

## MEASUREMENT AND TECHNICAL REPORT

DIRECTED ELECTRONICS INCORPORATED  
 1 Viper Way  
 Vista, CA 92083

**DATE: 14 February 2006**

<b>This Report Concerns:</b>	Original Grant: <input checked="" type="checkbox"/>	Class II Change: <input type="checkbox"/>
<b>Equipment Type:</b>	Responder SST HHU, Models 7701V, 7701P, and 7701X	
<b>Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?</b>	Yes: <input type="checkbox"/> <b>Defer until:</b> <input type="text"/>	No: <input checked="" type="checkbox"/>
<b>Company Name agrees to notify the Commission by:</b> of the intended date of announcement of the product so that the grant can be issued on that date.	<input type="text" value="N/A"/>	
<b>Transition Rules Request per 15.37?</b>	Yes: <input type="checkbox"/>	No: <input checked="" type="checkbox"/>
(*) FCC Part 15, Paragraph(s) 15.247(a), 15.247(b), 15.247(c), 15.109(a), and 15.209(a)		
<b>Report Prepared by:</b>	<b>TÜV AMERICA, INC</b> 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 Fax: 858 546 0364	

**TABLE OF CONTENTS**

	<b>Pages</b>
<b>1.0 GENERAL INFORMATION</b>	<u>3 - 7</u>
1.1 Product Description	<u>3 - 5</u>
1.2 Related Submittal Grant	<u>6</u>
1.3 Tested System Details	<u>6</u>
1.4 Test Methodology	<u>6</u>
1.5 Test Facility	<u>7</u>
<b>2.0 SYSTEM TEST CONFIGURATION</b>	<u>8</u>
2.1 Justification	<u>8</u>
2.2 EUT Exercise Software	<u>8</u>
2.3 Special Accessories	<u>8</u>
2.4 Equipment Modifications	<u>8</u>
2.5 Configuration of Test System	<u>8</u>
<b>3.0 BANDWIDTH EQUIPMENT/DATA</b>	
<b>CHANNEL SEPARATION EQUIPMENT/DATA</b>	
<b>TIME OF OCCUPANCY EQUIPMENT/DATA</b>	
<b>NUMBER OF HOPPING CHANNELS EQUIPMENT/DATA</b>	
<b>PEAK OUTPUT POWER EQUIPMENT/DATA</b>	
<b>BANEDGE EQUIPMENT/DATA</b>	
<b>RF CONDUCTED EMISSIONS EQUIPMENT/DATA</b>	
<b>RADIATED SPURIOUS EMISSIONS EQUIPMENT/DATA</b>	<u>9 - 56</u>
<b>4.0 ATTESTATION STATEMENT</b>	<u>57</u>

**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: Hand held keyfob transceiver for car alarm and convenience systems.

EUT Name: Responder SST HHU

Model No.: 7701V, 7701P, 7701X Serial No.: --

Product Options: --

Configurations to be tested: 1

**EUT Specifications and Requirements**

Length 3.50" Width: 1.41" Height: 0.72" Weight: --  
 : \_\_\_\_\_

**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: 1.5V (AAA 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
<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 modulated transmission
  
2. The System is a 25 channel frequency hopping design and is intended for use under FCC part 15.247

**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 #
Keyfob	7701V, 7701P, 7701X	--	EZSDEI7701

**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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**Oscillator Frequencies**

Frequency	Derived Frequency	Component # / Location	Description of Use
16MHz	909.744MHz to 919MHz	--	Transmitter RF carrier
8MHz	--	--	MCU clock

**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
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--

**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 Summary					
Test Description	Paragraph Number	Summary of Results			Pass/Fail
		Low Channel	Mid Channel	High Channel	
Bandwidth	15.247(a)(1)(i)	--	302 kHz	--	Pass
Channel Separation	15.247(a)(1)	--	380 kHz	--	Pass
Time of Occupancy	15.247(a)(1)(i)	--	338 mS	--	Pass
Number of Hopping Channels	15.247(a)(1)(i)	--	25 channels	--	Pass
Peak Output Power	15.247(b)(1)	110.74 mW	114.42 mW	116.36 mW	Pass
Bandedge	15.247(c)	No emissions detected	--	No emissions detected	Pass
RF Conducted Emissions	15.247(c)	No emissions detected	--	No emissions detected	Pass
Radiated Spurious Emissions – Restricted Bands (1GHz to 25GHz)	15.247(c)/ 15.209(a)	--	-3.28 dB @ 2728.63 MHz	--	Pass
Radiated Emissions (30 to 1000 MHz)	15.109(a)	--	-6.5 dB @ 654 MHz	--	Pass

Testing was performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8-M1983.

## 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: 858 678 1400  
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 Test Setup Photos Exhibit

### **2.2 EUT Exercise Software**

None

### **2.3 Special Accessories**

None

### **2.4 Equipment Modifications**

None

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

See Test Setup Photos Exhibit



- 3.0 BANDWIDTH EQUIPMENT/DATA
- CHANNEL SEPARATION EQUIPMENT/DATA
- TIME OF OCCUPANCY EQUIPMENT/DATA
- NUMBER OF HOPPING CHANNELS EQUIPMENT/DATA
- PEAK OUTPUT POWER EQUIPMENT/DATA
- BANDEDGE EQUIPMENT/DATA
- RF CONDUCTED EMISSIONS EQUIPMENT/DATA
- RADIATED SPURIOUS EMISSIONS EQUIPMENT/DATA

Test Conditions: BANDWIDTH: FCC Part 15.247(a)(1)(i) and RSS-Gen 4.4.1  
 CHANNEL SEPARATION: FCC 15.247(a)(1) and RSS-210, Annex 8.1  
 TIME OF OCCUPANCY: FCC Part 15.247(a)(1)(i) and RSS-Gen 4.3  
 NUMBER OF HOPPING CHANNELS: FCC Part 15.247(a)(1)(i) and RSS-210, Annex 8.1  
 PEAK OUTPUT POWER: FCC Part 15.247(b)(1) and RSS-Gen 4.6  
 BANDEDGE: FCC Part 15.247(c) and RSS-Gen 4.4.2  
 RF CONDUCTED EMISSIONS: FCC Part 15.247(c) and RSS-Gen 7.2.2  
 RADIATED SPURIOUS EMISSIONS: FCC Part 15.109(a), 15.209(a), 15.247(c) and RSS-Gen 7.2.3.2

The following 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)

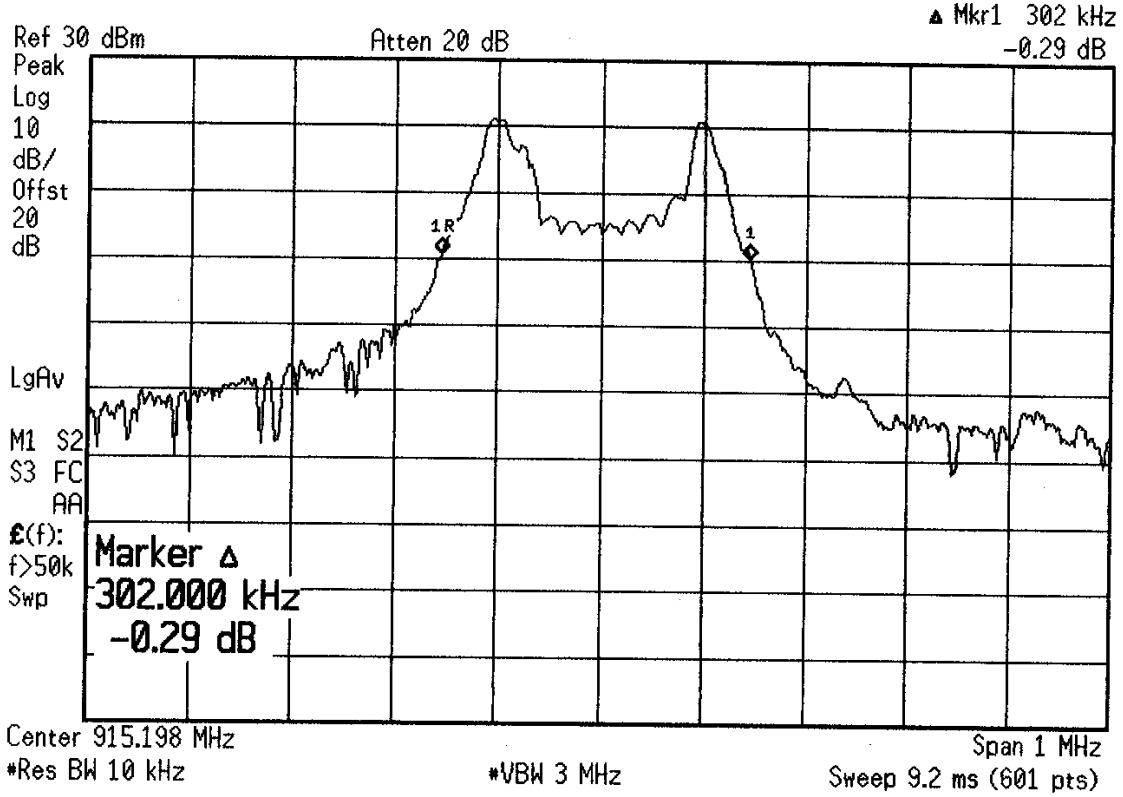
**Test Equipment Used:**

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Date Cal'ed
E4446A	6823	Spectrum Analyzer	Agilent	US44300486	04/05
3110B	6644	Biconical Antenna	EMCO	9508-2134	10/05
3146	6641	Antenna, Log Periodic Dipole	EMCO	106X	06/05
3115	6669	Double Ridge Antenna	EMCO	9412-4364	08/05

**Remarks:** One year calibration cycle for all test equipment and sites.

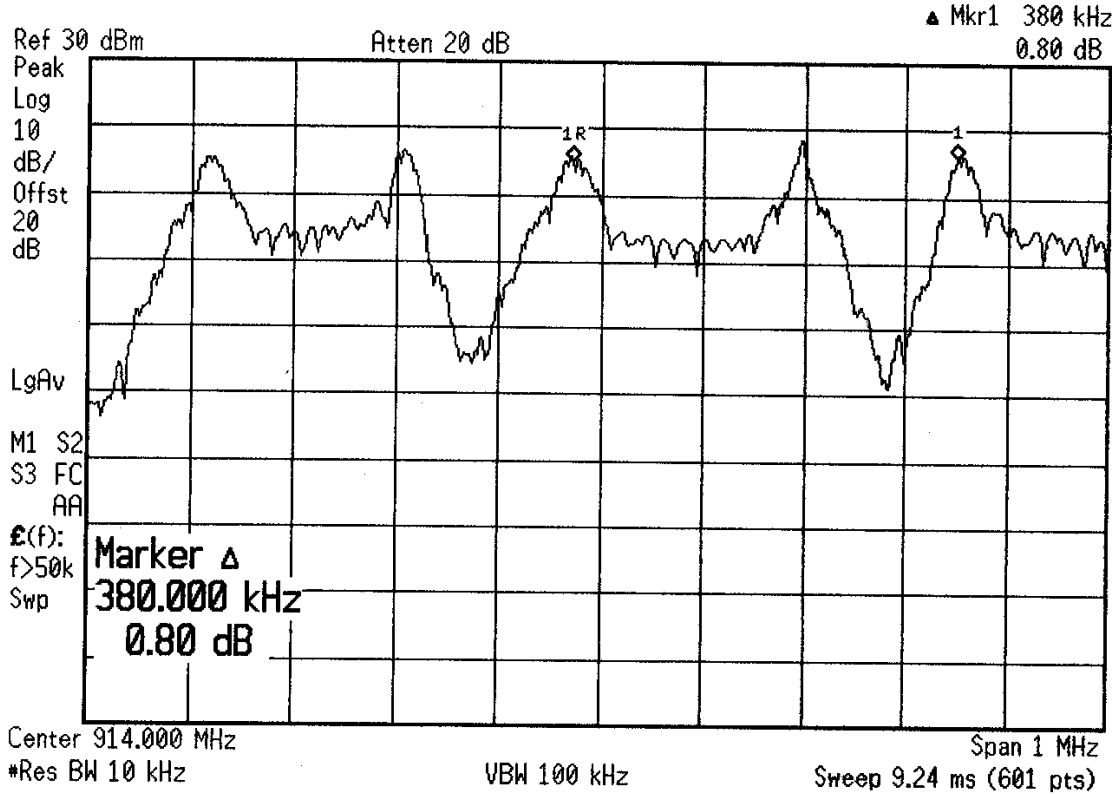
FCC Part 15.247(a)(1)(i) - Bandwidth

Agilent 10:06:42 Feb 8, 2006



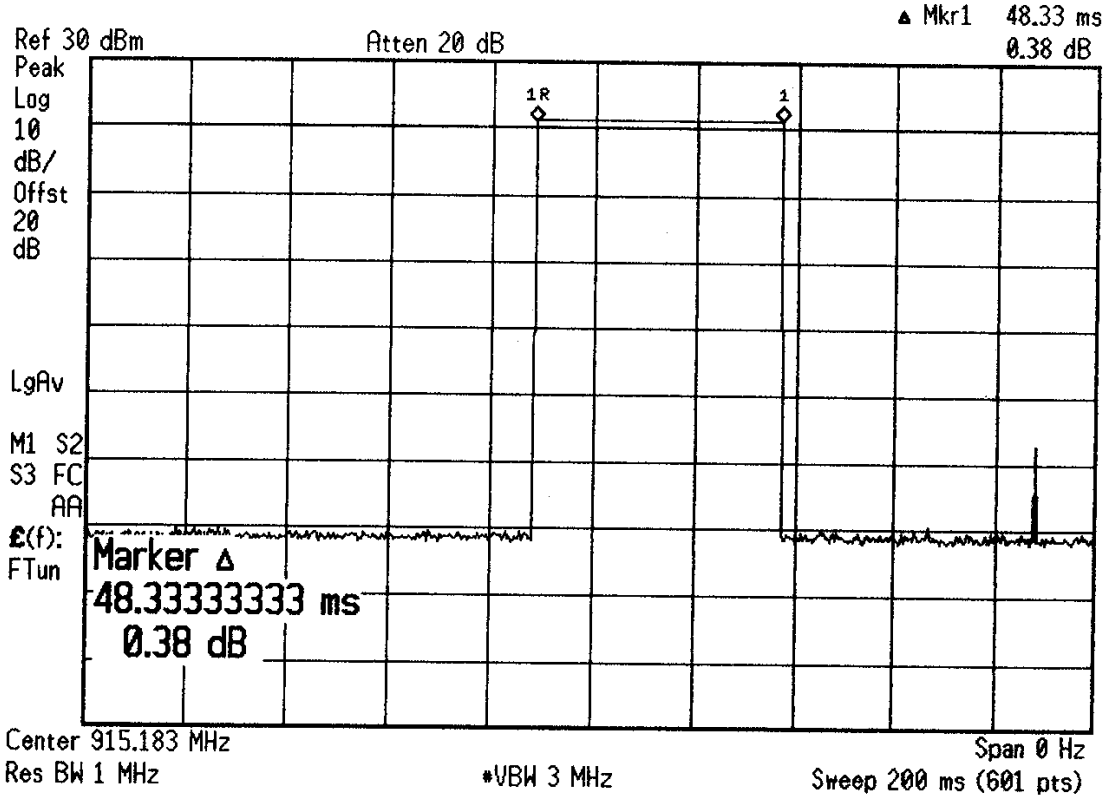
FCC Part 15.247(a)(1) - Channel Separation

\* Agilent 08:49:33 Feb 8, 2006



FCC Part 15.247(a)(1)(i) - Time of Occupancy

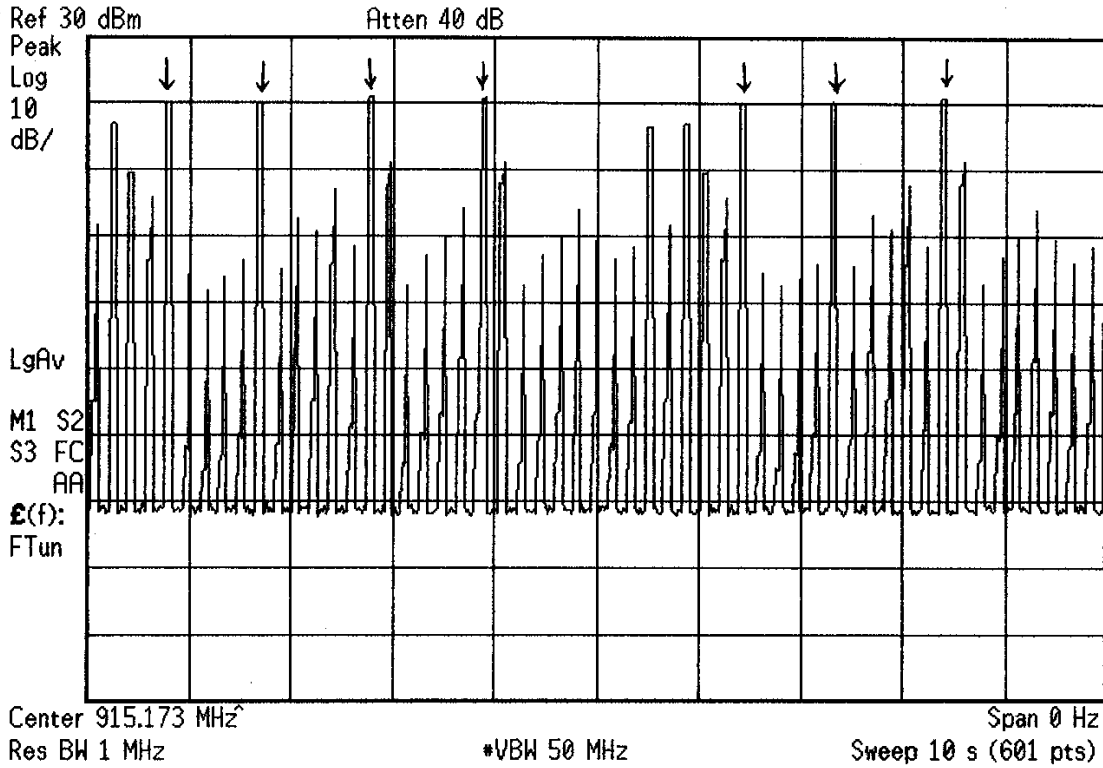
\* Agilent 09:55:03 Feb 8, 2006



Pulse duration = 48 mS

FCC Part 15.247(a)(1)(i) - Time of Occupancy

\* Agilent 14:23:52 Feb 8, 2006

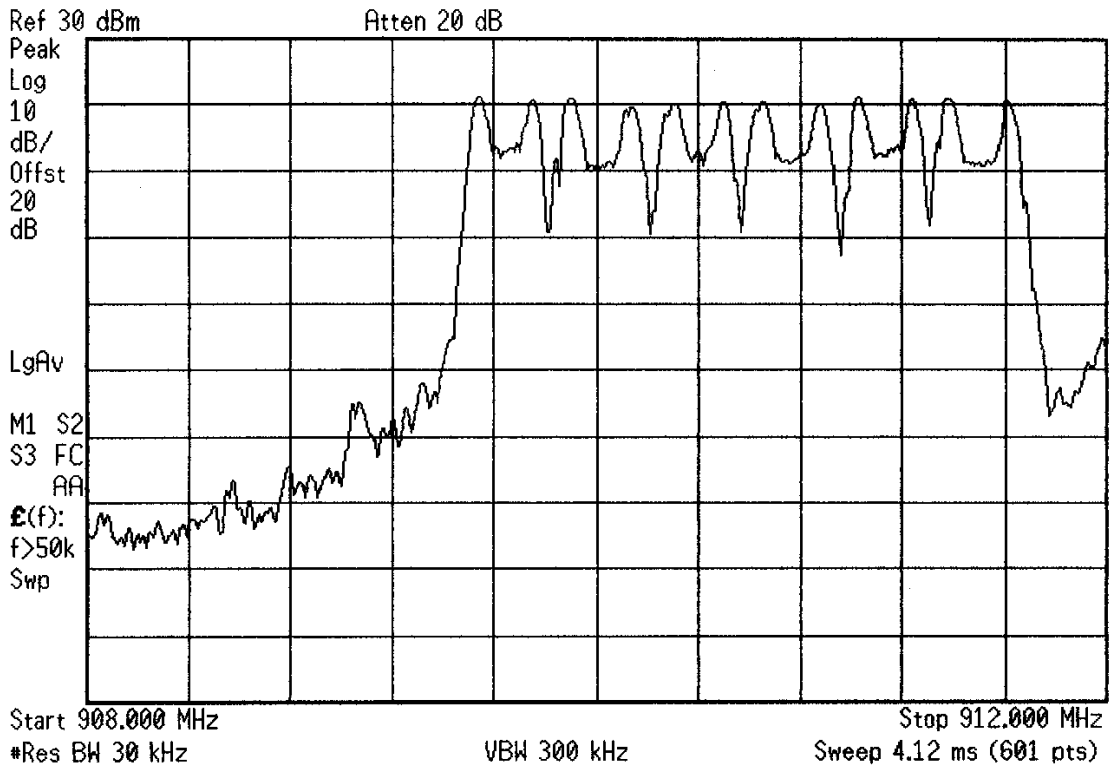


→ ON channel transmissions

Dwell time = 7 x 48 mS = 338 mS

FCC Part 15.247(a)(1)(i) - Number of Channels

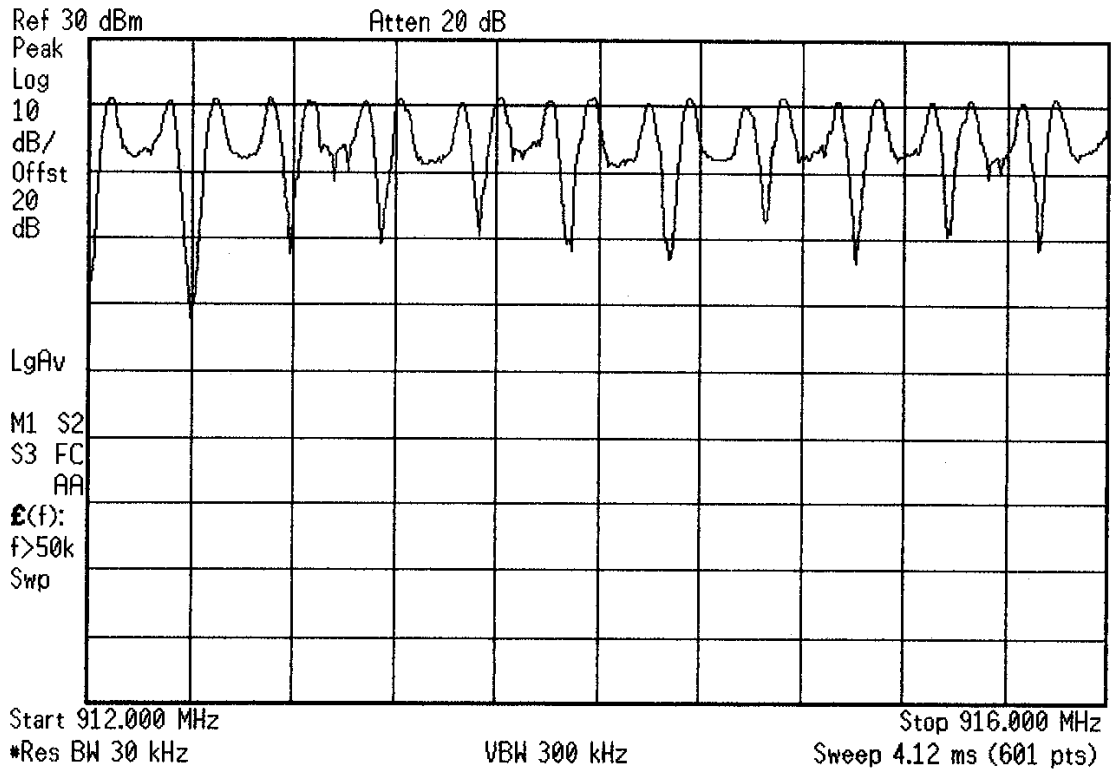
\* Agilent 09:19:11 Feb 8, 2006



Number of channels = 6

FCC Part 15.247(a)(1)(i) - Number of Channels

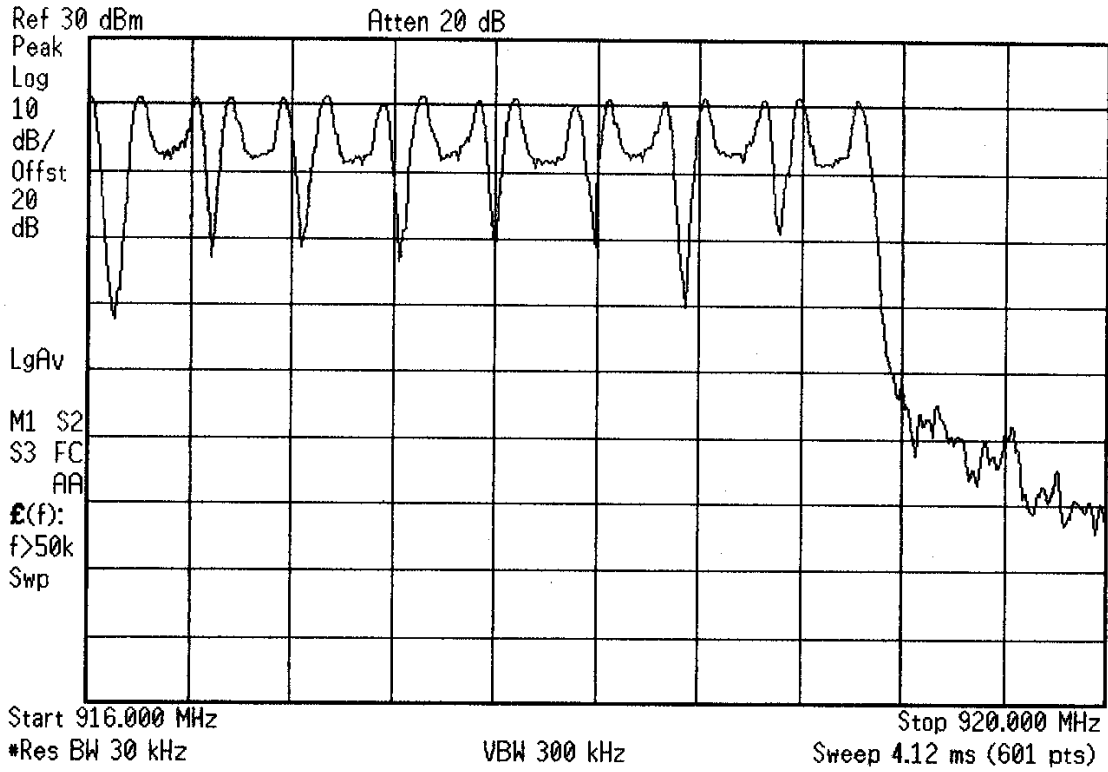
✱ Agilent 09:17:43 Feb 8, 2006



Number of channels = 11

FCC Part 15.247(a)(1)(i) - Number of Channels

\* Agilent 09:20:16 Feb 8, 2006

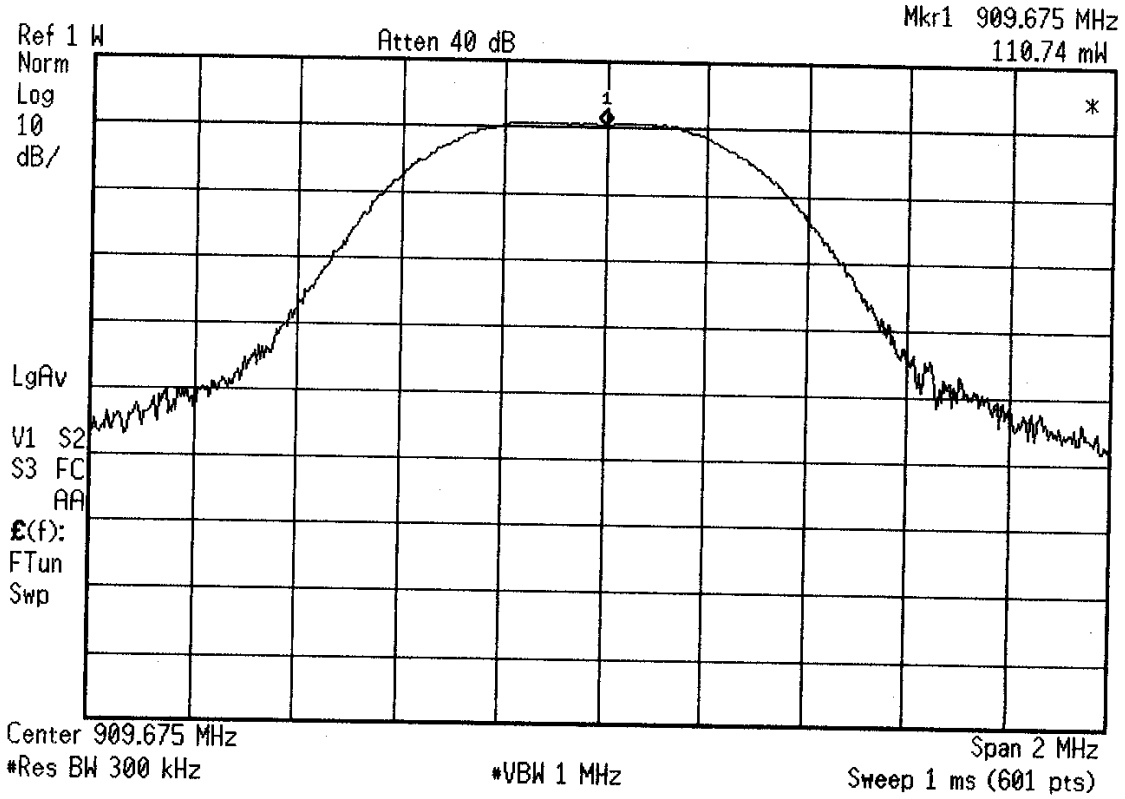


Number of channels = 8



FCC Part 15.247(b)(1) - Peak Output Power

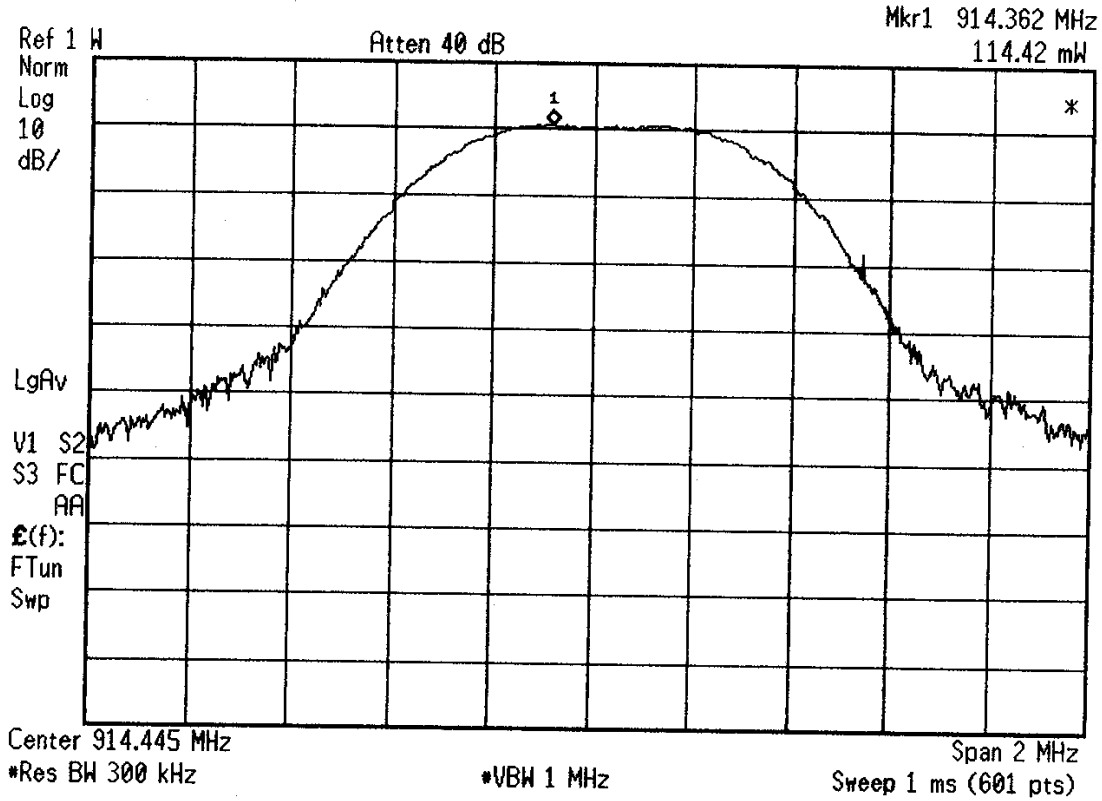
\* Agilent 11:34:29 Feb 8, 2006



Lo channel 1

FCC Part 15.247(b)(1) - Peak Output Power

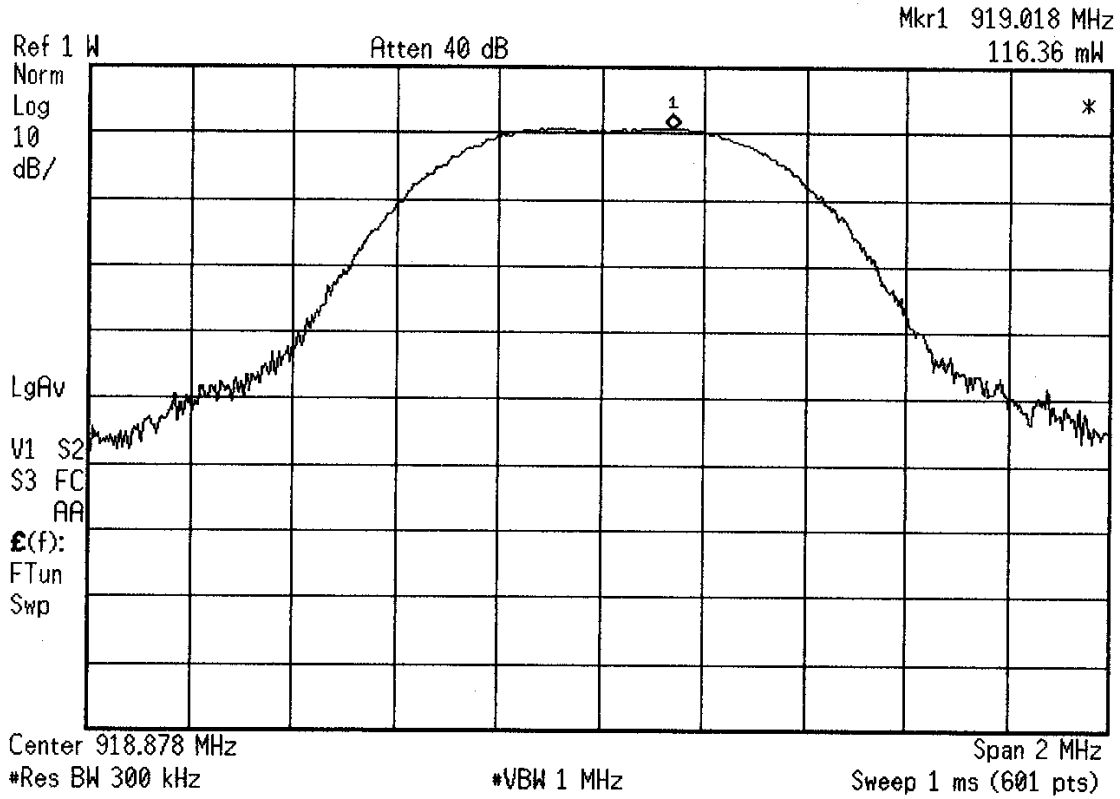
\* Agilent 11:39:38 Feb 8, 2006



Mid channel 12

FCC Part 15.247(b)(1) - Peak Output Power

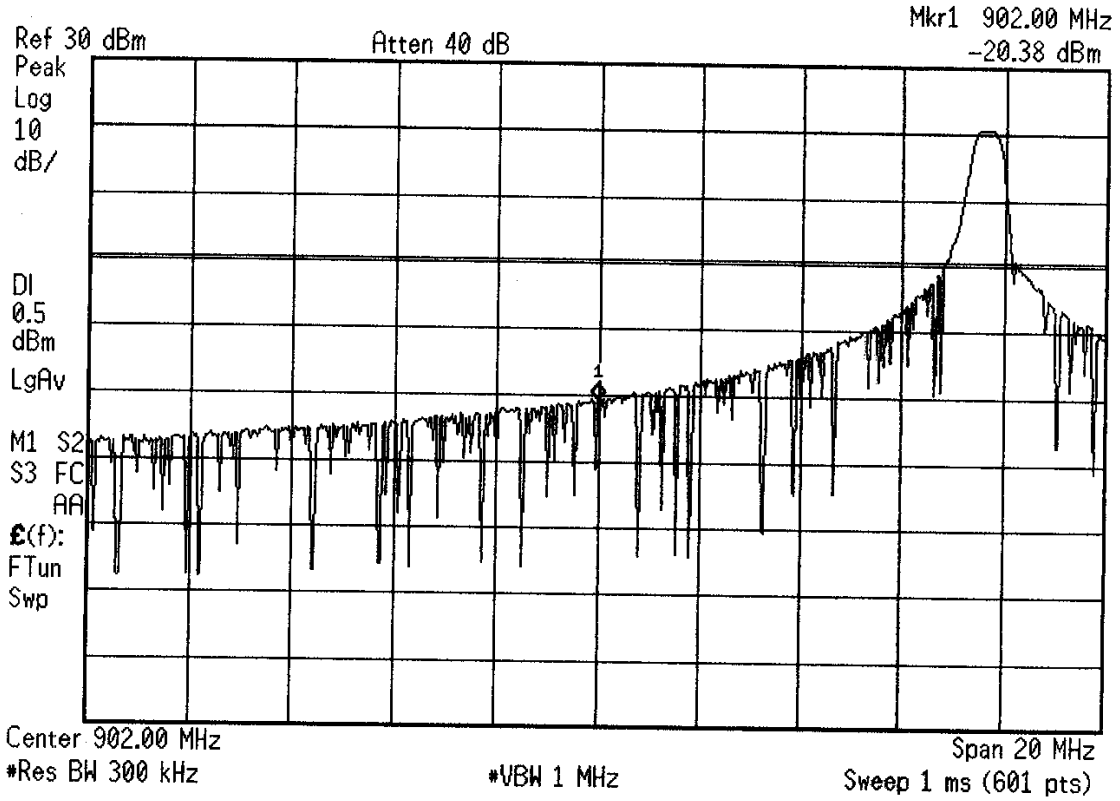
\* Agilent 11:42:04 Feb 8, 2006



Hi channel 25

FCC Part 15.247(c) - Bandedge

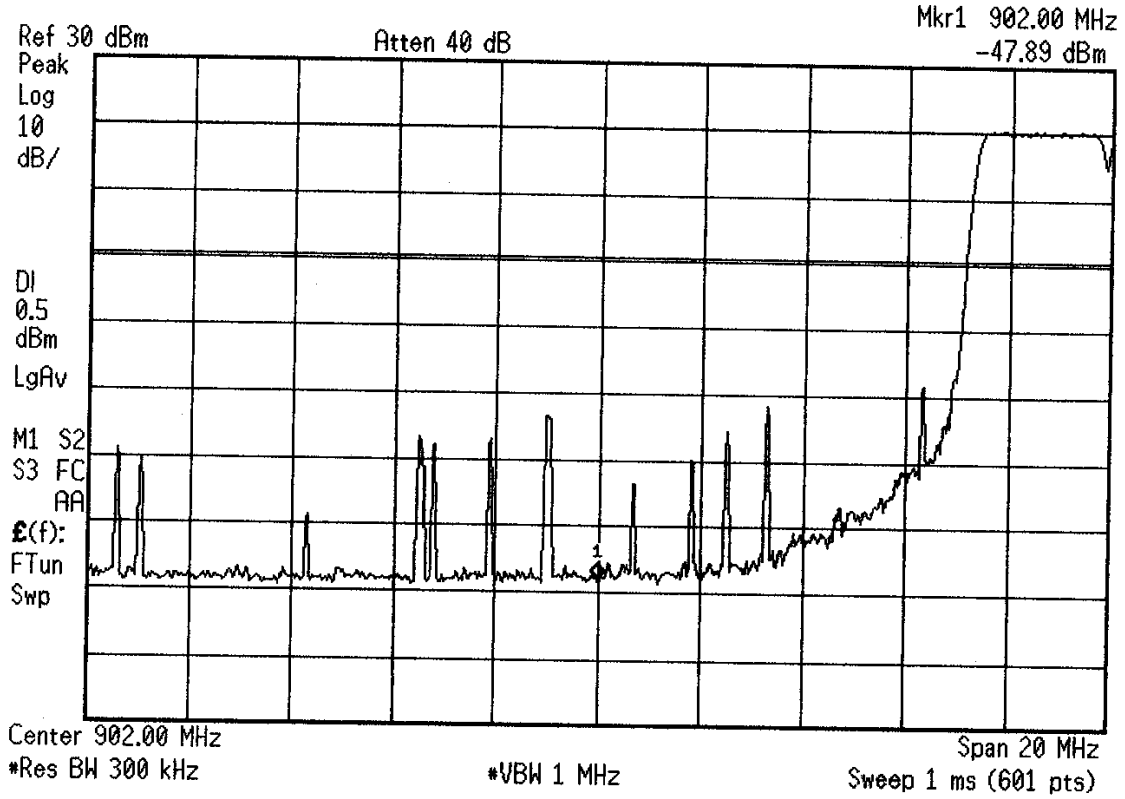
Agilent 11:56:56 Feb 8, 2006



Lower bandedge  
Channel 1 fixed

FCC Part 15.247(c) - Bandedge

\* Agilent 11:59:29 Feb 8, 2006

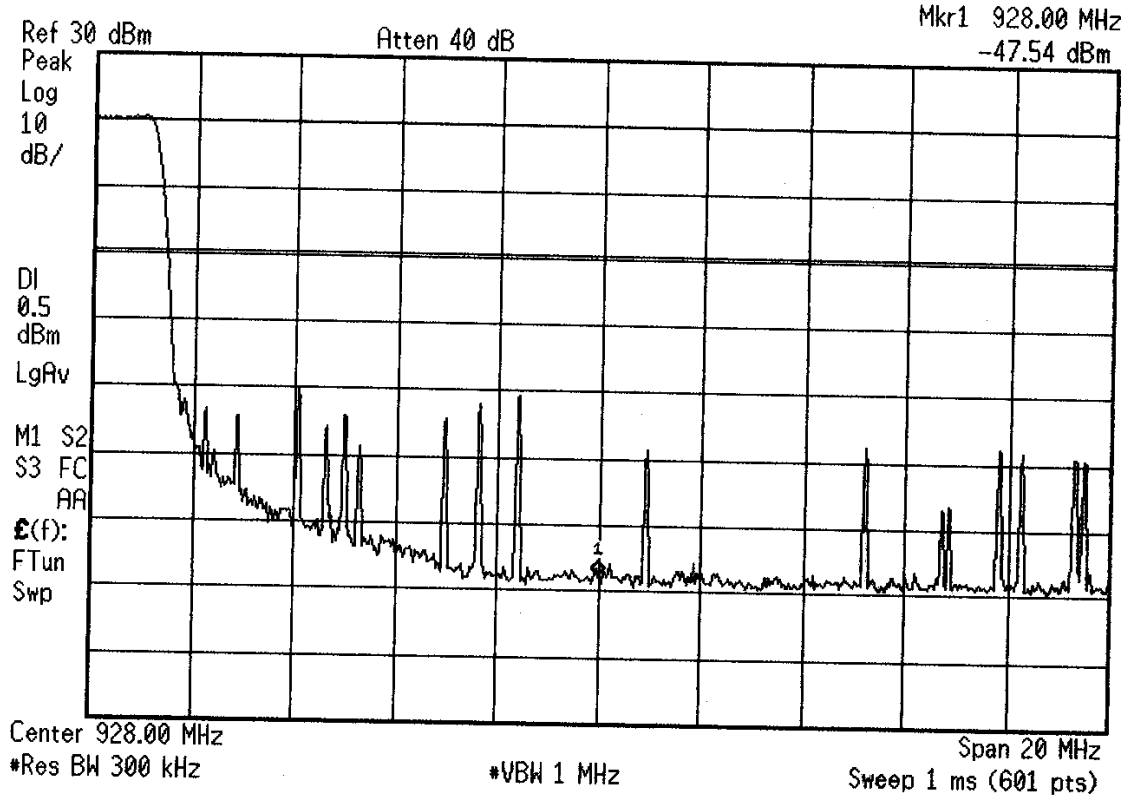


Lower bandedge  
Hopping



FCC Part 15.247(c) - Bandedge

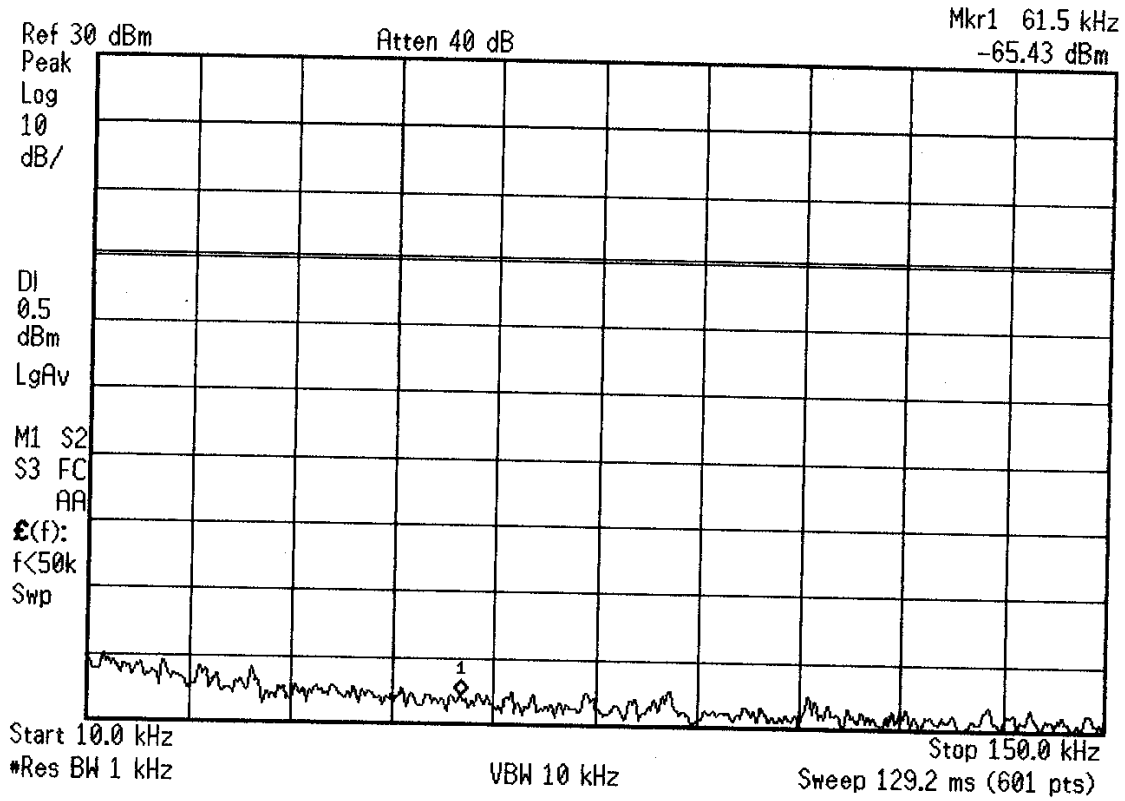
\* Agilent 12:01:17 Feb 8, 2006



Upper bandedge  
Hopping

FCC Part 15.247(c) - RF Conducted

Agilent 12:53:53 Feb 8, 2006

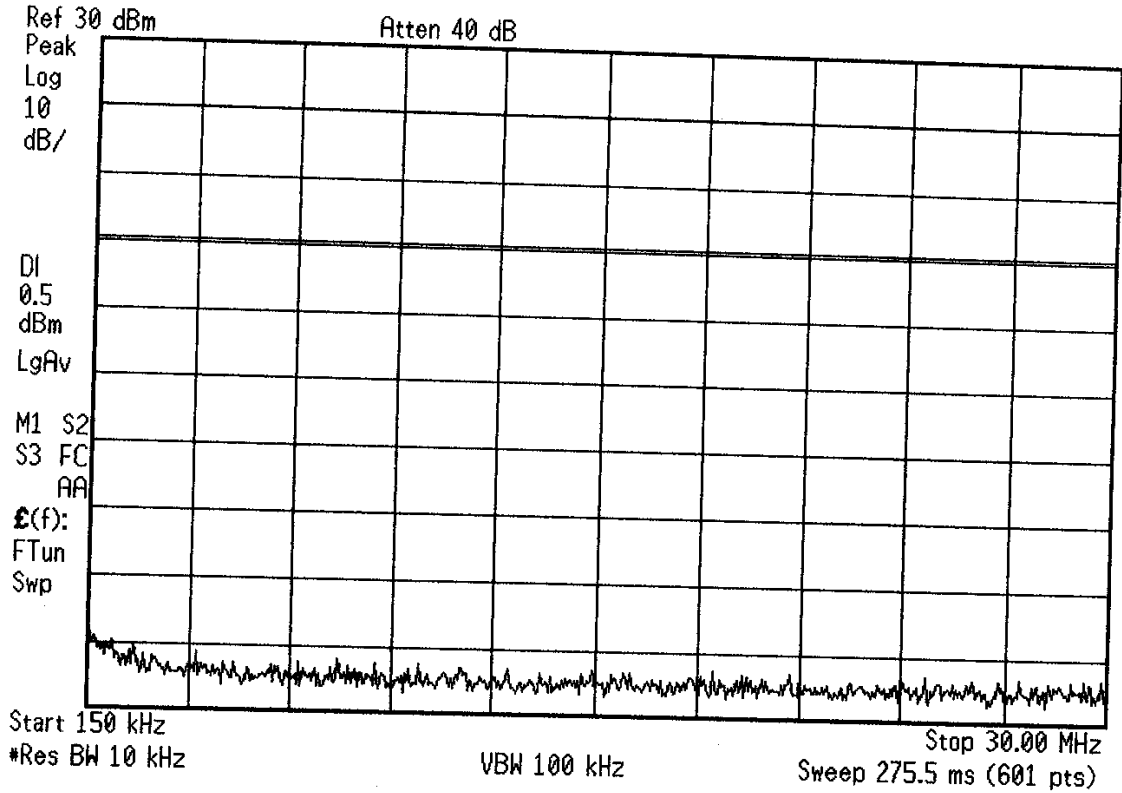


Channel 1



FCC Part 15.247(c) - RF Conducted

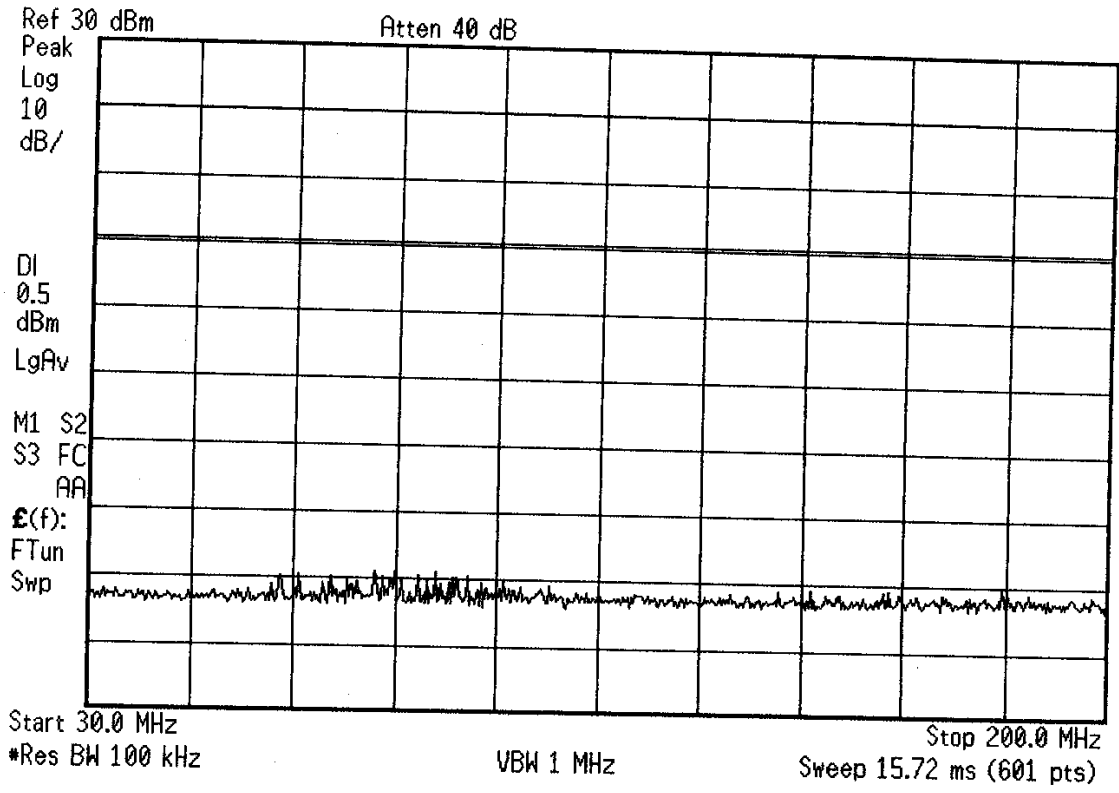
\* Agilent 13:01:22 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

\* Agilent 13:00:42 Feb 8, 2006

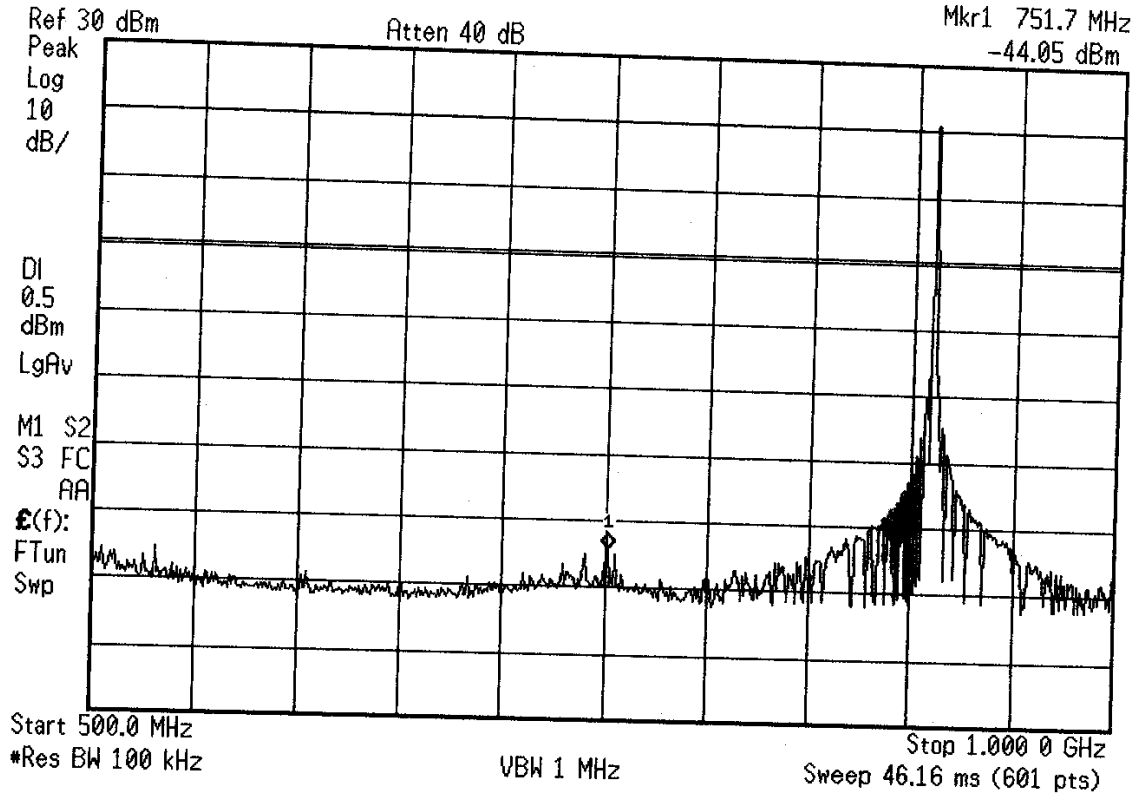


Channel 1



FCC Part 15.247(c) - RF Conducted

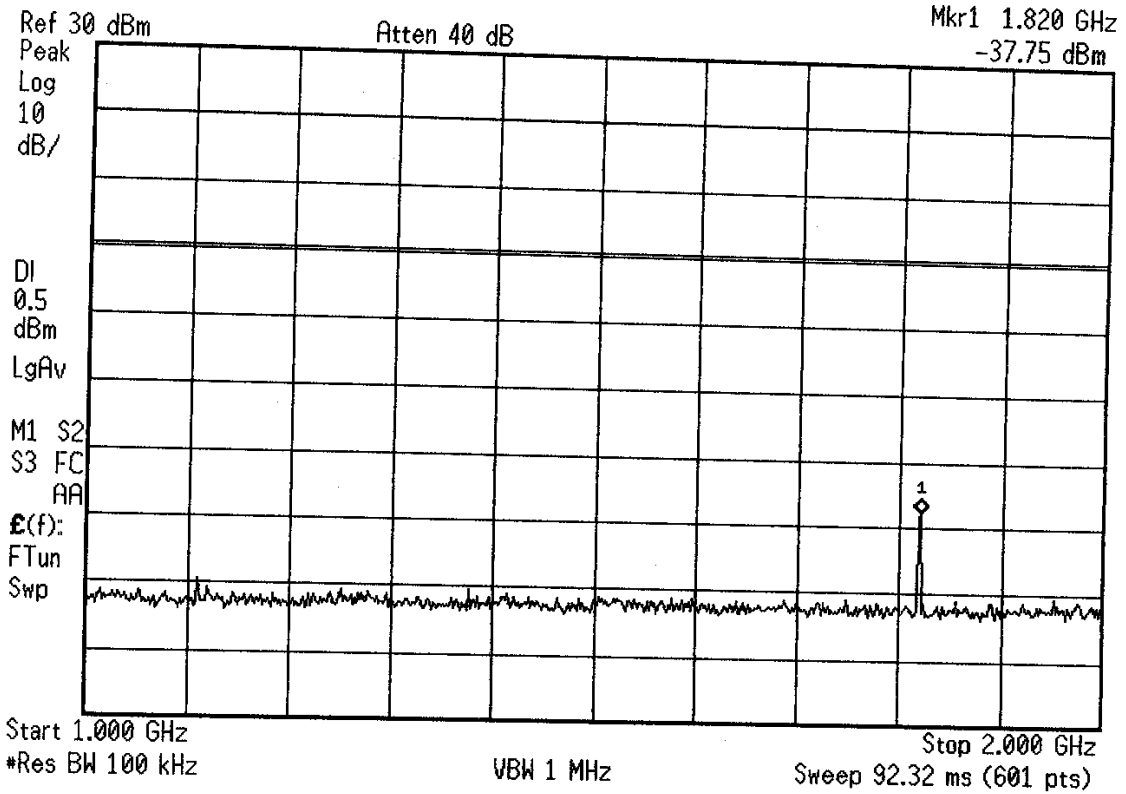
\* Agilent 13:04:54 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

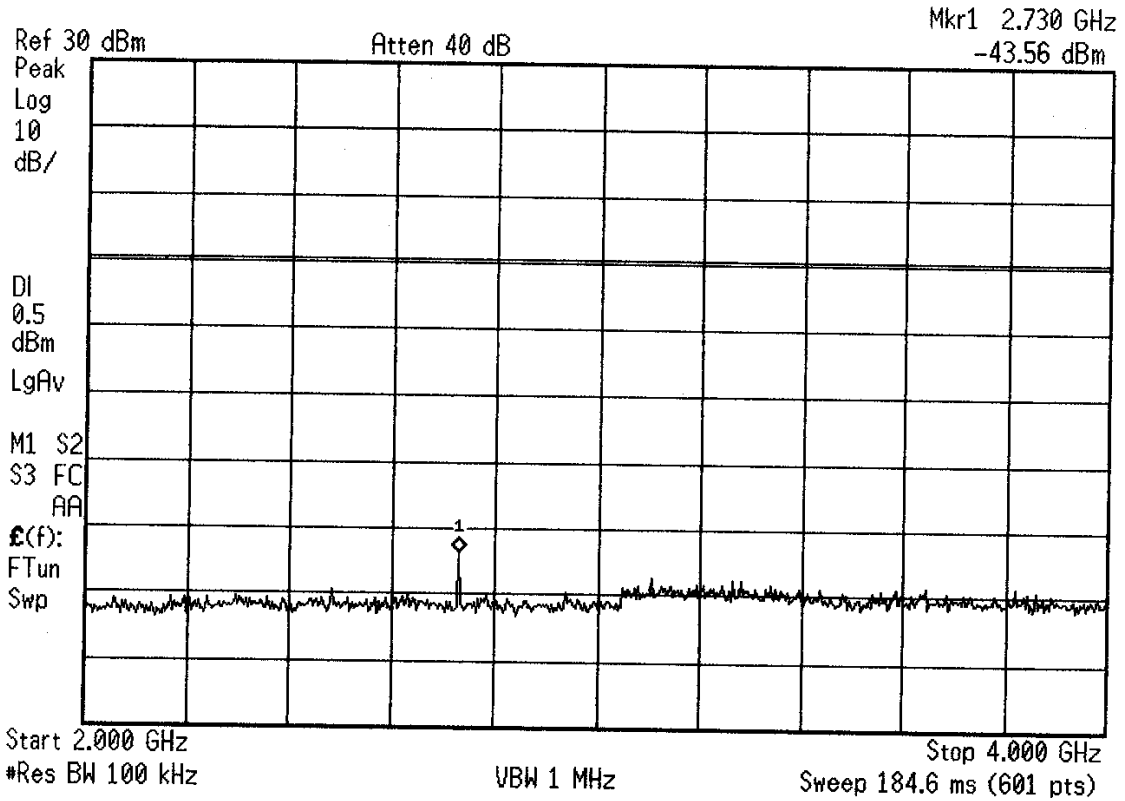
\* Agilent 13:06:44 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

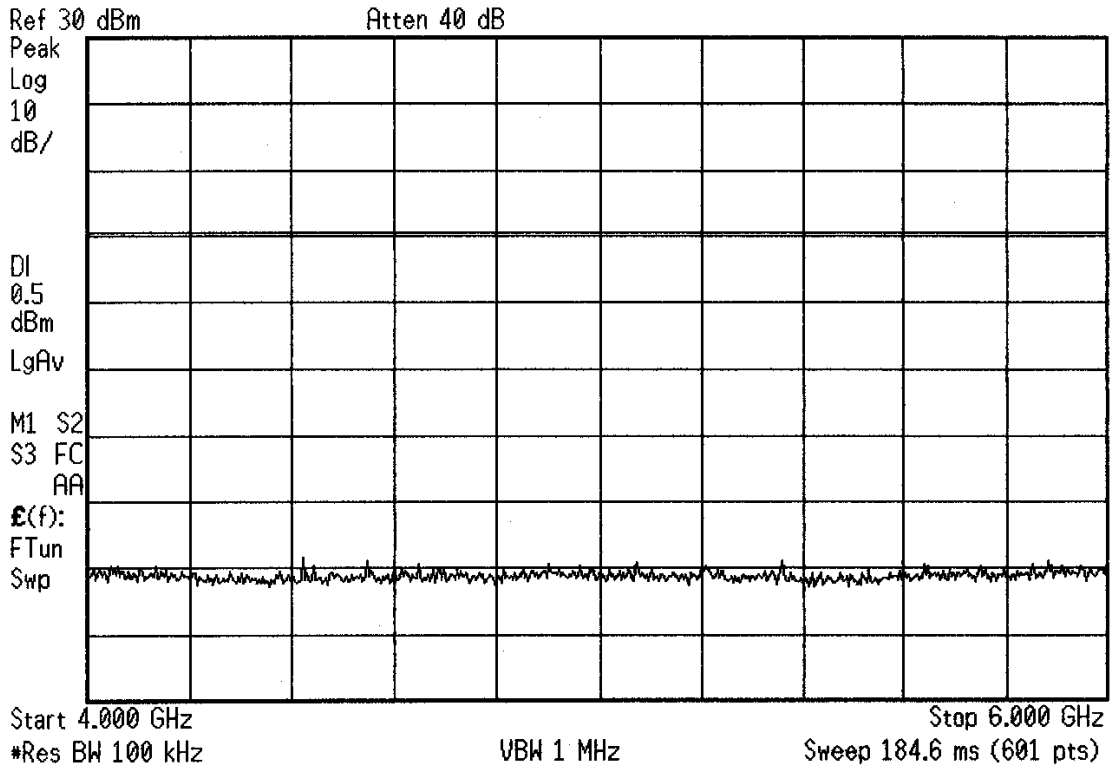
\* Agilent 13:08:48 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

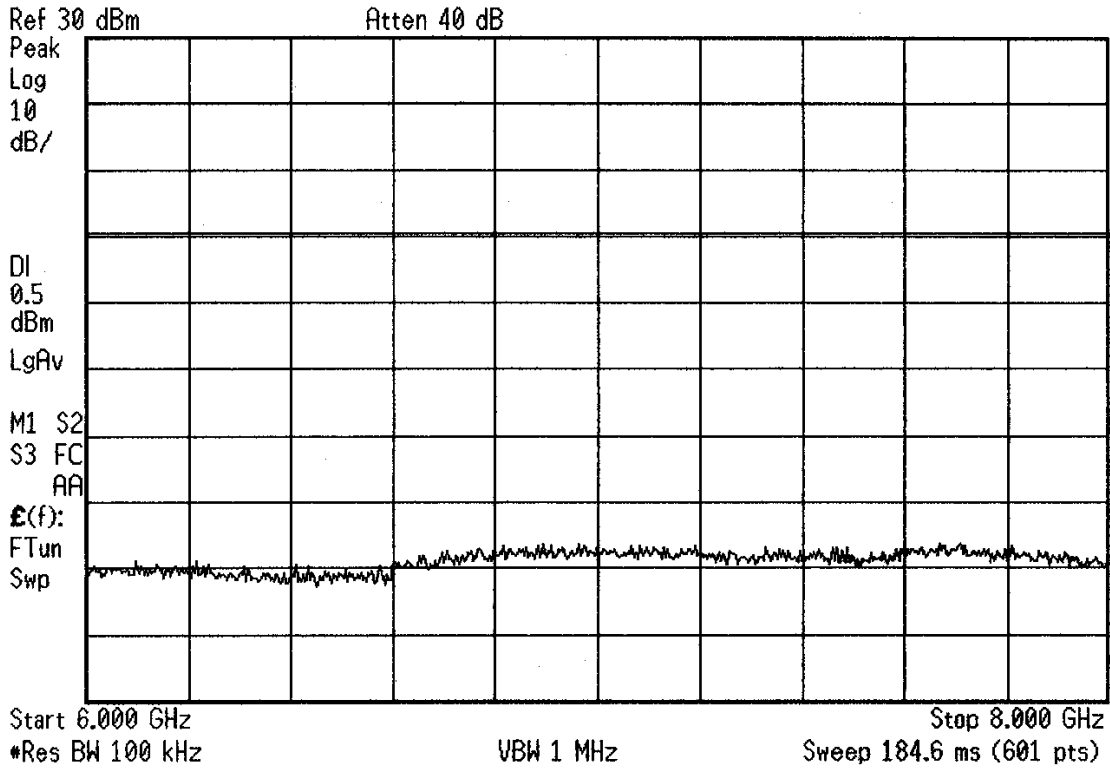
\* Agilent 13:10:06 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

✱ Agilent 13:10:40 Feb 8, 2006

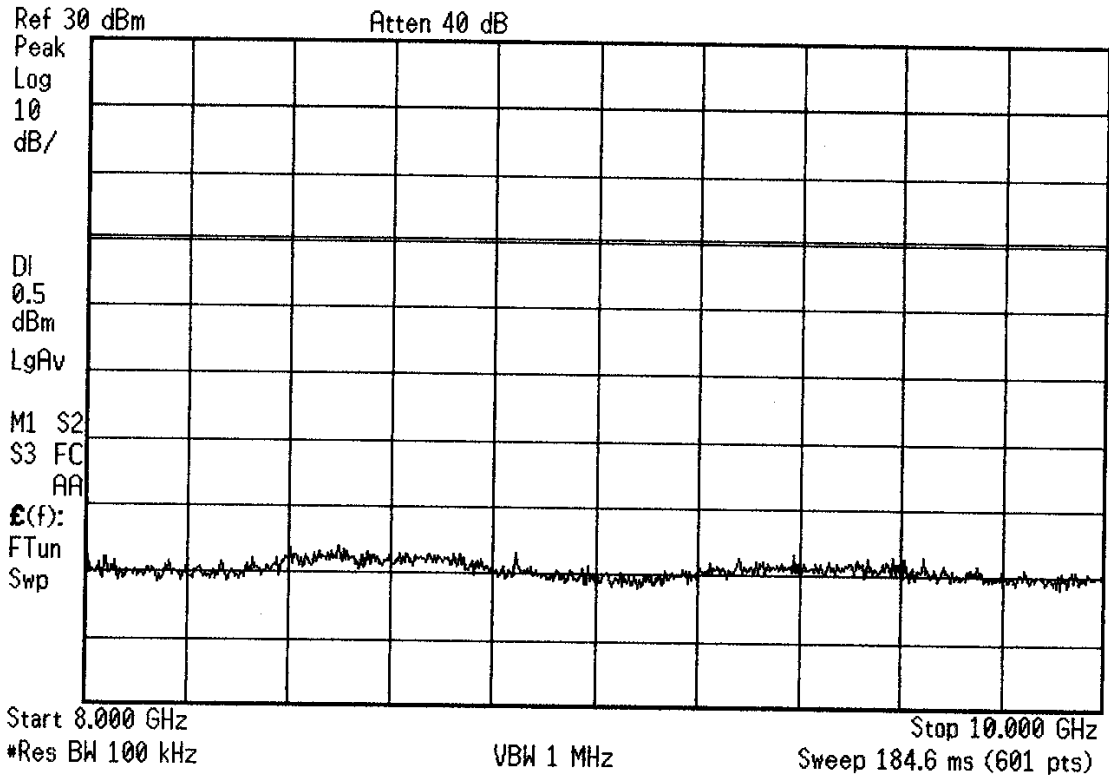


Channel 1



FCC Part 15.247(c) - RF Conducted

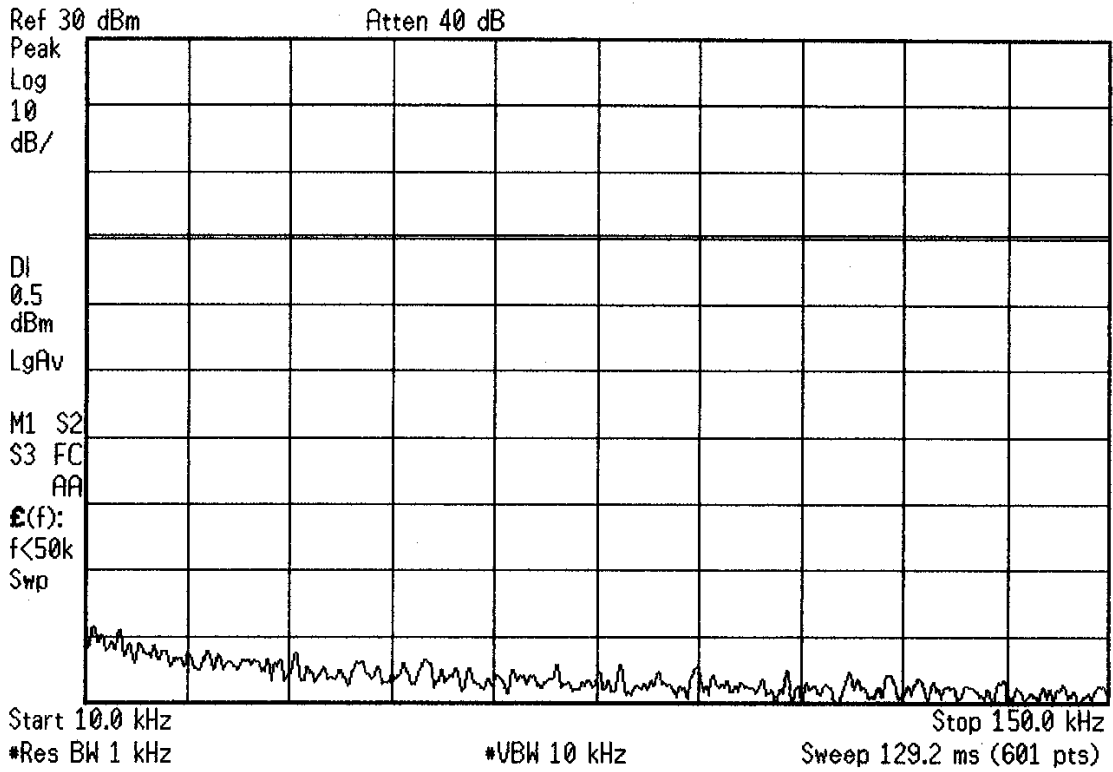
\* Agilent 13:11:47 Feb 8, 2006



Channel 1

FCC Part 15.247(c) - RF Conducted

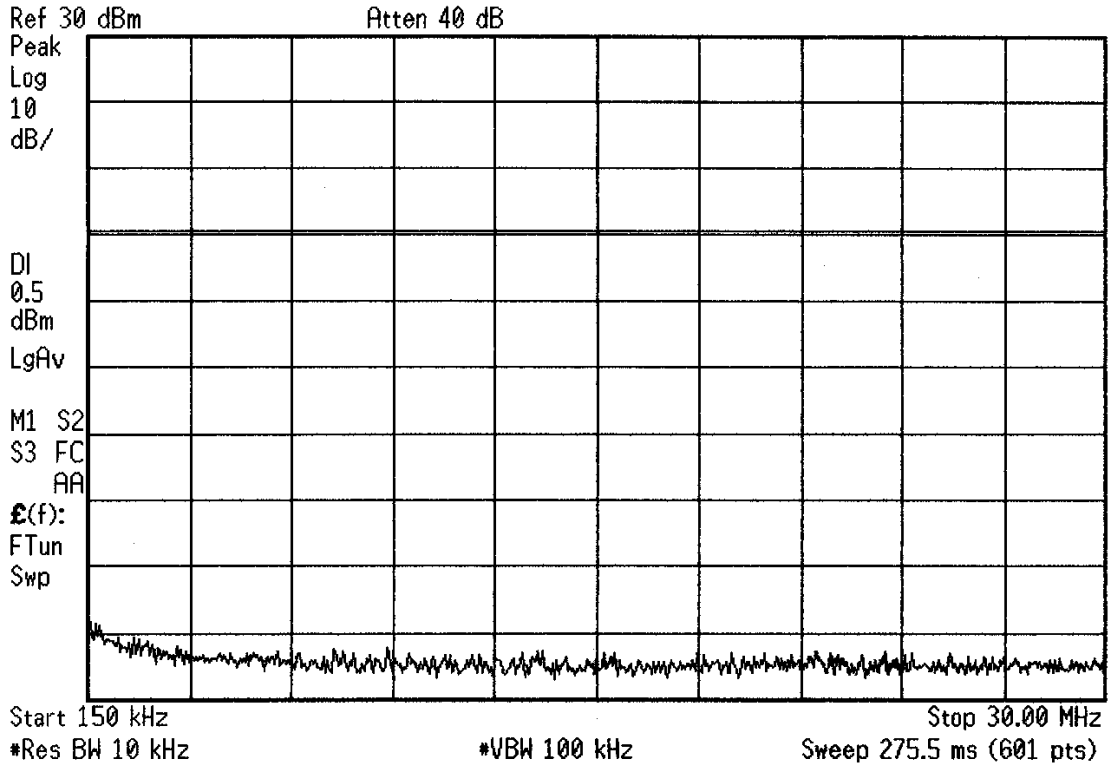
\* Agilent 13:25:47 Feb 8, 2006



Channel 12

FCC Part 15.247(c) - RF Conducted

\* Agilent 13:24:08 Feb 8, 2006



Channel 12









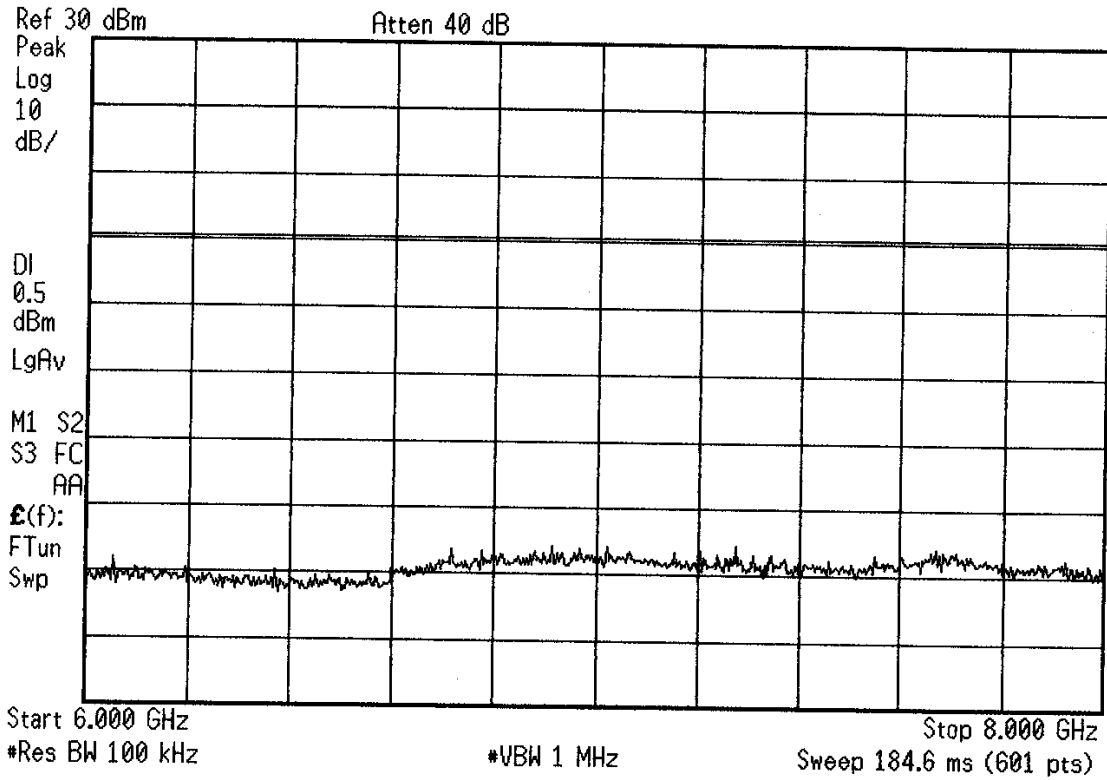






FCC Part 15.247(c) - RF Conducted

\* Agilent 13:15:40 Feb 8, 2006

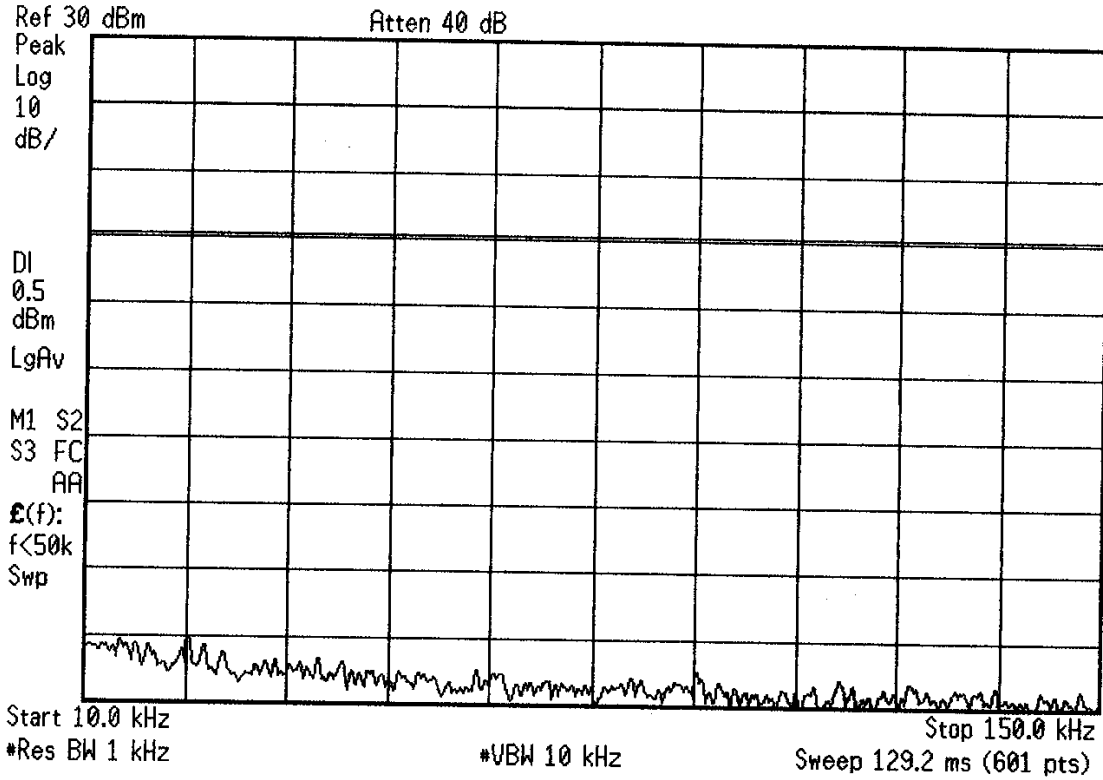


Channel 12



FCC Part 15.247(c) - RF Conducted

\* Agilent 13:29:06 Feb 8, 2006



Channel 25

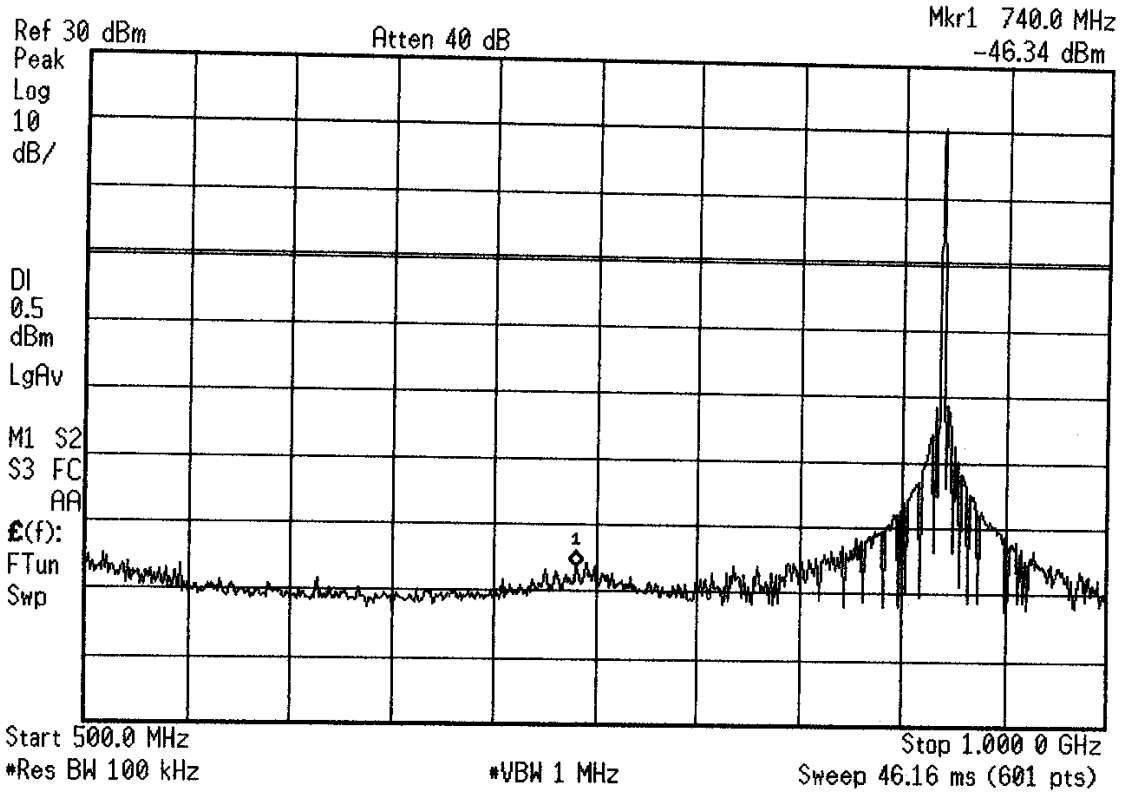






FCC Part 15.247(c) - RF Conducted

\* Agilent 13:36:23 Feb 8, 2006

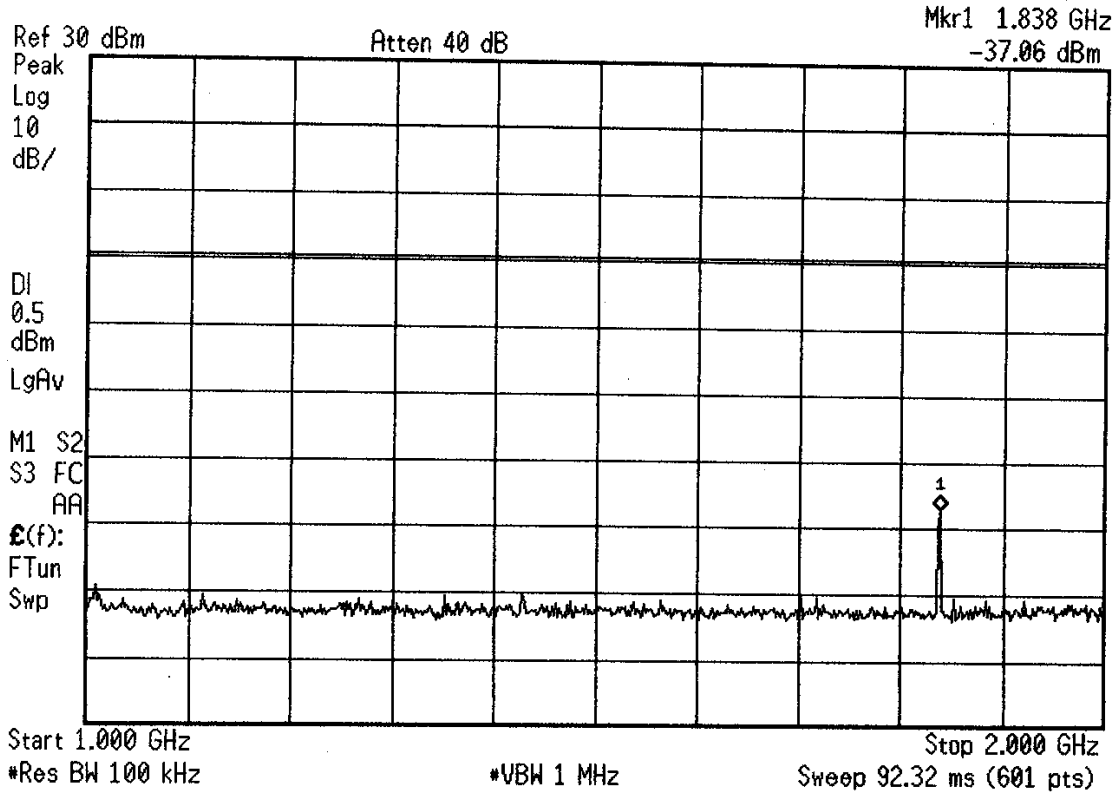


Channel 25



FCC Part 15.247(c) - RF Conducted

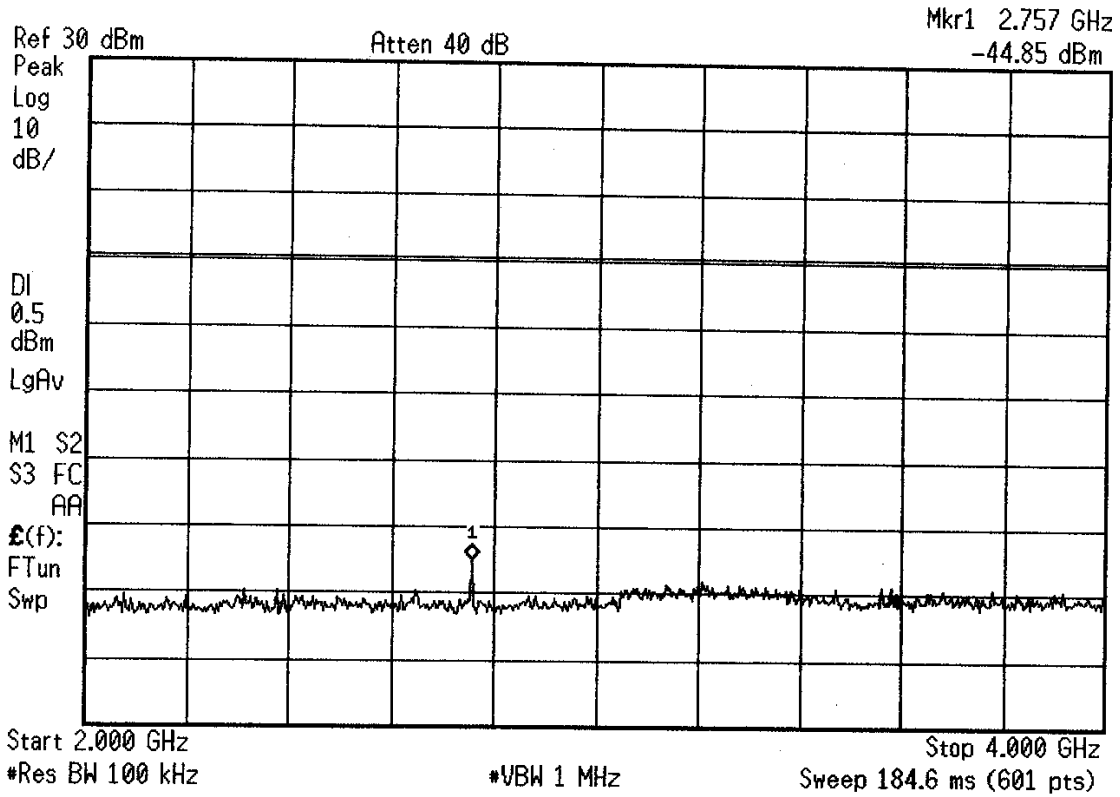
\* Agilent 13:36:49 Feb 8, 2006



Channel 25

FCC Part 15.247(c) - RF Conducted

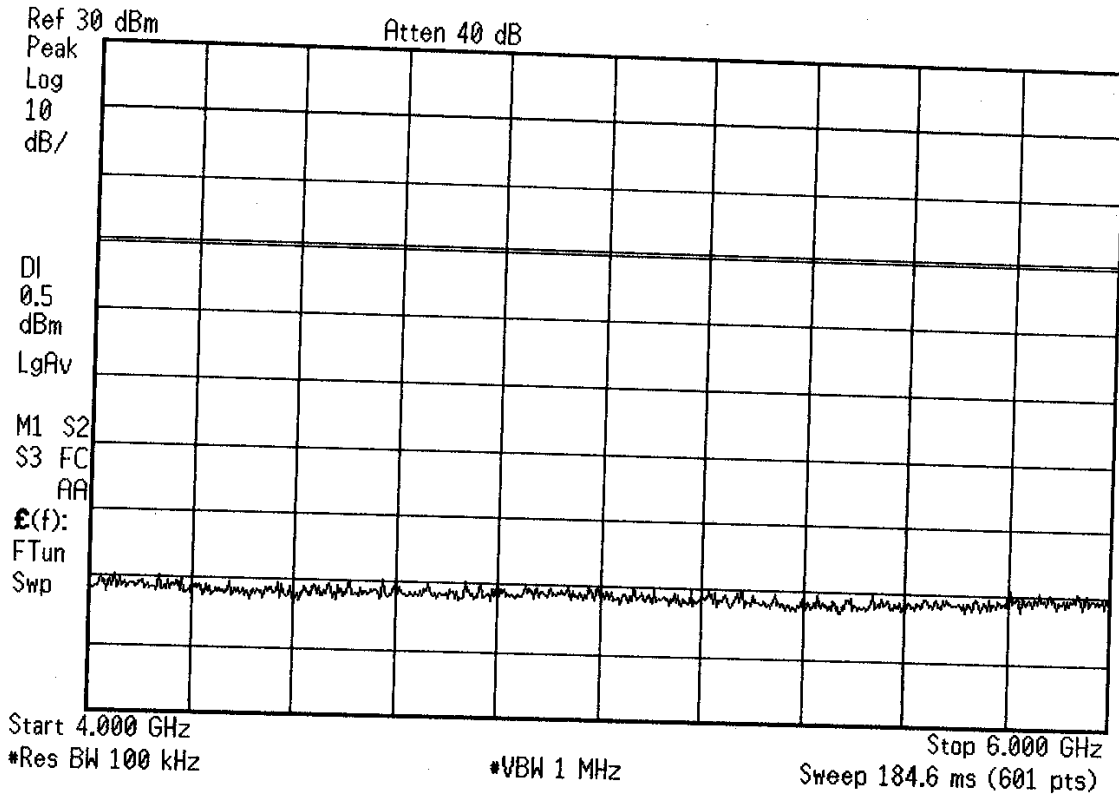
\* Agilent 13:37:27 Feb 8, 2006



Channel 25

FCC Part 15.247(c) - RF Conducted

\* Agilent 13:38:09 Feb 8, 2006

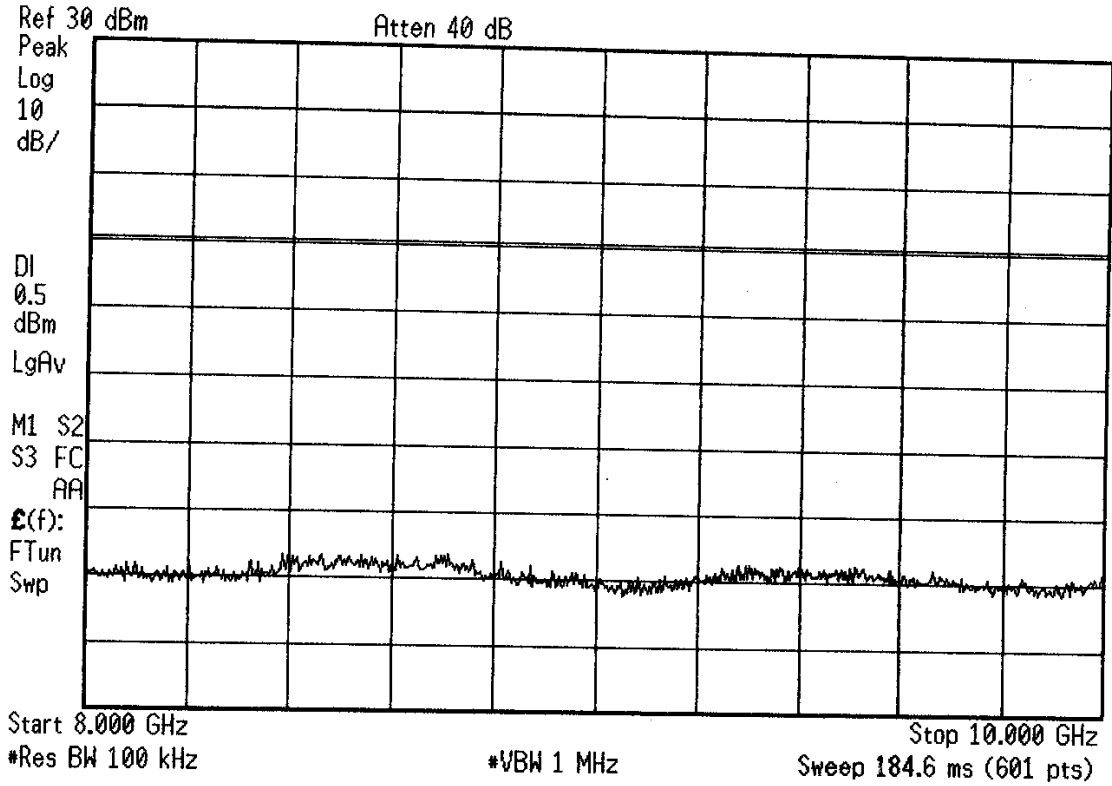


Channel 25



FCC Part 15.247(c) - RF Conducted

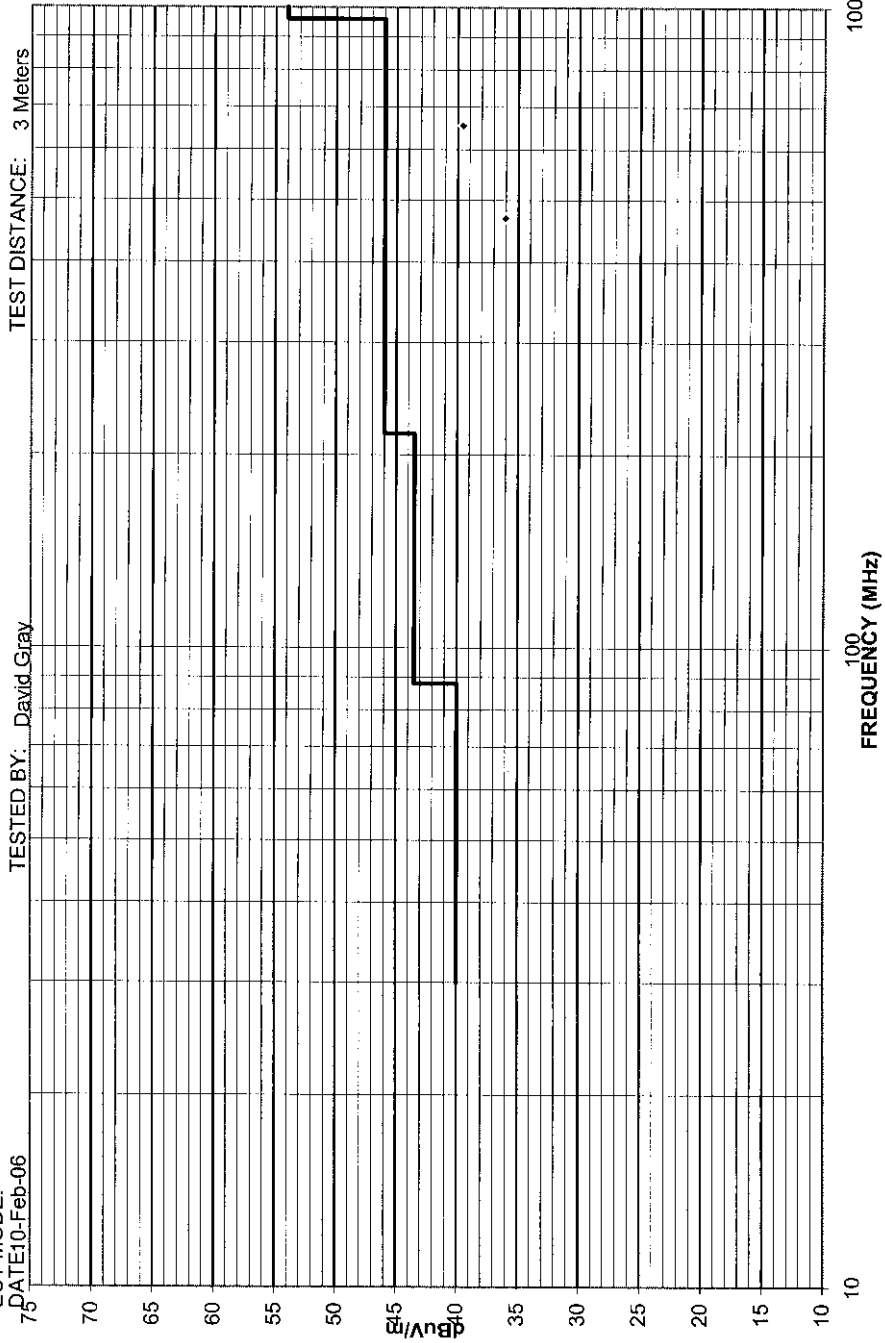
\* Agilent 13:39:22 Feb 8, 2006



Channel 25

SPEC: FCC Part 15 para 15.109(a)

REPORT NO: SC600639  
COMPANY: Directed Electronics Corp.  
EUT: 900MHz Responder HHU  
EUT MODE: transmit  
DATE: 10-Feb-06





REPORT No: SC600639 TESTER: David Gray SPEC: FCC Part 15 para 15.209(a)  
 CUSTOMER: Directed Electronics Corp. TEST DIST: 3 Meters  
 E U T: 900MHz Responder HHU TEST SITE: Roof  
 EUT MODE: transmit BICONICAL: N/A  
 DATE: February 7, 2006 LOG: 243  
 NOTES: OTHER: 453  
 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 + Preamp/loss Gain + Preselector Loss

FREQ (MHz)	VERTICAL (dBuV)		HORIZONTAL (dBuV)		CF (dBm)	MAX LEVEL (dBuV/m)		SPEC LIMIT (dBuV/m)		MARGIN (dB)		EUT Rotation	Antenna Height	Notes
	av	pk	pk	av		pk	av	pk	av	pk	av			
2728.63	57.5	55	50.8	47.8	-4.28249	53.22	50.7	74	54	-20.8	-3.28	120	1.2	
2743.35	56.9	54.2	51.1	47.3	-4.19123	52.71	50	74	54	-21.3	-3.99	120	1.2	
2756.63	55.6	53.1	52.4	49	-4.10889	51.49	49	74	54	-22.5	-5.01	120	1.2	
3638.49	44	34.9	44	34.9	-0.60611	43.39	34.3	74	54	-30.6	-19.7			noise floor
3657.8	40.7	34.4	40.7	34.4	-0.57908	40.12	33.8	74	54	-33.9	-20.2			
3675.5	43.2	34.6	43.2	34.6	-0.5543	42.65	34	74	54	-31.4	-20			
4548.11	43	35	44	35	-1.57869	42.42	33.4	74	54	-31.6	-20.6			noise floor
4572.2	42.1	34.8	42.1	34.8	-1.46788	40.63	33.3	74	54	-33.4	-20.7			
4594.4	42.9	34.9	42.9	34.9	-1.36576	41.53	33.5	74	54	-32.5	-20.5			
5457.74	42.3	34	42.3	34	3.42954	46.73	37.4	74	54	-28.3	-16.6			noise floor
5486.7	40.4	33.8	40.4	33.8	3.61488	44.01	37.4	74	54	-30	-16.6			
5513.2	41.9	34	41.9	34	3.75544	45.66	37.8	74	54	-28.3	-16.2			
7276.98	41.8	31.6	41.8	31.6	7.63238	49.43	39.2	74	54	-24.6	-14.8			noise floor
7315.6	39.3	31.1	39.3	31.1	7.67872	46.98	38.8	74	54	-27	-15.2			
7351	39.4	31	39.4	31	7.7212	47.12	38.7	74	54	-26.9	-15.3			
8186.6	42.4	32.7	42.4	32.7	8.54928	50.95	41.2	74	54	-23.1	-12.8			noise floor
8230	41.2	32.7	41.2	32.7	8.584	49.78	41.3	74	54	-24.2	-12.7			
8269.9	43.9	32.5	43.9	32.5	8.61592	52.52	41.1	74	54	-21.5	-12.9			
9096.2	41.5	32.7	41.5	32.7	9.8076	51.31	42.5	74	54	-22.7	-11.5			noise floor
9144.5	41.8	32.7	41.8	32.7	9.711	51.51	42.4	74	54	-22.5	-11.6			
9188.8	42.9	32.6	42.9	32.6	9.6224	52.52	42.2	74	54	-21.5	-11.8			



**4.0 ATTESTATION STATEMENT**

**GENERAL REMARKS:**

**SUMMARY:**

All tests were performed per: CFR 47, Part(s) 15.247(a), 15.247(b), 15.247(c), 15.109(a), and 15.209(a)

■ - **Performed**

The Equipment Under Test

■ - **Fulfills** the requirements of: CFR 47, Part(s) 15.247(a), 15.247(b), 15.247(c), 15.109(a), and 15.209(a)

Testing Start Date: 07 February 2006

Testing End Date: 10 February 2006

**- TÜV AMERICA, INC. -**

Reviewing Engineer:



Chuck Rickard  
(EMC Engineer)

Test Engineer:



David Gray  
(EMC Engineer In Charge)