



Nemko Test Report: 9116RUS1rev1

Applicant:
Axcess Inc.
3208 Commander Drive
Carrollton, TX 75006

Equipment Under Test: DOT Credential Tag Part Number AT-DOT-C
(E.U.T.)

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: Brian Boyea **DATE:** 28 November 2007
Brian Boyea, Resource Manager

APPROVED
BY: David Light **DATE:** 28 November 2007
David Light, Senior Wireless Engineer

Total Number of Pages: 188

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Section 1. Summary of Test Results

Manufacturer: Axcess, Inc.

Model No.: DOT Credential Tag Part Number AT-DOT-C

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. 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

FCC site registration number: 90693

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



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This report applies only to the items tested.

Summary Of Test Data

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

Footnotes:

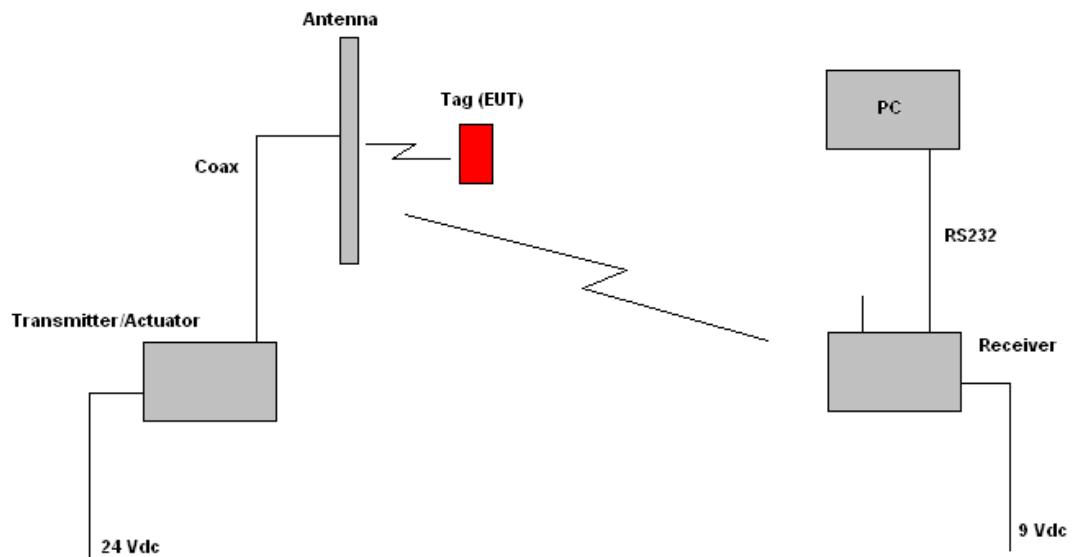
- 1) The EUT operates above 40.70 MHz
- 2) The EUT is powered by a 3 volt lithium ion battery.

Section 2. Equipment Under Test (E.U.T.)**General Equipment Information**

Frequency Range:	433.92 MHz
Operating Frequency(ies) of Sample:	433.92 MHz
Type of Emission:	OOK
Supply Power Requirement:	3 Vdc Lithium Ion Battery
Duty Cycle Correction Factor:	-7.5 dB

Description of E.U.T.

Active RFID tag

System Diagram

Section 3. Transmission Requirements

NAME OF TEST: Transmission Requirements	PARA. NO.: 15.231(a)
TESTED BY:	DATE:

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.

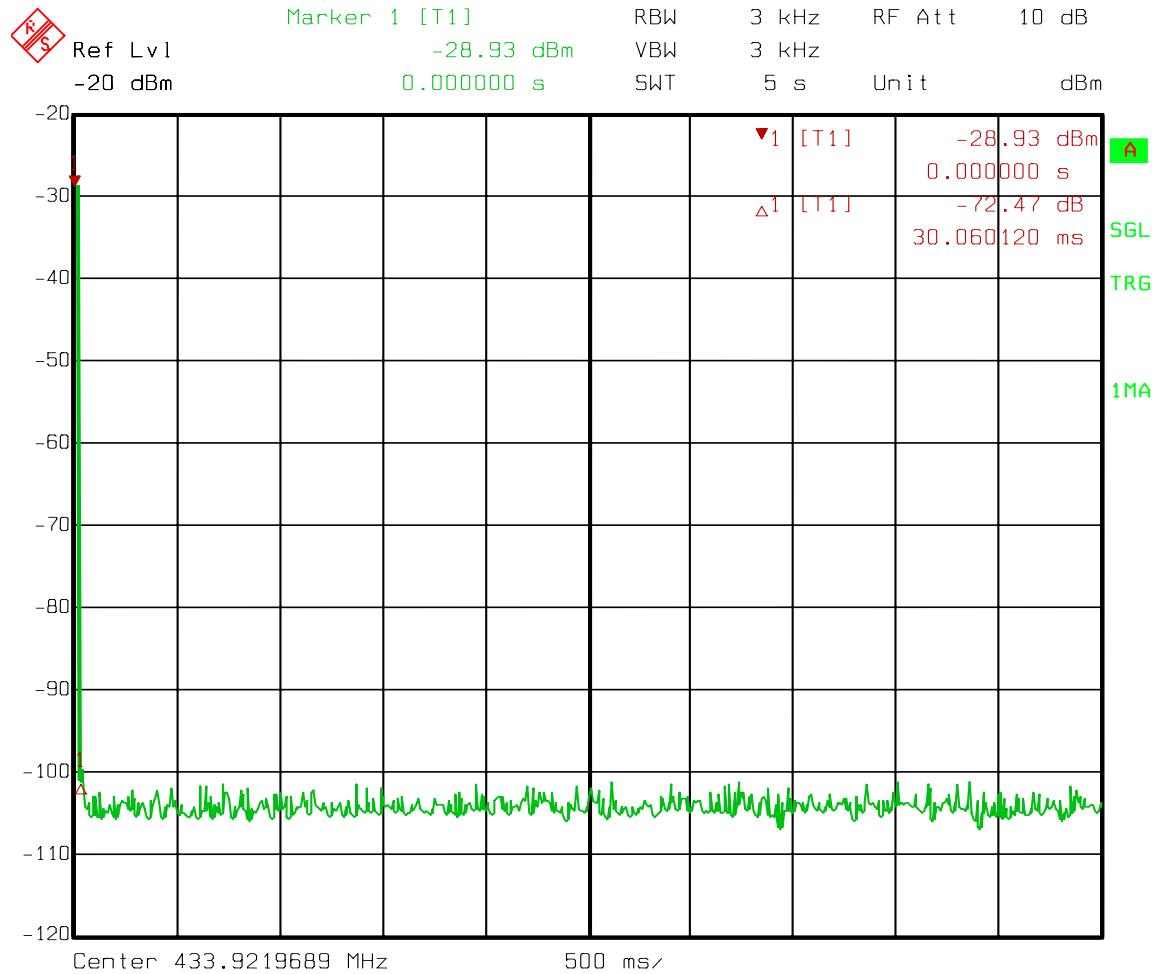
Test Data: Compliance was determined by verification of technical specifications and a functional test on the equipment.

Rationale for Compliance with Transmission Requirements

15.231(a)(1)	<input checked="" type="checkbox"/> Manual activation	TX deactivation time:
15.231(a)(2) :	<input type="checkbox"/> Automatic activation	
15.231(a)(3) :	<input type="checkbox"/> Regular, predetermined transmissions <input type="checkbox"/> Polling or supervisory transmissions <input checked="" type="checkbox"/> Not Applicable	TX rate and duration:
15.231(a)(4) :	<input type="checkbox"/> Alarm device operating during the pendency of alarm condition <input checked="" type="checkbox"/> Non-alarm device	

Test Data – Transmission Requirements

TX Deactivation Time



Date: 27.NOV.2007 12:01:58

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.231(b)
TESTED BY: Brian Boyea	DATE: 26 November 2007

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.

* Linear interpolation with frequency F in MHz

For 130 - 174 MHz: $FS \text{ (microvolts/m)} = (56.82 \times F) - 6136$

For 260 - 470 MHz: $FS \text{ (microvolts/m)} = (41.67 \times F) - 7083$

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

Frequency (MHz)	Field Strength ($\mu\text{V/m} @ 3\text{m}$)	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 Results:

Complies. The worst-case emission level is 45.4 dB μ V/m @ 3m at 1301.8 MHz. This is 8.6 dB below the specification limit.

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 3 MHz.

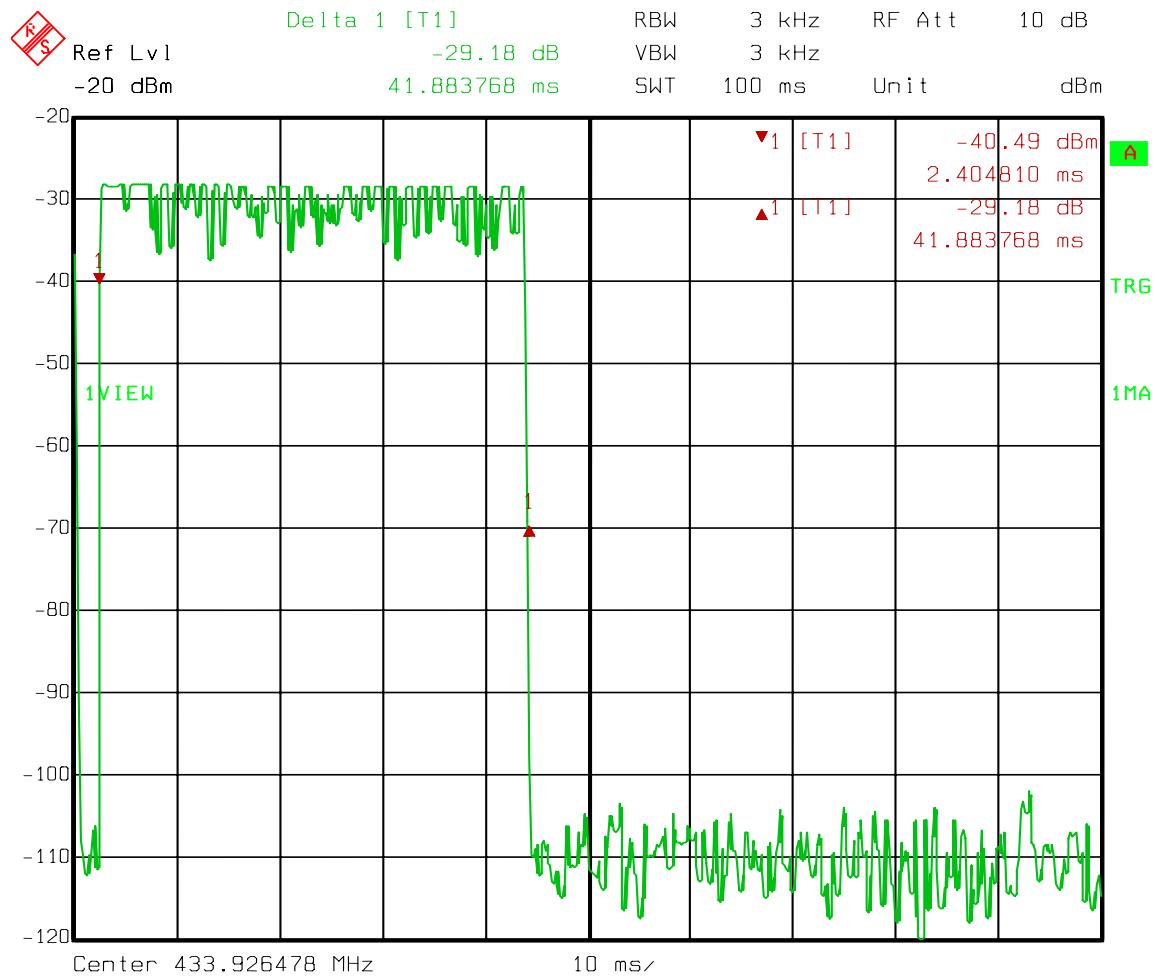
In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

Test Data - Radiated Emissions

Specification :	CFR47 Part 15, Subpart C, 15.231				Reference :	15.209 and 15.231					
Rod. Ant. #:					Date :	11/28/07					
Bicon Ant. #:					Time :	9:00					
Log Ant. #:					Staff :	Brian Boyea					
Bilog Ant. #:	1480	Temp. (deg. C) :	23		Photo ID:	NA					
Horn Ant. #:	993	Humidity (%) :	30		Peak Bandwidth:	100 KHz					
Cable #:	1484	Location:	AC 3		Video Bandwidth	100 KHz					
Preamp #:	1025	Distance:	3m		QP Bandwidth:	120 KHz					
Cable #:	1485	Barometric pressure:	1016								
Atten #:	NA										
Detector #:	1464										
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
433.93	H	0	77.5	16.8	5.0	27.8	71.5	80.8	-9.3	Pass	
433.93	V	0	66.1	16.8	5.0	27.8	60.1	80.8	-20.7	Pass	
867.8	H	0	45.9	22.6	6.2	27.8	46.9	60.8	-13.9	Pass	
867.8	V	0	40.3	22.6	6.2	27.8	41.3	60.8	-19.5	Pass	
1301.8	H	0	54.6	25.3	5.0	32.0	52.9	74.0	-21.1	Pass	
1301.8	H	7.5	54.6	25.3	5.0	32.0	45.4	54.0	-8.6	Pass	Average
1301.8	V	0	44.8	25.3	5.0	32.0	43.1	54.0	-10.9	Pass	
All readings are PEAK unless otherwise noted. Searched spectrum 30 MHz to 5 GHz											

All emissions within 20 dB of the specification limit are reported.

Test Site: Chamber 1

Duty Cycle

Duty Cycle Correction = $20 \log (\text{Time ON} / 100 \text{ mS}) = 20 \log 0.42 = -7.5 \text{ dB}$

Section 5. Occupied Bandwidth

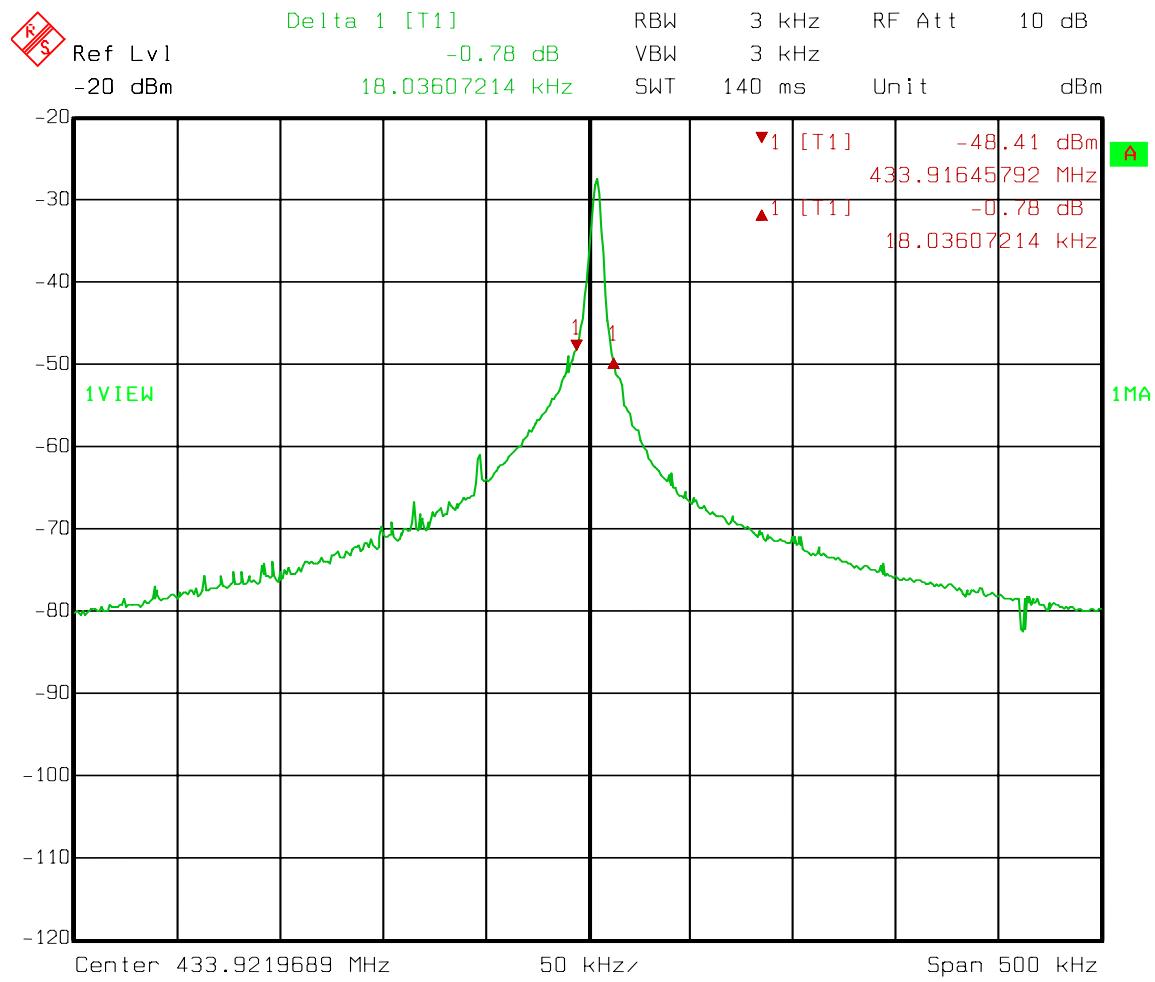
NAME OF TEST: Occupied Bandwidth	PARA. NO.: 15.231(c)
TESTED BY:	DATE:

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

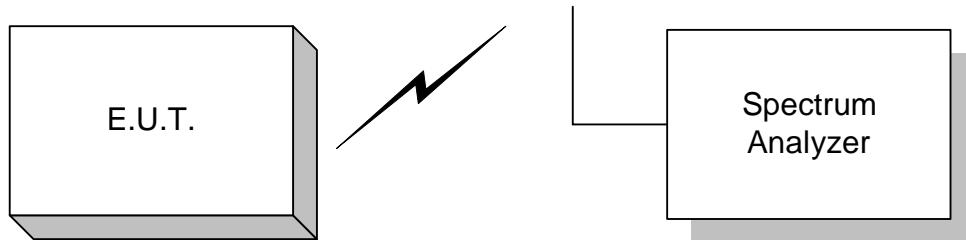


Date: 27.NOV.2007 15:00:24

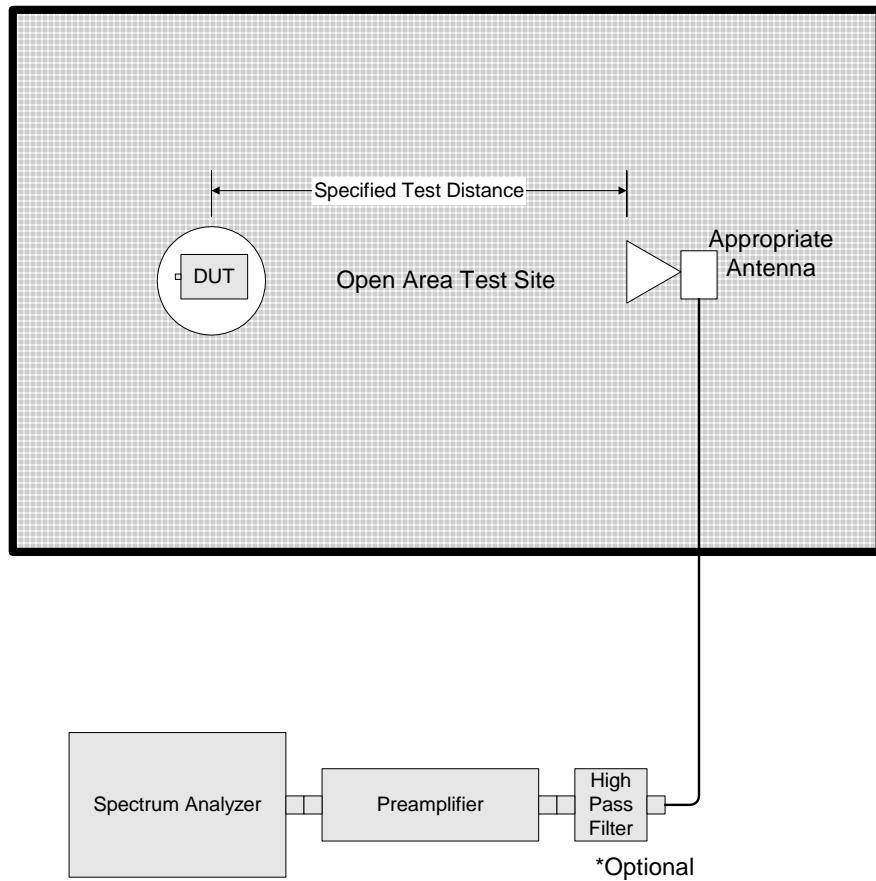
Limit = $0.0025 \times 434 = 1.085$ MHz

Section 6. Block Diagrams

Occupied Bandwidth, Duty Cycle

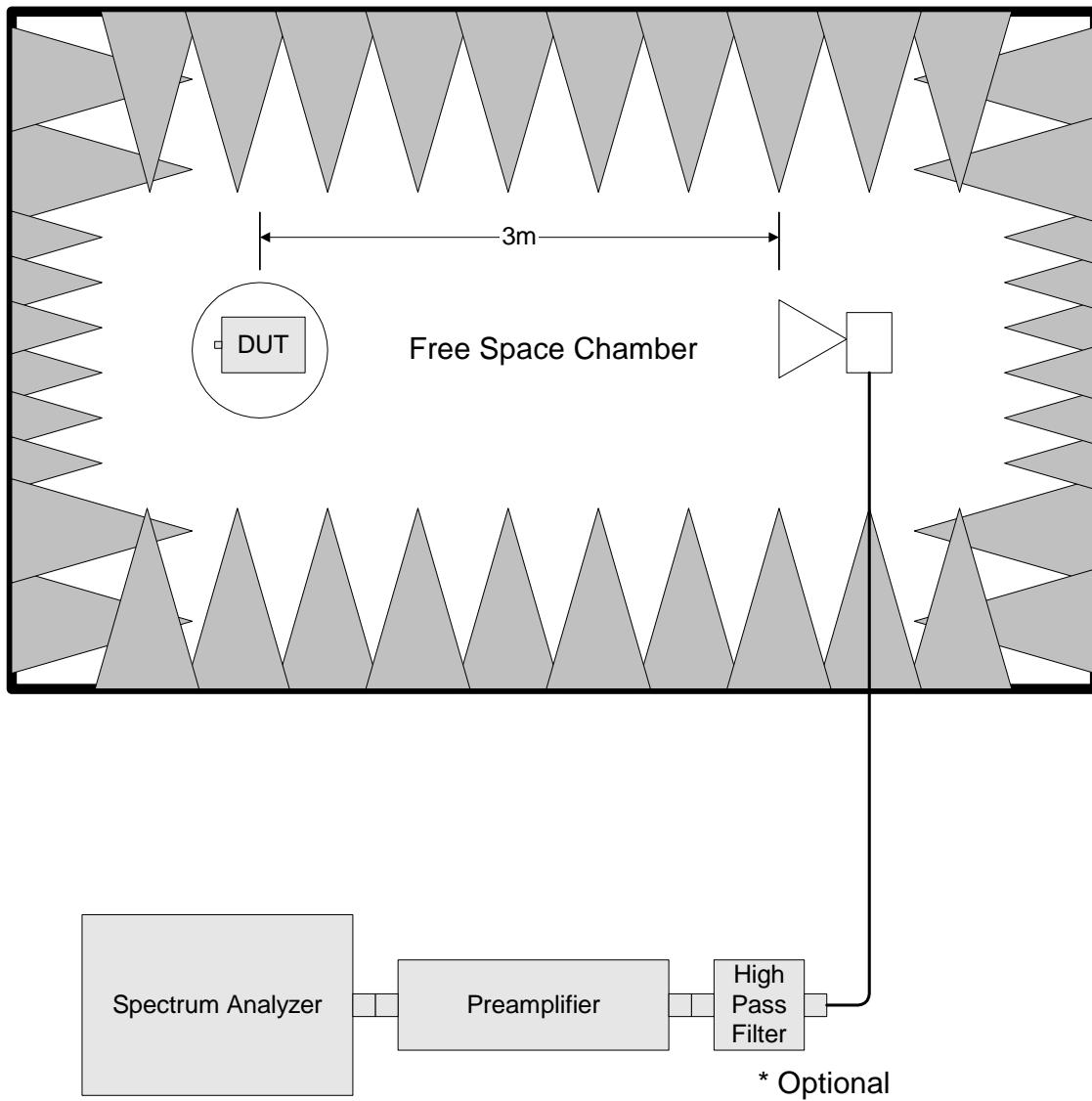


Outdoor Test Site For Radiated Emissions



Radiated Emissions 30 MHz - 1 GHz

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



Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08
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
1025	PREAMP, 25dB	Nemko USA, Inc. LNA25	399	09/29/06	09/29/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	12/18/06	12/18/07

Nemko USA, Inc.

FCC PART 15, SUBPART C

PERIODICALLY OPERATED LOW POWER TRANSMITTERS
EQUIPMENT: DOT Credential Tag Part Number AT-DOT-C PROJECT NO.:**9116RUS1**

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			