

TEST REPORT

Report Number: 3079683MPK-001

Project Number: 3079683

July 28, 2005

Testing performed on the

Remote Fan Controller

Model Number: R100

FCC ID: THE-GC621964

to

FCC Part 15.231

For

L.L Building Products Inc



A2LA Certificate Number: 1755-

Test Performed by:

Intertek Testing Services
1365 Adams Court
Menlo Park, CA 94025

Test Authorized by:

LL Building Products Inc
295 McKoy Road
Burgaw, NC 28425

Prepared by:


Suresh Kondapalli

Date: July 28, 2005

Reviewed by:


David Chernomordik

Date: July 28, 2005

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1.0 Summary of Tests

MODEL: R100
FCC ID: THE-GC621964

TEST	REFERENCE	RESULTS
Radiated Emission	15.231(b)	Complies
Out of Band Radiated Emission	15.231(b)	Complies
AC Conducted Emission	15.207	Not Applicable*
20 dB Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	Complies
Antenna Requirement	15.203	Complies

*EUT is Battery Powered

A handwritten signature in blue ink, appearing to read "Suresh Kondapalli".

Suresh Kondapalli, Test Engineer:

July 28, 2005
Date: _____

A handwritten signature in blue ink, appearing to read "David Chernomordik".

David Chernomordik, EMC Technical Manager

July 28, 2005

Date: _____

2.0 General Description

2.1 Product Description

Overview of the EUT

Applicant	LL Building Products Inc 295 McKoy Road Burgaw, NC 28425 USA
Trade Name & Model No.	R100
FCC Identifier	THE-GC621964
Use of product	Remote control for Fan
Transmitter activation	Manual and automatically deactivate within 5 seconds of being released
Frequency Range (MHz)	314.950 MHz
Antenna Requirement	The EUT uses a permanently connected internal antenna.
Manufacturer name & address	LL Building Products Inc 295 McKoy Road Burgaw, NC 28425 USA

A Production version of the EUT was received on May 20, 2005 in good operating condition

2.2 Related Submittal(s) Grants

This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (2003). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

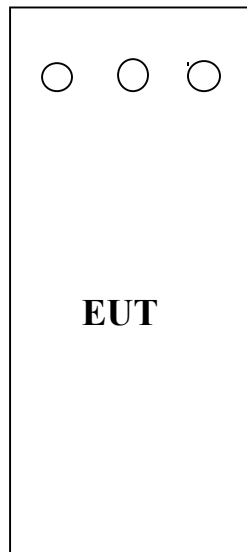
The open area test site and conducted measurement facility used to collect the radiated data is site 10meter Semi anechoic Chamber, Menlo Park CA. This test facility and site measurement data have been fully placed on file with the FCC and A2LA accredited.

3.0 System Test Configuration

3.1 Support Equipment and description

EUT is stand alone device. No support was used for testing.

3.2 Block Diagram of Test Setup



S = Shielded
U = Unshielded

F = With Ferrite
M = Length in Meters

3.3 Justification

For emission testing, the test procedures, as described in American National Standards Institute C63.4-2003, were employed. The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it).

If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

Each test was performed with the new battery.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

3.5 Mode of Operation During Test

EUT is manually operated by pressing buttons

3.6 Modifications Required for Compliance

No modifications were installed by Intertek Testing Services during compliance testing in order to bring the product into compliance (Please note that this does not include changes made specifically by LL Building Products prior to compliance testing)

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusions from the standard were made.

4.0 Measurement Results

4.1 Radiated Emission FCC Rule 15.231(b)

The limit specified in section 15.231(b) was used.

Procedure

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. The signal is maximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 3150 MHz.

Analyzer resolution is:

100 kHz or greater for frequencies 1000 MHz and below,
1 MHz for frequencies above 1000 MHz.

Analyzer video bandwidth is equal or greater than resolution bandwidth – for peak measurements, and 10 Hz – for average measurements.

The Peak and Average values of the Field Strength of the fundamental frequency and harmonics were measured.

All other spurious emissions were verified by using “delta-marker” method. Antenna was setup at approximately 0.1 m from the EUT. The graphs of the spectrum analyzer were printed and the “delta” between readings at fundamental frequency and worst-case spurious emission frequency was noted. The field strength of spurious emissions was calculated by subtracting the “delta” from the field strength at fundamental.

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follows:

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

Where FS = Field Strength in dB (μ V/m)

RA = Receiver Amplitude (including preamplifier) in dB (μ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(1/m)

AG = Amplifier Gain in dB

4.2 Test Results

The data below list the significant emission frequencies, the limit and the margin of compliance.

Field Strength of Fundamental: 314.950MHz

Function	Detector	Raw reading dBuV	Correction factor for Preamp, Antenna & cables dB	Final Reading dB(uV/m)	Limit dB(uV/m)	Margin dB
ON/OFF SW	P	77.7	-12.1	65.6	95.0	-29.4
	Av	66.3	-12.1	54.2	75.0	-20.8
Speed	P	77.5	-12.1	65.4	95.0	-29.6
	Av	68.1	-12.1	56.0	75.0	-19.0
Timer	P	76.8	-12.1	64.7	95.0	-30.3
	Av	65.8	-12.1	53.7	75.0	-21.3

Field Strength of Harmonics

Frequency MHz	Detector	Raw reading dBuV	Correction factor for Preamp, antenna & cables dB	Final Reading dB(uV/m)	Limit dB(uV/m)	Margin dB
630.2	P	51.4	-6.3	45.1	75.0	-29.9
	Av	35.4	-1.2	34.2	55.0	-20.8
945.3	P	39.0	-1.3	37.6	75.0	-37.4
	Av	28.5	-1.3	27.2	55.0	-27.8

Note: For Harmonics and Spurious emissions test all three modes were used and only worst case results are reported.

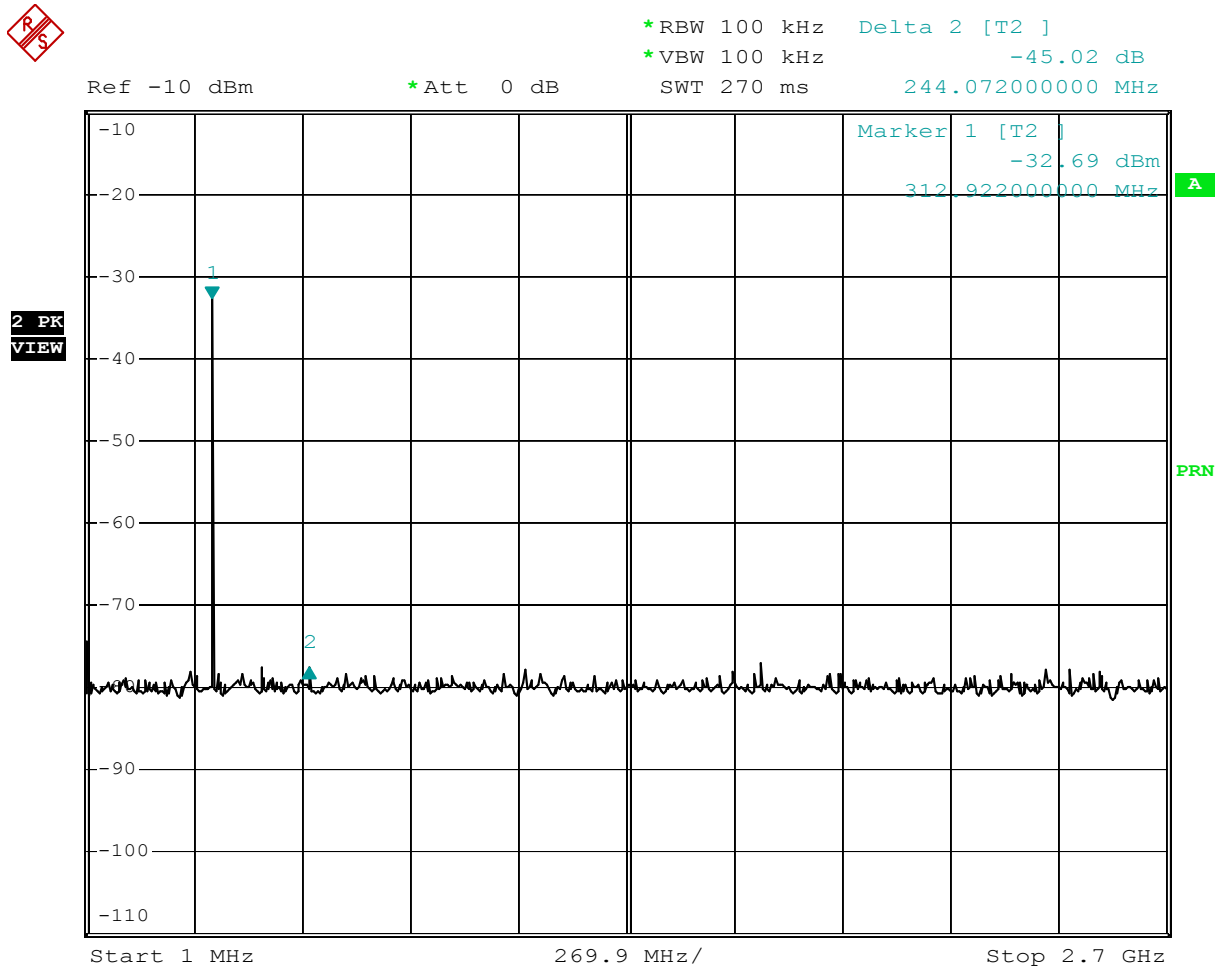
All other Harmonics not reported are at least 20dB below the limit

From the graphs below, the average field strength of other emissions except harmonics does not exceed 23 dB(uV/m); the peak field strength does not exceed 33 dB(uV/m).

4.2 Test Results

FCC Rule 15.209

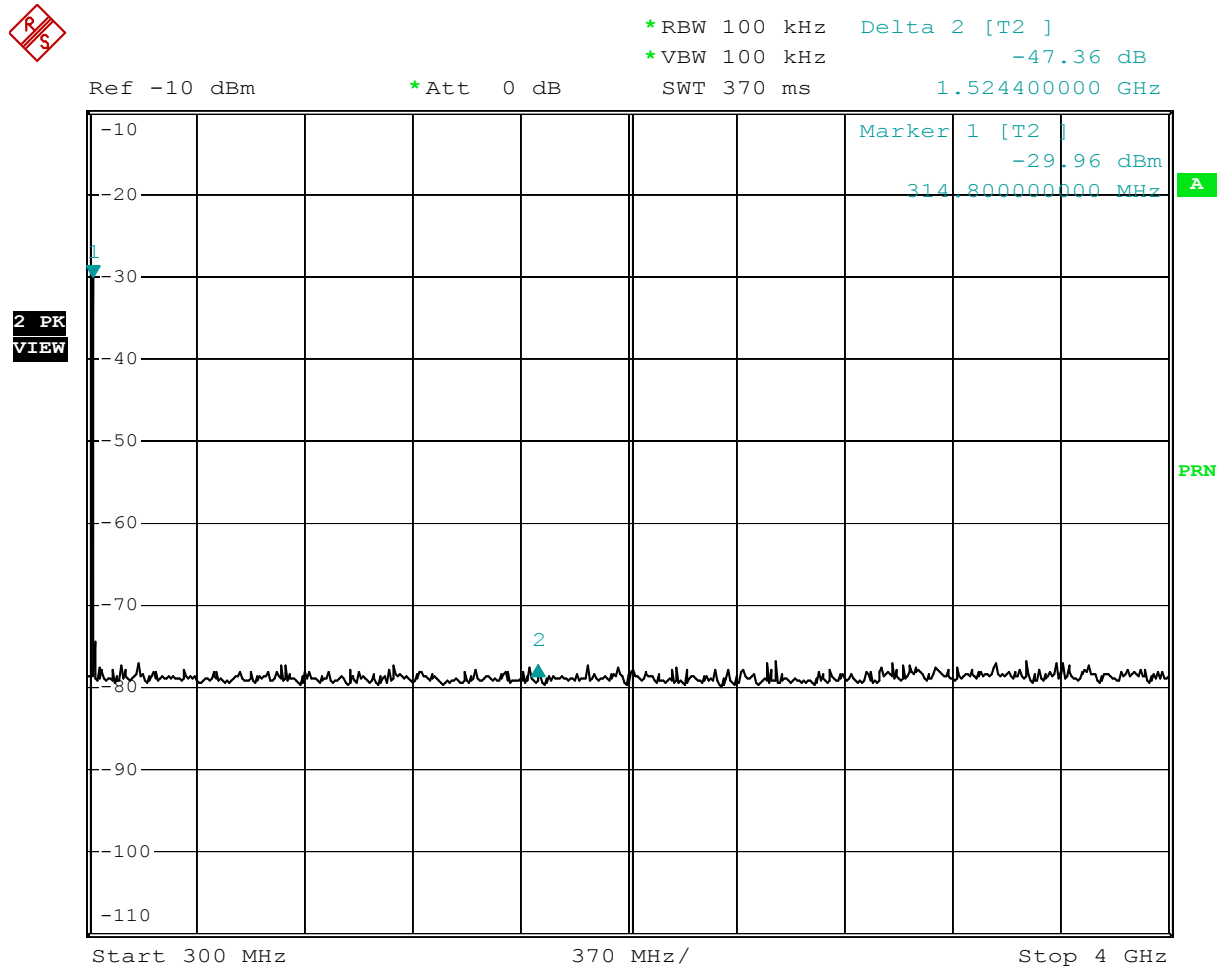
Field Strength of Spurious Emissions



Comment: Antenna conducted spurious emissions

Date: 18.JUL.2005 15:32:34

4.2 Test Results



Comment: Antenna conducted spurious emissions
Date: 18.JUL.2005 15:45:37

4.3 AC Line Conducted Emission
FCC Rule 15.207

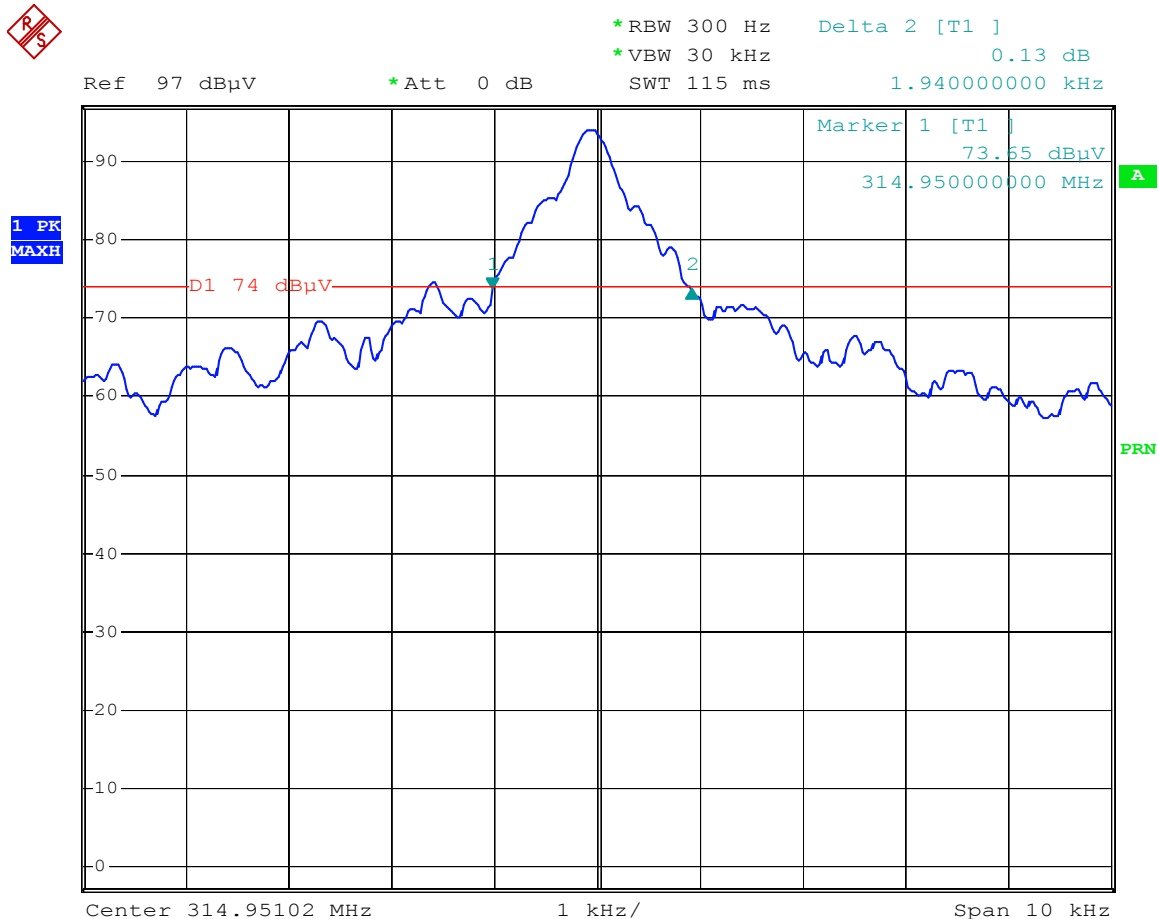
Test is not applicable. EUT is battery Operated

4.4 Occupied Bandwidth

The 15.231(c) emission bandwidth requirement: **0.25%** of fundamental frequency

The worst-case (widest) emission bandwidth at 20 dBc is 1.94 kHz, which is 0.00062% of the fundamental frequency.

The following plots show the emission bandwidth of the transmitter



Date of the test July 18, 2005
 Date: 4.AUG.2005 16:57:07

5.0 List of test equipment

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	9/10/05
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	9/10/05
EMI Receiver	Rhode-Schwarz	FSP-40	100030	12	9/15/05
BI-Log Antenna	EMCO	3143	9509-1160	12	10/28/05
Pre-Amplifier	Sonoma Inst.	310	185634	12	3/29/06
Horn Antenna	EMCO	3115	8812-3049	12	4/29/06

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3079683	SK	July 28, 2005	Original document