

低功率射頻器材試驗報告



申請廠商 先鋒股份有限公司
製造廠商 台北市內湖區瑞光路407號8樓
PIONEER CORPORATION
產品名稱 RDS AV 接收機
廠牌 Pioneer
型號 DMH-A5450BT
型號差異 N/A
報告號碼 ER/2021/90061
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Approved By:

楊景嵐

待測裝置已於台灣檢驗科技股份有限公司射頻實驗中心，依據國家通訊傳播委員會於中華民國一百零九年七月頒佈之低功率射頻器材技術規範 LP0002 測試。

台灣檢驗科技股份有限公司根據此條文規範項目測試，測試各項數據皆能符合此規範規定之限度值。

報告中所描述之測試結果和待測設備的架構組合，均根據實際量測情況作詳實的記錄，且本測試報告僅對上述待測樣品負責。

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
ER/2021/90061	00	Original	December 15, 2021	李宜芳	
ER/2021/90061	01	更新天線資訊	January 5, 2022	蔡伊瑜	*

Note:

1. 標註「*」為報告尚未正式取證前，因認證機構意見修改之版本。
2. 電源線傳導干擾及 Fully System 測試模式在各個無線功能全開下進行測試，經評估為最差模式。

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1 測試實驗室資料

1.1 認可登錄資訊:

實驗室認可登錄： 中華民國實驗室認證體系

認可編號： TAF 3702

認證有效期間： 110年06月14日起至113年06月13日止

實驗室名稱： 台灣檢驗科技股份有限公司射頻實驗中心

實驗室地址： 新北市新北產業園區五工路134號

電話： 886-2-22993939

傳真： 886-2-22982698

1.2 實驗室場地資訊

測試場地	測試場地編號		
	SAC 1	SAC 3	Conduction 1
新北市新北產業園區五工路 134 號	Conducted 1	Conducted 2	Conducted 3
	Conducted 4	Conducted 5	Conducted 6
	SAC C	SAC D	SAC G
桃園市龜山區(華亞科技園區)科技一路 2 號	Conduction C	Conducted A	Conducted B
	Conducted C	Conducted D	Conducted E
	Conducted F	Conducted G	
註: 測試場地編號記錄於每項測試之儀器清單, 用以表示測試場地地址。			

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2 實驗室量測不確定度

量測項目	量測不確定度			
	(擴充不確定度)			
傳導干擾量測	電源線	0.15-30MHz	2.34	dB
輻射干擾量測 (3m 測距)	水平極化	9kHz - 30MHz	2.64	dB
		30-1000MHz	4.45	dB
		1-18GHz	4.81	dB
		18-40GHz	4.52	dB
	垂直極化	9kHz - 30MHz	2.64	dB
		30-1000MHz	4.93	dB
		1-18GHz	4.81	dB
		18-40GHz	4.52	dB
頻率誤差量測			1.53	Hz
輸出功率	傳導方式		1	dB
有效輻射功率 (輻射方式)	水平極化	30-1000MHz	2	dB
		1-40GHz	3	dB
	垂直極化	30-1000MHz	2.33	dB
		1-40GHz	3	dB
功率頻譜密度	傳導方式		1.53	dB
鄰頻道功率量測 (輻射方式)	水平極化	30-1000MHz	2	dB
	垂直極化	30-1000MHz	2.33	dB
Transmitter Spurious Emission		33GHz-50GHz	3.8	dB
		50GHz-60GHz	4.67	dB
		60GHz-90GHz	4.81	dB
		90GHz-140GHz	4.57	dB
		140GHz-200GHz	5.42	dB

附註: 1. K=2 即代表測試結果具有95%的量測可信度。

2. 本報告中的符合性判定僅依據試驗結果，不考慮其試驗結果的量測不確定度。

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3 一般資料

3.1 產品描述

產品名稱	RDS AV 接收機
廠牌	Pioneer
型號	DMH-A5450BT
型號差異	N/A
使用電源	額定電源: 14.4VDC (允許 10.8V 至 15.1V)
測試軟體 (名稱/版本)	Bluetooth RF Test Tool/5.2.1.21

3.2 射頻特性

發射頻帶	2402MHz – 2480MHz
輸出功率	3.83 dBm (Peak)
調變方式	BT BR(GFSK)+EDR($\pi/4$ DQPSK, 8DPSK)
頻道數	79

3.3 天線資訊

Antenna Type	Brand	Antenna Model No.	Freq.	Peak Antenna Gain (dBi)
PIFA	深圳市徐港電子有限公司	M55	2402~2480	-5.6
Note: Antenna information is provided by the applicant.				

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3.4 配件資訊

以下不附賣配件經申請者切結，器材不隨貨提供並由實驗室提供併同檢驗。

是否附賣		配件	廠牌	型號	Power Rating (Vdc)
Yes	No				
☒	☐	多頻天線	GLEAD	QDAM1582R2J10Y_AT04_KW3.55M	N/A
☒	☐	USB 延長線	DayKing	167-00006-7547	N/A
☒	☐	AV 線	深圳市潤鑫成電子有限公司(無商標)	RXC 徐港-20070802	N/A
☒	☐	AUX IN 線	深圳市潤鑫成電子有限公司(無商標)	RXC 徐港-20070803	N/A
☒	☐	SWC/BACK CAMERA 線	深圳市潤鑫成電子有限公司(無商標)	RXC 徐港-20070806	N/A
☒	☐	電源線	Pioneer	CDP1666-A/N	N/A
☐	☒	紅白 AV 端子	Ion Audio	2CRA/2RCA	N/A
☐	☒	紅白黃 AV 端子	PRO-BEAT	3RCA/3RCA	N/A
☐	☒	紅白黃 AV 端子轉 AUX	I-WIZ	AD-35	N/A
☐	☒	FM 天線	ejiaze	1134	N/A

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4 測試方法依據

本測試報告之所有項目皆依據國家通訊傳播委員會低功率射頻器材技術規範(LP0002, 109.7.1 版本)如無國家標準可適用者，得依美國 EIA、IEEE ANSI 檢驗法檢驗，及美國 FCC 47 CFR Part 2 有關檢驗之規定及參考 ANSI C63.10:2013、FCC CFR 47 15.247 之檢驗法。

項次	測試項目	適用規範	測試結果
1	電源線傳導干擾	低功率射頻器材技術規範 3.3節	N/A
2	禁用頻道輻射發射	低功率射頻器材技術規範 3.5 & 3.6節	符合
3	天線增益要求	低功率射頻器材技術規範 4.10.1.3 (1) 節	符合
4	輸出峰值功率	低功率射頻器材技術規範 4.10.1.2.(A)、(B) 節	符合
5	頻帶邊緣發射	低功率射頻器材技術規範 4.10.1.5節	符合
6	20dB頻寬	低功率射頻器材技術規範 4.10.1.6.(1) (A) 節	符合
7	載波頻率間隔	低功率射頻器材技術規範 4.10.1.6.(1) (A) 節	符合
8	載波頻率佔用週期	低功率射頻器材技術規範 4.10.1.6.(1) (A)(a) 節	符合
9	頻道數量	低功率射頻器材技術規範 4.10.1.6.(1) (A)(a) 節	符合

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5 測試模式

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE
RADIATED EMISSION TEST (BELOW 1 GHz)				
Bluetooth	0 to 78	39	GFSK	DH5
RADIATED EMISSION TEST (ABOVE 1 GHz)				
Bluetooth	0 to 78	0,39,78	GFSK/8-DPSK	DH5/3DH5
Note: The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for channel Low, Mid and High, the worst case position was reported.				

ANTENNA PORT CONDUCTED TEST				
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	PACKET TYPE
Peak Output Power, 20dB Band Width				
Bluetooth	0 to 78	0,39,78	GFSK	DH5
	0 to 78	0,39,78	$\pi/4$ -DQPSK	2DH5
	0 to 78	0,39,78	8-DPSK	3DH5
Band Edge				
Bluetooth	0 to 78	0,78	GFSK/8-DPSK	DH5/3DH5
Frequency Separation				
Bluetooth	0 to 78	0,1,2,38,39,40,76,77,78	GFSK $\pi/4$ -DQPSK 8-DPSK	DH5/2DH5/3DH5
Number of hopping frequency				
Bluetooth	0 to 78	0 to 78	GFSK/8-DPSK	DH5/3DH5
Time of Occupancy(Dwell time)				
Bluetooth	0 to 78	39	GFSK	DH1/DH3/DH5
			$\pi/4$ -DQPSK	2DH1/2DH3/2DH5
			8-DPSK	3DH1/3DH3/3DH5

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6 適用規範

禁用頻帶限制之規定

依據NCC低功率射頻器材技術規範3.5節之要求，任何低功率射頻器材之主波皆不得使用下表所列各頻帶內之頻率；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第3.6節的限制規定。

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

依據NCC低功率射頻器材技術規範3.9節之要求，低功率射頻電機之收、發信機為成套銷售者，收、發信機應一併送審或提供經型式認證合格之對應收、發信機之送審資料；收信機之輻射電場強度不得超過3.6之發射規定，且不得解調3.5所列之頻率。

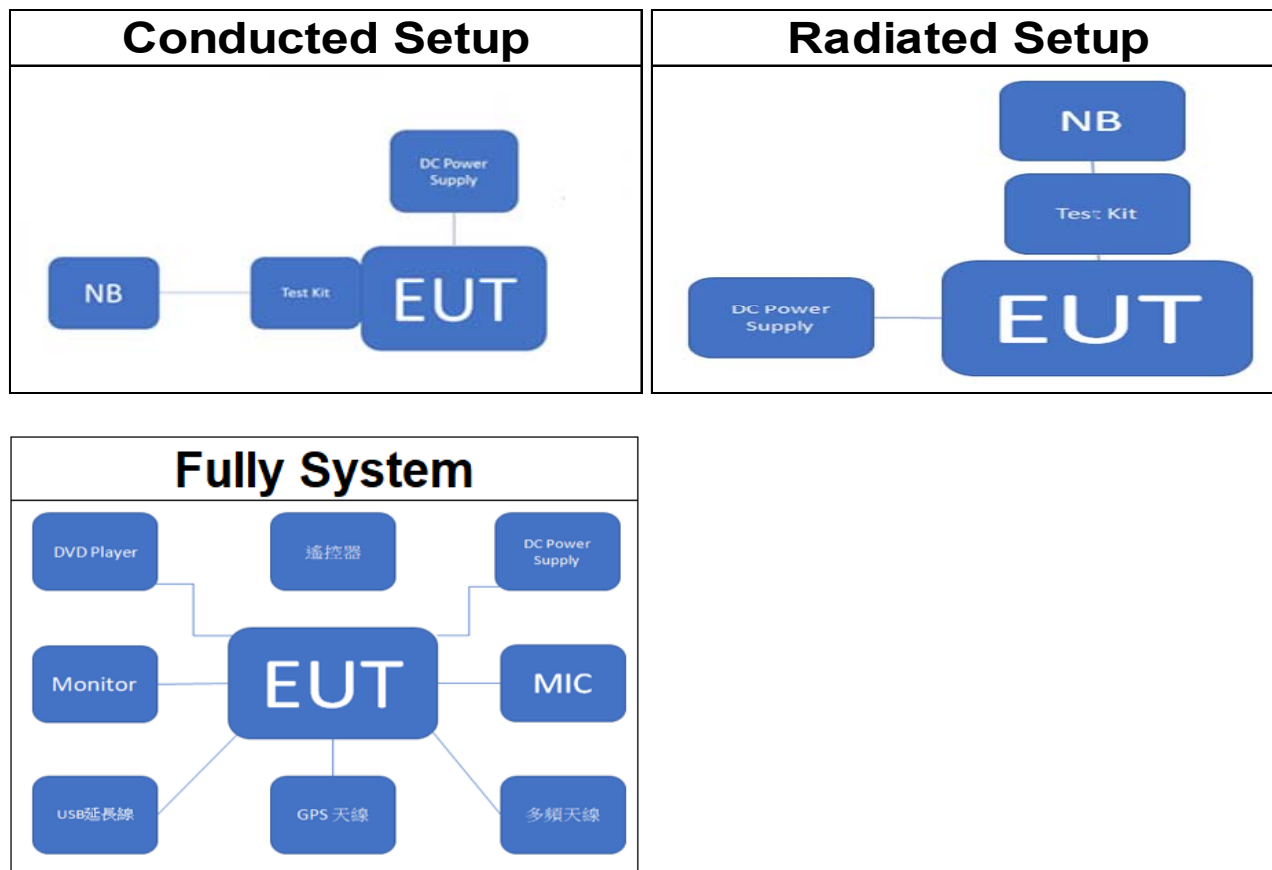
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7 測試配置

7.1 待測物與測試週邊配置圖



7.2 測試週邊描述

7.2.1 Conducted

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

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7.2.2 Radiated

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A
TEST Kit	MODULES	CP2102	N/A	N/A	N/A

7.2.3 Fully System

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
多頻天線	GLEAD	QDAM1582R2J10Y_AT04_KW3.55M	N/A	N/A	N/A
MIC	HUAFENG	AM-018EP	N/A	N/A	N/A
USB 延長線	DayKing	167-00006-7547	N/A	N/A	N/A
AV 線	深圳市潤鑫成電子有限公司	RXC 徐港-20070802	N/A	N/A	N/A
AUX IN 線	深圳市潤鑫成電子有限公司	RXC 徐港-20070803	N/A	N/A	N/A
SWC/BACK CAMERA 線	深圳市潤鑫成電子有限公司	RXC 徐港-20070806	N/A	N/A	N/A
電源線	Pioneer	CDP1666-A/N	N/A	N/A	N/A
遙控器	Pioneer	CXF3634	N/A	N/A	N/A
DVD Player	BLUESKY	DVD-929U	0829U1365	N/A	N/A
Monitor	Dell	U2410F	23.058D0.017G	N/A	N/A
紅白 AV 端子	Ion Audio	2RCA/2RCA	N/A	N/A	N/A
紅白黃 AV 端子	PRO-BEAT	3RCA/3RCA	N/A	N/A	N/A
紅白黃 AV 端子 轉 AUX	I-WIZ	AD-35	N/A	N/A	N/A
USB3.0	Kingston	DT100G3/32GB	N/A	N/A	N/A
FM 天線	ejiaze	1134	N/A	N/A	N/A

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8 電源線傳導干擾量測

8.1 適用標準

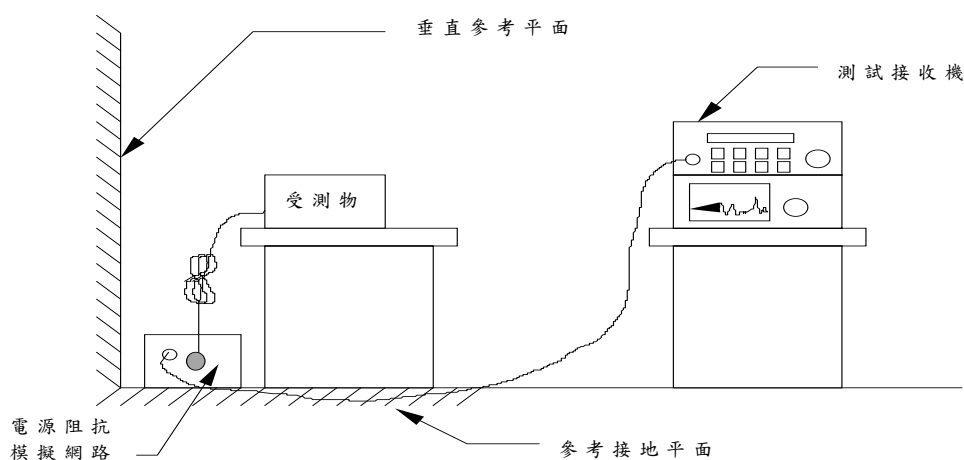
依據NCC低功率射頻器材技術規範之3.3節，以市電為電源之低功率射頻器材，其傳導回電源線上頻率自150 kHz~30 百萬赫(MHz)之射頻電壓(在電源端子每一電源線對接地點)應小於或等於下表所列之限制值。測量時應經過50 微亨利(uH)及50 歐姆(Ω)之電源線阻抗穩定網路(Line Impedance Stabilization Network; LISN)。頻率重疊處，以較低限制值為準。

頻率(MHz)	傳導限制值 (dBuV)	
	準峰值 (Quasi – peak)	平均值 (Average)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5	56	46
5 – 30	60	50

8.2 量測儀器

N/A，此產品使用 DC14.4V 電源，故無須測試。

8.3 測試配置



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8.4 測試方法

將待測物置於0.8米高的非金屬桌面，使其在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由 0.15MHz 至 30MHz 之間之電源線傳導放射強度的峰值量側(Peak)並提供掃描圖, Mark 最大的六個頻率點進行準峰值量測(QP),如果準峰值QP結果值已低於AV限制值時將不再進行AV值的量測。

8.5 干擾值計算

電源傳導干擾電壓之計算公式 =

儀器讀值(QP/AV) + 校正因子 (饋線損失 + 電源阻抗模擬網路損失)

8.6 量測結果:

N/A，此產品使用 DC14.4V 電源，故無須測試。

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9 輸出峰值功率量測

9.1 適用標準

依據 NCC 低功率射頻器材技術規範 4.10.1.2 (A)之規定，操作於 2400-2483.5 MHz，並至少使用 75 個跳頻頻道之跳頻系統，其峰值輸出功率不得大於 1 Watt。除前項 4.10.1.2 (A)以外，依 4.10.1.6(2)(B)其他限制事項 4.10.1.6(1)(A)，所有操作於 2400-2483.5 兆赫(MHz)之跳頻系統：0.125 瓦(W)(含)以下，且其所使用天線之增益不可大於 6dBi；若使用大於 6dBi 增益之天線，則其輸出峰值功率相對需衰減天線增益所增加之量(單位為 dB)。

依據NCC低功率射頻器材技術規範4.10.1.3之規定，進行固定式點對點操作時，應符合下列情現之一：依據NCC低功率射頻器材技術規範4.10.1.3 (1)之規定，操作頻率為2400-2483.5 兆赫(MHz)者，其發射天線之方向性增益超過6dBi，每超過3dB應降低1dB之最大傳導輸出功率。

依據NCC低功率射頻器材技術規範4.10.1.3 (2)之規定，操作頻率為5725-5850兆赫(MHz)者，其發射天線之方向性增益超過6dBi，不需降低最大傳導輸出功率。

依據NCC低功率射頻器材技術規範4.10.1.3 (3)之規定，用於點對多點操作時，如其發射天線之方向性增益超過 6dBi，應依所超過之dB數等量降低最大傳導輸出功率。

註：固定式點對點操作使用方式，並不包括使用點對多點之系統、全向性之應用以及發射相同資訊之共同安裝的多重發射機。展頻或數位調變之發射器需要專業安裝，該設備操作者或安裝者有責任確認該系統是限用於固定式、點對點之操作，隨機所附之使用手冊必須包含此訊息以告知使用者或安裝者須負之責任。

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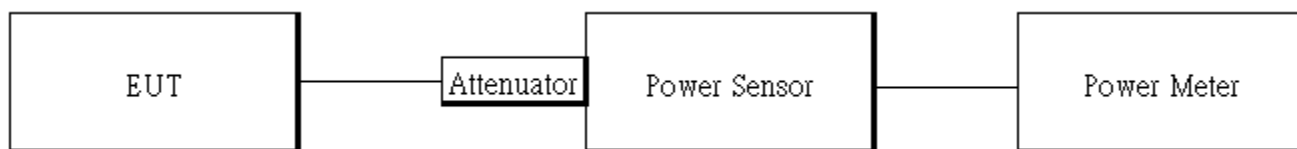
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9.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1804001	03/02/2021	03/01/2022
Power Sensor	Anritsu	MA2411B	1726104	03/02/2021	03/01/2022
Power Sensor	Anritsu	MA2411B	1726107	03/02/2021	03/01/2022
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

9.3 測試配置



9.4 量測方法

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10 Measurement Guidelines.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Max Hold, Detector = Peak, RBW >=20dB bandwidth)
4. Record the max. reading.
5. Repeat above procedures until all default test channel is completed.

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9.5 量測結果

1M BR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	19	2.17	1.648	1000
Mid	2441	18	1.74	1.493	1000
High	2480	18	1.99	1.581	1000

1M BR mode (Average):

CH	Freq. (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	19	1.90	1.549	1000
Mid	2441	18	1.71	1.483	1000
High	2480	18	1.94	1.564	1000

2M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	20	3.40	2.188	125
Mid	2441	20	3.81	2.404	125
High	2480	19	3.24	2.109	125

2M EDR mode (Average):

CH	Freq. (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	20	0.95	1.245	125
Mid	2441	20	1.43	1.391	125
High	2480	19	0.81	1.206	125

3M EDR mode (Peak):

CH	Freq. (MHz)	Power set	Peak Output Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	20	3.83	2.415	125
Mid	2441	19	3.32	2.148	125
High	2480	19	3.70	2.344	125

3M EDR mode (Average):

CH	Freq. (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Output Power (mW)	Limit (mW)
Low	2402	20	0.84	1.214	125
Mid	2441	19	0.35	1.084	125
High	2480	19	0.77	1.195	125

NOTE: cable loss as 1.8dB that offsets in the spectrum

*Note: Max. Output include tune up tolerance Power measured by using average detector.

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10 20dB 頻寬要求

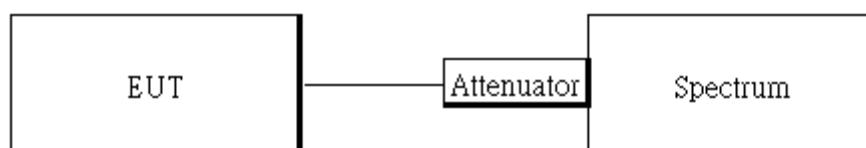
10.1 適用標準

NCC 低功率射頻器材技術規範 4.10.1.6(1)(A) 跳頻系統之載波頻率頻道間隔不得低於 25 千赫 (kHz)或跳頻頻道之 20dB 頻寬，兩者取較寬者。但操作頻率為 2400-2483.5 兆赫(MHz) 頻帶且輸出功率不大於 125 毫瓦(mW)跳頻系統，其載波頻率頻道間隔不得小於 25 千赫 (kHz)或跳頻頻道 20dB 頻寬之三分之二，兩者取較寬者。系統之跳頻頻道應依虛擬亂數排列，在各頻率之跳頻頻道上跳躍。每一發射機必須均等的使用每一頻率。系統接收機應具有與發射機跳躍頻道頻寬相匹配之輸入頻寬，且應隨所發射之信號同步偏移接收頻率。

10.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

10.3 測試配置



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10.4 量測方法

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set the spectrum analyzer as
RBW= 1 % to 5% of OBW ,
VBW = 3 X RBW,
Span= 2 to 5 times of the OBW,
Sweep=auto,
Detector = Peak, and Max hold for 20dB Bandwidth test.
5. Mark the peak frequency and -20dB (upper and lower) frequency
6. Repeat above procedures until all test default channel is completed

10.5 量測結果**GFSK**

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	0.9534	0.64
Mid	0.9528	0.64
High	0.9532	0.64

 $\pi/4$ -DQPSK

CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.229	0.82
Mid	1.228	0.82
High	1.230	0.82

8-DPSK

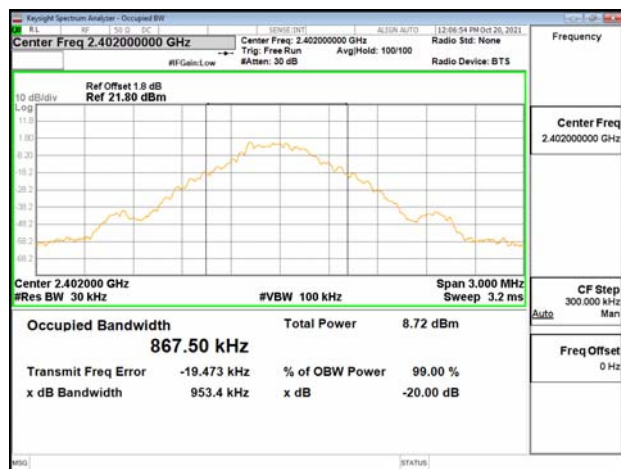
CH	20 dB BW (MHz)	2/3 BW (MHz)
Low	1.250	0.83
Mid	1.250	0.83
High	1.251	0.83

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OBW 20dB_GFSK_1M_DH5_2402MHz



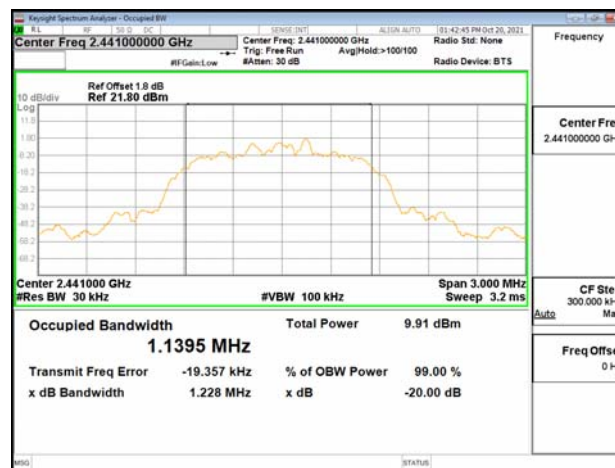
OBW 20dB_π/4DQPSK_2M_DH5_2402MHz



OBW 20dB_GFSK_1M_DH5_2441MHz



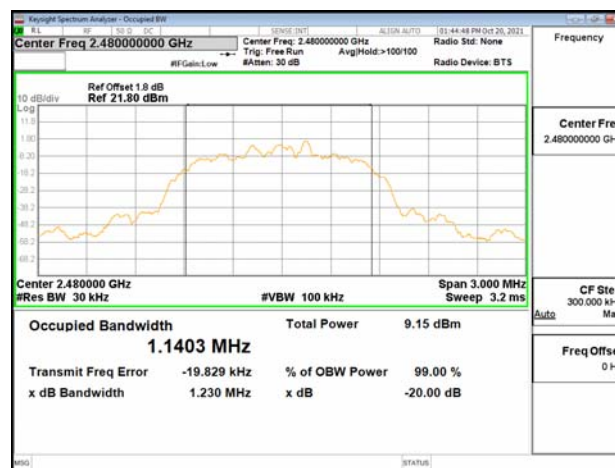
OBW 20dB_π/4DQPSK_2M_DH5_2441MHz



OBW 20dB_GFSK_1M_DH5_2480MHz



OBW 20dB_π/4DQPSK_2M_DH5_2480MHz



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OBW 20dB_8DPSK_3M_DH5_2402MHz



OBW 20dB_8DPSK_3M_DH5_2441MHz



OBW 20dB_8DPSK_3M_DH5_2480MHz



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11 帶外發射限制

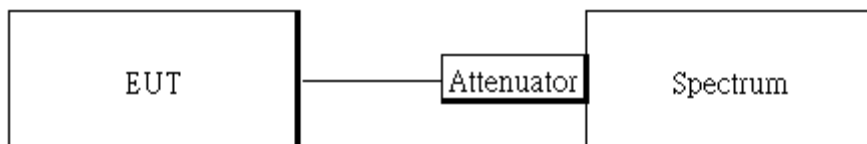
11.1 適用標準

依據 NCC 低功率射頻器材技術規範 4.10.1.5 之規定，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 千赫內的射頻功率，須衰減 20 分貝(dB)。

11.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

11.3 測試配置



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11.4 量測方法

11.4.1 開放頻帶邊緣量測:

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Sweep = auto
6. Mark Peak, 2.3999GHz and 2.4836GHz and record the max. level.
7. Repeat above procedures until all frequency measured were complete.

11.4.2 發射頻帶外量測:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows ANSI C63.10:2013.
3. Set RBW = 100 kHz & VBW = 300 kHz, Detector =Peak, Sweep = Auto
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

11.5 量測結果

發射限制測試值 CH-1(下邊緣頻帶): 在 2400.00MHz 之 100kHz 頻寬內最大值皆比主波低 20dB 以上。

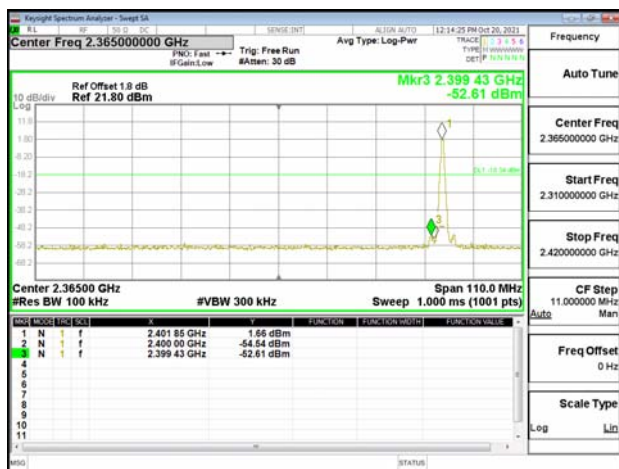
發射限制測試值 CH-79(上邊緣頻帶): 在 2483.5MHz 之 100kHz 頻寬內最大值皆比主波低 20dB 以上。

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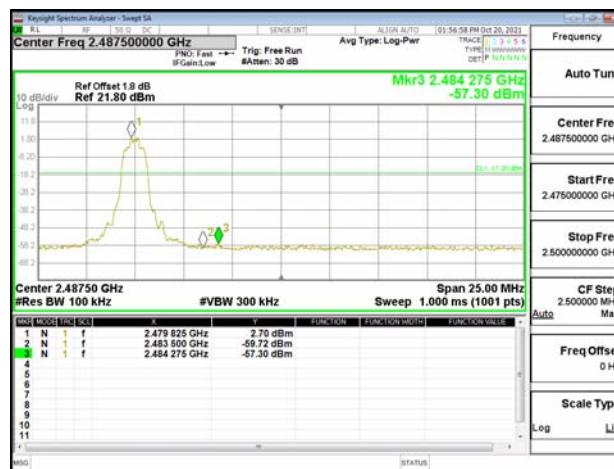
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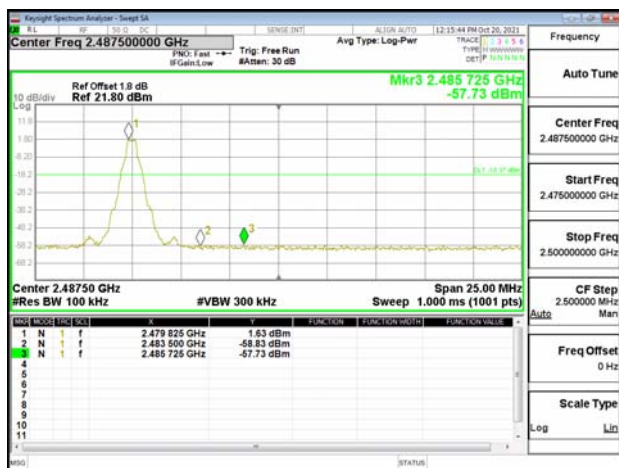
Band Edge_GFSK_1M_DH5_2402MHz



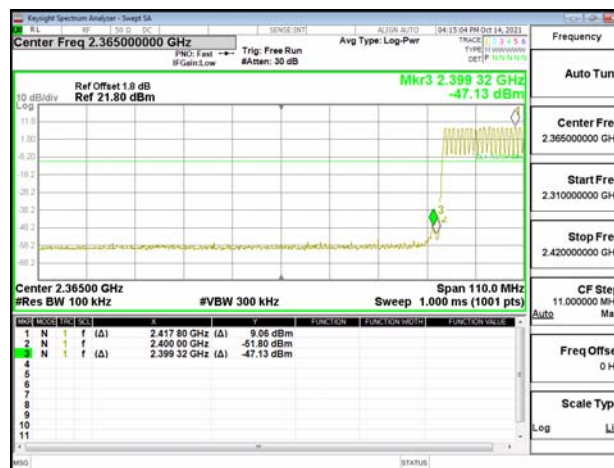
Band Edge_8DPSK_3M_DH5_2480MHz



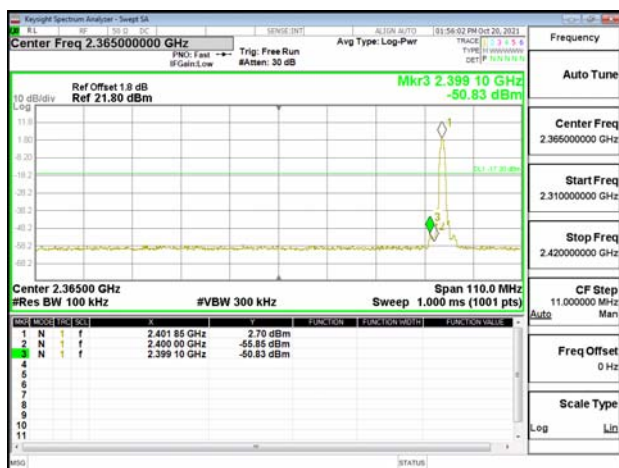
Band Edge_GFSK_1M_DH5_2480MHz



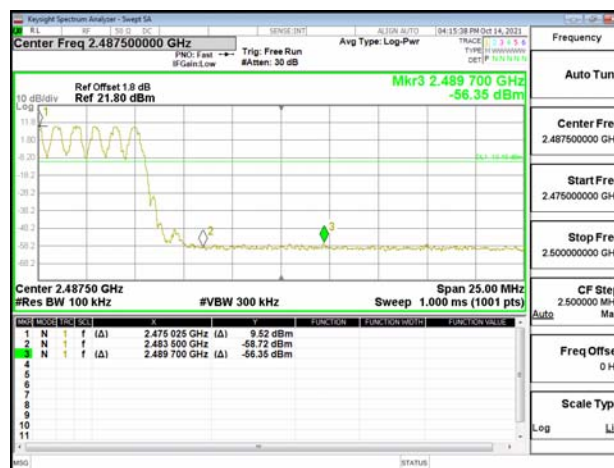
Hopping Band Edge_GFSK_1M_DH5_2402MHz



Band Edge_8DPSK_3M_DH5_2402MHz



Hopping Band Edge_GFSK_1M_DH5_2480MHz

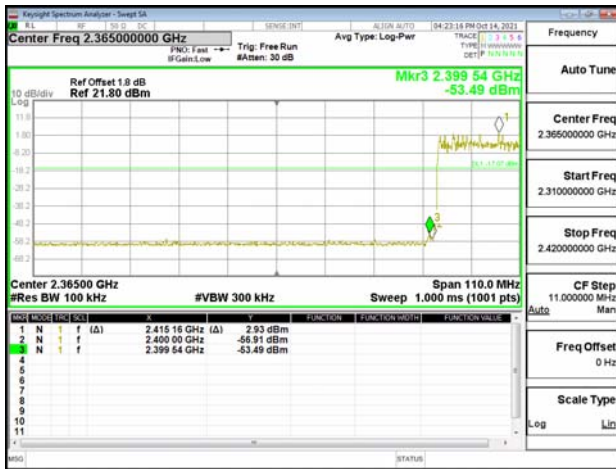


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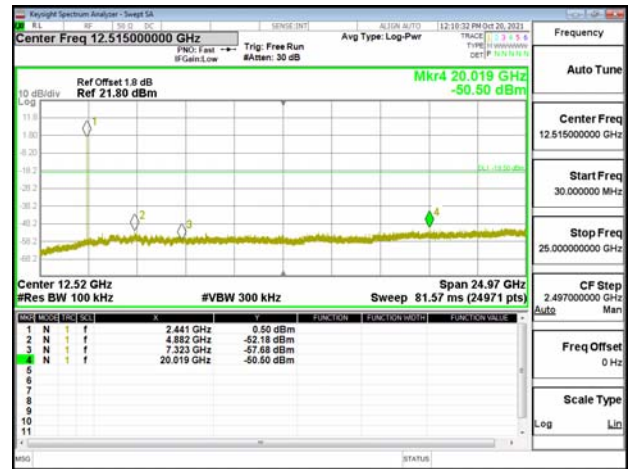
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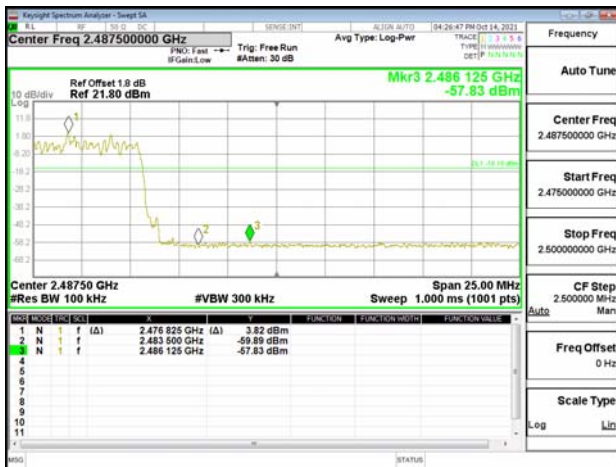
Hopping Band Edge_8DPSK_3M_DH5_2402MHz



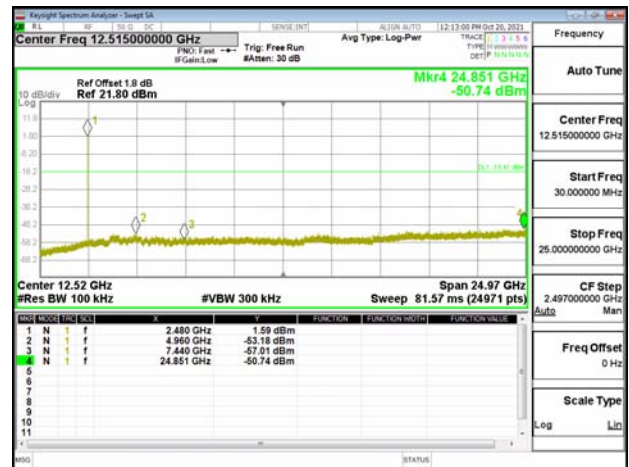
Spurious Emission_GFSK_1M_DH5_2441MHz



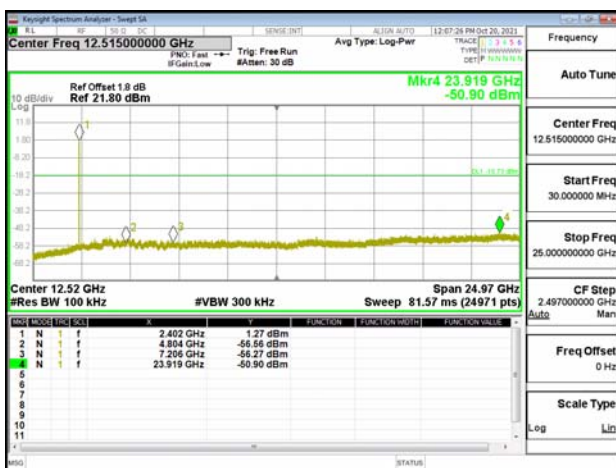
Hopping Band Edge_8DPSK_3M_DH5_2480MHz



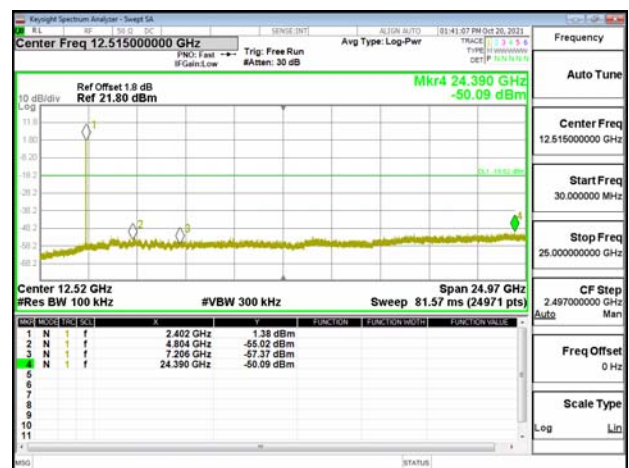
Spurious Emission_GFSK_1M_DH5_2480MHz



Spurious Emission_GFSK_1M_DH5_2402MHz



Spurious Emission_pi/4DQPSK_2M_DH5_2402MHz

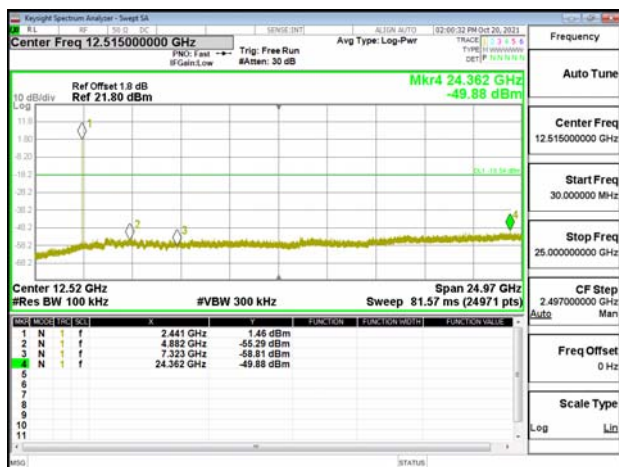


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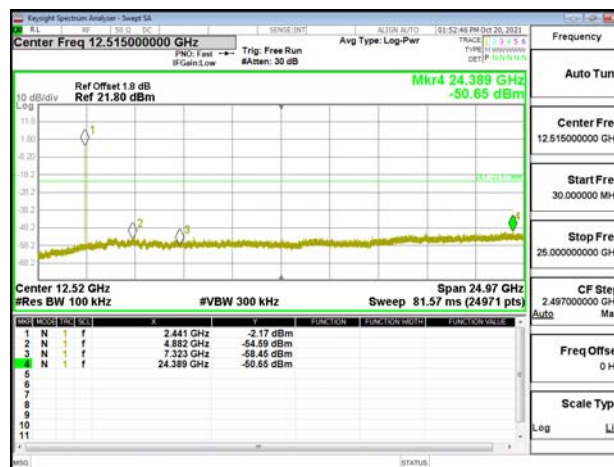
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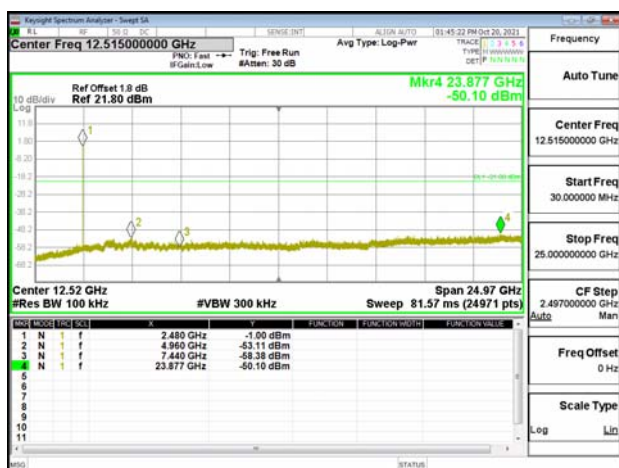
Spurious Emission_π/4DQPSK_2M_DH5_2441MHz



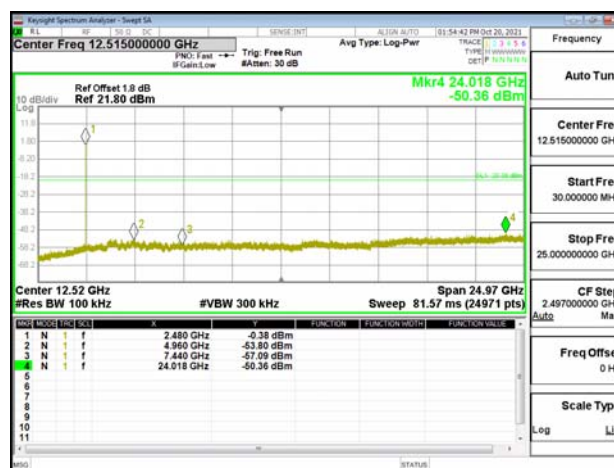
Spurious Emission_8DPSK_3M_DH5_2441MHz



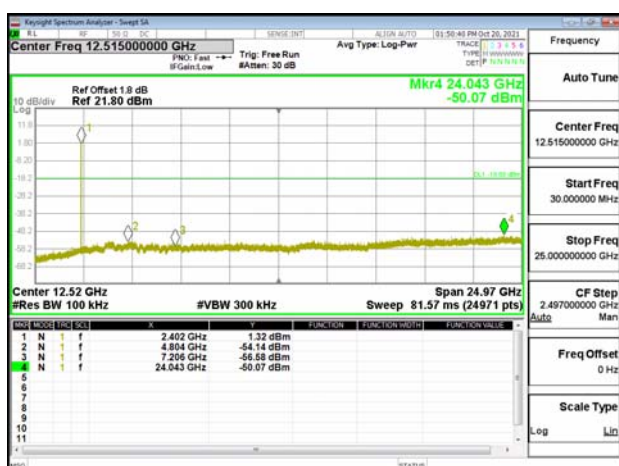
Spurious Emission_π/4DQPSK_2M_DH5_2480MHz



Spurious Emission_8DPSK_3M_DH5_2480MHz



Spurious Emission_8DPSK_3M_DH5_2402MHz



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12 禁用頻帶輻射發射量測

12.1 適用標準

依據NCC低功率射頻器材技術規範3.6 之要求，低功率射頻器材其電場強度應小於或等於下表之限制值，且其不必要之發射皆不得大於主波發射強度，此外，落於3.5禁用頻段之輻射發射，應符合3.6之規定。

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

將待測物置於非金屬桌面，測試頻率1GHz以下時，使用桌高0.8 米，1GHz以上時，使用桌高1.5米，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。

以下為頻譜儀的設定：

頻率	RBW	VBW	Detector
9kHz~150kHz	300Hz	300Hz	Quasi-Peak
150kHz~30MHz	10kHz	10kHz	Quasi-Peak
30MHz~1GHz	100kHz	300kHz	Peak
30MHz~1GHz	120kHz	360kHz	Quasi-Peak
1GHz以上 Maximum Emission	1MHz	3MHz	Peak
1GHz以上 Duty Cycle ≥ 98% Average Emission Measurements	1MHz	10Hz	Peak
1GHz以上 Duty Cycle < 98% Average Emission Measurements	1MHz	1/T	Peak

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12.2 量測儀器

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Site Cal	SGS	SAC I chamber	N/A	01/01/2021	12/31/2021
Horn Antenna	SCHWARZBECK	BBHA9120D	D803	12/17/2020	12/16/2021
Bi-log Antenna	TESEO	CBL 6112D	35242 & AT-N0555	01/13/2021	01/12/2022
Loop Antenna	ETS.LINDGREN	6502	148045	09/29/2021	09/28/2022
Spectrum Analyzer	Agilent	E4446A	MY51100003	10/26/2020	10/25/2022
Test Software	Audix	e3	Ver. 9.210322	N.C.R	N.C.R
DC Power Supply	Gwinstek	SPS-3610	GEV856750	08/04/2021	08/03/2022
EMI Test Receiver	R&S	ESCI 7	100759	08/26/2021	08/25/2022
Pre-Amplifier	HP	8449B	3008A01973	12/16/2020	12/15/2021
Pre-Amplifier	HP	8447D	2944A09469	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	12/16/2020	12/15/2021
Coaxial Cable	Huber Suhner	EMC 104-SM-SM-2000	160123	12/16/2020	12/15/2021
Bandreject Filter 2400-2483.5	EWT	EWT-14-0166	M1	12/16/2020	12/15/2021
3.2GHz High Pass Filter	WI	WHKX10-2624-80SS	4	04/20/2021	04/19/2022

NOTE: N.C.R refers to Not Calibrated Required.

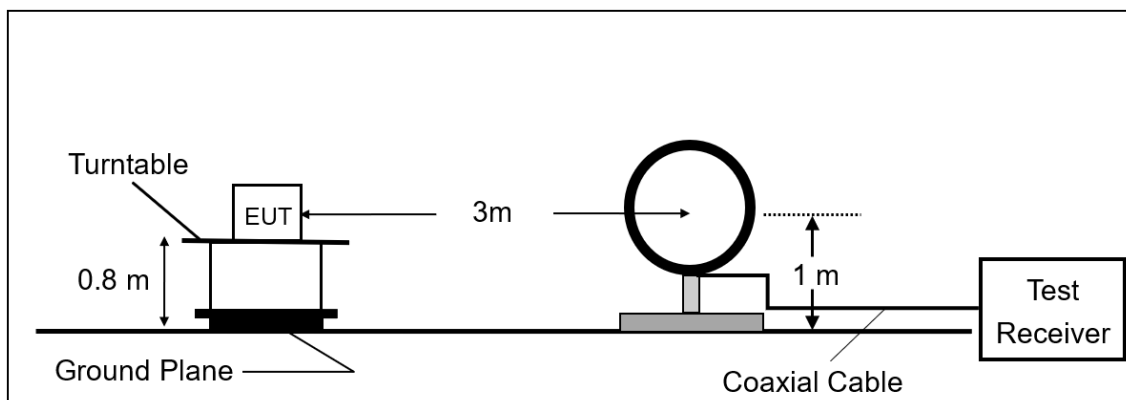
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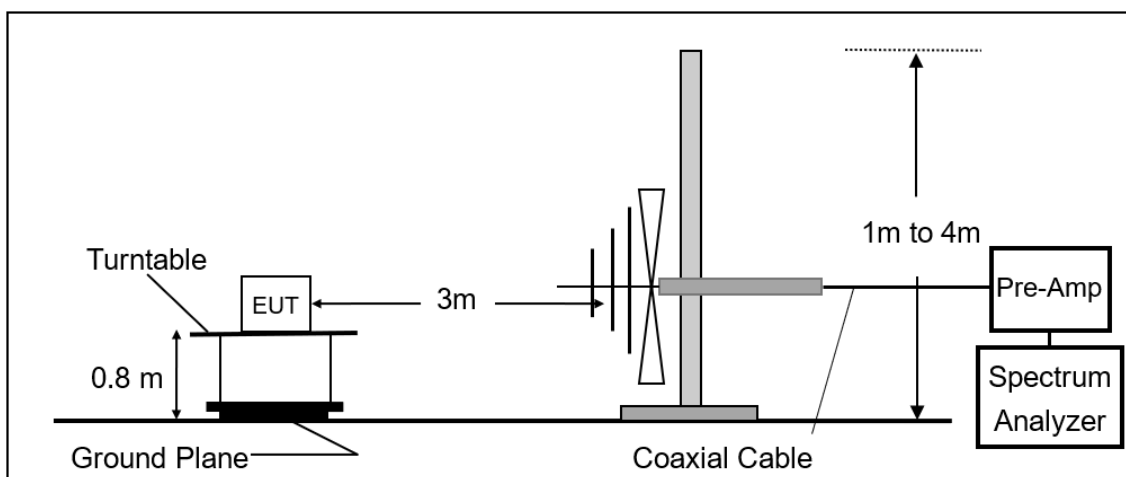
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12.3 測試配置

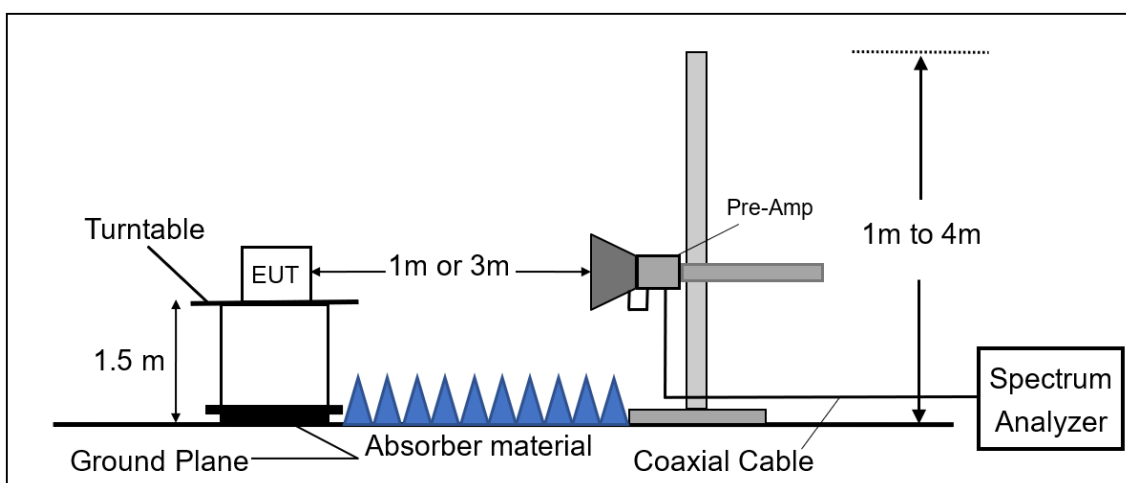
(A) 量測頻率低於 30MHz 以下之測試配置



(B) 量測頻率 30MHz 至 1000MHz 之測試配置



(C) 量測頻率 1000MHz 以上之測試配置



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12.4 量測方法

將待測物置於非金屬桌面，測試頻率1GHz以下時，使用桌高0.8 米，1GHz以上時，使用桌高1.5米，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。

以下為頻譜儀的設定：

頻率	RBW	VBW	Detector
9kHz~150kHz	300Hz	300Hz	Quasi-Peak
150kHz~30MHz	10kHz	10kHz	Quasi-Peak
30MHz~1GHz	100kHz	300kHz	Peak
30MHz~1GHz	120kHz	360kHz	Quasi-Peak
1GHz以上 Maximum Emission	1MHz	3MHz	Peak
According to C63.10:2013 Section 7.5 Procedure for determining the average value of pulsed emissions with duty cycle correction factor $20 \log (T_{on}/100ms)$.			

12.5 場強計算

- Distance extrapolation = $40 \cdot \log (\text{Required Distance(m)} / \text{Test Distance(m)})$
- Emission level (dBμV/m) = $20 \log \text{Emission level (μV/m)}$
- Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)
Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

註: 9 kHz ~ 30MHz 之輻射量測皆低於限制值 20dB 以上，依據LP0002 6.13規定混附發射毋需記錄。

輻射量測僅附上最差模式（30MHz 以上）。

比較H Plane、E1 Plane和E2 Plane測試值後，附上最差模式數據。

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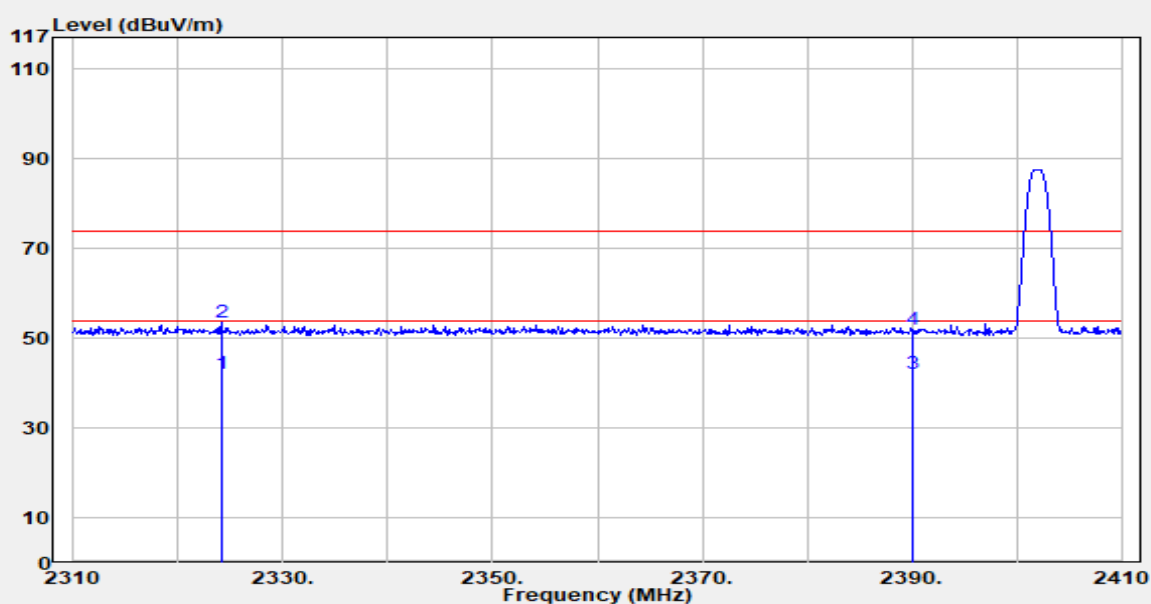
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12.6 量測結果

12.6.1 禁用頻帶邊緣

Report Number :ER/2021/90061
 Operation Mode :BR(1M)
 Test Frequency :2402 MHz
 Test Mode :Bandedge CH Low
 EUT Pol :E2 Plane

Test Site :SAC 1
 Test Date :2021-10-14
 Temp./Humi. :28.1/62
 Antenna Pol. :Vertical
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2324.10	Average	42.01	0.01	42.02	54.00	-11.98
2324.10	Peak	53.54	0.01	53.55	74.00	-20.45
2390.00	Average	42.22	-0.12	42.10	54.00	-11.90
2390.00	Peak	52.04	-0.12	51.92	74.00	-22.08

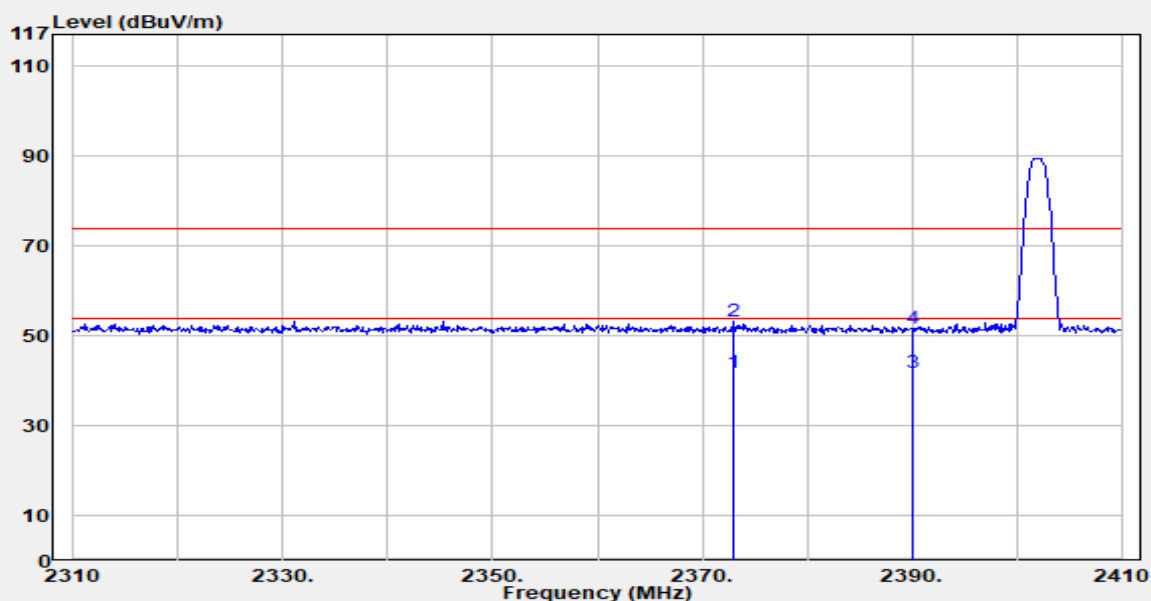
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



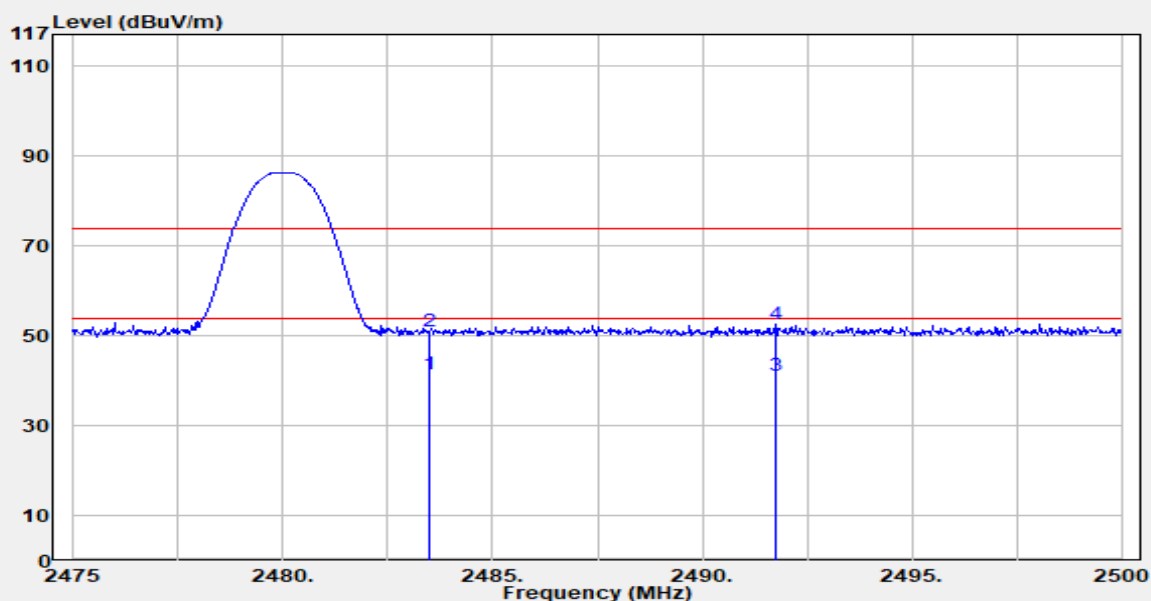
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2372.90	Average	42.02	-0.06	41.96	54.00	-12.04
2372.90	Peak	53.41	-0.06	53.35	74.00	-20.65
2390.00	Average	41.91	-0.12	41.79	54.00	-12.21
2390.00	Peak	51.73	-0.12	51.61	74.00	-22.39

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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	41.77	-0.16	41.61	54.00	-12.39
2483.50	Peak	51.22	-0.16	51.06	74.00	-22.94
2491.75	Average	41.31	-0.15	41.16	54.00	-12.84
2491.75	Peak	52.73	-0.15	52.58	74.00	-21.42

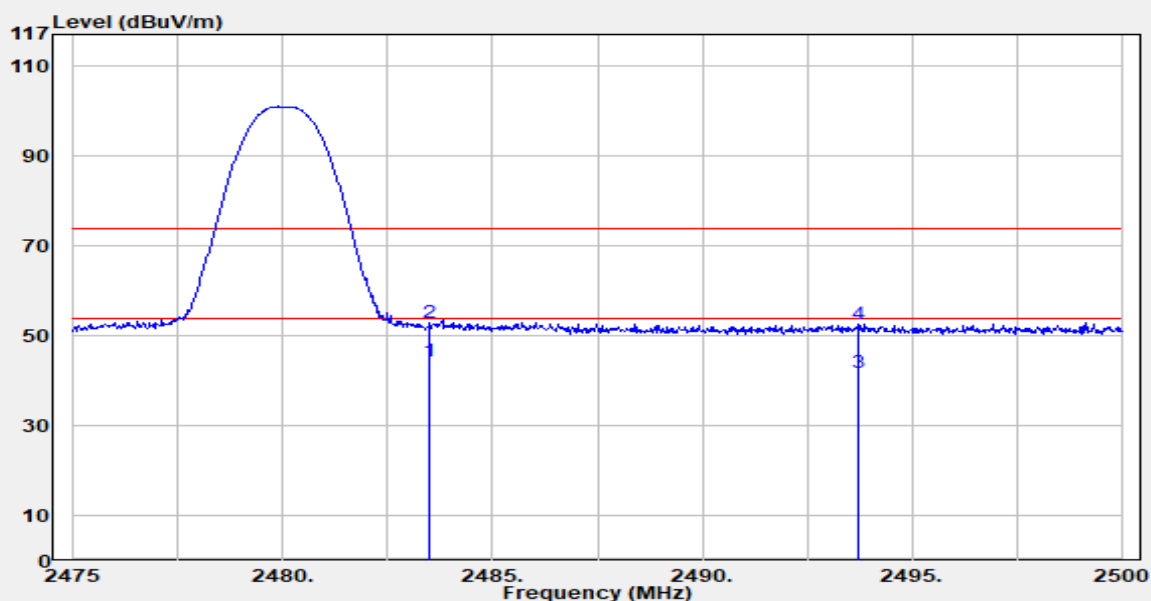
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	44.45	-0.16	44.29	54.00	-9.71
2483.50	Peak	53.07	-0.16	52.91	74.00	-21.09
2493.73	Average	42.09	-0.15	41.94	54.00	-12.06
2493.73	Peak	52.87	-0.15	52.71	74.00	-21.29

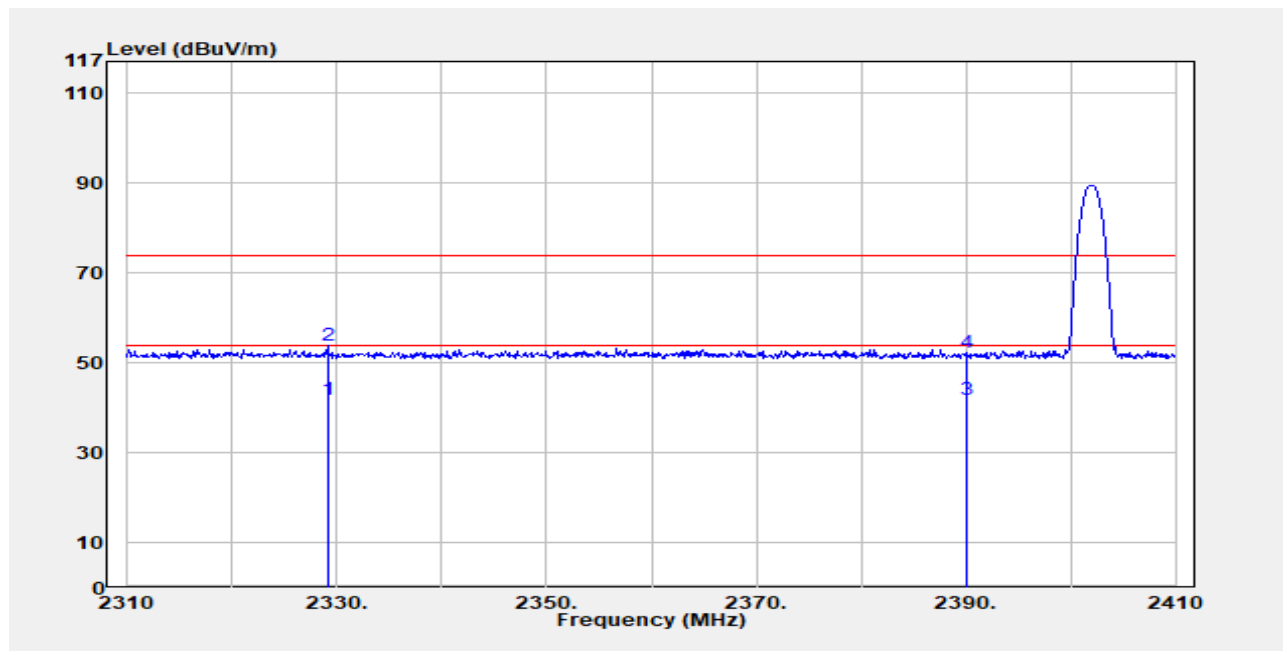
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2329.10	Average	41.88	0.01	41.89	54.00	-12.11
2329.10	Peak	53.79	0.01	53.80	74.00	-20.20
2390.00	Average	42.09	-0.12	41.97	54.00	-12.03
2390.00	Peak	52.50	-0.12	52.38	74.00	-21.62

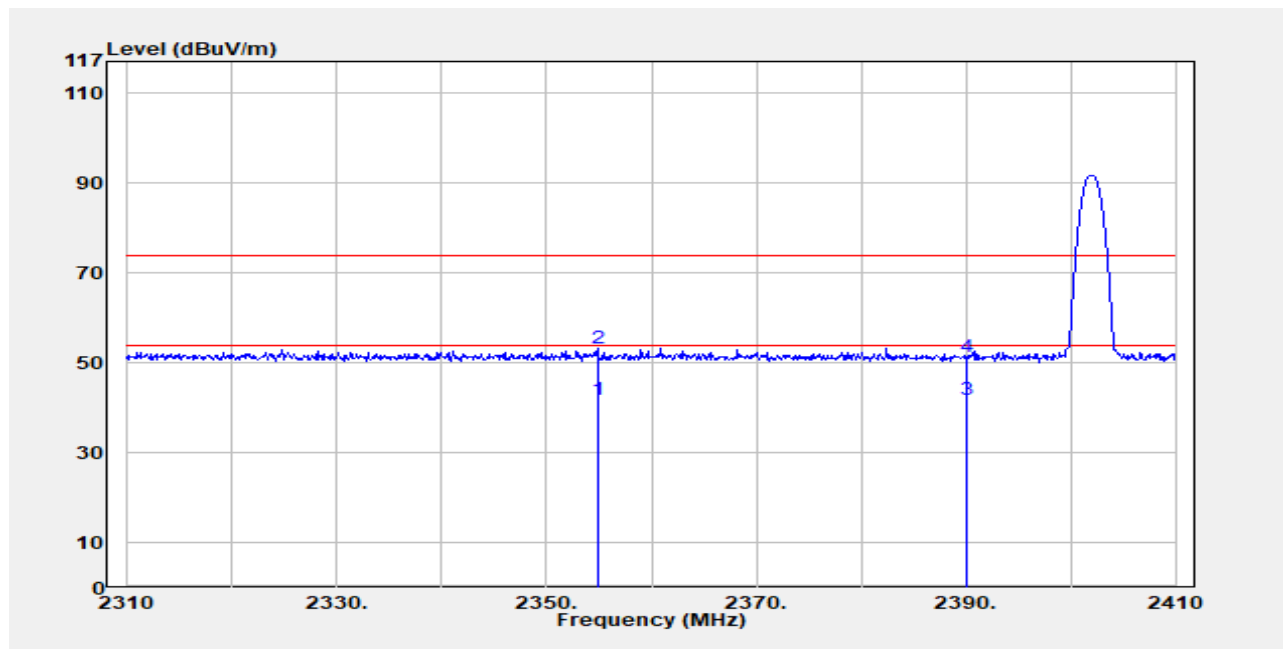
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



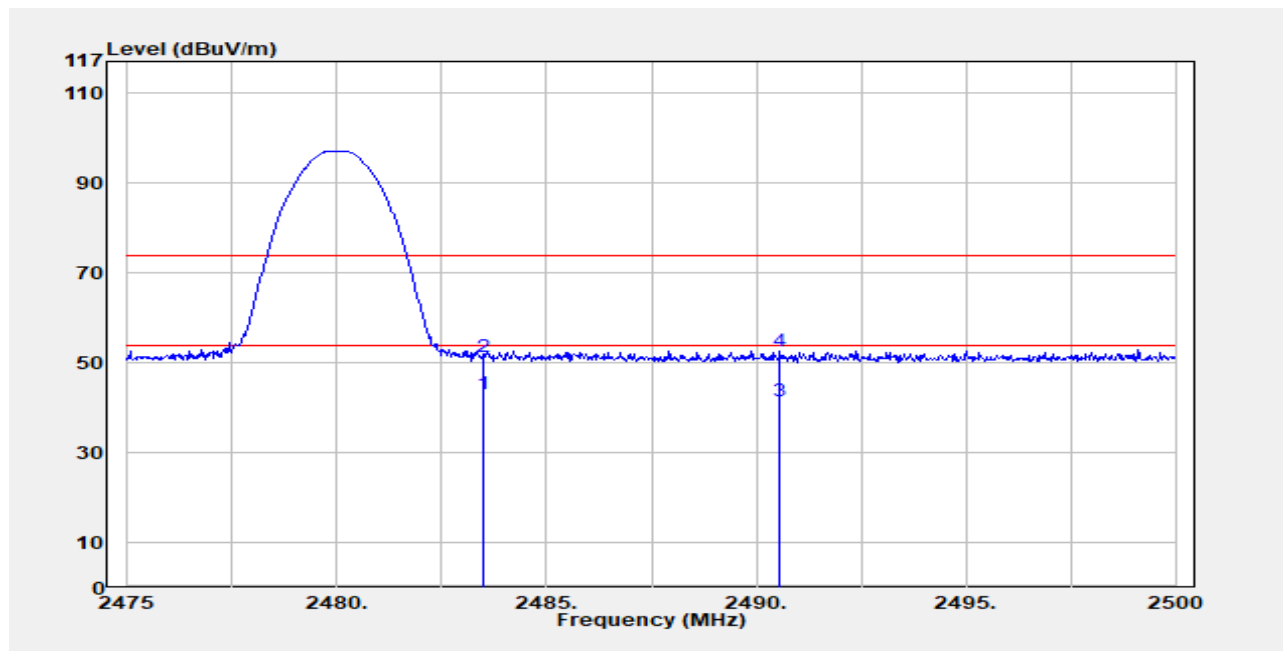
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2354.90	Average	41.90	0.00	41.90	54.00	-12.10
2354.90	Peak	53.23	0.00	53.23	74.00	-20.77
2390.00	Average	41.93	-0.12	41.81	54.00	-12.19
2390.00	Peak	51.45	-0.12	51.33	74.00	-22.67

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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	43.13	-0.16	42.97	54.00	-11.03
2483.50	Peak	51.46	-0.16	51.30	74.00	-22.70
2490.58	Average	41.81	-0.15	41.66	54.00	-12.34
2490.58	Peak	52.92	-0.15	52.76	74.00	-21.24

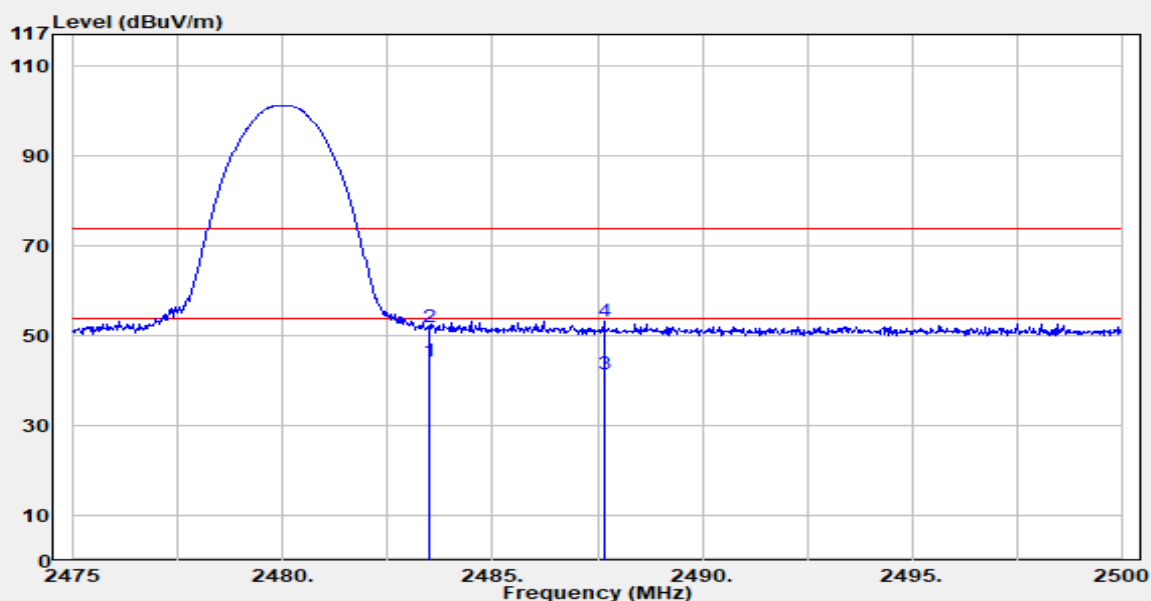
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	44.46	-0.16	44.30	54.00	-9.70
2483.50	Peak	52.07	-0.16	51.91	74.00	-22.09
2487.65	Average	41.85	-0.16	41.69	54.00	-12.31
2487.65	Peak	53.51	-0.16	53.35	74.00	-20.65

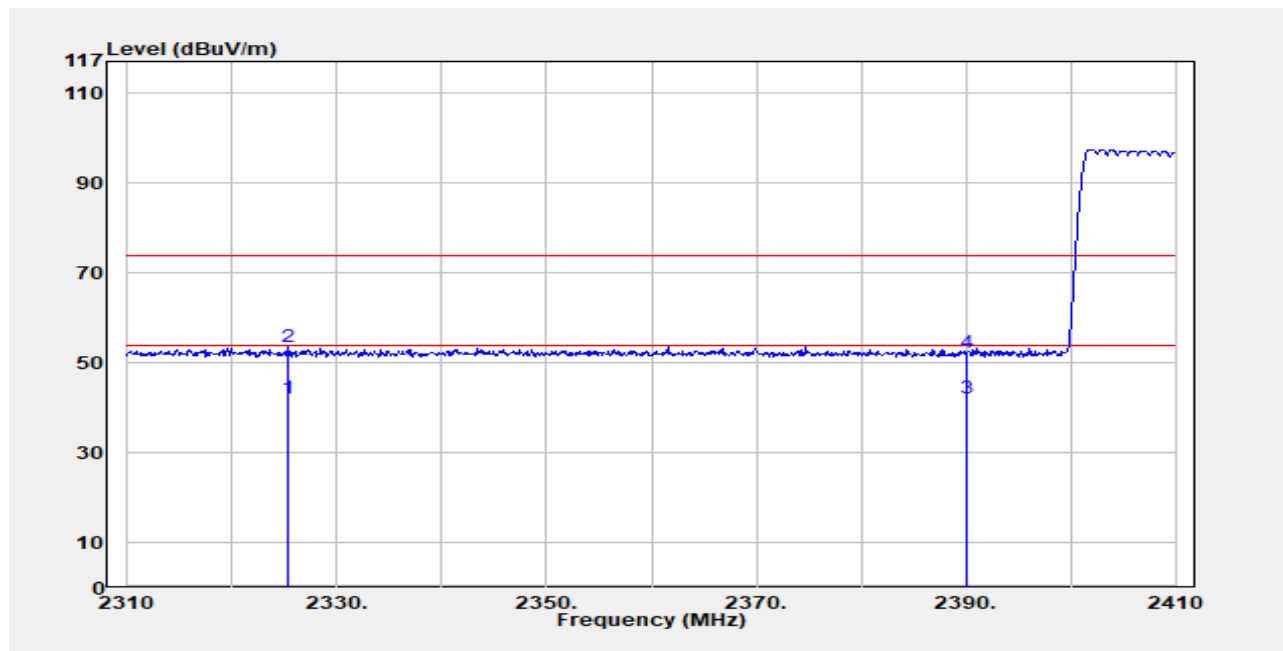
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Report Number :ER/2021/90061
Operation Mode :BR Hopping
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2325.30	Average	42.01	0.01	42.02	54.00	-11.98
2325.30	Peak	53.54	0.01	53.55	74.00	-20.45
2390.00	Average	42.14	-0.12	42.02	54.00	-11.98
2390.00	Peak	52.50	-0.12	52.38	74.00	-21.62

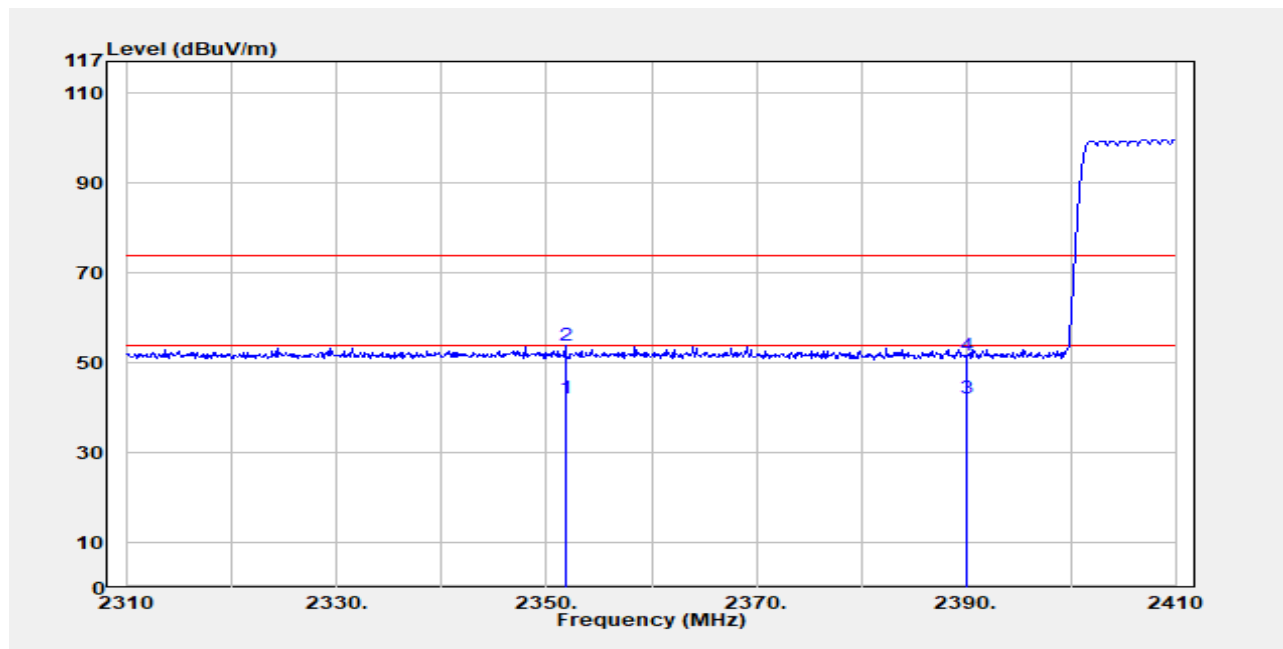
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Report Number :ER/2021/90061
Operation Mode :BR Hopping
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2351.80	Average	42.03	0.01	42.04	54.00	-11.96
2351.80	Peak	53.84	0.01	53.85	74.00	-20.15
2390.00	Average	42.32	-0.12	42.20	54.00	-11.80
2390.00	Peak	51.65	-0.12	51.53	74.00	-22.47

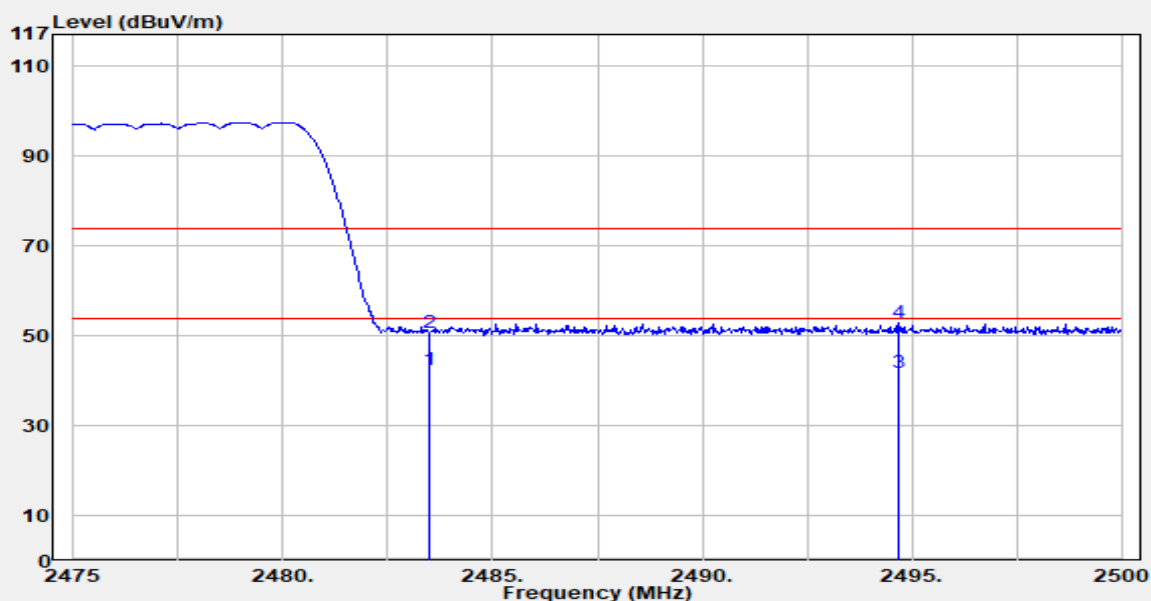
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Report Number :ER/2021/90061
Operation Mode :BR Hopping
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	42.69	-0.16	42.53	54.00	-11.47
2483.50	Peak	50.95	-0.16	50.79	74.00	-23.21
2494.70	Average	41.86	-0.15	41.71	54.00	-12.29
2494.70	Peak	52.96	-0.15	52.81	74.00	-21.19

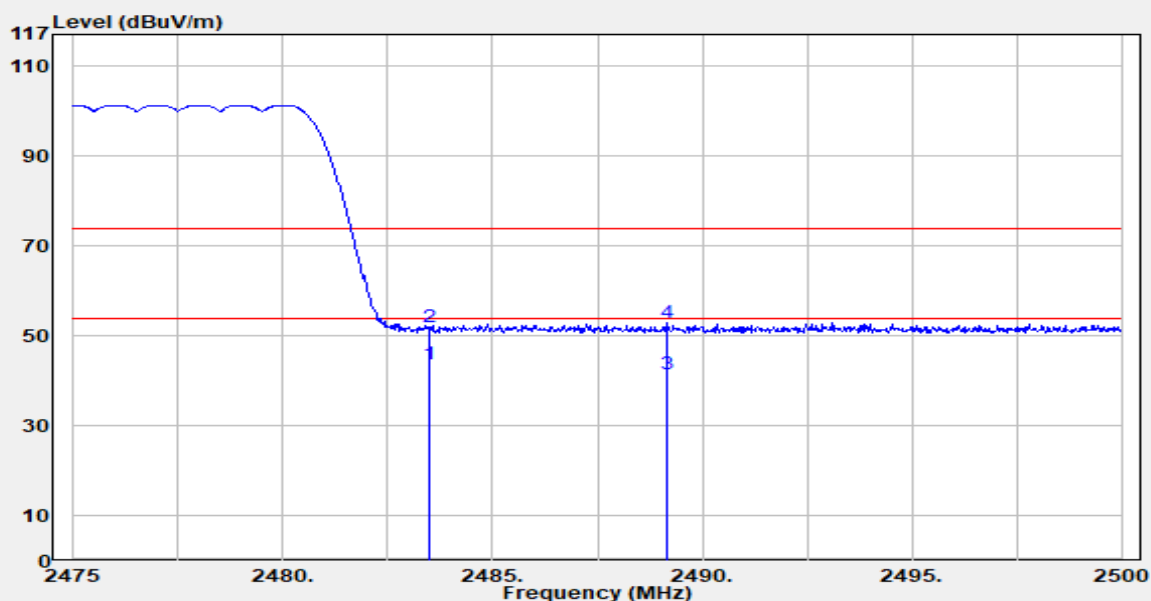
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Report Number :ER/2021/90061
Operation Mode :BR Hopping
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	44.06	-0.16	43.90	54.00	-10.10
2483.50	Peak	52.22	-0.16	52.05	74.00	-21.95
2489.18	Average	41.81	-0.16	41.65	54.00	-12.35
2489.18	Peak	53.19	-0.16	53.03	74.00	-20.97

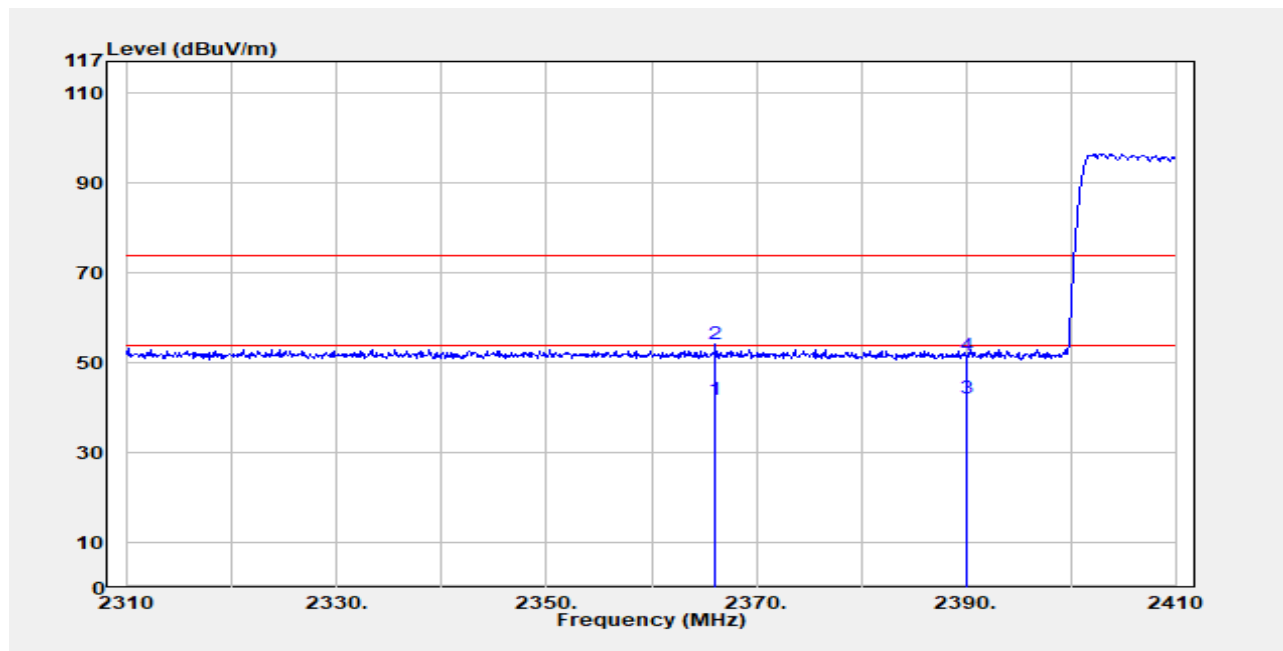
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Report Number :ER/2021/90061
Operation Mode :EDR Hopping
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2366.10	Average	41.97	-0.04	41.93	54.00	-12.07
2366.10	Peak	54.12	-0.04	54.08	74.00	-19.92
2390.00	Average	42.16	-0.12	42.04	54.00	-11.96
2390.00	Peak	51.95	-0.12	51.84	74.00	-22.16

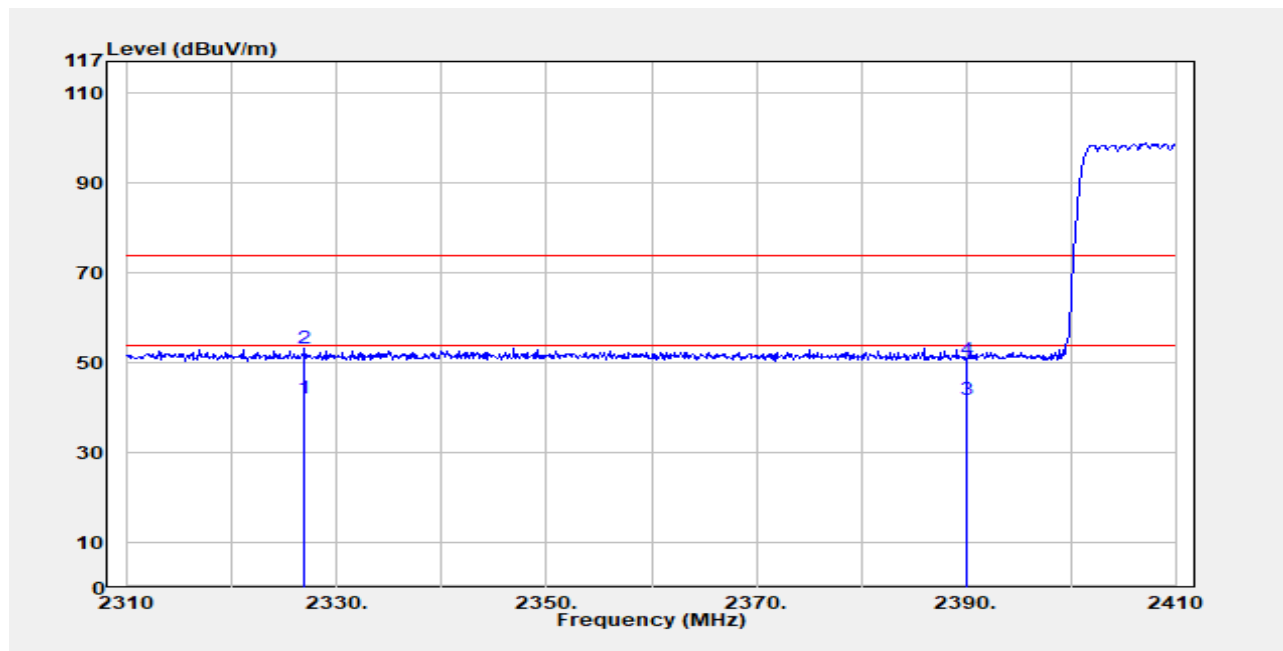
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Report Number :ER/2021/90061
Operation Mode :EDR Hopping
Test Frequency :2402 MHz
Test Mode :Bandedge CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2326.90	Average	42.04	0.01	42.05	54.00	-11.95
2326.90	Peak	53.23	0.01	53.23	74.00	-20.77
2390.00	Average	42.11	-0.12	41.99	54.00	-12.01
2390.00	Peak	50.86	-0.12	50.74	74.00	-23.26

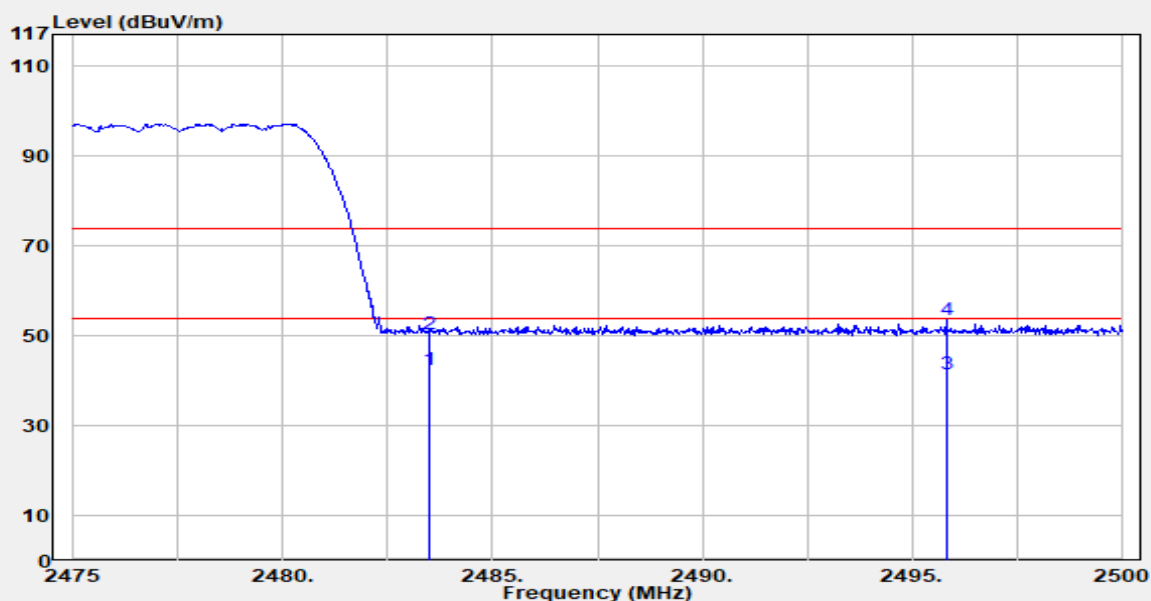
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Report Number :ER/2021/90061
Operation Mode :EDR Hopping
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Vertical
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	42.73	-0.16	42.57	54.00	-11.43
2483.50	Peak	50.67	-0.16	50.50	74.00	-23.50
2495.83	Average	41.76	-0.15	41.61	54.00	-12.39
2495.83	Peak	53.84	-0.15	53.69	74.00	-20.31

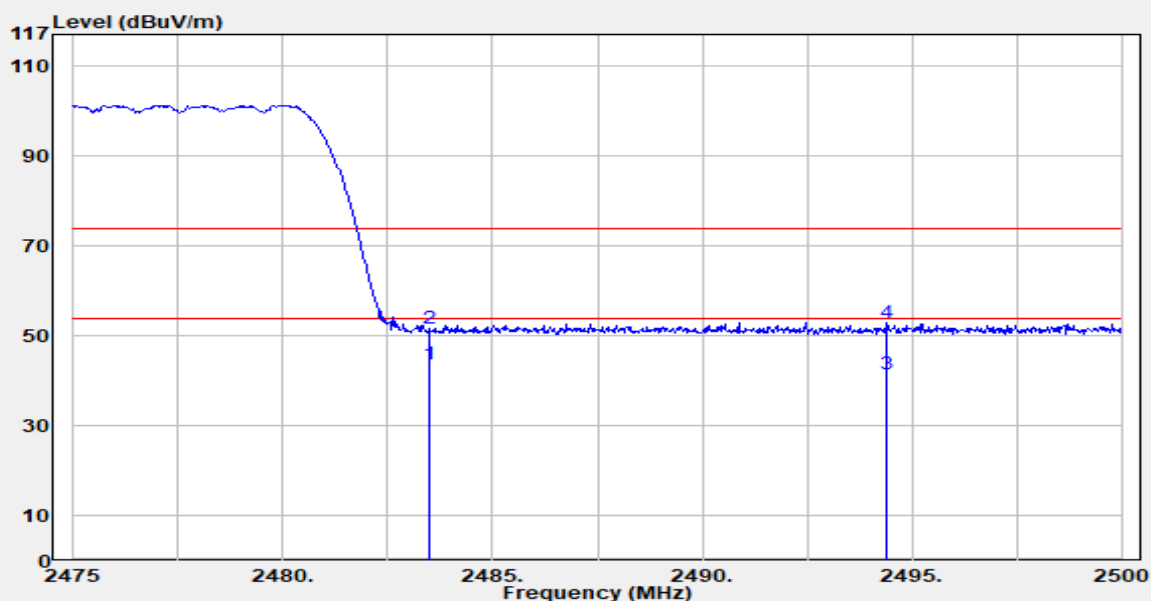
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Report Number :ER/2021/90061
Operation Mode :EDR Hopping
Test Frequency :2480 MHz
Test Mode :Bandedge CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
2483.50	Average	43.99	-0.16	43.83	54.00	-10.17
2483.50	Peak	51.78	-0.16	51.62	74.00	-22.38
2494.40	Average	41.72	-0.15	41.57	54.00	-12.43
2494.40	Peak	53.21	-0.15	53.06	74.00	-20.94

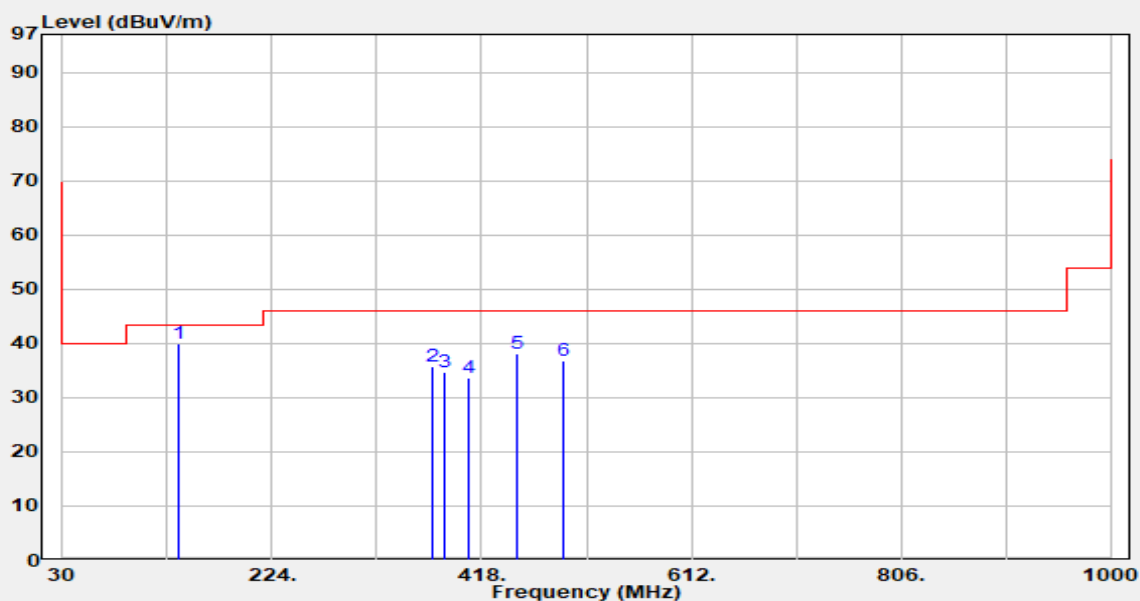
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12.6.2 禁用頻帶內輻射

Report Number :ER/2021/90061
 Operation Mode :BR(1M)
 Test Frequency :2441 MHz
 Test Mode :Tx CH Mid
 EUT Pol :E2 Plane

Test Site :SAC 1
 Test Date :2021-10-14
 Temp./Humi. :28.1/62
 Antenna Pol. :VERTICAL
 Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBUV	Factor dB	Actual FS dBUV/m	Limit @3m dBUV/m	Margin dB
138.32	Peak	52.18	-12.16	40.02	43.50	-3.48
372.73	Peak	43.64	-8.02	35.62	46.00	-10.38
384.05	Peak	42.41	-7.73	34.68	46.00	-11.32
405.07	Peak	40.31	-6.61	33.70	46.00	-12.30
450.33	Peak	44.36	-6.13	38.23	46.00	-7.77
493.98	Peak	42.75	-5.83	36.92	46.00	-9.08

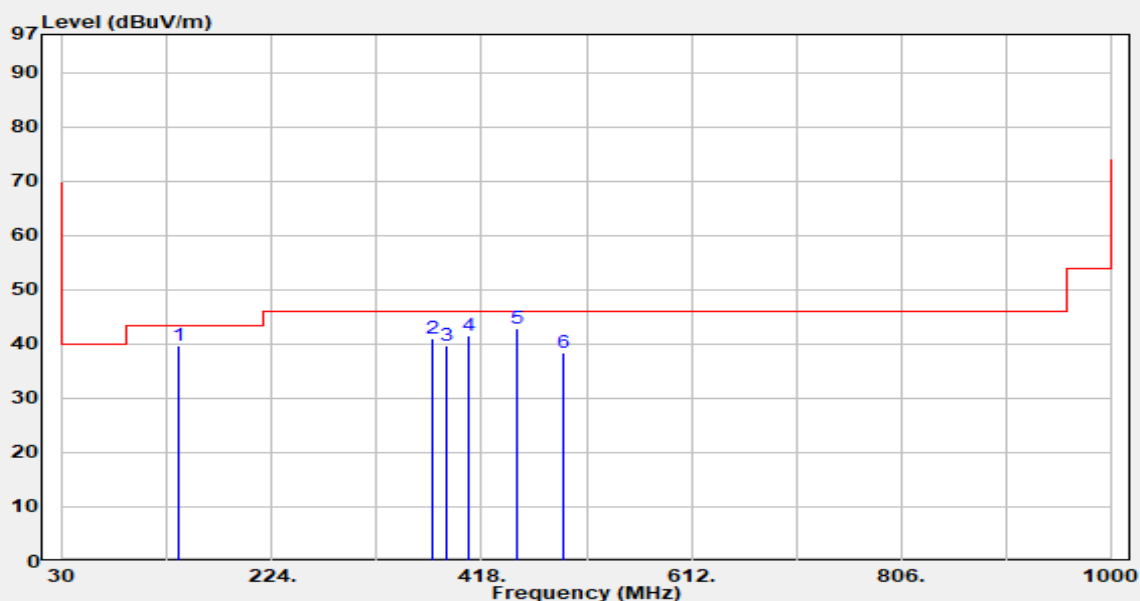
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
138.32	Peak	51.88	-12.16	39.73	43.50	-3.77
372.73	Peak	48.95	-8.02	40.94	46.00	-5.06
385.67	Peak	47.25	-7.66	39.59	46.00	-6.41
405.07	Peak	48.16	-6.61	41.55	46.00	-4.45
450.33	Peak	48.88	-6.13	42.75	46.00	-3.25
493.98	Peak	44.16	-5.83	38.33	46.00	-7.67

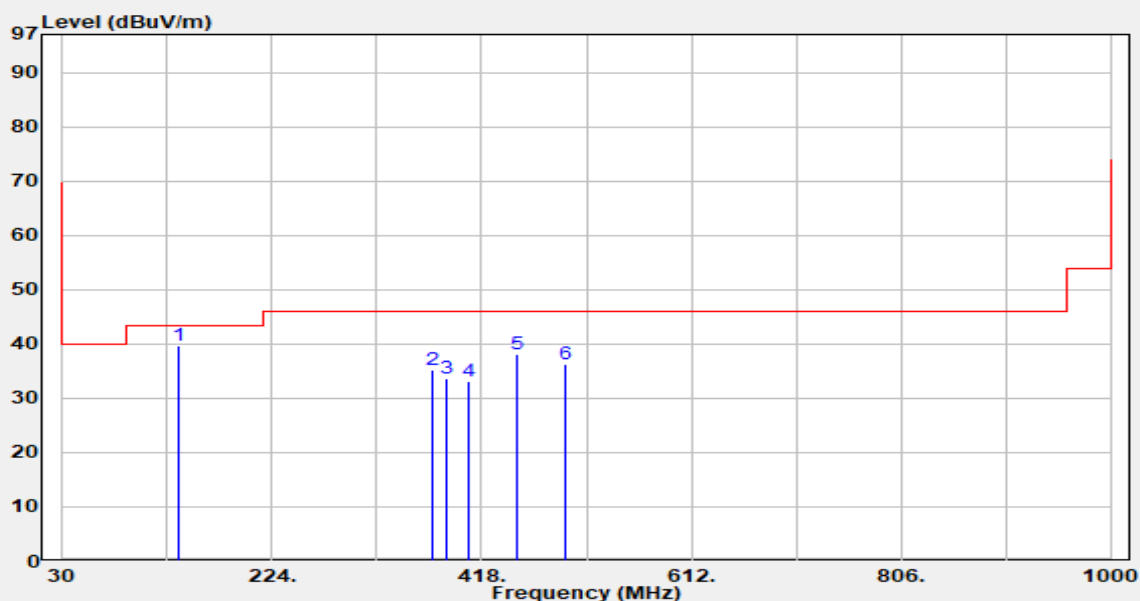
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
138.32	Peak	51.95	-12.16	39.80	43.50	-3.70
372.73	Peak	43.12	-8.02	35.11	46.00	-10.89
385.67	Peak	41.30	-7.66	33.64	46.00	-12.36
406.68	Peak	39.64	-6.55	33.09	46.00	-12.91
450.33	Peak	44.21	-6.13	38.08	46.00	-7.92
495.60	Peak	42.16	-5.82	36.34	46.00	-9.66

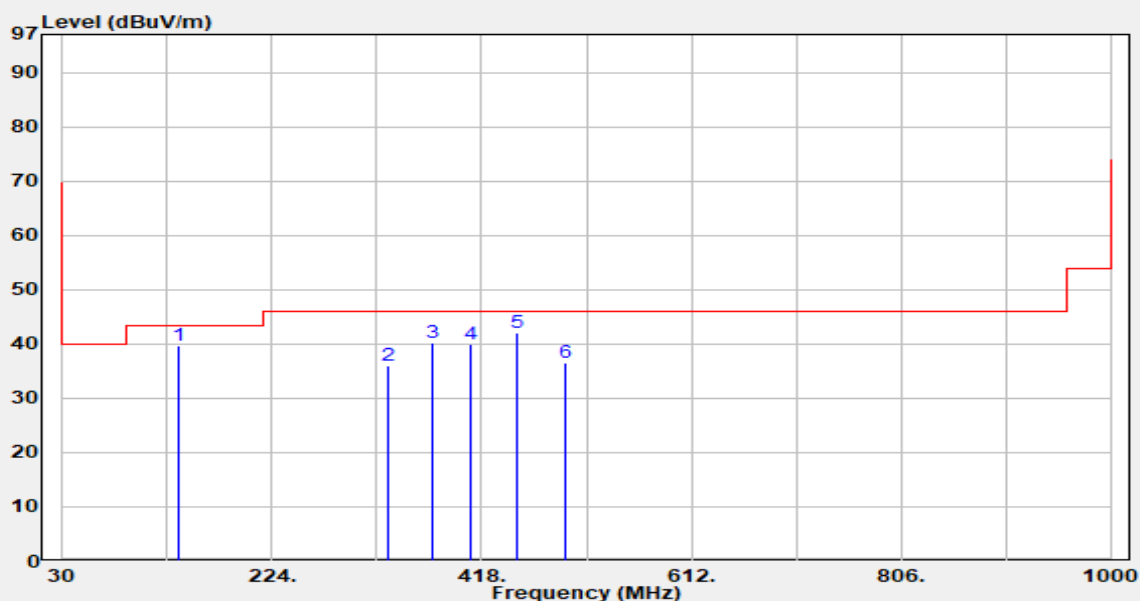
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
138.32	Peak	51.84	-12.16	39.69	43.50	-3.81
330.70	Peak	44.71	-8.59	36.12	46.00	-9.88
372.73	Peak	48.31	-8.02	40.29	46.00	-5.71
408.30	Peak	46.55	-6.48	40.06	46.00	-5.94
450.33	Peak	48.24	-6.13	42.12	46.00	-3.88
495.60	Peak	42.24	-5.82	36.42	46.00	-9.58

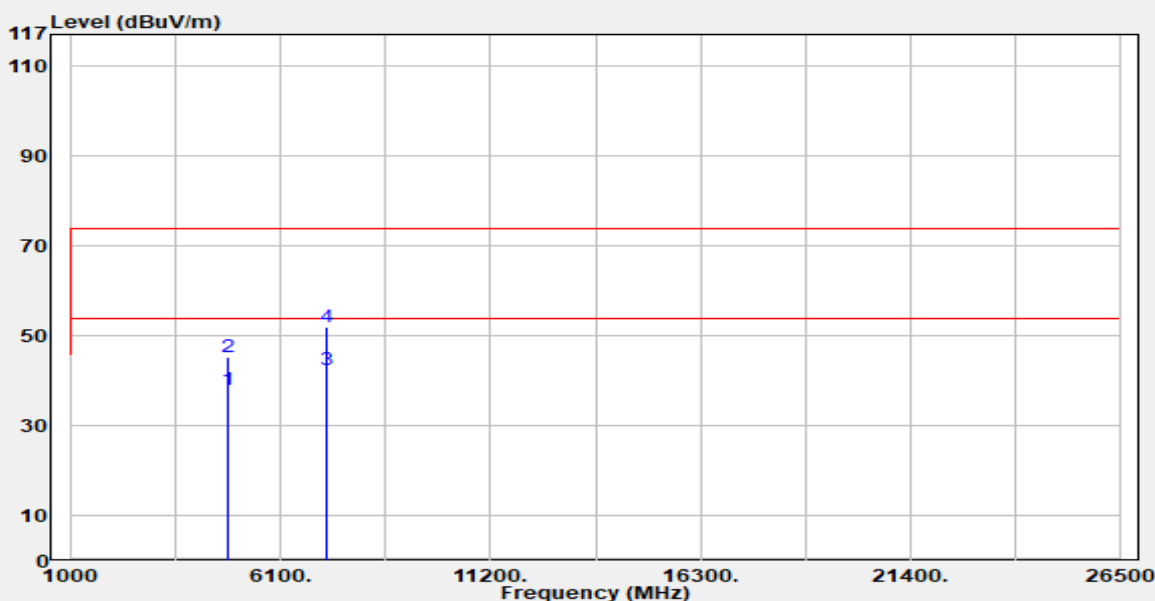
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2402 MHz
Test Mode :Tx CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4804.00	Average	30.87	7.10	37.97	54.00	-16.03
4804.00	Peak	38.39	7.10	45.49	74.00	-28.51
7206.00	Average	26.81	15.53	42.34	54.00	-11.66
7206.00	Peak	36.43	15.53	51.96	74.00	-22.04

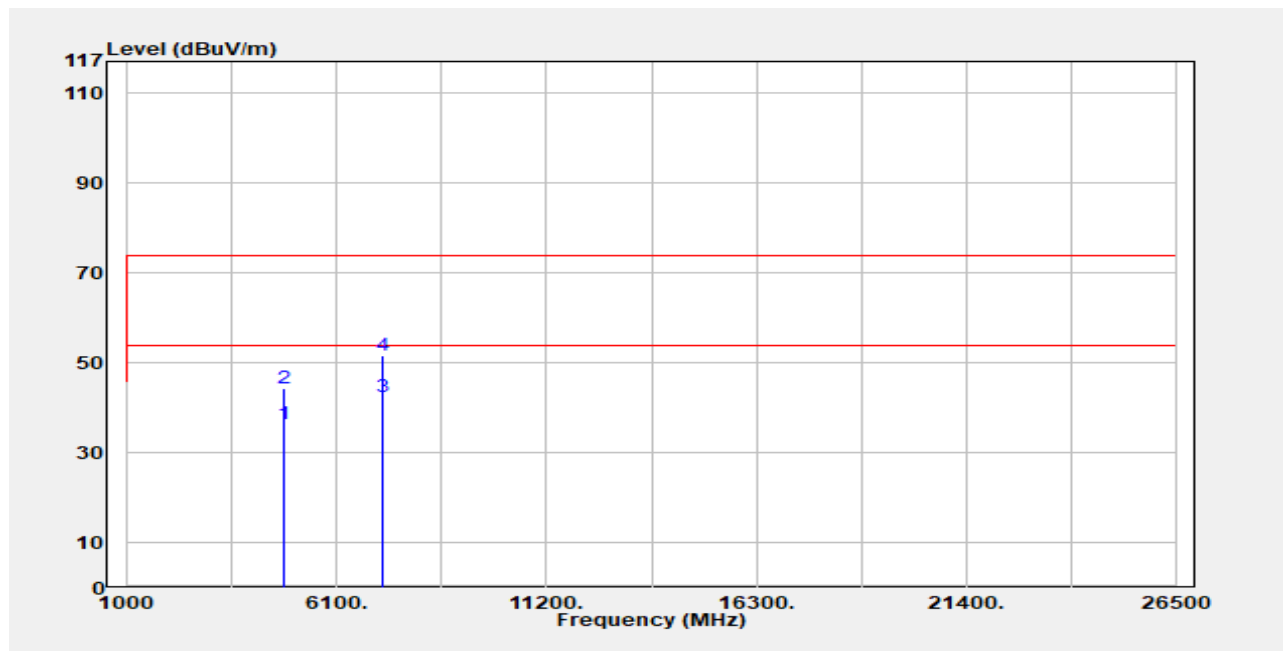
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2402 MHz
Test Mode :Tx CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



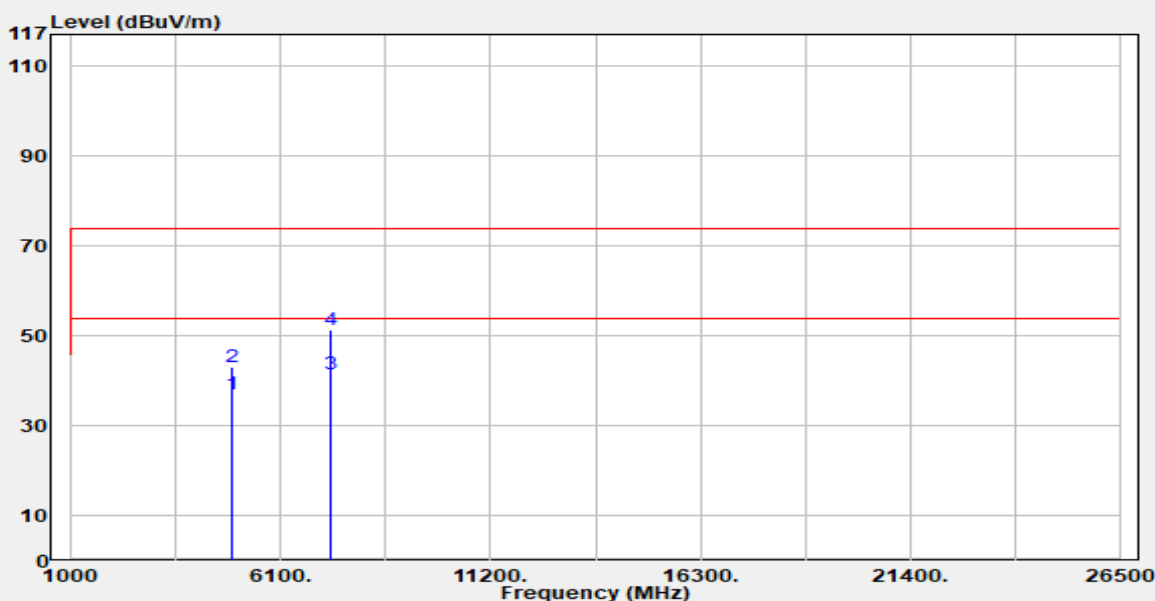
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4804.00	Average	29.46	7.10	36.56	54.00	-17.44
4804.00	Peak	37.30	7.10	44.40	74.00	-29.60
7206.00	Average	27.01	15.53	42.54	54.00	-11.46
7206.00	Peak	36.15	15.53	51.69	74.00	-22.31

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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



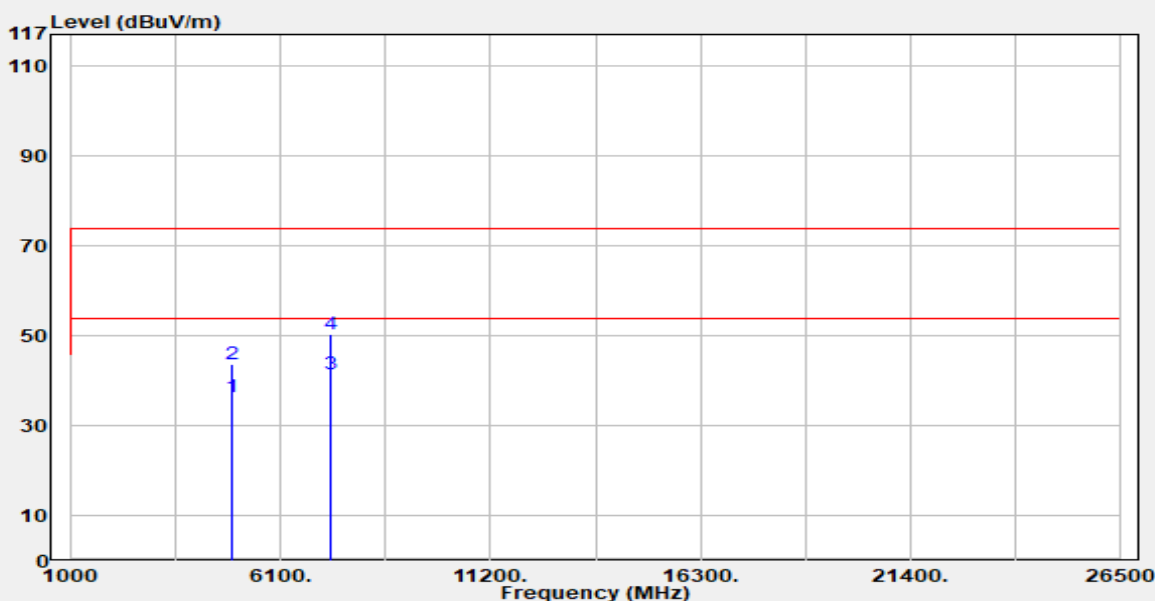
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4882.00	Average	30.08	7.06	37.14	54.00	-16.86
4882.00	Peak	36.18	7.06	43.24	74.00	-30.76
7323.00	Average	26.58	14.91	41.49	54.00	-12.51
7323.00	Peak	36.44	14.91	51.35	74.00	-22.65

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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4882.00	Average	29.53	7.06	36.59	54.00	-17.41
4882.00	Peak	36.57	7.06	43.63	74.00	-30.37
7323.00	Average	26.60	14.91	41.51	54.00	-12.49
7323.00	Peak	35.38	14.91	50.29	74.00	-23.71

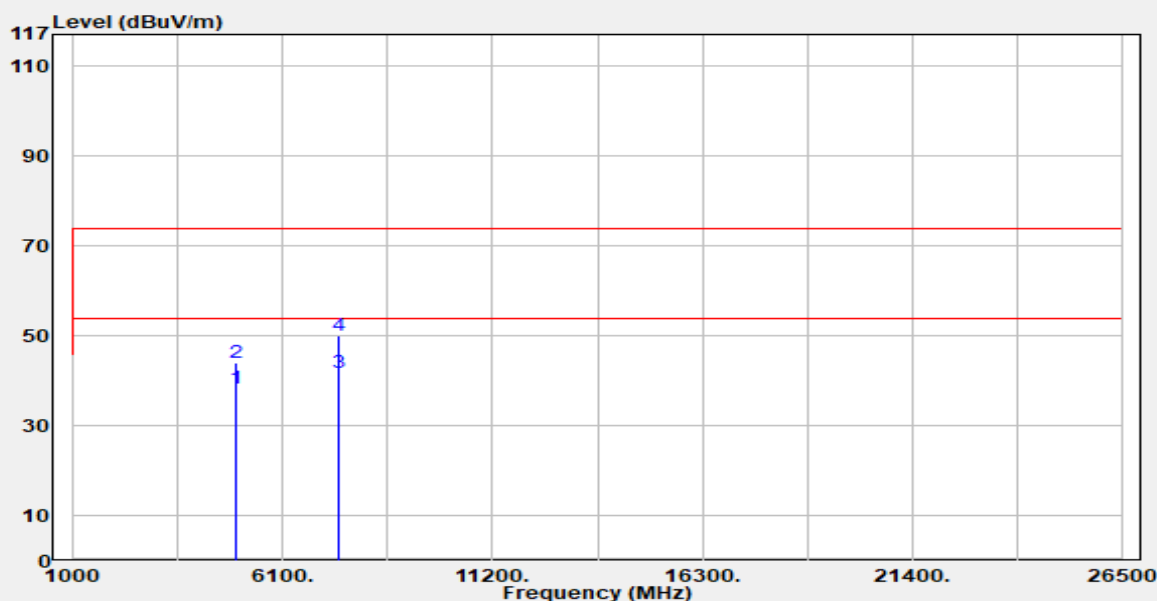
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2480 MHz
Test Mode :Tx CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4960.00	Average	30.97	7.47	38.44	54.00	-15.56
4960.00	Peak	36.63	7.47	44.10	74.00	-29.90
7440.00	Average	27.01	14.76	41.77	54.00	-12.23
7440.00	Peak	35.37	14.76	50.13	74.00	-23.87

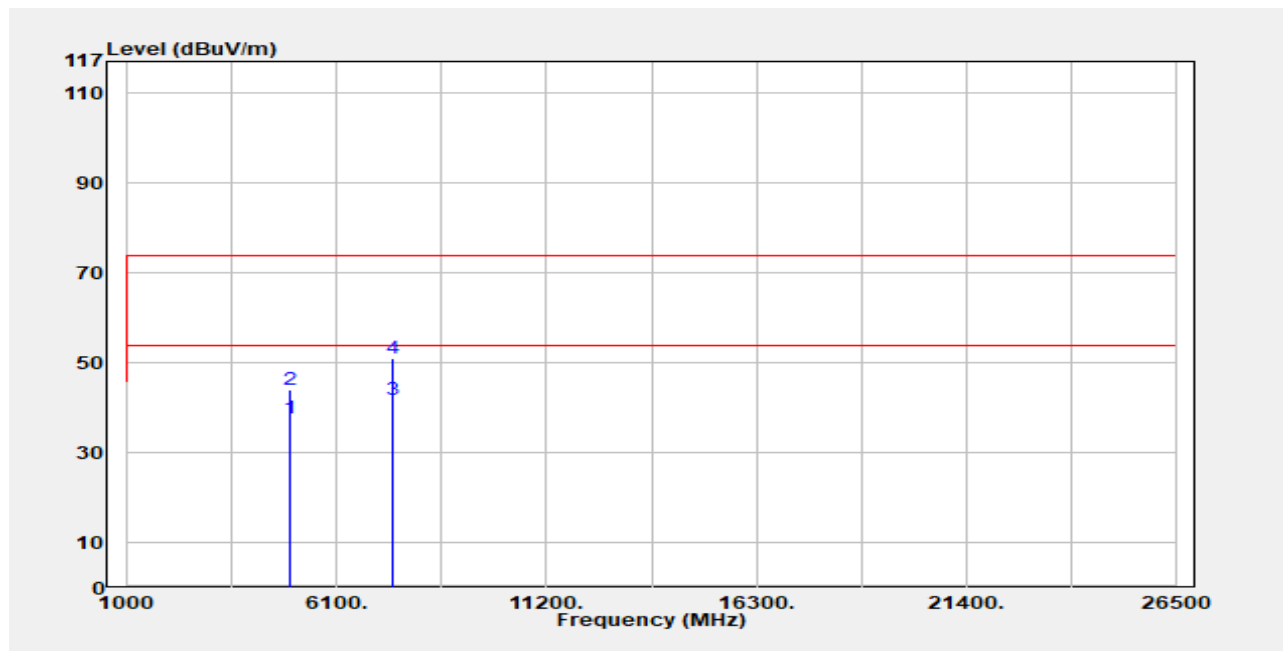
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2480 MHz
Test Mode :Tx CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4960.00	Average	30.17	7.47	37.64	54.00	-16.36
4960.00	Peak	36.48	7.47	43.95	74.00	-30.05
7440.00	Average	27.06	14.76	41.82	54.00	-12.18
7440.00	Peak	36.24	14.76	51.00	74.00	-23.00

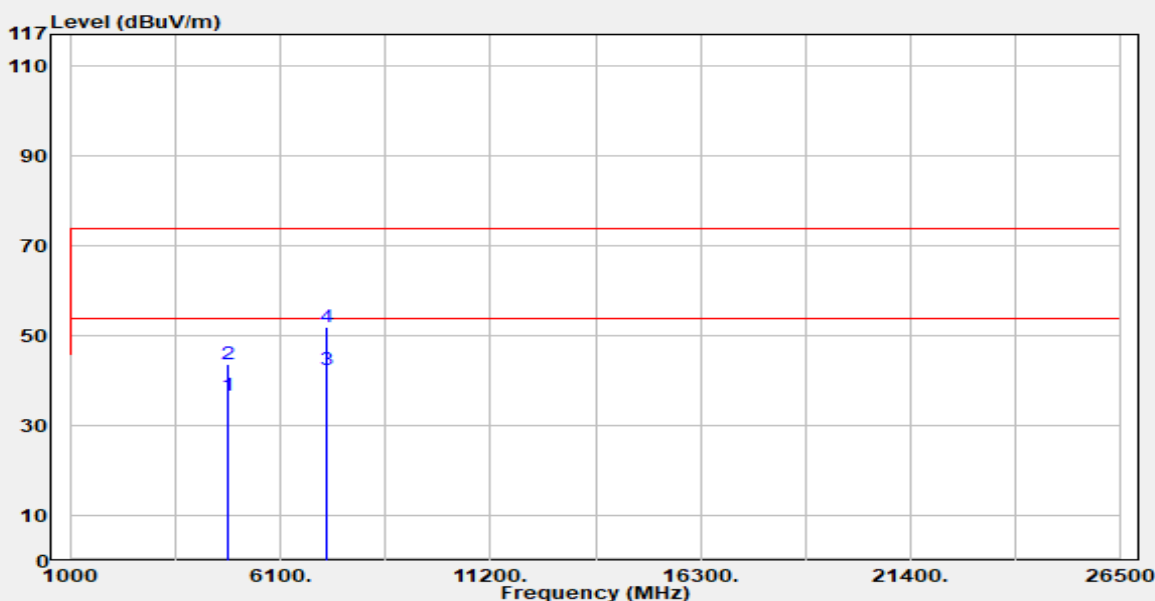
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2402 MHz
Test Mode :Tx CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4804.00	Average	29.61	7.10	36.71	54.00	-17.29
4804.00	Peak	36.60	7.10	43.70	74.00	-30.30
7206.00	Average	26.95	15.53	42.48	54.00	-11.52
7206.00	Peak	36.59	15.53	52.12	74.00	-21.88

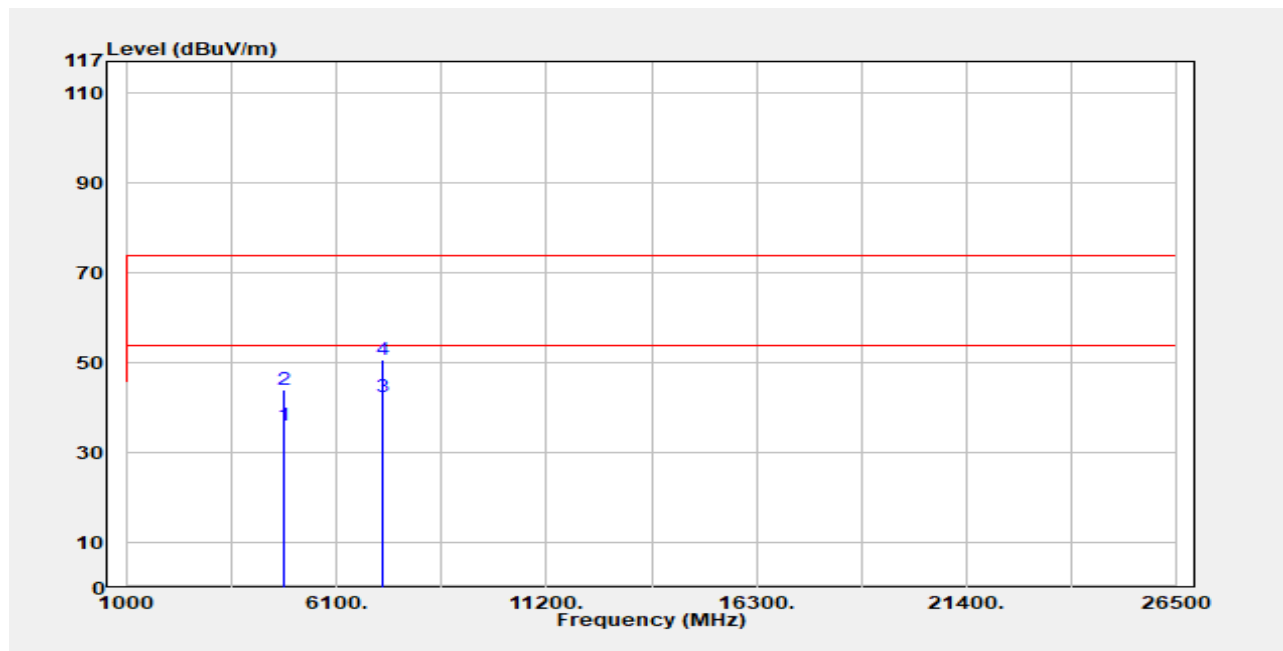
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2402 MHz
Test Mode :Tx CH Low
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4804.00	Average	29.10	7.10	36.20	54.00	-17.80
4804.00	Peak	37.09	7.10	44.19	74.00	-29.81
7206.00	Average	26.88	15.53	42.41	54.00	-11.59
7206.00	Peak	35.05	15.53	50.58	74.00	-23.42

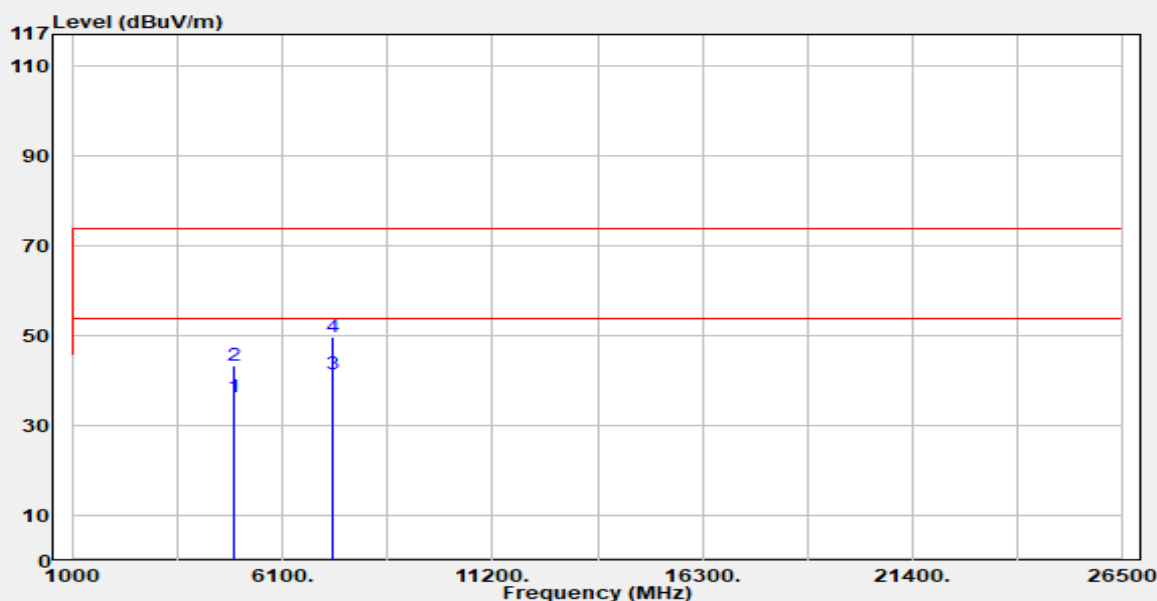
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4882.00	Average	29.38	7.06	36.44	54.00	-17.56
4882.00	Peak	36.28	7.06	43.35	74.00	-30.65
7323.00	Average	26.56	14.91	41.47	54.00	-12.53
7323.00	Peak	34.97	14.91	49.88	74.00	-24.12

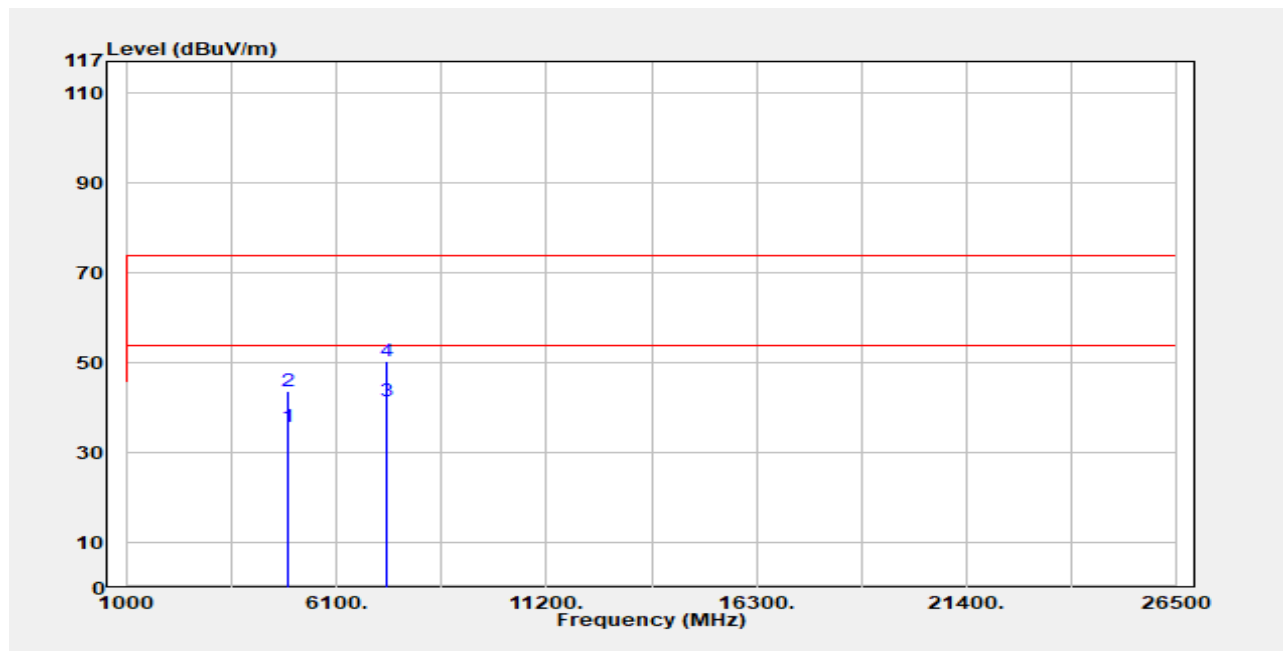
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Tx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4882.00	Average	28.89	7.06	35.95	54.00	-18.05
4882.00	Peak	36.58	7.06	43.65	74.00	-30.35
7323.00	Average	26.53	14.91	41.44	54.00	-12.56
7323.00	Peak	35.57	14.91	50.48	74.00	-23.52

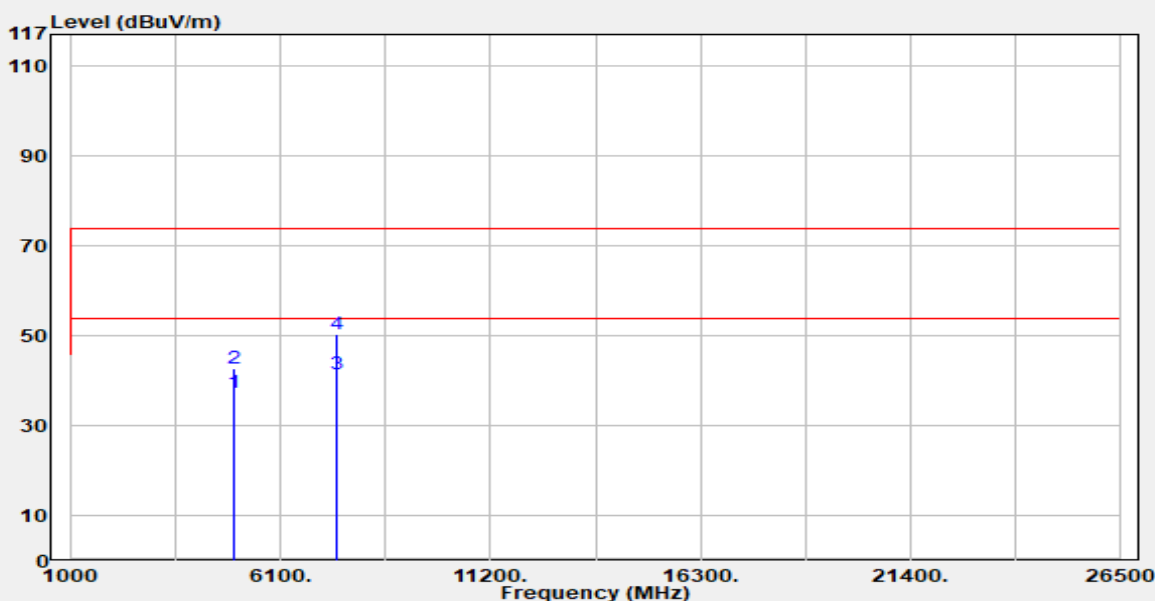
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2480 MHz
Test Mode :Tx CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
4960.00	Average	30.09	7.47	37.56	54.00	-16.44
4960.00	Peak	35.48	7.47	42.95	74.00	-31.05
7440.00	Average	26.87	14.76	41.63	54.00	-12.37
7440.00	Peak	35.67	14.76	50.43	74.00	-23.57

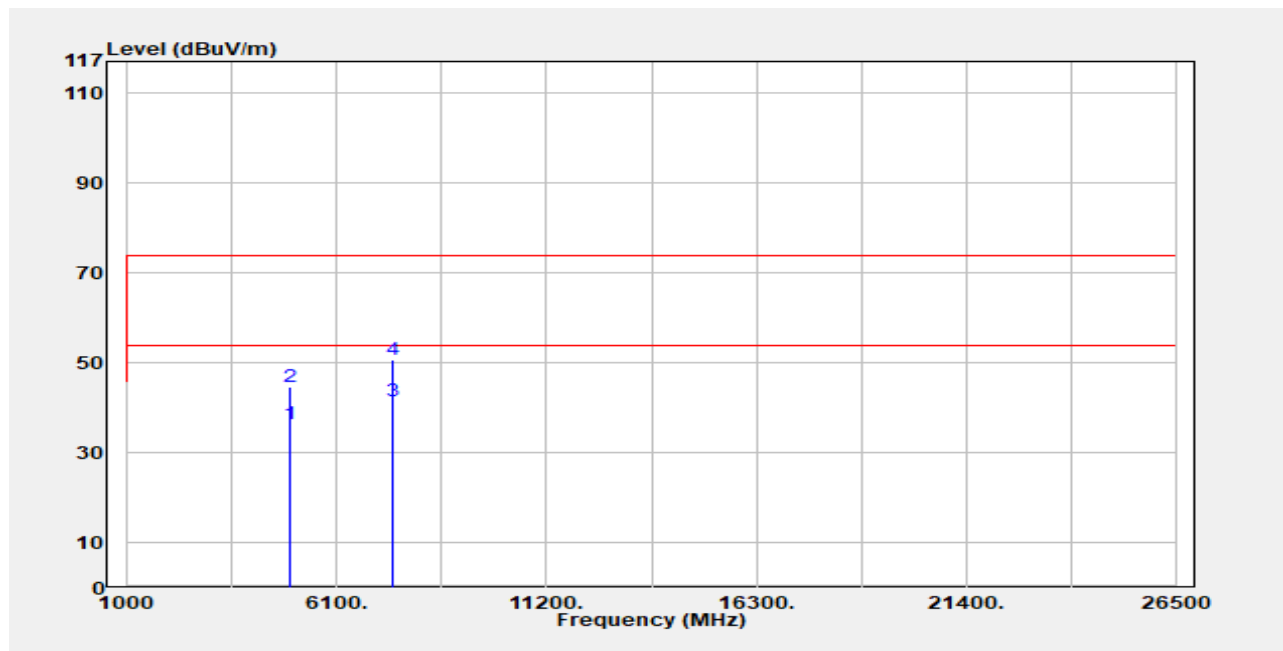
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2480 MHz
Test Mode :Tx CH High
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
4960.00	Average	29.01	7.47	36.48	54.00	-17.52
4960.00	Peak	37.29	7.47	44.76	74.00	-29.24
7440.00	Average	26.92	14.76	41.68	54.00	-12.32
7440.00	Peak	36.05	14.76	50.82	74.00	-23.18

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12.6.3 接收機場強輻射

Report Number :ER/2021/90061

Operation Mode :BR(1M)

Test Frequency :2441 MHz

Test Mode :Rx CH Mid

EUT Pol :E2 Plane

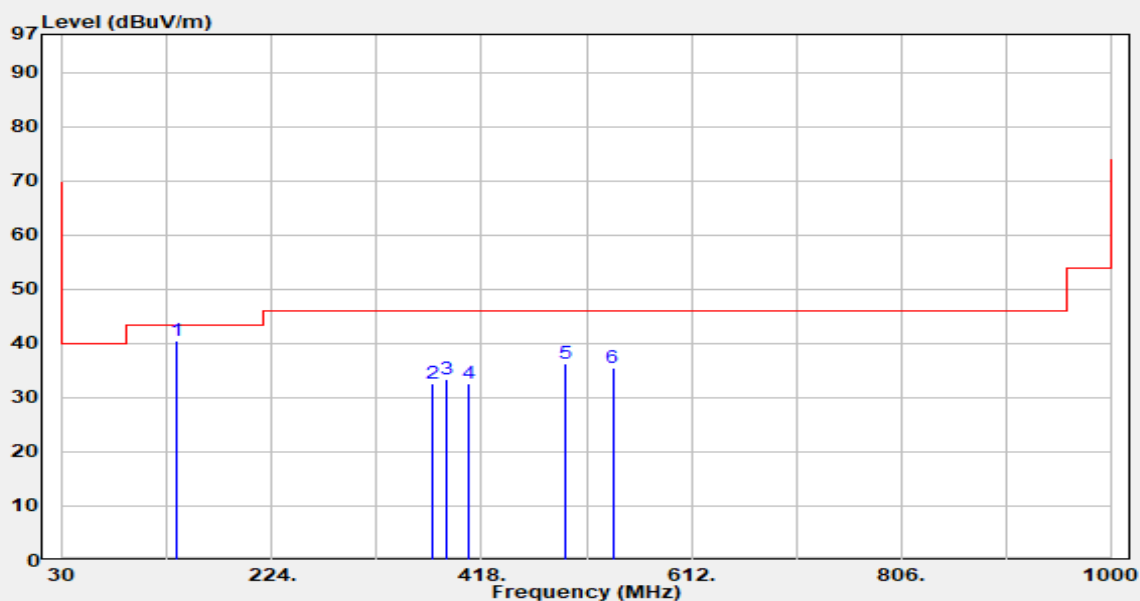
Test Site :SAC 1

Test Date :2021-10-14

Temp./Humi. :28.1/62

Antenna Pol. :VERTICAL

Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
135.08	Peak	52.34	-11.92	40.41	43.50	-3.09
372.73	Peak	40.57	-8.02	32.56	46.00	-13.44
385.67	Peak	40.95	-7.66	33.28	46.00	-12.72
405.07	Peak	39.12	-6.61	32.50	46.00	-13.50
495.60	Peak	42.08	-5.82	36.26	46.00	-9.74
539.25	Peak	39.19	-3.81	35.38	46.00	-10.62

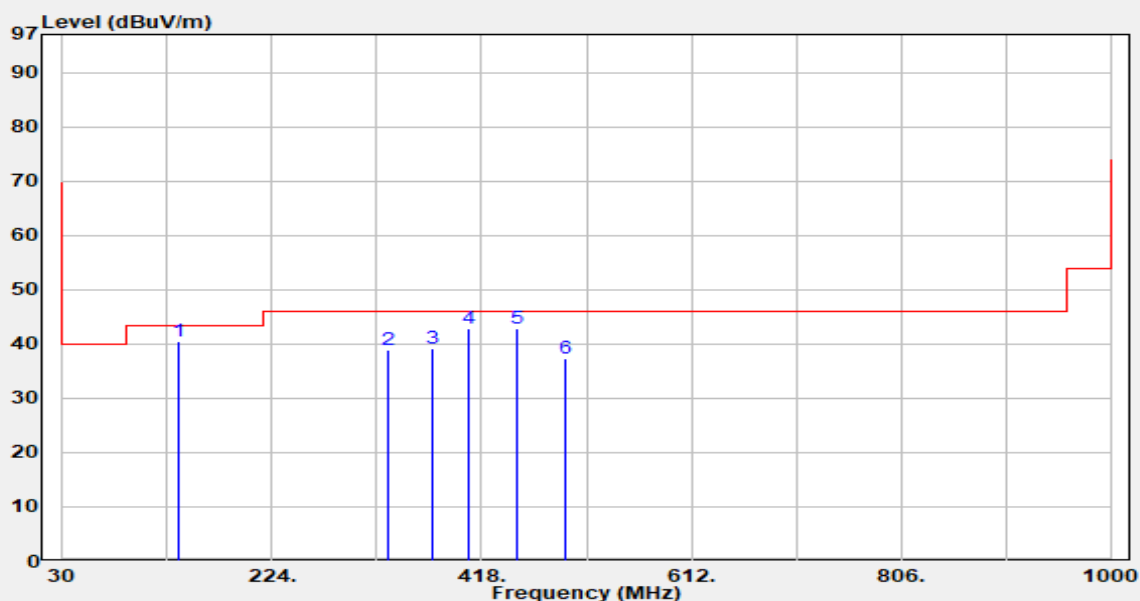
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
138.32	Peak	52.53	-12.16	40.38	43.50	-3.12
330.70	Peak	47.40	-8.59	38.82	46.00	-7.18
372.73	Peak	47.16	-8.02	39.15	46.00	-6.85
405.07	Peak	49.49	-6.61	42.88	46.00	-3.12
450.33	Peak	49.03	-6.13	42.90	46.00	-3.10
495.60	Peak	43.26	-5.82	37.44	46.00	-8.56

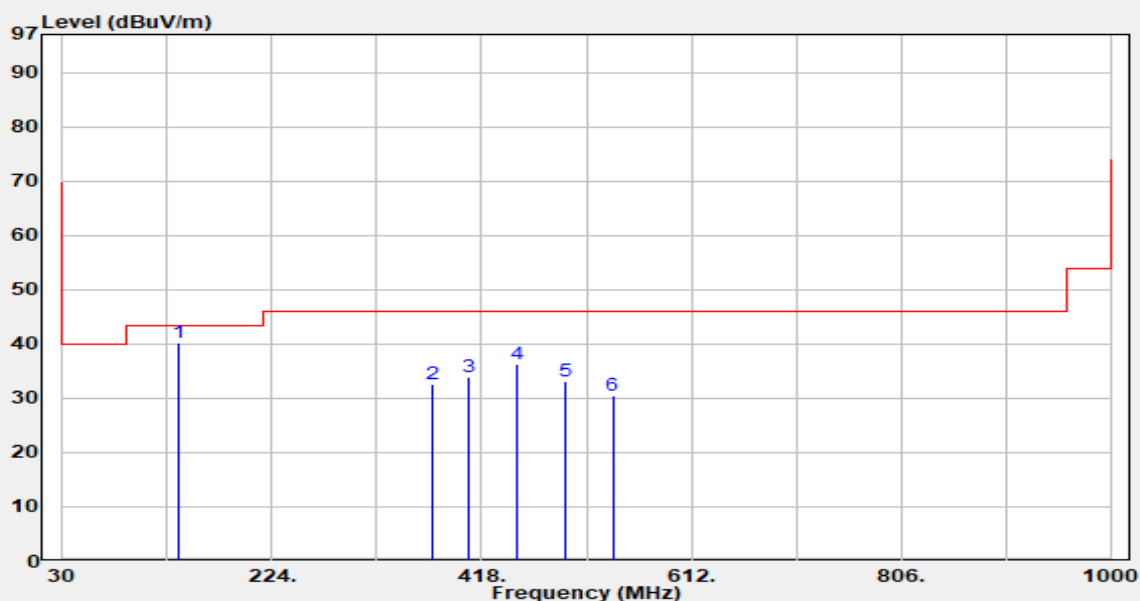
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
136.70	Peak	52.40	-12.08	40.32	43.50	-3.18
372.73	Peak	40.61	-8.02	32.60	46.00	-13.40
405.07	Peak	40.57	-6.61	33.96	46.00	-12.04
450.33	Peak	42.36	-6.13	36.24	46.00	-9.76
495.60	Peak	38.85	-5.82	33.03	46.00	-12.97
539.25	Peak	34.39	-3.81	30.58	46.00	-15.42

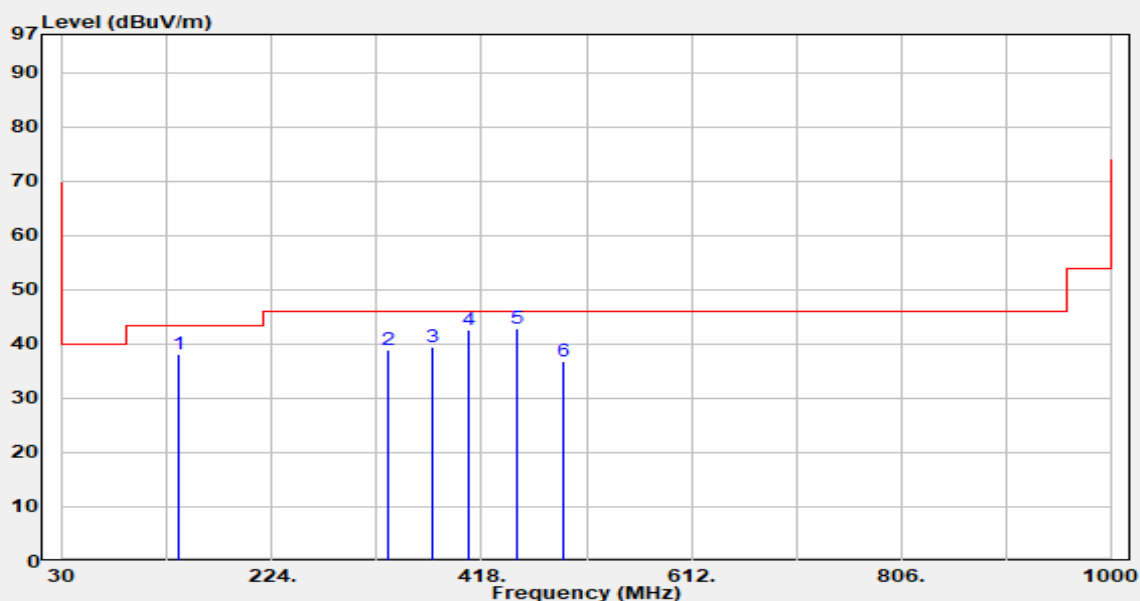
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Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
136.70	Peak	50.32	-12.08	38.24	43.50	-5.26
330.70	Peak	47.54	-8.59	38.96	46.00	-7.04
372.73	Peak	47.36	-8.02	39.34	46.00	-6.66
405.07	Peak	49.32	-6.61	42.71	46.00	-3.29
450.33	Peak	49.03	-6.13	42.90	46.00	-3.10
493.98	Peak	42.55	-5.83	36.72	46.00	-9.28

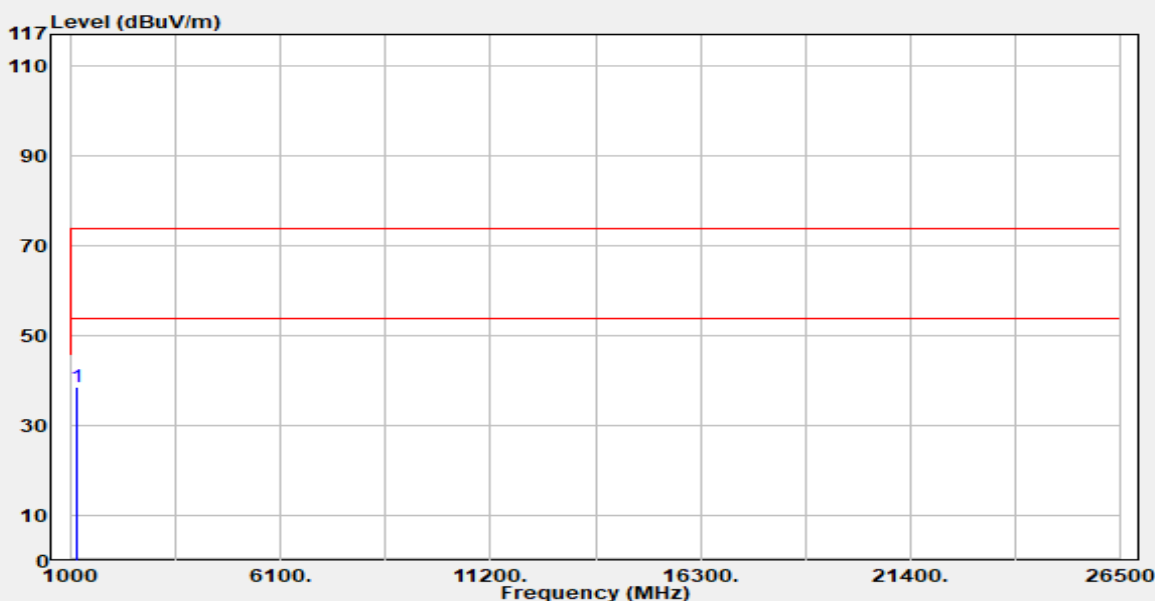
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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



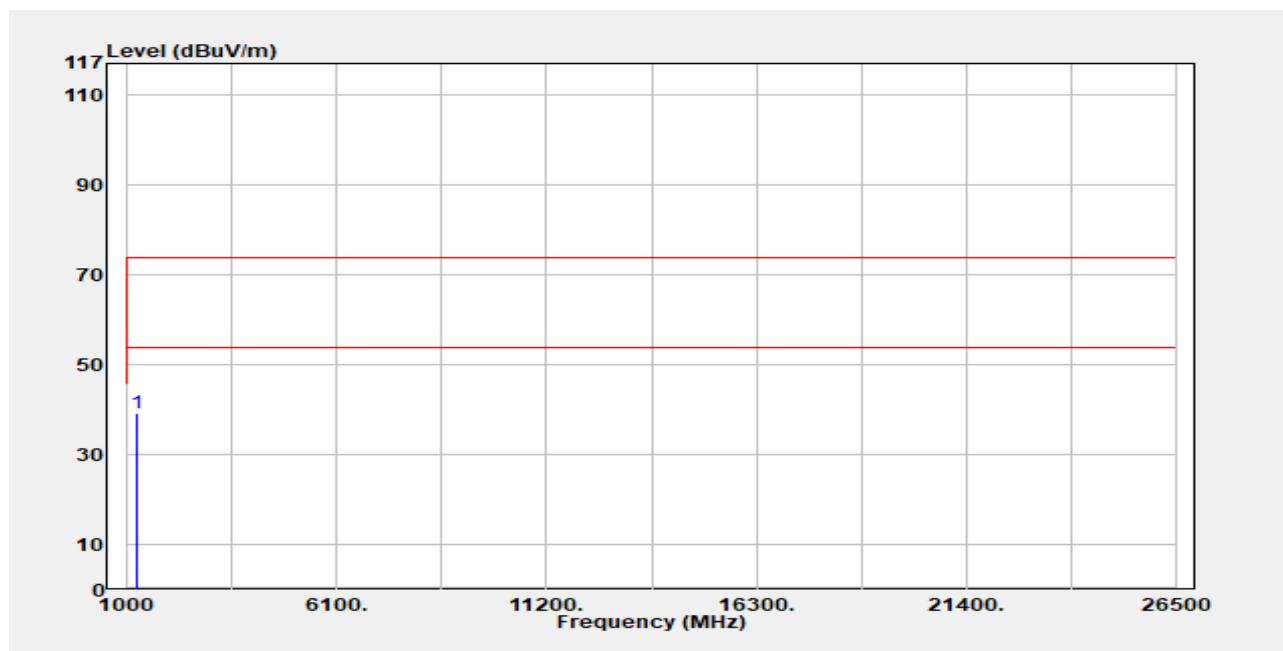
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
1135.00	Peak	44.60	-6.06	38.55	74.00	-35.45

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Report Number :ER/2021/90061
Operation Mode :BR(1M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
1243.00	Peak	44.87	-5.42	39.45	74.00	-34.55

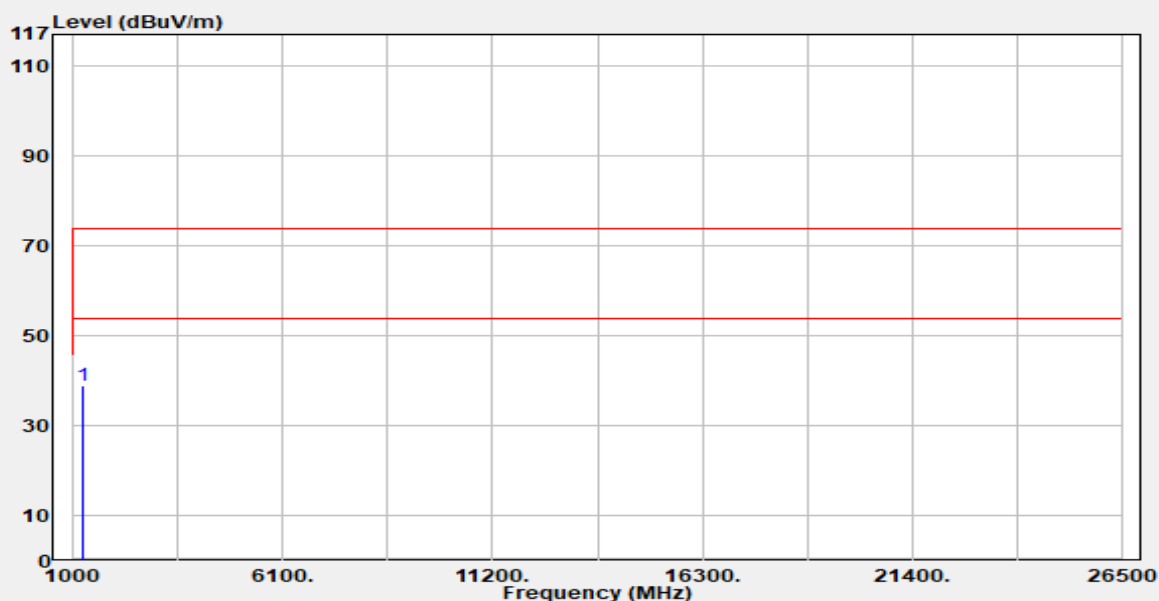
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :VERTICAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
1234.00	Peak	44.63	-5.47	39.16	74.00	-34.84

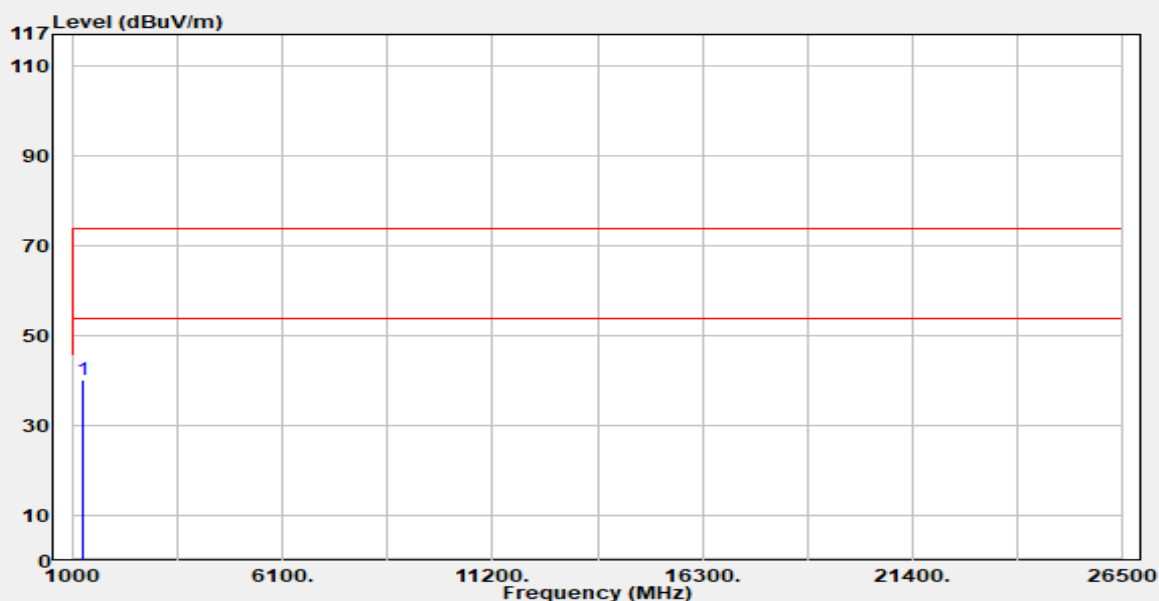
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Report Number :ER/2021/90061
Operation Mode :EDR(3M)
Test Frequency :2441 MHz
Test Mode :Rx CH Mid
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-10-14
Temp./Humi. :28.1/62
Antenna Pol. :HORIZONTAL
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
1237.00	Peak	45.57	-5.46	40.11	74.00	-33.89

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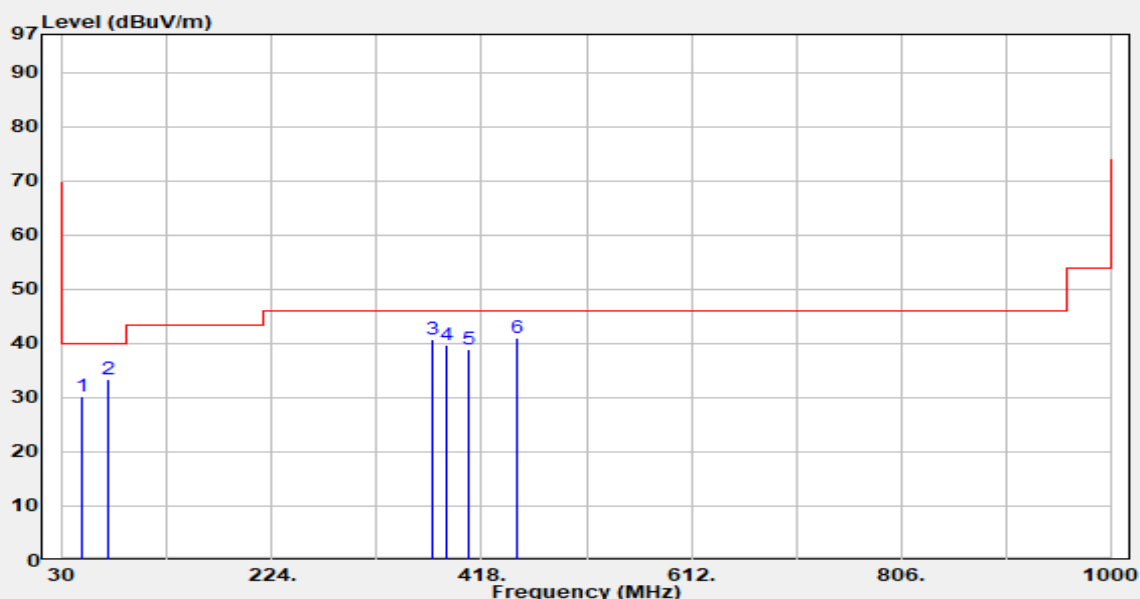
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12.6.4 Fully System

Report Number :ER/2021/90061
Operation Mode :System
Test Frequency :System
Test Mode :System
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-11-05
Temp./Humi. :25.4/69
Antenna Pol. :Vertical
Engineer :GN Lin



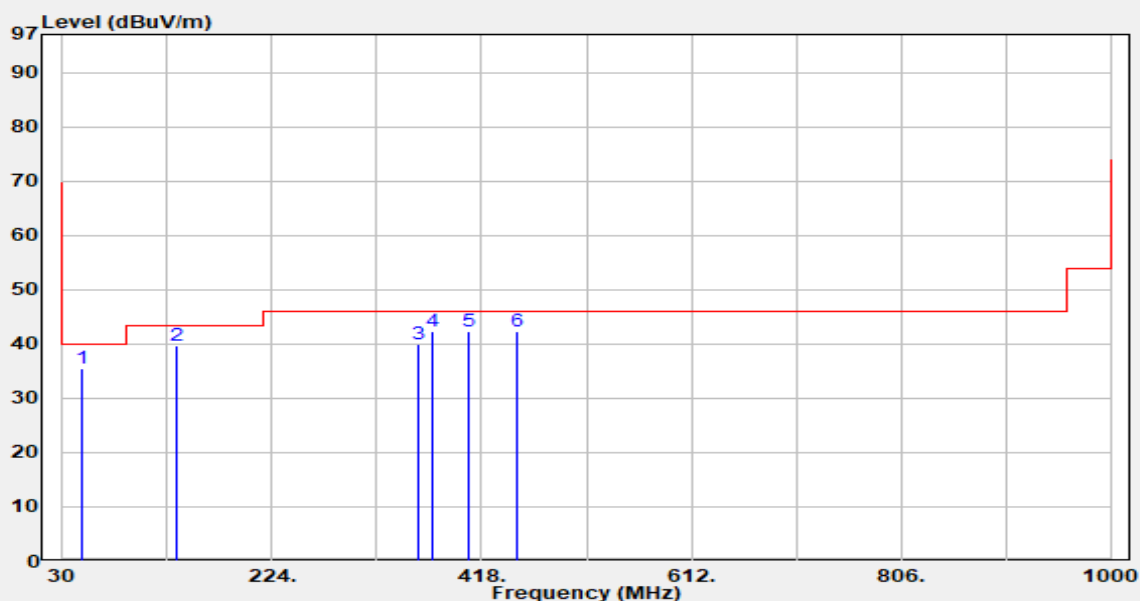
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
47.78	QP	44.78	-14.53	30.25	40.00	-9.75
72.03	QP	50.93	-17.41	33.52	40.00	-6.48
372.73	Peak	48.78	-8.02	40.77	46.00	-5.23
385.67	Peak	47.38	-7.66	39.72	46.00	-6.28
405.07	Peak	45.53	-6.61	38.92	46.00	-7.08
450.33	Peak	47.17	-6.13	41.04	46.00	-4.96

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Report Number :ER/2021/90061
Operation Mode :System
Test Frequency :System
Test Mode :System
EUT Pol :E2 Plane

Test Site :SAC 1
Test Date :2021-11-05
Temp./Humi. :25.4/69
Antenna Pol. :Horizontal
Engineer :GN Lin



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBuV	Factor dB	Actual FS dBuV/m	Limit @3m dBuV/m	Margin dB
47.78	Peak	49.93	-14.53	35.40	40.00	-4.60
135.08	Peak	51.53	-11.92	39.61	43.50	-3.89
359.80	Peak	47.86	-7.98	39.88	46.00	-6.12
372.73	Peak	50.35	-8.02	42.33	46.00	-3.67
405.07	Peak	48.84	-6.61	42.23	46.00	-3.77
450.33	Peak	48.46	-6.13	42.33	46.00	-3.67

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13 載波頻率間隔量測

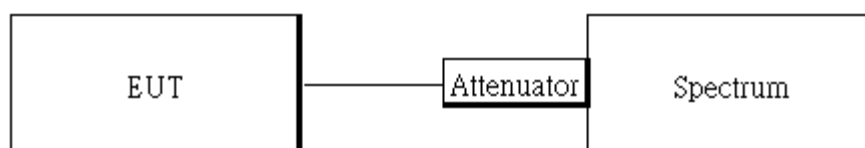
13.1 適用標準

NCC 低功率射頻器材技術規範 4.10.1.6(1)(A) 跳頻系統之載波頻率頻道間隔不得低於 25 千赫 (kHz)或跳頻頻道之 20dB 頻寬，兩者取較寬者。但操作頻率為 2400-2483.5 兆赫(MHz)頻帶且輸出功率不大於 125 毫瓦(mW)跳頻系統，其載波頻率頻道間隔不得小於 25 千赫 (kHz)或跳頻頻道 20dB 頻寬之三分之二，兩者取較寬者。系統之跳頻頻道應依虛擬亂數排列，在各頻率之跳頻頻道上跳躍。每一發射機必須均等的使用每一頻率。系統接收機應具有與發射機跳躍頻道頻寬相匹配之輸入頻寬，且應隨所發射之信號同步偏移接收頻率。

13.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

13.3 測試配置



13.4 量測方法

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = middle of hopping channel.

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5. Set the RBW approximately 30% of the channel spacing, $VBW \geq RBW$.
6. Adjust Span to Wide enough to capture the peaks of two adjacent channels.
7. Sweep = auto.
8. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

13.5 量測結果

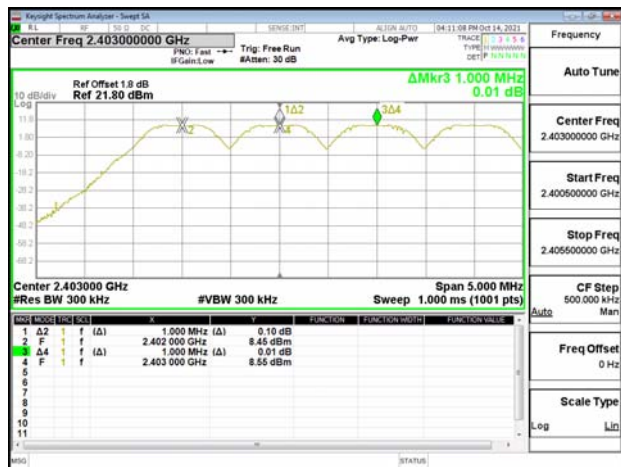
頻道	載波頻率間隔
CH Low	1MHz
CH Mid	1MHz
Ch High	1MHz

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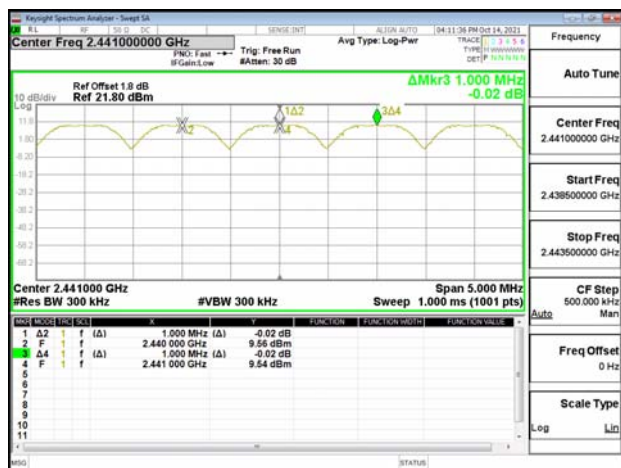
GFSK_1M_DH5_CH0CH1CH2



π/4DQPSK_2M_DH5_CH0CH1CH2



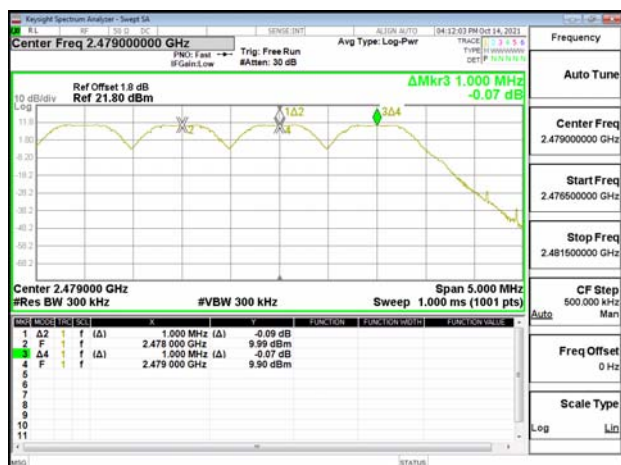
GFSK_1M_DH5_CH38CH39CH40



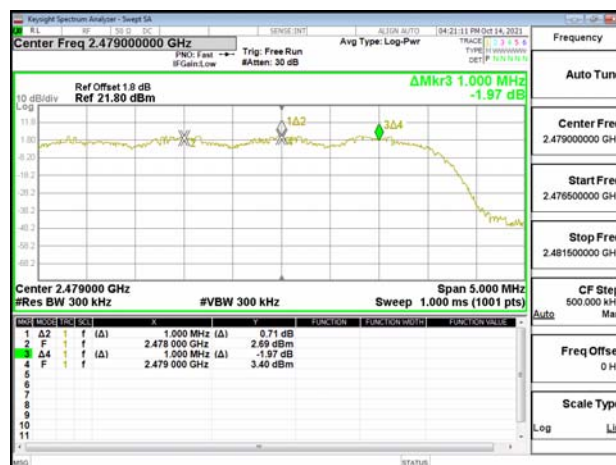
π/4DQPSK_2M_DH5_CH38CH39CH40



GFSK_1M_DH5_CH76CH77CH78



π/4DQPSK_2M_DH5_CH76CH77CH78

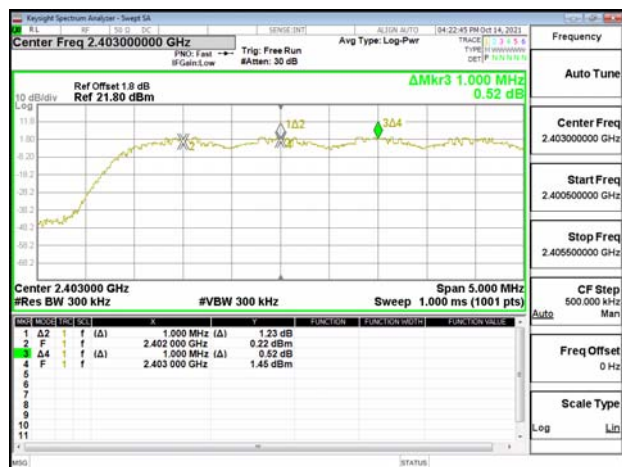


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8DPSK_3M_DH5_CH0CH1CH2



8DPSK_3M_DH5_CH38CH39CH40



8DPSK_3M_DH5_CH76CH77CH78



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14 頻道數量測

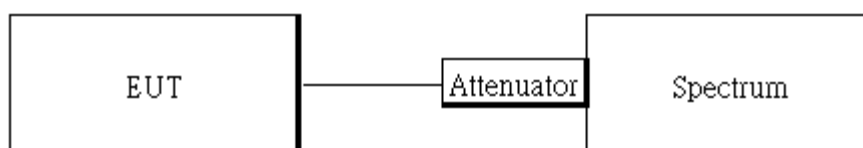
14.1 適用標準

依據NCC低功率射頻器材技術規範4.10.1.6(1)(A)(a)規定，操作於2400 MHz～2483.5 MHz之展頻跳頻系統，須使用至少15個無重疊的頻道，在0.4秒乘以跳頻頻道數之週期內，任一頻率占用之平均時間應小於或等於0.4秒。應使用智慧型跳頻技術，以避免占用於特定跳頻頻道。

14.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

14.3 測試配置



14.4 量測方法

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2013.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.

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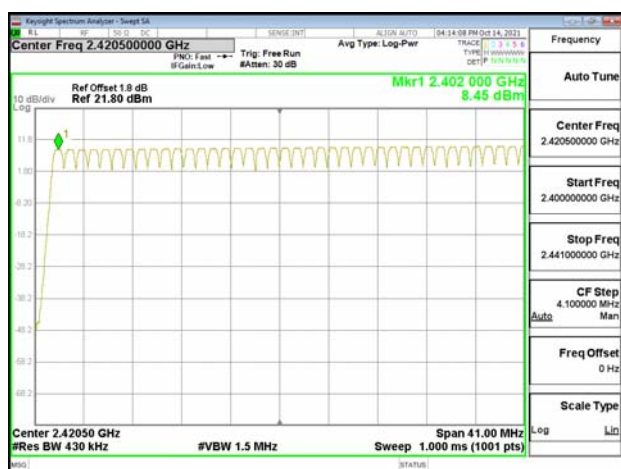
- Set the spectrum analyzer as RBW=430kHz, VBW=1.5MHz., Detector = Peak
- Max hold, view and count how many channel in the band.

14.5 量測結果

頻道數	量測值 (CH)
	79

註: 此裝置有 EDR 功能，由於 BR mode 及 EDR mode 跳頻數相同，僅以其中一個調變之數據為代表。

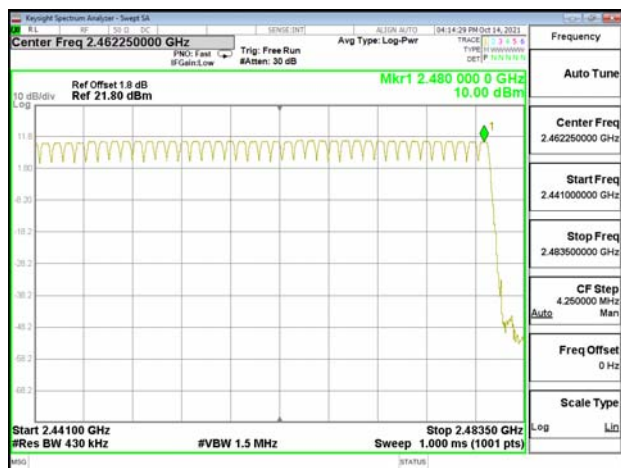
GFSK_1M_DH5_2400-2441



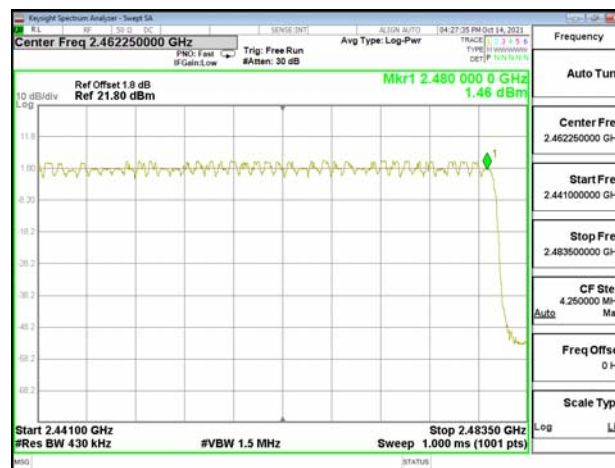
8DPSK_3M_DH5_2400-2441



GFSK_1M_DH5_2441-2480



8DPSK_3M_DH5_2441-2480



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15 載波頻率佔用週期量測

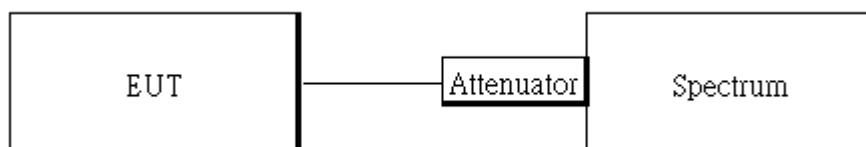
15.1 適用標準

NCC 低功率射頻器材技術規範 4.10.1.6(1)(A)(a) 在 0.4 秒乘以跳頻頻道數之週期內，任一頻率佔用之平均時間不得超過 0.4 秒。

15.2 量測儀器

Conducted Emission Test Site: Conducted 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	04/27/2021	04/26/2022
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
DC Power Supply	Agilent	E3640A	KR93300208	09/08/2021	09/07/2022
Coaxial Cable	Woken	00100A1F1 A196S	N/A	N/A	N/A
Attenuator	Mini-Circuit	BW-S10W2+	4	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
TEST Kit	MODULES	CP2102	N/A	N/A	N/A
Notebook	Lenovo	X250	PC-06A4E7	N/A	N/A

15.3 測試配置



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15.4 量測方式

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows ANSI C63.10:2015.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set center frequency of spectrum analyzer = operating frequency.
5. Set the spectrum analyzer as RBW, VBW=1MHz, 3MHz, Span = 0Hz , Detector = Peak, Adjust Sweep = 2~8ms.
6. Repeat above procedures until all frequency of the interest measured were complete.
9. Formula Deduced:

time occupancy of one time slot X Hopping rate / total slot in one channel / total channel that hops X period of working channels.

Where, standard hopping rate is 1600 hops/s, slot in one channel for DH1, DH3, and DH5 is 2, 4, and 6, respectively.

DH1 consists of single time slot of the uplink, and one slot of the downlink Total Slot: 2

DH3 consists of three time slot of the uplink, and one slot of the downlink. Total Slot: 4

DH5 consists of five time slot of the uplink, and one slot of the downlink. Total Slot: 6

Note:

the result of the complete test default channel at 1Mbps is recorded on the test report, 2Mbps, and 3Mbps only records the measurement result at middle channel that reveals no much deviation.

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15.5 開放載波頻率佔用週期量測結果:

GFSK (1Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	DH1	123.20	400ms	3.00
	DH3	262.40	400ms	1.00
	DH5	308.80	400ms	1.00

 $\pi/4$ DQPSK (2Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	2DH1	124.80	400ms	3.00
	2DH3	262.40	400ms	1.00
	2DH5	307.20	400ms	1.00

8-DPSK (3Mbps)

Channel	PACKET TYPE	Measurement Result (ms)	Limit (ms)	VBW setting (kHz)
Mid	3DH1	124.80	400ms	3.00
	3DH3	262.40	400ms	1.00
	3DH5	308.80	400ms	1.00

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GFSK (1Mbps):

CH Mid	DH1 time slot	=	0.385	*	(1600/2/79)	*	31.6	=	123.20	(ms)
	DH3 time slot	=	1.640	*	(1600/4/79)	*	31.6	=	262.40	(ms)
	DH5 time slot	=	2.895	*	(1600/6/79)	*	31.6	=	308.80	(ms)

 $\pi/4$ -DQPSK (2Mbps):

CH Mid	2DH1 time slot	=	0.390	*	(1600/2/79)	*	31.6	=	124.80	(ms)
	2DH3 time slot	=	1.640	*	(1600/4/79)	*	31.6	=	262.40	(ms)
	2DH5 time slot	=	2.880	*	(1600/6/79)	*	31.6	=	307.20	(ms)

8-DPSK (3Mbps):

CH Mid	3DH1 time slot	=	0.390	*	(1600/2/79)	*	31.6	=	124.80	(ms)
	3DH3 time slot	=	1.640	*	(1600/4/79)	*	31.6	=	262.40	(ms)
	3DH5 time slot	=	2.895	*	(1600/6/79)	*	31.6	=	308.80	(ms)

A period time = 0.4 (s) * 79 = 31.6 (s)

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GFSK (1Mbps) for AFH Mode			
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)
20	DH5	154.40	400
$\pi/4$ DQPSK (2Mbps) for AFH Mode			
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)
20	2DH5	153.60	400
8-DPSK (3Mbps) for AFH Mode			
Hopping Channel Number	PACKET TYPE	Measurement Result (ms)	Limit (ms)
20	3DH5	154.40	400

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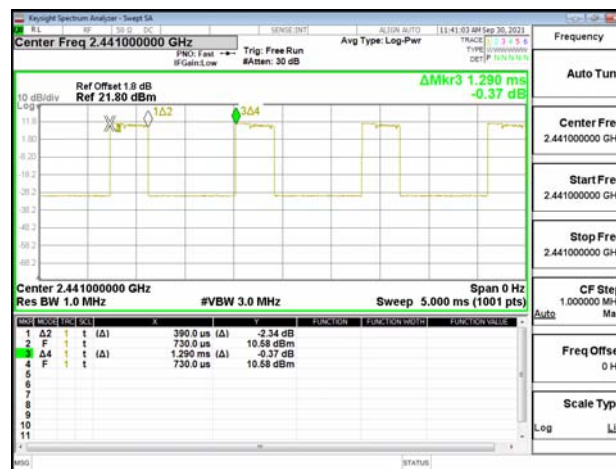
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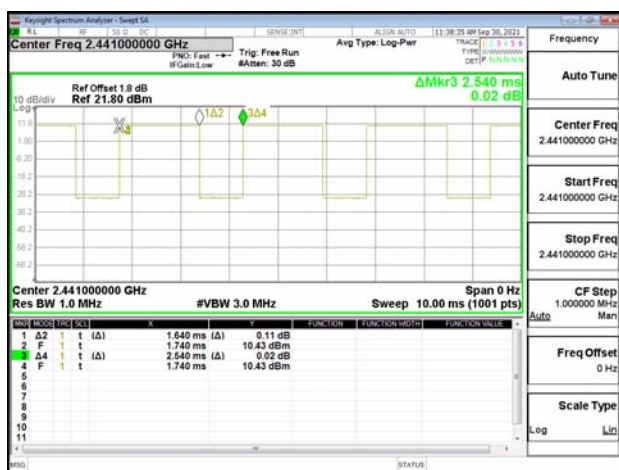
Dwell Time_GFSK_1M_DH1_2441MHz



Dwell Time_π/4DQPSK_2M_DH5_2441MHz



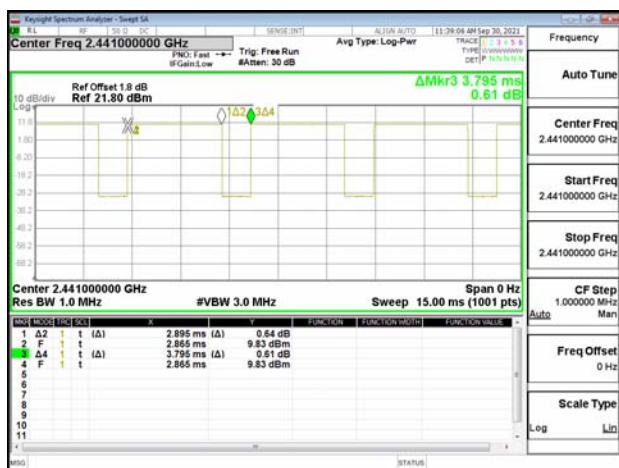
Dwell Time_GFSK_1M_DH3_2441MHz



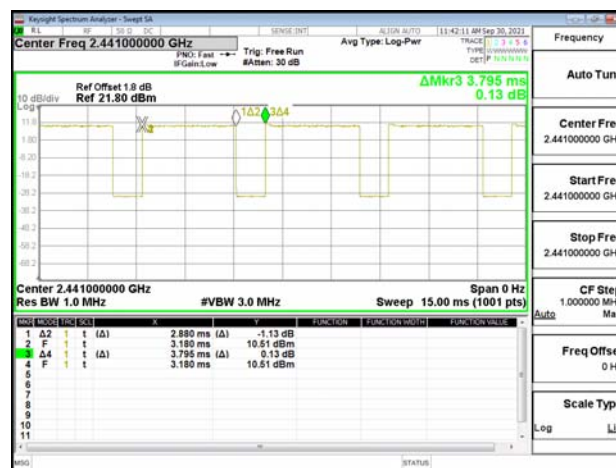
Dwell Time_π/4DQPSK_2M_DH5_2441MHz



Dwell Time_GFSK_1M_DH5_2441MHz



Dwell Time_π/4DQPSK_2M_DH5_2441MHz

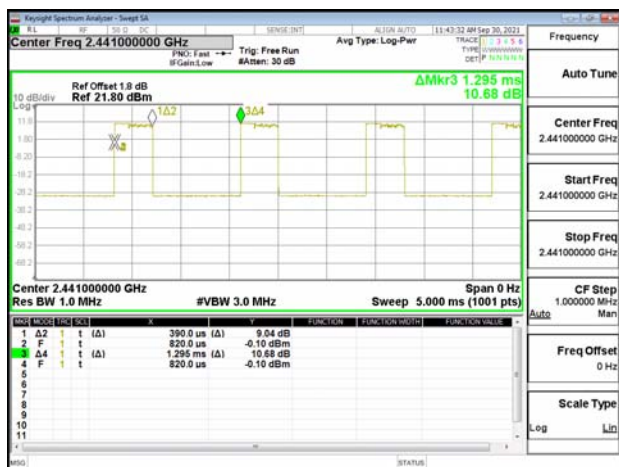


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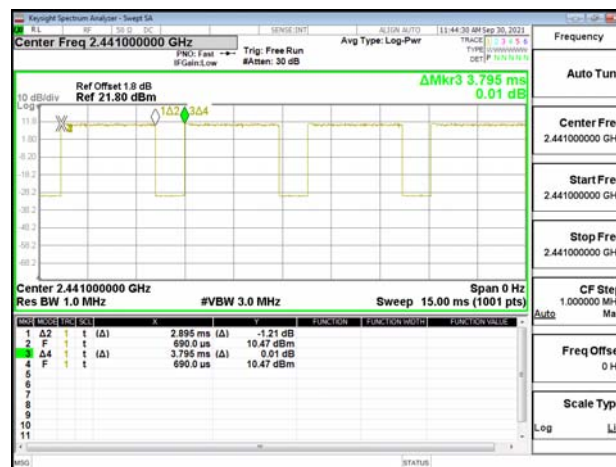
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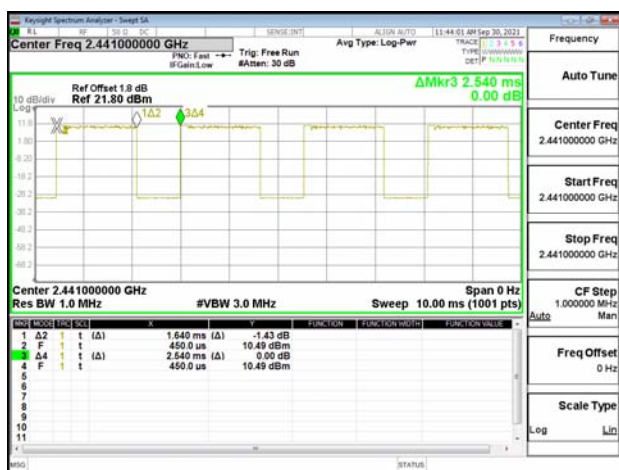
Dwell Time_8DPSK_3M_DH1_2441MHz



Dwell Time_8DPSK_3M_DH5_2441MHz



Dwell Time_8DPSK_3M_DH3_2441MHz



~ End of Report ~

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