



晶復科技股份有限公司

A Test Lab Techno Corp.

低功率射頻電機試驗報告

報告編號	1903DR77
版本(Rev.)	01
產品名稱	WIFI BT Module
申請廠商	寶力數位有限公司
商標或廠牌	BONNIE
型式 (號)	CCS1001
產品試驗依據之標準	低功率射頻電機技術規範(LP0002) 107 年 1 月 10 日
報告發行日期	108 年 05 月 03 日

填發本型式認可報告之試驗機構 (認可代號)

晶復科技股份有限公司
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財團法人全國認證基金會
認證編號 : 1330
認證有效期間 : 105.09.06 ~ 108.09.05
認可能量範圍 : 低功率射頻電機技術規範(LP0002)
2.4GHz 射頻電信終端設備技術規範(RTTE01)

實驗室聲明

本測試報告內之測試結果可藉由測試儀器設備之校正報告與本報告內所評估量測不確定度追溯至國家或國際標準。

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低功率射頻電機測試證明書

發行日期：108年05月03日

產品名稱：WIFI BT Module
商標：BONNIE
型號：CCS1001
申請廠商：寶力數位有限公司
申請者地址：高雄市前鎮區和平二路205號地下一樓
製造廠商：Redpine Signals Inc
製造商地址：2107 N.First Street, Suite 680, San Jose, California, 95131-2019, United States
待測物電壓：DC 1.8 V, 0.4 A / DC 3.3 V, 0.4 A
試驗電壓：DC 3.3 V
量測規範：低功率射頻電機技術規範(LP0002) 107年1月10日
試驗實驗室：晶復科技股份有限公司(桃園市八德區長安街140-1號)
試驗受理日期：107 年 10 月 24 號
樣品接受日期：107 年 11 月 06 號
試驗完成日期：108 年 03 月 25 號
報告中所描述之測試結果與待測設備之架構組合，均根據實際量測情況作詳實的記錄。
由測試結果顯示，上述待測設備樣機確實已符合低功率射頻電機技術規範(LP0002)所規定的各項限制值。
特此證明！

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呂宗霖

(呂 宗 霖)

本測試報告所敘述之測試結果，僅對客戶所提供之測試樣品，在此測試報告所述及之測試條件下所實施之量測有效。

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1. 一般敘述

1.1 待測設備一般敘述

本敘述僅針對產品簡單說明之，其他詳細之規格請參考使用說明書。

產 品 名 稱	WIFI BT Module				
商 標 或 廠 牌	BONNIE				
型 號	CCS1001				
額 定 電 源	DC 1.8 V, 0.4 A / DC 3.3 V, 0.4 A				
調 變 方 式	O-QPSK				
頻 率 使 用 範 圍	2405 MHz – 2480 MHz				
頻 道 數	16 CH				
頻 道 寬	5 MHz				
天 線 資 訊	廠牌	型號	型態	Connector	增益值 (dBi)
	Redpine	RSIA15	PCB Trace Antenna	Internal	0.99
	Taoglas	WS.01.B.305151	Heavy Duty Screw Mount Antenna	SMA Reverse	4.1
RF 最大輸出功率	Power setting 1_Antenna Type: PCB Trace Antenna				
	20.11 dBm / 0.10257 W				
	Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna				
	18.38 dBm / 0.06887 W				

輸出/輸入埠說明：

輸 出 / 入 埠		數量	介面內容說明
1	Signal Port	1	連接至治具

待測設備外圍說明：

電 源 線 類 別	本產品透過治具供電
附 屬 裝 置	無

1.2 其他相關聲明

本測試報告屬(以下選擇一種打■)

☒	新設計之機型,申請新的型式檢驗認可的測試.
☐	已取得型式檢驗認可之商品,因設計變更而重新測試. 登錄號碼: XXXXXXXX

2. 量測儀器及測試配置說明

2.1 量測設備

For Conducted

Test Period: Dec. 05, 2018

名稱	廠牌	型號	序號	本次校驗日期	校驗年限
Power Sensor	Anritsu	MA2411B	1126022	08/29/2018	1 year
Power Meter	Anritsu	ML2495A	1135009	08/29/2018	1 year
Spectrum Analyzer (3 Hz~50 GHz)	Agilent	N9030A	MY53120541	01/02/2018	1 year
Microwave Cable	EMCI	EMC102-SM-SM1500	001	11/21/2018	1 year

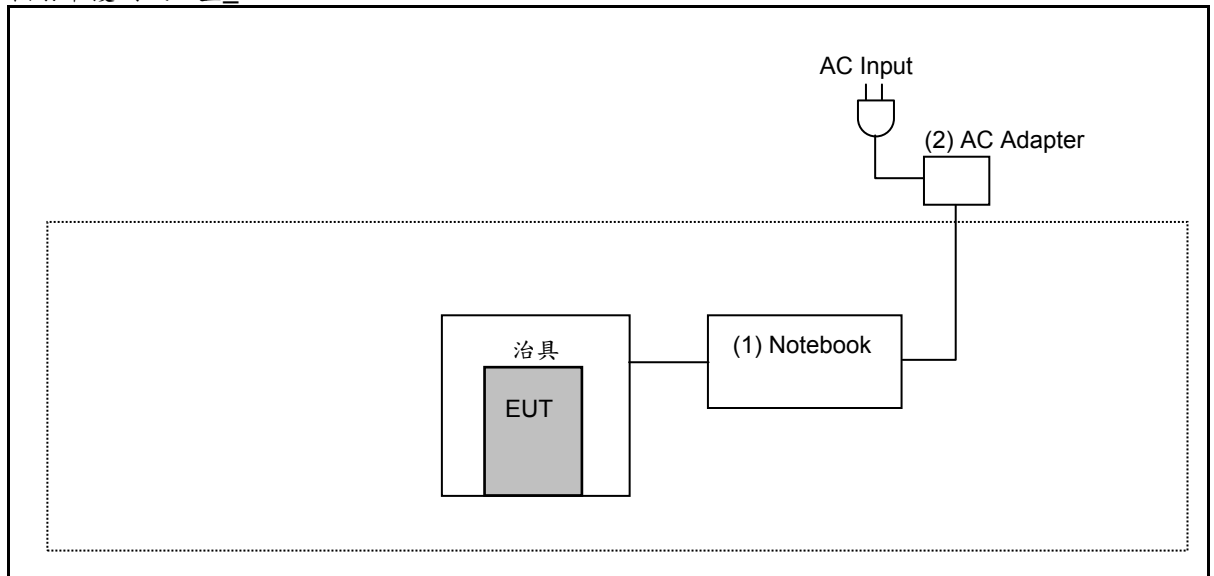
For Radiated Emissions

Test Period: Nov. 06 ~ Dec. 05, 2018 ~ Mar. 25, 2019

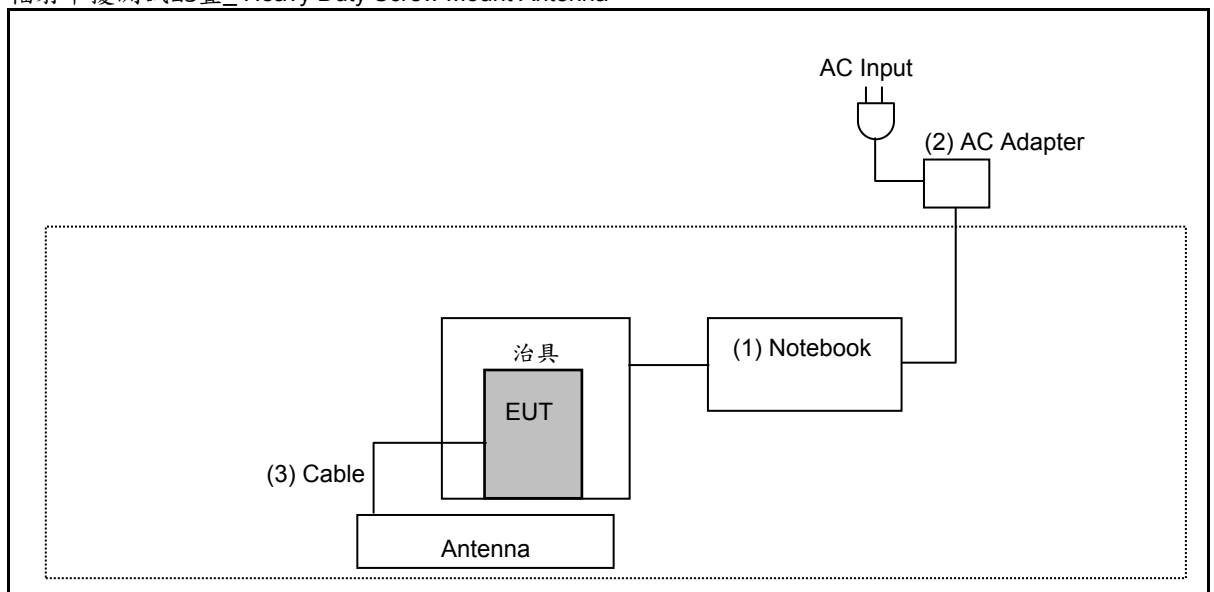
名稱	廠牌	型號	序號	本次校驗日期	校驗年限
Spectrum Analyzer (10 Hz~44 GHz)	Keysight	N9010A	MY52221312	01/15/2018	1 year
				01/14/2019	
Pre Amplifier (1~26.5 GHz)	Agilent	8449B	3008A02237	10/19/2018	1 year
Pre Amplifier (100 kHz~1.3 GHz)	Agilent	8447D	2944A11119	01/10/2018	1 year
				01/14/2019	
Trilog Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	SB AC VULB	9168-0841	03/02/2018	1 year
				11/19/2018	
Horn Antenna (1~18 GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	08/23/2018	1 year
Broadband Horn Antenna (18~ 40 GHz)	SCHWARZBECK MESS-ELEKTRONIK	9170	9170-320	08/07/2018	1 year
Loop Antenna	COM-POWER CORPORATION	AL-130	121014	03/13/2018	1 year
Loop Antenna	Electro-Metrics	EMCI-LPA600	277	04/19/2018	1 year
RF Cable	EMCI	EMC104-N-N-6000	TE01-1	02/20/2018	1 year
				02/20/2019	
Microwave Cable	EMCI	EMC102-KM-KM-14000	151001	02/20/2018	1 year
				02/20/2019	

2.2 檢驗系統示意圖

輻射干擾測試配置_ PCB Trace Antenna



輻射干擾測試配置_ Heavy Duty Screw Mount Antenna



2.3 輔助測試之週邊設備描述

下列輔助設備或配件為測試中所使用，以形成一個代表性的受測系統。

週邊名稱	商標	型 號	序 號	電 源 線	Loss	備註
(1) Notebook	DELL	Inspiron 15	726RWN2	---	---	---
(2) AC Adapter	DELL	HA65NM130	---	Non-Shielded, 0.8 m	---	INPUT: AC 100-240 V, 50/60 Hz, 1.7 A OUTPUT: DC 19.5 V, 3.34 A
(3) Cable	Amphenol RF	336314-12-01 00	---	---	0.38 dB	---

2.4 測試軟體版本

Measurement Software			
No.	Description	Software	Version
1	Radiated Emission	EZ EMC	1.1.4.4

2.5 測試模式

Pre-Test Mode
Mode 1: Transmit Mode
Mode 2: Continuous TX Mode
Mode 3: Receiver Mode

Final-Test Mode
Mode 1: Transmit Mode
Mode 2: Continuous TX Mode
Mode 3: Receiver Mode

RF Power setting	Antenna Type	Antenna Max. Gain (dBi)	Test Mode	Antenna Delivery	Frequency (MHz)
1	PCB Trace Antenna	0.99	Mode 2	1TX	2405, 2440, 2480
2	Heavy Duty Screw Mount Antenna	4.1	Mode 2	1TX	2405, 2440, 2480
Note: Redpine software has antenna selection parameter which enables the user to select the antenna and it internally adjusts the gain parameters. Default antenna type will be Redpine PCB antenna.					

2.6 量測不確定度

下列量測不確定水準是參照量測儀器 CISPR 16-4-2 所規定之不確定度。

Test Item	Frequency Range	Uncertainty (dB)
Conducted Emission	9 kHz ~ 150 kHz	2.7
	150 kHz ~ 30 MHz	2.7
Radiated Emission	9 kHz ~ 30 MHz	1.7
	30 MHz ~ 1000 MHz	5.7
	1000 MHz ~ 18000 MHz	5.5
	18000 MHz ~ 26500 MHz	4.8
	26500 MHz ~ 40000 MHz	4.8
Conducted Output Power	+0.27 dB / -0.28 dB	
RF Bandwidth	4.96 %	
Power Spectral Density	+0.71 dB / -0.77 dB	

2.7 試驗環境

產品測試時之實驗室環境條件如下：

項目	測試項目	需求	實際
溫度 Temperature (°C)	LP0002	10 - 40	26
濕度 Humidity (%RH)		10 - 90	60

中華民國實驗室認證體系

認可編號: 1330

測試實驗室名稱：晶復科技股份有限公司

TEL: 886-3-2710188 / FAX: 886-3-2710190

傳導干擾電壓量測地點：桃園市八德區長安街 140-1 號.

輻射干擾場強量測地點：桃園市八德區長安街 140-1 號.

3. 測試項目與結果判定總表

本測試報告之所有項目皆依據 NCC 低功率射頻電機技術規範(LP0002)之檢驗法。

項次	測試項目	適用規範	測試結果	量測設備	結果判定
1	輸出峰值功率	低功率射頻電機技術規範 3.10.1.2(1)(C)節	請參閱4.1節	請參閱2.1節	合格
2	電源線傳導干擾	低功率射頻電機技術規範 2.3節	請參閱4.2節	請參閱2.1節	不適用
3	場強輻射 (1 GHz以上)	低功率射頻電機技術規範 2.8節、2.9節、3.10.1.5節	請參閱4.3節	請參閱2.1節	合格
4	場強輻射其它不必要之訊號 (1 GHz以下)	低功率射頻電機技術規範 2.8節、2.9節、3.10.1.5節	請參閱4.3節	請參閱2.1節	合格
5	頻帶邊緣外之輻射發射	低功率射頻電機技術規範 3.10.1.5節	請參閱4.3節	請參閱2.1節	合格
6	非必要頻帶	低功率射頻電機技術規範 3.10.1.5節	請參閱4.4節	請參閱2.1節	合格
7	功率密度	低功率射頻電機技術規範 3.10.1.6(2)(B)節	請參閱4.5節	請參閱2.1節	合格
8	發射頻寬	低功率射頻電機技術規範 3.10.1.6(2)(A)節	請參閱4.6節	請參閱2.1節	合格
9	天線規格	低功率射頻電機技術規範 3.10.1.3(3)節、3.10.1.4節	請參閱4.7節	-----	合格
10	電波暴露量之評估	低功率射頻電機技術規範 5.20.2.1節、5.20.2.2節	請參閱4.8節	請參閱2.1節	合格

4. 測試項目表列

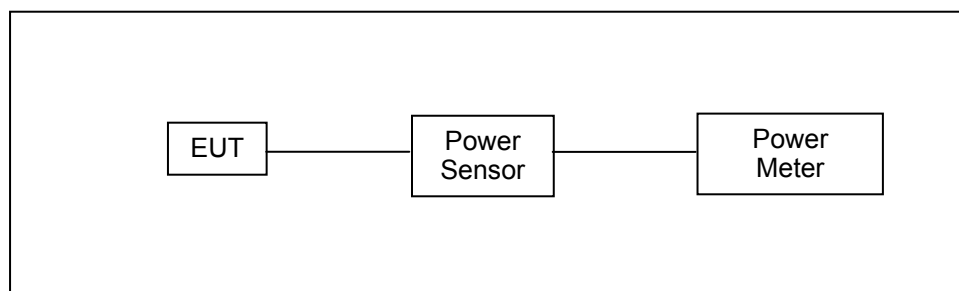
4.1 輸出峰值功率之量測

合格標準:

依據 NCC 低功率射頻電機技術規範(LP0002)之 3.10.1.2(1)(C)節之要求,操作於 2400-2483.5 兆赫(MHz)之所有數位調變技術系統: 1 瓦(W)以下。

除使用附件二之峰值輸出功率量測方式外,並得使用以最大傳導輸出功率(Maximum Conducted Output Power)作為量測方式。

測試架構圖:



測試結果:

Power setting 1_Antenna Type: PCB Trace Antenna

操作模式 : Mode 2: Continuous TX Mode						
操作模式	頻率 (MHz)	輸出功率(Average)		輸出功率(Peak)		限制值
		dBm	dBm	dBm	W	W
Mode 2	2405	16.81	0.04797	20.11	0.10257	≤ 1
	2440	15.23	0.03334	18.70	0.07413	≤ 1
	2480	15.10	0.03236	18.68	0.07379	≤ 1

Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna
--

操作模式 : Mode 2: Continuous TX Mode						
操作模式	頻率 (MHz)	輸出功率(Average)		輸出功率(Peak)		限制值
		dBm	dBm	dBm	W	W
Mode 2	2405	14.93	0.03112	18.38	0.06887	≤ 1
	2440	14.38	0.02742	17.91	0.06180	≤ 1
	2480	14.43	0.02773	18.06	0.06397	≤ 1

4.2 電源線傳導干擾之量測

合格標準：

依據 NCC 低功率射頻電機技術規範(LP0002)之 2.3 節，以市電為電源之低功率射頻電機，其傳導回電源線上頻率自 150 kHz 至 30 MHz 之射頻電壓（在電源端子每一電源線對接地點）不得超過下表所列之限值。測量時應經過 50 Ω /50 μ H 之電源線阻抗模擬網路 (LISN)。頻率重疊處，以較低限值為準。

Frequency (MHz)	傳導限制值 (dBuV)	
	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。

測試方法：

測試場地為標準傳導測試場地。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阻抗穩定網路上，從測試接收機記錄頻率由 0.15MHz 至 30 MHz 之間之電源線傳導放射強度。

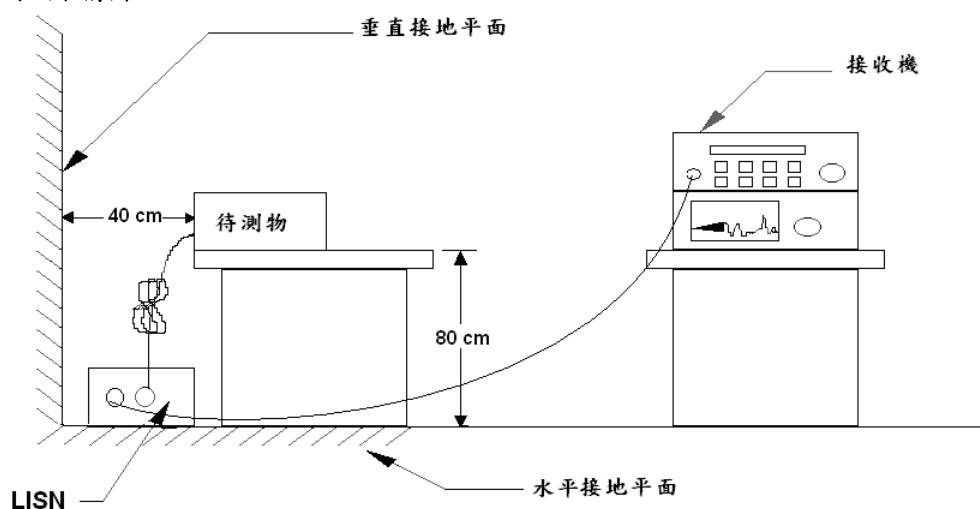
干擾值之計算

電源傳導干擾電壓之計算公式如下

結果值 = 儀器讀值(QP/AV) + 校正因子

其中校正因子為：饋線損失 + 電源阻抗模擬網路損失

測試架構圖：



測試結果：不適用，本產品透過 DC 電源供電。

4.3 場強輻射之量測

合格標準:

依據 NCC 低功率射頻電機技術規範(LP0002)之使用頻帶範圍外之任意 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，至少須衰減 20 dB，以射頻傳導或輻射方式測量。如發射機以依據 NCC 低功率射頻電機技術規範(LP0002)之 3.10.1.2(1)(C)之峰值傳導輸出功率量測方式者，至少須衰減 30 dB。此外，落於第 2.7 節禁用頻段之輻射發射，應符合第 2.8 節之規定。

依據 NCC 低功率射頻電機技術規範第 2.7 節之規定,禁用頻段如下：

頻率(MHz)	頻率(MHz)	頻率(MHz)	頻率(MHz)
0.090~0.110	108.00~138.00	1660.0~1785.0	8025.0~8500.0
0.490~0.510	149.90~150.05	1805.0~1888.0	9000.0~9200.0
2.172~2.198	156.70~156.90	1885.0~1900.0	9300.0~9500.0
3.013~3.033	162.01~167.17	1905.0~1985.0	10600~12700
4.115~4.198	167.72~173.20	2010.0~2025.0	13250~13400
5.670~5.690	240.00~285.00	2110.0~2170.0	14470~14500
6.200~6.300	322.00~335.40	2200.0~2300.0	15350~16200
8.230~8.400	399.90~410.00	2310.0~2390.0	17700~21400
12.265~12.600	485.00~510.00	2483.5~2900.0	22010~23120
13.340~13.430	608.00~614.00	3260.0~3267.0	23600~24000
14.965~15.020	703.00~748.00	3332.0~3339.0	31200~31800
16.700~16.755	758.00~803.00	3345.8~3358.0	36430~36500
19.965~20.020	825.00~915.00	3500.0~4400.0	38600 以上
25.500~25.700	930.00~1240.0	4500.0~5250.0	
37.475~38.275	1300.0~1427.0	5350.0~5460.0	
73.500~75.400	1435.0~1626.5	7250.0~7750.0	

依據 NCC 低功率射頻電機技術規範第 2.8 節之規定,除本規範各章節另有放寬規定者外，其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

頻 率 (MHz)	電場強度(μ V/m)	測距(m)
0.009 - 0.490(含)	2,400/頻率(千赫)	300
0.490 (不含) – 1.705 (含)	24,000/頻率(千赫)	30
1.705(不含) – 30 (不含)	30	30
30 (含) – 88 (含)	100	3
88 (不含)- 216 (含)	150	3
216 (不含)- 960 (含)	200	3
960 (不含)以上	500	3

測試方法：

測試場地為開放測試場,將待測物置於 1.5 米高的非金屬桌面，使其在工作狀態，接收天線置於 3 米外相同的高度。待測物分別要垂直或水平放置，而且桌面要 360 度旋轉，另外接收天線也要從 1.0 米至 4.0 米升降變化，以找出最大的輻射電場強度，接收天線置於水平、垂直極向各執行測試一次。

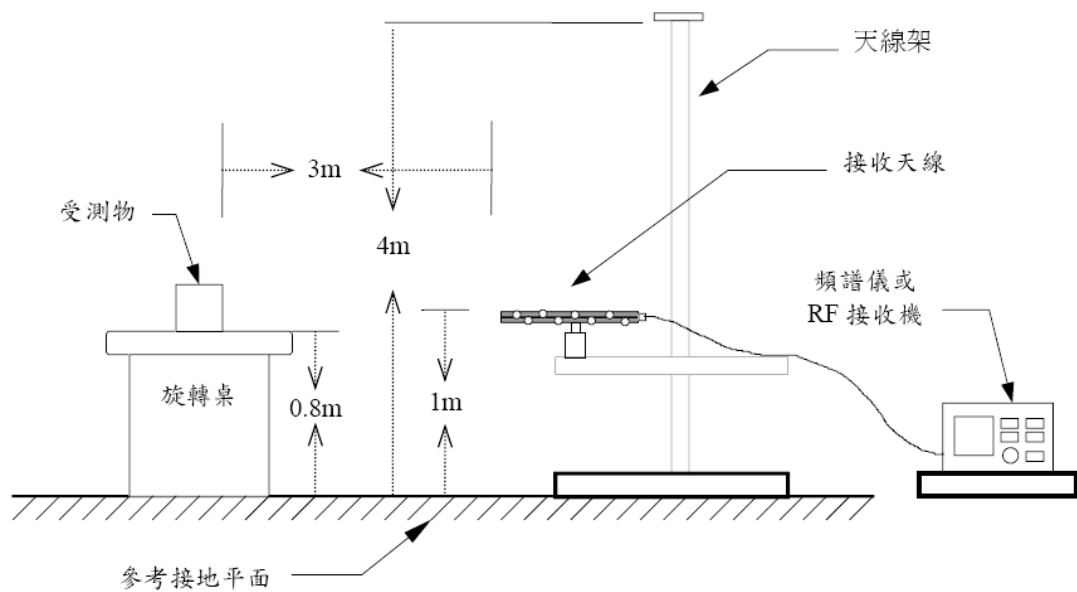
場強度之計算

場強之計算公式為：結果值 = 讀值 + 校正因子

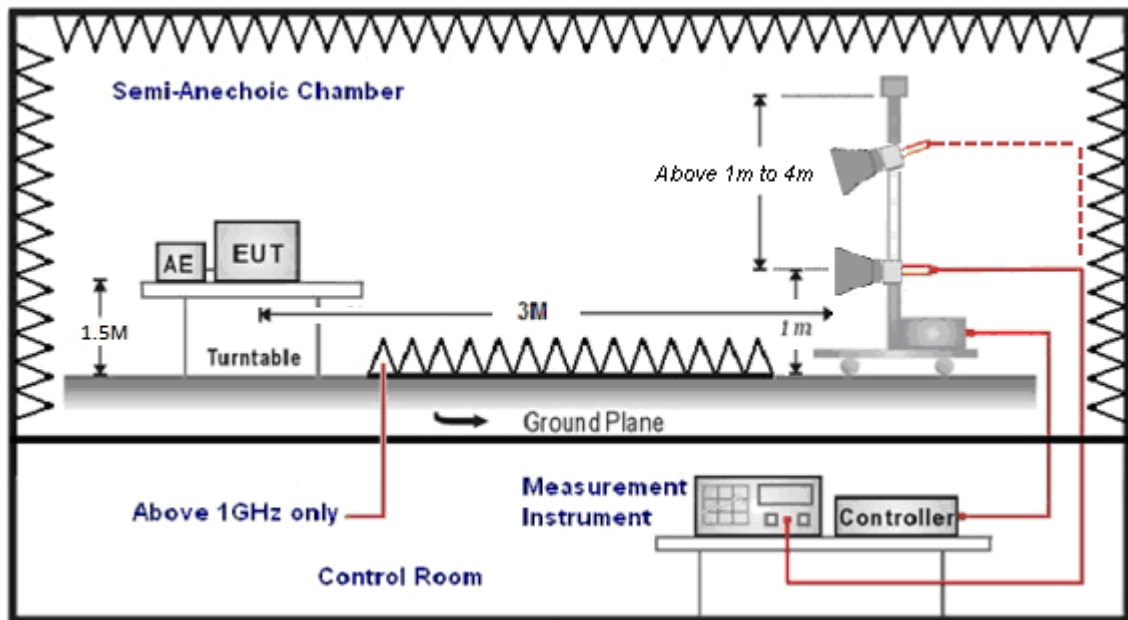
其中校正因子為：天線因子+ 饋線損失 + 濾波器損失（若有使用） - 放大器增益（若有使用）

測試架構圖：

量測頻率低於 1 GHz 以下之測試配置



量測頻率高於 1 GHz 以上之測試配置



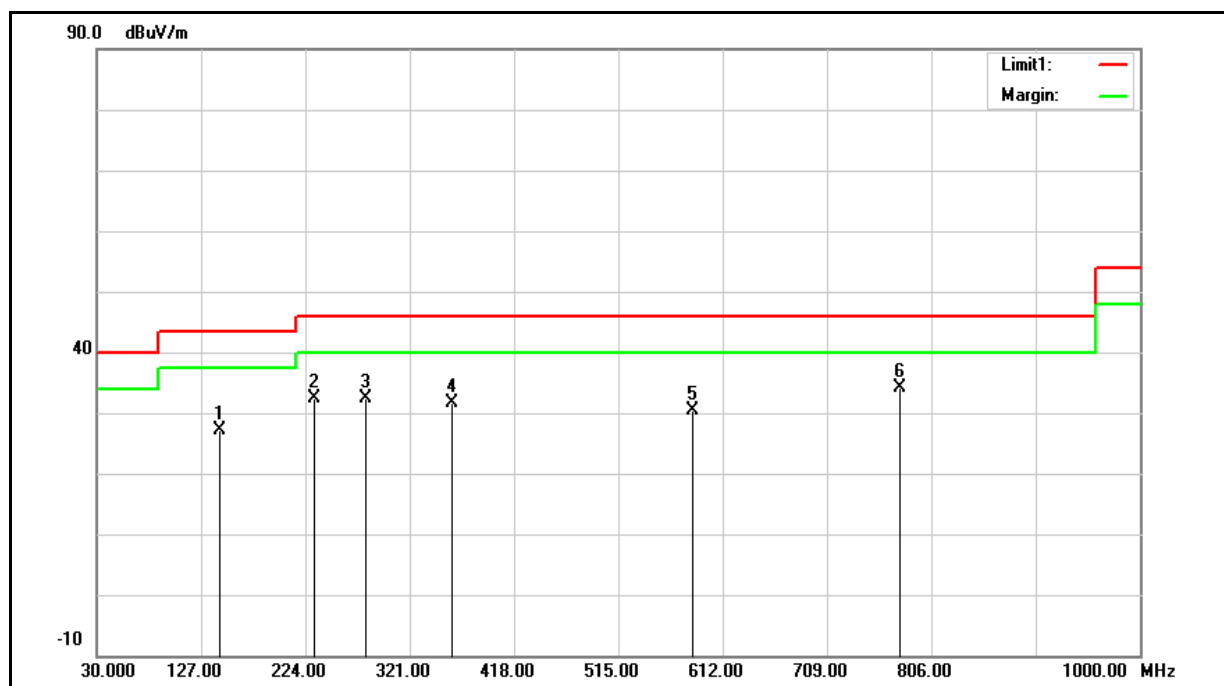
測試結果:

強輻射之量測依據輸出峰值功率之量測結果取其最大值之操作模式為場強輻射測試模式。

Power setting 1_Antenna Type: PCB Trace Antenna

其它不必要之訊號 (1 GHz 以下)

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	144.4600	33.90	-6.71	27.19	43.50	-16.31	QP
2	232.7300	39.92	-7.66	32.26	46.00	-13.74	QP
3	280.2600	37.64	-5.26	32.38	46.00	-13.62	QP
4	359.8000	35.40	-3.69	31.71	46.00	-14.29	QP
5	583.8700	29.40	1.02	30.42	46.00	-15.58	QP
6	776.9000	29.29	4.78	34.07	46.00	-11.93	QP

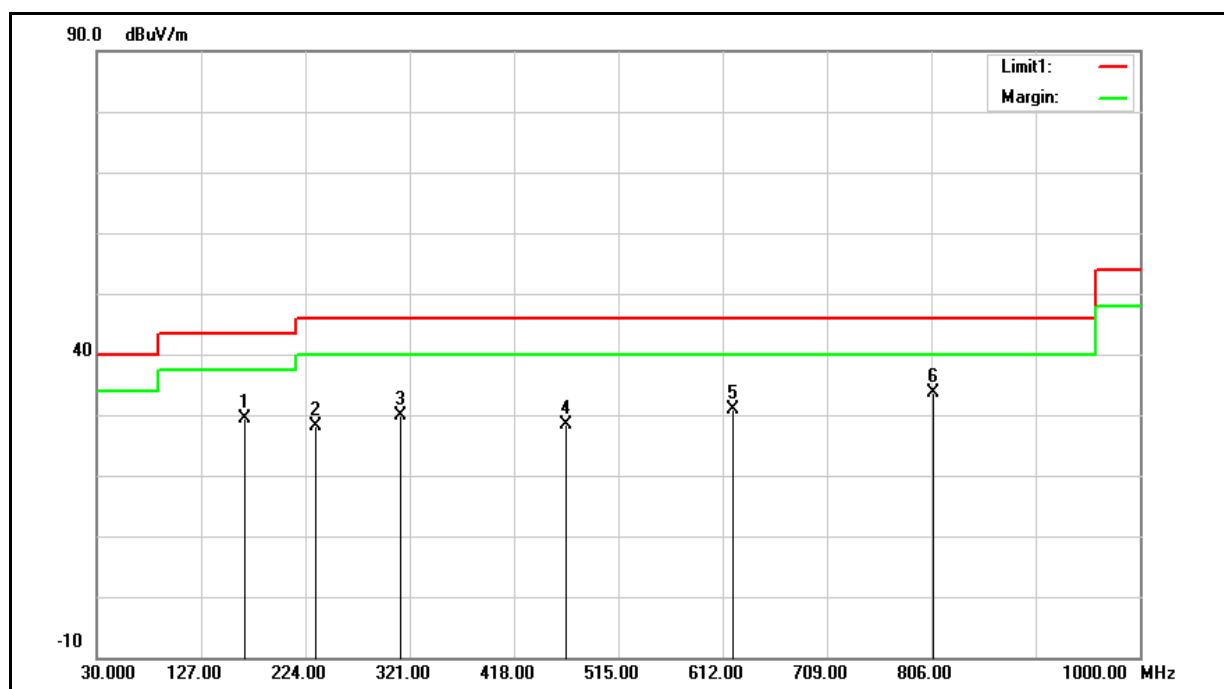
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 27.19 = -6.71 + 33.90.

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	167.7400	36.03	-6.57	29.46	43.50	-14.04	QP
2	233.7000	35.71	-7.59	28.12	46.00	-17.88	QP
3	312.2700	34.34	-4.50	29.84	46.00	-16.16	QP
4	466.5000	29.67	-1.27	28.40	46.00	-17.60	QP
5	621.7000	29.13	1.71	30.84	46.00	-15.16	QP
6	807.9400	28.31	5.28	33.59	46.00	-12.41	QP

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

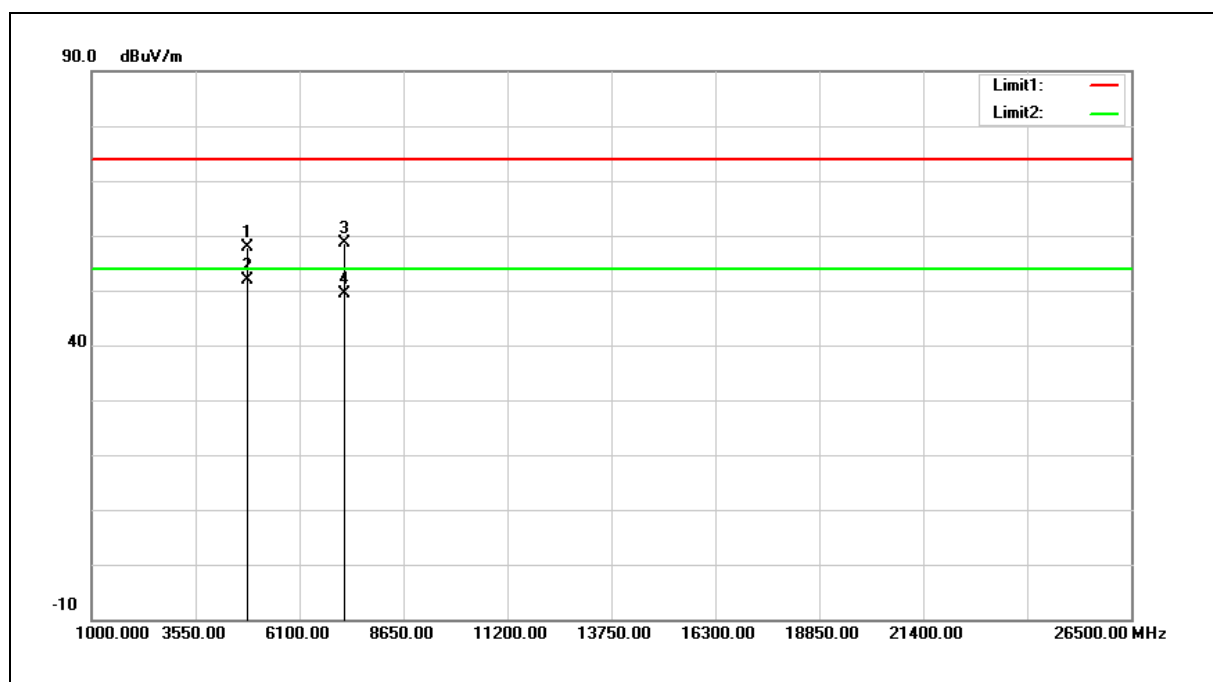
Example: $29.46 = -6.57 + 36.03$.

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

場強輻射量側 (1 GHz 以上)

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4810.000	62.66	-4.82	57.84	74.00	-16.16	peak
2	4810.000	56.76	-4.82	51.94	54.00	-2.06	AVG
3	7215.000	59.22	-0.48	58.74	74.00	-15.26	peak
4	7215.000	49.77	-0.48	49.29	54.00	-4.71	AVG

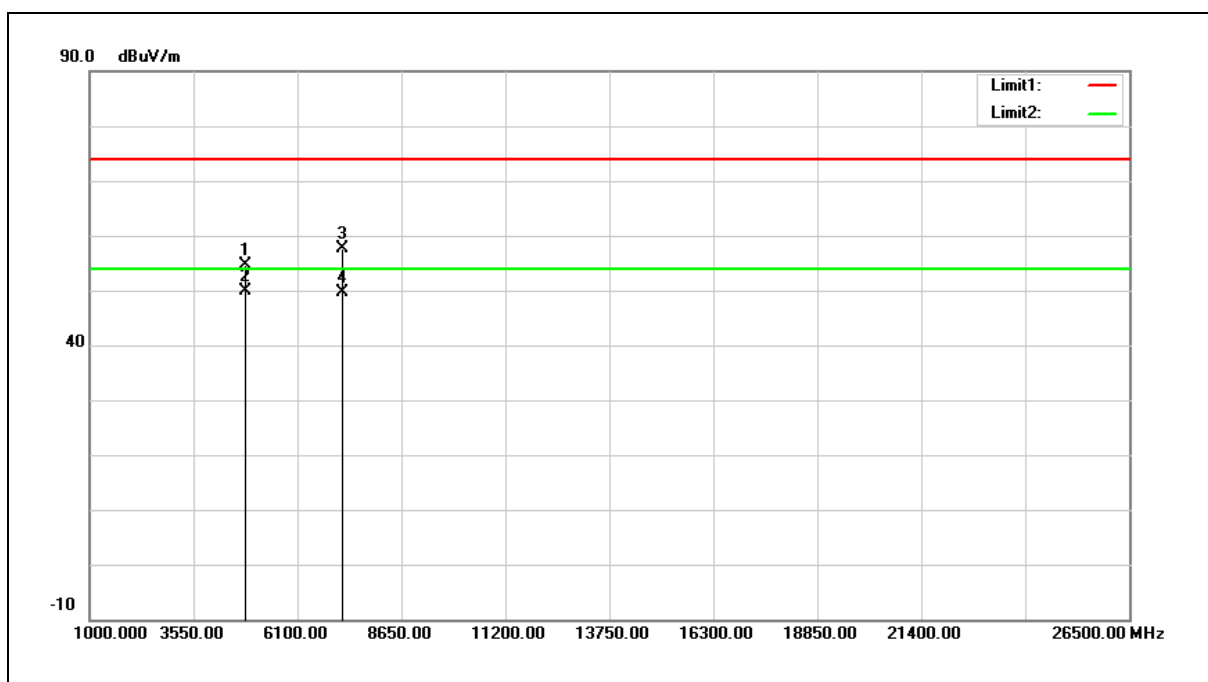
Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

Example: $57.84 = -4.82 + 62.66$.

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4810.000	59.37	-4.82	54.55	74.00	-19.45	peak
2	4810.000	54.75	-4.82	49.93	54.00	-4.07	AVG
3	7215.000	58.12	-0.48	57.64	74.00	-16.36	peak
4	7215.000	50.22	-0.48	49.74	54.00	-4.26	AVG

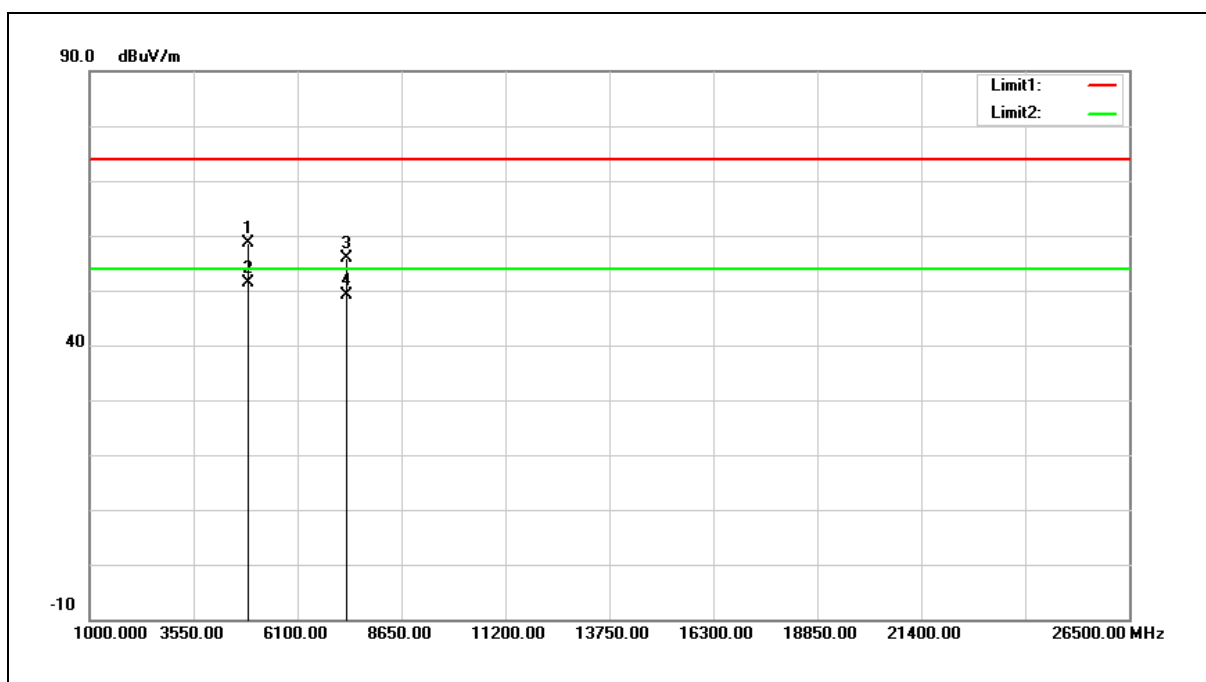
Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

Example: $54.55 = -4.82 + 59.37$.

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2440 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



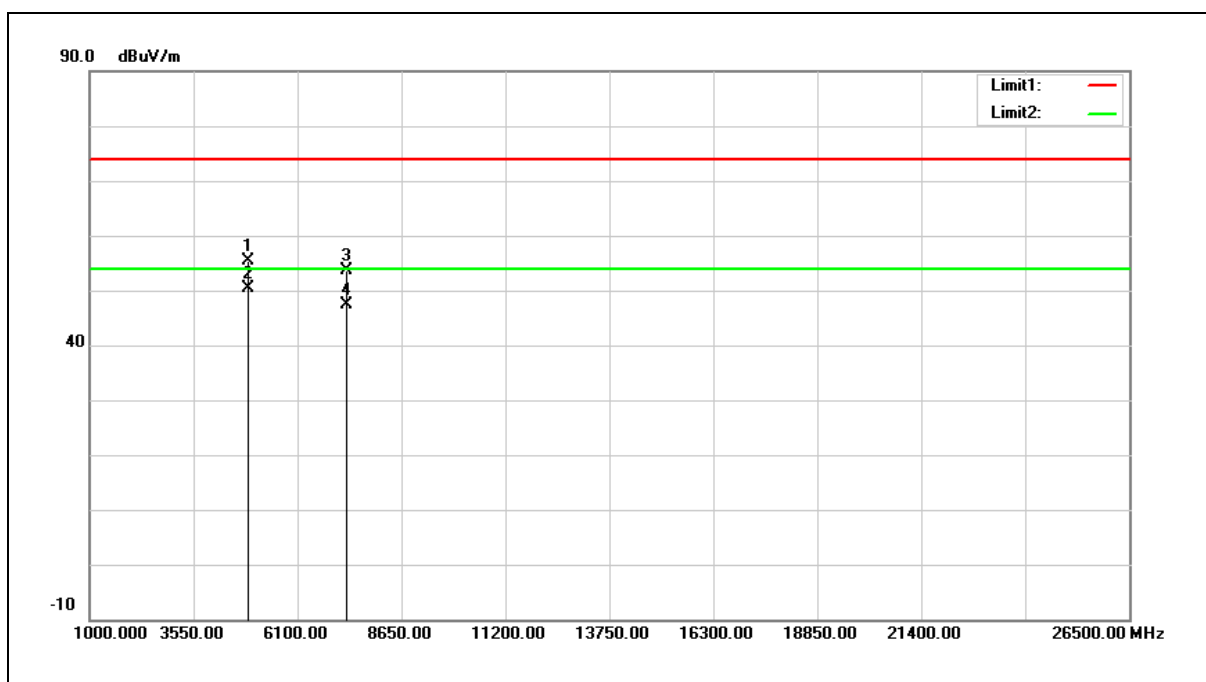
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	63.36	-4.85	58.51	74.00	-15.49	peak
2	4880.000	56.26	-4.85	51.41	54.00	-2.59	AVG
3	7320.000	55.97	-0.21	55.76	74.00	-18.24	peak
4	7320.000	49.43	-0.21	49.22	54.00	-4.78	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2440 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



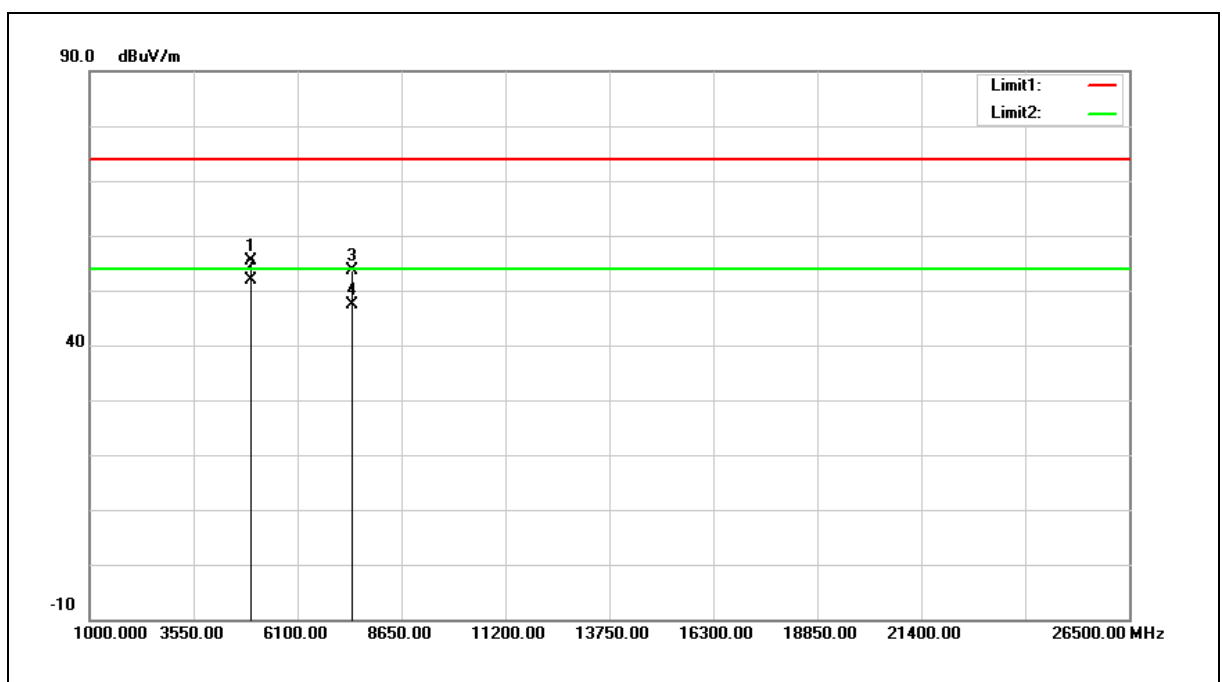
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	60.15	-4.85	55.30	74.00	-18.70	peak
2	4880.000	55.16	-4.85	50.31	54.00	-3.69	AVG
3	7320.000	53.72	-0.21	53.51	74.00	-20.49	peak
4	7320.000	47.61	-0.21	47.40	54.00	-6.60	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



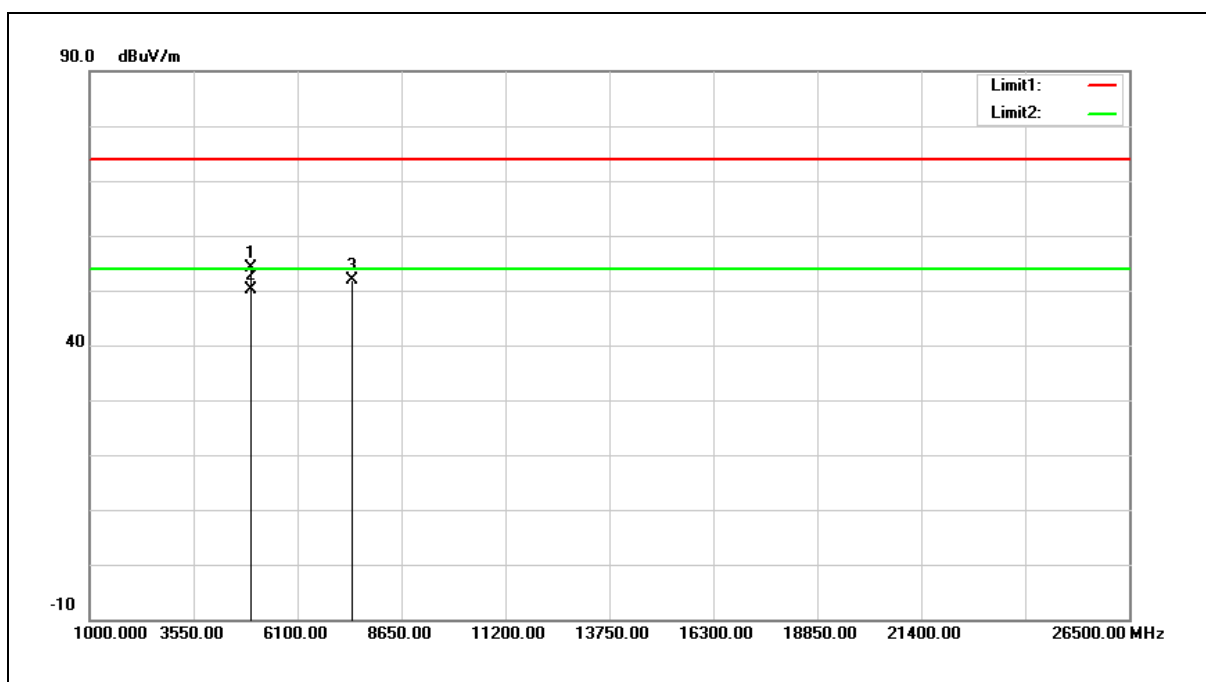
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	60.21	-4.89	55.32	74.00	-18.68	peak
2	4960.000	56.70	-4.89	51.81	54.00	-2.19	AVG
3	7440.000	53.66	0.06	53.72	74.00	-20.28	peak
4	7440.000	47.23	0.06	47.29	54.00	-6.71	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



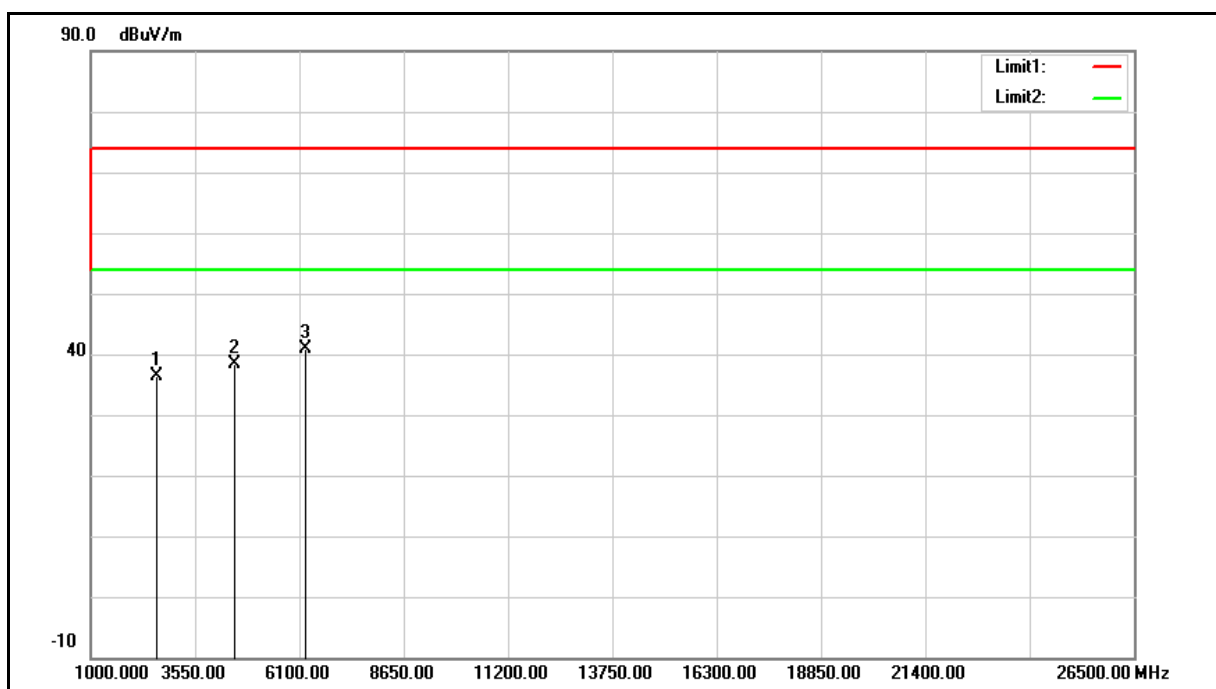
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	59.02	-4.89	54.13	74.00	-19.87	peak
2	4960.000	54.93	-4.89	50.04	54.00	-3.96	AVG
3	7440.000	51.88	0.06	51.94	74.00	-22.06	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 3	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Horizontal		



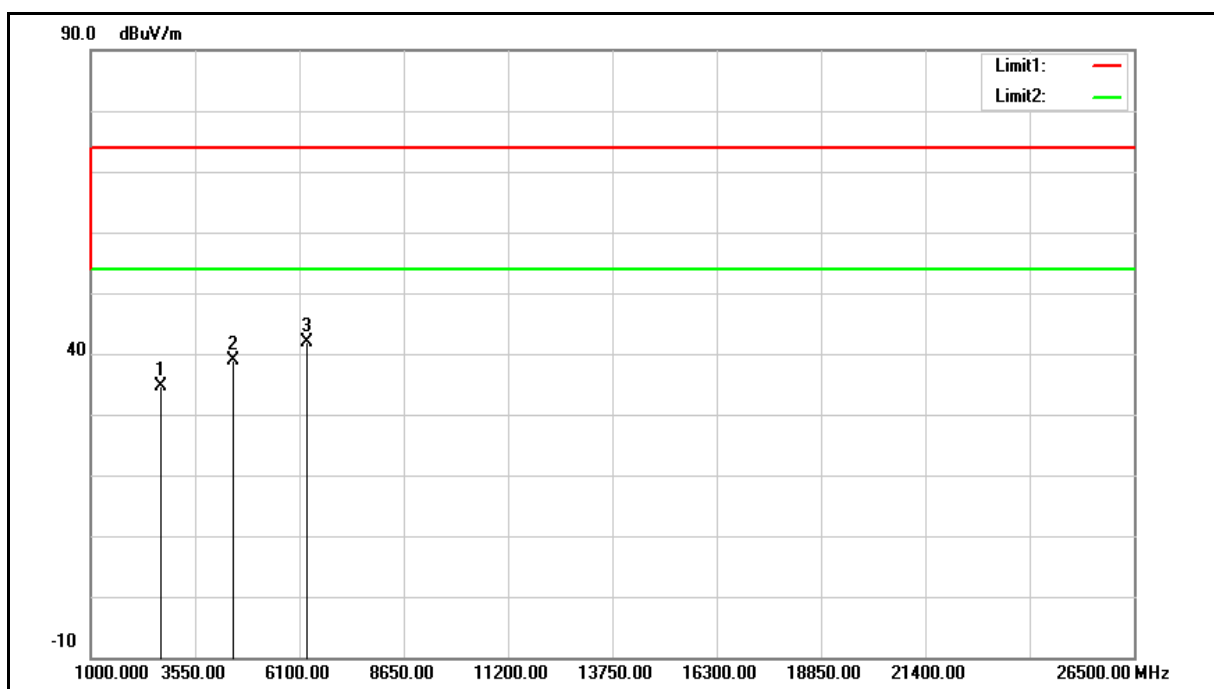
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2598.000	36.87	-0.47	36.40	74.00	-37.60	peak
2	4502.000	33.73	4.71	38.44	74.00	-35.56	peak
3	6253.000	31.94	8.94	40.88	74.00	-33.12	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 3	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2717.000	34.71	-0.14	34.57	74.00	-39.43	peak
2	4485.000	34.31	4.65	38.96	74.00	-35.04	peak
3	6270.000	32.91	9.01	41.92	74.00	-32.08	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

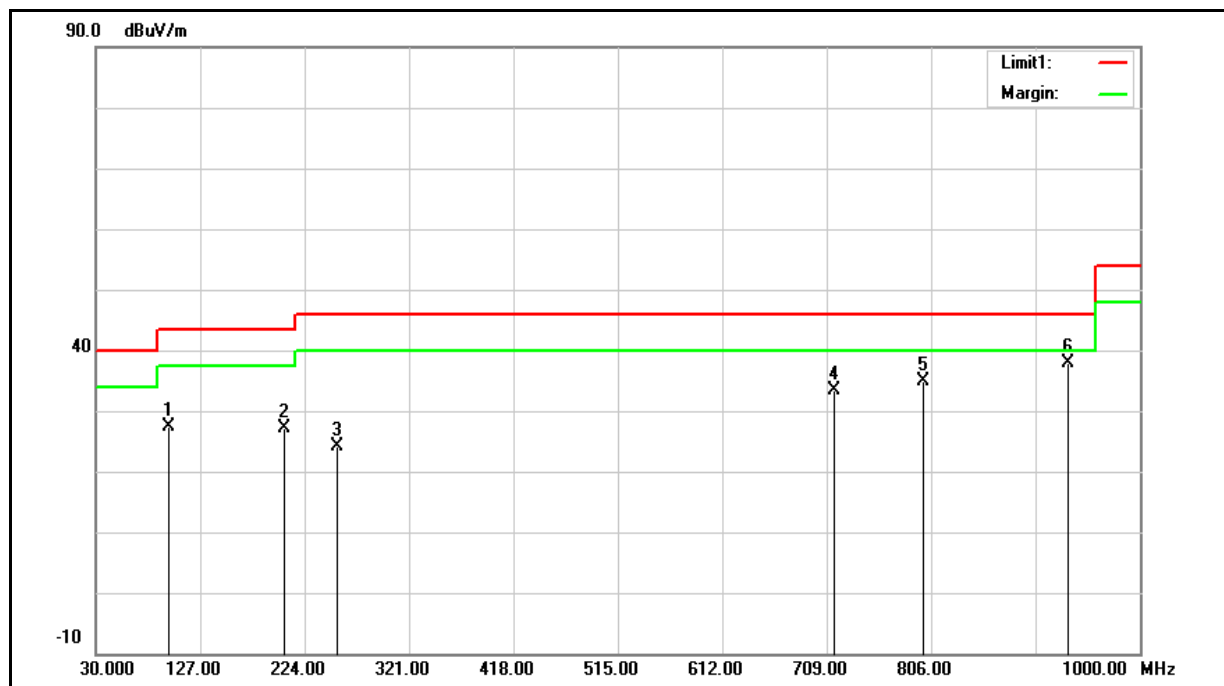
2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

其它不必要之訊號 (1 GHz 以下)

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	97.9000	42.96	-15.67	27.29	43.50	-16.21	QP
2	205.5700	40.85	-13.77	27.08	43.50	-16.42	QP
3	254.0700	36.30	-12.09	24.21	46.00	-21.79	QP
4	715.7900	34.97	-1.51	33.46	46.00	-12.54	QP
5	799.2100	34.79	0.21	35.00	46.00	-11.00	QP
6	933.0700	35.46	2.42	37.88	46.00	-8.12	QP

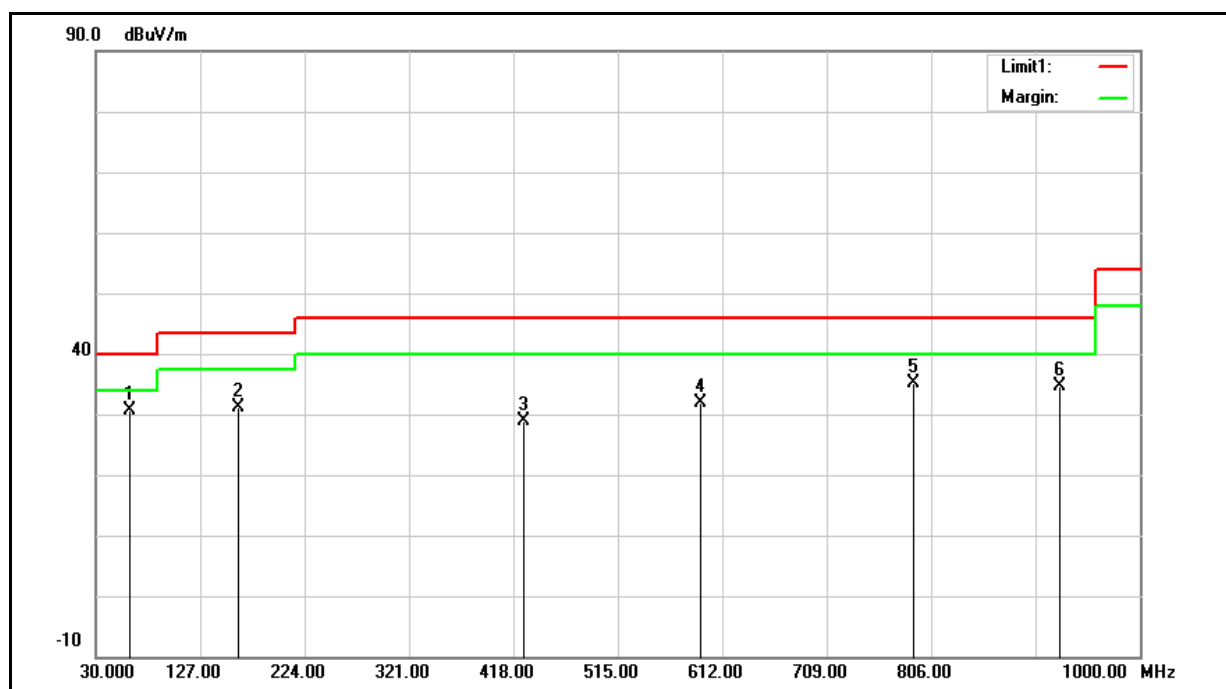
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 27.29 = -15.67 + 42.96.

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 1	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	62.0100	42.86	-12.18	30.68	40.00	-9.32	QP
2	162.8900	41.86	-10.75	31.11	43.50	-12.39	QP
3	427.7000	35.11	-6.16	28.95	46.00	-17.05	QP
4	591.6300	35.39	-3.45	31.94	46.00	-14.06	QP
5	789.5100	35.00	0.19	35.19	46.00	-10.81	QP
6	925.3100	32.55	2.15	34.70	46.00	-11.30	QP

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

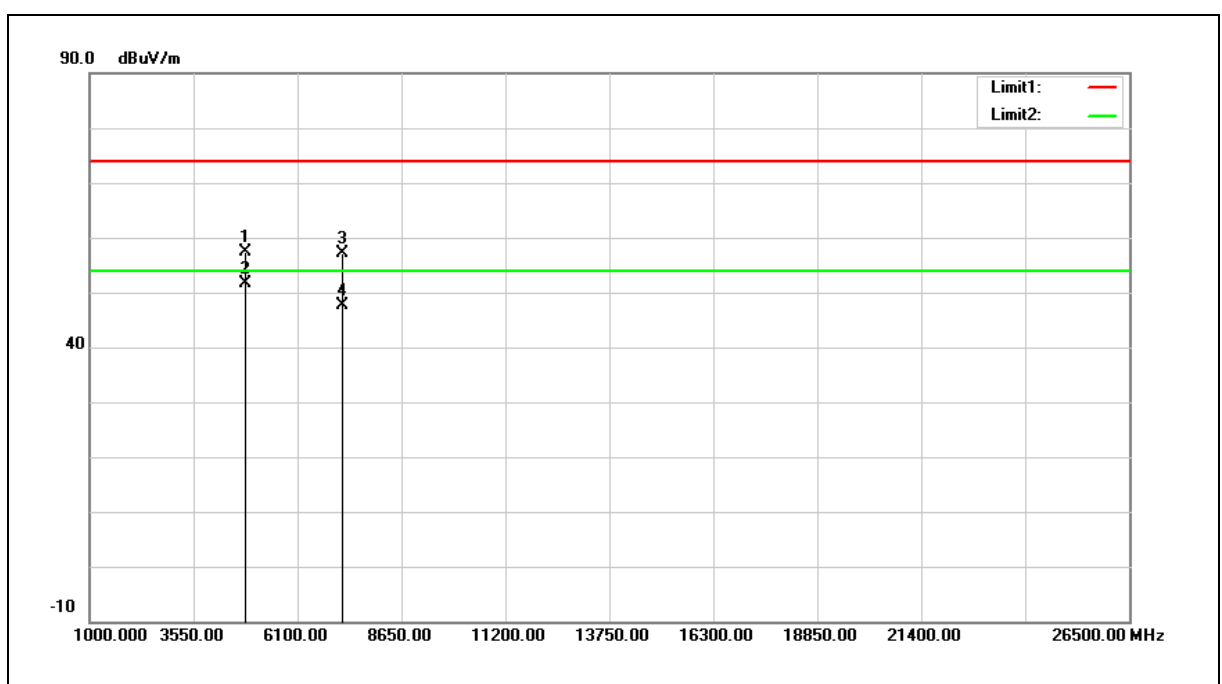
Example: 30.68 = -12.18 + 42.86.

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

場強輻射量側 (1 GHz 以上)

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4810.000	62.28	-4.82	57.46	74.00	-16.54	peak
2	4810.000	56.38	-4.82	51.56	54.00	-2.44	AVG
3	7215.000	57.62	-0.48	57.14	74.00	-16.86	peak
4	7215.000	48.16	-0.48	47.68	54.00	-6.32	AVG

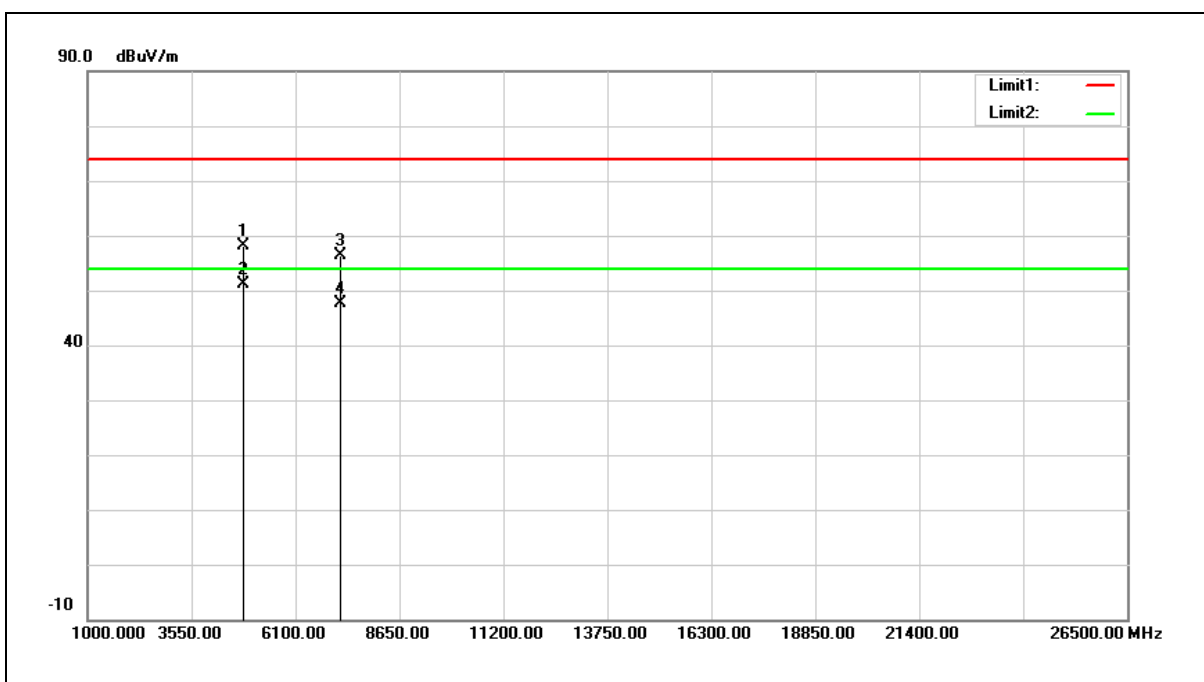
Note: 1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: $57.46 = -4.82 + 62.28$.

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4810.000	63.05	-4.82	58.23	74.00	-15.77	peak
2	4810.000	55.91	-4.82	51.09	54.00	-2.91	AVG
3	7215.000	56.88	-0.48	56.40	74.00	-17.60	peak
4	7215.000	48.05	-0.48	47.57	54.00	-6.43	AVG

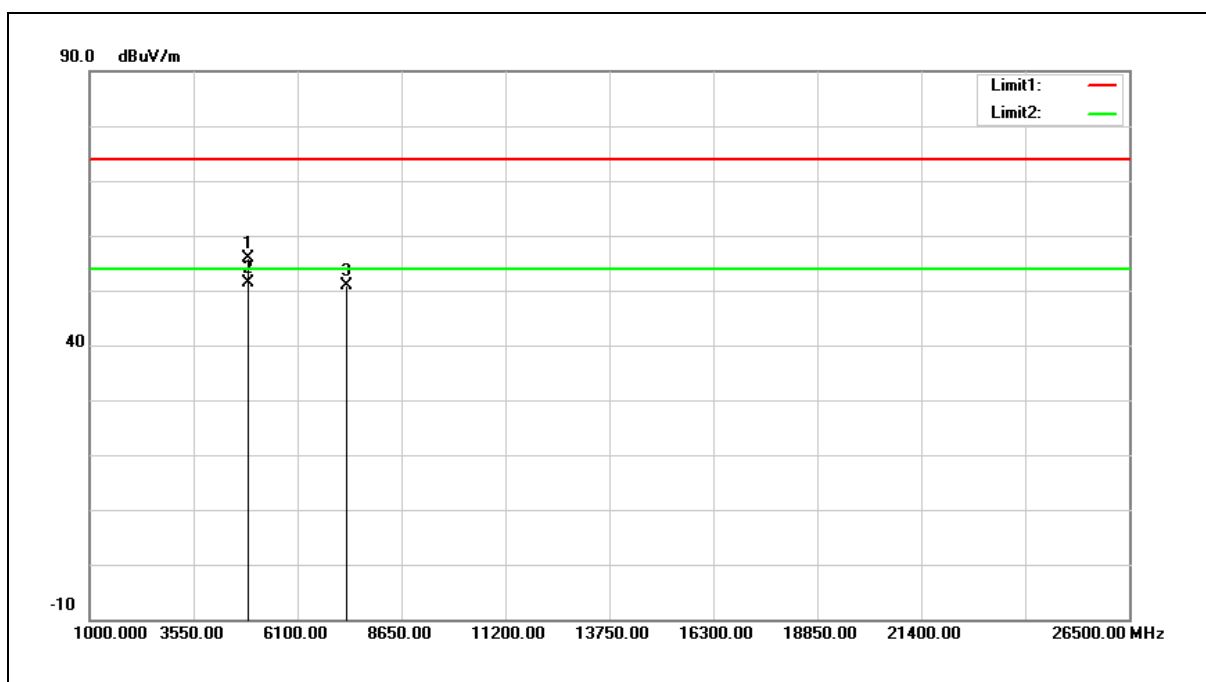
Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: $58.23 = -4.82 + 63.05$.

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2440 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



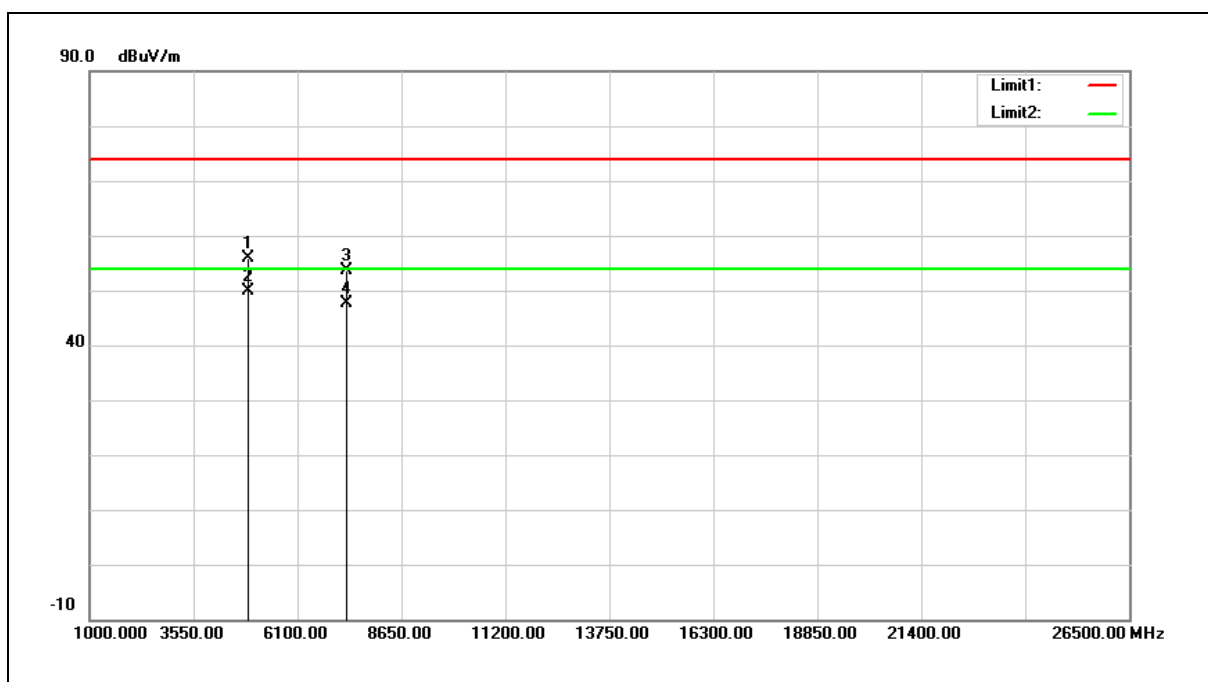
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	60.66	-4.85	55.81	74.00	-18.19	peak
2	4880.000	56.32	-4.85	51.47	54.00	-2.53	AVG
3	7320.000	51.11	-0.21	50.90	74.00	-23.10	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2440 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



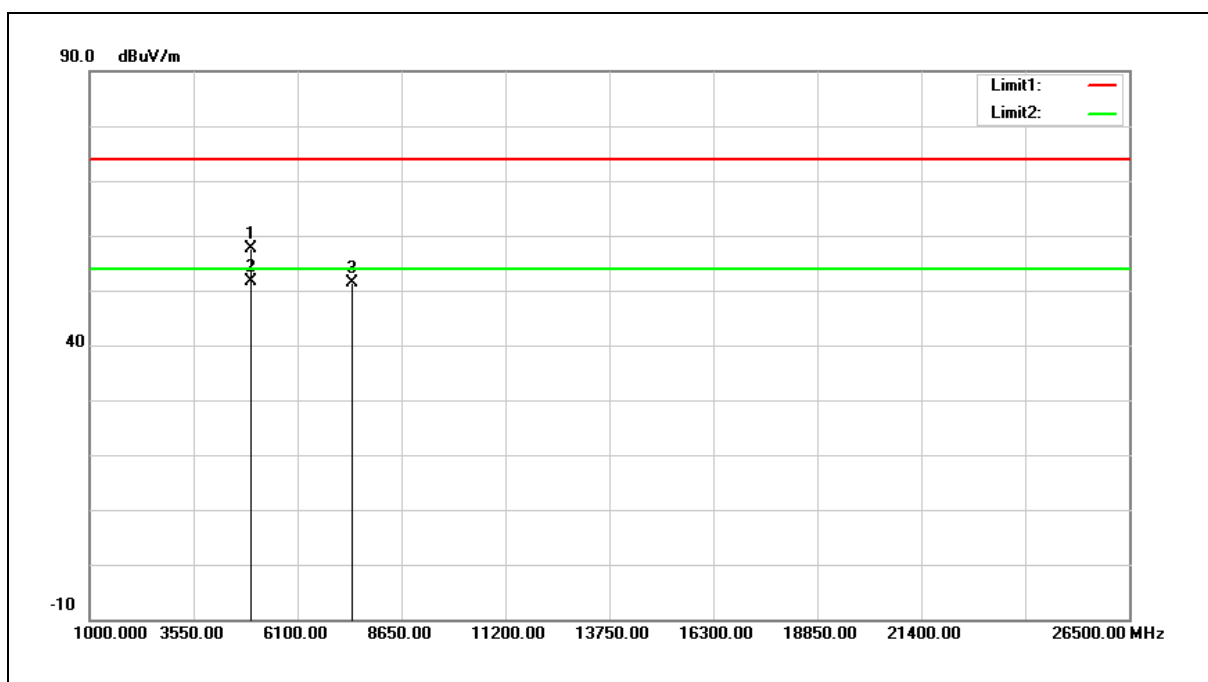
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4880.000	60.85	-4.85	56.00	74.00	-18.00	peak
2	4880.000	54.65	-4.85	49.80	54.00	-4.20	AVG
3	7320.000	53.92	-0.21	53.71	74.00	-20.29	peak
4	7320.000	47.79	-0.21	47.58	54.00	-6.42	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



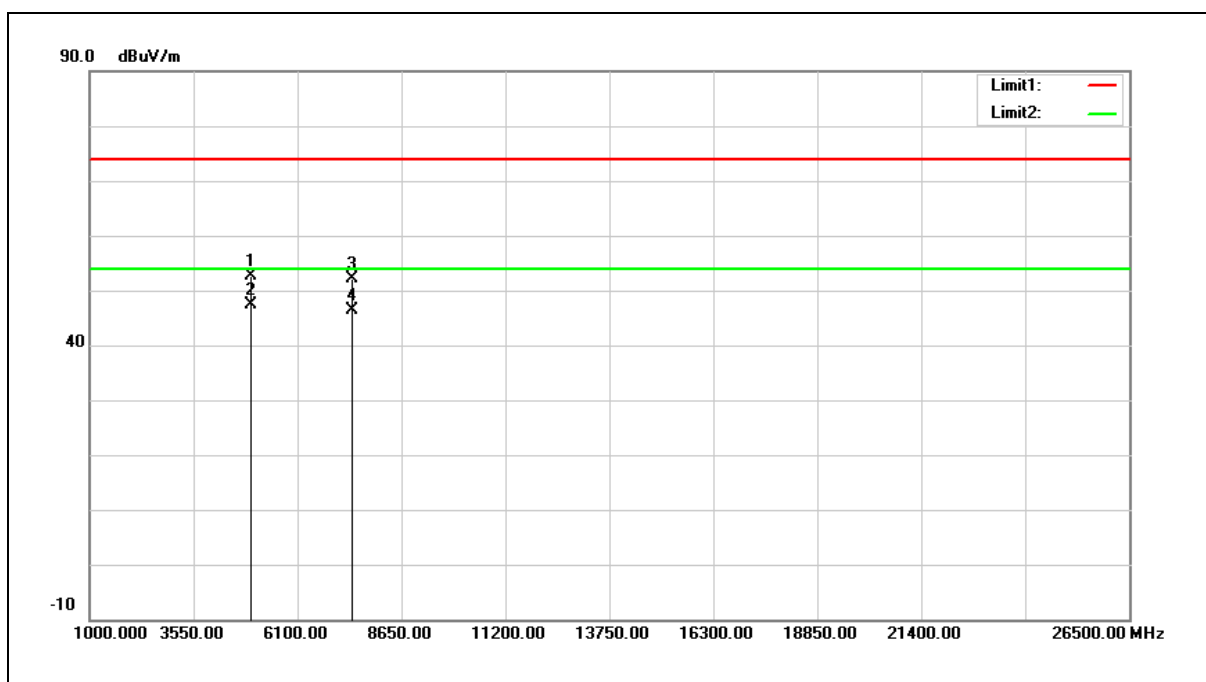
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	62.42	-4.89	57.53	74.00	-16.47	peak
2	4960.000	56.41	-4.89	51.52	54.00	-2.48	AVG
3	7440.000	51.27	0.06	51.33	74.00	-22.67	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



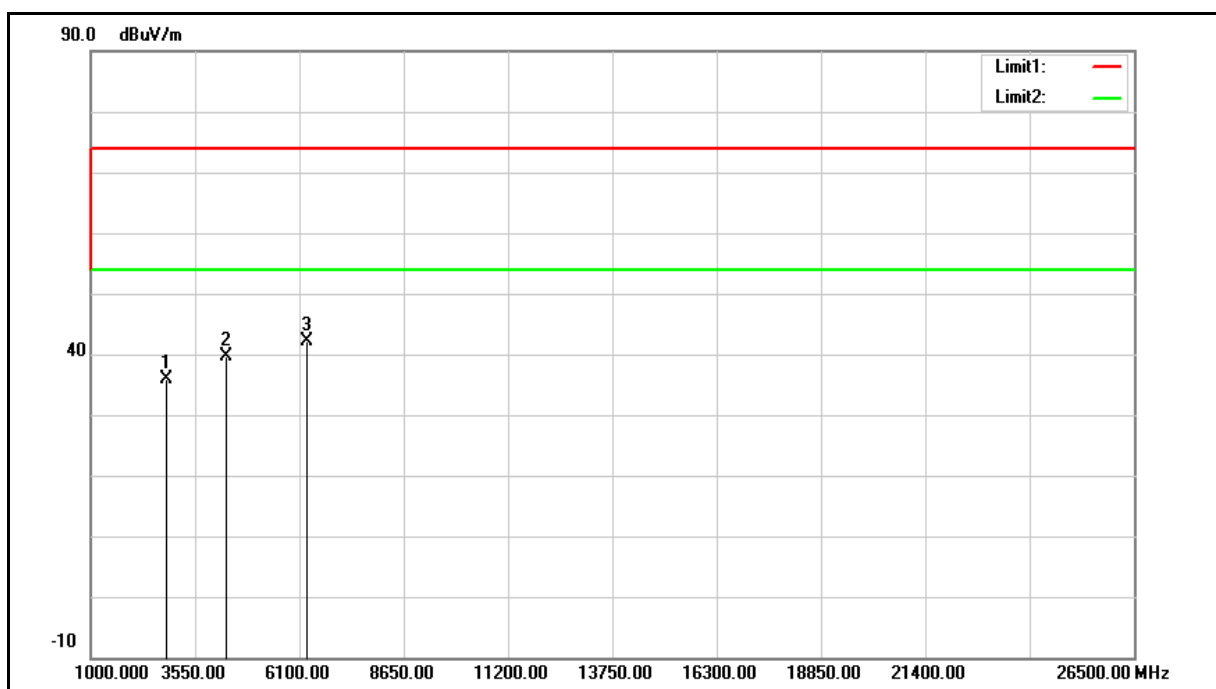
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4960.000	57.51	-4.89	52.62	74.00	-21.38	peak
2	4960.000	52.26	-4.89	47.37	54.00	-6.63	AVG
3	7440.000	52.03	0.06	52.09	74.00	-21.91	peak
4	7440.000	46.39	0.06	46.45	54.00	-7.55	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 3	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Horizontal		



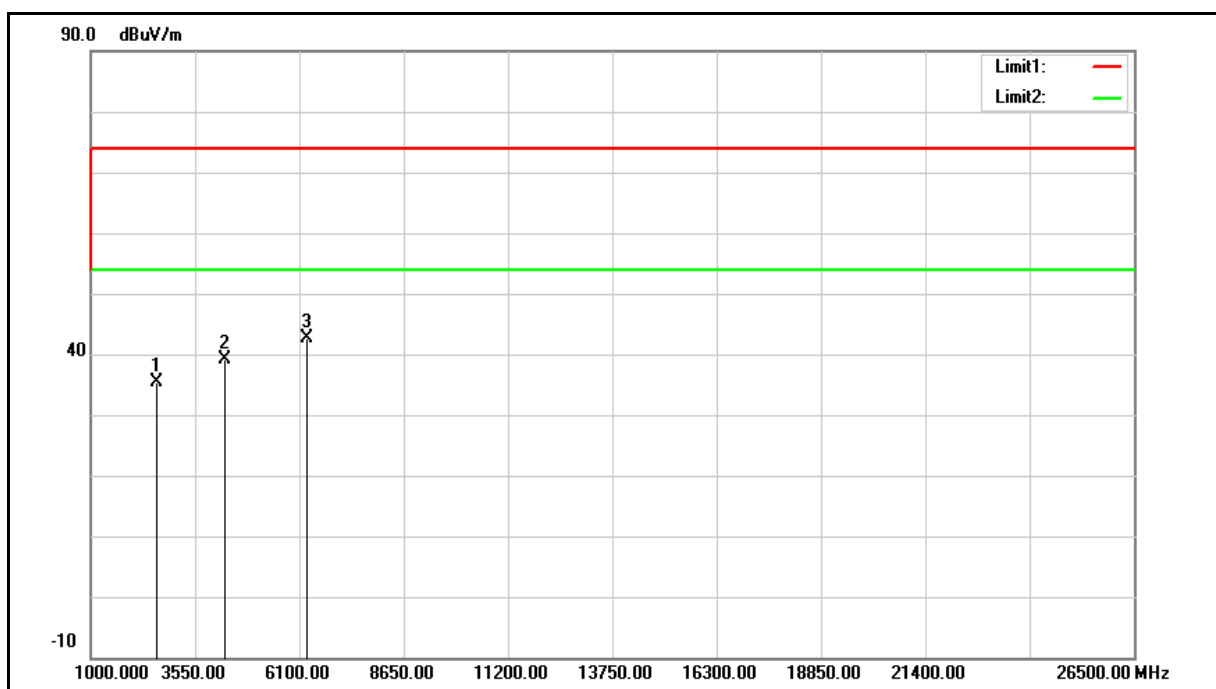
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2853.000	35.62	0.27	35.89	74.00	-38.11	peak
2	4298.000	35.66	4.02	39.68	74.00	-34.32	peak
3	6270.000	33.16	9.01	42.17	74.00	-31.83	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Harmonic	Power:	DC 3.3 V
Mode:	Mode 3	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2615.000	35.69	-0.42	35.27	74.00	-38.73	peak
2	4281.000	35.27	3.97	39.24	74.00	-34.76	peak
3	6270.000	33.66	9.01	42.67	74.00	-31.33	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

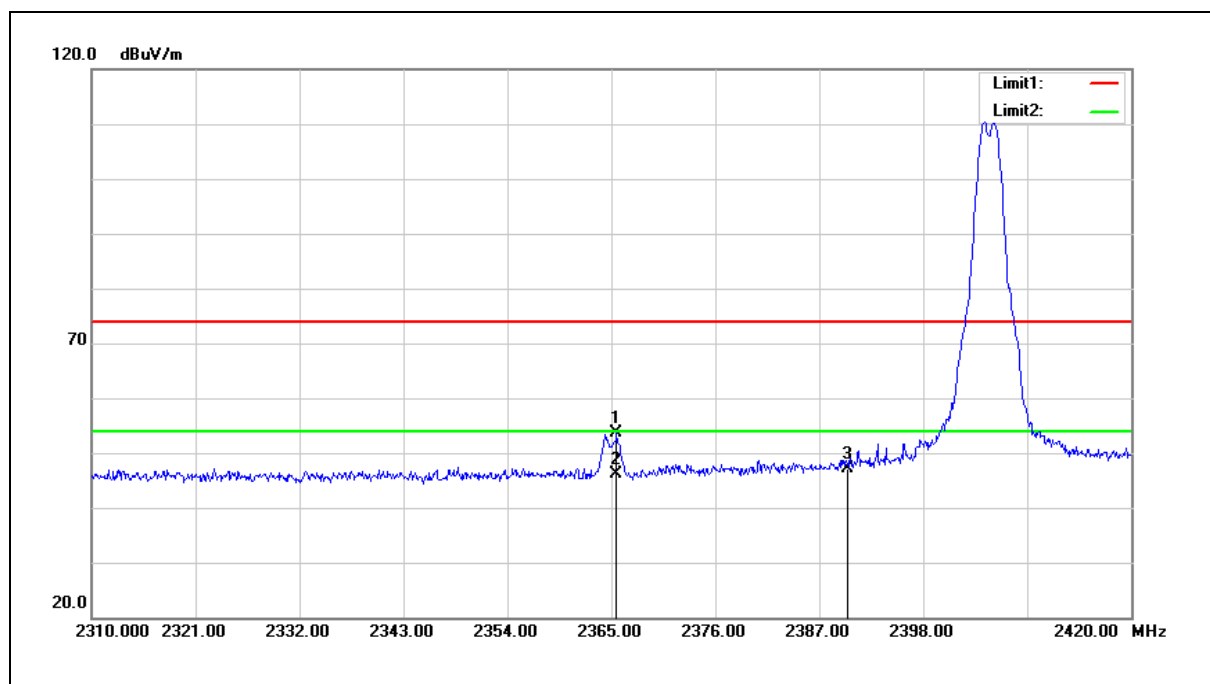
3.When the peak results are less than average limit, so not need to evaluate the average.

頻帶邊緣

附註: 其上下邊緣落於低功率射頻電機第 2.7 節所列頻帶內之混附發射, 其電場強度必須符合第 2.8 節的限制規定。

Power setting 1_Antenna Type: PCB Trace Antenna

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum. (%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



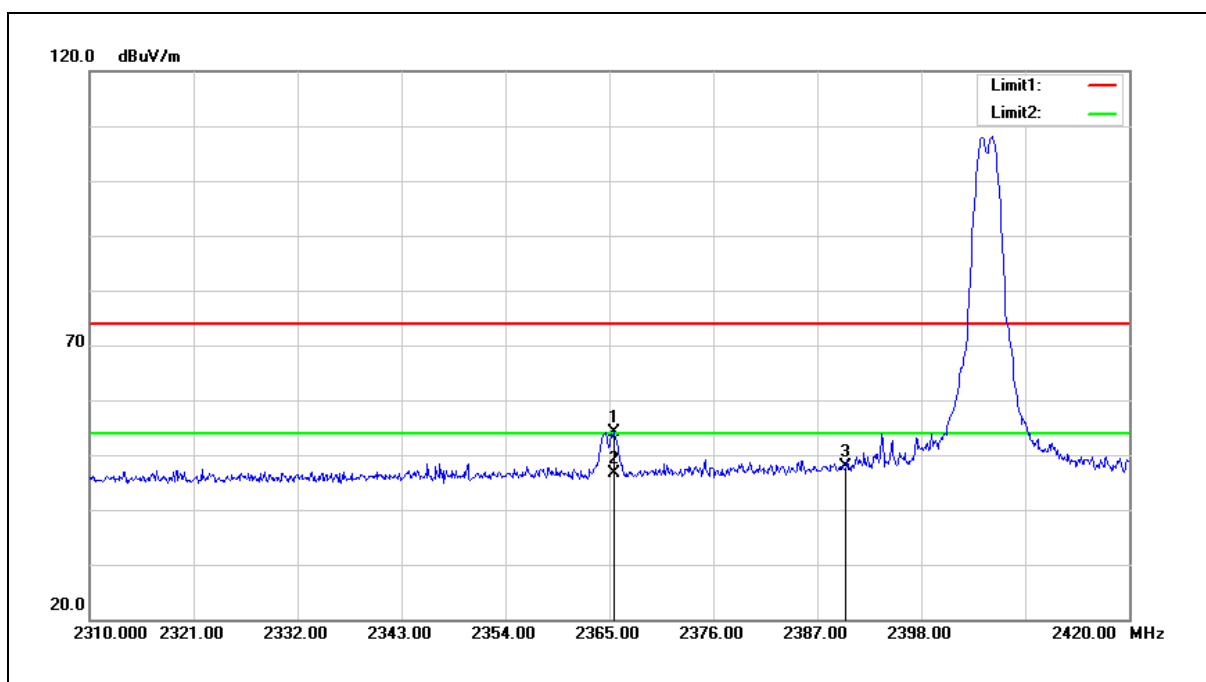
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2365.550	63.44	-9.71	53.73	74.00	-20.27	peak
2	2365.550	55.85	-9.71	46.14	54.00	-7.86	AVG
3	2390.000	56.87	-9.62	47.25	74.00	-26.75	peak

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



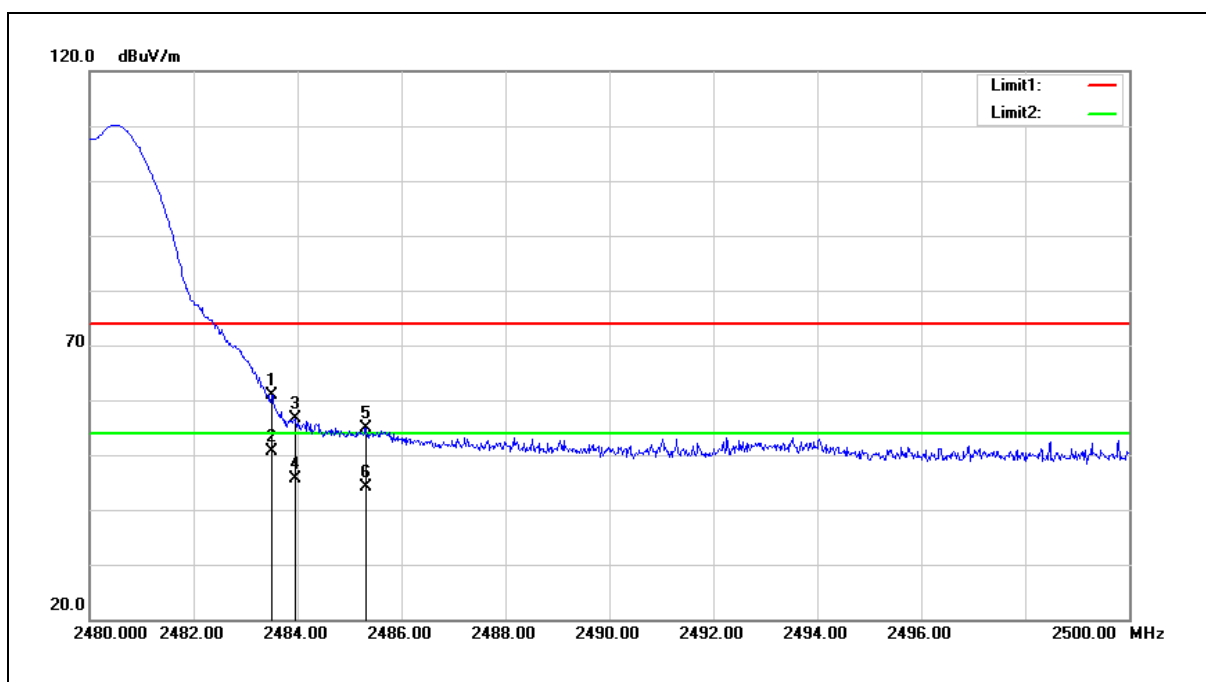
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2365.550	63.75	-9.71	54.04	74.00	-19.96	peak
2	2365.550	56.42	-9.71	46.71	54.00	-7.29	AVG
3	2390.000	57.58	-9.62	47.96	74.00	-26.04	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



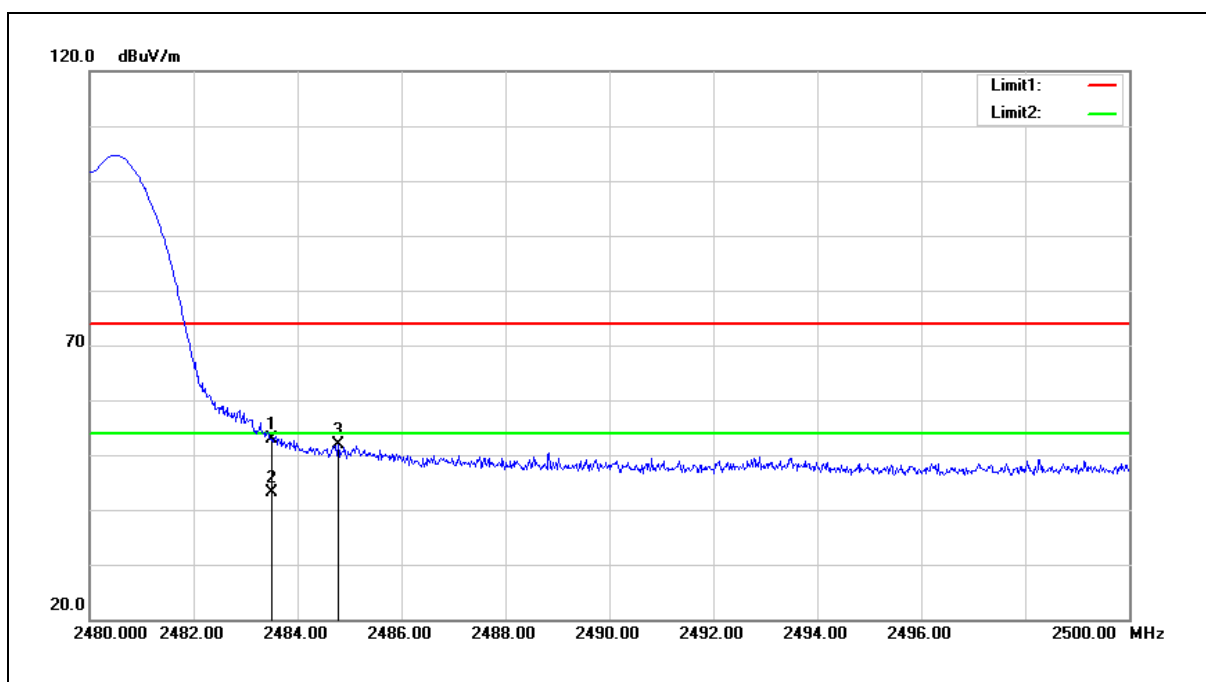
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	70.24	-9.37	60.87	74.00	-13.13	peak
2	2483.500	59.89	-9.37	50.52	54.00	-3.48	AVG
3	2483.960	65.99	-9.37	56.62	74.00	-17.38	peak
4	2483.960	55.04	-9.37	45.67	54.00	-8.33	AVG
5	2485.320	64.20	-9.37	54.83	74.00	-19.17	peak
6	2485.320	53.43	-9.37	44.06	54.00	-9.94	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	62.24	-9.37	52.87	74.00	-21.13	peak
2	2483.500	52.38	-9.37	43.01	54.00	-10.99	AVG
3	2484.780	61.14	-9.37	51.77	74.00	-22.23	peak

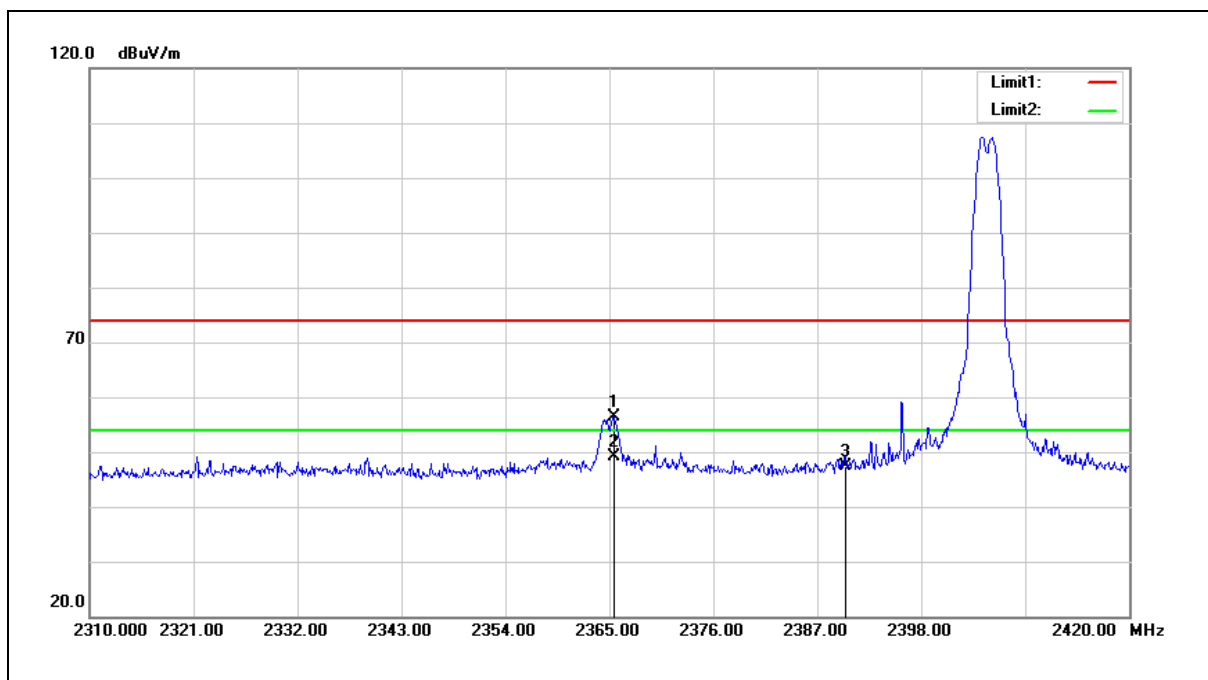
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



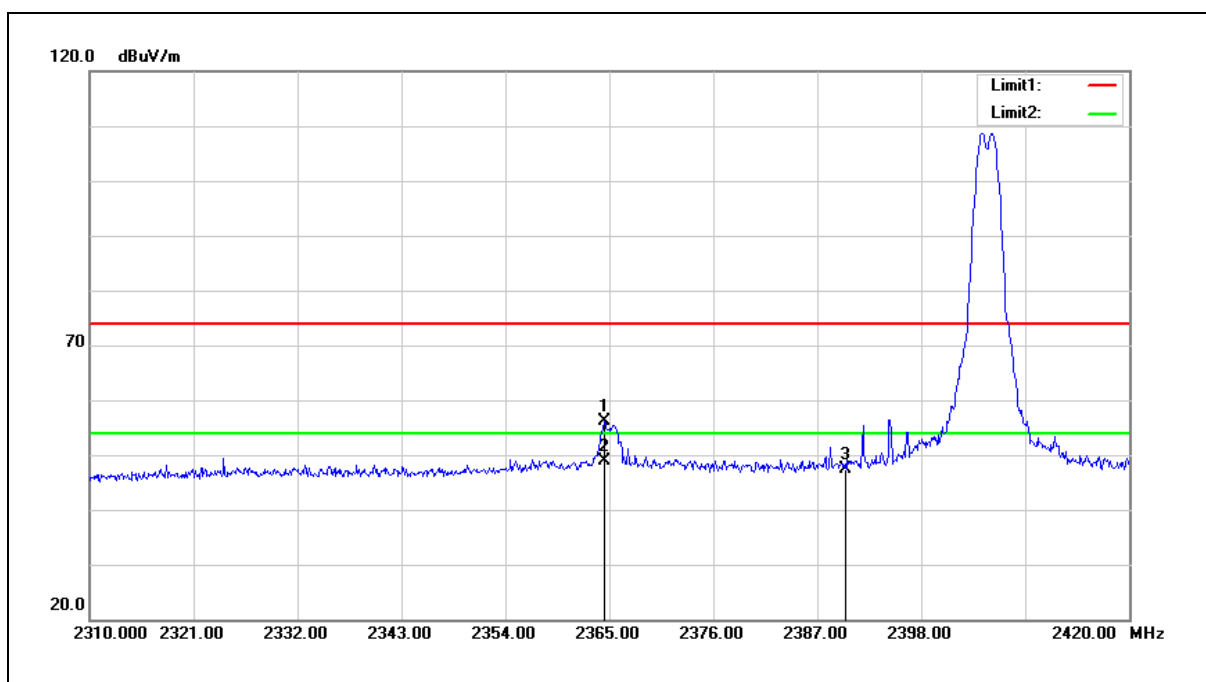
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2365.440	65.99	-9.71	56.28	74.00	-17.72	peak
2	2365.440	58.79	-9.71	49.08	54.00	-4.92	AVG
3	2390.000	56.88	-9.62	47.26	74.00	-26.74	peak

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2405 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



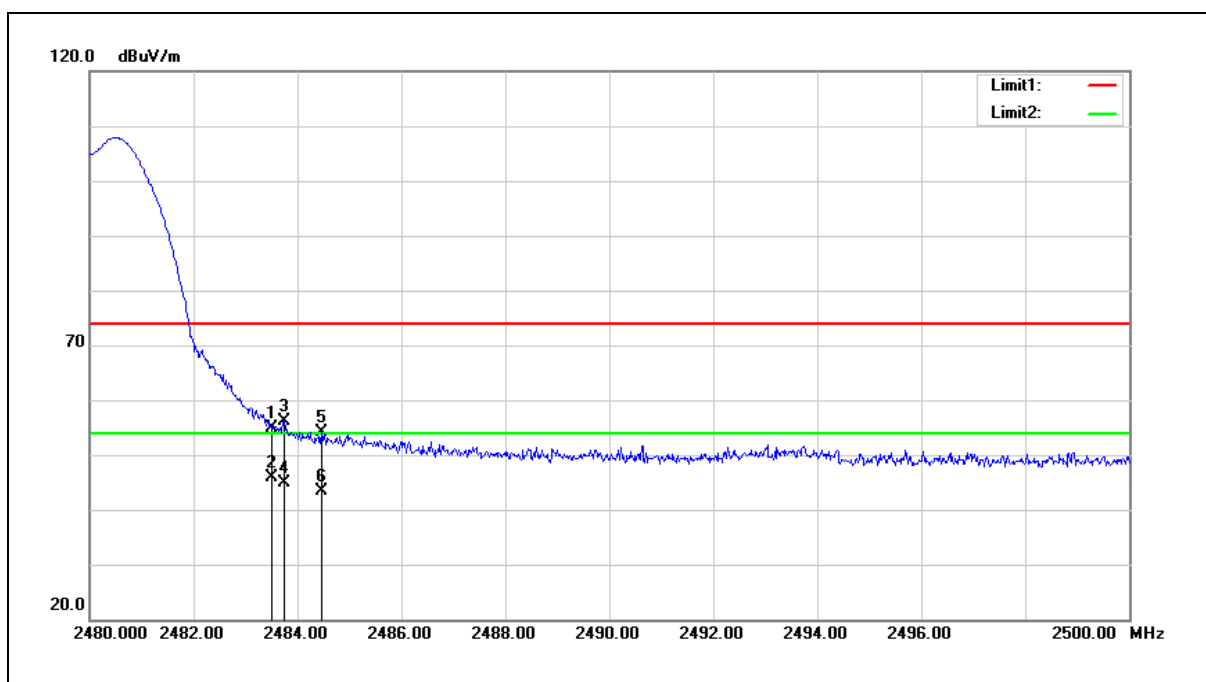
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2364.450	65.84	-9.72	56.12	74.00	-17.88	peak
2	2364.450	58.63	-9.72	48.91	54.00	-5.09	AVG
3	2390.000	57.06	-9.62	47.44	74.00	-26.56	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3.When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



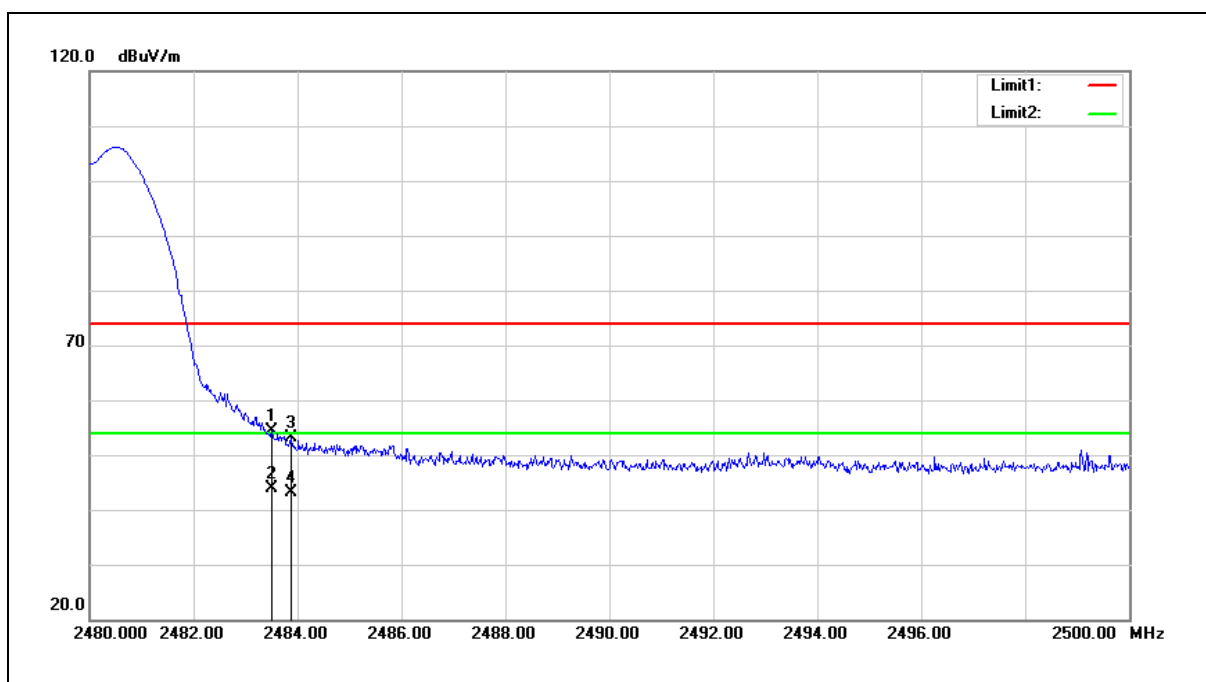
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	64.28	-9.37	54.91	74.00	-19.09	peak
2	2483.500	55.32	-9.37	45.95	54.00	-8.05	AVG
3	2483.740	65.57	-9.37	56.20	74.00	-17.80	peak
4	2483.740	54.15	-9.37	44.78	54.00	-9.22	AVG
5	2484.460	63.51	-9.37	54.14	74.00	-19.86	peak
6	2484.460	52.65	-9.37	43.28	54.00	-10.72	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	LP0002	Test Distance:	3 m
Test item:	Band edge	Power:	DC 3.3 V
Frequency:	2480 MHz	Temp.(°C)/Hum.(%RH):	26(°C)/60 %RH
Mode:	Mode 2		
Ant.Polar.:	Vertical		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	63.69	-9.37	54.32	74.00	-19.68	peak
2	2483.500	53.35	-9.37	43.98	54.00	-10.02	AVG
3	2483.880	62.42	-9.37	53.05	74.00	-20.95	peak
4	2483.880	52.58	-9.37	43.21	54.00	-10.79	AVG

Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

2. Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre-Amplifier gain (dB).

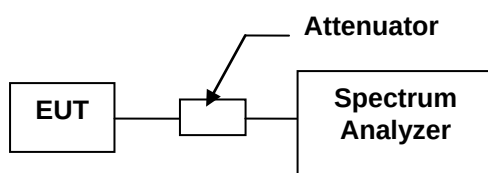
3. When the peak results are less than average limit, so not need to evaluate the average.

4.4 非必要頻帶之量測

合格標準：

發射限制： 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，須衰減 20 分貝(dB)，以射頻傳導或輻射方式測量。

測試架構圖：



測試結果：

操作模式	: Mode 2: Continuous TX Mode
測試結果	: 合格
量測之結果掃圖如下頁所示	

附註 1: 於使用頻帶範圍之任意 100 千赫 (kHz)內，發射器所產生的射頻功率相較於使用頻帶範圍中包含最高所需功率之 100 千赫 (kHz)內的射頻功率，衰減 20 分貝(dB)以上，符合規定。

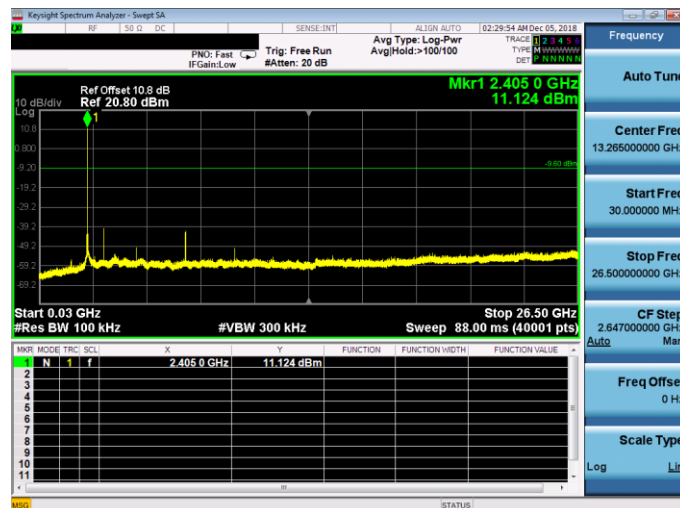
附註 2: 測試結果頻帶外之輻射雜訊皆小於主頻 TX 20 dB。

Power setting 1_Antenna Type: PCB Trace Antenna

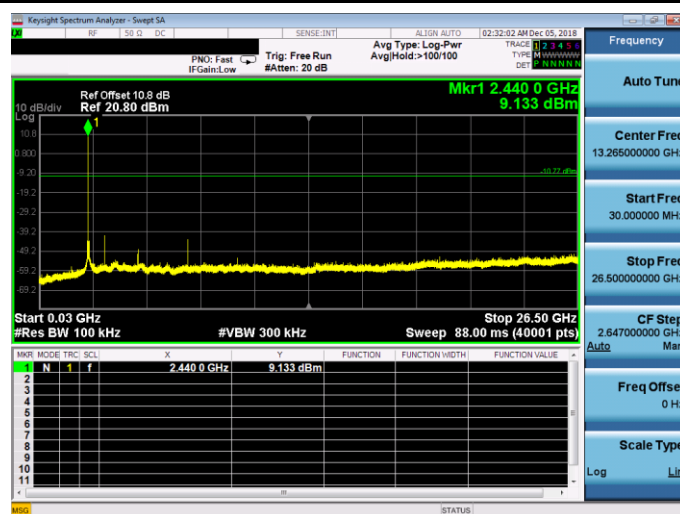
Out of Band Conducted Spurious Emission

Mode 2: Continuous TX Mode

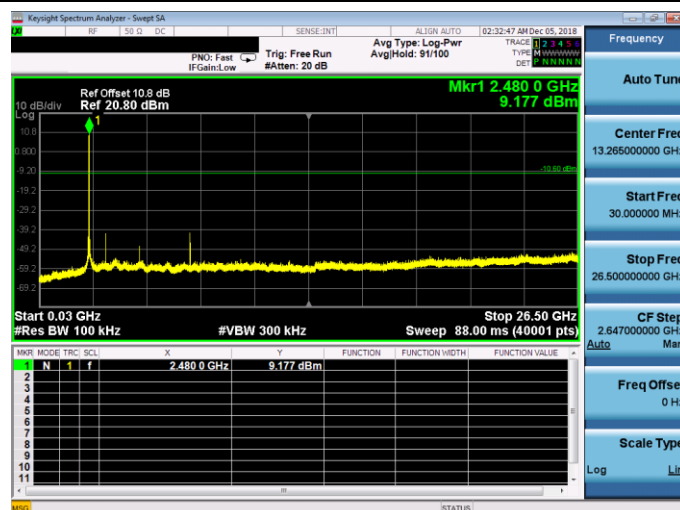
2405 MHz



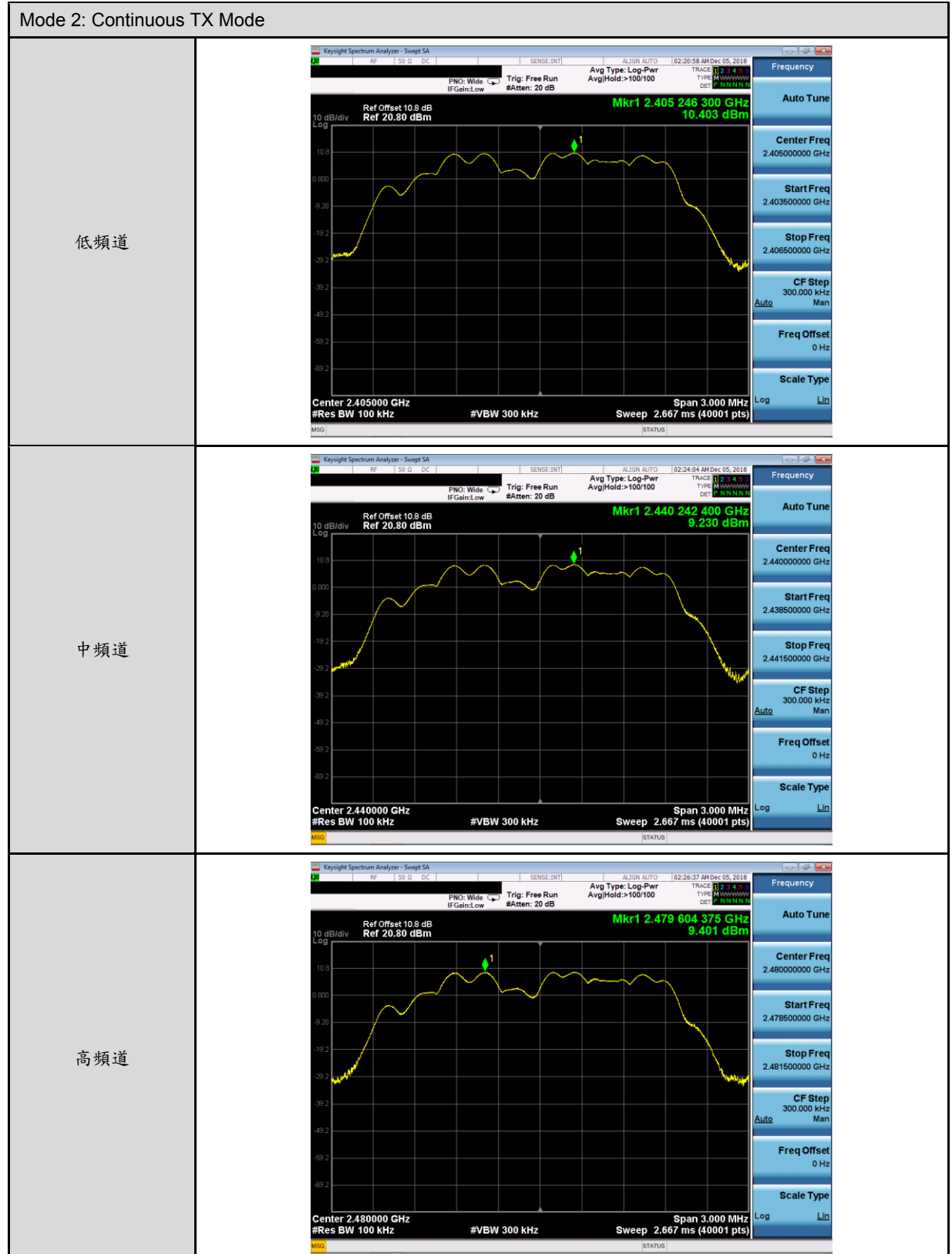
2440 MHz



2480 MHz



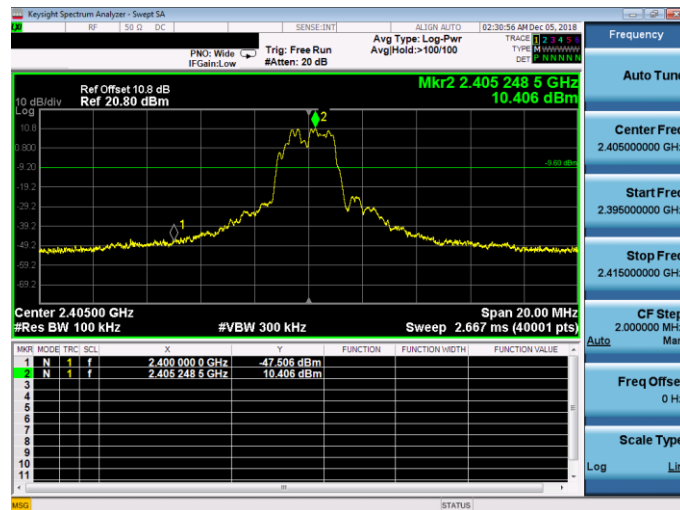
Reference level



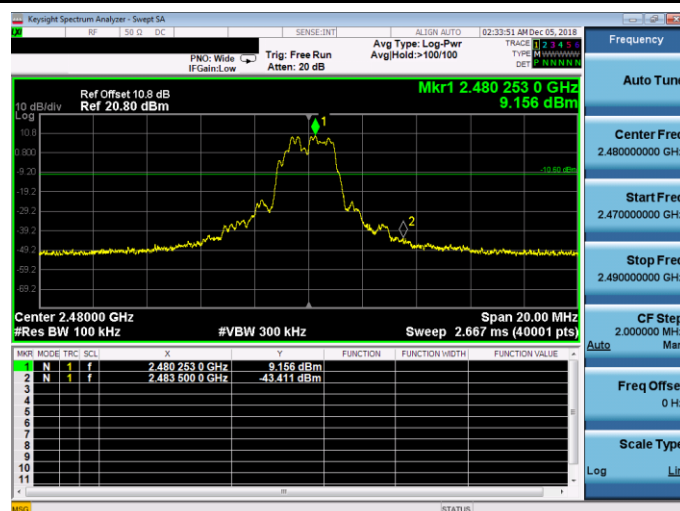
Conducted Band Edge

Mode 2: Continuous TX Mode

低頻道



高頻道

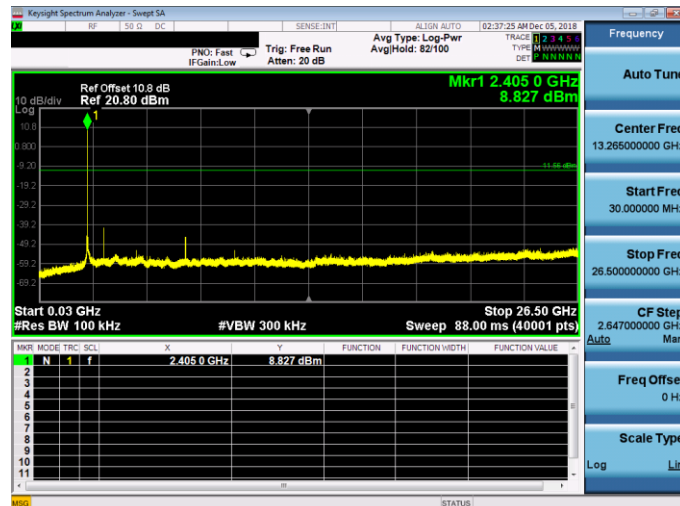


Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

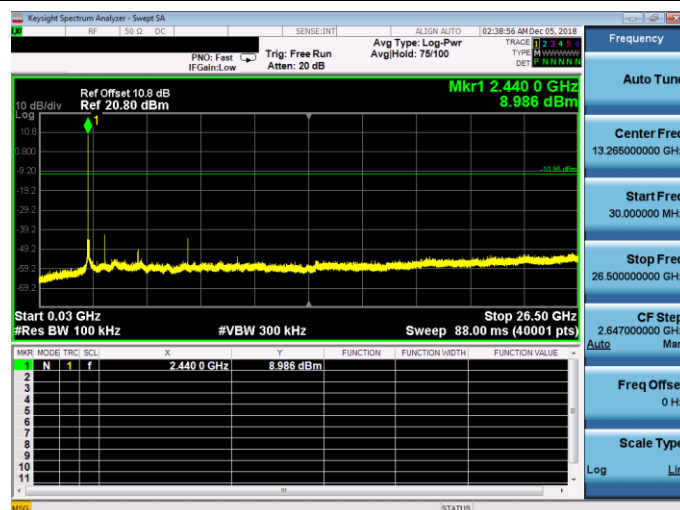
Out of Band Conducted Spurious Emission

Mode 2: Continuous TX Mode

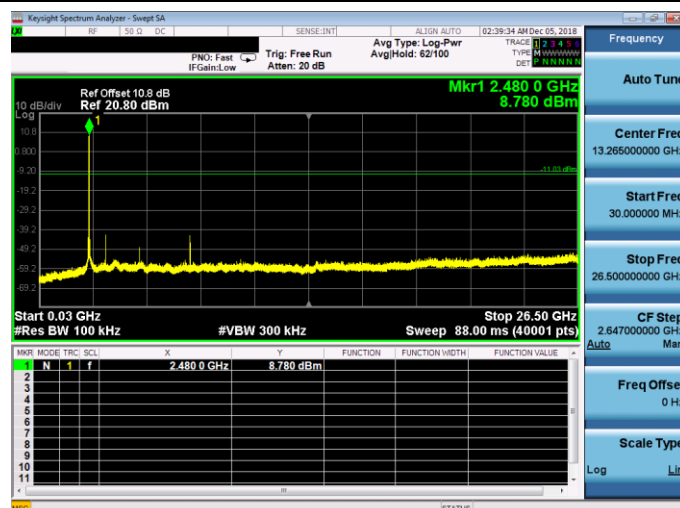
2405 MHz



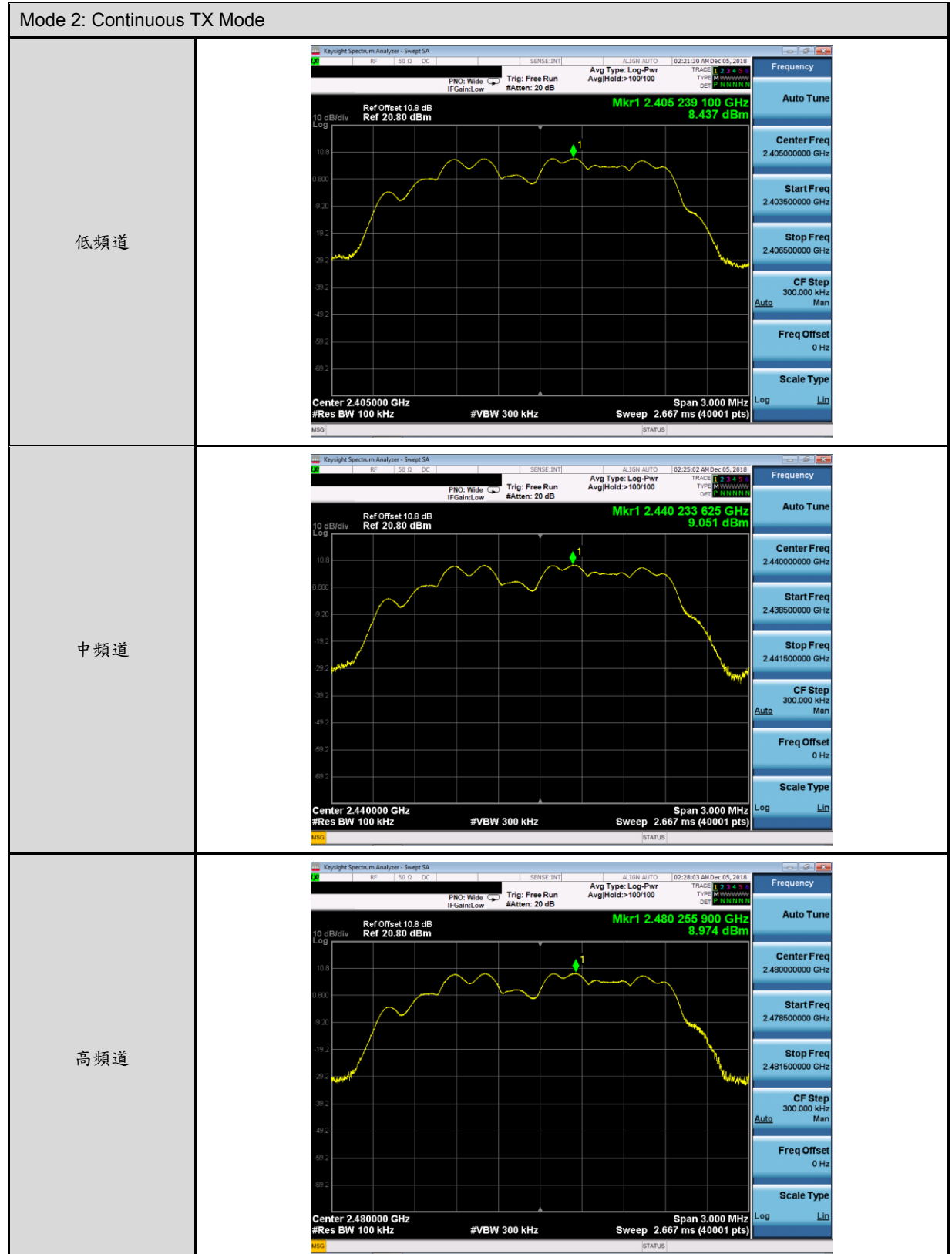
2440 MHz



2480 MHz



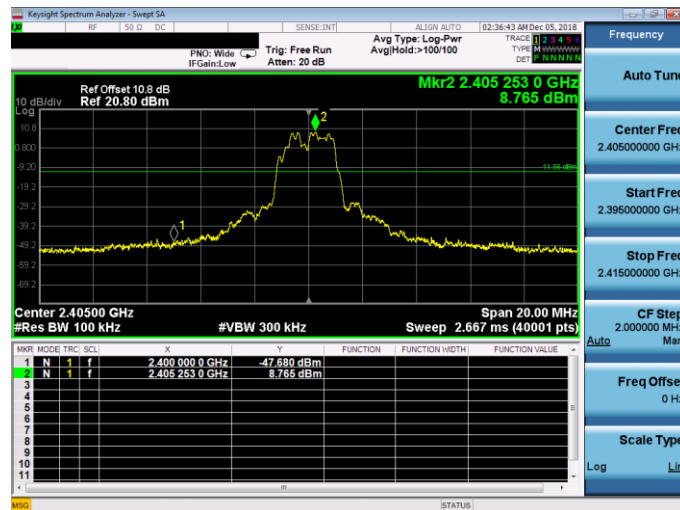
Reference level



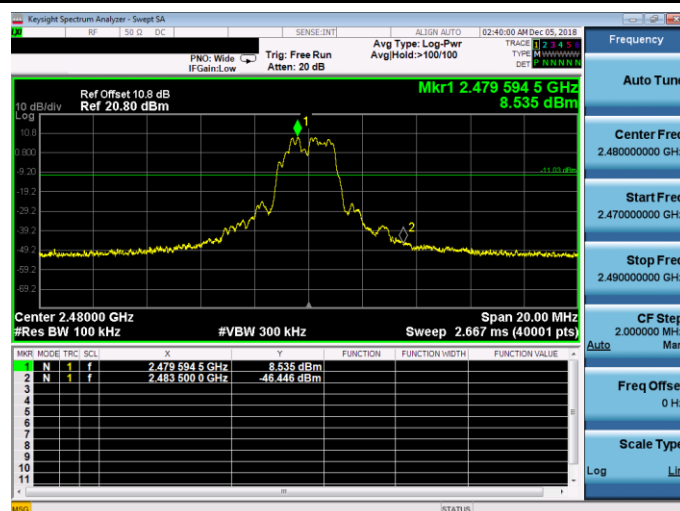
Conducted Band Edge

Mode 2: Continuous TX Mode

低頻道



高頻道



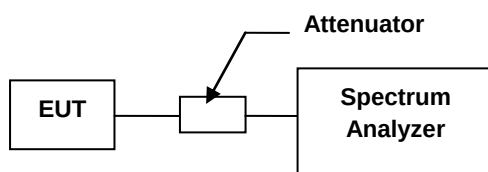
4.5 功率密度之要求

合格標準：

依據 NCC 低功率射頻電機技術規範(LP0002)之 3.10.1.6 (2).(B)節之要求，數位調變技術(Digital Modulation Techniques)系統之功率密度,再使用頻率範圍之任意 3kHz 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 8 dBm(複合系統時，關閉跳頻作業狀態檢驗)。

測試架構圖：

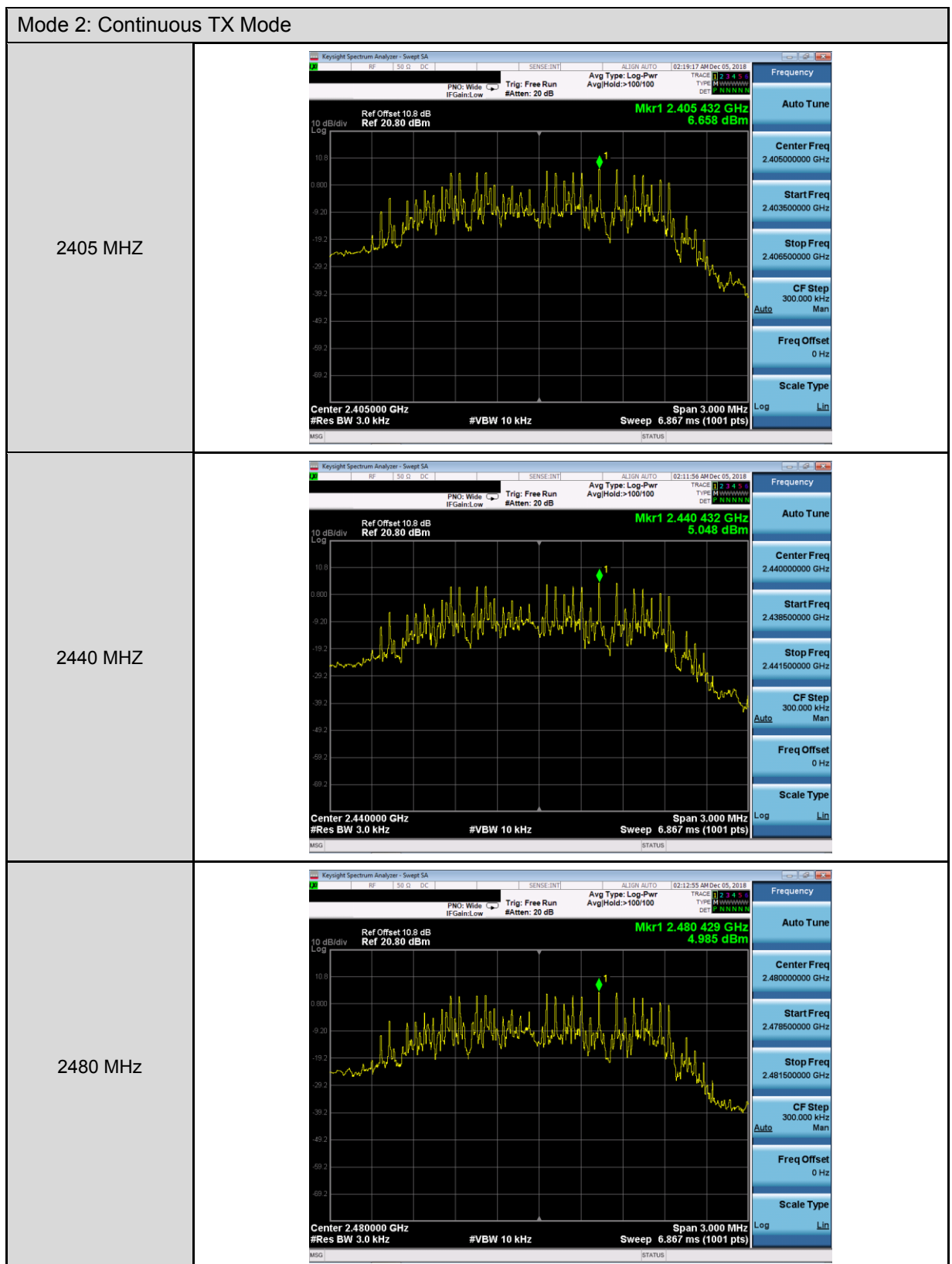
測試場地測試配置如圖所示。



測試結果：

Power setting 1_Antenna Type: PCB Trace Antenna			
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操作模式： Mode 2: Continuous TX Mode			
測試結果： 合格			
操作模式	頻率 (MHz)	量測值 (dBm)	限制值 (dBm)
Mode 2	2405	6.658	≤ 8
	2440	5.048	≤ 8
	2480	4.985	≤ 8

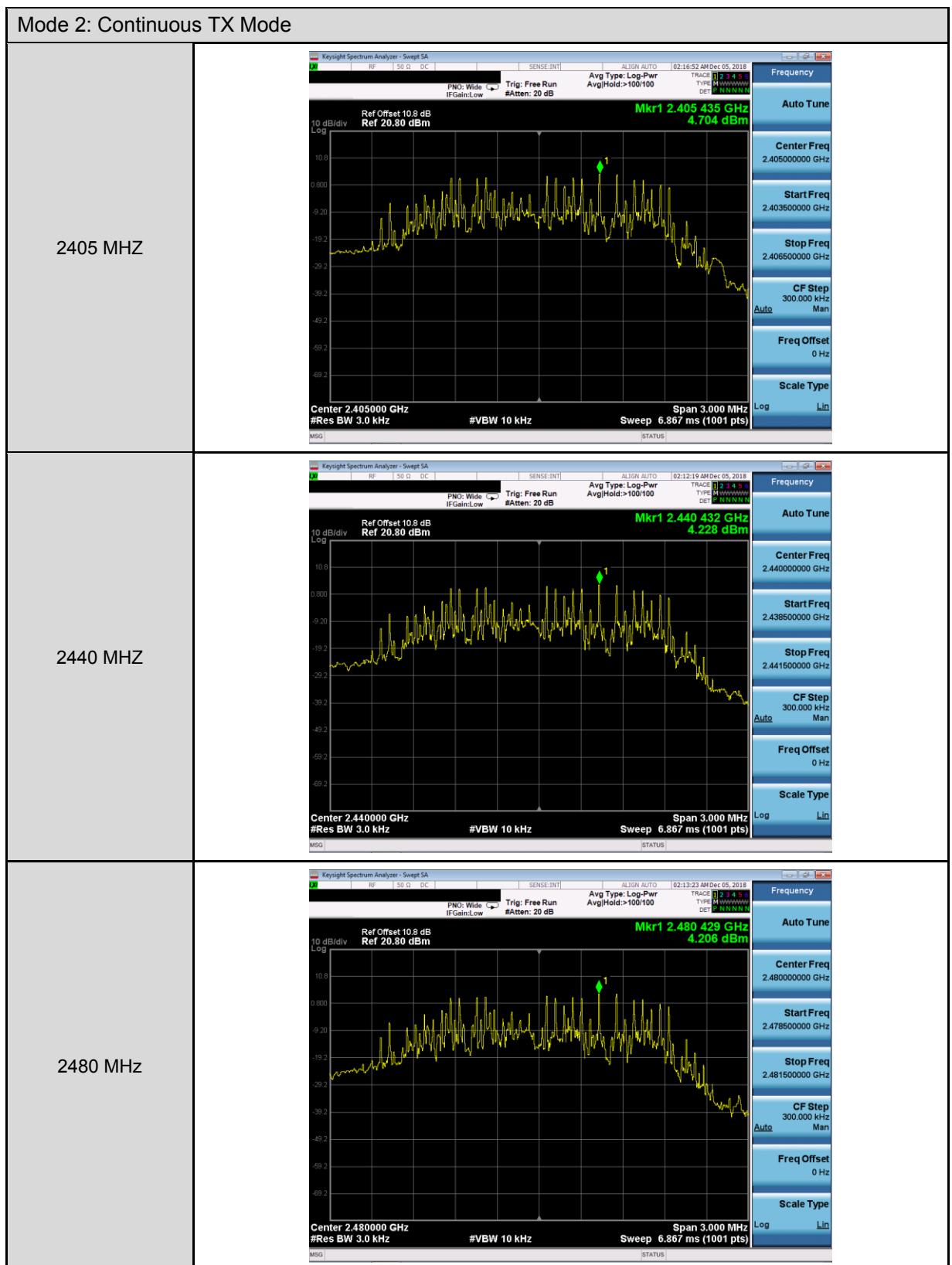


Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

操作模式 : Mode 2: Continuous TX Mode

測試結果 : 合格

操作模式	頻率 (MHz)	量測值 (dBm)	限制值 (dBm)
Mode 2	2405	4.704	≤ 8
	2440	4.228	≤ 8
	2480	4.206	≤ 8

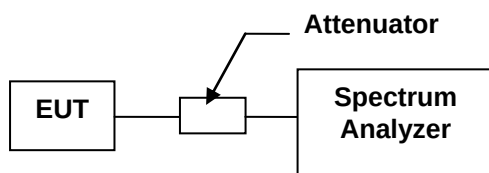


4.6 發射頻寬之要求

合格標準:

依據 NCC 低功率射頻電機技術規範 3.10.1.6 (2).(A) 節之要求，對使用數位調變技術(Digital Modulation Techniques)系統而言，6 dB 頻寬至少應有 500 千赫(kHz)。

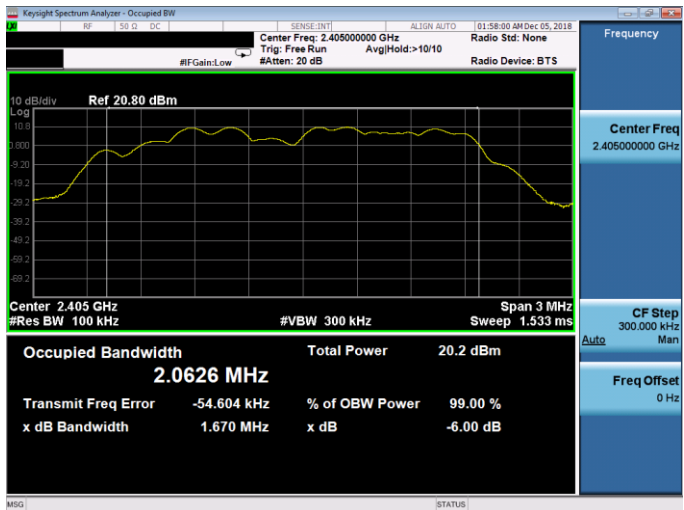
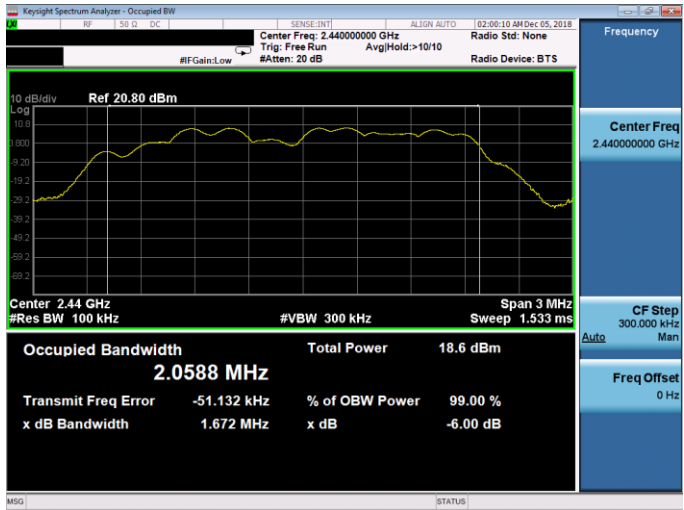
測試架構圖：



測試結果:

Power setting 1_Antenna Type: PCB Trace Antenna

操作模式 : Mode 2: Continuous TX Mode			
操作模式	頻率 (MHz)	量測值 (kHz)	限制值 (kHz)
Mode 2	2405	1670.000	≥ 500
	2440	1672.000	≥ 500
	2480	1664.000	≥ 500
測試掃描圖請參考下頁。			

Mode 2: Continuous TX Mode	
2405 MHz	 Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.405000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS 10 dB/div Ref 20.80 dBm Center 2.405 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1.333 ms Occupied Bandwidth 2.0626 MHz Total Power 20.2 dBm Transmit Freq Error -54.604 kHz % of OBW Power 99.00 % x dB Bandwidth 1.670 MHz x dB -6.00 dB Frequency Center Freq 2.405000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz
2440 MHz	 Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.440000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS 10 dB/div Ref 20.80 dBm Center 2.44 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1.333 ms Occupied Bandwidth 2.0588 MHz Total Power 18.6 dBm Transmit Freq Error -51.132 kHz % of OBW Power 99.00 % x dB Bandwidth 1.672 MHz x dB -6.00 dB Frequency Center Freq 2.440000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz
2480 MHz	 Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.480000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS 10 dB/div Ref 20.80 dBm Center 2.48 GHz #Res BW 100 kHz #VBW 300 kHz Span 3 MHz Sweep 1.333 ms Occupied Bandwidth 2.0586 MHz Total Power 19.6 dBm Transmit Freq Error -45.770 kHz % of OBW Power 99.00 % x dB Bandwidth 1.664 MHz x dB -6.00 dB Frequency Center Freq 2.480000000 GHz CF Step 300.000 kHz Auto Man Freq Offset 0 Hz

Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

操作模式 : Mode 2: Continuous TX Mode

操作模式	頻率 (MHz)	量測值 (kHz)	限制值 (kHz)
Mode 2	2405	1670.000	≥ 500
	2440	1670.000	≥ 500
	2480	1671.000	≥ 500

測試掃描圖請參考下頁。

Mode 2: Continuous TX Mode	
2405 MHz	Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.405000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref 20.80 dBm Center: 2.405 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 3 MHz Sweep: 1.333 ms Occupied Bandwidth: 2.0543 MHz Total Power: 18.0 dBm Transmit Freq Error: -53.718 kHz % of OBW Power: 99.00 % x dB Bandwidth: 1.670 MHz x dB: -6.00 dB Frequency: Center Freq 2.405000000 GHz CF Step: 300.000 kHz Freq Offset: 0 Hz
2440 MHz	Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.440000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref 20.80 dBm Center: 2.44 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 3 MHz Sweep: 1.333 ms Occupied Bandwidth: 2.0569 MHz Total Power: 17.8 dBm Transmit Freq Error: -50.915 kHz % of OBW Power: 99.00 % x dB Bandwidth: 1.670 MHz x dB: -6.00 dB Frequency: Center Freq 2.440000000 GHz CF Step: 300.000 kHz Freq Offset: 0 Hz
2480 MHz	Keysight Spectrum Analyzer - Occupied BW Center Freq: 2.480000000 GHz Trig: Free Run #IFGain: Low #Atten: 20 dB Avg/Hold: >10/10 Radio Std: None Radio Device: BTS Ref 20.80 dBm Center: 2.48 GHz #Res BW: 100 kHz #VBW: 300 kHz Span: 3 MHz Sweep: 1.333 ms Occupied Bandwidth: 2.0602 MHz Total Power: 18.1 dBm Transmit Freq Error: -51.069 kHz % of OBW Power: 99.00 % x dB Bandwidth: 1.671 MHz x dB: -6.00 dB Frequency: Center Freq 2.480000000 GHz CF Step: 300.000 kHz Freq Offset: 0 Hz

4.7 天線規格之要求

合格標準:

據 NCC 低功率射頻電機技術規範(LP0002)之 3.10.1.3(3)節之要求，除 3.10.1.3(1)及 3.10.1.3(2)外，使用超過 6 dBi 方向增益之發射天線時，應依超過 6 dBi 天線方向增益的 dBi 總量，等量減少最大傳導輸出功率限制值。

依據 NCC 低功率射頻電機技術規範(LP0002)之 3.10.1(4)節之要求，天線之規格不受第 2.2 節規定之限制

判定結果:

符合。

廠牌	型號	型態	Connector	增益值 (dBi)
Redpine	RSIA15	PCB Trace Antenna	Internal	0.99
Taoglas	WS.01.B.305151	Heavy Duty Screw Mount Antenna	SMA Reverse	4.1

4.8 電波暴露量之評估

合格標準：

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)以證明其符合電波暴露量之要求。限制值如下：

5.20.2.1 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：MHz。

5.20.2.2 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)
0.3~1.34	614	1.63	*100	30
1.34~30	824/f	2.19/f	*180/f ²	30
30~300	27.5	0.073	0.2	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：MHz。

判定結果:

Power setting 1_Antenna Type: PCB Trace Antenna

Band	Frequency (MHz)	Limit (mW/cm ²)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	With Duty cycle [P] x [G] (mW)	Power Density [S] (mW/cm ²)
Zigbee	2405	1	20	16.81	0.99	1.26	1	60.446	0.0120
	2440	1	20	15.23	0.99	1.26	1	42.012	0.0084
	2480	1	20	15.10	0.99	1.26	1	40.773	0.0081

Power setting 2_Antenna Type: Heavy Duty Screw Mount Antenna

Band	Frequency (MHz)	Limit (mW/cm ²)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	With Duty cycle [P] x [G] (mW)	Power Density [S] (mW/cm ²)
Zigbee	2405	1	20	14.93	4.1	2.57	1	79.971	0.0159
	2440	1	20	14.38	4.1	2.57	1	70.458	0.0140
	2480	1	20	14.43	4.1	2.57	1	71.274	0.0142