

NCC

低功率射頻電機型式試驗報告

產品名稱 : Wireless Flight Adapter
型號 : Flight Adapter
廠牌 : RHA
商標 : **RHA**
申請者 : 遠寬電信股份有限公司
申請者地址 : 新北市新店區安興路 127 號 10 樓
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 : 2019/12/3
測試日期 : 2019/12/4~2019/12/6

測試工程師

: 
(許丞哲)

報告審核人

: 
(陳柏均)

報告簽屬人

: 
(柯承志)



修訂紀錄

報告編號	版本	描述	發行日期
1912TW0102-T1	1.0	Original Report	2019-12-20

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	8
2.4 測試配置	9
2.5 測試周邊	11
2.6 操作程序	11
3. 測試設備明細	12
4. 量測不確定度	13
5. 測試結果	14
5.1 電源傳導測試	15
5.1.1 量測方法	15
5.1.2 限制要求	15
5.1.3 測試架構圖	15
5.1.4 電源傳導測試結果	16
5.2 峰值傳導輸出功率	20
5.2.1 量測方法	20
5.2.2 限制要求	20
5.2.3 測試架構圖	20
5.2.4 峰值傳導輸出功率測試結果	21
5.3 天線之要求	24
5.3.1 限制要求	24
5.3.2 天線樣式	24
5.4 帶外發射限制	25
5.4.1 量測方法	25
5.4.2 限制要求	25
5.4.3 測試架構圖	25
5.4.4 帶外輻射測試結果	26
5.5 輻射電場強度	30
5.5.1 量測方法	30
5.5.2 限制要求	30
5.5.3 測試架構圖	31
5.5.4 輻射電場強度測試結果	33

5.6 頻帶邊緣	55
5.6.1 量測方法	55
5.6.2 限制要求	55
5.6.3 測試架構圖	56
5.6.4 頻帶邊緣測試結果	57
5.7 間隔頻寬	66
5.7.1 量測方法	66
5.7.2 限制要求	66
5.7.3 測試架構圖	66
5.7.4 間隔頻寬測試結果	67
5.8 跳頻頻道數	70
5.8.1 量測方法	70
5.8.2 限制要求	70
5.8.3 測試架構圖	70
5.8.4 跳頻頻道數測試結果	71
5.9 占用時間	72
5.9.1 量測方法	72
5.9.2 限制要求	72
5.9.3 測試架構圖	72
5.9.4 占用時間測試結果	73

1. 一般資訊

申請者	遠寬電信股份有限公司
申請者地址	新北市新店區安興路 127 號 10 樓
製造商	RHA Technologies Limited
製造商地址	RHA Unit3, 69Haugh Road, Glasgow,G38TX, United Kingdom
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	Wireless Flight Adapter
產品型號	Flight Adapter
廠牌	RHA
商標	RHA
頻率範圍	2402~2480MHz
規格	Bluetooth Dual Mode: V5.0+EDR
調變模式	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
待測物電壓	By Battery (DC 3.7V)
最大輸出功率	3.283dBm
配件	
USB Type C Cable	MFR: 樂榮工業股份有限公司 M/N: SCNCE000000Z10Y0020 Length: 25cm

2.2 產品規格

Type of modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Data Rate	1Mbps(GFSK), 2Mbps($\pi/4$ DQPSK), 3Mbps(8DPSK)

V5.0+EDR

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz
03	2405 MHz	04	2406 MHz	05	2407 MHz
06	2408 MHz	07	2409 MHz	08	2410 MHz
09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz
15	2417 MHz	16	2418 MHz	17	2419 MHz
18	2420 MHz	19	2421 MHz	20	2422 MHz
21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz
27	2429 MHz	28	2430 MHz	29	2431 MHz
30	2432 MHz	31	2433 MHz	32	2434 MHz
33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz
39	2441 MHz	40	2442 MHz	41	2443 MHz
42	2444 MHz	43	2445 MHz	44	2446 MHz
45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz
51	2453 MHz	52	2454 MHz	53	2455 MHz
54	2456 MHz	55	2457 MHz	56	2458 MHz
57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz
63	2465 MHz	64	2466 MHz	65	2467 MHz
66	2468 MHz	67	2469 MHz	68	2470 MHz
69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz
75	2477 MHz	76	2478 MHz	77	2479 MHz
78	2480 MHz	N/A	N/A	N/A	N/A

2.3 測試模式

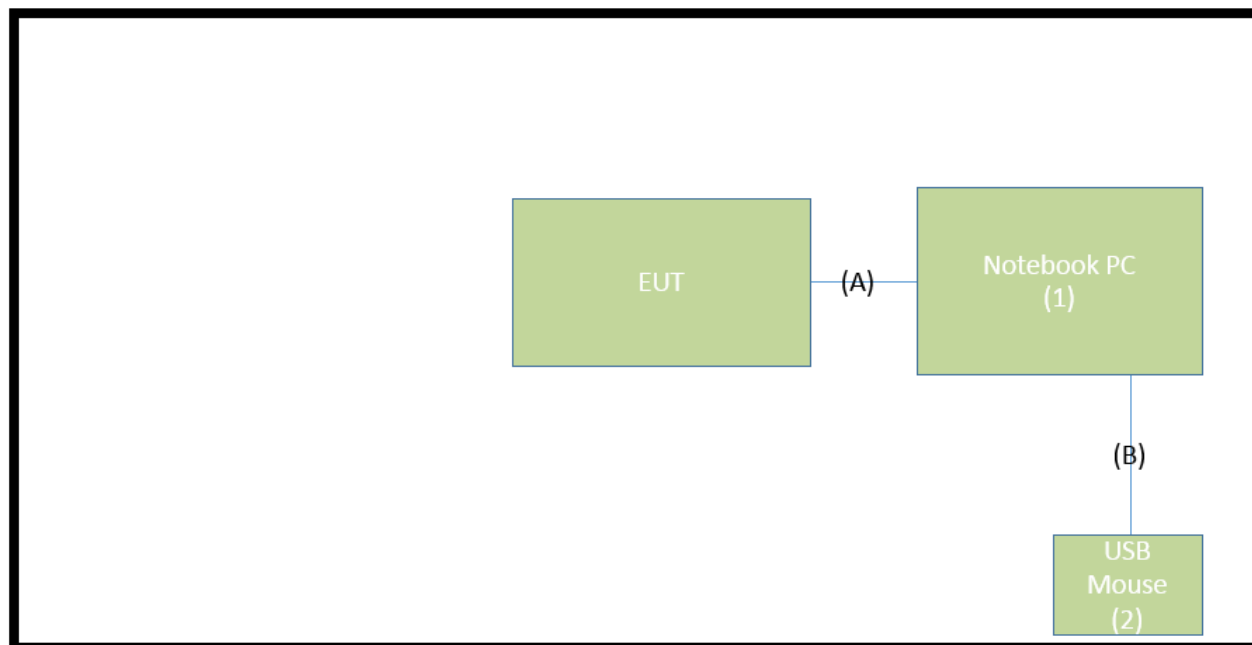
Test Mode	Mode 1: 發射器- 1Mbps(GFSK)
	Mode 2: 發射器- 3Mbps(8DPSK)
	Mode 3: 接收機- 1Mbps(GFSK)
	Mode 4: Charging

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。
2. 2Mbps 速率測試數據類似於 3Mbps，因此僅檢附 1Mbps 和 3Mbps 之測試數據。

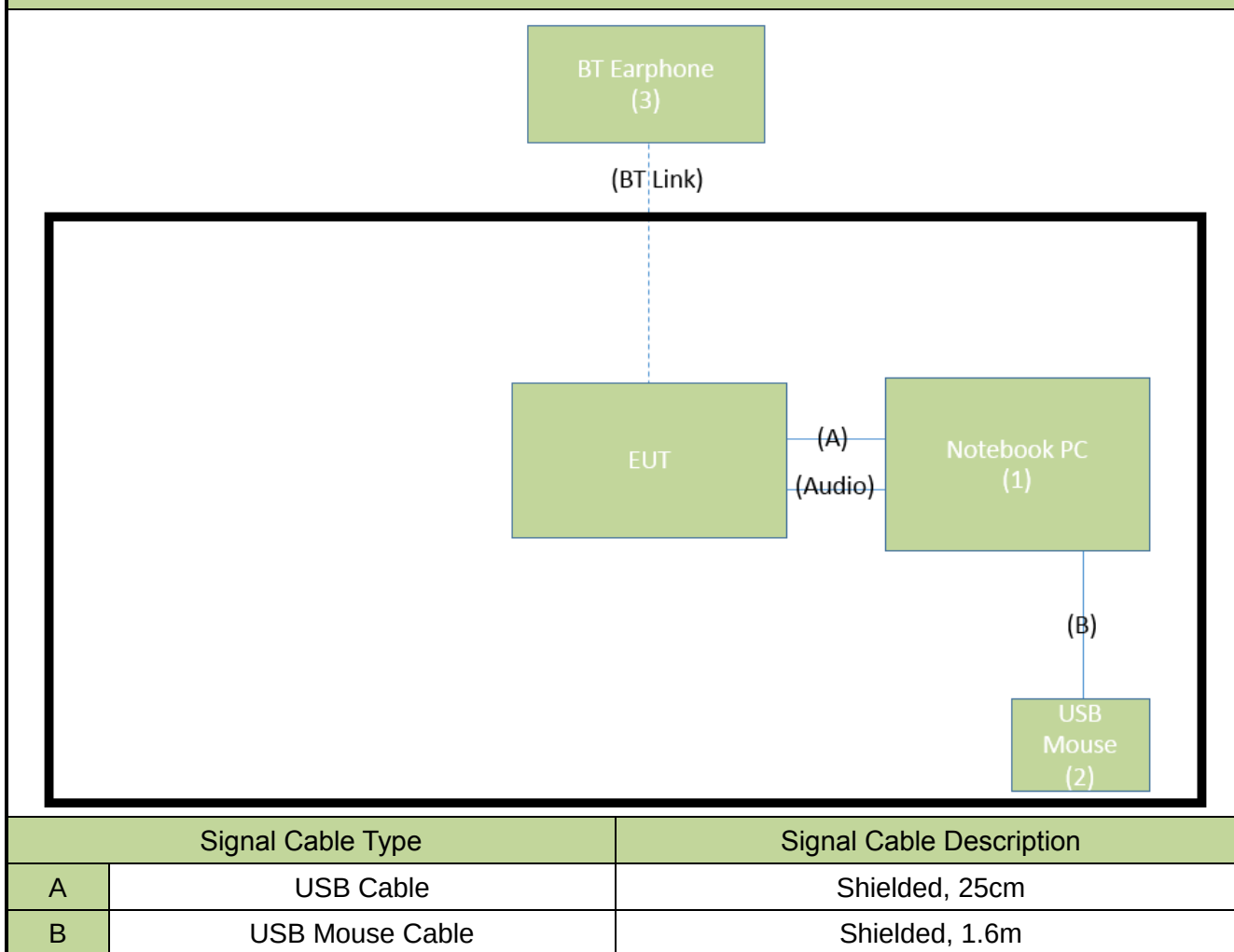
2.4 測試配置

待測物測試配置圖 (Mode 1~3)



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

待測物測試配置圖 (Mode 4)



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：

Mode 1~3:

No.	周邊名稱	廠牌	型號	序號	檢磁	電源線
1	Notebook PC	Lenovo	T450	PC0BH4FR	R33B65	Non-shielded, 0.8m
2	USB Mouse	Lenovo	M-U0025-O	HS427HA10UV	N/A	N/A

Mode 4:

No.	周邊名稱	廠牌	型號	序號	檢磁	電源線
1	Notebook PC	Lenovo	T450	PC0BH4FR	R33B65	Non-shielded, 0.8m
2	USB Mouse	Lenovo	M-U0025-O	HS427HA10UV	N/A	N/A
3	BT Earphone	THINK ACOUSTICS	T.A-01	N/A	N/A	N/A

2.6 操作程序

1.	Turn on the power of all equipment.
2.	Execute "Blue Test 3" 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	2020/3/25
Cable	Rosnol	N1C50-RG400- B1C50-500CM	MRTTWE00013	1 year	2020/6/18
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2020/3/25

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	2020/6/4
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2020/3/25
Active Loop Antenna	Schwarzbeck	FMZB 1519B	MRTTWA00002	1 year	2020/4/29
Broadband Horn antenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2020/4/22
Breitband Hornantenna	Schwarzbeck	BBHA 9170	MRTTWA00004	1 year	2020/4/23
Broadband Amplifier	Schwarzbeck	BBV 9721	MRTTWA00006	1 year	2020/4/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2020/4/24
Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2020/4/22

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	2020/7/11
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2020/3/26

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% ($U=2U_c(y)$): 2.53dB
電源傳導量測-通訊埠 (Conducted Emission- Impedance Stabilization Network Measurement)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.96dB
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.92dB (Below 30M)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.25dB (30M~1G)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.40dB (1G~18G)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.45dB (18G~40G)
頻率誤差量測 (Frequency Error)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 78.4\text{Hz}$
傳導功率量測 (Conducted Power)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.84\text{dB}$
傳導干擾量測 (Conducted Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 2.65\text{ dB}$
佔用頻寬量測 (Occupied Bandwidth)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.3%
溫度 / 濕度 (Temp. / Humidity)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.82^\circ\text{C}/ \pm 3\%$
直流電源 (DC Voltage)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.3\%$

5. 測試結果

產品名稱 **Wireless Flight Adapter**
 型號 **Flight Adapter**

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	$\leq 21.00\text{dBm}$	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	$\leq 20\text{dBc(Peak)}$	符合	第 5.4 章節
2.7	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	$\leq 74\text{dBuV/m(Peak)}$ $\leq 54\text{dBuV/m(Average)}$	符合	第 5.6 章節
3.10.1.6(1)(A)	間隔頻寬	不得小於25 kHz 或跳頻頻道20 dB 頻寬之三分之二，兩者取較寬者。	符合	第 5.7 章節
3.10.1.6(1)(A)(a)	跳頻頻道數	至少15個無重疊的頻道	符合	第 5.8 章節
3.10.1.6(1)(A)(a)	占用時間	$\leq 0.4\text{s}$	符合	第 5.9 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明顯差異，因此檢附其中一個測試頻道之測試數。

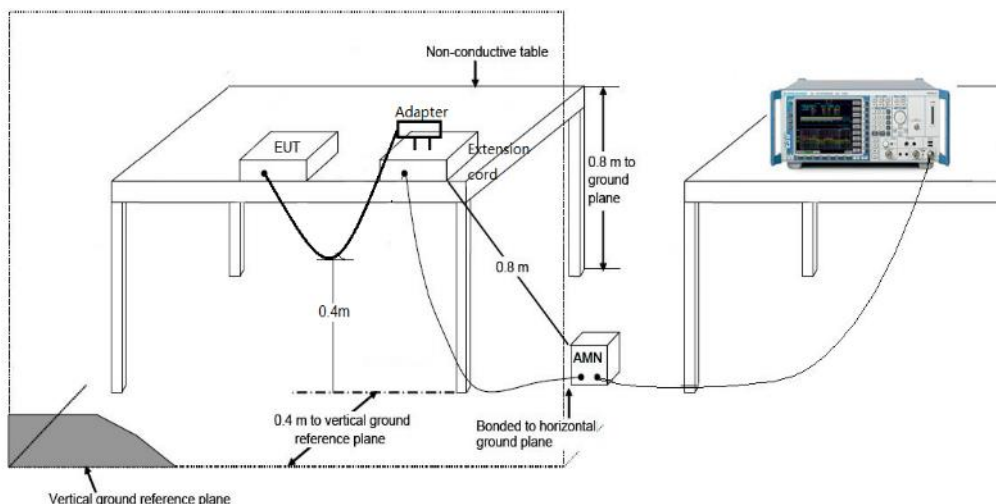
5.1.2 限制要求

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(μ H)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

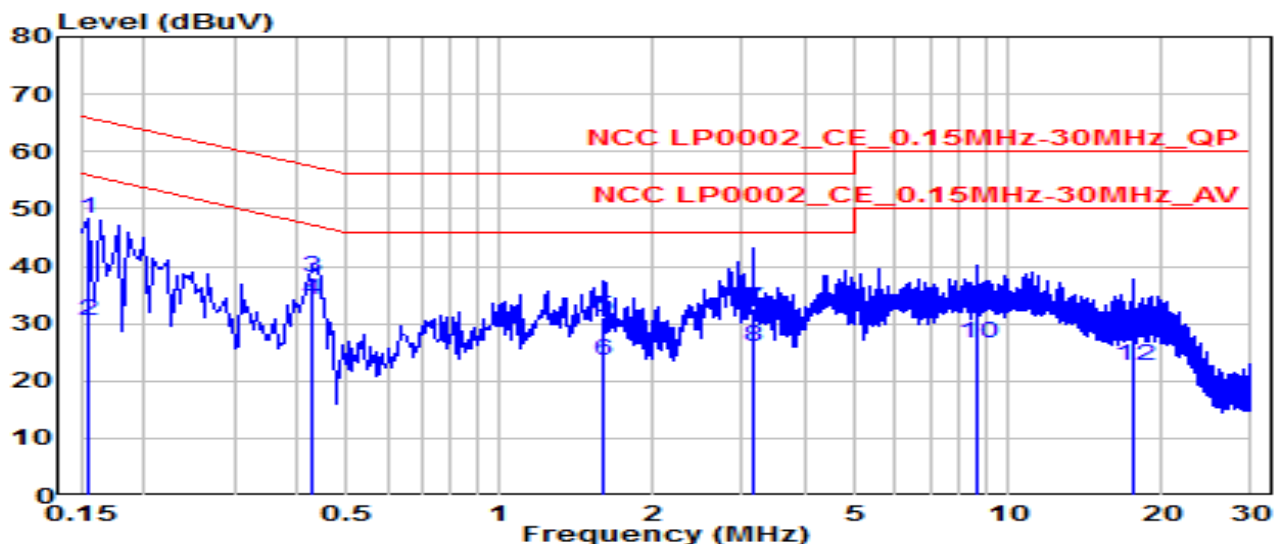
註：隨頻率之對數遞減

5.1.3 測試架構圖



5.1.4 電源傳導測試結果

EUT	Wireless Flight Adapter	Date of Test	2019-12-04
Factor	CE_ENV216-L1 (Filter ON)	Temp. / Humidity	22.4°C /50%
Polarity	Line1	Site / Test Engineer	SR2 / Eric
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

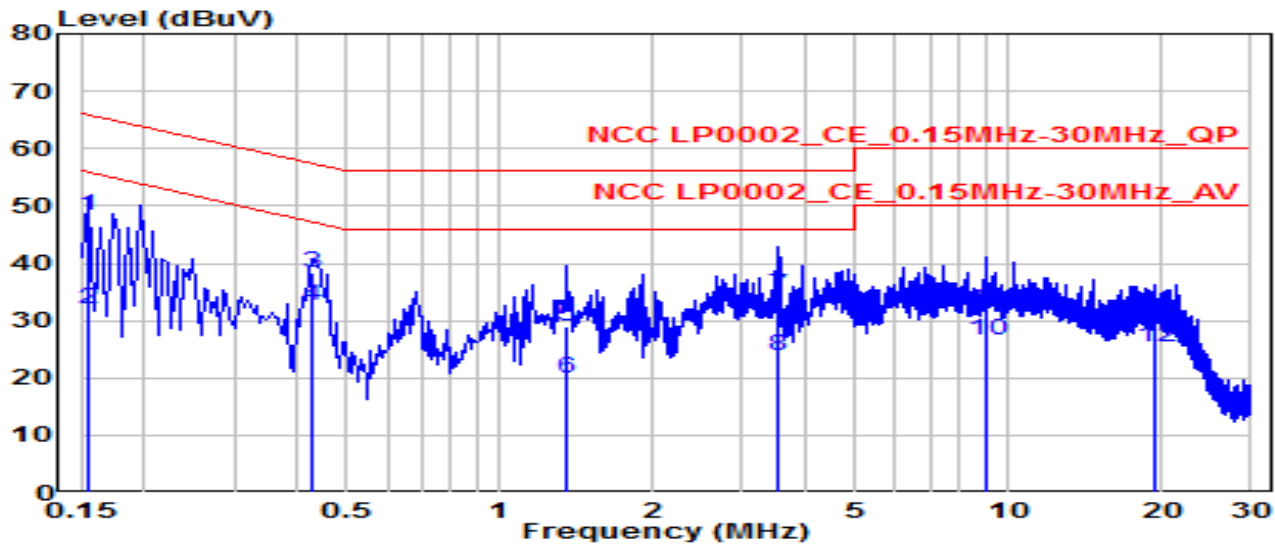


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	*	0.154	38.58	9.60	48.18	-17.57	65.75	QP
2		0.154	21.02	9.60	30.62	-25.14	55.75	Average
3		0.429	28.53	9.60	38.13	-19.14	57.27	QP
4	*	0.429	24.41	9.60	34.01	-13.26	47.27	Average
5		1.603	21.53	9.68	31.20	-24.80	56.00	QP
6		1.603	13.88	9.68	23.55	-22.45	46.00	Average
7		3.151	22.84	9.71	32.55	-23.45	56.00	QP
8		3.151	16.26	9.71	25.97	-20.03	46.00	Average
9		8.677	21.84	9.84	31.68	-28.32	60.00	QP
10		8.677	16.59	9.84	26.42	-23.58	50.00	Average
11		17.541	17.40	9.96	27.36	-32.64	60.00	QP
12		17.541	12.56	9.96	22.52	-27.48	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	Wireless Flight Adapter	Date of Test	2019-12-04
Factor	CE_ENV216-N (Filter ON)	Temp. / Humidity	22.4°C /50%
Polarity	Neutral	Site / Test Engineer	SR2 / Eric
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

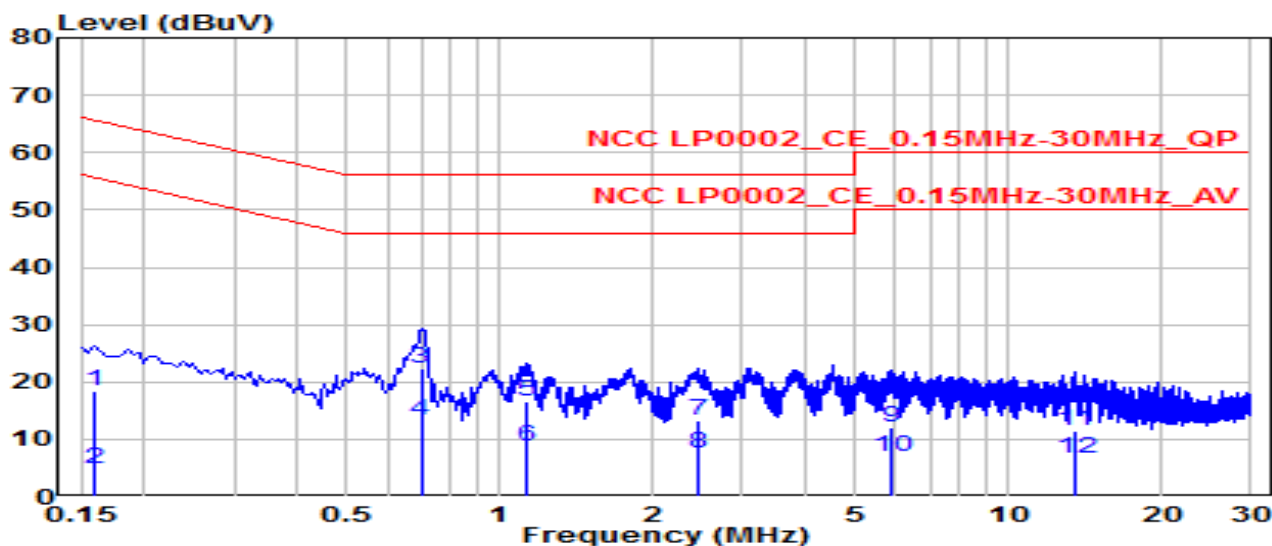


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	*	0.154	38.71	9.62	48.33	-17.42	65.75	QP
2		0.154	22.40	9.62	32.02	-23.74	55.75	Average
3		0.424	28.69	9.61	38.30	-19.06	57.36	QP
4	*	0.424	23.04	9.61	32.65	-14.71	47.36	Average
5		1.356	19.30	9.67	28.97	-27.03	56.00	QP
6		1.356	10.30	9.67	19.97	-26.03	46.00	Average
7		3.502	24.66	9.71	34.37	-21.63	56.00	QP
8		3.502	14.02	9.71	23.72	-22.28	46.00	Average
9		9.014	22.18	9.86	32.04	-27.96	60.00	QP
10		9.014	16.79	9.86	26.64	-23.36	50.00	Average
11		19.417	19.90	10.04	29.94	-30.06	60.00	QP
12		19.417	15.19	10.04	25.23	-24.77	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	Wireless Flight Adapter	Date of Test	2019-12-04
Factor	CE_ENV216-L1 (Filter ON)	Temp. / Humidity	22.4°C /50%
Polarity	Line1	Site / Test Engineer	SR2 / Eric
Test Mode	MODE4	Test Voltage	AC 110V/60Hz

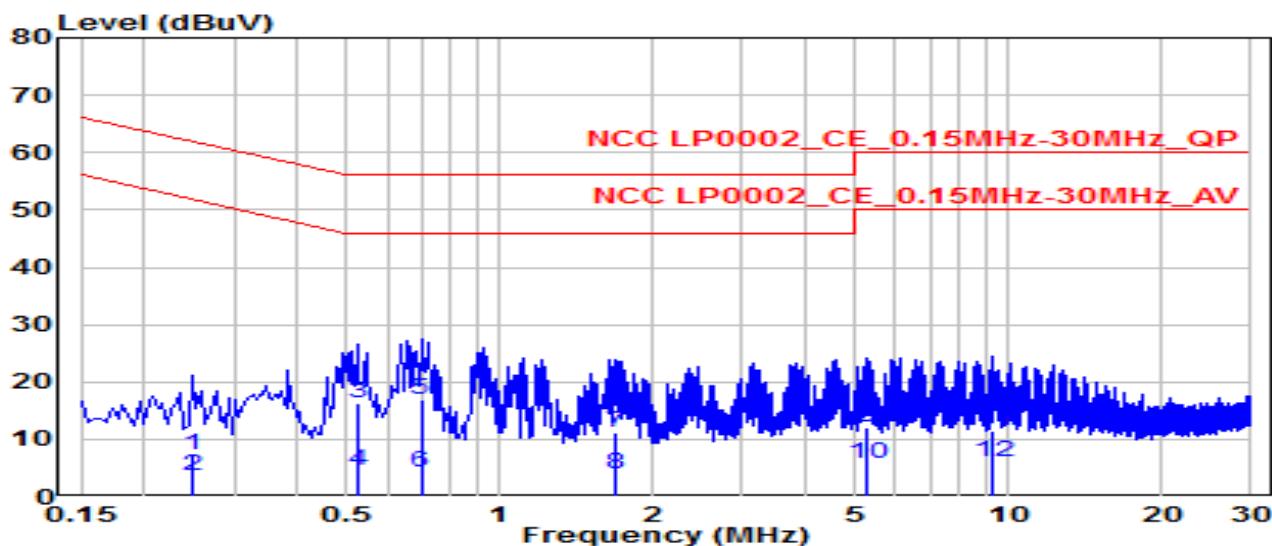


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1		0.159	8.75	9.59	18.35	-47.17	65.52	QP
2		0.159	-4.62	9.59	4.97	-50.54	55.52	Average
3	*	0.699	12.63	9.62	22.25	-33.75	56.00	QP
4	*	0.699	3.52	9.62	13.14	-32.86	46.00	Average
5		1.122	7.04	9.66	16.70	-39.30	56.00	QP
6		1.122	-0.83	9.66	8.83	-37.17	46.00	Average
7		2.449	3.52	9.70	13.22	-42.78	56.00	QP
8		2.449	-2.00	9.70	7.69	-38.31	46.00	Average
9		5.905	2.25	9.76	12.02	-47.98	60.00	QP
10		5.905	-2.70	9.76	7.06	-42.94	50.00	Average
11		13.500	1.50	9.92	11.42	-48.58	60.00	QP
12		13.500	-3.42	9.92	6.50	-43.50	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	Wireless Flight Adapter	Date of Test	2019-12-04
Factor	CE_ENV216-N (Filter ON)	Temp. / Humidity	22.4°C /50%
Polarity	Neutral	Site / Test Engineer	SR2 / Eric
Test Mode	MODE4	Test Voltage	AC 110V/60Hz



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Remark (QP/PK/AV)
1	0.249	-2.26	9.61	7.36	-54.43	61.79	QP
2	0.249	-5.88	9.61	3.74	-48.05	51.79	Average
3	0.523	6.65	9.61	16.26	-39.74	56.00	QP
4	* 0.523	-5.13	9.61	4.48	-41.52	46.00	Average
5	* 0.699	7.18	9.63	16.81	-39.19	56.00	QP
6	0.699	-5.29	9.63	4.34	-41.66	46.00	Average
7	1.689	1.42	9.68	11.09	-44.91	56.00	QP
8	1.689	-5.73	9.68	3.95	-42.05	46.00	Average
9	5.270	2.21	9.74	11.95	-48.05	60.00	QP
10	5.270	-4.04	9.74	5.70	-44.30	50.00	Average
11	9.352	1.63	9.87	11.50	-48.50	60.00	QP
12	9.352	-3.97	9.87	5.90	-44.10	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

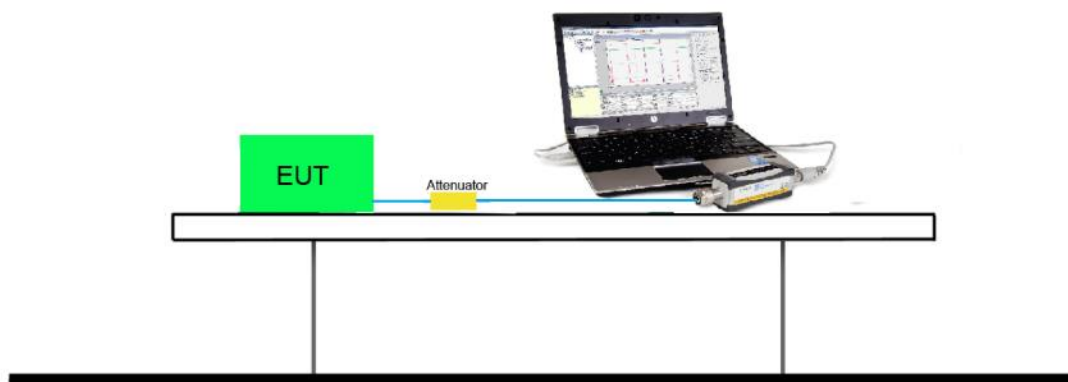
操作於2400-2483.5 MHz之跳頻或數位調變的發射器材與5725-5850 MHz之跳頻發射器材：1W(含)以下，當跳頻系統符合國家通訊傳播委員會低功率射頻電機技術規範之第3.10.1.6(1)(A)(a)節，其限制值為0.125 W(含)以下。

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

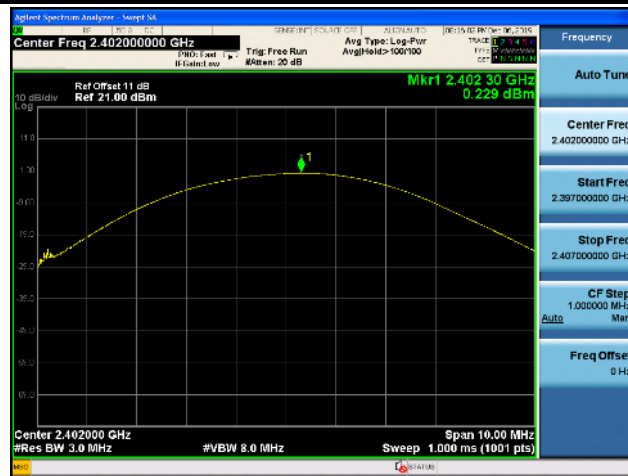
待測物名稱	Wireless Flight Adapter	測試日期	2019/12/6
待測物型號	Flight Adapter	溫度 / 濕度	23°C / 55%
測試場地 / 測試工程師	AC1 / Peter		

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
DH5(1Mbps)	00	2402	0.229	< 21
DH5(1Mbps)	39	2441	-0.160	< 21
DH5(1Mbps)	78	2480	-1.539	< 21
2-DH5(2Mbps)	00	2402	2.969	< 21
2-DH5(2Mbps)	39	2441	2.304	< 21
2-DH5(2Mbps)	78	2480	1.479	< 21
3-DH5(3Mbps)	00	2402	3.283	< 21
3-DH5(3Mbps)	39	2441	2.631	< 21
3-DH5(3Mbps)	78	2480	3.107	< 21

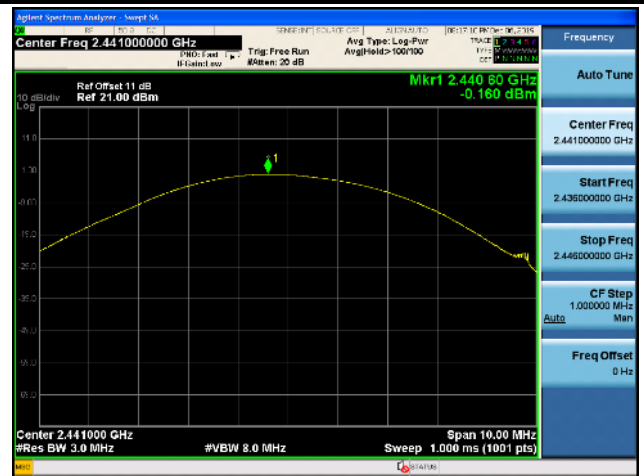
備註： 1. 此量測值已含線材損耗(Cable Loss=1dB)。

2. 封包型式共分為 DH1,DH3,DH5 經過初測並無明顯差異,故僅列最差之模式呈現在報告中。

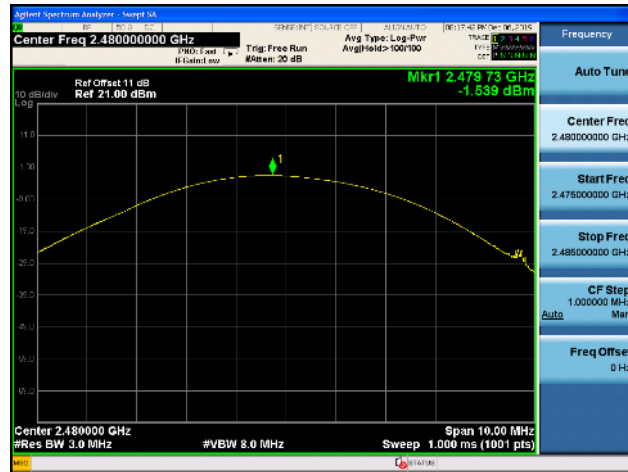
CH00 (2402MHz) DH5(1Mbps)



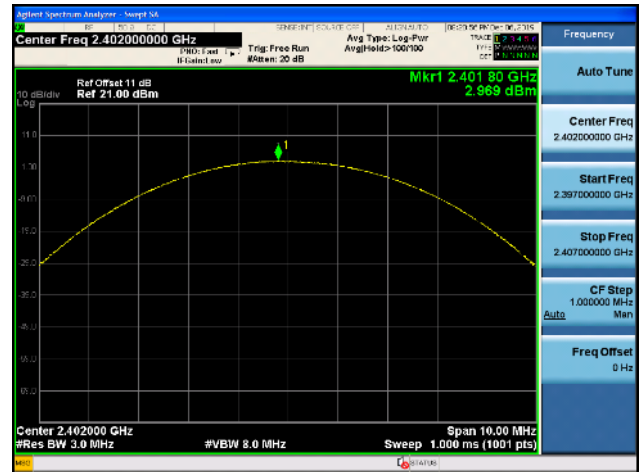
CH39 (2441MHz) DH5(1Mbps)



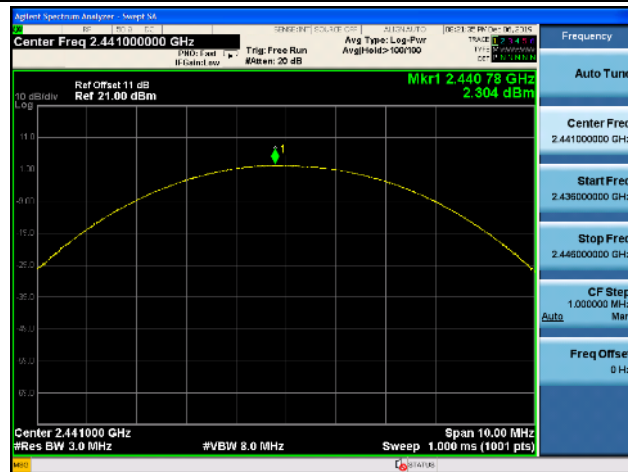
CH78 (2480MHz) DH5(1Mbps)



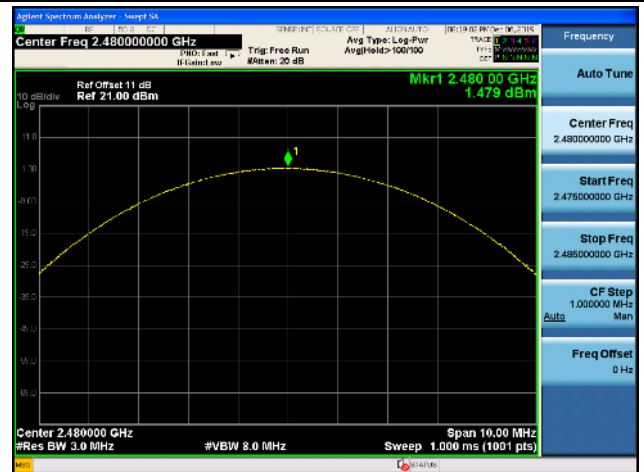
CH00 (2402MHz) 2-DH5(2Mbps)



CH39 (2441MHz) 2-DH5(2Mbps)



CH78 (2480MHz) 2-DH5(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 Wireless Flight Adapter 其天線為 Chip Antenna Type，(檢附天線規格書)

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	OneWave Electronic	WAN5020D245W36	3.19dBi

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。

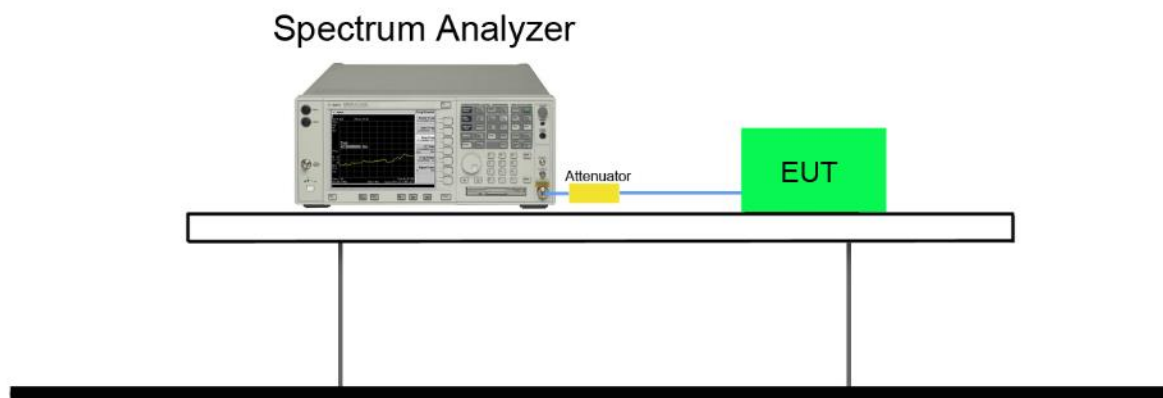
備 註: DH1,DH3,DH5僅為封包傳輸率的差異,其針對此章節無顯著之影響，因此僅檢附DH5為測試數據。

5.4.2 限制要求

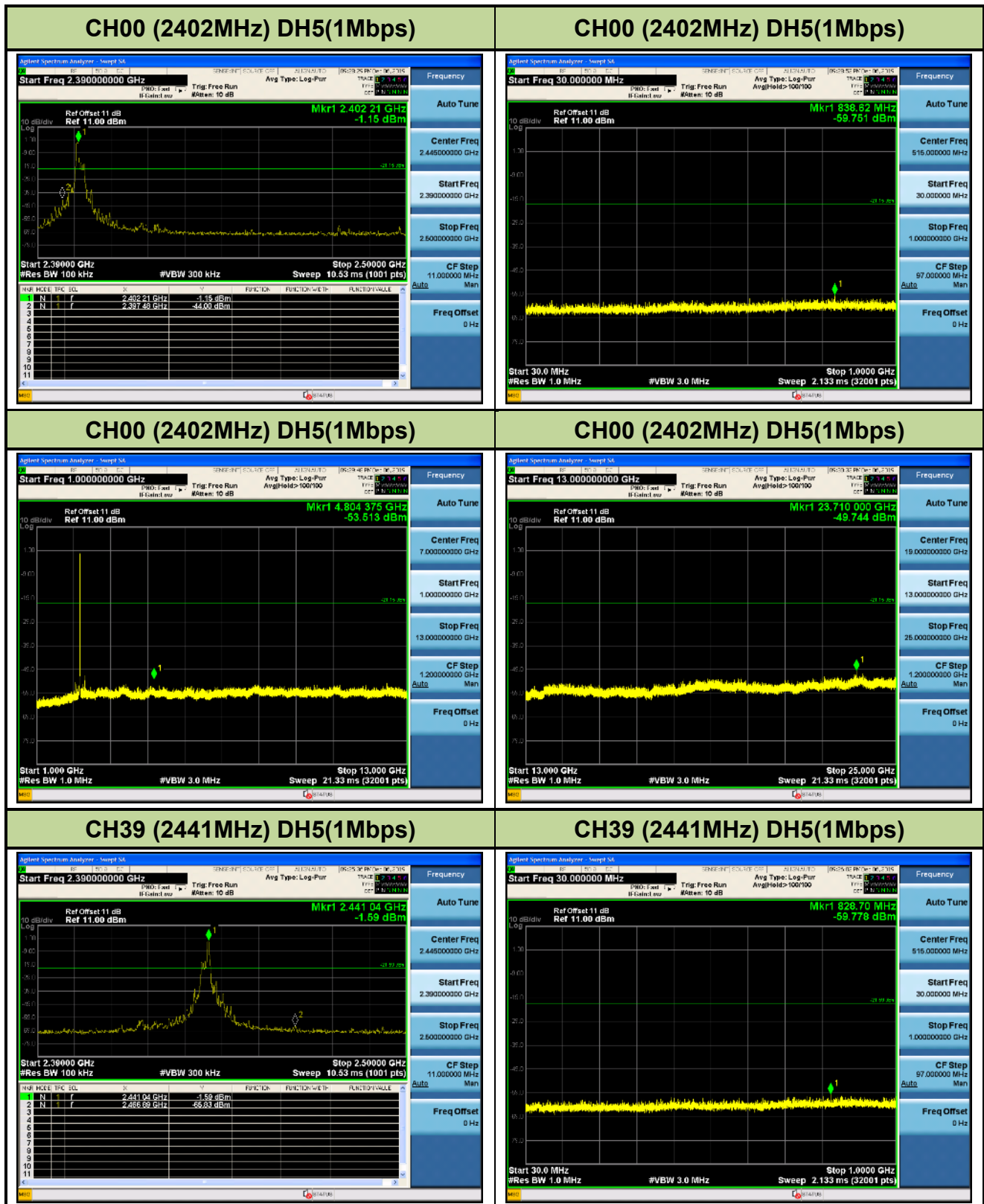
使用頻帶範圍外之任意 100 千赫 (kHz)內，發射器所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫 (kHz)內的射頻功率，衰減值限制如下：

- (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。

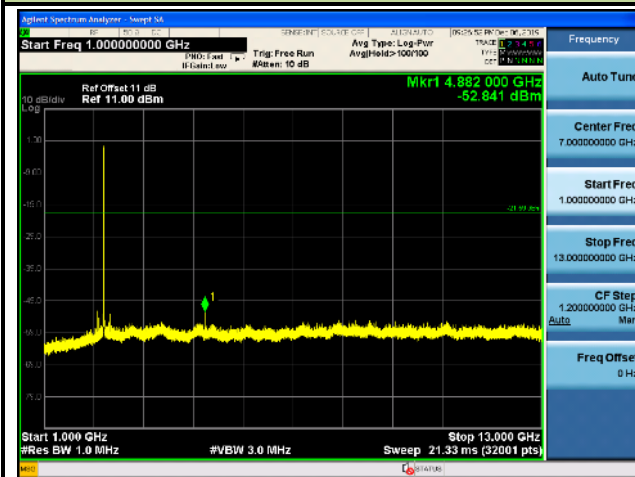
5.4.3 測試架構圖



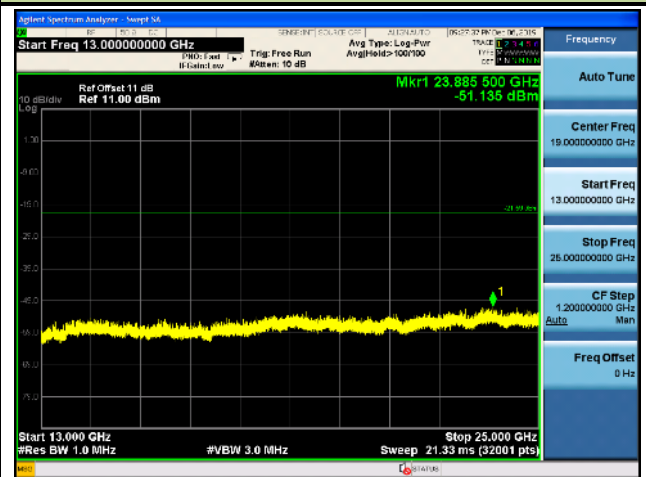
5.4.4 帶外輻射測試結果



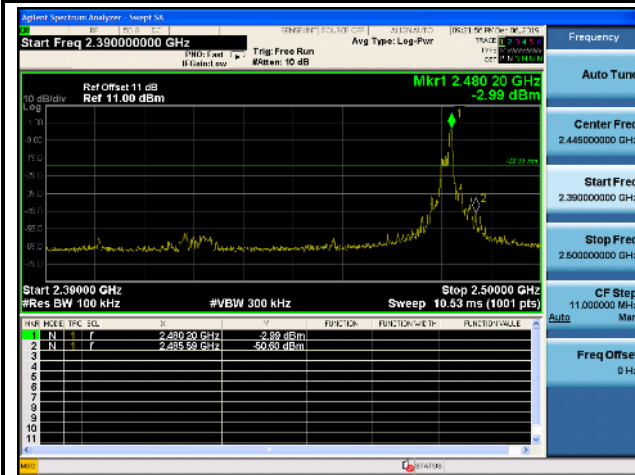
CH39 (2441MHz) DH5(1Mbps)



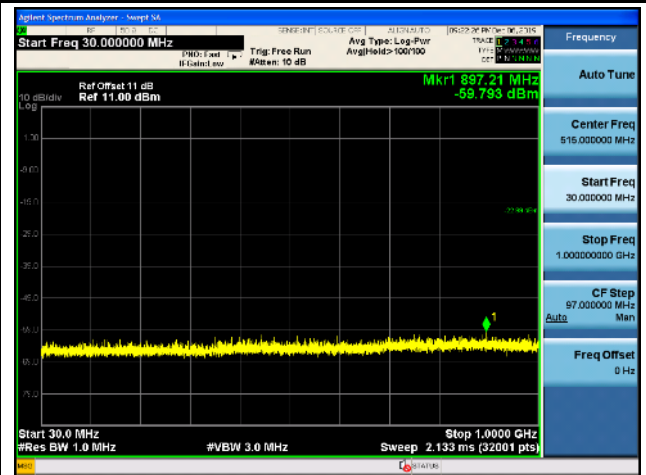
CH39 (2441MHz) DH5(1Mbps)



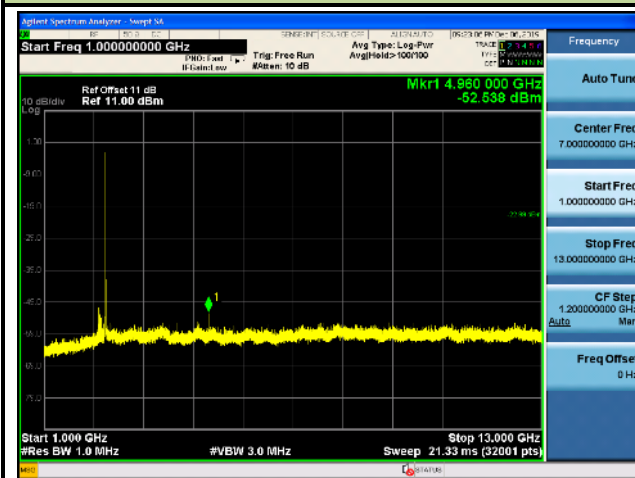
CH78 (2480MHz) DH5(1Mbps)



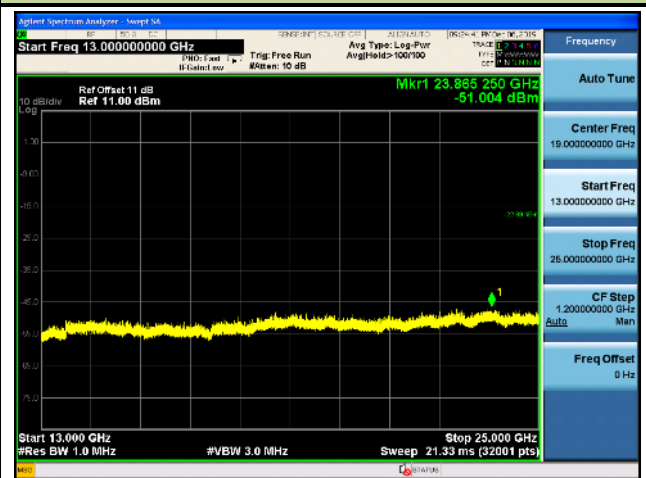
CH78 (2480MHz) DH5(1Mbps)



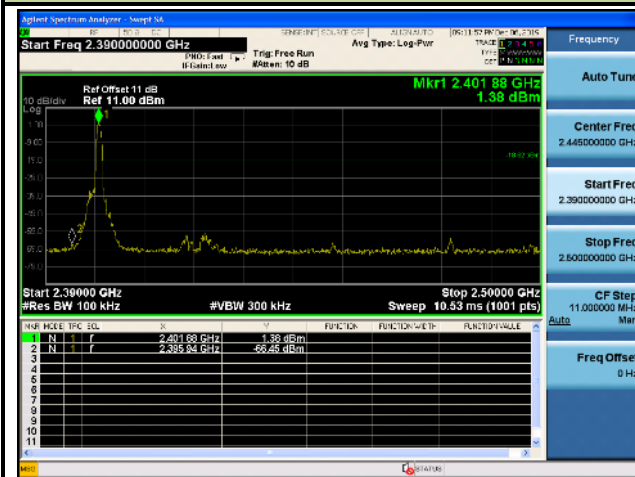
CH78 (2480MHz) DH5(1Mbps)



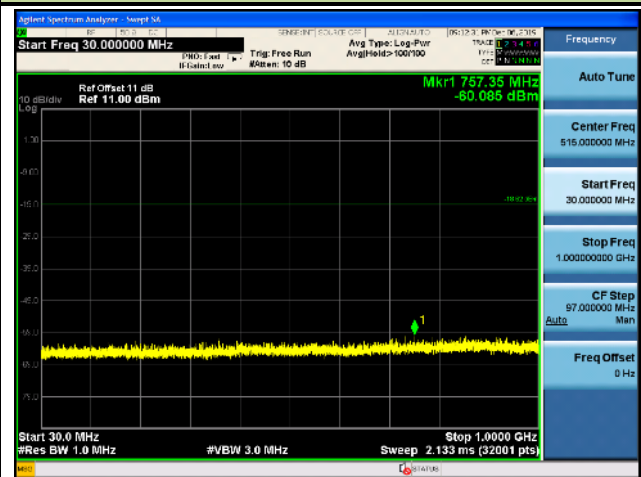
CH78 (2480MHz) DH5(1Mbps)



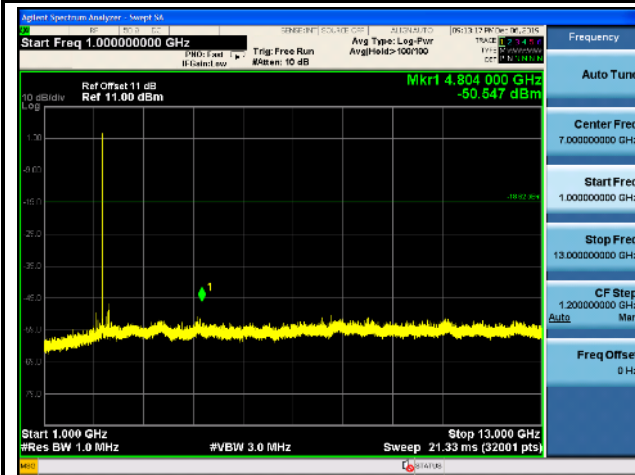
CH00 (2402MHz) 3-DH5(3Mbps)



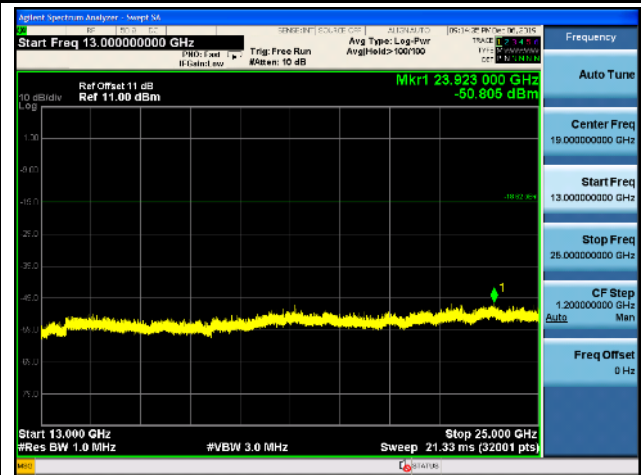
CH00 (2402MHz) 3-DH5(3Mbps)



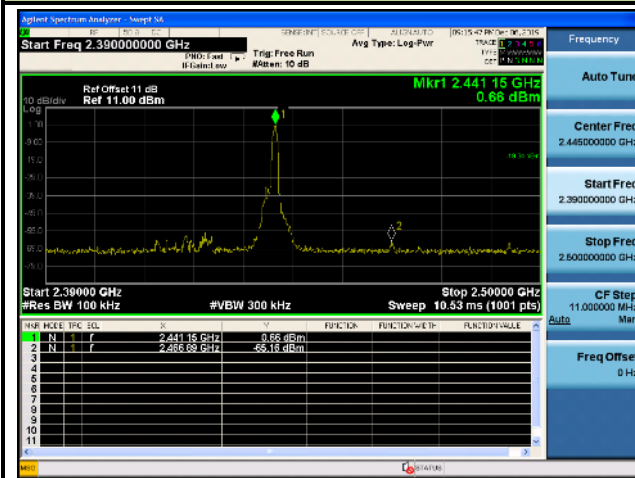
CH00 (2402MHz) 3-DH5(3Mbps)



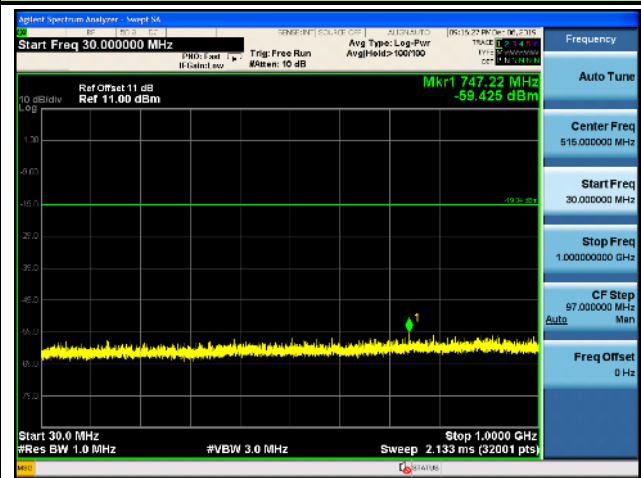
CH00 (2402MHz) 3-DH5(3Mbps)



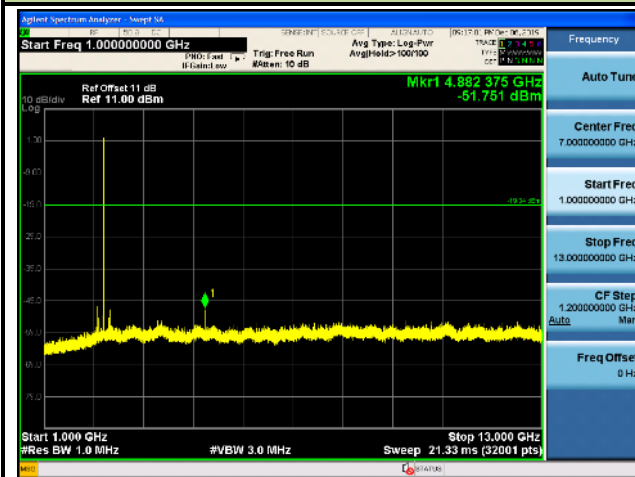
CH39 (2441MHz) 3-DH5(3Mbps)



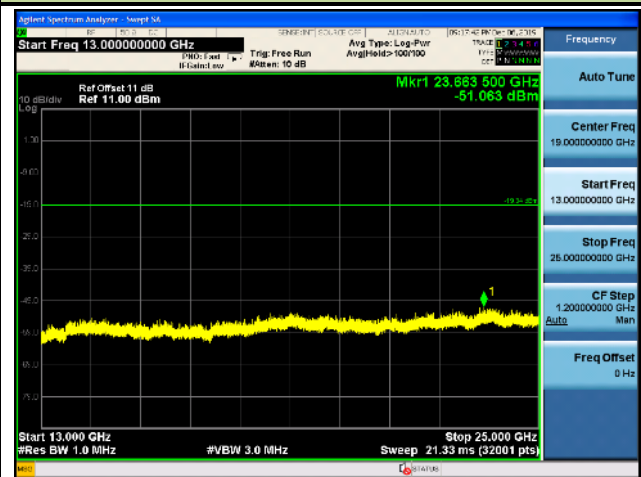
CH39 (2441MHz) 3-DH5(3Mbps)



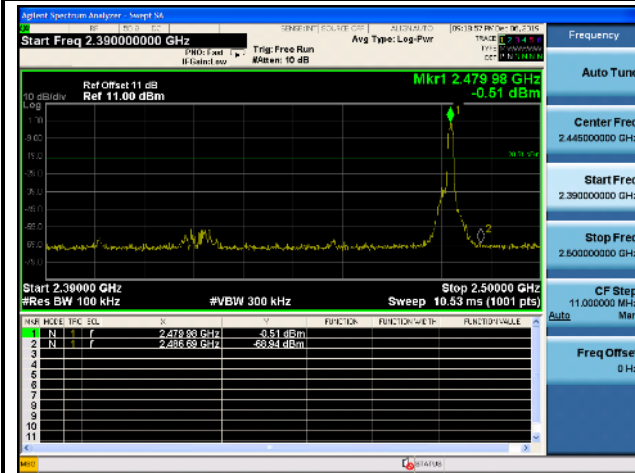
CH39 (2441MHz) 3-DH5(3Mbps)



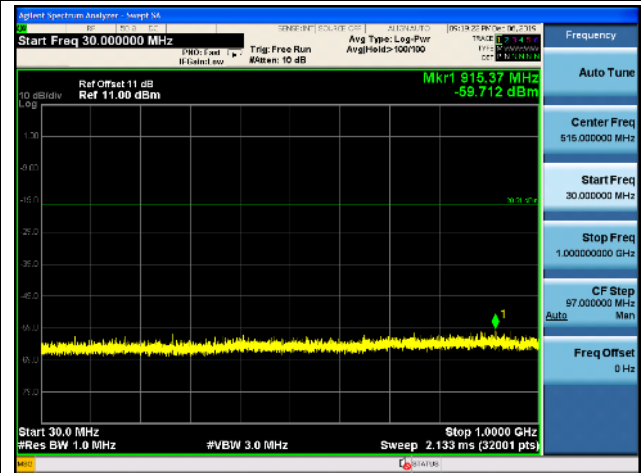
CH39 (2441MHz) 3-DH5(3Mbps)



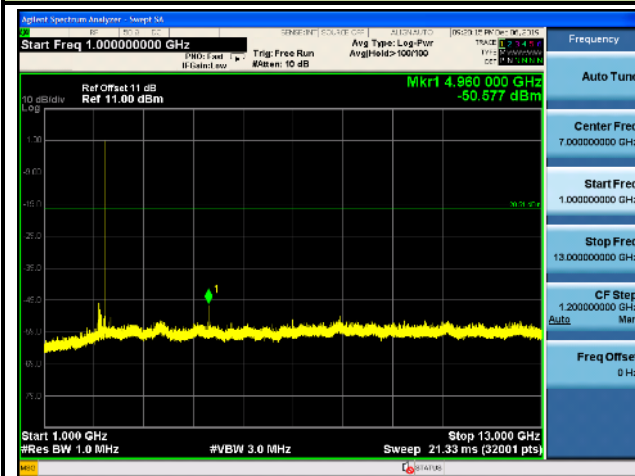
CH78 (2480MHz) 3-DH5(3Mbps)



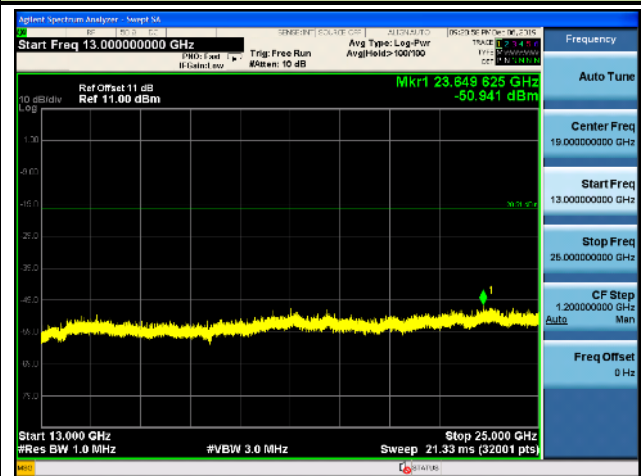
CH78 (2480MHz) 3-DH5(3Mbps)



CH78 (2480MHz) 3-DH5(3Mbps)



CH78 (2480MHz) 3-DH5(3Mbps)



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 C63.10-2014 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: DH1,DH3,DH5僅為封包傳輸率的差異,其針對此章節無顯著之影響，因此僅檢附DH5為測試數據。

5.5.2 限制要求

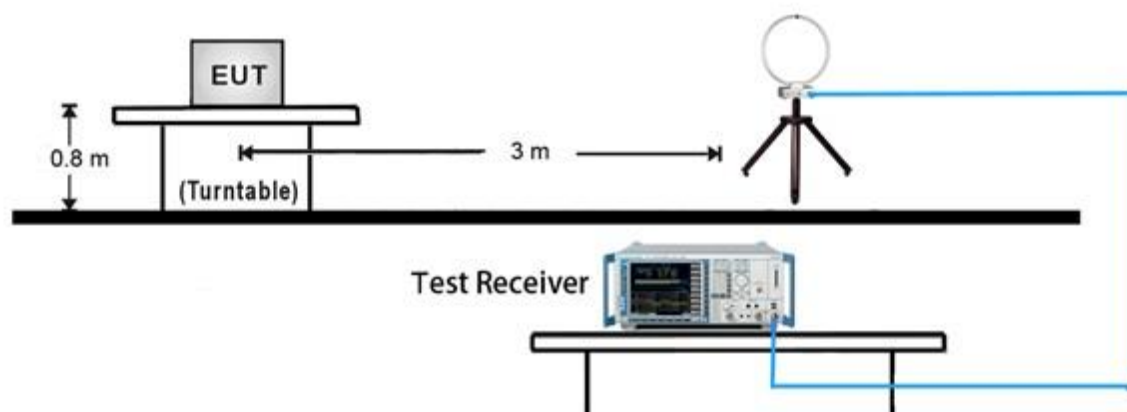
其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

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

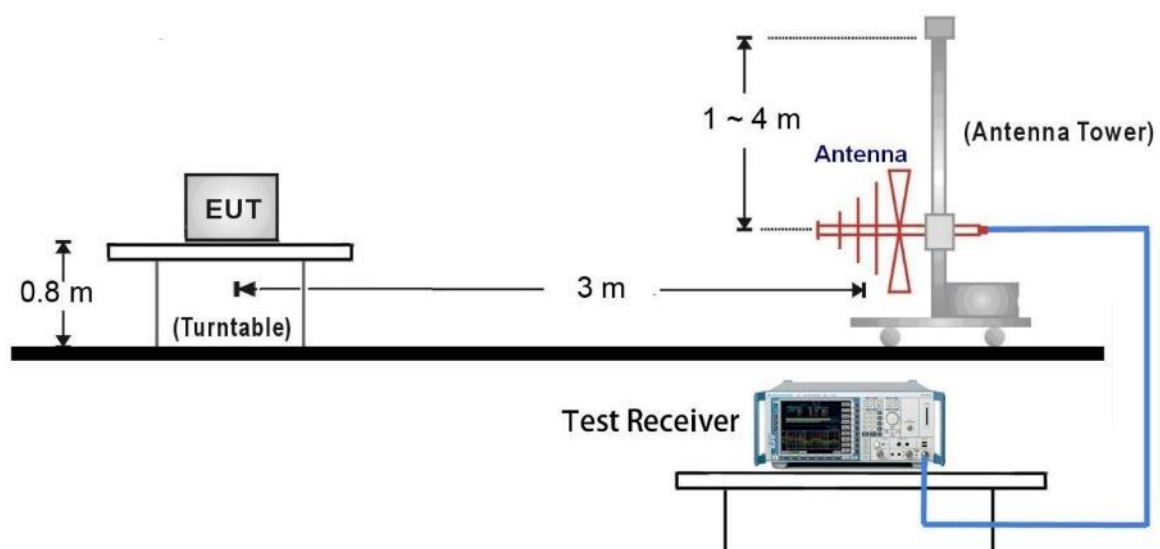
上表規定之電場強度，頻率在 9-90kHz 千赫(kHz)、110-490 千赫(kHz)以及 1000 兆赫(MHz)以上之發射，其量測以平均值檢波器為基準，且須符合低功率射頻電機技術規範第 5.14 節之規定；其他頻率之發射，應以 CISPR 準峰值(quasi-peak) 檢波器測量；非以上表所指定之距離測量時須符合低功率射頻電機技術規範第 5.5 節之規定，而輻射發射之量測頻率範圍須符合低功率射頻電機技術規範第 5.12 節之規定。

5.5.3 測試架構圖

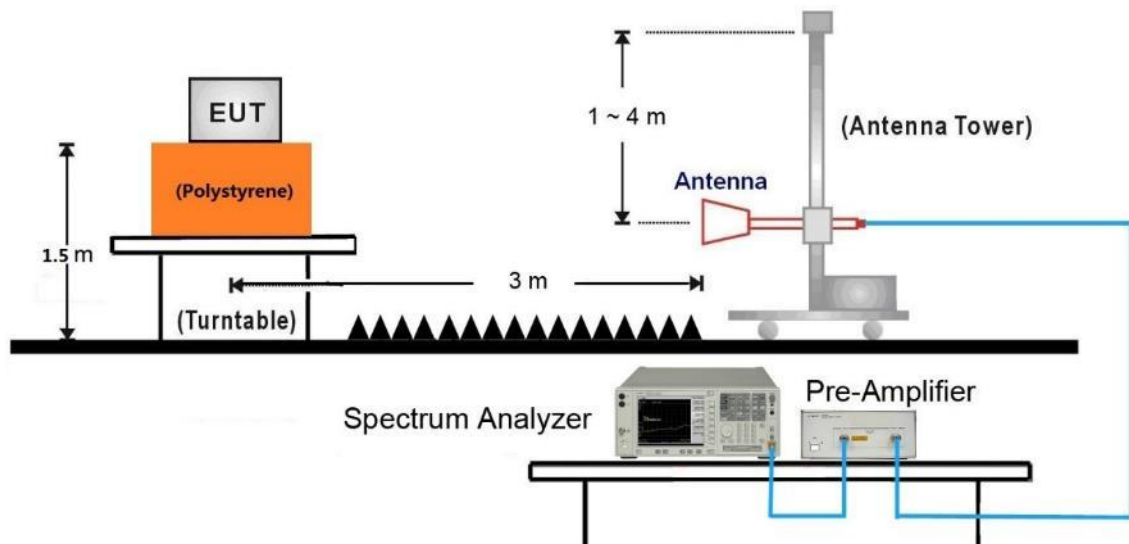
Under 30MHz Test Setup



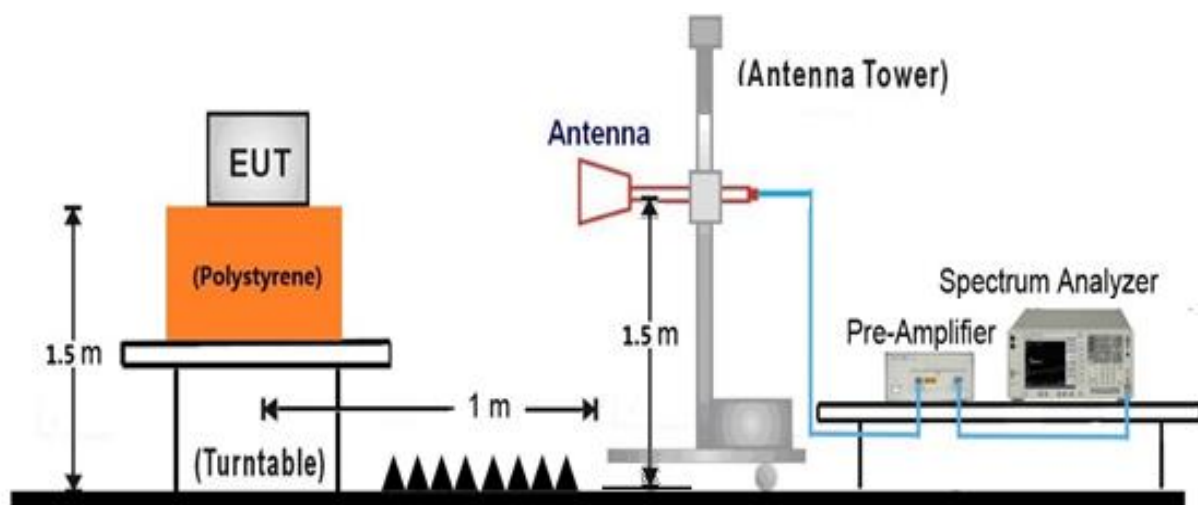
Under 1GHz Test Setup



1GHz ~ 18GHz Test Setup:

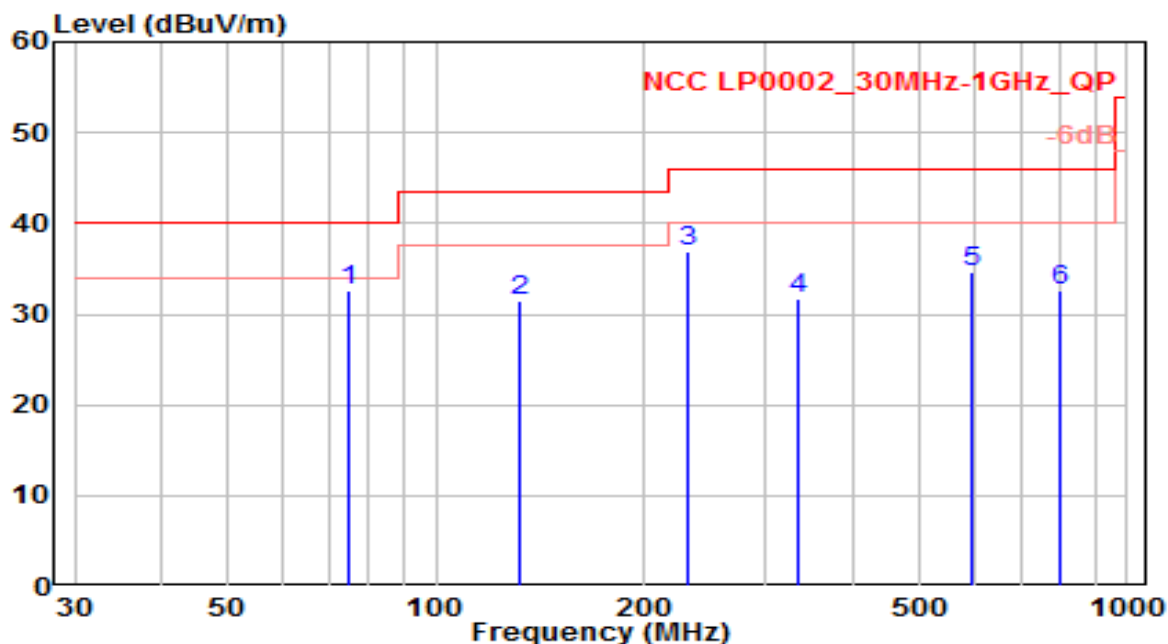


18GHz ~25GHz Test Setup:



5.5.4 輻射電場強度測試結果

EUT	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

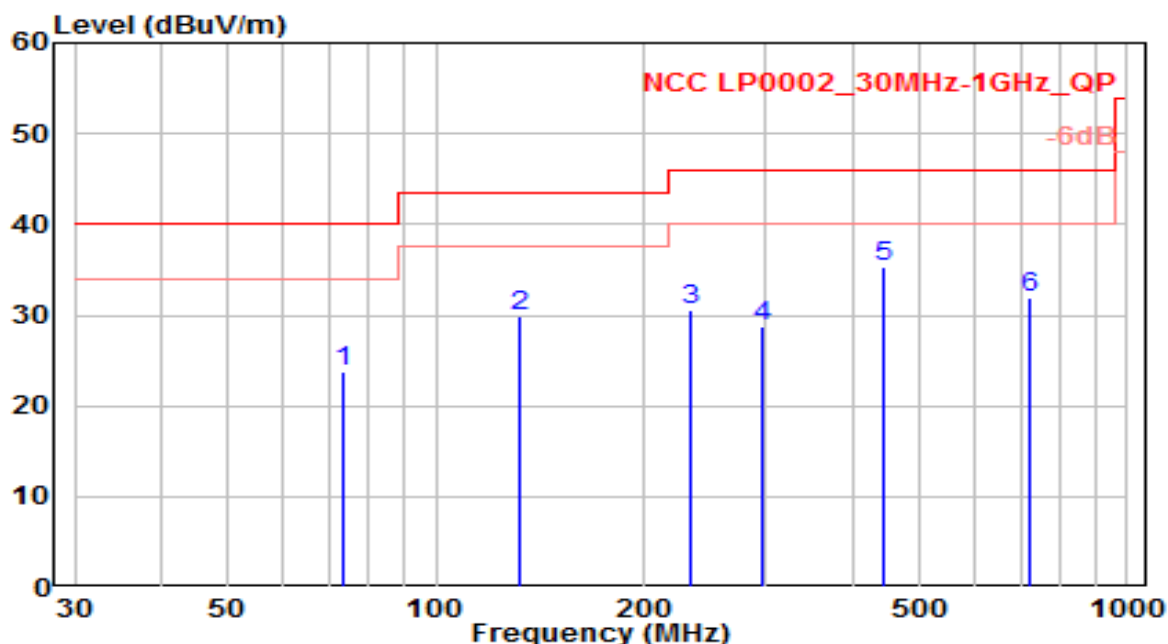


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	74.620	17.20	15.35	32.55	-7.45	40.00	125	250	QP
2		131.850	15.60	15.88	31.48	-12.02	43.50	170	115	QP
3		230.790	17.10	19.89	36.99	-9.01	46.00	160	220	QP
4		335.550	8.90	22.84	31.74	-14.26	46.00	155	260	QP
5		598.420	7.20	27.47	34.67	-11.33	46.00	120	180	QP
6		799.210	2.30	30.29	32.59	-13.41	46.00	105	-20	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

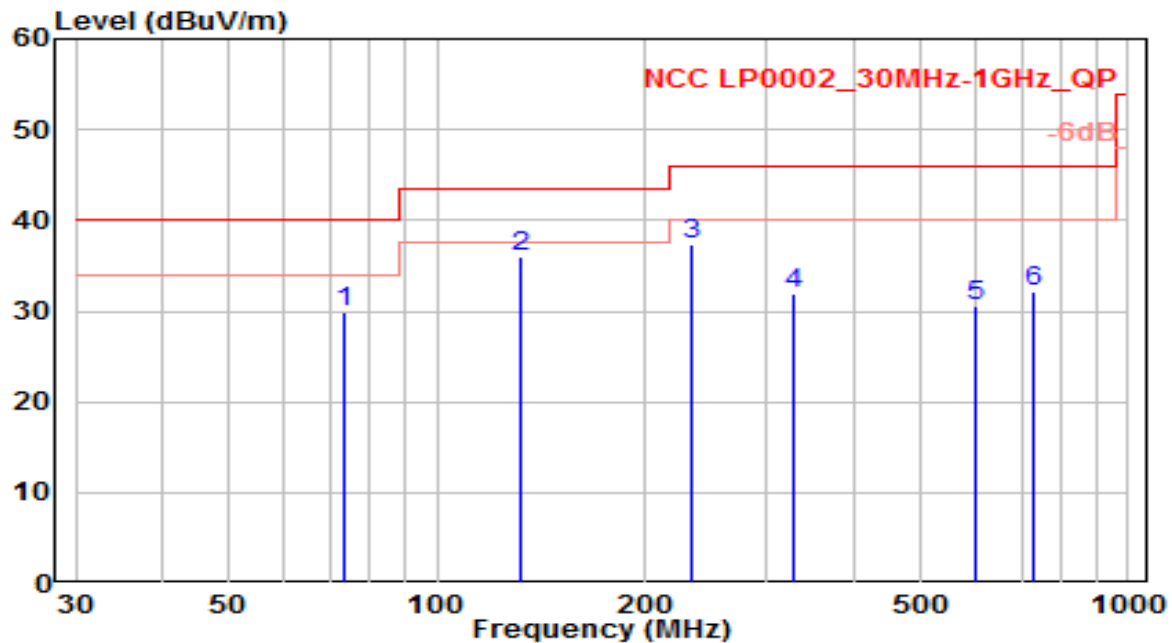


No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	73.650	8.10	15.59	23.69	-16.31	40.00	110	280	QP
2	131.850	14.10	15.88	29.98	-13.52	43.50	150	120	QP
3	233.700	10.60	19.99	30.59	-15.41	46.00	145	185	QP
4	295.780	7.30	21.34	28.64	-17.36	46.00	190	255	QP
5	* 446.130	10.40	24.83	35.23	-10.77	46.00	110	215	QP
6	722.580	2.40	29.49	31.89	-14.11	46.00	145	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_RX_DH5_CH39	Test Voltage	AC 110V/60Hz

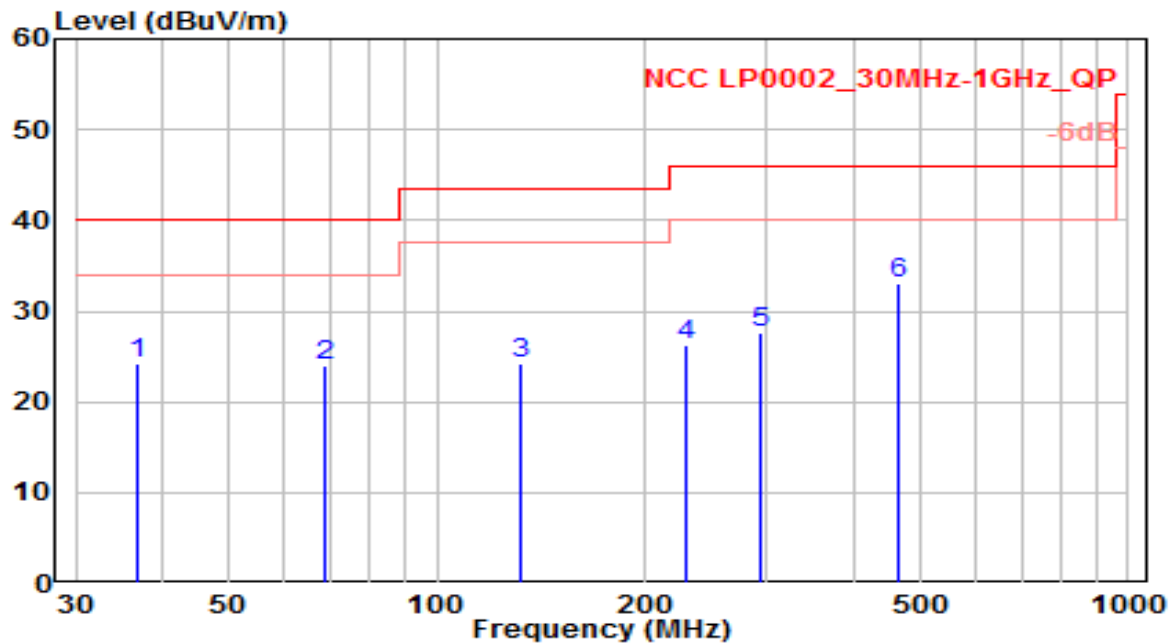


No	Frequency (MHz)	Reading (dBUV)	C.F (dB)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	73.650	14.20	15.59	29.79	-10.21	40.00	110	-20	QP
2	* 131.850	20.03	15.88	35.91	-7.59	43.50	150	145	QP
3	233.700	17.40	19.99	37.39	-8.61	46.00	210	100	QP
4	327.790	9.50	22.53	32.03	-13.97	46.00	175	150	QP
5	600.360	3.10	27.51	30.61	-15.39	46.00	200	250	QP
6	732.280	2.60	29.60	32.20	-13.80	46.00	195	155	QP

Note:

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

EUT	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_RX_DH5_CH39	Test Voltage	AC 110V/60Hz

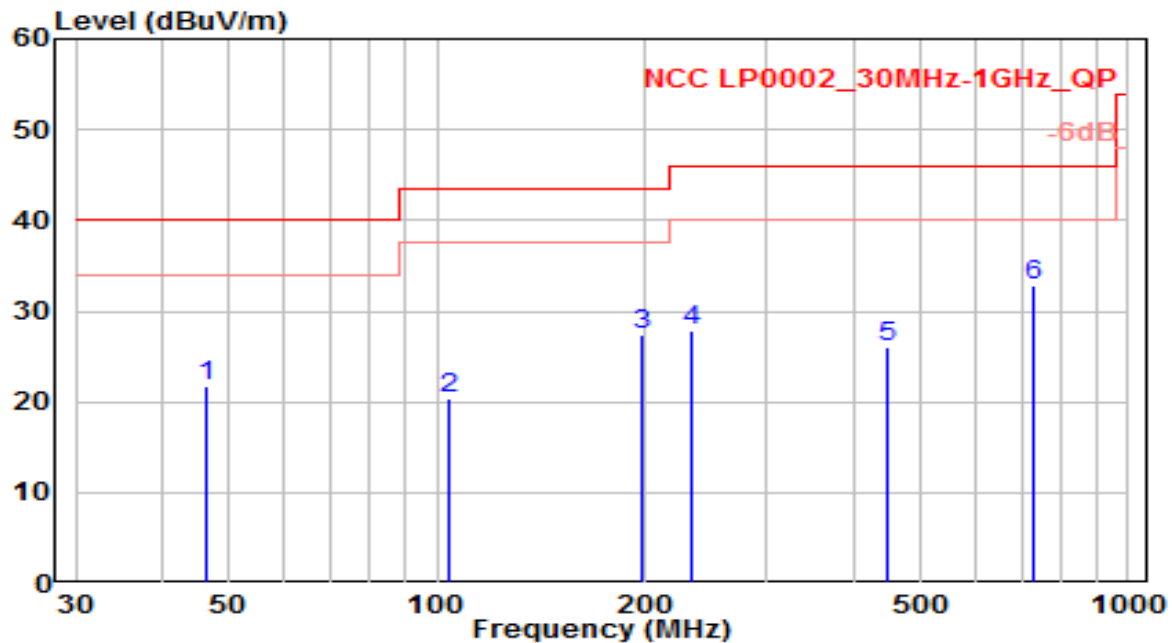


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	36.790	4.60	19.61	24.21	-15.79	40.00	125	250	QP
2	68.800	7.20	16.91	24.11	-15.89	40.00	105	255	QP
3	131.850	8.30	15.88	24.18	-19.32	43.50	115	155	QP
4	228.850	6.50	19.77	26.27	-19.73	46.00	170	210	QP
5	293.840	6.35	21.32	27.67	-18.33	46.00	165	150	QP
6	* 464.560	7.80	25.16	32.96	-13.04	46.00	110	120	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	MODE4	Test Voltage	AC 110V/60Hz

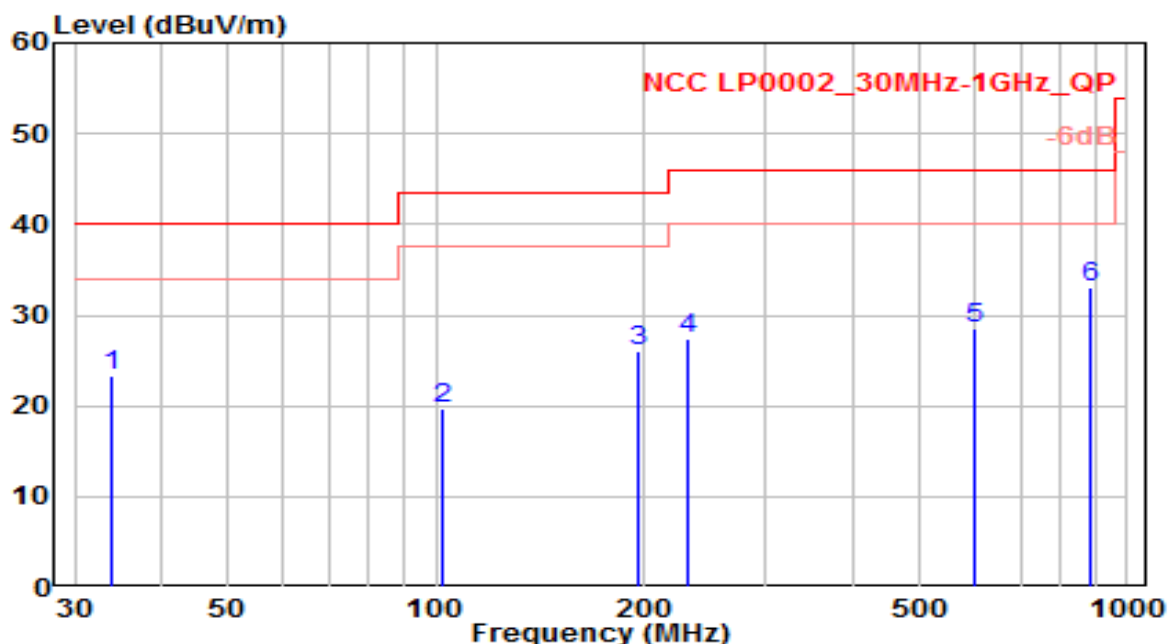


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	46.490	0.20	21.48	21.68	-18.32	40.00	210	-15	QP
2	103.720	1.00	19.32	20.32	-23.18	43.50	190	220	QP
3	198.780	8.50	18.92	27.42	-16.08	43.50	175	150	QP
4	232.730	7.90	19.96	27.86	-18.14	46.00	155	330	QP
5	449.040	1.20	24.88	26.08	-19.92	46.00	120	185	QP
6	* 729.370	3.20	29.57	32.77	-13.23	46.00	150	225	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	VULB 9162	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	MODE4	Test Voltage	AC 110V/60Hz

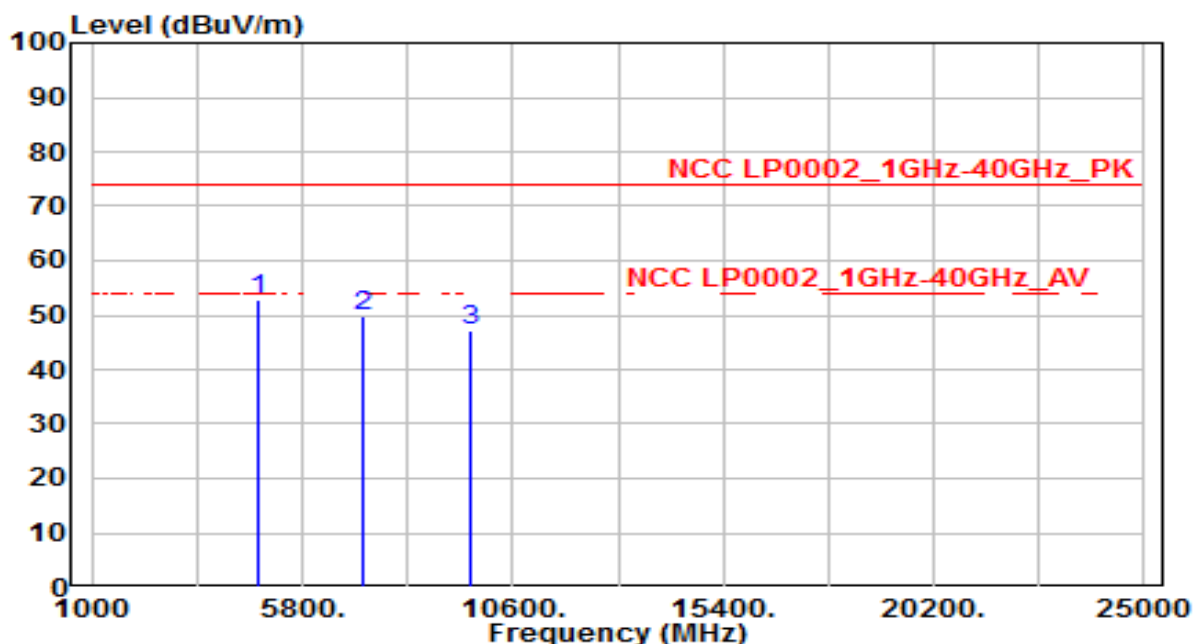


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	33.880	4.60	18.79	23.39	-16.61	40.00	150	225	QP
2	101.780	0.20	19.51	19.71	-23.79	43.50	115	155	QP
3	196.840	7.20	18.88	26.08	-17.42	43.50	155	310	QP
4	231.760	7.50	19.92	27.42	-18.58	46.00	190	220	QP
5	602.300	1.00	27.54	28.54	-17.46	46.00	210	155	QP
6	* 887.480	1.70	31.42	33.12	-12.88	46.00	200	115	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH0	Test Voltage	AC 110V/60Hz

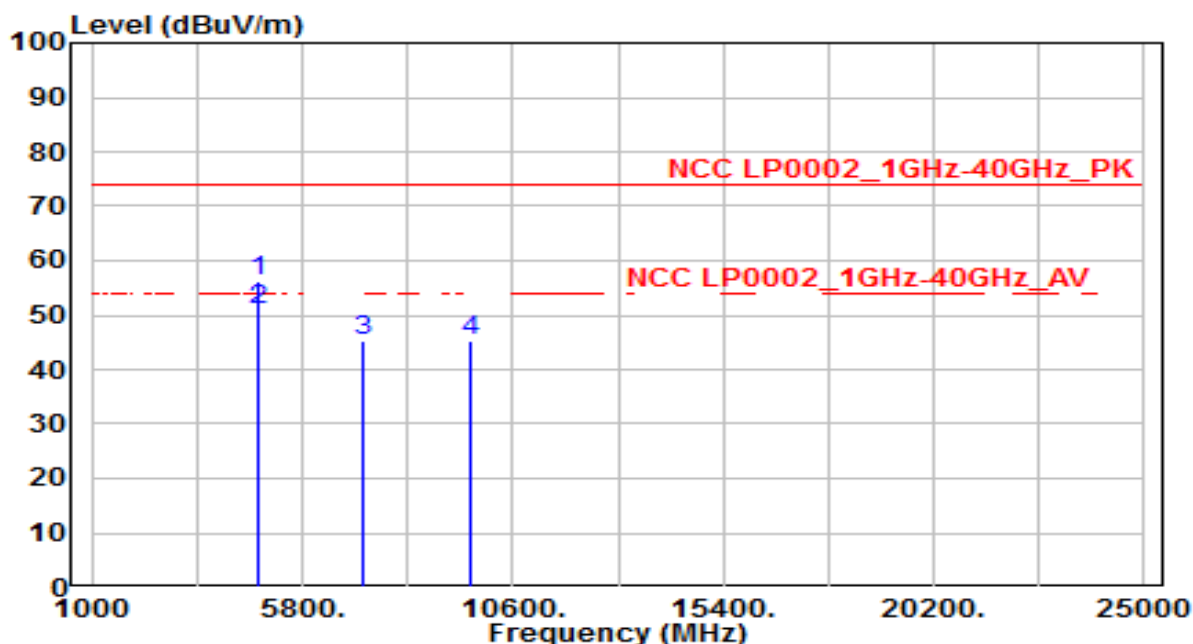


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	49.58	3.16	52.74	-21.26	74.00	150	400	Peak
2		7206.000	38.69	11.06	49.75	-24.25	74.00	150	400	Peak
3		9608.000	33.36	13.97	47.34	-26.66	74.00	150	400	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH0	Test Voltage	AC 110V/60Hz

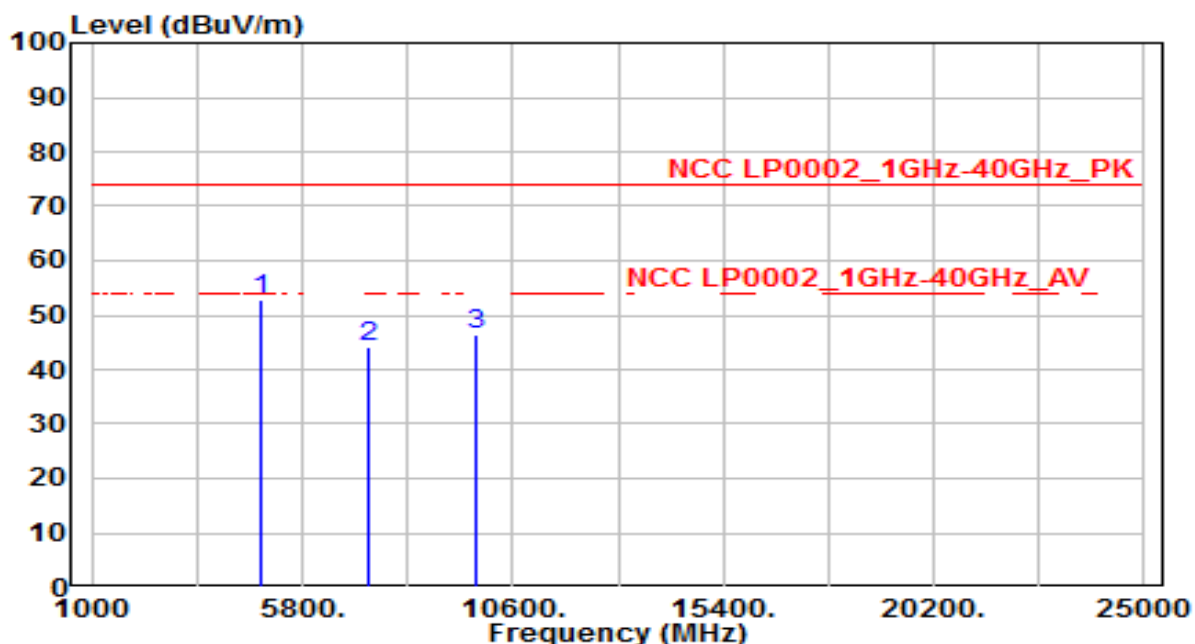


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	52.89	3.16	56.05	-17.95	74.00	150	80	Peak
2	*	4804.000	47.69	3.16	50.85	-3.15	54.00	150	80	Average
3		7206.000	34.16	11.06	45.22	-28.78	74.00	150	400	Peak
4		9608.000	31.15	13.97	45.13	-28.87	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

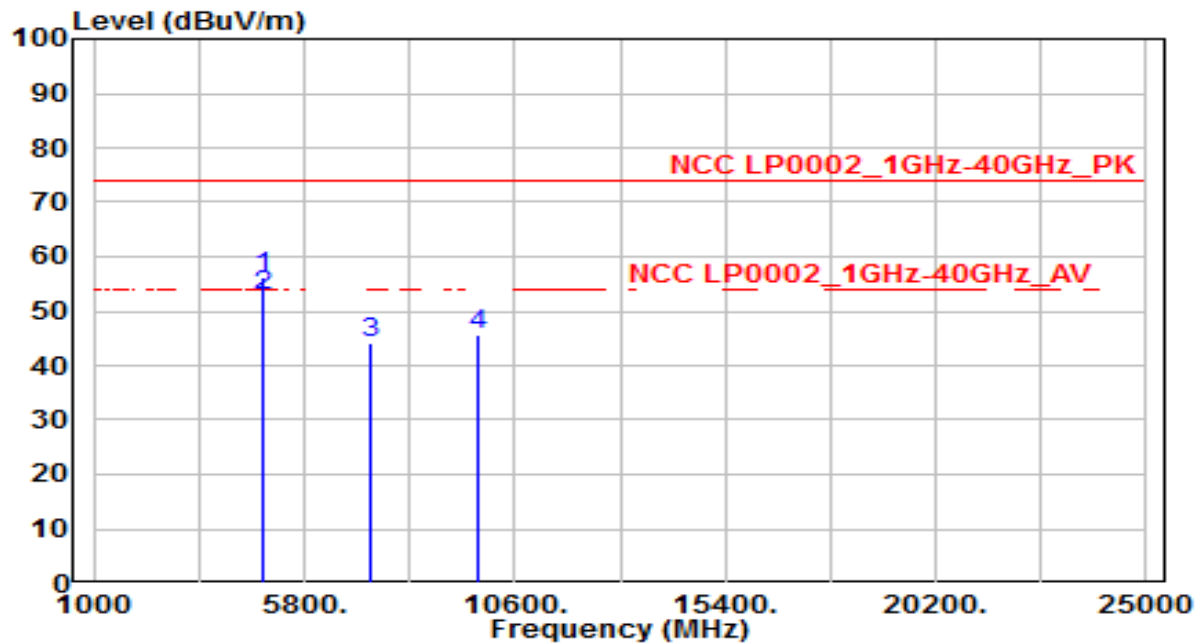


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4882.000	49.61	3.31	52.92	-21.08	74.00	150	400	Peak
2		7323.000	33.01	11.32	44.33	-29.67	74.00	150	400	Peak
3		9764.000	32.10	14.49	46.58	-27.42	74.00	150	400	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH39	Test Voltage	AC 110V/60Hz

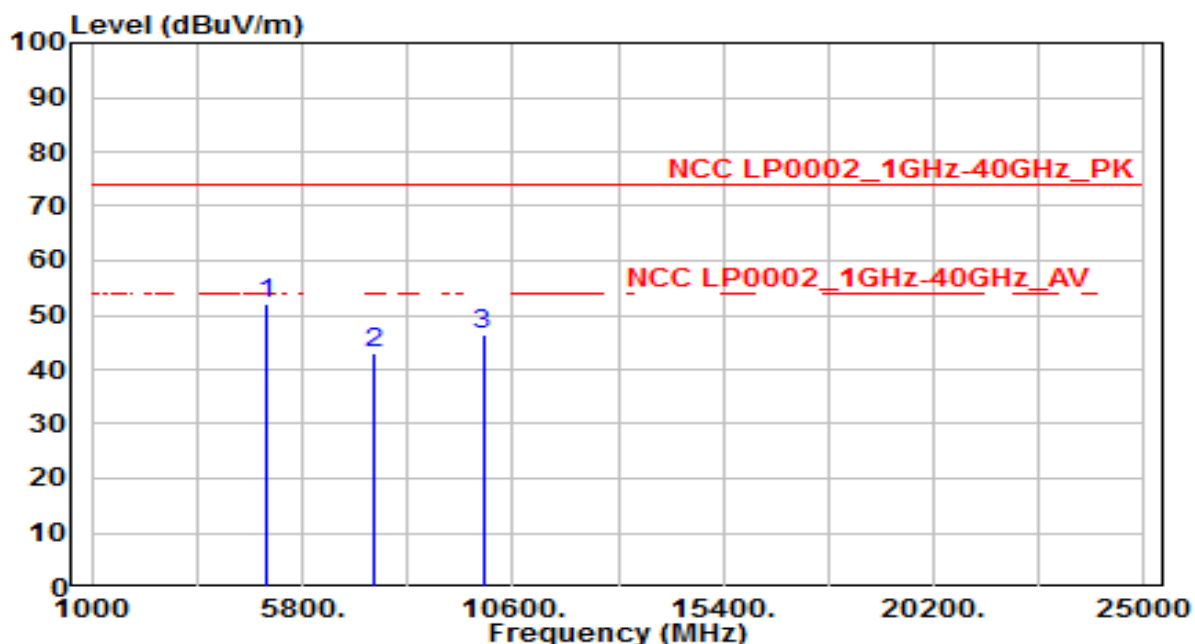


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4882.000	52.76	3.31	56.08	-17.92	74.00	150	150	Peak
2	*	4882.000	49.39	3.31	52.70	-1.30	54.00	150	150	Average
3		7323.000	32.76	11.32	44.08	-29.92	74.00	150	400	Peak
4		9764.000	31.30	14.49	45.78	-28.22	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH78	Test Voltage	AC 110V/60Hz

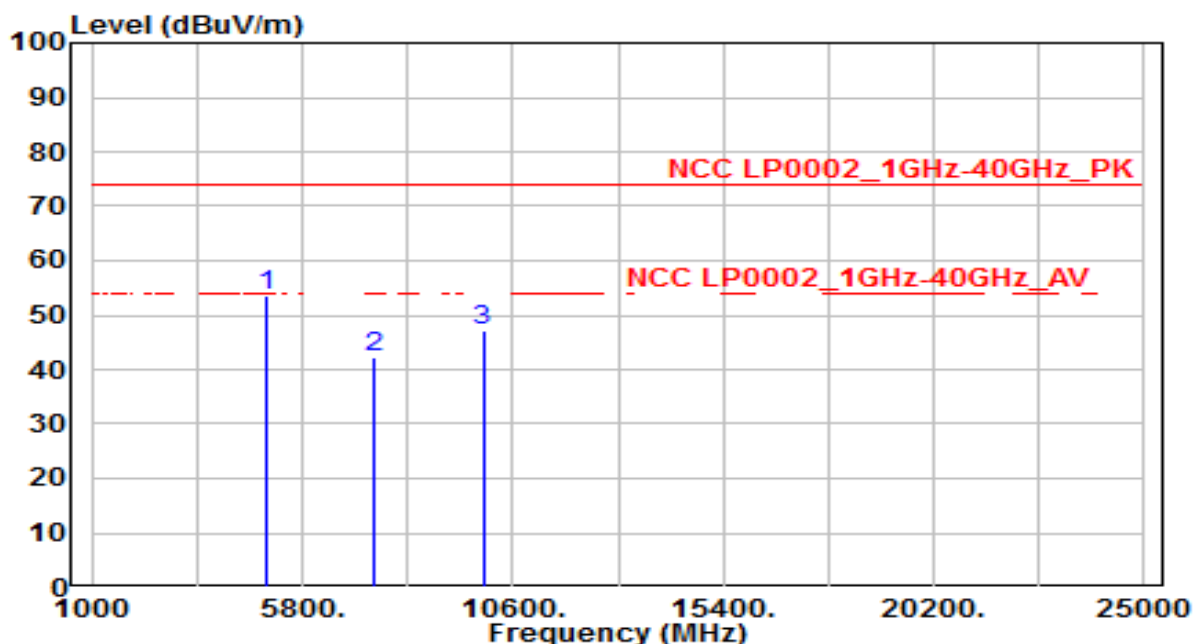


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 4960.000	48.51	3.47	51.98	-22.02	74.00	150	400	Peak
2	7440.000	31.38	11.58	42.96	-31.04	74.00	150	400	Peak
3	9920.000	31.33	15.00	46.33	-27.67	74.00	150	400	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH78	Test Voltage	AC 110V/60Hz

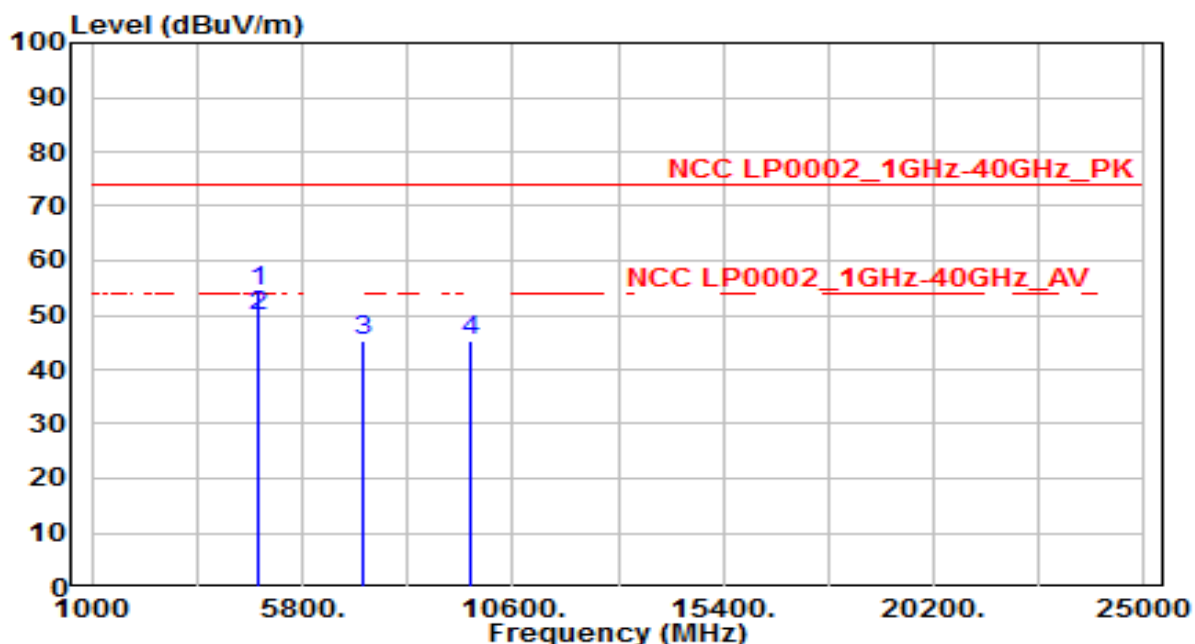


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4960.000	50.12	3.47	53.59	-20.41	74.00	150	400	Peak
2		7440.000	30.82	11.58	42.40	-31.60	74.00	150	400	Peak
3		9920.000	32.33	15.00	47.32	-26.68	74.00	150	400	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH0	Test Voltage	AC 110V/60Hz

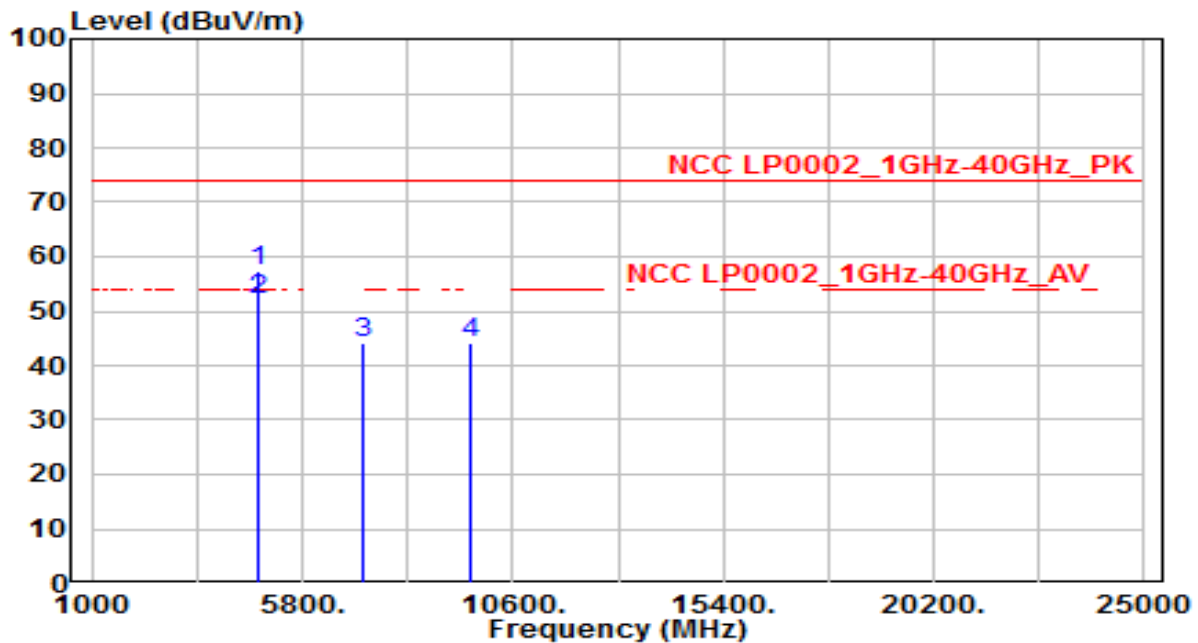


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	51.06	3.16	54.22	-19.78	74.00	150	120	Peak
2	*	4804.000	46.59	3.16	49.75	-4.25	54.00	150	120	Average
3		7206.000	34.11	11.06	45.17	-28.83	74.00	150	400	Peak
4		9608.000	31.38	13.97	45.35	-28.65	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH0	Test Voltage	AC 110V/60Hz

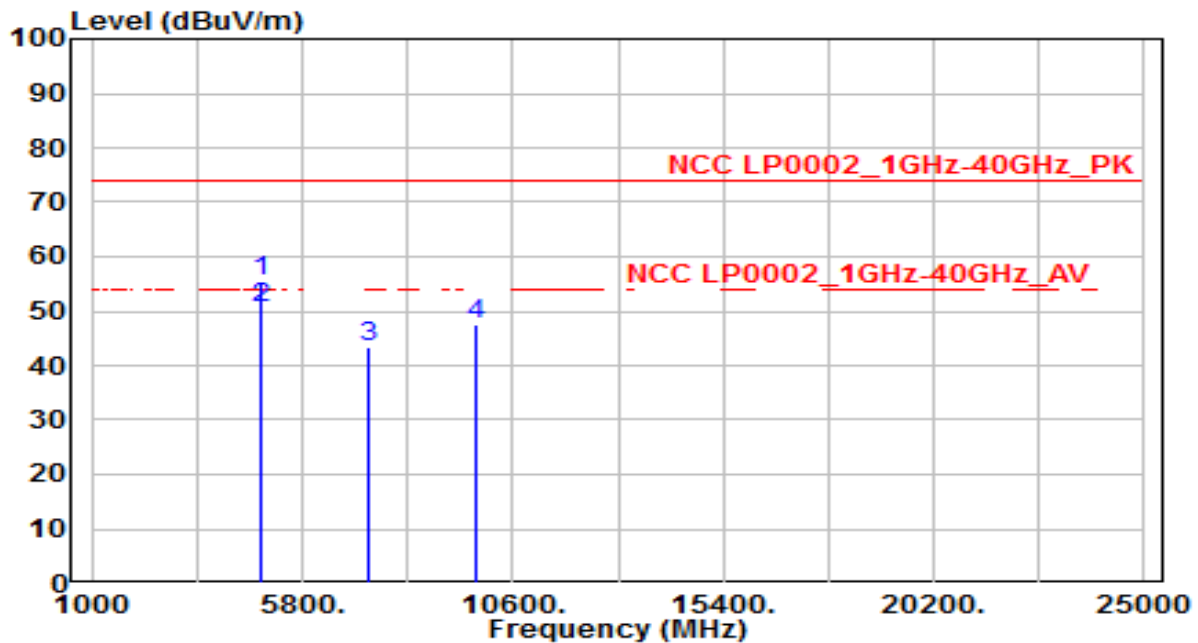


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4804.000	54.30	3.16	57.46	-16.54	74.00	150	80	Peak
2	*	4804.000	48.99	3.16	52.15	-1.85	54.00	150	80	Average
3		7206.000	33.18	11.06	44.24	-29.76	74.00	150	400	Peak
4		9608.000	30.32	13.97	44.29	-29.71	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH39	Test Voltage	AC 110V/60Hz

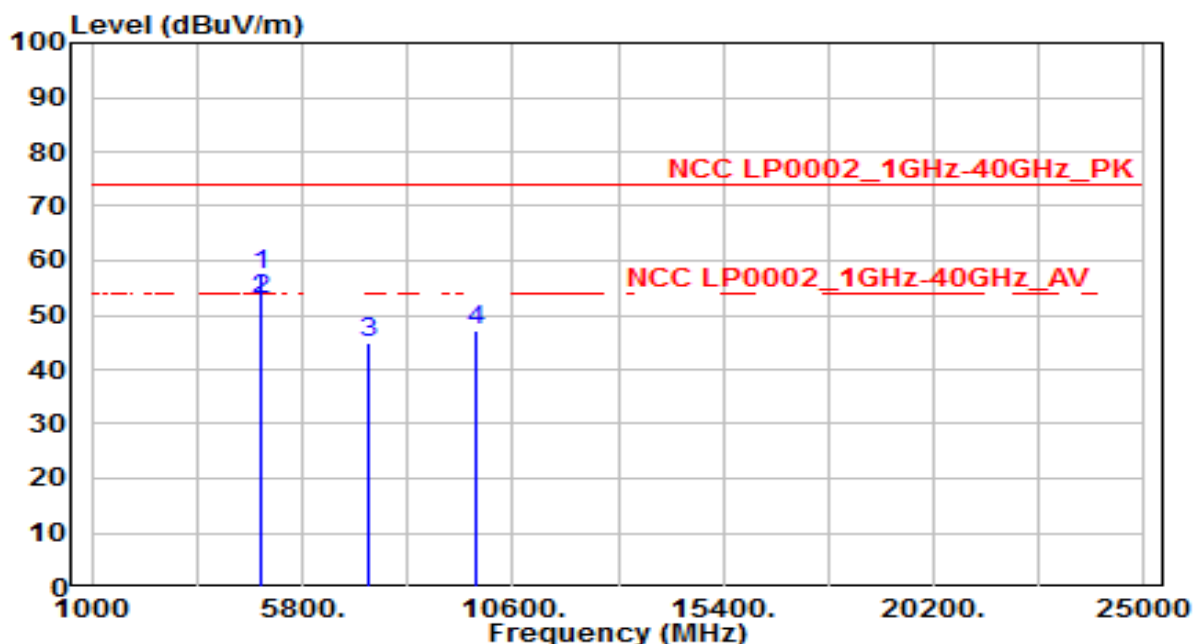


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4882.000	52.32	3.31	55.63	-18.37	74.00	150	330	Peak
2	*	4882.000	47.20	3.31	50.51	-3.49	54.00	150	330	Average
3		7323.000	32.20	11.32	43.52	-30.48	74.00	150	400	Peak
4		9764.000	33.04	14.49	47.52	-26.48	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH39	Test Voltage	AC 110V/60Hz

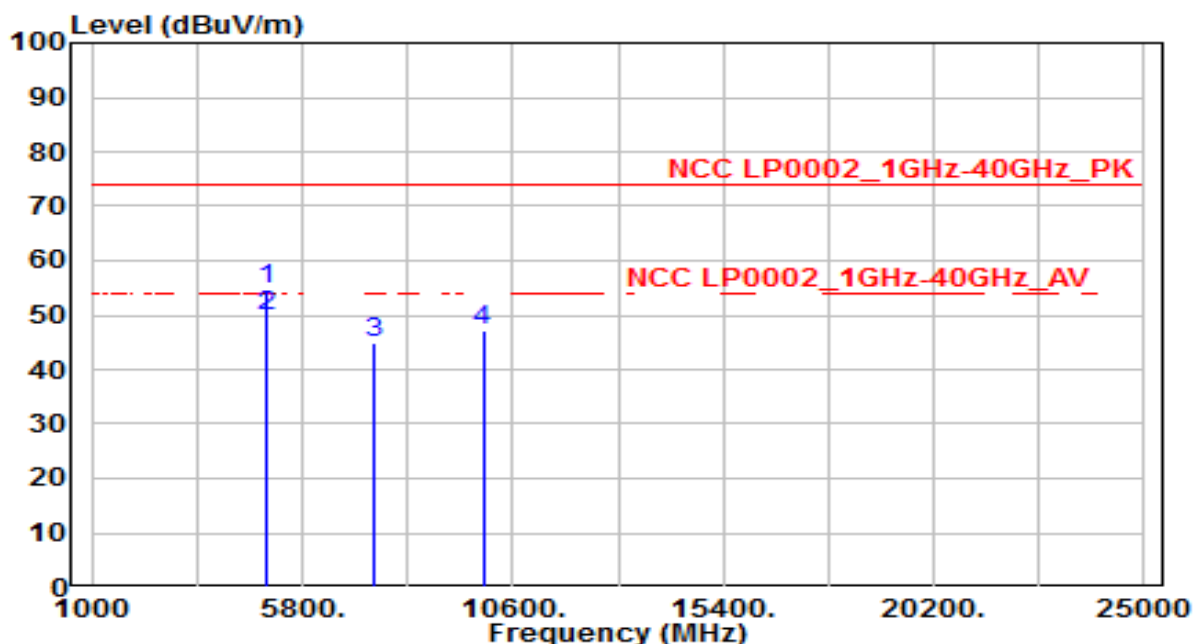


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4882.000	54.02	3.31	57.33	-16.67	74.00	150	150	Peak
2	*	4882.000	49.66	3.31	52.97	-1.03	54.00	150	150	Average
3		7323.000	33.47	11.32	44.79	-29.21	74.00	150	400	Peak
4		9764.000	32.64	14.49	47.12	-26.88	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH78	Test Voltage	AC 110V/60Hz

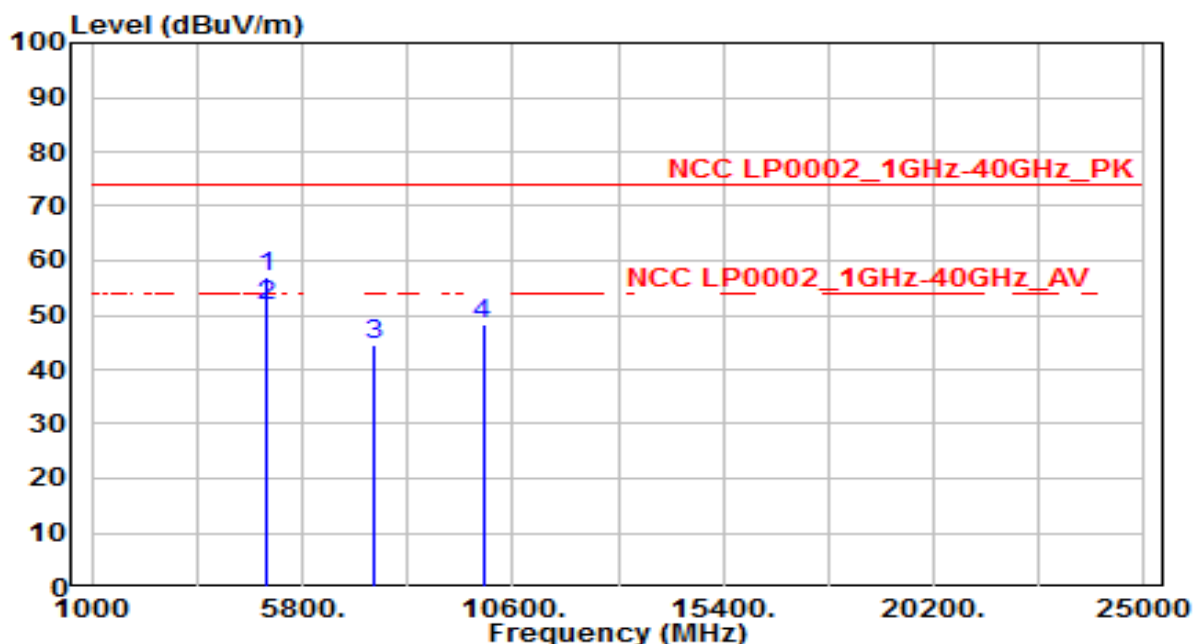


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4960.000	51.12	3.47	54.59	-19.41	74.00	150	250	Peak
2	*	4960.000	46.25	3.47	49.72	-4.28	54.00	150	250	Average
3		7440.000	33.27	11.58	44.85	-29.15	74.00	150	400	Peak
4		9920.000	32.08	15.00	47.08	-26.92	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH78	Test Voltage	AC 110V/60Hz

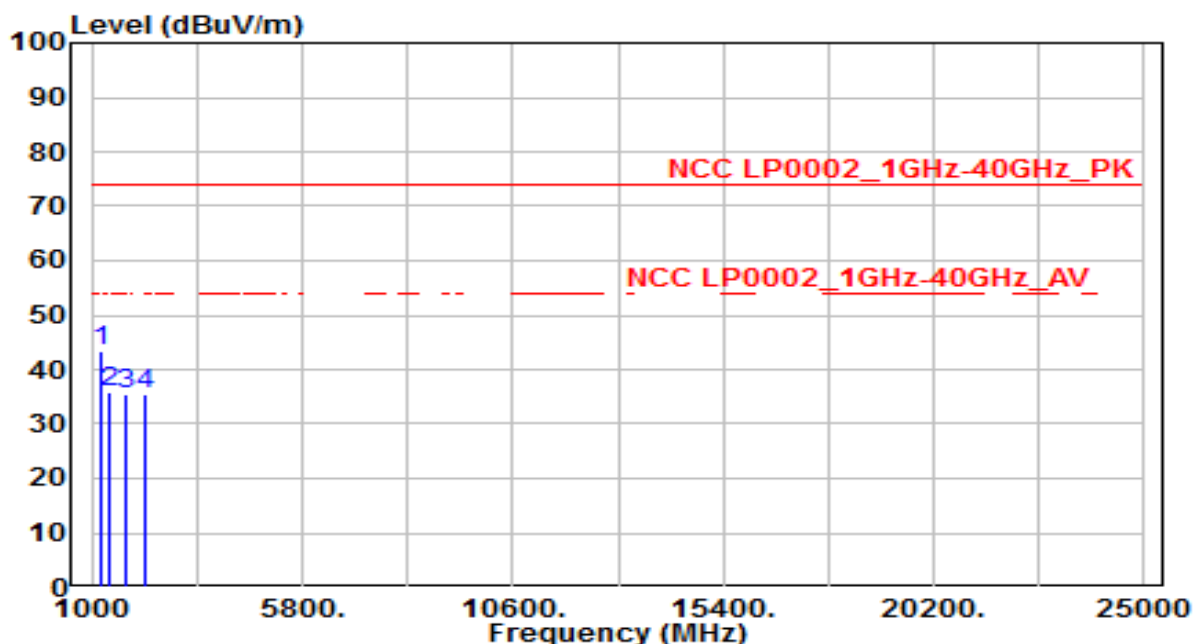


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	4960.000	53.39	3.47	56.86	-17.14	74.00	150	200	Peak
2	*	4960.000	48.30	3.47	51.77	-2.23	54.00	150	200	Average
3		7440.000	32.88	11.58	44.46	-29.54	74.00	150	400	Peak
4		9920.000	33.46	15.00	48.46	-25.54	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_RX_DH5_CH39	Test Voltage	AC 110V/60Hz

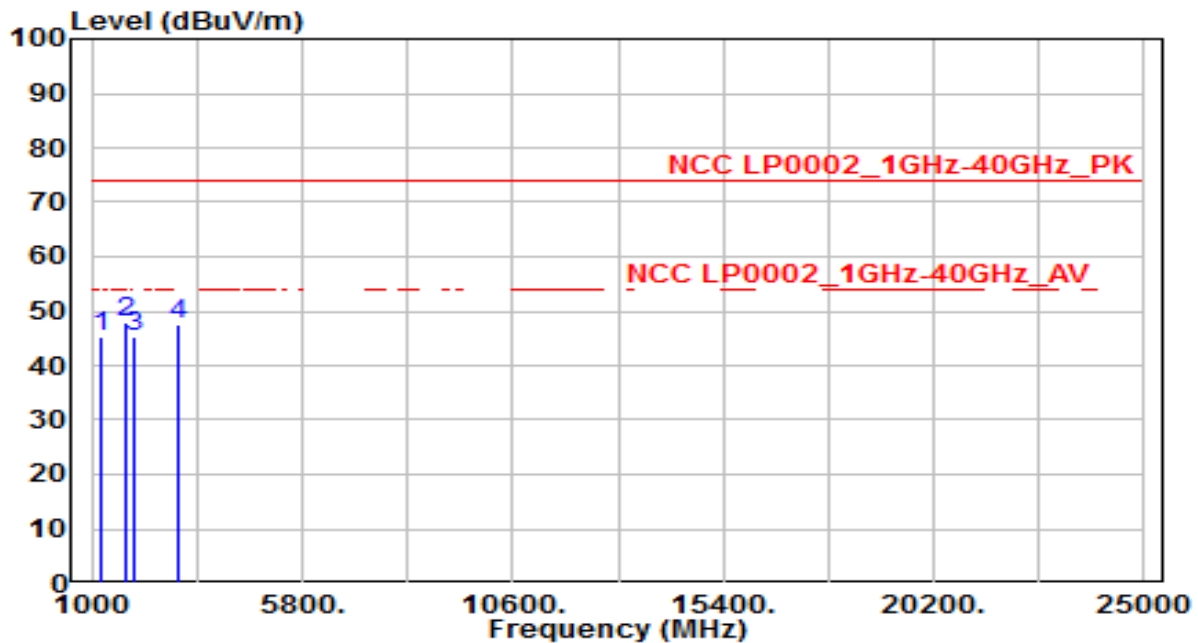


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	1195.500	50.09	-6.78	43.31	-30.69	74.00	150	400	Peak
2		1394.719	42.02	-6.09	35.93	-38.07	74.00	150	400	Peak
3		1797.406	40.39	-5.01	35.38	-38.62	74.00	150	400	Peak
4		2243.125	38.88	-3.40	35.48	-38.52	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_RX_DH5_CH39	Test Voltage	AC 110V/60Hz

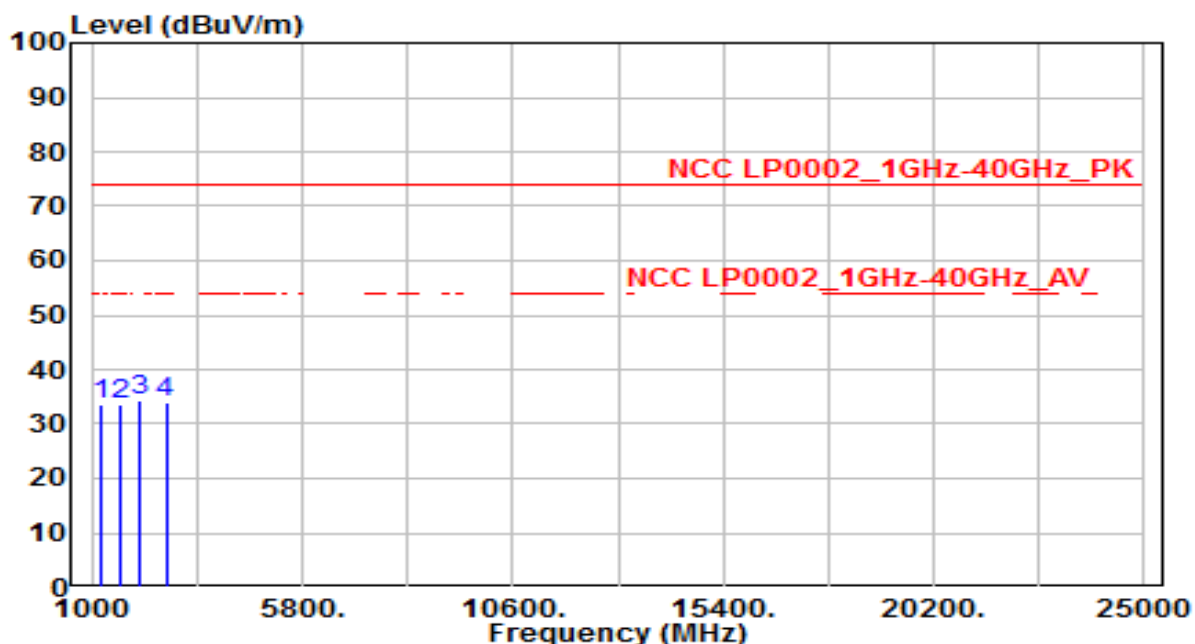


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1198.156	51.88	-6.77	45.11	-28.89	74.00	150	400	Peak
2	* 1799.000	52.79	-5.01	47.78	-26.22	74.00	150	400	Peak
3	1990.781	49.66	-4.54	45.12	-28.88	74.00	150	400	Peak
4	2995.906	50.36	-2.92	47.44	-26.56	74.00	150	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	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	MODE4	Test Voltage	AC 110V/60Hz

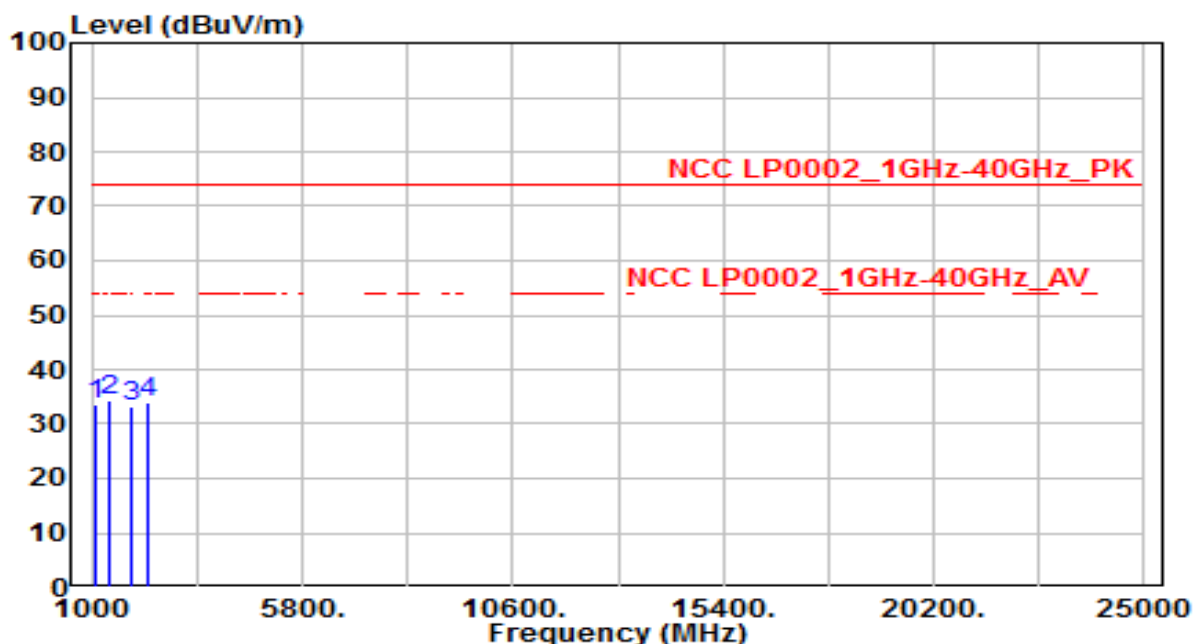


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1189.125	40.53	-6.80	33.73	-40.27	74.00	150	400	Peak
2	1646.000	38.85	-5.38	33.48	-40.52	74.00	150	400	Peak
3	* 2097.031	38.26	-4.07	34.19	-39.81	74.00	150	400	Peak
4	2690.969	36.51	-2.49	34.02	-39.98	74.00	150	400	Peak

Note:

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

EUT	Wireless Flight Adapter	Date of Test	2019-12-06
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	MODE4	Test Voltage	AC 110V/60Hz



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	1072.781	40.68	-7.20	33.48	-40.52	74.00	150	400	Peak
2	* 1417.563	40.48	-6.01	34.47	-39.53	74.00	150	400	Peak
3	1896.219	37.97	-4.77	33.20	-40.80	74.00	150	400	Peak
4	2307.938	36.95	-3.10	33.84	-40.16	74.00	150	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 C63.10-2014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: DH1,DH3,DH5僅為封包傳輸率的差異,其針對此章節無顯著之影響，因此僅檢附DH5為測試數據。

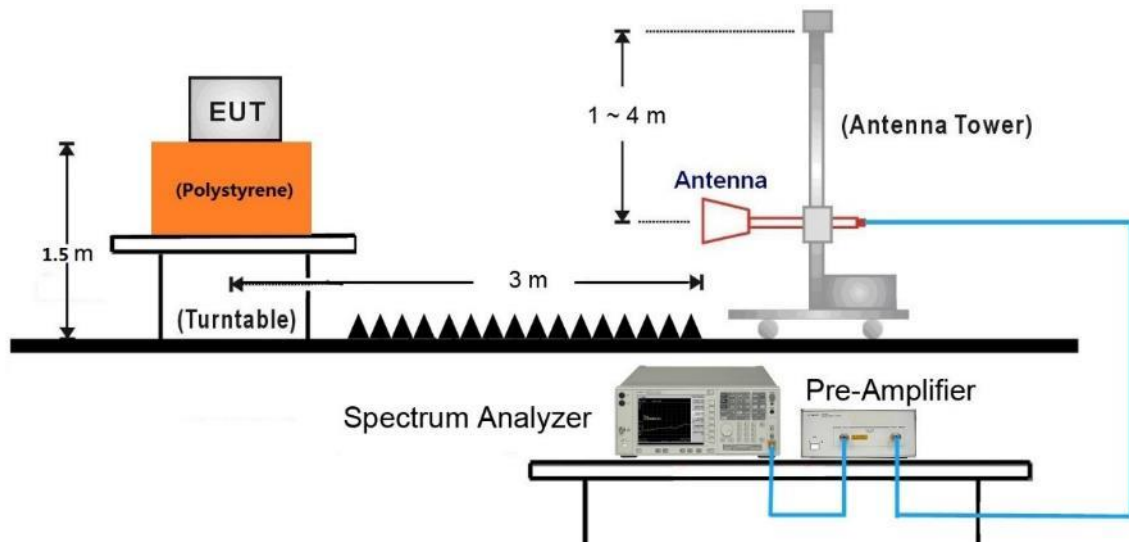
5.6.2 限制要求

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

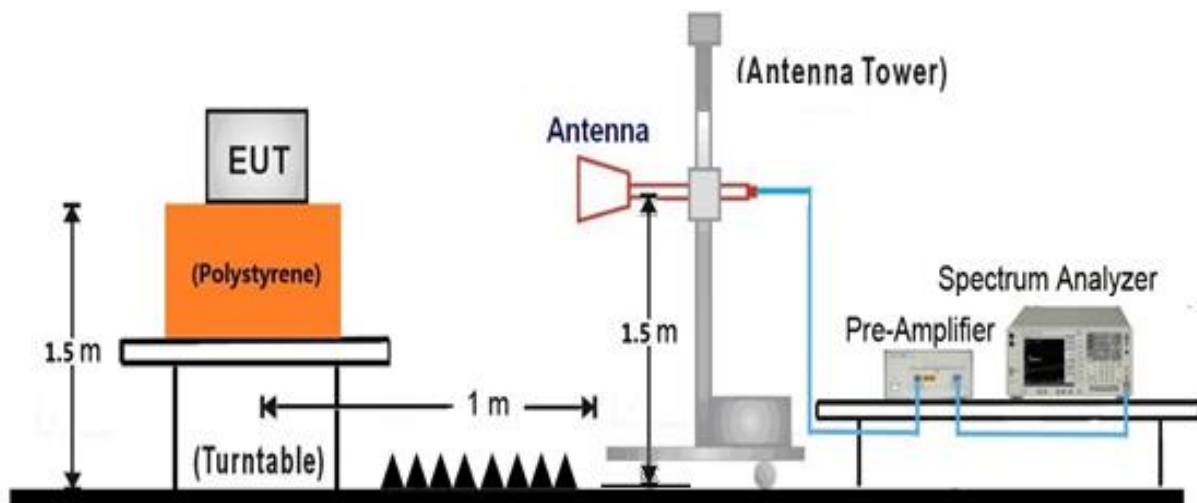
頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)
0.090~0.110	25.500~25.700	703.00~748.00	2310.0~2390.0	13250~13400
0.490~0.510	37.475~38.275	758.00~803.00	2483.5~2900.0	14470~14500
2.172~2.198	73.500~75.400	825.00~915.00	3260.0~3267.0	15350~16200
3.013~3.033	108.00~138.00	930.00~1240.0	3332.0~3339.0	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:

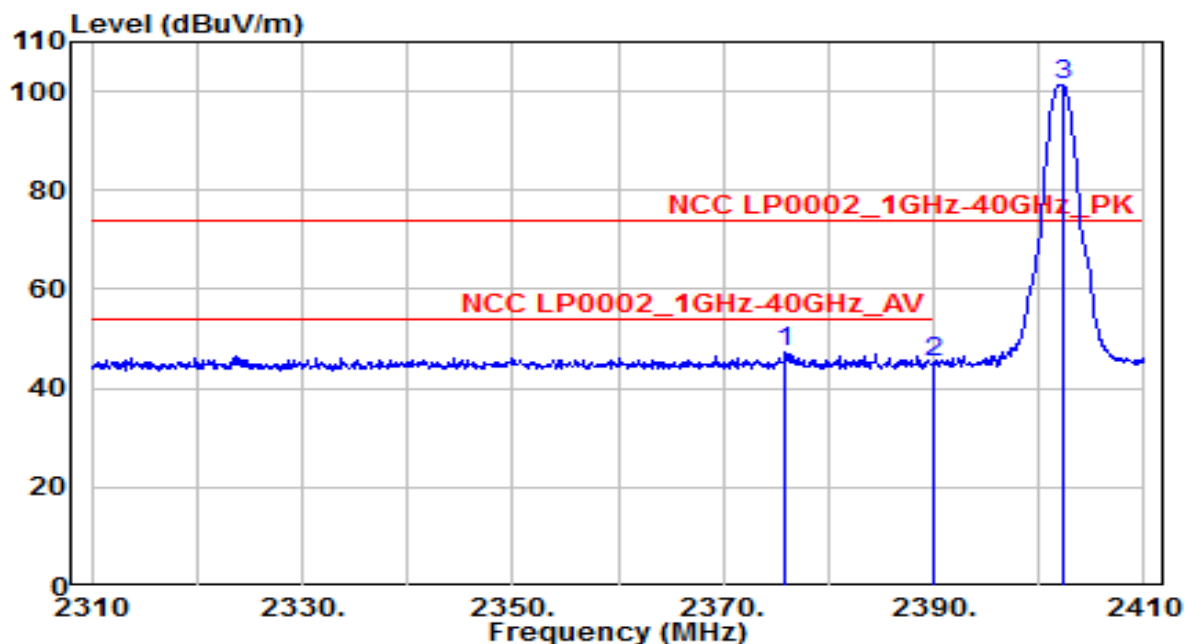


18GHz ~25GHz Test Setup:



5.6.4 頻帶邊緣測試結果

EUT	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C / 46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH0	Test Voltage	AC 110V/60Hz

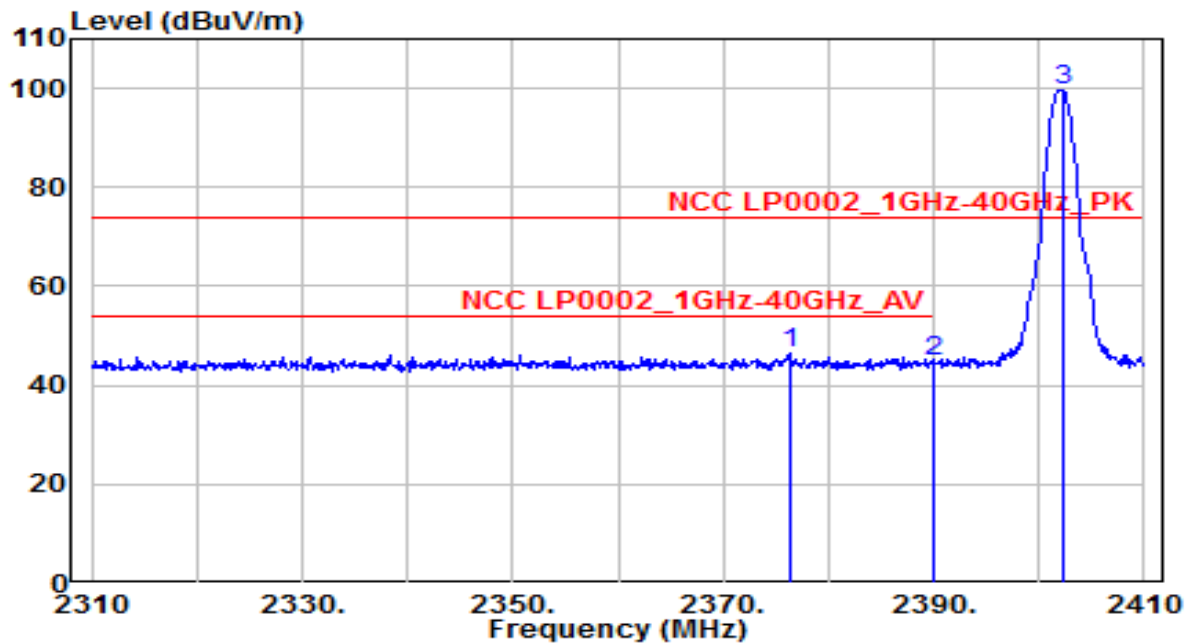


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 2375.900	49.99	-2.79	47.20	-26.80	74.00	165	360	Peak
2	2390.000	47.82	-2.73	45.09	-28.91	74.00	165	360	Peak
3	2402.200	104.11	-2.67	101.44	N/A	N/A	165	360	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH0	Test Voltage	AC 110V/60Hz

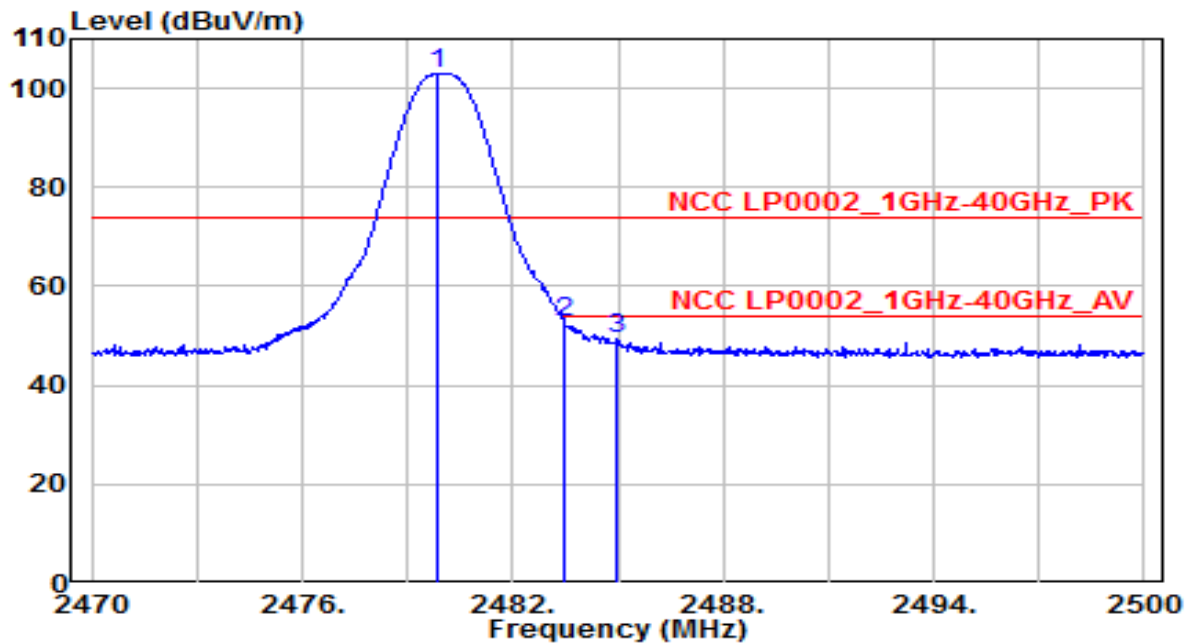


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 2376.300	49.21	-2.79	46.42	-27.58	74.00	160	280	Peak
2	2390.000	47.55	-2.73	44.83	-29.17	74.00	160	280	Peak
3	2402.200	102.36	-2.67	99.69	N/A	N/A	160	280	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH78	Test Voltage	AC 110V/60Hz

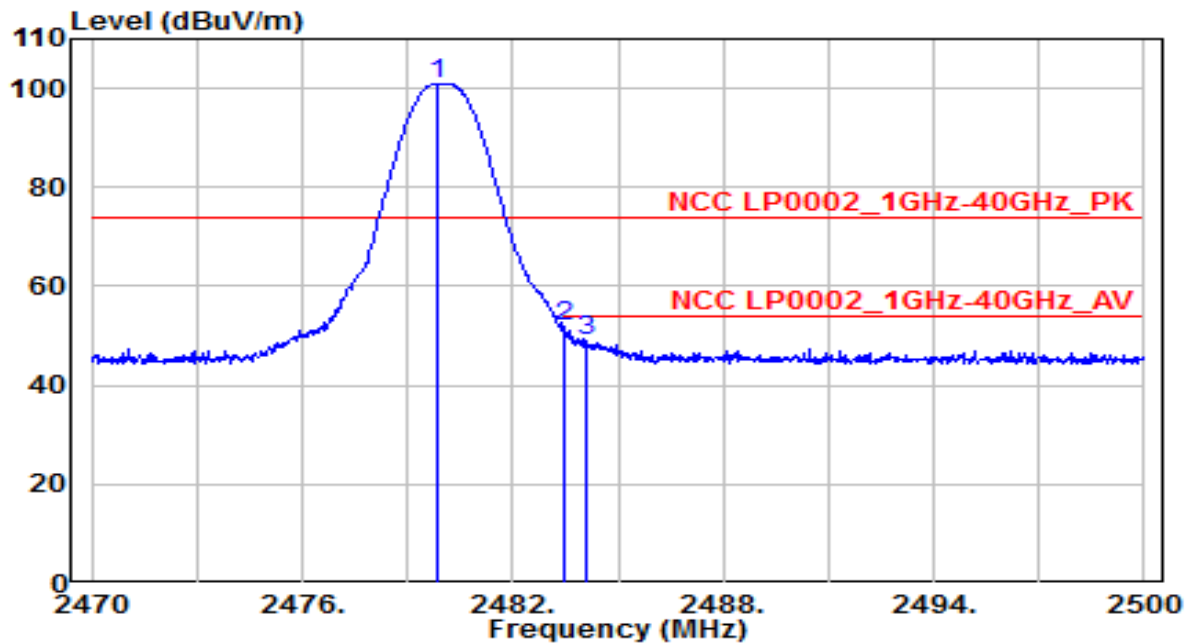


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2479.840	105.30	-2.31	102.98	N/A	N/A	160	5	Peak
2	* 2483.500	55.12	-2.30	52.82	-21.18	74.00	160	5	Peak
3	2484.970	51.84	-2.29	49.55	-24.45	74.00	160	5	Peak

Note:

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

EUT	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_DH5_CH78	Test Voltage	AC 110V/60Hz

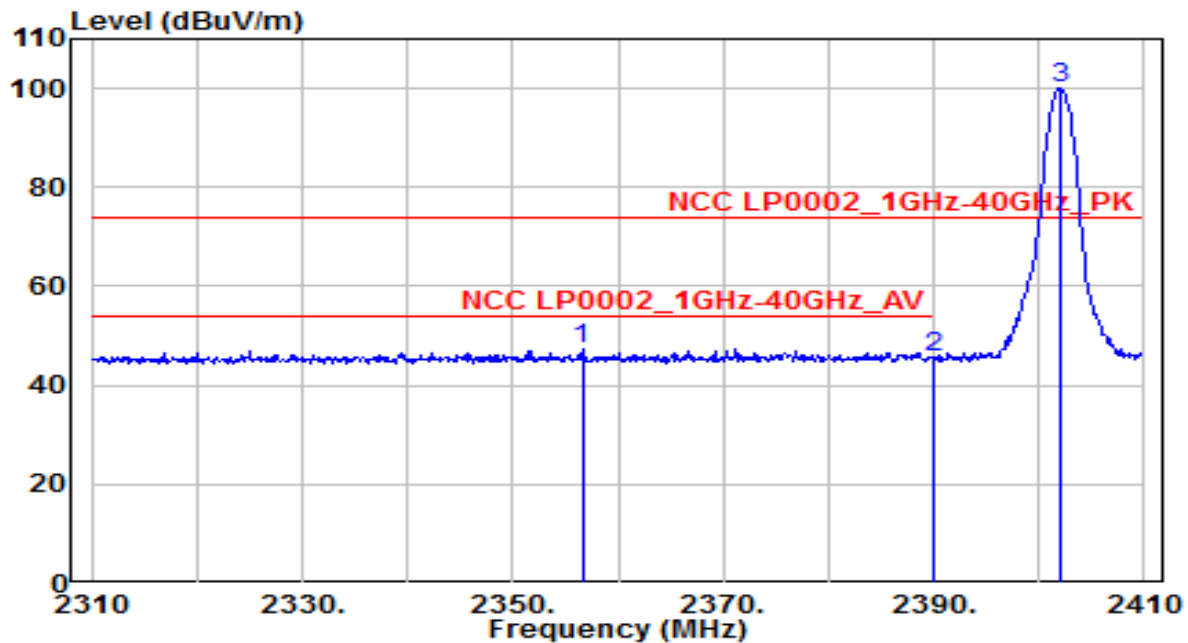


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2479.840	103.33	-2.31	101.02	N/A	N/A	145	275	Peak
2	* 2483.500	54.06	-2.30	51.76	-22.24	74.00	145	275	Peak
3	2484.100	51.18	-2.29	48.89	-25.11	74.00	145	275	Peak

Note:

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

EUT	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH0	Test Voltage	AC 110V/60Hz

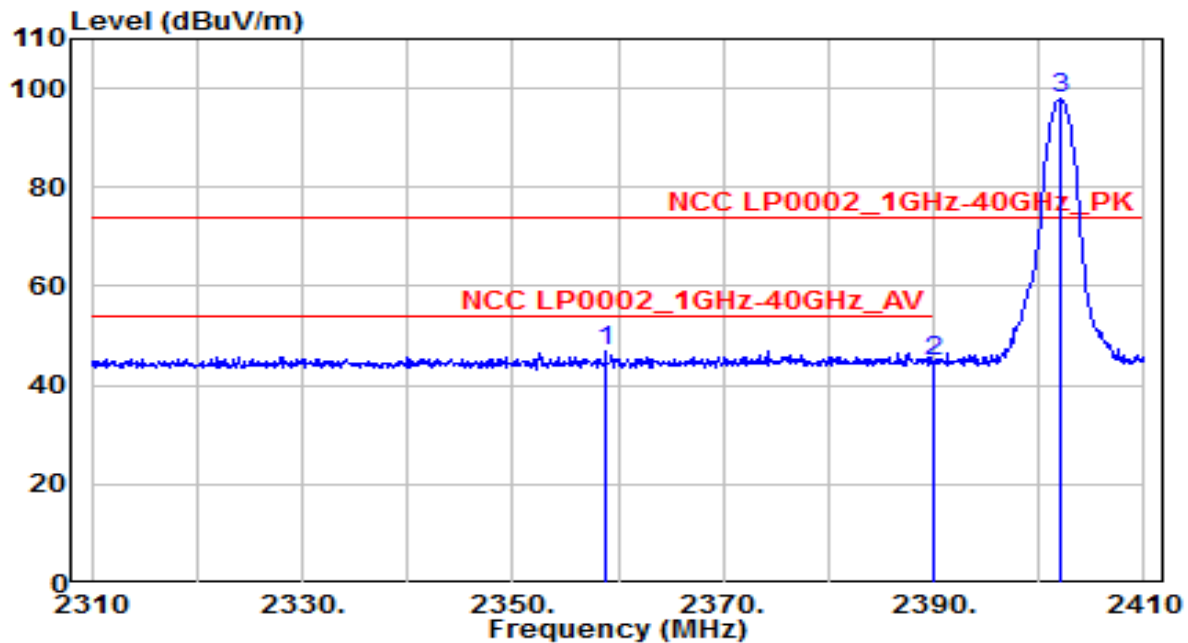


No		Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	2356.600	50.26	-2.88	47.38	-26.62	74.00	165	360	Peak
2		2390.000	48.27	-2.73	45.54	-28.46	74.00	165	360	Peak
3		2402.000	102.72	-2.67	100.05	N/A	N/A	165	360	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH0	Test Voltage	AC 110V/60Hz

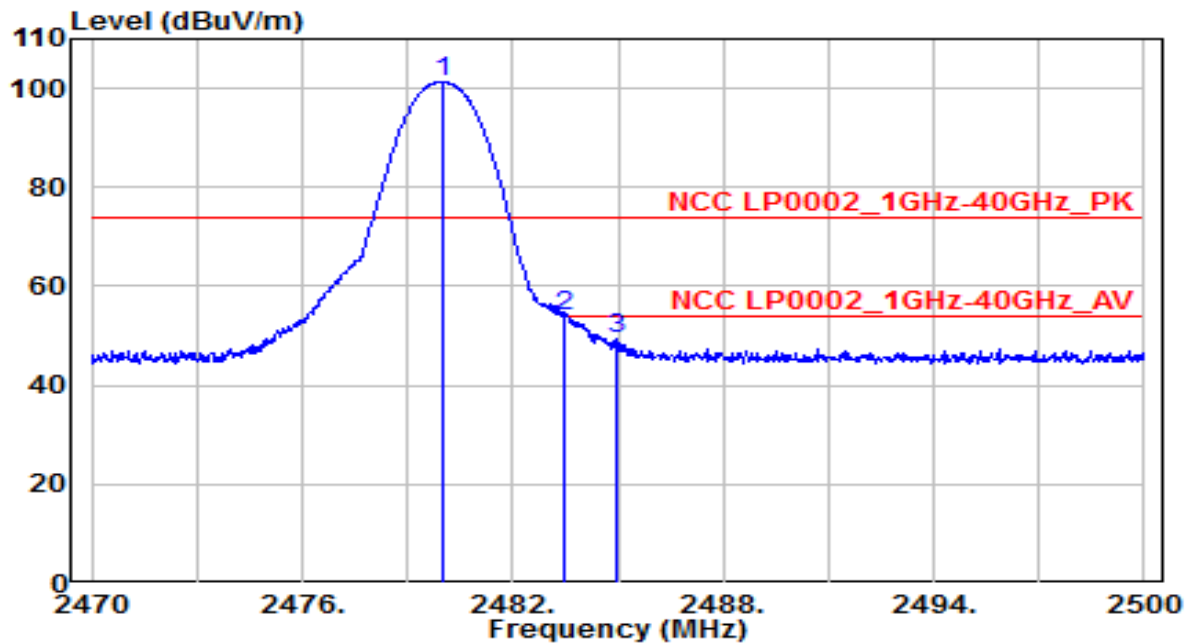


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 2358.800	49.67	-2.87	46.80	-27.20	74.00	160	280	Peak
2	2390.000	47.62	-2.73	44.89	-29.11	74.00	160	280	Peak
3	2402.100	100.49	-2.67	97.82	N/A	N/A	160	280	Peak

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	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH78	Test Voltage	AC 110V/60Hz

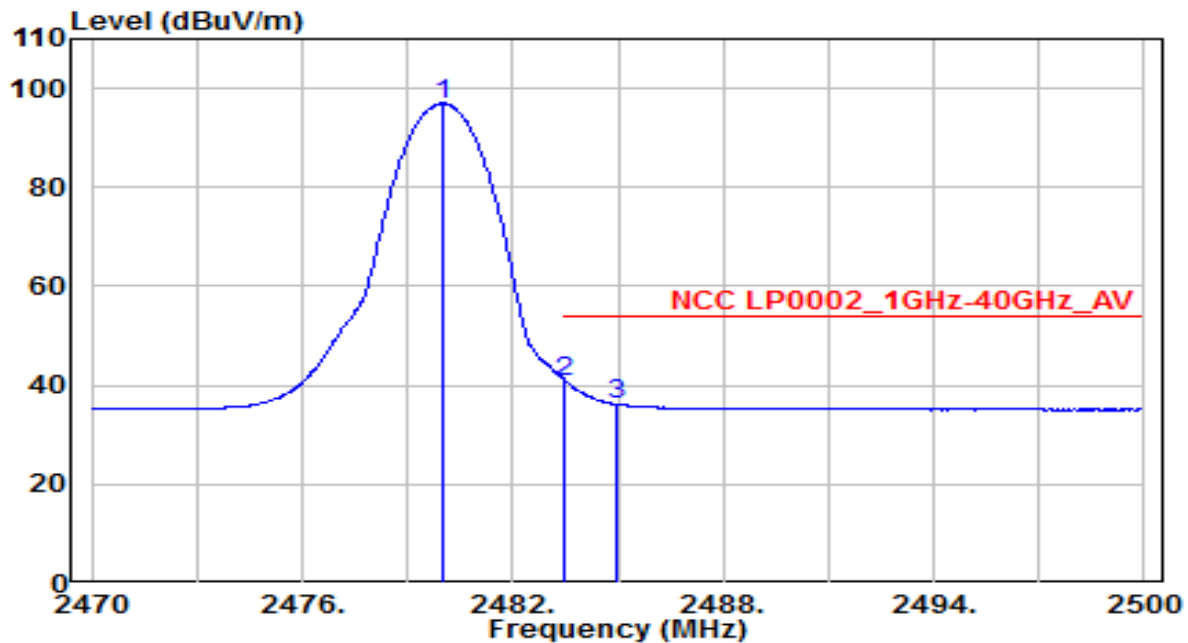


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2479.990	103.68	-2.31	101.37	N/A	N/A	160	5	Peak
2	* 2483.500	56.14	-2.30	53.84	-20.16	74.00	160	5	Peak
3	2484.970	51.69	-2.29	49.40	-24.60	74.00	160	5	Peak

Note:

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

EUT	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Horizontal	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH78	Test Voltage	AC 110V/60Hz

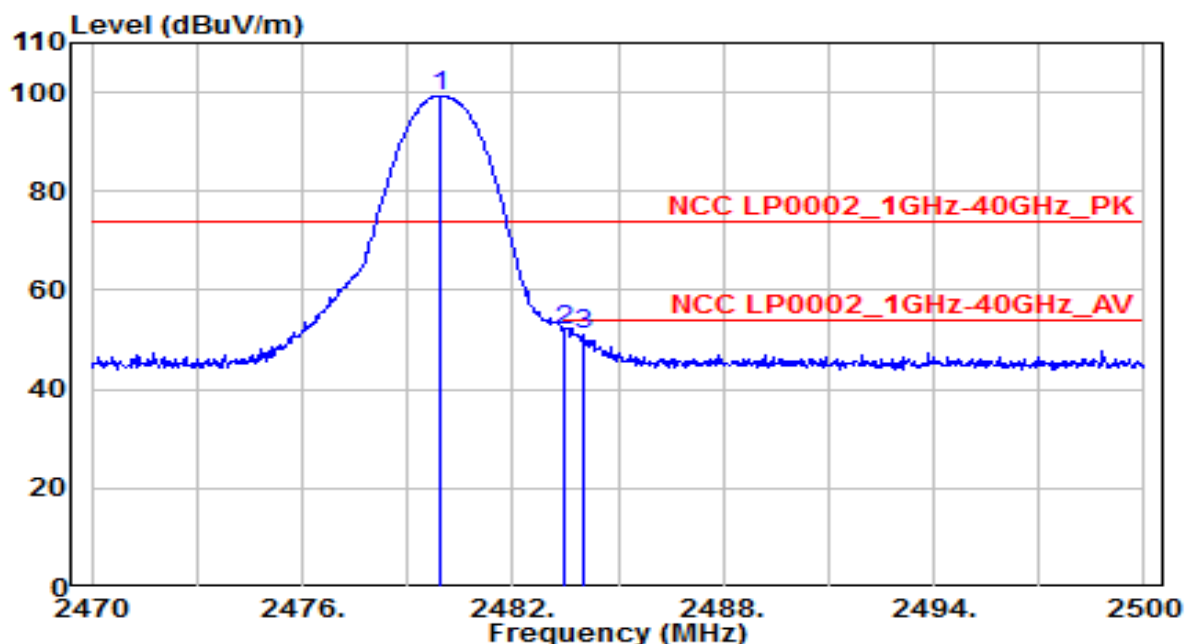


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2479.990	99.15	-2.31	96.84	N/A	N/A	160	5	Average
2	* 2483.500	43.14	-2.30	40.84	-13.16	54.00	160	5	Average
3	2484.970	38.45	-2.29	36.16	-17.84	54.00	160	5	Average

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	Wireless Flight Adapter	Date of Test	2019-12-05
Factor	BBHA 9120D	Temp. / Humidity	25°C /46%
Polarity	Vertical	Site / Test Engineer	AC1 / Jay
Test Mode	BT_TX_3DH5_CH78	Test Voltage	AC 110V/60Hz



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	2479.960	101.68	-2.31	99.37	N/A	N/A	145	275	Peak
2	* 2483.500	54.12	-2.30	51.82	-22.18	74.00	145	275	Peak
3	2484.040	53.29	-2.29	51.00	-23.00	74.00	145	275	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.

5.7 間隔頻寬

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:

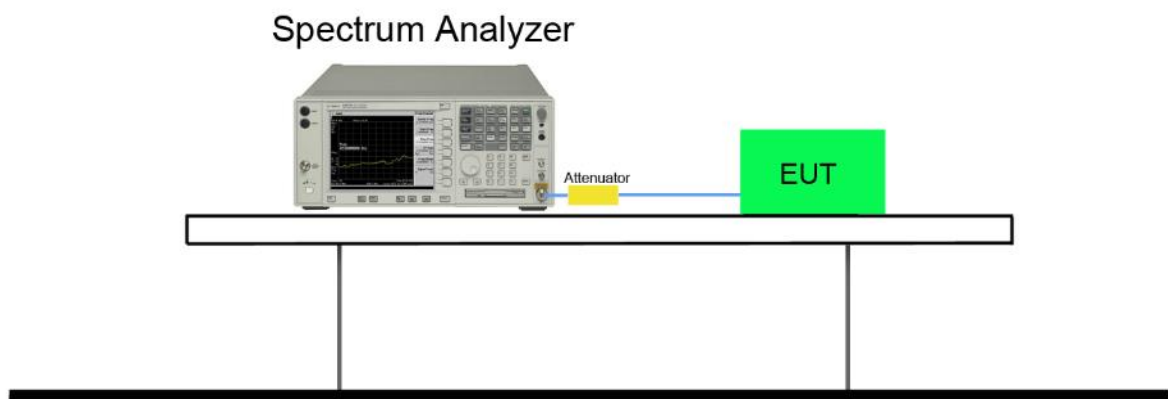
- (1) 頻率掃描範圍約為20 dB頻寬之2 到3 倍，中心頻率為跳頻頻道。
- (2) 解析頻寬不小於20 dB 頻寬的1%，視訊頻寬不小於解析頻寬。
- (3) 掃描時間為自動，檢波功能為峰值，訊號軌跡為最大保留(Max Hold)
- (4) 受測物必須以最大資料傳輸率發射，利用記號至波峰(Mark to Peak)功能以標記波峰。
- (5) 利用差值記號功能以測量發射之20 dB頻寬。若該值會因不同操作模式而異，對不同模式重複此測試。

備 註: DH1,DH3,DH5僅為封包傳輸率的差異,其針對此章節無顯著之影響，因此僅檢附DH5為測試數據。

5.7.2 限制要求

應大於或等於25 kHz 或跳頻頻道之20 dB頻寬，兩者取較寬者。但操作頻率為2400 MHz~2483.5 MHz 頻段且輸出功率應小於或等於125 mW 跳頻系統，其載波頻率頻道間隔不得小於25 kHz 或跳頻頻道20 dB頻寬之三分之二，兩者取較寬者。系統之跳頻頻道應依虛擬亂數排列，在各頻率之跳頻頻道上跳躍。每一發射機必須均等的使用每一頻率。系統接收機應具有與發射機跳躍頻道頻寬相匹配之輸入頻寬，且應隨所發射之訊號同步偏移接收頻率。

5.7.3 測試架構圖

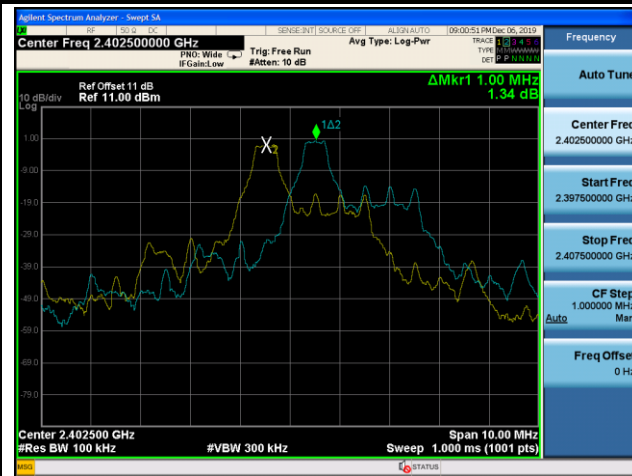


5.7.4 間隔頻寬測試結果

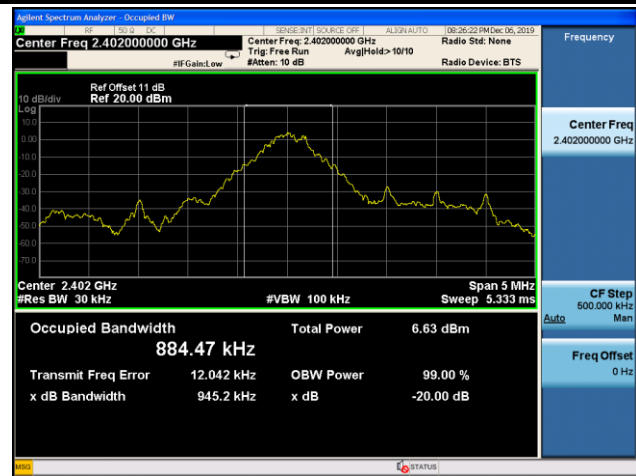
Test Mode	Channel No.	Frequency (MHz)	Channel Separation (MHz)	Limit (kHz)	Limit of 2/3*20dB Bandwidth (kHz)	Result
DH5(1Mbps)	00	2402	1.00	25	630.133	Pass
DH5(1Mbps)	39	2441	1.00	25	631.600	Pass
DH5(1Mbps)	78	2480	1.00	25	625.400	Pass
3-DH5(3Mbps)	00	2402	1.00	25	841.333	Pass
3-DH5(3Mbps)	39	2441	1.00	25	844.667	Pass
3-DH5(3Mbps)	78	2480	1.00	25	846.000	Pass

備註：Limit 為 25 kHz 或跳頻頻道 20 dB 頻寬之三分之二，兩者取較寬者。

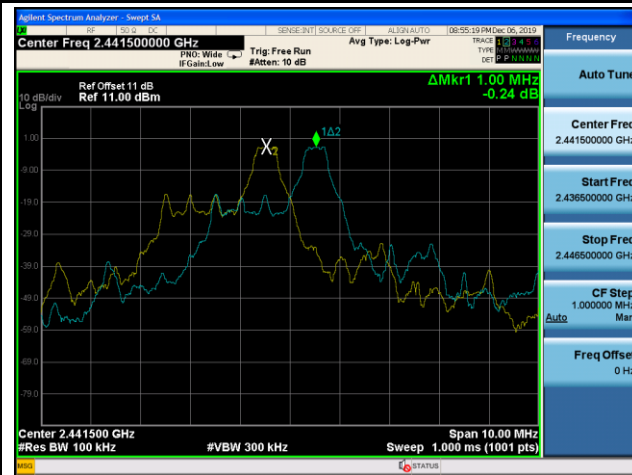
CH00 (2402MHz) DH5(1Mbps)- Channel Separation



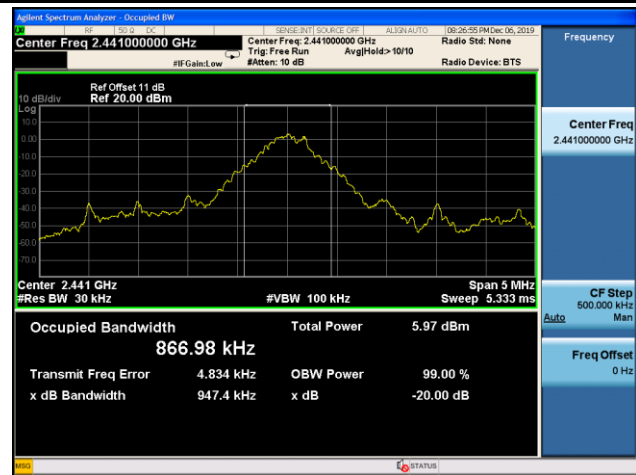
CH00 (2402MHz) DH5(1Mbps)- 20dB Bandwidth



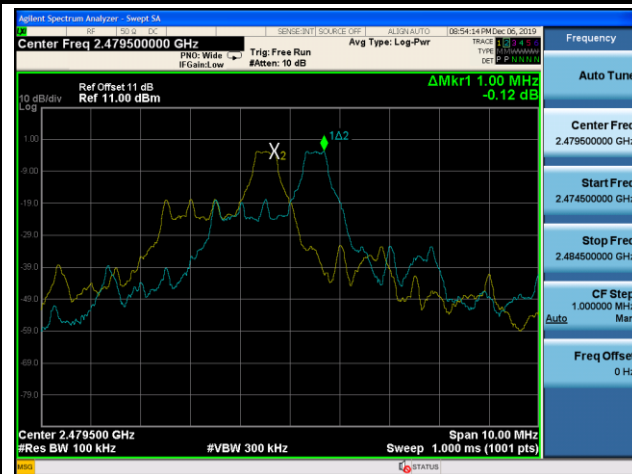
CH39 (2441MHz) DH5(1Mbps)- Channel Separation



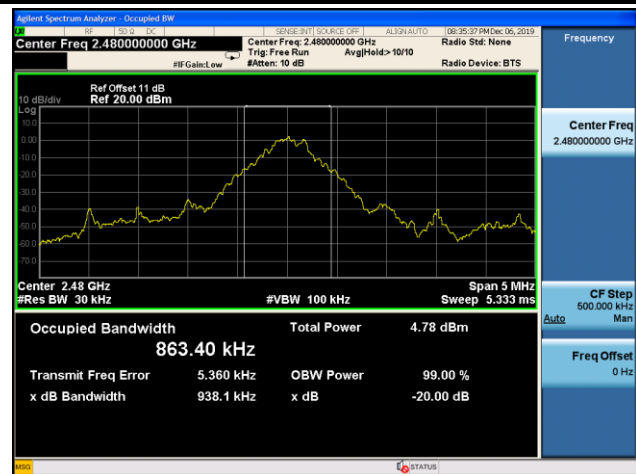
CH39 (2441MHz) DH5(1Mbps)- 20dB Bandwidth



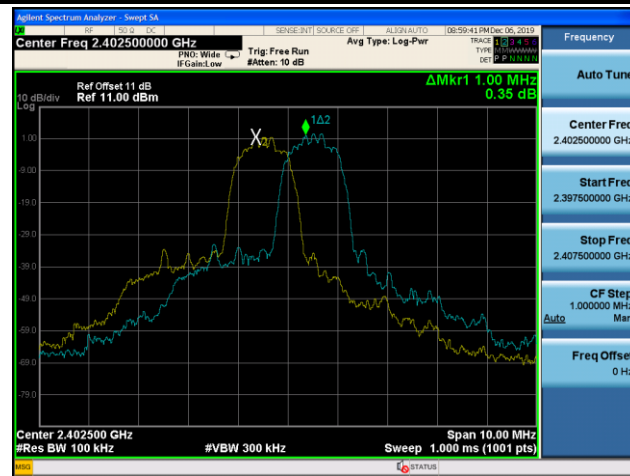
CH78 (2480MHz) DH5(1Mbps)- Channel Separation



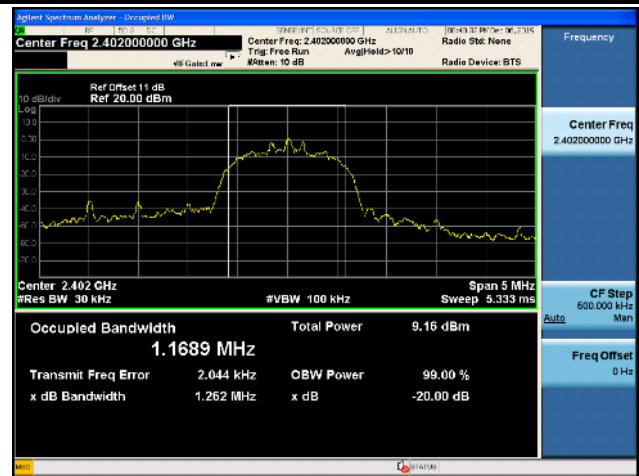
CH78 (2480MHz) DH5(1Mbps)- 20dB Bandwidth



CH00 (2402MHz) 3-DH5(3Mbps)- Channel Separation



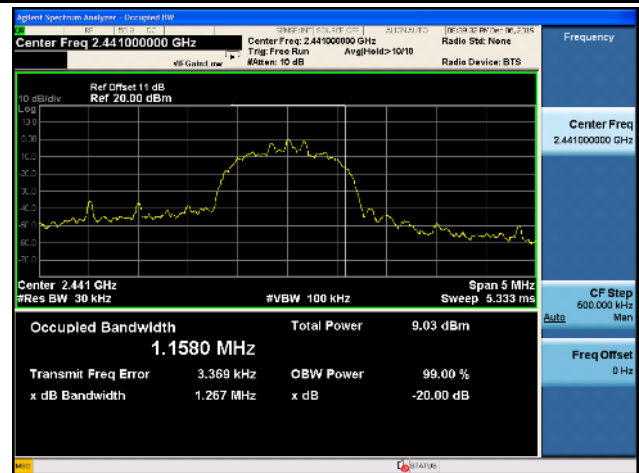
CH00 (2402MHz) 3-DH5(3Mbps)- 20dB Bandwidth



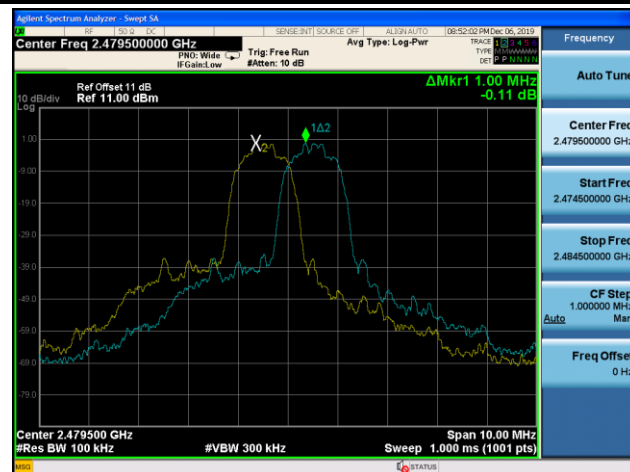
CH39 (2441MHz) 3-DH5(3Mbps)- Channel Separation



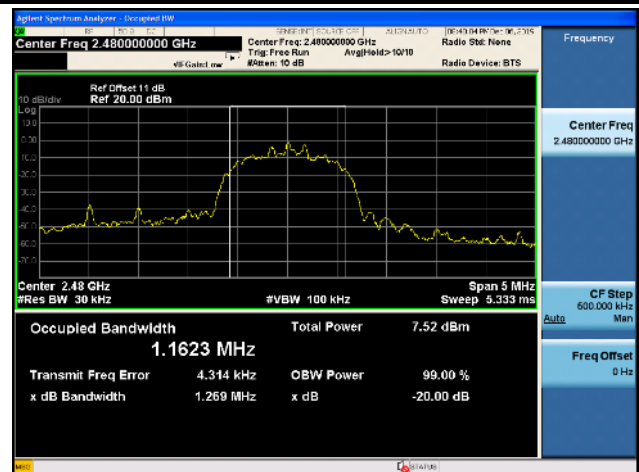
CH39 (2441MHz) 3-DH5(3Mbps)- 20dB Bandwidth



CH78 (2480MHz) 3-DH5(3Mbps)-Channel Separation



CH78 (2480MHz) 3-DH5(3Mbps)- 20dB Bandwidth



5.8. 跳頻頻道數

5.8.1 量測方法

(一) 啟動受測物之跳頻功能。

(二) 頻譜分析儀設定如下：

1. 頻率掃描範圍為受測物之操作頻帶。
2. 解析頻寬不小於1%的頻率掃描範圍，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)

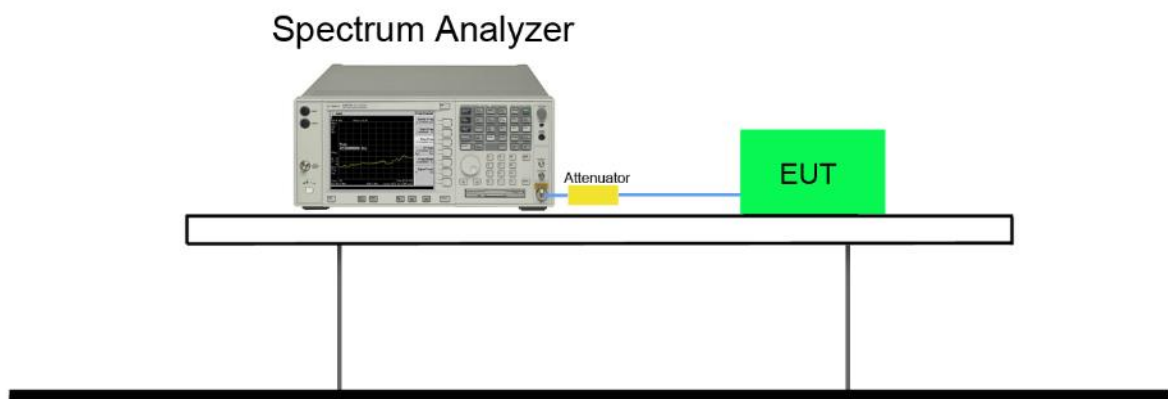
備 註: DH1,DH3,DH5為封包傳輸率的差異,其針對此章節無顯著之影響，因此僅檢附DH5為測試數據。

5.8.2 限制要求

(一) 操作於2400 MHz~2483.5 MHz之展頻跳頻系統，須使用至少15 個無重疊的頻道。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

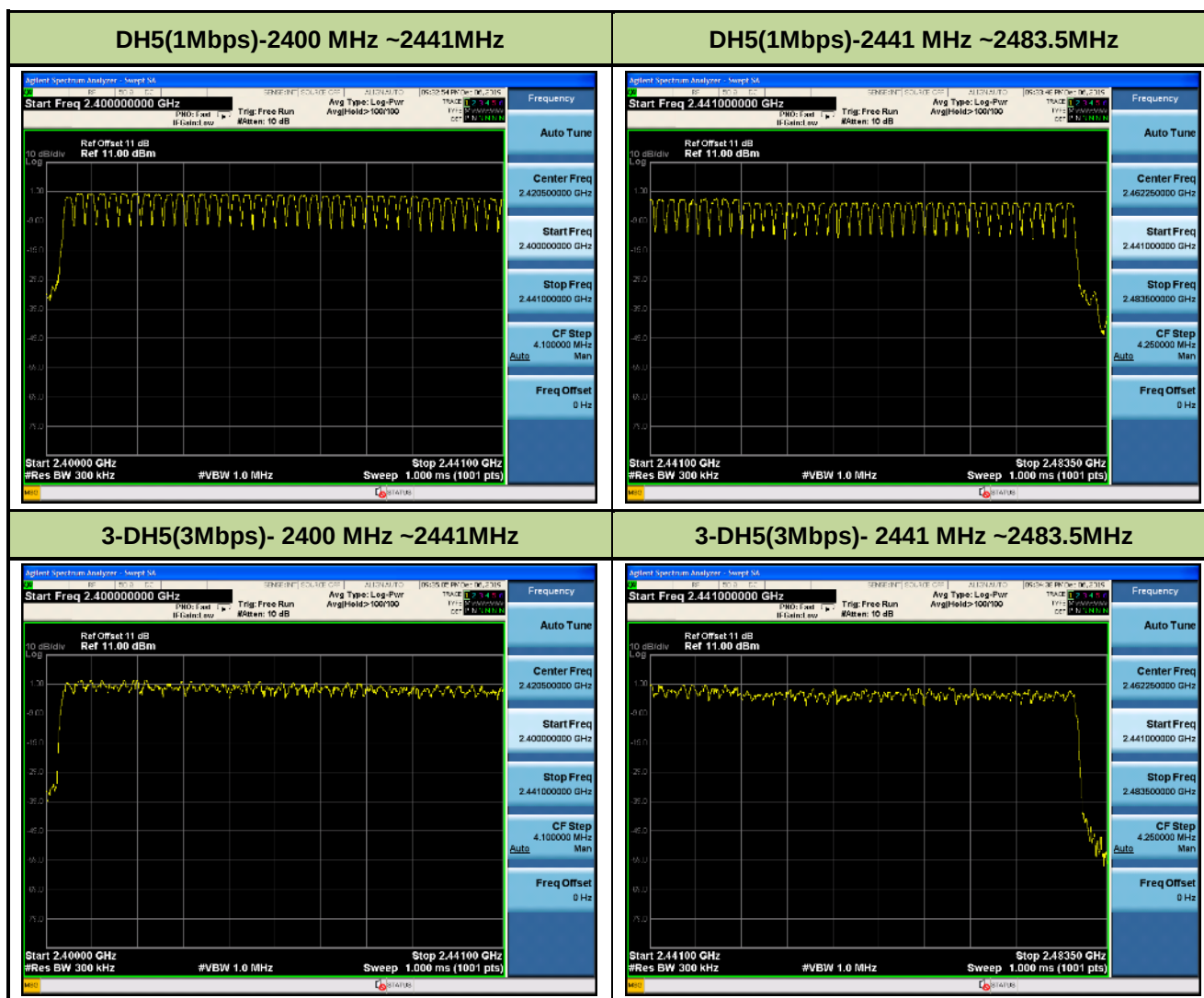
(二) 操作於5725 MHz~5850 MHz 之展頻跳頻系統，至少須使用75 個以上跳頻頻道(hopping channel)，每一跳頻頻道之20 dB頻寬應小於或等於1 MHz。

5.8.3 測試架構圖



5.8.4 跳頻頻道數測試結果

Test Mode (Hopping)	Channel Numbers	Frequency (MHz)	Limit (Hopping Channels)	Result
DH5(1Mbps)	79	2402~2480	≥ 15	Pass
3-DH5(3Mbps)	79	2402~2480	≥ 15	Pass



5.9. 占用時間

5.9.1 量測方法

(一) 啟動受測物之跳頻功能。

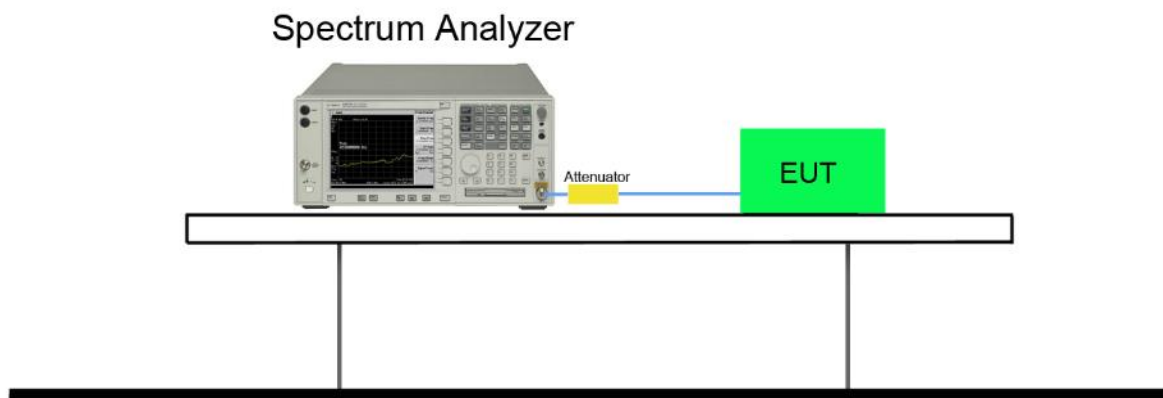
(二) 頻譜分析儀設定如下：

1. 頻率掃描範圍為零，中心頻率為跳頻頻道，解析頻寬為1 MHz，視訊頻寬不小於解析頻寬。
2. 掃描時間為足以測得每一個跳頻頻道之所有停留時間。
3. 檢波功能為峰值，訊號軌跡為最大保留(Max Hold)
4. 利用差值記號功能以決定停留時間。若該值會因不同操作模式而異，對不同模式重複此測試。

5.9.2 限制要求

- (一) 操作於2400 MHz~2483.5 MHz之展頻跳頻系統在0.4 秒乘以跳頻頻道數之週期內，任一頻率占用之平均時間應小於或等於0.4 秒。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。
- (二) 操作於5725 MHz~5850 MHz 之展頻跳頻系統在30秒週期內，任一頻率占用之平均時間應小於或等於0.4 秒。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

5.9.3 測試架構圖



5.9.4 占用時間測試結果

Test Mode	Frequency (MHz)	Time of Occupancy (ms)	Hopping of Numbers	Sweep time (ms)	Duty cycle	Dwell Time (Sec)	Limit (Sec)	Result
DH5(1Mbps)	2402	2.90	13	50	0.75	0.30	0.4	Pass
	2441	2.89	13	50	0.75	0.30	0.4	Pass
	2480	2.90	13	50	0.75	0.30	0.4	Pass
3-DH5(3Mbps)	2402	2.90	13	50	0.75	0.30	0.4	Pass
	2441	2.90	13	50	0.75	0.30	0.4	Pass
	2480	2.89	13	50	0.75	0.30	0.4	Pass

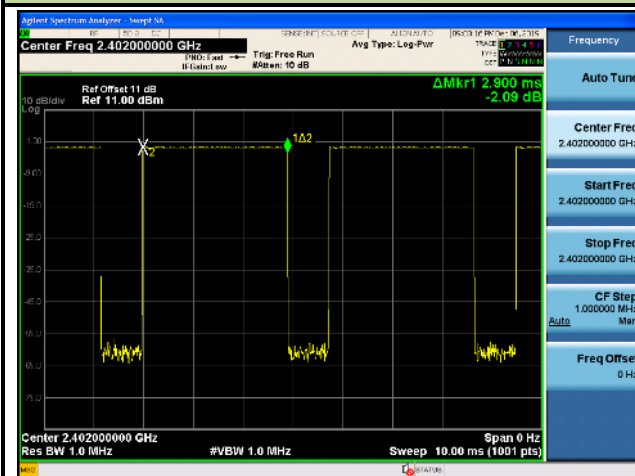
備註：(1) $\text{Duty cycle} = ((\text{Time slot length (ms)} * \text{Hopping of Number}) / \text{Sweep time (ms)})$ 。

$\text{Dwell time} = ((\text{Duty cycle} * (\text{Time Period} < 0.4 * 79 >)) / (\text{Total Hopping of Number} < 79 >))$

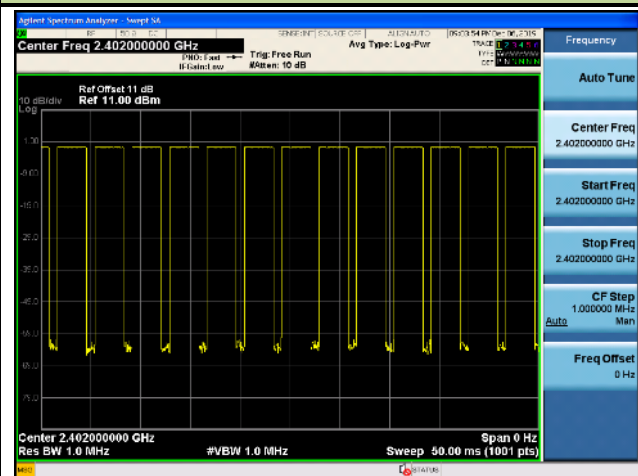
(2) 經初測驗證過，Dwell Time 針對測試頻道數並無明顯差異，故僅檢附最差狀況之測試頻道。

(3) 封包型式共分為 DH1,DH3,DH5 ,僅列最差之模式呈現在報告中。

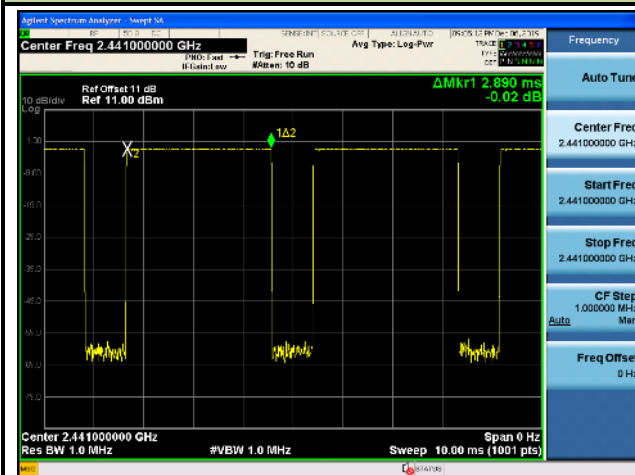
CH00 (2402MHz) DH5(1 Mbps)- Duty Cycle



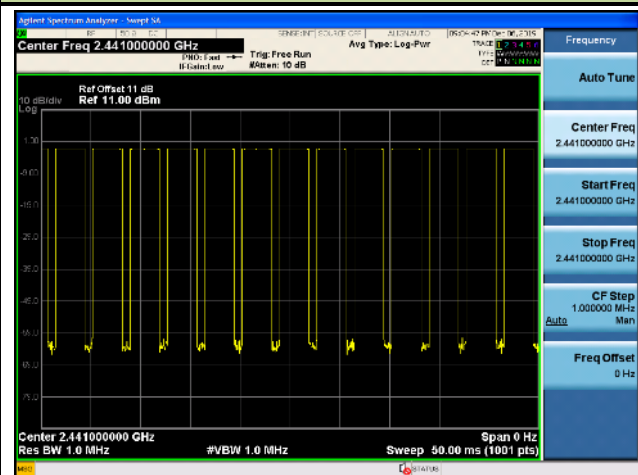
CH00 (2402MHz) DH5(1 Mbps)- Dwell time



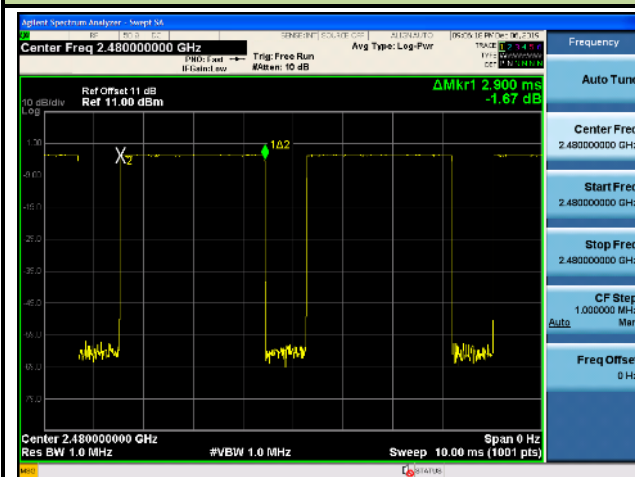
CH39 (2441MHz) DH5(1 Mbps)- Duty Cycle



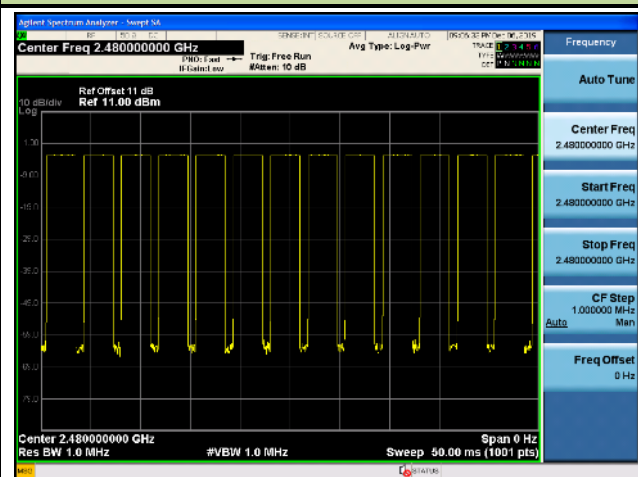
CH39 (2441MHz) DH5(1 Mbps)- Dwell time



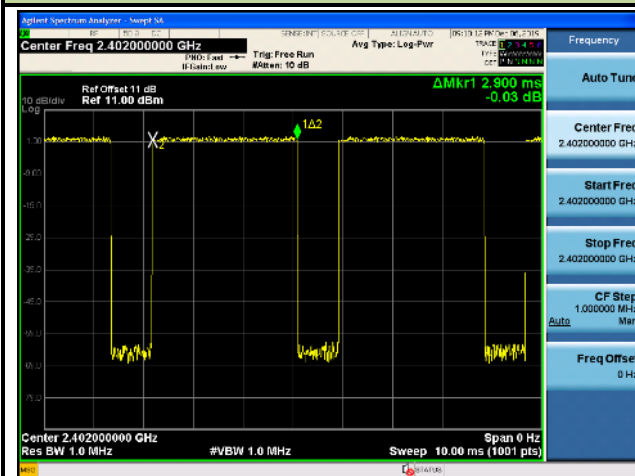
CH78 (2480MHz) DH5(1 Mbps)- Duty Cycle



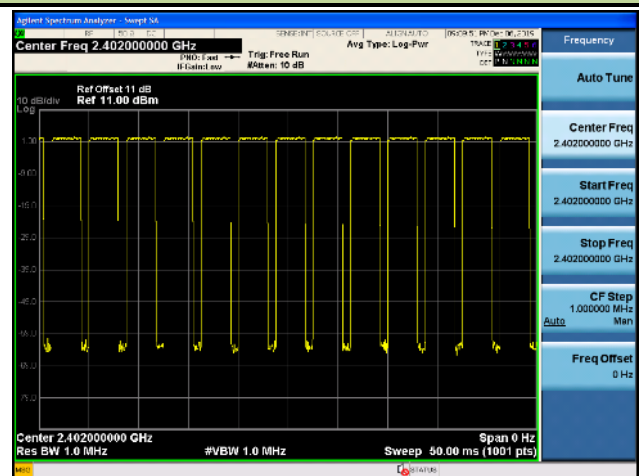
CH78 (2480MHz) DH5(1 Mbps)- Dwell time



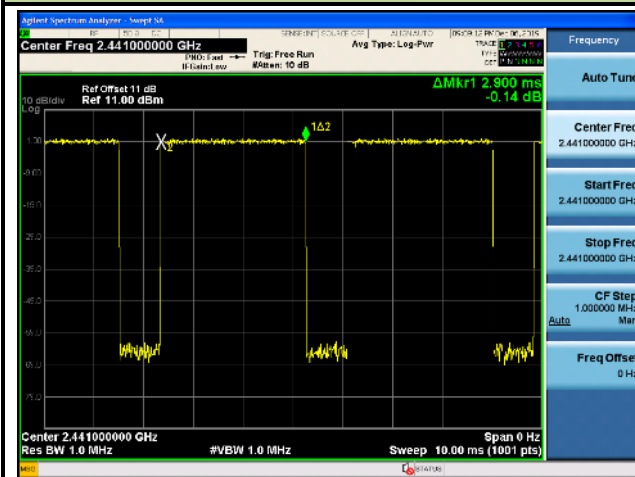
CH00 (2402MHz) 3DH5(1 Mbps)- Duty Cycle



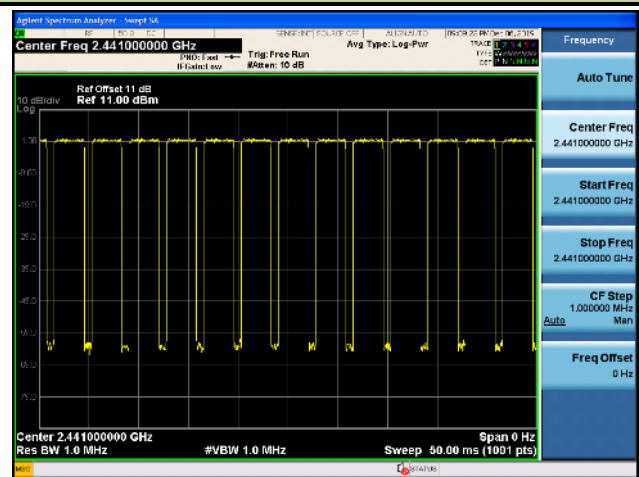
CH00 (2402MHz) 3DH5(1 Mbps)- Dwell time



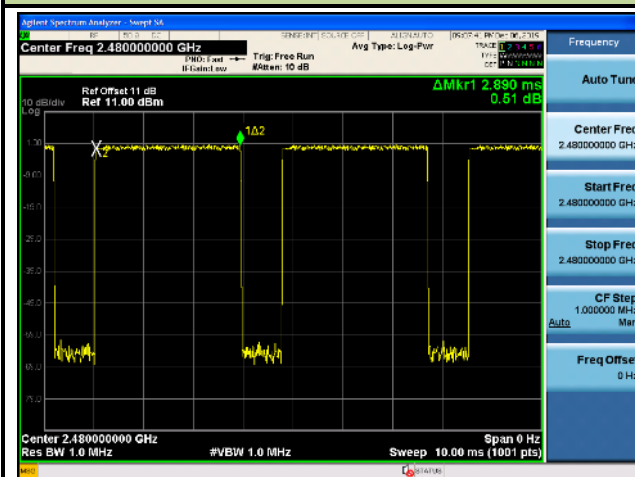
CH39 (2441MHz) 3DH5(1 Mbps)- Duty Cycle



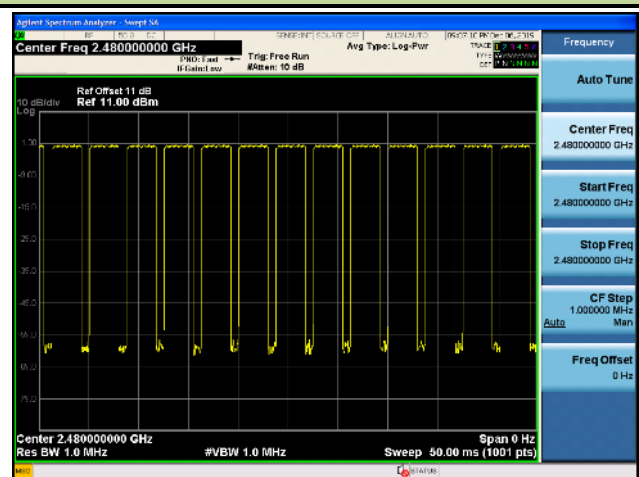
CH39 (2441MHz) 3DH5(1 Mbps)- Dwell time



CH78 (2480MHz) 3DH5(1 Mbps)- Duty Cycle



CH78 (2480MHz) 3DH5(1 Mbps)- Dwell time



The End