

NCC 低功率射頻器材型式試驗報告

產品名稱(中文)	RFID Reader/Writer
型號	TWN4 Slim
廠牌	ELATEC

申請者	ELATEC GmbH
地址	Zeppelinstrasse 1, Puchheim 82178 Germany

受理日期	110 年 06 月 04 日
報告發行日期	110 年 09 月 22 日
報告號碼	2160158R-E3032120201
報告版本	V1.0



本測試報告只針對受測樣品有效。

本測試報告內之測試結果可藉由測試儀器設備之校正報告與本報告內所評估量測不確定度追溯至國家或國際標準。不得使用本報告宣稱產品是由 TAF 或任何政府機構背書。

本測試報告非經德凱認證股份有限公司同意不可複製使用。

對各個測試系統與伴隨的連接設施，所執行的量測項目的量測不確定度，在此提供做為系統資訊的參考，符合性決定不考慮測試系統的不確定度而是基於符合性測試的結果決定。

低功率射頻器材量測報告

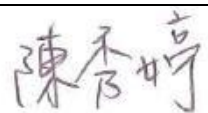
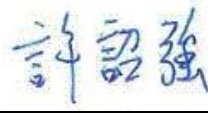
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產品名稱(中文)	RFID Reader/Writer
申請者	ELATEC GmbH
地 址	Zeppelinstrasse 1, Puchheim 82178 Germany
製造廠商	ELATEC GmbH
待測物額定電壓	DC 5V (Power by USB)
待測物測試電壓	DC 5V (Power by USB)
商標或廠牌	ELATEC
型式號	TWN4 Slim
試驗標準	低功率射頻器材技術規範(109 年 07 月)
試驗結果	符 合

項次	量 測 項 目	標 稱 規 格	測試結果	量測設備	量測不確定度
1	電源線傳導干擾	低功率射頻器材技術規範 3.3 節	PASS	請參閱 2.2 節	請參閱 2.3 節
2	天線之要求	低功率射頻器材技術規範 3.2 節	PASS	--	--
3	輻射干擾測試	低功率射頻器材技術規範 3.5 節及 3.6 節	PASS	請參閱 2.2 節	請參閱 2.3 節
4	以下空白	--	--	--	--

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目 錄

項 目	頁數
1. 基本資料.....	5
1.1. 待測物裝置資料.....	5
1.2. 裝置驗證說明.....	5
1.3. 系統測試時之週邊裝置.....	6
1.4. 測試系統組合圖.....	6
1.5. 測試系統操作程序.....	6
2. 測試環境與測試實驗室資訊.....	7
2.1. 試驗單位與週遭環境.....	7
2.2. 測試設備明細.....	8
2.3. 量測不確定度.....	9
3. 電源端點干擾測試.....	10
3.1. 適用標準.....	10
3.2. 量測方法.....	10
3.3. 測試架構圖.....	10
3.4. 電源端點測試結果.....	11
4. 天線之要求.....	15
4.1. 適用標準.....	15
4.2. 天線樣式.....	15
5. 輻射干擾測試.....	16
5.1. 適用標準.....	16
5.2. 量測方法.....	17
5.3. 測試架構圖.....	18
5.4. 輻射干擾測試結果.....	19
附件 1: 待測物測試擺設相片	
附件 2: 待測物內部相片	

Revision History

Report No.	Version	Description	Issued Date
2160158R-E3032120201	V1.0	Initial issue of report.	2021-09-22

1. 基本資料

1.1. 待測物裝置資料

申請者(或公司)	ELATEC GmbH
地址	Zeppelinstrasse 1,Puchheim 82178 Germany
製造廠商	ELATEC GmbH
產品名稱	RFID Reader/Writer
商標	ELATEC
產品型號	TWN4 Slim
操作頻率	125kHz
調變方式	ASK
天線樣式	Coil antenna

Antenna List

No.	廠牌	型號	Antenna Type
1	ELATEC GmbH	ANT042	Coil Antenna

1.2. 裝置驗證說明

待測物為 RFID Reader/Writer，使用無線電波 125kHz，其天線為 Coil antenna，悉採 125kHz 為載波，利用 ASK 調變方式來傳送信號，結果顯示於此份報告中。

本案經申請者切結器材不提供隨貨配件，配件由實驗室(或申請者)提供併同檢驗，及其廠牌型號資訊描述於 1.3 章。

1. 發射體主要功能特性有：

- (1) 待測裝置利用無線電波,分別借由無線電波,傳送及接收,達到信號傳送之目的。
- (2) 待測裝置使用 125kHz 為載波頻率，且其天線為 Coil antenna，利用 ASK 調變技術來傳送信號以達到最大發射功率。
- (3) 待測物測試電壓: DC 5V (Power by USB)
- (4) 調變方式: 採 ASK 調變
- (5) 測試軟體: Director V4.05。

Parameters of test software setting

Frequency	125kHz
	N/A

2. 待測裝置測試之試驗條件

待測裝置依功能特性,執行下列電磁干擾驗證測試。

EMI 模式	Mode 1: 發射器 Mode 2: 接收器
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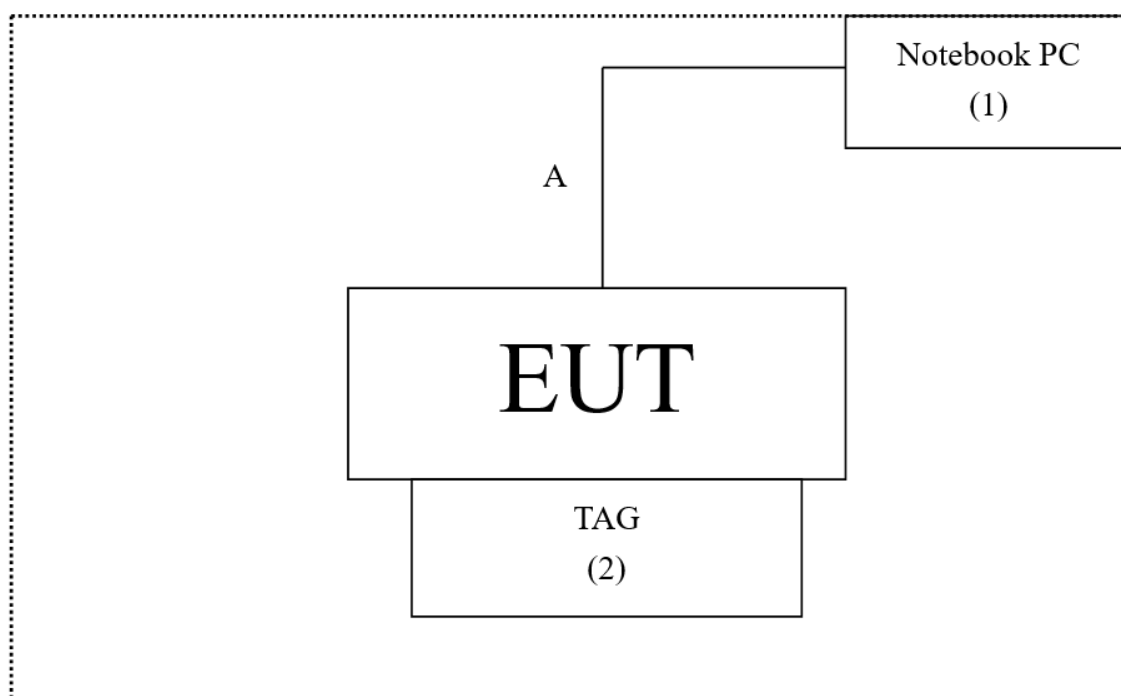
1.3. 系統測試時之週邊裝置

待測裝置測試時，其搭配系統測試時之週邊裝置包括下列：

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	P62G	229FJC2	N/A
2	TAG	ELATEC	ART13530	N/A	N/A

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 2.0m

1.4. 測試系統組合圖



1.5. 測試系統操作程序

1.	測試配置如上圖 1.4 所示
2.	利用負載觸發待測物發射訊號
3.	確認頻率及訊號正確
4.	功能無誤後開始測試

2. 測試環境與測試實驗室資訊

2.1. 試驗單位與週遭環境

實驗室環境條件:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	26.5°C
	Humidity (%RH)	10~90 %	43.1%
Radiated Emission	Temperature (°C)	10~40 °C	23.6°C
	Humidity (%RH)	10~90 %	62.3%

財團法人全國認證基金會 認證

特定服務計畫：通訊傳播設備測試實驗室認證服務計畫

初次認證日期：一百零三年十月二十四日

認證有效期間：一百零九年十二月十三日起至一百一十二年十二月十二日止

認可測試領域：低功率射頻器材(工作頻率9kHz to 325GHz)

認可編號：3023

測試實驗室：德凱認證股份有限公司

測試實驗室地址：桃園市龜山區華亞一路26號

電話號碼：+886-3-275-7255

傳真號碼：+866-3-327-5505

電子郵件信箱：info.tw@dekra.com

公司網站：<http://www.dekra.com.tw>

2.2. 測試設備明細

For Conduction measurements /SH1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2021.04.08	2022.04.07
X	Two-Line V-Network	R&S	ENV216	101307	2021.05.04	2022.05.03
X	Coaxial Cable	DEKRA	RG400_BNC	RF001	2021.05.24	2022.05.23

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

For Radiated measurements /966-3

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2021.03.16	2022.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-678	2020.09.04	2021.09.03
	Horn Antenna	ETS-Lindgren	3117	00201259	2020.10.23	2021.10.22
	Horn Antenna	Com-Power	AH-840	101087	2021.06.16	2022.06.15
X	Pre-Amplifier	EMCI	EMC001330	980302	2021.07.26	2022.07.25
	Pre-Amplifier	EMCI	EMC051835SE	980313	2020.11.25	2021.11.24
	Pre-Amplifier	EMCI	EMC05820SE	980310	2021.07.07	2022.07.06
	Pre-Amplifier	EMCI	EMC184045SE	980362	2021.08.24	2022.08.23
	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
X	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102793	2020.12.17	2021.12.16
X	Spectrum Analyzer	R&S	FSV3044	101113	2021.02.03	2022.02.02
	Coaxial Cable	SGH, EMCI	HA800 , SGH18	HY2103-001C	2021.03.03	2022.03.02
	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2021.06.25	2022.06.24

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0

2.3. 量測不確定度

不確定度已根據 DEKRA 內部文件進行了計算，並在本報告的每個測試章節中進行了描述。報告的擴展不確定性是基於標準不確定性乘以 $k = 2$ 的覆蓋因子得出的，置信度約為 95%。對各個測試系統與伴隨的連接設施，所執行的量測項目的量測不確定度，在此提供做為系統資訊的參考，符合性決定不考慮測試系統的不確定度而是基於符合性測試的結果。

Test item	Uncertainty	
電源端點干擾測試	± 3.42 dB	
輻射干擾測試	Under 1GHz ± 4.06 dB	Above 1GHz ± 3.73 dB

3. 電源端點干擾測試

3.1. 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範之第 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。

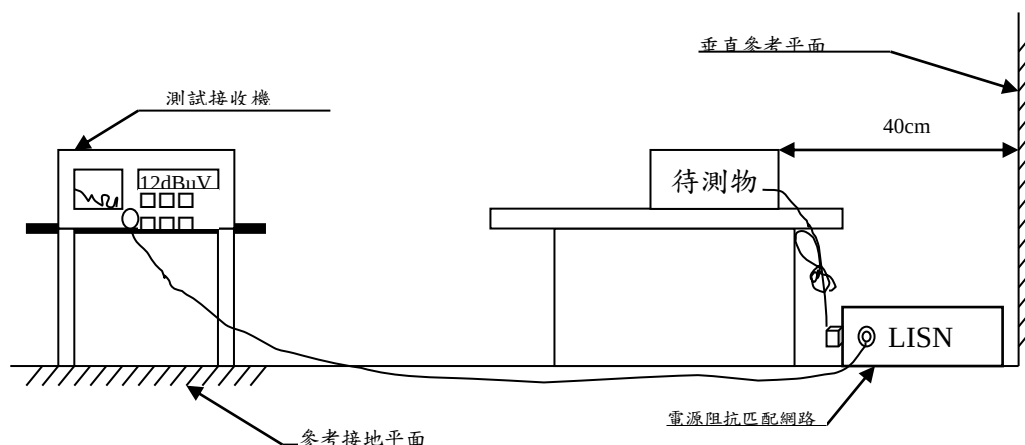
Frequency 頻率範圍 MHz	傳導限制值(dBuV)	
	準峰值	平均值
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

註:隨頻率之對數遞減

3.2. 量測方法

待測物置於高 80 公分之非導體桌面（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，於在正常工作狀態下，執行待測物之火線及地線各一次量測。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 10kHz。

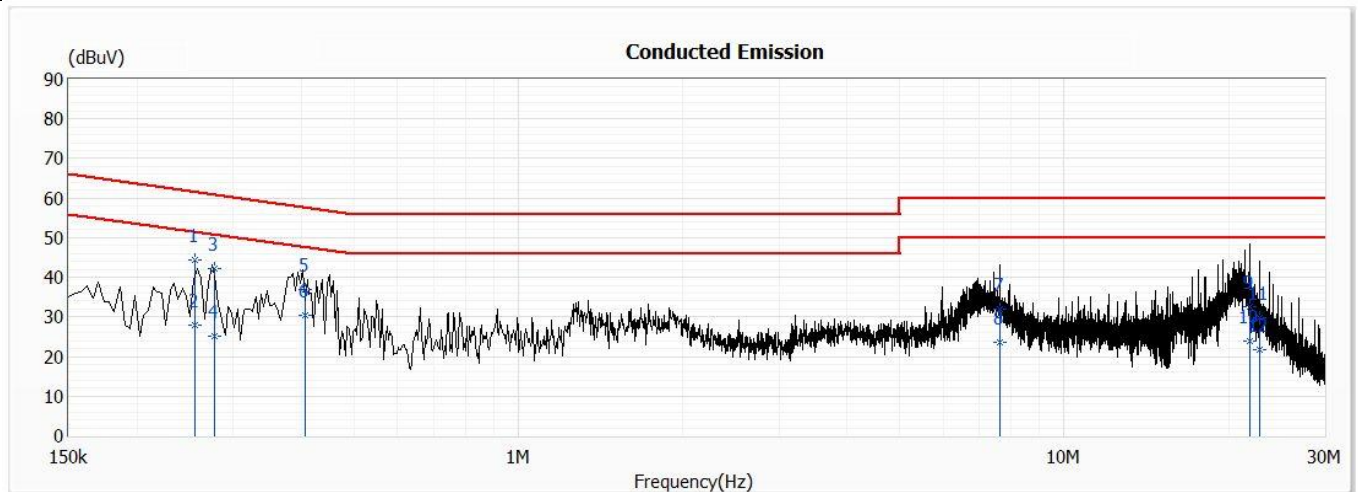
3.3. 測試架構圖



Note: 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據。

3.4. 電源端點測試結果

Model No	TWN4 Slim	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/18
Test Mode	Mode 1: 發射器	Engineer	Jason Tuan
Phase	L1	Temperature (°C)	26.5
Test Condition	--	Humidity (%RH)	43.1
Note	125K		

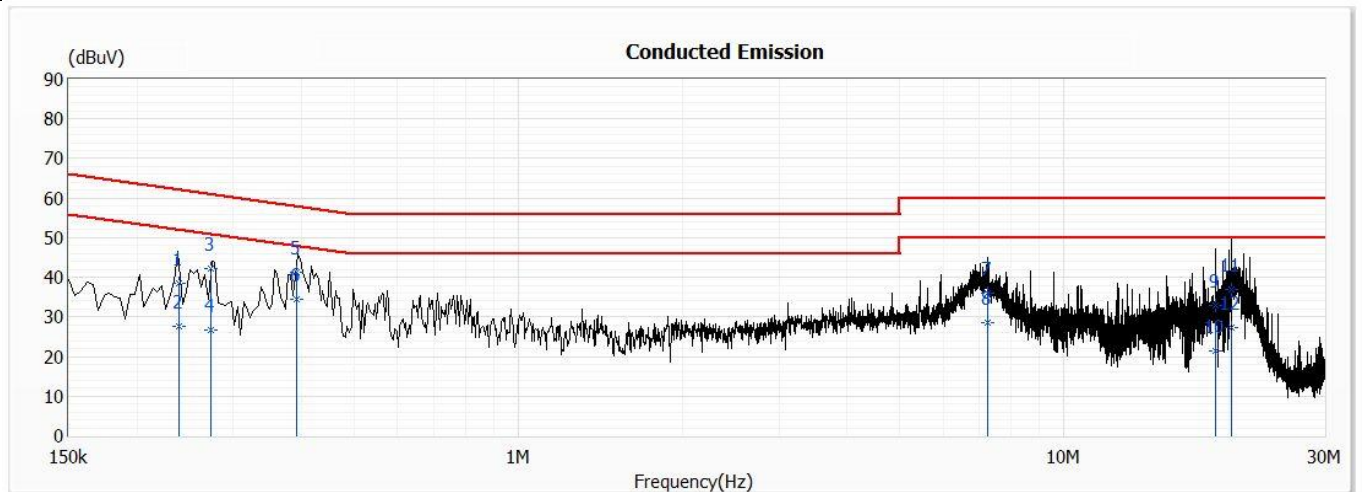


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.256	44.27	61.57	-17.30	34.62	9.65	QP
2	0.256	27.96	51.57	-23.61	18.31	9.65	AV
3	0.278	42.36	60.88	-18.52	32.71	9.65	QP
4	0.278	25.14	50.88	-25.74	15.49	9.65	AV
5	0.407	36.86	57.71	-20.85	27.20	9.66	QP
*6	0.407	30.55	47.71	-17.16	20.89	9.66	AV
7	7.621	31.87	60.00	-28.13	22.02	9.85	QP
8	7.621	23.52	50.00	-26.48	13.67	9.85	AV
9	21.839	32.74	60.00	-27.26	22.77	9.97	QP
10	21.839	23.97	50.00	-26.03	14.00	9.97	AV
11	22.775	29.87	60.00	-30.13	19.90	9.97	QP
12	22.775	21.60	50.00	-28.40	11.63	9.97	AV

Note:

1. “*” means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

Model No	TWN4 Slim	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/18
Test Mode	Mode 1: 發射器	Engineer	Jason Tuan
Phase	N	Temperature (°C)	26.5
Test Condition	--	Humidity (%RH)	43.1
Note	125K		

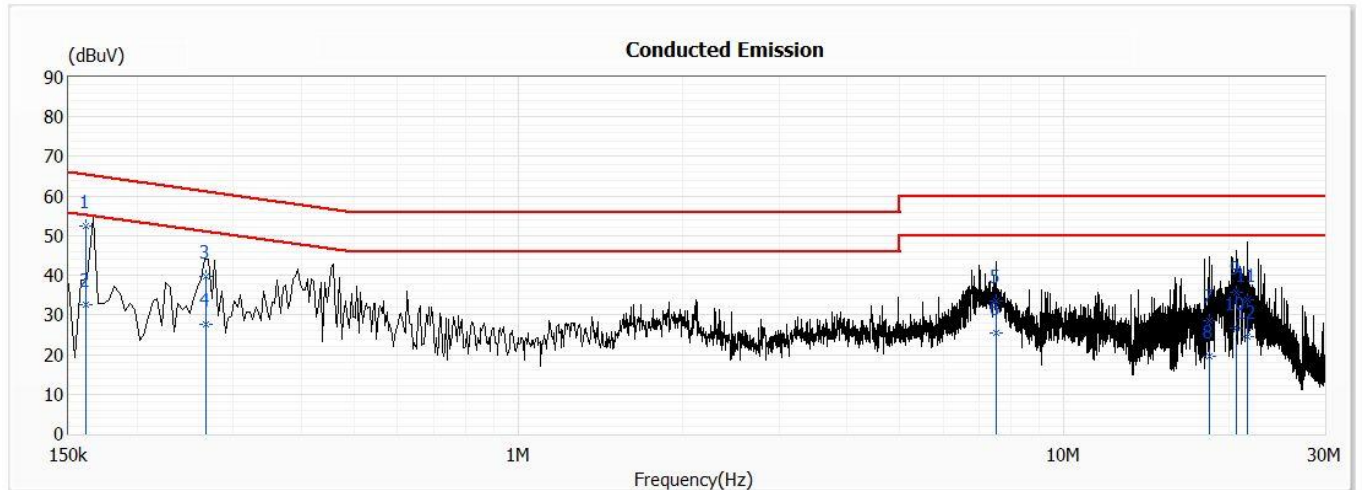


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.239	38.63	62.12	-23.49	28.96	9.67	QP
2	0.239	27.68	52.12	-24.44	18.01	9.67	AV
3	0.273	42.17	61.02	-18.85	32.50	9.67	QP
4	0.273	26.81	51.02	-24.21	17.14	9.67	AV
5	0.392	41.25	58.02	-16.77	31.58	9.67	QP
*6	0.392	34.39	48.02	-13.63	24.72	9.67	AV
7	7.225	36.02	60.00	-23.98	26.17	9.85	QP
8	7.225	28.49	50.00	-21.51	18.64	9.85	AV
9	18.965	32.75	60.00	-27.25	22.72	10.03	QP
10	18.965	21.39	50.00	-28.61	11.36	10.03	AV
11	20.226	36.99	60.00	-23.01	26.94	10.05	QP
12	20.226	27.29	50.00	-22.71	17.24	10.05	AV

Note:

1. “*” means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

Model No	TWN4 Slim	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/18
Test Mode	Mode 2: 接收器	Engineer	Jason Tuan
Phase	L1	Temperature (°C)	26.5
Test Condition	--	Humidity (%RH)	43.1
Note	125K		

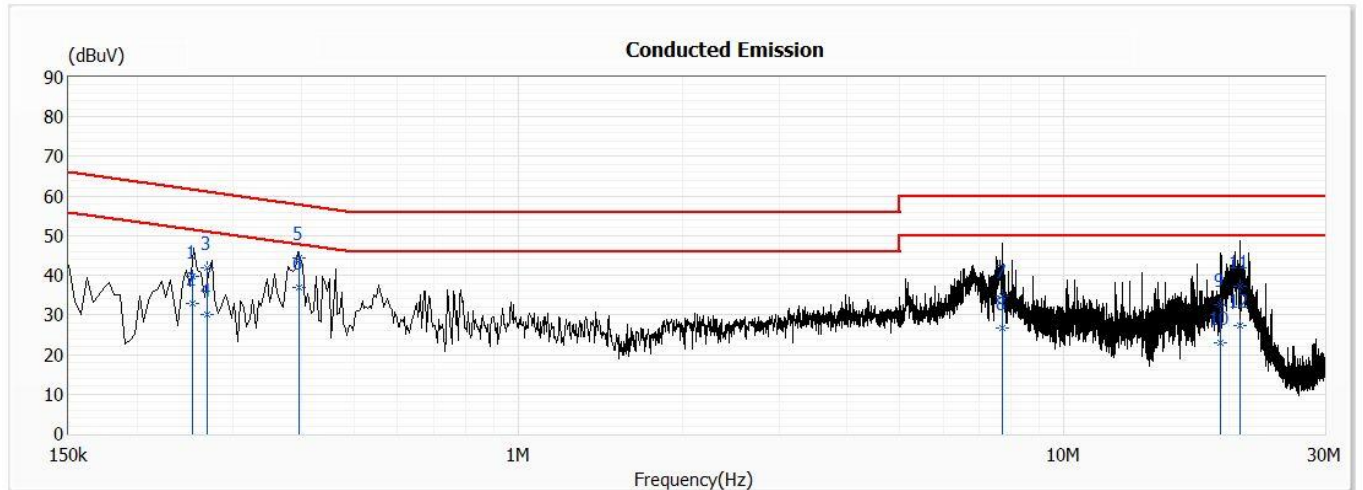


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.162	52.44	65.38	-12.94	42.78	9.66	QP
2	0.162	32.64	55.38	-22.74	22.98	9.66	AV
3	0.267	39.64	61.20	-21.56	29.99	9.65	QP
4	0.267	27.56	51.20	-23.64	17.91	9.65	AV
5	7.511	33.59	60.00	-26.41	23.74	9.85	QP
6	7.511	25.41	50.00	-24.59	15.56	9.85	AV
7	18.476	28.45	60.00	-31.55	18.49	9.96	QP
8	18.476	19.50	50.00	-30.50	9.54	9.96	AV
9	20.633	35.71	60.00	-24.29	25.75	9.96	QP
10	20.633	26.70	50.00	-23.30	16.74	9.96	AV
11	21.669	33.83	60.00	-26.17	23.86	9.97	QP
12	21.669	24.67	50.00	-25.33	14.70	9.97	AV

Note:

1. “*” means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

Model No	TWN4 Slim	Site	SH1
Test Voltage	AC 110V/60Hz	Test Date	2021/8/18
Test Mode	Mode 2: 接收器	Engineer	Jason Tuan
Phase	N	Temperature (°C)	26.5
Test Condition	--	Humidity (%RH)	43.1
Note	125K		



No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.253	39.79	61.66	-21.87	30.12	9.67	QP
2	0.253	32.86	51.66	-18.80	23.19	9.67	AV
3	0.269	41.91	61.15	-19.24	32.24	9.67	QP
4	0.269	29.96	51.15	-21.19	20.29	9.67	AV
5	0.397	44.30	57.92	-13.62	34.63	9.67	QP
*6	0.397	36.96	47.92	-10.96	27.29	9.67	AV
7	7.685	34.68	60.00	-25.32	24.81	9.87	QP
8	7.685	26.66	50.00	-23.34	16.79	9.87	AV
9	19.302	32.72	60.00	-27.28	22.67	10.05	QP
10	19.302	22.99	50.00	-27.01	12.94	10.05	AV
11	21.001	37.37	60.00	-22.63	27.31	10.06	QP
12	21.001	27.46	50.00	-22.54	17.40	10.06	AV

Note:

1. “*” means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor.
3. Margin = Emission Level – Limit.
4. Correct Factor = LISN insertion loss + Cable loss.

4. 天線之要求

4.1. 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範之第 3.2 節中規定，低功率射頻器材之發射機或收發信機所使用之天線，除本規範章節中另有規定外，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。

4.2. 天線樣式

此 RFID Reader/Writer 其天線為全固定式 Coil antenna.

Antenna List

No.	廠牌	型號	Antenna Type
1	ELATEC GmbH	ANT042	Coil Antenna

天線之要求判別結果:

PASS

5. 輻射干擾測試

5.1. 適用標準

依據國家通訊傳播委員會低功率射頻器材技術規範之第 3.5 節，除本規範另有規定外，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(兆赫)	頻率(兆赫)	頻率(兆赫)	頻率(兆赫)
0.090 - 0.110	162.01 - 167.17	2200.0 - 2300.0	23600.0 - 24000.0
0.490 - 0.510	167.72 - 173.20	2310.0 - 2390.0	31200.0 - 31800.0
2.172 - 2.198	240.00 - 285.00	2483.5 - 2900.0	36430.0 - 36500.0
3.013 - 3.033	322.00 - 335.40	3260.0 - 3267.0	38600.0 以上
4.115 - 4.198	399.90 - 410.00	3332.0 - 3339.0	
5.670 - 5.690	485.00 - 510.00	3345.8 - 3358.0	
6.200 - 6.300	608.00 - 614.00	3500.0 - 4400.0	
8.230 - 8.400	703.00 - 748.00	4500.0 - 5250.0	
12.265 - 12.600	758.00 - 803.00	5350.0 - 5460.0	
13.340 - 13.430	825.00 - 915.00	7250.0 - 7750.0	
14.965 - 15.020	930.00 - 1240.0	8025.0 - 8500.0	
16.700 - 16.755	1300.0 - 1427.0	9000.0 - 9200.0	
19.965 - 20.020	1435.0 - 1626.5	9300.0 - 9500.0	
25.500 - 25.700	1660.0 - 1785.0	10600.0 - 12700.0	
37.475 - 38.275	1805.0 - 1880.0	13250.0 - 13400.0	
73.500 - 75.400	1885.0 - 1900.0	14470.0 - 14500.0	
108.00 - 138.00	1905.0 - 1985.0	15350.0 - 16200.0	
149.90 - 150.05	2010.0 - 2025.0	17700.0 - 21400.0	
156.70 - 156.90	2110.0 - 2170.0	22010.0 - 23120.0	

依據國家通訊傳播委員會低功率射頻器材技術規範之第 3.6 節，低功率射頻器材，除本規範各章節另有放寬規定者外，其電場強度不得超過下表之限值，且其不必要之發射皆不得大於主波發射強度。各頻段重疊處，以較嚴格之限制值為準。

頻 率(兆赫)	電場強度(微伏/公尺)	測距(公尺)
0.009 - 0.490(含)	2400/f(kHz)	300
0.490(不含)~1.705(含)	24000/f(kHz)	30
1.705(不含)– 30 (不含)	30	30
30 (含)– 88 (含)	100	3
88 (不含)- 216 (含)	150	3
216 (不含)- 960 (含)	200	3
960 (不含)以上	500	3

上表規定之電場強度，頻率在 9-90kHz 千赫(kHz)、110-490 千赫(kHz)以及 1000 兆赫(MHz)以上之發射，其量測以平均值檢波器為基準，且須符合第 6.15.2 節之規定；其他頻率之發射，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須符合第 6.5 節之規定，而輻射發射之量測頻率範圍須符合第 6.14 節之規定。

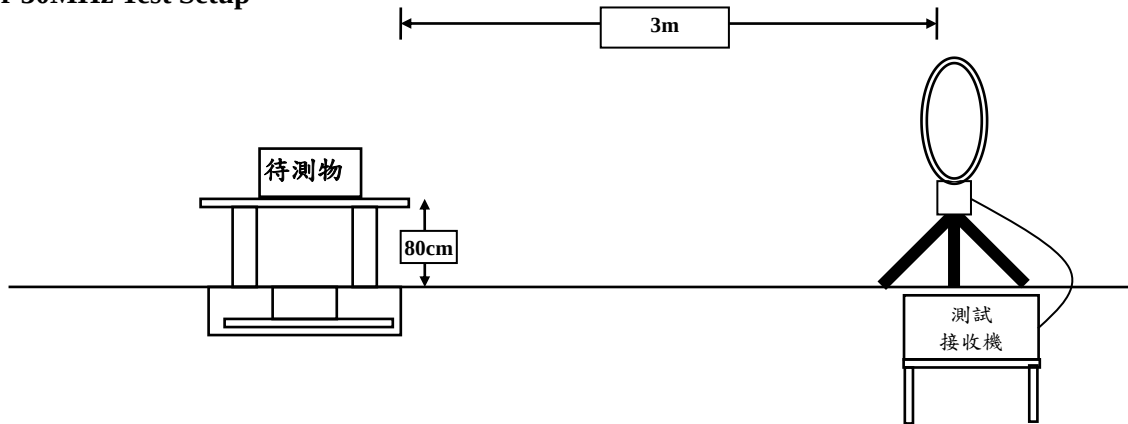
5.2. 量測方法

待測物置於高 80 公分(測試範圍低於 1GHz)或高 150 公分(測試範圍高於 1GHz)之非導體桌面（落地型產品置於地上），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。

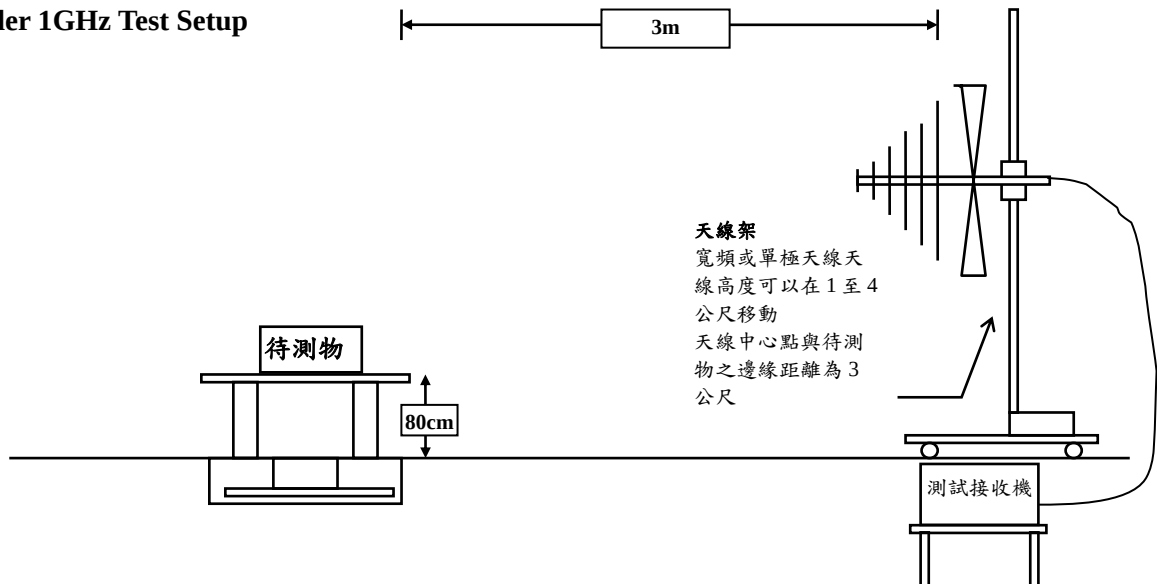
待測物應在正常發射狀態下量測。

5.3. 測試架構圖

Under 30MHz Test Setup

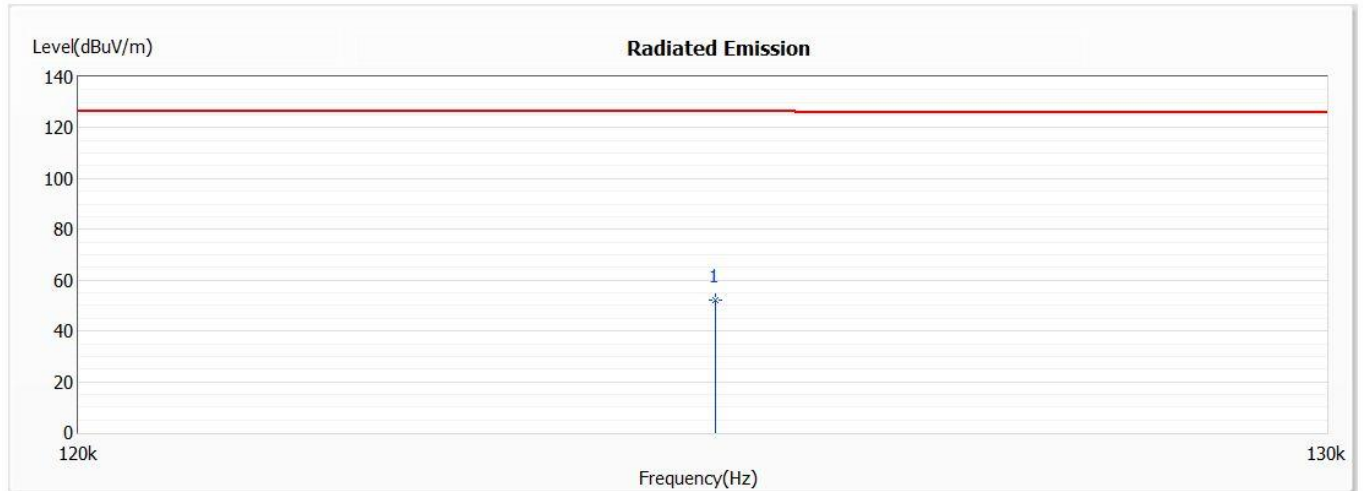


Under 1GHz Test Setup



5.4. 輻射干擾測試結果

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k,X 軸	Humidity (%RH)	62.3

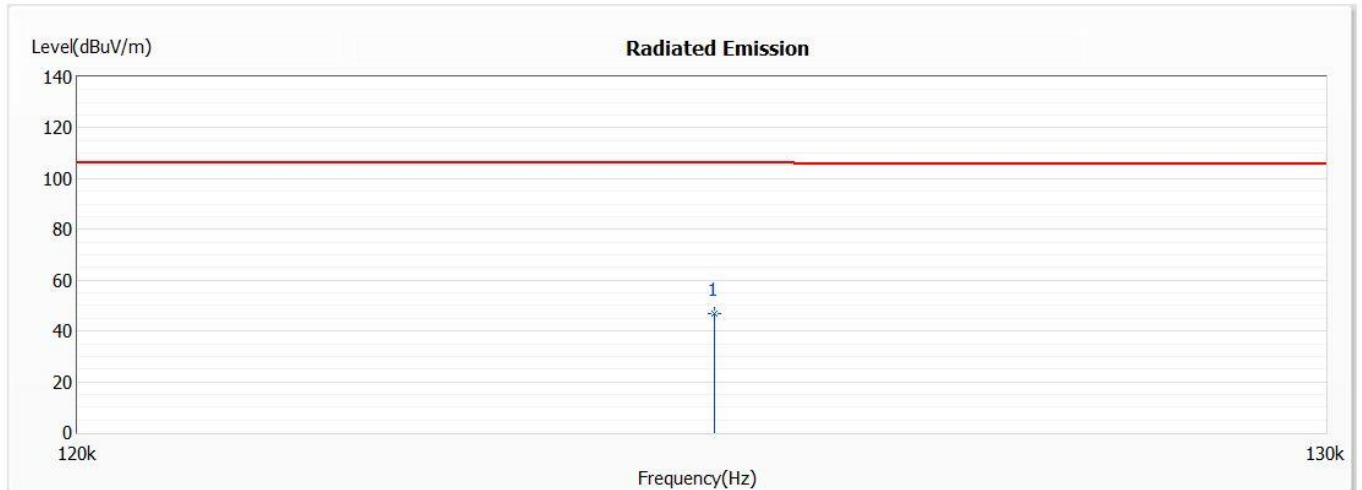


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	52.00	125.67	-73.67	31.88	20.12	PK

Remark:

1. "*" means this data is the worst emission level;
"!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k, X 軸	Humidity (%RH)	62.3

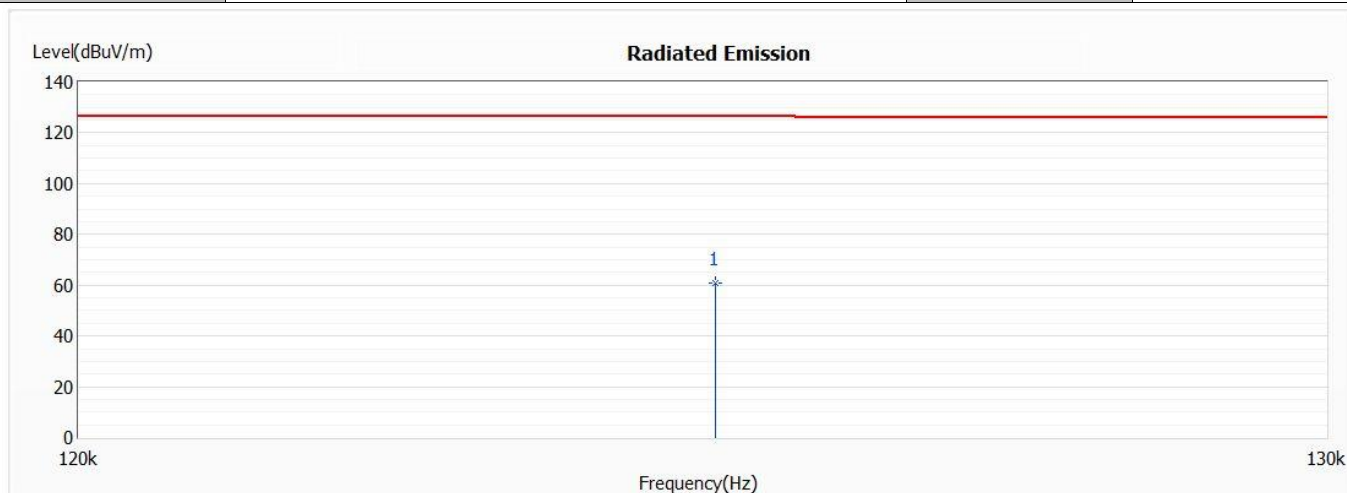


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	47.00	105.67	-58.67	26.88	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, X 軸	Humidity (%RH)	62.3

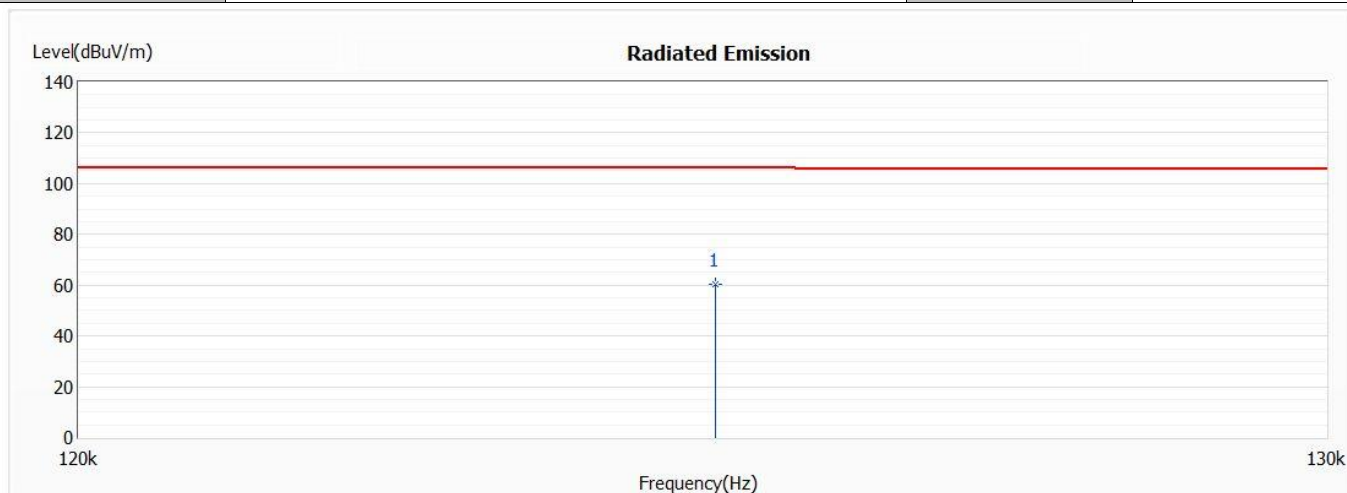


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	61.00	125.67	-64.67	40.88	20.12	PK

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, X 軸	Humidity (%RH)	62.3

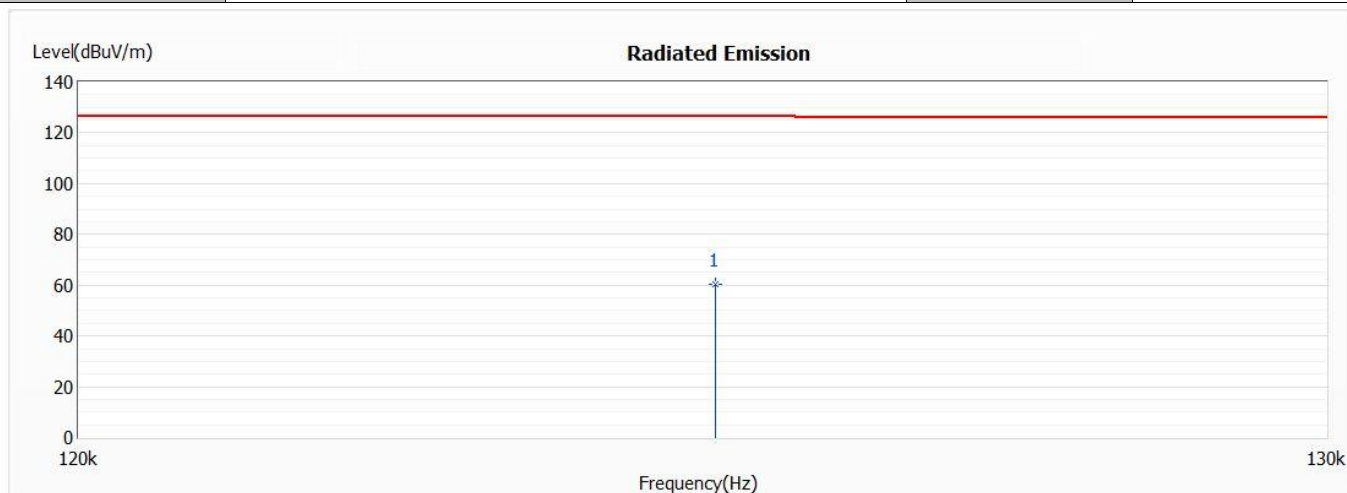


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	60.20	105.67	-45.47	40.08	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k, Y 軸	Humidity (%RH)	62.3

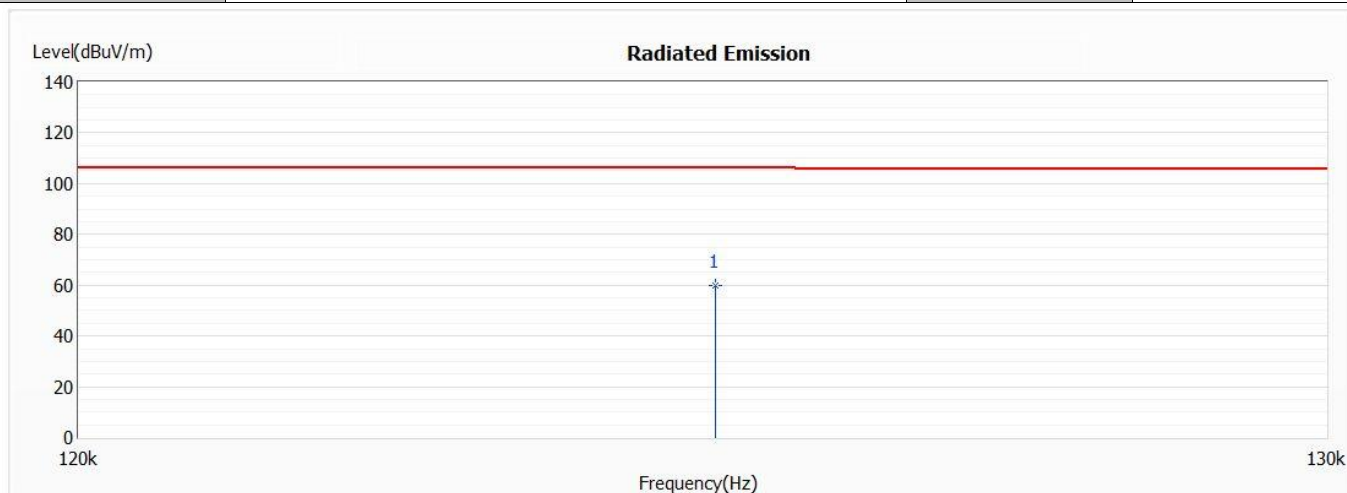


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	60.50	125.67	-65.17	40.38	20.12	PK

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k, Y 軸	Humidity (%RH)	62.3

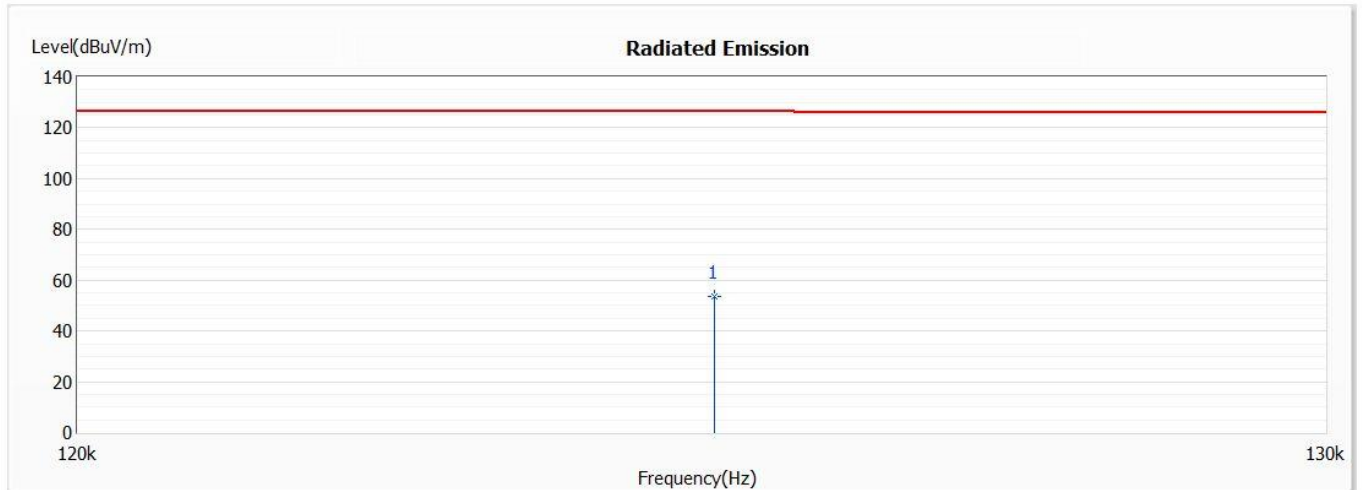


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	60.10	105.67	-45.57	39.98	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, Y 軸	Humidity (%RH)	62.3

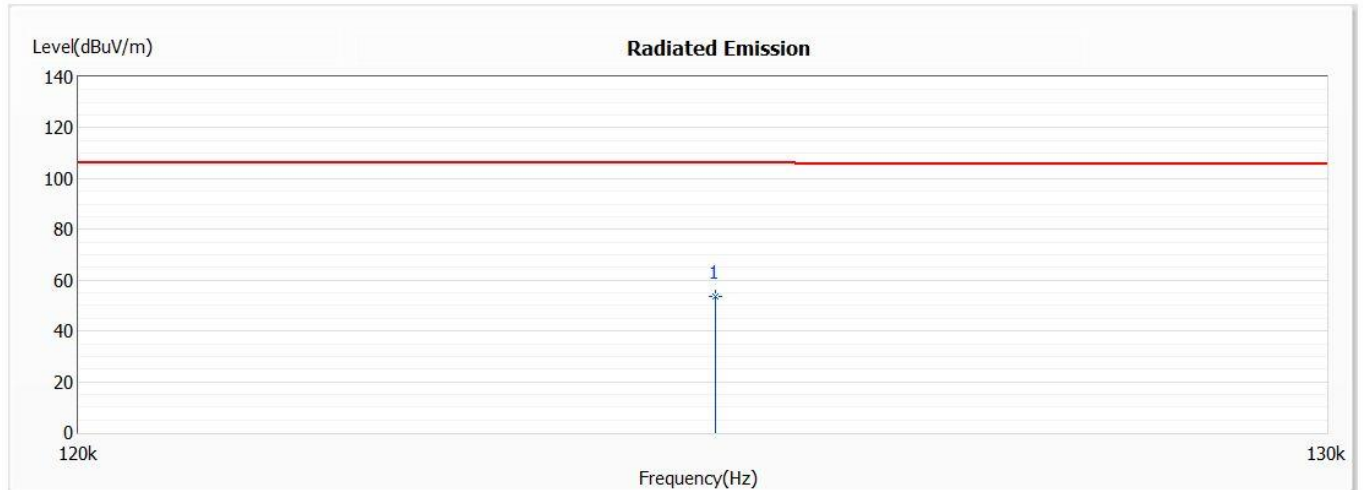


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	53.80	125.67	-71.87	33.68	20.12	PK

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, Y 軸	Humidity (%RH)	62.3

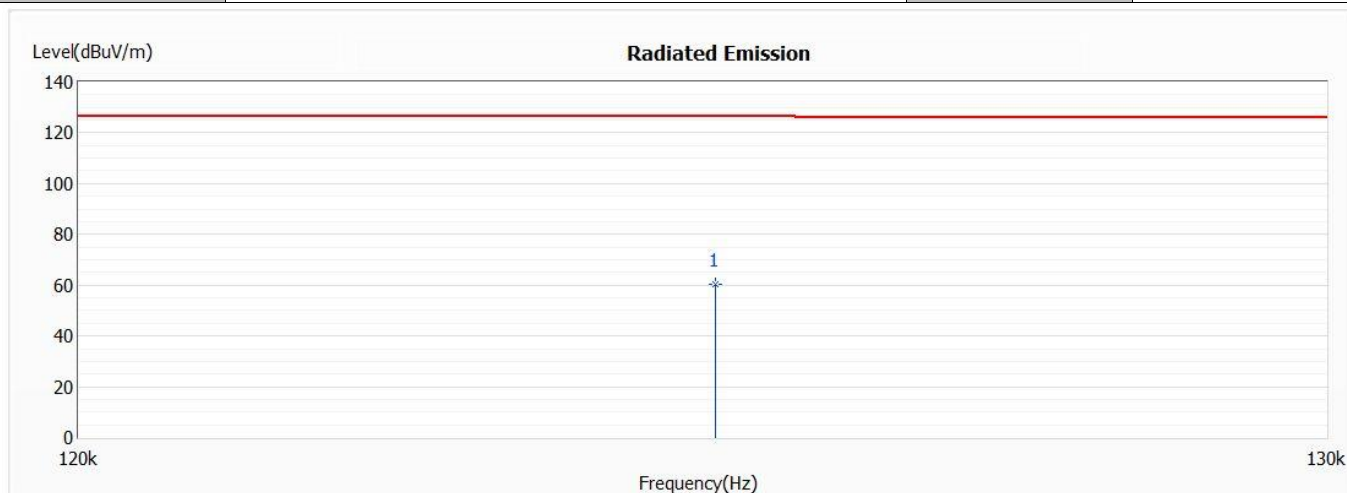


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	53.60	105.67	-52.07	33.48	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k,Z 軸	Humidity (%RH)	62.3

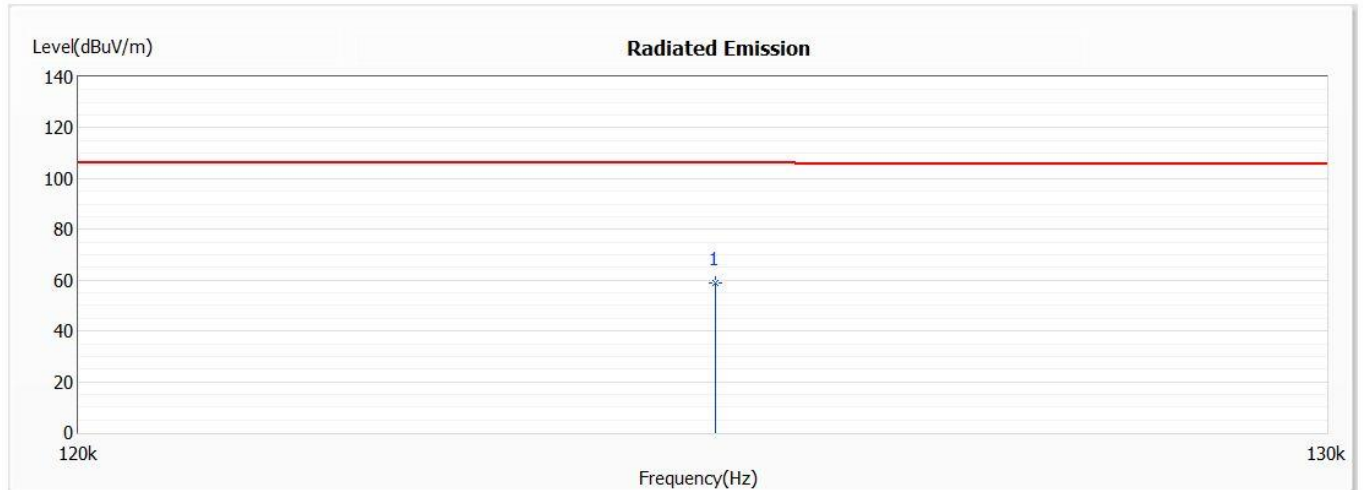


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	60.20	125.67	-65.47	40.08	20.12	PK

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k, Z 軸	Humidity (%RH)	62.3

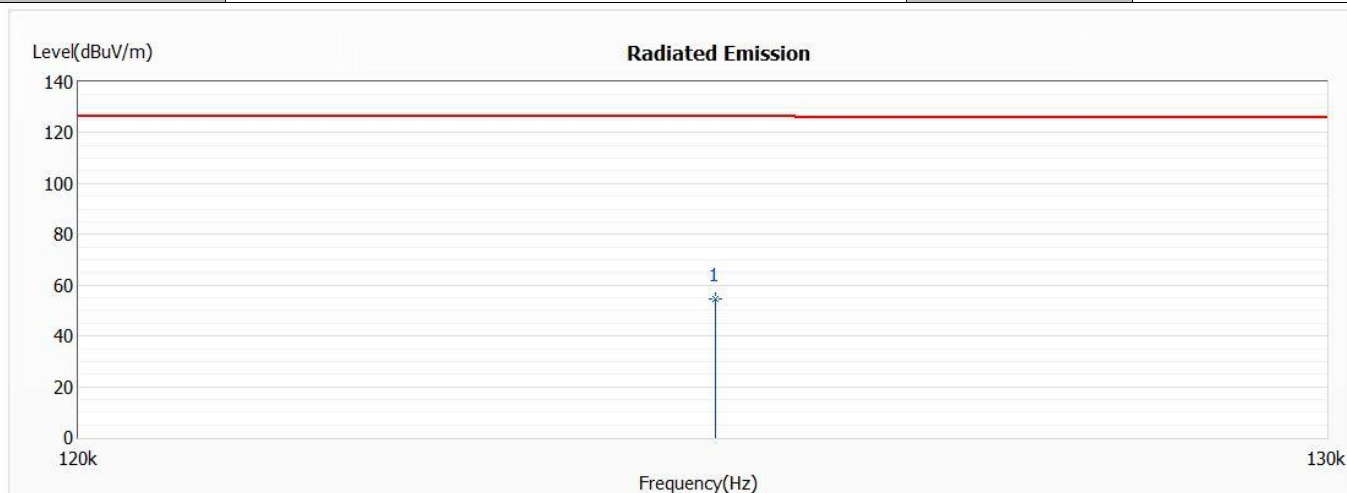


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	59.00	105.67	-46.67	38.88	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, Z 軸	Humidity (%RH)	62.3

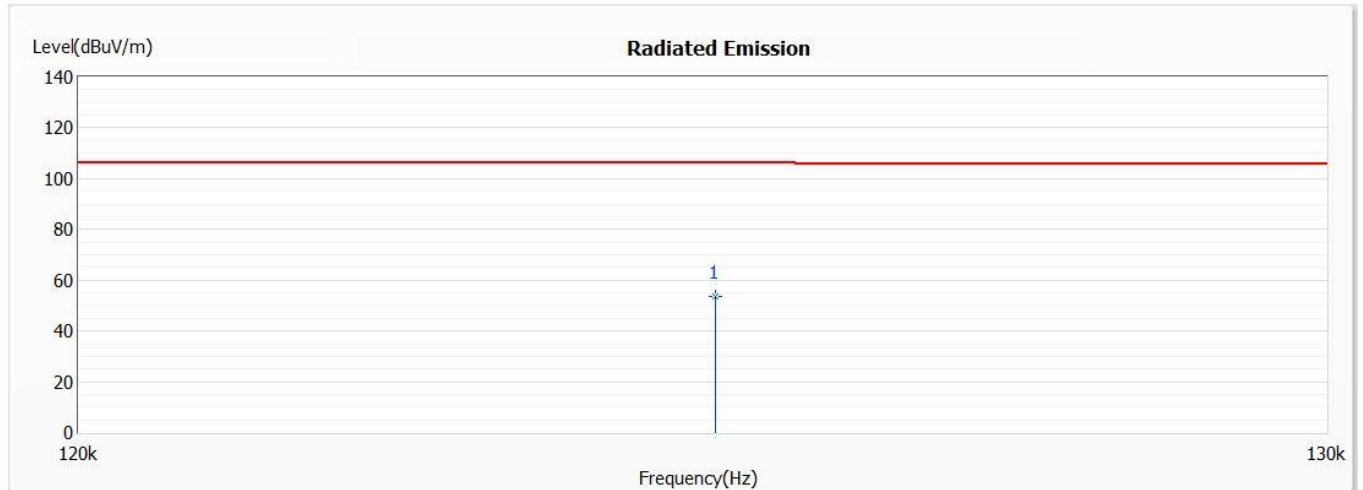


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	54.40	125.67	-71.27	34.28	20.12	PK

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	AC3-HY
Test Voltage	DC 5V (by USB)	Test Date	2021/6/29
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k, Z 軸	Humidity (%RH)	62.3



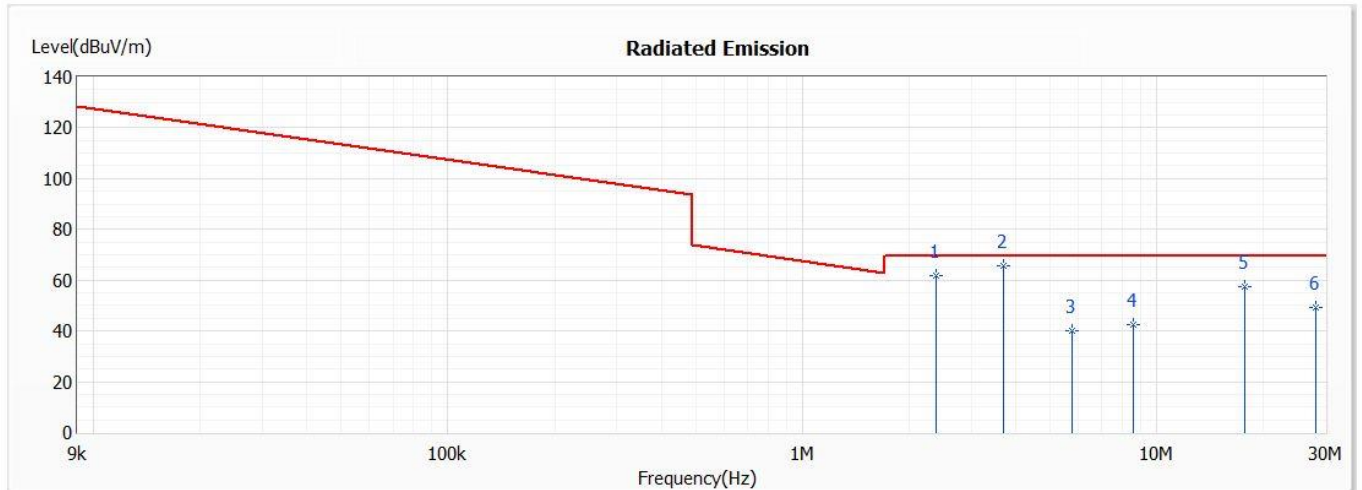
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	0.125	53.80	105.67	-51.87	33.68	20.12	AV

Remark:

- "*" means this data is the worst emission level;
"!" means this data is over limit.
- Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).
- Margin= Emission Level- Limit.

射頻輻射場強干擾(主波)測試結果:	PASS
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Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2.378	61.66	69.54	-7.88	41.56	20.10	QP
* 2	3.698	65.70	69.54	-3.84	45.56	20.14	QP
3	5.767	40.18	69.54	-29.36	20.07	20.11	QP
4	8.616	42.60	69.54	-26.94	22.51	20.09	QP
5	17.794	57.68	69.54	-11.86	37.80	19.88	QP
6	28.201	49.17	69.54	-20.37	29.18	19.99	QP

Remark:

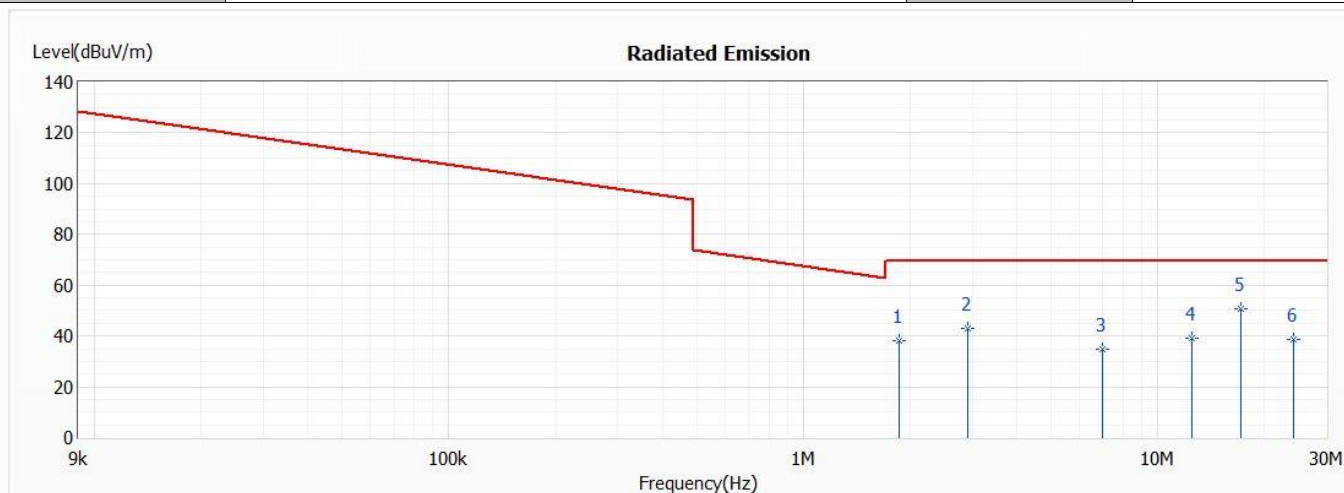
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	1.868	38.07	69.54	-31.47	17.98	20.09	QP
2	2.918	42.85	69.54	-26.69	22.74	20.11	QP
3	6.967	34.64	69.54	-34.90	14.53	20.11	QP
4	12.455	39.07	69.54	-30.47	18.86	20.21	QP
* 5	17.194	50.89	69.54	-18.65	30.99	19.90	QP
6	24.212	38.63	69.54	-30.91	18.85	19.78	QP

Remark:

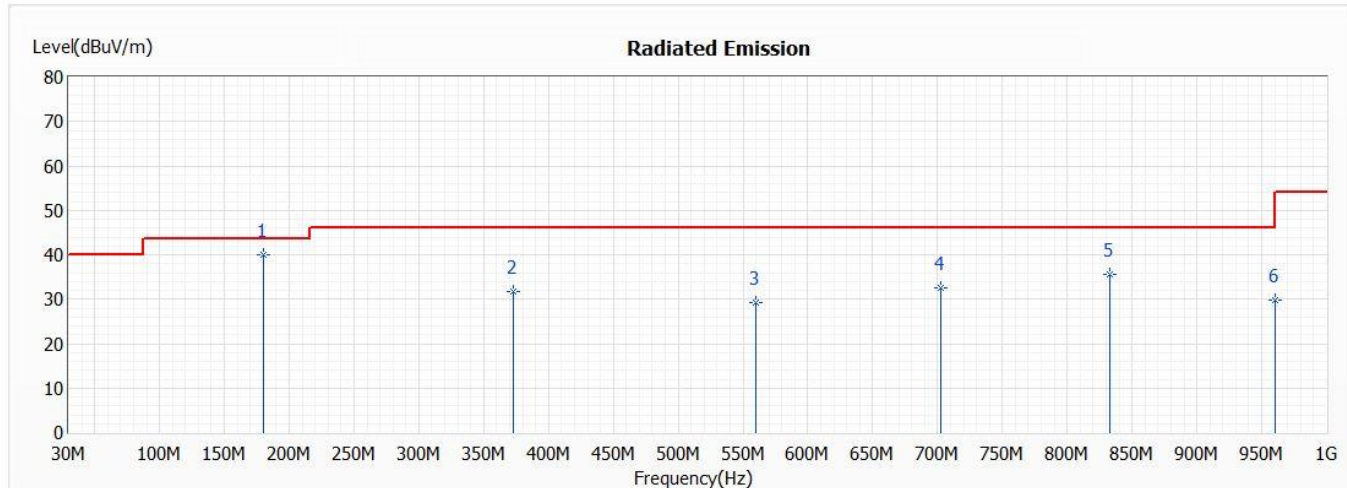
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	180.350	40.04	43.50	-3.46	51.82	-11.78	QP
2	372.410	31.64	46.00	-14.36	39.48	-7.84	QP
3	559.620	29.34	46.00	-16.66	33.20	-3.86	QP
4	702.210	32.49	46.00	-13.51	34.07	-1.58	QP
5	833.160	35.47	46.00	-10.53	35.32	0.15	QP
6	960.230	29.74	54.00	-24.26	27.75	1.99	QP

Remark:

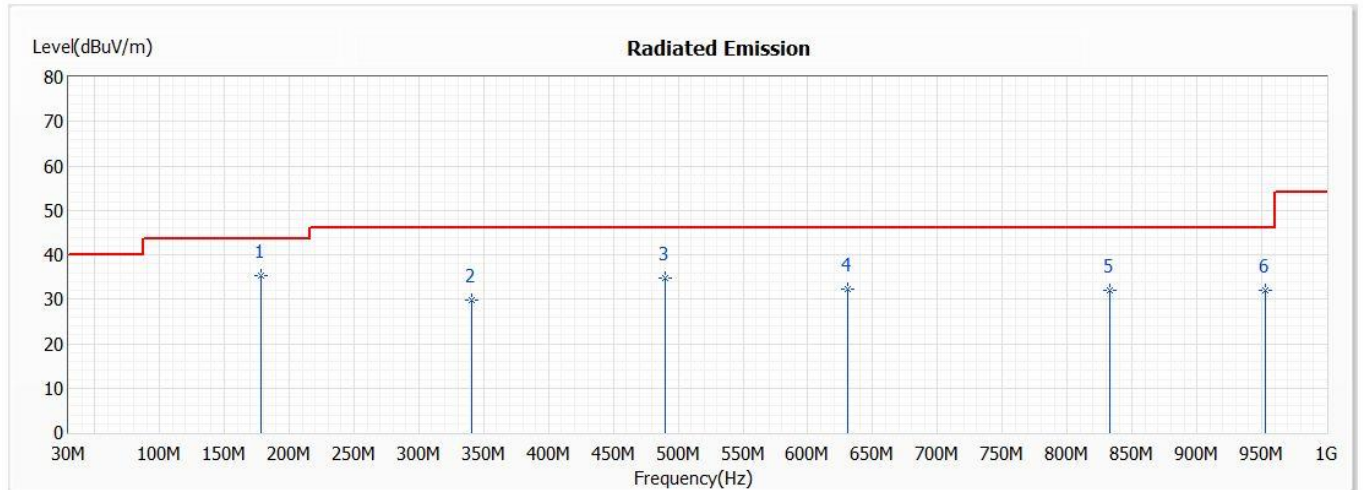
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 1: 發射器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	178.410	35.28	43.50	-8.22	46.67	-11.39	QP
2	340.400	29.88	46.00	-16.12	38.56	-8.68	QP
3	489.780	34.67	46.00	-11.33	40.06	-5.39	QP
4	630.430	32.16	46.00	-13.84	34.80	-2.64	QP
5	833.160	32.08	46.00	-13.92	31.93	0.15	QP
6	952.470	32.13	46.00	-13.87	30.16	1.97	QP

Remark:

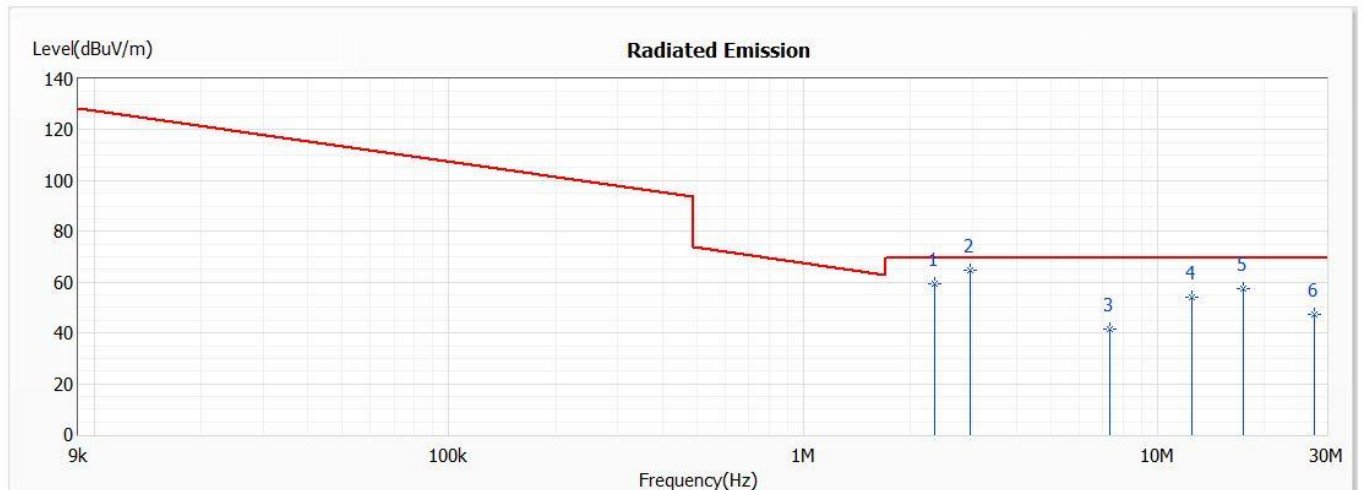
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 2: 接收器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2.348	59.48	69.54	-10.06	39.38	20.10	QP
* 2	2.948	64.81	69.54	-4.73	44.70	20.11	QP
3	7.327	41.54	69.54	-28.00	21.43	20.11	QP
4	12.485	54.18	69.54	-15.36	33.96	20.22	QP
5	17.434	57.56	69.54	-11.98	37.67	19.89	QP
6	27.601	47.38	69.54	-22.16	27.42	19.96	QP

Remark:

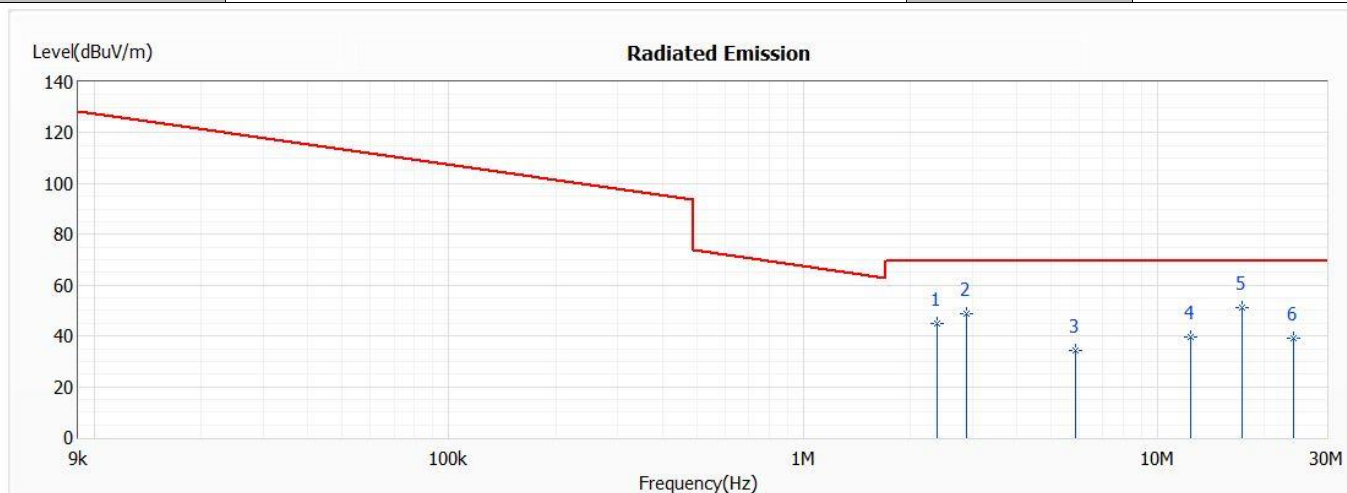
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 2: 接收器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125KHz	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2.378	44.89	69.54	-24.65	24.79	20.10	QP
2	2.888	48.93	69.54	-20.61	28.82	20.11	QP
3	5.887	34.06	69.54	-35.48	13.94	20.12	QP
4	12.425	39.52	69.54	-30.02	19.32	20.20	QP
* 5	17.284	51.09	69.54	-18.45	31.19	19.90	QP
6	24.272	39.10	69.54	-30.44	19.31	19.79	QP

Remark:

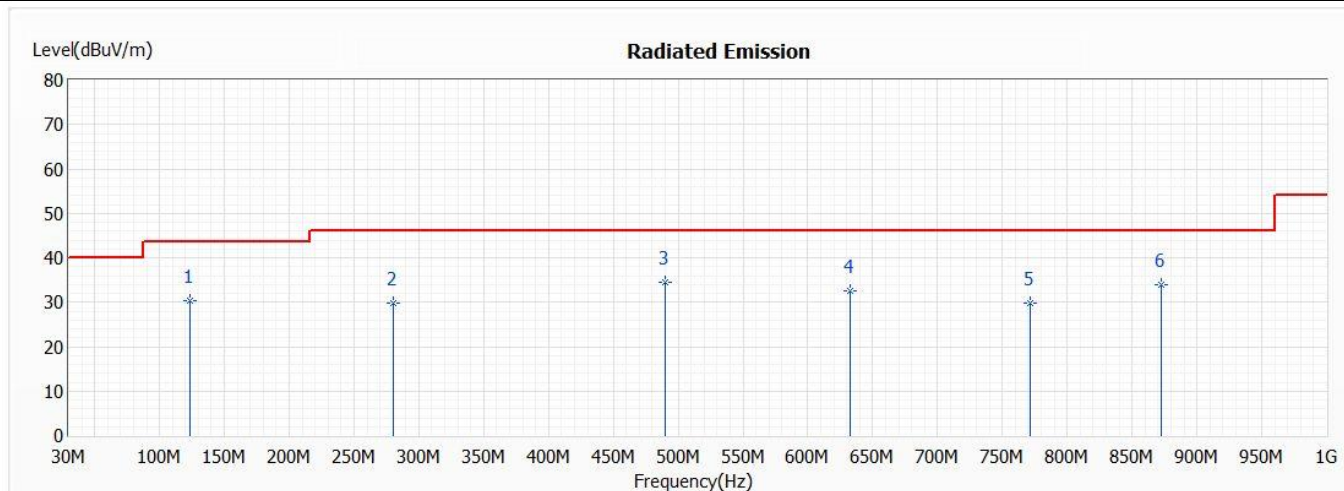
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 2: 接收器	Engineer	Johnny Lee
Polarity	Horizontal	Temperature (°C)	23.6
Test Condition	125k,	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	123.120	30.39	43.50	-13.11	43.13	-12.74	QP
2	280.260	29.74	46.00	-16.26	39.91	-10.17	QP
* 3	489.780	34.48	46.00	-11.52	39.87	-5.39	QP
4	632.370	32.57	46.00	-13.43	35.17	-2.60	QP
5	771.080	29.85	46.00	-16.15	30.17	-0.32	QP
6	872.930	33.83	46.00	-12.17	33.20	0.63	QP

Remark:

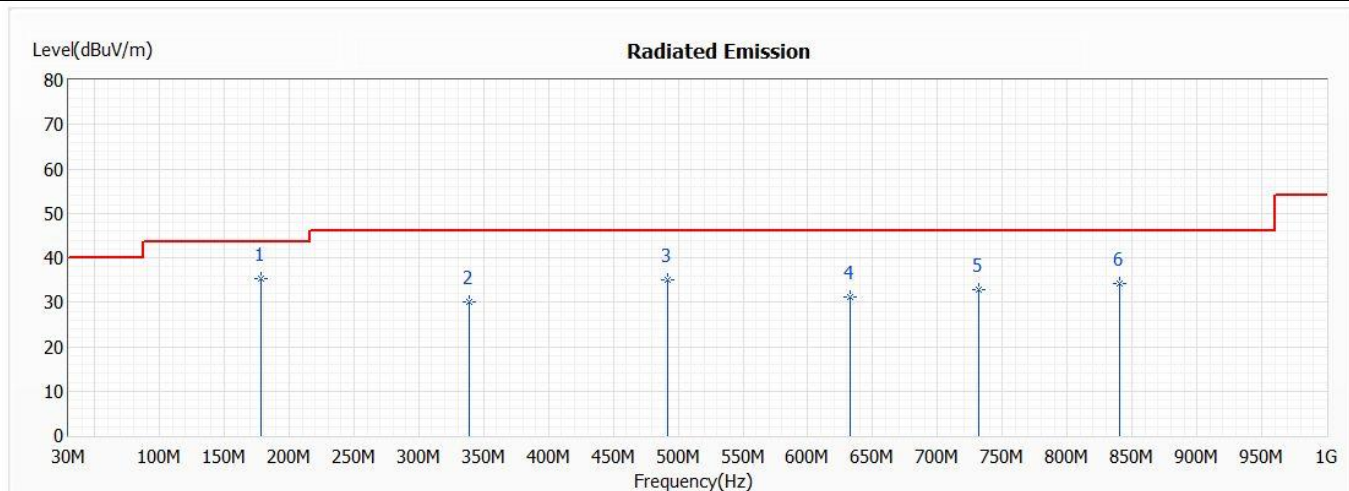
1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

Model No	TWN4 Slim	Site	966-3
Test Voltage	DC 5V (by USB)	Test Date	2021/6/30
Test Mode	Mode 2: 接收器	Engineer	Johnny Lee
Polarity	Vertical	Temperature (°C)	23.6
Test Condition	125k,	Humidity (%RH)	62.3



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	178.410	35.25	43.50	-8.25	46.64	-11.39	QP
2	338.460	30.03	46.00	-15.97	38.72	-8.69	QP
3	491.720	35.02	46.00	-10.98	40.39	-5.37	QP
4	632.370	31.05	46.00	-14.95	33.65	-2.60	QP
5	731.310	32.81	46.00	-13.19	33.85	-1.04	QP
6	839.950	34.24	46.00	-11.76	33.94	0.30	QP

Remark:

1. "*" means this data is the worst emission level;

"!" means this data is over limit.

2. Emission Level=Reading Level + Correct Factor(Correct Factor=Ant Factor+ Cable Loss- Pre Amp).

3. Margin= Emission Level- Limit.

射頻輻射場強干擾測試結果:

PASS

附件 1: 待測物測試擺設相片

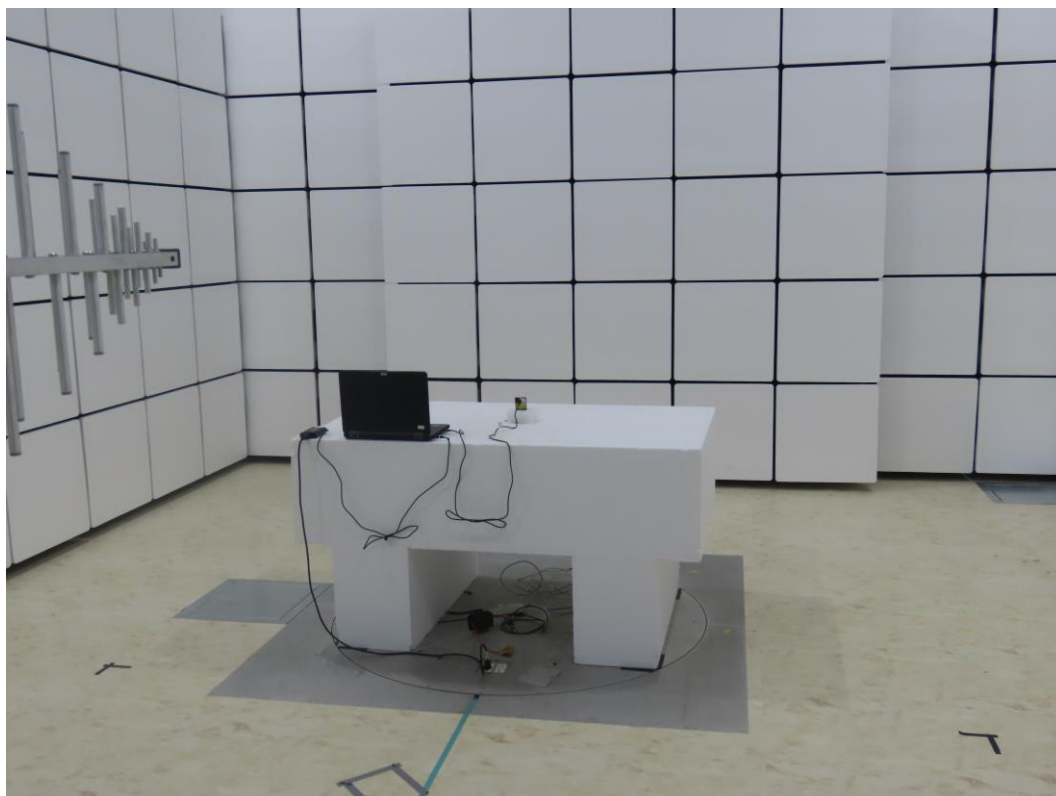
測試相片：電源端點測試 正面相片



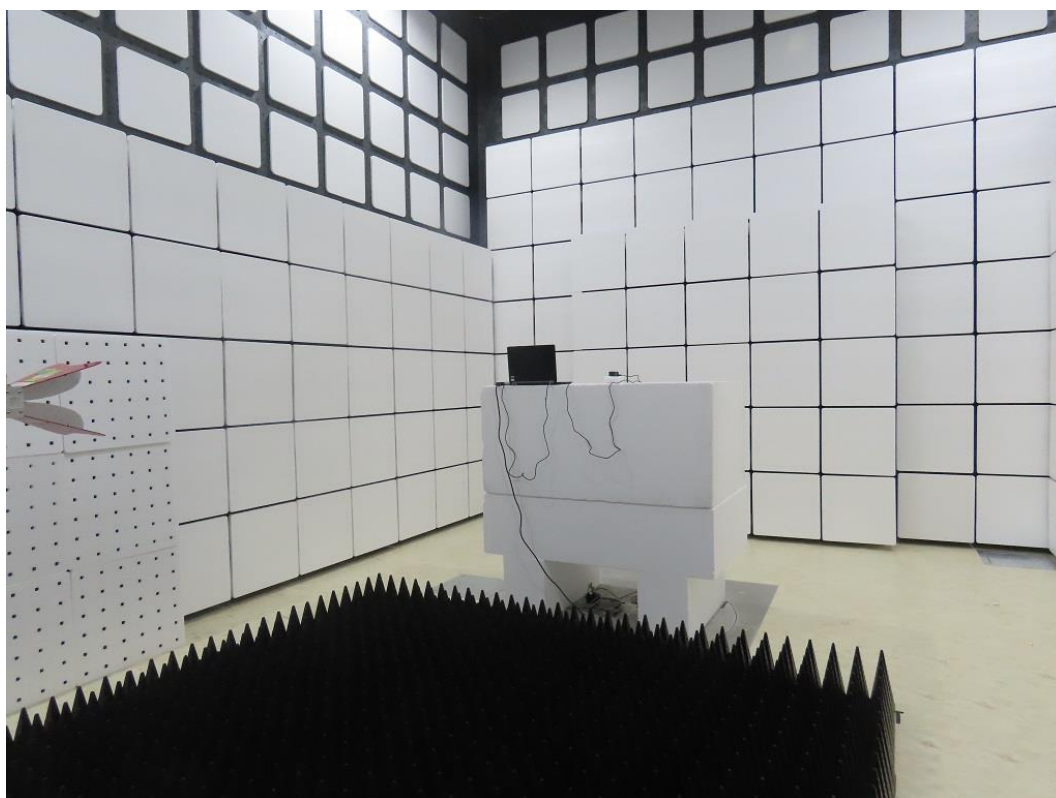
測試相片：電源端點測試 背面相片



測試相片：輻射測試



測試相片：輻射測試 (Hom)



測試相片：輻射測試 (LOOP)

