

FCC Part 15 Subpart C Requirement  
Measurement and Test Report

For

**Lelux Electronics Ltd.**

Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road, Tsuen Wan,  
New Territories, Hong Kong

**FCC ID: NS3-639S**

September 15, 2009

|  |   |
|--|---|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report  | <b>Equipment Type:</b><br>Visitor Chime and Watch Dog/Alarm |
| <b>Test Engineer:</b> Park Lee   |   |
| <b>Report Number:</b> SE09J-121F   |   |
| <b>Test Date:</b> September 07-08, 2009  |   |
| <b>Reviewed By:</b> <u>Hans Lee</u>  |   |
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**Note:** This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of S&E Technologies Laboratory Ltd.

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## 1-Test Result Certification

Applicant: Lelux Electronics Ltd.  
Unit 6, 10/F, TCL TOWER, NO.8, Tai Chung Road, Tsuen Wan,  
New Territories, Hong Kong

Equipment Under Test: Visitor Chime and Watch Dog/Alarm

Trade Name: HomeSafe

Model: 639S

Type of Modulation: Un-Modulation

Operation Frequency: 2400 ~2480MHz

Type of Equipment: Mobile

Antenna Designation: Non-user replaceable (fixed)

Battery Voltage: DC 12.0V from 8\*1.5V "AA" size batteries or  
DC 12.0V from Adapter

Test Item: Pre-Production

Test Exercise: The EUT was placed in continuous transmit mode of operation

Date of Test: September 07-08, 2009

| Applicable Standards                  |                         |
|---------------------------------------|-------------------------|
| Standard                              | Test Result             |
| FCC 47 CFR Part 15 Subpart C, §15.249 | No non-compliance noted |

### We hereby certify that:

The above equipment was tested at ATC Lab Co., Ltd (Guangdong, China). 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. The energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15C: 2007, §15.249.

The test results of this report relate only to the tested sample identified in this report.

## 2- EUT Description

|                      |  |
|----------------------|--|
| Product Description: | Visitor Chime and Watch Dog/Alarm                                    |
| Trade Name:          | HomeSafe   |
| Model Number:        | 639S   |
| Type of Modulation:  | Un-Modulation  |
| Power Supply         | DC 12.0V from 8*1.5V "AA" size batteries or<br>DC 12.0V from Adapter |
| Frequency Range      | 2400 ~2480 MHz   |
| Antenna Designation  | Non-user replaceable (fixed)   |

The 639S is a microcomputer-controlled, wall-mounted single technology instruction detector. Its operation is based on the physical phenomena – the Doppler frequency shift caused by a person moving in a microwave (MW) field.

During the tests the EUT was operated at 2417 MHz in "normal" mode.

**Remark:** *This submittal(s) test report is intended for FCC ID: NS3-639S filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules.*

## 3-Test System

### 3.1 Test Mode

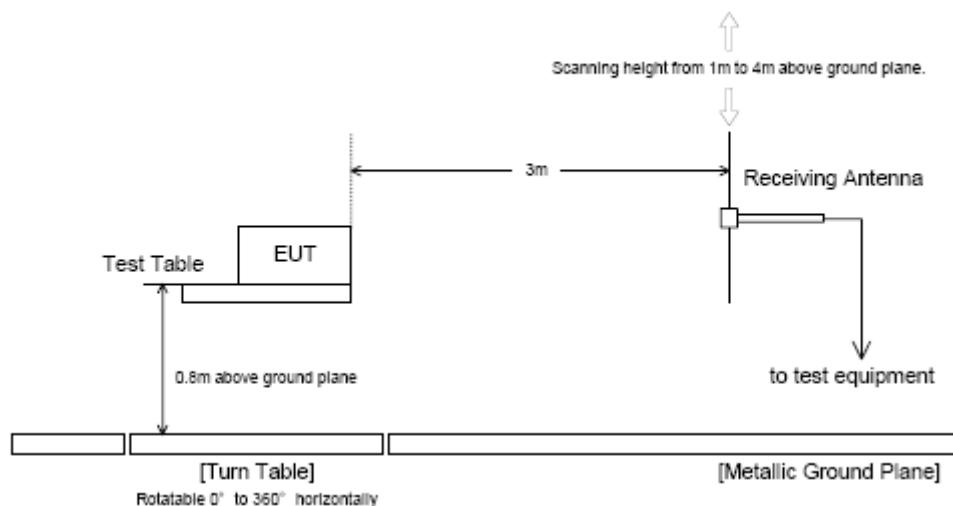
The compliance test was performed under test normal modes,

The EUT is designed both of horizontally placed and vertically place. In radiated emission measurement, each condition was conducted.

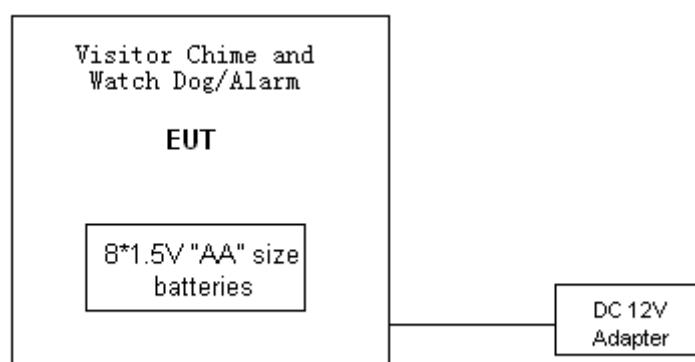
As a result, the emission that produce the maximum operation under were reported.

### 3.2 Test Setup Diagram

#### . Radiated Emission



### 3.3 Block Diagram of EUT System



## 4- Test Equipment and Calibration

| Equipment type                        | Manufacturer | Model   | Serial Number | Calibration Due |
|---------------------------------------|--------------|---------|---------------|-----------------|
| Chamber                               | ETS          | N/A     | N/A           | 2011/05         |
| Receiver                              | SCHAFFNER    | SMR4503 | 11725         | 2010/07         |
| Spectrum Analyzer                     | R/S          | FSP30   | 100755        | 2009/11         |
| Double-Ridged-Wave-guide Horn Antenna | ETS          | 3115    | 6587          | 2010/08         |
| Amplifier                             | Agilent      | 83017A  | MY39500438    | 2010/07         |
| Biconilog Antenna                     | ETS          | 3142C   | 00042672      | 2010/09         |
| LISN                                  | ETS          | 4825/2  | 1161          | 2010/07         |

## **5- Laboratory Accreditations and Measurement Uncertainty**

### **5.1 Laboratory Accreditation**

FCC-Registration No.: 415467

ATC Lab Co., Ltd (Guangdong, China) EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 415467. Listing date October 10, 2008.

IC-Registration No.: 7949A

The 3m Alternate Test Site of ATC Lab Co., Ltd (Guangdong, China) has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7949A on Oct. 29th, 2008.

### **5.2 Measurement Uncertainty**

of +/- 0.8 dB for Band Edge RF Conducted Measurement

of +/- 4.8 dB for Radiated Emissions

of +/- 2.3 dB for Conducted Emissions

## 6- Technical Requirements and Results

### 6.1 Radiated Emission Measurement

#### Applicable Standard:

According to §15.209(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table. And §15.249(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Requirements:

| Frequency                 | Limits                          |
|---------------------------|---------------------------------|
| Part 15.209               |                                 |
| 9kHz to 490kHz            | 2400/F(kHz) $\mu$ V/m@300meters |
| 490kHz to 1705kHz         | 2400/F(kHz) $\mu$ V/m@30meters  |
| 1705kHz to 30MHz          | 29.54dB $\mu$ V/m@30meters      |
| 30MHz to 88MHz            | 40dB $\mu$ V/m@3meters          |
| 88MHz to 216MHz           | 43.5dB $\mu$ V/m@3meters        |
| 216MHz to 960MHz          | 46.0dB $\mu$ V/m@3meters        |
| Above 960MHz              | 54.0dB $\mu$ V/m@3meters        |
| Part 15.249               |                                 |
| Fundamental 902—928MHz    | 94.0dB $\mu$ V/m@3meters        |
| Fundamental 2.4—2.4835MHz | 94.0dB $\mu$ V/m@3meters        |
| Harmonics                 | 54.0dB $\mu$ V/m@3meters        |

#### Test Procedure:

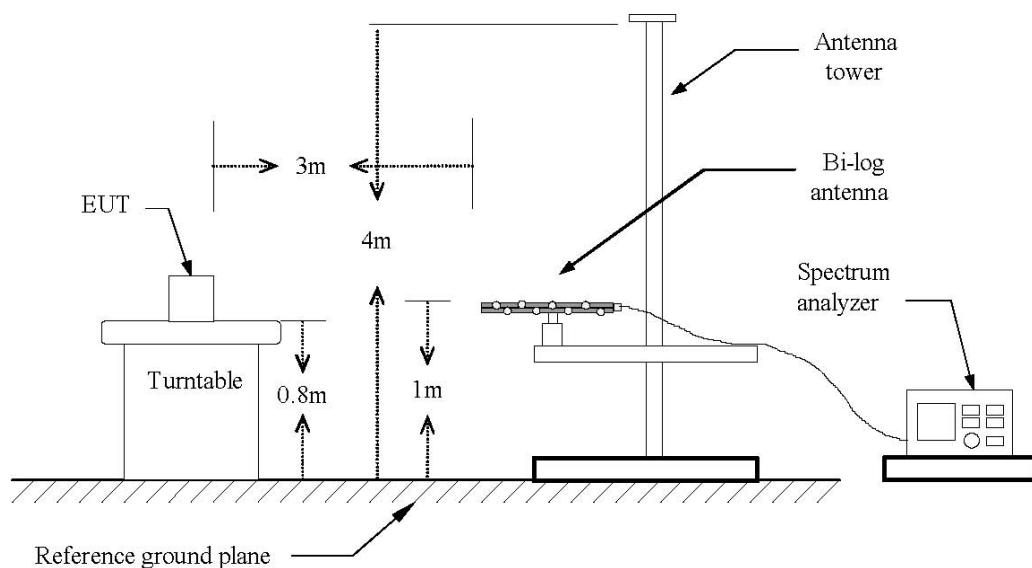
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the three highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

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

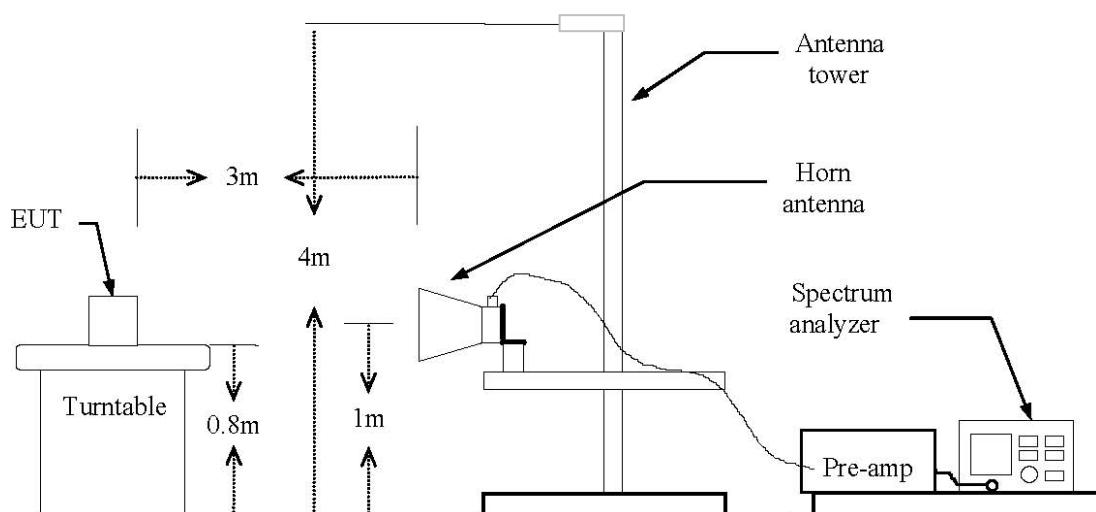
$$FS = RA + AF + CL - AG$$

|                           |  |
|---------------------------|--|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude    | AG = Amplifier Gain                        |
| AF = Antenna Factor       |  |

Test Configuration Below 1 GHz:



Test Configuration Above 1 GHz:



**Test Results:**

|                |                       |
|----------------|-----------------------|
| Temperature:   | 24°C                  |
| Humidity:      | 50%                   |
| EUT Operation: | Normal operation - on |
| Test Date:     | September 07, 2009    |

## Spurious Emission In the Frequency Rang Below 1GHz:

| Freq.<br>(MHz) | Ant.Pol.<br>(H/V) | Detector<br>Mode<br>(PK/QP) | Reading<br>(dBuV) | Ant./CL/<br>Amp.CF<br>(dB) | Actual FS<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Margin<br>(dB) |
|----------------|-------------------|-----------------------------|-------------------|----------------------------|-----------------------|----------------------|----------------|
| 33.04          | H                 | QP                          | 3.5               | 12.4                       | 15.9                  | 40.0                 | -14.1          |
| 170.80         | H                 | QP                          | 11.4              | 11.5                       | 22.9                  | 43.5                 | -20.1          |
| 934.65         | H                 | QP                          | 0.3               | 23.5                       | 23.8                  | 46.0                 | -23.2          |
| 35.60          | V                 | QP                          | 13.8              | 12.4                       | 26.2                  | 40.0                 | -13.8          |
| 114.24         | V                 | QP                          | 18.0              | 7.4                        | 25.4                  | 46.0                 | -20.6          |
| 901.84         | V                 | QP                          | 6.2               | 23.5                       | 29.7                  | 46.0                 | -16.3          |

Note: For spurious emission measurement, the compliance tests were performed both of horizontally placed and vertically placed in EUT (X position, Y position, Z position). As a result, the data of operation mode that produce the maximum emission were reported. The other emissions are more than 25dB below the limit.

## Spurious Emission In the Frequency Range above 1GHz:

## Horizontal Polarity

| Freq.<br>(MHz) | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant./CL/<br>Amp.CF<br>(dB) | Actual FS        |                | Peak<br>Limit<br>(dBuV/m) | AV Limit<br>(dBuV/m) | Peak<br>Margin | AV<br>Margin |
|----------------|---------------------------|-------------------------|----------------------------|------------------|----------------|---------------------------|----------------------|----------------|--------------|
|                |                           |                         |                            | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                      |                |              |
| 2416.92        | 87.47                     | 87.24                   | -0.72                      | 86.75            | 86.52          | 114.00                    | 94.00                | -27.25         | -7.48        |
| 4808.00        | 48.87                     | 28.46                   | 1.20                       | 50.07            | 29.66          | 74.00                     | 54.00                | -23.93         | -24.34       |
| 7256.00        | 39.15                     | 24.35                   | 4.22                       | 43.37            | 28.57          | 74.00                     | 54.00                | -30.63         | -25.43       |
| 12118.00       | 32.34                     | -                       | 10.33                      | 42.57            | -              | 74.00                     | 54.00                | -31.43         | -            |
| -              | -                         | -                       | -                          | -                | -              | -                         | -                    | -              | -            |

## Vertical Polarity

| Freq.<br>(MHz) | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant./CL/<br>Amp.CF<br>(dB) | Actual FS        |                | Peak<br>Limit<br>(dBuV/m) | AV Limit<br>(dBuV/m) | Peak<br>Margin | AV<br>Margin |
|----------------|---------------------------|-------------------------|----------------------------|------------------|----------------|---------------------------|----------------------|----------------|--------------|
|                |                           |                         |                            | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |                           |                      |                |              |
| 2416.95        | 81.63                     | 81.53                   | -0.72                      | 80.91            | 80.81          | 114.00                    | 94.00                | -33.09         | -13.19       |
| 4808.00        | 50.20                     | 30.60                   | 1.20                       | 51.40            | 31.80          | 74.00                     | 54.00                | -22.60         | -22.20       |
| 7222.00        | 37.73                     | 24.74                   | 4.22                       | 41.95            | 28.96          | 74.00                     | 54.00                | -32.05         | -25.04       |
| 10826.00       | 34.38                     | 21.59                   | 7.71                       | 41.09            | 29.30          | 74.00                     | 54.00                | -32.91         | -24.70       |
| -              | -                         | -                       | -                          | -                | -              | -                         | -                    | -              | -            |

Remark: The Field Strength of Fundamental refers to figures 1, 2, 3, 4.

Note: Data of measurement within this frequency range shown “--” in the table above means the reading of emissions are attenuated more than 25dB below the permissible limits or the field strength is too small to be measured.

Figure 1: Radiated Emission of Fundamental frequency (peak detector) @ Horizontal polarity

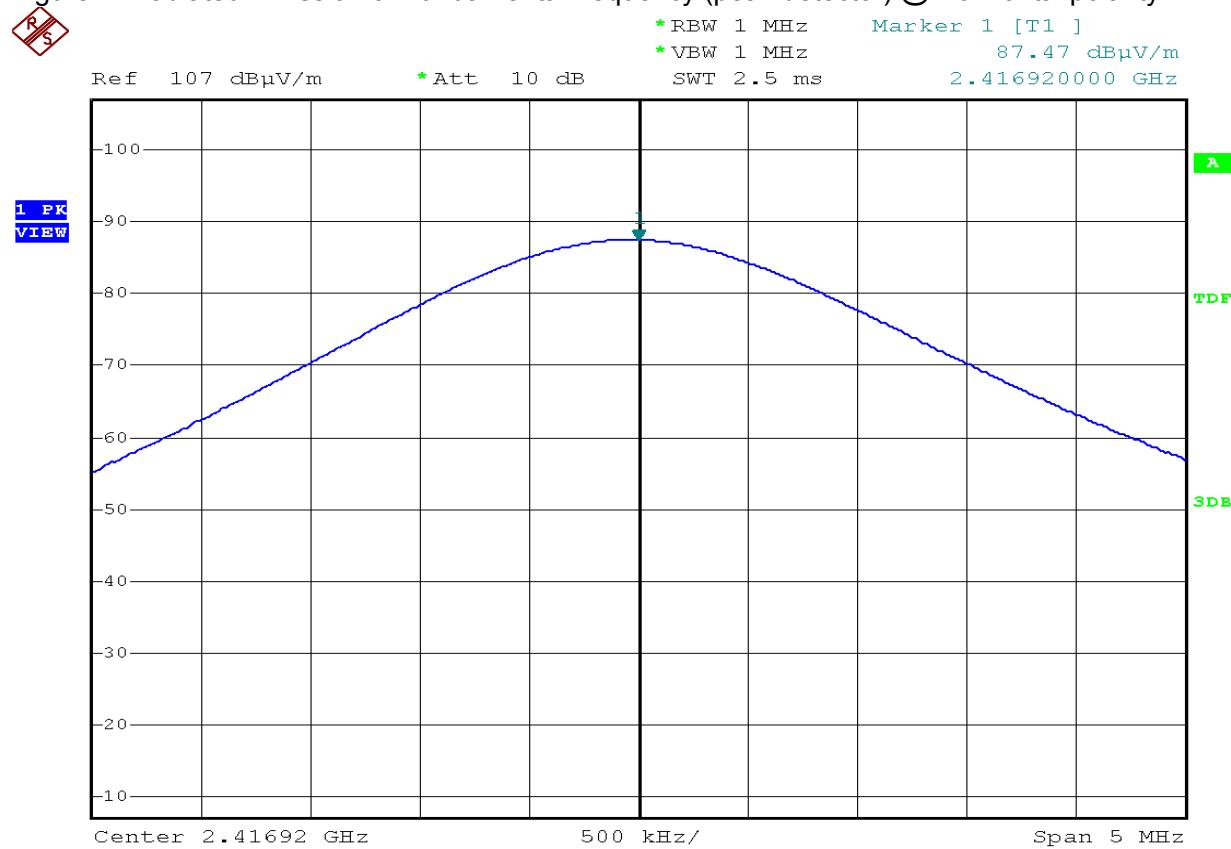


Figure 2: Radiated Emission of Fundamental at 2417MHz (peak detector) @ Vertical polarity

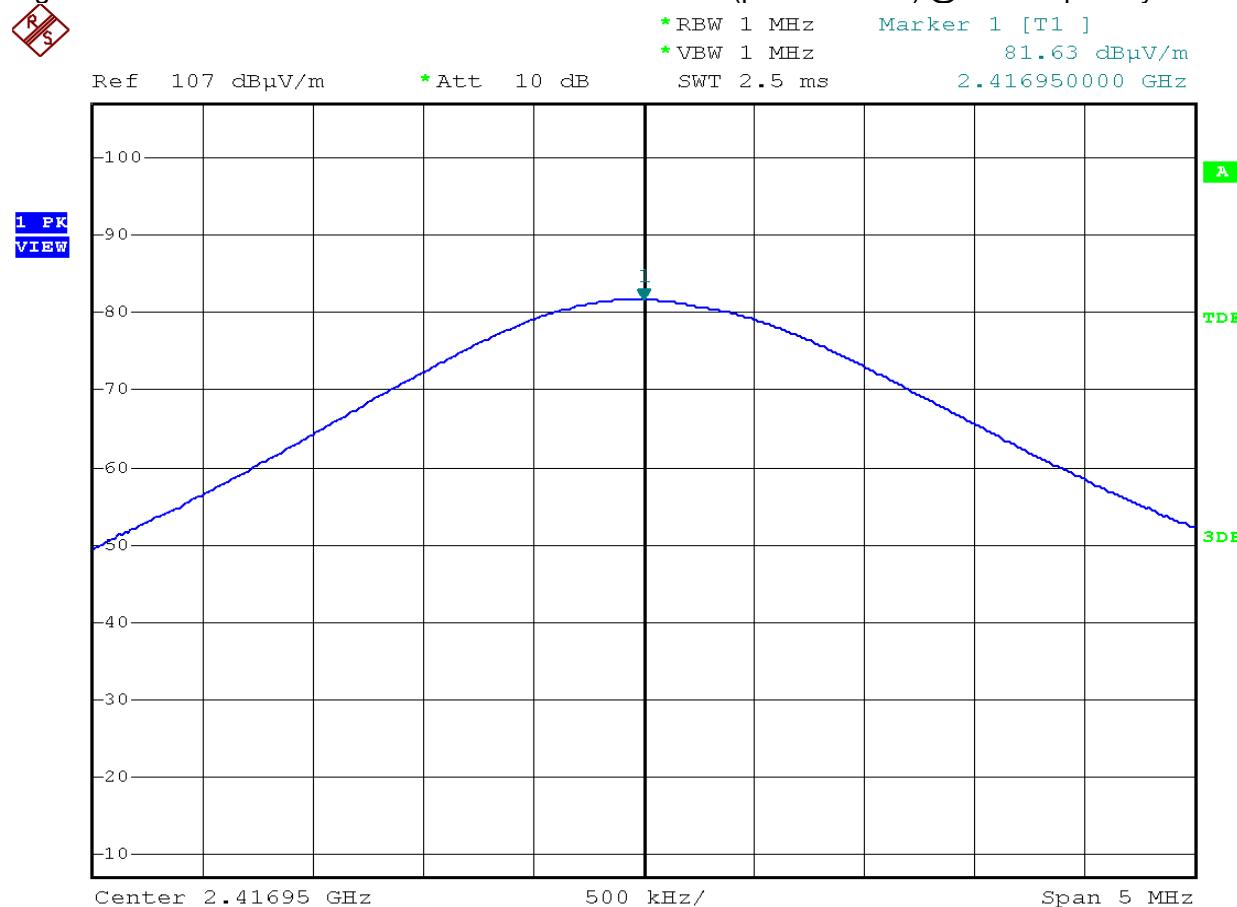


Figure 3: Radiated Emission of Fundamental at 2417MHz (average detector) @ Horizontal polarity

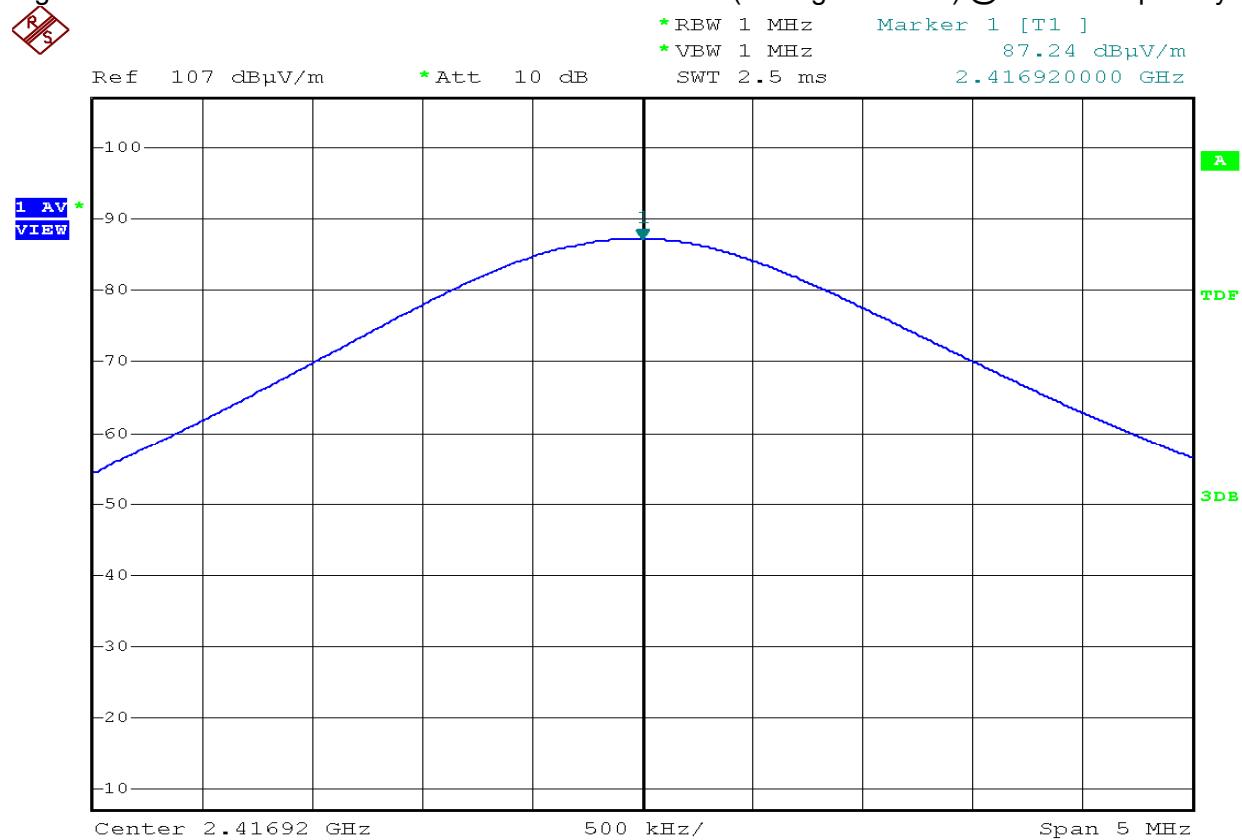
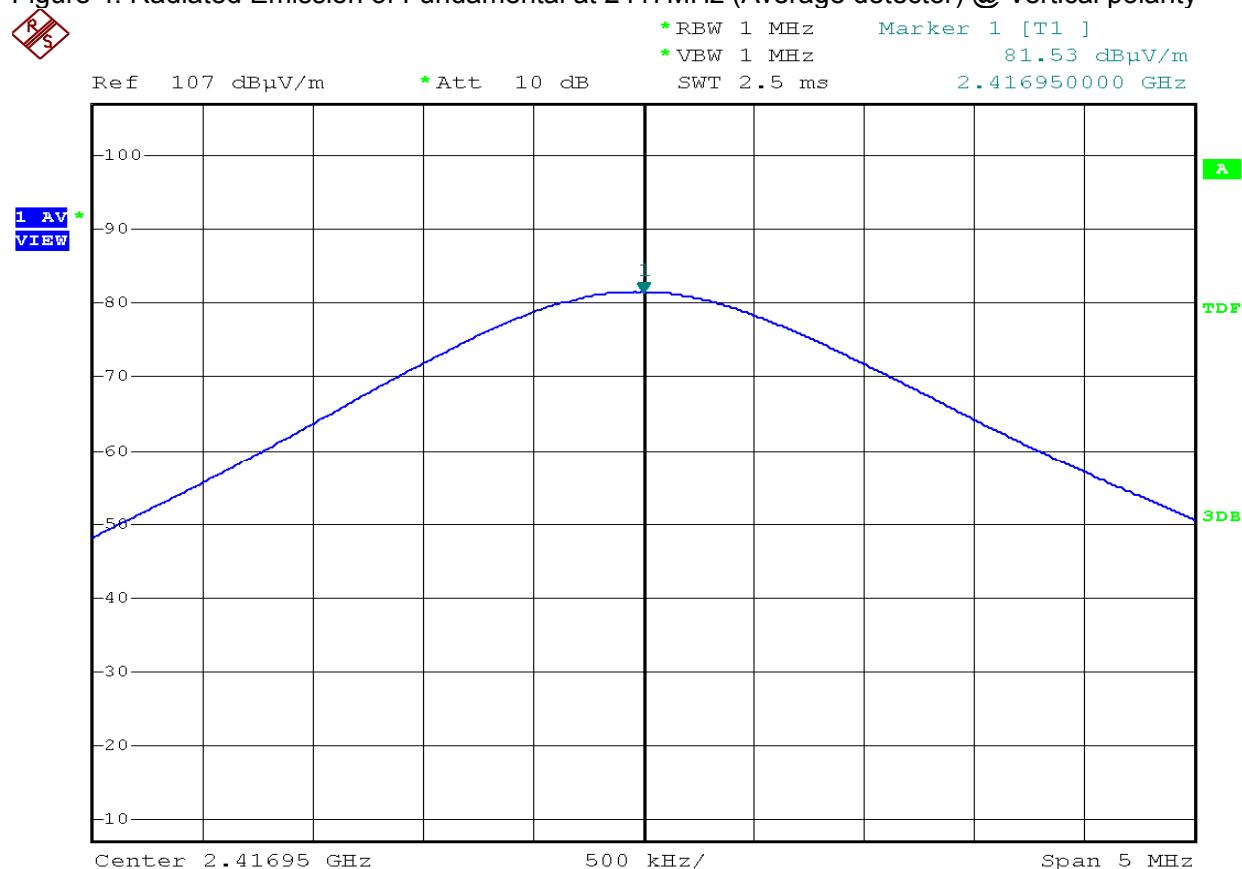


Figure 4: Radiated Emission of Fundamental at 2417MHz (Average detector) @ Vertical polarity



## 6.2 Band Edge and Restricted Band of Radiated Emission Measurement

### Applicable Standard:

According to §15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

### Test Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the highest emissions in restricted band to ensure EUT compliance.

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

$$FS = RA + AF - AG$$

|                           |  |
|---------------------------|--|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude    | AG = Amplifier Gain                        |
| AF = Antenna Factor       |  |

### Test Results:

|                |                        |
|----------------|------------------------|
| Temperature:   | 21°C                   |
| Humidity:      | 52%                    |
| EUT Operation: | Alarm and Transmitting |
| Test Date:     | September 08, 2009     |

| Freq.<br>(MHz) | Ant.Pol.<br>(H/V) | Peak<br>Reading<br>(dBuV) | AV<br>Reading<br>(dBuV) | Ant./CL/<br>Amp.CF<br>(dB) | Actual FS        |                | Limit            |                |
|----------------|-------------------|---------------------------|-------------------------|----------------------------|------------------|----------------|------------------|----------------|
|                |                   |                           |                         |                            | Peak<br>(dBuV/m) | AV<br>(dBuV/m) | Peak<br>(dBuV/m) | AV<br>(dBuV/m) |
| 2400.00        | H                 | 41.64                     | -                       | -0.72                      | 40.92            | -              | 74.0             | 54.0           |
| 2389.40        | H                 | 44.02                     | -                       | -0.50                      | 43.52            | -              | 74.0             | 54.0           |
| 2483.50        | H                 | 41.06                     | -                       | -0.72                      | 40.34            | -              | 74.0             | 54.0           |
| 2495.45        | H                 | 41.93                     | -                       | -0.72                      | 41.21            | -              | 74.0             | 54.0           |
| 2347.00        | V                 | 35.67                     | -                       | -0.50                      | 35.17            | -              | 74.0             | 54.0           |
| 2400.00        | V                 | 33.62                     | -                       | -0.72                      | 32.90            | -              | 74.0             | 54.0           |
| 2483.50        | V                 | 40.51                     | -                       | -0.72                      | 39.79            | -              | 74.0             | 54.0           |
| 2496.16        | V                 | 41.97                     | -                       | -0.72                      | 41.25            | -              | 74.0             | 54.0           |

Note: Refer to figures 5, 6, 7, 8.

**Note:** Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 25dB below the permissible limits or the field strength is too small to be measured.

Figure 5 Band Edge of Radiated Emission – Low frequency side (peak value)-Horizontal

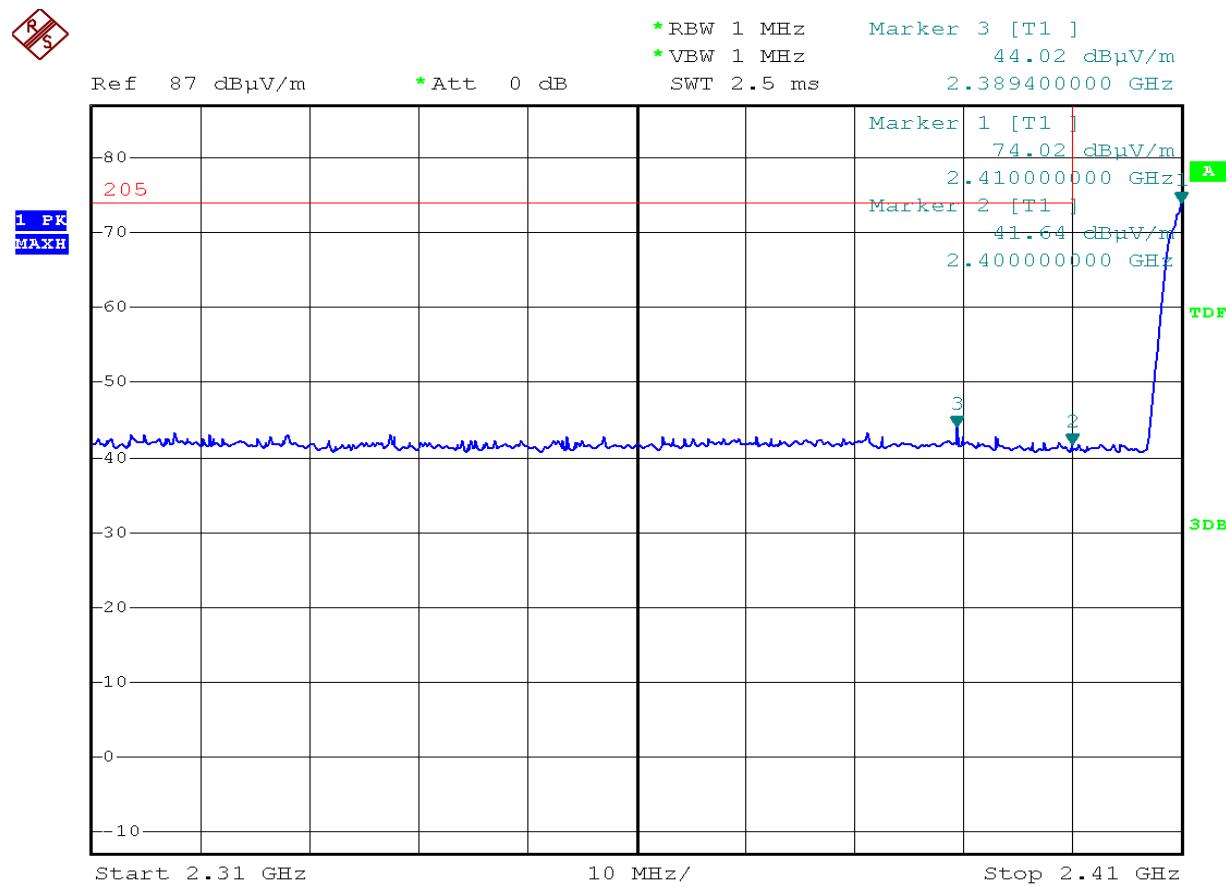


Figure 6 Band Edge of Radiated Emission – Low frequency side (peak value)-Vertical

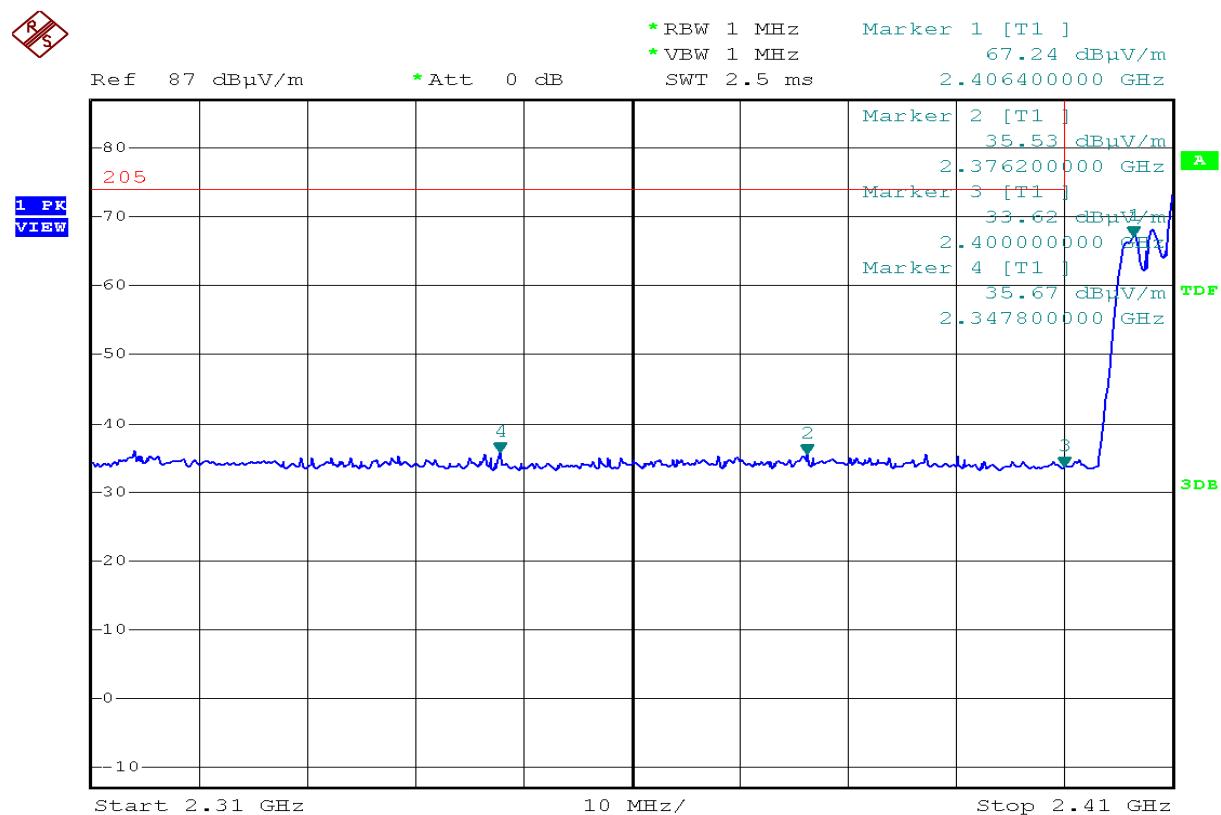


Figure 7 Band Edge of Radiated Emission – High frequency side (peak value)-Horizontal

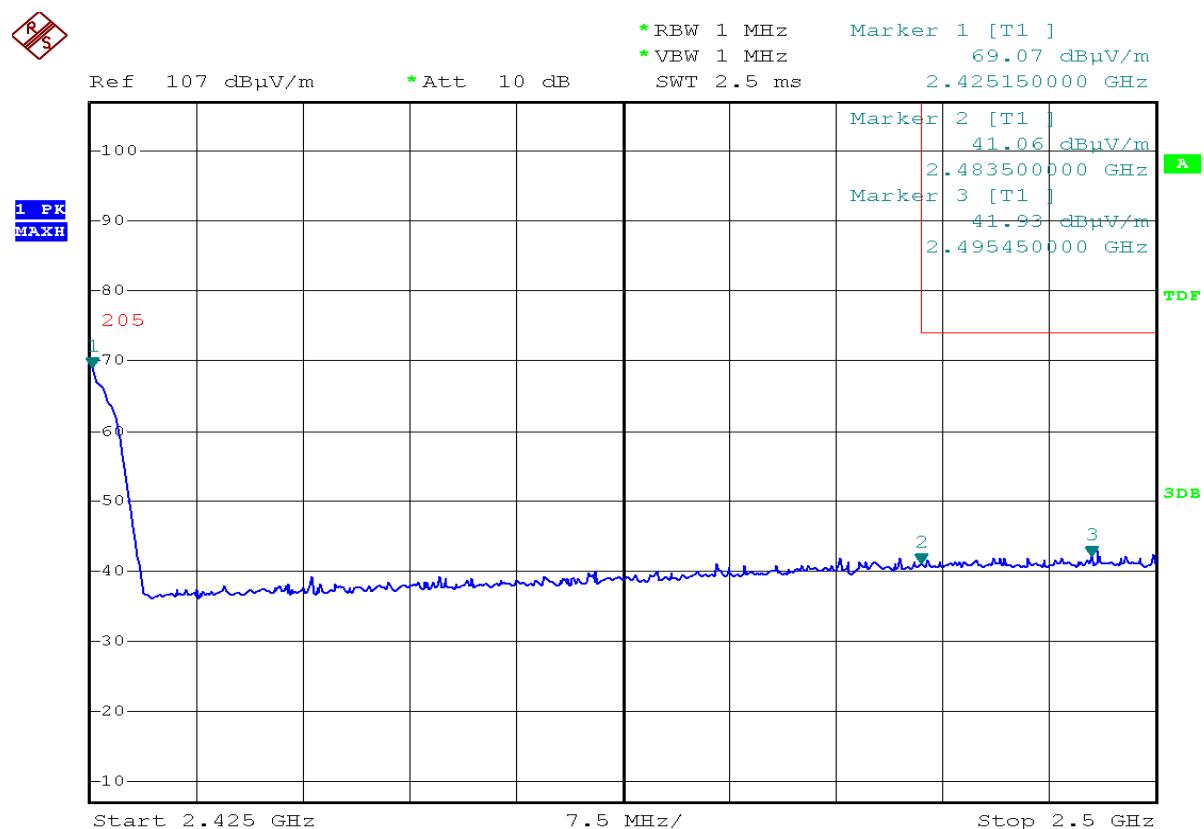
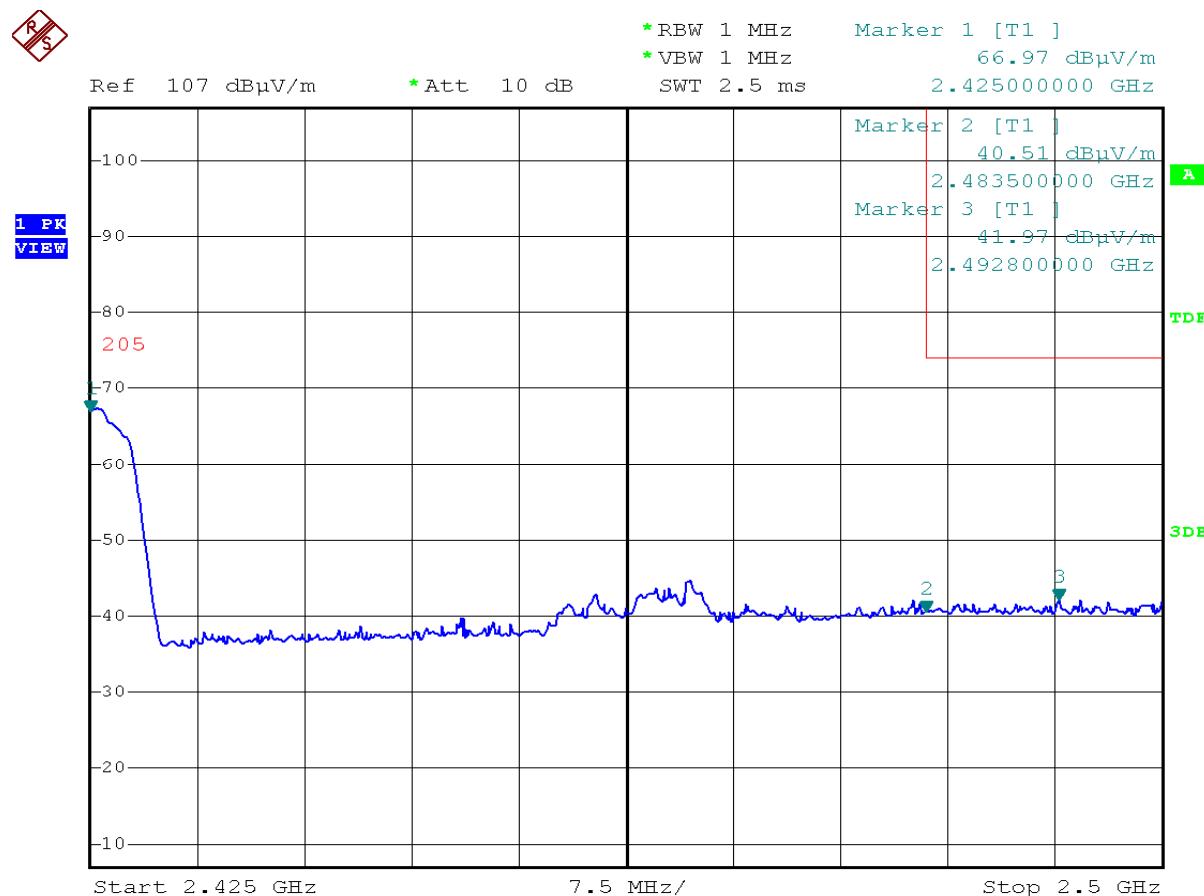


Figure 8 Band Edge of Radiated Emission – High frequency side (Peak Value)-Vertical



### 6.3 Power Line Conducted Interference:

#### Standard Applicable

According to §15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| 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         |

\* Decreases with the logarithm of the frequency.

The procedure used was ANSI C63.4-2003 using a 50  $\mu$ H/50 ohms LISN. Both lines were observed. The bandwidth of the receiver was 9 kHz with an appropriate sweep speed. The spectrum was scanned from 0.15 to 30 MHz.

#### Test Result:

|                |  |
|----------------|--|
| Temperature:   | 24°C                                   |
| Humidity:      | 50%                                    |
| EUT Operation: | Alarm and Transmitting with DC Adapter |
| Test Date:     | September 07, 2009                     |

| Frequency (MHz) | Line | Measured QP (dBuV/m) | QP Limit (dBuV/m) | Measured AV (dBuV/m) | AV Limit (dBuV/m) | Peak Margin | AV Margin |
|-----------------|------|----------------------|-------------------|----------------------|-------------------|-------------|-----------|
| 0.2000          | L    | 46.8                 | 63.5              | 22.4                 | 53.5              | -16.7       | -31.1     |
| 0.4000          | L    | 38.1                 | 57.8              | 19.4                 | 47.8              | -19.7       | -28.4     |
| 1.3950          | L    | 36.2                 | 56.0              | 16.9                 | 46.0              | -19.8       | -29.1     |
| 0.2050          | N    | 38.9                 | 63.3              | 17.1                 | 53.3              | -24.4       | -36.2     |
| 0.5000          | N    | 36.6                 | 56.0              | 18.1                 | 46.0              | -19.4       | -27.9     |
| 1.3950          | N    | 36.3                 | 56.0              | 16.9                 | 46.0              | -19.7       | -29.1     |

Note: Refer to figures 9, 10.

Figure 9 Live Line Conducted Interference

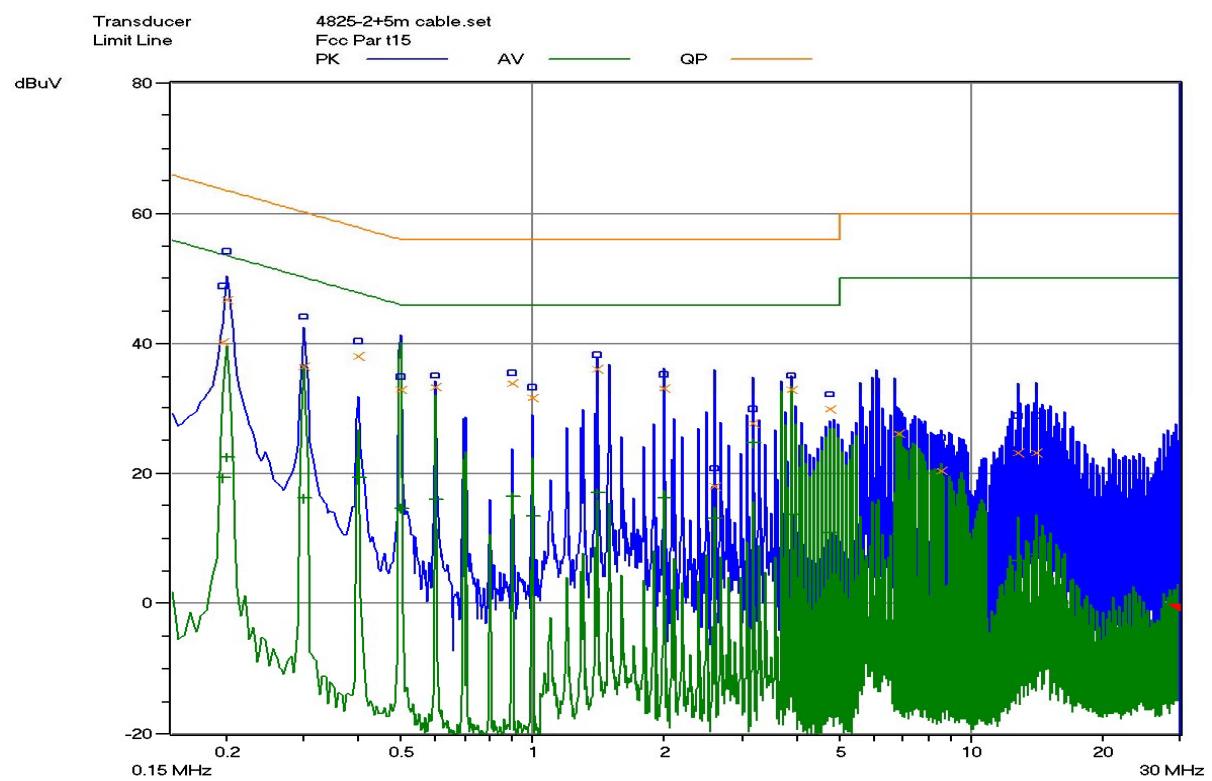


Figure 10 Neutral Line Conducted Interference

