| | |
|---|---|
| **Test Report:** | 2W06538 |
| **Applicant:** | Desa International Inc.<br>P.O. Box 90004, 2901 Industrial Ave.<br>Bowling Green, KY<br>42102<br>USA |
| **Equipment Under Test:**<br>**(EUT)** | 6014-TX Wireless Wall Switch<br>315MHz Transmitter |
| **FCC ID:** | BJ4-60WRC14TX |
| **In Accordance With:** | **FCC Part 15, Subpart C, 15.231** |
| **Tested By:** | Nemko Canada Inc.<br>303 River Road, R.R. 5<br>Ottawa, Ontario K1V 1H2 |
| **Authorized By:** |  <br>Kevin Carr, EMC Specialist |
| **Date:** | 19 December 2002 |
| **Total Number of Pages:** | 18 |

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## Section 1. Summary of Test Results

### 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. 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.

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".

TESTED BY: _____ DATE: 19 December 2002
Glen Westwell, Wireless Technologist

## Summary Of Test Data

| Name of Test | Para. Number | Results |
|---|---|---|
| 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 |
| Periodic Alternate Field Strength Requirements | 15.231(e) | N/A |
| Powerline Conducted Emissions | 15.207 | N/A |

Note: This device is powered by a 3Vdc lithium cell.

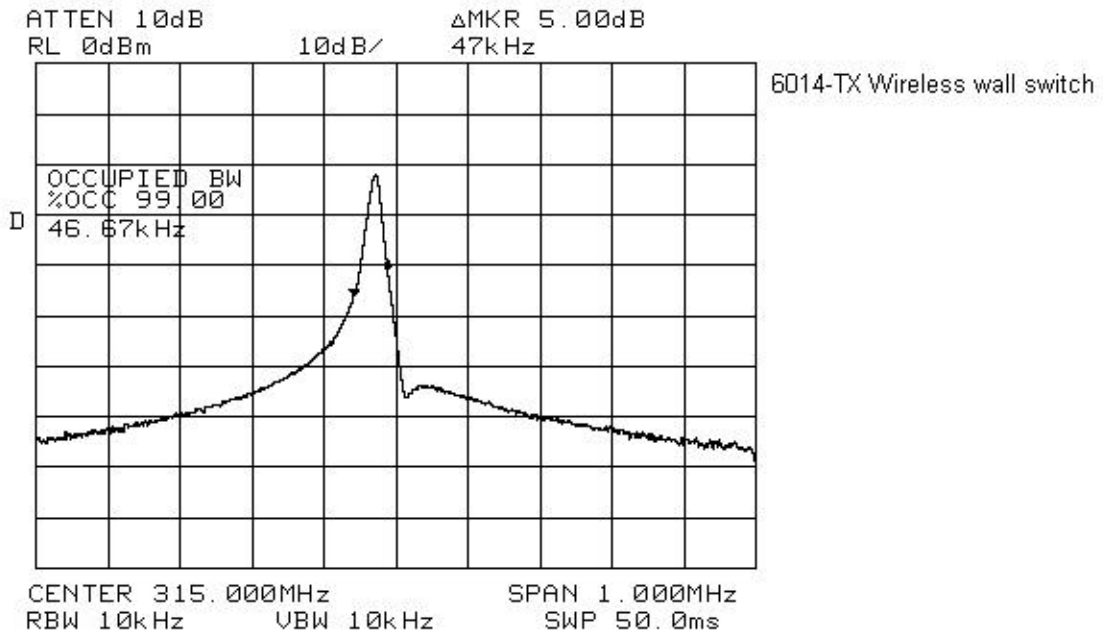
**Indoor** Temperature: 22 ?C
Humidity: 38 %

**Outdoor** Temperature: -7 ?C
Humidity: 36 %

## Section 2. Equipment Under Test

### General Equipment Information

| | |
|---|---|
| **Manufacturer:** | Desa International Inc. |
| **Model No.:** | 6014-TX |
| **Serial No.:** | none |
| **Date Received In Laboratory:** | 10 Dec. 2002 |
| **Nemko Identification No.:** | Item #1 |
| **Tx:** | 315 MHz Fixed |
| **Emission Designator:** | 47K0L1D |
| **Type of Modulation:** | Pulse Modulated |


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR 5.00dB
47kHz
6014-TX Wireless wall switch
OCCUPIED BW
%OCC 99.00
D
46.67kHz
CENTER 315.000MHz
SPAN 1.000MHz
RBW 10kHz
VBW 10kHz
SWP 50.0ms

## Section 3. Transmission Requirements

**Para. No.: 15.231(a)**

| **Test Performed By:** Glen Westwell | **Date of Test:** 19 Dec. 2002 |
|---|---|

**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.

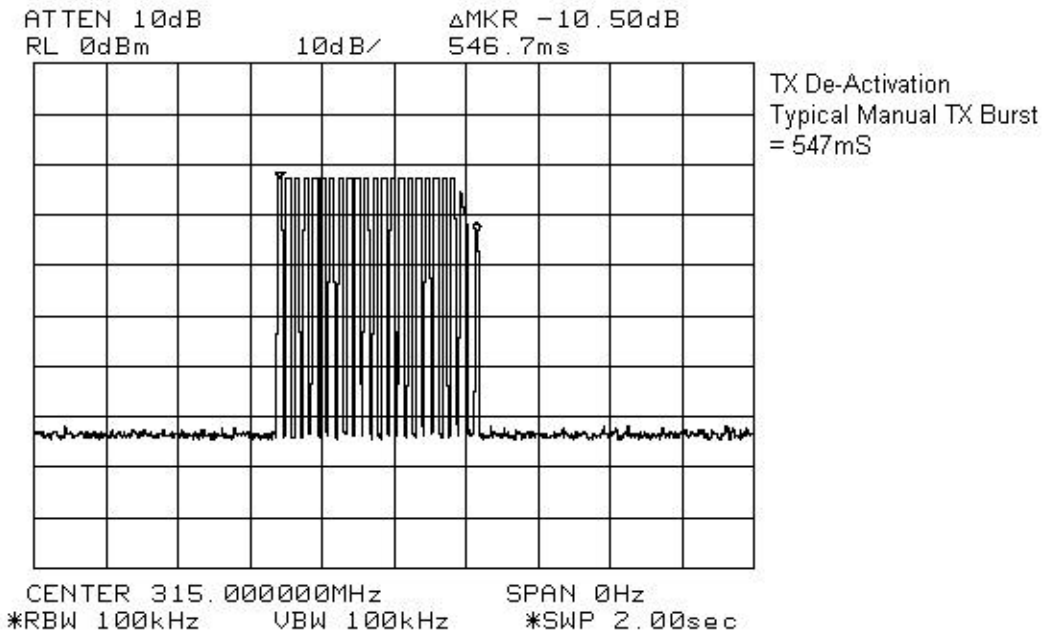
15.231(a)(2) A transmitter activated automatically shall cease transmission within 5 seconds of activation.

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.


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR -10.50dB
546.7ms
TX De-Activation
Typical Manual TX Burst
= 547mS
CENTER 315.000000MHz
SPAN 0Hz
*RBW 100kHz
VBW 100kHz
*SWP 2.00sec

## Rationale for Compliance with Transmission Requirements

**15.231(a)(1) :** Complies, transmitter de-activates immediately upon release.

**15.231(a)(2) :** N/A, manual operation only.

**15.231(a)(3) :** There are no provisions for regular predetermined periodic transmissions.

**15.231(a)(4) :** N/A

## Section 4. Radiated Emissions

**Para. No.: 15.231(b)**

| **Test Performed By:** Glen Westwell | **Date of Test:** 19 Dec, 2002 |
|---|---|

**Minimum Standard:**

| Fundamental Frequency (MHz) | Field Strength of Fundamental (? V/m @ 3m) | Field Strength of Spurious Emissions (? V/m @ 3m) |
|---|---|---|
| 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 |

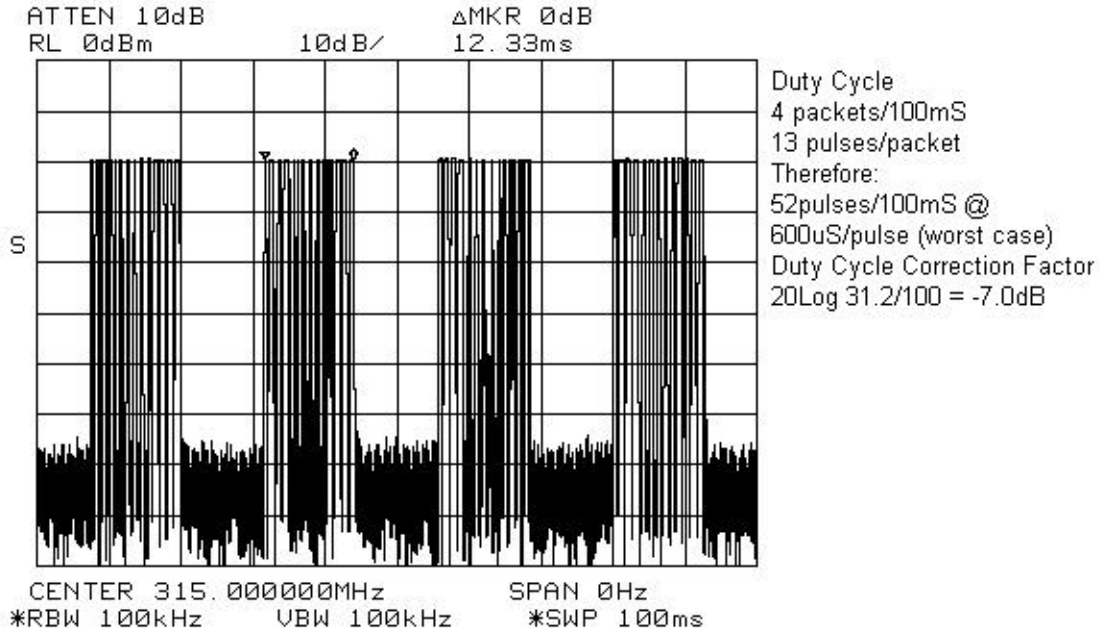
| Restricted Band Limits | | |
|---|---|---|
| **Frequency (MHz)** | **Field Strength (? V/m @ 3m)** | **Field Strength (dB? V/m @ 3m)** |
| 30 - 88 | 100 | 40.0 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

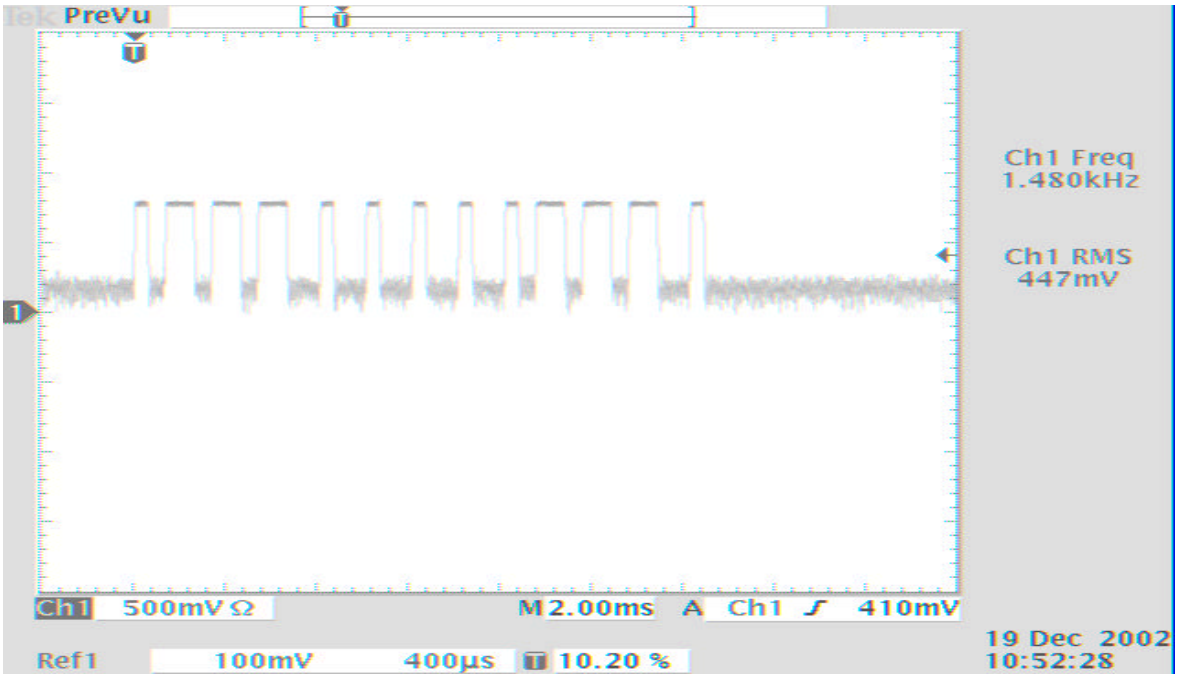
**Test Results:** Complies

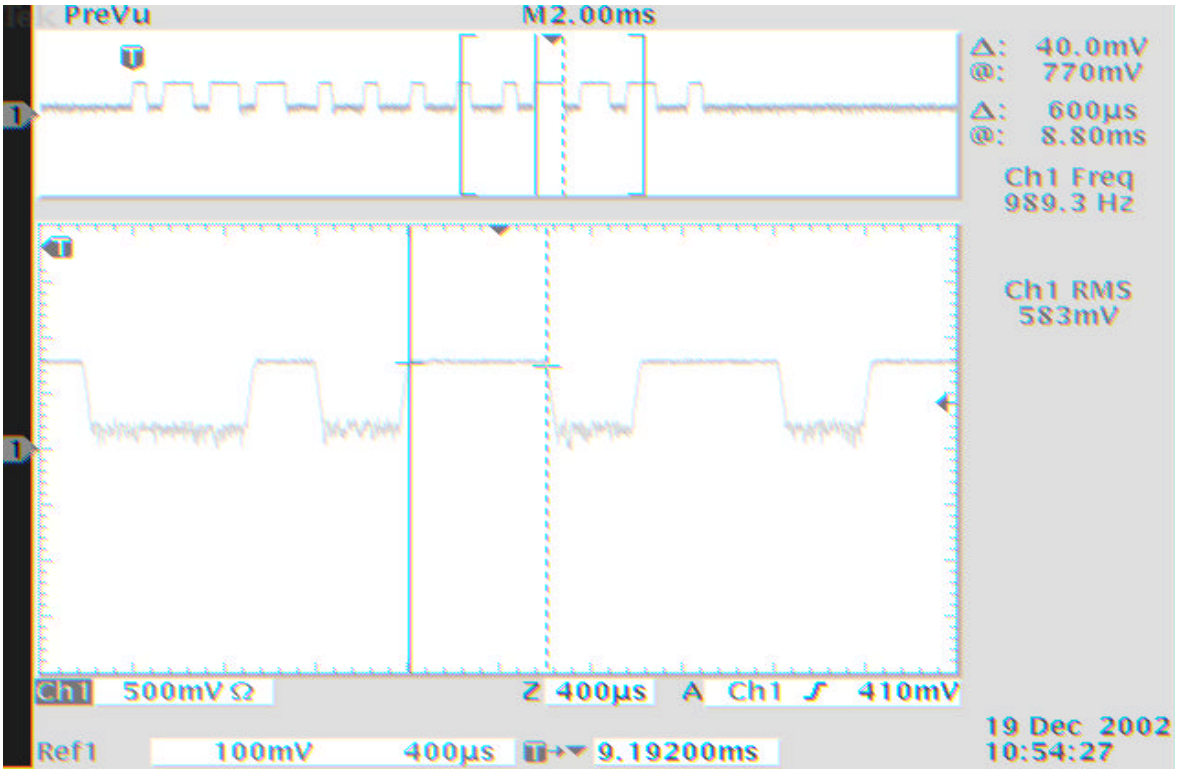
**Test Data:** As per attached tabulated data.

**Duty Cycle correction factor:** -7.0dB

?All spurious and harmonic emissions were search to the 10th harmonic.
?The EUT was searched on 3 orthogonal axis for maximum emission detection.
?The EUT was power with a fresh 3Vdc cell.


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR 0dB
12.33ms
S
CENTER 315.000000MHz
SPAN 0Hz
*RBW 100kHz
VBW 100kHz
*SWP 100ms
Duty Cycle
4 packets/100mS
13 pulses/packet
Therefore:
52pulses/100mS @
600uS/pulse (worst case)
Duty Cycle Correction Factor
20Log 31.2/100 = -7.0dB


PreVu
Ch1 Freq
1.480kHz
Ch1 RMS
447mV
Ch1 500mV Ω
M2.00ms A Ch1 410mV
Ref1 100mV 400µs 10.20 %
19 Dec 2002
10:52:28


PreVu
M2.00ms
Δ: 40.0mV
@: 770mV
Δ: 600µs
@: 8.80ms
Ch1 Freq
989.3 Hz
Ch1 RMS
583mV
Ch1 500mV Ω
Z 400µs A Ch1 410mV
Ref1 100mV 400µs 9.19200ms
19 Dec 2002
10:54:27

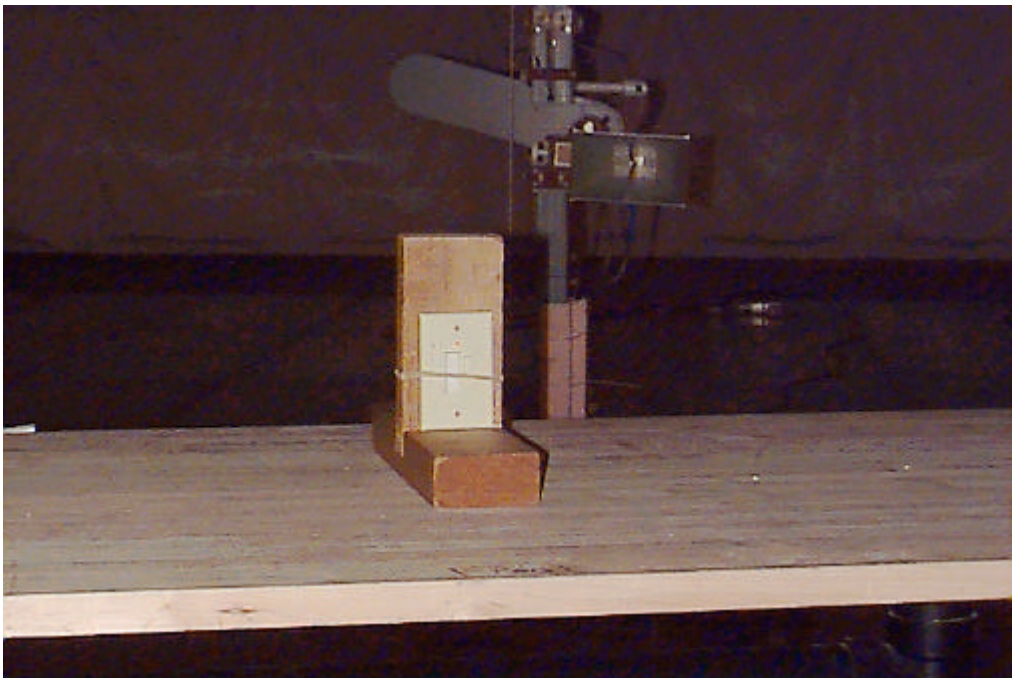
## Test Data - Radiated Emissions

| Test Distance (meters) : 3 | | Range: A Tower | | Receiver: ESVS 30/HP8564E | | RBW(kHz): 120/1000 | | Detector: Peak | |
|---|---|---|---|---|---|---|---|---|---|
| Freq. (MHz) | Ant. | Pol. (V/H) | RCVD Signal (dB? V) | Ant. Factor (dB)** | Amp. Gain (dB)*** | Duty Cycle Corr. (dB) | Field Strength (dB? V/m) | Limit (dB? V/m) | Margin (dB) |
| 315.0 | BL | V | 62.5 | 17.1 | | -7.0 | 72.6 | 75.6 | 3.0 |
| 315.0 | BL | H | 49.9 | 17.1 | | -7.0 | 60.0 | 75.6 | 15.6 |
| 630.0 | BL | V | 38.1 | 23.0 | | -7.0 | 54.1 | 55.6 | 1.5 |
| 630.0 | BL | H | 31.5 | 23.0 | | -7.0 | 47.5 | 55.6 | 8.1 |
| 945.0 | BL | V | 33.1 | 26.7 | | -7.0 | 52.8 | 55.6 | 2.8 |
| 945.0 | BL | H | 25.5 | 26.7 | | -7.0 | 45.2 | 55.6 | 10.4 |
| 1260.0 | Hrn3 | V | 51.7 | 30.9 | -37.9 | -7.0 | 37.7 | 54.0 | 16.3 |
| 1260.0 | Hrn3 | H | N.D. | 30.9 | -37.9 | -7.0 | N.D. | 54.0 | N.D. |
| 1575.0 | Hrn3 | V | 51.3 | 32.4 | -37.3 | -7.0 | 39.4 | 54.0 | 14.6 |
| 1575.0 | Hrn3 | H | N.D. | 32.4 | -37.3 | -7.0 | N.D. | 54.0 | N.D. |

**Notes:**
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Re-measured using dipole antenna.
** Includes cable loss when amplifier is not used.
*** Includes cable loss.
( ) Denotes failing emission level.
N.D. = Not Detected

## Radiated Photographs

**Front View:**



## Section 5. Occupied Bandwidth

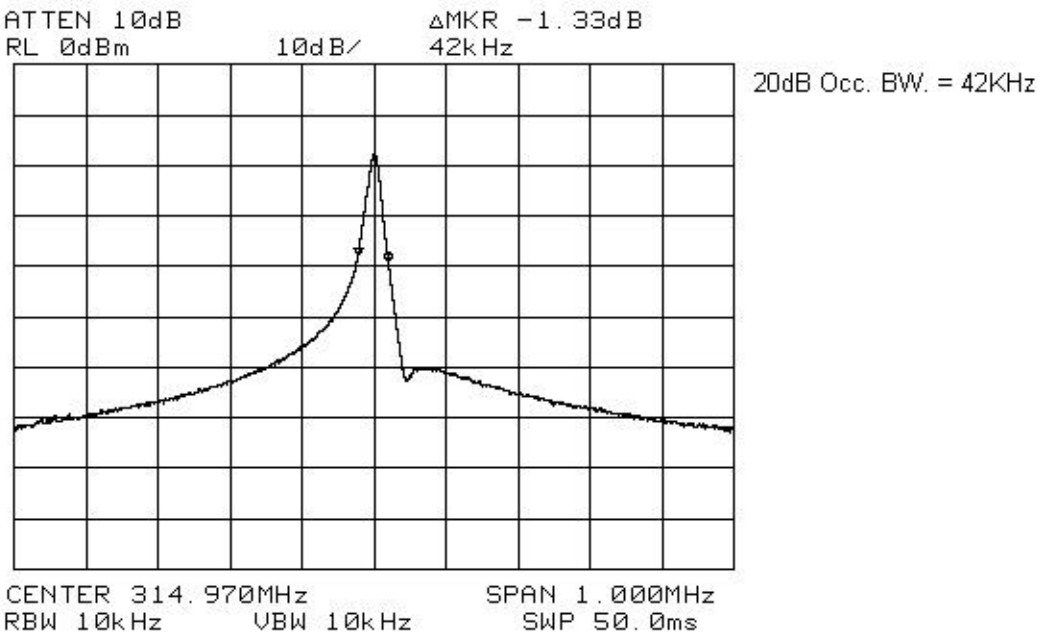
**Para. No.: 15.231(c)**

| **Test Performed By:** Glen Westwell | **Date of Test:** 19 Dec, 2002 |
|---|---|

**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.

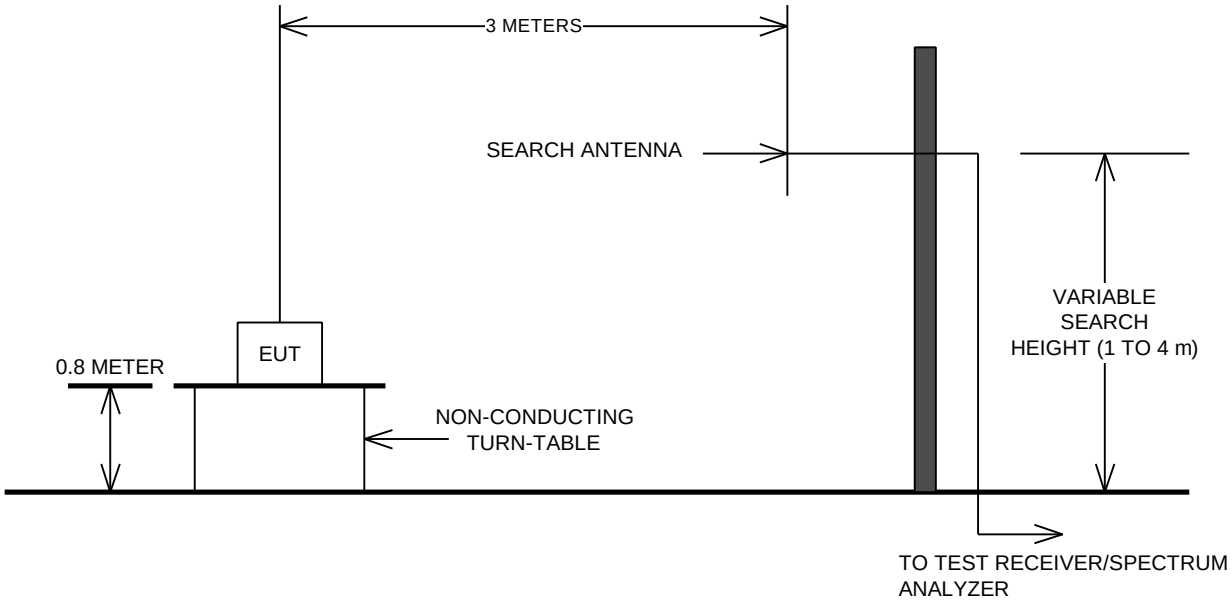
**Test Results:** Complies

**Test Data:** See attached graph.


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR -1.33dB
42kHz
20dB Occ. BW. = 42KHz
CENTER 314.970MHz
SPAN 1.000MHz
RBW 10kHz
VBW 10kHz
SWP 50.0ms

## Section 6. Block Diagrams

### Outdoor Test Site For Radiated Emissions




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

## Section 7. Test Equipment List

| CAL CYCLE | EQUIPMENT | MANUFACTURER | MODEL | SERIAL | LAST CAL. | NEXT CAL. |
|---|---|---|---|---|---|---|
| 1 Year | Spectrum Analyzer | Hewlett Packard | 8565E | FA000981 | Jul 15/02 | Jul 15/03 |
| 1 Year | Receiver | Rohde & Schwarz | ESVS 30 | FA001437 | Jul 04/02 | Jul 04/03 |
| 1 Year | Horn Antenna #3 | EMCO | 3115 | FA001452 | Mar. 03/02 | Mar. 03/03 |
| 1 Year | Oscilloscope | Tektronix | TDS 3012 | FA001560 | 29 Jul 02 | 29 Jul 03 |
| 1 Year | Bilog | Schaffner | CBL6612B | FA001503 | July 1/02 | July 1/03 |
| 1 Year | Pre-Amplifier 1- 26.5 GHz | Hewlett-Packard | HP 8449 | FA001761 | Feb. 19/02 | Feb. 19/03 |

NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use