



低功率射頻電機測試報告

申請廠商 : Gentex Corporation
地址 : 600 N. Centennial Street, Zeeland, MI, 49464, USA
器材名稱 : HomeLink 5 Universal Garage HomeLink 5 Universal Ga
Door Opener(Wireless)
廠牌 : HomeLink
型號 : UAHL5B



財團法人台灣電子檢驗中心電磁相容試驗二部

新北市林口區頂福里5鄰34號

電話 : (02)26023052

傳真 : (02)26010910

報告號碼: 18-08-RBF-029

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受理日期 : 107 年 08 月 29 日
 完成日期 : 107 年 10 月 24 日
 報告號碼 : 18-08-RBF-029
 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 : 110 年 10 月 08 日
 申請廠商 : Gentex Corporation
 申請廠商地址 : 600 N. Centennial Street, Zeeland, MI, 49464, USA
 製造廠商 : Gentex Corporation
 器材名稱 : HomeLink 5 Universal Garage HomeLink 5 Universal Garage Door Opener(Wireless)
 廠牌 : HomeLink
 型號 : UAHL5B
 發射功率(電場強度) : 288MHz: 74.46dB μ V/m @3m (電場強度)、310MHz: 76.30dB μ V/m @3m (電場強度)、365MHz: 73.50dB μ V/m @3m (電場強度)、433.92MHz: 83.92dB μ V/m @3m (電場強度)
 工作頻率 : 288MHz、310MHz、365MHz、433.92MHz (PWM / 4CH)
 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 107 年 01 月 10 日。

項次	測試項目	適用規範章節	測試結果	量測設備	判定
1	場強輻射	低功率射頻電機技術規範2.8節、3.4.2.5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	----	無實施 此項檢測
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	頻帶寬度之要求	低功率射頻電機技術規範3.4.2.2節	請參閱7.3節	請參閱7.2節	合格
	以下空白				

報告簽署人：

量測員：

1 一般資料

1.1 產品描述

- a) 產品型態 : HomeLink 5 Universal Garage HomeLink 5 Universal Garage Door Opener(Wireless)
- b) 商 標 : HomeLink
- c) 產品型號 : UAHL5B
- d) 供應電源 : DC13.5V(Power from DC Supply)

1.2 產品特性

本產品為 HomeLink 5 Universal Garage HomeLink 5 Universal Garage Door Opener(Wireless)，僅包括發射器。發射器將信號以無線方式傳送給所搭配之接收主機，額定發射/接收頻率為288MHz、310MHz、365MHz、433.92MHz。

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(LP0002)以及參考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3.4.2.5節(1)之要求，符合3.4.2.4(1)之規定者，除須符合第2.7節之規定外，距3公尺處其電場強度限值（採用平均值檢波儀量測，CISPR準峰值檢測儀亦可接受）如下表。各頻段重疊處，以較嚴格之限制值為準。

主波頻率 (兆赫)	主波電場強度 (微伏/公尺)	不必要之發射 (微伏/公尺)
40.66-40.70	2250	225
70-130(含)	1250	125
130(不含)-174(含)	1250-3750 _(註 1,2)	125-375 _(註 1,2)
174(不含)-260(含)	3750	375
260(不含)-470(含)	3750-12500 _(註 1,2)	375-1250 _(註 1,2)
470(不含)以上	12500	1250

註： 1.以線性插補法（linear interpolations），最大容許電場強度之計算公式如下：

(1) 130-174MHz(兆赫) == $>56.81818 \times (\text{工作頻率, 單位: 兆赫}) - 6136.3636$

(2) 260-470MHz(兆赫) == $>41.6667 \times (\text{工作頻率, 單位: 兆赫}) - 7083.3333$

2. 不必要之發射的電場強度應比主波最大容許值低至少 20dB 或符合第 2.8 節之限制，可取兩者中較寬鬆之規定；若使用平均值測量發射，同時亦必須符合第 5.15.2 之峰值規定。

依據低功率射頻電機技術規範3.4.2.5節(2)之要求，符合3.4.2.4(2)之規定者，除需符合第2.7節之規定外，距3公尺處其電場強度限值（採用平均值檢波儀量測，CISPR準峰值檢測儀亦可接受）如下表。各頻段重疊處，以較嚴格之限制值為準，發射機電場強度之限制要求如下：

主波頻率 (兆赫)	主波電場強度 (微伏/公尺)	不必要之發射 (微伏/公尺)
40.66-40.70	1000	100
70-130(含)	500	50
130(不含)-174(含)	500-1500 _(註 1,2)	50-150 _(註 1,2)
174(不含)-260(含)	1500	150
260(不含)-470(含)	1500-5000 _(註 1,2)	150-500 _(註 1,2)
470(不含)以上	5000	500

註：1. 以線性插補法（linear interpolations），最大容許電場強度之計算公式如下：

(1) 130-174MHz(兆赫) == $>22.72727 \times (\text{工作頻率, 單位: 兆赫}) - 2454.545$

(2) 260-470MHz(兆赫) == $>16.6667 \times (\text{工作頻率, 單位: 兆赫}) - 2833.3333$

2. 不必要之發射的電場強度應比主波最大容許值低至少20dB或符合第2.8節之限制，可取兩者中較寬鬆之規定；若使用平均值測量發射，同時亦須符合本規範5.15.2節之峰值規定。

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

低功率射頻電機之發射機或收發信機所使用之天線，依據低功率射頻電機技術規範2.2節之規定，其發射天線應為全固定、半固定式或以獨特之耦合(unique coupling)方式連接機體。製造者可設計供使用者因損壞而替換之天線，但不得設計或使用原認證以外之天線或可供引接各類電纜之標準天線插座或電氣連接頭，如：BNC、F type、N type、M type、UG type、RCA、SMA、SMB...等及其他各類工業或通訊標準接頭。

(4) 頻帶寬度之要求

依據低功率射頻電機技術規範3.4.2.2節之要求，其頻帶寬度限制如下：

發射頻率在70至900 MHz須限制於中心頻率之0.25%以內，發射頻率在900 MHz以上者，須限制於中心頻率之0.5%以內。頻寬係由低於經調變之主波20 dB點求取。

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	1805.0~1880.0
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	

3 受測裝置之系統說明

裝置名稱	製造者/代理商	型 號	纜線說明
HomeLink 5 Universal Garage	Gentex Corporation. /	UAHL5B	1.8m Unshielded DC Power
HomeLink 5 Universal Garage	Gentex Corporation		Cord
Door Opener(Wireless)*			
DC Power supply	GW	GPC-3030D	0.3m Unshielded DC Power
			Cord

標記“*”表欲申請之受測物。

4 場強輻射之量測

4.1 適用標準

發射機依據低功率射頻電機技術規範，需符合3.4.2.5節之要求，一般輻射干擾需符合2.8節之要求。

接收機依據低功率射頻電機技術規範需符合2.8節之要求。

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。

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	2018/10/08	2019/10/07
Bi-Log Antenna	ETC	MCTD 2786	2017/10/26	2018/10/25
Log-periodic Antenna	EMCO	3146	2018/10/15	2019/10/14
EMI Test Receiver	Rohde & Schwarz	ESL	2017/12/22	2018/12/21
Amplifier	HP	8447D	2017/12/08	2018/12/07
EMI Test Receiver	Rohde & Schwarz	ESU 40	2017/11/15	2018/11/14
Attenuator	Mini-Circuits	BW-S10W2+	2018/10/05	2019/10/04
Attenuator	Mini-Circuits	BW-S20W2+	2018/10/05	2019/10/04
Attenuator	Mini-Circuits	BW-S30W2+	2018/10/05	2019/10/04
Amplifier	HP	83051A	2018/09/03	2019/09/02

4.4 場強度之計算

場強之計算公式如下

$$\text{結果值(Peak)} = \text{讀值} + \text{校正因子}$$

$$\text{結果值(Average)} = \text{結果值(Peak)} + \text{週期因子}$$

其中校正因子為：

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

$$\text{週期因子為：} 20 \log \frac{\text{實際發射時間}}{\text{脈衝列週期}} \quad (\text{若脈衝列週期超過100 ms，則取100 ms})$$

Frequency 288MHz

$$\text{Duty Factor} = 20 \log \frac{(2.4\text{ms} \times 16) + (1.6\text{ms} \times 22)}{99.2\text{ms}} = -2.6 \text{ dB}$$

Frequency 310MHz

$$\text{Duty Factor} = 20 \log \frac{(2.4\text{ms} \times 15) + (1.6\text{ms} \times 23)}{98.8\text{ms}} = -2.7 \text{ dB}$$

Frequency 365MHz

$$\text{Duty Factor} = 20 \log \frac{(2.4\text{ms} \times 15) + (1.6\text{ms} \times 23)}{99.2\text{ms}} = -2.7 \text{ dB}$$

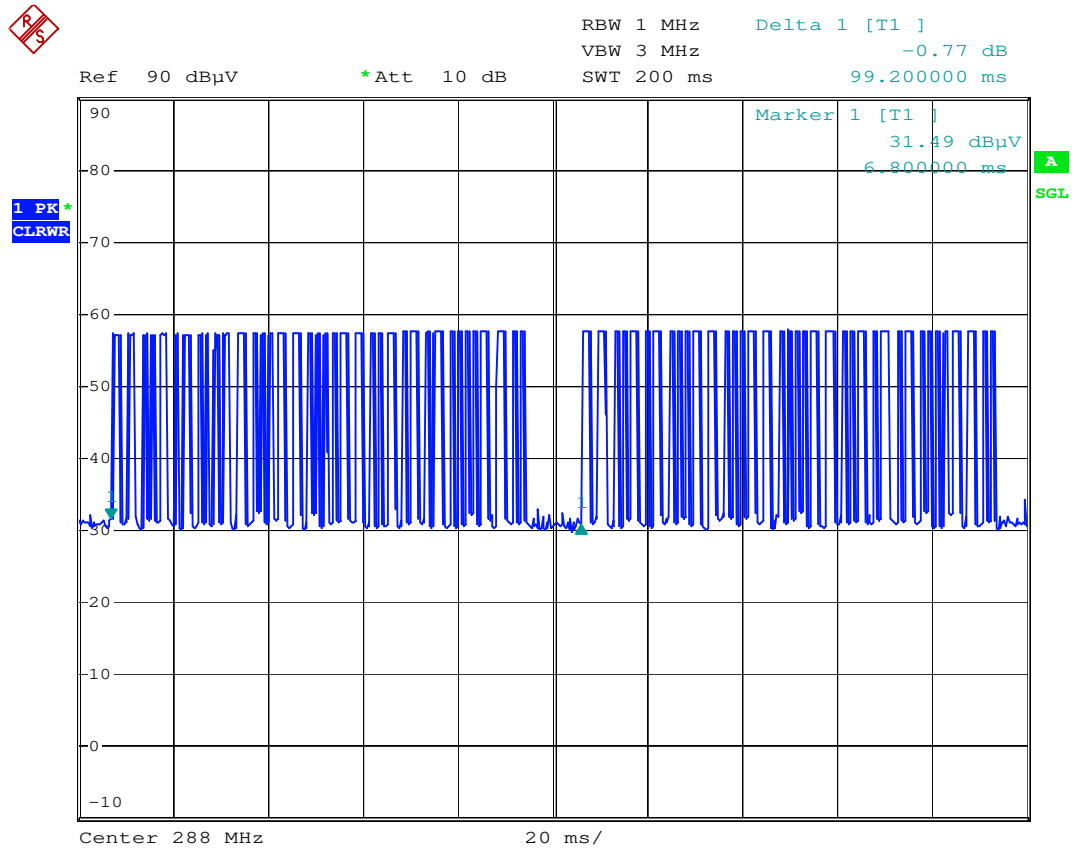
Frequency 433.92MHz

$$\text{Duty Factor} = 20 \log \frac{9.2\text{ms} \times 1}{60\text{ms}} = -16.3 \text{ dB}$$

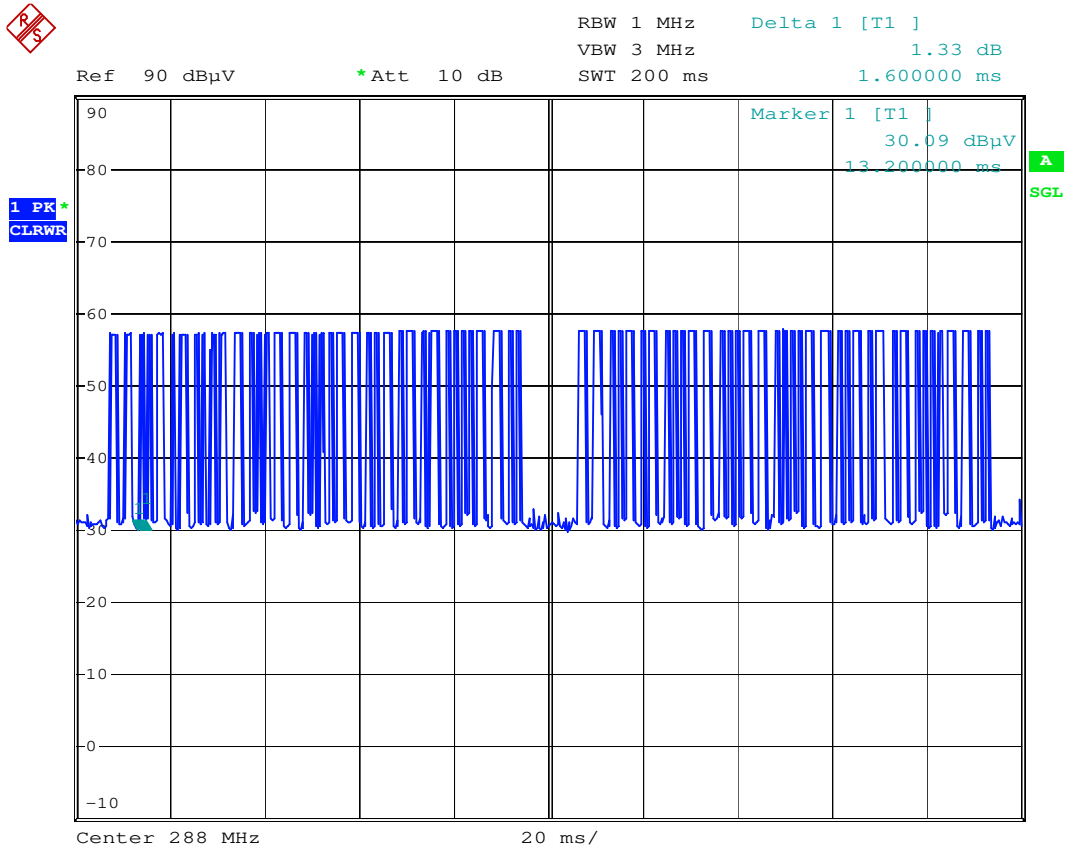
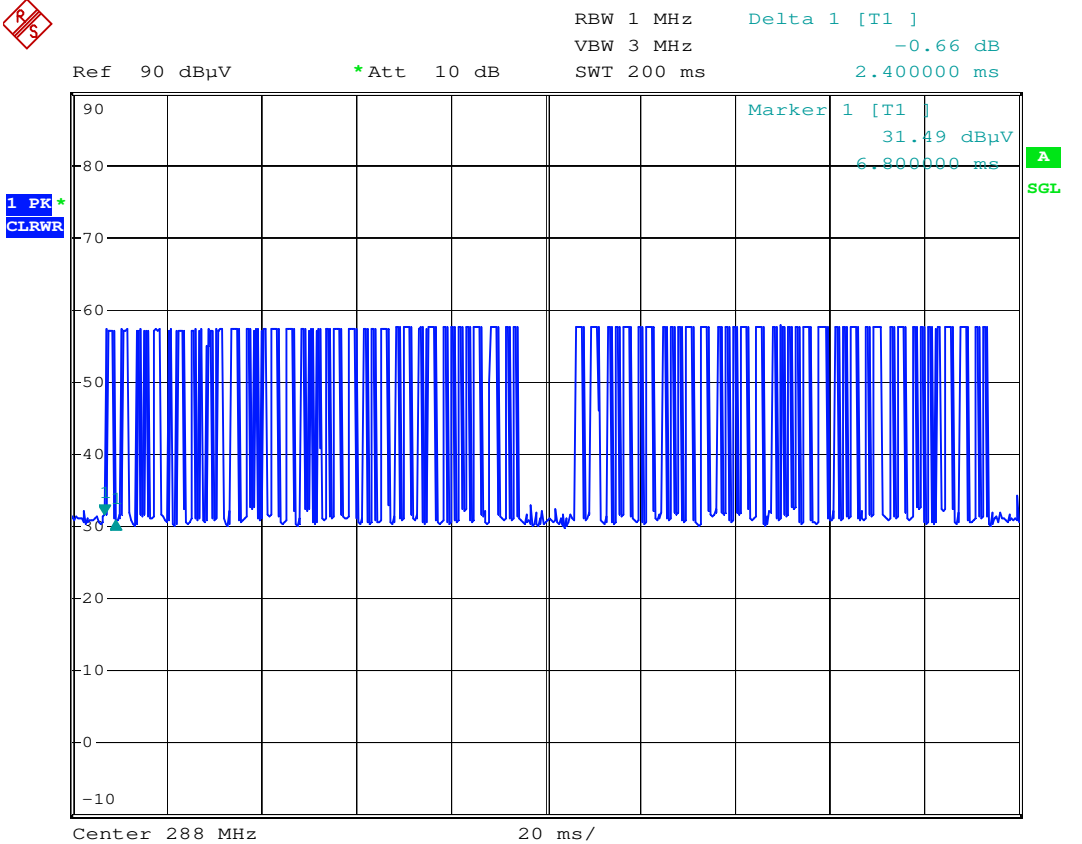
註：週期因子之測量圖請參考下圖。

Frequency 288MHz

Full Pulse Train

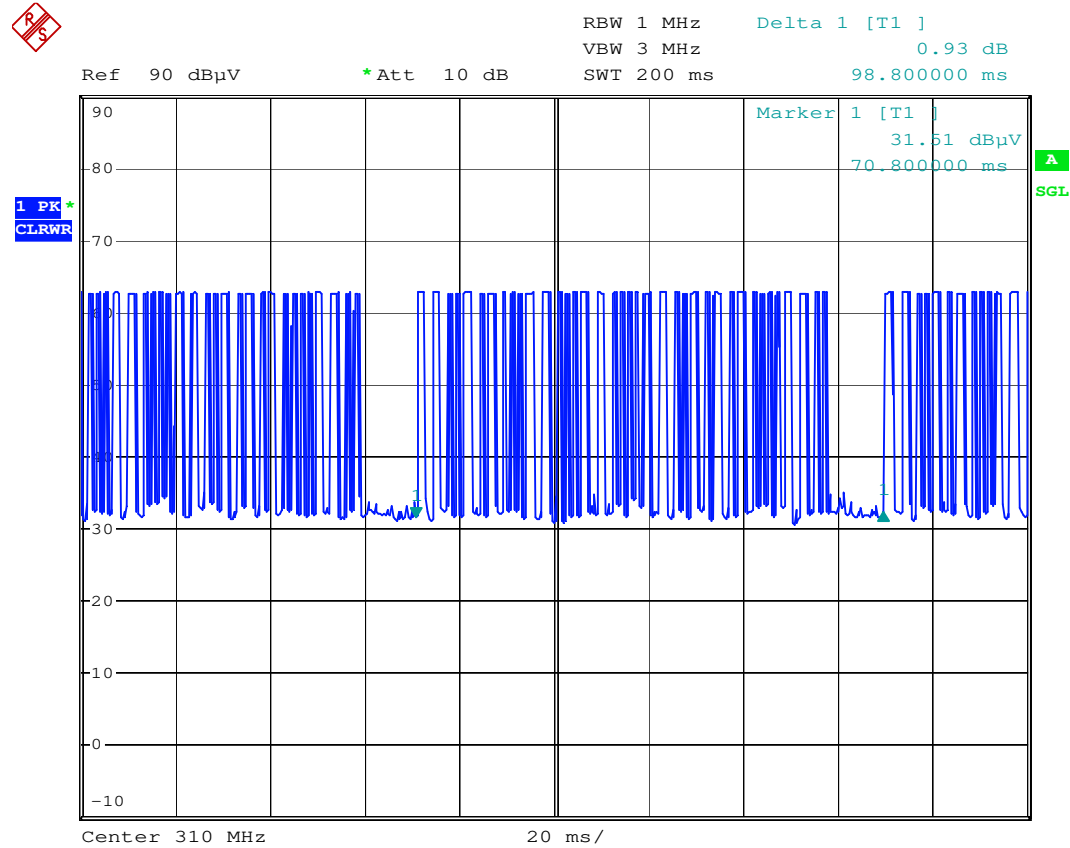


Detail of Pulse Train

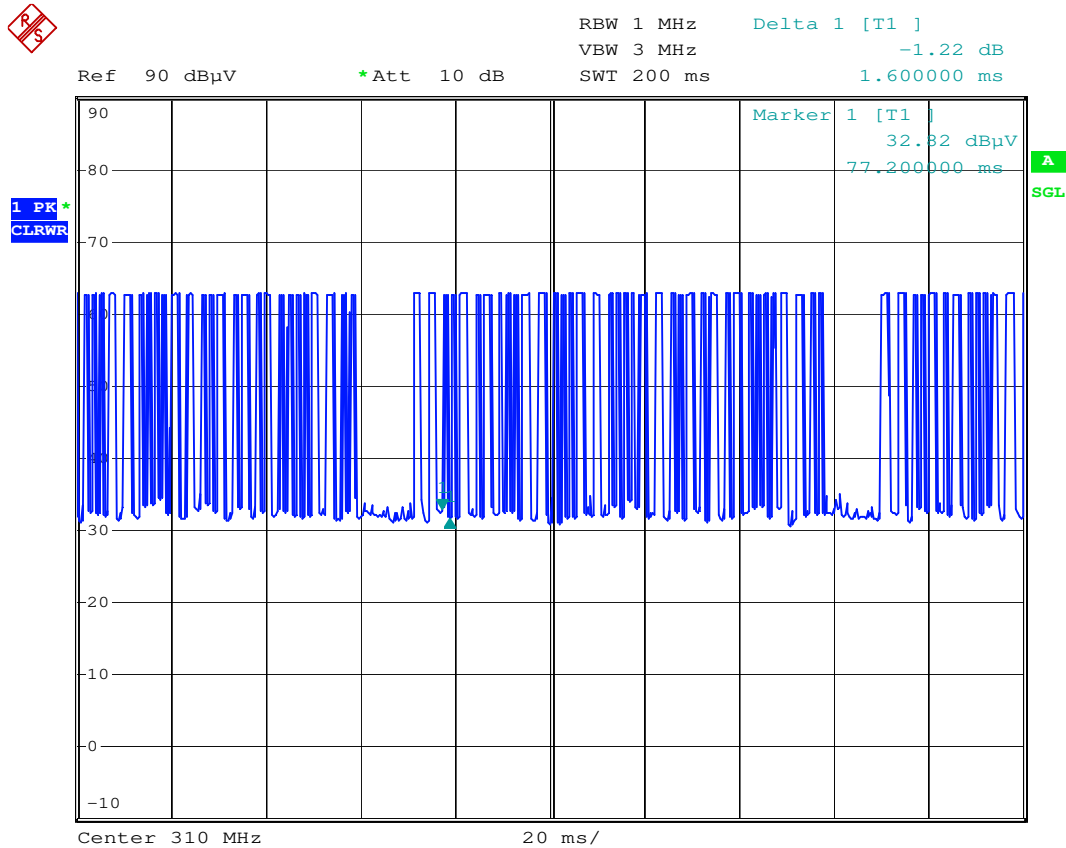
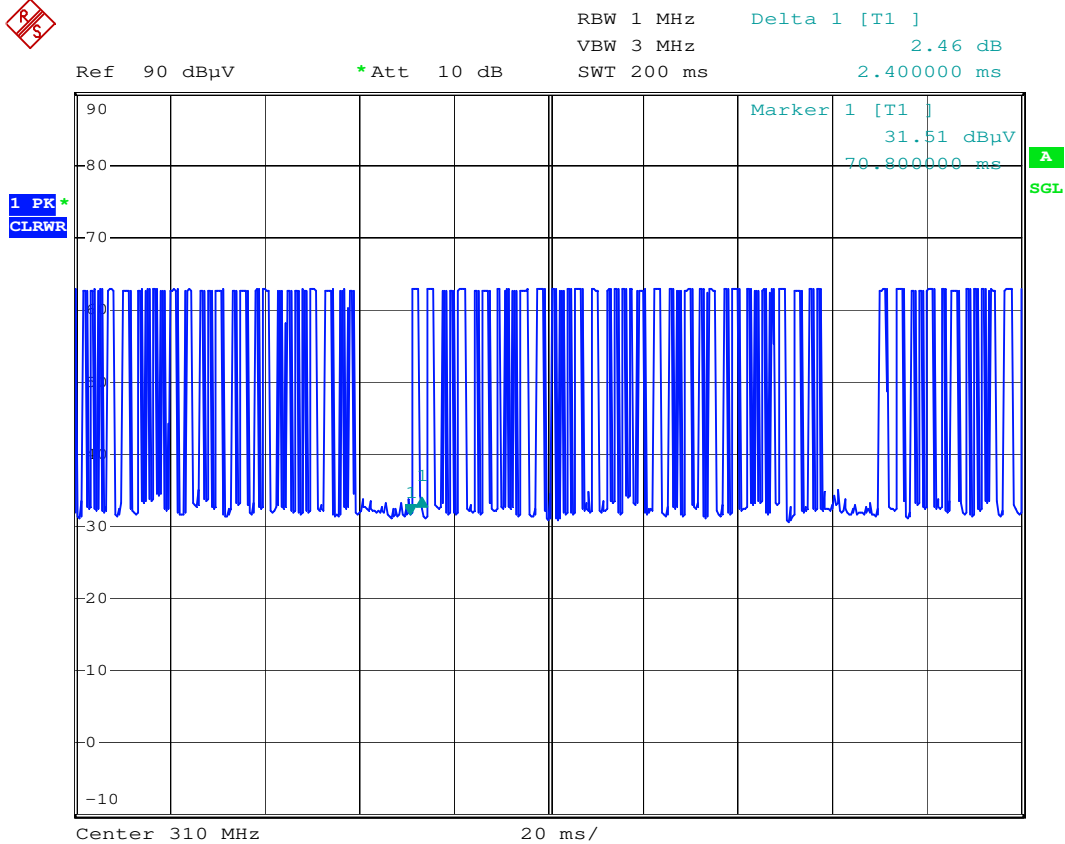


Frequency 310MHz

Full Pulse Train

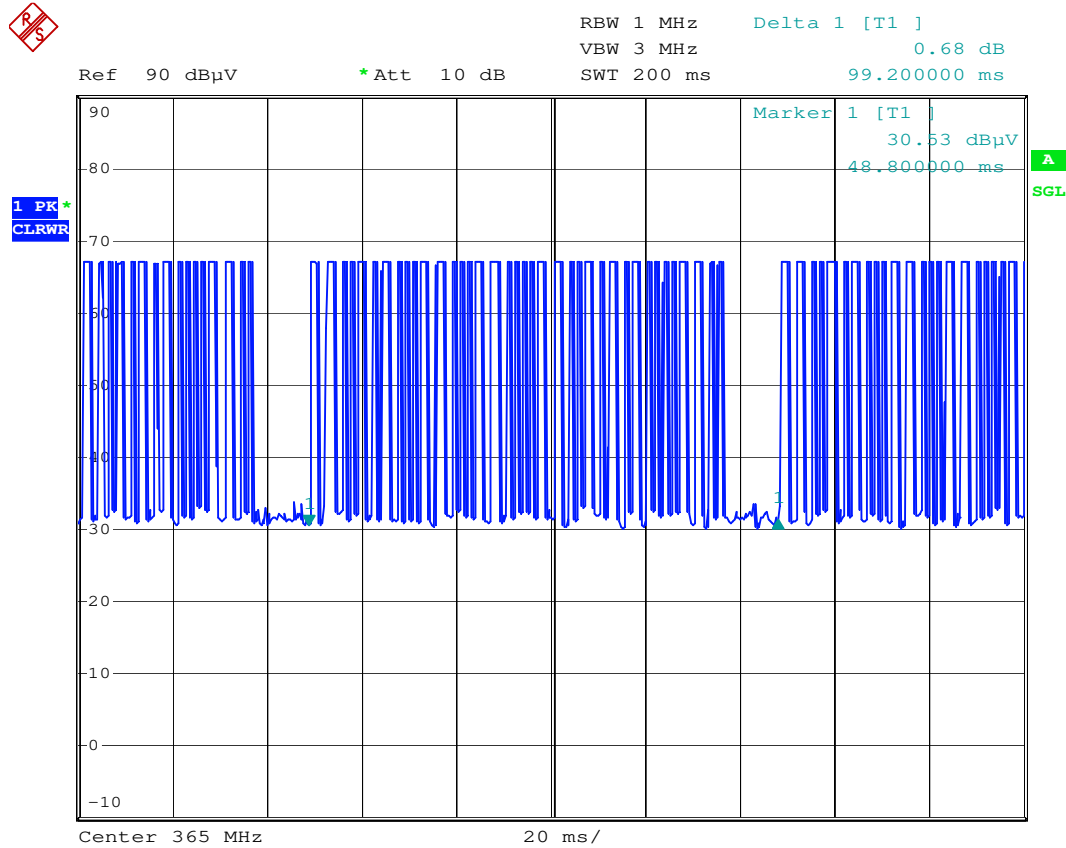


Detail of Pulse Train

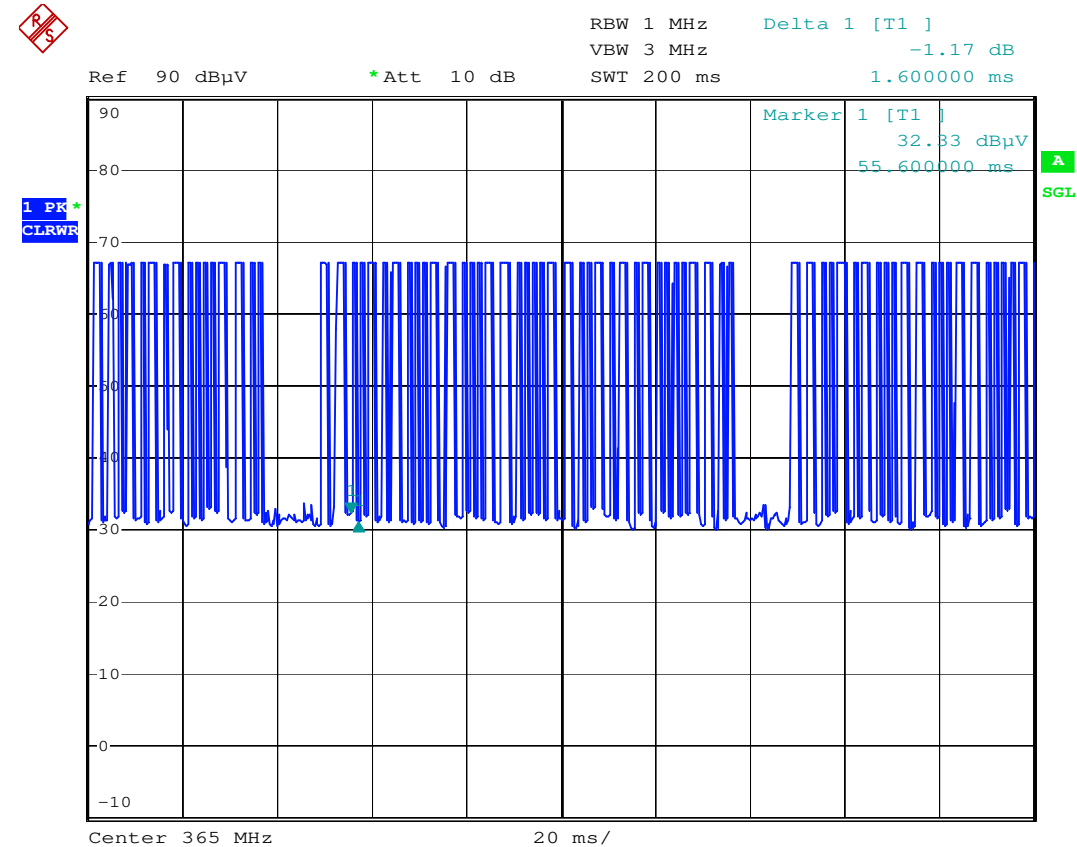
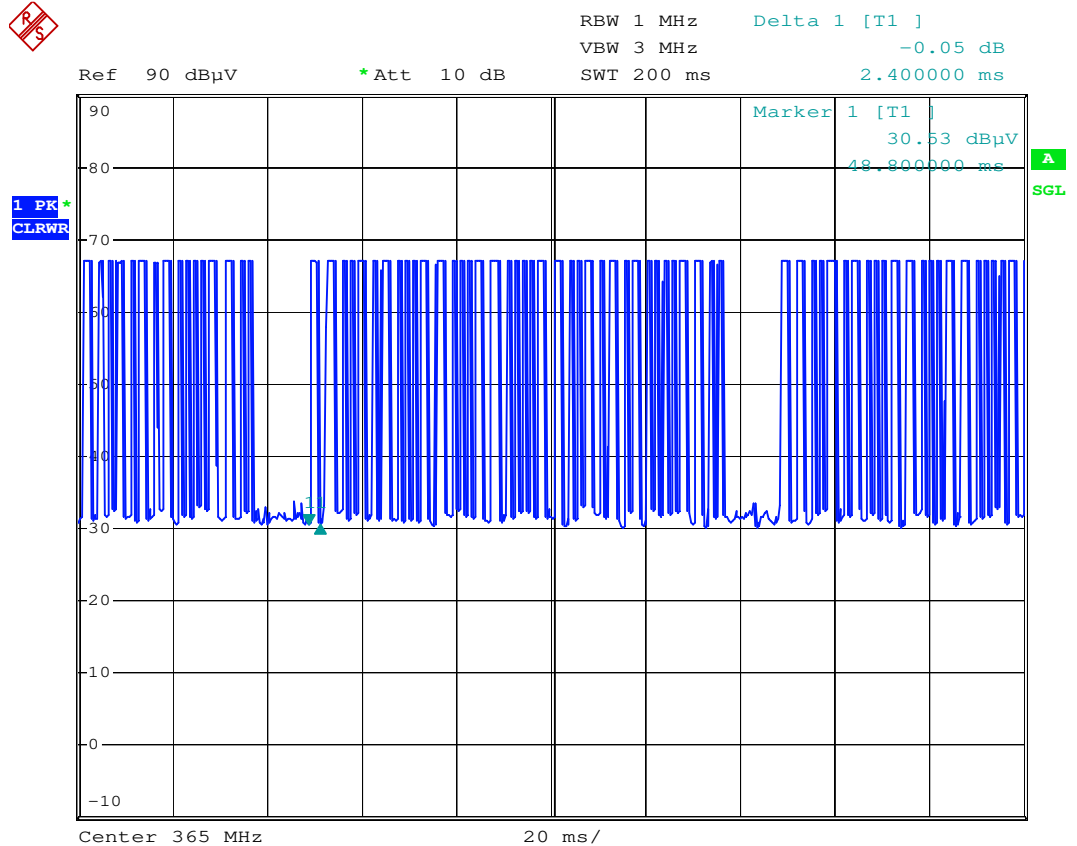


Frequency 365MHz

Full Pulse Train

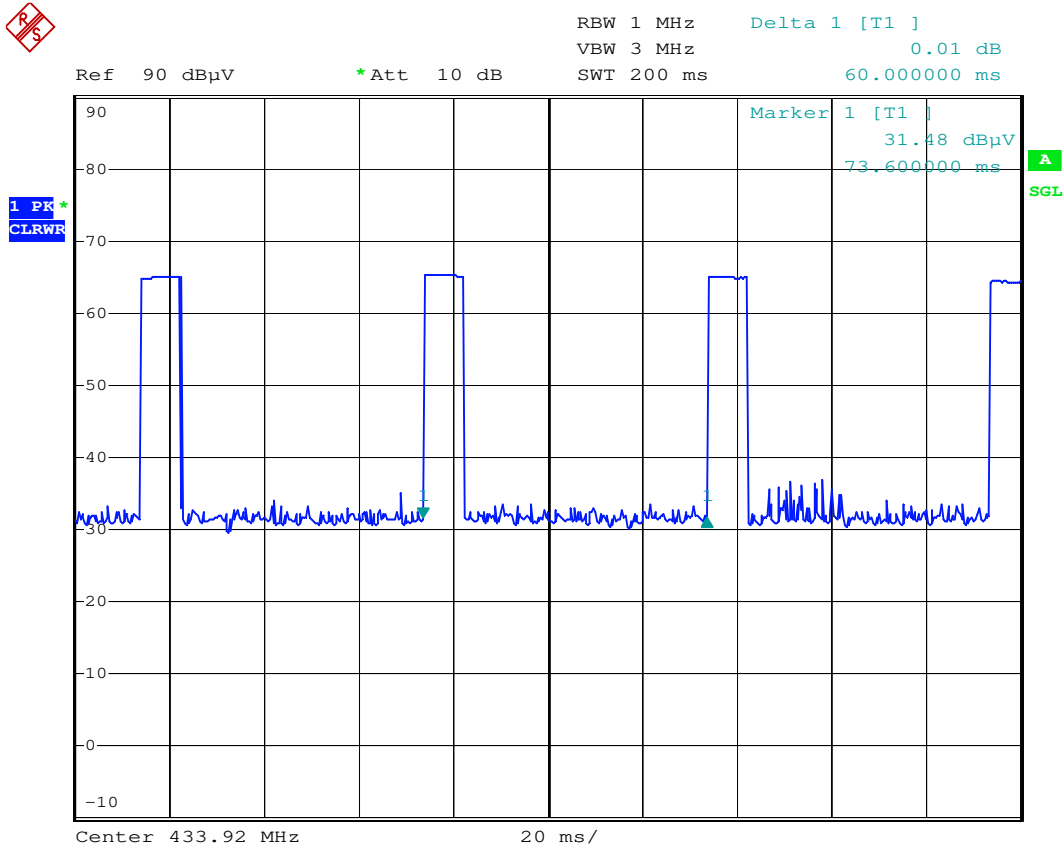


Detail of Pulse Train

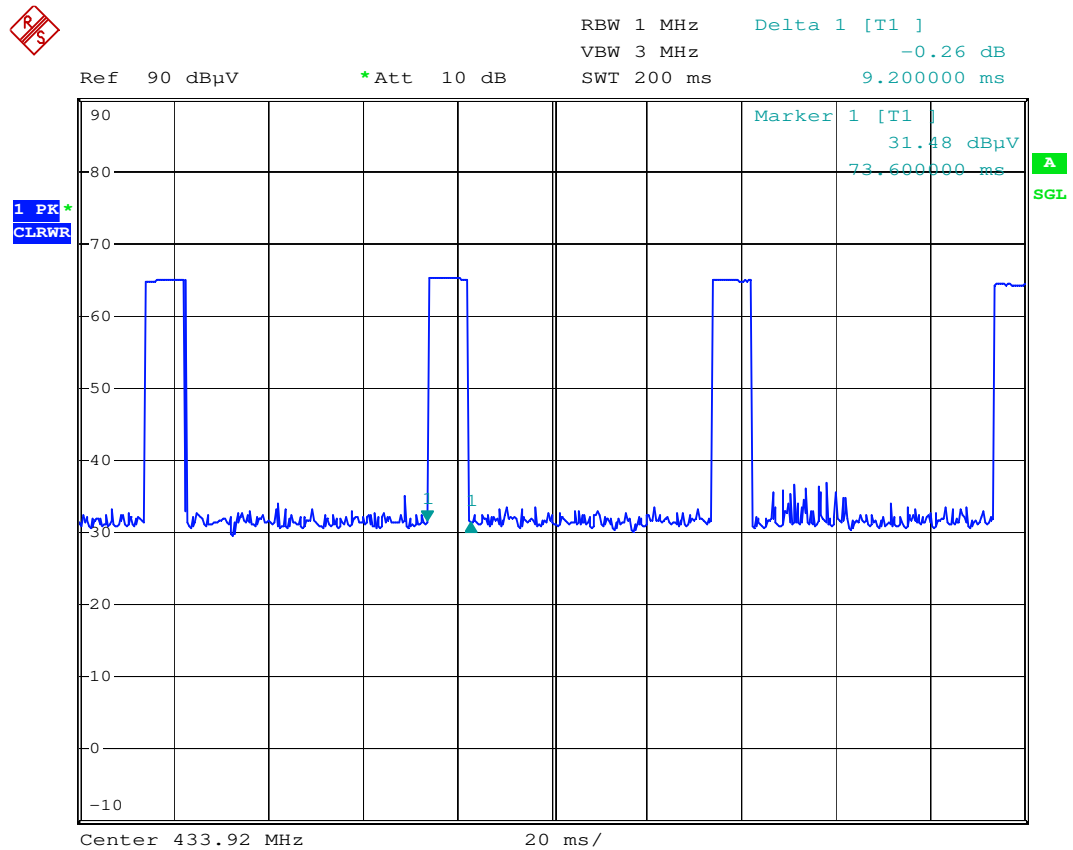


Frequency 433.92MHz

Full Pulse Train



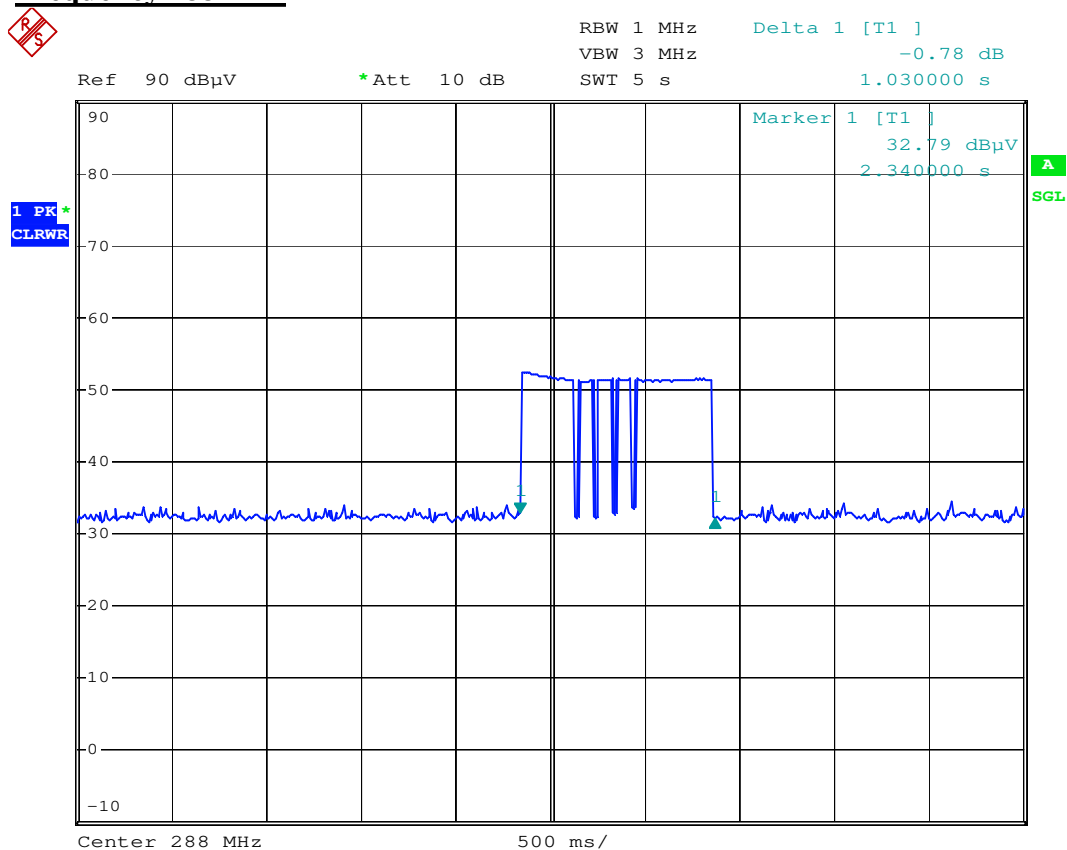
Detail of Pulse Train



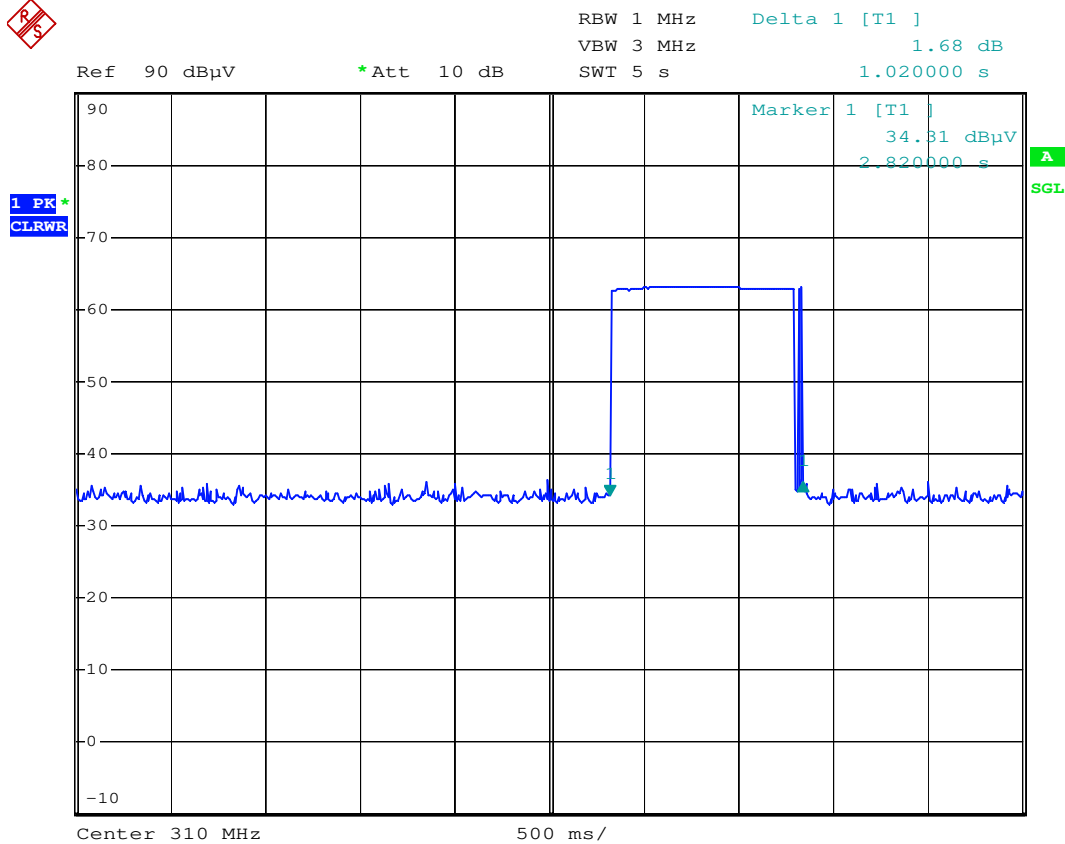
發射時間測試

依據低功率射頻電機技術規範 3.4.2.4 節(1)(A)之規定，在 314-316MHz 及 433-435MHz 作業者：如為手動發射器材者須有一開關，按下並釋放此開關後 5 秒內應自動停止發射。依據低功率射頻電機技術規範 3.4.2.4 節(1)(B)之規定，除(A)之作業頻率以外者：如為手動發射器材須有一開關，按下此開關後 5 秒內應自動停止發射。請參考下圖發射時間測試。

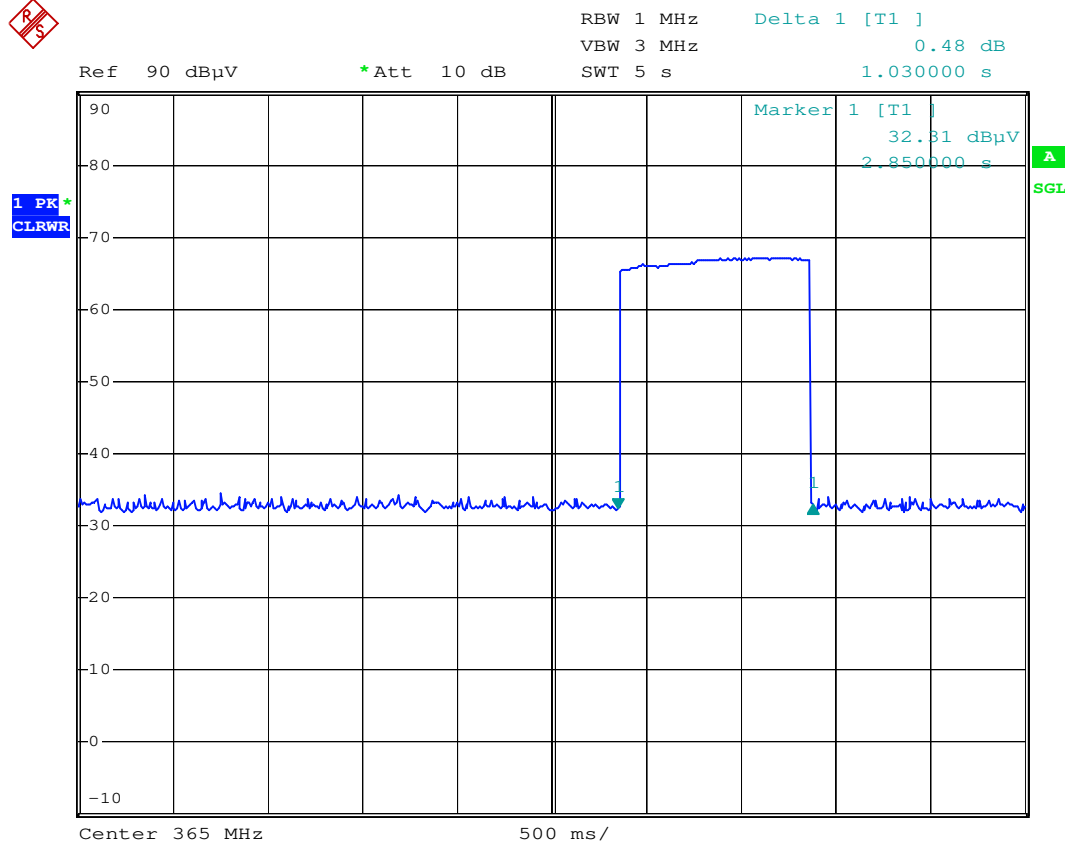
Frequency 288MHz



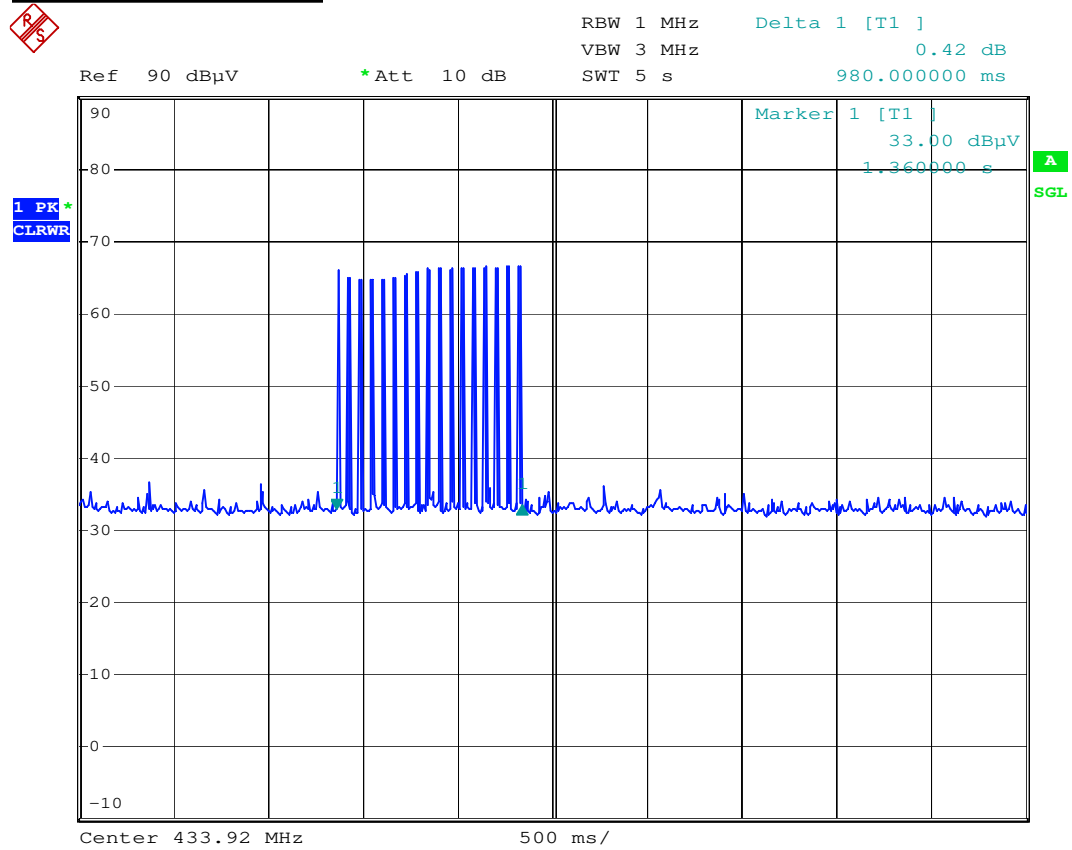
Frequency 310MHz



Frequency 365MHz



Frequency 433.92MHz



4.5 場強輻射之量測結果

a、30MHz~1000MHz

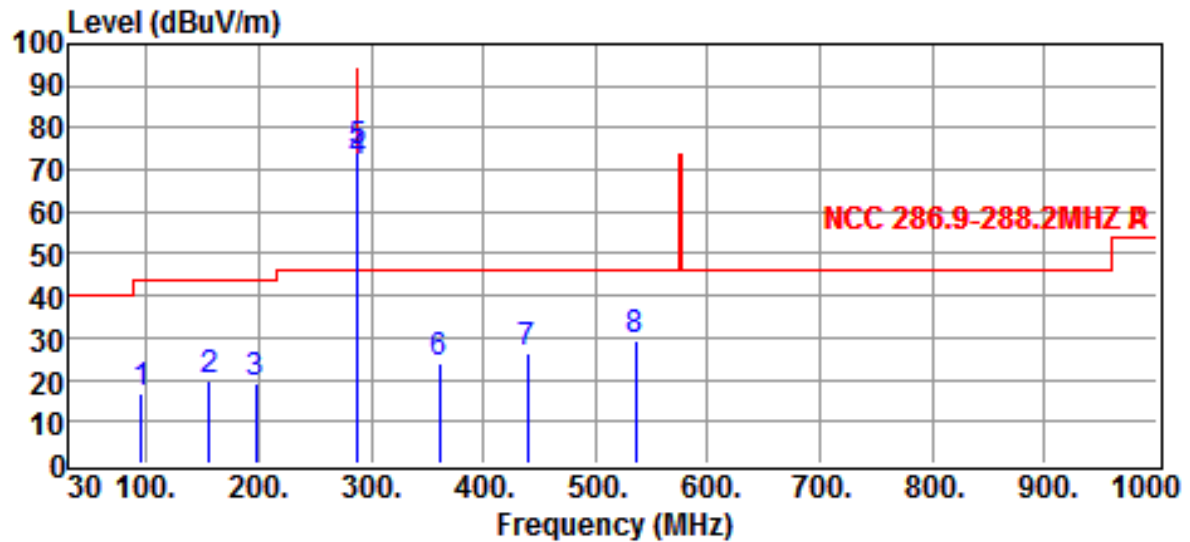
操作模式 : 發射

測試日期 : Sep.27, 2018

測試結果 : 合格

環境溫度 : 25 °C 環境濕度 : 57 %

測試者 : 何仁逸

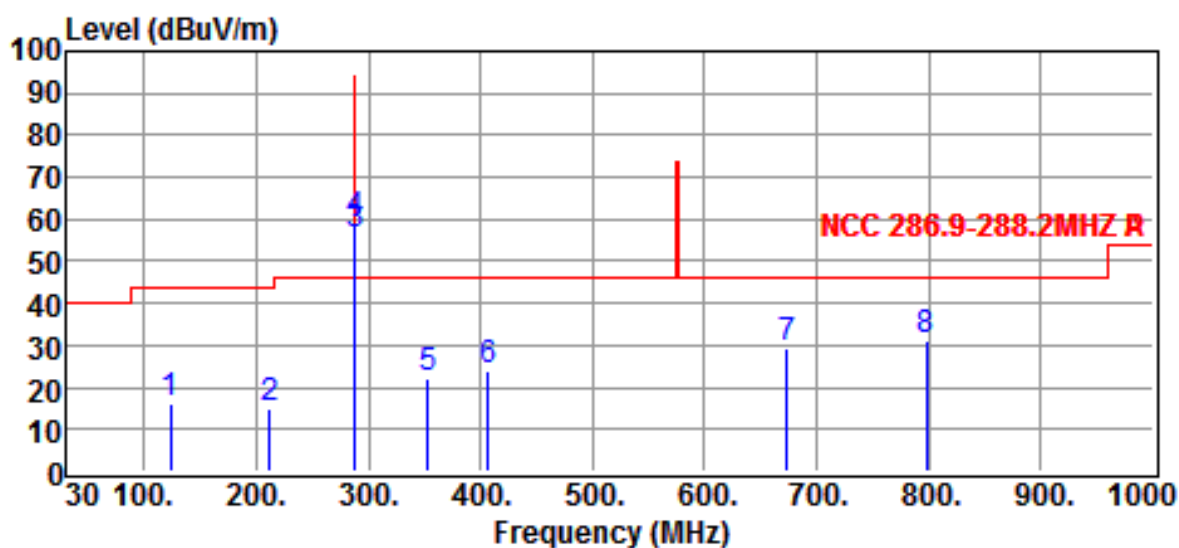


Site : Chamber#2 Date : 2018-09-27
 Limit : NCC 286.9-288.2MHz P Ant. Pol. : HORIZONTAL
 EUT : HomeLink 5 Universal Garage Door Opener(Wireless)
 Model : UAHL5B
 Power Rating : DC13.5V(Power from DC Supply) Temp. : 25 °C
 Engineer : Kazuma Ho Humi. : 57 %
 Test Mode : 288MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
95.9600	28.27	-11.61	16.66	43.50	-26.84	QP
156.1000	28.65	-8.71	19.94	43.50	-23.56	QP
197.8100	28.45	-9.28	19.17	43.50	-24.33	QP
288.0000	----	----	71.86	73.80	-1.94	Average
288.0000	79.17	-4.71	74.46	93.80	-19.34	Peak
360.7700	27.16	-3.14	24.02	46.00	-21.98	QP
439.3400	27.96	-1.82	26.14	46.00	-19.86	QP
535.3700	29.52	-0.32	29.20	46.00	-16.80	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.6)
3. Corrected 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.

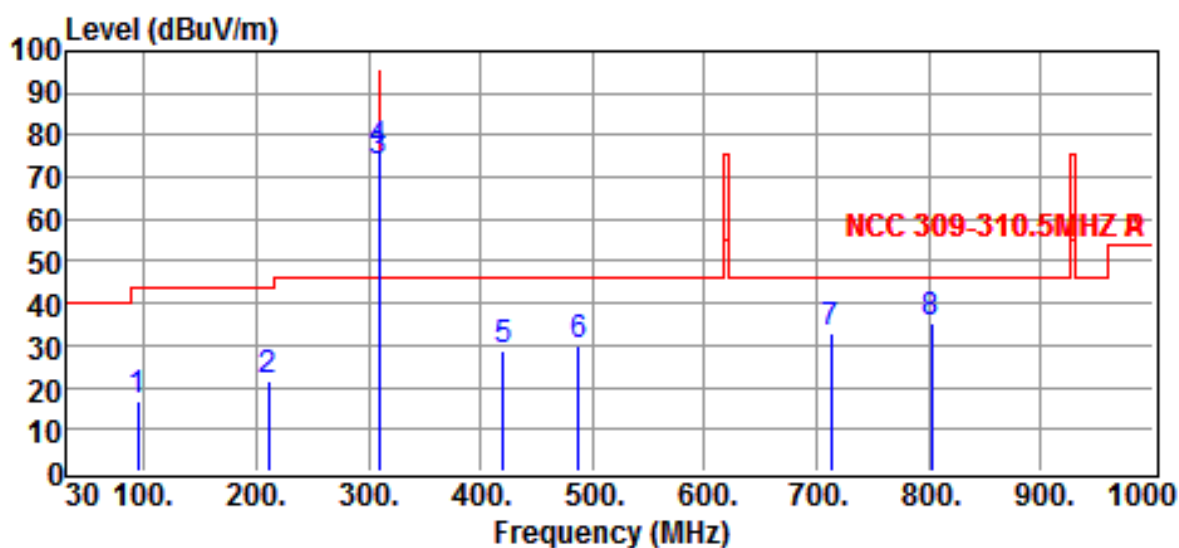


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 286.9-288.2MHz P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :288MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
123.1200	24.87	-8.92	15.95	43.50	-27.55	QP
212.3600	22.81	-7.67	15.14	43.50	-28.36	QP
288.0000	----	----	56.40	73.80	-17.40	Average
288.0000	63.71	-4.71	59.00	93.80	-34.80	Peak
353.0100	25.25	-3.36	21.89	46.00	-24.11	QP
407.3300	26.20	-2.19	24.01	46.00	-21.99	QP
673.1100	26.65	2.59	29.24	46.00	-16.76	QP
797.2700	26.96	4.13	31.09	46.00	-14.91	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.6)
3. Corrected 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.

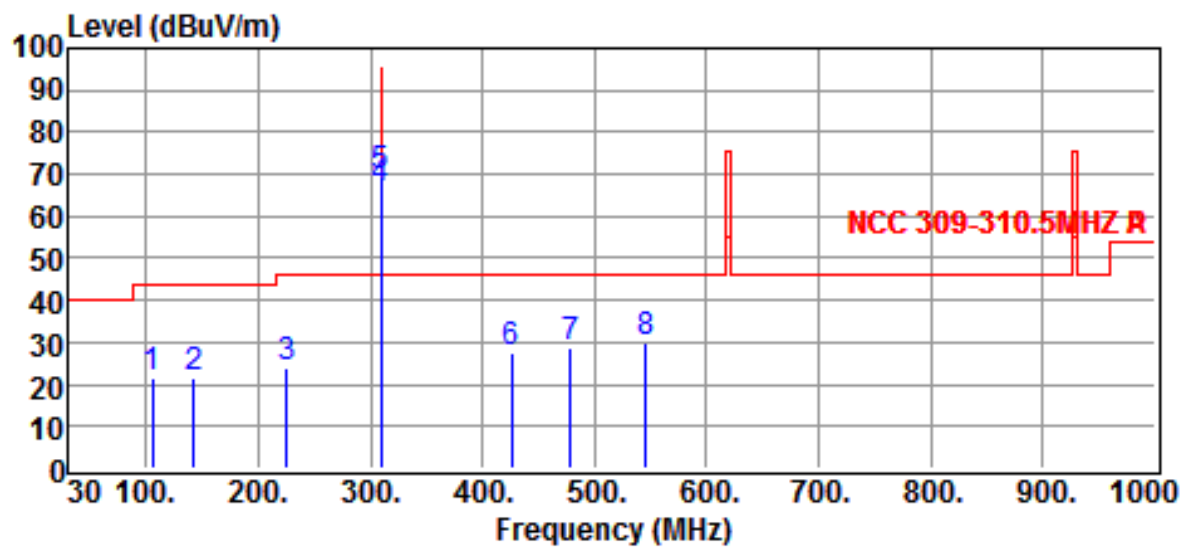


Site	:Chamber#2	Date	:2018-09-27
Limit	:NCC 309-310.5MHz P	Ant. Pol.	:HORIZONTAL
EUT	:HomeLink 5 Universal Garage Door Opener(Wireless)		
Model	:UAHL5B		
Power Rating	:DC13.5V(Power from DC Supply)	Temp.	:25 °C
Engineer	: Kazuma Ho	Humi.	:57 %
Test Mode	:310MHz		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
94.0200	28.69	-11.91	16.78	43.50	-26.72	QP
211.3900	29.13	-7.59	21.54	43.50	-21.96	QP
310.0000	----	----	73.60	75.30	-1.70	Average
310.0000	80.34	-4.04	76.30	95.30	-19.00	Peak
419.9400	31.14	-2.14	29.00	46.00	-17.00	QP
487.8400	30.95	-1.08	29.87	46.00	-16.13	QP
712.8800	29.91	2.90	32.81	46.00	-13.19	QP
802.1200	31.32	4.26	35.58	46.00	-10.42	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.7)
3. Corrected 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.

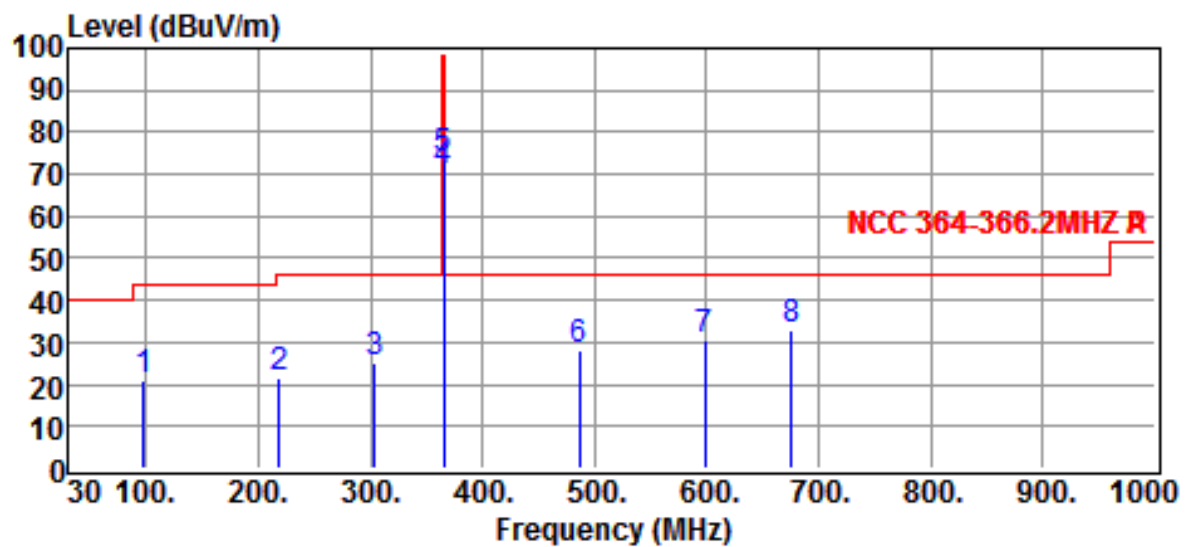


Site	:Chamber#2	Date	:2018-09-27
Limit	:NCC 309-310.5MHz P	Ant. Pol.	:VERTICAL
EUT	:HomeLink 5 Universal Garage Door Opener(Wireless)		
Model	:UAHL5B		
Power Rating	:DC13.5V(Power from DC Supply)	Temp.	:25 °C
Engineer	: Kazuma Ho	Humi.	:57 %
Test Mode	:310MHz		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
105.6600	31.59	-10.21	21.38	43.50	-22.12	QP
142.5200	30.01	-8.43	21.58	43.50	-21.92	QP
225.9400	31.84	-8.16	23.68	46.00	-22.32	QP
310.0000	----	----	66.62	75.30	-8.68	Average
310.0000	73.36	-4.04	69.32	95.30	-25.98	Peak
425.7600	29.61	-2.09	27.52	46.00	-18.48	QP
478.1400	29.92	-1.24	28.68	46.00	-17.32	QP
546.0400	30.06	-0.15	29.91	46.00	-16.09	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.7)
3. Corrected 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.

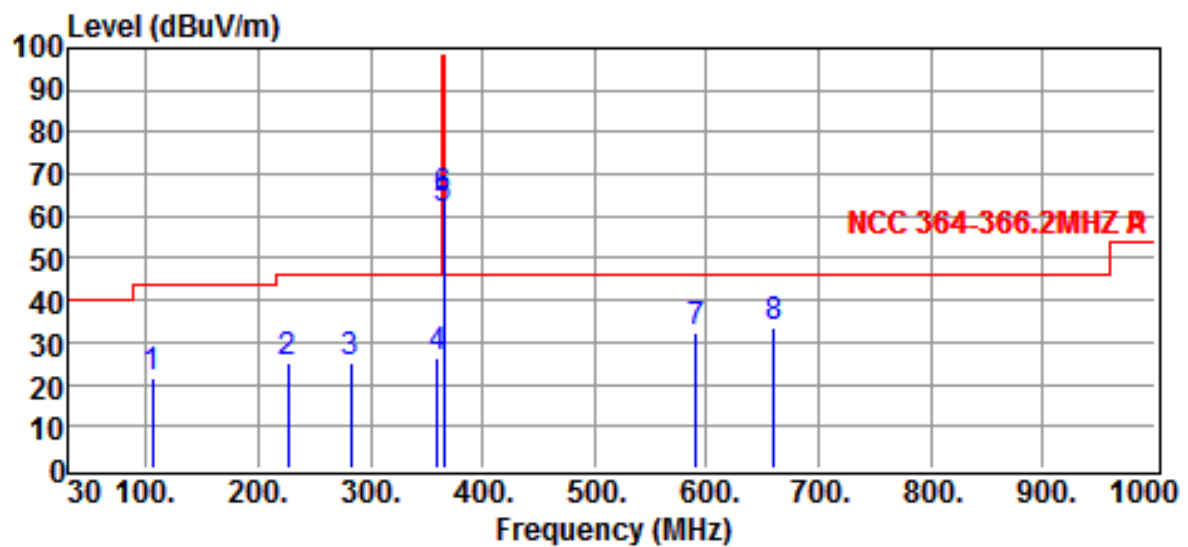


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 364-366.2MHz P Ant. Pol. :HORIZONTAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :365MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
97.9000	32.20	-11.28	20.92	43.50	-22.58	QP
218.1800	29.79	-8.07	21.72	46.00	-24.28	QP
303.5400	29.18	-4.07	25.11	46.00	-20.89	QP
365.0000	----	----	70.80	78.20	-7.40	Average
365.0000	76.50	-3.00	73.50	98.20	-24.70	Peak
485.9000	29.43	-1.12	28.31	46.00	-17.69	QP
598.4200	29.89	0.56	30.45	46.00	-15.55	QP
676.0200	30.05	2.67	32.72	46.00	-13.28	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.7)
3. Corrected 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.

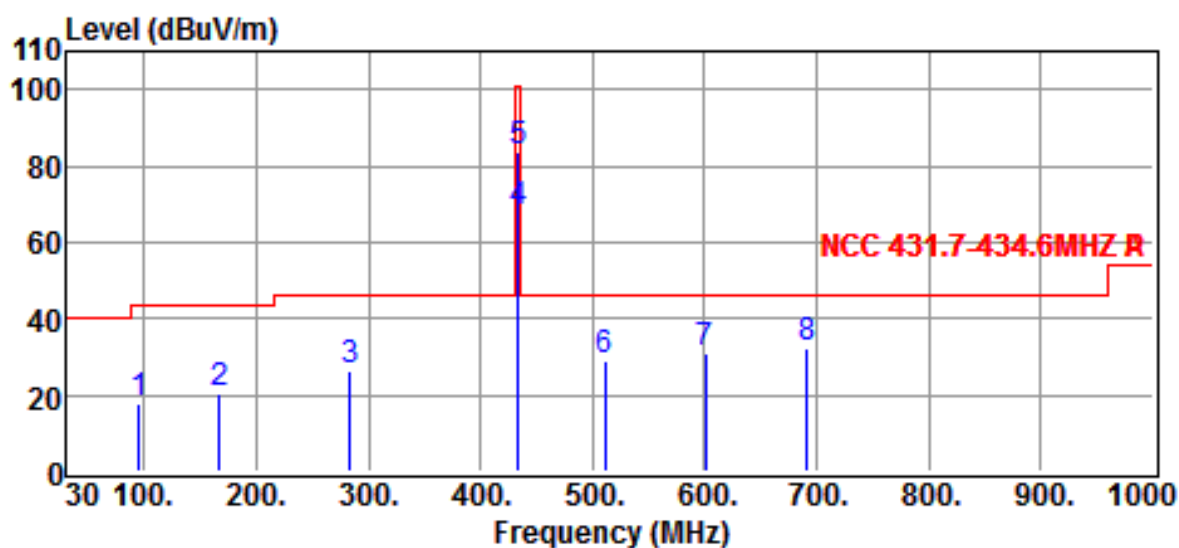


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 364-366.2MHz P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :365MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
105.6600	31.91	-10.21	21.70	43.50	-21.80	QP
226.9100	33.16	-8.15	25.01	46.00	-20.99	QP
282.2000	30.14	-5.05	25.09	46.00	-20.91	QP
359.8000	29.69	-3.16	26.53	46.00	-19.47	QP
365.0000	----	----	61.45	78.20	-16.75	Average
365.0000	67.15	-3.00	64.15	98.20	-34.05	Peak
590.6600	31.70	0.42	32.12	46.00	-13.88	QP
660.5000	31.54	2.22	33.76	46.00	-12.24	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-2.7)
3. Corrected 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.

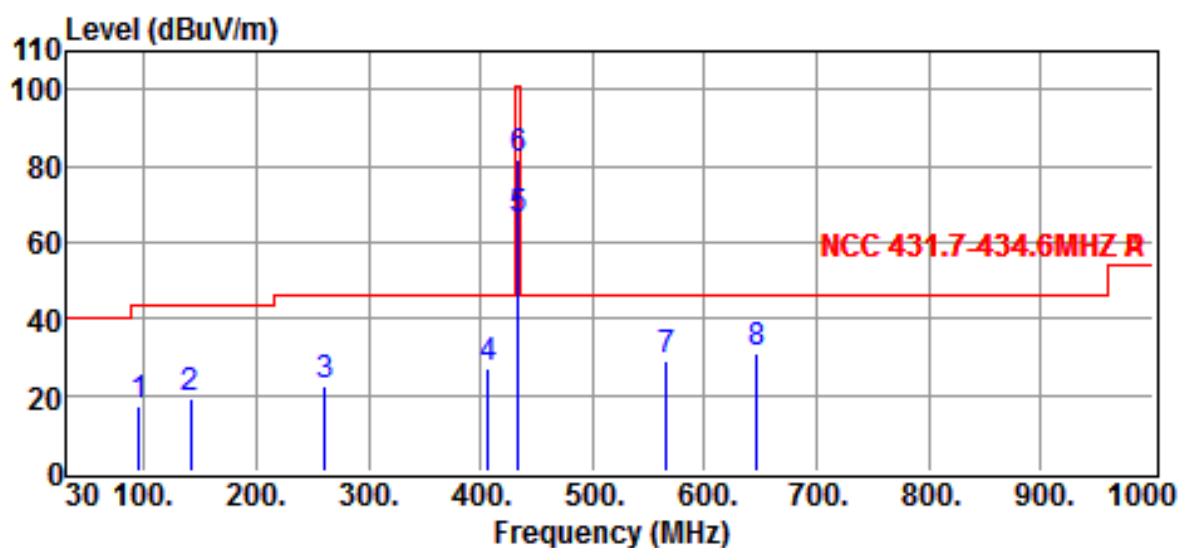


Site :CHAMBER #2 Date :2018-09-19
 Limit :NCC 431.7-434.6MHz P Ant. Pol. :HORIZONTAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :26 °C
 Engineer : Kazuma Ho Humi. :52 %
 Test Mode :433.92MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
95.9600	29.70	-11.61	18.09	43.50	-25.41	QP
166.7700	29.23	-9.00	20.23	43.50	-23.27	QP
284.1400	31.03	-4.93	26.10	46.00	-19.90	QP
433.9200	----	----	67.62	80.80	-12.88	Average
433.9200	85.85	-1.93	83.92	100.80	-16.88	Peak
511.1200	29.62	-0.71	28.91	46.00	-17.09	QP
600.3600	30.21	0.61	30.82	46.00	-15.18	QP
691.5400	29.57	2.75	32.32	46.00	-13.68	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-16.3)
3. Corrected 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.



Site :CHAMBER #2 Date :2018-09-19
 Limit :NCC 431.7-434.6MHz P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :26 °C
 Engineer : Kazuma Ho Humi. :52 %
 Test Mode :433.92MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
95.9600	28.45	-11.61	16.84	43.50	-26.66	QP
141.5500	27.19	-8.41	18.78	43.50	-24.72	QP
260.8600	28.42	-5.85	22.57	46.00	-23.43	QP
407.3300	29.13	-2.19	26.94	46.00	-19.06	QP
433.9200	----	----	65.36	80.80	-15.24	Average
433.9200	83.59	-1.93	81.66	100.80	-19.14	Peak
565.4400	29.13	0.03	29.16	46.00	-16.84	QP
646.9200	29.36	1.81	31.17	46.00	-14.83	QP

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor (-16.3)
3. Corrected 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.

b、1GHz以上

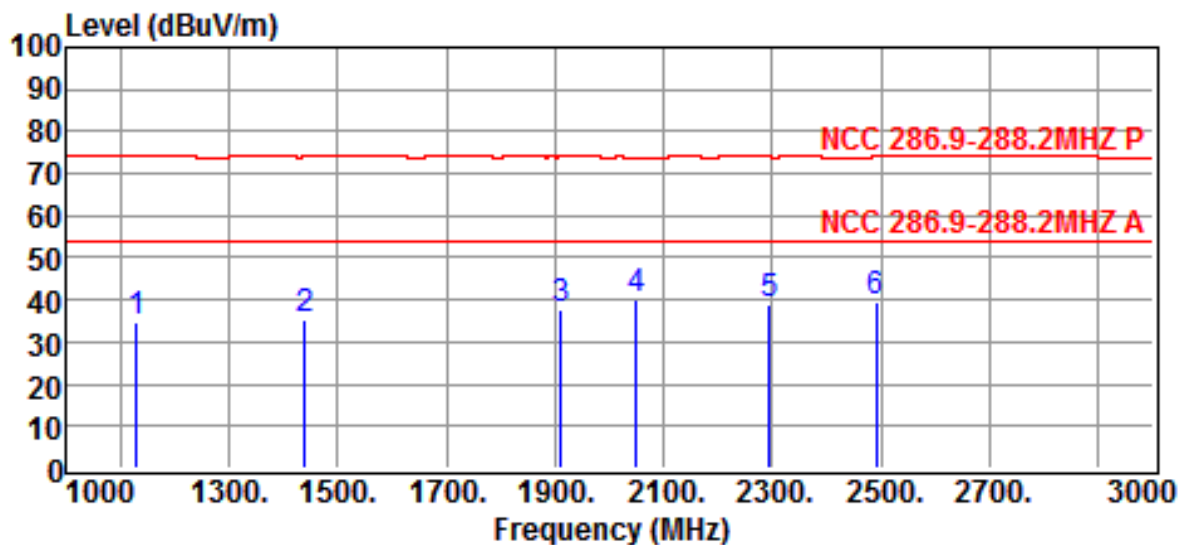
操作模式 : 發射

測試日期 : Sep.27, 2018

環境溫度 : 25 °C 環境濕度 : 57 %

測試結果 : 合格

測試者 : 何仁逸

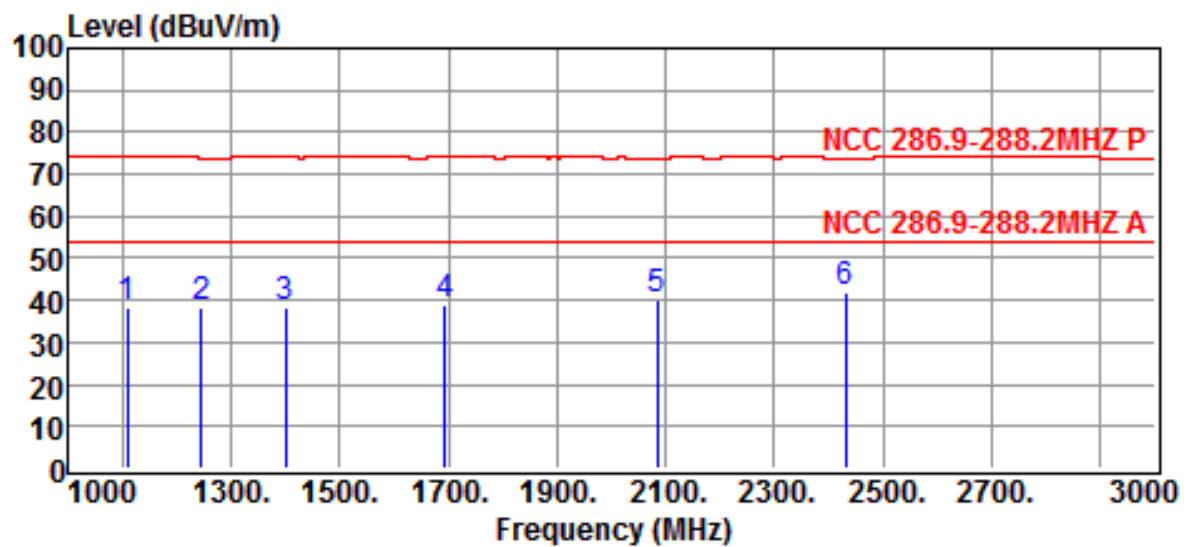


Site : Chamber#2 Date : 2018-09-27
 Limit : NCC 286.9-288.2MHz P Ant. Pol. : HORIZONTAL
 EUT : HomeLink 5 Universal Garage Door Opener(Wireless)
 Model : UAHL5B
 Power Rating : DC13.5V(Power from DC Supply) Temp. : 25 °C
 Engineer : Kazuma Ho Humi. : 57 %
 Test Mode : 288MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1130.0000	45.57	-10.89	34.68	74.00	-39.32	Peak
1440.0000	45.45	-9.95	35.50	74.00	-38.50	Peak
1910.0000	44.52	-6.96	37.56	74.00	-36.44	Peak
2050.0000	46.64	-6.28	40.36	73.80	-33.44	Peak
2295.0000	44.78	-5.72	39.06	74.00	-34.94	Peak
2490.0000	44.67	-5.24	39.43	74.00	-34.57	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

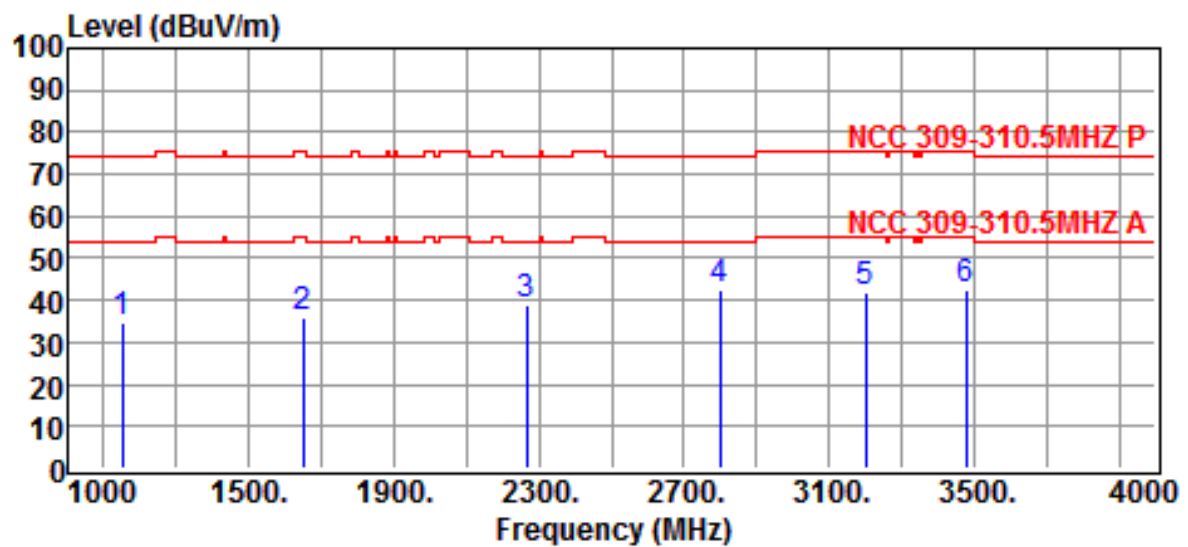


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 286.9-288.2MHZ P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :288MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1110.0000	49.37	-10.96	38.41	74.00	-35.59	Peak
1245.0000	48.55	-10.51	38.04	73.80	-35.76	Peak
1400.0000	48.57	-10.04	38.53	74.00	-35.47	Peak
1695.0000	47.56	-8.41	39.15	74.00	-34.85	Peak
2085.0000	46.60	-6.20	40.40	73.80	-33.40	Peak
2430.0000	47.37	-5.39	41.98	73.80	-31.82	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

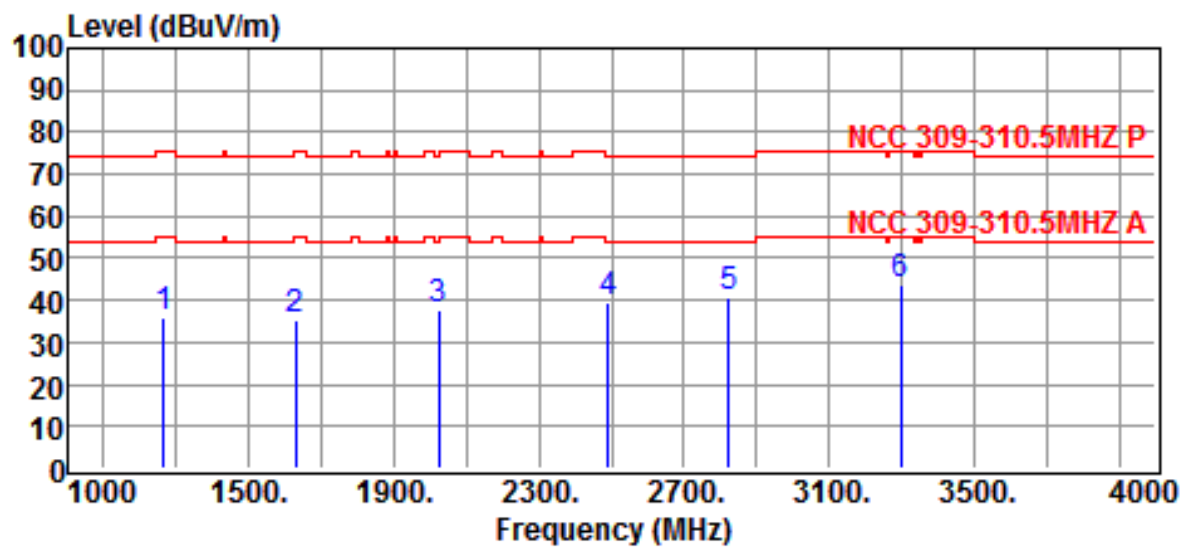


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 309-310.5MHz P Ant. Pol. :HORIZONTAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :310MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1150.0000	45.32	-10.82	34.50	74.00	-39.50	Peak
1650.0000	44.85	-8.74	36.11	75.30	-39.19	Peak
2265.0000	44.84	-5.80	39.04	74.00	-34.96	Peak
2800.0000	46.59	-4.04	42.55	74.00	-31.45	Peak
3200.0000	44.53	-2.64	41.89	75.30	-33.41	Peak
3480.0000	44.19	-1.71	42.48	75.30	-32.82	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

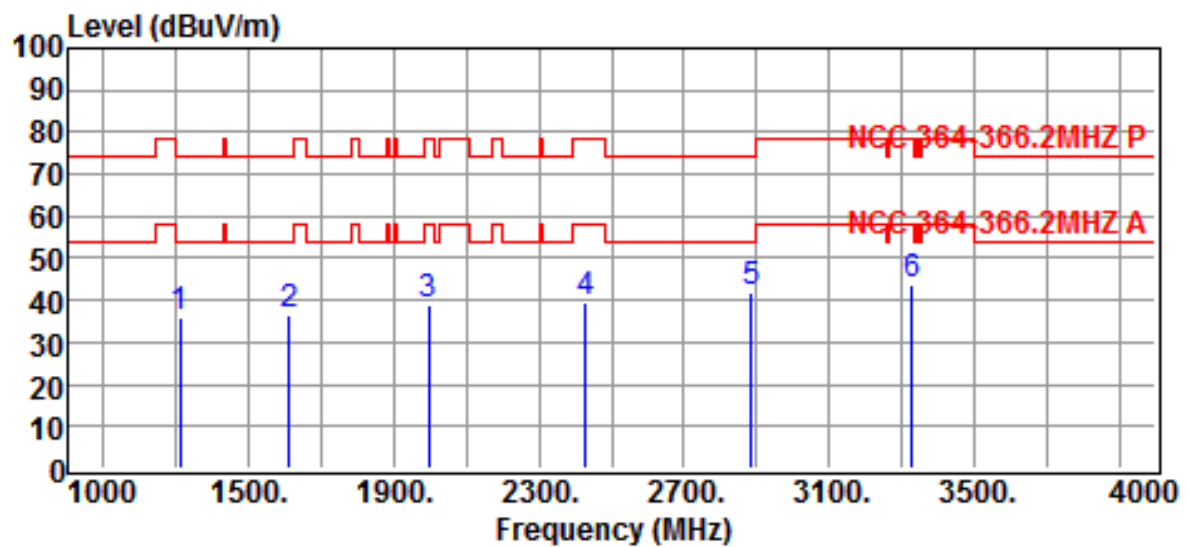


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 309-310.5MHZ P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :310MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1265.0000	46.54	-10.50	36.04	75.30	-39.26	Peak
1630.0000	44.41	-8.84	35.57	75.30	-39.73	Peak
2025.0000	44.03	-6.35	37.68	74.00	-36.32	Peak
2490.0000	44.65	-5.24	39.41	74.00	-34.59	Peak
2825.0000	44.59	-3.97	40.62	74.00	-33.38	Peak
3300.0000	46.29	-2.30	43.99	75.30	-31.31	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

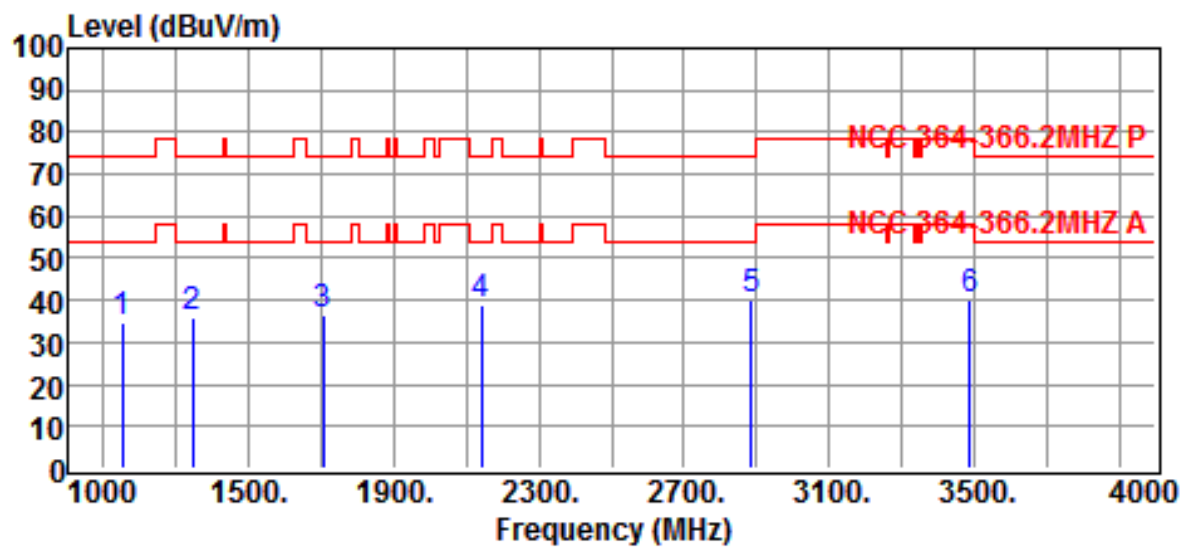


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 364-366.2MHz P Ant. Pol. :HORIZONTAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :365MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1310.0000	46.28	-10.34	35.94	74.00	-38.06	Peak
1610.0000	45.78	-8.97	36.81	74.00	-37.19	Peak
1995.0000	45.60	-6.40	39.20	78.20	-39.00	Peak
2430.0000	45.14	-5.39	39.75	78.20	-38.45	Peak
2885.0000	45.38	-3.71	41.67	74.00	-32.33	Peak
3330.0000	45.70	-2.21	43.49	78.20	-34.71	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

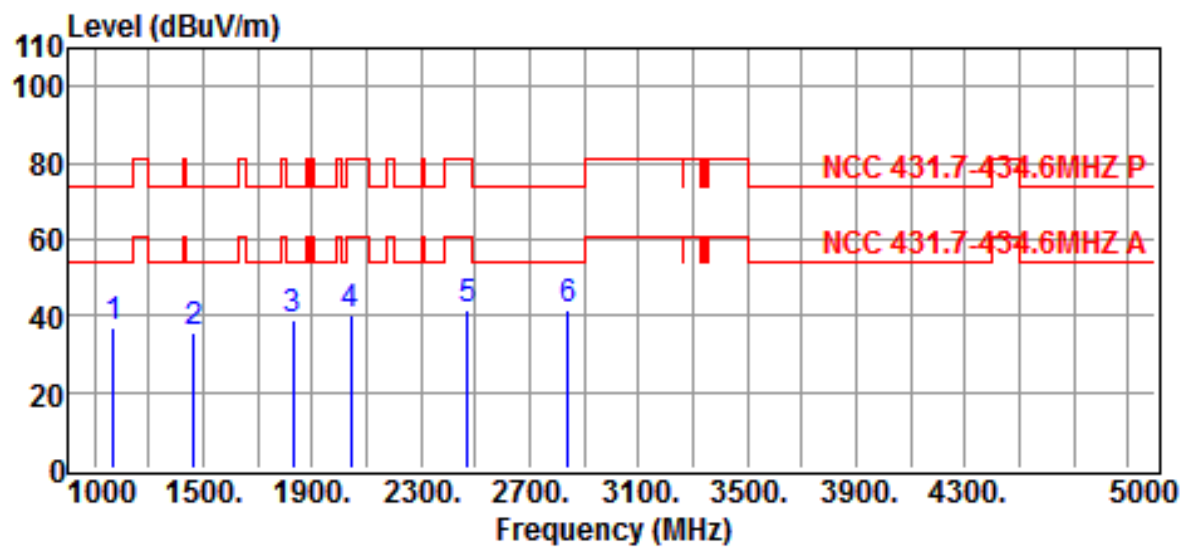


Site :Chamber#2 Date :2018-09-27
 Limit :NCC 364-366.2MHz P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :57 %
 Test Mode :365MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1150.0000	45.54	-10.82	34.72	74.00	-39.28	Peak
1345.0000	46.13	-10.19	35.94	74.00	-38.06	Peak
1705.0000	44.66	-8.37	36.29	74.00	-37.71	Peak
2140.0000	44.91	-6.07	38.84	74.00	-35.16	Peak
2885.0000	43.83	-3.71	40.12	74.00	-33.88	Peak
3490.0000	41.88	-1.70	40.18	78.20	-38.02	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

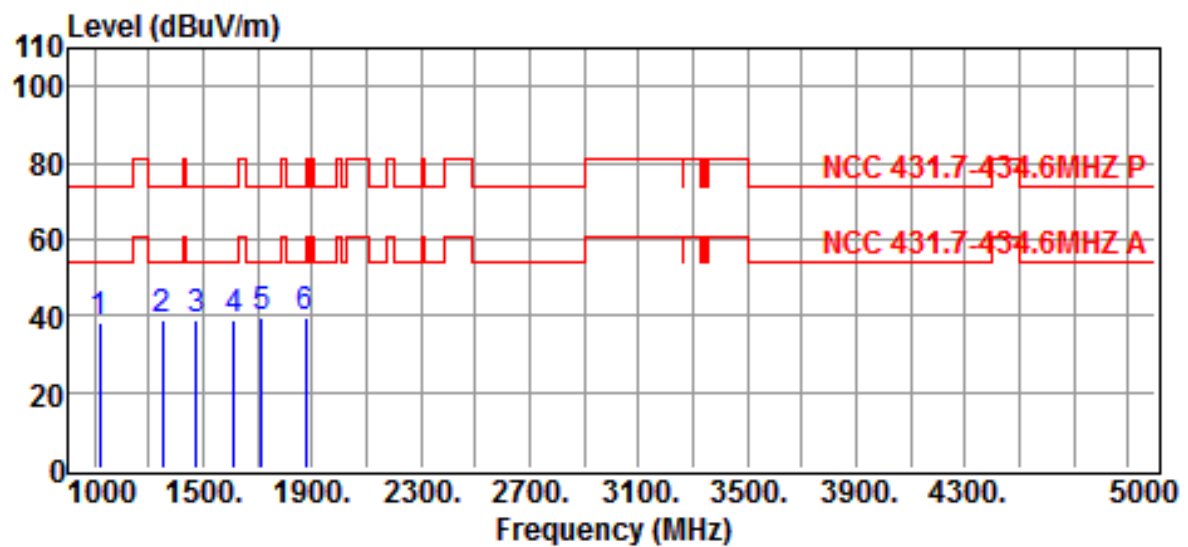


Site :CHAMBER #2 Date :2018-09-06
 Limit :NCC 431.7-434.6MHz P Ant. Pol. :HORIZONTAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :52 %
 Test Mode :433.92MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1170.0000	47.64	-10.74	36.90	74.00	-37.10	Peak
1465.0000	45.19	-9.86	35.33	74.00	-38.67	Peak
1830.0000	46.49	-7.50	38.99	74.00	-35.01	Peak
2040.0000	46.32	-6.31	40.01	80.80	-40.79	Peak
2470.0000	46.60	-5.31	41.29	80.80	-39.51	Peak
2840.0000	45.22	-3.90	41.32	74.00	-32.68	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.



Site :CHAMBER #2 Date :2018-09-06
 Limit :NCC 431.7-434.6MHz P Ant. Pol. :VERTICAL
 EUT :HomeLink 5 Universal Garage Door Opener(Wireless)
 Model :UAHL5B
 Power Rating :DC13.5V(Power from DC Supply) Temp. :25 °C
 Engineer : Kazuma Ho Humi. :52 %
 Test Mode :433.92MHz

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
1120.0000	49.31	-10.89	38.42	74.00	-35.58	Peak
1350.0000	48.86	-10.19	38.67	74.00	-35.33	Peak
1475.0000	48.42	-9.80	38.62	74.00	-35.38	Peak
1610.0000	47.85	-8.97	38.88	74.00	-35.12	Peak
1715.0000	47.83	-8.29	39.54	74.00	-34.46	Peak
1875.0000	46.90	-7.28	39.62	74.00	-34.38	Peak

Note :

1. Result = Reading + Corrected Factor
2. Average Result = Peak Result + Duty Factor ()
3. Corrected 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.

4.6 輻射之測試配置

圖 1：量測頻率低於1GHz之測試配置

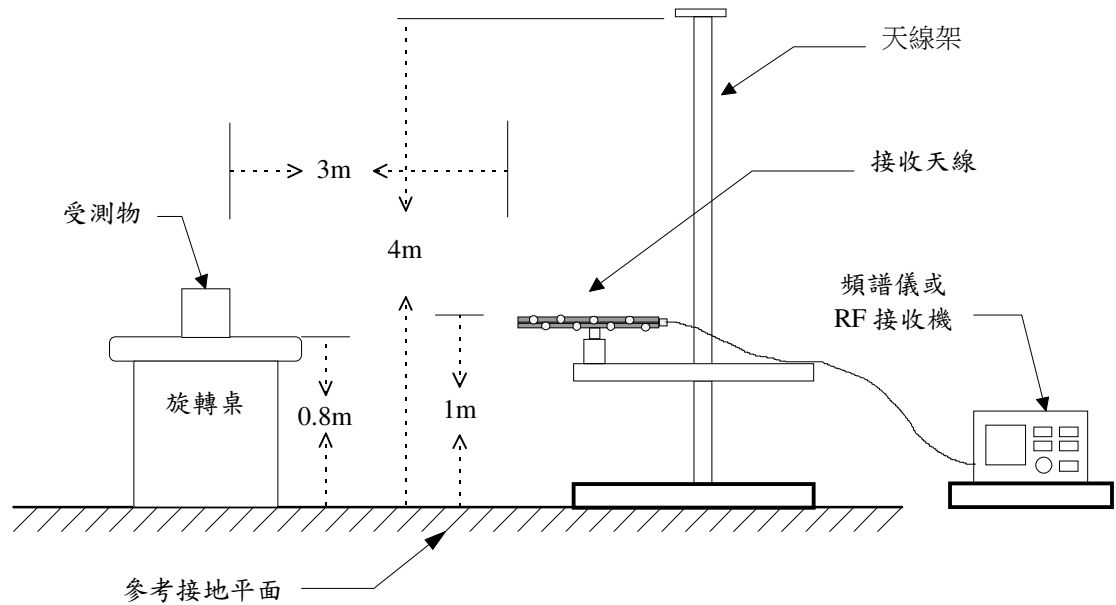
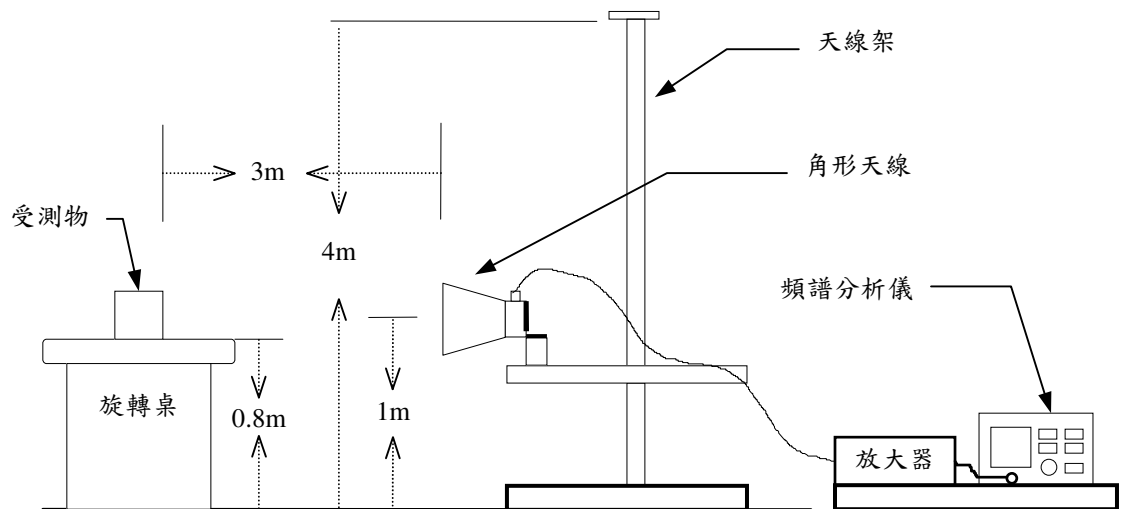
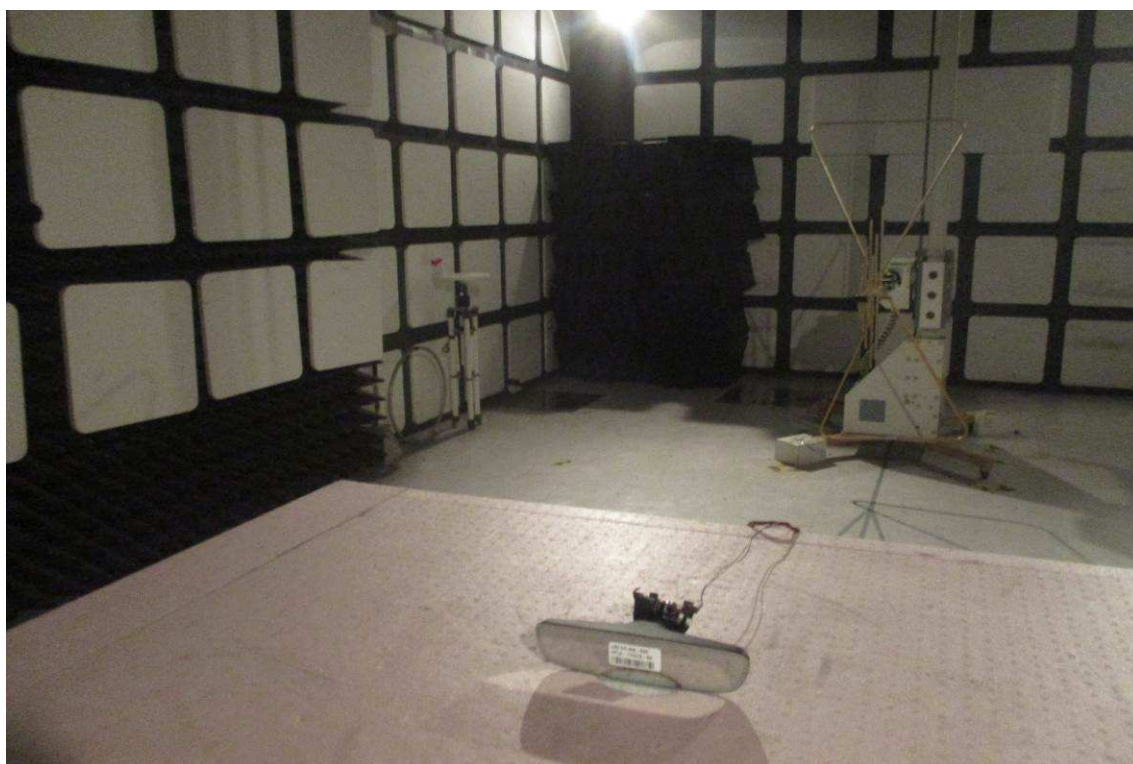


圖 2：量測頻率高於1GHz之測試配置

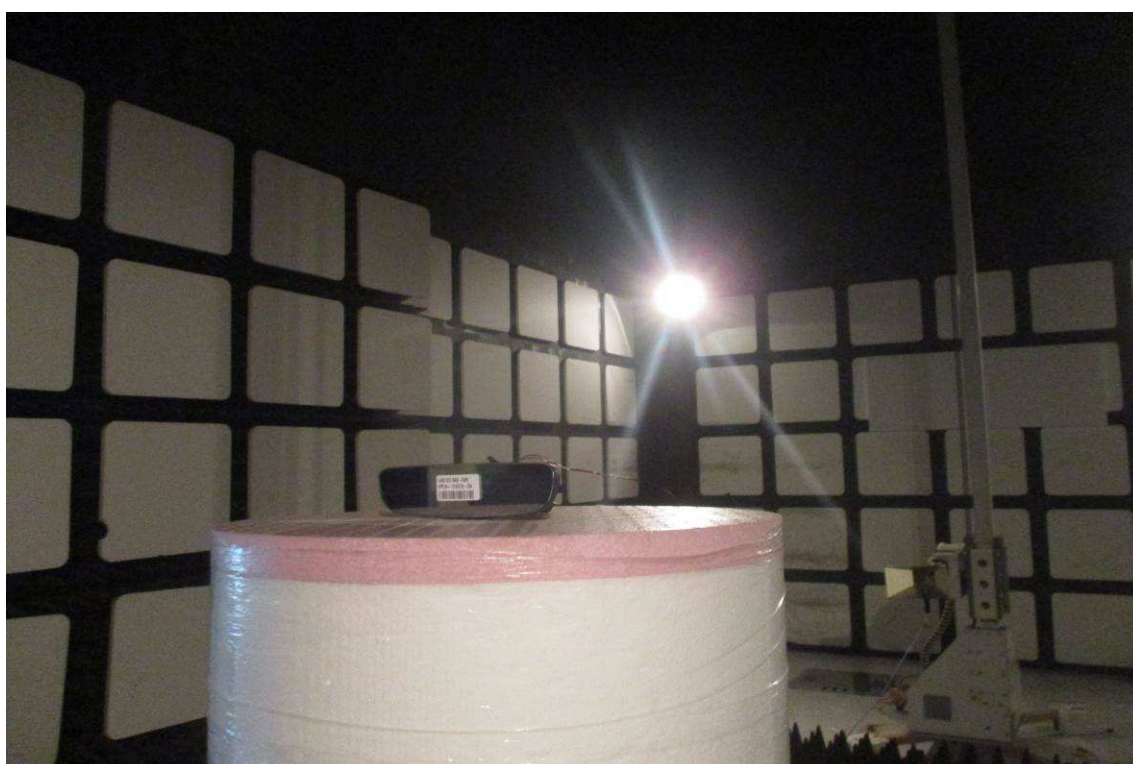
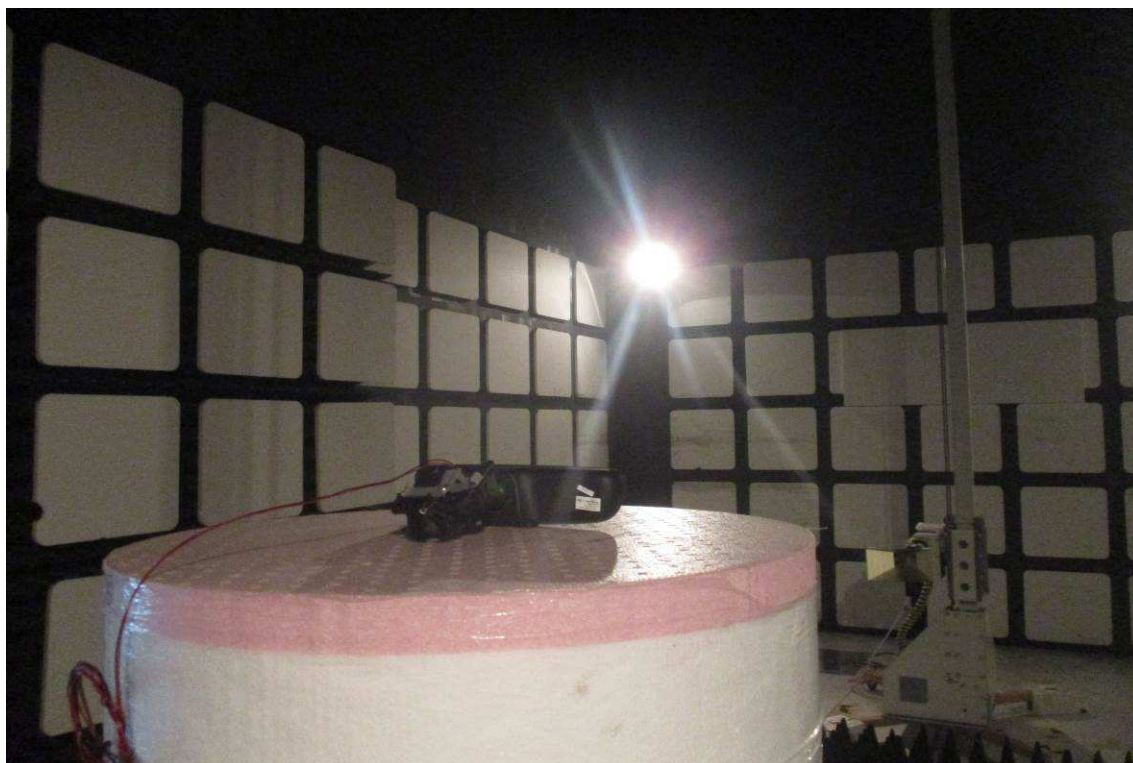


4.7 輻射量測之配置照片

(30MHz~1000MHz)



(Above 1GHz)



5 電源線傳導干擾之量測

5.1 適用標準

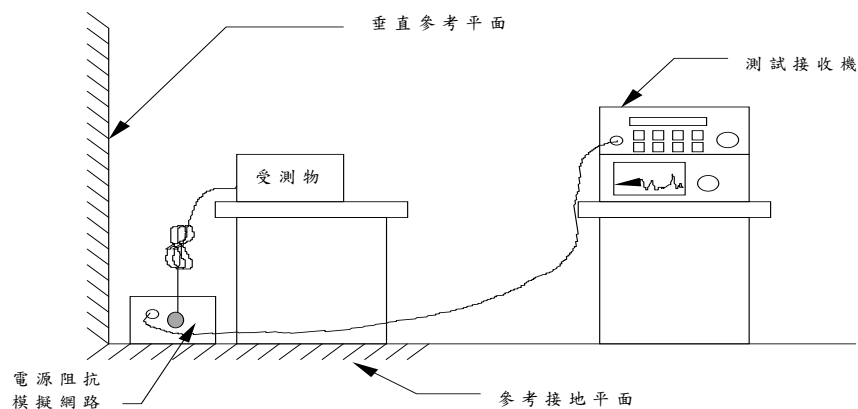
依據低功率射頻電機技術規範2.3節之要求。

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

因本產品使用直流電源,故無需實施此項檢測。

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，依據低功率射頻電機技術規範2.2節之規定，其發射天線應為全固定、半固定式或以獨特之耦合(unique coupling)方式連接機體。製造者可設計供使用者因損壞而替換之天線，但不得設計或使用原認證以外之天線或可供引接各類電纜之標準天線插座或電氣連接頭，如：BNC、F type、N type、M type、UG type、RCA、SMA、SMB...等及其他各類工業或通訊標準接頭。

6.2 天線樣式

此裝置使用固定式PCB天線。

7 頻帶寬度之要求

7.1 適用標準

依據低功率射頻電機技術規範3.4.2.2節之要求，其頻帶寬度限制如下：

發射頻率在70至900 MHz須限制於中心頻率之0.25%以內，發射頻率在900 MHz以上者，須限制於中心頻率之0.5%以內。頻寬係由低於經調變之主波20 dB點求取。

7.2 測試儀器

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	ESU 40	2017/11/15	2018/11/14

7.3 測試結果

測試日期 : Sep.19, 2018
測試結果 : 合格

環境溫度 : 26 °C

環境溼度 : 52 %
測試者 : 何仁逸

測試結果:

Frequency 288MHz

$288 \text{ MHz} \times 0.25\% = 720\text{KHz}$

20dB頻寬為 43 kHz。

頻寬43 KHz < 720 KHz

Frequency 310MHz

$310 \text{ MHz} \times 0.25\% = 775\text{kHz}$

20dB頻寬為 36 kHz。

頻寬36 kHz < 775 kHz

Frequency 365MHz

$365 \text{ MHz} \times 0.25\% = 912.5\text{kHz}$

20dB頻寬為43 kHz。

頻寬43 kHz < 912.5 kHz

Frequency 433.92MHz

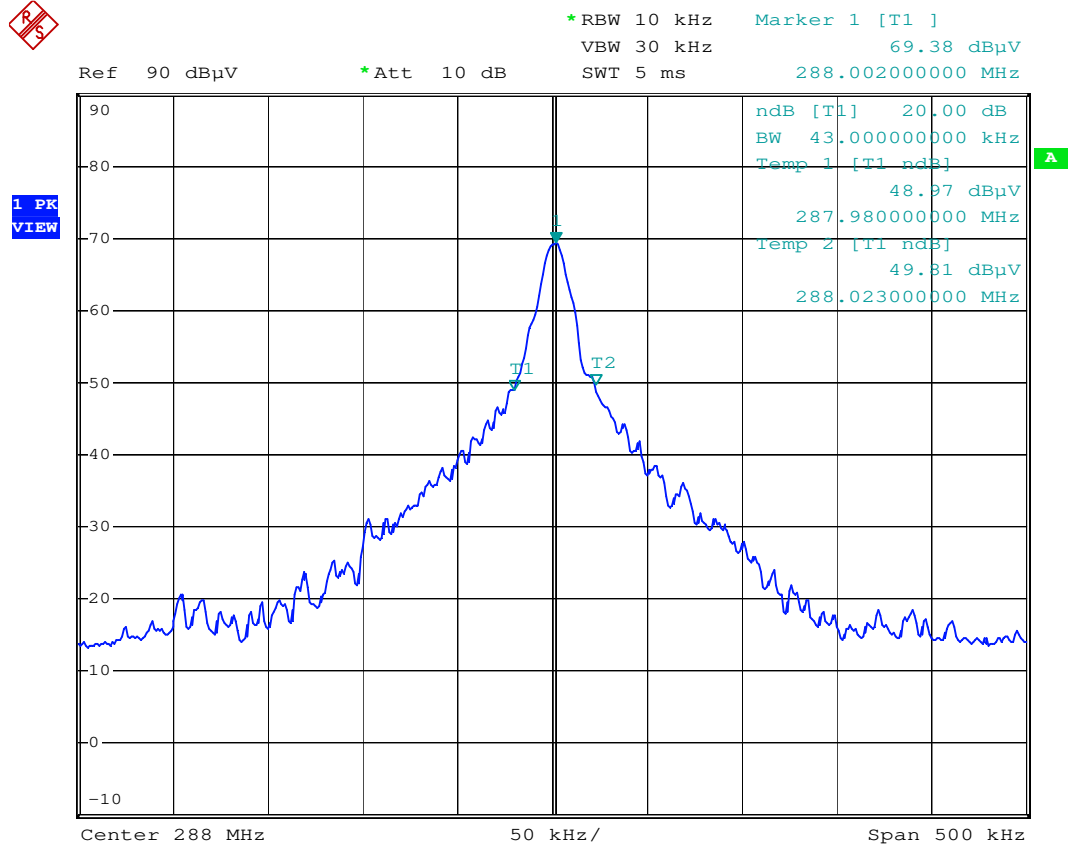
$433.92 \text{ MHz} \times 0.25\% = 1084.8\text{kHz}$

20dB頻寬為145 kHz。

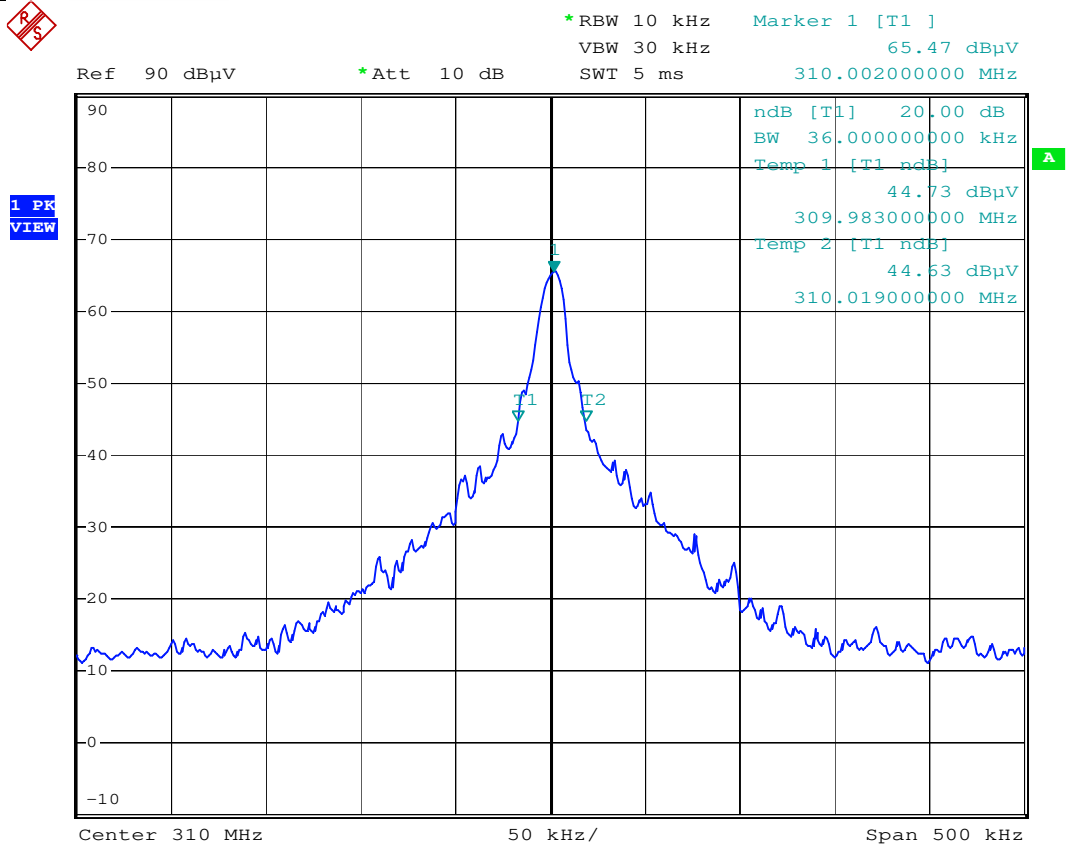
頻寬145 kHz < 1084.8 kHz

- 註：1. 本實驗室頻帶寬度檢驗之擴充不確定度 $\pm 1500\text{Hz}$ 。
2. 繪圖資料請參考下頁。

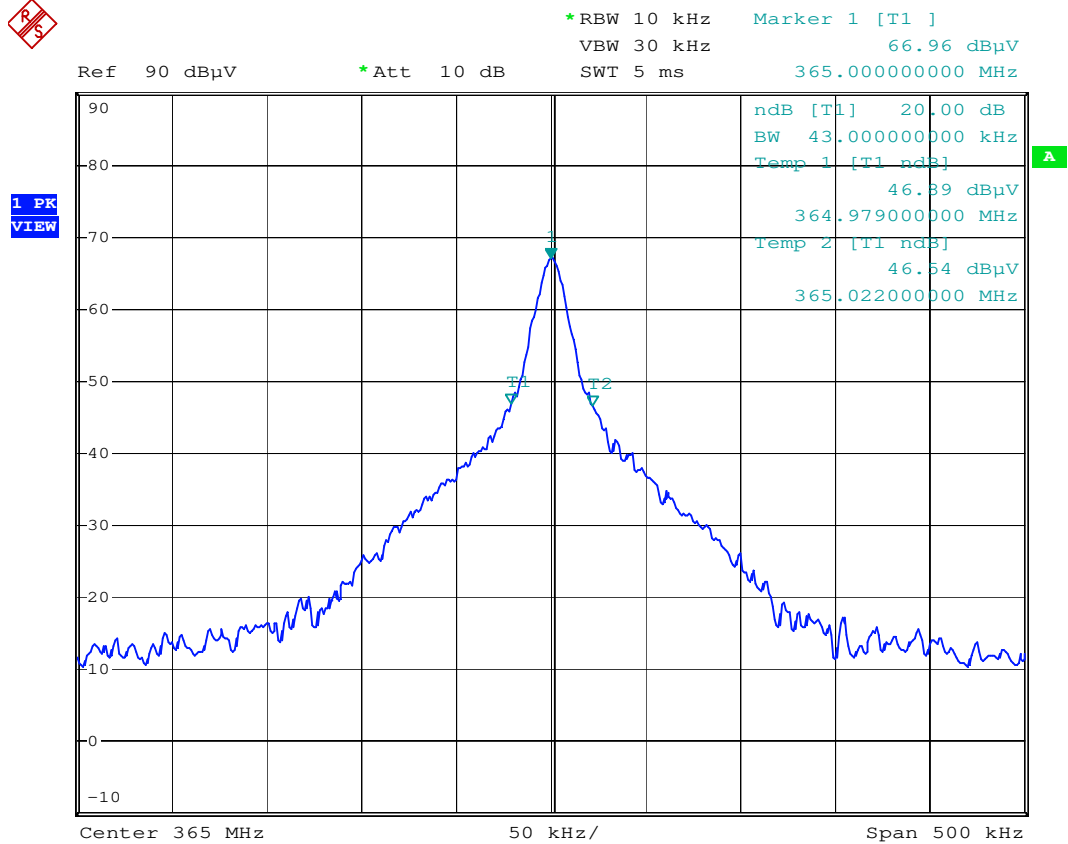
Frequency 288MHz



Frequency 310MHz



Frequency 365MHz



Frequency 433.92MHz

