

NCC

低功率射頻器材型式試驗報告

產品名稱 : AMS Wireless Vibration Monitor
主型號 : A9530V1
系列型號 : A9530V3
廠牌 : AMS
申請者 : COMPUTATIONAL SYSTEMS INC.
申請者地址 : 835 Innovation Drive, Knoxville, TN, 37932, USA
測試標準 : LP0002 (109 年版)
參考法規 : ANSI C63.10-2013
測試結果 : 符合
接收日期 : 2021/4/7
測試日期 : 2021/8/11~2021/8/27

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修訂紀錄

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1. 一般資訊

申請者	COMPUTATIONAL SYSTEMS INC.
申請者地址	835 Innovation Drive, Knoxville, TN, 37932, USA
製造商	COMPUTATIONAL SYSTEMS INC.
製造商地址	835 Innovation Drive, Knoxville, TN, 37932, USA
實驗室	台灣曼瑞檢測科技有限公司
實驗室地址	33377 台灣桃園市龜山區復興二路 38 號
實驗室資訊	1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm. 2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada. 3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.
實驗室測試環境條件	溫度 (°C) : 20-35 / 濕度 (%RH) : 30-65

2. 產品描述

2.1 產品資訊

產品名稱	AMS Wireless Vibration Monitor
產品主型號	A9530V1
產品系列型號	A9530V3
廠牌	AMS
頻率範圍	2405~2475MHz
調變模式	DSSS
待測物電壓	DC 3.6V (By Battery)
最大輸出功率	3.07dBm

備註: 型號差異為市場需求不同, 該產品確符合同系列產品技術規格及射頻性能相同。

2.2 產品規格

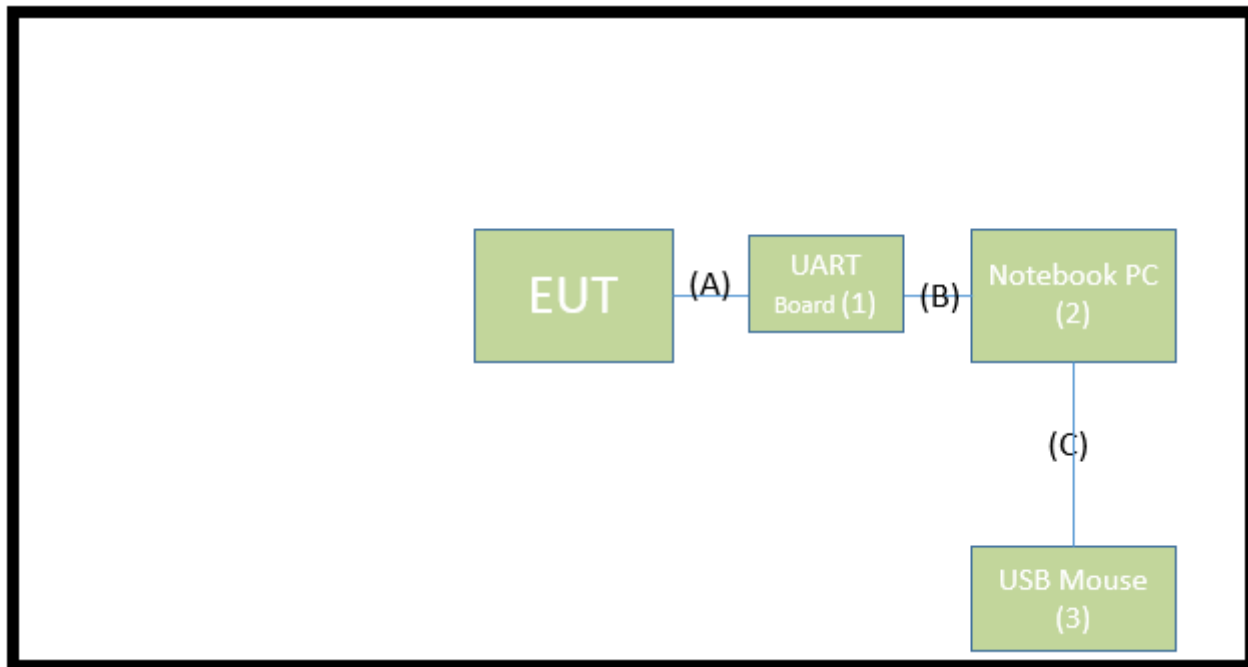
Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2405 MHz	1	2410 MHz	2	2415 MHz
3	2420 MHz	4	2425 MHz	5	2430 MHz
6	2435 MHz	7	2440 MHz	8	2445 MHz
9	2450 MHz	10	2455 MHz	11	2460 MHz
12	2465 MHz	13	2470 MHz	14	2475 MHz

2.3 測試模式

Test Mode	Mode 1: 發射器
	Mode 2: 接收機

2.4 測試配置

待測物測試配置圖



Signal Cable Type		Signal Cable Description
A	Signal Cable	Non-Shielded, 1.8m
B	USB Cable	Shielded, 0.2m
C	USB Mouse Cable	Shielded, 1.6m

2.5 測試周邊

待測裝置測試時，其搭配系統測試時之週邊裝置包括如下：

No.	周邊名稱	廠牌	型號	序號	電源線
1	UART Board	VIATOR	HM-MT-USB-010031	N/A	N/A
2	Notebook PC	Lenovo	Ideapad 300-15ISK	N/A	Non-shielded, 0.8m
3	USB Mouse	Lenovo	M110	N/A	N/A

2.6 操作程序

1.	Turn on the power of all equipment.
2.	Execute program
3.	Configure the test channel and the data rate.
4.	Start test.

3. 測試設備明細

電源傳導 – SR2

儀器名稱	廠牌	型號	財產編號	校正年限	校正有效日期
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2022/3/23
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2022/4/28
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2022/5/25

輻射干擾 – AC1

儀器名稱	廠牌	型號	財產編號	校正年限	校正有效日期
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2021/10/5
Broadband Horn antenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2022/4/21
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2022/4/21
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2022/3/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/3/24

傳導量測設備 –SR2

儀器名稱	廠牌	型號	財產編號	校正年限	校正有效日期
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/10/14
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/7/19
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2022/3/24

EMI 測試軟體

軟體名稱	廠牌	版本
e3	Audix	9.160520a
EMI	Quietek	V3

4. 量測不確定度

電源傳導量測-電源線 (Conducted Emission- Power Line)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.15MHz~30MHz: $\pm 2.53\text{dB}$
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~30MHz: $\pm 3.92\text{dB}$ 30MHz~1GHz: $\pm 4.25\text{dB}$ 1GHz~18GHz: $\pm 4.40\text{dB}$ 18GHz~40GHz: $\pm 4.45\text{dB}$
輻射干擾量測 (Radiated Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.92dB (Below 30M) Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.25dB (30M~1G) Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.40dB (1G~18G) Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 4.45dB (18G~40G)
頻率誤差量測 (Frequency Error)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 78.4\text{Hz}$
傳導功率量測 (Conducted Power)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.84\text{dB}$
傳導干擾量測 (Conducted Spurious Emission)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 2.65\text{ dB}$
佔用頻寬量測 (Occupied Bandwidth)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 3.3%
溫度 / 濕度 (Temp. / Humidity)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.82^\circ\text{C}/ \pm 3\%$
直流電源 (DC Voltage)
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 0.3\%$

5. 測試結果

產品名稱 **AMS Wireless Vibration Monitor**
 型號 **A9530V1**

法規章節	量測項目	限制值	測試結果	測試數據
3.3	電源傳導	低功率射頻器材技術規範 3.3 節	N/A	第 5.1 章節
4.10.1.2	峰值傳導輸出功率	$\leq 30.00\text{dBm}$	符合	第 5.2 章節
4.10.1.3	天線之要求	低功率射頻器材技術規範 4.10.1.3 節	符合	第 5.3 章節
4.10.1.5	帶外發射限制	$\leq 20\text{dBc(Peak)}$	符合	第 5.4 章節
3.6	輻射電場強度	低功率射頻器材技術規範 3.6 節	符合	第 5.5 章節
3.5	頻帶邊緣	$\leq 74\text{dBuV/m(Peak)}$ $\leq 54\text{dBuV/m(Average)}$	符合	第 5.6 章節
4.10.1.6(2)(A)	占用頻寬	$\geq 500\text{KHz}$	符合	第 5.7 章節
4.10.1.6(2)(B)	功率頻譜密度	$\leq 8\text{dBm}$	符合	第 5.8 章節

備註：符合性的判定是基於測試結果符合規範的限制值或客戶的宣告要求，測試結果的判定是不考慮測量不確定度的值。

5.1 電源傳導測試

5.1.1 量測方法

待測物放置於1m*2m*0.8m之非導體桌面並離垂直牆面40cm（落地型產品置於地上），將待測物之電源線接至電源阻抗網路器(LISN)，同時保持待測物至LISN距80公分，並將電源線多餘部份以30至40公分之八字形捆綁於電源線中央並離地40cm，於在正常工作狀態下，執行待測物之火線(Line)及地線(neutral)各一次量測。

電源端點場強之測量範圍由 0.15MHz –30MHz，所量測之讀值皆為準尖峰值(Quasi-Peak Value)及平均值(Average Value)。場強接收機之解析頻寬為9kHz。

備註：經初測驗證過，電源端點干擾測試對測試頻道數並無差異，因此檢附其中一個測試頻道之測試數。

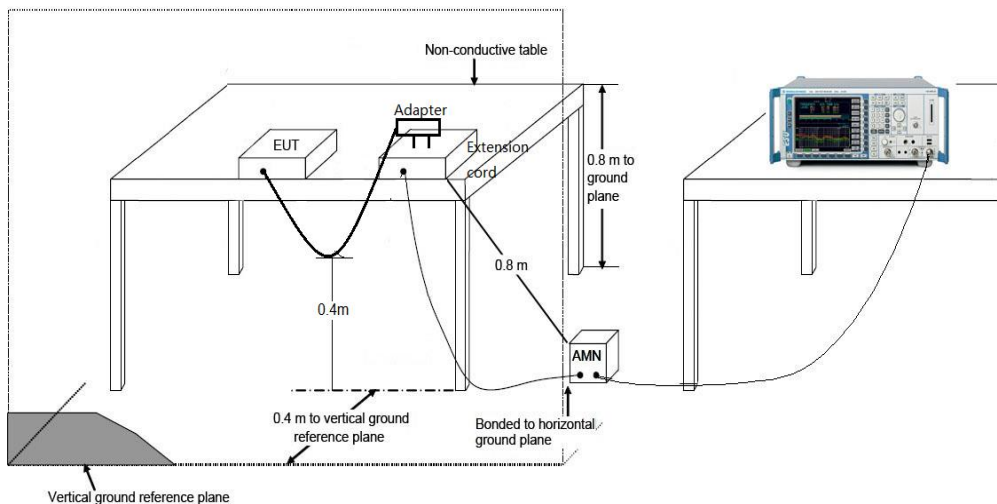
5.1.2 限制要求

以市電為電源之低功率射頻器材，其傳導回電源線上頻率自150kHz至30MHz之射頻電壓(在電源端子每一電源線對接地點)應小於或等於下表所列之限值。測量時應經過50微亨利(μ H)及50歐姆(Ω)之電源線阻抗模擬網路(LISN)。頻率重疊處，以較低限值為準。

Frequency 頻率範圍 MHz	傳導限制值(dBuV)	
	準尖峰值	平均值
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

註：隨頻率之對數遞減

5.1.3 測試架構圖



5.1.4 電源傳導測試結果

備註：此待測物為電池供電，因此不需測試電源傳導。

5.2 峰值傳導輸出功率

5.2.1 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，設定頻譜分析儀之解析度頻寬大於6dB發射頻寬或使用峰值功率表。除使用上述測量方式外，並得使用以最大傳導輸出功率作為測量方式。

5.2.2 限制要求

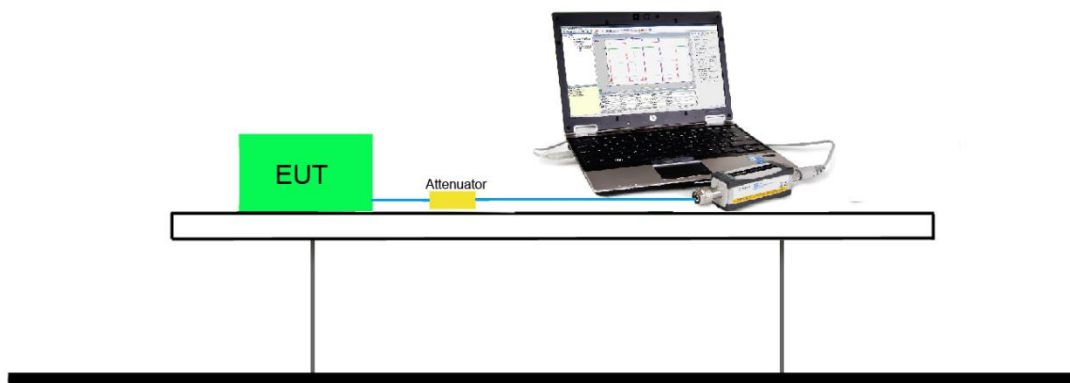
操作於2400-2483.5 MHz之跳頻或數位調變的發射器材與5725-5850 MHz之跳頻發射器材：1W(含)以下，當跳頻系統符合國家通訊傳播委員會低功率射頻器材技術規範之第4.10.1.6(1)(A)(a)節，其限制值為0.125 W(含)以下。

若用於非固定式點對點操作時，若其發射天線之方向性增益超過6dBi，應依所超過之dB數等量降低峰值輸出功率。如用於固定式點對點(註)操作時，應符合下列情形之一：

(1)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。

(2) 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。

5.2.3 測試架構圖



5.2.4 峰值傳導輸出功率測試結果

待測物名稱	AMS Wireless Vibration Monitor	測試日期	2021/8/26
待測物型號	A9530V1	溫度 / 濕度	23°C / 55%
測試場地 / 測試工程師	SR2 / Eric		

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
2.4GHz	CH0	2405	0.12	< 30
	CH7	2440	2.16	< 30
	CH14	2475	3.07	< 30

備 註： 此量測值已含線材損耗(Cable Loss=1dB)。

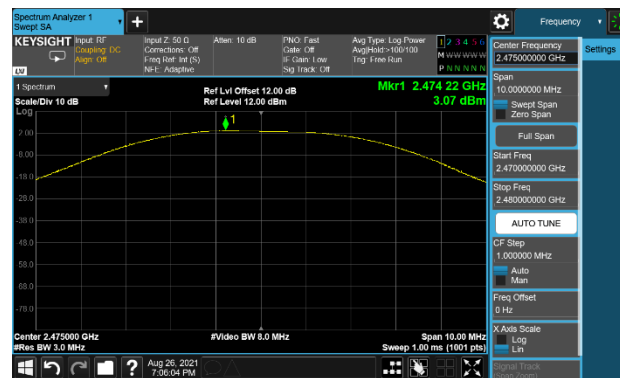
CH0 (2405MHz)



CH7 (2440MHz)



CH14 (2475MHz)



5.3 天線之要求

5.3.1 限制要求

依據國家通訊傳播委員會低功率射頻器材技術規範之第4.10.1.4節規定，天線之規格可不受下述規定之限制。

低功率射頻器材之發射機或收發信機所使用之天線，應為全固定、半固定式或以獨特之耦合(unique coupling)方式連接機體。製造者可設計供使用者因損壞而替換之天線，但不得設計或使用原認證以外之天線或可供引接各類電纜之標準天線插座或電氣連接頭，如：BNC、F type、N type、M type、UG type、RCA、SMA、SMB...等及其他各類工業或通訊標準接頭。

5.3.2 天線樣式

此其天線為 PIFA Antenna Type，(檢附天線規格書)

Antenna List

No.	Brand	Part No.	Peak Gain
1	Proant AB	PRO-OB-440	3.7dBi

5.4 帶外發射限制

5.4.1 量測方法

待測物之天線埠經由適當之衰減直接連至頻譜分析儀 RF 輸入端：

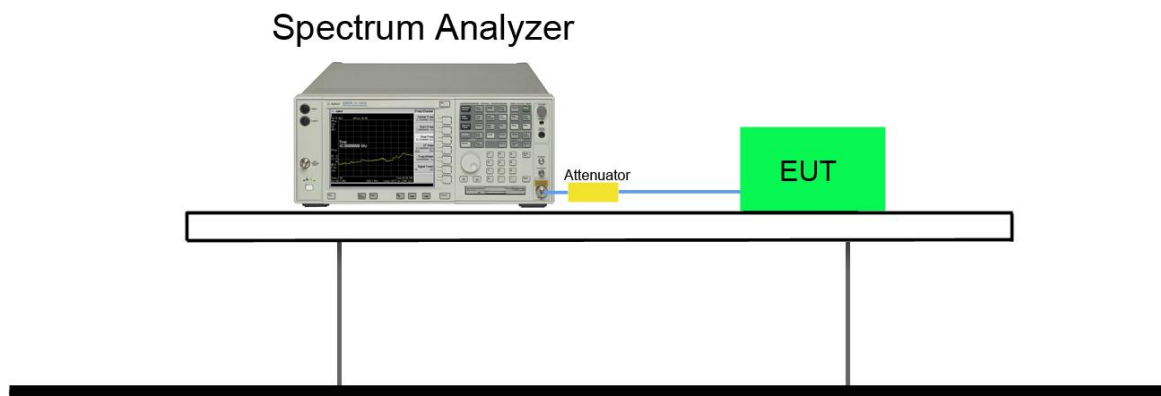
- (1) 頻率掃描範圍足以檢測頻帶內的發射波峰位準以及由受測物產生之最低頻率到第 10 次諧波的所有混附發射，通常需要分幾段以涵蓋全部頻率範圍。
- (2) 解析頻寬為 100 kHz，視訊頻寬不小於解析頻寬。
- (3) 掃描時間為自動，檢波功能為峰值，訊號軌跡為最大保留(Max Hold)。
- (4) 將標記設定於任何欲紀錄之波峰上，所顯示之位準值必須符合指定之限制值。

5.4.2 限制要求

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，衰減值限制如下：

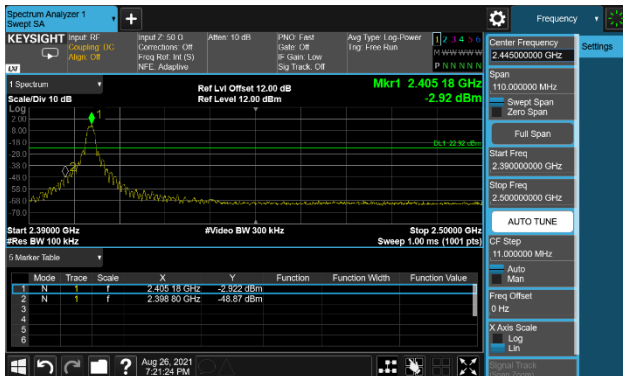
- (1) 輸出功率以低功率射頻器材技術規範附件二之峰值輸出功率方式量測者，至少須衰減 20 dB，可使用射頻傳導或輻射方式測量。
- (2) 輸出功率以數位調變技術系統之最大傳導輸出功率量測方式者，至少須衰減 30 dB。
- (3) 若落於禁用頻段之輻射發射，應符合低功率射頻器材技術規範第 3.6 節之規定。

5.4.3 測試架構圖

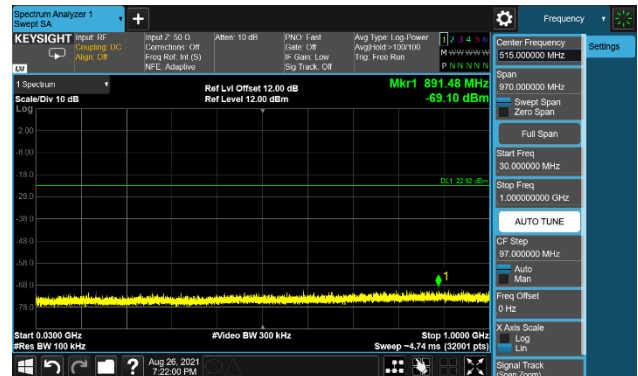


5.4.4 帶外輻射測試結果

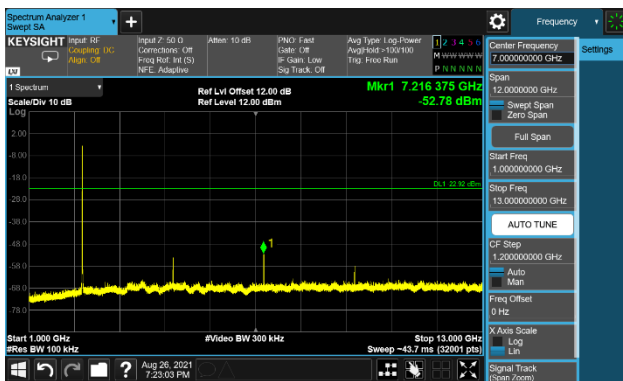
CH0 (2405MHz)



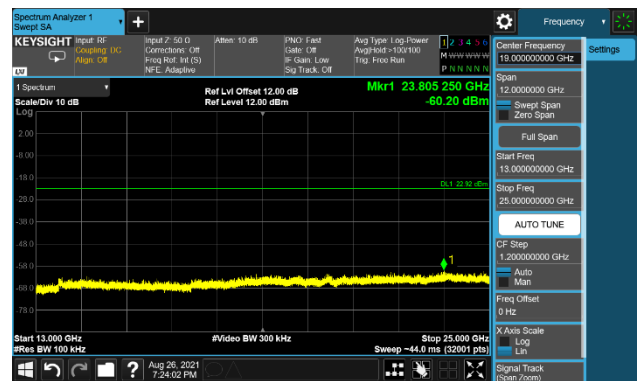
CH0 (2405MHz)



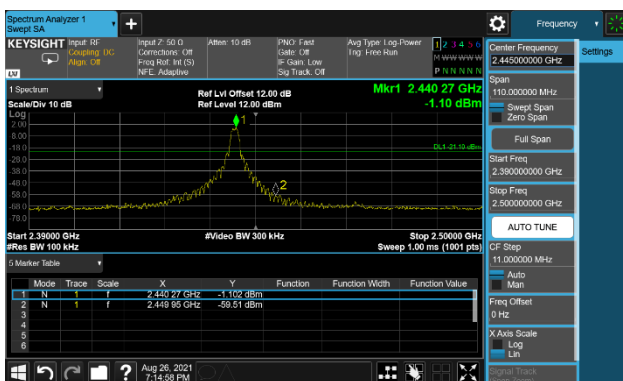
CH0 (2405MHz)



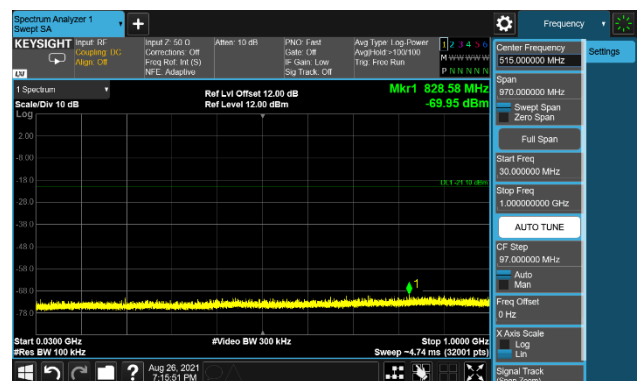
CH0 (2405MHz)



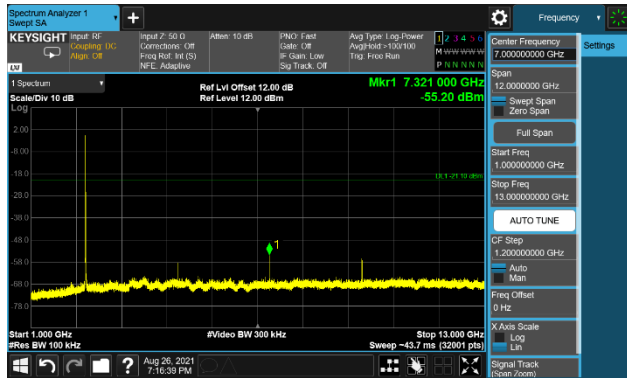
CH7 (2440MHz)



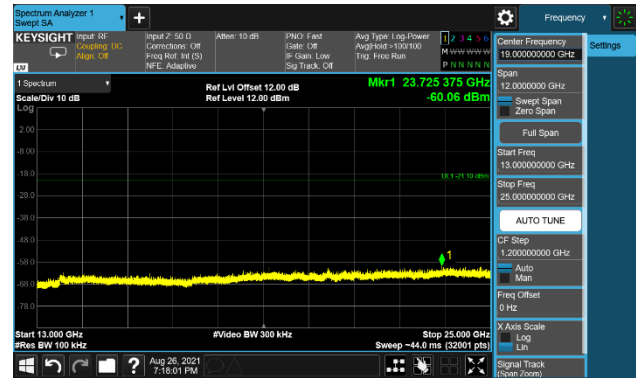
CH7 (2440MHz)



CH7 (2440MHz)



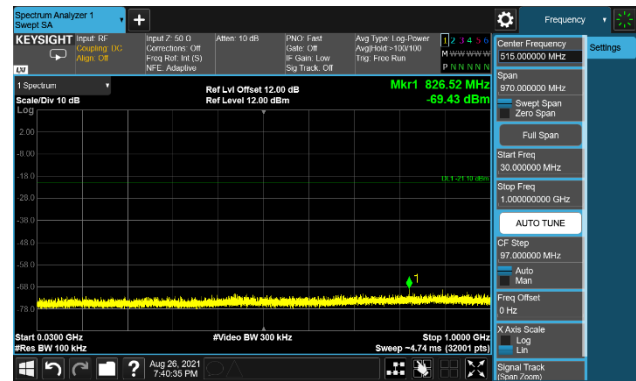
CH7 (2440MHz)



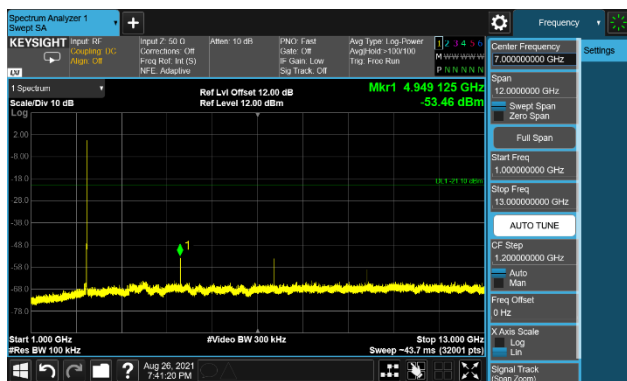
CH14 (2475MHz)



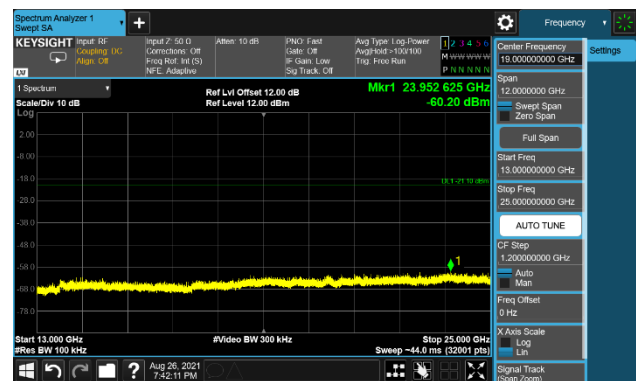
CH14 (2475MHz)



CH14 (2475MHz)



CH14 (2475MHz)



5.5 輻射電場強度

5.5.1 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可 360 度旋轉，接收天線置於距待測物 3m 距離，高度可在 1 至 4 公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水平及垂直極化方向各量測一次。（待測物擺設方式根據 ANSI C63.10-2013 版本，待測物放置桌中心，1G 以下擺設高度為 80cm/1G 以上擺設高度為 150cm）

- (1) 任一頻率小於或等於 1000 MHz 之訊號,使用 CISPR 準峰值檢波器
- (2) 任一頻率大於 1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含 1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加 20 dB。

備註：若為手持式或穿戴式之裝置，需對其三個正交軸的方位評估測試，並記錄最差的數值。

5.5.2 限制要求

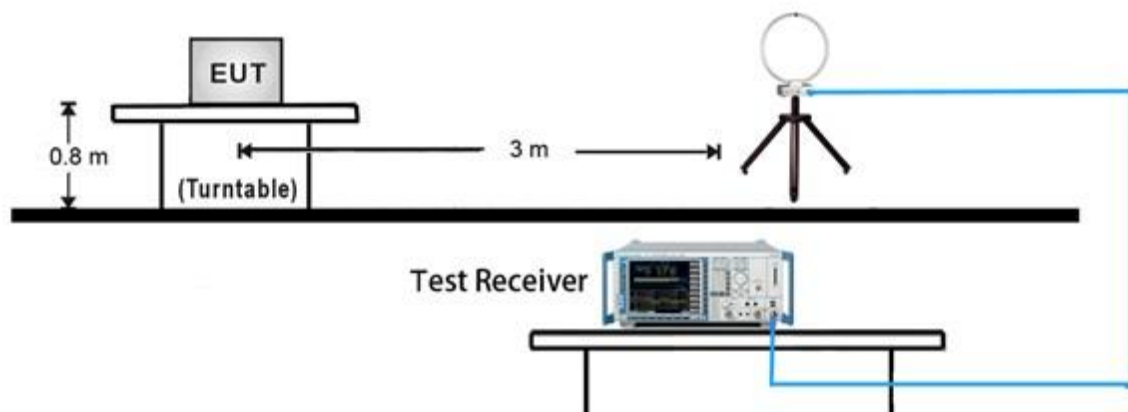
其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

頻率(f) (MHz)	電場強度 (微伏特/公尺, $\mu\text{V/m}$)	測距 (公尺)
$0.009 \leq f \leq 0.490$	$2400/f(\text{kHz})$	300
$0.490 < f \leq 1.705$	$24000/f(\text{kHz})$	30
$1.705 < f < 30$	30	30
$30 \leq f \leq 88$	100	3
$88 < f \leq 216$	150	3
$216 < f \leq 960$	200	3
$960 < f$	500	3

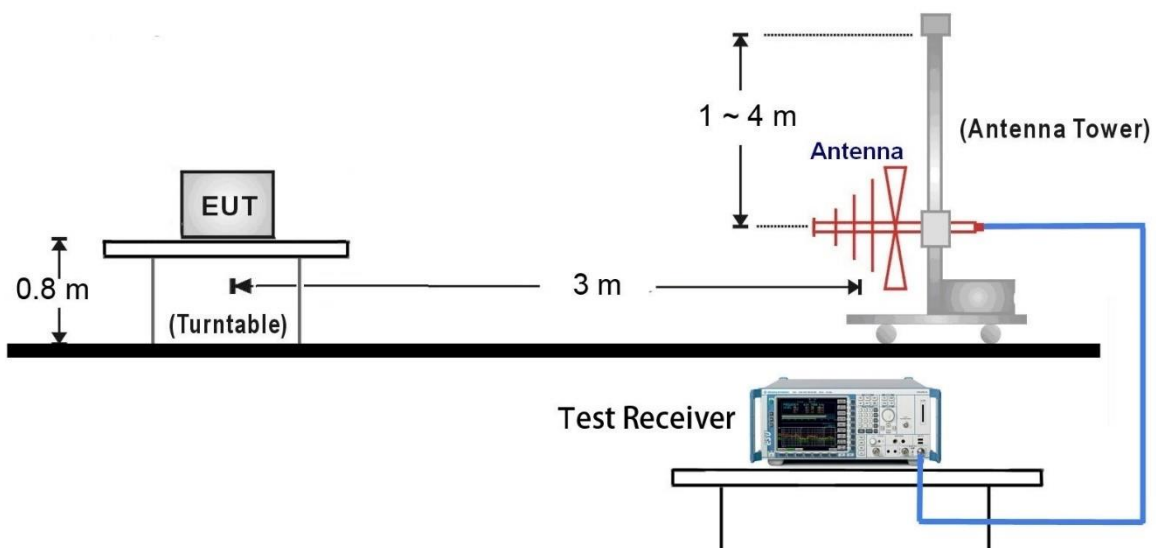
上表規定之電場強度，發射頻率在 9 kHz~90 kHz、110 kHz~490 kHz 及 1000MHz 以上者，其量測應以平均值檢波器為基準，且須符合低功率射頻器材技術規範第 6.14.節之規定；其他發射頻率，應以 CISPR 準峰值(quasi-peak) 檢波器測量；非以上表所指定之距離測量時，應符合第 6.5 節之規定，而輻射發射之量測頻率範圍須符合低功率射頻器材技術規範第 6.12 節之規定。

5.5.3 測試架構圖

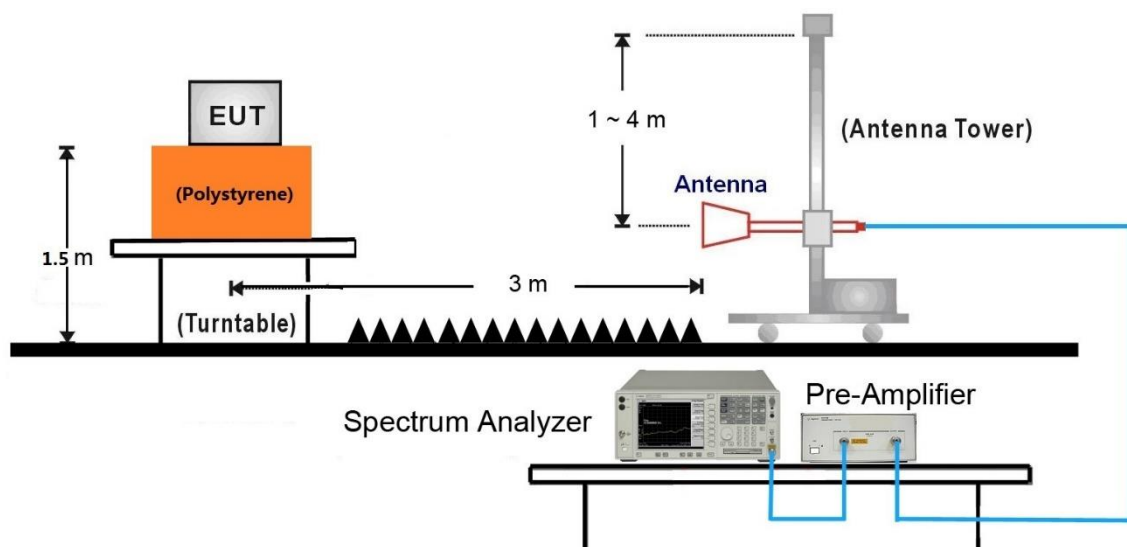
Under 30MHz Test Setup



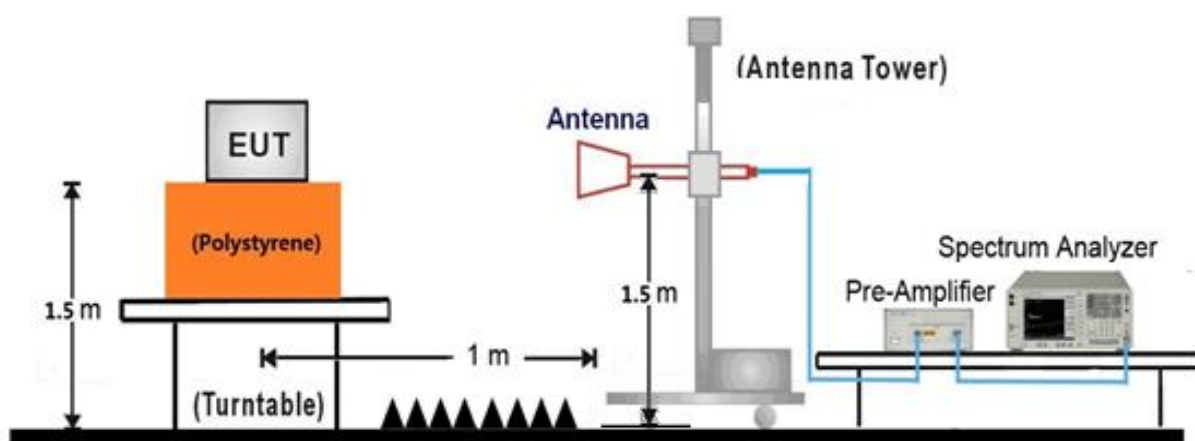
Under 1GHz Test Setup



1GHz ~ 18GHz Test Setup:

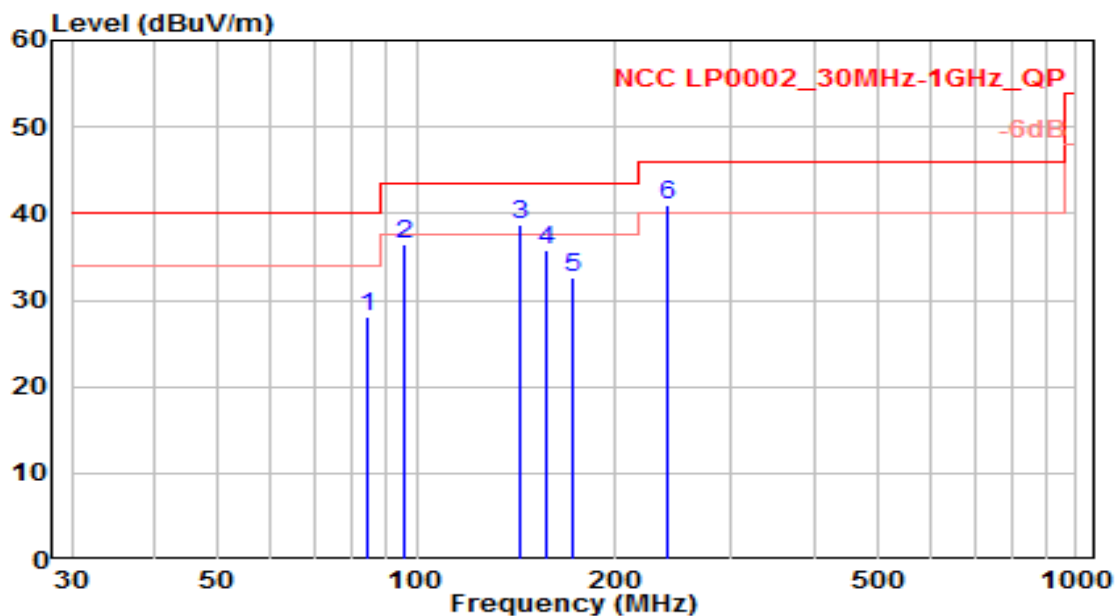


18GHz ~25GHz Test Setup:



5.5.4 輻射電場強度測試結果

EUT	A9530V1	Date of Test	2021-08-26
Factor	VULB 9162	Temp. / Humidity	23°C /56%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery

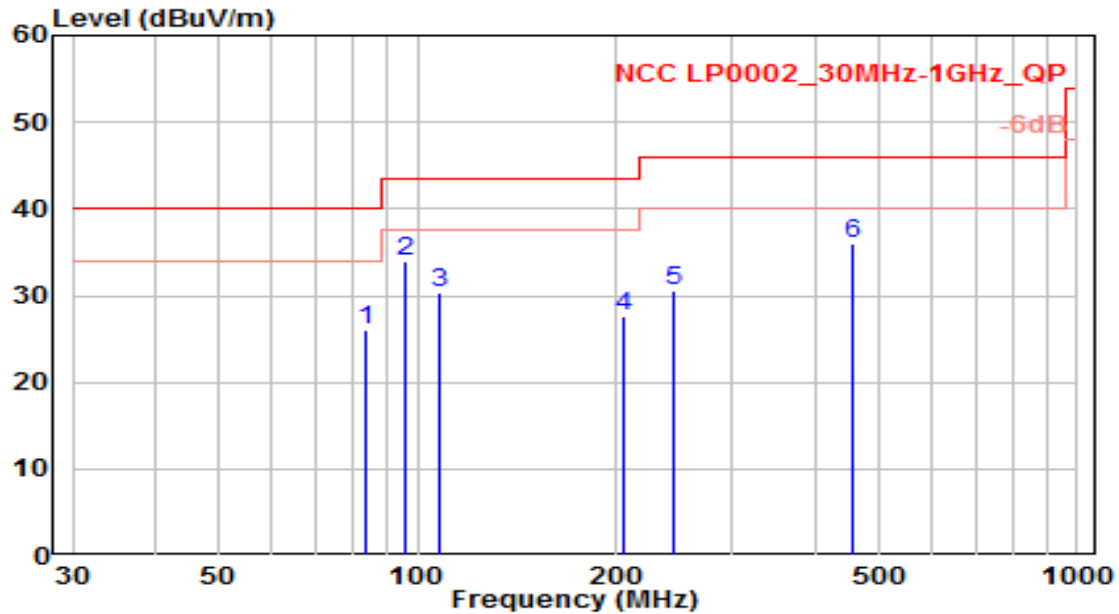


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	83.890	12.71	15.34	28.05	-11.95	40.00	100	255	QP
2	95.420	18.28	18.13	36.41	-7.09	43.50	100	255	QP
3	* 143.570	22.75	16.01	38.76	-4.74	43.50	100	255	QP
4	156.640	19.64	16.20	35.84	-7.66	43.50	100	255	QP
5	172.230	15.78	16.81	32.59	-10.91	43.50	100	155	QP
6	240.560	20.73	20.22	40.95	-5.05	46.00	100	0	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	VULB 9162	Temp. / Humidity	23°C /56%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery

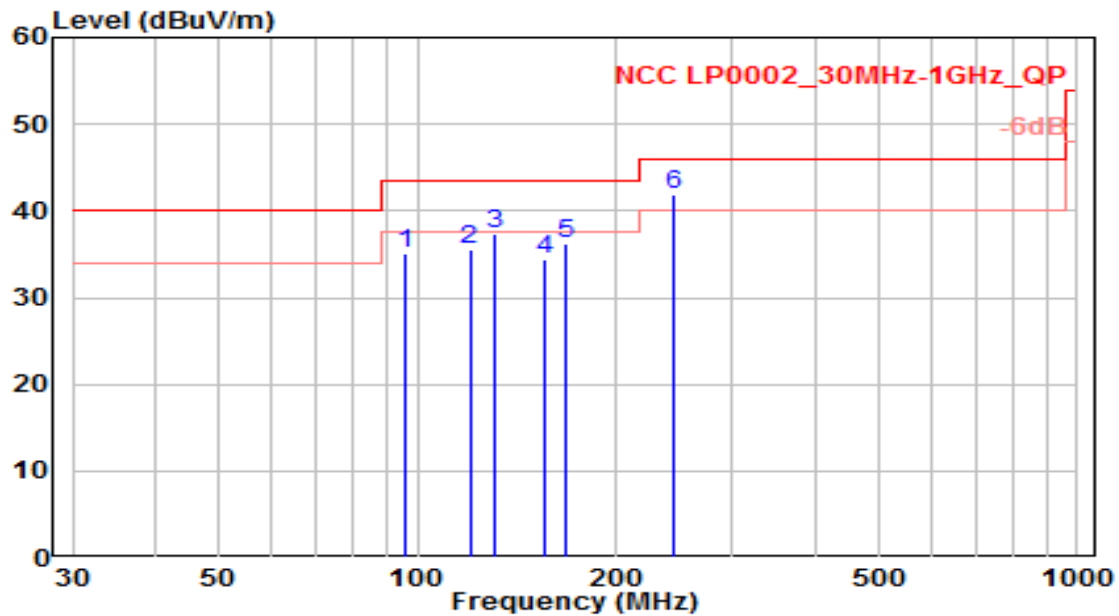


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	83.290	10.96	15.19	26.15	-13.85	40.00	100	315	QP
2	* 95.740	15.80	18.20	34.00	-9.50	43.50	100	315	QP
3	107.530	11.55	18.83	30.38	-13.12	43.50	100	315	QP
4	204.620	8.54	19.04	27.58	-15.92	43.50	100	315	QP
5	245.190	10.25	20.38	30.63	-15.37	46.00	100	315	QP
6	455.460	10.94	25.04	35.98	-10.02	46.00	100	315	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	VULB 9162	Temp. / Humidity	23°C /56%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	RX_CH 14_ANT 0	Test Voltage	By Battery

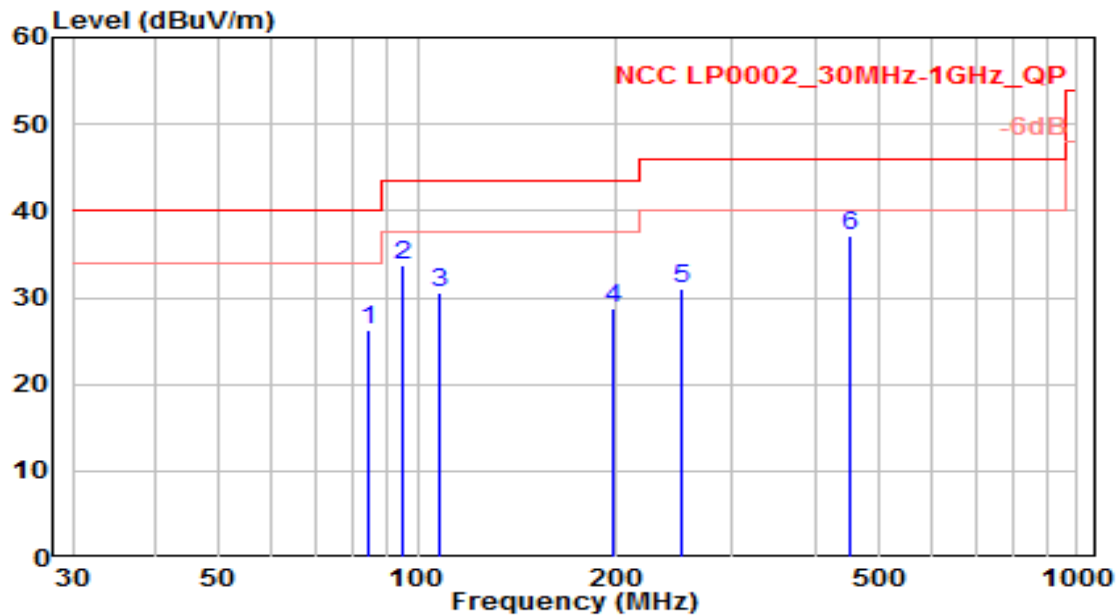


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	95.550	16.84	18.16	35.00	-8.50	43.50	100	255	QP
2	119.960	18.25	17.25	35.50	-8.00	43.50	100	255	QP
3	131.280	21.15	16.25	37.40	-6.10	43.50	100	255	QP
4	156.440	18.22	16.20	34.42	-9.08	43.50	100	255	QP
5	167.030	19.77	16.55	36.32	-7.18	43.50	100	255	QP
6	* 244.210	21.46	20.34	41.80	-4.20	46.00	100	0	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	VULB 9162	Temp. / Humidity	23°C /56%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	RX_CH 14_ANT 0	Test Voltage	By Battery

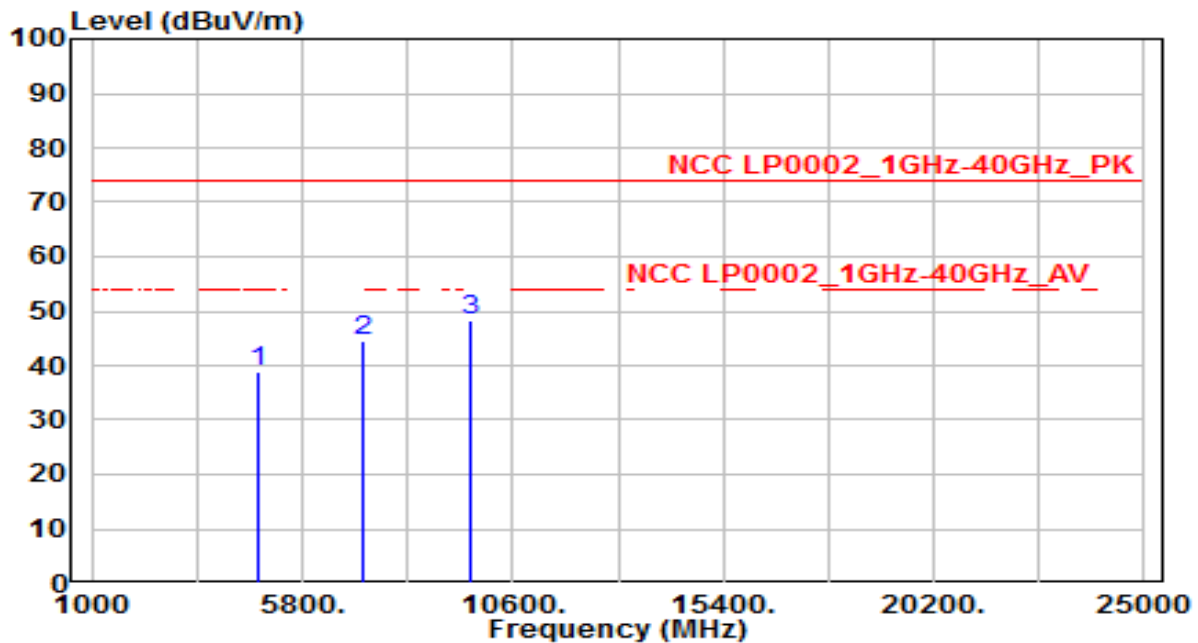


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	83.890	10.93	15.34	26.26	-13.74	40.00	100	315	QP
2	95.330	15.71	18.11	33.82	-9.68	43.50	100	315	QP
3	107.470	11.85	18.83	30.68	-12.82	43.50	100	315	QP
4	198.590	9.47	19.20	28.67	-14.83	43.50	100	315	QP
5	251.280	10.36	20.54	30.91	-15.09	46.00	100	315	QP
6	* 451.130	12.11	24.92	37.03	-8.97	46.00	100	315	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /71%
Polarity	Horizontal	Site / Test Engineer	AC1 / Eric
Test Mode	TX_CH0_ANT 0	Test Voltage	By Battery

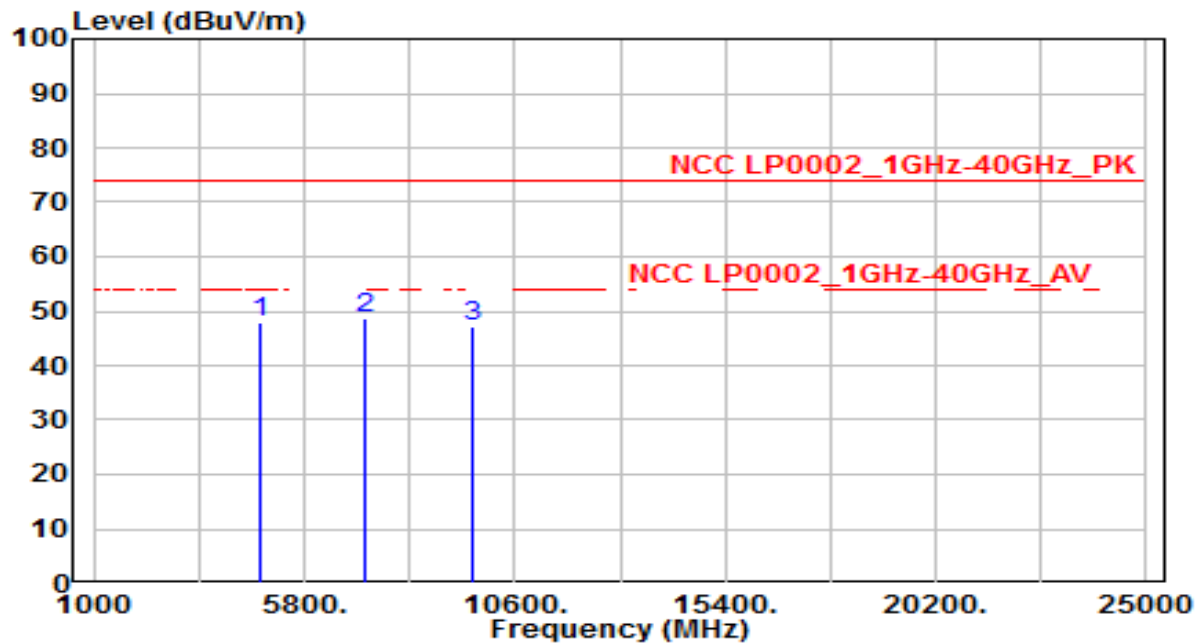


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	4810.000	35.52	3.29	38.81	-35.19	74.00	150	360	Peak
2	7215.000	33.51	10.91	44.41	-29.59	74.00	150	360	Peak
3	* 9620.000	33.69	14.65	48.34	-25.66	74.00	150	360	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
- Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /71%
Polarity	Vertical	Site / Test Engineer	AC1 / Eric
Test Mode	TX_CH0_ANT 0	Test Voltage	By Battery

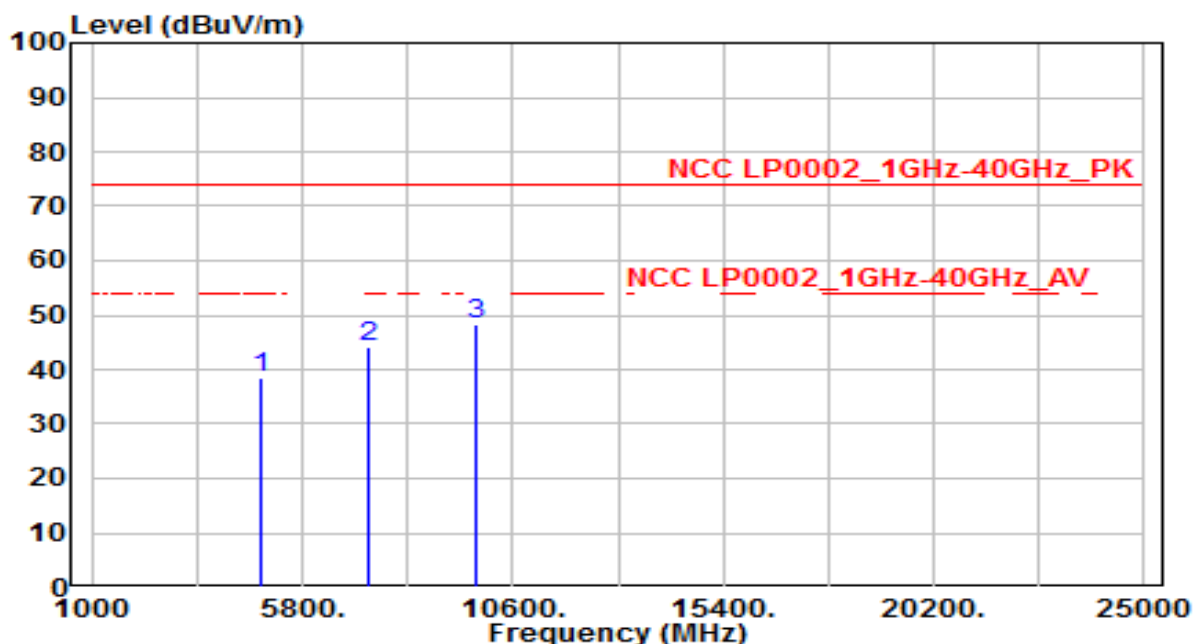


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	4810.000	44.80	3.29	48.10	-25.90	74.00	150	360	Peak
2	* 7215.000	37.90	10.91	48.80	-25.20	74.00	150	360	Peak
3	9620.000	32.55	14.65	47.19	-26.81	74.00	150	360	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
- Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /71%
Polarity	Horizontal	Site / Test Engineer	AC1 / Eric
Test Mode	TX_CH7_ANT 0	Test Voltage	By Battery

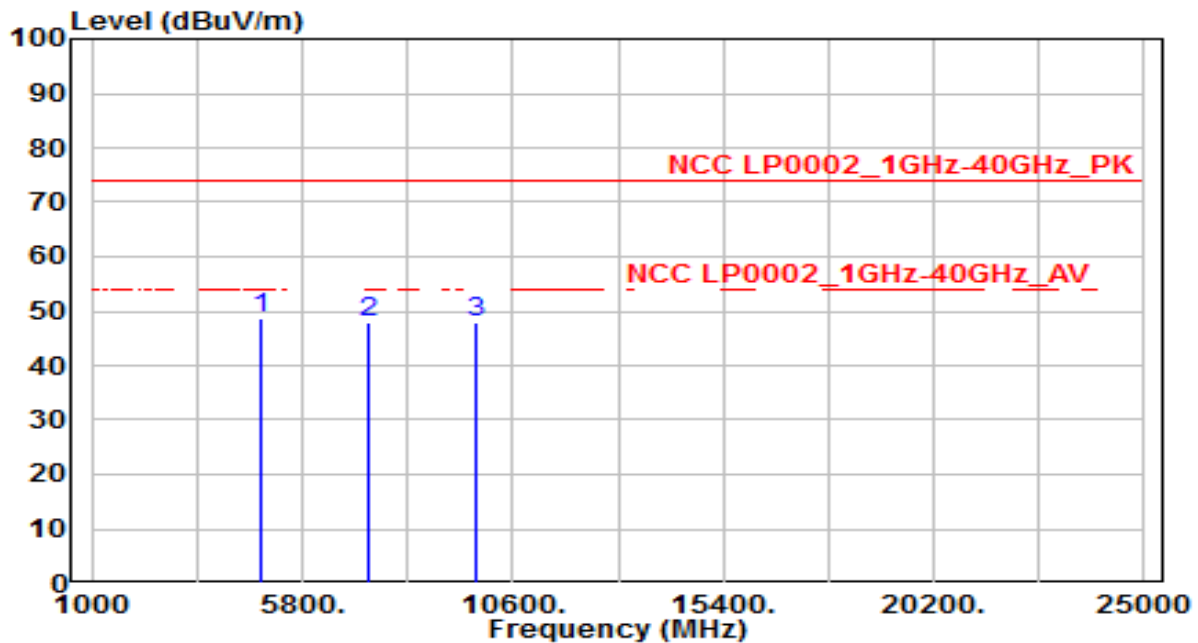


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	4880.000	35.18	3.46	38.64	-35.36	74.00	150	360	Peak
2	7320.000	32.92	11.21	44.13	-29.87	74.00	150	360	Peak
3	* 9760.000	33.23	14.91	48.14	-25.86	74.00	150	360	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
- Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	24°C /71%
Polarity	Vertical	Site / Test Engineer	AC1 / Eric
Test Mode	TX_CH7_ANT 0	Test Voltage	By Battery

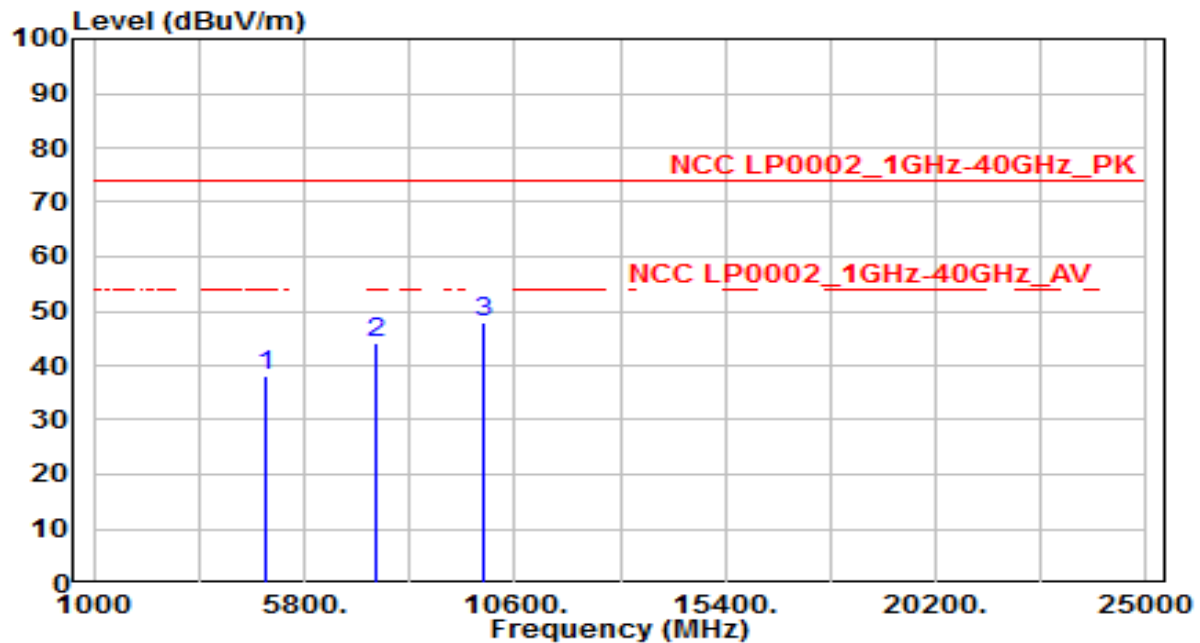


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 4880.000	45.33	3.46	48.79	-25.21	74.00	150	360	Peak
2	7320.000	36.89	11.21	48.09	-25.91	74.00	150	360	Peak
3	9760.000	32.99	14.91	47.89	-26.11	74.00	150	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	23°C /56%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery

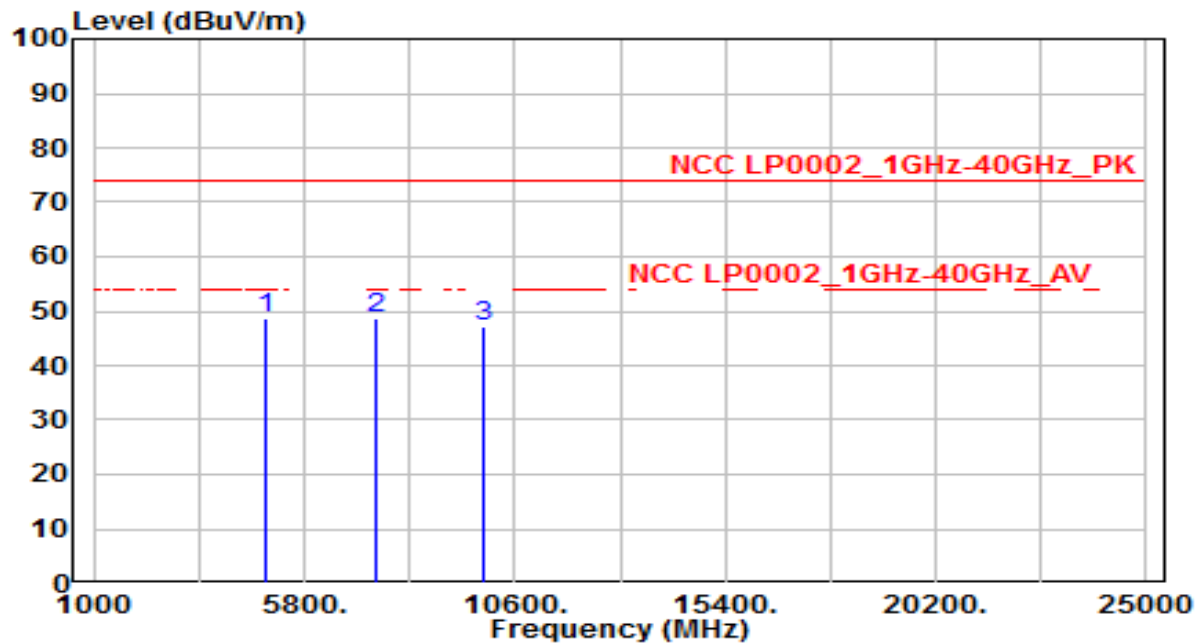


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	4950.000	34.21	3.86	38.07	-35.93	74.00	150	360	Peak
2	7425.000	31.35	12.68	44.03	-29.97	74.00	150	360	Peak
3	* 9900.000	31.63	16.39	48.02	-25.98	74.00	150	360	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
- Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	23°C /56%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery

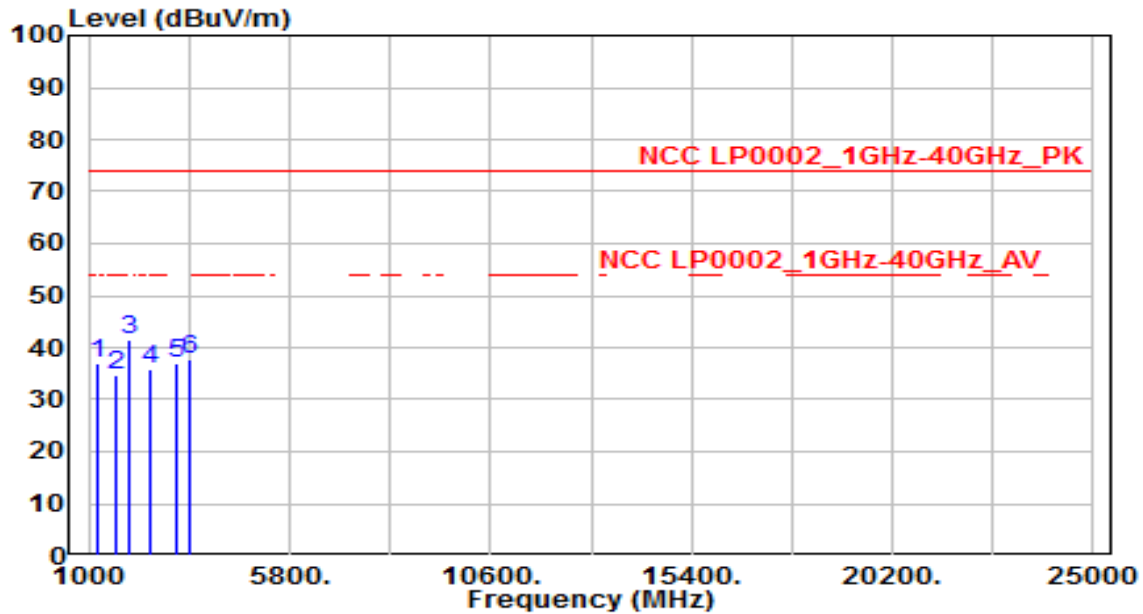


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 4950.000	44.90	3.86	48.76	-25.24	74.00	150	360	Peak
2	7425.000	35.85	12.68	48.53	-25.47	74.00	150	360	Peak
3	9900.000	30.62	16.39	47.01	-26.99	74.00	150	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	23°C /56%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	RX_CH 14_ANT 0	Test Voltage	By Battery

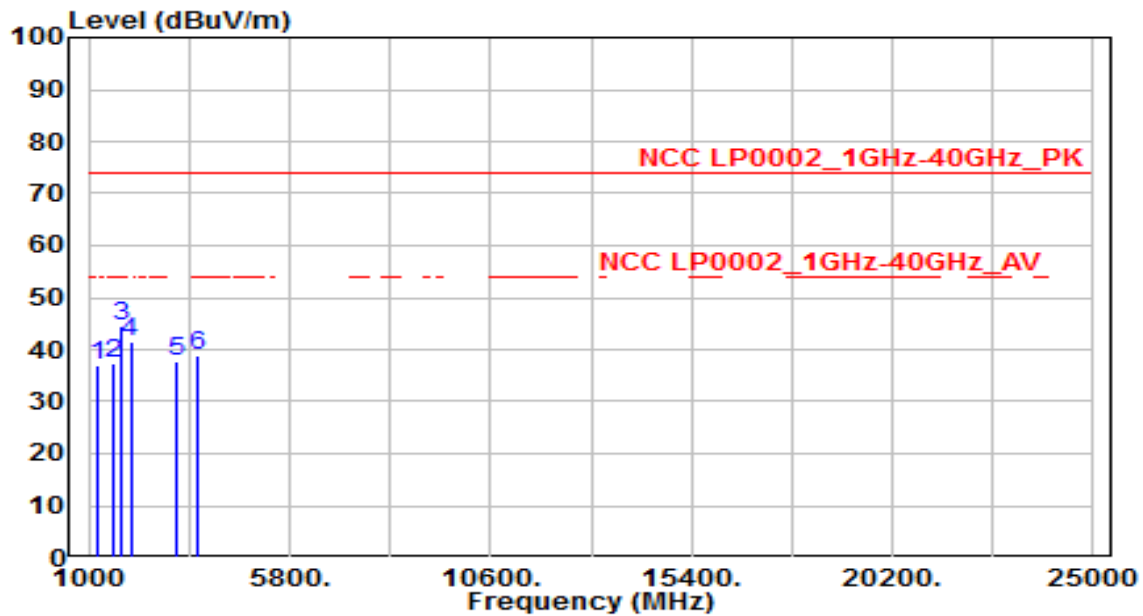


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1198.750	42.96	-5.93	37.03	-36.97	74.00	150	360	Peak
2	1635.250	39.34	-4.48	34.87	-39.13	74.00	150	360	Peak
3	* 1993.750	44.99	-3.54	41.46	-32.54	74.00	150	360	Peak
4	2494.000	37.65	-1.64	36.01	-37.99	74.00	150	360	Peak
5	3085.000	38.49	-1.49	36.99	-37.01	74.00	150	360	Peak
6	3403.750	38.22	-0.61	37.61	-36.39	74.00	150	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-26
Factor	BBHA 9120D & BBHA 9170	Temp. / Humidity	23°C /56%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	RX_CH 14_ANT 0	Test Voltage	By Battery



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1196.500	42.77	-5.93	36.83	-37.17	74.00	150	360	Peak
2	1599.250	41.93	-4.57	37.36	-36.64	74.00	150	360	Peak
3	* 1792.750	48.59	-4.06	44.53	-29.47	74.00	150	360	Peak
4	1999.750	44.85	-3.52	41.33	-32.67	74.00	150	360	Peak
5	3069.250	39.29	-1.54	37.75	-36.25	74.00	150	360	Peak
6	3578.500	38.90	-0.10	38.79	-35.21	74.00	150	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

5.6 頻帶邊緣

5.6.1 量測方法

待測物置於非導體桌面（落地型產品置於地上），受測物使用交流電源時，將其與任何配件設備之電源線連接至位於旋轉桌的交流電源。受測物使用電池時，測試時應裝置新電池或充電完全的電池。受測物與配件設備之電源線無須束綁，桌面上受測設備的所有電源線由桌子的後緣垂下沿旋轉桌表面接至交流插座。落地型設備的交流電源線可以方便的型態走線。桌面可360度旋轉，接收天線置於距待測物3m距離，高度可在1至4公尺間變動，以量測待測物之最大輻射電場強度，接收天線並應於水平及垂直極化方向各量測一次。（待測物擺設方式根據 ANSI C63.10-2013版，待測物放置桌中心，1G以下擺設高度為80cm/1G以上擺設高度為150cm）

- (1) 任一頻率小於或等於1000 MHz 之訊號,使用CISPR準峰值檢波器
- (2) 任一頻率大於1000 MHz 之訊號，使用平均值檢波器測量，當規定之發射限制值為平均值時(含1000 MHz 以下)，受測訊號藉由峰值檢波器(RBW:1MHz,VBW:3MHz)所測量之峰值，亦須符合峰值發射限制值，其峰值發射限制值為最大容許平均值加20 dB。

備註：若為手持式或穿戴式之裝置，需對其三個正交軸的方位評估測試，並記錄最差的數值。

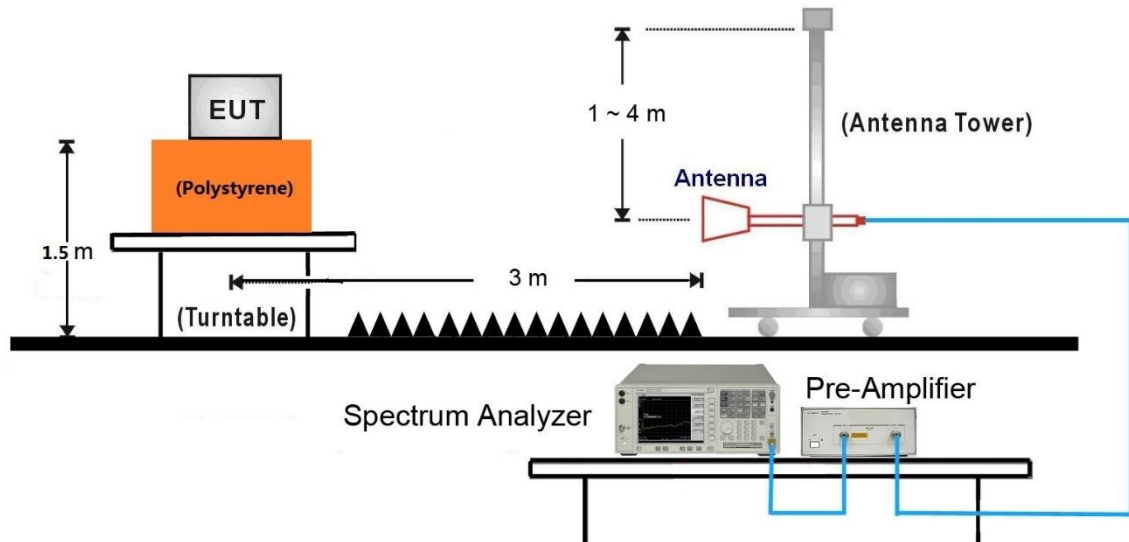
5.6.2 限制要求

除低功率射頻器材技術規範另有規定外，任何低功率射頻器材之主波皆不得使用下表所列各頻段之頻率低功率射頻器材落於下表所列頻帶內之混附發射，其電場強度必須符合低功率射頻器材技術規範之第3.6節限制規定

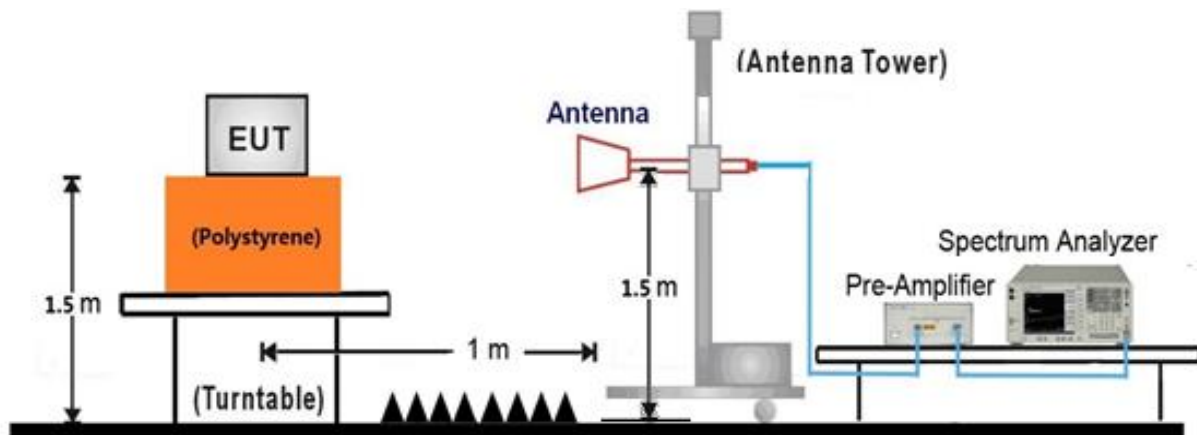
頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)	頻 率 (MHz)
0.090~0.110	25.500~25.700	703.00~748.00	2310.0~2390.0	13250~13400
0.490~0.510	37.475~38.275	758.00~803.00	2483.5~2900.0	14470~14500
2.172~2.198	73.500~75.400	825.00~915.00	3260.0~3267.0	15350~16200
3.013~3.033	108.00~138.00	930.00~1240.0	3332.0~3339.0	17700~21400
4.115~4.198	149.90~150.05	1300.0~1427.0	3345.8~3358.0	22010~23120
5.670~5.690	156.70~156.90	1435.0~1626.5	3500.0~4400.0	23600~24000
6.200~6.300	162.01~167.17	1660.0~1785.0	4500.0~5250.0	31200~31800
8.230~8.400	167.72~173.20	1805.0~1880.0	5350.0~5460.0	36430~36500
12.265~12.600	240.00~285.00	1885.0~1900.0	7250.0~7750.0	38600 以上
13.340~13.430	322.00~335.40	1905.0~1985.0	8025.0~8500.0	
14.965~15.020	399.90~410.00	2010.0~2025.0	9000.0~9200.0	
16.700~16.755	485.00~510.00	2110.0~2170.0	9300.0~9500.0	
19.965~20.020	608.00~614.00	2200.0~2300.0	10600~12700	

5.6.3 測試架構圖

1GHz ~ 18GHz Test Setup:

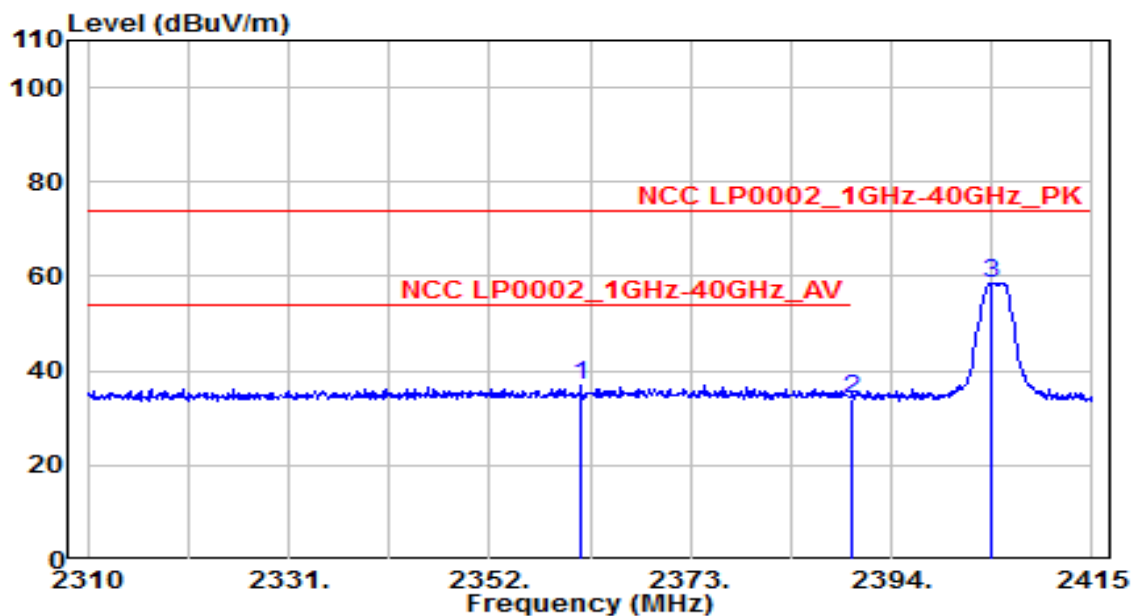


18GHz ~25GHz Test Setup:



5.6.4 頻帶邊緣測試結果

EUT	A9530V1	Date of Test	2021-08-11
Factor	BBHA 9120D	Temp. / Humidity	23°C /59%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 0_ANT 0	Test Voltage	By Battery

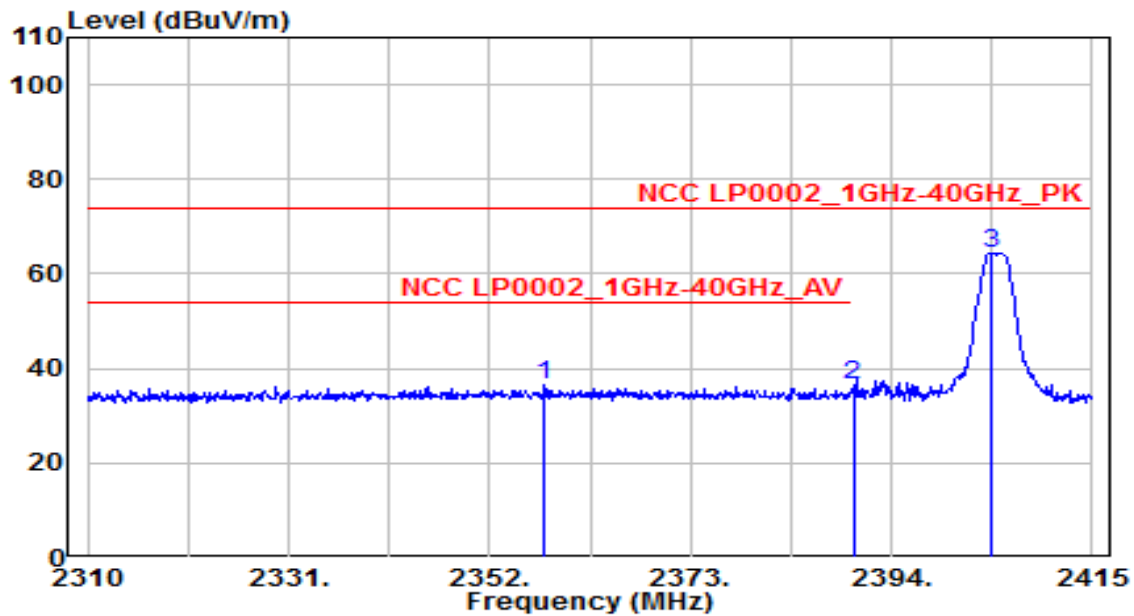


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 2361.555	38.94	-2.15	36.79	-37.21	74.00	135	315	Peak
2	2390.000	36.16	-2.04	34.12	-39.88	74.00	135	315	Peak
3	2404.395	60.62	-1.98	58.64	N/A	N/A	135	315	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-11
Factor	BBHA 9120D	Temp. / Humidity	23°C /59%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 0_ANT 0	Test Voltage	By Battery

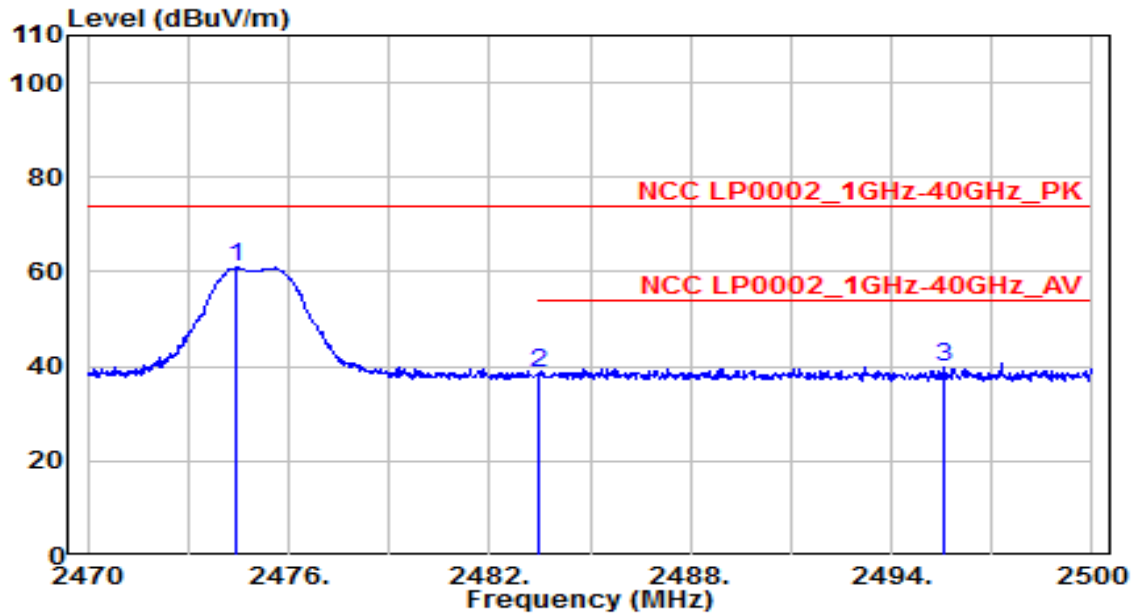


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	* 2357.670	38.82	-2.16	36.66	-37.34	74.00	190	5	Peak
2	2390.010	38.68	-2.04	36.64	-37.36	74.00	190	5	Peak
3	2404.395	66.51	-1.98	64.52	N/A	N/A	190	5	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-11
Factor	BBHA 9120D	Temp. / Humidity	23°C /59%
Polarity	Horizontal	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery

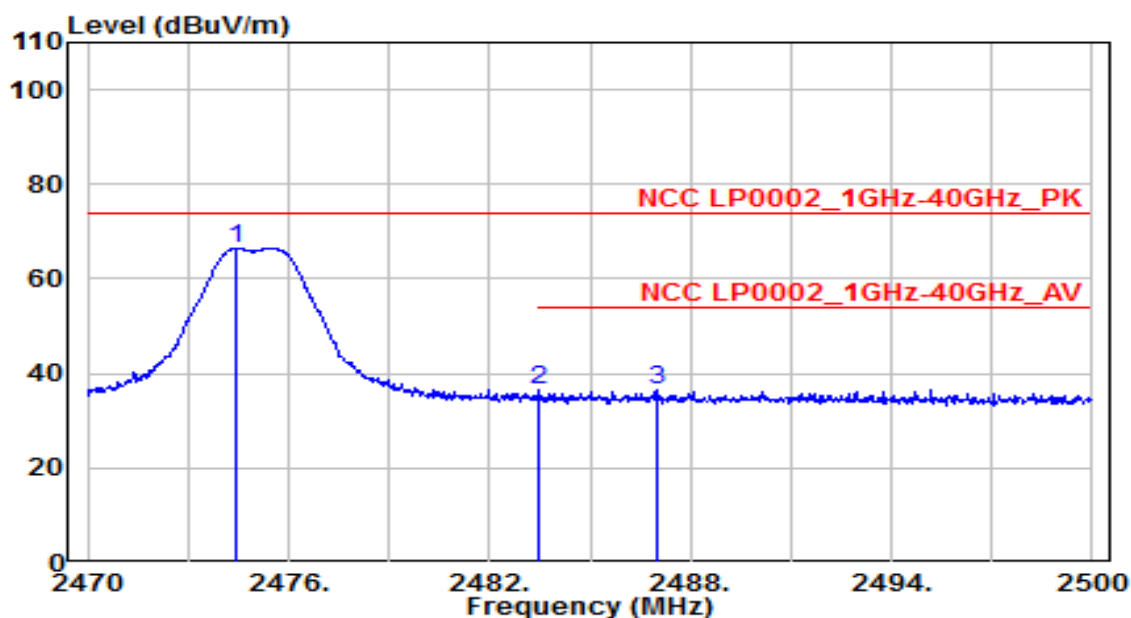


No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2474.440	62.64	-1.72	60.92	N/A	N/A	185	340	Peak
2	2483.500	40.28	-1.68	38.59	-35.41	74.00	185	340	Peak
3	* 2495.590	41.49	-1.64	39.85	-34.15	74.00	185	340	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	A9530V1	Date of Test	2021-08-11
Factor	BBHA 9120D	Temp. / Humidity	23°C /59%
Polarity	Vertical	Site / Test Engineer	AC1 / Kaunaz
Test Mode	TX_CH 14_ANT 0	Test Voltage	By Battery



No	Frequency (MHz)	Reading (dBuV)	C.F (dB)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	2474.440	68.20	-1.72	66.48	N/A	N/A	190	5	Peak
2	2483.500	38.25	-1.68	36.57	-37.43	74.00	190	5	Peak
3	* 2486.980	38.38	-1.67	36.71	-37.29	74.00	190	5	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

5.7. 占用頻寬

5.7.1 量測方法

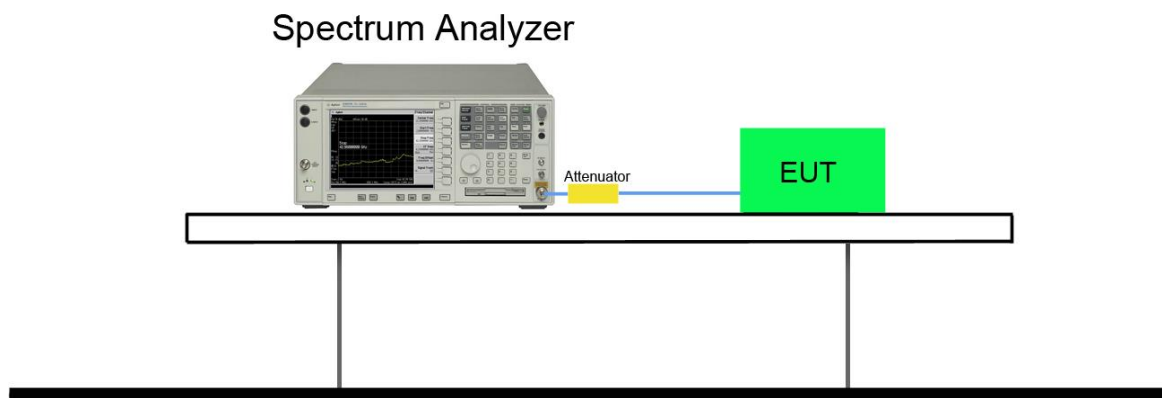
待測物之天線埠經由適當之衰減直接連至頻譜分析儀RF輸入端，頻譜分析儀之設定,參考如下:

- (1) Set RBW = 100 kHz
- (2) VBW $\geq 3 \times$ RBW
- (3) Detector = Peak
- (4) Trace mode = max hold
- (5) Sweep = auto couple

5.7.2 限制要求

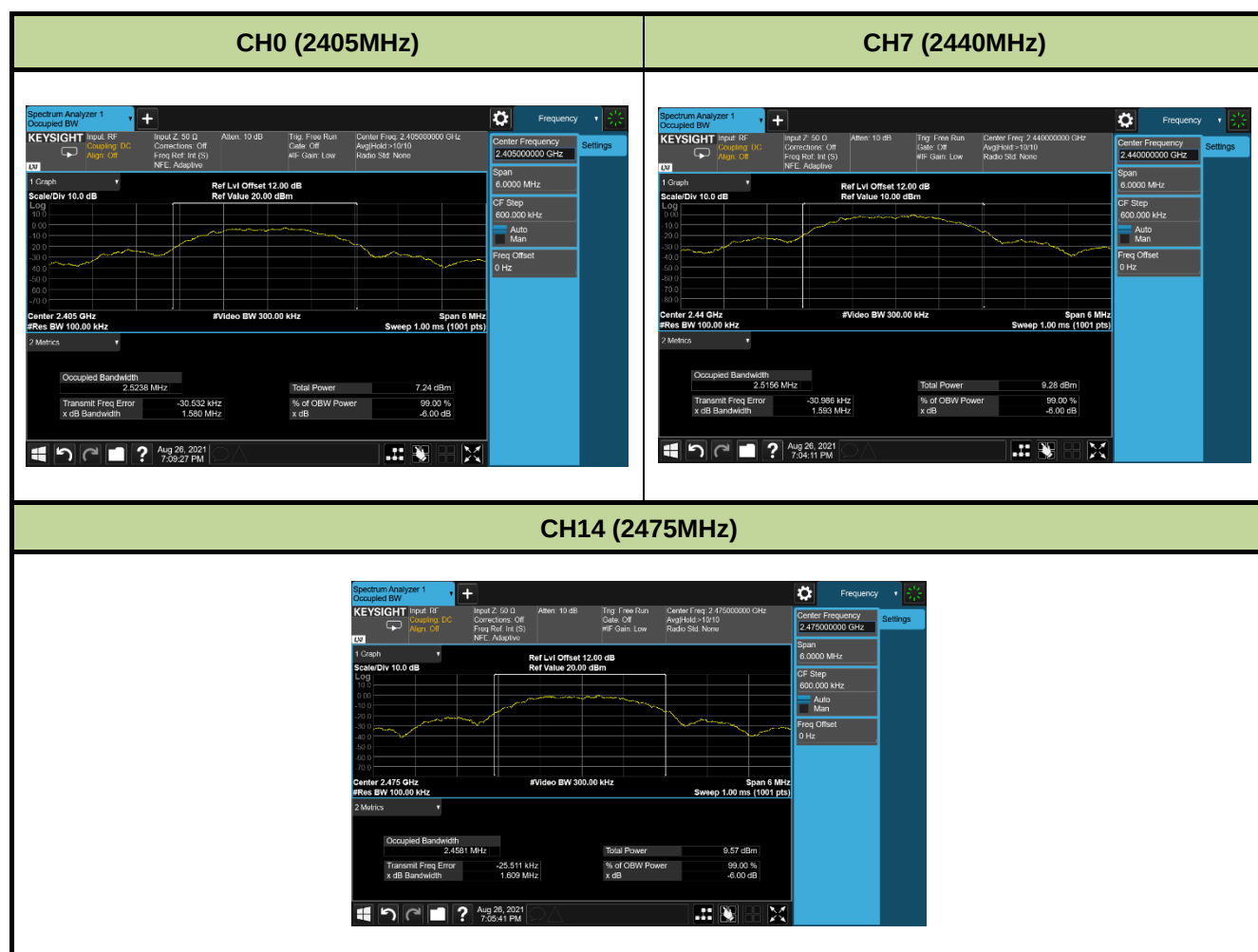
6dB頻寬至少應有500kHz。

5.7.3 測試架構圖



5.7.4 占用頻寬測試結果

Test Mode	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
2.4GHz	CH0	2405	1.580	≥ 0.5	Pass
	CH7	2440	1.593	≥ 0.5	Pass
	CH14	2475	1.609	≥ 0.5	Pass



5.8. 功率頻譜密度

5.8.1 量測方法

將發射機之天線埠經由適當之衰減直接連至測試儀器。找出發射峰值並擴展於通帶內，設定解析頻寬為3 kHz，視訊頻寬大於解析頻寬，掃描時間為頻率掃描範圍除以3 kHz。所測得之峰值位準必須應小於或等於8 dBm。

若受測裝置之頻譜線間隔小於3 kHz，測量時應將解析頻寬降低以使頻譜線間隔大於3kHz，所測得之數據再藉加總3 kHz 頻帶內所有個別頻譜線之功率(即標準化至3 kHz)以決定是否符合規定。

5.8.2 限制要求

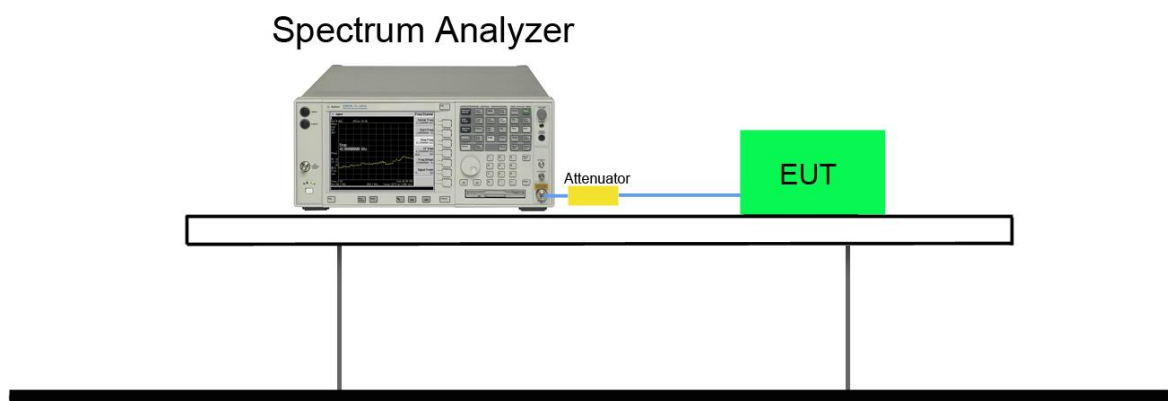
在使用頻率範圍之任意3千赫(kHz)頻寬內，由發射機傳導至天線之峰值發射電功率密度在任意期間內，皆不得大於8dBm。

若用於非固定式點對點操作時，若其發射天線之方向性增益超過6dBi，應依所超過之dB數等量降低峰值輸出功率。如用於固定式點對點(註)操作時，應符合下列情形之一：

(1)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。

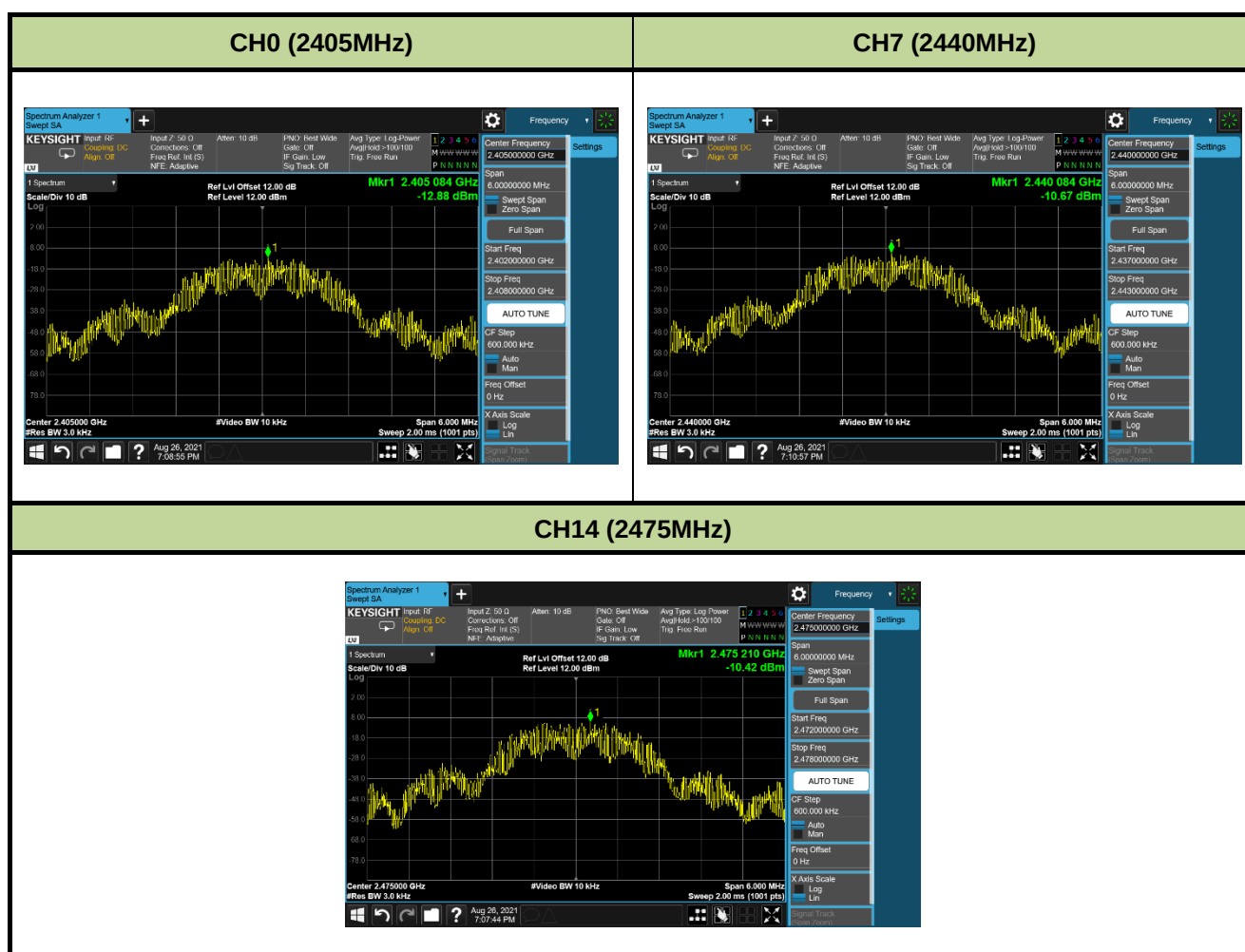
(2) 操作於5725-5850兆赫(MHz)者，其發射天線之方向性增益超過6dBi，不需降低峰值輸出功率。

5.8.3 測試架構圖



5.8.4 功率頻譜密度測試結果

Test Mode	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
2.4GHz	CH0	2405	-12.88	≤ 8	Pass
	CH7	2440	-10.67	≤ 8	Pass
	CH14	2475	-10.42	≤ 8	Pass



The End