



低功率射頻電機測試報告

申請廠商：中景科技股份有限公司
地址：臺中市西區臺灣大道二段573號6樓
器材名稱：藍牙多功能音箱
廠牌：E-books
型號：HE-D18



財團法人台灣電子檢驗中心電磁相容試驗二部

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報告號碼: 17-09-RBF-038-01

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受理日期 : 106 年 09 月 19 日
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 報告號碼 : 17-09-RBF-038-01
 實驗室名稱 : 財團法人台灣電子檢驗中心電磁相容試驗二部
 實驗室地址 : 新北市林口區頂福里 5 鄰 34 號
 實驗室電話 : 02-26023052
 認可編號及範圍 : 2628 (9KHz- 40GHz)
 認可證書有效期限 : 107 年 10 月 08 日
 申請廠商 : 中景科技股份有限公司
 申請廠商地址 : 臺中市西區臺灣大道二段 573 號 6 樓
 製造廠商 : 深圳市百焱科技有限公司
 器材名稱 : 藍牙多功能音箱
 廠牌 : E-books
 型號 : HE-D18
 發射功率(電場強度) : 88.17 dB μ V/m @3m Peak(電場強度)
 工作頻率及調變方式 : 2402 – 2480 MHz ; 79CH ; FHSS
 天線規格 : 固定式 PCB 天線
 備註 : 1. 本測試報告僅對受測之樣品負責。
 2. 非經本中心同意，測試報告不得摘錄複印使用。(全部複製除外)
 3. 本產品所適用之規範修訂日期 105 年 08 月 23 日。

項次	測試項目	適用規範	測試結果	量測設備	備註
1	場強輻射	低功率射頻電機技術規範 3.10.2.2節、2.8節	請參閱4.5節	請參閱4.3節	合格
2	電源線傳導干擾	低功率射頻電機技術規範2.3 節	請參閱5.4節	請參閱5.3節	合格
3	天線之要求	低功率射頻電機技術規範2.2 節	請參閱6.2節	----	合格
4	開放頻帶邊緣之 發射	低功率射頻電機技術規範 3.10.2.4、2.8節	請參閱7.4節	請參閱7.3節	合格
	以下空白				

報告簽署人：

張子娟

量測員：

黃義傑



1 一般資料

1.1 產品描述

- a) 產品型態 : 藍牙多功能音箱
- b) 廠 牌 : E-books
- c) 產品型號 : HE-D18
- d) 供應電源 : DC 3.7V Battery (DC 5V USB for Charging)

1.2 產品特性

本產品為藍牙多功能音箱，為藍牙無線裝置，額定發射頻率為2402 – 2480 MHz，共使用79個頻道。

1.3 測試方法之依據

本測試報告之所有項目皆依據低功率射頻電機技術規範以及參考EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、2.1053及2.1055之檢驗法。

2 適用規範

2.1 規範要求

(1) 傳導之規定

依據國家通訊傳播委員會低功率射頻電機技術規範2.3節之規定，以市電為電源之低功率射頻電機，其傳導回電源線上頻率自150 kHz~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。電源傳導干擾之限制要求如下：

頻率(MHz)	傳導限制值(dB μ V)	
	準峰值(Quasi-peak)	平均值(Average)
0.15-0.5	66 – 56 _(註)	56 – 46 _(註)
0.5-5	56	46
5-30	60	50

註：隨頻率之對數遞減。

(2) 輻射之規定

依據低功率射頻電機技術規範3.10.2.2節之要求，主波與諧波發射：除3.10.2.3 外，發射之電場強度應小於或等於下表限制值：

主波頻率 (MHz)	主波電場強度 (mV/m)	諧波電場強度 (uV/m)
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

3.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依2.8 之發射限制，兩者取其較鬆者。

接收機依據低功率射頻電機技術規範之要求，其任何輻射場強需符合2.8節之一般限制要求：

頻率 MHz	測試距離 m	限制值 dB μ V/m	限制值 μ V/m
0.009 - 0.490	300	67.6/kHz	2400/kHz
0.490 - 1.705	30	87.6/kHz	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
960以上	3	54.0	500

(3) 天線之要求

依據低功率射頻電機技術規範2.2節之規定，低功率射頻電機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。

2.2 限制使用之頻帶

頻率(MHz)	頻率(MHz)
0.090~0.110	1660.0~1770.0
0.490~0.510	1805.0~1865.0
2.172~2.198	1885.0~1900.0
3.013~3.033	1905.0~1985.0
4.115~4.198	2015.0~2025.0
5.670~5.690	2125.0~2165.0
6.200~6.300	2200.0~2300.0
8.230~8.400	2310.0~2390.0
12.265~12.600	2483.5~2900.0
13.340~13.430	3260.0~3267.0
14.965~15.020	3332.0~3339.0
16.700~16.755	3345.8~3358.0
19.965~20.020	3500.0~4400.0
25.500~25.700	4500.0~5250.0
37.475~38.275	5350.0~5460.0
73.500~75.400	7250.0~7750.0
108.00~138.00	8025.0~8500.0
149.90~150.05	9000.0~9200.0
156.70~156.90	9300.0~9500.0
162.01~167.17	10600~12700
167.72~173.20	13250~13400
240.00~285.00	14470~14500
322.00~335.40	15350~16200
399.90~410.00	17700~21400
485.00~510.00	22010~23120
608.00~614.00	23600~24000
703.00~748.00	31200~31800
758.00~803.00	36430~36500
825.00~915.00	38600 以上
930.00~1240.0	
1300.0~1427.0	
1435.0~1626.5	

3 受測裝置之系統說明

裝置名稱	製造者/代理者	型 號	纜線說明
藍牙多功能音箱*	深圳市百焱科技有限公司 / 中景科技股份有限公司	HE-D18	1.0m Unshielded USB Cable
Keyboard	Lemel	5137AU	1.5m Unshielded Cable
Mouse	ASUS	SD-2521_FS-82521	1.5m Unshielded Cable
Printer	HP	C9025A	1.5m Unshielded USB Cable 1.5m Unshielded AC Cable
USB Disk	WD	WDBACY5000 ASL-01	0.3m Unshielded USB Cable
NoteBook	DELL/C	VOSTRO2420	1.8mUnshielded AC Power Cord
Cell Phone	HTC	M10	----
IPOD	APPLE	----	1.0m Unshielded Cable
USB Disk	ADATA	UV130	1.0m Unshielded Cable
TF Card	SanDisk	----	----

標記“*”表欲申請之受測物。

4 場強輻射之量測

4.1 適用標準

依據低功率射頻電機技術規範3.10.2.2節之要求，主波與諧波發射：除3.10.2.3 外，發射之電場強度應小於或等於下表限制值：

主波頻率 (MHz)	主波電場強度 (mV/m)	諧波電場強度 (uV/m)
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

3.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依2.8 之發射限制，兩者取其較鬆者。

4.2 量測方法

將待測物置於0.8米高的非金屬桌面，使其在工作狀態，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4米至4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。

4.3 量測場強輻射之儀器

儀器名稱	製造者	型號	本次校驗日期	下次校驗日期
Test Receiver	Rohde & Schwarz	ESCI	2017/09/19	2018/09/18
Bi-Log Antenna	ETC	MCTD 2786	2017/07/12	2018/07/11
Log-periodic Antenna	EMCO	3146	2017/08/10	2018/08/09
Horn Antenna	EMCO	3115	2017/10/11	2018/10/10
Horn Antenna	EMCO	3116	2017/10/05	2018/10/04
Spectrum	R&S	FSP3	2017/01/04	2018/01/03
Amplifier	HP	8447D	2016/12/05	2017/12/04
EMI Test Receiver	Rohde & Schwarz	ESU 40	2016/11/10	2017/11/09
Attenuator	MINI-CIRCUITS	BW-S10W2+	2017/10/06	2018/10/05
Attenuator	MINI-CIRCUITS	BW-S20W2+	2017/10/06	2018/10/05
Attenuator	MINI-CIRCUITS	BW-S30W2+	2017/10/06	2018/10/05
Amplifier	HP	83051A	2017/08/25	2018/08/24

4.4 場強度之計算

場強之計算公式如下

$$\text{結果值} = \text{讀值} + \text{校正因子} + \text{週期因子}$$

其中校正因子為：

$$\text{天線因子} + \text{饋線損失} + \text{濾波器損失 (若有使用)} - \text{放大器增益 (若有使用)}$$

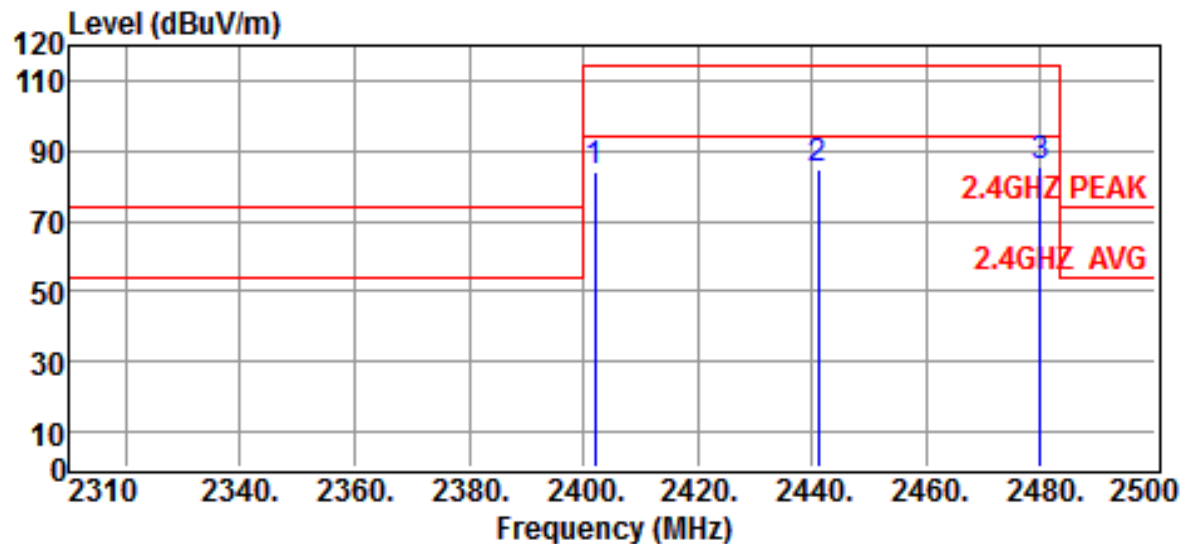
4.5 場強輻射之量測結果

4.5.1 發射主波、諧波及本地震盪

操作模式 : 發射接收(發射主波)

測試結果 : 合格

測試者 : 黃義傑



Site : CHAMBER #2

Date : 2017-11-06

Limit : 2.4GHZ PEAK

Ant. Pol. : HORIZONTAL

EUT : 藍牙多功能音箱

Model : HE-D18

Power Rating : DC 5V From NB

Temp. : 22 °C

Engineer : Brian Huang

Humi. : 56 %

Memo : Fundamental Frequency

Test Mode : BR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2402.0000	90.00	-5.68	84.32	114.00	-29.68	Peak
2441.0000	90.06	-5.55	84.51	114.00	-29.49	Peak
2480.0000	90.78	-5.47	85.31	114.00	-28.69	Peak

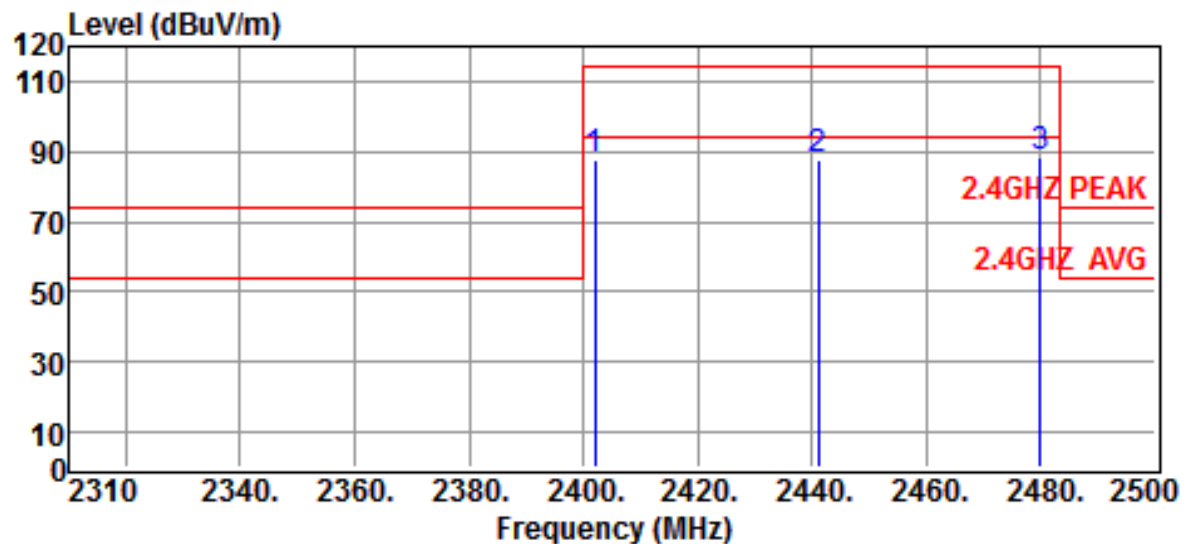
Note :

1. Result = Reading + Corrected Factor

2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)

3. The margin value=Limit – Result

4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

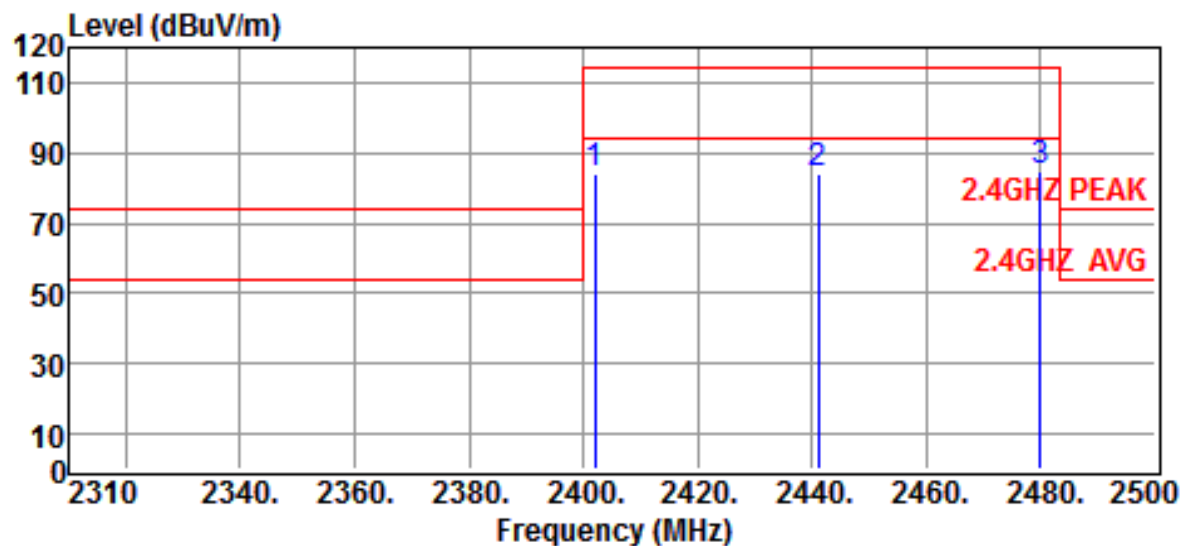


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:2.4GHZ PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:22°C
Engineer	:Brian Huang	Humi.	:56 %
Memo	:Fundamental Frequency	Test Mode	:BR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2402.0000	92.99	-5.68	87.31	114.00	-26.69	Peak
2441.0000	93.47	-5.55	87.92	114.00	-26.08	Peak
2480.0000	93.64	-5.47	88.17	114.00	-25.83	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit – Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

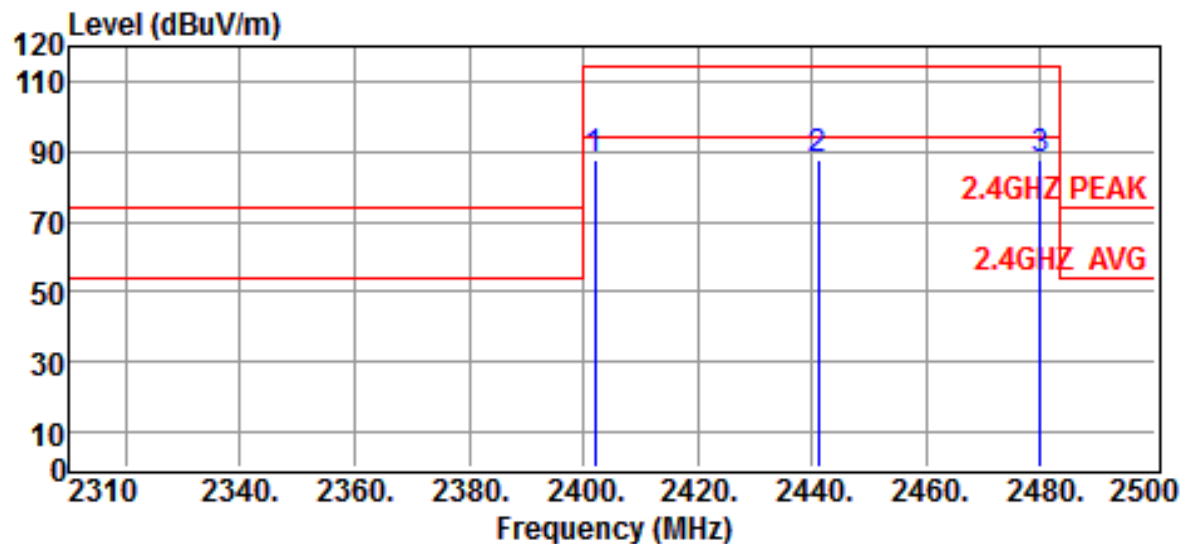


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:2.4GHZ PEAK	Ant. Pol.	:HORIZONTAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:22 °C
Engineer	:Brian Huang	Humi.	:56 %
Memo	:Fundamental / EDR	Test Mode	:EDR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2402.0000	89.62	-5.68	83.94	114.00	-30.06	Peak
2441.0000	89.96	-5.55	84.41	114.00	-29.59	Peak
2480.0000	90.42	-5.47	84.95	114.00	-29.05	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit – Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2017-11-06
Limit	:2.4GHZ PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:22 °C
Engineer	:Brian Huang	Humi.	:56 %
Memo	:Fundamental / EDR	Test Mode	:EDR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2402.0000	93.05	-5.68	87.37	114.00	-26.63	Peak
2441.0000	93.04	-5.55	87.49	114.00	-26.51	Peak
2480.0000	93.46	-5.47	87.99	114.00	-26.01	Peak

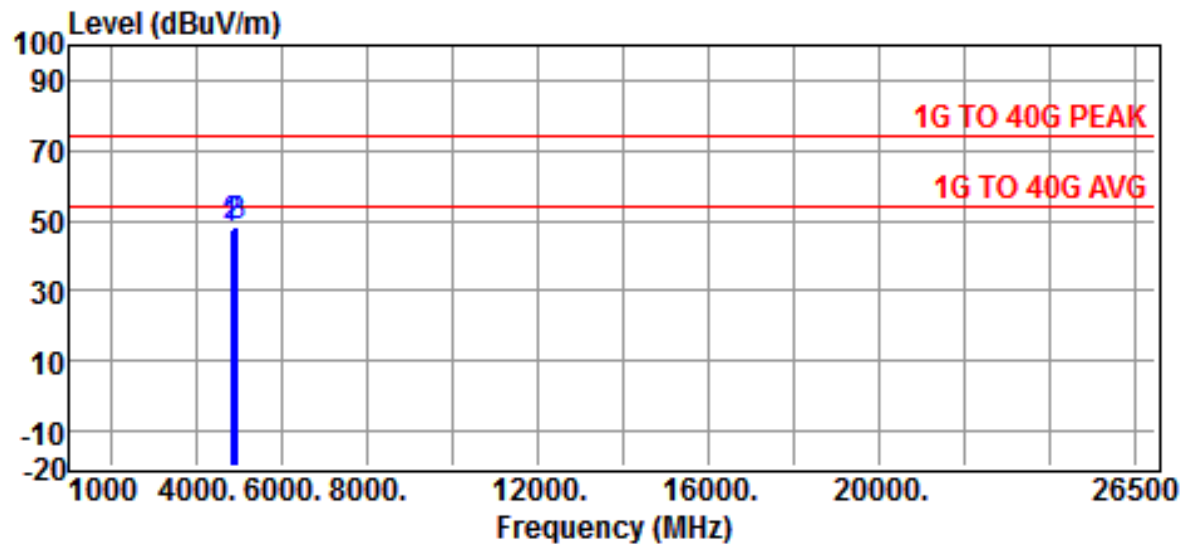
Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit – Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

操作模式 : 發射接收(諧波及本地震盪)

測試結果 : 合格

測試者 : 黃義傑



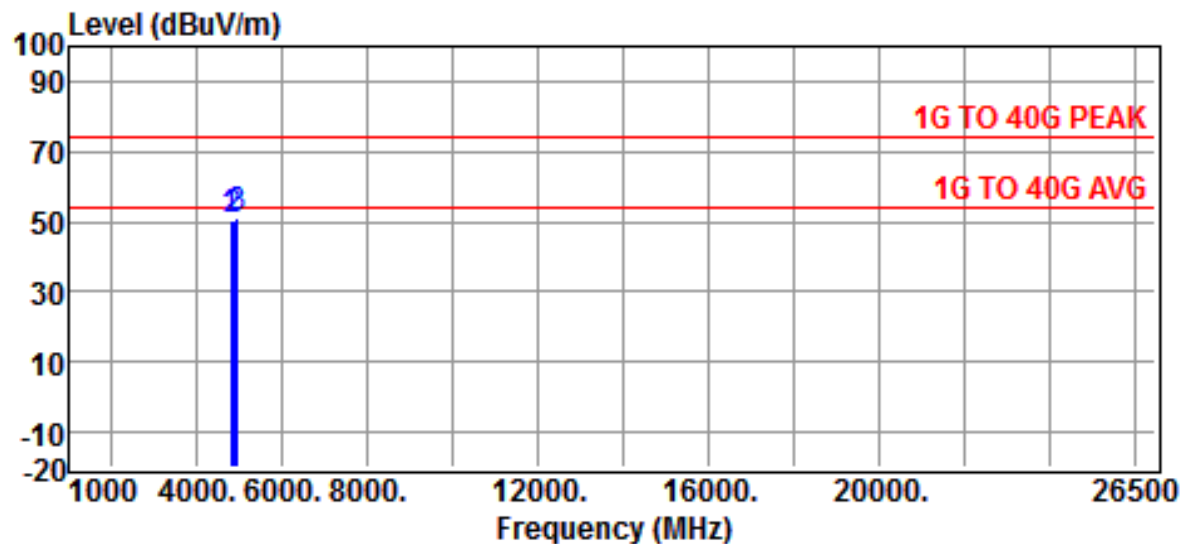
Site : CHAMBER #2
 Limit : 1G TO 40G PEAK
 EUT : 藍牙多功能音箱
 Power Rating : DC 5V From NB
 Engineer : Brian Huang
 Memo : Harmonics / BR

Date : 2017-11-06
 Ant. Pol. : HORIZONTAL
 Model : HE-D18
 Temp. : 24 °C
 Humi. : 53 %
 Test Mode : BR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
4804.0000	46.44	1.18	47.62	74.00	-26.38	Peak
4882.0000	46.57	1.40	47.97	74.00	-26.03	Peak
4960.0000	46.64	1.67	48.31	74.00	-25.69	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value = Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

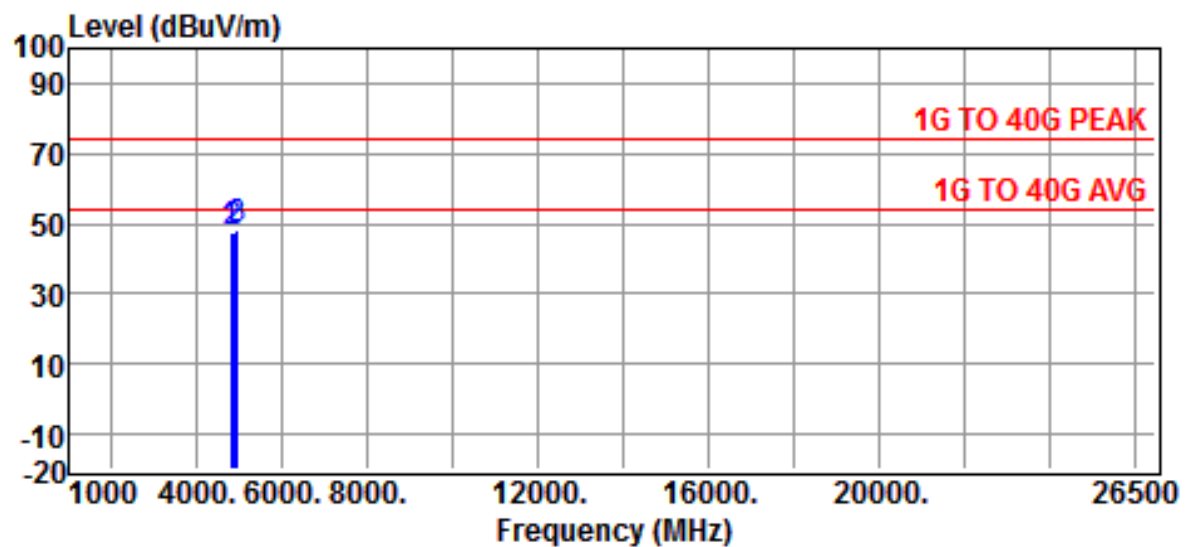


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Memo	:Harmonics / BR	Test Mode	:BR

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
4804.0000	49.19	1.18	50.37	74.00	-23.63	Peak
4882.0000	49.22	1.40	50.62	74.00	-23.38	Peak
4960.0000	49.26	1.67	50.93	74.00	-23.07	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

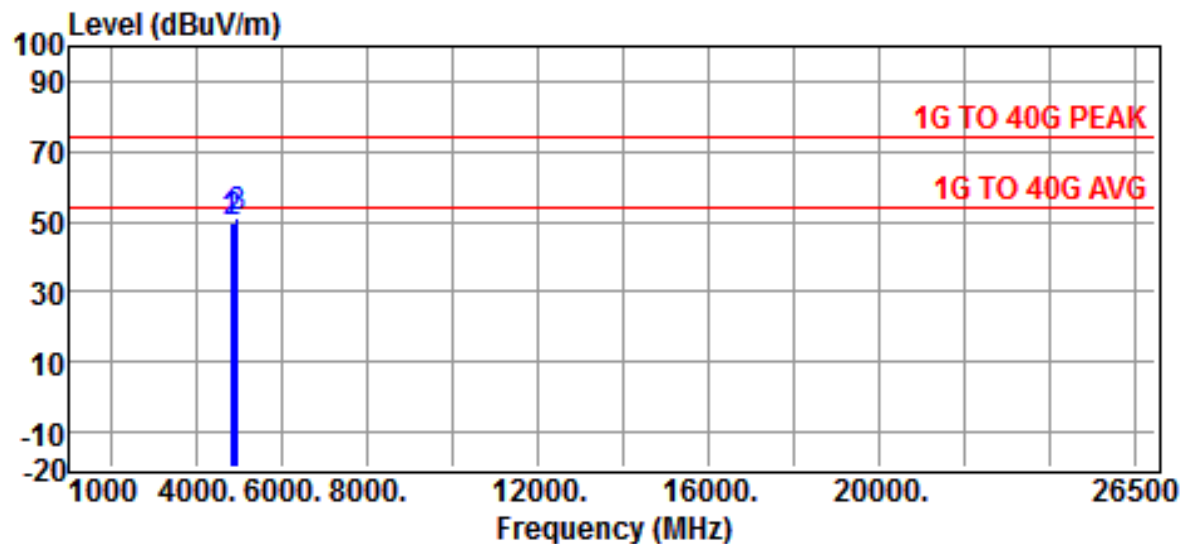


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Memo	:Harmonics / EDR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
4804.0000	46.43	1.18	47.61	74.00	-26.39	Peak
4882.0000	46.38	1.40	47.78	74.00	-26.22	Peak
4960.0000	46.63	1.67	48.30	74.00	-25.70	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Memo	:Harmonics / EDR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
4804.0000	48.57	1.18	49.75	74.00	-24.25	Peak
4882.0000	48.62	1.40	50.02	74.00	-23.98	Peak
4960.0000	49.39	1.67	51.06	74.00	-22.94	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

4.5.2 其它不必要之訊號

A. 1GHz以下

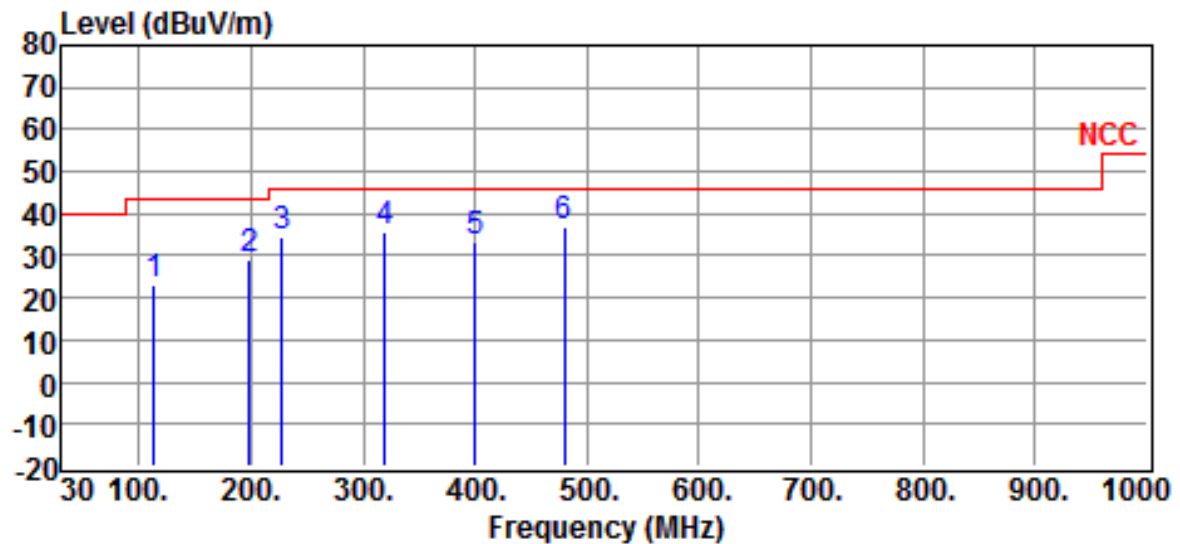
操作模式 : BT Mode

測試日期 : Oct. 27, 2017 環境溫度 : 22°C

環境濕度 : 52 %

測試結果 : 合格

測試者 : 黃義傑



Site : CHAMBER #2

Date : 2017-10-27

Limit : NCC

Ant. Pol. : HORIZONTAL

EUT : 藍牙多功能音箱

Model : HE-D18

Power Rating : DC 5V From NB

Temp. : 22°C

Engineer : Brian Huang

Humi. : 52 %

Test Mode : BT Mode

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
113.4200	31.90	-8.53	23.37	43.50	-20.13	QP
198.7800	37.43	-8.55	28.88	43.50	-14.62	QP
227.8800	41.65	-7.03	34.62	46.00	-11.38	QP
319.0600	38.35	-2.66	35.69	46.00	-10.31	QP
400.5400	34.34	-0.75	33.59	46.00	-12.41	QP
480.0800	37.04	0.04	37.08	46.00	-8.92	QP

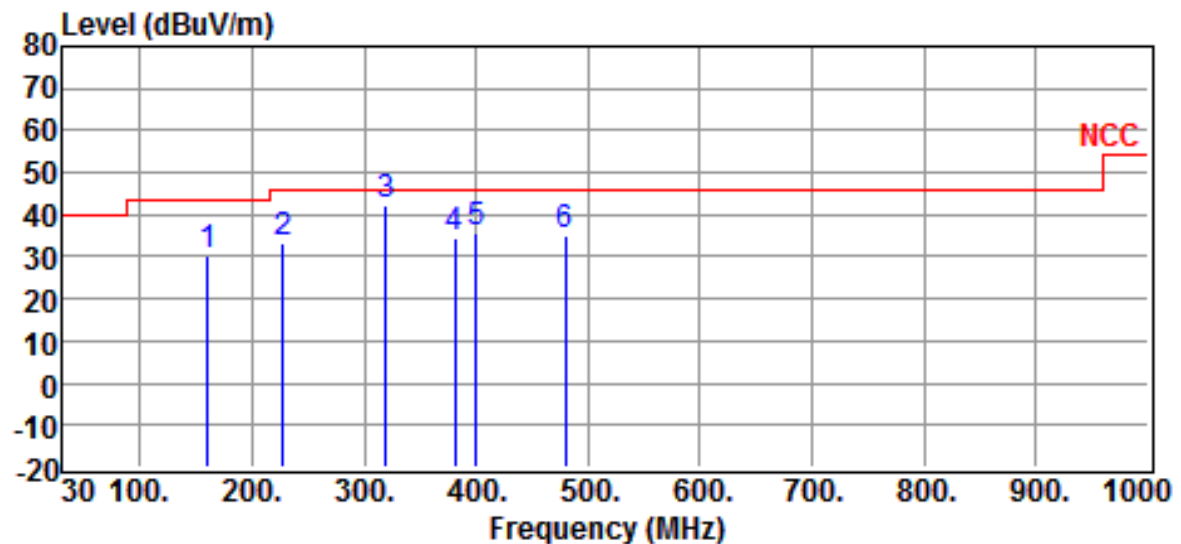
Note :

1. Result = Reading + Corrected Factor

2. Corrected Factor = Antenna Factor + Cable Loss

3. The margin value = Limit - Result

4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2017-10-27
Limit	:NCC	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:22 °C
Engineer	:Brian Huang	Humi.	:52 %
Test Mode	:BT Mode		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
159.9800	37.83	-7.82	30.01	43.50	-13.49	QP
227.8800	40.03	-7.03	33.00	46.00	-13.00	QP
319.0600	44.81	-2.66	42.15	46.00	-3.85	QP
381.1400	36.07	-1.33	34.74	46.00	-11.26	QP
400.5400	36.22	-0.75	35.47	46.00	-10.53	QP
480.0800	34.83	0.04	34.87	46.00	-11.13	QP

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit – Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

b. 1GHz以上

操作模式 : BT Play

測試日期 : Oct. 27, 2017 環境溫度 : 22°C

環境濕度 : 52 %

測試結果 : 合格

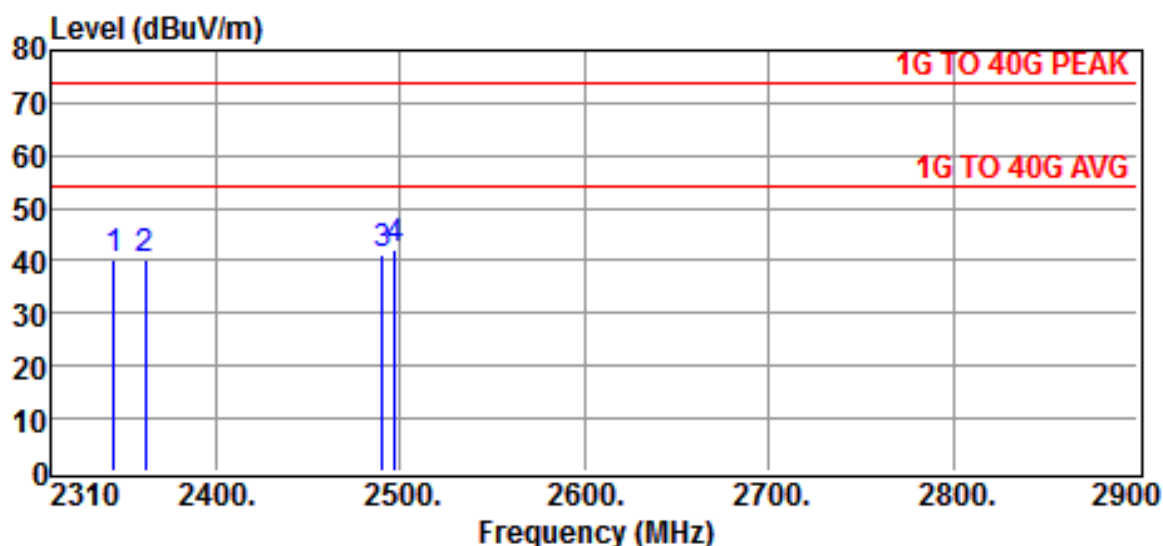
測試者 : 黃義傑

註：

1. 1GHz 以上輻射信號太弱，掃描圖請參考 4.5.1 節。

4.5.3 限制頻帶之場強輻射測量

測試日期 : Jun. 02 , 2017 環境溫度 : 25 °C 環境溼度 : 63 %
 測試結果 : 合格 測試者 : 黃義傑

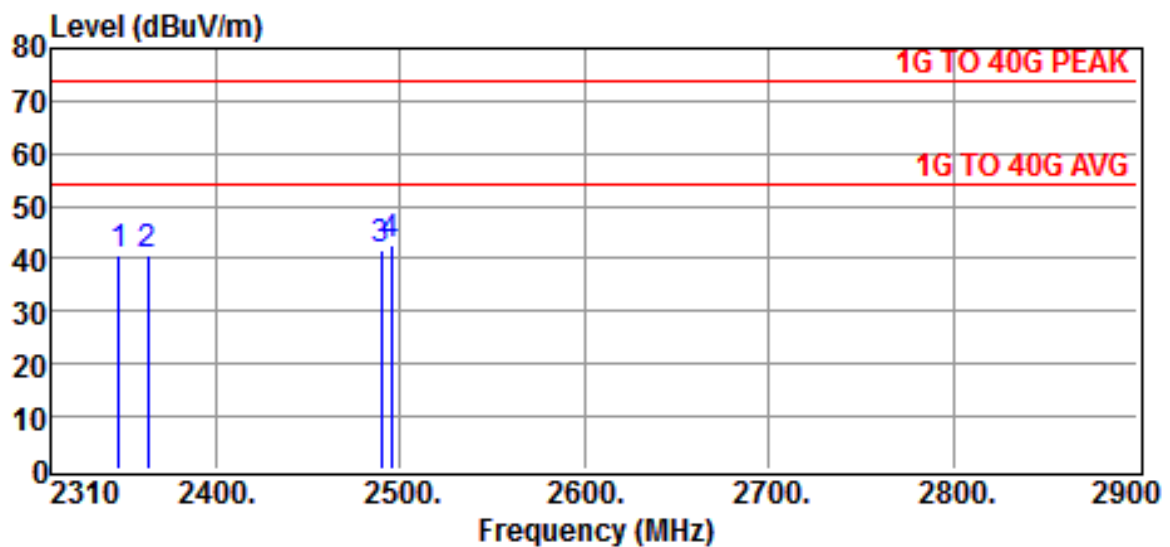


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:Restricted bands / BR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2344.2200	46.14	-5.79	40.35	74.00	-33.65	Peak
2361.3300	46.05	-5.75	40.30	74.00	-33.70	Peak
2490.5400	46.73	-5.43	41.30	74.00	-32.70	Peak
2497.0300	47.37	-5.43	41.94	74.00	-32.06	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

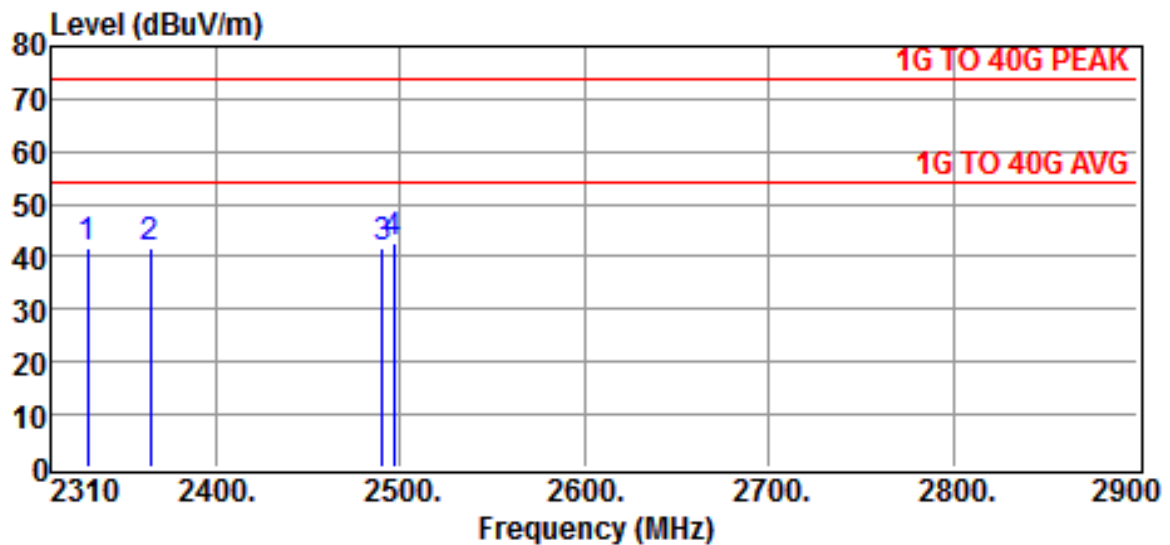


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:Restricted bands / BR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2347.1700	46.56	-5.79	40.77	74.00	-33.23	Peak
2362.5100	46.66	-5.75	40.91	74.00	-33.09	Peak
2489.3600	47.11	-5.43	41.68	74.00	-32.32	Peak
2495.2600	48.24	-5.43	42.81	74.00	-31.19	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

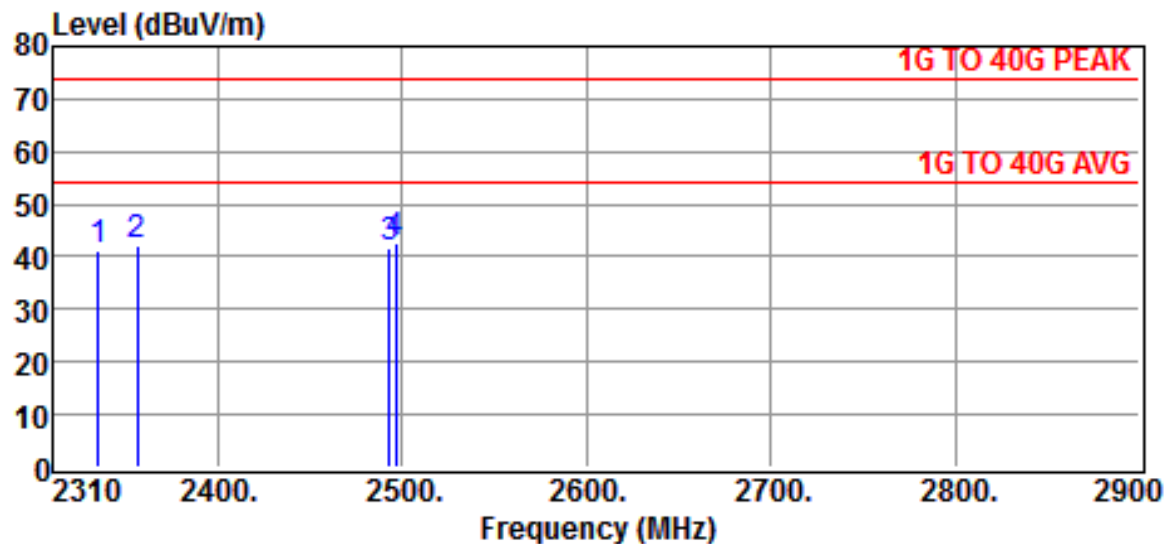


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:Restricted bands / EDR		

Freq MHz	Reading dB μ V	Correction Factor dB	Result dB μ V/m	Limits dB μ V/m	Over limit dB	Detector
2330.0600	47.71	-5.84	41.87	74.00	-32.13	Peak
2364.2800	47.51	-5.75	41.76	74.00	-32.24	Peak
2489.9500	47.13	-5.43	41.70	74.00	-32.30	Peak
2496.4400	48.11	-5.43	42.68	74.00	-31.32	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

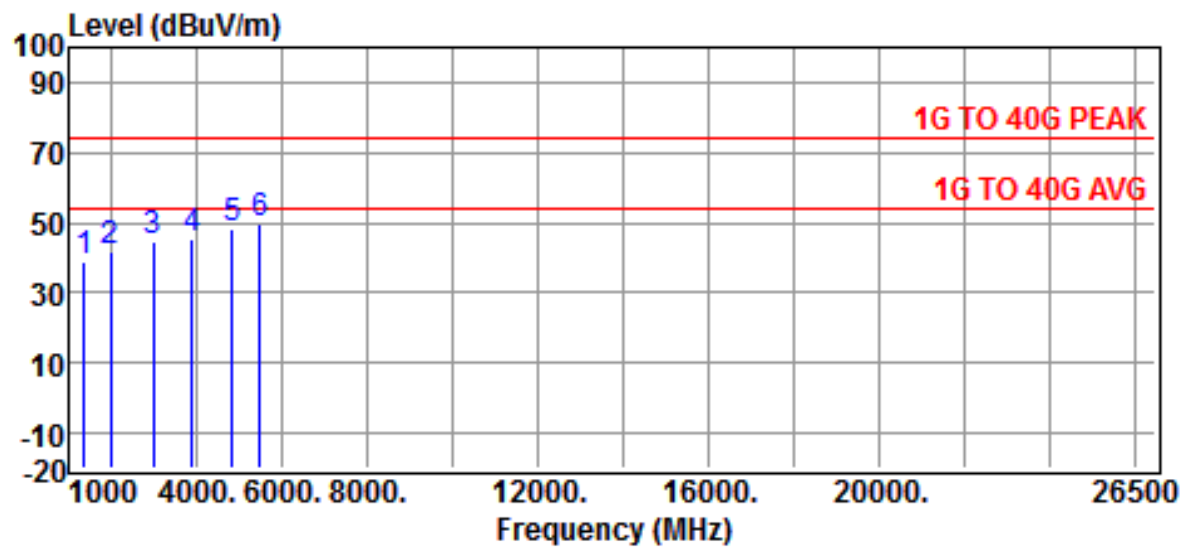


Site	:CHAMBER #2	Date	:2017-11-06
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:Restricted bands / EDR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2334.7800	46.77	-5.79	40.98	74.00	-33.02	Peak
2356.0200	48.13	-5.75	42.38	74.00	-31.62	Peak
2492.9000	47.13	-5.43	41.70	74.00	-32.30	Peak
2496.4400	48.11	-5.43	42.68	74.00	-31.32	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

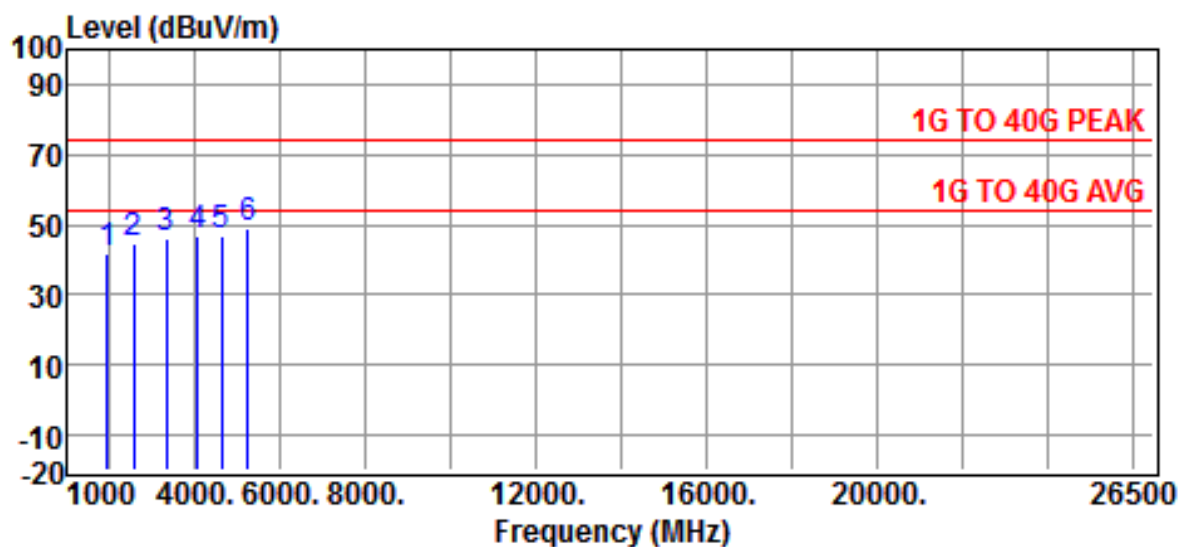


Site	:CHAMBER #2	Date	:2017-10-27
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:BT Mode		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
1360.0000	49.38	-10.33	39.05	74.00	-34.95	Peak
1990.0000	48.71	-6.68	42.03	74.00	-31.97	Peak
3000.0000	48.46	-3.48	44.98	74.00	-29.02	Peak
3900.0000	46.01	-0.35	45.66	74.00	-28.34	Peak
4845.0000	46.62	1.30	47.92	74.00	-26.08	Peak
5495.0000	46.58	2.80	49.38	74.00	-24.62	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2017-10-27
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Test Mode	:BT Mode		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
1945.0000	49.06	-6.92	42.14	74.00	-31.86	Peak
2575.0000	49.53	-5.11	44.42	74.00	-29.58	Peak
3340.0000	48.53	-2.38	46.15	74.00	-27.85	Peak
4080.0000	46.91	0.02	46.93	74.00	-27.07	Peak
4645.0000	46.31	0.63	46.94	74.00	-27.06	Peak
5250.0000	46.64	2.32	48.96	74.00	-25.04	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

4.6 輻射之測試配置

圖 1：量測頻率低於1GHz之測試配置

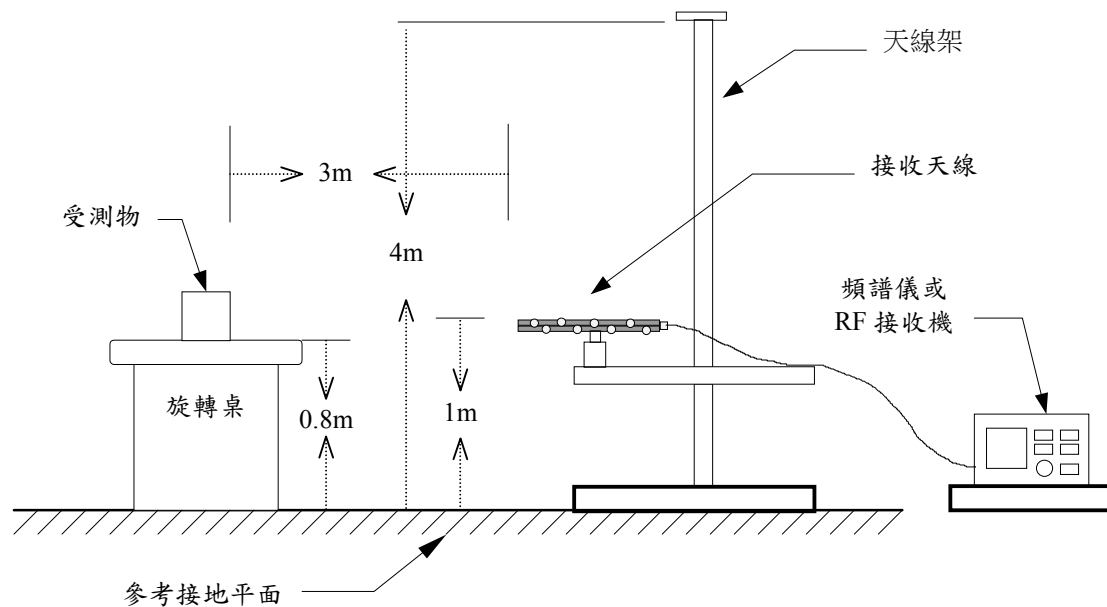
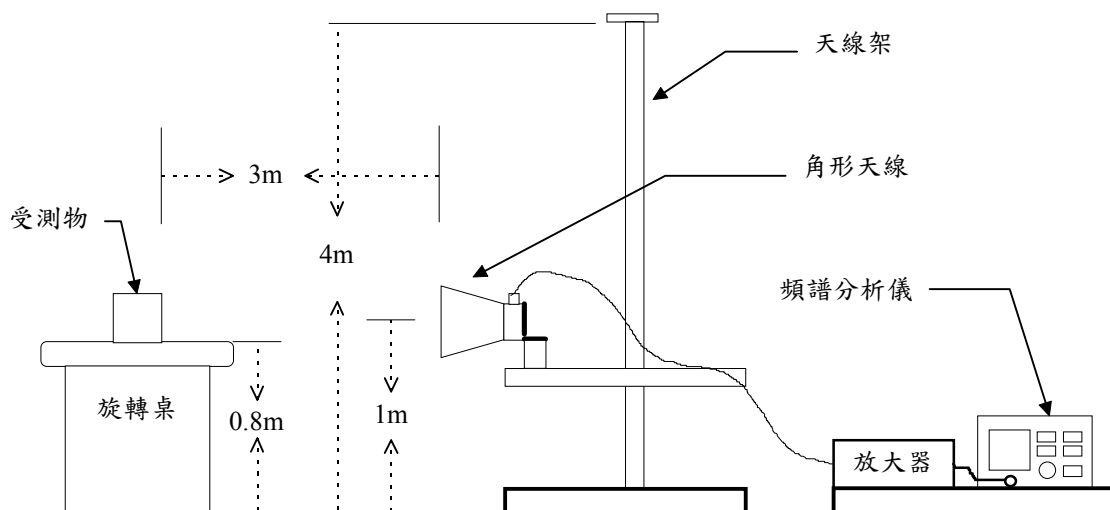


圖 2：量測頻率高於1GHz之測試配置



4.7 輻射量測之配置照片

(30MHz~1000MHz)



(Above 1GHz)



5 電源線傳導干擾之量測

5.1 適用標準

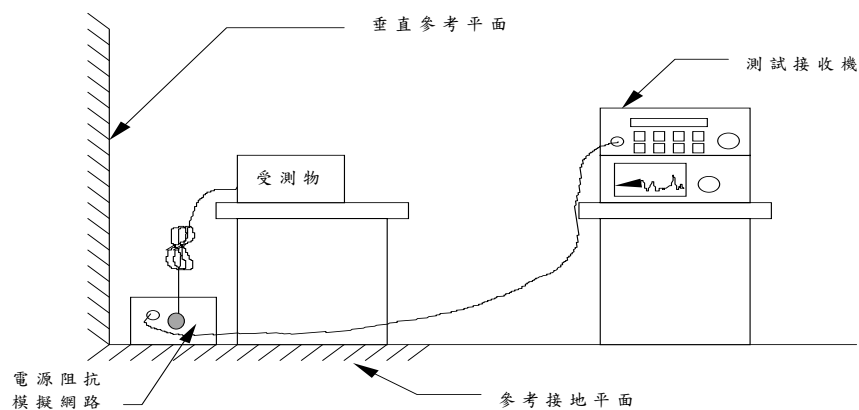
依據低功率射頻電機技術規範2.3節之要求。

5.2 測試方法

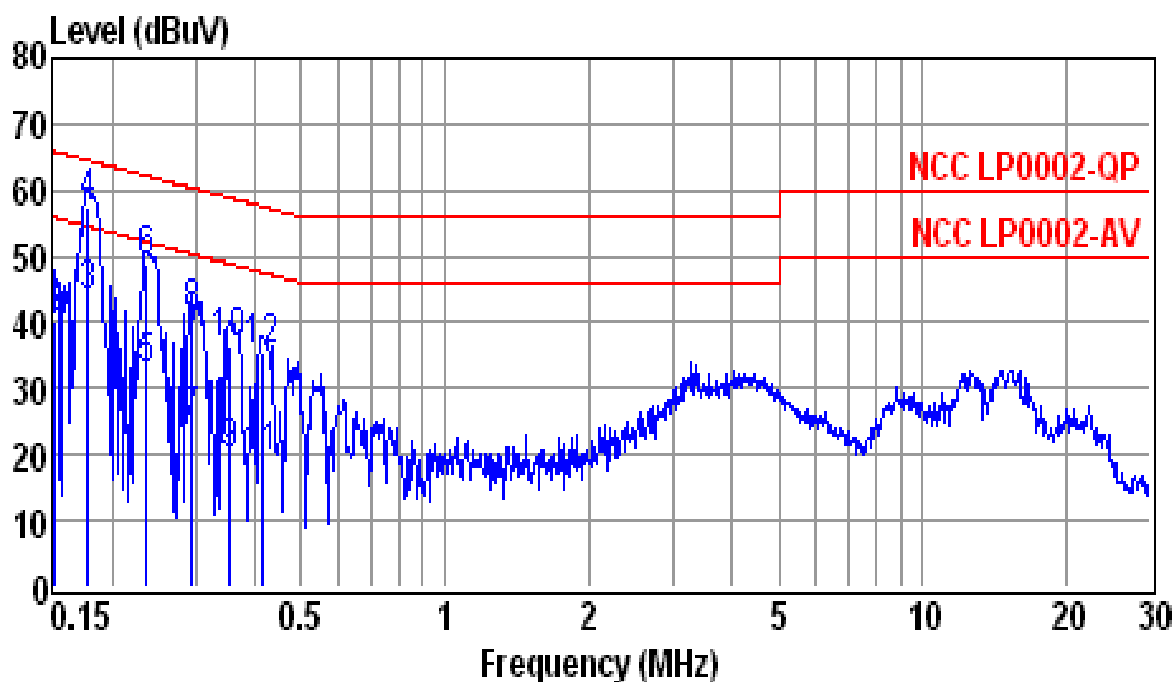
將待測物置於0.8米高的非金屬桌面，使其在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由 0.15MHz 至 30MHz 之間之電源線傳導放射強度。

5.3 測試配置

圖 3：傳導干擾之量測配置



5.4 傳導干擾之量測結果

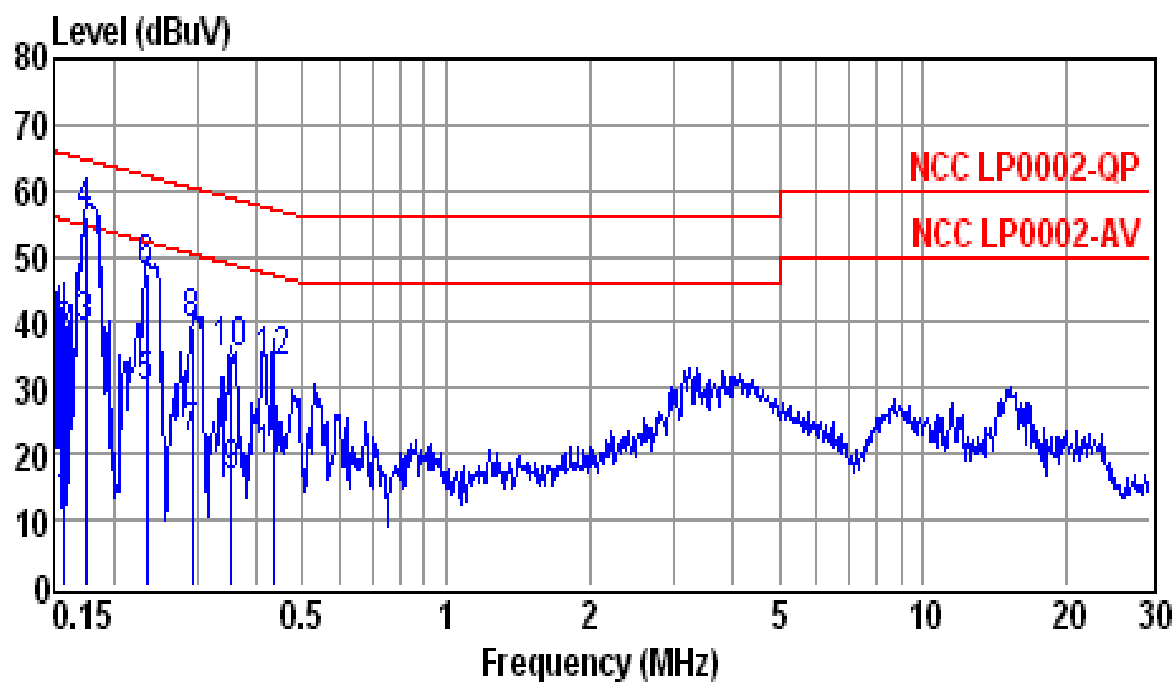


Site	: conducted #1	Date	: 10-30-2017
Condition	: NCC LP0002-QP	LISN	: NEUTRAL
Tem / Hum	: 24 °C / 56%	Test Mode	: BT Mode
EUT	: 藍牙多功能音箱	Power Rating	: DC 5V From NB
Memo	:	Memo	:

Freq (MHz)	Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Remark
0.1524	3.30	10.17	13.47	55.87	-42.40	Average
0.1524	29.86	10.17	40.03	65.87	-25.84	QP
0.1787	33.45	10.18	43.63	54.55	-10.92	Average
0.1787	47.39	10.18	57.57	64.55	-6.98	QP
0.2366	22.46	10.18	32.64	52.22	-19.58	Average
0.2366	38.64	10.18	48.82	62.22	-13.40	QP
0.2955	14.46	10.19	24.65	50.37	-25.72	Average
0.2955	30.53	10.19	40.72	60.37	-19.65	QP
0.3539	9.29	10.21	19.50	48.87	-29.37	Average
0.3539	26.40	10.21	36.61	58.87	-22.26	QP
0.4127	9.00	10.21	19.21	47.59	-28.38	Average
0.4127	25.42	10.21	35.63	57.59	-21.96	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 10-30-2017
Condition	: NCC LP0002-QP	LISN	: LINE
Tem / Hum	: 24 °C / 56%	Test Mode	: BT Mode
EUT	: 藍牙多功能音箱	Power Rating	: DC 5V From NB
Memo	:	Memo	:

Freq (MHz)	Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limit Line (dBμV)	Over Limit (dB)	Remark
0.1582	1.92	10.18	12.10	55.56	-43.46	Average
0.1582	27.00	10.18	37.18	65.56	-28.38	QP
0.1758	28.52	10.19	38.71	54.68	-15.97	Average
0.1758	46.02	10.19	56.21	64.68	-8.47	QP
0.2353	19.58	10.19	29.77	52.26	-22.49	Average
0.2353	37.45	10.19	47.64	62.26	-14.62	QP
0.2940	11.80	10.19	21.99	50.41	-28.42	Average
0.2940	29.12	10.19	39.31	60.41	-21.10	QP
0.3539	6.12	10.20	16.32	48.87	-32.55	Average
0.3539	24.66	10.20	34.86	58.87	-24.01	QP
0.4328	8.38	10.20	18.58	47.20	-28.62	Average
0.4328	23.32	10.20	33.52	57.20	-23.68	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

5.5 干擾值之計算

電源傳導干擾電壓之計算公式如下

$$\text{結果值} = \text{儀器讀值} + \text{校正因子}$$

其中校正因子為：

$$\text{饋線損失} + \text{電源阻抗模擬網路損失}$$

5.6 傳導干擾之量測儀器

儀器名稱	製造者	型號	本次校驗日期	下次校驗日期
EMI Test Receiver	Rohde & Schwarz	ESCI	2016/12/05	2017/12/04
LISN	EMCO	3825/2	2017/04/26	2018/04/25
LISN	Rohde & Schwarz	ESH2-Z5	2017/04/01	2018/03/31
Monitor	IBM	E54	N.C.R.	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.	N.C.R.
Shielded Room	Riken	---	N.C.R.	N.C.R.
Computer	Acer	Veriton	N.C.R.	N.C.R.

5.7 傳導量測之配置照片



6 天線之要求

6.1 適用標準

依據低功率射頻電機技術規範2.2節之規定，低功率射頻電機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。

6.2 天線增益

此裝置使用固定式P C B天線，其天線增益未超過6dBi之規定值，不需降低峰值發射功率以及峰值功率頻譜密度。

7 開放頻帶邊緣之量測

7.1 適用標準

3.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依2.8 之發射限制，兩者取其較鬆者。

7.2 開放頻帶邊緣之測試配置

如圖2所示。

7.3 量測開放頻帶邊緣之儀器

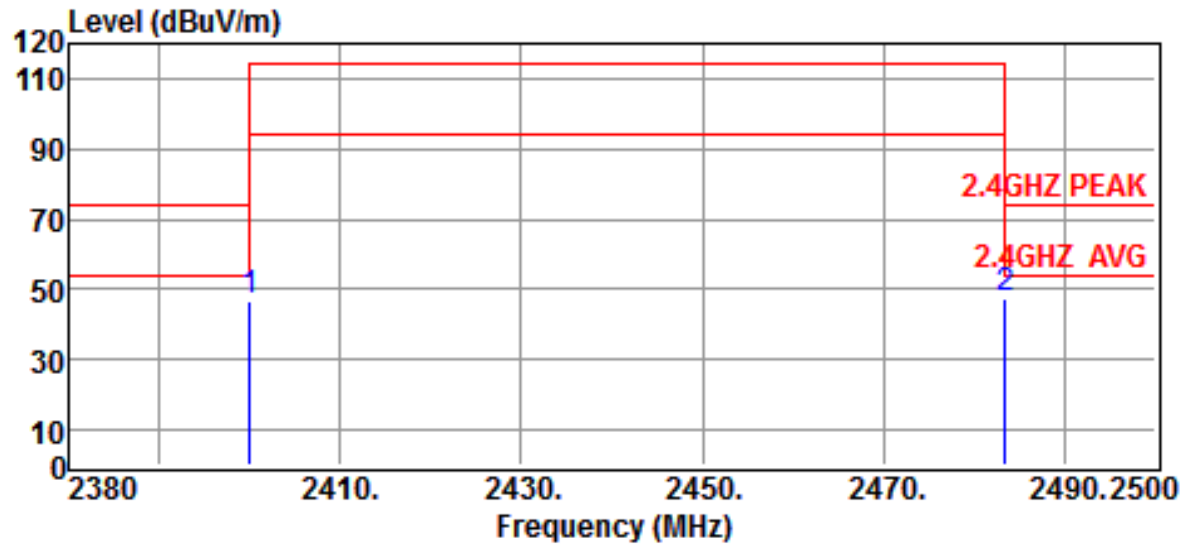
儀器名稱	製造者	型號	本次校驗日期	下次校驗日期
Test Receiver	Rohde & Schwarz	ESCI	2017/09/19	2018/09/18
Bi-Log Antenna	ETC	MCTD 2786	2017/07/12	2018/07/11
Log-periodic Antenna	EMCO	3146	2017/08/10	2018/08/09
Horn Antenna	EMCO	3115	2017/10/11	2018/10/10
Horn Antenna	EMCO	3116	2017/10/05	2018/10/04
Spectrum	R&S	FSP3	2017/01/04	2018/01/03
Amplifier	HP	8447D	2016/12/05	2017/12/04
EMI Test Receiver	Rohde & Schwarz	ESU 40	2016/11/10	2017/11/09
Attenuator	MINI-CIRCUITS	BW-S10W2+	2017/10/06	2018/10/05
Attenuator	MINI-CIRCUITS	BW-S20W2+	2017/10/06	2018/10/05
Attenuator	MINI-CIRCUITS	BW-S30W2+	2017/10/06	2018/10/05
Amplifier	HP	83051A	2017/08/25	2018/08/24

7.4 開放頻帶邊緣之量測結果

操作模式 : 發射接收(帶外發射)

測試結果 : 合格

測試者 : 黃義傑



Site : CHAMBER #2
 Limit : 2.4GHZ PEAK
 EUT : 藍牙多功能音箱
 Power Rating : DC 5V From NB
 Engineer : Brian Huang
 Memo : Band edge / BR

Date : 2017-11-06
 Ant. Pol. : HORIZONTAL
 Model : HE-D18
 Temp. : 24 °C
 Humi. : 53 %

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2400.0000	52.04	-5.68	46.36	74.00	-27.64	Peak
2483.5000	52.55	-5.47	47.08	74.00	-26.92	Peak

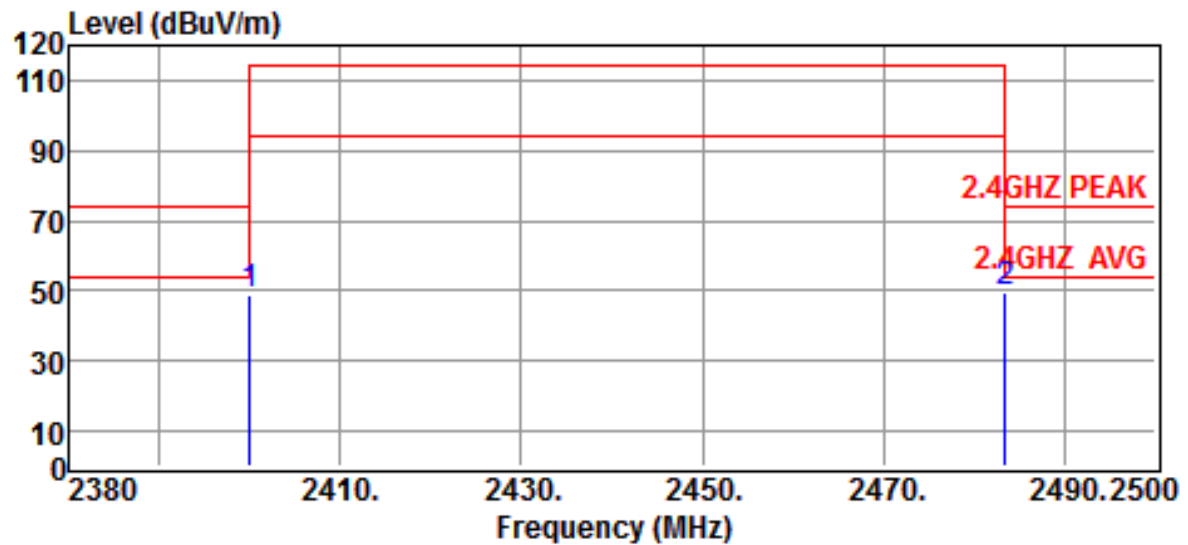
Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value = Limit - Result

操作模式 : 發射接收(帶外發射)

測試結果 : 合格

測試者 : 黃義傑



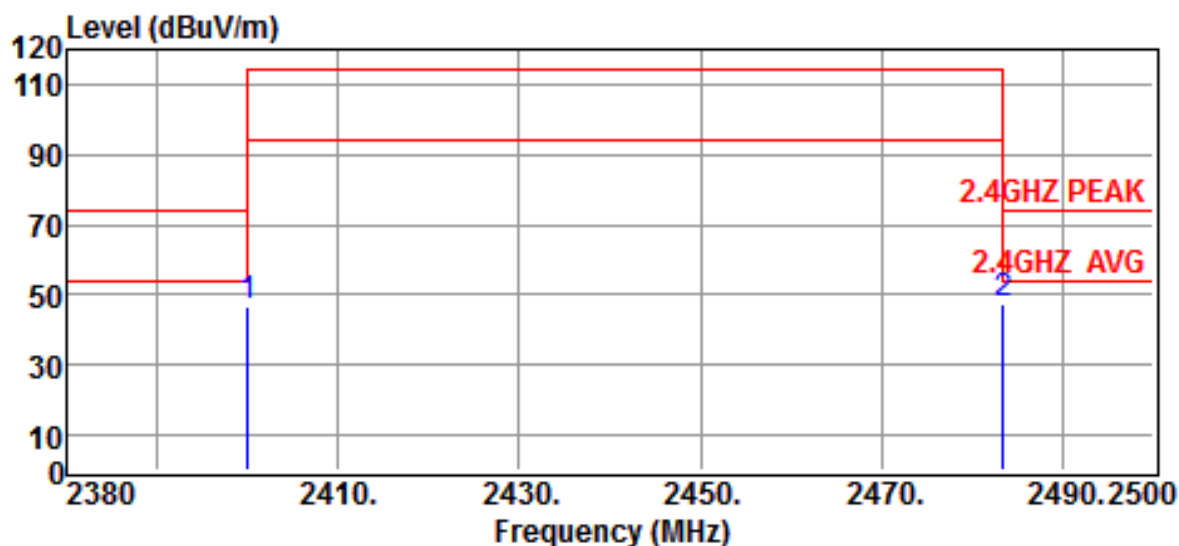
Site : CHAMBER #2
 Limit : 2.4GHZ PEAK
 EUT : 藍牙多功能音箱
 Power Rating : DC 5V From NB
 Engineer : Brian Huang
 Memo : Band edge / BR

Date : 2017-11-06
 Ant. Pol. : VERTICAL
 Model : HE-D18
 Temp. : 24 °C
 Humi. : 53 %

Freq MHz	Reading dB μ V	Correction Factor dB	Result dB μ V/m	Limits dB μ V/m	Over limit dB	Detector
2400.0000	54.89	-5.68	49.21	74.00	-24.79	Peak
2483.5000	54.72	-5.47	49.25	74.00	-24.75	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value = Limit - Result



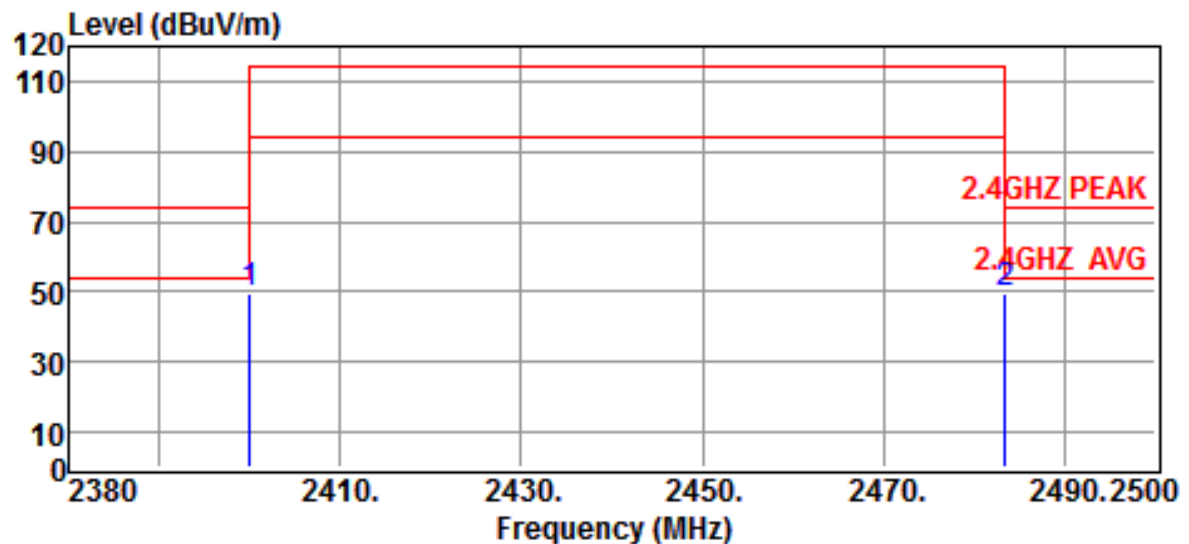
Site :CHAMBER #2
 Limit :2.4GHZ PEAK
 EUT :藍牙多功能音箱
 Power Rating :DC 5V From NB
 Engineer :Brian Huang
 Memo :Band edge / EDR

Date :2017-11-06
 Ant. Pol. :HORIZONTAL
 Model :HE-D18
 Temp. :24 °C
 Humi. :53 %

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2400.0000	52.50	-5.68	46.82	74.00	-27.18	Peak
2483.5000	52.73	-5.47	47.26	74.00	-26.74	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result



Site	:CHAMBER #2	Date	:2017-11-06
Limit	:2.4GHZ PEAK	Ant. Pol.	:VERTICAL
EUT	:藍牙多功能音箱	Model	:HE-D18
Power Rating	:DC 5V From NB	Temp.	:24 °C
Engineer	:Brian Huang	Humi.	:53 %
Memo	:Band edge / EDR		

Freq MHz	Reading dBμV	Correction Factor dB	Result dBμV/m	Limits dBμV/m	Over limit dB	Detector
2400.0000	55.19	-5.68	49.51	74.00	-24.49	Peak
2483.5000	55.32	-5.47	49.85	74.00	-24.15	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result

廠牌：E-books

型號：HE-D18

產品外觀照



產品合格標籤照



廠牌：E-books

型號：HE-D18

產品外觀照



產品外觀照



廠牌：E-books

型號：HE-D18

產品外觀照

廠牌：E-books
型號：HE-D18



產品外觀照

廠牌：E-books
型號：HE-D18

