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Test Report Number:	**ETRA90929, Rev. D**
Reference Standard:	**CFR Title 47, FCC Part 15, Subpart C, Section 15.249, RSS 210, Issue 7, June 2007**
Dates of Test:	**28 September through 3 November 2009**
Date of Report:	**25 March 2010**
Model Number:	**RFD21712 LMA**
Serial Number:	**Proto**
FCC ID#:	**XO6-DJ2MOD1**
IC ID#	**8558A-DJ2MOD1**
Manufacturer:	**danjuliodesigns LLC**
Representative:	**Dan Julio**
Report Type:	**Certification (Limited Modular Approval)**
Test Result:	**Compliant**
Approved By:	Vincent W. Bent

NVLAP LAB CODE 200737-0

Nemko ELA No. 215

FCC	BSMI	VCCI	MIC
319793 & 610588	SL2-IN-E-1134R	C-2697 R-2462	US0168

Prepared for:

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Customer Representative:

Dan Julio
Owner

Tested at:

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Tested by:

Kevin Johnson
EMC Test Engineer

Report Prepared by:

Mary Burback
Office Manager

Report Approved by:

Vincent Greb
Quality Manager

Revision	Description of Revision	Date:
Rev. -	Initial Release	18 December 2009
Rev. A	Implemented changes based on Nemko pre-review	25 January 2010
Rev. B	Implemented changes, per Nemko email request	28 January 2010
Rev. C	Changed product name from “LMA Test Fixture” to “RFD21712 LMA”, per Nemko request	11 February 2010
Rev. D	Implemented changes, per Nemko Canada review	25 March 2010

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LIST OF APPENDICES

Prefatory Notes

EMC Integrity is registered with both the Federal Communications Commission and Industry Canada, as follows:

FCC Registration Number: US5250
IC Registration Number: 7726A-1

1.0 SUMMARY OF TEST RESULTS

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with the Code of Federal Regulations, Title 47, Part 15, Subpart C, Section 15.249 as well as the standard for Industry Canada: RSS 210, Issue 7, June 2007. Radiated tests were performed in accordance with ANSI C63.4-2003, and were made in a 10-meter chamber which has been accredited by both NVLAP and Nemko for emissions testing.

The equipment under test complied with all applicable testing required for compliance with FCC Part 15.249, Subpart C and IC RSS 210, Issue 7 for intentional radiators. A summary of test results is shown in Table 1-1.

Table 1-1

Test	Description	FCC Part	RSS 210	Appendix	Result
Radiated Emissions*	Electric field emissions, 30 MHz to 25 GHz, EUT in Rx mode	15.109	Annex 2.9	A	Compliant
	Electric field emissions, 30 MHz to 25 GHz, EUT in Tx mode (low, mid & high)	15.209	Annex 2.9	B	Compliant
Field Strength, Fundamental	Measured magnitude of radiated field for fundamental. (The data for the harmonics may be found in Appendix D.)	15.249(a)	Annex 2.9	C	Compliant
20 dB Bandwidth	Radiated measurement to confirm 20 dB bandwidth (low, mid & high)	15.215(c)	RSS GEN: Bandwidth** 4.6	D	Compliant
Band-Edge	Radiated measurement to confirm that transmitter does not violate upper and lower band-edge limits (low and high)	15.249(d)	Annex 2.9	E	Compliant

*All radiated emission (RE) measurements from 30 MHz to 2 GHz were performed at a distance of 10 meters; FCC Part 15, Class B limits under 15.109 and limits under 15.209 are specified at 3 meters, and have been reduced by 10.5 dB (20 log (3/10)) to account for this. For any other RE measurements that were made at 10 meters, the limits have been adjusted accordingly.

** The RSS GEN referred to is the RSS-Gen Issue 2 June 2007.

2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Product Identification

The product tested was the RFD21712 LMA. The details of the main components which comprised the EUT are listed in Table 2-1.

Table 2-1

UUT Components			
Name	**Model No.**	**Manufacturer**	**Description**
Transmitter Module	nRF240L01+	RF Digital	Transmitter board (tested for compliance on test fixture for limited modular approval)
Interconnect Cable	E189529	VEGA	10 cm interconnect cable, 9-wire ribbon cable
Single Fixture TP Remote Control	PCB 20-0004-00	Danjuliodesigns, LLC	Remote control emulator board
Switch	N/A	N/A	On/off switch for test fixture
Batteries	AAA	Ray-O-Vac	Four AAA batteries connected in series to power test fixture

2.2 Samples Submitted for Assessment

As this is a limited modular approval, testing was performed on a test fixture which utilized the RF transmitter module built by RF Digital. The test platform consisted of a main PCB, which was the Single Fixture TP Remote Control. This was powered by four AAA batteries connected in series via an on/off switch. The battery was connected to the main PCB with a 10 cm cable assembly. In addition, the main PCB was connected to the RF transmitter board via a 10 cm ribbon cable.

The unit was tested this way so that the transmitter module might be used in multiple products. Thus, the limited modular approval.

2.3 Sample Description

The RFD21712 LMA was designed and built by danjuliodesigns, LLC. An accurate description of this device is given in Section 2.2 of this report.

2.4 Theory of Operation

The RFD21712 LMA emulates the operation of lighting controls designed and built by danjuliodesigns, LLC. As such, it generates up to four channels of intensity modulation signals and optionally provides power to LED lighting fixtures. This product contains intelligence for managing address decode, command processing, color space interpolation and color space transformation. The interface is achieved using a radio transceiver which operates in the 2.40 to 2.4835 GHz band.

2.5 Technical Specfications of EUT

Frequency:	2,400 – 2,483.5 MHz
FCC compliance:	Part 15.249 (unlicensed)
Temperature:	0 - 50C operating (23 - 122 F) -20 - 60C storage (-4 - 140 F)
Humidity:	5-100% relative humidity (condensing)
Power:	6 Vdc, 0.05A Max
Dimensions:	7.23 x 13.03 x 2.81 cm (2.845" x 5.130" x 1.107")
Weight:	3 oz / 85 gm

3.0 TEST CONDITIONS

3.1 Specifications

This apparatus was assessed against the following specifications:

CFR Title 47, FCC Part 15, Subpart C, Section 15.249 for operation of digitally modulated transmitters in the 2,400 – 2,483.5 MHz range.

3.2 Deviations from Laboratory Test Procedures

None.

3.3 Test Environment

Temperature:	21 degrees Celsius (=/- 2 degrees)
Relative Humidity:	19% (+/-3%)
Barometric Pressure:	837 mbars (+/-5%)
Voltage:	120 Vac/60 Hz (nominal)

It should be noted that testing was performed with new batteries.

3.4 Test Equipment

The test equipment used for each test is given as the last page of the test data sheet. All test data is contained in the appropriate appendix of this report.

4.0 OBSERVATIONS

4.1 Modifications Performed During Assessment

No modifications were required for compliance.

4.2 Record of Technical Judgments

No technical judgments were made during the assessment.

4.3 EUT Parameters Affective Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Test Deleted

No tests were deleted from this assessment.

4.5 Comments

There were no additional observations made during this assessment.

5.0 DESCRIPTION OF TEST METHODS

5.1 Radiated E-field Emissions

Radiated emissions testing was performed at a distance of 10-meters in a semi-anechoic 10-meter chamber. This chamber is calibrated annually and meets the volumetric site attenuation requirements of ANSI C63.4: 2003. For measurements from 30 MHz to 1 GHz, a biconilog antenna is used in conjunction with a high-gain, low-noise preamplifier. This is connected to an HP 8566B spectrum analyzer with an HP 85650A Quasi-Peak (QP) Adapter, via an HP 85685 RF Preselector. A notch filter is used to notch out the transmitter for the Tx-low, -mid and –high measurements.

Radiated emissions testing is broken into two parts: pre-scan and QP/maximization. Pre-scanning a product from 30 MHz to 2 GHz consists of measuring peak emissions from eight radials (every 45 degrees), at four antenna heights (1 m, 2 m, 3 m and 4 m) for both antenna polarities. Data is recorded in a graph showing amplitude vs. frequency of the emissions, and frequencies for QP/maximization are chosen based on this graph. The procedure for maximizing emissions is as follows:

1. The analyzer is tuned to the frequency associated with the emissions having the least margin.
2. The turntable and antenna mast are moved to the location where the maximum emission was measured during the pre-scan.
3. Both are then oriented such that the maximum emission is obtained.
4. Cables on the UUT are manually manipulated to achieve the maximum emission.
5. The turntable and antenna mast are then re-adjusted to ensure a maximum reading.
6. If the signal in question is less than 1 GHz, quasi-peak detection is performed on the signal for a minimum of 10 seconds. For signals greater than 1 GHz, video averaging is performed.
7. Turntable/antenna mast maximization and QP detection are performed on all other signals within 6 dB of the limit. In the event that there are not six signals within 6 dB of the limit, the highest six signals are maximized. This ensures that a minimum of six signals are maximized and appear in the final data table.

For emission measurements above 2 GHz, the antenna is changed to a double-ridged horn equipped with a preamplifier and run directly into the spectrum analyzer. The QP adapter and RF preselector are not used above 1 GHz. Measurements on the fundamental transmit frequency are performed with the preamplifier removed. In order to measure the magnitude of the harmonics, the fundamental is notched out so that it does not drive the amplifier into compression.

Pre-scanning a product from 2-18 GHz is performed using a 3-meter separation. In addition, the pre-scan consists of 16 radials (every 22.5 degrees) and three antenna heights (1 m, 1.5 m and 2 m). A similar maximization process is used as for the lower frequency range with two major exceptions. First, average measurements are performed, rather than QP measurements and

second, a boresight fixture is installed to ensure the EUT is within the beamwidth of the horn antenna.

For measurements from 18-25 GHz, a 1-meter separation is used. In the event that any signals are detected, these are compared to the 3-meter limits. If these signals maximize under the 3-meter limits, they are taken. In the event that a signal was to maximize above the 3-meter limit, the measurement would be repeated using a 3-meter separation.

5.2 20 dB Bandwidth

For this measurement, the antenna is placed at a distance of 10 meters from the UUT. For these measurements, the standard 1-18 GHz preamplifier was used, but with a 20 dB attenuator placed in front of it (i.e., between the antenna output and the preamplifier input) to keep the power of the fundamental frequency from driving the preamp into compression.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest frequency, its highest frequency and a frequency that is roughly in the middle of its transmit band. The peak of the signal is identified using the "peak search" function and this amplitude is noted. The "delta marker" function is then used as Marker 1 is tuned to the 20 dB down point on the low side of the waveform and Marker 2 is tuned to the 20 dB down point on the high side of the waveform. The 20 dB bandwidth is simply the distance between these two markers, and this number is then compared against the requirement to determine compliance.

5.3 Band-Edge Measurement

For this measurement, the antenna is placed at a distance of 10 meters from the UUT. For these measurements, the standard 1-18 GHz preamplifier was used, but with a 20 dB attenuator placed in front of it (i.e., between the antenna output and the preamplifier input) to keep the power of the fundamental frequency from driving the preamp into compression.

The analyzer settings are shown on each plot and the EUT is configured to transmit at its lowest and highest frequency to determine whether or not the emissions at the boundary of the specific frequency band is within acceptable limits.

6.0 STATEMENT OF MEASUREMENT UNCERTAINTY

6.1 Measurement Uncertainty

The measurement uncertainty for EMC Integrity's emissions test facility complies with the requirements defined in CISPR 16. The complete calculations of EMC Integrity's measurement uncertainty is contained in an EMCI memo, which is available upon request. However, a summary of EMCI's measurement uncertainty is given in Table 2-1.

Table 7-1

Test	Requirement	Actual
Conducted Emissions	3.60 dB	3.04 dB
Radiated Emissions – Horizontal Polarity	5.20 dB	4.67 dB
Radiated Emissions – Vertical Polarity	5.20 dB	5.01 dB

APPENDIX A

Radiated Emissions, Rx Mode, Part 15.109

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90930
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	November 3, 2009
Temperature:	22˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	Margin: FCC Class B AV (dB)
QP	30.967	31.2	21.4	-30.4	22.1	164/V-Pole/1.00	7.42	-
QP	39.064	25.1	15.3	-30.7	9.8	59/V-Pole/1.43	19.78	-
QP	45.186	36.3	11.1	-30.6	16.7	40/V-Pole/1.00	12.81	-
QP	78.732	42.6	8.3	-30.8	20.1	135/V-Pole/3.63	9.43	-
QP	87.711	40.9	7.8	-31.0	17.7	144/V-Pole/3.79	11.84	-
QP	73.135	39.4	8.4	-30.7	17.0	150/V-Pole/2.30	12.56	-
QP	199.644	30.7	13.3	-30.7	13.3	182/V-Pole/1.00	19.70	-
QP	105.513	34.4	11.6	-30.7	15.4	317/H-Pole/4.00	17.66	-
AV	2857.045	80.6	30.0	-66.0	44.6	206/V-Pole/1.00	-	9.27

The highest emission measured was at **30.967MHz,** which was **7.42 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 120kHz, VBW is 3 MHz
  - QP = Quasi-Peak Measurement: RBW is 120kHz, VBW is 3 MHz, and QP Detection is ENABLED
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- The PRESCAN is a peak measurement and is performed with the RBW set to 120 kHz, VBW set to 3 MHz (30 MHz to 1 GHz), and the RBW set to 1 MHz, VBW set to 100 kHz (> 1 GHz)

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90930
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	November 3, 2009

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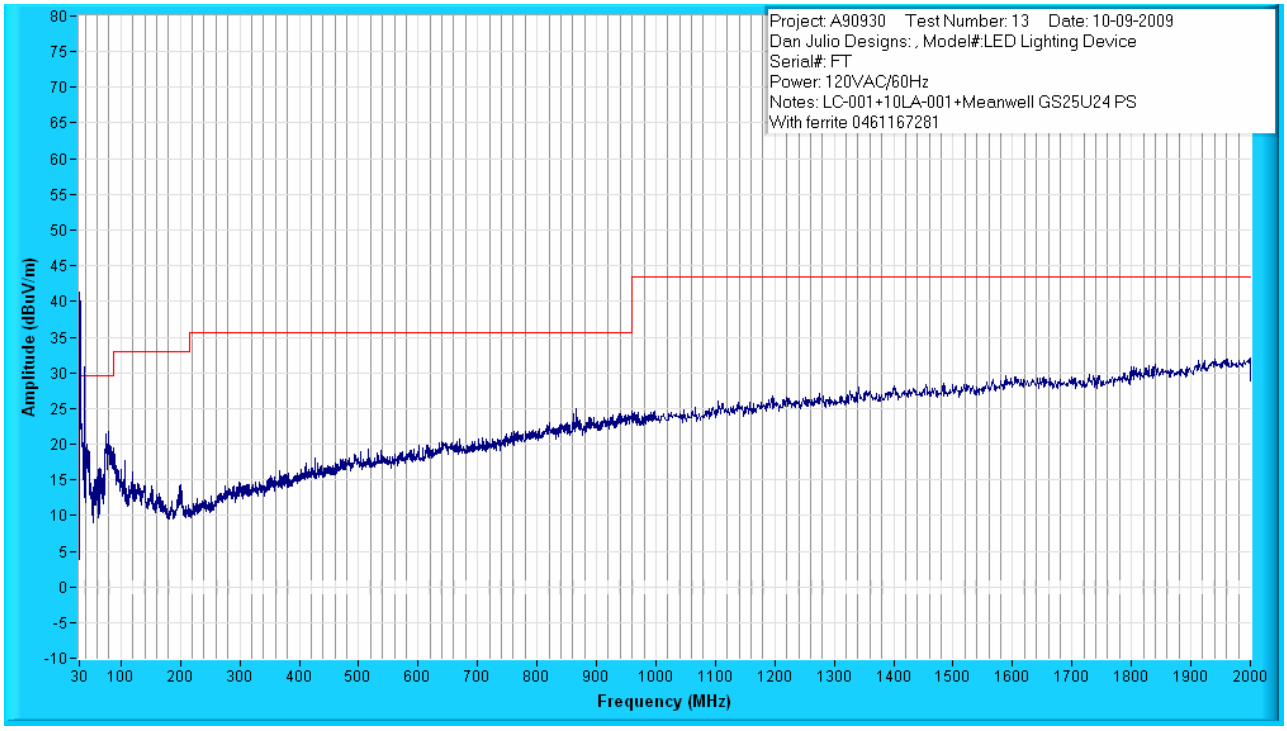

Figure A1: Radiated Emissions Exploratory Measurement, 30MHz to 2000MHz, Rx Mode, Peak Measurement at 10m Distance

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90930
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	November 3, 2009

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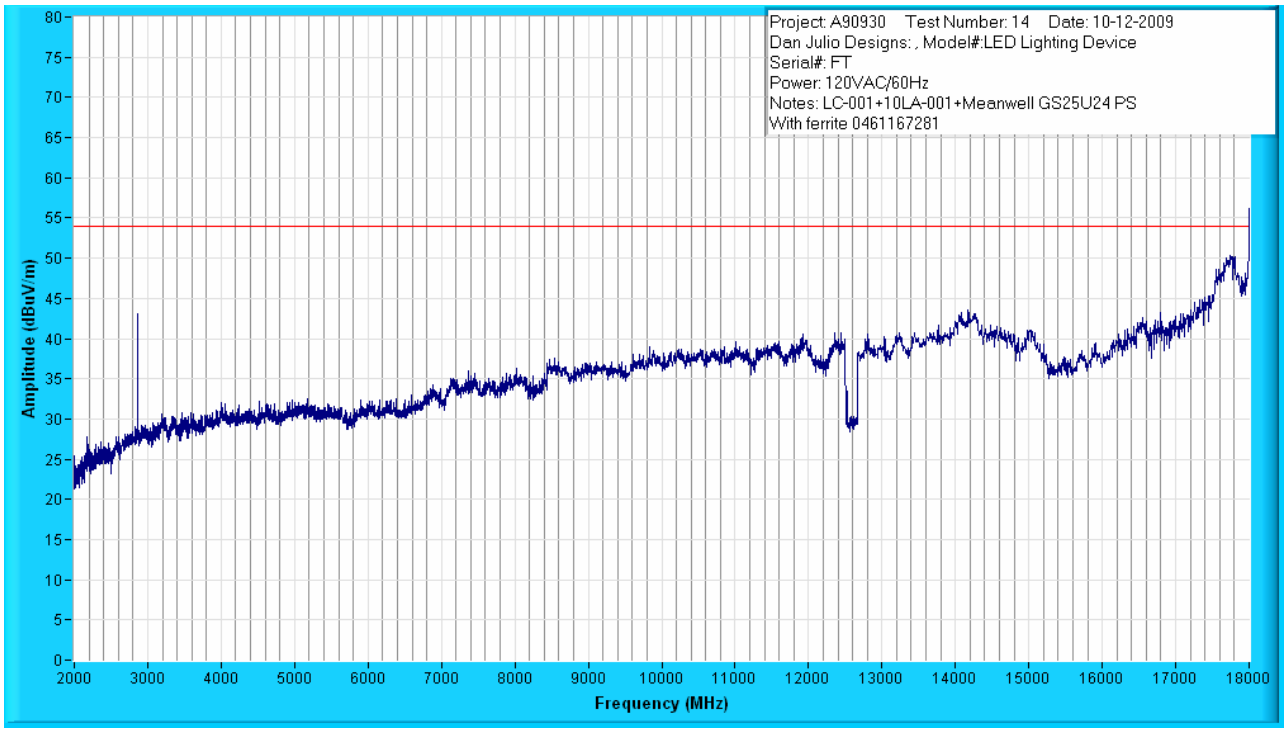

Figure A2: Radiated Emissions Exploratory Measurement, 2GHz to 18GHz, Peak Measurements at 3m Distance

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90930
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	November 3, 2009

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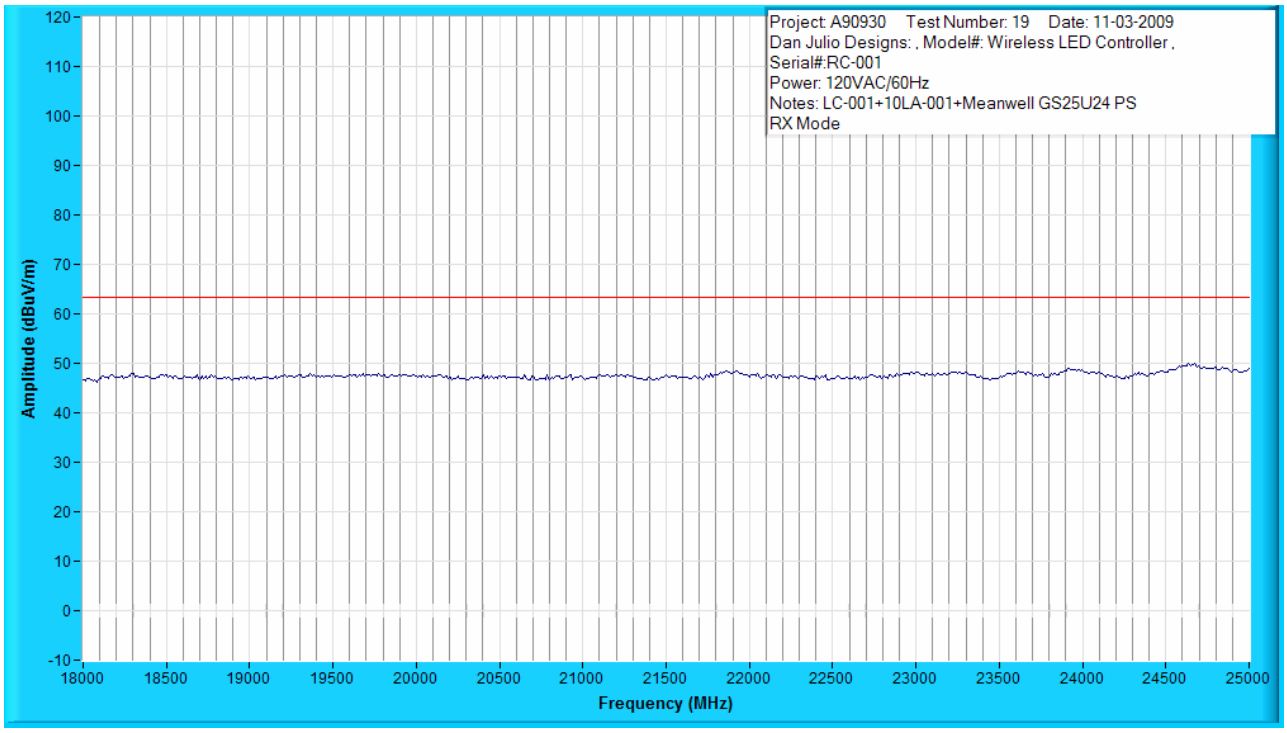

Figure A3: Radiated Emissions Exploratory Measurement, 18GHz to 25GHz, Peak Measurements at 1m Distance

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90930
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	November 3, 2009

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1045	Hewlett Packard	8566B	2403A08106	Spectrum Analyzer Display	04/29/2009	04/29/2010
1046	Hewlett Packard	8566B	2430A00988	Spectrum Analyzer with 2403A08106	04/29/2009	04/29/2010
1133	Sorenson	XTD12	4561	Dual Output DC Power Supply	NA	NA
1196	EMCO	3115	00028256	DRG Horn 1-18 GHz	06/08/2009	06/08/2010
1197	EMCO	3116	00040962	DRG Horn 18-40 GHz	08/06/2009	08/06/2010
1208	Extech	115715	252868	Hygro-Thermometer	06/05/2009	06/05/2010
1215	Hewlett Packard	8564E	3943A01645	9kHz-40GHz Portable Spectrum Analyzer	05/21/2009	05/21/2010
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	03/30/2009	03/30/2010
1231	Sunol Sciences	JB1	A071605-1	Bilog Antenna, 30 MHz to 2.0 GHz	11/12/2009	11/12/2010
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	10/18/2009	10/18/2010
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1253	Narda West	1840N506	010-100	18 to 40 GHz Preamplifier, 40dB Gain Nominal	12/26/2008	12/26/2009
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	12/23/2008	12/23/2009
1266	California Instruments	MX15-1	57961	AC Power Source, 0 - 300 VAC / 16 - 819 Hz / 15kVA	NA	NA
1276	Narda	DBL-0218N308	037-038	1GHz to 18GHz Preamplifier, 60dB gain nominal	04/24/2009	04/24/2010

APPENDIX B

Radiated Emissions, Tx Mode, Part 15.209

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009
Temperature:	21˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

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Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	Margin: FCC Class B AV (dB)
QP	33.174	26.6	19.8	-30.5	15.9	160/H-Pole/3.27	13.66	-
QP	48.217	30.4	9.7	-30.6	9.5	9/H-Pole/3.47	20.08	-
QP	58.204	33.2	7.5	-30.6	10.1	45/V-Pole/1.59	19.42	-
QP	76.992	34.8	8.3	-30.8	12.3	134/V-Pole/2.73	17.20	-
QP	105.485	34.8	11.6	-30.7	15.8	228/H-Pole/3.63	17.25	-
QP	138.809	27.0	13.8	-30.6	10.3	13/H-Pole/4.00	22.78	-
QP	191.317	26.6	11.7	-30.6	7.8	153/H-Pole/3.87	25.25	-
QP	199.638	35.0	13.3	-30.7	17.6	309/V-Pole/1.00	15.44	-
AV	4803.510	74.5	33.5	-62.8	45.3	111/V-Pole/1.32	-	8.62
AV	7205.300	68.2	36.9	-60.8	44.3	231/H-Pole/1.19	-	9.61
AV	9607.047	76.5	38.3	-61.6	53.2	134/V-Pole/1.33	-	0.69

The highest emission measured was at **0.69 MHz,** which was **9607.047 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 120kHz, VBW is 3 MHz
  - QP = Quasi-Peak Measurement: RBW is 120kHz, VBW is 3 MHz, and QP Detection is ENABLED
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- The PRESCAN is a peak measurement and is performed with the RBW set to 120 kHz, VBW set to 3 MHz (30 MHz to 1 GHz), and the RBW set to 1 MHz, VBW set to 100 kHz (> 1 GHz)

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

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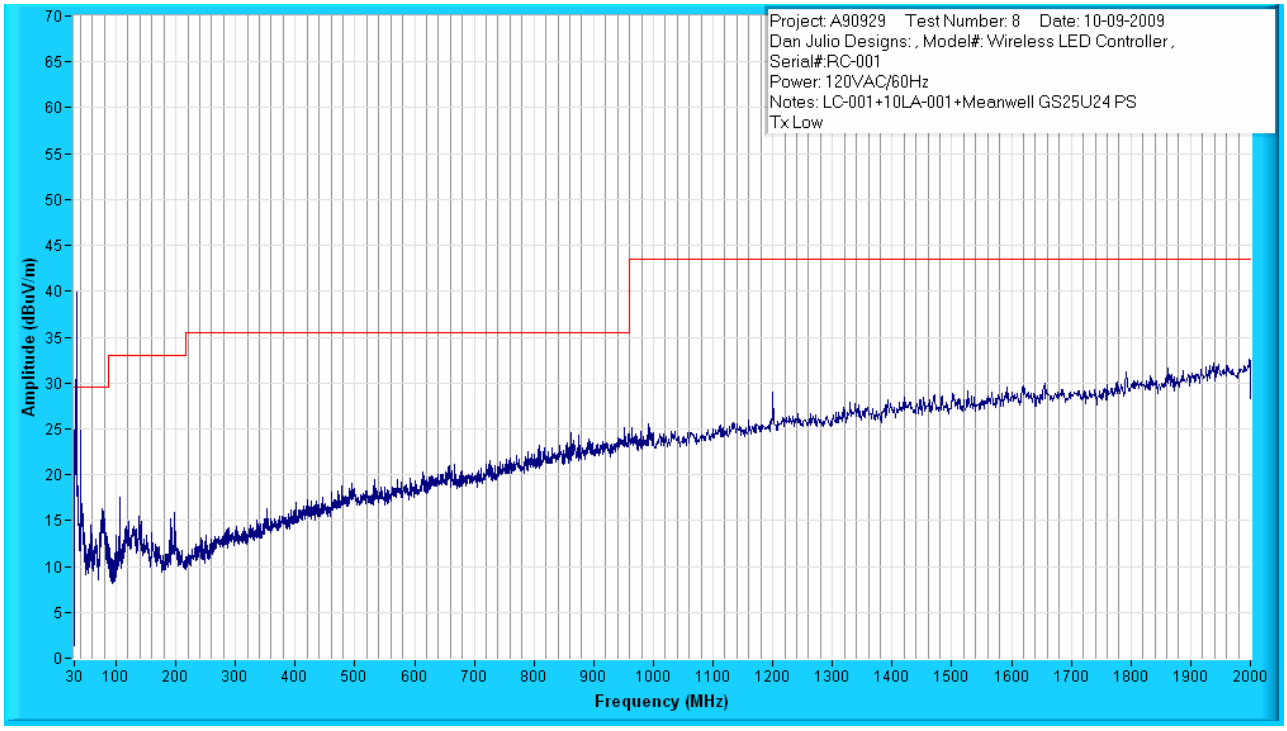

Figure B1: Radiated Emissions Exploratory Measurement, 30MHz to 2000MHz, Tx Low, Peak Measurements at 10m Distance

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

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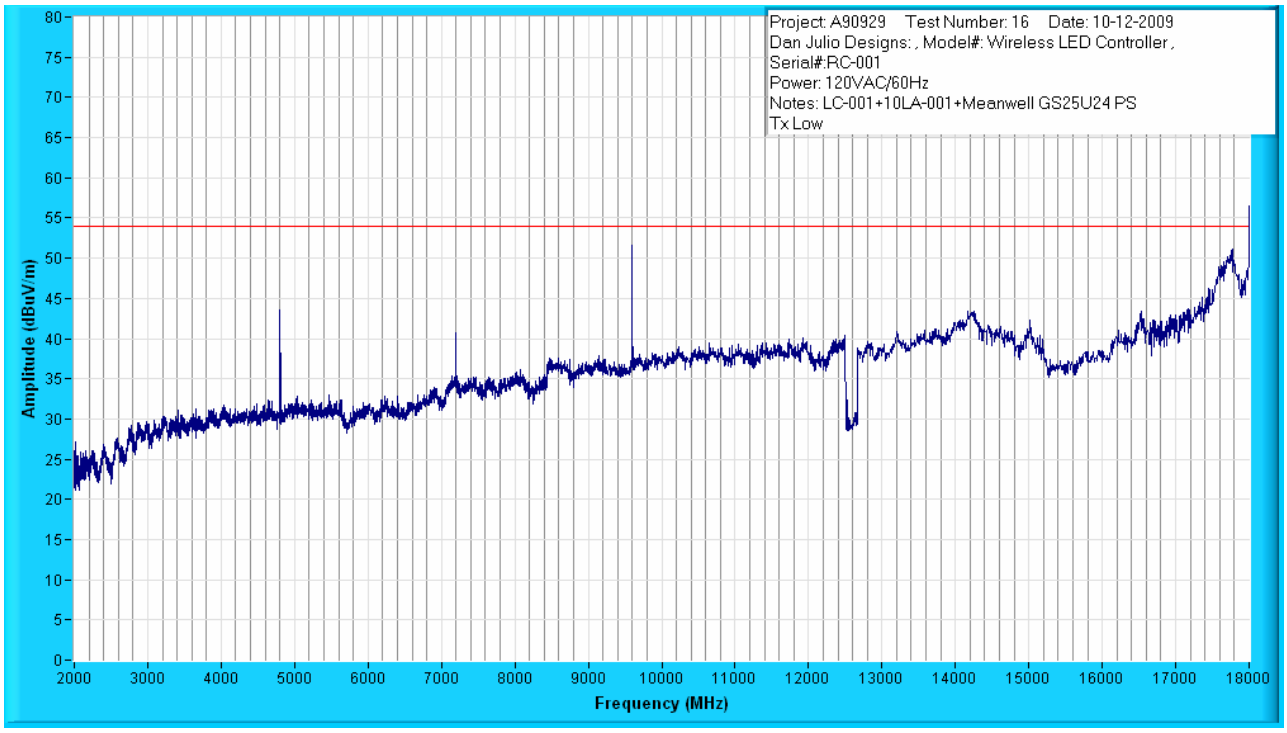

Figure B2: Radiated Emissions Exploratory Measurement, 2GHz to 18GHz, Tx Low, Peak Measurements at 3m Distance

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Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

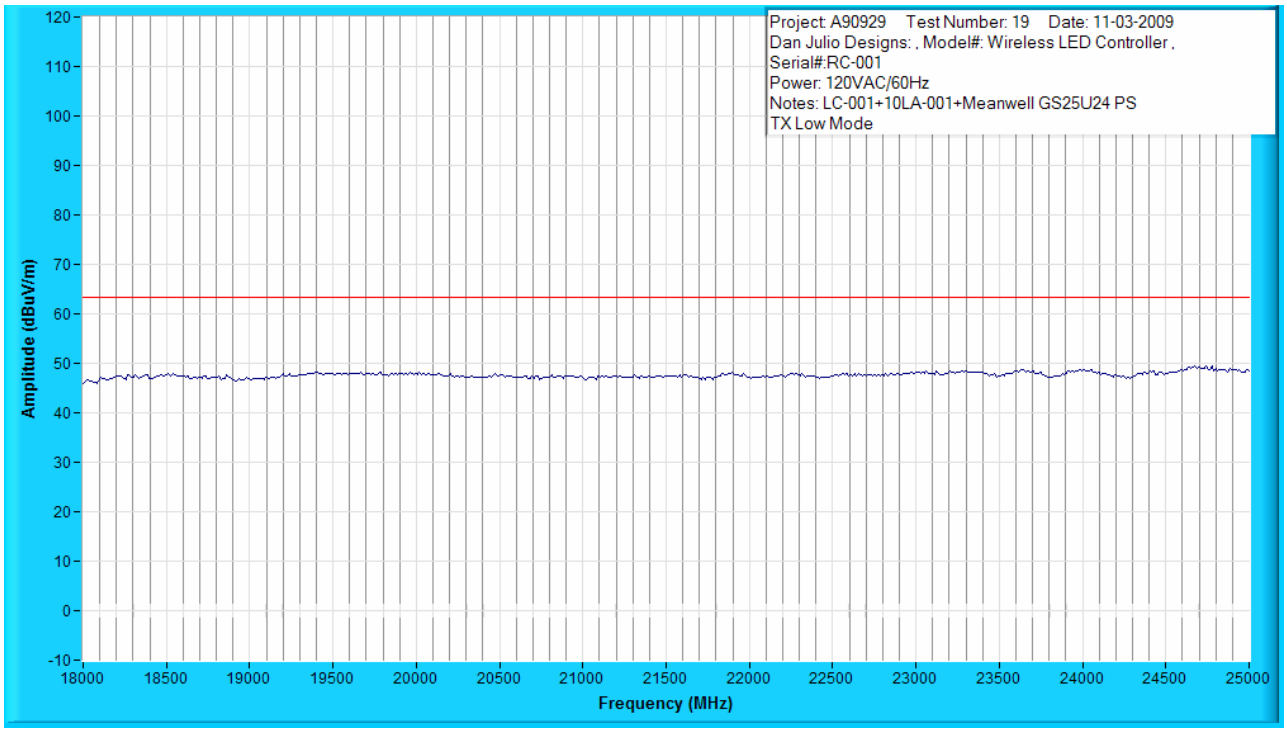

Figure B3: Radiated Emissions Exploratory Measurement, 18GHz to 25GHz, Tx Low, Peak Measurements at 1m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009
Temperature:	22˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

A90929-22-RE.doc FR0100

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	Margin: FCC Class B AV (dB)
QP	30.204	28.9	21.9	-30.4	20.5	235/V-Pole/1.00	9.06	-
QP	42.849	32.0	12.7	-30.7	14.0	20/V-Pole/1.00	15.59	-
QP	78.931	35.2	8.2	-30.8	12.7	124/V-Pole/3.47	16.87	-
QP	105.492	34.2	11.6	-30.7	15.2	340/V-Pole/1.80	17.88	-
QP	116.118	26.7	13.6	-30.6	9.7	20/H-Pole/3.20	23.32	-
QP	129.906	26.7	14.3	-30.5	10.5	290/H-Pole/2.57	22.56	-
QP	138.583	26.9	13.8	-30.6	10.2	20/H-Pole/2.95	22.86	-
QP	198.808	35.2	13.1	-30.7	17.7	290/V-Pole/1.38	15.35	-
AV	4899.530	75.2	33.8	-62.5	46.5	112/V-Pole/1.28	-	7.37
AV	7349.309	68.5	37.2	-61.1	44.6	224/H-Pole/1.56	-	9.33
AV	9799.080	74.2	38.6	-61.4	51.4	230/H-Pole/1.71	-	2.48

The highest emission measured was at **9799.080 MHz,** which was **2.48 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 120kHz, VBW is 3 MHz
  - QP = Quasi-Peak Measurement: RBW is 120kHz, VBW is 3 MHz, and QP Detection is ENABLED
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- The PRESCAN is a peak measurement and is performed with the RBW set to 120 kHz, VBW set to 3 MHz (30 MHz to 1 GHz), and the RBW set to 1 MHz, VBW set to 100 kHz (> 1 GHz)

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

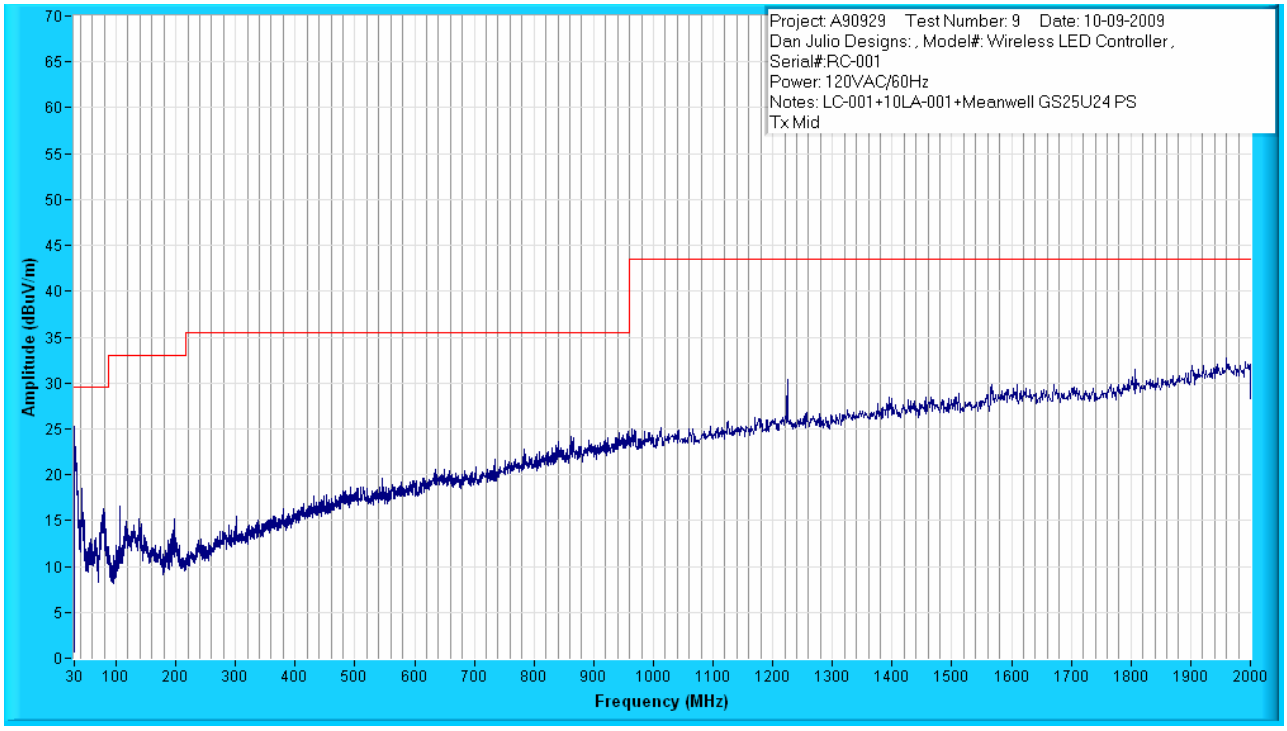

Figure B4: Radiated Emissions Exploratory Measurement, 30MHz to 2000MHz, Tx Mid, Peak Measurements at 10m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

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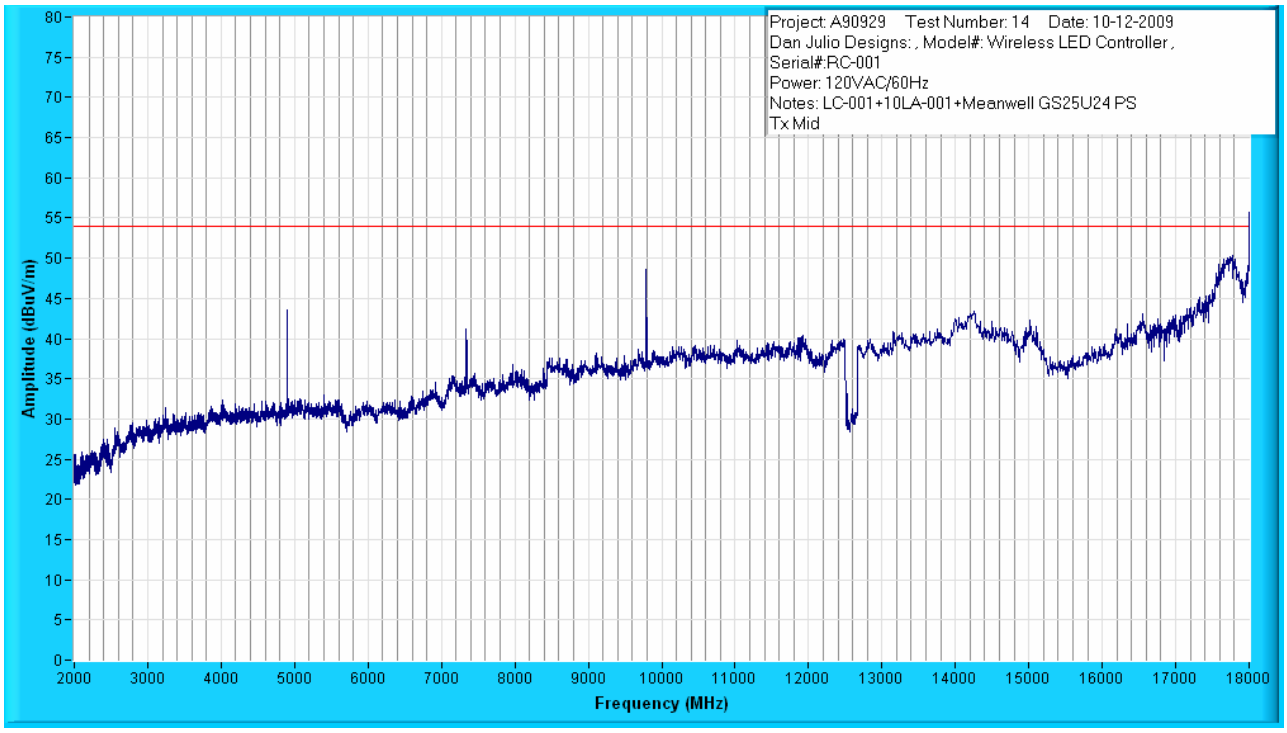

Figure B5: Radiated Emissions Exploratory Measurement, 2GHz to 18GHz, Tx Mid, Peak Measurements at 3m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

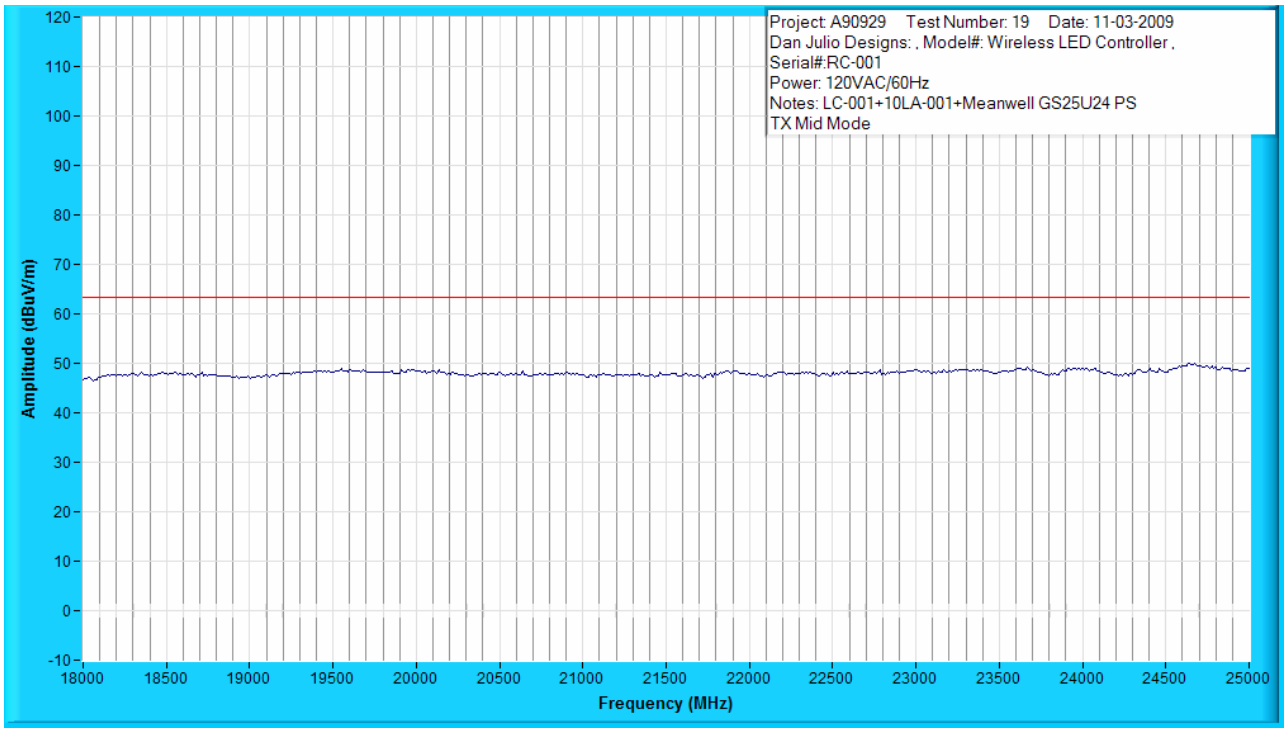

Figure B6: Radiated Emissions Exploratory Measurement, 18GHz to 25GHz, Tx Mid, Peak Measurements at 1m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009
Temperature:	22˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

A90929-22-RE.doc FR0100

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	Margin: FCC Class B QP (dB)	Margin: FCC Class B AV (dB)
QP	30.090	29.2	22.0	-30.4	20.9	210/V-Pole/1.00	8.66	-
QP	42.572	31.6	12.9	-30.7	13.8	16/V-Pole/1.00	15.78	-
QP	65.203	32.3	8.0	-30.7	9.7	158/V-Pole/2.09	19.87	-
QP	79.218	34.9	8.2	-30.8	12.4	135/V-Pole/2.86	17.18	-
QP	102.351	31.4	10.8	-30.7	11.5	20/V-Pole/3.13	21.56	-
QP	105.482	33.8	11.6	-30.7	14.7	152/H-Pole/3.28	18.33	-
QP	144.003	33.8	13.3	-30.6	16.5	9/H-Pole/3.05	16.55	-
QP	197.962	31.6	13.0	-30.7	13.9	99/V-Pole/1.00	19.14	-
AV	2836.467	65.3	29.9	-66.0	29.3	184/V-Pole/1.77	54	24.63
AV	4959.546	70.8	33.9	-62.3	42.3	267/V-Pole/1.34	54	11.56
AV	7439.333	70.5	37.4	-61.3	46.6	252/H-Pole/1.85	54	7.30
AV	9919.086	75.2	38.8	-61.0	52.9	222/V-Pole/1.00	54	0.96

The highest emission measured was at **9919.086 MHz,** which was **0.96 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 120kHz, VBW is 3 MHz
  - QP = Quasi-Peak Measurement: RBW is 120kHz, VBW is 3 MHz, and QP Detection is ENABLED
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- The PRESCAN is a peak measurement and is performed with the RBW set to 120 kHz, VBW set to 3 MHz (30 MHz to 1 GHz), and the RBW set to 1 MHz, VBW set to 100 kHz (> 1 GHz)

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

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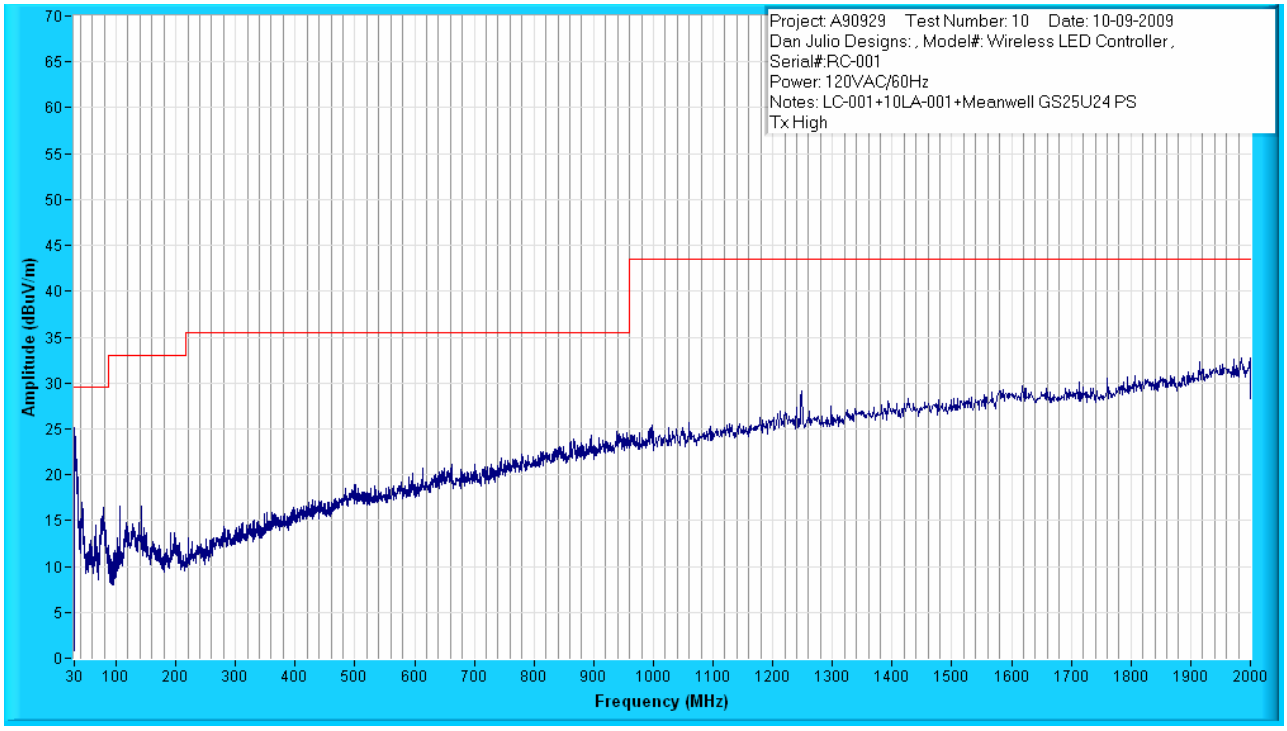

Figure B7: Radiated Emissions Exploratory Measurement, 30MHz to 2000MHz, Tx High, Peak Measurements at 10m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

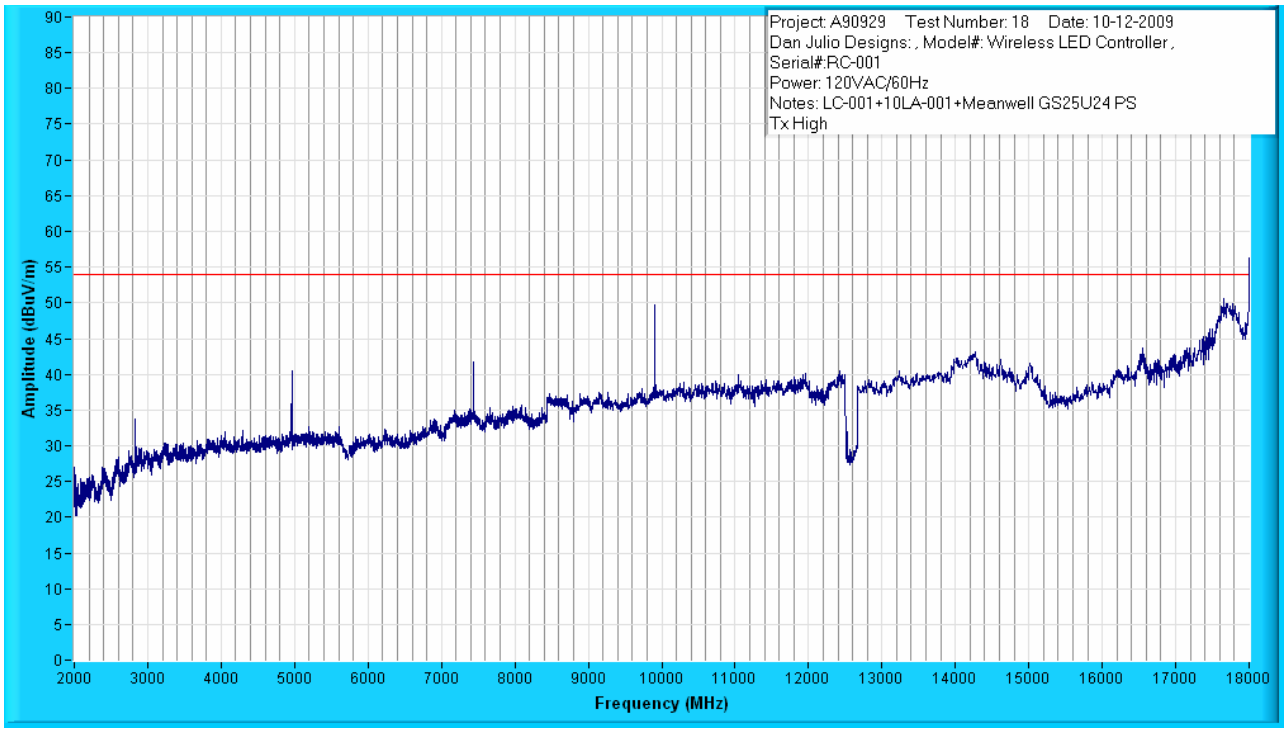

Figure B8: Radiated Emissions Exploratory Measurement, 2GHz to 18GHz, Tx High, Peak Measurements at 3m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

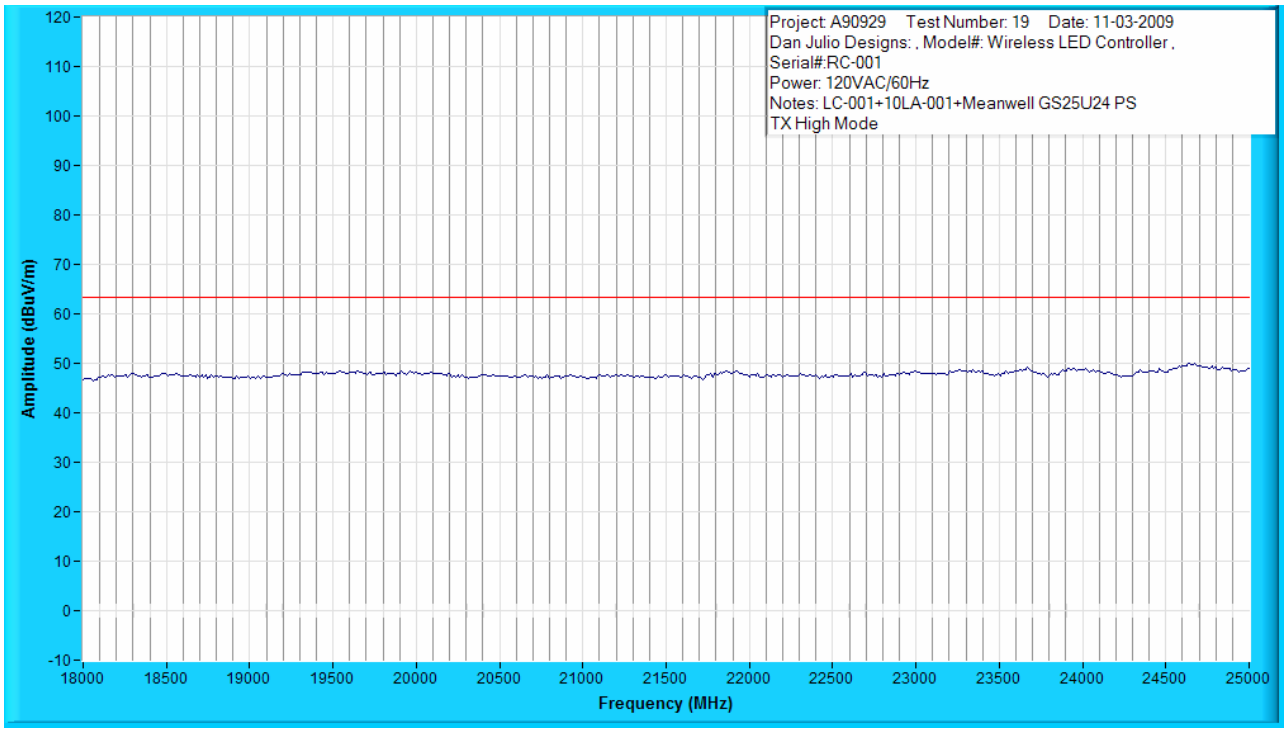

Figure B9: Radiated Emissions Exploratory Measurement, 18GHz to 25GHz, Tx High, Peak Measurements at 1m Distance

emc integrity incorporated

Radiated Emissions, FCC

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	November 3, 2009

A90929-22-RE.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1045	Hewlett Packard	8566B	2403A08106	Spectrum Analyzer Display	04/29/2009	04/29/2010
1046	Hewlett Packard	8566B	2430A00988	Spectrum Analyzer with 2403A08106	04/29/2009	04/29/2010
1196	EMCO	3115	00028256	DRG Horn 1-18 GHz	06/08/2009	06/08/2010
1197	EMCO	3116	00040962	DRG Horn 18-40 GHz	08/06/2009	08/06/2010
1215	Hewlett Packard	8564E	3943A01645	9kHz-40GHz Portable Spectrum Analyzer	05/21/2009	05/21/2010
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	03/30/2009	03/30/2010
1229	Hewlett Packard	85685A	3010A01077	RF Preselector	06/11/2009	06/11/2010
1231	Sunol Sciences	JB1	A071605-1	Bilog Antenna, 30 MHz to 2.0 GHz	11/12/2009	11/12/2010
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	10/18/2009	10/18/2010
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1253	Narda West	1840N506	010-100	18 to 40 GHz Preamplifier, 40dB Gain Nominal	12/26/2008	12/26/2009
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	12/23/2008	12/23/2009
1266	California Instruments	MX15-1	57961	AC Power Source, 0 - 300 VAC / 16 - 819 Hz / 15kVA	NA	NA

APPENDIX C

Field Strength, Fundamental & Harmonics, Part 15.249(a)

emc integrity incorporated

Radiated Emissions, FCC Part 15.249(a)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	28 September 2009
Temperature:	21˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

A90929-22-RE.doc FR0100

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol/ Hgt(m)	FCC 15.249. Limit @ 3 meters (dBuV/m)	Margin: FCC 15.249 Limit @ 3 meters (dB)
PK	2401.766	52.8	28.6	2.6	84.0	93/V-Pole/2.42	114 (Peak)	30.0
AV	2401.766	50.4	28.6	2.6	81.6	93/V-Pole/2.42	94 (Average)	12.4
Transmit Fundamental Low								
PK	2449.774	52.3	28.7	2.6	83.6	90/H-Pole/2.16	114 (Peak)	30.4
AV	2449.774	49.1	28.7	2.6	80.5	90/H-Pole/2.16	94 (Average)	13.5
Transmit Fundamental Mid								
PK	2479.753	51.0	28.8	2.6	82.4	74/V-Pole/2.47	114 (Peak)	31.6
AV	2479.753	47.1	28.8	2.6	78.4	74/V-Pole/2.47	94 (Average)	15.5
Transmit Fundamental High								

The highest fundamental emission measured was at **2401.766 MHz**. The minimum margin was for the average measurement, which was **12.4 dB** below the limit. (It should be noted that the *peak* reading was below the *average* limit.)

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 1 MHz, VBW is 3 MHz
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.

emc integrity incorporated

Radiated Emissions, FCC Part 15.249(a)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	28 September 2009
Temperature:	21˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol /Hgt(m)	FCC 15.249. Limit @ 3 meters (dBuV/m)	Margin: FCC 15.249 Limit @ 3 meters (dB)
PK	2836.467	68.2	29.9	-66.0	32.2	184/V-Pole/1.77	74	41.8
AV	2836.467	65.3	29.9	-66.0	29.3	184/V-Pole/1.77	54	24.63
PK	4959.546	72.6	33.9	-62.3	44.1	267/V-Pole/1.34	74	29.9
AV	4959.546	70.8	33.9	-62.3	42.3	267/V-Pole/1.34	54	11.56
PK	7439.333	73.7	37.4	-61.3	49.8	252/H-Pole/1.85	74	24.2
AV	7439.333	70.5	37.4	-61.3	46.6	252/H-Pole/1.85	54	7.30
PK	9919.086	77.3	38.8	-61.0	55.0	222/V-Pole/1.00	74	19.0
AV	9919.086	75.2	38.8	-61.0	52.9	222/V-Pole/1.00	54	0.96

The highest harmonic emission measured was at **9919.086 MHz**. The minimum margin was for the average measurement, which was **0.96 dB** below the limit. (It should be noted that no harmonics could be measured above 9919 MHz.)

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 1 MHz, VBW is 3 MHz
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log.
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.

emc integrity incorporated

Radiated Emissions, FCC Part 15.249(a)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	28 September 2009

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Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1045	Hewlett Packard	8566B	2403A08106	Spectrum Analyzer Display	04/29/2009	04/29/2010
1046	Hewlett Packard	8566B	2430A00988	Spectrum Analyzer with 2403A08106	04/29/2009	04/29/2010
1196	EMCO	3115	00028256	DRG Horn 1-18 GHz	06/08/2009	06/08/2010
1197	EMCO	3116	00040962	DRG Horn 18-40 GHz	08/06/2009	08/06/2010
1215	Hewlett Packard	8564E	3943A01645	9kHz-40GHz Portable Spectrum Analyzer	05/21/2009	05/21/2010
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	03/30/2009	03/30/2010
1229	Hewlett Packard	85685A	3010A01077	RF Preselector	06/11/2009	06/11/2010
1231	Sunol Sciences	JB1	A071605-1	Bilog Antenna, 30 MHz to 2.0 GHz	11/12/2009	11/12/2010
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	10/18/2009	10/18/2010
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1253	Narda West	1840N506	010-100	18 to 40 GHz Preamplifier, 40dB Gain Nominal	12/26/2008	12/26/2009
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	12/23/2008	12/23/2009

APPENDIX D

20 dB Bandwidth, Part 15.215(c)

emc integrity incorporated

20 dB Bandwidth, FCC Part 15.215(c)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009
Temperature:	22˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Transmitting low, middle and high		
Test Engineer:	Kevin Johnson		

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Frequency Range	20 dB Bandwidth Measurement
Low-band	520 kHz
Mid-Band	474 kHz
High-band	486 kHz

Conclusion: **" …the 20dB bandwidth of the emission…is contained within the frequency band designated in the rule section under which the equipment is operated."**

emc integrity incorporated

20 dB Bandwidth, FCC Part 15.215(c)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

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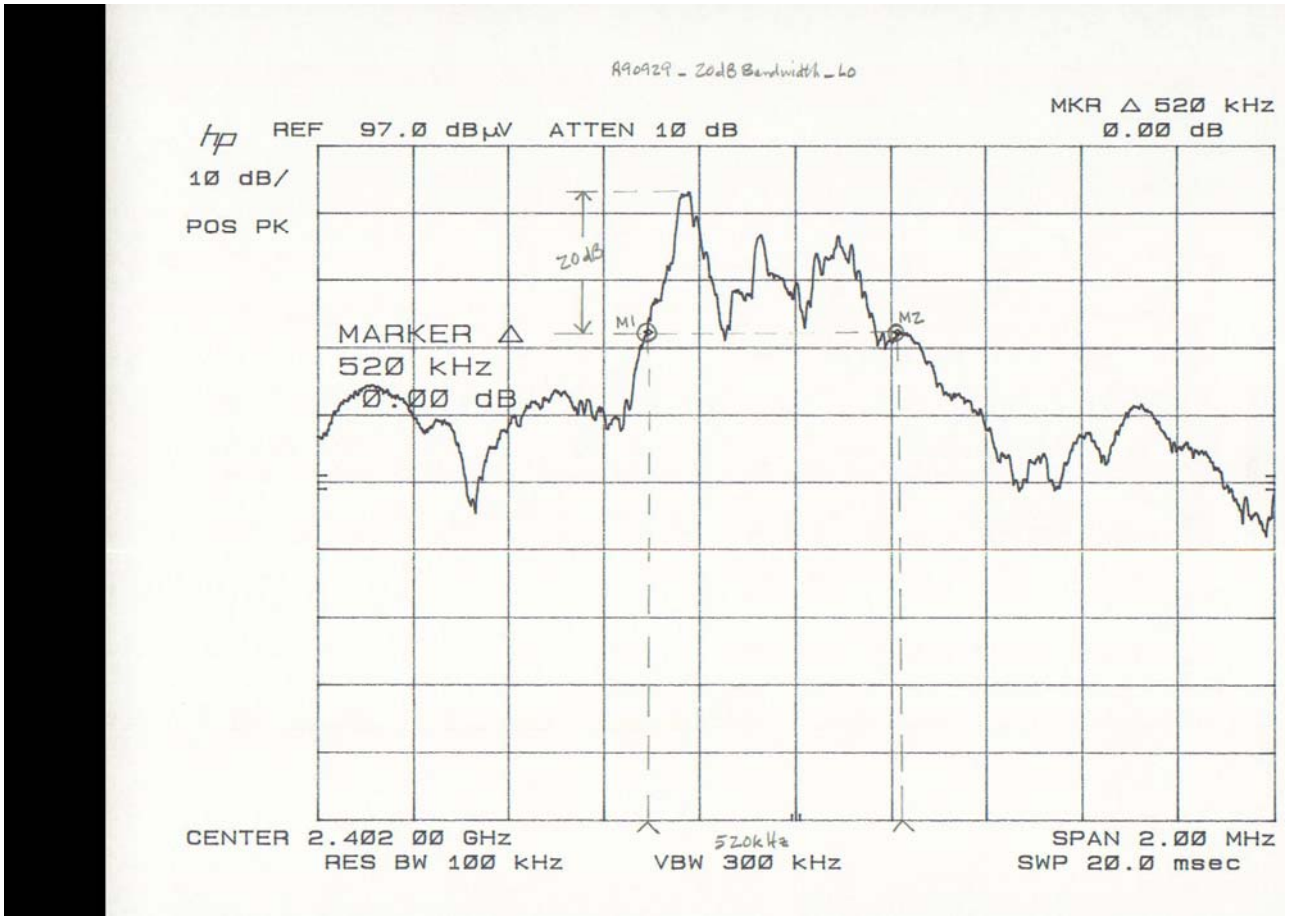

Figure D1. 20 dB Bandwidth – Tx Low (2.402 GHz)

emc integrity incorporated

20 dB Bandwidth, FCC Part 15.215(c)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

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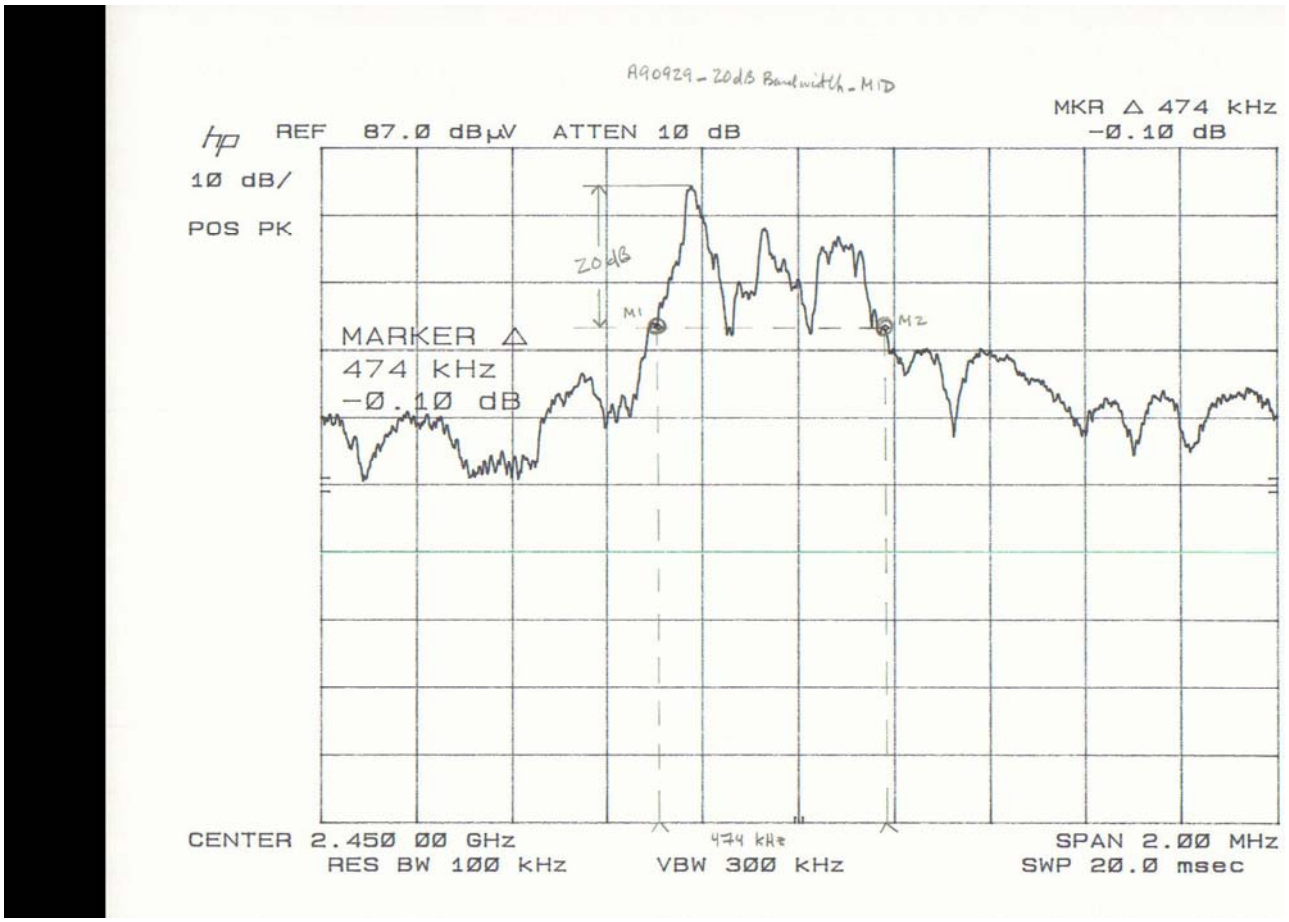

Figure D2. 20 dB Bandwidth – Tx Middle (2.450 GHz)

emc integrity incorporated

20 dB Bandwidth, FCC Part 15.215(c)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

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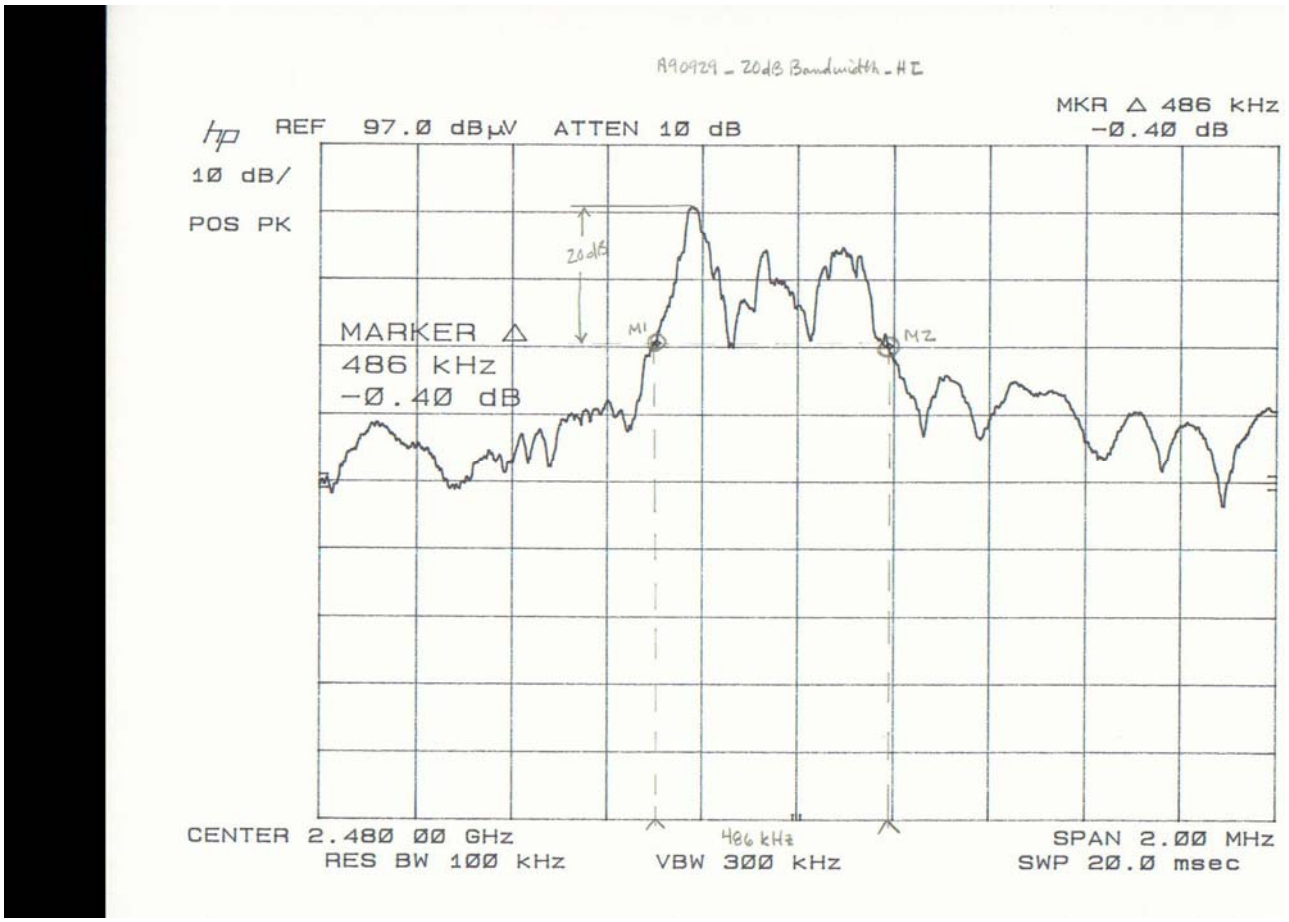

Figure D3. 20 dB Bandwidth – Tx High (2.480 GHz)

emc integrity incorporated

20 dB Bandwidth, FCC Part 15.215(c)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC	Date:	3 November 2009

A90929-22-RE.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1045	Hewlett Packard	8566B	2403A08106	Spectrum Analyzer Display	04/29/2009	04/29/2010
1046	Hewlett Packard	8566B	2430A00988	Spectrum Analyzer with 2403A08106	04/29/2009	04/29/2010
1196	EMCO	3115	00028256	DRG Horn 1-18 GHz	06/08/2009	06/08/2010
1208	Extech	115715	252868	Hygro-Thermometer	06/05/2009	06/05/2010
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	03/30/2009	03/30/2010
1231	Sunol Sciences	JB1	A071605-1	Bilog Antenna, 30 MHz to 2.0 GHz	11/12/2009	11/12/2010
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	10/18/2009	10/18/2010
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	12/23/2008	12/23/2009
1266	California Instruments	MX15-1	57961	AC Power Source, 0 - 300 VAC / 16 - 819 Hz / 15kVA	NA	NA
1276	Narda	DBL-0218N308	037-038	1GHz to 18GHz Preamplifier, 60dB gain nominal	04/24/2009	04/24/2010
NA	Pasternack	PE7004-10	NA	10 dB Attenuator, DC-18 GHz, 1 Watt	NA	NA
NA	Pasternack	PE7014-10	NA	10 dB Attenuator, DC-18 GHz, 2 Watt	NA	NA

APPENDIX E

Band-Edge, Part 15.249(d)

emc integrity incorporated

Band-Edge, FCC Part 15.249(d)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009
Temperature:	22˚C Humidity: 20%	Pressure:	840mb
Input Voltage:	120VAC/60Hz		
Configuration of Unit:	Normal Operating Mode		
Test Engineer:	Kevin Johnson		

A90929-22-RE.doc FR0100

Frequency Range	Band-Edge Measurement
Low-band	Amplitude at 2,400.0 MHz was measured at a distance of 10 meters with a 1 MHz RBW / 3 MHz VBW. The peak field strength will be compared to the limit defined by 15.209. This is accomplished as follows: Limit: 500 uV/m @ 3 meters Convert to dBuV/m using 20 $\log_{10}$ (500 uV/1uV) => limit equals 54 dBuV/m @ 3 meters Adjust for 10-meter separation using 20 $\log_{10}$ (10 m/3 m) => 10.5 dB Limit @ 10 meters is 54 dBuV/m – 10.5 dB = 43.5 dBuV/m Calculate amplitude of emission at 2,400 MHz as follows: Field Strength (dBuV/m) = Measured Signal (dBuV) – Gain (dB) + Antenna Factor (dB/m) Field Strength (dBuV/m) = 42.5 dBuV – 44.8 dB* + 28.6 dB/m **Field Strength is 26.3 dBuV/m, which is 17.2 below the adjusted 15.209 limit.** *Preamp gain of 64.9 dB has been adjusted to account for 20.1 dB front-end attenuation. Effective gain is 44.8 dB.
High-band	Amplitude at 2,483.5 MHz was measured at a distance of 10 meters with a 1 MHz RBW / 3 MHz VBW. The peak field strength will be compared to the limit defined by 15.209. This is accomplished as follows: Limit: 500 uV/m @ 3 meters Convert to dBuV/m using 20 $\log_{10}$ (500 uV/1uV) => limit equals 54 dBuV/m @ 3 meters Adjust for 10-meter separation using 20 $\log_{10}$ (10 m/3 m) => 10.5 dB Limit @ 10 meters is 54 dBuV/m – 10.5 dB = 43.5 dBuV/m Calculate amplitude of emission at 2,400 MHz as follows: Field Strength (dBuV/m) = Measured Signal (dBuV) – Gain (dB) + Antenna Factor (dB/m) Field Strength (dBuV/m) = 41.0 dBuV – 44.8 dB* + 28.8 dB/m **Field Strength is 25.0 dBuV/m, which is 18.5 below the adjusted 15.209 limit.** *Preamp gain of 64.9 dB has been adjusted to account for 20.1 dB front-end attenuation. Effective gain is 44.8 dB.

Conclusion: Product complies with Band-Edge requirement of FCC Part 15.249(d). The *peak* emission at the band-edge frequency is below the *average* limit specified by 15.209.

emc integrity incorporated

Band-Edge, FCC Part 15.249(d)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

A90929-22-RE.doc FR0100

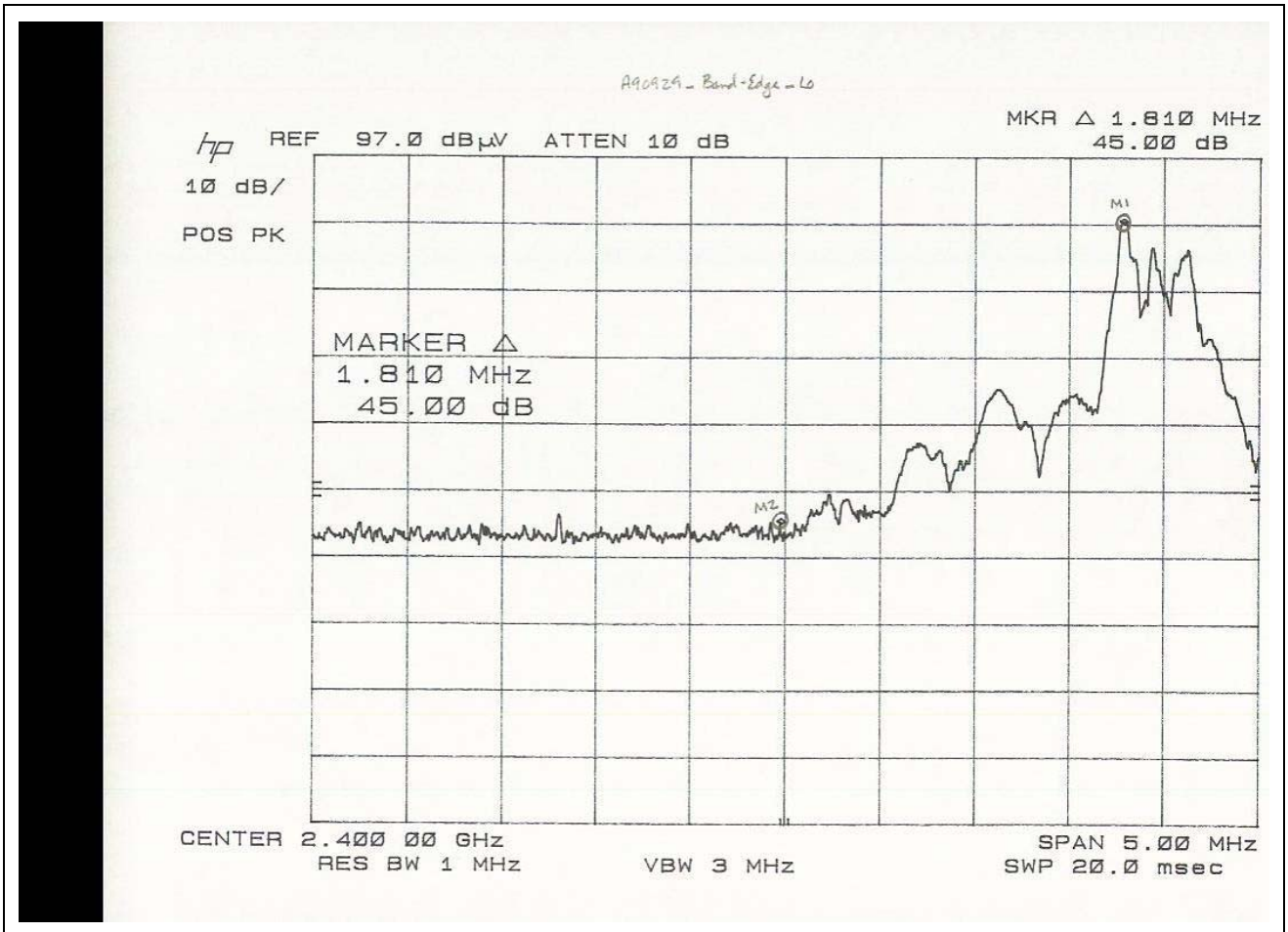

Figure E1. Band-Edge – Low.

emc integrity incorporated

Band-Edge, FCC Part 15.249(d)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

A90929-22-RE.doc FR0100

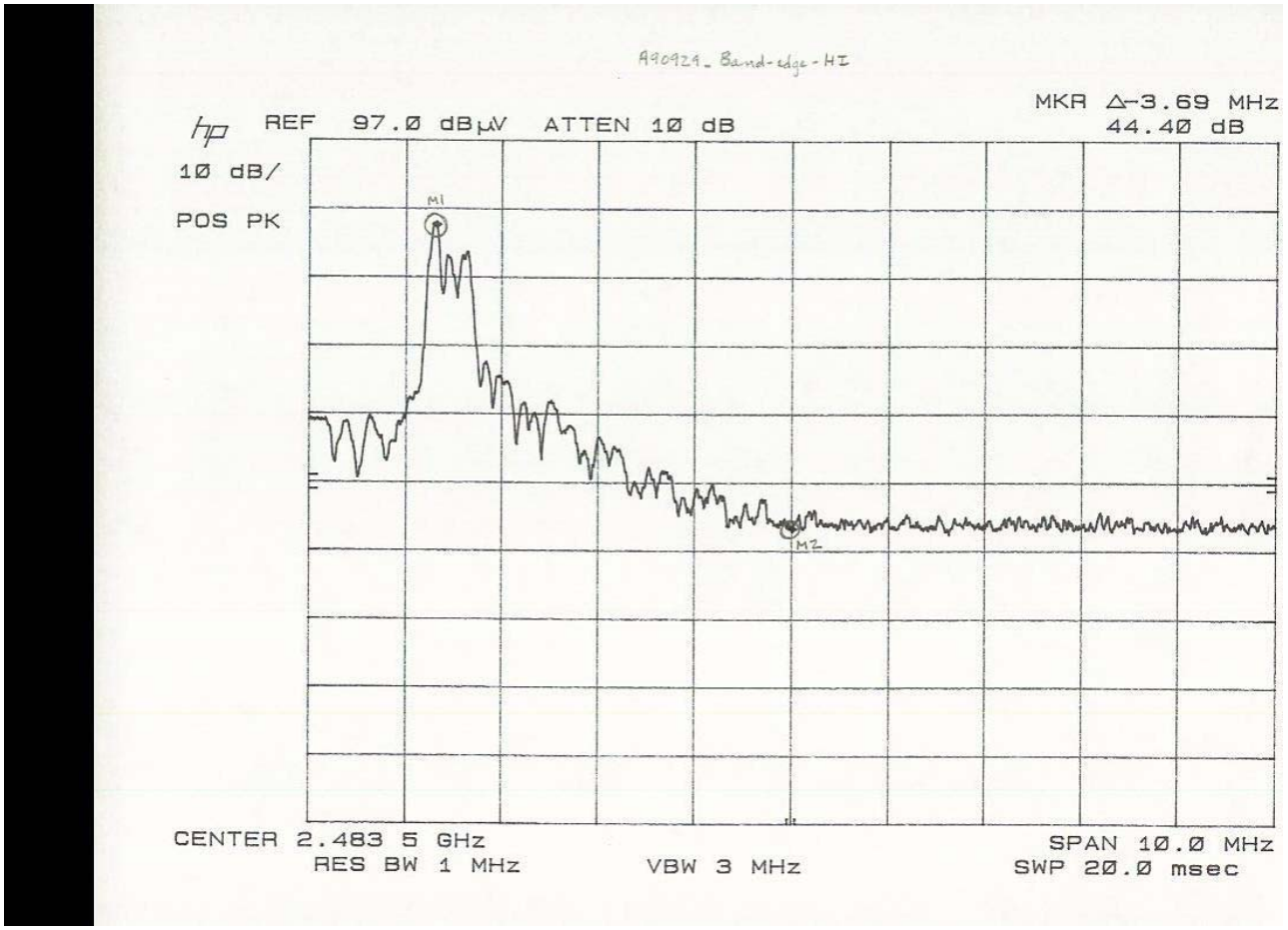

Figure E2. Band-Edge – High.

emc integrity incorporated

Band-Edge, FCC Part 15.249(d)

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Customer Representative:	Dan Julio	Test Area:	10M
Model:	RFD21712 LMA	S/N:	FT
Standard Referenced:	FCC Part 15	Date:	3 November 2009

A90929-22-RE.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1045	Hewlett Packard	8566B	2403A08106	Spectrum Analyzer Display	04/29/2009	04/29/2010
1046	Hewlett Packard	8566B	2430A00988	Spectrum Analyzer with 2403A08106	04/29/2009	04/29/2010
1196	EMCO	3115	00028256	DRG Horn 1-18 GHz	06/08/2009	06/08/2010
1208	Extech	115715	252868	Hygro-Thermometer	06/05/2009	06/05/2010
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	03/30/2009	03/30/2010
1231	Sunol Sciences	JB1	A071605-1	Bilog Antenna, 30 MHz to 2.0 GHz	11/12/2009	11/12/2010
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Radiated Emissions Semi-Anechoic Chamber	10/18/2009	10/18/2010
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1265	Hewlett Packard	85650A	2521A00641	Quasi-Peak Adapter	12/23/2008	12/23/2009
1266	California Instruments	MX15-1	57961	AC Power Source, 0 - 300 VAC / 16 - 819 Hz / 15kVA	NA	NA
1276	Narda	DBL-0218N308	037-038	1GHz to 18GHz Preamplifier, 60dB gain nominal	04/24/2009	04/24/2010
NA	Pasternack	PE7004-10	NA	10 dB Attenuator, DC-18 GHz, 1 Watt	NA	NA
NA	Pasternack	PE7014-10	NA	10 dB Attenuator, DC-18 GHz, 2 Watt	NA	NA

APPENDIX F

EMI Test Log

emc integrity incorporated

EMI Test Log

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Model:	RFD21712 LMA	S/N:	FT
Customer Representative:	Dan Julio		
Standard Referenced:	FCC Part 15		

FR0105

Test	Test Code	Date	Event	Time (hrs)	Result	Initials
RE	1342	September 28, 2009 1600-1645	Test#1: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz	0.75	Complete	KJ
		1645-1700	Test#2: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz Passed	0.25	Complete	KJ
RE		October 8, 2009 1000-1100	Test#3: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz FT mid 2450MHz, highest data rate. RC-001	1.0	Complete	KJ
		1100-1115	Test#4: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz FT mid 2450MHz, highest data rate. **LC-001**	0.25	Complete	KJ
		1115- 1130	Test#5: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz FT mid 2450MHz, highest data rate. **LC-002**	0.25	Complete	KJ
		1130-1145	Test#6: 2GHz - 16GHz, 1 rads, 1 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz FT mid 2450MHz, highest data rate. **CT-002**	0.25	Complete	KJ
		1145-1245	Test#7: 2GHz - 16GHz, 16 rads, 3 heights, 3 second dwell, 107 dB ref level, 3 meter distance 120VAC/60Hz FT mid 2450MHz, highest data rate. **RC-001**	1.0	Complete	KJ
RE	1348	1200-1330	Test#8: 30MHz - 2GHz, 8 rads, 4 heights, 3 second dwell, 80dB ref level, 10 meter distance **LC-001+10LA-001+Meanwell GS25U24 PS** **SN: FT** 120VAC/60Hz **With Fair –Rite 0461167281 with 2 turns on power line.** **Tx Low (2402 MHz)** **Formal**	1.5	Complete	KJ

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EMI Test Log

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Model:	RFD21712 LMA	S/N:	FT
Customer Representative:	Dan Julio		
Standard Referenced:	FCC Part 15		

FR0105

Test	Test Code	Date	Event	Time (hrs)	Result	Initials
		1330-1500	Test#9: 30MHz - 2GHz, 8 rads, 4 heights, 3 second dwell, 80dB ref level, 10 meter distance **LC-001+10LA-001+Meanwell GS25U24 PS** **SN: FT** 120VAC/60Hz **With Fair –Rite 0461167281 with 2 turns on power line.** **Tx Mid (2450 MHz)** **Formal**	1.5	Complete	KJ
		1500-1630	Test#10: 30MHz - 2GHz, 8 rads, 4 heights, 3 second dwell, 80dB ref level, 10 meter distance **LC-001+10LA-001+Meanwell GS25U24 PS** **SN: FT** 120VAC/60Hz **With Fair –Rite 0461167281 with 2 turns on power line.** **Tx High (2498 MHz)** **Formal**	1.5	Complete	KJ
RE		October 12, 2009 0800-0900	Test#11: 2GHz-3GHz, 4 rads, 1 height, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line**.** **Tx High (2498 MHz)** **Fundamental transmit frequency measurement at 2498MHz**	1.0	Complete	KJ
RE		0900-1130	Test#12: 2GHz-18GHz, 16 rads, 3 heights, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line 1246 notch filter **Tx High (2498 MHz)**	2.5	Complete	KJ
		1130-1200	Test#13: 2GHz-3GHz, 4 rads, 1 height, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line **Tx Mid (2450 MHz)** **Fundamental transmit frequency measurement at 2450MHz**	0.5	Complete	KJ
		1200-1315	Test#14: 2GHz-18GHz, 16 rads, 3 heights, 3 second dwell, 107dB ref level, 3 meters distance. 120VAC/60Hz 1246 notch filter **Tx Mid (2450 MHz)**	1.25	Complete	KJ

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EMI Test Log

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Model:	RFD21712 LMA	S/N:	FT
Customer Representative:	Dan Julio		
Standard Referenced:	FCC Part 15		

FR0105

Test	Test Code	Date	Event	Time (hrs)	Result	Initials
		1315-1400	Test#15: 2GHz-3GHz, 4 rads, 1 height, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line **Tx Low (2402 MHz)** **Fundamental transmit frequency measurement at 2402MHz**	0.25	Complete	KJ
		1400-1500	Test#16: 2GHz-18GHz, 16 rads, 3 heights, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line 1246 notch filter **Tx Low (2450 MHz)**	1.0	Complete	KJ
		1630	**Redoing Tx High (2480)** Test#17: 2GHz-3GHz, 4 rads, 1 height, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line**.** **Tx High (2498 MHz)** **Fundamental transmit frequency measurement at 2498MHz**	0.25	Complete	KJ
		16451730	**Redoing Tx High (2480)** Test#18: 2GHz-18GHz, 16 rads, 3 heights, 3 second dwell, 107dB ref level, 3 meters distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz With Fair –Rite 0461167281 with 2 turns on power line 1246 notch filter **Tx High (2480 MHz)**	0.75	Complete	KJ
RE		November 3, 2009 1430-1500	Test#19: 18GHz-25GHz 1 meter distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz **RX Mode** **THIS REPORT UNDER A90930**	0. 5	Complete	KJ/TW

emc integrity incorporated

EMI Test Log

Manufacturer:	Dan Julio Designs	Project Number:	A90929
Model:	RFD21712 LMA	S/N:	FT
Customer Representative:	Dan Julio		
Standard Referenced:	FCC Part 15		

FR0105

Test	Test Code	Date	Event	Time (hrs)	Result	Initials
		1500-1515	Test#19: 18GHz-25GHz 1 meter distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz **High TX**	0.25	Complete	KJ/TW
		1515-1530	Test#19: 18GHz-25GHz 1 meter distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz **Mid TX**	0.25	Complete	KJ/TW
		1530-1600	Test#19: 18GHz-25GHz 1 meter distance. LC-001+10LA-001+Meanwell GS25U24 PS SN: FT 120VAC/60Hz **Low TX**	0.25	Complete	KJ/TW
CE	2341	1600-1700	Test#20 Conducted Emissions, 150 kHz - 30 MHz (Tx mode = Lo, Mid, Hi)-- 120 VAC / 60 Hz Tx Lo, mid, hi	1.0	Pass	KJ
CE	2431	1700-1730	Test#20 Conducted Emissions, 150 kHz - 30 MHz (Tx mode = Lo, Mid, Hi)-- 120 VAC / 60 Hz **Rx Mode**	0.5	Pass	KJ

APPENDIX G

Laboratory Accreditations

Nemko Laboratory Authorization

Authorization: ELA 215

EMC Laboratory: **EMC Integrity, Inc.**
1736 Vista View Drive
Longmont, Colorado 80504
USA

Scope of Authorization: **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and all of the corresponding CISPR, IEC and ISO EMC standards that are listed on the accompanying page.**

Nemko has assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through December 31, 2011.

Dallas, Texas, USA.

For and on behalf of Nemko AS:

T.B. Ketterling,

Nemko ELA Co-ordinator

Region: North America

Nemko

Nemko Laboratory Authorization

Authorization: ELA 215

SCOPE OF AUTHORIZATION

Capability to perform a basic test implies also that any product (family) standard calling up this basic test is also within the scope if mentioned below or not.

Generic & Product –Family Standards		
EN 55011 :1998+A1 :1999 +A2 :2002 EN 55011:2007 +A2:2007 CISPR 11:1997 (Modified) + A1:1999 + A2:2002 CISPR 11 Ed. 4.1	EN 55014-1:2006 EN 55014-1:2000 + A1:2001 + A2:2002 CISPR 14-1:2000 + A1:2001 + A2:2002 CISPR 14-1 Ed. 5.0	EN 55014-2:1997 + A1:2001 CISPR 14-2:1997 + A1:2001 CISPR 14-2 Ed. 1.2
EN 55022: 1998+ A1:2000, +A2:2003 CISPR 22: 2003+ A1:2004 CISPR 22:2005 (Modified) EN55022:2006 CISPR 22 Ed. 5.2 EN 55022 +A1: 2007	EN 55024: 1998 +A1:2001, +A2:2003 CISPR 24: 1997 +A1:2001, +A2:2002 CISPR 24 Ed. 1.0	EN 61000-6-1 :2007 IEC 61000-6-1 Ed. 2.0 EN 61000-6-1: 2001
EN 61000-6-2:2005 IEC 61000-6-2 Ed. 2.0	EN 61000-6-3 :2007 IEC 61000-6-3 Ed. 2.0 EN 61000-6-3: 2001 + A1 :2004	IEC 61000-6-2 Ed. 2.0 EN 61000-6-2: 2005 IEC 61000-6-2: 2005 EN 61000-6-2: 2001
EN 61326:1997 +A1:1998 + A2:2001 +A3:2003 IEC 61326:1997 + A1:1998 + A2:2000 EN 61326-1 Ed. 1.0 IEC 61326:2006	EN 60601-1-2:2001 + A1:2006 IEC 60601-1-2:2001 EN 60601-1-2:2006 IEC 60601-1-2 Ed. 3.0	EN 55103-1:1996 EN 55103-2 :1996 EN 55103-1:2005 EN 55103-2:2005
EN 300 386 V.1.3.1 EN 300 386 V.1.3.3 EN 300 386 V.1.4.1	EN 61000-3-3: 1995, +A1:2001 +A2:2005 IEC 61000-3-3: 1994, +A1:2001 +A2:2005 EN 61000-3-3:2008	EN 61000-3-2: 2000 +A2 :2005 IEC 61000-3-2: 2000 (Modified) +A1:2001 +A2:2004 EN 61000-3-2:2006
EN 50130-4: 1995 + A1:1998 + A2:2002	ETSI EN 301 489 V1.8.1	ETSI EN 300 339 Ed. 1
Basic Standards		
EN 61000-4-2:1995, +A1:1998, +A2:2000 IEC 61000-4-2:1995, +A1:1998, +A2:2000 IEC 61000-4-2 : 2009	EN 61000-4-3:2002, +A1:2002 IEC 61000-4-3:2002, +A1:2002 EN 61000-4-3 :2006 +A1 :2006 +A2 :2006 IEC 61000-4-3 Ed. 3.0	EN 61000-4-4:1995, +A1:2002, +A2:2002 IEC 61000-4-4:1995, +A1:2000, +A2:2001 EN 61000-4-4:2004 IEC 61000-4-4 Ed. 2.0
EN 61000-4-5:1995, +A1:2001 IEC 61000-4-5:1995, +A1:2000 EN 61000-4-5 :2006 IEC 61000-4-5 Ed. 2.0	EN 61000-4-6:1996, +A1:2001 IEC 61000-4-6:1996, +A1:2000 EN 61000-4-6 : 2009 IEC 61000-4-6 Ed. 2.2	EN 61000-4-8:1994,+A1:2001 IEC 61000-4-8:1994, +A1:2001 IEC 61000-4-8 Ed. 1.1
EN 61000-4-11:2004 IEC 61000-4-11 Ed. 2.0 EN 61000-4-11:1994, +A1:2000 IEC 61000-4-11:1994, +A1:2000	BLANK	BLANK

May 1, 2009

T.B. Ketterling, Nemko ELA Co-ordinator

2(2) NLA 3 ED3

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMC Integrity, Inc.
1736 Vista View Drive
Longmont, CO 80504
Mr. Vincent W. Greb
Phone: 303-776-7249 Fax: 303-776-7314
E-Mail: vinceg@emcintegrity.com
URL: http://www.emcintegrity.com

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2009-05-28

NVLAP Code	*Designation / Description*
Emissions Test Methods	
12/100063c	IEC 61000-6-3 (1996), EN 61000-6-3 (2001), A1 (2004): Electromagnetic Compatibility (EMC) - Part 6: Generic standards - Section 3: Emission standard for residential, commercial, and light-industrial environments.
12/CIS11f	AS/NZS CISPR 11 (2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11g	IEC/CISPR 11, Ed. 4.1 (2004-06): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurements
12/CIS11h	AS/NZS CISPR 11 (2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11i	IEC/CISPR 11, Ed. 4.1 (2004-06) + A1(2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

2009-07-01 through 2010-06-30
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NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2009-05-28

NVLAP Code	*Designation / Description*
12/CIS11j	EN 55011 (1998) + A1(1999), A2(2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11k	IEC/CISPR 11 (2003), EN 55011 (1998), A2(2002): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment
12/CIS14b1	AS/NZS CISPR 14-1 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS14x	IEC/CISPR 14-1, Ed. 4 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CIS22a4	IEC/CISPR 22 (1993) & EN 55022 (1994)+A1(1995), A2(1997): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/CIS22c	IEC/CISPR 22, Fourth Edition (2003-04) & EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22c1	IEC/CISPR 22, Edition 5 (2005) and EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement

2009-07-01 through 2010-06-30
Effective dates

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NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2009-05-28

NVLAP Code	*Designation / Description*
12/CIS22c3	IEC/CISPR 22, Edition 5 (2005) + A1(2005): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22c4	EN 55022 (1998) + A1(2000) + A2(2003): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22f	CNS 13438 (2006): LImits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/EM02d	IEC 61000-3-2, Edition 2.2 (2004-11): Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)
12/EM03b	IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections
12/EM03g	IEC 61000-3-3, Edition 1.1 (2003) +A2 (2005): EMC Part 3-3: Limits - Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connections
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/FCC15b	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/KN22	KN22 with RRL Notice No. 2005-82 (Sept. 29, 2005): RRL Notice No. 2005-82: Technical Requirements for Electromagnetic Interference Annex 8 (KN-22), RRL Notice No. 2005-131: Conformity Assessment Procedures for Electromagnetic Interference
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

2009-07-01 through 2010-06-30
Effective dates

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NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2009-05-28

NVLAP Code	*Designation / Description*
12/VCCIa	VCCI: Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2005.04

Immunity Test Methods

12/610006h	IEC 61000-6-1, 2nd edition (2005-03): Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 1: Immunity for residential, commercial and light-industrial environments
12/610006i	IEC 61000-6-2, Edition 2.0 (2005-01): Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
12/I01b	IEC 61000-4-2 (2001); EN 61000-4-2 (2001), A2 (2001): Electrostatic Discharge Immunity Test
12/I01c	EN 61000-4-2 +A1(1998) +A2(2001): Electrostatic Discharge Immunity Test
12/I02b	IEC/EN 61000-4-3, Ed. 2.1 (2002), A1 (2002); EN 61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test
12/I02e	EN 61000-4-3 (2002) + A1(2002) + IS1(2004): Radiated, radio-frequency, electromagnetic field immunity test
12/I02f	EN 61000-4-3 (2002) + A1(2002): Radiated, radio-frequency, electromagnetic field immunity test
12/I03c	IEC 61000-4-4, Ed. 2.0 (2004-07): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/I04b	IEC 61000-4-5 (2001), A1(2000); EN 61000-4-5(2001), A1(2000): Surge Immunity Test
12/I05d	IEC 61000-4-6, Ed. 2.1 (2004); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

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NVLAP Code	*Designation / Description*
12/I05e	EN 61000-4-6 (1996) + A1 (2001): Immunity to Conducted Disturbances, Induced by Radio Frequency Fields
12/I06b	IEC 61000-4-8 (2001), A1(2000); EN 61000-4-8 (2001),A1(2000): Power Frequency Magnetic Field Immunity Test
12/I06c	EN 61000-4-8 (1993) + A1 (2001): Power Frequency Magnetic Field Immunity Test
12/I07c	IEC 61000-4-11, Ed. 2 (2004-03) & EN 61000-4-11: Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
12/I07e	EN 61000-4-11 (1994), A1 (2001): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/I07f	EN 61000-4-11 (2004): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11a	KN 61000-4-11 with RRL Notice No. 2005-130 (Dec 27, 2005): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN24	KN24 (December 2005) with RRL Notice No. 2005-83: Information Technology Equipment - immunity charateristics - limits and methods of measurements
12/KN2a	KN 61000-4-2 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electrostatic Discharge Immunity Test
12/KN3a	KN 61000-4-3 with RRL Notice No. 2005-130 (Dec. 27, 2005): Radiated, radio-frequency, electromagnetic field immunity test
12/KN4a	KN 61000-4-4 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immun

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Scope Revised: 2009-05-28

NVLAP Code	*Designation / Description*
12/KN5a	KN 61000-4-5 with RRL Notice No. 2005-130 (Dec. 27, 2005): Surge Immunity Test
12/KN6a	KN 61000-4-6 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances,
12/KN8a	KN 61000-4-8 with RRL Notice No. 2005-130 (Dec. 27, 2005): Power Frequency Magnetic Field Immunity Test

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200737-0

EMC Integrity, Inc.
Longmont, CO

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

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Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

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NVLAP-01C (REV. 2009-01-28)

END OF REPORT