

**FCC PART SUBPART C 15.225 TEST REPORT**

**for**

**RFID Reader**

**Model No.: FL20S-NC**

**FCC ID: WXAFL20S-NC**

**of**

**Applicant: GIGA-TMS INC.**

**Address: 8F, NO.31, LANE 169, KANG-NING ST., HSI-CHIH,  
NEW TAIPEI CITY, 22180 TAIWAN**

**Tested and Prepared**

**by**

**Worldwide Testing Services (Taiwan) Co., Ltd.**

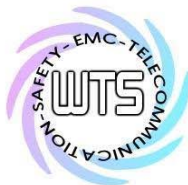
**FCC Registration No.: TW1477, TW0020, TW1072**

**Industry Canada filed test laboratory Reg. No.: TW1477**

**A2LA Accredited No.: 2732.01**



**Report No.: W6M21810-18507-C-2**



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### **Appendix: Diagrams**



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## **1 General Information**

### **1.1 Notes**

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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### **Tester:**

June 14, 2019

Spencer Yang

*Spencer*

Date

WTS-Lab.

Name

Signature

### **Technical responsibility for area of testing:**

June 14, 2019

Kevin Wang

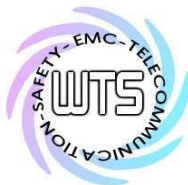
*Kevin Wang*

Date

WTS

Name

Signature



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## **1.2 Testing laboratory**

### **1.2.1 Location**

OATS

No.5-1, Lishui, Shuang Sing Village,  
Wanli Dist., New Taipei City 207,  
Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

TEL:886-2-6613-0228

FAX:886-2-2791-5046

Company

Worldwide Testing Services(Taiwan) Co., Ltd.

6F, NO. 58, LANE 188, RUEY-KUANG RD.

NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

### **1.2.2 Details of accreditation status**

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. TW1477, TW0020, TW1072

Industry Canada filed test laboratory Reg. No. TW1477

**Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :**

Name: ./.

Accredited number: ./.

Street: ./.

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.

## **1.3 Details of approval holder**

Name: GIGA-TMS INC.

Street: 8F, NO.31, LANE 169, KANG-NING ST.,HSI-CHIH,

Town: NEW TAIPEI CITY, 22180

Country: TAIWAN

Telephone: +886-2-26954214

Fax: +886-2-26954213



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## **1.4 Application details**

Date of receipt of test item: October 12, 2018

Date of test: from October 15, 2018 to June 11, 2019

## **1.5 General information of Test item**

Type of test item: RFID Reader

Model Number: FL20S-NC

Multi-listing model number: FL20S-10

Brand name: PROMAG,GIGATEK,ProxData

Photos: ./.

Transmitting Frequency: 13.56 MHz

Operation modes: Half-duplex

Antenna Type: Loop Antenna

Power supply: 12 Vd.c.

### **Manufacturer: (if different from Approval Holder)**

Name: GIGATEK INC.

Street: No. 47, Hsiang Ho Road, Tantz District,

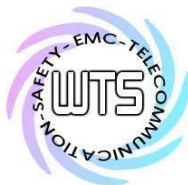
Town: Taichung City 42741,

Country: Taiwan, R.O.C.

Additional information: ./.

## **1.6 Test standards**

Technical standard : FCC RULES PART 15 SUBPART C § 15.225 (2018-10)



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## **2 Technical test**

### **2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



**or**

The deviations as specified in 3 were ascertained in the course of the tests performed.



### **2.2 Test environment**

Relative humidity content: 20 ... 75 %

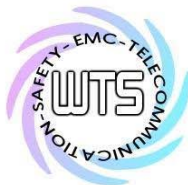
Air pressure: 86 ... 103 kPa

Details of power supply: 12 Vd.c.

Extreme conditions parameters: ./.

| Test item Name                                                                                                                              | Measurement Uncertainty                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Estimation Result of Uncertainty of Conducted Emission                                                                                      | Expanded Uncertainty :<br>AMN : 1.30 dB<br>Voltage probe : 1.36 dB                                                     |
| Estimation Result of Uncertainty of Radiated Emission(3M)                                                                                   | Expanded Uncertainty :<br>0.009-30 MHz : 2.02 dB<br>30-1000 MHz : 3.49 dB<br>1-18 GHz : 3.01 dB<br>18-40 GHz : 2.43 dB |
| Estimation Result of Uncertainty of Bandwidth Measurement<br>20 dB Bandwidth, Occupied bandwidth, Channel bandwidth,<br>Necessary Bandwidth | Expanded Uncertainty : 0.45 kHz                                                                                        |
| Estimation Result of Uncertainty of Frequency Drift<br>Measurement<br>Frequency stability                                                   | Expanded Uncertainty : 6.11 Hz                                                                                         |

The decision rule is : Measurement uncertainty is not taken into account.



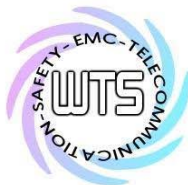
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## 2.3 Test Equipment List

| No.          | Test equipment                                     | Type            | Serial No.    | Manufacturer          | Cal. Date     | Next Cal. Date |
|--------------|----------------------------------------------------|-----------------|---------------|-----------------------|---------------|----------------|
| ETSTW-CE 001 | EMI TEST RECEIVER                                  | ESHS10          | 842121/013    | R&S                   | 2019/5/20     | 2020/5/19      |
| ETSTW-CE 003 | AC POWER SOURCE                                    | APS-9102        | D161137       | GW                    | Function Test |                |
| ETSTW-CE 004 | ZWEILEITER-V-NETZNACHBILDUNG<br>TWO-LINE V-NETWORK | ESH3-Z5         | 840731/011    | R&S                   | 2018/11/1     | 2019/10/31     |
| ETSTW-CE 006 | IMPULSBEGRENZER<br>PULSE LIMITER                   | ESH3-Z2         | 100226        | R&S                   | 2018/8/21     | 2019/8/20      |
| ETSTW-CE 008 | HF-EICHELITUNG RF<br>STEP ATTENUATOR<br>139dB DPSP | 334.6010.02     | 844581/024    | R&S                   | Function Test |                |
| ETSTW-CE 009 | TEMP.&HUMIDITY<br>CHAMBER                          | GTH-225-40-1P-U | MAA0305-009   | GIANT FORCE           | 2018/7/13     | 2019/7/12      |
| ETSTW-CE 016 | TWO-LINE V-NETWORK                                 | ENV216          | 100050        | R&S                   | 2018/9/25     | 2019/9/24      |
| ETSTW-CE 028 | MXE EMI Receiver                                   | N9038A          | MY53220110    | Agilent               | 2018/7/16     | 2019/7/15      |
| ETSTW-RE 003 | EMI TEST RECEIVER                                  | ESI 26          | 831438/001    | R&S                   | 2019/5/20     | 2020/5/19      |
| ETSTW-RE 004 | EMI TEST RECEIVER                                  | ESI 40          | 832427/004    | R&S                   | 2019/5/29     | 2020/5/28      |
| ETSTW-RE 012 | TUNABLE BANDREJECT<br>FILTER                       | D.C 0309        | 146           | K&L                   | Function Test |                |
| ETSTW-RE 013 | TUNABLE BANDREJECT<br>FILTER                       | D.C 0336        | 397           | K&L                   | Function Test |                |
| ETSTW-RE 018 | MICROWAVE HORN<br>ANTENNA                          | AT4560          | 27212         | AR                    | 2018/7/13     | 2019/7/12      |
| ETSTW-RE 027 | Passive Loop Antenna                               | 6512            | 00034563      | ETS-Lindgren          | 2018/7/12     | 2019/7/11      |
| ETSTW-RE 030 | Double-Ridged Guide Horn<br>Antenna                | 3117            | 00035224      | ETS-Lindgren          | 2019/4/2      | 2020/4/1       |
| ETSTW-RE 042 | Biconical Antenna                                  | HK116           | 100172        | R&S                   | 2019/1/29     | 2020/1/28      |
| ETSTW-RE 043 | Log-Periodic Dipole<br>Antenna                     | HL223           | 100166        | R&S                   | 2019/4/23     | 2020/4/22      |
| ETSTW-RE 044 | Log-Periodic Antenna                               | HL050           | 100094        | R&S                   | 2019/5/13     | 2020/5/12      |
| ETSTW-RE 045 | ESA-E SERIES<br>SPECTRUM ANALYZER                  | E4404B          | MY45111242    | Agilent               | Pre-test Use  |                |
| ETSTW-RE 050 | Attenuator 10dB                                    | 50HF-010-1      | None          | JFW                   | 2019/2/27     | 2020/2/26      |
| ETSTW-RE 051 | Attenuator 6dB                                     | 50HF-006-1      | None          | JFW                   | 2019/2/27     | 2020/2/26      |
| ETSTW-RE 053 | Attenuator 3dB                                     | 50HF-003-1      | None          | JFW                   | 2019/2/27     | 2020/2/26      |
| ETSTW-RE 055 | SPECTRUM ANALYZER                                  | FSU 26          | 200074        | R&S                   | 2019/3/5      | 2020/3/4       |
| ETSTW-RE 060 | Attenuator 30dB                                    | 5015-30         | F651012z-01   | ATM                   | 2019/2/27     | 2020/2/26      |
| ETSTW-RE 062 | Amplifier Module                                   | CHC 2           | None          | KMIC                  | 2019/5/16     | 2020/5/15      |
| ETSTW-RE 064 | Bluetooth Test Set                                 | MT8852B-042     | 6K00005709    | Anritsu               | Function Test |                |
| ETSTW-RE 069 | Double-Ridged Guide Horn<br>Antenna                | 3117            | 00069377      | ETS-Lindgren          | Function Test |                |
| ETSTW-RE 072 | CELL SITE TEST SET                                 | 8921A           | 3339A00375    | HP                    | 2018/9/17     | 2019/9/16      |
| ETSTW-RE 088 | SOLID STATE<br>AMPLIFIER                           | KMA180265A01    | 99057         | KMIC                  | 2018/9/18     | 2019/9/17      |
| ETSTW-RE 091 | Match Pad                                          | MDCS1500        | None          | WOKEN                 | 2019/5/9      | 2020/5/8       |
| ETSTW-RE 099 | DC Block                                           | 50DB-007-1      | None          | JFW                   | 2019/2/22     | 2020/2/21      |
| ETSTW-RE 112 | AC POWER SOURCE                                    | TFC-1005        | T-0A023536    | T-Power               | Function test |                |
| ETSTW-RE 115 | 2.4GHz Notch Filter                                | N0124411        | 473874        | MICROWAVE<br>CIRCUITS | 2019/1/15     | 2020/1/14      |
| ETSTW-RE 120 | RF Player                                          | MP9200          | MP9210-111022 | ADIVIC                | Function test |                |

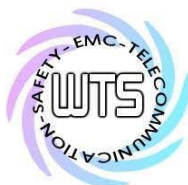


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|                 |                                      |                                        |                 |                    |                  |            |
|-----------------|--------------------------------------|----------------------------------------|-----------------|--------------------|------------------|------------|
| ETSTW-RE 122    | SIGNAL GENERATOR                     | SMF100A                                | 102149          | R&S                | 2019/5/20        | 2020/5/19  |
| ETSTW-RE 125    | 5GHz Notch filter                    | 5NSL11-5200/E221.3-O/O                 | 1               | K&L Microwave      | 2018/8/8         | 2019/8/7   |
| ETSTW-RE 126    | 5GHz Notch filter                    | 5NSL12-5800/E221.3-O/O                 | 1               | K&L Microwave      | 2018/8/8         | 2019/8/7   |
| ETSTW-RE 127    | RF Switch Box                        | RFS-01                                 | None            | WTS                | 2019/2/26        | 2020/2/25  |
| ETSTW-RE 128    | 5.3GHz Notch filter                  | N0153001                               | SN487233        | Microwave Circuits | 2018/8/8         | 2019/8/7   |
| ETSTW-RE 129    | 5.5GHz Notch filter                  | N0555984                               | SN487234        | Microwave Circuits | 2018/8/8         | 2019/8/7   |
| ETSTW-RE 130    | Handheld RF Spectrum Analyzer        | N9340A                                 | CN0147000204    | Agilent            | Pre-test Use     |            |
| ETSTW-RE 142    | Amplifier                            | 8447D                                  | 2805A03378      | Agilent            | 2019/5/16        | 2020/5/15  |
| ETSTW-RE 147    | Bi-log Hybrid Antenna                | MCTD 2786B                             | BLB16M04005     | ETC                | 2019/4/2         | 2020/4/1   |
| ETSTW-RE 151    | Thermohygrometer                     | 608-h1                                 | 45104376        | TESTO              | 2018/8/17        | 2019/8/16  |
| ETSTW-EMI 011   | USB Compact Modulator                | SFC-U                                  | 101689          | R&S                | 2019/5/16        | 2020/5/15  |
| ETSTW-EMS 008   | Exposure Level Tester                | ELT-400                                | G-0009          | Narda              | 2018/7/17        | 2019/7/16  |
| ETSTW-GSM 002   | Universal Radio Communication Tester | CMU 200                                | 109439          | R&S                | 2019/3/5         | 2020/3/4   |
| ETSTW-GSM 003   | Radio Communication Analyzer         | MT8820C                                | 6201342073      | Anritsu            | 2019/3/26        | 2020/3/25  |
| ETSTW-GSM 004   | Wideband Radio Communication Tester  | CMW500                                 | 128092          | R&S                | 2018/10/19       | 2019/10/18 |
| ETSTW-GSM 019   | Band Reject Filter                   | WRCTF824/849-822/851-40 /12+9SS        | 3               | WI                 | 2019/1/14        | 2020/1/13  |
| ETSTW-GSM 020   | Band Reject Filter                   | WRCD1747/1748-1743/1752-32/5SS         | 1               | WI                 | 2019/1/14        | 2020/1/13  |
| ETSTW-GSM 021   | Band Reject Filter                   | WRCD1879.5/1880.5-1875.5/1884.5-32/5SS | 3               | WI                 | 2019/1/14        | 2020/1/13  |
| ETSTW-GSM 022   | Band Reject Filter                   | WRCT901.9/903.1-904.25-50/8SS          | 1               | WI                 | 2019/1/14        | 2020/1/13  |
| ETSTW-GSM 023   | Power Divider                        | 4901.19.A                              | None            | SUHNER             | 2018/9/12        | 2019/9/11  |
| ETSTW-GSM 024   | Radio Communication Analyzer         | MT8821C                                | None            | Anritsu            | 2019/3/5         | 2020/3/4   |
| ETSTW-GSM 025   | Band Reject Filter                   | BRM19835                               | 001             | Micro-Tronics      | 2018/8/9         | 2019/8/8   |
| ETSTW-Cable 011 | SMA to N type Cable                  | RGU-400                                | None            | THERMAX            | Pre-test Use NCR |            |
| ETSTW-Cable 016 | BNC Cable                            | Switch Box                             | B Cable 1       | Schwarz beck       | 2019/2/21        | 2020/2/20  |
| ETSTW-Cable 017 | BNC Cable                            | X Cable                                | B Cable 2       | Schwarz beck       | 2019/2/21        | 2020/2/20  |
| ETSTW-Cable 018 | BNC Cable                            | Y Cable                                | B Cable 3       | Schwarz beck       | 2019/2/21        | 2020/2/20  |
| ETSTW-Cable 019 | BNC Cable                            | Z Cable                                | B Cable 4       | Schwarz beck       | 2019/2/21        | 2020/2/20  |
| ETSTW-Cable 020 | N TYPE Cable                         | OATS Cable 1                           | N30N30-L335-15M | JYE BAO CO.,LTD.   | 2018/7/2         | 2019/7/1   |
| ETSTW-Cable 026 | Microwave Cable                      | SUCOFLEX 104                           | 279075          | HUBER+SUHNER       | 2019/2/25        | 2020/2/24  |
| ETSTW-Cable 027 | Microwave Cable                      | SUCOFLEX 104                           | 279083          | HUBER+SUHNER       | 2019/5/10        | 2020/5/9   |
| ETSTW-Cable 028 | Microwave Cable                      | FA147A0015M2020                        | 30064-2         | UTIFLEX            | 2018/9/18        | 2019/9/17  |
| ETSTW-Cable 029 | Microwave Cable                      | FA147A0015M2020                        | 30064-3         | UTIFLEX            | 2018/9/18        | 2019/9/17  |
| ETSTW-Cable 030 | Microwave Cable                      | SUCOFLEX 104 (S Cable 9)               | 279067          | HUBER+SUHNER       | 2019/2/25        | 2020/2/24  |
| ETSTW-Cable 043 | Microwave Cable                      | SUCOFLEX 104                           | 317576          | HUBER+SUHNER       | 2019/5/16        | 2020/5/15  |
| ETSTW-Cable 058 | Microwave Cable                      | SUCOFLEX 104                           | none            | HUBER+SUHNER       | 2019/6/4         | 2020/6/3   |
| ETSTW-Cable 064 | Microwave Cable                      | SUCOFLEX 104                           | MY28891         | HUBER+SUHNER       | 2019/5/16        | 2020/5/15  |
| ETSTW-Cable 066 | SMA type cable                       | 32022                                  | None            | ASTROLAB           | 2019/3/15        | 2020/3/14  |



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|                 |                     |                           |          |              |                  |           |
|-----------------|---------------------|---------------------------|----------|--------------|------------------|-----------|
| ETSTW-Cable 071 | N TYPE CABLE        | EMCCFD400-NM-<br>NM-25000 | 170239   | EMCI         | 2019/6/4         | 2020/6/3  |
| ETSTW-Cable 072 | SMA type cable (8m) | SUCOFLEX 104              | 805800/4 | HUBER+SUHNER | 2019/5/16        | 2020/5/15 |
| ETSTW-Cable 074 | SMA type cable (2m) | SUCOFLEX 104              | 802563/4 | HUBER+SUHNER | 2019/5/16        | 2020/5/15 |
| WTSTW-SW 002    | EMI TEST SOFTWARE   | EZ_EM C                   | None     | Farad        | Version ETS-03A1 |           |
| WTSTW-SW 006    | EMI TEST SOFTWARE   | e3                        | None     | AUDIX        | Version 9.161014 |           |
| WTSTW-SW 008    | Signal studio       | Agilent                   | None     | AUDIX        | Version 2.0.0.1  |           |



## **2.4 General Test Procedure**

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.10-2013 6.2 using a LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was according to ANSI STANDARD C63.10-2013 6.3 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBμV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

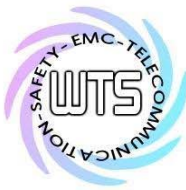
Example:

Freq (MHz)      METER READING + ACF + CABLE LOSS (to the receiver) = FS  
33                      20 dBμV + 10.36 dB + 6 dB = 36.36 dBμV/m @3m

The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.10-2013 Section 6.2.2 The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.



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When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:

Average = Peak + Duty Factor

Duty Factor =  $20 \log (\text{dwell time}/T)$

T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

ANSI STANDARD C63.10-2013 B.2.7: Any measurements that utilize special test software shall be indicated and referenced in the test report. During testing, test software 'EZ EMC' was used for setting up different operation modes.



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**3 Test results (enclosure)**

| TEST CASE                      | Para. Number       | Required                            | Test passed                         | Test failed              |
|--------------------------------|--------------------|-------------------------------------|-------------------------------------|--------------------------|
| Output Power Field Strength    | 15.225 (a) (b) (c) | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Out of Band Radiated Emissions | 15.225 (d)         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Band Edge                      | 15.225 (d)         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Occupied Bandwidth             | 2.1049             | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Frequency Stability            | 15.225 (e)         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Power Line Conducted Emission  | 15.207 (a)         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> |

The following is intentionally left blank.



Registration number: W6M21810-18507-C-2

FCC ID: WXAFL20S-NC

## 3.1 Output Power (Field Strength)

FCC Rules: 15.225 (a) (b) (c), 15.205, 15.209, 15.35

Operation within the band 13.110 - 14.010 MHz

Limit

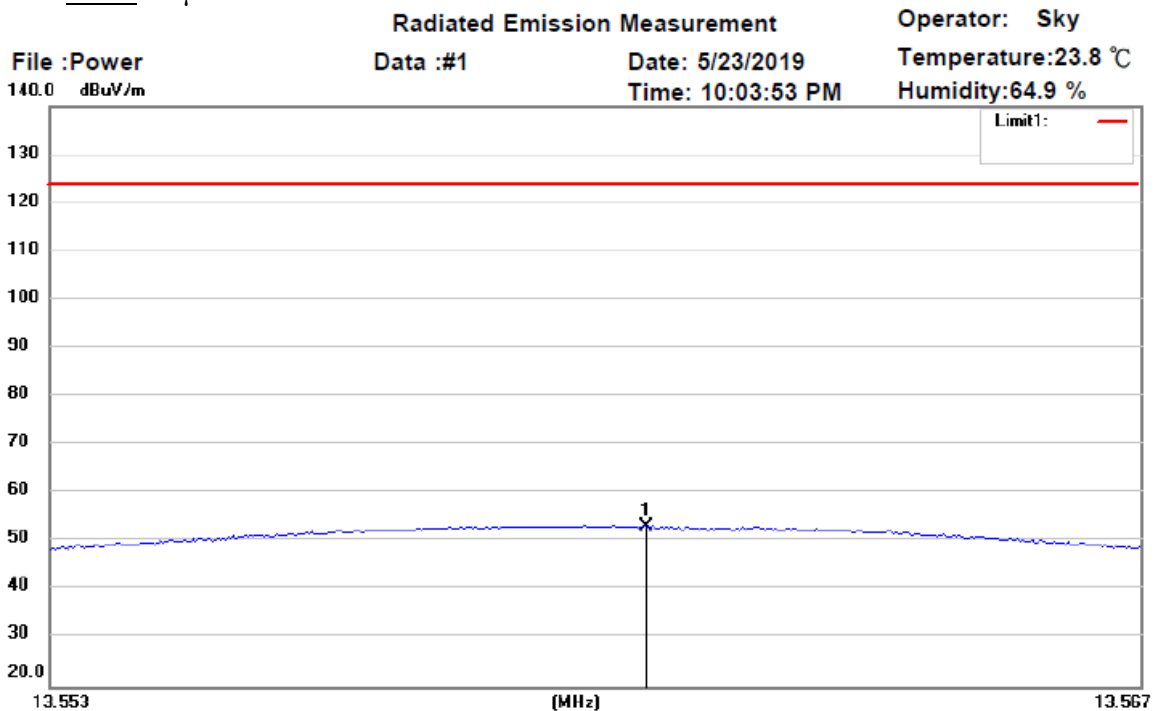
(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

Measurement Results:

The field strength at 3 meter distance as 53.29 dB $\mu$ V/m. Extrapolated with 40 dB to 30 meter distance it would be 13.29 dB $\mu$ V/m.



Site : Chamber

Condition : FCC 15.225 power (3m)

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

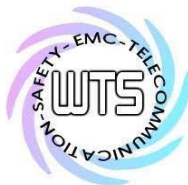
Polarization:

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
| *   | 13.5607         | 19.51          | peak     | 33.78               | 53.29           | 124.00         | 100          | 185            | -70.71      |         |

Test equipment used: ETSTW-RE 027, ETSTW-RE 004



Registration number: W6M21810-18507-C-2

FCC ID: WXAFL20S-NC

## 3.2 Out of Band Radiated Emissions

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

| Frequency of Emission (MHz) | Limit           | Measurement distance |
|-----------------------------|-----------------|----------------------|
| 0.009 – 0.490               | 2400 / f (KHz)  | 300                  |
| 0.49 – 1.705                | 24000 / f (KHz) | 30                   |
| 1.705 – 30                  | 30              | 30                   |
| 30 – 88                     | 100             | 3                    |
| 88 – 216                    | 150             | 3                    |
| 216 – 960                   | 200             | 3                    |
| Above 960                   | 500             | 3                    |

### Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

Summary table with radiated data of the test plots

Model: FL20S-NC

Date: --

Mode: --

Temperature: -- °C Engineer: --

Polarization: Horizontal

Humidity: -- %

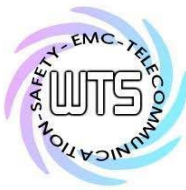
| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|----------|-------------|-----------------|----------------|-------------|---------------------|----------------|
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|-----------------|----------------|----------|-------------|-----------------|----------------|-------------|---------------------|----------------|
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |
| --              | --             | --       | --          | --              | --             | --          | --                  | --             |

### Note

1. Correction Factor = Antenna factor + Cable loss - Preamplifier
2. The formula of measured value as: Test Result = Reading + Correction Factor
3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
5. See attached diagrams in appendix.

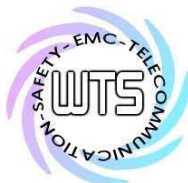


Registration number: W6M21810-18507-C-2  
FCC ID: WXAFL20S-NC

All other not noted test plots do not contain significant test results in relation to the limits  
Test results: The unit meet the FCC requirements.

Explanation: See attached diagrams for above 30MHz in appendix.  
For receiver part of above 30 MHz, please refer to test report no.: W6M21810-18507-P-15B.

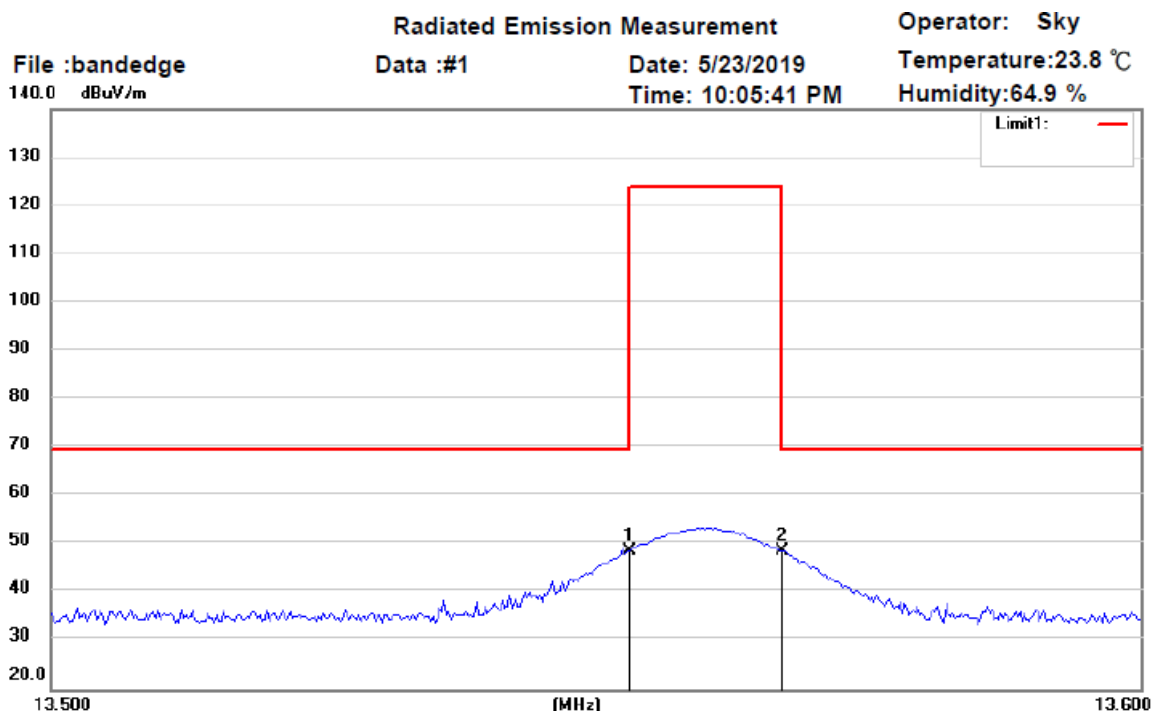
Test equipment used: ETSTW-RE 004, ETSTW-RE 027, ETSTW-RE 142, ETSTW-RE 147,  
ETSTW-RE 062



Registration number: W6M21810-18507-C-2

FCC ID: WXAFL20S-NC

## Test result of Band Edge



Site : Chamber

Condition : FCC 15.225 bandedge (3m)

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

Polarization:

Power : 12 Vd.c.

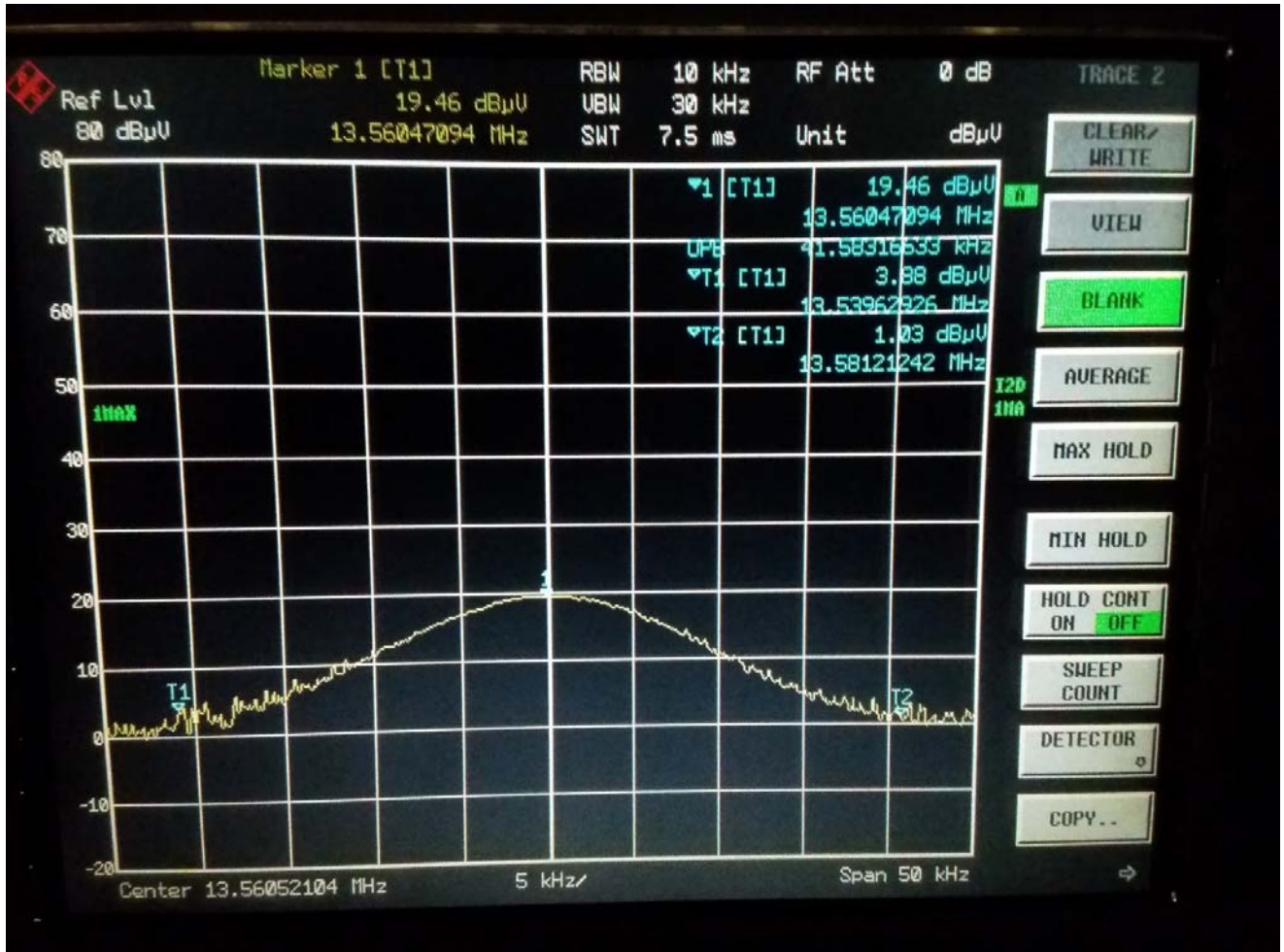
Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
| *   | 13.5530         | 14.90          | peak     | 33.78               | 48.68           | 69.50          | 100          | 185            | -20.82      |         |
|     | 13.5670         | 14.76          | peak     | 33.78               | 48.54           | 69.50          | 100          | 185            | -20.96      |         |

Test equipment used: ETSTW-RE 004, ETSTW-RE 027

Registration number: W6M21810-18507-C-2  
FCC ID: WXAFL20S-NC

## 3.3 Occupied Bandwidth



Test equipment used: ETSTW-RE 027, ETSTW-RE 004



Registration number: W6M21810-18507-C-2  
FCC ID: WXAFL20S-NC

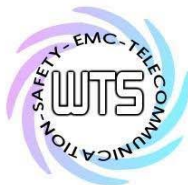
## **3.4 Frequency tolerance**

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20°C to +50°C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20°C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### **Measurement Results:**

| Temperature Degrees | Voltage(Vd.c.) | Frequency MHz | Frequency deviation kHz | Limit kHz(0.01%) |
|---------------------|----------------|---------------|-------------------------|------------------|
| 20°C                | 3.145          | 13.560802     | -0.962                  | 1.356            |
| 20°C                | 4.225          | 13.559041     | 0.799                   | 1.356            |
| 50°C                | 3.7            | 13.559840     | 0.000                   | 1.356            |
| 40°C                | 3.7            | 13.559840     | 0.000                   | 1.356            |
| 30°C                | 3.7            | 13.560321     | -0.481                  | 1.356            |
| *20°C               | 3.7            | 13.559840     | 0.000                   | 1.356            |
| 10°C                | 3.7            | 13.559840     | 0.000                   | 1.356            |
| 0°C                 | 3.7            | 13.559886     | -0.046                  | 1.356            |
| -10°C               | 3.7            | 13.559880     | -0.040                  | 1.356            |
| -20°C               | 3.7            | 13.560641     | -0.801                  | 1.356            |

Test equipment used: ETSTW-RE 055, ETSTW-CE 009



Registration number: W6M21810-18507-C-2

FCC ID: WXAFL20S-NC

## 3.5 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

| Model:             | FL20S-NC                     | Date:        | --                      |                             |           |                            |    |                |
|--------------------|------------------------------|--------------|-------------------------|-----------------------------|-----------|----------------------------|----|----------------|
| Mode:              | --                           | Temperature: | --                      | °C                          | Engineer: | --                         |    |                |
| Polarization:      | --                           | Humidity:    | --                      | %                           |           |                            |    |                |
| Frequency<br>(MHz) | Reading<br>(dBuV)<br>QP Ave. |              | Factor<br>(dB)<br>Corr. | Result<br>(dBuV)<br>QP Ave. |           | Limit<br>(dBuV)<br>QP Ave. |    | Margin<br>(dB) |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |
| --                 | --                           | --           | --                      | --                          | --        | --                         | -- | --             |

Polarization: --

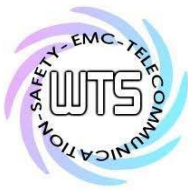
| Frequency<br>(MHz) | Reading<br>(dBuV)<br>QP Ave. |    | Factor<br>(dB)<br>Corr. | Result<br>(dBuV)<br>QP Ave. |    | Limit<br>(dBuV)<br>QP Ave. |    | Margin<br>(dB) |
|--------------------|------------------------------|----|-------------------------|-----------------------------|----|----------------------------|----|----------------|
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |
| --                 | --                           | -- | --                      | --                          | -- | --                         | -- | --             |

- Note: 1. The formula of measured value as: Test Result = Reading + Correction Factor  
2. The Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss  
3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average  
4. All not in the table noted test results are more than 20 dB below the relevant limits.  
5. Up Line: QP Limit Line, Down Line: Ave Limit Line.  
6. This test is not required.

### Limits:

| Frequency of Emission (MHz) | Conducted Limit (dBuV) |          |
|-----------------------------|------------------------|----------|
|                             | Quasi Peak             | Average  |
| 0.15-0.5                    | 66 to 56               | 56 to 46 |
| 0.5-5                       | 56                     | 46       |
| 5-30                        | 60                     | 50       |
|                             |                        |          |

Test equipment used: ETSTW-CE 001, ETSTW-CE 016, ETSTW-RE 045



Registration number: W6M21810-18507-C-2  
FCC ID: WXAFL20S-NC

## **Appendix**

### **Measurement diagrams**

Spurious Emissions Radiated



Address: 6F., No. 58, Ln 188, Ruey Kuang Rd, Neihu, Taipei  
Tel: +886-2-6606-8877  
Fax: +886-2-6606-8875

# Radiated Emission Measurement

Operator: Sky

File :1

Data :#1

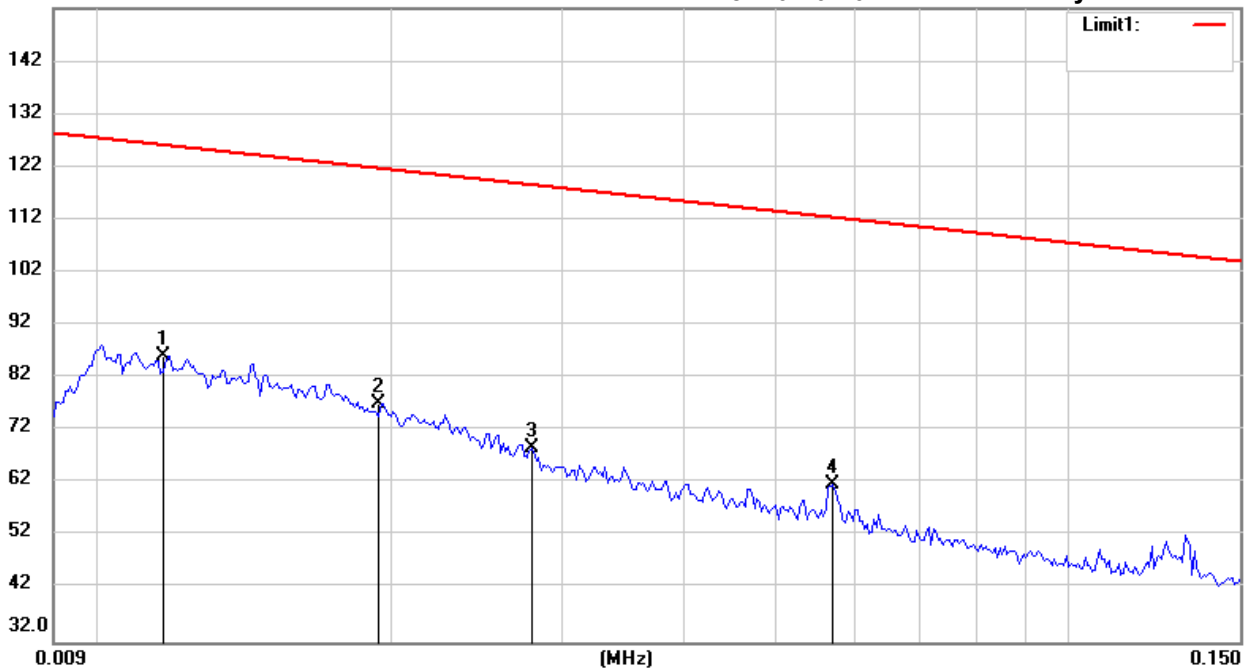
Date: 5/23/2019

Temperature: 23.8 °C

152.0 dBuV/m

Time: 10:20:10 PM

Humidity: 64.9 %



Site : Chamber

Condition : FCC 15.225 (3m)(<30MHz)

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

Polarization:

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
| *   | 0.0117          | -7.19          | peak     | 93.35               | 86.16           | 126.23         | 100          | 255            | -40.07      |         |
|     | 0.0195          | -9.06          | peak     | 86.13               | 77.07           | 121.80         | 100          | 170            | -44.73      |         |
|     | 0.0280          | -9.53          | peak     | 78.26               | 68.73           | 118.65         | 100          | 30             | -49.92      |         |
|     | 0.0572          | -9.02          | peak     | 70.83               | 61.81           | 112.45         | 100          | 160            | -50.64      |         |

\*:Maximum data    x:Over limit    !:over margin



Address: 6F., No. 58, Ln 188, Ruey Kuang Rd, NeiHu, Taipei  
Tel: +886-2-6606-8877  
Fax: +886-2-6606-8875

# Radiated Emission Measurement

Operator: Sky

File : 2

Data : #1

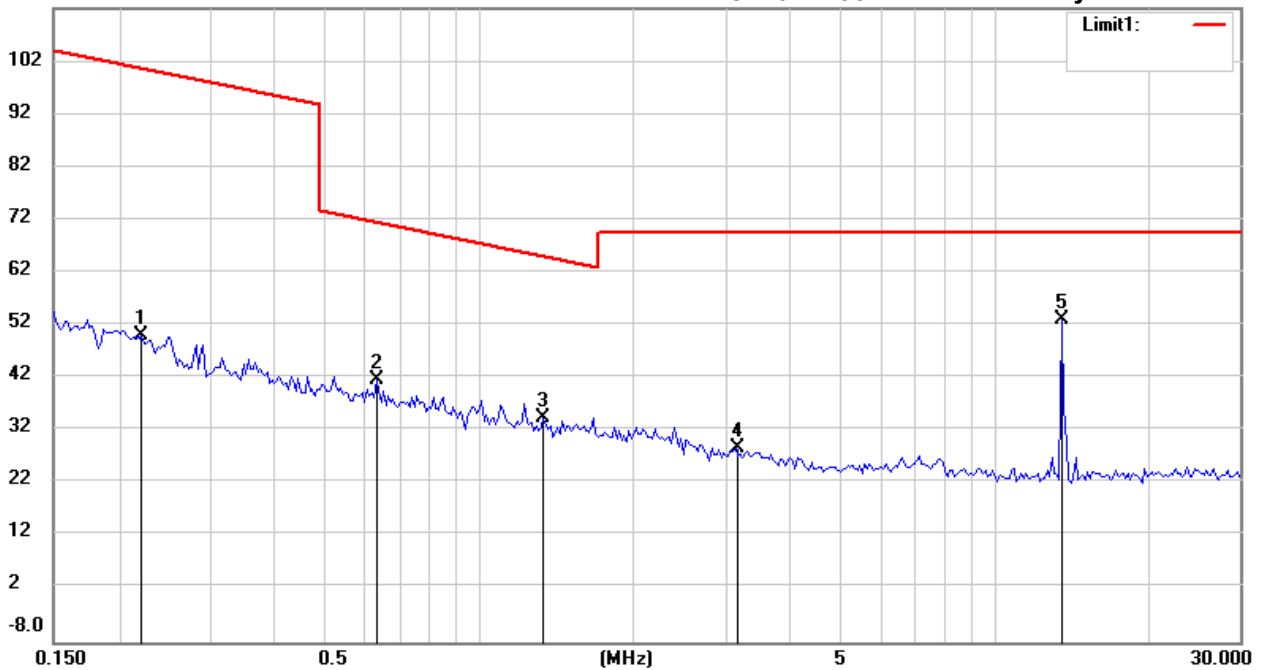
Date: 5/23/2019

Temperature: 23.8 °C

112.0 dBuV/m

Time: 10:27:36 PM

Humidity: 64.9 %



Site : Chamber

Condition : FCC 15.225 (3m)(<30MHz)

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

Polarization:

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment  |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|----------|
|     | 0.2222          | -9.64          | peak     | 59.58               | 49.94           | 100.67         | 100          | 90             | -50.73      |          |
|     | 0.6357          | -8.82          | peak     | 50.33               | 41.51           | 71.54          | 100          | 60             | -30.03      |          |
|     | 1.3366          | -10.26         | peak     | 44.82               | 34.56           | 65.08          | 100          | 225            | -30.52      |          |
|     | 3.1590          | -8.62          | peak     | 37.45               | 28.83           | 69.54          | 100          | 170            | -40.71      |          |
| *   | 13.5293         | 19.38          | peak     | 33.78               | 53.16           | 69.54          |              |                | -16.38      | RF Power |

\*:Maximum data    x:Over limit    !:over margin



Address: 6F., No. 58, Ln 188, Ruey Kuang Rd, NeiHu, Taipei  
Tel: +886-2-6606-8877  
Fax: +886-2-6606-8875

# Radiated Emission Measurement

Operator: Leon

File :3

Data :#1

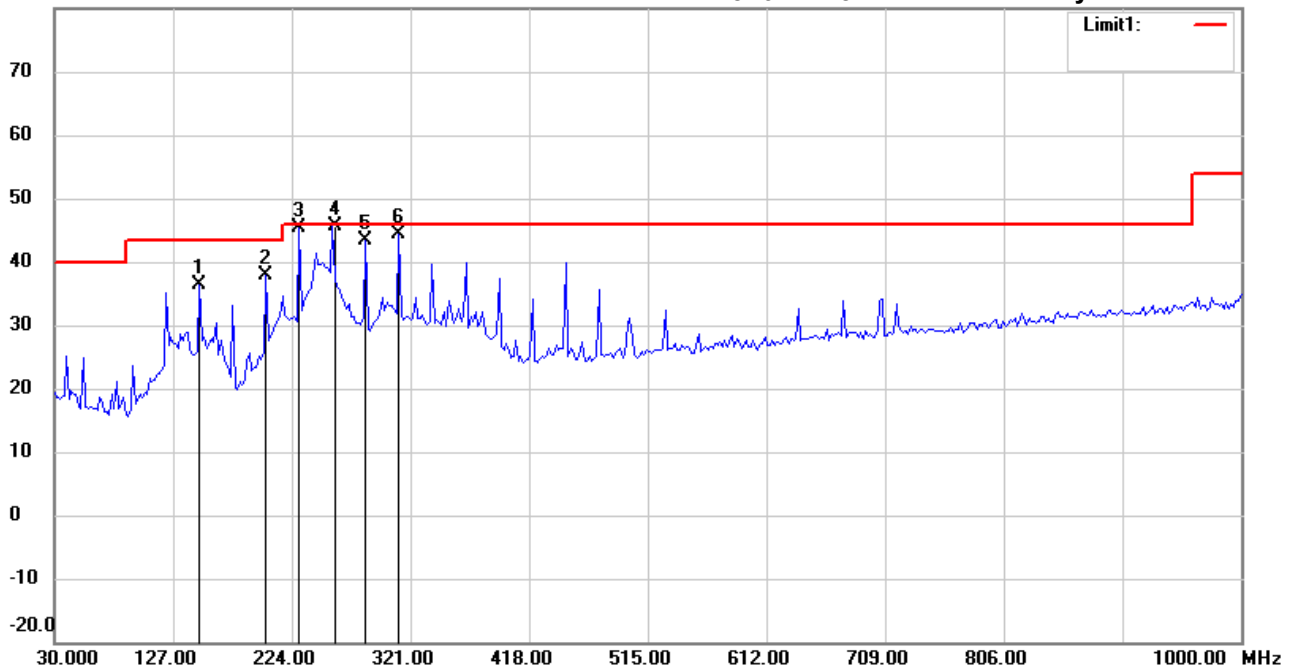
Date: 5/24/2019

Temperature: 23.9 °C

80.0 dBuV/m

Time: 9:42:18 AM

Humidity: 62.4 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_30-1000MHz

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

Polarization: **Horizontal**

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
|     | 148.5772        | 43.58          | peak     | -7.18               | 36.40           | 43.50          | 100          | 52             | -7.10       |         |
|     | 203.0060        | 48.12          | peak     | -10.22              | 37.90           | 43.50          | 100          | 179            | -5.60       |         |
|     | 230.2204        | 53.83          | QP       | -8.43               | 45.40           | 46.00          | 100          | 236            | -0.60       |         |
| *   | 257.4350        | 52.64          | QP       | -7.04               | 45.60           | 46.00          | 100          | 155            | -0.40       |         |
|     | 284.6492        | 49.21          | peak     | -5.92               | 43.29           | 46.00          | 100          | 80             | -2.71       |         |
|     | 311.8637        | 49.60          | peak     | -5.31               | 44.29           | 46.00          | 100          | 140            | -1.71       |         |

\*:Maximum data    x:Over limit    !:over margin



Address: 6F., No. 58, Ln 188, Ruey Kuang Rd, NeiHu, Taipei  
Tel: +886-2-6606-8877  
Fax: +886-2-6606-8875

# Radiated Emission Measurement

Operator: Leon

File :3

Data :#2

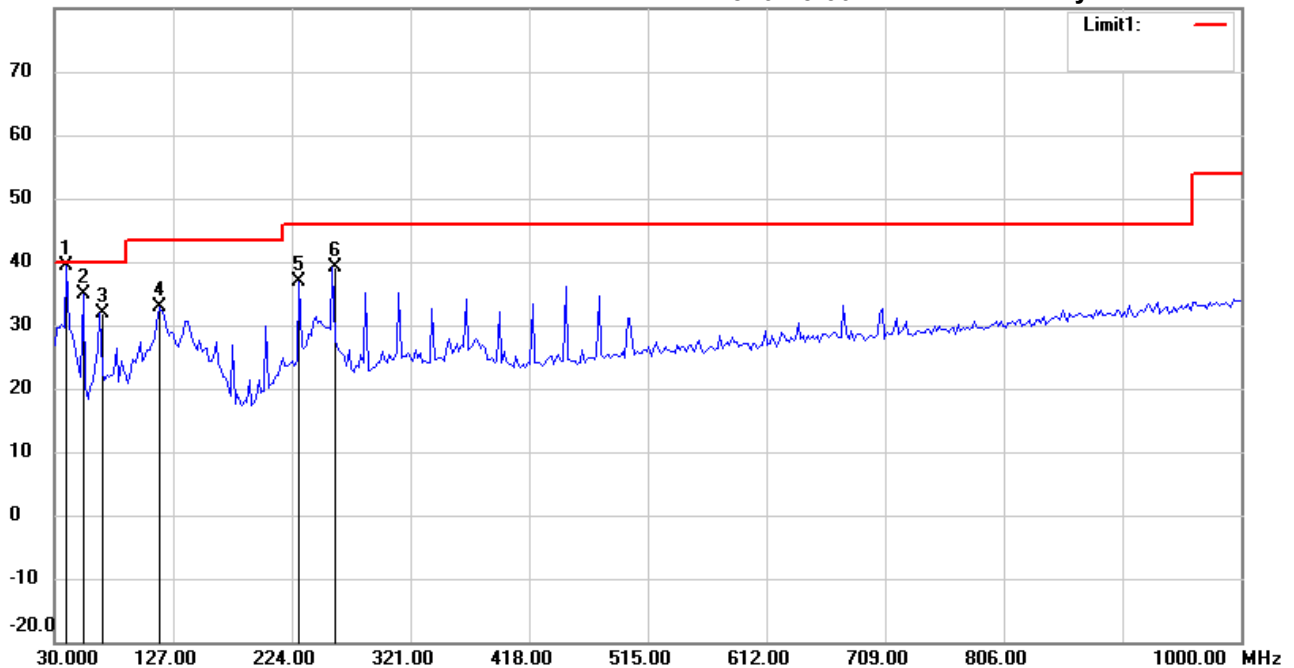
Date: 5/24/2019

Temperature: 23.9 °C

80.0 dBuV/m

Time: 9:45:30 AM

Humidity: 62.4 %



Site : Chamber

Condition : FCC\_part 15 RE-Class C\_30-1000MHz

EUT : W6M21810-18507

M/N:

Test Mode : TX 13.56MHz

Note :

Polarization: Vertical

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
| *   | 39.7194         | 48.60          | QP       | -9.20               | 39.40           | 40.00          | 100          | 175            | -0.60       |         |
|     | 53.3267         | 45.35          | peak     | -10.53              | 34.82           | 40.00          | 100          | 80             | -5.18       |         |
|     | 66.9340         | 45.08          | peak     | -13.11              | 31.97           | 40.00          | 100          | 135            | -8.03       |         |
|     | 115.5311        | 39.77          | peak     | -6.95               | 32.82           | 43.50          | 100          | 90             | -10.68      |         |
|     | 230.2204        | 45.30          | peak     | -8.43               | 36.87           | 46.00          | 100          | 245            | -9.13       |         |
|     | 257.4350        | 46.14          | peak     | -7.04               | 39.10           | 46.00          | 100          | 58             | -6.90       |         |

\*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei  
Tel:+886-2-6606-8877  
Fax:+886-2-6606-8875

# Radiated Emission Measurement

Operator: Sky

File :1

Data :#1

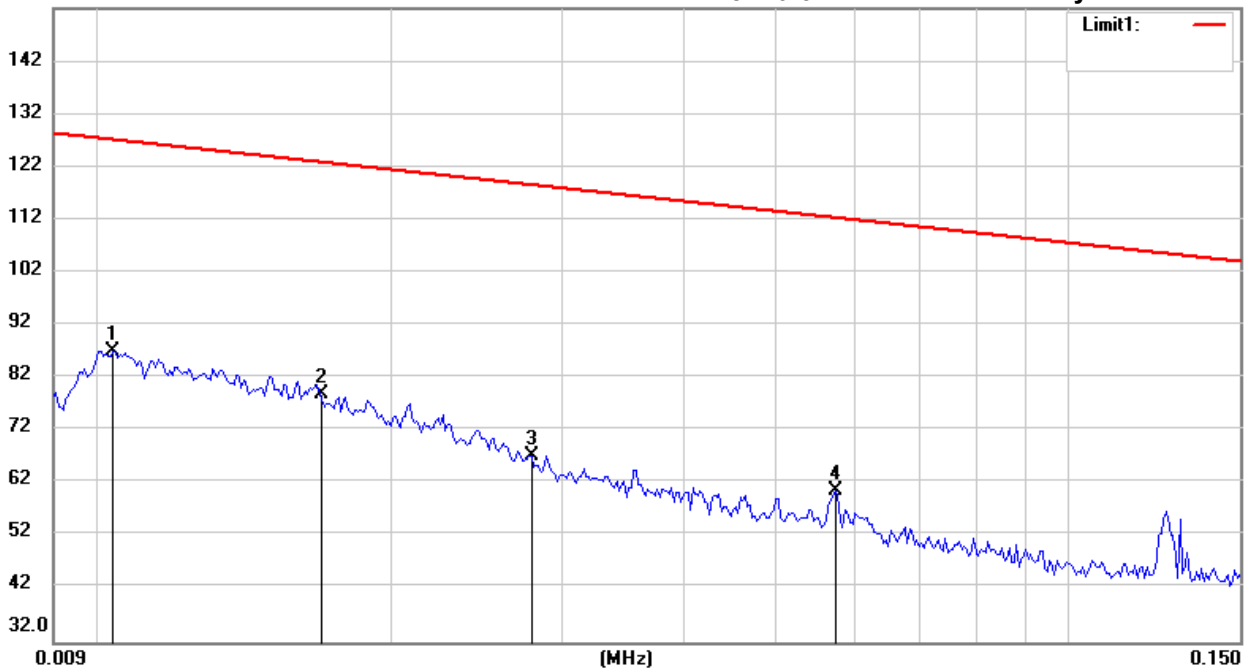
Date: 5/23/2019

Temperature:23.8 °C

152.0 dBuV/m

Time: 10:32:21 PM

Humidity:64.9 %



Site : Chamber

Condition : FCC 15.225 (3m)(<30MHz)

EUT : W6M21810-18507

M/N:

Test Mode : RX 13.56MHz

Note :

Polarization:

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
| *   | 0.0104          | -7.51          | peak     | 94.55               | 87.04           | 127.25         | 100          | 90             | -40.21      |         |
|     | 0.0170          | -9.42          | peak     | 88.44               | 79.02           | 122.99         | 100          | 165            | -43.97      |         |
|     | 0.0280          | -10.94         | peak     | 78.26               | 67.32           | 118.65         | 100          | 115            | -51.33      |         |
|     | 0.0575          | -10.07         | peak     | 70.79               | 60.72           | 112.41         | 100          | 240            | -51.69      |         |

\*:Maximum data x:Over limit !:over margin



Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei  
Tel:+886-2-6606-8877  
Fax:+886-2-6606-8875

# Radiated Emission Measurement

Operator: Sky

File :2

Data :#1

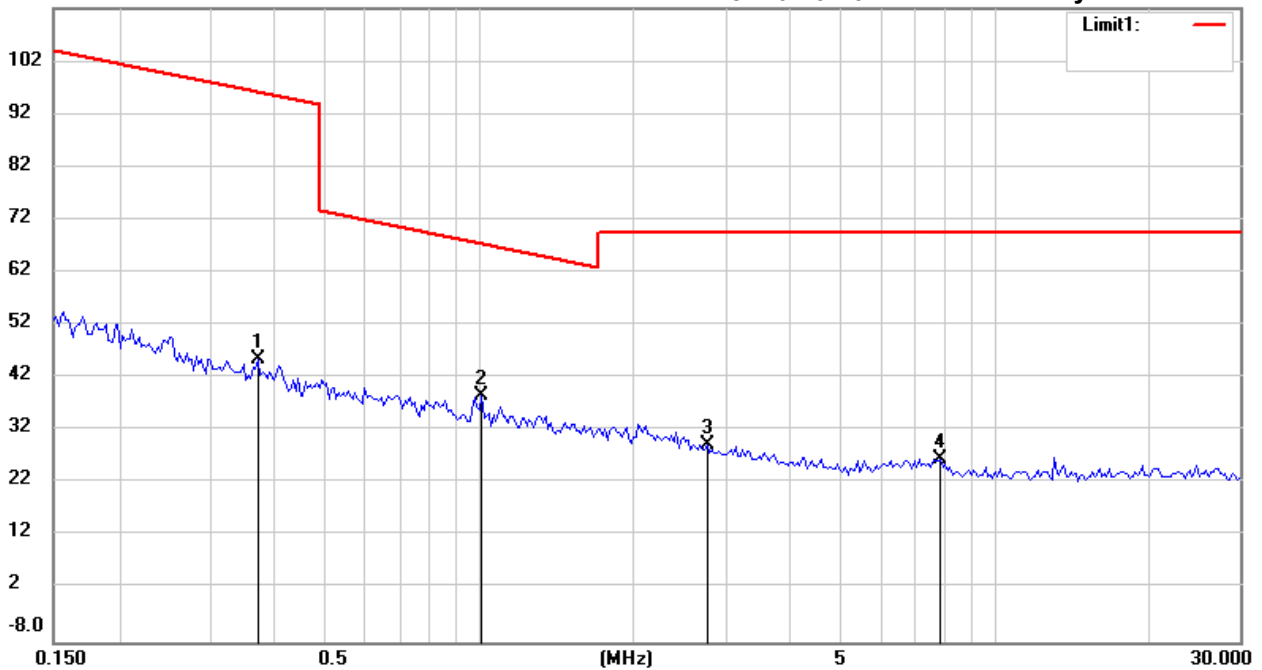
Date: 5/23/2019

Temperature:23.8 °C

112.0 dBuV/m

Time: 10:29:29 PM

Humidity:64.9 %



Site : Chamber

Condition : FCC 15.225 (3m)(<30MHz)

EUT : W6M21810-18507

M/N:

Test Mode : RX 13.56MHz

Note :

Polarization:

Power : 12 Vd.c.

Distance: 3m

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|-----|-----------------|----------------|----------|---------------------|-----------------|----------------|--------------|----------------|-------------|---------|
|     | 0.3738          | -8.96          | peak     | 54.55               | 45.59           | 96.15          | 100          | 160            | -50.56      |         |
| *   | 1.0141          | -7.65          | peak     | 46.20               | 38.55           | 67.48          | 100          | 90             | -28.93      |         |
|     | 2.7810          | -9.30          | peak     | 38.64               | 29.34           | 69.54          | 100          | 225            | -40.20      |         |
|     | 7.8723          | -7.52          | peak     | 34.30               | 26.78           | 69.54          | 100          | 130            | -42.76      |         |

\*:Maximum data x:Over limit !:over margin