

MEASUREMENT AND TECHNICAL REPORT

HM ELECTRONICS INCORPORATED
6675 Mesa Ridge Road
San Diego, CA 92121

DATE: 14 February 2003

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	SYS500 Headset, Model HS500	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: Defer until:	No: X
Company Name agrees to notify the Commission by:	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:	No: X*
(*) FCC Part 15, Paragraph(s) 15.249(a)		
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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Report No. SC300494-03

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: Wireless Headset Communicator

EUT Name: SYS500 Headset

Model No.: HS500 Serial No.: 5

Product Options: --

Configurations to be tested: (2) - Transmit, Receive

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: 3.6V (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: --

Current (Amps/phase(max)): 0.2A Current (Amps/phase(nominal)): 0.09A

Other: Battery Operated

Other Special Requirements

--

Typical Installation and/or Operating Environment

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

Industrial - Quick Service Restaurants

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)
EXAMPLE: RS232	☐	☒	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6
--	☐	☐		☐	☐					☐

EUT Software.

Revision Level: Ver 1.00

Description: Embedded Firmware for operation/control

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. Receive Enabled
2. Transmit and Receive Enabled

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 #
Headset	HS500	5	BYMHS500
Battery	--	--	--

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

Description	Model #	Serial #	BSMI #
--			

Oscillator Frequencies

Frequency	Derived Frequency	Component # / Location	Description of Use
7.16 MHz	--	Y3	Clock for Micro 'U3'
--	3.58 MHz	Y3/2	Clock for IC 'U11'
4.00 MHz	--	Y2	Clock for IC 'U8'
8.00 MHz	--	Y1	Ref oscillator for 'U4'
926.064 - 927.864 MHz	--	--	RF transmit oscillator
902.136 - 903.936 MHz	--	--	RF receive oscillator

Power Supply

Manufacturer	Model #	Serial #	Type
--			☐ Switched-mode (Frequency) ☐ Linear ☐ Other

Power Line Filters

Manufacturer	Model #	Location in EUT
--		

Critical EMI Components (Capacitors, ferrites, etc.)

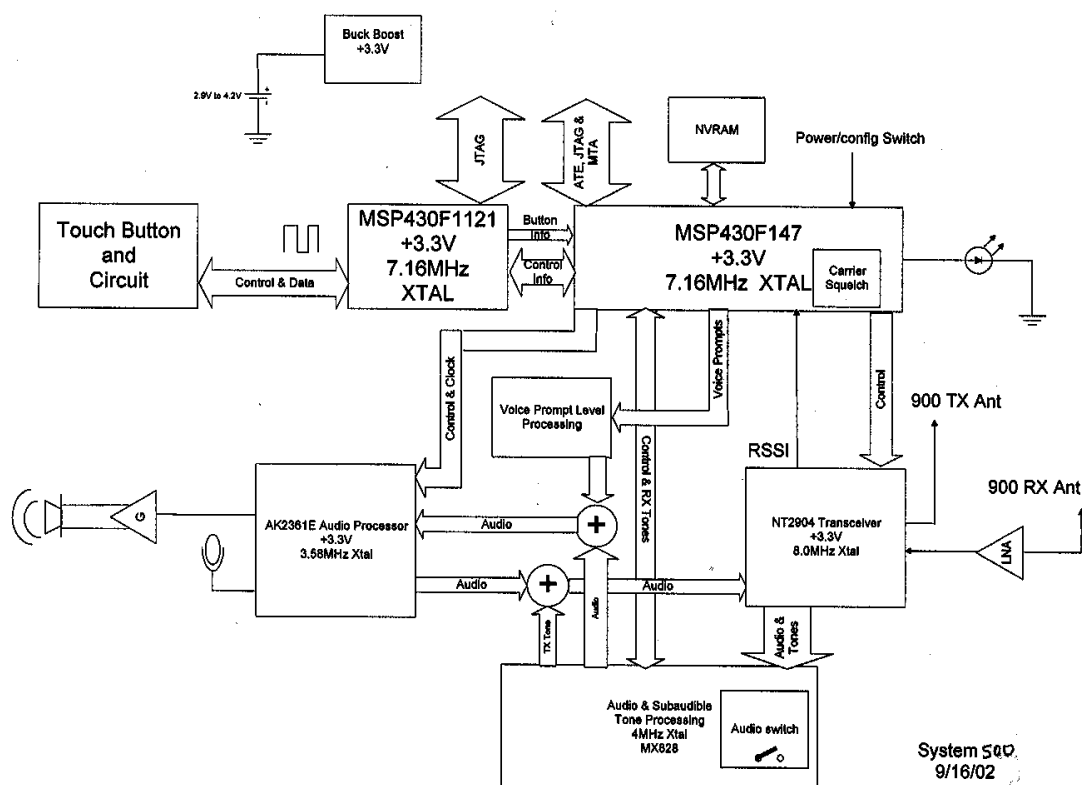
Description	Manufacturer	Part # or Value	Qty	Component # / Location
--				

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

PCB layout and shielding

System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.

Basic Functional Block Diagram for HS500



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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
Radiated Emissions	15.249(a)	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 to the 10th harmonic.

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 RADIATED EMISSIONS EQUIPMENT/DATA

See following page(s).

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Test Conditions: RADIATED EMISSIONS: FCC Part 15.249(a)

The RADIATED EMISSIONS measurements were performed at the San Diego Testing Facility:

☐ - Test not applicable

- - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
- - Roof (Small Open Area Test Site)
(Date of listing July 27, 2001. Site Verification Valid for 3 years from listing.)
- - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego
(Date of listing July 15, 2002. Site Verification Valid for 3 years from listing.)

Test Equipment Used:

SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
CBL6111	461	Bilog Antenna	Chase Electronics	1291	NCR*
HP8566B	721	Spectrum Analyzer	Hewlett Packard	2542A12099	07/02
3115	453	Double Ridge Horn Antenna	EMCO	3564	01/03

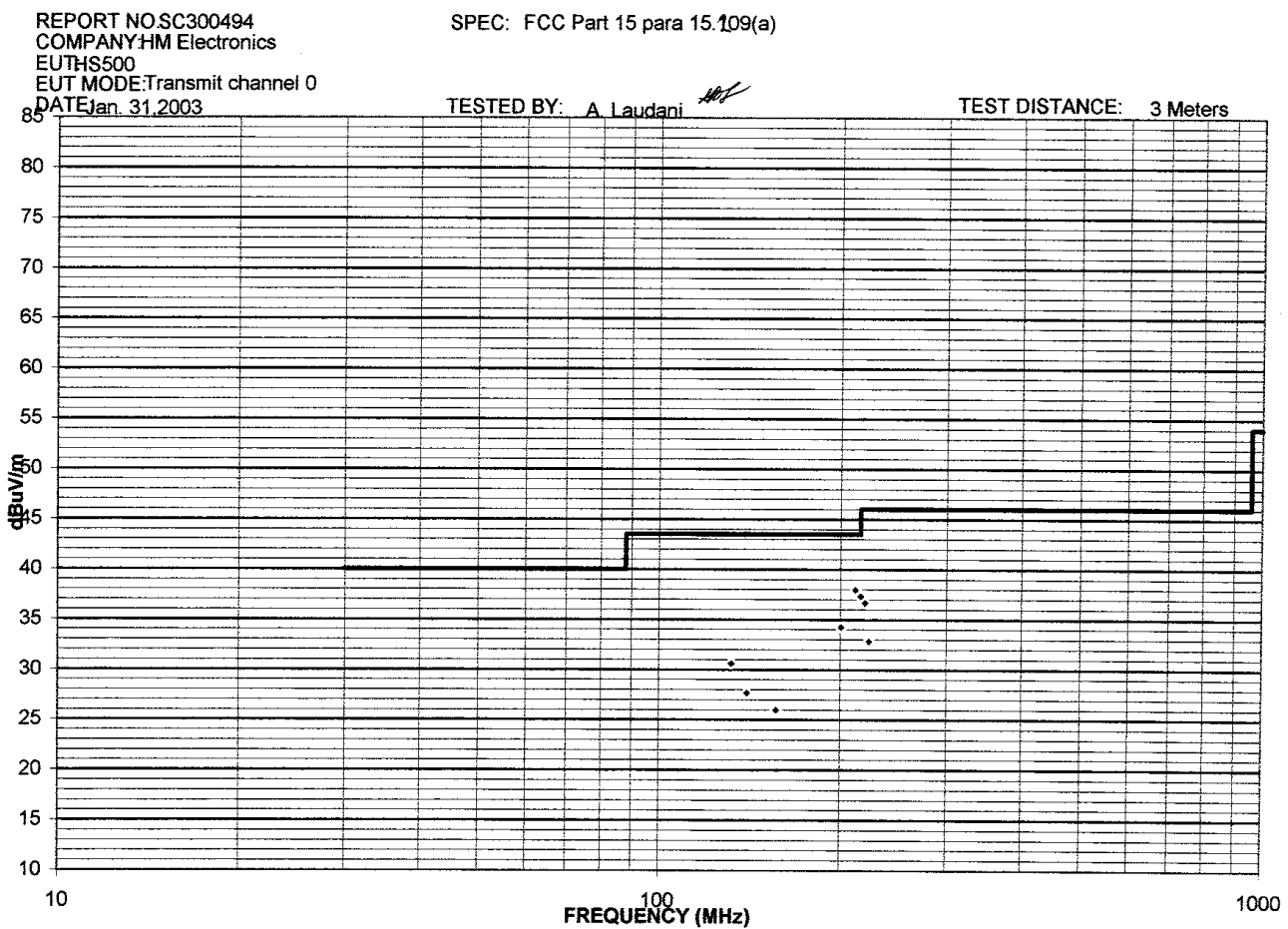
Roof (Small Open Area Test Site)

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
HP8566B	743	Spectrum Analyzer	Hewlett Packard	2618A02913	09/02
Cable 1	731	30' cable	United Microwave Pro	--	NCR*
Cable 2	756	10' Cable	United Microwave Pro	--	NCR*
Cable 3	6788	3' Cable	United Microwave Pro	--	NCR*
3146	243	Log Periodic Antenna	EMCO	106X	04/02
3115	251	Double Ridge Horn Antenna	EMCO	2495	12/02
FF6548-2	777	900 MHz High Pass Filter	Sage	006	NCR*
AMF-5D-010180-35-10P	719	PreAmplifier	Miteq	549460	NCR*
8445B	6677	Preselector	Hewlett Packard	1442A01127	NCR*

Canyon #2 (3- and 10-Meter Open Area Test Site)

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
ESVS30	427	EMC Receiver	Rohde & Schwarz	830350/006	12/02
LBP25020/A	739	Bilog Antenna	Antenna Research	1170	05/02

Remarks: One year calibration cycle for all test equipment and sites. (*) No Calibration Required.



REPORT No: SC300494

SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: HM Electronics

TEST DIST: 3 Meters

E U T: HS500

TEST SITE: 2

EUT MODE: Transmit channel 0

BICONICAL: 739

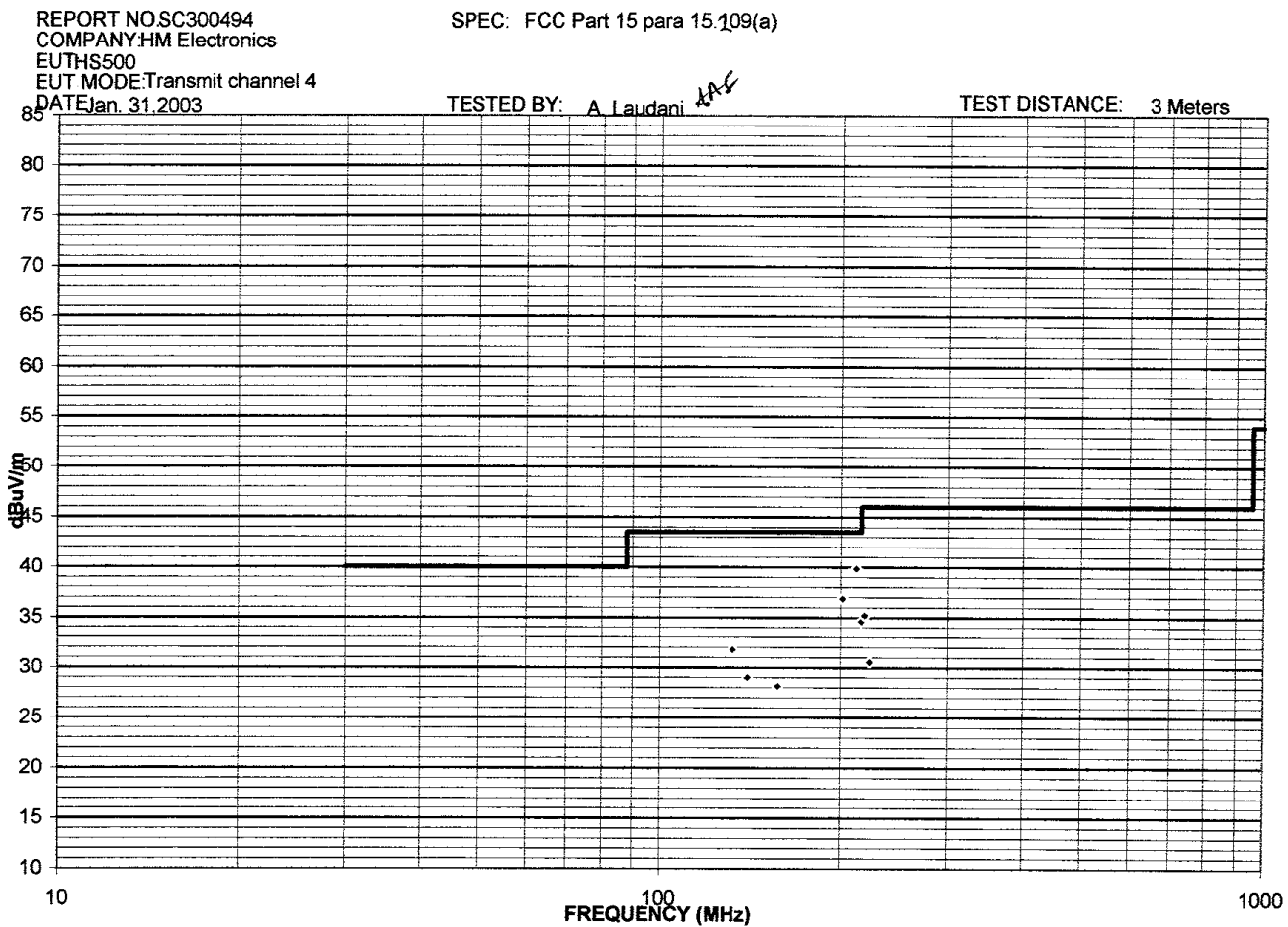
DATE: Jan. 31, 2003 TESTED BY: A. Laudani *AL*

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.

RCVR: 427

[illegible]



REPORT No: SC300494

SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: HM Electronics

TEST DIST: 3 Meters

EUT: HS500

TEST SITE: 2

EUT MODE: Transmit channel 4

BICONICAL: 739

DATE: Jan. 31, 2003 TESTED BY: A. Laudani *lux*

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.

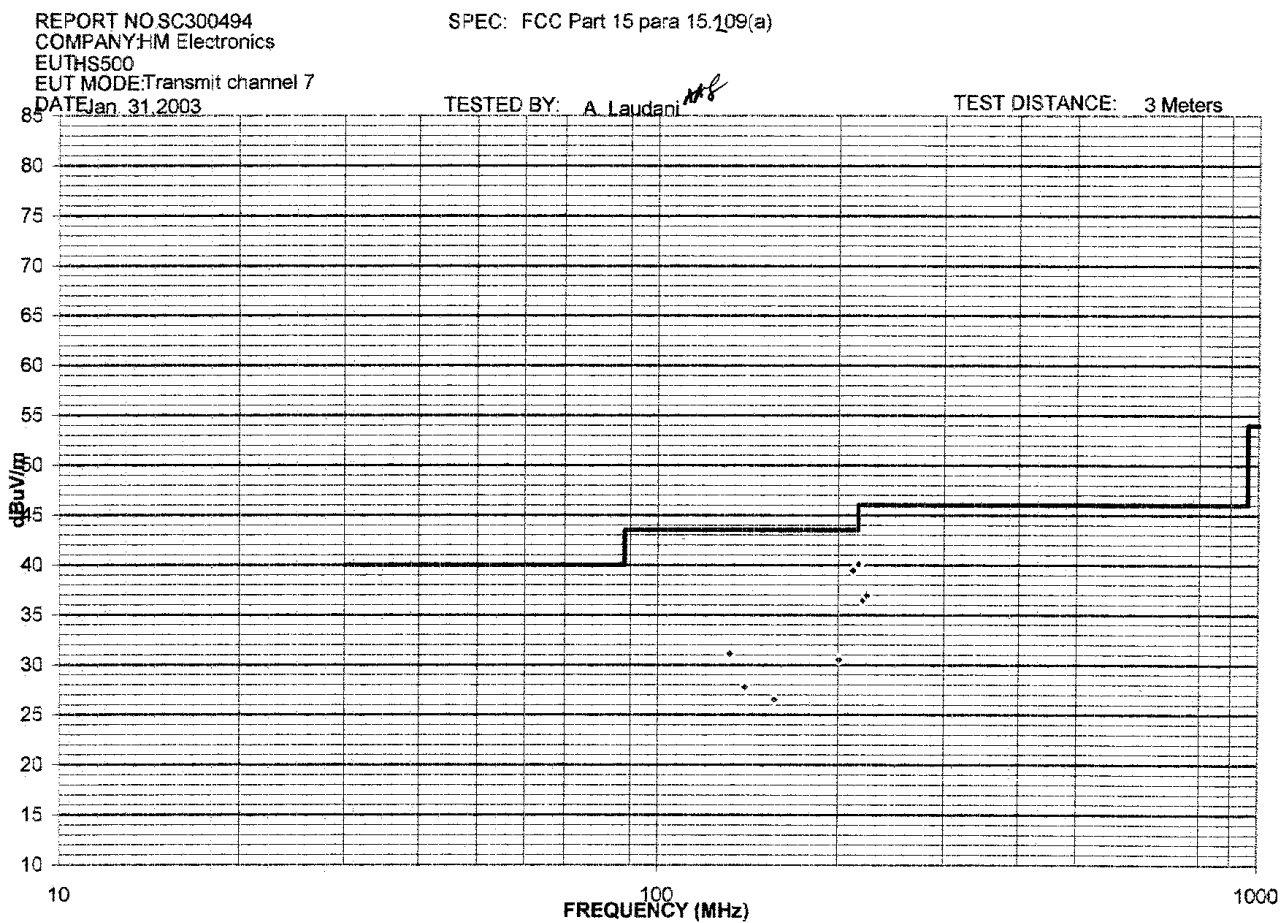
RCVR: 427

Temperature: 30 Relative Humidity: 38%

EUT MARGIN	-3.6	dB at 211.7 MHz
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ver 1.8b

[illegible]



REPORT No: SC300494

SPEC: FCC Part 15 para 15.109(a)

CUSTOMER: HM Electronics

TEST DIST: 3 Meters

E U T: HS500

TEST SITE: 2

EUT MODE: Transmit channel 7

BICONICAL: 739

DATE: Jan. 31, 2003 TESTED BY: A. Laudani *KL*

LOG PERIODIC: 739

NOTES: Quasi-Peak with 120 KHz measurement bandwidth.

RCVR: 427

[illegible]

above 1GHz: RBW & VBW 1 MHz for Pk; RBW 1MHz and VBW 10Hz for AVG
below 1GHz: RBW & VBW 100 kHz for Pk; RBW 100kHz and VBW 10Hz for AVG
CF = Antenna Factor + Cable Loss - Preamplifier Gain + Preselector Loss

Rev.No 1.0

NOTES:	3.6 Vdc Lithium	OTHER:	251
	above 1GHz: RBW & VBW 1 MHz for Pk; RBW 1MHz and VBW 10Hz for AVG		
	below 1GHz: RBW & VBW 100 kHz for Pk; RBW 100kHz and VBW 10Hz for AVG		
	CF = Antenna Factor + Cable Loss - Preamplifier Gain + Preselector Loss		

Rev.No 1.0

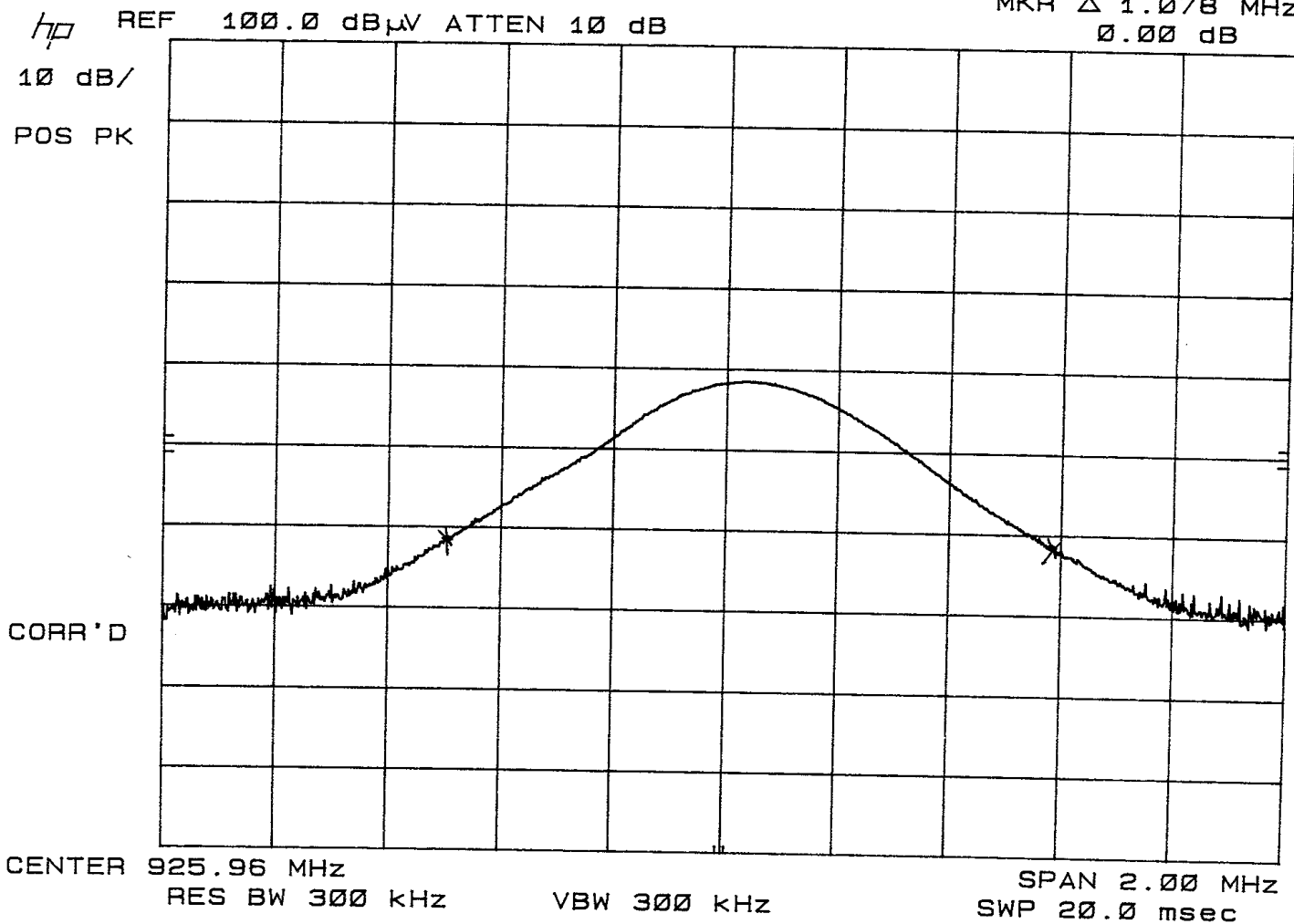
TÜV AMERICA, INC. 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

HM Electronics Inc.
FS210 Section 6.2.2/5.9.1
SC300494 TUV SR3

Model HS500
Occupied Bandwidth -20 dB

Jan. 31, 2003
TECH/ENGR: AAL

MKR Δ 1.078 MHz
0.00 dB



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4.0 ATTESTATION STATEMENT

GENERAL REMARKS:

SUMMARY:

All tests were performed per CFR 47, Part(s) 15.249(a)

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, Part(s) 15.249(a)

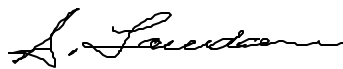
- TÜV AMERICA, INC. -

Responsible Engineer:



Jim Owen
(EMC Chief Engineer)

Responsible Engineer:



Alan Laudani
(EMC Engineer)