

Report No. SC206263-03

MEASUREMENT AND TECHNICAL REPORT

DIRECTED ELECTRONICS INCORPORATED
2560 Progress Street
Vista, CA 92083

DATE: 06 January 2003

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

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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

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
	<i>EXAMPLE:</i> 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"/>

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)	
			<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.

--

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).

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

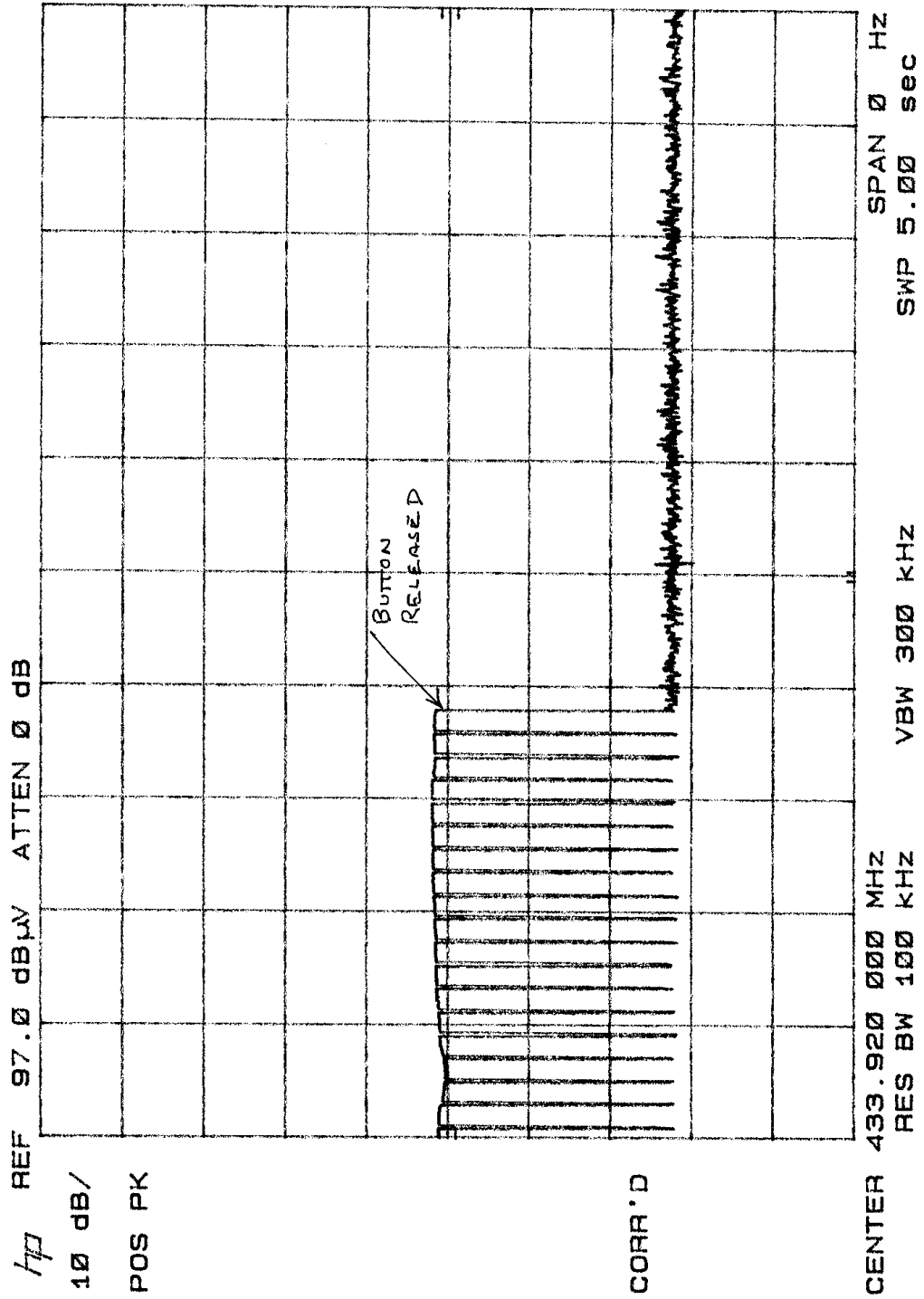
Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
HP8566B	721	Spectrum Analyzer	Hewlett Packard	2112A02185	09/02
CBL6111	461	Bilog Antenna	Chase Electronics	1291	NCR*

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



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REPORT No: SC206263 TESTER: Alan Laudani *AL* 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

FREQ (MHz)	VERT. (dBuv)		HORIZ (dBuv)		CF (dB/m)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		Rotation	EUT Height
	pk	DCav	pk	DCav		pk	av	pk	av	pk	av		
433.972	54.0	47.7	66.0	59.7	16.9	82.9	76.6	100.8	80.8	-17.9	-4.2	90	1
867.944	30.2	23.9	39.9	33.6	23.5	63.4	57.2	80.8	60.8	-17.4	-3.7	124	1
1301.916	66.9	60.6	68.0	61.7	-12.5	55.5	49.3	74.0	54.0	-18.5	-4.7	22	1.3
1735.888	59.6	53.3	60.3	54.0	-9.1	51.2	44.9	80.8	60.8	-29.6	-15.9	59	1
2169.860	49.6	43.3	51.7	45.4	-6.8	44.9	38.6	80.8	60.8	-35.9	-22.2	130	1.5
2603.832	53.3	47.0	50.4	44.1	-5.1	48.2	42.0	80.8	60.8	-32.6	-18.9	98	1.2
3037.804	48.7	42.4	58.5	52.2	-2.5	56.0	49.8	80.8	60.8	-24.8	-11.1	12	1
3471.776	45.5	39.2	47.0	40.7	-0.9	46.1	39.8	80.8	60.8	-34.7	-21.0	106	1
3905.748	47.1	40.8	50.3	44.0	-0.2	50.1	43.8	74.0	54.0	-23.9	-10.2	160	1
4339.720	47.6	41.3	47.9	41.6	-1.3	46.6	40.4	74.0	54.0	-27.4	-13.6	160	1

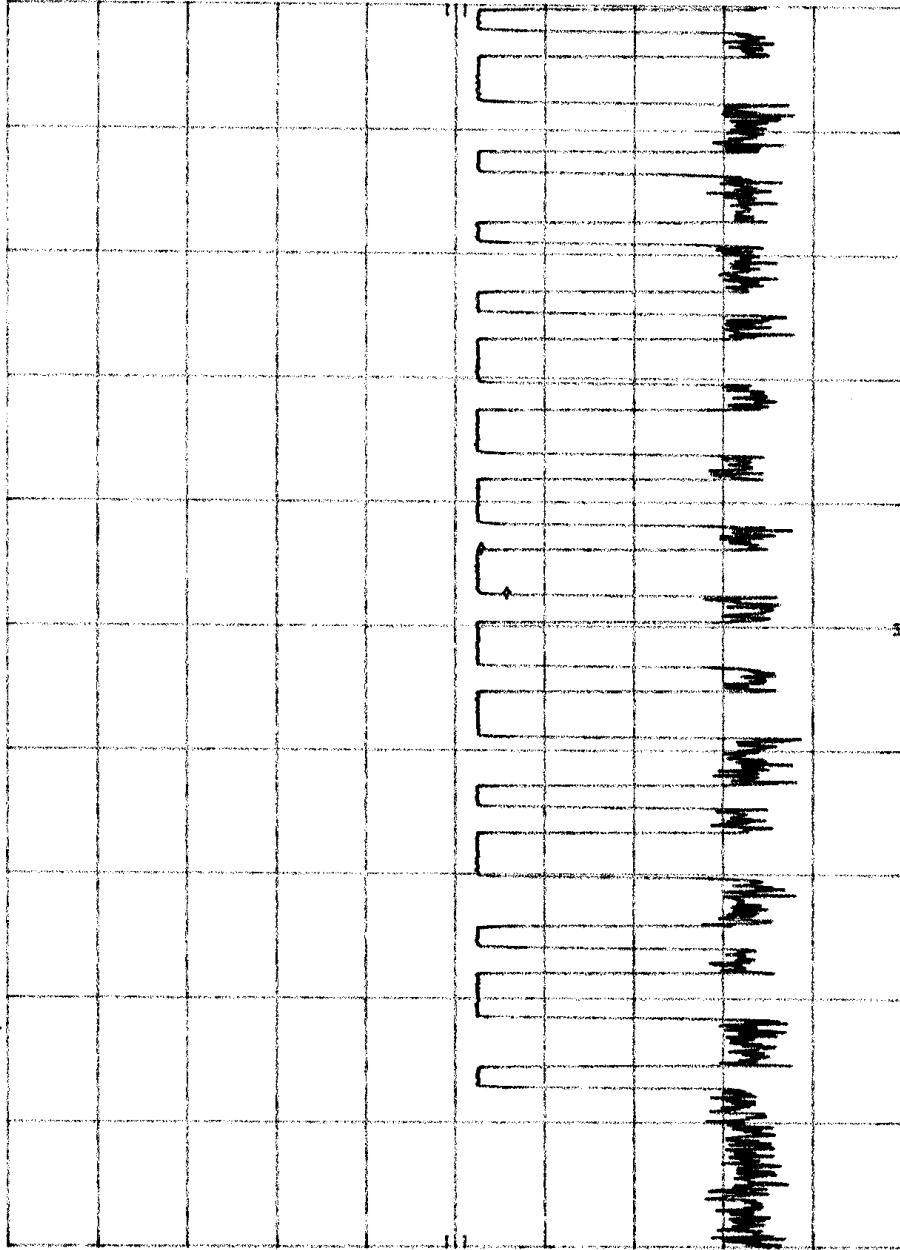
SC206263 15.231(b)
 DIRECTED 12/30/02 SR2: ENGR: AAP
 ELECTRONICS DUTY CYCLE: BIT ON .6 msec
 MODEL: 4735/4745

DC = BIT ON x word ON = $\frac{81 \times .6}{100} = 48.6\%$
 MKR Δ 720.0 μ sec
 2.90 dB

HP REF 97.0 dB μ V ATTEN 0 dB

10 dB/

POS PK



CORR'D

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

SC206263 15-23(Lb)

Directed
Electronics

12/20/02

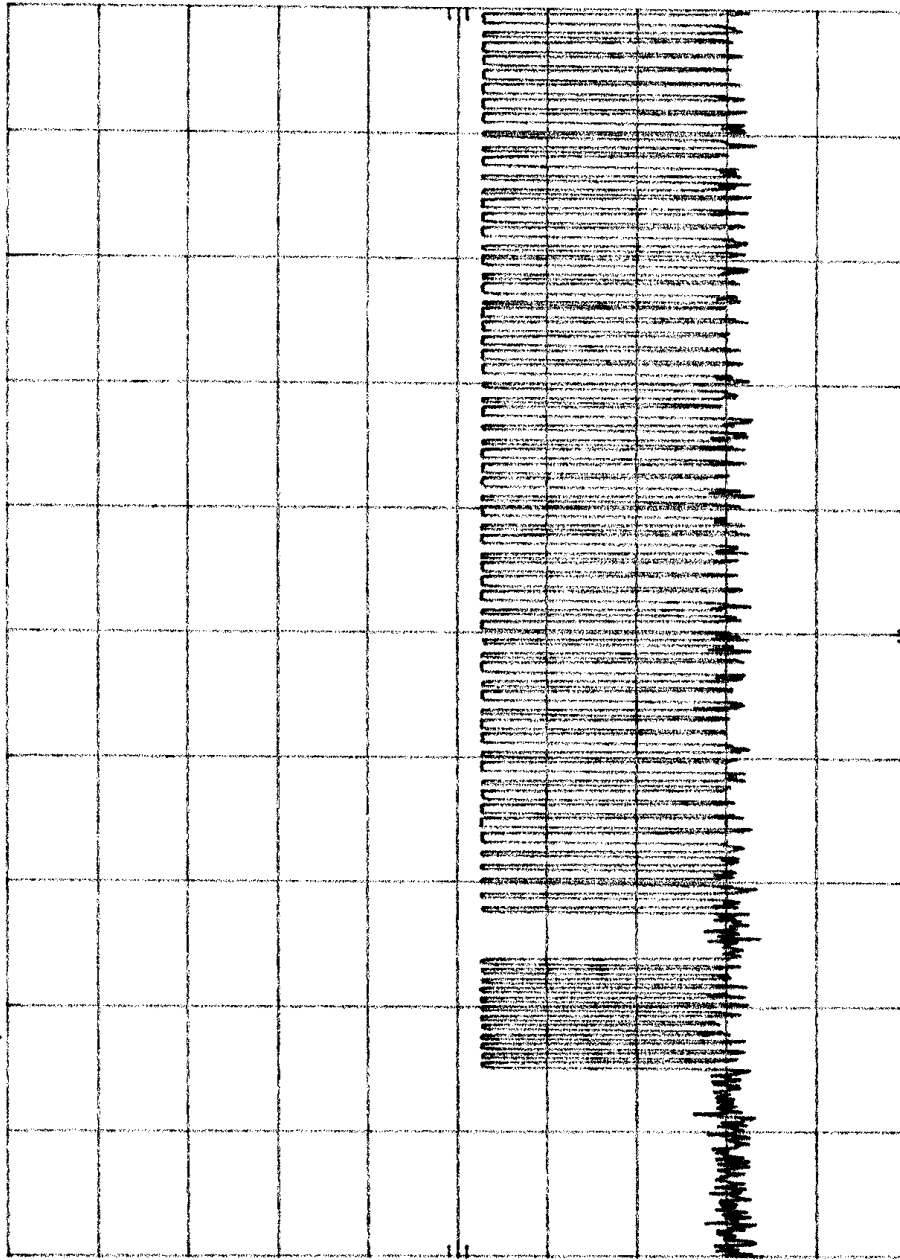
MODEL: 4735A/74S SR2: Eyr A.A.C

DUTY CYCLE: WORD ON 2 81 msec PART I

hp REF 97.0 dBµV ATTEN 0 dB

10 dB/

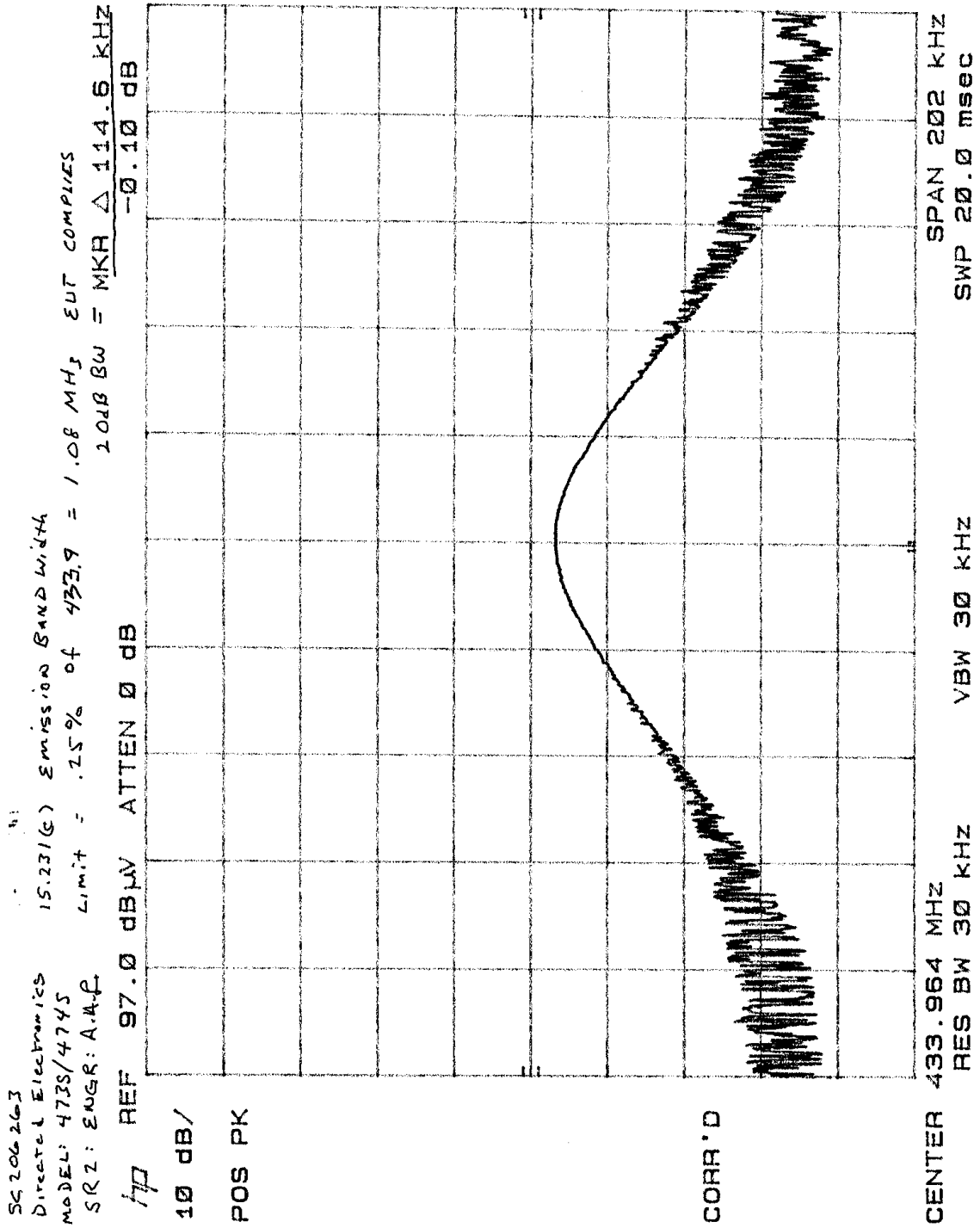
POS PK



CORR'D

CENTER 433.920 000 MHZ
RES BW 100 KHZ

SPAN 0 HZ
SWP 100 msec
VBW 300 KHZ



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)

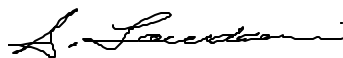
- TÜV AMERICA, INC. -

Responsible Engineer:



Jim Owen
(EMC Chief Engineer)

Responsible Engineer:



Alan Laudani
(EMC Engineer)