Advanced Compliance Laboratory

6 Randolph Way
Hillsborough, NJ 08844
Tel: (908) 927 9288
Fax: (908) 927 0728

ELECTROMAGNETIC EMISSION COMPLIANCE REPORT

of

Z-WAVE TO RTS INTERFACE

MODEL: 1870202
FCC ID: DWNZRTSI

MAY 11, 2011

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

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:	0048-110509-01

NVLAP®

Lab Code: 200101 **The test result in this report IS supported and covered by the NVLAP accreditation**

Table of Contents

Figures

1. GENERAL INFORMATION

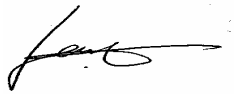
1.1 Verification of Compliance

EUT:	Z-WAVE TO RTS INTERFACE
Model:	1870202
Applicant:	SOMFY SYSTEM, INC.
Test Type:	FCC Part 15C CERTIFICATION 15.231 and 15.249
Result:	PASS
Tested by:	ADVANCED COMPLIANCE LABORATORY
Test Completion Date:	MAY 11, 2011
Report Number:	0048-110509-01

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.	±2.36	±2.99	±1.83



Wei Li
Lab Manager
Advanced Compliance Lab

Date: MAY 11, 2011

1.2 Equipment Modifications

N/A

1.3 Product Information

System Configuration

ITEM	DESCRIPTION	FCC ID	CABLE
Product	Z-WAVE TO RTS INTERFACE 1870202 (1)	DWNZRTSI	
Housing	PLASTICS		
Power Supply	AC Main		
Operation Freq.	**433.4 MHz & 908.4 MHz**		
Accessories			
Receiver	1870202(RX)	Verification	

(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	Cal Due dd/mm/yy
Hewlett-Packard	HP8546A	3448A00290	EMI Receiver	25/09/11
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	19/10/11
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	19/10/11
Fischer Custom	LISN-2	900-4-0008	Line Impedance Stabilization Networks	05/10/11
Fischer Custom	LISN-2	900-4-0009	Line Impedance Stabilization Networks	18/10/11
EMCO	3115	4945	Double Ridge Guide Horn Antenna	17/10/11

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

FCC ID: DWNZRTSI

This device complies with part 15 of the FCC Rules. Operating 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.

Figure 2.1 FCC ID Label
(Only FCC ID shown on EUT)

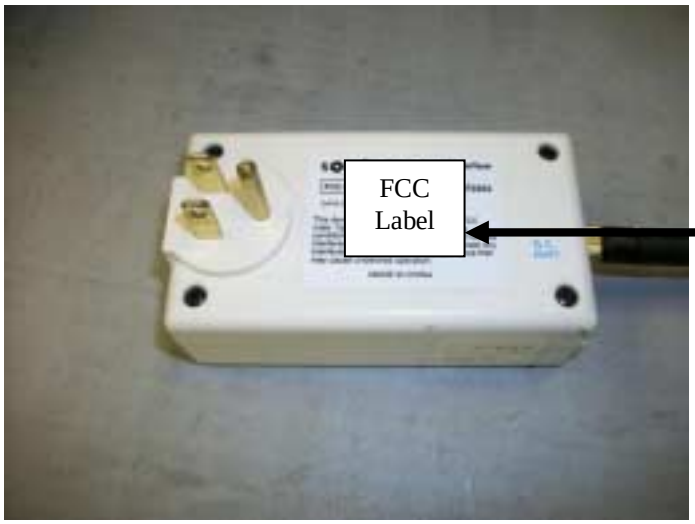


Figure 2.2 FCC Label Location

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 the antenna for 433MHz Tx Mode its antenna is removable to the EUT with max length, 5" and SMA connector; Antenna for 908MHz Tx mode is integrated on PCB with max 3" length wire. This system will be Professional Installation only.

Testing was performed as EUT was continuously operated at the following frequency channels:

433.4MHz or 908.4 MHz.

3.2 Special Accessories

N/A

3.3 Configuration of Tested System

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

Figure 3.1 Radiated Test Setup

Figure 3.2 Conducted Test Setup

4. SYSTEM SCHEMATICS

Provided by Somfy.

Figure 4.1 System Schematics

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)

5.2 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^{th} harmonics were investigated.

5.3 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 this section. Worst case was recorded in which the AC/DC power was used.

Test Personnel: 

Typed/Printed Name: Edward Lee Date: MAY 11, 2011

Radiated Test Data for Operation Mode 1: RTS @433.4MHz

Frequency (MHz)	Polarity (H or V) Position (Z)(1)	Antenna Height (m)	Azimuth (Degree)	Peak Reading(5) at 3m (dBuV/m)	After* Correction (dBuV/m)	FCC 3m Limit(3,4) (dBuV/m)	Difference (dBuV/m)
433.4	H	1.1	335	80.6	75	80.8	-5.8
866.8	H	1.1	270	58.1	52.5	60.8	-8.3
1300.2	H	1.0	090	48.7	43.1	54.0**(2)**	-10.9
1733.6	H	1.0	180	54.6	49	60.8	-11.8
2167.0	H	1.0	180	47.6	42	60.8	-18.8
433.4	V	1.1	000	85.0	79.4	80.8	-1.4
866.8	V	1.1	270	61.7	56.1	60.8	-4.7
1300.2	V	1.0	180	57.7	52.1	54.0	-1.9
1733.6	V	1.0	180	58.9	53.3	60.8	-7.5
2167.0	V	1.0	170	49.7	44.1	60.8	-16.7

(1) See Figure 3.1 for definition of position Z, which is the typical orientation when EUT is installed.
(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) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

** Pulse Train Calculation for RTS 433Tx Mode*
The pulse train timing plots are showed in Figure 6.2.
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. =(55x0.640+1x4.8+5x2.5)/100=0.525
The maximum average field strength should be 0.51 of the peak field strength measured. So we use peak value minus 5.6dB as calculated maximum average field strength.

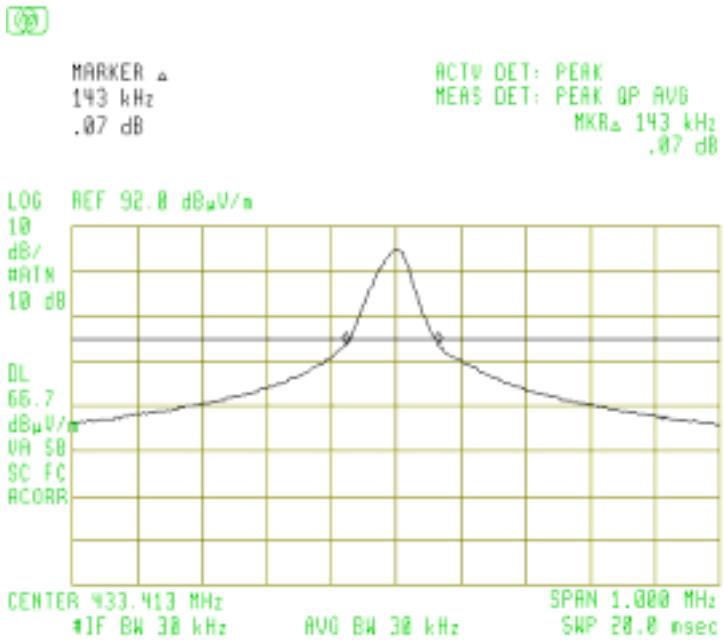
Radiated Test Data for Operation Mode 1: Z-Wave @908.4MHz

Frequency (MHz)	Polarity (H or V)	Antenna Height (m)	Azimuth (Degree)	Peak Reading at 3m(2) (dBuV/m)	After Correction (dBuV/m)	FCC 3m Limit(1) (dBuV/m)	Difference (dBuV/m)
908.4	H	1.1	180	86.9		94	-7.1
1816.8	H	1.0	180	47.8		54	-6.2
2725.2	H	1.0	170	47.3		54	-6.7
908.4	V	1.1	075	92.9		94	-1.1
1816.8	V	1.0	180	52.8		54	-1.2
2725.2	V	1.0	180	53.0		54	-1

(1) The limit for emissions within the 902-928MHz band is 50mV(94dB) per Sec. 15.249. The limit for its harmonics is 500uV (54dB). Other spurious emissions shall be lower than either its fundamental by 50dB or the limit defined in Sec. 15.209, whichever is higher.
(2) If each peak reading is less than the FCC average limit, it'll be not necessary to show the measured/ calculated average reading.

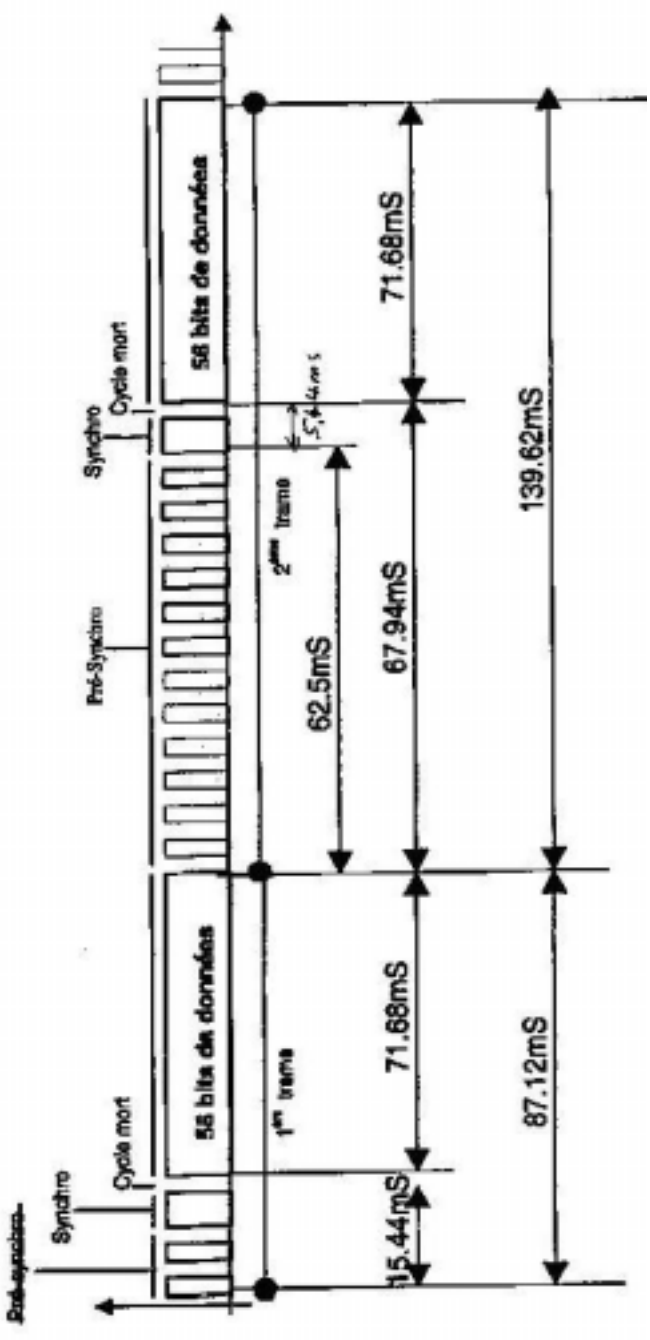
5.4 Occupied Bandwidth

The bandwidth of the emission shall be no wider than 0.25% of the center frequency, in this case, 1.084MHz(433.5x0.25%) for 433MHz Tx Mode . Bandwidth is determined at the points 20dB down from the modulated carrier. Figure 5.1 shows the occupied bandwidth plot.

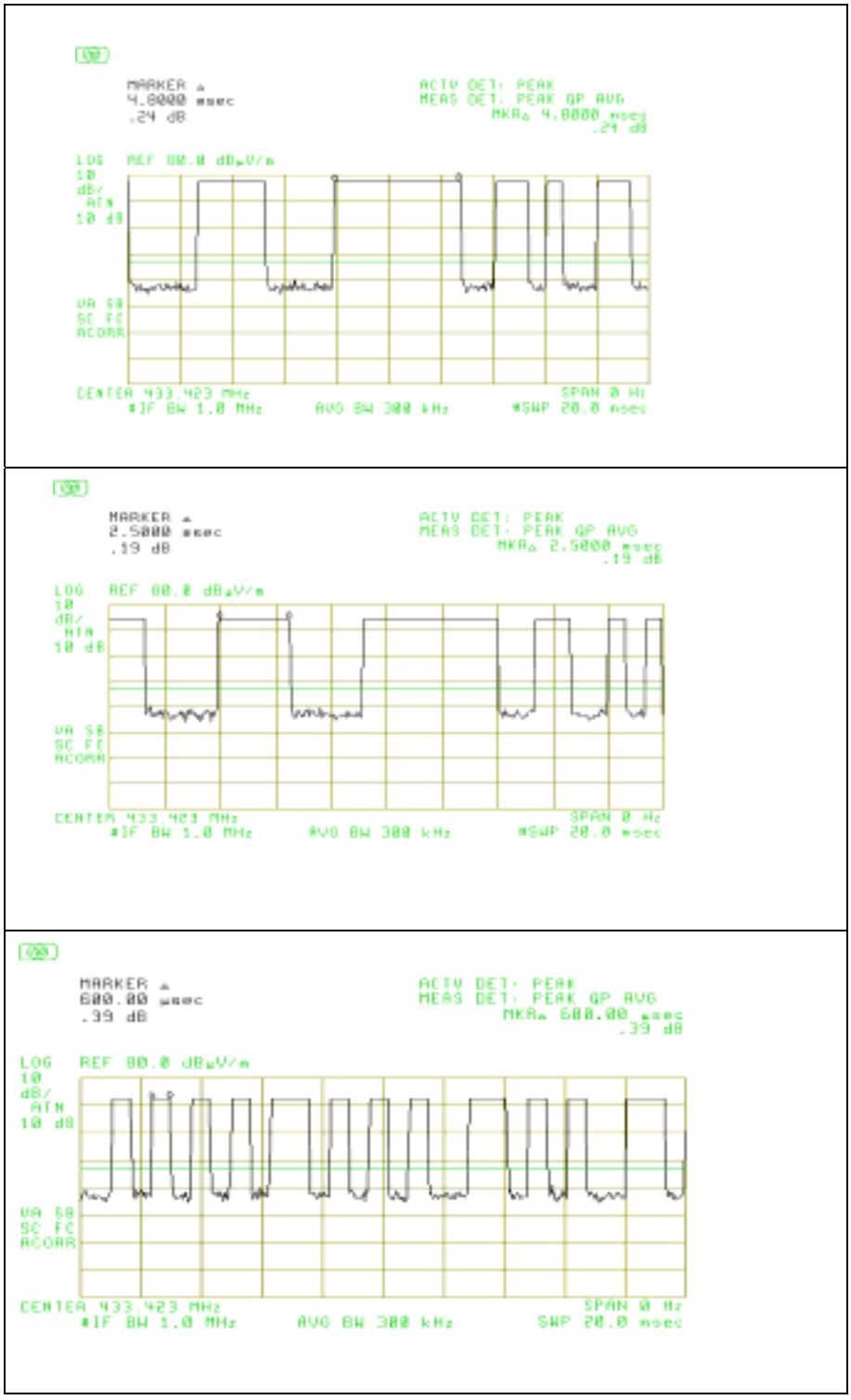


433.4 MHz, 20dB Bandwidth Plot

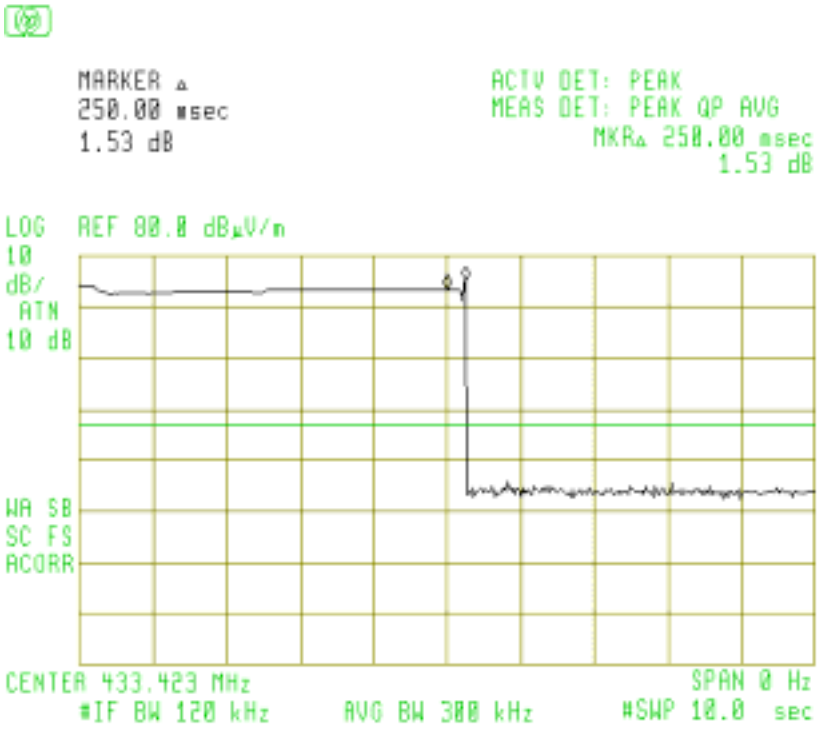
Occupied Bandwidth



Pulse Train Timing-1



Pulse Train Timing-2



Less than 5 seconds

Manual Operation Deactivation Time

6. CONDUCTED EMISSIONS DATA

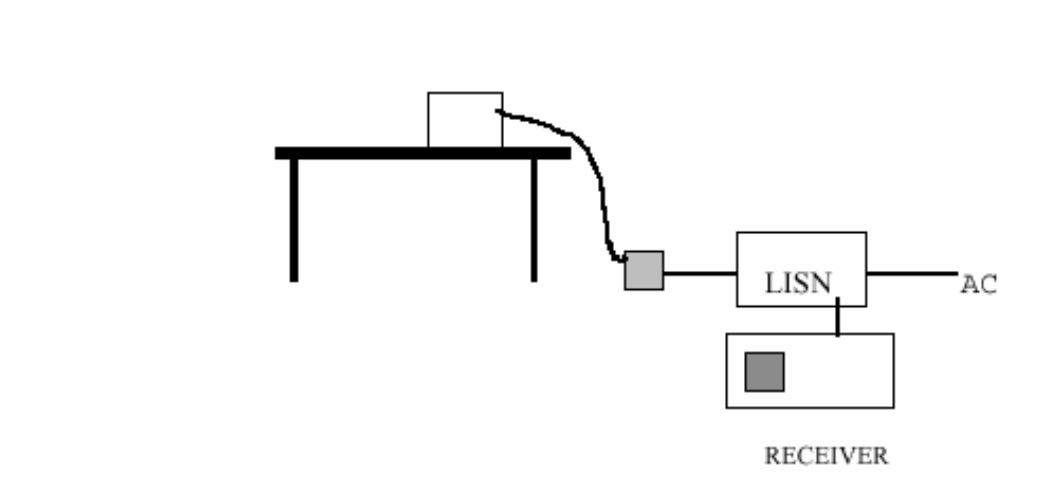
6.1 Test Methods and Conditions

The EUT exercise program was loaded during the conducted emission test. EMI Receiver was scanned from 150KHz to 30MHz with maximum hold mode for maximum emission. The IF Bandwidth is 9KHz. 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 plots is using FCC Part 15 & CISPR22 Class B limit given as following:

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

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

6.2 Measurement Instrument Configuration for Conducted Emission



6.3 Testing Data

The following plots show the neutral and line conducted emissions for the typical operation condition. The conducted test data shows the worst case emissions still below the FCC Part 15/CISPR22 Class B limits.

Highest Data for AC Line Conducted Emissions (w/ DC motor)						
Frequency (MHz)	0.16	0.19	0.24	-	-	-
Peak Reading (dBuV) from Line*	12.5	18.5	14.5	-	-	-
Peak Reading(dBuV) from Neural *	15.3	13.0	14.3	-	-	-

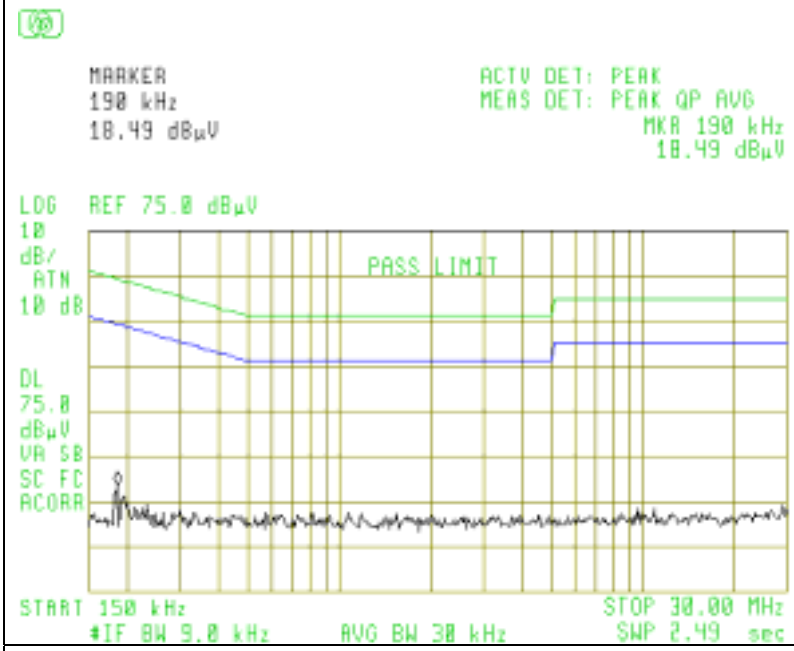
* No average reading is needed since the peak reading is already below average limit.
** Worst case of Tx 433MHz mode and Tx 908MHz mode is given above.

Test Personnel:

Tester Signature:  Date: MAY 11, 2011

Typed/Printed Name: Edward Lee

Line



Neutral