



Nemko Test Report: 10213664RUS1rev1

Applicant: Overhead Door Corporation
TREQ Center, Suite B2170 French Settlement Rd.
Dallas, TX 75212
USA

**Equipment Under Test:
(E.U.T.)** Genie - GIWC / OHD - OAWC

FCC ID.: B8Q-95AW
IC: 2133A-915AW

In Accordance With: **FCC Part 15, Subpart C, 15.247 and Industry
Canada RSS 210, Issue 8**
Frequency Hopping Transmitters

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

TESTED BY:

A handwritten signature in black ink, appearing to read 'David Light'.

David Light, Senior Wireless Engineer

DATE: 16-Sep-2011

APPROVED BY:

A handwritten signature in black ink, appearing to read 'Michael Cantwell'.

Mike Cantwell, GM

DATE: 21-Sep-2011

Total Number of Pages: 34

Record of document revisions

Rev.	Comment	Author	Date
1	Changed model number of EUT and added FCC and IC certification numbers	Light	2/27/12

Table of Contents

SECTION 1.	SUMMARY OF TEST RESULTS	4
SECTION 2.	EQUIPMENT UNDER TEST (E.U.T.)	6
SECTION 3.	CHANNEL SEPARATION	8
SECTION 4.	TIME OF OCCUPANCY	13
SECTION 6.	PEAK POWER OUTPUT	16
SECTION 6.	SPURIOUS EMISSIONS (ANTENNA CONDUCTED)	17
SECTION 7.	SPURIOUS EMISSIONS (RADIATED)	23
SECTION 8.	POWERLINE CONDUCTED EMISSIONS	24
SECTION 9.	RECEIVER SPURIOUS EMISSIONS	29
SECTION 10.	TEST EQUIPMENT LIST	31
ANNEX A -	TEST DIAGRAMS	32

Section 1. Summary of Test Results

Manufacturer: Overhead Door Corporation

Model No.: Genie- GIWC / OHD-OAWC

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 15.247 and RSS 210, Issue 8 for Frequency Hopping Spread Spectrum devices. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC and with Industry Canada.



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.

See " Summary of Test Data".



Nemko USA, Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety, for use by the company's employees only.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Nemko USA, Inc. is a NVLAP accredited laboratory.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko USA, Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
Powerline Conducted Emissions	15.207(a), RSS Gen 7.2.4	Complies
Channel Separation	15.247(a)(1), RSS 210 A8.1	Complies
Time of Occupancy	15.247(a)(1), RSS 210 A8.1	Complies
20 dB Occupied Bandwidth	15.247(a)(1), RSS 210 A8.1	Complies
Peak Power Output	15.247(b), RSS 210 A8.4	Complies
Spurious Emissions (Conducted)	15.247(d), RSS 210 A8.5	Complies
Spurious Emissions (Radiated)	15.247(d), RSS-Gen 7.2.2	Complies
Receiver Spurious Emissions	RSS-Gen 6.1	Complies

Footnotes:

Note: Models AWC-36865R and AWC-36870R are identical except for plastic enclosure and are marketed under the brand names Genie and Overhead Door respectively.

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

General Equipment Information

Frequency Band: ☒ 902 – 928 MHz
 ☐ 2400 – 2483.5 MHz
 ☐ 5725 – 5850 MHz

Operating Frequency Range: 903.9 to 925.6 MHz

Number of Channels: 51

Channel Spacing: 384 kHz

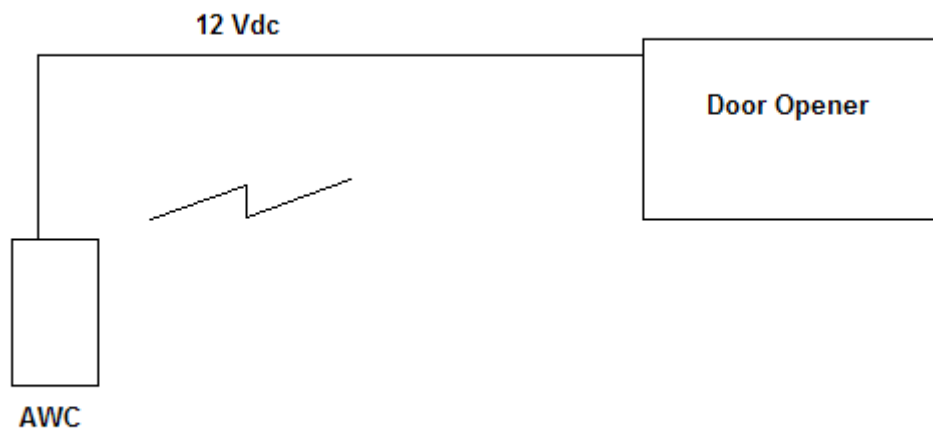
20 dB Bandwidth: 86 kHz

User Frequency Adjustment: Software controlled

Description of EUT

900 MHz wireless controller for garage door operator.

System Diagram



Section 3. Channel Separation

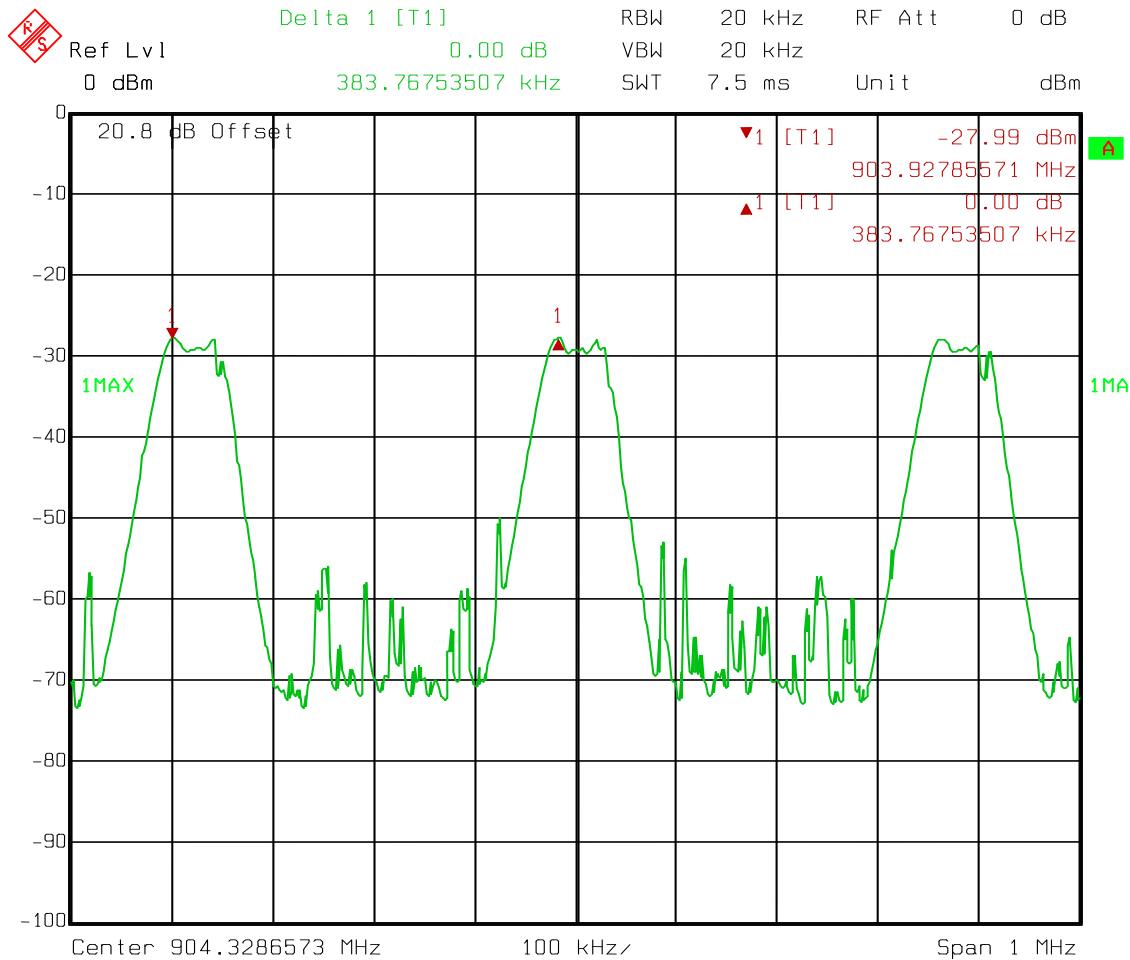
NAME OF TEST: Channel Separation	15.247(a)(1) RSS 210, A8.1
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies.**Measurement Data:** See 20 dB BW plot

Measured 20 dB bandwidth:	86 kHz
Channel Separation:	384 kHz

Equipment Used: 1767-1082-1472**Measurement Uncertainty:** 1×10^{-7} ppm**Temperature:** 22 °C**Relative Humidity:** 45 %

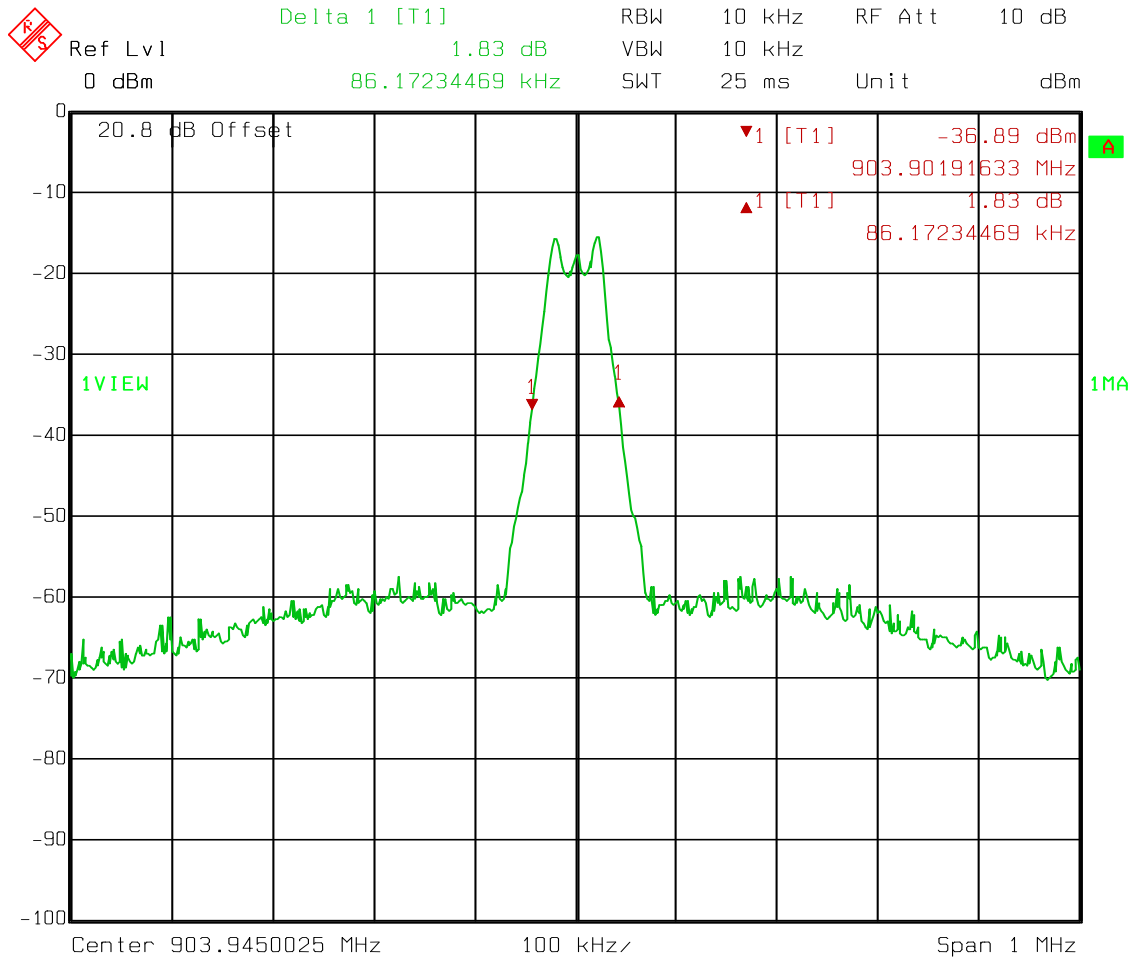
Test Data – Channel Separation



Date: 09.SEP.2011 09:21:20

Test Data – 20 dB Bandwidth

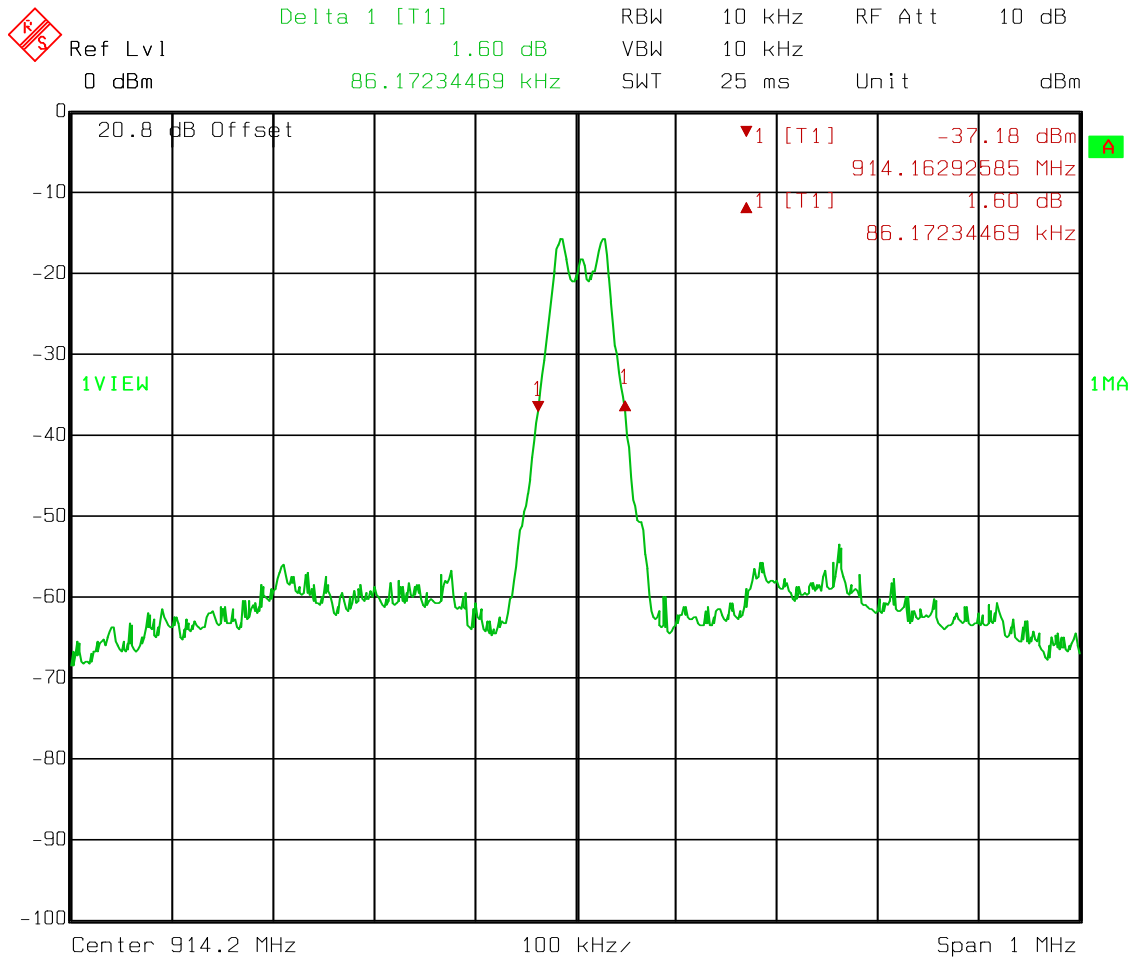
Low Channel



Date: 09.SEP.2011 08:40:15

Test Data – 20 dB Bandwidth

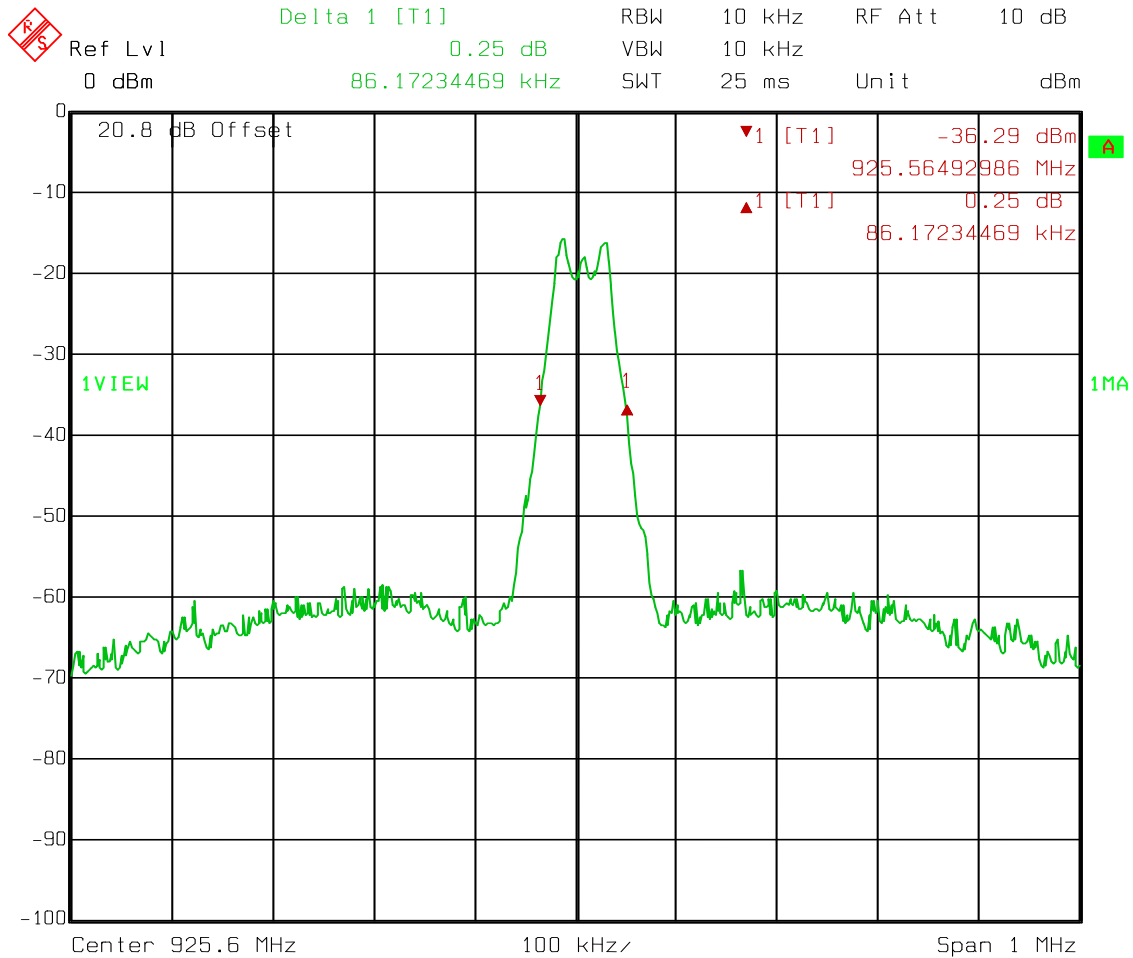
Mid Channel



Date: 09.SEP.2011 09:06:50

Test Data – 20 dB Bandwidth

High Channel



Date: 09.SEP.2011 09:09:47

Section 4. Time of Occupancy

NAME OF TEST: Time of Occupancy	15.247(a)(1) RSS 210, A8.1
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies.

Measurement Data:

Maximum Dwell Time On Any Channel: 390 ms in 20 seconds

Equipment Used: 1767-1082-1472

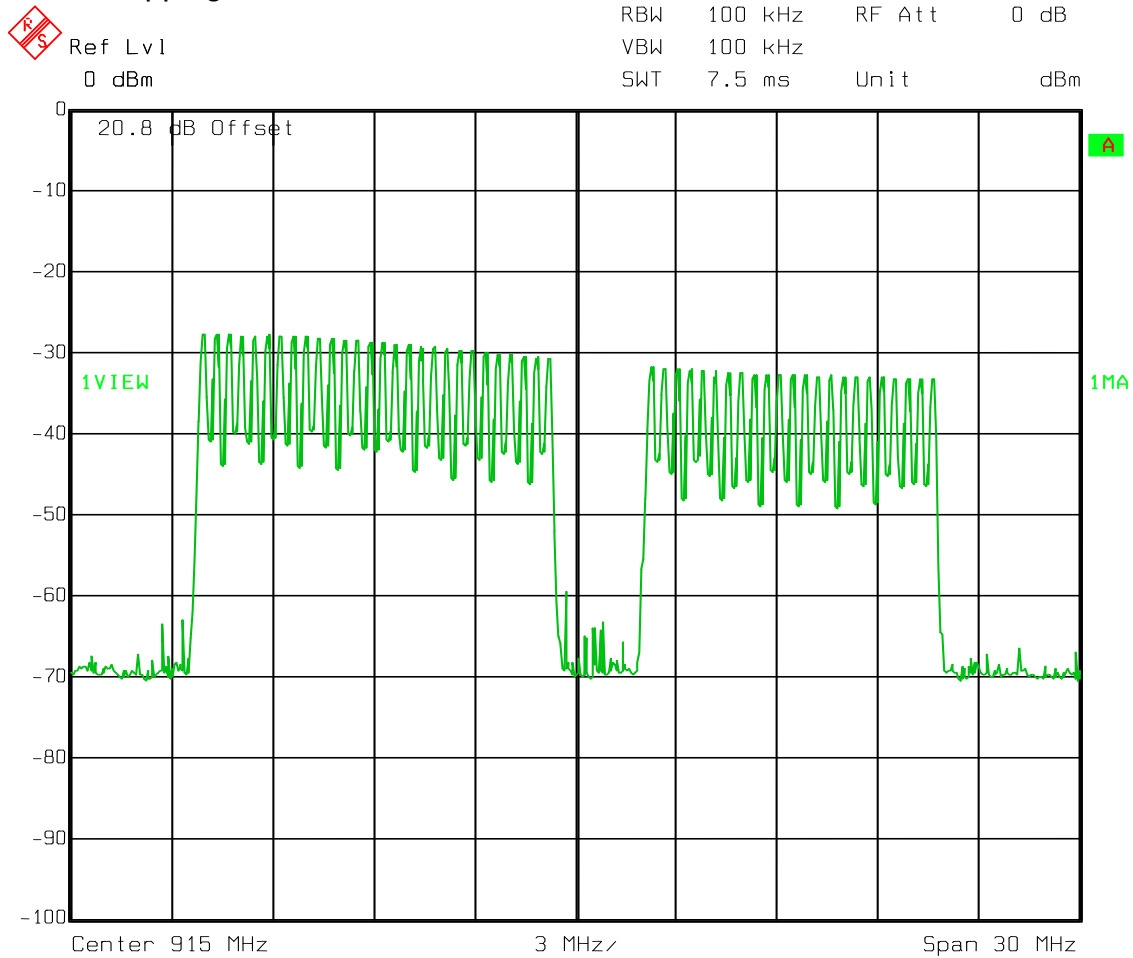
Measurement Uncertainty: 1X10⁻⁷ppm

Temperature: 22 °C

Relative Humidity: 45 %

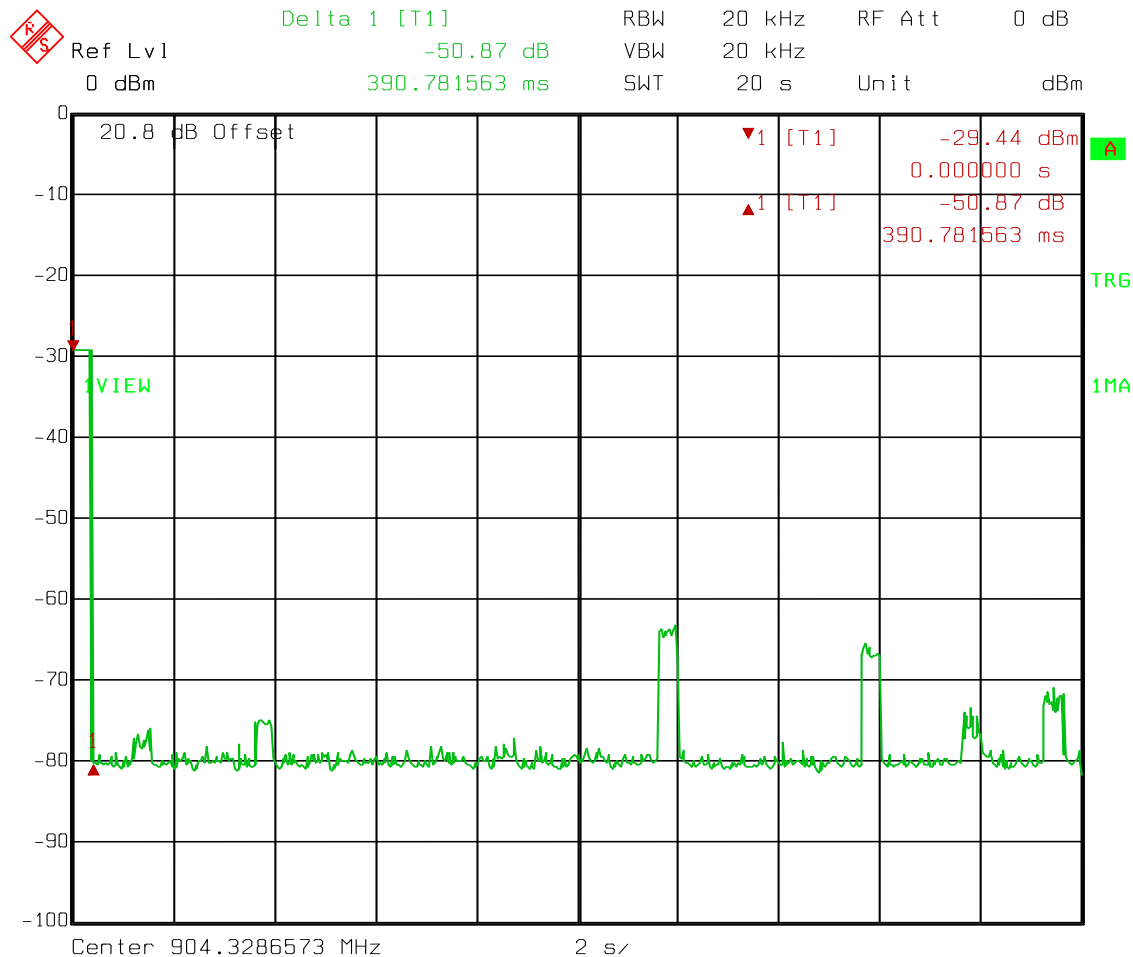
Test Data – Time of Occupancy

Number of hopping channels = 51



Date: 09.SEP.2011 09:15:39

Test Data – Time of Occupancy



Date: 09.SEP.2011 09:25:40

Section 6. Peak Power Output

NAME OF TEST: Peak Power Output	15.247 (b)
	RSS 210, A8.4
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies.

Measurement Data: See attached plots.

Detachable antenna? ☐ Yes ☒ No

If yes, state the type of non-standard connector used:

Antenna Type: Printed Monopole T type

Frequency (MHz)	Peak Power (dBm)	Peak Power (mW)		Gain (dBi)	E.I.R.P. (dBm)	E.I.R.P. (mW)
903.95	-15.4	0.03		2.0	-13.4	0.05
914.20	-15.5	0.03		2.0	-13.5	0.04
925.60	-15.5	0.03		2.0	-13.5	0.04
Maximum EIRP (mW): 0.05						

☒ This device was tested at +/- 15% input power per 15.31(e), with no variation in output power.

☐ For battery powered equipment, the device was tested with a fresh battery per 15.31(e).

☒ The device was tested on three channels per 15.31(l).

Spectrum analyzer settings:

RBW/VBW: 5 MHz

Detector: Max. Peak

Equipment Used: 1767-1082-1472

Measurement Uncertainty: 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

Section 6. Spurious Emissions (Conducted)

NAME OF TEST: Spurious Emissions (Conducted)	15.247(d) RSS 210, A8.5
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies.

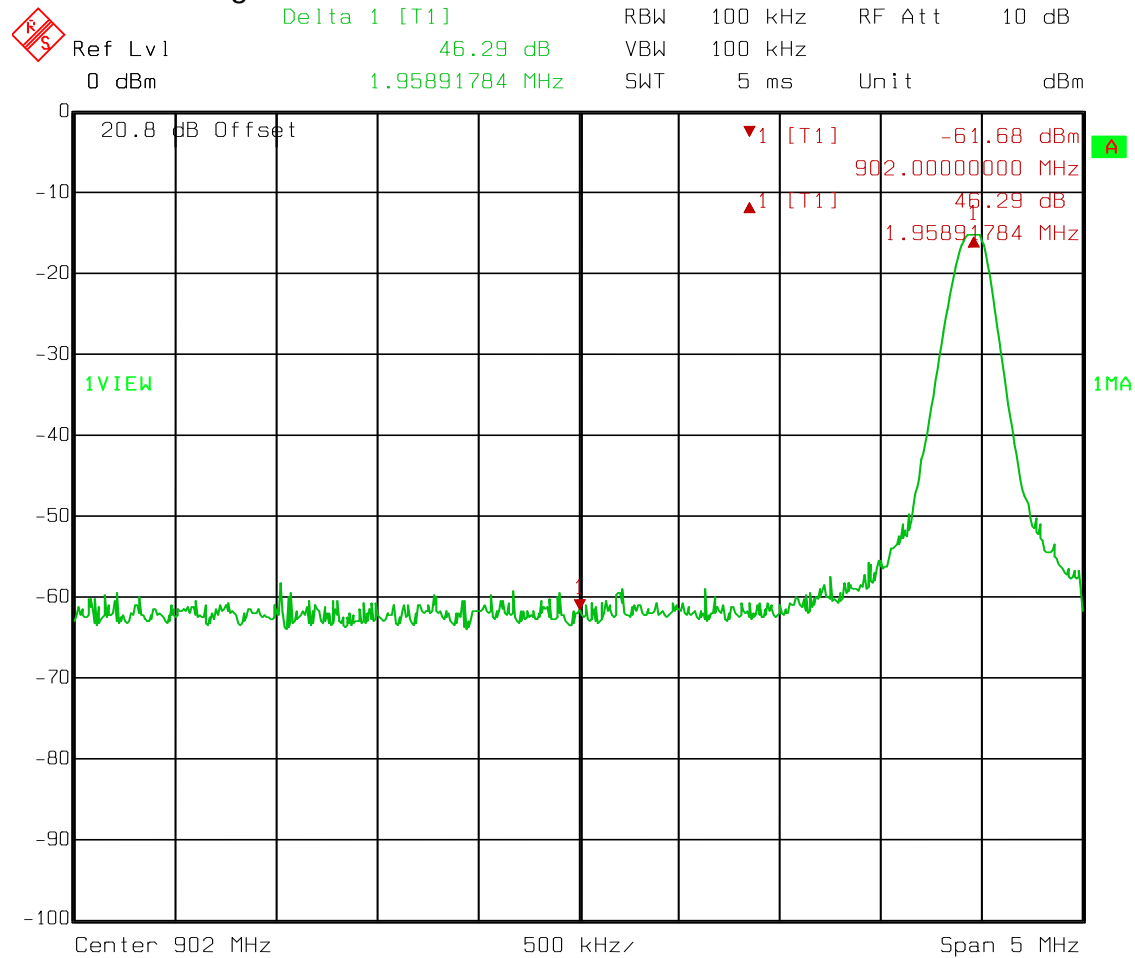
Measurement Data: See attached plots.

Equipment Used: 1767-1472-1082

Measurement Uncertainty: 1×10^{-7} ppm

Temperature: 22 °C

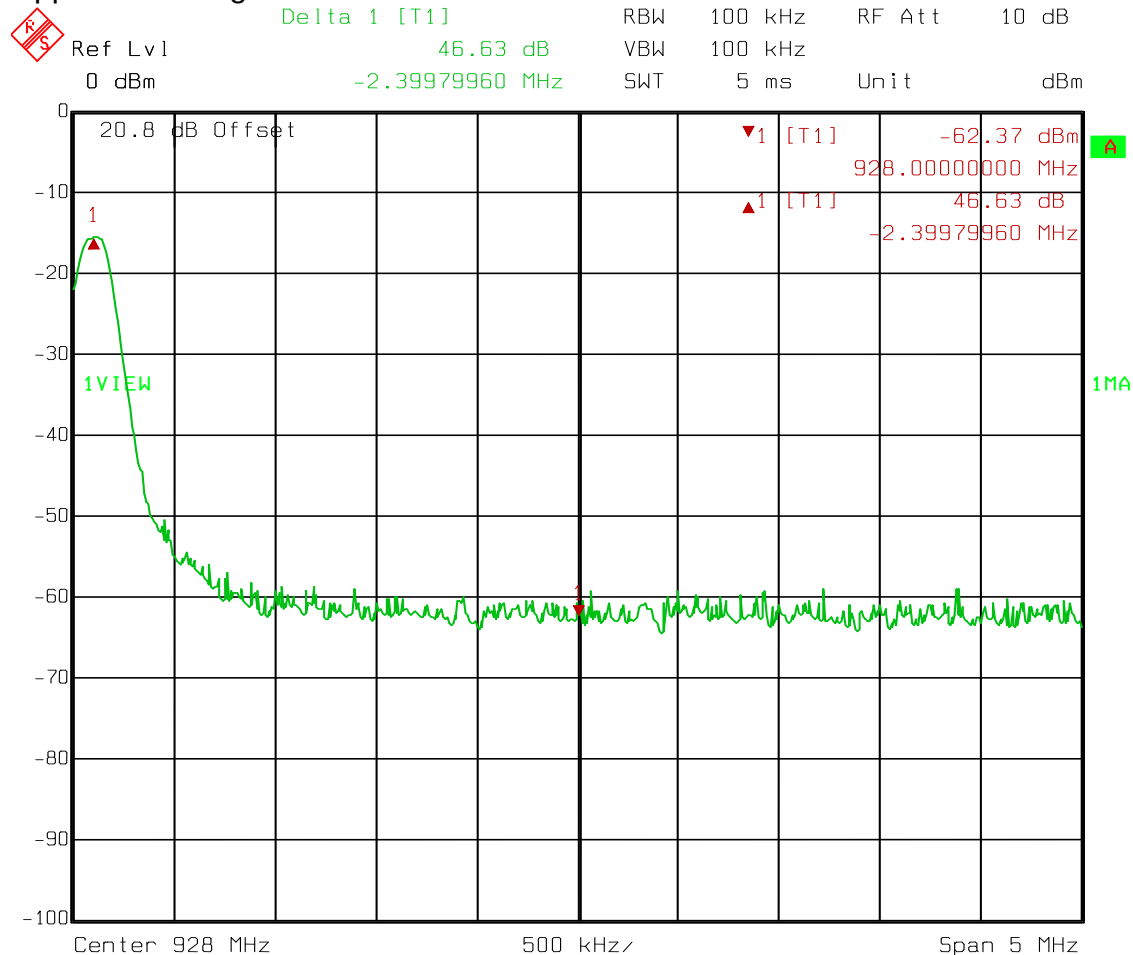
Relative Humidity: 45 %

Test Data – Spurious Emissions at Antenna Terminals**Lower Band Edge**

Date: 09.SEP.2011 08:36:41

Test Data – Spurious Emissions at Antenna Terminals

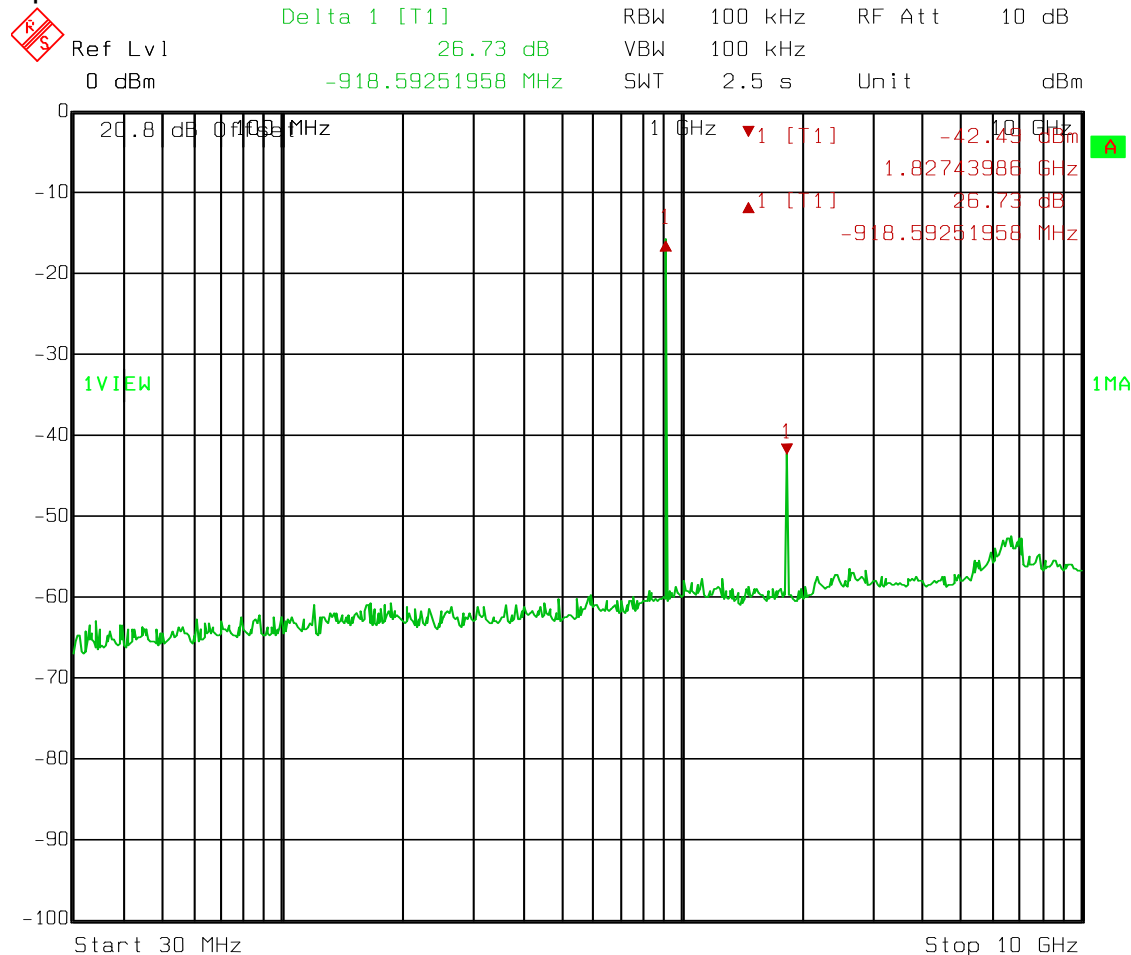
Upper Band Edge



Date: 09.SEP.2011 09:08:07

Test Data – Spurious Emissions at Antenna Terminals

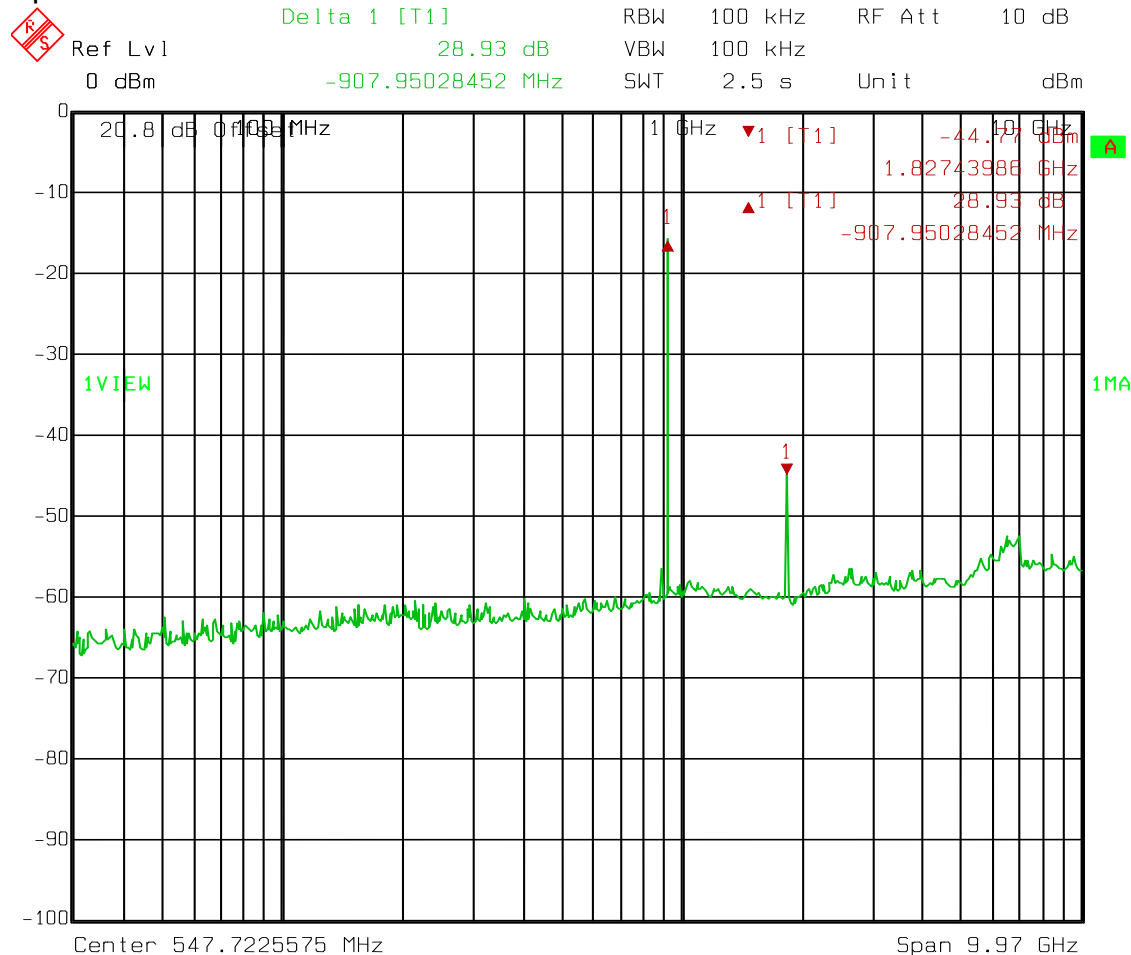
Spurs – Low Channel



Date: 09.SEP.2011 08:41:54

Test Data – Spurious Emissions at Antenna Terminals

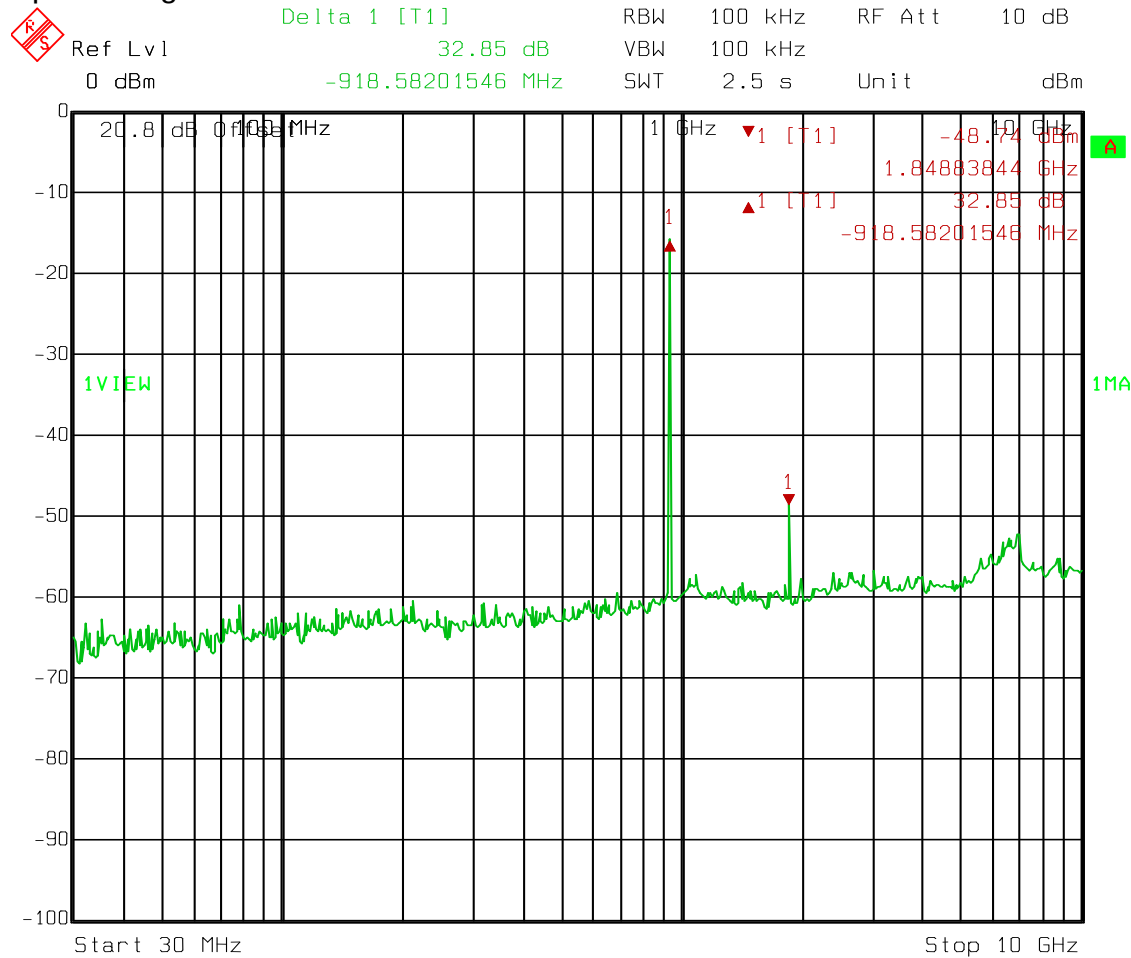
Spurs – Mid Channel



Date: 09.SEP.2011 09:05:20

Test Data – Spurious Emissions at Antenna Terminals

Spurs – High Channel



Date: 09.SEP.2011 09:11:31

Section 7. Spurious Emissions (Radiated)

NAME OF TEST: Spurious Emissions (Radiated)	15.247(d) RSS 210, para. 2.1
TESTED BY: David Light	DATE: 09 September 2011

Test Results:

Complies.

Test Data:

No emissions were detected within 20 dB of the specification limit therefore none are reported per 15.31(o).

Freq. Range (MHz)	RBW (MHz)	VBW (MHz)	Meas. Type	Detector
30-1000	0.100	0.100	QP	Peak
>1000	1.0	1.0	Peak	Peak
>1000	1.0	0.001	Average	Peak

Notes:

- ☐ For handheld devices, the EUT was tested on three orthogonal axis'
- ☒ The device was tested from 30 MHz to the tenth harmonic of the highest fundamental frequency per 15.33
- ☒ The device was tested on three channels per 15.31(l).

Spectrum Analyzer settings:

RBW/VBW: 100 kHz below 1 GHz, 1 MHz above 1 GHz

Detector: Max. Peak

Equipment Used: 1767-1783-993-1016**Measurement Uncertainty:** +/-3.6 dB**Temperature:** 22 °C**Relative Humidity:** 45 %

Section 8. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	15.207(a) RSS GEN
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies. The worst case emission was 51.29 dB μ V at 8.32 MHz. This is 8.7 dB below the quasi-peak specification limit of 60 dB μ V.

Test Data: Refer to attached plots

Equipment Used: 1663-1188-674-704-749

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

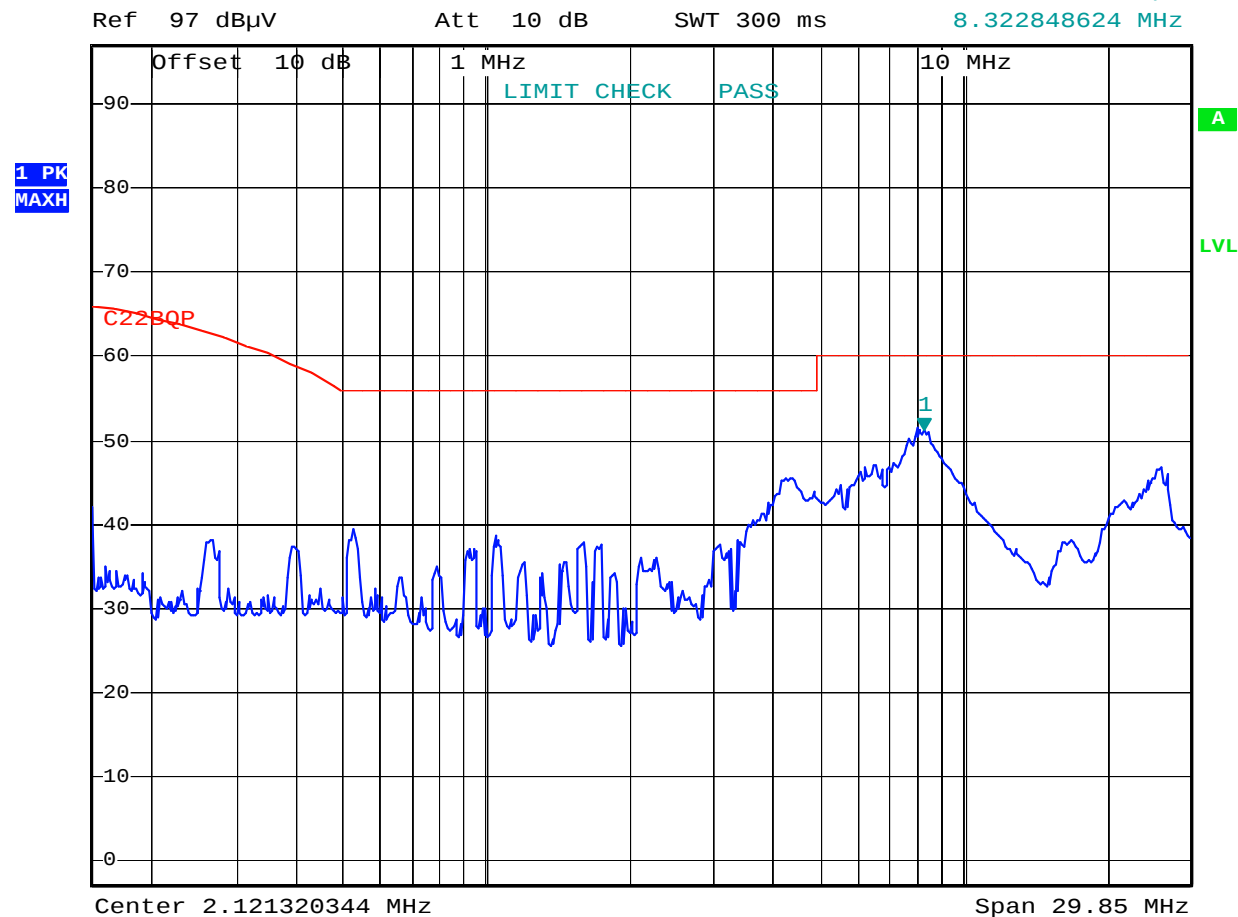
Test Data – Powerline Conducted Emissions

Line 1

Peak



* RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 51.29 dBμV
SWT 300 ms 8.322848624 MHz

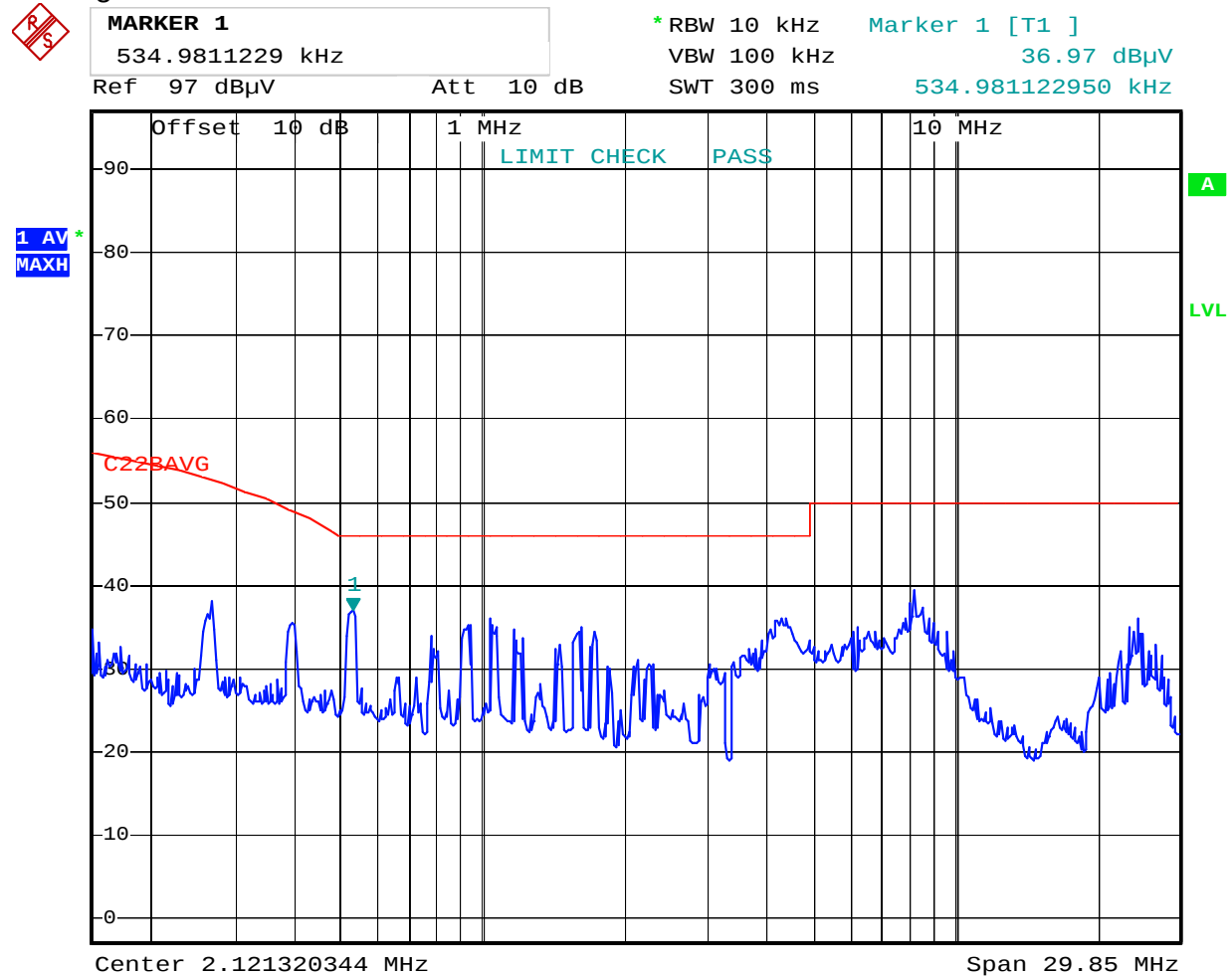


Date: 9.SEP.2011 16:59:09

Test Data – Powerline Conducted Emissions

Line 1

Average

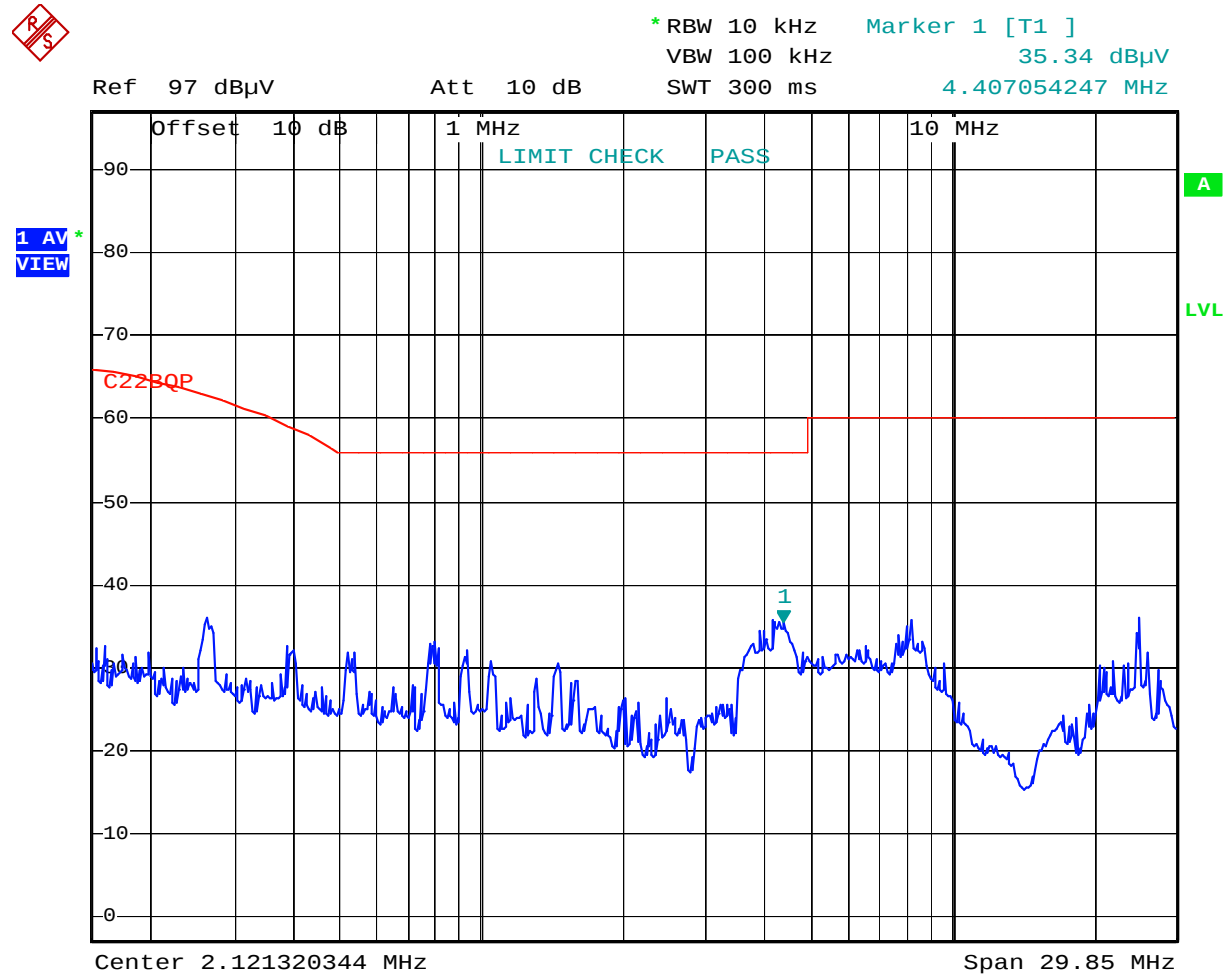


Date: 9.SEP.2011 17:07:25

Test Data – Powerline Conducted Emissions

Line 2

Peak

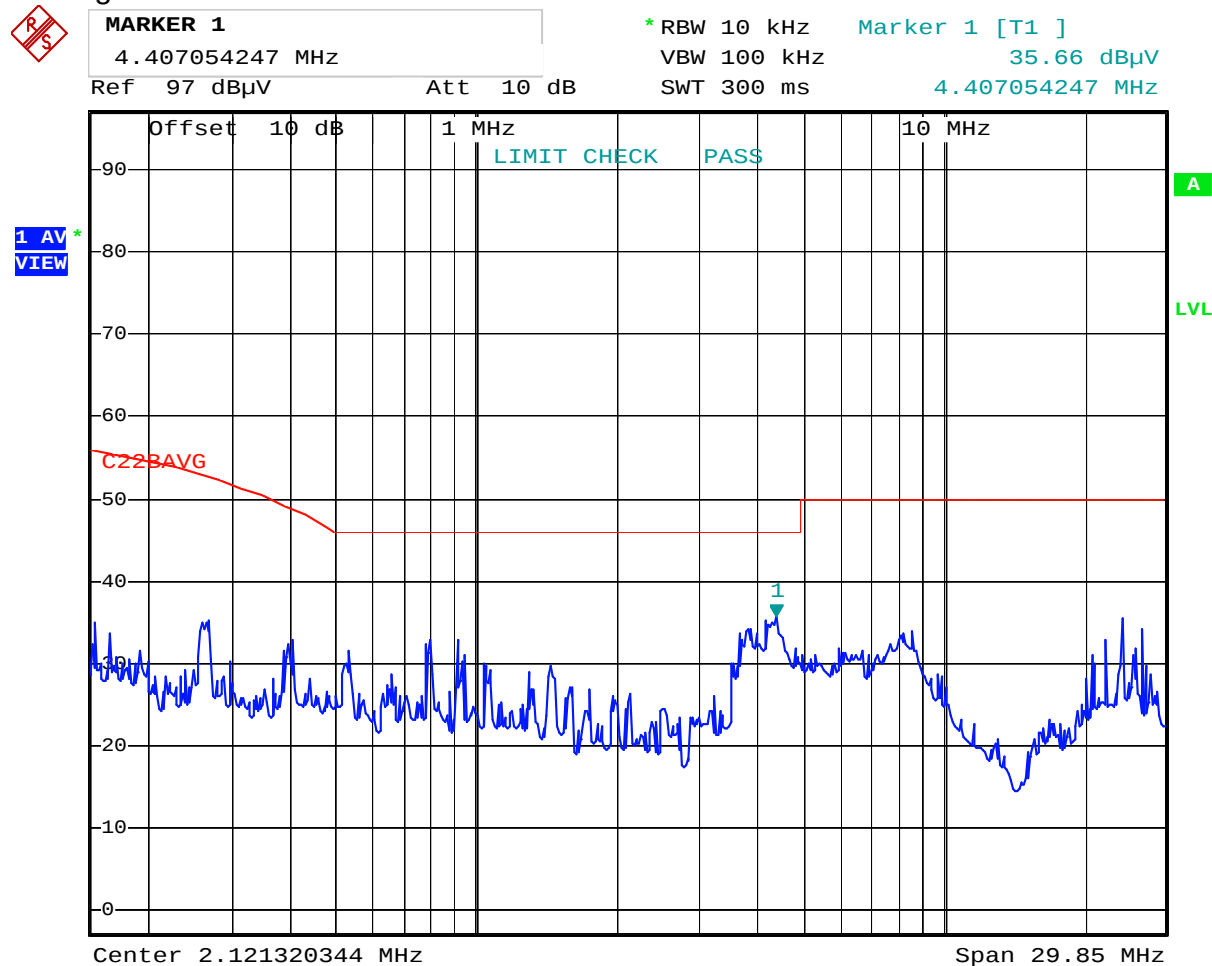


Date: 9.SEP.2011 17:09:28

Test Data – Powerline Conducted Emissions

Line 2

Average



Date: 9.SEP.2011 17:08:33

Section 9. Receiver Spurious Emissions

NAME OF TEST: Receiver Spurious Emissions	RSS-GEN 6.0
TESTED BY: David Light	DATE: 09 September 2011

Test Results: Complies. The worst case emission is 29.6 dB μ V/m at 880.1 MHz. This is 16.4 dB below the specification limit.

Test Data: Refer to attached plots

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Table 1 - Spurious Emission Limits for Receivers

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Spectrum Analyzer settings:

RBW/VBW: 100 kHz below 1 GHz, 1 MHz above 1 GHz

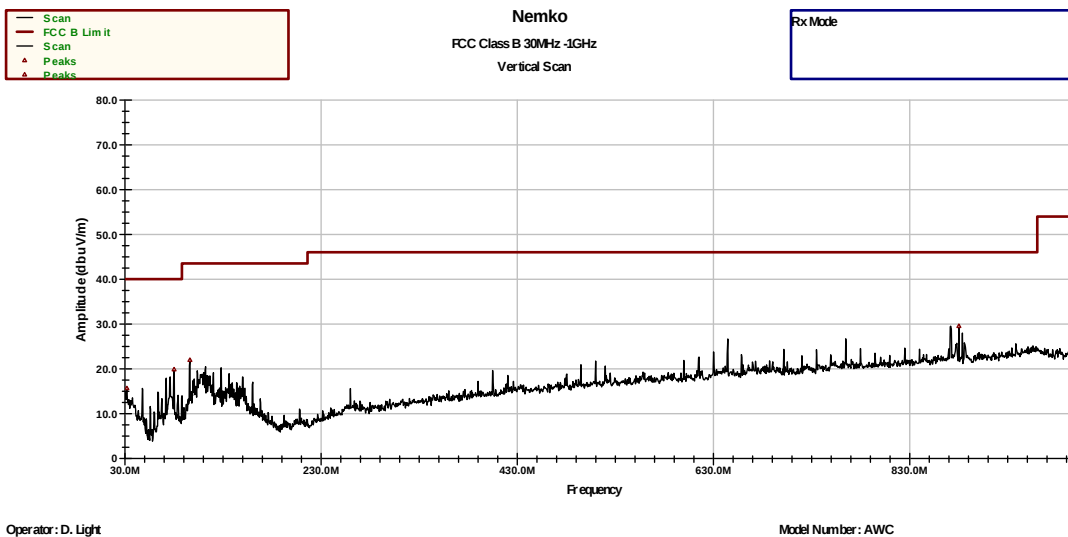
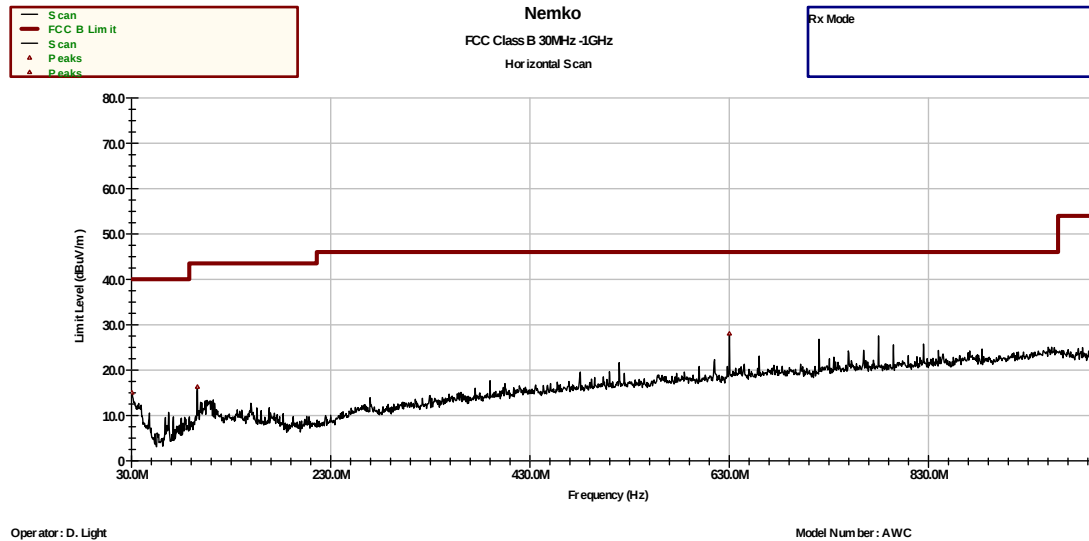
Equipment Used: 1767-1783-1025-1480

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

Test Data – Receiver Spurious Emissions



There were no emissions detected above 1000 MHz.

Section 10. Test Equipment List

Asset Tag	Description	Manufacturer	Model	Serial #	Last Cal	Next Cal
674	Limiter	Hewlett Packard	11947A	3107A02200	26-Oct-2010	26-Oct-2011
704	Filter, High Pass	Solar Electronics	7930-5.0	933126	29-Sep-2010	29-Sep-2011
749	Cable, 4.8m	Nemko USA, Inc.	RG223		25-Feb-2011	25-Feb-2012
993	Antenna, Horn	A.H. Systems	SAS-200/571	162	09-Sep-2009	09-Sep-2011
1016	Preamplifier	Hewlett Packard	8449A	2749A00159	20-Jul-2011	20-Jul-2012
1025	Preamplifier	Nemko USA, Inc.	LNA25	399	23-Feb-2011	23-Feb-2012
1082	Cable, 2m	Astrolab	32027-2-29094-72TC		N/R	
1188	LISN	EMCO	3825/2	1214	25-Oct-2010	25-Oct-2011
1472	Attenuator,	Omni Spectra	20600-20db		N/R	
1480	Antenna, Bilog	Schaffner-Chase	CBL6111C	2572	19-Jan-2011	19-Jan-2012
1663	Spectrum Analyzer	Rohde & Schwartz	FSP3	100073	02-Sep-2011	02-Sep-2013
1767	Receiver	Rohde & Schwartz	ESIB26	837491/0002	01-Dec-2010	01-Dec-2011
1783	Cable Assy, 3m Chamber	Nemko	Chamber		04-Oct-2010	04-Oct-2011

Nemko USA, Inc.

FCC PART 15, SUBPART C
and RSS 210, ISSUE 8

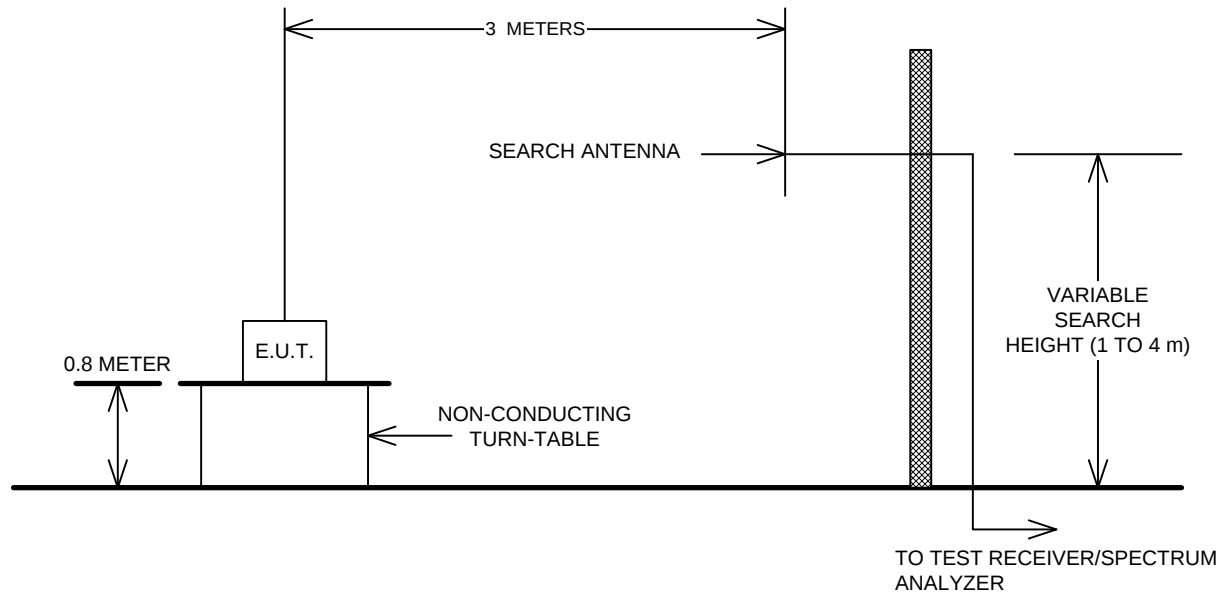
FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER

EQUIPMENT: Genie- GIWC / OHD-OAWC

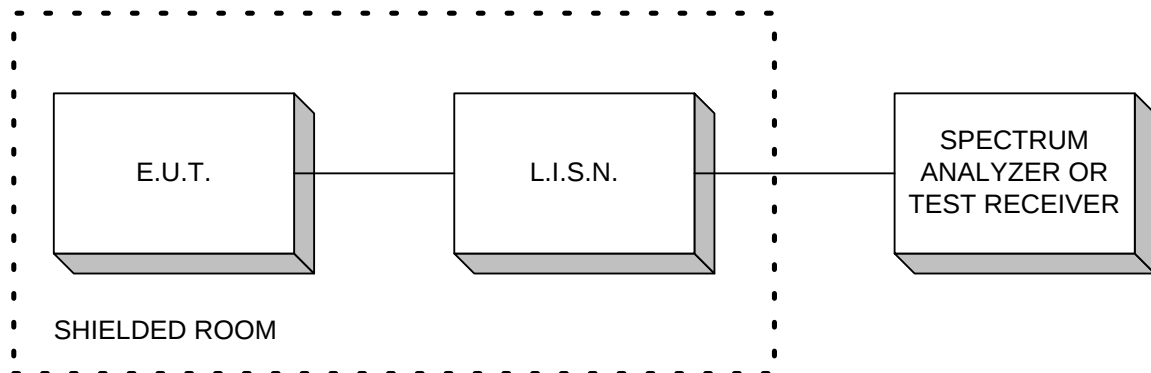
PROJECT NO.: 10213664RUS1rev1

ANNEX A - TEST DIAGRAMS

Test Site for Radiated Emissions



Conducted Emissions



Peak Power at Antenna Terminals

