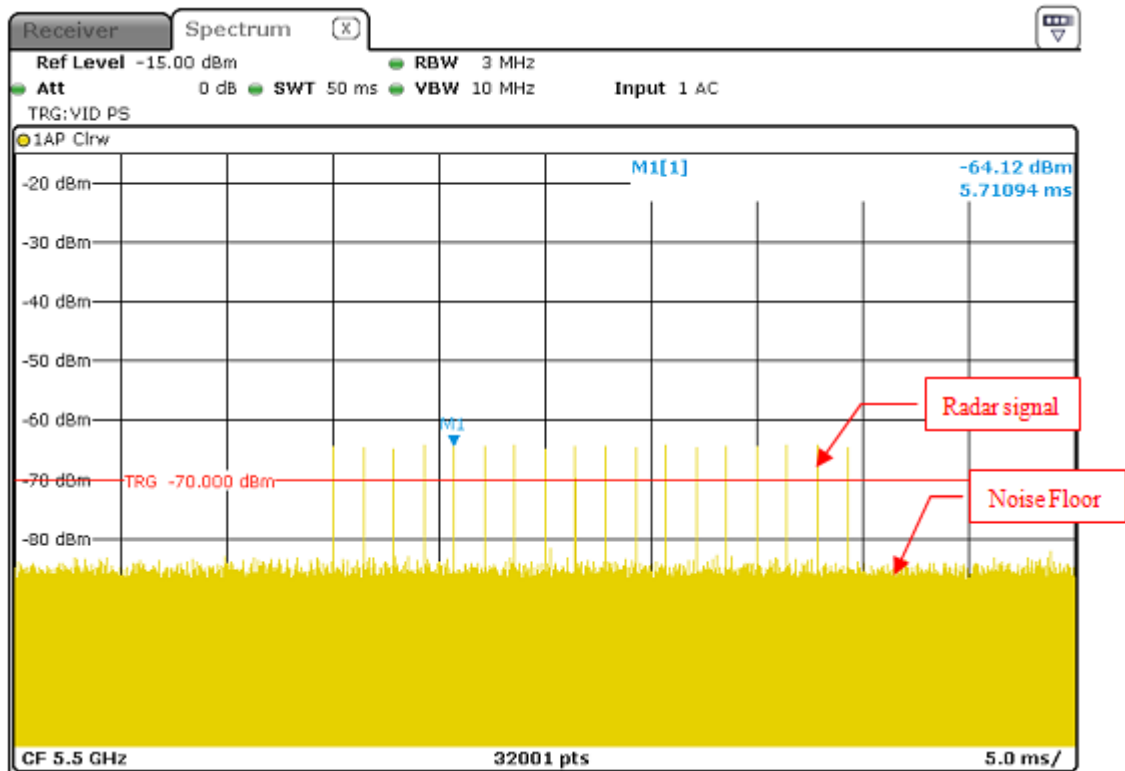
## 5.2 Test Results

### 5.2.1 Test Mode: Device operating in Client without Radar Detection Mode

Client with injection at the Master. (The radar test signals are injected into the Master Device)

#### DFS Detection Threshold

For a detection threshold level of -64 dBm, the required signal strength at AP antenna location is -64 dBm. The tested level is lower than required level hence it provides margin to the limit.



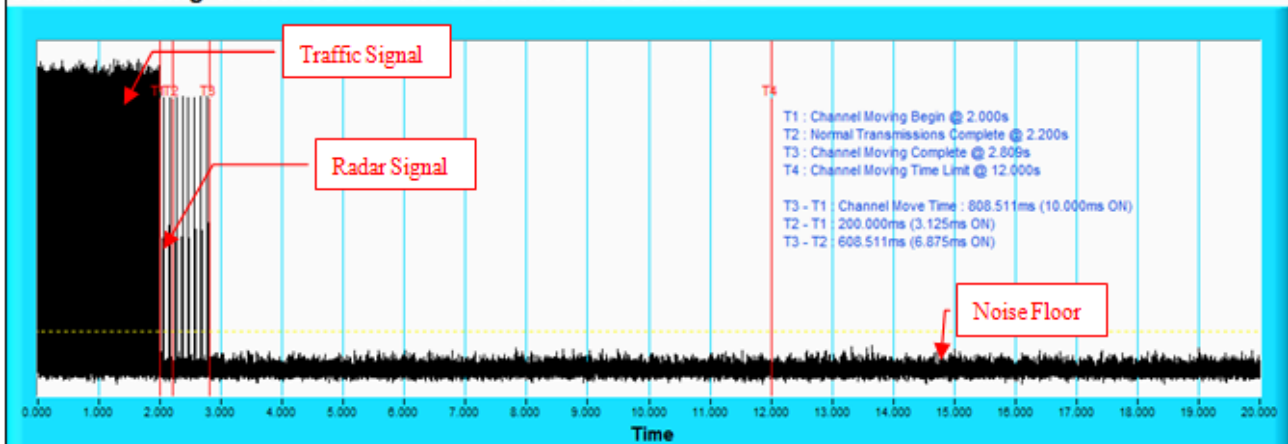
Radar Signal 0

## 5.2.2 Channel Closing Transmission and Channel Move Time

### Radar Signal 0

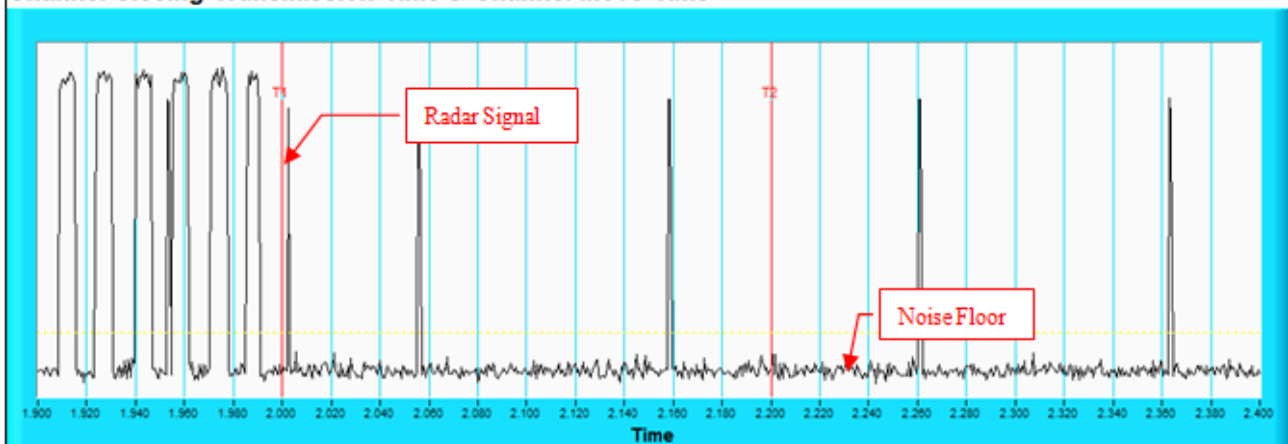
#### 802.11n (HT20)

#### Channel Closing Transmission Time & Channel Move Time



**NOTE:** T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200 ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.

#### Channel Closing Transmission Time & Channel Move Time

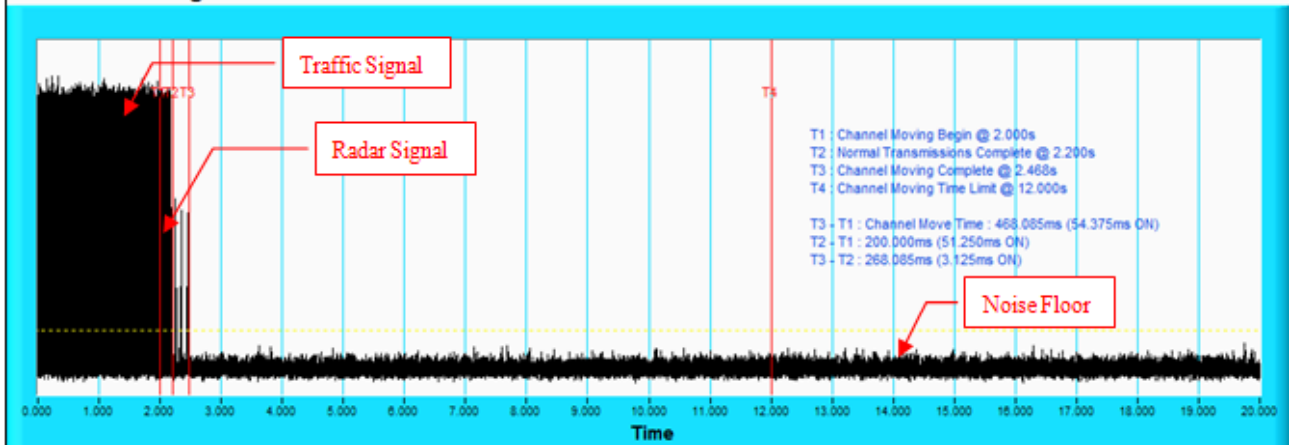


**NOTE:** An expanded plot for the device vacates the channel in the required 500 ms.

## Radar signal 0

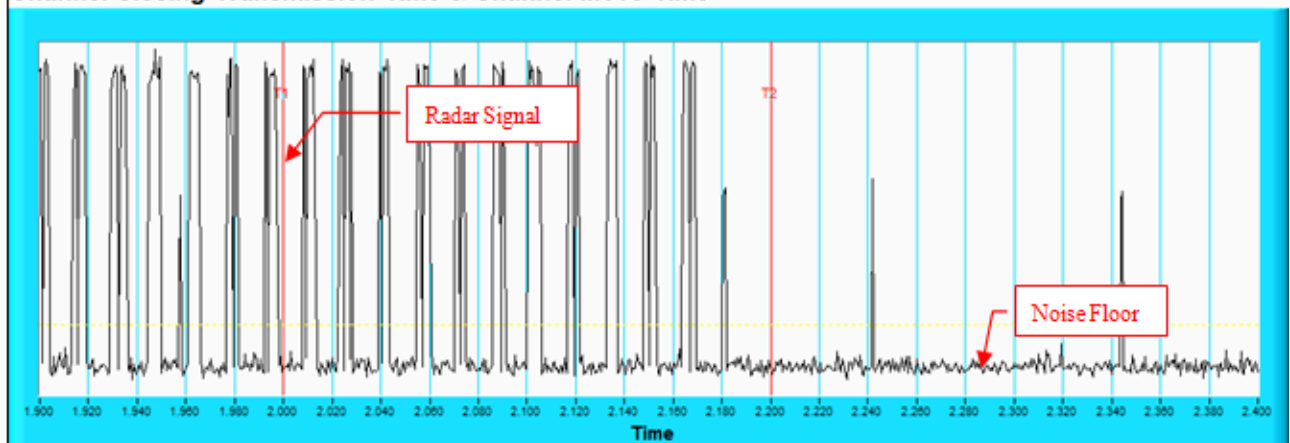
802.11n (HT40)

### Channel Closing Transmission Time & Channel Move Time



**NOTE:** T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200 ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.

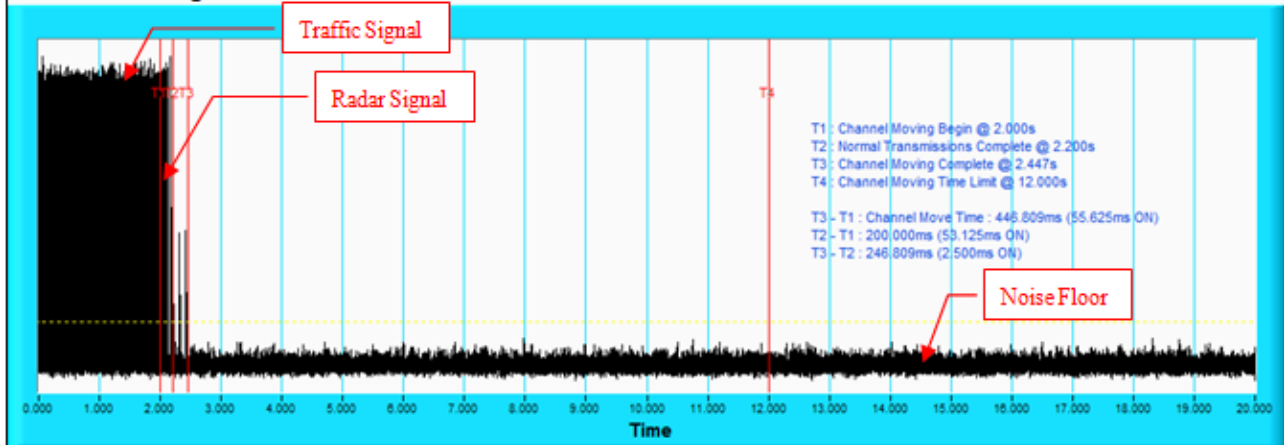
### Channel Closing Transmission Time & Channel Move Time



**NOTE:** An expanded plot for the device vacates the channel in the required 500 ms.

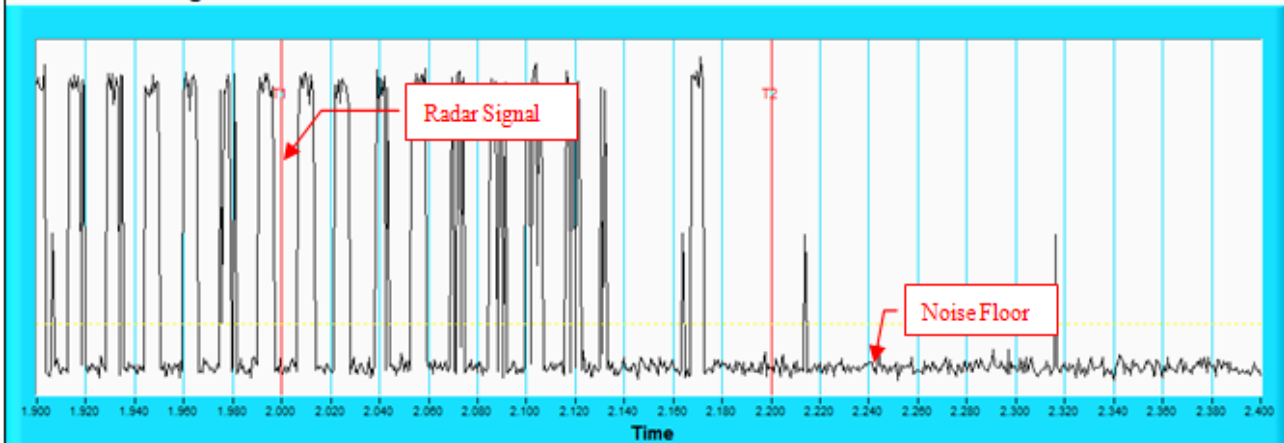
# Radar signal 0 802.11ac (VHT80)

## Channel Closing Transmission Time & Channel Move Time



**NOTE:** T1 denotes the start of Channel Move Time upon the end of the last Radar burst. T2 denotes the data transmission time of 200 ms from T1. T3 denotes the end of Channel Move Time. T4 denotes the 10 second from T1 to observe the aggregate duration of transmissions.

## Channel Closing Transmission Time & Channel Move Time



**NOTE:** An expanded plot for the device vacates the channel in the required 500 ms.

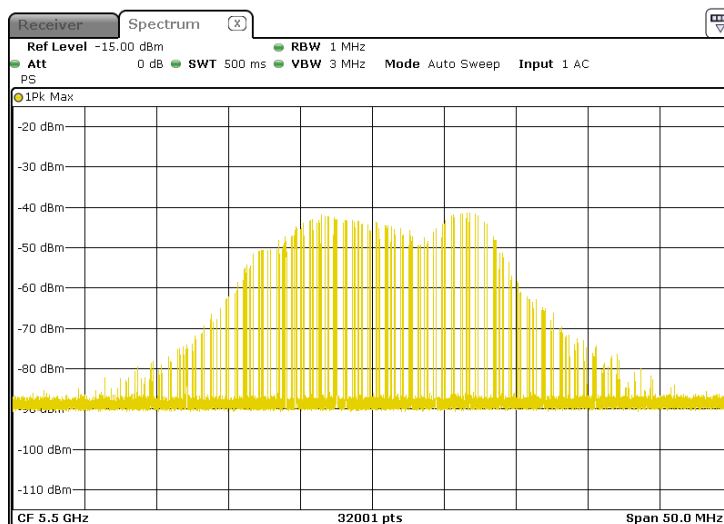
### 5.2.3 Non-Occupancy Period

#### Associate test:

During the 30 minutes observation time, UUT did not make any transmissions on a channel after a radar signal was detected on that channel by either the Channel Availability Check or the In-Service Monitoring.

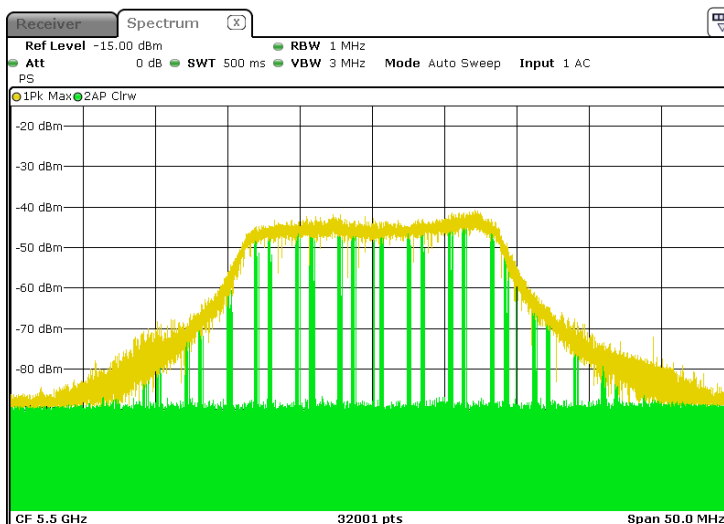
- 1) EUT (Client) links with master on 5500 MHz.

Waveform of EUT links up with Master

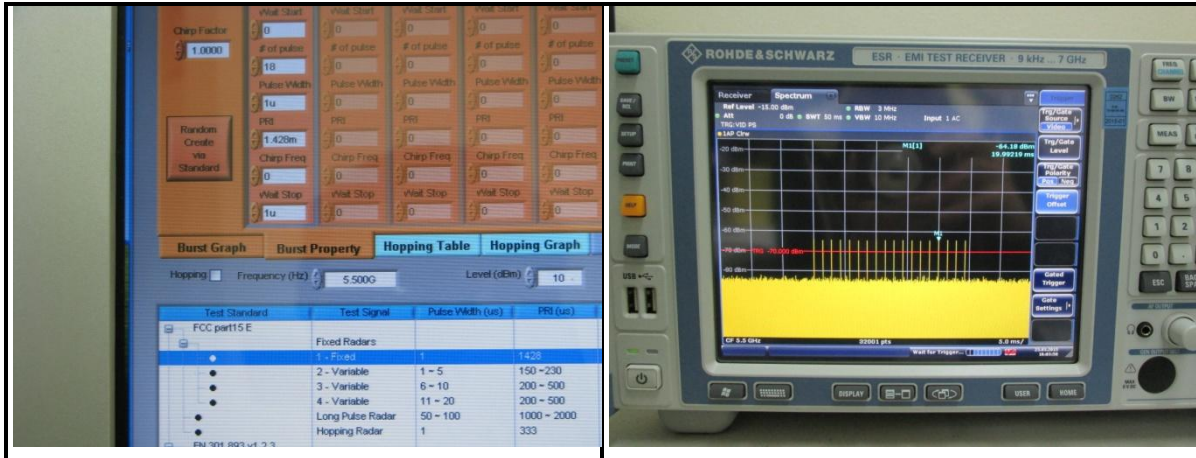


- 2) Client plays specified files via master.

Waveform of transmission



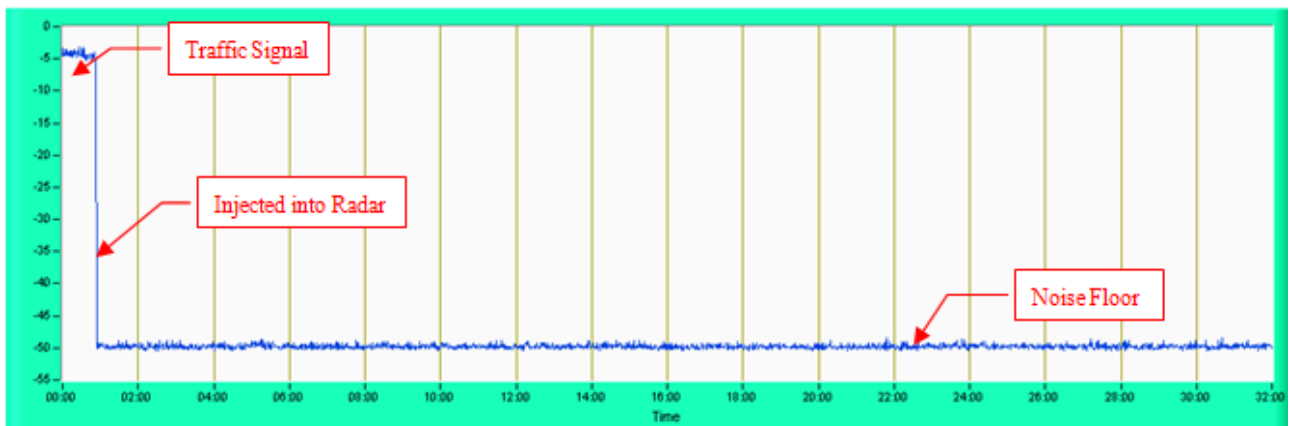
3) Radar signal 0 is applied to the Master device and WiFi traffic signal stop immediately.



4) 5500 MHz has been monitored in 30 minutes period. In this period, no any transmission occurs.

Plot of 30 minutes period

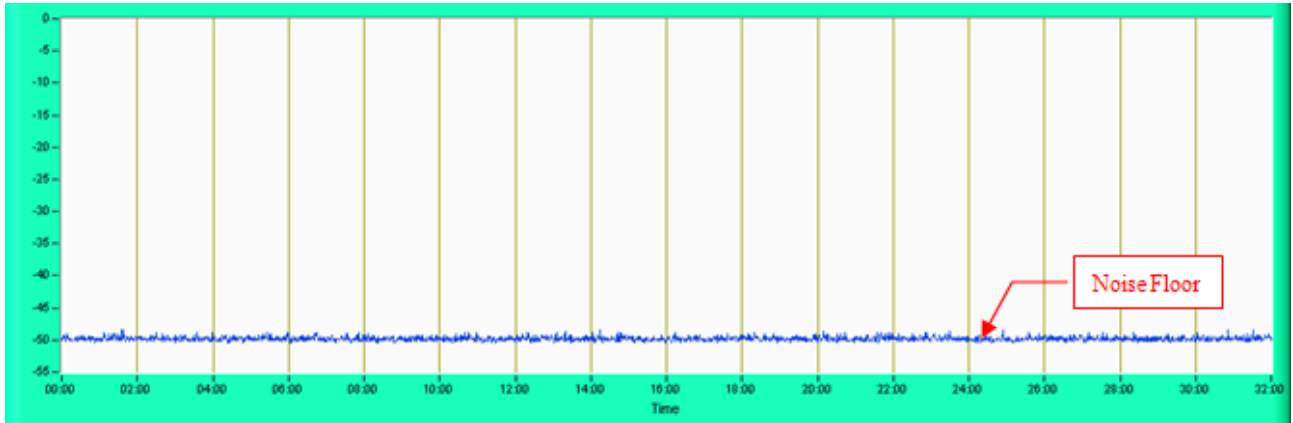
802.11n (HT20)



#### 5.2.4 Non-associated test

Master was off.

During the 30 minutes observation time, the UUT did not make any transmissions in the DFS band after UUT power up.



#### 5.2.5 Non- Co-Channel Test

The UUT was investigated after radar was detected the channel and made sure no co-channel operation with radars.

## 9 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。  
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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](mailto:service.adt@tw.bureauveritas.com)

Web Site: [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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---END---