



低功率射頻器材測試報告

申請廠商 : 台灣飛利浦股份有限公司
地址 : 臺北市南港區園區街3之1號14樓
器材名稱 : 飛利浦鑽石靚白音波震動牙刷(白鑽)
飛利浦鑽石靚白音波震動牙刷(黑鑽)
飛利浦鑽石靚白音波震動牙刷(粉鑽)
廠牌 : PHILIPS
型號 : HX9912/07; HX9912/17; HX9912/40



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1 一般資料

1.1 產品描述

- a) 產品型態 : 飛利浦鑽石靚白音波震動牙刷(白鑽)
飛利浦鑽石靚白音波震動牙刷(黑鑽)
飛利浦鑽石靚白音波震動牙刷(粉鑽)
- b) 廠 牌 : PHILIPS
- c) 產品型號 : HX9912/07; HX9912/17; HX9912/40
- d) 供應電源 : Power Power Adapter(110V60Hz)
Power From Battery(3.7V)

1.2 產品特性

本產品為飛利浦鑽石靚白音波震動牙刷(白鑽)/(黑鑽)/(粉鑽)，為2.4GHz無線裝置，額定發射頻率為2402 MHz~2480MHz，共使用40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器材技術規範以及參考EIA 603、ANSI、FCC/47 CFR/2.1046、2.1047、2.1049、2.1051、2.1053及2.1055之檢驗法。

1.4 系列機種差異說明及測試判定

(一)申請機種型號：HX9912/07

(二)系列申請機種型號：HX9912/17, HX9912/40

(三)機種差異描述：

機種名稱 評估項目	主型號 HX9912/07	系列型號 1 HX9912/17	系列型號 2 HX9912/40
電路設計、印刷電路板	0	0	0
天線規格、射頻模組	0	0	0
使用元件、線材、材料	0	0	0
使用元件位置、走線、結構	0	0	0
廠牌、型號	0	0	0
顏色	白色	黑色	粉色
配件： 充電座(型號)	CBA5001 白色	CBA6001 黑色 (僅差異外觀顏色及型號不同， 電路設計、線路等皆相同)	CBA5001 白色
配件： 充電盒(型號)	TCA1001 白色	TCA2001 黑色 (僅差異外觀顏色及型號不同， 電路設計、線路等皆相同)	TCA1001 白色
配件：(刷頭)	0	0	0
配件：(玻璃杯)	0	0	0
其他說明	系列型號 1 與主型號差異為外觀顏色及型號不同， 其配件充電座/充電盒型號僅顏色及型號不同，其餘無線射頻器材 及電路設計、線路等皆相同。 系列型號 2 與主型號差異為外觀顏色及型號不同，其餘無線射頻 器材及電路設計、線路等皆相同。		
註：(1)完全相同請標示“○”。 (2)未完全相同請標示“×”，並於其他說明欄說明差異處。			

(四)系列判定說明：

詳如機種差異描述所示：本產品系列機種型號與主測機種型號，技術規格及射頻性能均相同，僅外觀顏色、型號及搭配配件(充電座)/(充電盒)顏色型號不同，故無需再執行測試。

(五)判定測試方式：

(1)主測型號：HX9912/07

(2)系列免測型號：HX9912/17, HX9912/40

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器材技術規範3.3節之規定，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。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

依據低功率射頻器材技術規範4.10.2.2節之要求，主波與諧波發射：除4.10.2.3 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

4.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依3.6之發射限制，兩者取其較鬆者。

接收機依據低功率射頻器材技術規範之要求，其任何輻射場強需符合3.6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	48.5 ~ 13.8	2400/kHz
0.490 - 1.705	30	33.8 ~ 22.97	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

依據低功率射頻器材技術規範3.2節之規定，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。

2.2 限制使用之頻帶

頻率(MHz)	頻率(MHz)
0.090~0.110	1660.0~1785.0
0.490~0.510	1805.0~1880.0
2.172~2.198	1885.0~1900.0
3.013~3.033	1905.0~1985.0
4.115~4.198	2010.0~2025.0
5.670~5.690	2110.0~2170.0
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	

2.3 量測不確定度資訊

Measurement	Frequency	Uncertainty
Conducted emissions	9kHz ~ 30MHz	$\pm 3.34\text{dB}$ (Mains)(LISN)
Radiated emissions	9kHz ~ 30MHz	$\pm 4.22\text{dB}$
Radiated emissions	30MHz ~ 1GHz	$\pm 4.2\text{dB}$ ($30\text{MHz} \leq f \leq 300\text{MHz}$)
		$\pm 4.44\text{dB}$ ($300\text{MHz} < f \leq 1\text{GHz}$)
	Above 1GHz	$\pm 4.44\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)
		$\pm 3.02\text{dB}$ ($18\text{GHz} \leq f \leq 40\text{GHz}$)

此量測不確定數值係以 95%區間, $k=2$ 之擴充不確定度表示

本實驗室依據之測試方法或標準若已有限制值或判斷基準，測試結果將依據測試方法或標準直接給出決定規則，量測不準確度不列入考慮。

3 受測裝置之系統說明

3.1測試接續圖(一般正常使用)

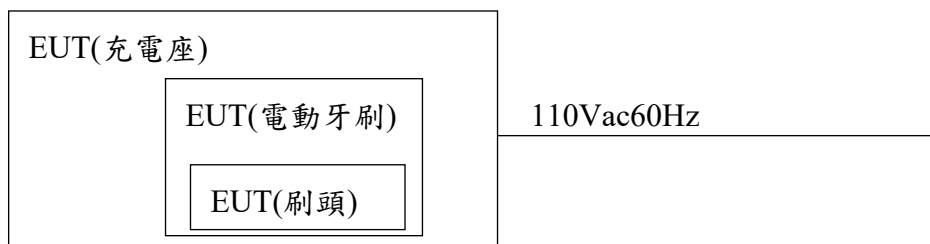
NFC Mode



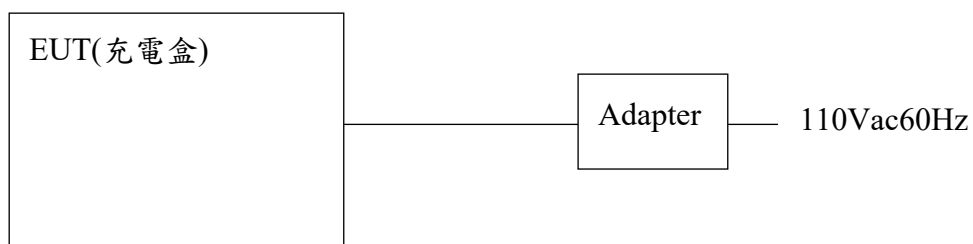
BT Mode



Charge Stand Mode



Charge Box Mode



3.1.1 待測物之主要配備

裝置名稱	廠牌/製造者	型號	纜線說明 /規格
*飛利浦鑽石靚白音波震動牙刷(白鑽)	PHILIPS /Philips Consumer Lifestyle B.V.	HX9912/07	---
(充電座)(隨附配件)	PHILIPS /Philips Consumer Lifestyle B.V.	CBA5001 (搭配型號: HX9912/07, HX9912/40) CBA6001(搭配型號: HX9912/17)	---
(充電盒)(隨附配件)	PHILIPS /Philips Consumer Lifestyle B.V.	TCA1001 (搭配型號: HX9912/07, HX9912/40) TCA2001(搭配型號: HX9912/17)	---

*表示待測物

3.1.2. 外接週邊設備

裝置名稱	廠牌/製造者	型號/料號	纜線說明/規格
手機	Apple	i8 Plus	---
Adapter	Topcom	TC-KPD36WD	---

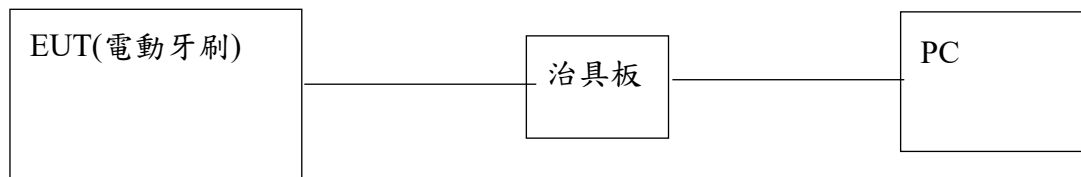
手機



Adapter



3.2測試接續圖(測試模式使用)



3.2.1.測試治具、測試軟體名稱、測試軟體版本

裝置名稱	供應商	型號	纜線說明/規格
測試治具	FTDI Future Technology Devices International Ltd.	MM232R	---
測試治具線材	ETC(供應商)	---	1.5m 非屏蔽線材
PC	ETC(供應商)	ACER TMP257- M-58VU-001(型 號)	---

測試軟體名稱	CmdGui
測試軟體版本	Command GUI V1.0

3.2.2.測試模式之最大發射功率、頻率、頻寬、調變技術等設定值

模式	頻率	設定值
Bluetooth 4.2 BLE : 1Mbps	2402MHz~2480MHz	Low - 2402MHz: A5 0A 0B 02 08 00 00 25 00 ck Mid - 2440MHz: A5 0A 0B 02 08 00 13 25 00 ck High -2480MHz: A5 0A 0B 02 08 00 27 25 00 ck
NFC	13.56MHz	無法設定

3.2.3 測試治具應具 4x6 吋以上具尺規之彩色照片。



4 場強輻射之量測

4.1 適用標準

依據低功率射頻器材技術規範4.10.2.2節之要求，主波與諧波發射：除4.10.2.3 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

4.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依3.6之發射限制，兩者取其較鬆者。

4.2 量測方法

30MHz ~ 1GHz：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1米高相同的高度。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。

1GHz以上：將待測物置於1.5米或0.8米高(依待測物為發射機或接收機)的非金屬桌面，使其在工作狀態，接收指向性天線置於3米外高度1米高(依待測物為發射機或接收機)。待測物分別要垂直或水平放置，而且桌面要360度旋轉，另外接收指向性天線也要從1米至4米升降變化，以找出最大的輻射電場強度，接收指向性天線置於水平、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
EMI Test Receiver	Rohde & Schwarz	ESU40 (13054416-001)	2021/03/25	2022/03/24
Bi-Log Antenna with 5dB Pad (3m)	ETC & JYE BAO	MCTD 2786 & FAT-NM5NF5T3G2W6(13057618-002 & RF-002)	2021/09/10	2022/09/09
Amplifier	HP	8447D (13040711-001)	2021/09/22	2022/09/21
Horn Antenna	EMCO	3116 (13058801-001)	2021/08/27	2022/08/26
Horn Antenna	ETS-Lindgren	3117 (13059211-002)	2021/03/16	2022/03/15
Amplifier	HP	8449B (13052901-001)	2021/09/22	2022/09/21
Amplifier	Keysight	83051A (13052926-001 & 13032683-001)	2021/09/09	2022/09/08

4.4 場強度之計算

場強之計算公式如下

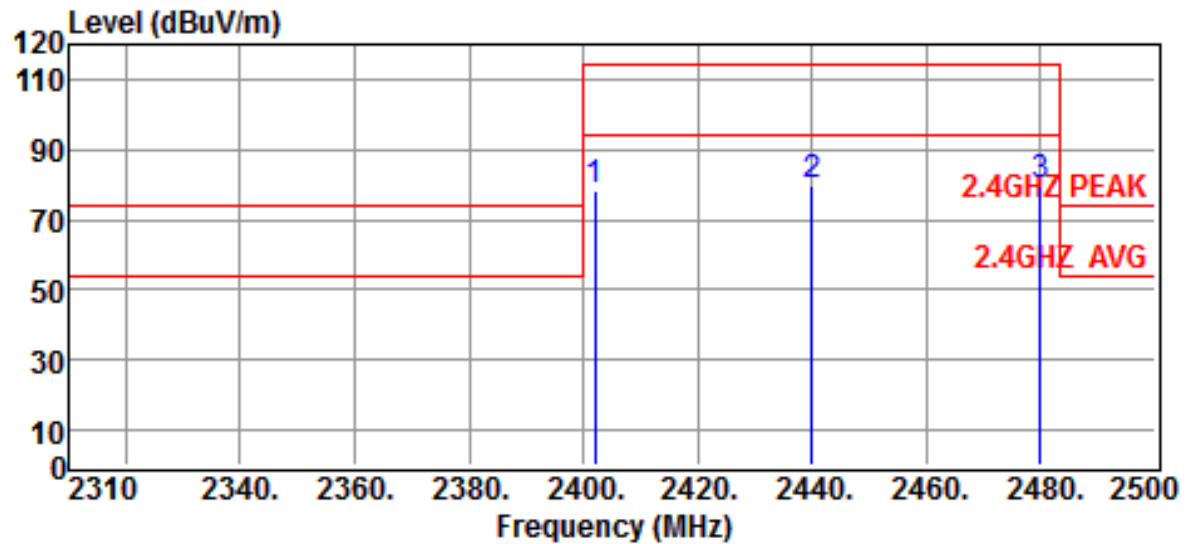
$$\text{結果值} = \text{讀值} + \text{校正因子} + \text{週期因子}$$

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

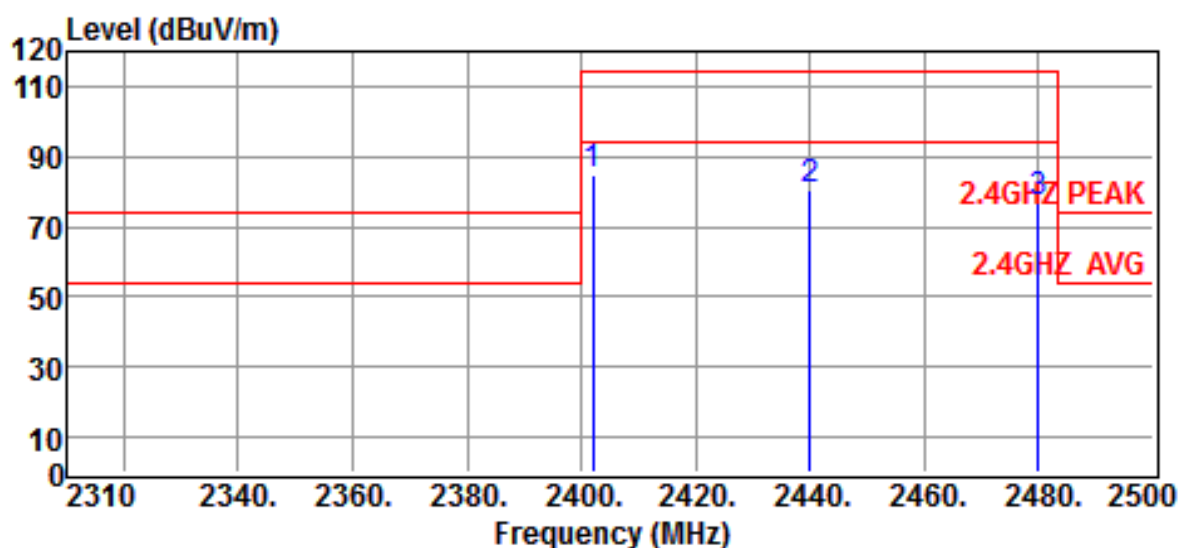


Site	:Chamber#2	Date	:2022-02-23
Limit	:2.4GHZ PEAK	Ant. Pol.	:HORIZONTAL
EUT	:飛利浦鑽石靚白音波震動牙刷(白鑽)		
Model	:HX9912/07		
Power Rating	:Battery	Temp.	:18 °C
Engineer	:Brian Huang	Humi.	:70 %
Test Mode	:BLE 4.2		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	2402.0000	80.63	-2.03	78.60	114.00	-35.40	Peak
	2440.0000	81.52	-2.09	79.43	114.00	-34.57	Peak
*	2480.0000	82.07	-2.02	80.05	114.00	-33.95	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.



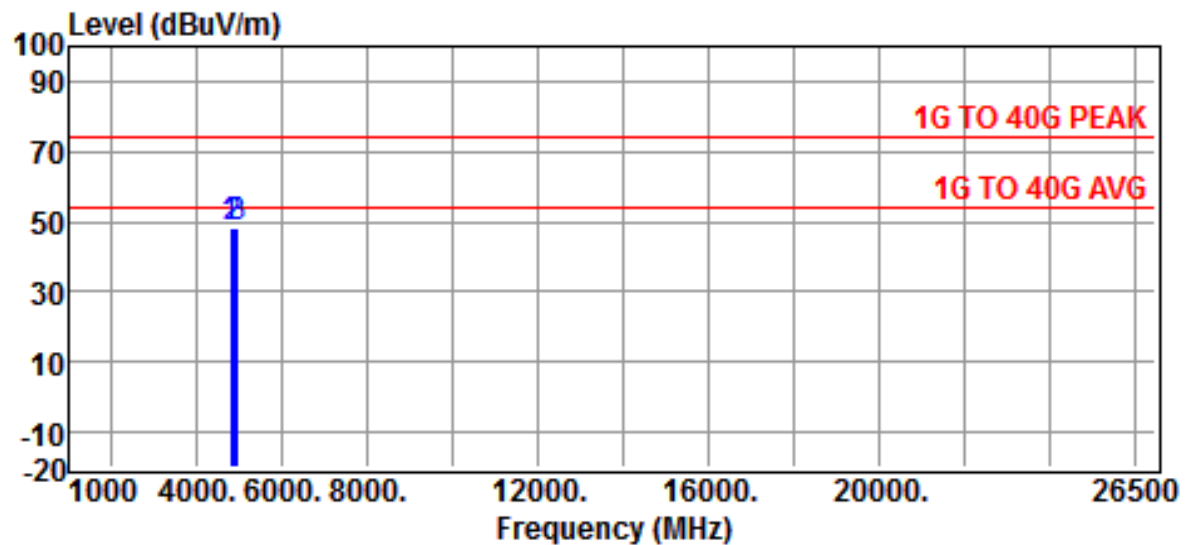
Site :Chamber#2 Date :2022-02-23
 Limit :2.4GHZ PEAK Ant. Pol. :VERTICAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :Battery Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :BLE 4.2

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	2402.0000	86.65	-2.03	84.62	114.00	-29.38	Peak
	2440.0000	82.61	-2.09	80.52	114.00	-33.48	Peak
	2480.0000	79.03	-2.02	77.01	114.00	-36.99	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.

4.5.2 諧波及本地震盪

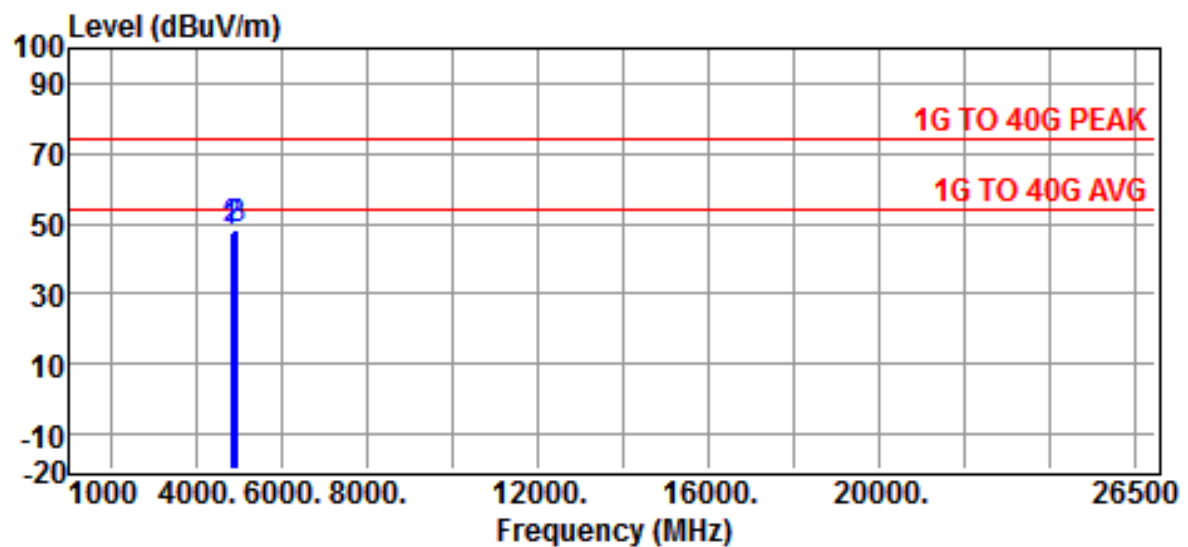


Site	:Chamber#2	Date	:2022-02-23
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:飛利浦鑽石靚白音波震動牙刷(白鑽)		
Model	:HX9912/07		
Power Rating	:Battery	Temp.	:18°C
Engineer	:Brian Huang	Humi.	:70 %
Test Mode	:BLE 4.2		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	4804.0000	45.84	2.09	47.93	74.00	-26.07	Peak
	4880.0000	45.79	2.23	48.02	74.00	-25.98	Peak
*	4960.0000	46.20	2.35	48.55	74.00	-25.45	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.



Site	:Chamber#2	Date	:2022-02-23
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:飛利浦鑽石靚白音波震動牙刷(白鑽)		
Model	:HX9912/07		
Power Rating	:Battery	Temp.	:18°C
Engineer	:Brian Huang	Humi.	:70 %
Test Mode	:BLE 4.2		

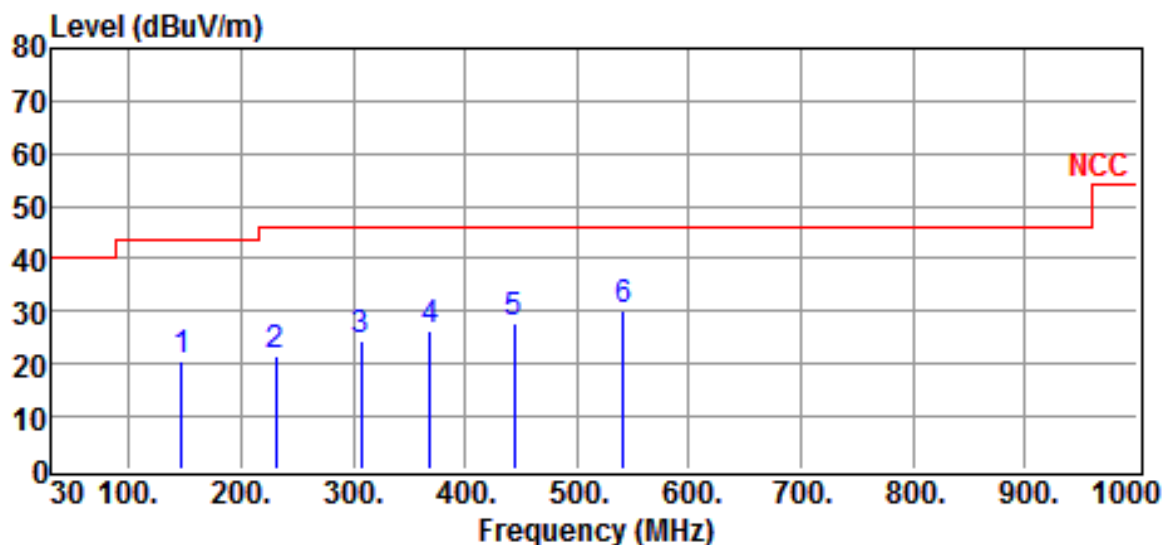
	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	4804.0000	45.79	2.09	47.88	74.00	-26.12	Peak
*	4880.0000	46.05	2.23	48.28	74.00	-25.72	Peak
	4960.0000	45.93	2.35	48.28	74.00	-25.72	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.

4.5.3 其它不必要之訊號

A. 1GHz以下



Site :Chamber#2

Date :2022-02-23

Limit :NCC

Ant. Pol. :HORIZONTAL

EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)

Model :HX9912/07

Power Rating :Battery

Temp. :18 °C

Engineer :Brian Huang

Humi. :70 %

Test Mode :BT Mode

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	147.3700	28.81	-8.40	20.41	43.50	-23.09	QP
	230.7900	29.37	-8.00	21.37	46.00	-24.63	QP
	307.4200	28.48	-3.90	24.58	46.00	-21.42	QP
	368.5300	28.94	-2.64	26.30	46.00	-19.70	QP
	444.1900	29.51	-1.54	27.97	46.00	-18.03	QP
*	541.1900	29.86	0.11	29.97	46.00	-16.03	QP

Note :

1. Result = Reading + Correction Factor

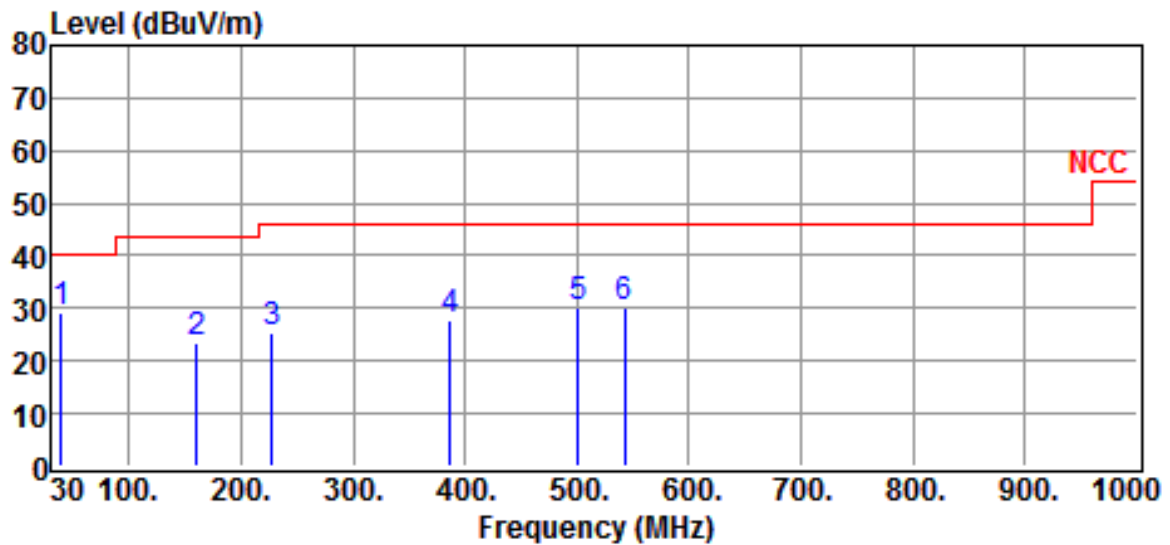
2. Average Result = Peak Result + Duty Factor ()

3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)

4. The margin value=Limit - Result

5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

6. ” * ” mean this data is the worst emission level.

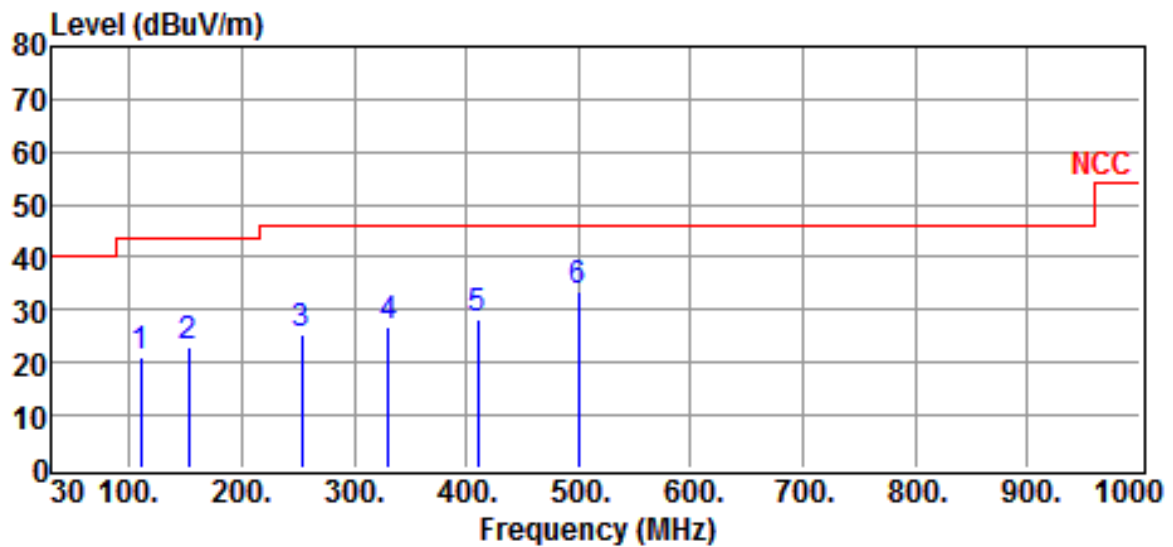


Site	:Chamber#2	Date	:2022-02-23
Limit	:NCC	Ant. Pol.	:VERTICAL
EUT	:飛利浦鑽石靚白音波震動牙刷(白鑽)		
Model	:HX9912/07		
Power Rating	:Battery	Temp.	:18 °C
Engineer	:Brian Huang	Humi.	:70 %
Test Mode	:BT Mode		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	39.7000	36.28	-7.05	29.23	40.00	-10.77	QP
	159.9800	32.42	-8.79	23.63	43.50	-19.87	QP
	227.8800	33.24	-8.05	25.19	46.00	-20.81	QP
	386.9600	30.14	-2.19	27.95	46.00	-18.05	QP
	501.4200	30.54	-0.54	30.00	46.00	-16.00	QP
	542.1600	30.29	0.13	30.42	46.00	-15.58	QP

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. ” * ” mean this data is the worst emission level.

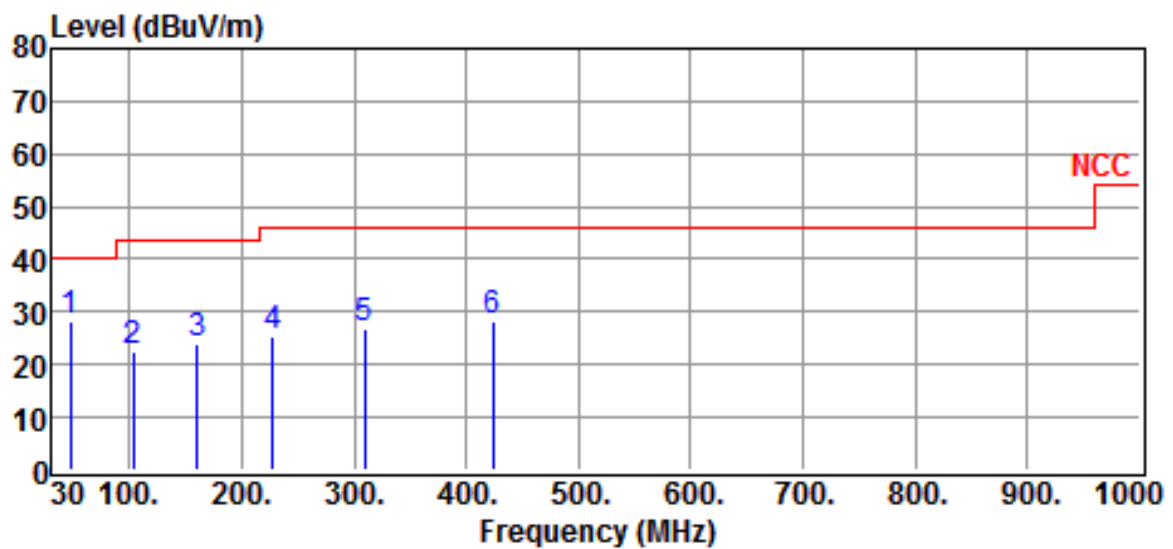


Site :Chamber#2 Date :2022-02-23
 Limit :NCC Ant. Pol. :HORIZONTAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :110Vac60Hz Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :Charge Stand Mode

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	109.5400	30.93	-9.67	21.26	43.50	-22.24	QP
	152.2200	31.72	-8.52	23.20	43.50	-20.30	QP
	253.1000	31.11	-5.73	25.38	46.00	-20.62	QP
	330.7000	30.49	-3.53	26.96	46.00	-19.04	QP
	410.2400	30.01	-1.78	28.23	46.00	-17.77	QP
*	499.4800	34.00	-0.55	33.45	46.00	-12.55	QP

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. ” * ” mean this data is the worst emission level.

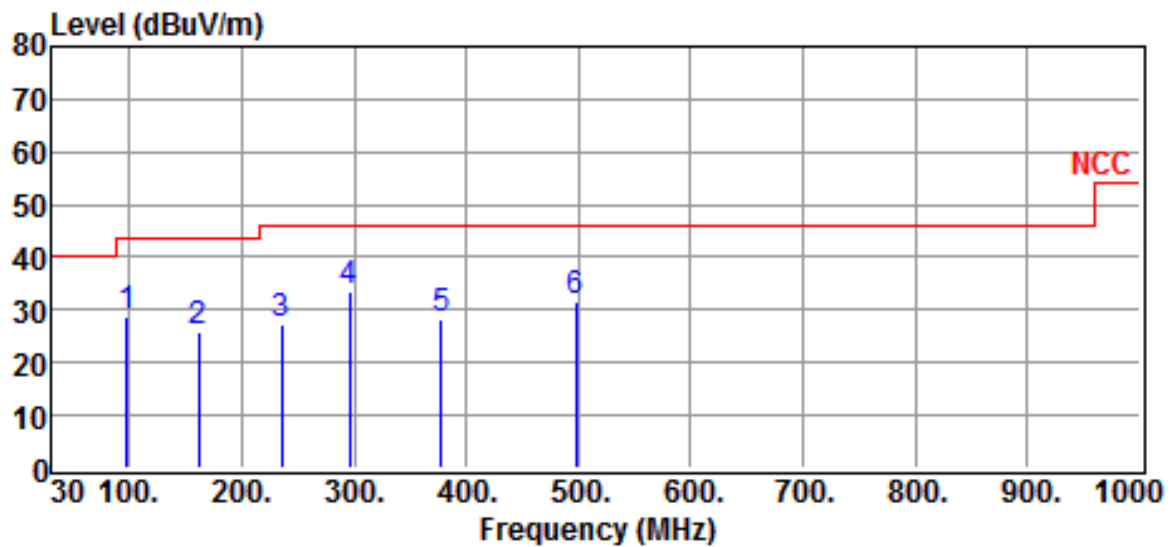


Site :Chamber#2 Date :2022-02-23
 Limit :NCC Ant. Pol. :VERTICAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :110Vac60Hz Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :Charge Stand Mode

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	47.4600	39.22	-11.13	28.09	40.00	-11.91	QP
	103.7200	32.86	-10.18	22.68	43.50	-20.82	QP
	159.9800	32.71	-8.79	23.92	43.50	-19.58	QP
	227.8800	33.51	-8.05	25.46	46.00	-20.54	QP
	309.3600	30.71	-3.90	26.81	46.00	-19.19	QP
	423.8200	29.91	-1.66	28.25	46.00	-17.75	QP

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. ” * ” mean this data is the worst emission level.

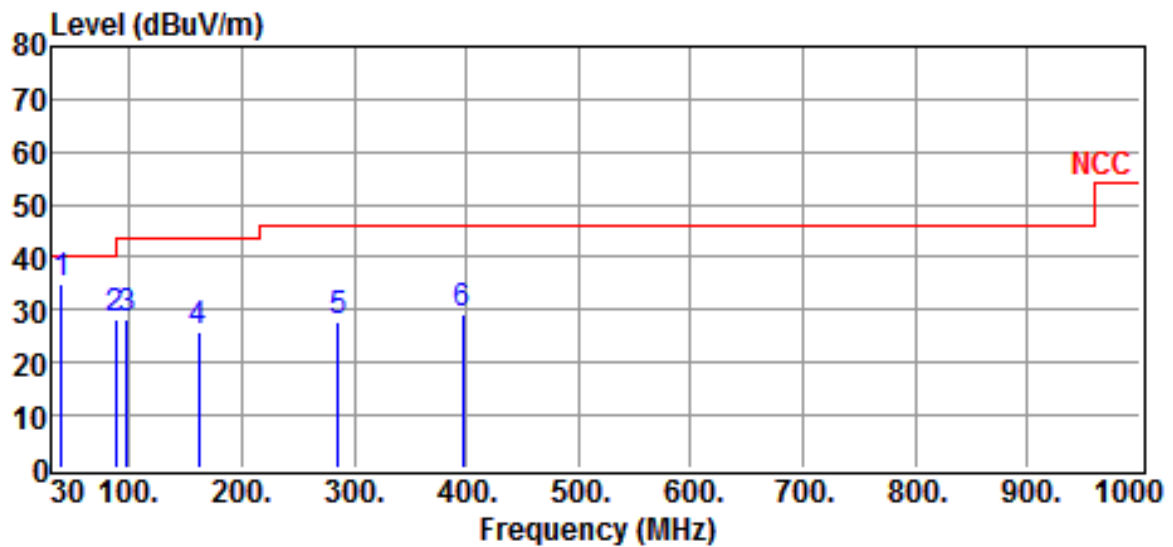


Site :Chamber#2 Date :2022-02-23
 Limit :NCC Ant. Pol. :HORIZONTAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :DC Power From Adapter 110Vac60Hz Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :Charge Box Mode

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	97.9000	39.70	-10.85	28.85	43.50	-14.65	QP
	161.9200	34.66	-8.87	25.79	43.50	-17.71	QP
	235.6400	34.92	-7.85	27.07	46.00	-18.93	QP
*	295.7800	37.69	-4.19	33.50	46.00	-12.50	QP
	377.2600	30.77	-2.37	28.40	46.00	-17.60	QP
	497.5400	32.21	-0.55	31.66	46.00	-14.34	QP

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.



Site :Chamber#2 Date :2022-02-23
 Limit :NCC Ant. Pol. :VERTICAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :DC Power From Adapter 110Vac60Hz Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :Charge Box Mode

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
*	39.7000	41.93	-7.05	34.88	40.00	-5.12	QP
	88.2000	40.27	-12.15	28.12	43.50	-15.38	QP
	97.9000	38.98	-10.85	28.13	43.50	-15.37	QP
	161.9200	34.84	-8.87	25.97	43.50	-17.53	QP
	286.0800	32.68	-4.84	27.84	46.00	-18.16	QP
	396.6600	31.24	-1.88	29.36	46.00	-16.64	QP

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.

B. 1GHz以上

操作模式 : 請參閱第三章節受測裝置之系統說明

測試日期 : --

環境溫度 : --°C

環境濕度 : --%

測試結果 : 符合

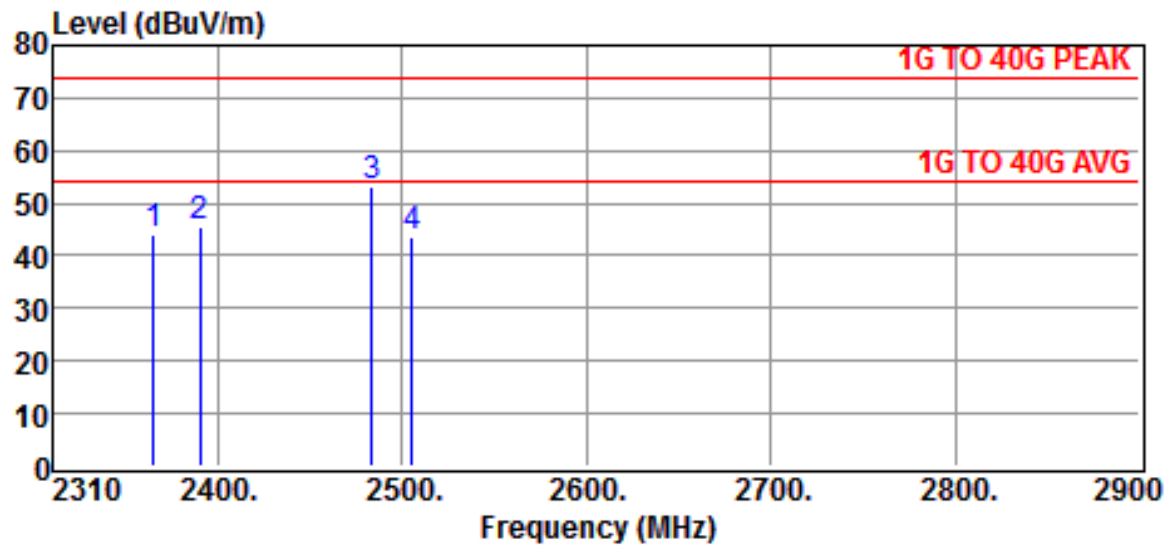
測試者 : 黃義傑

註：

1.1GHz 以上之不必要發射之訊號太弱而儀器無法量測。

2.掃描圖請參考 4.5.1 發射及接收諧波及本地震盪。

4.5.4 限制頻帶之場強輻射測量

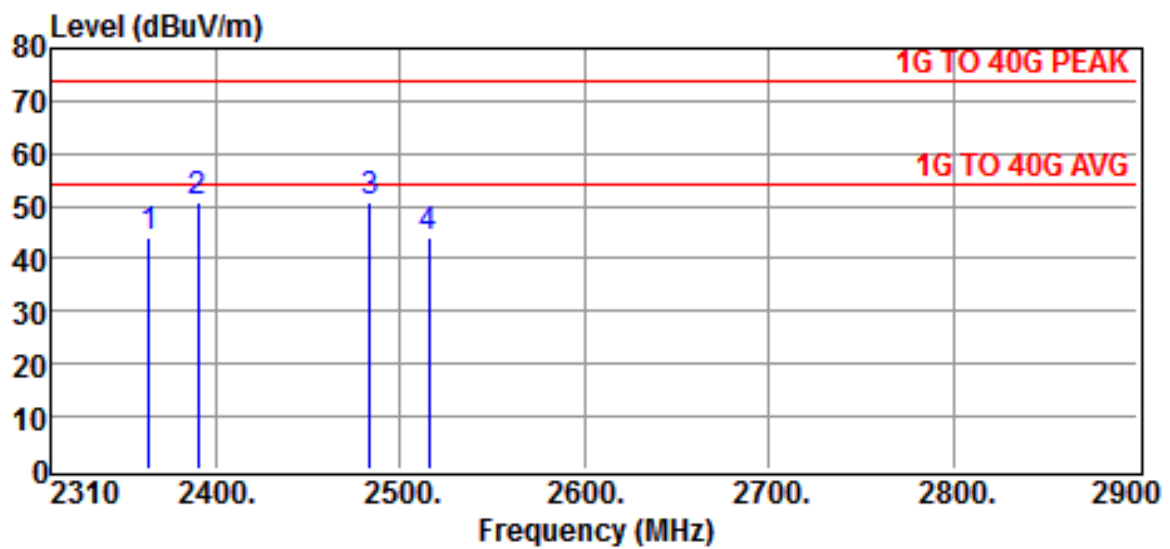


Site :site Date :2022-02-23
 Limit :1G TO 40G PEAK Ant. Pol. :HORIZONTAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :Battery Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :BLE 4.2

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	2365.0000	45.89	-1.99	43.90	74.00	-30.10	Peak
	2390.0000	47.73	-2.02	45.71	74.00	-28.29	Peak
*	2483.5000	55.00	-2.01	52.99	74.00	-21.01	Peak
	2505.5000	45.79	-1.97	43.82	74.00	-30.18	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.



Site :Chamber#2 Date :2022-02-23
 Limit :1G TO 40G PEAK Ant. Pol. :VERTICAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :Battery Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :BLE 4.2

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	2363.6000	46.12	-1.99	44.13	74.00	-29.87	Peak
*	2390.0000	52.80	-2.02	50.78	74.00	-23.22	Peak
	2483.5000	52.73	-2.01	50.72	74.00	-23.28	Peak
	2515.6000	46.23	-1.96	44.27	74.00	-29.73	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.

4.6 輻射之測試配置

圖 1：量測頻率低於1GHz之測試配置

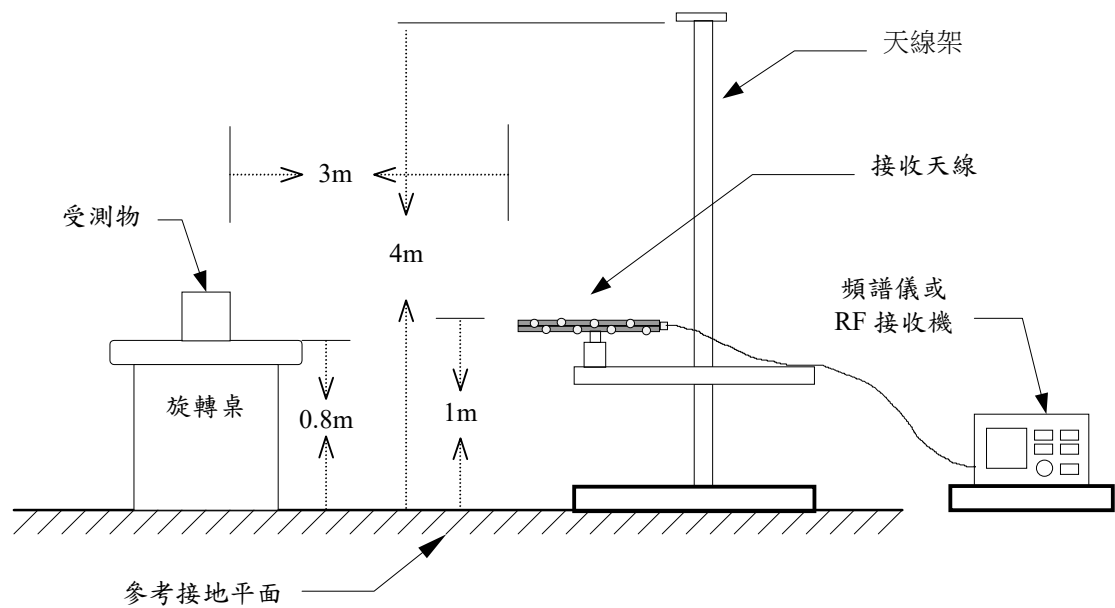
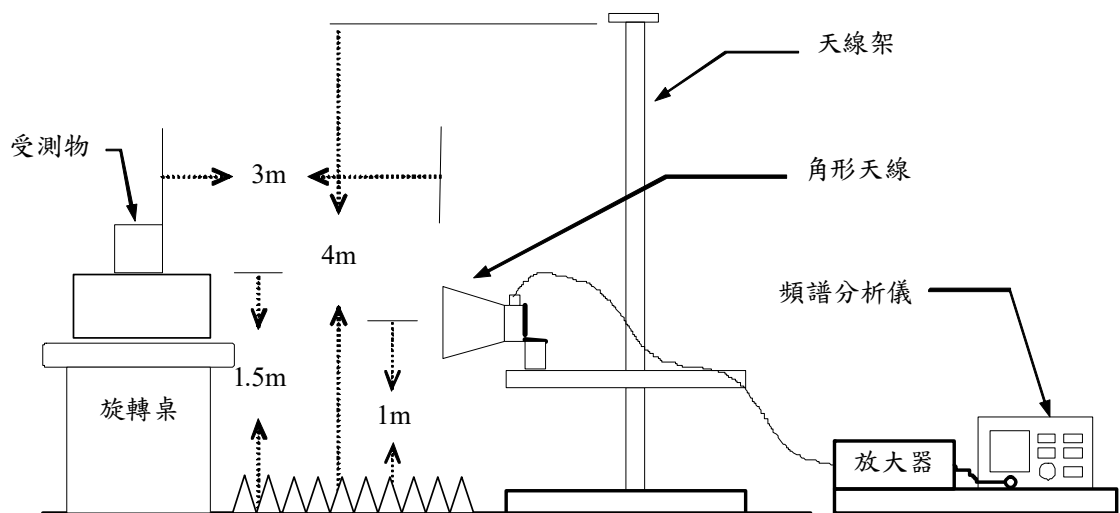


圖 2：量測頻率高於1GHz之測試配置



4.7 輻射量測之配置照片

30M-1GHz



Charge Stand Mode



Charge Box Mode



1GHz-6GHz



6GHz-26.5GHz



5 電源線傳導干擾之量測

5.1 適用標準

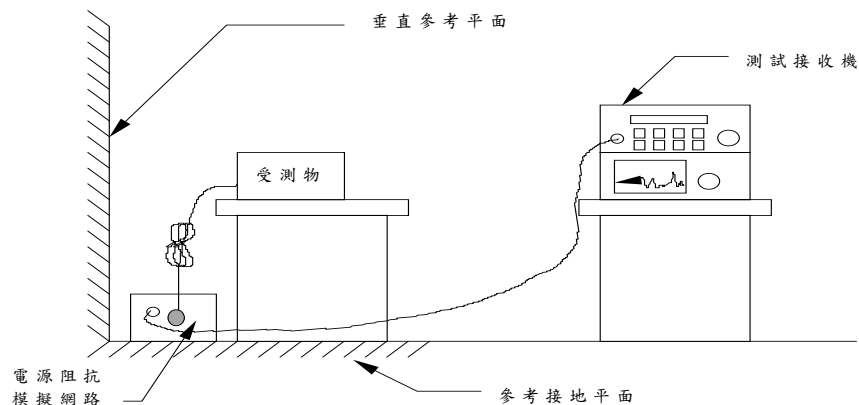
依據低功率射頻器材技術規範3.3節之要求。

5.2 測試方法

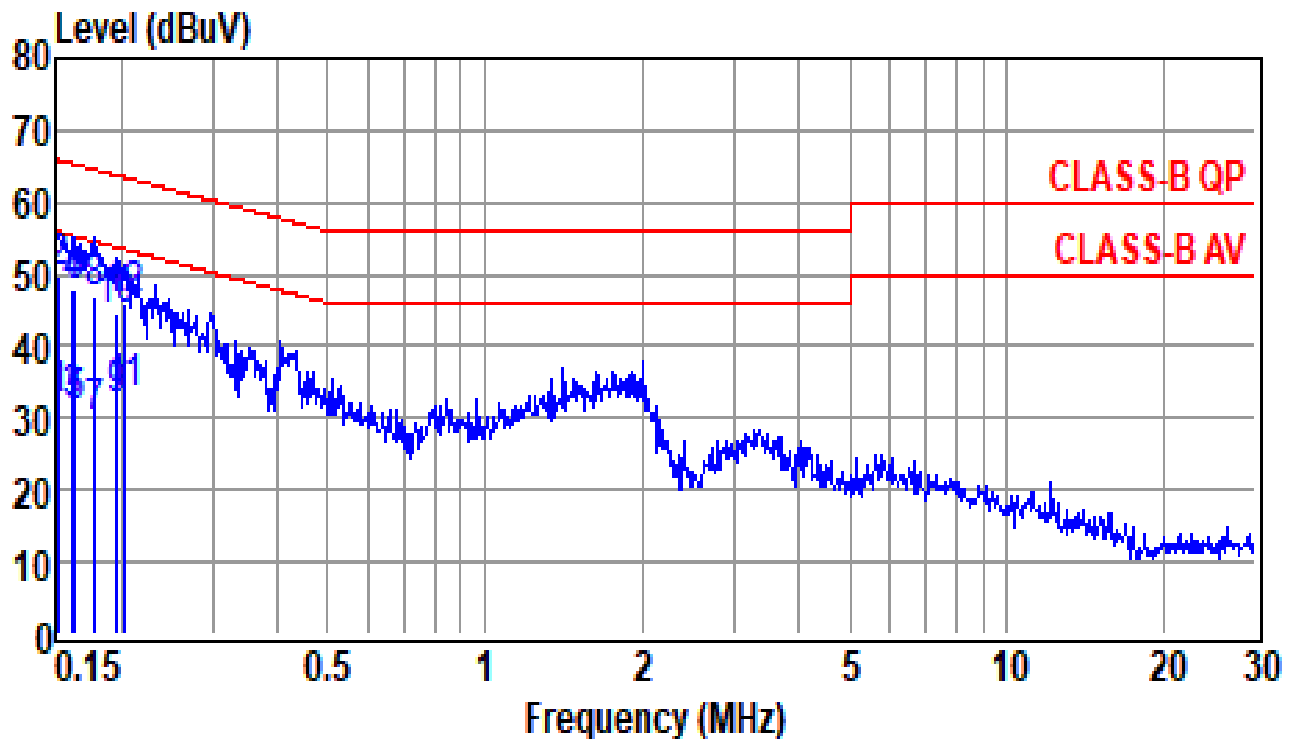
將待測物置於0.8米高的非金屬桌面，使其在工作狀態，待測物電源線接至電源線阻抗穩定網路上，從測試接收機記錄頻率由 0.15MHz 至 30MHz 之間之電源線傳導放射強度。

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



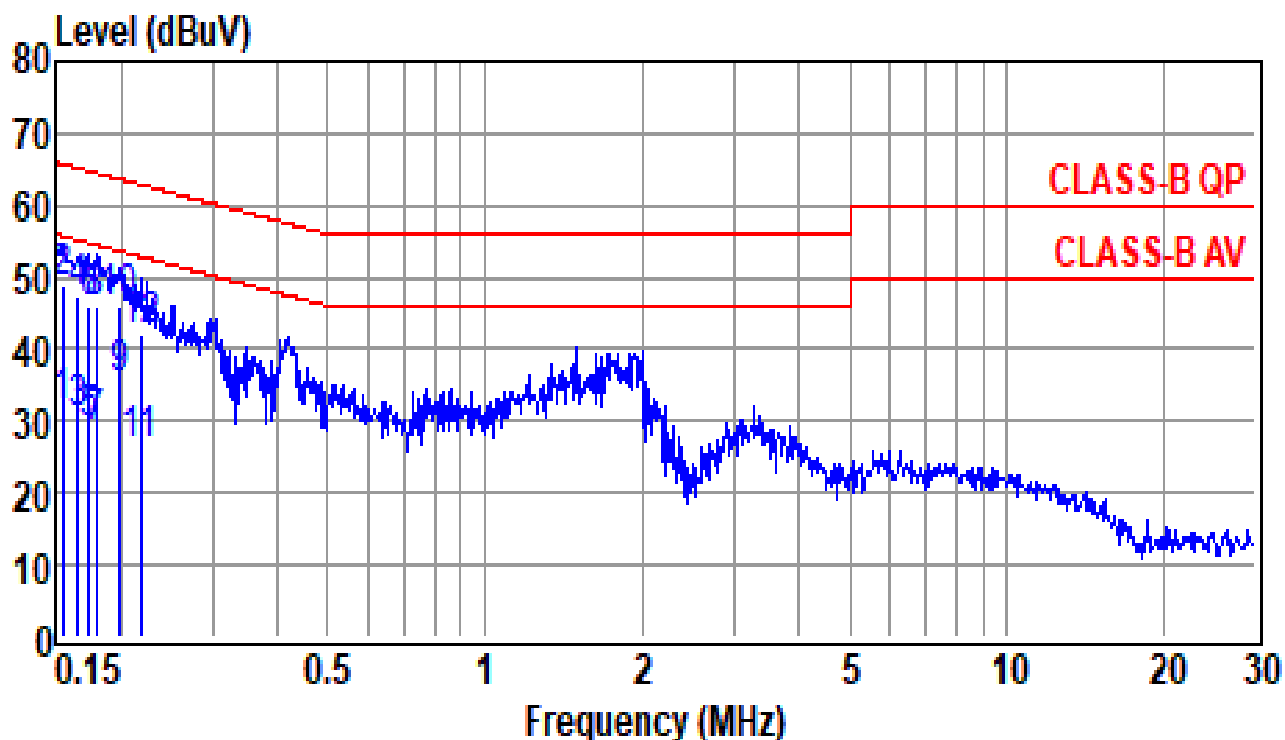
Site : conducted #1 Date : 2022-02-21
Condition : CLASS-B QP LISN : NEUTRAL
Tem / Hum : 18 °C / 70%
Test Mode : Charge Stand Mode
EUT : 飛利浦鑽石靚白音波震動牙刷(白鑽) Power Rating : 110Vac60Hz
Engineer : Brian Huang Model : HX9912/07

	Freq (MHz)	Reading (dBUV)	Factor (dB)	Emission Level (dBUV)	Limit Line (dBUV)	Over Limit (dB)	Remark
	0.1524	22.20	10.00	32.20	55.87	-23.67	Average
*	0.1524	39.79	10.00	49.79	65.87	-16.08	QP
	0.1616	21.47	10.00	31.47	55.38	-23.91	Average
	0.1616	37.90	10.00	47.90	65.38	-17.48	QP
	0.1641	21.33	10.00	31.33	55.25	-23.92	Average
	0.1641	38.00	10.00	48.00	65.25	-17.25	QP
	0.1787	19.77	10.00	29.77	54.55	-24.78	Average
	0.1787	36.81	10.00	46.81	64.55	-17.74	QP

	0.1965	22.08	10.00	32.08	53.76	-21.68	Average
	0.1965	34.76	10.00	44.76	63.76	-19.00	QP
	0.2040	23.17	10.00	33.17	53.45	-20.28	Average
	0.2040	36.21	10.00	46.21	63.45	-17.24	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss+ Pulse Limiter Factor
3. ” * ” mean this data is the worst emission level



Site : conducted #1

Date : 2022-02-21

Condition : CLASS-B QP

LISN : LINE

Tem / Hum : 18 °C / 70%

Test Mode : Charge Stand Mode

EUT : 飛利浦鑽石靚白音波震動牙刷(白鑽)

Power Rating : 110Vac60Hz

Engineer : Brian Huang

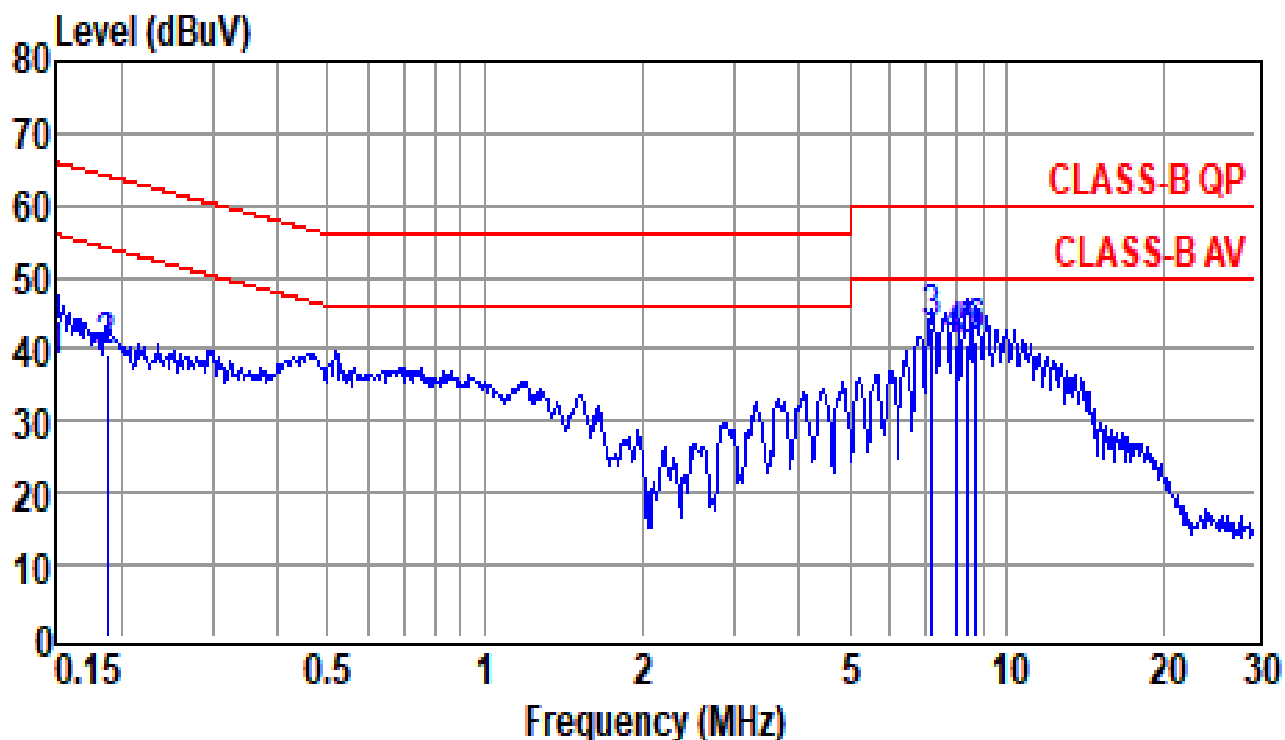
Model : HX9912/07

	Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
	0.1549	21.39	10.00	31.39	55.74	-24.35	Average
*	0.1549	39.07	10.00	49.07	65.74	-16.67	QP
	0.1659	20.52	10.00	30.52	55.16	-24.64	Average
	0.1659	37.20	10.00	47.20	65.16	-17.96	QP
	0.1740	19.31	10.00	29.31	54.77	-25.46	Average
	0.1740	36.20	10.00	46.20	64.77	-18.57	QP
	0.1796	18.76	10.00	28.76	54.50	-25.74	Average
	0.1796	36.06	10.00	46.06	64.50	-18.44	QP
	0.1997	25.45	10.00	35.45	53.62	-18.17	Average
	0.1997	36.04	10.00	46.04	63.62	-17.58	QP

	0.2185	16.50	10.00	26.50	52.88	-26.38	Average
	0.2185	32.35	10.00	42.35	62.88	-20.53	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss+ Pulse Limiter Factor
3. ” * ” mean this data is the worst emission level

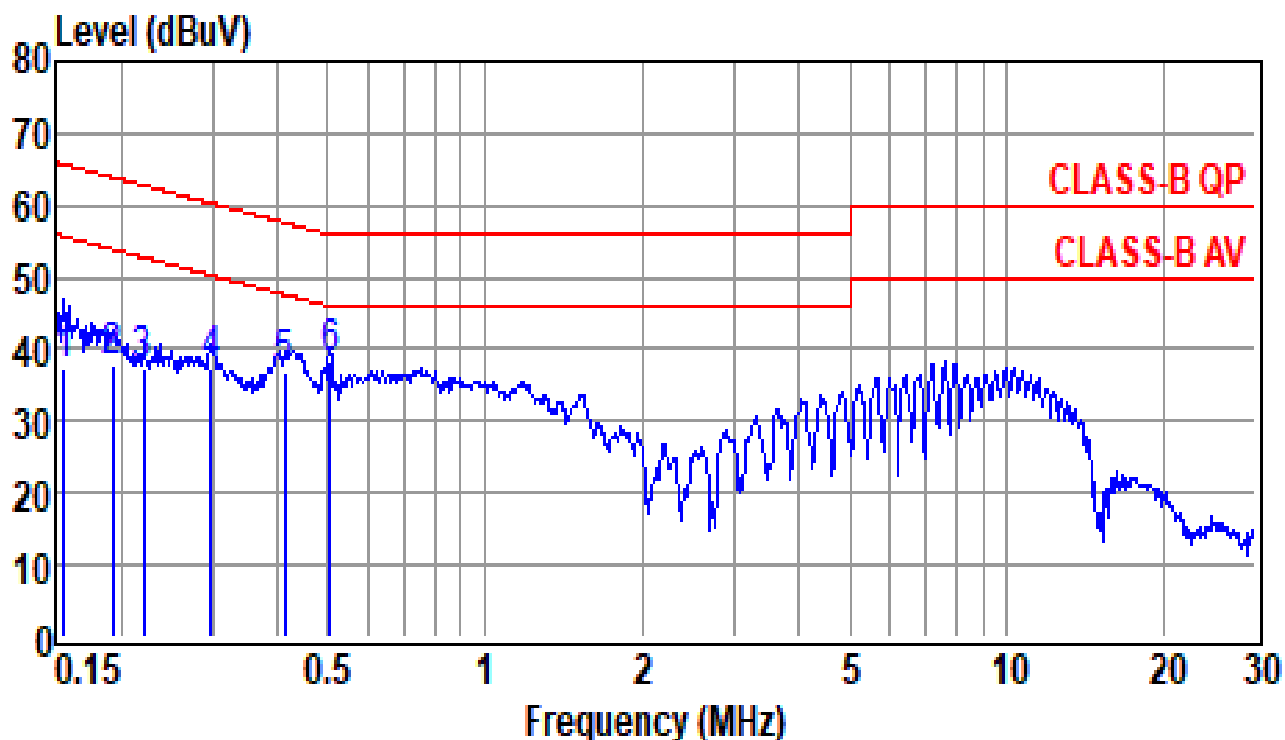


Site : conducted #1 Date : 2022-02-21
 Condition : CLASS-B QP LISN : NEUTRAL
 Tem / Hum : 18 °C / 70%
 Test Mode : Charge Box Mode
 EUT : 飛利浦鑽石靚白音波震動牙刷(白鑽)
 Power Rating : DC Power From Adapter 110Vac60Hz
 Engineer : Brian Huang Model : HX9912/07

	Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
	0.1508	27.86	10.00	37.86	65.96	-28.10	QP
	0.1884	29.13	10.00	39.13	64.11	-24.98	QP
*	7.1750	32.97	10.16	43.13	60.00	-16.87	QP
	7.9770	30.39	10.17	40.56	60.00	-19.44	QP
	8.4120	30.43	10.17	40.60	60.00	-19.40	QP
	8.7290	30.93	10.17	41.10	60.00	-18.90	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss+ Pulse Limiter Factor
3. " * " mean this data is the worst emission level



Site : conducted #1 Date : 2022-02-21
 Condition : CLASS-B QP LISN : LINE
 Tem / Hum : 18 °C / 70%
 Test Mode : Charge Box Mode
 EUT : 飛利浦鑽石靚白音波震動牙刷(白鑽)
 Power Rating : DC Power From Adapter 110Vac60Hz
 Engineer : Brian Huang Model : HX9912/07

	Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
	0.1557	27.38	10.00	37.38	65.69	-28.31	QP
	0.1934	27.74	10.00	37.74	63.89	-26.15	QP
	0.2208	27.56	10.00	37.56	62.79	-25.23	QP
	0.2987	27.59	10.00	37.59	60.28	-22.69	QP
	0.4127	26.96	10.02	36.98	57.59	-20.61	QP
*	0.5047	28.19	10.02	38.21	56.00	-17.79	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss+ Pulse Limiter Factor
3. " * " mean this data is the worst emission level

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 (13054412-003)	2021/10/18	2022/10/17
LISN	Narda(PMM)	L2-16B 13035912-001 (000WT61017)	2021/5/10	2022/05/09
PLUSE LIMITER (10dB)	Schwarzbeck	VTSD 9561 F-N (13056701-003)	2021/04/29	2022/04/28

5.7 傳導量測之配置照片

Charge Stand Mode



Charge Box Mode



6 天線之要求

6.1 適用標準

依據低功率射頻器材技術規範3.2節之規定，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。

6.2 天線增益

此裝置使用PCB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

4.10.2.4 除諧波外，指定頻帶外之發射應比主波低50 dB以上或依3.6 之發射限制，兩者取其較鬆者。

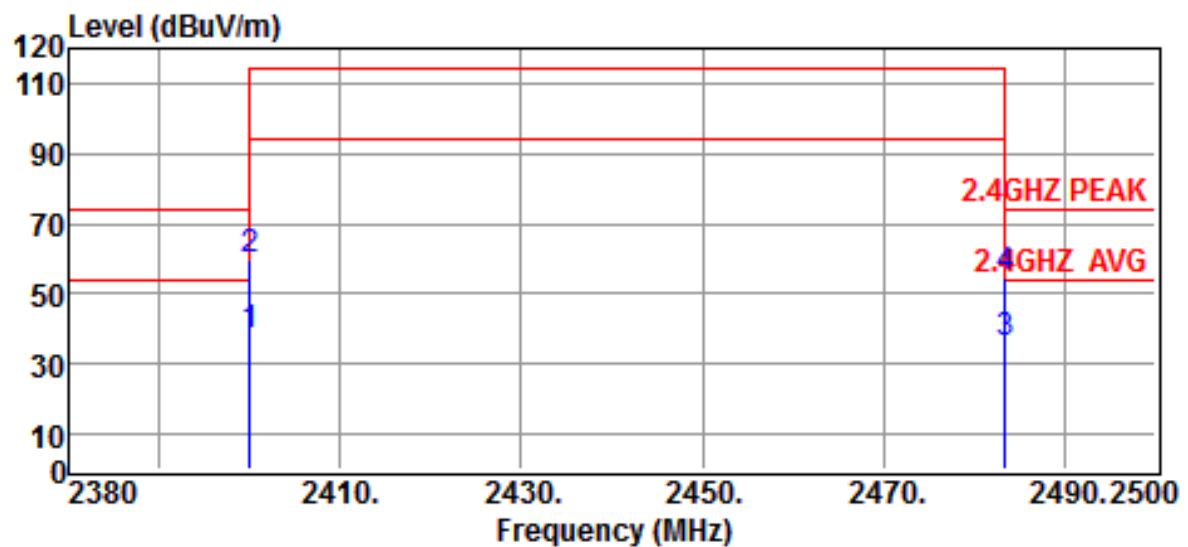
7.2 開放頻帶邊緣之測試配置

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
EMI Test Receiver	Rohde & Schwarz	ESU40 (13054416-001)	2021/03/25	2022/03/24
Horn Antenna	ETS-Lindgren	3117 (13059211-002)	2021/03/16	2022/03/15
Amplifier	HP	8449B (13052901-001)	2021/09/22	2022/09/21

7.4 開放頻帶邊緣之量測結果

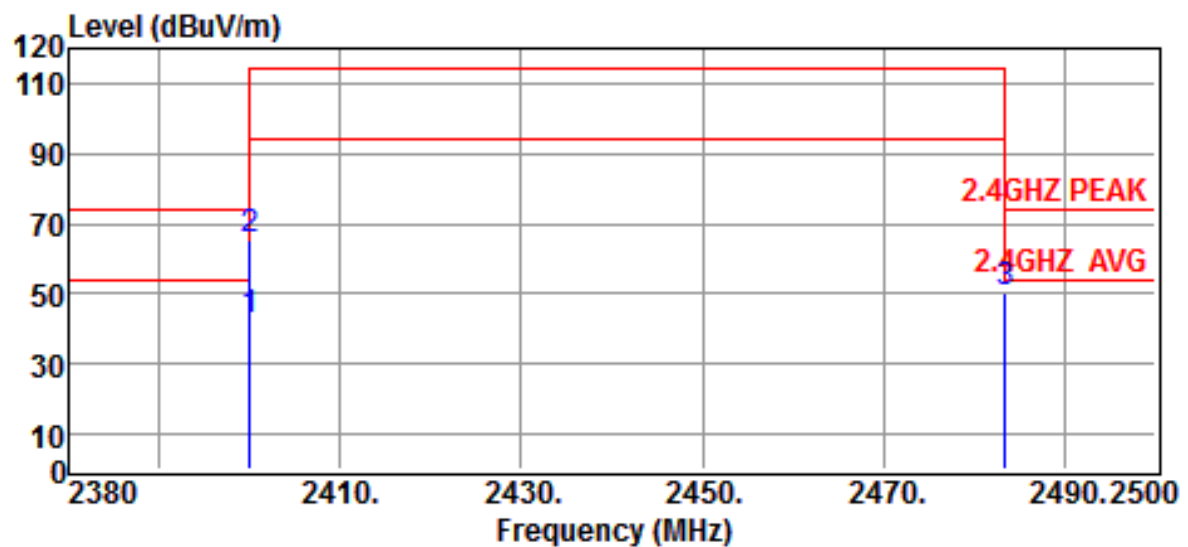


Site	:Chamber#2	Date	:2022-02-23
Limit	:2.4GHZ PEAK	Ant. Pol.	:HORIZONTAL
EUT	:飛利浦鑽石靚白音波震動牙刷(白鑽)		
Model	:HX9912/07		
Power Rating	:Battery	Temp.	:18 °C
Engineer	:Brian Huang	Humi.	:70 %
Test Mode	:BLE 4.2		

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	2400.0000	40.08	-2.04	38.04	54.00	-15.96	Average
*	2400.0000	61.57	-2.04	59.53	74.00	-14.47	Peak
	2483.5000	37.83	-2.01	35.82	54.00	-18.18	Average
	2483.5000	56.72	-2.01	54.71	74.00	-19.29	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.



Site :Chamber#2 Date :2022-02-23
 Limit :2.4GHZ PEAK Ant. Pol. :VERTICAL
 EUT :飛利浦鑽石靚白音波震動牙刷(白鑽)
 Model :HX9912/07
 Power Rating :Battery Temp. :18°C
 Engineer :Brian Huang Humi. :70 %
 Test Mode :BLE 4.2

	Freq MHz	Reading dBuV	Correction Factor dB/m	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
	2400.0000	44.13	-2.04	42.09	54.00	-11.91	Average
*	2400.0000	67.14	-2.04	65.10	74.00	-8.90	Peak
	2483.5000	52.53	-2.01	50.52	74.00	-23.48	Peak

Note :

1. Result = Reading + Correction Factor
2. Average Result = Peak Result + Duty Factor ()
3. Correction Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
4. The margin value=Limit - Result
5. Above 1Ghz : Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.
6. " * " mean this data is the worst emission level.