NCC

低功率射頻電機型式試驗報告

產品名稱	：藍牙耳機
型號	：T2
廠牌	：Klipsch
商標	：Klipsch
申請者	：釪環數位音響有限公司
申請者地址	：臺中市霧峰區五福里中投西路二段 442 號
測試標準	：LP0002 (107 年版)
參考法規	：ANSI C63.10-2013
測試結果	：符合
接收日期	：2020/8/5
測試日期	：2020/8/19~2020/8/26

測試工程師 ： （ 陳駿豪 ）

報告審核人 ： （ 陳柏均 ）

報告簽屬人 ： （ 柯承志 ）

Testing Laboratory
3261

本測試報告僅對實驗室所受測之樣品負責
本測試報告非經本公司同意不可局部複製使用

修訂紀錄

報告編號	版本	描述	發行日期
2010TW3701-T4	1.0	Original Report	2020-10-29

備註: 原始報告為 2008TW3701-T4,證號為 CCAH20LP0720E0，此次為複製報告，因市場銷售需求僅變更產品型號，依工程判定不須重新檢測比對新器材設備之主波輸出功率/電場強度與原取得審驗案件器材設備於+/-2dB 範圍內之要求，並沿用原報告之數據內容。

CONTENTS

Description **Page**

1. 一般資訊 5

2. 產品描述 6

2.1 產品資訊 6
2.2 產品規格 7
2.3 測試模式 7
2.4 測試配置 8
2.5 測試周邊 9
2.6 操作程序 9

3. 測試設備明細 10

4. 量測不確定度 11

5. 測試結果 12

5.1 電源傳導測試 13
5.1.1 量測方法 13
5.1.2 限制要求 13
5.1.3 測試架構圖 13
5.1.4 電源傳導測試結果 14
5.2 峰值傳導輸出功率 16
5.2.1 量測方法 16
5.2.2 限制要求 16
5.2.3 測試架構圖 16
5.2.4 峰值傳導輸出功率測試結果 17
5.3 天線之要求 19
5.3.1 限制要求 19
5.3.2 天線樣式 19
5.4 帶外發射限制 20
5.4.1 量測方法 20
5.4.2 限制要求 20
5.4.3 測試架構圖 20
5.4.4 帶外輻射測試結果 21
5.5 輻射電場強度 25
5.5.1 量測方法 25
5.5.2 限制要求 25
5.5.3 測試架構圖 26
5.5.4 輻射電場強度測試結果 28

5.6 頻帶邊緣 46
5.6.1 量測方法 46
5.6.2 限制要求 46
5.6.3 測試架構圖 47
5.6.4 頻帶邊緣測試結果 48
5.7. 占用頻寬 59
5.7.1 量測方法 59
5.7.2 限制要求 59
5.7.3 測試架構圖 59
5.7.4 占用頻寬測試結果 60
5.8. 功率頻譜密度 62
5.8.1 量測方法 62
5.8.2 限制要求 62
5.8.3 測試架構圖 62
5.8.4 功率頻譜密度測試結果 63

1. 一般資訊

申請者	釪環數位音響有限公司
申請者地址	臺中市霧峰區五福里中投西路二段 442 號
製造商	XIAMEN ACOUSYCOM ELECTRONIC CO.,LTD
實驗室	台灣曼瑞檢測科技有限公司
實驗室地址	33377 台灣桃園市龜山區復興二路 38 號
實驗室資訊	**1.** MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm. **2.** MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada. **3.** MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.
實驗室測試環境條件	溫度 (°C) : 20-35 / 濕度 (%RH) : 30-65

2. 產品描述

2.1 產品資訊

產品名稱	藍牙耳機
產品型號	T2
廠牌	Klipsch
商標	Klipsch
頻率範圍	2402~2480MHz
規格	Bluetooth: V5.0 LE
調變模式	GFSK
待測物電壓	By Battery (DC 3.7V)
最大輸出功率	9.162dBm
USB Type C Cable	Brand: Klipsch M/N: T2 USB Length: 50cm
無線充電盒 **#1**	Brand: Klipsch Product Name: Charging Case (Wireless charging) M/N: T2
充電盒 **#2**	Brand: Klipsch Product Name: Charging Case M/N: T2

2.2 產品規格

Type of modulation	GFSK
Data Rate	1Mbps(GFSK)

V5.0 LE

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2404 MHz	02	2406 MHz
03	2408 MHz	04	2410 MHz	05	2412 MHz
06	2414 MHz	07	2416 MHz	08	2418 MHz
09	2420 MHz	10	2422 MHz	11	2424 MHz
12	2426 MHz	13	2428 MHz	14	2430 MHz
15	2432 MHz	16	2434 MHz	17	2436 MHz
18	2438 MHz	19	2440 MHz	20	2442 MHz
21	2444 MHz	22	2446 MHz	23	2448 MHz
24	2450 MHz	25	2452 MHz	26	2454 MHz
27	2456 MHz	28	2458 MHz	29	2460 MHz
30	2462 MHz	31	2464 MHz	32	2466 MHz
33	2468 MHz	34	2470 MHz	35	2472 MHz
36	2474 MHz	37	2476 MHz	38	2478 MHz
39	2480 MHz	N/A	N/A	N/A	N/A

2.3 測試模式

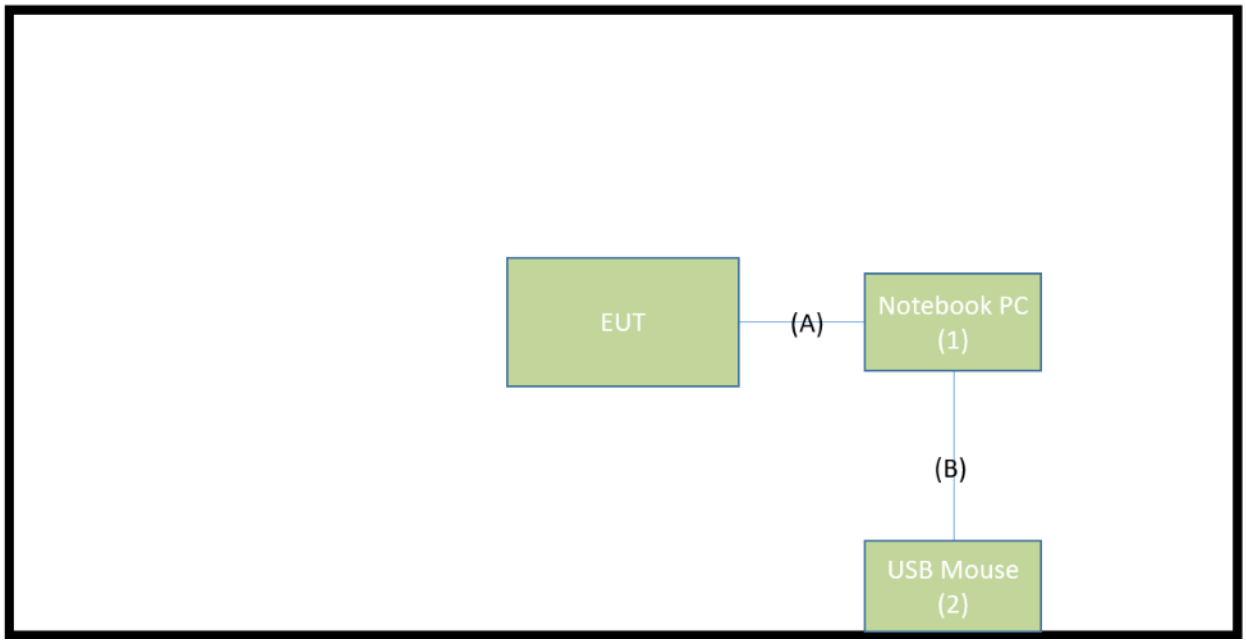
Test Mode	Mode 1: 發射器- 1Mbps(LE)
	Mode 2: 發射器- 2Mbps(LE)
	Mode 3: 接收機- 1Mbps(LE)
	Mode 4: 接收機- 2Mbps(LE)

Note:

1. 經初測驗證過，1GHz 以下的 Mode 1 & Mode 2 並無明顯差異，故僅檢附最差狀況之 Mode1; 1GHz 以下的 Mode 3 & Mode 4 並無明顯差異，故僅檢附最差狀況之 Mode3。
2. 此左耳產品(BLE)與 2008TW3701-T1 的 Normal mode 相同。

2.4 測試配置

待測物測試配置圖(Mode1~Mode4)



Signal Cable Type		Signal Cable Description
A	USB Cable	Shielded, 1.0m
B	USB Mouse Cable	Shielded, 1.6m

2.5 測試周邊

待測裝置測試時，其搭配系統測試時之週邊裝置包括如下:

(Mode1~Mode4)

No.	周邊名稱	廠牌	型號	序號	電源線
1	Notebook PC	Lenovo	T450	PC0BH4FR	Non-shielded, 0.8m
2	USB Mouse	Lenovo	M-U0025-O	HS427HA10UV	N/A

2.6 操作程序

1.	Turn on the power of all equipment.
2.	Execute “Actions V2.20” program
3.	Configure the test channel and the data rate.
4.	Start test.

3. 測試設備明細

電源傳導 – SR2

儀器名稱	製造商	型號	財產編號	校正年限	校正有效日期
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2021/3/26
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2021/4/24
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2021/5/26

輻射干擾 – AC1

儀器名稱	製造商	型號	財產編號	校正年限	校正有效日期
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2020/9/4
Broadband Horn antenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2021/4/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2021/4/24
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2021/3/24
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2021/3/25

傳導量測設備 –SR2

儀器名稱	製造商	型號	財產編號	校正年限	校正有效日期
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2020/10/2
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/7/14
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2021/3/26

EMI 測試軟體

軟體名稱	製造商	版本
e3	Audix	9.160520a
EMI	Quietek	V3

4. 量測不確定度

電源傳導量測-電源線 (Conducted Emission- Power Line)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.15MHz~30MHz: ± 2.53dB
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~30MHz: ± 3.92dB 30MHz~1GHz: ± 4.25dB 1GHz~18GHz: ± 4.40dB 18GHz~40GHz: ± 4.45dB
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.92dB (Below 30M) Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 4.25dB (30M~1G) Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 4.40dB (1G~18G) Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 4.45dB (18G~40G)
頻率誤差量測 (Frequency Error)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±78.4Hz
傳導功率量測 (Conducted Power)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 0.84dB
傳導干擾量測 (Conducted Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 2.65 dB
佔用頻寬量測 (Occupied Bandwidth)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.3%
溫度 / 濕度 (Temp. / Humidity)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±0.82°C/ ±3%
直流電源 (DC Voltage)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±0.3%

5. 測試結果

產品名稱　　藍牙耳機

型號　　T2

法規章節	量測項目	限制值	測試結果	測試數據
2.3	電源傳導	低功率射頻電機技術規範 2.3 節	符合	第 5.1 章節
3.10.1.2	峰值傳導輸出功率	≦ 30.00dBm	符合	第 5.2 章節
3.10.1.3	天線之要求	低功率射頻電機技術規範 3.10.1.3 節	符合	第 5.3 章節
3.10.1.5	帶外發射限制	≦ 20dBc(Peak)	符合	第 5.4 章節
2.8	輻射電場強度	低功率射頻電機技術規範 2.8 節	符合	第 5.5 章節
2.7	頻帶邊緣	≦ 74dBuV/m(Peak) ≦ 54dBuV/m(Average)	符合	第 5.6 章節
3.10.1.6(2)(A)	占用頻寬	≧ 500KHz	符合	第 5.7 章節
3.10.1.6(2)(B)	功率頻譜密度	≦ 8dBm	符合	第 5.8 章節

備註：符合性的判定是基於測試結果符合規範的限制值或客戶的宣告要求，測試結果的判定是不考慮測量不確定度的值。

5.1 電源傳導測試

5.1.1 量測方法

待測物放置於1m*2m*0.8m之非導體桌面並離垂直牆面40cm（落地型產品置於地上），將待測物之電源線接至電源阻抗網路器(LISN)，同時保持待測物至LISN距80公分，並將電源線多餘部份以30至40公分之八字形捆綁於電源線中央並離地40cm，於在正常工作狀態下，執行待測物之火線(Line)及地線(neutral)各一次量測。

電源端點場強之測量範圍由 0.15MHz –30MHz，所量測之讀值皆為準尖峰值(Quasi-Peak Value)及平均值(Average Value)。 場強接收機之解析頻寬為9kHz。

備 註: 經初測驗證過，電源端點干擾測試對測試頻道數並無差異，因此檢附其中一個測試頻道之測試數。

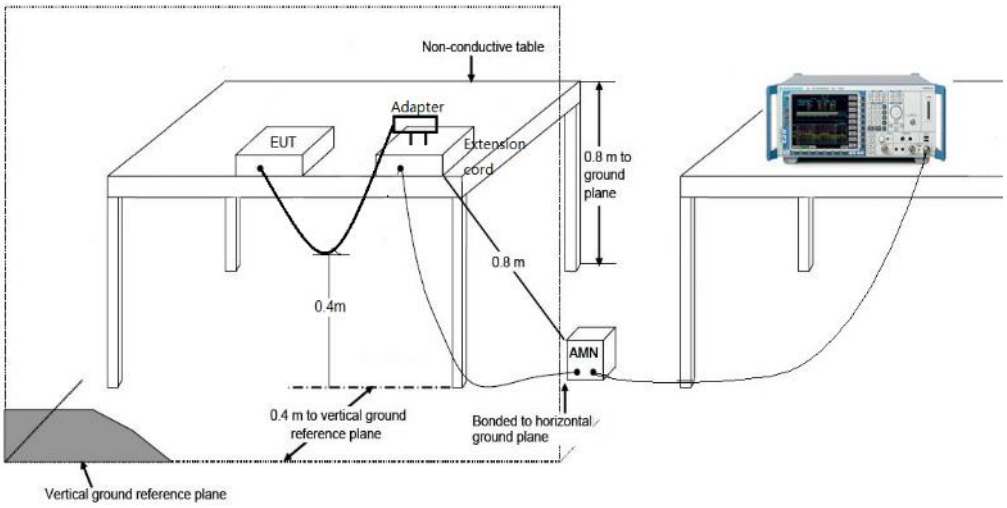
5.1.2 限制要求

以市電為電源之低功率射頻電機，其傳導回電源線上頻率自150kHz至30MHz之射頻電壓(在電源端子每一電源線對接地點)應小於或等於下表所列之限值。測量時應經過50微亨利(μH)及50歐姆(Ω)之電源線阻抗模擬網路(LISN)。頻率重疊處，以較低限值為準。

Frequency 頻率範圍 MHz	傳導限制值(dBuV)	
	準尖峰值	平均值
0.15 - 0.50	66-56(註)	56-46(註)
0.50-5.0	56	46
5.0 - 30	60	50

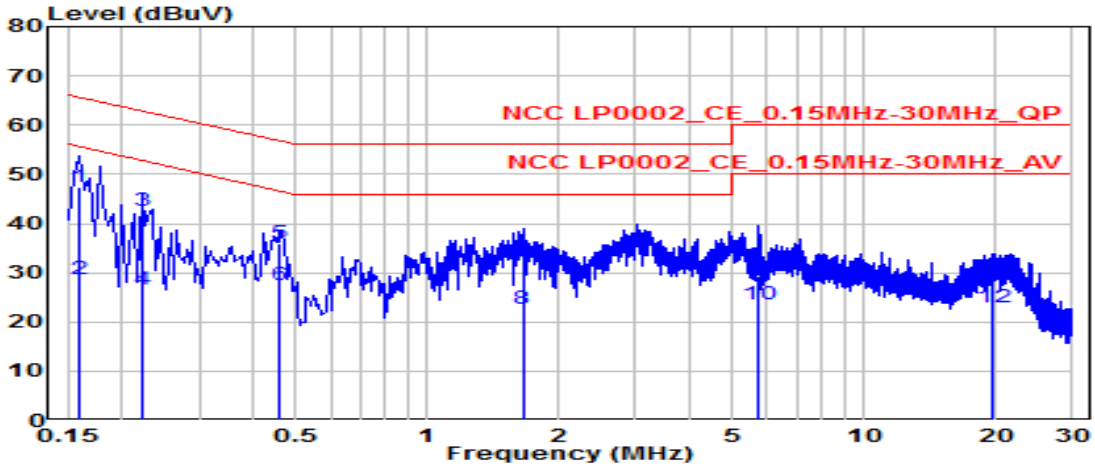
註:隨頻率之對數遞減

5.1.3 測試架構圖



5.1.4 電源傳導測試結果

EUT	藍牙耳機	Date of Test	2020-08-21
Factor	CE_ENV216-L1 (Filter ON)	Temp. / Humidity	27°C /46%
Polarity	Line1	Site / Test Engineer	SR2 / Tim
Test Mode	BLE_TX_1Mbps_CH19	Test Voltage	By Notebook PC

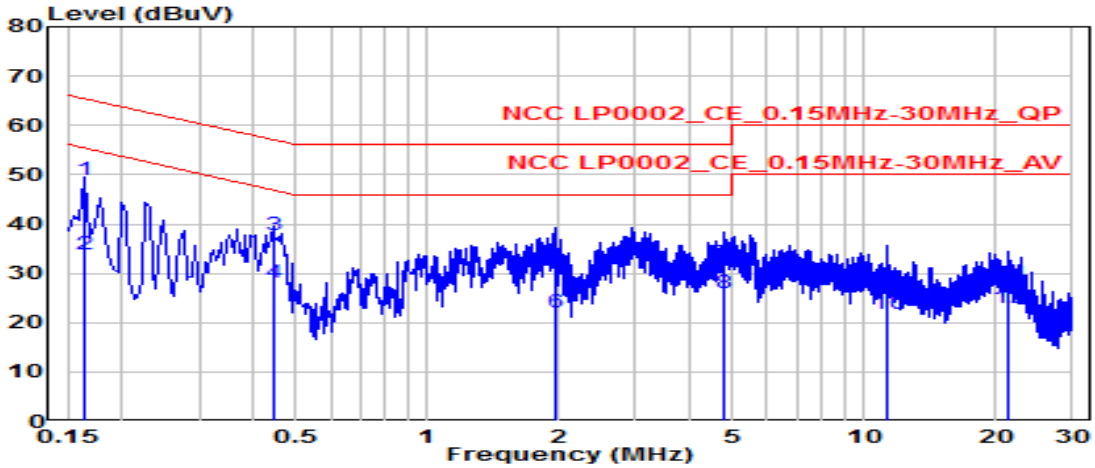


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	*	0.159	37.83	9.61	47.44	-18.08	65.52	QP
2		0.159	19.11	9.61	28.72	-26.79	55.52	Average
3		0.222	32.84	9.61	42.45	-20.29	62.74	QP
4		0.222	17.03	9.61	26.64	-26.10	52.74	Average
5		0.456	26.41	9.63	36.04	-20.73	56.77	QP
6	*	0.456	17.77	9.63	27.40	-19.36	46.77	Average
7		1.653	22.24	9.68	31.92	-24.08	56.00	QP
8		1.653	12.99	9.68	22.67	-23.33	46.00	Average
9		5.752	19.55	9.76	29.31	-30.69	60.00	QP
10		5.752	13.86	9.76	23.62	-26.38	50.00	Average
11		19.620	18.37	9.99	28.36	-31.64	60.00	QP
12		19.620	13.07	9.99	23.06	-26.94	50.00	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).

EUT	藍牙耳機	Date of Test	2020-08-21
Factor	CE_ENV216-N (Filter ON)	Temp. / Humidity	27°C /46%
Polarity	Neutral	Site / Test Engineer	SR2 / Tim
Test Mode	BLE_TX_1Mbps_CH19	Test Voltage	By Notebook PC



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	*	0.163	39.40	9.62	49.02	-16.26	65.28	QP
2		0.163	24.11	9.62	33.73	-21.55	55.28	Average
3		0.442	27.98	9.64	37.62	-19.40	57.02	QP
4	*	0.442	18.29	9.64	27.93	-19.09	47.02	Average
5		1.963	20.62	9.69	30.31	-25.69	56.00	QP
6		1.963	12.25	9.69	21.94	-24.06	46.00	Average
7		4.807	22.35	9.75	32.09	-23.91	56.00	QP
8		4.807	16.29	9.75	26.04	-19.96	46.00	Average
9		11.363	16.73	9.91	26.65	-33.35	60.00	QP
10		11.363	11.70	9.91	21.61	-28.39	50.00	Average
11		21.437	17.80	10.09	27.89	-32.11	60.00	QP
12		21.437	12.94	10.09	23.03	-26.97	50.00	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).

5.2 峰值傳導輸出功率

5.2.1 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，設定頻譜分析儀之解析度頻寬大於6dB發射頻寬或使用峰值功率表。除使用上述測量方式外,並得使用以最大傳導輸出功率作為測量方式。

5.2.2 限制要求

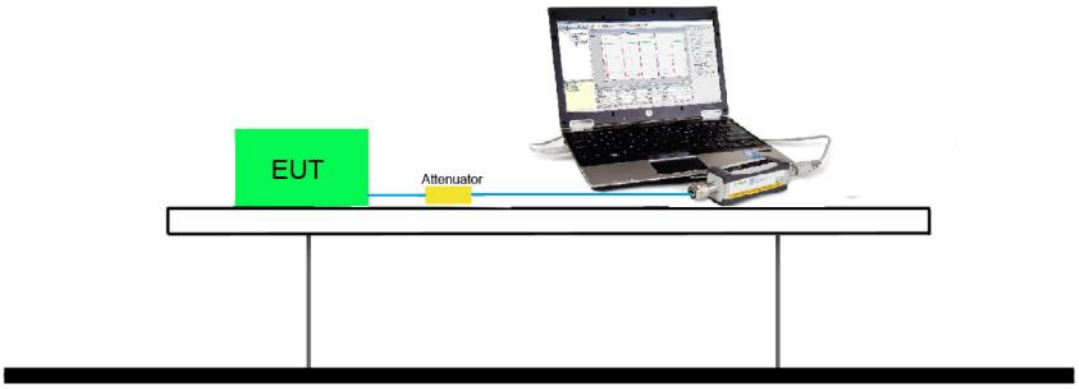
操作於2400-2483.5 MHz之跳頻或數位調變的發射器材與5725-5850 MHz之跳頻發射器材：1W(含)以下，當跳頻系統符合國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.6(1)(A)(a)節,其限制值為0.125 W(含)以下。

若用於非固定式點對點操作時，若其發射天線之方向性增益超過6dBi，應依所超過之dB數等量降低峰值輸出功率。如用於固定式點對點(註)操作時，應符合下列情形之一：

(1)操作於2400-2483.5兆赫(MHz)者，其發射天線之方向性增益超過6dBi，應於每超過3dB降低1dB之峰值輸出功率。

(2) 操作於5725-5850兆赫(MHz)者，其發射天線之方向性增益超過6dBi，不需降低峰值輸出功率。

5.2.3 測試架構圖

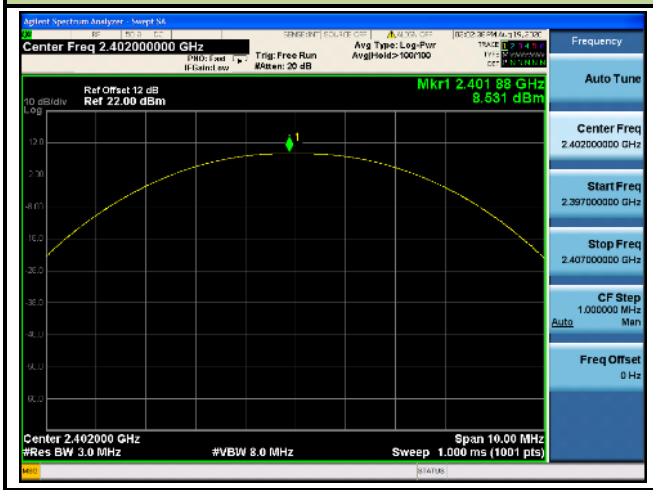
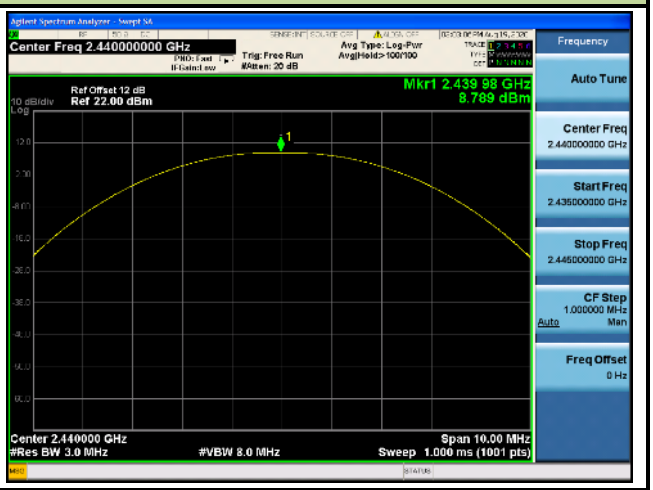
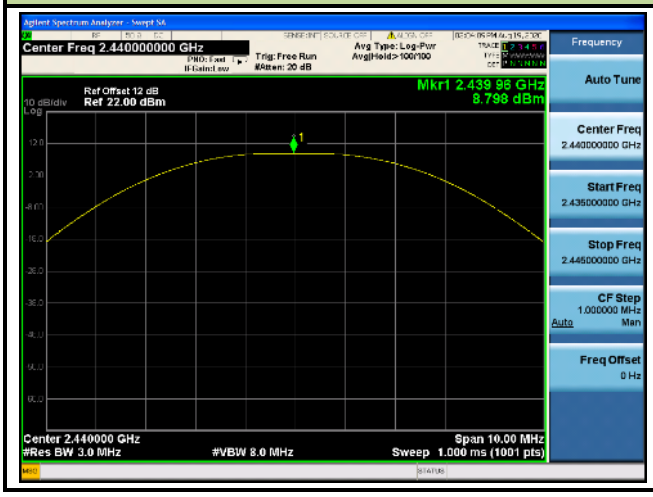
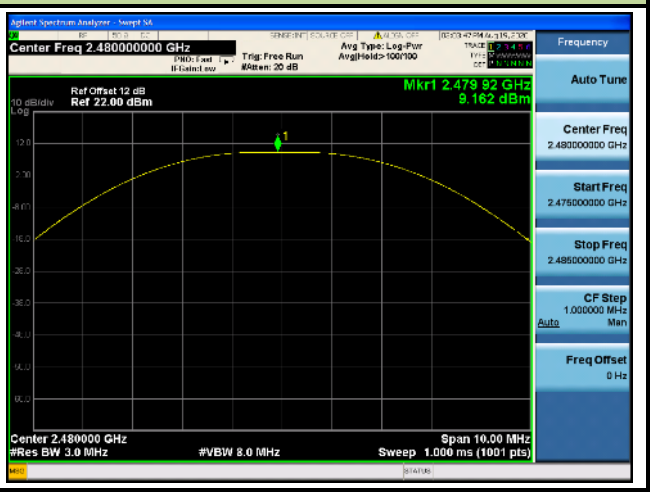


5.2.4 峰值傳導輸出功率測試結果

待測物名稱	藍牙耳機	測試日期	2020/8/19
待測物型號	T2	溫度 / 濕度	23°C / 55%
測試場地 / 測試工程師	SR2 / Eric		

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
LE(1Mbps)	00	2402	8.531	< 30
LE(1Mbps)	19	2440	8.789	< 30
LE(1Mbps)	39	2480	9.151	< 30
LE(2Mbps)	00	2402	8.534	< 30
LE(2Mbps)	19	2440	8.798	< 30
LE(2Mbps)	39	2480	9.162	< 30

備 註： 此量測值已含線材損耗(Cable Loss=1dB)。

CH00 (2402MHz) LE(1Mbps)	CH19 (2440MHz) LE(1Mbps)
	
CH78 (2480MHz) LE(1Mbps)	**CH00 (2402MHz) LE(2Mbps)**
CH19 (2440MHz) LE(2Mbps)	**CH78 (2480MHz) LE(2Mbps)**
	

5.3 天線之要求

5.3.1 限制要求

依據國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.4節規定，天線之規格可不受下述規定之限制。

低功率射頻電機之發射機或收發信機所使用之天線，應為全固定、半固定式或以獨特之耦合(unique coupling)方式連接機體。製造者可設計供使用者因損壞而替換之天線，但不得設計或使用原認證以外之天線或可供引接各類電纜之標準天線插座或電氣連接頭，如：BNC、F type、N type、M type、UG type、RCA、SMA、SMB…等及其他各類工業或通訊標準接頭。

5.3.2 天線樣式

此藍牙耳機其天線為 PCB Antenna Type，(檢附天線規格書)

，(檢附天線規格書)

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	深圳市大山通訊有限公司	PLT-TWS SPORT-R	-0.70dBi

5.4 帶外發射限制

5.4.1 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀 RF 輸入端：

(1) 頻率掃描範圍足以檢測頻帶內的發射波峰位準以及由受測物產生之最低頻率到第 10 次諧波的所有混附發射，通常需要分幾段以涵蓋全部頻率範圍。

(2) 解析頻寬為 100 kHz，視訊頻寬不小於解析頻寬。

(3) 掃描時間為自動，檢波功能為峰值，訊號軌跡為最大保留(Max Hold)。

(4) 將標記設定於任何欲紀錄之波峰上，所顯示之位準值必須符合指定之限制值。

5.4.2 限制要求

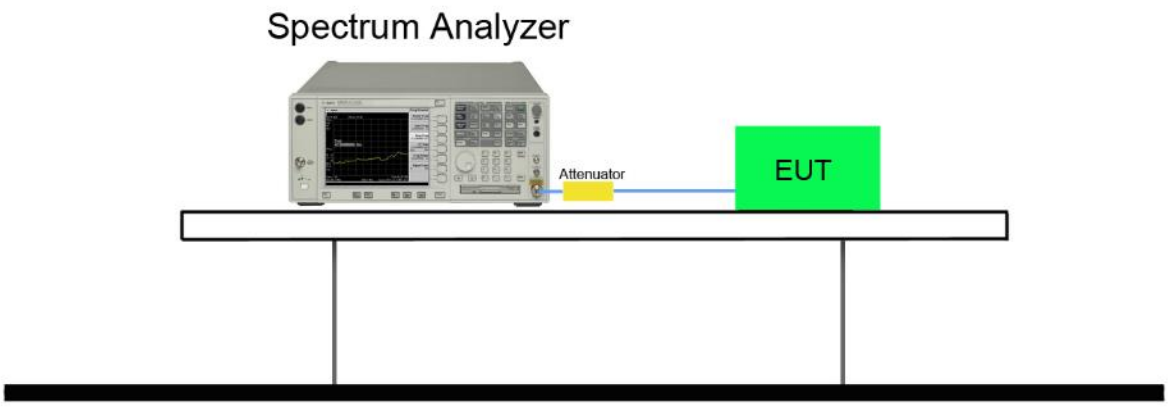
使用頻帶範圍外之任意 100 千赫 (kHz)內，發射器所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫 (kHz)內的射頻功率，衰減值限制如下：

(1) 輸出功率以低功率射頻電機技術規範附件二之峰值輸出功率方式量測者，至少須衰減 20 dB，可使用射頻傳導或輻射方式測量。

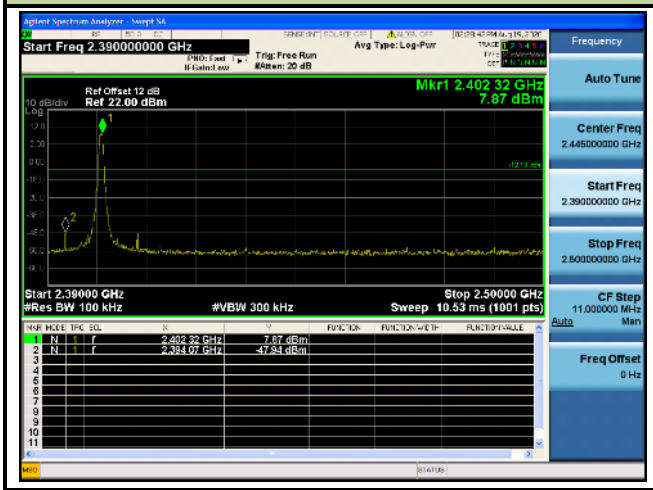
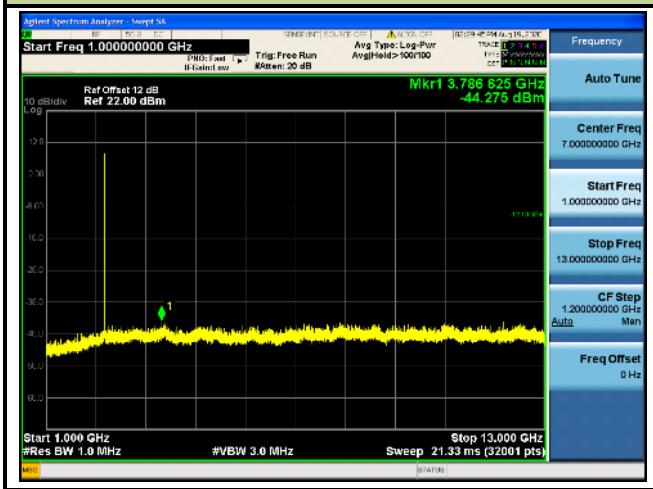
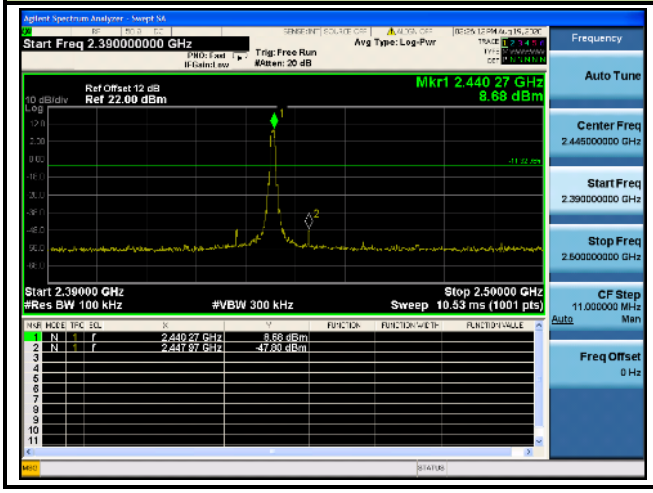
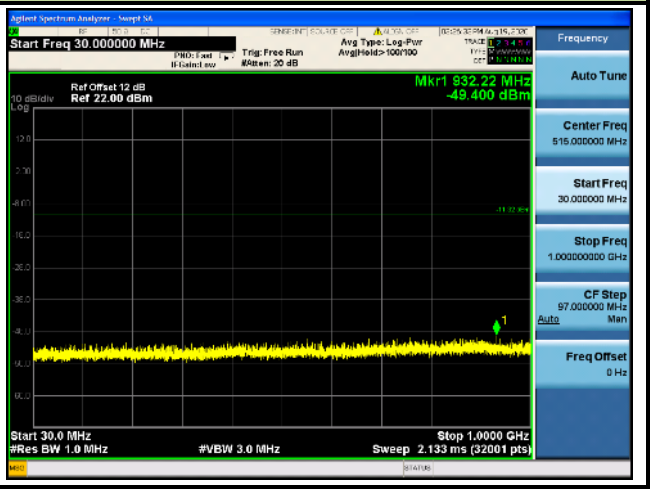
(2) 輸出功率以數位調變技術系統之最大傳導輸出功率量測方式者，至少須衰減 30 dB。

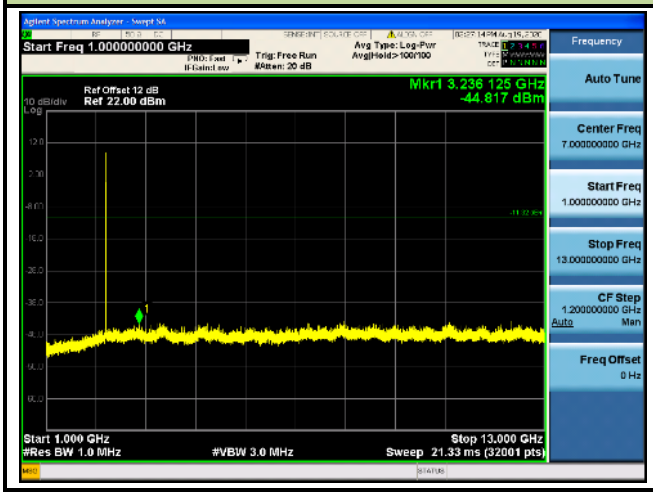
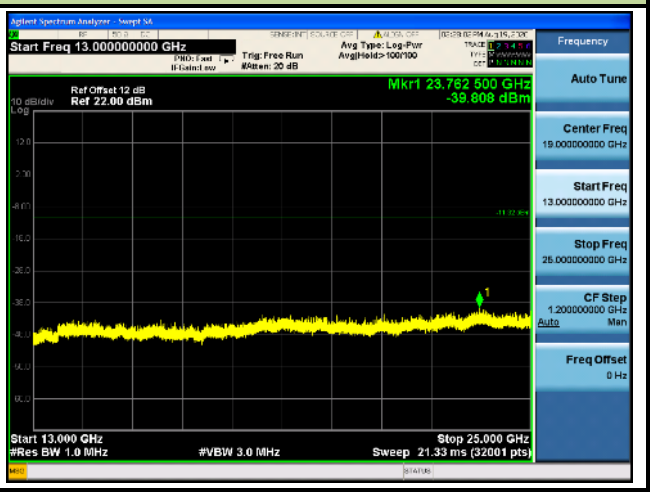
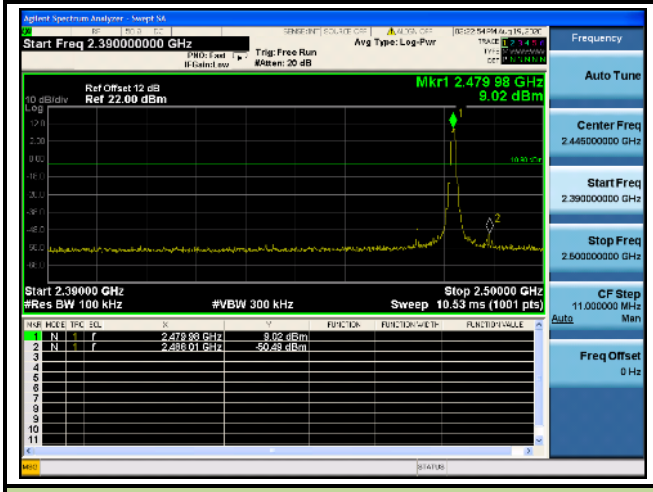
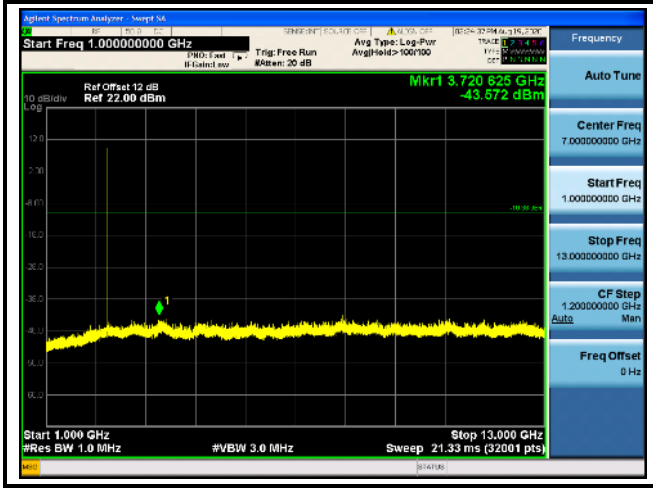
(3) 若落於禁用頻段之輻射發射，應符合低功率射頻電機技術規範第 2.8 節之規定。

5.4.3 測試架構圖

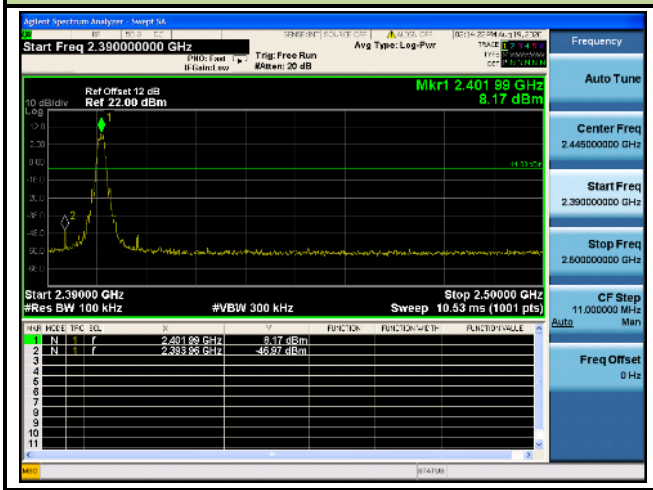


5.4.4 帶外輻射測試結果

CH00 (2402MHz) LE(1Mbps)	CH00 (2402MHz) LE(1Mbps)
	
CH00 (2402MHz) LE(1Mbps)	**CH00 (2402MHz) LE(1Mbps)**
	
CH19 (2440MHz) LE(1Mbps)	**CH19 (2440MHz) LE(1Mbps)**
	

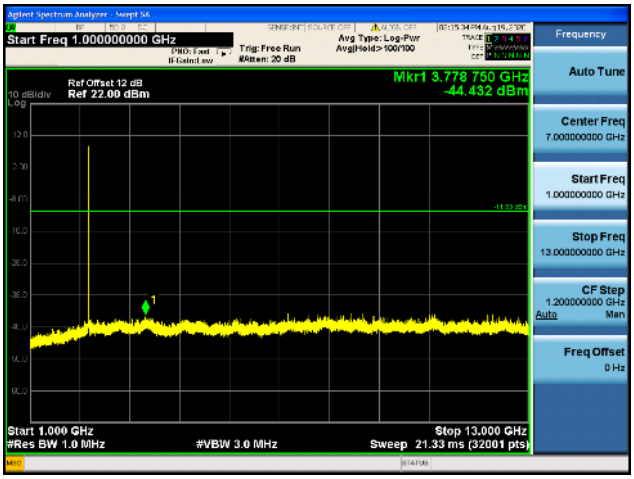
CH19 (2440MHz) LE(1Mbps)	CH19 (2440MHz) LE(1Mbps)
	
CH39 (2480MHz) LE(1Mbps)	**CH39 (2480MHz) LE(1Mbps)**
	
CH39 (2480MHz) LE(1Mbps)	**CH39 (2480MHz) LE(1Mbps)**
	

CH00 (2402MHz) LE(2Mbps)

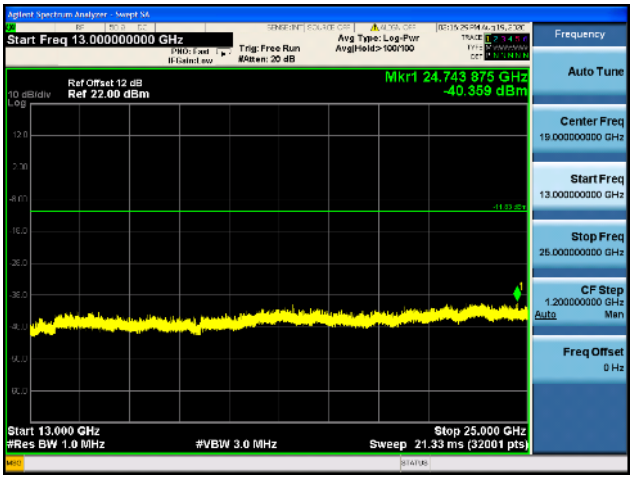


CH00 (2402MHz) LE(2Mbps)

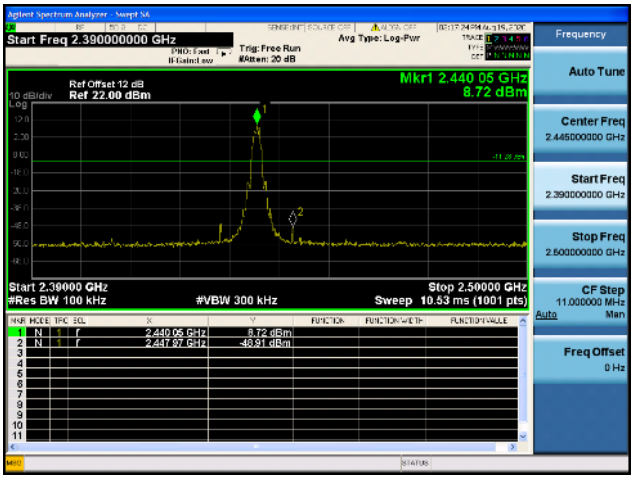
CH00 (2402MHz) LE(2Mbps)



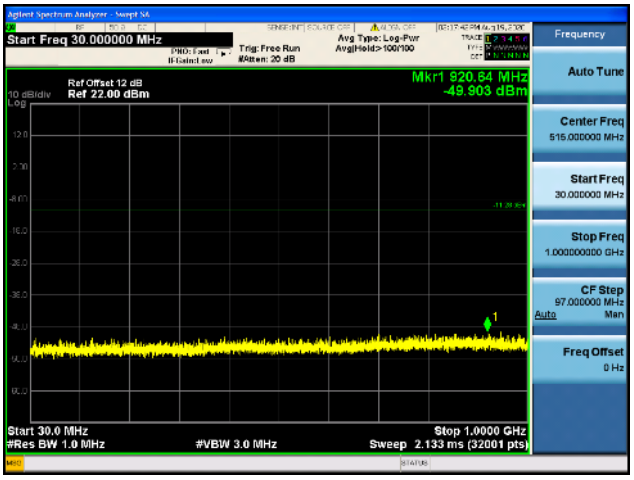
CH00 (2402MHz) LE(2Mbps)

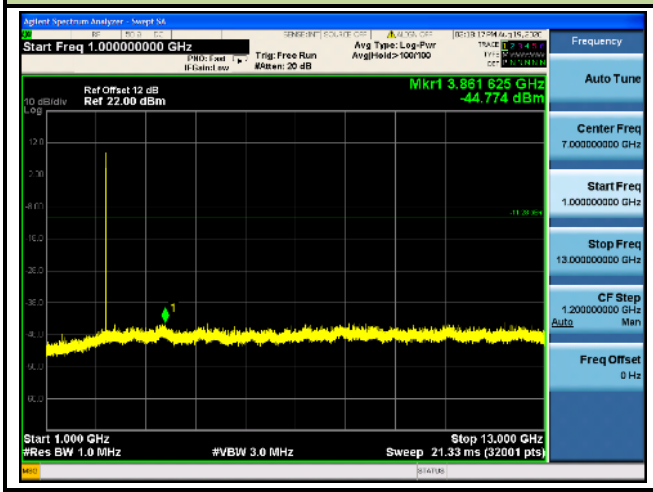


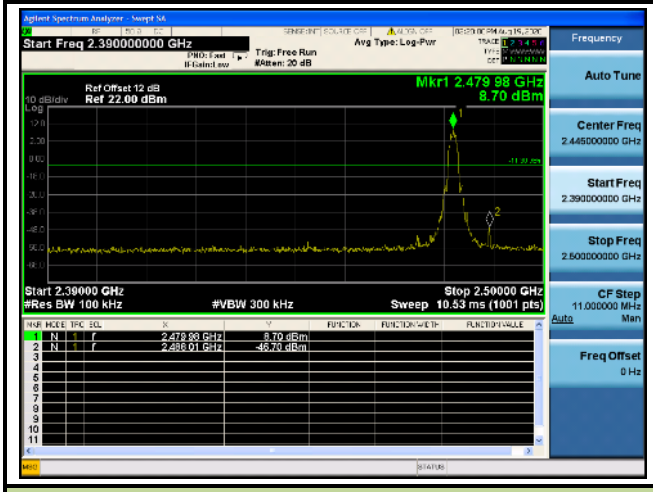
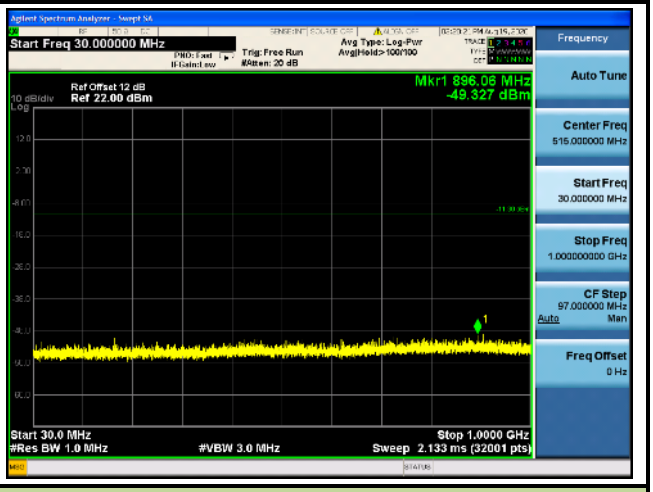
CH19 (2440MHz) LE(2Mbps)

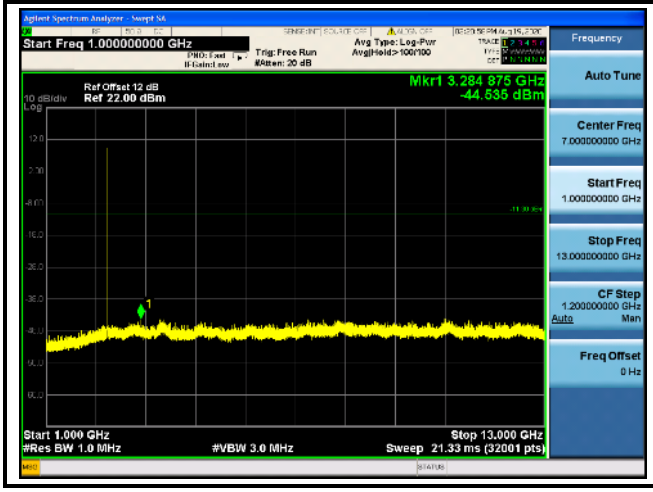


CH19 (2440MHz) LE(2Mbps)



CH19 (2440MHz) LE(2Mbps)	CH19 (2440MHz) LE(2Mbps)
	

CH39 (2480MHz) LE(2Mbps)	CH39 (2480MHz) LE(2Mbps)
	

CH39 (2480MHz) LE(2Mbps)	CH39 (2480MHz) LE(2Mbps)
	

5.5 輻射電場強度

5.5.1 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可 360 度旋轉，接收天線置於距待測物 3m 距離，高度可在 1 至 4 公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水平及垂直極化方向各量測一次。(待測物擺設方式根據 ANSI C63.10-2013 版本，待測物放置桌中心，1G 以下擺設高度為 80cm/1G 以上擺設高度為 150cm)

(1) 任一頻率小於或等於 1000 MHz 之訊號,使用 CISPR 準峰值檢波器
(2) 任一頻率大於 1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含 1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加 20 dB。

備註: 若為手持式或穿戴式之裝置，需對其三個正交軸的方位評估測試，並記錄最差的數值。

5.5.2 限制要求

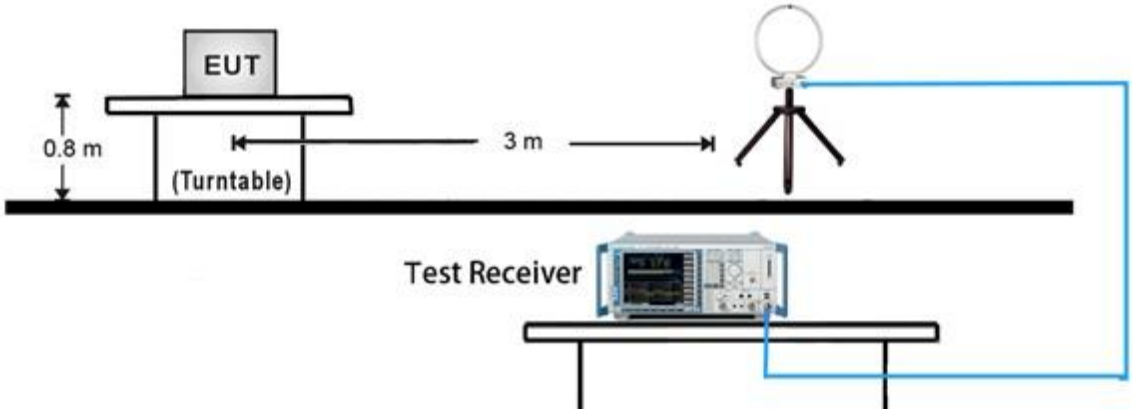
其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

頻　率(MHz)	電場強度(uV/m)	測距(m)
0.009 - 0.490(含)	2,400/f(KHz)	300
0.490 (不含) – 1.705 (含)	24,000/f(KHz)	30
1.705(不含) – 30 (不含)	30	30
30 (含) – 88 (含)	100	3
88 (不含)- 216 (含)	150	3
216 (不含)- 960 (含)	200	3
960 (不含)以上	500	3

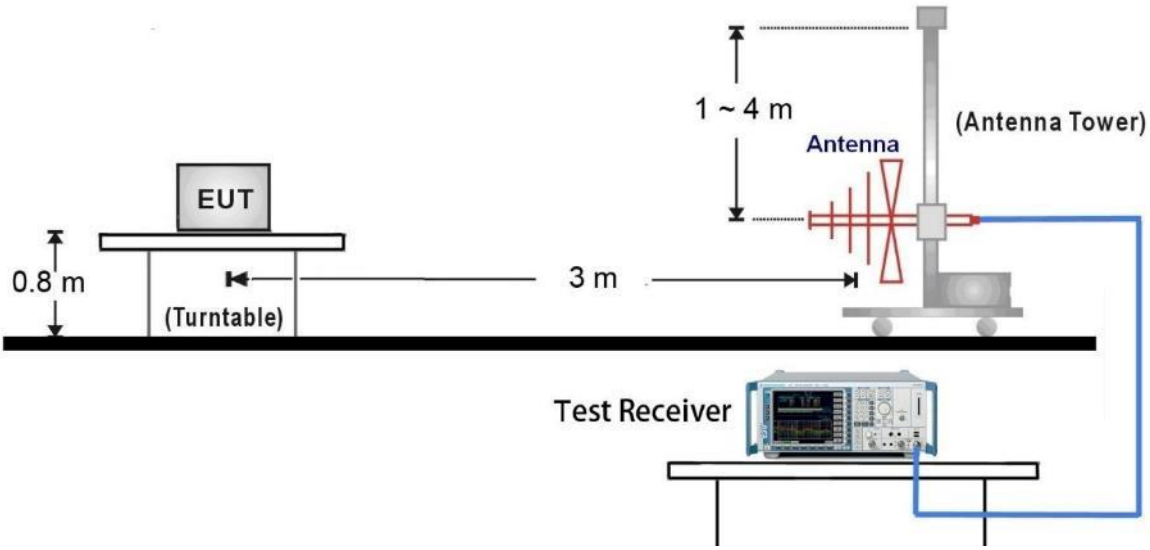
上表規定之電場強度，頻率在 9-90kHz 千赫(kHz)、110-490 千赫(kHz)以及 1000 兆赫(MHz)以上之發射，其量測以平均值檢波器為基準，且須符合低功率射頻電機技術規範第 5.14 節之規定；其他頻率之發射，應以 CISPR 準峰值(quasi-peak) 檢波器測量；非以上表所指定之距離測量時須符合低功率射頻電機技術規範第 5.5 節之規定，而輻射發射之量測頻率範圍須符合低功率射頻電機技術規範第 5.12 節之規定。

5.5.3 測試架構圖

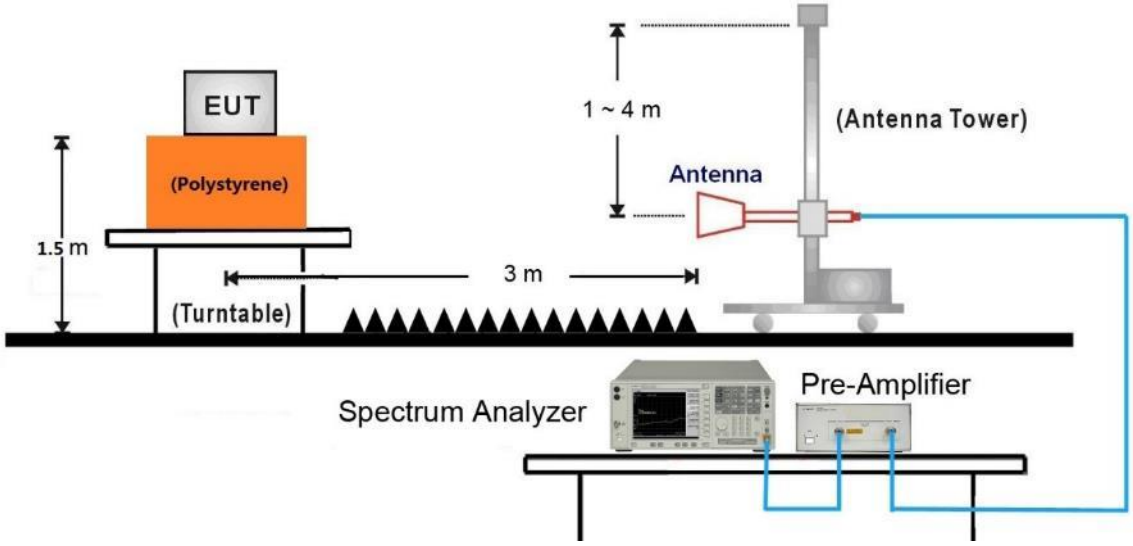
Under 30MHz Test Setup



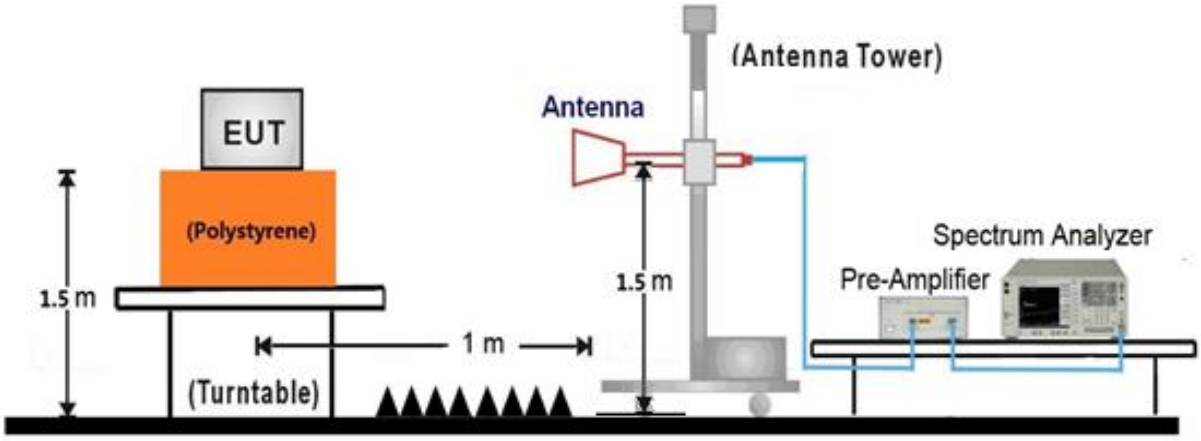
Under 1GHz Test Setup



1GHz ~ 18GHz Test Setup:

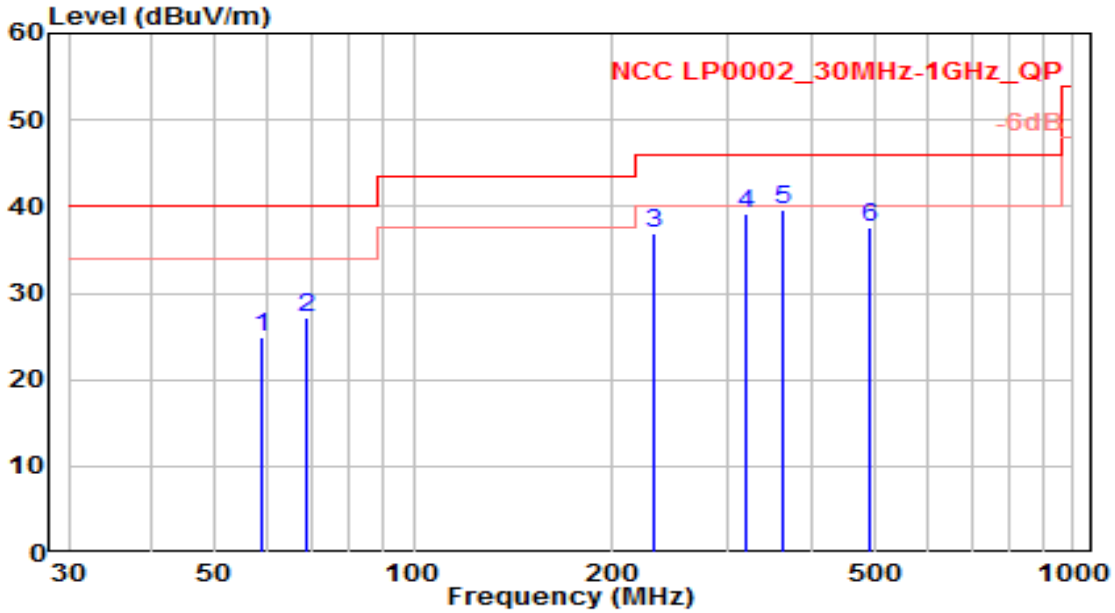


18GHz ~25GHz Test Setup:



5.5.4 輻射電場強度測試結果

EUT	藍牙耳機	Date of Test	2020-08-24
Factor	VULB 9162	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 19	Test Voltage	By Notebook PC

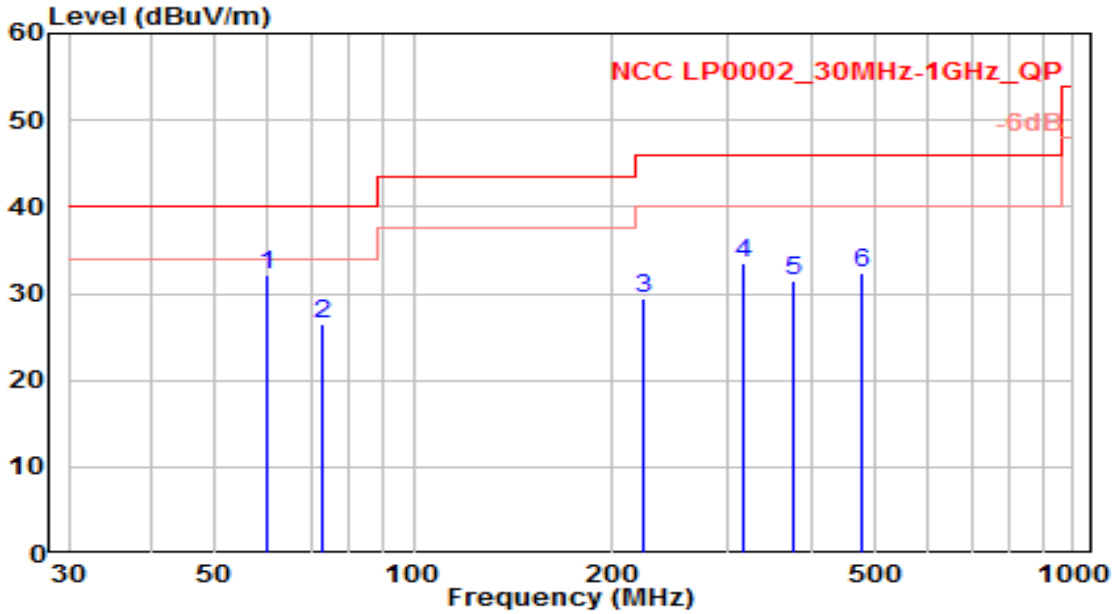


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		59.100	4.68	20.25	24.93	-15.07	40.00	100	0	QP
2		68.800	10.27	16.91	27.18	-12.82	40.00	100	110	QP
3		231.760	17.03	19.92	36.96	-9.04	46.00	100	20	QP
4		320.030	16.91	22.21	39.12	-6.88	46.00	100	150	QP
5	*	361.740	15.91	23.60	39.51	-6.49	46.00	100	350	QP
6		491.720	11.91	25.67	37.58	-8.42	46.00	100	400	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-24
Factor	VULB 9162	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 19	Test Voltage	By Notebook PC

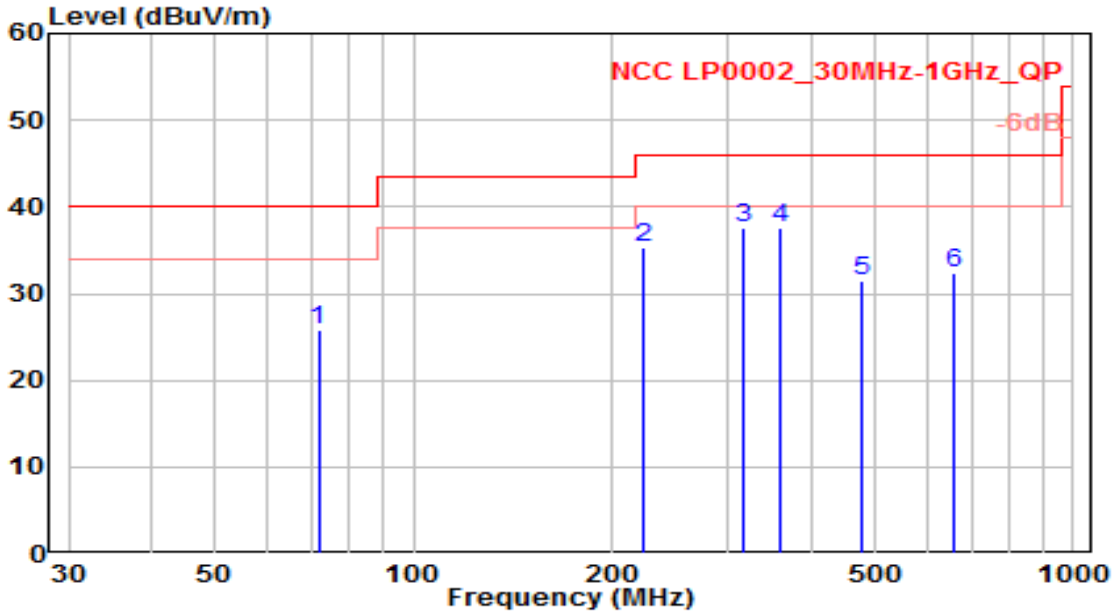


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	60.070	12.13	20.08	32.21	-7.79	40.00	100	150	QP
2		72.680	10.62	15.82	26.44	-13.56	40.00	100	60	QP
3		224.000	10.05	19.36	29.41	-16.59	46.00	100	350	QP
4		316.150	11.36	22.06	33.41	-12.59	46.00	105	100	QP
5		375.320	7.73	23.80	31.53	-14.47	46.00	100	225	QP
6		480.080	6.88	25.45	32.33	-13.67	46.00	100	175	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-24
Factor	VULB 9162	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_RX_1Mbps_CH 19	Test Voltage	By Notebook PC

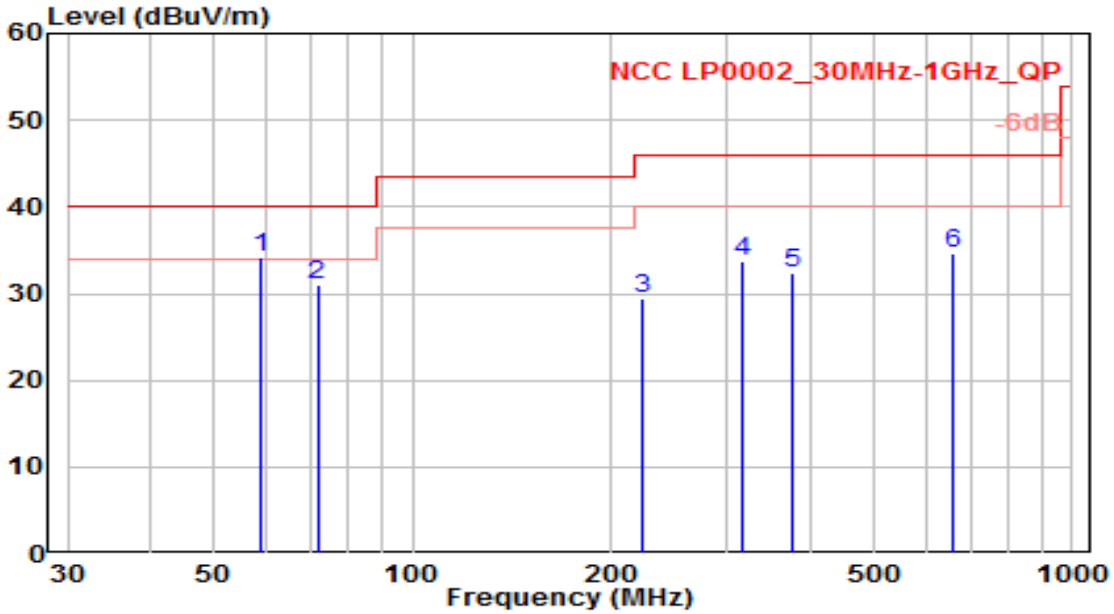


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		71.710	9.68	16.06	25.74	-14.26	40.00	100	100	QP
2		222.060	16.06	19.20	35.26	-10.74	46.00	100	200	QP
3	*	316.150	15.59	22.06	37.65	-8.35	46.00	100	350	QP
4		359.800	14.03	23.57	37.60	-8.40	46.00	100	400	QP
5		480.080	5.99	25.45	31.44	-14.56	46.00	100	-40	QP
6		656.620	3.85	28.43	32.28	-13.72	46.00	100	0	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-24
Factor	VULB 9162	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_RX_1Mbps_CH 19	Test Voltage	By Notebook PC

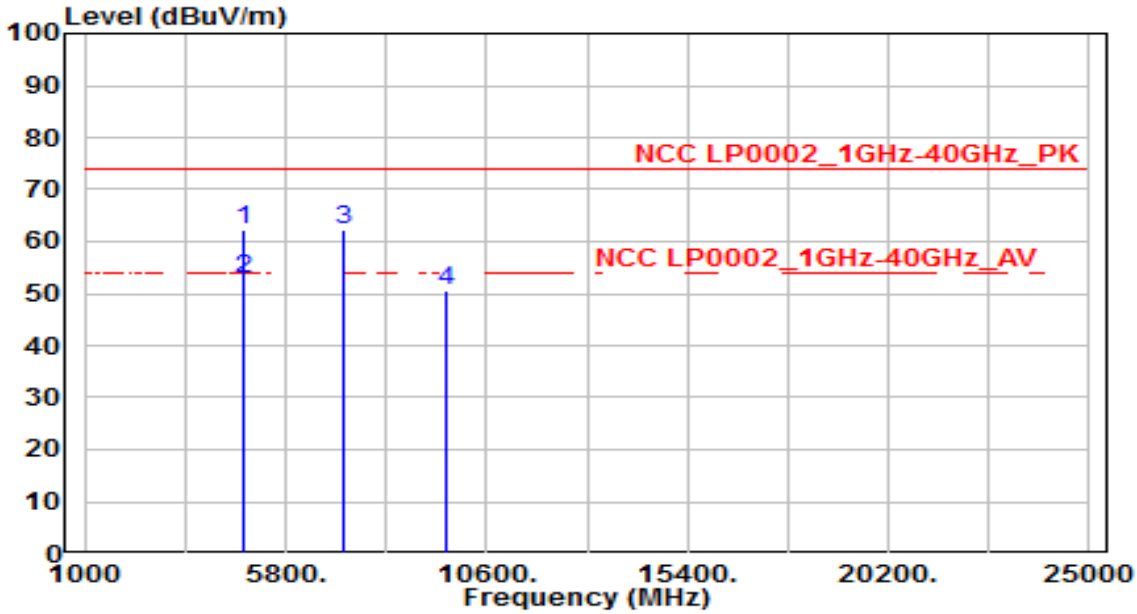


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	59.100	13.91	20.25	34.16	-5.84	40.00	100	100	QP
2		71.710	15.06	16.06	31.11	-8.89	40.00	100	20	QP
3		222.060	10.33	19.20	29.53	-16.47	46.00	100	300	QP
4		316.150	11.68	22.06	33.74	-12.26	46.00	100	200	QP
5		375.320	8.67	23.80	32.47	-13.53	46.00	100	150	QP
6		656.620	6.19	28.43	34.62	-11.38	46.00	100	100	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 0	Test Voltage	By Notebook PC

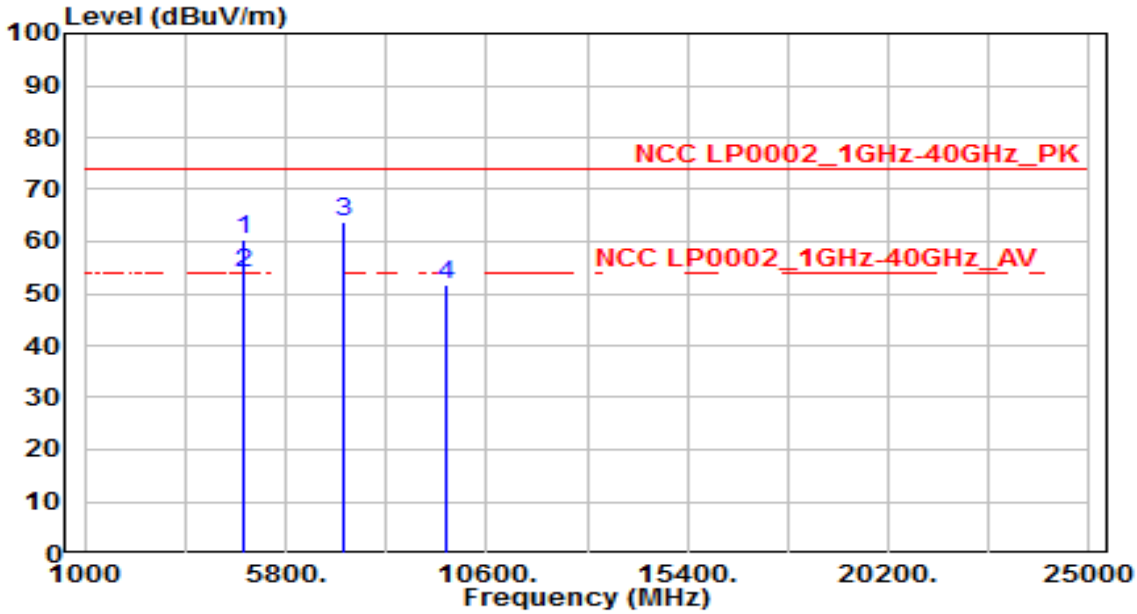


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	59.13	3.28	62.41	-11.59	74.00	100	125	Peak
2	*	4804.000	49.40	3.28	52.68	-1.32	54.00	100	125	Average
3		7206.000	51.36	10.88	62.24	-11.76	74.00	100	400	Peak
4		9608.000	35.81	14.62	50.43	-23.57	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. No3 is not in restricted band, its limit is 20dBc/30dBc of the fundamental emission level(already evaluated in Section 5.4) or LP0002 Section 2.8 which is higher.(Here, we are using stringent limits:74dBuV/m.)
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 0	Test Voltage	By Notebook PC

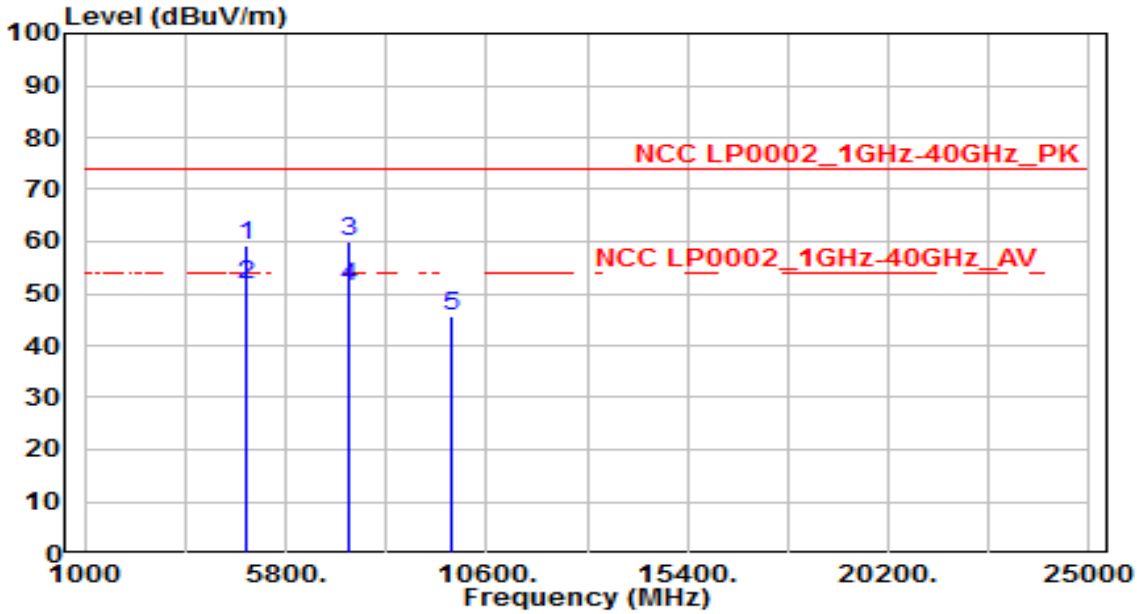


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4804.000	57.19	3.28	60.47	-13.53	74.00	100	-20	Peak
2	*	4804.000	49.70	3.28	52.98	-1.02	54.00	100	-20	Average
3	*	7206.000	52.96	10.88	63.84	-10.16	74.00	100	400	Peak
4		9608.000	37.10	14.62	51.72	-22.28	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. No3 is not in restricted band, its limit is 20dBc/30dBc of the fundamental emission level(already evaluated in Section 5.4) or LP0002 Section 2.8 which is higher.(Here, we are using stringent limits:74dBuV/m.)
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 19	Test Voltage	By Notebook PC

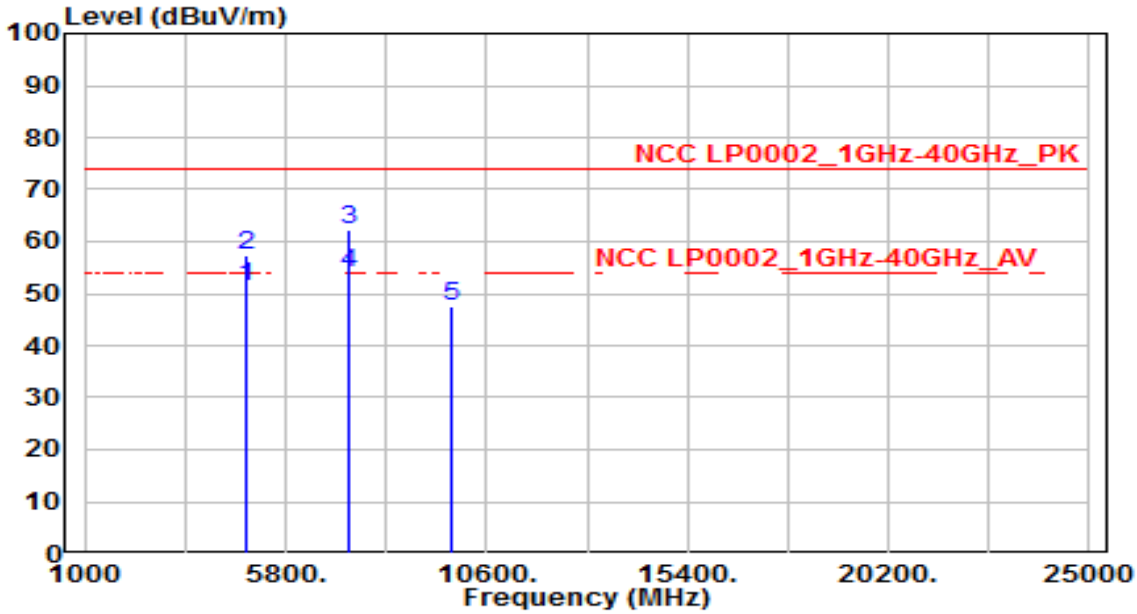


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4880.000	55.81	3.46	59.28	-14.72	74.00	150	140	Peak
2	*	4880.000	48.28	3.46	51.74	-2.26	54.00	150	140	Average
3	*	7320.000	48.62	11.21	59.83	-14.17	74.00	100	145	Peak
4		7320.000	40.09	11.21	51.30	-2.70	54.00	100	145	Average
5		9760.000	30.89	14.91	45.79	-28.21	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 19	Test Voltage	By Notebook PC

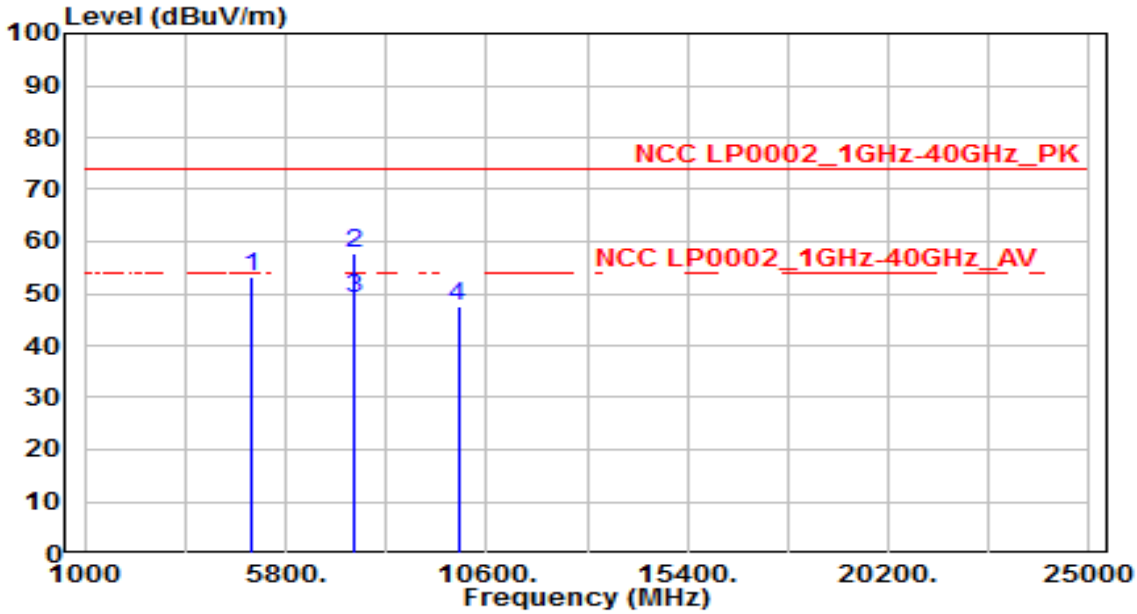


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4880.000	47.95	3.46	51.41	-22.59	74.00	100	340	Peak
2		4880.000	54.06	3.46	57.52	-16.48	74.00	100	340	Peak
3	*	7320.000	51.03	11.21	62.24	-11.76	74.00	100	350	Peak
4	*	7320.000	41.57	11.21	52.78	-1.22	54.00	100	350	Average
5		9760.000	32.51	14.91	47.42	-26.58	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 39	Test Voltage	By Notebook PC

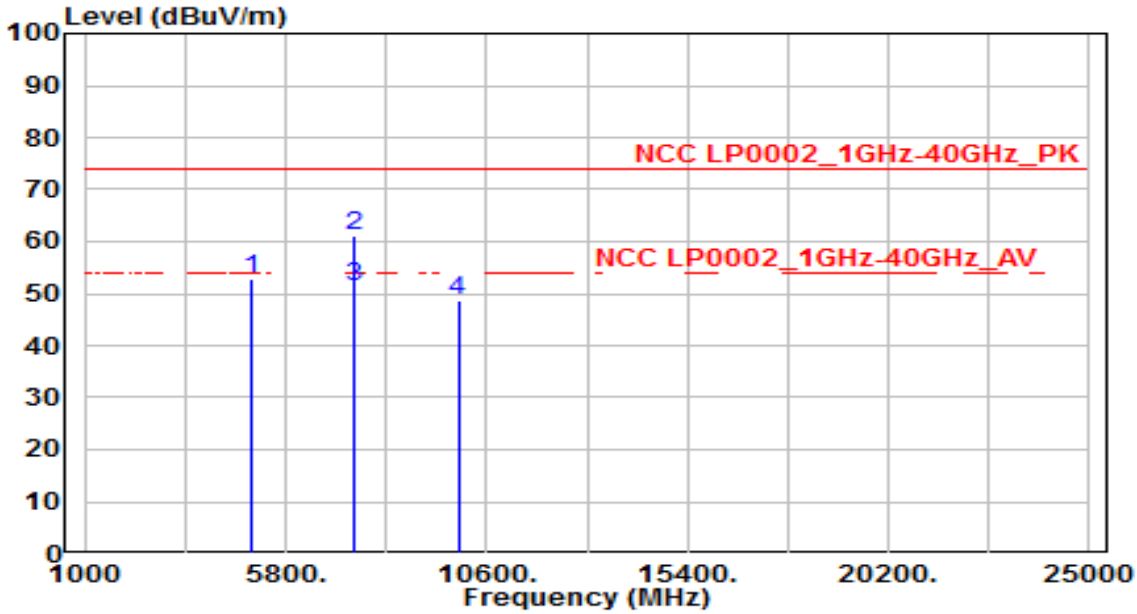


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4960.000	49.64	3.65	53.29	-20.71	74.00	100	400	Peak
2	*	7440.000	46.31	11.55	57.86	-16.14	74.00	100	100	Peak
3	*	7440.000	37.52	11.55	49.07	-4.93	54.00	100	100	Average
4		9920.000	32.28	15.21	47.49	-26.51	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 39	Test Voltage	By Notebook PC

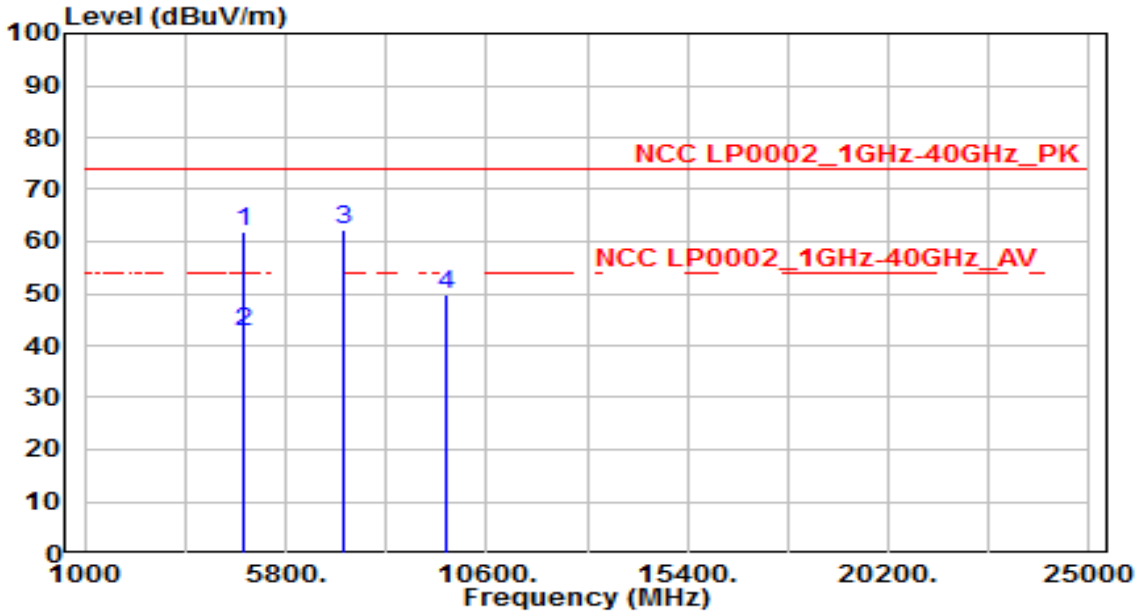


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4960.000	49.02	3.65	52.68	-21.32	74.00	100	400	Peak
2	*	7440.000	49.46	11.55	61.00	-13.00	74.00	100	400	Peak
3	*	7440.000	39.91	11.55	51.46	-2.54	54.00	100	400	Average
4		9920.000	33.57	15.21	48.78	-25.22	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 0	Test Voltage	By Notebook PC

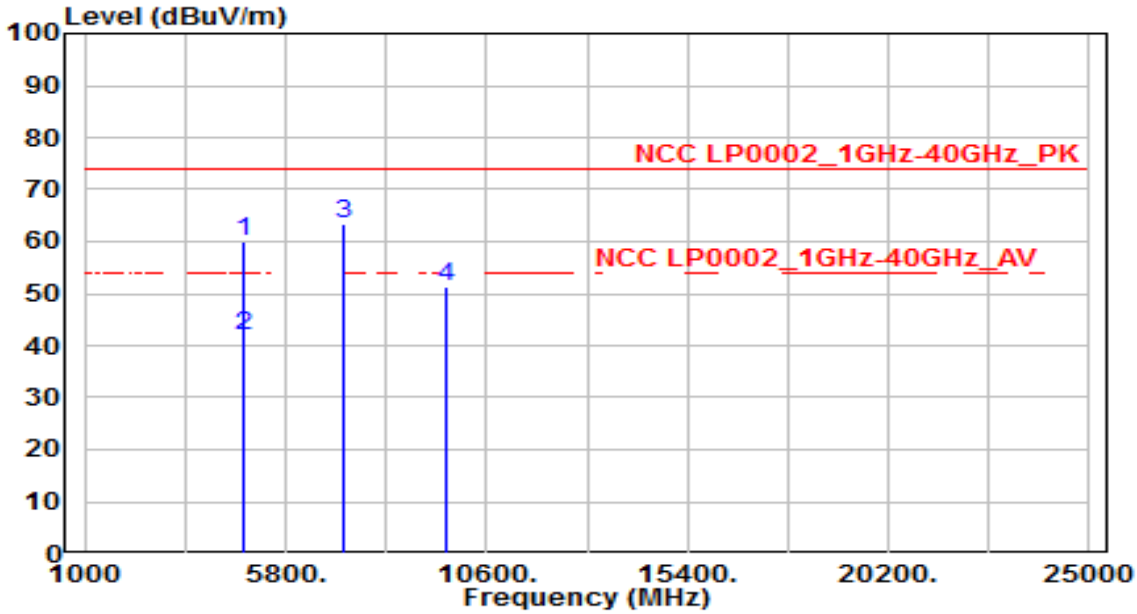


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	58.74	3.28	62.02	-11.98	74.00	100	400	Peak
2	*	4804.000	39.24	3.28	42.52	-11.48	54.00	100	125	Average
3		7206.000	51.42	10.88	62.30	-11.70	74.00	100	400	Peak
4		9608.000	35.17	14.62	49.79	-24.21	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. No3 is not in restricted band, its limit is 20dBc/30dBc of the fundamental emission level(already evaluated in Section 5.4) or LP0002 Section 2.8 which is higher.(Here, we are using stringent limits:74dBuV/m.)
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 0	Test Voltage	By Notebook PC

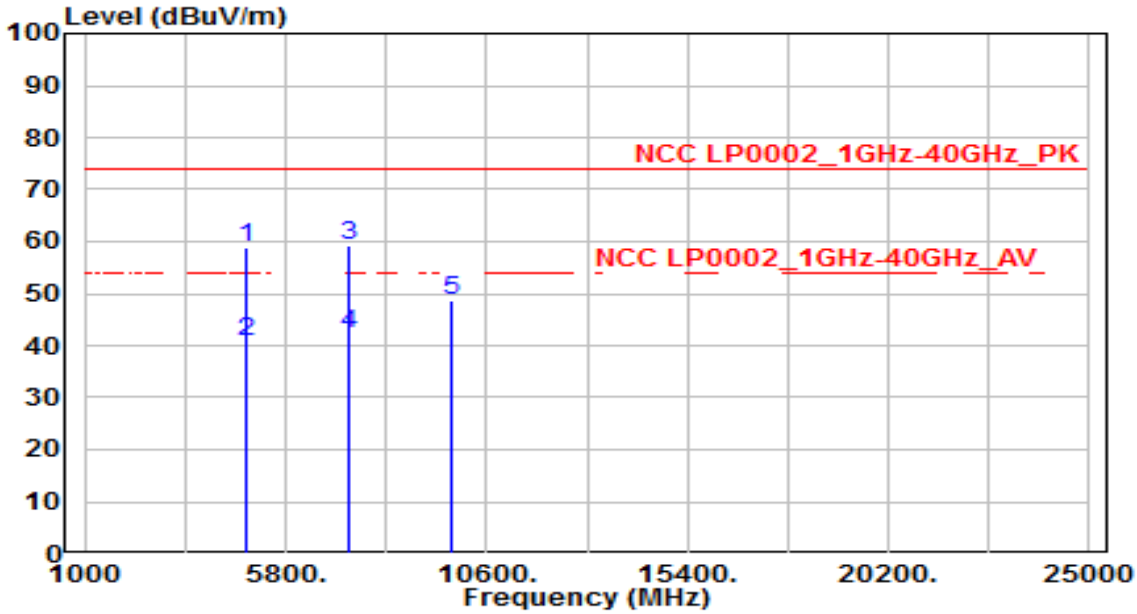


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4804.000	56.61	3.28	59.89	-14.11	74.00	100	400	Peak
2	*	4804.000	38.61	3.28	41.89	-12.11	54.00	100	-20	Average
3	*	7206.000	52.59	10.88	63.47	-10.53	74.00	100	-20	Peak
4		9608.000	36.84	14.62	51.46	-22.54	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. No3 is not in restricted band, its limit is 20dBc/30dBc of the fundamental emission level(already evaluated in Section 5.4) or LP0002 Section 2.8 which is higher.(Here, we are using stringent limits:74dBuV/m.)
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 19	Test Voltage	By Notebook PC

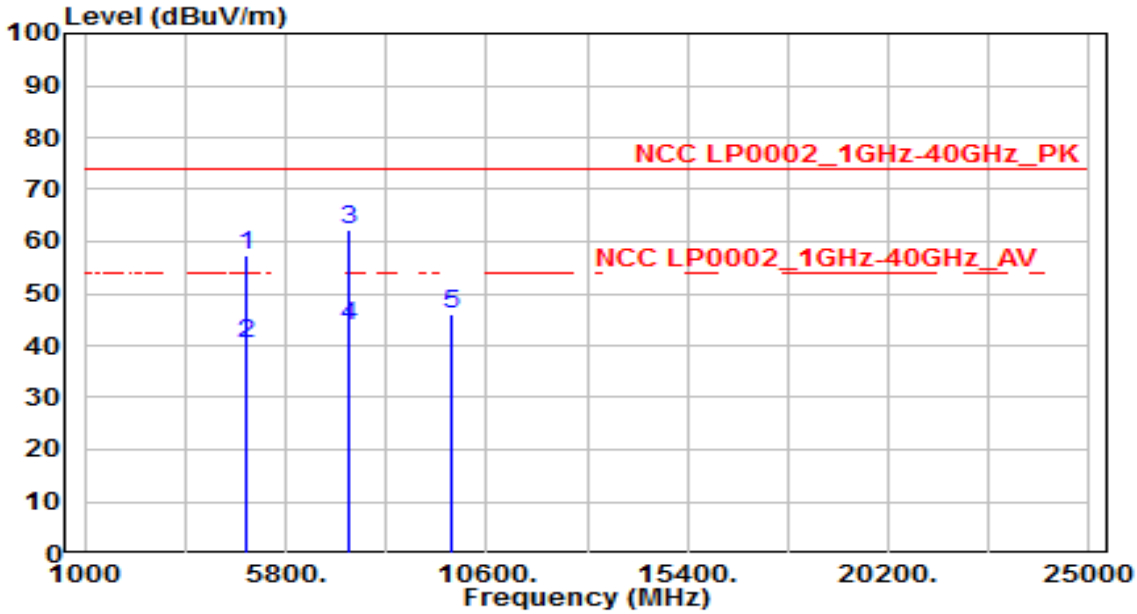


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4880.000	55.28	3.46	58.74	-15.26	74.00	100	140	Peak
2		4880.000	37.31	3.46	40.77	-13.23	54.00	100	140	Average
3	*	7320.000	47.92	11.21	59.13	-14.87	74.00	100	145	Peak
4	*	7320.000	31.16	11.21	42.37	-11.63	54.00	100	145	Average
5		9760.000	33.93	14.91	48.84	-25.16	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 19	Test Voltage	By Notebook PC

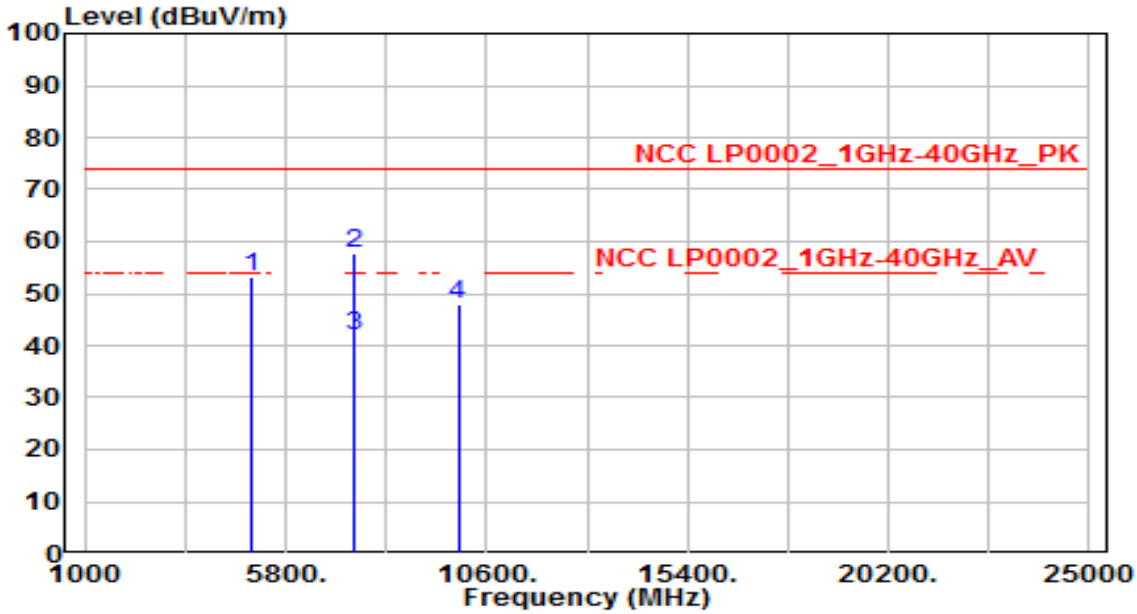


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4880.000	53.76	3.46	57.22	-16.78	74.00	100	340	Peak
2		4880.000	36.89	3.46	40.35	-13.65	54.00	100	340	Average
3	*	7320.000	51.00	11.21	62.21	-11.79	74.00	100	350	Peak
4	*	7320.000	32.51	11.21	43.72	-10.28	54.00	100	350	Average
5		9760.000	31.03	14.91	45.94	-28.06	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC

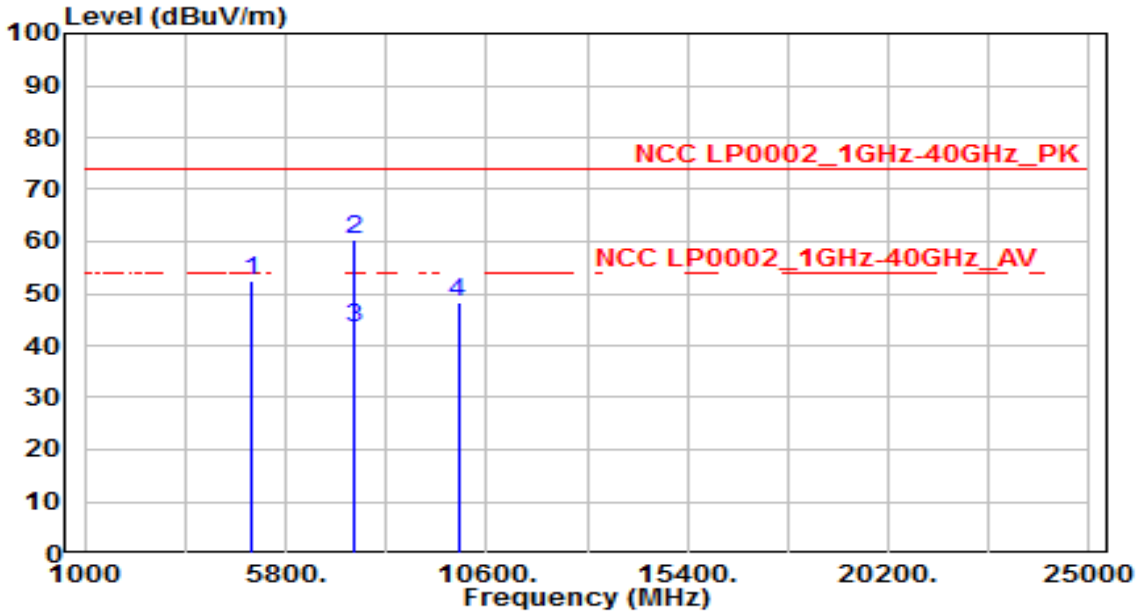


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4960.000	49.46	3.65	53.11	-20.89	74.00	100	400	Peak
2	*	7440.000	46.28	11.55	57.83	-16.17	74.00	100	100	Peak
3	*	7440.000	30.23	11.55	41.78	-12.22	54.00	100	100	Average
4		9920.000	32.82	15.21	48.03	-25.97	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC

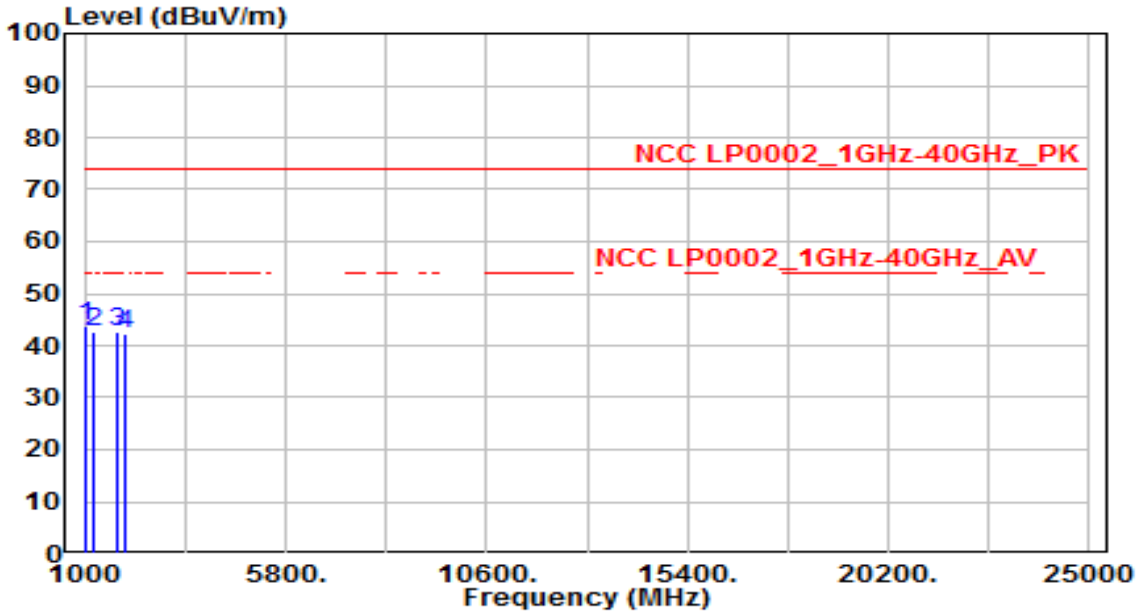


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		4960.000	48.76	3.65	52.42	-21.58	74.00	100	400	Peak
2	*	7440.000	48.92	11.55	60.46	-13.54	74.00	100	400	Peak
3	*	7440.000	31.69	11.55	43.24	-10.76	54.00	100	400	Average
4		9920.000	33.12	15.21	48.33	-25.67	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_RX_1Mbps_CH 19	Test Voltage	By Notebook PC

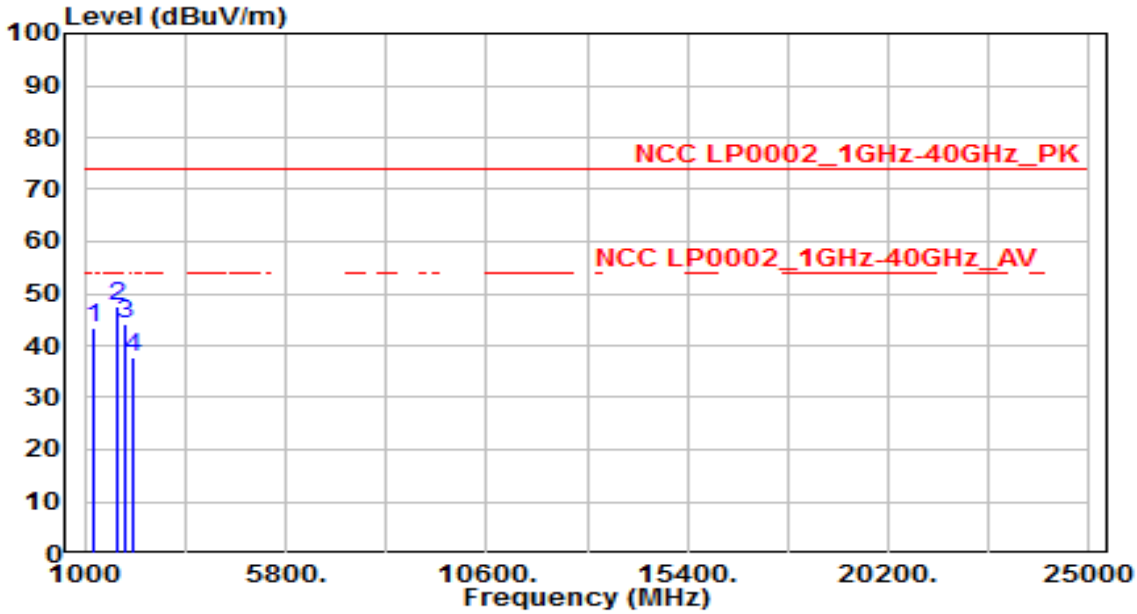


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	1034.000	51.50	-7.80	43.70	-30.30	74.00	100	400	Peak
2		1187.000	49.81	-7.12	42.69	-31.31	74.00	100	400	Peak
3		1782.000	47.78	-4.99	42.78	-31.22	74.00	100	400	Peak
4		1986.000	46.82	-4.46	42.37	-31.63	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_RX_1Mbps_CH 19	Test Voltage	By Notebook PC



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1187.000	50.70	-7.12	43.58	-30.42	74.00	100	400	Peak
2	*	1782.000	52.65	-4.99	47.66	-26.34	74.00	100	400	Peak
3		1986.000	48.62	-4.46	44.16	-29.84	74.00	100	400	Peak
4		2173.000	41.46	-3.66	37.80	-36.20	74.00	100	400	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

5.6 頻帶邊緣

5.6.1 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可360度旋轉，接收天線置於距待測物3m距離，高度可在1至4公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水平及垂直極化方向各量測一次。(待測物擺設方式根據 ANSI C63.10-2013版，待測物放置桌中心，1G以下擺設高度為80cm/1G以上擺設高度為150cm)

(1) 任一頻率小於或等於1000 MHz 之訊號,使用CISPR準峰值檢波器
(2) 任一頻率大於1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加20 dB。

備註: 若為手持式或穿戴式之裝置，需對其三個正交軸的方位評估測試，並記錄最差的數值。

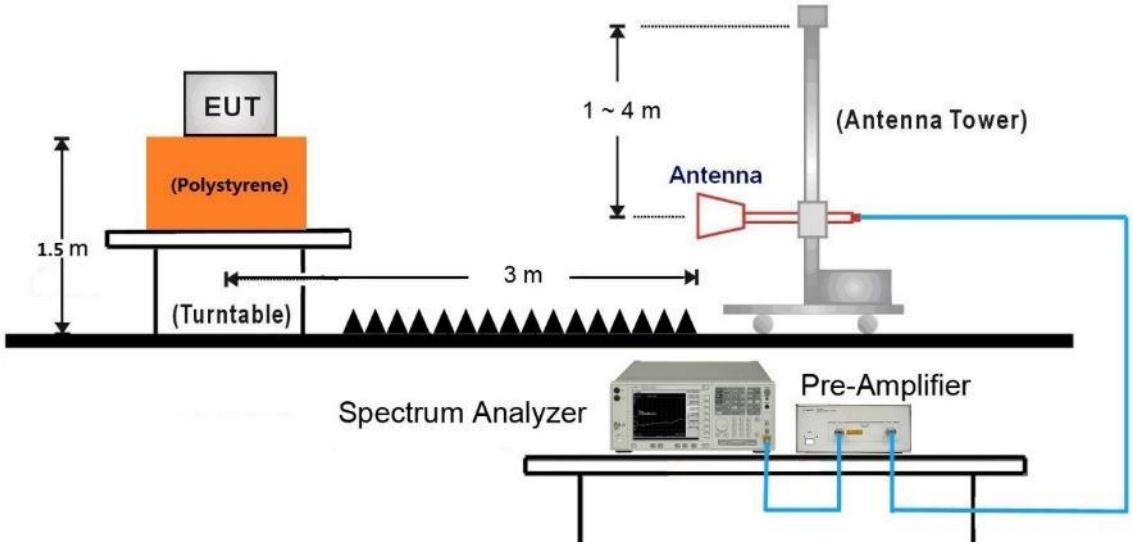
5.6.2 限制要求

除低功率射頻電機技術規範另有規定外，任何低功率射頻電機之主波皆不得使用下表所列各頻段之頻率低功率射頻電機落於下表所列頻帶內之混附發射，其電場強度必須符合低功率射頻電機技術規範之第2.8節限制規定

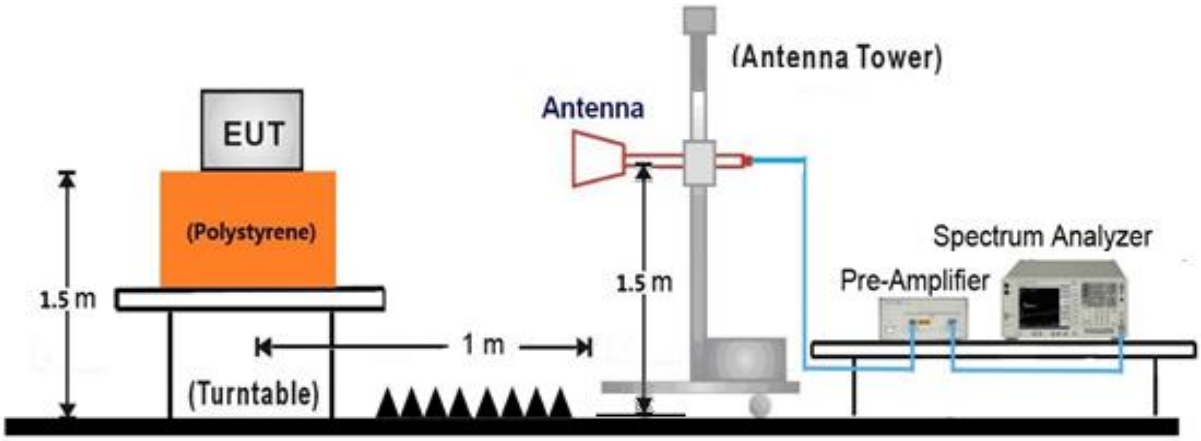
頻　率(MHz)	頻　率(MHz)	頻　率(MHz)	頻　率(MHz)	頻　率(MHz)
0.090～0.110	25.500～25.700	703.00～748.00	2310.0～2390.0	13250～13400
0.490～0.510	37.475～38.275	758.00～803.00	2483.5～2900.0	14470～14500
2.172～2.198	73.500～75.400	825.00～915.00	3260.0～3267.0	15350～16200
3.013～3.033	108.00～138.00	930.00～1240.0	3332.0～3339.0	17700～21400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

5.6.3 測試架構圖

1GHz ~ 18GHz Test Setup:

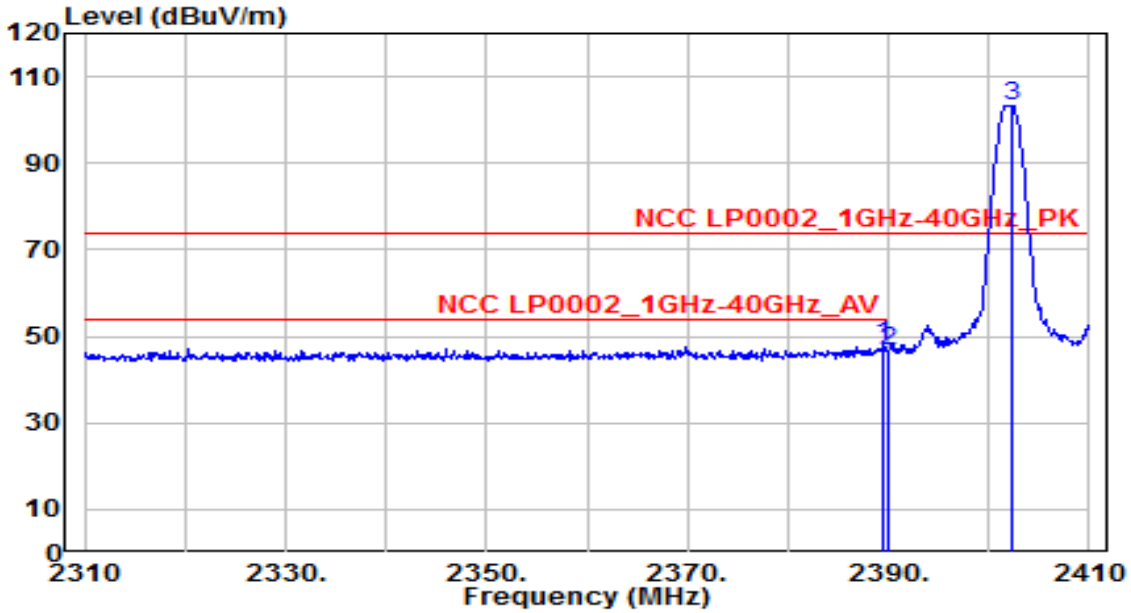


18GHz ~25GHz Test Setup:



5.6.4 頻帶邊緣測試結果

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 0	Test Voltage	By Notebook PC

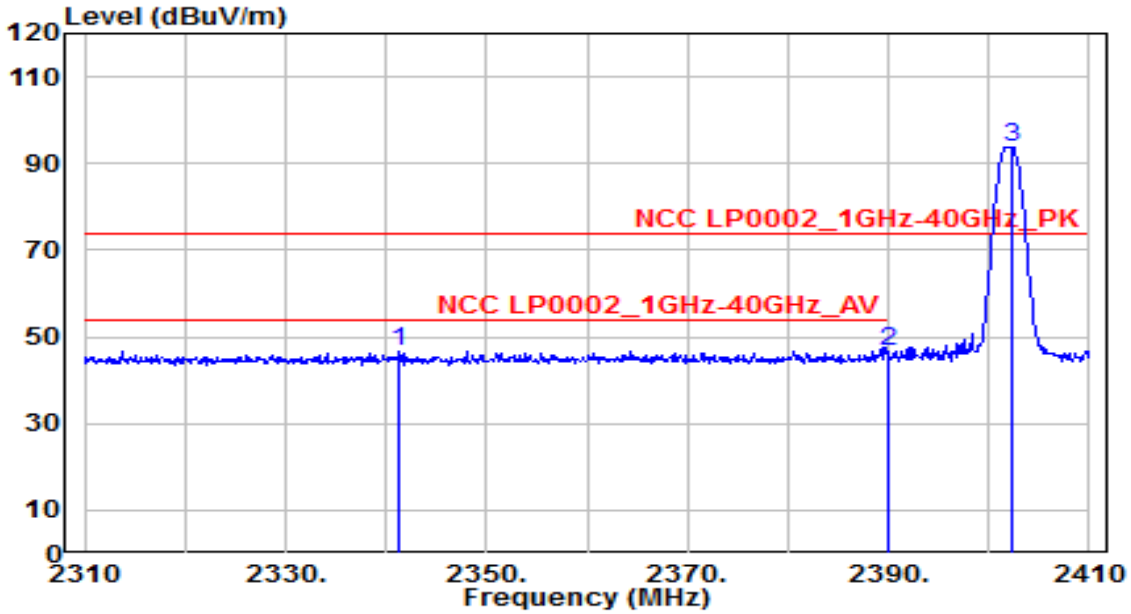


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	2389.400	50.81	-2.71	48.10	-25.90	74.00	140	240	Peak
2		2390.000	49.14	-2.70	46.43	-27.57	74.00	140	240	Peak
3		2402.300	106.05	-2.65	103.40	N/A	N/A	140	240	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 0	Test Voltage	By Notebook PC

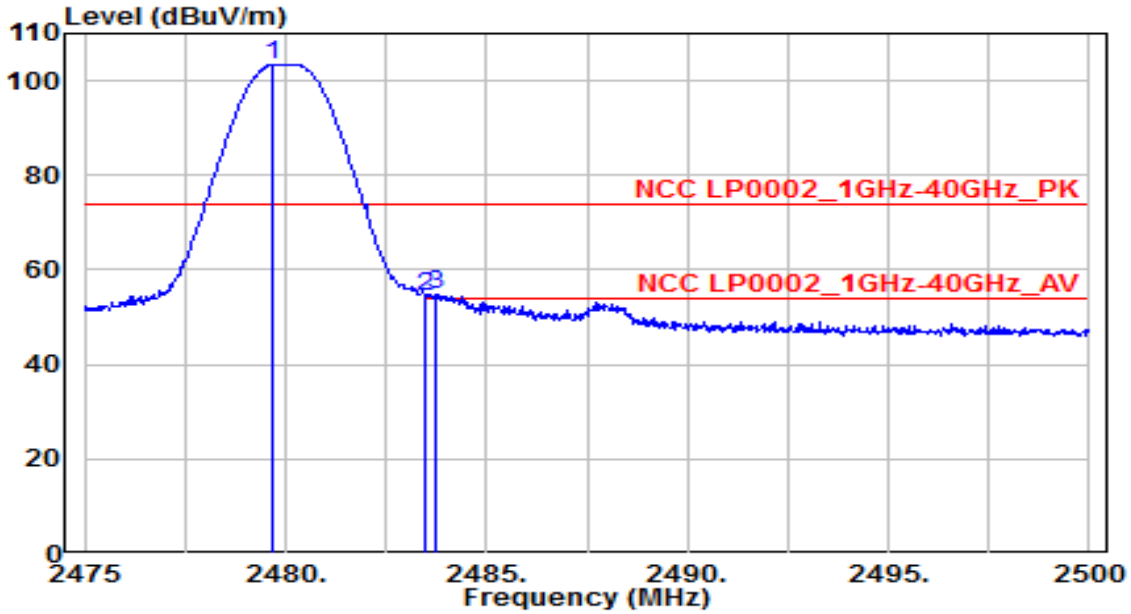


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2341.300	49.73	-2.92	46.81	-27.19	74.00	165	195	Peak
2	*	2390.000	49.53	-2.70	46.83	-27.17	74.00	165	195	Peak
3		2402.300	96.59	-2.65	93.94	N/A	N/A	165	195	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 39	Test Voltage	By Notebook PC

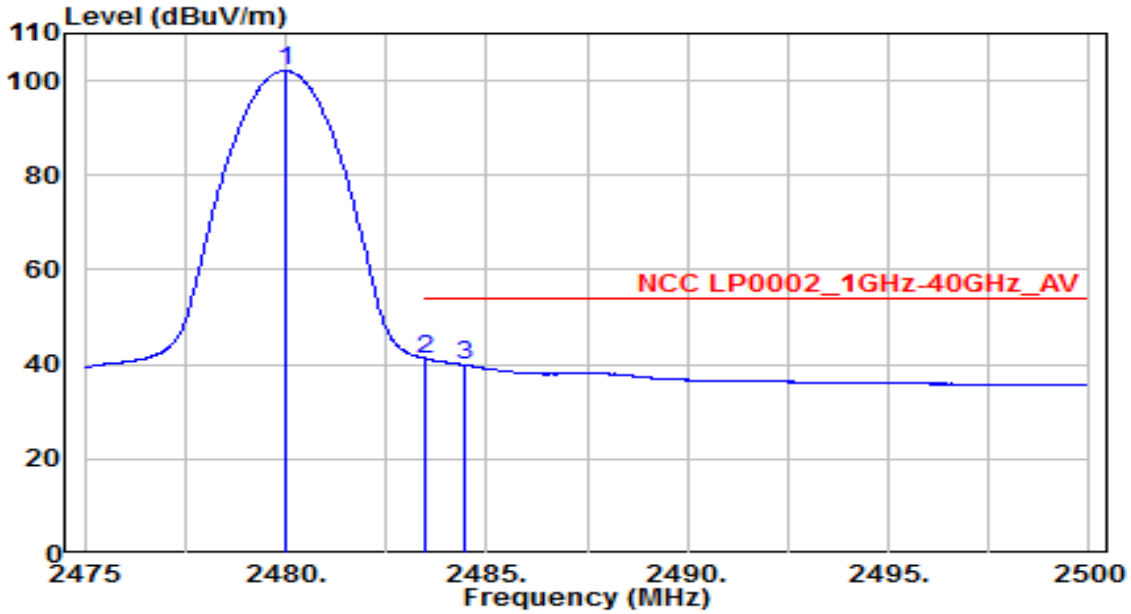


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2479.700	105.66	-2.31	103.35	N/A	N/A	124	240	Peak
2		2483.500	56.76	-2.29	54.47	-19.53	74.00	120	240	Peak
3	*	2483.725	57.21	-2.29	54.92	-19.08	74.00	120	240	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 39	Test Voltage	By Notebook PC

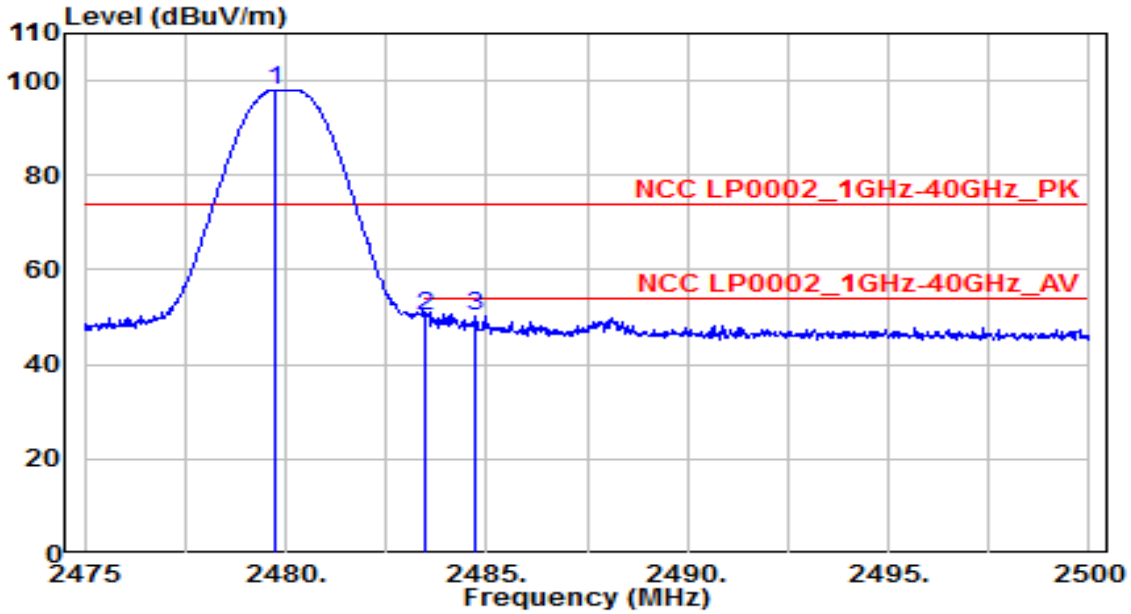


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2480.000	104.46	-2.31	102.16	N/A	N/A	120	240	Average
2	*	2483.500	43.48	-2.29	41.19	-12.81	54.00	120	240	Average
3		2484.425	42.25	-2.29	39.96	-14.04	54.00	120	240	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_1Mbps_CH 39	Test Voltage	By Notebook PC

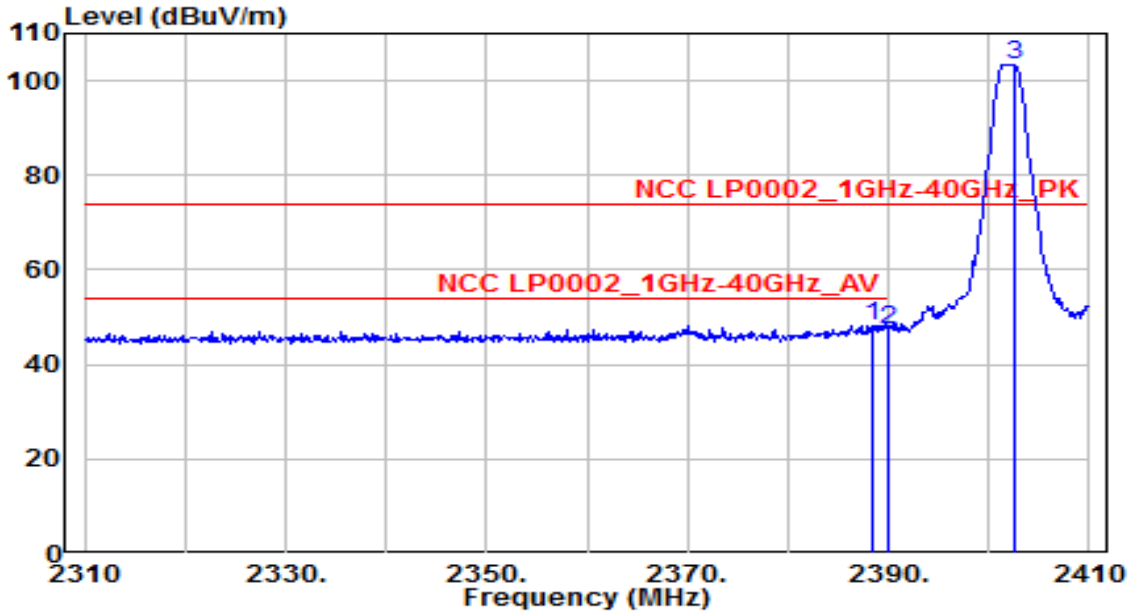


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2479.725	100.32	-2.31	98.01	N/A	N/A	160	205	Peak
2	*	2483.500	52.49	-2.29	50.20	-23.80	74.00	160	205	Peak
3		2484.725	52.48	-2.29	50.19	-23.81	74.00	160	205	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 0	Test Voltage	By Notebook PC

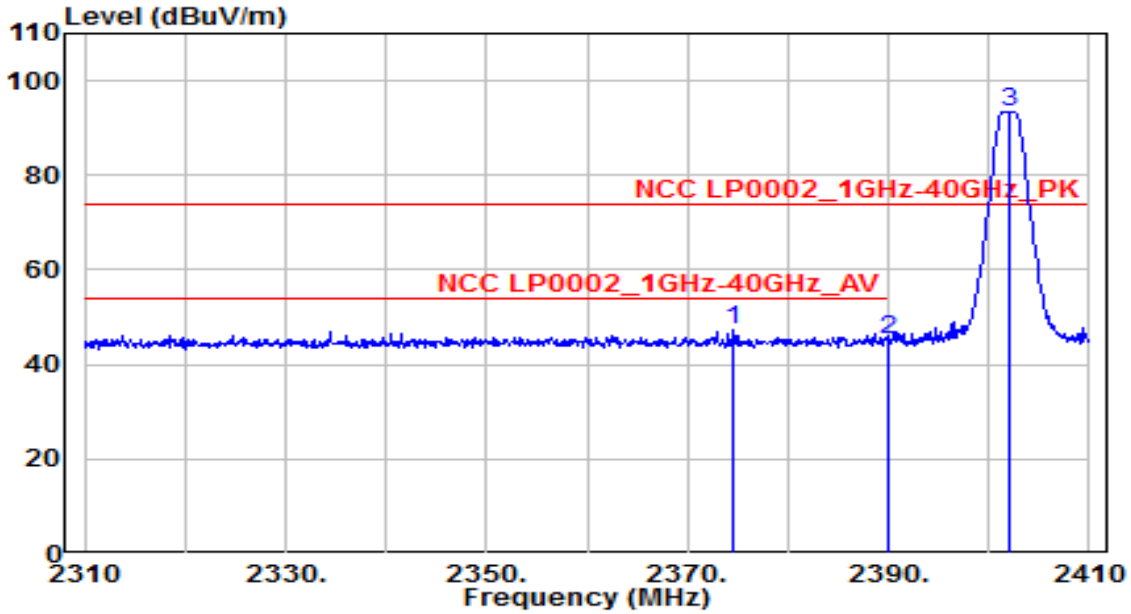


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	2388.400	51.06	-2.71	48.35	-25.65	74.00	140	240	Peak
2		2390.000	49.86	-2.70	47.15	-26.85	74.00	140	240	Peak
3		2402.600	106.19	-2.65	103.54	N/A	N/A	140	240	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 0	Test Voltage	By Notebook PC

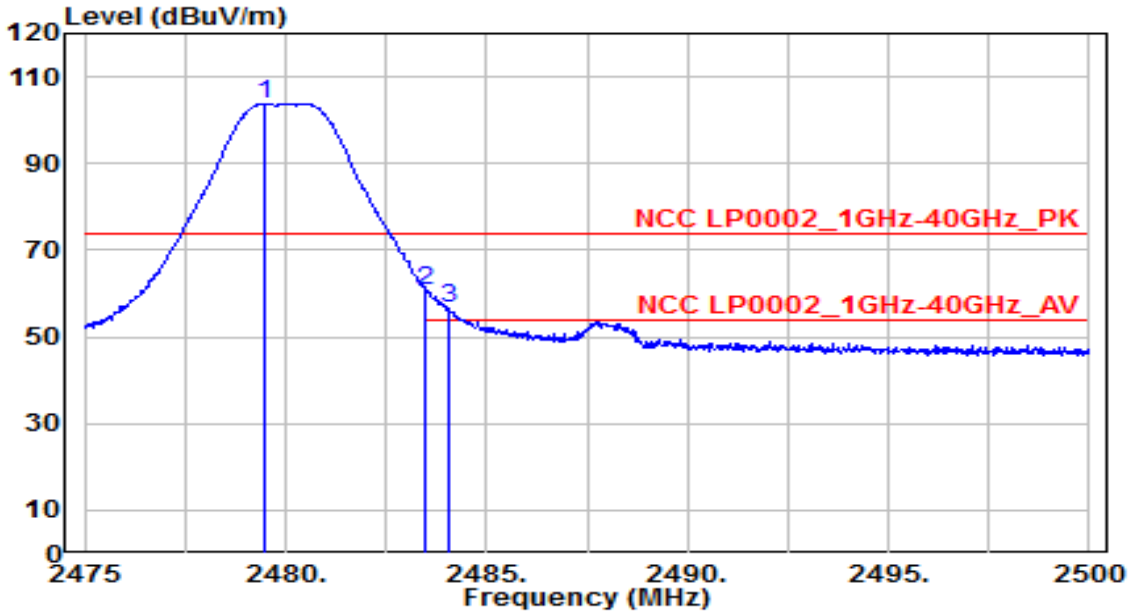


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	2374.600	49.95	-2.77	47.18	-26.82	74.00	165	195	Peak
2		2390.000	48.02	-2.70	45.32	-28.68	74.00	165	195	Peak
3		2402.100	96.22	-2.65	93.57	N/A	N/A	165	195	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC

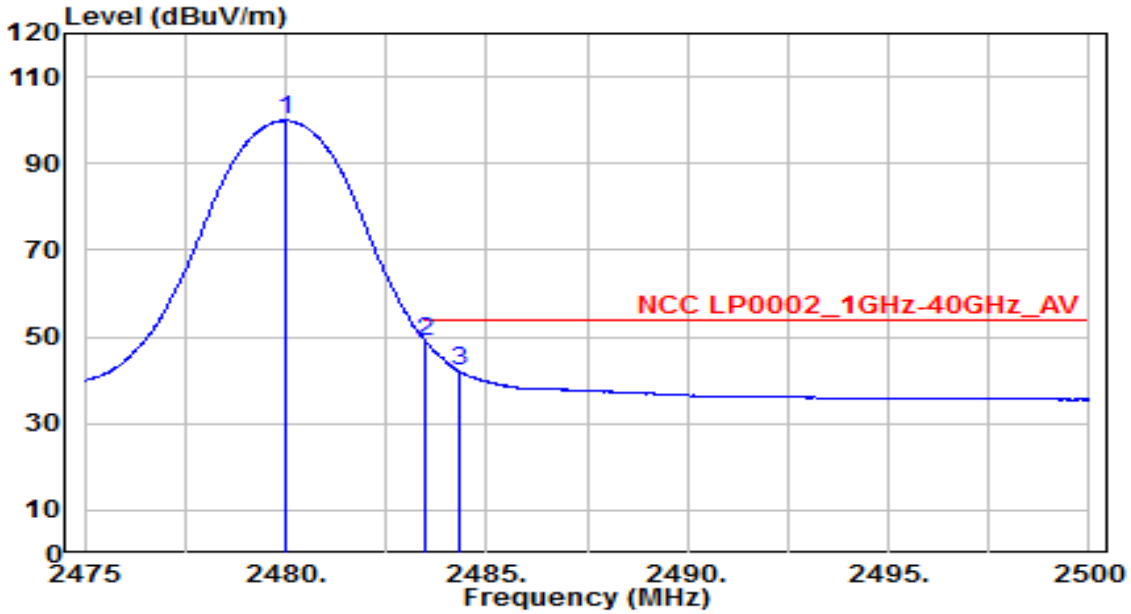


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2479.475	106.18	-2.31	103.87	N/A	N/A	120	240	Peak
2	*	2483.500	63.11	-2.29	60.82	-13.18	74.00	120	240	Peak
3		2484.075	58.67	-2.29	56.38	-17.62	74.00	120	240	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC

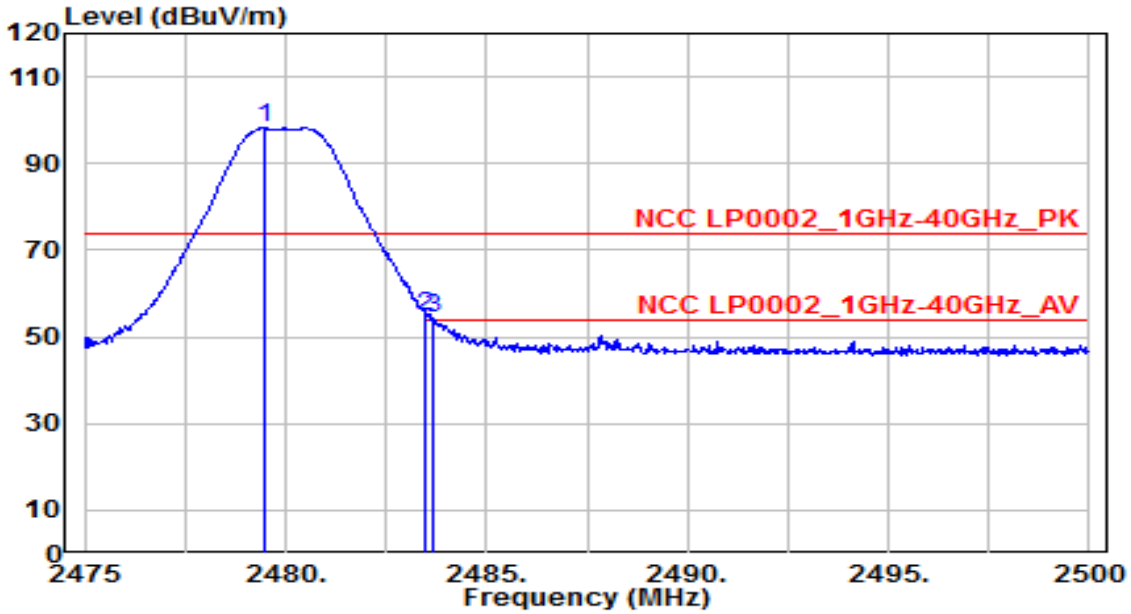


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2479.975	102.29	-2.31	99.98	N/A	N/A	120	240	Average
2	*	2483.500	51.18	-2.29	48.88	-5.12	54.00	120	240	Average
3		2484.325	44.29	-2.29	42.00	-12.00	54.00	120	240	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC

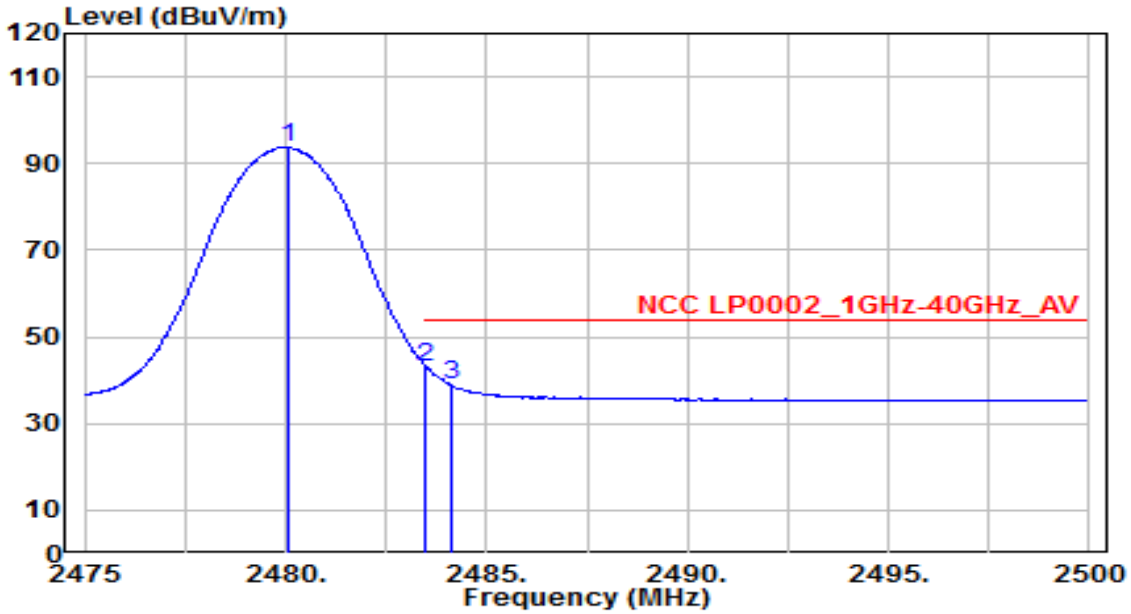


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2479.450	100.45	-2.31	98.14	N/A	N/A	160	205	Peak
2	*	2483.500	57.11	-2.29	54.81	-19.19	74.00	160	205	Peak
3		2483.675	56.79	-2.29	54.50	-19.50	74.00	160	205	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	藍牙耳機	Date of Test	2020-08-26
Factor	BBHA 9120D	Temp. / Humidity	24°C /52%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BLE_TX_2Mbps_CH 39	Test Voltage	By Notebook PC



No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		2480.050	96.08	-2.31	93.77	N/A	N/A	160	205	Average
2	*	2483.500	45.50	-2.29	43.21	-10.79	54.00	160	205	Average
3		2484.125	41.12	-2.29	38.83	-15.17	54.00	160	205	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

5.7. 占用頻寬

5.7.1 量測方法

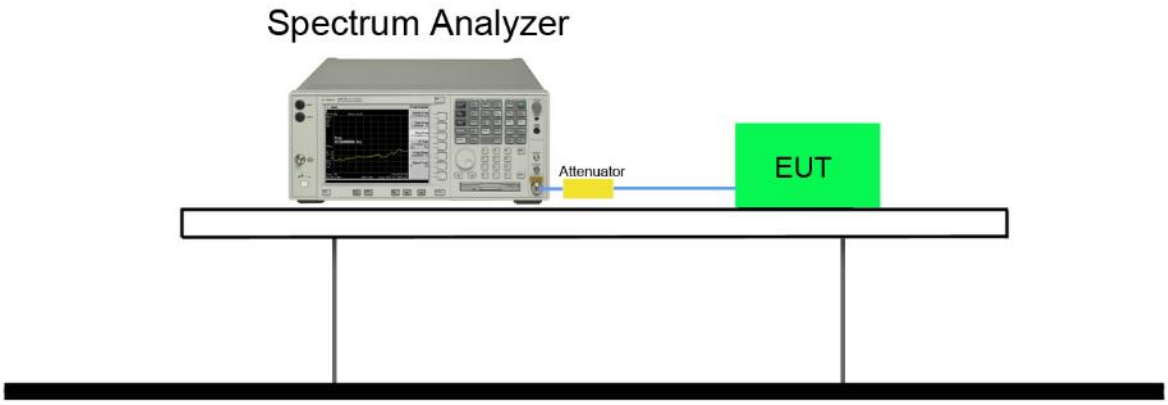
待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，頻譜分析儀之設定,參考如下:

(1) Set RBW = 100 kHz
(2) VBW ≥ 3 × RBW
(3) Detector = Peak
(4) Trace mode = max hold
(5) Sweep = auto couple

5.7.2 限制要求

6dB頻寬至少應有500kHz。

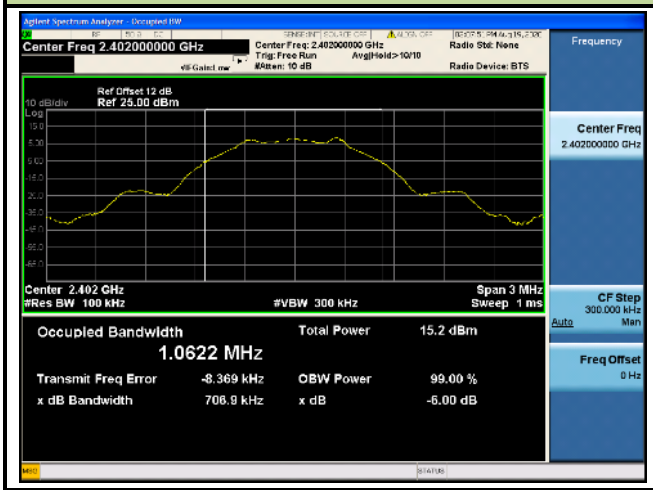
5.7.3 測試架構圖



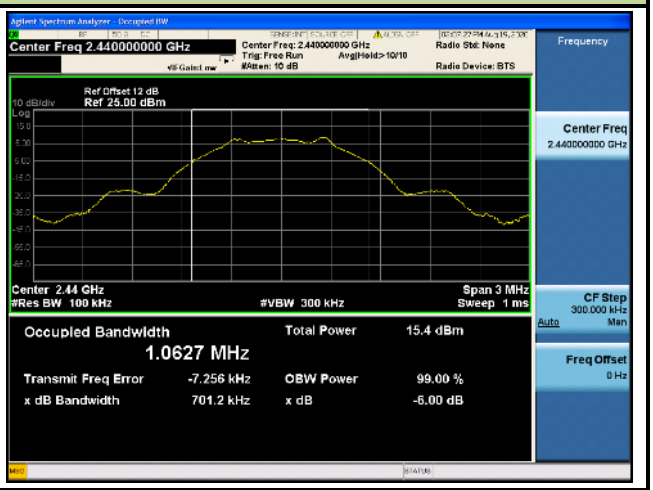
5.7.4 占用頻寬測試結果

Test Mode	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
LE (1Mbps)	00	2402	0.7069	≥ 0.5	Pass
LE (1Mbps)	19	2440	0.7012	≥ 0.5	Pass
LE (1Mbps)	39	2480	0.7026	≥ 0.5	Pass
LE (2Mbps)	00	2402	1.2280	≥ 0.5	Pass
LE (2Mbps)	19	2440	1.2130	≥ 0.5	Pass
LE (2Mbps)	39	2480	1.2700	≥ 0.5	Pass

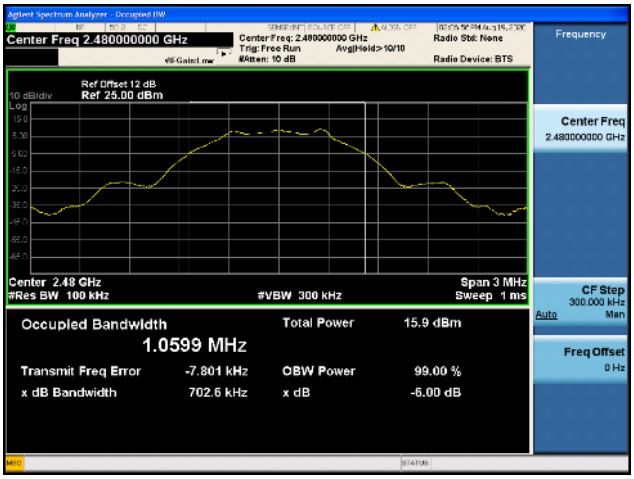
CH00 (2402MHz) LE(1Mbps)



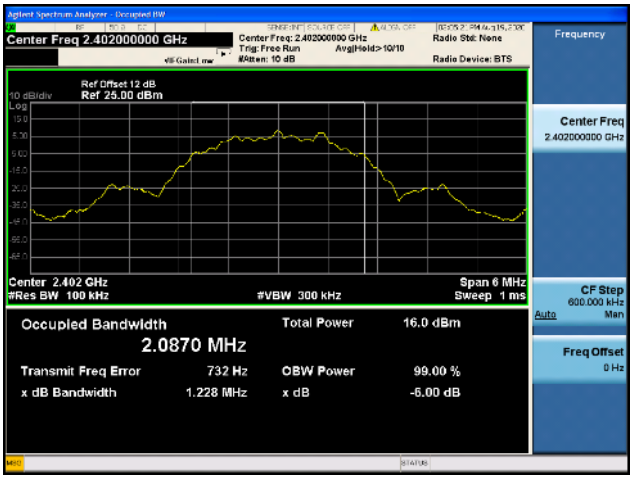
CH19 (2440MHz) LE(1Mbps)



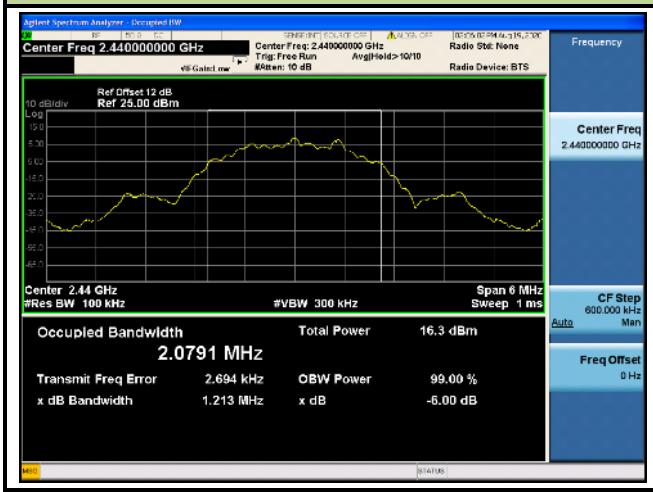
CH78 (2480MHz) LE(1Mbps)



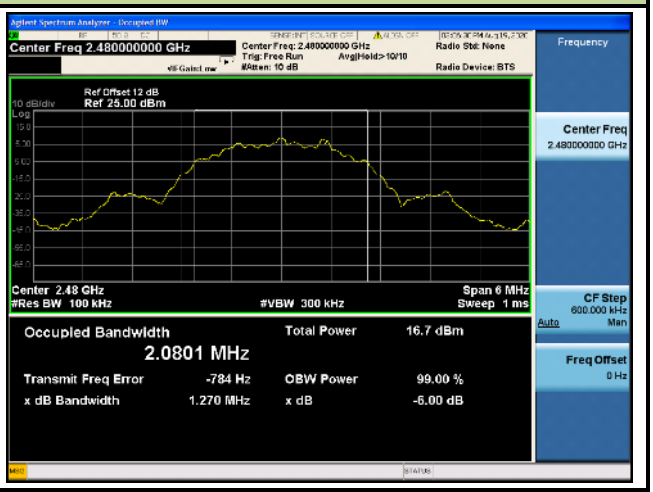
CH00 (2402MHz) LE(2Mbps)



CH19 (2440MHz) LE(2Mbps)



CH78 (2480MHz) LE(2Mbps)



5.8. 功率頻譜密度

5.8.1 量測方法

將發射機之天線埠經由適當之衰減直接連至測試儀器。找出發射峰值並擴展於通帶內，設定解析頻寬為3 kHz，視訊頻寬大於解析頻寬，掃描時間為頻率掃描範圍除以3 kHz。所測得之峰值位準必須應小於或等於8 dBm。

若受測裝置之頻譜線間隔小於3 kHz，測量時應將解析頻寬降低以使頻譜線間隔大於3kHz，所測得之數據再藉加總3 kHz 頻帶內所有個別頻譜線之功率(即標準化至3 kHz)以決定是否符合規定。

5.8.2 限制要求

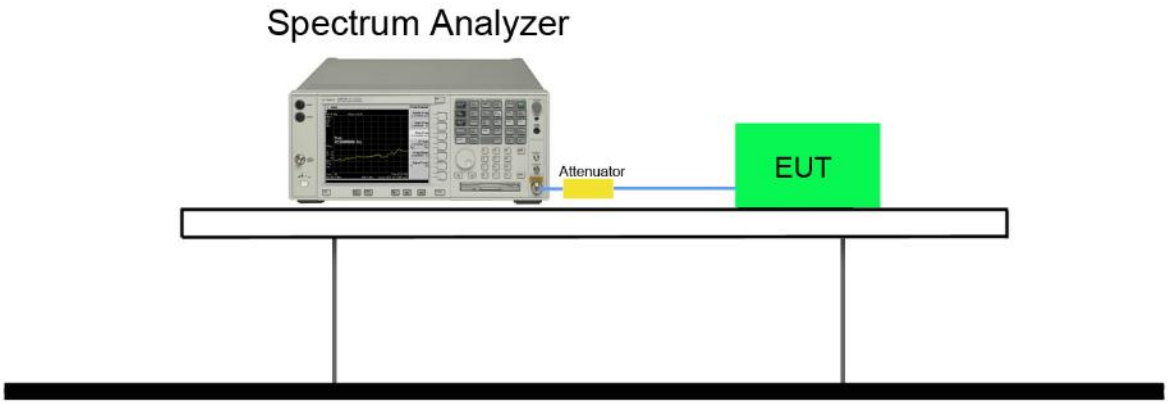
在使用頻率範圍之任意3千赫(kHz)頻寬內，由發射機傳導至天線之峰值發射電功率密度在任意期間內，皆不得大於8dBm。

若用於非固定式點對點操作時，若其發射天線之方向性增益超過6dBi，應依所超過之dB數等量降低峰值輸出功率。如用於固定式點對點(註)操作時，應符合下列情形之一：

(1)操作於2400-2483.5兆赫(MHz)者，其發射天線之方向性增益超過6dBi，應於每超過3dB降低1dB之峰值輸出功率。

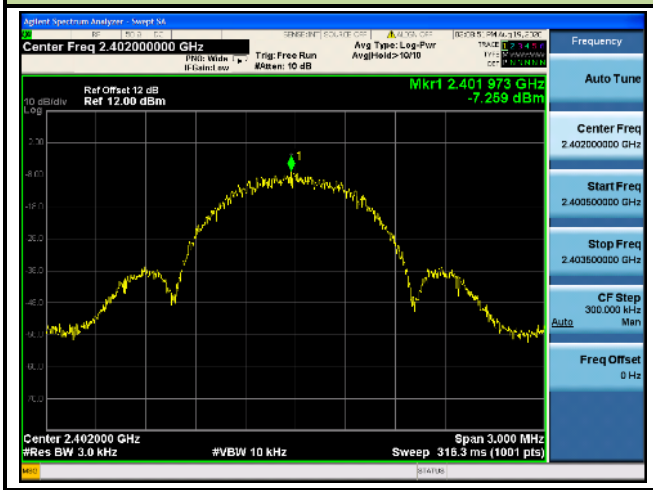
(2) 操作於5725-5850兆赫(MHz)者，其發射天線之方向性增益超過6dBi，不需降低峰值輸出功率。

5.8.3 測試架構圖



5.8.4 功率頻譜密度測試結果

Test Mode	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
LE (1Mbps)	00	2402	-7.259	≤ 8	Pass
LE (1Mbps)	19	2440	-7.103	≤ 8	Pass
LE (1Mbps)	39	2480	-6.714	≤ 8	Pass
LE (2Mbps)	00	2402	-8.498	≤ 8	Pass
LE (2Mbps)	19	2440	-8.300	≤ 8	Pass
LE (2Mbps)	39	2480	-7.949	≤ 8	Pass

CH00 (2402MHz) LE(1Mbps)	CH19 (2440MHz) LE(1Mbps)
	
CH78 (2480MHz) LE(1Mbps)	**CH00 (2402MHz) LE(2Mbps)**
CH19 (2440MHz) LE(2Mbps)	**CH78 (2480MHz) LE(2Mbps)**

The End