



Nemko Test Report: 6L0697RUS1

Applicant: SensoNix, Inc.
15755 32nd Avenue North
Plymouth, MN 55447

Equipment Under Test: DX80
(E.U.T.)

In Accordance With: **FCC Part 15, Subpart C, 15.247**
Frequency Hopping Transmitters

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

TESTED BY: David Light DATE: 06 Oct 2006
David Light, Senior Wireless Engineer

APPROVED BY:  DATE: _____

Total Number of Pages: 23

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Section 1. Summary of Test Results

Manufacturer: Sensonix, Inc.

Model No.: DX80

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 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.

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".



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Nemko USA, Inc.

FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER

EQUIPMENT: DX80

PROJECT NO.:6L0697RUS1

Summary Of Test Data

| NAME OF TEST | PARA. NO. | RESULT |
|---|--------------|-------------|
| Powerline Conducted Emissions | 15.207(a) | Complies** |
| Channel Separation | 15.247(a)(1) | Not Tested* |
| Time of Occupancy | 15.247(a)(1) | Not Tested* |
| 20 dB Occupied Bandwidth | 15.247(a)(1) | Not Tested* |
| Peak Power Output | 15.247(b) | Not Tested* |
| Spurious Emissions (Antenna Conducted) | 15.247(d) | Not Tested* |
| Spurious Emissions (Radiated) | 15.247(d) | Complies |

Footnotes:

* Adding antennas for class 2 change only. Refer to original submission to the commission for FCC Identifier TGUDX80

** Adding option for end user to use device with external ac/dc converter. Original submission was battery powered only.

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: 902.5 to 927.5 MHz

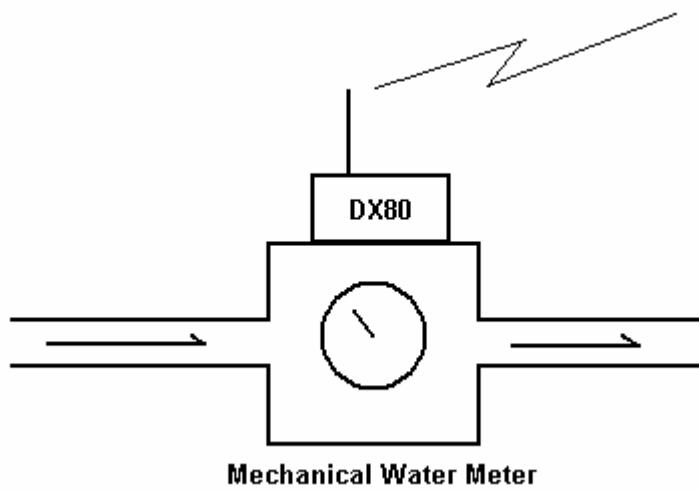
Number of Channels: 27

Channel Spacing: 500 kHz

User Frequency Adjustment: Software controlled

Description of EUT

The DX80 is a TDMA frequency hopping transmitter used to transmit water meter data.

System Diagram**Description for Class II Change**

- 1) Adding 4 antennas. Wide band omni-directional antenna at 8.2 dBi gain, Omni base antenna with 7.2 dBi gain and two Yagi antennas with 8 and 10 dBi gain.
- 2) The manufacturer is adding option for the end user to supply an AC/DC converter if battery power is not desired. The device was tested with a CUI, Inc. supply model EPAS-101W-24.

Section 3. Powerline Conducted Emissions

| | |
|---|----------------------|
| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207(a) |
| TESTED BY: Arturo Ruvalcaba | DATE: 08 Aug 2006 |

Test Results: Complies. The worst case emission was 53 dB μ V at 0.742 MHz. This is 7 dB below the average specification limit of 60 dB μ V.

Note: The device was tested with an "off the shelf" power adapter. It is the responsibility of the end user to furnish the AC/DC adapter.

Adapter used: CUI, Inc. Model EPAS-101W-24

Test Data: Refer to attached data

Equipment Used: 969-704-1194-1997-1663-674

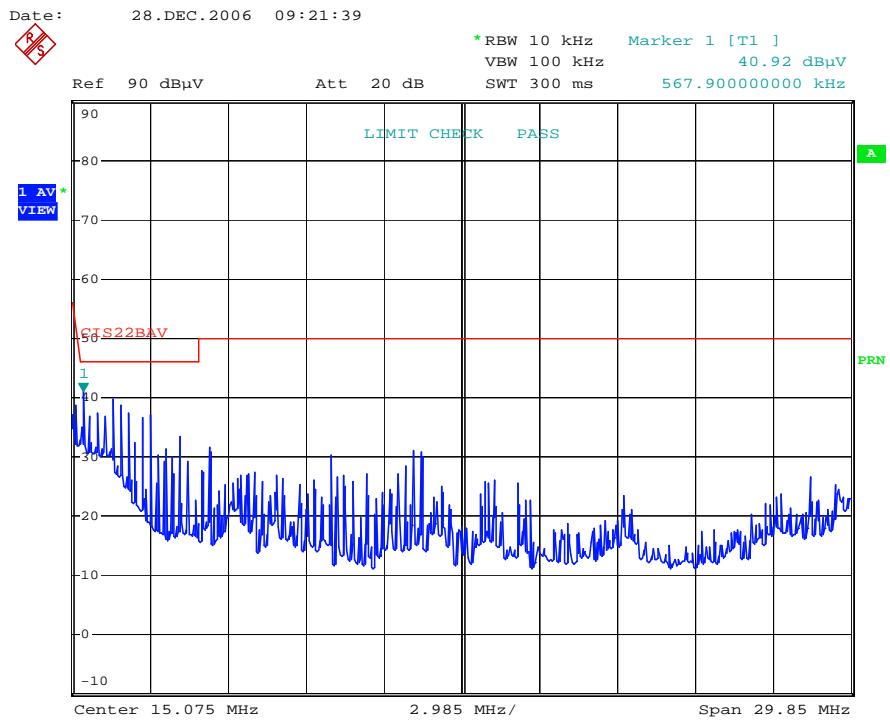
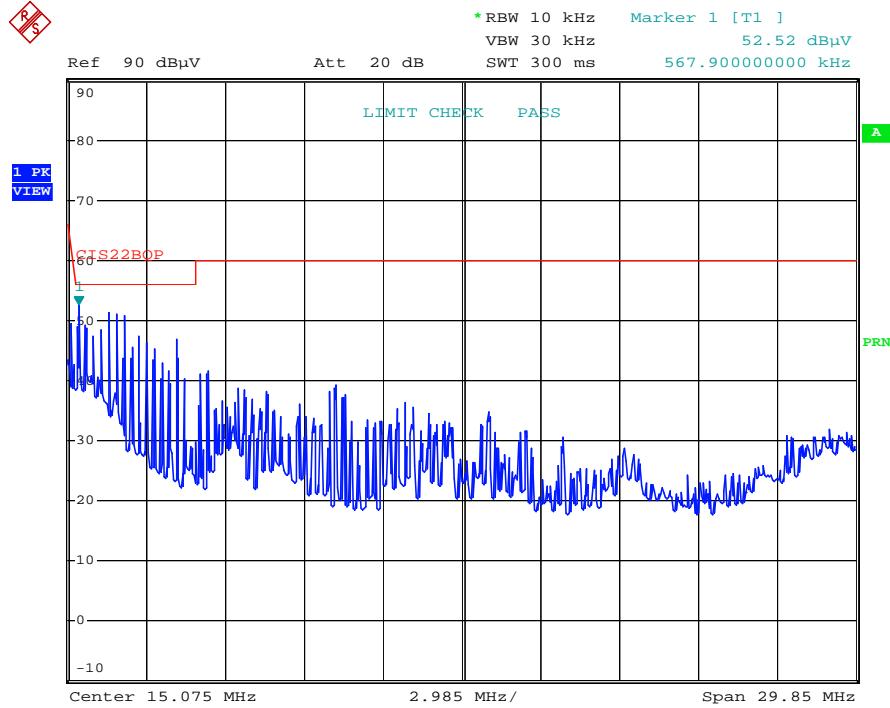
Measurement Uncertainty: +/- 1.7 dB

Temperature: 31 °C

Relative Humidity: 41 %

Test Data – Powerline Conducted Emissions

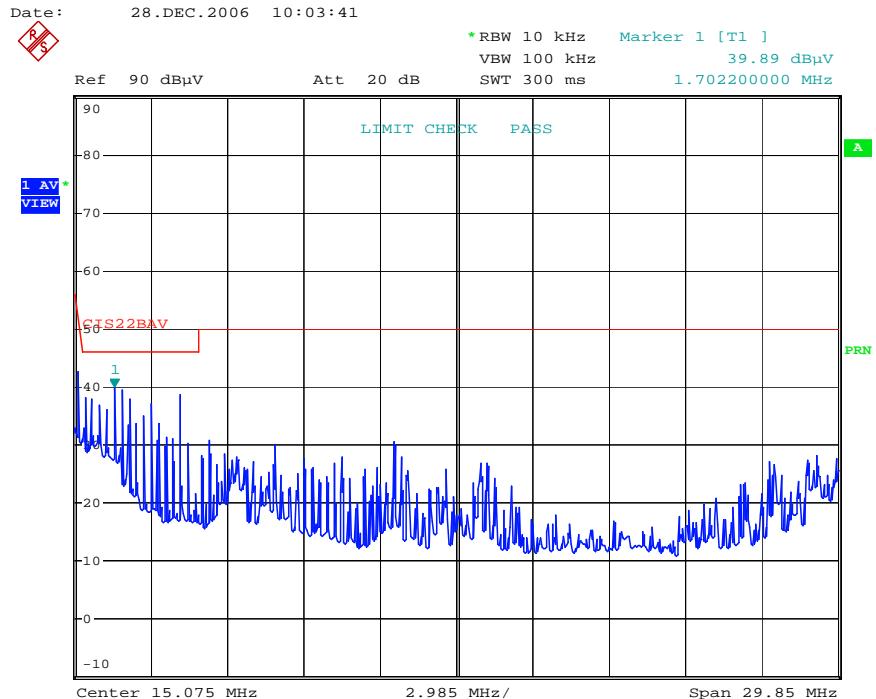
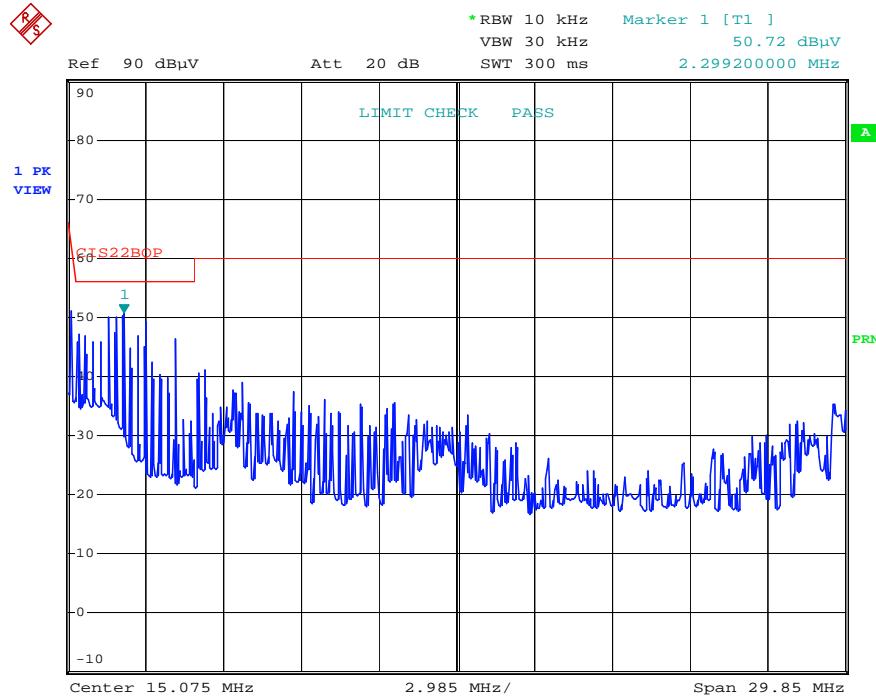
Line 1



Date: 28.DEC.2006 09:22:33

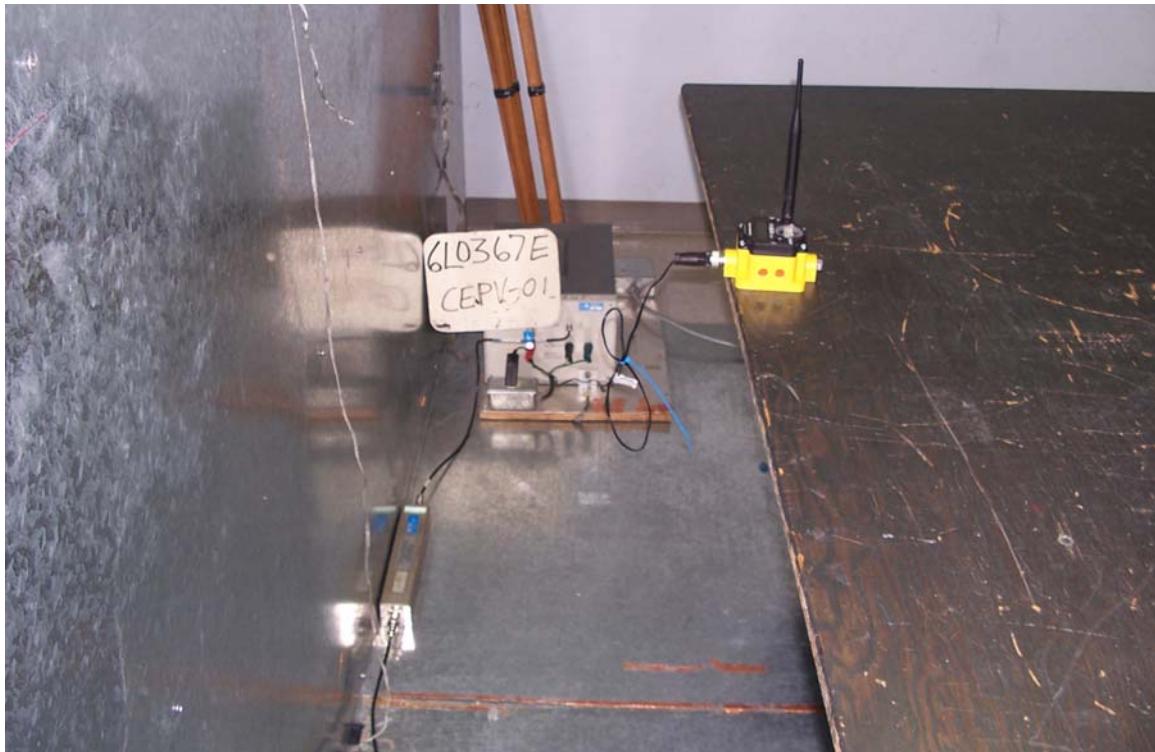
Test Data – Powerline Conducted Emissions

Line 2



Date: 28.DEC.2006 09:23:33

Test Setup Photos – Powerline Conducted Emissions



Section 4. Spurious Emissions (Radiated)

| | |
|---|-----------------------|
| NAME OF TEST: Spurious Emissions (Radiated) | PARA. NO.: 15.247(d) |
| TESTED BY: David Light | DATE: 06 October 2006 |

Test Results: Complies. The noise floor data presented for transmit frequency 915 MHz is representative of other channels tested at 902.5 and 927.5 MHz.

Measurement Data: See attached table.

Duty Cycle Calculation: [None](#)

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).

Analyzer Settings:

Peak: RBW=VBW=100 kHz at frequencies below 1000 MHz
RBW=VBW=1 MHz at frequencies above 1000 MHz

Average: RBW=1 MHz / VBW=100 Hz

[Note: The device was transmitting in CW mode when tested.](#)

Equipment Used: 1195-759-791-1484-1485-1016-993-1464

Measurement Uncertainty: +/-3.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Test Data - Radiated Emissions**FB35T900WA base**

| Measurement Data: | | Reading listed by order taken. | | | | | Test Distance: 3 Meters | | | | |
|--------------------------|----------|--------------------------------|-------|-------|-------|-------|-------------------------|--------------|--------------|--------|-------|
| # | Freq | Rdng | Cable | Cable | Pre-A | Horn | Dist | Corr | Spec | Margin | Polar |
| | MHz | dB μ V | dB | dB | dB | dB | Table | dB μ V/m | dB μ V/m | dB | Ant |
| 1 | 2745.027 | 47.7 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 48.1 | 74.0 | -25.9 | Vert |
| Ave 2 | 2745.027 | 36.0 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 36.4 | 54.0 | -17.6 | Vert |
| 3 | 3660.036 | 39.5 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 41.3 | 74.0 | -32.7 | Vert |
| Ave 4 | 3660.036 | 31.7 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 33.5 | 54.0 | -20.5 | Vert |
| 5 | 4575.045 | 42.2 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 46.8 | 74.0 | -27.2 | Vert |
| Ave 6 | 4575.045 | 30.8 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 35.4 | 54.0 | -18.6 | Vert |
| 7 | 5490.054 | 39.2 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 45.6 | 74.0 | -28.4 | Vert |
| Ave 8 | 5490.054 | 30.0 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.4 | 54.0 | -17.6 | Vert |
| 9 | 6405.063 | 39.7 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 49.1 | 74.0 | -24.9 | Vert |
| Ave 10 | 6405.063 | 29.2 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.6 | 54.0 | -15.4 | Vert |
| 11 | 7320.072 | 38.0 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 46.7 | 74.0 | -27.3 | Vert |
| Ave 12 | 7320.072 | 29.2 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.9 | 54.0 | -16.1 | Vert |
| 13 | 8235.081 | 38.0 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 47.7 | 74.0 | -26.3 | Vert |
| Ave 14 | 8235.081 | 30.7 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 40.4 | 54.0 | -13.6 | Vert |
| 15 | 9150.090 | 37.8 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 45.6 | 74.0 | -28.4 | Vert |
| Ave 16 | 9150.090 | 30.3 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.1 | 54.0 | -15.9 | Vert |
| 17 | 2745.027 | 45.8 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 46.2 | 74.0 | -27.8 | Horiz |
| Ave 18 | 2745.027 | 34.5 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 34.9 | 54.0 | -19.1 | Horiz |
| 19 | 3660.036 | 38.8 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 40.6 | 74.0 | -33.4 | Horiz |
| Ave 20 | 3660.036 | 31.5 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 33.3 | 54.0 | -20.7 | Horiz |
| 21 | 4575.045 | 40.0 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 44.6 | 74.0 | -29.4 | Horiz |
| Ave 22 | 4575.045 | 30.5 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 35.1 | 54.0 | -18.9 | Horiz |
| 23 | 5490.054 | 38.8 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 45.2 | 74.0 | -28.8 | Horiz |
| Ave 24 | 5490.054 | 30.0 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.4 | 54.0 | -17.6 | Horiz |
| 25 | 6405.063 | 37.2 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 46.6 | 74.0 | -27.4 | Horiz |
| Ave 26 | 6405.063 | 29.5 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.9 | 54.0 | -15.1 | Horiz |
| 27 | 7320.072 | 37.5 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 46.2 | 74.0 | -27.8 | Horiz |
| Ave 28 | 7320.072 | 29.2 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.9 | 54.0 | -16.1 | Horiz |
| 29 | 8235.081 | 44.0 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 53.7 | 74.0 | -20.3 | Horiz |
| Ave 30 | 8235.081 | 35.2 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 44.9 | 54.0 | -9.1 | Horiz |
| 31 | 9150.090 | 39.8 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 47.6 | 74.0 | -26.4 | Horiz |
| Ave 32 | 9150.090 | 30.5 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.3 | 54.0 | -15.7 | Horiz |

Test Data - Radiated Emissions

BGY890K yagi

| Measurement Data: | | | Reading listed by order taken. | | | Test Distance: 3 Meters | | | | | |
|-------------------|----------|------------|--------------------------------|-------|-------|-------------------------|-------|--------------|--------------|--------|-------|
| # | Freq | Rdng | Cable | Cable | Pre-A | Horn | Dist | Corr | Spec | Margin | Polar |
| | MHz | dB μ V | dB | dB | dB | dB | Table | dB μ V/m | dB μ V/m | dB | Ant |
| 1 | 2745.027 | 42.2 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 42.6 | 74.0 | -31.4 | Horiz |
| Ave 2 | 2745.027 | 32.3 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 32.7 | 54.0 | -21.3 | Horiz |
| 3 | 3660.036 | 39.7 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 41.5 | 74.0 | -32.5 | Horiz |
| Ave 4 | 3660.036 | 31.2 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 33.0 | 54.0 | -21.0 | Horiz |
| 5 | 4575.045 | 38.8 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 43.4 | 74.0 | -30.6 | Horiz |
| Ave 6 | 4575.045 | 30.7 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 35.3 | 54.0 | -18.7 | Horiz |
| 7 | 5490.054 | 40.5 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 46.9 | 74.0 | -27.1 | Horiz |
| Ave 8 | 5490.054 | 30.0 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.4 | 54.0 | -17.6 | Horiz |
| 9 | 6405.063 | 37.3 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 46.7 | 74.0 | -27.3 | Horiz |
| Ave 10 | 6405.063 | 29.0 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.4 | 54.0 | -15.6 | Horiz |
| 11 | 7320.072 | 35.8 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 44.5 | 74.0 | -29.5 | Horiz |
| Ave 12 | 7320.072 | 29.2 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.9 | 54.0 | -16.1 | Horiz |
| 13 | 8235.081 | 39.0 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 48.7 | 74.0 | -25.3 | Horiz |
| Ave 14 | 8235.081 | 30.2 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 39.9 | 54.0 | -14.1 | Horiz |
| 15 | 9150.090 | 38.8 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 46.6 | 74.0 | -27.4 | Horiz |
| Ave 16 | 9150.090 | 30.2 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.0 | 54.0 | -16.0 | Horiz |
| 17 | 2745.027 | 40.5 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 40.9 | 74.0 | -33.1 | Vert |
| Ave 18 | 2745.027 | 32.0 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 32.4 | 54.0 | -21.6 | Vert |
| 19 | 3660.036 | 39.2 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 41.0 | 74.0 | -33.0 | Vert |
| Ave 20 | 3660.036 | 31.2 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 33.0 | 54.0 | -21.0 | Vert |
| 21 | 4575.045 | 40.5 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 45.1 | 74.0 | -28.9 | Vert |
| Ave 22 | 4575.045 | 30.5 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 35.1 | 54.0 | -18.9 | Vert |
| 23 | 5490.054 | 37.3 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 43.7 | 74.0 | -30.3 | Vert |
| Ave 24 | 5490.054 | 29.8 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.2 | 54.0 | -17.8 | Vert |
| 25 | 6405.063 | 38.0 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 47.4 | 74.0 | -26.6 | Vert |
| Ave 26 | 6405.063 | 29.0 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.4 | 54.0 | -15.6 | Vert |
| 27 | 7320.072 | 37.0 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 45.7 | 74.0 | -28.3 | Vert |
| Ave 28 | 7320.072 | 29.2 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.9 | 54.0 | -16.1 | Vert |
| 29 | 8235.081 | 39.0 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 48.7 | 74.0 | -25.3 | Vert |
| Ave 30 | 8235.081 | 30.7 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 40.4 | 54.0 | -13.6 | Vert |
| 31 | 9150.090 | 40.3 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 48.1 | 74.0 | -25.9 | Vert |
| Ave 32 | 9150.090 | 30.2 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.0 | 54.0 | -16.0 | Vert |

Test Data - Radiated Emissions

BA06 antenna

| Measurement Data: | | | Reading listed by order taken. | | | Test Distance: 3 Meters | | | | | |
|-------------------|----------|------------|--------------------------------|-------|-------|-------------------------|-------|--------------|--------------|--------|-------|
| # | Freq | Rdng | Cable | Cable | Pre-A | Horn | Dist | Corr | Spec | Margin | Polar |
| | MHz | dB μ V | dB | dB | dB | dB | Table | dB μ V/m | dB μ V/m | dB | Ant |
| 1 | 2745.027 | 45.3 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 45.7 | 74.0 | -28.3 | Vert |
| Ave 2 | 2745.027 | 36.3 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 36.7 | 54.0 | -17.3 | Vert |
| 3 | 3660.036 | 40.3 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 42.1 | 74.0 | -31.9 | Vert |
| Ave 4 | 3660.036 | 31.0 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 32.8 | 54.0 | -21.2 | Vert |
| 5 | 4575.045 | 38.7 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 43.3 | 74.0 | -30.7 | Vert |
| Ave 6 | 4575.045 | 30.2 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 34.8 | 54.0 | -19.2 | Vert |
| 7 | 5490.054 | 38.7 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 45.1 | 74.0 | -28.9 | Vert |
| Ave 8 | 5490.054 | 29.7 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.1 | 54.0 | -17.9 | Vert |
| 9 | 6405.063 | 36.2 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 45.6 | 74.0 | -28.4 | Vert |
| Ave 10 | 6405.063 | 28.8 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.2 | 54.0 | -15.8 | Vert |
| 11 | 7320.072 | 37.3 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 46.0 | 74.0 | -28.0 | Vert |
| Ave 12 | 7320.072 | 28.8 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.5 | 54.0 | -16.5 | Vert |
| 13 | 8235.081 | 39.5 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 49.2 | 74.0 | -24.8 | Vert |
| Ave 14 | 8235.081 | 30.2 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 39.9 | 54.0 | -14.1 | Vert |
| 15 | 9150.090 | 39.0 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 46.8 | 74.0 | -27.2 | Vert |
| Ave 16 | 9150.090 | 30.2 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.0 | 54.0 | -16.0 | Vert |
| 17 | 2745.027 | 41.5 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 41.9 | 74.0 | -32.1 | Horiz |
| Ave 18 | 2745.027 | 32.5 | +0.8 | +2.9 | +32.7 | +29.4 | +0.0 | 32.9 | 54.0 | -21.1 | Horiz |
| 19 | 3660.036 | 39.8 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 41.6 | 74.0 | -32.4 | Horiz |
| Ave 20 | 3660.036 | 30.8 | +0.8 | +2.8 | +32.3 | +30.5 | +0.0 | 32.6 | 54.0 | -21.4 | Horiz |
| 21 | 4575.045 | 38.0 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 42.6 | 74.0 | -31.4 | Horiz |
| Ave 22 | 4575.045 | 30.3 | +1.0 | +3.1 | +31.8 | +32.3 | +0.0 | 34.9 | 54.0 | -19.1 | Horiz |
| 23 | 5490.054 | 38.7 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 45.1 | 74.0 | -28.9 | Horiz |
| Ave 24 | 5490.054 | 29.7 | +1.2 | +3.5 | +31.9 | +33.6 | +0.0 | 36.1 | 54.0 | -17.9 | Horiz |
| 25 | 6405.063 | 39.0 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 48.4 | 74.0 | -25.6 | Horiz |
| Ave 26 | 6405.063 | 29.0 | +1.3 | +3.9 | +30.9 | +35.1 | +0.0 | 38.4 | 54.0 | -15.6 | Horiz |
| 27 | 7320.072 | 39.2 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 47.9 | 74.0 | -26.1 | Horiz |
| Ave 28 | 7320.072 | 29.0 | +1.2 | +4.0 | +32.3 | +35.8 | +0.0 | 37.7 | 54.0 | -16.3 | Horiz |
| 29 | 8235.081 | 40.2 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 49.9 | 74.0 | -24.1 | Horiz |
| Ave 30 | 8235.081 | 32.3 | +1.3 | +4.3 | +33.2 | +37.3 | +0.0 | 42.0 | 54.0 | -12.0 | Horiz |
| 31 | 9150.090 | 37.8 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 45.6 | 74.0 | -28.4 | Horiz |
| Ave 32 | 9150.090 | 30.2 | +1.3 | +4.3 | +34.8 | +37.0 | +0.0 | 38.0 | 54.0 | -16.0 | Horiz |

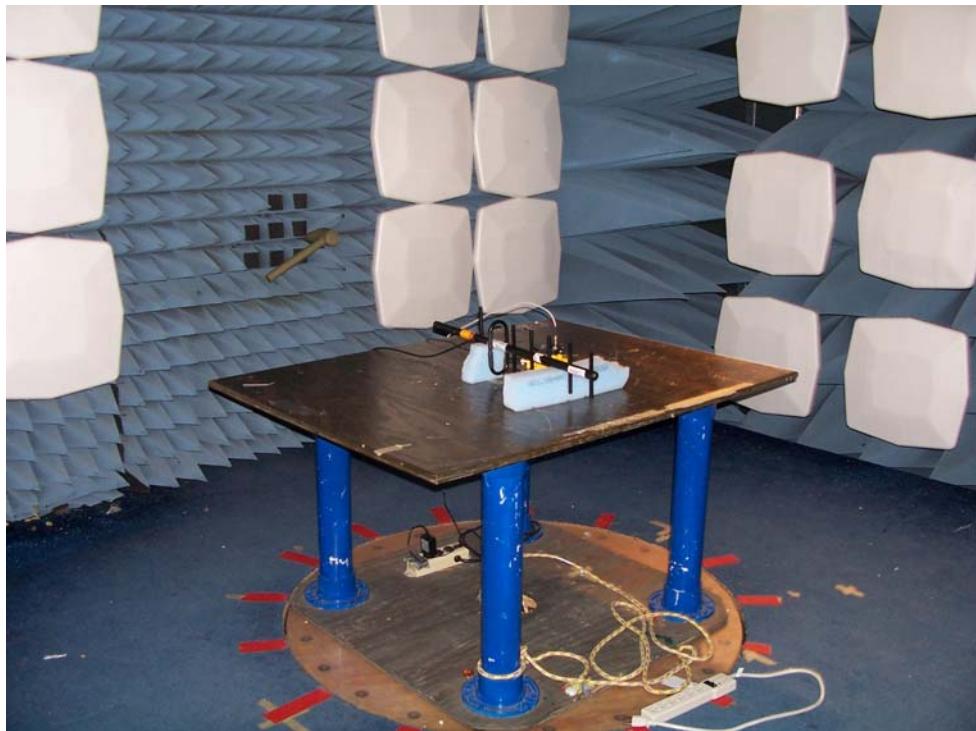
Radiated Photographs

FB35T900WA base



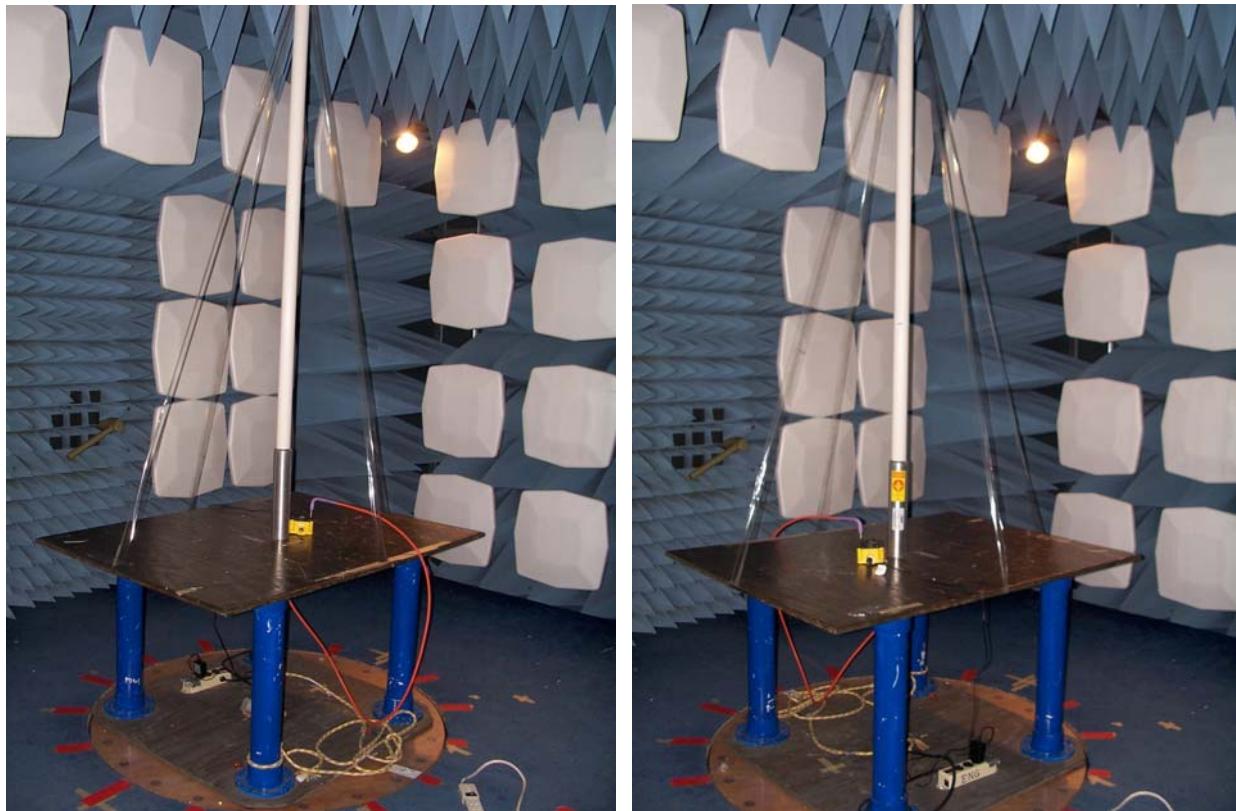
Radiated Photographs

BGY890K yagi



Radiated Photographs

BA06 antenna



Section 5. Test Equipment List

| Nemko ID | Description | Manufacturer Model Number | Serial Number | Calibration Date | Calibration Due |
|----------|--------------------------|---------------------------|---------------|------------------|-----------------|
| 759 | ANTENNA, LOG PERIODIC | A.H. SYSTEMS SAS-200/510 | 556 | 02/13/06 | 02/13/07 |
| 1195 | ANTENNA,BICONICAL | A.H. SYSTEMS SAS-200/542 | 235 | 02/10/06 | 02/10/07 |
| 791 | PREAMP, 25dB | Nemko USA, Inc. LNA25 | 398 | 04/20/06 | 04/20/07 |
| 1484 | Cable | Storm PR90-010-072 | N/A | 10/02/06 | 10/02/07 |
| 1485 | Cable | Storm PR90-010-216 | N/A | 10/02/06 | 10/02/07 |
| 1464 | Spectrum analyzer | Hewlett Packard 8563E | 3551A04428 | 01/14/05 | 01/15/07 |
| 993 | Horn antenna | A.H. Systems SAS-200/571 | XXX | 08/01/05 | 08/02/07 |
| 1016 | Pre-Amp | HEWLETT PACKARD 8449A | 2749A00159 | 04/20/06 | 04/20/07 |
| 969 | lisn | Schwarzbeck NNLA 8120 | 8120281 | 02/02/06 | 02/02/07 |
| 704 | FILTER, HIGH PASS, 5 KHz | SOLAR 7930-5.0 | 933126 | 04/20/06 | 04/20/07 |
| 1194 | CABLE, 7m | Nemko USA, Inc. RG214 | N/A | 03/09/06 | 03/09/07 |
| 1997 | CABLE, 1.5M | Nemko USA, Inc. RG213 | N/A | 03/09/06 | 03/09/07 |
| 1663 | Spectrum Analyzer | Rhode & Schwarz FSP | 973351 | 05/18/06 | 05/18/07 |
| 674 | LIMITER | HP 11947A | 3107A02200 | 04/19/06 | 04/19/07 |

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FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER
EQUIPMENT: DX80 PROJECT NO.:6L0697RUS1

ANNEX A - TEST DETAILS

| | |
|---|----------------------|
| NAME OF TEST: Powerline Conducted Emissions | PARA. NO.: 15.207(a) |
|---|----------------------|

Minimum Standard: §15.207 Conducted limits.

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 mH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency of Conducted Emission (MHz) | Limit (dBmV) | |
|---------------------------------------|--------------|-----------|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

* Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current systems containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 mV within the frequency band 535-1705 kHz, as measured using a 50 mH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits as provided in §15.205 and §§15.209, 15.221, 15.223, 15.225 or 15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

NAME OF TEST: Radiated Spurious Emissions

PARA. NO.: 15.247(d)

Minimum Standard: In any 100kHz bandwidth outside the frequency band in which the transmitter is operating, emissions shall be at least 20 dB below the fundamental emission or shall not exceed the following field strength limits:

Emissions falling in the restricted bands of 15.205 shall not exceed the following field strength limits:

| Frequency (MHz) | Field Strength (μ V/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 |

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15.205 Restricted Bands

| MHz | MHz | MHz | GHz |
|-------------------|---------------------|---------------|-------------|
| 0.09-0.11 | 16.42-16.423 | 399.9-410 | 4.5-5.25 |
| 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.125-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 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 | 1718 | | |

Number of channels tested:

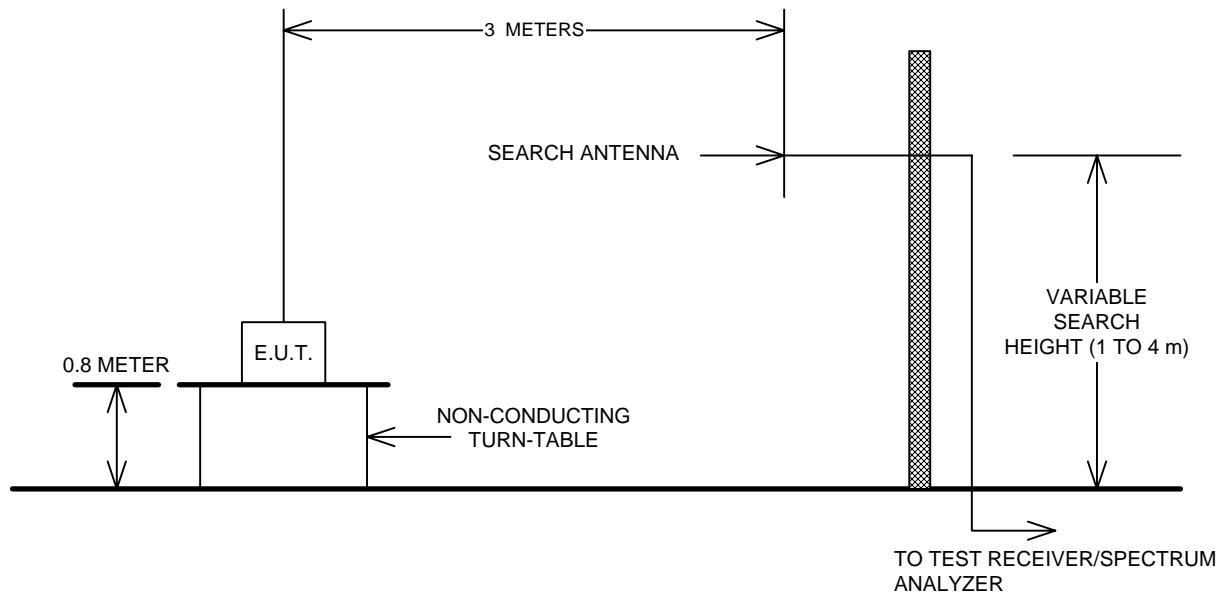
| Tuning range | Number of channels tested | Channel location in band |
|------------------|---------------------------|--------------------------|
| 1 MHz or less | 1 | middle |
| 1 to 10 MHz | 2 | top and bottom |
| more than 10 MHz | 3 | top, middle, bottom |

Nemko USA, Inc.

FCC PART 15, SUBPART C

FREQUENCY HOPPING SPREAD SPECTRUM TRANSMITTER
EQUIPMENT: DX80 PROJECT NO.:6L0697RUS1

ANNEX B - TEST DIAGRAMS

Test Site For Radiated Emissions**Conducted Emissions**