Advanced
Compliance Laboratory

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# ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

TRANSMITTER
MODEL: TELIS4
FCC ID: DWNTELIS4

*February 20, 2004*

This report concerns (check one): Original grant _____ Class II change __X__
Equipment type: TRANSMITTER

Deferred grant requested per 47 CF 0.457(d)(1)(ii)? yes _____ no __x__
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 __x__
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: | 0048-040211-03 |

NVLAP®

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

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# 1. GENERAL INFORMATION

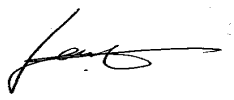
## 1.1 Verification of Compliance

| | |
|---|---|
| EUT: | TRANSMITTER |
| Model: | TELIS4 |
| Applicant: | SOMFY SYSTEM, INC. |
| Test Type: | FCC Part 15C CERTIFICATION |
| Result: | PASS |
| Tested by: | ADVANCED COMPLIANCE LAB |
| Test Date: | February 18, 2004 |
| Report Number: | 0048-040211-03 |

The above equipment was tested by Advanced Compliance Laboratory 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. | ±2.36 | ±2.99 | ±1.83 |



Wei Li
2004
Lab Manager
Advanced Compliance Lab

Date: February 20,

## 1.2 Equipment Modifications

N/A

## 1.3 Product Information

**System Configuration**

| ITEM | DESCRIPTION | FCC ID | CABLE |
|---|---|---|---|
| Product | TRANSMITTER | DWNTELIS4 | |
| Housing | PLASTICS | | |
| Power Supply | BATTERY | | |
| Clock/OSC Freq. | 433.5 MHz | | |
| Device Type | Periodic Operation | | |

(1) EUT submitted for grant.

## 1.4 Test Methodology

Radiated tests were performed according to the procedures in ANSI C63.4-1992 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 50 Randolph Road, Somerset, 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 dd/mm/yy | Cal Due dd/mm/yy |
|---|---|---|---|---|---|
| Hewlett-Packard | HP8546A | 3625A00341 | EMI Receiver | 12/01/04 | 12/01/05 |
| EMCO | 3115 | 4945 | Double Ridge Guide Horn Antenna | 11/08/03 | 11/08/04 |
| AIL | 94455 | 933 | 20-300MHz Biconical Antenna | 11/03/03 | 11/03/04 |
| EMCO | 3146 | 3672 | 200-1000MHz Log-Periodic Antenna | 11/02/03 | 11/02/04 |
| Fischer Custom | LISN-2 | 900-4-0008 | Line Impedance Stabilization Networks | 11/08/03 | 11/08/04 |
| Fischer Custom | LISN-2 | 900-4-0009 | Line Impedance Stabilization Networks | 25/08/03 | 25/08/04 |

All Test Equipment Used are Calibrated Traceable to NIST Standards.

### 1.7 Statement for the Document Use

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## 2. PRODUCT LABELING

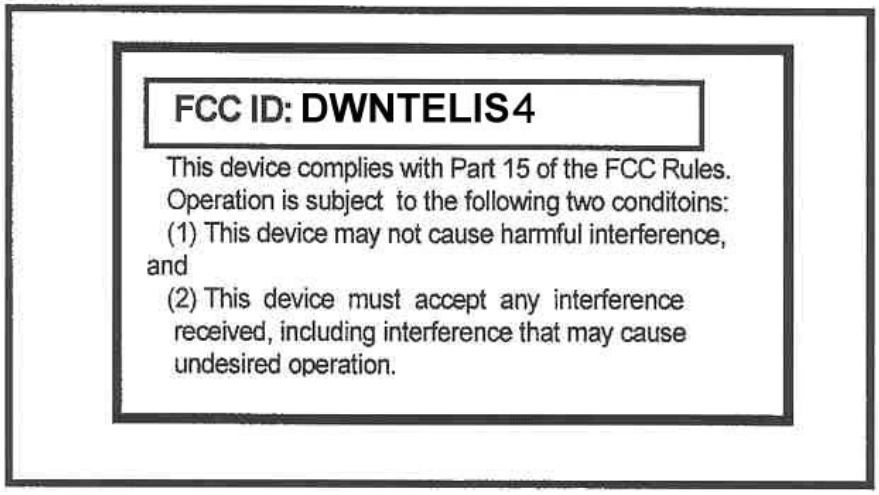


**Figure 2.1 FCC ID Label**

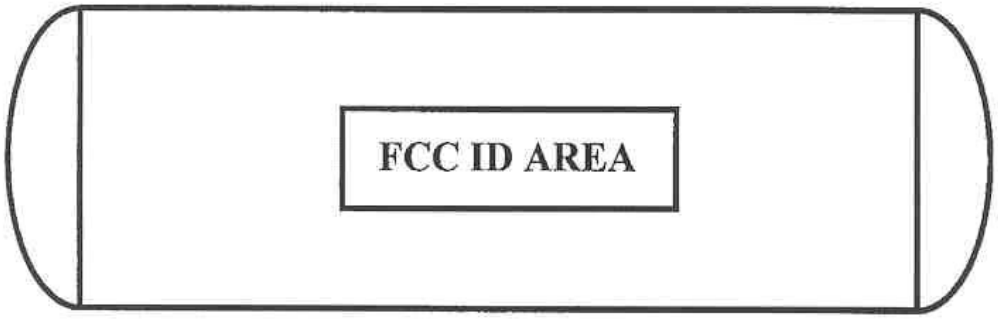


**Figure 2.2 Location of Label on Back of the EUT**

# 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 (Made on the PCB). Four LEDs on the front appearance.

This manually operated transmitter will deactivate immediately after press “ ” button.

Testing was performed in either “UP arrow”, “ Down arrow” and “ O” button. It is the worst case.

## 3.2 Special Accessories

N/A

## 3.3 Configuration of Tested System

Figure 3.1 and Figure 3.3 illustrate this system, which is tested standing along.

**Figure 3.1 Radiated Test Setup, Position 1**

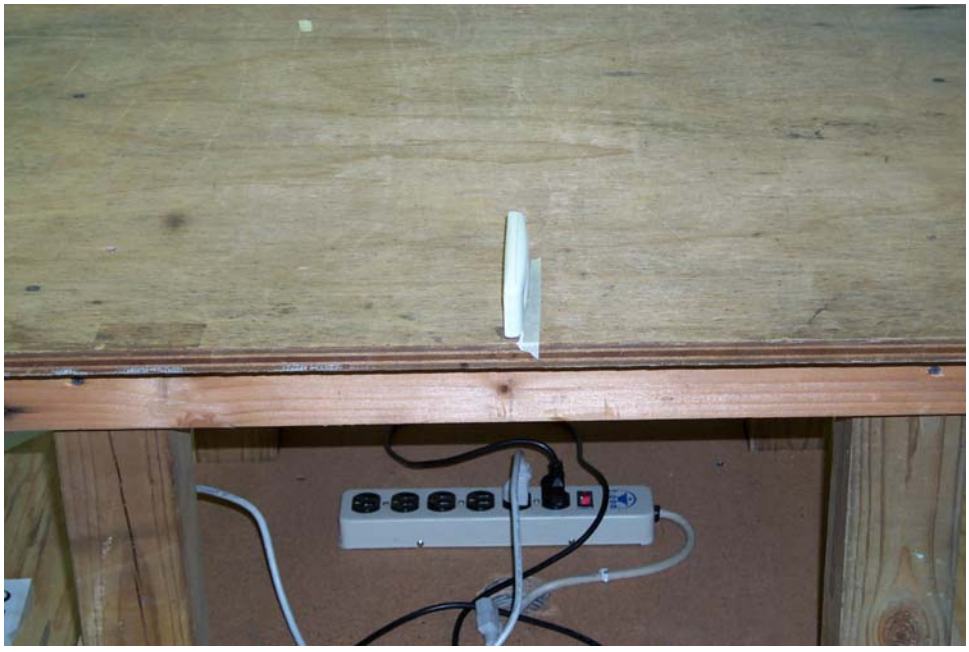

**Figure 3.2 Radiated Test Setup, Position 2**

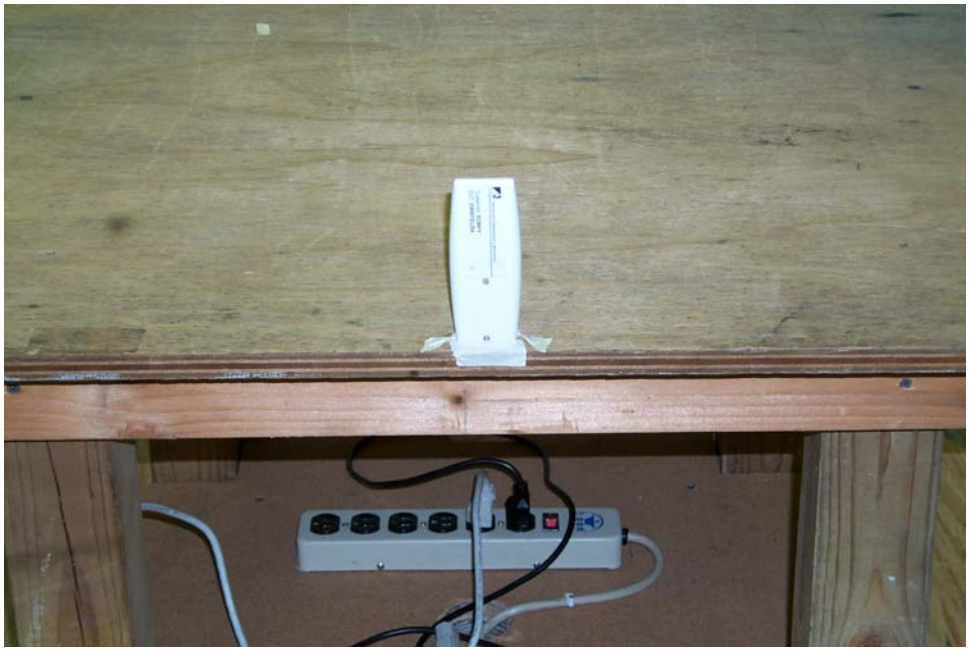

**Figure 3.3 Radiated Test Setup, Position 3**

# 5. RADIATED EMISSION DATA

## 5.1 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 dBμV/m
RA: Amplitude of EMI Receiver before correction in dBμV
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)

The pulse train timing plots are showed in Figure 5.1.
The pulse train timing plots as follows:
The total time for each pulse train is 139.62 ms, The short pulse is 0.640ms, The middle pulse is 2.5 ms, The long pulse is 4.8m

Coeff. =(56x0.640+1x4.8+4x2.5+(2.88-2.5))/(71.68+5.44+22.88)= 51.02/100=0.51

The maximum average field strength should be 0.51 of the peak field strength measured. So we use peak value minus 5.85dB as calculated maximum average field strength.

## 5.2 Test Methods and Conditions

The initial step in collecting radiated data is an EMI Receiver scan of the measurement range 30MHz - 5GHz using peak detector. IF bandwidth is 120KHz and video bandwidth is 300KHz for measuring 30MHz-1GHz. Both bandwidths are 1MHz for above 1GHz measurement.

## 5.3 Test Data

The following data lists the significant emission frequencies, polarity and position, peak reading of the EMI Receiver, calculated average reading, the FCC limit, and the difference between the peak reading and the limit. Explanation of the correction and calculation are given in section 5.1.

Test Personnel:

Tester Signature 

Typed/Printed Name: Edward Lee Date: February 20, 2004

# Radiated Test Data

| Frequency (MHz) | Polarity [H or V], Position (X,Y,Z) | Height (m) | Azimuth (Degree) | Peak Reading (dBμV/m) | Calculated Average Reading (dBμV/m) | FCC 3m Limit (dBμV/m) | Difference from limit (dB) |
|---|---|---|---|---|---|---|---|
| 433.5 | H,X | 2.4 | 270 | 84.5 | 78.65 | 80.8(3) | -2.15 |
| 867 | H,X | 1.1 | 270 | 60.7 | 54.85 | 60.8(4) | -5.95 |
| 1300.5 | H,X | 1.2 | 315 | 55.3 | 49.45 | 54.0(2) | -4.55 |
| 1734 | H,X | 1.1 | 45 | 39.6 | 33.75 | 60.8 | -27.05 |
| 2167.5 | H,X | 1.3 | 45 | 49.1 | 43.25 | 60.8 | -17.55 |
| 433.5 | V,X | 2.0 | 100 | 79 | 73.15 | 80.8 | -7.65 |
| 867 | V,X | 1.4 | 180 | 57 | 51.15 | 54.0 | -2.85 |
| 1300.5 | V,X | 1.1 | 0 | 52.4 | 46.55 | 60.8 | -14.25 |
| 1734 | V,X | 1.1 | 0 | 39 | 33.15 | 60.8 | -27.65 |
| 2167.5 | V,X | 1.0 | 45 | 46.6 | 40.75 | 60.8 | -20.05 |
| 433.5 | H,Y | 2.4 | 250 | 80.4 | 74.55 | 80.8 | -6.25 |
| 867 | H,Y | 1.5 | 90 | 61.1 | 55.25 | 60.8 | -5.55 |
| 1300.5 | H,Y | 1.2 | 45 | 54 | 48.15 | 54.0 | -5.85 |
| 1734 | H,Y | 1.1 | 315 | 44.6 | 38.75 | 60.8 | -22.05 |
| 2167.5 | H,Y | 1.1 | 90 | 54.5 | 48.65 | 60.8 | -12.15 |
| 433.5 | V,Y | 2.1 | 250 | 82.8 | 76.95 | 80.8 | -3.85 |
| 867 | V,Y | 1.2 | 270 | 56.7 | 50.85 | 60.8 | -9.95 |
| 1300.5 | V,Y | 1.3 | 45 | 56.7 | 50.85 | 54.0 | -3.15 |
| 1734 | V,Y | 1.1 | 315 | 34.4 | 28.55 | 60.8 | -32.25 |
| 2167.5 | V,Y | 1.2 | 90 | 41.2 | 35.35 | 60.8 | -25.45 |
| 433.5 | H,Z | 2.3 | 180 | 81.7 | 75.85 | 80.8 | -4.95 |
| 867 | H,Z | 1.1 | 180 | 55.8 | 49.95 | 60.8 | -10.85 |
| 1300.5 | H,Z | 1.3 | 180 | 55.2 | 49.35 | 54.0 | -4.65 |
| 2167.5 | H,Z | 1.1 | 90 | 46.9 | 41.05 | 60.8 | -19.75 |
| 433.5 | V,Z | 2.1 | 180 | 82.2 | 76.35 | 80.8 | -4.45 |
| 867 | V,Z | 1.0 | 150 | 60.5 | 54.65 | 60.8 | -6.15 |
| 1300.5 | V,Z | 1.1 | 0 | 56.3 | 50.45 | 54.0 | -3.55 |
| 1734 | V,Z | 1.1 | 0 | 41.6 | 35.75 | 60.8 | -25.05 |
| 2167.5 | V,Z | 1.1 | 0 | 50.4 | 44.55 | 60.8 | -16.25 |

(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.
(4) Spurious limit is 375-1250 microvolts/meter linear interpolations.

## 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.

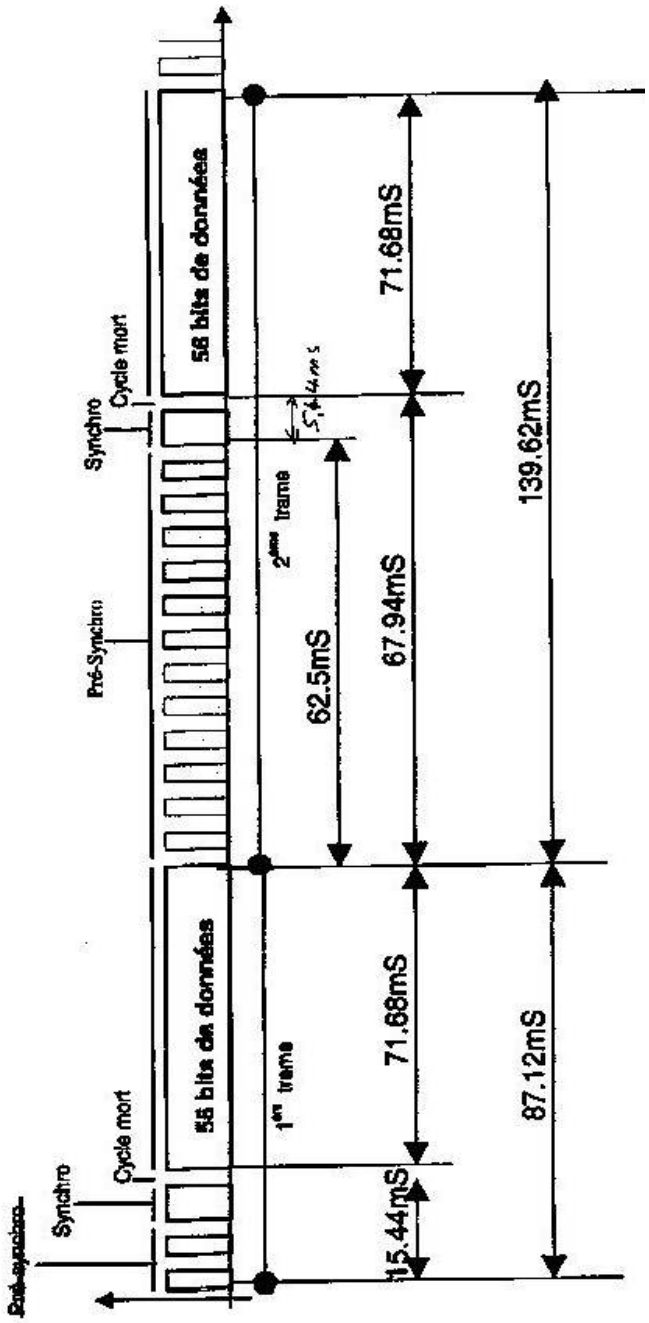


Figure 5.1 Pulse Train Timing

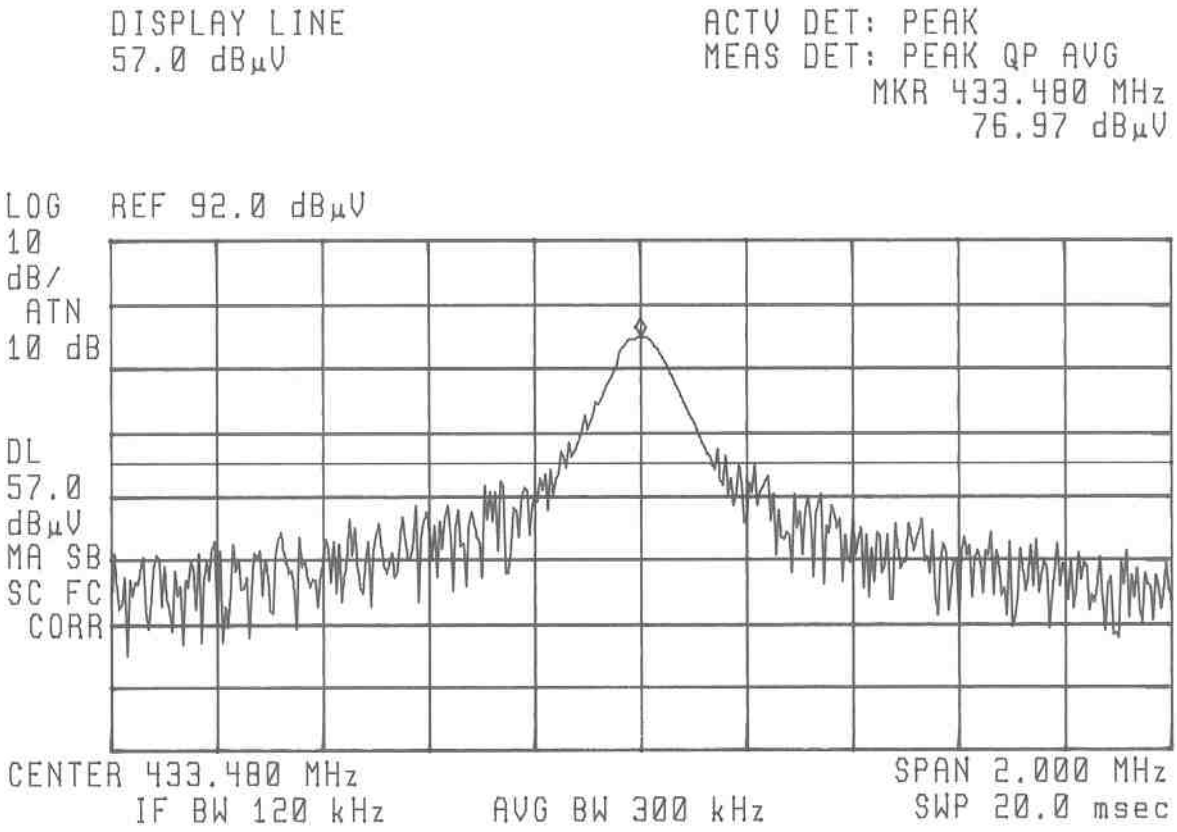


Figure 5.2 Occupied Bandwidth