Standards Council of Canada
Accredited Laboratory
Scope of Accreditation 75

Conseil canadien des normes
Laboratoire accrédité
Portée d'accréditation 75

TM

| | |
|---|---|
| **Test Report:** | 4W08181, Issue2 |
| **Applicant:** | Desa International Inc.<br>P.O. Box 90004, 2901 Industrial Avenue,<br>Bowling Green, KY.<br>42102, USA |
| **Equipment Under Test: (EUT)** | 6005-8TX |
| **FCC ID:** | BJ4-WRC6005TX |
| **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/EMI/Wireless Specialist |
| **Date:** | 2 June 2004 |
| **Total Number of Pages:** | 17 |

## Table of Contents

# 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 C63.4-2001. 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: 2 June 2004
Daxesh Thakker, Wireless Test Engineer




Nemko Canada Inc., a testing laboratory, is accredited by the Standards Council of Canada.
The tests included in this report are within the scope of this accreditation.

## Summary Of Test Data

| Name of Test | Para. Number | Results |
|---|---|---|
| Transmission Requirements | 15.231(a) | Complied |
| Radiated Emissions | 15.231(b) | Complied |
| Occupied Bandwidth | 15.231(c) | Complied |
| Frequency Tolerance | 15.231(d) | N/A (1) |
| Periodic Alternate Field Strength Requirements | 15.231(e) | N/A (2) |
| Power line Conducted Emissions | 15.207 | N/A (3) |

Justification of N/A's

(1) The EUT does not operate in the frequency range of 40.66 – 40.70 MHz.
(2) The EUT does not periodically transmission at predetermined intervals.
(3) The EUT is battery powered.

**Test Conditions:**

**Indoor** Temperature: 24° C
Humidity: 56 %

**Outdoor** Temperature: 20° C
Humidity: 42 %

## Section 2. Equipment Under Test

### General Equipment Information

| | |
|---|---|
| **Manufacturer:** | Desa International Inc. |
| **Company Number:** | 3984A |
| **Model No.:** | 6005-8TX |
| **Serial No.:** | None |
| **Date Received In Laboratory:** | May 19, 2004 |
| **Nemko Identification No.:** | Item no. 5 & 6 |
| **Test Voltage** | One A23 battery of 12 volts |
| **Frequency Range (*or fixed frequency*):** | 315 MHz, Fixed |
| **Field Strength (*distance*):** | 70.9 dBµV/m @ 3m |
| **Occupied Bandwidth (99% BW):** | 21.33 kHz |
| **Type of Modulation:** | PCM |
| **Emission Designator (TRC-43:)** | 21K3L1D |

## Section 3. Transmission Requirements

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

| **Test Performed By: Daxesh Thakker** | **Date of Test: May 20, 2004** |
|---|---|

**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.

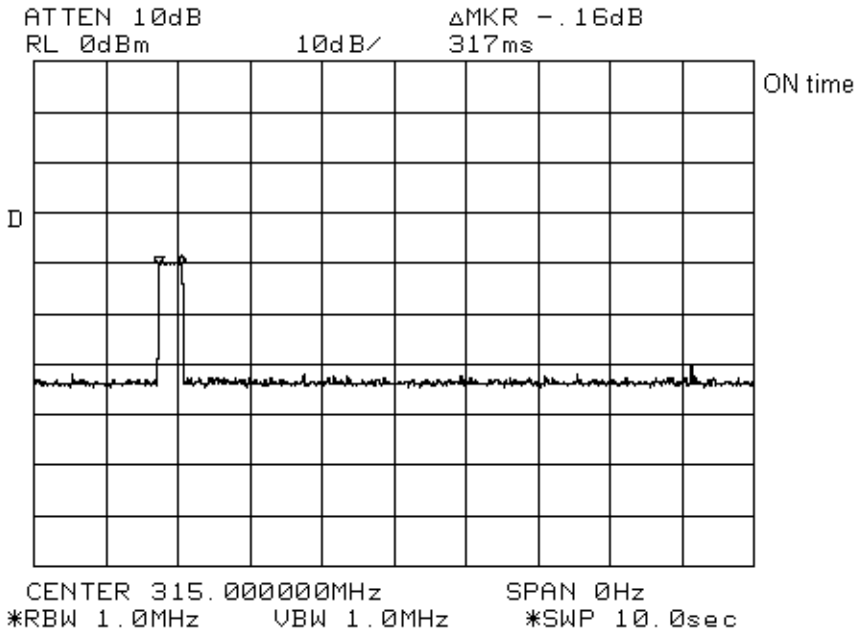
15.231(a)(4) Intentional radiators, which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm.

**Test Results:** Complied

**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):** | N/A – The EUT does not continuously transmit voice, video or data and is manually operated. |
| | |
| **15.231(a)(1):** | Complied. The EUT shuts off automatically in 317 mseconds. |
| | |
| **15.231(a)(2):** | The EUT is not automatically activated. |
| | |
| **15.231(a)(3):** | N/A – The EUT does not periodically transmit at predetermined intervals. |
| | |
| **15.231(a)(4):** | N/A – The EUT is not intended for emergency purposes. |


ATTEN 10dB
RL 0dBm
10dB/
ΔMKR -.16dB
317ms
ON time
D
CENTER 315.000000MHz
SPAN 0Hz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 10.0sec

## Section 4. Radiated Emissions

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

| **Test Performed By: Daxesh Thakker** | **Date of Test: May 20, 2004** |
|---|---|

**Minimum Standard:**

| Fundamental Frequency (MHz) | Field Strength of Fundamental (μV/m @ 3m) | Field Strength of Spurious Emissions (μV/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 (μV/m @ 3m)** | **Field Strength (dBμV/m @ 3m)** |
| 30 - 88 | 100 | 40.0 |
| 88 - 216 | 150 | 43.5 |
| 216 - 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

**Test Results:** Complied

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

| | |
|---|---|
| Test Date: 20-May-04 | |
| Engineer's Name: Daxesh Thakker | |
| Temperature (C°): 20 | Humidity: 42 % |
| | |
| Tested as per Table Top | |
| Test Distance (meters): 3 | Range: A |

| Freq. (MHz) | Ant. | Pol. V/H | RCVD Signal (dBμV) **R.S.** | Ant. Factor (dB) **A.F.** | Amp. Gain (dB) **A.G.** | Duty Cycle Corr. (-dB) **D.C.C.** | Cable Loss (dB) **C.L.** | Field Strength (dBμV/m) **F.S.** | Limit (dBμV/m) **L.** | Margin (dB) **M.** | Amp. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 315.0000 | ED3 | H | 59.7 | 19.1 | -- | -10.2 | 2.3 | 70.9 | 75.6 | 4.7 | -- |
| 315.0000 | ED3 | V | 41.5 | 19.1 | -- | -10.2 | 2.3 | 52.7 | 75.6 | 22.9 | -- |
| 630.0000 | LP1 | H | 38.0 | 20.2 | -- | -10.2 | 3.1 | 51.1 | 55.6 | 4.5 | -- |
| 630.0000 | LP1 | V | 31.0 | 20.0 | -- | -10.2 | 3.1 | 43.9 | 55.6 | 11.7 | -- |
| 1260.0000 | Horn2 | H | 55.0 | 26.6 | 46.5 | -10.2 | 3.2 | 28.1 | 54.0 | 25.9 | 1-2GHz |
| 1260.0000 | Horn2 | V | 60.7 | 26.6 | 46.5 | -10.2 | 3.2 | 33.7 | 54.0 | 20.3 | 1-2GHz |
| 1575.0000 | Horn2 | H | 55.0 | 28.6 | 46.3 | -10.2 | 3.4 | 30.5 | 54.0 | 23.5 | 1-2GHz |
| 1575.0000 | Horn2 | V | 55.8 | 28.2 | 46.3 | -10.2 | 3.4 | 30.9 | 54.0 | 23.1 | 1-2GHz |
| 1890.0000 | Horn2 | H | 54.2 | 29.0 | 46.3 | -10.2 | 4.0 | 30.6 | 55.6 | 25.0 | 1-2GHz |
| 1890.0000 | Horn2 | V | 50.0 | 28.5 | 46.3 | -10.2 | 4.0 | 26.0 | 55.6 | 29.6 | 1-2GHz |

Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

| | |
|---|---|
| Notes: | All emissions to the 10th harmonic were searched.<br>Receiver bandwidth of 100KHz was used below 1GHz & 1MHz bandwidth was used above 1GHz. In both cases a peak detector was used. Emissions were measured at the Ottawa Facility. The EUT was tested with one fresh new battery of 12 volts. The EUT was tested in all three orthogonal axes and worst case emissions are reported. |

**Sample Calculation for Field Strength (F.S.) and Margin:**

All parameters are defined as follows.

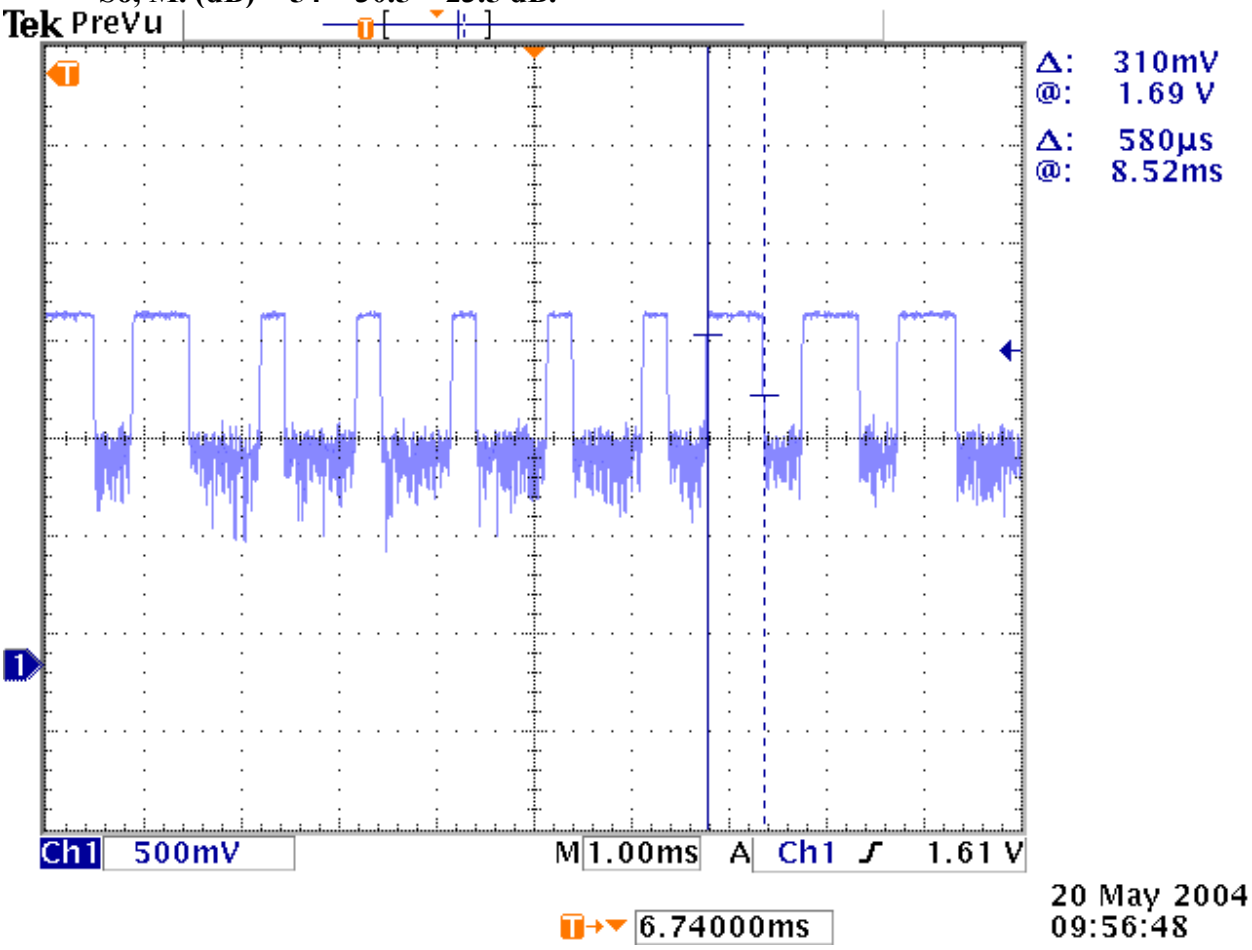
***Received Signal (dBμV) - R.S.***
***Antenna Factor (dB) - A.F.***
***Amplifier Gain (dB) - A.G.***
***Duty Cycle Correction (dB) - D.C.C.***
***Cable Loss (dB) - C.L.***
***Field Strength (dBμV/m) - F.S.***
***Limit (dBμV/m) - L.***
***Margin (dB) - M.***

So,

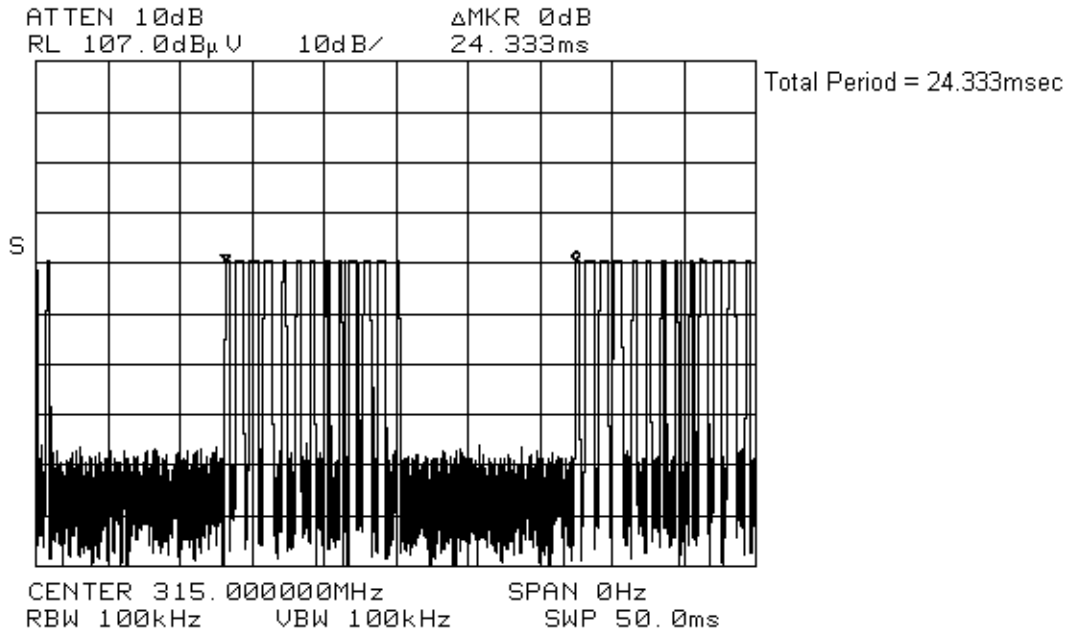
**F.S. *(dBμV/m)* = (R.S. + A.F. + C.L.) – (A.G. + D.C.C.) And**
**M. (dB) = (L.) – (F.S.)**

**E.g. @ 1575 MHz in Hor. Pol., F.S. *(dBμV/m)*=(55.0+28.6+3.4) – (46.3+10.2) = 30.5 *dBμV/m***

**So, M. (dB) = 54 – 30.5 = 23.5 dB.**




580 µSec Pulse




580 µSec x 13 pulses = 7.54 mSec
DUTY CYCLE = $20\text{Log}_{10}$ (7.54/24.33) = - 10.17 dB

**Radiated Emission Setup photo:**

## Section 5. Occupied Bandwidth

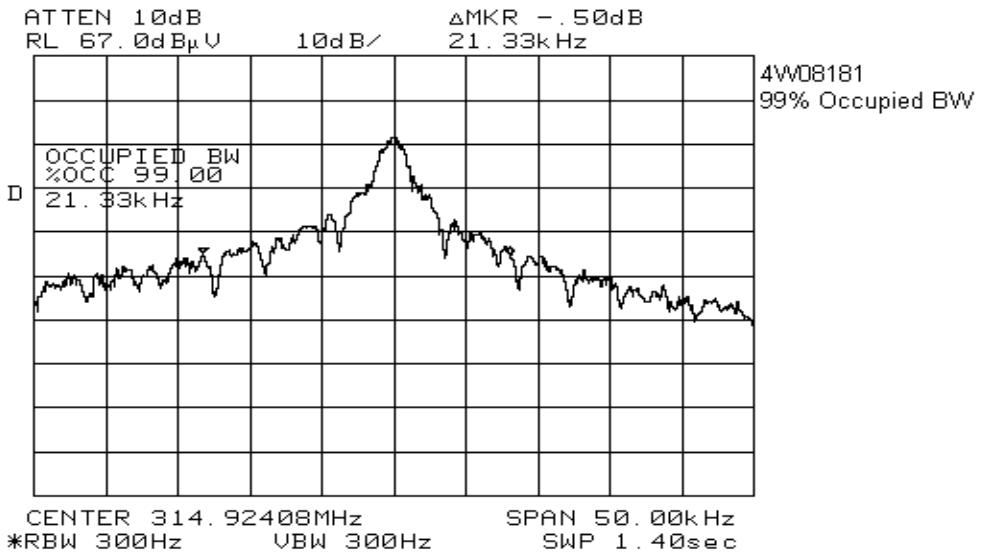
**Para. No.: 15.231(c)**

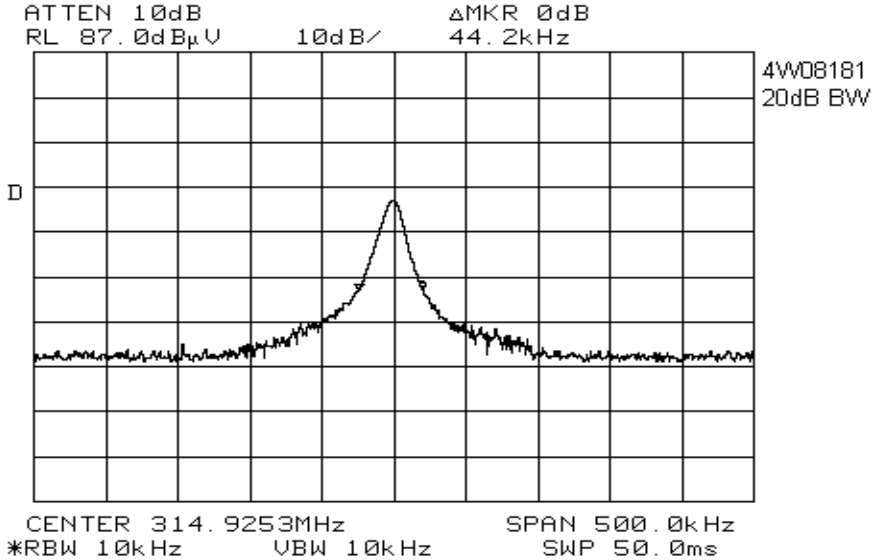
| **Test Performed By: Daxesh Thakker** | **Date of Test: May 20, 2004** |
|---|---|

**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:** Complied

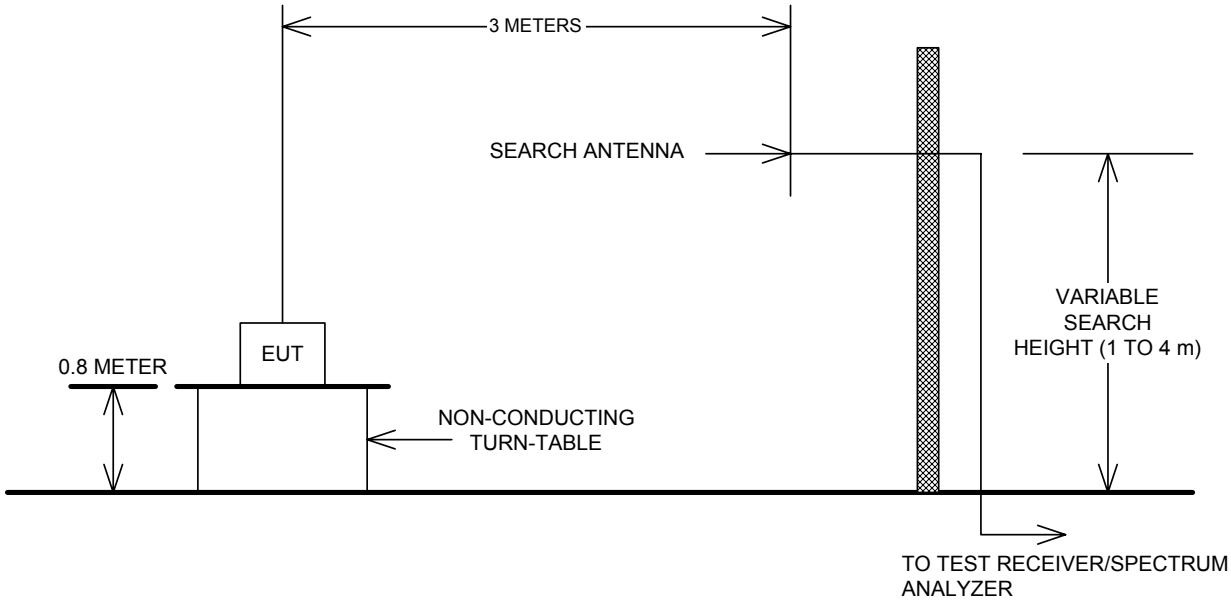
**Test Data:** See attached graph.


ATTEN 10dB
RL 67.0dBµV
10dB/
ΔMKR -.50dB
21.33kHz
4VV08181
99% Occupied BW
OCCUPIED BW
%OCC 99.00
21.33kHz
D
CENTER 314.92408MHz
SPAN 50.00kHz
*RBW 300Hz
VBW 300Hz
SWP 1.40sec


ATTEN 10dB
RL 87.0dBµV
10dB/
ΔMKR 0dB
44.2kHz
4VV08181
20dB BW
D
CENTER 314.9253MHz
SPAN 500.0kHz
*RBW 10kHz
VBW 10kHz
SWP 50.0ms

## Section 6. Block Diagram

### 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 No. | Asset/Serial No. | Last Cal. | Next Cal. |
|---|---|---|---|---|---|---|
| 1 Year | Spectrum Analyzer | Hewlett-Packard | 8565E | FA000981 | July 03/03 | July 03/04 |
| 1 Year | Dipole Antenna Set | EMCO #1 | 3121C | FA000814 | May 09/04 | May 09/05 |
| 1 Year | Horn Antenna #2 | EMCO | 3115 | FA000825 | Dec. 10/03 | Dec. 10/04 |
| 1 Year | Log Periodic Antenna #1 | EMCO | LPA-25 | FA000477 | Sept. 02/03 | Sept. 02/04 |
| 1 Year | 1.0 – 2.0 GHz Amplifier | JCA | 12-400 | FA001498 | June. 18/03 | June. 18/04 |
| 1 Year | 2.0 – 4.0 GHz Amplifier | JCA | 24-600 | FA001496 | June. 18/03 | June. 18/04 |

Note: N/A = Not Applicable, NCR = No Cal Required, COU = CAL On Use, OUT = Out For CAL/Repair