



低功率射頻電機測試報告

申請廠商	: 德鋁企業股份有限公司
地址	: 台北市內湖區行善路 417 巷 30 號
製造廠商	: 自然聲電子(深圳)有限公司
地址	: 深圳市龍崗區龍城街道龍西社區玉湖村 1 號
產品名稱	: 無線藍牙耳機
產品型號	: GEAR
廠牌	: NOBD+
受理日期	: 108 年 08 月 23 日
完成日期	: 108 年 12 月 23 日

實驗室名稱：世騰電子科技股份有限公司測試實驗室

實驗室地址：桃園市蘆竹區聯福街 2 巷 10 號

實驗室認可證書有效期限：109 年 07 月 08 日

實驗室認可編號及範圍：1439 (9 kHz to 40 GHz)

實驗室認證資格





目 錄

證 明 書.....	5
1. 一般描述.....	6
1.1. 產品規格.....	6
1.2. 差異說明.....	6
1.3. 無線界面規格及頻道對應頻率.....	6
1.4. 測試模式之描述.....	7
1.5. 受測裝置之系統說明.....	7
1.6. 測試場地.....	8
1.7. 量測不確定度.....	8
2. 測試儀器.....	9
3. 天線增益之要求.....	11
3.1. 天線型式及其增益.....	11
3.2. 結果判定.....	11
4. 電源線傳導干擾之量測規定.....	12
4.1. 適用標準.....	12
4.2. 測試方法.....	12
4.3. 傳導干擾之擺設.....	12
4.4. 傳導干擾之測試結果及數據.....	13
4.5. 傳導量測之配置照片.....	15
5. 輻射之量測規定.....	16
5.1. 適用標準.....	16
5.2. 測試方法.....	16
5.3. 輻射場地之擺設.....	17
5.4. 輻射之測試結果及數據 (9kHz ~ 30MHz).....	18
5.5. 輻射之測試結果及數據 (30MHz ~ 1GHz).....	18
5.6. 輻射之測試結果及數據 (1GHz ~ 25GHz).....	24
5.7. 輻射量測之配置照片 (30MHz ~ 1GHz).....	42
5.8. 輻射量測之配置照片 (1GHz ~ 25GHz).....	44
6. 20dB 頻寬之規定.....	45
6.1. 適用標準.....	45
6.2. 測試方法.....	45
6.3. 測試配置.....	45
6.4. 20dB 頻寬之測試結果及數據.....	45
6.5. 結果判定.....	45
7. 頻道間隔之規定.....	48
7.1. 適用標準.....	48
7.2. 測試方法.....	48
7.3. 測試配置.....	48
7.4. 頻道間隔之測試結果及數據.....	48
7.5. 結果判定.....	48
8. 頻率佔用時間之規定.....	51
8.1. 適用標準.....	51
8.2. 測試方法.....	51
8.3. 測試配置.....	51
8.4. 頻率佔用時間之測試結果及數據.....	52
8.5. 結果判定.....	52
9. 跳頻頻道使用數量之規定.....	56
9.1. 適用標準.....	56
9.2. 測試方法.....	56
9.3. 測試配置.....	56
9.4. 跳頻頻道使用數量之測試結果及數據.....	56
9.5. 結果判定.....	56



10.	峰值輸出功率之規定	58
10.1.	適用標準	58
10.2.	測試方法	58
10.3.	測試配置	58
10.4.	峰值輸出功率之測試結果及數據	59
10.5.	結果判定	59
11.	混附波發射限制之規定	60
11.1.	適用方法	60
11.2.	測試方法	60
11.3.	測試配置	60
11.4.	結果判定	60
11.5.	混附波發射限制之測試結果及數據	61
12.	電波暴露量之評估	68
12.1.	Applicable Standards	68
12.2.	EUT Specification	68
13.	限制使用之頻帶	70
附錄 A:產品照		A1 ~A14
附錄 B:測試配件照		B1 ~B2



修訂記錄

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TENB1908207	Dec. 23, 2019	Original



證 明 書

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產品型號	: GEAR
廠牌	: NOBD+
該產品樣品試驗 依據之試驗標準	: 國家通訊傳播委員會低功率射頻電機技術規範(LP0002)。 規範修訂日期 107 年 1 月 10 日。
發射功率 (電場強度)	: 8.04 dBm

茲在此鄭重聲明：

本試驗報告所列之待測設備樣品已於民國 108 年 12 月 16 日在本公司的標準測試場地完成詳細及完整之量測。本試驗報告所列之量測皆依據低功率射頻電機技術規範之規定來執行。並判斷此待測設備樣品確實符合低功率射頻電機技術規範規定。

備註：本測試報告僅對受測之樣品負責。非經本公司同意，測試報告不得摘錄複印使用。(全部複製除外)。

項次	測試項目	低功率射頻電機技術 規範	量測設備	測試結果	結果判定
1	天線增益之要求	3.10.1.3 節	---	請參閱 3.2 節	---
2	電源線傳導干擾之要求	2.3 節	---	請參閱 4.4 節	合格
3	場強輻射之要求	3.10.1.5 節	請參閱 2 章	請參閱 5.4 節 及 5.5 節	合格
4	發射頻寬之要求	3.10.1.6 節(1)(A)	請參閱 2 章	請參閱 6.4 節	合格
5	頻道間隔之要求	3.10.1.6 節(1)(A)	請參閱 2 章	請參閱 7.4 節	合格
6	頻道佔用時間之要求	3.10.1.6 節(1)(A)(a)	請參閱 2 章	請參閱 8.4 節	合格
7	跳頻頻道使用數量之要求	3.10.1.6 節(1)(A)(a)	請參閱 2 章	請參閱 9.4 節	合格
8	峰值輸出功率之要求	3.10.1.2 節	請參閱 2 章	請參閱 10.4 節	合格
9	混附波發射限制之要求	3.10.1.5 節	請參閱 2 章	請參閱 11.4 節	合格

本實驗室依據 ISO-IEC 17025，已將儀器、環境、人員等不確定影響因素降低，故當量測結果符合標準要求時，即判定合格，不評估與量測結果有相關的不確定度

報告簽署人：



1. 一般描述

1.1. 產品規格

Frequency Range	2400-2483.5MHz
Modulation Type	BT: GFSK, $\pi/4$ -DQPSK, 8DPSK BLE: GFSK
Modulation Technology	FHSS, DTS
Data Rate	BT: GFSK: 1Mbps, $\pi/4$ -DQPSK: 2Mbps, 8DPSK: 3Mbps BLE: GFSK: 1Mbps
Antenna Type	Chip Antenna
Antenna Gain	2.28dBi
充電盒	廠牌: 自然聲電子(深圳) 型號: HB12

Note:

*For more details, please refer to the User's manual of the EUT.

*左耳藍牙耳機、右耳藍牙耳機之電路設計/佈線相同時，左耳藍牙耳機、右耳藍牙耳機屬同一發射機無須驗證 2dB，僅以右耳藍牙耳機為測試之判定。

1.2. 差異說明

無。

1.3. 無線界面規格及頻道對應頻率

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

*為量測之頻率



1.4. 測試模式之描述

- 電源傳導及輻射測試之測試軟體如下：
 1. 將量測系統之全部電源打開。
 2. 於測試進行的同時，在 Windows OS system 作業系統下，待測物執行” AWRDLab ver. R_1_0_6_220” 傳送及接收訊號。
- 執行以下測試模式如下：

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	Charger Mode
caused “Test Mode 1” generated the worst case, it was reported as the final data.	
Radiation Emissions (30MHz ~ 1GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps) , Transmitter
2	$\pi/4$ -DQPSK (2Mbps) , Transmitter
3	8DPSK (3Mbps) , Transmitter
4	GFSK (1Mbps), Receiver
5	$\pi/4$ -DQPSK (2Mbps), Receiver
6	8DPSK (3Mbps), Receiver
7	Charger Mode
caused “Test Mode 3, 6, 7” generated the worst case, they were reported as the final data.	
Radiation Emissions (1GHz ~ 25GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps) , Transmitter
2	$\pi/4$ -DQPSK (2Mbps) , Transmitter
3	8DPSK (3Mbps) , Transmitter
4	GFSK (1Mbps), Receiver
5	$\pi/4$ -DQPSK (2Mbps), Receiver
6	8DPSK (3Mbps), Receiver
caused “Test Mode 1, 3, 6” generated the worst case, they were reported as the final data.	

1.5. 受測裝置之系統說明

「本案經申請者切結器材不提供隨貨配件，配件由實驗室提供併同檢驗」，及其廠牌型號資訊如下：

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
USB TYPE-C	SAMSUNG	EP-DG950CBE	1.2m / NS	N/A
Adapter	SAMSUNG	EP-TA20JBS	N/A	N/A
AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
USB TYPE-C	SAMSUNG	EP-DG950CBE	1.2m / NS	N/A
Adapter	SAMSUNG	EP-TA20JBS	N/A	N/A



1.6. 測試場地

測試場地：	世騰電子科技股份有限公司測試實驗室 338 桃園市蘆竹區聯福街 2 巷 10 號
測試電壓：	AC 110V / 60Hz
適用規範：	本測試報告之所有項目皆依據國家通訊傳播委員會低功率射頻電機技術規範以及參考 ANSI、FCC/47CFR/2.1046、2.1047、2.1049、2.1051、2.1053 及 2.1055 之檢驗法。
測試頻率：	電源傳導：從 150 kHz 到 30 MHz。 場強輻射：從 30 MHz 到 25000 MHz。
測試天線的距離：	場強輻射之測試距離為 3 M。

Test Item	Test Site	Finish Date	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2019/12/16	22°C / 61%	Nick Guan
Radiated Emissions	3M02-NK	2019/12/16	22°C / 45%	Vic Yeh
AC Power Line Conducted Emission	CON02-NK	2019/12/04	24°C / 57%	Dian Chen

1.7. 量測不確定度

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±1.60dB
Radiated Spurious Emission(9KHz~30MHz)	±3.405dB
Radiated Spurious Emission(30MHz~1GHz)	±5.326dB
Radiated Spurious Emission(1GHz~25GHz)	±5.918dB
Conducted Spurious Emission	±2.156dB
6dB Bandwidth	±4.401%
20dB Bandwidth	±4.40%
Occupied Bandwidth	±4.41%
Peak Output Power(Conducted Power Meter)	±1.31dB
Dwell Time	±0.11%
Power Spectral Density	±2.146dB
Duty Cycle	±0.17%



2. 測試儀器

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	275	2019/09/24	2020/09/23
Bilog Antenna	Schwarzbeck	VULB9168	369	2019/03/29	2020/03/28
Active Loop Antenna	EMCO	6507	40855	2019/05/24	2020/05/23
Horn Antenna	EMCO	3115	31589	2019/04/01	2020/03/31
Horn Antenna	EMCO	3116	31974	2019/09/17	2020/09/16
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2019/05/14	2020/05/13
Spectrum Analyzer	ROHDE & SCHWARZ	FSP 40	100047	2019/03/28	2020/03/27
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2019/08/02	2020/08/01
Preamplifier	EM Electronics corp.	EM330	60660	2019/03/11	2020/03/10
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2019/09/20	2020/09/19
Preamplifier	Agilent	8449B	3008A01954	2019/03/11	2020/03/10
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2019/11/07	2020/11/06
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2019/04/07	2020/04/06
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2019/04/09	2020/04/08
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1316	2019/09/20	2020/09/19
Cable-0.5m(1G-40G)	HUBER SUHNER	SUCOFLEX 100	805443/4	2019/05/20	2020/05/19
Cable-3m(1G-40G)	HUBER SUHNER	SUCOFLEX 100	805796/4	2019/05/20	2020/05/19
Cable-8m(1G-40G)	HUBER SUHNER	SUCOFLEX 100	805795/4	2019/05/20	2020/05/19
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

Test Item	RF Conducted				
Test Site	RFCON01-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Spectrum Analyzer	ROHDE & SCHWARZ	FSP 40	100047	2019/03/28	2020/03/27
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2019/08/02	2020/08/01
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2019/04/07	2020/04/06
Attenuator	KEYSIGHT	8491B	MY39250703	2019/09/12	2020/09/11
TEMP & HUMI CHAMBER	T-MACHINE	TMJ-9712	T-12-040111	2019/08/28	2020/08/27
Power Meter	Anritsu	ML2495A	1224005	2019/04/11	2020/04/10
Power Sensor	Anritsu	MA2411B	1207295	2019/04/09	2020/04/08



Test Item	AC Power Line Conducted Emission				
Test Site	CON02-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESCI	100821	2019/09/16	2020/09/15
Line Impedance Stabilization Network	Schwarzbeck	NSLK 8127	8127-516	2019/09/19	2020/09/18
TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ENV216	102185	2019/07/05	2020/07/04
Cable-6m(9k~300M)	NA	EMC5D-BM-BM-6	130606	2019/03/14	2020/03/13
E3	AUDIX	v8.2014-8-6	RK-000536	NA	NA



3. 天線增益之要求

天線規格不受國家通訊傳播委員會低功率射頻電機技術規範(2.2)節規定之限制，其發射天線之方向性增益超過 6dBi 時，應依其所超過之 dB 數等量降低峰值輸出功率。如用於固定式點對點操作時，應符合下列情形之一：

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。

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。

3.1. 天線型式及其增益

1.1 Brand :	ONEWAVE
1.2 Model :	WAN3216F245M08
1.3 Antenna type :	Chip Antenna
1.4 Frequency Rang :	2402-2480MHz
1.5 Gain(peak) :	2.28 dBi
(參照天線規格資料)	

3.2. 結果判定

其發射天線之方向性增益低於 6dBi，因此無需降低峰值輸出功率。

4. 電源線傳導干擾之量測規定

4.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範之 2.3 節，電源傳導干擾之限制要求如下：

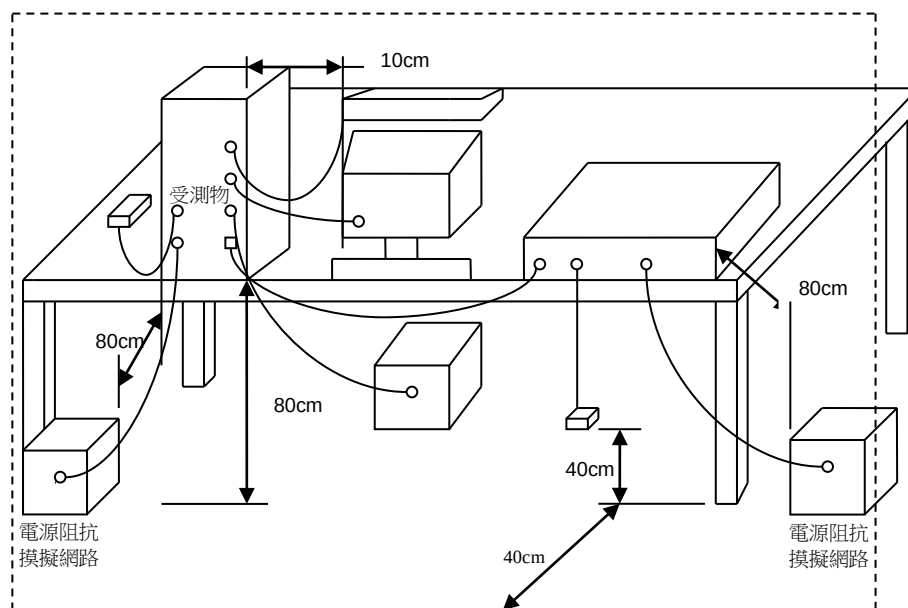
頻率範圍(MHz)	傳導限制值 (dB μ V)	
	準峰值(Quasi-peak)	平均值(Average)
0.15 ~ 0.5	66-56 (註)	56-46 (註)
0.5 ~ 5	56	46
5 ~ 30	60	50

註：隨頻率之對數遞減

4.2. 測試方法

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

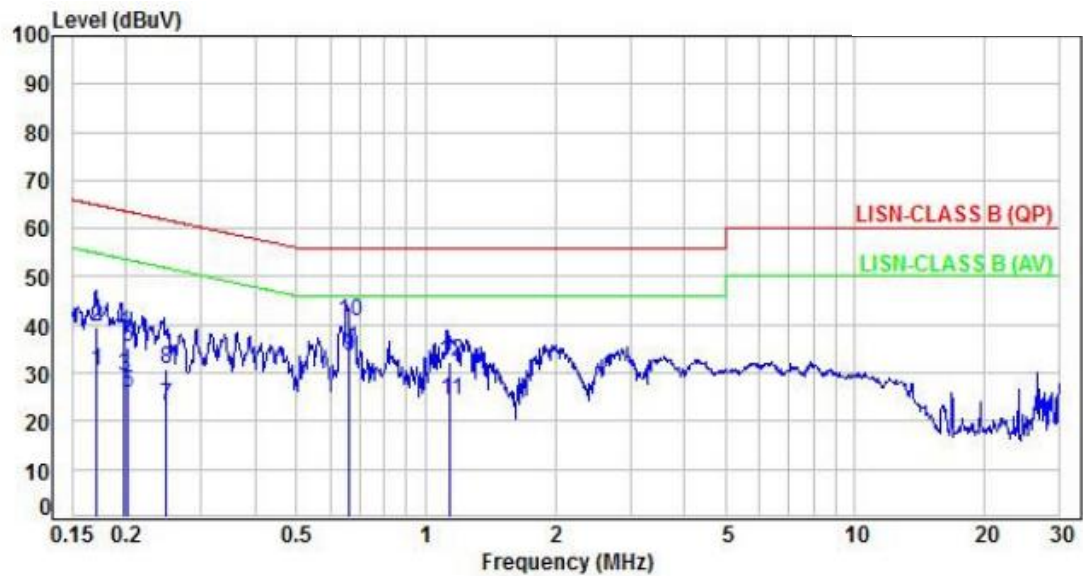
4.3. 傳導干擾之擺設





4.4. 傳導干擾之測試結果及數據

Power	: AC 110V / 60Hz	Pol/Phase	: LINE
Test Mode	: Mode 1		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	P/F
1	0.17	9.64	20.86	30.50	54.94	-24.44	Average	P
2	0.17	9.64	30.08	39.72	64.94	-25.22	QP	P
3	0.20	9.64	19.68	29.32	53.68	-24.36	Average	P
4	0.20	9.64	28.80	38.44	63.68	-25.24	QP	P
5	0.20	9.64	16.09	25.73	53.57	-27.84	Average	P
6	0.20	9.64	25.68	35.32	63.57	-28.25	QP	P
7	0.25	9.64	13.54	23.18	51.81	-28.63	Average	P
8	0.25	9.64	21.24	30.88	61.81	-30.93	QP	P
9	0.66	9.65	23.85	33.50	46.00	-12.50	Average	P
10	0.66	9.65	31.04	40.69	56.00	-15.31	QP	P
11	1.14	9.68	14.54	24.22	46.00	-21.78	Average	P
12	1.14	9.68	22.62	32.30	56.00	-23.70	QP	P

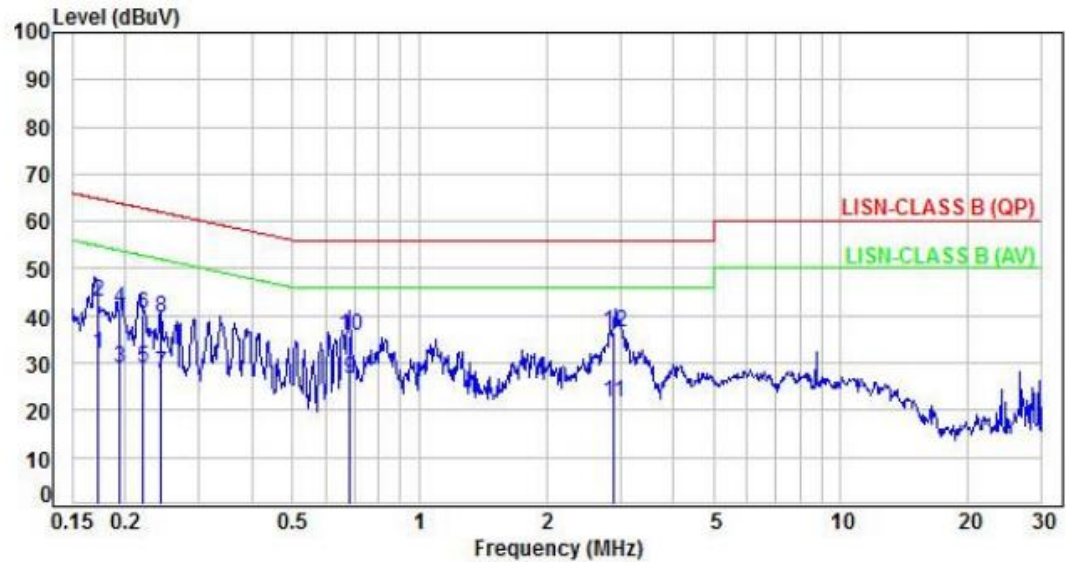
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



Power	: AC 110V / 60Hz	Pol/Phase	: NEUTRAL
Test Mode	: Mode 1		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.17	9.64	22.24	31.88	54.86	-22.98	Average	P
2	0.17	9.64	33.45	43.09	64.86	-21.77	QP	P
3	0.19	9.63	19.27	28.90	53.85	-24.95	Average	P
4	0.19	9.63	31.74	41.37	63.85	-22.48	QP	P
5	0.22	9.63	19.37	29.00	52.80	-23.80	Average	P
6	0.22	9.63	30.49	40.12	62.80	-22.68	QP	P
7	0.24	9.63	18.20	27.83	51.97	-24.14	Average	P
8	0.24	9.63	29.96	39.59	61.97	-22.38	QP	P
9	0.68	9.65	17.11	26.76	46.00	-19.24	Average	P
10	0.68	9.65	26.04	35.69	56.00	-20.31	QP	P
11	2.89	9.75	11.75	21.50	46.00	-24.50	Average	P
12	2.89	9.75	26.85	36.60	56.00	-19.40	QP	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



5. 輻射之量測規定

5.1. 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1 節(5)之要求，落於 2.7 節禁用頻段之輻射干擾需符合 2.8 節之一般限制要求：

頻率(MHz)	測試距離(m)	限制值(dB μ V)	限制值(μ V/m)
0.009 – 0.490 (含)	300	67.6 / f(kHz)	2400 / f(kHz)
0.490 (不含) – 1.705 (含)	30	87.6 / f(kHz)	24000 / f(kHz)
1.705(不含) – 30(不含)	30	29.5	30
30 (含) – 88 (含)	3	40.0	100
88(不含) – 216 (含)	3	43.5	150
216(不含) – 960 (含)	3	46.0	200
960(不含)以上	3	54.0	500

5.2. 測試方法

將待測物置於 0.8 米(Below 1G) & 1.5 米(Above 1G)高的非金屬桌面，使其在測試模式狀態，且設定為高、中、低各頻道產生最高峰值輸出功率的傳輸速率，接收天線置於 3 米外，且桌面要 360 度旋轉，另外接收天線也要從 1 米至 4 米升降變化，接收天線置於水平、垂直極向各執行測試一次。待測物若為手持式則分別要以三軸相放置，並分別測試以找出最大輻射電場強度。

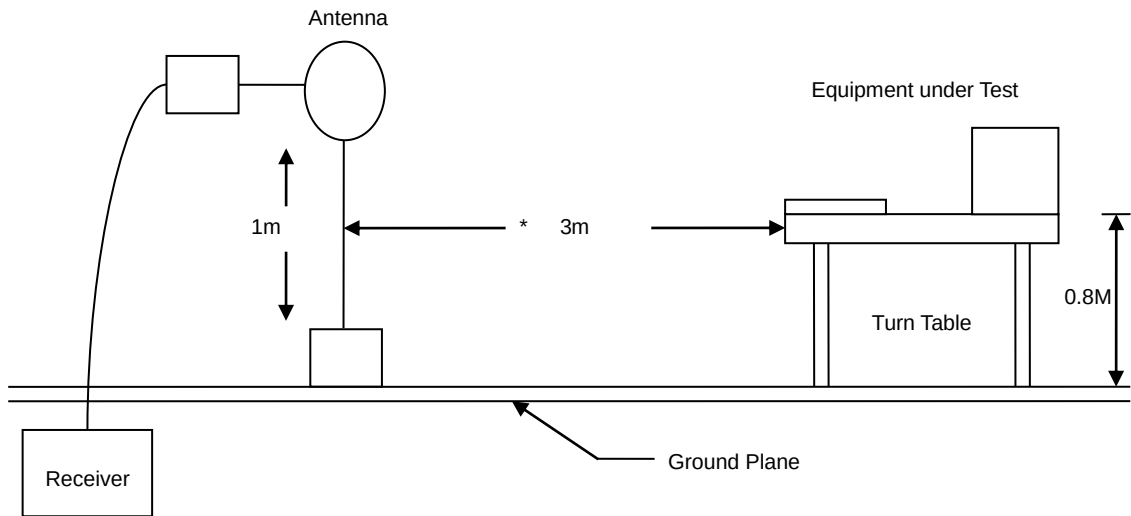
備註：

For Below 1G 若待測物之輻射峰值低於限制值 3dB 以上，則將終止測試，並以峰值之讀值作為報告之記錄；反之，若無 3dB 餘裕範圍之輻射，則每一訊號皆以準峰值之測試方法量測，並記錄於報告之中

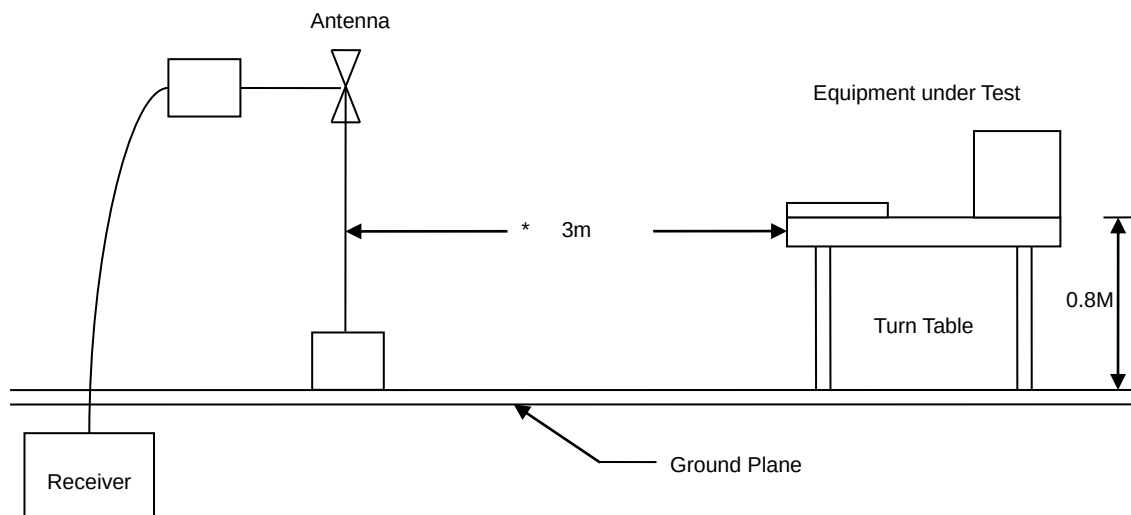


5.3. 輻射場地之擺設

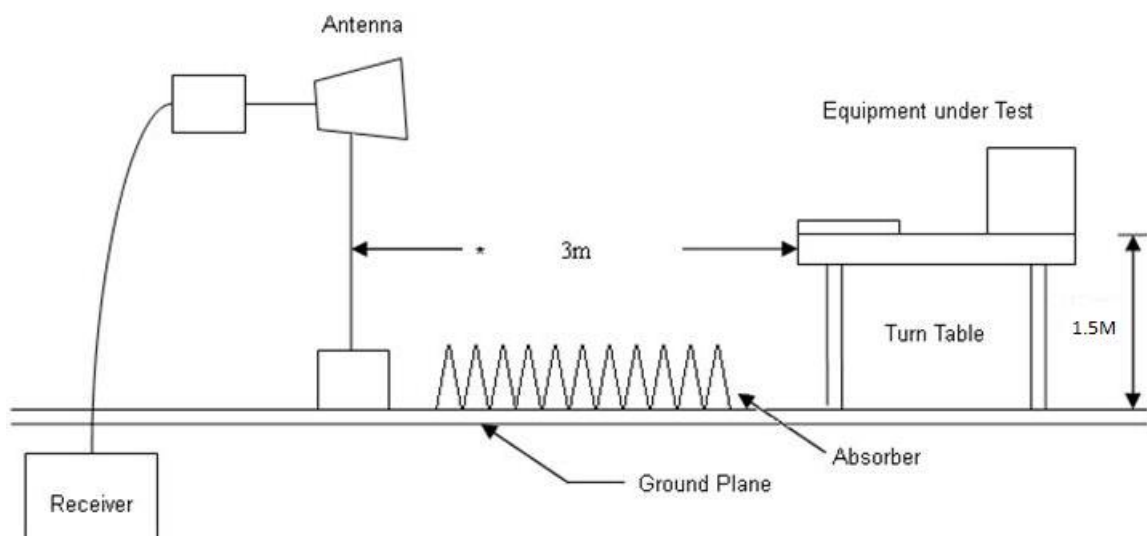
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



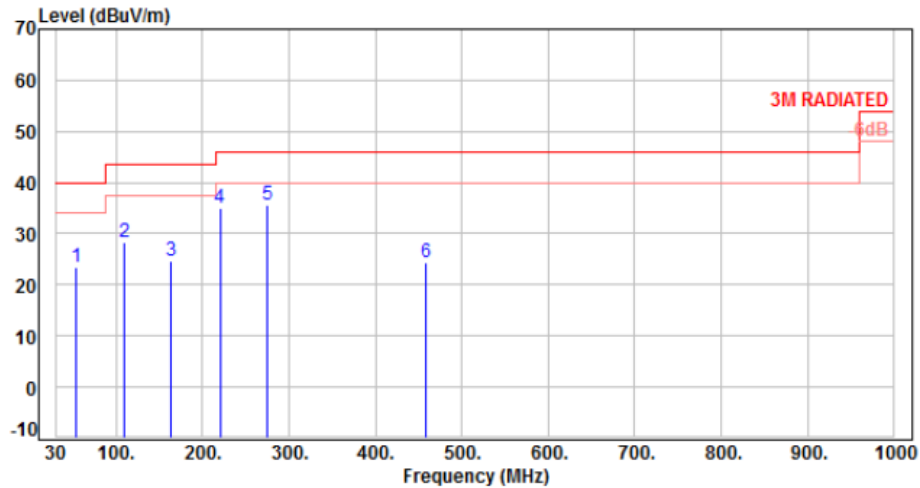


5.4. 輻射之測試結果及數據 (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

5.5. 輻射之測試結果及數據 (30MHz ~ 1GHz)

Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 3		

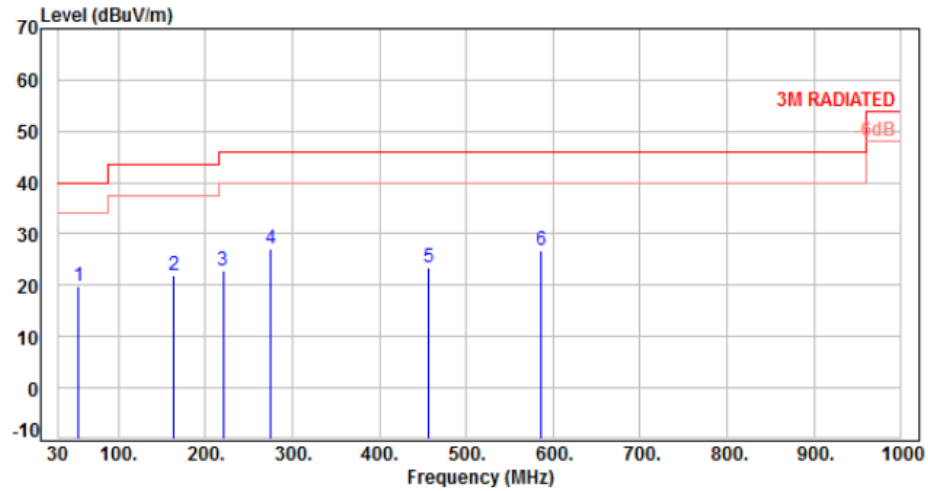


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	53.28	-9.38	32.86	23.48	40.00	-16.52	Peak	100	0	P
2	109.54	-12.50	40.85	28.35	43.50	-15.15	Peak	100	0	P
3	163.86	-9.50	34.04	24.54	43.50	-18.96	Peak	100	0	P
4	220.12	-11.93	46.82	34.89	46.00	-11.11	Peak	100	0	P
5	274.44	-9.21	44.96	35.75	46.00	-10.25	Peak	100	0	P
6	458.74	-4.30	28.55	24.25	46.00	-21.75	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	53.28	-9.38	29.23	19.85	40.00	-20.15	Peak	100	0	P
2	163.86	-9.50	31.50	22.00	43.50	-21.50	Peak	100	0	P
3	220.12	-11.93	34.85	22.92	46.00	-23.08	Peak	100	0	P
4	274.44	-9.21	36.30	27.09	46.00	-18.91	Peak	100	0	P
5	456.80	-4.33	27.70	23.37	46.00	-22.63	Peak	100	0	P
6	586.78	-1.61	28.35	26.74	46.00	-19.26	Peak	100	0	P

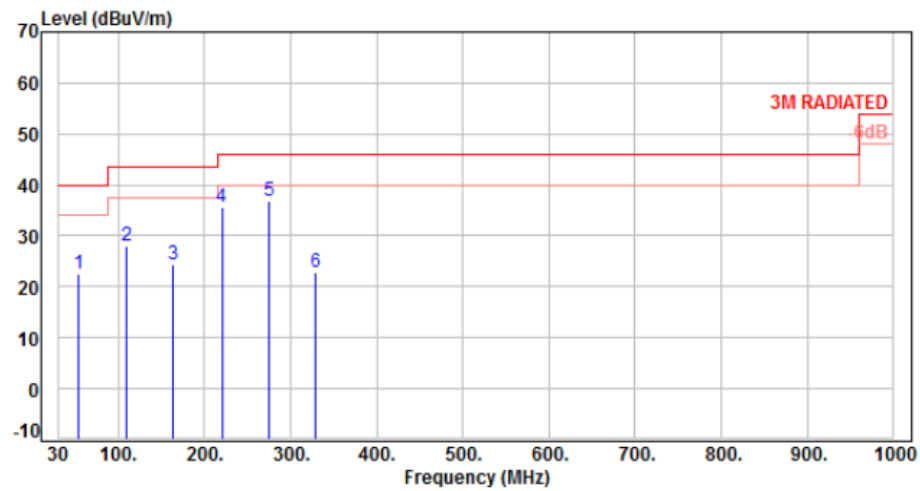
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 6		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	53.28	-9.38	31.83	22.45	40.00	-17.55	Peak	100	0	P
2	109.54	-12.50	40.38	27.88	43.50	-15.62	Peak	100	0	P
3	163.86	-9.50	33.75	24.25	43.50	-19.25	Peak	100	0	P
4	220.12	-11.93	47.42	35.49	46.00	-10.51	Peak	100	0	P
5	274.44	-9.21	45.91	36.70	46.00	-9.30	Peak	100	0	P
6	328.76	-7.53	30.50	22.97	46.00	-23.03	Peak	100	0	P

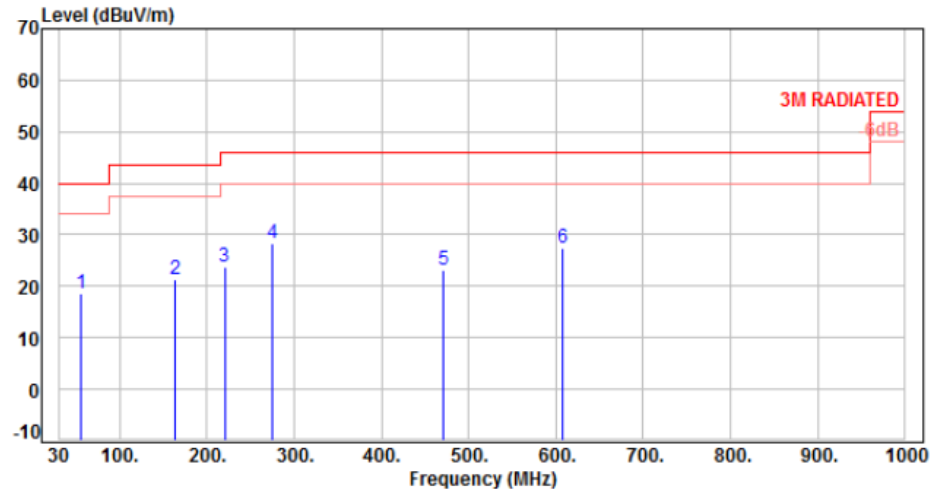
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	56.19	-9.56	28.11	18.55	40.00	-21.45	Peak	100	0	P
2	163.86	-9.50	30.79	21.29	43.50	-22.21	Peak	100	0	P
3	220.12	-11.93	35.73	23.80	46.00	-22.20	Peak	100	0	P
4	274.44	-9.21	37.56	28.35	46.00	-17.65	Peak	100	0	P
5	470.38	-4.10	27.35	23.25	46.00	-22.75	Peak	100	0	P
6	608.12	-0.93	28.42	27.49	46.00	-18.51	Peak	100	0	P

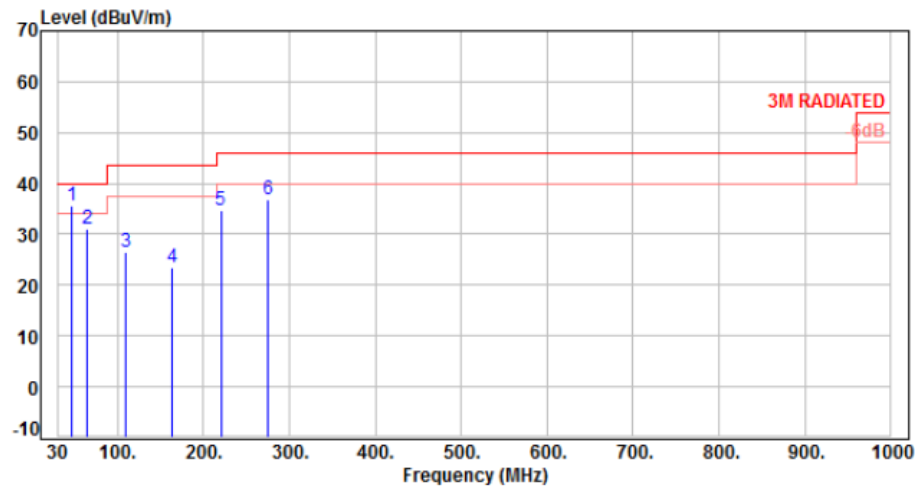
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 7		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	47.46	-9.30	44.90	35.60	40.00	-4.40	Peak	100	0	P
2	64.92	-10.68	41.60	30.92	40.00	-9.08	Peak	100	0	P
3	109.54	-12.50	39.11	26.61	43.50	-16.89	Peak	100	0	P
4	163.86	-9.50	33.01	23.51	43.50	-19.99	Peak	100	0	P
5	220.12	-11.93	46.79	34.86	46.00	-11.14	Peak	100	0	P
6	274.44	-9.21	46.08	36.87	46.00	-9.13	Peak	100	0	P

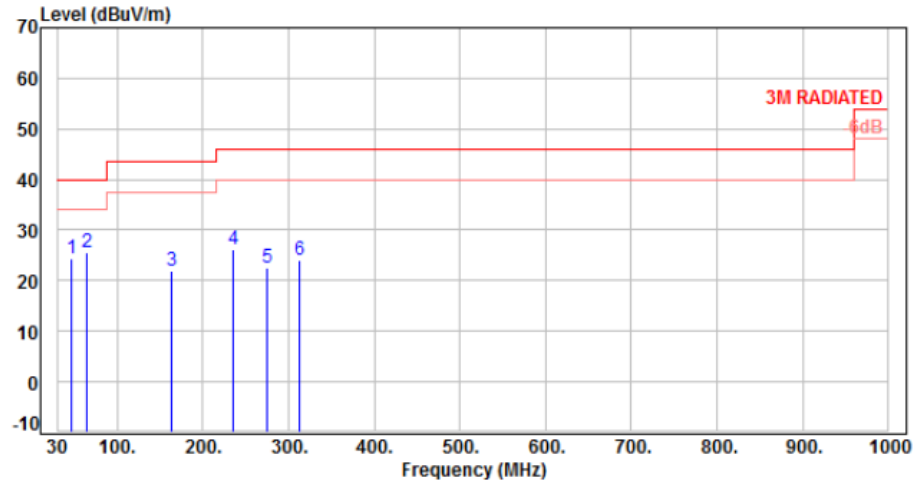
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 7		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	47.46	-9.30	33.68	24.38	40.00	-15.62	Peak	100	0	P
2	64.92	-10.68	36.23	25.55	40.00	-14.45	Peak	100	0	P
3	163.86	-9.50	31.36	21.86	43.50	-21.64	Peak	100	0	P
4	235.64	-10.78	36.93	26.15	46.00	-19.85	Peak	100	0	P
5	274.44	-9.21	31.67	22.46	46.00	-23.54	Peak	100	0	P
6	313.24	-8.11	32.23	24.12	46.00	-21.88	Peak	100	0	P

Note: Level=Reading+Factor

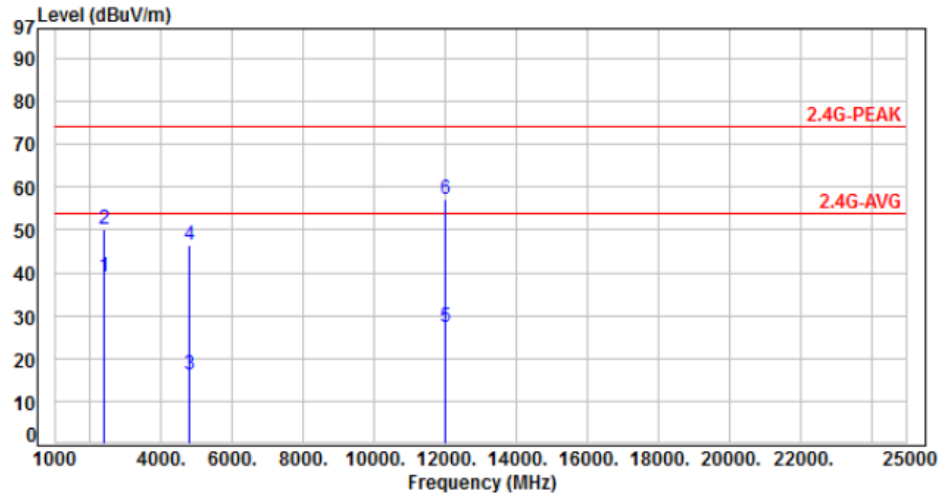
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



5.6. 輻射之測試結果及數據 (1GHz ~ 25GHz)

Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	42.56	38.92	54.00	-15.08	Average	100	212	P
2	2390.00	-3.64	53.81	50.17	74.00	-23.83	Peak	100	212	P
3	4804.00	3.65	12.72	16.37	54.00	-37.63	Average	100	264	P
4	4804.00	3.65	42.82	46.47	74.00	-27.53	Peak	100	264	P
5	12010.00	13.50	13.65	27.15	54.00	-26.85	Average	100	117	P
6	12010.00	13.50	43.75	57.25	74.00	-16.75	Peak	100	117	P

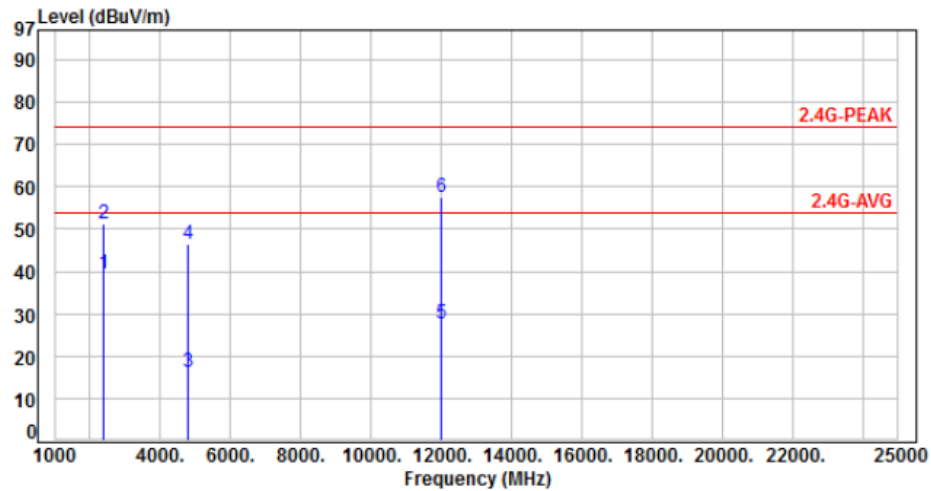
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	43.15	39.51	54.00	-14.49	Average	100	133	P
2	2390.00	-3.64	54.96	51.32	74.00	-22.68	Peak	100	133	P
3	4804.00	3.65	12.67	16.32	54.00	-37.68	Average	100	221	P
4	4804.00	3.65	42.77	46.42	74.00	-27.58	Peak	100	221	P
5	12010.00	13.50	13.98	27.48	54.00	-26.52	Average	100	314	P
6	12010.00	13.50	44.08	57.58	74.00	-16.42	Peak	100	314	P

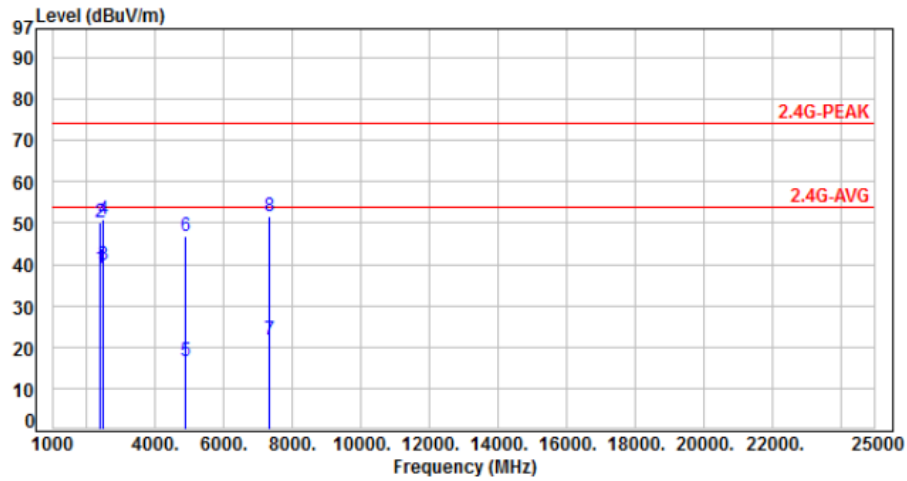
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	42.88	39.24	54.00	-14.76	Average	100	202	P
2	2390.00	-3.64	53.64	50.00	74.00	-24.00	Peak	100	202	P
3	2483.50	-3.30	42.95	39.65	54.00	-14.35	Average	100	202	P
4	2483.50	-3.30	54.15	50.85	74.00	-23.15	Peak	100	202	P
5	4882.00	3.97	12.60	16.57	54.00	-37.43	Average	100	254	P
6	4882.00	3.97	42.70	46.67	74.00	-27.33	Peak	100	254	P
7	7323.00	8.84	12.76	21.60	54.00	-32.40	Average	100	36	P
8	7323.00	8.84	42.86	51.70	74.00	-22.30	Peak	100	36	P

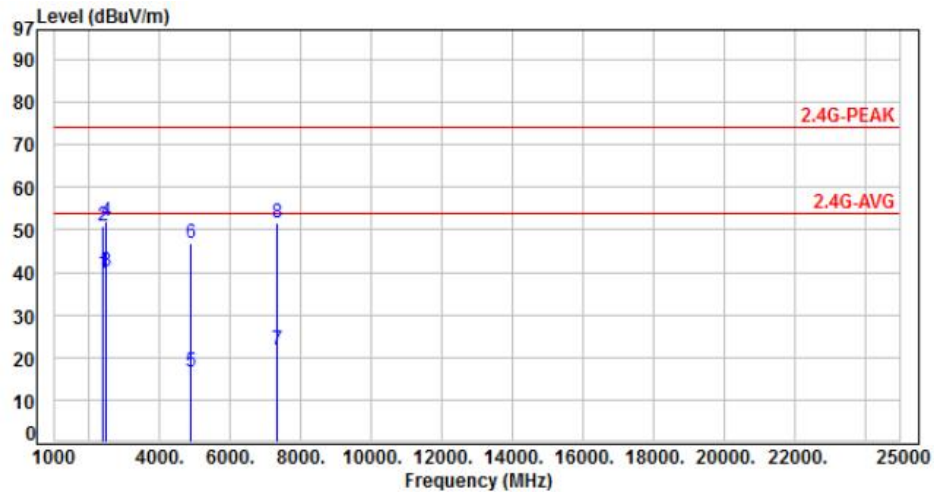
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	43.36	39.72	54.00	-14.28	Average	100	121	P
2	2390.00	-3.64	54.46	50.82	74.00	-23.18	Peak	100	121	P
3	2483.50	-3.30	43.59	40.29	54.00	-13.71	Average	100	121	P
4	2483.50	-3.30	55.35	52.05	74.00	-21.95	Peak	100	121	P
5	4882.00	3.97	12.78	16.75	54.00	-37.25	Average	100	208	P
6	4882.00	3.97	42.88	46.85	74.00	-27.15	Peak	100	208	P
7	7323.00	8.84	12.87	21.71	54.00	-32.29	Average	100	23	P
8	7323.00	8.84	42.97	51.81	74.00	-22.19	Peak	100	23	P

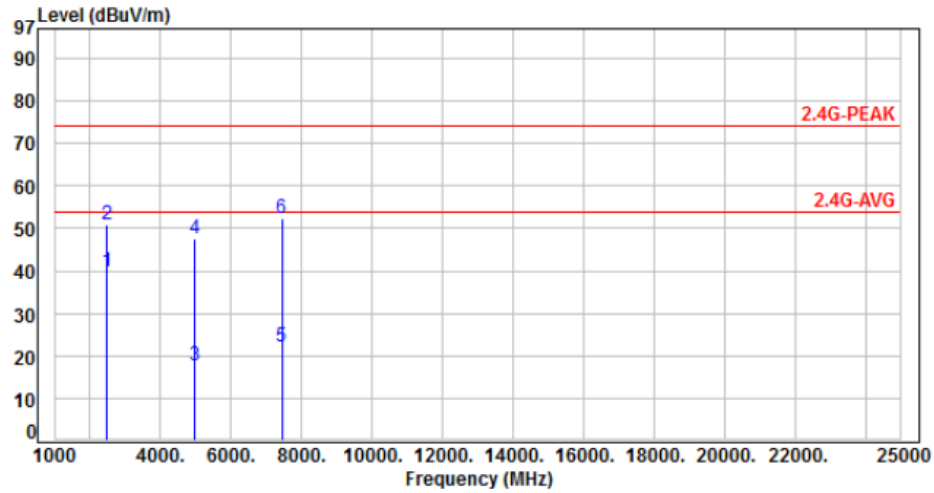
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH78		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-3.30	43.25	39.95	54.00	-14.05	Average	100	203	P
2	2483.50	-3.30	54.35	51.05	74.00	-22.95	Peak	100	203	P
3	4960.00	4.21	13.36	17.57	54.00	-36.43	Average	100	262	P
4	4960.00	4.21	43.46	47.67	74.00	-26.33	Peak	100	262	P
5	7440.00	8.98	13.16	22.14	54.00	-31.86	Average	100	12	P
6	7440.00	8.98	43.26	52.24	74.00	-21.76	Peak	100	12	P

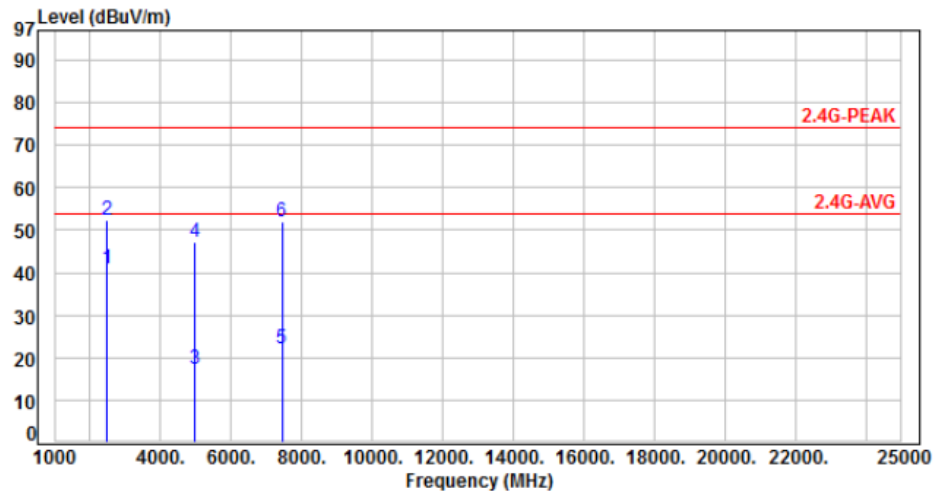
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH78		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-3.30	44.41	41.11	54.00	-12.89	Average	100	136	P
2	2483.50	-3.30	55.51	52.21	74.00	-21.79	Peak	100	136	P
3	4960.00	4.21	13.05	17.26	54.00	-36.74	Average	100	200	P
4	4960.00	4.21	43.15	47.36	74.00	-26.64	Peak	100	200	P
5	7440.00	8.98	13.01	21.99	54.00	-32.01	Average	100	8	P
6	7440.00	8.98	43.11	52.09	74.00	-21.91	Peak	100	8	P

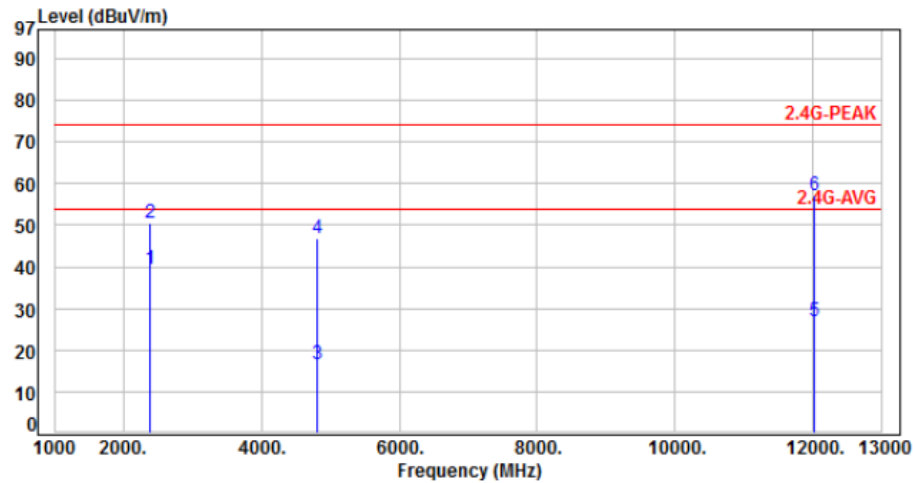
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	43.03	39.39	54.00	-14.61	Average	100	229	P
2	2390.00	-3.64	54.13	50.49	74.00	-23.51	Peak	100	229	P
3	4804.00	3.65	13.05	16.70	54.00	-37.30	Average	100	241	P
4	4804.00	3.65	43.15	46.80	74.00	-27.20	Peak	100	241	P
5	12010.00	13.50	13.42	26.92	54.00	-27.08	Average	100	128	P
6	12010.00	13.50	43.52	57.02	74.00	-16.98	Peak	100	128	P

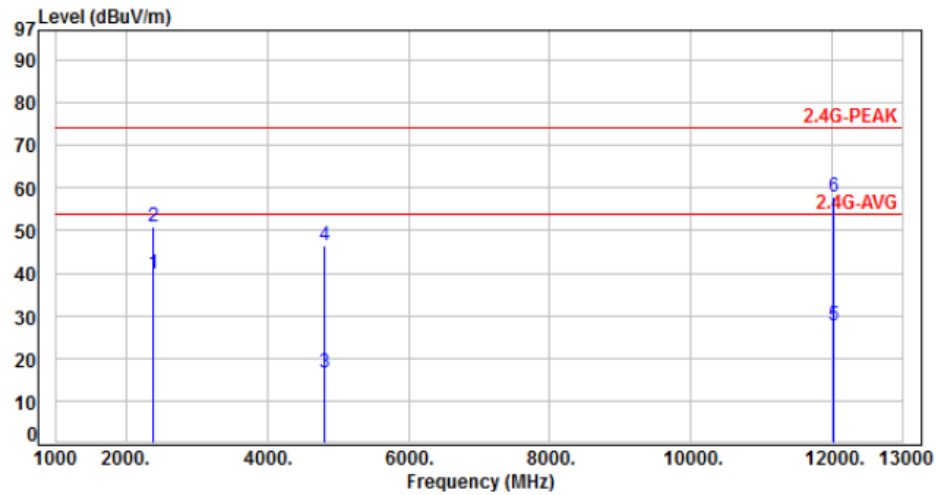
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	43.52	39.88	54.00	-14.12	Average	100	145	P
2	2390.00	-3.64	54.62	50.98	74.00	-23.02	Peak	100	145	P
3	4804.00	3.65	12.86	16.51	54.00	-37.49	Average	100	233	P
4	4804.00	3.65	42.96	46.61	74.00	-27.39	Peak	100	233	P
5	12010.00	13.50	14.25	27.75	54.00	-26.25	Average	100	233	P
6	12010.00	13.50	44.35	57.85	74.00	-16.15	Peak	100	233	P

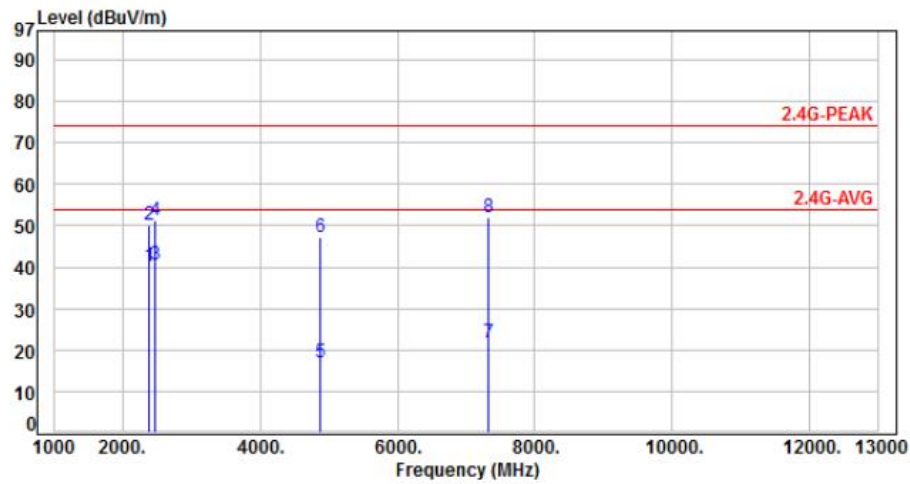
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	43.78	40.14	54.00	-13.86	Average	100	186	P
2	2390.00	-3.64	53.88	50.24	74.00	-23.76	Peak	100	186	P
3	2483.50	-3.30	43.83	40.53	54.00	-13.47	Average	100	186	P
4	2483.50	-3.30	54.63	51.33	74.00	-22.67	Peak	100	186	P
5	4882.00	3.97	12.99	16.96	54.00	-37.04	Average	100	239	P
6	4882.00	3.97	43.09	47.06	74.00	-26.94	Peak	100	239	P
7	7323.00	8.84	13.05	21.89	54.00	-32.11	Average	100	23	P
8	7323.00	8.84	43.15	51.99	74.00	-22.01	Peak	100	23	P

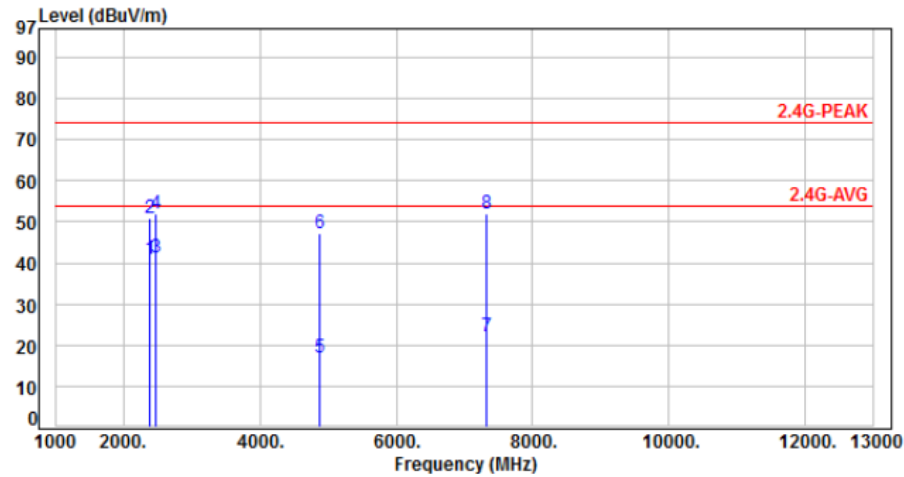
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.64	44.52	40.88	54.00	-13.12	Average	100	102	P
2	2390.00	-3.64	54.62	50.98	74.00	-23.02	Peak	100	102	P
3	2483.50	-3.30	44.76	41.46	54.00	-12.54	Average	100	102	P
4	2483.50	-3.30	55.15	51.85	74.00	-22.15	Peak	100	102	P
5	4882.00	3.97	13.17	17.14	54.00	-36.86	Average	100	215	P
6	4882.00	3.97	43.27	47.24	74.00	-26.76	Peak	100	215	P
7	7323.00	8.84	13.16	22.00	54.00	-32.00	Average	100	48	P
8	7323.00	8.84	43.26	52.10	74.00	-21.90	Peak	100	48	P

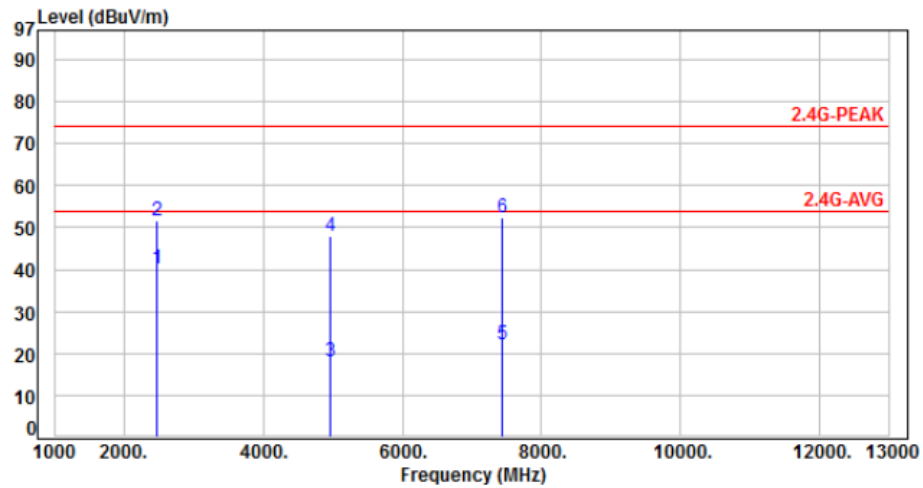
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH78		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-3.30	43.65	40.35	54.00	-13.65	Average	100	193	P
2	2483.50	-3.30	54.75	51.45	74.00	-22.55	Peak	100	193	P
3	4960.00	4.21	13.72	17.93	54.00	-36.07	Average	100	248	P
4	4960.00	4.21	43.82	48.03	74.00	-25.97	Peak	100	248	P
5	7440.00	8.98	13.32	22.30	54.00	-31.70	Average	100	64	P
6	7440.00	8.98	43.42	52.40	74.00	-21.60	Peak	100	64	P

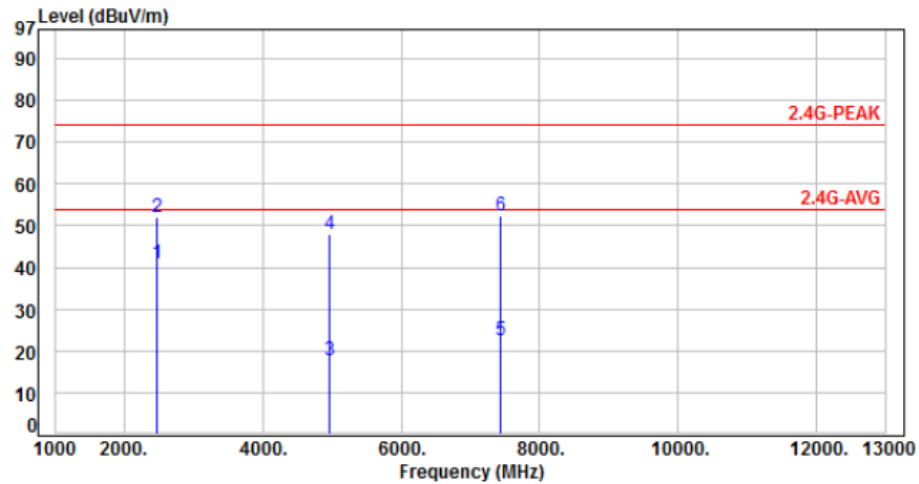
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH78		

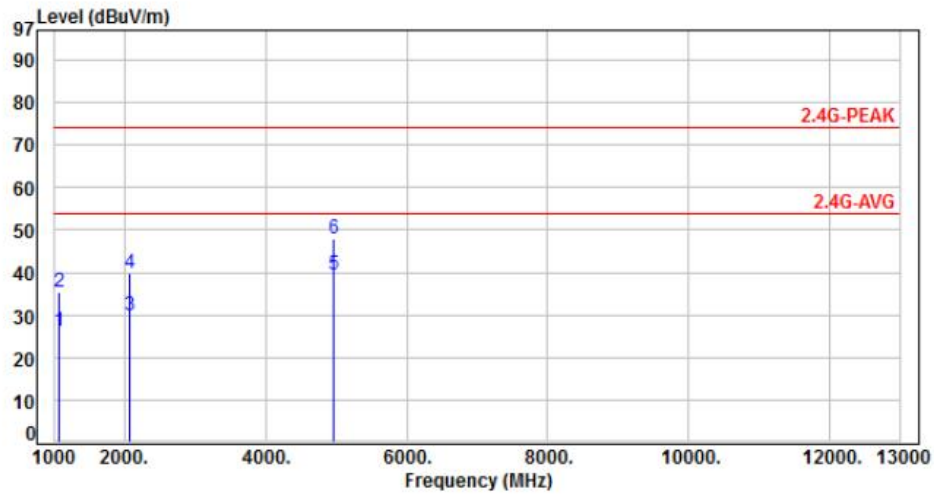


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-3.30	44.28	40.98	54.00	-13.02	Average	100	127	P
2	2483.50	-3.30	55.38	52.08	74.00	-21.92	Peak	100	127	P
3	4960.00	4.21	13.48	17.69	54.00	-36.31	Average	100	208	P
4	4960.00	4.21	43.58	47.79	74.00	-26.21	Peak	100	208	P
5	7440.00	8.98	13.37	22.35	54.00	-31.65	Average	100	356	P
6	7440.00	8.98	43.47	52.45	74.00	-21.55	Peak	100	356	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 6, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	36.31	26.18	54.00	-27.82	Average	100	170	P
2	1080.00	-10.13	45.68	35.55	74.00	-38.45	Peak	100	170	P
3	2073.00	-4.55	34.28	29.73	54.00	-24.27	Average	100	66	P
4	2073.00	-4.55	44.53	39.98	74.00	-34.02	Peak	100	66	P
5	4958.00	4.20	35.42	39.62	54.00	-14.38	Average	100	269	P
6	4958.00	4.20	43.63	47.83	74.00	-26.17	Peak	100	272	P

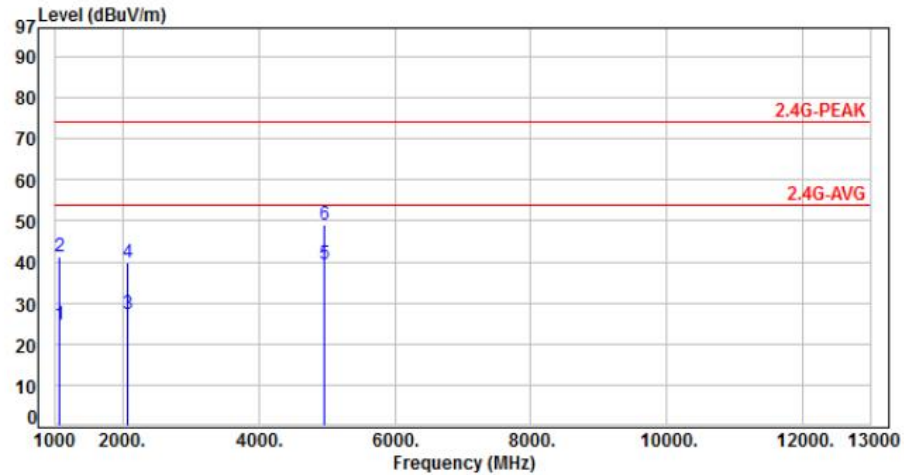
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6, CH00		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	34.68	24.55	54.00	-29.45	Average	100	308	P
2	1080.00	-10.13	51.53	41.40	74.00	-32.60	Peak	100	308	P
3	2073.00	-4.55	31.81	27.26	54.00	-26.74	Average	100	59	P
4	2073.00	-4.55	44.37	39.82	74.00	-34.18	Peak	100	64	P
5	4958.00	4.20	35.32	39.52	54.00	-14.48	Average	100	211	P
6	4958.00	4.20	44.71	48.91	74.00	-25.09	Peak	100	203	P

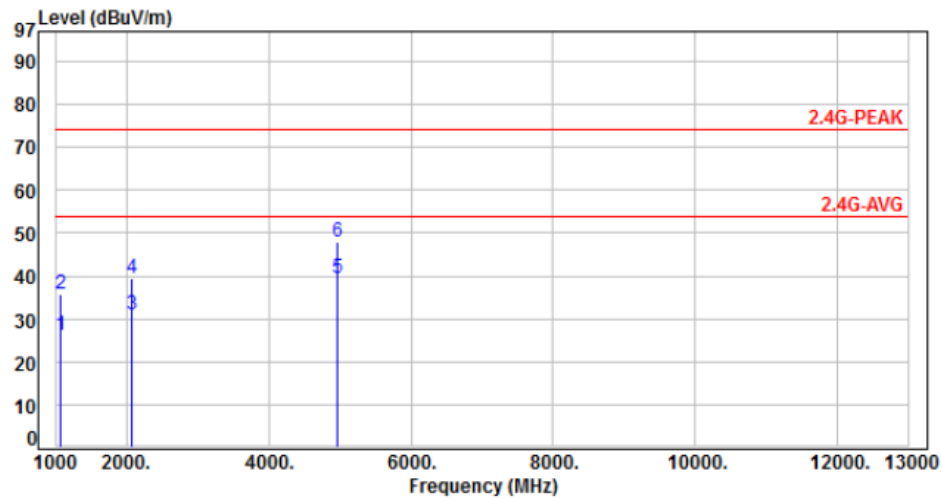
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 6, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	36.48	26.35	54.00	-27.65	Average	100	175	P
2	1080.00	-10.13	45.95	35.82	74.00	-38.18	Peak	100	175	P
3	2073.00	-4.55	35.71	31.16	54.00	-22.84	Average	100	46	P
4	2073.00	-4.55	44.19	39.64	74.00	-34.36	Peak	100	46	P
5	4958.00	4.20	35.21	39.41	54.00	-14.59	Average	100	272	P
6	4958.00	4.20	43.80	48.00	74.00	-26.00	Peak	100	272	P

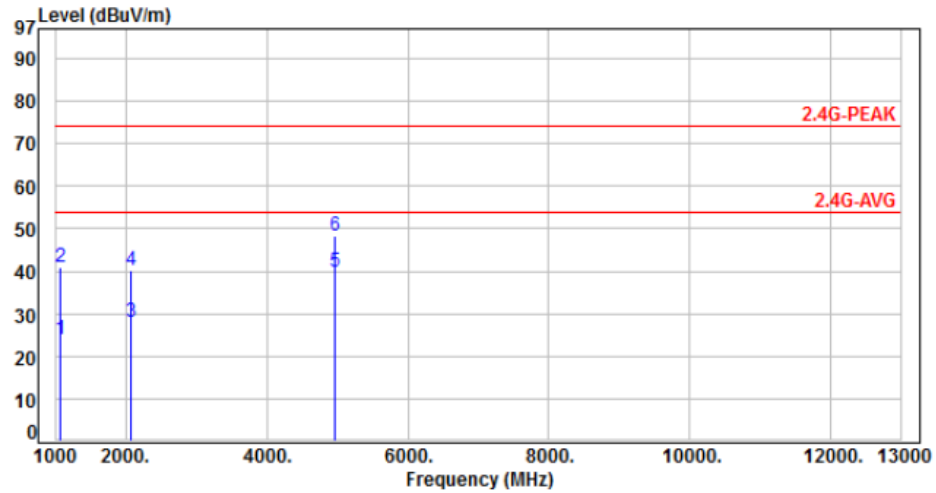
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6, CH39		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	34.17	24.04	54.00	-29.96	Average	100	310	P
2	1080.00	-10.13	51.24	41.11	74.00	-32.89	Peak	100	310	P
3	2073.00	-4.55	32.41	27.86	54.00	-26.14	Average	100	70	P
4	2073.00	-4.55	44.72	40.17	74.00	-33.83	Peak	100	64	P
5	4958.00	4.20	35.45	39.65	54.00	-14.35	Average	100	198	P
6	4958.00	4.20	44.12	48.32	74.00	-25.68	Peak	100	198	P

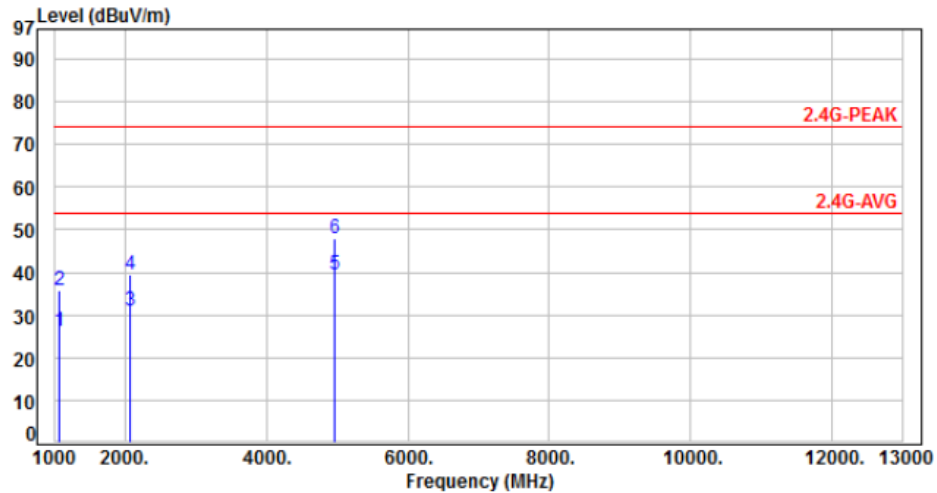
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: VERTICAL
Test Mode	: Mode 6, CH78		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	36.48	26.35	54.00	-27.65	Average	100	175	P
2	1080.00	-10.13	45.95	35.82	74.00	-38.18	Peak	100	175	P
3	2073.00	-4.55	35.71	31.16	54.00	-22.84	Average	100	46	P
4	2073.00	-4.55	44.19	39.64	74.00	-34.36	Peak	100	46	P
5	4958.00	4.20	35.21	39.41	54.00	-14.59	Average	100	272	P
6	4958.00	4.20	43.80	48.00	74.00	-26.00	Peak	100	272	P

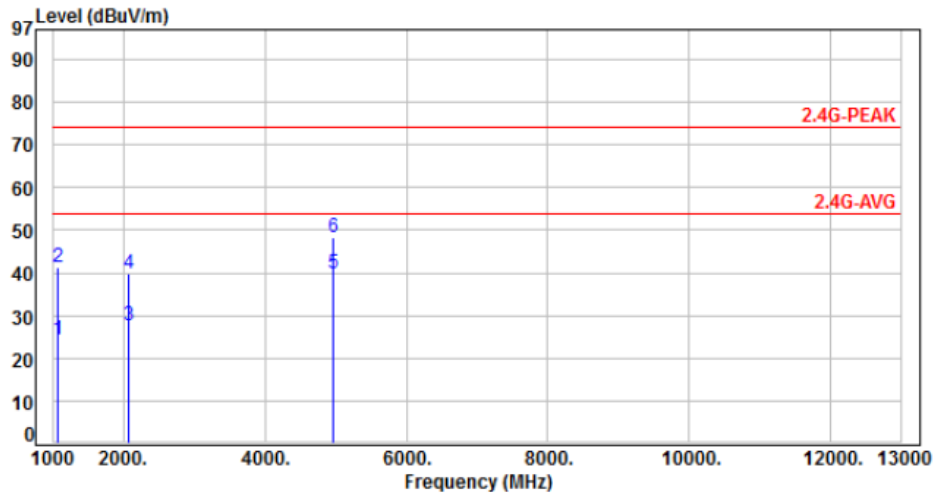
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V / 60Hz	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6, CH78		



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1080.00	-10.13	34.36	24.23	54.00	-29.77	Average	100	315	P
2	1080.00	-10.13	51.40	41.27	74.00	-32.73	Peak	100	315	P
3	2073.00	-4.55	32.16	27.61	54.00	-26.39	Average	100	64	P
4	2073.00	-4.55	44.26	39.71	74.00	-34.29	Peak	100	64	P
5	4958.00	4.20	35.70	39.90	54.00	-14.10	Average	100	203	P
6	4958.00	4.20	44.18	48.38	74.00	-25.62	Peak	100	203	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



6. 20dB 頻寬之規定

6.1. 適用標準

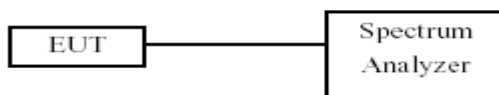
對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(1)(A)規定，載波頻率頻道間隔不得低於 25 千赫 (kHz)或跳頻頻道之 20dB 頻寬，兩者取較寬者。

但操作頻率為 2400-2483.5 兆赫(MHz)頻帶且輸出功率不大於 125 毫瓦(mW)跳頻系統，其載波頻率頻道間隔不得小於 25 千赫 (kHz)或跳頻頻道 20dB 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，且應隨所發射之信號同步偏移接收頻率。

6.2. 測試方法

- 將待測物和儀器相連接。
- 設定儀器解析頻寬 30KHz 和視訊頻寬為 100 KHz。
- 量測峰值減去 20 dB 之頻寬並記錄於報告中。

6.3. 測試配置



6.4. 20dB 頻寬之測試結果及數據

Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (MHz)	2/3 20dB Bandwidth (MHz)
GFSK	0	2402	0.970	0.647
	39	2441	0.970	0.647
	78	2480	0.960	0.640
$\pi/4$ -DQPSK	0	2402	1.290	0.860
	39	2441	1.300	0.867
	78	2480	1.300	0.867
8DPSK	0	2402	1.310	0.873
	39	2441	1.300	0.867
	78	2480	1.310	0.873

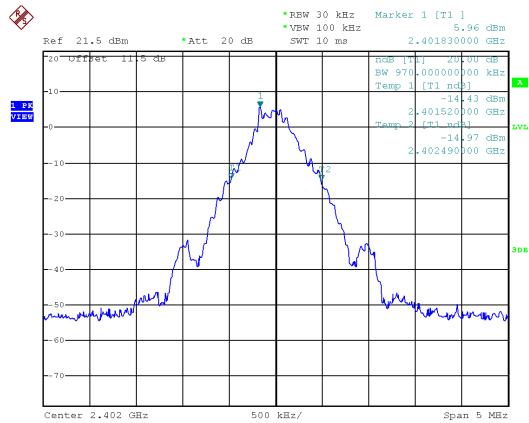
備註：繪圖資料請參考下頁。

6.5. 結果判定

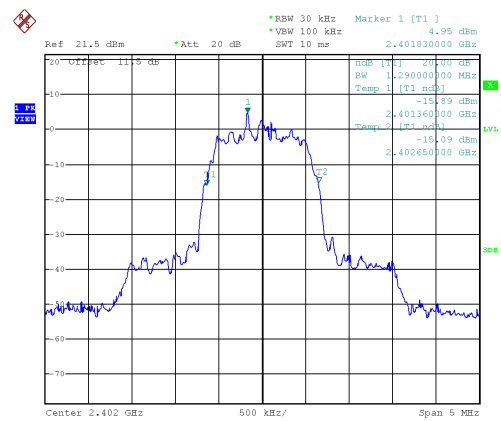
高、中、低頻段的 20dB 頻寬皆大於 25 KHz，合乎標準規定。



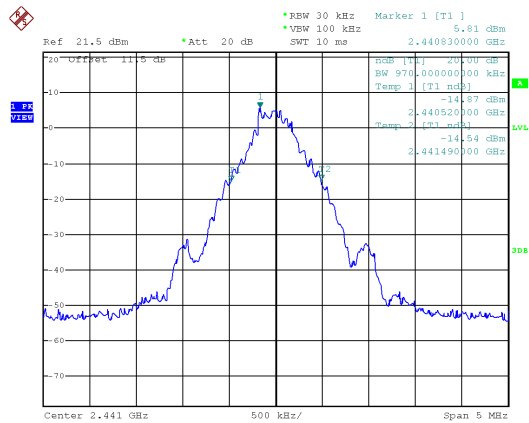
Modulation Type: GFSK (1Mbps)
Channel: 00



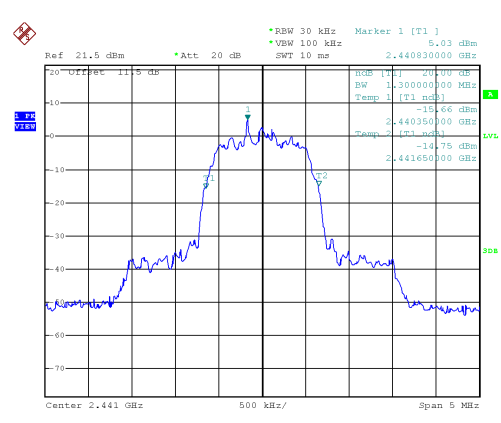
Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 00



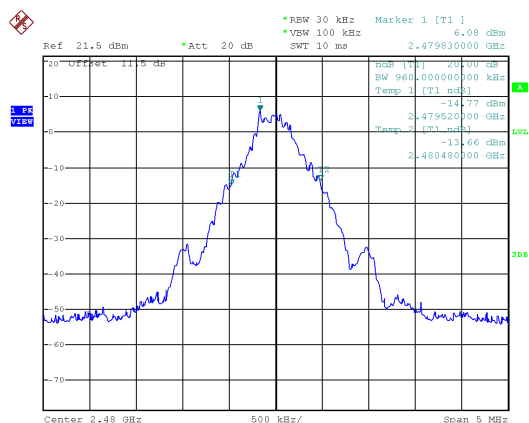
CH39



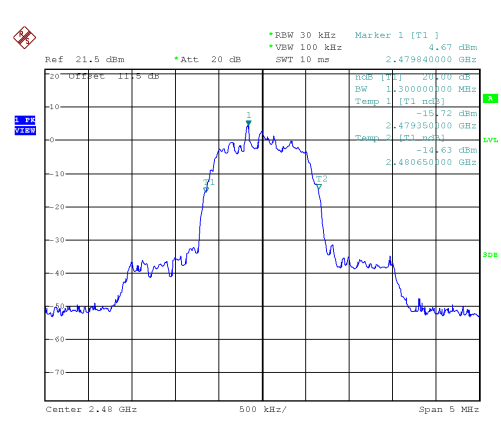
CH39



CH78



CH78





Ref 21.5 dBm Att 20 dB SWT 10 ms

Marker 1 [T1] 2.89 dBm 2.401840000 GHz

dBm [dB] 20.000 dB
BW 1.310000000 MHz
Temp 1 [T1] mHz
-13.85 dBm
2.401340000 GHz
Temp 2 [T2] mHz
-17.20 dBm
2.402650000 GHz

Center 2.402 GHz 500 kHz/ Span 5 MHz

Ref 21.5 dBm Att 20 dB SWT 10 ms 2.440830000 GHz

20 Offset 11.5 dB

10

0

-10

-20

-30

-40

-50

-60

-70

Center 2.441 GHz 500 kHz/ Span 5 MHz

Marker 1 [T1] 3.83 dBm
BW 1.300000000 MHz
Temp 1 [T1 mdB] -13.00 dBm
2.440340000 GHz
Temp 2 [T2 mdB] -16.22 dBm
2.441640000 GHz

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[illegible]



7. 頻道間隔之規定

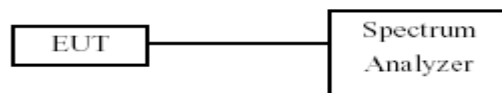
7.1. 適用標準

對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(1)(A)規定，跳頻系統之載波頻率頻道間隔應大於或等於 25 千赫 (kHz)或跳頻頻道之 20 分貝(dB) 頻寬，兩者取較寬者。但操作頻率為 2400MHz~2483.5MHz 頻段且輸出功率小於或等於 125 毫瓦(mW)跳頻系統，其載波頻率頻道間隔不得小於 25 千赫 (kHz)或跳頻頻道 20 分貝(dB)頻寬之三分之二，兩者取較寬者。

7.2. 測試方法

- 將待測物和儀器相連接。
- 設定儀器解析頻寬 100KHz 和視訊頻寬為 300 KHz。
- 量測頻率間隔並記錄於報告中。

7.3. 測試配置



7.4. 頻道間隔之測試結果及數據

Modulation Type	Channel	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
GFSK	0	2402	1.002	0.647
	39	2441	1.002	0.647
	78	2480	1.002	0.640
$\pi/4$ -DQPSK	0	2402	1.002	0.860
	39	2441	1.002	0.867
	78	2480	1.002	0.867
8DPSK	0	2402	1.002	0.873
	39	2441	1.002	0.867
	78	2480	1.002	0.873

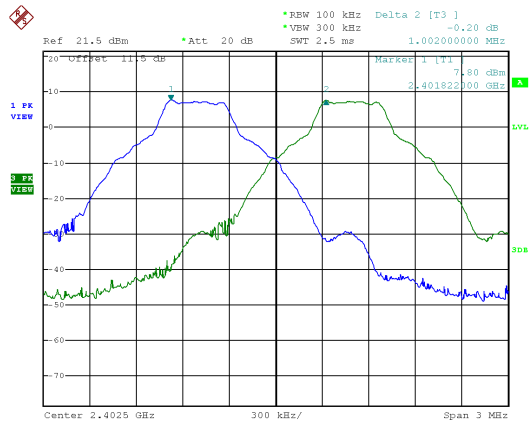
備註：繪圖資料請參考下頁。

7.5. 結果判定

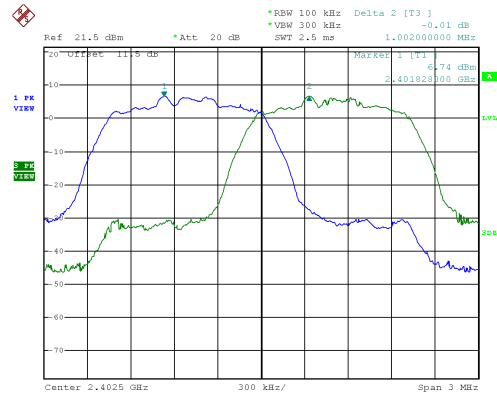
高、中、低頻段的頻道間隔皆大於 25 KHz，合乎標準規定。



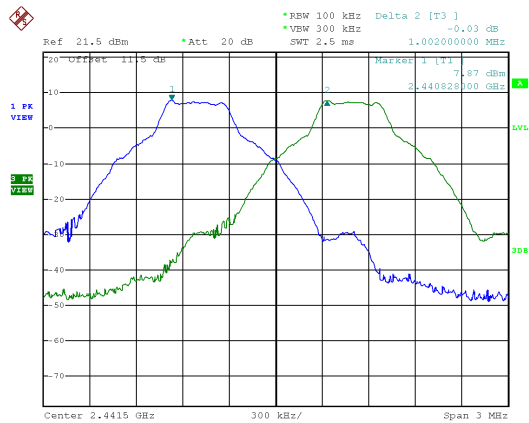
Modulation Type: GFSK (1Mbps)
Channel: 00



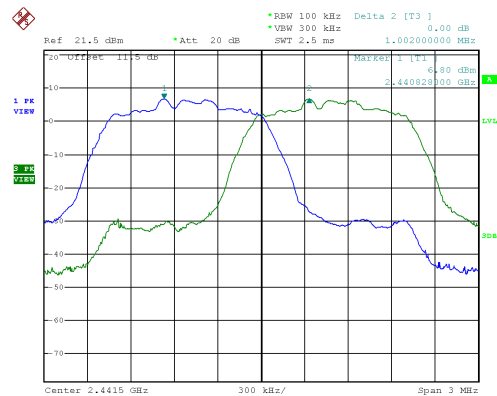
Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 00



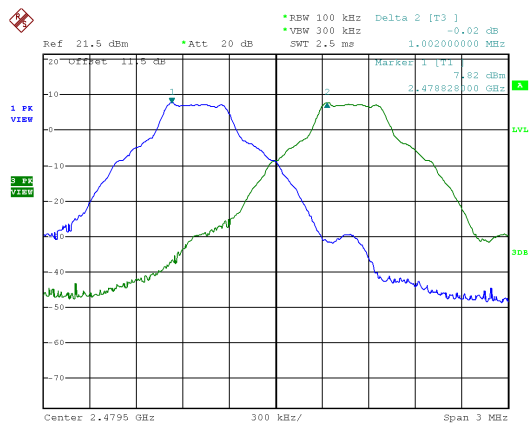
CH39



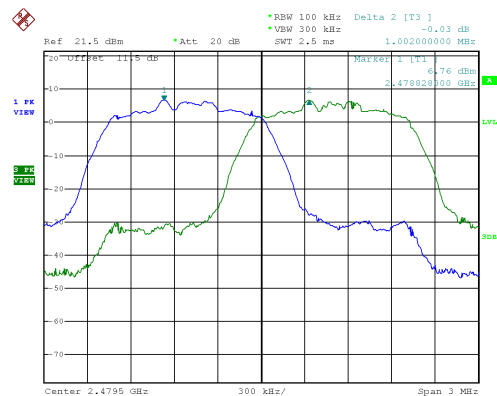
CH39



CH78

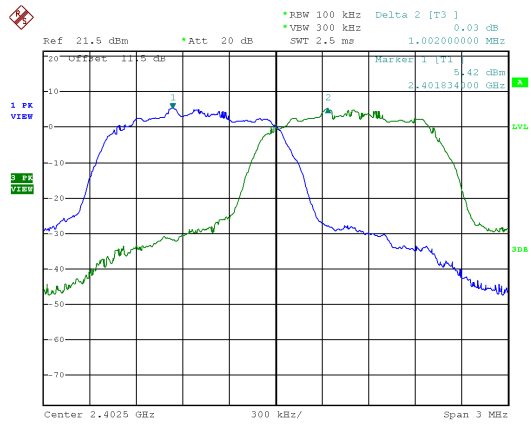


CH78

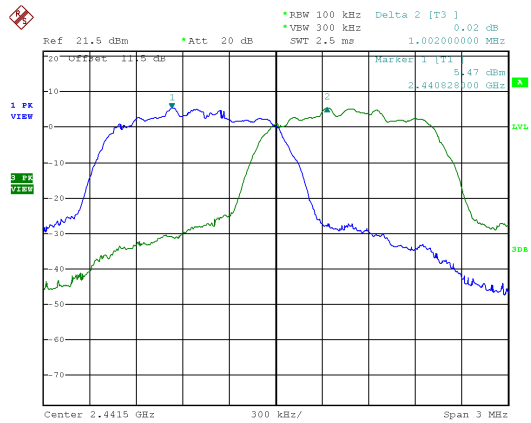




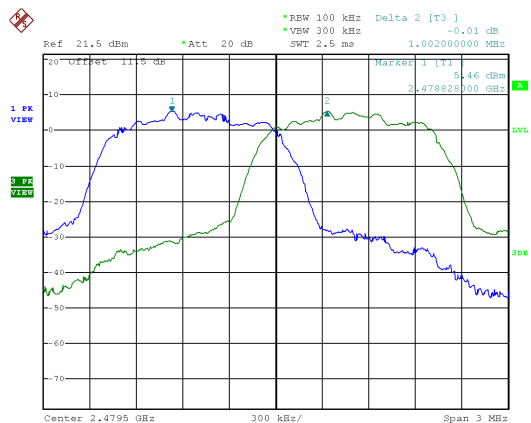
Modulation Type: 8DPSK (3Mbps)
Channel: 00



CH39



CH78





8. 頻率佔用時間之規定

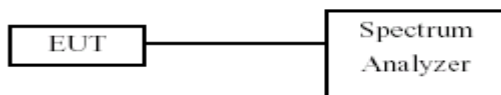
8.1. 適用標準

對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(1)(A)(a)規定，操作於 2400MHz~2483.5MHz 之展頻跳頻系統，須使用至少 15 個無重疊的頻道，在 0.4 秒乘以跳頻頻道數之週期內，任一頻率佔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。

8.2. 測試方法

- 將待測物和儀器相連接。
- 設定儀器解析頻寬和視訊頻寬為 1MHz。
- 量測頻率佔用時間並記錄於報告中。

8.3. 測試配置





8.4. 頻率佔用時間之測試結果及數據

ANSI 63.10-2014 7.8.4 Time of occupancy (dwell time)

Channel	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 31.6 (79 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
GFSK-DH1	2402	0.420	320.10	134.44	400
GFSK-DH3	2402	1.720	159.90	275.03	400
GFSK-DH5	2402	2.960	106.81	316.16	400
$\pi/4$ -DQPSK-DH1	2402	0.440	320.10	140.84	400
$\pi/4$ -DQPSK-DH3	2402	1.740	159.90	278.23	400
$\pi/4$ -DQPSK-DH5	2402	2.960	106.81	316.16	400
8DPSK-DH1	2402	0.440	320.10	140.84	400
8DPSK-DH3	2402	1.720	159.90	275.03	400
8DPSK-DH5	2402	2.960	106.81	316.16	400

Channel	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 8 (20 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
AFH-DH1	2402-2421	0.420	160.00	67.20	400
AFH-DH3	2402-2421	1.720	80.00	137.60	400
AFH-DH5	2402-2421	2.960	53.33	157.86	400

備註：繪圖資料請參考下頁。

DH1 模式:

本系統每秒跳頻 1600 次，故每次跳頻時間 $1/1600=0.625\text{ms}$ 。而每個 package 需要 1 次發射及 1 次接收，故每秒於 79 個頻道中只發射 800 次，平均每秒每個頻道之發射次數為 $800/79=10.13$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $10.13 \times 31.6 = 320.1$ 次。

DH3 模式:

本系統每秒跳頻 1600 次，故每次跳頻時間 $1/1600=0.625\text{ms}$ 。而每個 package 需要 3 次發射及 1 次接收，故每秒於 79 個頻道中只發射 400 次，平均每秒每個頻道之發射次數為 $400/79=5.06$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $5.06 \times 31.6 = 159.9$ 次。

DH5 模式:

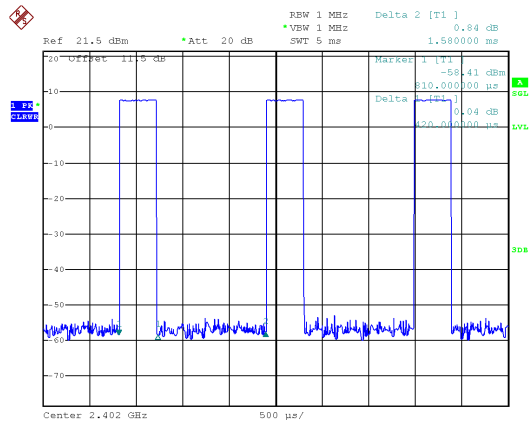
本系統每秒跳頻 1600 次，故每次跳頻時間 $1/1600=0.625\text{ms}$ 。而每個 package 需要 5 次發射及 1 次接收，故每秒於 79 個頻道中只發射 266.7 次，平均每秒每個頻道之發射次數為 $266.7/79=3.38$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $3.38 \times 31.6 = 106.81$ 次。

8.5. 結果判定

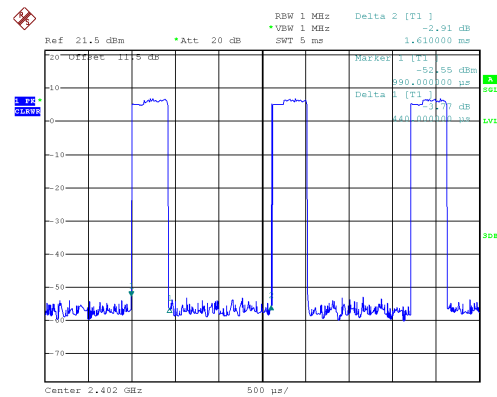
高、中、低頻段的頻率佔用時間皆小於 0.4 秒，合乎標準規定。



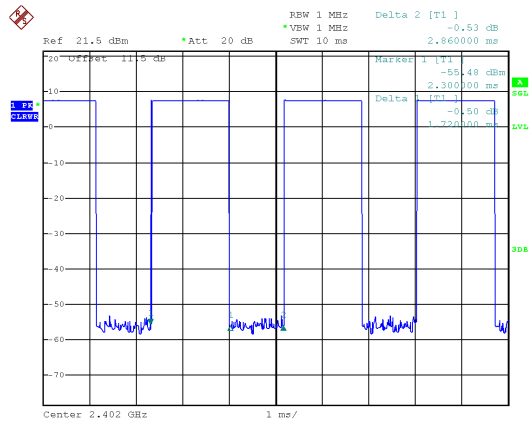
Modulation Type: GFSK (DH1)
Channel: 00



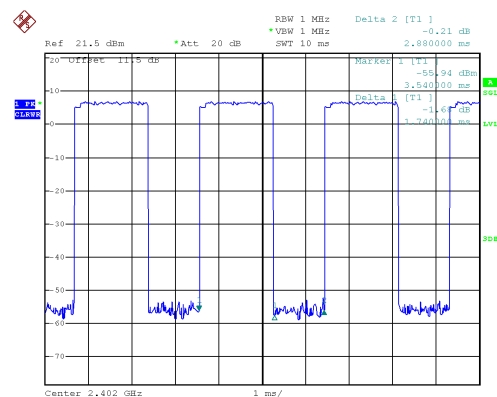
Modulation Type: $\pi/4$ -DQPSK (DH1)
Channel: 00



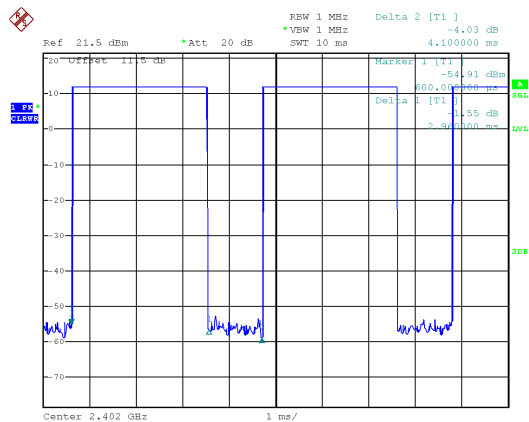
Modulation Type: GFSK (DH3)
Channel: 39



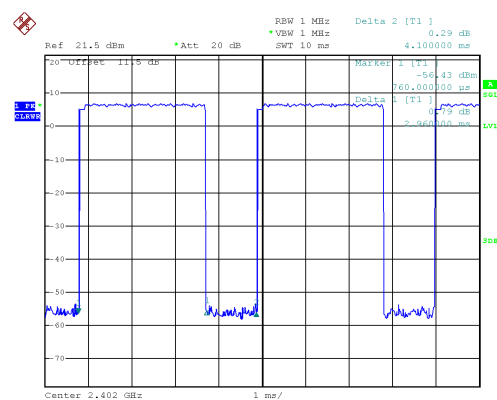
Modulation Type: $\pi/4$ -DQPSK (DH3)
Channel: 39



Modulation Type: GFSK (DH5)
Channel: 78

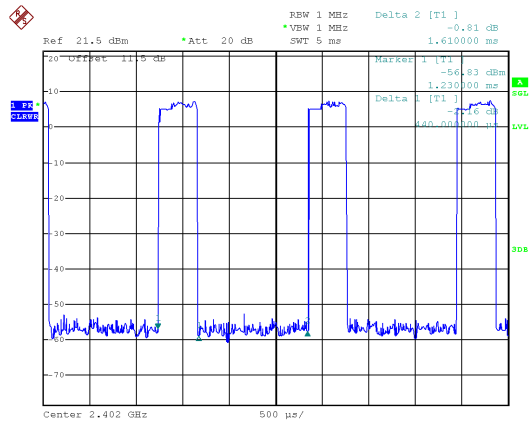


Modulation Type: $\pi/4$ -DQPSK (DH5)
Channel: 78

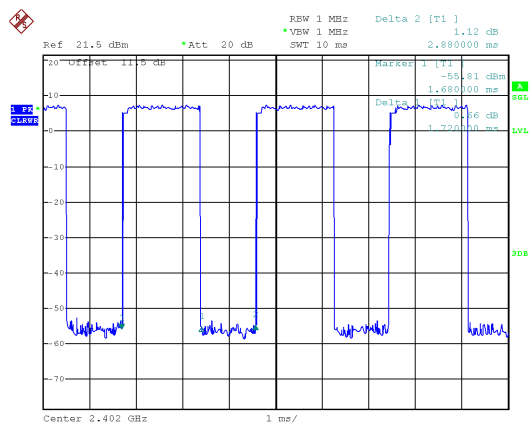




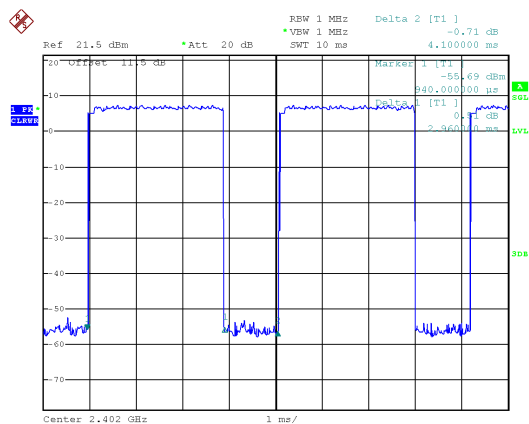
Modulation Type: 8DPSK (DH1)
Channel: 00



Modulation Type: 8DPSK (DH3)
Channel: 39

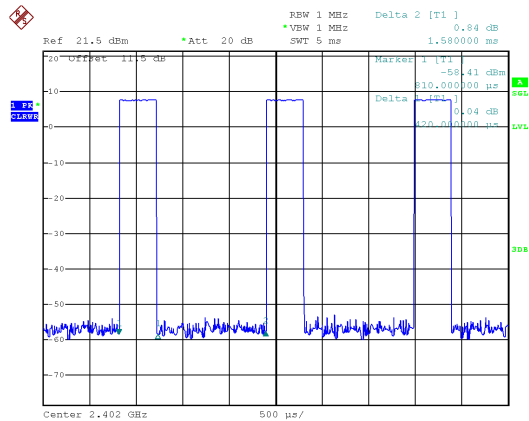


Modulation Type: 8DPSK (DH5)
Channel: 78

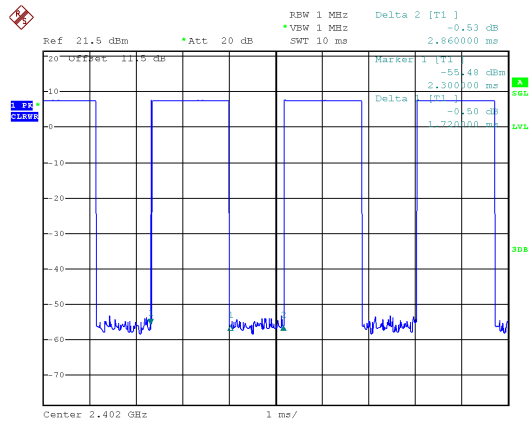




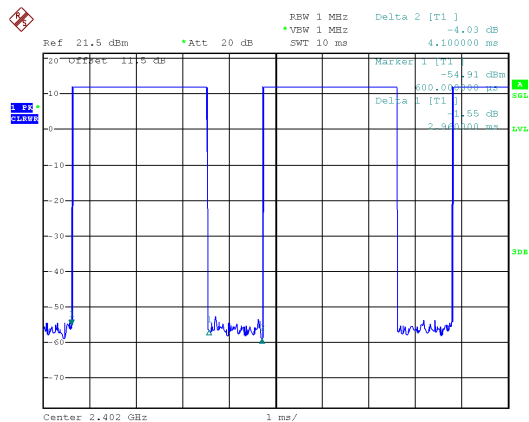
AFH Mode
Modulation Type: GFSK (DH1)
Channel: 00



Modulation Type: GFSK (DH3)
Channel: 39



Modulation Type: GFSK (DH5)
Channel: 78





9. 跳頻頻道使用數量之規定

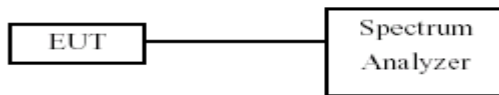
9.1. 適用標準

對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(1)(A)(a)規定，須使用至少 15 個無重疊的頻道。

9.2. 測試方法

- 將待測物和儀器相連接。
- 設定儀器解析頻寬 100KHz 和視訊頻寬為 300 KHz。
- 將待測物設定於跳頻模式，並記錄每個頻道之所有訊號。

9.3. 測試配置



9.4. 跳頻頻道使用數量之測試結果及數據

Modulation Type	Hopping Channels
GFSK	79
$\pi/4$ -DQPSK	79
8DPSK	79

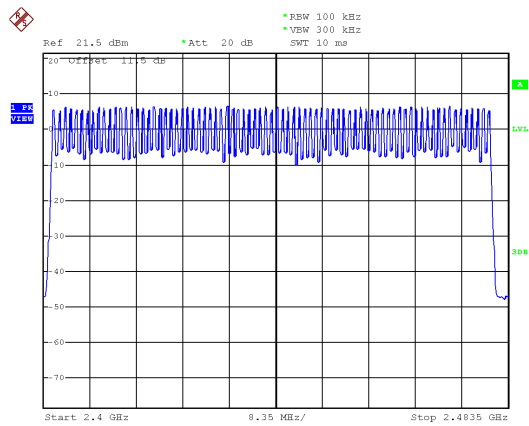
備註：繪圖資料請參考下頁。

9.5. 結果判定

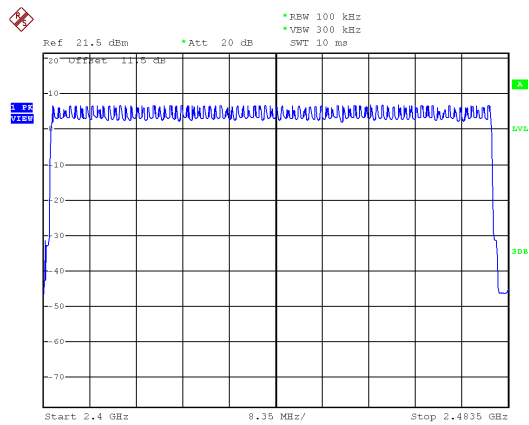
高、中、低頻段的跳頻頻道使用數量皆多於 15 個無重疊的頻道，合乎標準規定。



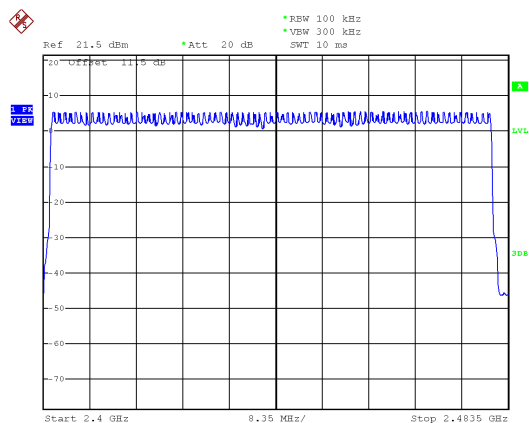
Modulation Type: GFSK (1Mbps)



Modulation Type: $\pi/4$ -DQPSK (2Mbps)



Modulation Type: 8DPSK (3Mbps)





10. 峰值輸出功率之規定

10.1. 適用標準

對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.2 節之(1)規定，操作於 2400MHz~2483.5MHz 者，

(A)：至少使用 75 個跳頻頻道之跳頻系統：1W(含)以下。

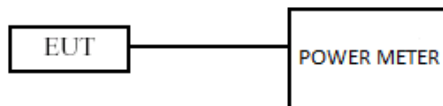
(B)：除(A)外，依 3.10.1.6(A)(a)之跳頻系統：0.125 瓦(W)(含)以下。

(C)：數位調變技術系統：1W(含)以下。

10.2. 測試方法

- a. 將待測物和儀器相連接。
- b. 量測輸出功率並記錄於報告中。

10.3. 測試配置



**10.4. 峰值輸出功率之測試結果及數據**

Modulation Type	Setting	Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)
GFSK	0x04	0	2402	7.42	5.521
	0x04	39	2441	7.46	5.572
	0x04	78	2480	7.48	5.598
$\pi/4$ -DQPSK	0x06	0	2402	7.19	5.236
	0x06	39	2441	7.22	5.272
	0x06	78	2480	7.29	5.358
8DPSK	0x06	0	2402	7.96	6.252
	0x06	39	2441	8.02	6.339
	0x06	78	2480	8.04	6.368

Modulation Type	Setting	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	0x04	0	2402	7.33	5.408
	0x04	39	2441	7.38	5.470
	0x04	78	2480	7.41	5.508
$\pi/4$ -DQPSK	0x06	0	2402	4.66	2.924
	0x06	39	2441	4.75	2.985
	0x06	78	2480	4.90	3.090
8DPSK	0x06	0	2402	4.89	3.083
	0x06	39	2441	4.94	3.119
	0x06	78	2480	4.97	3.141

備註：Average power is for reference only.

AFH Mode

Modulation Type	Setting	Channel	Frequency (MHz)	PK Output Power (dBm)	PK Output Power (mW)
GFSK	0x04	0-19	2402-2421	7.44	5.546
$\pi/4$ -DQPSK	0x06	0-19	2402-2421	7.21	5.260
8DPSK	0x06	0-19	2402-2421	7.99	6.295

AFH Mode

Modulation Type	Setting	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	0x04	0-19	2402-2421	7.35	5.433
$\pi/4$ -DQPSK	0x06	0-19	2402-2421	4.72	2.965
8DPSK	0x06	0-19	2402-2421	4.91	3.097

備註：Average power is for reference only.

繪圖資料請參考下頁。

10.5. 結果判定

高、中、低頻段的峰值輸出功率皆低於 30 dBm，合乎標準規定。



11. 混附波發射限制之規定

11.1. 適用方法

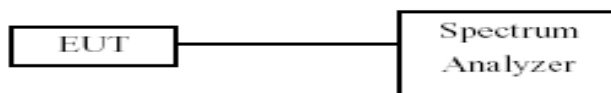
對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.5 節之規定，操作頻帶範圍外之任意 100 千赫(kHz)內，發射機所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫(kHz)內的射頻功率，其衰減值限制如下：

- (1) 輸出功率以附件二峰值輸出功率方式測量者，至少須衰減 20 分貝(dB)，可使用射頻傳導或輻射方式測量。
 - (2) 輸出功率以 3.10.1.2(1)(C)之最大傳導輸出功率測量方式者，至少須衰減 30 分貝(dB)。
- 此外，落於第 2.7 節禁用頻段之輻射發射，應符合第 2.8 節之規定。

11.2. 測試方法

1. 將待測物和儀器相連接。
2. 設定儀器解析頻寬 100KHz 和視訊頻寬為 300 KHz。
3. 將頻寬展開至 100 MHz。
4. 量測並記錄於報告中。

11.3. 測試配置



11.4. 結果判定

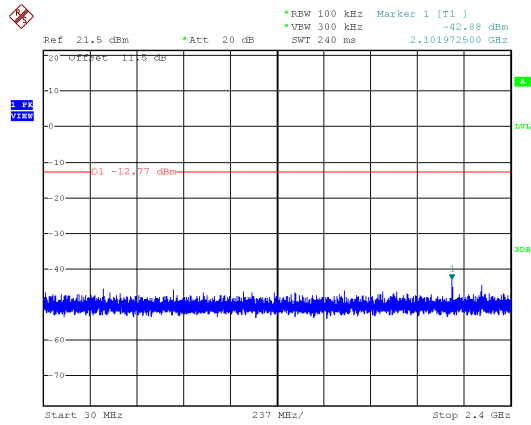
- 下邊緣頻帶：距下頻帶邊緣 40MHz 內最大混附波比主波低 20dB 以上，合乎標準規定。
- 上邊緣頻帶：距上頻帶邊緣 40MHz 內最大混附波比主波低 20dB 以上，合乎標準規定。



11.5. 混附波發射限制之測試結果及數據

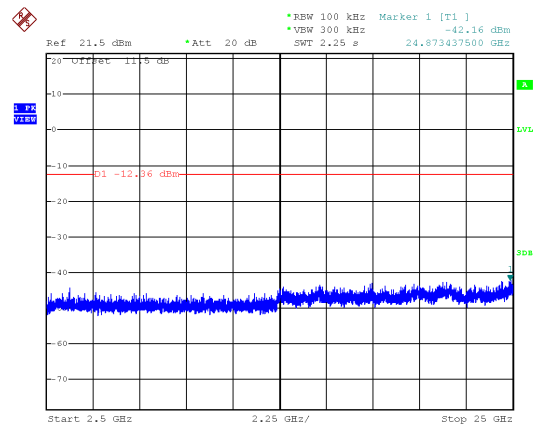
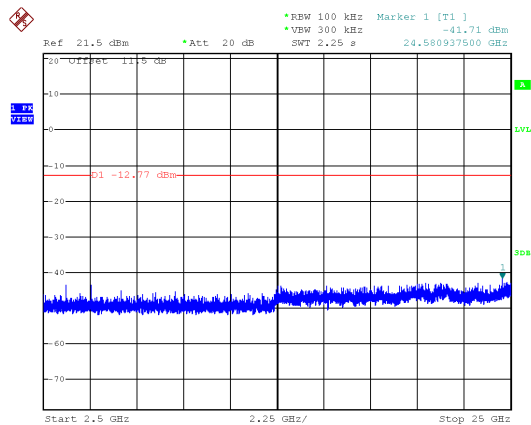
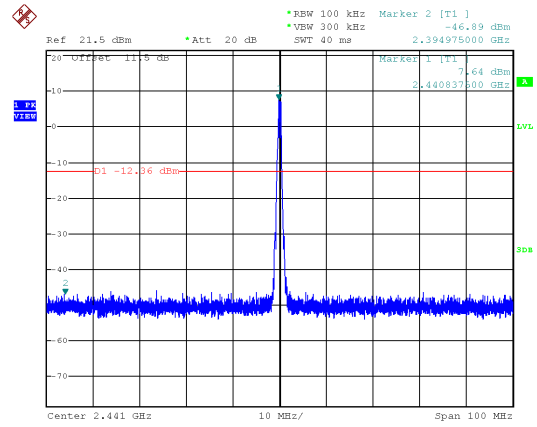
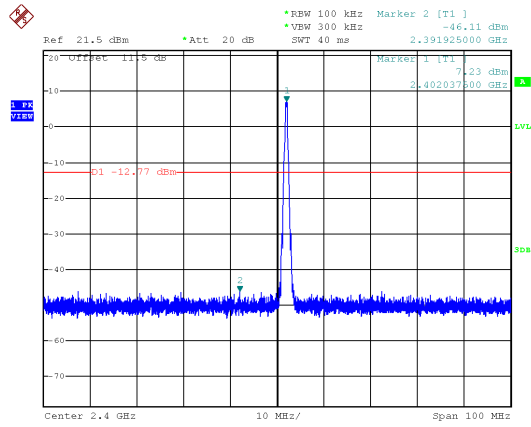
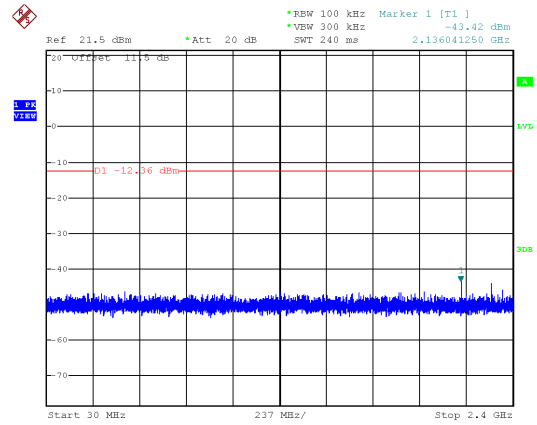
Modulation Type: GFSK (1Mbps)

Channel: 00



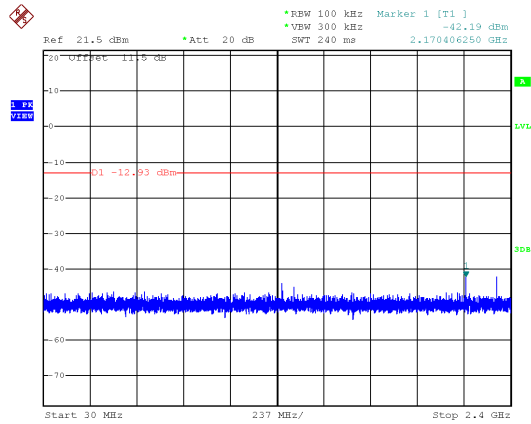
Modulation Type: GFSK (1Mbps)

Channel: 39

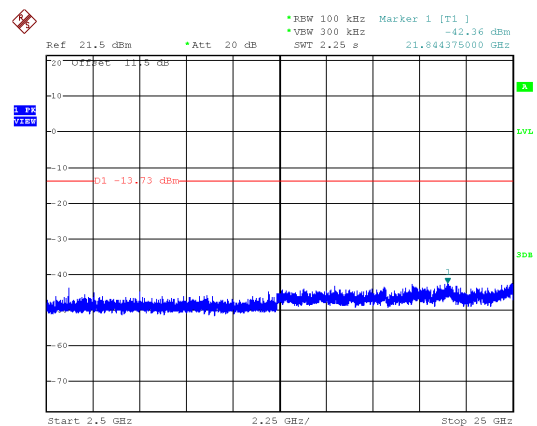
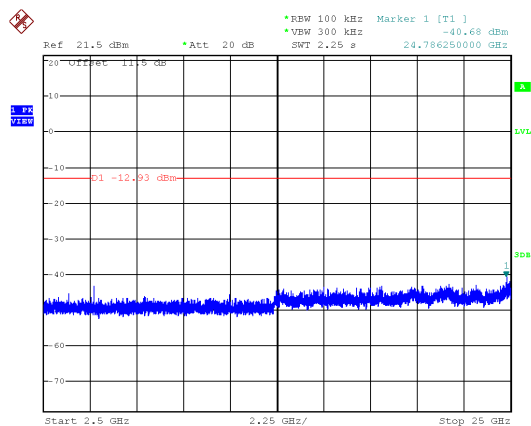
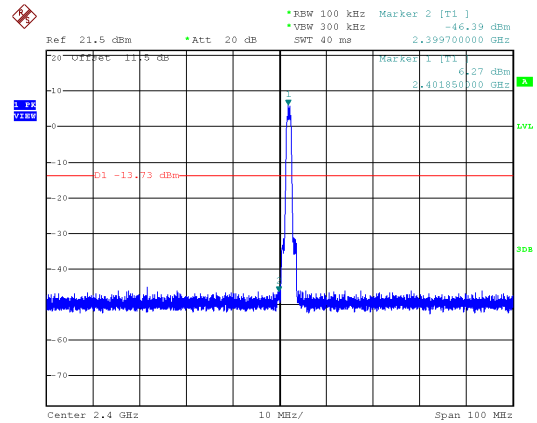
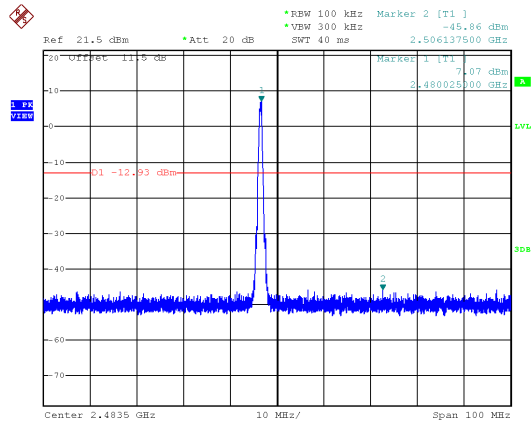
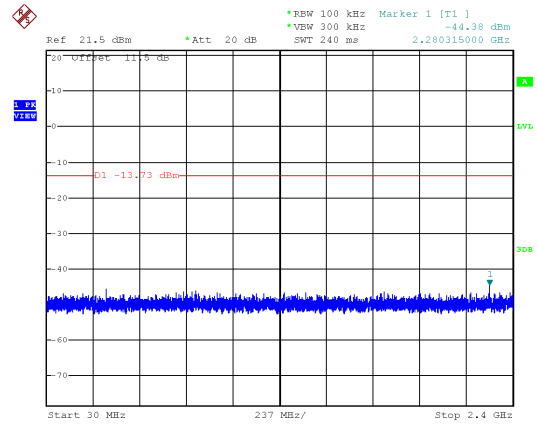




Modulation Type: GFSK (1Mbps)
Channel: 78

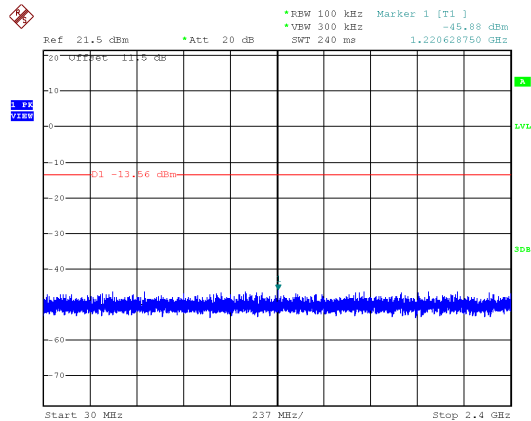


Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 00

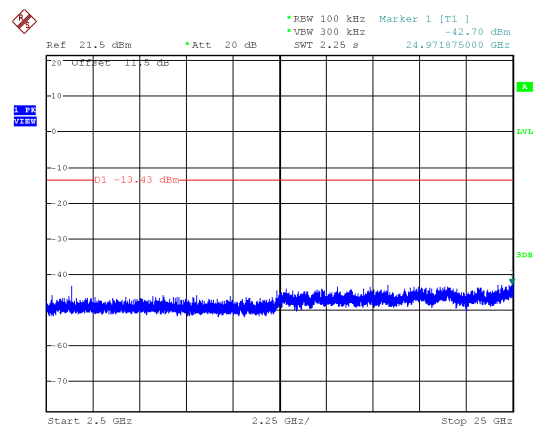
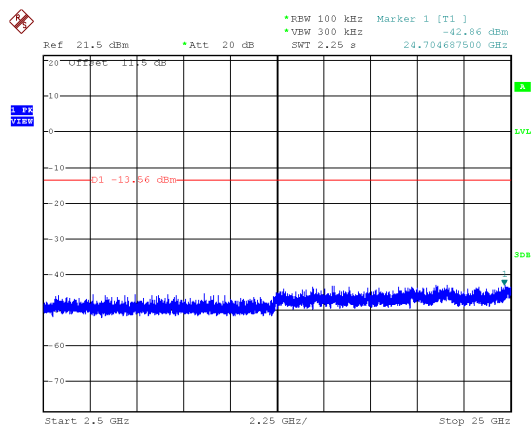
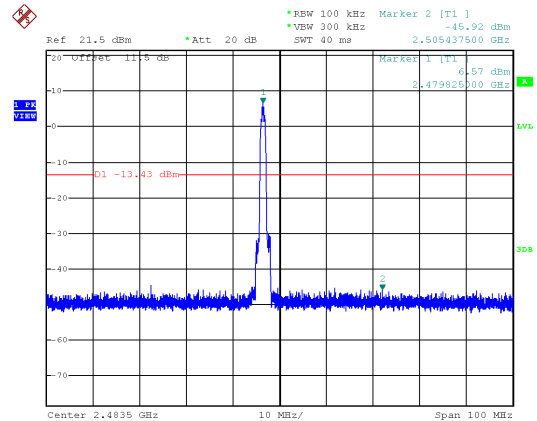
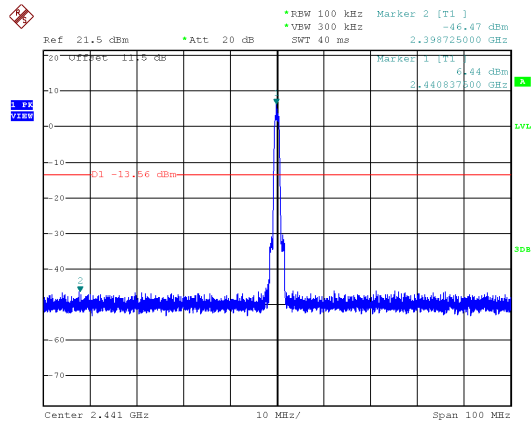
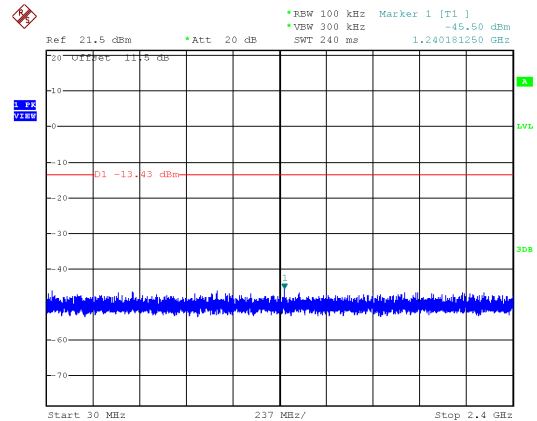




Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 39

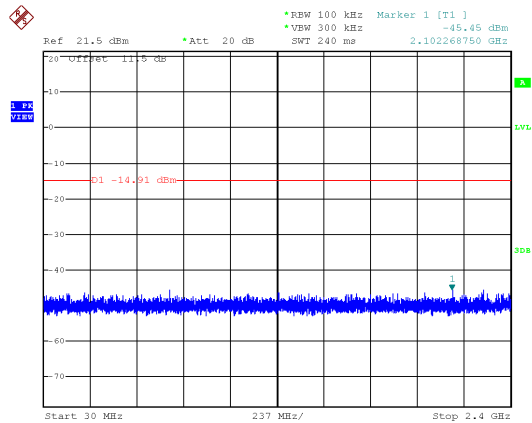


Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 78

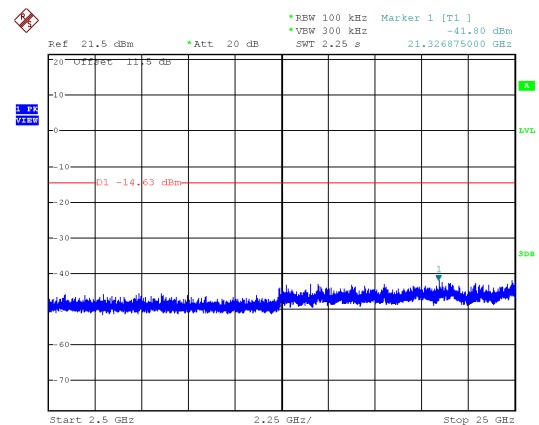
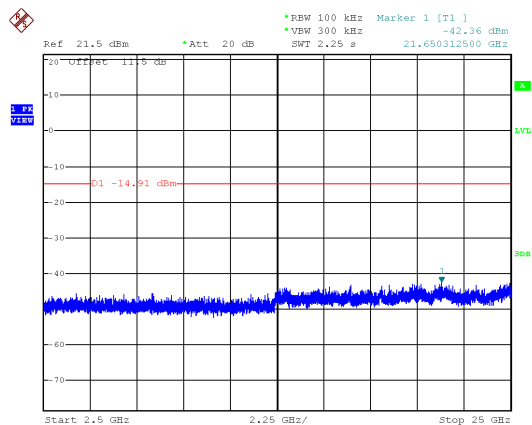
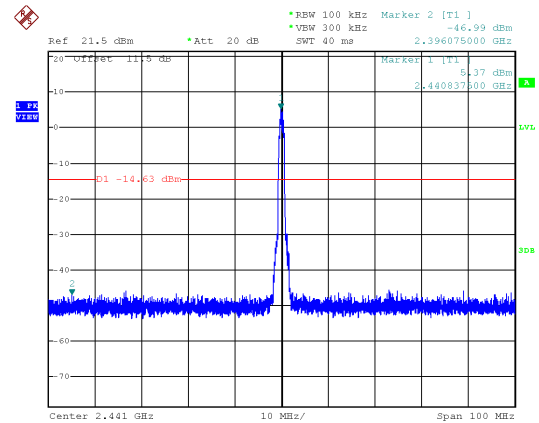
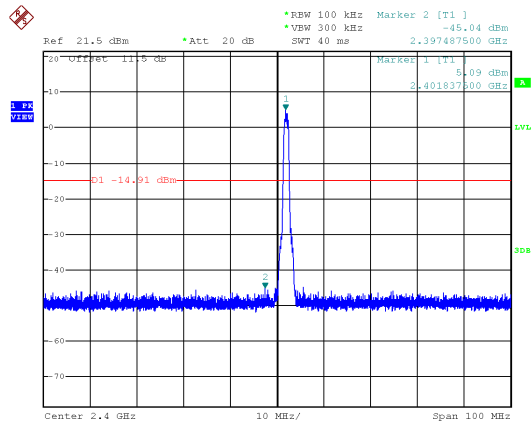
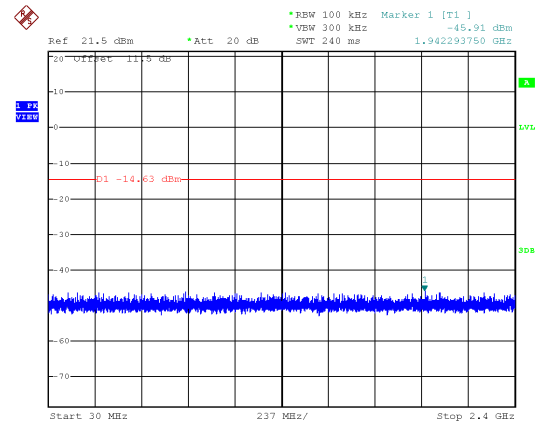




Modulation Type: 8DPSK (3Mbps)
Channel: 00

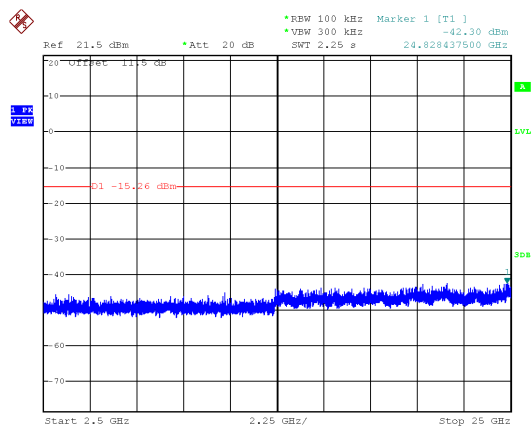
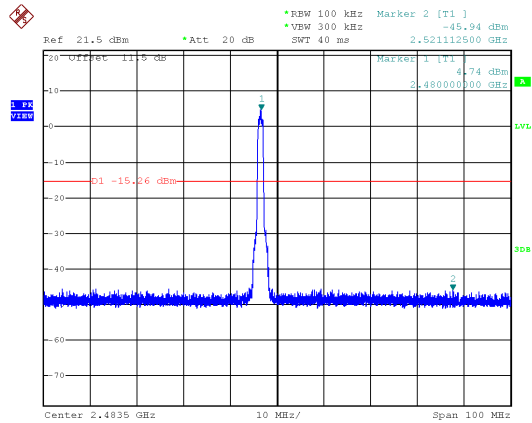
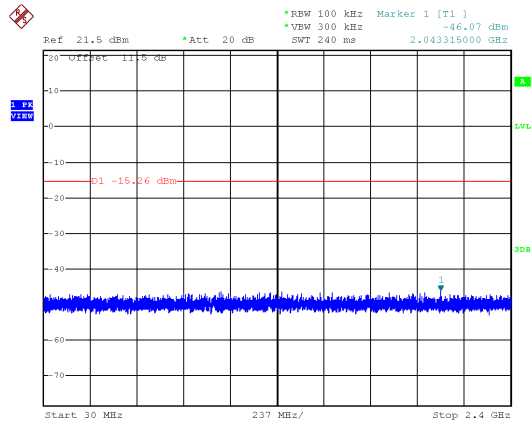


Modulation Type: 8DPSK (3Mbps)
Channel: 39



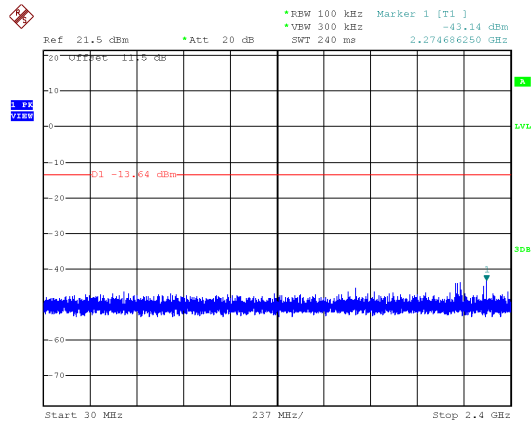


Modulation Type: 8DPSK (3Mbps)
Channel: 78

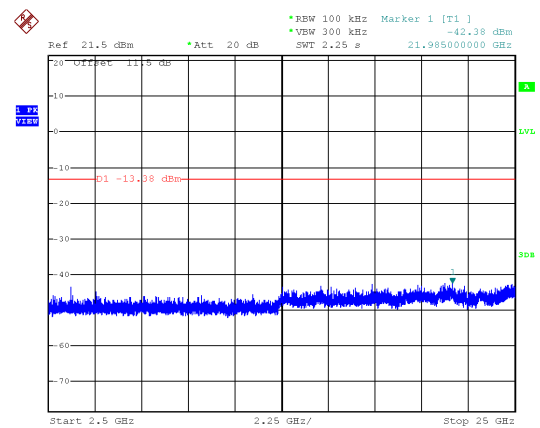
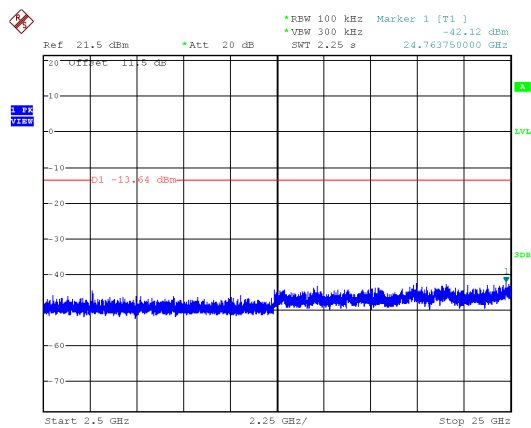
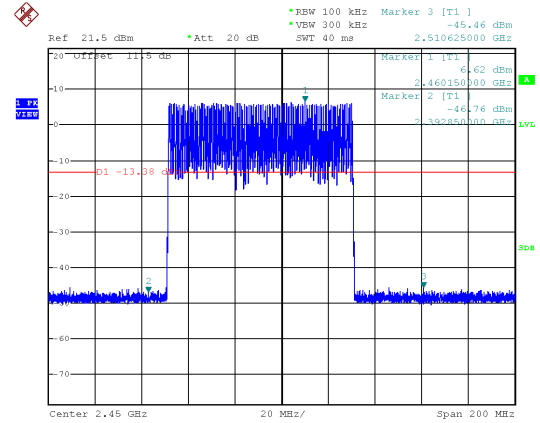
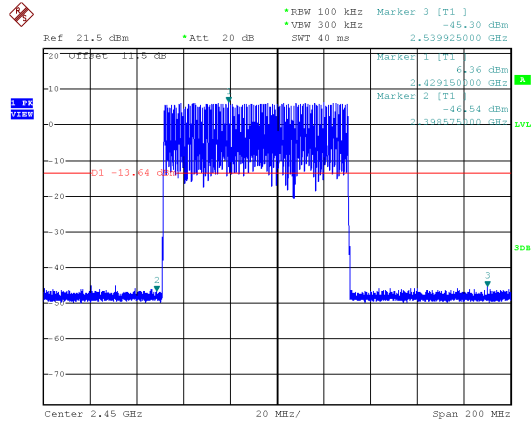
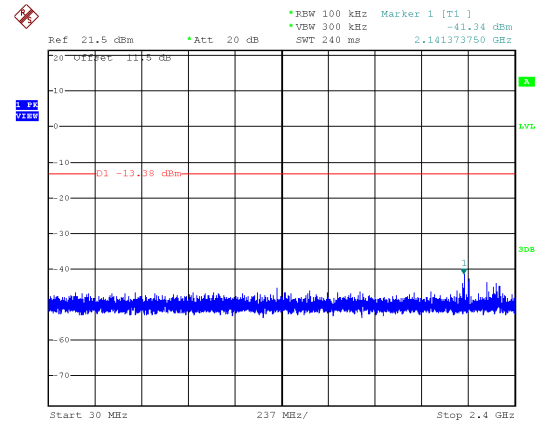




Hopping Mode: Modulation Type: GFSK

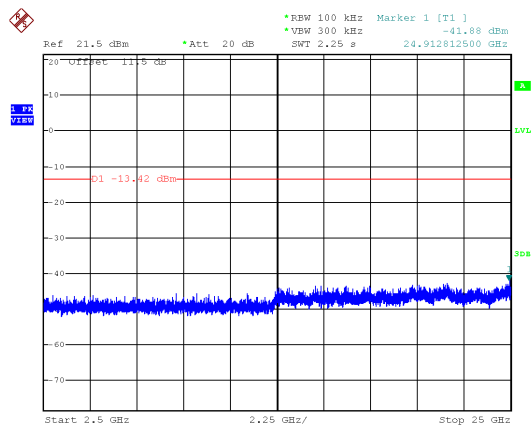
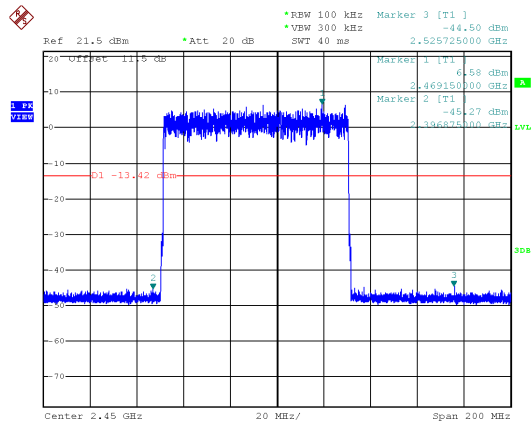
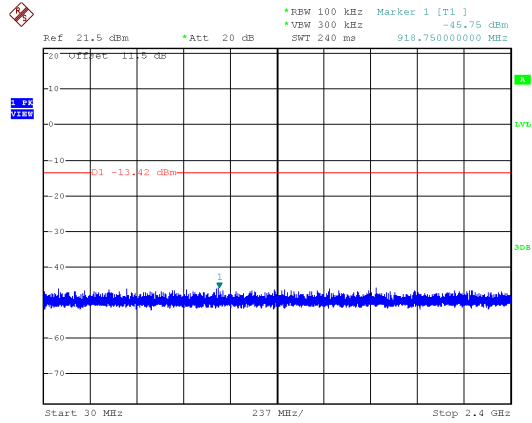


Modulation Type: $\pi/4$ -DQPSK





Modulation Type: 8DPSK





12. 電波暴露量之評估

12.1. Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in FCC Part 2 (Section 2.1093)

LIMIT

KDB 447498 D01 § 4.3(a)

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

*f(GHz) is the RF channel transmit frequency in GHz

* Power and distance are rounded to the nearest mW and mm before calculation

*The result is rounded to one decimal place for comparison

*The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion

12.2.EUT Specification

Frequency band (Operating)	☐ WLAN: 2412MHz ~ 2462MHz ☒ Bluetooth: 2402MHz ~ 2480MHz
Device category	☒ Portable (<20cm separation) ☐ Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure ☒ General Population/Uncontrolled exposure
Antenna diversity	☒ Single antenna ☐ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☐ Tx/Rx diversity
Evaluation applied	☐ MPE Evaluation* ☒ SAR Evaluation ☐ N/A
Remark: 1. The maximum output power is <u>8.04 dBm (6.368mW)</u> at <u>2480MHz</u> (with <u>2.28dBi</u> antenna gain.) 2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance. 3. For mobile or fixed location transmitters, no SAR consideration applied.	

*Note: Simultaneous transmission is not applicable for this EUT.



TEST RESULTS

According to the KDB447498:

The SAR test exclusion thresholds Level:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * \text{sqrt}(\text{freq. in GHz}) < 3$$

Calculation

Modulation Mode	Channel Frequency (MHz)	Max. Conducted output power (dBm)	Max. Tune up power (dBm)	Max. Tune up power (mW)	Distance (mm)	SAR test exclusion thresholds (mW)
GFSK	2402-2480	7.48	8.48	7.05	5	10.0000
$\pi/4$ -DQPSK	2402-2480	7.29	8.29	6.75	5	10.0000
8DPSK	2402-2480	8.04	9.04	8.02	5	10.0000

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing



13. 限制使用之頻帶

Only spurious emissions are permitted in any of the frequency bands listed below:

頻率(兆赫)	頻率(兆赫)	頻率(兆赫)
0.090 - 0.110	240.00 - 285.00	3332.0 - 3339.0
0.490 - 0.510	322.00 - 335.40	3345.8 - 3358.0
2.172 - 2.198	399.90 - 410.00	3500.0 - 4400.0
3.013 - 3.033	485.00 - 510.00	4500.0 - 5250.0
4.115 - 4.198	608.00 - 614.00	5350.0 - 5460.0
5.670 - 5.690	703.00 - 748.00	7250.0 - 7750.0
6.200 - 6.300	758.00 - 803.00	8025.0 - 8500.0
8.230 - 8.400	825.00 - 915.00	9000.0 - 9200.0
12.265 - 12.600	930.00 - 1240.0	9300.0 - 9500.0
13.340 - 13.430	1300.0 - 1427.0	10600 - 12700
14.965 - 15.020	1435.0 - 1626.5	13250 - 13400
16.700 - 16.755	1660.0 - 1770.0	14470 - 14500
19.965 - 20.020	1805.0 - 1865.0	15350 - 16200
25.500 - 25.700	1885.0 - 1900.0	17700 - 21400
37.475 - 38.275	1905.0 - 1985.0	22010 - 23120
73.500 - 75.400	2015.0 - 2025.0	23600 - 24000
108.00 - 138.00	2125.0 - 2165.0	31200 - 31800
149.90 - 150.05	2200.0 - 2300.0	36430 - 36500
156.70 - 156.90	2310.0 - 2390.0	38600 以上
162.01 - 167.17	2483.5 - 2900.0	
167.72 - 173.20	3260.0 - 3267.0	