

MEASUREMENT AND TECHNICAL REPORT

MEDTRONIC MINIMED
18000 Devonshire Street
Northridge, CA 91325

DATE: 26 September 2002

This Report Concerns:	Original Grant: <input checked="" type="checkbox"/>	Class II Change: <input type="checkbox"/>
Equipment Type:	ComLink, Model MMT-7304	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: <input type="checkbox"/> Defer until:	No: <input checked="" type="checkbox"/>
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: <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: Computer peripheral for RF downloads of insulin therapy from insulin pump

EUT Name: ComLink

Model No.: MMT-7304 Serial No.: --

Product Options: Transmit/Receive

Configurations to be tested: Transmit/Receive

EUT Specifications and Requirements

Length: 2.25" Width: 0.65" Height: 1.30" Weight: 21.4 grams

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: 3.5 to 15.0 VDC (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: --

Current (Amps/phase(max)): 23.0ma during RF Transmit Current (Amps/phase(nominal)): --

Other: EUT is powered by computer Com port.

Other Special Requirements

--

Typical Installation and/or Operating Environment

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

Hospital, Doctors Office, Home

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"/>
RS232	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	--	--	Metallized 9-pin D-Sub	Characteristic Impedance	1.83	<input checked="" type="checkbox"/>	<input type="checkbox"/>

EUT Software.

Revision Level: Test Software Revision A

Description: RF Immunity: P/N 9027568
 RF Emissions: P/N 9027569

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. For FCC Emissions: "Continuous Transmit Mode"
2. For Radiated Immunity: "Continuous Communications Mode"

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 ID #
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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 #
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Any PC or Laptop Computer	--	--	--
MMT-511 Insulin Pump	511	--	OH2511

Oscillator Frequencies

Frequency	Derived Frequency	Component # / Location	Description of Use
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10.0MHz	--	Crystal Y1	Oscillator for microcontroller
916.5MHz	--	RF Transceiver at U3	RF Transceiver

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
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Critical EMI Components (Capacitors, ferrites, etc.)

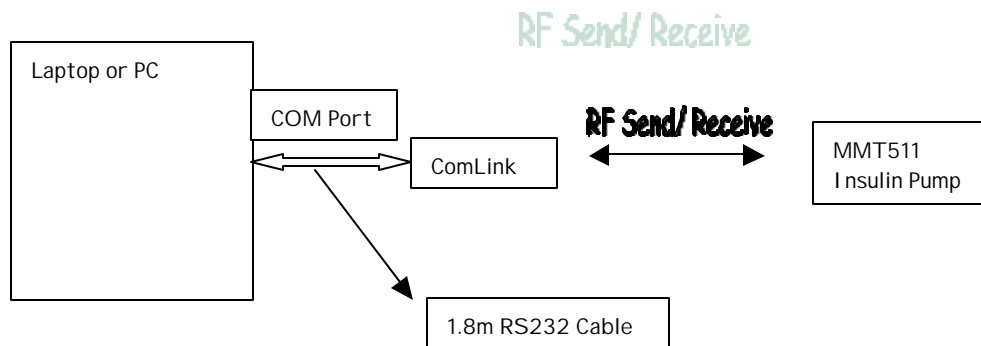
Description	Manufacturer	Part # or Value	Qty	Component # / Location
-------------	--------------	-----------------	-----	------------------------

--

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

--

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.



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 ANSI C63.4 setup.

TEST	FCC CFR 47#	PASS/FAIL
Deactivation	15.231(a)	Pass
Radiated Spurious Emissions	15.231(b)	Pass
Emissions Bandwidth	15.231(c)	Pass
Duty Cycle Measurements	ANSI C63.4, Appendix 14, Para. 10	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.

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

Test Software Revision A

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

See following page(s).

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Test Conditions: DEACTIVATION: FCC Part 15.231(a)**The DEACTIVATION measurements were performed at the San Diego Testing Facility:** - Test not applicable

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

Test Equipment Used:

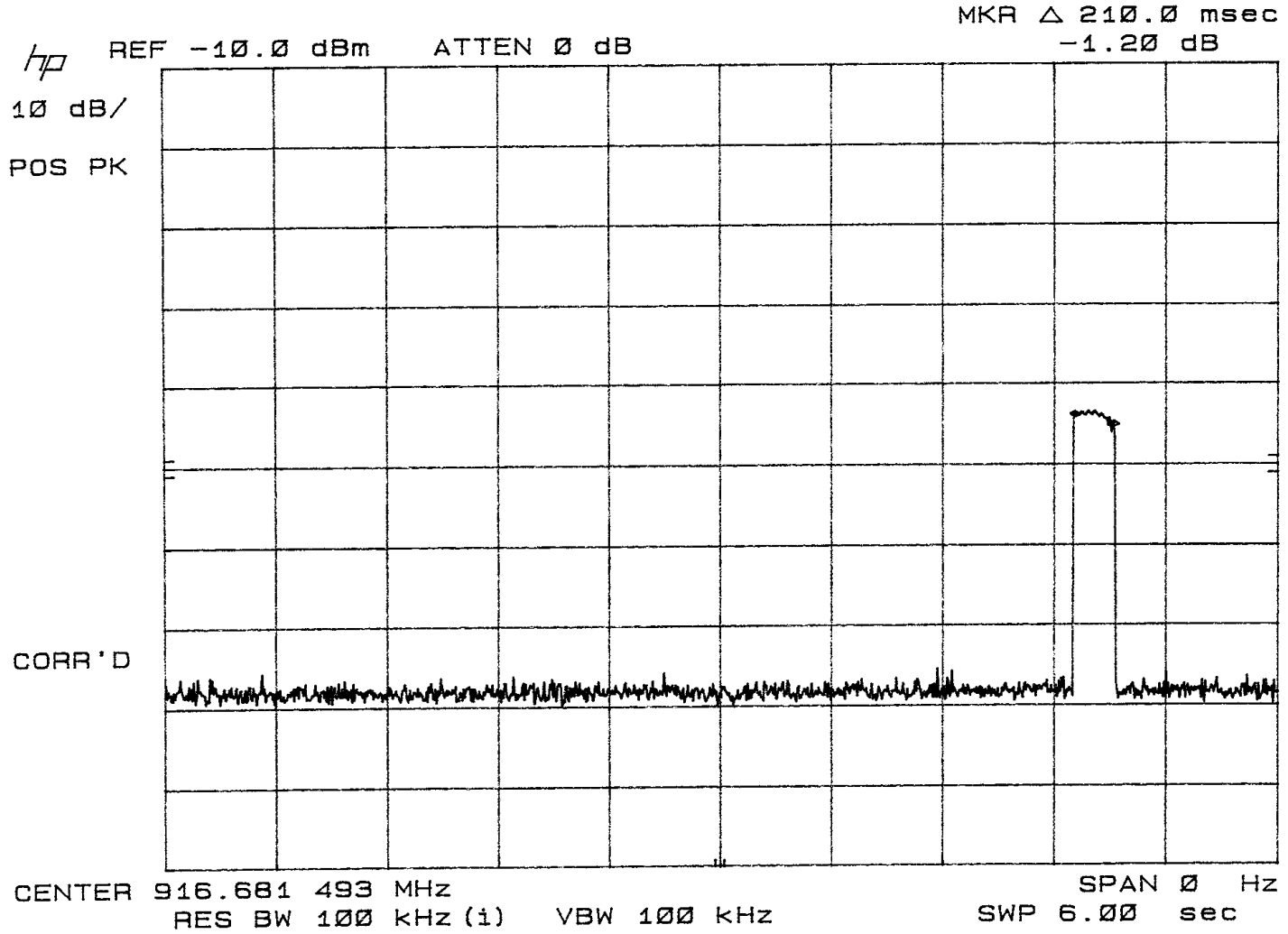
Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	6676	Spectrum Analyzer	Hewlett Packard	2332A02751	08/03
CBL6111	460	Antenna, Bilog	Chase	1013	NCR

Remarks: _____

SC-204504
MEDTRONICS MINIMED
FCC CFR 47 PART 15.231(a) Deactivation

MMT 7304 COMLINK
Unit Deactivates within Five Seconds Button RELEASED

Aug. 28, 2002
TEST ENGR: AAL *AAL*
Test Room: SR3



4.0 RADIATED SPURIOUS EMISSIONS 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).

4.1 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.

Test Conditions: RADIATED SPURIOUS EMISSIONS: FCC Part 15.231(b)

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

- Test not applicable

■ - Roof (Small Open Area Test Site)

Testing was performed at a test distance of:

■ - 3 meters

Test Equipment Used:

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	407	Spectrum Analyzer	Hewlett Packard	2311A02209	11/02
AMF-5D-010180-35-10P	719	PreAmp	TUV PS	--	NCR
3115	251	Antenna, Horn	Electro Mechanics Co	2595	12/03
Cable 1	732	30' Cable	United Microwave Pro	--	NCR
Cable 2	6788	3" Cable	United Microwave Pro	--	NCR
Cable 3	656	10" Cable	United Microwave Pro	--	NCR
HP8445B	809	Automatic Preselector	Hewlett Packard	1442A01127	NCR
3146	243	Antenna, Log Periodic	Electro Mechanics Co	106X	04/03

Remarks: _____

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5.0 EMISSIONS BANDWIDTH EQUIPMENT/DATA

See following page(s).

Report No. SC204504-03

Test Conditions: EMISSIONS BANDWIDTH: FCC Part 15.231(c)

The **EMISSIONS BANDWIDTH** measurements were performed at the San Diego Testing Facility in:

- Test not applicable

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

Test Equipment Used:

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	6676	Spectrum Analyzer	Hewlett Packard	2332A02751	08/03
CBL6111	460	Antenna, Bilog	Chase	1013	NCR

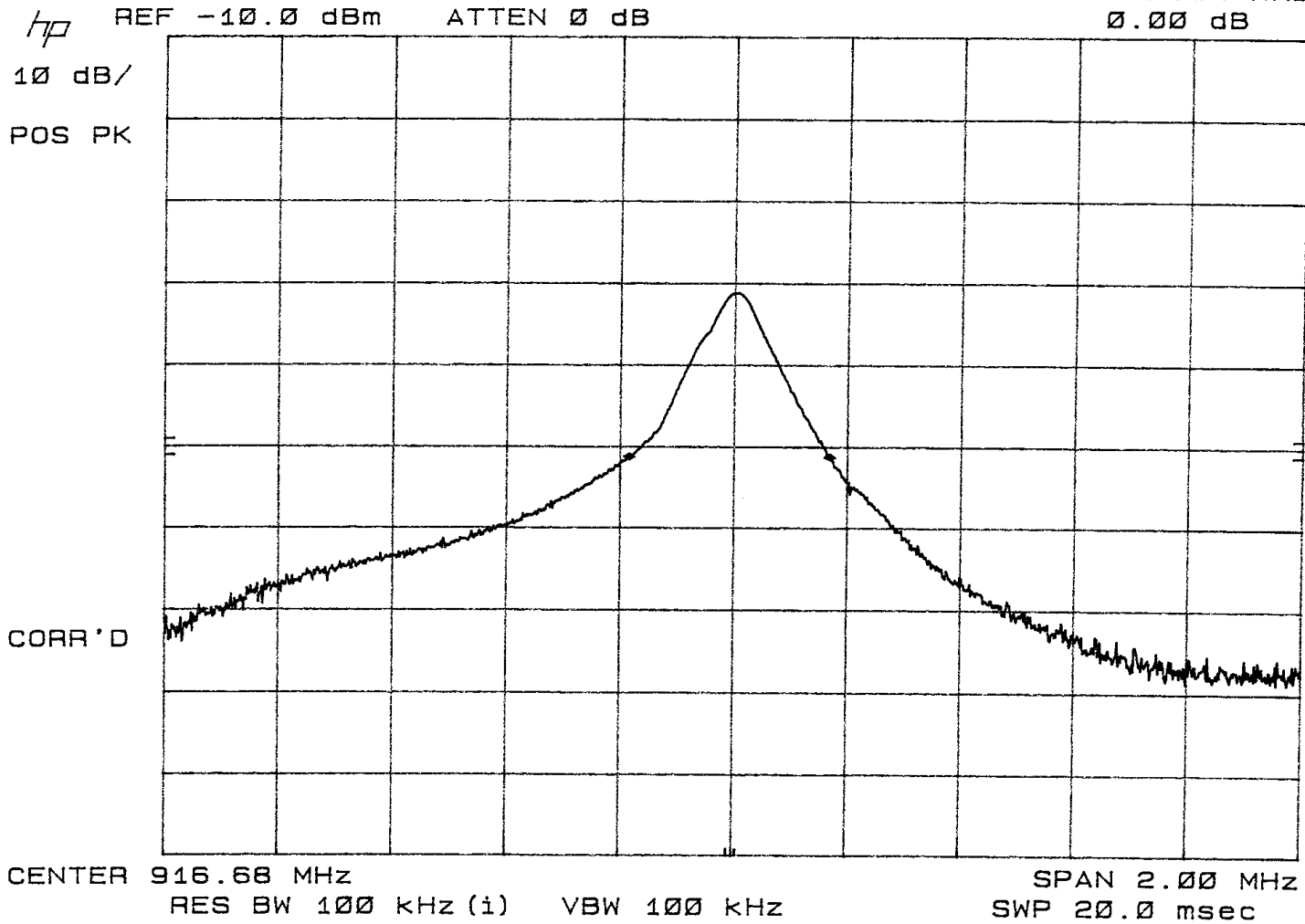
Remarks: _____

SC-204504
MEDTRONICS MINIMED
FCC CFR 47 PART 15.231(c) Band Width

MMT 7304 COMLINK
20 dB BW < 0.5 % of Fo (916.68 MHz)

Aug. 28, 2002
TEST ENGR: AAL *AAL*
Test Room: SR3

MKR Δ 354 kHz
0.00 dB



6.0 DUTY CYCLE MEASUREMENTS EQUIPMENT/DATA

See following page(s).

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Test Conditions: DUTY CYCLE MEASUREMENTS: ANSI C63.4, Appendix 14, Para. 10

The DUTY CYCLE MEASUREMENTS measurements were performed at the San Diego Testing Facility in:

- Test not applicable

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

Test Equipment Used:

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Due Date
HP8566B	6676	Spectrum Analyzer	Hewlett Packard	2332A02751	08/03
CBL6111	460	Antenna, Bilog	Chase	1013	NCR

Remarks: _____

Duty Cycle
8-28-02 AAF
SR3

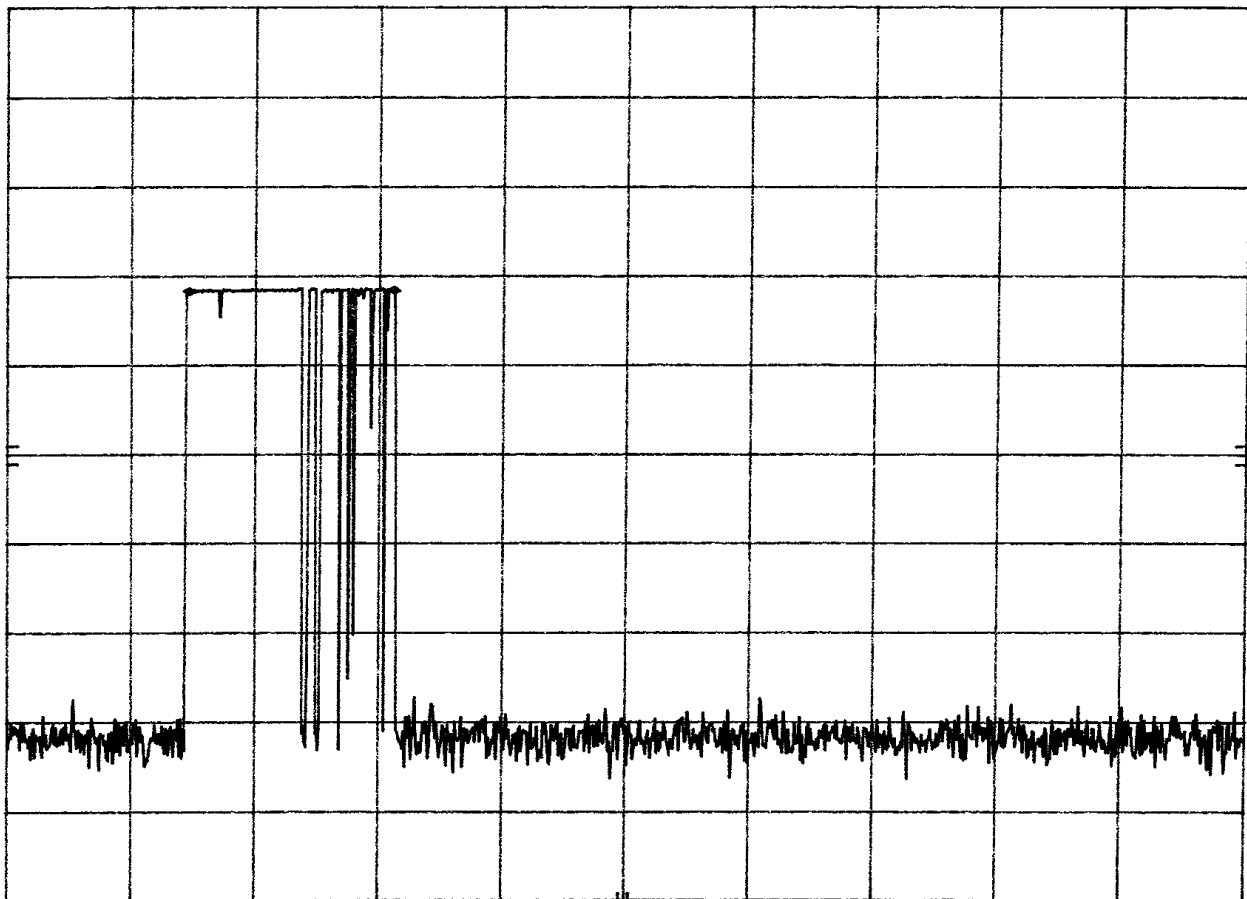
MKR Δ 16.50 msec
0.10 dB

hp REF -10.0 dBm ATTEN 0 dB

10 dB/
POS PK

CORR'D

CENTER 916.681 493 MHz SPAN 0 Hz
RES BW 100 KHz (i) VBW 100 KHz SWP 100 msec



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7.0 ATTESTATION STATEMENT

GENERAL REMARKS:

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 Technician:



Alan Laudani
(EMC Technician)