Nemko Test Report:	3L0043RUS1
Applicant:	Four Star Marketing
Equipment Under Test: (E.U.T.)	315 MHz Keyfob Transmitter
In Accordance With:	**FCC Part 15, Subpart C** For Low Power Transmitters Operating Periodically In The Band 40.66 - 40.77 MHz And Above 70 MHz
Tested By:	Nemko Dallas, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 Tom Tidwell, Frontline Manager
Date:	3/7/03
Total Number of Pages:	20

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Section 1. Summary of Test Results

Manufacturer: Four Star Marketing

Model No.: 315 MHz Keyfob Transmitter

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 Part 15, Subpart C, Paragraph 15.231. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

☒ 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

Summary Of Test Data

Transmission Requirements	15.231(a)	Complies
Radiated Emissions	15.231(b)	Complies
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	N/A
Alternate Field Strength Requirements	15.231(e)	N/A
Powerline Conducted Emissions	15.207	N/A

Footnotes:

1) The device does not operate within the frequency band 40.66-40.70 MHz.
2) The device does not operate periodically.
3) The device is battery powered.

Section 2. Equipment Under Test (E.U.T.)

General Equipment Information

	315 MHz
	315 MHz
	Digital
	3 Volt battery
	-21.8 dB

Description of E.U.T.

The device is a keyfob transmitter used to turn on a lighting device.

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

Justification

The E.U.T. was configured for testing as per typical installation.

The following combinations were investigated to establish worst case configuration:

(1) Lying flat (Worst case)

(2) Upright

(3) On edge.

Exercise Mode

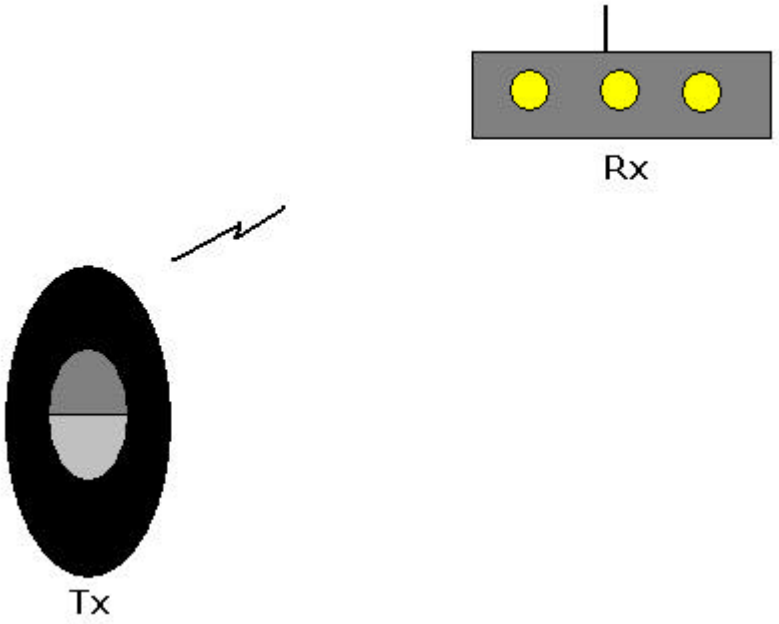
The E.U.T. exercise mode used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

Exercise mode:

(1) Tx on

Section 3. Equipment Configuration

Configuration of the Equipment Under Test (E.U.T)



Section 4. Transmission Requirements

NAME OF TEST: Transmission Requirements	PARA. NO.: 15.231(a)
TESTED BY: David Light	DATE: 4/2/03

Minimum Standard:

15.231(a) Continuous transmissions such as voice, video or data transmissions are not permitted.

15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds after being released.

15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

15.231(a)(3) Periodic transmissions at regular pre-determined intervals are not permitted. However polling or supervisory transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

15.231(a)(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

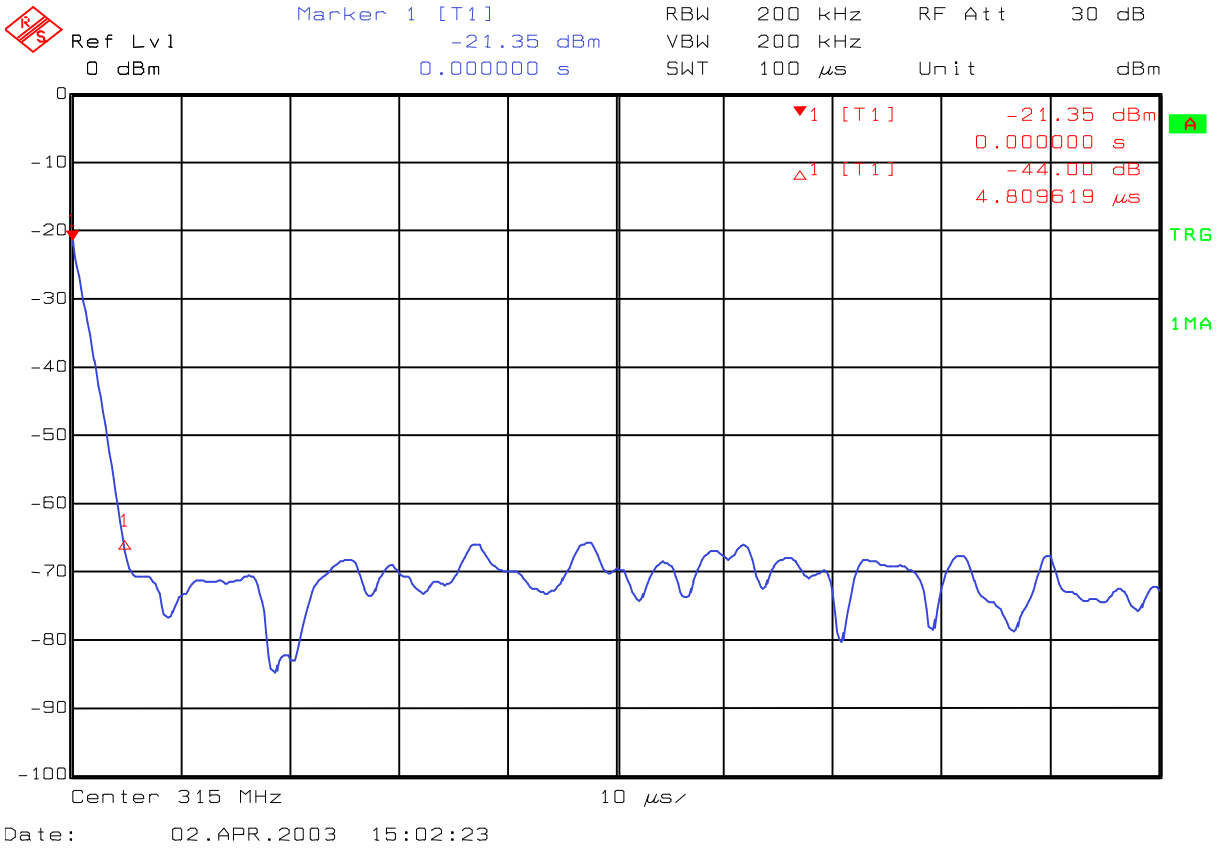
Test Results: Complies.

Test Data: Compliance was determined by verification of technical specifications and a functional test on the equipment.

Rationale for Compliance with Transmission Requirements

15.231(a)(1) **15.231(a)(2) :**	☒ Manual activation ☐ Automatic activation	TX deactivation time: 4.81 µS
15.231(a)(3) :	☐ Regular, predetermined transmissions ☐ Polling or supervisory transmissions	TX rate and duration: N/A No regular intervals or supervisory transmissions.
15.231(a)(4) :	☐ Alarm device operating during the pendancy of alarm condition	
	☒ Non-alarm device	

Release Time



Section 5. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.231(b)
TESTED BY: David Light	DATE: 4/2/03

Minimum Standard:

Permissible Field Strength Limits (Momentarily Operated Devices

Fundamental Frequency (MHz)	Field Strength of Fundamental Microvolts/Meter at 3 meters; (watts)	Field Strength of Unwanted Emissions Microvolts/Meter at 3 meters; (watts)
40.66 - 40.70	2,250	225
70-130	1, 250	125
130-174	1,250 to 3,750*	125 to 375
174-260 (note 1)	3,750	375
260-470 (note 1)	3,750 to 12,500*	375 to 1,250
Above 470	12,500	1,250

Notes:

# Use quasi-peak or averaging meter.	*For 130 - 174 MHz: FS (microvolts/m) = (56.82 x F) - 6136*
** Linear interpolation with frequency F in MHz*	*For 260 - 470 MHz: FS (microvolts/m) = (41.67 x F) - 7083*

Test Results: Complies

Test Data: See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 1 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

Test Data - Radiated Emissions

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 2

Complete ____
Preliminary: ____

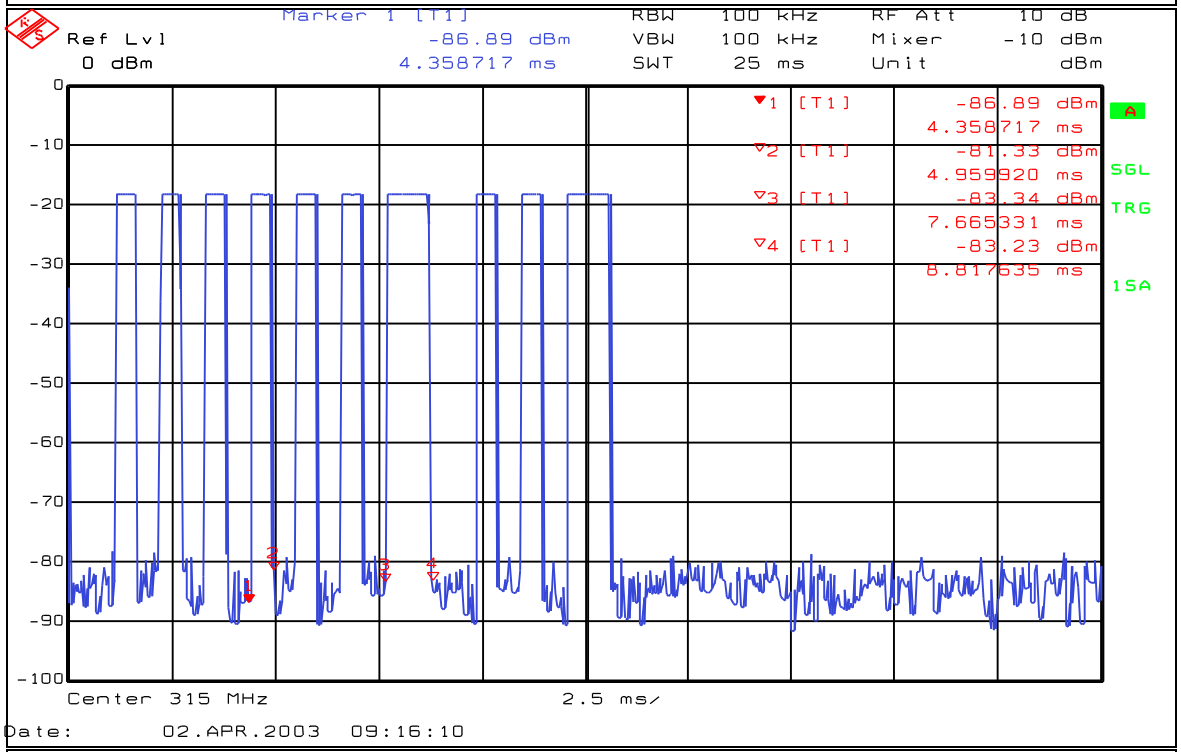
Job No.:	3L0043R	Date:	4/2/2003
Specification:	15.231	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	315 MHz Transmitter		
Configuration:	Tx		
Sample Number:	1		
Location:	Lab 2	RBW:	100 kHz
Detector Type:	Sample	VBW:	100 kHz

Measurement Distance: na m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1045
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: 802
Measurement Uncertainty: +/-1.7 dB



Notes:
One pulse train
Narrow pulse 601.2 uS each (8 pulses per train) = 4.81 mS total
Wide pulse 1.15 mS each (2 pulses per train) = 2.30 mS total

Test Data - Radiated Emissions

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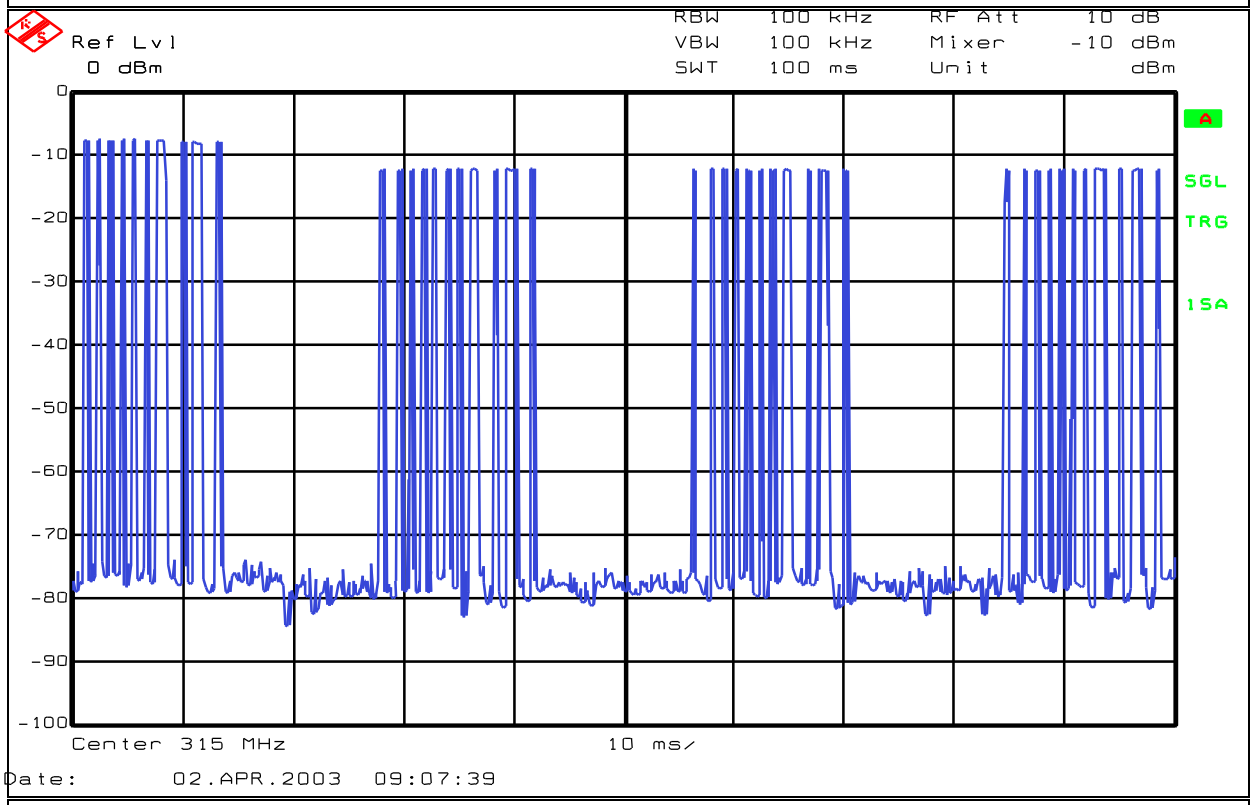
Nemko Dallas, Inc.

Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 2

Job No.:	3L0043R	Date:	4/2/2003
Specification:	15.2	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	315 MHz Transmitter		
Configuration:	Tx		



Notes: **4 pulse trains per 100 mS**
20log(28.44/100) = 21.8 dB correction

Test Data - Radiated Emissions

NEMKO Dallas, Inc.

Dallas Headquarters:
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Radiated Emissions Data

Complete X
Preliminary

Job # : 3L0043R
Page 1

Test # : RADIATED
of 1

Client Name : FOUR STAR MARKETING
EUT Name : 315 MHz KEYFOB TRANSMITTER
EUT Model # : NONE
EUT Part # : NONE
EUT Serial # : NONE
EUT Config. : TX ON - LYING FLAT (WORST CASE)

Specification : 15.231
Reference :

Horn Ant. #: 1304
Bicon Ant.#:
Log Ant.#: 1034
Bilog Ant.#: NA
Dipole Ant.#: NA
Cable#: 1514
Preamp#: 1016
Limiter#: NA
Atten #: NA
Detector#: 1464

Temp. (deg. C) : 22
Humidity (%) : 40
EUT Voltage : 3
EUT Frequency : DC
Phase:
Location: BOATS & AC3
Distance: 3

Date : 4/2/2003
Time : 4:00
Staff : D. LIGHT
Photo ID: NONE
Peak Bandwidth: 100 kHz
Video Bandwidth 100kHz

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Atten. (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
315	H	-21.8	54.2	18.5	4.8	0.0	55.7	75.6	-19.9	Pass	
315	V	-21.8	40.8	18.5	4.8	0.0	42.3	75.6	-33.3	Pass	
630	H	-21.8	37.3	19.7	7.3	0.0	42.5	55.6	-13.1	Pass	
630	V	-21.8	30.6	19.7	7.3	0.0	35.8	55.6	-19.8	Pass	
945	H	-21.8	60.7	23.1	2.0	30.0	34.0	55.6	-21.6	Pass	
945	V	-21.8	46.2	23.1	2.0	30.0	19.5	55.6	-36.1	Pass	
1260	H	-21.8	62.7	24.3	1.6	31.4	35.4	55.6	-20.2	Pass	
1260	V	-21.8	46.9	24.3	1.6	31.4	19.6	55.6	-36.0	Pass	
1575	H	-21.8	61.5	24.3	2.4	32.4	34.0	55.6	-21.6	Pass	
1575	V	-21.8	46.4	24.3	2.4	32.4	18.9	55.6	-36.7	Pass	
1890	H	-21.8	50.3	27.9	2.9	32.9	26.4	55.6	-29.2	Pass	
1890	V	-21.8	39.2	27.9	2.9	32.9	15.3	55.6	-40.3	Pass	
2205	H	-21.8	51.5	27.9	2.8	32.7	27.7	55.6	-27.9	Pass	
2205	V	-21.8	46.9	27.9	2.8	32.7	23.1	55.6	-32.5	Pass	
2520	H	-21.8	45.9	28.2	3.1	32.9	22.5	55.6	-33.1	Pass	
2520	V	-21.8	40.7	28.2	3.1	32.9	17.3	55.6	-38.3	Pass	
2835	H	-21.8	39.9	30	3.7	33.1	18.7	55.6	-36.9	Pass	
2835	V	-21.8	38.7	30	3.7	33.1	17.5	55.6	-38.1	Pass	
3150	H	-21.8	36.6	30	3.7	32.7	15.8	55.6	-39.8	Pass	
3150	V	-21.8	37.9	30	3.7	32.7	17.1	55.6	-38.5	Pass	

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Radiated Photographs (Worst Case Configuration)

Section 6. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY: David Light	DATE: 4/2/03

Minimum Standard: 15.231(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Results: Complies. See attached graph.

Test Data: See attached graph.

Test Data – Occupied Bandwidth

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Occupied Bandwidth**

Page 1 of 1 Complete ____

Job No.: 3L0043R Date: 4/2/2003 Preliminary: ____

Specification: 15.231 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: 315 MHz Transmitter

Configuration: Tx

Sample Number: 1

Location: Lab 2 RBW: Refer to plots Measurement

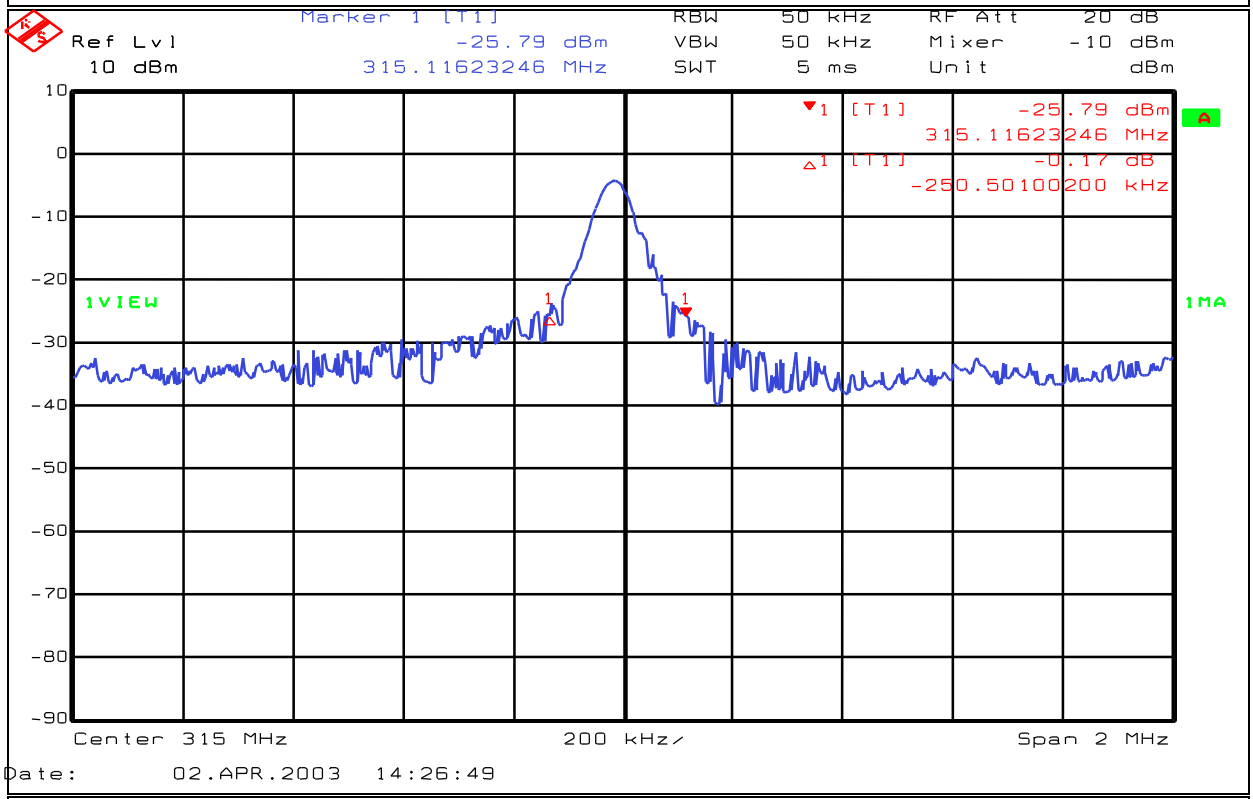
Detector Type: Peak VBW: Refer to plots Distance: na m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1045
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used: 802

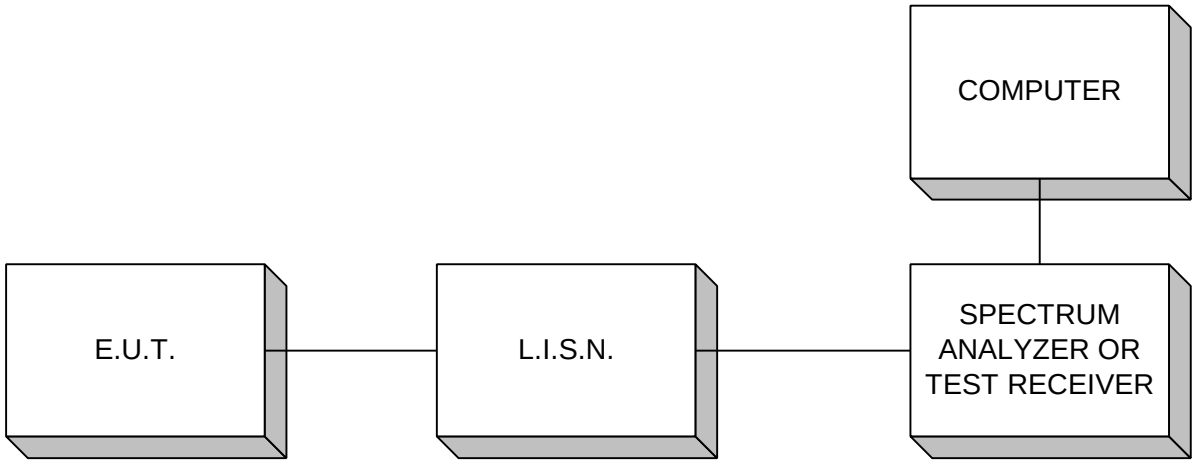
Measurement Uncertainty: +/-1.7 dB



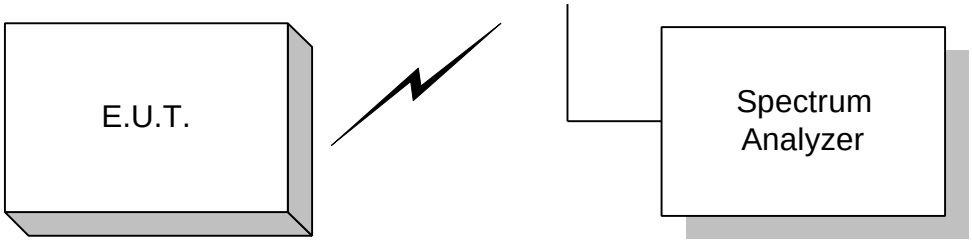
Notes:

Section 7. Block Diagrams

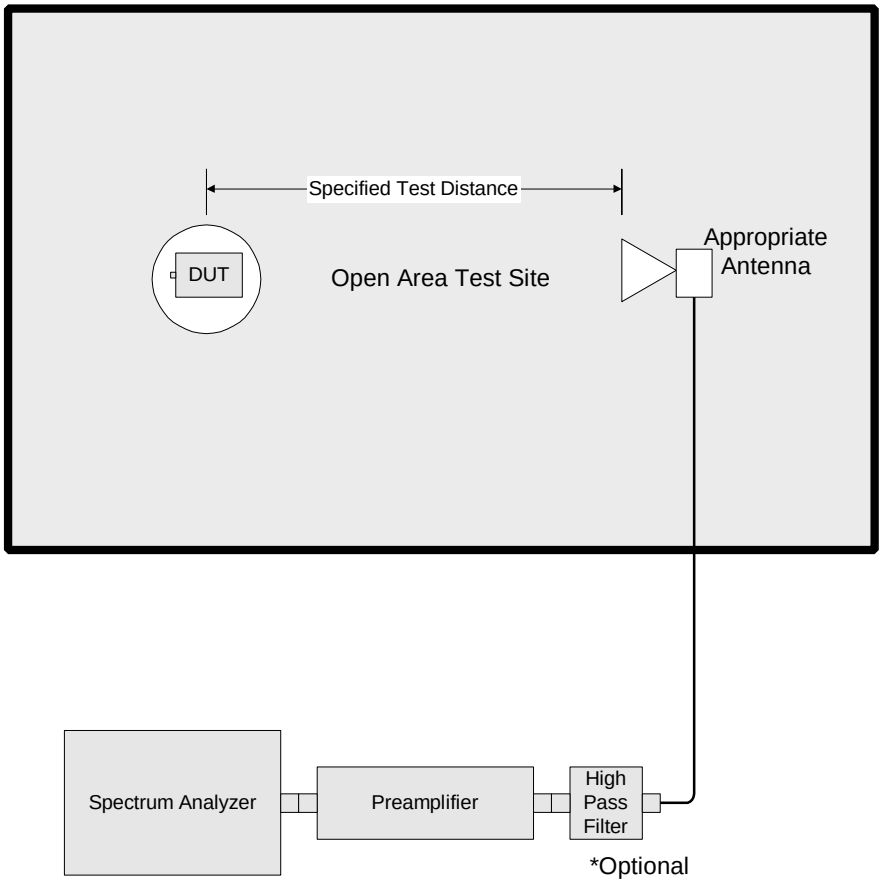
Conducted Emissions



Occupied Bandwidth, Duty Cycle

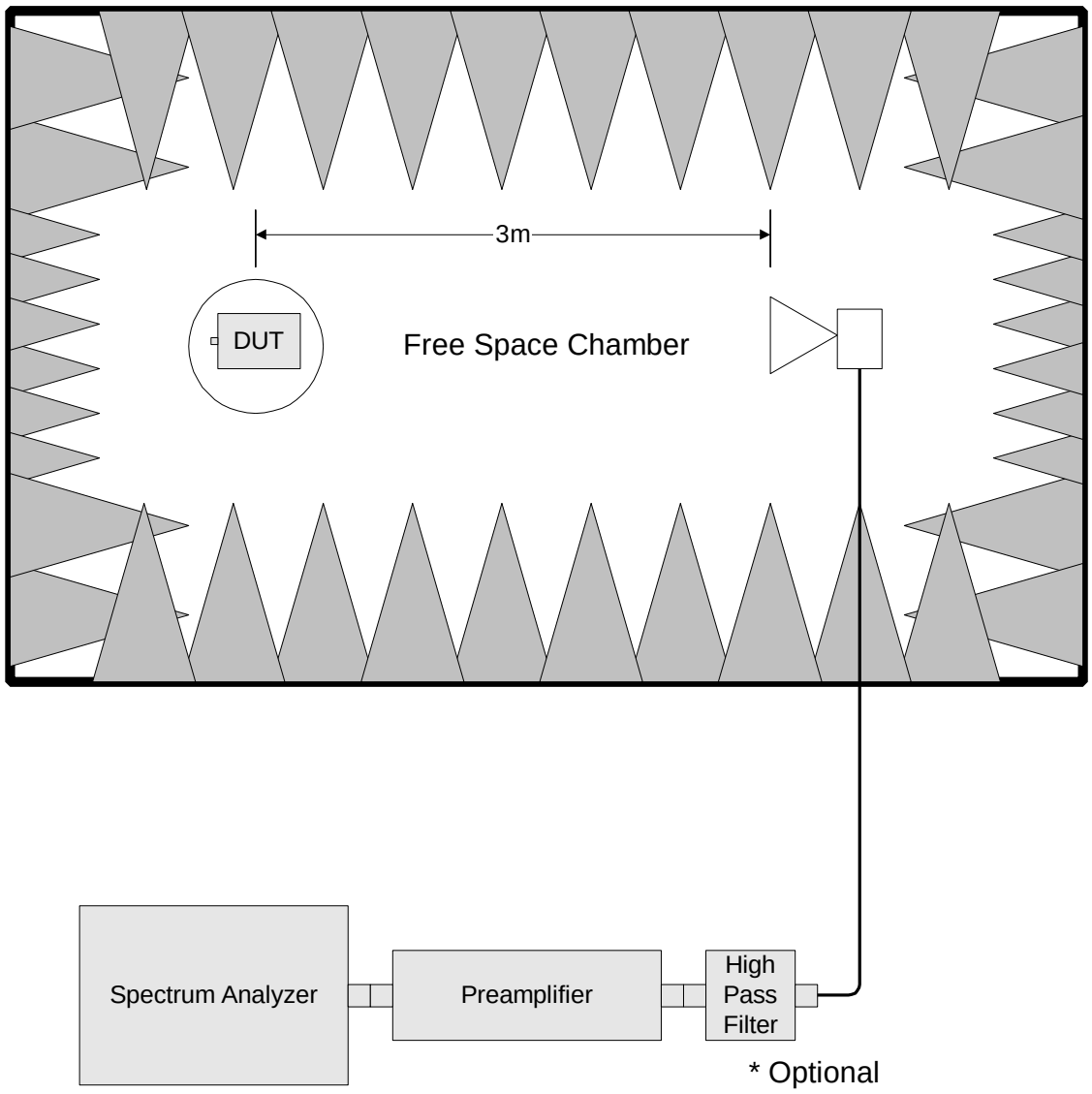


Outdoor Test Site For Radiated Emissions



Radiated Emissions 30 MHz - 1 GHz

The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation.



Radiated Emissions above 1 GHz

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	12/18/01	12/19/03
802	Near Field Probe Set	EMCO 7405	103	N/A	N/A
1045	CABLE 2m	Astrolab Inc. 32027-2-29094-72TC	N/A	CBU	N/A
1034	ANTENNA,LP	A.H. SYSTEMS SAS-200/510	121	05/09/02	05/09/03
1514	CABLE ASSY, LAB 2- B OATS	KTL SITE B OATS	N/A	03/28/03	03/27/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	07/15/02	07/15/03
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	07/30/01	07/31/03