



# FCC Test Report

Report No: FCS202306161W01

Issued for

|   |  |
|---|--|
| Applicant:  | Huizhou MOSITOECO intelligence Lighting Technology Co., Ltd  |
| Address:  | C block 2 floor , No.10 East Hechang No.5Road, Zhongkai Hi-tech industrial DevelopmentPark,Huizhou , Guangdong,China |
| Product Name:   | Remote control   |
| Brand Name:   | MST  |
| Model Name:   | MST-F304B  |
| Series Model:   | N/A  |
| FCC ID:   | 2AU7R-MST-F304B  |
| <p>Issued By: Flux Compliance Service Laboratory<br/>Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan<br/>Tel: 769-27280901 Fax:769-27280901 <a href="http://www.FCS-lab.com">http://www.FCS-lab.com</a></p> |  |

**TEST RESULT CERTIFICATION**

Applicant's Name.....: Huizhou MOSITOECO intelligence Lighting Technology Co., Ltd  
Address.....: C block 2 floor , No.10 East Hechang No.5Road,Zhongkai  
Hi-tech industrial DevelopmentPark,Huizhou ,Guangdong,China  
Manufacture's Name.....: Huizhou MOSITOECO intelligence Lighting Technology Co., Ltd  
Address.....: C block 2 floor , No.10 East Hechang No.5Road,Zhongkai  
Hi-tech industrial DevelopmentPark,Huizhou ,Guangdong,China

**Product Description**

Product Name.....: Remote control  
Brand Name .....: MST  
Model Name.....: MST-F304B  
Series Model.....: N/A  
Test Standards.....: FCC Rules and Regulations Part 15 Subpart C, Section 231  
Test Procedure.....: ANSI C63.10:2013

This device described above has been tested FCS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test.....:**

Date (s) of performance of tests.: Jun 21, 2023 ~ Jun 30, 2023

Date of Issue.....: Jun 30, 2023

Test Result.....: Pass

Tested by

:

*Scott Shen*

\_\_\_\_\_  
(Scott Shen)

Reviewed by

:

*Duke Qian*

\_\_\_\_\_  
(Duke Qian)

Approved by

:

*Jack Wang*

\_\_\_\_\_  
(Jack Wang)



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**Revision History**

| Rev. | Issue Date   | Effect Page | Contents      |
|------|--------------|-------------|---------------|
| 00   | Jun 30, 2023 | N/A         | Initial Issue |
|      |              |             |               |

## 1. SUMMARY OF TEST RESULTS

| FCC Part 15.231,Subpart C |                     |          |        |
|---------------------------|---------------------|----------|--------|
| Standard Section          | Test Item           | Judgment | Remark |
| 15.207                    | Conducted Emission  | N/A      | --     |
| 15.209,<br>15.231(b)      | Radiated Emission   | PASS     | --     |
| 15.231(a) (1)             | Transmitter time    | PASS     | --     |
| 15.231(c)                 | 20dB Bandwidth      | PASS     | --     |
| 15.231                    | Duty cycle          | PASS     | --     |
| 15.203                    | Antenna Requirement | PASS     | --     |

## NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

### 1.1 TEST FACTORY

|   |  |
|---|--|
| Company Name:   | Flux Compliance Service Laboratory   |
| Address:  | Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan |
| Telephone:  | +86-769-27280901   |
| Fax:  | +86-769-27280901   |
| FCC Test Firm Registration Number: 514908<br>Designation number: CN0127<br>A2LA accreditation number: 5545.01 |  |

### 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

| No. | Item                                      | Uncertainty   |
|-----|---|---------------|
| 1   | RF output power, conducted                | $\pm 0.71$ dB |
| 2   | Unwanted Emissions, conducted             | $\pm 2.98$ dB |
| 3   | Conducted Emission (9KHz-150KHz)          | $\pm 4.13$ dB |
| 4   | All emissions radiated (9KHz -30MHz)      | $\pm 3.1$ dB  |
| 5   | Conducted Emission (150KHz-30MHz)         | $\pm 4.74$ dB |
| 6   | All emissions,radiated(<1G) 30MHz-1000MHz | $\pm 3.2$ dB  |
| 7   | All emissions,radiated (1GHz -18GHz)      | $\pm 3.66$ dB |
| 8   | All emissions,radiated (18GHz -40GHz)     | $\pm 4.31$ dB |

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF THE EUT

|                         |                                   |
|-------------------------|-----------------------------------|
| Product Name            | Remote control                    |
| Trade Name              | MST                               |
| Model Name              | MST-F304B                         |
| Series Model            | N/A                               |
| Model Difference        | N/A                               |
| Frequency               | 304.25MHz                         |
| Modulation              | ASK                               |
| Antenna type            | PCB antenna                       |
| Power Supply            | DC 12V                            |
| Battery                 | DC 12V                            |
| Hardware version number | V1.0                              |
| Software version number | V1.0                              |
| Connecting I/O Port(s)  | Please refer to the User's Manual |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Table for Filed Antenna

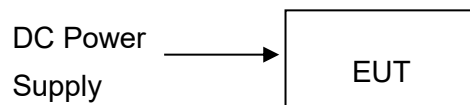
| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE    |
|------|-------|------------|--------------|-----------|------------|---------|
| 1    | N/A   | GTBV       | PCB antenna  | N/A       | 0 dBi      | Antenna |

## 2.2 DESCRIPTION OF THE TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

### Configuration and peripherals

Mode 1:



### Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature range: 21-25°C

Humidity range: 40-75%

Pressure range: 86-106kPa



2.3 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|------------|------|
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |

Support units

| Item | Equipment | Mfr/Brand | Model/Type No. | Serial No. | Note |
|------|-----------|-----------|----------------|------------|------|
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |
|      |           |           |                |            |      |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

## 2.4 EQUIPMENTS LIST

### Radiation Test equipment

| Kind of Equipment                | Manufacturer | Type No.     | Company No. | Last calibration | Calibrated until |
|----------------------------------|--------------|--------------|-------------|------------------|------------------|
| EMI Test Receiver                | R&S          | ESRP 3       | FCS-E001    | 2022.08.30       | 2023.08.29       |
| Signal Analyzer                  | R&S          | FSV40-N      | FCS-E012    | 2022.08.30       | 2023.08.29       |
| Active loop Antenna              | ZHINAN       | ZN30900C     | FCS-E013    | 2022.08.30       | 2023.08.29       |
| Bilog Antenna                    | SCHWARZBECK  | VULB 9168    | FCS-E002    | 2022.08.30       | 2023.08.29       |
| Horn Antenna                     | SCHWARZBECK  | BBHA 9120D   | FCS-E003    | 2022.08.30       | 2023.08.29       |
| SHF-EHF Horn Antenna (18G-40GHz) | A-INFO       | LB-180400-KF | FCS-E018    | 2022.08.30       | 2023.08.29       |
| Pre-Amplifier(0.1M-3G Hz)        | EMCI         | EM330N       | FCS-E004    | 2022.08.30       | 2023.08.29       |
| Pre-Amplifier (1G-18GHz)         | N/A          | TSAMP-0518SE | FCS-E014    | 2022.08.30       | 2023.08.29       |
| Pre-Amplifier (18G-40GHz)        | TERA-MW      | TRLA-0400    | FCS-E019    | 2022.08.30       | 2023.08.29       |
| Temperature & Humidity           | HTC-1        | victor       | FCS-E005    | 2022.08.30       | 2023.08.29       |

### Conduction Test equipment

| Kind of Equipment      | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|------------------------|--------------|----------|-------------|------------------|------------------|
| EMI Test Receiver      | R&S          | ESPI     | FCS-E020    | 2022.08.30       | 2023.08.29       |
| LISN                   | R&S          | ENV216   | FCS-E007    | 2022.08.30       | 2023.08.29       |
| LISN                   | ETS          | 3810/2NM | FCS-E009    | 2022.08.30       | 2023.08.29       |
| Temperature & Humidity | HTC-1        | victor   | FCS-E008    | 2022.08.30       | 2023.08.29       |

### RF Connected Test

| Kind of Equipment | Manufacturer | Type No. | Company No. | Last calibration | Calibrated until |
|-------------------|--------------|----------|-------------|------------------|------------------|
| Spectrum Analyzer | Keysight     | N9020A   | FCS-E015    | 2022.08.30       | 2023.08.29       |
| Spectrum Analyzer | Agilent      | E4447A   | MY50180039  | 2022.08.30       | 2023.08.29       |
| Spectrum Analyzer | R&S          | FSV-40   | 101499      | 2022.08.30       | 2023.08.29       |

### 3. RADIATED EMISSION MEASUREMENT

#### 3.1 LIMIT

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

#### LIMITS OF RADIATED EMISSION MEASUREMENT (0.009mhz - 1000mhz)

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009~0.490       | 2400/F(KHz)                       | 300                           |
| 0.490~1.705       | 24000/F(KHz)                      | 30                            |
| 1.705~30.0        | 30                                | 30                            |
| 30~88             | 100                               | 3                             |
| 88~216            | 150                               | 3                             |
| 216~960           | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

#### LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

| FREQUENCY (MHz) | (dBuV/m) (at 3M) |         |
|-----------------|------------------|---------|
|                 | PEAK             | AVERAGE |
| Above 1000      | 74               | 54      |

#### LIMITS OF FIELD STRENGTH OF THE FUNDAMENTAL SIGNAL

| FREQUENCY (MHz) | (dBuV/m) (at 3M) |         |
|-----------------|------------------|---------|
|                 | PEAK             | AVERAGE |
| 304.25          | 94.95            | 74.95   |

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector

(2) At frequencies below 30MHz, measurement may be performed at a distance closer then that specified, and the limit at closer measurement distance can be extrapolated by below formula:  
 $Limit_{3m}(dBuV/m) = Limit_{300m}(dBuV/m) + 40Log(300m/3m) = Limit_{300m}(dBuV/m) + 80$   
 $Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m) = Limit_{30m}(dBuV/m) + 40$

#### (3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions include fundamental emission shall not exceed FCC 15.231 section (b) limit of comply with FCC 15.209 limit which permit higher emission level.

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters =  $56.81818(F) - 6136.3636$ ; for the band 260-470 MHz, uV/m at 3 meters =  $41.6667(F) - 7083.3333$ . The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

### 3.2 TEST PROCEDURE

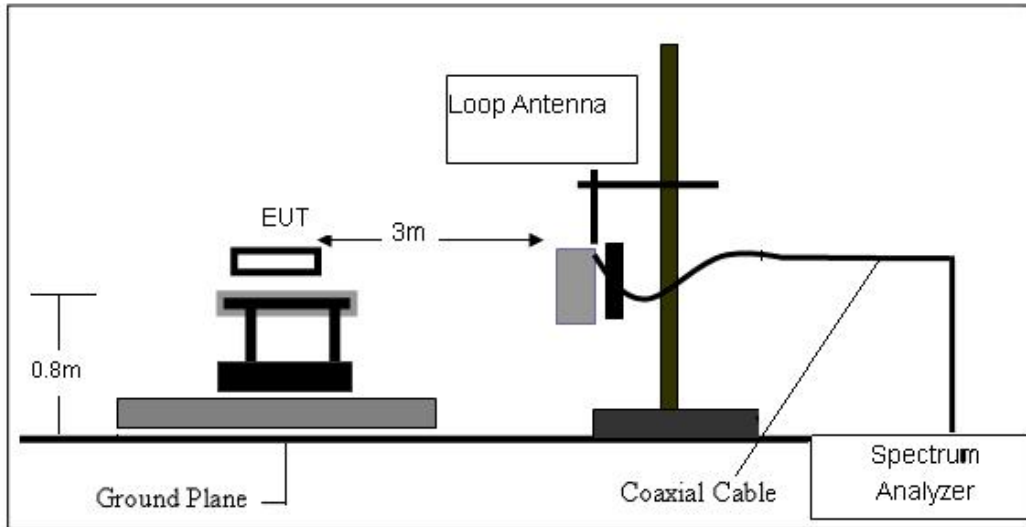
- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

**Note:**

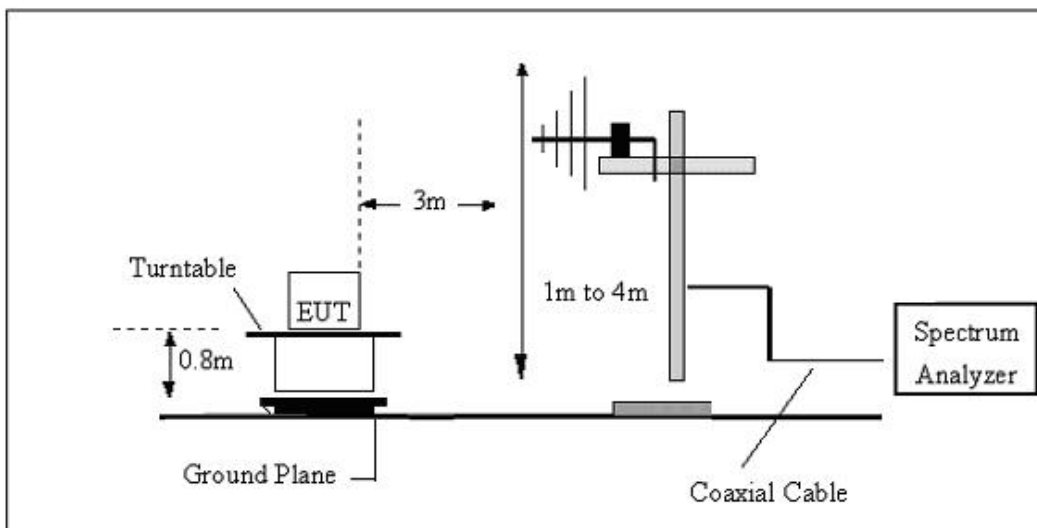
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.3 TEST SETUP

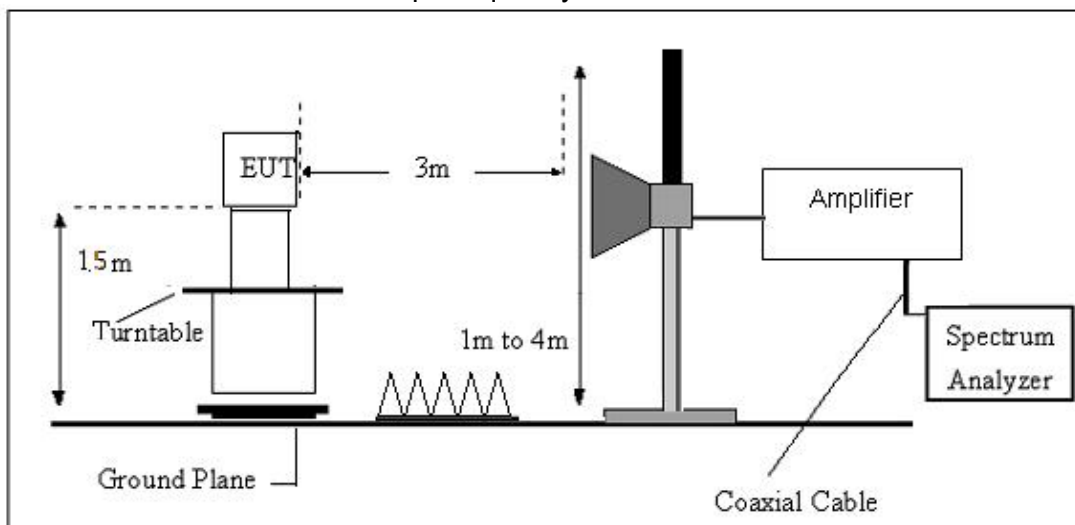
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### (C) Radiated Emission Test-Up Frequency Above 1GHz



### 3.4 TEST RESULTS

|              |      |                    |        |
|--------------|------|--------------------|--------|
| Temperature: | 25°C | Relative Humidity: | 60%    |
| Test Mode:   | ASK  | Test Voltage:      | DC 12V |

For field strength of the fundamental signal

Peak value

| Frequency (MHz) | Peak Level(dBuV/m) | Peak limit (dBuV/m) | Over Limit(dB) | Polarization |
|-----------------|--------------------|---------------------|----------------|--------------|
| 304.25          | 72.01              | 94.95               | -22.94         | H            |
| 304.25          | 72.60              | 94.95               | -22.35         | V            |

Average value

| Frequency (MHz) | AV Level (dBuV/m) | AV limit (dBuV/m) | Over Limit (dB) | Polarization |
|-----------------|-------------------|-------------------|-----------------|--------------|
| 304.25          | 62.37             | 74.95             | -12.58          | H            |
| 304.25          | 62.96             | 74.95             | -11.99          | V            |

Note: av Level=pk level +PDCF

Duty cycle factor= -9.64dB

For spurious emission

(9KHz-30MHz)

| Freq. | Reading  | Limit    | Margin | State | Test Result |
|-------|----------|----------|--------|-------|-------------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB)   | P/F   |             |
| --    | --       | --       | --     | --    | PASS        |
| --    | --       | --       | --     | --    | PASS        |

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

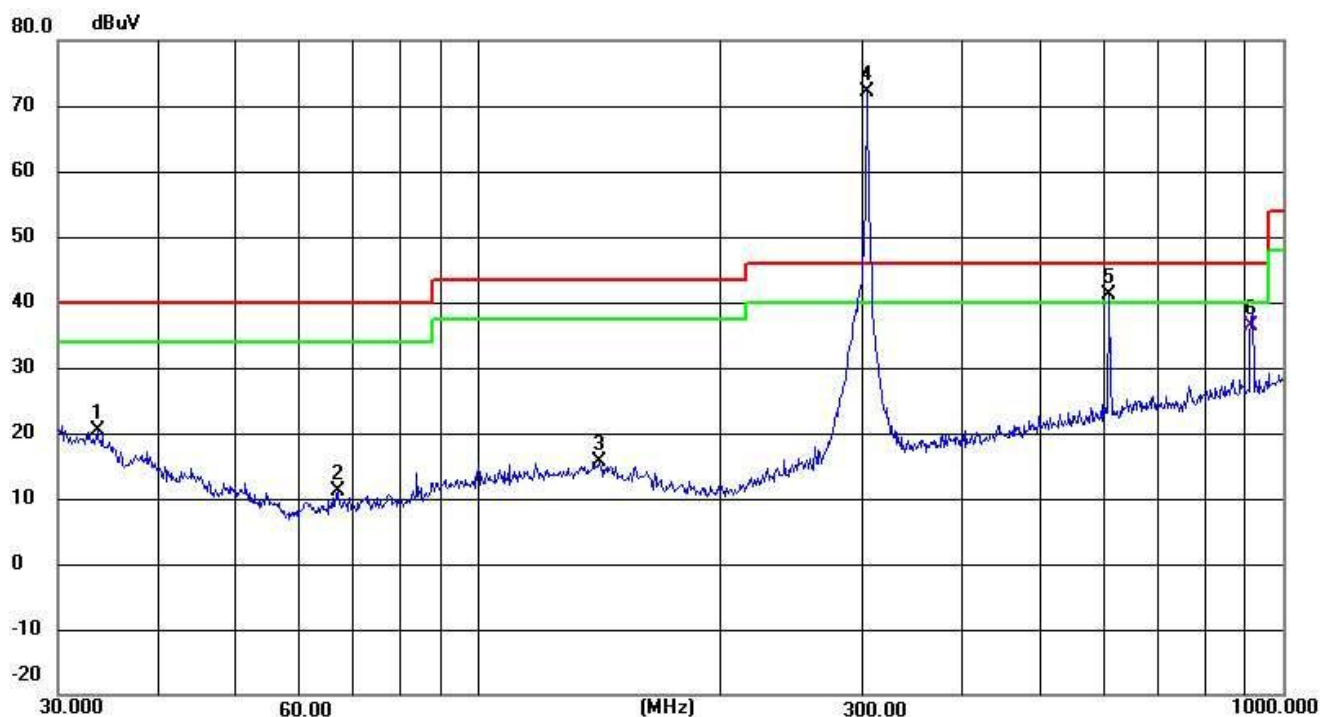
Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits (dBuv) + distance extrapolation factor.

(30MHZ-1000MHZ)

|               |        |                    |            |
|---------------|--------|--------------------|------------|
| Temperature:  | 23.7°C | Relative Humidity: | 61%        |
| Test Voltage: | DC 12V | Phase:             | Horizontal |
| Test Mode:    | ASK    |                    |            |

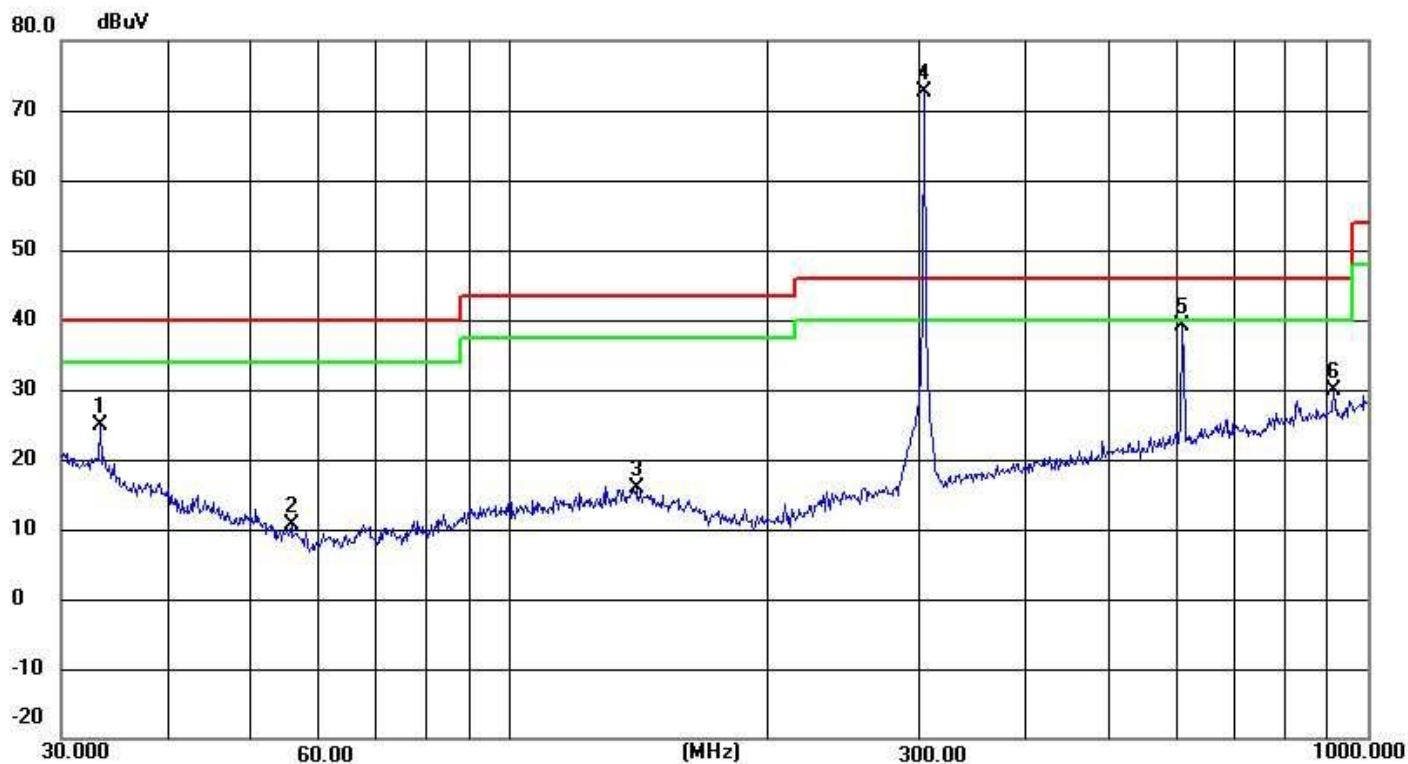
| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|----------------------|-----------------|----------------|-------------|--------|
| 1   | 33.5624         | 29.98          | -9.66                | 20.32           | 40.00          | -19.68      | QP     |
| 2   | 66.7325         | 31.32          | -20.15               | 11.17           | 40.00          | -28.83      | QP     |
| 3   | 141.3298        | 47.98          | -32.26               | 15.72           | 43.50          | -27.78      | QP     |
| 4   | 304.2511        | 104.11         | -32.10               | 72.01           | /              | /           | QP     |
| 5   | 607.7867        | 72.83          | -31.76               | 41.07           | 46.00          | -4.93       | QP     |
| 6   | 912.8620        | 67.89          | -31.39               | 36.50           | 46.00          | -9.50       | QP     |



1. Result = Reading + Corrected Factor Note :
2. The fundamental wave filtered out during the test.

|               |        |                    |          |
|---------------|--------|--------------------|----------|
| Temperature:  | 22.7°C | Relative Humidity: | 61%      |
| Test Voltage: | DC 12V | Phase:             | Vertical |
| Test Mode:    | ASK    |                    |          |

| No. | Frequency (MHz) | Reading (dBuV) | Correct Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|-----|-----------------|----------------|----------------------|-----------------|----------------|-------------|--------|
| 1   | 33.3279         | 34.47          | -9.51                | 24.96           | 40.00          | -15.04      | QP     |
| 2   | 55.6094         | 30.17          | -19.65               | 10.52           | 40.00          | -29.48      | QP     |
| 3   | 140.3421        | 48.07          | -32.26               | 15.81           | 43.50          | -27.69      | QP     |
| 4   | 304.2502        | 104.70         | -32.10               | 72.60           | /              | /           | QP     |
| 5   | 607.7866        | 70.89          | -31.76               | 39.13           | 46.00          | -6.87       | QP     |
| 6   | 912.8620        | 61.33          | -31.39               | 29.94           | 46.00          | -16.06      | QP     |



1. Result = Reading + Corrected Factor Note :
2. The fundamental wave filtered out during the test.



| Freq.<br>(MHz) | Ant.PoL<br>H/V | Emission<br>Level(dBuV/m) |       | Limit 3m(dBuV/m) |    | Margin(dB) |        |
|----------------|----------------|---------------------------|-------|------------------|----|------------|--------|
|                |                | PK                        | AV    | PK               | AV | PK         | AV     |
| 1217.00        | V              | 55.65                     | 46.09 | 74               | 54 | -18.35     | -7.91  |
| 1521.25        | V              | 53.46                     | 43.90 | 74               | 54 | -16.54     | -10.10 |
| 1217.00        | H              | 52.90                     | 43.34 | 74               | 54 | -21.10     | -10.66 |
| 1521.25        | H              | 54.78                     | 45.22 | 74               | 54 | -19.22     | -8.78  |

Note: 1. Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor– Antenna Factor–Cable Factor

2: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

3. Measuring frequencies from 9k~10th harmonic , No emission found between lowest

internal used/generated frequency to 30MHz.

#### 4. TRANSMITTER TIME

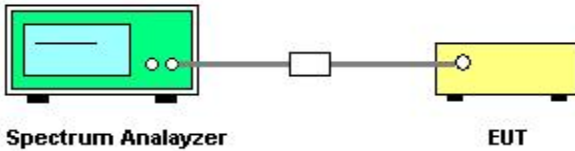
##### 4.1 LIMIT

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

##### 4.2 TEST PROCEDURE

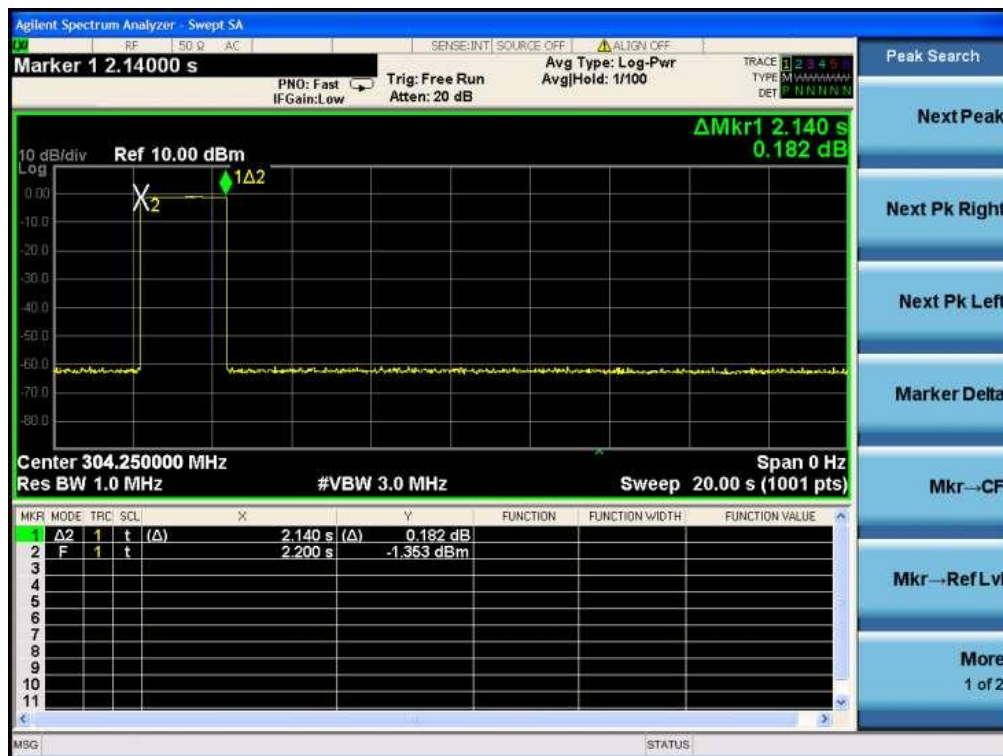
- a. The EUT's RF signal was coupled to spectrum analyzer by antenna connected to spectrum analyzer.
- b. Set the spectrum to zero span mode, and centered of EUT frequency.
- c. Measure the stop transmitting time after release EUT button

##### 4.3 TEST SETUP



##### 4.4 TEST RESULTS

| Frequency(MHz) | Limit | Result |
|----------------|-------|--------|
| 304.25         | ≤5s   | Pass   |



## 5. 20 DB BANDWIDTH TEST

### 5.1 LIMIT

The bandwidth of the emission shall be no wider than 0.25% of the center frequency of devices operation above 70MHz and below 900MHz.

### 5.2 TEST PROCEDURE

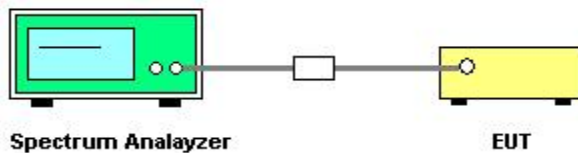
Connect EUT' s antenna output to spectrum analyzer by RF cable.

a.

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and 10kHz VBW. The 20dB bandwidth is defined as the total spectrum the

b. power of which is higher than peak power minus 20dB

### 5.3 TEST SETUP



### 5.4 TEST RESULTS

|              |      |                    |        |
|--------------|------|--------------------|--------|
| Temperature: | 25°C | Relative Humidity: | 50%    |
| Test Mode:   | ASK  | Test Voltage:      | DC 12V |

| Frequency  | 20dB Bandwidth (KHz) | Limit (KHz) | Result |
|------------|----------------------|-------------|--------|
| 304.25 MHz | 57.52                | 760.625     | PASS   |



## 6. DUTY CYCLE

### 6.1 LIMIT

None: for reporting purposes only.

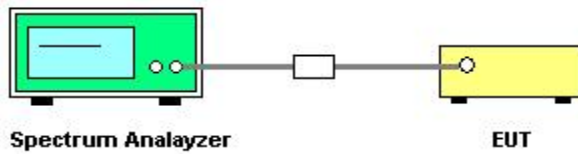
### 6.2 TEST PROCEDURE

Set the Centre frequency of the spectrum analyzer to the transmitting frequency;

- a. Set the span=0MHz, RBW=1MHz, VBW=3MHz, Sweep time=5.00ms;

Trace mode = Single hold

### 6.3 TEST SETUP



### 6.4 TEST RESULTS

|            |            |
|------------|------------|
| Frequency  | Duty Cycle |
| 304.25 MHz | 32.95%     |

The duty cycle is simply the on time divided by the period:

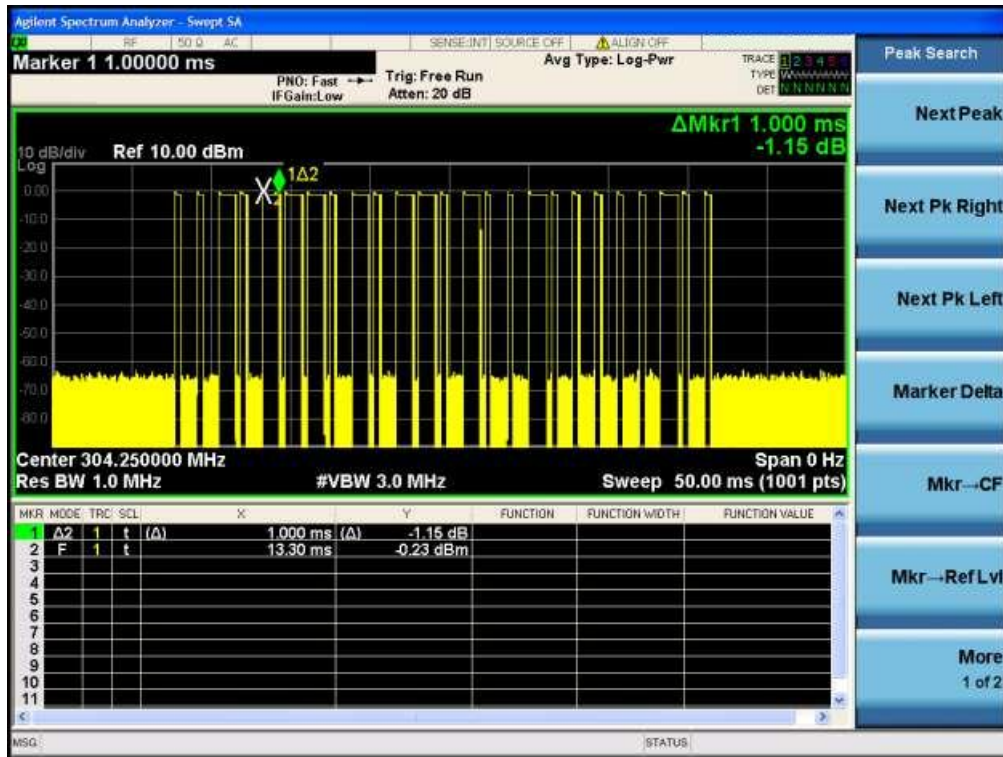
The duration of one cycle = 44ms

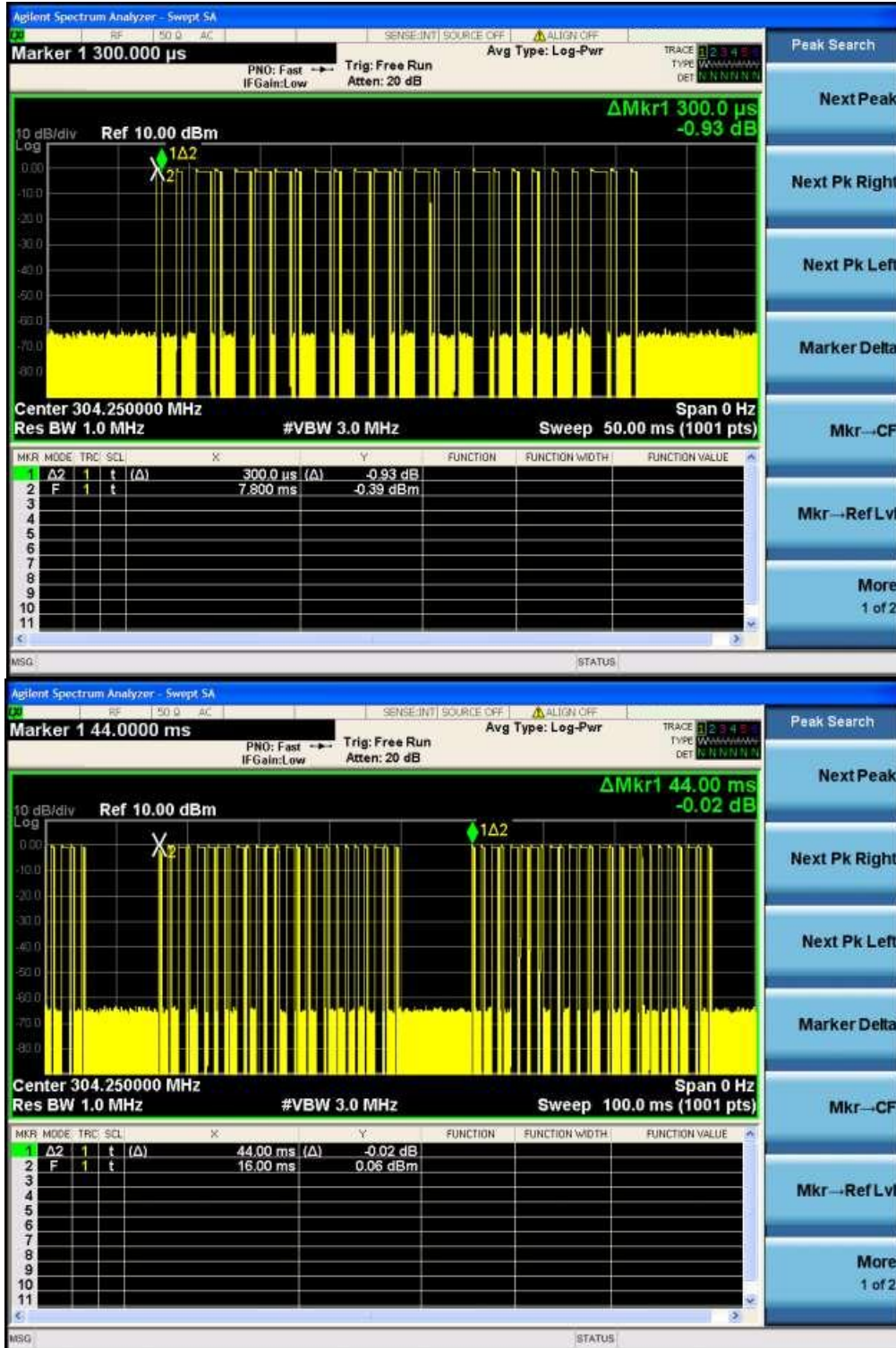
Effective period of the cycle =  $1 \times 10 + 1.3 \times 15 = 14.5\text{ms}$

Duty Cycle =  $14.5\text{ms} / 44.0\text{ms} = 32.95\%$

Duty Cycle Factor(dB) =  $20\log(\text{duty cycle}(\%)) = -9.64\text{dB}$

Original test data





## 7 ANTENNA REQUIREMENT

### 7.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 7.2 EUT ANTENNA

The antennas used for this product are PCB antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0 dBi.

\*\*\*\*\*END OF THE REPORT\*\*\*\*\*