

**Advanced  
Compliance Laboratory**

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## **ELECTROMAGNETIC EMISSION COMPLIANCE REPORT**

of

**X-10 TO RTS INTERFACE**

**MODEL: 6300110**

**FCC ID: DWNX10RTS**

*July 1, 2005*

This report concerns (check one): Original grant ☒ Class II change ☐  
Equipment type: Low Power Intentional Radiator

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes ☐ no ☒  
If yes, defer until: \_\_\_\_\_ (date)  
Company agrees to notify the Commission by \_\_\_\_\_ (date)  
of the intended date of announcement of the product so that the grant can be  
issued on that date.

Transition Rules Request per 15.37? yes ☐ no ☒  
If no, assumed Part 15, Subpart B for unintentional radiators - the new 47 CFR  
[10-1-90 Edition] provision.

Report prepared for: Somfy System, Inc.  
Report prepared by: Advanced Compliance Lab  
Report number: 0048-050620-01



**The test result in this report IS supported and covered by the NVLAP accreditation**

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# 1. GENERAL INFORMATION

## 1.1 Verification of Compliance

EUT: X-10 TO RTS INTERFACE

Model: 6300110

Applicant: SOMFY SYSTEM, INC.

Test Type: FCC Part 15C CERTIFICATION (15.231: a)

Result: PASS

Tested by: ADVANCED COMPLIANCE LABORATORY

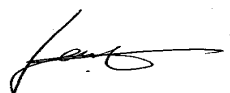
Test Date: July 1, 2005

Report Number: 0048-050620-01

The above equipment was tested by Compliance Laboratory, Advanced Technologies, Inc. for compliance with the requirement set forth in the FCC rules and regulations Part 15 subpart C. This said equipment in the configuration described in the report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

|                                 | Prob. Dist. | Uncertainty(dB) | Uncertainty(dB) | Uncertainty(dB) |
|---------------------------------|-------------|-----------------|-----------------|-----------------|
|                                 |             | 30-1000MHz      | 1-6.5GHz        | Conducted       |
| Combined Std. Uncertainty $u_c$ | norm.       | $\pm 2.36$      | $\pm 2.99$      | $\pm 1.83$      |



Wei Li  
Lab Manager  
Advanced Compliance Lab

Date: July 1, 2005

## **1.2 Equipment Modifications**

N/A

### 1.3 Product Information

#### System Configuration

| ITEM            | DESCRIPTION                          | FCC ID    | CABLE |
|-----------------|--------------------------------------|-----------|-------|
| Product         | X-10 TO RTS INTERFACE<br>6300110 (1) | DWNX10RTS |       |
| Housing         | PLASTICS                             |           |       |
| Power Supply    | 120 VAC                              |           |       |
| Operation Freq. | 433.42MHz                            |           |       |
| Device Type     | Periodic Operation                   |           |       |
| Receiver        | RTS Receiver                         | DoC       |       |

(1) EUT submitted for grant.

### 1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-2003 at an antenna to EUT distance of 3 meters.

### 1.5 Test Facility

The open area test site and conducted measurement facility used to collect the radiated and conducted data are located at Hillsborough, New Jersey. This site has been accepted by FCC to perform measurements under Part 15 or 18 in a letter dated May 19, 1997 (Refer to: 31040/PRV 1300F2). The NVLAP Lab code for accreditation of FCC EMC Test Method is: 200101-0.

### 1.6 Test Equipment

| Manufacture     | Model   | Serial No. | Description                           | Last Cal<br>dd/mm/y | Cal Due<br>dd/mm/y |
|-----------------|---------|------------|---------------------------------------|---------------------|--------------------|
| Hewlett-Packard | HP8546A | 3448A00290 | EMI Receiver                          | 12/01/05            | 12/01/06           |
| EMCO            | 3104C   | 9307-4396  | 20-300MHz Biconical Antenna           | 12/02/05            | 12/02/06           |
| EMCO            | 3146    | 9008-2860  | 200-1000MHz Log-Periodic Antenna      | 09/02/05            | 09/02/06           |
| Fischer Custom  | LISN-2  | 900-4-0008 | Line Impedance Stabilization Networks | 23/08/04            | 23/08/05           |
| Fischer Custom  | LISN-2  | 900-4-0009 | Line Impedance Stabilization Networks | 23/08/04            | 23/08/05           |
| EMCO            | 6502    | 2665       | 10KHz-30MHz Active Loop Antenna       | 27/02/05            | 27/02/06           |
| EMCO            | 3115    | 4945       | Double Ridge Guide Horn Antenna       | 11/08/04            | 11/08/05           |

All Test Equipment Used are Calibrated Traceable to NIST Standards.

### **1.7 Statement for the Document Use**

This report shall not be reproduced except in full, without the written approval of the laboratory. And this report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

## 2. PRODUCT LABELING

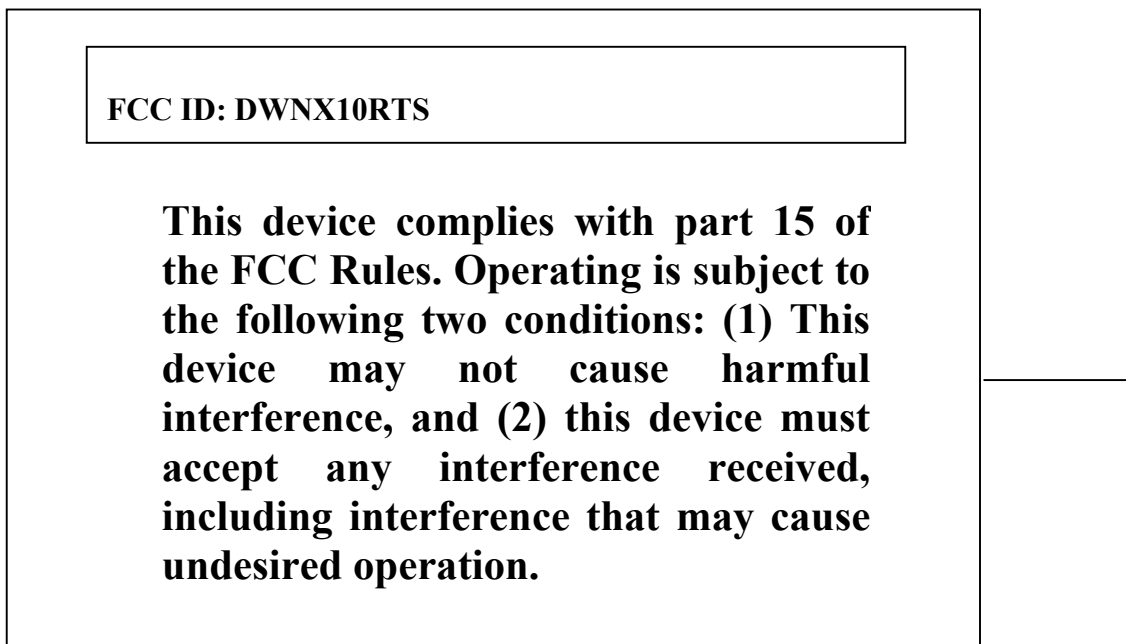


Figure 2.1 FCC ID Label

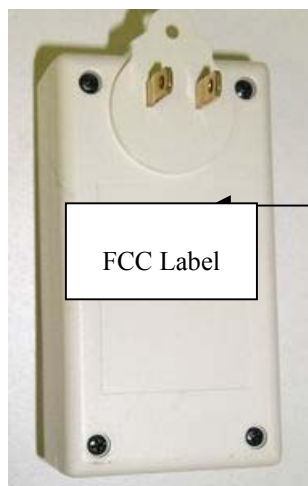


Figure 2.2 FCC ID Label Location



### **3. SYSTEM TEST CONFIGURATION**

#### **3.1 Justification**

The system was configured for testing in a typical fashion (as a customer would normally use it). And its antenna was permanently attached to the EUT.

Testing was performed as EUT was operated continuously.

#### **3.2 Special Accessories**

N/A

#### **3.3 Configuration of Tested System**

Figure 3.1 to Figure 3.5 illustrate this system, which is tested standing along.



**Figure 3.1 Radiated Test Setup, position 1-X**



**Figure 3.2 Radiated Test Setup, position 2-Y**



**Figure 3.3 Radiated Test Setup, position 3-Z**



**Figure 3.4 Conducted Setup- Front**



**Figure 3.5 Conducted Setup- Rear**

## **4. SYSTEM SCHEMATICS**

See Attachment.

**Figure 4.1 System Schematics**

## 5. CONDUCTED EMISSION DATA

### 5.1 Test Methods and Conditions

The EUT was under normal operational mode during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. Recorded data was sent to the plotter to generate output in linear format. At the input of the spectrum analyzer, a HP transient limiter is inserted for protective purpose. This limiter has a 10 dB attenuation in the range of 150KHz to 30MHz. That factor was automatically compensated by the receiver, so the readings are the corrected readings. The reference of the plot is the CISPR 22 Class B limit in Figure 5.1 through Figure 5.2.

| Conducted Emission Technical Requirements |                    |                 |                    |                 |
|-------------------------------------------|--------------------|-----------------|--------------------|-----------------|
| Frequency Range                           | Class A            |                 | Class B            |                 |
|                                           | Quasi-Peak<br>dBuV | Average<br>dBuV | Quasi-Peak<br>DBuV | Average<br>dBuV |
| 150kHz –0.5MHz                            | 79 (8912uV)        | 66 (1995uV)     | 66-56              | 56-46           |
| 0.5MHz-30MHz                              | 73 (4467uV)        | 60 (1000uV)     | ---                | ---             |
| 0.5MHz- 5MHz                              | ---                | ---             | 56                 | 46 (250uV)      |
| 5MHz-30MHz                                | ---                | ---             | 60                 | 50              |

Emissions that have peak values close to the specification limit (if any) are also measured in the quasi-peak mode to determine compliance.

### 5.2 Test Data

Figure 5.1-5.2 show the neutral and line conducted emissions for the standard operation.

| Six Highest Data for AC Line Conducted Emissions |       |       |       |       |       |   |
|--------------------------------------------------|-------|-------|-------|-------|-------|---|
| Frequency (MHz)                                  | 0.152 | 0.155 | 0.200 | 28.75 | 28.82 | - |
| Line(L)/Neutral(N)                               | L     | N     | N     | N     | L     |   |
| Peak Reading (dBuV)                              | 20.0  | 19.8  | 18.0  | 26.3  | 23.1  | - |
| Class B Limit (average)                          | 55    | 55    | 53    | 50    | 50    |   |
| Margin (dB)                                      | -35.0 | -35.2 | -35.0 | -23.7 | -26.9 |   |

Test Personnel:



Tester Signature: \_\_\_\_\_

Date: July 1, 2005

Typed/Printed Name: Edward Lee

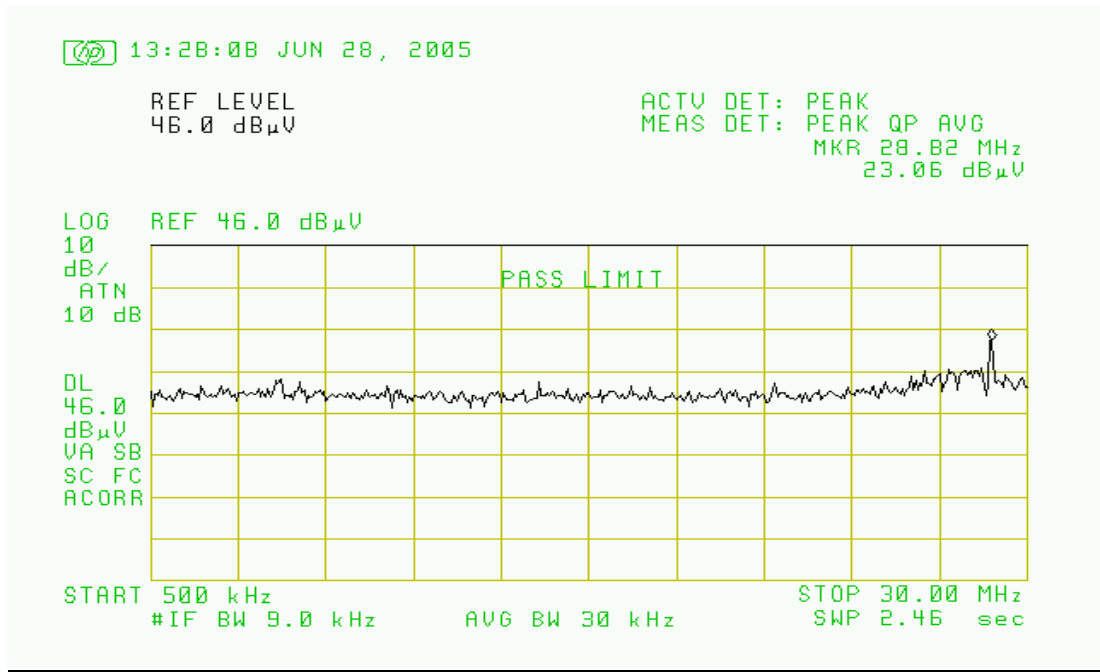
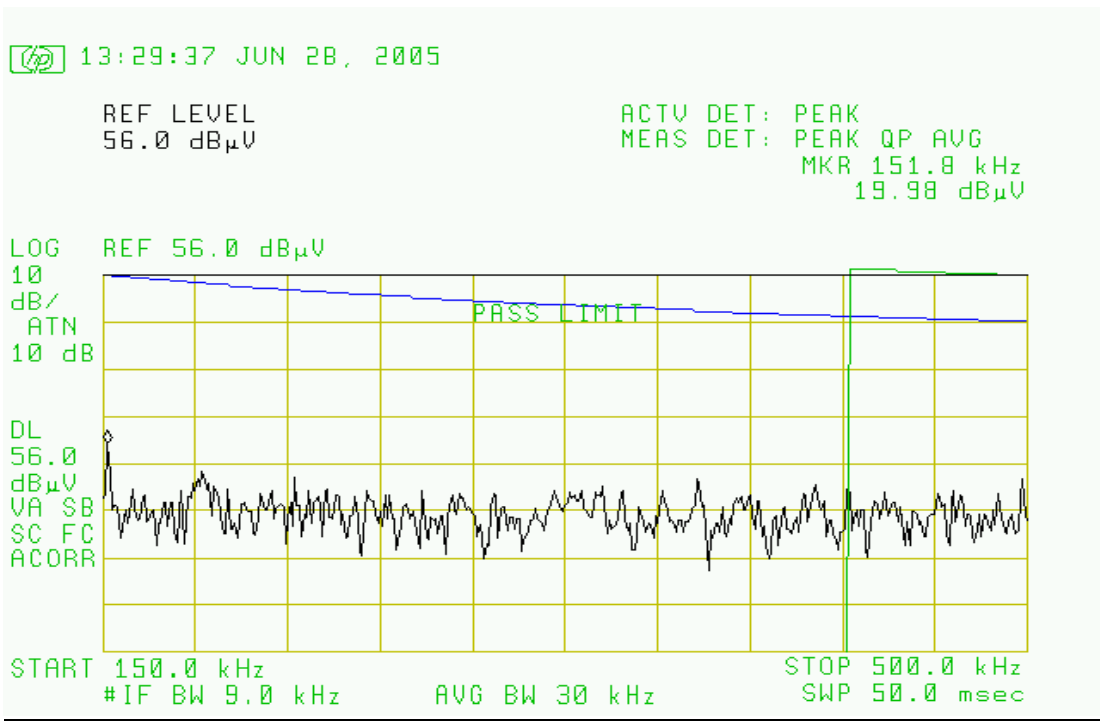


Fig. 5.1 Conducted Emission-Line

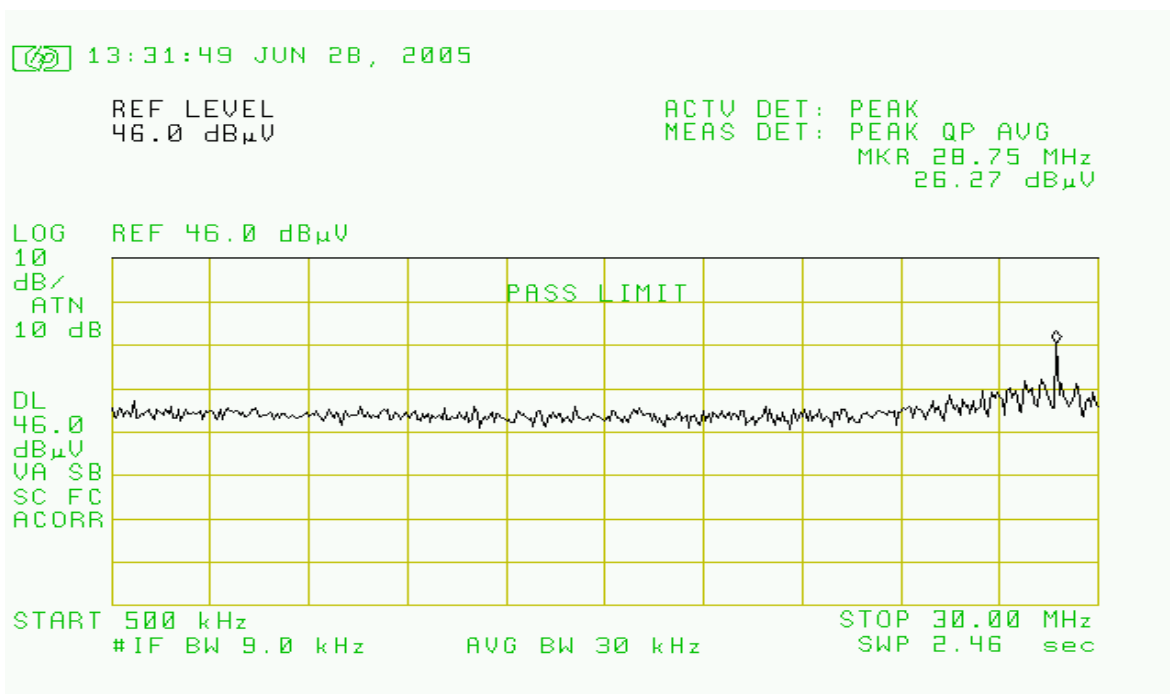
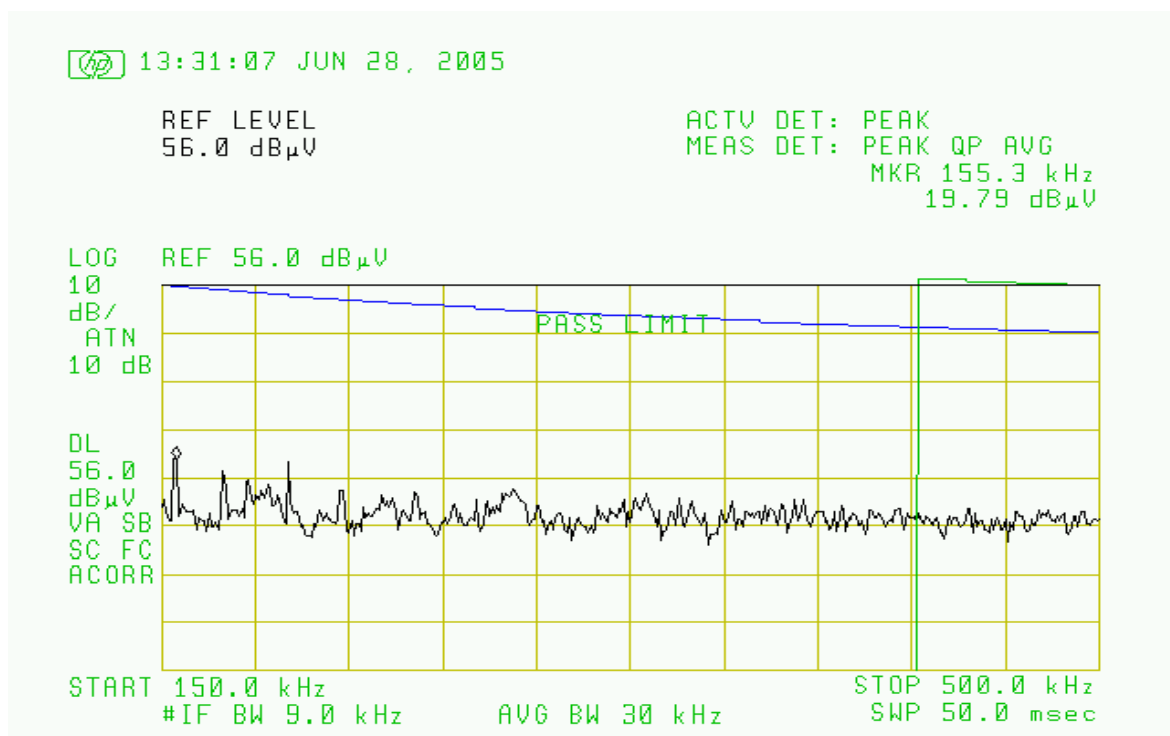


Fig. 5.2 Conducted Emission- Neutral



## 6. RADIATED EMISSION DATA

### 6.1 Field Strength Calculation

The corrected field strength is automatically calculated by EMI Receiver using following:

$$FS = RA + AF + CF + AG$$

where FS: Corrected Field Strength in dB $\mu$ V/m

RA: Amplitude of EMI Receiver before correction in dB $\mu$ V

AF: Antenna Factor in dB/m

CF: Cable Attenuation Factor in dB

AG: Built-in Preamplifier Gain in dB (Stored in receiver as part of the calibration data)

### 6.2 Test Methods and Conditions

The initial step in collecting radiated data is a EMI Receiver scan of the measurement range below 30MHz using peak detector and 9KHz IF bandwidth / 30KHz video bandwidth. For the range 30MHz - 1GHz, 120KHz IF bandwidth / 120KHz video bandwidth are used. Both bandwidths are 1MHz for above 1GHz measurement. Up to 10<sup>th</sup> harmonics were investigated.

### 6.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 6.1.

Test Personnel:   
\_\_\_\_\_

Typed/Printed Name: Edward Lee

Date: July 1, 2005

## Radiated Test Data

| Frequency<br>(MHz) | Polarity<br>[H or V],<br>Position<br>(X,Y,Z) | Height<br>(m) | Azimuth<br>(Degree) | Peak<br>Reading<br>(dBμV/m) | FCC<br>3m Limit<br>(dBμV/m) | Difference<br>from limit<br>(dB) |
|--------------------|----------------------------------------------|---------------|---------------------|-----------------------------|-----------------------------|----------------------------------|
| 433.5              | H,X                                          | 1.9           | 0                   | 73.8*                       | 80.8(3)                     | -7                               |
| 433.5              | H,X                                          | 1.9           | 0                   | 82.6                        | 100.8(5)                    | -18.2                            |
| 867                | H,X                                          | 1.5           | 0                   | 46.6                        | 60.8(4)                     | -14.2                            |
| 1300.5             | H,X                                          | 1.2           | 0                   | 45.9                        | 54.0(2)                     | -8.1                             |
| 1734               | H,X                                          | 1.1           | 0                   | 46.0                        | 60.8                        | -14.8                            |
| 2167.5             | V,X                                          | 1.1           | 0                   | 41.5                        | 60.8                        | -19.3                            |
| 433.5              | V,X                                          | 2.0           | 10                  | 73.2                        | 80.8                        | -7.6                             |
| 867                | V,X                                          | 1.5           | 10                  | 44.8                        | 54.0                        | -9.2                             |
| 1300.5             | V,X                                          | 1.1           | 10                  | 41.8                        | 60.8                        | -19                              |
| 1734               | V,X                                          | 1.1           | 10                  | 43.9                        | 60.8                        | -16.9                            |
| 433.5              | H,Y                                          | 1.2           | 10                  | 73.9                        | 80.8                        | -6.9                             |
| 867                | H,Y                                          | 1.1           | 30                  | 41.8                        | 60.8                        | -19                              |
| 1300.5             | H,Y                                          | 1.1           | 10                  | 44.0                        | 54.0                        | -10                              |
| 1734               | H,Y                                          | 1.1           | 10                  | 45.2                        | 60.8                        | -15.6                            |
| 433.5              | V,Y                                          | 1.3           | 40                  | 75.5                        | 80.8                        | -5.3                             |
| 867                | V,Y                                          | 1.2           | 10                  | 41.4                        | 60.8                        | -19.4                            |
| 1300.5             | V,Y                                          | 1.1           | 10                  | 46.0                        | 54.0                        | -8                               |
| 1734               | V,Y                                          | 1.1           | 0                   | 43.0                        | 60.8                        | -17.8                            |
| 433.5              | H,Z                                          | 1.3           | 0                   | 77.2                        | 80.8                        | -3.6                             |
| 867                | H,Z                                          | 1.2           | 10                  | 43.2                        | 60.8                        | -17.6                            |
| 1300.5             | H,Z                                          | 1.2           | 10                  | 45.1                        | 54.0                        | -8.9                             |
| 1734               | H,Z                                          | 1.1           | 10                  | 43.8                        | 60.8                        | -17                              |
| 433.5              | V,Z                                          | 1.1           | 0                   | 73.4*                       | 80.8                        | -7.4                             |
| 433.5              | V,Z                                          | 1.1           | 0                   | 82.0                        | 100.8                       | -18.8                            |
| 867                | V,Z                                          | 1.5           | 10                  | 43.6                        | 60.8                        | -17.2                            |
| 1300.5             | V,Z                                          | 1.2           | 20                  | 48.0                        | 54.0                        | -6                               |
| 1734               | V,Z                                          | 1.1           | 10                  | 46.2                        | 60.8                        | -14.6                            |
| 2167.5             | V,Z                                          | 1.1           | 0                   | 40.6                        | 60.8                        | -20.2                            |

(1) See Figure 3.1, 3.2 and 3.3 for definition of position X-1, Y-2, Z-3.

(2) Restricted band.

(3) Fundamental limit is 3750-12500 microvolts/meter linear interpolations (average reading). Per FCC 15.231(a).

(4) Spurious limit is 375-1250 microvolts/meter linear interpolations (average reading). Per 15.231(a).

(5) Peak Reading Limit = Average reading Limit +20dB.

\*---Average Reading

5.4 Occupied Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency, in this case, 1.084MHz(433.5x0.25%). Bandwidth is determined at the points 20dB down from the modulated carrier. Figure 5.2 shows the occupied bandwidth plot.

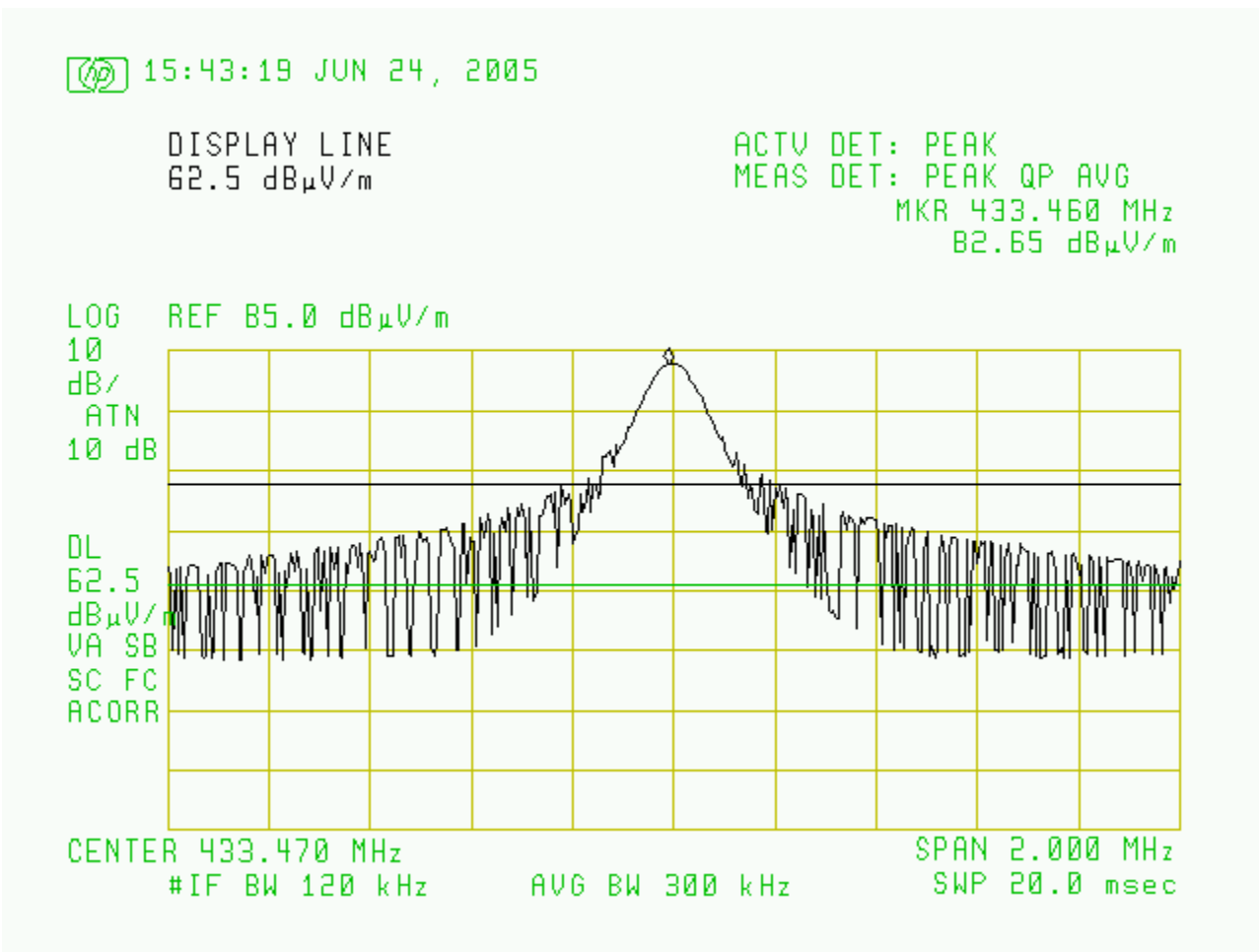


Figure 6.1 Occupied Bandwidth

## **7. PHOTOS OF TESTED EUT**

The following photos show the inside details of the EUT.