1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX78665
e-mail:info@ptitest.com
(512)244-3371 Fax:(512)244-1846

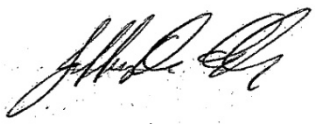
DLP Design
1605 Roma Lane
Allen, TX 75013

Dear applicant:

Enclosed is the Wireless Test Report for the DLP-RFID2 by DLP Design. This report can be used to demonstrate compliance with FCC and IC requirements for wireless devices in the United States and Canada.

If you have any questions, please contact me.

Sincerely,



Jeffrey A. Lenk
President

Enclosure

Project 13799-10

DLP Design
DLP-RFID2

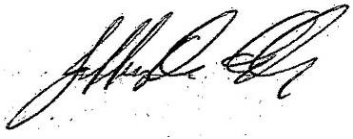
Wireless Test Report

Prepared for:
DLP Design
1605 Roma Lane
Allen, TX 75013

Professional Testing (EMI), Inc.
1601 N. A.W. Grimes Blvd., Suite B
Round Rock, Texas78665

July 6, 2012

Reviewed by



Jeffrey A. Lenk
President

Written by

Jesse Banda
EMC Engineer

Table of Contents

Applicant: DLP Design

Applicant's Address: 1605 Roma Lane
Allen, TX 75013

FCC ID: SX9RFID2
IC ID: 5675A-RFID2

Project Number: 13799-10

Test Dates: July 5, 2012

The DLP Design RFID2 was tested to and found to be in compliance with FCC 47 CFR Part 15 and IC RSS-210 issue 8.

The highest emissions generated by the above equipment are listed below:

Parameter	Frequency (MHz)	Level	Limit	Margin (dB)	OBW 99%
Transmitter: Fundamental	13.56	80.4dBµV/m @ 3 m	124 dBµV/m	-43.6	6.9 kHz
Transmitter: Radiated Spurious	901.9	23.2 dBµV/m @ 10 m	33.1 dBµV/m	-9.9	
Receiver : Radiated Spurious	901.9	26.4 dBµV/m @ 10 m	35.6 dBµV/m	-9.2	

I, Jesse Banda, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.

Jesse Banda
EMC Engineer

This report has been reviewed and accepted by DLP Design. The undersigned is responsible for ensuring that this devicewill continue to comply with the FCC and IC rules.

_____
Representative of DLP Design

1.0 Introduction

1.1 Scope

This report describes the extent of the equipment under test (EUT) conformance to the intentional radiator requirements of the United States and Canada.

Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates, and expressions thereof for EMC testing. The procedure of ANSI C63.4: 2009 were utilized for making all emissions measurements.

1.2 EUT Description

The DLP-RFID2 is a low-cost module for reading from and writing to ISO 15693, ISO 18000-3, and Tag-it™ intelligent RFID transponder tags. It has the ability to both read and write up to 256 bytes of data in addition toreading the unique identifier (UID/SID). All of the DLP-RFID2's electronics reside within the compact PCB module, and all operational power is taken from an external 3-5 volt supply. The read range of the external antennas is up to 5 inches from the RFID tag depending upon the size of the antenna and tag used.The system tested consisted of the following:

Manufacturer	DLP Design
Model Number	DLP-RFID2
FCC ID	SX9RFID2
IC ID	5675A-RFID2
Power Supply	3-5VDC from Batteries
Modulation Type (13.56 MHz)	PM
Antenna Type	UFL

The following rules apply to the operation of the EUT:

Guidelines	**FCC Rules**	**IC Rules**	
	Part 15	**RSS-GEN Issue 3**	**RSS-210 Issue 8**
Transmitter Characteristics	15.225	4.6.1, 6	A.2
Spurious Radiated Power	15.209	7.2.2	A.2
Antenna Requirement	15.203	7.1.2	

1.3

1.4 Modifications

No modifications were made to the EUT during the performance of the test program.

1.5 Test Site

Measurements were made at the PTIsemi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas.This site is registered with the FCCunder Section 2.948 and Industry Canada per RS-212, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas, 78758, while the main office is located at 1601 N. A.W. Grimes Blvd., Suite B, Round Rock, Texas, 78665.

1.6 Applicable Documents

Document	Title	Release
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment	2009
ANSI C63.10	American National Standard forTesting Unlicensed Wireless Devices	2009
47 CFR	Part 15 – Radio Frequency DevicesSubpart C -Intentional Radiators	
RSS-210	Low-power License-exempt Radio communication Devices (All Frequency Bands): Category I Equipment	Issue 8
RSS-Gen	General Requirements and Information for the Certification of Radio Communication Equipment	Issue 3

1.7 Applicable Tests

Test	Rule (FCC)	Rule (IC)
Output Power	15.225a	RSS-210 A2.6a
Occupied Bandwidth	N/A	RSS-Gen 461
Radiated Emissions, Harmonic, Spurious,	15.205(a), 15.209(a), 15.249(a)	RSS-Gen 7.2.2
Frequency Tolerance	15.225e	RSS-210 A2.6
Antenna Requirements	15.203	RSS-Gen 7.1.2

2.0 Fundamental Field Strength Measurements

Fundamental field strength measurements were made on the selected fundamental transmitting frequency of the EUT.

Tests of the fundamental field strength of the EUT also determined the worse case polarization of the device. The emissions of the device were measured with the EUT in three orthogonal axes.

2.1 Test Procedure

Radiated emission measurements were made of the fundamental field strength level for the EUT. The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable that enables 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 3 meters, as measured from the closest point of the EUT. The field strength emissions were maximized by rotating the EUT. A diagram showing the test setup is given as Figure 2.1.1.

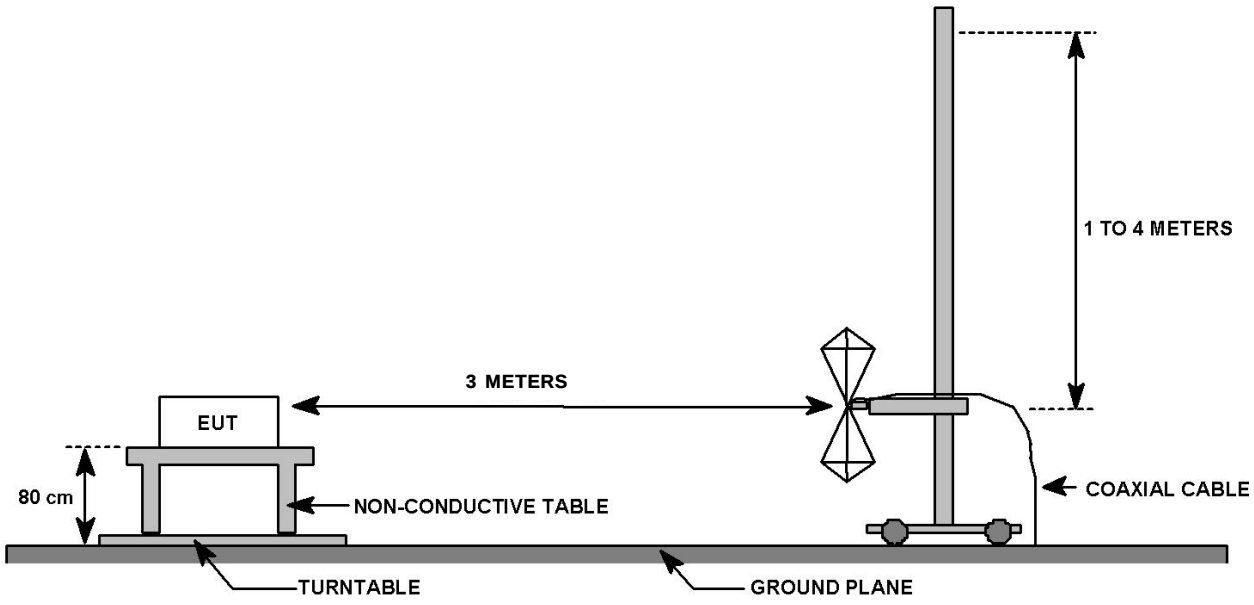


Figure 2.1.1: Radiated Emission Test Setup

2.2 Test Criteria

The maximum field strength of the fundamental frequency is84dBuV/m, at 30 m for devices operating in the frequency ranges of 13.553-13.567 MHz,according to FCC Section 15.225 and RSS-210.

2.3 Test Equipment

Table 2.3.1: Radiated Emissions Test Equipment (frequency < 30MHz)

Asset #	Manufacturer	Model #	Description	Calibration Due
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	8/7/2012
1937	Agilent	E4440A	Spectrum Analyzer, 3 Hz - 26.5 GHz	7/18/2012
6	EMCO	6502	Antenna, Loop, Active, .01-30MHz	4/26/2013
C027	N/A	RG214	Cable Coax, N-N, 25m	7/26/2012
1327	EMCO	1050	Controller, Antenna Mast	N/A
0942	EMCO	11968D	Turntable, 4ft.	N/A
1969	HP	11713A	Attenuator/Switch Driver	N/A

2.4 Test Results

Radiated emission measurements of the fundamental field strength level for the EUT were taken on July 5, 2012 and the EUT was found to be in compliance with applicable requirements.

Table 2.4.1: Radiated Emissions on the Fundamental Strength Test

PROJECT #	DATE	FREQUENCY	RULE	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
13799-10	July 5, 2012	13.56 MHz	15.225	3m	Loop	9 kHz	9 kHz	Peak
COMMENT		**13.56 MHz Transmitting**						

Parallel Polarization

Frequency Measured (MHz)	Modulation	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
13.56	PM	0	1.0	Peak	76.0	80.4	124	-43.6

Perpendicular Polarization

Frequency Measured (MHz)	Modulation	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
13.56	PM	0	1.0	Peak	70.2	74.6	124	-49.4

Calculated Result

Frequency Measured (MHz)	Polarization	Field Strength (dBµV)	E.I.R.P.	
			dBm	mW
13.56	Parallel	80.4	-14.83	0.0329
13.56	Perpendicular	74.6	-20.63	0.0087

Note: Calculation was performed as follows: $P = \frac{(E*d)^2}{30*G}$

P=Power in watts, E=measured maximum field strength in V/m, d=distance in meters,
G=numeric gain of transmitting antenna, Distance=3 meters, Gain=1dBi

3.0 Occupied Bandwidth

Occupied bandwidth measurements were performed on the EUT to determine compliance with RSS-210.

3.1 Test Procedure

The occupied bandwidth was measured with a spectrum analyzer connected to the antenna of the EUT while it was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. A diagram showing the test setup is given as Figure 3.1.1.

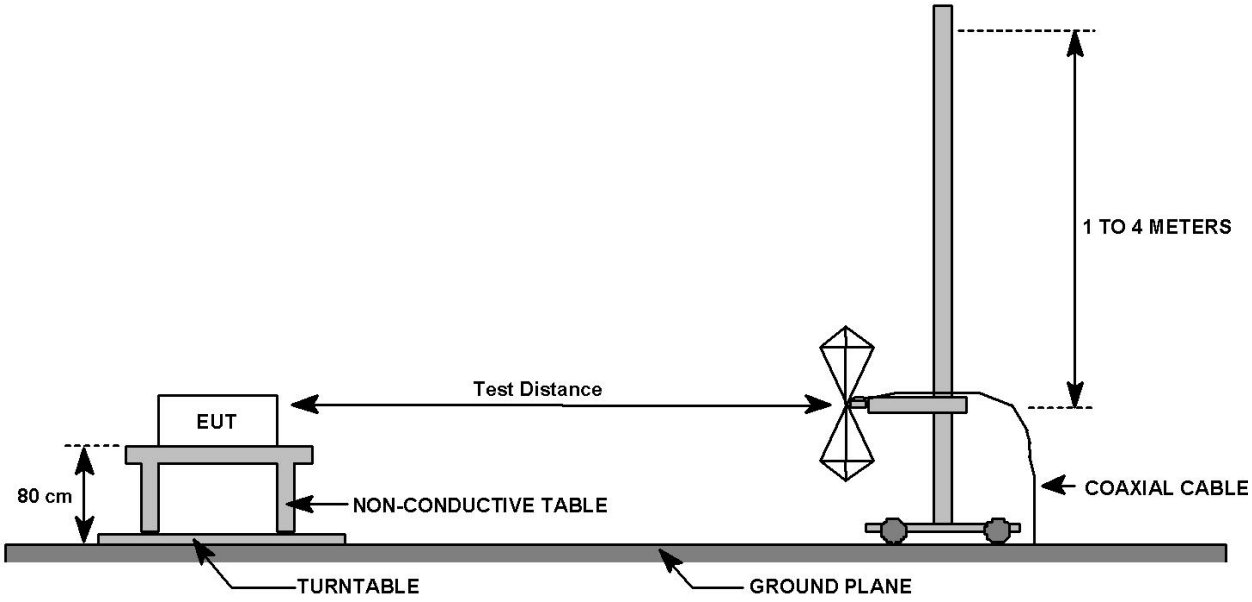


Figure 3.1.1: Conducted Measurement Method

3.2 Test Criteria

There are no requirements for FCC 15.225 or RSS-Gen, section 4.6.1.

3.3 Test Equipment

Table 3.3.1: ConductedEmissions Test Equipment for Occupied Bandwidth

Asset #	Manufacturer	Model #	Description	Calibration Due
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	8/7/2012
1937	Agilent	E4440A	Spectrum Analyzer, 3 Hz - 26.5 GHz	7/18/2012
6	EMCO	6502	Antenna, Loop, Active, .01-30MHz	4/26/2013
C027	N/A	RG214	Cable Coax, N-N, 25m	7/26/2012

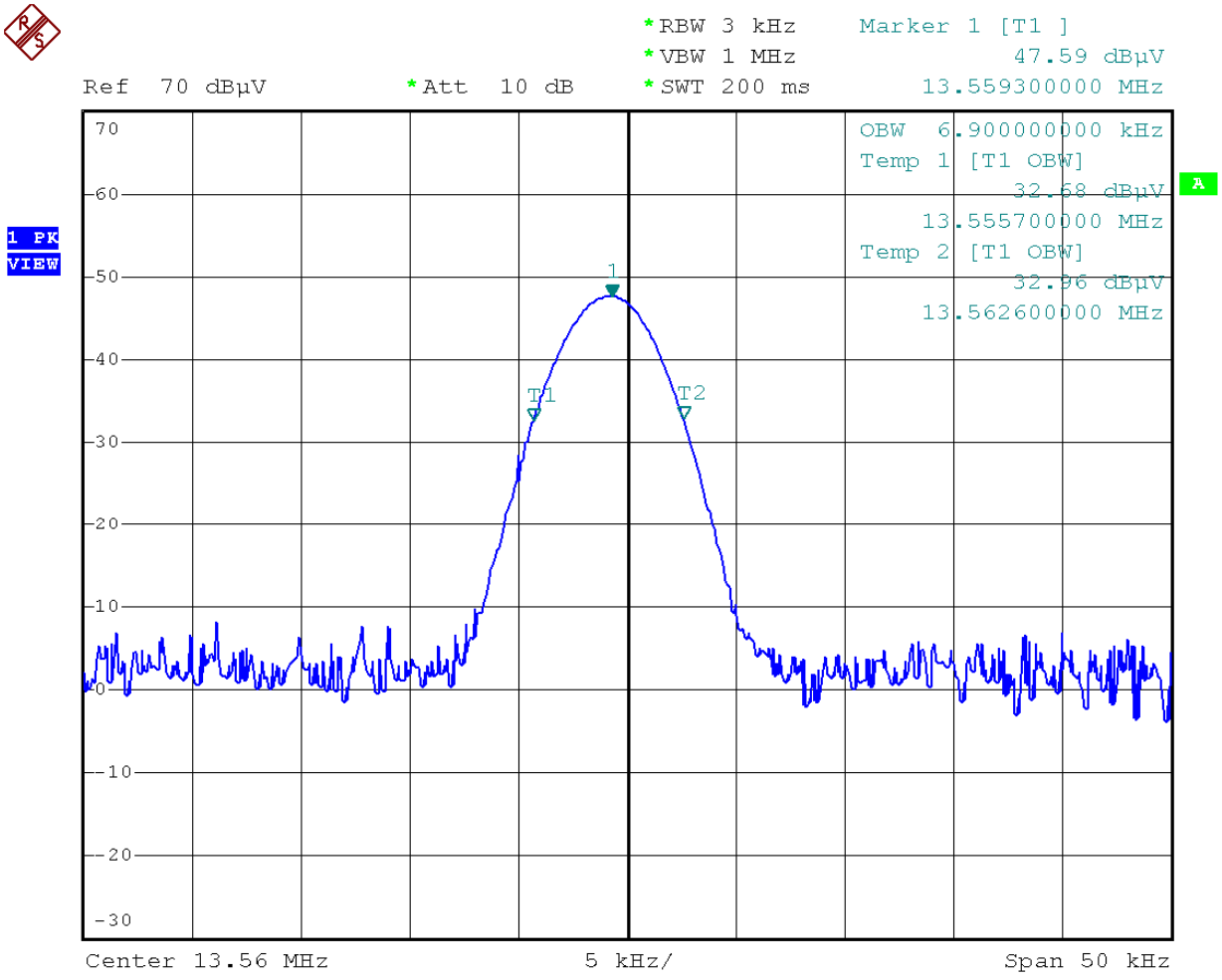
3.4 Test Results

Occupied bandwidth measurements were taken on July 5, 2012.Since there are no requirements for occupied bandwidth, the EUT was found to be in compliance.

Table 3.4.1: Occupied Bandwidth Test Results

PROJECT #	DATE	RULE	METHOD	FREQUENCY	MODE	RBW	VBW
13799-10	July 5, 2012	RSS-Gen	Radiated	13.56 MHz	OM	3 kHz	1 MHz
COMMENT	OBW = 6.9 kHz						

99% BW



4.0 Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to FCC sections 15.249, 15.209, and RSS-210.

4.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 3 or 10 meters from the measurement antenna.

For spurious emissions below 30 MHz, quasi-peak detection was used with a resolution bandwidth of 9 kHz. All measurements below 30 MHz were normalized to 3 meter distance using a 20 dB/decade distance extrapolation. The emissions were maximized by rotating the EUT on a turntable.

For spurious emissions above 30 MHz, quasi-peak detection was used with a resolution bandwidth of 120 kHz. All measurements below 1 GHz were normalized to 10 meter distance using a 20 dB/decade distance extrapolation. The emissions were maximized by rotating the EUT and raising and lowering the measurement antenna from 1 to 4 meters.

4.2 Test Criteria

The radiated limits of FCC 15.209 and RSS-210 are shown below. The limits specified are at 30 and 3 meters.

Frequency MHz	Specification Test Distance (Meters)	Field Strength (dBuV/m)	Alternative Test Distance (Meters)	Field Strength (dBuV/m)
10 to 30	30	29.5	3	49.5
30 to 88	3	40.0	10	29.5
88 to 216	3	43.5	10	33.1
216 to 960	3	46.0	10	35.6
Above 960	3	54.0	3	54.0

4.3 Test Equipment

Table 4.3.1: Radiated Emissions Test Equipment (frequency < 30 MHz)

Asset #	Manufacturer	Model #	Description	Calibration Due
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	8/7/2012
1937	Agilent	E4440A	Spectrum Analyzer, 3 Hz - 26.5 GHz	7/18/2012
6	EMCO	6502	Antenna, Loop, Active, .01-30MHz	4/26/2013
C027	N/A	RG214	Cable Coax, N-N, 25m	7/26/2012
1327	EMCO	1050	Controller, Antenna Mast	N/A
0942	EMCO	11968D	Turntable, 4ft.	N/A
1969	HP	11713A	Attenuator/Switch Driver	N/A

Table 4.3.2: Radiated Emissions Test Equipment (frequency ≥ 30 MHz)

Asset #	Manufacturer	Model #	Description	Calibration Due
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	8/7/2012
0586	HP	8447D	Preamp, 0.1-1300MHz, 26dB	12/21/2012
1937	Agilent	E4440A	Spectrum Analyzer, 3 Hz - 26.5 GHz	7/18/2012
1926	ETS-Lindgren	3142D	Antenna, Biconilog, 26 MHz - 6 GHz	7/5/2012
C027	N/A	RG214	Cable Coax, N-N, 25m	7/26/2012
1327	EMCO	1050	Controller, Antenna Mast	N/A
0942	EMCO	11968D	Turntable, 4ft.	N/A
1969	HP	11713A	Attenuator/Switch Driver	N/A

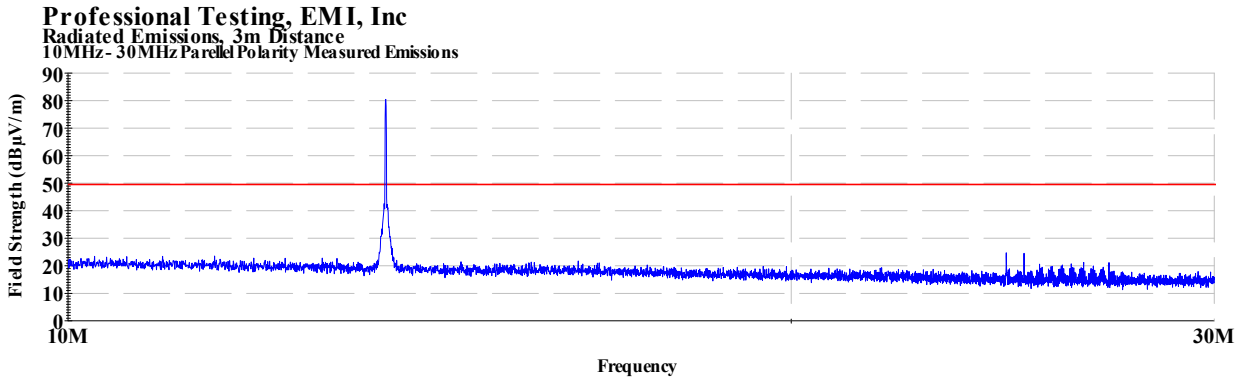
4.4 Test Results

Out of band spurious emissions measurements were taken on July 5, 2012, and the EUT was found to be in compliance with applicable requirements.

Table 4.4.1: Out of Band Spurious Emissions Test Results, 10 MHz to 30 GHz, Parallel Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
13.56 MHz	Transmit	July 5, 2012	FCC B	10 m	Biconilog	9 kHz	9 kHz	Peak
COMMENT	Transmitting 13.56 MHz Harmonics and spurious investigated up to 1 GHz							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
24.5	3	15	1	Peak	18.1	24.6	49.5	-25.0
25	3	234	1	Peak	17.7	24.3	49.5	-25.2

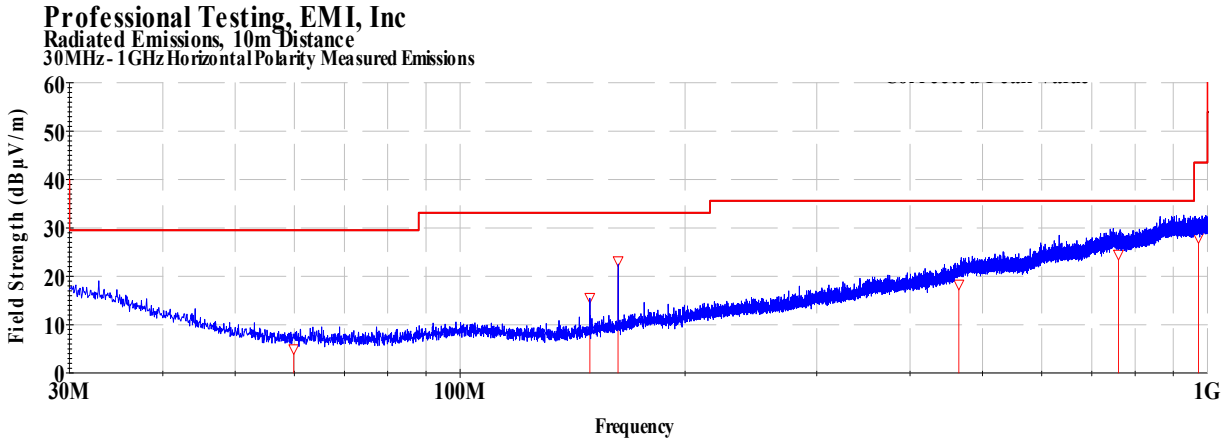


Result = Pass

Table 4.4.2: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Horizontal Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
13.56 MHz	Transmit	July 5, 2012	FCC B	10 m	Biconilog	120 kHz	120 kHz	Quasi-peak
COMMENT	Transmitting 13.56 MHz Harmonics and spurious investigated up to 1 GHz							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
59.8867	10	216	1.54	Quasi-peak	22.1	5.0	29.5	-24.5
149.118	10	250	3.62	Quasi-peak	30.8	15.6	33.1	-17.5
162.706	10	262	3.63	Quasi-peak	37.4	23.2	33.1	-9.9
464.937	10	144	2.27	Quasi-peak	21.4	17.6	35.6	-18.0
760.308	10	11	1.91	Quasi-peak	20.5	23.7	35.6	-11.9
972.711	10	201	3.42	Quasi-peak	20.2	27.1	43.5	-16.4

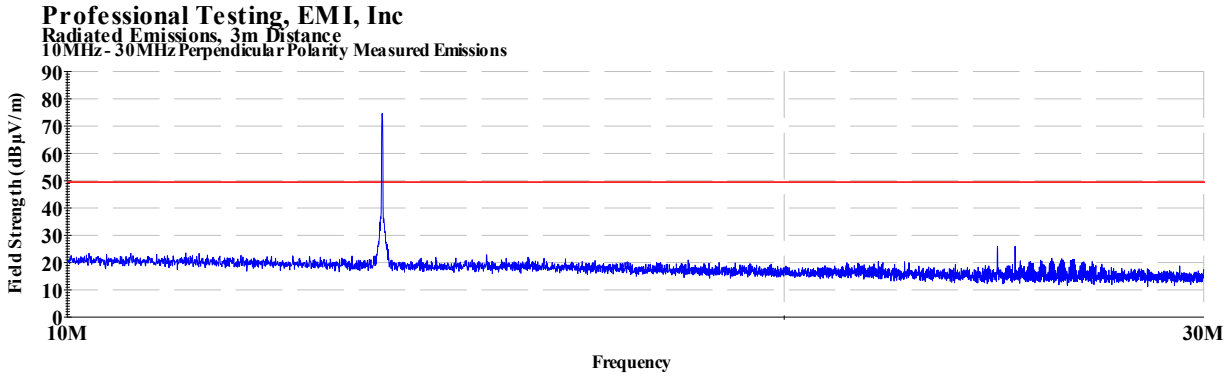


Result = Pass

Table 4.4.3: Out of Band Spurious Emissions Test Results, 10 MHz to 30 MHz, Perpendicular Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
13.56 MHz	Transmit	July 5, 2012	FCC B	10 m	Biconilog	9 kHz	9 kHz	Peak
COMMENT	Transmitting 13.56 MHz Harmonics and spurious investigated up to 1 GHz							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
24.5	3	82	1	Peak	19.3	25.8	49.5	-23.8
25	3	242	1	Peak	18.4	25.0	49.5	-24.5

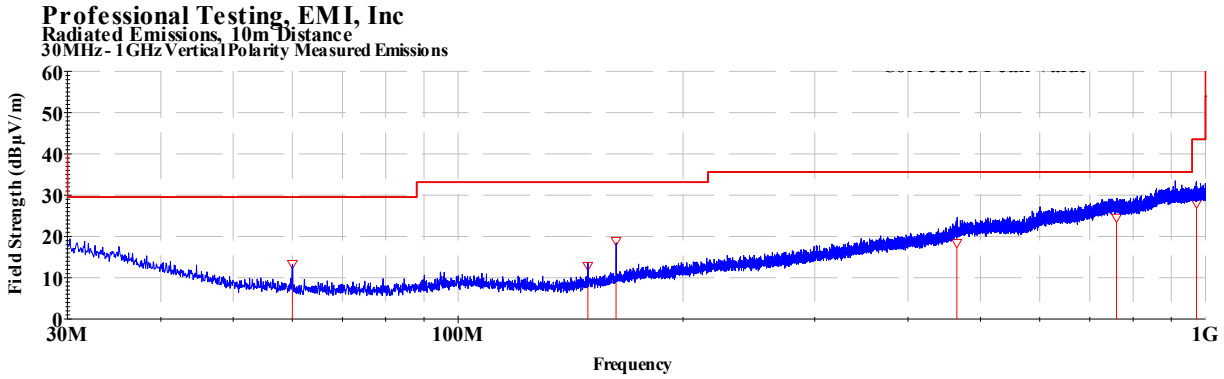


Result = Pass

Table 4.4.4: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Vertical Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
13.56 MHz	Transmit	July 5, 2012	FCC B	10 m	Biconilog	120 kHz	120 kHz	Quasi-peak
COMMENT	Transmitting 13.56 MHz Harmonics and spurious investigated up to 1 GHz							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
59.9942	10	16	4.08	Quasi-peak	30.4	13.3	29.5	-16.2
149.131	10	321	1.21	Quasi-peak	28.1	12.9	33.1	-20.2
162.706	10	6	1.21	Quasi-peak	33.1	18.9	33.1	-14.2
464.902	10	42	2.27	Quasi-peak	21.5	17.7	35.6	-17.9
760.191	10	213	3.07	Quasi-peak	20.6	23.8	35.6	-11.8
972.968	10	226	1.71	Quasi-peak	20.2	27.1	43.5	-16.4

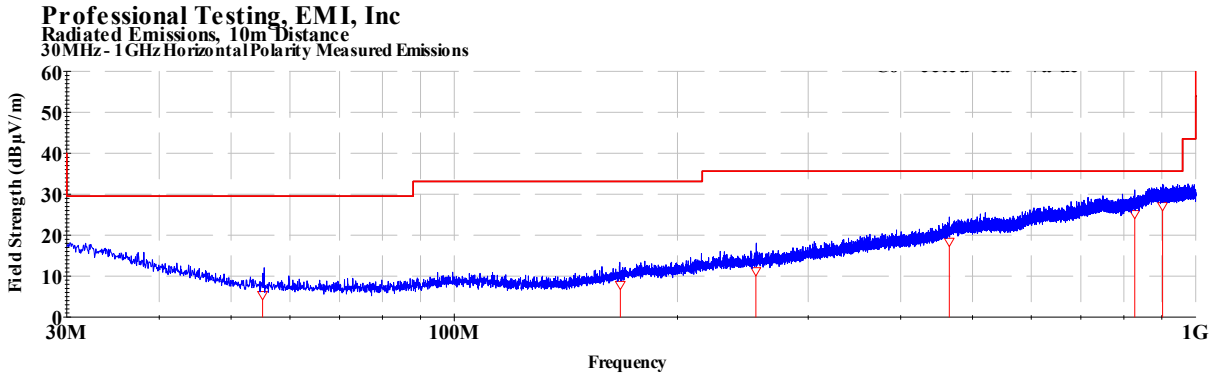


Result = Pass

Table 4.4.5: Receive Mode Radiated Emissions Test Results, 30 MHz to 1 GHz, Horizontal Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
N/A	Receive	July 5, 2012	FCC B	10 m	Biconilog	120 kHz	120 kHz	Quasi-peak
COMMENT	Receive Mode Harmonics and spurious investigated up to 1 GHz							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
55.1213	10	137	3.57	Quasi-peak	22	5.4	29.5	-24.1
167.439	10	143	1.27	Quasi-peak	21.6	7.9	33.1	-25.2
255.097	10	8	1.05	Quasi-peak	21.4	10.6	35.6	-25.0
465.039	10	62	3.11	Quasi-peak	21.4	17.6	35.6	-18.0
827.386	10	219	3.59	Quasi-peak	20.2	24.6	35.6	-11.0
901.912	10	74	3.61	Quasi-peak	20.4	26.4	35.6	-9.2



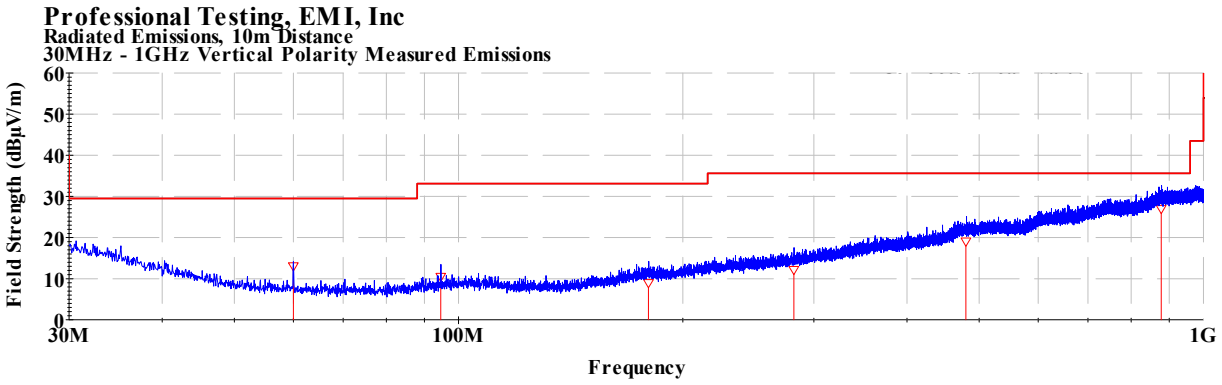
Result = Pass

Table 4.4.6: Receive Mode Radiated Emissions Test Results, 30 MHz to 1 GHz, Vertical Polarization

FREQUENCY	MODE	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
N/A	Receive	July 5, 2012	FCC B	10 m	Biconilog	120 kHz	120 kHz	Quasi-peak
COMMENT	Receive Mode Harmonics and spurious investigated up to 1 GHz							

`

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)
60.0076	10	102	4.07	Quasi-peak	30.1	13.0	29.5	-16.5
94.6378	10	20	1.38	Quasi-peak	26.4	10.5	33.1	-22.6
179.896	10	280	1.87	Quasi-peak	21.6	8.9	33.1	-24.2
281.897	10	259	1.18	Quasi-peak	21.4	11.4	35.6	-24.2
480.021	10	35	1.5	Quasi-peak	21.3	18.2	35.6	-17.4
877.814	10	245	2.38	Quasi-peak	20.4	26.3	35.6	-9.3



Result = Pass

5.0 Frequency Tolerance

Frequency tolerance measurements were performed on the EUT to determine compliance with FCC 15.225e.

5.1 Test Procedure

Frequency tolerance was measured with a spectrum analyzer connected to artificial antenna, near the transmitting antenna,while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. The EUT was placed in a temperature chamber while the measurement equipment was place outside.

The EUT was powered with a DC power supply. The temperature was adjusted to the min and max temperature while the transmitting frequency was inspected for anomalies.

5.2 Test Criteria

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.3 Test Equipment

Table 5.3.1: Test Equipment for Frequency Tolerance

Asset #	Manufacturer	Model #	Description	Calibration Due
Rental	Rhode &Scwartz	FSP	Spectrum Analyzer, 9 kHz - 30 GHz	12/22/2012
419	Thermotron	SM-32C	Chamber, Environmental Control	10/24/2012

5.4 Test Results

Frequency tolerancemeasurements were taken on July 5, 2012. The EUT was found to be in compliance

Temperature Variation

Temperature Conditions (°C)		Voltage Conditions (VDC)		Frequency Measured (MHz)	Frequency Drift (kHz)
normal	20°	normal	3	13.55920	
min	-20°	normal	3	13.55940	0.2
max	50°	normal	3	13.55920	0.0

Voltage Variation

Temperature Conditions (°C)		Voltage Conditions (VDC)		Frequency Measured (MHz)	Frequency Drift (kHz)
normal	20°	normal	3	13.55920	
normal	20°	min	2.55	13.55920	0.0
normal	20°	max	5.75	13.55920	0.0

6.0 Antenna Requirements

An antenna evaluation was performed on the EUTtodetermine compliance with FCC sections 15.203, 15.249(b) and RSS-210.

6.1 Evaluation Procedure

The design of the EUT antenna was evaluated for conformance to engineering requirements for gain and to prevent substitution of unapproved antennae. Gain of the antenna was assessed by reviewing the antenna manufacturer's data sheet.

6.2 Evaluation Criteria

The antenna design must meet at least one of the following criteria:

a) Antenna is permanently attached to the unit.
b) Antenna must use a unique type of connector to attach to the EUT.
c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

6.3 Evaluation Results

The DLP-RFID2 met the criteria of this rule by virtue of having an unique antenna connector to attach to the EUT.

End of Report

(This page intentionally left blank.)