

低功率射頻電機 檢驗報告

申請者	和泰汽車股份有限公司
申請者地址	台北市中山區松江路121號8~14樓
製造廠商	TOYOTA MOTOR CORPORATION
受檢設備名稱	Smart LF Oscillator (With Wireless Function)
廠牌	TOYOTA
型號	TMLF19T-1
檢驗依據標準	國家通訊傳播委員會低功率射頻電機 技術規範 (LP0002)
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檢驗結果	合格

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實驗室認可編號及範圍：0371 (9 kHz to 325 GHz)

實驗室認可證書有效期限：110年10月31日



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測試報告記錄

申請廠商：和泰汽車股份有限公司

製造廠商：TOYOTA MOTOR CORPORATION

廠牌：TOYOTA

品名：Smart LF Oscillator (With Wireless Function)

型號：TMLF19T-1

檢驗依據標準：國家通訊傳播委員會低功率射頻電機技術規範(LP0002)
規範修訂日期107年01月10日

發射功率(電場強度)：14.66 $\mu\text{V/m}$ (電場強度@300m)

工作頻率及調變方式：125 kHz / ASK

天線規格：N/A

- 備註：1. 本試驗報告中是描述本實驗室以最佳的知識和能力進行試驗，我們的責任僅限於合理與謹慎的試驗，並非確保賣方之法律和/或合同的義務。
2. 本符合性試驗係依據適當的標準及試驗樣品進行測試，本試驗報告的結果僅與測試項目有關，且僅針對受試驗之樣品負責，無法確保產品生產過程中的品質與性能要求。
3. 非經本中心同意，檢驗報告不得摘錄複印使用。（全部複製除外）。

項次	測試項目	適用規範	測試結果	量測設備	結果判定
1	場強輻射	低功率射頻電機技術規範 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	工作頻率範圍之要求	低功率射頻電機技術規範2.7 節	請參閱6.4節	請參閱6.3節	合格
4	天線之要求	低功率射頻電機技術規範 2.2節	請參閱7.2節	----	合格
	以下空白				

測量實驗室負責人：

鄭敦
108/1/26

直接主管：

黃敬瑞
108.11.26

量測員：

許志宏
108.11.26

1 一般資料

1.1 產品描述

- a) 產品型態 : Smart LF Oscillator (With Wireless Function)
- b) 廠 牌 : TOYOTA
- c) 產品型號 : TMLF19T-1
- d) 供應電源 : 12 Vdc

1.2 產品特性

本 Smart LF Oscillator (With Wireless Function) 使用頻率為 125 kHz，調變方式為 ASK。

1.3 測試方法之依據

本測試報告之所有項目皆依據國家通訊傳播委員會低功率射頻電機技術規範以及參考 IEEE ANSI、歐盟 ETSI EN 與美國 EIA、FCC 47 CFR PART 2、KDB 及 ARIB STD-T67 等有關檢驗之規定。

試驗室介紹：財團法人台灣電子檢驗中心電磁相容試驗室通過下列評鑑、認可、登錄與相互認可協議：

- ① ISO/IEC 17025: BSMI, TAF, NCC, NVLAP, ILAC MRA, UL, Compliance
- ② Filing: FCC, Industry Canada, VCCI
- ③ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, ILAC MRA through TAF
- ④ FCC Registration Number: TW0371, TW1112
- ⑤ Industry Canada Site Registration Number: IC 2949A-2

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之2.3節，電源傳導干擾之限制要求如下：

頻率範圍 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

依據國家通訊傳播委員會低功率射頻電機技術規範2.8節之一般限制要求：

頻率 MHz	測試距離 m	限制值 μ V/m
0.009 - 0.490(含)	300	2400/頻率(kHz)
0.490(不含) - 1.705(含)	30	24000/頻率(kHz)
1.705(不含) - 30(不含)	30	30
30(含) - 88(含)	3	100
88(不含) - 216(含)	3	150
216(不含) - 960(含)	3	200
960(不含)以上	3	500

(3) 天線之要求

低功率發射機，依據國家通訊傳播委員會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

MHz	MHz
0.090 - 0.110	1660.0 – 1785.0
0.490 - 0.510	1805.0 – 1880.0
2.172 - 2.198	1855.0 – 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	

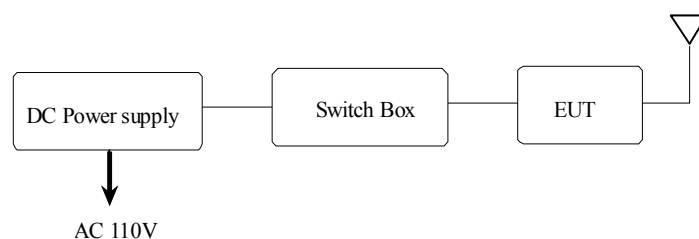
3 受測裝置之系統說明

3.1 受測裝置

裝置名稱	製造者/代理者	型 號	纜線說明
* Smart LF Oscillator (With Wireless Function)	TOYOTA MOTOR CORPORATION	TMLF19T-1	----
DC Power supply	GW	GPS-1850	非隔離電源線 1.8m*1 非隔離信號線 1.8m*1
Switch Box	N/A	N/A	非隔離電源線 1.8m*1 非隔離信號線 0.4m*1

註:

1. 標記“*”表欲申請之受測物。
2. 測試配置:



3.測試模式:

Test Mode	Antenna Type	Note
Mode 1	D Door Antenna (Door Antenna)	-
Mode 2	Back Door Antenna (Trunk Antenna)	-
Mode 3	Fr & Rr1 & Rr1 Antenna (Room Antenna)	-
Mode 4	D Door Antenna & P Door Antenna (Door Antenna)	-
Mode 5	Immobilizer Antenna	-

3.2 測試場地

項次	測 試 場 地
1	☒ RE02 — EMC B1 — N2 第一大樓地下二樓 3m 半電波暗室(N2)
2	☐ CE04 — 10M 2F 第三大樓二樓傳導測試室(10m 大樓)
3	☐ RF — Cond01 第一大樓地下一樓直量測試區
4	☒ RF — Cond02 第一大樓地下二樓直量測試區

4 場強輻射之量測

4.1 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範第2.8節之要求。

4.2 量測方法

將待測物置於非金屬桌面，使其在工作狀態，接收天線與待測物距離3米。待測物分別要垂直或水平放置，而且桌面要360度旋轉，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 量測輻射場強之儀器

儀器名稱	製造者	型號
EMI Receiver	R&S	ESCI
Spectrum Analyzer	R&S	FSU46
Loop Antenna	EMCO	6512
PRE-Amplifier	Agilent	8447D
BiLog Antenna	ETC	MCTD 2786
Spectrum Analyzer	R&S	FSV

測試軟體: LZ-RF (Ver. ETC-3A2)

4.4 場強度之計算

場強之計算公式如下

峰值結果值(PEAK) = 讀值 + 校正因子

平均值結果值(Average) = 峰值結果值(PEAK) + 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）

測量頻率小於30 MHz 時，得於所規定距離以內進行測試，但應儘量避免於近場做測試。當測試距離較規定距離為近時，測試結果應以插補係數換算至規定距離之值；對同一輻射方向最少兩個距離作測量以決定適當的插補係數或線性距離平方之反比(40 dB/10 倍距離)換算成規定距離值。

4.5 場強輻射之量測結果

測試工程師：許志宏

測試日期：Oct. 21, 2019

環境溫度：24℃

環境濕度：55%

4.5.1 主波

4.5.1.1 Mode 1

4.5.1.1.1 操作模式：連續發射(Loop 正對)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	59.61	----	38.05	97.66	----	7.64	----	192.0	19.2	-11.56

4.5.1.1.2 操作模式：連續發射(Loop 90度角)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	55.42	----	38.05	93.47	----	4.72	----	192.0	19.2	-14.48

註：

1. 標記“----”表示發射之訊號太弱而儀器無法量測。
2. 若以峰值功能測量之值符合準峰值限制值或平均值限制值，則可視同以準峰值或平均值功能測量之值亦符合準峰值限制值或平均值限制值。
3. 上表之量測值皆以儀器之準峰值檢測功能量取，限制值依據規範第2.8節。
4. 於測試場地空間不足之情形下，限制值(量測距離超過3公尺)之換算公式如下：

300m換算至3m公式(頻率0.009MHz-0.490MHz):

假設實測頻率 = 250.000 kHz

300m限制值=2400/頻率 (uV/m)

∴3m限制值= $20 \times \log(2400/271.600) + 40 \log(300m/3m)$ (dBuV/m)

= 19.6 + 80 (dBuV/m)

= 99.6 (dBuV/m)

5. 量測不準確度:±4.2dB

4.5.1.2 Mode 2

4.5.1.2.1 操作模式：連續發射(Loop 正對)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	58.42	----	38.05	96.47	----	6.66	----	192.0	19.2	-12.54

4.5.1.2.2 操作模式：連續發射(Loop 90度角)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	57.07	----	38.05	95.12	----	5.7	----	192.0	19.2	-13.50

註：

1. 標記”----”表示發射之訊號太弱而儀器無法量測。
2. 若以峰值功能測量之值符合準峰值限制值或平均值限制值，則可視同以準峰值或平均值功能測量之值亦符合準峰值限制值或平均值限制值。
3. 上表之量測值皆以儀器之準峰值檢測功能量取，限制值依據規範第2.8節。
4. 於測試場地空間不足之情形下，限制值(量測距離超過3公尺)之換算公式如下：

300m換算至3m公式(頻率0.009MHz-0.490MHz):

假設實測頻率 = 250.000 kHz

300m限制值=2400/頻率 (uV/m)

∴3m限制值= $20 \times \log(2400/271.600) + 40 \log(300\text{m}/3\text{m})$ (dBuV/m)

= 19.6 + 80 (dBuV/m)

= 99.6 (dBuV/m)

5. 量測不準確度:±4.2dB

4.5.1.3 Mode 3

4.5.1.3.1 操作模式：連續發射(Loop 正對)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	61.25	----	38.05	99.30	----	9.23	----	192.0	19.2	-9.97

4.5.1.3.2 操作模式：連續發射(Loop 90度角)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	56.03	----	38.05	94.08	----	5.06	----	192.0	19.2	-14.14

註：

1. 標記“----”表示發射之訊號太弱而儀器無法量測。
2. 若以峰值功能測量之值符合準峰值限制值或平均值限制值，則可視同以準峰值或平均值功能測量之值亦符合準峰值限制值或平均值限制值。
3. 上表之量測值皆以儀器之準峰值檢測功能量取，限制值依據規範第2.8節。
4. 於測試場地空間不足之情形下，限制值(量測距離超過3公尺)之換算公式如下：

300m換算至3m公式(頻率0.009MHz-0.490MHz):

假設實測頻率 = 250.000 kHz

300m限制值=2400/頻率 (uV/m)

∴3m限制值= $20 \times \log(2400/271.600) + 40 \log(300\text{m}/3\text{m})$ (dBuV/m)

= 19.6 + 80 (dBuV/m)

= 99.6 (dBuV/m)

5. 量測不準確度:±4.2dB

4.5.1.4 Mode 4

4.5.1.4.1 操作模式：連續發射(Loop 正對)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	65.27	----	38.05	103.32	----	14.66	----	192.0	19.2	-4.54

4.5.1.4.2 操作模式：連續發射(Loop 90度角)

輻射頻率 (KHz)	儀器讀值 (dBμV/m)		校正 因子 (dB)	結果值 @3m (dBμV/m)		結果值 @300m (μV/m)		限制值 @3m (μV/m)	限制值 @300m (μV/m)	餘裕度 @300m (μV/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	61.05	----	38.05	99.10	----	9.02	----	192.0	19.2	-10.18

註：

1. 標記“----”表示發射之訊號太弱而儀器無法量測。
2. 若以峰值功能測量之值符合準峰值限制值或平均值限制值，則可視同以準峰值或平均值功能測量之值亦符合準峰值限制值或平均值限制值。
3. 上表之量測值皆以儀器之準峰值檢測功能量取，限制值依據規範第2.8節。
4. 於測試場地空間不足之情形下，限制值(量測距離超過3公尺)之換算公式如下：

300m換算至3m公式(頻率0.009MHz-0.490MHz):

假設實測頻率 = 250.000 kHz

300m限制值=2400/頻率 (uV/m)

∴3m限制值= $20 \cdot \log(2400/271.600) + 40 \log(300\text{m}/3\text{m})$ (dBuV/m)

= 19.6 + 80 (dBuV/m)

= 99.6 (dBuV/m)

5. 量測不準確度:±4.2dB

4.5.1.5 Mode 5

4.5.1.5.1 操作模式: 連續發射(Loop 正對)

輻射頻率 (KHz)	儀器讀值 (dB μ V/m)		校正 因子 (dB)	結果值 @3m (dB μ V/m)		結果值 @300m (μ V/m)		限制值 @3m (μ V/m)	限制值 @300m (μ V/m)	餘裕度 @300m (μ V/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	56.47	----	38.05	94.52	----	5.32	----	192.0	19.2	-13.88

4.5.1.5.2 操作模式: 連續發射(Loop 90度角)

輻射頻率 (KHz)	儀器讀值 (dB μ V/m)		校正 因子 (dB)	結果值 @3m (dB μ V/m)		結果值 @300m (μ V/m)		限制值 @3m (μ V/m)	限制值 @300m (μ V/m)	餘裕度 @300m (μ V/m)
	Peak	AV		Peak	AV	Peak	AV	AV	AV	
125.0	51.79	----	38.05	89.84	----	3.10	----	192.0	19.2	-16.1

註：

1. 標記“----”表示發射之訊號太弱而儀器無法量測。
2. 若以峰值功能測量之值符合準峰值限制值或平均值限制值，則可視同以準峰值或平均值功能測量之值亦符合準峰值限制值或平均值限制值。
3. 上表之量測值皆以儀器之準峰值檢測功能量取，限制值依據規範第2.8節。
4. 於測試場地空間不足之情形下，限制值(量測距離超過3公尺)之換算公式如下:
 300m換算至3m公式(頻率0.009MHz-0.490MHz):
 假設實測頻率 = 250.000 kHz
 300m限制值=2400/頻率 (uV/m)
 $\therefore$ 3m限制值= $20 \times \log(2400/271.600) + 40 \log(300\text{m}/3\text{m})$ (dBuV/m)
 $= 19.6 + 80$ (dBuV/m)
 $= 99.6$ (dBuV/m)
5. 量測不準確度: ± 4.2 dB

4.5.2 其它不必要之訊號測試圖

4.5.2.1 Mode 1

操作模式: 發射 (Loop 正對)

File: 19-10-MAS-023

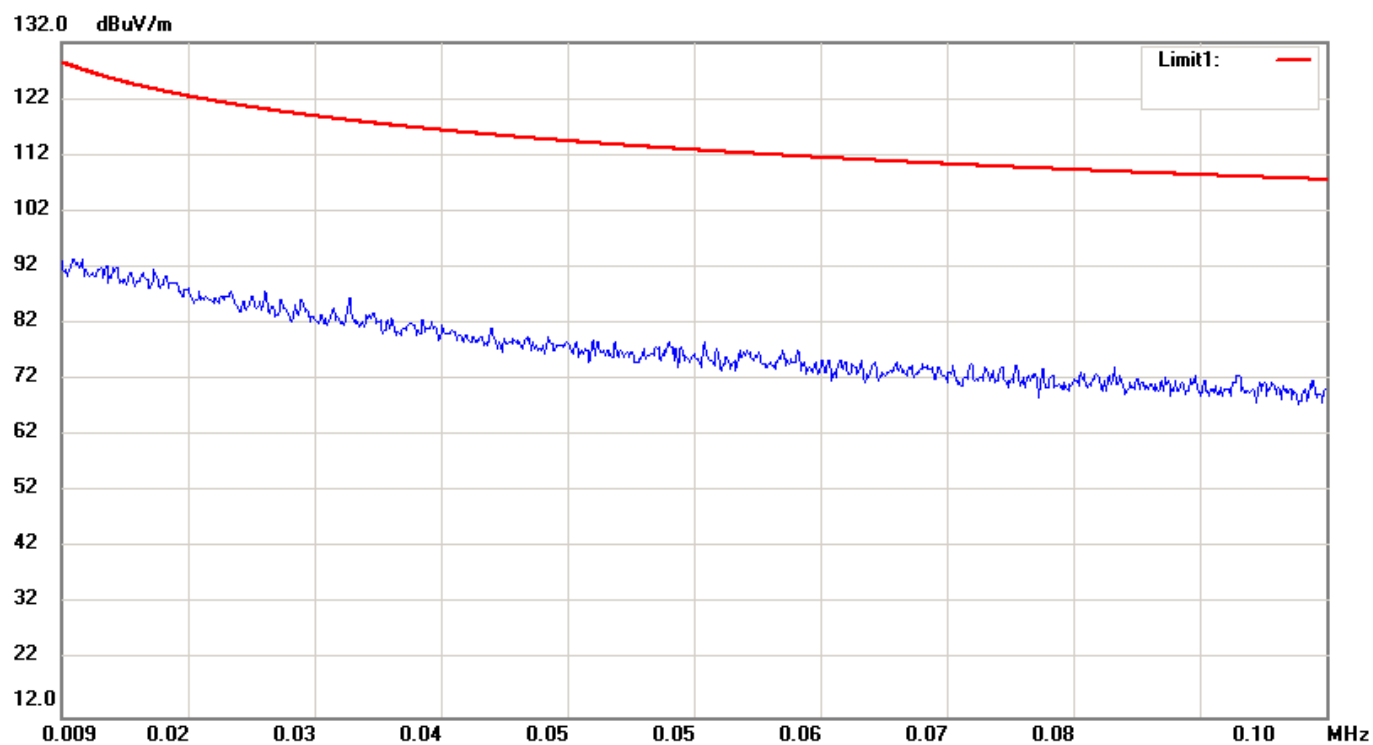
#21

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: D Door Antenna

File: 19-10-MAS-023

#29

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: D Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1054	27.80	peak	38.97	66.77	107.14	-40.37
2	0.1131	34.99	peak	38.60	73.59	106.53	-32.94
3	0.1212	46.28	peak	38.21	84.49	105.93	-21.44
4	0.1287	48.22	peak	37.84	86.06	105.41	-19.35
5	0.1370	37.26	peak	37.44	74.70	104.86	-30.16
6	0.1446	33.09	peak	37.07	70.16	104.39	-34.23

File: 19-10-MAS-023

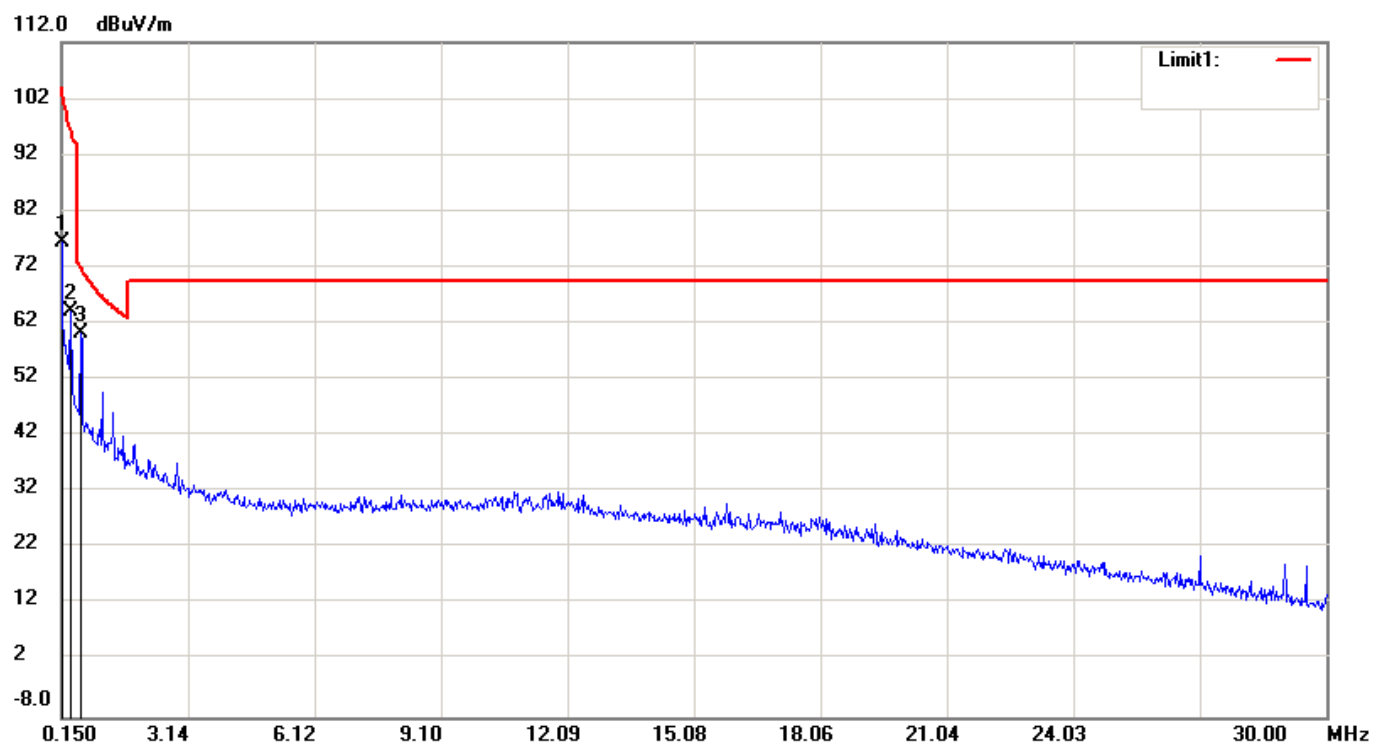
#41

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: D Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1500	39.62	peak	36.81	76.43	104.08	-27.65
2	0.3590	36.26	peak	27.98	64.24	96.50	-32.26
3	0.5977	37.27	peak	23.10	60.37	72.08	-11.71

操作模式: 發射 (Loop 90度角)

File: 19-10-MAS-023

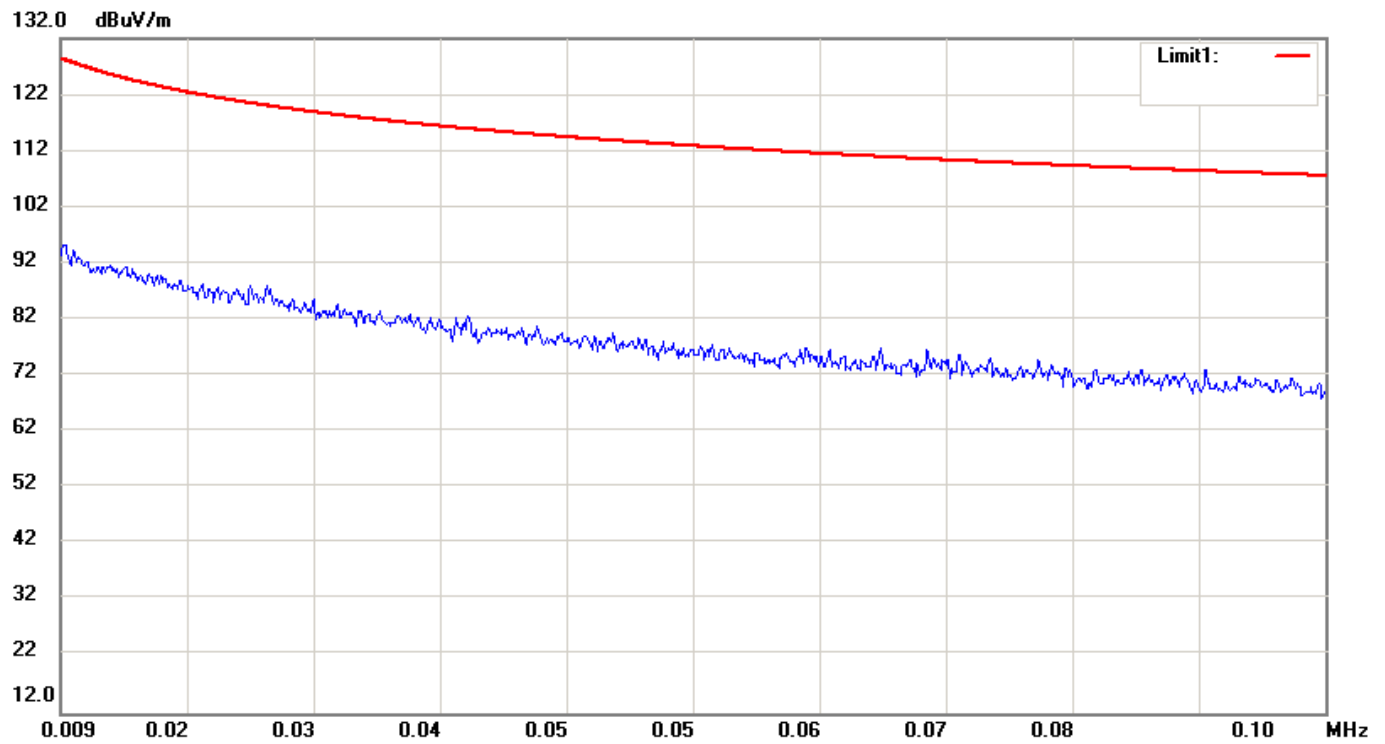
#20

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: D Door Antenna

File: 19-10-MAS-023

#28

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: D Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1053	22.77	peak	38.97	61.74	107.15	-45.41
2	0.1131	30.65	peak	38.60	69.25	106.53	-37.28
3	0.1212	41.85	peak	38.21	80.06	105.93	-25.87
4	0.1287	43.98	peak	37.84	81.82	105.41	-23.59
5	0.1368	33.44	peak	37.45	70.89	104.88	-33.99
6	0.1444	29.26	peak	37.08	66.34	104.41	-38.07

File: 19-10-MAS-023

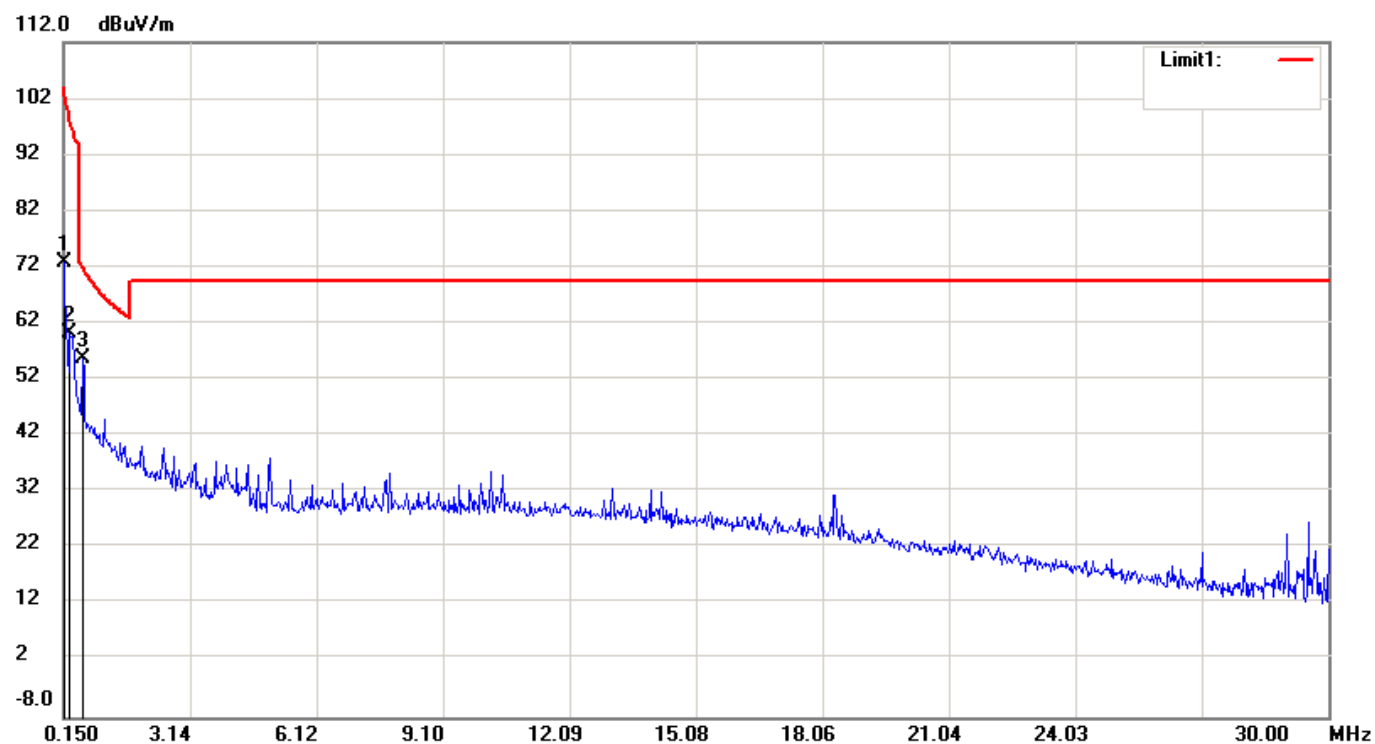
#40

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: D Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1500	36.03	peak	36.81	72.84	104.08	-31.24
2	0.2992	30.69	peak	29.59	60.28	98.08	-37.80
3	0.5977	32.64	peak	23.10	55.74	72.08	-16.34

4.5.2.2 Mode 2

操作模式: 發射 (Loop 正對)

File: 19-10-MAS-023

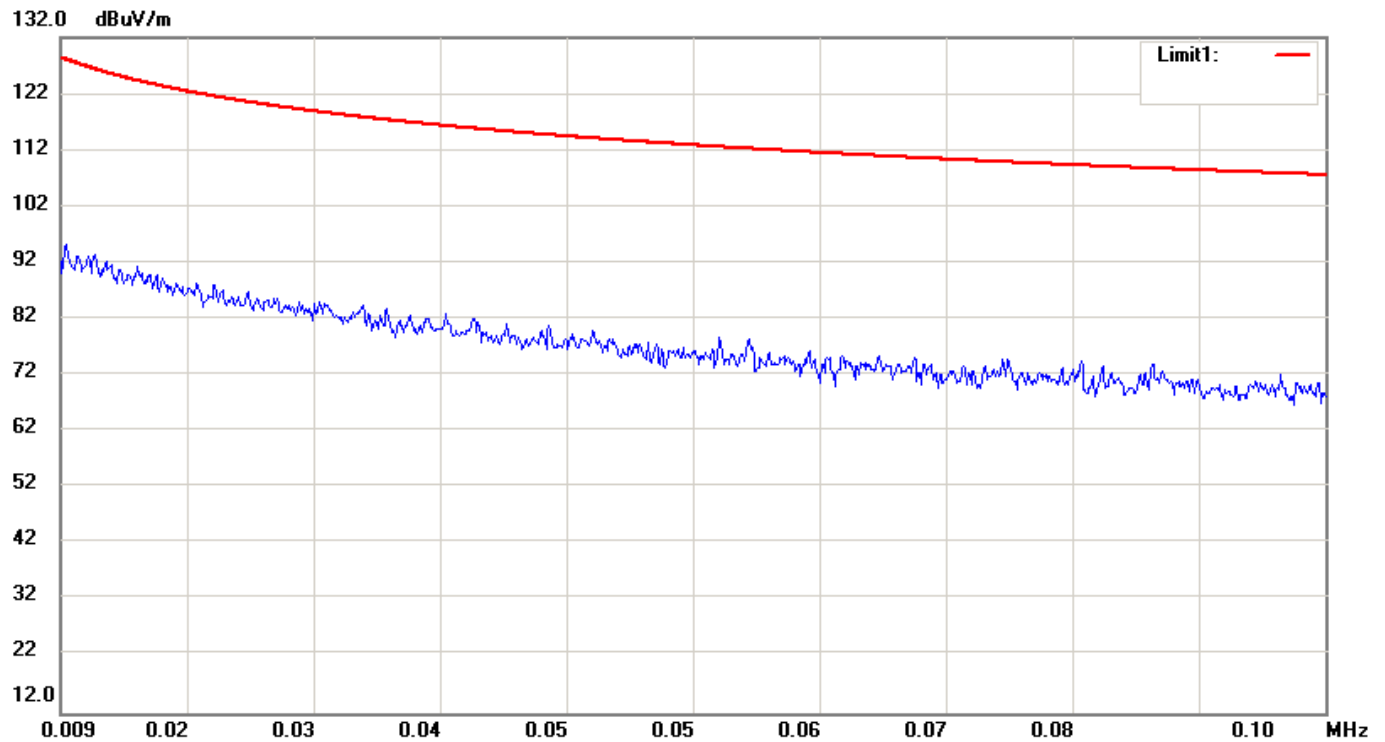
#23

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Back Door Antenna

File: 19-10-MAS-023

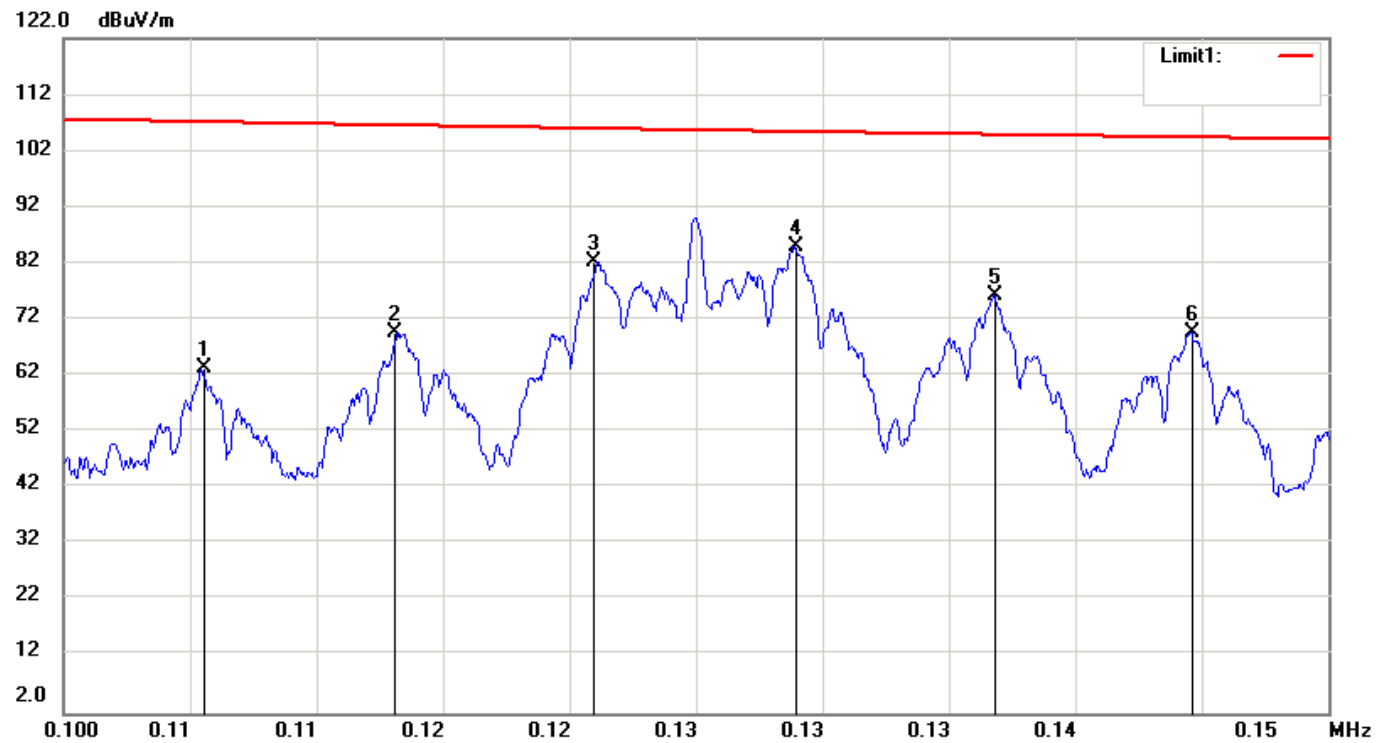
#33

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1054	24.23	peak	38.97	63.20	107.14	-43.94
2	0.1131	31.08	peak	38.60	69.68	106.53	-36.85
3	0.1210	44.10	peak	38.22	82.32	105.94	-23.62
4	0.1288	47.11	peak	37.84	84.95	105.40	-20.45
5	0.1368	38.86	peak	37.45	76.31	104.88	-28.57
6	0.1445	32.68	peak	37.07	69.75	104.40	-34.65

File: 19-10-MAS-023

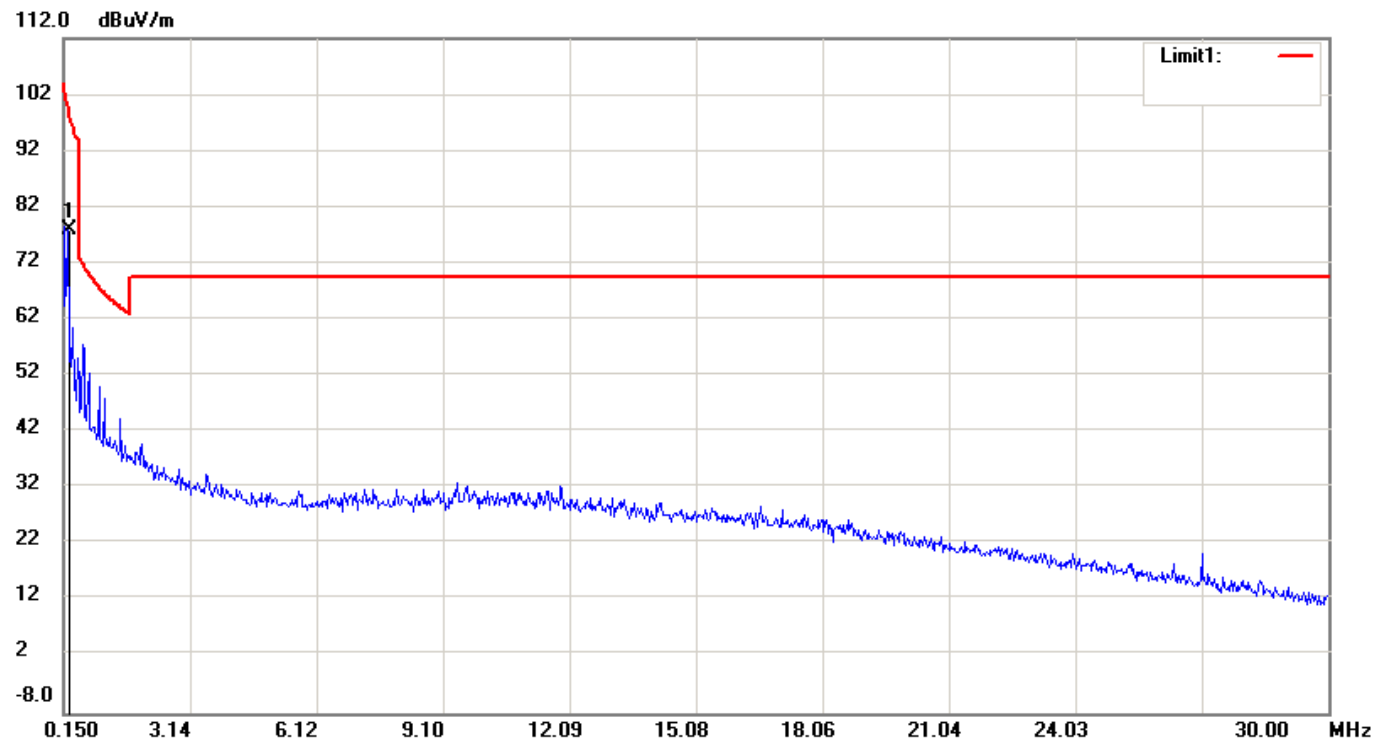
#34

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.2395	45.43	peak	32.48	77.91	100.01	-22.10

操作模式: 發射 (Loop 90度角)

File: 19-10-MAS-023

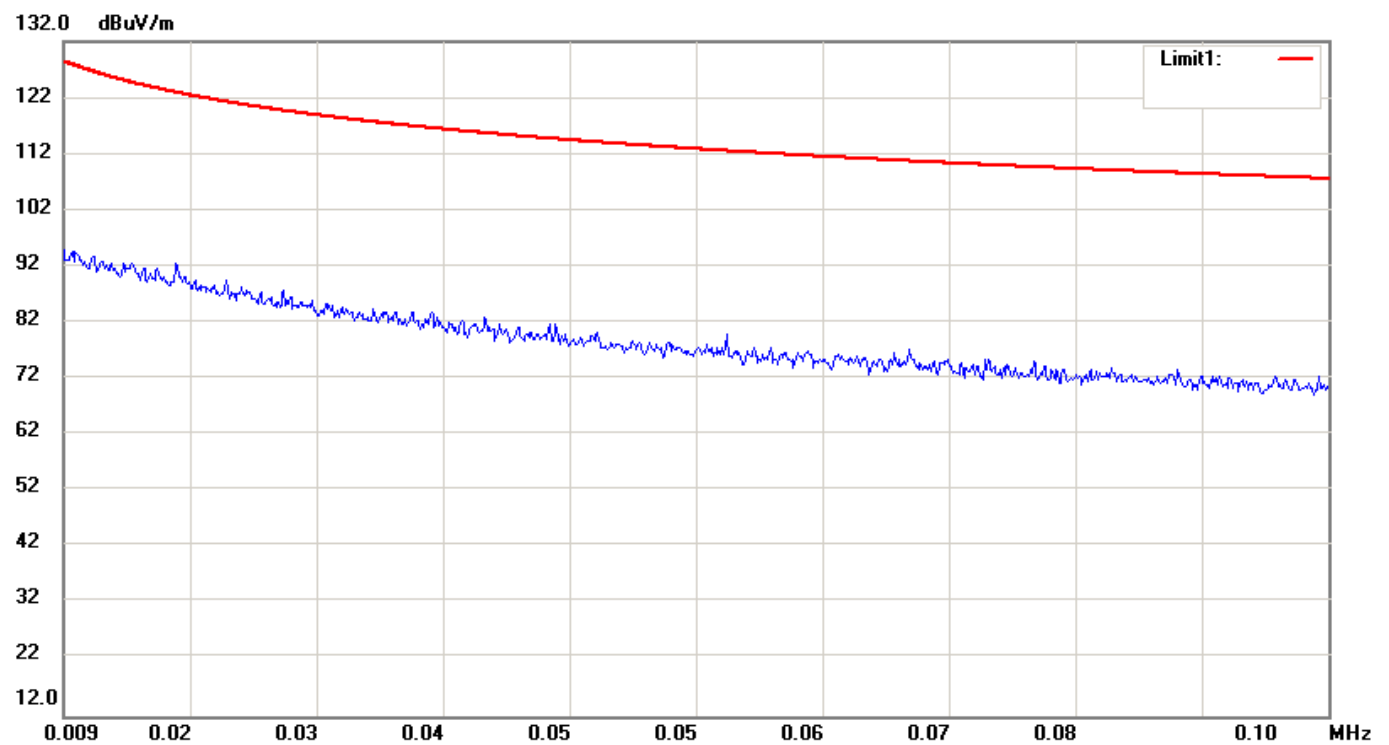
#22

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Back Door Antenna

File: 19-10-MAS-023

#32

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1054	23.12	peak	38.97	62.09	107.14	-45.05
2	0.1132	29.76	peak	38.60	68.36	106.52	-38.16
3	0.1210	42.92	peak	38.22	81.14	105.94	-24.80
4	0.1287	45.76	peak	37.84	83.60	105.41	-21.81
5	0.1368	37.52	peak	37.45	74.97	104.88	-29.91
6	0.1444	31.94	peak	37.08	69.02	104.41	-35.39

File: 19-10-MAS-023

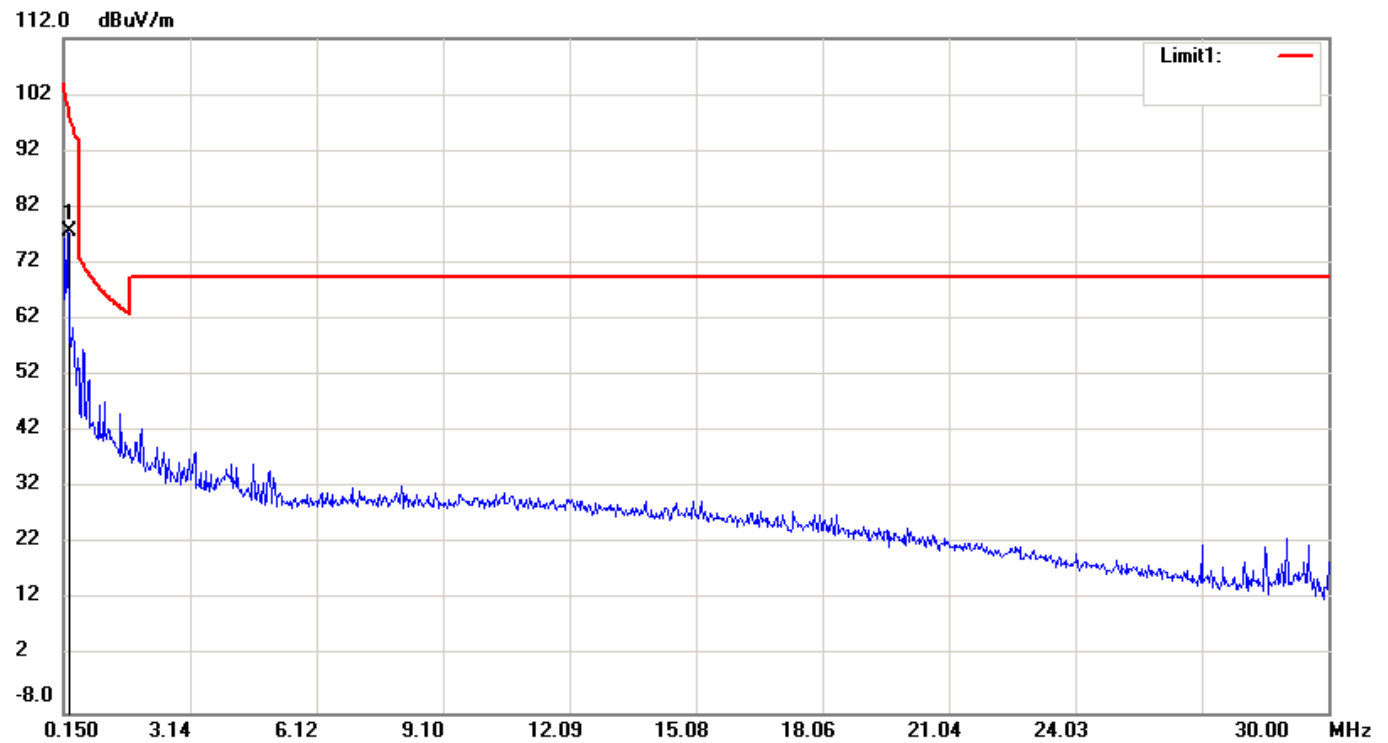
#35

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.2395	45.19	peak	32.48	77.67	100.01	-22.34

4.5.2.3 Mode 3

操作模式: 發射 (Loop 正對)

File: 19-10-MAS-023

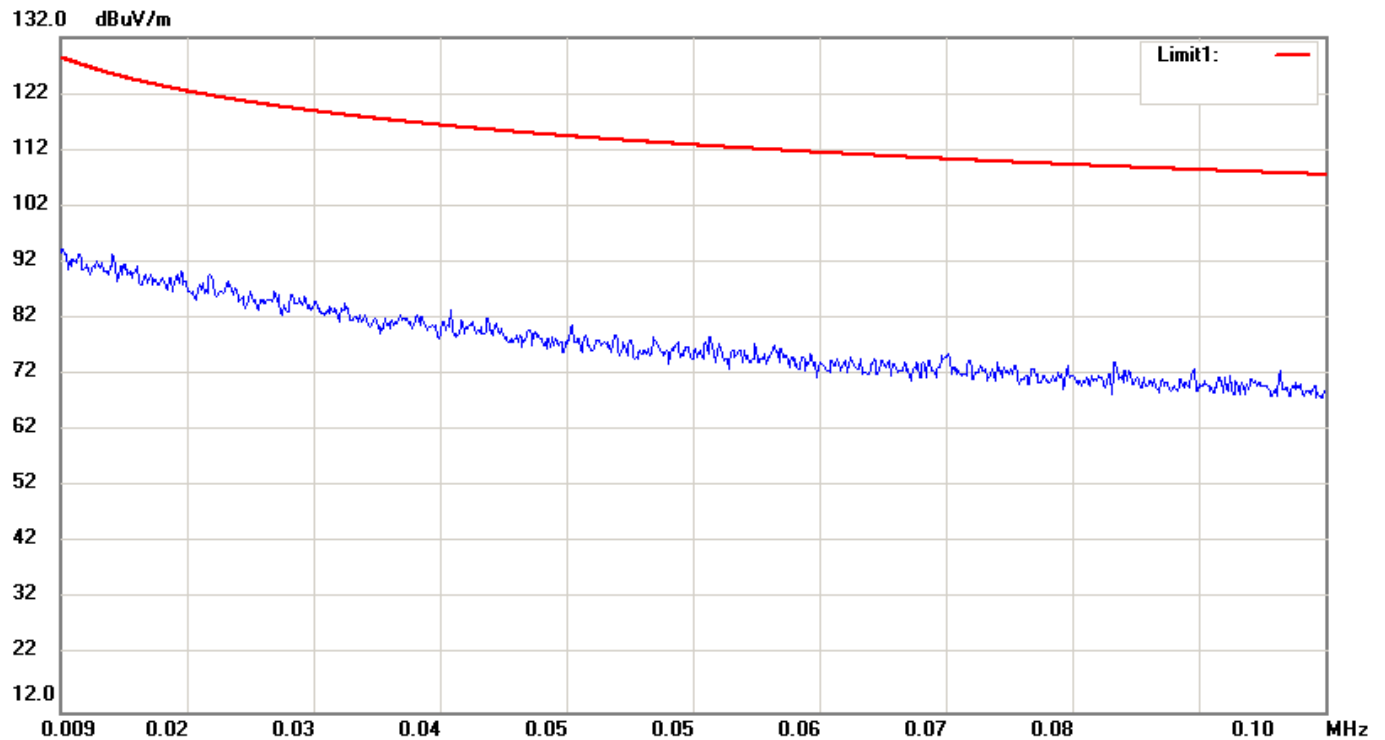
#24

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Fr Antenna

File: 19-10-MAS-023

#26

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1055	31.42	peak	38.96	70.38	107.13	-36.75
2	0.1133	37.80	peak	38.59	76.39	106.51	-30.12
3	0.1211	48.28	peak	38.21	86.49	105.93	-19.44
4	0.1290	48.65	peak	37.83	86.48	105.39	-18.91
5	0.1368	39.43	peak	37.45	76.88	104.88	-28.00
6	0.1447	34.51	peak	37.07	71.58	104.39	-32.81

File: 19-10-MAS-023

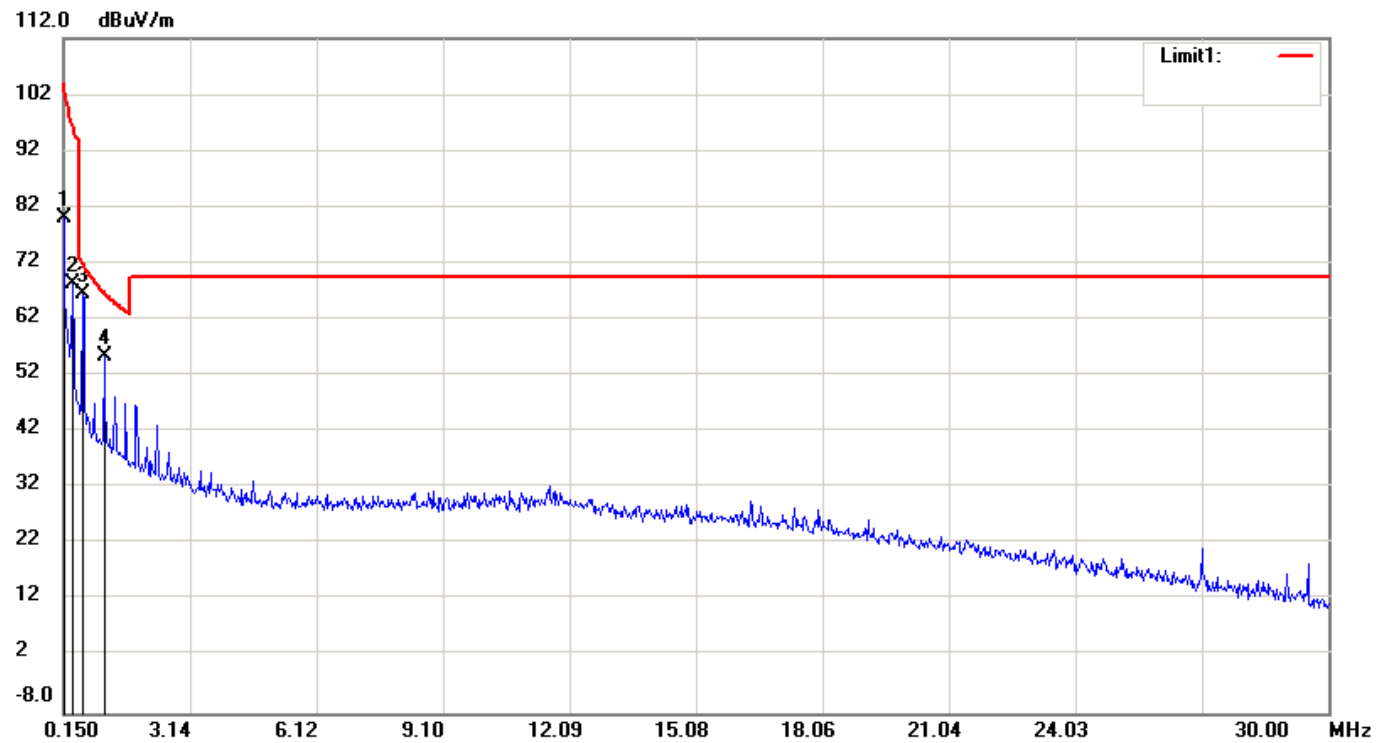
#38

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1500	43.10	peak	36.81	79.91	104.08	-24.17
2	0.3590	40.31	peak	27.98	68.29	96.50	-28.21
3	0.5977	43.36	peak	23.10	66.46	72.08	-5.62
4	1.1050	37.18	peak	18.14	55.32	66.76	-11.44

操作模式: 發射 (Loop 90度角)

File: 19-10-MAS-023

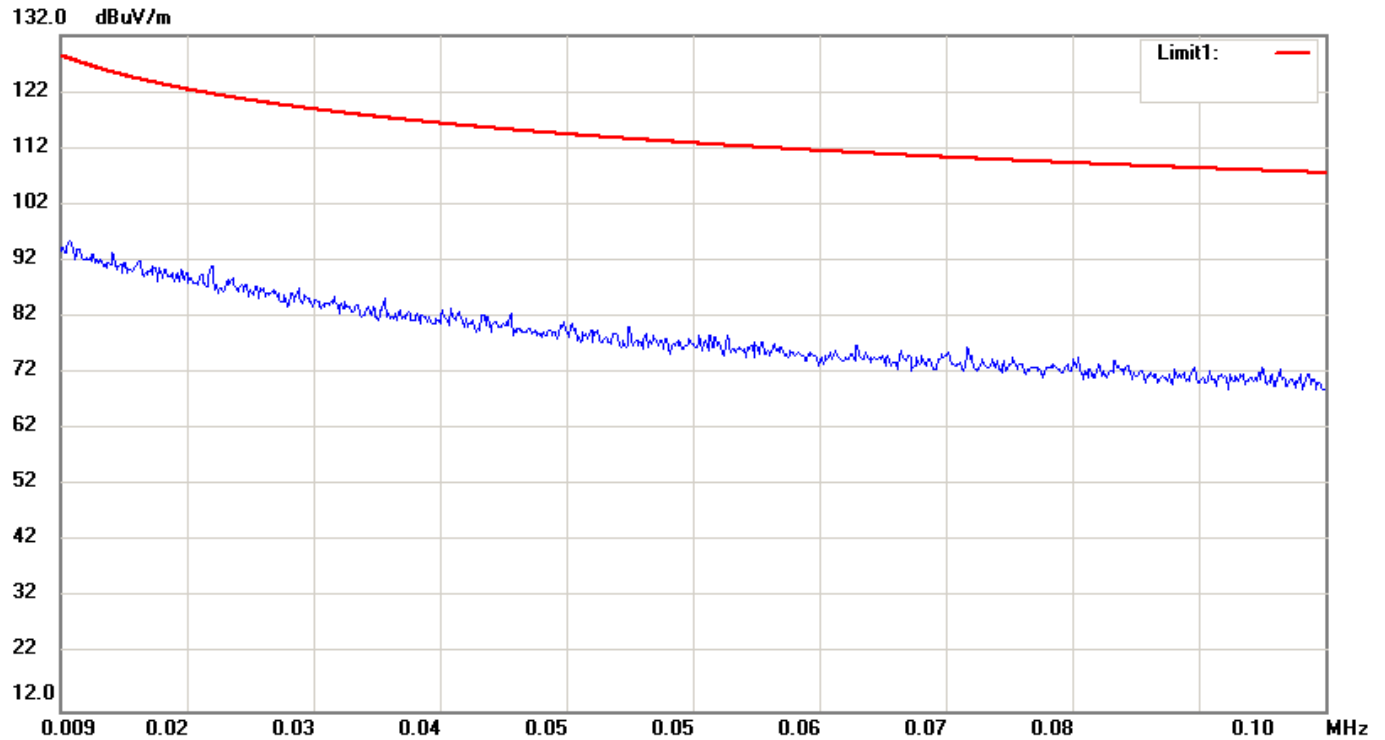
#25

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Fr Antenna

File: 19-10-MAS-023

#27

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1055	26.73	peak	38.96	65.69	107.13	-41.44
2	0.1132	33.62	peak	38.60	72.22	106.52	-34.30
3	0.1212	43.54	peak	38.21	81.75	105.93	-24.18
4	0.1288	44.91	peak	37.84	82.75	105.40	-22.65
5	0.1366	34.54	peak	37.46	72.00	104.89	-32.89
6	0.1446	30.54	peak	37.07	67.61	104.39	-36.78

File: 19-10-MAS-023

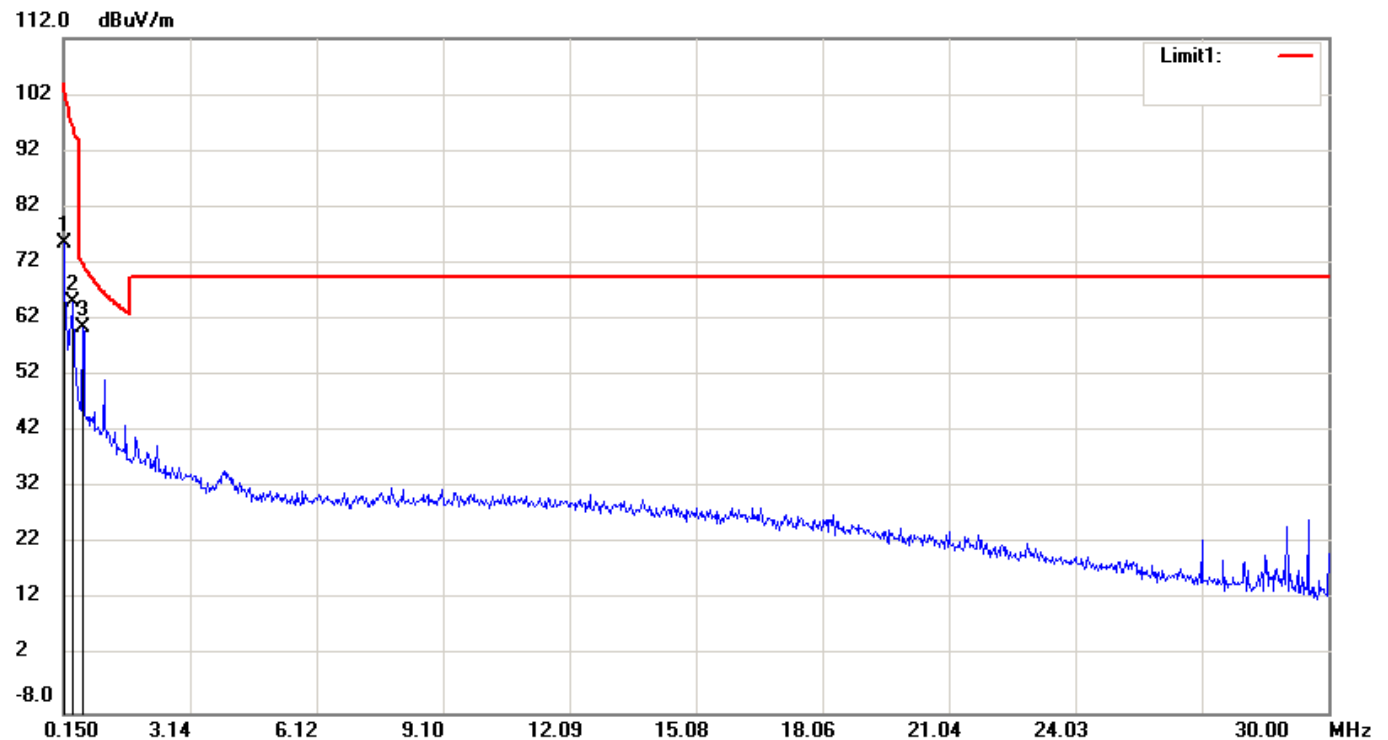
#39

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1500	38.60	peak	36.81	75.41	104.08	-28.67
2	0.3590	37.09	peak	27.98	65.07	96.50	-31.43
3	0.5977	37.45	peak	23.10	60.55	72.08	-11.53

4.5.2.4 Mode 4

操作模式: 發射 (Loop 正對)

File: 19-10-MAS-023

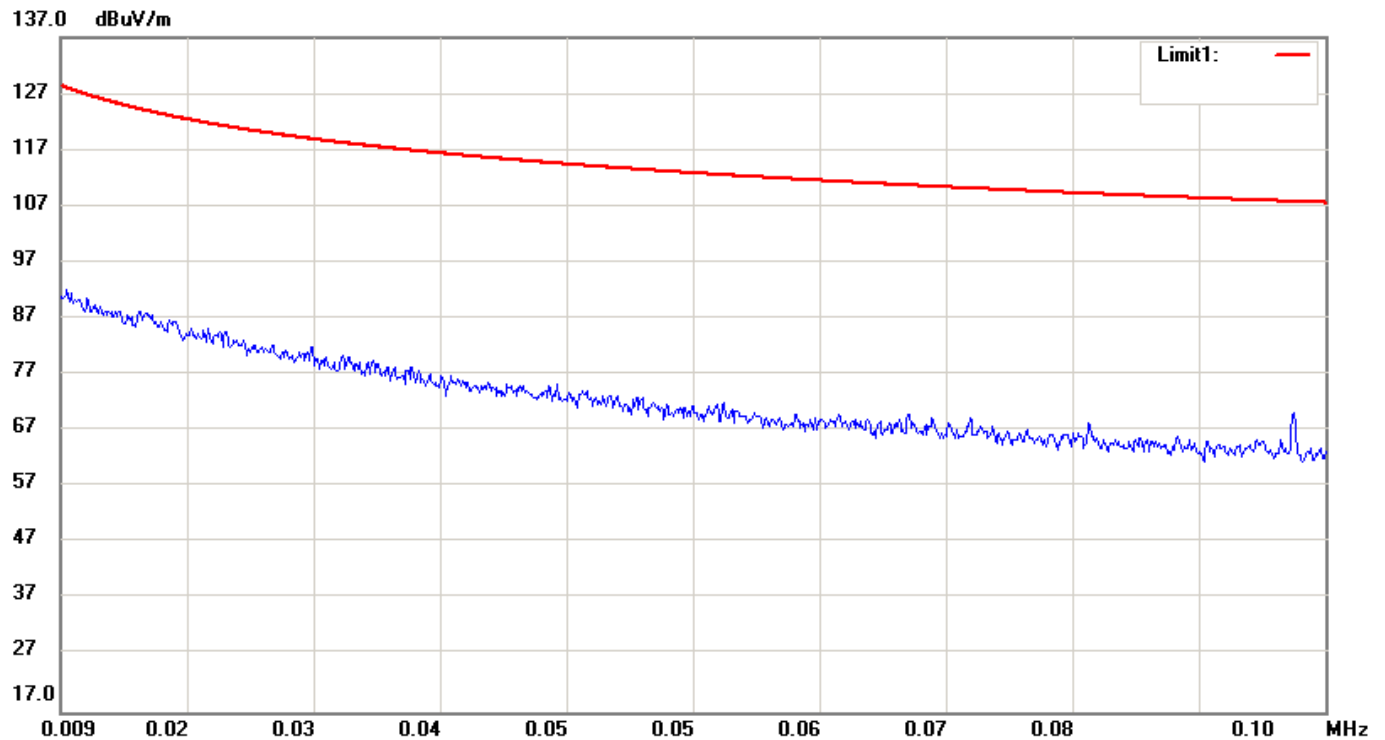
#70

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: D Door Antenna & P Door Antenna

File: 19-10-MAS-023

#26

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1055	31.42	peak	38.96	70.38	107.13	-36.75
2	0.1133	37.80	peak	38.59	76.39	106.51	-30.12
3	0.1211	48.28	peak	38.21	86.49	105.93	-19.44
4	0.1290	48.65	peak	37.83	86.48	105.39	-18.91
5	0.1368	39.43	peak	37.45	76.88	104.88	-28.00
6	0.1447	34.51	peak	37.07	71.58	104.39	-32.81

File: 19-10-MAS-023

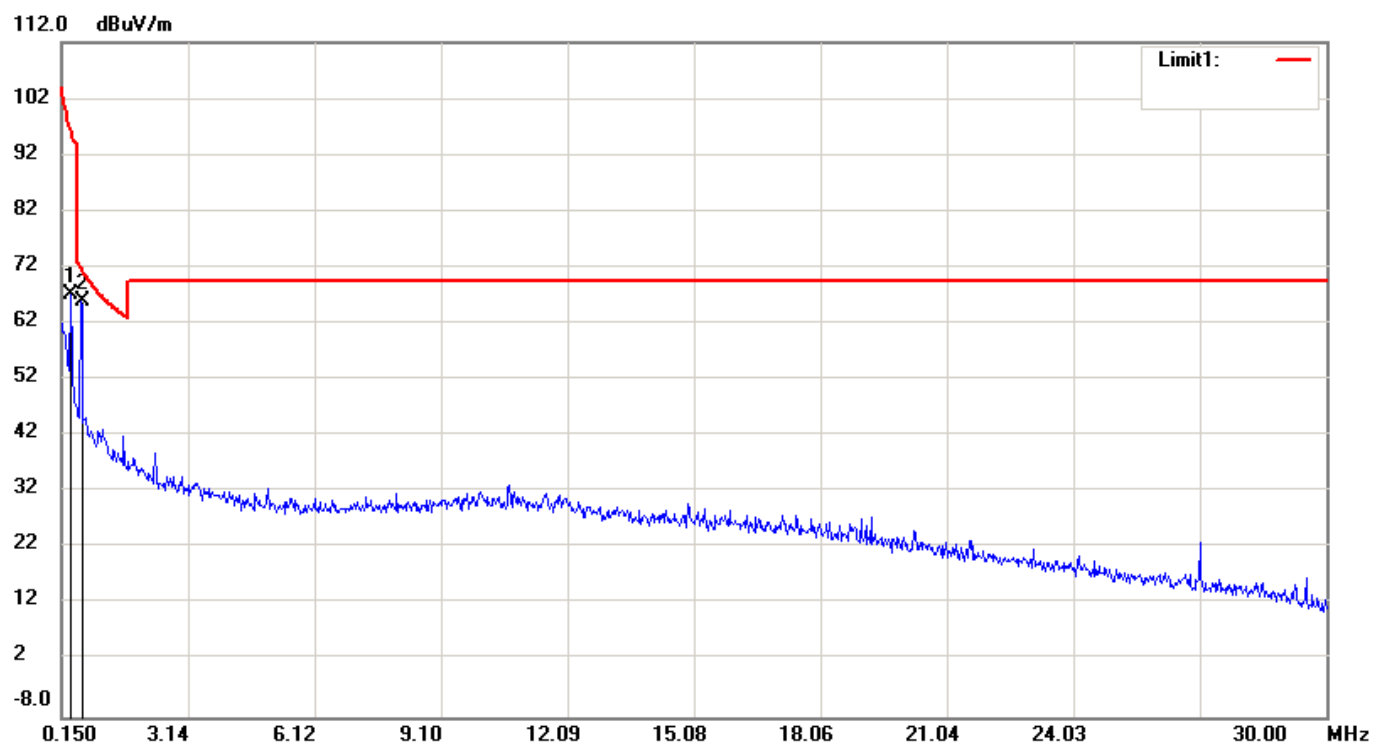
#67

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: D Door Antenna & P Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.3590	39.13	peak	27.98	67.11	96.50	-29.39
2	0.5978	42.98	peak	23.09	66.07	72.08	-6.01

操作模式: 發射 (Loop 90度角)

File: 19-10-MAS-023

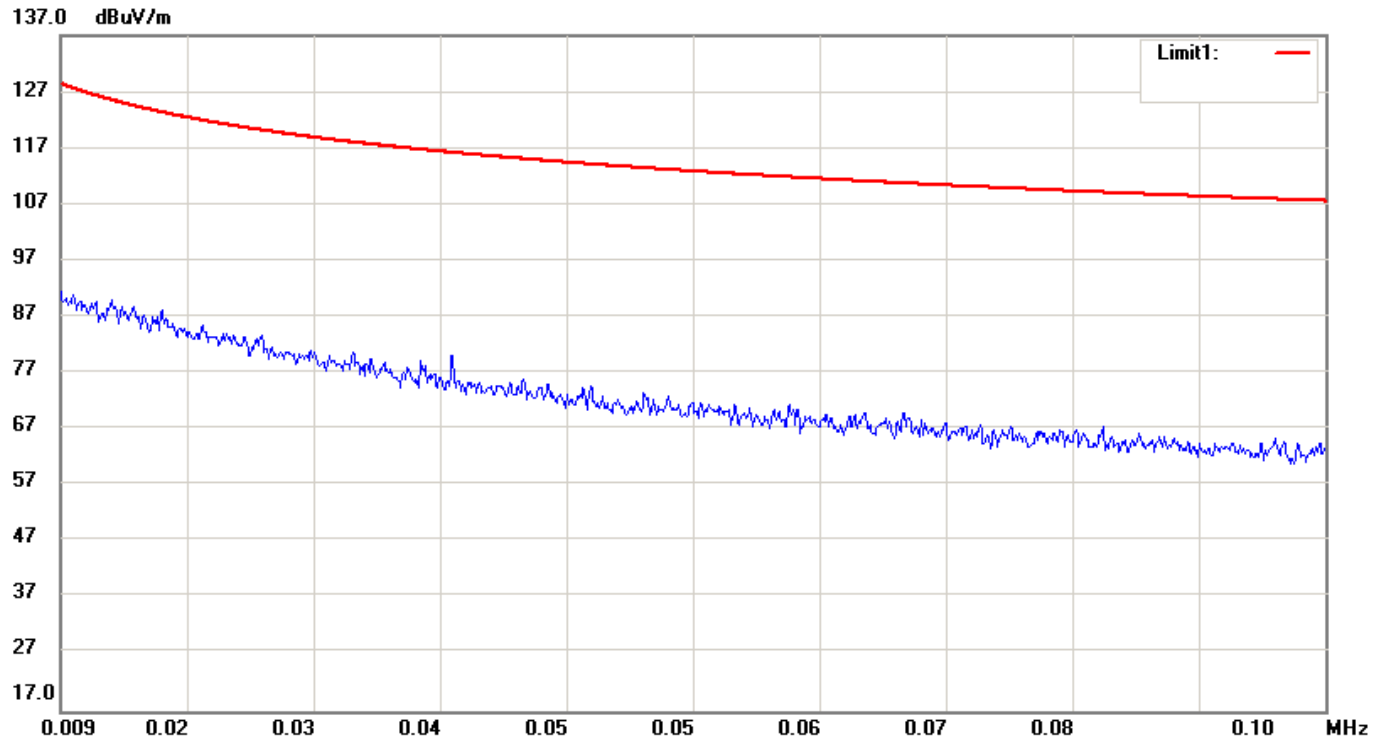
#69

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: D Door Antenna & P Door Antenna

File: 19-10-MAS-023

#27

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1055	26.73	peak	38.96	65.69	107.13	-41.44
2	0.1132	33.62	peak	38.60	72.22	106.52	-34.30
3	0.1212	43.54	peak	38.21	81.75	105.93	-24.18
4	0.1288	44.91	peak	37.84	82.75	105.40	-22.65
5	0.1366	34.54	peak	37.46	72.00	104.89	-32.89
6	0.1446	30.54	peak	37.07	67.61	104.39	-36.78

File: 19-10-MAS-023

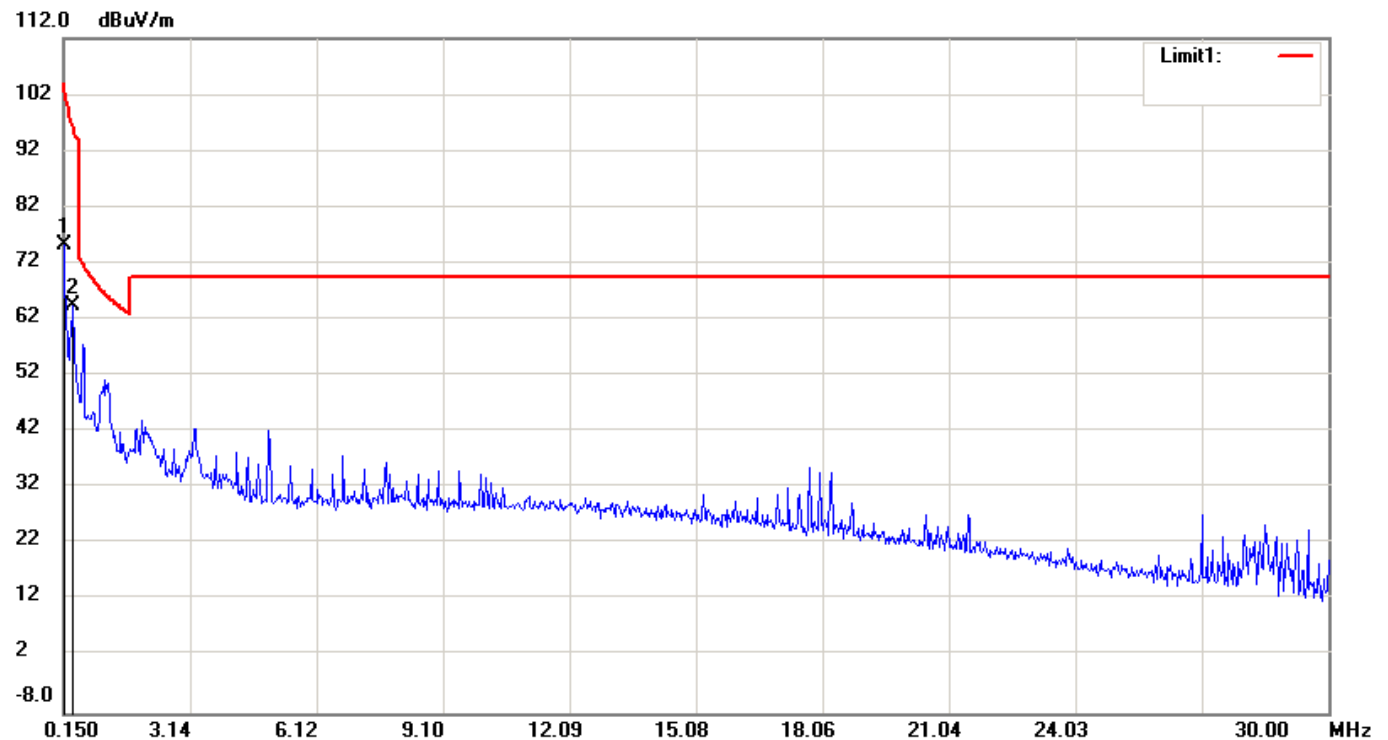
#68

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: D Door Antenna & P Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1500	38.58	peak	36.81	75.39	104.08	-28.69
2	0.3590	36.47	peak	27.98	64.45	96.50	-32.05

4.5.2.5 Mode 5

操作模式: 發射 (Loop 正對)

File: 19-10-MAS-023

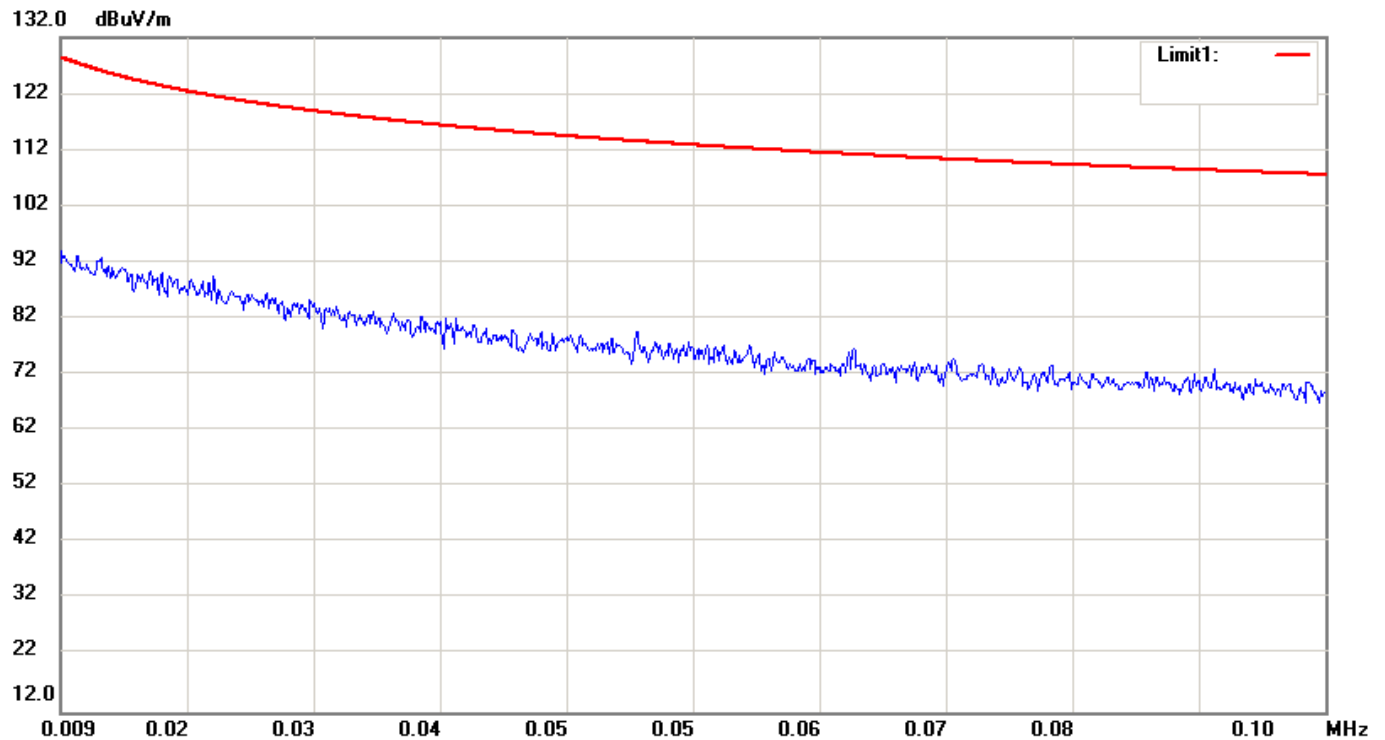
#18

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Immobilizer Antenna

File: 19-10-MAS-023

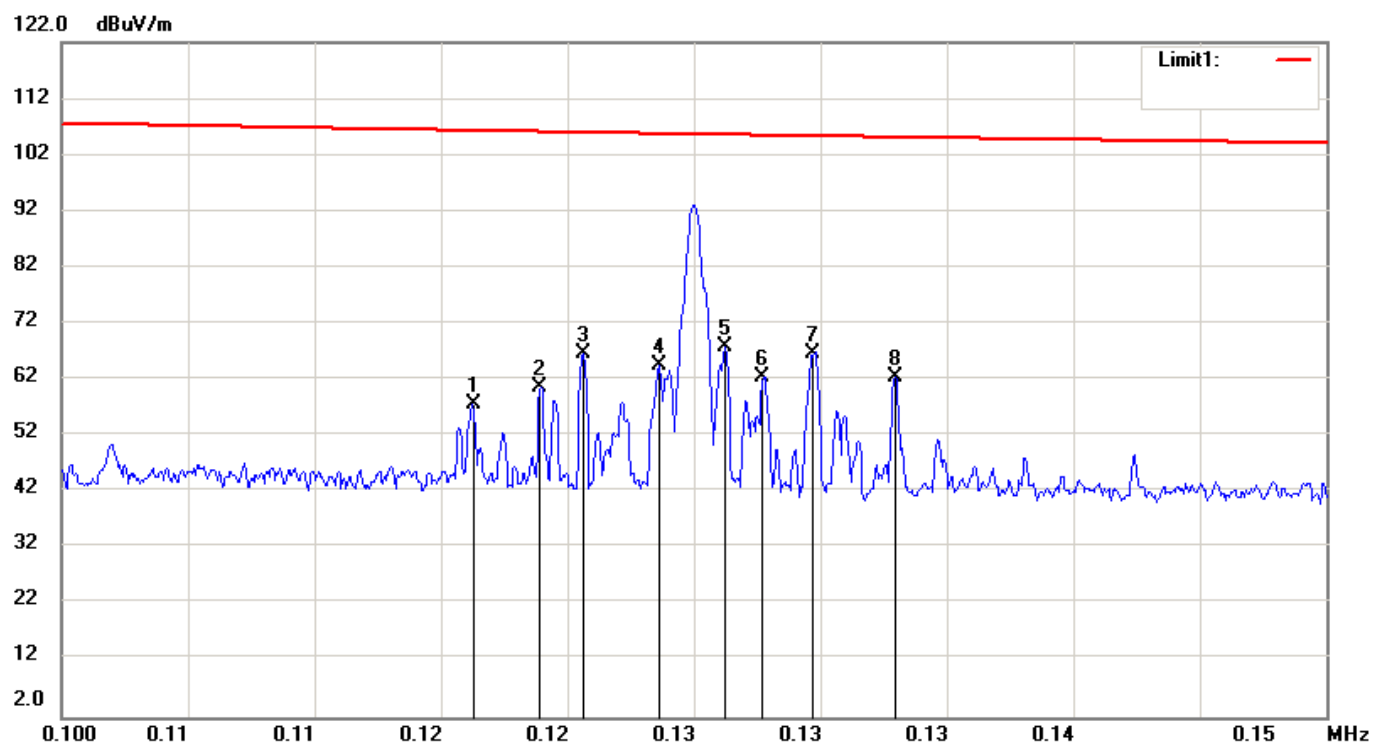
#30

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1161	19.26	peak	38.45	57.71	106.30	-48.59
2	0.1190	22.46	peak	38.31	60.77	106.09	-45.32
3	0.1204	28.51	peak	38.24	66.75	105.98	-39.23
4	0.1236	26.40	peak	38.08	64.48	105.76	-41.28
5	0.1262	29.91	peak	37.96	67.87	105.58	-37.71
6	0.1277	24.46	peak	37.89	62.35	105.47	-43.12
7	0.1297	28.98	peak	37.80	66.78	105.34	-38.56
8	0.1330	24.76	peak	37.63	62.39	105.12	-42.73

File: 19-10-MAS-023

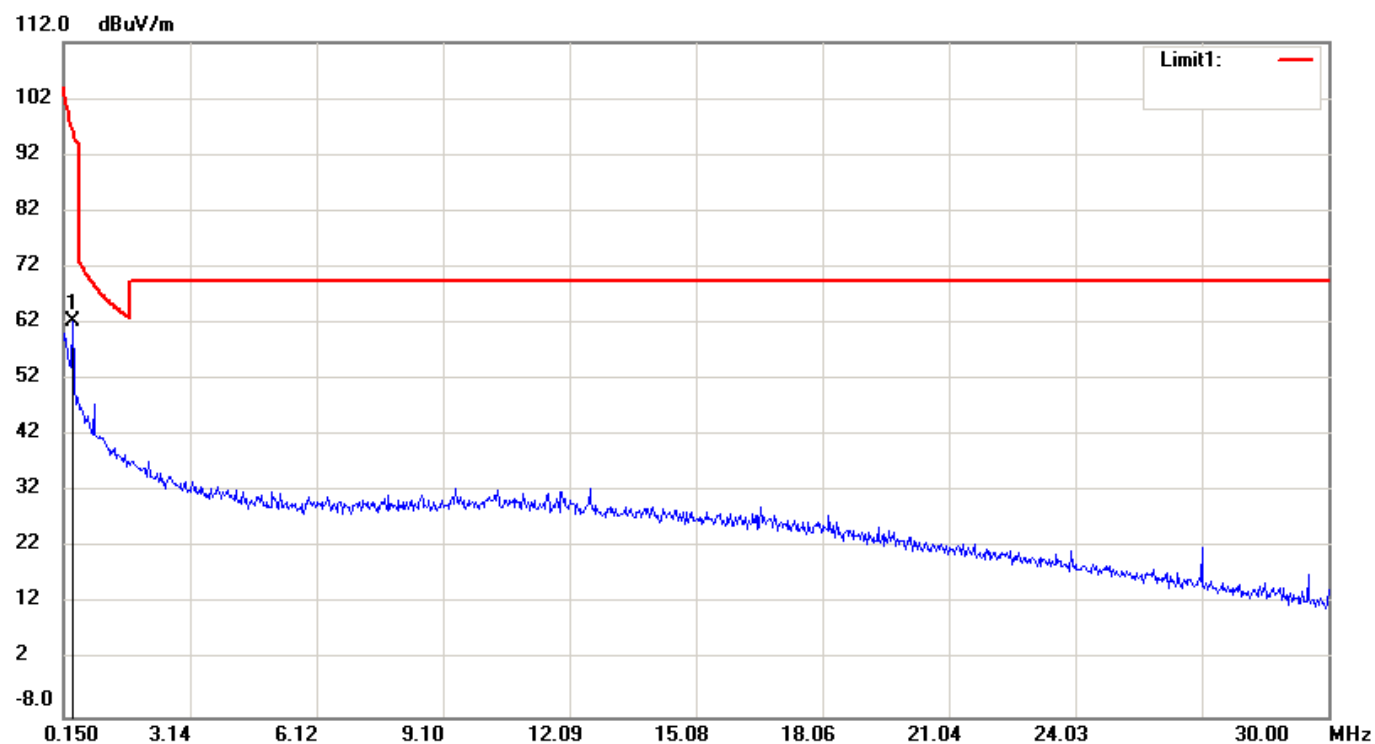
#37

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(0 度)

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.3590	34.47	peak	27.98	62.45	96.50	-34.05

操作模式: 發射 (Loop 90度角)

File: 19-10-MAS-023

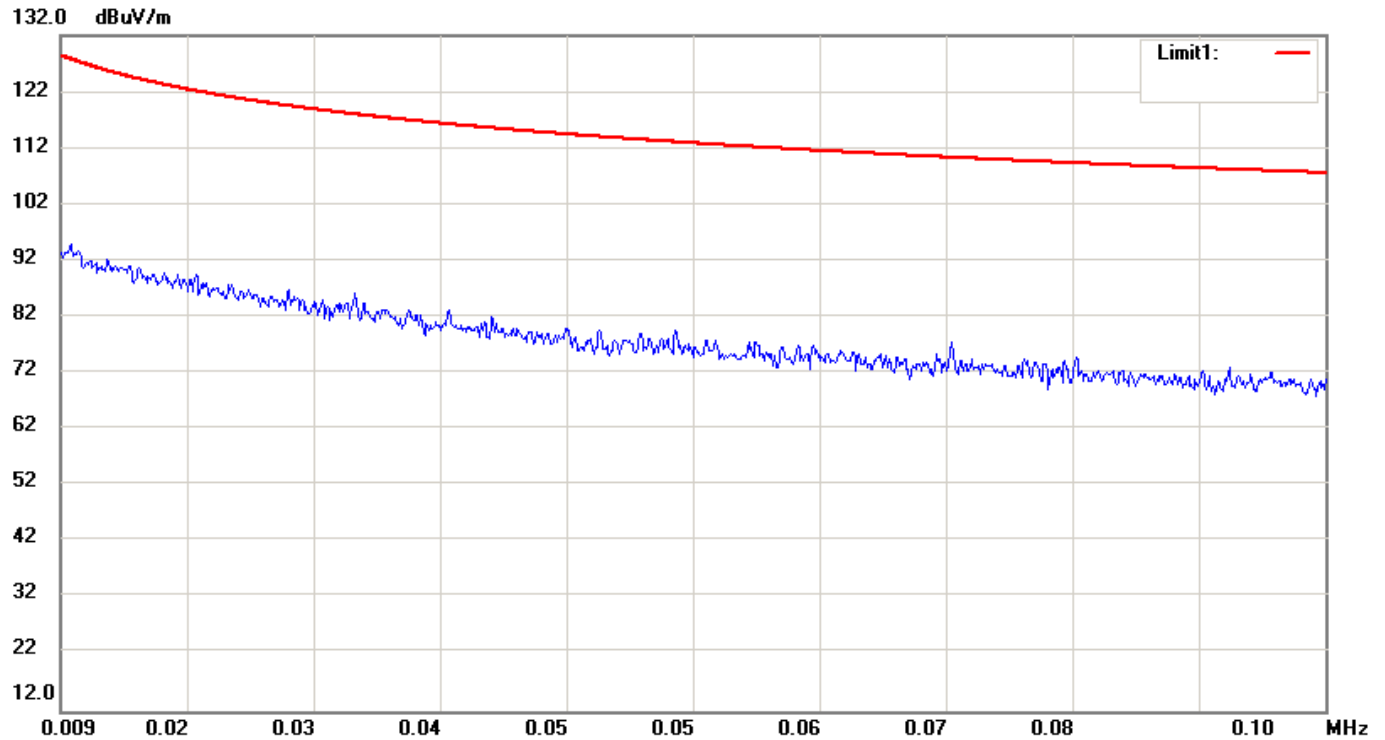
#19

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Immobilizer Antenna

File: 19-10-MAS-023

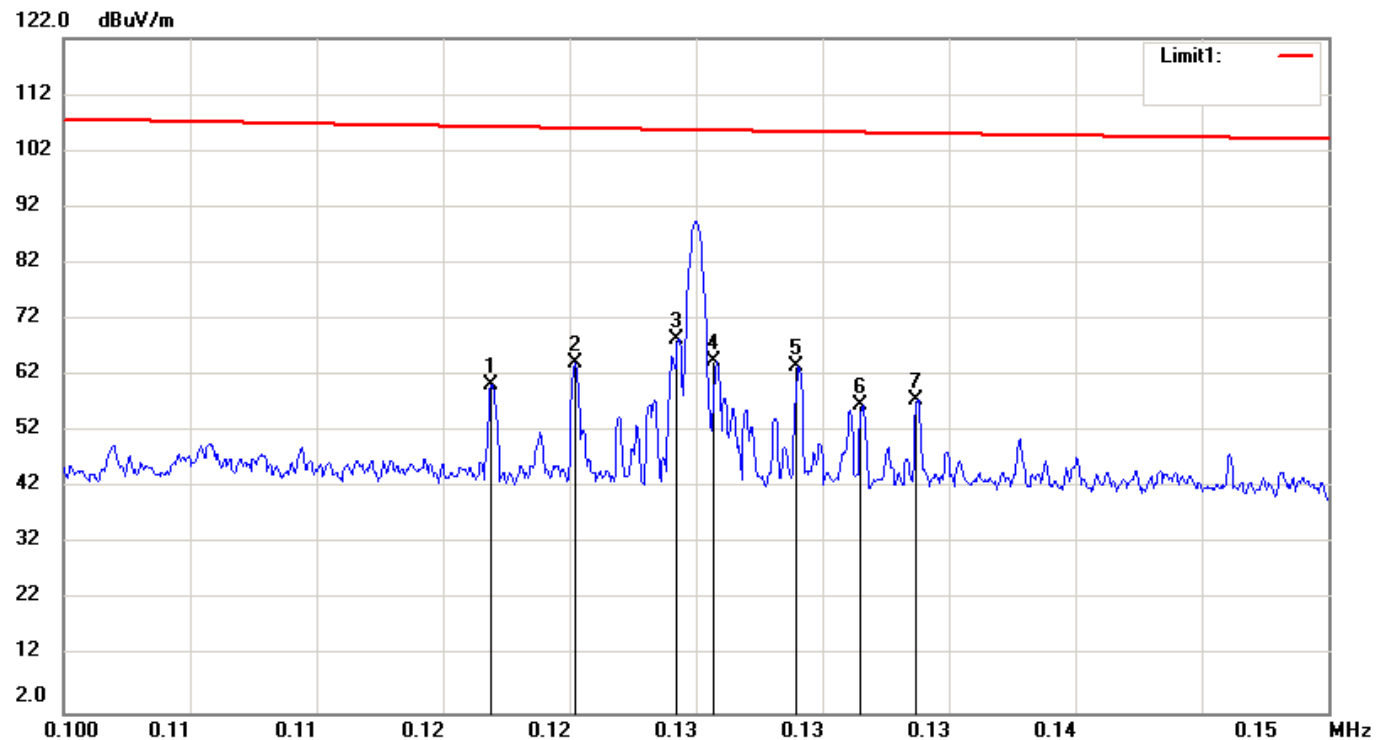
#31

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(KHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1170	21.91	peak	38.41	60.32	106.23	-45.91
2	0.1202	25.93	peak	38.25	64.18	106.00	-41.82
3	0.1242	30.50	peak	38.06	68.56	105.71	-37.15
4	0.1257	26.44	peak	37.98	64.42	105.61	-41.19
5	0.1290	25.78	peak	37.83	63.61	105.39	-41.78
6	0.1315	19.10	peak	37.71	56.81	105.22	-48.41
7	0.1337	20.00	peak	37.60	57.60	105.08	-47.48

File: 19-10-MAS-023

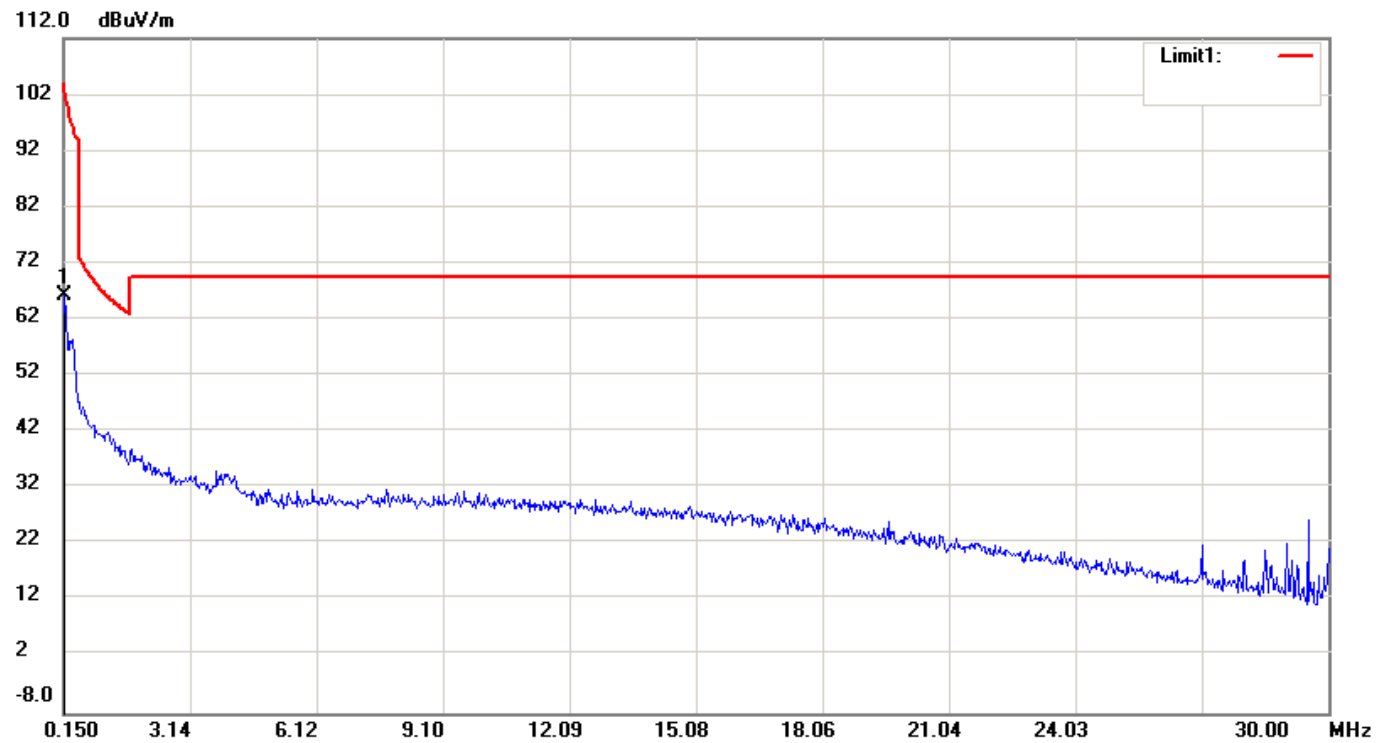
#36

2019/10/21

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition: NCC_Below 1G

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX(90 度)

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	0.1797	30.95	peak	35.37	66.32	102.51	-36.19

4.5.3 操作模式: 30MHz – 1GHz

4.5.3.1 Mode 1

File: 19-10-MAS-023

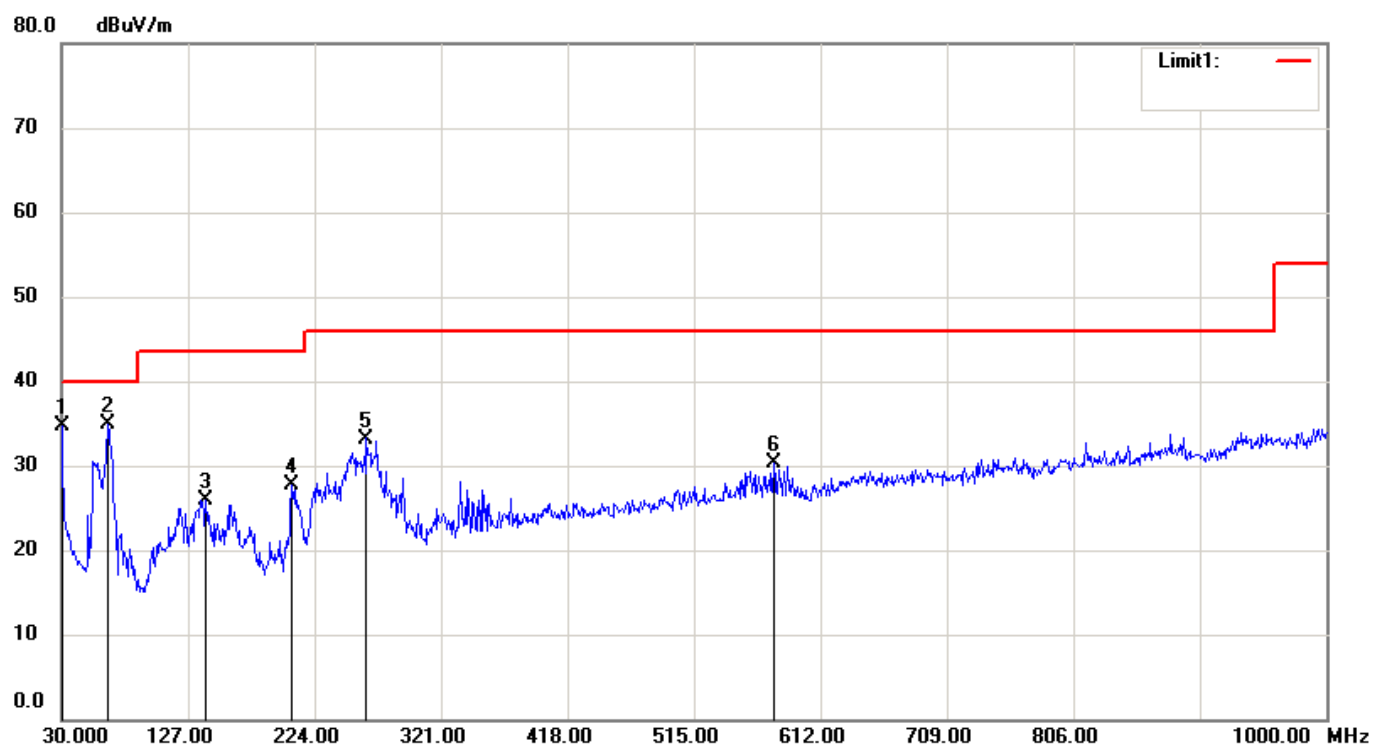
#71

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: D Door Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	42.22	peak	-7.54	34.68	40.00	-5.32
2	64.9200	46.85	peak	-11.94	34.91	40.00	-5.09
3	140.5800	31.68	peak	-5.74	25.94	43.50	-17.56
4	206.5400	37.58	peak	-9.84	27.74	43.50	-15.76
5	263.7700	39.27	peak	-6.07	33.20	46.00	-12.80
6	576.1100	30.48	peak	-0.22	30.26	46.00	-15.74

File: 19-10-MAS-023

#72

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: D Door Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	42.89	peak	-7.54	35.35	40.00	-4.65
2	55.2200	45.22	peak	-9.84	35.38	40.00	-4.62
3	98.8700	31.37	peak	-8.72	22.65	43.50	-20.85
4	221.0900	38.18	peak	-9.03	29.15	46.00	-16.85
5	253.1000	34.59	peak	-6.58	28.01	46.00	-17.99
6	633.3400	28.85	peak	1.03	29.88	46.00	-16.12

註：量測不準確度: $\pm 4.6\text{dB}$ ($30\text{MHz} \leq f < 300\text{MHz}$) $\pm 4.4\text{dB}$ ($300\text{MHz} \leq f < 1\text{GHz}$) $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

4.5.3.2 Mode 2

File: 19-10-MAS-023

#73

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	30.0000	39.21	peak	-7.54	31.67	40.00	-8.33
2	64.9200	44.09	peak	-11.94	32.15	40.00	-7.85
3	138.6400	30.94	peak	-5.64	25.30	43.50	-18.20
4	176.4700	33.94	peak	-10.00	23.94	43.50	-19.56
5	253.1000	36.98	peak	-6.58	30.40	46.00	-15.60
6	337.4900	30.65	peak	-4.01	26.64	46.00	-19.36

File: 19-10-MAS-023

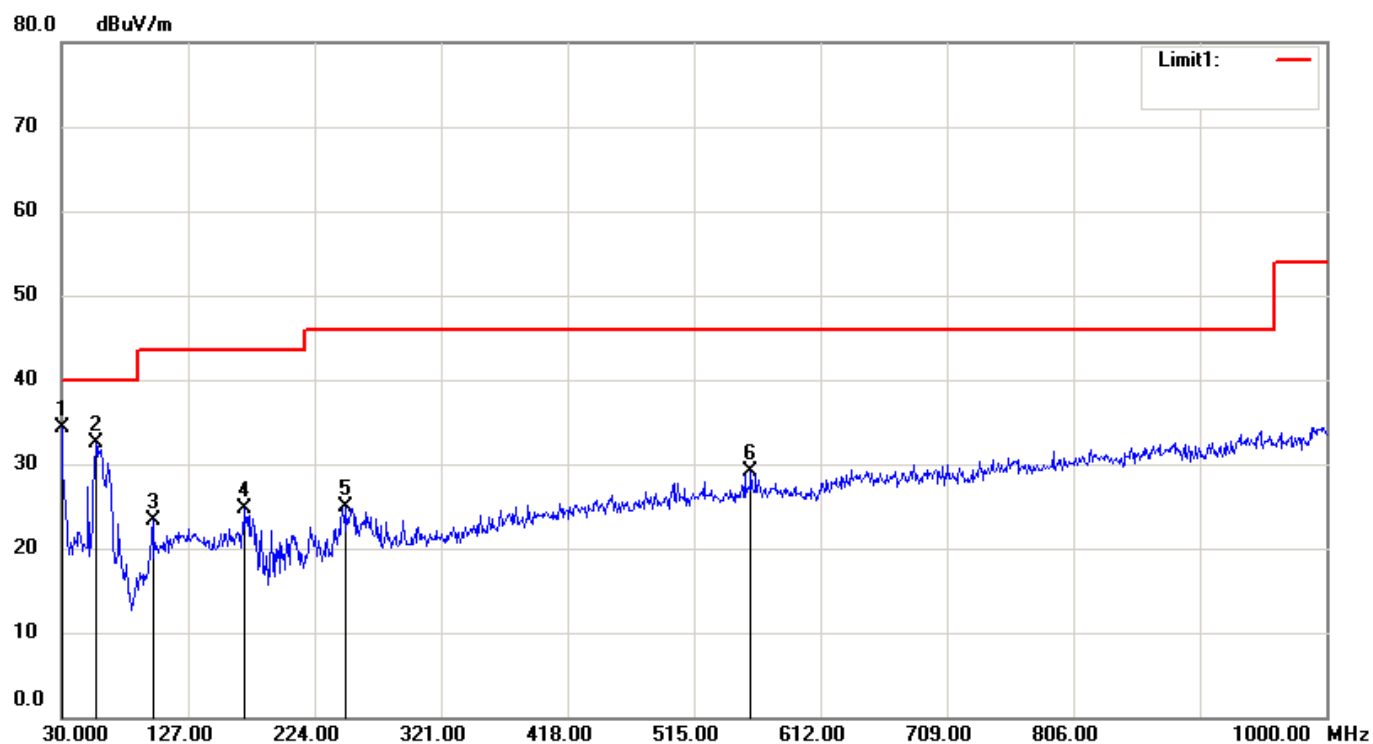
#74

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Back Door Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	41.84	peak	-7.54	34.30	40.00	-5.70
2	56.1900	42.49	peak	-10.00	32.49	40.00	-7.51
3	99.8400	31.70	peak	-8.37	23.33	43.50	-20.17
4	170.6500	34.17	peak	-9.41	24.76	43.50	-18.74
5	247.2800	31.89	peak	-6.98	24.91	46.00	-21.09
6	558.6500	29.47	peak	-0.27	29.20	46.00	-16.80

註：量測不準確度: $\pm 4.6\text{dB}$ ($30\text{MHz} \leq f < 300\text{MHz}$) $\pm 4.4\text{dB}$ ($300\text{MHz} \leq f < 1\text{GHz}$) $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

4.5.3.3 Mode 3

File: 19-10-MAS-023

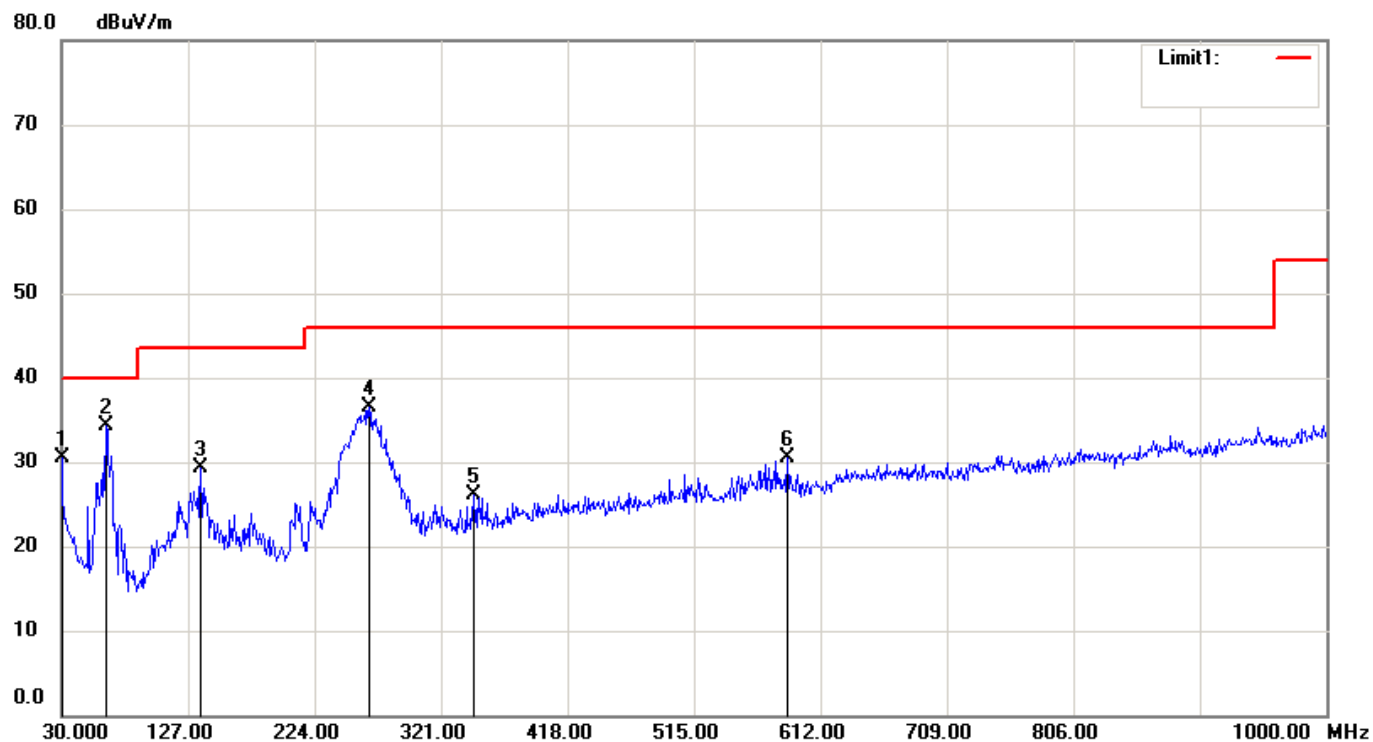
#75

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	30.0000	38.01	peak	-7.54	30.47	40.00	-9.53
2	63.9500	45.96	peak	-11.68	34.28	40.00	-5.72
3	136.7000	34.95	peak	-5.58	29.37	43.50	-14.13
4	265.7100	42.48	peak	-6.03	36.45	46.00	-9.55
5	346.2200	29.97	peak	-3.82	26.15	46.00	-19.85
6	586.7800	30.77	peak	-0.18	30.59	46.00	-15.41

File: 19-10-MAS-023

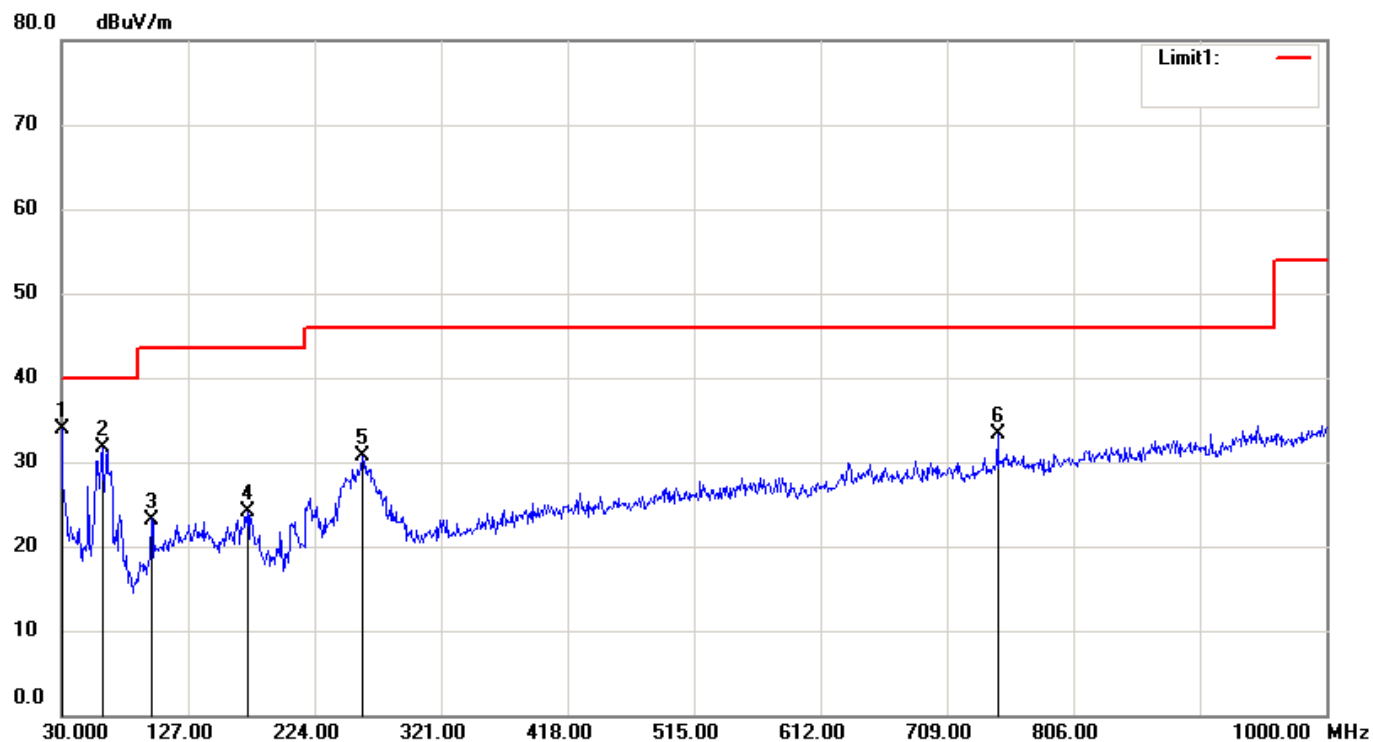
#76

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Fr Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.0000	41.46	peak	-7.54	33.92	40.00	-6.08
2	61.0400	42.56	peak	-10.90	31.66	40.00	-8.34
3	98.8700	31.92	peak	-8.72	23.20	43.50	-20.30
4	172.5900	33.78	peak	-9.60	24.18	43.50	-19.32
5	260.8600	36.79	peak	-6.15	30.64	46.00	-15.36
6	747.8000	30.43	peak	2.83	33.26	46.00	-12.74

註：量測不準確度: $\pm 4.6\text{dB}$ ($30\text{MHz} \leq f < 300\text{MHz}$) $\pm 4.4\text{dB}$ ($300\text{MHz} \leq f < 1\text{GHz}$) $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

4.5.3.4 Mode 4

File: 19-10-MAS-023

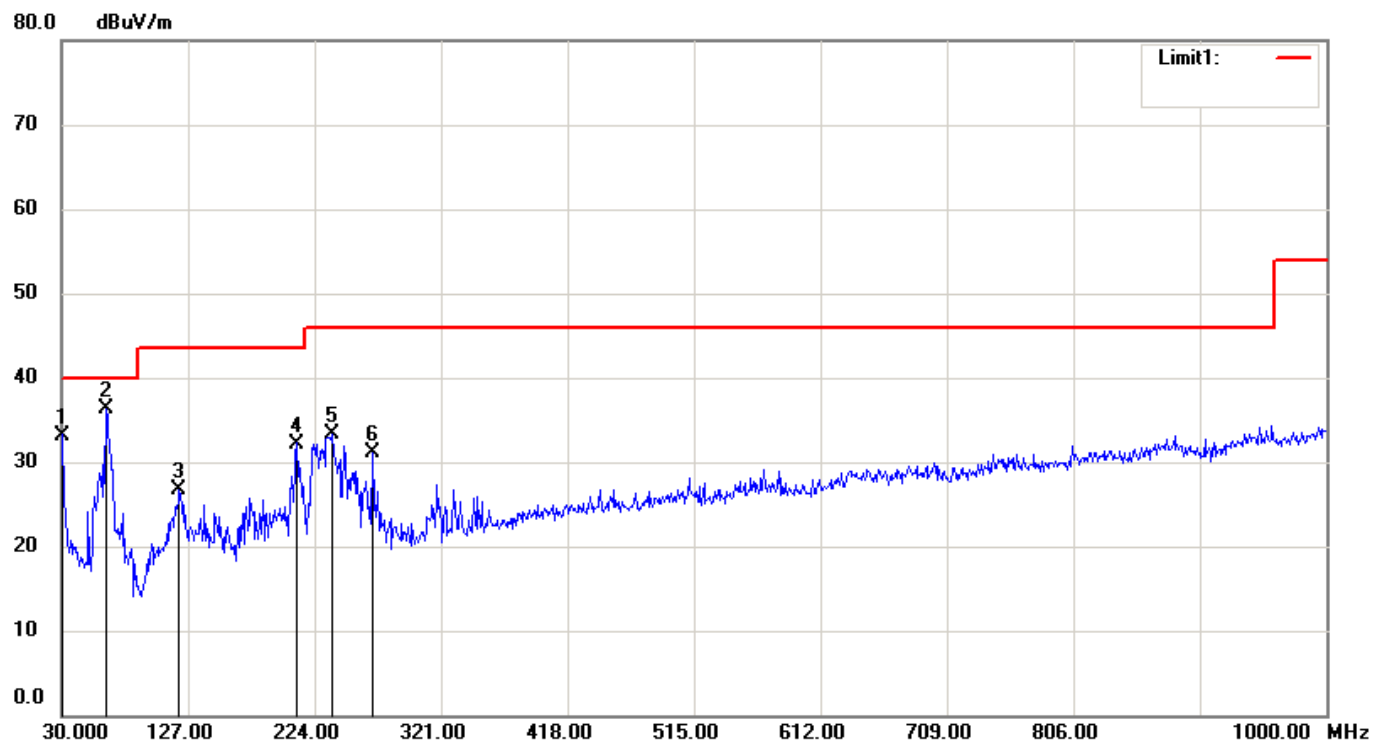
#77

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: D Door Antenna & P Door Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	30.9700	40.84	peak	-7.64	33.20	40.00	-6.80
2	63.9500	48.05	peak	-11.68	36.37	40.00	-3.63
3	120.2100	32.17	peak	-5.50	26.67	43.50	-16.83
4	210.4200	42.01	peak	-9.81	32.20	43.50	-11.30
5	237.5800	40.98	peak	-7.67	33.31	46.00	-12.69
6	268.6200	37.02	peak	-5.94	31.08	46.00	-14.92

File: 19-10-MAS-023

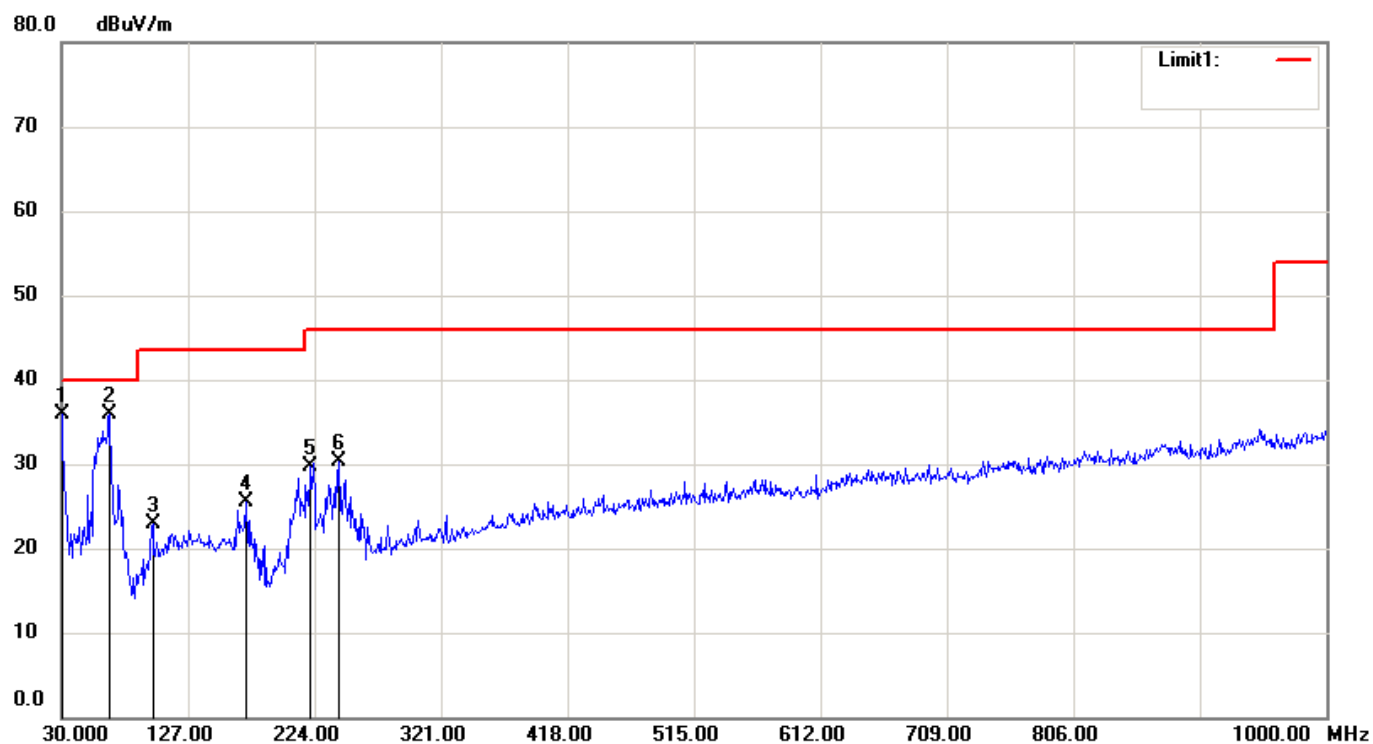
#78

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: D Door Antenna & P Door Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	30.0000	43.47	peak	-7.54	35.93	40.00	-4.07
2	66.8600	48.38	peak	-12.44	35.94	40.00	-4.06
3	99.8400	31.20	peak	-8.37	22.83	43.50	-20.67
4	171.6200	35.02	peak	-9.52	25.50	43.50	-18.00
5	221.0900	38.74	peak	-9.03	29.71	46.00	-16.29
6	242.4300	37.70	peak	-7.36	30.34	46.00	-15.66

註：量測不準確度: $\pm 4.6\text{dB}$ ($30\text{MHz} \leq f < 300\text{MHz}$) $\pm 4.4\text{dB}$ ($300\text{MHz} \leq f < 1\text{GHz}$) $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

4.5.3.5 Mode 5

File: 19-10-MAS-023

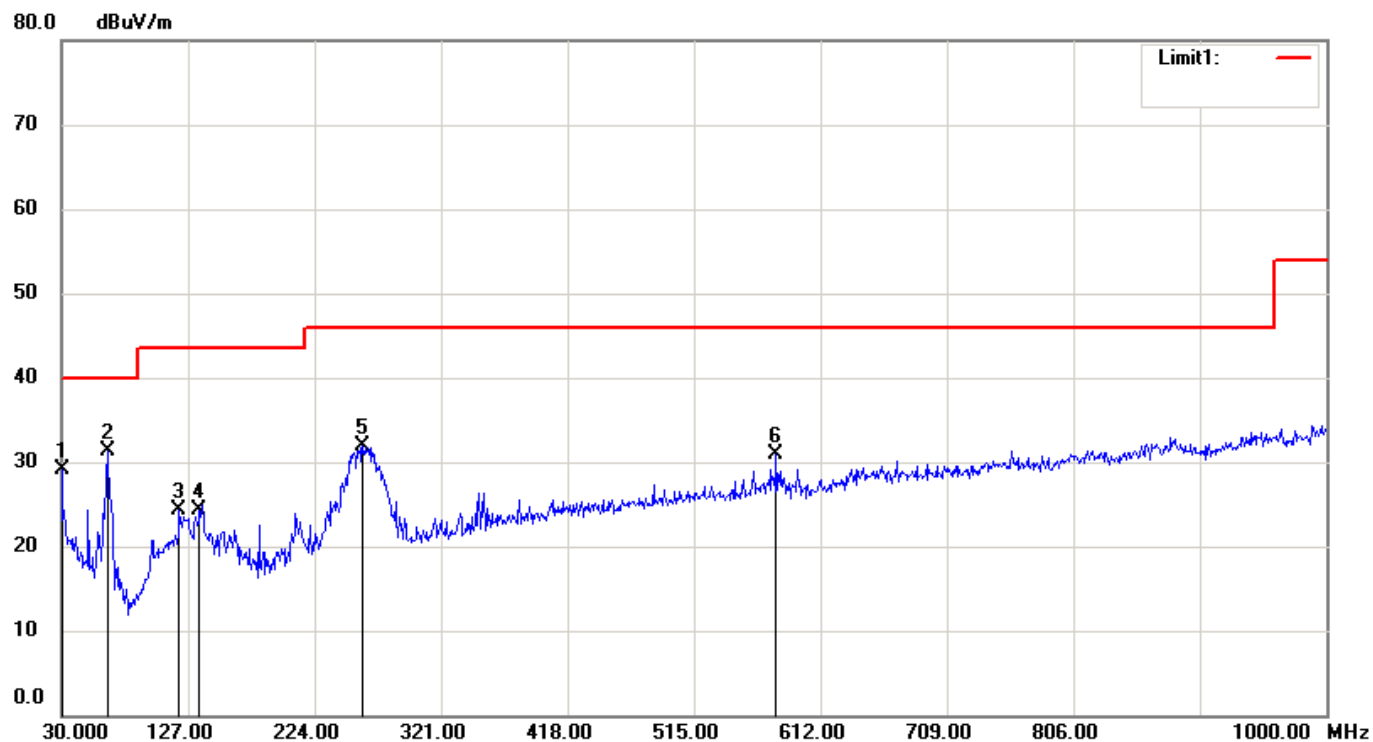
#79

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Horizontal

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBuV/m)		dB/m	(dBuV/m)	(dBuV/m)	(dB)
1	30.0000	36.72	peak	-7.54	29.18	40.00	-10.82
2	64.9200	43.30	peak	-11.94	31.36	40.00	-8.64
3	120.2100	29.85	peak	-5.50	24.35	43.50	-19.15
4	135.7300	29.78	peak	-5.56	24.22	43.50	-19.28
5	260.8600	38.02	peak	-6.15	31.87	46.00	-14.13
6	578.0500	31.11	peak	-0.21	30.90	46.00	-15.10

File: 19-10-MAS-023

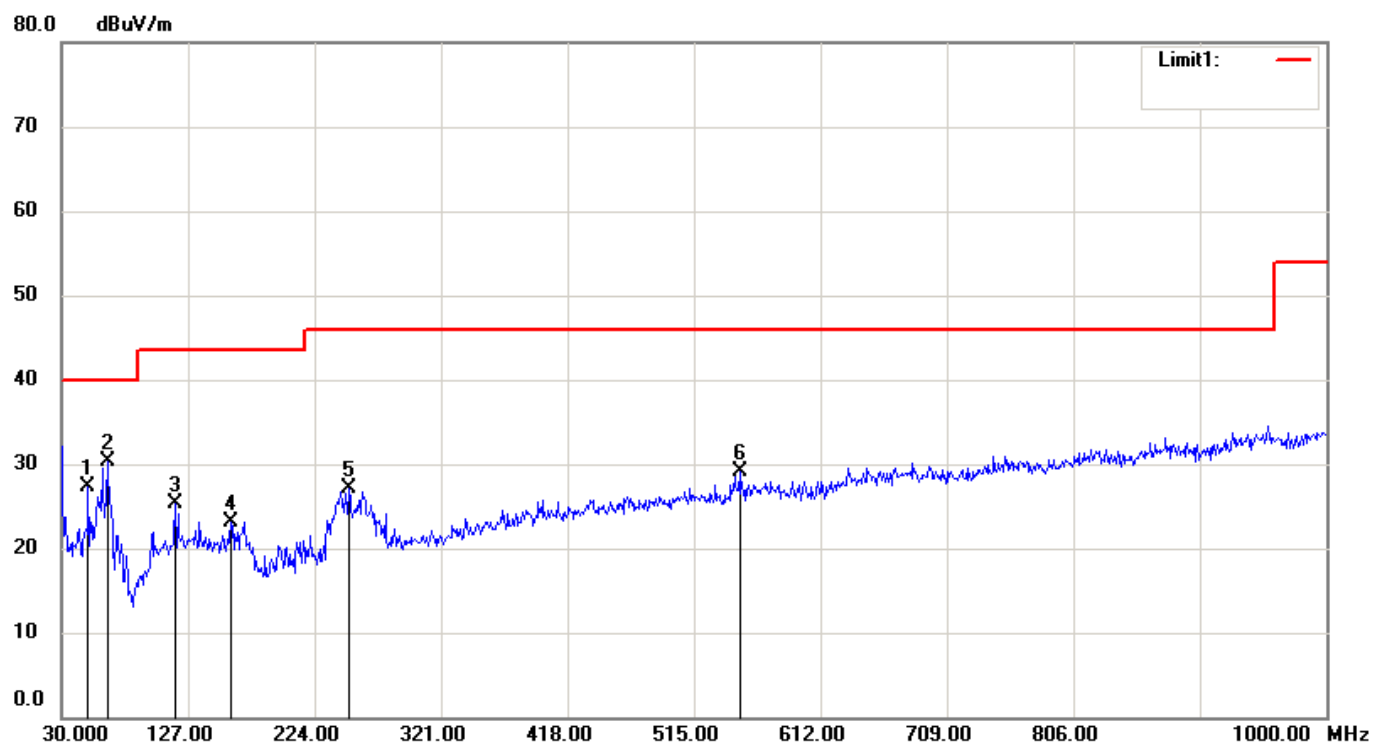
#80

2019/10/23

Temperature: 26 °C

Site RE02-EMC B1- N2

Humidity: 57 %



Condition: NCC_LP0002_30-1000MHz

Polarization: Vertical

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode: TX

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1	50.3700	36.32	peak	-9.06	27.26	40.00	-12.74
2	64.9200	42.17	peak	-11.94	30.23	40.00	-9.77
3	117.3000	31.06	peak	-5.67	25.39	43.50	-18.11
4	159.9800	31.01	peak	-7.84	23.17	43.50	-20.33
5	250.1900	33.86	peak	-6.75	27.11	46.00	-18.89
6	549.9200	29.32	peak	-0.30	29.02	46.00	-16.98

註：量測不準確度: $\pm 4.6\text{dB}$ ($30\text{MHz} \leq f < 300\text{MHz}$) $\pm 4.4\text{dB}$ ($300\text{MHz} \leq f < 1\text{GHz}$) $\pm 4.1\text{dB}$ ($1\text{GHz} \leq f \leq 18\text{GHz}$)

4.6 結果判定

輻射干擾皆低於限制值，合乎標準規定。

4.7 輻射之測試配置

圖 1：量測頻率低於30MHz之測試配置

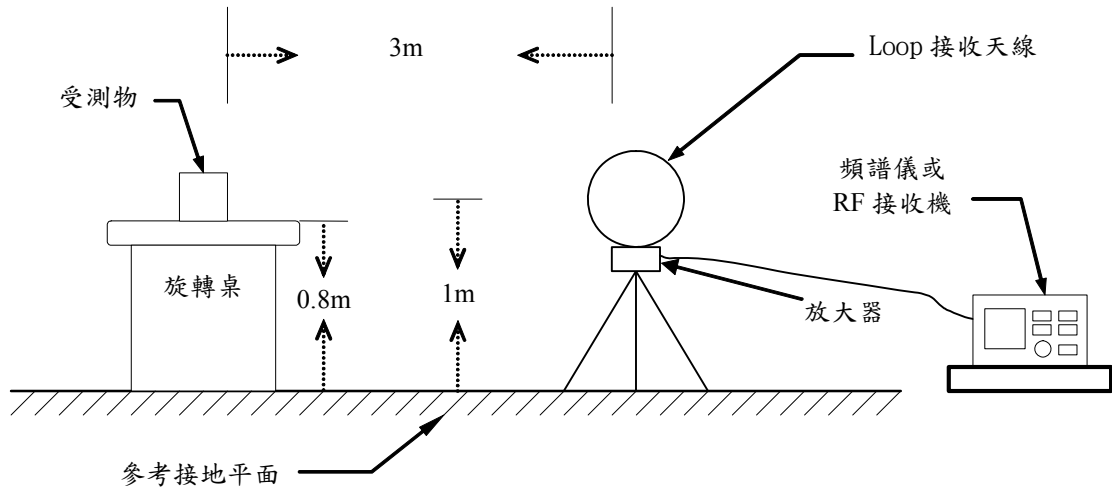
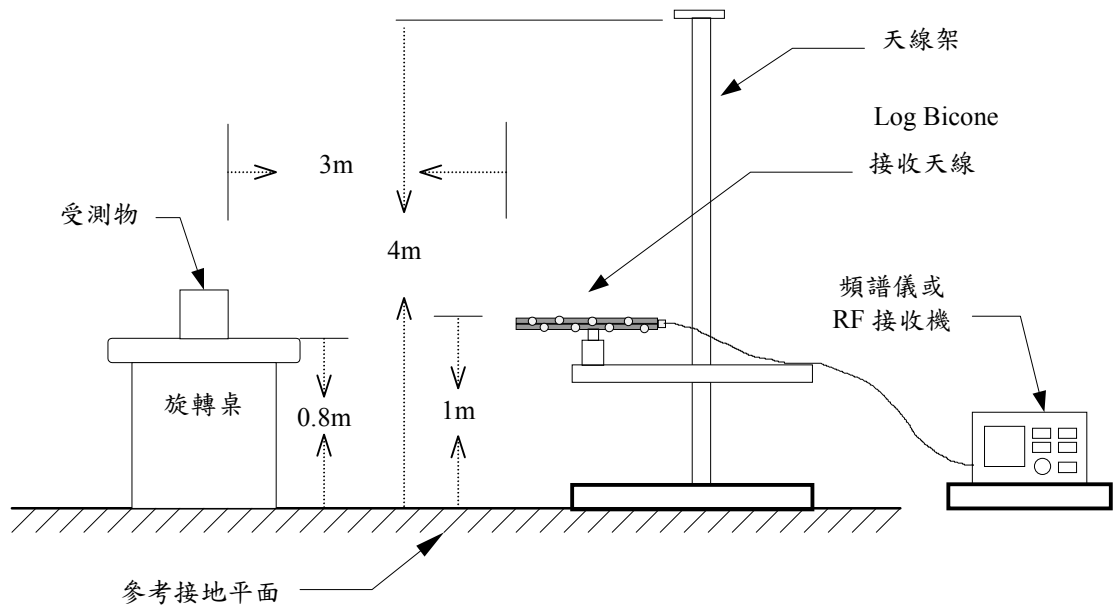


圖 2：量測頻率大於30MHz小於1GHz之測試配置



4.8 輻射量測之配置照片

請參考產品照片

5 電源線傳導干擾之量測

由於此 Smart LF Oscillator (With Wireless Function) 使用直流電源，且由電池供電，故無須作傳導測試。

6 工作頻率範圍之量測

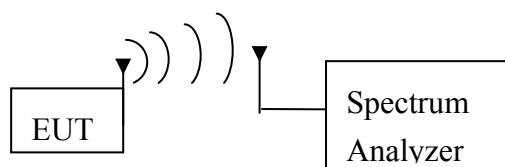
6.1 適用標準

依據國家通訊傳播委員會低功率射頻電機技術規範2.7節之規定，主波工作頻率範圍不得使用下表所列各頻帶內之頻率。

MHz	MHz
0.090 - 0.110	1660.0 – 1785.0
0.490 - 0.510	1805.0 – 1880.0
2.172 - 2.198	1855.0 – 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	

6.2 頻率範圍之測試配置

如圖所示。



6.3 頻率範圍之量測儀器

儀器名稱	製造者	型 號
Spectrum Analyzer	Agilent	E4446A

測試軟體: LZ-RF (Ver. ETC-3A2)

6.4 頻率範圍之量測結果

測試工程師：許志宏

測試日期: Oct. 22, 2019

環境溫度: 24°C

環境濕度: 55%

相對於主波峰值功率 20dB 處之上下頻率皆落於範圍內，符合規範2.7節要求。

[註]：繪圖資料請參考第58-62頁。

Mode 1

File: 19-10-MAS-023

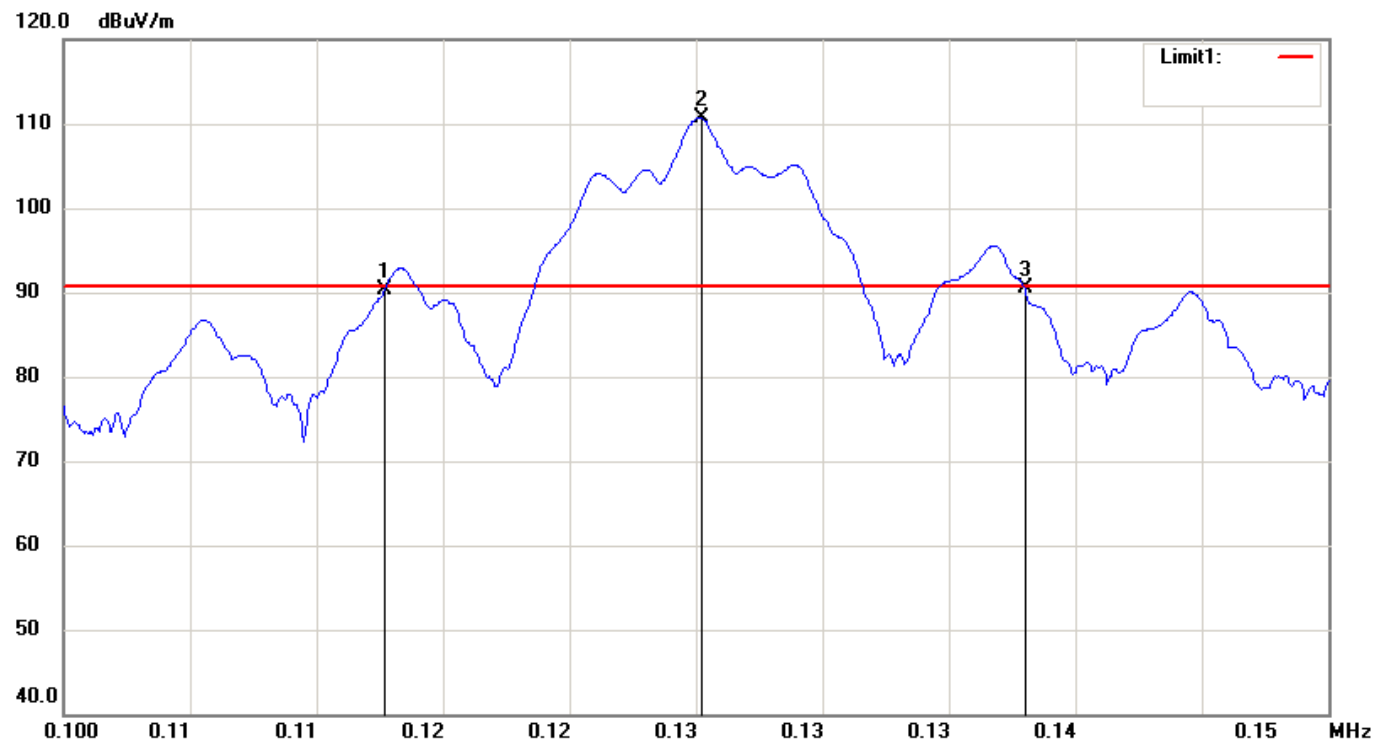
#57

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition:

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode:

Operator: Bruce

Note: D Door Antenna

No.	Frequency	Reading	Detector
	(MHz)	(dBuV/m)	
1	0.1127	51.70	peak
2	0.1252	72.76	peak
3	0.1380	53.08	peak

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	0.0253	0.15

Mode 2

File: 19-10-MAS-023

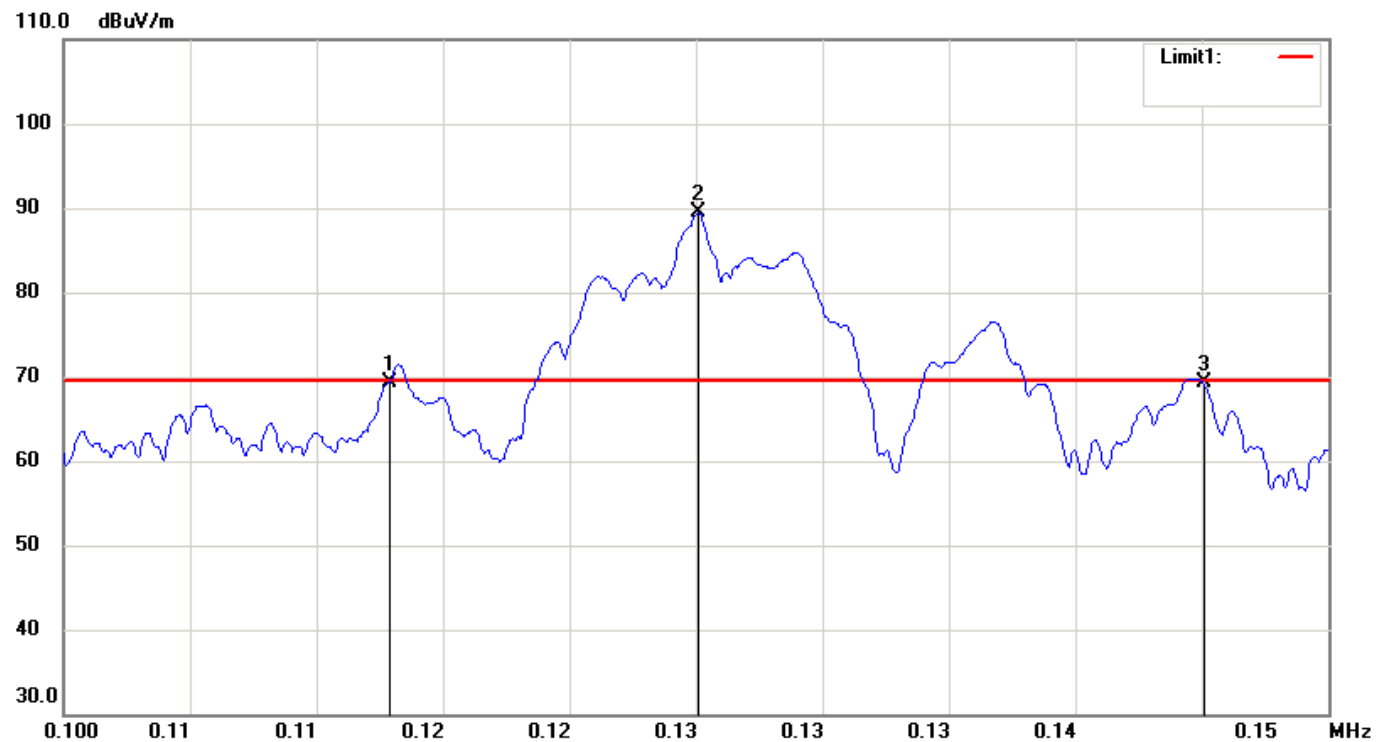
#54

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition:

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode:

Operator: Bruce

Note: Back Door Antenna

No.	Frequency	Reading	Detector
	(MHz)	(dBuV/m)	
1	0.1129	30.75	peak
2	0.1251	51.41	peak
3	0.1451	32.22	peak

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	0.0322	-0.09

Mode 3

File: 19-10-MAS-023

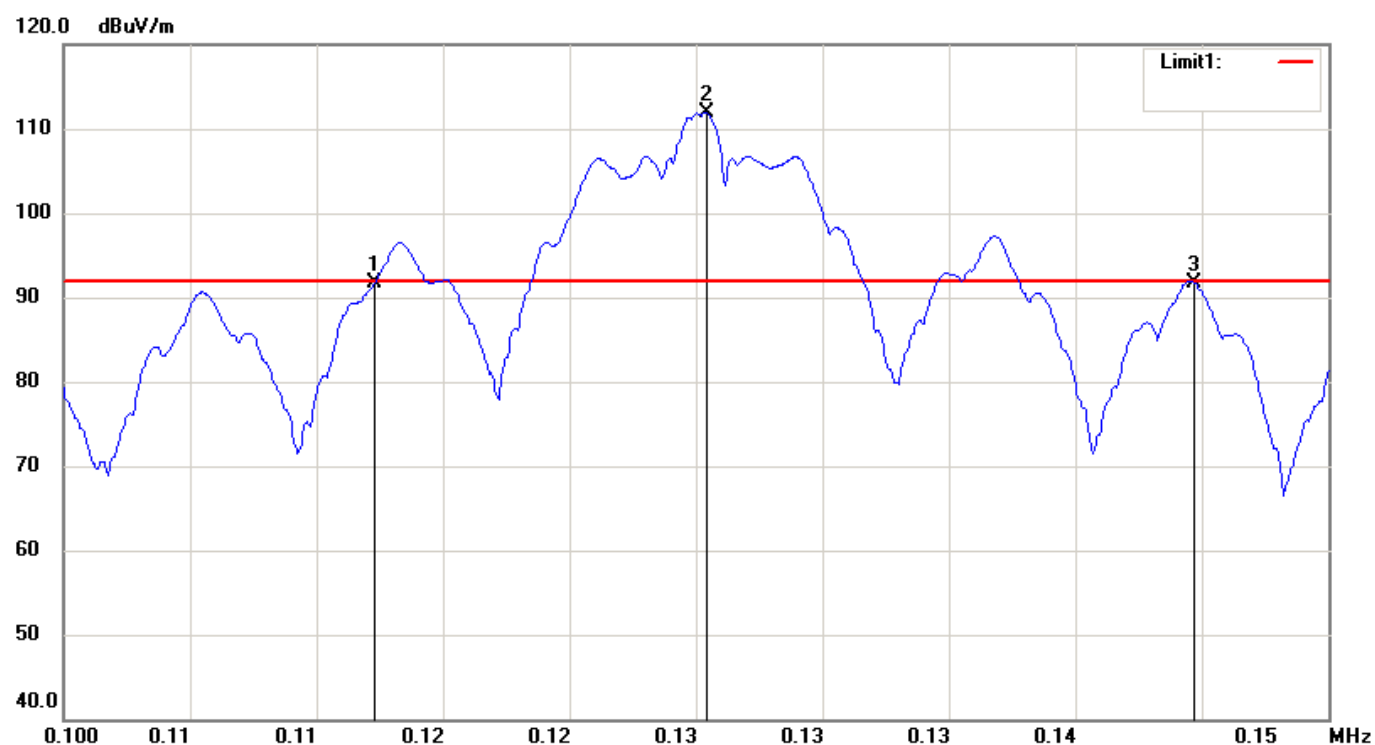
#55

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition:

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode:

Operator: Bruce

Note: Fr Antenna

No.	Frequency	Reading	Detector
	(MHz)	(dBuV/m)	
1	0.1123	53.15	peak
2	0.1254	73.88	peak
3	0.1447	54.72	peak

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	0.0324	0.01

Mode 4

File: 19-10-MAS-023

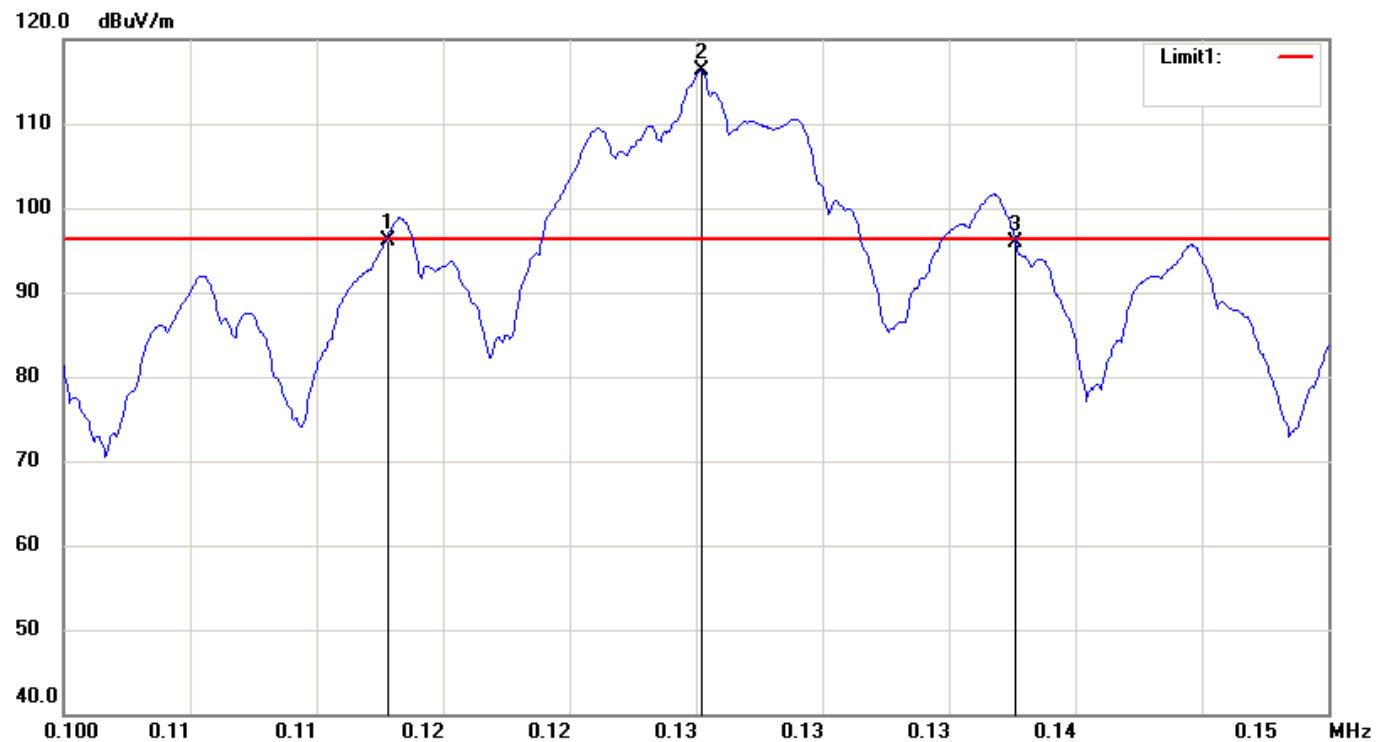
#58

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition:

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode:

Operator: Bruce

Note: D Door Antenna & P Door Antenna

No.	Frequency	Reading	Detector
	(MHz)	(dBuV/m)	
1	0.1128	57.54	peak
2	0.1252	78.30	peak
3	0.1376	58.52	peak

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	0.0248	-0.22

Mode 5

File: 19-10-MAS-023

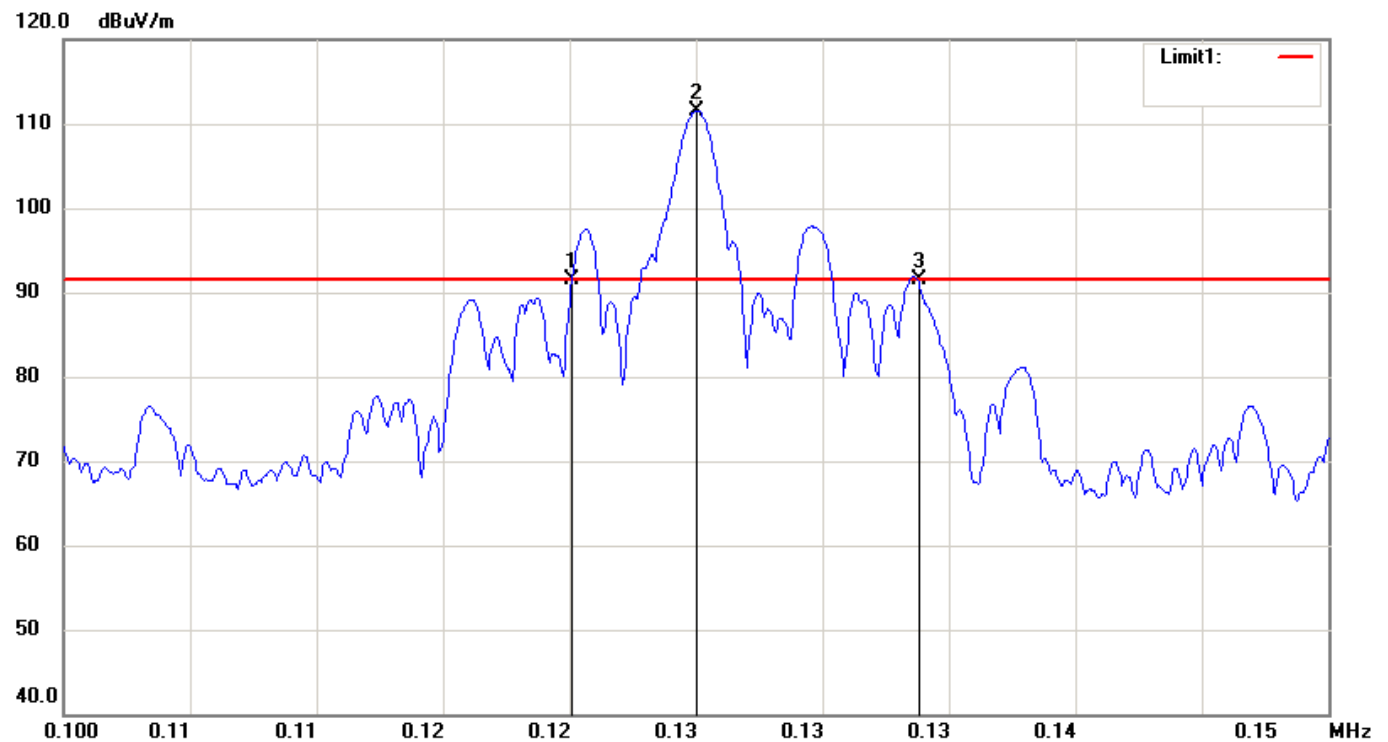
#56

2019/10/22

Temperature: 24 °C

Site RE02-EMC B1- N2

Humidity: 55 %



Condition:

Polarization:

EUT: Smart LF Oscillator (With Wireless Function)

Distance: 3m

Model: TMLF19T-1

Test Mode:

Operator: Bruce

Note: Immobilizer Antenna

No.	Frequency	Reading	Detector
	(MHz)	(dBuV/m)	
1	0.1201	53.19	peak
2	0.1250	73.52	peak
3	0.1338	53.89	peak

No.		Δ Frequency(MHz)	Δ Level(dB)
1	mk3-mk1	0.0137	0.04

7 天線之要求

7.1 適用標準

低功率發射機，依據國家通訊傳播委員會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。

7.2 天線樣式

Smart LF Oscillator (With Wireless Function)使用固定式天線連接於主體上，請見產品及天線之內部及外觀照。

8 量測之儀器

儀器名稱	製造者	型號	財產編號/序號	校驗日期	下次校驗日期
EMI Receiver	R&S	ESCI	13054423-001	01/04/2019	01/03/2020
Loop Antenna	EMCO	6512	13054104-001	01/03/2019	01/02/2020
PRE-Amplifier	Agilent	8447D	13040715-002	04/24/2019	04/23/2020
BiLog Antenna	ETC	MCTD 2786	BL19J04024	01/15/2019	01/14/2020
Spectrum Analyzer	R&S	FSV	13052017-001	07/05/2019	07/04/2020