



## CONFORMANCE TEST REPORT FOR FCC 47 CFR, Part 15 Subpart C

**Report No.: ET94S-09-165-04**

Client: **Scienteck Electronics Co., Ltd.**  
Product: **Wireless Smoke Detector**  
Model: **SM-3S**  
FCC ID: **TYLSM3**  
Manufacturer/supplier: **Scienteck Electronics Co., Ltd.**

Date test item received: 2005/09/20  
Date test campaign completed: 2005/10/31  
Date of issue: 2005/11/22

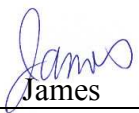
**The test result only corresponds to the tested sample. It is not permitted to copy this report, in part or in full, without the permission of the test laboratory.**

*Total number of pages of this test report: 21 pages*

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*Internal photos 3 pages*

*Setup photos 1 pages*

| Test Engineer                                                                                | Checked By                                                                                  | Approved By                                                                                        |
|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <br>James | <br>Mark | <br>Joe Hsieh |

ELECTRONICS TESTING CENTER, TAIWAN  
NO.8, LANE 29, WENMING RD.,  
LESHAN TSUEN, GUISHAN SHIANG,  
TAOYUAN COUNTY, TAIWAN 33383, R.O.C.

TEL: (03) 3276170~4  
INT: +886-3-3276170~4  
FAX: (03) 3276188  
INT: +886-3-3276188



Client : Scientech Electronics Co., Ltd.  
Address : 4F, No. 501-17, Chung-Cheng Rd., Hsin-Tien City, Taipei 231, Taiwan, R.O.C.  
Manufacturer : Scientech Electronics Co., Ltd.  
Address : 4F, No. 501-17, Chung-Cheng Rd., Hsin-Tien City, Taipei 231, Taiwan, R.O.C.  
EUT : Wireless Smoke Detector  
Trade name : LifeSOS  
Model No. : SM-3S  
Comment issues : (1) The report also apply to model: SM-3A  
(2) The multiple listing recognized without test basis is according to information supplied by manufacturer. A detail documentation of the above models must be verified by legal right organization for the EMC characteristic with relation to the subject model.  
Power Source : 9VDC  
Regulations applied : FCC 47 CFR, Part 15 Subpart C (2005)

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

The compliance test is only certified for the test equipment and the results of the testing report relate only to the item tested. The compliance test of this report was conducted in accordance with the appropriate standards. It's not intention to assure the quality and performance of the product. This report shall not be reproduced except in full, without the approval of ETC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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NVLAP Lab Code 200133-0

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## 1. GENERAL INFORMATION

### 1.1 Product Description

|                      |                           |
|----------------------|---------------------------|
| a) Type of EUT       | : Wireless Smoke Detector |
| b) Model No.         | : SM-3S                   |
| c) Serial No.        | : ----                    |
| d) FCC ID            | : TYLSM3                  |
| e) Working Frequency | : 433.920 MHz             |
| f) Power Supply      | : 9VDC                    |

### 1.2 Characteristics of Device:

SM-3S is a wireless smoke detector, it works with LS-30 alarm base unit.

### 1.3 Test Methodology

Both Conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4.

The equipment under test was operated continuously in its normal operating mode for the purpose of the measurements. In order to secure the continuous operation of the device under test, the circuit rewired by the manufacturer to affect its intended operation. The receiving antenna was varied from 1 to 4 meters and the wooden turntable was rotated through 360 degrees to obtain the highest reading on the field strength meter or on the display of the spectrum analyzer. And also, each emission was to be maximized by changing the orientation of the equipment transmitter under test.

### 1.4 Test Facility

The semi-anechoic chamber and conducted measurement facility used to collect the radiated and conducted data are located inside the Building at No.8, Lane 29, Wen-ming Road, Lo-shan Tsun, Kweishan Hsiang, Taoyuan, Taiwan, R.O.C.

This site has been accreditation as a FCC filing site.

## 2. DEFINITION AND LIMITS

### 2.1 Definition

Intentional radiator:

A device that intentionally generates and emits radio frequency energy by radiation or induction.

### 2.2 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz               | MHz                   | MHz           | GHz         |
|-------------------|-----------------------|---------------|-------------|
| 0.090 - 0.110     | 16.42-16.423          | 399.9-410     | 4.5-5.25    |
| 0.495 - 0.505 **  | 16.69475 - 16.69525   | 608-614       | 5.35-5.46   |
| 2.1735 - 2.1905   | 16.80425 - 16.80475   | 960-1240      | 7.25-7.75   |
| 4.125-4.128       | 25.5-25.67            | 1300-1427     | 8.025-8.5   |
| 4.17725-4.17775   | 37.5-38.25            | 1435-1626.5   | 9.0-9.2     |
| 4.20725-4.20775   | 73-74.6               | 1645.5-1646.5 | 9.3-9.5     |
| 6.215-6.218       | 74.8-75.2             | 1660-1710     | 10.6-12.7   |
| 6.26775-6.26825   | 108-121.94            | 1718.8-1722.2 | 13.25-13.4  |
| 6.31175-6.31225   | 123-138               | 2200-2300     | 14.47-14.5  |
| 8.291-8.294       | 149.9-150.05          | 2310-2390     | 15.35-16.2  |
| 8.362-8.366       | 156.52475 - 156.52525 | 2483.5-2500   | 17.7-21.4   |
| 8.37625-8.38675   | 156.7-156.9           | 2655-2900     | 22.01-23.12 |
| 8.41425-8.41475   | 162.0125-167.17       | 3260-3267     | 23.6-24.0   |
| 12.29-12.293      | 167.72-173.2          | 3332-3339     | 31.2-31.8   |
| 12.51975-12.52025 | 240-285               | 3345.8-3358   | 36.43-36.5  |
| 12.57675-12.57725 | 322-335.4             | 3600-4400     | Above 38.6  |
| 13.36-13.41       |                       |               |             |

Remark “\*\*” : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

## 2.3 Limitation

### (1) Conducted Emission Limits :

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the conducted limit is the following:

| Frequency<br>MHz | Quasi Peak<br>dB $\mu$ V | Average<br>dB $\mu$ V |
|------------------|--------------------------|-----------------------|
| 0.15 - 0.5       | 66-56                    | 56-46                 |
| 0.5 - 5.0        | 56                       | 46                    |
| 5.0 - 30.0       | 60                       | 50                    |

### (2) Radiated Emission Limits :

According to 15.231 ,Periodic operation in the band 40.66-40.70 MHz and above 70 MHz, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Frequency Band<br>(MHz) | Field strength of<br>Fundamental (uV/m) | Field strength of<br>Spurious (uV/m) |
|-------------------------|-----------------------------------------|--------------------------------------|
| 40.66-40.70             | 2250                                    | 225                                  |
| 70-130                  | 1250                                    | 125                                  |
| 130-174                 | *1,250 to 3,750                         | *125 to 375                          |
| 174-260                 | 3750                                    | 375                                  |
| 260-470                 | *3,750 to 12,500                        | *375 to 1250                         |
| Above 470               | 12500                                   | 1250                                 |

\* Linear interpolations.

Field strength limits are at the distance of 3 meters, emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209,as following table:

| Other Frequencies<br>(MHz) | Field Strength of Fundamental |                  |
|----------------------------|-------------------------------|------------------|
|                            | $\mu$ V/meter                 | dB $\mu$ V/meter |
| 30 - 88                    | 100                           | 40.0             |
| 88 - 216                   | 150                           | 43.5             |
| 216 - 960                  | 200                           | 46.0             |
| Above 960                  | 500                           | 54.0             |

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

### **(3) Limit of transmission time**

- a) A manually operated equipment transmitter shall employ a switch that will automatically deactivate the equipment transmitter within not more than 5 seconds of being released.
- b) The equipment transmitter activated automatically shall cease transmission within 5 seconds after activation.

## **2.4 Labeling Requirement**

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## **2.5 User Information**

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with the FCC RF exposure compliance requirement, this device and its antenna must not be co-located or operating to conjunction with any other antenna or transmitter.

### **3. RADIATED EMISSION MEASUREMENT**

#### **3.1 Applicable Standard**

For periodic operation intentional radiator, the radiated emission shall comply with § 15.231(b).

#### **3.2 Measurement Procedure**

##### **Final Measurement**

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively. Turn on EUT and make sure that it is in continuous operating function.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a semi-anechoic chamber to determine the accurate frequencies of higher emissions and then each selected frequency is precisely measured. As the same purpose, for emission measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission measured below and above 1 GHz, set the spectrum analyzer on a 120 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.

Figure 1 : Frequencies measured below 1 GHz configuration

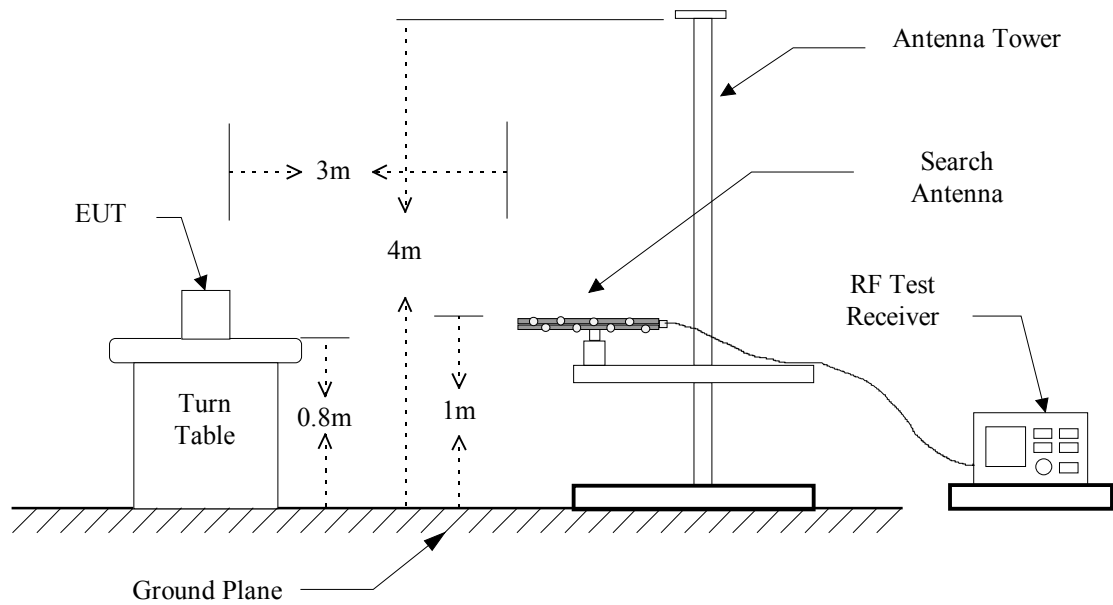
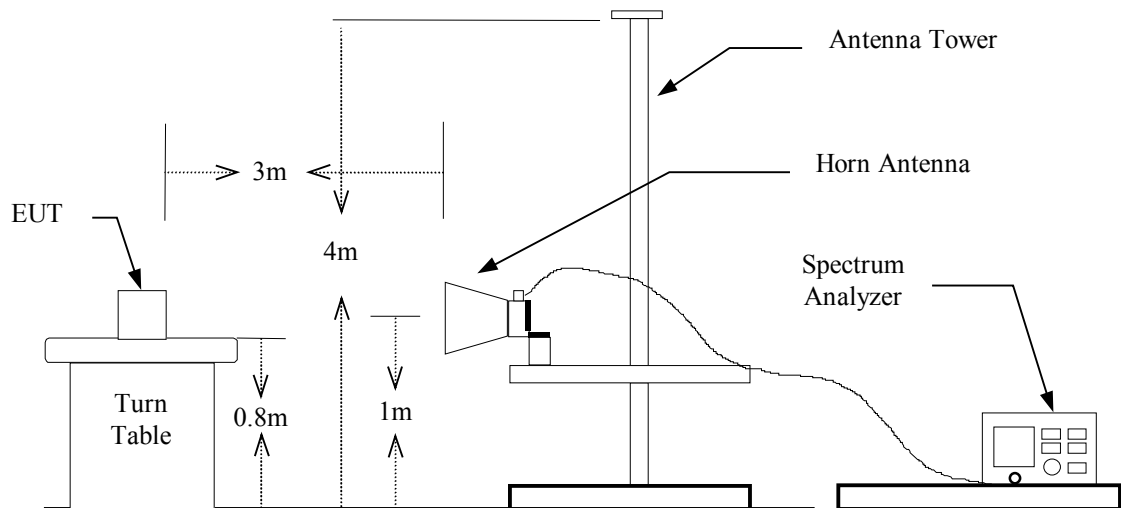


Figure 2 : Frequencies measured above 1 GHz configuration



### 3.3 Test Data

#### 3.3.1 Fundamental and Harmonic

Operated mode : TransmittingTest Date : Sep. 22, 2005Temperature : 20 °CHumidity : 69%

| Frequency<br>(MHz) | Ant<br>Pol<br>H / V | Reading<br>(dBuV)<br>Peak | Correct<br>Factor<br>(dB) | Duty<br>Factor<br>(dB) | Result @3m<br>(dBuV/m) |      | Limit @3m<br>(dBuV/m) |      | Margins |
|--------------------|---------------------|---------------------------|---------------------------|------------------------|------------------------|------|-----------------------|------|---------|
|                    |                     |                           |                           |                        | Peak                   | AVG  | Peak                  | AVG  | ( dB )  |
| Fundamental        |                     |                           |                           |                        |                        |      |                       |      |         |
| 433.890            | H                   | 53.1                      | 20.1                      | -7.6                   | 73.2                   | 65.6 | 100.8                 | 80.8 | -15.2   |
| 433.890            | V                   | 58.9                      | 20.1                      | -7.6                   | 79.0                   | 71.4 | 100.8                 | 80.8 | -9.4    |
| Harmonic           |                     |                           |                           |                        |                        |      |                       |      |         |
| 867.780            | H                   | 24.0                      | 25.0                      | -7.6                   | 49.0                   | 41.4 | 80.8                  | 60.8 | -19.4   |
| 867.780            | V                   | 14.4                      | 25.0                      | -7.6                   | 39.4                   | 31.8 | 80.8                  | 60.8 | -29.0   |
| *1301.670          | H                   | 60.5                      | -12.3                     | -7.6                   | 48.2                   | 40.6 | 74.0                  | 54.0 | -13.4   |
| *1301.670          | V                   | 64.7                      | -12.3                     | -7.6                   | 52.4                   | 44.8 | 74.0                  | 54.0 | -9.2    |
| 1735.560           | H                   | 58.5                      | -11.0                     | -7.6                   | 47.5                   | 39.9 | 80.8                  | 60.8 | -20.9   |
| 1735.560           | V                   | 57.6                      | -11.0                     | -7.6                   | 46.6                   | 39.0 | 80.8                  | 60.8 | -21.8   |
| 2169.450           | H                   | 54.8                      | -8.7                      | -7.6                   | 46.1                   | 38.5 | 80.8                  | 60.8 | -22.3   |
| 2169.450           | V                   | 52.5                      | -8.7                      | -7.6                   | 43.8                   | 36.2 | 80.8                  | 60.8 | -24.6   |
| 2603.340           | H                   | 56.9                      | -6.7                      | -7.6                   | 50.2                   | 42.6 | 80.8                  | 60.8 | -18.2   |
| 2603.340           | V                   | 59.0                      | -6.7                      | -7.6                   | 52.3                   | 44.7 | 80.8                  | 60.8 | -16.1   |
| 3037.230           | H                   | 55.1                      | -4.4                      | -7.6                   | 50.7                   | 43.1 | 80.8                  | 60.8 | -17.7   |
| 3037.230           | V                   | 58.2                      | -4.4                      | -7.6                   | 53.8                   | 46.2 | 80.8                  | 60.8 | -14.6   |
| 3471.120           | H                   | ----                      | -1.2                      | -7.6                   | ----                   | ---- | 80.8                  | 60.8 | ----    |
| 3471.120           | V                   | 55.8                      | -1.2                      | -7.6                   | 54.6                   | 47.0 | 80.8                  | 60.8 | -13.8   |
| *3905.010          | H                   | ----                      | 0                         | -7.6                   | ----                   | ---- | 74.0                  | 54.0 | ----    |
| *3905.010          | V                   | ----                      | 0                         | -7.6                   | ----                   | ---- | 74.0                  | 54.0 | ----    |
| *4338.900          | H                   | ----                      | 1.8                       | -7.6                   | ----                   | ---- | 74.0                  | 54.0 | ----    |
| *4338.900          | V                   | ----                      | 1.8                       | -7.6                   | ----                   | ---- | 74.0                  | 54.0 | ----    |

**Note:**

1. Peak Result = Peak Reading + Correct Factor
2. AVG Result = Peak Result + Duty Factor
3. If the result of peak value is under the limit of average, the average value doesn't need to be measured.
4. "\*" means the frequency is in the Restricted Bands.

## 3.3.2 Other Emission

Operated mode : TransmittingTest Date : Sep. 22, 2005      Temperature : 20 °C      Humidity : 69%**A. below 1GHz**

| Emission<br>Frequency<br>( MHz ) | Meter Reading<br>( dBuV ) |       | CORR'd<br>Factor<br>( dB ) | Results<br>( dBuV/m ) |       | Limit<br>(3m)<br>(dBuV/m) | Margins<br>( dB ) | Table Degree<br>(deg) |       | Ant. High<br>(m) |       |
|----------------------------------|---------------------------|-------|----------------------------|-----------------------|-------|---------------------------|-------------------|-----------------------|-------|------------------|-------|
|                                  | HOR.                      | VERT. |                            | HOR.                  | VERT. |                           |                   | HOR.                  | VERT. | HOR.             | VERT. |
| 41.640                           | 10.1#                     | 13.8# | 13.2                       | 23.3#                 | 27.0# | 40.0                      | -13.0             | 330                   | 300   | 1.5              | 1.2   |
| 56.190                           | ***                       | 15.8# | 13.2                       | ***                   | 29.0# | 40.0                      | -11.0             | ***                   | 310   | ***              | 1.1   |
| 65.890                           | ***                       | 14.3# | 11.6                       | ***                   | 25.9# | 40.0                      | -14.1             | ***                   | 312   | ***              | 1.2   |
| 101.780                          | ***                       | 13.9# | 10.8                       | ***                   | 24.7# | 43.5                      | -18.8             | ***                   | 350   | ***              | 1.0   |
| 135.730                          | 6.6#                      | ***   | 15.1                       | 21.7#                 | ***   | 43.5                      | -21.8             | 310                   | ***   | 1.2              | ***   |
| 158.040                          | ***                       | 7.1#  | 14.9                       | ***                   | 22.0# | 43.5                      | -21.5             | ***                   | 45    | ***              | 1.0   |
| 167.740                          | 7.1#                      | ***   | 15.4                       | 22.5#                 | ***   | 43.5                      | -21.0             | 320                   | ***   | 1.1              | ***   |
| 225.940                          | 9.0#                      | ***   | 13.7                       | 22.7#                 | ***   | 46.0                      | -23.3             | 20                    | ***   | 1.5              | ***   |
| 256.980                          | 9.7#                      | ***   | 14.6                       | 24.3#                 | ***   | 46.0                      | -21.7             | 45                    | ***   | 1.0              | ***   |
| 310.330                          | 9.0#                      | ***   | 16.8                       | 25.8#                 | ***   | 46.0                      | -20.2             | 350                   | ***   | 1.2              | ***   |
| 392.780                          | ***                       | 8.2#  | 19.4                       | ***                   | 27.6# | 46.0                      | -18.4             | ***                   | 20    | ***              | 1.0   |

**B. above 1GHz**

| B. above 1GHz                                                                        |                     |                           |                           |                        |                                         |  |                                        |  |                   |
|--------------------------------------------------------------------------------------|---------------------|---------------------------|---------------------------|------------------------|-----------------------------------------|--|----------------------------------------|--|-------------------|
| Frequency<br>(MHz)                                                                   | Ant<br>Pol<br>H / V | Reading<br>(dBuV)<br>Peak | Correct<br>Factor<br>(dB) | Duty<br>Factor<br>(dB) | Result @3m<br>(dBuV/m)<br>Peak      AVG |  | Limit @3m<br>(dBuV/m)<br>Peak      AVG |  | Margins<br>( dB ) |
| Radiated emission frequencies above 1 GHz to 4.5 GHz<br>were too low to be measured. |                     |                           |                           |                        |                                         |  |                                        |  |                   |

Note:

1. Place of Measurement: Measuring site of the ETC.
2. If the data table appeared symbol of "\*\*\*\*" means the value was too low to be measured.
3. The estimated measurement uncertainty of the result measurement is  
 $\pm 4.6\text{dB}$  ( $30\text{MHz} \leq f < 300\text{MHz}$ ).  
 $\pm 4.4\text{dB}$  ( $300\text{MHz} \leq f < 1000\text{MHz}$ ).  
 $\pm 4.1\text{dB}$  ( $1\text{GHz} \leq f \leq 18\text{GHz}$ ).

### 3.4 Field Strength Calculation

#### (a) Field Strength:

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$\text{RESULT} = \text{READING} + \text{CORR. FACTOR}$$

where CORR. FACTOR = Antenna FACTOR + Cable FACTOR

Assume a receiver reading of 62.4 dB  $\mu$  V is obtained. The Antenna Factor of 14.1 and a Cable Factor of 3.4 is added. The total of field strength is 79.9 dB  $\mu$  V/m.

$$\text{RESULT} = 62.4 + 14.1 + 3.4 = 79.9 \text{ dB } \mu \text{ V/m}$$

$$\text{Level in } \mu \text{ V/m} = \text{Common Antilogarithm}[(79.9 \text{ dB } \mu \text{ V/m})/20] = 9885.5 \mu \text{ V/m}$$

#### (b) Duty Factor:

$$20 \log \frac{0.74(\text{ms}) \times 42 + 0.341(\text{ms}) \times 31}{100(\text{ms})} = -7.6 \text{ dB}$$

The plotted graph of Duty Factor please see page 13 ~ 15

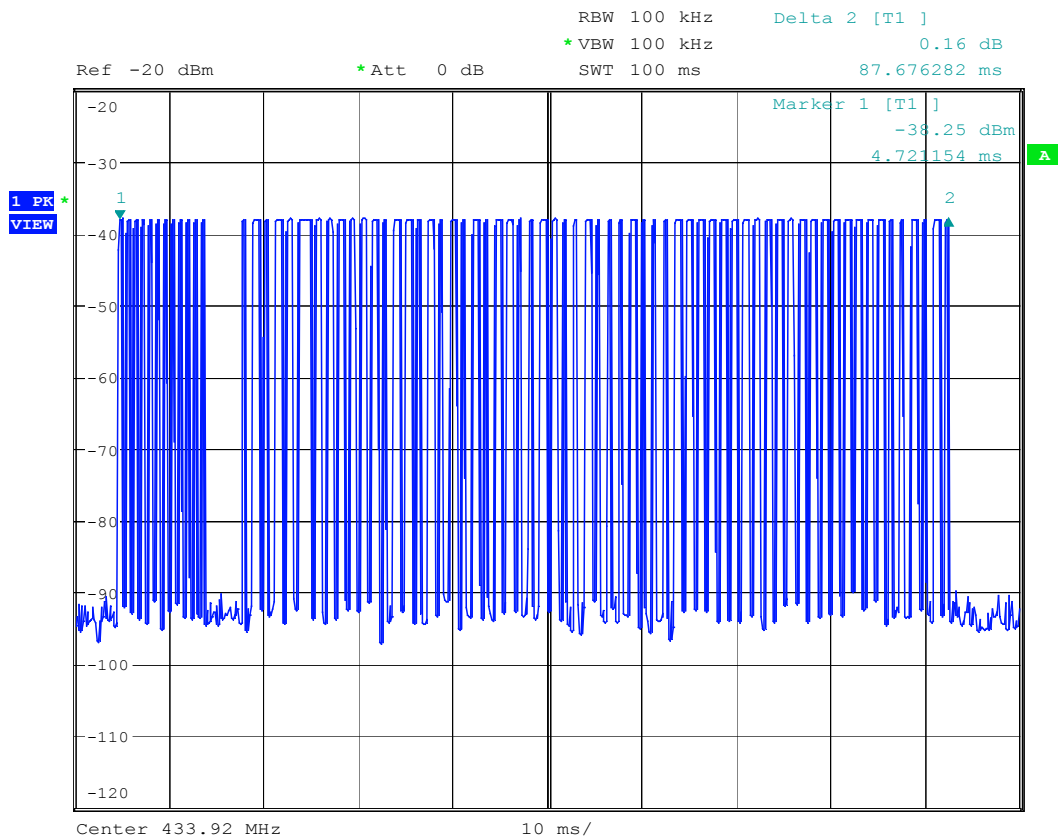
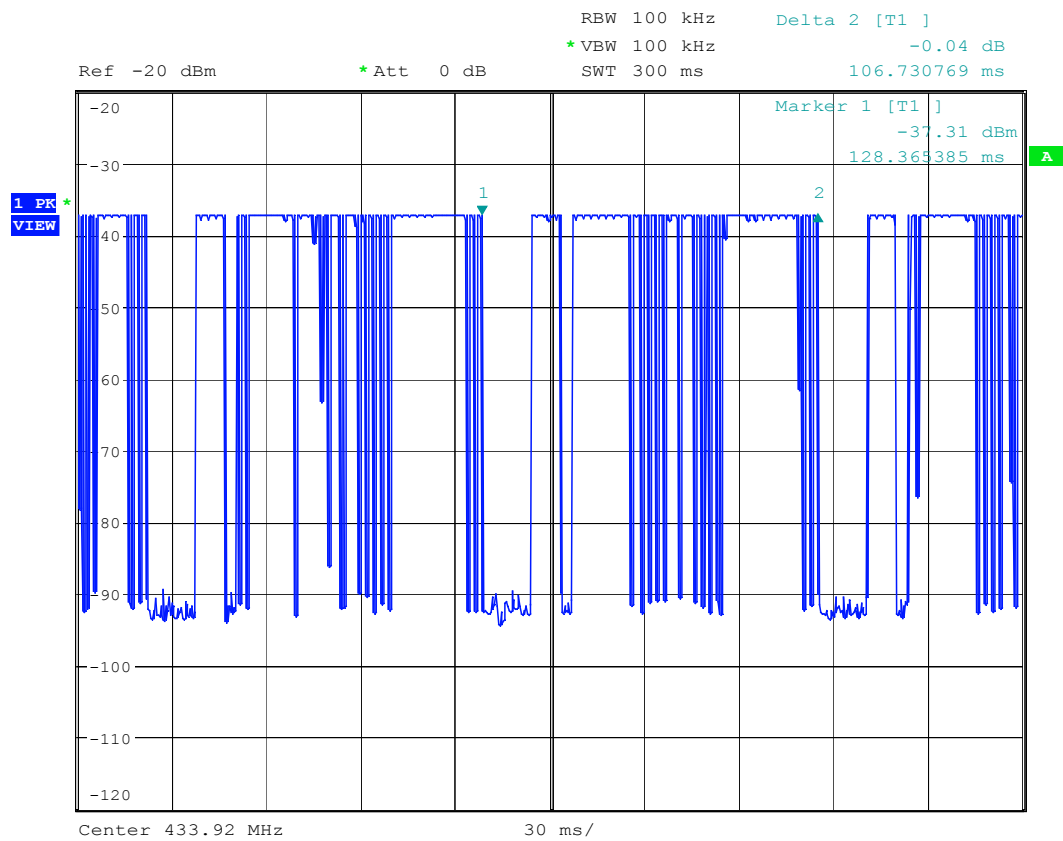
### 3.5 Radiated Test Equipment

The following instrument are used for radiated emissions measurement :

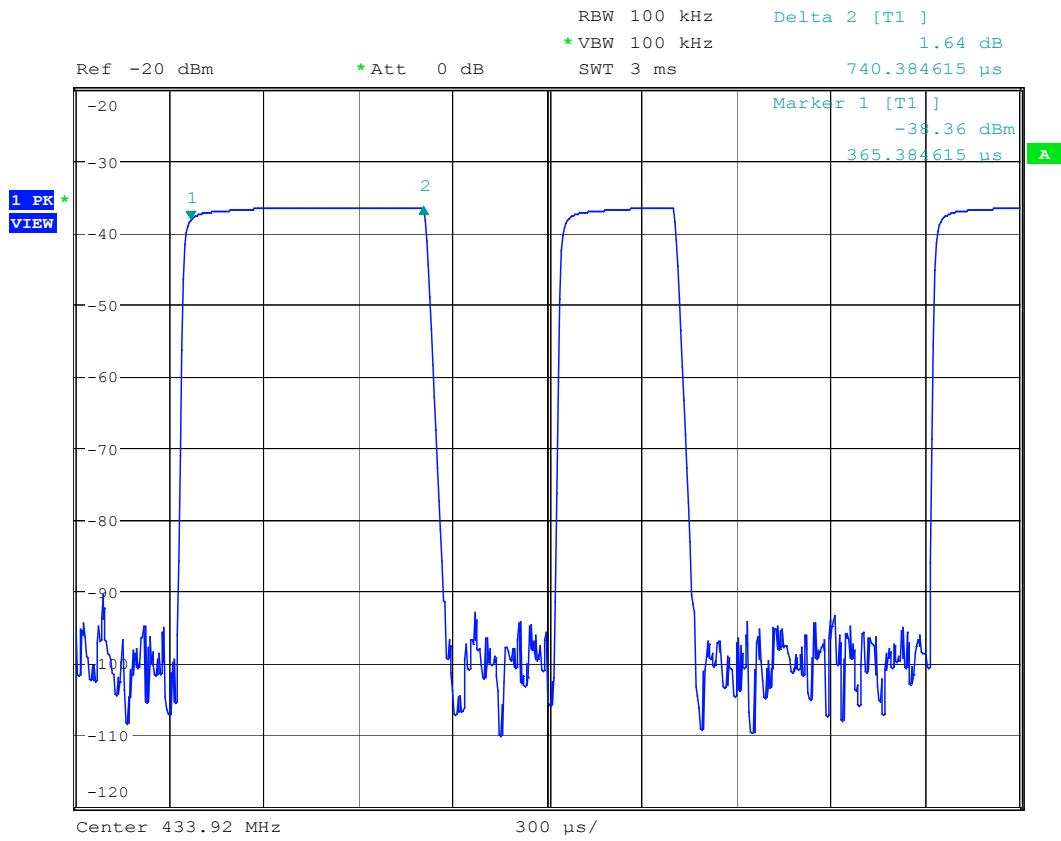
| Equipment         | Manufacturer    | Model No. | Serial No.   | Calibrated until |
|-------------------|-----------------|-----------|--------------|------------------|
| EMI Test Receiver | HP              | 8546A     | 13054404-001 | Sep. 06, 2006    |
| BiconiLog Antenna | Schwarzbeck     | VULB 9160 | 13057310-001 | Oct. 28,2006     |
| Horn Antenna      | EMCO            | 3115      | 9107-3729    | Jun. 04, 2006    |
| Spectrum Analyzer | Rohde & Schwarz | FSU46     | 13040904-001 | Oct. 03,2006     |

Note: The standards used to perform this calibration are traceable to NML/ROC, NIST/USA and NPL.

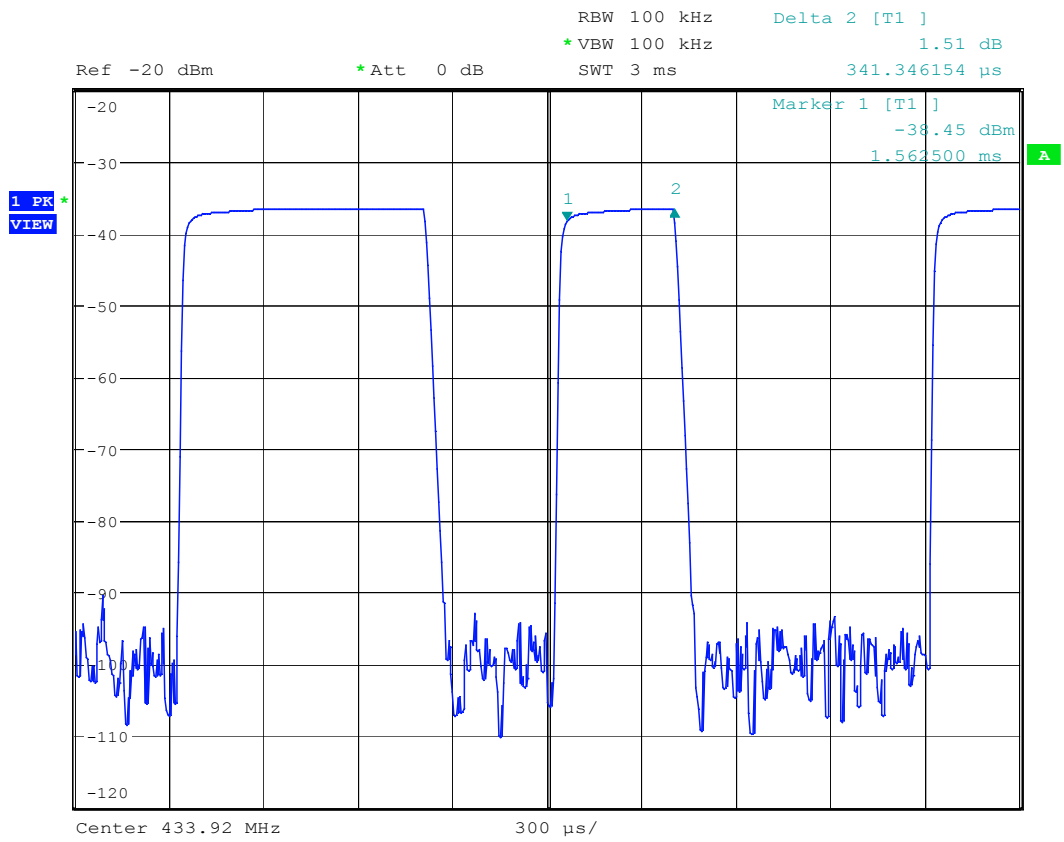
## Plotted graph 1 of Duty Factor



## Plotted graph 2 of Duty Factor



## Plotted graph 3 of Duty Factor



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### 3.6 Measuring Instrument Setup

Measuring instrument setup in measured frequency band when specified detector function is used :

| Frequency Band (MHz) | Instrument        | Function | Resolution Bandwidth | Video Bandwidth |
|----------------------|-------------------|----------|----------------------|-----------------|
| 30 to 1000           | EMI Test Receiver | Peak     | 120 kHz              | 300 kHz         |
| 1000 to 4500         | EMI Test Receiver | Peak     | 1 MHz                | 1 MHz           |

## 4. BANDWIDTH OF EMISSION

### 4.1 Applicable Standard Plot Graphic of Bandwidth

Per FCC rule §15.231(c), the permitted emission bandwidth is no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz.

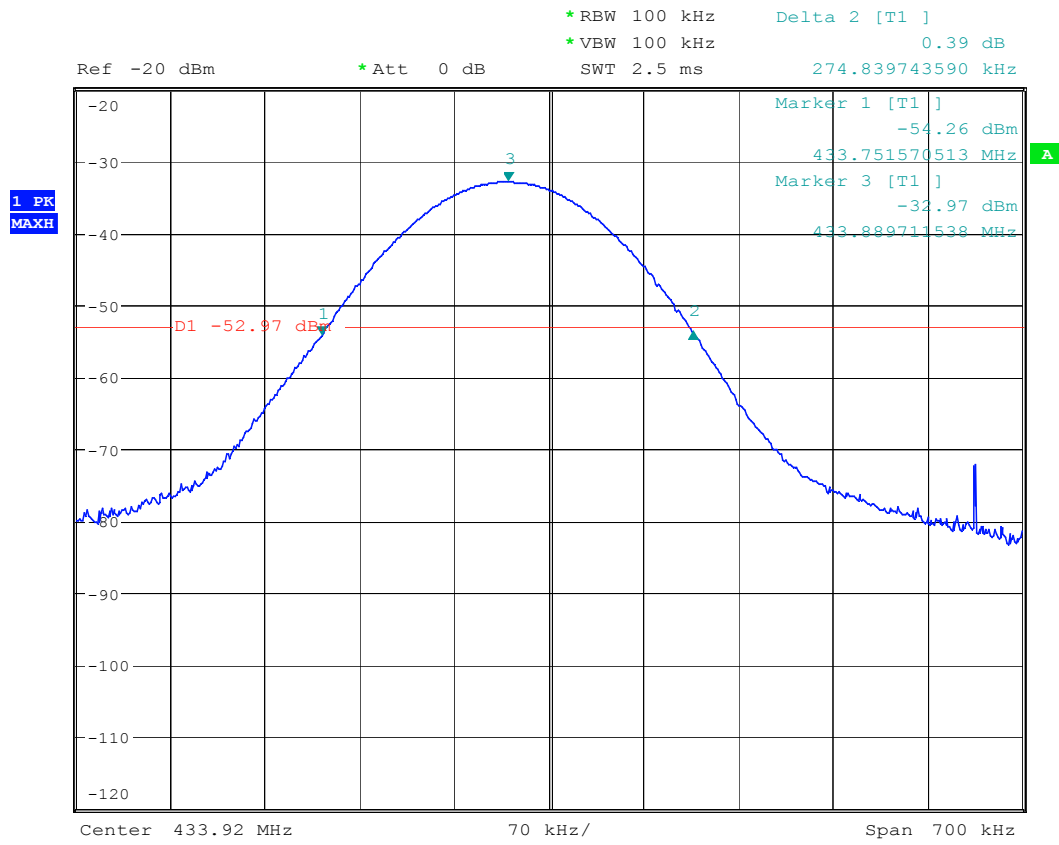
### 4.2 Test Equipment

| Equipment         | Manufacturer    | Model No. | Next Cal. Date |
|-------------------|-----------------|-----------|----------------|
| Spectrum Analyzer | Rohde & Schwarz | FSU46     | 10/03/2006     |

### 4.3 Test Result

Test Date : Sep. 22, 2005      Temperature : 20 °C      Humidity : 69%

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Center Frequency      | 433.920 MHz                                              |
| FCC Limit             | $433.920 \text{ MHz} \times 0.25\% = 1084.8 \text{ kHz}$ |
| Bandwidth of Emission | 274.8 kHz                                                |
| Chart                 | Page 18                                                  |
| Result                | PASS                                                     |



## **5. CONDUCTED EMISSION MEASUREMENT**

This EUT is excused from investigation of conducted emission, for it is powered by battery only. According to §15.207 (d), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

## **6. LIMIT OF TRANSMISSION TIME**

### **6.1 Applicable Standard**

According to 15.231(a)(1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### **6.2 Active Time**

This transmitter is operated by manual and active time is 1.067 second after being released.

*Note : Please refer to page 21 for chart*

