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1 GENERAL INFORMATION

1.1 Product Description

EUT Description: Low Power Inventory Transmitter, Model LPX2A

Power Requirements

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

EUT Power Cable: Not Applicable

EUT Software:

Revision Level: LPX2

Description: Two-button communication protocol

EUT Operating Modes to be Tested -

1. Take button pressed
2. Return button pressed
3. Both take and return buttons pressed.

EUT System Components

Description	Model #	Serial #	FCC ID #
Inventory Transmitter	LPX2A	N/A	

Oscillator Frequencies

Frequency MHz	Derived Frequency	Component # / Location	Description of Use
315	--	SAW Y1	Local Oscillator
433.92	--	SAW Y2	Local Oscillator
4	--	NC U1	Processor clock internal

1 GENERAL INFORMATION (continued)**1.2 Related Submittal/Grant**

None

1.3 Tested System Details

The FCC IDs 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 ANSI C63.4 setup.

TEST	FCC CFR 47 #	PASS/FAIL
Radiated	15.231(b)	Pass
Deactivation	15.231(a)	Pass
Emission Bandwidth	15.231(c)	Pass
Conducted Emissions	15.107(a)	Battery
Radiated Emissions	15.109(a)	Pass - no detectable emissions

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 PRODUCT SERVICE
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 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, 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.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

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

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.

3 RADIATED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

See test setup photos for radiated emissions test setup.

PRODUCT SERVICE
Emissions Test Conditions: SPURIOUS RADIATED EMISSIONS

Roof (small open area test site)

The <i>Spurious Radiated Emissions</i> measurements were performed using the following equipment:

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
8586B	721	Spectrum Analyzer	Hewlett Packard	2542A12089	06/02
PreAmp 2 - 20 GHz	752	PreAmp	TUV PS	--	N/A*
3115	251	Antenna, Horn	Electro Mechanics Co	2595	06/02
Cable 1	733	30' cable	Universal Microwave Prod	--	N/A*
Cable 2	655	6" cable	Universal Microwave Prod	--	N/A*
FF 6549-1	778	900 MHz High Pass Filter	Sage	5	N/A*
FF 6548-2	782	2000 MHz High Pass Filter	Sage	007	N/A*
For Substitution					
Cable 3	732	30' cable	Universal Microwave Prod	--	N/A*
Cable 4	657	6" cable	Universal Microwave Prod	--	N/A*
HP83640B	791	Signal Generator	Hewlett Packard	3844A00726	03/02
3115	453	Antenna, Horn	Electro Mechanics Co	3564	12/02

Remarks: (*) Verified

FREQ (MHz)	VERTICAL (dBuV)		HORIZONTAL (dBuV)		CF (dBm)	MAX LEVEL (dBmV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)	EUT Rotation	Antenna Height	Notes
	av	pk	pk	av		pk	av	pk	av				
314.92	36.9	30.879	52.1	46.08	15.1968	67.3	51.3	95.6	75.6	-28.3	30	1.2	
629.84	32.3	26.279			19.5984	61.9	45.9	76.5	56.5	-24.6	-10.6		noise floor
944.76	19.4	13.379	18.2	12.18	23.2426	42.64	36.6	76.5	56.5	-33.9	-19.9	0	1
1259.68	56.6	50.579	57.1	51.08	12.0794	45.02	39	79.5	59.5	-34.5	-20.5		
1574.8	42.7	36.679	41.6	35.68	-9.7778	32.92	26.9	74	54	-41.1	-27.1		
1889.52	33.4	27.379	40.7	34.68	-7.57336	33.13	27.1	79.5	59.5	-46.4	-32.4		
2204.44	43.5	37.479	42.5	36.48	-5.85948	37.64	31.6	74	54	-38.4	-22.4		
2519.36	44.3	38.279	44	37.68	-4.43418	39.37	33.8	70.5	59.5	-39.6	-25.7		
433.92	51.9	45.879	58.7	52.88	16.3784	75.08	69.1	100	80	-24.9	-10.9	220	1
867.84	16	9.8754	26.9	20.88	22.7392	49.64	43.6	76.5	56.5	-26.9	-12.9	0	1
1301.76	46.6	40.579	47.7	41.68	-11.767	35.93	29.9	74	54	-38.1	-24.1	206	1.3
1735.68	44	37.979	52	45.88	-8.65024	43.35	37.3	79.5	59.5	-36.2	-22.2	250	1.1
2189.6	50.6	44.579	49	42.98	-6.01954	44.58	38.9	79.5	59.5	-34.9	-20.9	220	1
2603.52	59.8	53.779	55.2	49.18	-4.14803	55.65	49.6	79.5	59.5	-23.8	-9.87	160	1.1
3037.44	64.8	58.779	66.2	60.18	-2.66632	63.53	57.5	79.5	59.5	-16	-1.99	160	1.2

Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} - 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

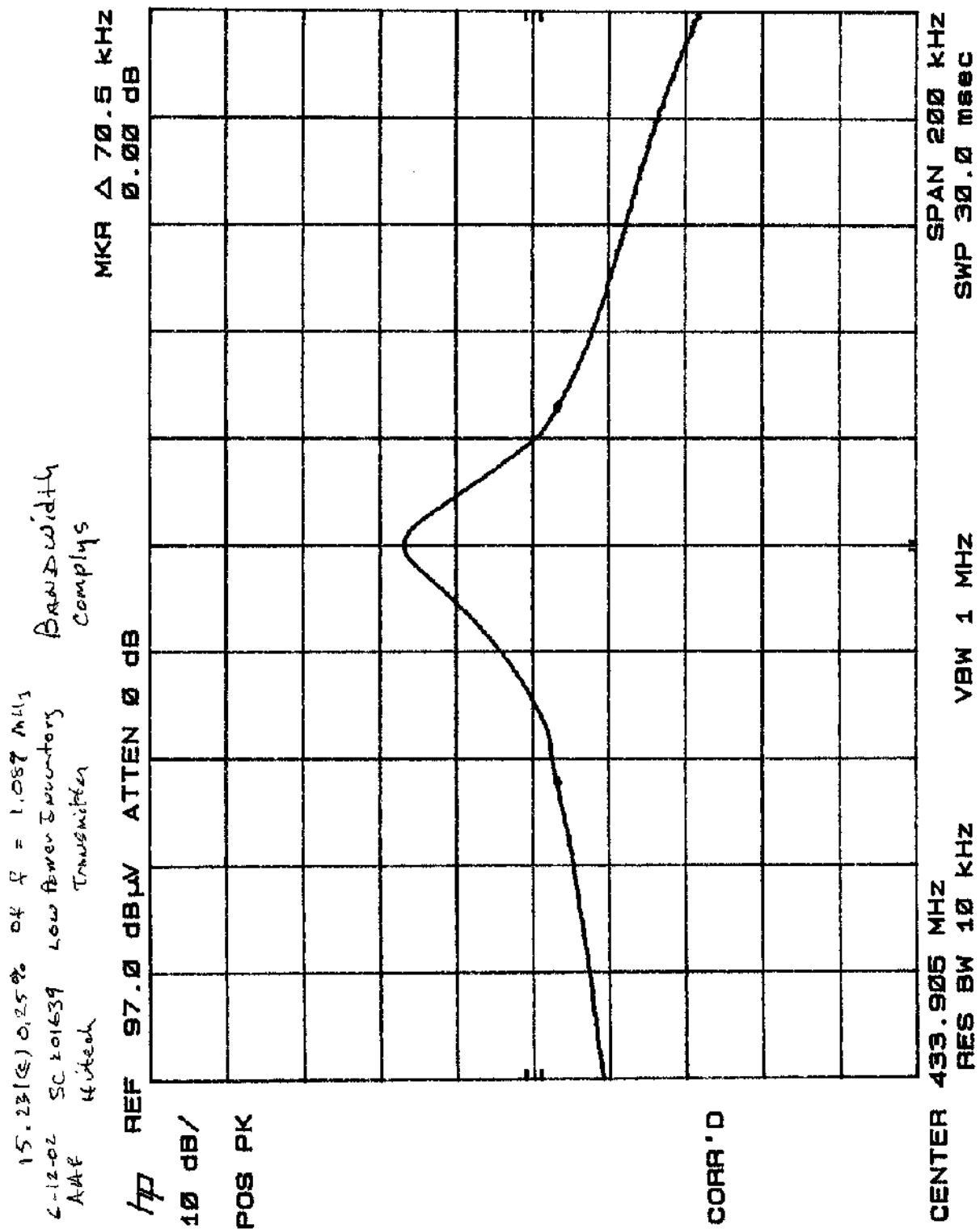
This result is well below the FCC and CSA Class A limit of 29.5 dBuV/m at 83 MHz.

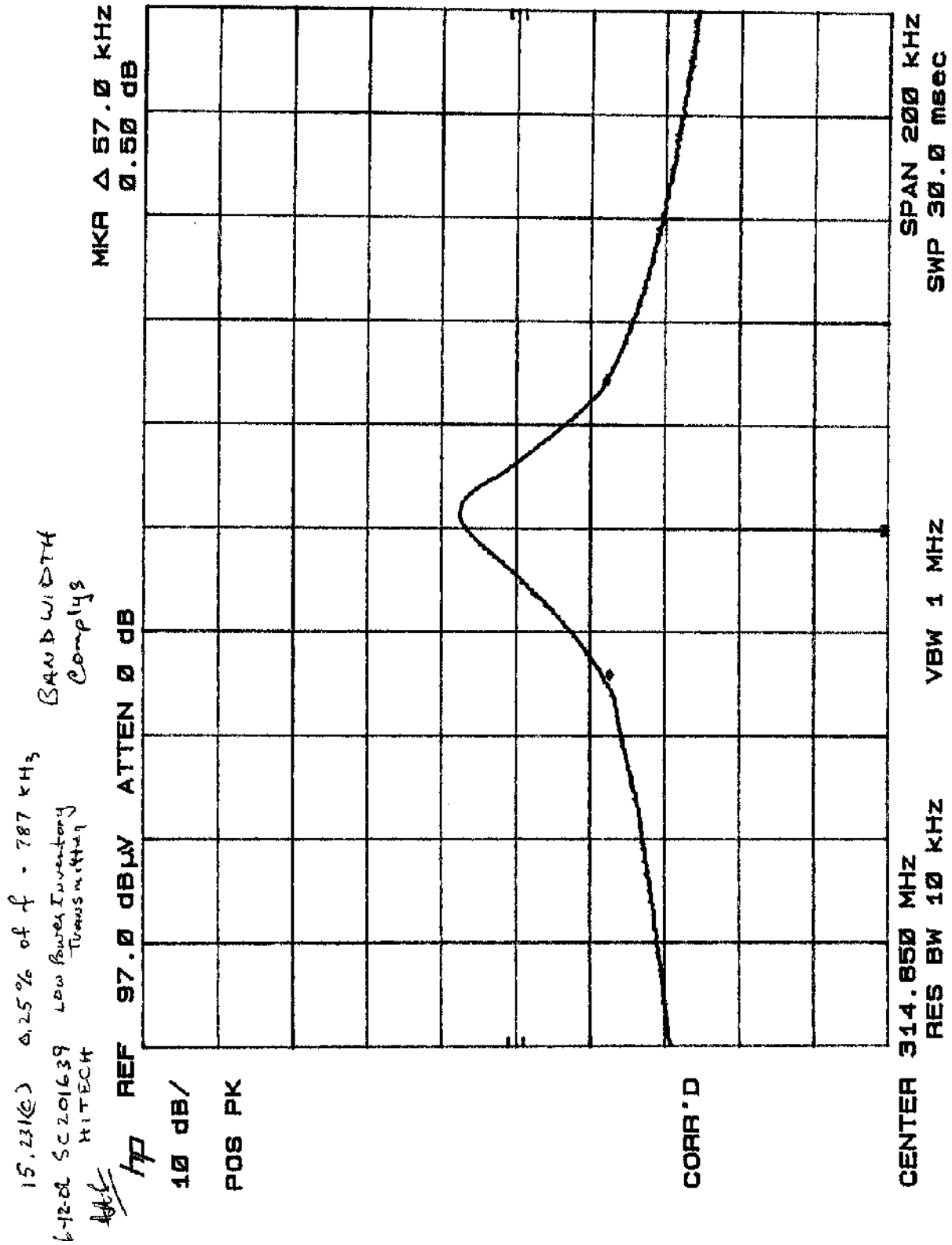
For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.

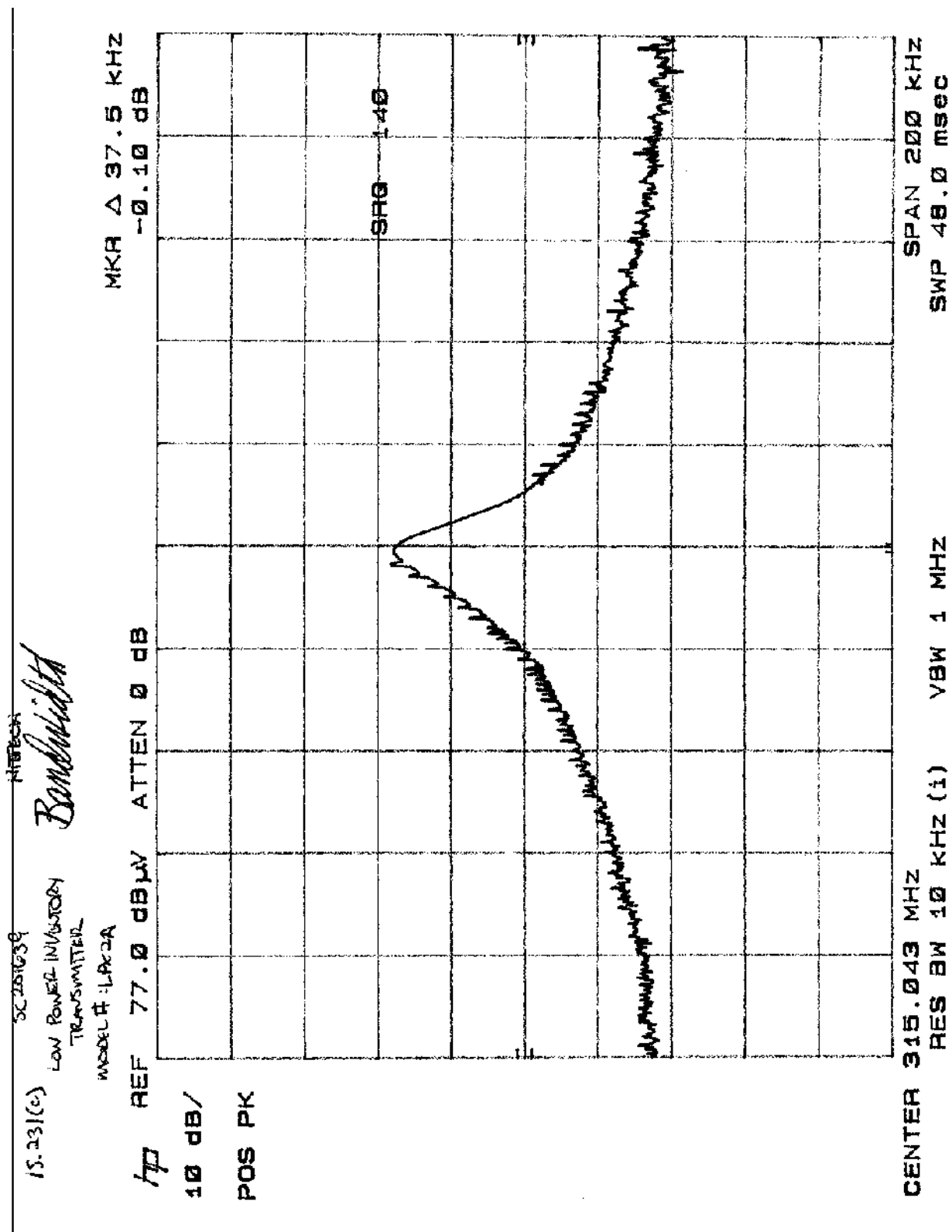
4 DEACTIVATION & BANDWIDTH EQUIPMENT/DATA

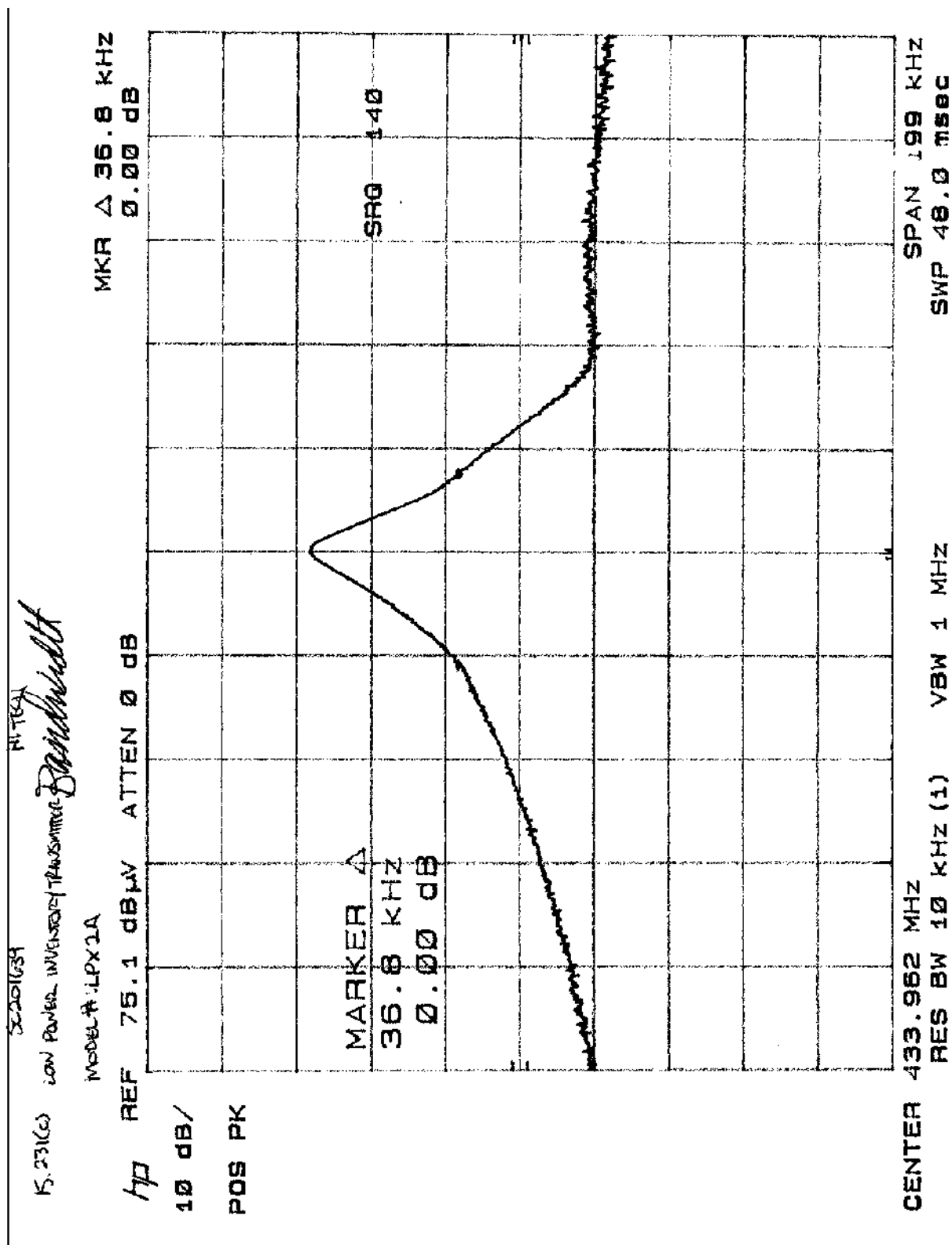
HP Spectrum Analyzer, Model 8566B, Prop. # 721, Cal Date: 08/22/02
Cable, Prop. # 787, Cal Date: N/A

See following page(s).









ATTESTATION STATEMENT

GENERAL REMARKS:

- ⁽¹⁾Conducted Emissions not tested - unit battery operated.
⁽²⁾Radiated Emissions 30 - 1000 MHz - no detectable emissions.

SUMMARY:

All tests were performed per *FCC Part 2, Paragraphs 15.231(a); (b); (c); 15.107(a)¹; 15.109(a)²*.

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of *FCC Part 2, Paragraphs 15.231(a); (b); (c); 15.107(a); 15.109(a)*.

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Rodel Resolme
(EMC Engineer)