

Nemko Test Report: 4L0100RUS1REV3

Applicant: AGL Corporation
2202 Redmond Rd.
Jacksonville, AR 72076

**Equipment Under Test:
(E.U.T.)** A710 Laser w/Wireless Remote Control

In Accordance With: **FCC Part 15, Subpart C, 15.249**
For 900 MHz Transmitters

Tested By: Nemko Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

Authorized By: 
Dustin Oaks, Account Manager

Date: 10/8/2004

Total Number of Pages: 23

EQUIPMENT: A710

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*EQUIPMENT: A710***Section 1. Summary Of Test Results**

Manufacturer: AGL Corporation

Model No.: A710

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15.249. All tests were conducted using measurement procedure ANSI C63.4-2001. Radiated Emissions were made on an open area test site.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE
TEST SPECIFICATIONS HAVE BEEN MADE. NONE**NVLAP LAB CODE: 100426-0**

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Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Conducted Emissions	15.207	Complies
Radiated Emissions	15.249	Complies

EQUIPMENT: A710
Canadian/FCC Matrix

FCC Section	Canada Section
15.249(a) Fundamental	RSS210 6.2.2(m2)(1) Fundamental
15.249(a) Harmonics	RSS210 6.2.2(m2)(1) Harmonics
15.249(b)	RSS210 6.2.2(m2)(3)
15.207	RSS 210 9.0

Section 2. General Equipment Specification

Frequency Range: Single Channel

Operating Frequency(ies) of Sample: 915.4 MHz

Tunable Bands: N/A

Number of Channels: 1

Channel Spacing: NA

User Frequency Adjustment: None

Integral Antenna **Yes** **No**

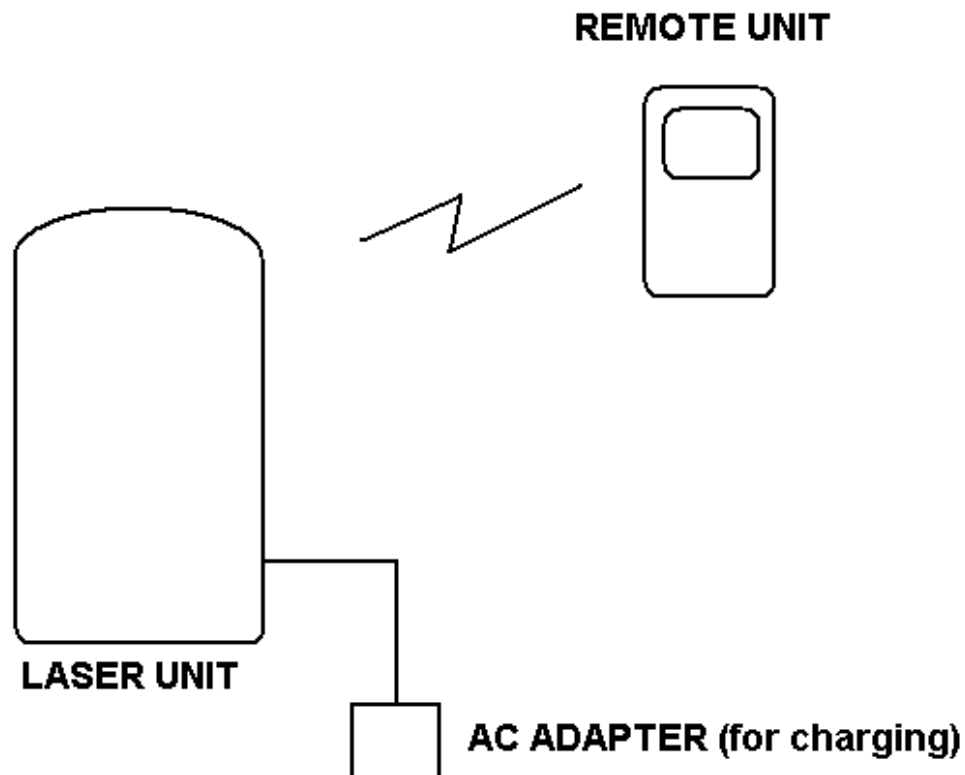
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EQUIPMENT: A710

Description of EUT

A visible universal laser that can be used for leveling , vertical alignment, squaring, and single single and dule grade applications.

System Diagram



*EQUIPMENT: A710***Section 3. Powerline Conducted Emissions**

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: Art Ruvalcaba	DATE: 3/16/04

Minimum Standard:

Limits for conducted disturbance at the mains ports

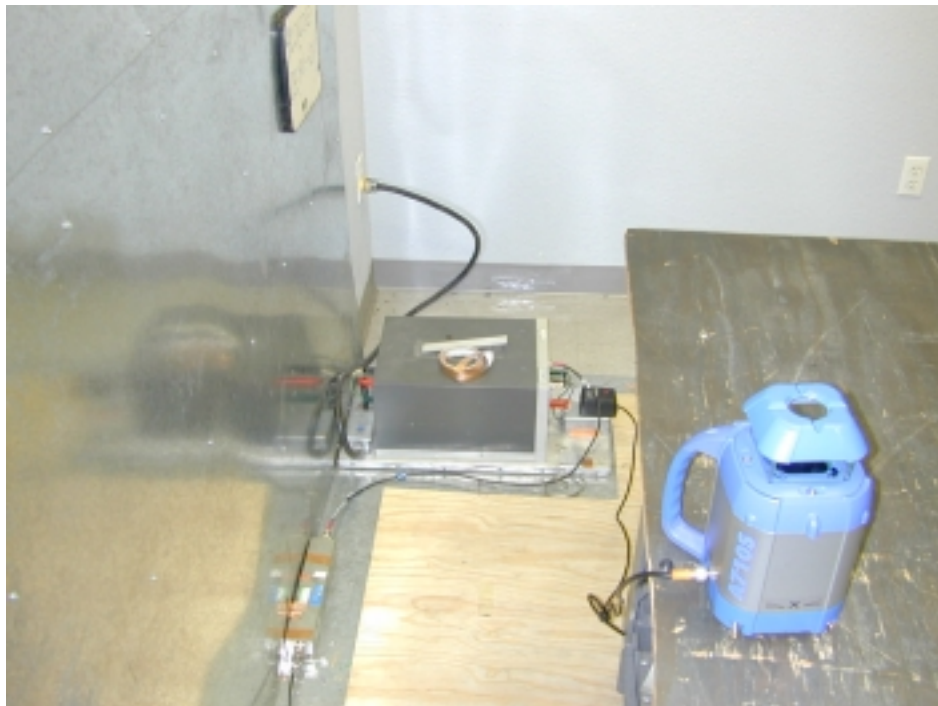
Frequency Range (MHz)	Quasi-peak Limits (dBuV)	Average Limits (dBuV)
0.15 to 0.50	66-56	56-46
0.50 to 5.00	56	46
5.00-30.0	60	50
The limit decreases with the logarithm of the frequency in the range 0.15MHz to 0.5 MHz		

Test Results: Complies.**Measurement Data:** See attached data.**Method of Measurement: (Procedure ANSI C63.4-1992)**

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak Detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak Detector.

[illegible]

EQUIPMENT: A710
Conducted Photographs



EQUIPMENT: A710

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.249
TESTED BY: David Light	DATE: 3/16/04

Minimum Standard: Para no. 15.249

(a) The field strengths shall not exceed the following:

Fundamental (MHz)	Field Strength (mV/m)	Field Strength (dB μ V)	Harmonic (mV/m)	Harmonic (dB μ V)
902-928	50	94	0.5	54

(b) Field strength limits are specified at a distance of 3 metres.

(c) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits of 15.209 whichever is the less attenuation.

(d) ...for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Test Results:

Complies

Measurement Data: See attached table.

Test Data - Radiated Emissions (Digital Emissions: both units)

Complete	X	Job # :	4L0100E	Test # :	REHE-01
Preliminary			Page 1	of	2
Client Name :	AGL Corporation				
EUT Name :	A 710				
EUT Model # :	A 710				
EUT Part # :	NONE				
EUT Serial # :	NONE				
EUT Config. :	Rotating Power on				
Specification :	CFR47 Part 15, Subpart B, Class B		Reference :		
Rod. Ant. #:	NA	Temp. (deg. C) :	24	Date :	03/17/04
Bicon Ant.#:	1479	Humidity (%) :	31	Time :	8:30
Log Ant.#:	1508	EUT Voltage :	120Vac	Staff :	J. Fish
Bilog Ant.#:	NA	EUT Frequency :	60Hz	Photo ID:	4L0100E REHE-01
Dipole Ant.#:	NA	Phase:	Single	Peak Bandwidth:	100 kHz
Cable#:	1522	Location:	D OATS	Video Bandwidth	100kHz
Preamp#:	762	Distance:	3m		
Limiter#:	NA				
Atten #:	NA				
Detector#:	1284				

[illegible]

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Digital Emissions Continued

[illegible]

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Carrier Field Strength



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Radiated Emissions Data

Complete	<u>X</u>	Job # :	<u>4L0100R</u>	Test # :	<u>REHE-02</u>
Preliminary	<u> </u>		Page <u>1</u>	of	<u>1</u>
Client Name : <u>AGL Corporation</u>					
EUT Name : <u>A710</u>					
EUT Model # : <u>A710</u>					
EUT Part # : <u>None</u>					
EUT Serial # : <u>None</u>					
EUT Config. : <u>Laser Unit on side (Worst case)</u>					
<u>Remote unit on edge (Worst case)</u>					
Specification : <u>15.249(a)</u>					
Rod. Ant. #:	<u>NA</u>	Temp. (deg. C) :	<u>22</u>	Reference :	<u> </u>
Bicon Ant. #:	<u>NA</u>	Humidity (%) :	<u>45</u>	Date :	<u>09/30/04</u>
Log Ant. #:	<u>1034</u>	EUT Voltage :	<u> </u>	Time :	<u>9:00</u>
Bilog Ant. #:	<u>NA</u>	EUT Frequency :	<u> </u>	Staff :	<u>D. Light</u>
Dipole Ant. #:	<u>NA</u>	Phase:	<u> </u>	Photo ID:	<u>NA</u>
Cable#:	<u>1983</u>	Location:	<u>AOATS</u>	Peak Bandwidth:	<u>100 kHz</u>
Preamp#:	<u>791</u>	Distance:	<u>3M</u>	Video Bandwidth	<u>100kHz</u>
Limiter#:	<u>NA</u>				
Atten #:	<u>NA</u>				
Detector#:	<u>1464</u>				

Meas. Freq. (MHz)	Ant. Pol. (H/V)	External Attenuation (dB)	Meter Reading (dBuV)	Antenna Factor (dB)	Path Loss (dB)	RF Gain (dB)	Corrected Reading (dBuV/m)	Spec. limit (dBuV/m)	CR/SL Diff. (dB)	Pass Fail Unc.	Comment
											Laser Unit
915.5	V	0	59.5	23.9	8.2	0.0	91.6	94.0	-2.4	Pass	
915.5	H	0	51	23.9	8.2	0.0	83.1	94.0	-10.9	Pass	
											Remote Unit
915.5	V	0	39	23.9	8.2	0.0	71.1	94.0	-22.9	Pass	
915.5	H	0	38.6	23.9	8.2	0.0	70.7	94.0	-23.3	Pass	

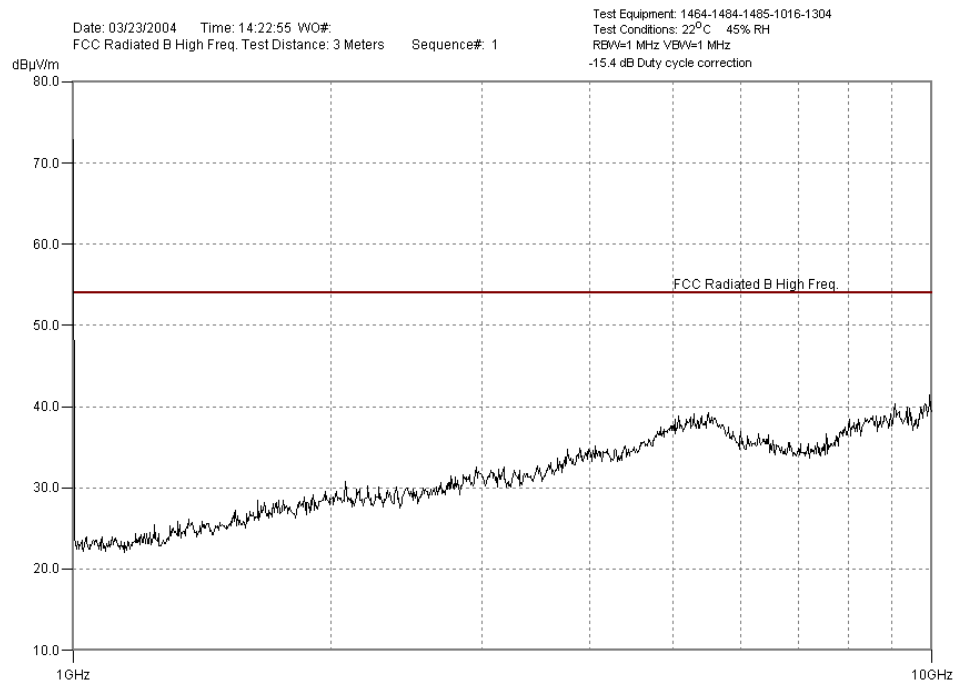
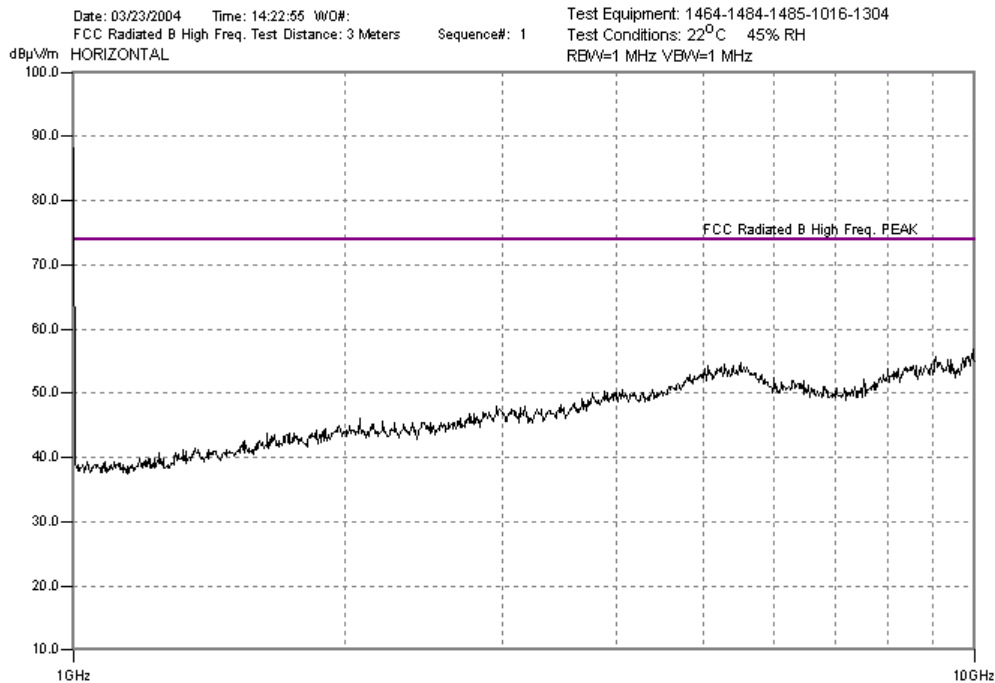
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Harmonic Emissions

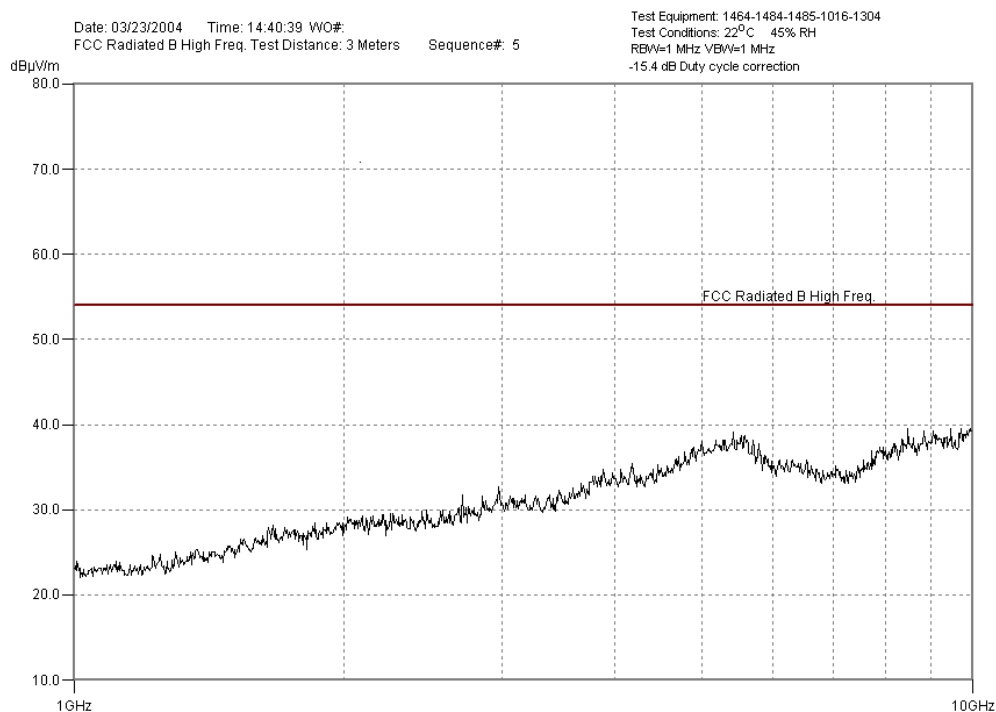
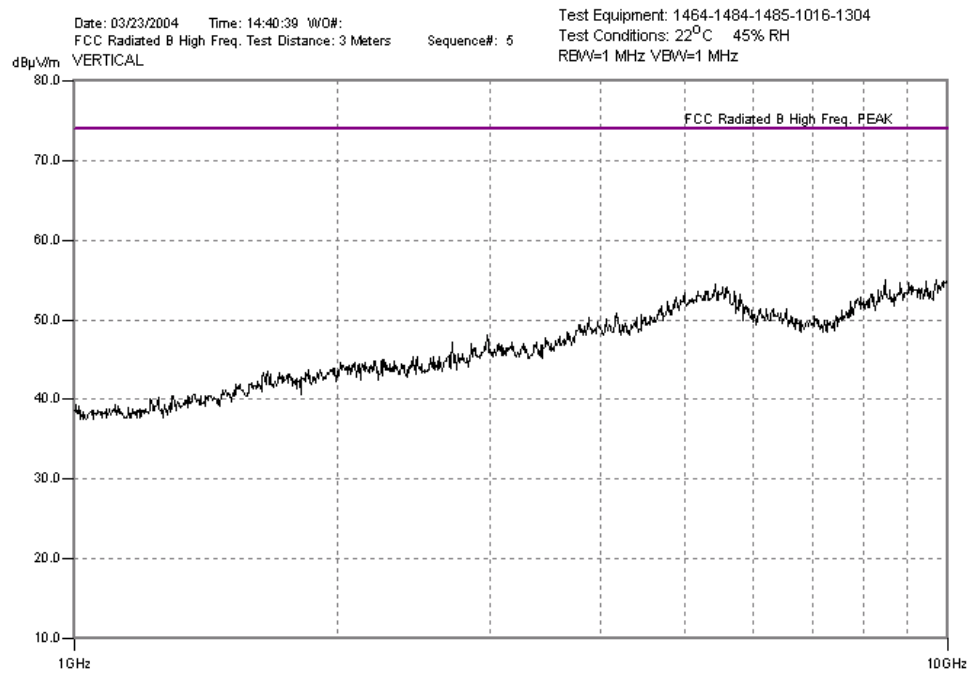
Note: There were no emissions detected above .1 GHz. Plots shown are representative of all devices and configurations.

Horizontal



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Vertical



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Duty Cycle - Laser



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Data Plot		Spurious Emissions	
Page <u>1</u> of 4		Complete <u>X</u>	
Job No.: 4L0100	Date: 3/23/2004	Preliminary: _____	
Specification: 15.249 (15.207)	Temperature(°C): 22	Measurement Distance: <u>NA</u> m	
Tested By: Lance Walker	Relative Humidity(%) 40		
E.U.T.: LASER			
Configuration: TX			
Sample Number: 1			
Location: A-OATS	RBW: Refer to plots	Measurement Distance: <u>NA</u> m	
Detector Type: Peak	VBW: Refer to plots		
Test Equipment Used			
Antenna: 1034	Directional Coupler: _____		
Pre-Amp: 791	Cable #1: _____		
Filter: _____	Cable #2: _____	Measurement Distance: <u>NA</u> m	
Receiver: 1464	Cable #3: _____		
Attenuator #1: _____	Cable #4: _____		
Attenuator #2: _____	Mixer: _____		
Additional equipment used: _____			
Measurement Uncertainty: +/-1.7 dB		Measurement Distance: <u>NA</u> m	
ATTEN 10dB ΔMKR -39.16dB RL 107.0dBμV 10dB/ 17.00ms ΔMKR T 17.00 ms -39.16 dB CENTER 915.381667MHz SPAN 0Hz *RBW 1.0MHz VBW 1.0MHz *SWP 100ms			
20log (0.17) = -15.4 dB			
Laser Unit			

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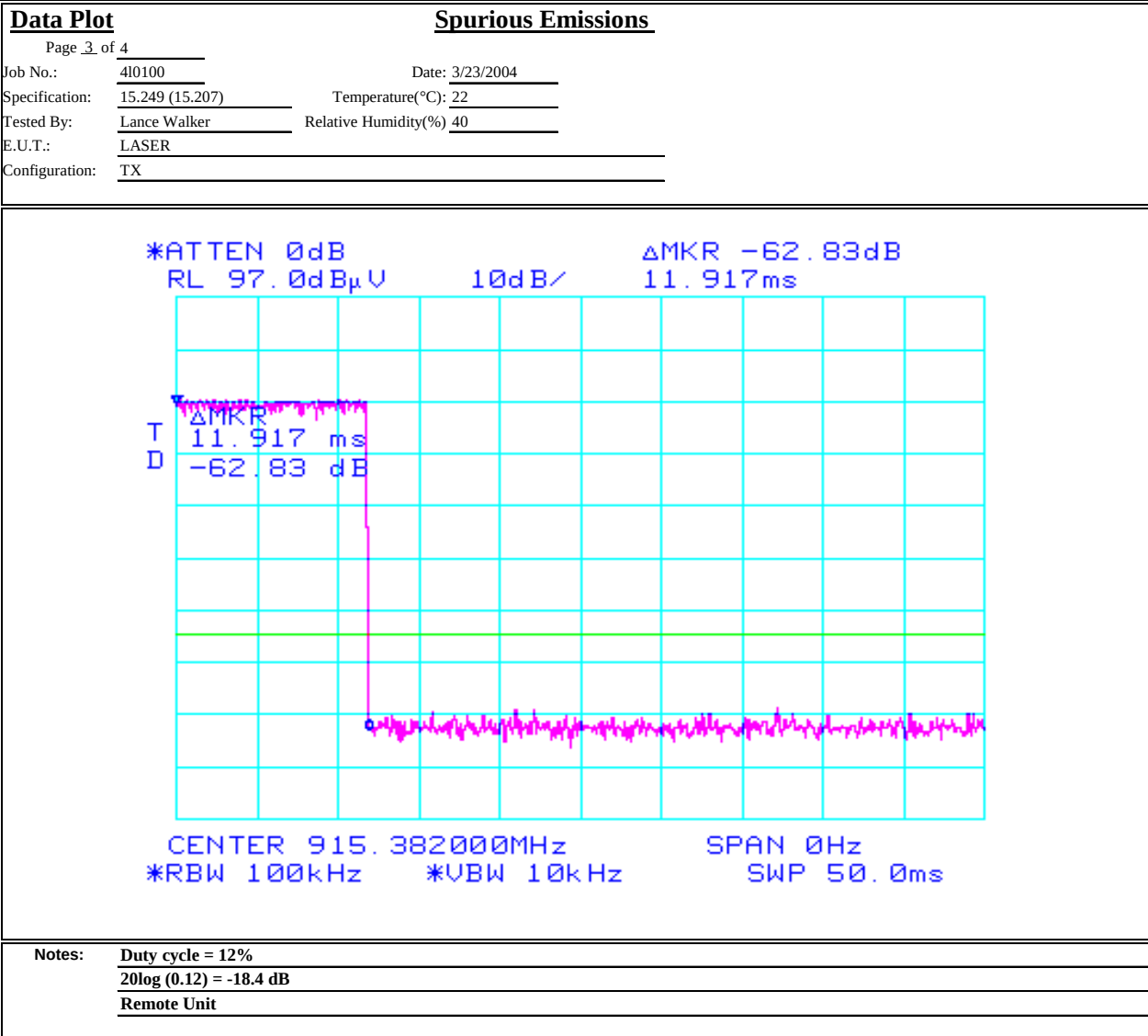
Duty Cycle – Remote Unit



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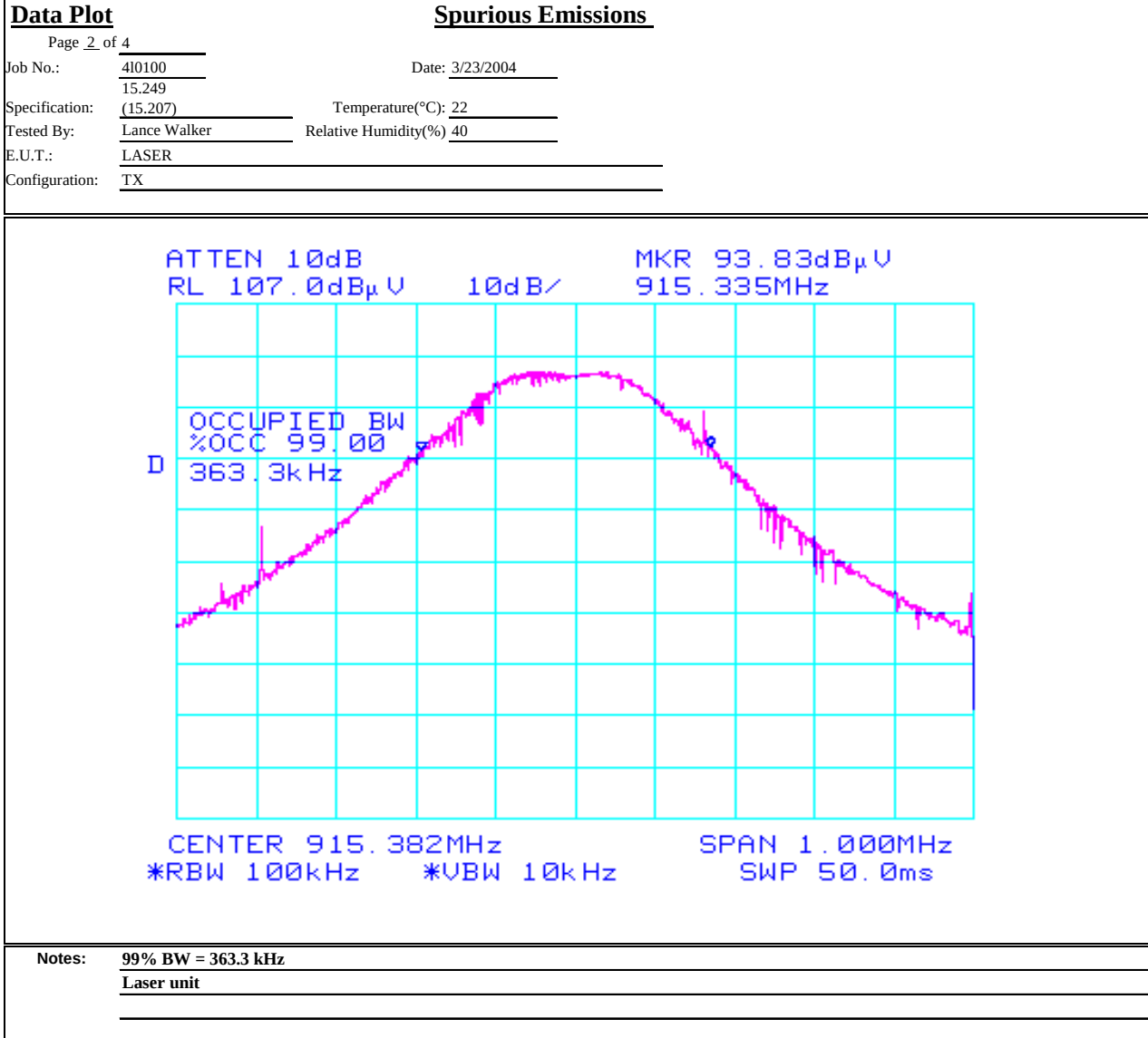
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Occupied Bandwidth – Laser



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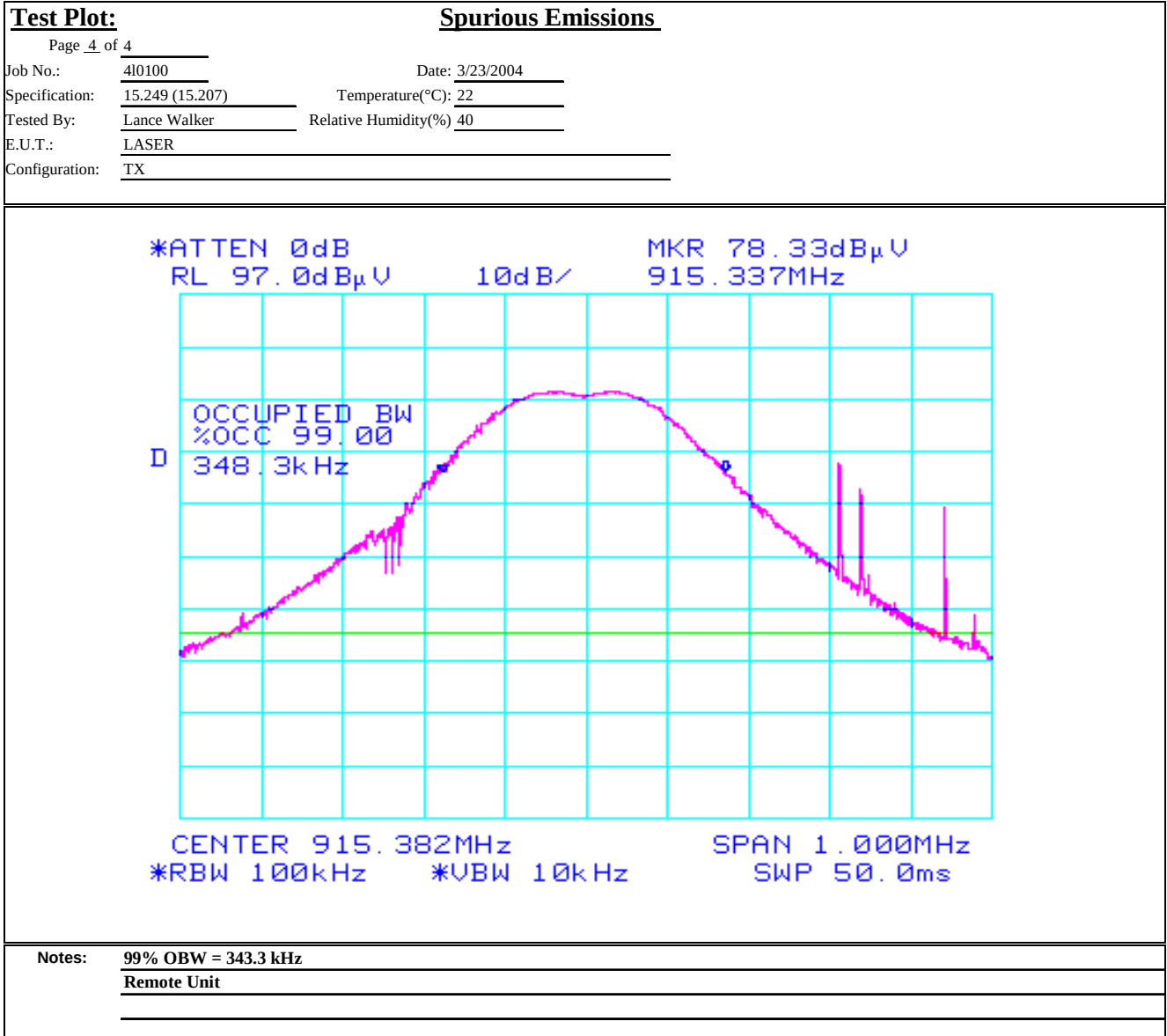
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Occupied Bandwidth – Remote Unit



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Radiated Photographs

Laser Unit



Remote Unit



EQUIPMENT: A710

Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1258	LISN .15mhz-30mhz	EMCO 0	1305	09/15/03	09/14/04
1433	High pass filter	Solar 7930-5.0	933142	02/04/04	02/03/05
1998	CABLE, 1m	KTL RG223	N/A	06/27/03	06/26/04
1194	CABLE, 7m	KTL RG214	N/A	11/13/03	11/12/04
785	ANALYZER, SPECTRUM	HP 8591E	3412A02996	04/09/03	04/08/04
1479	Bi Conical Antenna 20-330 Mhz	A. H. Systems SAS-200/540	496	07/02/03	07/01/04
1508	ANTENNA, LP	KTL 3146	1349	06/05/03	06/04/04
1522	Cable Assy, LAB 5 - D OATS	KTL Site D OATS	N/A	03/11/04	03/11/05
762	27dB GAIN PREAMP	ICC 27dB LNA	946	08/28/03	08/27/04
1284	QuasiPeak ADAPTER	HEWLETT PACKARD 85650A	2521A00769	12/19/03	12/18/04
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	06/09/03	06/08/04
1983	CABLE	KTL Site A OATS	N/A	03/11/04	03/11/05
791	PREAMP, 25dB	ICC LNA25	398	10/27/03	10/26/04
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05

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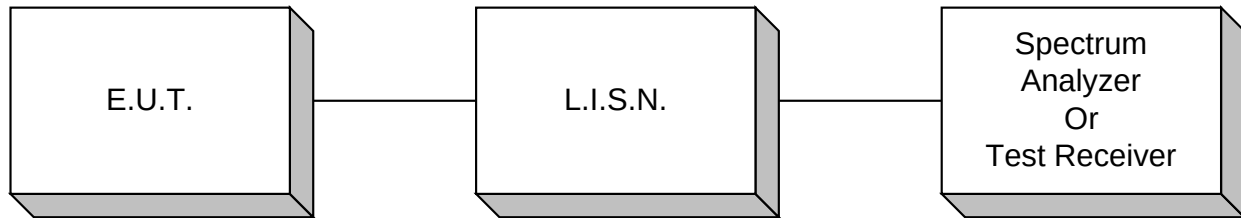
FCC PART 15, SUBPART C
FOR 900 MHz Transmitters
Test Report No.: 4L0100RUS1

EQUIPMENT: A710

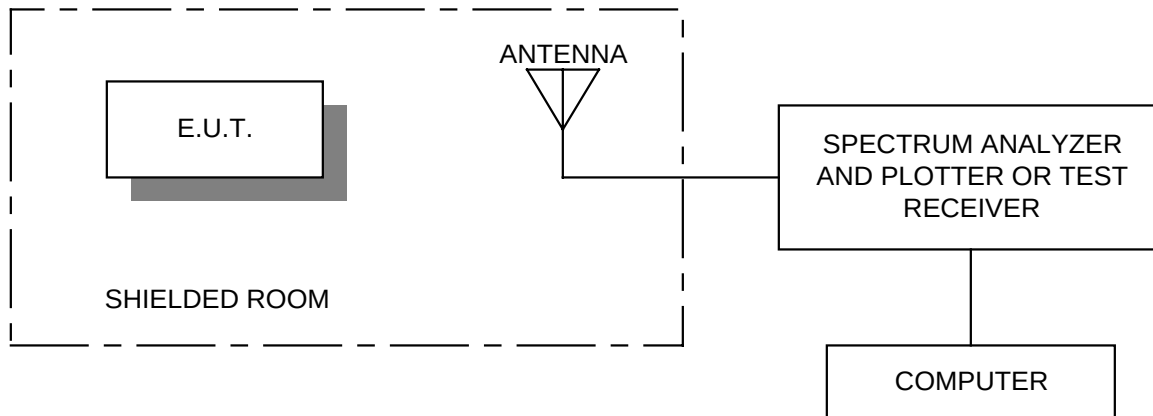
ANNEX A

TEST DIAGRAMS

EQUIPMENT: A710
Conducted Emissions



Radiated Prescan



EQUIPMENT: A710

Test Site For Radiated Emissions

