

Report No. SC206263-03

## MEASUREMENT AND TECHNICAL REPORT

DIRECTED ELECTRONICS INCORPORATED  
2560 Progress Street  
Vista, CA 92083

**DATE: 06 January 2003**

|                                                                                                                                                                                                     |                                    |                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------|
| <b>This Report Concerns:</b>                                                                                                                                                                        | Original Grant: X                  | Class II Change: |
|                                                                                                                                                                                                     |                                    |                  |
| <b>Equipment Type:</b>                                                                                                                                                                              | Sidewinder Transmitter, Model 474S |                  |
|                                                                                                                                                                                                     |                                    |                  |
| <b>Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?</b>                                                                                                                                         | Yes:<br><b>Defer until:</b>        | No: X            |
|                                                                                                                                                                                                     |                                    |                  |
| <b>Company Name agrees to notify the Commission by:</b>                                                                                                                                             | N/A                                |                  |
| <b>of the intended date of announcement of the product so that the grant can be issued on that date.</b>                                                                                            |                                    |                  |
|                                                                                                                                                                                                     |                                    |                  |
| <b>Transition Rules Request per 15.37?</b>                                                                                                                                                          | Yes:                               | No: X*           |
|                                                                                                                                                                                                     |                                    |                  |
| (*) FCC Part 15, Paragraph(s) <b>15.231(a), 15.231(b), 15.231(c)</b>                                                                                                                                |                                    |                  |
| <p><b>Report Prepared by:</b></p> <p><b>TÜV AMERICA, INC</b><br/> <b>10040 Mesa Rim Road</b><br/> <b>San Diego, CA 92121-2912</b><br/> <b>Phone: 858 546 3999</b><br/> <b>Fax: 858 546 0364</b></p> |                                    |                  |

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## 1.0 GENERAL INFORMATION

### 1.1 Product Description

**General Equipment Description -- NOTE: This information will be input into your test report as shown below.**

EUT Description: Keyfob transmitter

EUT Name: Sidewinder Transmitter

Model No.: 474S Serial No.: --

Product Options: --

Configurations to be tested: --

#### Power Requirements

**Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)**

Voltage: 3V (CR2032 lithium battery) (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: --

Current (Amps/phase(max)): -- Current (Amps/phase(nominal)): --

Other: --

#### Other Special Requirements

--

#### Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

Automotive

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### EUT Power Cable

☐ Permanent      OR      ☐ Removable      Length (in meters):      --  
☐ Shielded      OR      ☐ Unshielded  
☒ Not Applicable

### EUT Interface Ports and Cables

| Interface       |                          |                                     |     | Shielding                           |                          |                 |             |                        |                          |                    |                                     |                          |
|-----------------|--------------------------|-------------------------------------|-----|-------------------------------------|--------------------------|-----------------|-------------|------------------------|--------------------------|--------------------|-------------------------------------|--------------------------|
| Type            | Analog                   | Digital                             | Qty | Yes                                 | No                       | Type            | Termination | Connector Type         | Port Termination         | Length (in meters) | Removable                           | Permanent                |
| <b>EXAMPLE:</b> |                          |                                     |     |                                     |                          |                 |             |                        |                          |                    |                                     |                          |
| RS232           | <input type="checkbox"/> | <input checked="" type="checkbox"/> | 2   | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Foil over braid | Coaxial     | Metallized 9-pin D-Sub | Characteristic Impedance | 6                  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| --              | <input type="checkbox"/> | <input type="checkbox"/>            |     | <input type="checkbox"/>            | <input type="checkbox"/> |                 |             |                        |                          |                    | <input type="checkbox"/>            | <input type="checkbox"/> |

### EUT Software.

Revision Level:      --

Description:      --

**EUT Operating Modes to be Tested** -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Continuous transmission with typical modulation.

**EUT System Components** -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

| Description | Model # | Serial # | FCC # |
|-------------|---------|----------|-------|
| --          |         |          |       |

**Support Equipment** -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)

| Description | Model # | Serial # | FCC ID # |
|-------------|---------|----------|----------|
| --          |         |          |          |

#### Oscillator Frequencies

| Frequency  | Derived Frequency | Component # / Location | Description of Use   |
|------------|-------------------|------------------------|----------------------|
| 433.92 MHz | --                | --                     | RF Carrier frequency |

#### Power Supply

| Manufacturer | Model # | Serial # | Type                                                                                                                 |
|--------------|---------|----------|----------------------------------------------------------------------------------------------------------------------|
| --           |         |          | <input type="checkbox"/> Switched-mode (Frequency)<br><input type="checkbox"/> Linear <input type="checkbox"/> Other |

#### Power Line Filters

| Manufacturer | Model # | Location in EUT |
|--------------|---------|-----------------|
| --           |         |                 |

#### Critical EMI Components (Capacitors, ferrites, etc.)

| Description | Manufacturer | Part # or Value | Qty | Component # / Location |
|-------------|--------------|-----------------|-----|------------------------|
| --          |              |                 |     |                        |

**EMC Critical Detail** -- Describe other EMC Design details used to reduce high frequency noise.

--

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## 1.2 Related Submittal Grant

None

## 1.3 Tested System Details

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

None

## 1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the following tests.

| TEST                        | FCC CFR 47# | PASS/FAIL |
|-----------------------------|-------------|-----------|
| Deactivation                | 15.231(a)   | Pass      |
| Field Strength of Emissions | 15.231(b)   | Pass      |
| Emissions Bandwidth         | 15.231(c)   | Pass      |

Both Conducted and Radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8-M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 25 GHz).

## 1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV AMERICA, INC  
10040 Mesa Rim Road  
San Diego, CA 92121-2912  
Phone: 858 546 3999  
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI C63.4 and are registered with the FCC, 7435 Oakland Mills Road, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

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## **2.0 SYSTEM TEST CONFIGURATION**

### **2.1 Justification**

The EUT was initially tested for FCC emissions in the following configuration:

See Block Diagram

### **2.2 EUT Exercise Software**

None

### **2.3 Special Accessories**

None

### **2.4 Equipment Modifications**

None

### **2.5 Configuration of Test System**

See Block Diagram



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**3.0 DEACTIVATION EQUIPMENT/DATA**  
**FIELD STRENGTH OF EMISSIONS EQUIPMENT/DATA**  
**EMISSIONS BANDWIDTH EQUIPMENT/DATA**

See following page(s).

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**Test Conditions:** DEACTIVATION: FCC Part 15.231(a)  
 FIELD STRENGTH OF EMISSIONS: FCC Part 15.231(b)  
 EMISSIONS BANDWIDTH: FCC Part 15.231(c)

The DEACTIVATION, FIELD STRENGTH OF EMISSIONS, and EMISSIONS BANDWIDTH measurements were performed at the San Diego Testing Facility:

☐ - Test not applicable

- - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
- - Roof (Small Open Area Test Site)

**Test Equipment Used: SR2**

| Model No. | Prop. No. | Description       | Manufacturer      | Serial No. | Cal Date |
|-----------|-----------|-------------------|-------------------|------------|----------|
| HP8566B   | 721       | Spectrum Analyzer | Hewlett Packard   | 2112A02185 | 09/02    |
| CBL6111   | 461       | Bilog Antenna     | Chase Electronics | 1291       | NCR*     |

**Test Equipment Used: Roof**

| Model No.            | Prop. No. | Description           | Manufacturer         | Serial No. | Cal Date |
|----------------------|-----------|-----------------------|----------------------|------------|----------|
| FF6549-1             | 778       | Cellular Band Filters | Sage                 | 005        | NCR*     |
| --                   | 6767      | 3' Cable              | United Microwave Pro | --         | NCR*     |
| AMF-5D-010180-35-10P | 719       | Amplifier             | Miteq                | 549460     | NCR*     |
| 3146                 | 243       | Log Periodic Antenna  | EMCO                 | 106X       | 04/02    |
| 3115                 | 453       | Double Ridge Antenna  | EMCO                 | 9412-4364  | 12/02    |
| --                   | 6789      | 30' Cable             | United Microwave Pro | --         | NCR*     |
| HP85650A             | 745       | Quasi-Peak Adapter    | Hewlett Packard      | 2043A00324 | 11/02    |

**Remarks:** (\*) No Calibration Required.

SC 206263  
Directed  
Electronics  
15.231(a) DEACTIVATION  
12/30/02  
SR2: ENGR APP.  
EUT CEASES TRANSMITTING AS BUTTON IS RELEASED.  
MODEL: 4735/4745

# REF 97.0 dBμV ATTEN 0 dB

10 dB/

Y  
S  
O  
T

Button  
RELEASED

CONFIDENTIAL

|        |         |     |     |
|--------|---------|-----|-----|
| CENTER | 433.920 | 000 | MHZ |
| RES BW | 100     | KHZ |     |
| VBW    | 300     | KHZ |     |
| SWP    | 5.00    | sec |     |
| SPAN   | Ø       | HZ  |     |

REPORT No: SC206263      TESTER: Alan Laudani      SPEC: FCC Part 15 para 15.231(b)

CUSTOMER: Directed Electronics

TEST DIST: 3 Meters

E U T: 473S/474S

TEST SITE: Roof

EUT MODE: Transmitting

BICONICAL: N/A

DATE: Dec. 30, 2002

LOG: 243

NOTES: Duty Cycle= 48.6% OTHER: 453

above 1GHz: RBW & VBW 1 MHz for Pk; AVG = PK - 20LOG(Duty Cycle)

below 1GHz: RBW & VBW 100 kHz for Pk; AVG = PK - 20LOG(Duty Cycle)

CF = Antenna Factor + Cable Loss - Preamplifier Gain

v.beta231

[illegible]

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SC206263 15.231(b)  
DIRECTED 12/30/02 SR2:ENG: AAP  
ELECTRONICS  
MODEL: 4735/4745

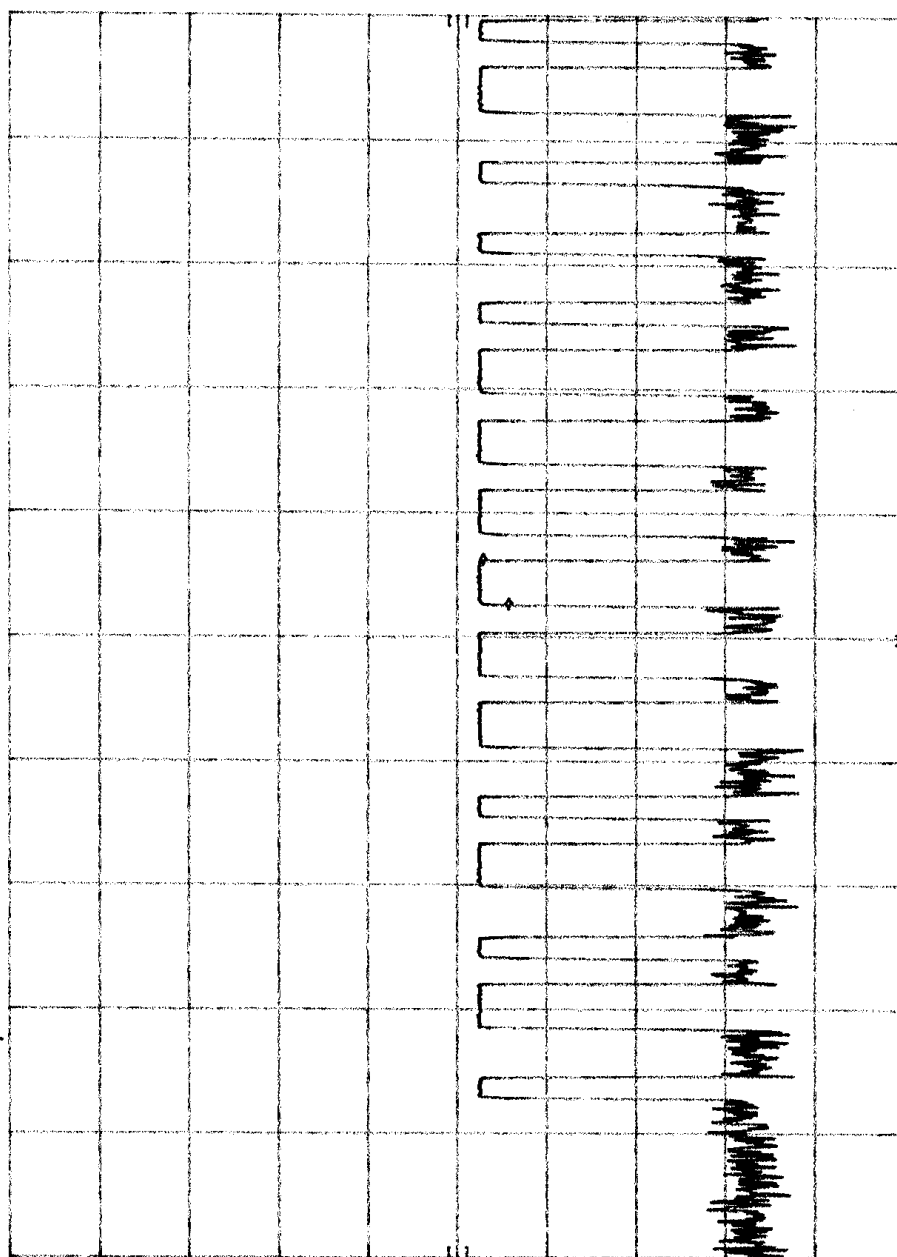
DC = BIT ON x word ON =  $\frac{81 \times .6}{100} = 48.6\%$   
DUTY CYCLE: BIT ON .6 msec  
MKR  $\Delta$  720.0  $\mu$ sec  
2.90 dB

70 REF 97.0 dB $\mu$ V ATTN 0 dB

10 dB/

POS PK

CORR'D



CENTER 433.920 000 MHZ  
RES BW 100 KHZ  
SPAN 0 HZ  
SWP 20.0 msec  
VBW 300 KHZ

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SC206263 15.231(b)  
DIRECTED 12/20/02  
Electronics  
MODEL: 4735/4745 SR2: Eng'r A.A.L

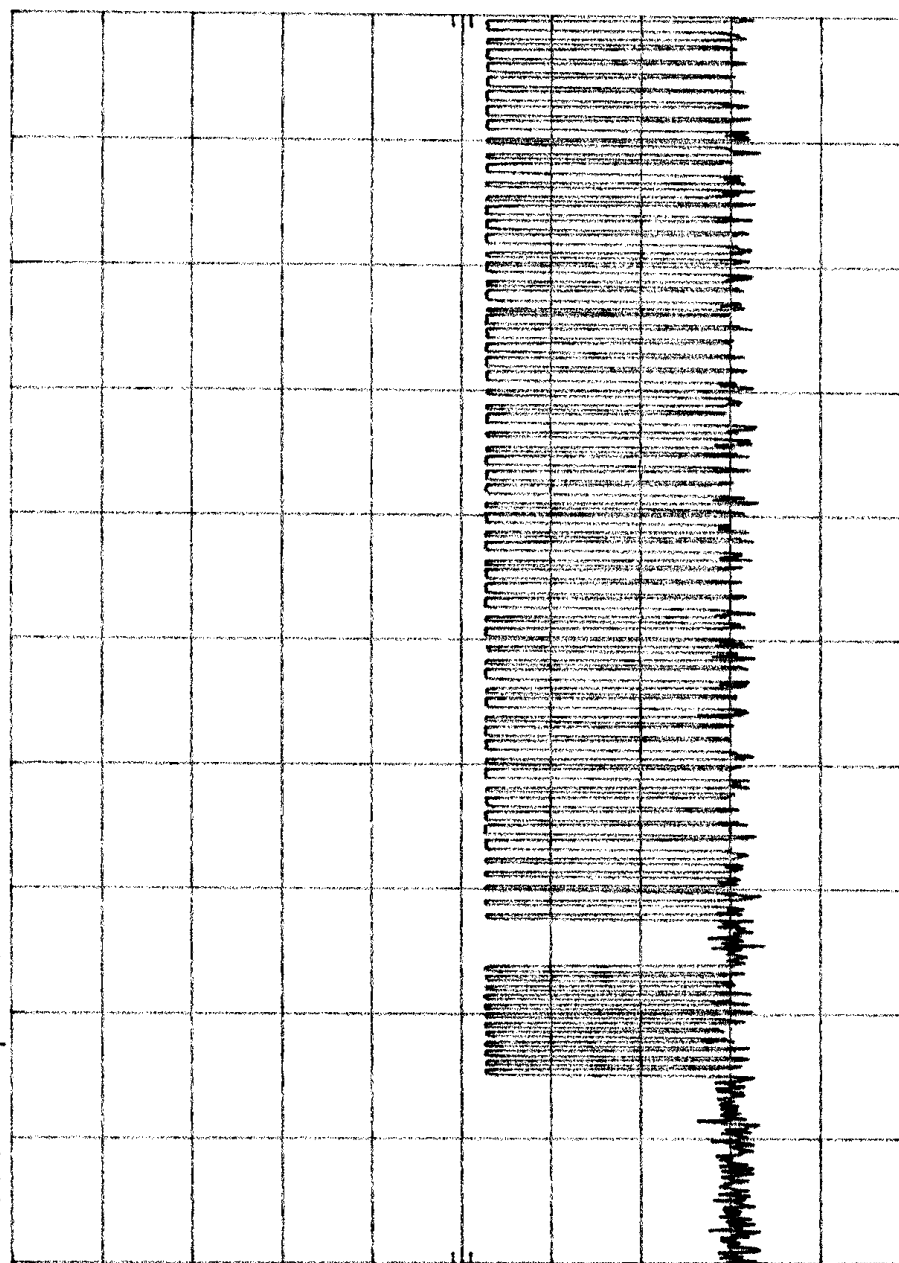
DUTY CYCLE: WORD ON  $\approx$  81 msec PART I

hp REF 97.0 dB $\mu$ V ATTEN 0 dB

10 dB/

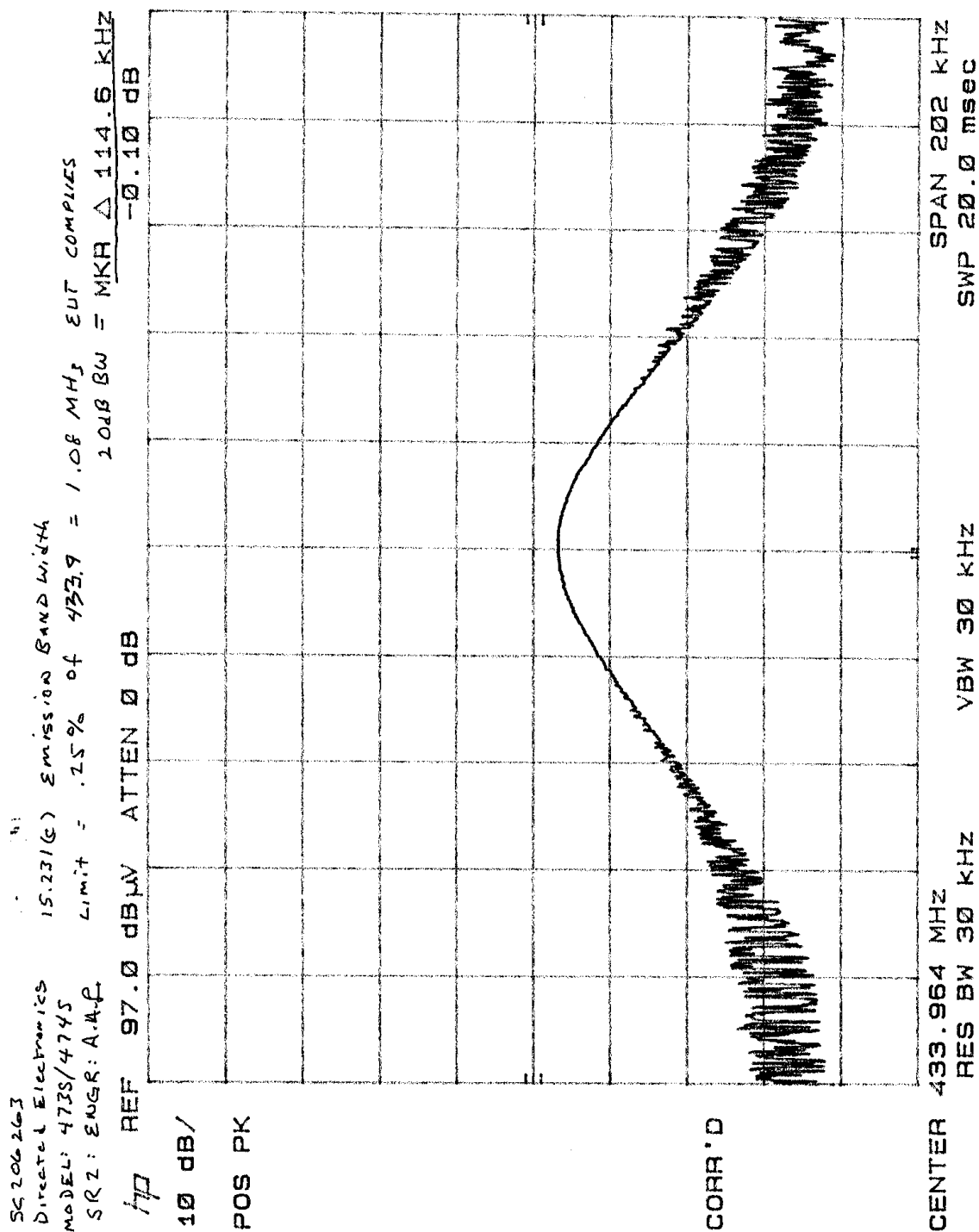
POS PK

CORR'D



CENTER 433.920 000 MHZ  
RES BW 100 KHZ  
SPAN 0 HZ  
SWP 100 msec  
VBW 300 KHZ

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#### 4.0 ATTESTATION STATEMENT

##### GENERAL REMARKS:

1. These transmitters are single frequency devices. They're SAW resonator based and the transmission frequency is determined by the SAW resonator. The resonator used in the 473S/474S has a center frequency of 433.92 MHz +/- 75 KHz. This means the single transmission frequency will always be locked at 433.92MHz only with a +/-75 KHz tolerance for its center.  
Furthermore, the receivers operated by these transmitters are single band receivers tuned to 433.92MHz and only capable of receiving this frequency.
2. The 473S/474S are data transmission devices. Their protocol consists of 12 preamble bits (400us each) and 66 data bits (400us or 800us each, they are random) for a total of 78 bits. So the calculation for the duty cycle becomes:

$$(12 \times 400\text{us}) + (66 \times 800\text{us}) = 57.60\text{ms within a 100ms period}$$

The worst case scenario calculation is assured by the fact that we used 800us for all 66 data bits as they can be either 400us or 800us.

##### SUMMARY:

All tests were performed per CFR 47, Part(s) 15.231(a), 15.231(b), 15.231(c)

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, Part(s) 15.231(a), 15.231(b), 15.231(c)

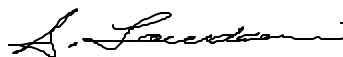
- TÜV AMERICA, INC. -

Responsible Engineer:



Jim Owen  
(EMC Chief Engineer)

Responsible Engineer:



Alan Laudani  
(EMC Engineer)