



低功率射頻器材測試報告

申請廠商	: 泓澤檢測設備股份有限公司
地址	: 新北市汐止區汐萬路 3 段 199 巷 1 弄 18 號
工廠	: NeoLAB Convergence, Inc.
地址	: #1501, Mario Tower, 28, Digital-ro 30-gil, Guro-gu, Seoul, Korea 08389, Korea
產品名稱	: 智慧筆
產品型號	: NWP-F30
廠牌	: Neo smartpen dimo
受理日期	: 110 年 11 月 23 日
完成日期	: 110 年 12 月 17 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：112 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	7
1.4. 測試模式之描述	8
1.5. 受測裝置之系統說明	9
1.6. 測試場地	10
1.7. 量測不確定度	10
2. 測試儀器	11
3. 天線增益之要求	12
3.1. 天線型式及其增益	12
3.2. 結果判定	12
4. 電源線傳導干擾之量測規定	13
4.1. 適用標準	13
4.2. 測試方法	13
4.3. 傳導干擾之擺設	13
4.4. 傳導干擾之測試結果及數據	13
5. 輻射之量測規定	14
5.1. 適用標準	14
5.2. 測試方法	14
5.3. 輻射場地之擺設	15
5.4. 輻射之測試結果及數據 (9kHz ~ 30MHz)	16
5.5. 輻射之測試結果及數據 (30MHz ~ 1GHz)	16
5.6. 輻射之測試結果及數據 (1GHz ~ 25GHz)	20
5.7. 輻射量測之配置照片 (30MHz ~ 1GHz)	44
5.8. 輻射量測之配置照片 (1GHz ~ 25GHz)	45
6. 20dB 頻寬之規定	47
6.1. 適用標準	47
6.2. 測試方法	47
6.3. 測試配置	47
6.4. 20dB 頻寬之測試結果及數據	48
6.5. 結果判定	48
7. 頻道間隔之規定	51
7.1. 適用標準	51
7.2. 測試方法	51
7.3. 測試配置	51
7.4. 頻道間隔之測試結果及數據	52
7.5. 結果判定	52
8. 頻率佔用時間之規定	55
8.1. 適用標準	55
8.2. 測試方法	55
8.3. 測試配置	55
8.4. 頻率佔用時間之測試結果及數據	56
8.5. 結果判定	56
9. 跳頻頻道使用數量之規定	59
9.1. 適用標準	59
9.2. 測試方法	59
9.3. 測試配置	59
9.4. 跳頻頻道使用數量之測試結果及數據	59
9.5. 結果判定	59
10. 輸出功率之規定	61



10.1.	適用標準	61
10.2.	測試方法	61
10.3.	測試配置	61
10.4.	輸出功率之測試結果及數據	62
10.5.	結果判定	62
11.	混附波發射限制之規定.....	63
11.1.	適用方法	63
11.2.	測試方法	63
11.3.	測試配置	63
11.4.	結果判定	63
11.5.	混附波發射限制之測試結果及數據.....	64
12.	電波暴露量之評估	71
12.1.	Applicable Standards	71
12.2.	EUT Specification	71
12.3.	TEST RESULTS	72
13.	限制使用之頻帶	73
附錄 A:	產品照	A1~A11



修訂記錄

報告號碼.	發行日期	描述
21110170-TRNCC01	Dec. 17, 2021	Original



證 明 書

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廠牌	: Neo smartpen dimo
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器材技術規範(LP0002)。 規範修訂日期 109 年 07 月 01 日。
發射功率 (電場強度)	: 7.85 dBm (Average)

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 110 年 12 月 03 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器材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器材技術規範規定。

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	低功率射頻器材技術 規範	量測設備	測試結果	結果判定
1	天線增益之要求	4.10.1.3 節	---	請參閱 3.2 節	合格
2	電源線傳導干擾之要求	3.3 節	請參閱 2 章	請參閱 4.4 節	免驗
3	場強輻射之要求	4.10.1.5 節	請參閱 2 章	請參閱 5.4 節, 5.5 節及 5.6 節	合格
4	發射頻寬之要求	4.10.1.6 節(1)(A)	請參閱 2 章	請參閱 6.4 節	合格
5	頻道間隔之要求	4.10.1.6 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	4.10.1.6 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	4.10.1.6 節(1)(A)(a)	請參閱 2 章	請參閱 9.4 節	合格
8	輸出功率之要求	4.10.1.2 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	4.10.1.5 節	請參閱 2 章	請參閱 11.4 節	合格

本實驗室已依據合約內的標準，降低儀器、環境、人員等不確定因素。因此測試結果將直接依照標準要求判定之。

報告簽署人：



1. 一般描述

1.1. 產品規格

Operation Frequency Range	BT / BLE: 2400-2483.5MHz
Center Frequency Range	BT / BLE: 2402MHz-2480MHz
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	PCB Antenna
Antenna Gain	BT / BLE: 2400-2485MHz: 1.62dBi

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

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” WCN COMBO Tool ver.W1916” 傳送及接收訊號。
- 執行以下測試模式如下：

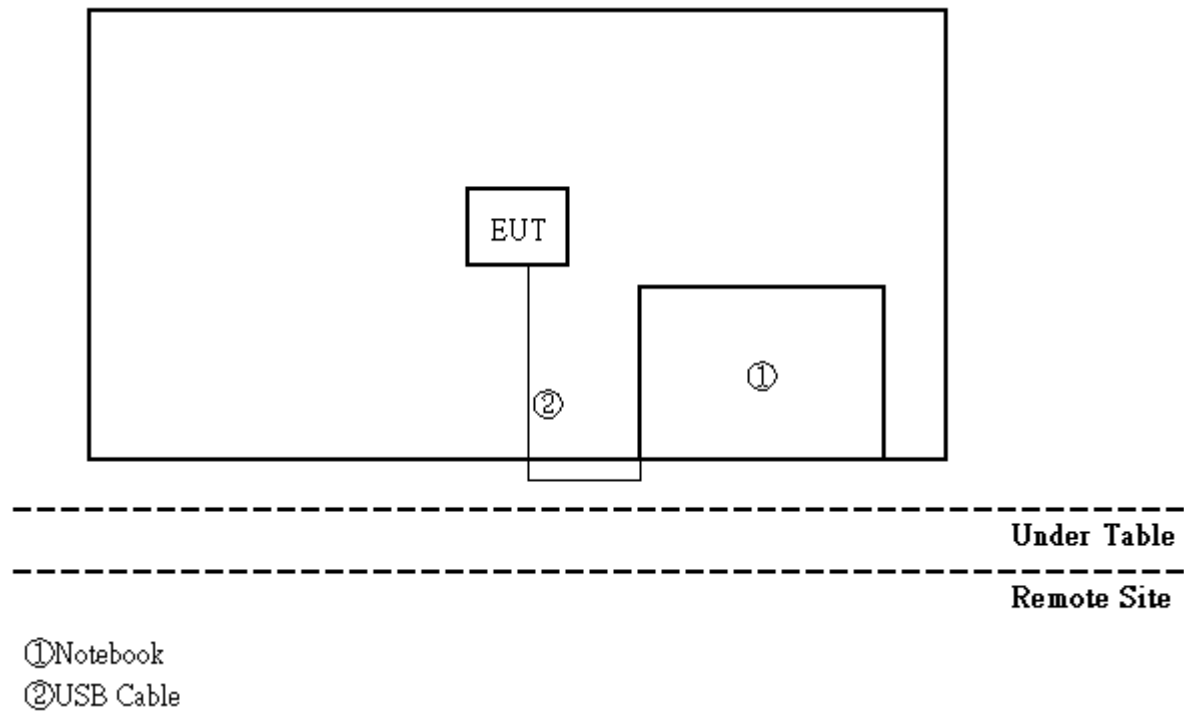
Radiation Emissions (30MHz ~ 1GHz)	
Test Mode	Operating Description
1	GFSK (1Mbps) , Transmitter Mode
2	$\pi/4$ -DQPSK (2Mbps) , Transmitter Mode
3	8DPSK (3Mbps) , Transmitter Mode
4	GFSK (1Mbps) , Receiver Mode
5	$\pi/4$ -DQPSK (2Mbps) , Receiver Mode
6	8DPSK (3Mbps) , Receiver Mode
caused “Test Mode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

Modulation Type	TX CONFIGURATION
GFSK	1TX
$\pi/4$ -DQPSK	1TX
8DPSK	1TX



1.5. 受測裝置之系統說明

輻射干擾:



「本案經申請者切結器材不提供下列配件，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	lenovo	S1GL2W	N/A	N/A
USB Cable	BENEVO	BUSB3100AMF	1m / NS	N/A
電源供應器	Gwinstek	SPD-3606	N/A	N/A
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
USB Cable	BENEVO	BUSB3100AMF	1m / NS	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：	DC 1.5V From Battery
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器材技術規範以及參考 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	Test period	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2021/12/03	25°C / 48%	Dian Chen
Radiated Emissions	3M02-NK	2021/11/27~2021/12/02	23~25°C / 43~47%	Dian Chen

1.7. 量測不確定度

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Measurement Item	Uncertainty
AC Power Line Conduction(150K~30MHz)	±3.12dB
Radiated Spurious Emission(9KHz~30MHz)	±3.4dB
Radiated Spurious Emission(30MHz~1GHz)	±5.6dB
Radiated Spurious Emission(1GHz~25GHz)	±6.6dB
Conducted Spurious Emission	±1.8dB
6dB Bandwidth	±4.4%
20dB Bandwidth	±4.4%
Occupied Bandwidth	±4.4%
Peak Output Power(Conducted Power Meter)	±1.1dB
Dwell Time / Deactivation Time	±1.2%
Power Spectral Density	±1.8dB
Duty Cycle	±1.2%



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	369	2021/04/26	2022/04/25
Active Loop Antenna	EMCO	6507	40855	2021/06/10	2022/06/09
Horn Antenna	EMCO	3115	31589	2021/04/09	2022/04/08
Horn Antenna	EMCO	3116	31970	2021/03/29	2022/03/28
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2021/06/30	2022/06/29
Spectrum Analyzer	ROHDE & SCHWARZ	FSV 40-N	102151	2021/08/06	2022/08/05
Preamplifier	EM Electronics corp.	EM330	60660	2021/03/18	2022/03/17
Preamplifier	Agilent	8449B	3008A01954	2021/03/22	2022/03/21
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2021/11/16	2022/11/15
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2021/04/19	2022/04/18
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2021/04/12	2022/04/11
Cable-0.5m(1G-18G)	EMEC	EM104-SMSM-0.5M	CCE1354	2021/05/06	2022/05/05
Cable-3m(1G-18G)	EMEC	EM104-SMSM-3M	CCE1355	2021/05/06	2022/05/05
Cable-8m(1G-18G)	EMEC	EM104-SMSM-8M	CCE1356	2021/05/06	2022/05/05
Cable-0.5m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	28420/2	2021/04/03	2022/04/02
Cable-3m(30M-40G)	HUBER SUHNER	SUCOFLEX 102	MY2608/2	2021/04/09	2022/04/08
Cable-0.5m(1G-40G)	Rapidtek	40GHZ 50CM	38MS-38MS50314	2021/04/08	2022/04/07
Cable-6m(9k~300M)	NA	CFD300-NL	NA	2021/03/15	2022/03/14
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	FSV 40-N	102151	2021/08/06	2022/08/05
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2021/04/19	2022/04/18
CAX Signal Analyzer	KEYSIGHT	N9000B	MY57100339	2020/12/25	2021/12/24
Attenuator	KEYSIGHT	8491B	MY39250703	2021/04/09	2022/04/08
TEMP & HUMI CHAMBER	T-MACHINE	TMJ-9712	T-12-040111	2021/08/27	2022/08/26
Power Meter	Anritsu	ML2495A	1224005	2021/04/14	2022/04/13
Power Sensor	Anritsu	MA2411B	1207295	2021/04/14	2022/04/13



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器材技術規範(3.2)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。

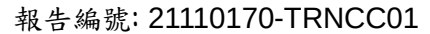
操作於 5725-5850 兆赫(MHz)者，其發射天線之方向性增益超過 6dBi，不需降低峰值輸出功率。

3.1. 天線型式及其增益

1.1 Brand :	RADINA
1.2 Model :	NWP-F30
1.3 Antenna type :	PCB Antenna
1.4 Frequency Rang :	2400-2485MHz
1.5 Gain(peak) :	1.62 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。





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器材技術規範 4.10.1.5 之要求，落於 3.5 節禁用頻段之輻射干擾需符合 3.6 節之一般限制要求：

頻率(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。如待測物可以三軸相放置，並分別測試以找出最大輻射電場強度(最差的結果為 Z 軸)。

備註：

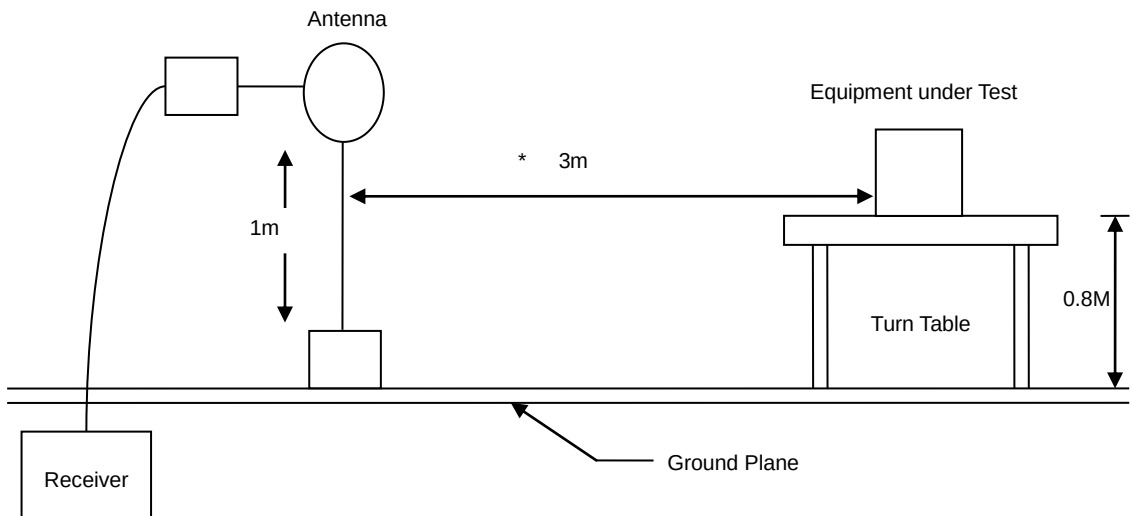
1.For Below 1G 若待測物之輻射峰值低於限制值 3dB 以上，則將終止測試，並以峰值之讀值作為報告之記錄;反之，若無 3dB 餘裕範圍之輻射，則每一訊號皆以準峰值之測試方法量測，並記錄於報告之中

2.Due to the test software function limit the operation band setting(200dBuV/m). There's no corresponding limitation in the actual test item.

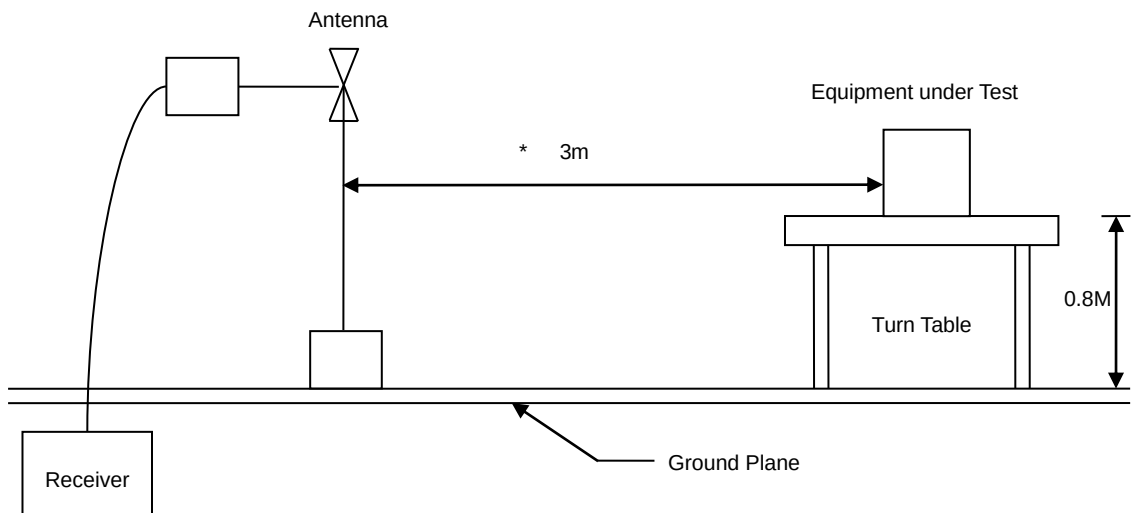


5.3. 輻射場地之擺設

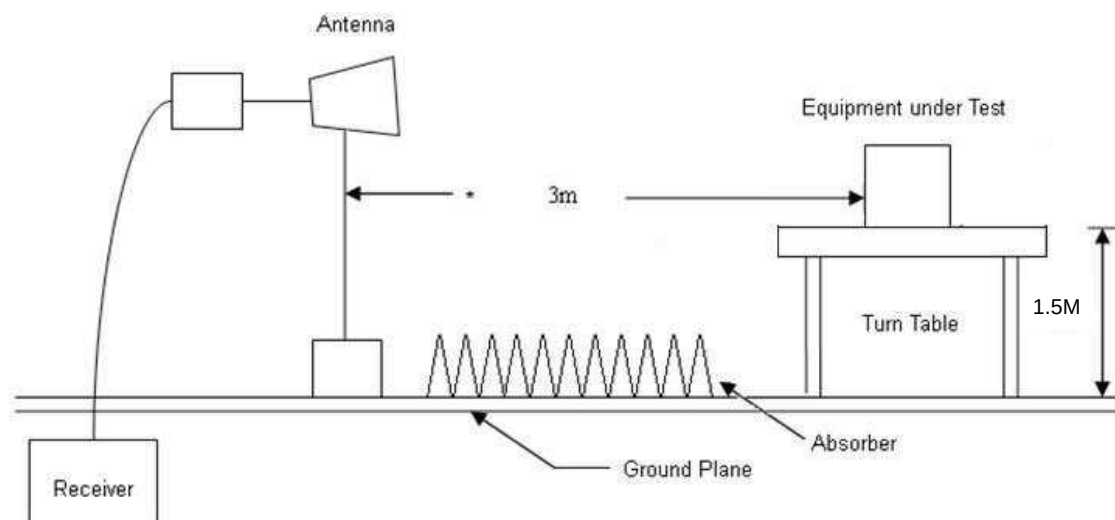
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



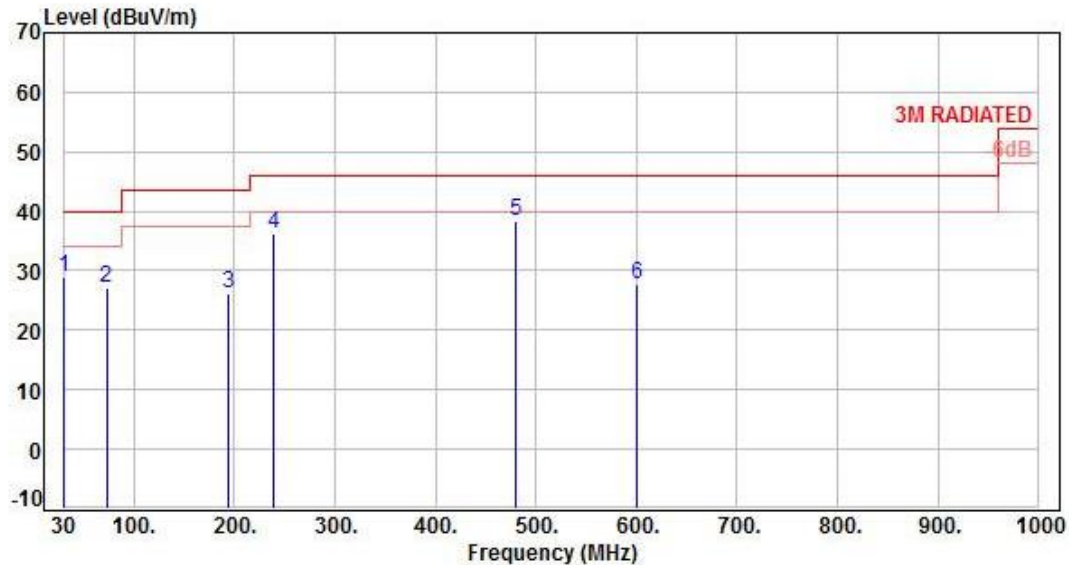


5.4. 輻射之測試結果及數據 (9kHz ~ 30MHz)

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	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-12.86	41.84	28.98	40.00	-11.02	Peak	400	0	P
2	72.68	-14.01	41.06	27.05	40.00	-12.95	Peak	400	0	P
3	194.90	-13.31	39.42	26.11	43.50	-17.39	Peak	400	0	P
4	239.52	-12.80	49.01	36.21	46.00	-9.79	Peak	400	0	P
5	480.08	-6.09	44.52	38.43	46.00	-7.57	Peak	400	0	P
6	600.36	-3.26	31.11	27.85	46.00	-18.15	Peak	400	0	P

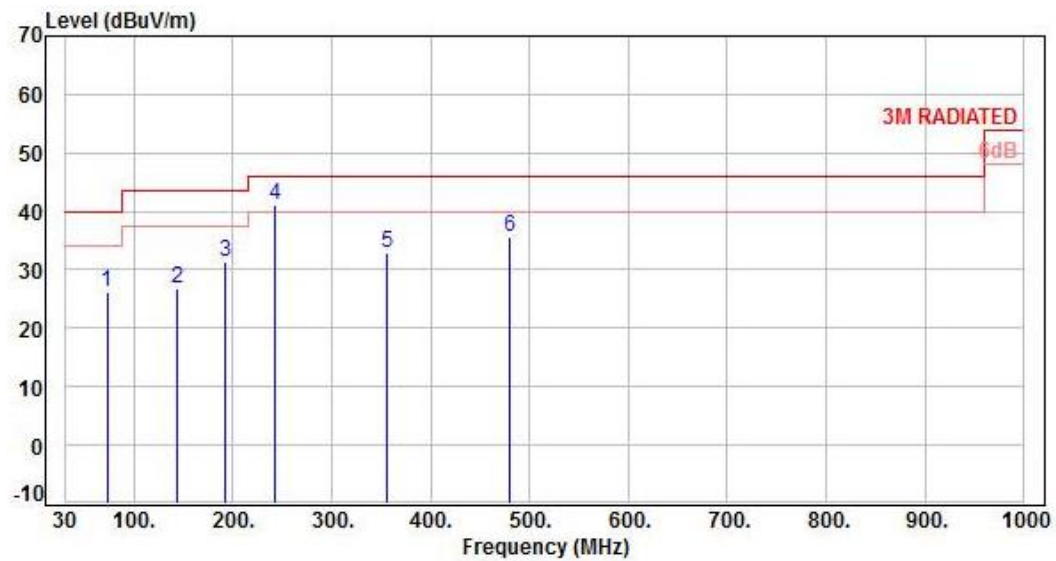
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	72.68	-14.01	40.16	26.15	40.00	-13.85	Peak	400	360	P
2	144.46	-11.96	38.75	26.79	43.50	-16.71	Peak	400	360	P
3	192.96	-13.41	44.81	31.40	43.50	-12.10	Peak	400	360	P
4	243.40	-12.51	53.46	40.95	46.00	-5.05	QP	100	238	P
5	355.92	-9.31	42.16	32.85	46.00	-13.15	Peak	400	360	P
6	480.08	-6.09	41.70	35.61	46.00	-10.39	Peak	400	360	P

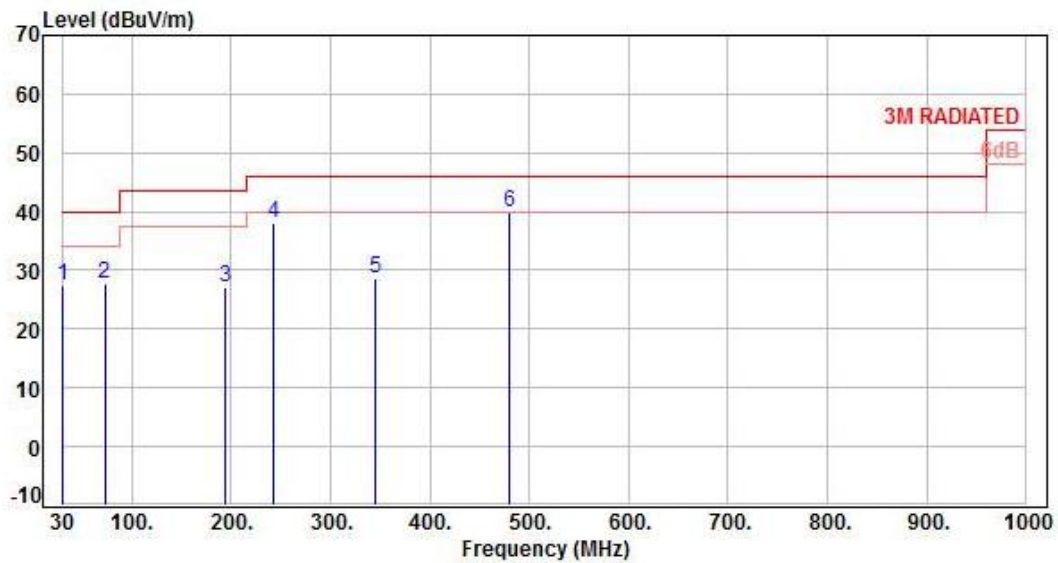
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: From Battery	Pol/Phase	: VERTICAL
Test Mode	: Mode 4		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-12.86	40.12	27.26	40.00	-12.74	Peak	400	360	P
2	72.68	-14.01	41.83	27.82	40.00	-12.18	Peak	400	360	P
3	194.90	-13.31	40.33	27.02	43.50	-16.48	Peak	400	360	P
4	243.40	-12.51	50.50	37.99	46.00	-8.01	Peak	400	360	P
5	344.28	-9.67	38.16	28.49	46.00	-17.51	Peak	400	360	P
6	480.08	-6.09	46.09	40.00	46.00	-6.00	Peak	400	360	P

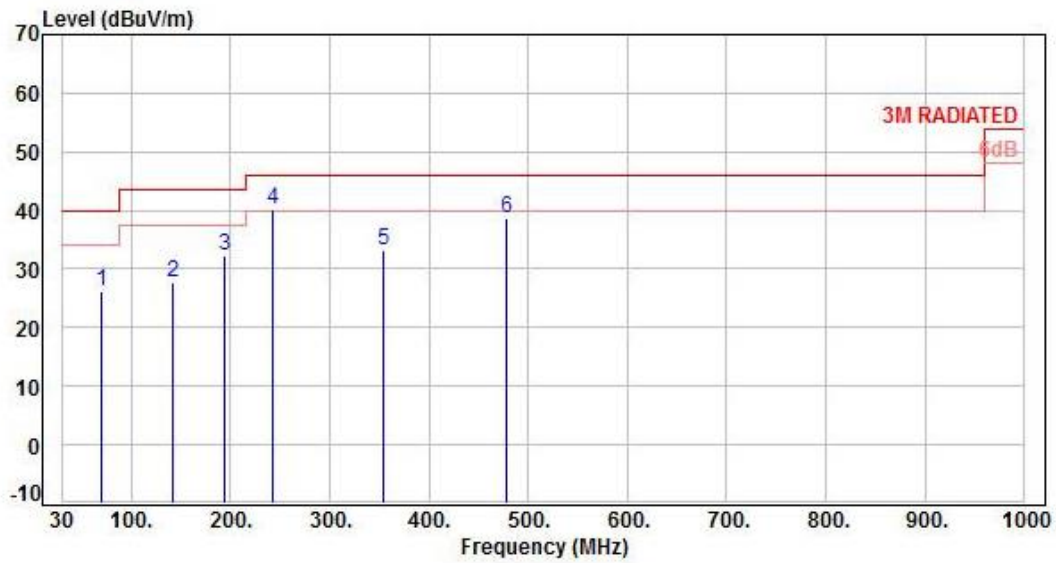
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	70.74	-13.57	39.77	26.20	40.00	-13.80	Peak	400	360	P
2	142.52	-12.02	39.67	27.65	43.50	-15.85	Peak	400	360	P
3	194.90	-13.31	45.61	32.30	43.50	-11.20	Peak	400	360	P
4	242.43	-12.57	52.64	40.07	46.00	-5.93	QP	100	226	P
5	354.95	-9.33	42.56	33.23	46.00	-12.77	Peak	400	360	P
6	478.14	-6.10	44.92	38.82	46.00	-7.18	Peak	400	360	P

Note: Level=Reading+Factor

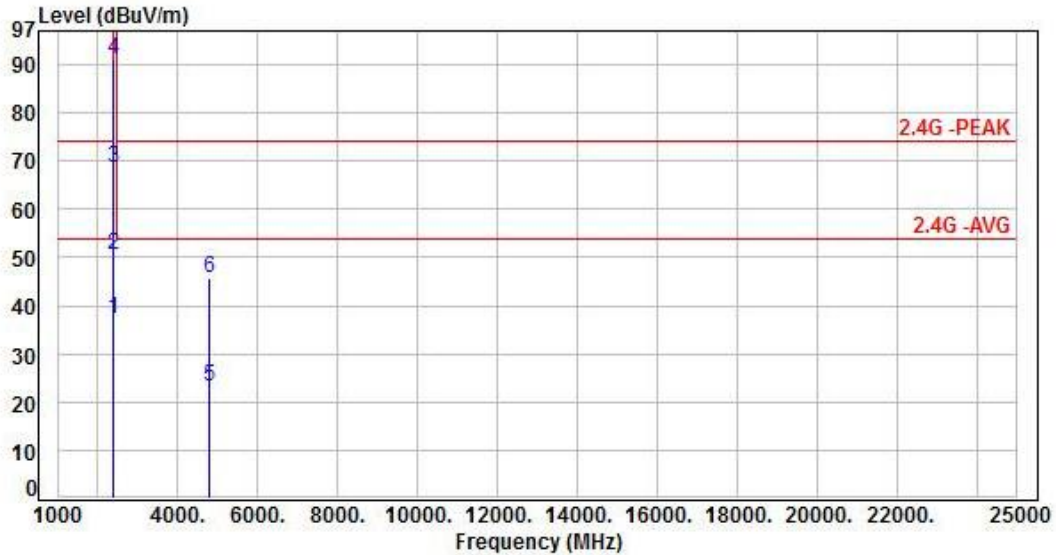
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



5.6. 輻射之測試結果及數據 (1GHz ~ 25GHz)

Power	:	From Battery	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	-3.54	40.66	37.12	54.00	-16.88	Average	393	198	P
2	2390.00	-3.54	54.21	50.67	74.00	-23.33	Peak	393	198	P
3	2402.00	-3.51	72.16	68.65	200.00	-131.35	Average	393	198	P
4	2402.00	-3.51	94.66	91.15	200.00	-108.85	Peak	393	198	P
5	4804.00	3.76	19.36	23.12	54.00	-30.88	Average	100	321	P
6	4804.00	3.76	41.86	45.62	74.00	-28.38	Peak	100	321	P

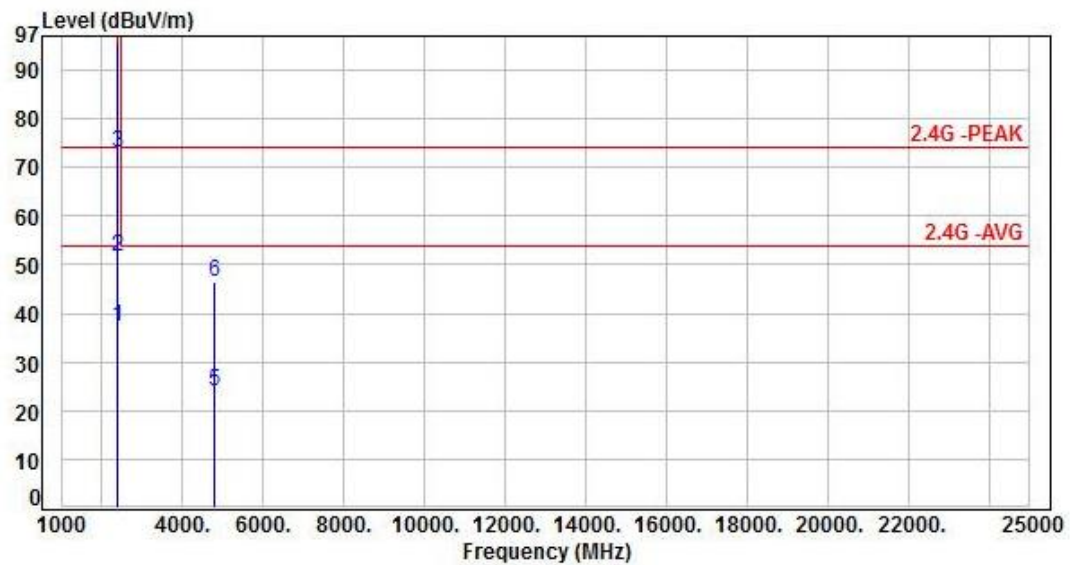
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	40.67	37.13	54.00	-16.87	Average	106	47	P
2	2390.00	-3.54	55.31	51.77	74.00	-22.23	Peak	106	47	P
3	2402.00	-3.51	76.48	72.97	200.00	-127.03	Average	106	47	P
4	2402.00	-3.51	98.98	95.47	200.00	-104.53	Peak	106	47	P
5	4804.00	3.76	20.13	23.89	54.00	-30.11	Average	100	245	P
6	4804.00	3.76	42.63	46.39	74.00	-27.61	Peak	100	245	P

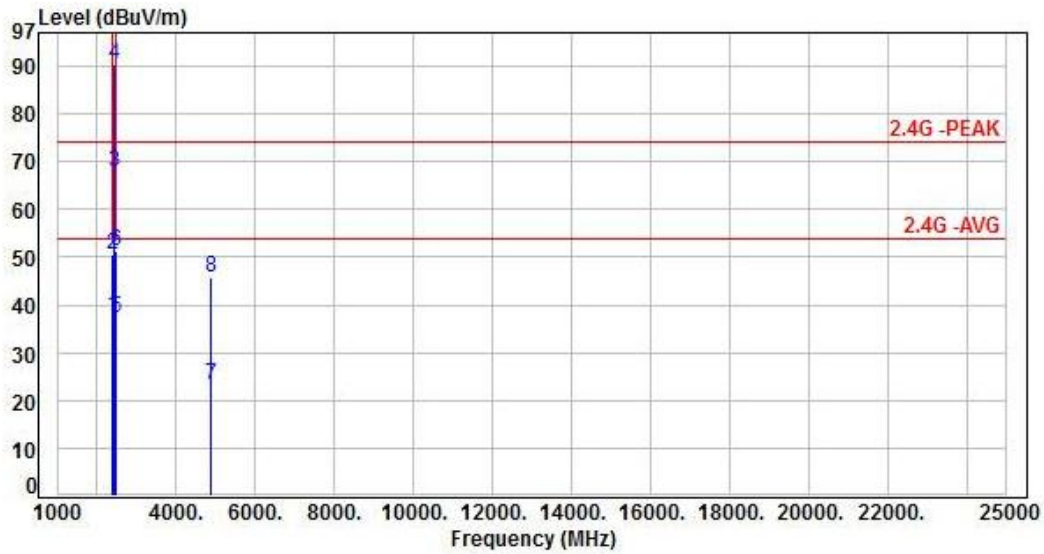
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	41.05	37.51	54.00	-16.49	Average	100	164	P
2	2390.00	-3.54	54.23	50.69	74.00	-23.31	Peak	100	164	P
3	2441.00	-3.47	71.25	67.78	200.00	-132.22	Average	100	164	P
4	2441.00	-3.47	93.75	90.28	200.00	-109.72	Peak	100	164	P
5	2483.50	-3.30	40.69	37.39	54.00	-16.61	Average	100	164	P
6	2483.50	-3.30	54.45	51.15	74.00	-22.85	Peak	100	164	P
7	4882.00	4.01	19.11	23.12	54.00	-30.88	Average	100	219	P
8	4882.00	4.01	41.61	45.62	74.00	-28.38	Peak	100	219	P

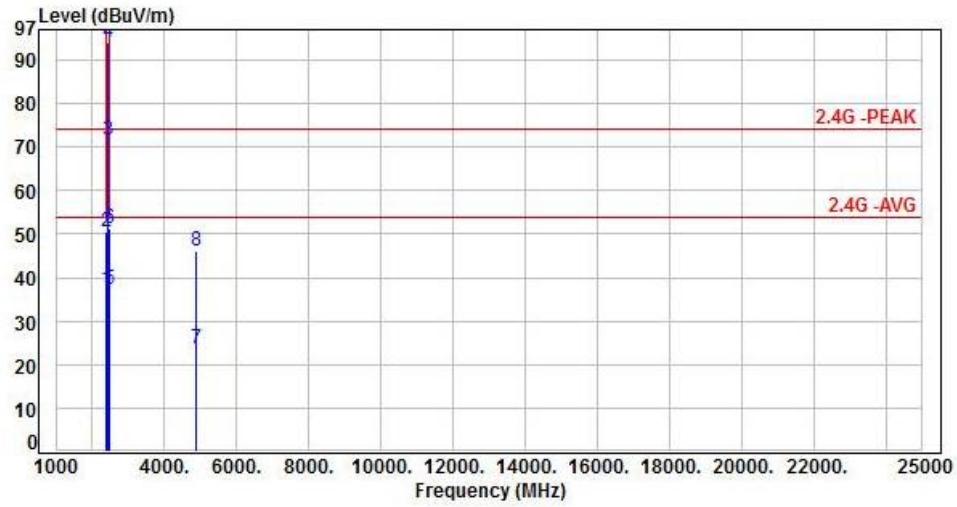
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH39		:	

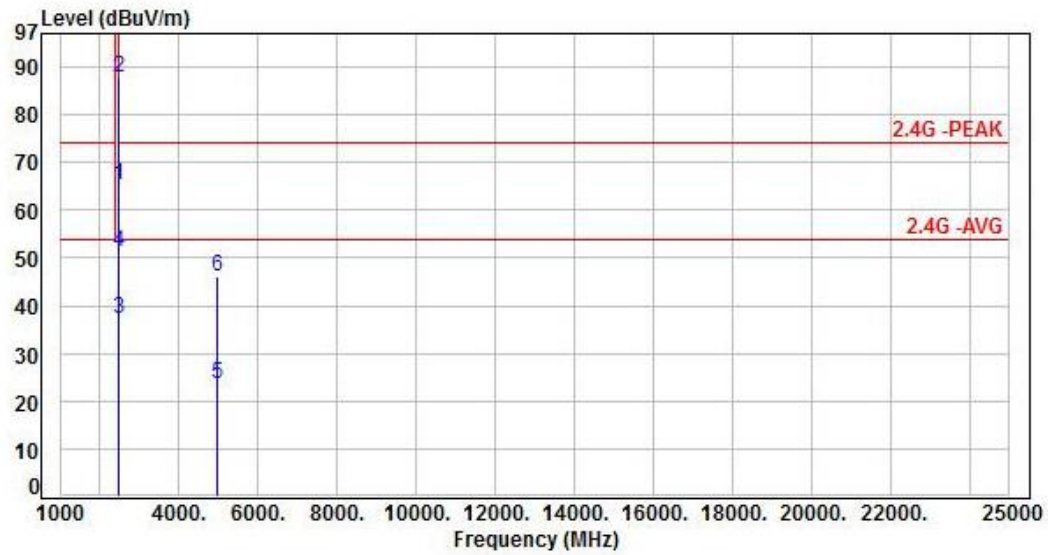


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-3.54	40.68	37.14	54.00	-16.86	Average	148	40	P
2	2390.00	-3.54	54.14	50.60	74.00	-23.40	Peak	148	40	P
3	2441.00	-3.47	74.98	71.51	200.00	-128.49	Average	148	40	P
4	2441.00	-3.47	97.48	94.01	200.00	-105.99	Peak	148	40	P
5	2483.50	-3.30	40.66	37.36	54.00	-16.64	Average	148	40	P
6	2483.50	-3.30	54.53	51.23	74.00	-22.77	Peak	148	40	P
7	4882.00	4.01	19.59	23.60	54.00	-30.40	Average	100	267	P
8	4882.00	4.01	42.09	46.10	74.00	-27.90	Peak	100	267	P

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



Power	:	From Battery	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	2480.00	-3.31	68.57	65.26	200.00	-134.74	Average	373	163	P
2	2480.00	-3.31	91.07	87.76	200.00	-112.24	Peak	373	163	P
3	2483.50	-3.30	40.71	37.41	54.00	-16.59	Average	373	163	P
4	2483.50	-3.30	54.68	51.38	74.00	-22.62	Peak	373	163	P
5	4960.00	4.35	19.13	23.48	54.00	-30.52	Average	100	316	P
6	4960.00	4.35	41.63	45.98	74.00	-28.02	Peak	100	316	P

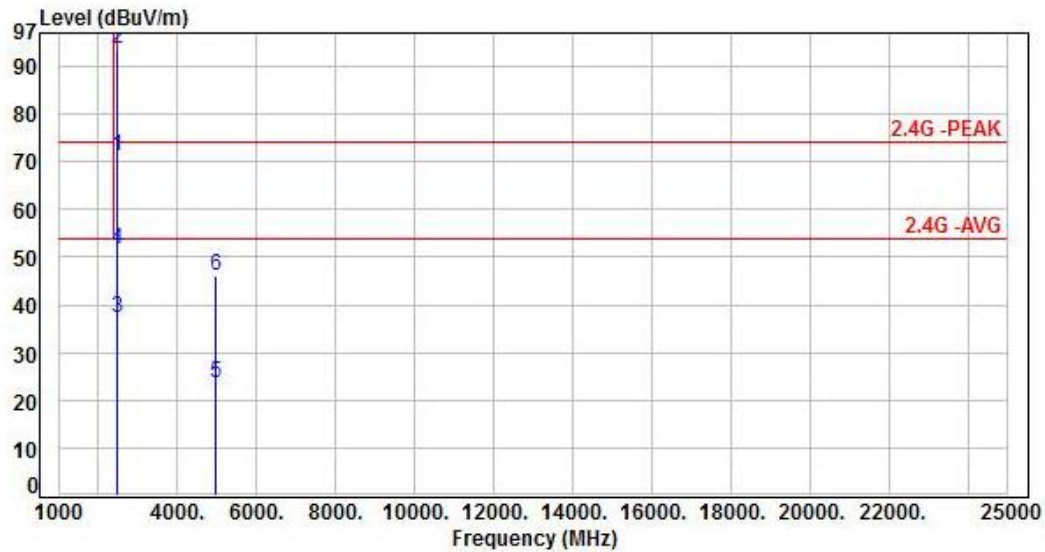
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	2480.00	-3.31	74.49	71.18	200.00	-128.82	Average	146	40	P
2	2480.00	-3.31	96.99	93.68	200.00	-106.32	Peak	146	40	P
3	2483.50	-3.30	40.73	37.43	54.00	-16.57	Average	146	40	P
4	2483.50	-3.30	54.77	51.47	74.00	-22.53	Peak	146	40	P
5	4960.00	4.35	19.19	23.54	54.00	-30.46	Average	100	271	P
6	4960.00	4.35	41.69	46.04	74.00	-27.96	Peak	100	271	P

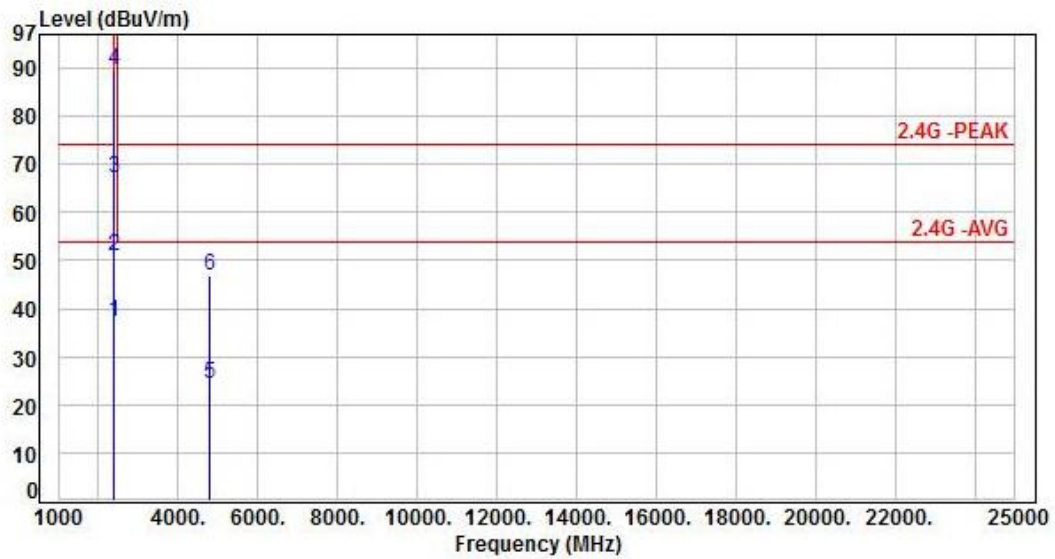
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, 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	-3.54	40.72	37.18	54.00	-16.82	Average	400	162	P
2	2390.00	-3.54	54.59	51.05	74.00	-22.95	Peak	400	162	P
3	2402.00	-3.51	70.64	67.13	200.00	-132.87	Average	400	162	P
4	2402.00	-3.51	93.14	89.63	200.00	-110.37	Peak	400	162	P
5	4804.00	3.76	20.61	24.37	54.00	-29.63	Average	100	295	P
6	4804.00	3.76	43.11	46.87	74.00	-27.13	Peak	100	295	P

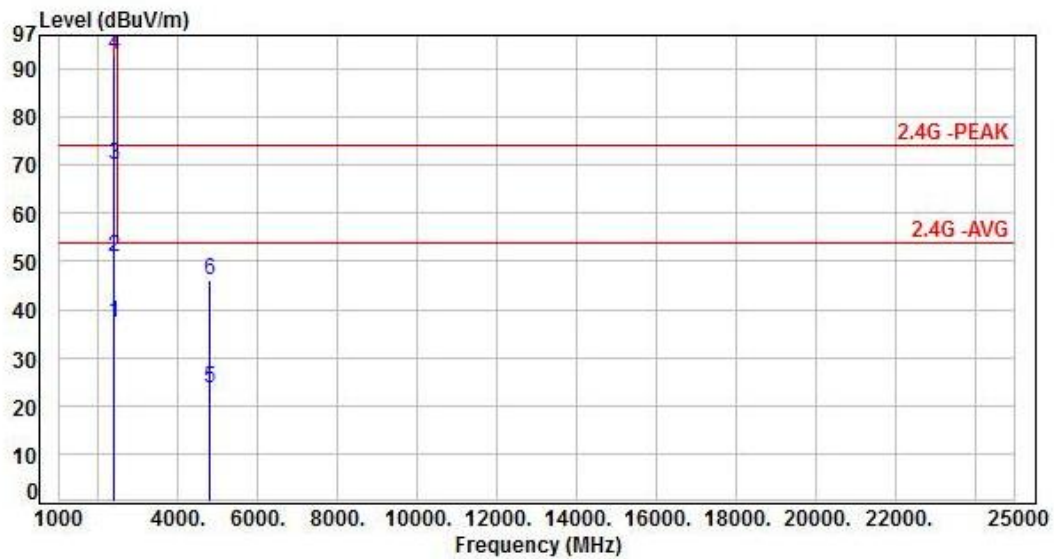
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, 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	-3.54	40.73	37.19	54.00	-16.81	Average	128	240	P
2	2390.00	-3.54	54.43	50.89	74.00	-23.11	Peak	128	240	P
3	2402.00	-3.51	73.77	70.26	200.00	-129.74	Average	128	240	P
4	2402.00	-3.51	96.27	92.76	200.00	-107.24	Peak	128	240	P
5	4804.00	3.76	19.72	23.48	54.00	-30.52	Average	100	311	P
6	4804.00	3.76	42.22	45.98	74.00	-28.02	Peak	100	311	P

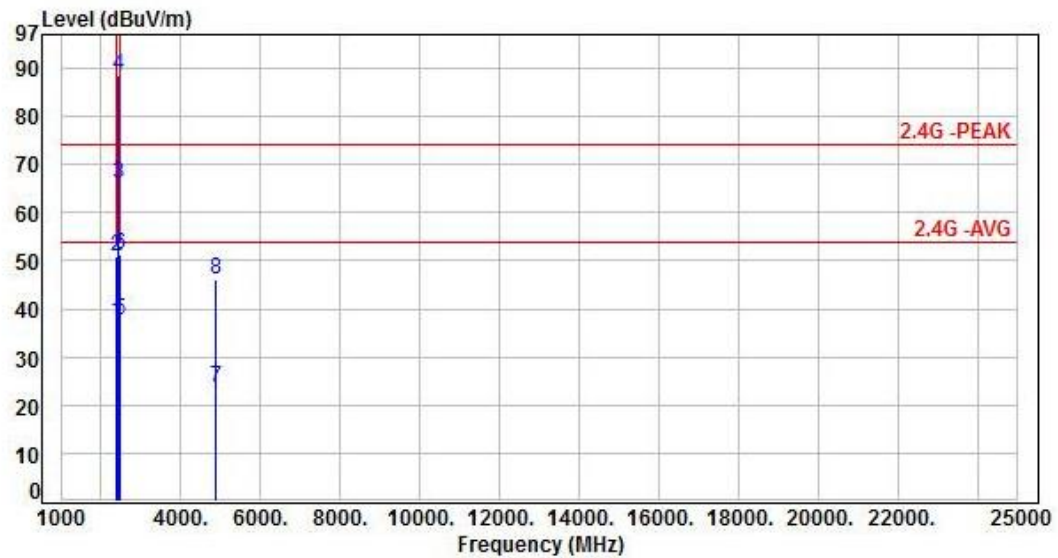
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, 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	-3.54	40.82	37.28	54.00	-16.72	Average	383	161	P
2	2390.00	-3.54	54.46	50.92	74.00	-23.08	Peak	383	161	P
3	2441.00	-3.47	69.38	65.91	200.00	-134.09	Average	383	161	P
4	2441.00	-3.47	91.88	88.41	200.00	-111.59	Peak	383	161	P
5	2483.50	-3.30	40.75	37.45	54.00	-16.55	Average	383	161	P
6	2483.50	-3.30	54.67	51.37	74.00	-22.63	Peak	383	161	P
7	4882.00	4.01	19.57	23.58	54.00	-30.42	Average	100	231	P
8	4882.00	4.01	42.07	46.08	74.00	-27.92	Peak	100	231	P

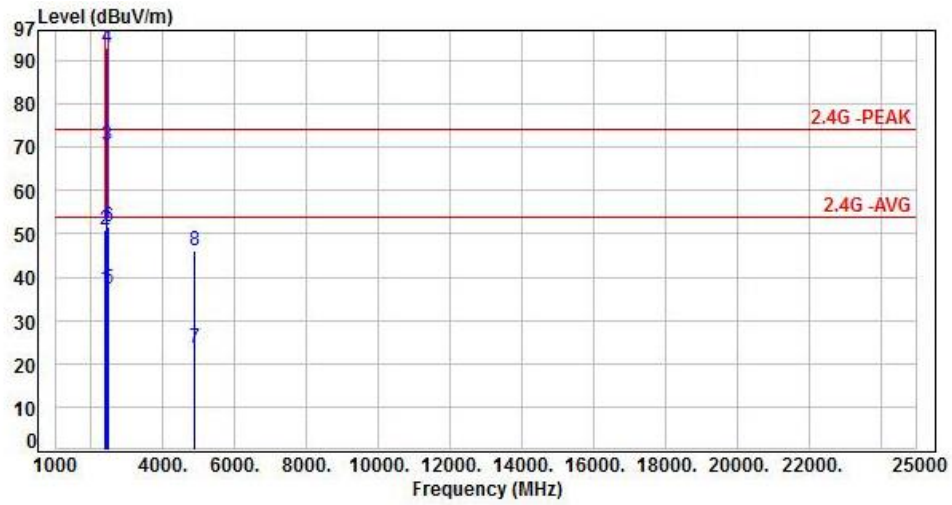
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, 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	-3.54	40.71	37.17	54.00	-16.83	Average	118	135	P
2	2390.00	-3.54	54.52	50.98	74.00	-23.02	Peak	118	135	P
3	2441.00	-3.47	73.88	70.41	200.00	-129.59	Average	118	135	P
4	2441.00	-3.47	96.38	92.91	200.00	-107.09	Peak	118	135	P
5	2483.50	-3.30	40.65	37.35	54.00	-16.65	Average	118	135	P
6	2483.50	-3.30	54.78	51.48	74.00	-22.52	Peak	118	135	P
7	4882.00	4.01	19.73	23.74	54.00	-30.26	Average	100	106	P
8	4882.00	4.01	42.23	46.24	74.00	-27.76	Peak	100	106	P

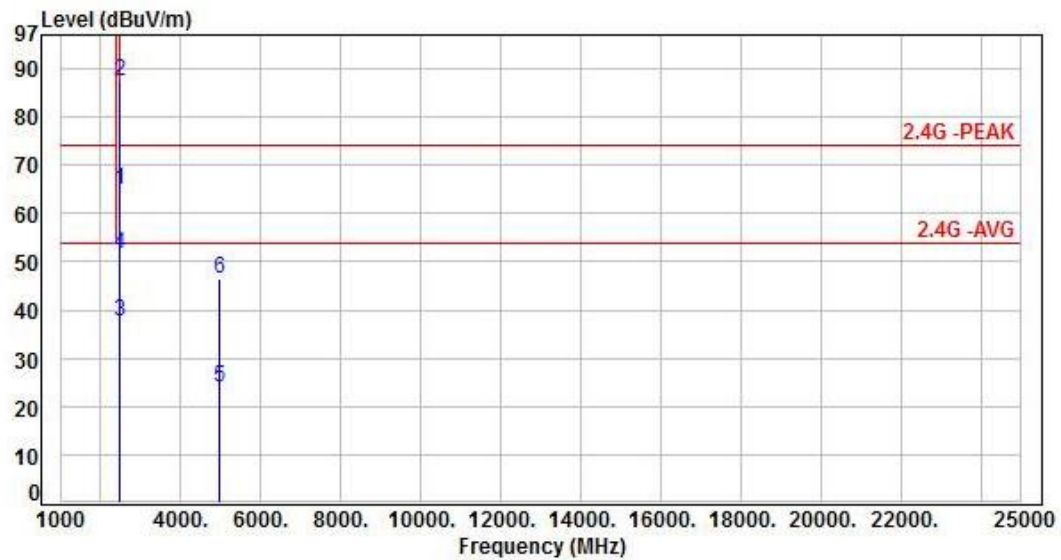
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH78		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-3.31	68.26	64.95	200.00	-135.05	Average	372	162	P
2	2480.00	-3.31	90.76	87.45	200.00	-112.55	Peak	372	162	P
3	2483.50	-3.30	40.76	37.46	54.00	-16.54	Average	372	162	P
4	2483.50	-3.30	54.96	51.66	74.00	-22.34	Peak	372	162	P
5	4960.00	4.35	19.55	23.90	54.00	-30.10	Average	100	229	P
6	4960.00	4.35	42.05	46.40	74.00	-27.60	Peak	100	229	P

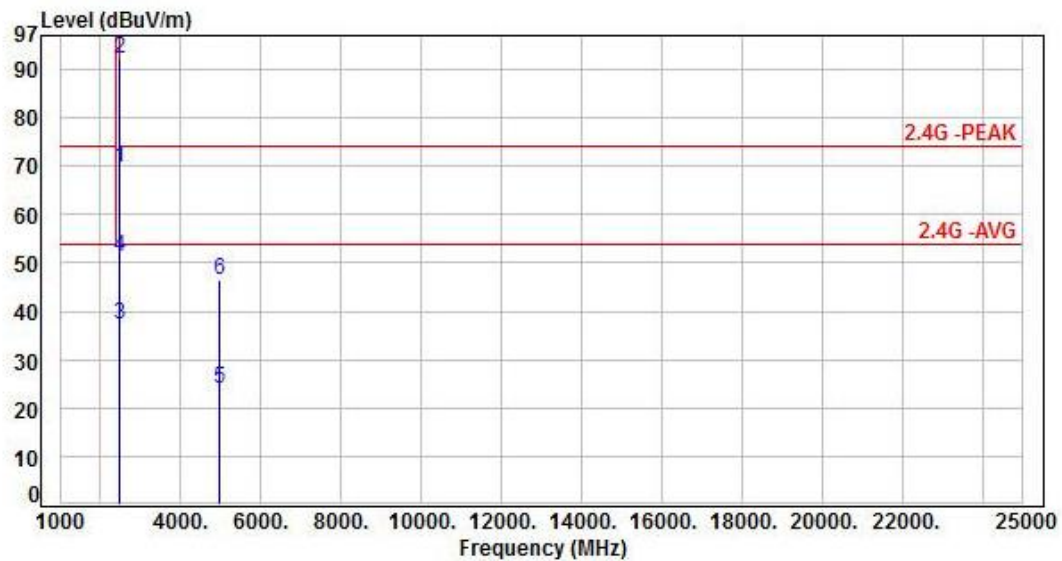
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH78		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2480.00	-3.31	72.85	69.54	200.00	-130.46	Average	147	44	P
2	2480.00	-3.31	95.35	92.04	200.00	-107.96	Peak	147	44	P
3	2483.50	-3.30	40.69	37.39	54.00	-16.61	Average	147	44	P
4	2483.50	-3.30	54.54	51.24	74.00	-22.76	Peak	147	44	P
5	4960.00	4.35	19.59	23.94	54.00	-30.06	Average	100	113	P
6	4960.00	4.35	42.09	46.44	74.00	-27.56	Peak	100	113	P

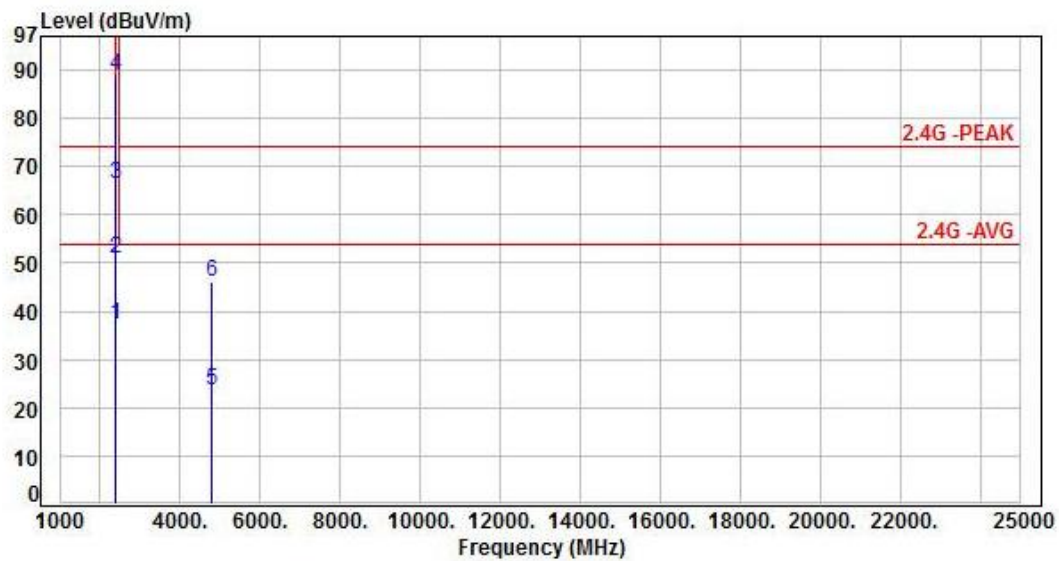
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	40.82	37.28	54.00	-16.72	Average	400	161	P
2	2390.00	-3.54	54.28	50.74	74.00	-23.26	Peak	400	161	P
3	2402.00	-3.51	69.87	66.36	200.00	-133.64	Average	400	161	P
4	2402.00	-3.51	92.37	88.86	200.00	-111.14	Peak	400	161	P
5	4804.00	3.76	19.99	23.75	54.00	-30.25	Average	100	281	P
6	4804.00	3.76	42.49	46.25	74.00	-27.75	Peak	100	281	P

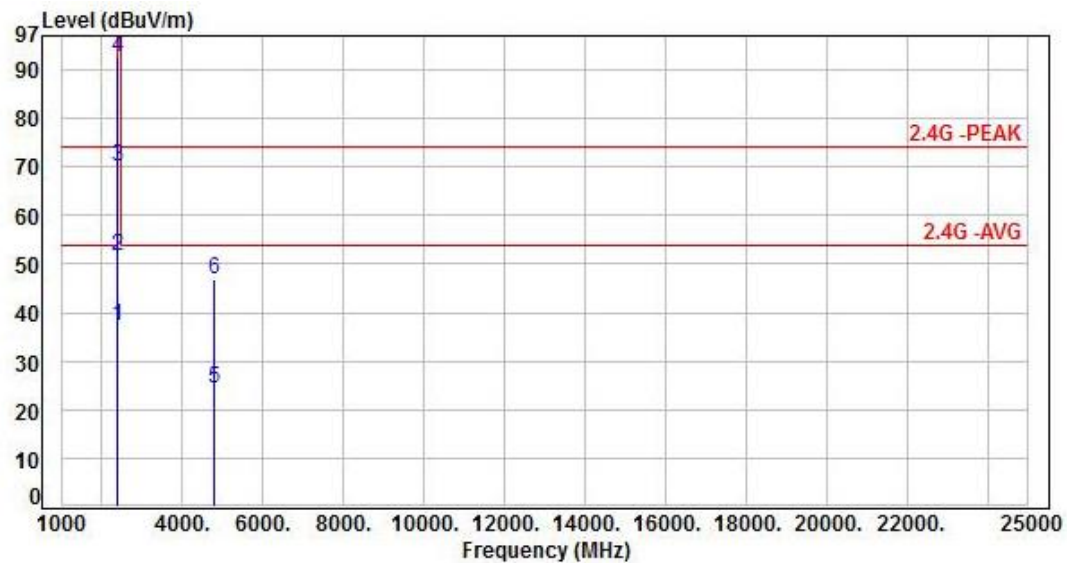
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	40.78	37.24	54.00	-16.76	Average	127	240	P
2	2390.00	-3.54	55.16	51.62	74.00	-22.38	Peak	127	240	P
3	2402.00	-3.51	73.73	70.22	200.00	-129.78	Average	127	240	P
4	2402.00	-3.51	96.23	92.72	200.00	-107.28	Peak	127	240	P
5	4804.00	3.76	20.50	24.26	54.00	-29.74	Average	100	333	P
6	4804.00	3.76	43.00	46.76	74.00	-27.24	Peak	100	333	P

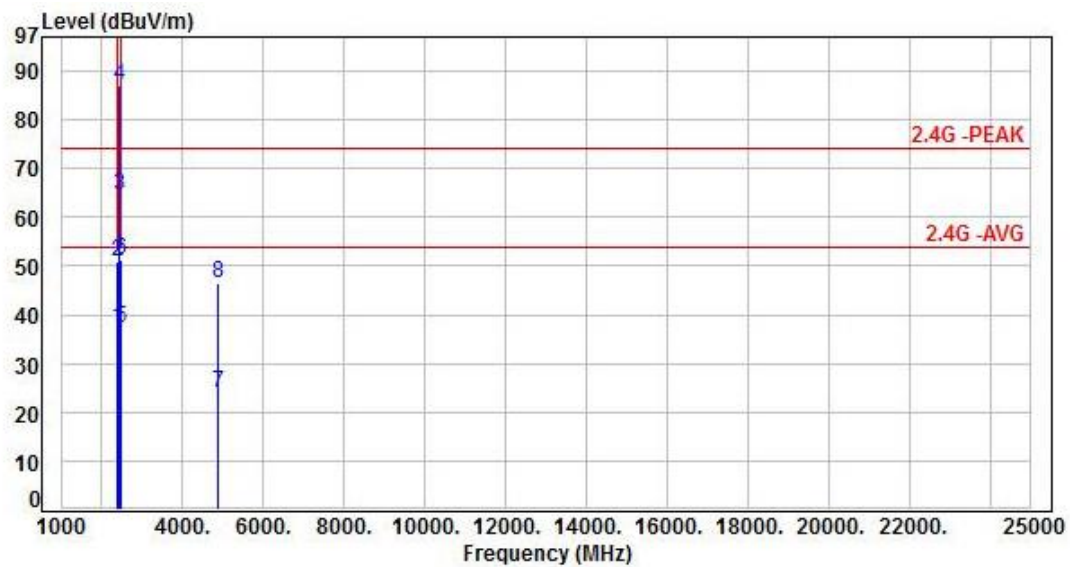
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	40.70	37.16	54.00	-16.84	Average	383	161	P
2	2390.00	-3.54	54.41	50.87	74.00	-23.13	Peak	383	161	P
3	2441.00	-3.47	68.16	64.69	200.00	-135.31	Average	383	161	P
4	2441.00	-3.47	90.66	87.19	200.00	-112.81	Peak	383	161	P
5	2483.50	-3.30	40.61	37.31	54.00	-16.69	Average	383	161	P
6	2483.50	-3.30	54.55	51.25	74.00	-22.75	Peak	383	161	P
7	4882.00	4.01	19.86	23.87	54.00	-30.13	Average	100	249	P
8	4882.00	4.01	42.36	46.37	74.00	-27.63	Peak	100	249	P

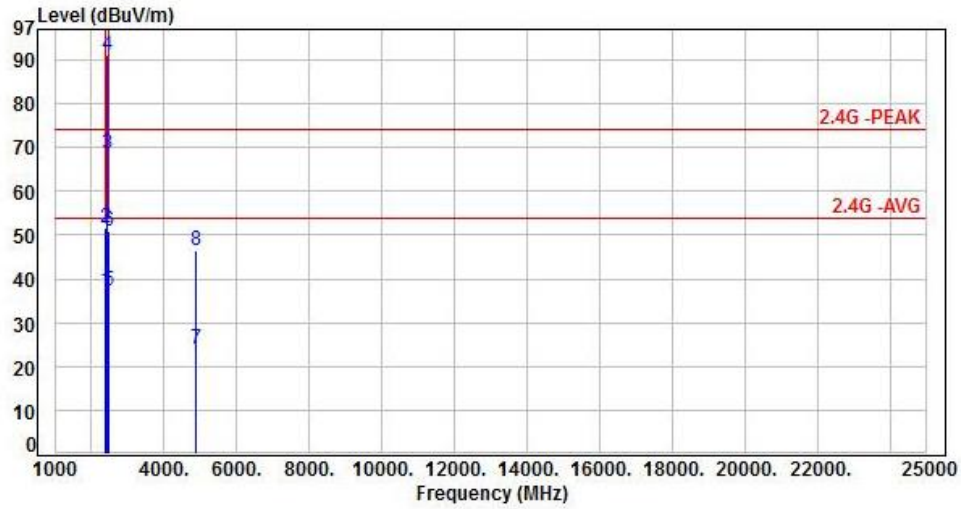
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	-3.54	40.73	37.19	54.00	-16.81	Average	125	36	P
2	2390.00	-3.54	55.33	51.79	74.00	-22.21	Peak	125	36	P
3	2441.00	-3.47	72.06	68.59	200.00	-131.41	Average	125	36	P
4	2441.00	-3.47	94.56	91.09	200.00	-108.91	Peak	125	36	P
5	2483.50	-3.30	40.62	37.32	54.00	-16.68	Average	125	36	P
6	2483.50	-3.30	54.18	50.88	74.00	-23.12	Peak	125	36	P
7	4882.00	4.01	19.93	23.94	54.00	-30.06	Average	100	142	P
8	4882.00	4.01	42.43	46.44	74.00	-27.56	Peak	100	142	P

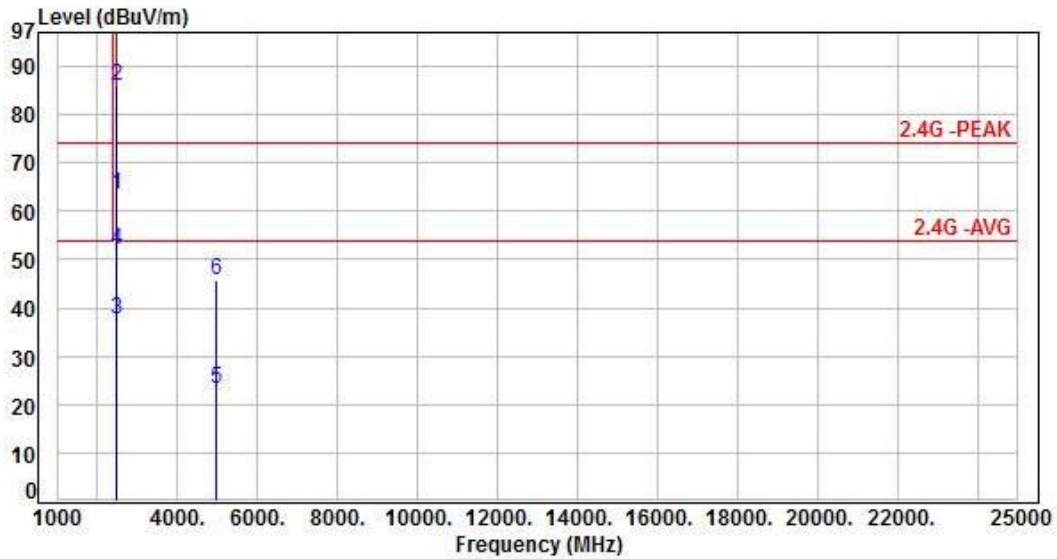
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	2480.00	-3.31	66.81	63.50	200.00	-136.50	Average	121	164	P
2	2480.00	-3.31	89.31	86.00	200.00	-114.00	Peak	121	164	P
3	2483.50	-3.30	40.75	37.45	54.00	-16.55	Average	121	164	P
4	2483.50	-3.30	55.43	52.13	74.00	-21.87	Peak	121	164	P
5	4960.00	4.35	19.06	23.41	54.00	-30.59	Average	100	255	P
6	4960.00	4.35	41.56	45.91	74.00	-28.09	Peak	100	255	P

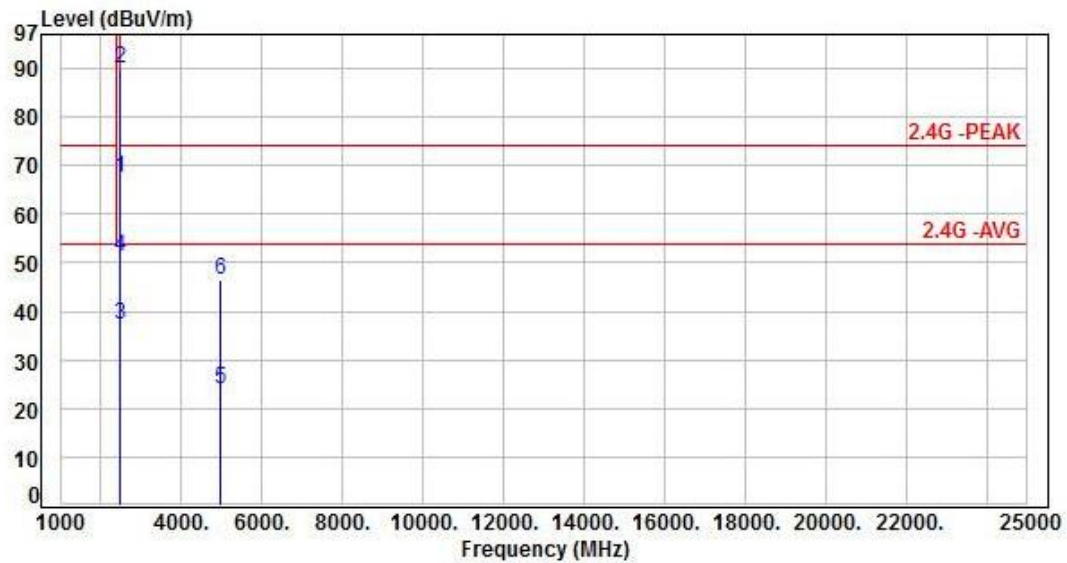
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	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	2480.00	-3.31	70.81	67.50	200.00	-132.50	Average	100	93	P
2	2480.00	-3.31	93.31	90.00	200.00	-110.00	Peak	100	93	P
3	2483.50	-3.30	40.65	37.35	54.00	-16.65	Average	100	93	P
4	2483.50	-3.30	54.73	51.43	74.00	-22.57	Peak	100	93	P
5	4960.00	4.35	19.64	23.99	54.00	-30.01	Average	100	307	P
6	4960.00	4.35	42.14	46.49	74.00	-27.51	Peak	100	307	P

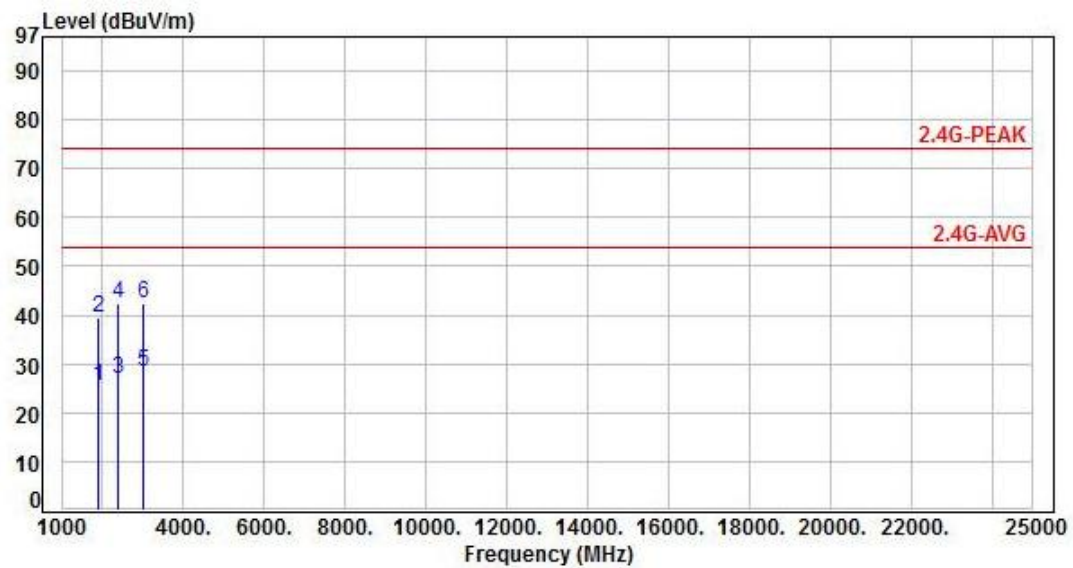
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH00		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.24	25.42	54.00	-28.58	Average	100	206	P
2	1900.00	-4.82	44.11	39.29	74.00	-34.71	Peak	100	206	P
3	2400.00	-3.51	30.41	26.90	54.00	-27.10	Average	100	174	P
4	2400.00	-3.51	45.88	42.37	74.00	-31.63	Peak	100	174	P
5	3000.00	-1.15	29.58	28.43	54.00	-25.57	Average	100	299	P
6	3000.00	-1.15	43.57	42.42	74.00	-31.58	Peak	100	299	P

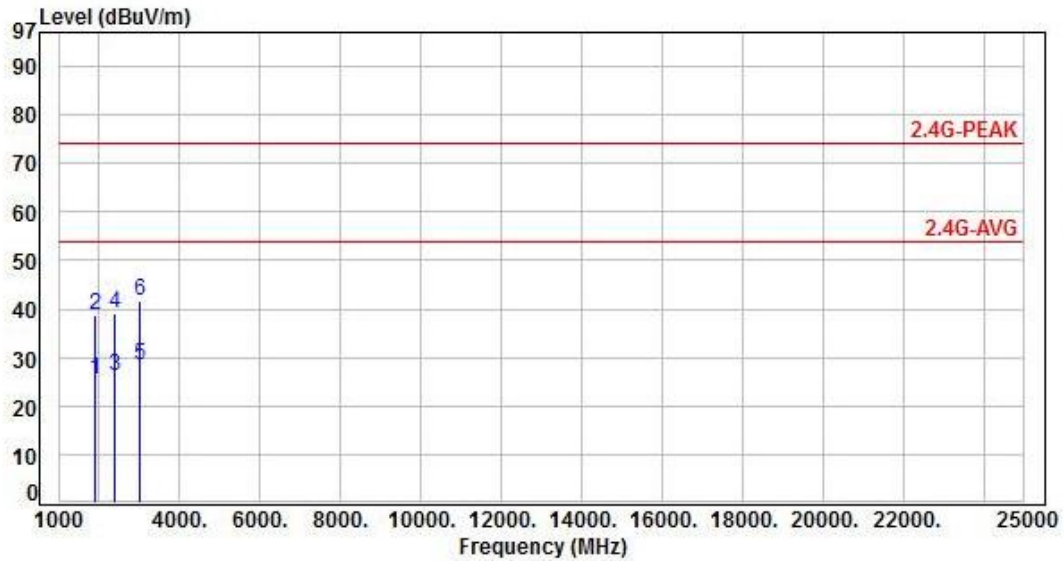
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH00		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.33	25.51	54.00	-28.49	Average	100	124	P
2	1900.00	-4.82	43.51	38.69	74.00	-35.31	Peak	100	124	P
3	2400.00	-3.51	29.64	26.13	54.00	-27.87	Average	100	286	P
4	2400.00	-3.51	42.70	39.19	74.00	-34.81	Peak	100	286	P
5	3000.00	-1.15	29.70	28.55	54.00	-25.45	Average	100	231	P
6	3000.00	-1.15	42.81	41.66	74.00	-32.34	Peak	100	231	P

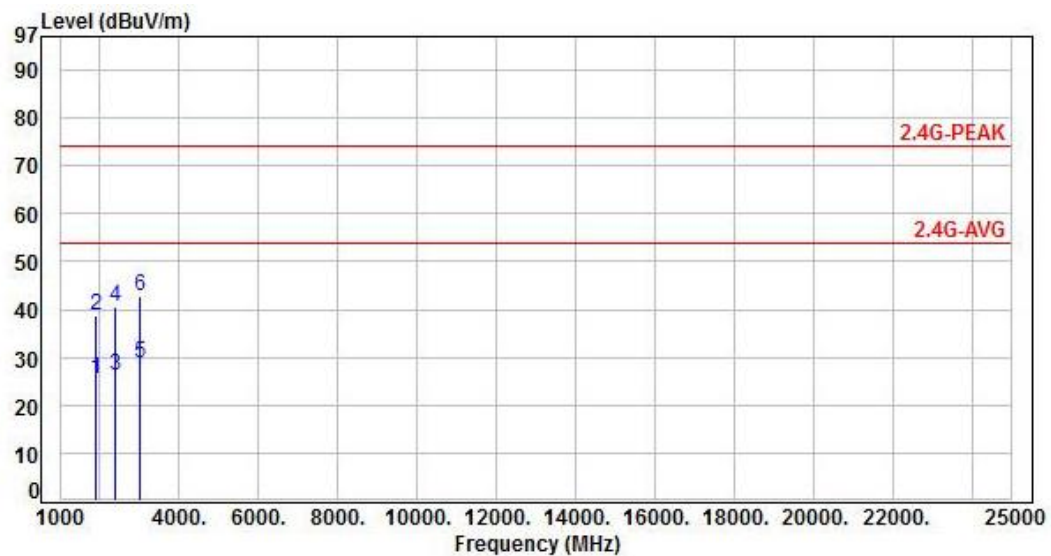
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH39		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.22	25.40	54.00	-28.60	Average	100	181	P
2	1900.00	-4.82	43.65	38.83	74.00	-35.17	Peak	100	181	P
3	2400.00	-3.51	29.83	26.32	54.00	-27.68	Average	100	155	P
4	2400.00	-3.51	44.12	40.61	74.00	-33.39	Peak	100	155	P
5	3000.00	-1.15	29.88	28.73	54.00	-25.27	Average	100	273	P
6	3000.00	-1.15	43.88	42.73	74.00	-31.27	Peak	100	273	P

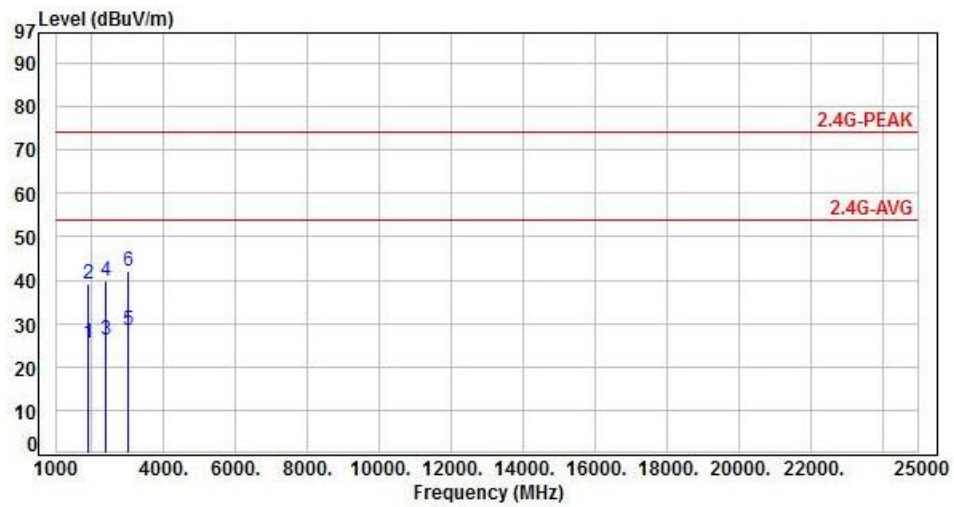
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH39		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.28	25.46	54.00	-28.54	Average	100	139	P
2	1900.00	-4.82	43.99	39.17	74.00	-34.83	Peak	100	139	P
3	2400.00	-3.51	29.73	26.22	54.00	-27.78	Average	100	270	P
4	2400.00	-3.51	43.35	39.84	74.00	-34.16	Peak	100	270	P
5	3000.00	-1.15	29.66	28.51	54.00	-25.49	Average	100	212	P
6	3000.00	-1.15	43.24	42.09	74.00	-31.91	Peak	100	212	P

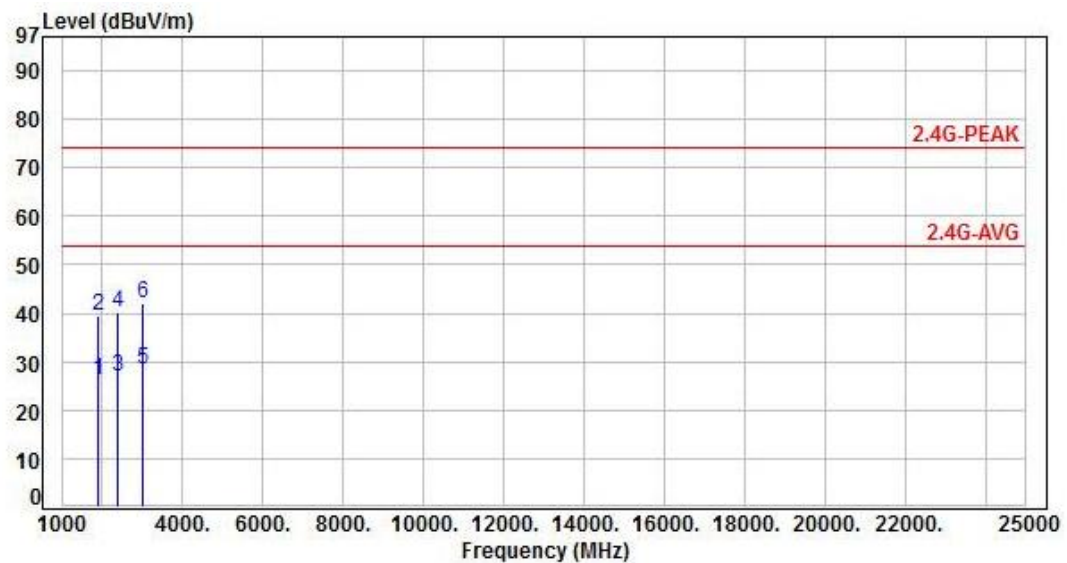
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH78		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.94	26.12	54.00	-27.88	Average	100	211	P
2	1900.00	-4.82	44.25	39.43	74.00	-34.57	Peak	100	211	P
3	2400.00	-3.51	30.40	26.89	54.00	-27.11	Average	100	194	P
4	2400.00	-3.51	43.58	40.07	74.00	-33.93	Peak	100	194	P
5	3000.00	-1.15	29.62	28.47	54.00	-25.53	Average	100	264	P
6	3000.00	-1.15	43.17	42.02	74.00	-31.98	Peak	100	264	P

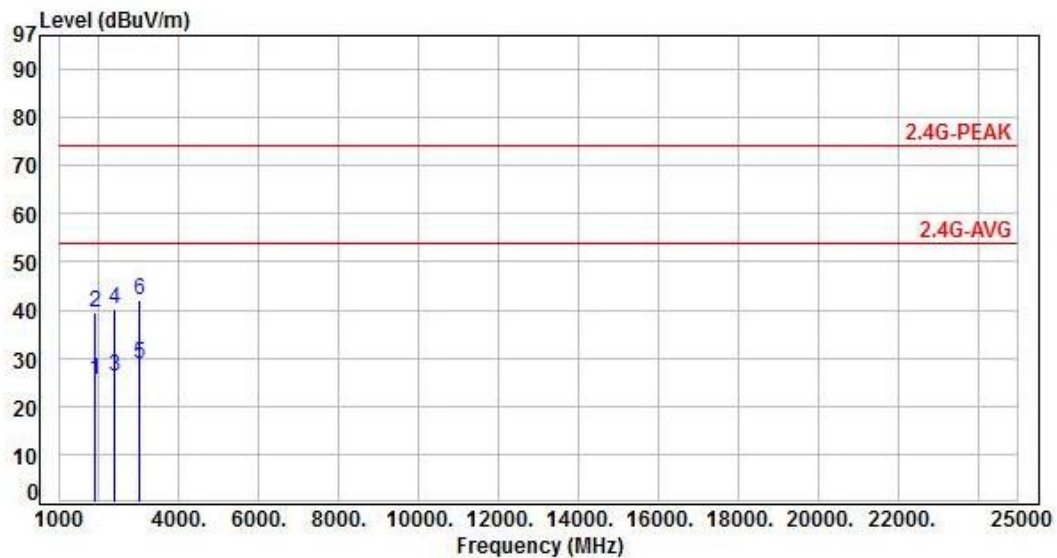
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From Battery	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH78		:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1900.00	-4.82	30.37	25.55	54.00	-28.45	Average	100	117	P
2	1900.00	-4.82	44.13	39.31	74.00	-34.69	Peak	100	117	P
3	2400.00	-3.51	29.70	26.19	54.00	-27.81	Average	100	298	P
4	2400.00	-3.51	43.69	40.18	74.00	-33.82	Peak	100	298	P
5	3000.00	-1.15	29.76	28.61	54.00	-25.39	Average	100	207	P
6	3000.00	-1.15	43.32	42.17	74.00	-31.83	Peak	100	207	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

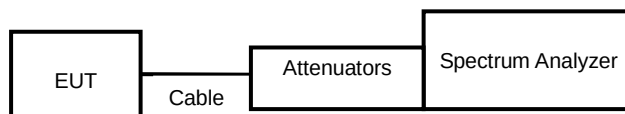
對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.6 節之(1)(A)規定，載波頻率頻道間隔不得低於 25 千赫 (kHz)或跳頻頻道之 20dB 頻寬，兩者取較寬者。

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	0.968	0.646
	39	2441	0.969	0.646
	78	2480	0.969	0.646
$\pi/4$ -DQPSK	0	2402	1.284	0.856
	39	2441	1.286	0.857
	78	2480	1.284	0.856
8DPSK	0	2402	1.285	0.857
	39	2441	1.285	0.857
	78	2480	1.287	0.858

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





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



CH39



CH78





7. 頻道間隔之規定

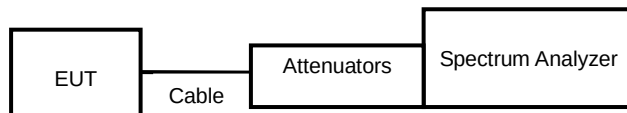
7.1. 適用標準

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器材技術規範 4.10.1.6 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 300KHz 和視訊頻寬為 1000 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	0.646
	39	2441	1.002	0.646
	78	2480	1.002	0.646
$\pi/4$ -DQPSK	0	2402	1.002	0.856
	39	2441	1.002	0.857
	78	2480	1.002	0.856
8DPSK	0	2402	1.002	0.857
	39	2441	1.002	0.857
	78	2480	1.002	0.858

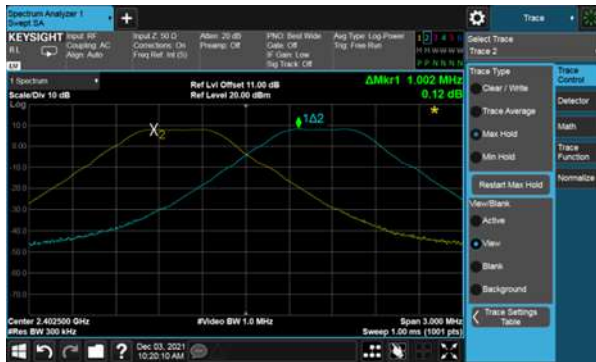
備註：繪圖資料請參考下頁。

7.5. 結果判定

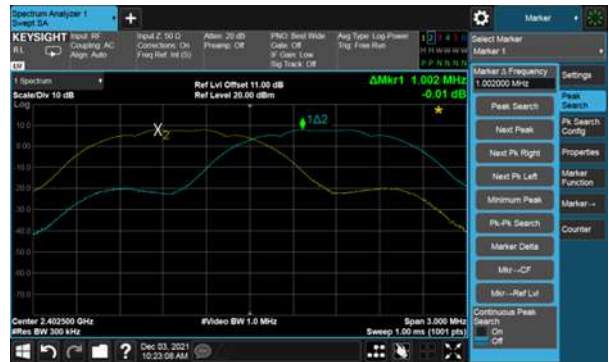
高、中、低頻段的頻道間隔皆大於 25 KHz，合乎標準規定。



Modulation Type: GFSK (1Mbps)
Channel: 00



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



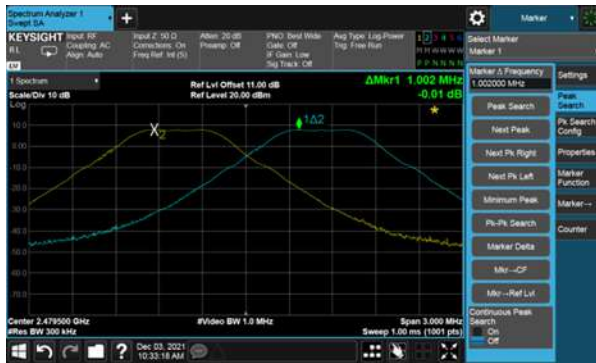
CH39



CH39



CH78

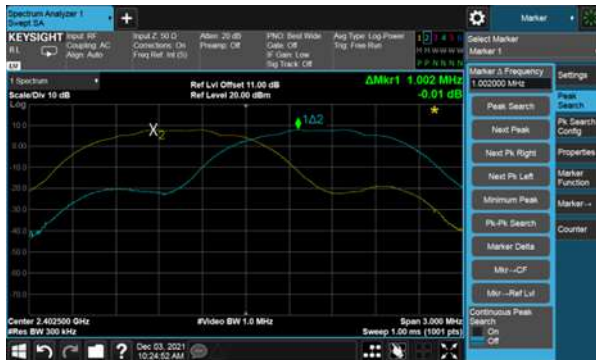


CH78

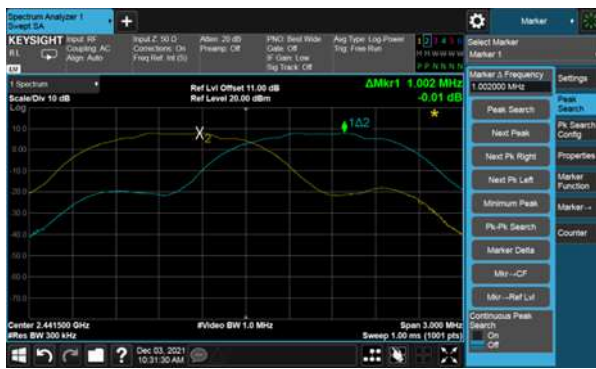




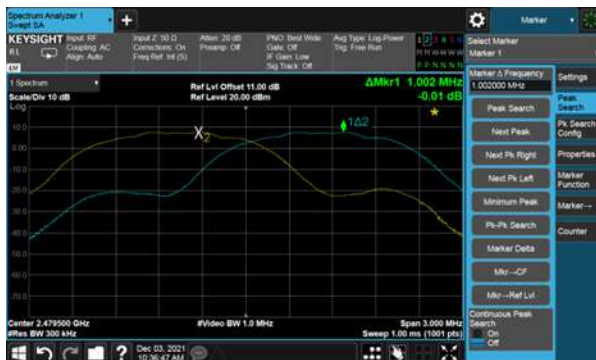
Modulation Type: 8DPSK (3Mbps)
Channel: 00



CH39



CH78





8. 頻率佔用時間之規定

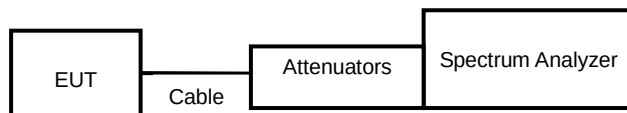
8.1. 適用標準

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器材技術規範 4.10.1.6 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 300KHz 和視訊頻寬為 1000 KHz。
- 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	0.375	320.10	120.04	400
GFSK-DH3	2402	1.632	159.90	260.96	400
GFSK-DH5	2402	2.880	106.81	307.61	400
$\pi/4$ -DQPSK-DH1	2402	0.385	320.10	123.24	400
$\pi/4$ -DQPSK-DH3	2402	1.632	159.90	260.96	400
$\pi/4$ -DQPSK-DH5	2402	2.880	106.81	307.61	400
8DPSK-DH1	2402	0.380	320.10	121.64	400
8DPSK-DH3	2402	1.632	159.90	260.96	400
8DPSK-DH5	2402	2.895	106.81	309.21	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	0.373	160.00	59.73	400
AFH-DH3	2402-2421	1.632	80.00	130.56	400
AFH-DH5	2402-2421	2.868	53.33	152.95	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 $800/79=10.12$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $10.12 \times 31.6 = 320$ 次。

DH3 模式:

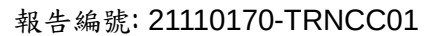
本系統每秒跳頻 1600 次，故每次跳頻時間 $3/1600=1.875\text{ms}$ 。而每個 package 需要 3 次發射及 1 次接收，故每秒於 79 個頻道中只發射 400 次，平均每秒每個頻道之發射次數為 $400/79=5.06$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $5.06 \times 31.6 = 160$ 次。

DH5 模式:

本系統每秒跳頻 1600 次，故每次跳頻時間 $5/1600=3.125\text{ms}$ 。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 266.67 次，平均每秒每個頻道之發射次數為 $266.67/79=3.37$ 次。故於週期(31.6 秒)內每個頻道發射次數為 $3.37 \times 31.6 = 106.67$ 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: $\pi/4$ -DQPSK-DH1
Channel: 00



Modulation Type: $\pi/4$ -DQPSK-DH3
Channel: 00

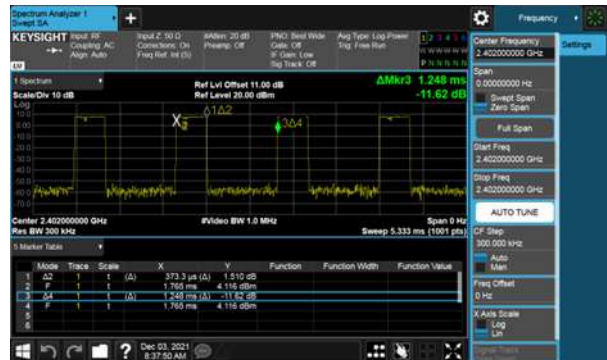


Modulation Type: $\pi/4$ -DQPSK-DH5
Channel: 00



Modulation Type: 8DPSK-DH1
Channel: 00

Modulation Type: AFH (DH1)

Modulation Type: 8DPSK-DH3
Channel: 00

Modulation Type: AFH (DH3)

Modulation Type: 8DPSK-DH5
Channel: 00

Modulation Type: AFH (DH5)





9. 跳頻頻道使用數量之規定

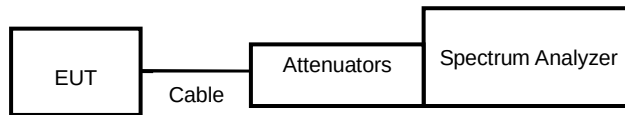
9.1. 適用標準

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器材技術規範 4.10.1.6 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

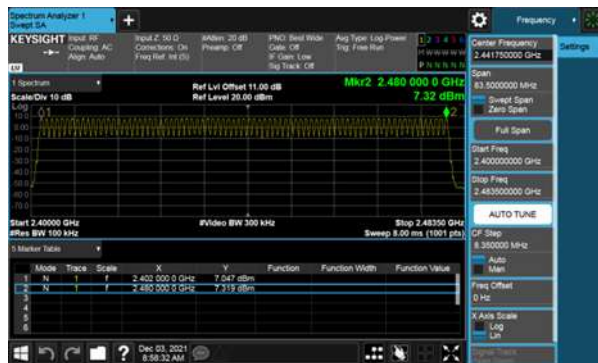
備註：繪圖資料請參考下頁。

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. 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器材技術規範 4.10.1.2 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。

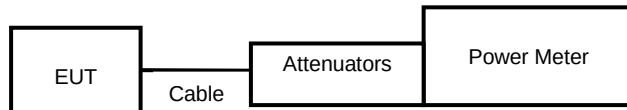
(B)：除(A)外，依 4.10.1.6(A)(a)之跳頻系統：0.125 瓦(W)(含)以下。

(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. 輸出功率之測試結果及數據**

Modulation Type	Setting	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	7	0	2402	7.85	6.095
	7	39	2441	7.83	6.067
	7	78	2480	7.54	5.675
$\pi/4$ -DQPSK	7	0	2402	5.45	3.508
	7	39	2441	5.58	3.614
	7	78	2480	5.28	3.373
8DPSK	7	0	2402	5.45	3.508
	7	39	2441	5.58	3.614
	7	78	2480	5.27	3.365

AFH Mode

Modulation Type	Setting	Channel	Frequency (MHz)	AV Output Power (dBm)	AV Output Power (mW)
GFSK	7	0-19	2402-2421	7.84	6.081
$\pi/4$ -DQPSK	7	0-19	2402-2421	5.51	3.556
8DPSK	7	0-19	2402-2421	5.51	3.556

10.5. 結果判定

高、中、低頻段的輸出功率皆低於 21 dBm，合乎標準規定。



11. 混附波發射限制之規定

11.1. 適用方法

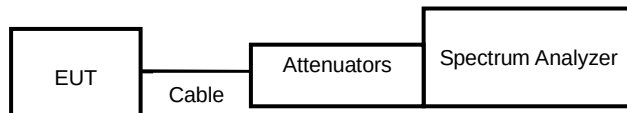
對使用跳頻系統之低功率發射機，依據國家通訊傳播委員會低功率射頻器材技術規範 4.10.1.5 節之規定，操作頻帶範圍外之任意 100 千赫(kHz)內，發射機所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫(kHz)內的射頻功率，其衰減值限制如下：

- (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 4.10.1.2(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 3.5 節禁用頻段之輻射發射，應符合第 3.6 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

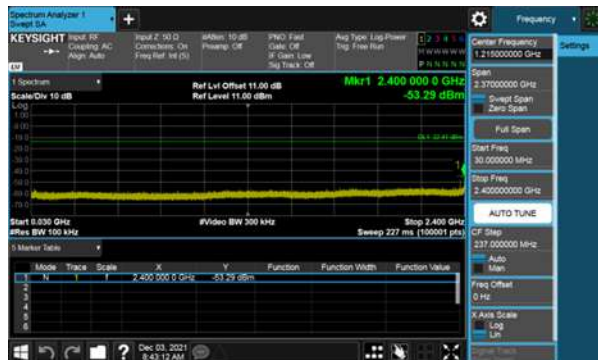
下邊緣頻帶：距下頻帶邊緣 40MHz 內最大混附波比主波低 30dB 以上，合乎標準規定。
上邊緣頻帶：距上頻帶邊緣 40MHz 內最大混附波比主波低 30dB 以上，合乎標準規定。



11.5. 混附波發射限制之測試結果及數據

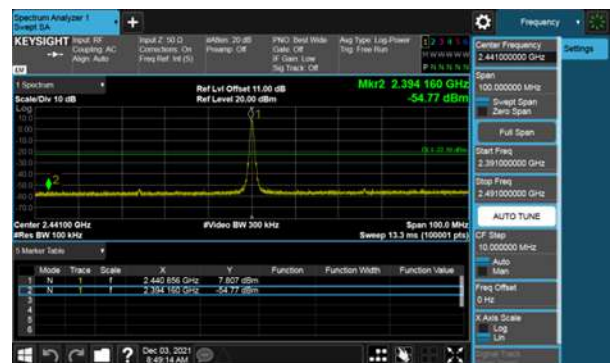
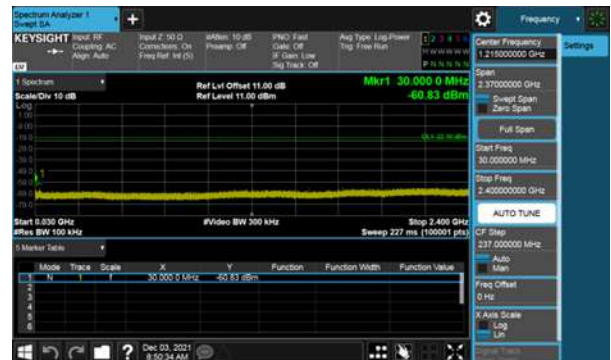
Modulation Type: GFSK (1Mbps)

Channel: 00



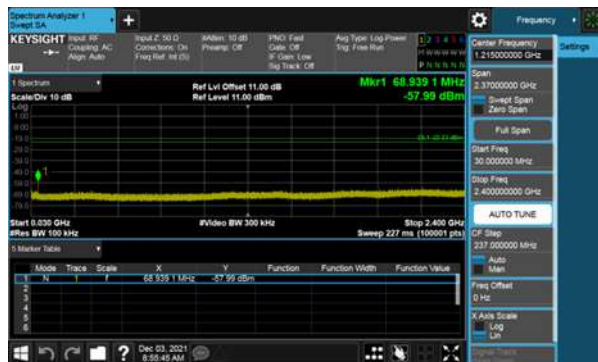
Modulation Type: GFSK (1Mbps)

Channel: 39

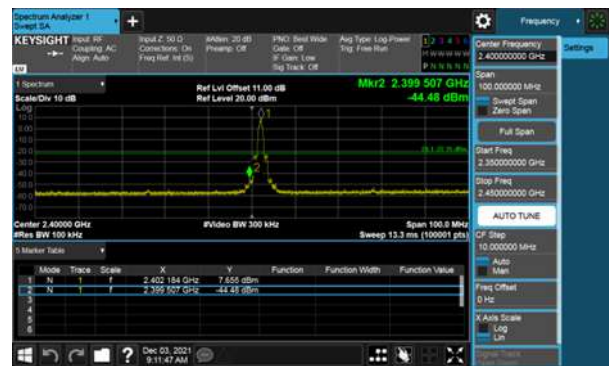
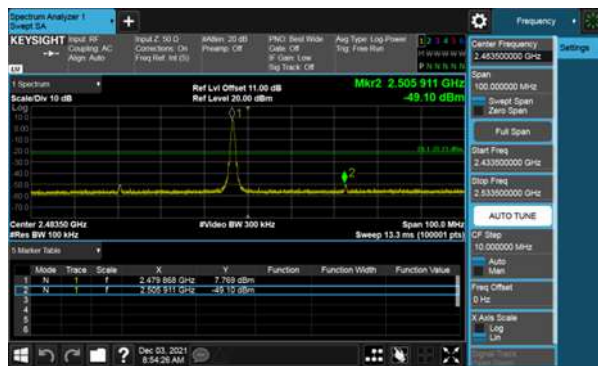
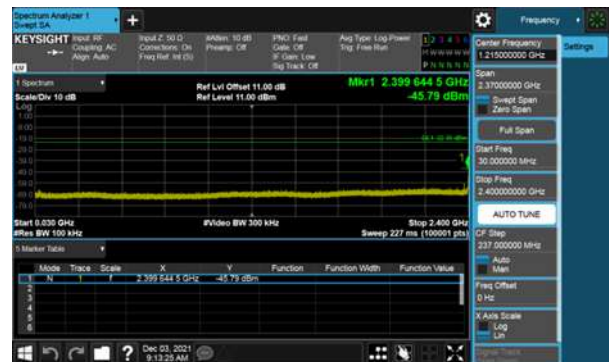




Modulation Type: GFSK (1Mbps)
Channel: 78



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

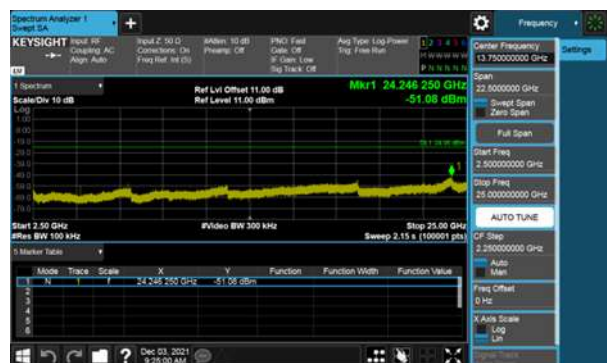
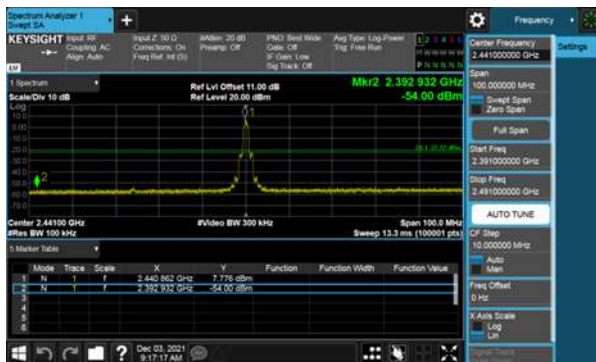




Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 39

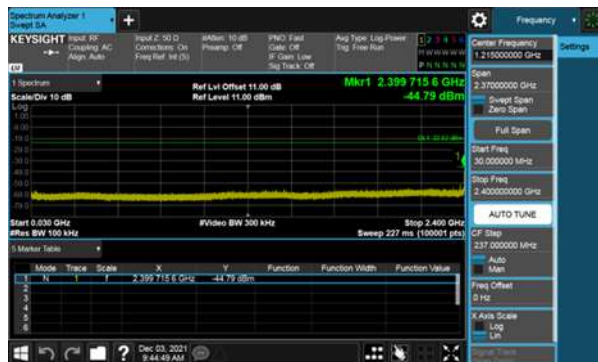


Modulation Type: $\pi/4$ -DQPSK (2Mbps)
Channel: 78

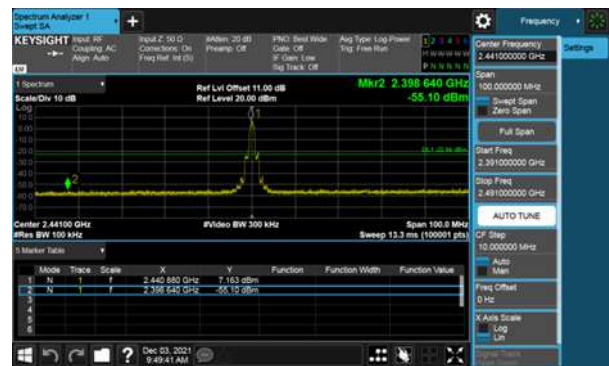
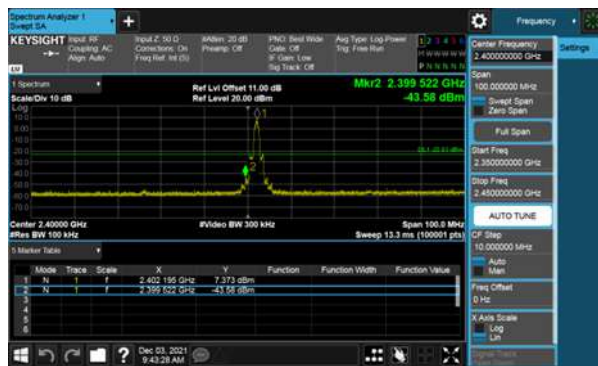




Modulation Type: 8DPSK (3Mbps)
Channel: 00

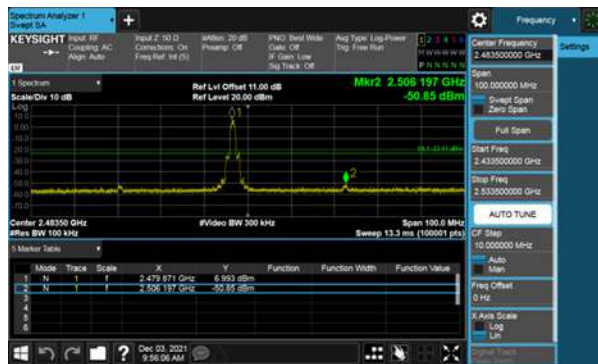


Modulation Type: 8DPSK (3Mbps)
Channel: 39





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

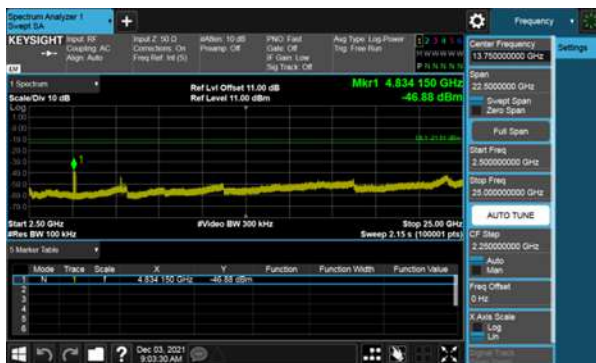




Hopping Mode: Modulation Type: GFSK

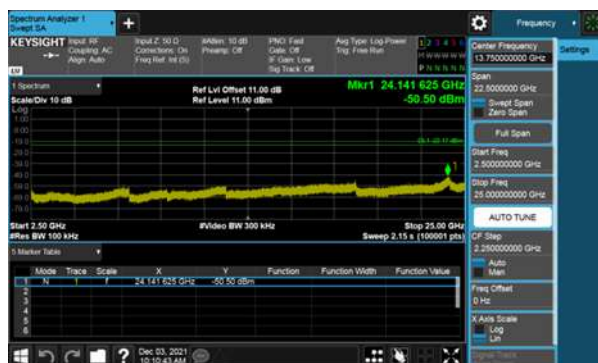


Modulation Type: $\pi/4$ -DQPSK





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>7.85 dBm (6.095mW)</u> at <u>2402MHz</u> (with <u>1.62 dBi antenna gain</u> .) 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.	



12.3.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	7.85	9.35	8.61	5	10.0000
$\pi/4$ -DQPSK	2402-2480	5.58	7.08	5.11	5	10.0000
8DPSK	2402-2480	5.58	7.08	5.11	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 - 1785.0	14470 - 14500
19.965 - 20.020	1805.0 - 1880.0	15350 - 16200
25.500 - 25.700	1885.0 - 1900.0	17700 - 21400
37.475 - 38.275	1905.0 - 1985.0	22010 - 23120
73.500 - 75.400	2010.0 - 2025.0	23600 - 24000
108.00 - 138.00	2110.0 - 2170.0	31200 - 31800
149.90 - 150.05	2200.0 - 2300.0	36430 - 36500
156.70 - 156.90	2310.0 - 2390.0	38600 以上
162.01 - 167.17	2483.5 - 2900.0	
167.72 - 173.20	3260.0 - 3267.0	

-----THE END OF REPORT-----