MEASUREMENT AND TECHNICAL REPORT

DIRECTED ELECTRONICS INCORPORATED
1 Viper Way
Vista, CA 92083

DATE: 16 February 2006

This Report Concerns:	Original Grant: X	Class II Change:
Equipment Type:	Responder SST IVU, Model 6701T	
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: **Defer until:**	No: X
Company Name **agrees to notify the Commission by:** **of the intended date of announcement of the product so that the grant can be issued on that date.**	N/A	
Transition Rules Request per 15.37?	Yes:	No: X*

(*) FCC Part 15, Paragraph(s) 15.247(a), 15.247(b), 15.247(c), 15.109(a), and 15.209(a)

Report Prepared by:

TÜV AMERICA, INC
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 678 1400
Fax: 858 546 0364

TÜV AMERICA

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TÜV AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 678 1400 FAX 858 546 0364

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 IVU

Model No.: 6701T Serial No.: --

Product Options: --

Configurations to be tested: 1

EUT Specifications and Requirements

Length: 1.50" Width: 8.00" Height: 0.472" Weight: N/A

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: 5V (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

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

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

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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 #
Windshield mount Transceiver module	6701T	--	EZSDEI6701

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*
16MHz	909.623MHz to 918.878MHz	--	Transmitter RF carrier
8MHz	--	--	MCU clock

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.

--

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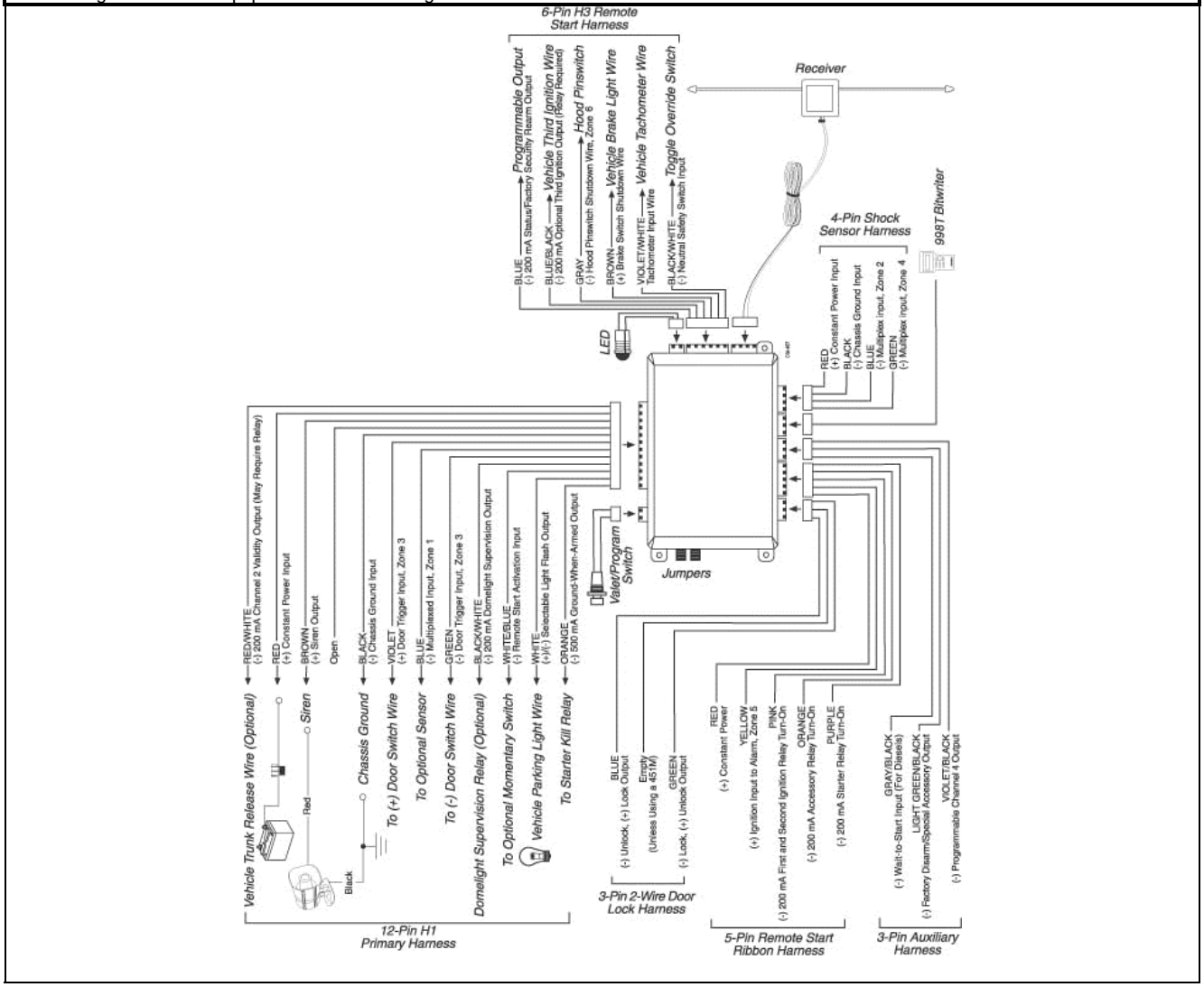
System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



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

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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)	--	266 kHz	--	Pass
Channel Separation	15.247(a)(1)	--	390 kHz	--	Pass
Time of Occupancy	15.247(a)(1)(i)	--	144.78 mS	--	Pass
Number of Hopping Channels	15.247(a)(1)(i)	--	25 channels	--	Pass
Peak Output Power	15.247(b)(1)	181.84 mW	184.37 mW	185.69 mW	Pass
Bandedge	15.247(c)	No emissions detected	No emissions detected	No emissions detected	Pass
RF Conducted Emissions	15.247(c)	No emissions detected	No emissions detected	No emissions detected	Pass
Radiated Spurious Emissions – Restricted Bands (1GHz to 25GHz)	15.247(c)/ 15.209(a)	--	1.97 @ 2756.64 MHz	--	Pass
Receiver Spurious Emissions	15.109(a)	--	No emissions detected	--	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
RECEIVER 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 15.209(a), 15.247(c) and RSS-Gen 7.2.3.2
RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan

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
E4440A	6814	Spectrum Analyzer	Hewlett Packard	MY42510441	02/06
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
AMF-5D-010180-35-10P	719	Preamplifier	Miteq	549460	Verified
E4446A	6823	Spectrum Analyzer	Agilent	US44300486	04/05
CBL6111	6527	Bilog Antenna	Chase Electronics	1013	Verified

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

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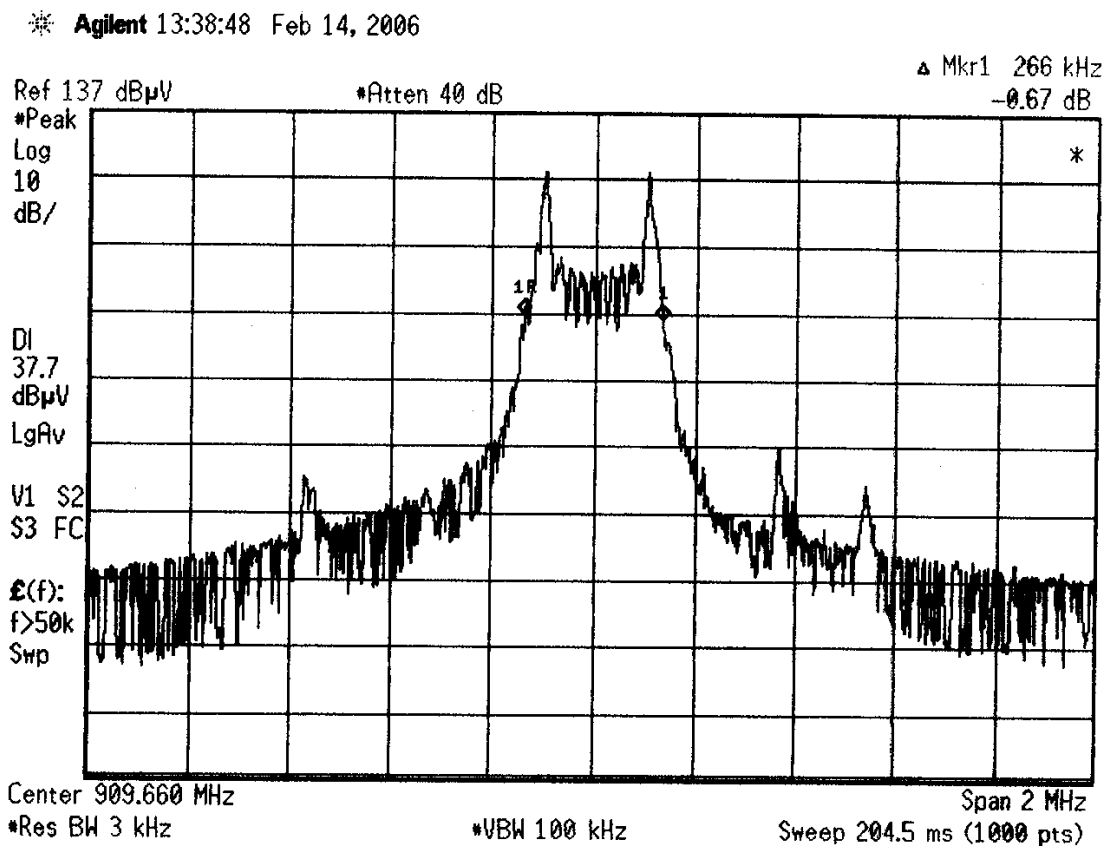
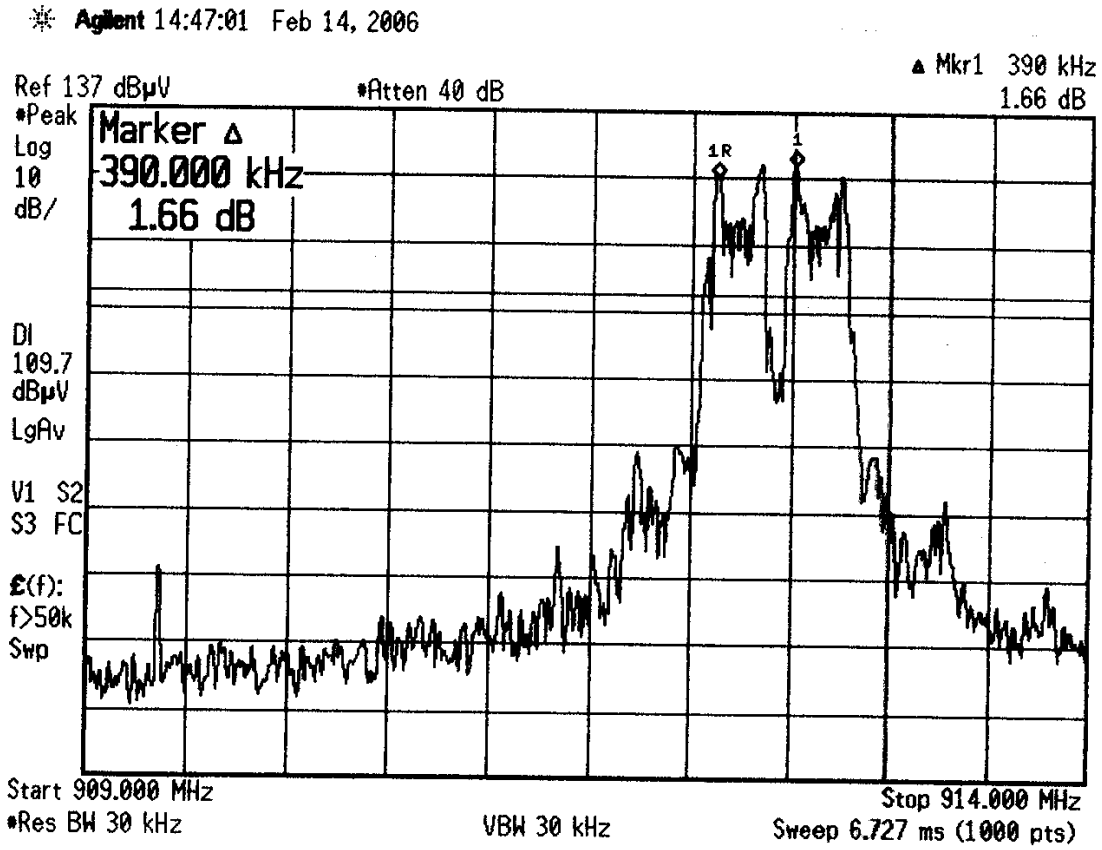
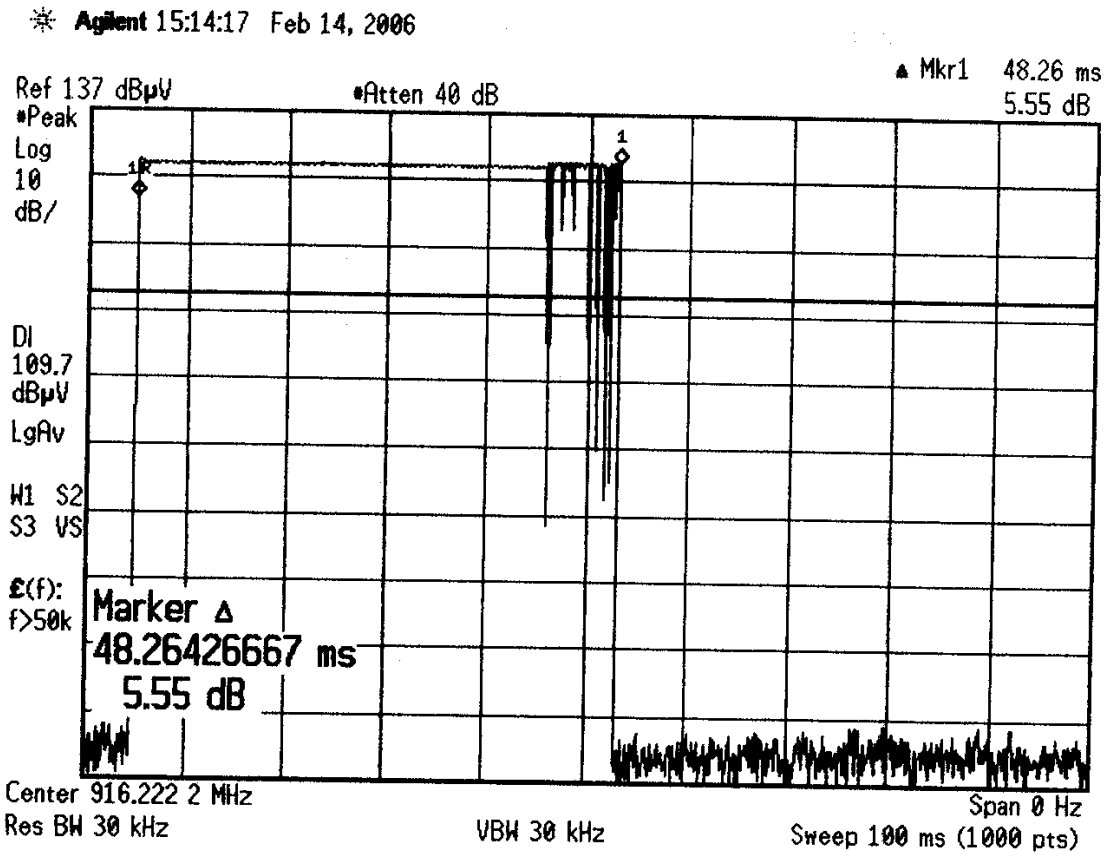
BANDWIDTH: FCC Part 15.247(a)(1)(i)



CHANNEL SEPARATION: FCC 15.247(a)(1)



TIME OF OCCUPANCY: FCC Part 15.247(a)(1)(i)



48.26ms x 3 = 144.78ms

(for 10 sec)

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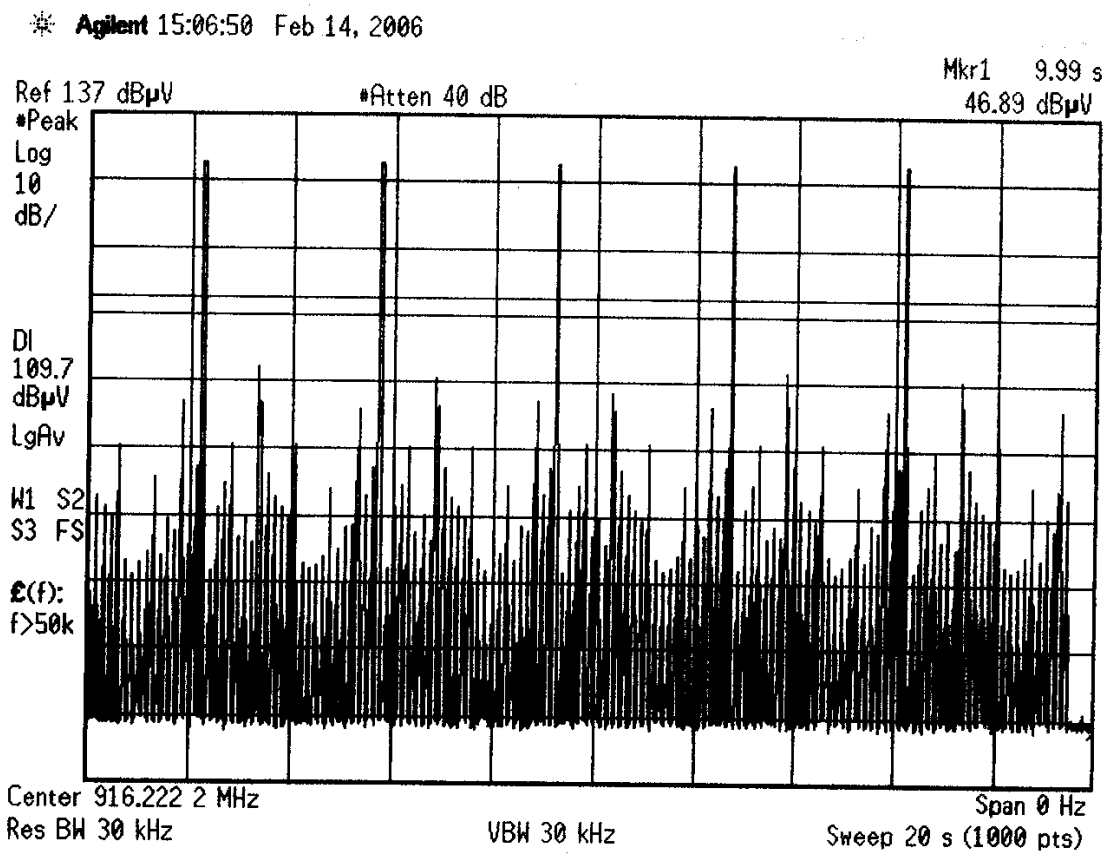
TIME OF OCCUPANCY: FCC Part 15.247(a)(1)(i)



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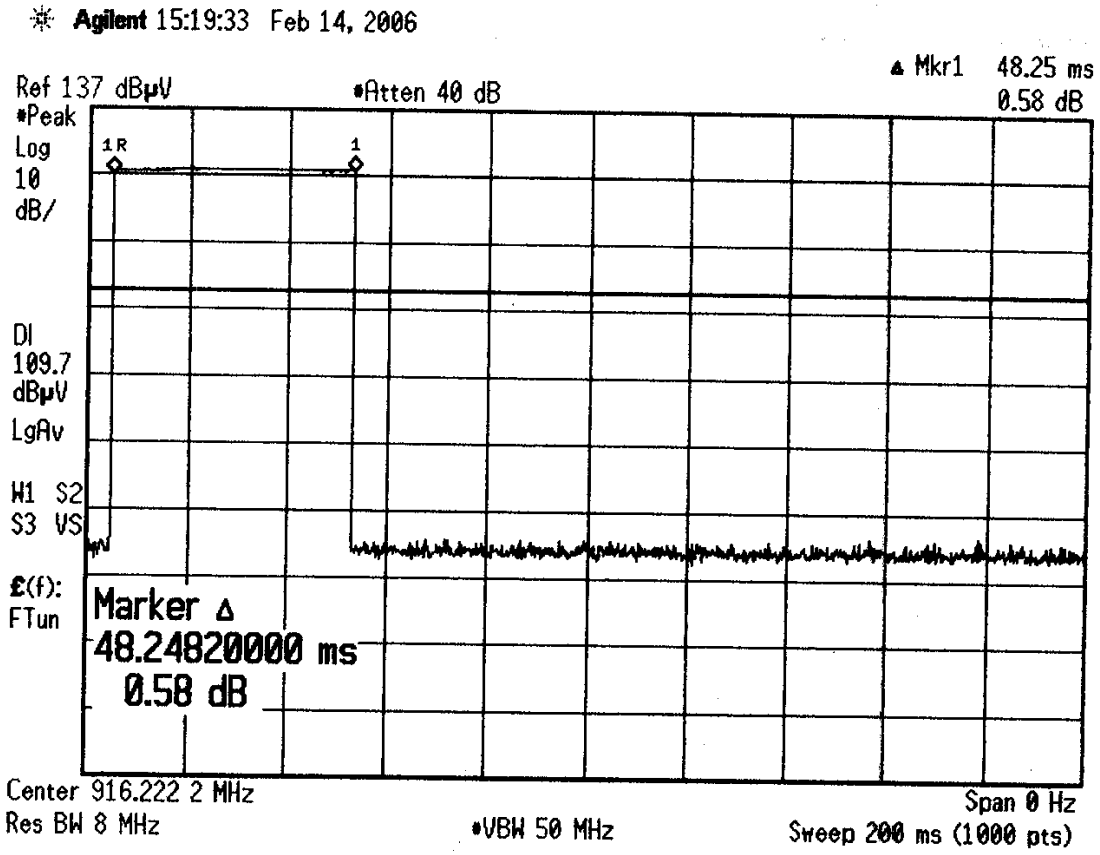
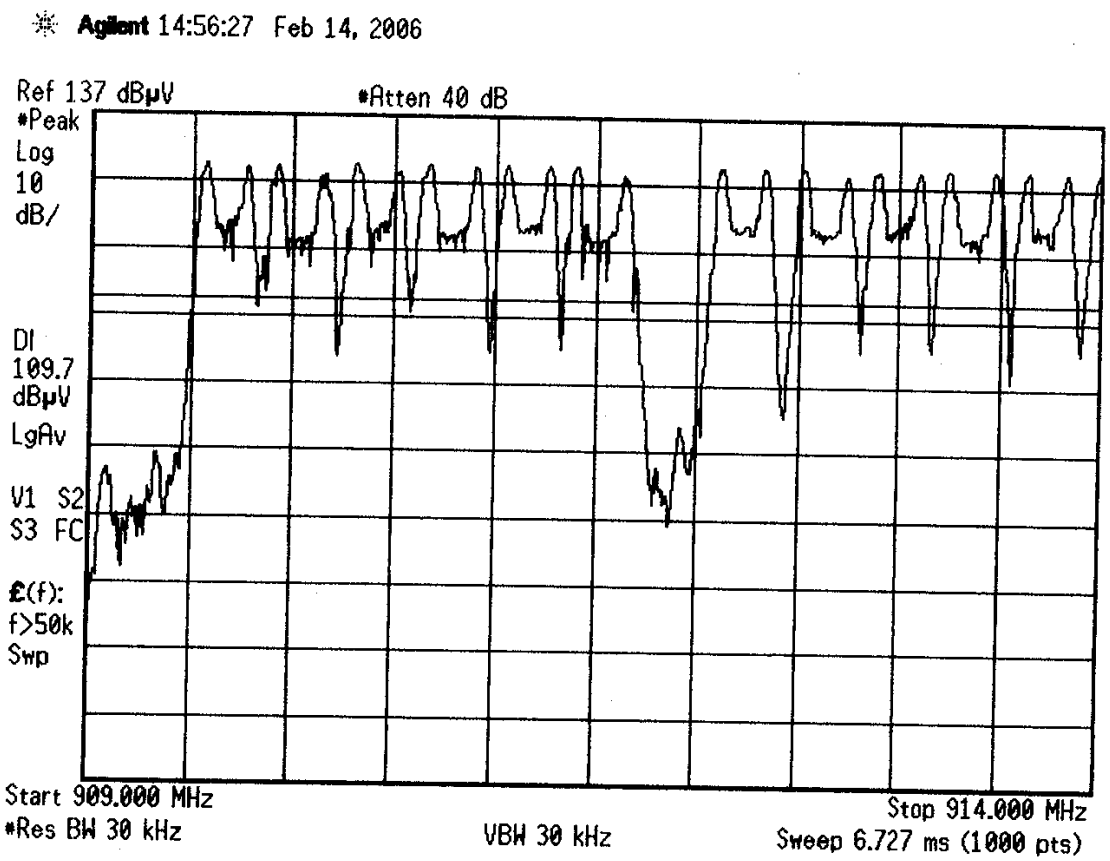
DUTY CYCLE CORRECTION - Information Only



NUMBER OF HOPPING CHANNELS: FCC Part 15.247(a)(1)(i)



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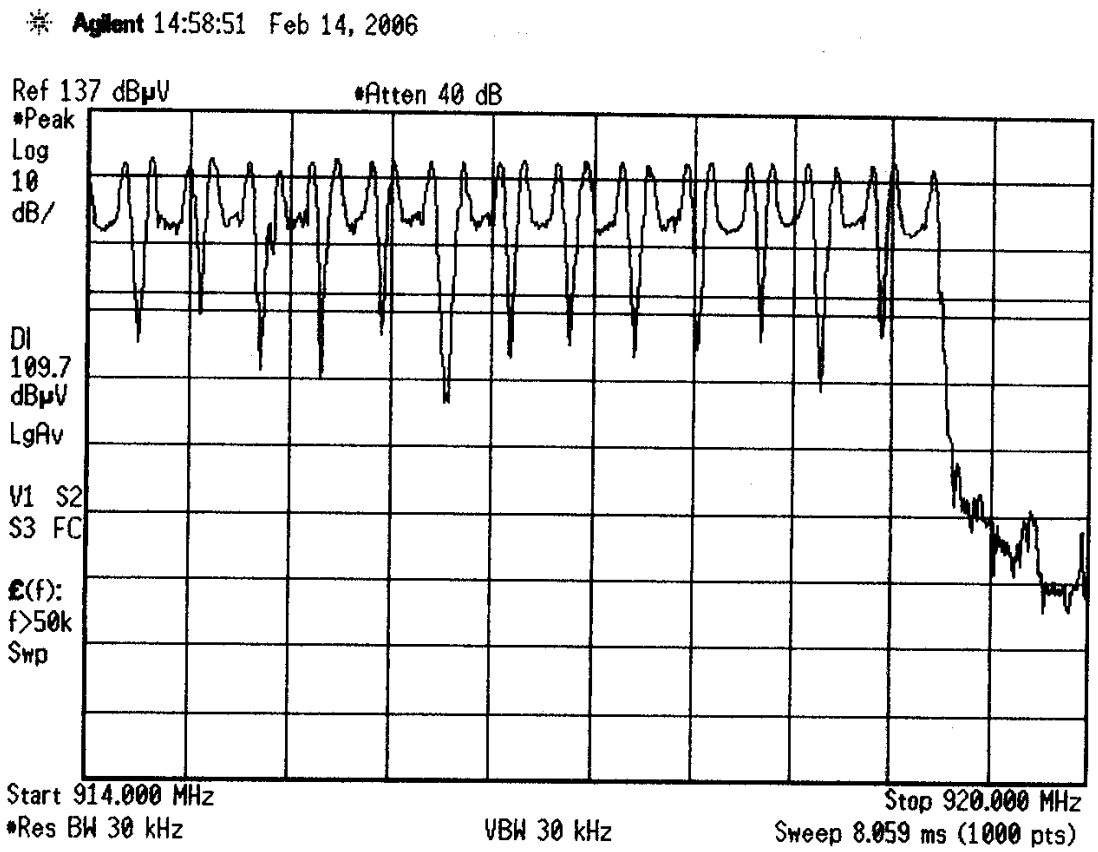
NUMBER OF HOPPING CHANNELS: FCC Part 15.247(a)(1)(i)



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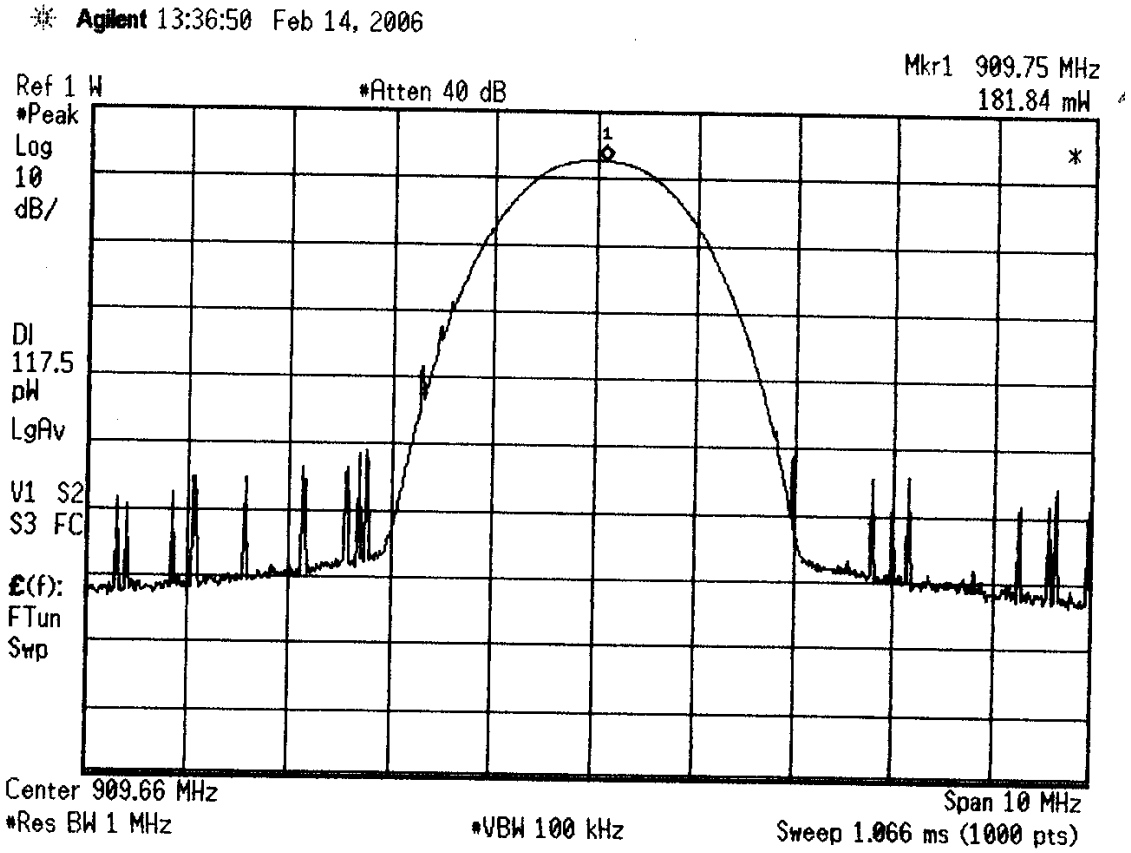
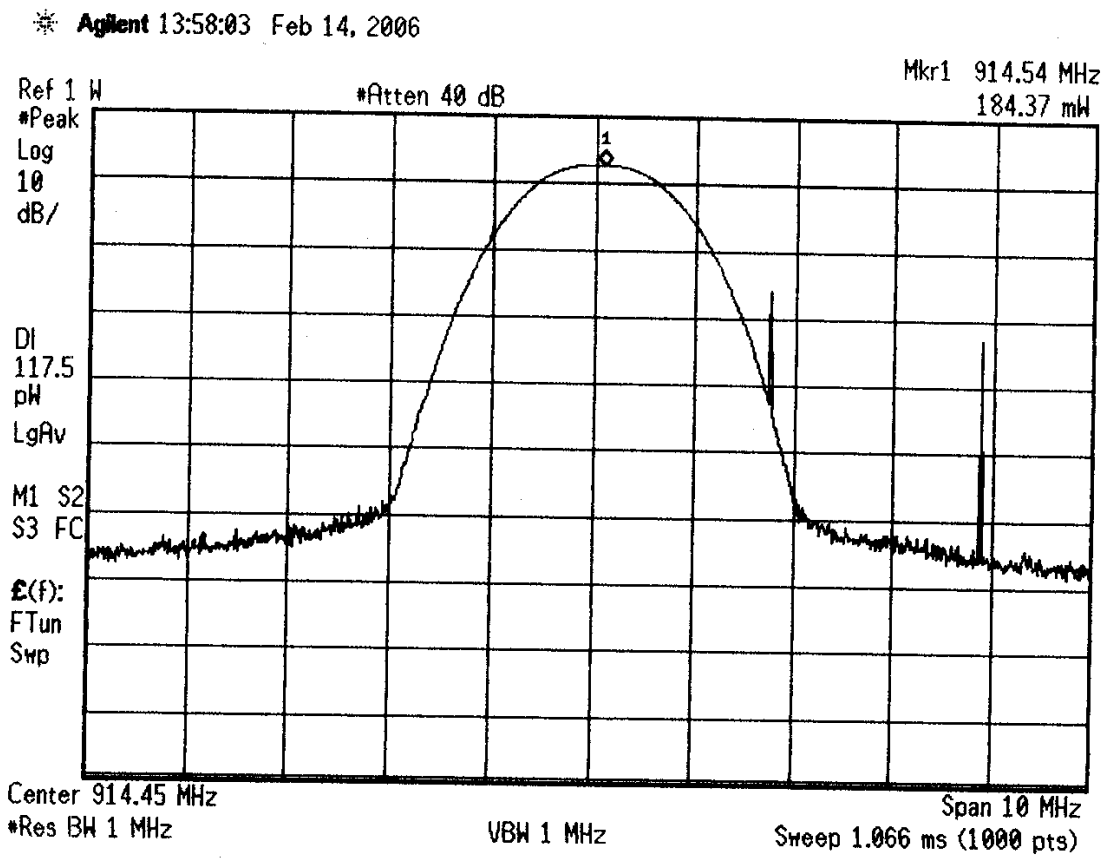
PEAK OUTPUT POWER: FCC Part 15.247(b)(1)

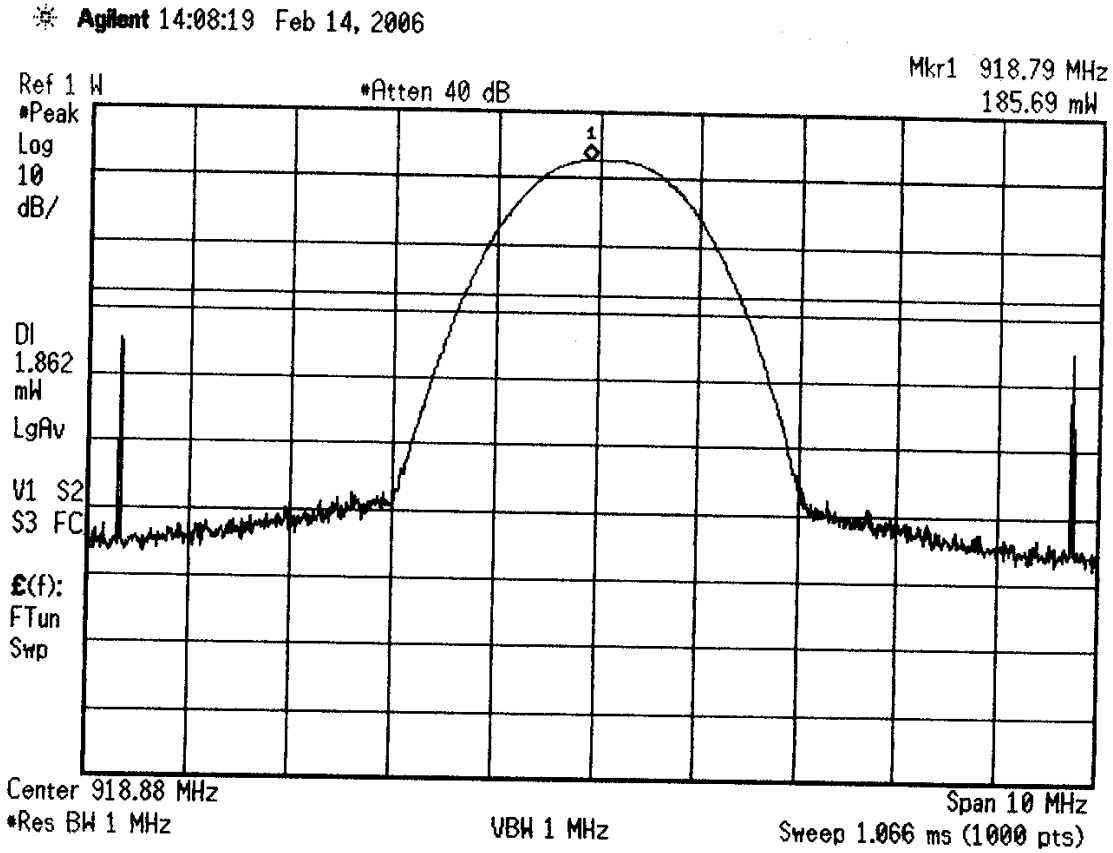


0.1818 W

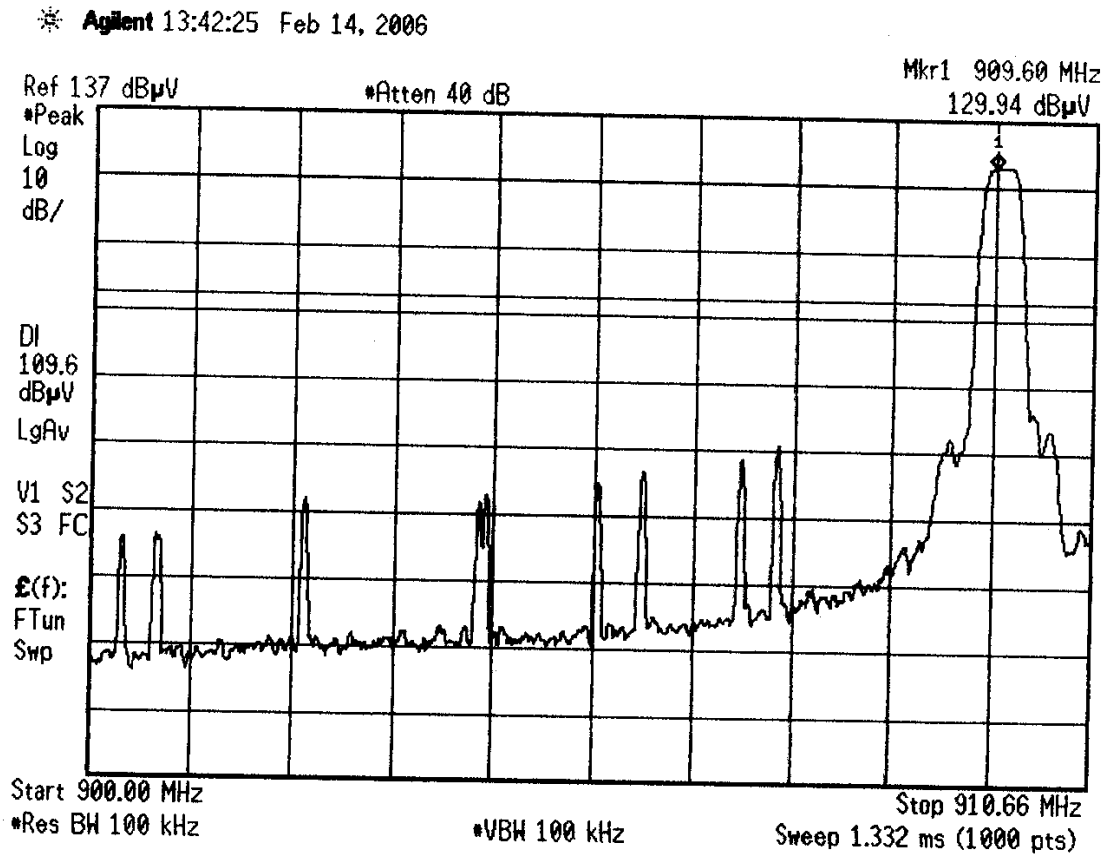
PEAK OUTPUT POWER: FCC Part 15.247(b)(1)



PEAK OUTPUT POWER: FCC Part 15.247(b)(1)



BANDEDGE: FCC Part 15.247(c) Low



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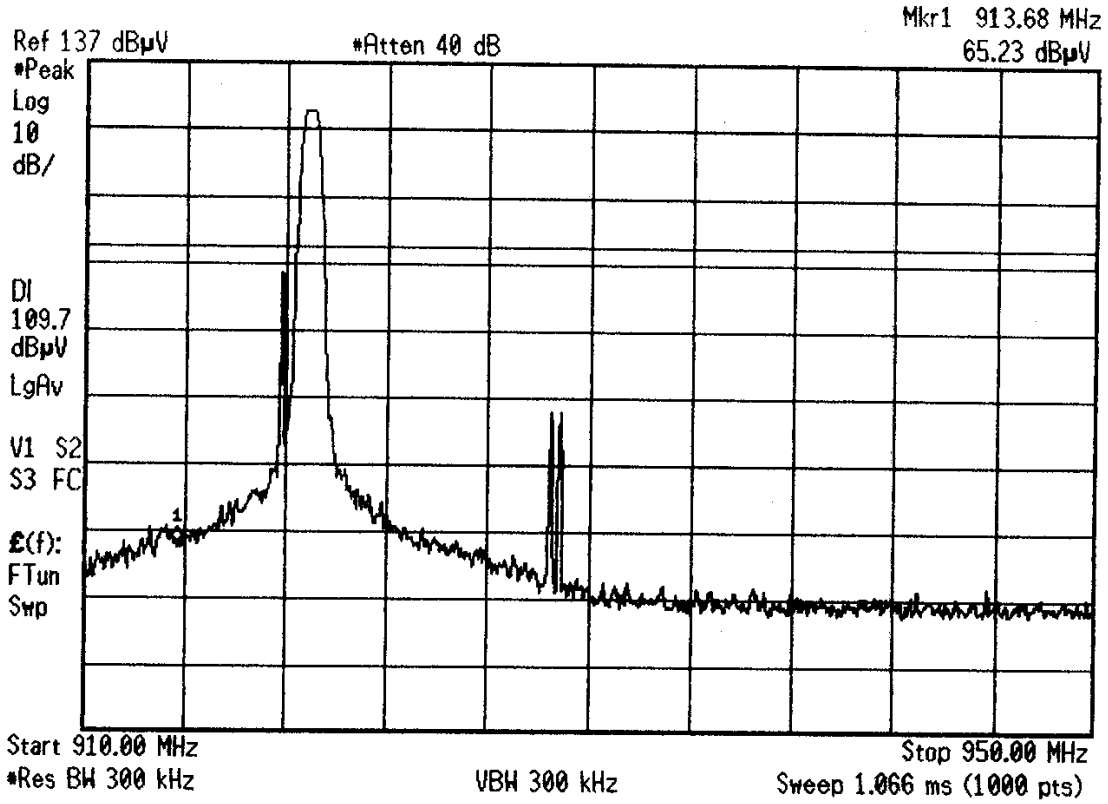
BANDEDGE: FCC Part 15.247(c) High



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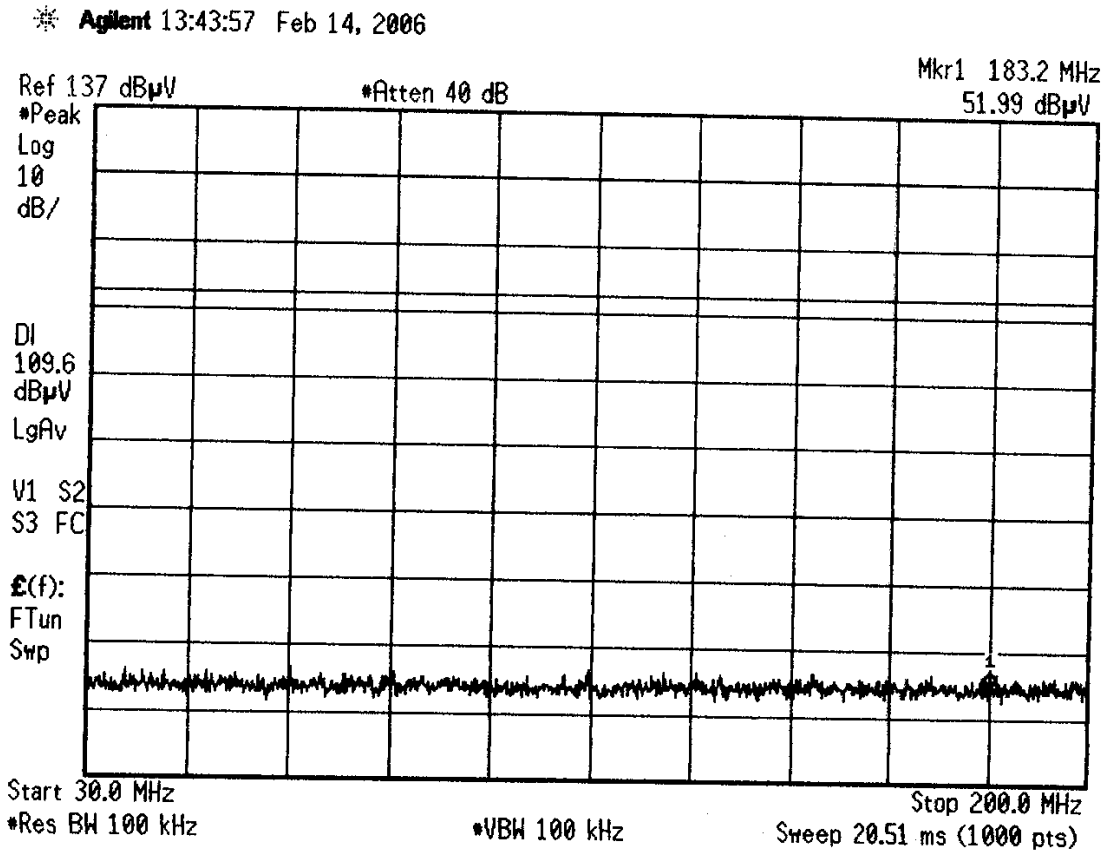
RF CONDUCTED EMISSIONS: FCC Part 15.247(c)



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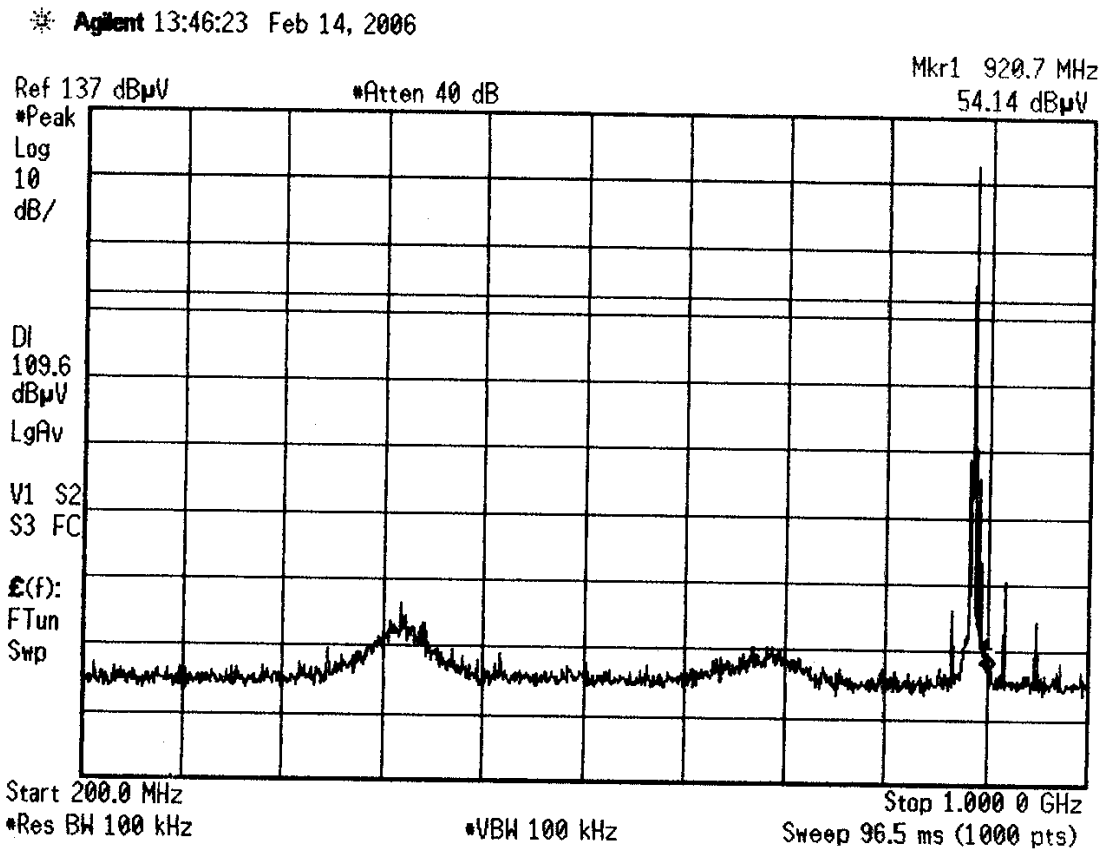

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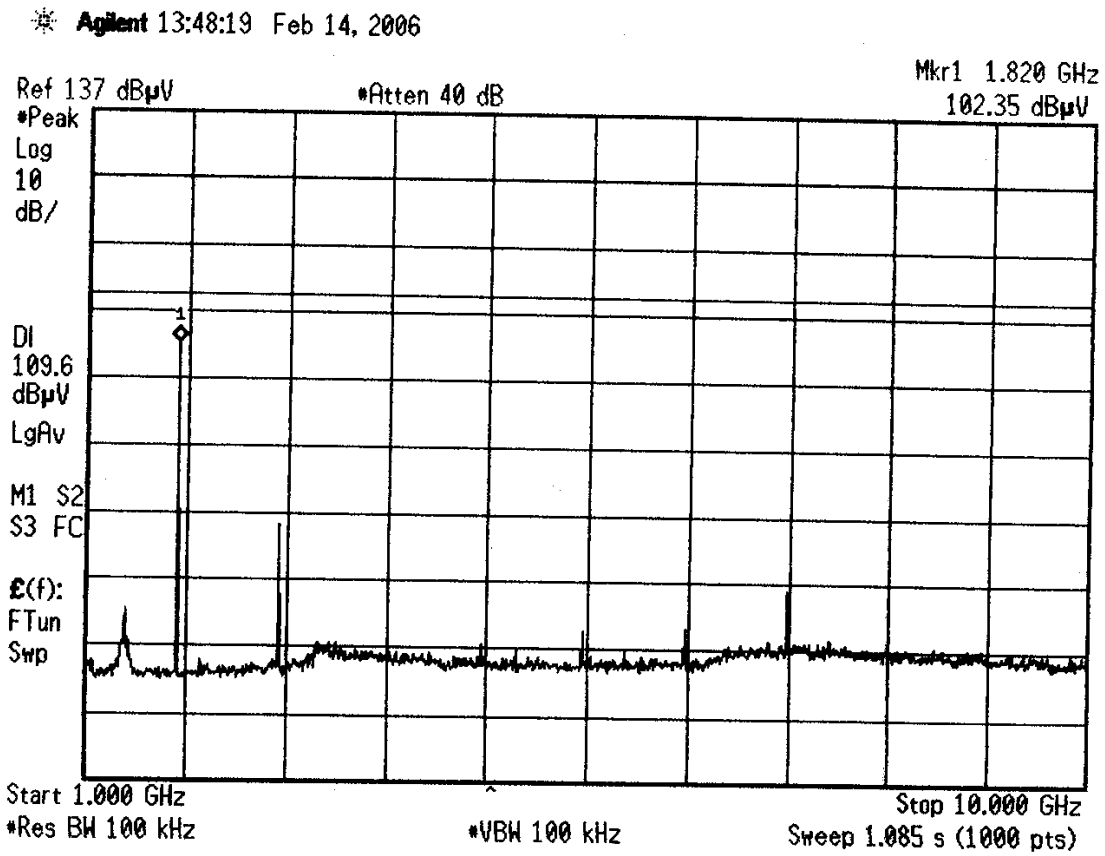

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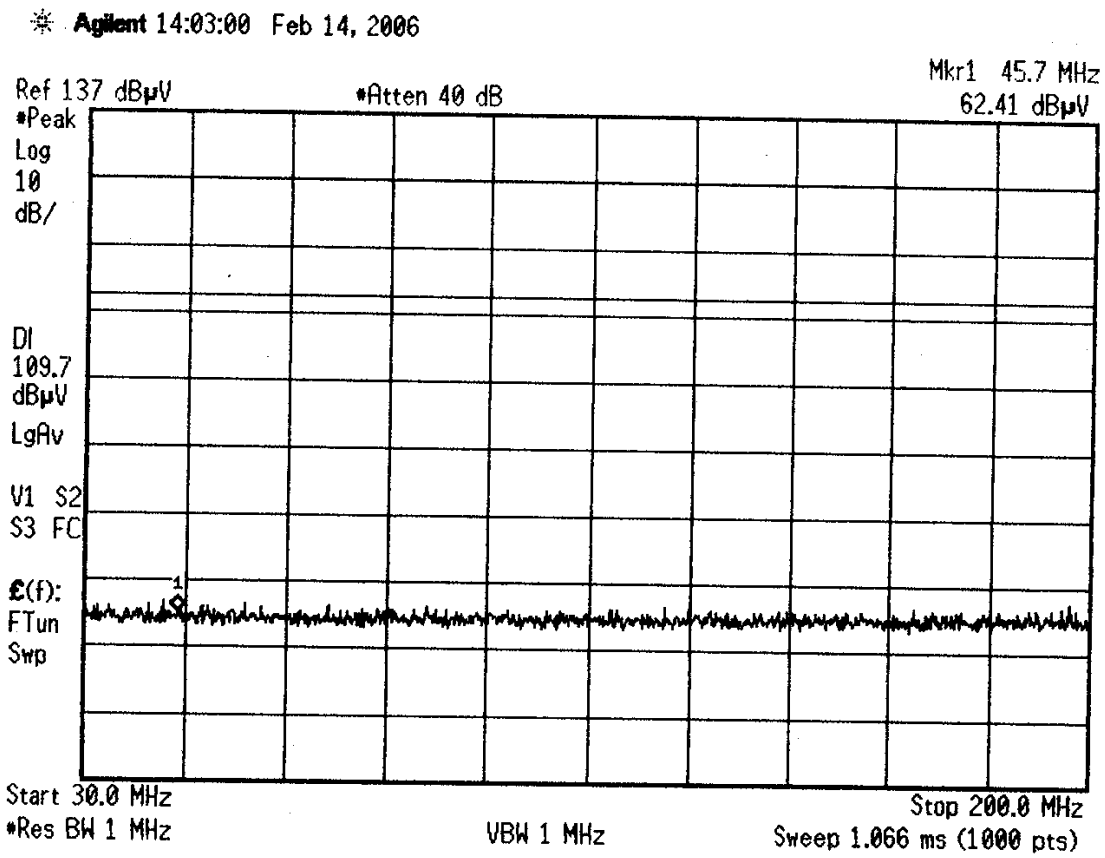

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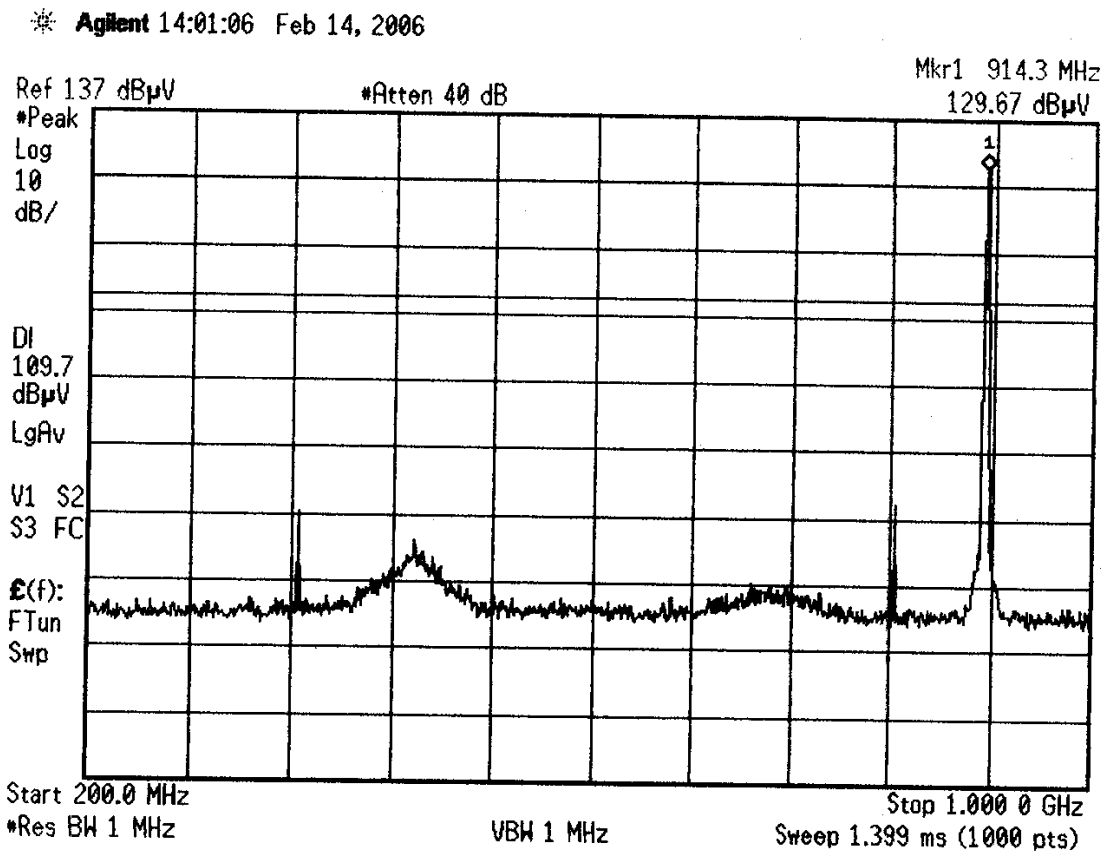

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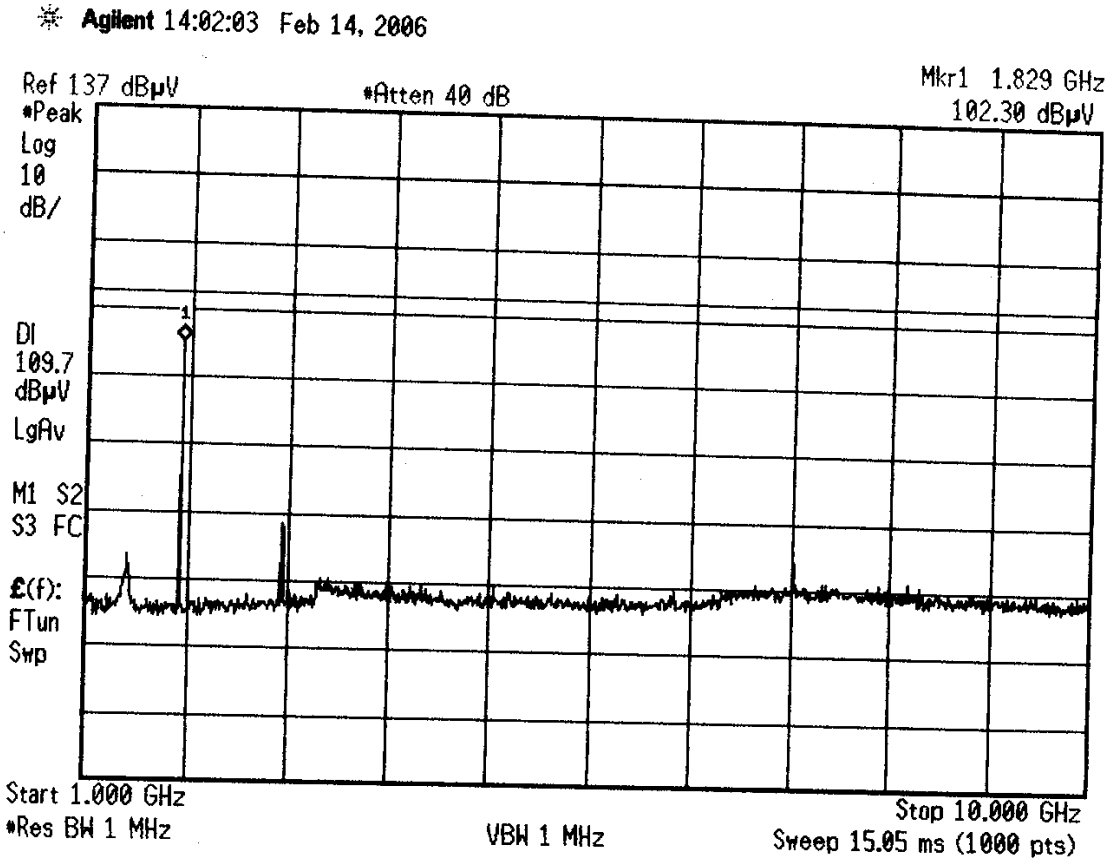
RF CONDUCTED EMISSIONS: FCC Part 15.247(c)



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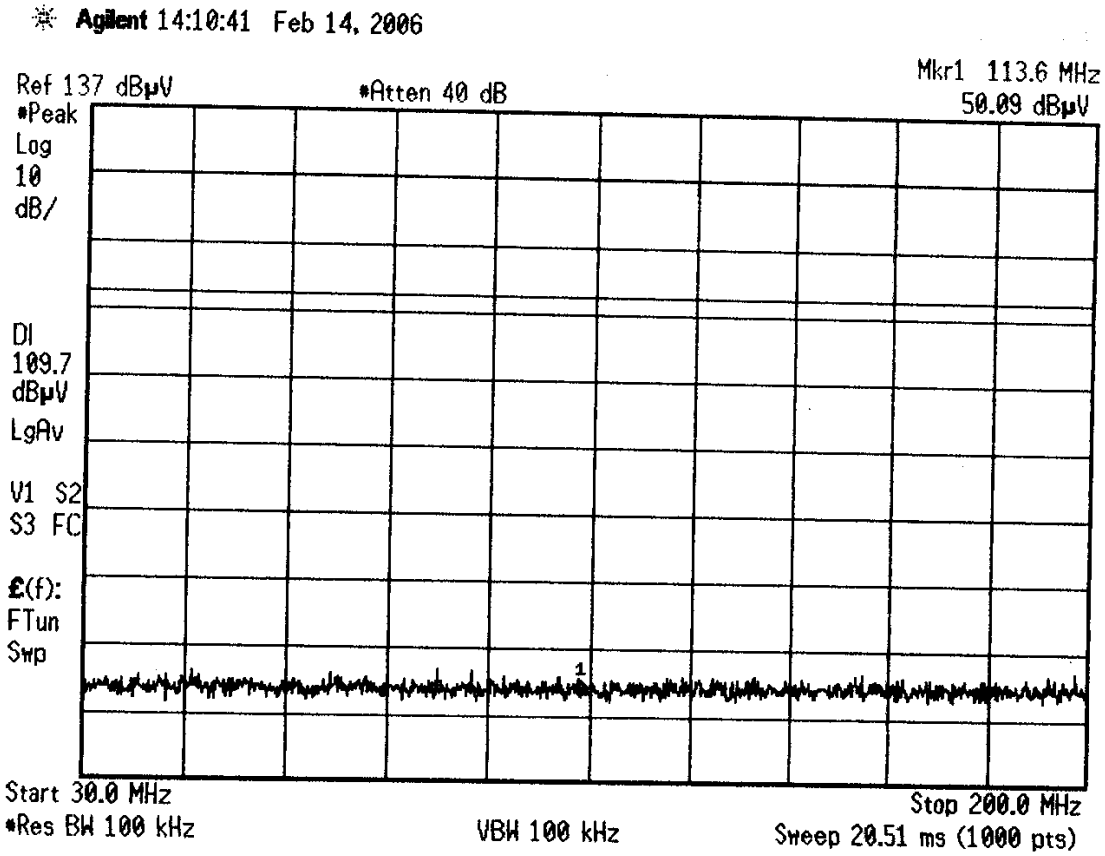

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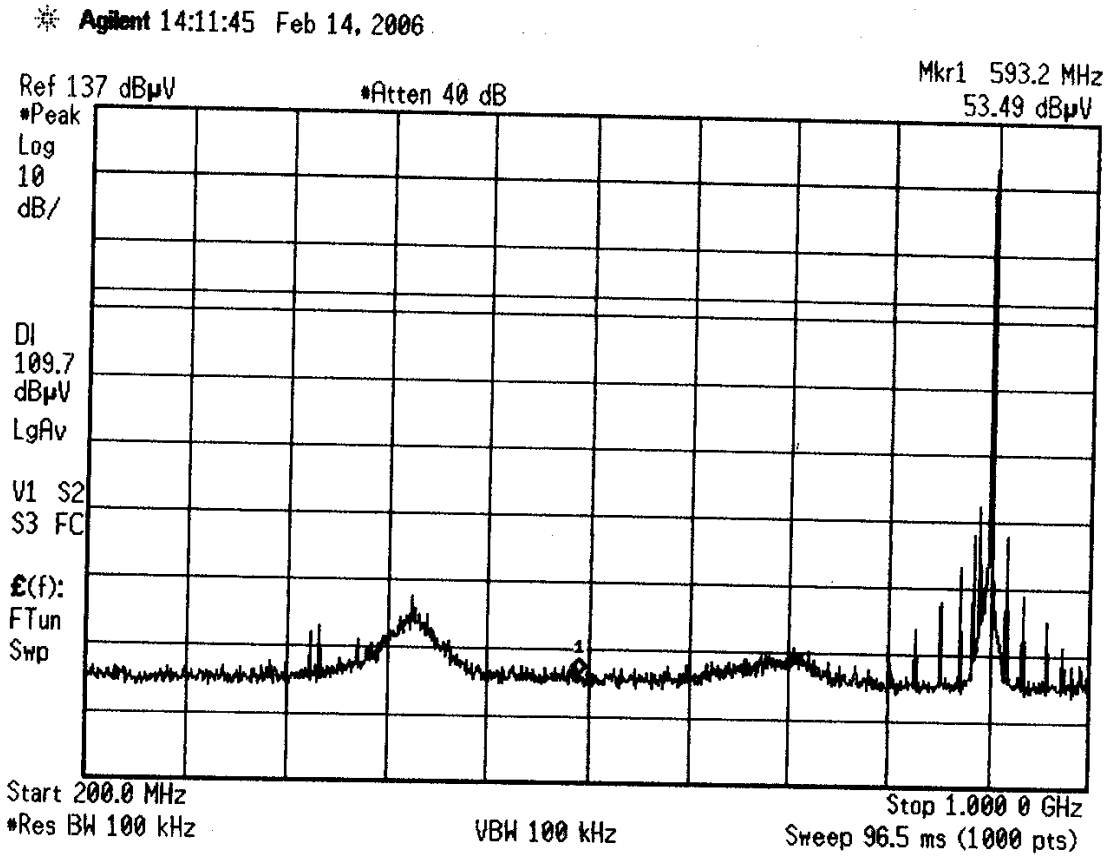

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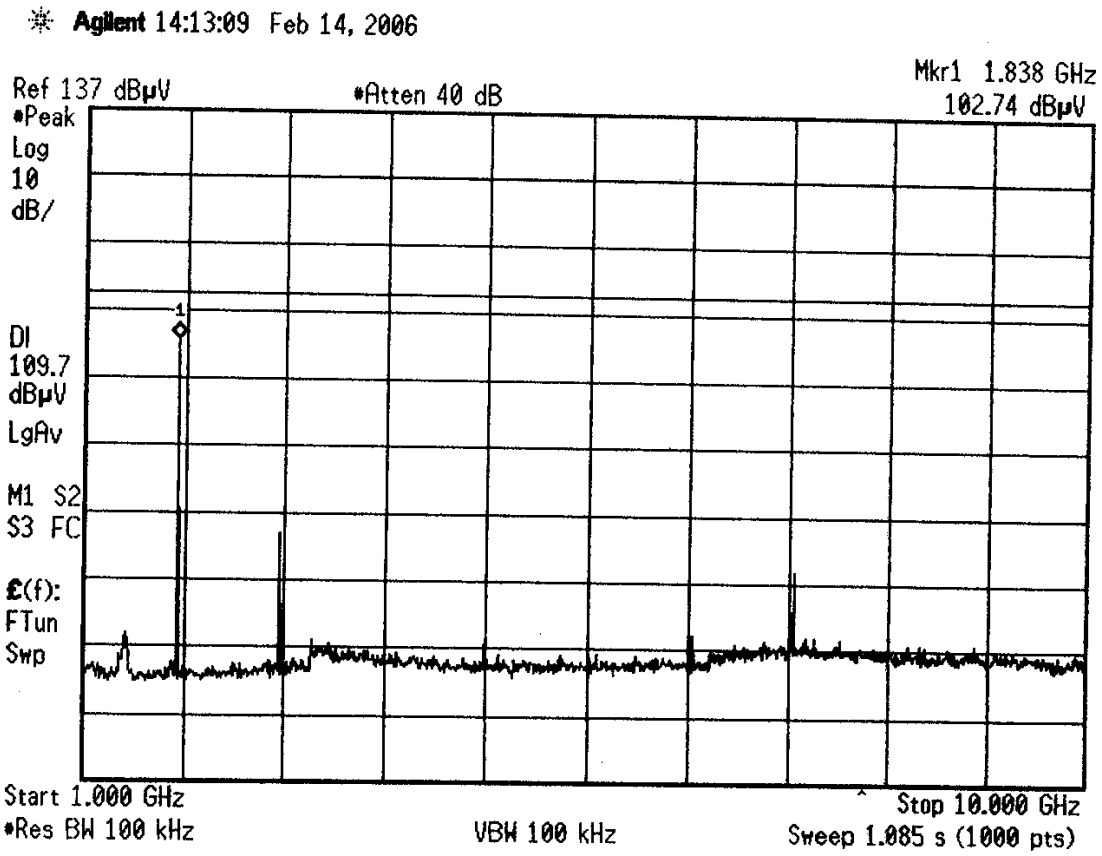

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REPORT No: SC600879 TESTER: David Gray SPEC: FCC Part 15 para 15.209(a)

CUSTOMER: Directed Electronics TEST DIST: 3 Meters

E U T: Responder SST IVU TEST SITE: Roof

EUT MODE: Transmitting BICONICAL: 491

DATE: February 14, 2006 LOG: 243

NOTES: *** Duty Cycle Correction = 6dB 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

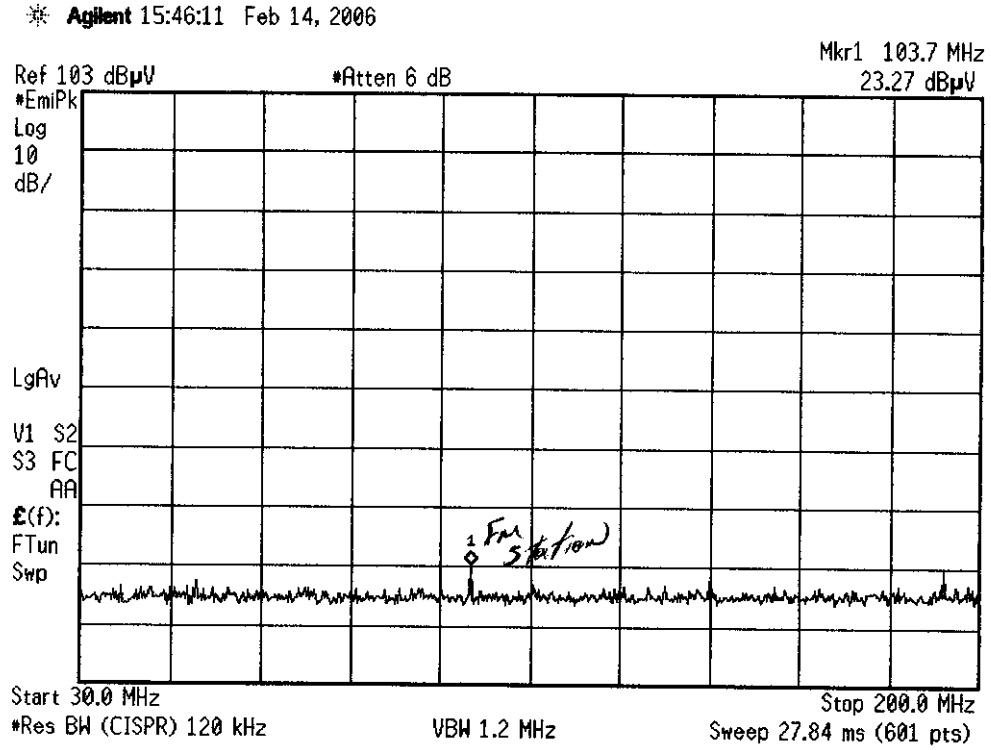
CF = Antenna Factor + Cable Loss - Preamplifier Gain + Preselector Loss

Spurious Emissions - Restricted Bands FCC 15.247(c)

v.beta1a

FREQ (MHz)	VERTICAL (dBuv) pk	VERTICAL (dBuv) av	HORIZONTAL (dBuv) pk	HORIZONTAL (dBuv) av	CF (dB/m)	MAX LEVEL (dBuV/m) pk	MAX LEVEL (dBuV/m) av	SPEC LIMIT (dBuV/m) pk	SPEC LIMIT (dBuV/m) av	MARGIN (dB) pk	MARGIN (dB) av	EUT Rotation	Antenna Height	Notes
909.66					23.5517	**23.55**	**23.6**	66	46	-42.4	-22.4			low channel
1819.32					-8.55635	**-8.56**	**-8.6**	74	54	-82.6	-62.6			
2729.15	65.38	62.16	57.09		-4.27927	**61.1**	**57.9**	74	54	-12.9	-2.12	78	1	retest - see below ***
3638.64	53.1	46.4	46.3		-0.6059	**52.49**	**45.8**	74	54	-21.5	-8.21	21	1	
4548.3	67.13	62.74	63.95	59.3	-1.57782	**65.55**	**61.2**	74	54	-8.45	1.16	47	2	retest - see below ***
5457.96	56.79	50			3.43094	**60.22**	**53.4**	74	54	-13.8	-6.57			***
7276.98	48.29	37.7			7.63238	**55.92**	**45.3**	74	54	-18.1	-8.67	292	2	
4548.3	55.53	49.22			-1.57782	**53.95**	**47.6**	74	54	-20	-6.36	166	2	added C28=2.7pF
2729.15	64.74	61.76			-4.27927	**60.46**	**57.5**	74	54	-13.5	-2.52	85	1	***
914.45					23.5278	**23.53**	**23.5**	66	46	-42.5	-22.5			mid channel
2743.36	64.75	61.75	59.89		-4.19117	**60.56**	**57.6**	74	54	-13.4	-2.44	82	1	***
4572.21	57.1	48.9	49.7		-1.46783	**55.63**	**47.4**	74	54	-18.4	-6.57	175	2	
918.88					23.5056	**23.51**	**23.5**	66	46	-42.5	-22.5			high channel
2756.64	65.21	62.14	58.29		-4.10883	**61.1**	**58**	74	54	-12.9	-1.97	198	1	***
4594.4	56.67	49.58	52.69		-1.36576	**55.3**	**48.2**	74	54	-18.7	-5.79	260	2	
3675.52	50.39				-0.55427	**49.84**	**-0.6**	74	54	-24.2	-54.6			
5513.45	58.59	50.74	51.99		3.75649	**62.35**	**54.5**	74	54	-11.7	-5.5	219	1.55	***
7351.32	49.59	38.79			7.72158	**57.31**	**46.5**	74	54	-16.7	-7.49	260	1.6	
5486.7	58.69	52.29	56.69		3.61488	**62.3**	**55.9**	74	54	-11.7	-4.1	266	1.8	mid channel ***
7315.88	47.69	38.2			7.67906	**55.37**	**45.9**	74	54	-18.6	-8.12	278	1.7	
9144.5	46.99				9.711	**56.7**	**9.71**	74	54	-17.3	-44.3			

RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan



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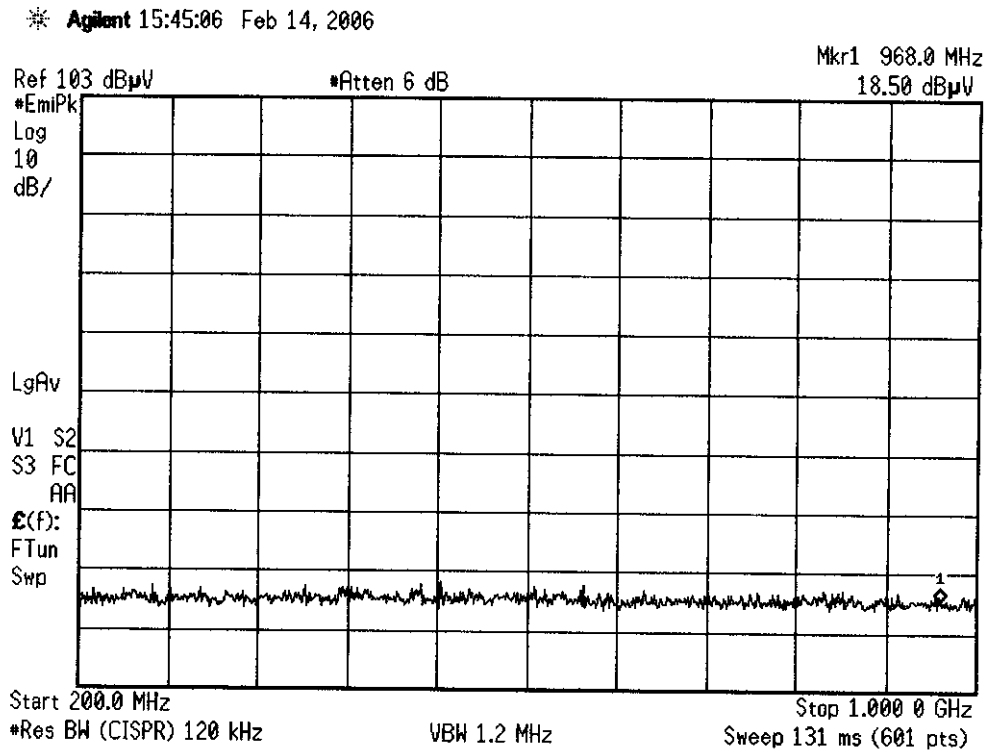
RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan



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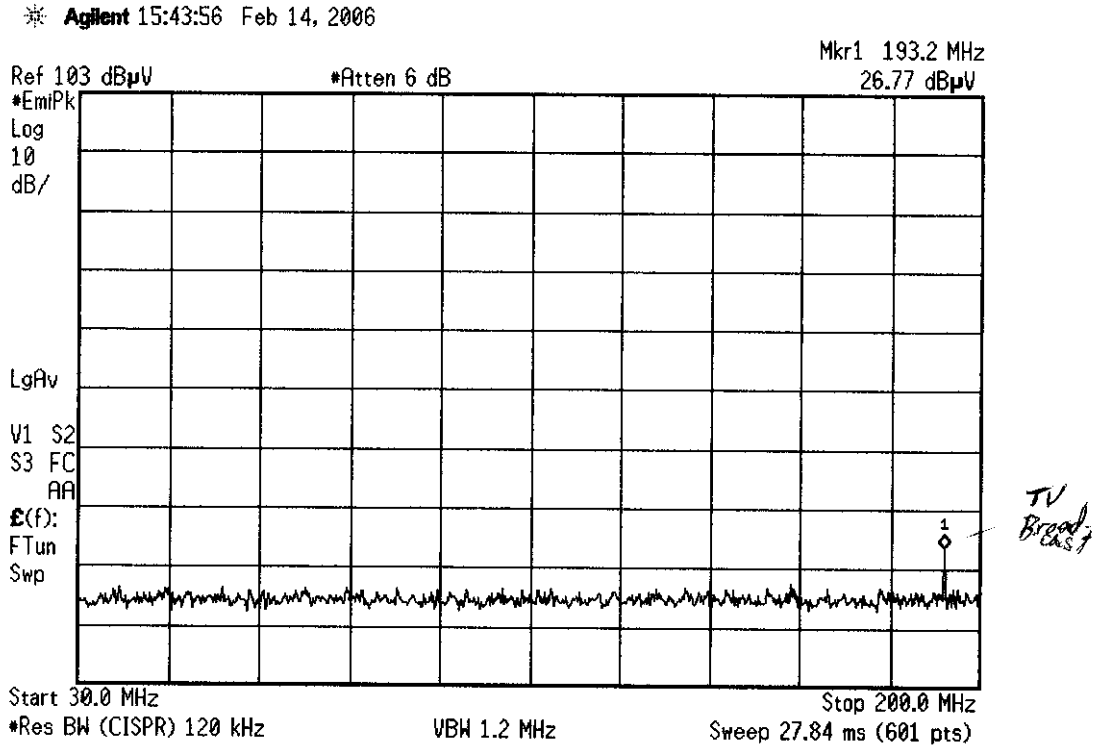

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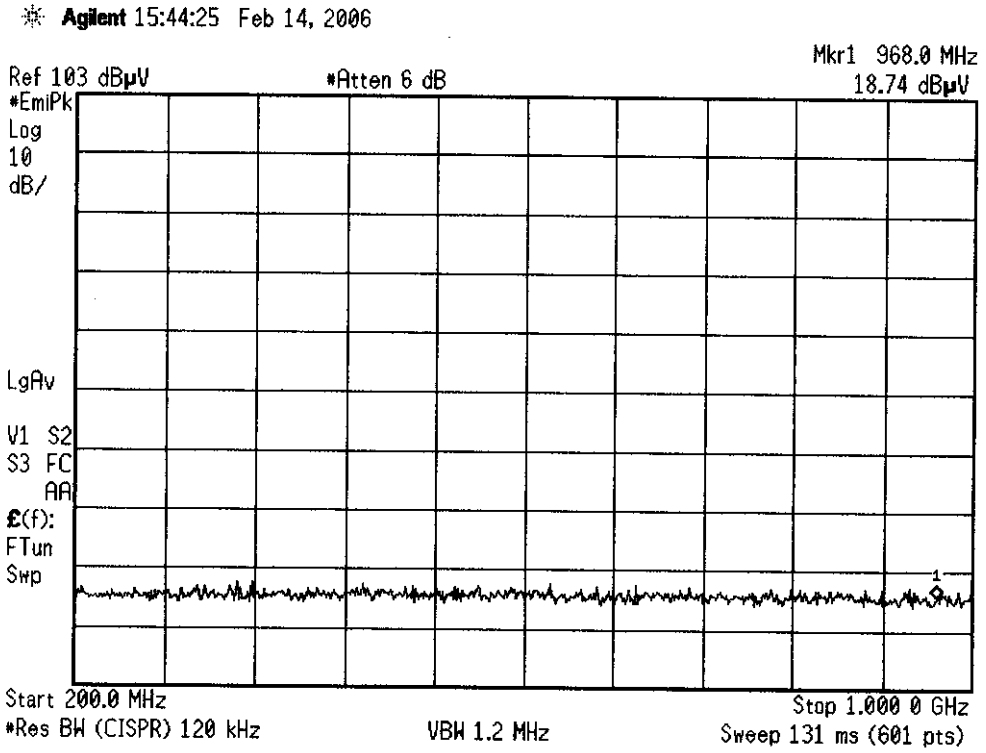
RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan



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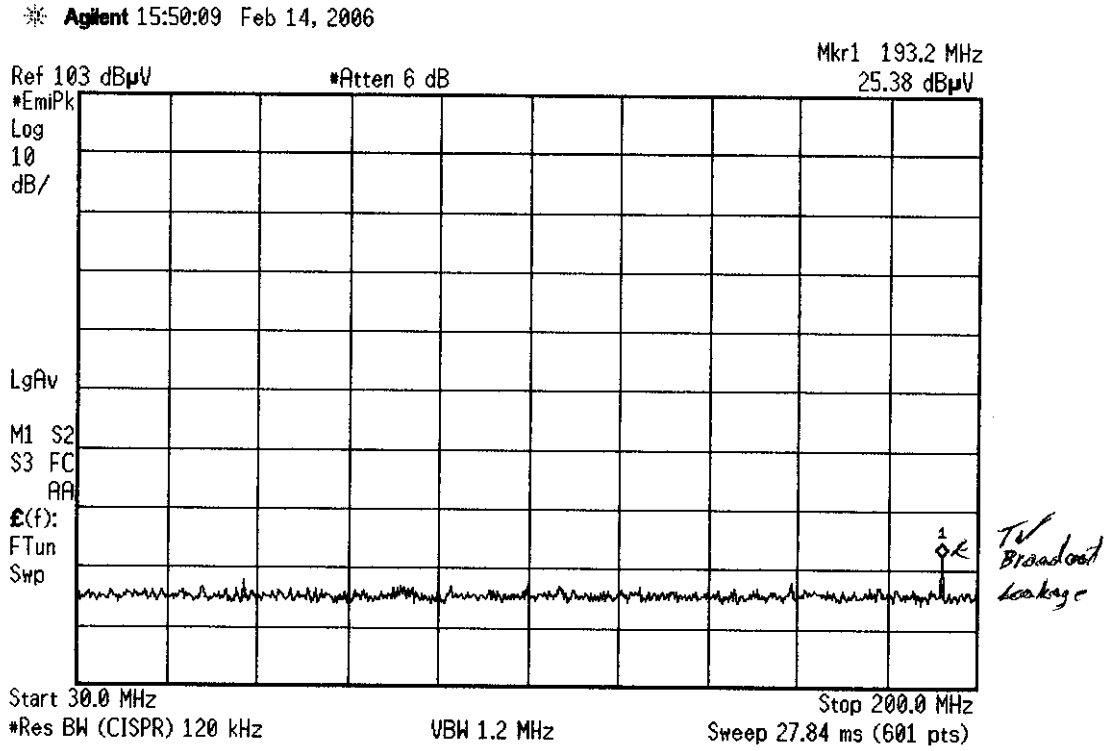

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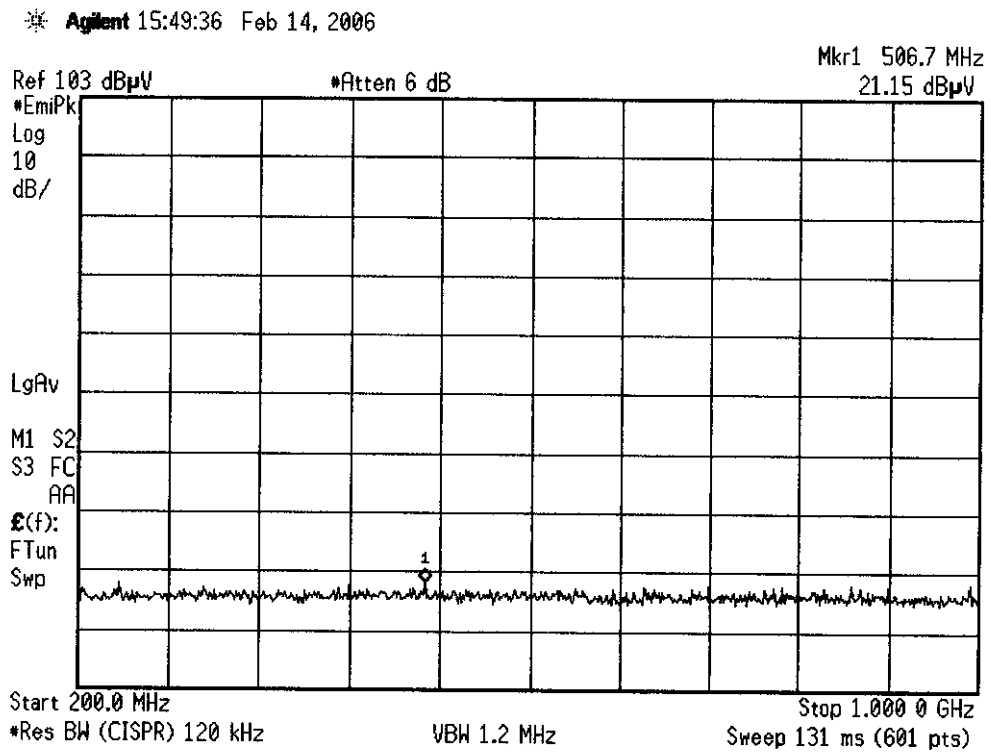
RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan



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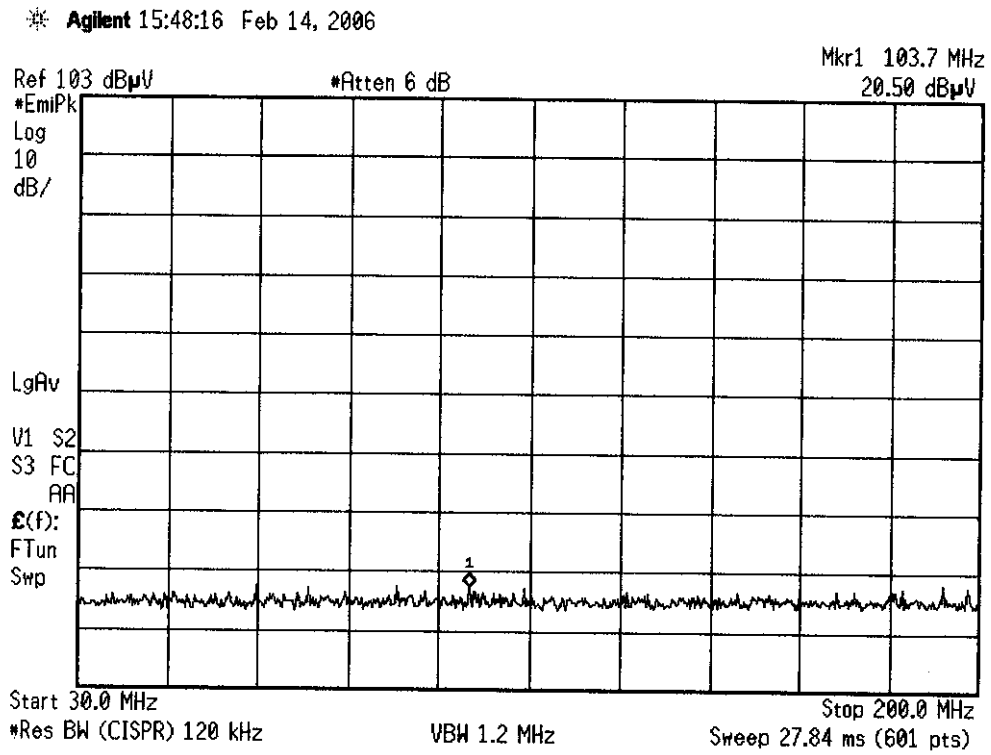
RECEIVER SPURIOUS EMISSIONS: FCC Part 15.109(a) - Prescan



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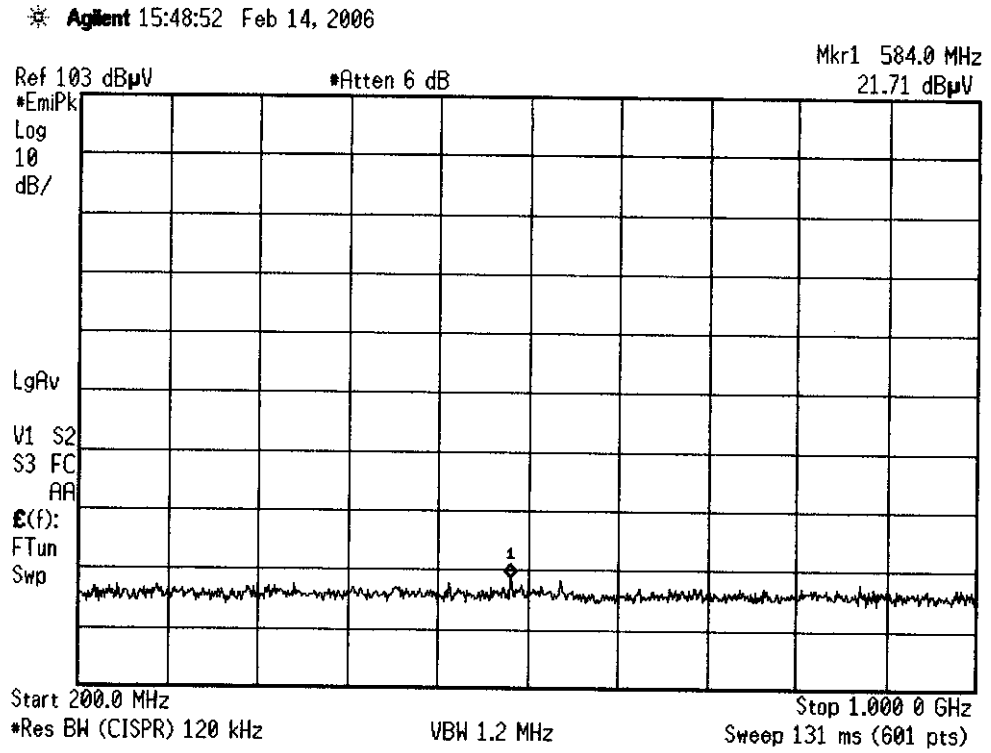

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4.0 ATTESTATION STATEMENT

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: 14 February 2006

Testing End Date: 14 February 2006

- TÜV AMERICA, INC. -

Reviewing Engineer:

Chuck Rickard
(EMC Engineer)

Test Engineer:

David Gray
(EMC Engineer In Charge)

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