

低功率射頻器材 檢驗報告

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製造廠商	Murata Manufacturing Co., Ltd.
受檢設備名稱	Communication Module
廠牌	muRata
型號	Type2AW
檢驗依據標準	國家通訊傳播委員會低功率射頻器材 技術規範 (LP0002)
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財團法人台灣商品檢測驗證中心

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實驗室認可編號及範圍: 0371 (9 kHz to 325 GHz)

實驗室認可證書有效期限: 110年10月31日



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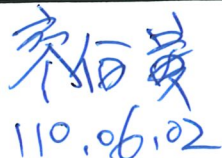
測試報告記錄

申請廠商：宜家家居股份有限公司
 製造廠商：Murata Manufacturing Co., Ltd.
 廠牌：muRata
 品名：Communication Module
 型號：Type2AW
 檢驗依據標準：國家通訊傳播委員會低功率射頻器材技術規範(LP0002)
 規範修訂日期109年07月01日
 發射功率(電場強度)：14.12 dBm (發射功率)
 工作頻率及調變方式：5260 ~ 5320 MHz / DSSS + OFDM
 天線規格：muRata/ Type1MW-Antenna /0.1 dBi@2.4GHz ,-0.4 dBi@5GHz

- 備註：1. 本試驗報告中是描述本實驗室以最佳的知識和能力進行試驗，我們的責任僅限於合理與謹慎的試驗，並非確保賣方之法律和/或合同的義務。
 2. 本符合性試驗係依據適當的標準及試驗樣品進行測試，其中量測不確定度可符合標準CISPR16-4-2 及 ETSI TR 100 028要求，則不列入測試結果考量。本試驗報告的結果僅與測試項目有關，且僅針對受試驗之樣品負責，無法確保產品生產過程中的品質與性能要求。。
 3. 非經本中心同意，檢驗報告不得摘錄複印使用。（全部複製除外）。

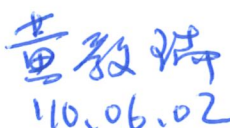
項次	測試項目	適用規範	量測設備	測試結果	結果判定
1	電源線傳導干擾之要求	低功率射頻器材技術規範 3.3節	----	----	因使用直流電源故無需測試
2	天線增益之要求	低功率射頻器材技術規範 5.7.8節	----	請參閱5.2節	----
3	發射頻寬之量測	低功率射頻器材技術規範 5.7.3.2節(1)	請參閱6.3節	請參閱6.4節	----
4	最大傳導輸出功率之要求	低功率射頻器材技術規範 5.7.3.2節(1)	請參閱7.3節	請參閱7.4節	符合
5	功率密度之要求	低功率射頻器材技術規範 5.7.3.2節(2)	請參閱8.3節	請參閱8.4節	符合
6	混附波發射限制之要求	低功率射頻器材技術規範 5.7.4.1節	請參閱10.3節	請參閱10.4節	符合
7	場強輻射之要求	低功率射頻器材技術規範 5.7.4.4 - 5.7.4.6節	請參閱11.3節	請參閱11.5節	符合
8	DFS之要求	低功率射頻器材技術規範 5.7.7.2節	請參閱12.3節	請參閱12.5節	符合
	以下空白				

報告簽署人：



110.06.02

直接主管：



110.06.02

量測員：



110/06/02

1 一般資料

1.1 產品描述

- a) 產品型態 : Communication Module
 b) 商 標 : muRata
 c) 產品型號 : Type2AW
 d) 供應電源 : DC 3.3V

備註：1.本產品內含Bluetooth、Bluetooth LE及WLAN無線技術，WLAN部份包含DTS與UNII頻帶。本報告僅記錄UNII Band 2 (5260至 5320 MHz)部份，Bluetooth部份請見ETC報告編號: 20-08-MAS-001-01，Bluetooth LE部份請見ETC報告編號: 20-08-MAS-001-02，DTS部份請見ETC報告編號: 20-08-MAS-001-03，UNII Band 1 (5180 MHz 至 5240 MHz) 部份請見ETC報告編號: 20-08-MAS-001-04，UNII Band 3 (5500 至 5700 MHz) 部份請見ETC報告編號: 20-08-MAS-001-06，UNII Band 4 (5725 至 5850 MHz) 部份請見ETC報告編號: 20-08-MAS-001-07。

2. 此產品測試依照”完全模組”之要求進行測試。

3. 本案經申請者切結器材不提供隨貨配件，配件由實驗室(或申請者)提供併同檢驗。

4. 本器材不具備主控運作模式動態頻率選擇與Ad-hoc功能。

1.2 產品特性

此裝置為 Communication Module，其發射頻率落於 5260 至 5320 MHz 頻段，採用 IEEE 802.11a/n/ac 直接序列展頻調變技術。其應用為區域網路無線傳輸。主波發射功率為 14.12 dBm，即為 25.82 mW，其無線特性列表如下：

RF chain	1T1R	
Operating Frequency	IEEE802.11a/n 20/ac20MHz: 5.26GHz ~5.32GHz, 4ch; IEEE 802.11n 40MHz/ac 40MHz 5.27GHz~5.31GHz, 2ch IEEE 802.11ac 80MHz 5.29GHz,1ch	
Modulation	IEEE 802.11a(OFDM/DSSS) 48/54 Mbps (QAM-64) 24/36 Mbps (QAM-64) 12/18 Mbps (QPSK) 6/19 Mbps (BPSK)	IEEE 802.11n(OFDM/DSSS) QAM-64 QAM-16 QPSK BPSK
	IEEE 802.11ac(20MHz,40MHz,80MHz)(OFDM/DSSS) QAM-256, QAM-64, QAM-16, QPSK,BPSK	

1.3 測試方法之依據

本測試報告之所有項目皆依據國家通訊傳播委員會低功率射頻器材技術規範以及參考IEEE ANSI、歐盟ETSI EN與美國EIA、FCC 47 CFR PART 2、KDB及ARIB STD-T67 等有關檢驗之規定。

試驗室介紹：財團法人台灣商品檢測驗證中心電磁相容試驗室通過下列評鑑、認可、登錄與相互認可協議：

- ❶ ISO/IEC 17025 : TAF(0371), NVLAP(Lab code: 200133-0), CBTL(**TÜ V SÜ D**)
- ❷ Recognized : BSMI, NCC, FCC(TW0371, TW1112), ISED(Industry Canada Site # 2949A-2)
- ❸ Filing : VCCI (C-13518, R-13177, G-10098, T-11682)
- ❹ MRA : Australia, New Zealand, Singapore

2 適用規範

2.1 規範要求

(1) 傳導之規定

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

頻率範圍 MHz	傳導限制值(dB μ V)	
	準峰值(Quasi-peak)	平均值(Average)
0.15 – 0.5	66-56(註)	56-46(註)
0.5 – 5	56	46
5 – 30	60	50

註:隨頻率之對數遞減

(2) 天線增益之要求

國家通訊傳播委員會低功率射頻器材技術規範5.7.8節規定，天線之規格不受3.2 規定之限制。若使用超過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) 頻寬之量測

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.2節(1)之規定，5.25 GHz~5.35 GHz 頻帶，最大傳導輸出功率應小於或等於250 mW或11dBm+10log B (B 是26 dB發射頻寬，單位MHz)之較小者。

(4) 發射輸出功率與功率密度之要求

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.2節之規定:

- (1) 5.25 GHz~5.35 GHz頻帶，最大傳導輸出功率應小於或等於250 mW或11dBm+10log B (B 是26 dB發射頻寬，單位MHz)之較小者。
- (2) 最大功率頻譜密度在任何 1 MHz 頻帶中應小於或等於 11 dBm。
- (3) 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力率及最大功率頻譜密度。

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.4節之規定:

- (1) 最大傳導輸出功率必須使用依據均方根等效電壓校準之儀器測量於任何連傳輸之時段，測量結果須依儀器限制(如偵測器反應時間、相較於發射頻寬有限之解析頻寬能力，靈敏度等)調整得出正確之峰值測量，以符合本段落所提之發射定義。
- (2) 最大功率頻譜密度檢驗規定:
 - (A) 應將測試儀器直接連接待測物，以傳導方式執行。
 - (B) 5.15 GHz~5.25 GHz、5.25 GHz~5.35 GHz 及5.47 GHz~5.725 GHz頻段，測試儀器之頻寬應設定為 1 MHz 頻寬或待測物之 26 dB 發射頻寬，兩者取較小者。
 - (C) 5.725 GHz~5.850 GHz頻段，測試儀器之頻寬應設定為 500 kHz 或待測物之 26 dB 發射頻寬，兩者取較小者。
 - (D) 解析頻寬小於 (B)或 (C)時，應以補償方式計算總功率頻譜密度。

(5) 發射限制之要求

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.1節之規定，在 5.15 GHz～5.35 GHz 及 5.470 GHz～5.725 GHz 頻帶操作的發射器：帶外發射之有效等向輻射功率 (EIRP) 不應超過 -27 dBm/MHz。

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.3節之規定，測量不必要發射時，應使用之最低解析頻寬為 1 MHz。必要時，於頻帶邊緣附近可使用小於 1 MHz 之解析頻寬，並以補償方式計算其總值。

(6) 輻射之規定

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.5節之規定，在 1GHz 以下的非必要之發射，應符合第 3.6節之規定，任何使用交流市電為供應電之設備亦須符合第 3.3節之電源線傳導限制值。

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.6節之規定，不必要發射頻率屬 3.5節規定頻段者，應符合 3.6節之規定。

落於3.5節禁用頻段之輻射干擾需符合3.6節之一般限制要求：

頻率(f) MHz	電場強度 (微伏特/公尺, $\mu\text{V/m}$)	測距 (公尺)
$0.009 \leq f \leq 0.490$	$2400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

(7) 發射功率控制(TPC)及動態頻率選擇(DFS)之規定

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.6節之規定:

(1) 無線資訊傳輸設備應在”無資料傳輸”或”操作失效”時自動中斷傳輸，此規定並不預先排除傳送控制或信號(signaling)資訊或使用運用數位技術完成碼框或資料突發(burst)區間的重複碼(repetitive codes)，申請人應在申請型式認證文件中提供如何符合本規範之說明。

(2) 發射功率控制(TPC)及動態頻率選擇(DFS):

(2.1) 發射功率控制(TPC)：操作於5.25 GHz~5.35 GHz 與5.470 GHz~5.725GHz 頻段的設備，應具備發射功率控制功能。設備必須至少具有6 dB 低於平均EIRP 30 dBm 的能力。EIRP 低於500 mW 之系統不須具備TPC功能。

(2.2) 動態頻率選擇(DFS)之雷達偵測功能: 動態頻率選擇(DFS)：操作於5.25 GHz~5.35 GHz 與5.470 GHz~5.725GHz 频段之設備應具備動態頻率選擇雷達偵測功能並啟動之，以完整偵測使用頻帶內之雷達訊號，避免與雷達系統同頻道操作。相關規定如下：

(1)最低動態頻率選擇的偵測門檻

(A)最大EIRP 為200 mW~1 W 之設備，其最低動態頻率選擇的偵測門檻值為-64 dBm。

(B)最大EIRP 低於200 mW，且功率頻譜密度小於10 dBm/MHz 之設備，其最低動態頻率選擇的偵測門檻值為-62 dBm。

(C)最大EIRP 低於200 mW，且功率頻譜密度大於或等於10 dBm/MHz之設備，其最低動態頻率選擇的偵測門檻值為-64 dBm。

(D)此偵測門檻值為1 微秒內之平均接收功率，並以0 dBi 天線為參考基準。頻道初始設定得由系統隨機選取或使用使用者手動選取。

(2)操作模式：動態頻率選擇之規定適用於以下之操作模式：

(A)頻道可用性檢查時間之規定，適用於主控運作模式。

(B)頻道移動時間之規定，適用於主控及受控運作模式。

(3)頻道可用性檢查時間：設備必須檢查其可在某一頻道上起始傳送之前是否有雷達系統已經操作在該頻道上，以及何時其必須移動到另一新的頻道，在60 秒內若沒有偵測到功率位準大過上述之干擾門檻值的雷達訊號時，設備才可開始使用該頻道。

(4)頻道移動時間：在偵測到雷達的存在後，所有在該操作頻道上的所有傳輸須在10 秒內停止，在偵測到雷達訊號後，該期間內的傳輸應維持最多200 毫秒的正常通訊。另外，間歇性的管理與控制訊號可在剩餘的時間中傳送，以便撤離該操作頻道。

(5)不可占用期間：某一頻道已被頻道可用性檢查或「服務中」監視顯示含有雷達系統，至少須有30 分鐘的不可占用期間。不可占用期間起始於偵測到雷達系統的當時。

2.2 限制使用之頻帶

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

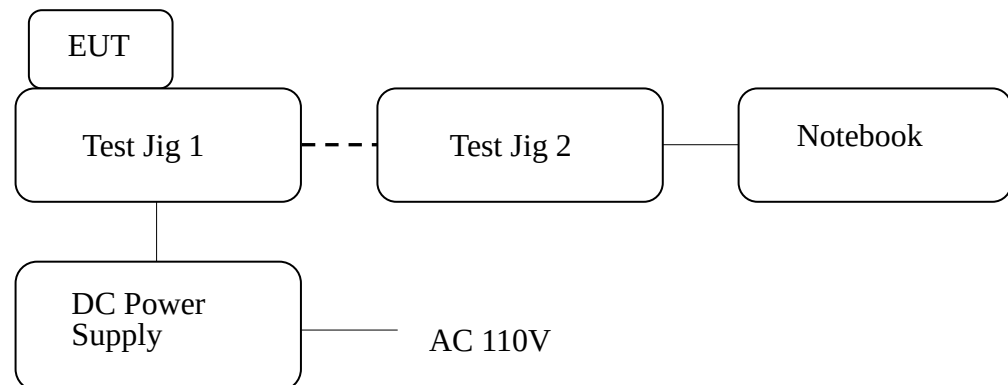
3 受測裝置之系統說明

3.1 受測裝置

裝置名稱	製造者/代理者	型 號	纜線說明
* Communication Module	Murata Manufacturing Co., Ltd.	Type2AW	----
Test Jig 1	N/A	N/A	非隔離電源線 2.3m*1
Test Jig 2	N/A	N/A	非隔離電源線 1.5m*1 非隔離信號線 0.1m*1 非隔離信號線 1.8m*1(RS-232)
Notebook	HP	probook 6570b	----
DC Power Supply	GW	GPS-3030D	非隔離電源線 1.8m*1(廠牌:Volex,型號:V1625)

註: 1.標記“*”表欲申請之受測物。

2.測試配置：



3. 測試模式：

3.1 IEEE 802.11a, 802.11n HT20, IEEE 802.11ac (20MHz) mode:

測試頻道如下：

Channel	Frequency (MHz)
Low = 56	5260
Middle = 60	5300
High = 64	5320

IEEE 802.11a mode: 6 Mbps data rate is the worse case for full testing.

IEEE 802.11n HT20 mode: MCS0 data rate is the worse case for full testing.

IEEE 802.11ac (20MHz) mode: MCS0 data rate is the worse case for full testing.

3.2 IEEE 802.11n HT40, IEEE 802.11ac (40MHz) mode:

測試頻道如下:

Channel	Frequency (MHz)
54	5270
62	5310

IEEE 802.11n HT40 mode: MCS0 data rate is the worse case for full testing.

IEEE 802.11ac (40MHz) mode: MCS0 data rate is the worse case for full testing.

3.3 IEEE 802.11ac (80MHz) mode:

測試頻道如下:

Channel	Frequency (MHz)
58	5290

IEEE 802.11ac (80MHz) mode: MCS0 data rate is the worse case for full testing.

4. 軟體設定:Tera Term.exe

	Power Setting
IEEE 802.11a	60
	60
	56
IEEE 802.11n HT20	60
	60
	56
IEEE 802.11n HT40	56
	56
IEEE 802.11ac (20MHz)	60
	60
	56
IEEE 802.11ac (40MHz)	56
	56
IEEE 802.11ac (80MHz)	40

3.2 測試模式說明

3.2.1 調變方式及模式

Test Mode	Modulation	Note
A	IEEE 802.11a	-
B	IEEE 802.11n HT20	-
C	IEEE 802.11n HT40	-
D	IEEE 802.11ac (20MHz)	-
E	IEEE 802.11ac (40MHz)	-
F	IEEE 802.11ac (80MHz)	-

Mode	IEEE 802.11a/n20/ac (20MHz)	IEEE 802.11n40/ac (40MHz)	IEEE 802.11ac (80MHz)
Test Channel	Frequency (MHz)	Frequency (MHz)	Frequency (MHz)
Channel Low (L)	5260	5270	5290
Channel Mid (M)	5300	-	-
Channel High (H)	5320	5310	-

3.2.2 測試項目及模式

Item	測試項目	測試模式	測試頻率(MHz)
1	電源線傳導干擾之量測	-	-
2	發射頻寬之量測	A, D, E, F (註3)	L, M, H
3	最大傳導輸出功率之量測	A, B, C, D, E, F(註4)	L, M, H
4	功率密度之量測	A, D, E, F (註3)	L, M, H
5	混附波發射限制之量測	A, D, E, F (註3)	L, M, H
6	場強輻射之量測(主諧波)	A, D, E, F (註3)	L, M, H
6.1	場強輻射之量測(1GHz以下)	A(註1)	M (註2)
6.2	場強輻射之量測(1GHz以上)	A, D, E, F (註3)	L, M, H
7	DFS之量測	F (註4)	5280-5320 MHz

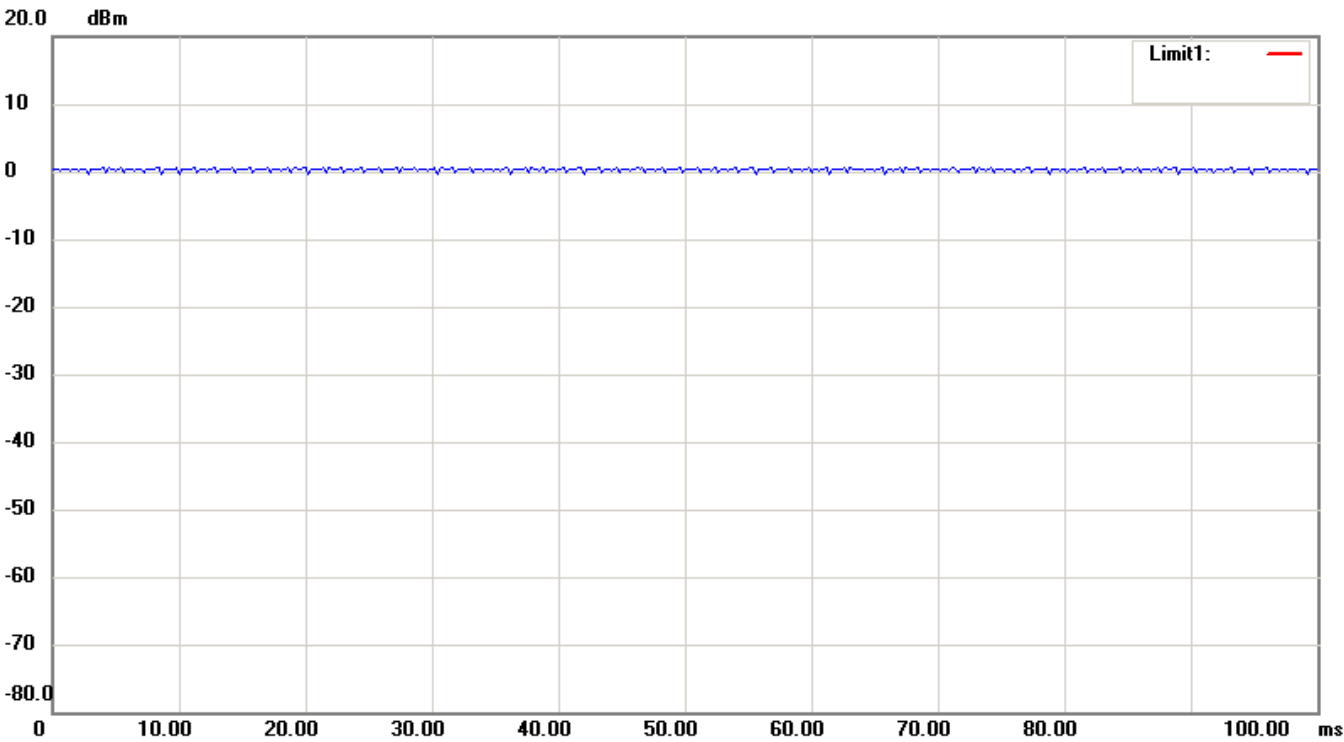
- 註: 1. 以上調變方式預掃時無差異，擇一作最終測試並記錄之。
 2. 高，中，低頻道預掃時無差異，擇中間頻道作最終測試並記錄之。
 3. Test Mode B 與 Test Mode D / Test Mode C 與 Test Mode E 使用相同調變技術及頻寬，故以最大傳導輸出功率較大者 Test Mode D 及 Test Mode E 為 Worse case，作最終測試並記錄之。
 4. 進行 DFS 測試時，產品操作於 Normal mode，並對所有的調變及頻道進行測試，確認所有調變及頻道均符合後，擇一做最終測試並記錄之。
 5. 量測場強輻射時，應對其三個正交軸(X、Y、Z)的方位評估測試，並分別測試以找出最大輻射電場強度軸向，以最差軸模式測試，並記錄其值與軸向放置。
 6. 依 NCC 74 次一致性會議：審驗時不具一般正常使用模式者，得不包括一般正常使用模式。

3.2.3 測試場地

項次	測 試 場 地
1	☒ RE02 — EMC B1 — N2 第一大樓地下二樓 3m 半電波暗室(N2)
2	☐ CE04 — 10M 2F 第三大樓二樓傳導測試室(10m 大樓)
3	☒ RF — Cond01 第一大樓地下一樓直量測試區
4	☐ RF — Cond02 第一大樓地下二樓直量測試區

3.2.4 Duty cycle
IEEE 802.11a

File:	20-08-MAS-001_5-2a	#22	Date:	2020/10/19	Temperature:	25 °C
Site:	RF-Cond01				Humidity:	52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 100ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11a Duty-1		

File: 20-08-MAS-001_5-2a

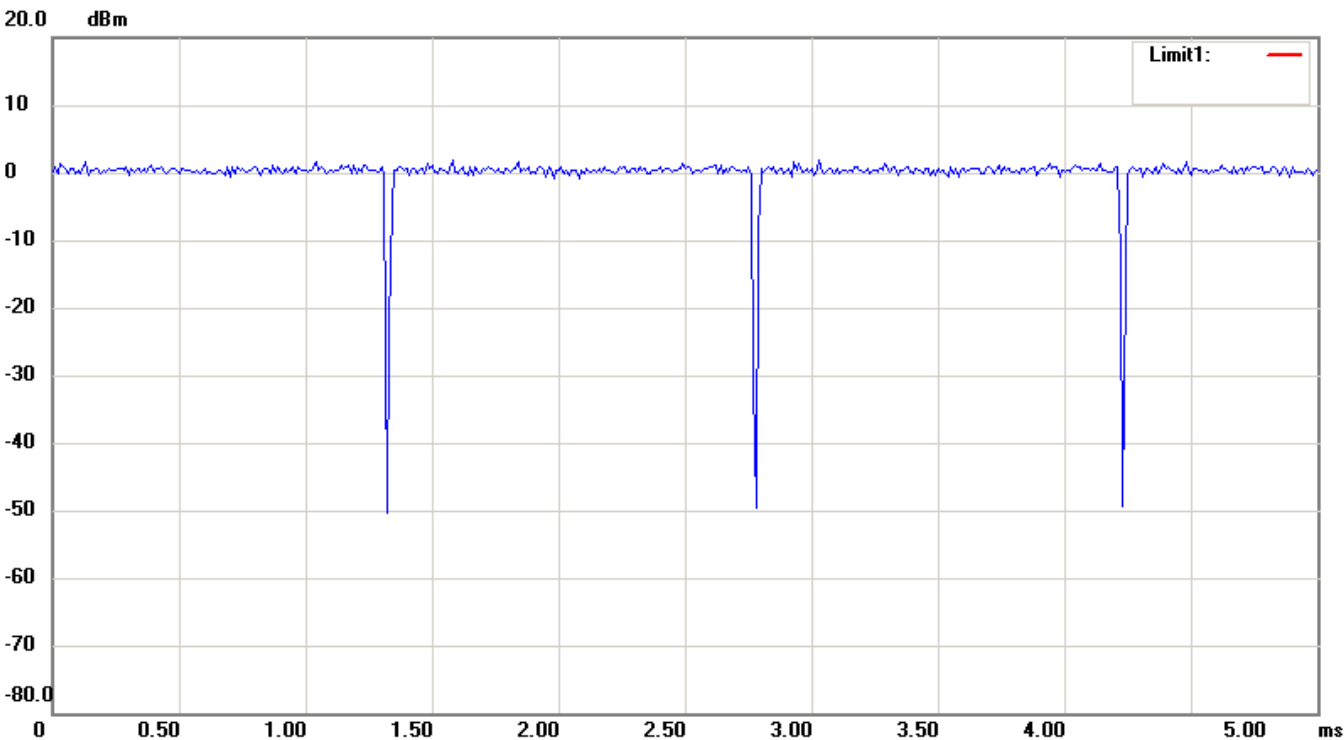
#21

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 5ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11a Duty-2 (Duty > 98%)		

IEEE 802.11ac (20MHz)

File: 20-08-MAS-001_5-2ac20

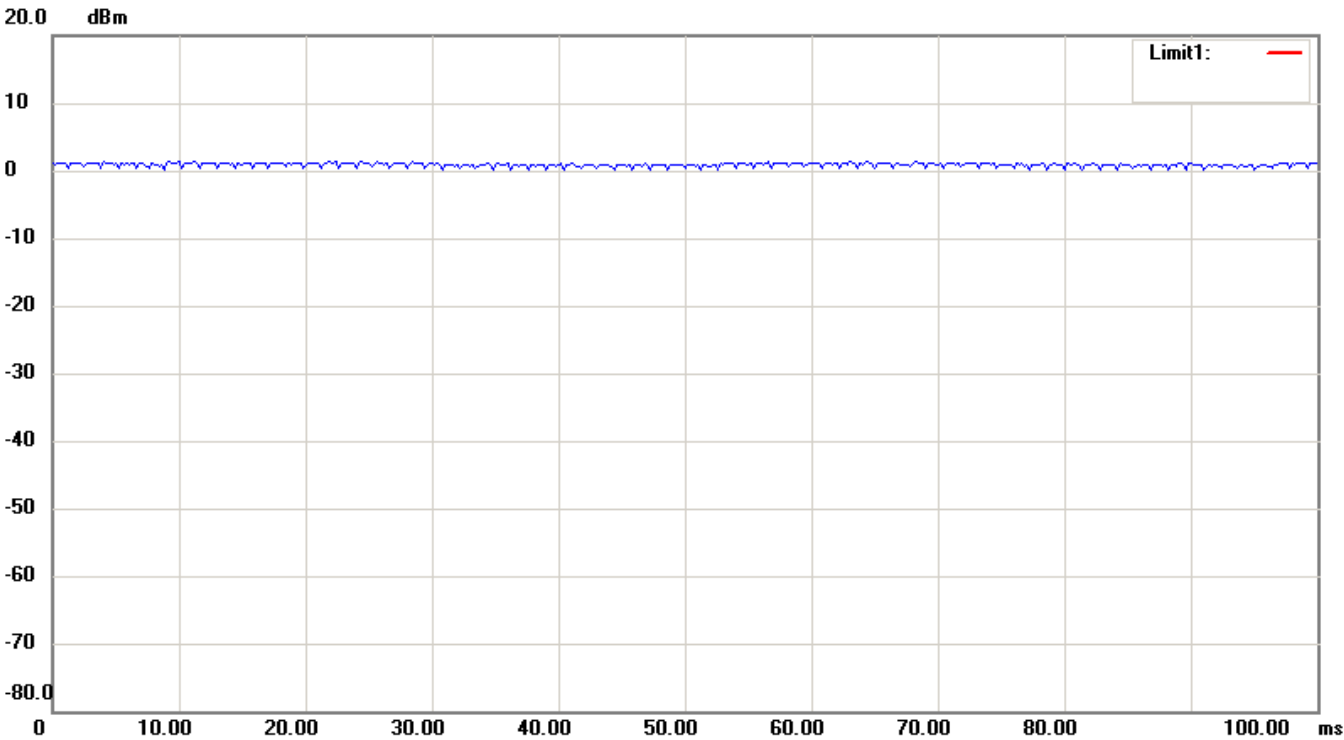
#21

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 100ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac20 Duty-1		

File: 20-08-MAS-001_5-2ac20

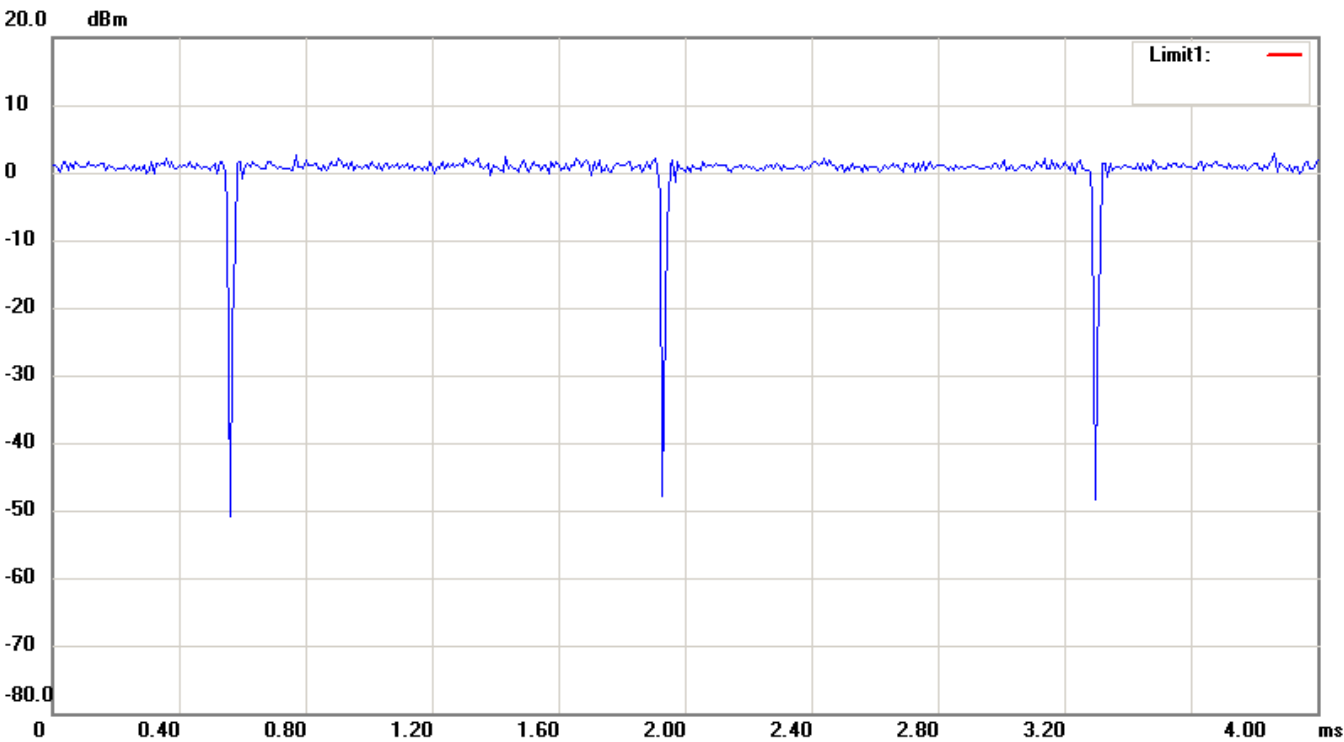
#22

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 4ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac20 Duty-2 (Duty = 97%)		

IEEE 802.11ac (40MHz)

File: 20-08-MAS-001_5-2ac40

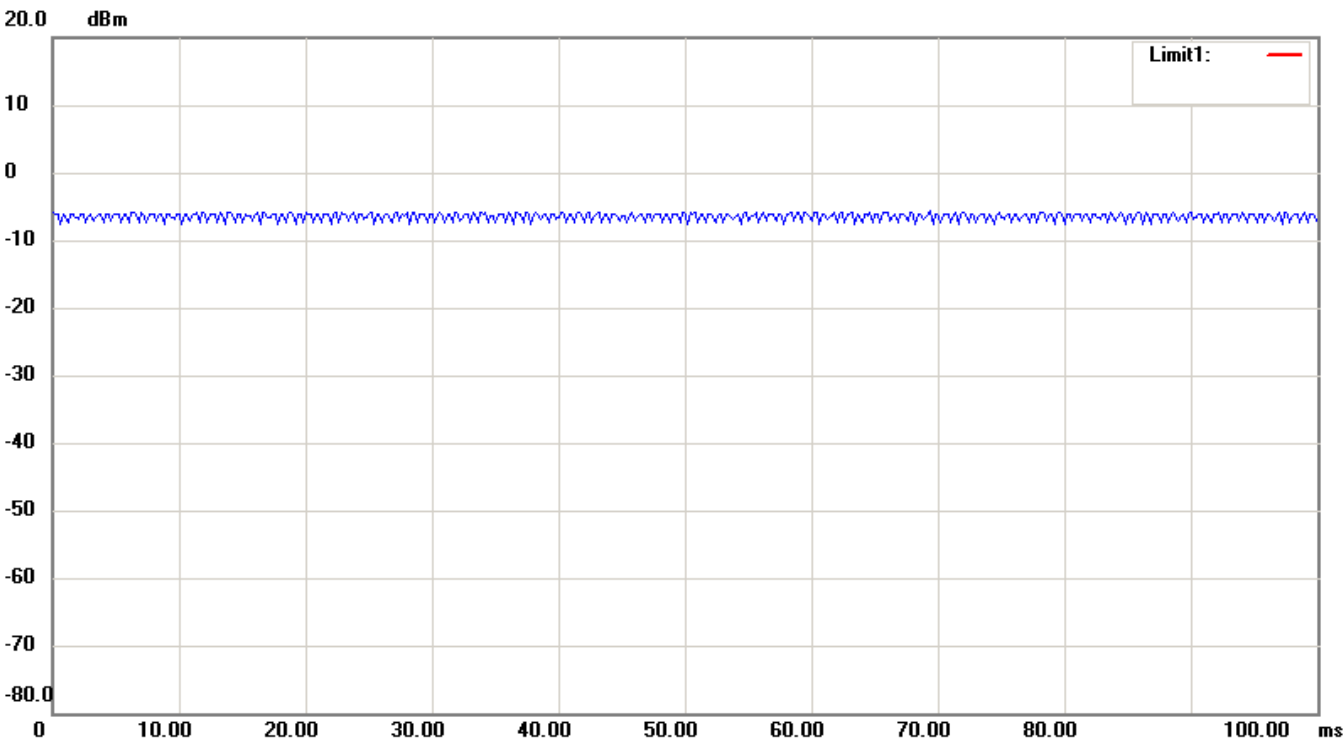
Site: RF-Cond01

#15

Date: 2020/10/19

Temperature: 25 °C

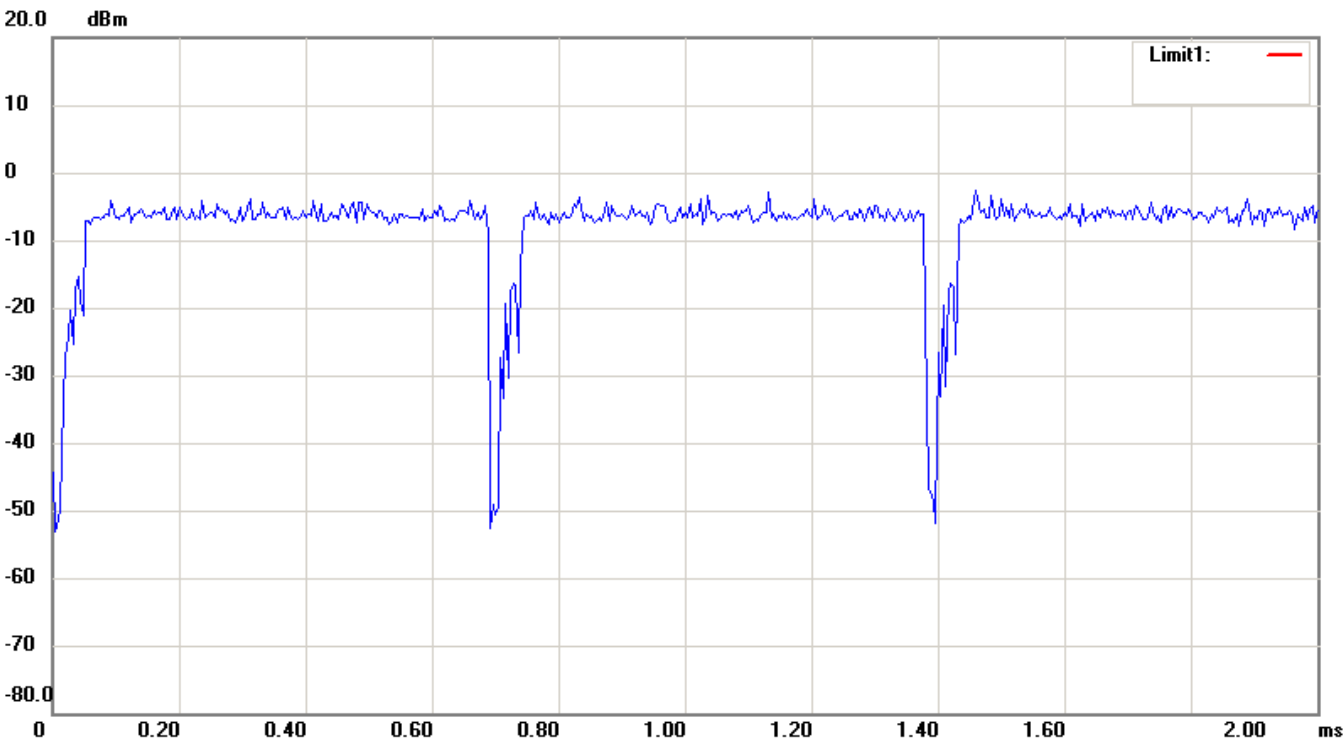
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 100ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac40 Duty-1		

File: 20-08-MAS-001_5-2ac40
Site: RF-Cond01

#16 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 2ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac40 Duty-2 (Duty = 92.4%)		

IEEE 802.11ac (80MHz)

File: 20-08-MAS-001_5-2ac80

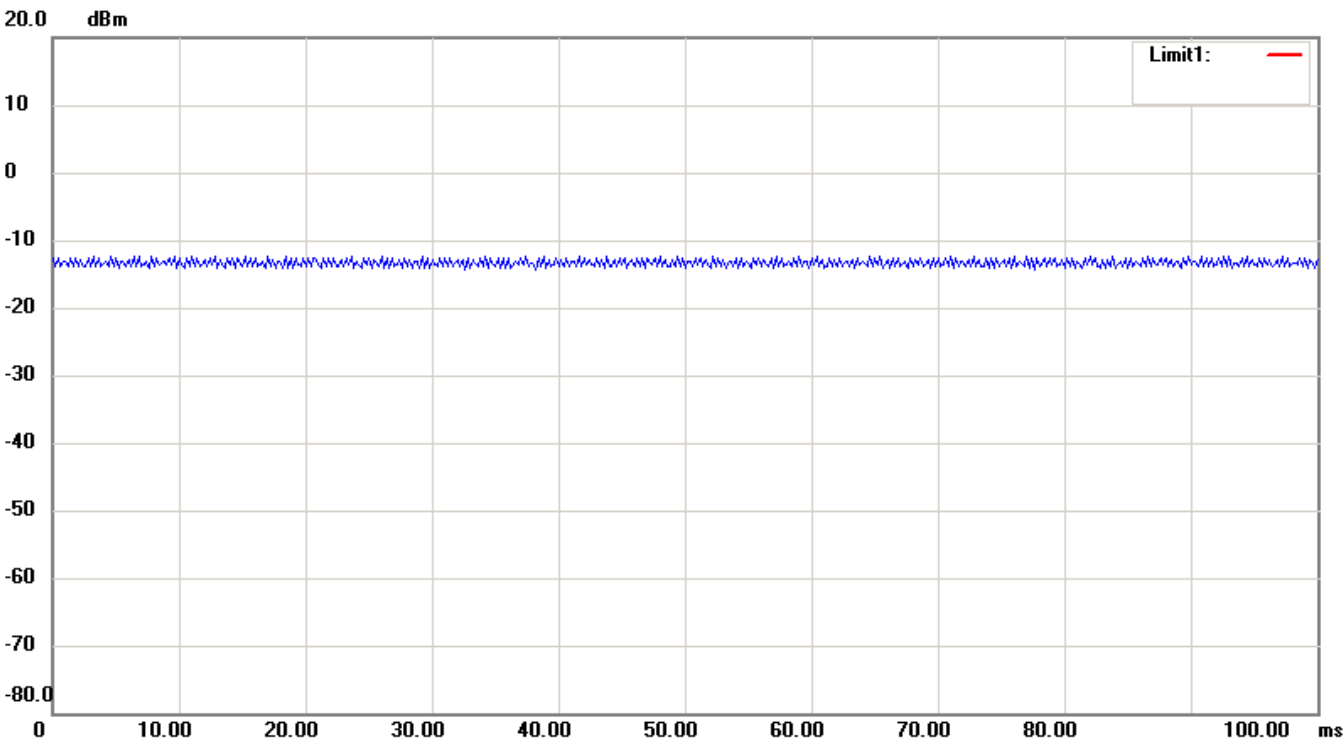
#9

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 100ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac80 Duty-1		

File: 20-08-MAS-001_5-2ac80

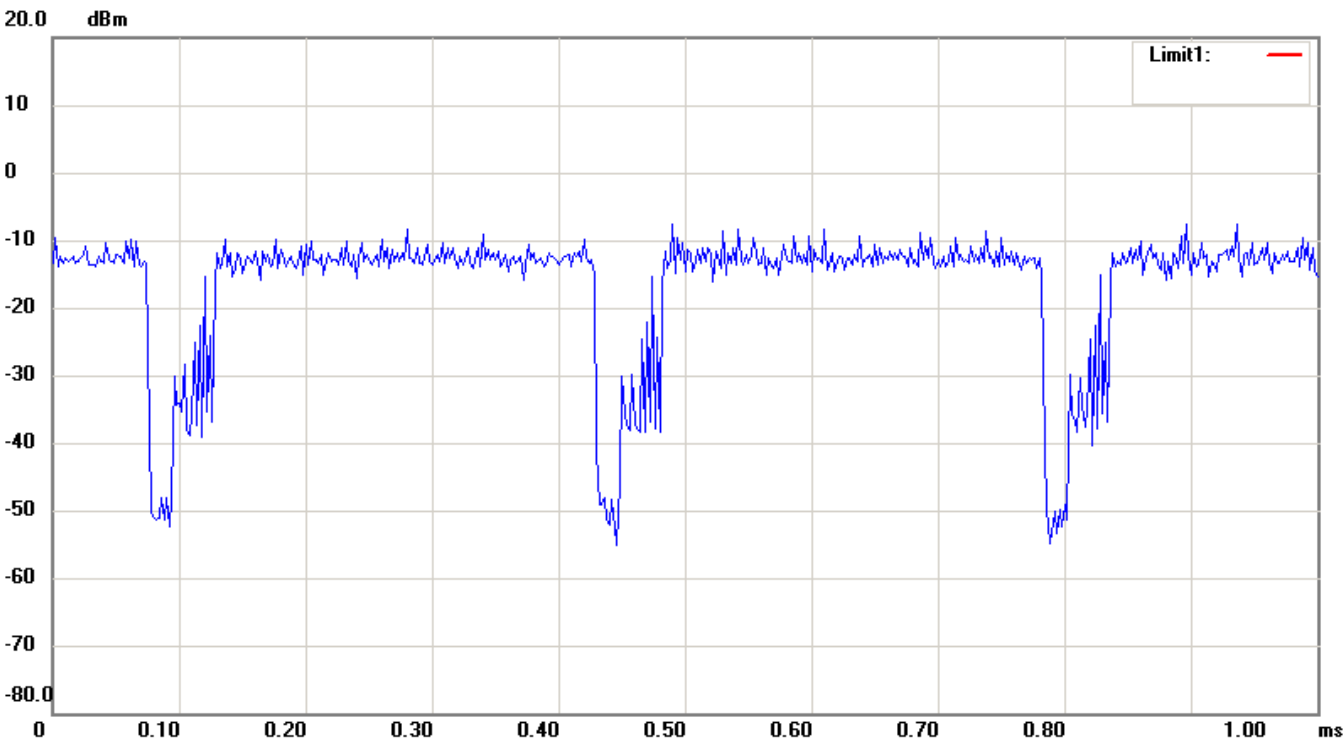
#10

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 1ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac80 Duty-2 (Duty = 84.7%)		

4 電源線傳導干擾之量測

本產品使用電源為直流電源，故無須對其電源傳導干擾部份進行測試。

5 天線增益之要求

5.1 適用標準

國家通訊傳播委員會低功率射頻器材技術規範5.7.8節規定，天線之規格不受3.2 規定之限制。若使用超過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。

5.2 天線增益

此裝置使用內接固定式天線連接於主體內 PCB 板上，天線增益 -0.4 dBi，未超過 6 dBi，不須降低峰值輸出功率。

5.3 結果判定

天線之方向性增益未超過6dBi，不須降低最大傳導輸出功率及功率密度之限制值。

6 發射頻寬之量測

6.1 適用標準

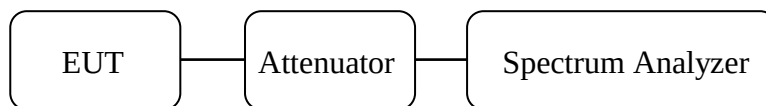
依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.2節(1)之規定。

使用頻率於5.25 GHz~5.35 GHz 與5.470 GHz~5.725 GHz 頻段，最大傳導輸出功率應小於或等於250 mW或11dBm+10log B (B 是26 dB發射頻寬，單位MHz)之較小者。

國家通訊傳播委員會低功率射頻器材技術規範5.7節無規定限制值，僅提供數據參考計算用。

6.2 測試配置

圖 1：發射頻寬之測試配置



6.3 發射頻寬之量測儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	R&S	FSV
Attenuator	WEINSCHEL	56-10

測試軟體: LZ-RF (Ver. ETC-3A2)

6.4 量測結果

測試工程師: 羅世勇

6.4.1 調變技術: IEEE 802.11a

測試日期: Oct. 19, 2020

環境溫度 : 25°C

環境濕度: 52%

Channel	26dB Bndwidth (MHz)	Chart
L	21.8152	Page 25
M	21.8152	Page 26
H	21.5710	Page 27

註：繪圖資料請參考第 25-27 頁。

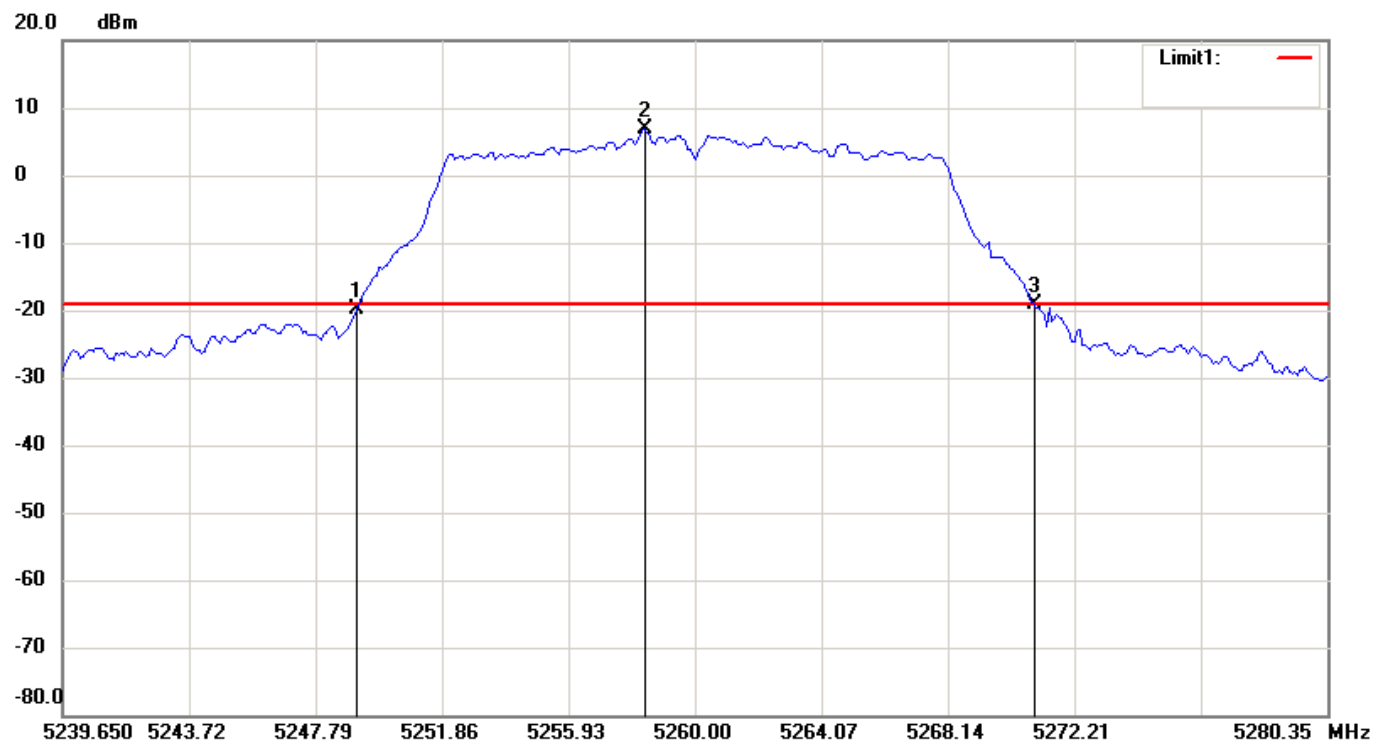
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

Data #2

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -19.22dBm

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a Channel 52_-26dB EBW

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 300 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5249.09240	-19.91
2	5258.37200	6.78
3	5270.90760	-19.22

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	21.8152	0.69

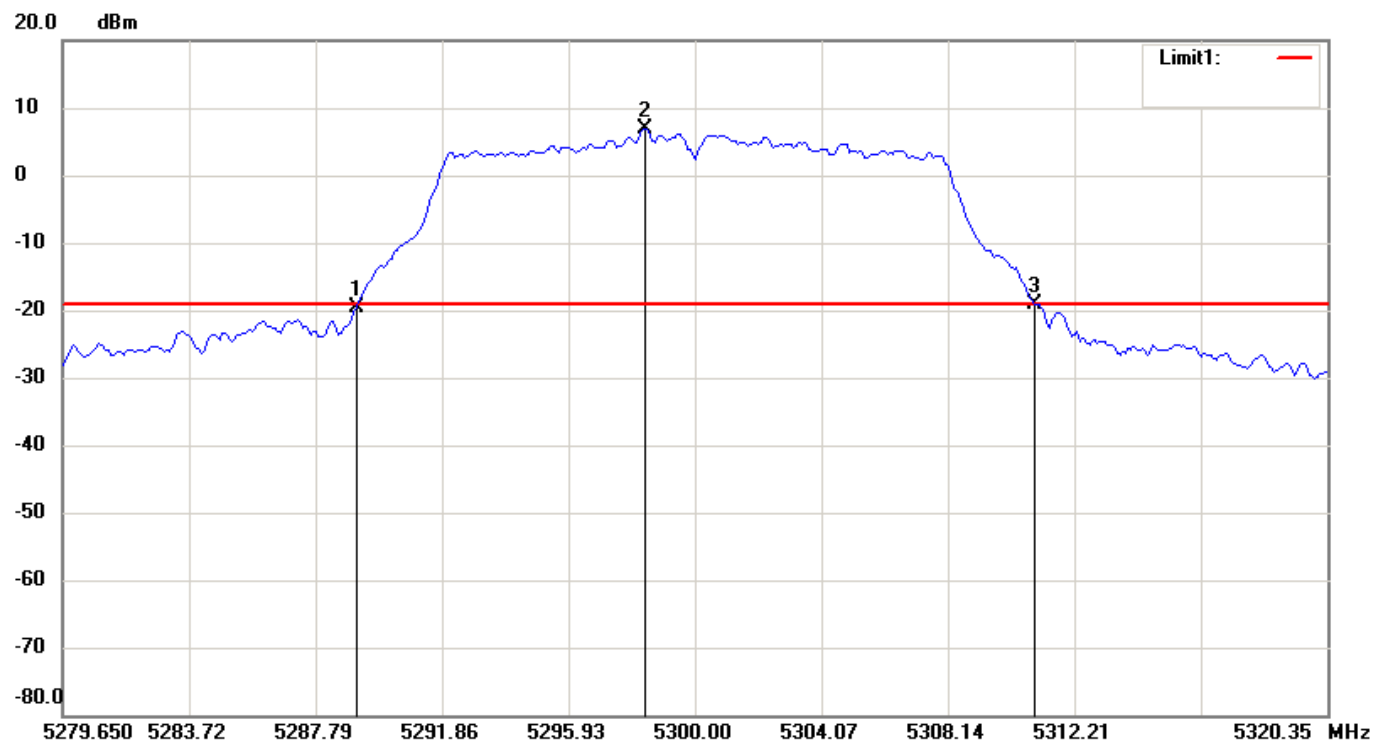
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

Data #9

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -19.03dBm

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a Channel 60_-26dB EBW

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 300 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5289.09240	-19.62
2	5298.37200	6.97
3	5310.90760	-19.05

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	21.8152	0.57

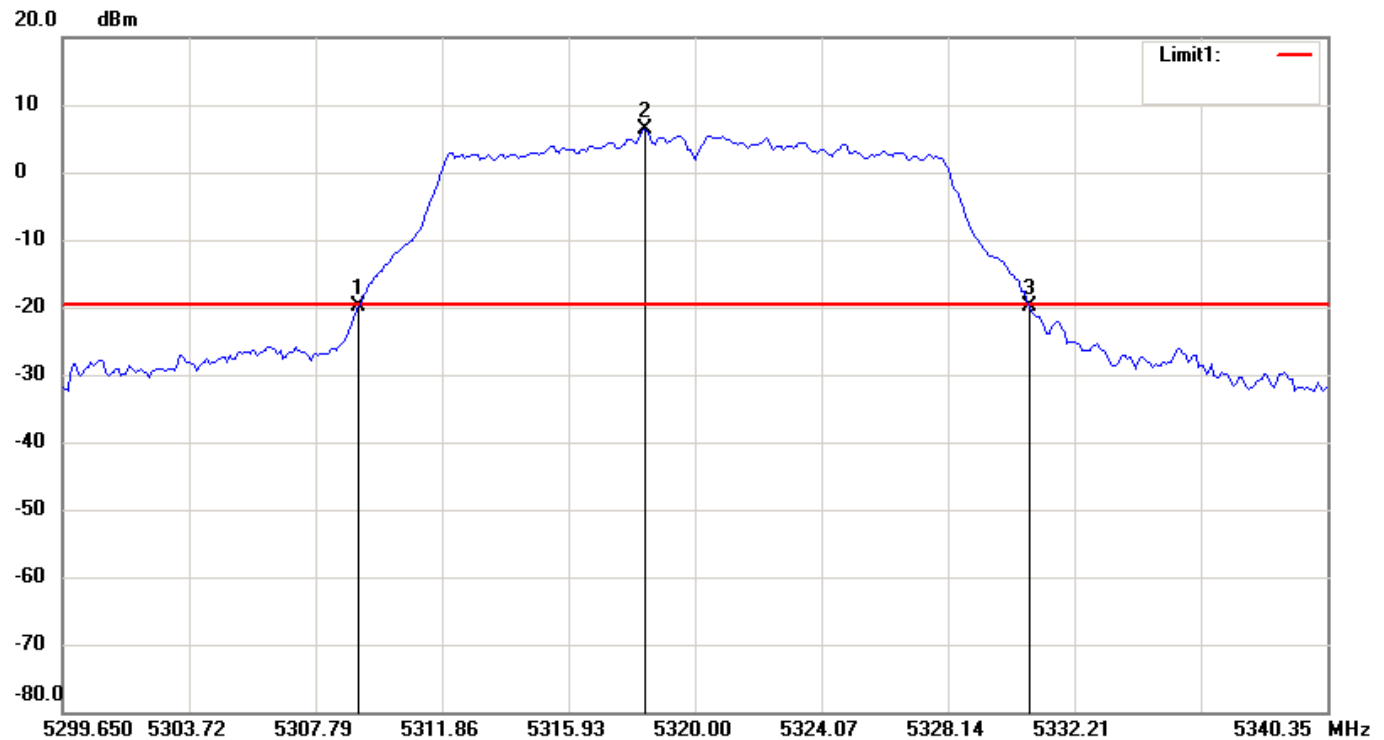
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#15

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -19.64dBm
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11a Channel 64_-26dB EBW

RF Conducted
Sweep Time: 1ms Att.: 25dB
RBW: 300 KHz VBW: 1000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5309.17380	-19.97
2	5318.37200	6.36
3	5330.74480	-19.92

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	21.571	0.05

6.4.2 調變技術: IEEE 802.11ac (20MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

Channel	26dB Bndwidth (MHz)	Chart
L	22.2222	Page 29
M	22.3036	Page 30
H	22.0594	Page 31

註：繪圖資料請參考第 29-31 頁。

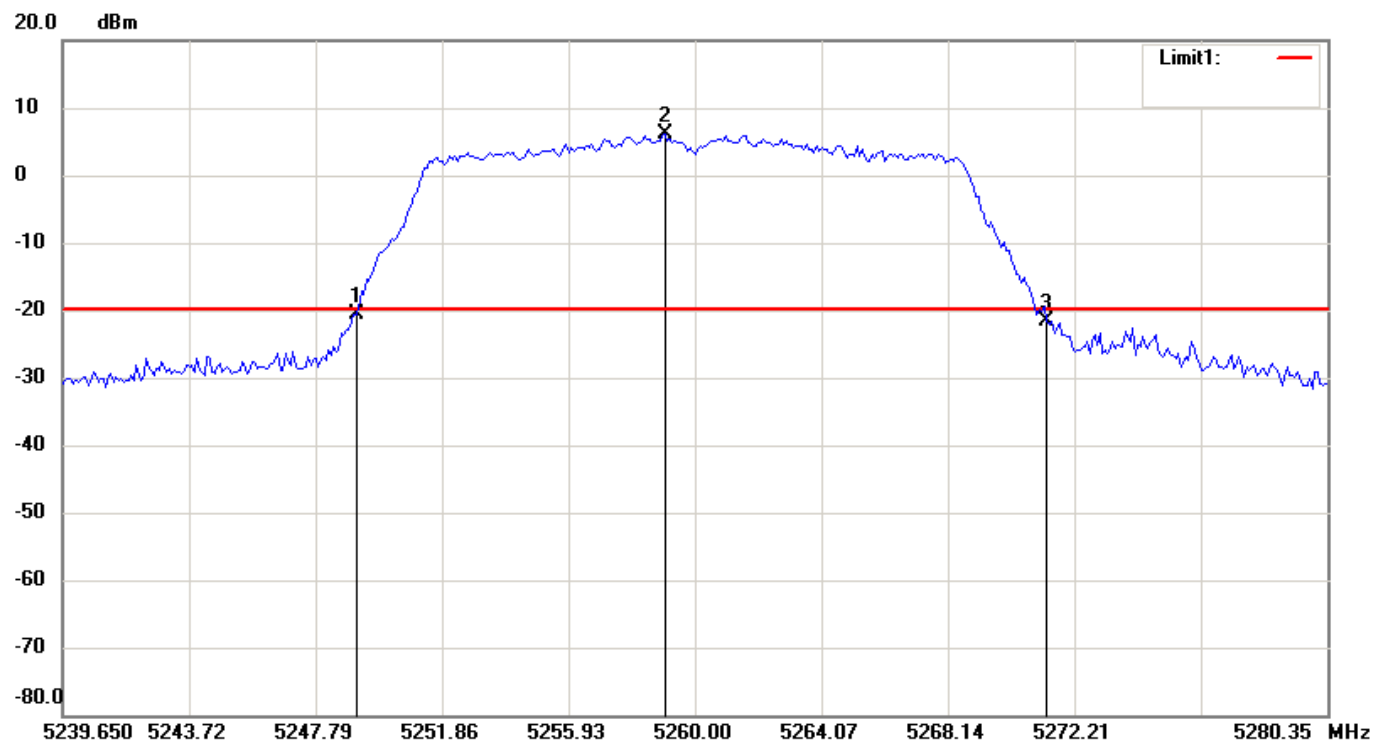
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

Data #2

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -19.84dBm

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20 Channel 52_-26dB EBW

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 300 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5249.09240	-20.73
2	5259.02320	6.16
3	5271.31460	-21.69

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	22.2222	-0.96

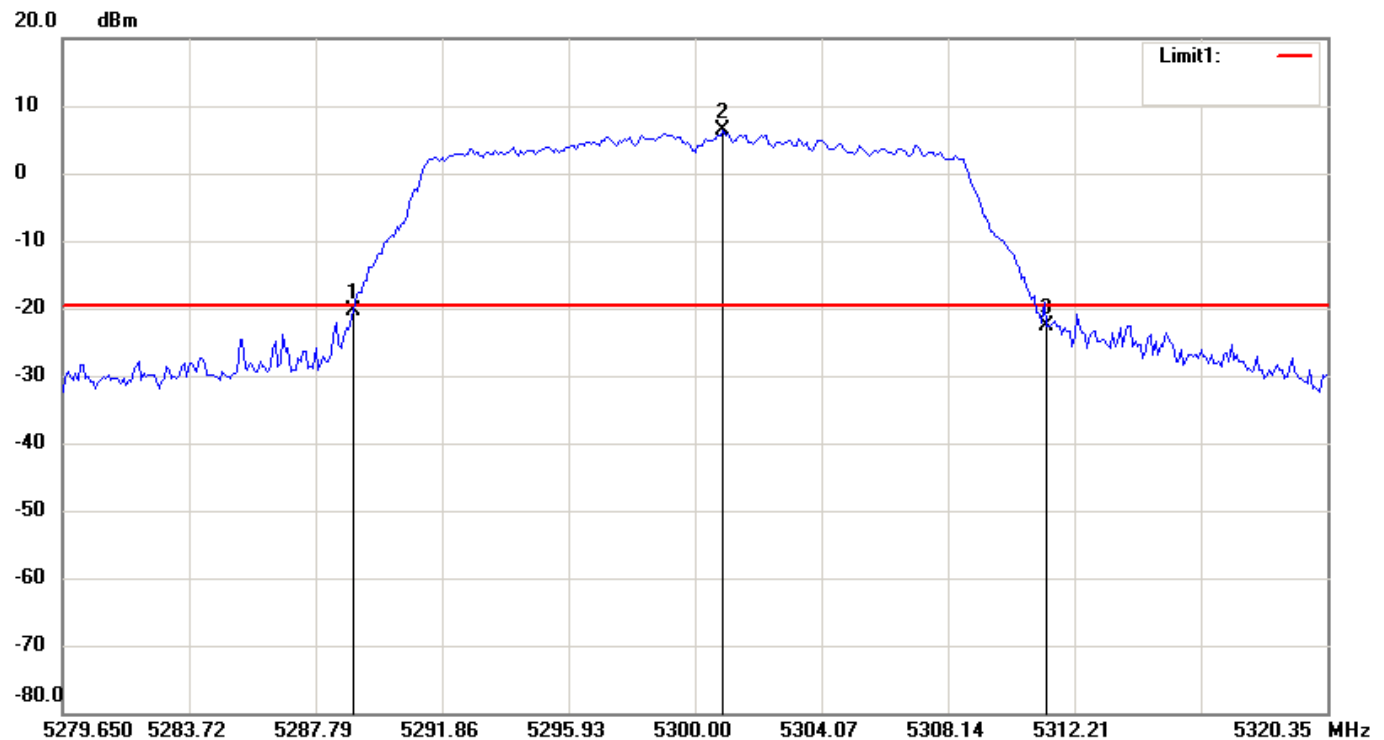
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

Data #9

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -19.66dBm

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20 Channel 60_-26dB EBW

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 300 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5289.01100	-20.26
2	5300.89540	6.34
3	5311.31460	-22.68

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	22.3036	-2.42

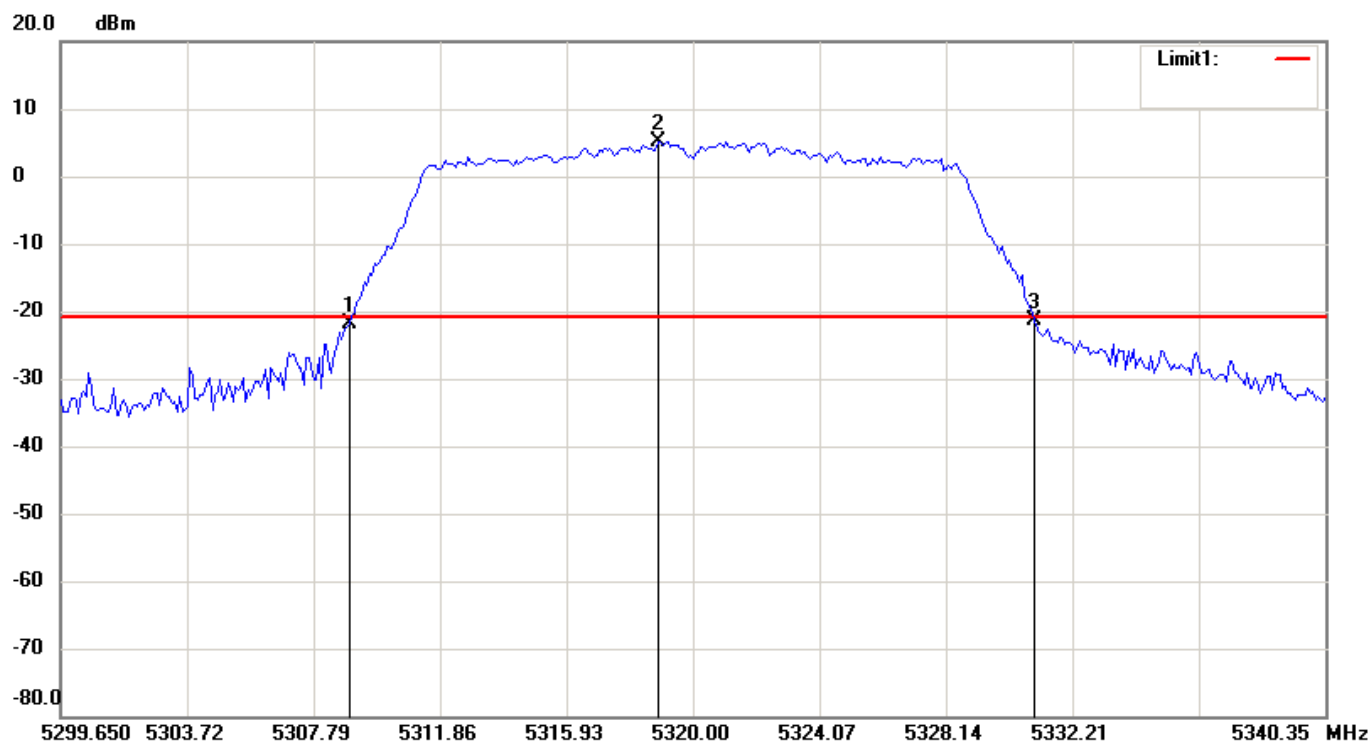
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#15

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: -20.76dBm

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20 Channel 64_-26dB EBW

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 300 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5308.92960	-21.84
2	5318.86040	5.24
3	5330.98900	-21.39

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	22.0594	0.45

6.4.3 調變技術: IEEE 802.11ac (40MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

Channel	26dB Bndwidth (MHz)	Chart
L	41.3004	Page 33
H	40.3248	Page 34

註：繪圖資料請參考第 33-34 頁。

File: 20-08-MAS-001_5-3ac40

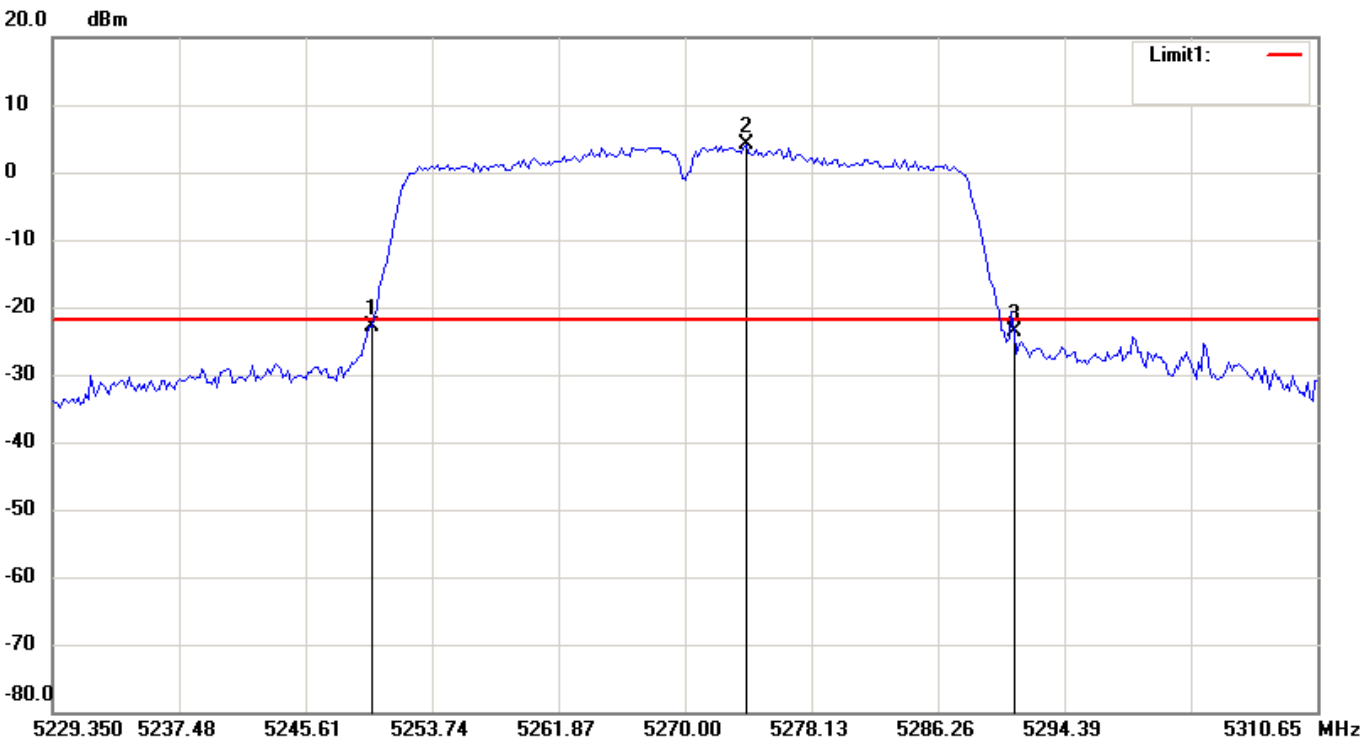
#2

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: -21.95dBm

RF Conducted

EUT: Communication Module

Sweep Time: 1ms Att.: 25dB

Model: Type2AW

RBW: 500 KHz VBW: 3000 KHz

Test Mode: UNII

Operator: Phillip

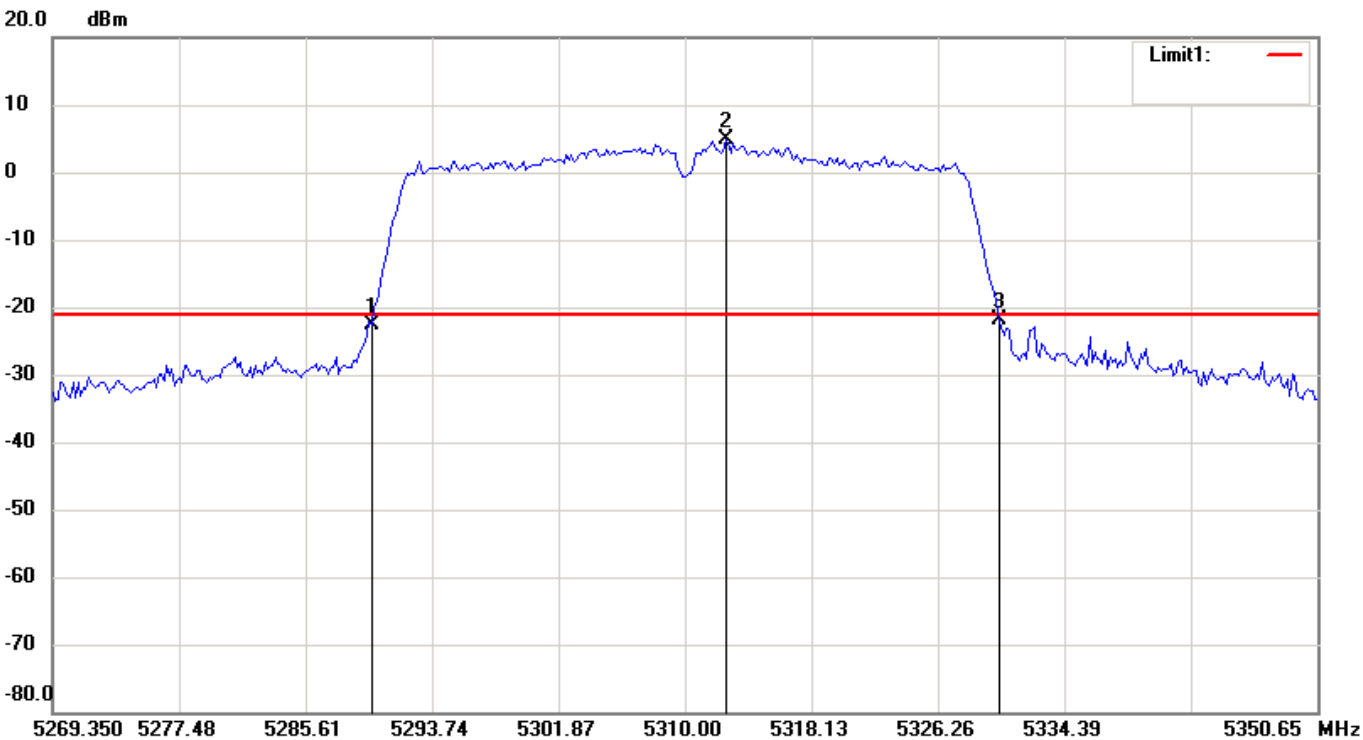
Note: NCC_LP0002_802.11ac40 Channel 54_-26dB EBW

No.	Frequency(MHz)	Level(dBm)
1	5249.83760	-22.80
2	5273.90240	4.05
3	5291.13800	-23.57

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	41.3004	-0.77

File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#9 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	-21.15dBm	RF Conducted
EUT:	Communication Module	Sweep Time: 1ms Att.: 25dB
Model:	Type2AW	RBW: 500 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac40 Channel 62_-26dB EBW	

No.	Frequency(MHz)	Level(dBm)
1	5289.83760	-22.62
2	5312.60160	4.85
3	5330.16240	-21.75

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	40.3248	0.87

6.4.4 調變技術:IEEE 802.11ac (80MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

Channel	26dB Bndwidth (MHz)	Chart
L	82.152	Page 36

註：繪圖資料請參考第 36 頁。

6.5 結果判定

僅提供數據，無須判定。

File: 20-08-MAS-001_5-3ac80

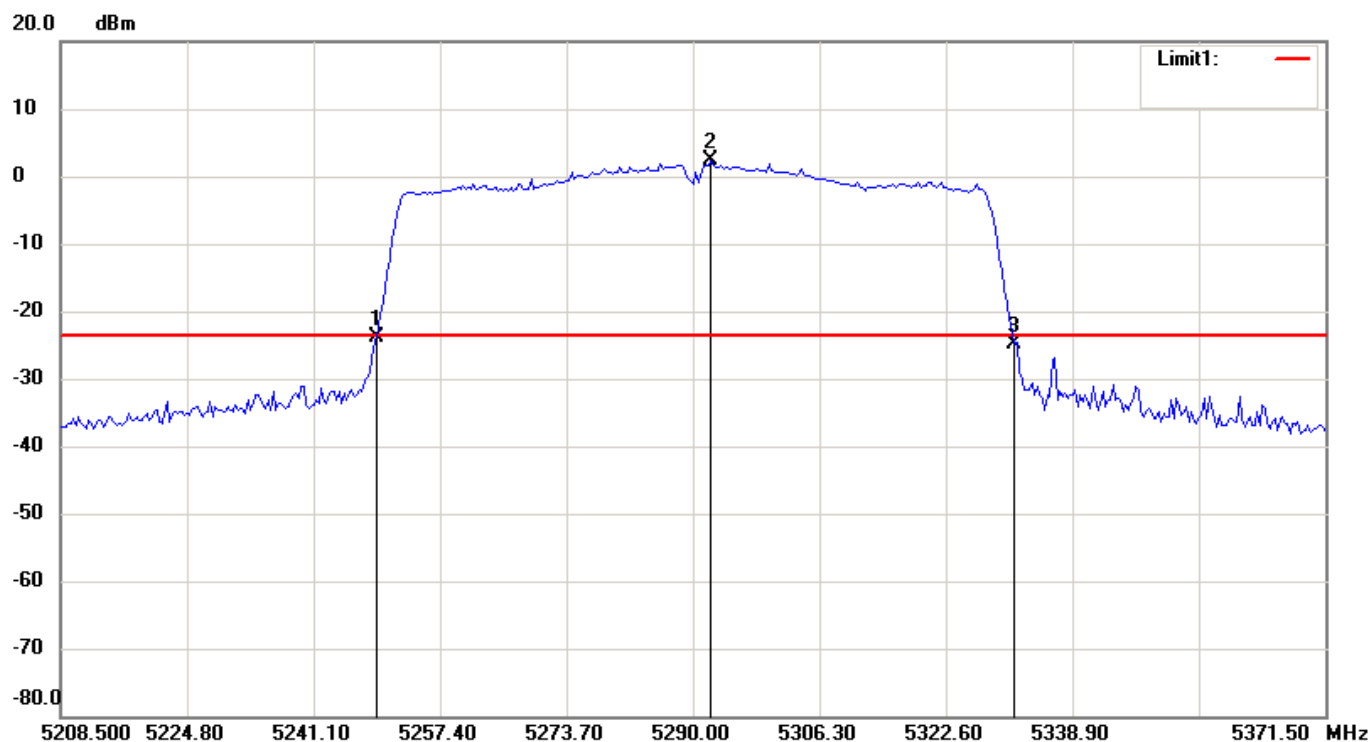
#2

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: -23.66dBm

RF Conducted

EUT: Communication Module

Sweep Time: 1ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 3000 KHz

Test Mode: UNII

Operator: Phillip

Note: NCC_LP0002_802.11ac80 Channel 58_-26dB EBW

No.	Frequency(MHz)	Level(dBm)
1	5249.25000	-23.82
2	5292.28200	2.34
3	5331.40200	-24.97

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	82.152	-1.15

7 最大傳導輸出功率之量測

7.1 最大傳導輸出功率適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.2節(1)(3)之規定：

5.7.3.2節(1)：5.25 GHz～5.35 GHz頻帶，最大傳導輸出功率應小於或等於250 mW或11dBm+10log B (B 是26 dB發射頻寬，單位MHz)之較小者。

5.7.3.2節(3)：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。

7.2 最大傳導輸出功率之測試配置

如圖 1 所示。

7.3 最大傳導輸出功率之量測儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	R&S	FSV
Attenuator	WEINSCHEL	56-10

測試軟體: LZ-RF (Ver. ETC-3A2)

7.4 最大傳導輸出功率之量測結果

測試工程師: 羅世勇

7.4.1 調變技術: IEEE 802.11a

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixd limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	21.815	24.39	14.12	24	Page 39
M	24	21.815	24.39	14.11	24	Page 40
H	24	21.571	24.34	13.28	24	Page 41

註：1. 繪圖資料請參考第 39-41 頁。

2. 最大傳導輸出功率 (Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Caculated Limit = 11dBm + 10 log (26dB BW)

5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm

6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm – (highest antenna gain – 6 dBi)

7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

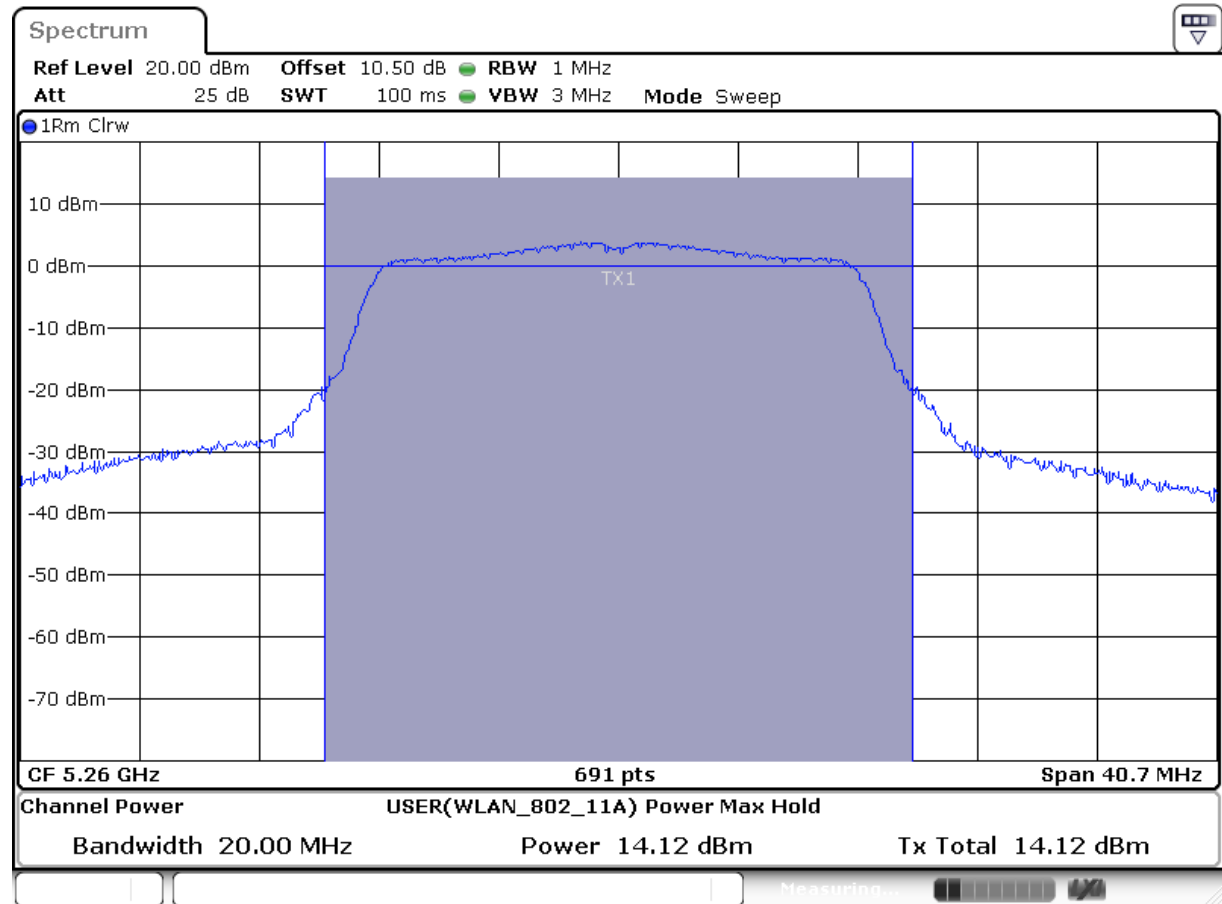
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

Data #1

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %

**Condition:**

EUT:

Model:

Test Mode:

Note:

Communication Module

Type2AW

UNII

NCC_LP0002_802.11a_Channel 52_Output power

RF Conducted

Sweep Time: 100ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

File: 20-08-MAS-001_5-3a

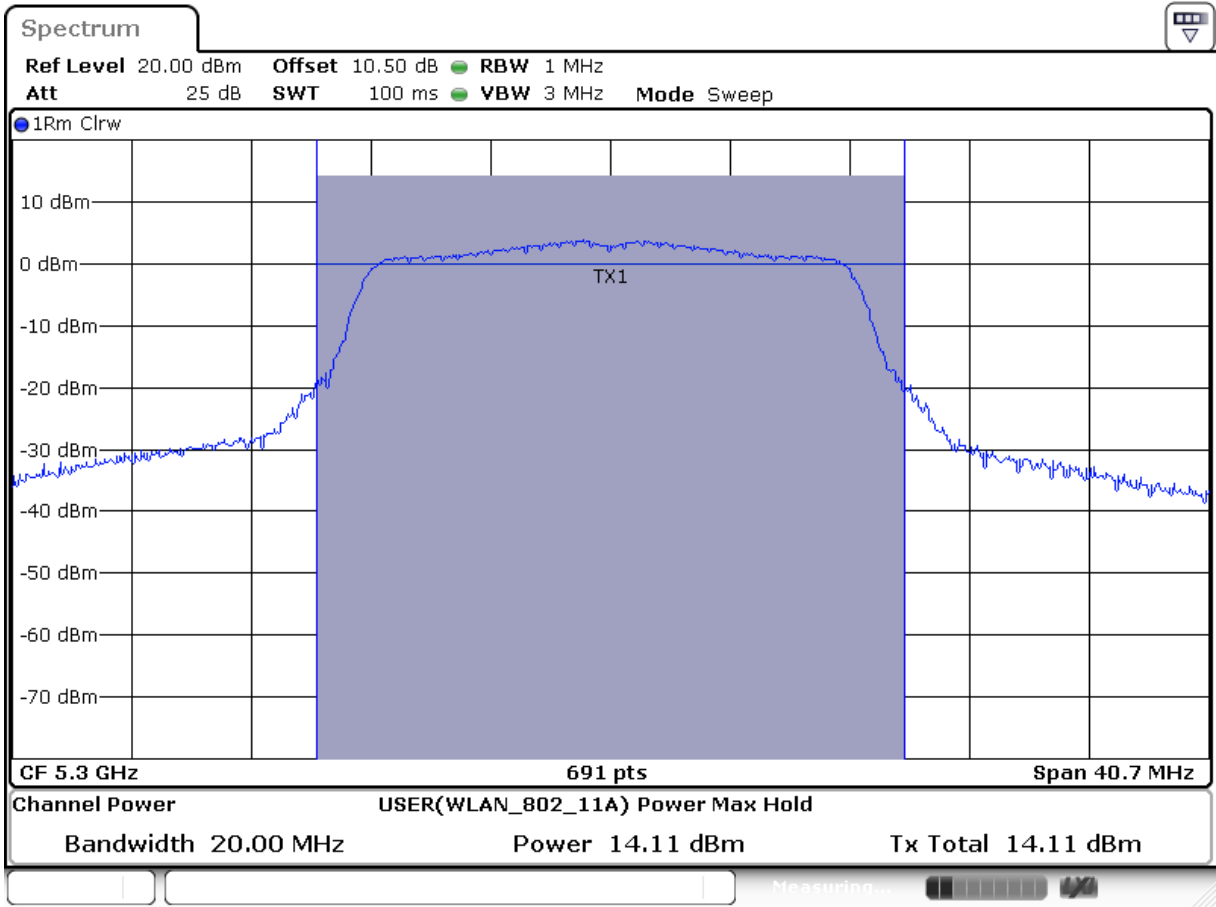
Site: RF-Cond01

Data #8

Date: 2020/10/19

Temperature: 25 °C

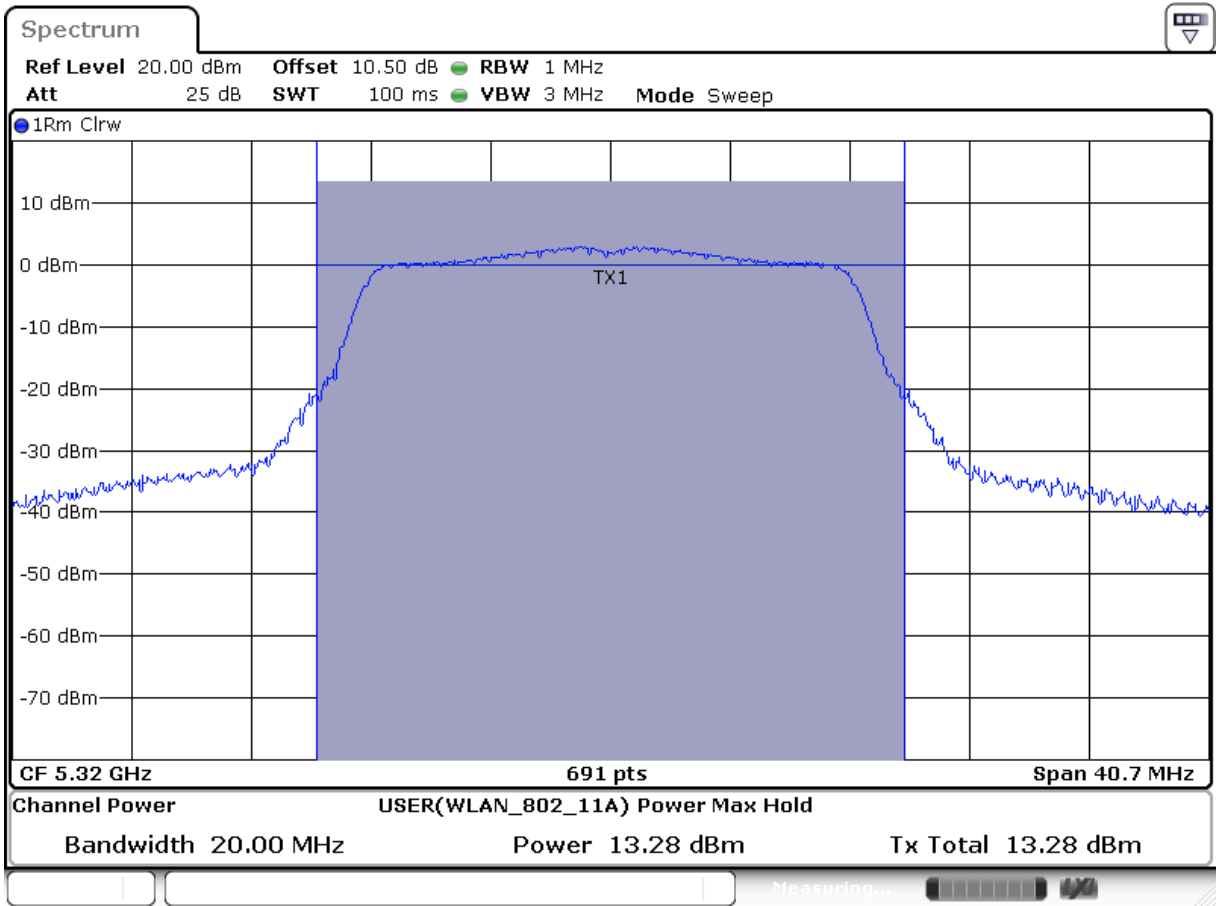
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11a_Channel 60_Output power	

File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#14 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11a_Channel 64_Output power	

7.4.2 調變技術:IEEE 802.11n HT20

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixd limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	22.222	24.47	13.70	24	Page 43
M	24	22.304	24.48	13.74	24	Page 44
H	24	22.059	24.44	12.86	24	Page 45

註：1. 繪圖資料請參考第 43-45 頁。

2. 最大傳導輸出功率(Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Caculated Limit = 11dBm + 10 log (26dB BW)

5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm

6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm – (highest antenna gain – 6 dBi)

7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

File: 20-08-MAS-001_5-3n20

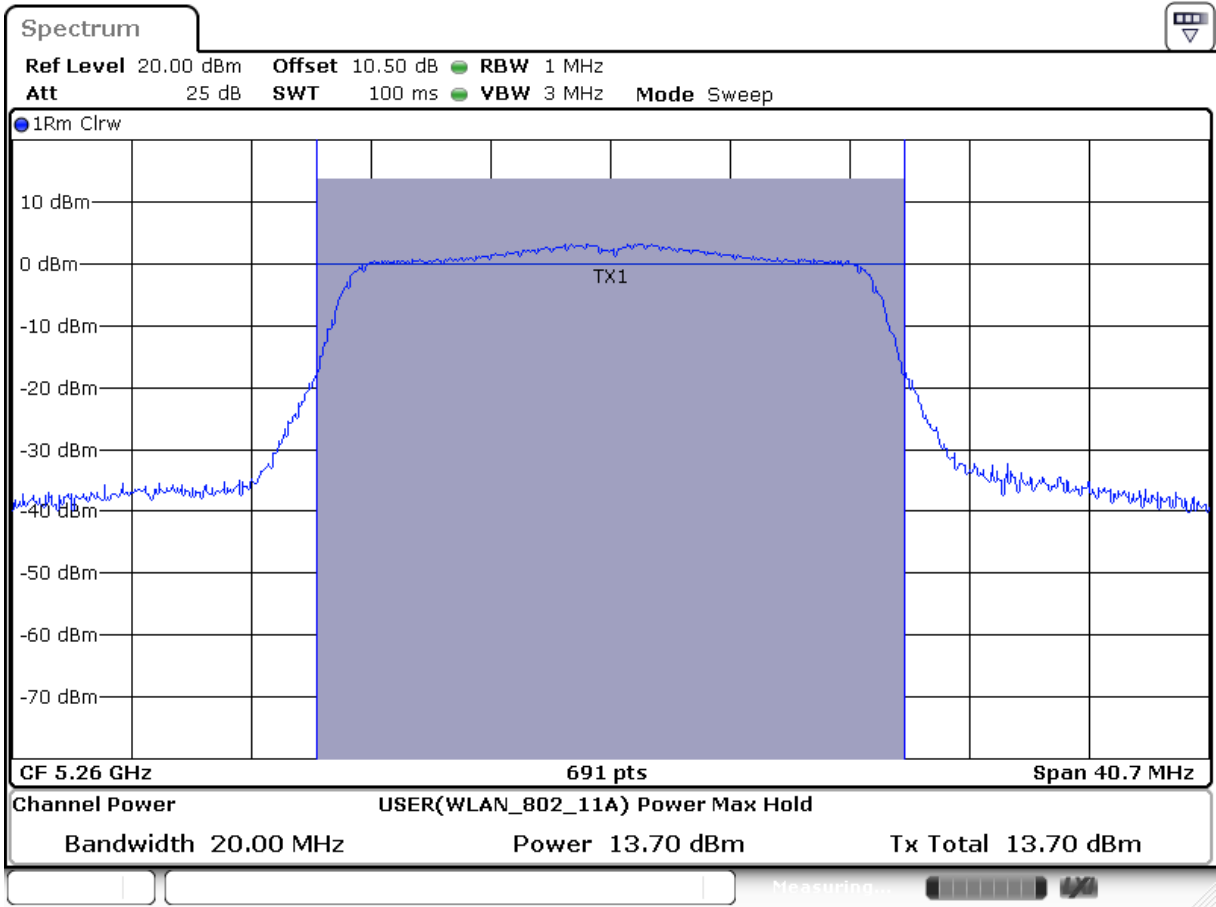
Site: RF-Cond01

Data #1

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11n20_Channel 52_Output power	

File: 20-08-MAS-001_5-3n20

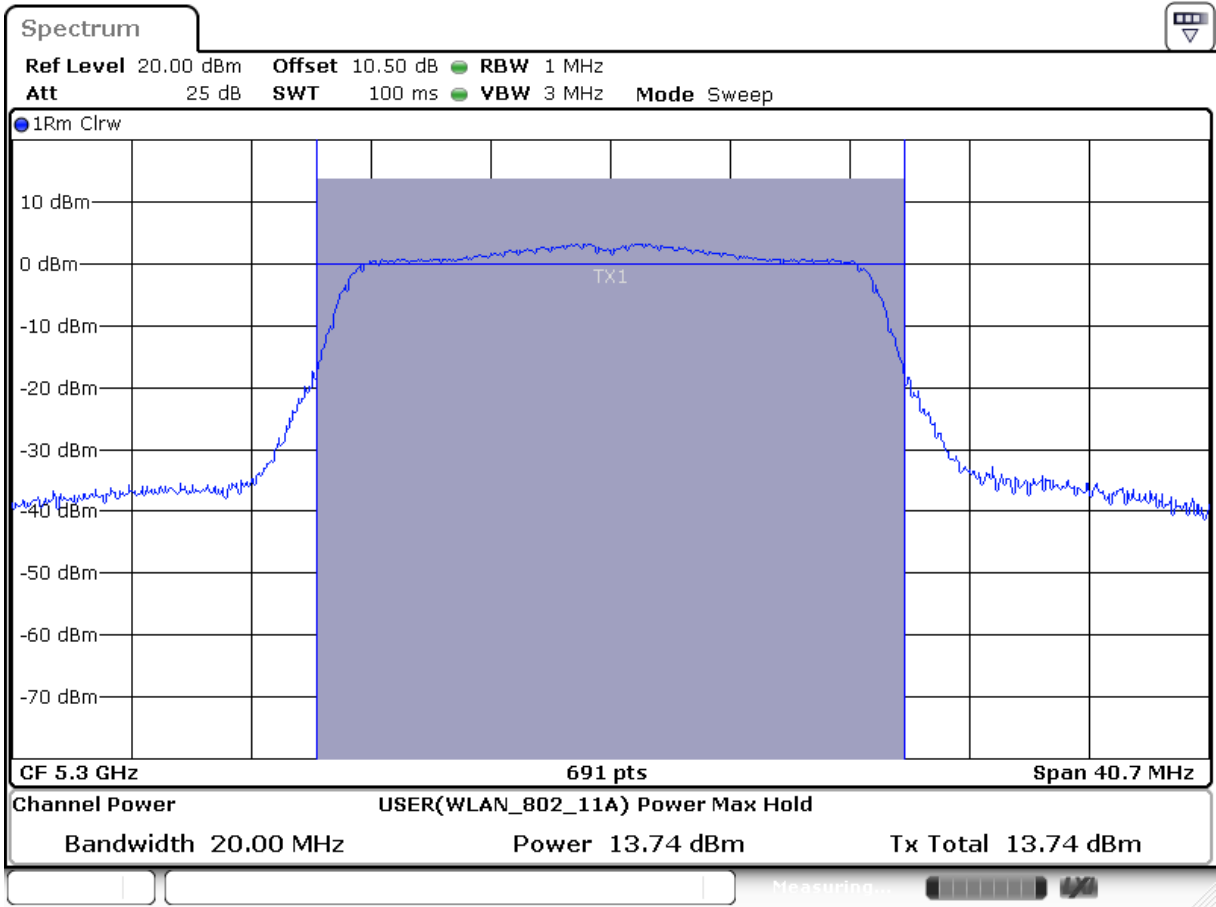
Site: RF-Cond01

Data #8

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11n20_Channel 60_Output power	

File: 20-08-MAS-001_5-3n20_14

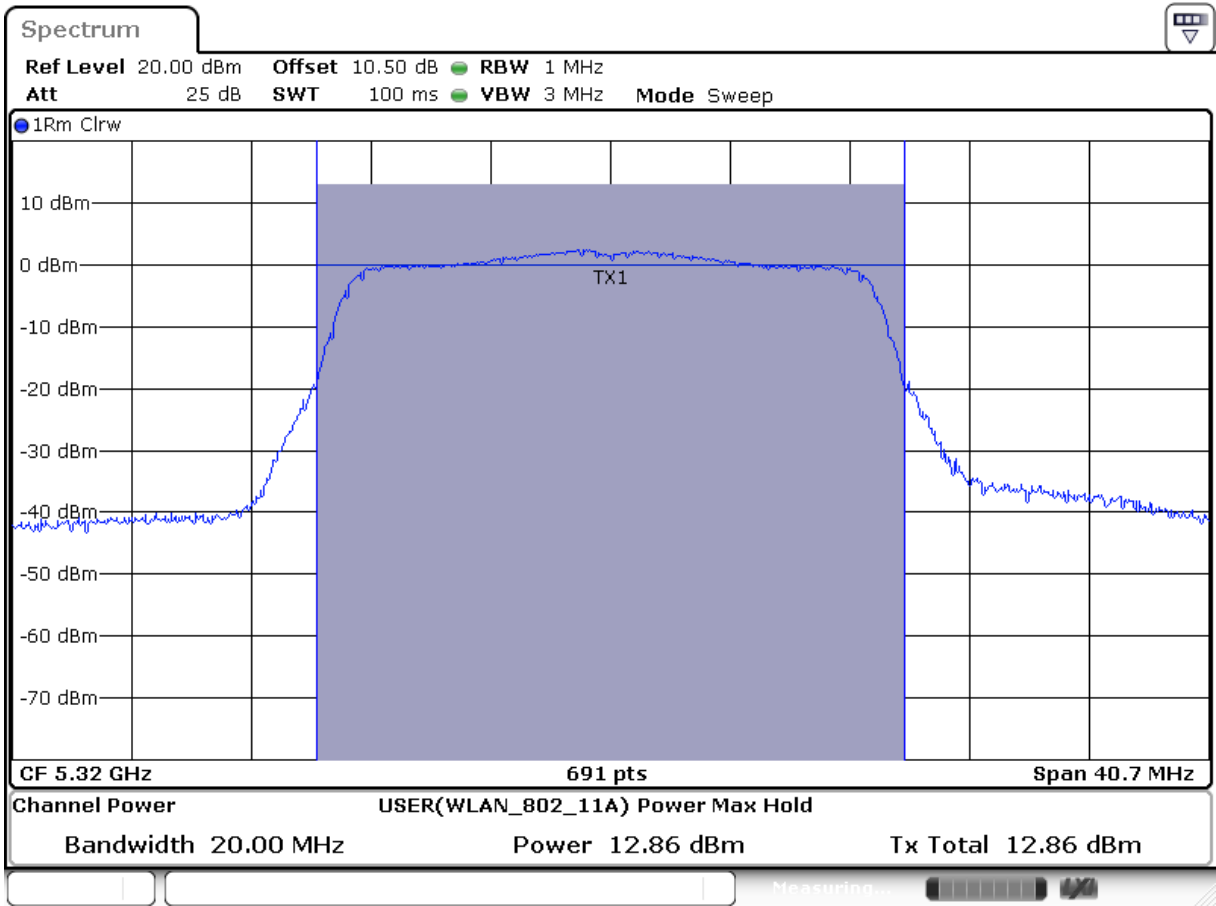
#14

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11n20_Channel 64_Output power	

7.4.3 調變技術: IEEE 802.11n HT40

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixed limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	41.300	27.16	12.44	24	Page 47
H	24	40.325	27.06	12.56	24	Page 48

註：1. 繪圖資料請參考第 47-48 頁。

2. 最大傳導輸出功率(Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Calculated Limit = 11dBm + 10 log (26dB BW)

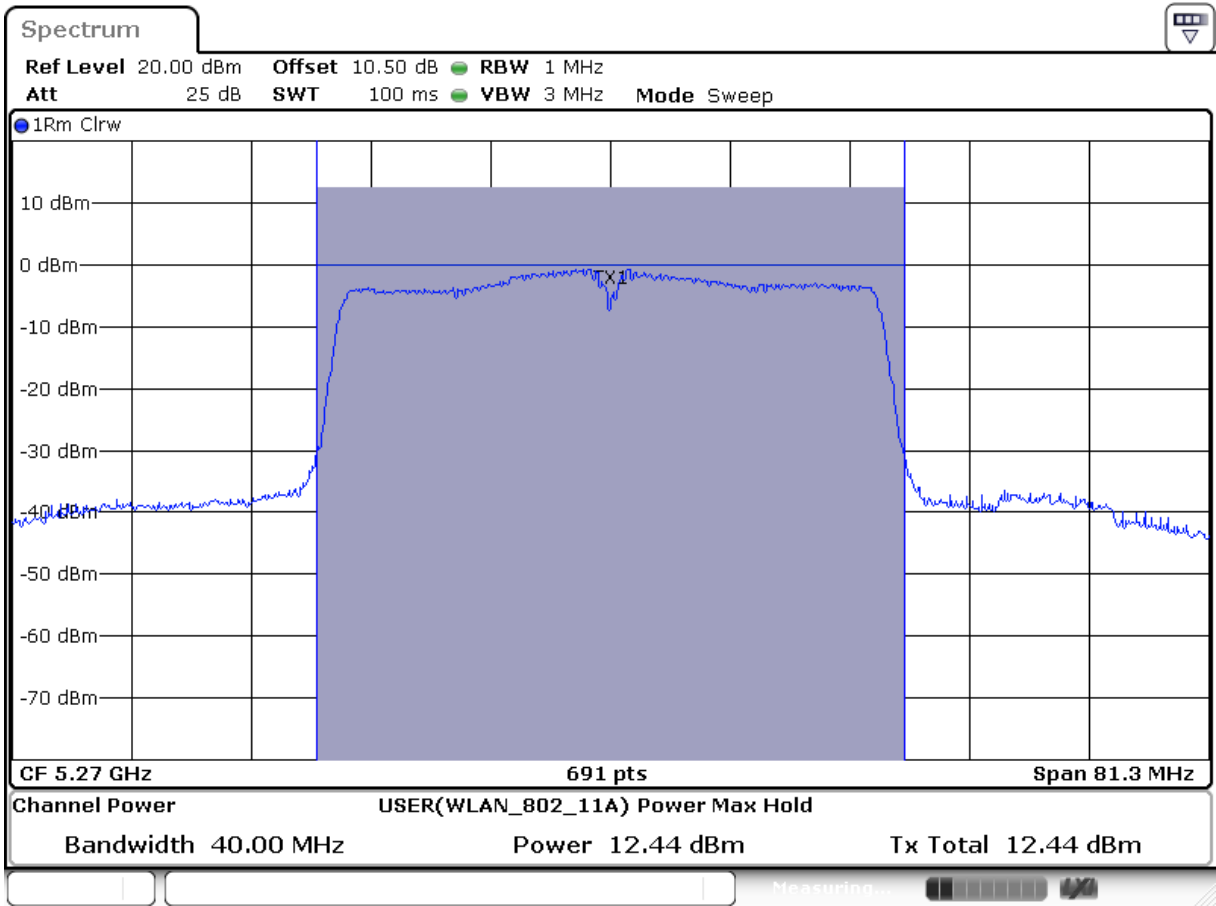
5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit and Calculated Limit) dBm

6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit and Calculated Limit) dBm – (highest antenna gain – 6 dBi)

7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

File: 20-08-MAS-001_5-3n40_14
Site: RF-Cond01

#1 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11n40_Channel 54_Output power	

File: 20-08-MAS-001_5-3n40_14

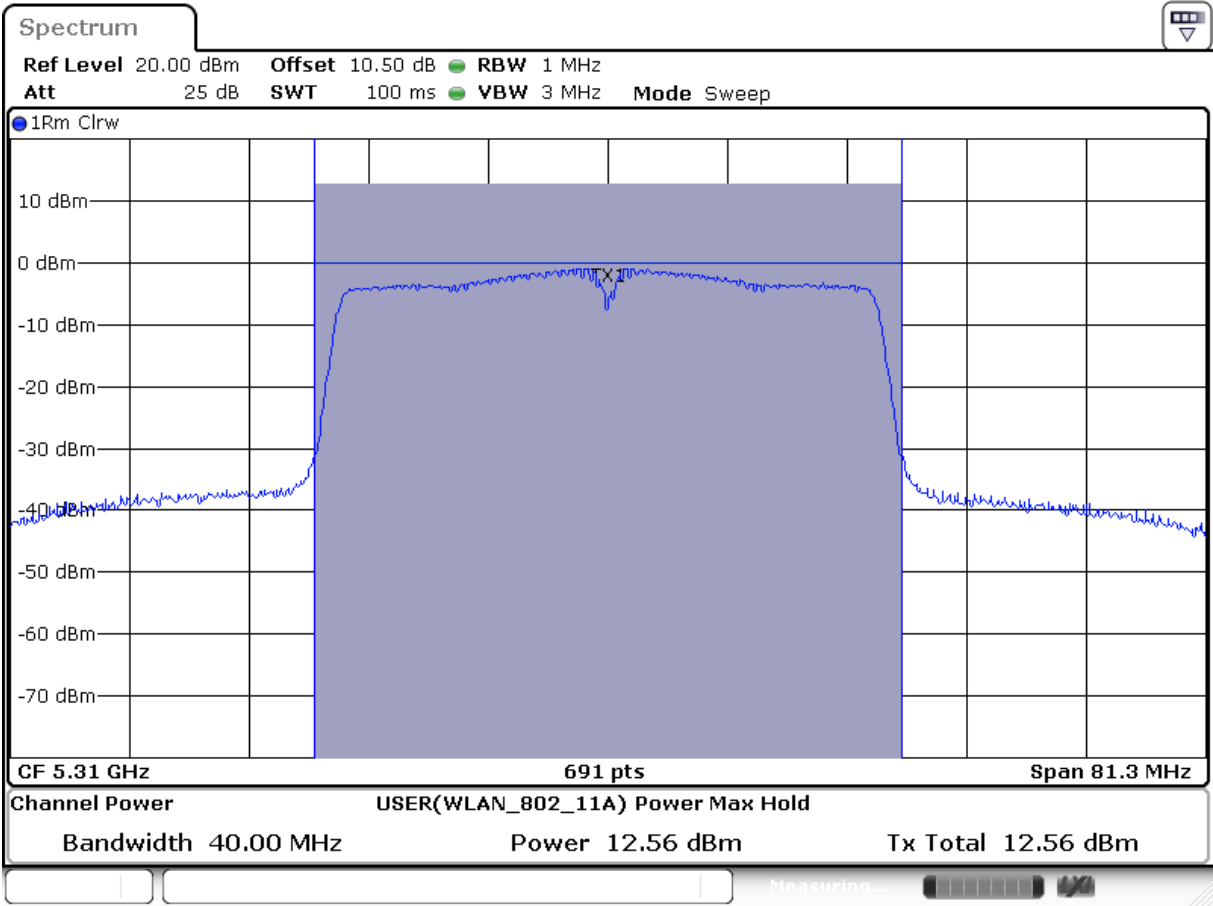
#8

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:

EUT:

Model:

Test Mode:

Note:

Communication Module

Type2AW

UNII

NCC_LP0002_802.11n40_Channel 62_Output power

RF Conducted

Sweep Time: 100ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

7.4.4 調變技術: IEEE 802.11ac (20MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixd limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	22.222	24.47	13.76	24	Page 50
M	24	22.304	24.48	13.76	24	Page 51
H	24	22.059	24.44	12.90	24	Page 52

註：1. 繪圖資料請參考第 50-52 頁。

2. 最大傳導輸出功率(Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Caculated Limit = 11dBm + 10 log (26dB BW)

5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm

6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm – (highest antenna gain – 6 dBi)

7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

File: 20-08-MAS-001_5-3ac20

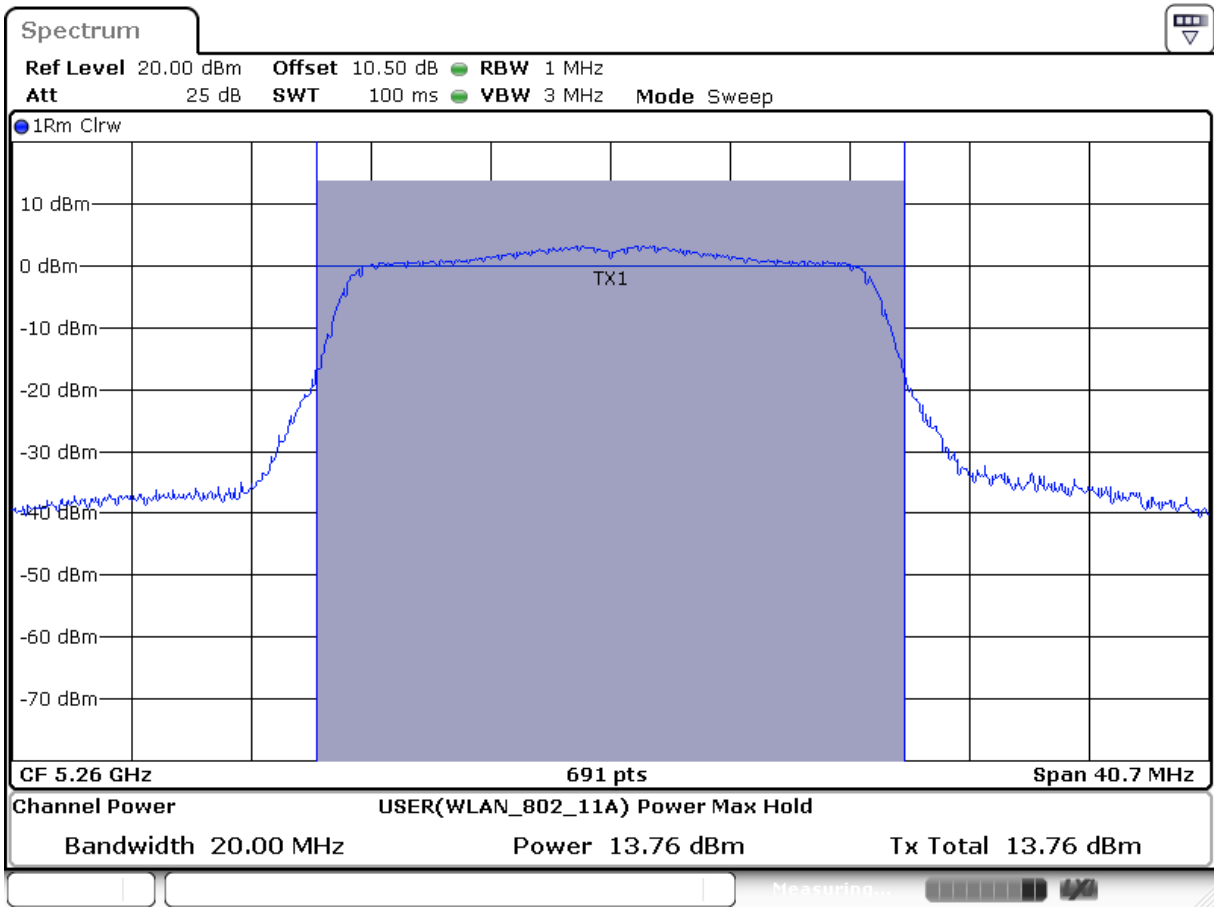
Site: RF-Cond01

Data\ #1

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac20_Channel 52_Output power	

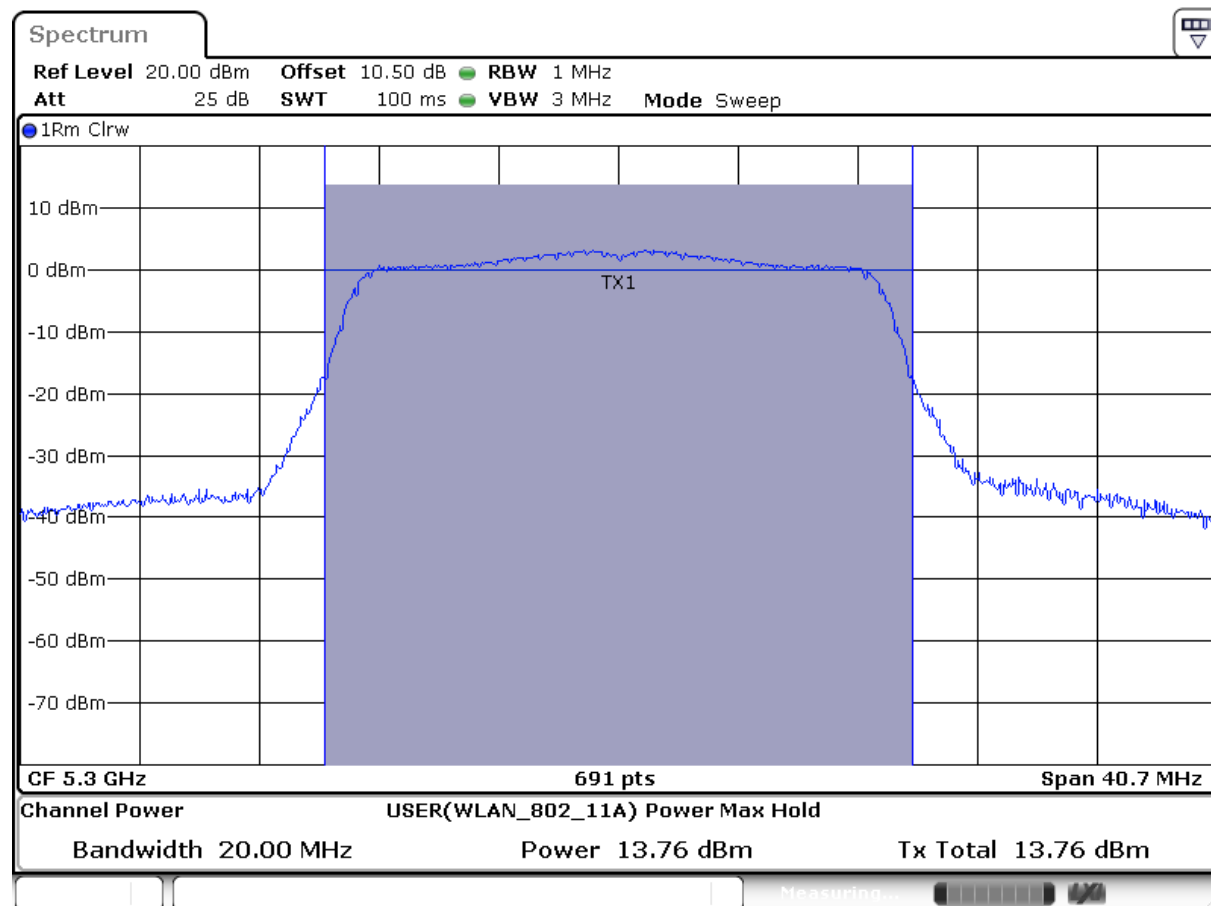
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

Data #8

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %

**Condition:**

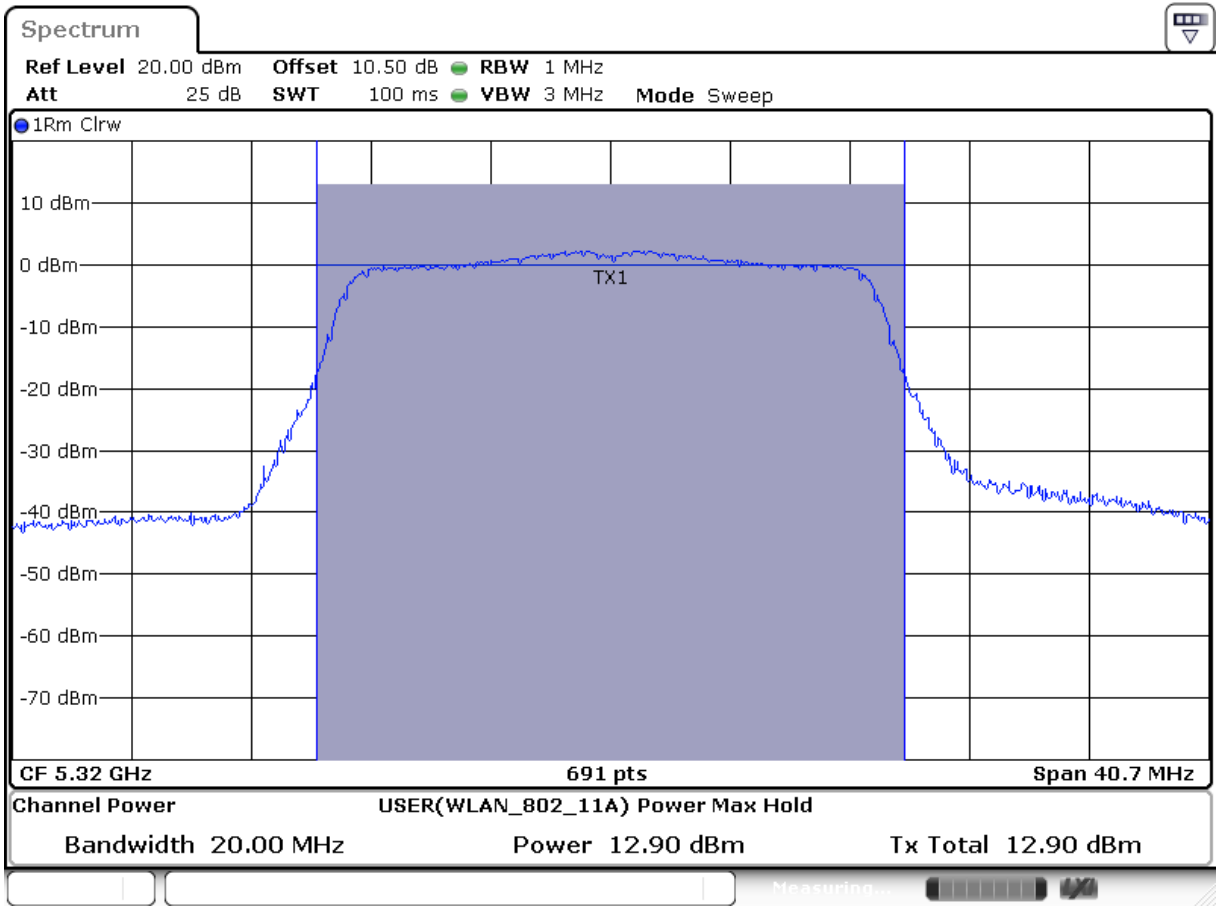
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20_Channel 60_Output power

RF Conducted

Sweep Time: 100ms Att.: 25dB
RBW: 1000 KHz VBW: 3000 KHz
Operator: Phillip

File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#14 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac20_Channel 64_Output power	

7.4.5 調變技術: IEEE 802.11ac (40MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixed limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	41.300	27.16	12.44	24	Page 54
H	24	40.325	27.06	12.57	24	Page 55

註：1. 繪圖資料請參考第 54-55 頁。

2. 最大傳導輸出功率(Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Calculated Limit = 11dBm + 10 log (26dB BW)

5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit and Calculated Limit) dBm

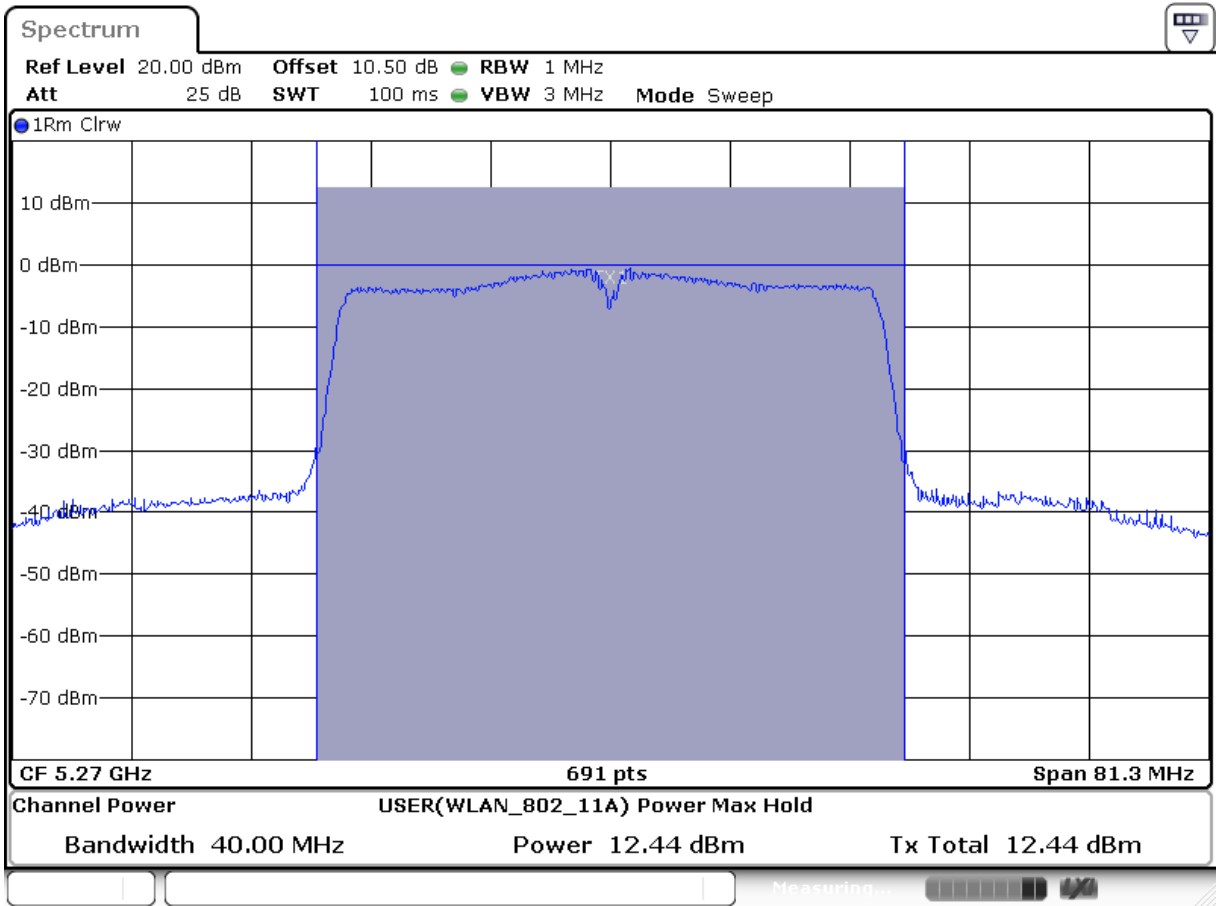
6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit and Calculated Limit)

dBm – (highest antenna gain – 6 dBi)

7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

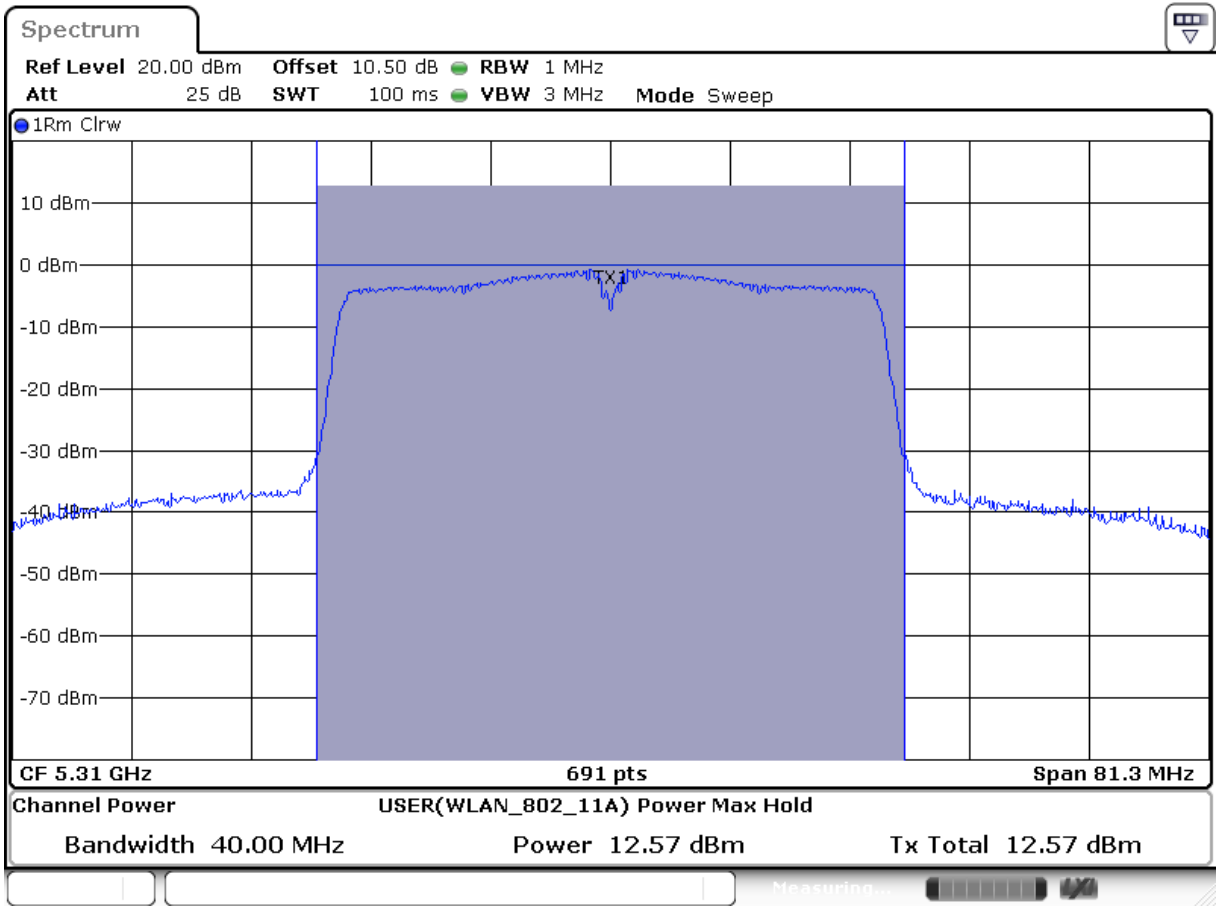
#1 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac40_Channel 54_Output power	

File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#8 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac40_Channel 62_Output power	

7.4.6 調變技術: IEEE 802.11ac (80MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Fixd limit (dBm)	26dB BW (MHz)	Limit (dBm)	Output Power (dBm)	NCC Limit (dBm)	Chart
L	24	82.152	30.15	9.30	24	Page 57

註：1. 繪圖資料請參考第 57 頁。

2. 最大傳導輸出功率(Maximum Output Power) 為經儀器校正補償過後的結果值。

3. Fixed Limit = 250mW=24dBm

4. Caculated Limit = 11dBm + 10 log (26dB BW)

5. If antenna gain $\leq$ 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm

6. If antenna gain > 6dBi, NCC Limit = (Minimum of Fixed Limit nd Caculated Limit) dBm – (highest antenna gain – 6 dBi)

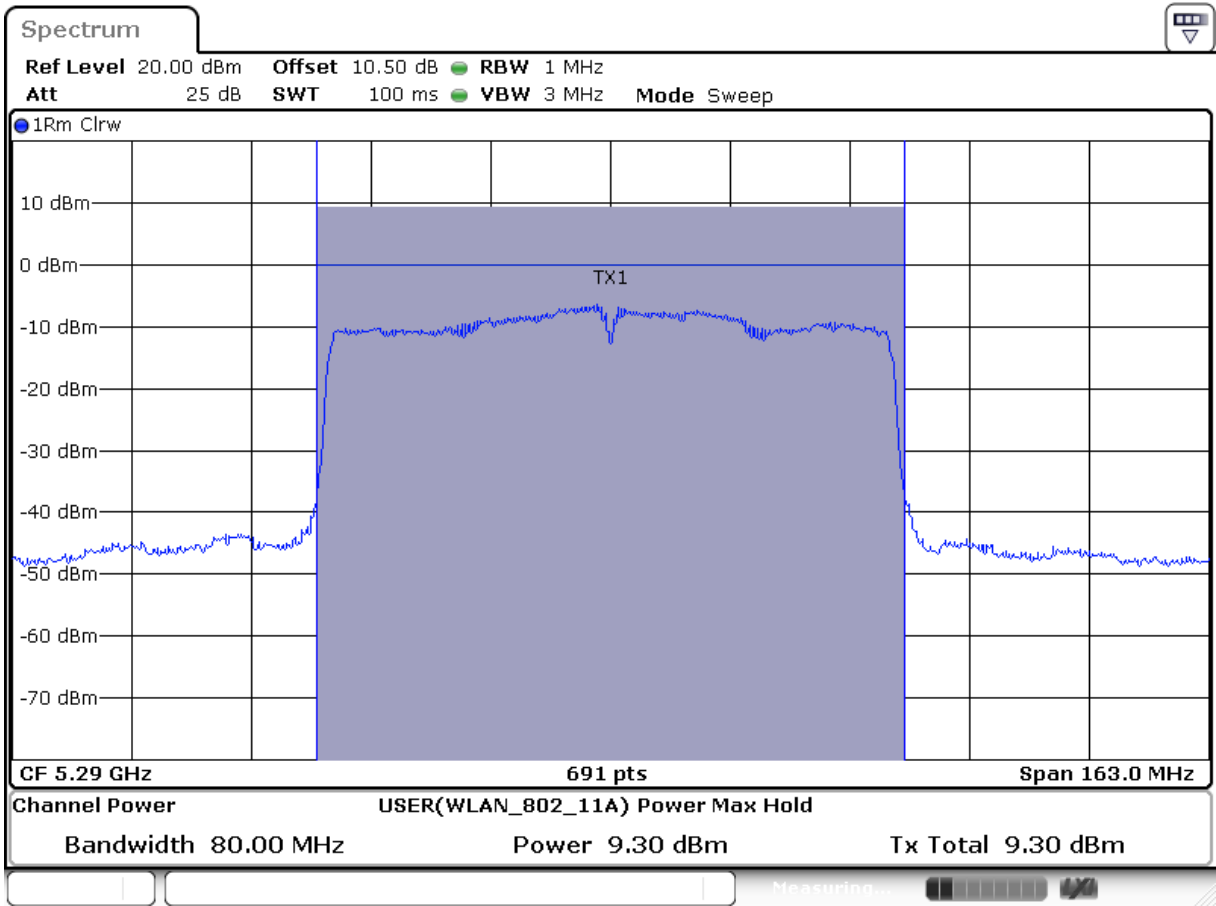
7. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

7.5 結果判定

高、中、低頻段的最大傳導輸出功率皆低於限制值。

File: 20-08-MAS-001_5-3ac80
Site: RF-Cond01

#1 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:		RF Conducted
EUT:	Communication Module	Sweep Time: 100ms Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz VBW: 3000 KHz
Test Mode:	UNII	Operator: Phillip
Note:	NCC_LP0002_802.11ac40_Channel 58_Output power	

8 功率密度之量測

8.1 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.3.2節之規定:

5.7.3.2 (2)最大功率頻譜密度在任何1 MHz 頻帶中應小於或等於11 dBm。

5.7.3.2 (3)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。

8.2 量測功率密度之配置

如圖 1 所示。

8.3 量測功率密度之儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	R&S	FSV
Attenuator	WEINSCHEL	56-10

測試軟體: LZ-RF (Ver. ETC-3A2)

8.4 量測結果

測試工程師: 羅世勇

8.4.1 調變技術: IEEE 802.11a

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi, NCC Limit 如下表所示:

Channel	Power Spectral Density (dBm)	NCC Limit (dBm)	Chart
L	8.36	11	Page 60
M	8.48	11	Page 61
H	7.94	11	Page 62

註: 1. 繪圖資料請參考第 60-62 頁。

2. 功率頻譜密度 (Power Spectral Density) 為經儀器校正補償過後的結果值。

3. If antenna gain $\leq$ 6dBi, NCC Limit = 11dBm

4. If antenna gain > 6dBi, NCC Limit = 11dBm – (highest antenna gain – 6 dBi)

5. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

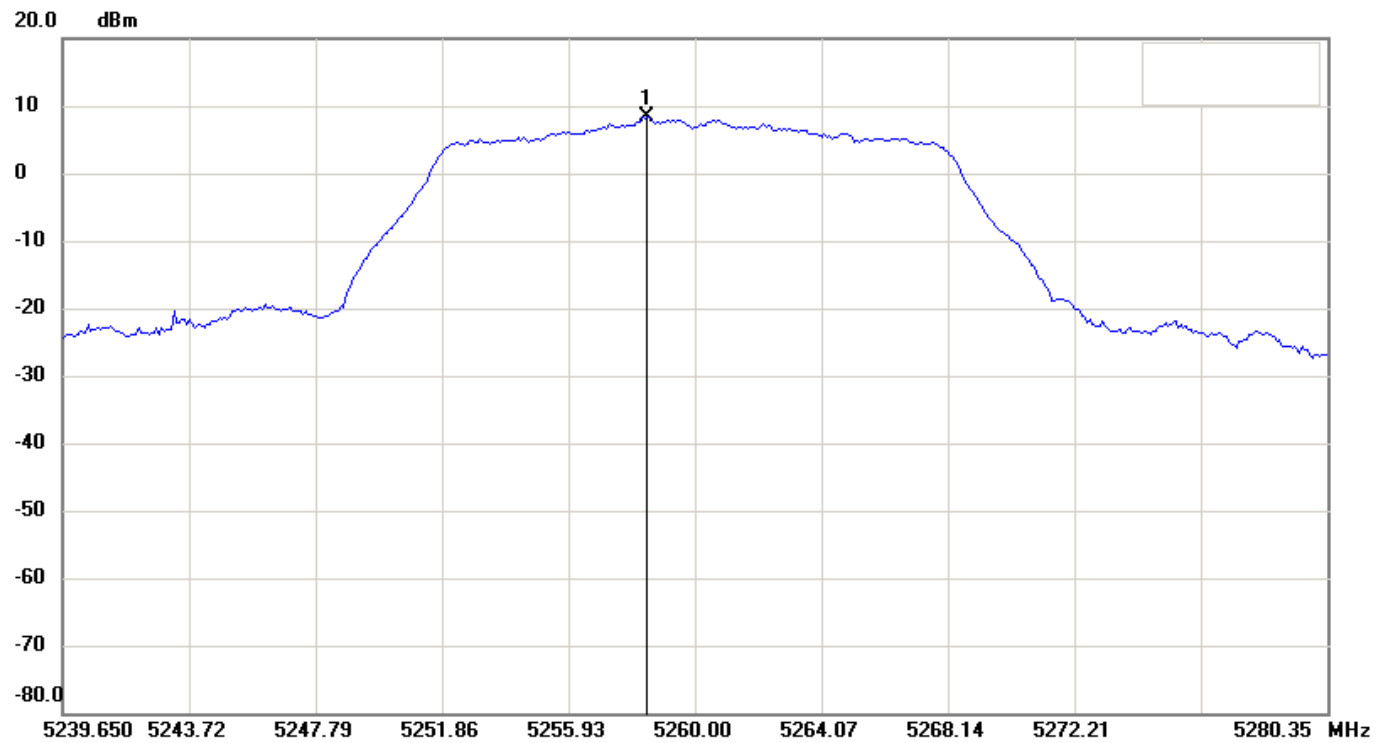
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

Data #4

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %

**Condition:**

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a_Channel 52_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5258.45340	8.36

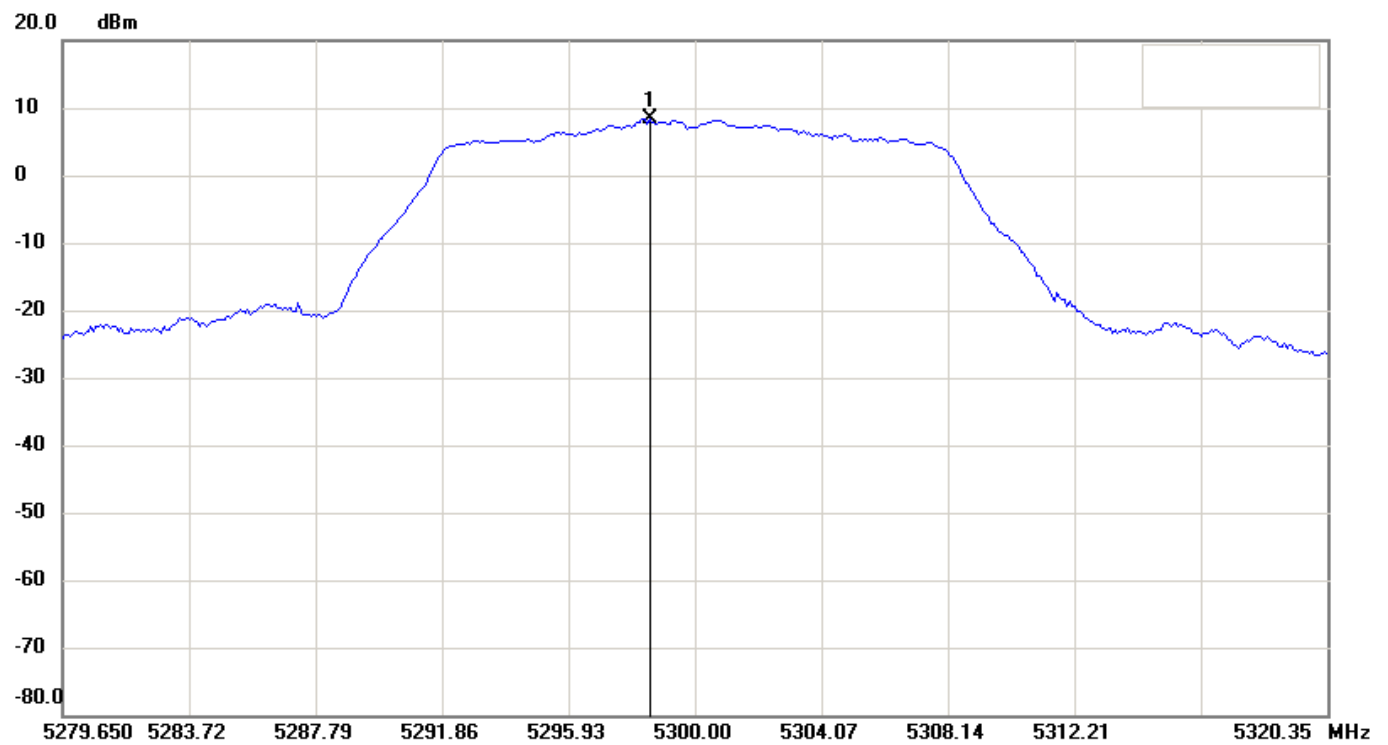
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

Data #11

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a_Channel 60_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5298.53480	8.48

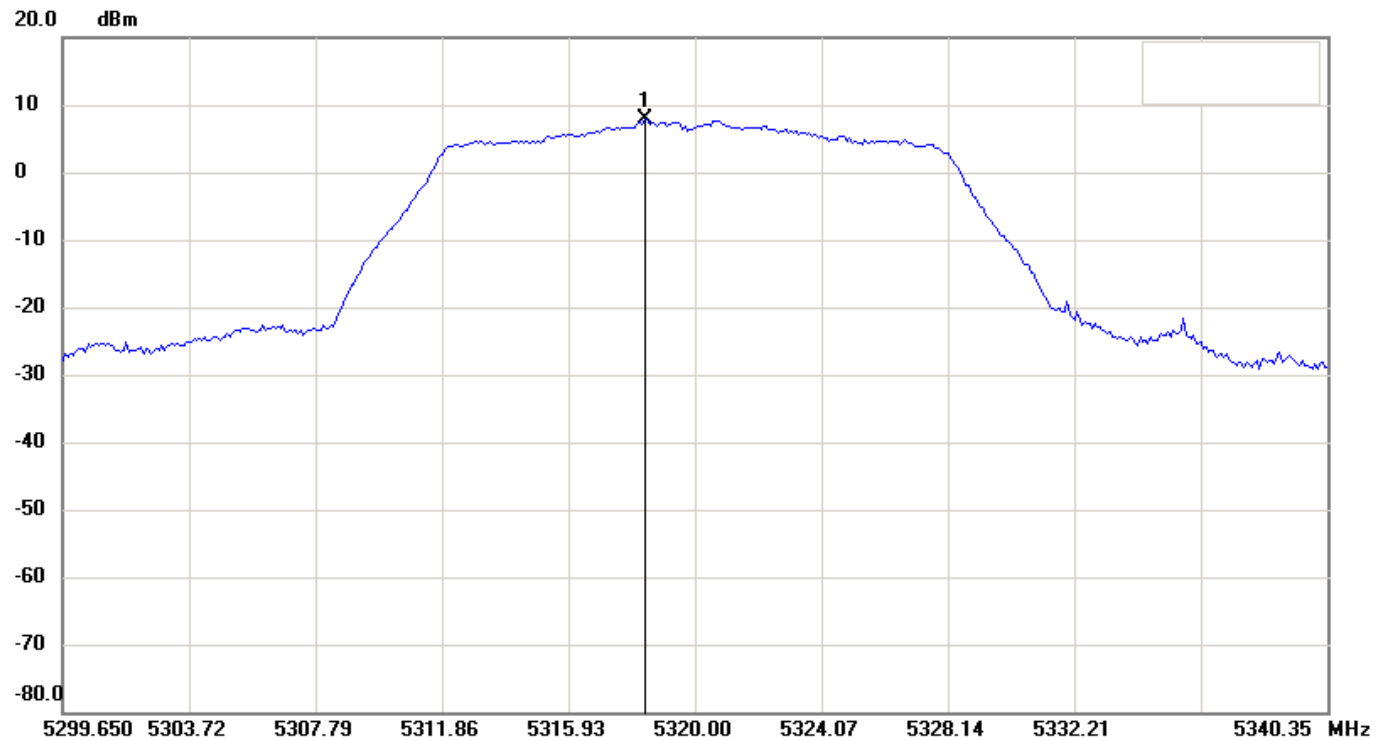
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#17

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a_Channel 64_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5318.37200	7.94

8.4.2 調變技術: IEEE 802.11ac (20MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Power Spectral Density (dBm)	NCC Limit (dBm)	Chart
L	7.79	11	Page 64
M	7.82	11	Page 65
H	6.83	11	Page 66

註：1. 繪圖資料請參考第 64-66 頁。

2. 功率頻譜密度 (Power Spectral Density) 為經儀器校正補償過後的結果值。

3. If antenna gain $\leq$ 6dBi, NCC Limit = 11 dBm

4. If antenna gain > 6dBi, NCC Limit = 11 dBm – (highest antenna gain – 6 dBi)

5. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

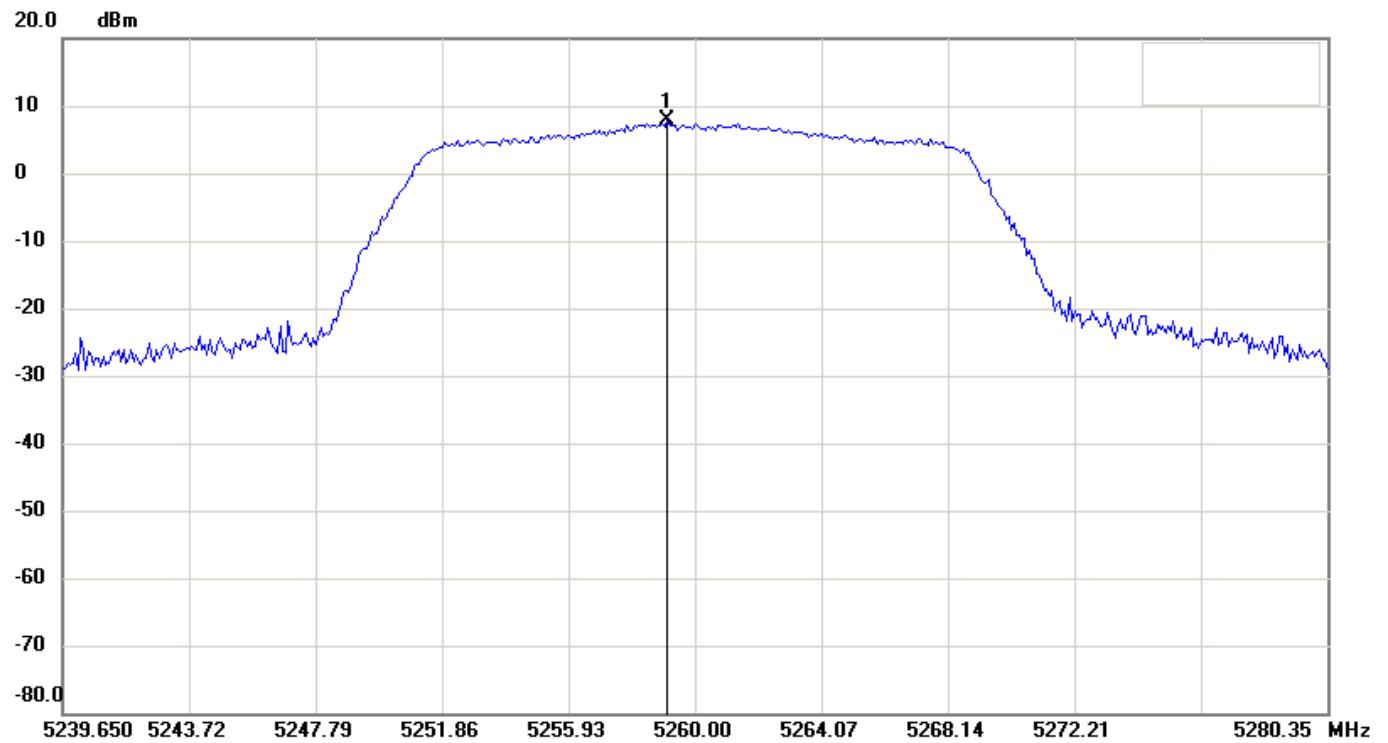
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

Data #4

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20_Channel 52_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB
RBW: 1000 KHz VBW: 3000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5259.10460	7.79

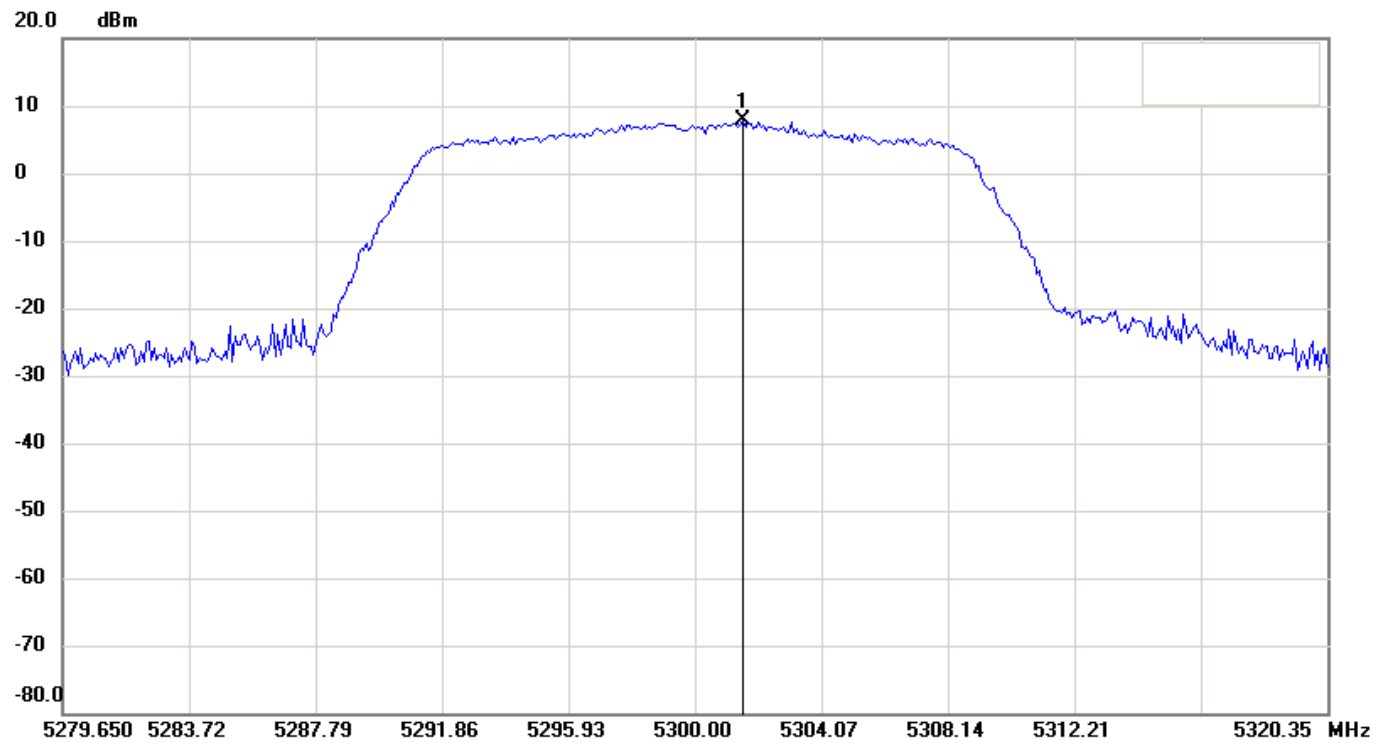
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

Data #11

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20_Channel 60_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB
RBW: 1000 KHz VBW: 3000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5301.54660	7.82

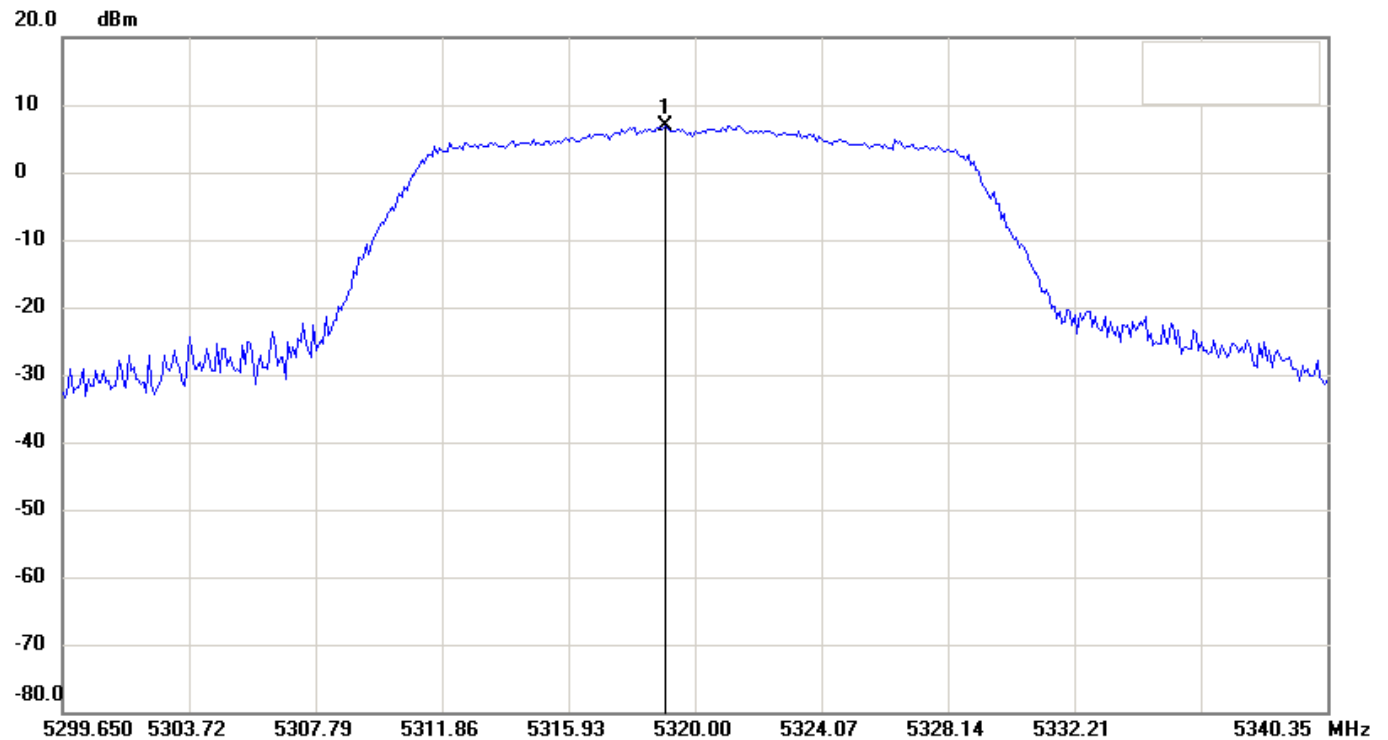
File: 20-08-MAS-001_5-3ac20
 Site: RF-Cond01

#17

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20_Channel 64_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5319.02320	6.83

8.4.3 調變技術: IEEE 802.11ac (40MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Power Spectral Density (dBm)	NCC Limit (dBm)	Chart
L	3.47	11	Page 68
H	3.63	11	Page 69

註：1. 繪圖資料請參考第 68-69 頁。

2. 功率頻譜密度 (Power Spectral Density) 為經儀器校正補償過後的結果值。

3. If antenna gain $\leq$ 6dBi, NCC Limit = 11 dBm

4. If antenna gain > 6dBi, NCC Limit = 11 dBm – (highest antenna gain – 6 dBi)

5. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

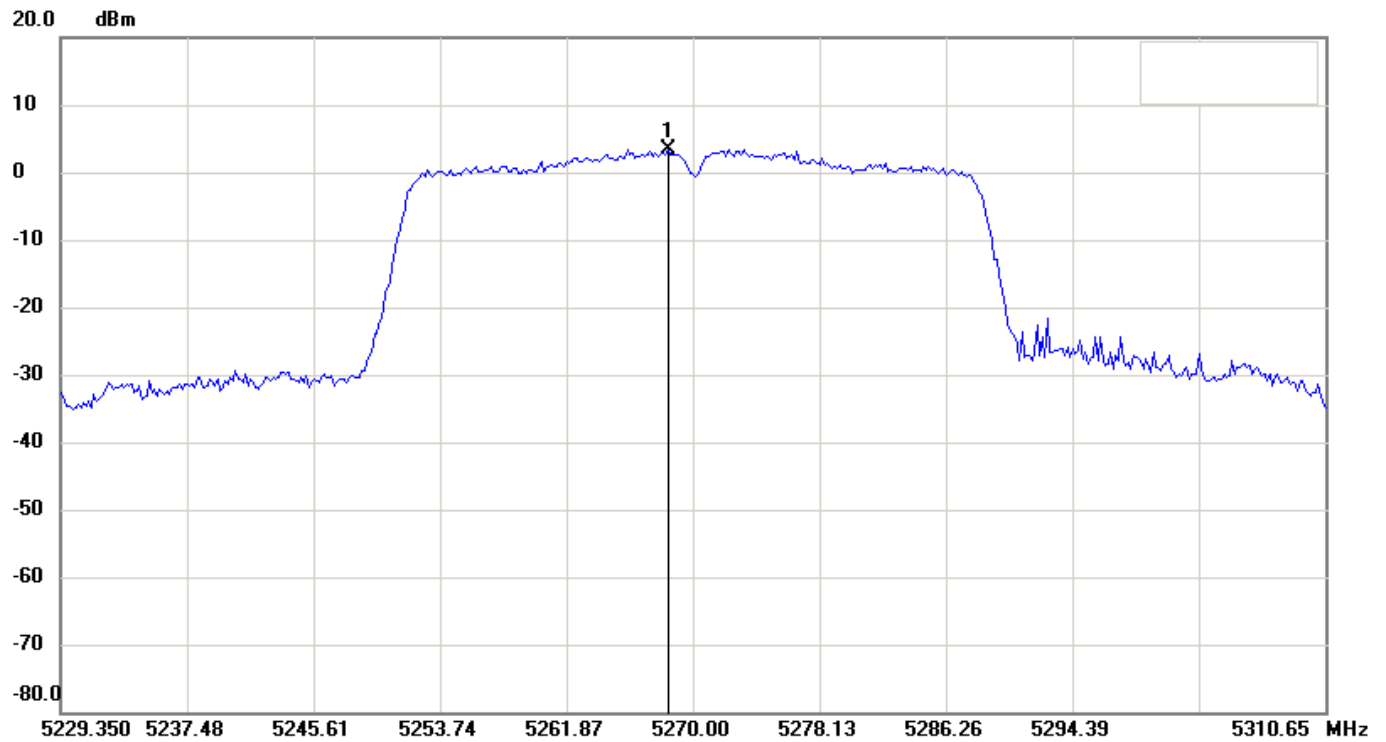
File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#4

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %

**Condition:**

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac40_Channel 54_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5268.37400	3.47

File: 20-08-MAS-001_5-3ac40

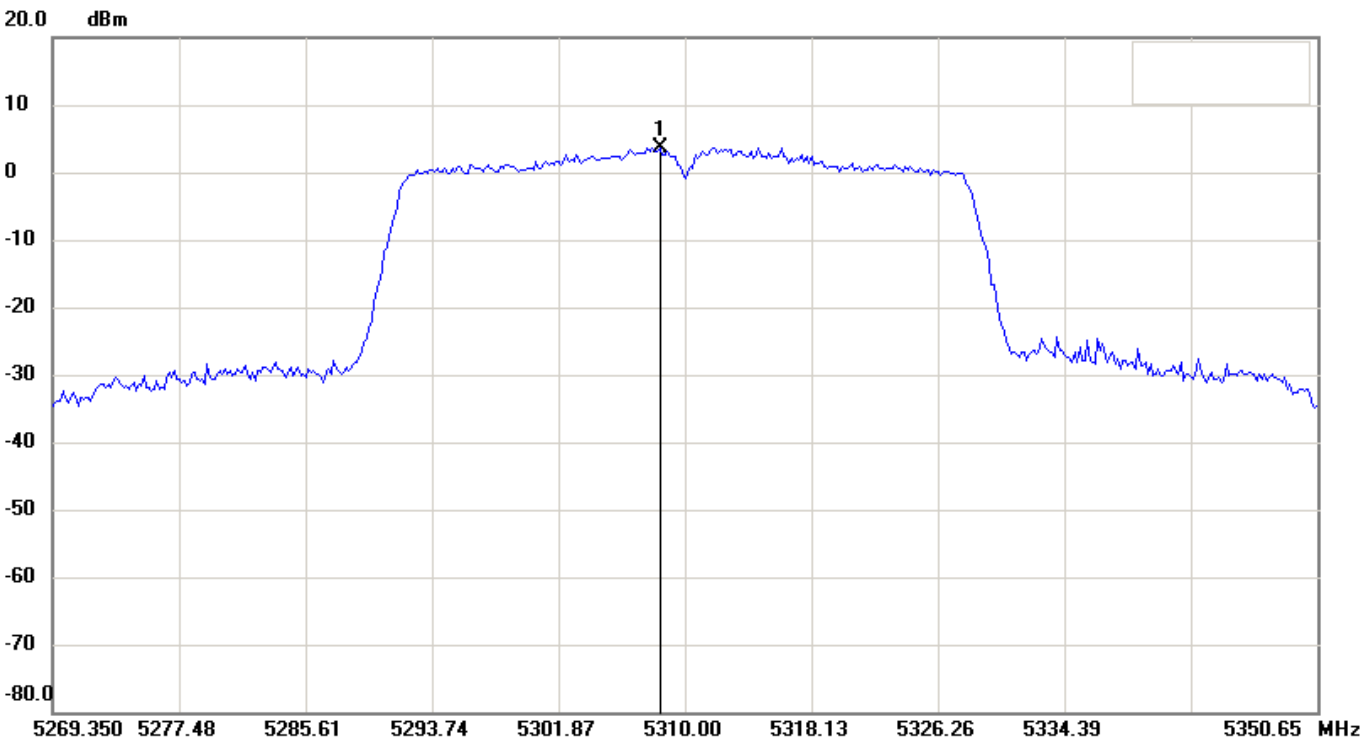
#11

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition:

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac40_Channel 62_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5308.37400	3.63

8.4.4 調變技術: IEEE 802.11ac (80MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

天線增益最大值為-0.4 dBi，NCC Limit 如下表所示：

Channel	Power Spectral Density (dBm)	NCC Limit (dBm)	Chart
L	-2.08	11	Page 71

註：1. 繪圖資料請參考第 71 頁。

2. 功率頻譜密度 (Power Spectral Density) 為經儀器校正補償過後的結果值。

3. If antenna gain $\leq$ 6dBi, NCC Limit = 11dBm

4. If antenna gain > 6dBi, NCC Limit = 11 dBm – (highest antenna gain – 6 dBi)

5. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

8.5 結果判定

高、中、低頻段的功率頻譜密度皆低於限值，合乎標準規定。

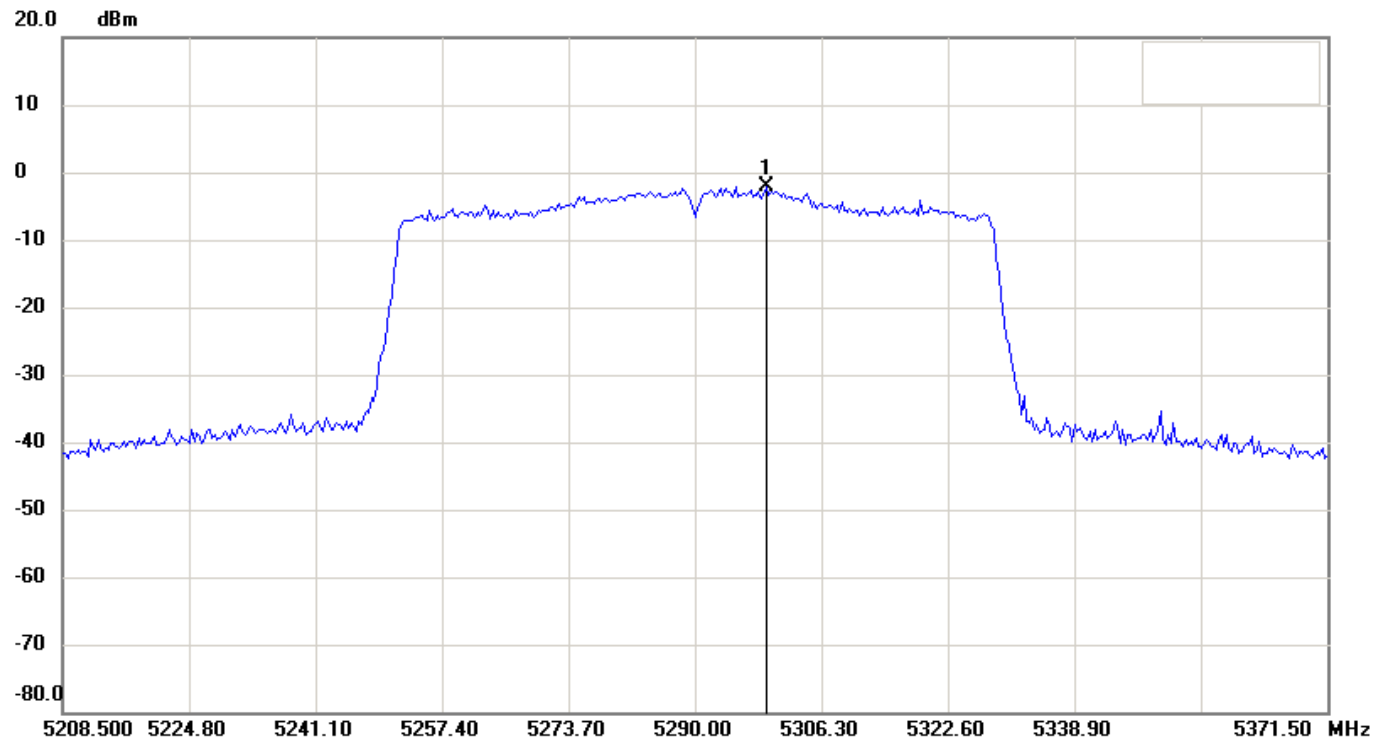
File: 20-08-MAS-001_5-3ac80
 Site: RF-Cond01

#4

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition:

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac80_Channel 58_Power Density

RF Conducted

Sweep Time: 1ms Att.: 25dB

RBW: 1000 KHz VBW: 3000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5299.12800	-2.08

9 混附波發射限制之量測

9.1 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.1之規定，在 5.15 GHz～5.35 GHz 及 5.470 GHz～5.725 GHz 頻帶操作的發射器：帶外發射之有效等向輻射功率(EIRP) ≤ -27 dBm/MHz。

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.3之規定，測量不必要發射時，應使用之最低解析頻寬為 1 MHz。必要時，於頻帶邊緣附近可使用小於 1 MHz 之解析頻寬，並以補償方式計算其總值。

9.2 混附波發射限制之測試配置

如圖1 所示。

9.3 量測混附波發射限制之儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	R&S	FSV
Attenuator	WEINSCHEL	56-10

測試軟體: LZ-RF (Ver. ETC-3A2)

9.4 混附波發射限制之量測結果 (傳導方式量測)

Single Conducted Limit:

Eirp Limit – Aantenna Directional Gain – $10 \log[\text{number of Tx output(s)}]$

測試工程師: 羅世勇

9.4.1 調變技術: IEEE 802.11a

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

註：1. 繪圖資料請參考第 73-78 頁。

2. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 40\text{GHz}$)

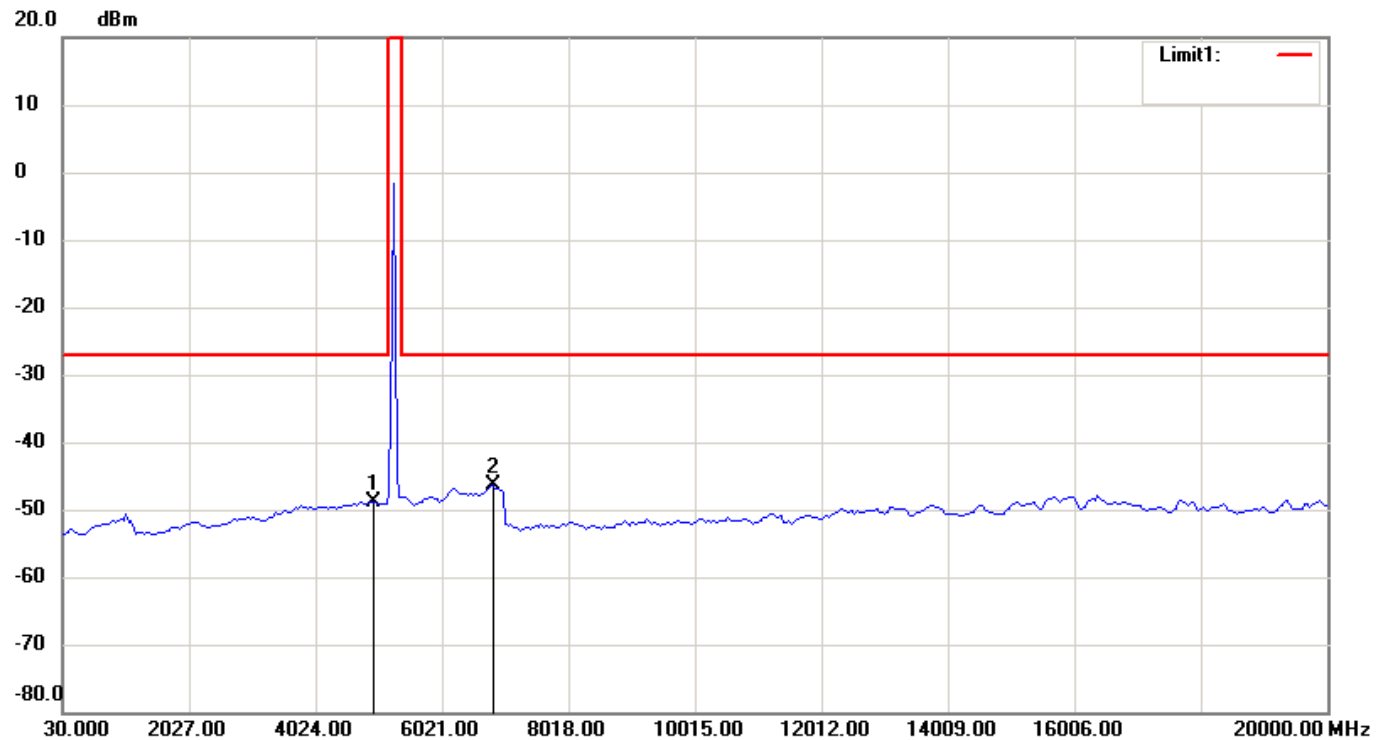
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#5

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a_Channel 52_Spurious-1

RF Conducted

Sweep Time: 79.9ms Att.: 25dB

RBW: 1000 KHz

VBW: 1000 KHz

Operator:

Phillip

No.	Frequency(MHz)	Level(dBm)
1	4942.62000	-48.91
2	6819.80000	-46.42

File: 20-08-MAS-001_5-3a

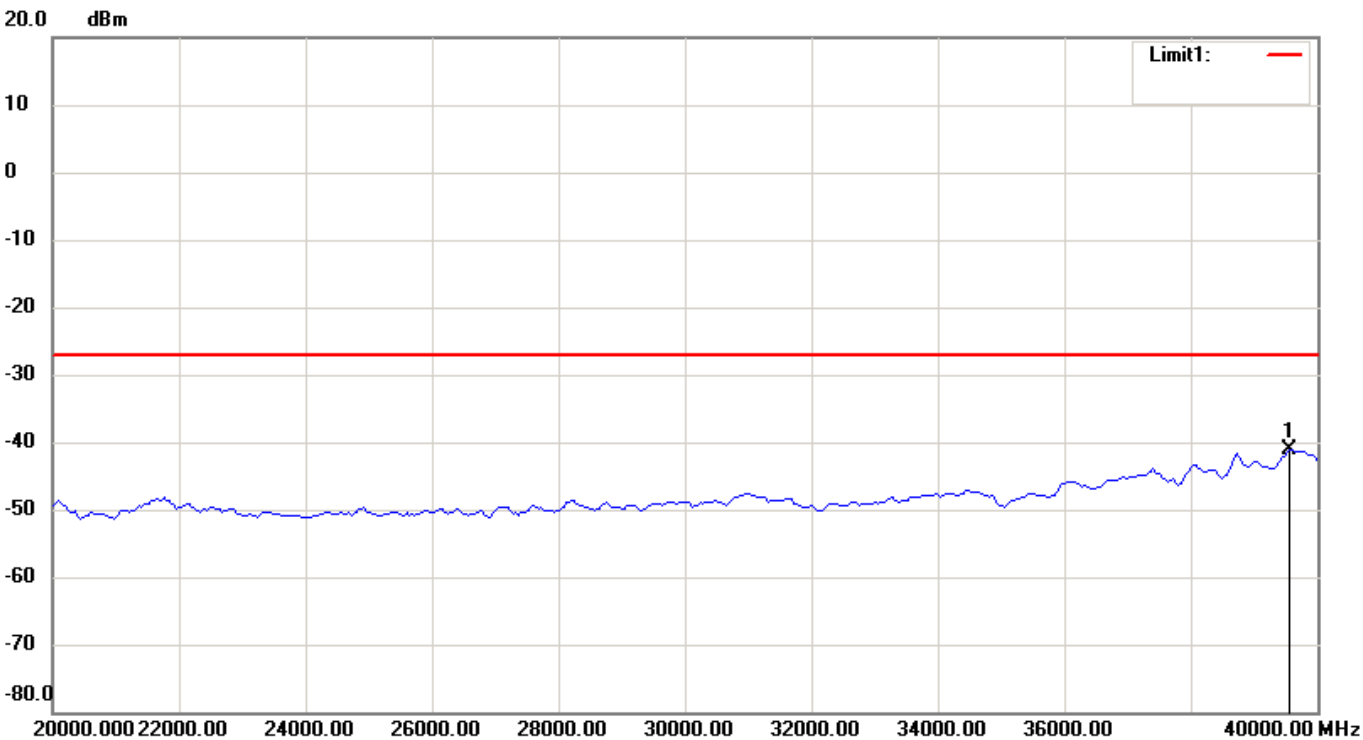
#6

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 80ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 1000 KHz

Test Mode: UNII

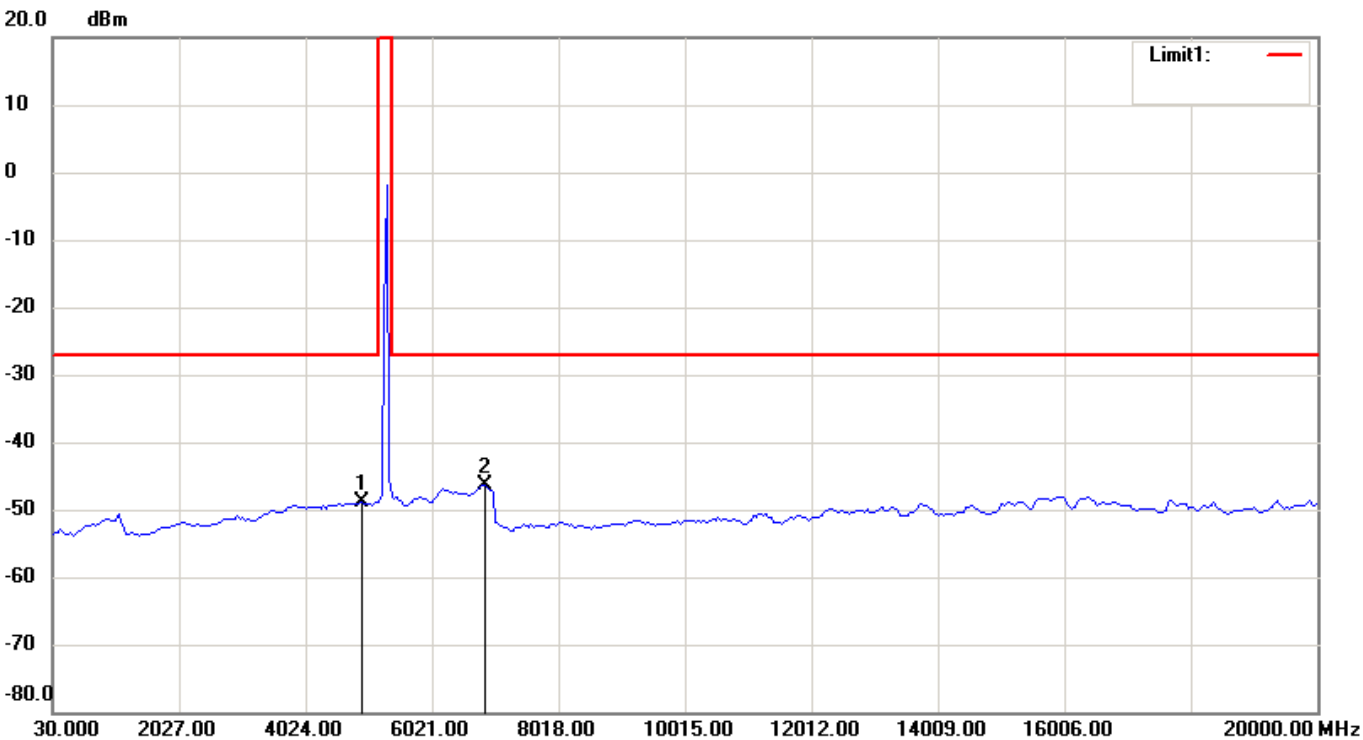
Operator: Phillip

Note: NCC_LP0002_802.11a_Channel 52_Spurious-2

No.	Frequency(MHz)	Level(dBm)
1	39560.00000	-41.02

File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#12 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 79.9ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 1000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11a_Channel 60_Spurious-1		

No.	Frequency(MHz)	Level(dBm)
1	4902.68000	-48.86
2	6859.74000	-46.34

File: 20-08-MAS-001_5-3a

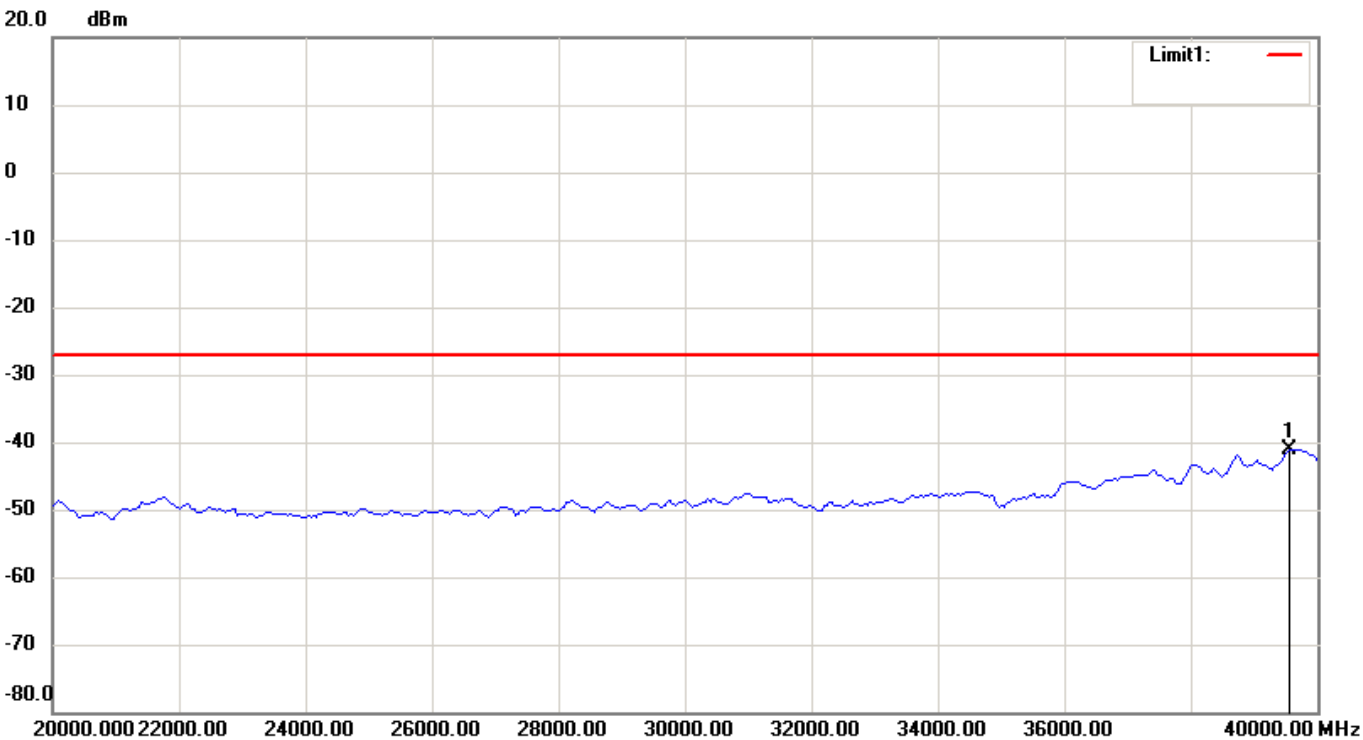
#13

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 80ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 1000 KHz

Test Mode: UNII

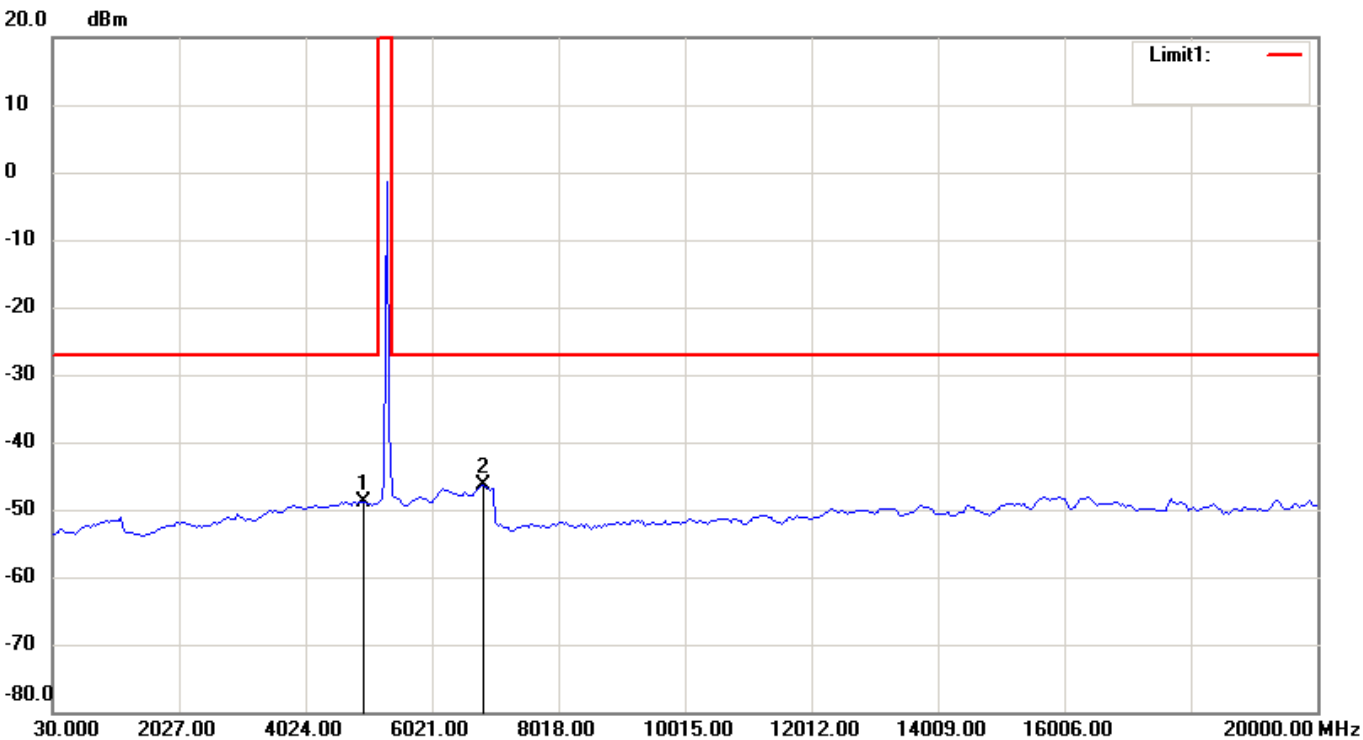
Operator: Phillip

Note: NCC_LP0002_802.11a_Channel 60_Spurious-2

No.	Frequency(MHz)	Level(dBm)
1	39560.00000	-41.10

File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#18 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 79.9ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 1000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11a_Channel 64_Spurious-1		

No.	Frequency(MHz)	Level(dBm)
1	4942.62000	-48.79
2	6819.80000	-46.47

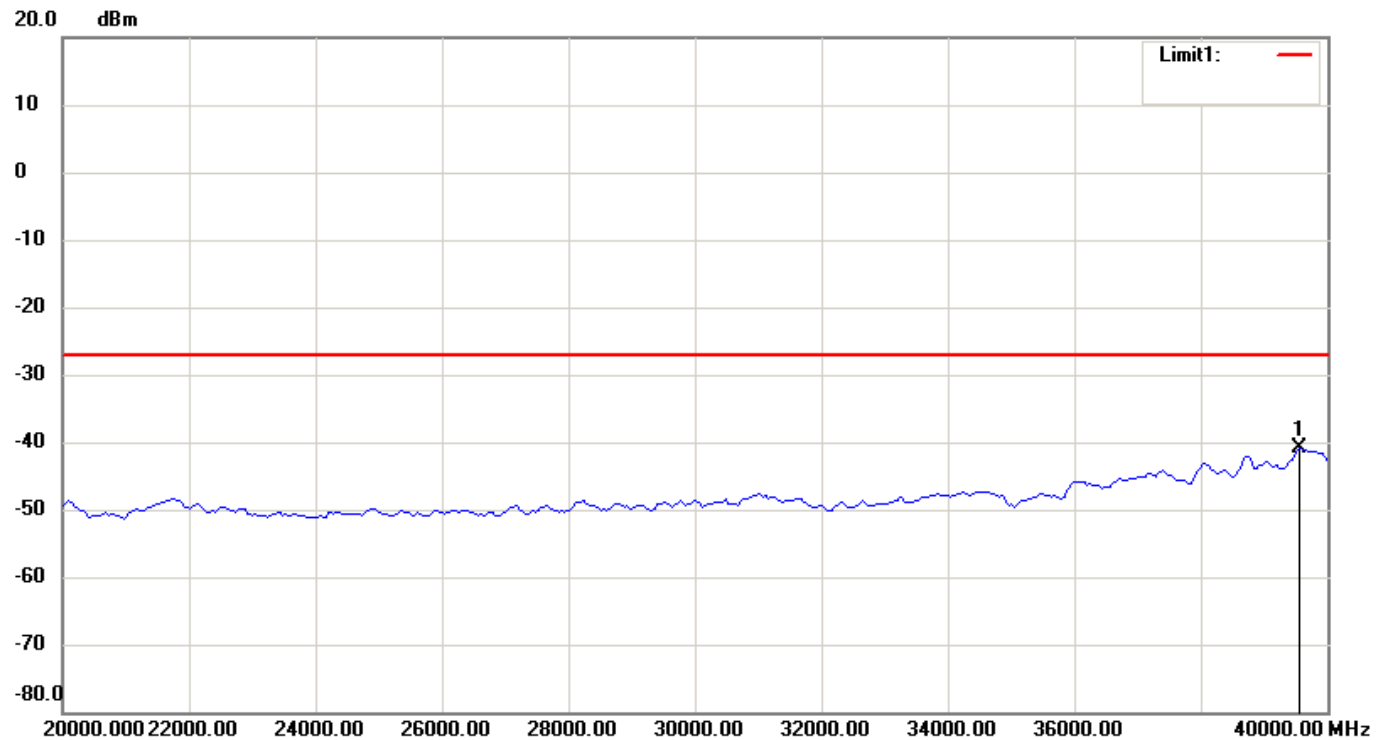
File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#19

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11a_Channel 64_Spurious-2

RF Conducted

Sweep Time: 80ms Att.: 25dB

RBW: 1000 KHz VBW: 1000 KHz

Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	39560.00000	-40.95

9.4.2 調變技術: IEEE 802.11ac (20MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

註：1. 繪圖資料請參考第 80-85 頁。

2. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 40\text{GHz}$)

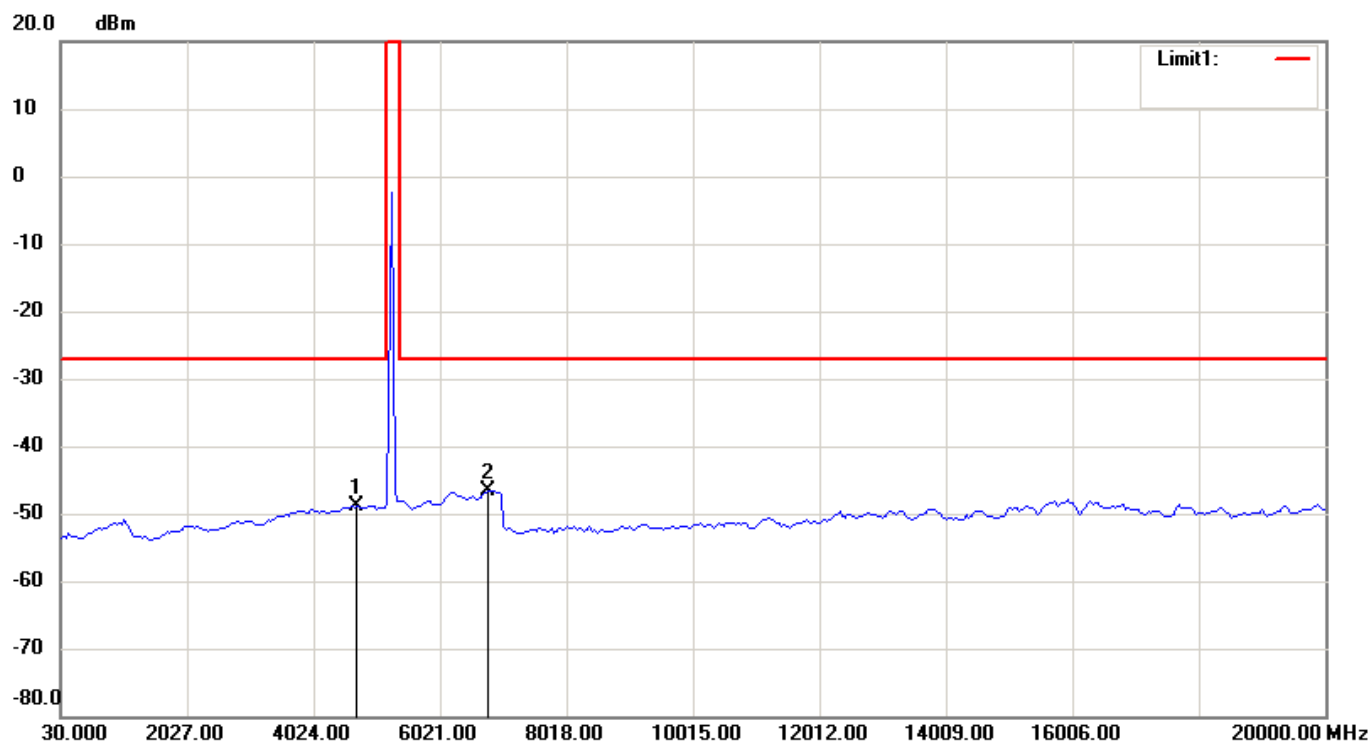
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#5

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20_Channel 52_Spurious-1

RF Conducted
Sweep Time: 79.9ms Att.: 25dB
RBW: 1000 KHz VBW: 1000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	4702.98000	-48.85
2	6779.86000	-46.64

File: 20-08-MAS-001_5-3ac20

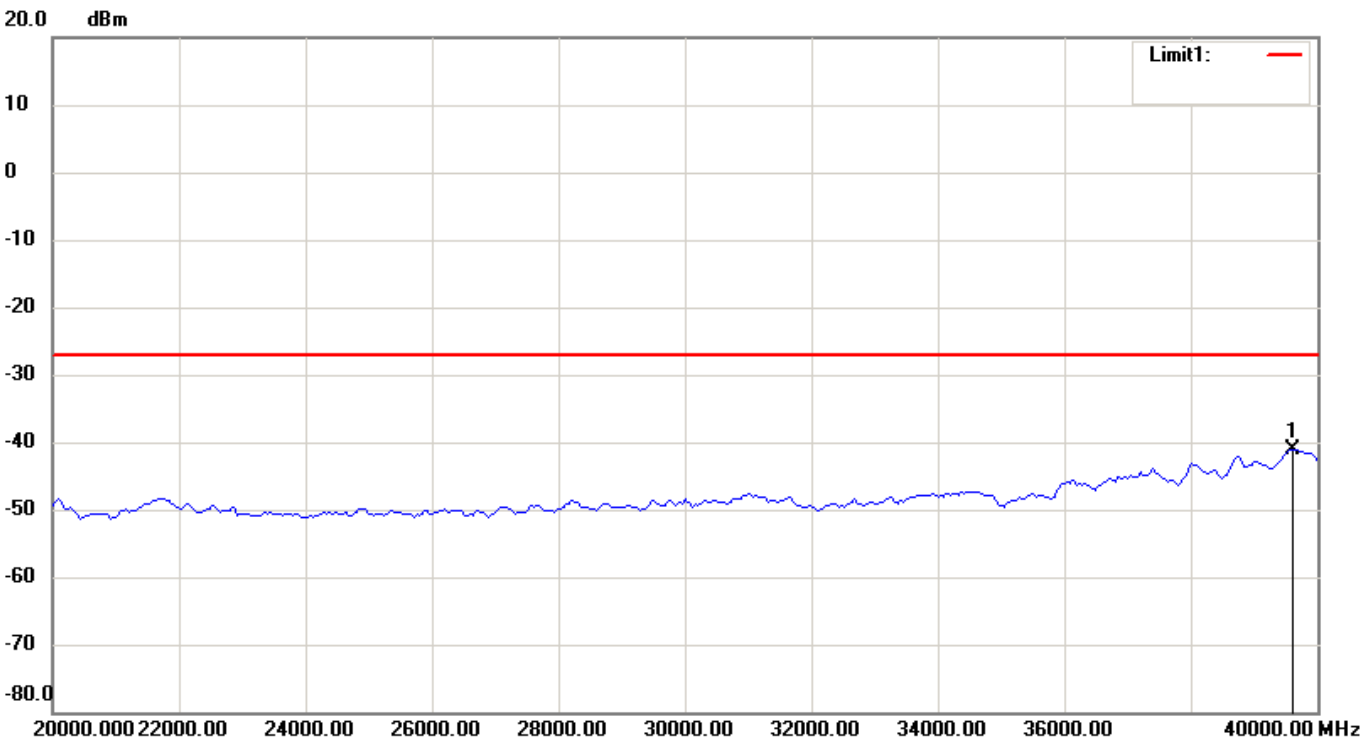
#6

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 80ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 1000 KHz

Test Mode: UNII

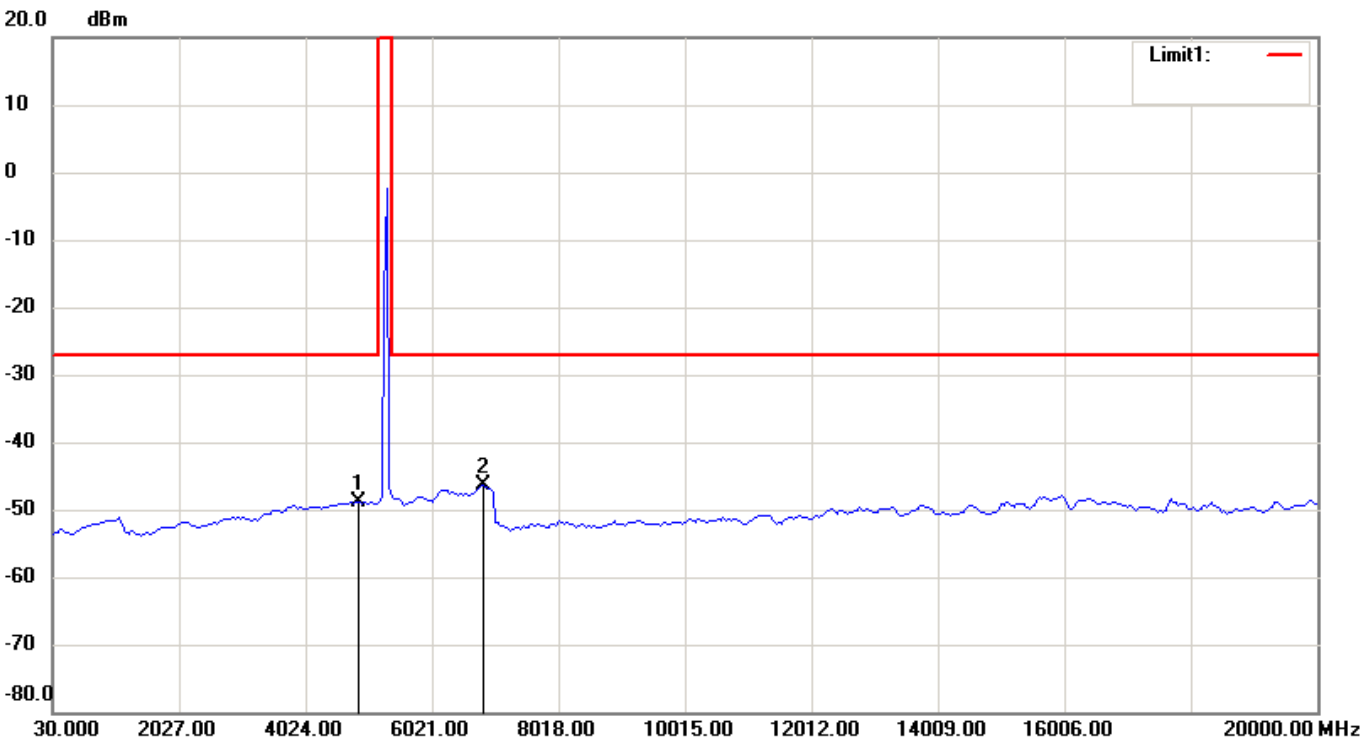
Operator: Phillip

Note: NCC_LP0002_802.11ac20_Channel 52_Spurious-2

No.	Frequency(MHz)	Level(dBm)
1	39600.00000	-41.13

File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#12 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 79.9ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 1000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac20_Channel 60_Spurious-1		

No.	Frequency(MHz)	Level(dBm)
1	4862.74000	-48.76
2	6819.80000	-46.34

File: 20-08-MAS-001_5-3ac20

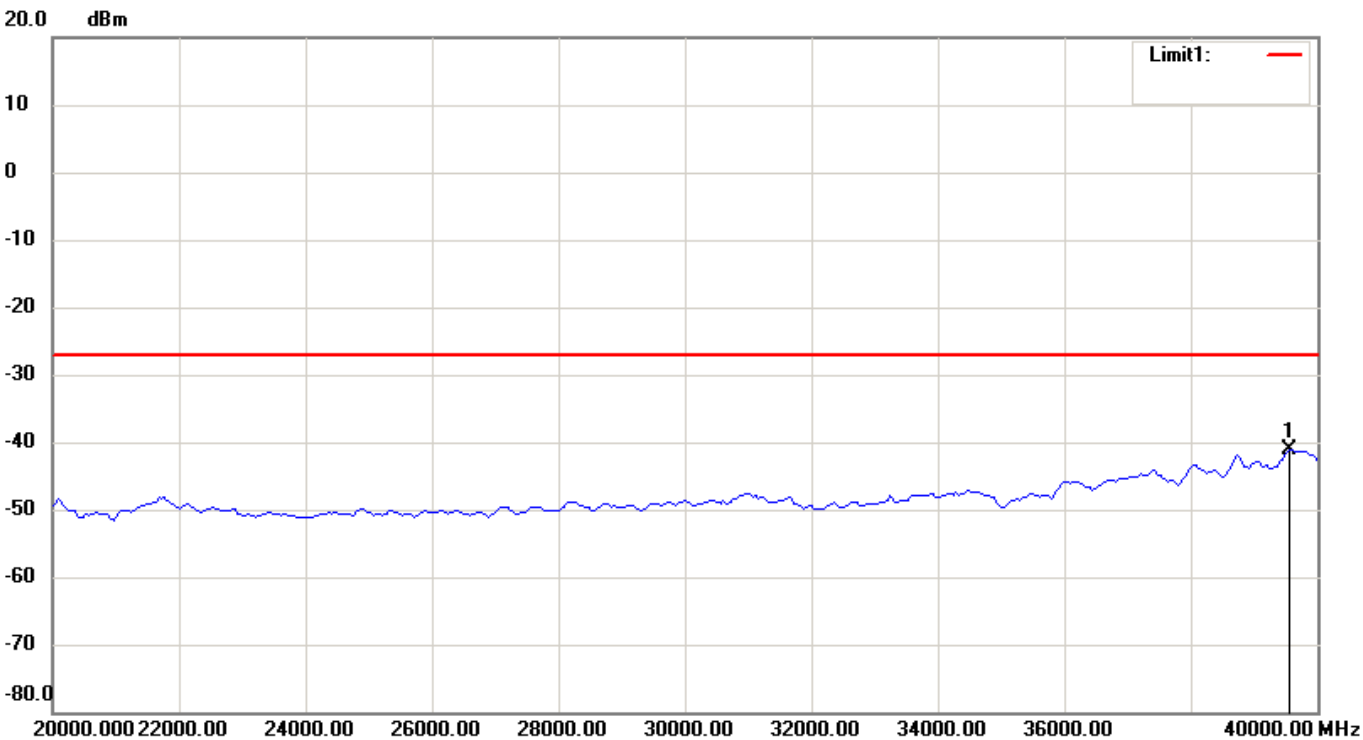
#13

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20_Channel 60_Spurious-2

RF Conducted

Sweep Time: 80ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 1000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	39560.00000	-41.01

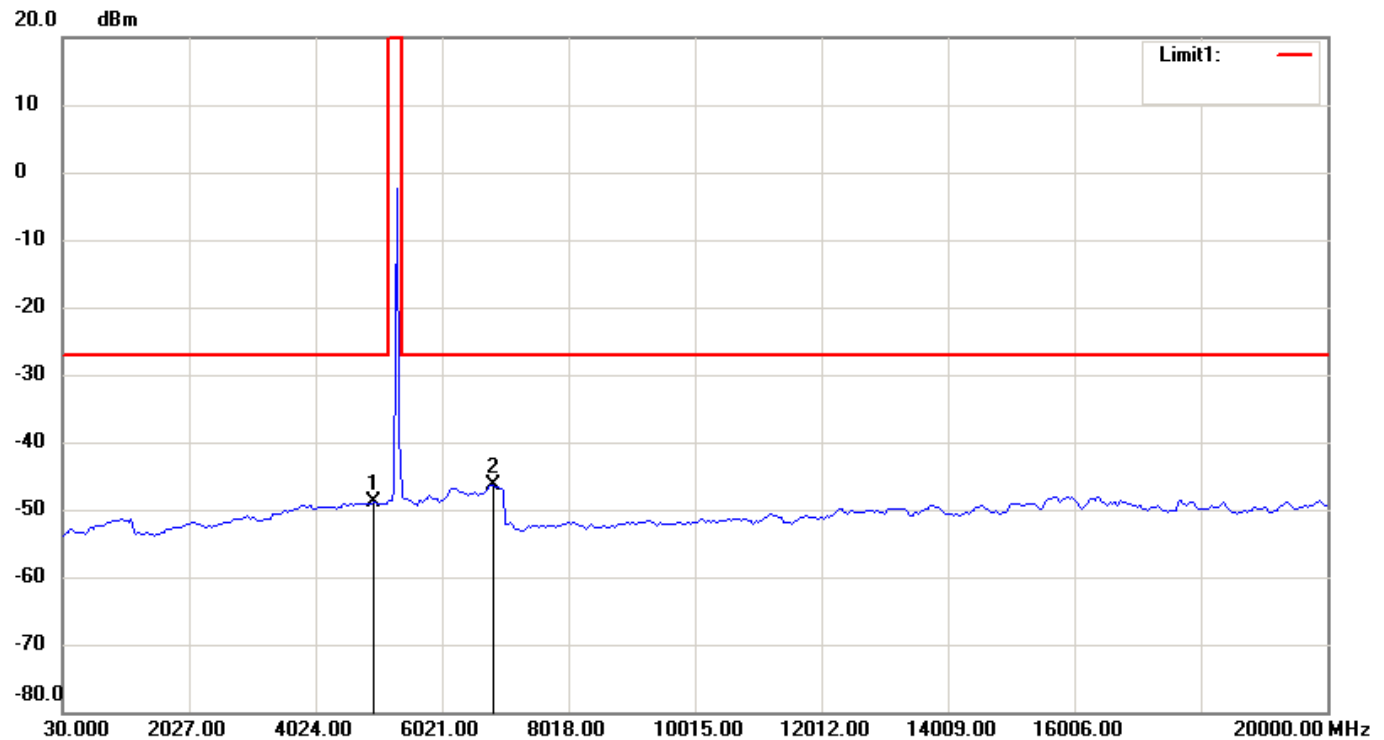
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#18

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20_Channel 64_Spurious-1

RF Conducted
Sweep Time: 79.9ms Att.: 25dB
RBW: 1000 KHz VBW: 1000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	4942.62000	-48.89
2	6819.80000	-46.34

File: 20-08-MAS-001_5-3ac20

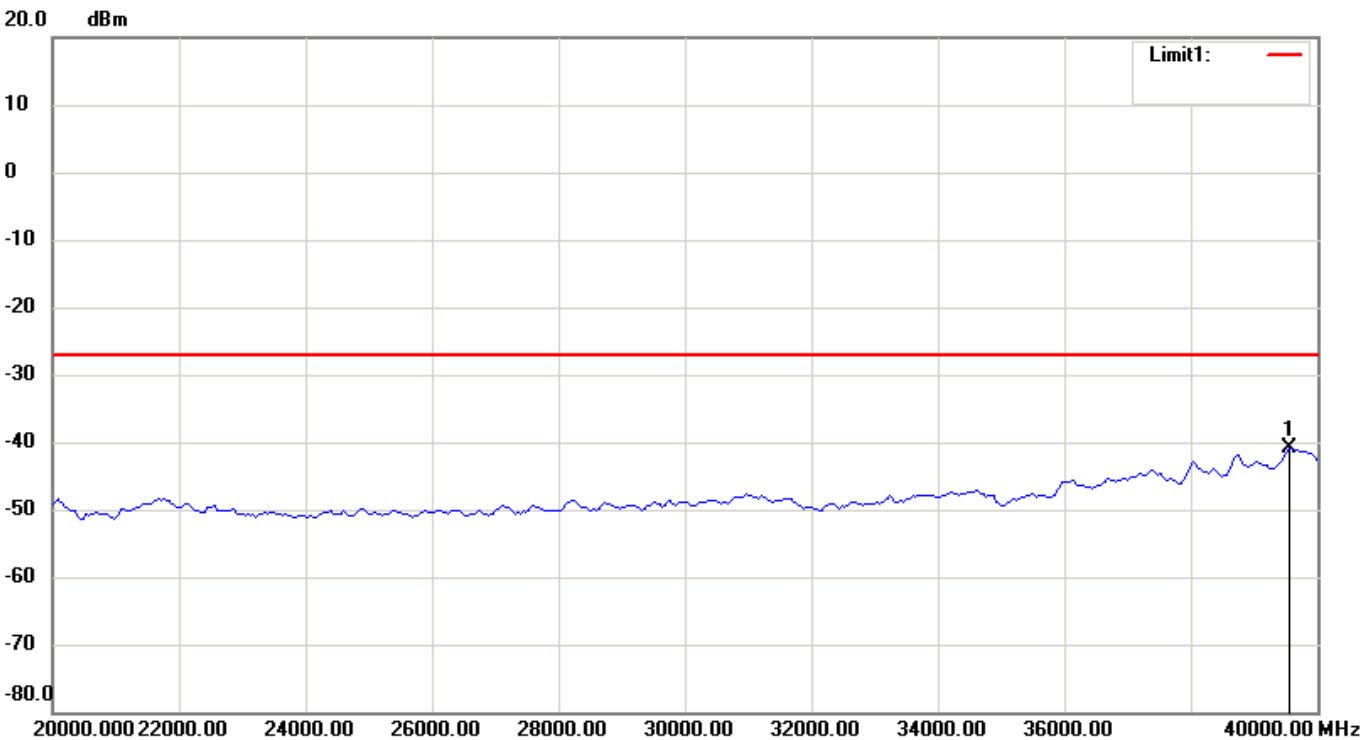
#19

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 80ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 1000 KHz

Test Mode: UNII

Operator: Phillip

Note: NCC_LP0002_802.11ac20_Channel 64_Spurious-2

No.	Frequency(MHz)	Level(dBm)
1	39560.00000	-40.95

9.4.3 調變技術: IEEE 802.11ac (40MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

註：1. 繪圖資料請參考第 87-90 頁。

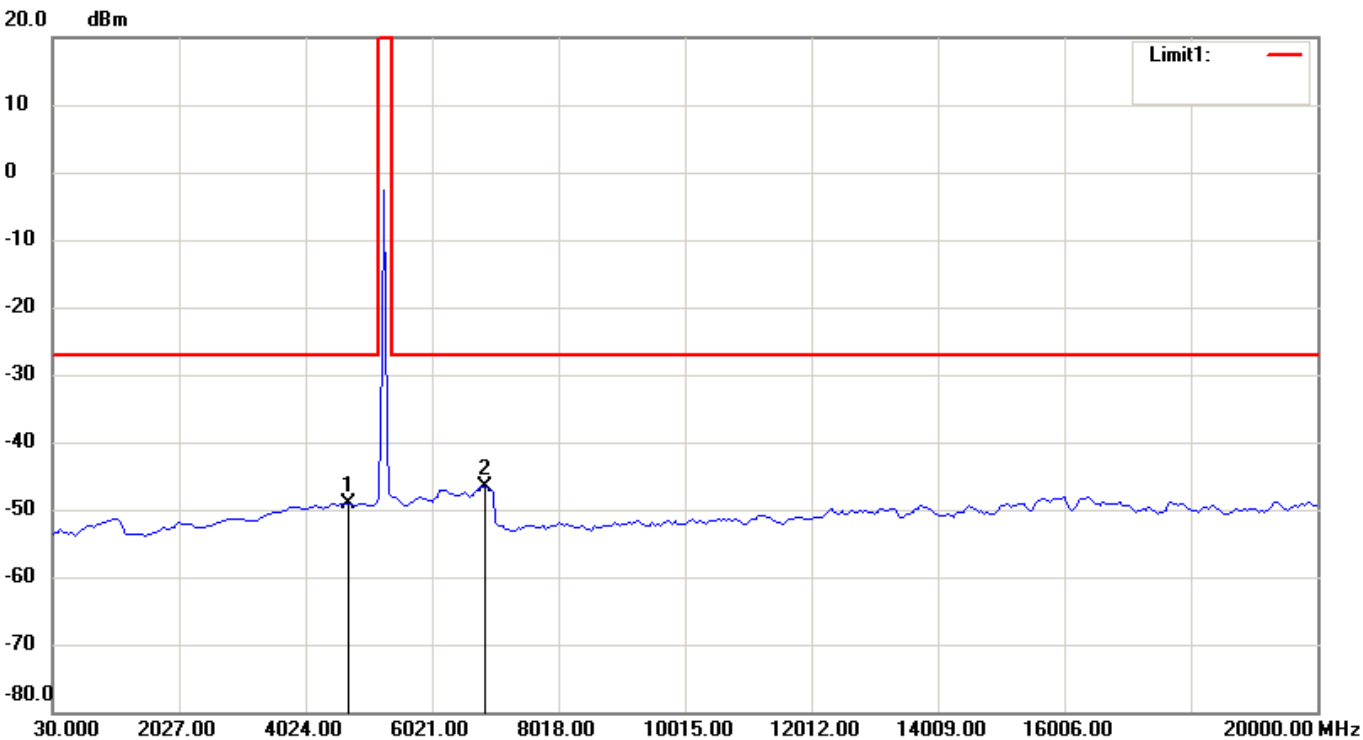
2. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 40\text{GHz}$)

File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#5

Date: 2020/10/19

Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 79.9ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 1000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac40_Channel 54_Spurious-1		

No.	Frequency(MHz)	Level(dBm)
1	4702.98000	-49.05
2	6859.74000	-46.54

File: 20-08-MAS-001_5-3ac40

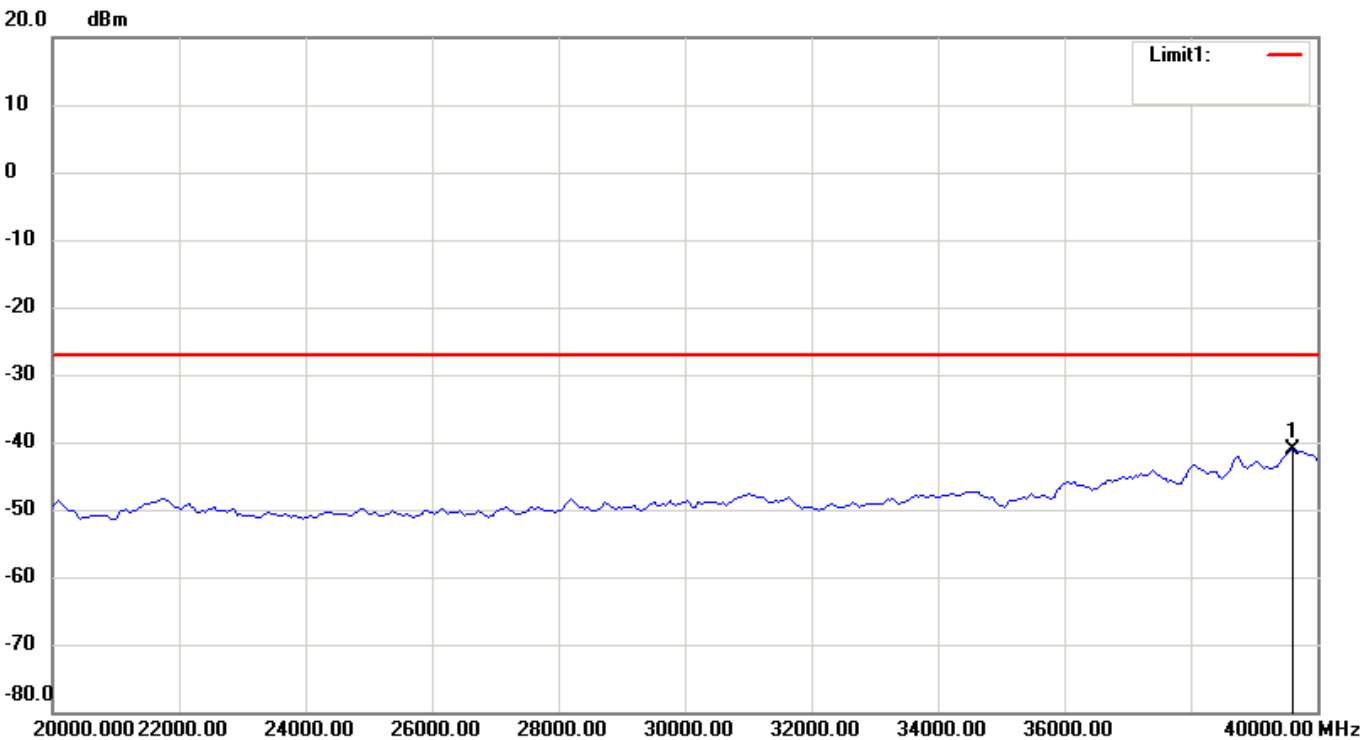
#6

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 80ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 1000 KHz

Test Mode: UNII

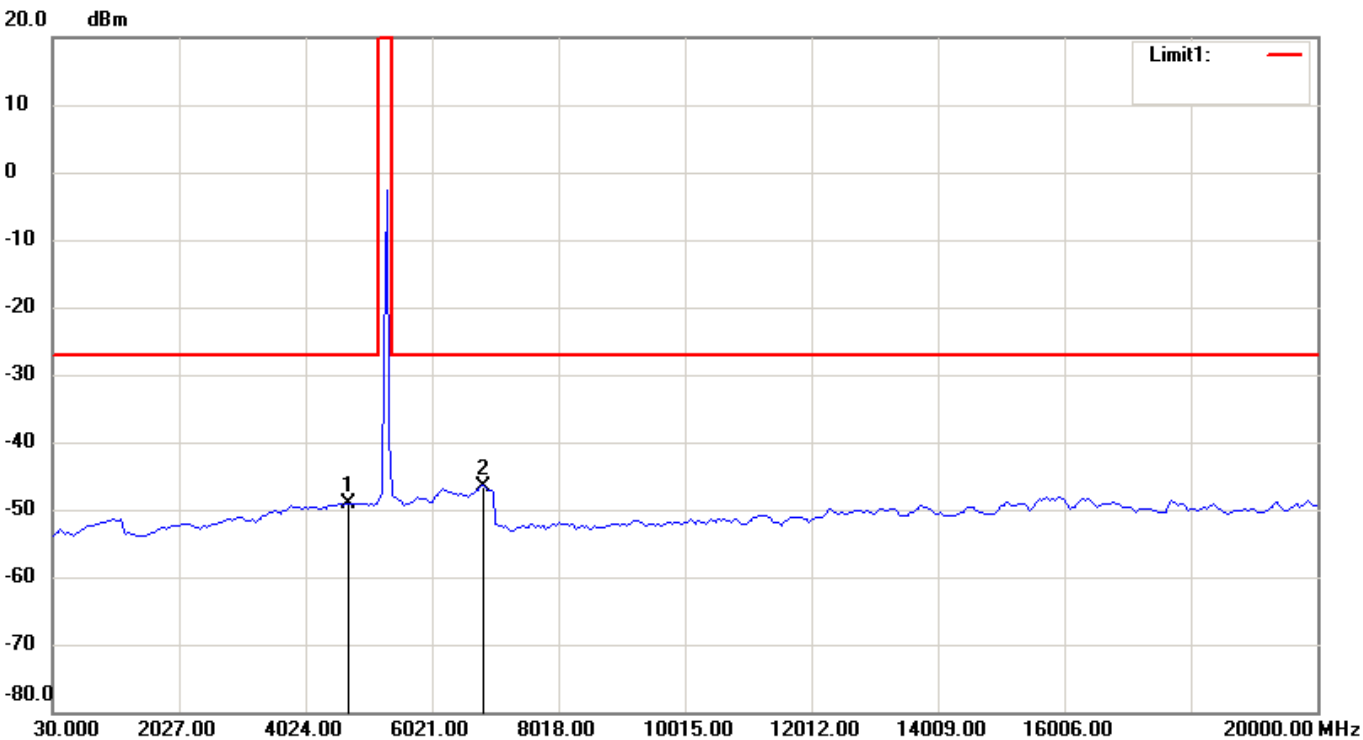
Operator: Phillip

Note: NCC_LP0002_802.11ac40_Channel 54_Spurious-2

No.	Frequency(MHz)	Level(dBm)
1	39600.00000	-41.17

File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#12 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 79.9ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 1000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11ac40_Channel 62_Spurious-1		

No.	Frequency(MHz)	Level(dBm)
1	4702.98000	-49.02
2	6819.80000	-46.50

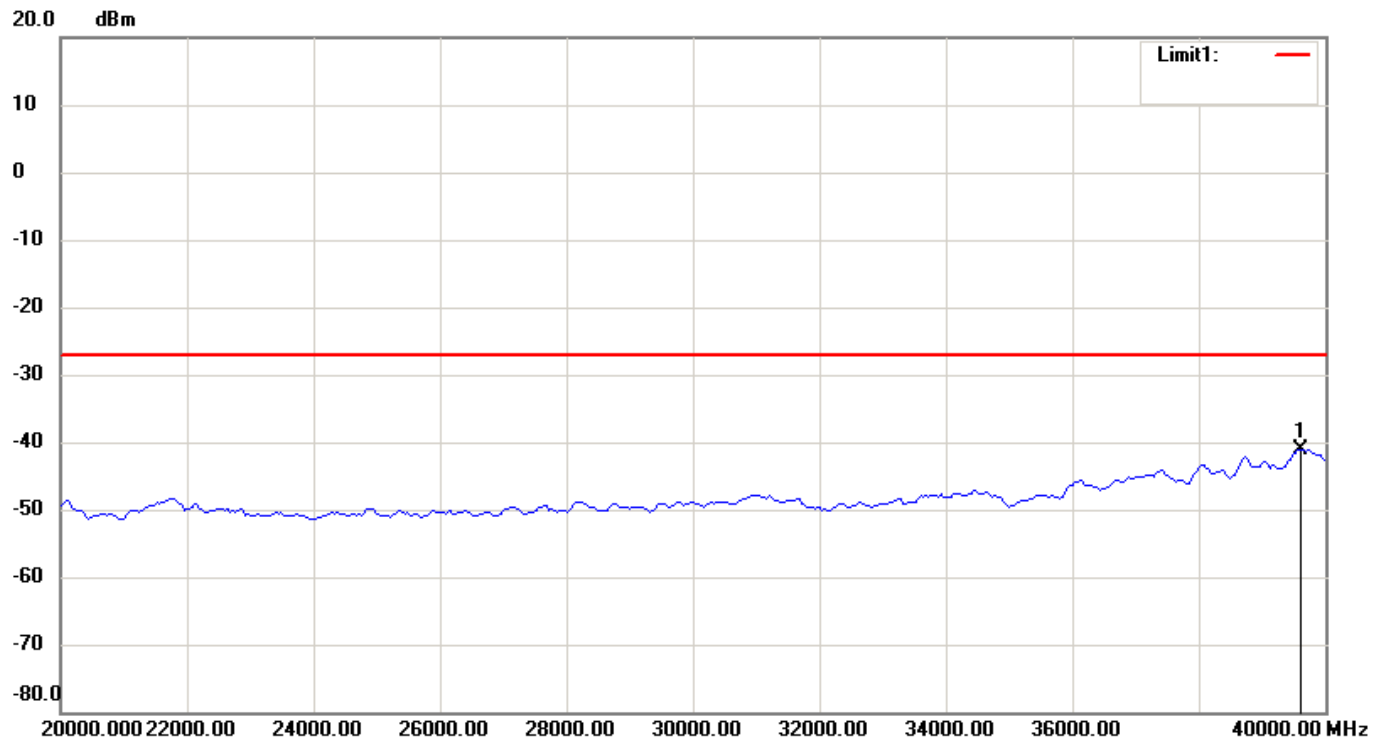
File: 20-08-MAS-001_5-3ac40
Site: RF-Cond01

#13

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac40_Channel 62_Spurious-2

RF Conducted
Sweep Time: 80ms Att.: 25dB
RBW: 1000 KHz VBW: 1000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	39600.00000	-41.03

9.4.4 調變技術: IEEE 802.11ac (80MHz)

測試日期: Oct. 19, 2020

環境溫度: 25°C

環境濕度: 52%

註：1. 繪圖資料請參考第 92-93 頁。

2. 量測不準確度: $\pm 1.5\text{dB}$ ($1\text{GHz} \leq f \leq 40\text{GHz}$)

9.5 結果判定

混附波之發射皆低於限值，符合標準規定。

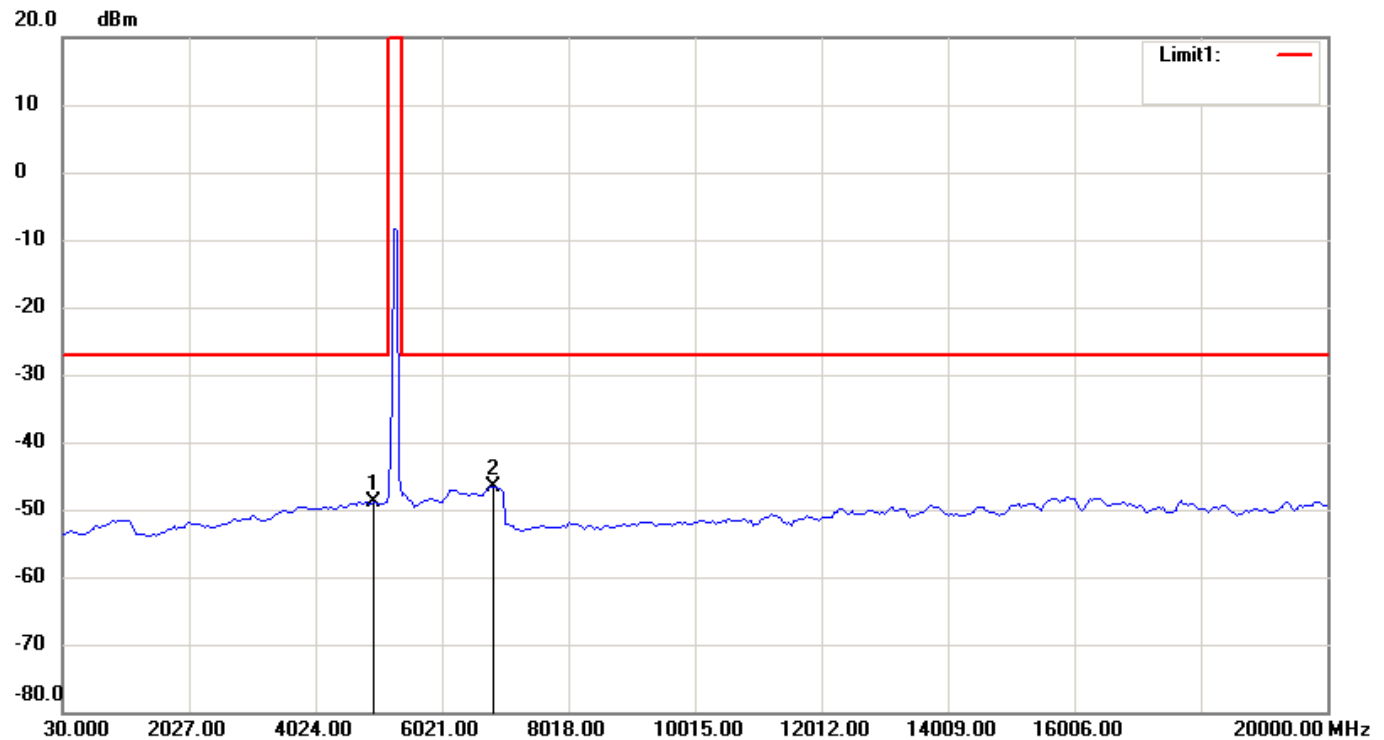
File: 20-08-MAS-001_5-3ac80
Site: RF-Cond01

#5

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac80_Channel 58_Spurious-1

RF Conducted

Sweep Time: 79.9ms Att.: 25dB

RBW: 1000 KHz

VBW: 1000 KHz

Operator:

Phillip

No.	Frequency(MHz)	Level(dBm)
1	4942.62000	-48.82
2	6819.80000	-46.51

File: 20-08-MAS-001_5-3ac80

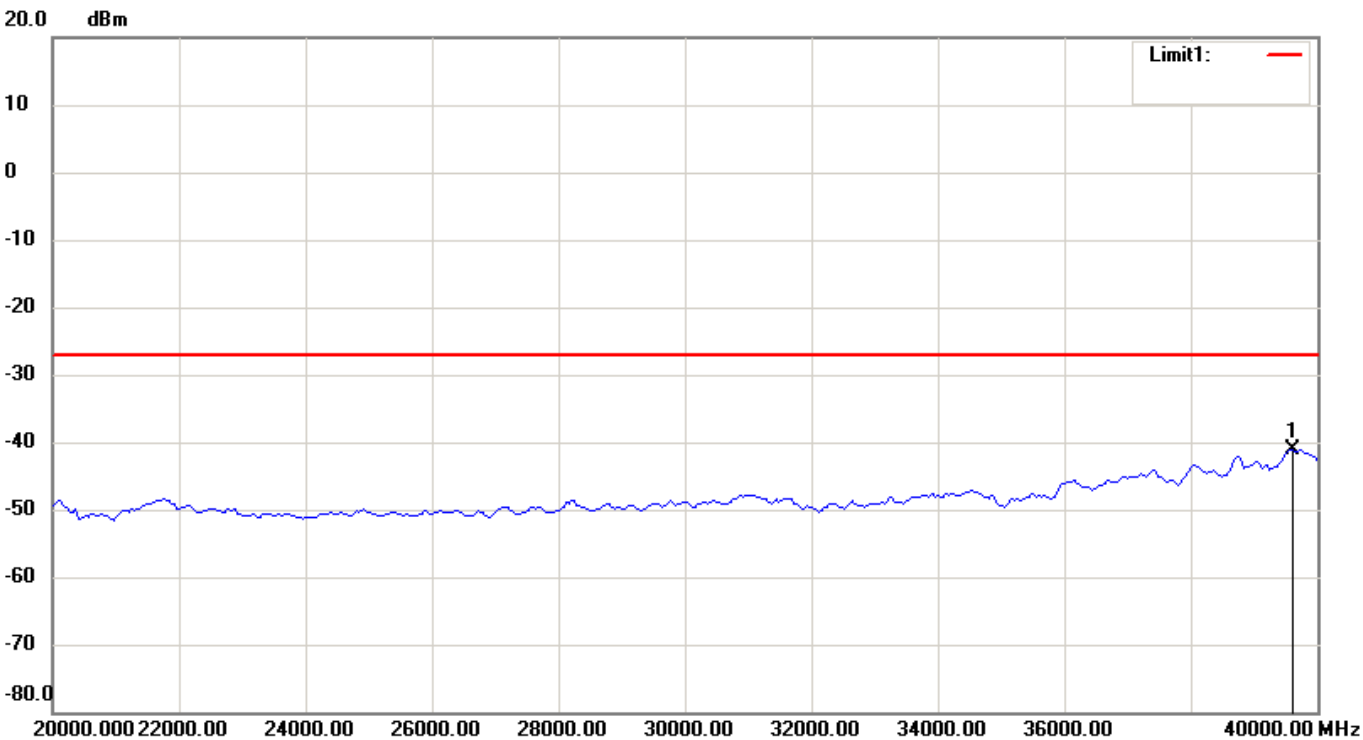
#6

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac80_Channel 58_Spurious-2

RF Conducted

Sweep Time: 80ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 1000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	39600.00000	-41.09

10 場強輻射之量測

10.1 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.5節之規定，在 1GHz 以下的不必要之發射，應符合第 3.6節之規定，任何使用交流市電為供應電之設備亦須符合第 3.3節之電源線傳導限制值。

依據國家通訊傳播委員會低功率射頻器材技術規範5.7.4.6節之規定，不必要發射頻率屬 3.5節規定頻段者，應符合 3.6節之規定。

10.2 量測方法

將待測物置於非金屬桌面，使其在測試模式狀態，且設定為高、中、低各頻道產生最高最大傳導輸出功率的傳輸速率，接收天線置於3米外，且桌面要360度旋轉，另外接收天線也要從1米至4米升降變化，接收天線置於水平、垂直極向各執行測試一次。待測物若為手持式則分別要以三軸相放置，並分別測試以找出最大輻射電場強度。

10.3 量測場強輻射之儀器

(1)量測儀器

儀器名稱	製造者	型號
EMI Receiver	R&S	ESCI
Spectrum Analyzer	R&S	FSU46
Horn Aantenna	EMCO	3117
Horn Aantenna	EMCO	3116
PRE-Amplifier	Agilent	8449B
PRE-Amplifier	Agilent	8447D
BiLog Aantenna	ETC	MCTD 2786
PRE-Amplifier	Agilent	83051A
Spectrum Analyzer	R&S	FSV

測試軟體: LZ-RF (Ver. ETC-3A2)

(2)儀器設定

Frequency Bnd (MHz)	Instrument	Function	Resolution Bndwidth	Video Bndwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	300 kHz
	RF Test Receiver	Peak	120 kHz	300 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

10.4 場強度之計算

場強之計算公式如下

$$\text{結果值} = \text{讀值} + \text{校正因子}$$

其中校正因子為：

天線因子+饋線損失+濾波器損失（若有使用）-放大器增益（若有使用）
量測結果請見下頁。

10.5 場強輻射之量測結果

測試工程師: 羅世勇

10.5.1 諧波發射

測試日期: Oct. 16, 2020

環境溫度: 22°C

環境濕度: 58%

10.5.1.1 調變技術: IEEE 802.11a

a. Channel Low

基本波頻率 : 5260 MHz

輻射 頻率 (MHz)	天線 極性 H/V	機器讀值 (dBuV/m)@3m		校正 因子 (dB)	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse) (dB)
		Peak	AVG		Peak	AVG	Peak	AVG	
10520.0000	H	---	---	6.33	---	---	74.0	54.0	---
10520.0000	V	---	---	6.33	---	---	74.0	54.0	---
15780.0000	H	---	---	11.35	---	---	74.0	54.0	---
15780.0000	V	---	---	11.35	---	---	74.0	54.0	---
21040.0000	H	---	---	18.72	---	---	74.0	54.0	---
21040.0000	V	---	---	18.72	---	---	74.0	54.0	---
26300.0000	H	---	---	16.47	---	---	74.0	54.0	---
26300.0000	V	---	---	16.47	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

b. Channel Mid

基本波頻率：5300 MHz

輻射 頻率	天線 極性	機器讀值 (dBuV/m)@3m		校正 因子	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse)
		Peak	AVG		Peak	AVG	Peak	AVG	
(MHz)	H/V			(dB)					(dB)
10600.0000	H	---	---	6.43	---	---	74.0	54.0	---
10600.0000	V	---	---	6.43	---	---	74.0	54.0	---
15900.0000	H	---	---	11.49	---	---	74.0	54.0	---
15900.0000	V	---	---	11.49	---	---	74.0	54.0	---
21200.0000	H	---	---	18.86	---	---	74.0	54.0	---
21200.0000	V	---	---	18.86	---	---	74.0	54.0	---
26500.0000	H	---	---	16.39	---	---	74.0	54.0	---
26500.0000	V	---	---	16.39	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

c. Channel High

基本波頻率：5320 MHz

輻射 頻率	天線 極性	機器讀值 (dBuV/m)@3m		校正 因子	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse)
		Peak	AVG		Peak	AVG	Peak	AVG	
(MHz)	H/V			(dB)					(dB)
10640.0000	H	---	---	6.49	---	---	74.0	54.0	---
10640.0000	V	---	---	6.49	---	---	74.0	54.0	---
15960.0000	H	---	---	11.56	---	---	74.0	54.0	---
15960.0000	V	---	---	11.56	---	---	74.0	54.0	---
21280.0000	H	---	---	18.93	---	---	74.0	54.0	---
21280.0000	V	---	---	18.93	---	---	74.0	54.0	---
26600.0000	H	---	---	16.38	---	---	74.0	54.0	---
26600.0000	V	---	---	16.38	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

10.5.1.2 調變技術: IEEE 802.11ac (20MHz)

a. Channel Low

基本波頻率 : 5260 MHz

輻射 頻率 (MHz)	天線 極性 H/V	機器讀值 (dBuV/m)@3m		校正 因子 (dB)	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse) (dB)
		Peak	AVG		Peak	AVG	Peak	AVG	
10520.0000	H	---	---	6.33	---	---	74.0	54.0	---
10520.0000	V	---	---	6.33	---	---	74.0	54.0	---
15780.0000	H	---	---	11.35	---	---	74.0	54.0	---
15780.0000	V	---	---	11.35	---	---	74.0	54.0	---
21040.0000	H	---	---	18.72	---	---	74.0	54.0	---
21040.0000	V	---	---	18.72	---	---	74.0	54.0	---
26300.0000	H	---	---	16.47	---	---	74.0	54.0	---
26300.0000	V	---	---	16.47	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

b. Channel Mid

基本波頻率：5300 MHz

輻射 頻率	天線 極性	機器讀值 (dBuV/m)@3m		校正 因子	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse)
		Peak	AVG		Peak	AVG	Peak	AVG	
(MHz)	H/V			(dB)					(dB)
10600.0000	H	---	---	6.43	---	---	74.0	54.0	---
10600.0000	V	---	---	6.43	---	---	74.0	54.0	---
15900.0000	H	---	---	11.49	---	---	74.0	54.0	---
15900.0000	V	---	---	11.49	---	---	74.0	54.0	---
21200.0000	H	---	---	18.86	---	---	74.0	54.0	---
21200.0000	V	---	---	18.86	---	---	74.0	54.0	---
26500.0000	H	---	---	16.39	---	---	74.0	54.0	---
26500.0000	V	---	---	16.39	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

c. Channel High

基本波頻率：5320 MHz

輻射 頻率	天線 極性	機器讀值 (dBuV/m)@3m		校正 因子	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse)
		Peak	AVG		Peak	AVG	Peak	AVG	
(MHz)	H/V			(dB)					(dB)
10640.0000	H	---	---	6.49	---	---	74.0	54.0	---
10640.0000	V	---	---	6.49	---	---	74.0	54.0	---
15960.0000	H	---	---	11.56	---	---	74.0	54.0	---
15960.0000	V	---	---	11.56	---	---	74.0	54.0	---
21280.0000	H	---	---	18.93	---	---	74.0	54.0	---
21280.0000	V	---	---	18.93	---	---	74.0	54.0	---
26600.0000	H	---	---	16.38	---	---	74.0	54.0	---
26600.0000	V	---	---	16.38	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

10.5.1.3 調變技術: IEEE 802.11ac (40MHz)

a. Channel Low

基本波頻率 : 5270 MHz

輻射 頻率 (MHz)	天線 極性 H/V	機器讀值 (dBuV/m)@3m		校正 因子 (dB)	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse) (dB)
		Peak	AVG		Peak	AVG	Peak	AVG	
10540.0000	H	---	---	6.35	---	---	74.0	54.0	---
10540.0000	V	---	---	6.35	---	---	74.0	54.0	---
15810.0000	H	---	---	11.38	---	---	74.0	54.0	---
15810.0000	V	---	---	11.38	---	---	74.0	54.0	---
21080.0000	H	---	---	18.75	---	---	74.0	54.0	---
21080.0000	V	---	---	18.75	---	---	74.0	54.0	---
26350.0000	H	---	---	16.45	---	---	74.0	54.0	---
26350.0000	V	---	---	16.45	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

b.Channel High

基本波頻率：5310 MHz

輻射 頻率 (MHz)	天線 極性 H/V	機器讀值 (dBuV/m)@3m		校正 因子 (dB)	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse) (dB)
		Peak	AVG		Peak	AVG	Peak	AVG	
10620.0000	H	---	---	6.45	---	---	74.0	54.0	---
10620.0000	V	---	---	6.45	---	---	74.0	54.0	---
15930.0000	H	---	---	11.53	---	---	74.0	54.0	---
15930.0000	V	---	---	11.53	---	---	74.0	54.0	---
21240.0000	H	---	---	18.89	---	---	74.0	54.0	---
21240.0000	V	---	---	18.89	---	---	74.0	54.0	---
26550.0000	H	---	---	16.39	---	---	74.0	54.0	---
26550.0000	V	---	---	16.39	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

10.5.1.4 IEEE 802.11ac (80MHz)

Channel High

基本波頻率：5290 MHz

輻射 頻率 (MHz)	天線 極性 H/V	機器讀值 (dBuV/m)@3m		校正 因子 (dB)	結果值 (dBuV/m)@3m		限制值 (dBuV/m)@3m		餘裕值 (worse) (dB)
		Peak	AVG		Peak	AVG	Peak	AVG	
10580.0000	H	---	---	6.40	---	---	74.0	54.0	---
10580.0000	V	---	---	6.40	---	---	74.0	54.0	---
15870.0000	H	---	---	11.45	---	---	74.0	54.0	---
15870.0000	V	---	---	11.45	---	---	74.0	54.0	---
21160.0000	H	---	---	18.82	---	---	74.0	54.0	---
21160.0000	V	---	---	18.82	---	---	74.0	54.0	---
26450.0000	H	---	---	16.41	---	---	74.0	54.0	---
26450.0000	V	---	---	16.41	---	---	74.0	54.0	---

註：1. 標記“---”表發射之訊號太弱而儀器無法量測。

2. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

3. 量測不準確度： $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

10.5.2 諧波及其它不必要之訊號測試圖

10.5.2.1 調變技術: IEEE 802.11a

a. Channel Low

操作模式 : 發射接收

基本波頻率 : 5260MHz

File: 20-08-MAS-001_5-3a

#33

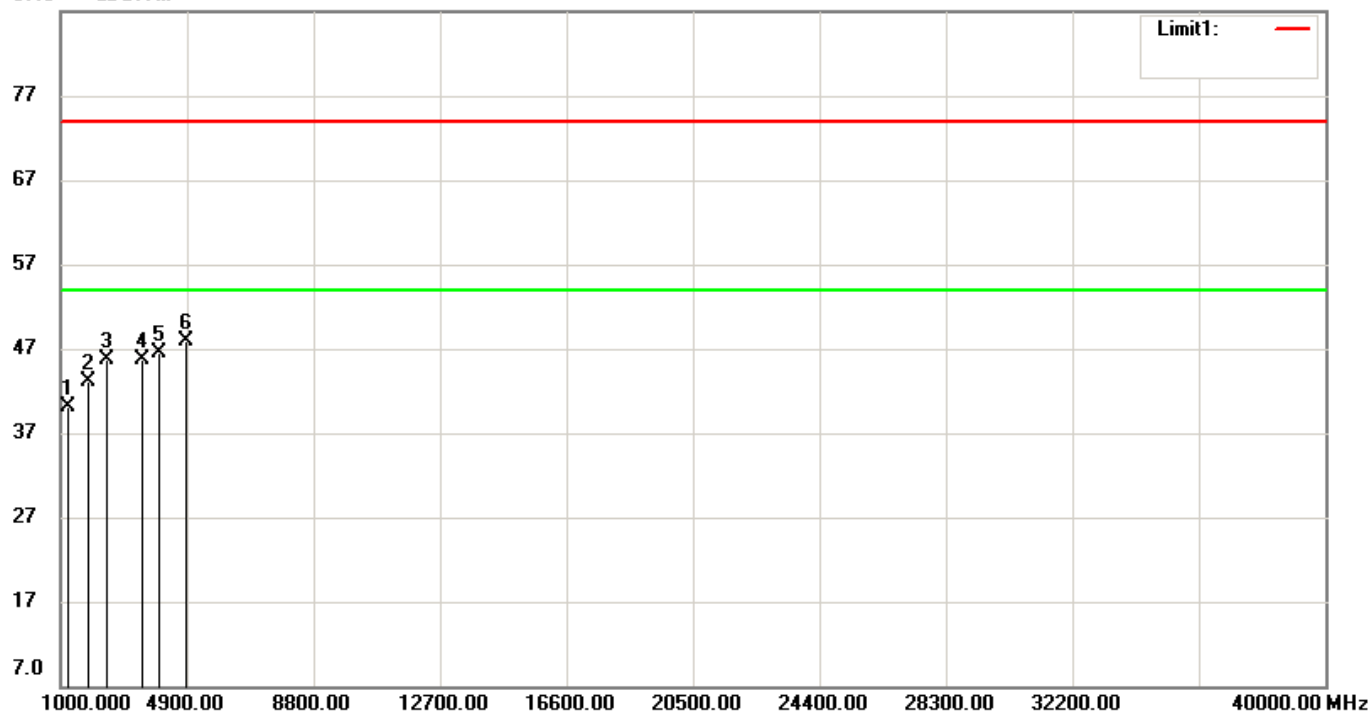
Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %

87.0 dBuV/m



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH LOW-1

Polarization: Horizontal
 Distance: 3m
 Operator: Phillip

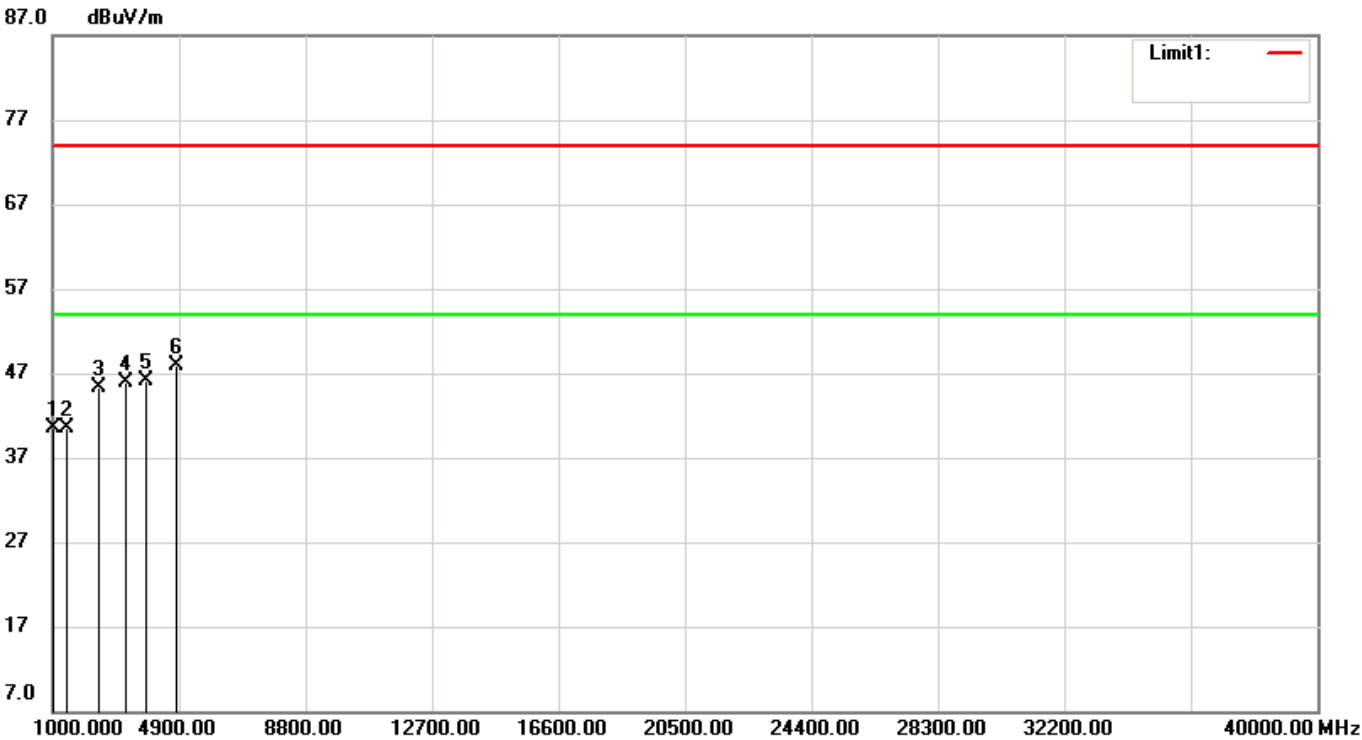
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1204.32700	49.11	peak	-8.94	40.17	74.00	-33.83
2	1817.30760	48.40	peak	-5.35	43.05	74.00	-30.95
3	2409.85560	48.28	peak	-2.66	45.62	74.00	-28.38
4	3451.92300	47.01	peak	-1.25	45.76	74.00	-28.24
5	4058.09300	46.36	peak	0.18	46.54	74.00	-27.46
6	4814.10250	46.86	peak	1.06	47.92	74.00	-26.08

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收
基本波頻率：5260 MHz

File: 20-08-MAS-001_5-3a #34 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH LOW-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1020.43260	49.89	peak	-9.41	40.48	74.00	-33.52
2	1388.22110	49.01	peak	-8.46	40.55	74.00	-33.45
3	2409.85560	48.06	peak	-2.66	45.40	74.00	-28.60
4	3233.97430	47.47	peak	-1.56	45.91	74.00	-28.09
5	3867.38780	46.39	peak	-0.21	46.18	74.00	-27.82
6	4793.66980	46.91	peak	1.02	47.93	74.00	-26.07

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

b. Channel Mid

操作模式：發射接收

基本波頻率：5300 MHz

File: 20-08-MAS-001_5-3a

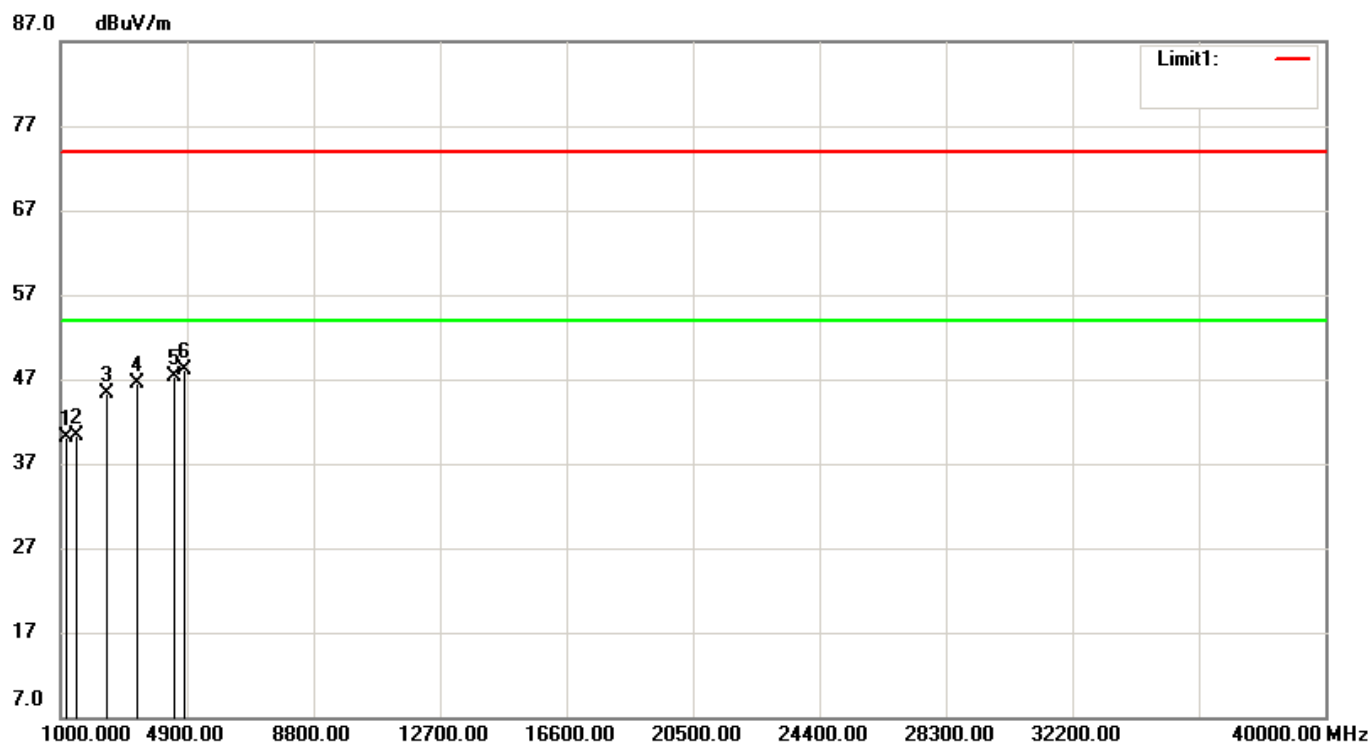
#35

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH MID-1

Polarization: Horizontal
 Distance: 3m
 Operator: Phillip

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1170.27240	49.08	peak	-9.03	40.05	74.00	-33.95
2	1497.19550	48.54	peak	-8.18	40.36	74.00	-33.64
3	2403.04480	47.96	peak	-2.67	45.29	74.00	-28.71
4	3336.13780	47.98	peak	-1.42	46.56	74.00	-27.44
5	4439.50320	46.79	peak	0.42	47.21	74.00	-26.79
6	4780.04800	47.09	peak	1.00	48.09	74.00	-25.91

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收

基本波頻率：5300 MHz

File: 20-08-MAS-001_5-3a

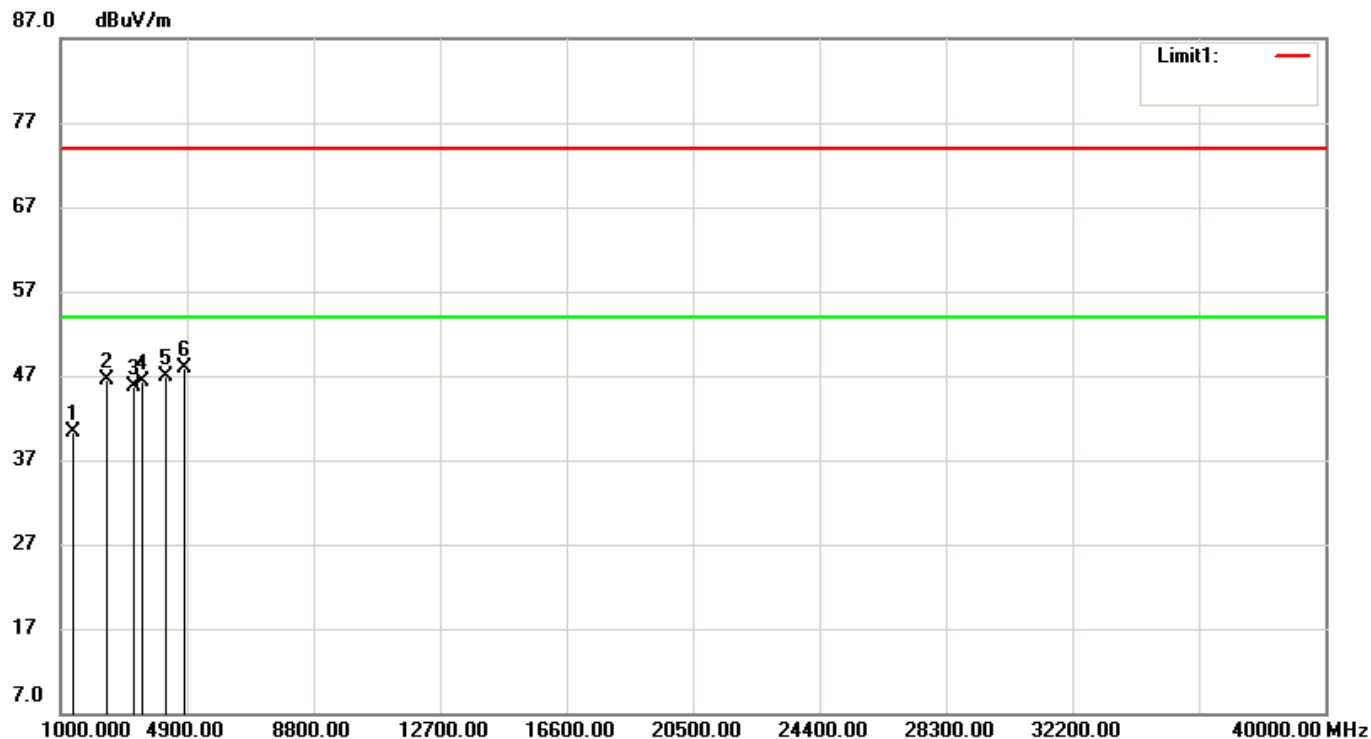
#36

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: CH MID-1

Polarization: Vertical
Distance: 3m
Operator: Phillip

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1333.73400	48.89	peak	-8.61	40.28	74.00	-33.72
2	2409.85560	49.19	peak	-2.66	46.53	74.00	-27.47
3	3233.97430	47.25	peak	-1.56	45.69	74.00	-28.31
4	3458.73400	47.51	peak	-1.23	46.28	74.00	-27.72
5	4221.55430	46.69	peak	0.28	46.97	74.00	-27.03
6	4800.48070	46.97	peak	1.03	48.00	74.00	-26.00

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

c. Channel High

操作模式：發射接收

基本波頻率：5320 MHz

File: 20-08-MAS-001_5-3a

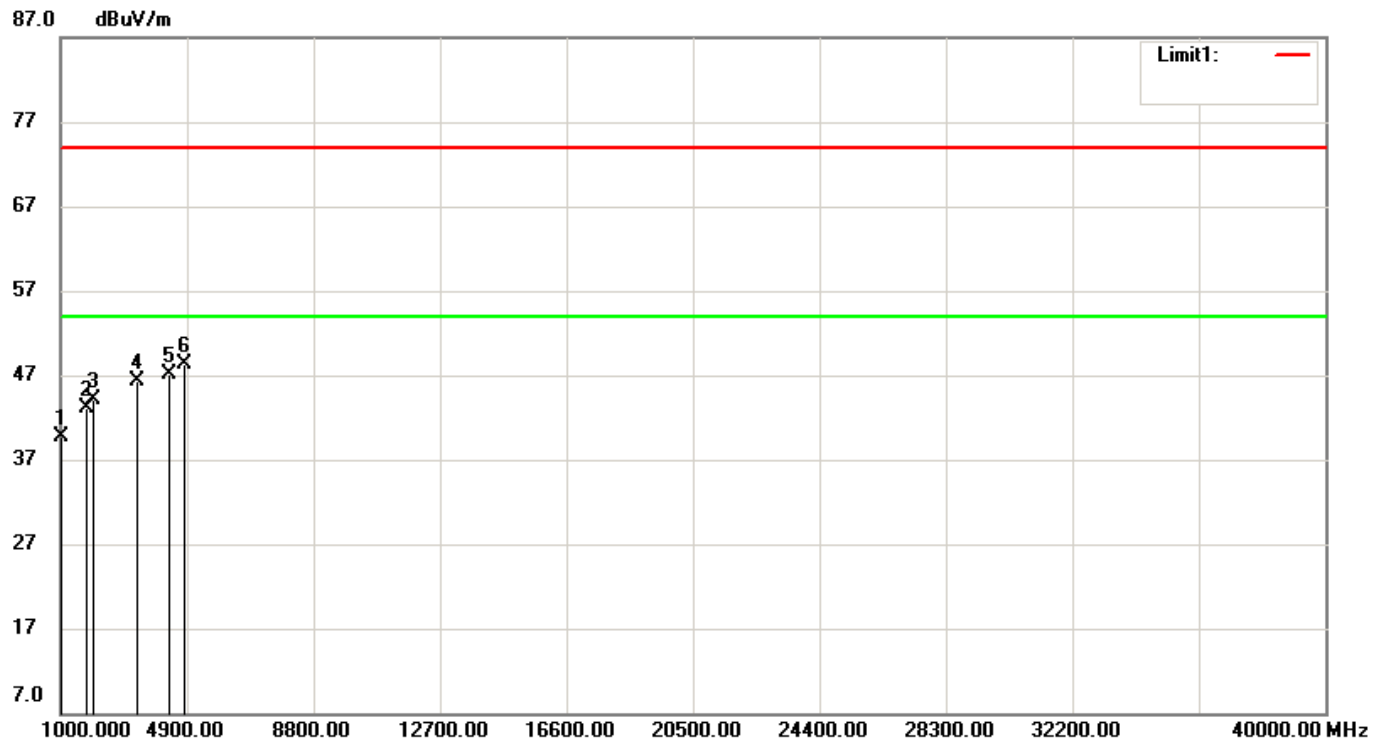
#37

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH HIGH-1

Polarization: Horizontal
 Distance: 3m
 Operator: Phillip

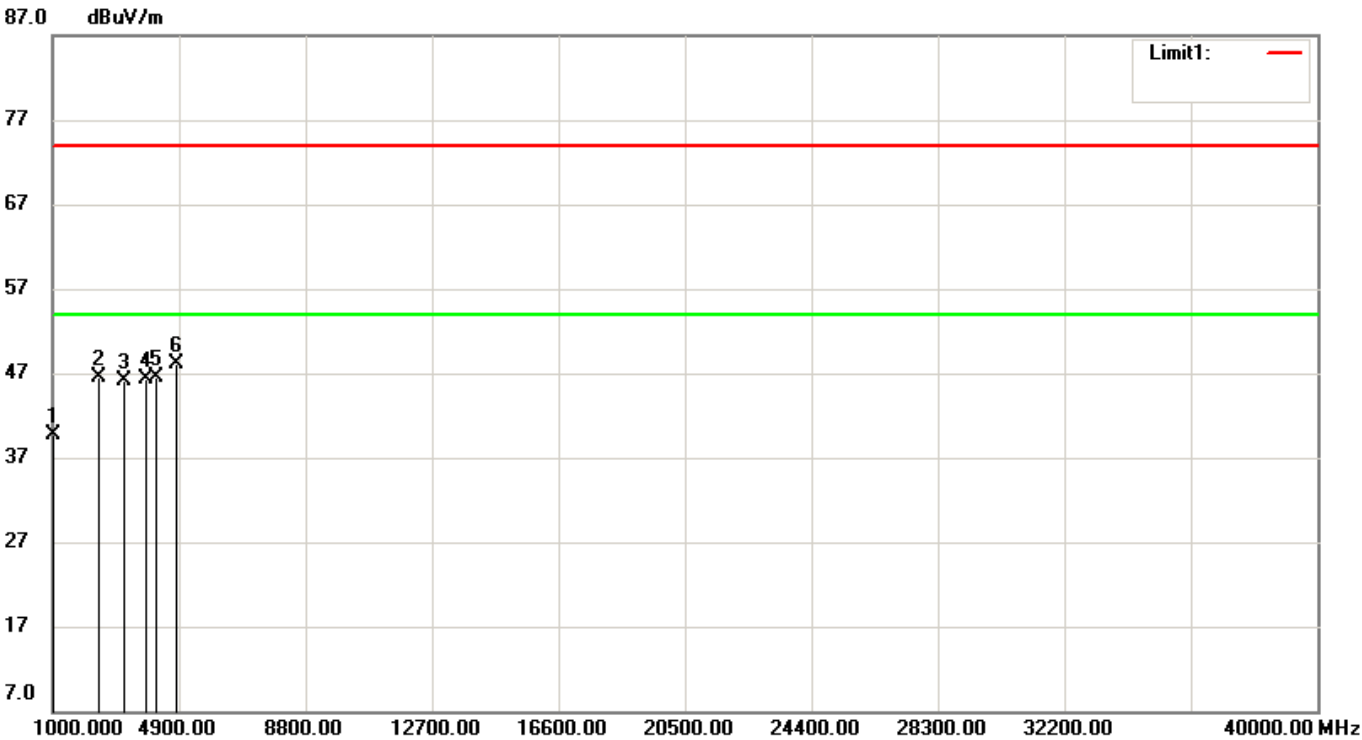
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1006.81080	49.17	peak	-9.45	39.72	74.00	-34.28
2	1762.82050	49.00	peak	-5.84	43.16	74.00	-30.84
3	1973.95830	47.98	peak	-3.96	44.02	74.00	-29.98
4	3356.57050	47.64	peak	-1.38	46.26	74.00	-27.74
5	4364.58330	46.69	peak	0.37	47.06	74.00	-26.94
6	4780.04800	47.25	peak	1.00	48.25	74.00	-25.75

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收
基本波頻率：5320 MHz

File: 20-08-MAS-001_5-3a #38 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH HIGH-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1061.29800	49.07	peak	-9.31	39.76	74.00	-34.24
2	2409.85560	49.18	peak	-2.66	46.52	74.00	-27.48
3	3152.24350	47.81	peak	-1.68	46.13	74.00	-27.87
4	3874.19870	46.58	peak	-0.19	46.39	74.00	-27.61
5	4173.87820	46.29	peak	0.25	46.54	74.00	-27.46
6	4800.48070	47.04	peak	1.03	48.07	74.00	-25.93

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

10.5.2.2 調變技術: IEEE 802.11ac (20MHz)

a. Channel Low

操作模式：發射接收

基本波頻率：5260 MHz

File: 20-08-MAS-001_5-3ac20

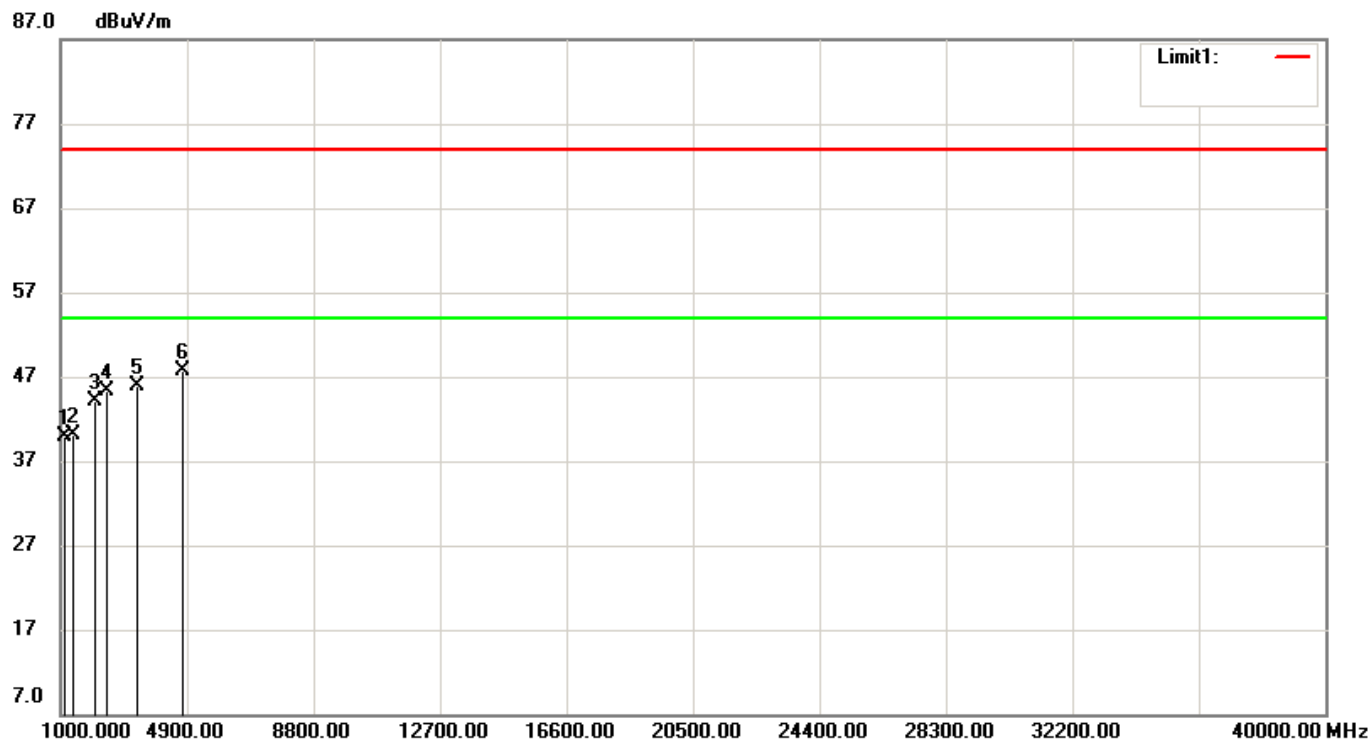
#31

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH LOW-1

Polarization: Horizontal
 Distance: 3m
 Operator: Phillip

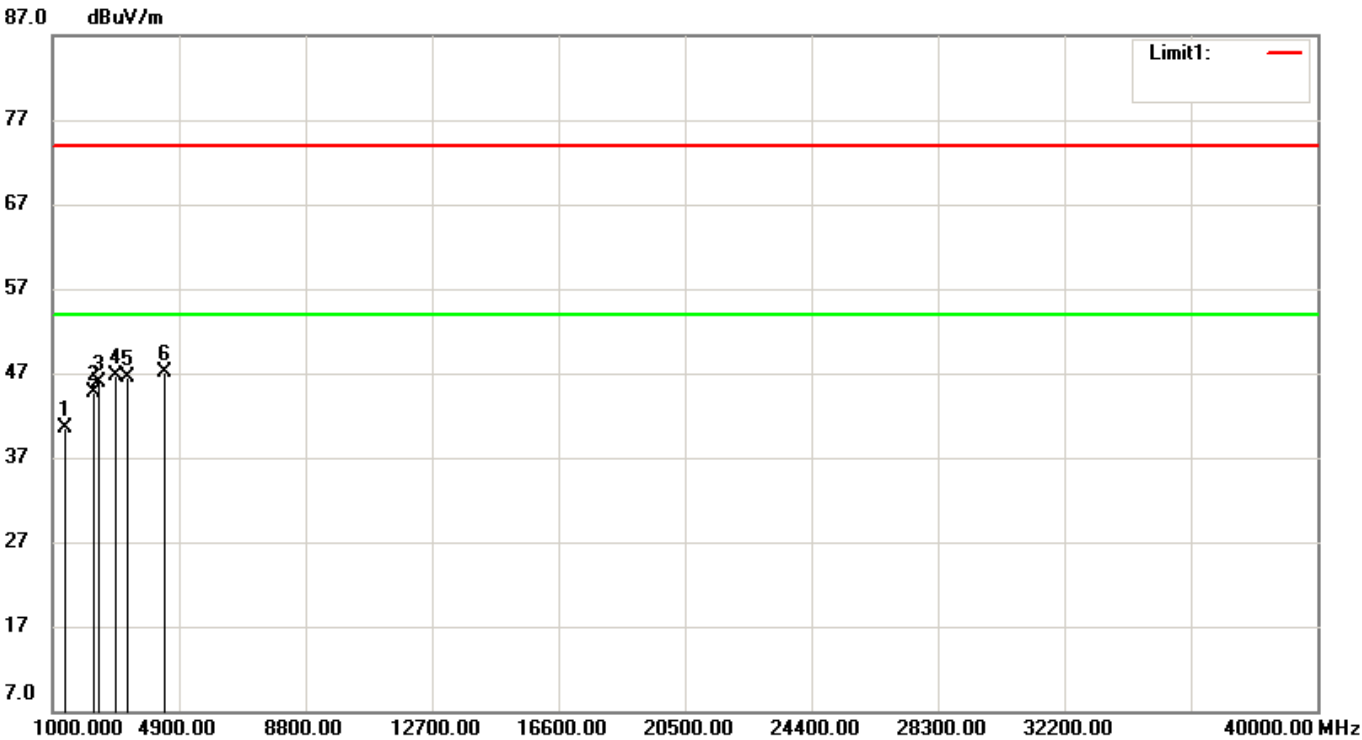
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1095.35250	49.14	peak	-9.22	39.92	74.00	-34.08
2	1360.97750	48.63	peak	-8.54	40.09	74.00	-33.91
3	2055.68910	47.74	peak	-3.58	44.16	74.00	-29.84
4	2409.85560	47.91	peak	-2.66	45.25	74.00	-28.75
5	3356.57050	47.23	peak	-1.38	45.85	74.00	-28.15
6	4691.50640	46.83	peak	0.83	47.66	74.00	-26.34

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收
基本波頻率：5260 MHz

File: 20-08-MAS-001_5-3ac20 #32 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH LOW-1

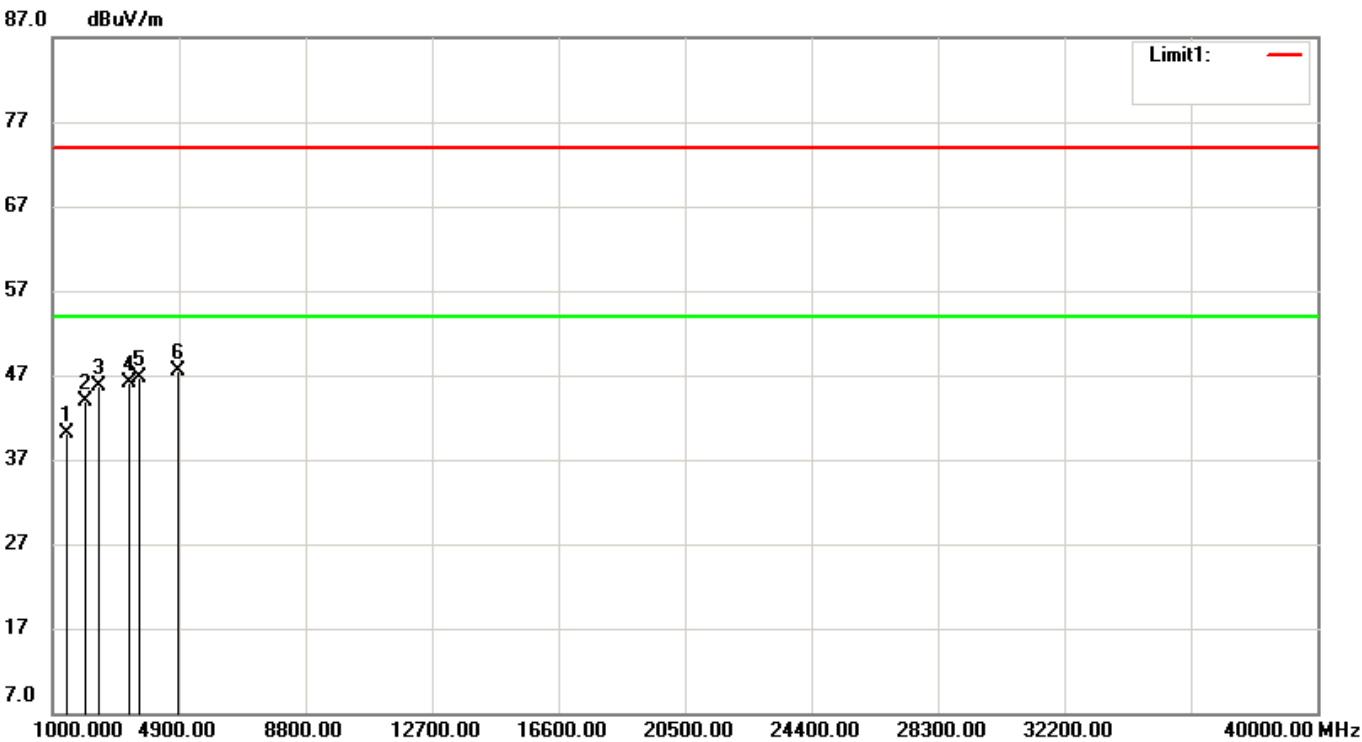
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1333.73400	49.09	peak	-8.61	40.48	74.00	-33.52
2	2205.52880	47.89	peak	-3.19	44.70	74.00	-29.30
3	2409.85560	48.50	peak	-2.66	45.84	74.00	-28.16
4	2913.86210	48.73	peak	-1.99	46.74	74.00	-27.26
5	3295.27240	47.97	peak	-1.47	46.50	74.00	-27.50
6	4432.69230	46.72	peak	0.42	47.14	74.00	-26.86

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

b. Channel Mid

操作模式：發射接收
基本波頻率：5300 MHz

File: 20-08-MAS-001_5-3ac20 #33 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



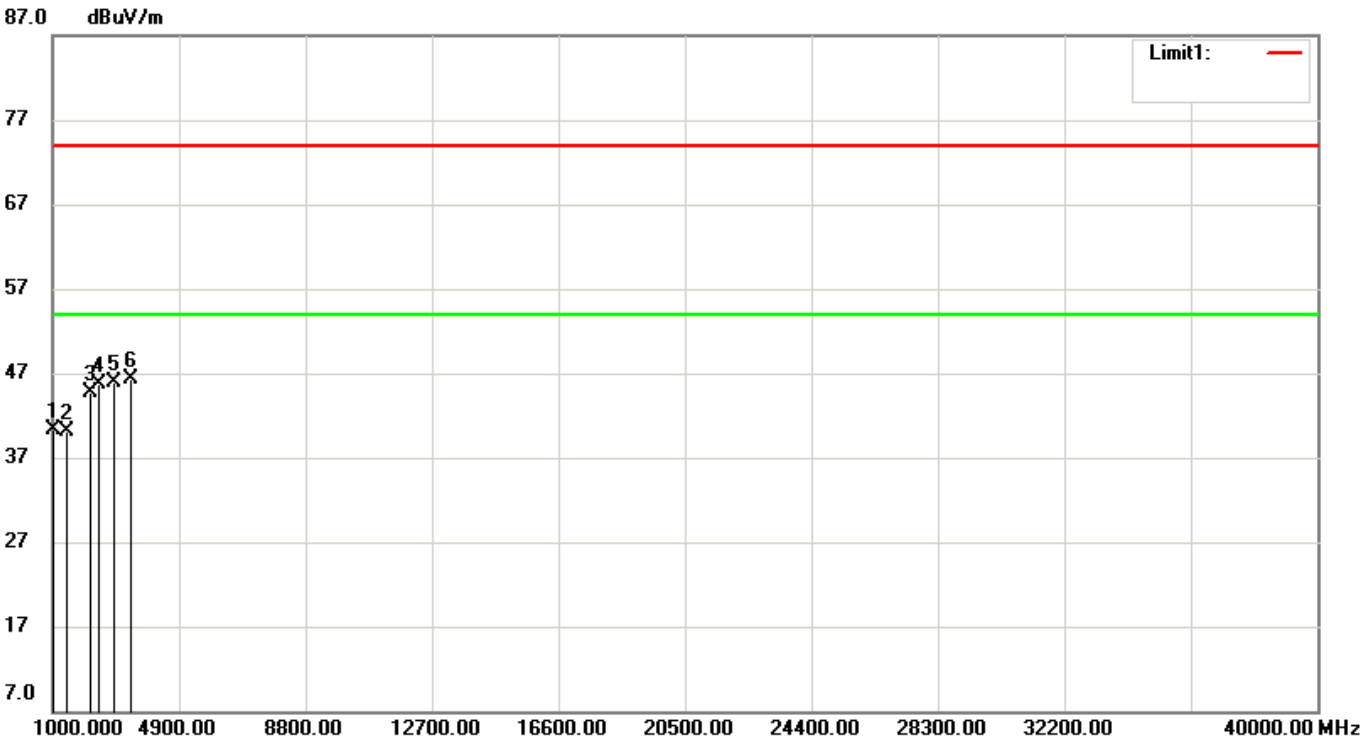
Condition: NCC_Above1G_Pk Polarization: Horizontal
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH MID-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1408.65380	48.60	peak	-8.42	40.18	74.00	-33.82
2	1946.71470	48.14	peak	-4.20	43.94	74.00	-30.06
3	2416.66660	48.30	peak	-2.64	45.66	74.00	-28.34
4	3370.19230	47.37	peak	-1.36	46.01	74.00	-27.99
5	3663.06080	47.47	peak	-0.74	46.73	74.00	-27.27
6	4814.10250	46.53	peak	1.06	47.59	74.00	-26.41

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

操作模式：發射接收
基本波頻率：5300 MHz

File: 20-08-MAS-001_5-3ac20 #34 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH MID-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1013.62170	49.71	peak	-9.44	40.27	74.00	-33.73
2	1408.65380	48.59	peak	-8.42	40.17	74.00	-33.83
3	2164.66340	47.95	peak	-3.29	44.66	74.00	-29.34
4	2416.66660	48.42	peak	-2.64	45.78	74.00	-28.22
5	2845.75320	47.99	peak	-2.05	45.94	74.00	-28.06
6	3397.43580	47.72	peak	-1.32	46.40	74.00	-27.60

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

c. Channel High

操作模式：發射接收

基本波頻率：5320 MHz

File: 20-08-MAS-001_5-3ac20

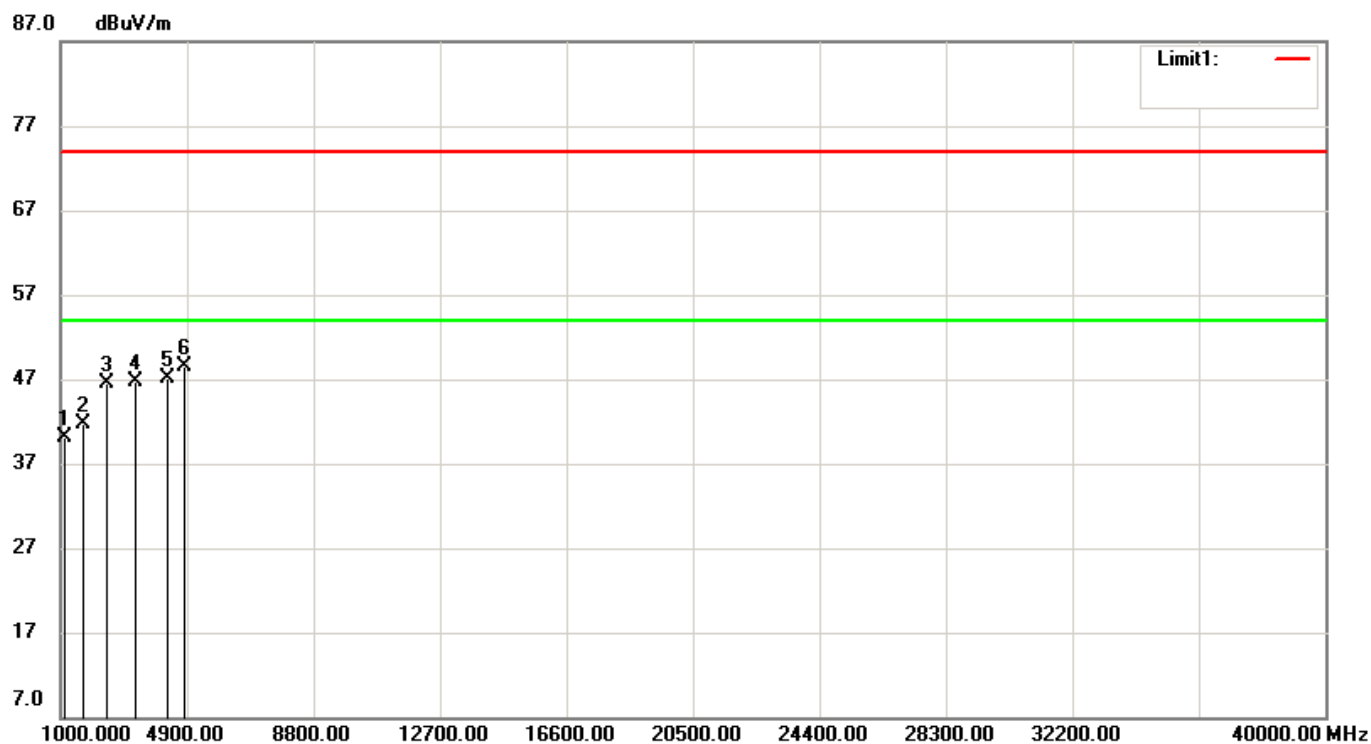
#35

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH HIGH-1

Polarization: Horizontal
 Distance: 3m
 Operator: Phillip

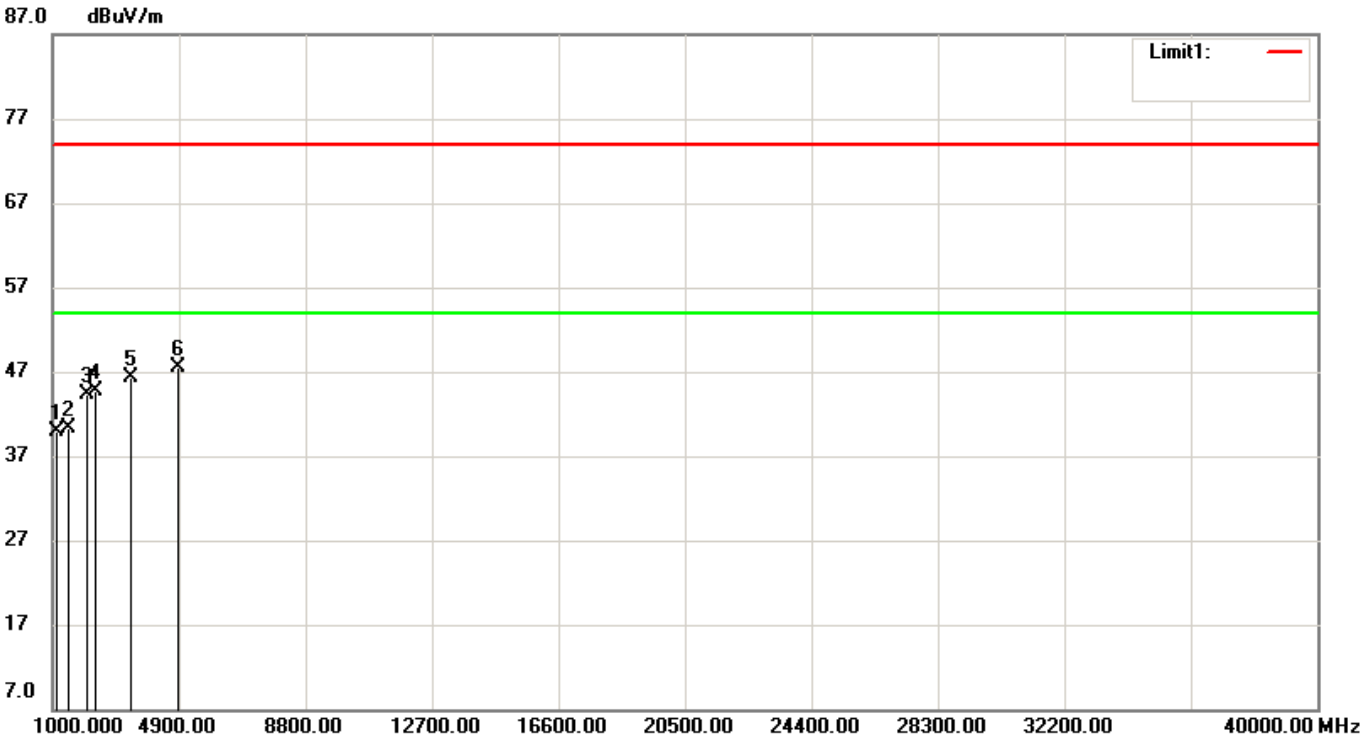
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1095.35250	49.35	peak	-9.22	40.13	74.00	-33.87
2	1640.22430	48.72	peak	-6.93	41.79	74.00	-32.21
3	2409.85560	49.14	peak	-2.66	46.48	74.00	-27.52
4	3295.27240	48.24	peak	-1.47	46.77	74.00	-27.23
5	4282.85250	46.87	peak	0.32	47.19	74.00	-26.81
6	4807.29160	47.43	peak	1.04	48.47	74.00	-25.53

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收
基本波頻率：5320 MHz

File: 20-08-MAS-001_5-3ac20 #36 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH HIGH-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1095.35250	49.21	peak	-9.22	39.99	74.00	-34.01
2	1476.76280	48.61	peak	-8.24	40.37	74.00	-33.63
3	2055.68910	47.81	peak	-3.58	44.23	74.00	-29.77
4	2273.63780	47.76	peak	-3.01	44.75	74.00	-29.25
5	3390.62500	47.66	peak	-1.33	46.33	74.00	-27.67
6	4848.15700	46.34	peak	1.12	47.46	74.00	-26.54

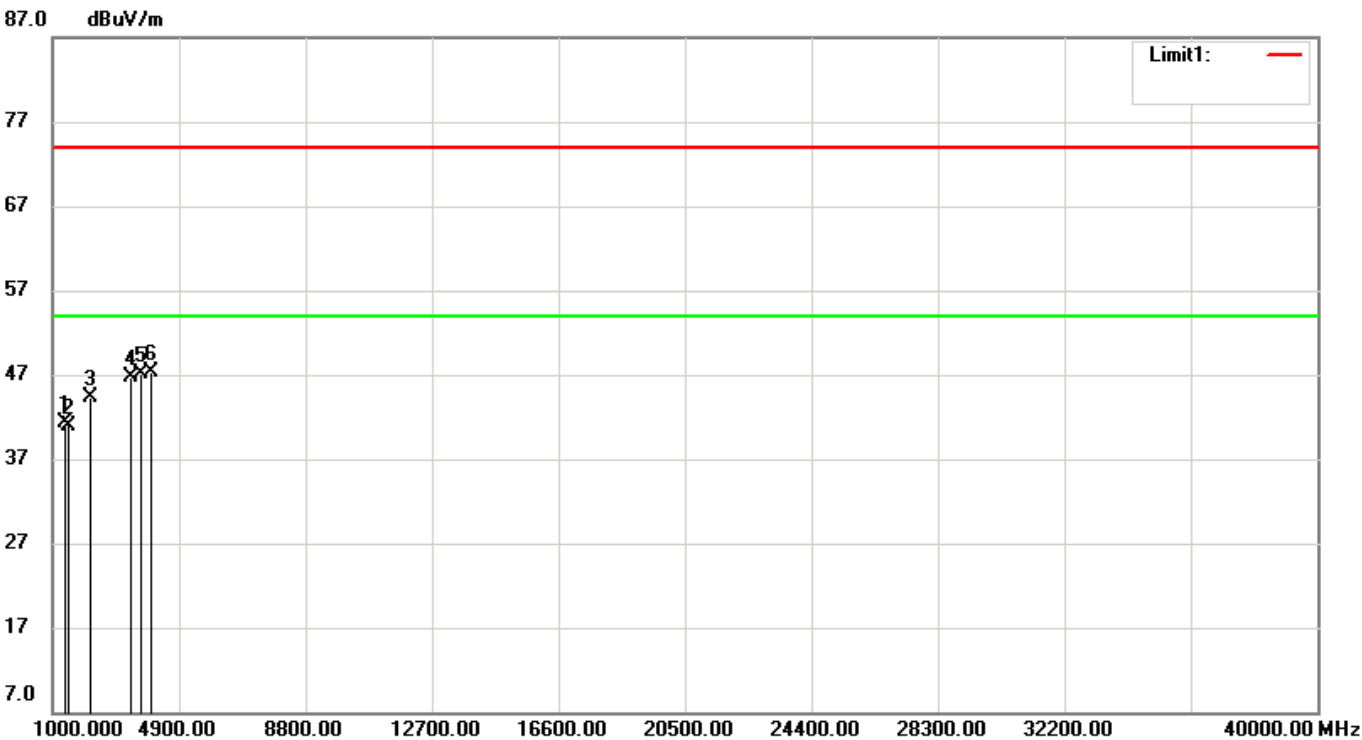
註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

10.5.2.3 調變技術: IEEE 802.11ac (40MHz)

a. Channel Low

操作模式：發射接收
基本波頻率：5270 MHz

File: 20-08-MAS-001_5-3ac40 #25 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Horizontal
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH LOW-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1360.97750	49.79	peak	-8.54	41.25	74.00	-32.75
2	1456.33000	49.23	peak	-8.30	40.93	74.00	-33.07
3	2137.41980	47.76	peak	-3.37	44.39	74.00	-29.61
4	3411.05760	48.02	peak	-1.31	46.71	74.00	-27.29
5	3717.54800	47.72	peak	-0.60	47.12	74.00	-26.88
6	4030.84930	47.21	peak	0.15	47.36	74.00	-26.64

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

操作模式：發射接收

基本波頻率：5270 MHz

File: 20-08-MAS-001_5-3ac40

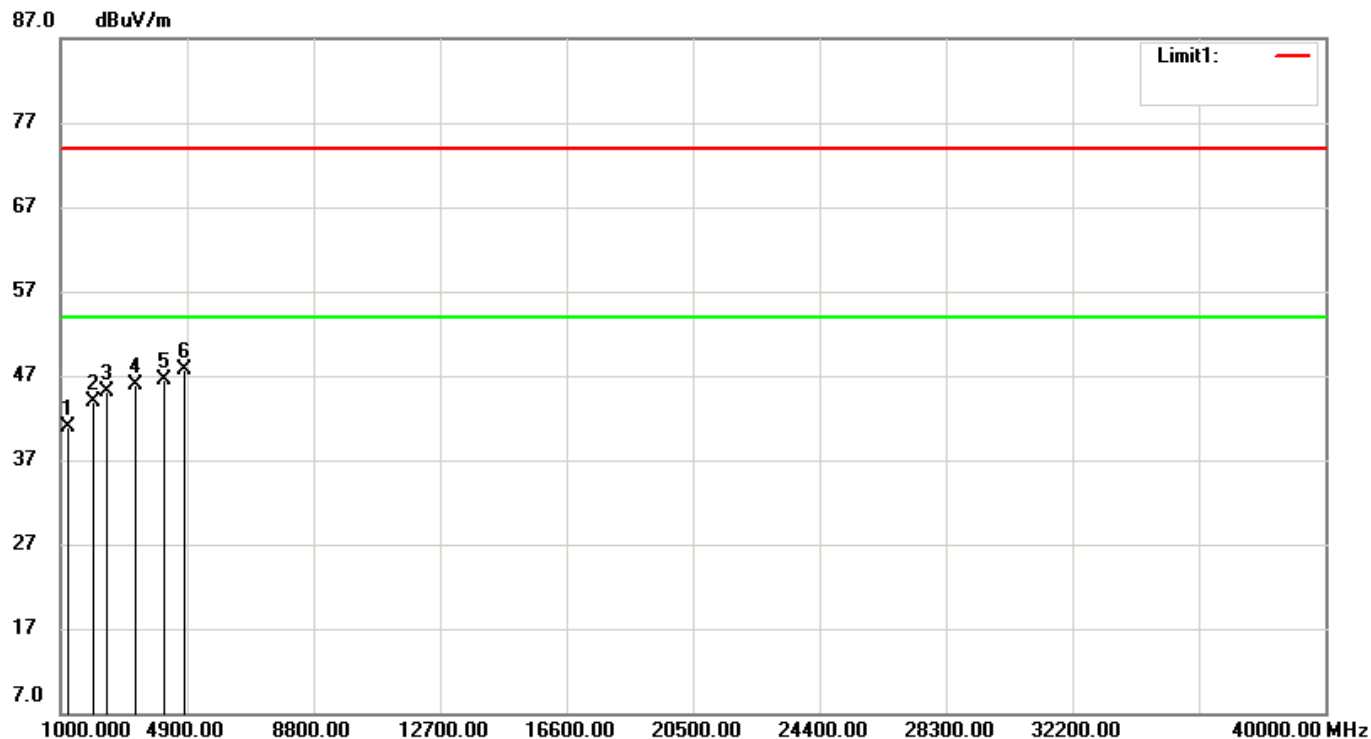
#26

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
 EUT: Communication Module
 Model: Type2AW
 Test Mode: UNII
 Note: CH LOW-1

Polarization: Vertical
 Distance: 3m
 Operator: Phillip

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1231.57050	49.87	peak	-8.88	40.99	74.00	-33.01
2	1973.95830	47.89	peak	-3.96	43.93	74.00	-30.07
3	2416.66660	47.76	peak	-2.64	45.12	74.00	-28.88
4	3302.08330	47.37	peak	-1.46	45.91	74.00	-28.09
5	4173.87820	46.16	peak	0.25	46.41	74.00	-27.59
6	4800.48070	46.65	peak	1.03	47.68	74.00	-26.32

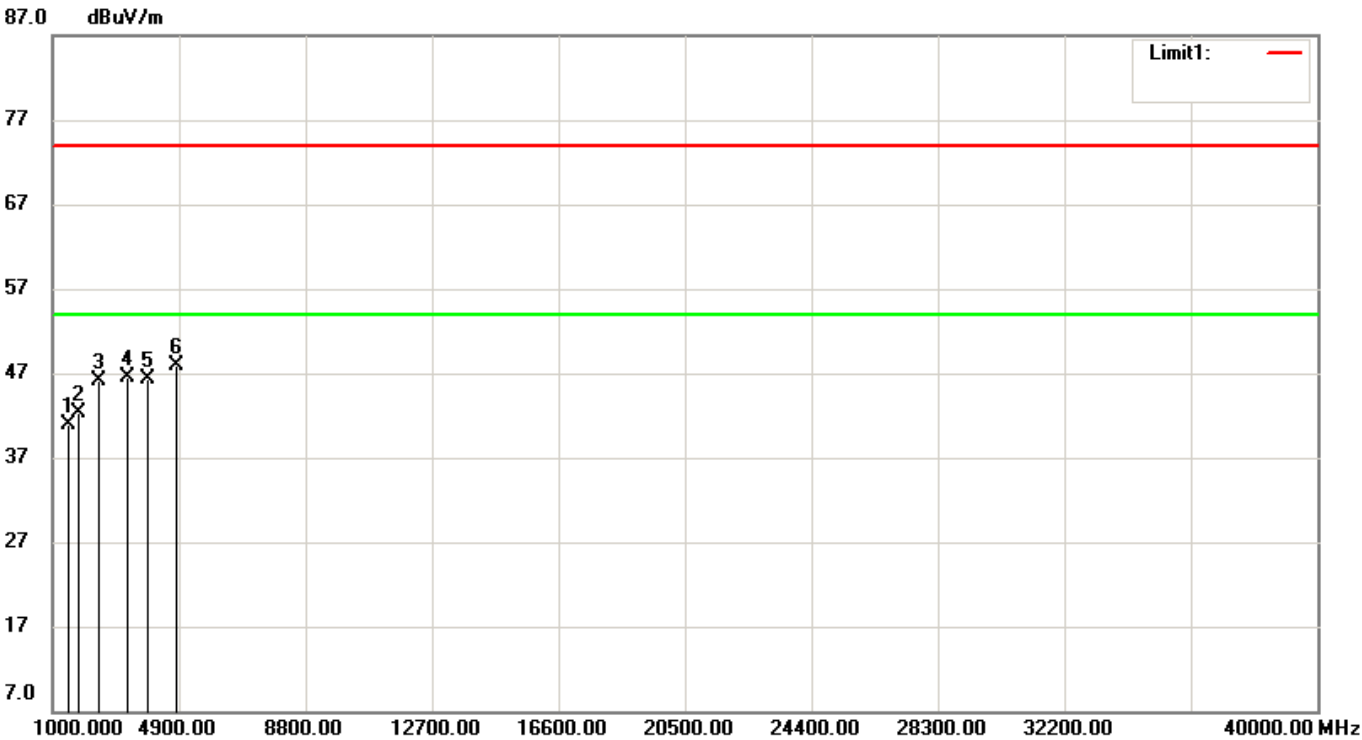
註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

b. Channel High

操作模式：發射接收
基本波頻率：5310 MHz

File: 20-08-MAS-001_5-3ac40 #27 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



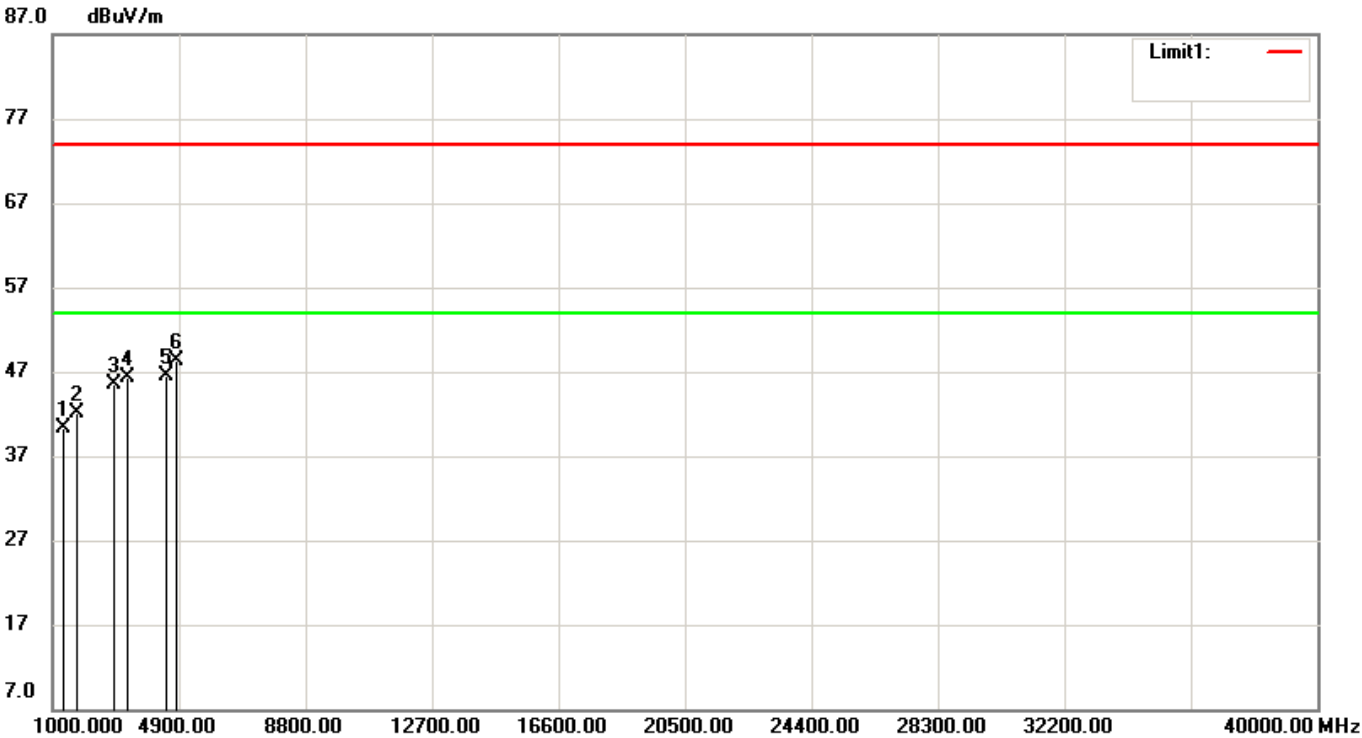
Condition: NCC_Above1G_Pk Polarization: Horizontal
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH HIGH-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1463.14100	49.24	peak	-8.27	40.97	74.00	-33.03
2	1790.06410	47.97	peak	-5.60	42.37	74.00	-31.63
3	2416.66660	48.69	peak	-2.64	46.05	74.00	-27.95
4	3261.21800	47.99	peak	-1.52	46.47	74.00	-27.53
5	3901.44230	46.40	peak	-0.12	46.28	74.00	-27.72
6	4786.85900	46.96	peak	1.00	47.96	74.00	-26.04

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

操作模式：發射接收
基本波頻率：5310 MHz

File: 20-08-MAS-001_5-3ac40 #28 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH HIGH-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1252.00320	49.16	peak	-8.82	40.34	74.00	-33.66
2	1721.95510	48.25	peak	-6.21	42.04	74.00	-31.96
3	2832.13140	47.62	peak	-2.07	45.55	74.00	-28.45
4	3274.83950	47.72	peak	-1.50	46.22	74.00	-27.78
5	4453.12500	46.07	peak	0.43	46.50	74.00	-27.50
6	4786.85900	47.29	peak	1.00	48.29	74.00	-25.71

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

10.5.2.4 調變技術: IEEE 802.11ac (80MHz)

操作模式 : 發射接收

基本波頻率 : 5290 MHz

File: 20-08-MAS-001_5-3ac80

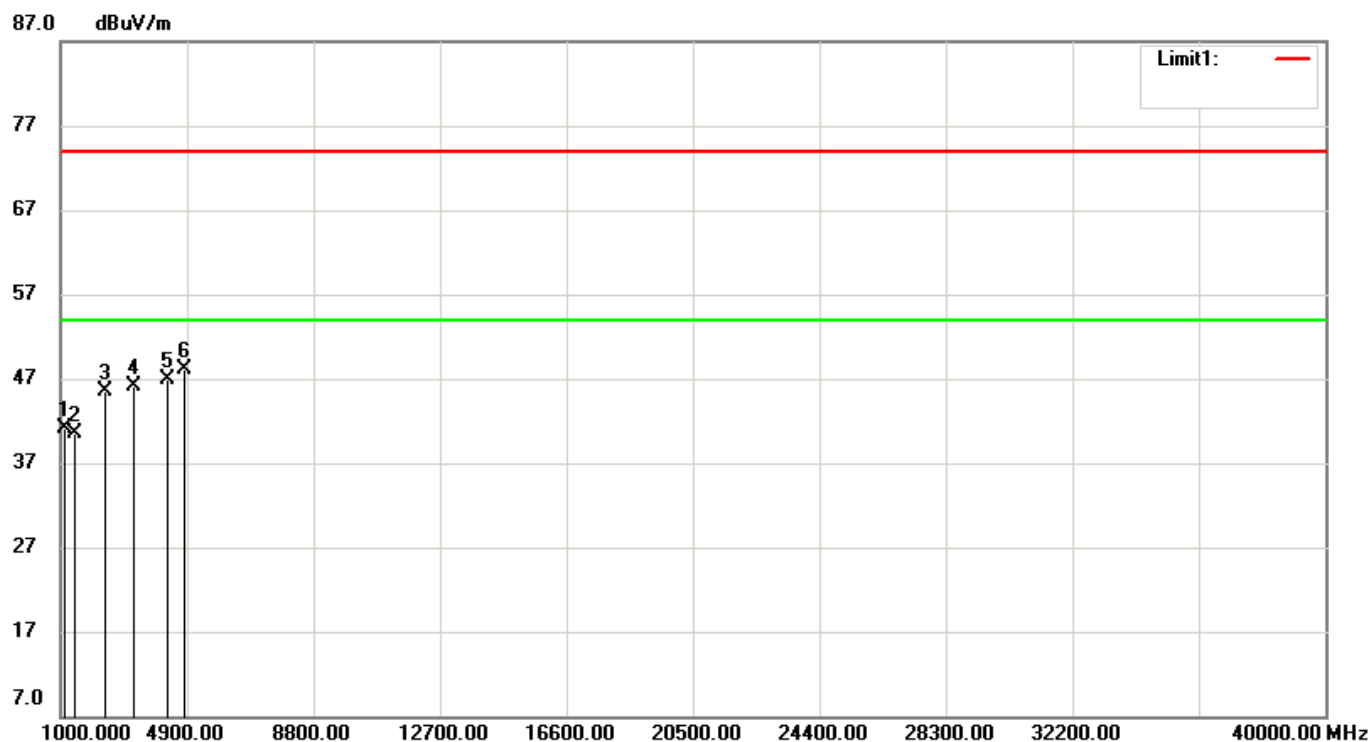
#23

Date: 2020/10/16

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_Above1G_Pk
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: CH LOW-1

Polarization: Horizontal
Distance: 3m
Operator: Phillip

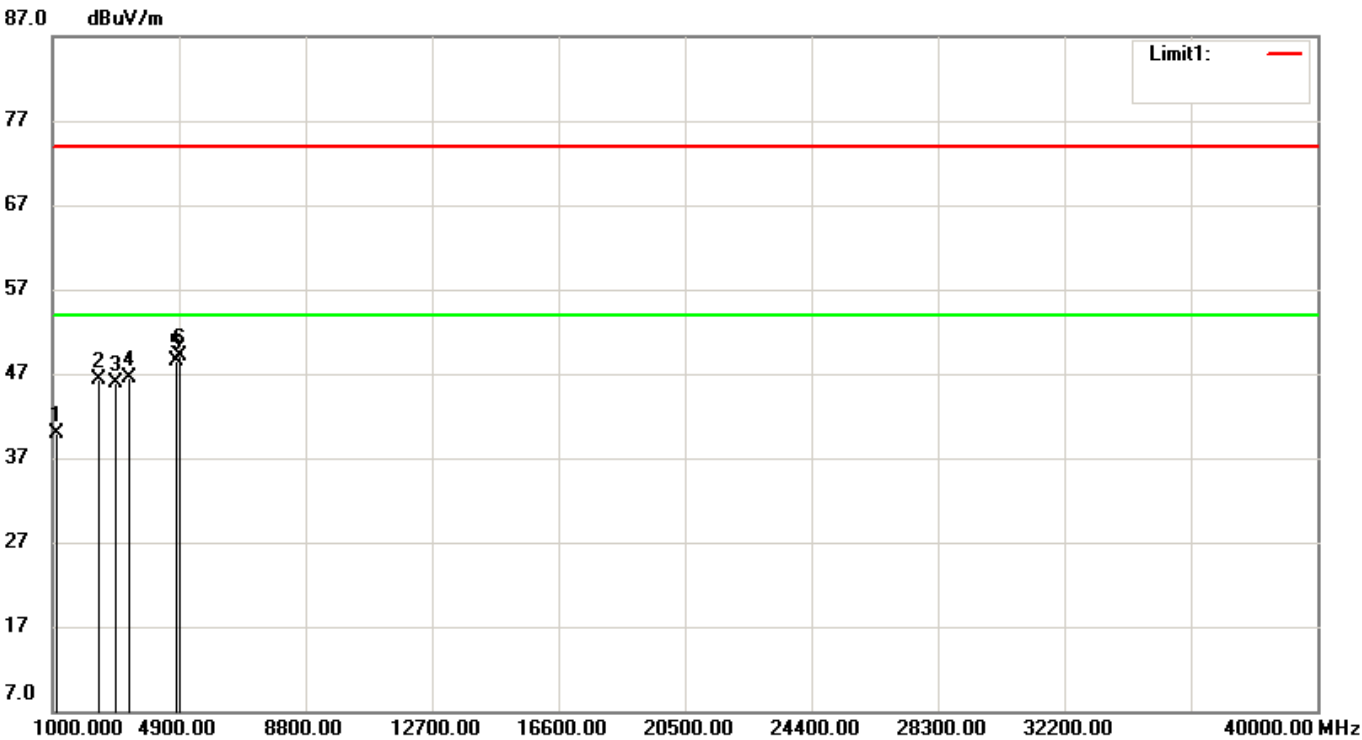
No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1074.91970	50.36	peak	-9.28	41.08	74.00	-32.92
2	1388.22110	48.89	peak	-8.46	40.43	74.00	-33.57
3	2368.99030	48.17	peak	-2.76	45.41	74.00	-28.59
4	3193.10900	47.66	peak	-1.62	46.04	74.00	-27.96
5	4255.60900	46.56	peak	0.30	46.86	74.00	-27.14
6	4793.66980	47.11	peak	1.02	48.13	74.00	-25.87

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。

2. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f < 18\text{GHz}$)
 $\pm 4.4\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

操作模式：發射接收
基本波頻率：5290 MHz

File: 20-08-MAS-001_5-3ac80 #24 Date: 2020/10/16 Temperature: 22 °C
Site: RE02-EMC B1- N2 Humidity: 58 %



Condition: NCC_Above1G_Pk Polarization: Vertical
EUT: Communication Module Distance: 3m
Model: Type2AW
Test Mode: UNII Operator: Phillip
Note: CH LOW-1

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	1095.35250	49.16	peak	-9.22	39.94	74.00	-34.06
2	2409.85560	48.99	peak	-2.66	46.33	74.00	-27.67
3	2886.61850	47.83	peak	-2.02	45.81	74.00	-28.19
4	3349.75960	47.99	peak	-1.39	46.60	74.00	-27.40
5	4786.85900	47.44	peak	1.00	48.44	74.00	-25.56
6	4875.40060	47.98	peak	1.17	49.15	74.00	-24.85

註：1. 若以峰值檢測功能測量之值符合平均值限制值，則可視同以平均值功能測量之值亦符合平均值限制值。
2. 量測不準確度: $\pm 4.1\text{dB}(1\text{GHz} \leq f < 18\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$
 $\pm 4.4\text{dB}(18\text{GHz} \leq f \leq 40\text{GHz})$

10.5.3 其它不必要之訊號

測試狀態: IEEE 802.11a

File: 20-08-MAS-001_Below 1G

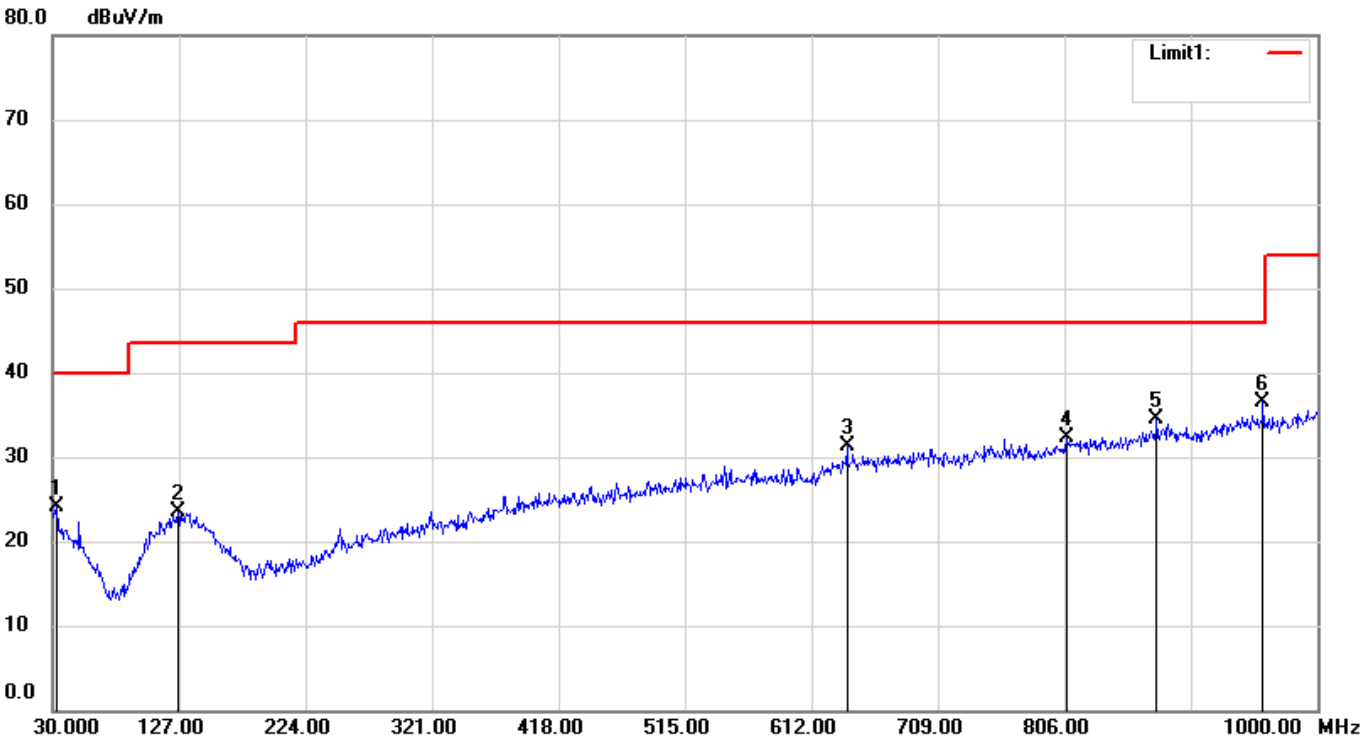
#7

Date: 2020/10/20

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Communication Module

Distance: 3m

Model: Type2AW

Operator: Phillip

Test Mode: Band2

Note:

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	32.9100	28.36	QP	-4.28	24.08	40.00	-15.92
2	126.0300	27.28	QP	-3.81	23.47	43.50	-20.03
3	639.1600	29.28	QP	1.99	31.27	46.00	-14.73
4	807.9400	27.81	QP	4.42	32.23	46.00	-13.77
5	876.8100	28.38	QP	6.11	34.49	46.00	-11.51
6	958.2900	28.67	QP	7.91	36.58	46.00	-9.42

File: 20-08-MAS-001_Below 1G

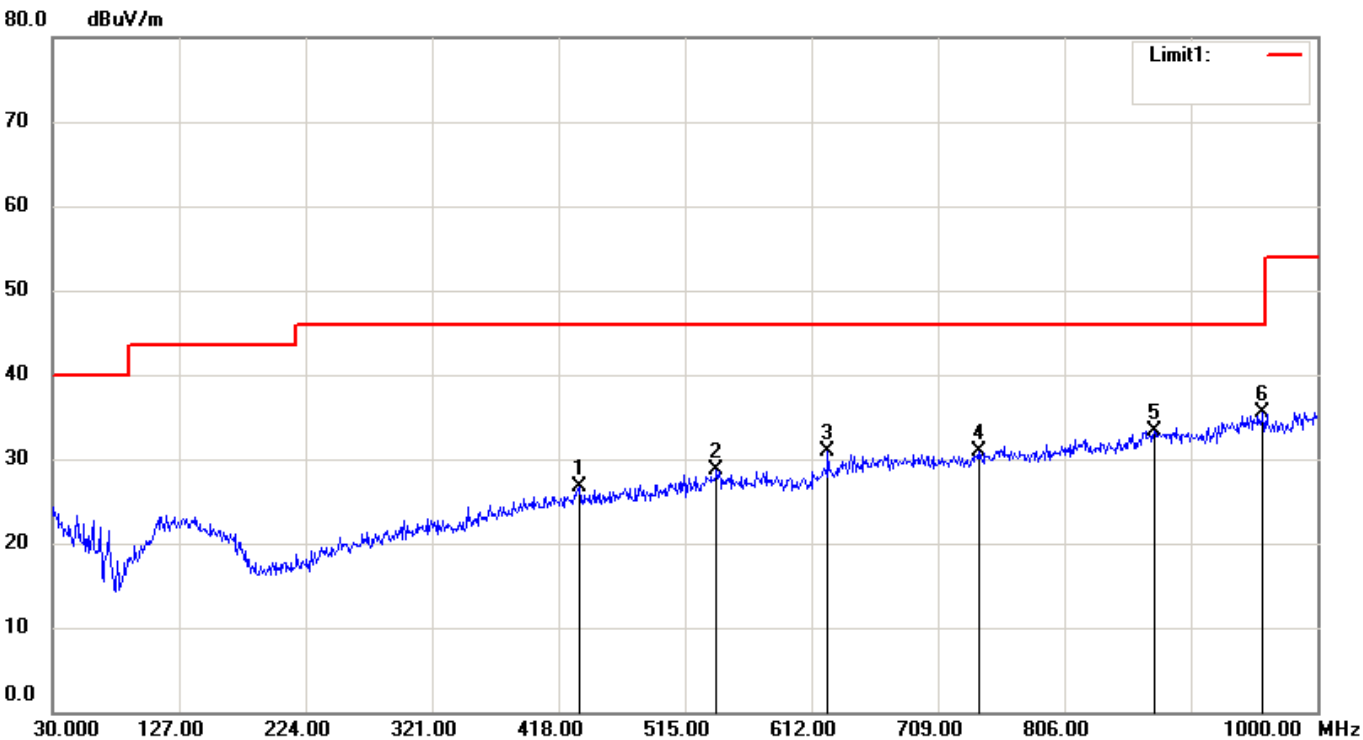
#8

Date: 2020/10/20

Temperature: 22 °C

Site: RE02-EMC B1- N2

Humidity: 58 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Communication Module

Distance: 3m

Model: Type2AW

Operator: Phillip

Test Mode: Band2

Note:

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	434.4900	28.35	QP	-1.56	26.79	46.00	-19.21
2	539.2500	28.81	QP	-0.19	28.62	46.00	-17.38
3	624.6100	29.51	QP	1.35	30.86	46.00	-15.14
4	740.0400	27.58	QP	3.38	30.96	46.00	-15.04
5	874.8700	27.19	QP	6.08	33.27	46.00	-12.73
6	958.2900	27.53	QP	7.91	35.44	46.00	-10.56

註：1. 若以峰值檢測功能測量之值符合準峰值限制值，則可視同以準峰值功能測量之值亦符合準峰值限制值。

2. 量測不準確度: +4.20dB/ -4.24 dB (30MHz≤f<1GHz)

10.6 頻帶外邊緣輻射場強之量測結果

操作模式: 發射接收

測試日期: Oct. 16, 2020

環境溫度: 22°C

環境濕度: 58%

10.6.1 調變技術: IEEE 802.11a

輻射 頻率	儀器讀值@3m (dBuV/m)				校正 因子	結果值		限制值@3m		餘裕值 (worse)	
	水平		垂直			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	峰值	平均值	峰值	平均值	(dB)	峰值	平均值	峰值	平均值	峰值	平均值
5150.000	26.72	12.90	26.80	12.89	38.47	65.27	51.37	74.00	54.00	-8.73	-2.63
5350.000	30.28	13.60	30.59	13.75	38.91	69.50	52.66	74.00	54.00	-4.50	-1.34

10.6.2 調變技術: IEEE 802.11ac (20MHz)

輻射 頻率	儀器讀值@3m (dBuV/m)				校正 因子	結果值		限制值@3m		餘裕值 (worse)	
	水平		垂直			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	峰值	平均值	峰值	平均值	(dB)	峰值	平均值	峰值	平均值	峰值	平均值
5150.000	26.82	12.91	27.10	12.90	38.47	65.57	51.38	74.00	54.00	-8.43	-2.62
5350.000	28.30	12.73	27.53	12.79	38.91	67.21	51.70	74.00	54.00	-6.79	-2.30

10.6.3 調變技術: IEEE 802.11ac (40MHz)

輻射 頻率	儀器讀值@3m (dBuV/m)				校正 因子	結果值		限制值@3m		餘裕值 (worse)	
	水平		垂直			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	峰值	平均值	峰值	平均值	(dB)	峰值	平均值	峰值	平均值	峰值	平均值
5150.000	26.87	12.92	27.29	12.90	38.47	65.76	51.39	74.00	54.00	-8.24	-2.61
5351.939	31.35	13.87	31.61	14.20	38.91	70.52	53.11	74.00	54.00	-3.48	-0.89

10.6.4 調變技術: IEEE 802.11ac (80MHz)

輻射 頻率	儀器讀值@3m (dBuV/m)				校正 因子	結果值		限制值@3m		餘裕值 (worse)	
	水平		垂直			(dBuV/m)		(dBuV/m)		(dB)	
(MHz)	峰值	平均值	峰值	平均值	(dB)	峰值	平均值	峰值	平均值	峰值	平均值
5146.202	26.67	12.91	27.19	12.90	38.46	65.65	51.37	74.00	54.00	-8.35	-2.63
5350.000	27.70	13.08	27.59	13.17	38.91	66.61	52.08	74.00	54.00	-7.39	-1.92

註: 1. 量測不準確度: $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

2. 量測頻率範圍為 4500 ~ 5250 MHz 及 5350 ~ 5460 MHz, 並記錄兩頻率範圍中之最大讀值。

10.7 頻帶外邊緣直接量測之量測結果

調變技術: IEEE 802.11a

File: 20-08-MAS-001_5-3a

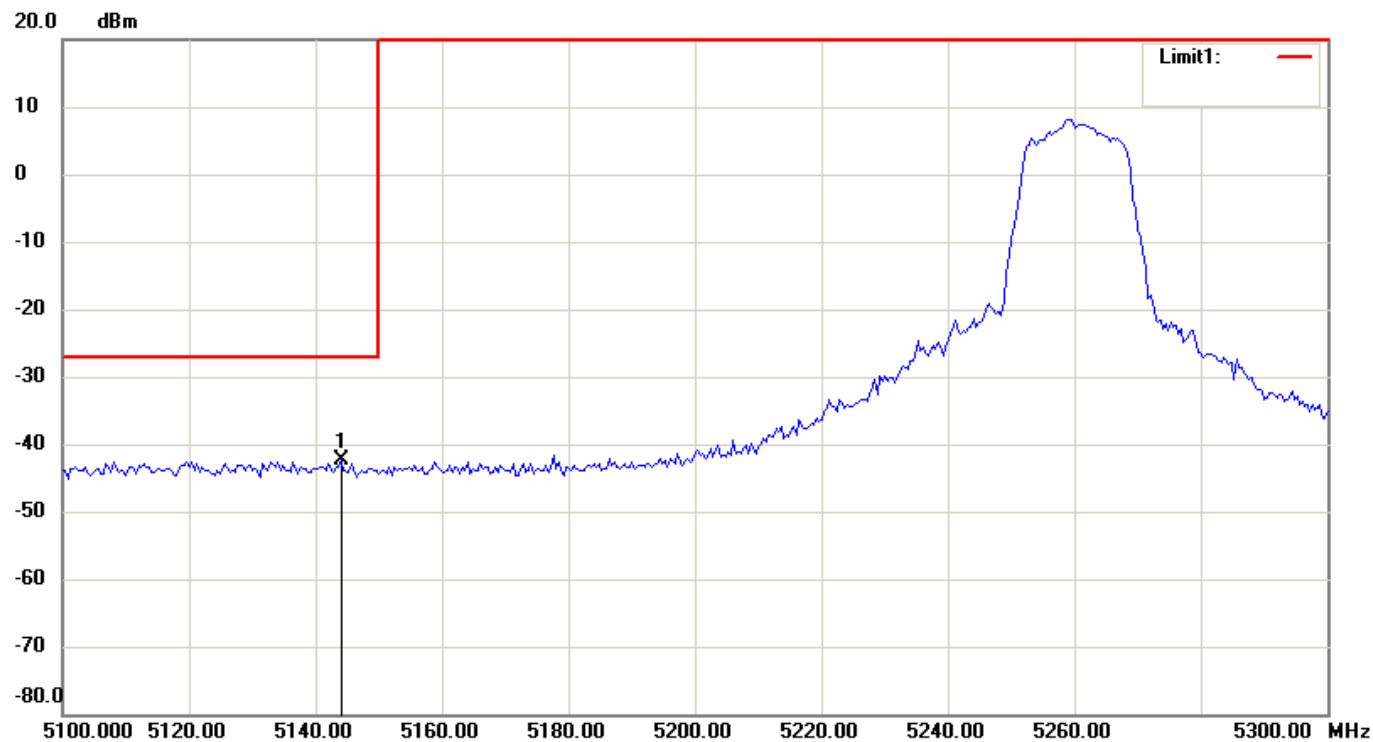
Data #7

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

RF Conducted

EUT: Communication Module

Sweep Time: 1ms Att.: 25dB

Model: Type2AW

RBW: 1000 KHz VBW: 3000 KHz

Test Mode: UNII

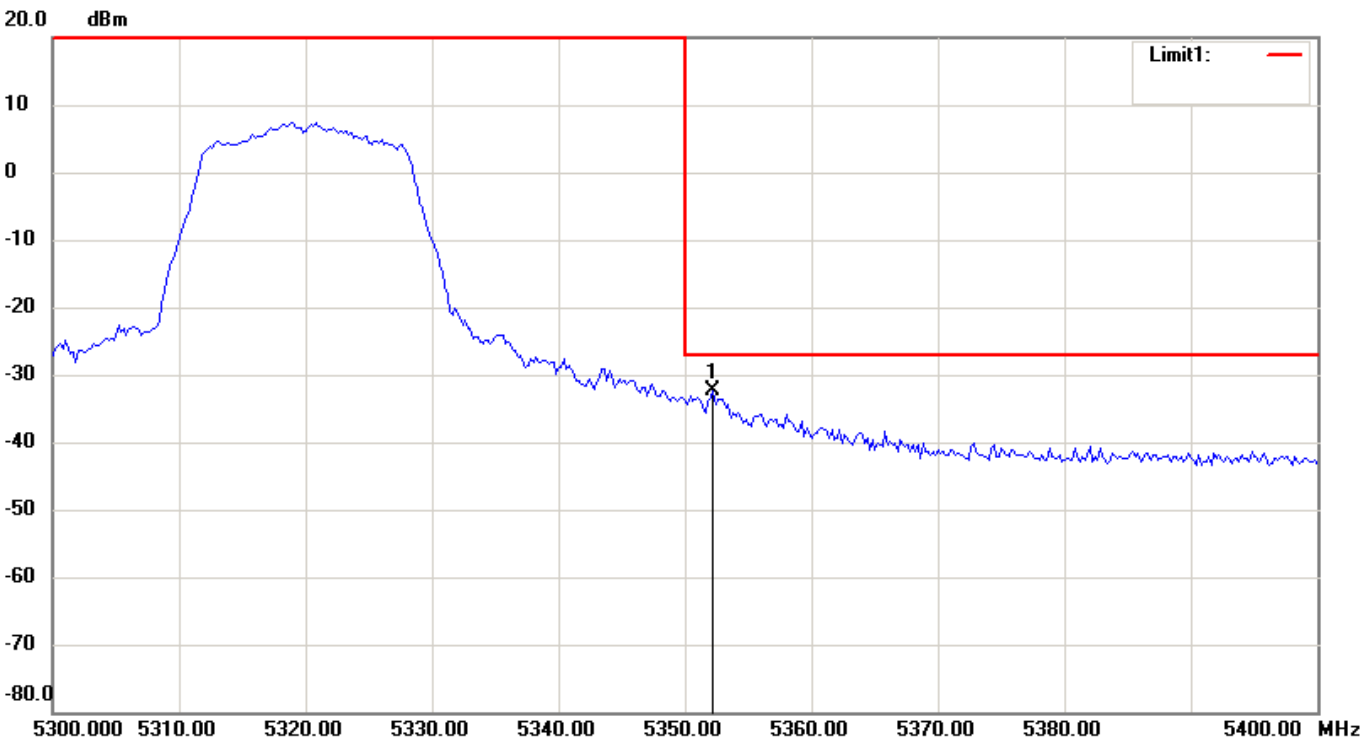
Operator: Phillip

Note: NCC_LP0002_802.11a Channel 52_Low_Bandedge

No.	Frequency(MHz)	Level(dBm)
1	5144.00000	-42.33

File: 20-08-MAS-001_5-3a
Site: RF-Cond01

#20 Date: 2020/10/19 Temperature: 25 °C
Humidity: 52 %



Condition:	UNII-Band1-2-Bandedge	RF Conducted	
EUT:	Communication Module	Sweep Time: 1ms	Att.: 25dB
Model:	Type2AW	RBW: 1000 KHz	VBW: 3000 KHz
Test Mode:	UNII	Operator:	Phillip
Note:	NCC_LP0002_802.11a Channel 64_High_Bandedge		

No.	Frequency(MHz)	Level(dBm)
1	5352.20000	-32.47

調變技術: IEEE 802.11ac (20MHz)

File: 20-08-MAS-001_5-3ac20

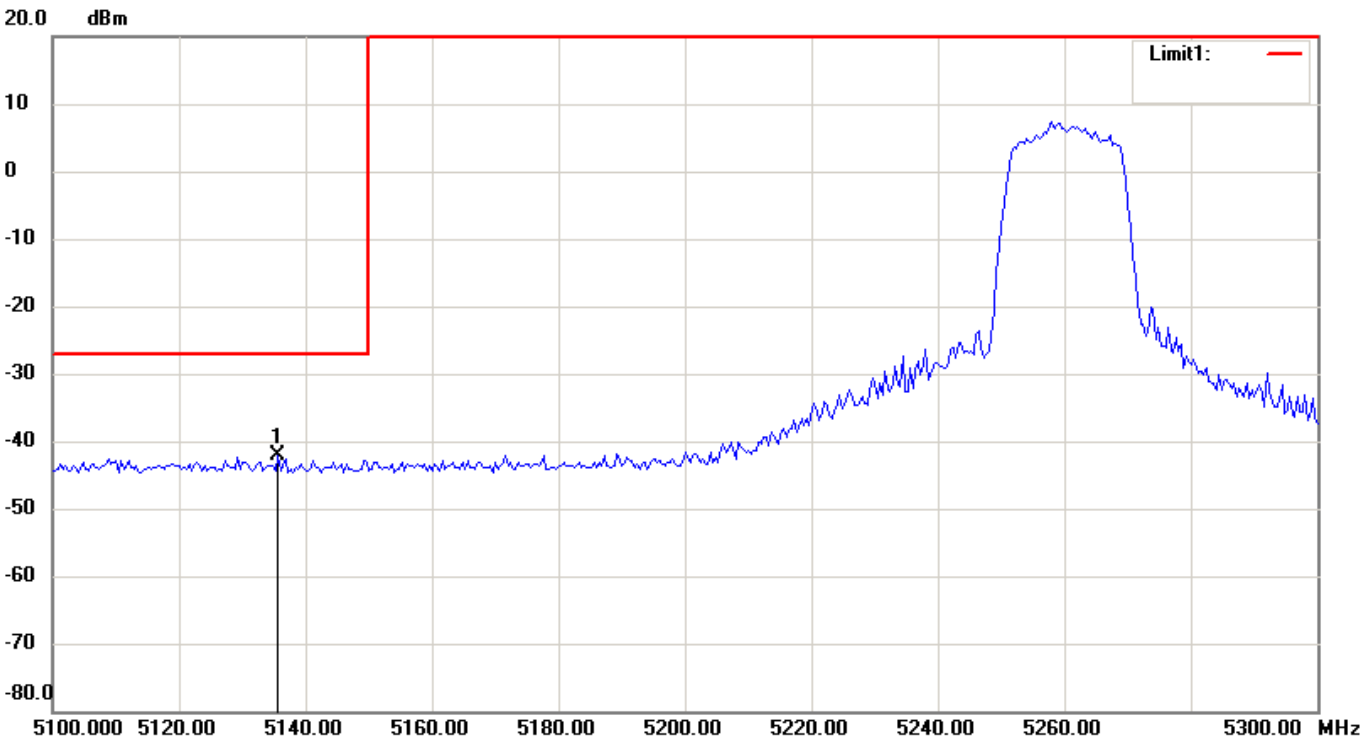
Data #7

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac20 Channel 52_Low_Bandedge

RF Conducted

Sweep Time: 1ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	5135.60000	-42.19

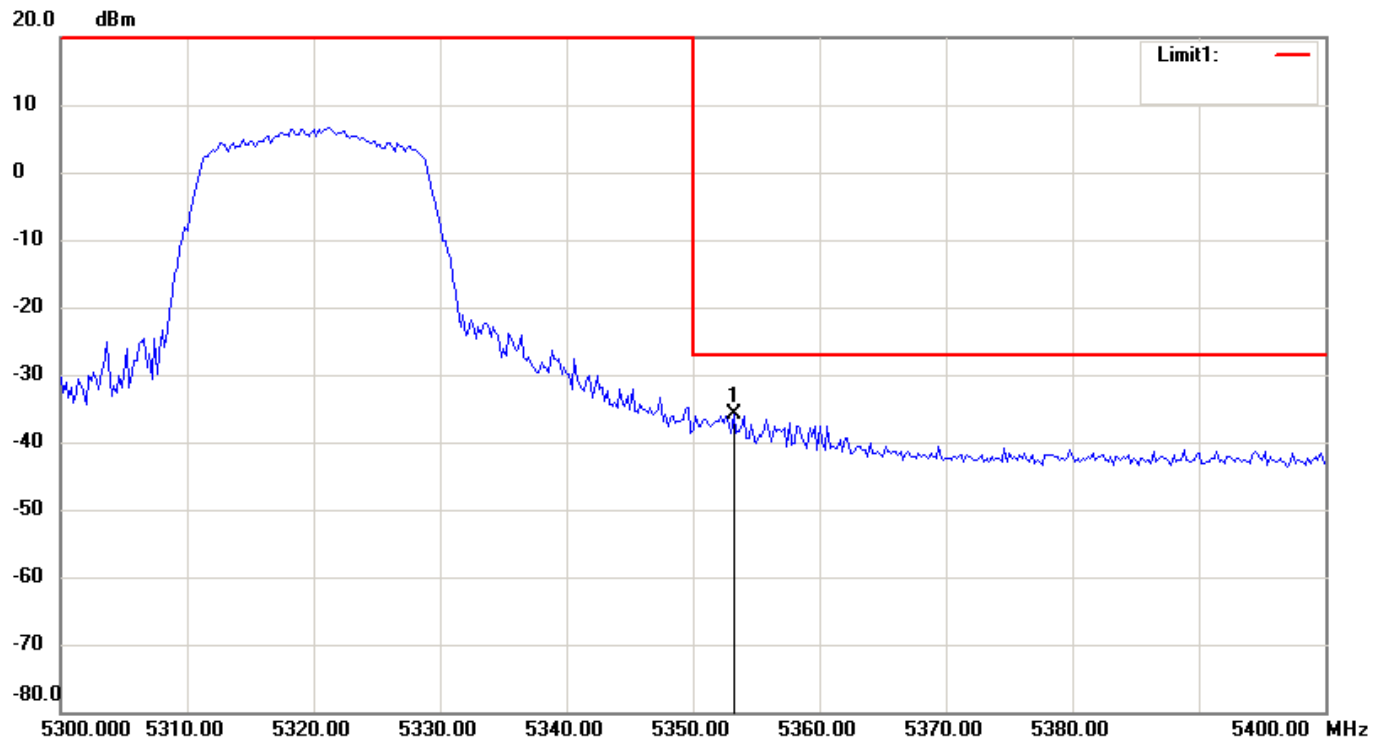
File: 20-08-MAS-001_5-3ac20
Site: RF-Cond01

#20

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac20 Channel 64_High_Bandedge

RF Conducted
Sweep Time: 1ms Att.: 25dB
RBW: 1000 KHz VBW: 3000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5353.20000	-35.88

調變技術: IEEE 802.11ac (40MHz)

File: 20-08-MAS-001_5-3ac40

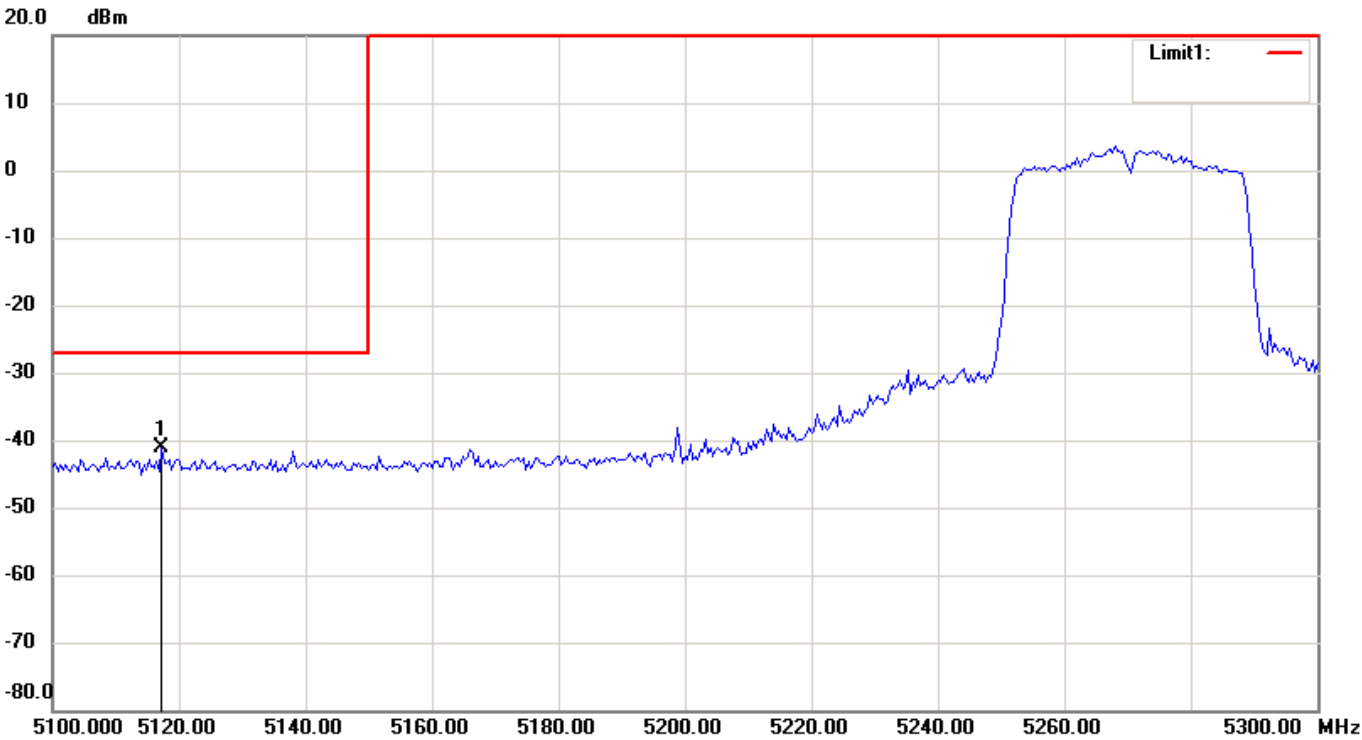
#7

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac40 Channel 54_Low_Bandedge

RF Conducted

Sweep Time: 1ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	5117.20000	-41.16

File: 20-08-MAS-001_5-3ac40

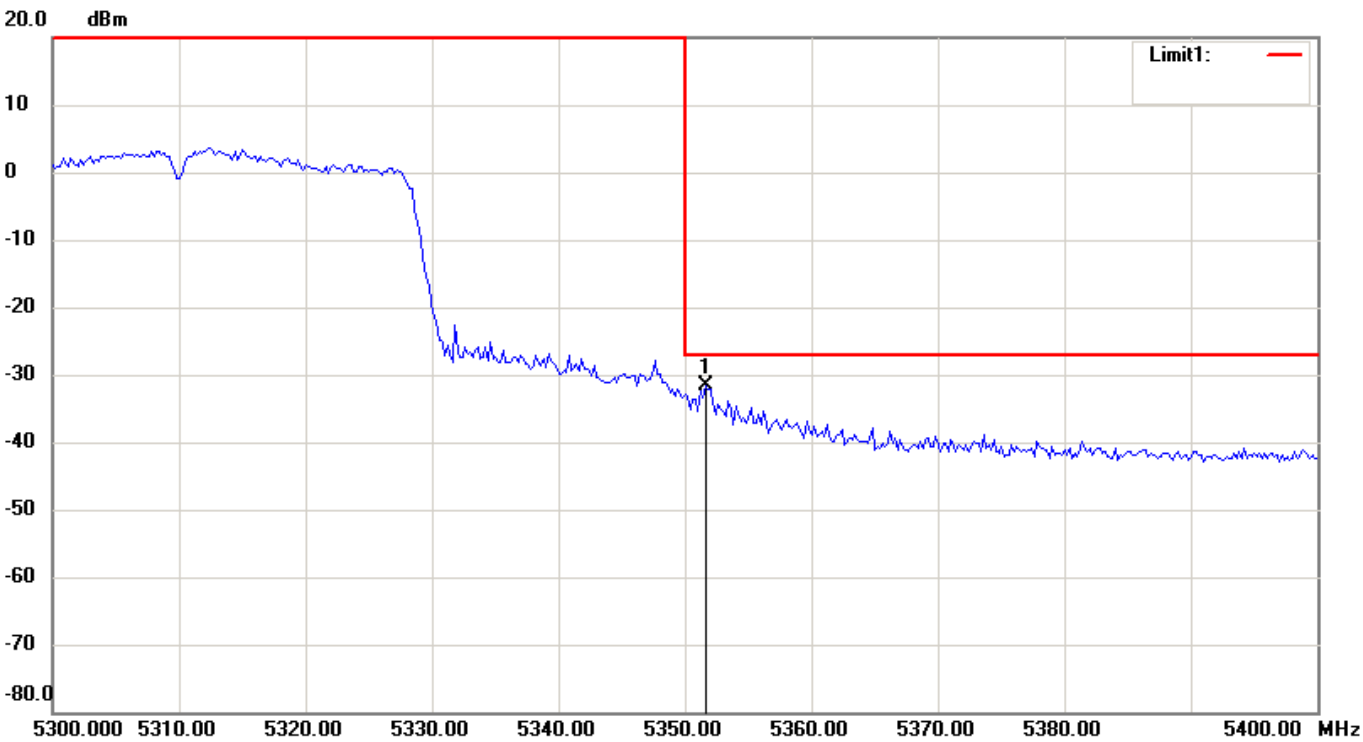
#14

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac40 Channel 62_High_Bandedge

RF Conducted

Sweep Time: 1ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	5351.60000	-31.53

調變技術: IEEE 802.11ac80

File: 20-08-MAS-001_5-3ac80

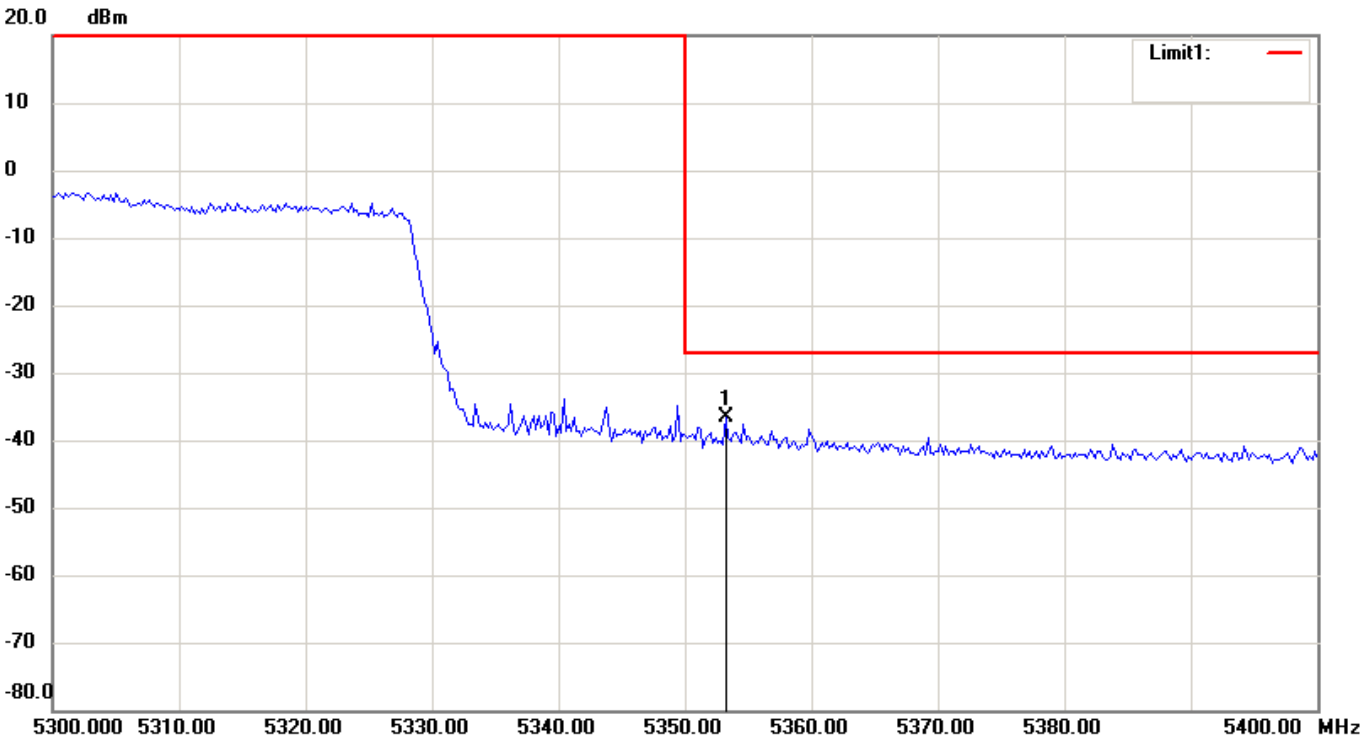
#8

Date: 2020/10/19

Temperature: 25 °C

Site: RF-Cond01

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Note: NCC_LP0002_802.11ac80 Channel 58_High_Bandedge

RF Conducted

Sweep Time: 1ms

RBW: 1000 KHz

Operator:

Att.: 25dB

VBW: 3000 KHz

Phillip

No.	Frequency(MHz)	Level(dBm)
1	5353.20000	-36.58

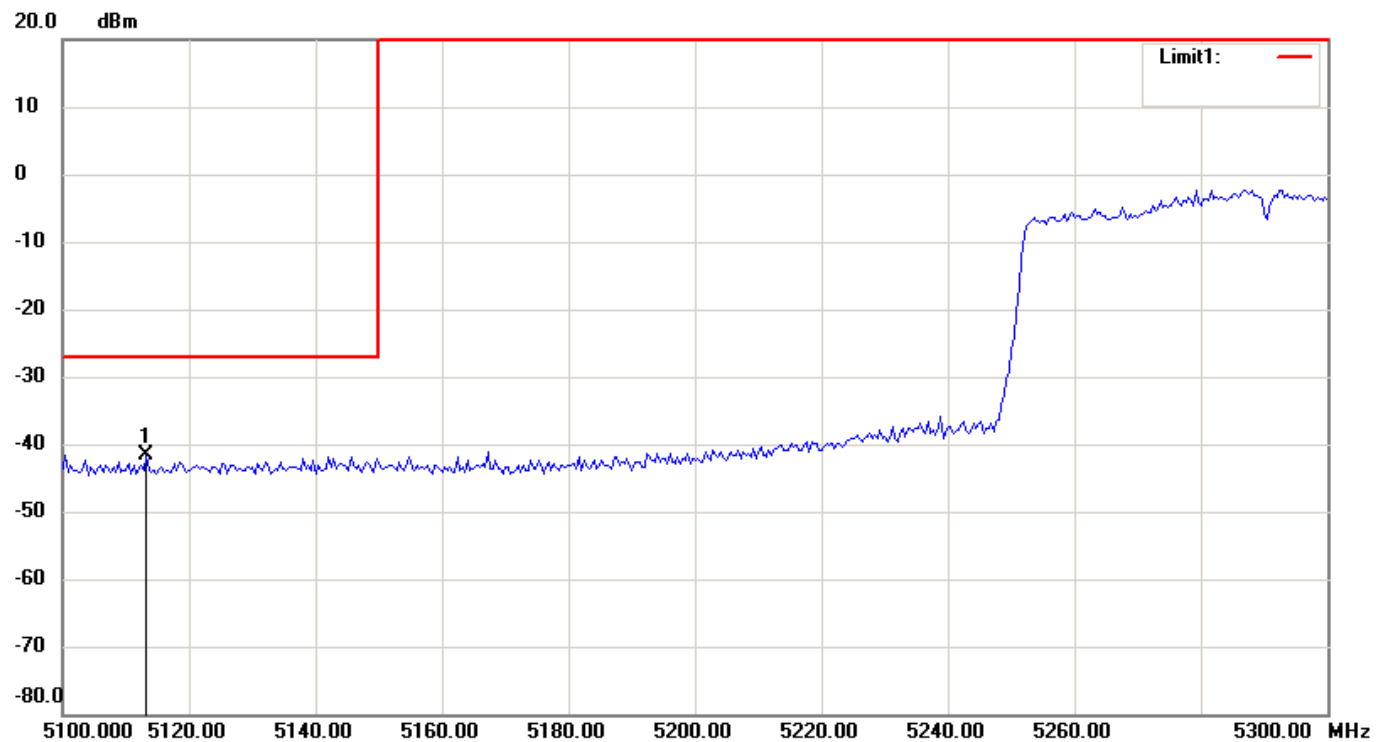
File: 20-08-MAS-001_5-3ac80
Site: RF-Cond01

#7

Date: 2020/10/19

Temperature: 25 °C

Humidity: 52 %



Condition: UNII-Band1-2-Bandedge
EUT: Communication Module
Model: Type2AW
Test Mode: UNII
Note: NCC_LP0002_802.11ac80 Channel 58_Low_Bandedge

RF Conducted
Sweep Time: 1ms Att.: 25dB
RBW: 1000 KHz VBW: 3000 KHz
Operator: Phillip

No.	Frequency(MHz)	Level(dBm)
1	5113.20000	-41.73

10.8 結果判定

以上頻帶外邊緣測試之結果皆低於限制值-27dBm，合乎標準規定。

10.9 輻射之測試配置

圖 2: 量測頻率低於1GHz之測試配置

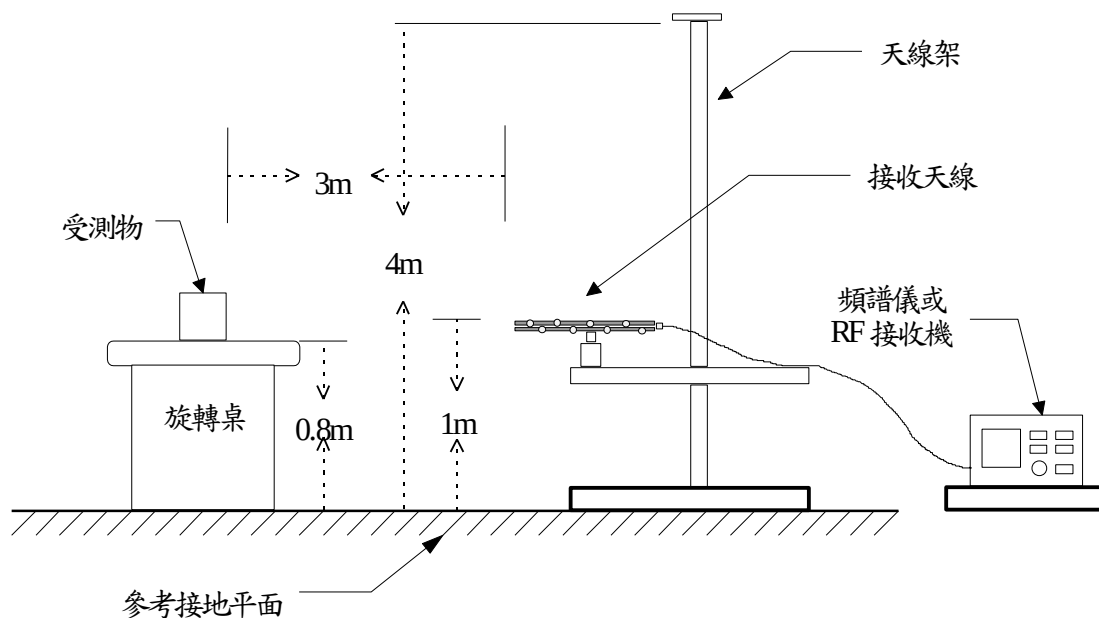
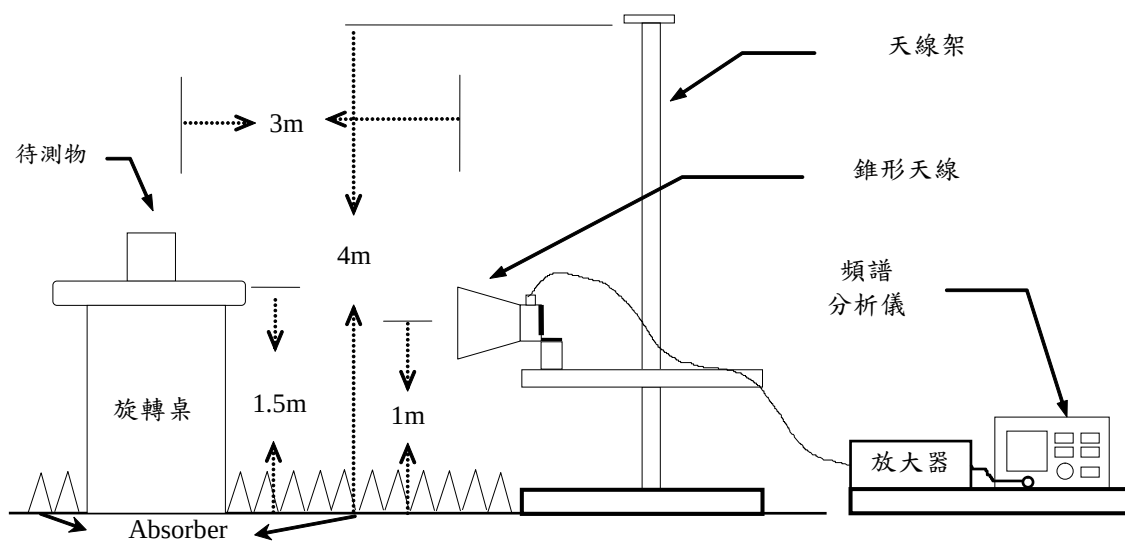


圖 3: 量測頻率高於1GHz之測試配置



10.10 輻射量測之配置照片

請參考產品照片

11 發射功率控制(TPC)之量測

11.1 發射功率控制(TPC)適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範4.7.7.1節之規定，操作於 5.25GHz ~5.35GHz 與5.470GHz~5.725GHz 頻段的設備，應具備發射功率控制機能。設備必須至少具有6dB 低於平均 EIRP 30dBm 的能力。EIRP 低於 500mW 之系統不須具備 TPC機能。

11.2 發射功率控制(TPC)之測試配置

如圖 1 所示。

11.3 適用性

Highest Power Level in DFS Bnd (EIRP)		14.12dBm -0.4 dBi =13.72 dBm =23.6 mW
☒	EIRP < 500 mW	Not Applicable
☐	EIRP $\geq$ 500 mW	Applicable

12 動態頻率選擇(DFS)之量測

12.1 LIMITS

依據國家通訊傳播委員會低功率射頻器材技術規範 4.7.7.2 節之規定與 FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION.

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	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 each of the bonded 20 MHz channels and the channel center frequency.		

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (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 4: DFS Response Requirement Values

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> 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.	

Table 5 – 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 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	$\text{Roundup} \left\{ \left(\frac{1}{360} \right), \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	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 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Table 6 – 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

12.2 產品描述

12.2.1 待測物

DFS 操作頻帶	☒ 5250MHz~5350MHz
操作模式	☐ 主控 (Master)
	☒ 受控 (Client without In-Service Monitoring)
	☐ 受控 (Client with In-Service Monitoring)
頻道負載運作方式	☒ IP Based System
	☐ Frame Based System
	☐ Other System _____

Note: The tested level is lower than the required level hence it provides margin to the limit.

12.3 測試系統

12.3.1 系統描述

12.3.1.1 雷達信號

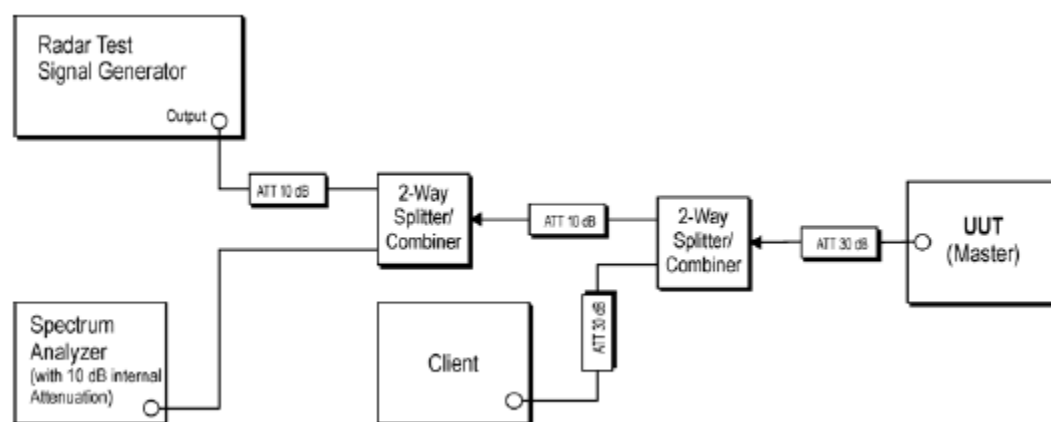
所有雷達信號依據 FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 之規定產生。

12.3.1.2 參考信號負載

無線傳輸信號負載使用由美國電信資訊署(N.T.I.A)參考系統所提供之 MPEG 影像檔。
資料傳送方向由 Master 傳送到 Client。

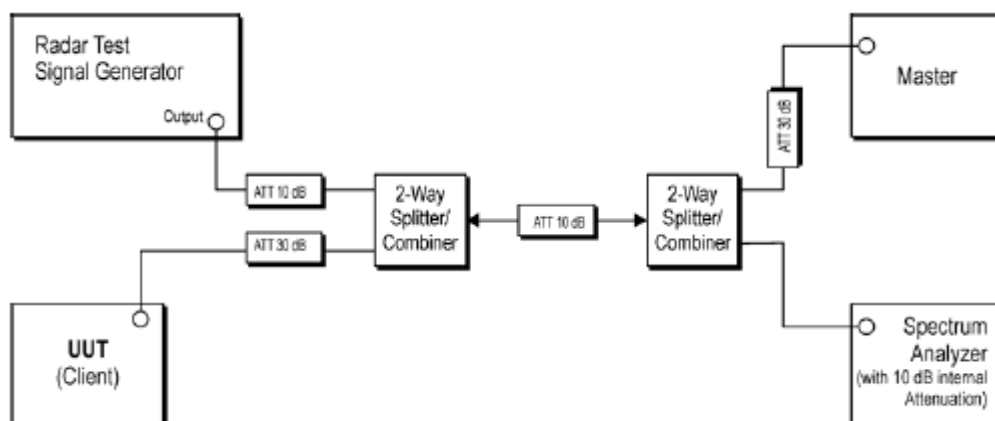
12.3.2 系統配置

12.3.2.1 Setup for Master with injection at the Master



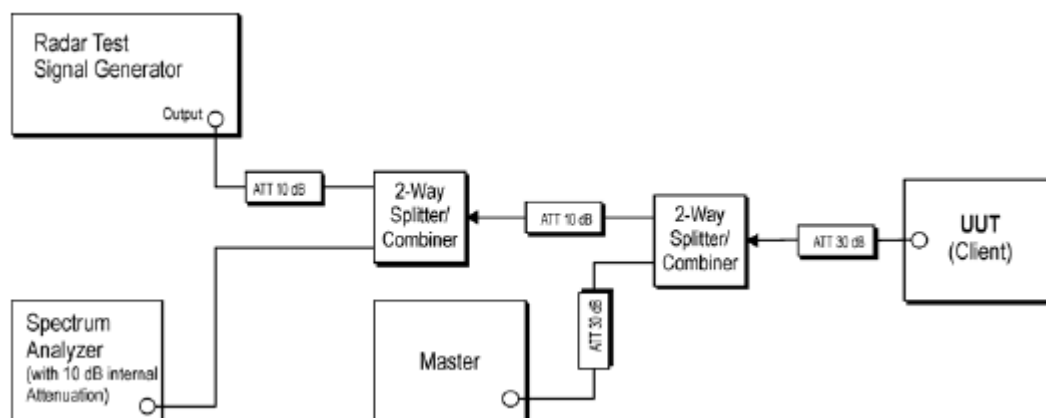
主控設備配置圖

12.3.2.2 Setup for Client with injection at the Master



受控設備配置圖 1(Client without In-Service Monitoring)

12.3.2.3 Setup for Client with injection at the Client



受控設備配置圖 2 (Client with In-Service Monitoring)

12.3.3 量測儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	R&S	FSU46
Vector Signal Generator	R&S	SMU200A

12.3.4 使用週邊

裝置名稱	製造者/代理者	型 號	纜 線 說 明
Notebook	Dell	Inspiron 1420	非隔離電源線 3.3m*1 / Adaptor 非隔離信號線 1.0m*1/RJ45
Notebook	HP	650G1	非隔離電源線 2.8m*1 / Adaptor 非隔離信號線 1.0m*1/RJ45
Access Point	I O Data	WN-AC1167GR	非隔離電源線 1.5m*1 / Adaptor

12.4 測試頻道及測試方法

12.4.1

測試方法	☒ 直接量測方式	☐ 輻射方式
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12.4.2 使用雷達信號

使用 Short Pulse Radar Type 0 ， Level = -64dBm 。

12.5 量測結果

12.5.1 Radar TYPE 0 CHANNEL MOVE TIME RESULTS

結果判定：符合標準規定。

Modulation	Operation Frequency (MHz)	Channel Move Time (s)	Limit (s)
IEEE 802.11ac VHT80	5290	< 10S	10

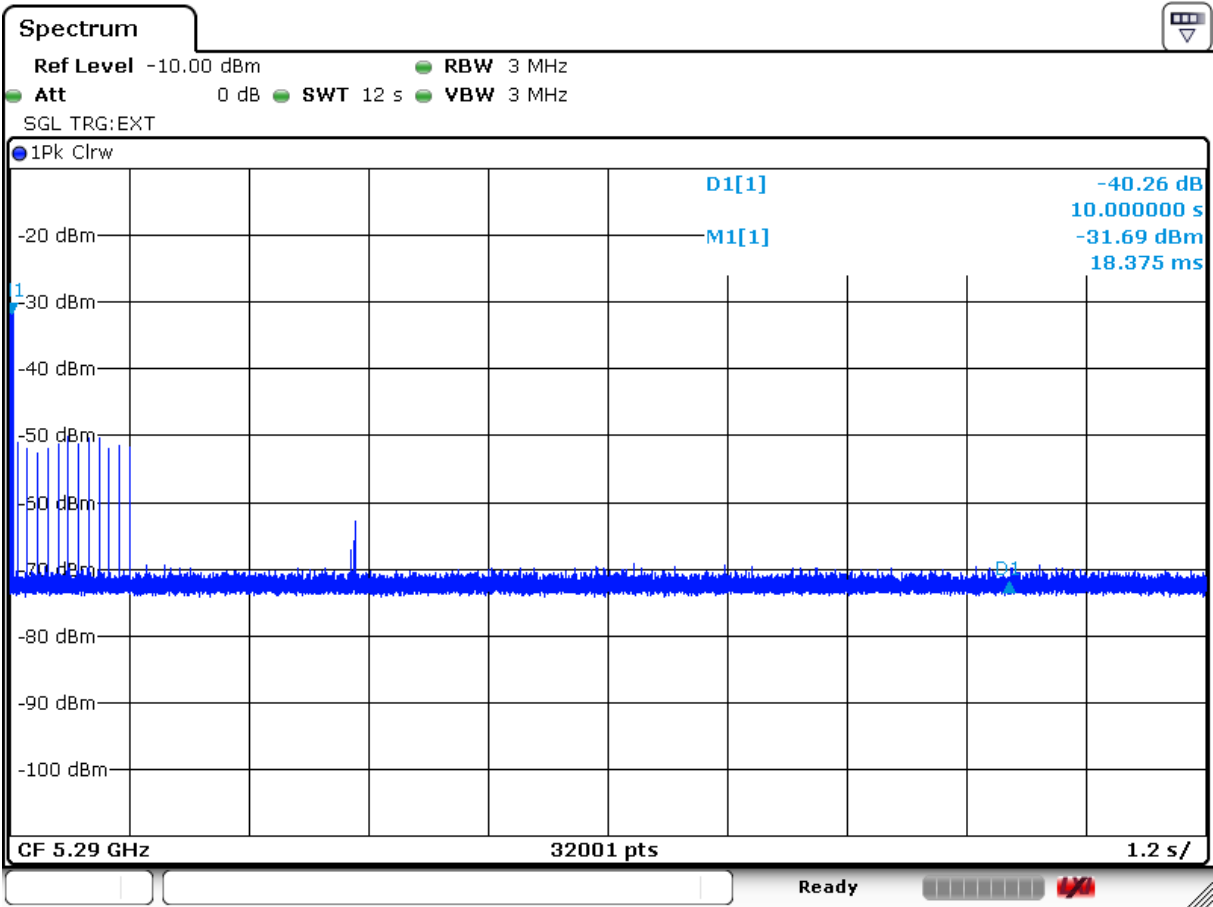
File: 20-08-MAS-001_5-3

Date: 2020/9/11

Temperature: 24 °C

Site: RF-Cond02

Humidity: 50 %



Condition:

NCC_LP0002

RF Conducted

EUT:

Communication Module

Model:

Type2AW

Test Mode:

UNII

Operator: Phillip

Note:

12s-1

12.5.2 Radar TYPE 0 CHANNEL CLOSING TRANSMISSION TIME RESULTS

The following plot demonstrates a channel close time of <200ms, with an aggregate of no more than 60 ms.

結果判定：符合標準規定。

Modulation	Operation Frequency (MHz)	Aggregate Transmission Time (ms)	Limit (ms)
IEEE 802.11ac VHT80	5290	8	60

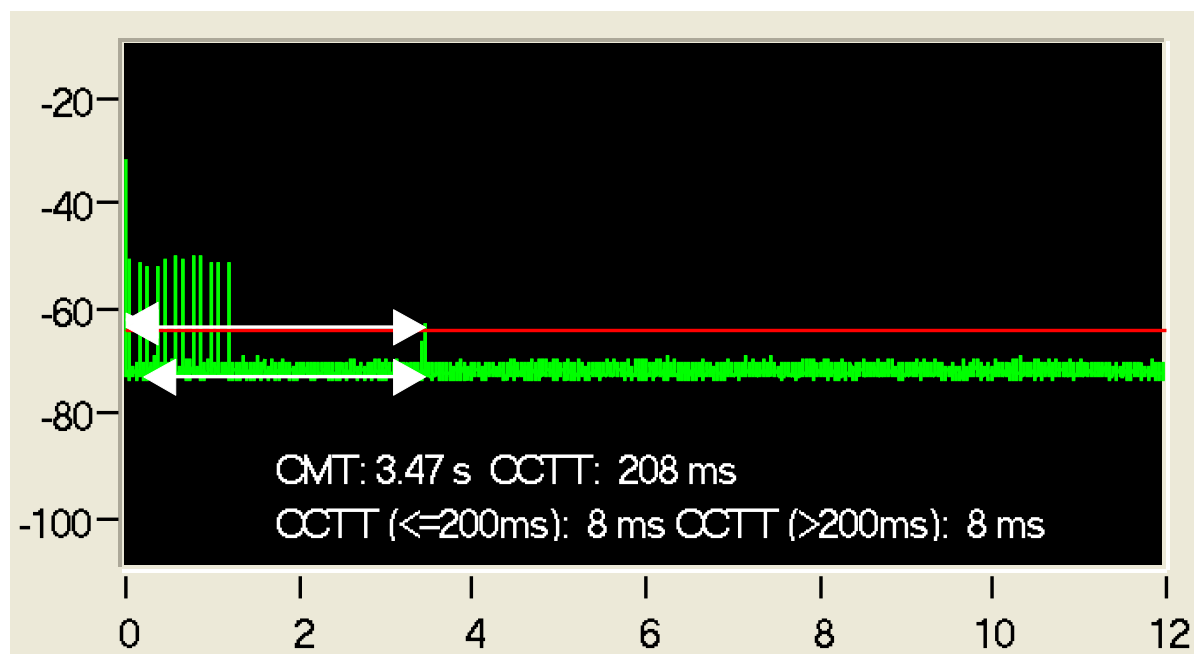
File: 20-08-MAS-001_5-3

Date: 2020/9/11

Temperature: 24 °C

Site: RF-Cond02

Humidity: 50 %



Condition: NCC_LP0002

RF Conducted

EUT: Communication Module

Model: Type2AW

Test Mode: UNII

Operator: Phillip

Note: 12s-2

Aggregate Transmission Time =

(Number of analyzer bins showing Transmission) * (dwell time per bin)

=8 ms

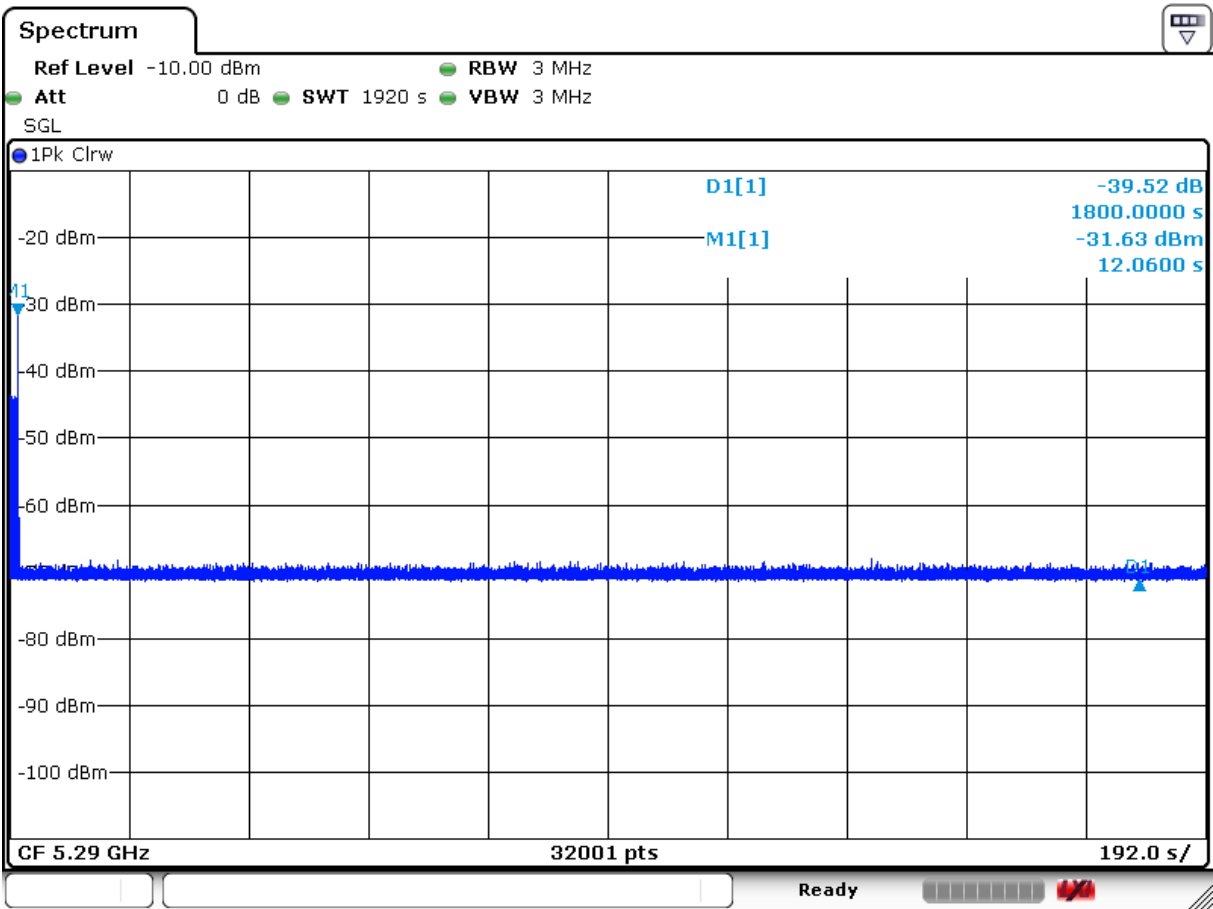
12.5.3 Non-occupncy Period (Associated Test)

No EUT Transmissions were observed on the test channel during the 30-minute observation time.

結果判定：符合標準規定。

File: 20-08-MAS-001_5-3
Site: RF-Cond02

Date: 2020/9/11 Temperature: 24 °C
Humidity: 50 %



Condition:	NCC_LP0002	RF Conducted
EUT:	Communication Module	
Model:	Type2AW	
Test Mode:	UNII	Operator: Phillip
Note:	30 min	

13 量測之儀器

儀器名稱	製造者	型 號	財產編號/序號	校驗日期	下次校驗日期
Spectrum Analyzer	R&S	FSV	13052017-001	06/12/2020	06/11/2021
Attenuator	WEINSCHEL	56-10	58772	04/24/2020	04/23/2021
EMI Receiver	R&S	ESCI	13054423-001	12/24/2019	12/25/2020
Spectrum Analyzer	R&S	FSU46	13040904-001	05/28/2020	05/27/2021
Horn Antenna	EMCO	3117	13059211-004	04/21/2020	04/20/2021
Horn Antenna	EMCO	3116	13059202-001	11/15/2019	11/14/2020
PRE-Amplifier	Agilent	8449B	13040709-001	12/31/2019	12/30/2020
PRE-Amplifier	Agilent	8447D	13040715-002	04/22/2020	04/21/2021
BiLog Antenna	ETC	MCTD 2786	BL19J04024	01/14/2020	01/13/2021
PRE-Amplifier	Agilent	83051A	13052916001	09/18/2020	09/17/2021
Vector Signal Generator	R&S	SMU200A	13549901-002	06/08/2020	06/07/2021