



**Test Report:** 4W27578.2

**Applicant:** PARADOX SECURITY SYSTEMS  
780 INDUSTRIAL BLVD  
ST-EUSTACHE  
QUEBEC, CANADA, J7R 5V3

**Equipment Under Test:  
(EUT)** MG-SMK1 (433MHz), Wireless Smoke Detector

**FCC ID:** KDYMGSMK1

**In Accordance With:** **FCC Part 15, Subpart C, 15.231**

**Tested By:** Nemko Canada Inc.  
303 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2

**Authorized By:**  
  
Glen Westwell, Wireless Specialist

**Date:** 13 October 2004

**Total Number of Pages:** 16

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*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

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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. NONE  
See " Summary of Test Data".



TESTED BY: \_\_\_\_\_  
Chris Maidens, EMC Specialist

DATE: 7 October 2004

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This report applies only to the items tested.

*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

**Summary Of Test Data**

| <b>Name of Test</b>                            | <b>Para. Number</b> | <b>Results</b> |
|--|---------------------|----------------|
| 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)         |
| Powerline Conducted Emissions                  | 15.207              | N/A(3)         |

**Justification for N/A's**

|        |  |
|--------|--|
| N/A(1) | The Eut does not transmit in the band 40.66-40.070MHz            |
| N/A(2) | The requirements of this section are not applicable to this EUT. |
| N/A(3) | The EUT is Battery Powered (Single 9V battery)                   |

**Test Conditions:**

**Indoor**                      Temperature: 20°C  
    Humidity: 49%

*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

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## **Section 2.        Equipment Under Test**

### **General Equipment Information**

|  |   |
|--|---|
| <b>Manufacturer:</b>                         | Paradox Security Systems  |
| <b>Company Number:</b>                       | 2438A   |
| <b>Model No.:</b>                            | MG-SMK1   |
| <b>Serial No.:</b>                           | 001185  |
| <b>Date Received In Laboratory:</b>          | June 4, 2004  |
| <b>Nemko Identification No.:</b>             | 9   |
| <b>EUT Description:</b>                      | The EUT is a wireless smoke detector that functions with the Magellan alarm system. |
| <b>Frequency Range (or fixed frequency):</b> | Fixed, 433.92MHz  |
| <b>Type of Modulation:</b>                   | ASK, 100% or OOK  |
| <b>Emission Designator (TRC-43:)</b>         | 71K8L1D   |

**Section 3.           Transmission Requirements**

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

|   |                                     |
|---|-------------------------------------|
| <b>Test Performed By: Chris Maidens</b> | <b>Date of Test: Sept. 23, 2004</b> |
|---|-------------------------------------|

**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.

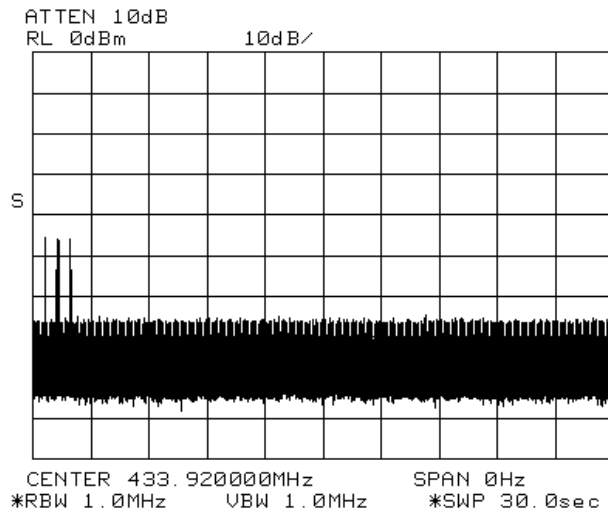
EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

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**Rationale for Compliance with Transmission Requirements**

15.231(a)(1) : N/A- The EUT does not continuously transmit voice, video or data, nor is it intended for manually activated transmissions

15.231(a)(2) : Complies- The EUT stops transmitting in less than 3 seconds (plot shows 3s/div)



15.231(a)(3) : N/A- The EUT employs no periodic polling or supervisory transmissions.

15.231(a)(4) : Complies- The EUT only transmits during an alarm state.

EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

**Section 4. Radiated Emissions**

Para. No.: 15.231(b)

|   |                                     |
|---|-------------------------------------|
| <b>Test Performed By: Chris Maidens</b> | <b>Date of Test: Sept. 23, 2004</b> |
|---|-------------------------------------|

**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:** Complies.

**Test Data:** See attached tabulated data.



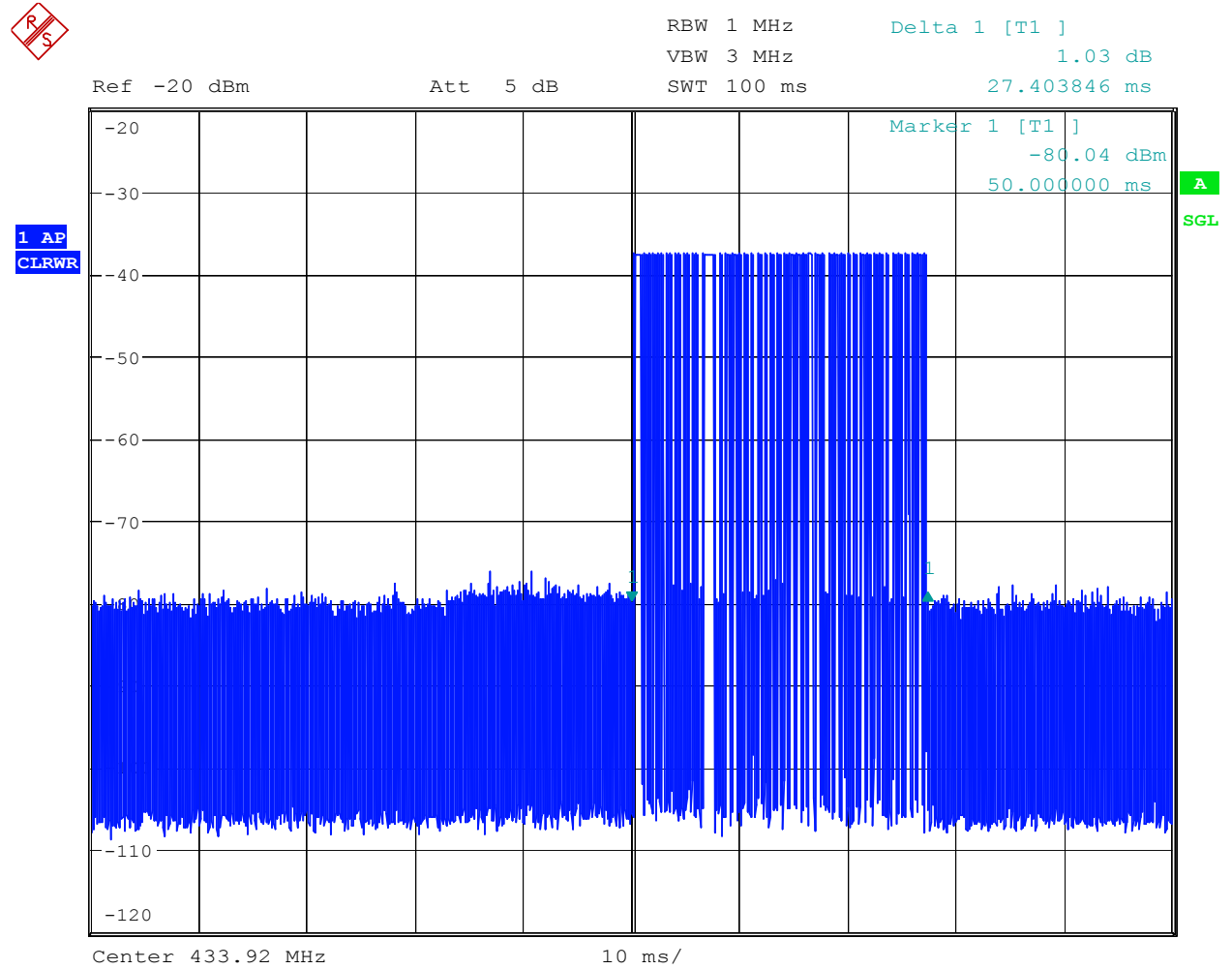
EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

**Radiated Disturbance Test Data:**

| Test Date: September 23, 2004  |       |          |                    |                  |                |                        |                 |                         |                |             |        |
|--|-------|----------|--------------------|------------------|----------------|------------------------|-----------------|-------------------------|----------------|-------------|--------|
| Engineer's Name: Chris Maidens   |       |          |                    |                  |                |                        |                 |                         |                |             |        |
| Temperature (C°): 24   |       |          |                    |                  |                | Humidity %: 54         |                 |                         |                |             |        |
| Tested as per Table Top  |       |          |                    |                  |                |                        |                 |                         |                |             |        |
| Test Distance (meters): 3  |       |          |                    |                  |                | Range: 1               |                 |                         |                |             |        |
| Freq. (MHz)  | Ant.  | Pol. V/H | RCVD Signal (dBµV) | Ant. Factor (dB) | Amp. Gain (dB) | Duty Cycle Corr. (-dB) | Cable Loss (dB) | Field Strength (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Amp.   |
| 433.9200   | LP1   | V        | 52.7               | 16.1             | 0              | -11.2                  | 2.7             | 60.3                    | 80.8           | 20.5        | None   |
| 433.9200   | LP1   | H        | 46.9               | 16.8             | 0              | -11.2                  | 2.7             | 55.2                    | 80.8           | 25.6        | None   |
| 867.8400   | LP1   | V        | 31.4               | 22.1             | 0              | -11.2                  | 3.9             | 46.2                    | 60.8           | 14.6        | None   |
| 867.8400   | LP1   | H        | 27.6               | 23.1             | 0              | -11.2                  | 3.9             | 43.4                    | 60.8           | 17.4        | None   |
| 1301.7600  | Horn1 | V        | 44.8               | 26.4             | 46.5           | -11.2                  | 3.3             | 16.7                    | 54.0           | 37.3        | 1-2GHz |
| 1301.7600  | Horn1 | H        | 49.9               | 26.3             | 46.5           | -11.2                  | 3.3             | 21.8                    | 54.0           | 32.2        | 1-2GHz |
| 1735.6800  | Horn1 | V        | 60.3               | 28.2             | 46.6           | -11.2                  | 3.9             | 34.5                    | 60.8           | 26.3        | 1-2GHz |
| 1735.6800  | Horn1 | H        | 57.0               | 28.0             | 46.6           | -11.2                  | 3.9             | 31.0                    | 60.8           | 29.8        | 1-2GHz |
| 2169.6000  | Horn1 | V        | 66.2               | 29.1             | 55.3           | -11.2                  | 4.7             | 33.4                    | 60.8           | 27.4        | 2-4GHz |
| 2169.6000  | Horn1 | H        | 65.2               | 29.1             | 55.3           | -11.2                  | 4.7             | 32.4                    | 60.8           | 28.4        | 2-4GHz |
| 2603.5200  | Horn1 | V        | 66.5               | 30.2             | 56.5           | -11.2                  | 8.0             | 37.0                    | 60.8           | 23.8        | 2-4GHz |
| 2603.5200  | Horn1 | H        | 66.0               | 30.2             | 56.5           | -11.2                  | 8.0             | 36.5                    | 60.8           | 24.3        | 2-4GHz |
| 3037.4400  | Horn1 | V        | 65.4               | 31.2             | 56.1           | -11.2                  | 6.1             | 35.3                    | 60.8           | 25.5        | 2-4GHz |
| 3037.4400  | Horn1 | H        | 62.5               | 31.4             | 56.1           | -11.2                  | 6.1             | 32.6                    | 60.8           | 28.2        | 2-4GHz |
| 3471.3600  | Horn1 | V        | 64.4               | 31.3             | 55.1           | -11.2                  | 7.2             | 36.6                    | 60.8           | 24.2        | 2-4GHz |
| 3471.3600  | Horn1 | H        | 61.5               | 31.5             | 55.1           | -11.2                  | 7.2             | 33.9                    | 60.8           | 26.9        | 2-4GHz |
| 3905.2800  | Horn1 | V        | 63.5               | 32.8             | 54.6           | -11.2                  | 7.6             | 38.1                    | 54.0           | 15.9        | 2-4GHz |
| 3905.2800  | Horn1 | H        | 61.7               | 32.8             | 54.6           | -11.2                  | 7.6             | 36.3                    | 54.0           | 17.7        | 2-4GHz |
| 4339.2000  | Horn1 | V        | 60.2               | 32.8             | 52.5           | -11.2                  | 8.3             | 37.6                    | 54.0           | 16.4        | 4-8GHz |
| 4339.2000  | Horn1 | H        | 58.9               | 32.8             | 52.5           | -11.2                  | 8.3             | 36.3                    | 54.0           | 17.7        | 4-8GHz |
| Notes:   |       |          |                    |                  |                |                        |                 |                         |                |             |        |
| 1) Emissions were searched to the 10 <sup>th</sup> harmonic of the fundamental (433.92 to 4339.2MHz)<br>2) The EUT was tested with a fresh battery.<br>3) The EUT was pre-evaluated in 3 orthogonal axes, the worst case was reported<br>4) Receiver bandwidth of 100kHz was used below 1GHz, & 1MHz bandwidth was used on emissions above 1GHz. |       |          |                    |                  |                |                        |                 |                         |                |             |        |

EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

Duty Cycle Plots



Duty Cycle Calculation:

$$20\log(27.4/100)$$

$$=-11.2\text{dB}$$

*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

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**OATS Set up Photo**



*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

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**Section 5. Occupied Bandwidth**

Para. No.: 15.231(c)

|   |                                     |
|---|-------------------------------------|
| <b>Test Performed By: Chris Maidens</b> | <b>Date of Test: Sept. 17, 2004</b> |
|---|-------------------------------------|

**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.

EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

99% Occupied BW:

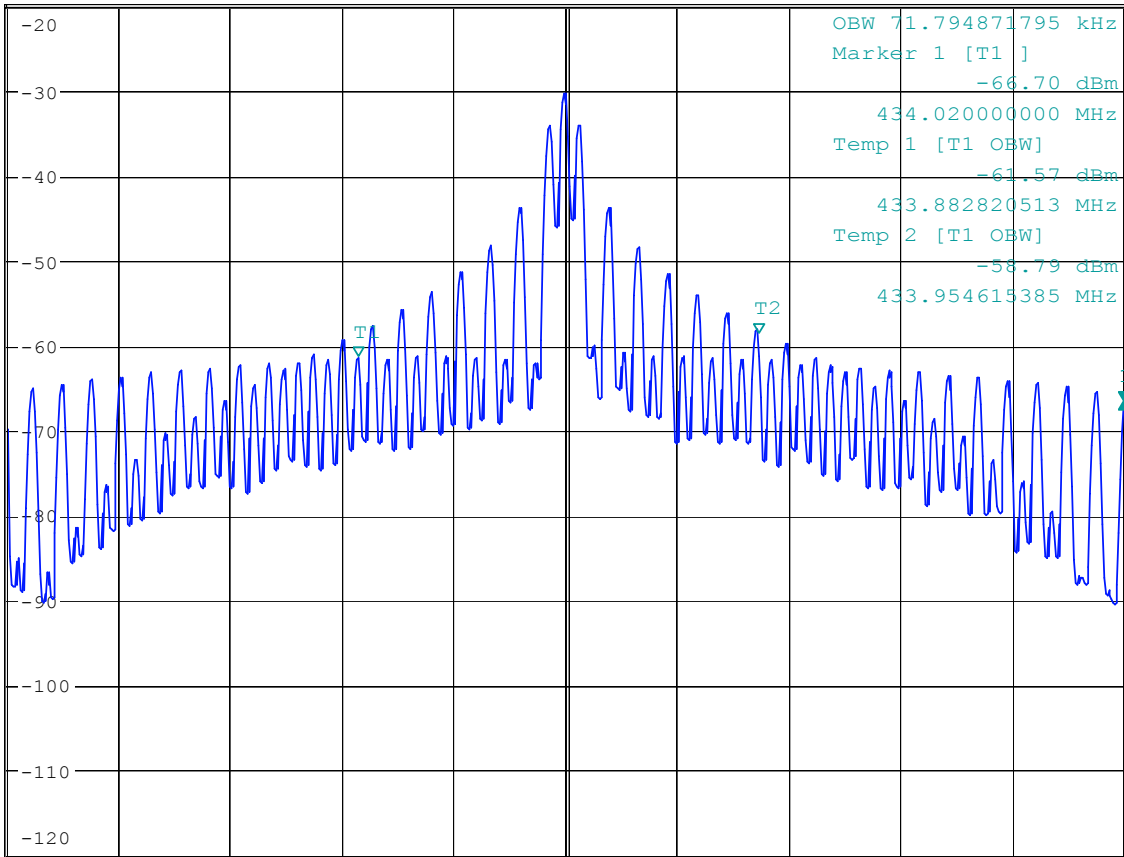


\*RBW 1 kHz      Delta 1 [T1 ]  
VBW 3 kHz                      0.00 dB  
SWT 200 ms                      0.000000000 Hz

Ref -20 dBm

Att 5 dB

1 PK  
VIEW



Center 433.92 MHz

20 kHz/

Span 200 kHz

EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

20dB Bandwidth:



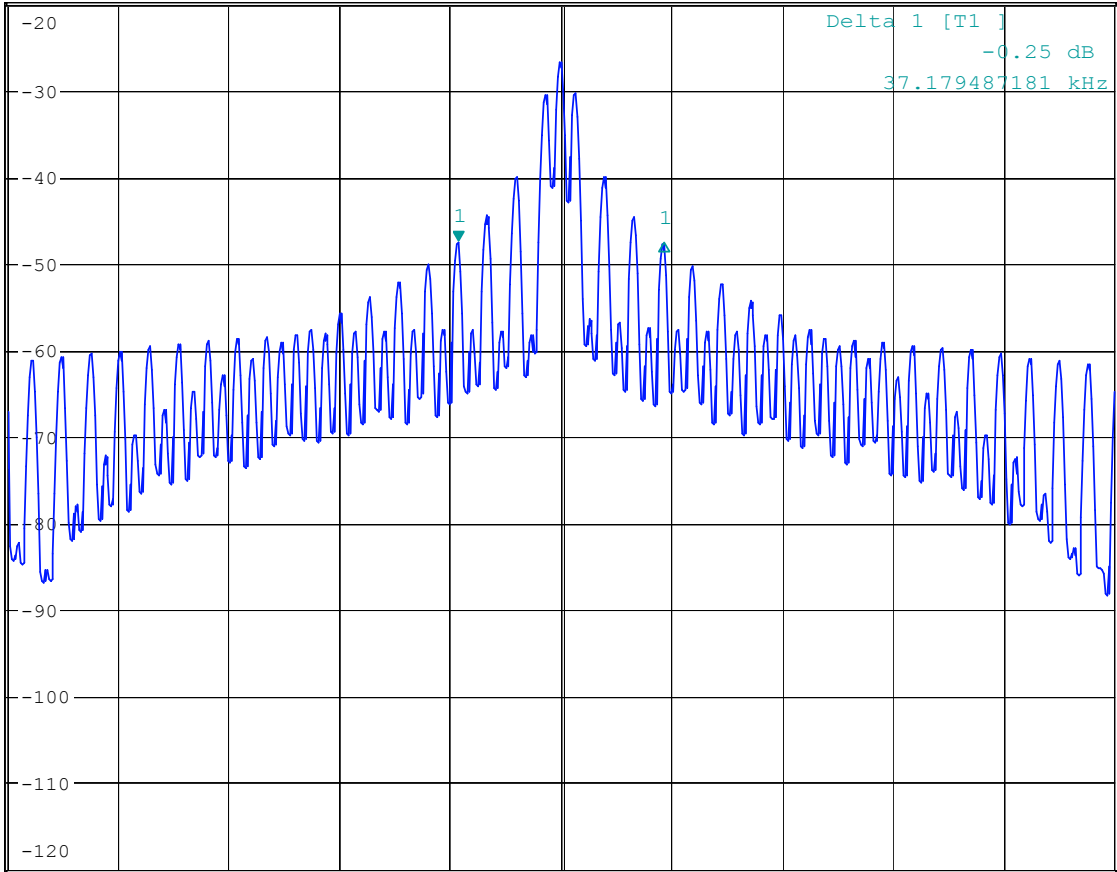
\*RBW 1 kHz  
VBW 3 kHz  
SWT 200 ms  
Marker 1 [T1 ]  
-47.65 dBm  
433.901410256 MHz

Ref -20 dBm

Att 5 dB

Delta 1 [T1 ]  
-0.25 dB  
37.179487181 kHz

1 PK  
VIEW



Center 433.92 MHz

20 kHz/

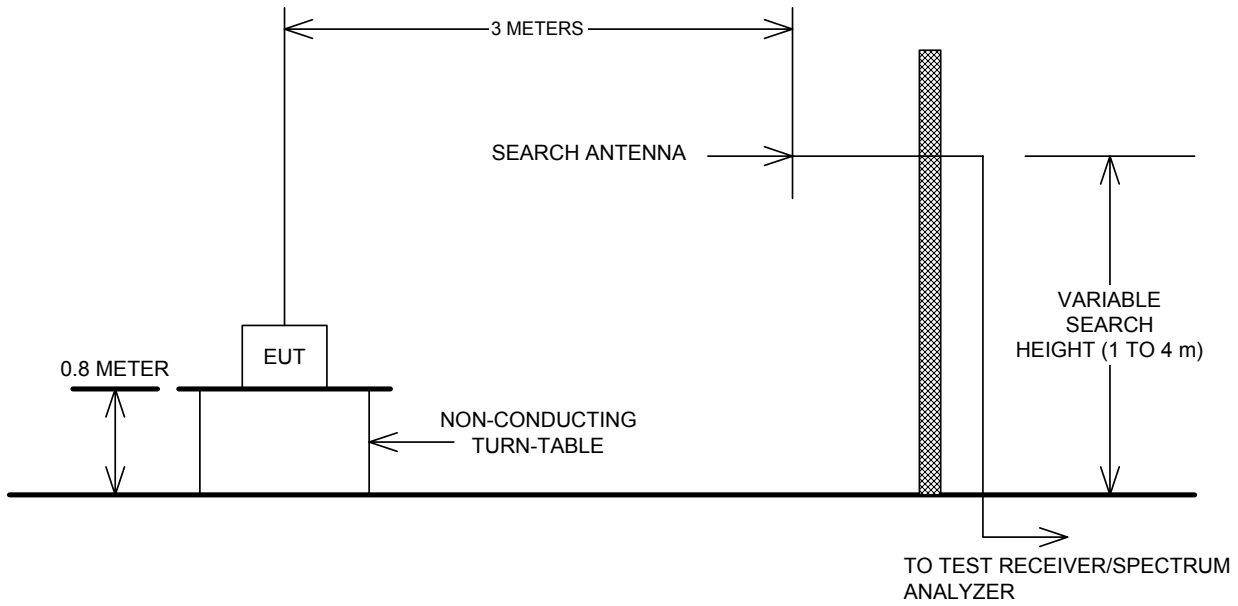
Span 200 kHz

EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector

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## 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.

*EQUIPMENT: MG-SMK1 (433MHz), Wireless Smoke Detector*

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**Section 7. Test Equipment List**

**Equipment List - Radiated Emissions**

| CAL Cycle | Equipment               | Manufacturer    | Model No. | Asset/Serial No. | Last Cal.   | Next Cal.   |
|-----------|-------------------------|-----------------|-----------|------------------|-------------|-------------|
| 1 Year    | Spectrum Analyzer       | Hewlett-Packard | 8564E     | FA001367         | June 28/04  | June 28/05  |
| 1 Year    | Horn Antenna #1         | EMCO            | 3115      | FA000649         | Dec. 18/03  | Dec. 18/04  |
| 1 Year    | Dipole Antenna Set      | EMCO #1         | 3121C     | FA000814         | April 21/04 | April 21/05 |
| 1 Year    | Log Periodic Antenna #2 | EMCO            | 3148      | FA001355         | May 05/04   | May 05/05   |
| 1 Year    | 1.0 – 2.0 GHz Amplifier | JCA             | 12-400    | FA001498         | June 18/04  | June 18/05  |
| 1 Year    | 2.0 – 4.0 GHz Amplifier | JCA             | 24-600    | FA001496         | June 18/04  | June 18/05  |
| 1 Year    | 4.0 – 8.0 GHz Amplifier | JCA             | 48-600    | FA001497         | June 18/04  | June 18/05  |

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