

# MEASUREMENT REPORT


(FCC : Part 15 Subpart C / ANSI C63.4-2003)




Testing Laboratory  
1288

Product\_\_\_\_\_ : HAND HELD RF TRANSMITTER  
Trade Name\_\_\_\_\_ : WEKKA  
Model No.\_\_\_\_\_ : WK1101A  
Applicant\_\_\_\_\_ : WEKKA TECHNOLOGY CO., LTD  
Applicant Address\_\_\_\_\_ : No.550, Sishih Rd. Fongyuan, Taichung  
42077, Taiwan

|                             |                           |
|-----------------------------|---------------------------|
| <b>Report Number</b>        | MLT0702P15004             |
| <b>Applicant</b>            | WEKKA TECHNOLOGY CO., LTD |
| <b>Product</b>              | HAND HELD RF TRANSMITTER  |
| <b>Sample Received Date</b> | 2007/02/12                |

|                           |   |
|---------------------------|---|
| <b>Report Prepared By</b> | Jesse Tien  |
| <b>Signature</b>          |  |
| <b>Date Prepared</b>      | 2007/02/13 ~ 2007/03/2  |

|                             |  |
|-----------------------------|--|
| <b>Report Authorized By</b> | Roger Chen   |
| <b>Signature</b>            |  |
| <b>Date Authorized</b>      | 2007/03/21   |

Test By

Max Light Technology Co., Ltd.  
Room 5, 8F, No.125, Section 3 Roosevelt Road,  
Taipei, Taiwan., R.O.C.  
Office : Tel: 886-2-2363-2447 Fax: 886-2-2363-2597  
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laboratory.

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## CERTIFICATION


We here by verify that :

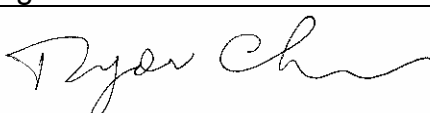
The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4-2003. All test were conducted by MLT(Max Light Technology Co.,Ltd) Room 5, 8F, No.125, Section 3 Roosevelt Road, Taipei, Taiwan, R.O.C Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is in compliance with radiated emission limit of FCC Rules Part 15 Subpart C Section 15.231.

|                             |   |
|-----------------------------|---|
| <b>Applicant Name</b>       | WEKKA TECHNOLOGY CO., LTD                           |
| <b>Applicant Address</b>    | No.550, Sishih Rd. Fongyuan, Taichung 42077, Taiwan |
| <b>Manufacturer Name</b>    | WEKKA TECHNOLOGY CO., LTD                           |
| <b>Manufacturer Address</b> | No.550, Sishih Rd. Fongyuan, Taichung 42077, Taiwan |

|                  |                          |
|------------------|--------------------------|
| <b>Equipment</b> | HAND HELD RF TRANSMITTER |
| <b>Model No</b>  | WK1101A                  |
| <b>FCC ID</b>    | U5UWK1101A               |

|                           |   |
|---------------------------|---|
| <b>Report Prepared By</b> | Jesse Tien  |
| <b>Signature</b>          |  |

|                             |  |
|-----------------------------|--|
| <b>Report Authorized By</b> | Roger Chen   |
| <b>Signature</b>            |  |

## I. GENERAL

### 1.1 Introduction

The following measurement report is submitted on behalf of WEKKA TECHNOLOGY CO., LTD In support of an Intentional Periodic Radiator certification in accordance with Part 2 Subpart J and Part 15 Subpart A And C of the Commission's and Regulations.

### 1.2 Customer Details

|                             |   |
|-----------------------------|---|
| <b>Applicant Name</b>       | WEKKA TECHNOLOGY CO., LTD                           |
| <b>Applicant Address</b>    | No.550, Sishih Rd. Fongyuan, Taichung 42077, Taiwan |
| <b>Manufacturer Name</b>    | WEKKA TECHNOLOGY CO., LTD                           |
| <b>Manufacturer Address</b> | No.550, Sishih Rd. Fongyuan, Taichung 42077, Taiwan |

### 1.3 Technical data of EUT

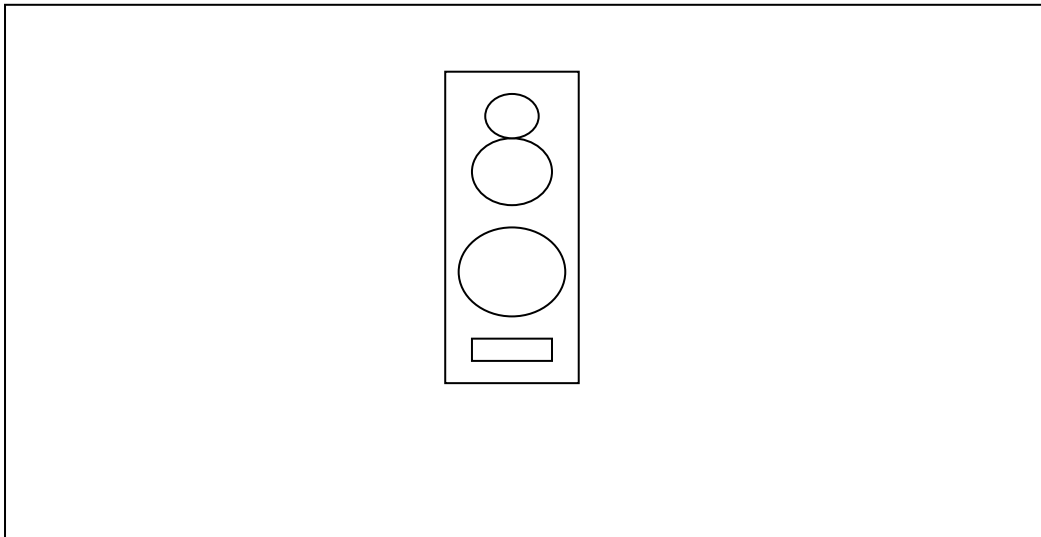
|                   |                            |
|-------------------|----------------------------|
| <b>Equipment</b>  | HAND HELD RF TRANSMITTER   |
| <b>Model No</b>   | WK1101A                    |
| <b>FCC ID</b>     | U5UWK1101A                 |
| <b>Power Type</b> | Powered by 12V Battery X1. |

The EUT (WK1101A) is a remote HAND HELD RF TRANSMITTER. The operation frequency is 303.8Mhz. Press the button of the remote HAND HELD RF TRANSMITTER. The remote HAND HELD RF TRANSMITTER contains a DIP SW. and we test the EUT under 4 different modes, in order to choice the worst case to be the data of this report.

### 1.4 Description of Support Equipment

The EUT itself forms a system. No support equipment is required for its normal operation.

## 1.5 Configuration of System Under Test



## 1.6 Test Procedure

All measurements contained in this report were performed according to the techniques described in Measurement procedure ANSI C63.4: 2003 "Measurement of Intentional Radiators."

## 1.7 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests was chosen as that which produced the highest emission levels. However, only those conditions which the EUT was considered likely to encounter in normal use were investigated.

## **II. Conducted Emissions Requirements**

The EUT operates solely by the battery. According to the rule of Section 15.207(c), the EUT exempt to the power line conducted test.

## **III. Radiated Emissions Requirements**

### **3.1 General Configuration:**

Prior to open-field testing, the EUT was placed in a shielded enclosure and scanned at a close distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration which produced the highest emissions was noted so it could be reproduced later during the open-field tests. This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

### **3.2 General Configuration:**

Final radiation measurements were made on a three-meter, open-field test site. The EUT system was placed on a nonconductive turntable which is 0.8 meters height, top surface 1.0 x 1.5 meter. The spectrum was examined from 250 MHz to 2.5 GHz in order to cover the whole spectrum below 10th harmonic which could generate from the EUT. During the test, EUT was set to transmit continuously & Measurements spectrum range from 30 MHz to 5 GHz is investigated.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

A nonconductive material surrounded the EUT to supporting the EUT for standing on three orthogonal planes. At each condition, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

The field strength below 1 GHz was measured by EMCO Biconilog Antenna (mode 3142C) at 3 Meter and the SCHWARZBECK Double Ridged Guide Antenna (model BBHA9120D&9170) was used in frequencies 1 – 40 GHz at a distance of 3 meter. All test results were extrapolated to equivalent signal at 3 meters utilizing an inverse linear distance extrapolation Factor (20dB/decade).



For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. No post – detector video filters were used in the test.

The spectrum analyzer's 6 dB bandwidth was set to 1 MHz, and the analyzer was operated in the peak detection mode, for frequencies both below and up 1 GHz. The average levels were obtained by subtracting the duty cycle correction factor from the peak readings.

The actual field intensity in referenced to 1 microvolt per meter (dBuV/m) is determined by algebraically adding the measured reading in dBuV, the antenna factor (dB), and cable loss (dB) and Subtracting the gain of preamplifier (dB) is auto calculate in spectrum analyzer.

$$(1) \text{ Amplitude (dBuV/m)} = FI(\text{dBuV}) + AF(\text{dBuV}) + CL(\text{dBuV}) - \text{Gain}(\text{dB})$$

FI= Reading of the field intensity.

AF= Antenna factor.

CL= Cable loss.

*P.S Amplitude is auto calculate in spectrum analyzer.*

$$(2) \text{ Actual Amplitude (dBuV/m)} = \text{Amplitude (dBuV)} - \text{Duty}(\text{dB}) - \text{Dis}(\text{dB})$$

The FCC specified emission limits were calculated according the EUT operating frequency and by following linear interpolation equations:

(1) For fundamental frequency :

| <b>FUNDAMENTAL FREQUENCY (MHz), excluding restricted band frequencies of Table 2</b> | <b>FIELD STRENGTH OF FUNDAMENTAL microvolts/m at 3 metres, (watts, EIRP)(1)</b> | <b>FIELD STRENGTH OF UNWANTED EMISSIONS(1) microvolt/metre at 3 metres</b> |
|--|---|--|
| 40.66-40.70  | See RSS-210 section 6.2.2(g).   |  |
| 70-130   | 1,250 (470 nW)  | 125  |
| 130-174  | 1,250 to 3,750*   | 125 to 375   |
| 174-260 (note 1)   | 3,750 (4.2 uW)  | 375  |
| 260-470 (note 1)   | 3,750 to 12,500*  | 375 to 1,250   |
| Above 470  | 12,500 (47 uW)  | 1250   |

Note : Use quasi-peak or averaging meter.

\* Linear interpolation with frequency F in MHz:

For 130-174 MHz: FS (microvolts/m) = (56.82 x F) - 6136

For 260-470 MHz: FS (microvolts/m) = (41.67 x F) - 7083

nW = nanowatt (EIRP) ; uW = microwatt (EIRP).

(2) For spurious frequency :

Spurious emission limits = fundamental emission limit /10

### 3.3 Test Equipment List:

| <b>Item</b> | <b>Mfr/Brand</b> | <b>Instruments</b> | <b>Serial No.</b> | <b>Model/Type No.</b> | <b>Calibrated Date</b> | <b>Next Cali. Date</b> |
|-------------|------------------|--------------------|-------------------|-----------------------|------------------------|------------------------|
| 1.          | HP               | Spectrum Analyzer  | 73412A00110       | 8591EM                | 2007/02/12             | 2008/02/12             |
| 2.          | HP               | Pre Amplifier      | 2944A08954        | 8447D                 | 2006/04/14             | 2007/04/14             |
| 3.          | HP               | Pre Amplifier      | 3113A05475        | 8447F                 | 2007/02/14             | 2008/02/14             |
| 4.          | R&S              | EMI Receiver       | 881121/010        | ESVP                  | 2007/02/12             | 2008/02/12             |
| 5.          | EMCO             | Biconilog Antenna  | 00059739          | 3142C                 | 2006/04/19             | 2007/04/19             |
| 6.          | Agilent          | Spectrum Analyzer  | US44300422        | E4446A                | 2006/04/19             | 2007/04/19             |
| 7.          | HP               | Pre Amplifier      | 3008A01463        | 8449B                 | 2007/02/12             | 2008/02/12             |
| 8.          | SCHWARZBECK      | Horn Antenna       | 181               | BBHA 9170             | 2006/07/06             | 2007/07/06             |
| 9.          | SCHWARZBECK      | Horn Antenna       | 304               | BBHA 9120 D           | 2006/07/06             | 2007/07/06             |
| 10.         | EMCO             | Biconilog Antenna  | 00044568          | 3142C                 | 2006/06/27             | 2007/06/27             |

### 3.4 Measurement Data Of Radiated Emissions:

#### 3.4.1 Open Field Radiated Emissions (Horizontal/X-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (HORIZONTAL) |                    |          |                |           |                     |                |             |
|---------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)                 | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                          | 55.12              | 1.5      | 200            | 16.80     | 38.32               | 74.92          | -36.60      |
| 608.00                          | 37.69              | 1.8      | 140            | 16.80     | 20.89               | 54.92          | -34.03      |
| 911.10                          | 29.60              | 1.2      | 180            | 16.80     | 12.80               | 54.92          | -42.12      |
| 1215.50                         | 41.52              | 1        | 290            | 16.80     | 24.72               | 54.00          | -29.28      |
| 1518.60                         | 40.86              | 1        | 250            | 16.80     | 24.06               | 54.00          | -29.94      |
| 1822.10                         | 44.33              | 1        | 200            | 16.80     | 27.53               | 54.92          | -27.39      |
| 2126.30                         | 40.51              | 1        | 160            | 16.80     | 23.71               | 54.92          | -31.21      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.

### 3.4.2 Open Field Radiated Emissions (Vertical/X-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (VERTICAL) |                    |          |                |           |                     |                |             |
|-------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)               | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                        | 73.43              | 1        | 320            | 16.80     | 56.63               | 74.92          | -18.29      |
| 608.00                        | 39.31              | 1.5      | 310            | 16.80     | 22.51               | 54.92          | -32.41      |
| 911.10                        | 35.33              | 1        | 270            | 16.80     | 18.53               | 54.92          | -36.39      |
| 1215.60                       | 43.53              | 1        | 290            | 16.80     | 26.73               | 54.00          | -27.27      |
| 1518.40                       | 44.11              | 1        | 110            | 16.80     | 27.31               | 54.00          | -26.69      |
| 1822.30                       | 42.87              | 1        | 280            | 16.80     | 26.07               | 54.92          | -28.85      |
| 2126.70                       | 43.09              | 1        | 240            | 16.80     | 26.29               | 54.92          | -28.63      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.

### 3.4.3 Open Field Radiated Emissions (Horizontal/Y-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (HORIZONTAL) |                    |          |                |           |                     |                |             |
|---------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)                 | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                          | 73.16              | 2        | 160            | 16.80     | 56.36               | 74.92          | -18.56      |
| 608.00                          | 42.39              | 1.5      | 320            | 16.80     | 25.59               | 54.92          | -29.33      |
| 911.10                          | 35.61              | 1.5      | 300            | 16.80     | 18.81               | 54.92          | -36.11      |
| 1215.50                         | 42.45              | 1        | 180            | 16.80     | 25.65               | 54.00          | -28.35      |
| 1518.60                         | 44.61              | 1        | 70             | 16.80     | 27.81               | 54.00          | -26.19      |
| 1822.10                         | 43.55              | 1        | 250            | 16.80     | 26.75               | 54.92          | -28.17      |
| 2126.30                         | 42.02              | 1        | 120            | 16.80     | 25.22               | 54.92          | -29.70      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.

#### 3.4.4 Open Field Radiated Emissions (Vertical/Y-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (VERTICAL) |                    |          |                |           |                     |                |             |
|-------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)               | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                        | 70.57              | 1        | 310            | 16.80     | 53.77               | 74.92          | -21.15      |
| 608.00                        | 40.24              | 1.2      | 250            | 16.80     | 23.44               | 54.92          | -31.48      |
| 911.10                        | 36.00              | 1        | 240            | 16.80     | 19.20               | 54.92          | -35.72      |
| 1215.60                       | 45.22              | 1        | 320            | 16.80     | 28.42               | 54.00          | -25.58      |
| 1518.40                       | 46.83              | 1        | 90             | 16.80     | 30.03               | 54.00          | -23.97      |
| 1822.30                       | 41.74              | 1        | 180            | 16.80     | 24.94               | 54.92          | -29.98      |
| 2126.70                       | 43.05              | 1        | 200            | 16.80     | 26.25               | 54.92          | -28.67      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.

### 3.4.5 Open Field Radiated Emissions (Horizontal/Z-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (HORIZONTAL) |                    |          |                |           |                     |                |             |
|---------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)                 | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                          | 75.96              | 2        | 200            | 16.80     | 59.16               | 74.92          | -15.76      |
| 608.00                          | 42.96              | 1.5      | 80             | 16.80     | 26.16               | 54.92          | -28.76      |
| 911.10                          | 36.76              | 1        | 320            | 16.80     | 19.96               | 54.92          | -34.96      |
| 1215.50                         | 43.42              | 1        | 330            | 16.80     | 26.62               | 54.00          | -27.38      |
| 1518.60                         | 45.72              | 1        | 240            | 16.80     | 28.92               | 54.00          | -25.08      |
| 1822.10                         | 42.95              | 1        | 100            | 16.80     | 26.15               | 54.92          | -28.77      |
| 2126.30                         | 40.06              | 1        | 160            | 16.80     | 23.26               | 54.92          | -31.66      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.

### 3.4.6 Open Field Radiated Emissions (Vertical/Z-axis)

The highest peak values of radiated emissions from the EUT at various antenna heights, antenna polarization, EUT orientation , etc. are recorded on the following

Test Mode : HAND HELD RF TRANSMITTER

| Radiated Emissions (VERTICAL) |                    |          |                |           |                     |                |             |
|-------------------------------|--------------------|----------|----------------|-----------|---------------------|----------------|-------------|
| Frequency (MHz)               | Amplitude (dBuV/m) | Ant. (m) | Table (Degree) | Duty (dB) | Actual Amp (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
| 303.80                        | 57.07              | 1.2      | 210            | 16.80     | 40.27               | 74.92          | -34.65      |
| 608.00                        | 28.87              | 1        | 300            | 16.80     | 12.07               | 54.92          | -42.85      |
| 911.10                        | 34.11              | 1        | 150            | 16.80     | 17.31               | 54.92          | -37.61      |
| 1215.60                       | 46.88              | 1        | 240            | 16.80     | 30.08               | 54.00          | -23.92      |
| 1518.40                       | 45.87              | 1        | 200            | 16.80     | 29.07               | 54.00          | -24.93      |
| 1822.30                       | 41.98              | 1        | 270            | 16.80     | 25.18               | 54.92          | -29.74      |
| 2126.70                       | 41.20              | 1        | 120            | 16.80     | 24.40               | 54.92          | -30.52      |

**Notes :** 1.Margin= Amplitude - Limits

2.Distance of Measurement : 3 Meter (30MHz~26.5GHz)

3.Height of table for EUT placed: 0.8 Meter.

4.ANT= Antenna height.

5.Duty= Duty cycle correction factor.

6.Amplitude= Reading Amplitude – Amplifier gain + Cable loss + Antenna factor  
(Auto calculate in spectrum analyzer)

7.Actual Amp= Amplitude – Duty.

8. EUT Orthogonal Axes : X denotes Laid on Table ; Z denotes Side Stand ;  
Y denotes Vertical Stand.



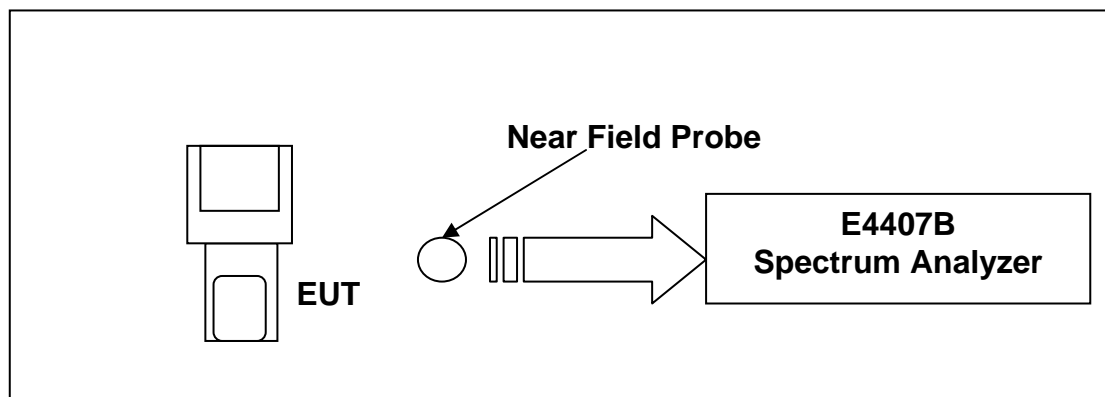
## IV. HAND HELD RF TRANSMITTER Bandwidth Measurement

### 4.1 Test Condition & Setup :

The HAND HELD RF TRANSMITTER bandwidth measurements were performed in a shielded enclosure. The EUT was placed on a wooded table which is 0.8 meters height and a near field probe was used at a distance about 20 cm for receiving. While testing, EUT was set to transmit continuously.

The resolution bandwidth of the spectrum analyzer was set to 10KHz. The detector function was set to peak and hold mode to clearly observe the components. The maximum permitted bandwidth at  $-20\text{dB}$  with respect to the reference level specified by the rule was 0.25 % of the center frequency of the EUT.

### 4.2 Test Instruments Configuration:



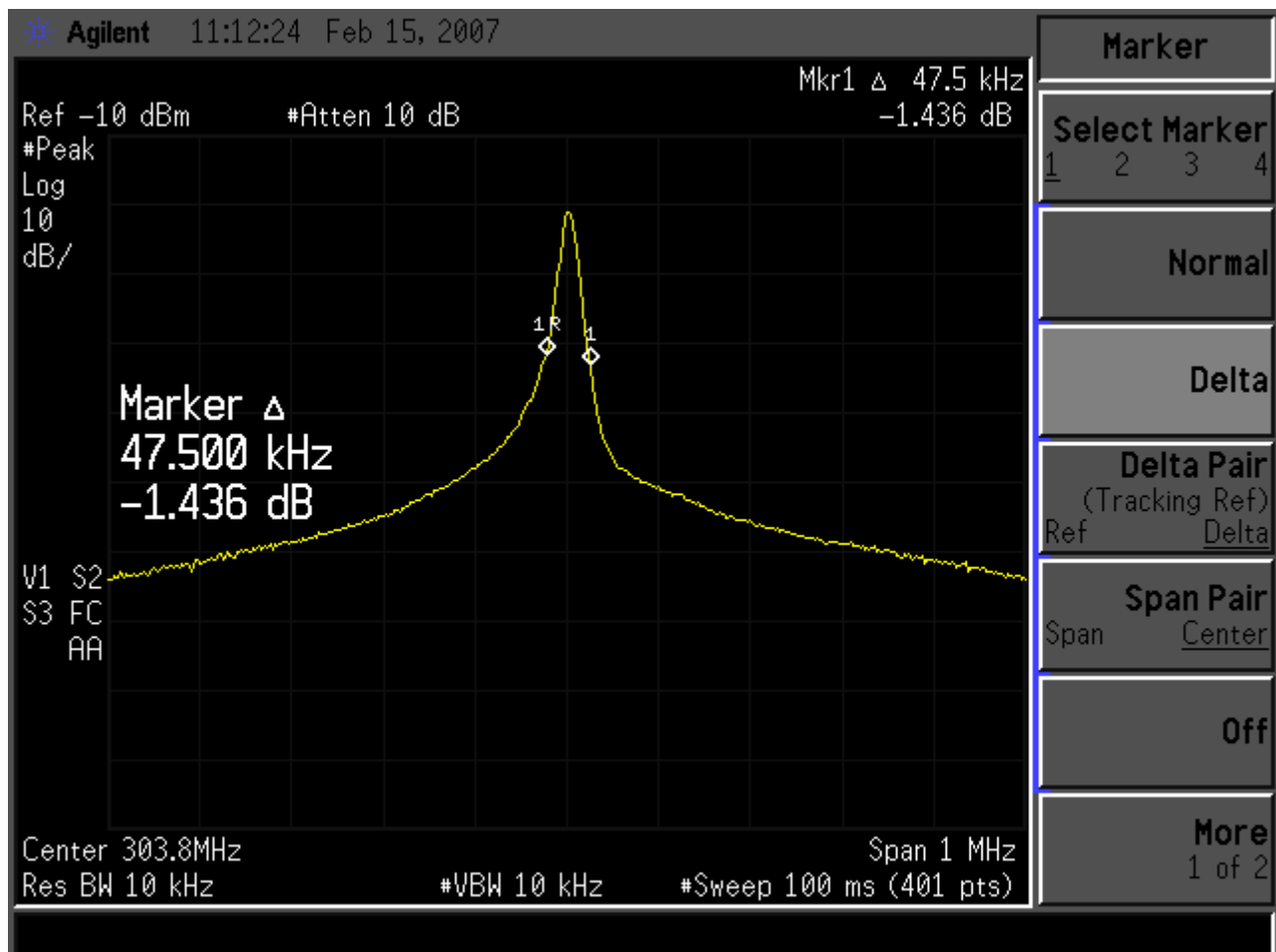
### 4.3 Test Equipment List:

| Item | Mfr/Brand   | Instruments       | Serial No. | Model/Type No. | Calibrated Date | Next Cali. Date |
|------|-------------|-------------------|------------|----------------|-----------------|-----------------|
| 1.   | Agilent     | Spectrum Analyzer | US44300422 | E4446A         | 2006/04/19      | 2007/04/19      |
| 2.   | HP          | Pre Amplifier     | 3008A01463 | 8449B          | 2007/02/12      | 2008/02/12      |
| 3.   | HP          | Pre Amplifier     | 2805A03013 | 8447F          | 2007/02/13      | 2008/02/13      |
| 4.   | EMCO        | Biconilog Antenna | 00044568   | 3142C          | 2006/06/27      | 2007/06/27      |
| 5.   | SCHWARZBECK | Horn Antenna      | 181        | BBHA 9170      | 2006/07/06      | 2007/07/06      |
| 6.   | SCHWARZBECK | Horn Antenna      | 304        | BBHA 9120 D    | 2006/07/06      | 2007/07/06      |
| 7    | EM          | Probe             | 107328     | EM-6992        | N/A             | N/A             |

#### 4.4 Test Result:

|                             |        |     |
|-----------------------------|--------|-----|
| Permitted Maximum Bandwidth | 759.50 | KHz |
| Bandwidth Measurement       | 47.50  | KHz |

#### 4.5 Test Graphs:



## V. HAND HELD RF TRANSMITTER Duty Cycle Measurement

### 5.1 Test Condition & Setup :

The HAND HELD RF TRANSMITTER bandwidth measurements were performed in a shielded enclosure. The EUT was placed on a wooded table which is 0.8 meters height and a near field probe was used at a distance about 20 cm for receiving. While testing, EUT was set to transmit continuously. Various key configurations were also investigated to find the maximum duty cycle.

The spectrum analyzer resolution bandwidth and video bandwidth were all set to 1 MHz to encompass all significant spectral components during the test. The analyzer was operated in linear scale and zero span mode after tuning to the HAND HELD RF TRANSMITTER carrier frequency. A digital oscilloscope was connected to the aux video output of the spectrum analyzer for measuring pulse width. The pulse width was determined by the difference between the half voltage points on a pulse.

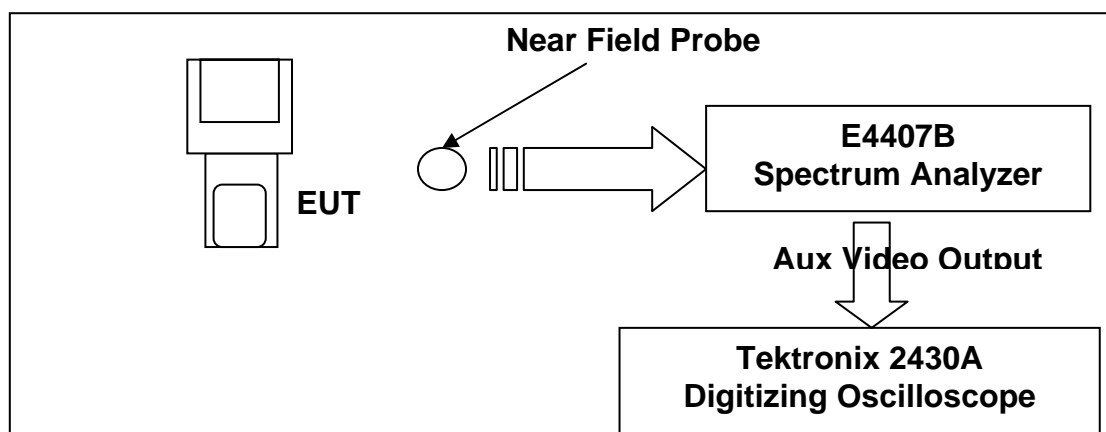
The duty cycle was determined by the following equation :

TO calculate the actual field intensity, the duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion :

$$\text{Duty Cycle(\%)} = \frac{(\text{Total On Interval in a Complete Pulse Train})}{(\text{Length of a Complete Pulse Train})} \times 100\%$$

$$\text{Duty Cycle Correction Factor (dB)} = 20 \times \text{Log}_{10} (\text{Duty Cycle(\%)})$$

### 5.2 Test Instruments Configuration:



### 5.3 Test Equipment List:

| Item | Mfr/Brand   | Instruments       | Serial No. | Model/Type No. | Calibrated Date | Next Cali. Date |
|------|-------------|-------------------|------------|----------------|-----------------|-----------------|
| 1.   | Agilent     | Spectrum Analyzer | US44300422 | E4446A         | 2006/04/19      | 2007/04/19      |
| 2.   | HP          | Pre Amplifier     | 3008A01463 | 8449B          | 2007/02/12      | 2008/02/12      |
| 3.   | HP          | Pre Amplifier     | 2805A03013 | 8447F          | 2007/02/13      | 2008/02/13      |
| 4.   | EMCO        | Biconilog Antenna | 00044568   | 3142C          | 2006/06/27      | 2007/06/27      |
| 5.   | SCHWARZBECK | Horn Antenna      | 181        | BBHA 9170      | 2006/07/06      | 2007/07/06      |
| 6.   | SCHWARZBECK | Horn Antenna      | 304        | BBHA 9120 D    | 2006/07/06      | 2007/07/06      |
| 7    | EM          | Probe             | 107328     | EM-6992        | N/A             | N/A             |

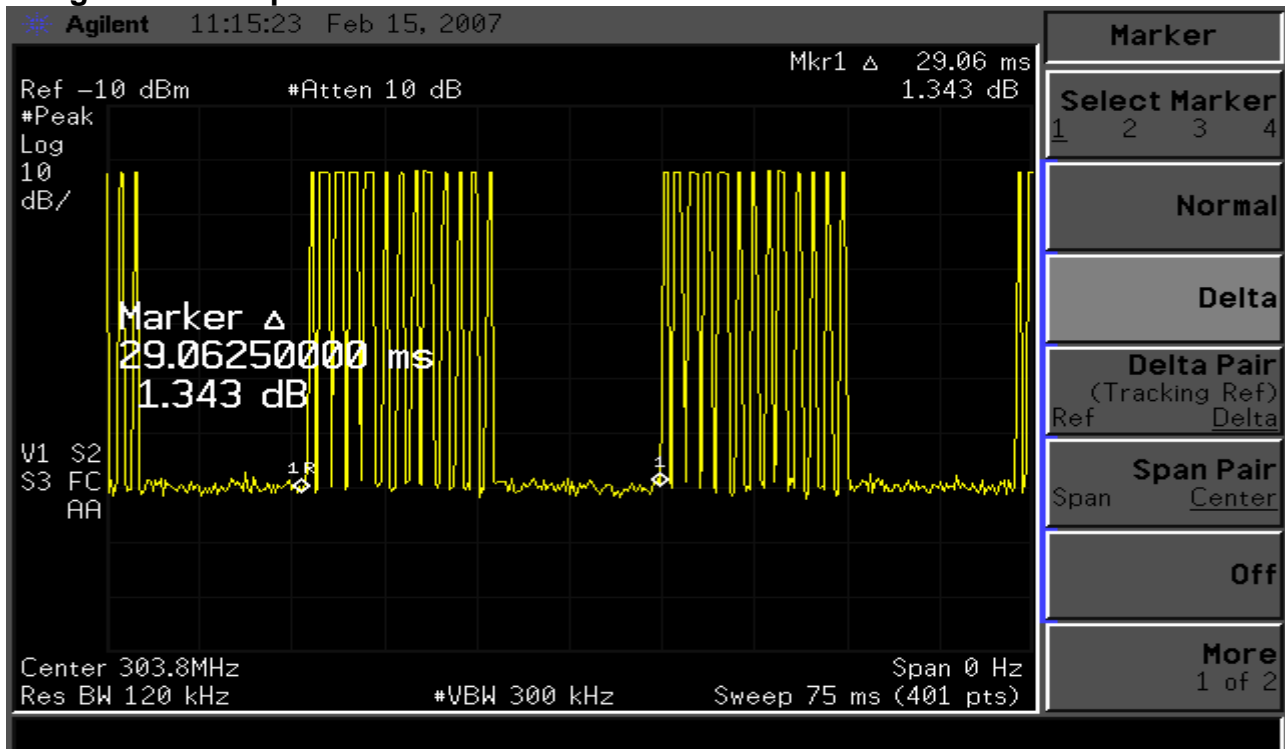
### 5.4 Test Result:

| Pulse Train | Number of Pulse | T(ms) | Total Time (ms) |      |
|-------------|-----------------|-------|-----------------|------|
| Long Pulse  | 5               | 0.6   | 3               | msec |
| Short Pulse | 15              | 0.15  | 2.25            | msec |

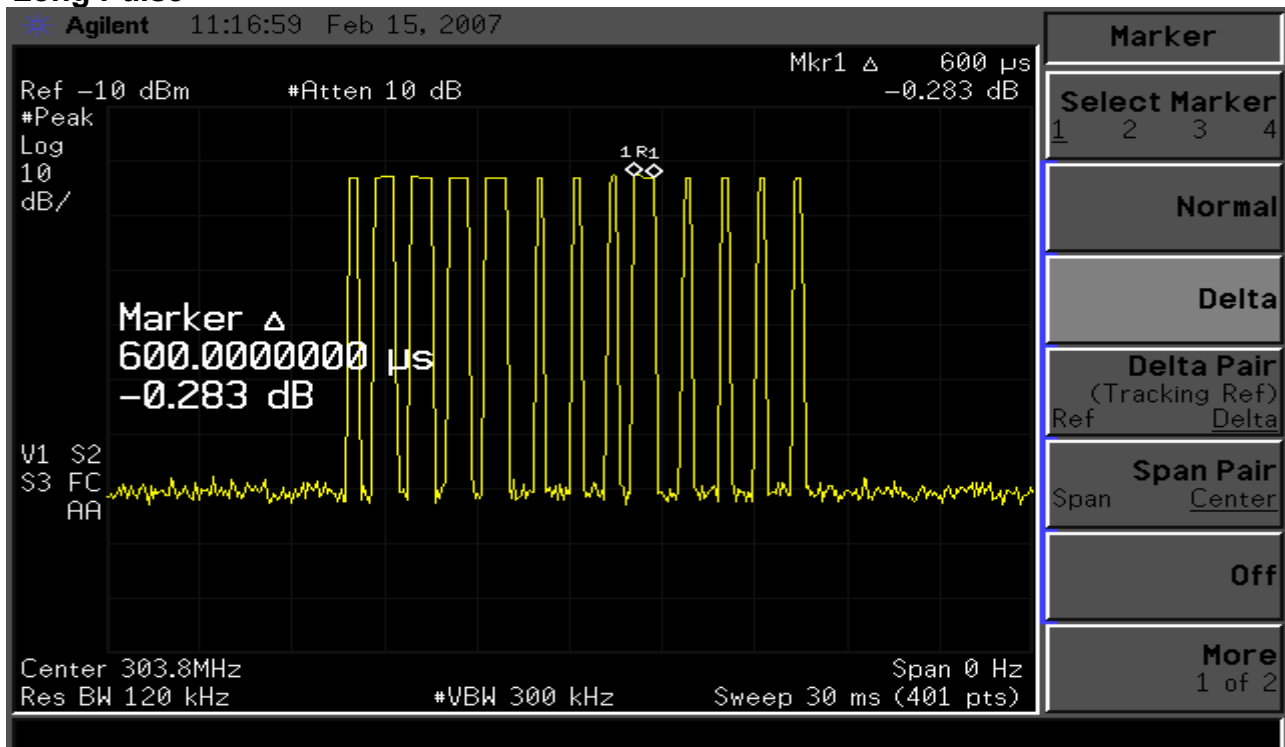
|   |       |      |
|---|-------|------|
| Total ON interval in a complete pulse train | 5.25  | msec |
| Length of a complete pulse train            | 29.06 | msec |
| Duty Cycle (%)                              | 14.45 | %    |
| Duty Cycle Correction Factor (dB)           | 16.80 | dB   |

### 5.5 Test Graphs: See next page.

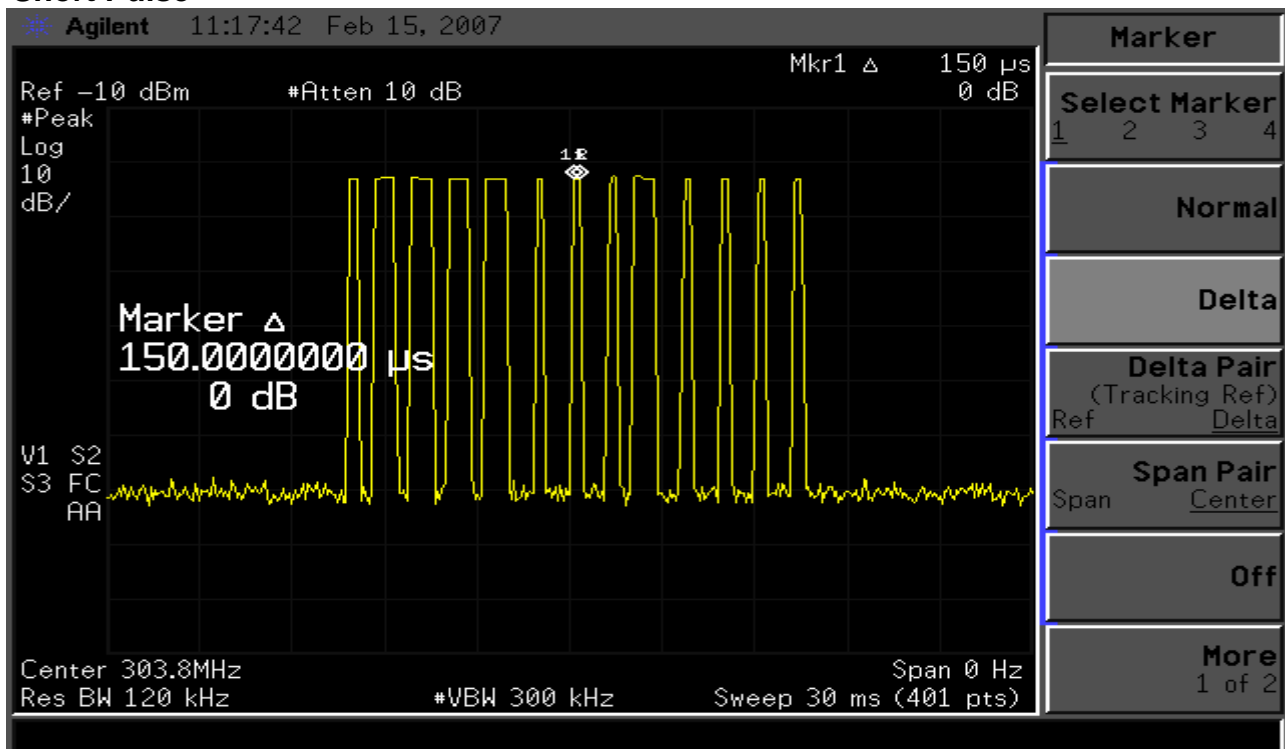
### Length of A Complete Pulse Train



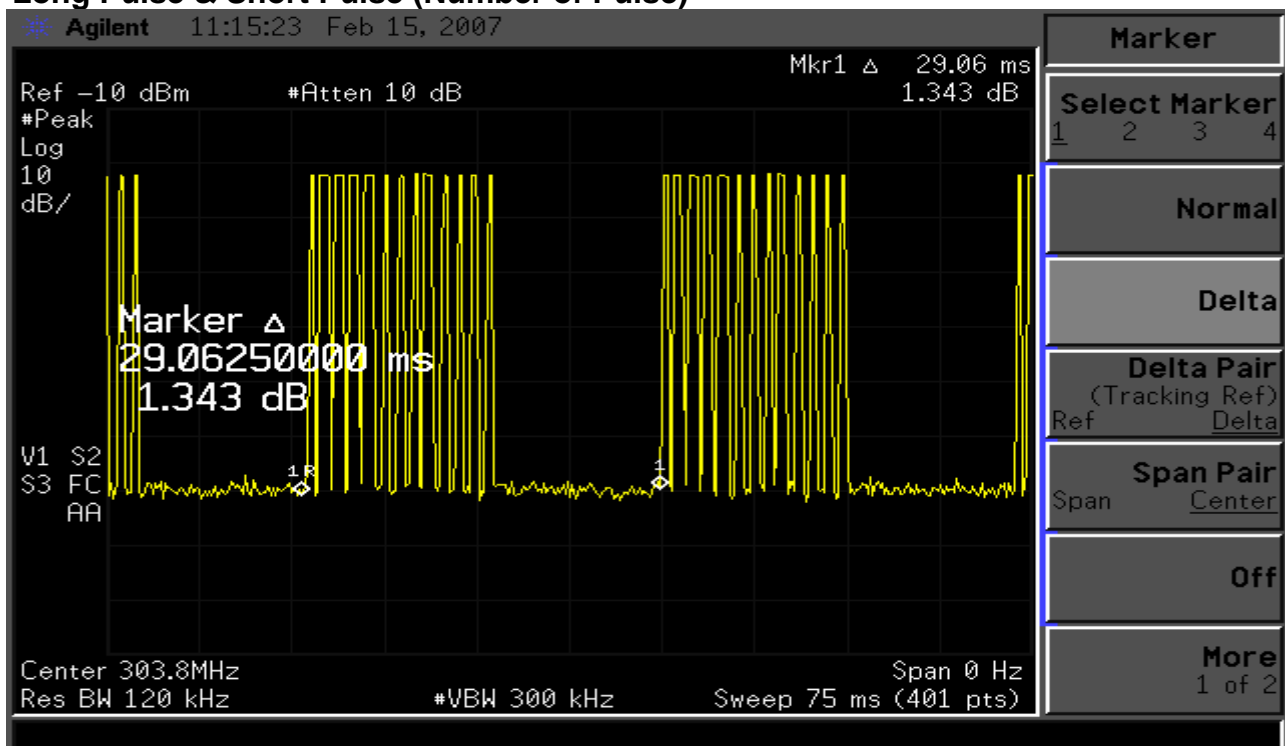
### Long Pulse



### Short Pulse



### Long Pulse & Short Pulse (Number of Pulse)



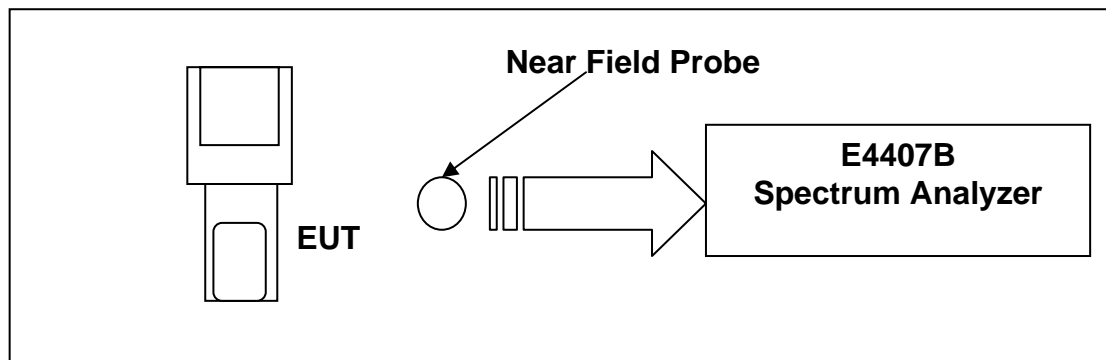
## VI. Verification of De-activation after 5 seconds

### 6.1 Test Condition & Setup :

Verification of the HAND HELD RF TRANSMITTER de-activation after 5 seconds was performed in a shielded enclosure. The EUT was placed on a wooded table which is 0.8 meters height and a near field probe was used at a distance about 20 cm for receiving.

The spectrum analyzer resolution bandwidth and video bandwidth were all set to 100KHZ to encompass all Significant spectral components during the test. The analyzer was operated in linear scale and zero span mode after tuning to the HAND HELD RF TRANSMITTER carrier frequency.

### 6.2 Test Instruments Configuration:



### 6.3 Test Equipment List:

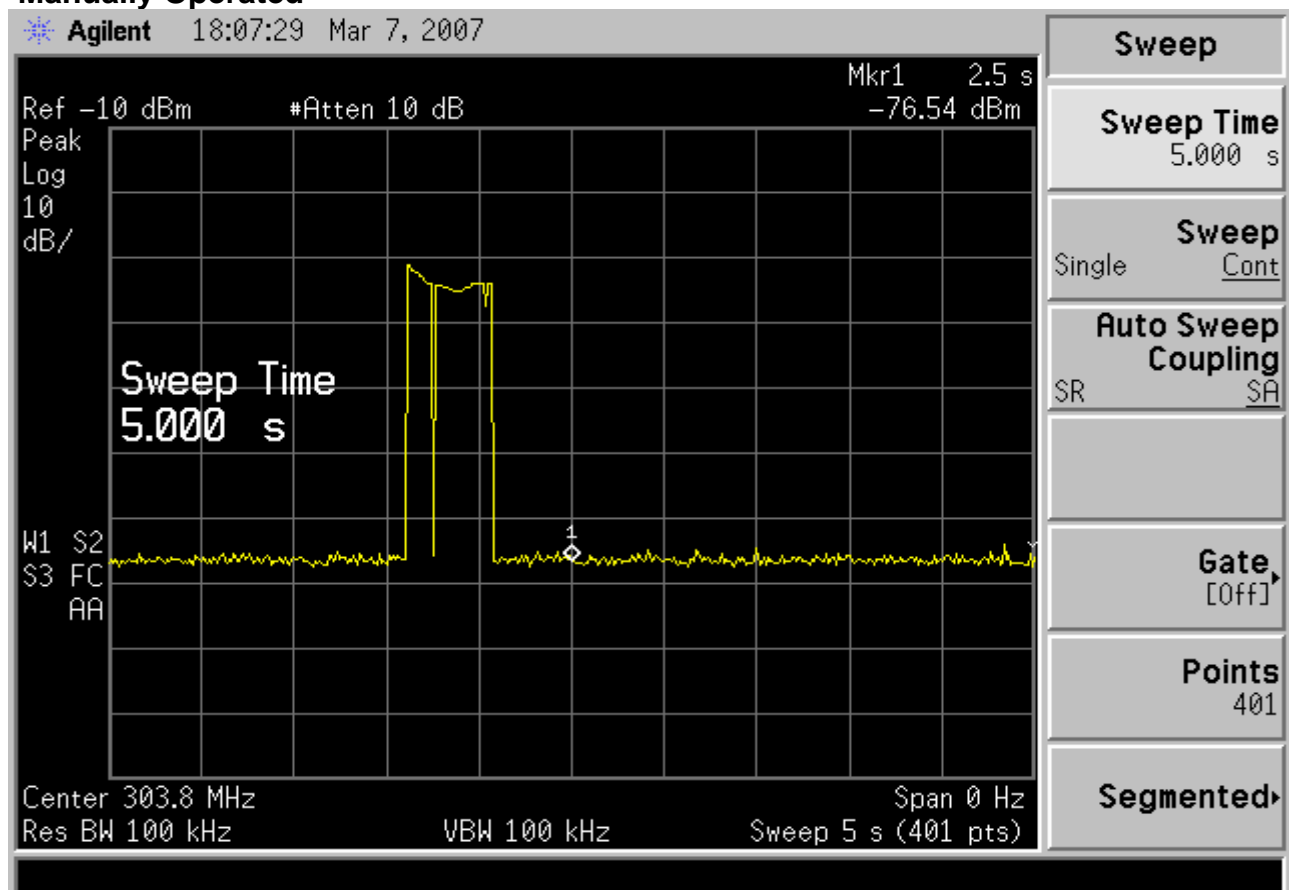
| Item | Mfr/Brand   | Instruments       | Serial No. | Model/Type No. | Calibrated Date | Next Cali. Date |
|------|-------------|-------------------|------------|----------------|-----------------|-----------------|
| 1.   | Agilent     | Spectrum Analyzer | US44300422 | E4446A         | 2006/04/19      | 2007/04/19      |
| 2.   | HP          | Pre Amplifier     | 3008A01463 | 8449B          | 2007/02/12      | 2008/02/12      |
| 3.   | HP          | Pre Amplifier     | 2805A03013 | 8447F          | 2007/02/13      | 2008/02/13      |
| 4.   | EMCO        | Biconilog Antenna | 00044568   | 3142C          | 2006/06/27      | 2007/06/27      |
| 5.   | SCHWARZBECK | Horn Antenna      | 181        | BBHA 9170      | 2006/07/06      | 2007/07/06      |
| 6.   | SCHWARZBECK | Horn Antenna      | 304        | BBHA 9120 D    | 2006/07/06      | 2007/07/06      |
| 7    | EM          | Probe             | 107328     | EM-6992        | N/A             | N/A             |

## 6.4 Test Result:

| Compliant Conditions (Section 15.231)   | EUT Status |     |    |
|---|------------|-----|----|
| Was the EUT manually operated ?   | x          | Yes | No |
| If yes, did the EUT employ a switch that would automatically deactivate the HAND HELD RF TRANSMITTER within not more than 5 seconds of being released ?   | x          | Yes | No |
| Was the EUT automatically activated ?   | Yes        | x   | No |
| The devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds. | Yes        | x   | No |

**Note:** This device stops transmitting once the activation button is released.

### Manually Operated





## Appendix I- EUT Test SETUP

### MEASUREMENT OF RADIATED EMISSION

