



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 2007DR24

版本(Rev.) 00

產品名稱 電子視聽音響 / Alpine BT car audio

申請廠商 汎德股份有限公司

廠牌 ALPINE

型式 (號) ALB214

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 109 年 08 月 13 日

填發本型式認可報告之試驗機構 (認可代號)

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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 : 108.09.06 ~ 111.09.05
認可能量範圍 : 低功率射頻電機技術規範(LP0002) (頻率範圍:9 kHz to 40 GHz)

免責聲明

- 1.本測試報告所敘述之測試結果，僅對顧客所提供之測試樣品，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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報告修訂紀錄

版本 (Rev.)	發行日期	修訂內容	修訂者
00	109 年 08 月 13 日	初版發行	王裕霜

低功率射頻電機測試證明書

產品名稱：電子視聽音響 / Alpine BT car audio

廠牌：ALPINE

型號：ALB214

申請廠商：汎德股份有限公司

申請者地址：臺北市內湖區行愛路100號7樓

製造廠商：ALPS ALPINE CO., LTD.

製造商地址：20-1 Yoshima-Industrial Park Iwaki-city Fukushima 970-1192 JAPAN

待測物電壓：DC 9~16V

試驗電壓：DC 12V

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：109 年 03 月 06 日

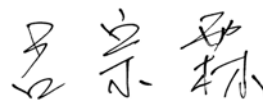
試驗日期：109 年 07 月 03 日~109 年 07 月 09 日

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！

審核者：



(呂 宗 霖)

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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	電子視聽音響 / Alpine BT car audio		
廠 牌	ALPINE		
型 號	ALB214		
額 定 電 源	DC 9~16V		
調 變 方 式	IEEE 802.11b: DSSS		
	IEEE 802.11g: OFDM		
頻 率 使 用 範 圍	Mode	Frequency Range (MHz)	
	IEEE 802.11b / IEEE 802.11g	2412 – 2462	
天 線 製 造 商	Harman Becker Automotive Systems GmbH		
天 線 型 號	BMW Kabelantenne 2,4GHz		
天 線 型 態	外接式天線		
天 線 增 益 值	-3 dBi		
R F 最 大 輸 出 功 率	Mode	Power	
	IEEE 802.11b	16.07 dBm	23.96 W
	IEEE 802.11g	23.96 dBm	0.249 W

輸出/輸入埠說明：

輸 出 / 入 埠		數量	介面內容說明
1	DC Power / Signal Port	1	連接至 Car Battery / Ground / Speaker / CAN (Controller Area Network) Unit
2	BT Antenna Port	1	連接至 Bluetooth Antenna
3	W-LAN Antenna Port	1	連接至 WLAN Antenna
4	FM1 Antenna Port	1	連接至 Car Radio Antenna
5	FM2 Antenna Port	1	連接至 Car Radio Antenna
6	GPS Antenna Port	1	連接至 GPS Antenna
7	OABR Port	1	連接至 Rear Entertainment Unit
8	USB1 Port	1	連接至 USB Memory or USB Device
9	USB2 Port	1	連接至 USB Memory or USB Device
10	APIX OUT1 Port	1	連接至 Display Unit
11	APIX OUT2 Port	1	連接至 Instrument Panel Unit

待測設備外圍說明：

電 源 線 類 別	本產品透過 Car Connector 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■)

☐	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: CCAK14LP2171T6

機型版別之差異說明

機型廠牌/型號	差異敘述
ALPINE /ALB214	1.變更產品名稱(加入英文產品名稱)。 2.因市場銷售需求,變更部份 PCB Layout 及部份線路(Ethernet circuits),其餘電路設計、印刷電路板等等並無變更。 測試結果說明: 1.工程判定其變更不影響射頻功能,但法規需更新為低功率射頻電機技術規範(LP0002)107年1月10日版,故場強輻射需重新評估測試並記錄其結果數據。 2.經驗證輸出峰值功率與原案差異不超過± 2 dB(符合技術規範限制值)。 其它測試結果請參閱原報告編號:1603DR52 Rev.01。

2. 量測儀器及測試配置說明

2.1 量測設備

For Radiated Emissions

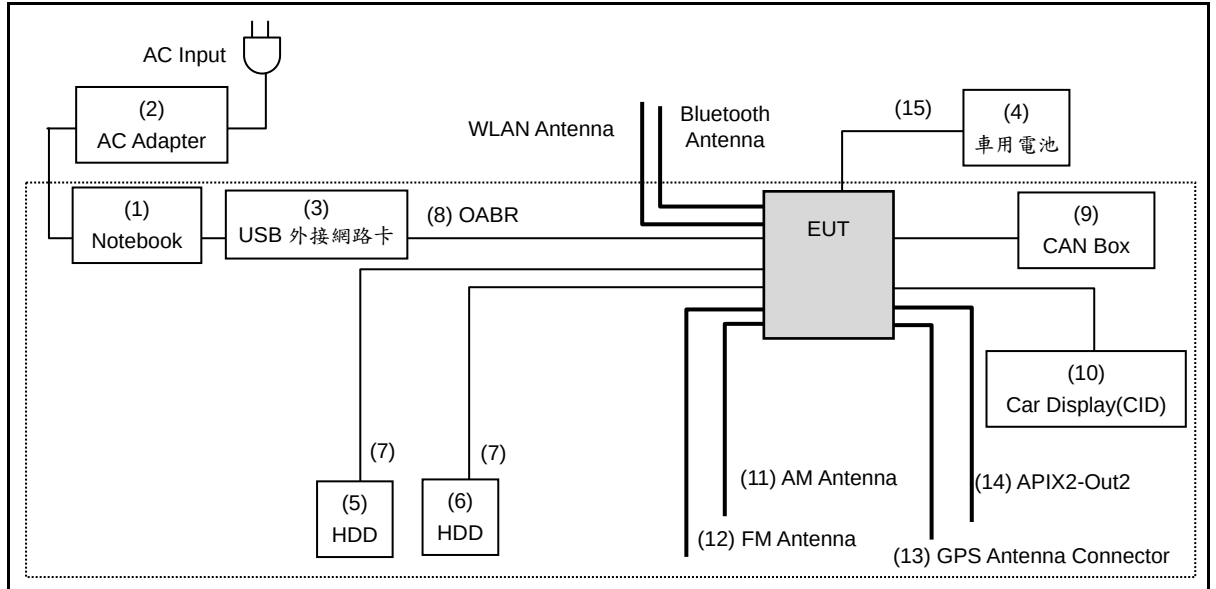
Test Period: Jul. 03 ~ Jul. 09, 2020

測試者: 廖經雄

名稱	廠牌	型號	序號	本次校驗日期	校驗年限
Spectrum Analyzer	Keysight	N9010A	MY52221312	01/13/2020	1 year
Amplifier	Agilent	8449B	3008A02456	03/25/2020	1 year
Amplifier	Agilent	8447D	2944A11119	01/15/2020	1 year
天線	SCHWARZBECK MESS-ELEKTRONIK	VULB 9168	416	10/23/2019	1 year
天線(1~18 GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	08/22/2019	1 year
天線(18~40 GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	08/14/2019	1 year

2.2 檢驗系統示意圖

輻射干擾測試配置



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		廠牌	型號	序號	備註
(1)	Notebook	ASUS	BU400A	D1NXAS148534020	USB*3、RJ45、VGA、HDMI、SD、 耳機(實驗室提供)
(2)	AC Adapter	ASUS	EXA1203YH	---	NPUT : 100-240 VAC, 50/60 Hz, 1.5 A OUTPUT : 19 VDC, 3.42 A Non-Shielded, 0.8 m (實驗室提供)
(3)	USB 外接網路卡	DigiFusion	RHU06	---	(實驗室提供)
(4)	車用電池	YUASA 湯淺	75D23L	---	(實驗室提供)
(5)	HDD	Transend	TS1TSJ25A3K-RU	D72654-0611	(實驗室提供)
(6)	HDD	Transend	TS1TSJ25A3K-RU	D72654-2240	(實驗室提供)
(7)	USB Cable	USB	USB Cable	---	(申請者提供)
(8)	OABR	OABR-Connector	OABR Connector Cable	---	(申請者提供)
(9)	CAN Box	HARMAN/BEC KER	NEW CAN-Box HS	---	(申請者提供)
(10)	Car Display(CID)	Alpine	QFBE406	---	(申請者提供)
(11)	AM Antenna	FM/AM-ANT	Cable Antena	---	(申請者提供)
(12)	FM Antenna	FM/AM-ANT	Cable Antena	---	(申請者提供)
(13)	GPS Antenna Connector	GPS-CONN	GPS Connector Cable	---	(申請者提供)
(14)	APIX2-Out2	DIAG-CONN	DIAG Connector Cable	---	含電阻負載 (申請者提供)
(15)	Car Connector	CAR-CONN	Car Power Cable	---	(申請者提供)

註：本案經申請者切結器材不提供隨貨配件，配件由實驗室(或申請者)提供併同檢驗。

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

使用定頻模式量測

Pre-Test Mode
Mode 1: Transmit Mode
Mode 2: IEEE 802.11b Continuous TX Mode
Mode 3: IEEE 802.11g Continuous TX Mode
Mode 4: Receiver Mode

Final-Test Mode
Mode 2: IEEE 802.11b Continuous TX Mode
Mode 3: IEEE 802.11g Continuous TX Mode
Mode 4: Receiver Mode

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)
Radiated Emission	9 kHz ~ 30 MHz	2.14
	30 MHz ~ 1000 MHz	4.99
	1000 MHz ~ 18000 MHz	4.99
	18000 MHz ~ 26500 MHz	4.23
	26500 MHz ~ 40000 MHz	4.39

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	20 - 30
濕度 Humidity (%RH)		10 - 90	45 - 75

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。

2.4 GHz 頻段適用下列表格

項次	測試項目	適用規範	測試結果	量測設備	結果判定
1	電源線傳導干擾	低功率射頻電機技術規範 2.3 節	Note	Note	不適用 (Note)
2	場強輻射	低功率射頻電機技術規範 2.8 節、2.9 節、3.10.1.5.(1)節	請參閱 4.1 節	請參閱 2.1 節	符合
3	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.(1)節	Note	Note	符合 (Note)
4	最大傳導輸出功率	低功率射頻電機技術規範 3.10.1.2(1)(C)節	Note	Note	符合 (Note)
5	天線規格	低功率射頻電機技術規範 3.10.1.3(3)、3.10.1.4 節	Note	Note	符合 (Note)
6	非必要頻帶	低功率射頻電機技術規範 3.10.1.5(1)節	Note	Note	符合 (Note)
7	6 dB 頻寬	低功率射頻電機技術規範 3.10.1.6(2)(A)節	Note	Note	符合 (Note)
8	峰值發射電功率密度	低功率射頻電機技術規範 3.10.1.6(2)(B)節	Note	Note	符合 (Note)
9	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 4.2 節	請參閱 2.1 節	符合

Note :參閱原報告編號：1603DR52 Rev.01。

Decision Rule

☒ Uncertainty is not included.

☐ Uncertainty is included.

4. 測試項目表列

4.1 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 ($\mu\text{V/m}$)	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 0.8 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。

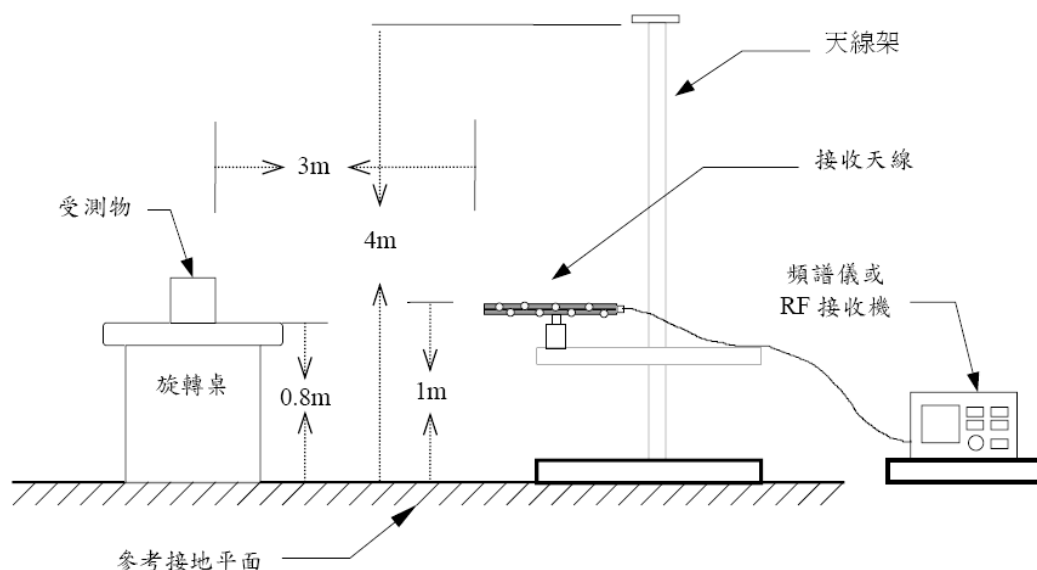
場強度之計算

場強之計算公式為：結果值 = 讀值 + 校正因子

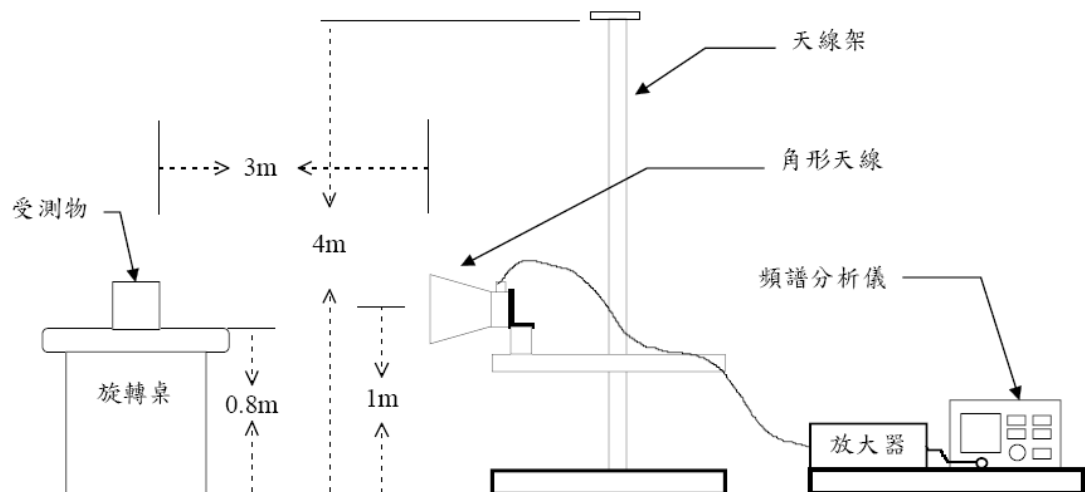
其中校正因子為：天線因子+ 饋線損失 + 濾波器損失（若有使用） - 放大器增益（若有使用）

測試架構圖：

量測頻率低於 1 GHz 以下之測試配置

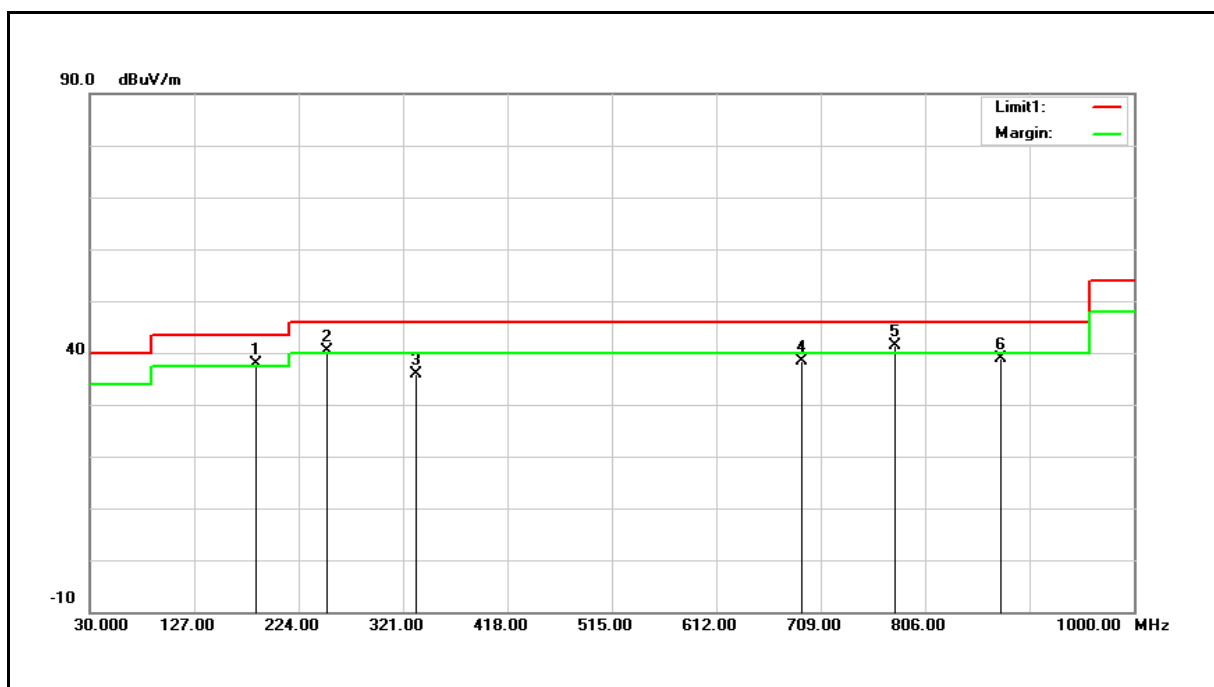


量測頻率高於 1 GHz 以上之測試配置



其它不必要之訊號 (1 GHz 以下)

Standard:	LP0002	Test Distance:	3 m
Test item:	Radiated Emission		
Frequency:	2412 MHz		
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	184.2300	44.75	-6.98	37.77	43.50	-5.73	QP
2	250.1900	46.31	-6.00	40.31	46.00	-5.69	QP
3	332.6400	39.63	-3.67	35.96	46.00	-10.04	QP
4	691.5400	34.60	3.76	38.36	46.00	-7.64	QP
5	777.8700	35.72	5.55	41.27	46.00	-4.73	QP
6	875.8400	31.86	7.14	39.00	46.00	-7.00	QP

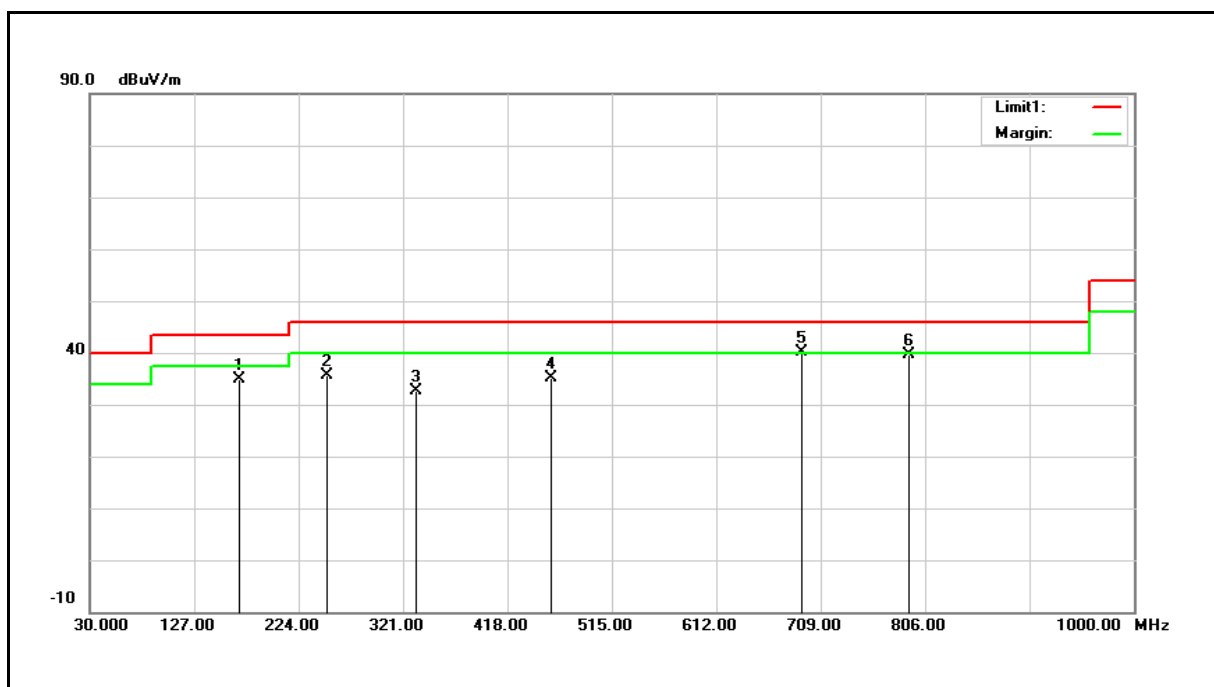
Note: 1. Result (dBuV/m) = Correct Factor (dB/m) + Reading (dBuV).

Example: $37.77 = -6.98 + 44.75$.

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:	Radiated Emission		
Frequency:	2412 MHz		
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	168.7100	40.73	-5.75	34.98	43.50	-8.52	QP
2	250.1900	41.67	-6.00	35.67	46.00	-10.33	QP
3	333.6100	36.27	-3.66	32.61	46.00	-13.39	QP
4	458.7400	35.70	-0.61	35.09	46.00	-10.91	QP
5	691.5400	36.37	3.76	40.13	46.00	-5.87	QP
6	790.4800	34.03	5.70	39.73	46.00	-6.27	QP

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

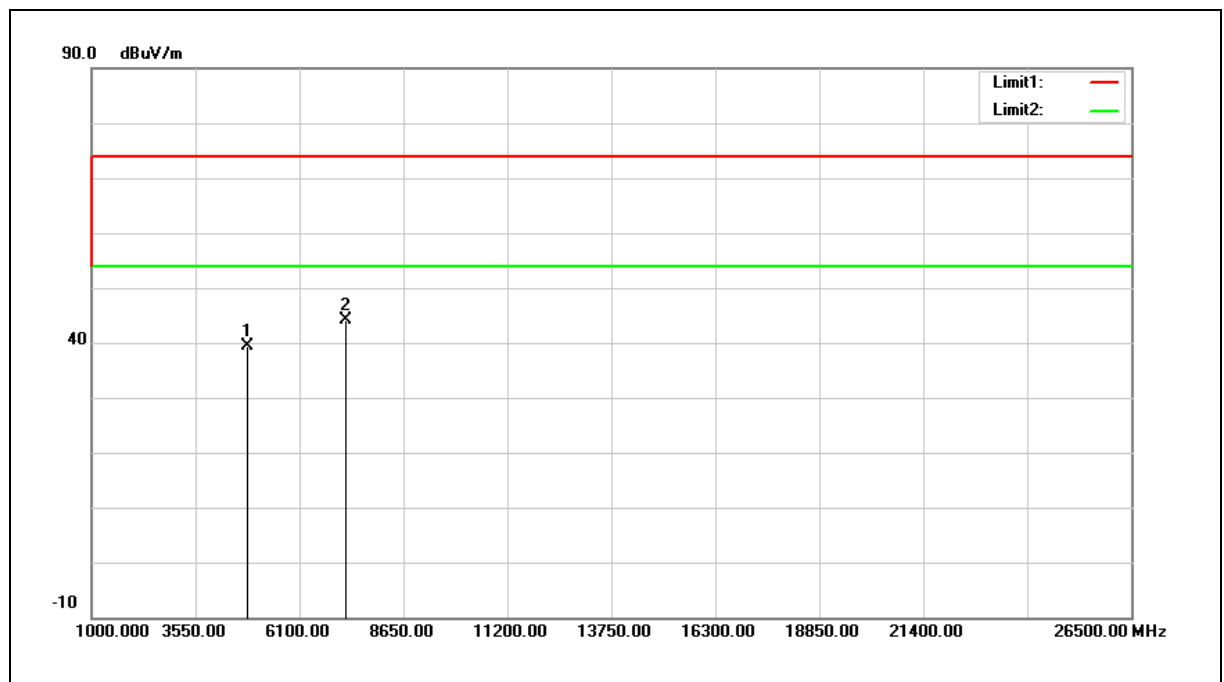
Example: 34.98=-5.75+40.73.

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:	3m
Test item:	Harmonic		
Frequency:	2412MHz		
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	4824.000	35.07	4.20	39.27	74.00	-34.73	peak
2	7236.000	33.71	10.38	44.09	74.00	-29.91	peak

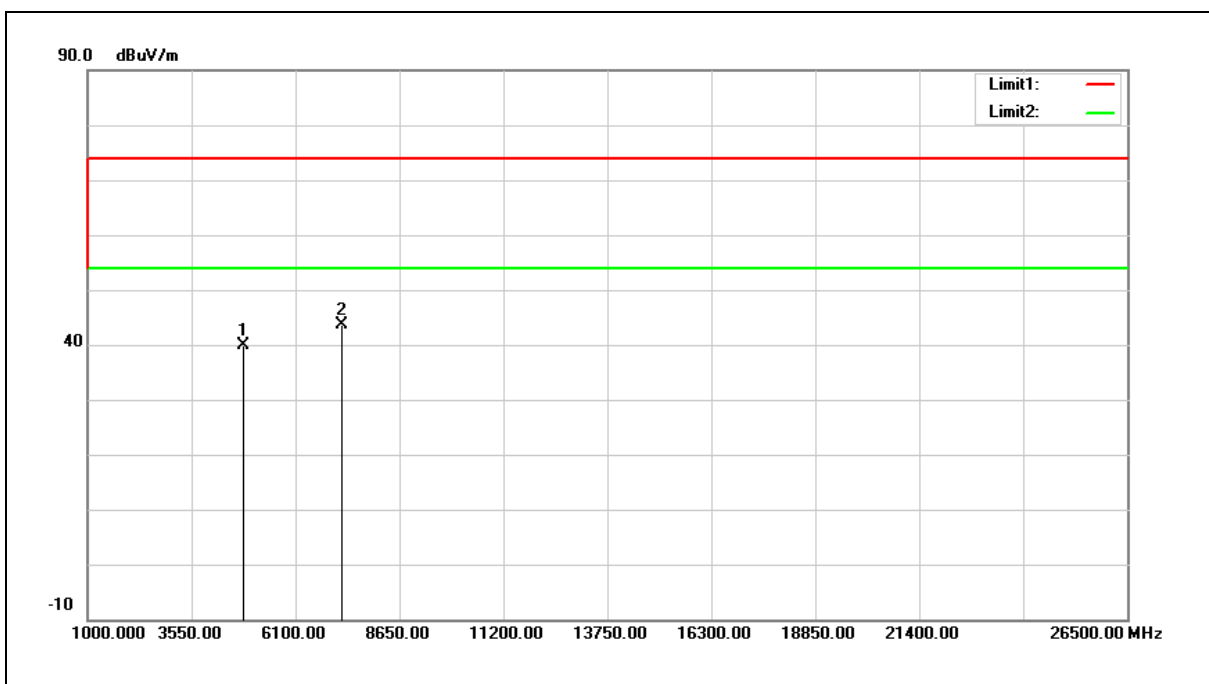
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 39.27=4.20+35.07.

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:	3m
Test item:	Harmonic		
Frequency:	2412MHz		
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	4824.000	35.70	4.20	39.90	74.00	-34.10	peak
2	7236.000	33.25	10.38	43.63	74.00	-30.37	peak

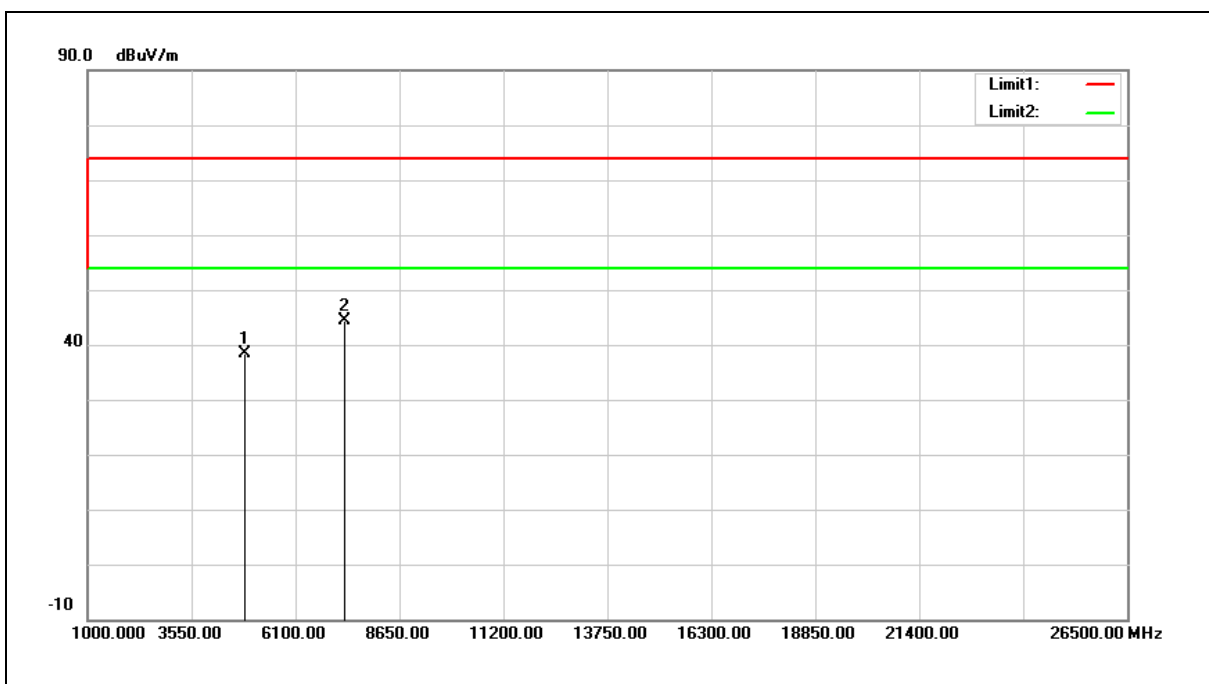
Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

Example: 39.90=4.20+35.70.

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:	3m
Test item:	Harmonic		
Frequency:	2437MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



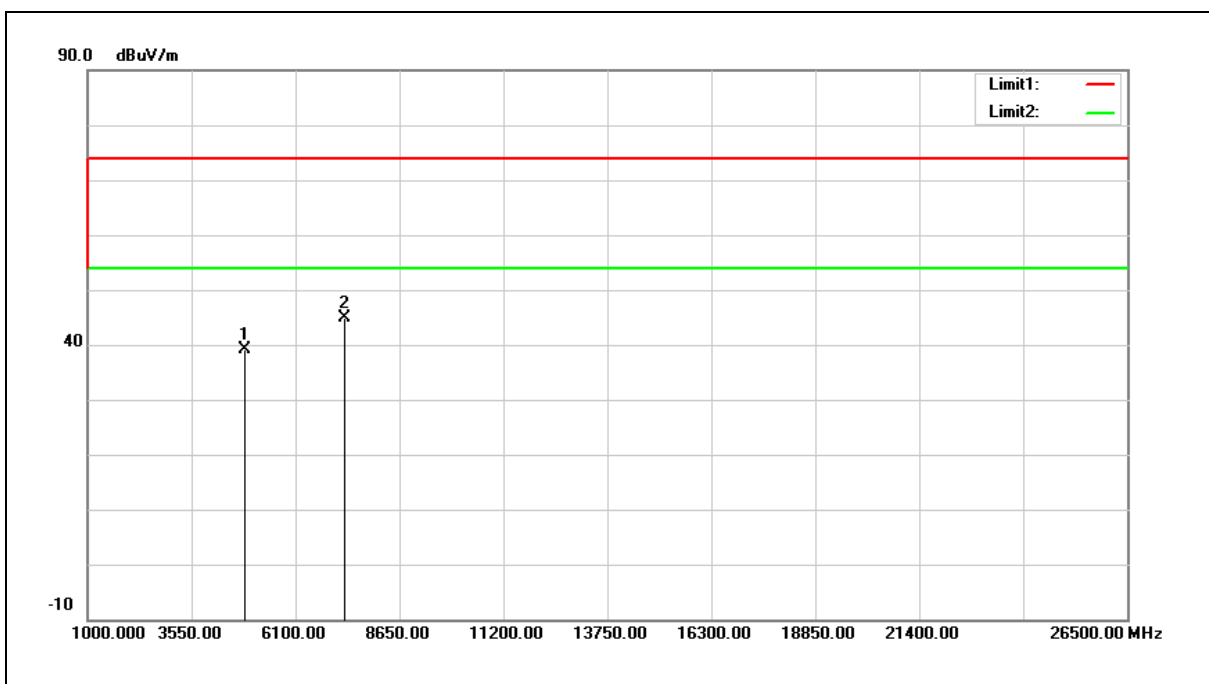
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	34.15	4.34	38.49	74.00	-35.51	peak
2	7311.000	33.79	10.61	44.40	74.00	-29.60	peak

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:	3m
Test item:	Harmonic		
Frequency:	2437MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



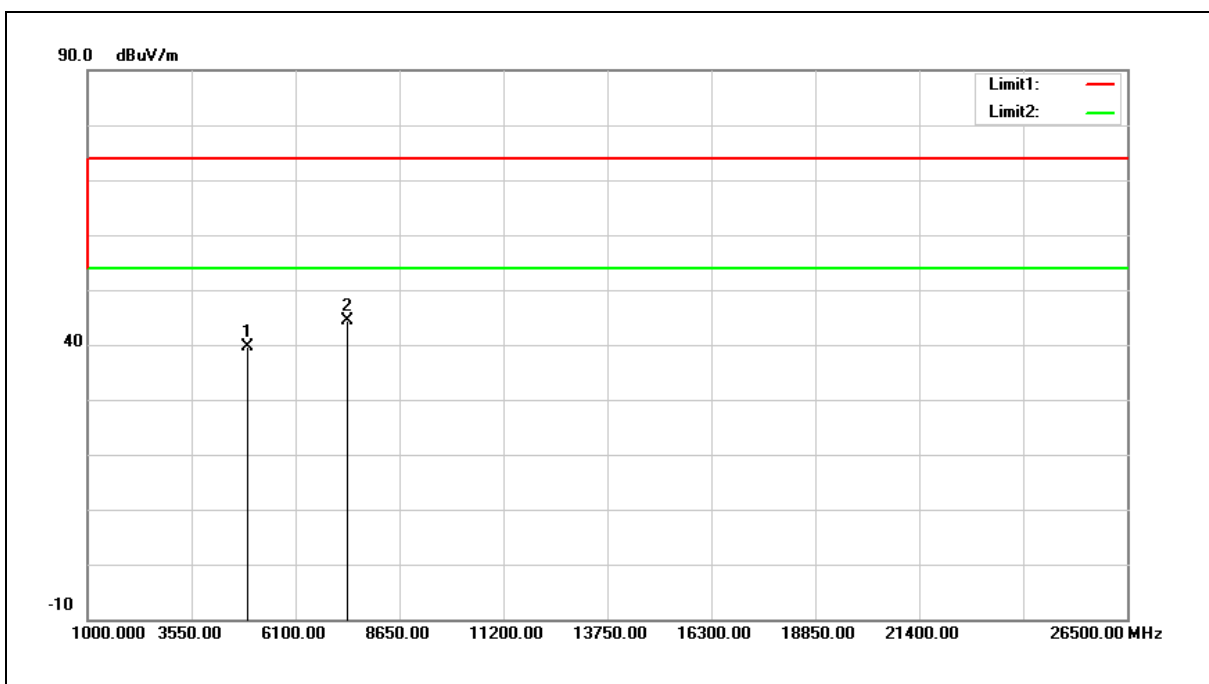
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	34.77	4.34	39.11	74.00	-34.89	peak
2	7311.000	34.21	10.61	44.82	74.00	-29.18	peak

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:	3m
Test item:	Harmonic		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



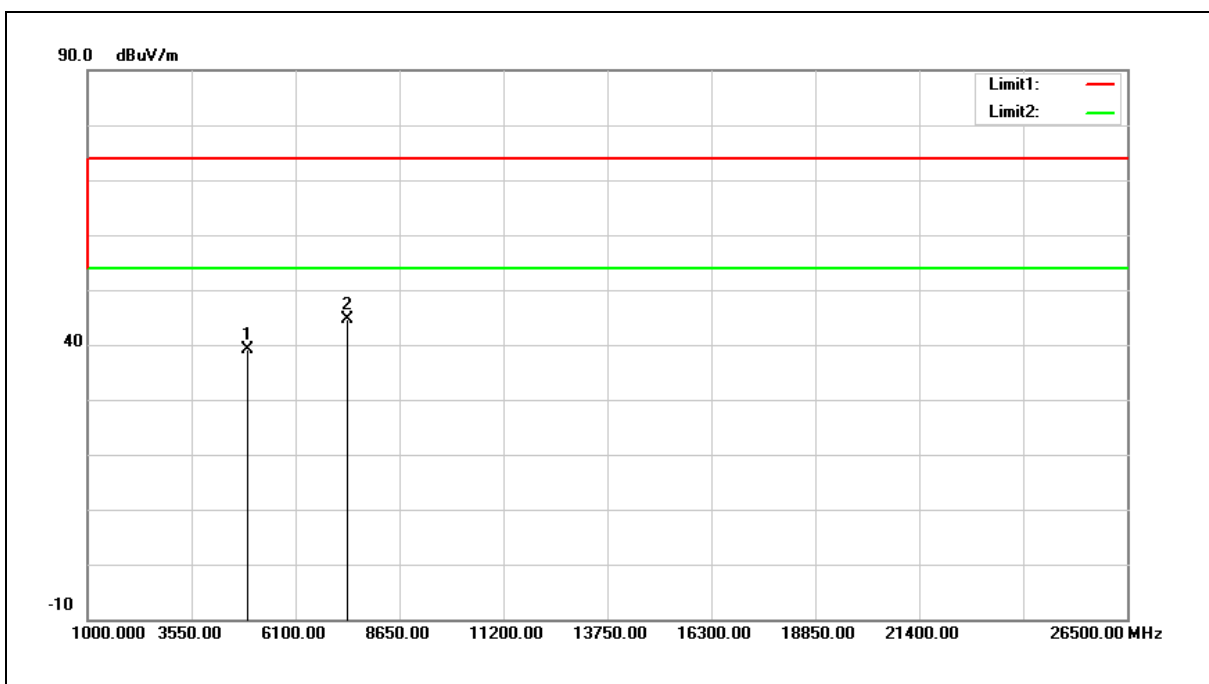
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	35.10	4.49	39.59	74.00	-34.41	peak
2	7386.000	33.58	10.85	44.43	74.00	-29.57	peak

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:	3m
Test item:	Harmonic		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



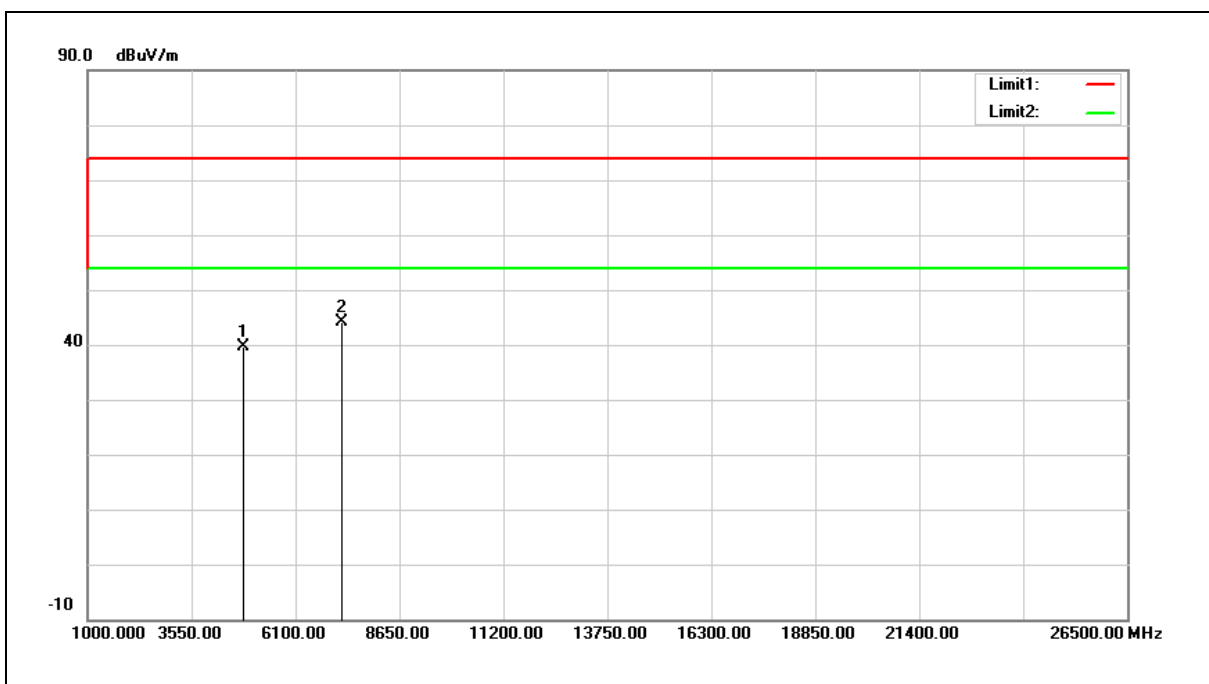
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	34.54	4.49	39.03	74.00	-34.97	peak
2	7386.000	33.86	10.85	44.71	74.00	-29.29	peak

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:	3m
Test item:	Harmonic		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



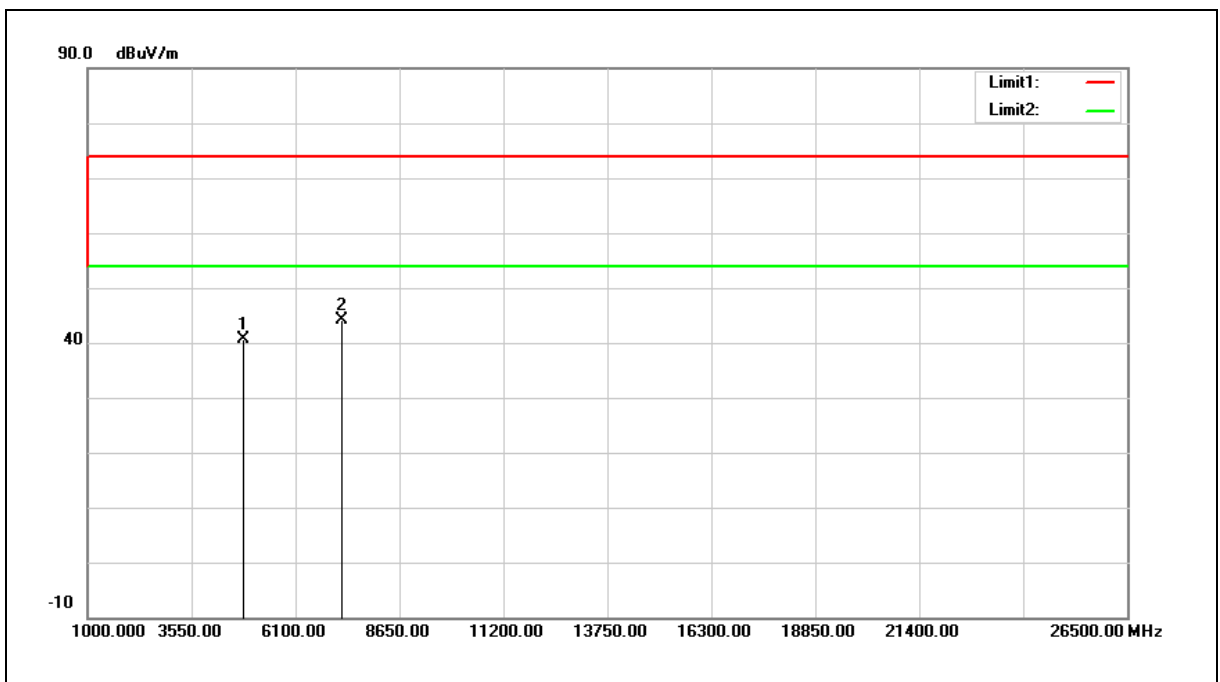
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	35.46	4.20	39.66	74.00	-34.34	peak
2	7236.000	33.63	10.38	44.01	74.00	-29.99	peak

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:	3m
Test item:	Harmonic		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		



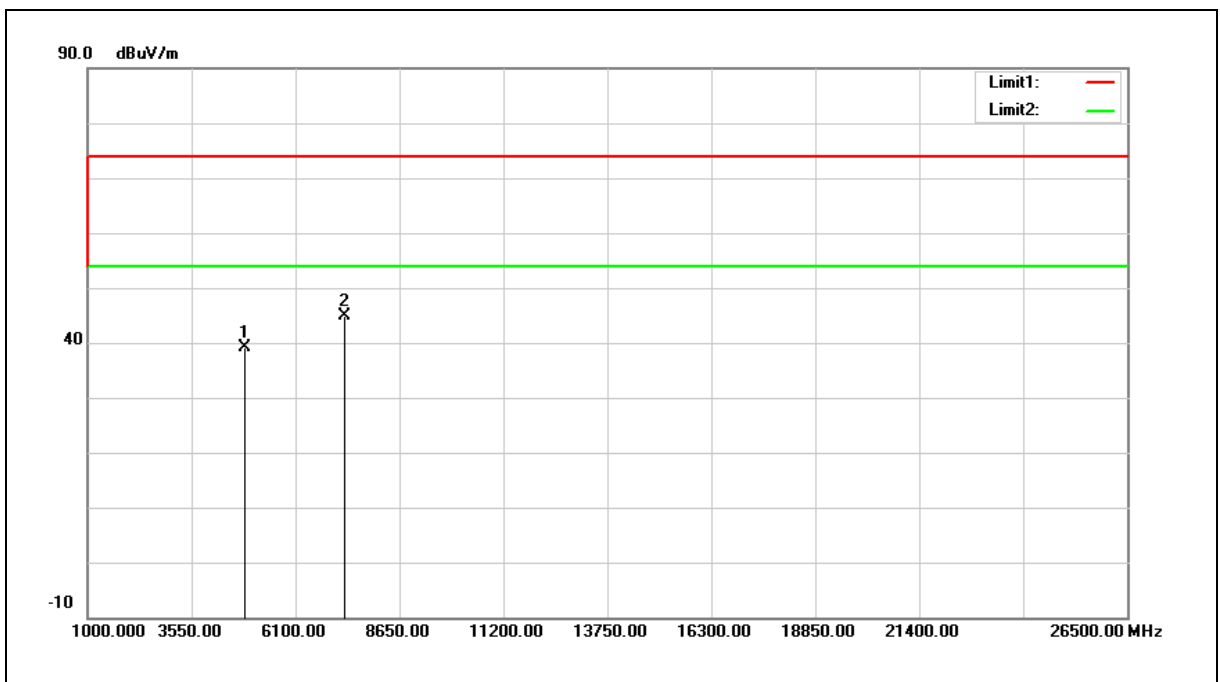
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4824.000	36.34	4.20	40.54	74.00	-33.46	peak
2	7236.000	33.85	10.38	44.23	74.00	-29.77	peak

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:	3m
Test item:	Harmonic		
Frequency:	2437MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



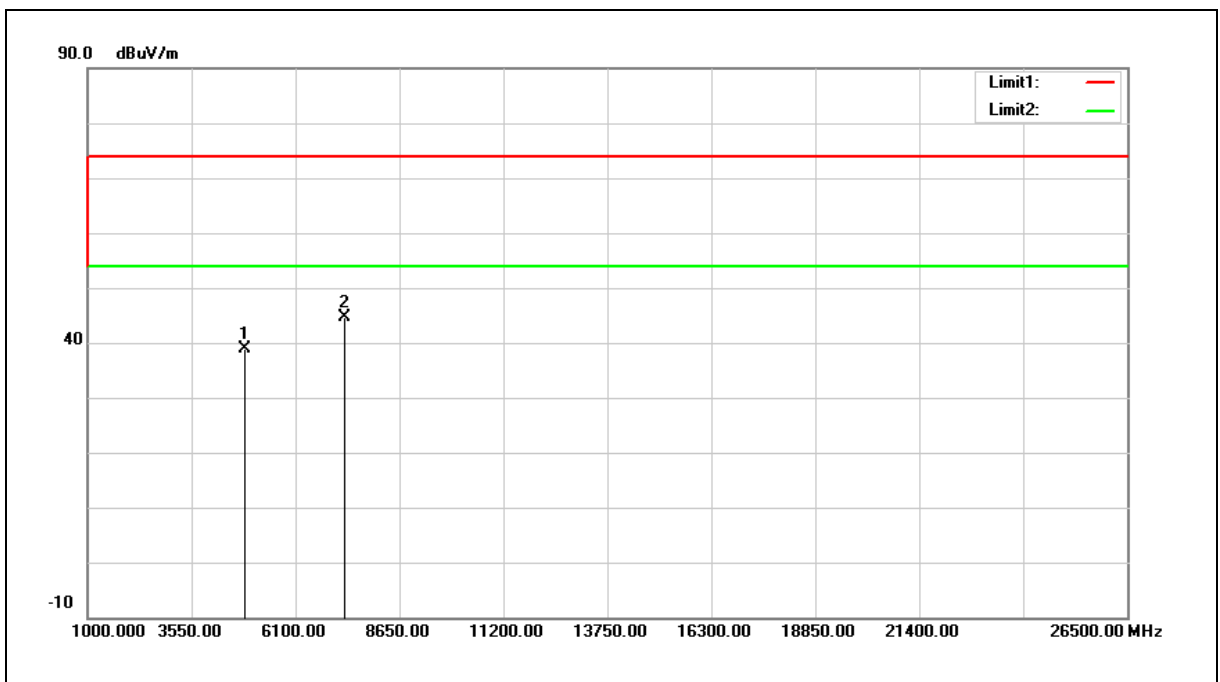
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	34.68	4.34	39.02	74.00	-34.98	peak
2	7311.000	34.36	10.61	44.97	74.00	-29.03	peak

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:	3m
Test item:	Harmonic		
Frequency:	2437MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		



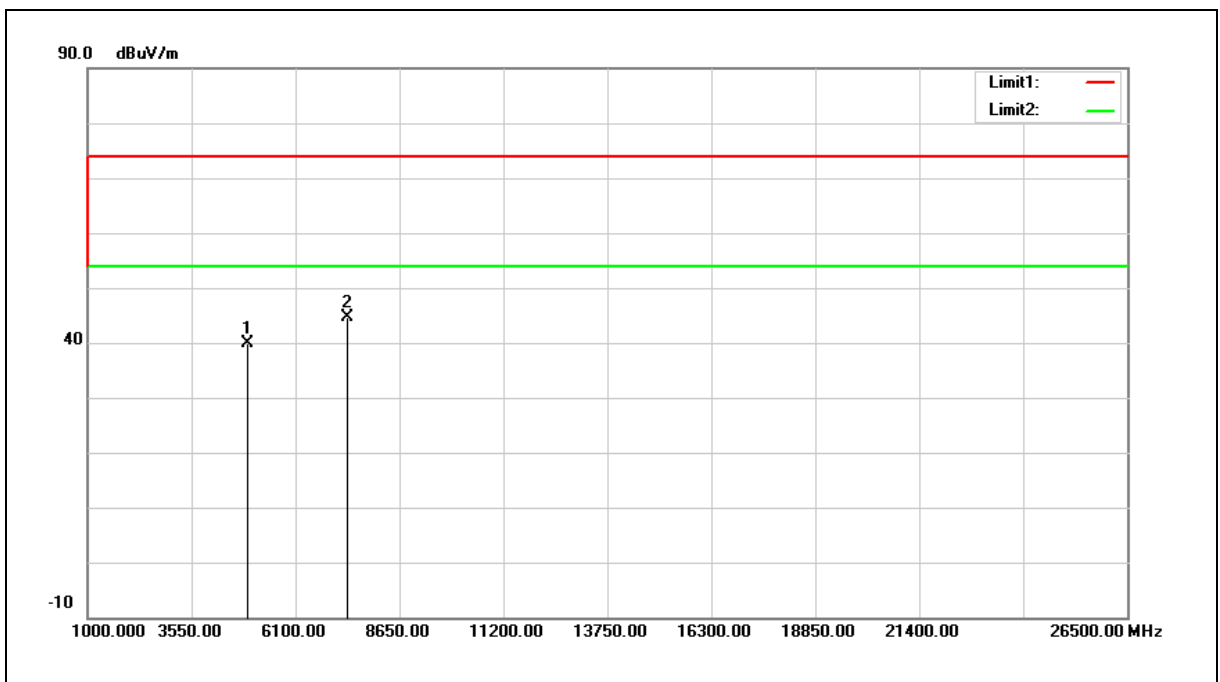
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4874.000	34.61	4.34	38.95	74.00	-35.05	peak
2	7311.000	33.97	10.61	44.58	74.00	-29.42	peak

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:	3m
Test item:	Harmonic		
Frequency:	2462MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



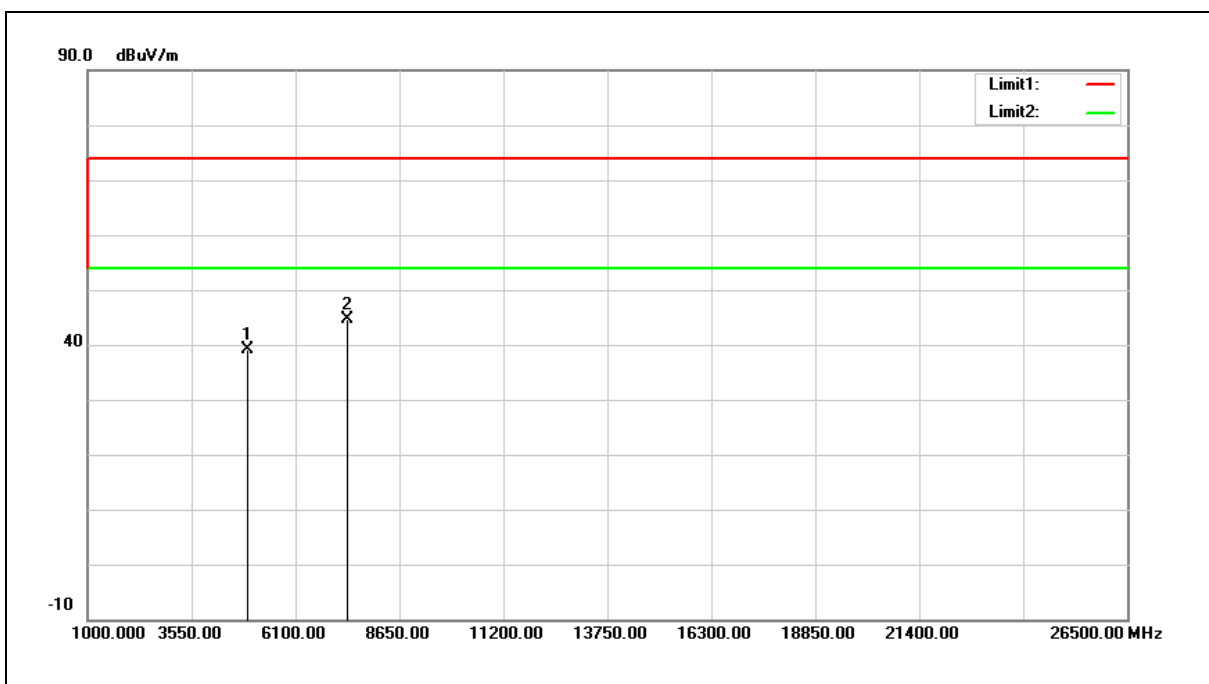
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	35.35	4.49	39.84	74.00	-34.16	peak
2	7386.000	33.88	10.85	44.73	74.00	-29.27	peak

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:	3m
Test item:	Harmonic		
Frequency:	2462MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		



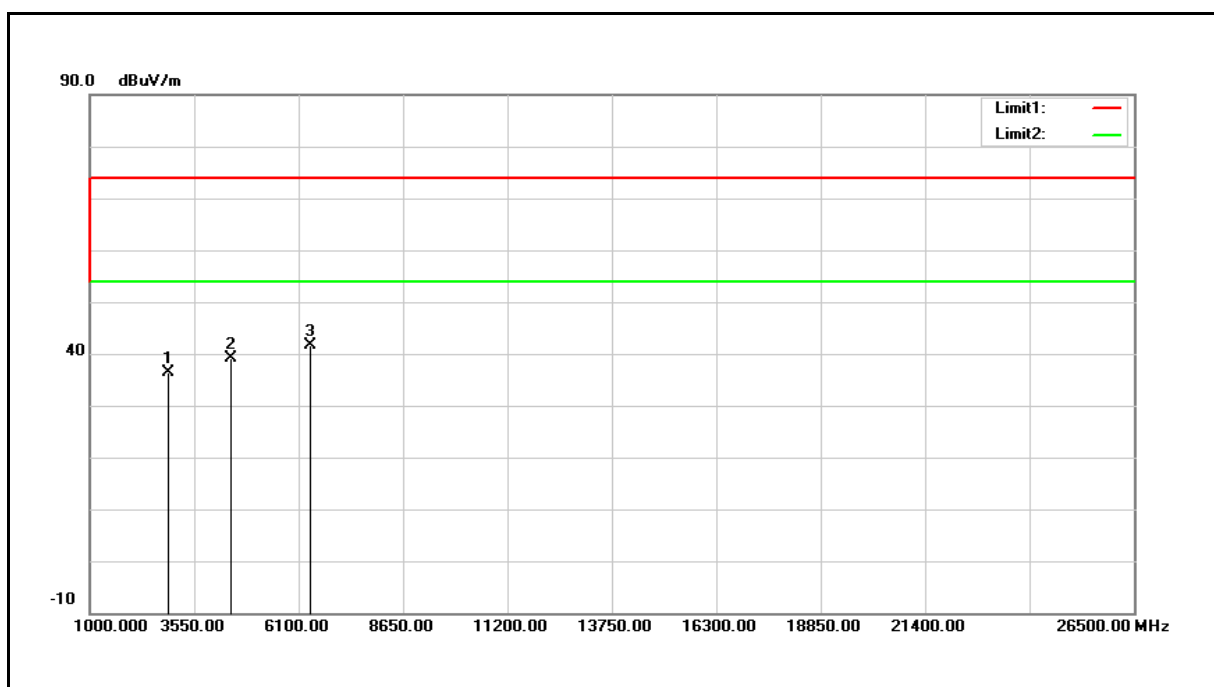
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4924.000	34.66	4.49	39.15	74.00	-34.85	peak
2	7386.000	33.75	10.85	44.60	74.00	-29.40	peak

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:	3m
Test item:	Harmonic		
Mode:	Simultaneous Transmitting		
	(Bluetooth + WLAN 2.4 GHz)		
Ant.Polar.:	Horizontal		



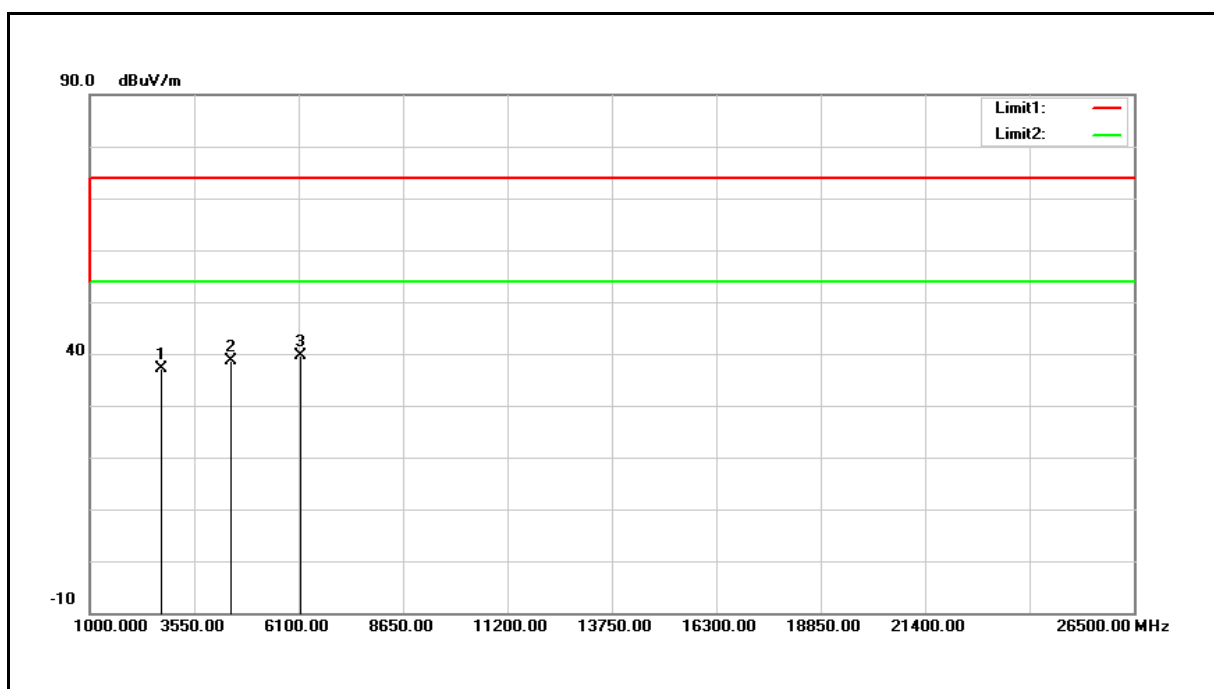
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2921.000	37.30	-0.96	36.34	74.00	-37.66	peak
2	4434.000	36.01	3.11	39.12	74.00	-34.88	peak
3	6389.000	33.58	8.07	41.65	74.00	-32.35	peak

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:	3m
Test item:	Harmonic		
Mode:	Simultaneous Transmitting		
	(Bluetooth + WLAN 2.4 GHz)		
Ant.Polar.:	Vertical		



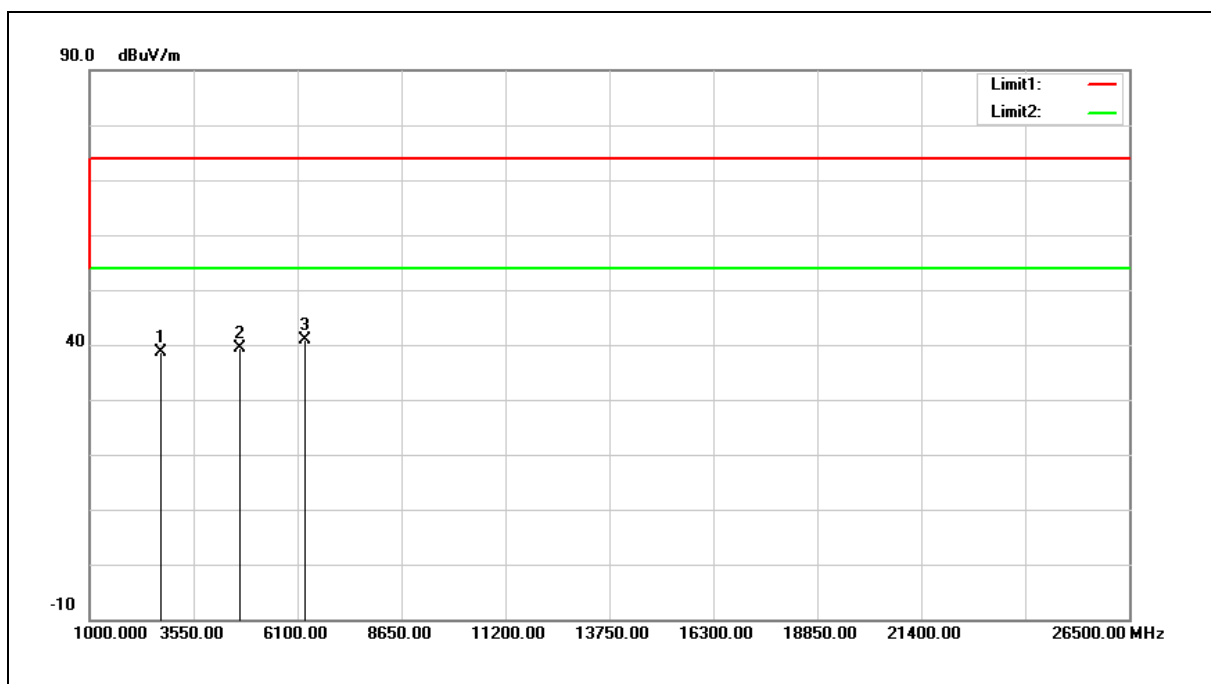
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2751.000	38.48	-1.45	37.03	74.00	-36.97	peak
2	4434.000	35.53	3.11	38.64	74.00	-35.36	peak
3	6151.000	32.28	7.38	39.66	74.00	-34.34	peak

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:	3m
Test item:	Harmonic		
Mode:	Mode 4		
Ant.Polar.:	Horizontal		
Description:			



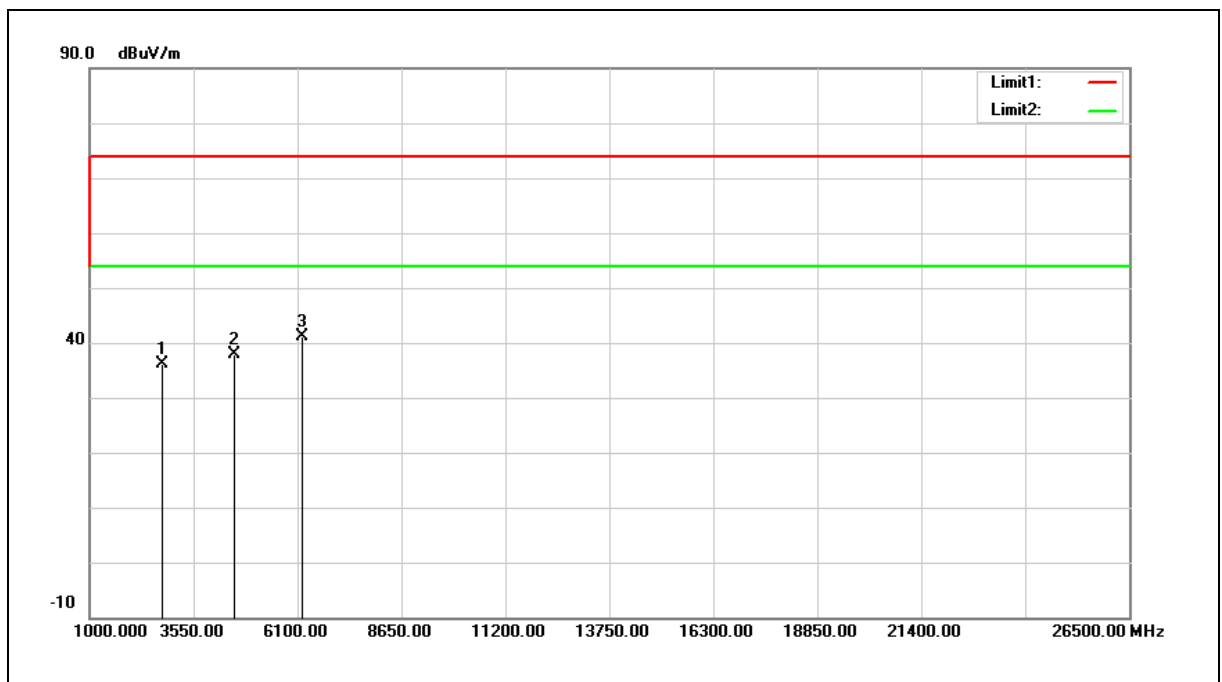
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2734.000	40.11	-1.49	38.62	74.00	-35.38	peak
2	4655.000	35.71	3.70	39.41	74.00	-34.59	peak
3	6287.000	33.04	7.79	40.83	74.00	-33.17	peak

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:	3m
Test item:	Harmonic		
Mode:	Mode 4		
Ant.Polar.:	Vertical		
Description:			



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2785.000	37.51	-1.35	36.16	74.00	-37.84	peak
2	4553.000	34.46	3.40	37.86	74.00	-36.14	peak
3	6219.000	33.63	7.58	41.21	74.00	-32.79	peak

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

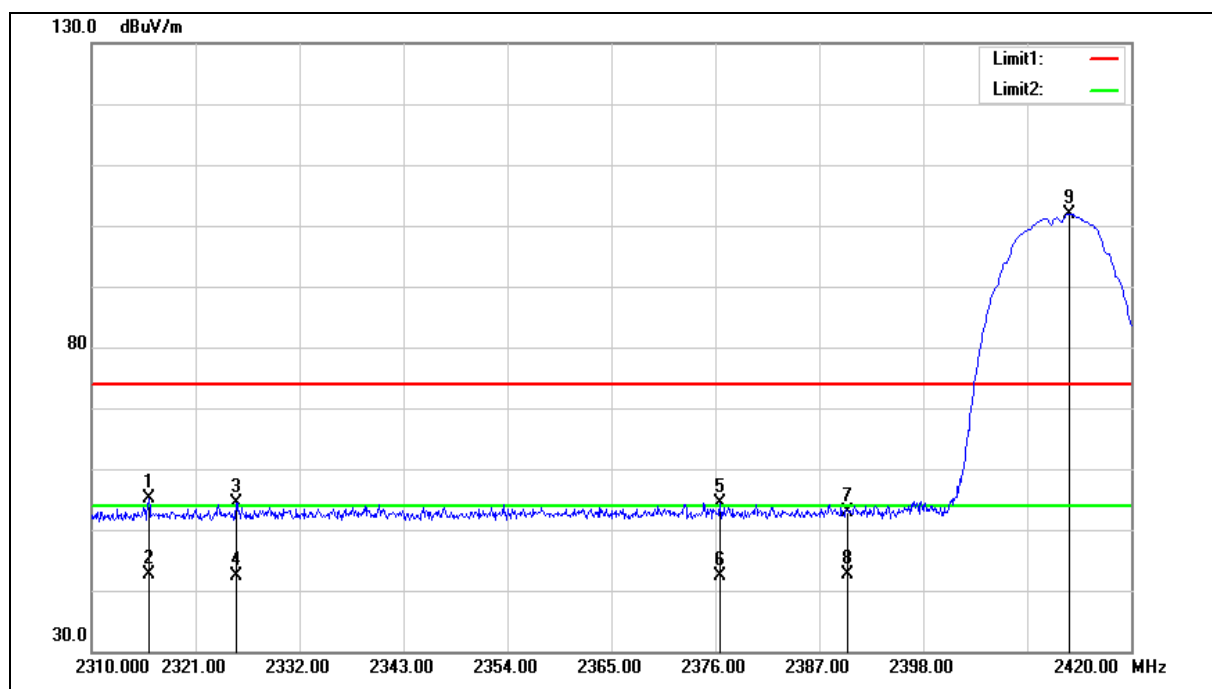
2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

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。

Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		

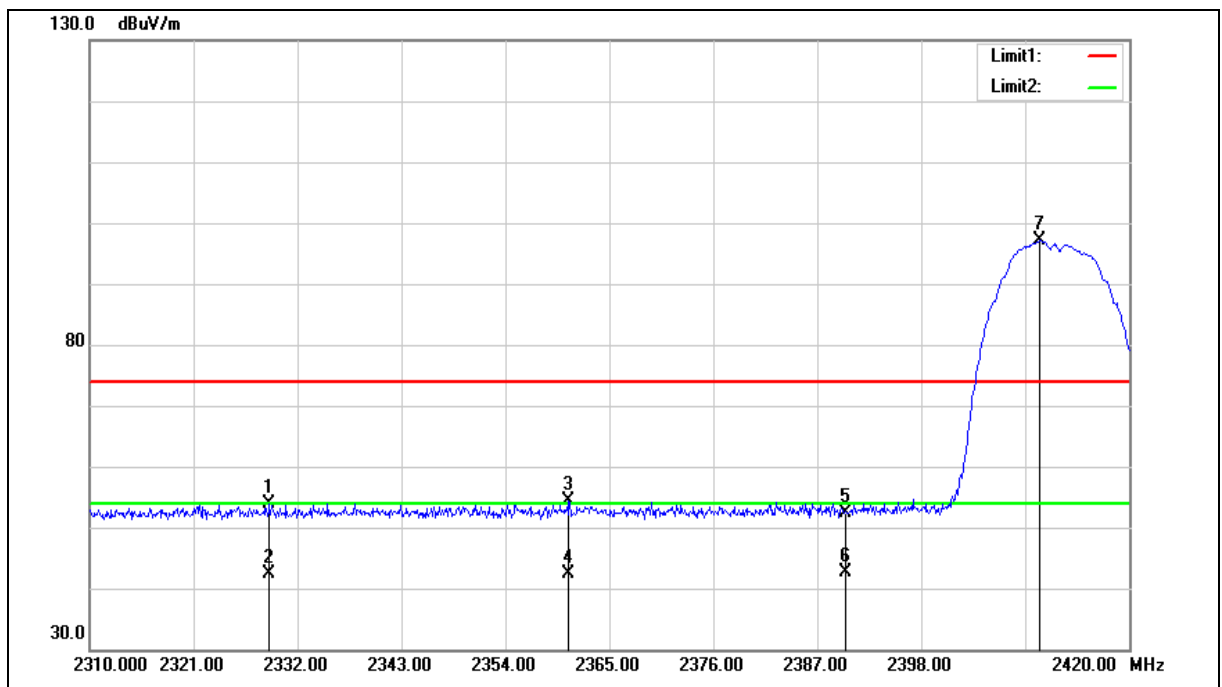
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2316.050	58.28	-3.12	55.16	74.00	-18.84	peak
2	2316.050	45.63	-3.12	42.51	54.00	-11.49	AVG
3	2325.290	57.45	-3.06	54.39	74.00	-19.61	peak
4	2325.290	45.45	-3.06	42.39	54.00	-11.61	AVG
5	2376.550	57.22	-2.80	54.42	74.00	-19.58	peak
6	2376.550	45.28	-2.80	42.48	54.00	-11.52	AVG
7	2390.000	55.69	-2.73	52.96	74.00	-21.04	peak
8	2390.000	45.44	-2.73	42.71	54.00	-11.29	AVG
9	2413.510	104.50	-2.61	101.89	--	--	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:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		

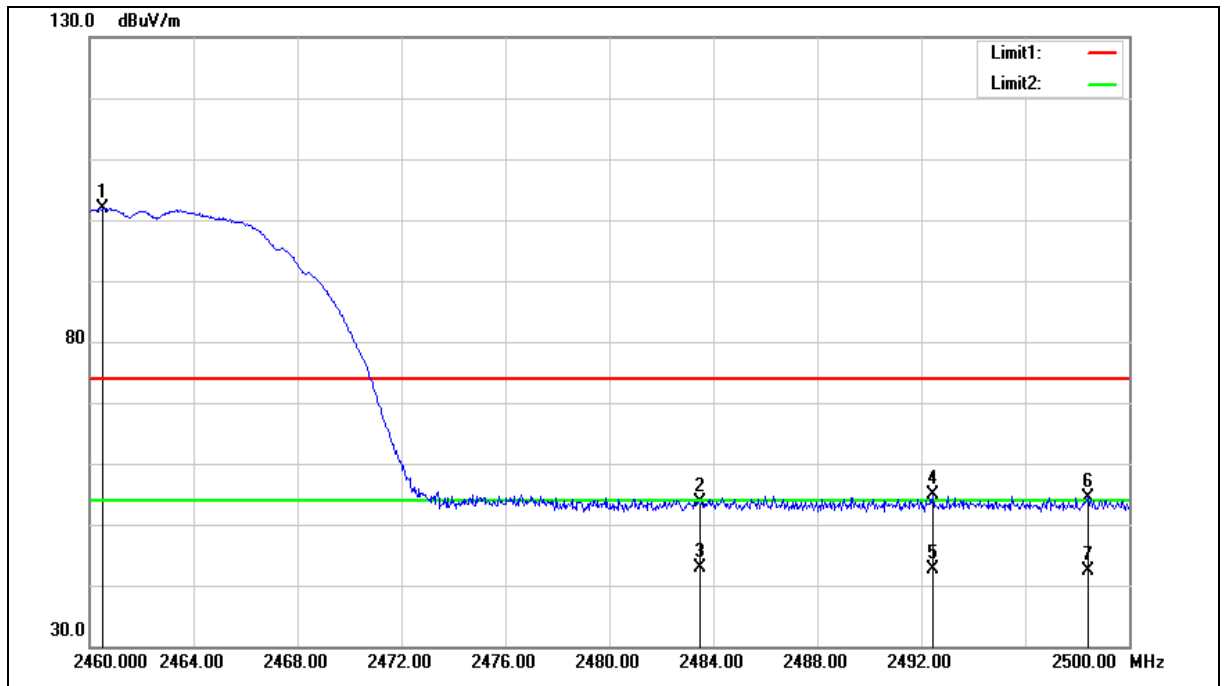
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2329.030	56.97	-3.04	53.93	74.00	-20.07	peak
2	2329.030	45.44	-3.04	42.40	54.00	-11.60	AVG
3	2360.710	57.14	-2.88	54.26	74.00	-19.74	peak
4	2360.710	45.23	-2.88	42.35	54.00	-11.65	AVG
5	2390.000	55.22	-2.73	52.49	74.00	-21.51	peak
6	2390.000	45.28	-2.73	42.55	54.00	-11.45	AVG
7	2410.540	99.64	-2.62	97.02	--	--	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:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Horizontal		

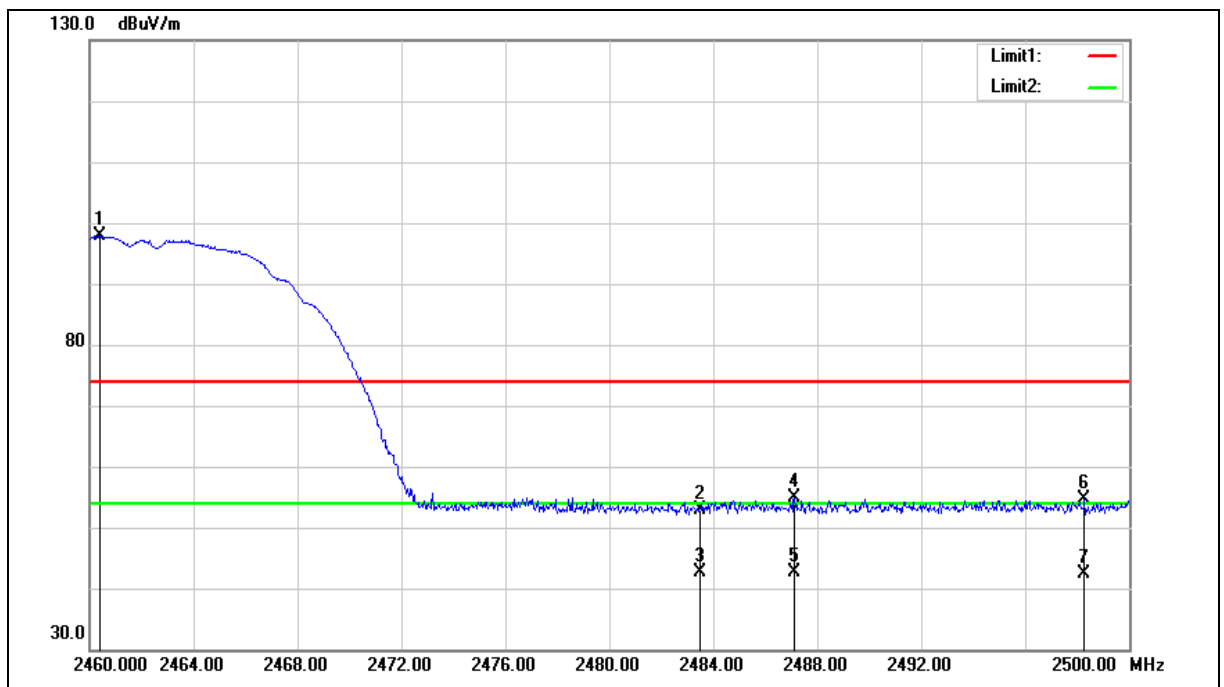
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.480	104.19	-2.38	101.81	--	--	peak
2	2483.500	55.83	-2.27	53.56	74.00	-20.44	peak
3	2483.500	45.06	-2.27	42.79	54.00	-11.21	AVG
4	2492.440	56.98	-2.22	54.76	74.00	-19.24	peak
5	2492.440	44.74	-2.22	42.52	54.00	-11.48	AVG
6	2498.400	56.69	-2.19	54.50	74.00	-19.50	peak
7	2498.400	44.57	-2.19	42.38	54.00	-11.62	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:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 2		
Ant.Polar.:	Vertical		

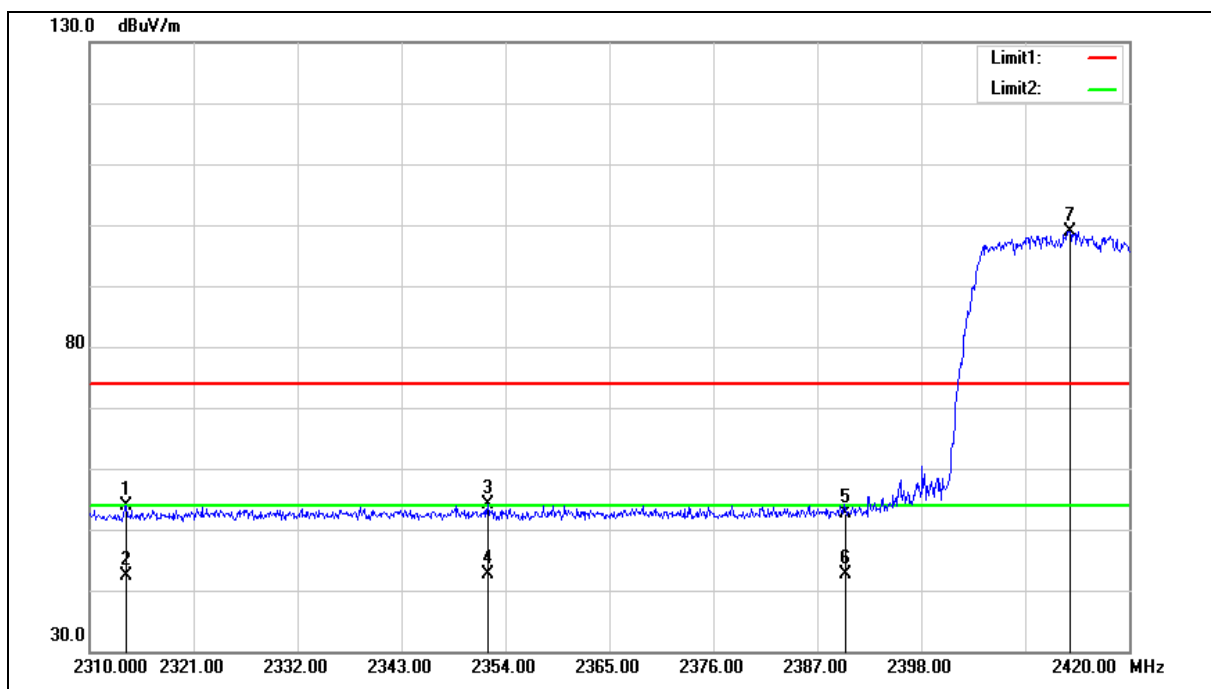
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.400	100.24	-2.38	97.86	--	--	peak
2	2483.500	55.17	-2.27	52.90	74.00	-21.10	peak
3	2483.500	45.00	-2.27	42.73	54.00	-11.27	AVG
4	2487.120	57.17	-2.24	54.93	74.00	-19.07	peak
5	2487.120	44.83	-2.24	42.59	54.00	-11.41	AVG
6	2498.280	56.81	-2.19	54.62	74.00	-19.38	peak
7	2498.280	44.63	-2.19	42.44	54.00	-11.56	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:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		

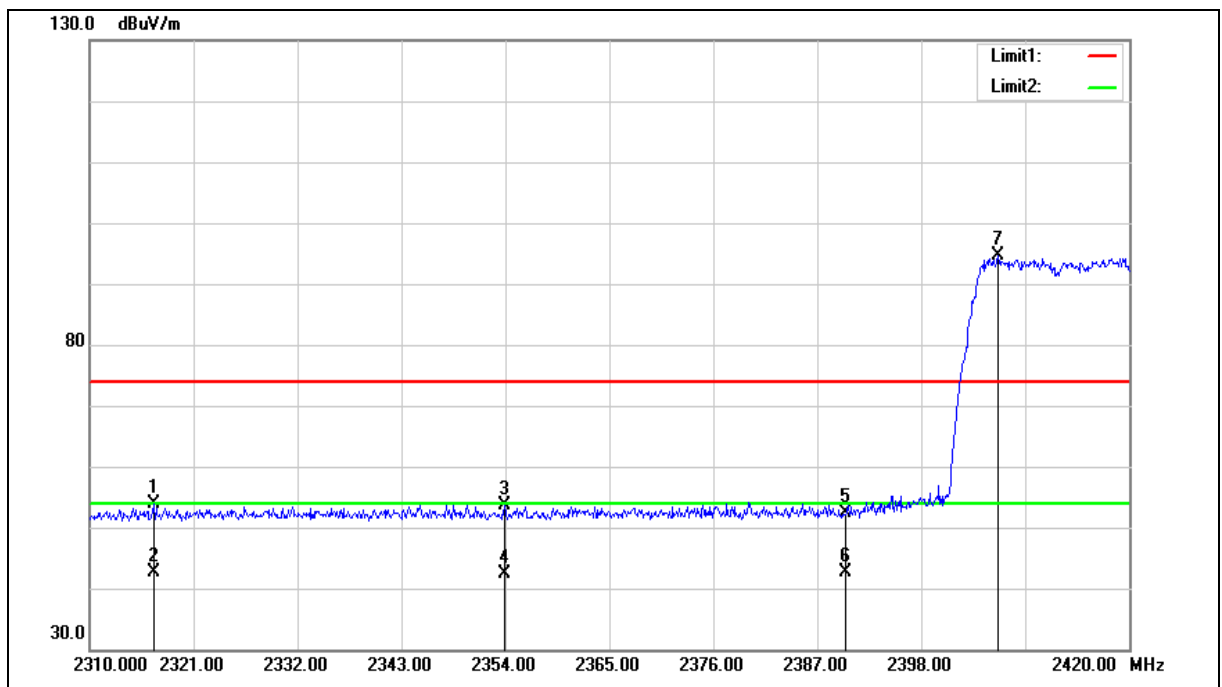
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2313.850	56.95	-3.12	53.83	74.00	-20.17	peak
2	2313.850	45.60	-3.12	42.48	54.00	-11.52	AVG
3	2352.130	57.11	-2.92	54.19	74.00	-19.81	peak
4	2352.130	45.47	-2.92	42.55	54.00	-11.45	AVG
5	2390.000	55.25	-2.73	52.52	74.00	-21.48	peak
6	2390.000	45.45	-2.73	42.72	54.00	-11.28	AVG
7	2413.730	101.58	-2.61	98.97	--	--	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:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2412MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		

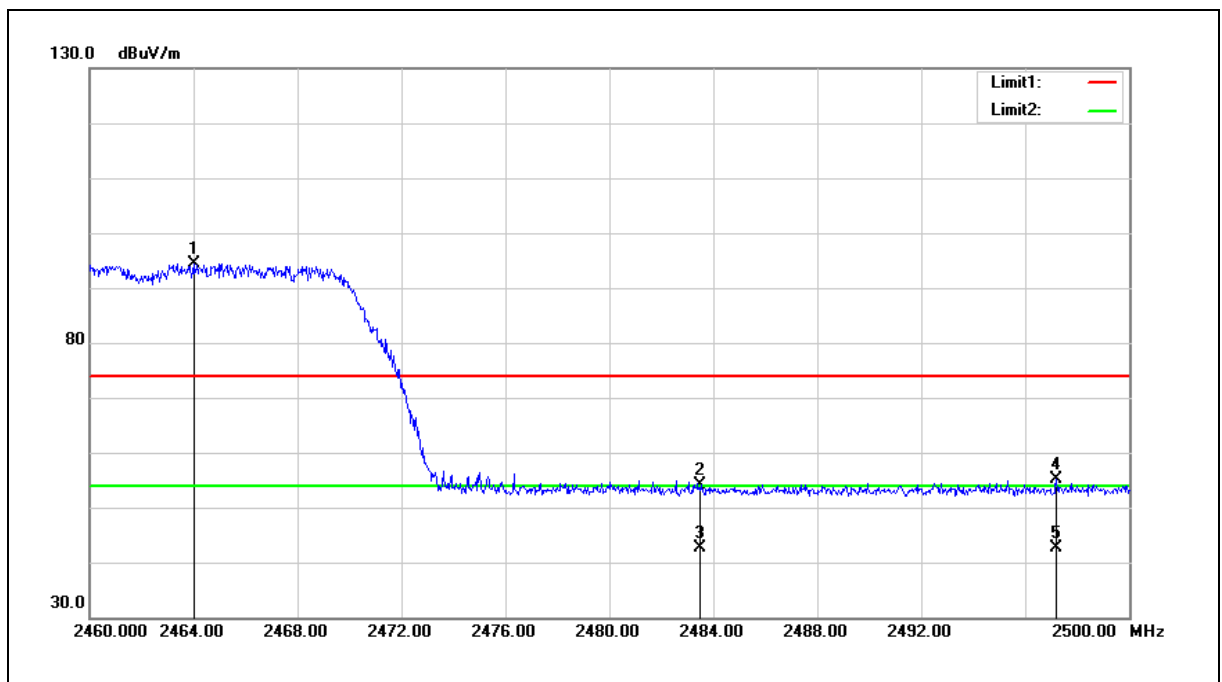
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2316.820	57.07	-3.11	53.96	74.00	-20.04	peak
2	2316.820	45.62	-3.11	42.51	54.00	-11.49	AVG
3	2353.890	56.66	-2.92	53.74	74.00	-20.26	peak
4	2353.890	45.41	-2.92	42.49	54.00	-11.51	AVG
5	2390.000	55.00	-2.73	52.27	74.00	-21.73	peak
6	2390.000	45.29	-2.73	42.56	54.00	-11.44	AVG
7	2406.140	97.19	-2.65	94.54	--	--	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:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 3		
Ant.Polar.:	Horizontal		



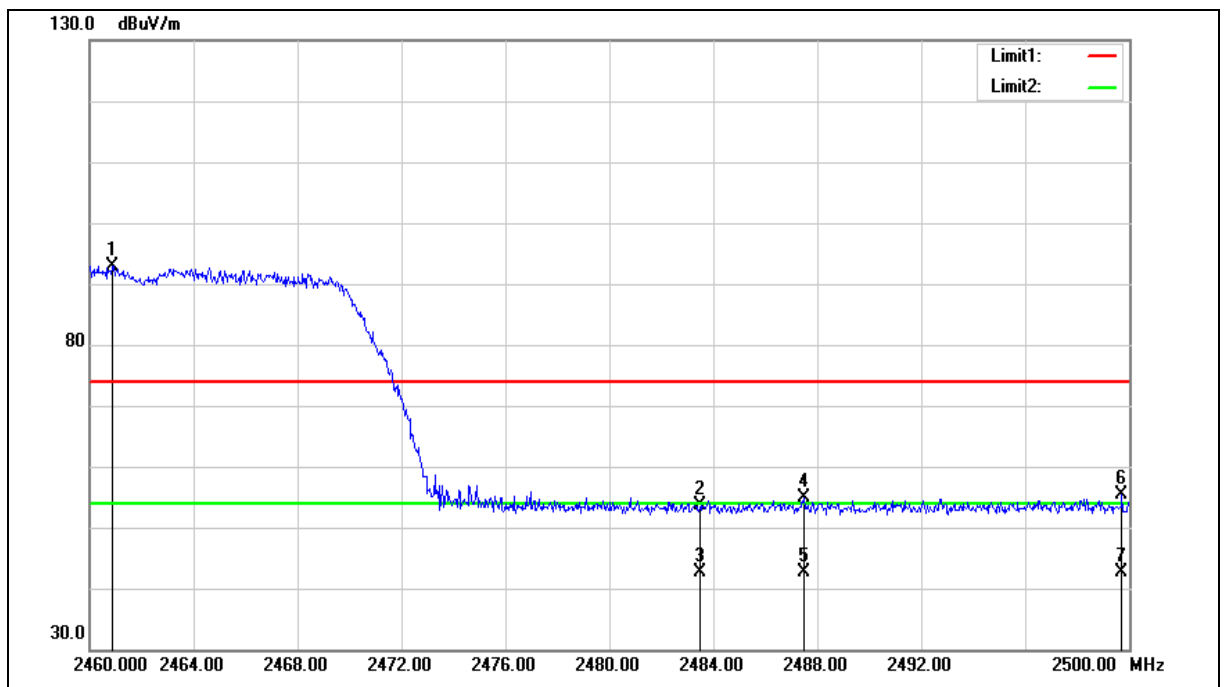
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2464.000	96.76	-2.36	94.40	--	--	peak
2	2483.500	56.37	-2.27	54.10	74.00	-19.90	peak
3	2483.500	45.02	-2.27	42.75	54.00	-11.25	AVG
4	2497.200	57.44	-2.19	55.25	74.00	-18.75	peak
5	2497.200	44.88	-2.19	42.69	54.00	-11.31	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:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		



Standard:	LP0002	Test Distance:	3m
Test item:	Band edge		
Frequency:	2462MHz		
Mode:	Mode 3		
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2460.880	95.23	-2.38	92.85	--	--	peak
2	2483.500	55.89	-2.27	53.62	74.00	-20.38	peak
3	2483.500	44.84	-2.27	42.57	54.00	-11.43	AVG
4	2487.480	57.22	-2.24	54.98	74.00	-19.02	peak
5	2487.480	44.86	-2.24	42.62	54.00	-11.38	AVG
6	2499.720	57.46	-2.18	55.28	74.00	-18.72	peak
7	2499.720	44.86	-2.18	42.68	54.00	-11.32	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.

4.2 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:

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)
WLAN 2.4 GHz	2412~2462	1	20	14.14	-3.00	0.5	1	12.971	0.0026
Bluetooth	2402~2480	1	20	2.13	-3.00	0.5	1	0.817	0.0002

$$\text{Simultaneous MPE} = 2.4 \text{ G MPE} + \text{Bluetooth MPE} = 0.0026 + 0.0002 = 0.0028$$

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