



低功率射頻電機測試報告

申請廠商	: 香港商優比快科技有限公司台灣分公司
地址	: 台北市信義區松仁路 107 號 12 樓
製造廠商	: Ubiquiti Networks, Inc.
地址	: 685 Third Avenue, 27th Floor New York, New York 10017 USA
產品名稱	: 3x3 802.11ac 家用無線路由器
產品型號	: AFi-R
廠牌	: ULABS
受理日期	: 106 年 11 月 23 日
完成日期	: 106 年 12 月 04 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





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證 明 書

申請廠商	:	香港商優比快科技有限公司台灣分公司
地址	:	台北市信義區松仁路 107 號 12 樓
製造廠商	:	Ubiquiti Networks, Inc.
地址	:	685 Third Avenue, 27th Floor New York, New York 10017 USA
產品名稱	:	3x3 802.11ac 家用無線路由器
產品型號	:	AFi-R
廠牌	:	ULABS
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 105 年 8 月 23 日。
發射功率 (電場強度)	:	27.47 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 106 年 11 月 25 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 2.2 節	---
2	電源線傳導干擾之要求	2.3 節	請參閱 2 章	免驗	免驗
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(2).(A)	請參閱 2 章	請參閱 6.4 節	合格
5	峰值輸出功率之要求	3.10.1.2 節(C)	請參閱 2 章	請參閱 7.4 節	合格
6	混附波發射限制之要求	3.10.1.5 節	請參閱 2 章	請參閱 8.4 節	合格
7	功率密度之要求	3.10.1.6 節(2).(B)	請參閱 2 章	請參閱 9.4 節	合格

報告簽署人：

測試工程師：



1. 一般描述

1.1. 產品規格

Modulation Type	DSSS, OFDM, FHSS, GFSK (Bluetooth low energy)
Frequency Range	802.11b/g/n: 2400-2483.5MHz 802.11a/an/ac: 5150-5250MHz, 5725-5850MHz Bluetooth: 2400-2483.5MHz
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: 6.5Mbps to 450Mbps (MCS0 – MCS23, HT20/40) 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11ac: 13Mbps to 1300Mbps (MCS0 – MCS9, VHT 20/40/80) Bluetooth: 1MHz
Antenna Type	PIFA Antenna
Antenna Gain	802.11b/g/n/a/an/ac: Antenna 0: 4.0 dBi Antenna 1: 4.0 dBi Antenna 2: 4.0 dBi Bluetooth: 1.0 dBi
Adapter	GP-M015-QC Input: 100-240V~ 50/60Hz MAX. 0.5A Output: 5V / 3A or 9V / 1.7A or 12V / 1.25A

1.2. 差異說明

無。



1.3. 無線界面規格及頻道對應頻率

802.11b, 802.11g, 802.11n HT20 (2412MHz~2462MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	*11	2462
*06	2437	---	---

802.11n HT40 (2422MHz~2452MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
---	---	07	2442
---	---	08	2447
*03	2422	*09	2452
04	2427	---	---
05	2432	---	---
*06	2437	---	---

*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 7 作業系統下，待測物執行"Art2_ver_4_9_815"傳送及接收訊號。
- 本申請件測試模式如下：

Test Mode	Operating Description
1	802.11b (11Mbps)
2	802.11g (54Mbps)
3	802.11n HT20 (195Mbps)
4	802.11n HT40 (405Mbps)
經驗證傳導干擾及輻射干擾以 Test Mode 3 之測試結果為最差，故以此作為發報告之依據。	

- 量測頻道及頻率：

802.11b/g/n HT20: CH 01: 2412MHz, CH 06: 2437MHz, CH 11: 2462MHz

802.11n HT 40: CH 03: 2422MHz, CH 06: 2437MHz, CH 09: 2452MHz

1.5. 受測裝置之系統說明

設備	廠牌	型號	檢磁號碼	長度/訊號線類別	長度/電源線類別
遠端工作站					
筆記型電腦	DELL	LatitudeE5450	R33002	N/A	非隔離, 1.8m

訊號線：

Cable	Quantity	Description
RJ45	1	非隔離 / 15.0m



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 223 新北市石碇區十八重溪 68 之 1 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。

1.7. 量測不確定度

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	±2.9076 dB
Radiated Emission	9 kHz ~ 25,000 MHz	Vertical / Horizontal	±0.948 dB
Spurious Emission (Conducted)	-	-	±4.011 dB
Maximum Peak and Average Output Power	-	-	±0.322 dB
Power Spectral Density	-	-	±0.322 dB
Bandwidth	-	-	±74.224Hz



2. 測試儀器

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2017/03/07	2018/03/06
LISN	Schwarzbeck	NSLK 8127	8127-568	2017/02/15	2018/02/14
Pulse Limiter	R&S	ESH3-Z2	101934	2017/02/14	2018/02/13
Bilog Antenna	Schwarzbeck	VULB9168	369	2017/03/15	2018/03/14
Active Loop Antenna	EMCO	6507	40855	2017/05/15	2018/05/14
Horn Antenna	EMCO	3115	31589	2017/02/18	2018/02/17
Horn Antenna	EMCO	3116	31970	2017/03/29	2018/03/28
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2017/03/17	2018/03/16
Preamplifier	EM	EM330	60660	2017/02/25	2018/02/24
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2017/09/20	2018/09/19
Preamplifier	Agilent	8449B	3008A01954	2017/02/09	2018/02/08
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2017/11/10	2018/11/09
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2017/03/17	2018/03/16
Spectrum Analyzer	R&S	FSP40	100219	2017/07/01	2018/06/30
BLUETOOTH TESTER	R&S	CBT	101133	2017/03/10	2018/03/09
Attenuator	KEYSIGHT	8491B	MY39250703	2017/03/07	2018/03/06
Rotary Attenuator	Agilent	8495B	MY42146680	2017/03/13	2018/03/12
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2017/09/04	2018/09/03
Series Power Meter	Anritsu	ML2495A	1224005	2017/03/01	2018/02/28
Power Sensor	Anritsu	MA2411B	1207295	2017/03/01	2018/02/28
Cable	HUBER SUHNER	SUCOFLEX 102	28422/2	2017/02/25	2018/02/24
Cable	HUBER SUHNER	SUCOFLEX 102	28418/2	2017/02/25	2018/02/24
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	v2.0.0.1	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A



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 : UBIQUIT
- 1.2 Model : N/A
- 1.3 Antenna type : PIFA Antenna
- 1.4 Frequency Range : 2412-2462MHz
- 1.5 Gain(peak) : 4.0 dBi

(參照天線規格資料)

$$\begin{aligned}\text{Directional gain} &= G_{\text{ant}} + 10\log(N) \text{ dBi} \\ &= 4 + 10\log(3) \\ &= 8.77 \text{ (dBi)}\end{aligned}$$

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

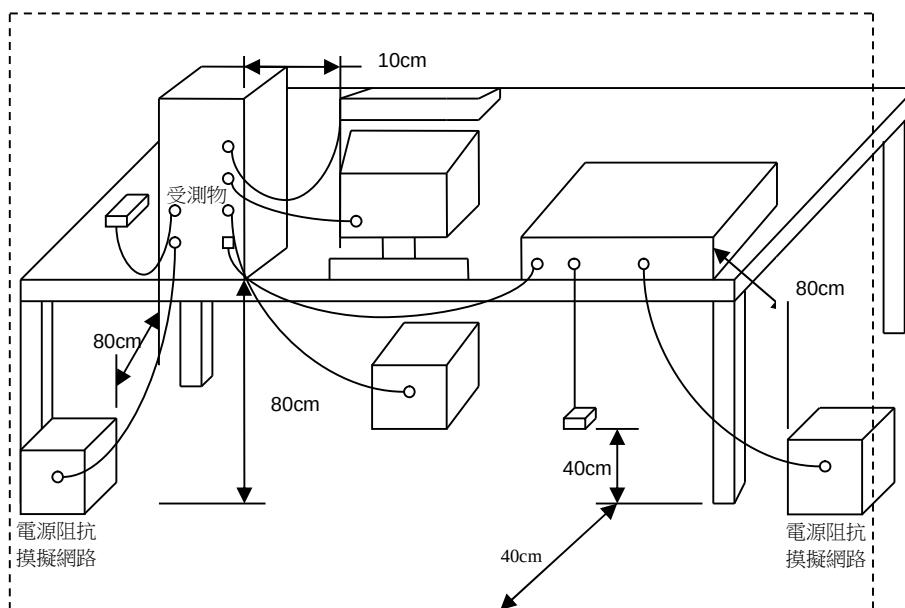
註：隨頻率之對數遞減

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 之間之電源線導放射強度。

備註：此項目之擴充不確定度為 $\pm 2.71\text{dB}$

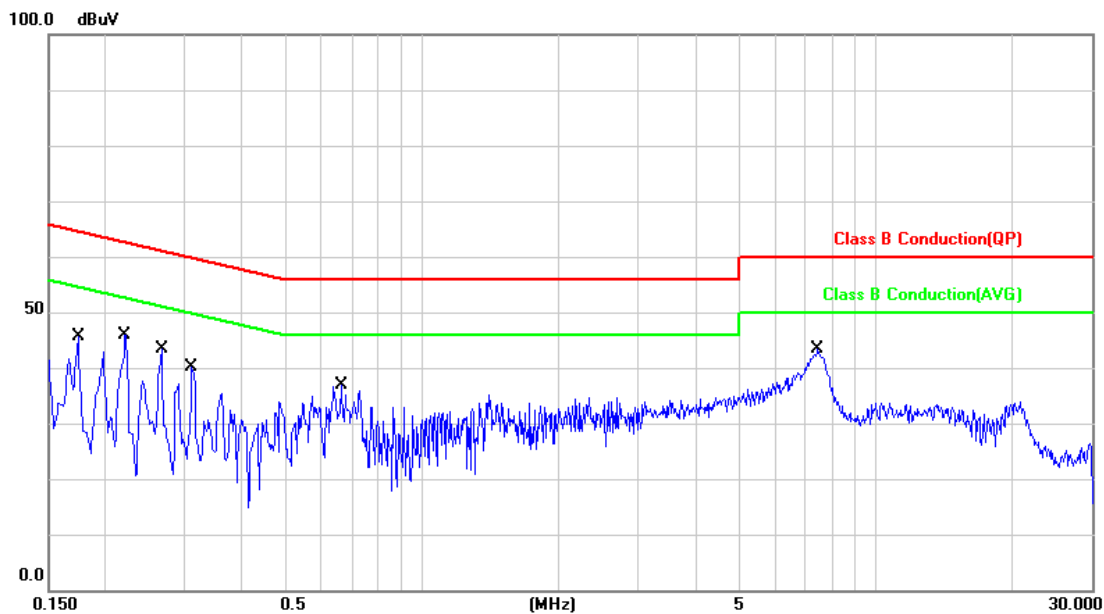
4.3. 傳導干擾之擺設





4.4. 傳導干擾之測試結果及數據

Power	: AC 110V	Pol/Phase	: LINE
Test Mode	: Mode 3, CH01	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1740	9.99	31.34	41.33	64.76	-23.43	QP	P
2	0.1740	9.99	15.69	25.68	54.76	-29.08	AVG	P
3	0.2220	10.00	32.83	42.83	62.74	-19.91	QP	P
4	0.2220	10.00	19.32	29.32	52.74	-23.42	AVG	P
5	0.2660	10.01	29.38	39.39	61.24	-21.85	QP	P
6	0.2660	10.01	16.82	26.83	51.24	-24.41	AVG	P
7	0.3100	10.02	25.63	35.65	59.97	-24.32	QP	P
8	0.3100	10.02	13.35	23.37	49.97	-26.60	AVG	P
9	0.6620	10.04	25.66	35.70	56.00	-20.30	QP	P
10	0.6620	10.04	21.29	31.33	46.00	-14.67	AVG	P
11	7.4700	10.32	31.38	41.70	60.00	-18.30	QP	P
12	7.4700	10.32	28.97	39.29	50.00	-10.71	AVG	P

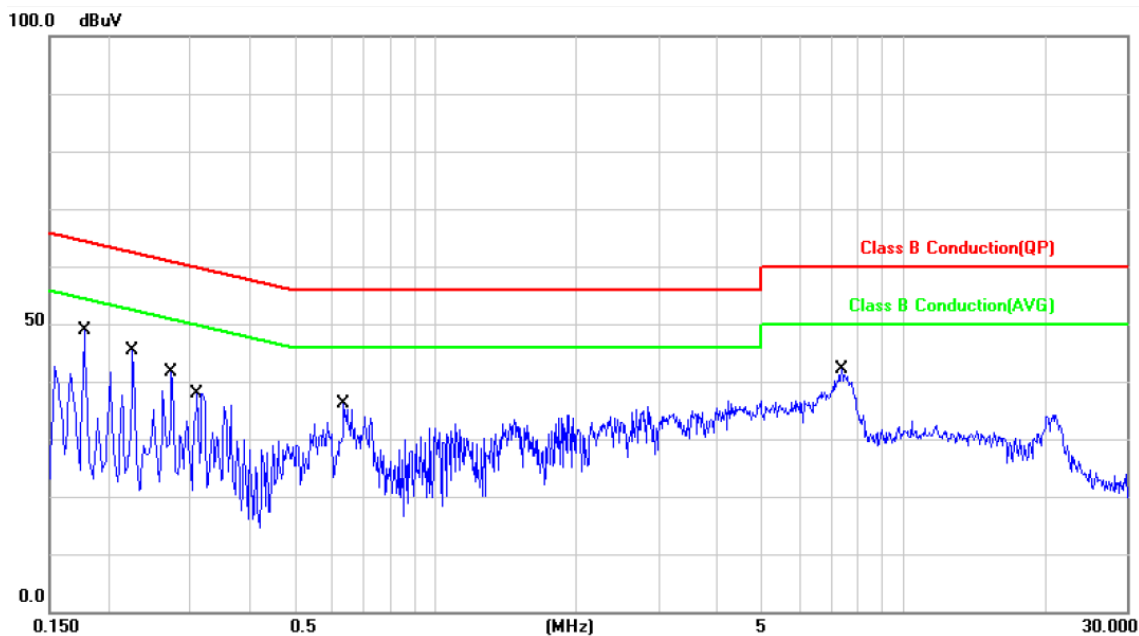
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	: AC 110V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3, CH01	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	9.98	36.25	46.23	64.57	-18.34	QP	P
2	0.1780	9.98	20.50	30.48	54.57	-24.09	AVG	P
3	0.2260	9.97	33.11	43.08	62.59	-19.51	QP	P
4	0.2260	9.97	18.54	28.51	52.59	-24.08	AVG	P
5	0.2740	9.97	28.20	38.17	60.99	-22.82	QP	P
6	0.2740	9.97	13.48	23.45	50.99	-27.54	AVG	P
7	0.3100	9.98	24.86	34.84	59.97	-25.13	QP	P
8	0.3100	9.98	10.84	20.82	49.97	-29.15	AVG	P
9	0.6380	10.00	23.14	33.14	56.00	-22.86	QP	P
10	0.6380	10.00	17.69	27.69	46.00	-18.31	AVG	P
11	7.3780	10.34	29.23	39.57	60.00	-20.43	QP	P
12	7.3780	10.34	26.95	37.29	50.00	-12.71	AVG	P

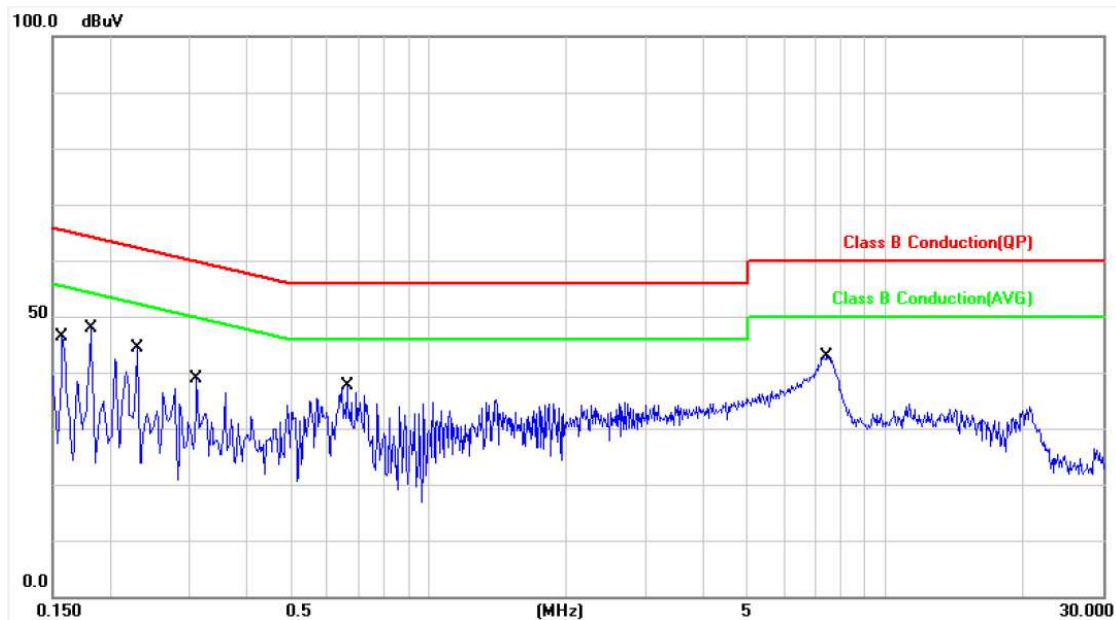
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	: AC 110V	Pol/Phase	: LINE
Test Mode	: Mode 3, CH06	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1580	9.99	38.04	48.03	65.56	-17.53	QP	P
2	0.1580	9.99	23.53	33.52	55.56	-22.04	AVG	P
3	0.1819	10.00	35.16	45.16	64.39	-19.23	QP	P
4	0.1819	10.00	21.19	31.19	54.39	-23.20	AVG	P
5	0.2300	10.00	29.17	39.17	62.45	-23.28	QP	P
6	0.2300	10.00	14.89	24.89	52.45	-27.56	AVG	P
7	0.3100	10.02	25.13	35.15	59.97	-24.82	QP	P
8	0.3100	10.02	13.25	23.27	49.97	-26.70	AVG	P
9	0.6620	10.04	25.79	35.83	56.00	-20.17	QP	P
10	0.6620	10.04	21.34	31.38	46.00	-14.62	AVG	P
11	7.4660	10.32	31.14	41.46	60.00	-18.54	QP	P
12	7.4660	10.32	28.08	38.40	50.00	-11.60	AVG	P

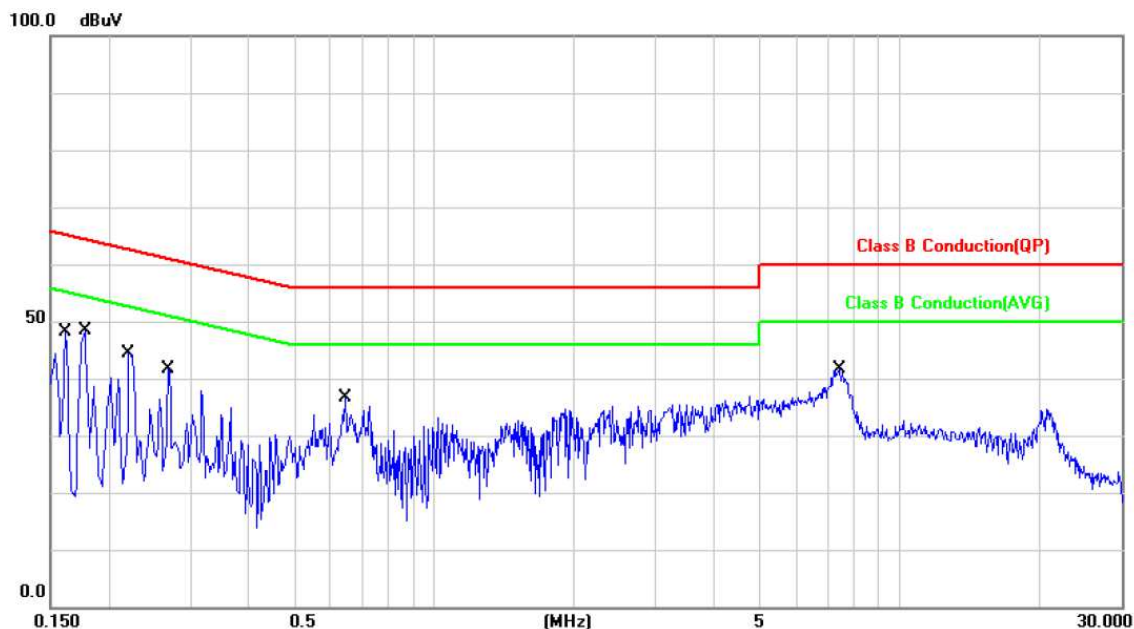
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	: AC 110V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3, CH06	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1620	9.99	33.53	43.52	65.36	-21.84	QP	P
2	0.1620	9.99	16.67	26.66	55.36	-28.70	AVG	P
3	0.1780	9.98	35.81	45.79	64.57	-18.78	QP	P
4	0.1780	9.98	20.15	30.13	54.57	-24.44	AVG	P
5	0.2220	9.97	32.05	42.02	62.74	-20.72	QP	P
6	0.2220	9.97	17.20	27.17	52.74	-25.57	AVG	P
7	0.2700	9.97	29.84	39.81	61.12	-21.31	QP	P
8	0.2700	9.97	16.96	26.93	51.12	-24.19	AVG	P
9	0.6460	10.00	21.41	31.41	56.00	-24.59	QP	P
10	0.6460	10.00	15.12	25.12	46.00	-20.88	AVG	P
11	7.4220	10.34	29.07	39.41	60.00	-20.59	QP	P
12	7.4220	10.34	26.35	36.69	50.00	-13.31	AVG	P

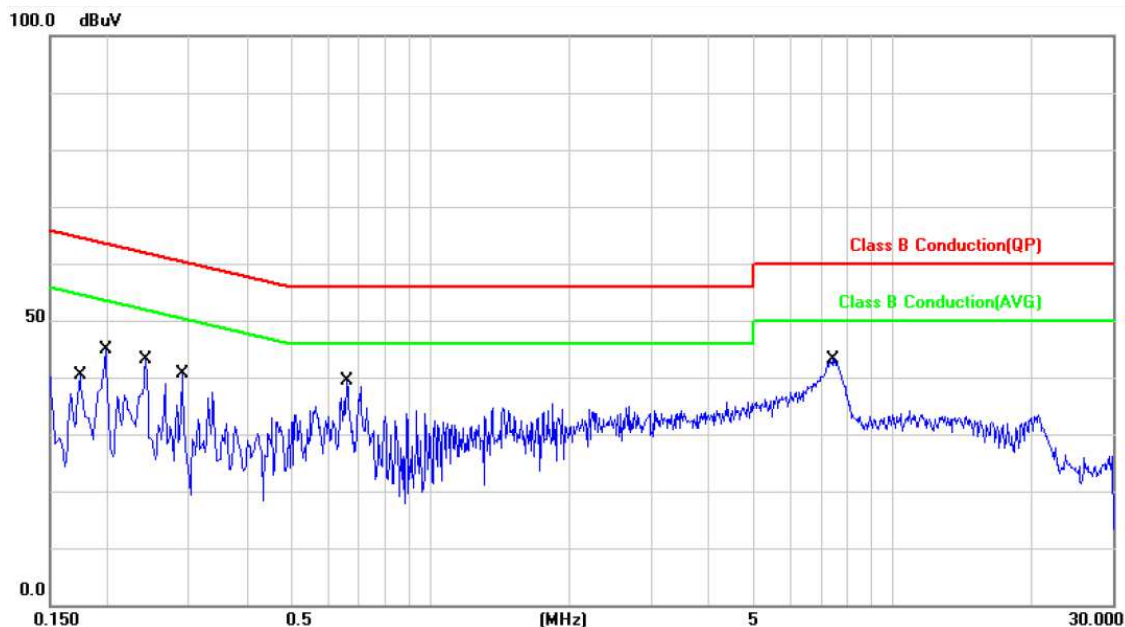
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	: AC 110V	Pol/Phase	: LINE
Test Mode	: Mode 3, CH11	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1740	9.99	30.71	40.70	64.76	-24.06	QP	P
2	0.1740	9.99	15.39	25.38	54.76	-29.38	AVG	P
3	0.1980	10.00	31.67	41.67	63.69	-22.02	QP	P
4	0.1980	10.00	17.03	27.03	53.69	-26.66	AVG	P
5	0.2420	10.01	28.84	38.85	62.02	-23.17	QP	P
6	0.2420	10.01	15.44	25.45	52.02	-26.57	AVG	P
7	0.2900	10.01	27.17	37.18	60.52	-23.34	QP	P
8	0.2900	10.01	16.24	26.25	50.52	-24.27	AVG	P
9	0.6580	10.04	24.73	34.77	56.00	-21.23	QP	P
10	0.6580	10.04	18.66	28.70	46.00	-17.30	AVG	P
11	7.4460	10.32	31.38	41.70	60.00	-18.30	QP	P
12	7.4460	10.32	28.94	39.26	50.00	-10.74	AVG	P

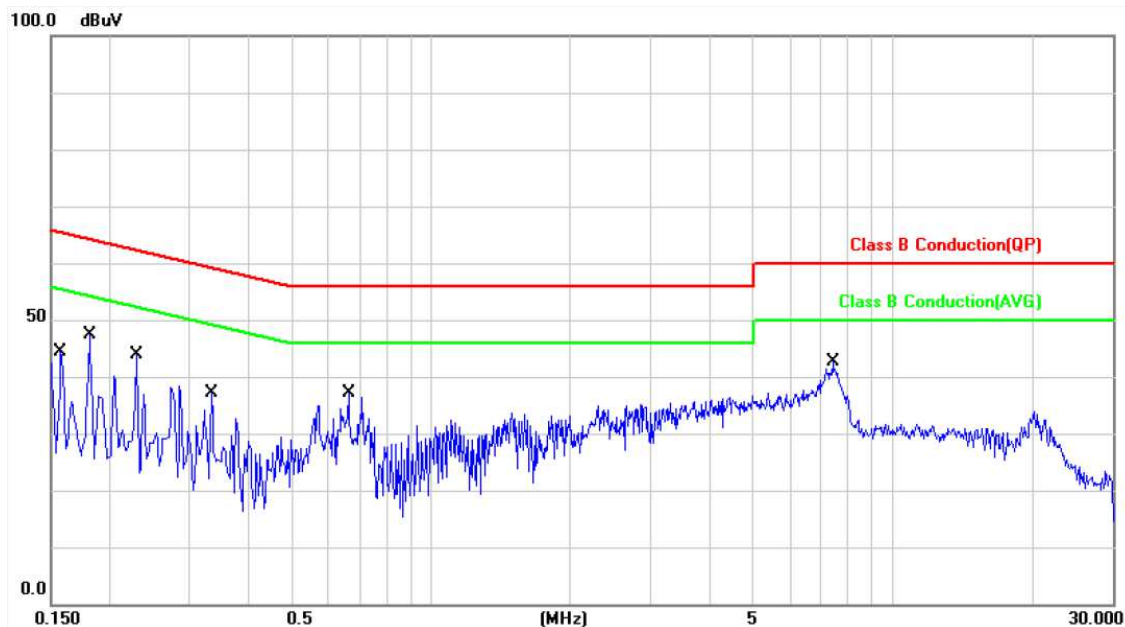
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator



Power	: AC 110V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3, CH11	Temperature	: 21 °C
Test date	: Nov. 23, 2017	Humidity	: 52 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1580	9.99	37.81	47.80	65.56	-17.76	QP	P
2	0.1580	9.99	21.74	31.73	55.56	-23.83	AVG	P
3	0.1819	9.98	34.99	44.97	64.39	-19.42	QP	P
4	0.1819	9.98	19.35	29.33	54.39	-25.06	AVG	P
5	0.2300	9.97	28.80	38.77	62.45	-23.68	QP	P
6	0.2300	9.97	12.82	22.79	52.45	-29.66	AVG	P
7	0.3339	9.98	24.04	34.02	59.35	-25.33	QP	P
8	0.3339	9.98	12.00	21.98	49.35	-27.37	AVG	P
9	0.6620	10.00	24.55	34.55	56.00	-21.45	QP	P
10	0.6620	10.00	19.26	29.26	46.00	-16.74	AVG	P
11	7.4260	10.34	28.66	39.00	60.00	-21.00	QP	P
12	7.4260	10.34	25.09	35.43	50.00	-14.57	AVG	P

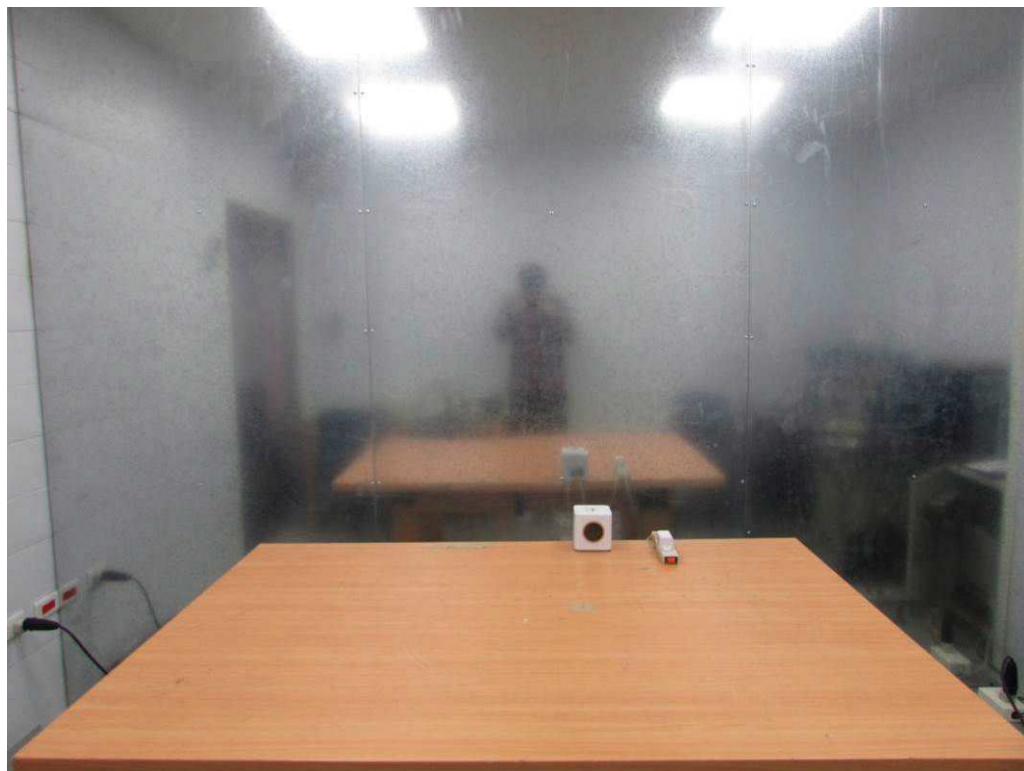
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator

4.5. 傳導量測之配置照片

正面照



背面照





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 3.10.1.5 節之要求，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：

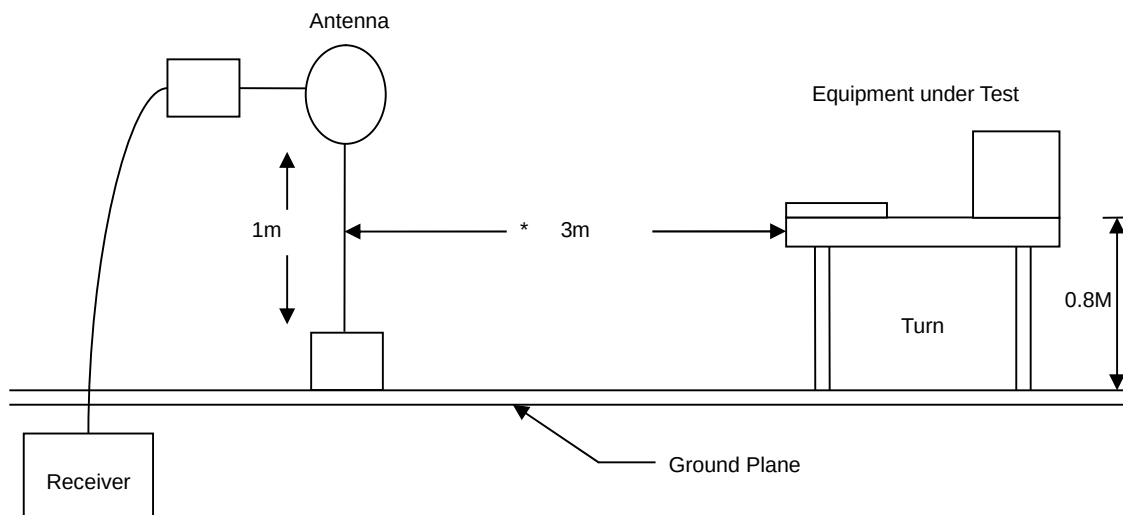
頻率(MHz)	測試距離(m)	限制值(dB μ V)	限制值(μ V/m)
0.009 – 0.490 (含)	300	67.6 / kHz	2400 / kHz
0.490 (不含) – 1.705 (含)	30	87.6 / kHz	24000 / kHz
1.705(不含) – 30(不含)	30	29.5	30
30 (含) – 88 (含)	3	40.0	100
88(不含) – 216 (含)	3	43.5	150
216(不含) – 960 (含)	3	46.0	200
960(不含)以上	3	54.0	500

5.2. 測試方法

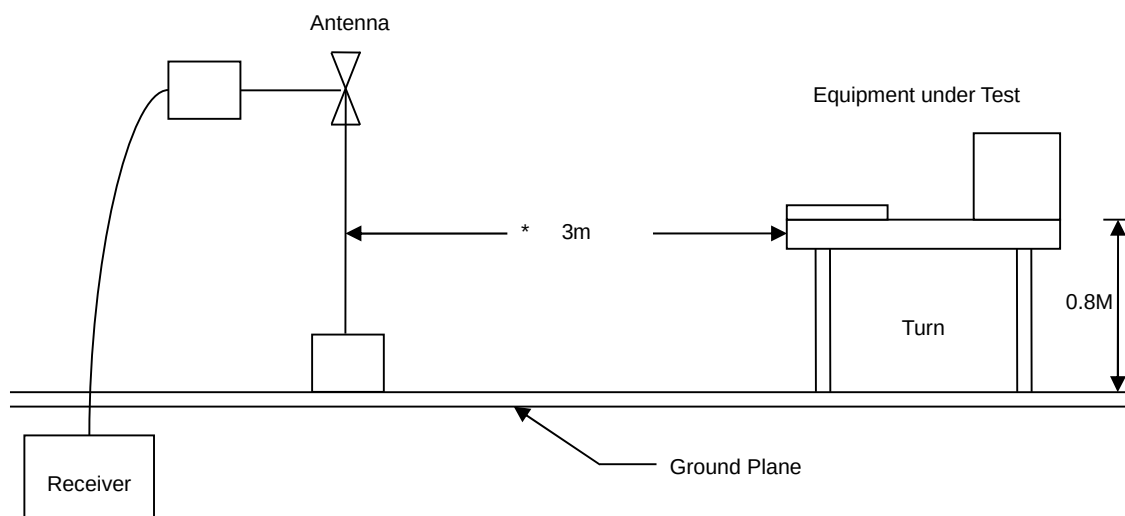
將待測物置於 0.8 米(Below 1G) & 1.5 米(Above 1G)高的非金屬桌面，使其在測試模式狀態，且設定為高、中、低各頻道產生最高峰值輸出功率的傳輸速率，接收天線置於 3 米外，且桌面要 360 度旋轉，另外接收天線也要從 1 米至 4 米升降變化，接收天線置於水平、垂直極向各執行測試一次。待測物若為手持式則分別要以三軸相放置，並分別測試以找出最大輻射電場強度。
備註：此項目之擴充不確定度為 $\pm 4.11\text{dB}$

5.3. 輻射場地之擺設

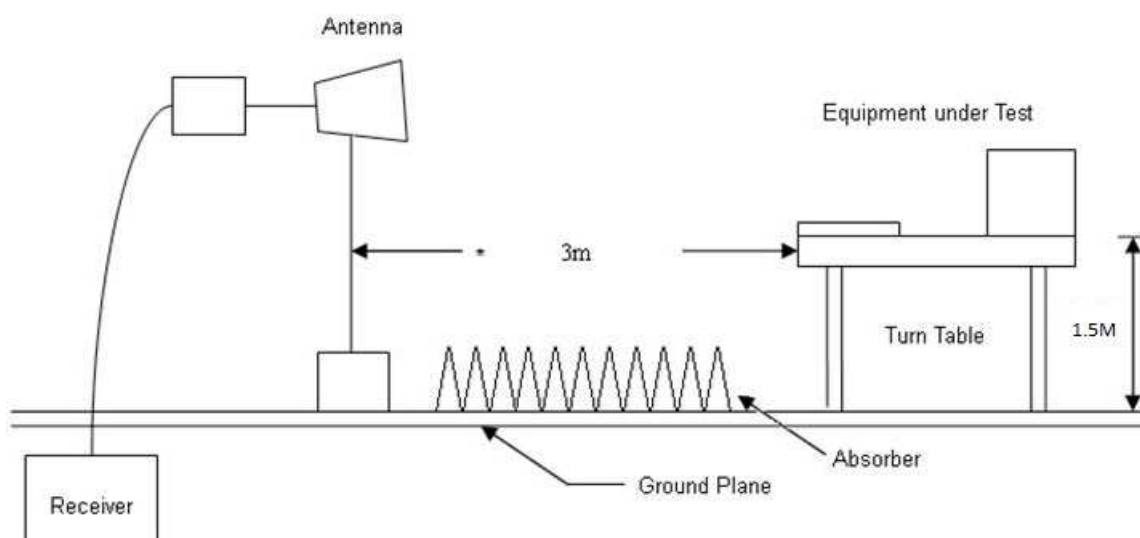
Below 30MHz test setup



30MHz- 1GHz Test Setup



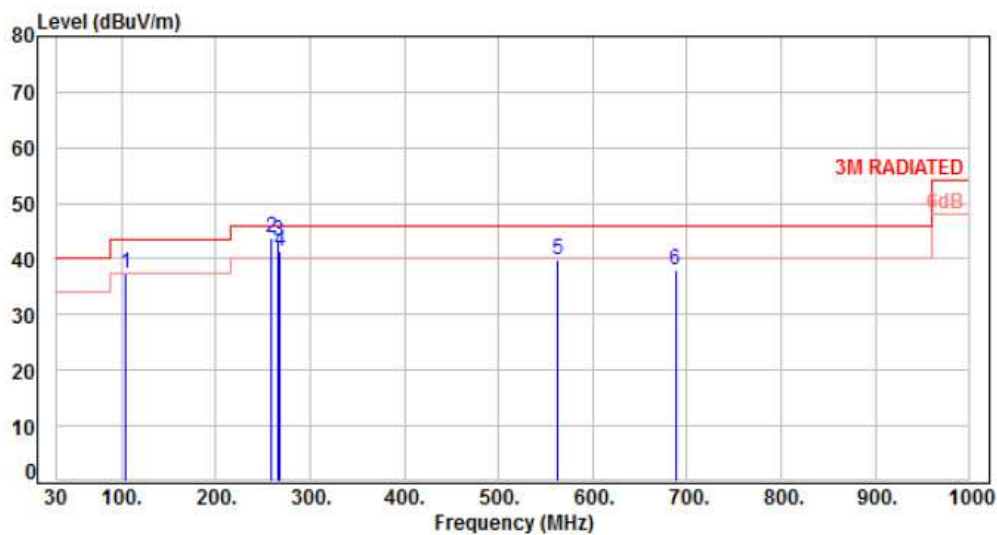
Above 1GHz Test Setup





5.4. 輻射之測試結果及數據 (30MHz ~ 1GHz)

Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	103.72	-14.12	51.57	37.45	43.50	-6.05	QP	100	201	P
2	258.92	-10.30	54.07	43.77	46.00	-2.23	QP	100	122	P
3	265.71	-10.02	53.14	43.12	46.00	-2.88	QP	100	179	P
4	268.62	-9.90	51.12	41.22	46.00	-4.78	QP	100	167	P
5	562.53	-2.70	42.58	39.88	46.00	-6.12	QP	100	152	P
6	687.66	-0.42	38.55	38.13	46.00	-7.87	Peak	100	0	P

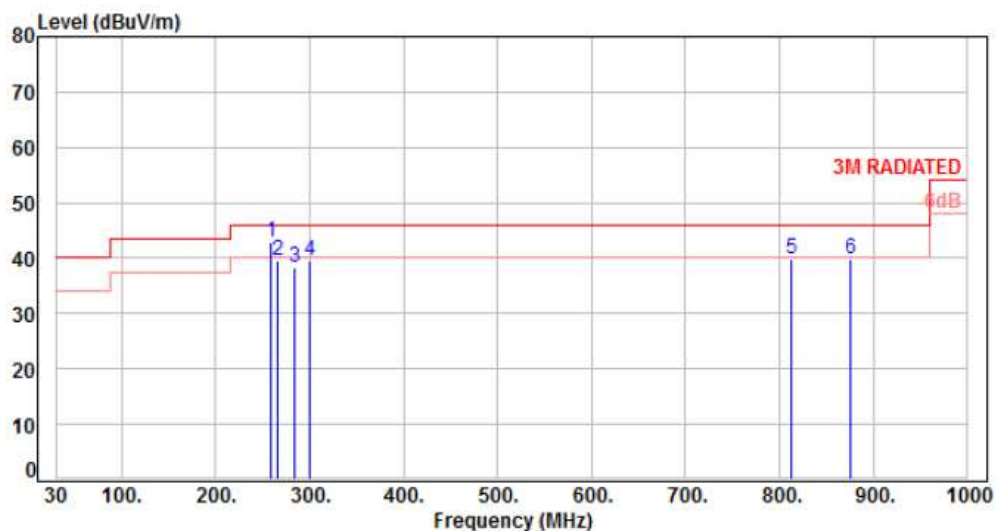
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	258.92	-10.30	53.09	42.79	46.00	-3.21	QP	100	154	P
2	265.71	-10.02	49.67	39.65	46.00	-6.35	Peak	100	0	P
3	284.14	-9.29	47.73	38.44	46.00	-7.56	Peak	100	0	P
4	299.66	-8.81	48.32	39.51	46.00	-6.49	Peak	100	0	P
5	812.79	1.58	38.20	39.78	46.00	-6.22	Peak	100	0	P
6	875.84	2.54	37.33	39.87	46.00	-6.13	QP	100	184	P

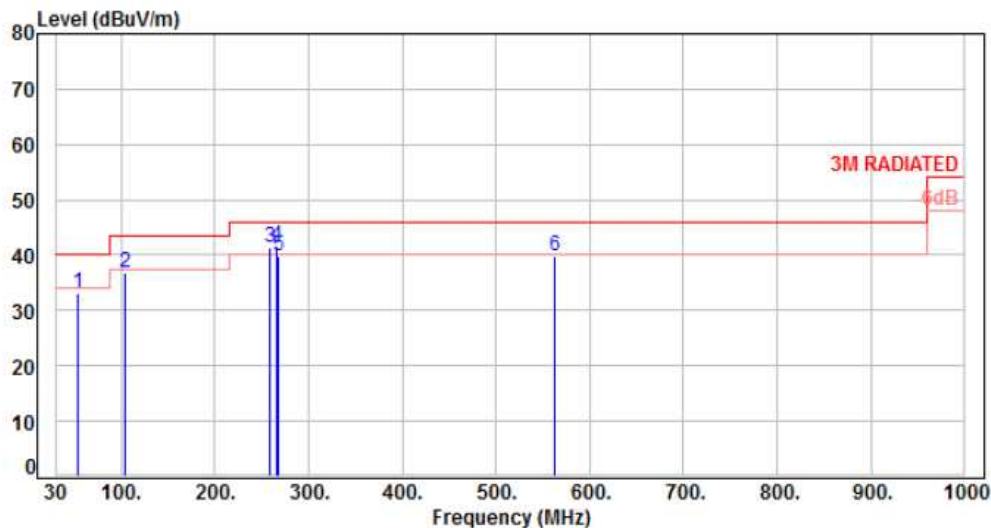
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH06	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	54.25	-9.97	43.10	33.13	40.00	-6.87	Peak	0	0	P
2	103.72	-14.12	50.91	36.79	43.50	-6.71	QP	100	125	P
3	258.92	-10.30	51.68	41.38	46.00	-4.62	QP	100	161	P
4	265.71	-10.02	51.80	41.78	46.00	-4.22	QP	100	167	P
5	268.62	-9.90	49.74	39.84	46.00	-6.16	QP	100	189	P
6	562.53	-2.70	42.47	39.77	46.00	-6.23	QP	100	149	P

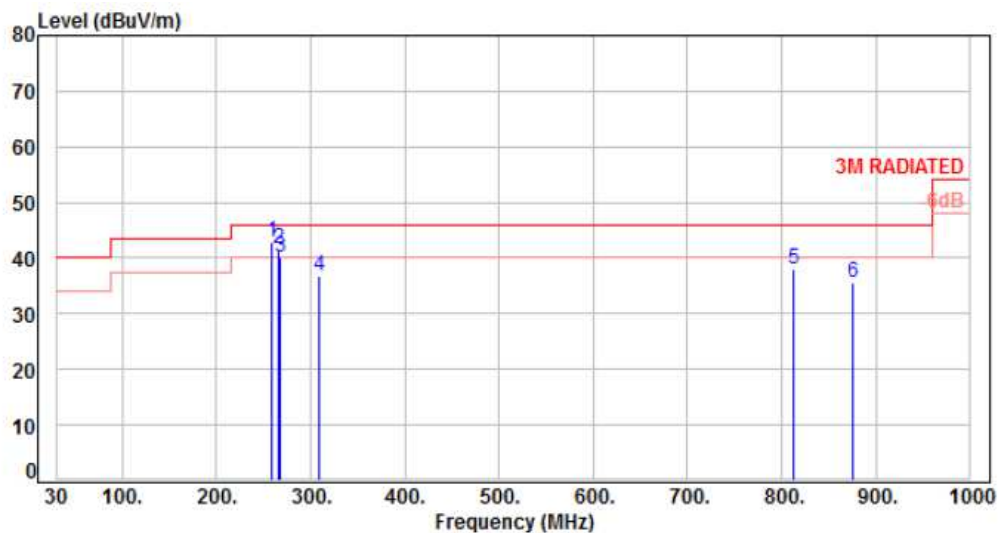
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH06	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	258.92	-10.30	53.23	42.93	46.00	-3.07	QP	100	179	P
2	265.71	-10.02	51.84	41.82	46.00	-4.18	QP	100	195	P
3	268.62	-9.90	50.02	40.12	46.00	-5.88	QP	100	157	P
4	309.36	-8.55	45.26	36.71	46.00	-9.29	Peak	100	0	P
5	812.79	1.58	36.39	37.97	46.00	-8.03	Peak	100	0	P
6	875.84	2.54	33.14	35.68	46.00	-10.32	Peak	100	0	P

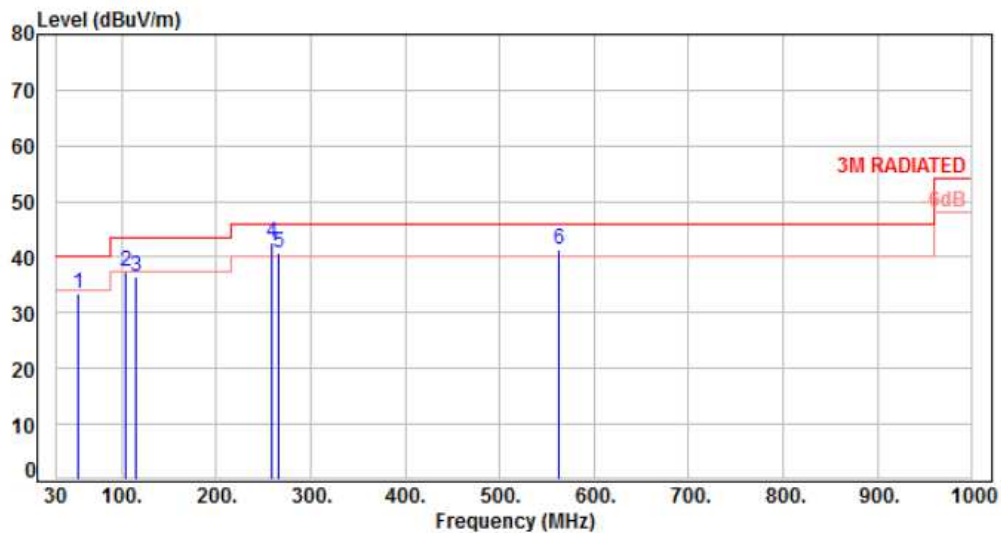
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	54.25	-9.97	43.34	33.37	40.00	-6.63	Peak	100	0	P
2	104.69	-13.96	51.25	37.29	43.50	-6.21	QP	100	174	P
3	115.36	-12.63	49.18	36.55	43.50	-6.95	Peak	100	0	P
4	258.92	-10.30	52.91	42.61	46.00	-3.39	QP	100	148	P
5	265.71	-10.02	50.85	40.83	46.00	-5.17	QP	100	179	P
6	562.53	-2.70	44.15	41.45	46.00	-4.55	QP	100	196	P

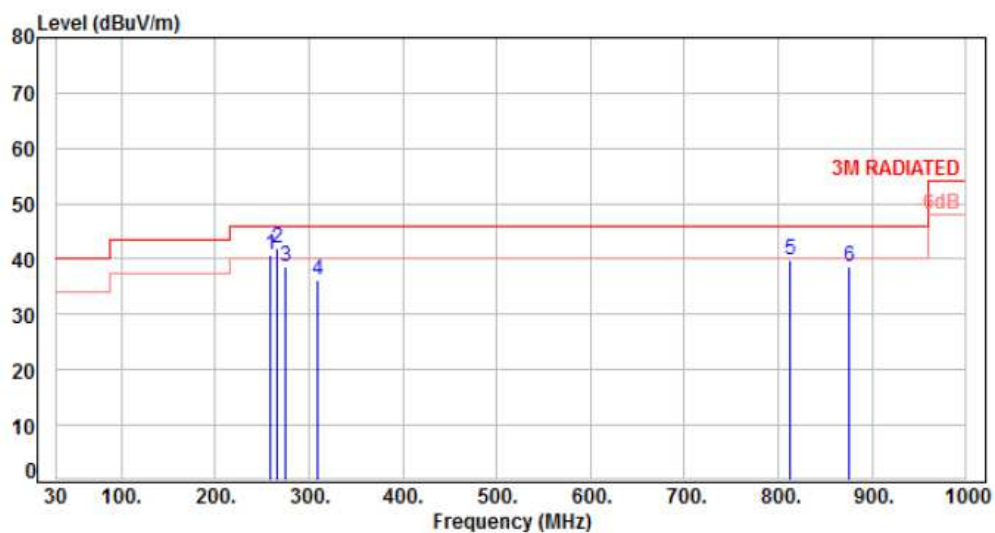
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	258.92	-10.30	50.94	40.64	46.00	-5.36	QP	100	157	P
2	265.71	-10.02	51.88	41.86	46.00	-4.14	QP	100	177	P
3	274.44	-9.64	48.29	38.65	46.00	-7.35	Peak	100	0	P
4	308.39	-8.58	44.70	36.12	46.00	-9.88	Peak	100	0	P
5	812.79	1.58	38.41	39.99	46.00	-6.01	Peak	100	0	P
6	875.84	2.54	35.98	38.52	46.00	-7.48	Peak	100	0	P

Note: Level=Reading+Factor

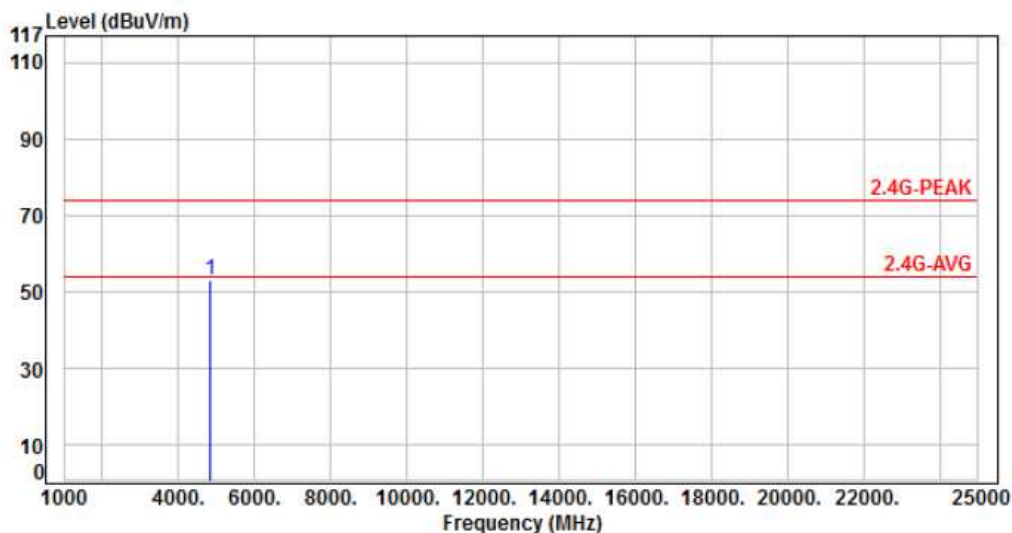
Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



5.5. 輻射之測試結果及數據 (1GHz ~ 25GHz)

Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH01	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4824.00	-13.23	65.98	52.75	74.00	-21.25	Peak	100	0	P

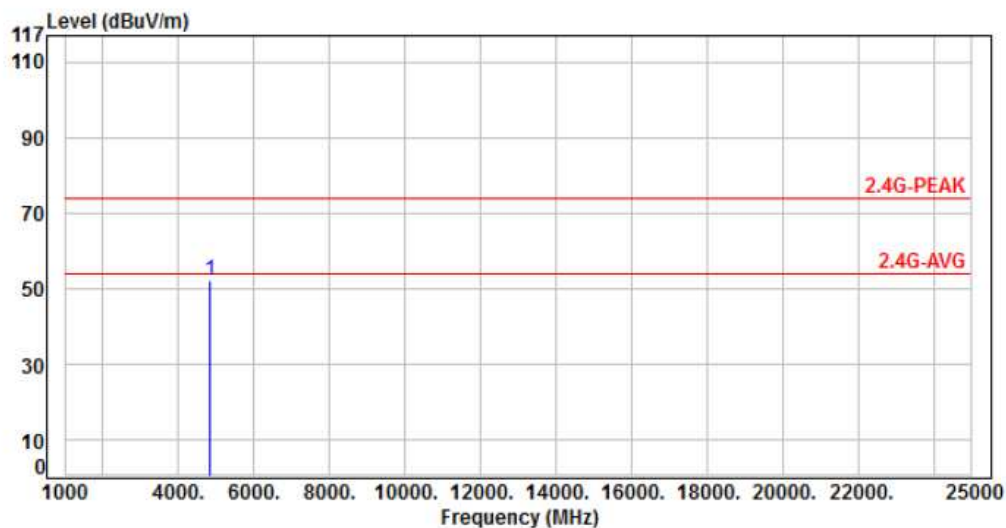
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH01	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4824.00	-13.23	65.34	52.11	74.00	-21.89	Peak	200	0	P

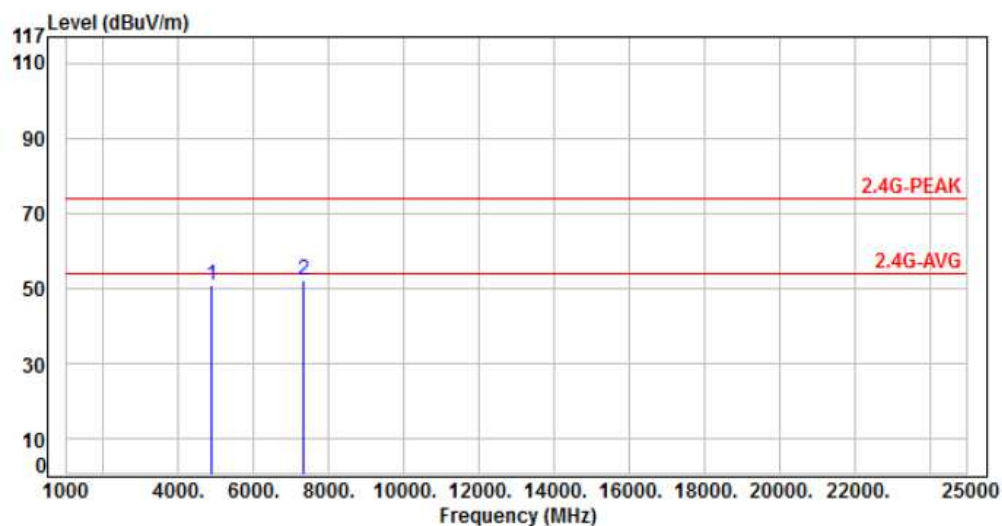
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH06	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4874.00	-13.11	63.92	50.81	74.00	-23.19	Peak	100	0	P
2	7311.00	-10.18	62.09	51.91	74.00	-22.09	Peak	100	0	P

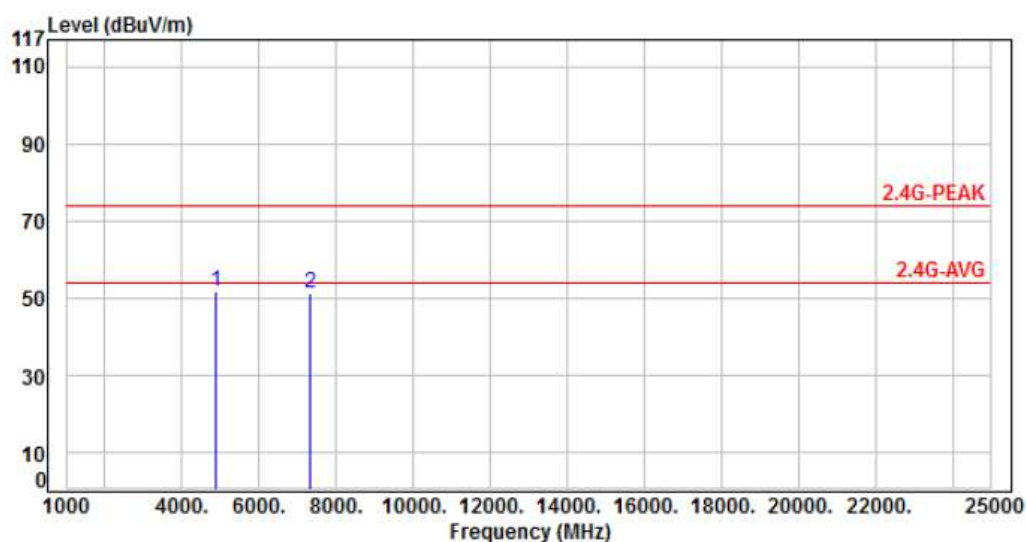
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH06	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4874.00	-13.11	64.69	51.58	74.00	-22.42	Peak	200	0	P
2	7311.00	-10.18	61.42	51.24	74.00	-22.76	Peak	200	0	P

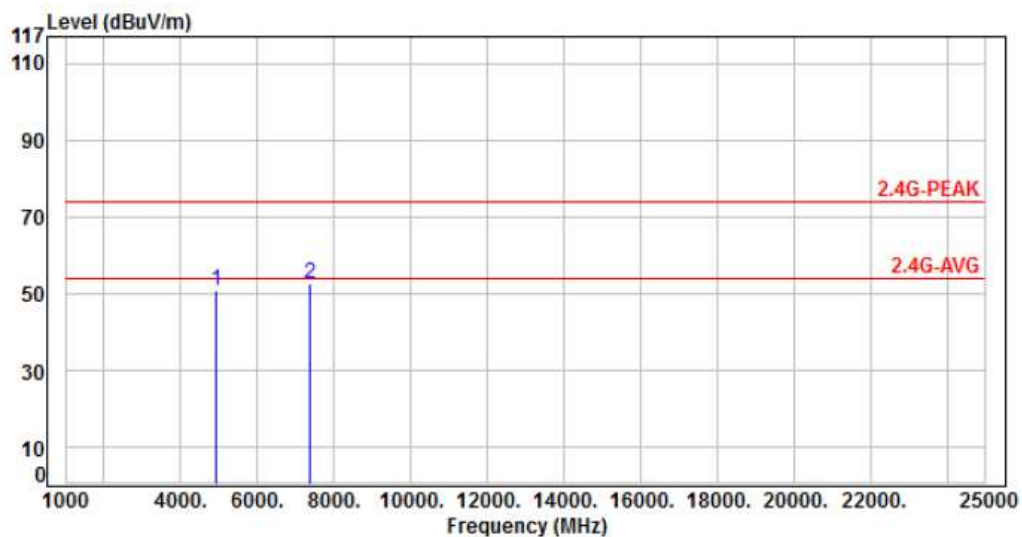
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH11	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4924.00	-12.98	63.50	50.52	74.00	-23.48	Peak	100	0	P
2	7386.00	-10.00	62.71	52.71	74.00	-21.29	Peak	100	0	P

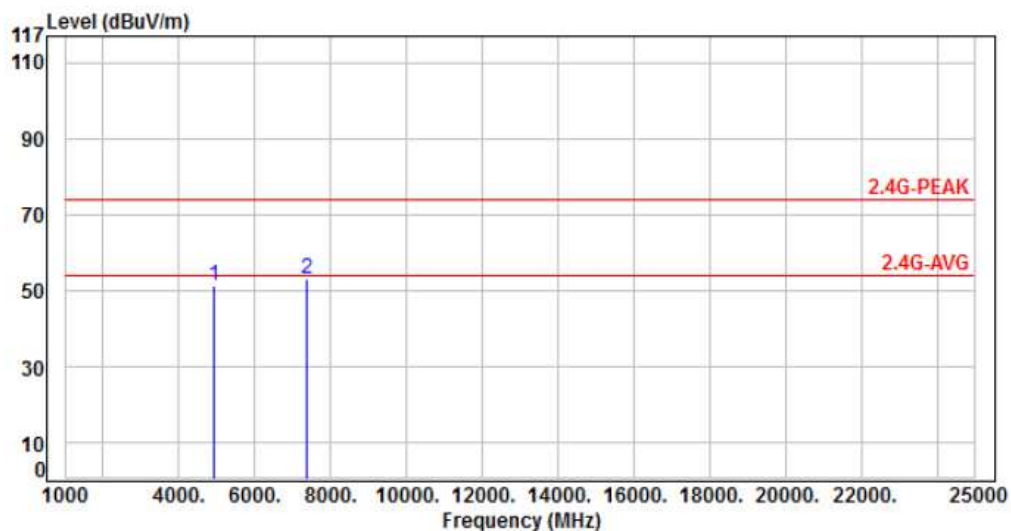
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH11	Temperature	: 24 °C
Test date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	4924.00	-12.98	63.92	50.94	74.00	-23.06	Peak	200	0	P
2	7386.00	-10.00	62.85	52.85	74.00	-21.15	Peak	200	0	P

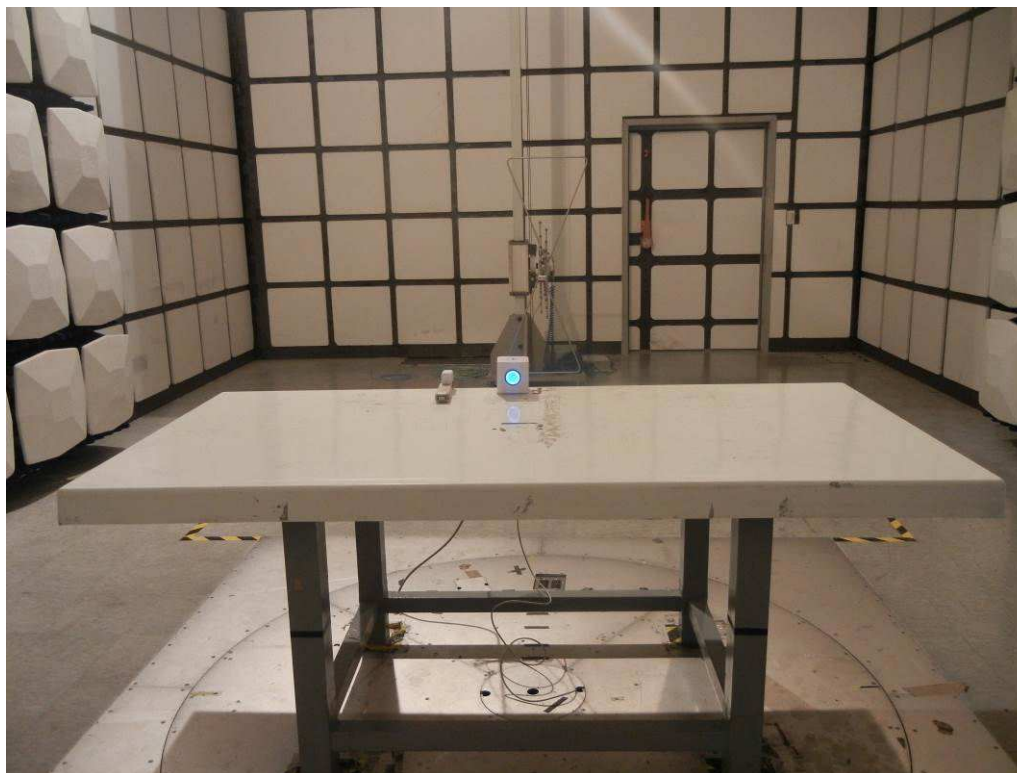
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor

5.6. 輻射量測之配置照片(30MHz ~ 1GHz)

正面照

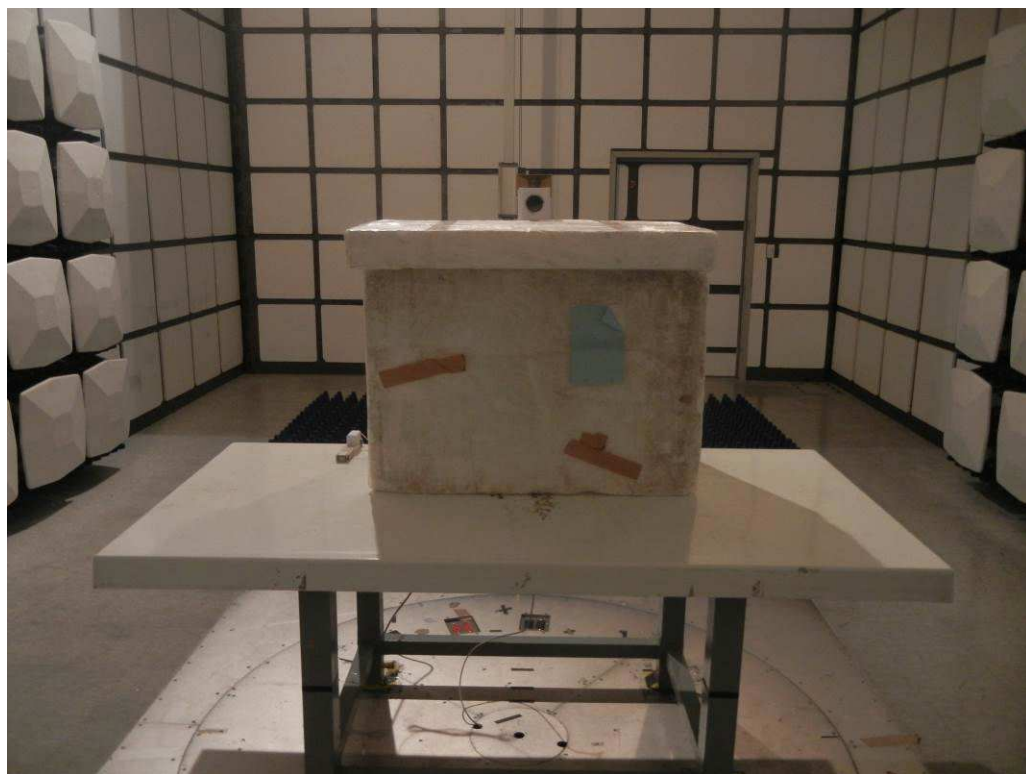


背面照



5.7. 輻射量測之配置照片 (1GHz ~ 25GHz)

正面照



背面照





6. 6dB 頻寬之規定

6.1. 適用標準

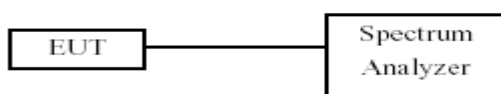
對使用數位調變技術之低功率發射機，依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(2)(A)規定，6dB 頻寬至少應有 500 kHz。

6.2. 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 300KHz。
- 量測峰值減去 6 dB 之頻寬並記錄於報告中。

備註:此項目之擴充不確定度為 ± 7500 Hz

6.3. 測試配置



6.4. 6dB 頻寬之測試結果及數據

Test Result : PASS Temperature : 21°C
Test Date : Nov. 24, 2017 Humidity : 55%

Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (MHz)			Limit (MHz)
			ANT 0	ANT 1	ANT 2	
IEEE 802.11b (11Mbps)	01	2412	7.60	7.40	7.70	0.5
	06	2437	7.50	7.60	7.70	0.5
	11	2462	7.80	7.60	7.90	0.5
IEEE 802.11g (54Mbps)	01	2412	16.50	16.50	16.50	0.5
	06	2437	16.50	16.50	16.50	0.5
	11	2462	16.60	16.50	16.60	0.5
IEEE 802.11n HT20 (195Mbps)	01	2412	17.80	17.70	17.80	0.5
	06	2437	17.80	17.80	17.80	0.5
	11	2462	17.70	17.70	17.60	0.5
IEEE 802.11n HT40 (405Mbps)	03	2422	36.40	36.20	36.40	0.5
	06	2437	36.60	36.40	36.40	0.5
	09	2452	36.40	36.40	36.20	0.5

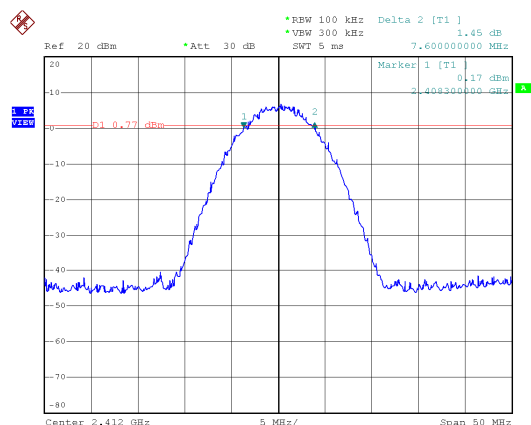
備註：繪圖資料請參考下頁。

6.5. 結果判定

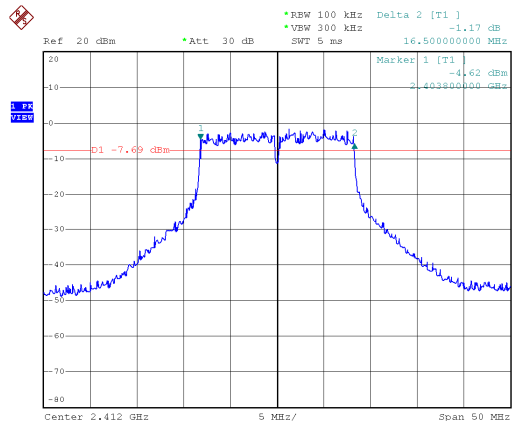
高、中、低頻段的 6dB 頻寬皆大於 500 KHz，合乎標準規定。



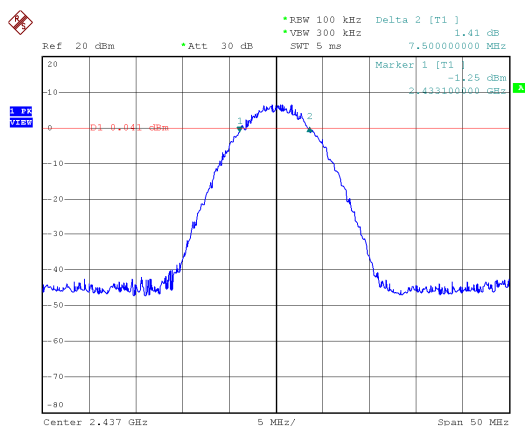
Antenna 0
Modulation Type: 802.11b
CH01



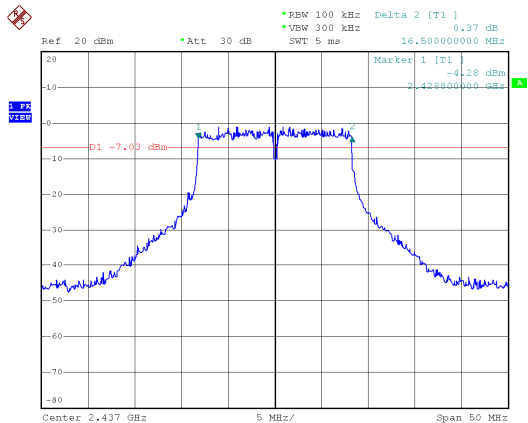
Modulation Type: 802.11g
CH01



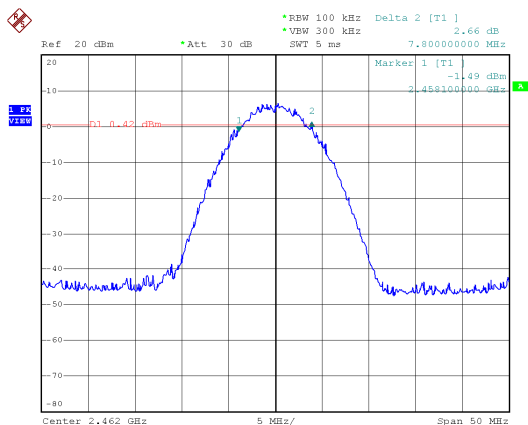
CH06



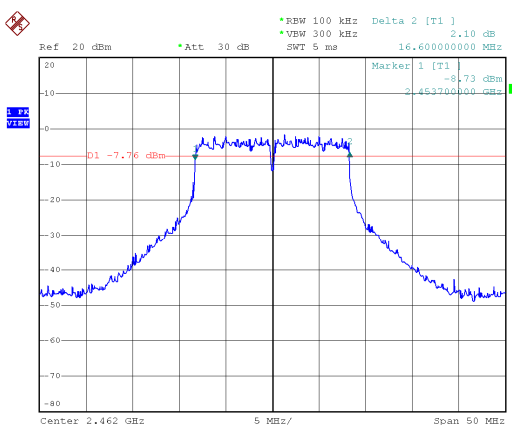
CH06



CH11

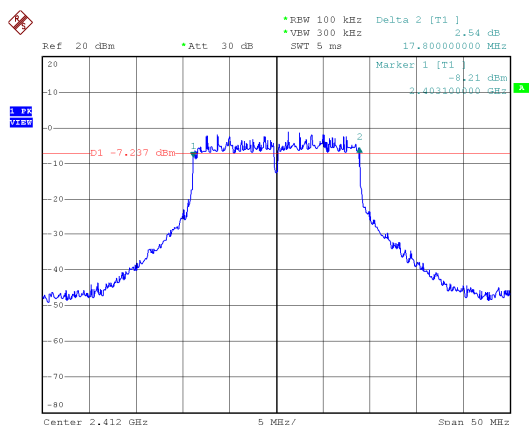


CH11

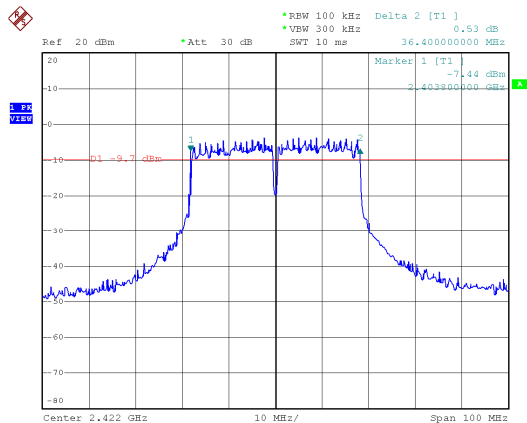




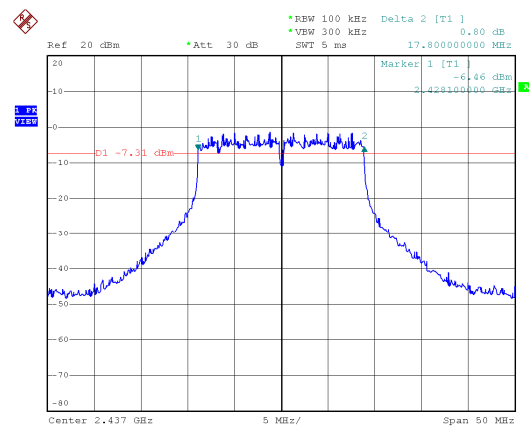
Antenna 0
Modulation Type: 802.11n HT20
CH01



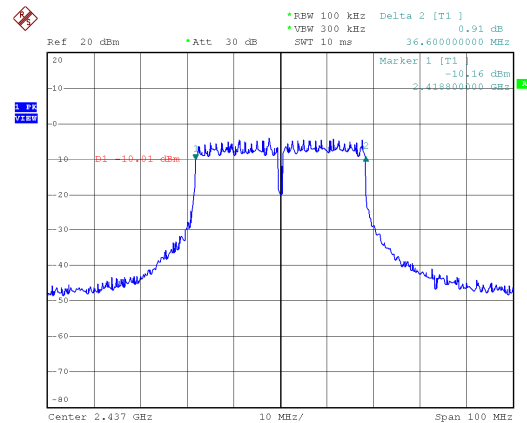
Modulation Type: 802.11n HT40
CH03



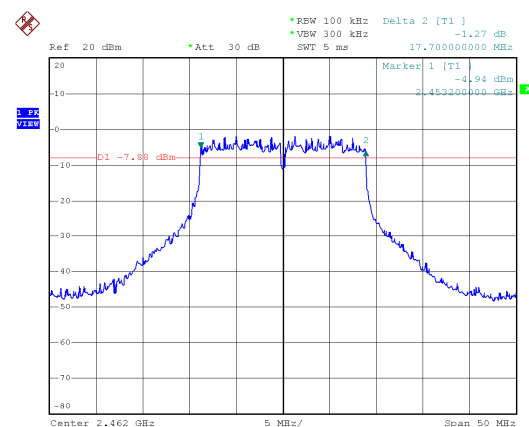
CH06



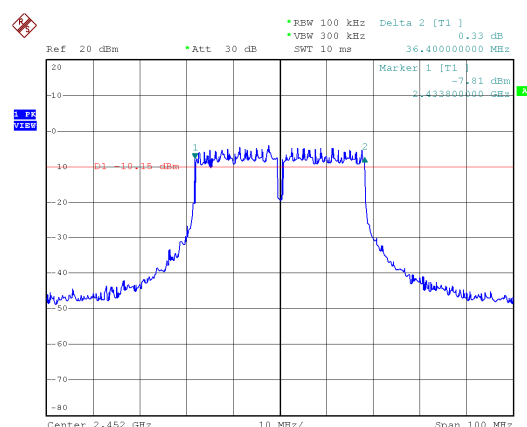
CH06



CH11

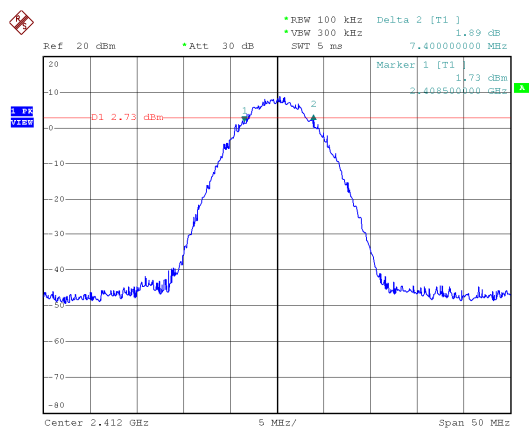


CH09

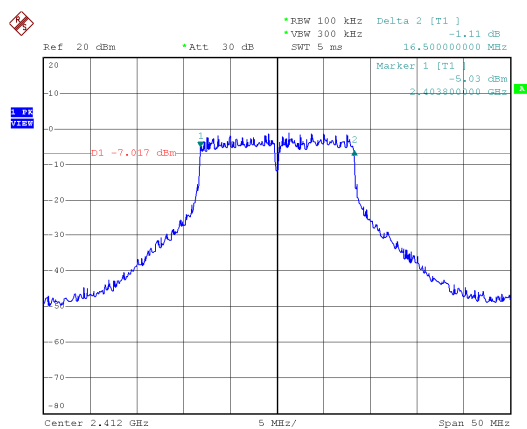




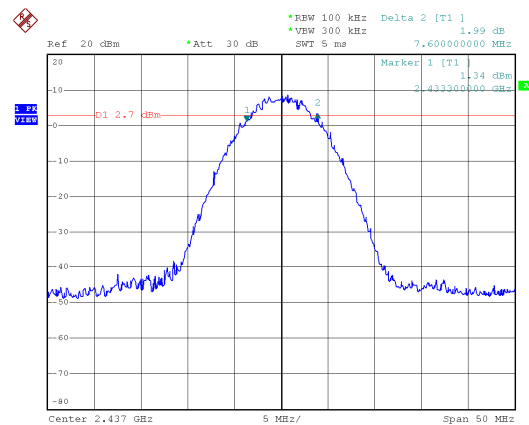
Antenna 1
Modulation Type: 802.11b
CH01



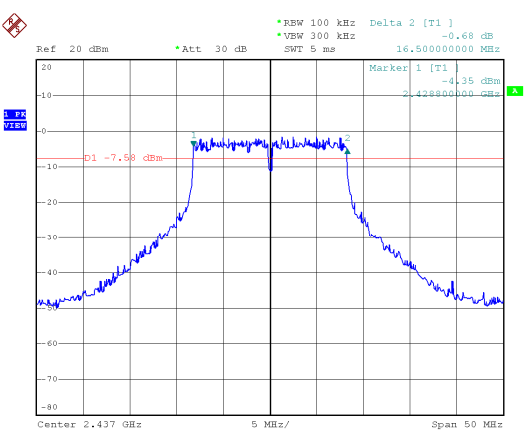
Modulation Type: 802.11g
CH01



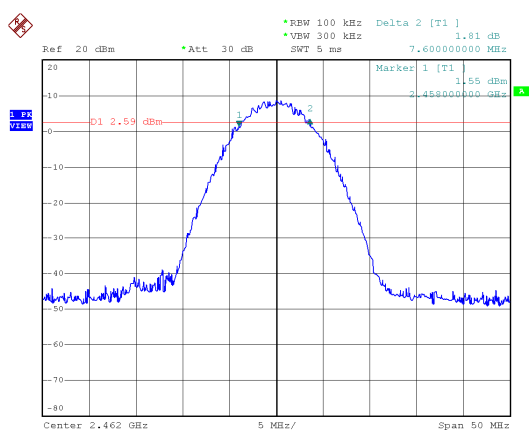
CH06



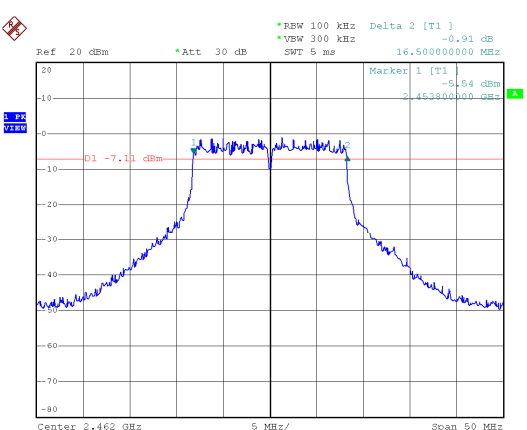
CH06



CH11

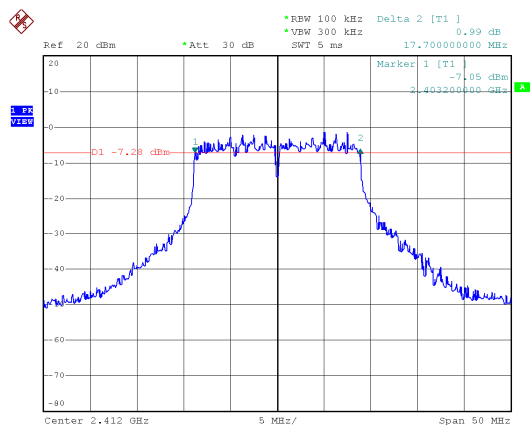


CH11

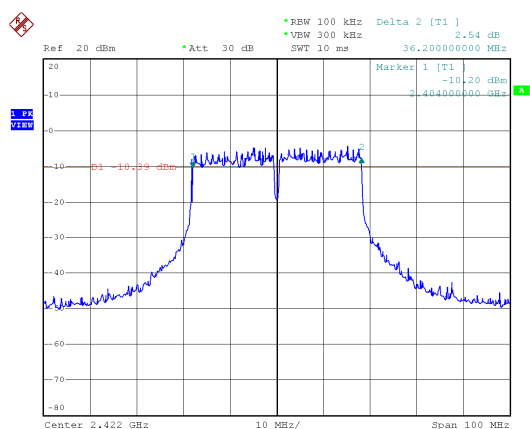




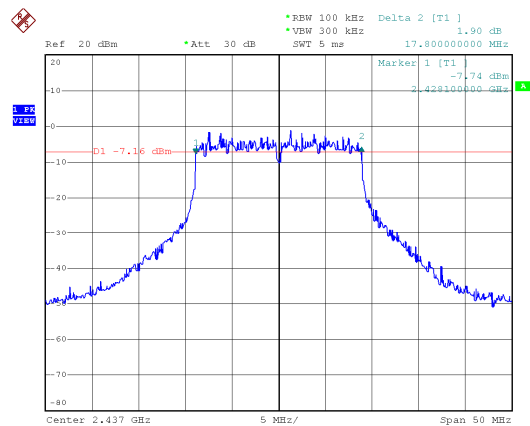
Antenna 1
Modulation Type: 802.11n HT20
CH01



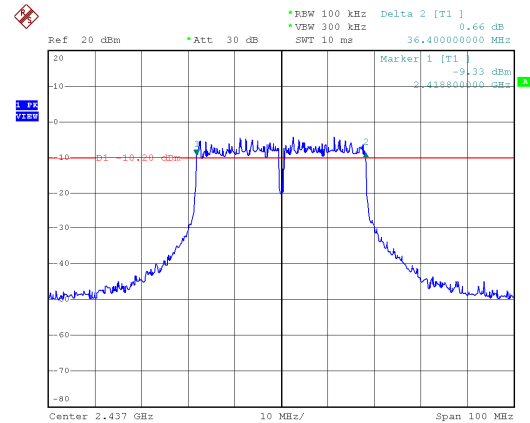
Modulation Type: 802.11n HT40
CH03



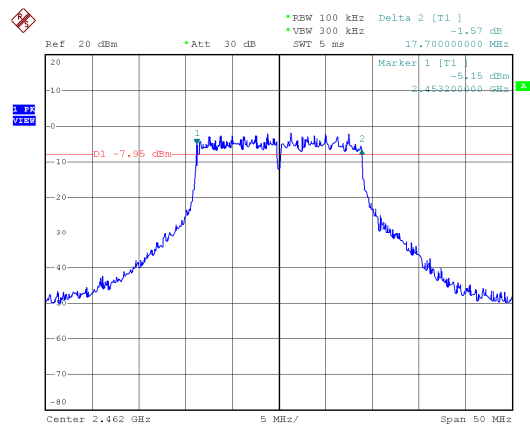
CH06



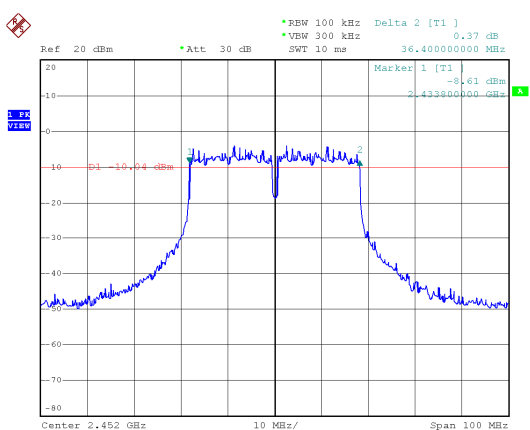
CH06



CH11

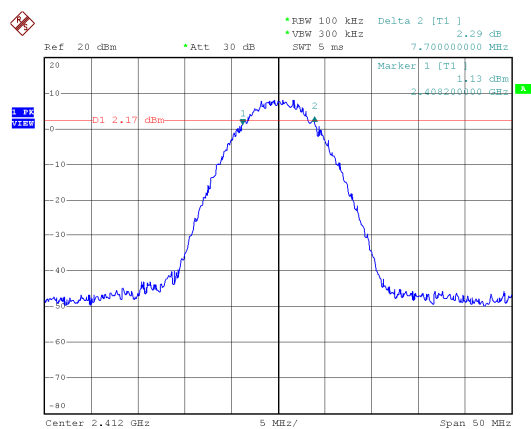


CH09

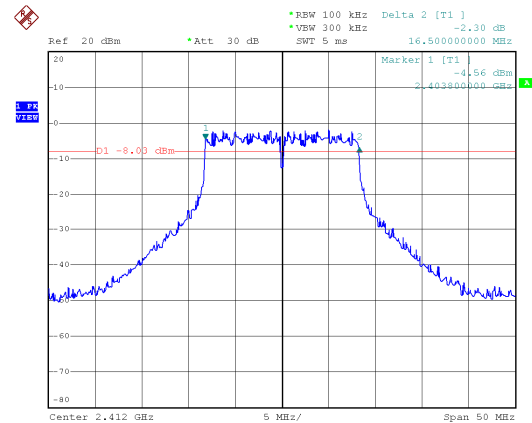




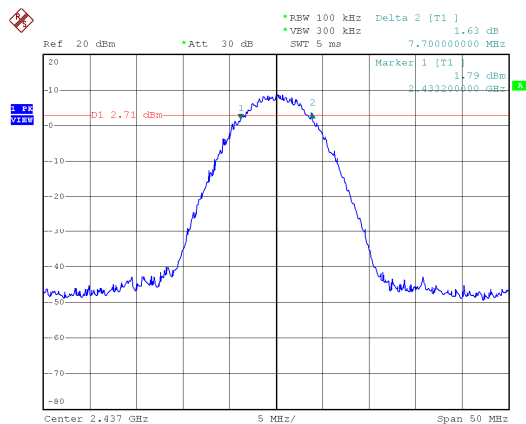
Antenna 2
Modulation Type: 802.11b
CH01



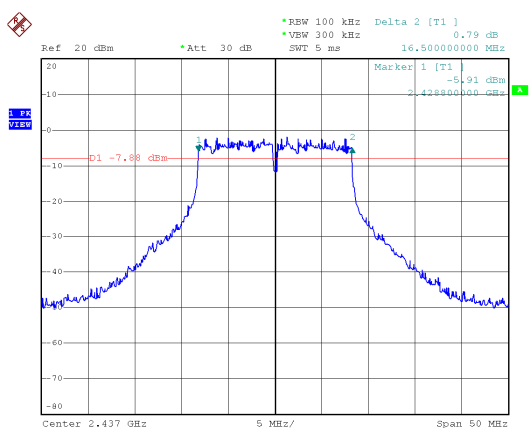
Modulation Type: 802.11g
CH01



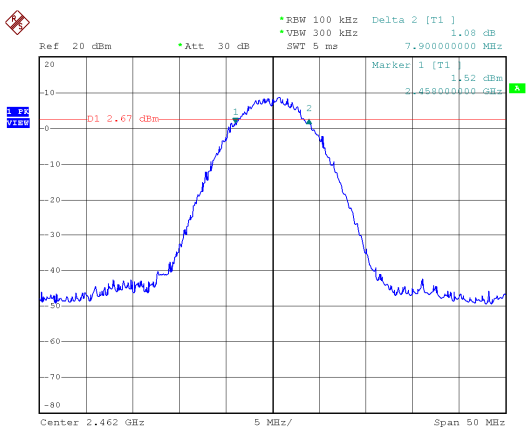
CH06



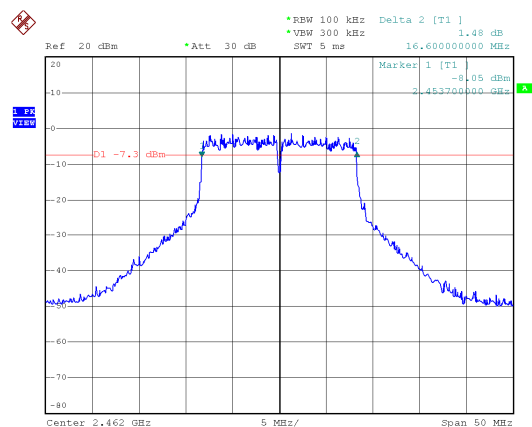
CH06



CH11



CH11

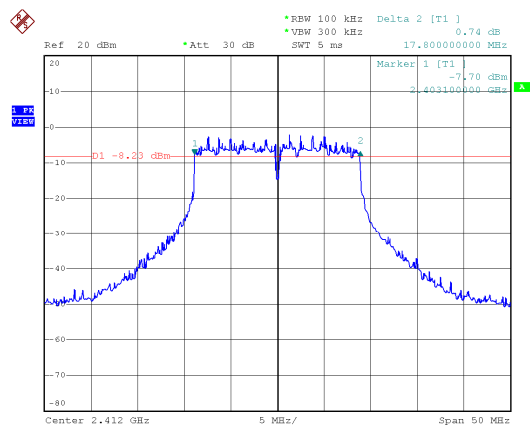




Antenna 2

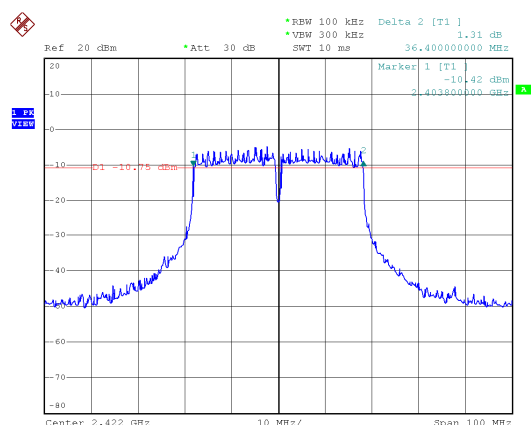
Modulation Type: 802.11n HT20

CH01

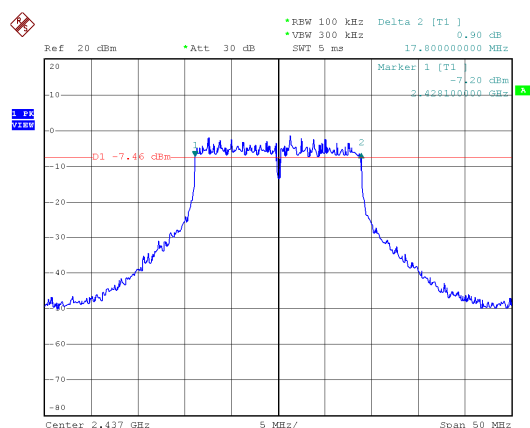


Modulation Type: 802.11n HT40

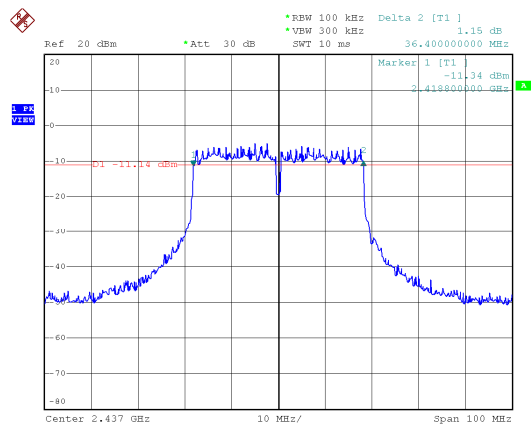
CH03



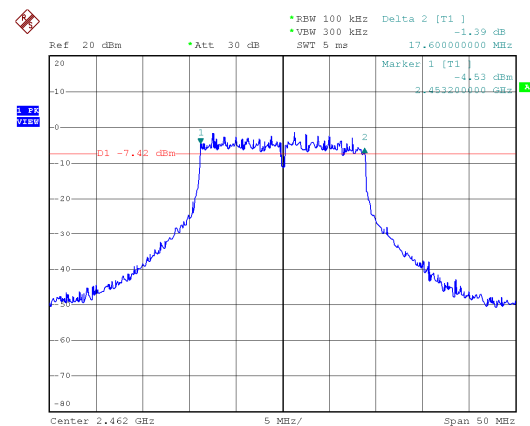
CH06



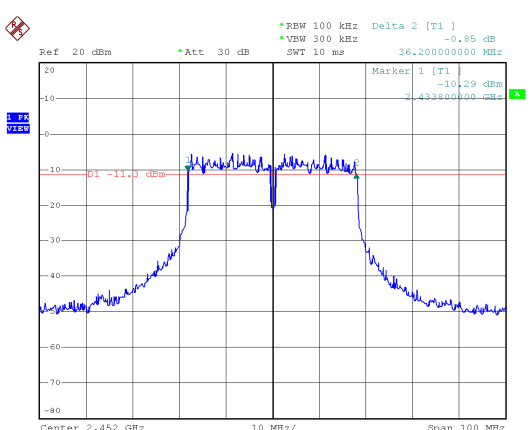
CH06



CH11



CH09





7. 峰值輸出功率之規定

7.1. 適用標準

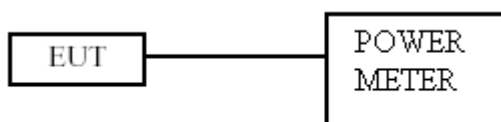
依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.2 節(C)之規定，對使用數位調變技術之低功率發射機，其輸出峰值功率不得大於 1 Watt，且其所使用天線之增益不可大於 6dBi，若使用大於 6dBi 增益之天線，則其輸出峰值功率相對需衰減天線增益所增加之量(單位為 dB)。放寬之條件請參考天線增益之要求。

7.2. 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。

備註:此測試項目檢驗之擴充不準確定度 $\pm 1.4\text{dB}$ 。

7.3. 測試配置





7.4. 峰值輸出功率之測試結果及數據

Test Result : PASS
Test Date : Nov. 24, 2017

Temperature : 21°C
Humidity : 55%

Modulation Type	Channel	Frequency (MHz)	Peak Power Output (dBm)				Peak Power Output (mW)			
			ANT 0	ANT 1	ANT 2	0+1+2	ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	23.63	20.88	21.14	26.84	230.67	122.46	130.02	483.15
	06	2437	23.55	20.79	21.08	26.76	226.46	119.95	128.23	474.65
	11	2462	23.47	20.84	21.32	26.81	222.33	121.34	135.52	479.19
IEEE 802.11g (54Mbps)	01	2412	24.33	21.39	21.72	27.46	271.02	137.72	148.59	557.33
	06	2437	24.25	21.69	21.59	27.47	266.07	147.57	144.21	557.85
	11	2462	24.28	21.35	21.71	27.42	267.92	136.46	148.25	552.63
IEEE 802.11n HT20 (195Mbps)	01	2412	21.12	21.04	21.08	25.85	129.42	127.06	128.23	384.71
	06	2437	21.36	21.01	21.12	25.94	136.77	126.18	129.42	392.38
	11	2462	21.42	20.99	21.02	25.92	138.68	125.60	126.47	390.75
IEEE 802.11n HT40 (405Mbps)	03	2422	21.76	21.06	20.72	25.97	149.97	127.64	118.03	395.64
	06	2437	21.56	21.12	20.96	25.99	143.22	129.42	124.74	397.38
	09	2452	21.78	21.3	20.88	26.11	150.66	134.90	122.46	408.02

Modulation Type	Channel	Frequency (MHz)	Avg. Power Output (dBm)				Avg. Power Output (mW)			
			ANT 0	ANT 1	ANT 2	0+1+2	ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	20.44	17.53	17.79	23.57	110.66	56.62	60.12	227.40
	06	2437	20.25	17.69	17.56	23.46	105.93	58.75	57.02	221.69
	11	2462	20.14	17.54	17.92	23.46	103.28	56.75	61.94	221.97
IEEE 802.11g (54Mbps)	01	2412	13.28	10.39	10.36	16.34	21.28	10.94	10.86	43.09
	06	2437	13.19	10.36	10.42	16.31	20.84	10.86	11.02	42.72
	11	2462	13.31	10.58	10.29	16.39	21.43	11.43	10.69	43.55
IEEE 802.11n HT20 (195Mbps)	01	2412	9.78	9.22	9.49	14.27	9.51	8.36	8.89	26.75
	06	2437	9.77	9.36	9.56	14.34	9.48	8.63	9.04	27.15
	11	2462	9.68	9.42	9.33	14.25	9.29	8.75	8.57	26.61
IEEE 802.11n HT40 (405Mbps)	03	2422	9.72	9.45	8.93	14.15	9.38	8.81	7.82	26.00
	06	2437	9.58	9.55	8.96	14.14	9.08	9.02	7.87	25.96
	09	2452	9.45	9.43	8.84	14.02	8.81	8.77	7.66	25.24

*Average Power 參考用

7.5. 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。



8. 混附波發射限制之規定

8.1. 適用方法

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

- (1) 輸出功率以峰值輸出功率方式量測者，至少需衰減 20dB，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，至少需衰減 30dB，可使用射頻傳導或輻射方式測量。

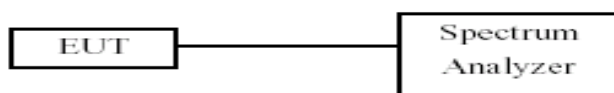
此外，落於第 2.7 節禁用頻段之輻射發射，應符合第 2.8 節之規定。

8.2. 測試方法

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

備註:此測試項目檢驗之擴充不確定度 $\pm 2.2\text{dB}$ 。

8.3. 測試配置



8.4. 結果判定

7.6.1 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。

7.6.2 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。

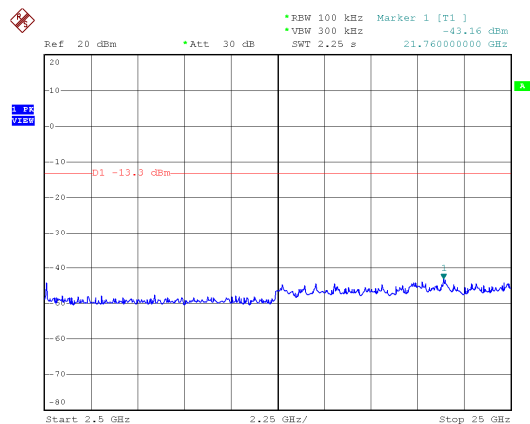
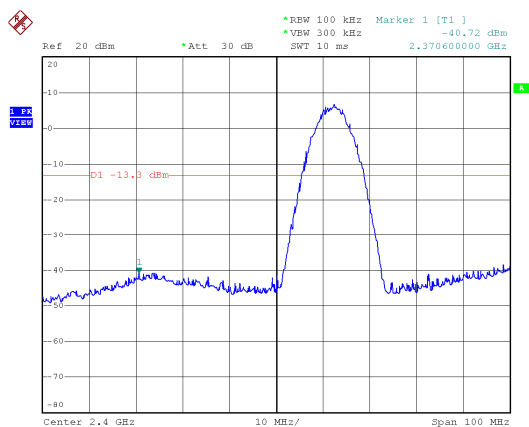
備註：繪圖資料請參考下頁。



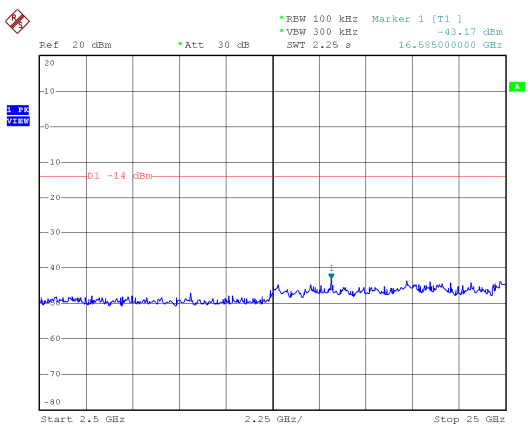
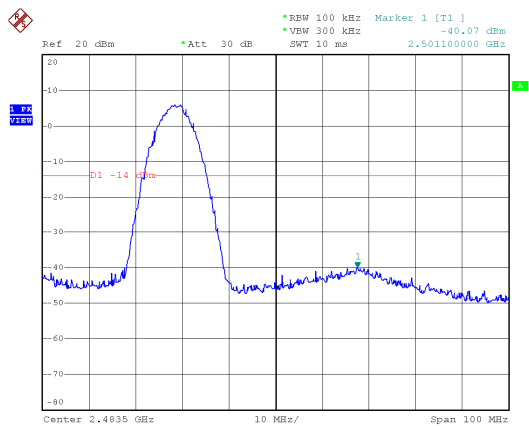
8.5. 混附波發射限

Antenna 0

Modulation Type: 802.11b, CH01

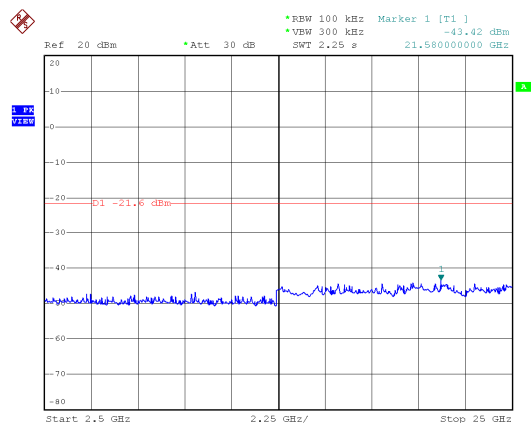
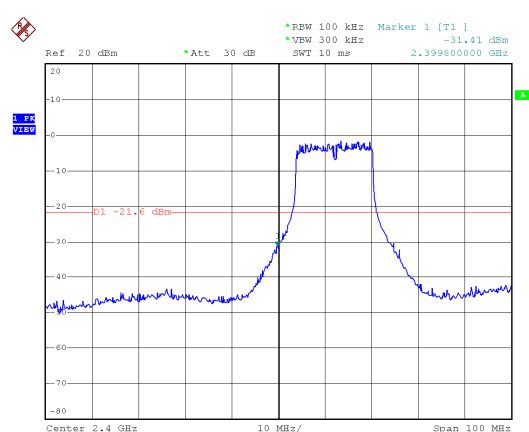


Modulation Type: 802.11b, CH11

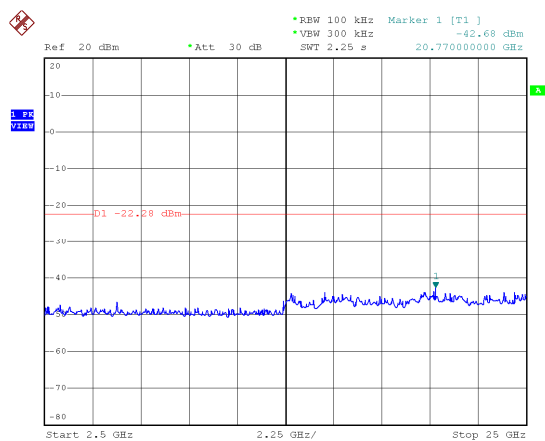
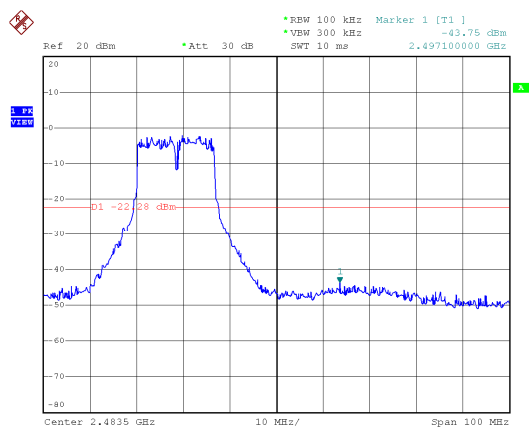




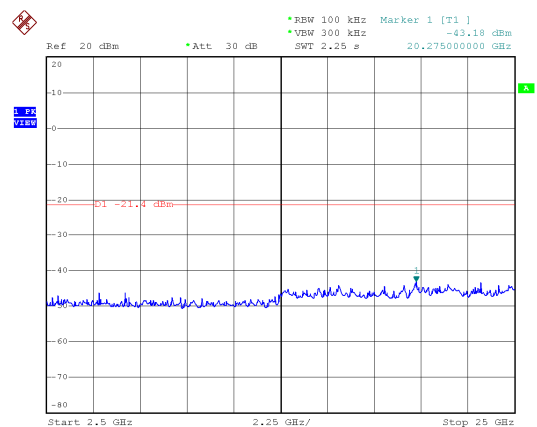
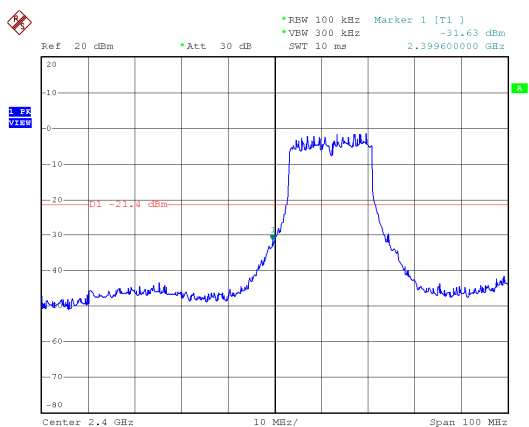
Antenna 0 Modulation Type: 802.11g, CH01



Modulation Type: 802.11g, CH11



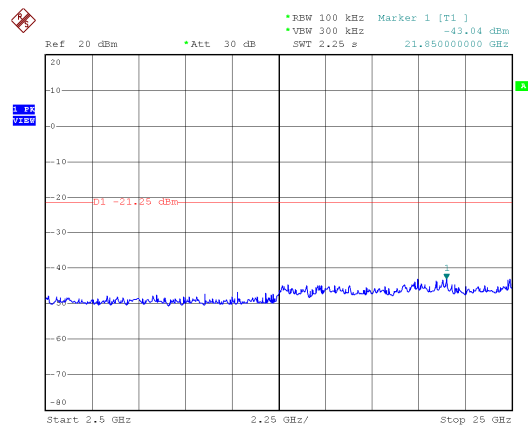
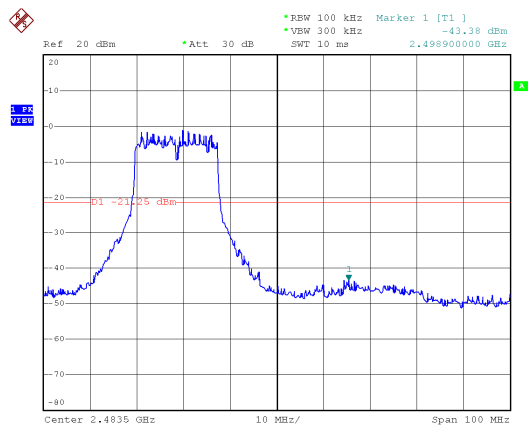
Modulation Type: 802.11n HT20, CH01



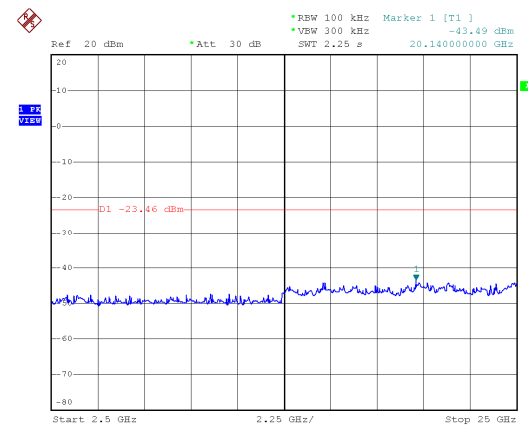
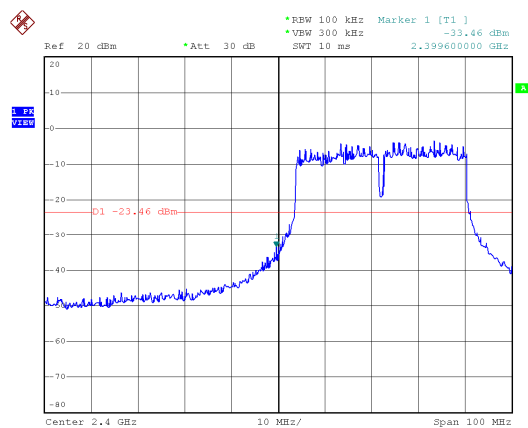


Antenna 0

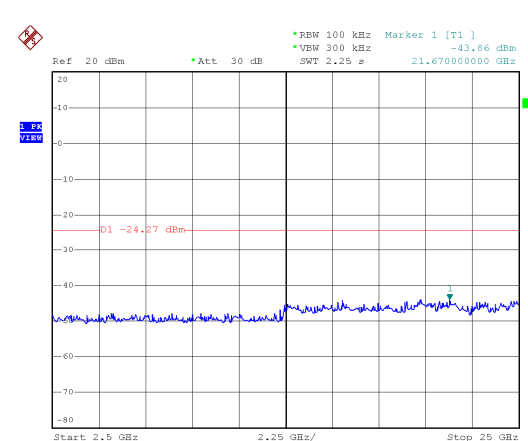
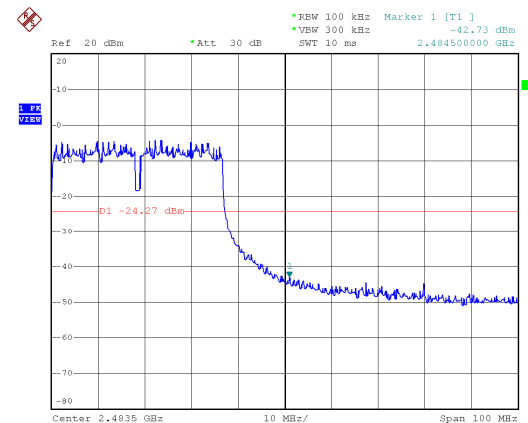
Modulation Type: 802.11n HT20, CH11



Modulation Type: 802.11n HT40, CH03

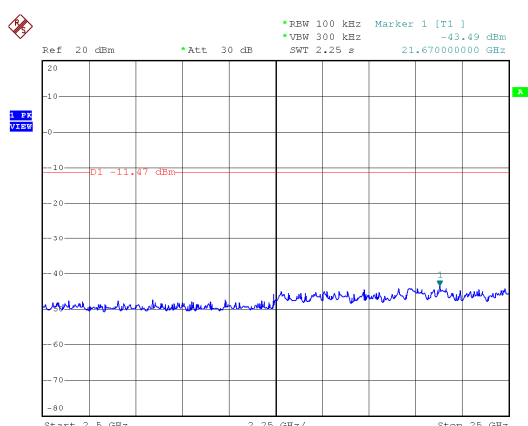
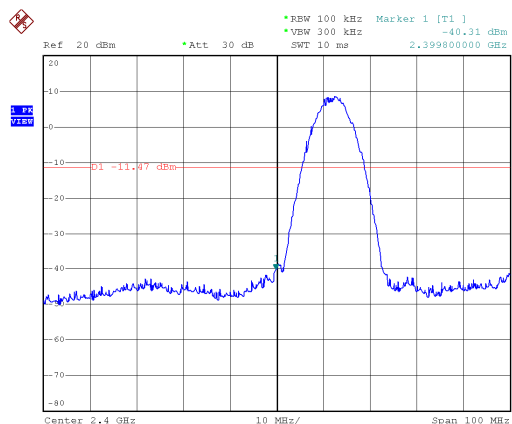


Modulation Type: 802.11n HT40, CH09

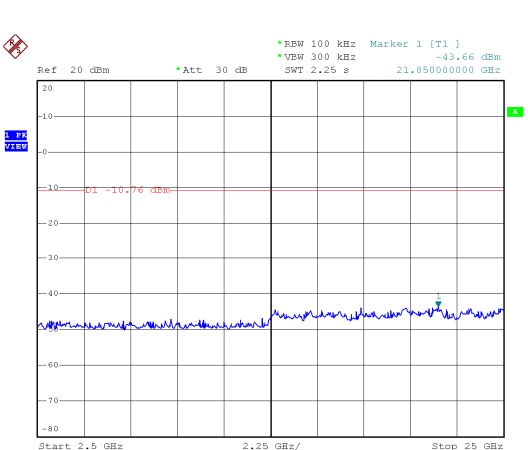
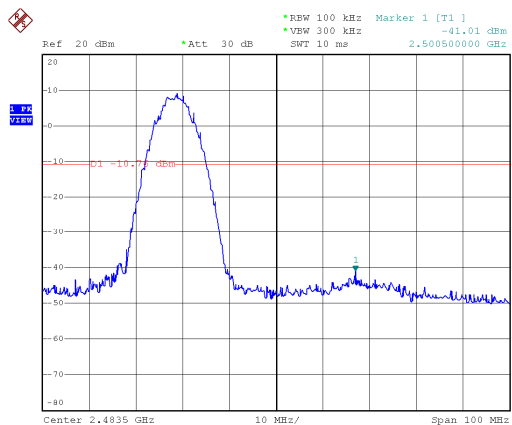




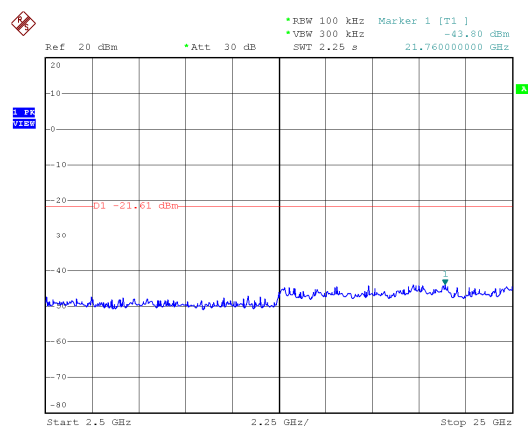
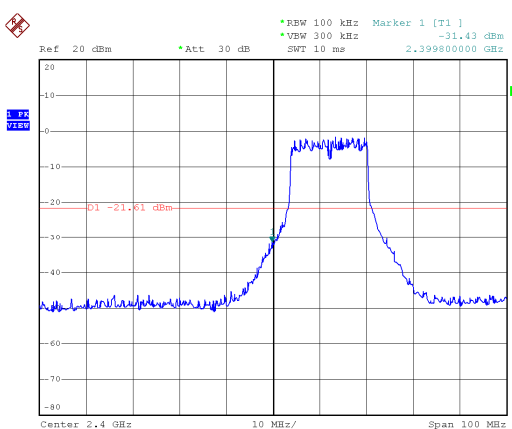
Antenna 1 Modulation Type: 802.11b, CH01



Modulation Type: 802.11b, CH11



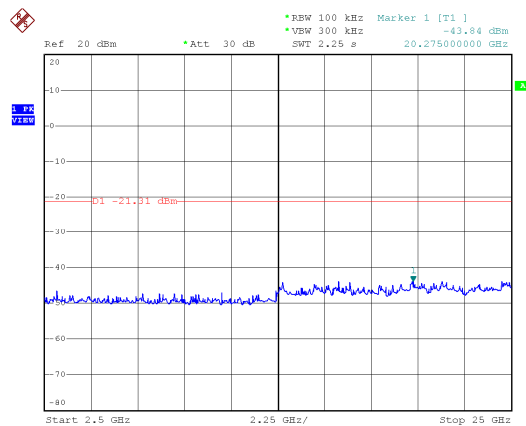
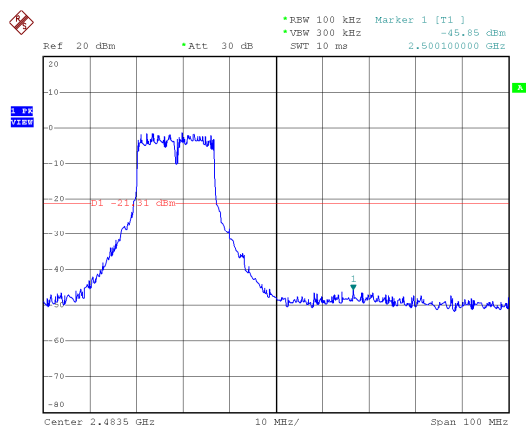
Modulation Type: 802.11g, CH01



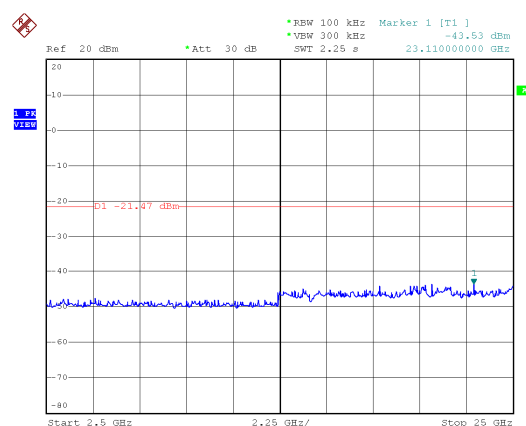
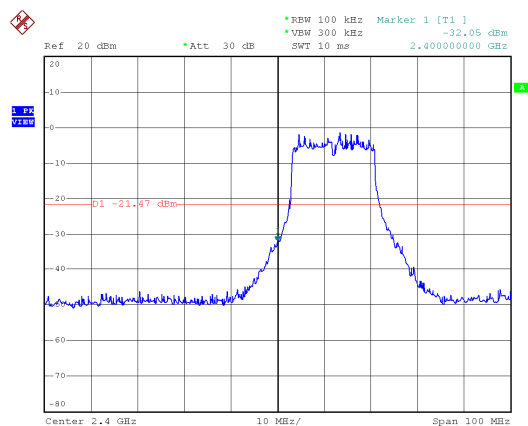


Antenna 1

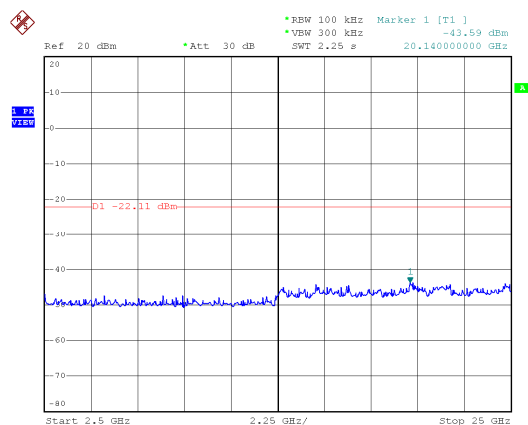
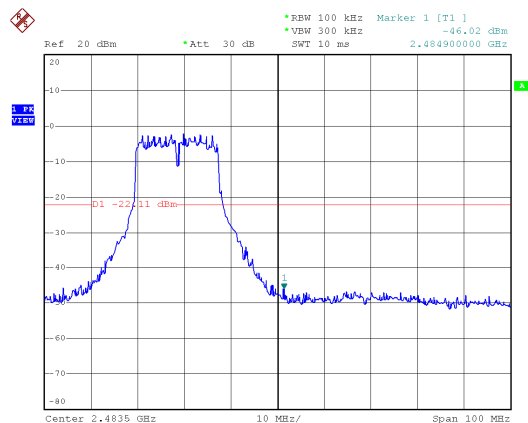
Modulation Type: 802.11g, CH11



Modulation Type: 802.11n HT20, CH01

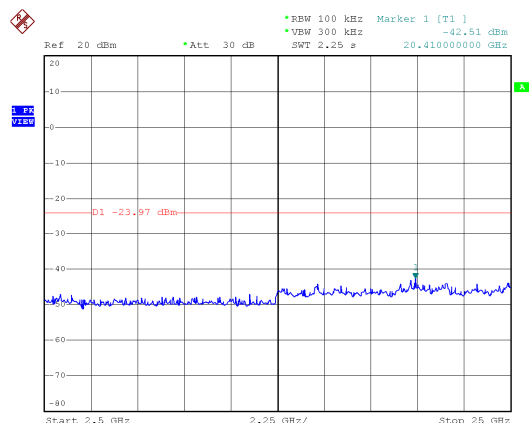
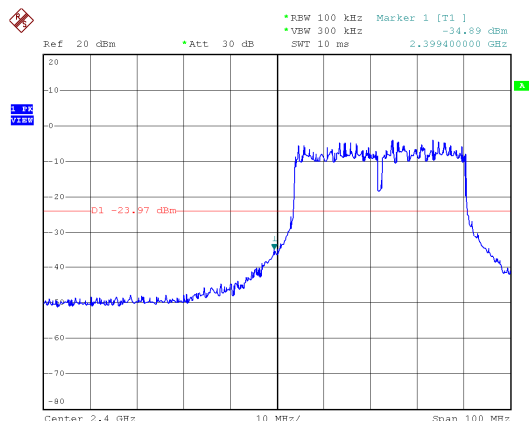


Modulation Type: 802.11n HT20, CH11

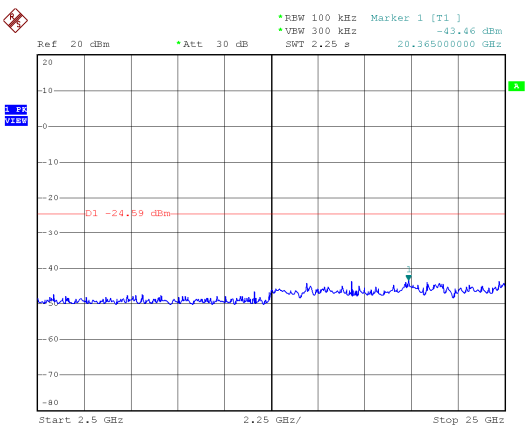
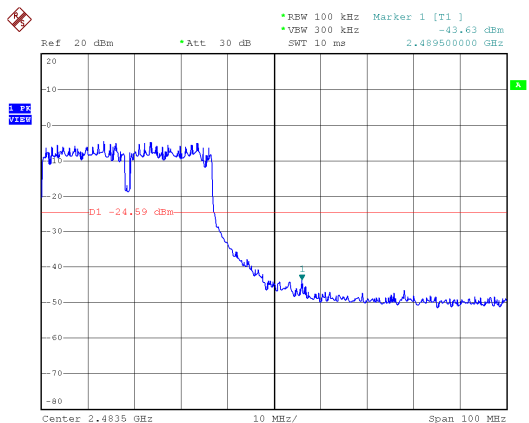




Antenna 1 Modulation Type: 802.11n HT40, CH03

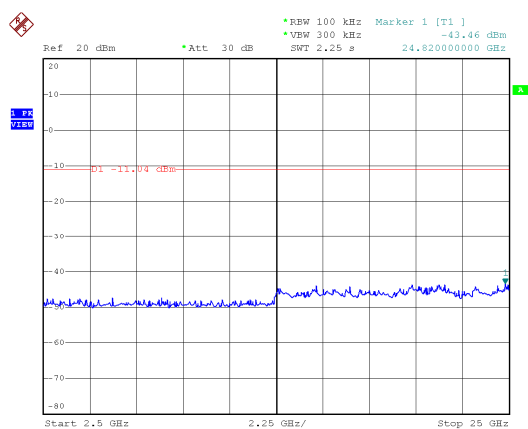
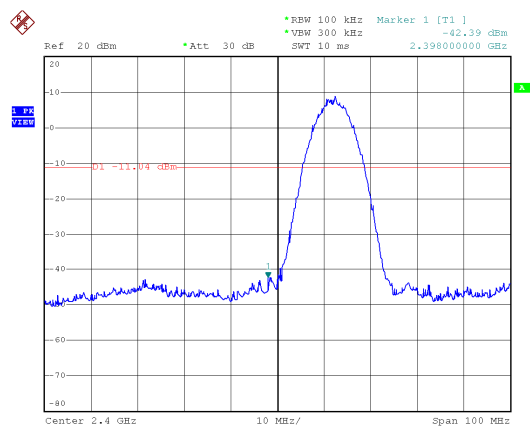


Modulation Type: 802.11n HT40, CH09

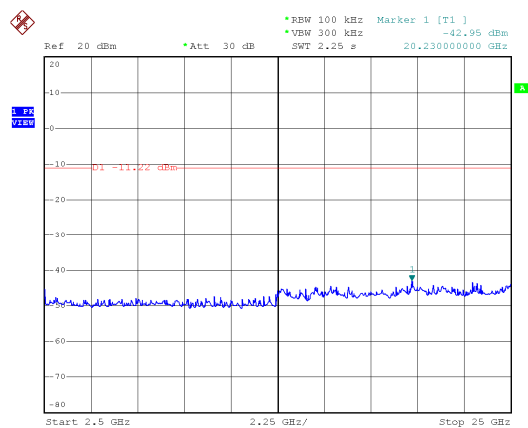
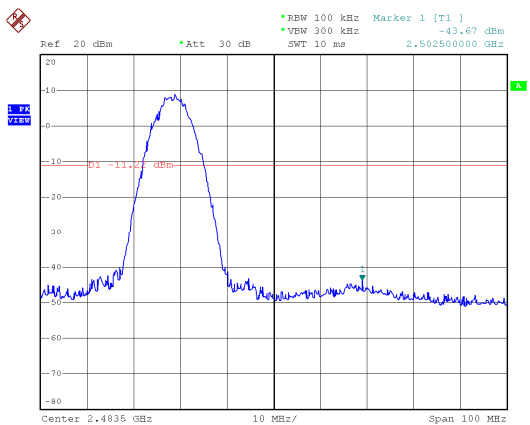




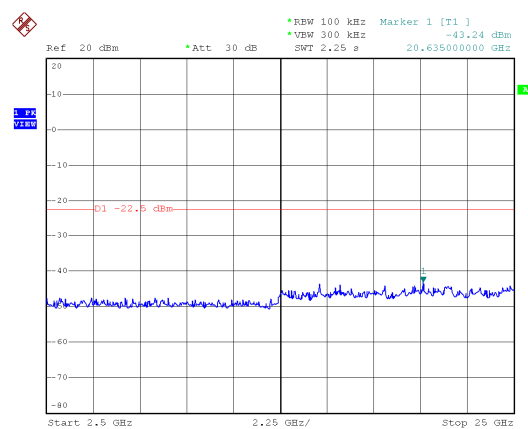
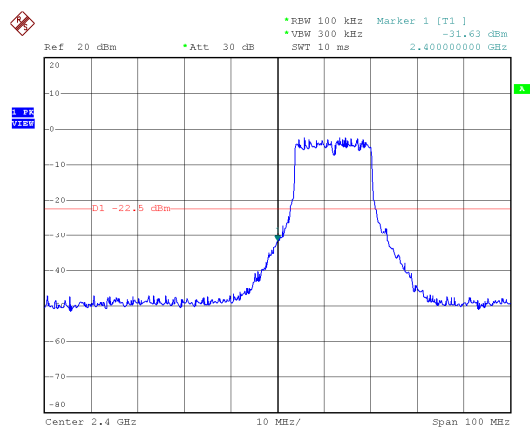
Antenna 2 Modulation Type: 802.11b, CH01



Modulation Type: 802.11b, CH11



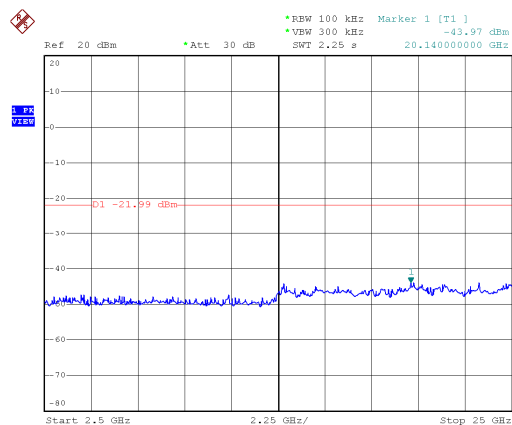
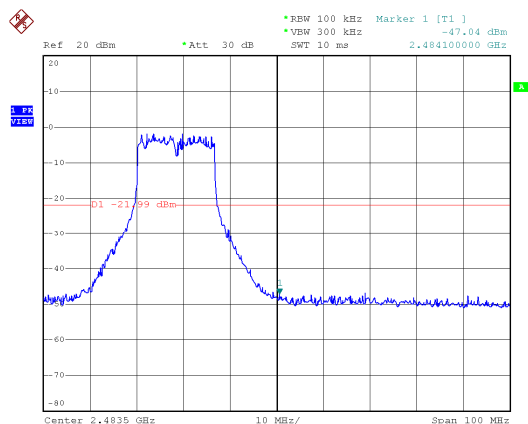
Modulation Type: 802.11g, CH01



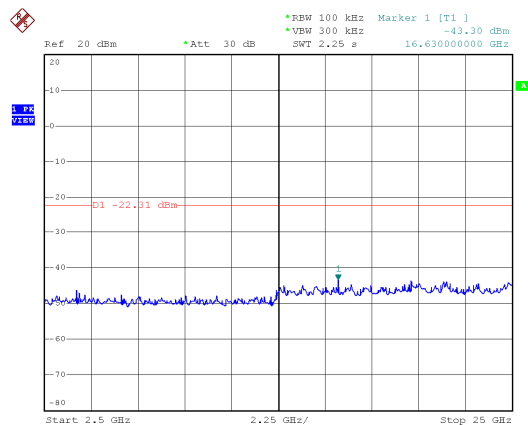
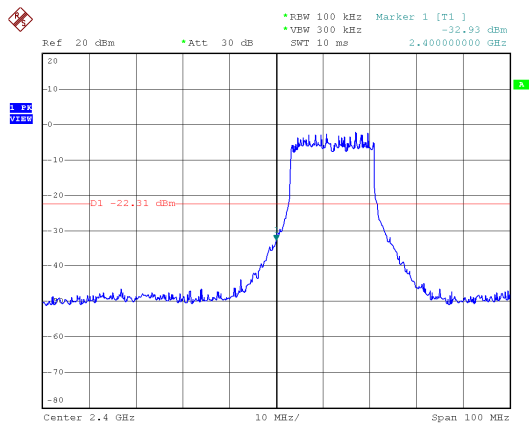


Antenna 2

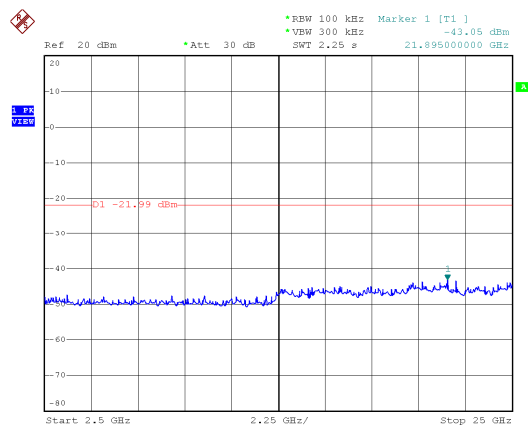
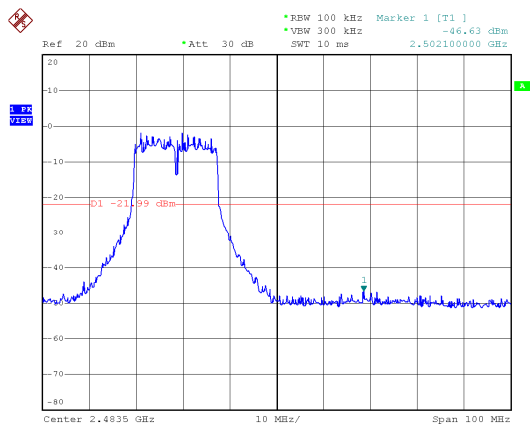
Modulation Type: 802.11g, CH11



Modulation Type: 802.11n HT20, CH01



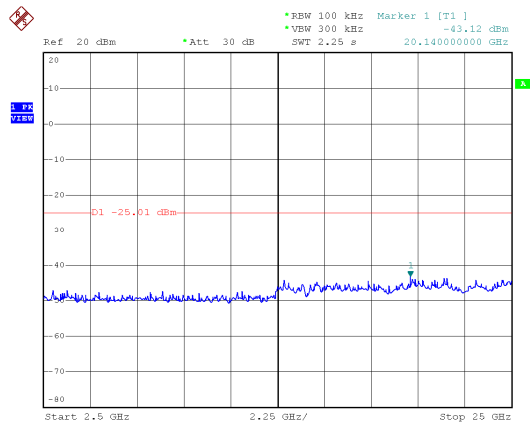
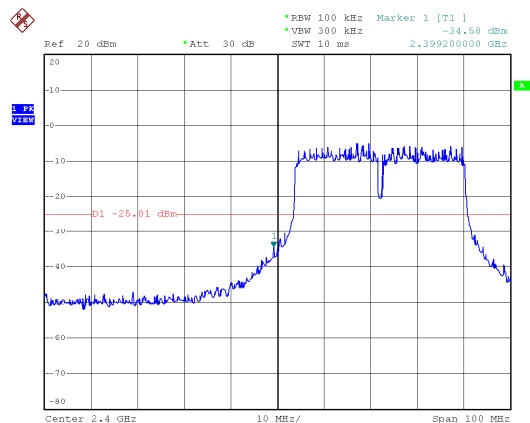
Modulation Type: 802.11n HT20, CH11



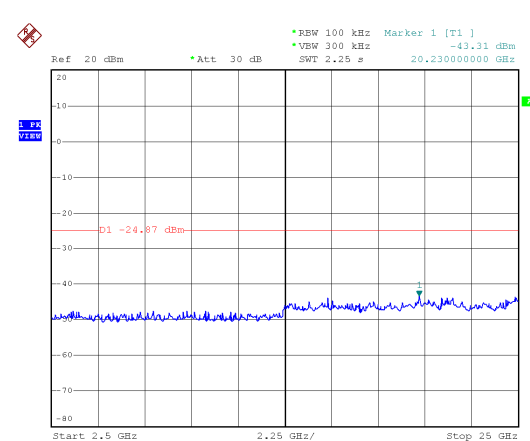
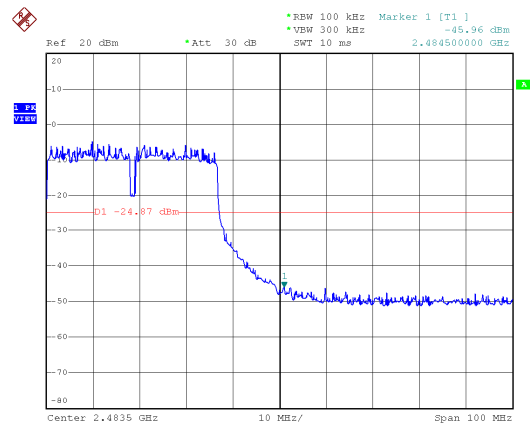


Antenna 2

Modulation Type: 802.11n HT40, CH03



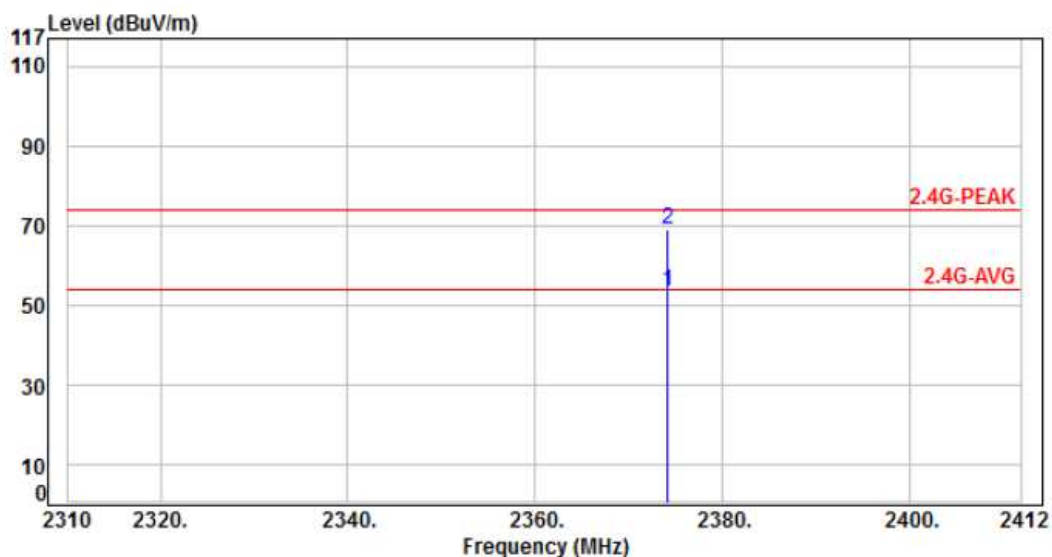
Modulation Type: 802.11n HT40, CH09





8.6. 禁用頻段內幅射場強之量測結果及數據

Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2374.16	-18.99	72.55	53.56	54.00	-0.44	Average	159	164	P
2	2374.16	-18.99	87.76	68.77	74.00	-5.23	Peak	159	164	P

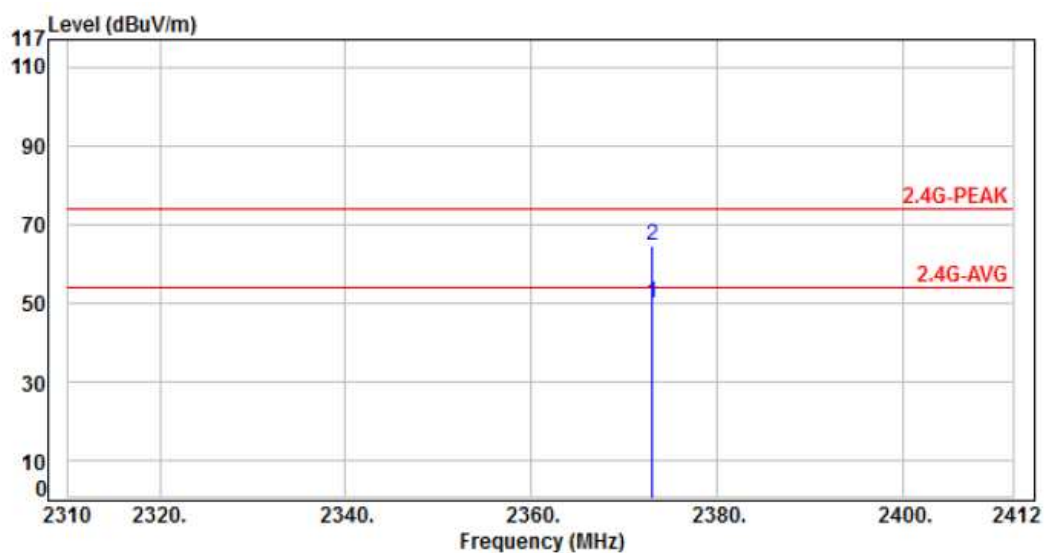
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2372.93	-18.99	68.84	49.85	54.00	-4.15	Average	156	187	P
2	2372.93	-18.99	83.45	64.46	74.00	-9.54	Peak	156	187	P

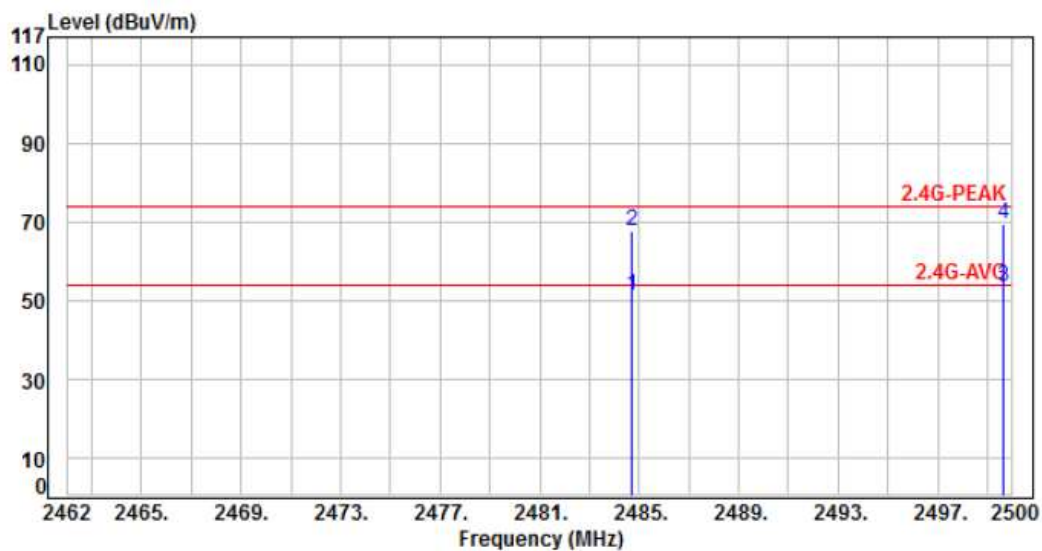
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 1, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2484.69	-18.71	69.69	50.98	54.00	-3.02	Average	156	162	P
2	2484.69	-18.71	86.16	67.45	74.00	-6.55	Peak	156	162	P
3	2499.62	-18.67	72.23	53.56	54.00	-0.44	Average	156	162	P
4	2499.62	-18.67	87.95	69.28	74.00	-4.72	Peak	156	162	P

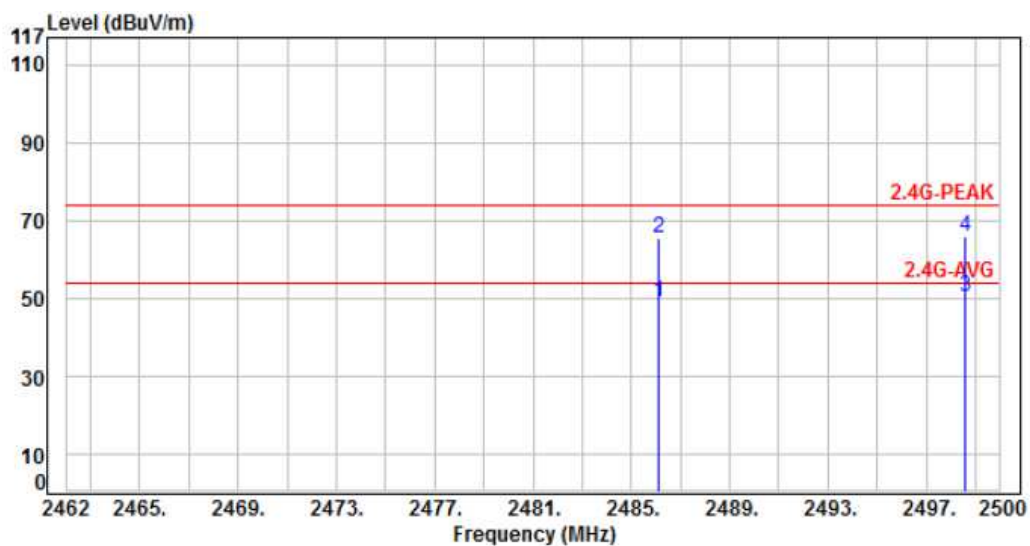
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2486.13	-18.71	67.54	48.83	54.00	-5.17	Average	211	183	P
2	2486.13	-18.71	84.23	65.52	74.00	-8.48	Peak	211	183	P
3	2498.56	-18.67	68.85	50.18	54.00	-3.82	Average	211	183	P
4	2498.56	-18.67	84.36	65.69	74.00	-8.31	Peak	211	183	P

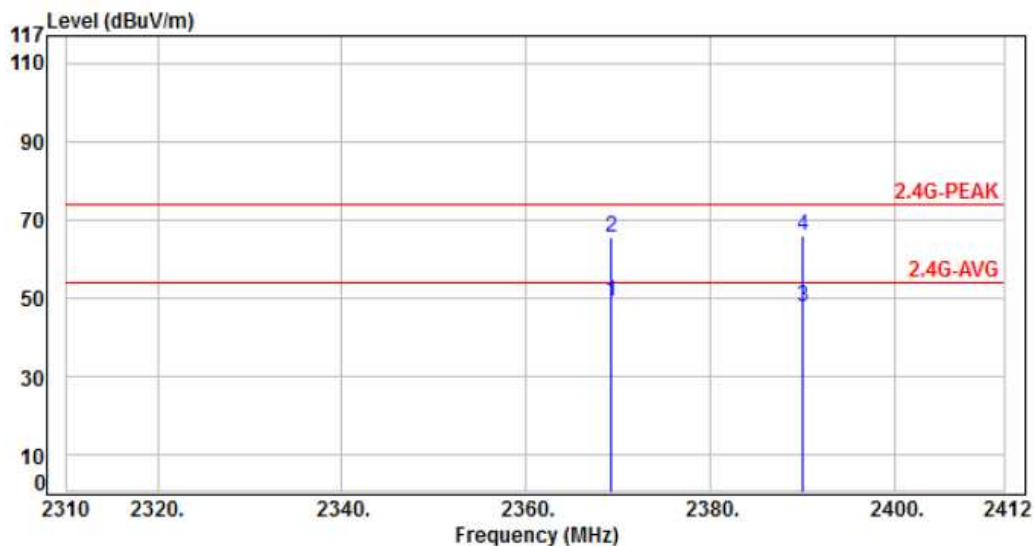
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 2, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2369.26	-19.00	67.92	48.92	54.00	-5.08	Average	175	168	P
2	2369.26	-19.00	84.44	65.44	74.00	-8.56	Peak	175	168	P
3	2390.00	-18.95	66.72	47.77	54.00	-6.23	Average	175	168	P
4	2390.00	-18.95	84.84	65.89	74.00	-8.11	Peak	175	168	P

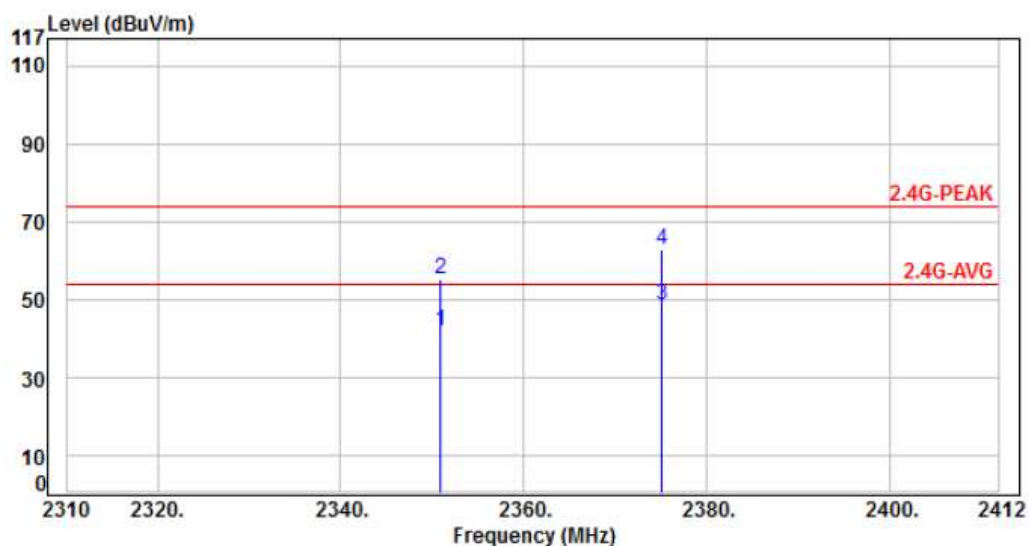
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 2, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2350.80	-19.05	60.79	41.74	54.00	-12.26	Average	158	148	P
2	2350.80	-19.05	74.11	55.06	74.00	-18.94	Peak	158	148	P
3	2375.18	-18.99	67.43	48.44	54.00	-5.56	Average	158	148	P
4	2375.18	-18.99	81.64	62.65	74.00	-11.35	Peak	158	148	P

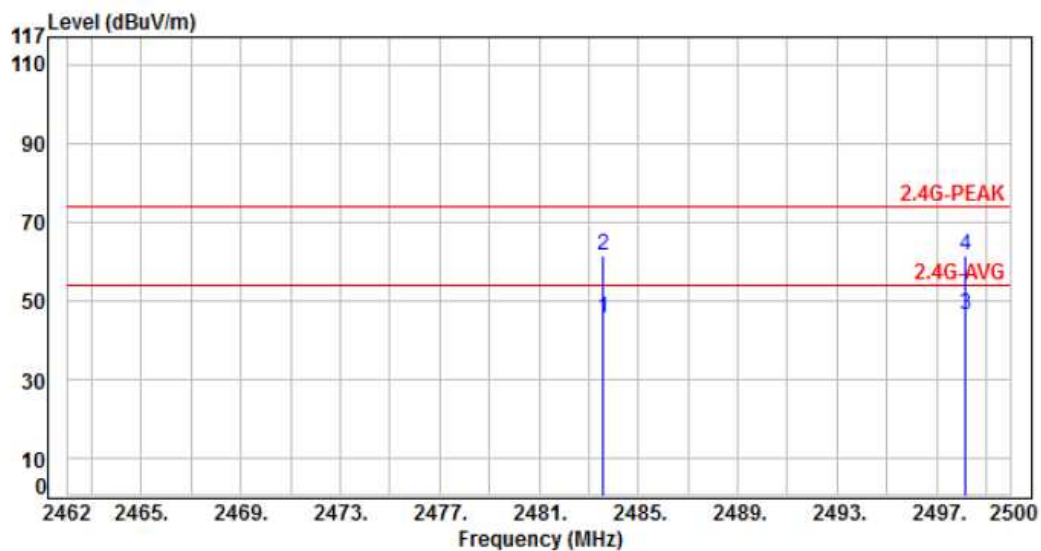
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 2, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.55	-18.71	63.98	45.27	54.00	-8.73	Average	166	182	P
2	2483.55	-18.71	80.10	61.39	74.00	-12.61	Peak	166	182	P
3	2498.18	-18.67	64.92	46.25	54.00	-7.75	Average	166	182	P
4	2498.18	-18.67	80.03	61.36	74.00	-12.64	Peak	166	182	P

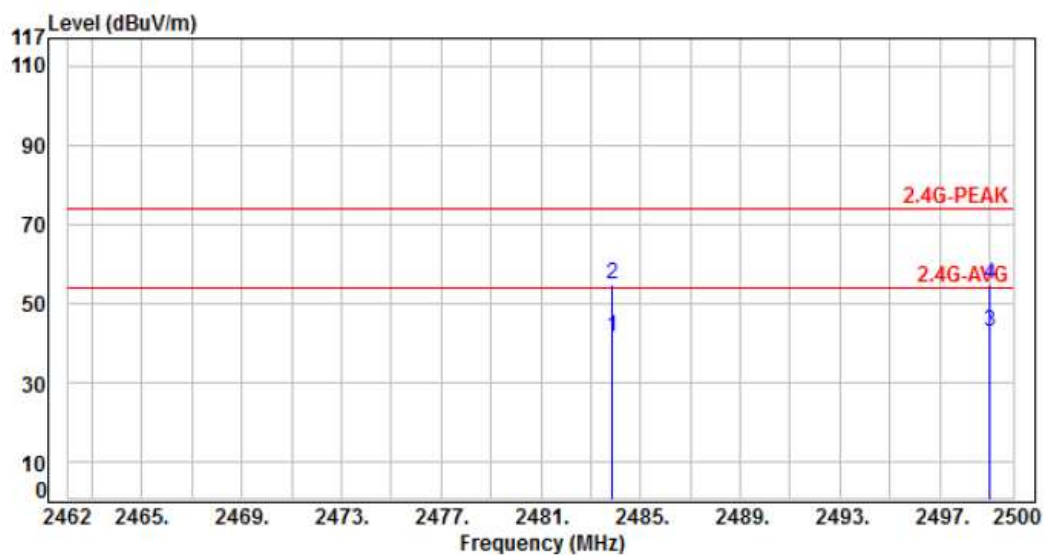
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 2, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.85	-18.71	60.07	41.36	54.00	-12.64	Average	189	194	P
2	2483.85	-18.71	73.43	54.72	74.00	-19.28	Peak	189	194	P
3	2498.97	-18.67	61.54	42.87	54.00	-11.13	Average	189	194	P
4	2498.97	-18.67	73.50	54.83	74.00	-19.17	Peak	189	194	P

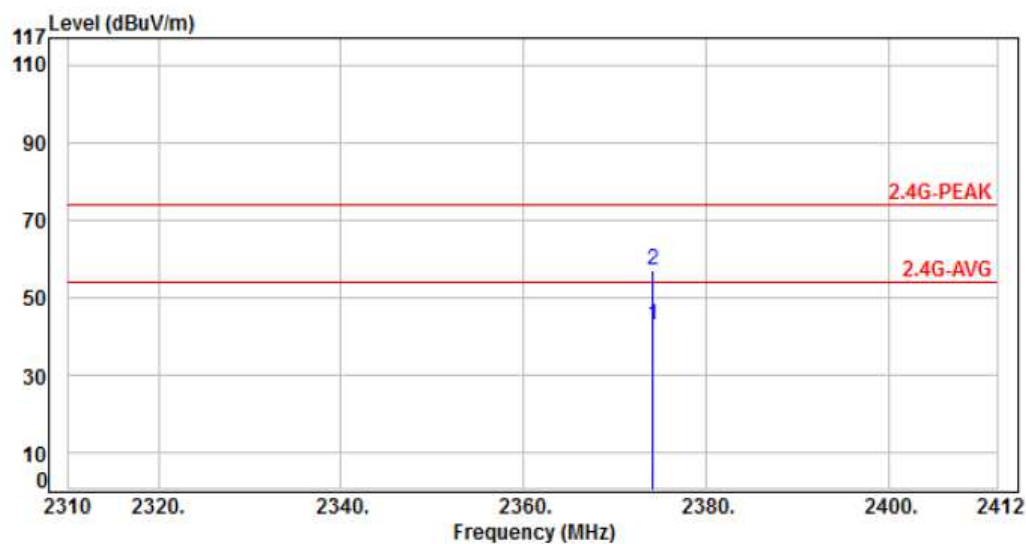
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2374.06	-18.99	61.91	42.92	54.00	-11.08	Average	144	201	P
2	2374.06	-18.99	75.73	56.74	74.00	-17.26	Peak	144	201	P

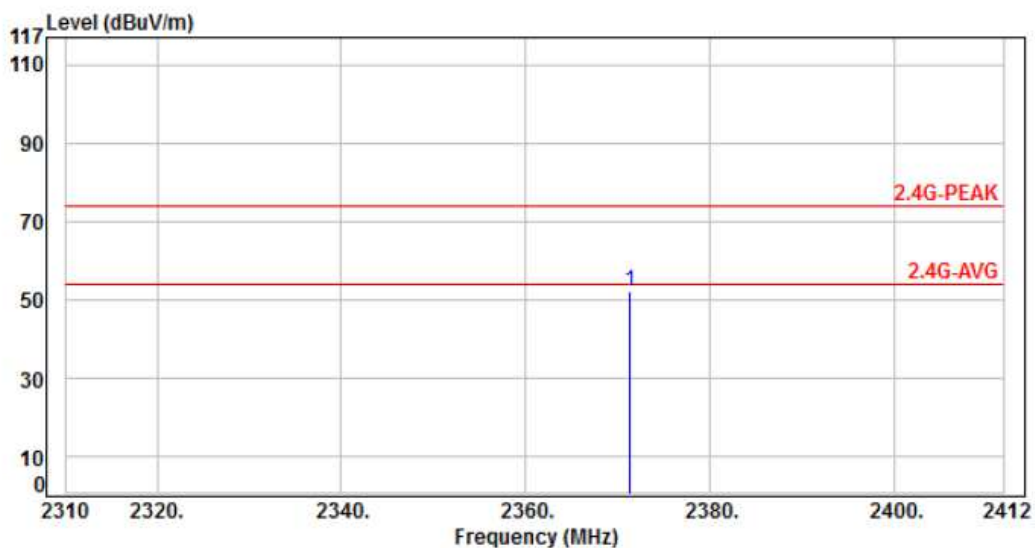
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH01	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2371.30	-19.00	70.96	51.96	74.00	-22.04	Peak	200	0	P

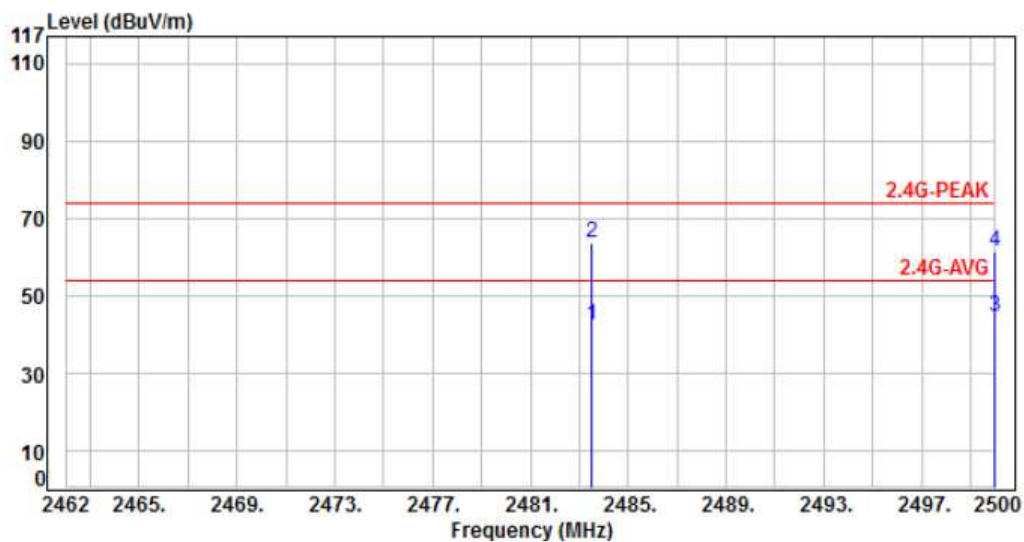
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-18.71	60.94	42.23	54.00	-11.77	Average	124	212	P
2	2483.50	-18.71	82.40	63.69	74.00	-10.31	Peak	124	212	P
3	2500.00	-18.67	63.23	44.56	54.00	-9.44	Average	124	212	P
4	2500.00	-18.67	80.15	61.48	74.00	-12.52	Peak	124	212	P

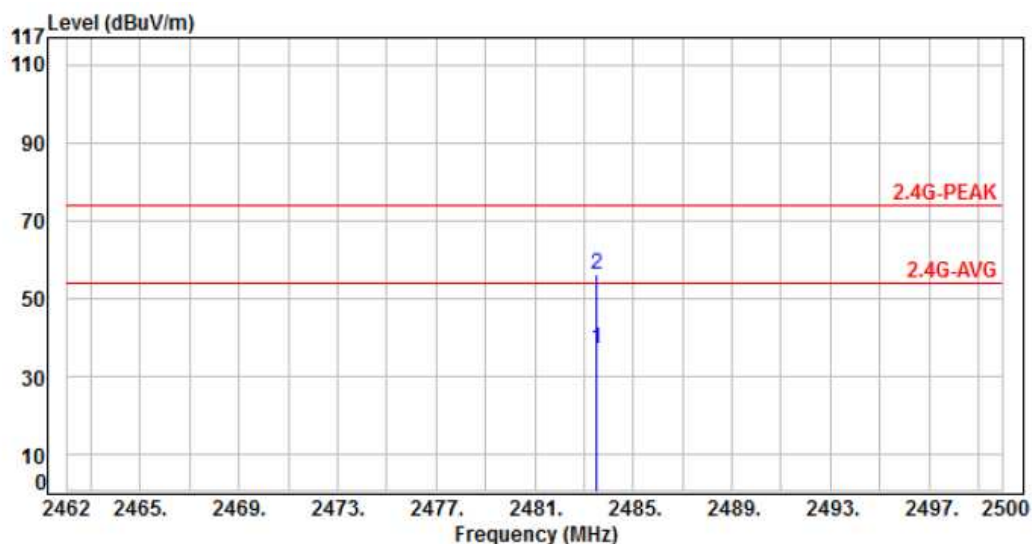
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, CH11	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-18.71	55.59	36.88	54.00	-17.12	Average	121	264	P
2	2483.50	-18.71	74.92	56.21	74.00	-17.79	Peak	121	264	P

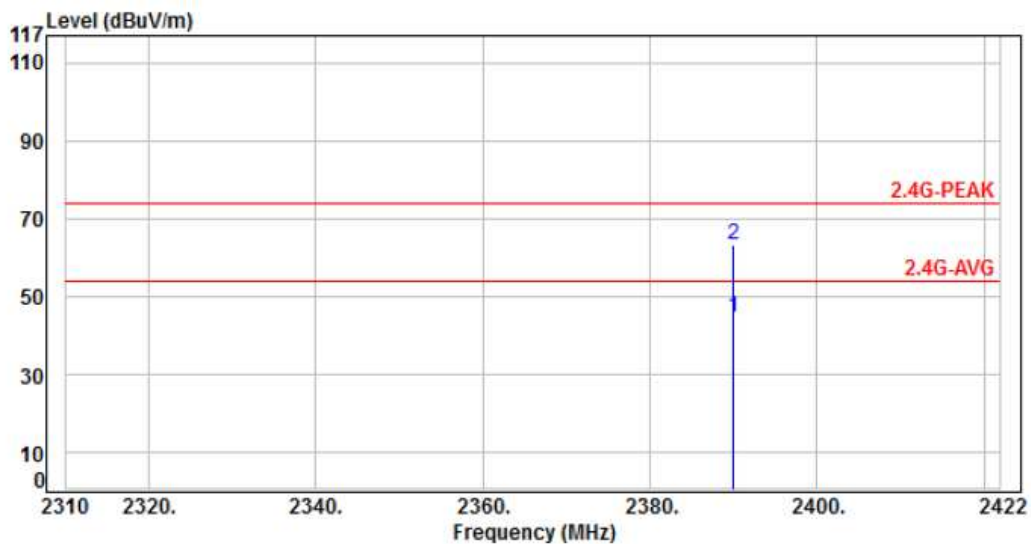
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 4, CH03	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-18.95	63.23	44.28	54.00	-9.72	Average	100	177	P
2	2390.00	-18.95	82.06	63.11	74.00	-10.89	Peak	100	177	P

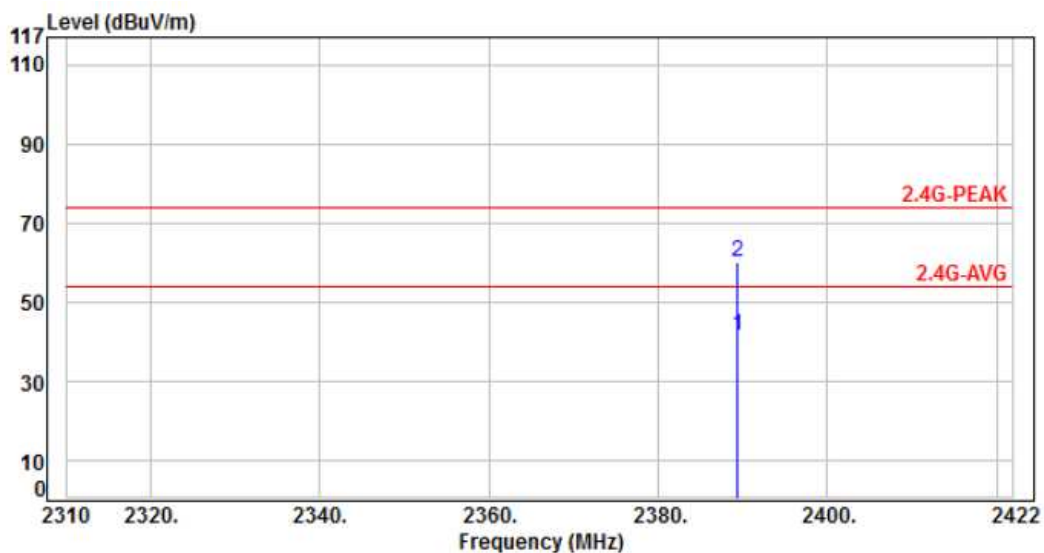
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 4, CH03	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2389.30	-18.95	60.20	41.25	54.00	-12.75	Average	163	201	P
2	2389.30	-18.95	79.08	60.13	74.00	-13.87	Peak	163	201	P

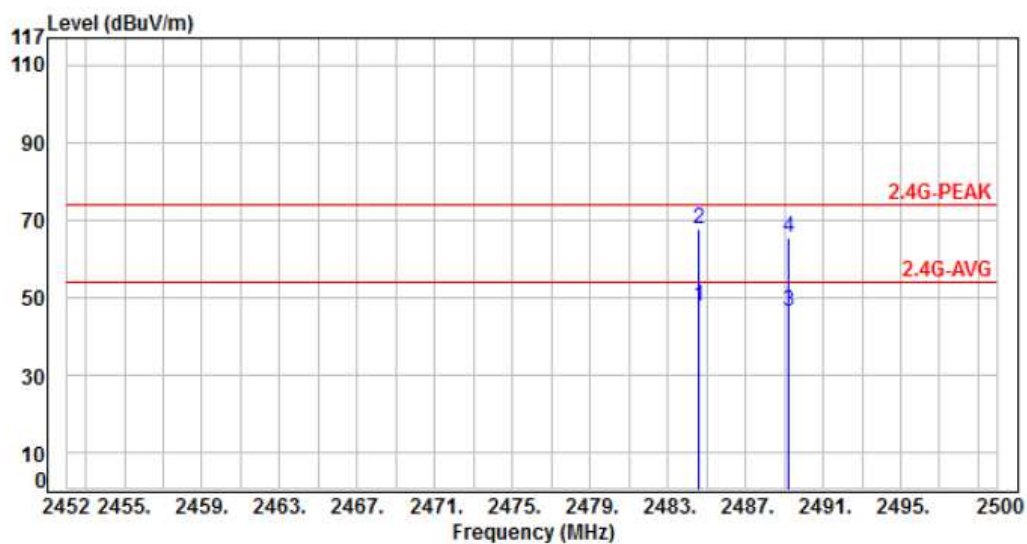
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: VERTICAL
Test Mode	: Mode 4, CH09	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2484.59	-18.71	66.24	47.53	54.00	-6.47	Average	149	208	P
2	2484.59	-18.71	86.38	67.67	74.00	-6.33	Peak	149	208	P
3	2489.25	-18.70	65.14	46.44	54.00	-7.56	Average	149	208	P
4	2489.25	-18.70	84.31	65.61	74.00	-8.39	Peak	149	208	P

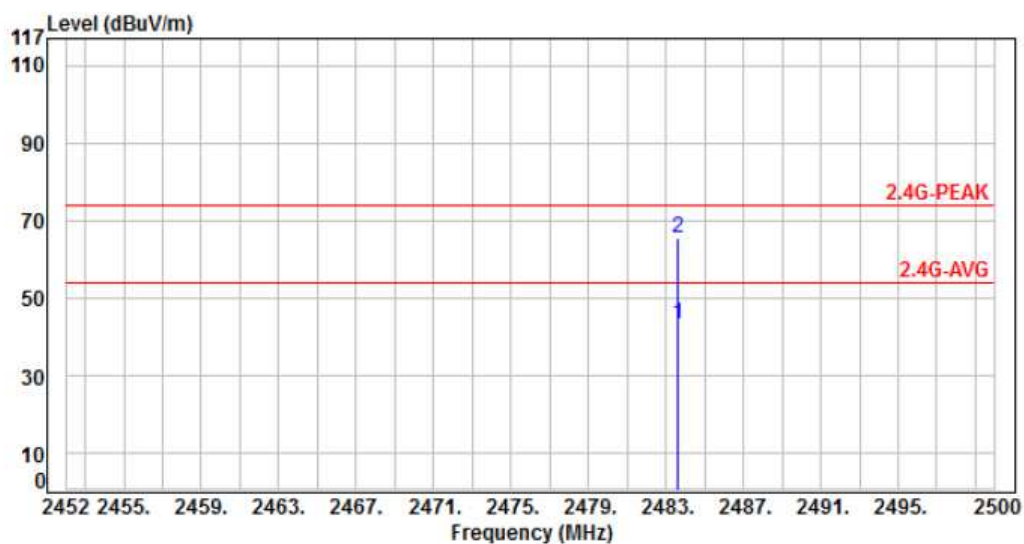
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: AC 110V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 4, CH09	Temperature	: 24 °C
Test Date	: Nov. 25, 2017	Humidity	: 68 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.58	-18.71	62.06	43.35	54.00	-10.65	Average	146	237	P
2	2483.58	-18.71	83.99	65.28	74.00	-8.72	Peak	146	237	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



9. 功率密度之規定

9.1. 適用標準

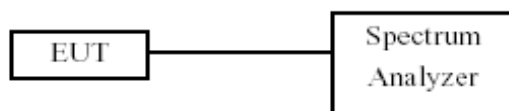
依據國家通訊傳播委員會低功率射頻電機技術規範 3.10.1.6 節之(2)(B)規定，對數位調變技術系統，在使用任意 3 kHz 之頻寬內，由發射機傳導至天線之峰值發射電功率密度在任意期間內，皆不得大於 8dBm，且應依 3.10.1.3 之方式降低功率頻譜密度限制值。

9.2. 測試方法

1. 將待測物和儀器相連接。
2. 設定儀器解析頻寬為 3kHz、視訊頻寬為 30 kHz。
3. 量測並記錄於報告中。

備註:此測試項目檢驗之擴充不確定度 ± 2.2 dB。

9.3. 測試配置



9.4. 功率密度之量測結果及數據

Test Result : PASS

Temperature : 21°C

Test Date : Nov. 24, 2017

Humidity : 55%

Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 3 kHz Bandwidth (dBm)			
			ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	-7.88	-5.32	-6.49	-1.67
	06	2437	-7.59	-5.24	-6.05	-1.42
	11	2462	-7.74	-4.90	-5.57	-1.14
IEEE 802.11g (54Mbps)	01	2412	-15.75	-15.79	-15.93	-11.05
	06	2437	-16.30	-15.93	-14.85	-10.88
	11	2462	-16.35	-15.02	-15.64	-10.86
IEEE 802.11n HT20 (195Mbps)	01	2412	-16.65	-16.10	-16.59	-11.67
	06	2437	-16.36	-15.78	-15.68	-11.16
	11	2462	-16.81	-16.43	-16.79	-11.90
IEEE 802.11n HT40 (405Mbps)	03	2422	-17.48	-15.96	-17.89	-12.26
	06	2437	-18.10	-18.33	-17.56	-13.21
	09	2452	-18.29	-18.53	-18.07	-13.52

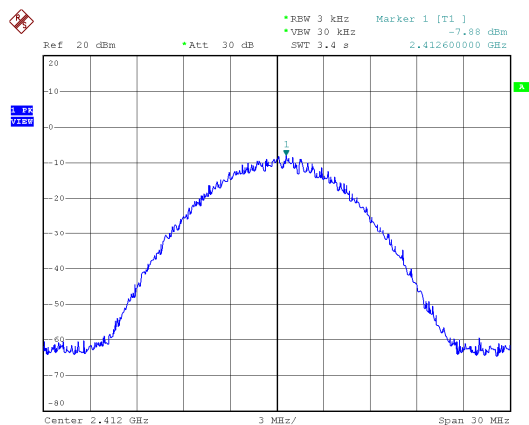
備註：繪圖資料請參考下頁。

9.5. 結果判定

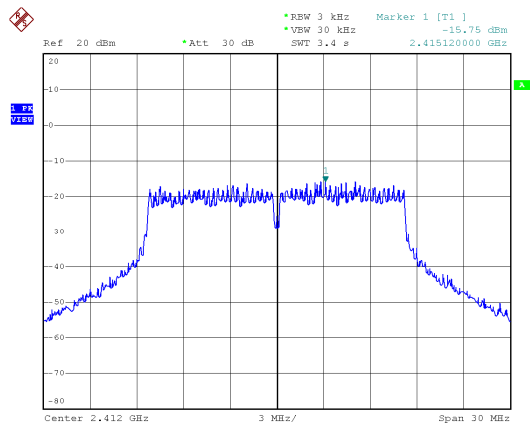
高、中、低頻段的 3 kHz 功率密度皆低於 8 dBm，合乎標準規定。



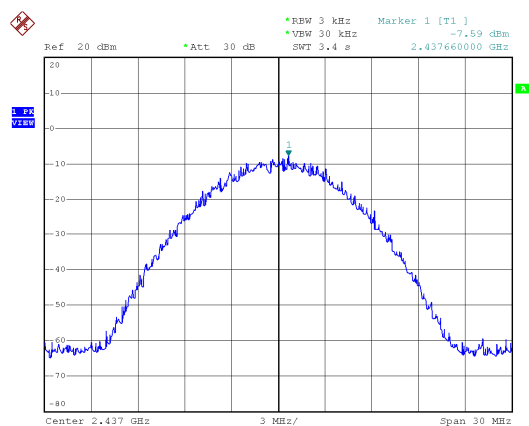
Antenna 0
Modulation Type: 802.11b
CH01



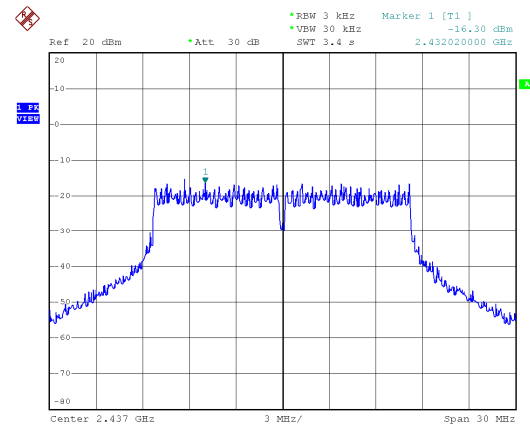
Modulation Type: 802.11g
CH01



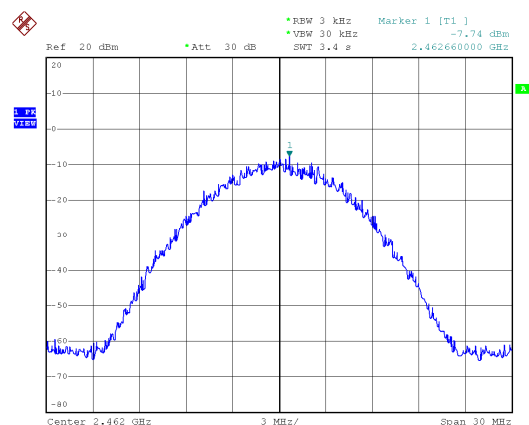
CH06



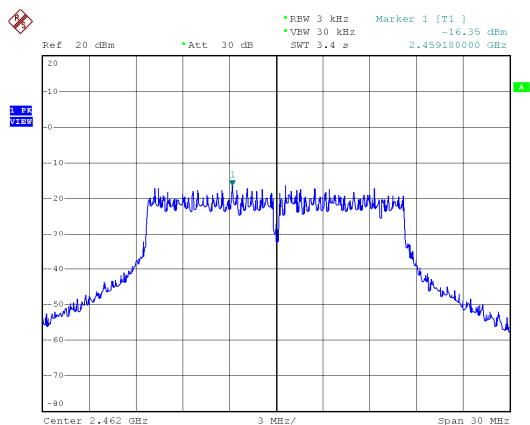
CH06



CH11

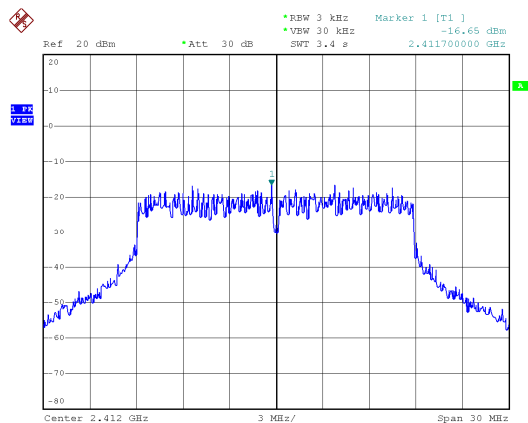


CH11

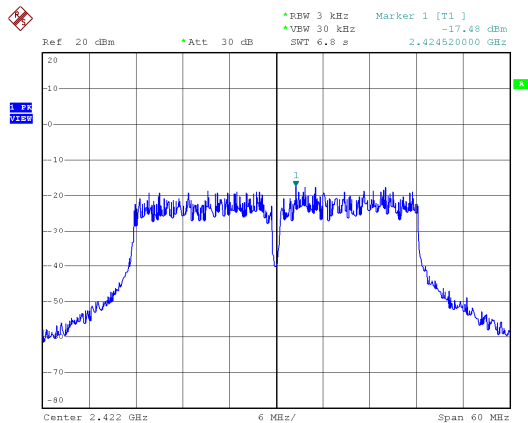




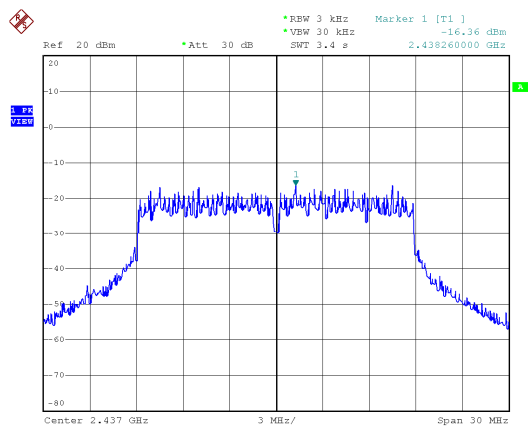
Antenna 0
Modulation Type: 802.11n HT20
CH01



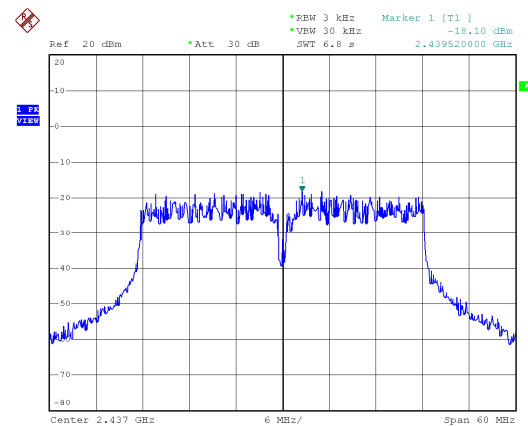
Modulation Type: 802.11n HT40
CH03



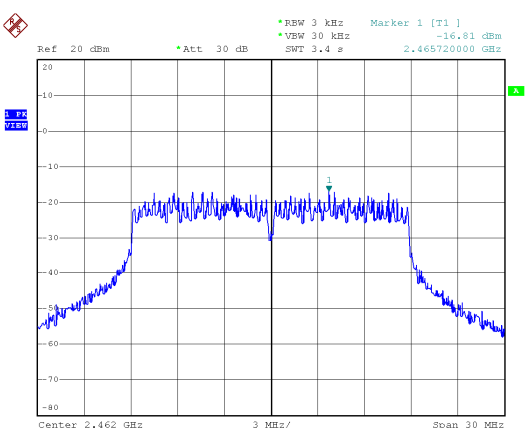
CH06



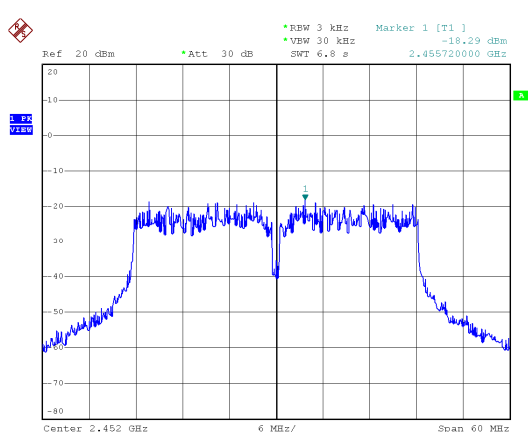
CH06



CH11

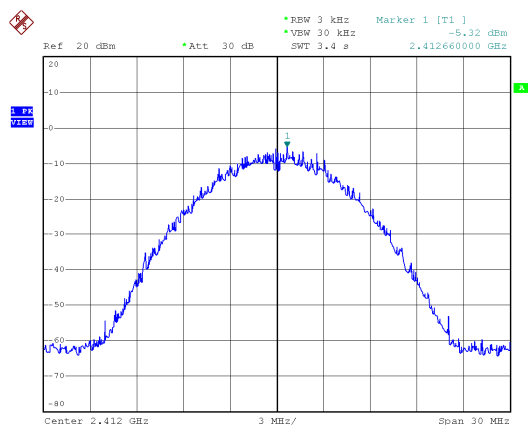


CH09

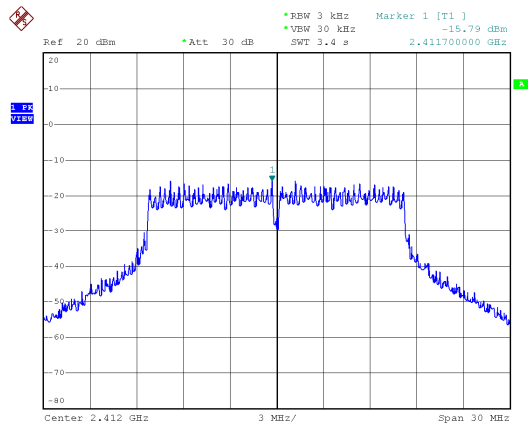




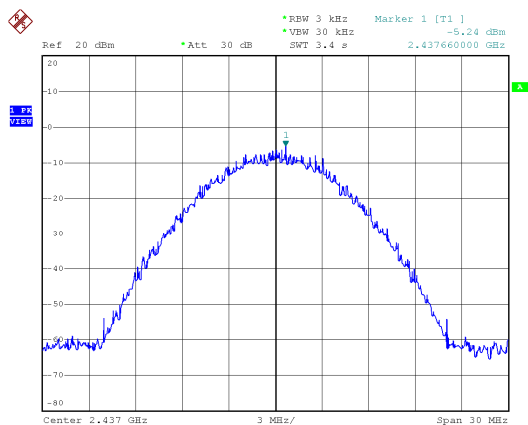
Antenna 1
Modulation Type: 802.11b
CH01



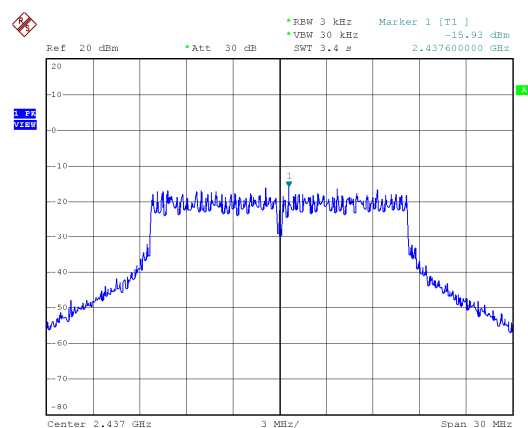
Modulation Type: 802.11g
CH01



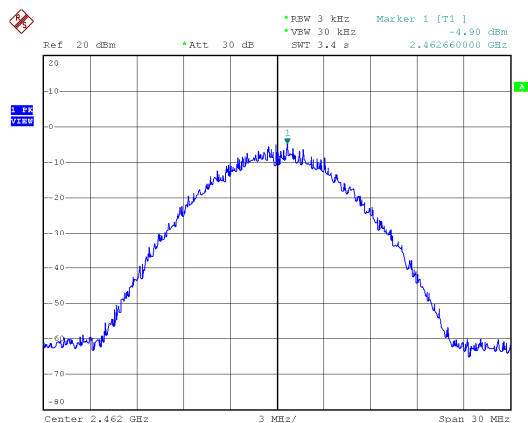
CH06



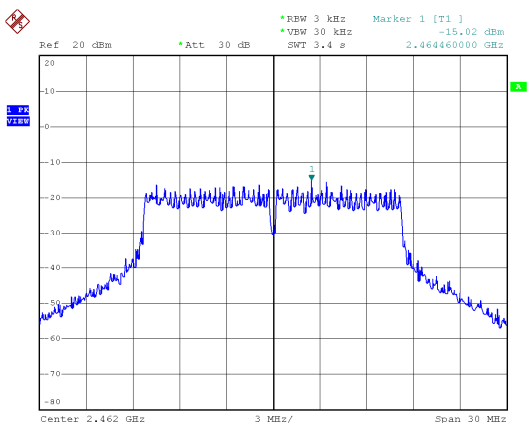
CH06



CH11

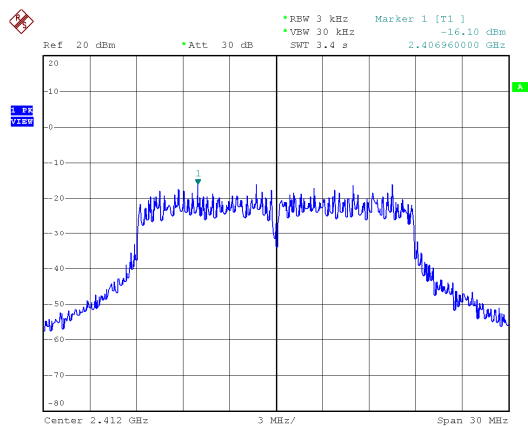


CH11

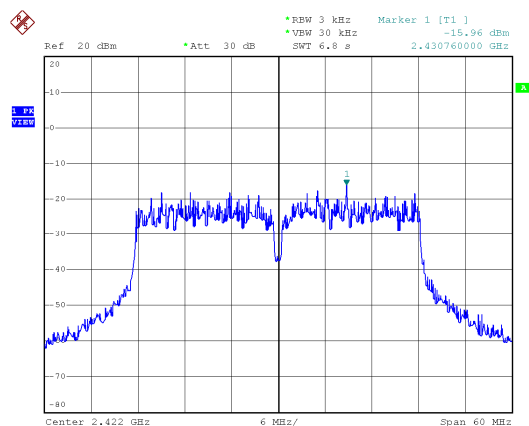




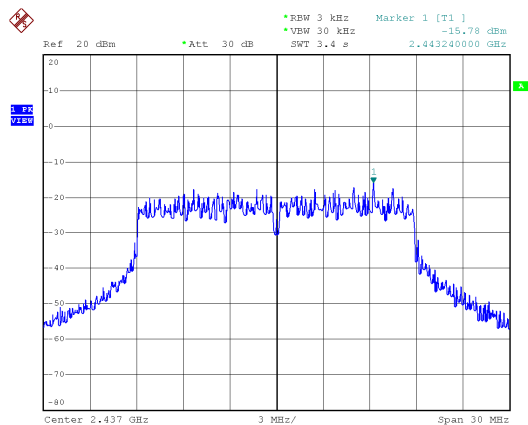
Antenna 1
Modulation Type: 802.11n HT20
CH01



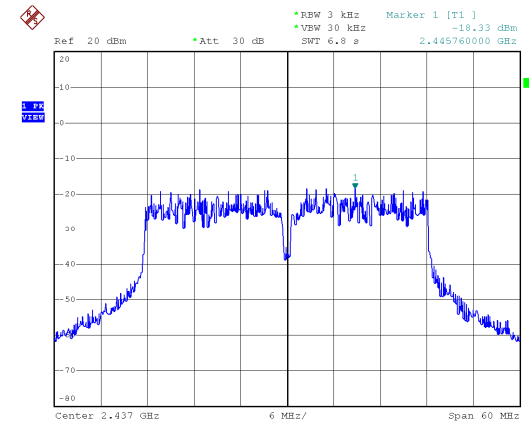
Modulation Type: 802.11n HT40
CH03



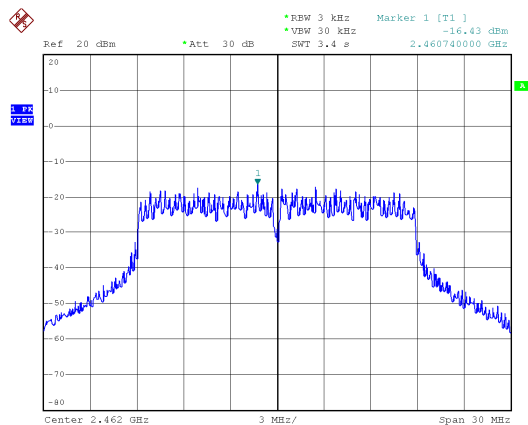
CH06



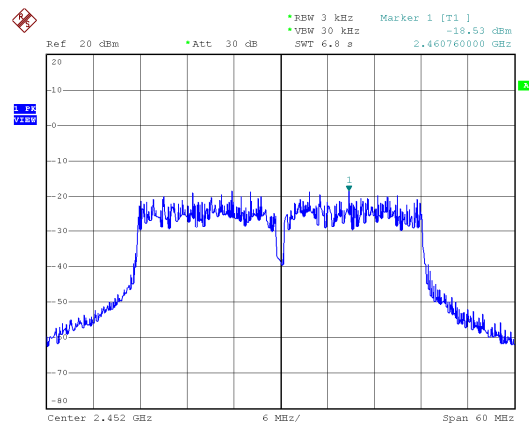
CH06



CH11

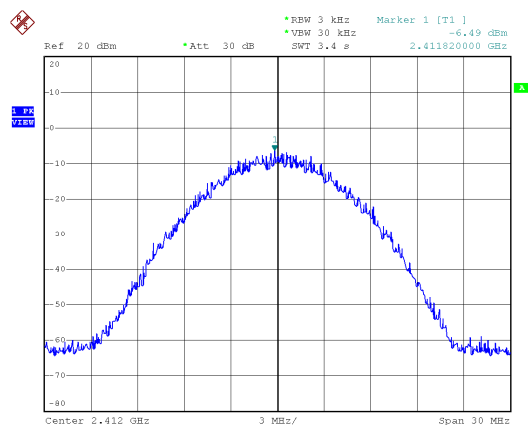


CH09

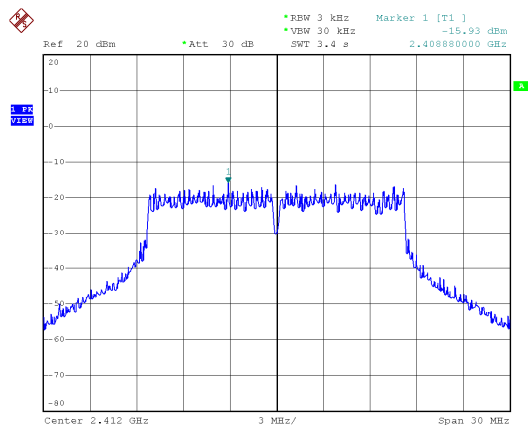




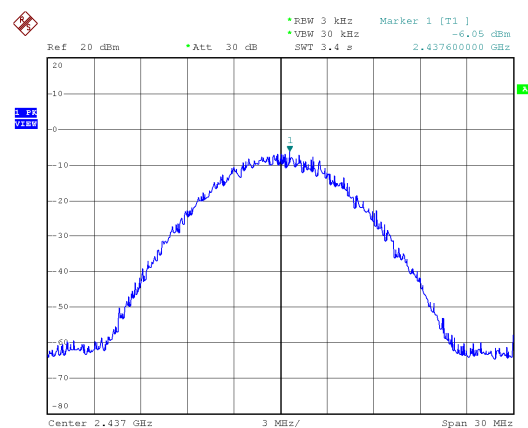
Antenna 2
Modulation Type: 802.11b
CH01



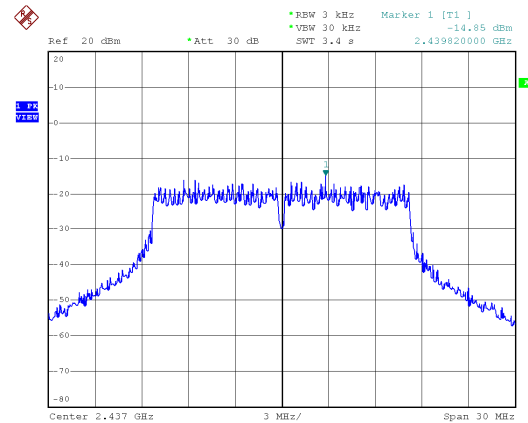
Modulation Type: 802.11g
CH01



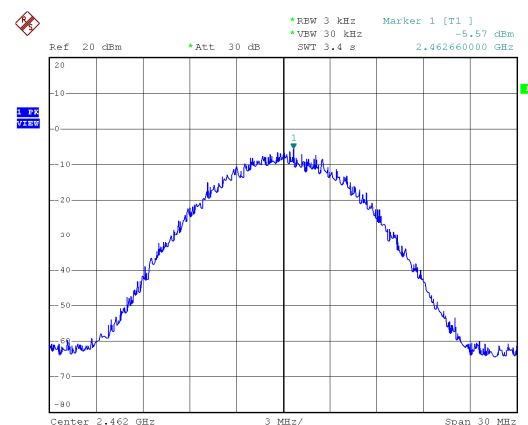
CH06



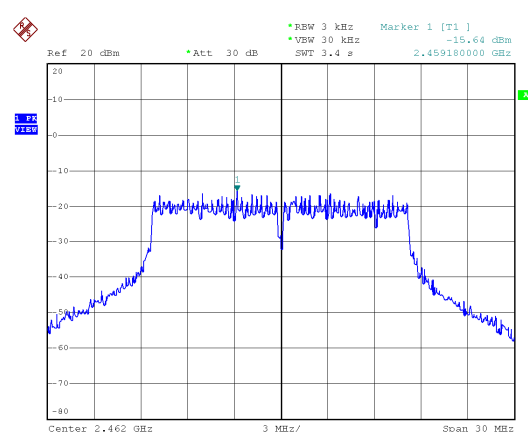
CH06



CH11



CH11

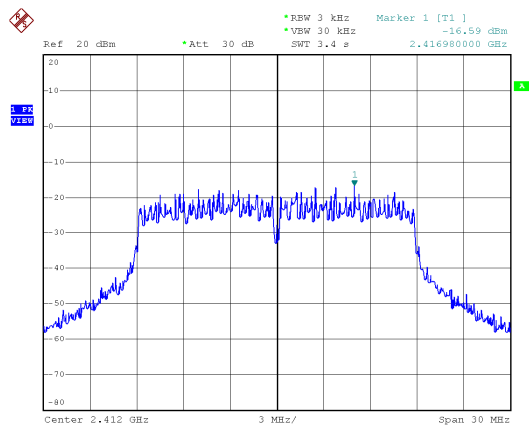




Antenna 2

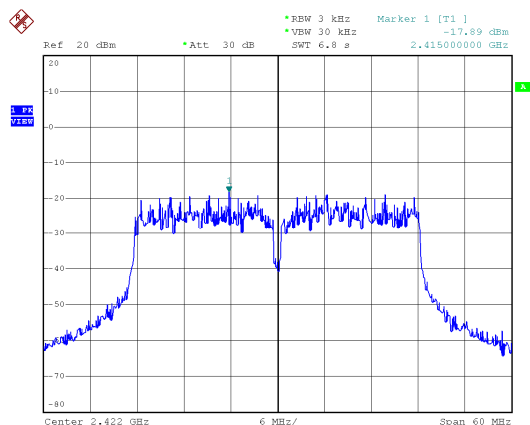
Modulation Type: 802.11n HT20

CH01

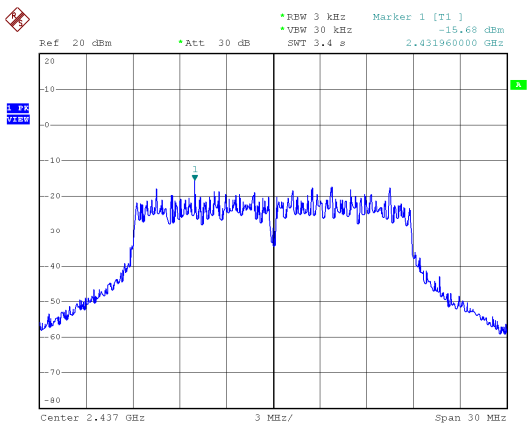


Modulation Type: 802.11n HT40

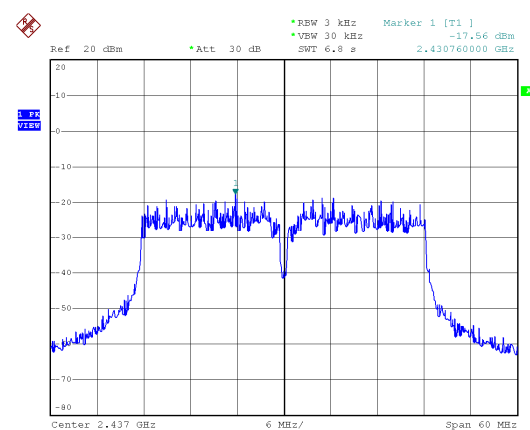
CH03



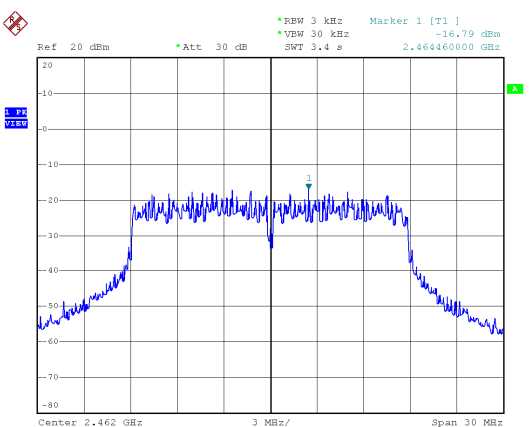
CH06



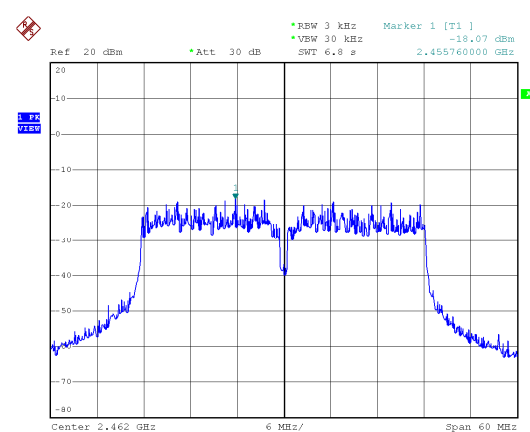
CH06



CH11



CH09





10. 電波暴露量之評估

10.1. 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 5.20 節之(5.20.2)規定，若受測物於正常操作模式下，其發射機距離人體 20 公分以上者，可測試最大暴露允許值(Maximum Permissible Exposure, MPE)以證明其符電波暴露量之要求。限制值如下：

(1) 職業性/可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3-3.0	614	1.63	*100	6
3-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500	-----	-----	f/300	6
1,500-100,000	-----	-----	5.0	6

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。

(2) 一般人/不可控制之暴露

頻率範圍 (MHz)	電場強度 (V/m)	磁場強度 (A/m)	功率密度 (mW/cm ²)	平均時間 (minutes)
0.3-3.0	614	1.63	*100	30
3-30	1842/f	4.89/f	*180/f ²	30
30-300	27.5	0.073	1.0	30
300-1,500	-----	-----	f/1500	30
1,500-100,000	-----	-----	1.0	30

註 1：標記*表平面波等效功率密度。

註 2：f 表測試頻率，單位：百萬赫(MHz)。



10.2. 電波暴露量之評估結果及數據

Test Result : PASS Temperature : 21°C
Test Date : Nov. 24, 2017 Humidity : 55%

Modulation Type	Frequency (MHz)	Max. Conducted output power(dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm2)	Limit (mW/cm2)
		ANT 0+1+2			ANT 0+1+2	
802.11b	2412-2462	26.84	4	20	0.2414	1
802.11g	2412-2462	27.47	4	20	0.2788	1
802.11n HT20	2412-2462	25.94	4	20	0.1961	1
802.11n HT40	2412-2462	26.11	4	20	0.2039	1

10.3. 結果判定

高、中、低頻段的電波暴露量皆低於限制值，合乎標準規定。



11. 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	167.72 - 173.20	3260.0 - 3267.0
0.490 - 0.510	240.00 - 285.00	3332.0 - 3339.0
2.172 - 2.198	322.00 - 335.40	3345.8 - 3358.0
3.013 - 3.033	399.90 - 410.00	3500.0 - 4400.0
4.115 - 4.198	485.00 - 510.00	4500.0 - 5250.0
5.670 - 5.690	608.00 - 614.00	5350.0 - 5460.0
6.200 - 6.300	703.00 - 748.00	7250.0 - 7750.0
8.230 - 8.400	758.00 - 803.00	8025.0 - 8500.0
12.265 - 12.600	825.00 - 915.00	9000.0 - 9200.0
13.340 - 13.430	930.00 - 1240.0	9300.0 - 9500.0
14.965 - 15.020	1300.0 - 1427.0	10600- 12700
16.700 - 16.755	1435.0 - 1626.5	13250- 13400
19.965 - 20.020	1660.0 - 1770.0	14470- 14500
25.500 - 25.700	1805.0 - 1865.0	15350- 16200
37.475 - 38.275	1885.0 - 1900.0	17700- 21400
73.500 - 75.400	1905.0 - 1985.0	22010- 23120
108.00 - 138.00	2015.0 - 2025.0	23600- 24000
149.90 - 150.05	2125.0 - 2160.0	31200- 31800
156.70 - 156.90	2200.0 - 2300.0	36430- 36500
162.01 - 167.17	2310.0 - 2390.0	38600 以上
162.01 - 167.17	2483.5 - 2900.0	