Nemko Test Report: 10469RUS1

Applicant: AMX, LLC
3000 Research Drive
Richardson, TX 75082
USA

Equipment Under Test: (E.U.T.) Active Asset Tag

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 USA, Inc.
802 N. Kealy
Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **08 February 2008**
David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **15 February 2008**
Mike Cantwell, Frontline Manager

Total Number of Pages: 19

TABLE OF CONTENTS

Section 1. Summary of Test Results

Manufacturer: AMX, LLC

Model No.: Active Asset Tag

Serial No.: 200009

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 C63.4-2003. Amplitude measurements were made in a semi-anechoic chamber. Details of the chamber are 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.
See " Summary of Test Data".

NVLAP®
LAB CODE: 100426-0

Summary Of Test Data

Name of Test	Paragraph No.	Results
Transmission Requirements	15.231(a)	NA
Radiated Emissions	15.231(b)	NA
Occupied Bandwidth	15.231(c)	Complies
Frequency Tolerance	15.231(d)	NA
Alternate Field Strength Requirements	15.231(e)	Complies
Powerline Conducted Emissions	15.207	NA

Footnotes:

1) The DUT does not operate in the frequency band 40.66–40.70 MHz.
2) The DUT is battery powered.

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

General Equipment Information

Frequency Range:	433.92 MHz
Operating Frequency(ies) of Sample:	433.95 MHz
Type of Emission:	OOD
Supply Power Requirement:	3.0 Vdc
Duty Cycle Correction Factor:	-36.1 dB

Description of E.U.T.

Active RFID tag intended for use for asset identification.

System Diagram

Section 3. Periodic Alternate Field Strength Requirements

NAME OF TEST: Periodic Alternate Field Strength Requirements	PARA. NO.: 15.231(e)
TESTED BY: David Light	DATE: 07 February 2008

Minimum Standard: 15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this section, except the field strength table in paragraph (b) of this section is replaced by the following.

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	1000	100
70-130	500	50
130-174	500 to 1500[1]	50 to 150[1]
174-260 (note 1)	1500	150
260-470 (note 1)	1500 to 500[1]	150 to 500[1]
Above 470	5000	500

Notes: *[1]Linear interpolation with frequency F in MHz*

Any emissions that fall within the restricted bands of 15.205 shall not exceed the following limits:

Frequency (MHz)	Field Strength (µV/m @ 3m)	Field Strength (dB @ 3m)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above 960	500	54.0

Test Data: See attached table.

Test Results: Complies. The worst-case emission level is 46.1 dBμV/m @ 3m at 433.95 MHz. This is 26.7 dB above/below the specification limit of 72.8 .dBμV/m.

Test Data - Periodic Alternate Field Strength Requirements

Meas. Freq. (MHz)	Ant. Pol. (H/V)	Duty Cycle (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
433.95	V	-36.1	91.6	16.7	1.7	27.8	46.1	72.8	-26.7	Pass	
433.95	H	-36.1	83	16.7	1.7	27.8	37.5	72.8	-35.3	Pass	

Notes:

1) There were no spurious (harmonic) emissions detected above the noise floor which was at least 20 dB below the specification limit. The spectrum was searched from 30 MHz to 5 GHz.

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

3) For handheld devices, the EUT was tested on three orthogonal axis'

Analyzer Settings: Below 1000 MHz: RBW/VBW = 100 kHz Peak detector

Above 1000 MHz: RBW/VBW = 1 MHz Peak detector

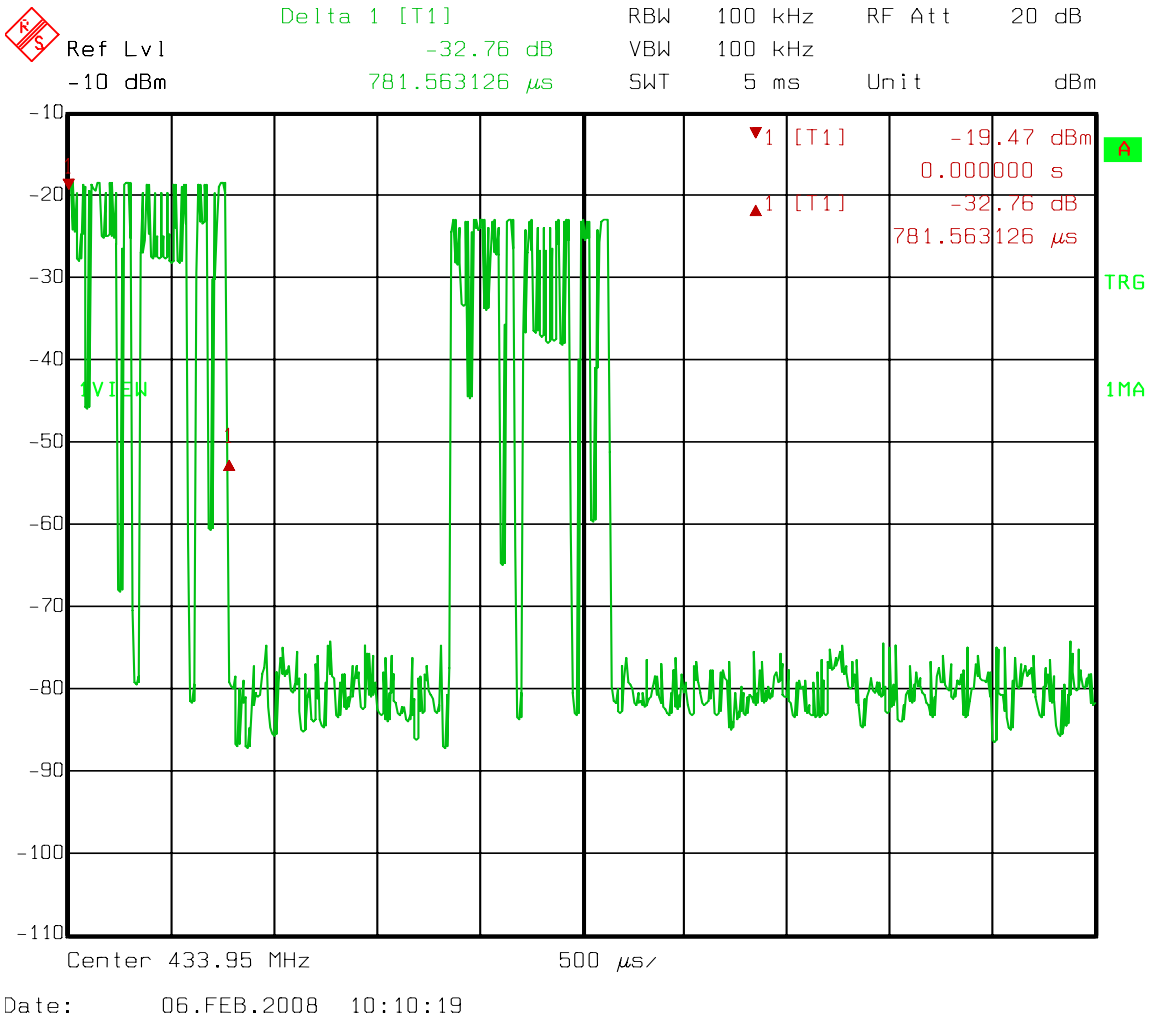
Test Conditions: 22 %RH
30 °C

Measurement Uncertainty: +/-3.6 dB

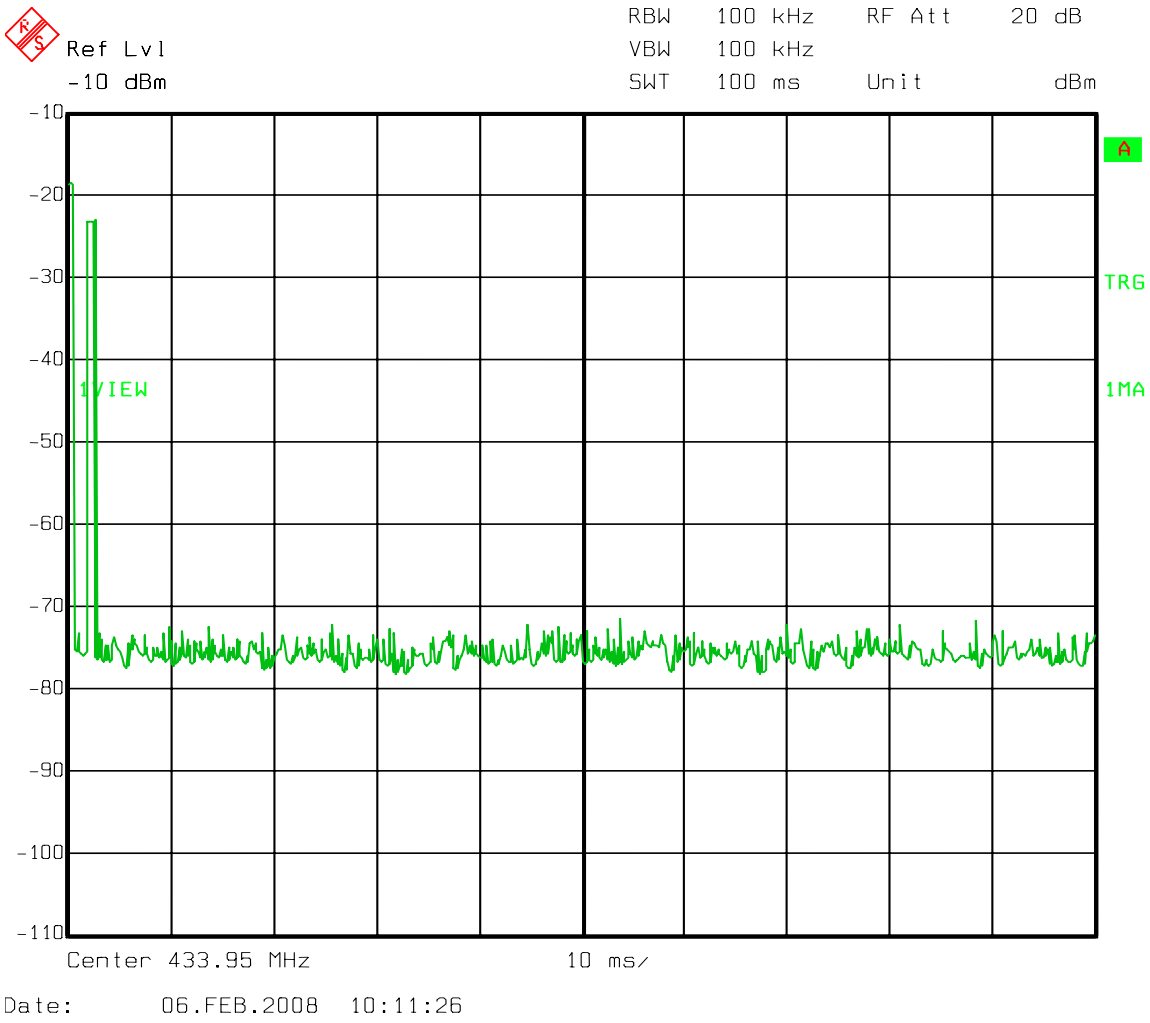
Test Equipment Used: 1763-1762-1659-1025-1464-1484-1485-1016-993

Repetition rate is programmable in the factory and will not be greater than once every 10 seconds.

Duty Cycle Correction



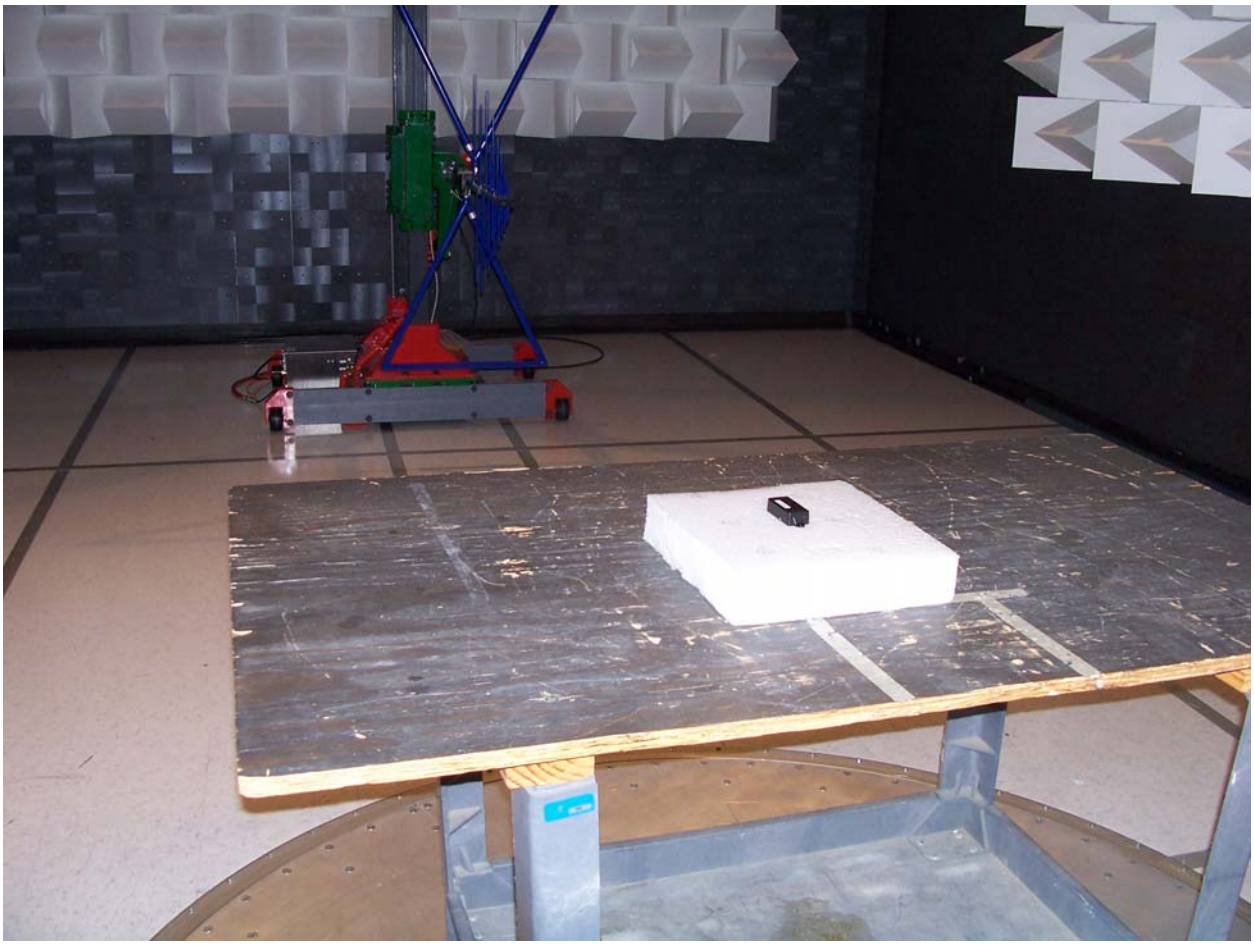
Duty Cycle Correction



2 Pulses at 781.56 µS = 1.56 mS

Duty Cycle Correction = 20 log (1.56/100) = -36.1 dB

Radiated Photographs



Section 4. Occupied Bandwidth

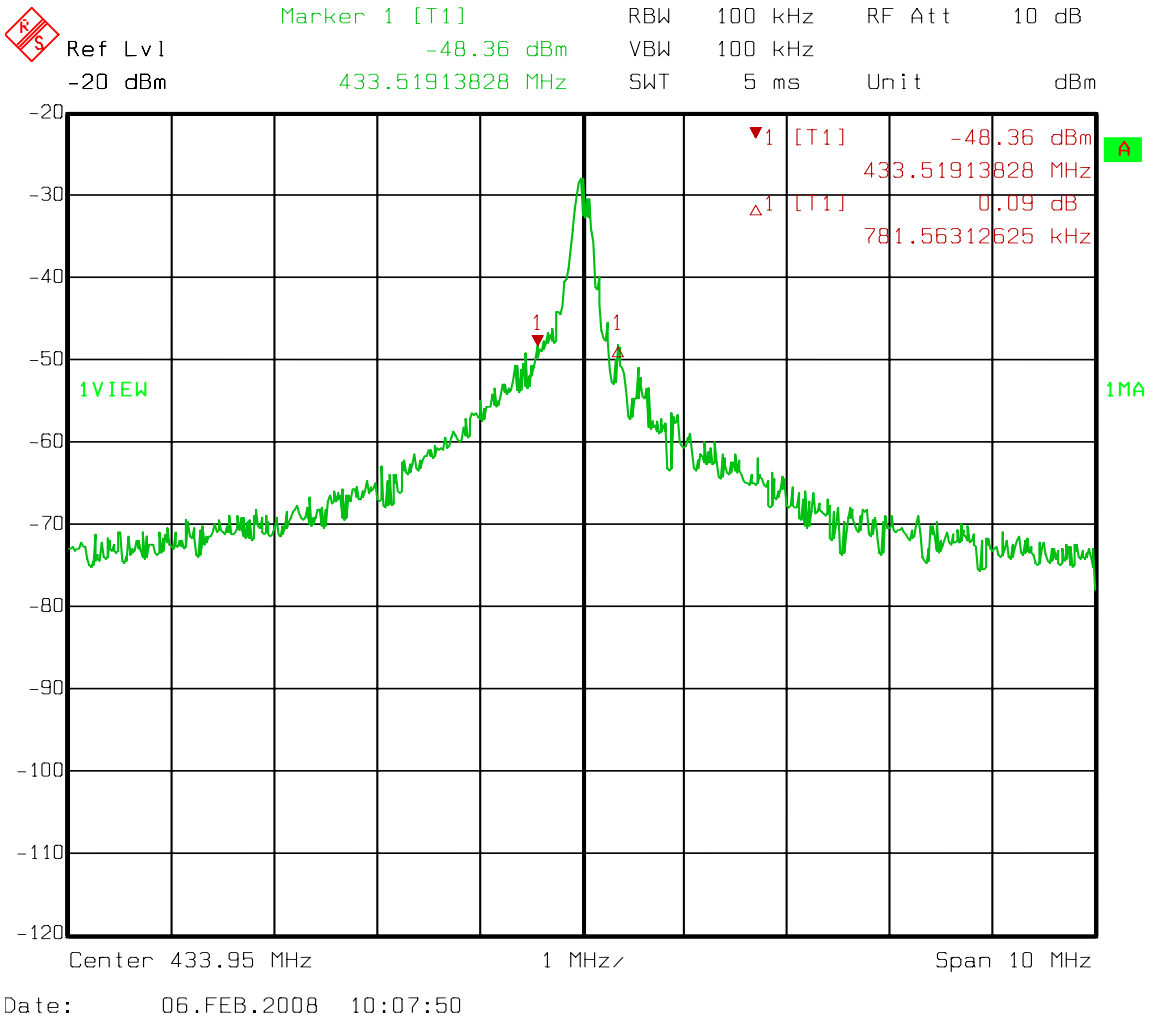
NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY: David Light	DATE: 06 February 2008

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.

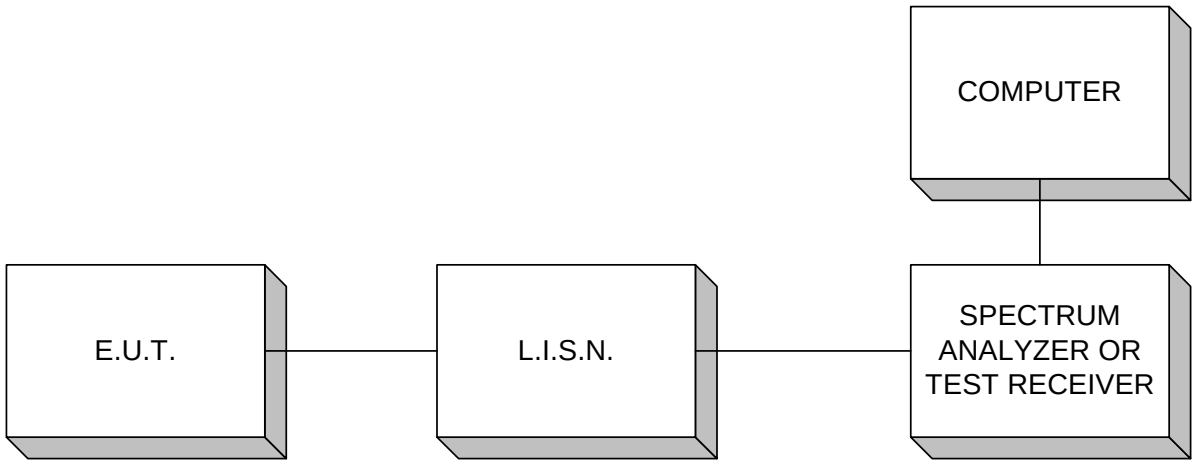
Test Data – Occupied Bandwidth



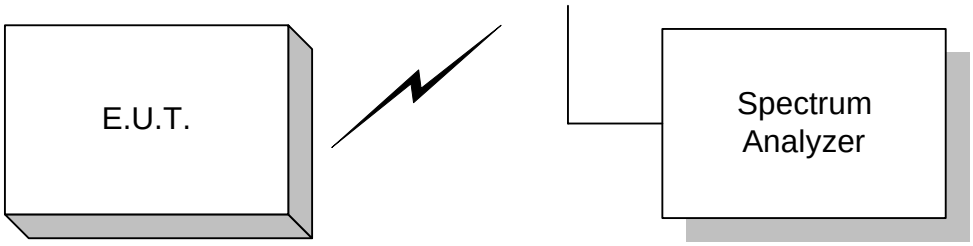
Limit = 434 x 0.0025 = 1.085 MHz

Section 5. Block Diagrams

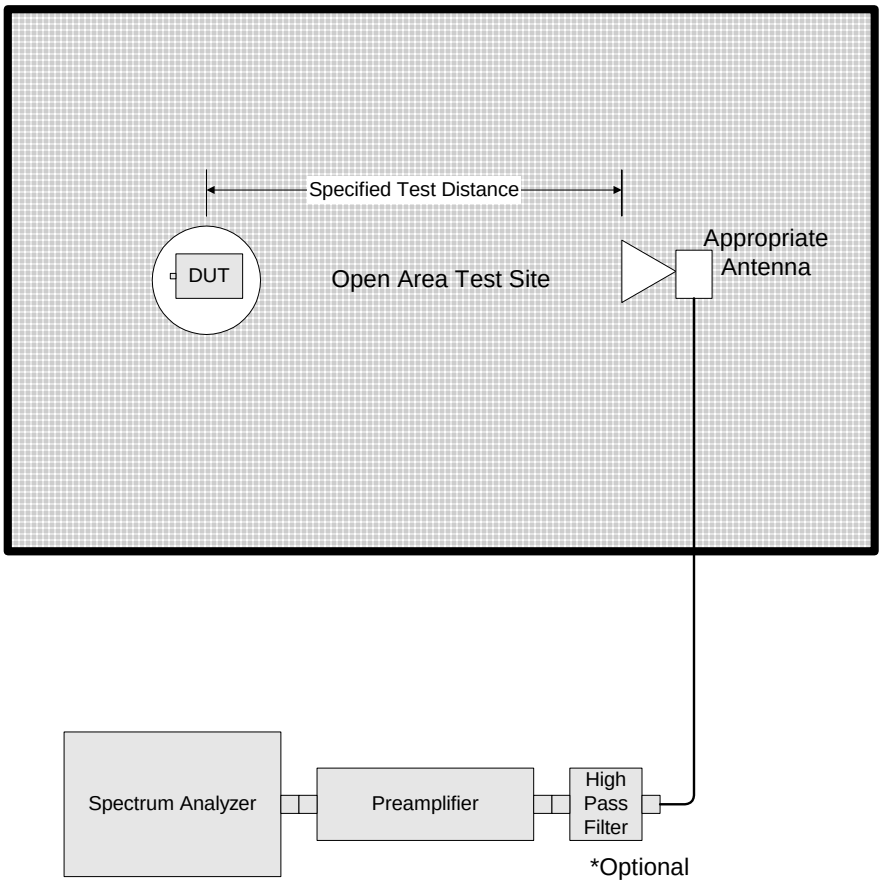
Conducted Emissions



Occupied Bandwidth, Duty Cycle

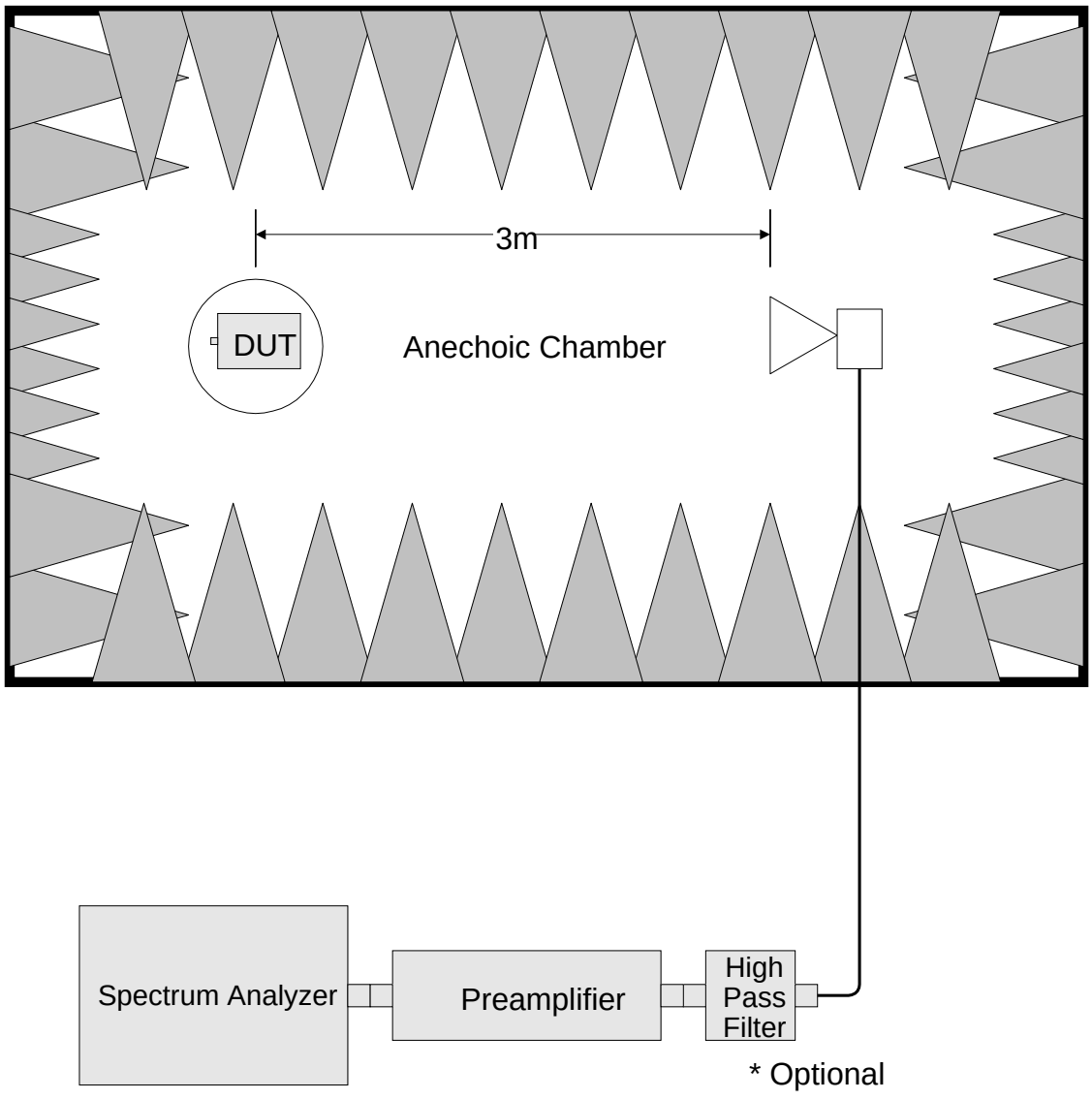


Outdoor Test Site For Radiated Emissions



Radiated Emissions 30 MHz - 1 GHz

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


3m
DUT
Anechoic Chamber
Spectrum Analyzer
Preamplifier
High Pass Filter
* Optional

Section 6. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1763	Bilog Antenna	Schaffner CBL 6111D	22926	09/21/07	09/20/08
1762	Cable	Nemko USA, Inc. None	None	09/19/07	09/19/08
1659	Spectrum Analyzer	Rhode & Schwarz FSP	973353	01/24/07	01/24/09
1025	PREAMP, 25dB	Nemko USA, Inc. LNA25	399	12/07/07	12/06/08
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/02/07	05/01/08
1485	Cable	Storm PR90-010-216	N/A	05/02/07	05/01/08
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08

ANNEX A - RESTRICTED BANDS

Annex A Restricted Bands of Operation

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.49 - 0.51	16.69475-16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425-16.80475	960-1240	7.25-7.75
3.020 - 3.026	25.5-25.67	1300-1427	8.025-8.5
4.125 - 4.128	37.5-38.25	1435-1626.6	9.0-9.2
4.17725 - 4.17775	73-74.6	1645.5-1646.5	9.3-9.5
4.20725 - 4.20775	74.8-75.2	1660-1710	10.6-12.7
6.215 - 6.218	108-121.94	1718.8-1722.2	13.25-13.4
6.31175 - 6.31225	123-138	2220-2300	14.47-14.5
8.291 - 8.294	149.9-150.05	2310-2390	15.35-16.2
8.362 - 8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625 - 8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425 - 8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29 - 12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975 - 12.52025	240-285	3345.8-3358	36.43-36.5
12.57675 - 12.57725	322-335.4	3600-4400	Above 38.6
13.36 - 13.41			