TEST RESULT SUMMARY

FCC PART 15 SUBPART C
Section 15.247
Industry Canada RSS-210: Issue 5: 2001
A1: Nov. 2002, A2: Apr. 2003, A3: 2004, A4: 2004
Section 6.2.2(o)

MANUFACTURER'S NAME	XATA Corporation
NAME OF EQUIPMENT	XATA Application Module
TYPE OF EQUIPMENT	Fleet Management System
MODEL NUMBER	**SA-0085-01**
MANUFACTURER'S ADDRESS	151 East Cliff Road Burnsville MN 55337
TEST REPORT NUMBER	WC500169
TEST DATE	19 & 21 January 2005

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15 Subpart C Section 15.247 and RSS-210, section 6.2.2(o).

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15 Subpart C Section 15.247 and RSS-210, section 6.2.2(o).

Date: 22 February 2005

Location: Taylors Falls MN USA

R. M. Johnson
Tested By

T. K. Swanson
Reviewed By

Not Transferable

EMC EMISSION - T E S T R E P O R T

Test Report File No.	:	**WC500169**	Date of issue:	22 February 2005

Model No.	:	**SA-0085-01**
Product Name	:	XATA Application Module
Product Type	:	Fleet Management System
Applicant	:	XATA Corporation
Manufacturer	:	XATA Corporation
License holder	:	XATA Corporation
Address	:	151 East Cliff Road
	:	Burnsville MN 55337
Test Result	:	■ **Positive** ☐ **Negative**
Test Project Number Reference(s)	:	**WC500169**
Total pages		50

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 50081-1 / 1991

☐ - EN 55011 / 1998 w/Amendment A1:1999 ☐ - Group 1 ☐ - Group 2 ☐ - Class A ☐ - Class B

☐ - EN 55013 / 1990

☐ - EN 55014 / 1987 ☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices

☐ - EN 55014 / A2: 1990

☐ - EN 55014 / 1993 ☐ - Household appliances and similar ☐ - Portable tools ☐ - Semiconductor devices

☐ - EN 55015 / 1987

☐ - EN 55015 / A1:1990

☐ - EN 55015 / 1993

☐ - EN 55022 / 1987 ☐ - Class A ☐ - Class B

■ - FCC Part 15 Subpart C Section 15.247

☐ - FCC Part 15 Subpart C Section 15.207 Conducted Emission Requirements

■ - RSS-210, Issue 5, 2001 – Section 6.2.2(o)

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Emission Test Results:

Peak Power Out [FCC 15.247 (b)(3)], [RSS-210 6.2.2(o)(b)]

The requirements are ■ - MET ☐ - NOT MET

Maximum peak power output shall be 1 watt.

Remarks: Max peak output power is measured to be 14.2 dBm (26.3 mW).

6 dB Bandwidth [FCC 15.247 (a)(2)], [RSS-210 6.2.2(o) Amd. 1 (IV)]

The requirements are ■ - MET ☐ - NOT MET

The minimum 6 dB bandwidth shall be at least 500 kHz.

Remarks: Bandwidths are shown to be 12.2 to 17.2 MHz.

99% Bandwidth [RSS-210 5.9.1]

The requirements are ■ - MET ☐ - NOT MET

The minimum

Remarks: Bandwidths are shown to be 12.2 to 17.2 MHz.

Power Spectral Density – [FCC 15.247 (e)], [RSS-210 6.2.2(o) Amd. 1 (IV)]

The requirements are ■ - MET ☐ - NOT MET

Peak power spectral density shall not be greater than 8 dBm in any 3 kHz band.

Remarks: Maximum peak power spectral density is –11.68 dBm/3 kHz.

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Emission Test Results Continued:

Conducted Out of Band Emissions [FCC 15.247 (d)], [RSS-210 6.2.2(o)(e1)]

The requirements are ■ - MET ☐ - NOT MET

Remarks: The limit is -20 dBc in any 100 kHz band outside the operating band.

Special attention is paid to ensure band edge compliance.

Spurious radiated emissions (electric field) 30 MHz - 1000 MHz (restricted bands) [FCC 15.247 (d)]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance >10 dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: Meets FCC 15.209 limit. No emissions detected above the noise level of the measuring system.

Spurious radiated emissions 1 GHz – 25 GHz (restricted bands) [FCC 15.247 (d)]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance 8 dB at 18.0 GHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: Meets FCC 15.209 limit. No emissions detected above the noise level of the measuring system.

AC Line Conducted emissions 150 kHz - 30 MHz [FCC 15.207], [RSS-210 (CISPR 22)]

The requirements are ☐ - MET ☐ - NOT MET ■ - N/A

Minimum margin of compliance _____ dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: Test not applicable.

Receiver Spurious Radiated Emissions [FCC 15.109]

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance >10 dB at _____ MHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: Meets FCC 15.209 limit. No emissions detected above the noise level of the measuring system.

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Environmental conditions in the lab: TUV America Large Test Site

	Actual
Temperature	: 23 °C
Relative Humidity	: 40 %
Atmospheric pressure	: 97.0 kPa
Power supply system	: 14 VDC

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-2001 procedures and using the CISPR 22 Limits.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.8 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit.

To convert between dBμV and μV, the following conversions apply:

dBμV = 20(log μV)

μV = Inverse log(dBμV/20)

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RADIATED EMISSIONS

The final level, expressed in dBμV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBμV), adding the antenna correction factor and cable loss factor (Factor dB) to it, then subtracting the preamp gain. This result then has the CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE/ANT/PREAMP (dB)	(dB/m)	(dB)	FINAL (dBuV/m)		POL/HGT/AZ (m)	(deg)	DELTA1 EN 55022 A
60.80	42.5Qp	+	1.2	+ 10.9	- 25.5 =	29.1	V	1.0	0.0	-10.9

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-2001 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 25000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The transmitter is rotated through 3 orthogonal axes in order to determine the maximum emission levels.

DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

☐ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 19 January 2005

Testing End Date: 21 January 2005

- TÜV PRODUCT SERVICE INC -

Reviewed By:
T. K. Swanson

Tested By:
R. M. Johnson

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Constructional Data Form(s)

and/or

Product Information Form(s)

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Form

EMC Test Plan and Constructional Data Form

PRODUCT SERVICE

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- ***NOTE: This information will be input into your test report as shown below.***
Press the F1 key at any time to get HELP for the current field selected.

Company: XATA Corporation

Address: 151 E Cliff Rd

Burnsville

MN, 55337

Contact: Dennis Quy Position: VP Hardware Engineering

Phone: 952-707-5695 Fax: 952-894-2463

E-mail Address: denny.quy@xata.com

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description Fleet Management System

EUT Name Xata Application Module

Model No.: SA-0076-01 & SA-0085-01 Serial No.:

Product Options: Orbcomm Satellite comm

Configurations to be tested: 802.11b system with and without the satellite comm.

Test Objective

☐	EMC Directive 89/336/EEC (EMC)	☒	FCC:	Class	☐ A	☒ B	Part	15
	Std:	☐	VCCI:	Class	☐ A	☐ B		
☐	Machinery Directive 89/392/EEC (EMC	☐	BCIQ:	Class	☐ A	☐ B		
	Std:	☒	Canada:	Class	☐ A	☐ B		
☐	Medical Device Directive 93/42/EEC (EMC)	☐	Australia:	Class	☐ A	☐ B		
	Std:	☐	Other:					
☐	Vehicle Directive 72/245/EEC (EMC) Std:							
☐	FDA Reviewers Guidance for Premarket Notification Submissions (EMC)							

TÜV Product Service Certification Requested

☐	Attestation of Conformity (AoC)	☐	International EMC Mark (IEM)
☐	Certificate of Conformity (CoC)	☒	Compliance Document

Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

Form

EMC Test Plan and Constructional Data Form

(Press **F1** when field is selected to show additional information on Protection Class.)

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TUV Product Service should:

☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: 7" Width: 7" Height: 5" Weight: 10 Lbs

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: 12V DC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): 0.5A Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

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

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 9

☒ Shielded OR ☐ Unshielded

☐ Not Applicable

Form

EMC Test Plan and Constructional Data Form

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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*	☒	☐
RS232	☐	☒	1	☐	☒			9 Pin D-Sub		2	☒	☐
	☐	☐		☐	☐						☐	☐
	☐	☐		☐	☐						☐	☐
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	☐	☐		☐	☐						☐	☐

Form

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

EUT Software.

Revision Level:

Description: Special software to interface to the 802.11 radio to place the radio into special modes for the FCC and IC tests.

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. Stand alone on a metal surface

2.

3.

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 #
Domed module containing the radio	SA- 0085-01		

Form

EMC Test Plan and Constructional Data Form

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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 #*
AC/DC power Supply			
Personal Computer			
Connector interface module			

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*

Power Supply

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

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

Form

EMC Test Plan and Constructional Data Form

PRODUCT SERVICE

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.

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures

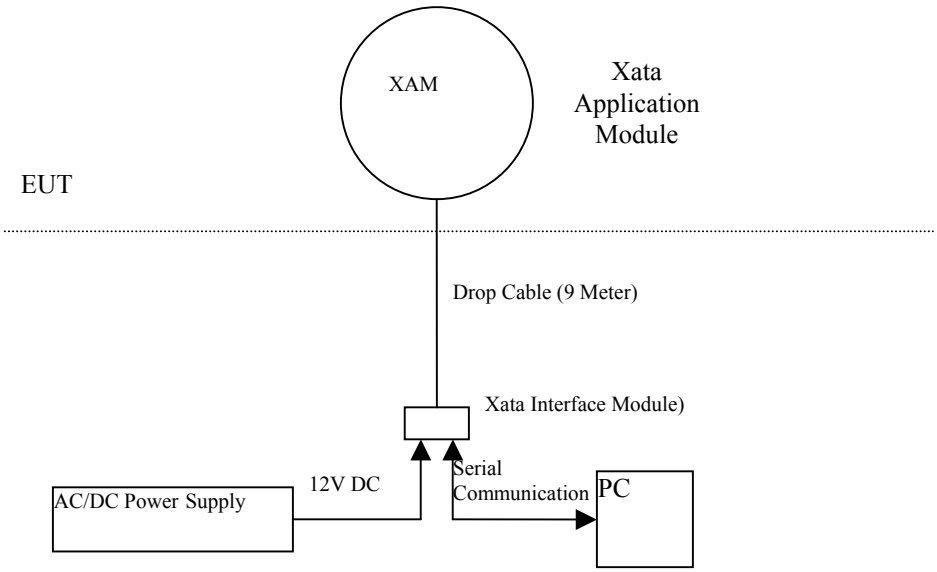
Dennis A. Ley 2/11/2005

Customer authorization to perform tests according to this test plan.	Date
Test Plan/CDF Prepared By (please print)	Date
Reviewed by TÜV Product Service Associate	Date

Form

EMC Block Diagram Form

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.



Authorization Signatures

Dennis A. Ley

2/3/2005

Customer authorization to perform tests according to this test plan.	Date
Test Plan/CDF Prepared By (please print)	Date
Reviewed by TÜV Product Service Associate	Date

Test Data

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Maximum Power Output

Specifications:
FCC Specification: Paragraph: 15.247 (b)(3)
IC Specification: RSS-210, 6.2.2(o)(b)

The *MAXIMUM POWER OUTPUT* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3334	8542C	Giga-tronics	Peak Power Meter	1831096	02-Apr-05
3336	80350A	Giga-tronics	Peak Power Sensor	1822765	27-May-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Results:

Channel	Measured Power	Final Level
1	+13.6 dBm + 0.6 dB Cable Loss	+14.2 dBm
6	+13.3 dBm + 0.6 dB Cable Loss	+13.9 dBm
11	+13 dBm + 0.6 dB Cable Loss	+13.6 dBm

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6 dB Bandwidth

Specifications:
FCC Specification: Paragraph: 15.247 (a)(2)
IC Specification: RSS-210, 6.2.2(o) Amd. 1 (IV)

The *6 dB Bandwidth* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	25-Aug-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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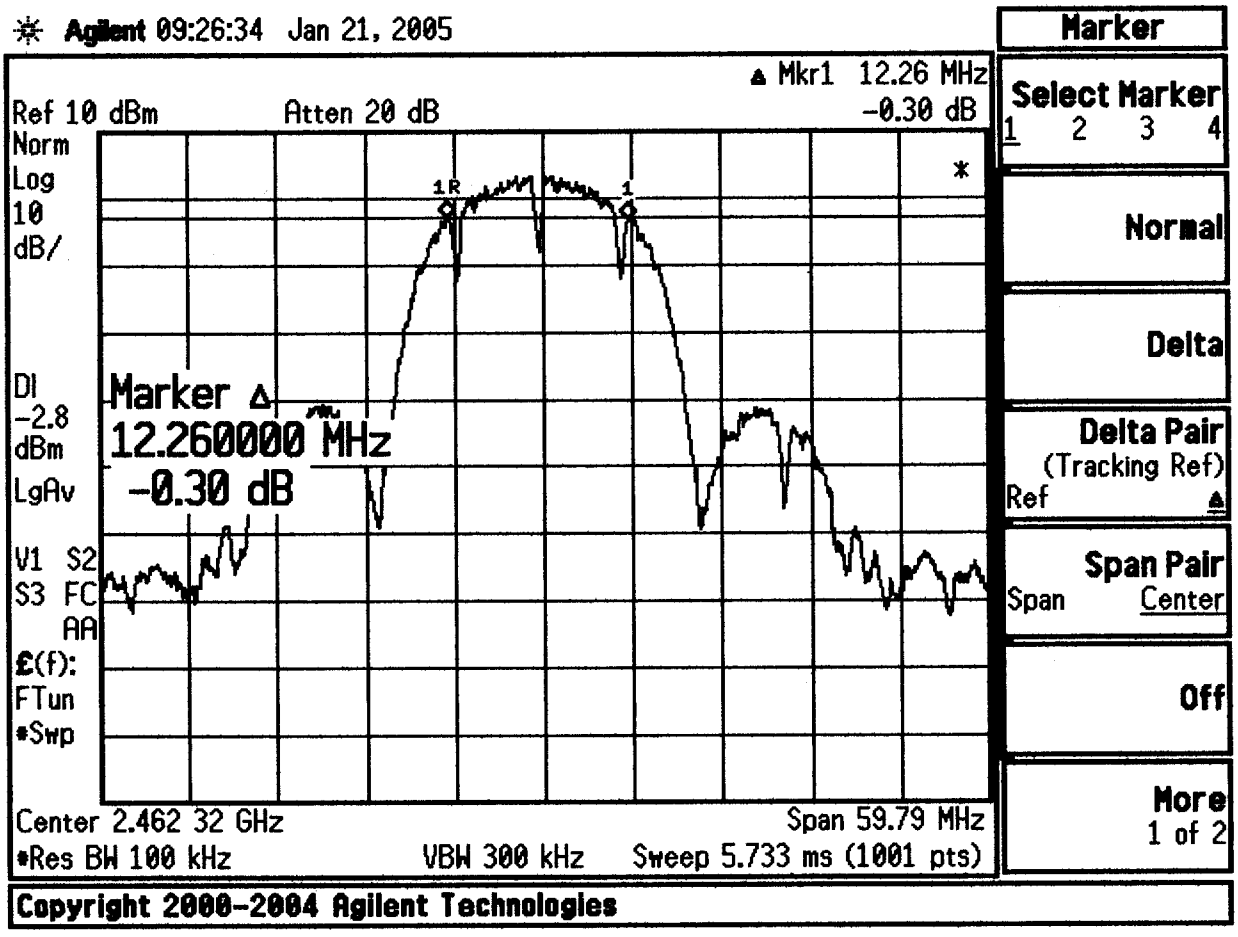
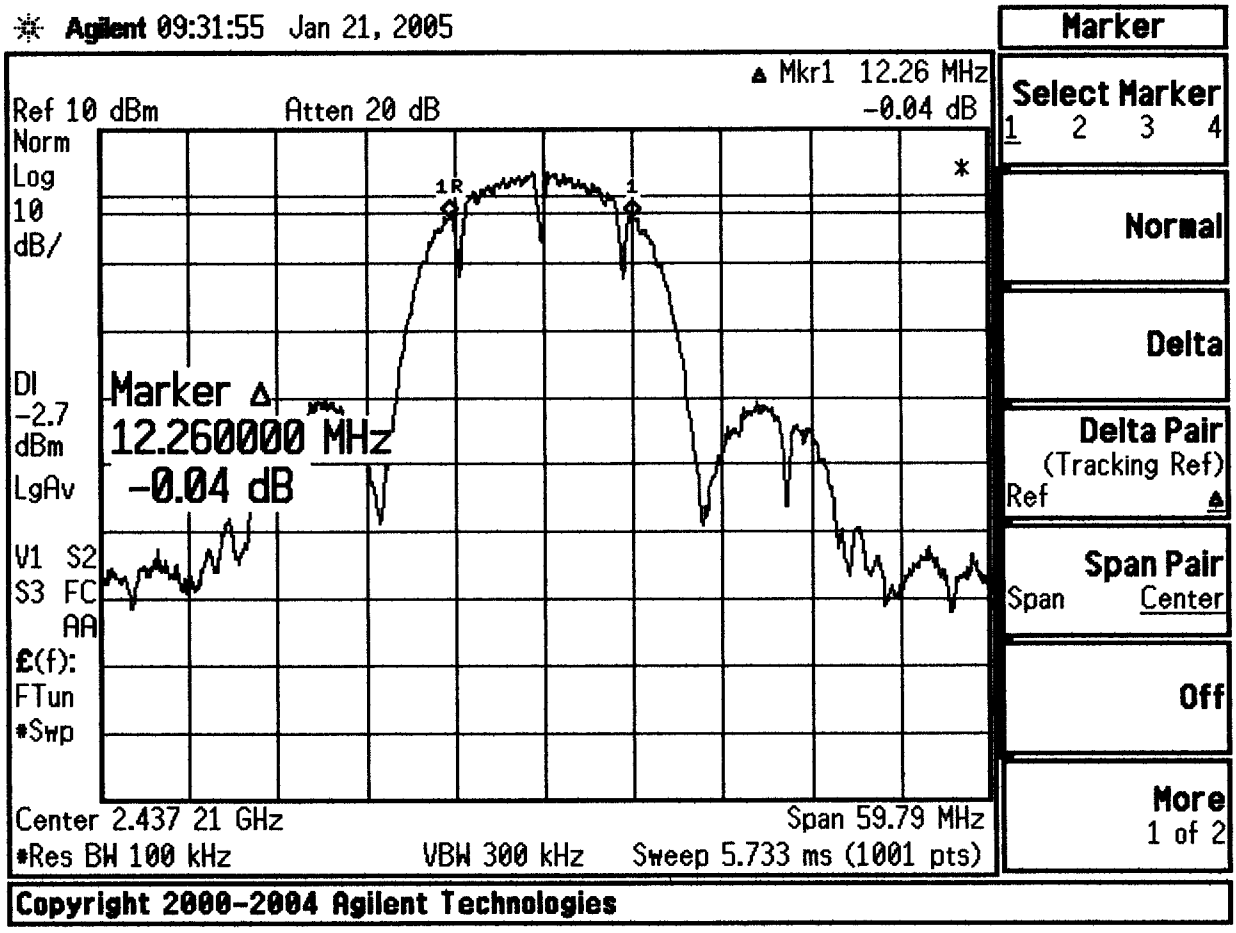
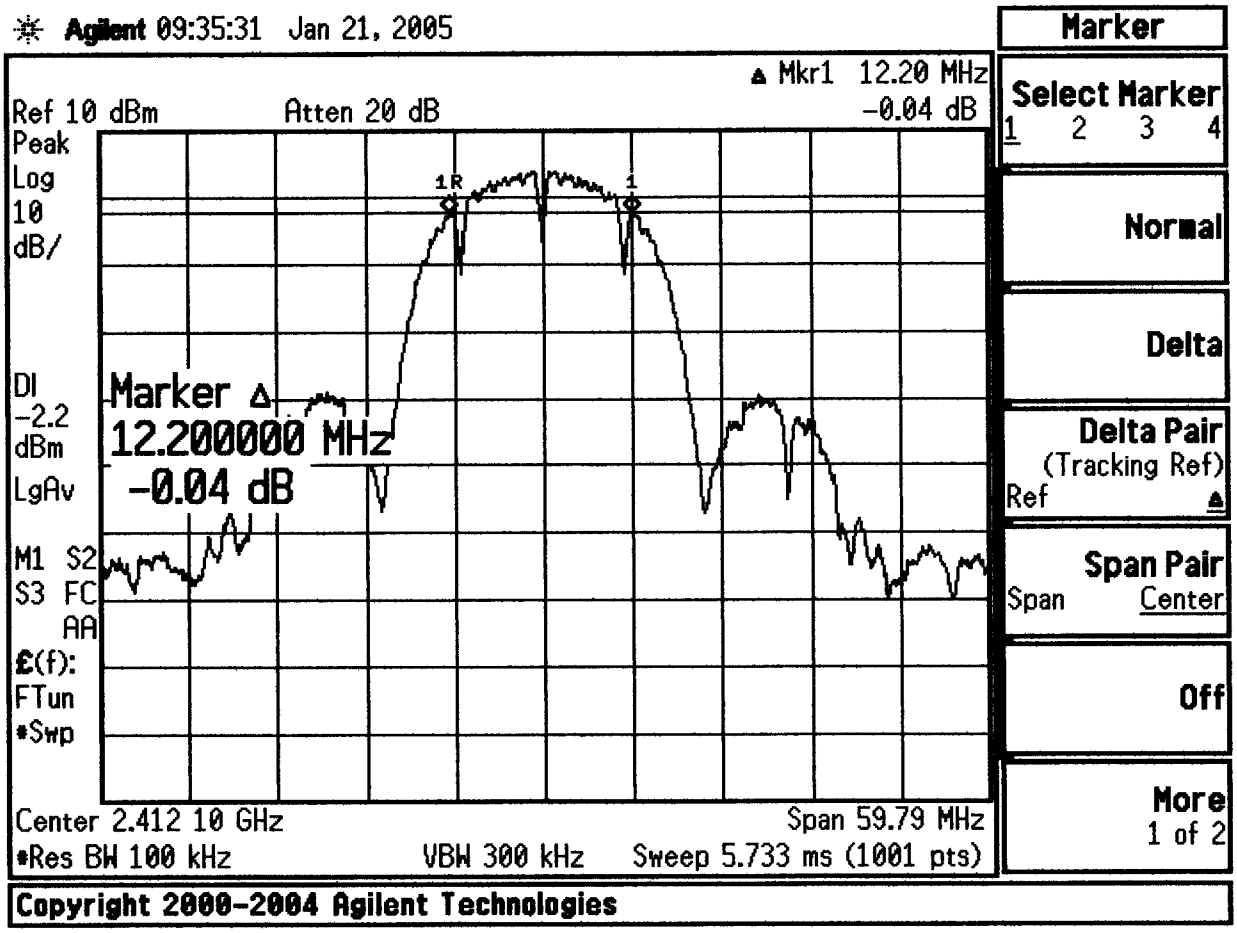


Ch. #11 6dB Bandwidth



Ch. #6 6 dB Bandwidth



Ch # 1 6 dB Bandwidth

99% Bandwidth

Specifications:
FCC Specification: N/A
IC Specification: RSS-210, 5.9.1

The *99% Bandwidth* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	25-Aug-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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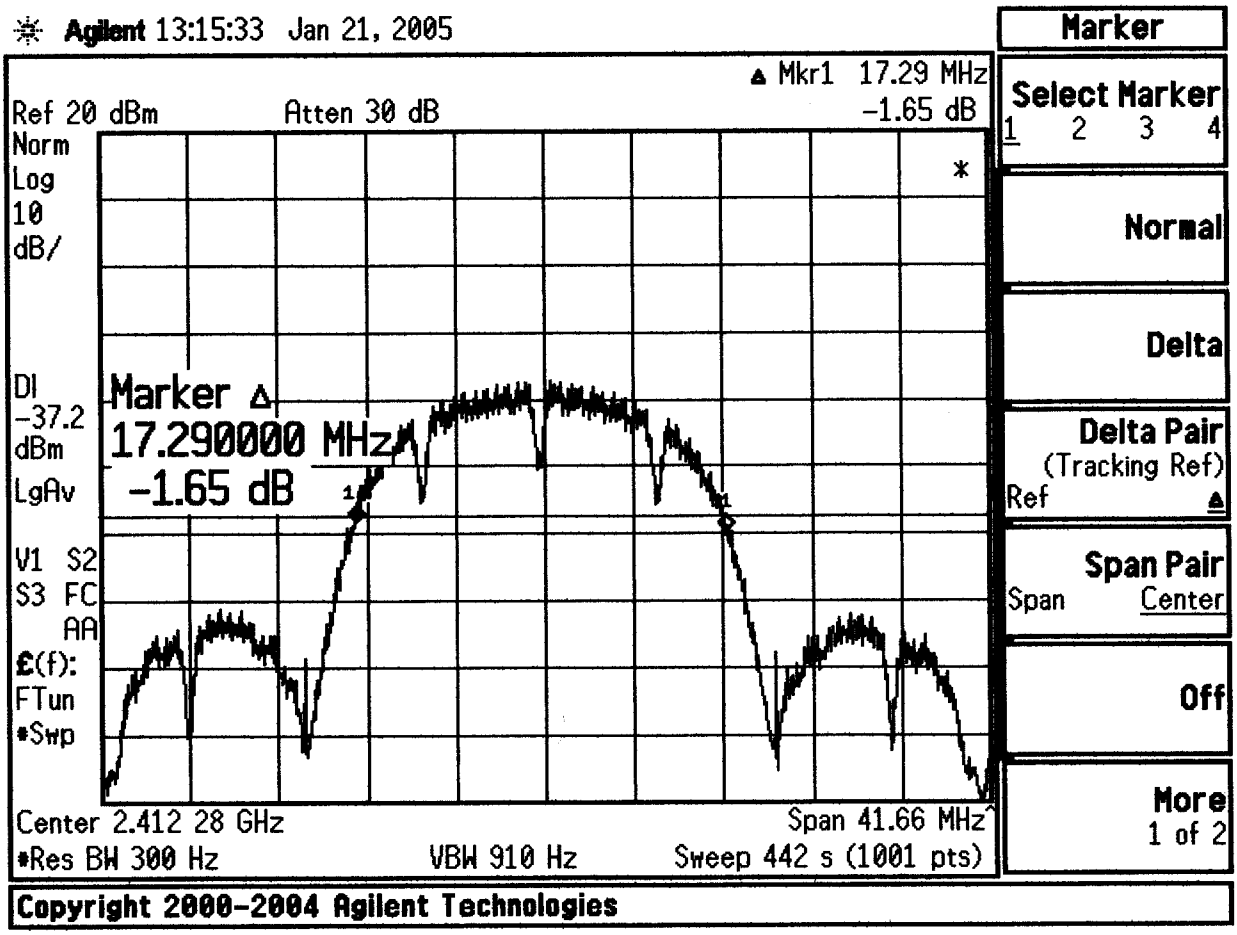
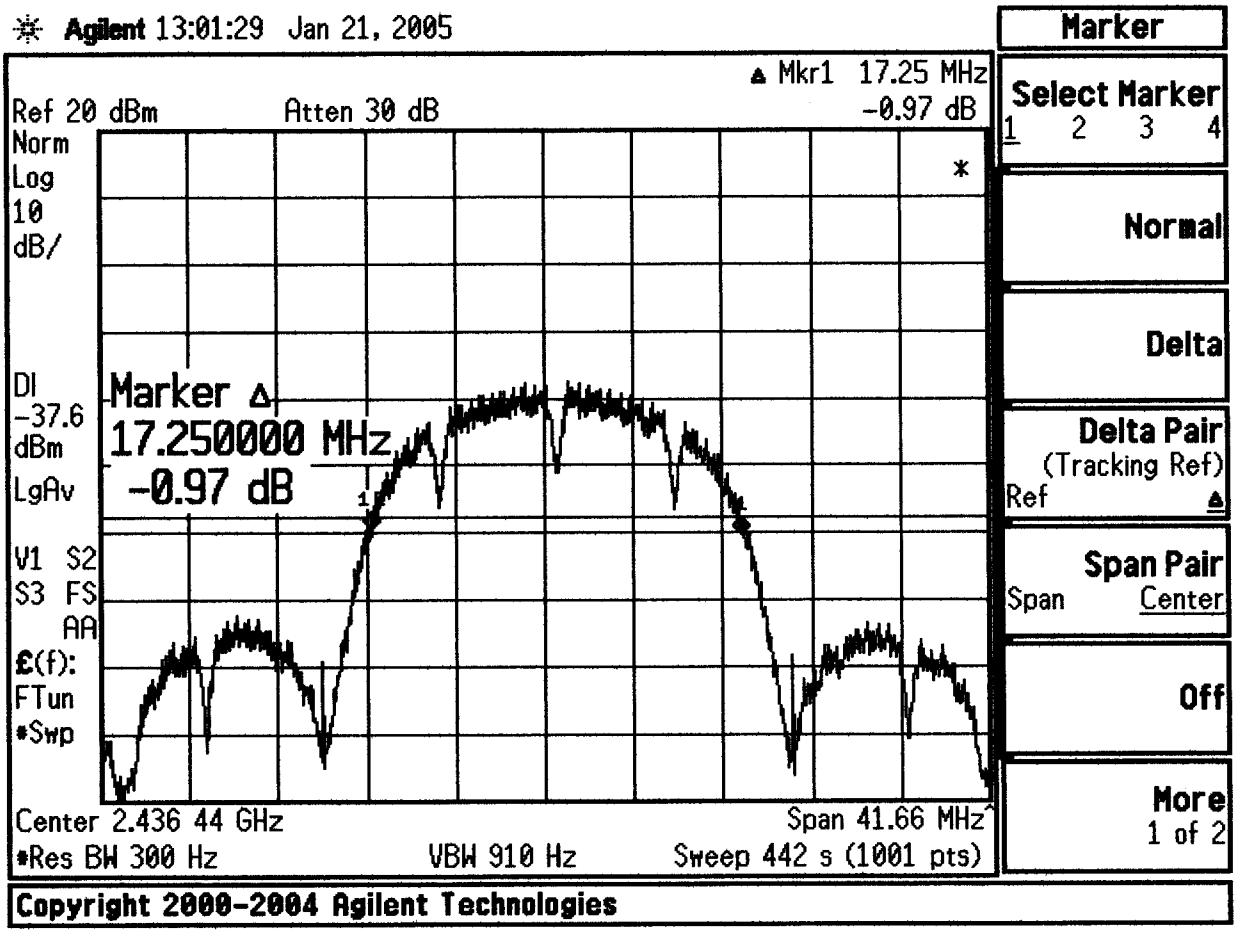
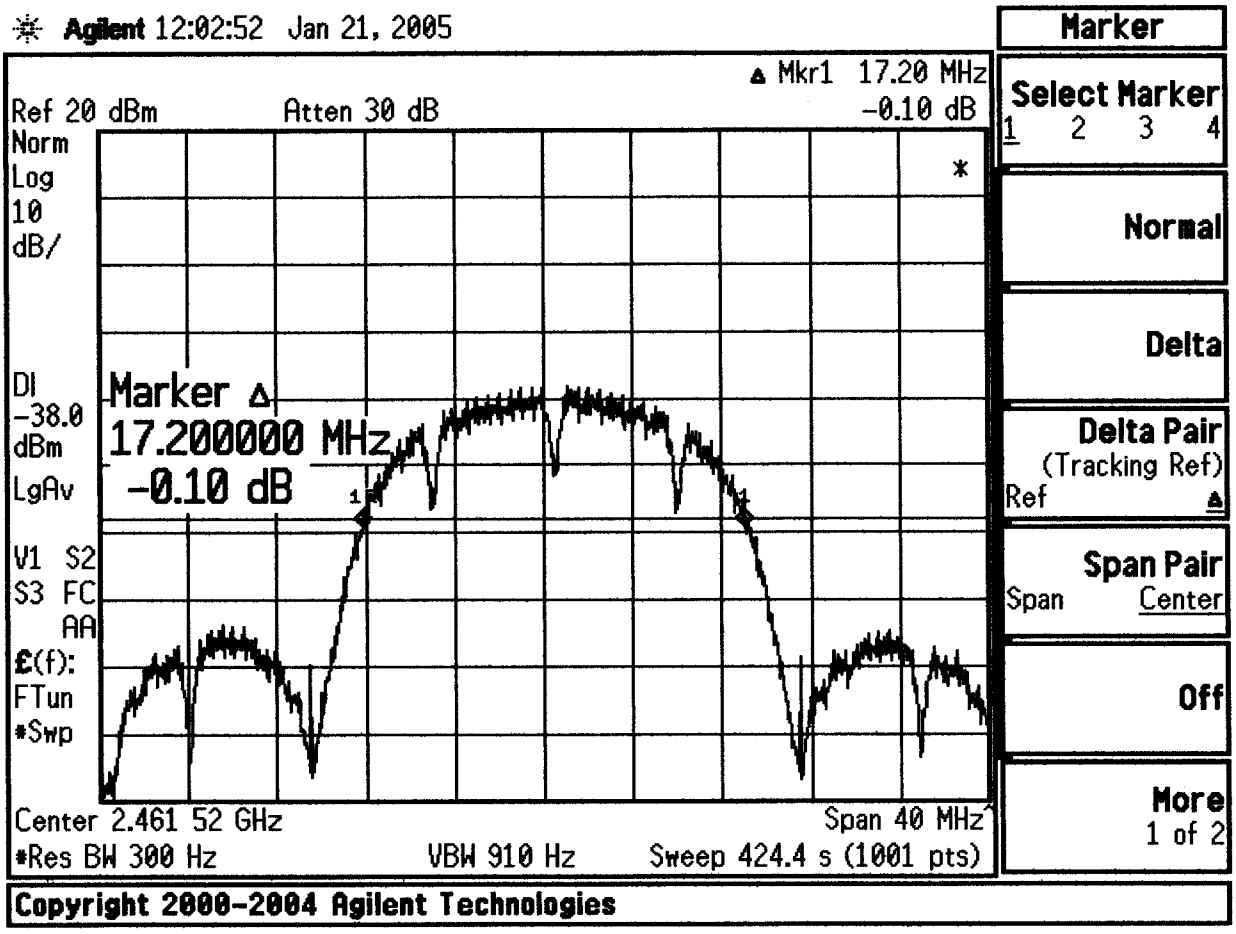


Ch #1 Industry Canada Occupied Bandwidth



Ch #6 Industry Canada Occupied Bandwidth



Ch #11 Industry Canda Occupied Bandwidth

Power Spectral Density

Specifications:
FCC Specification: Paragraph: 15.247 (e)
IC Specification: RSS-210, 6.2.2(o) Amd. 1 (IV)

The *Power Spectral Density* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	25-Aug-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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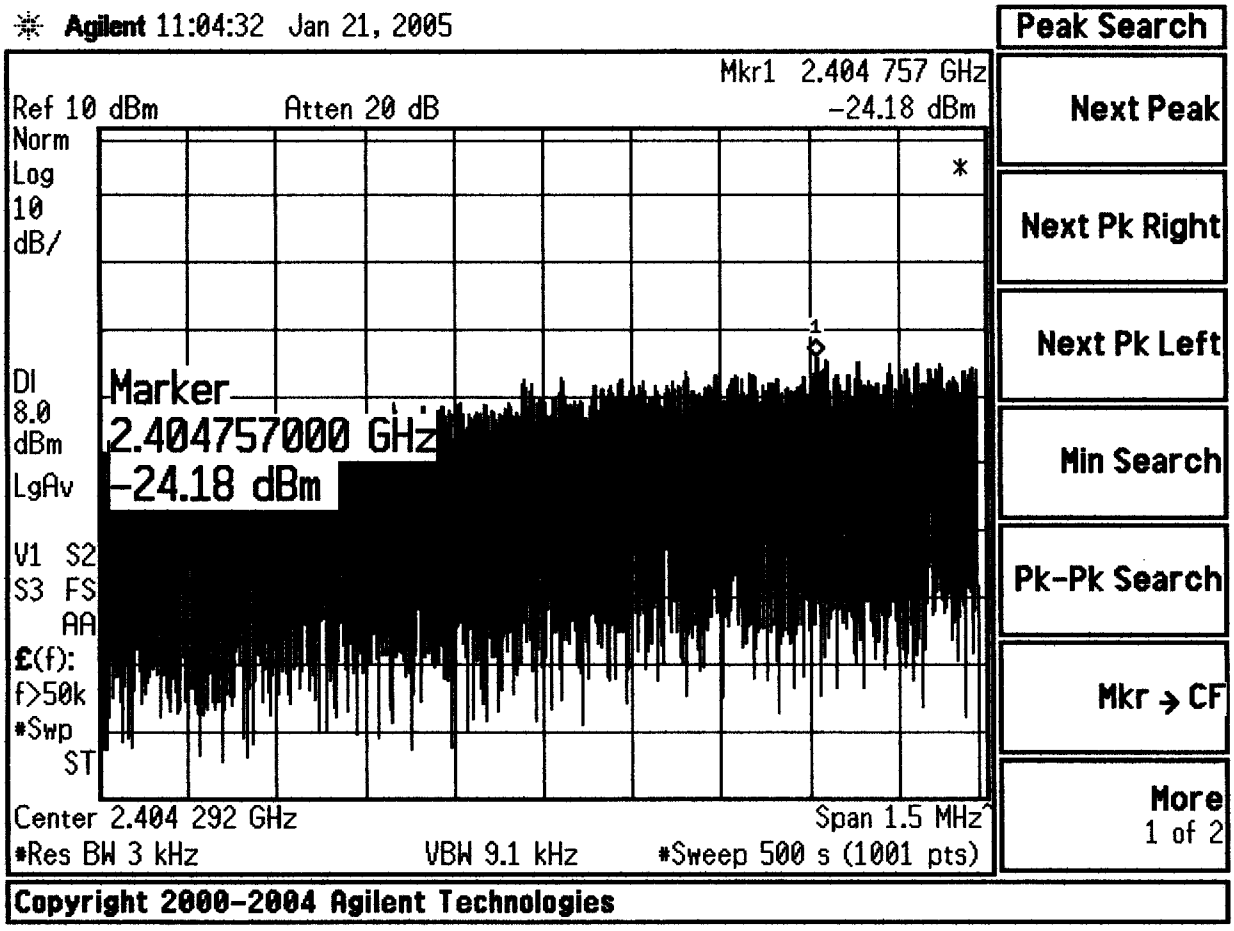
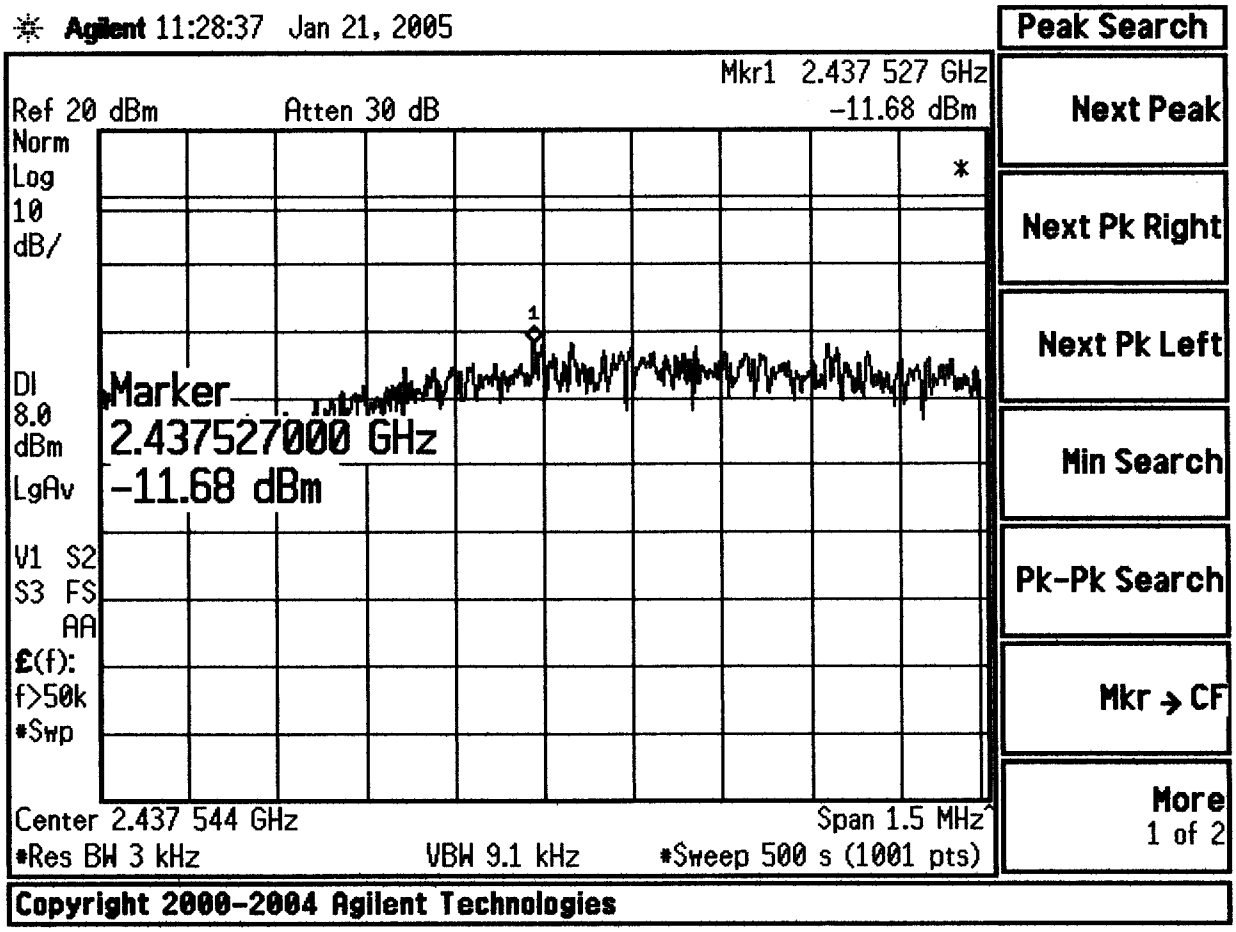
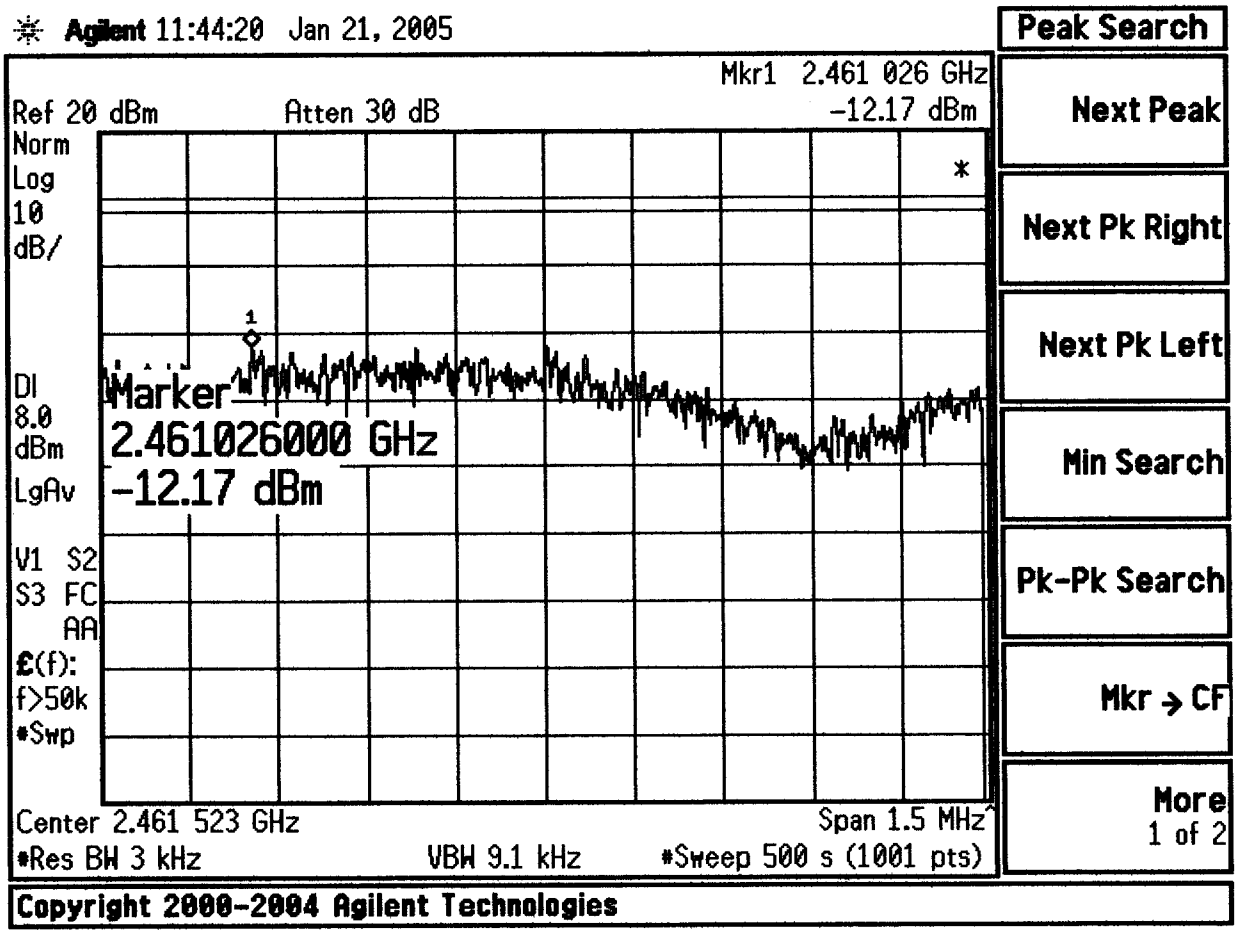


Ch #1 Spectral Density



Ch #6 Spectral Density



Ch #11 Spectral Density

Conducted Out of Band Emissions

Specifications:
FCC Specification: Paragraph: 15.247 (d)
IC Specification: RSS-210, 6.2.2(o)(e1)

The *Out of Band Emission* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	25-Aug-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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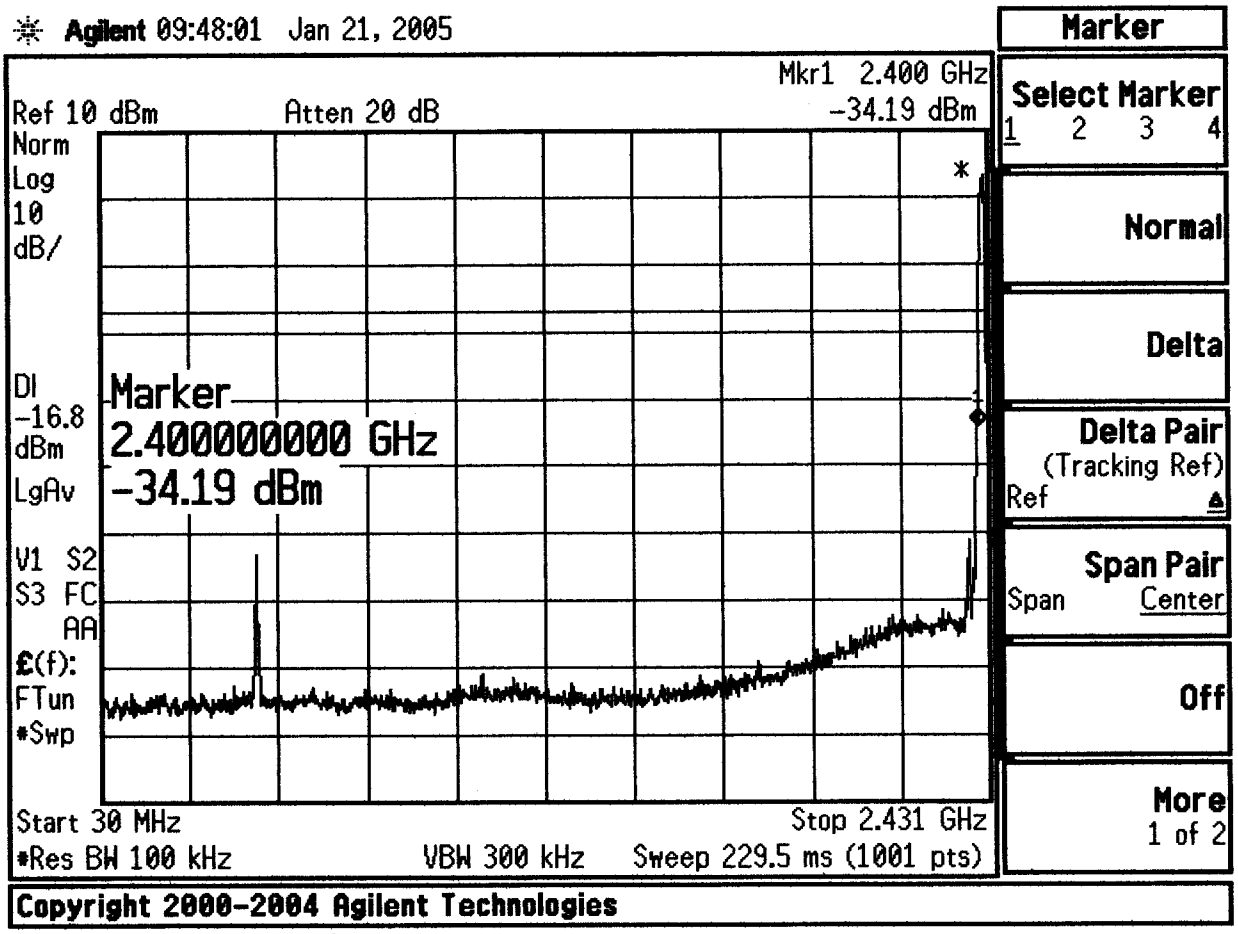
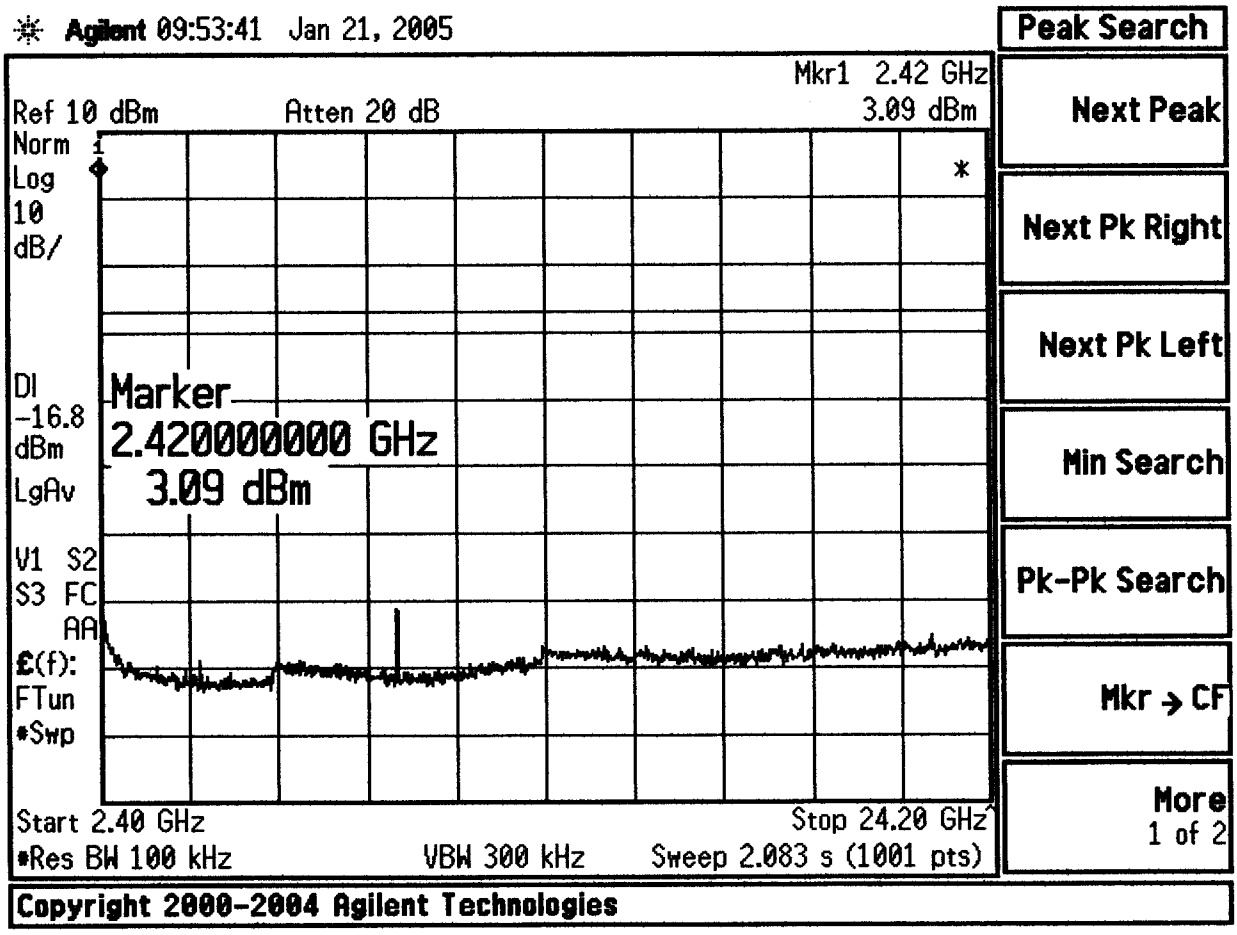


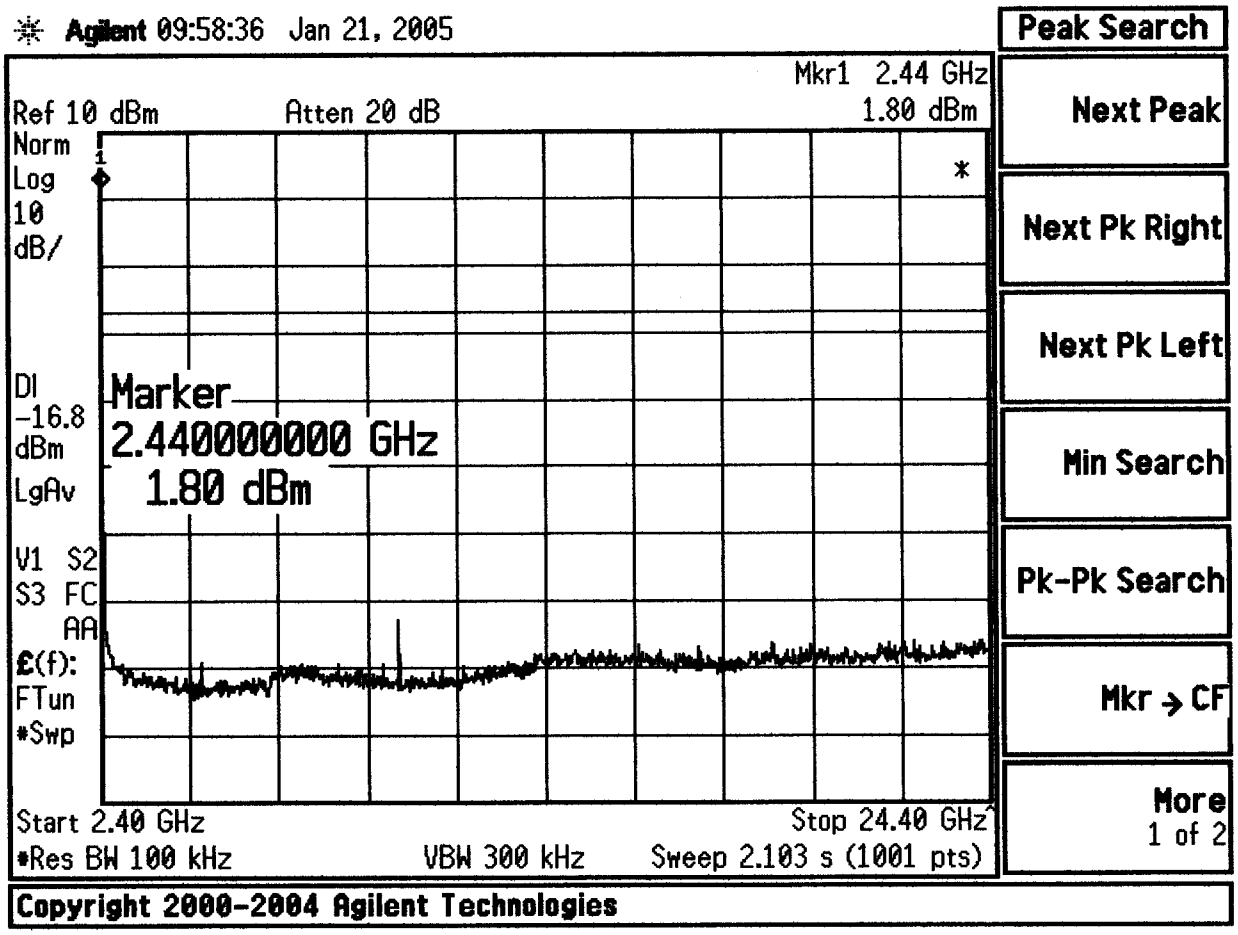
Ch #1 Band edge & Spurious plot #1

Spectrum Analyzer # 3367

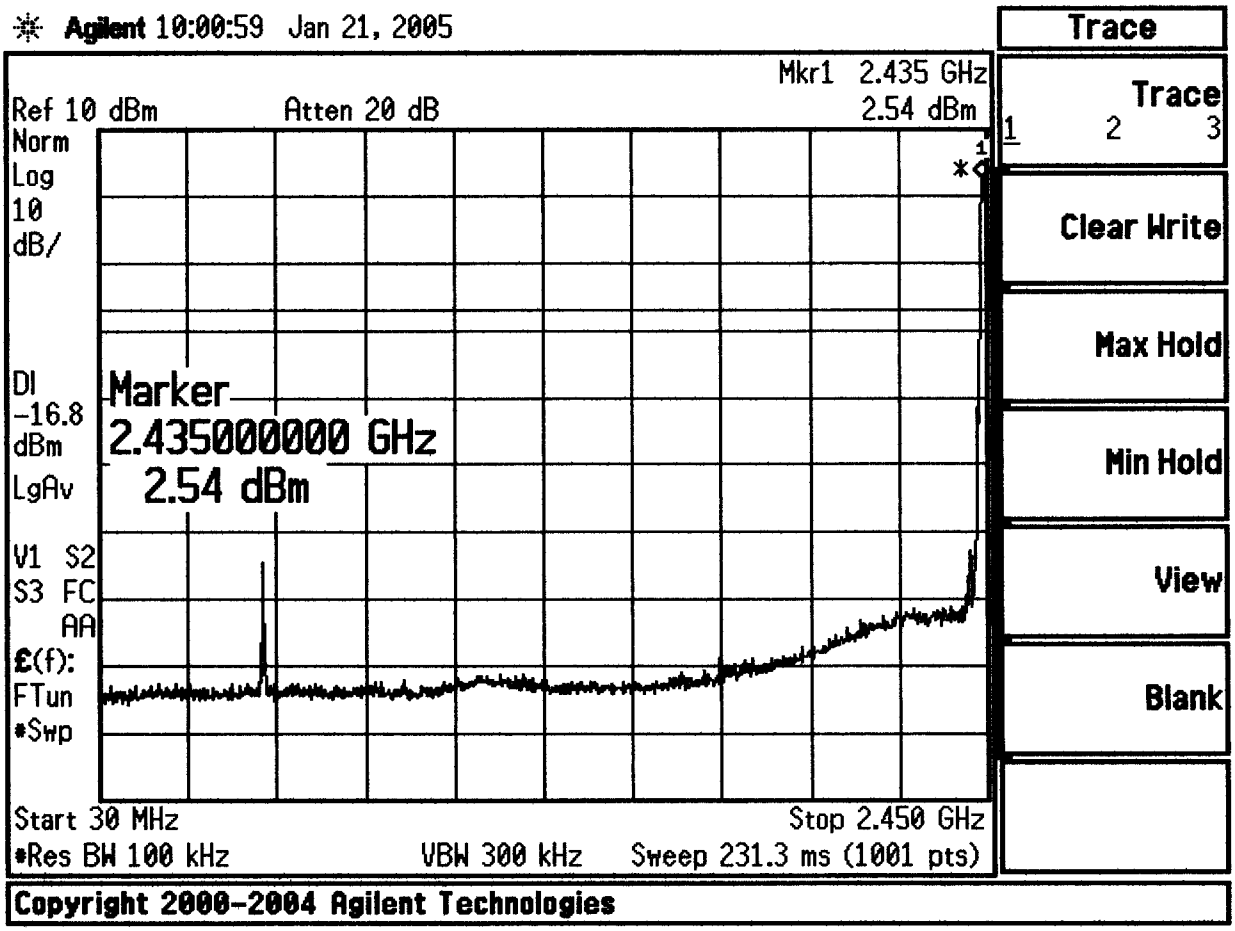
Cable # 3897



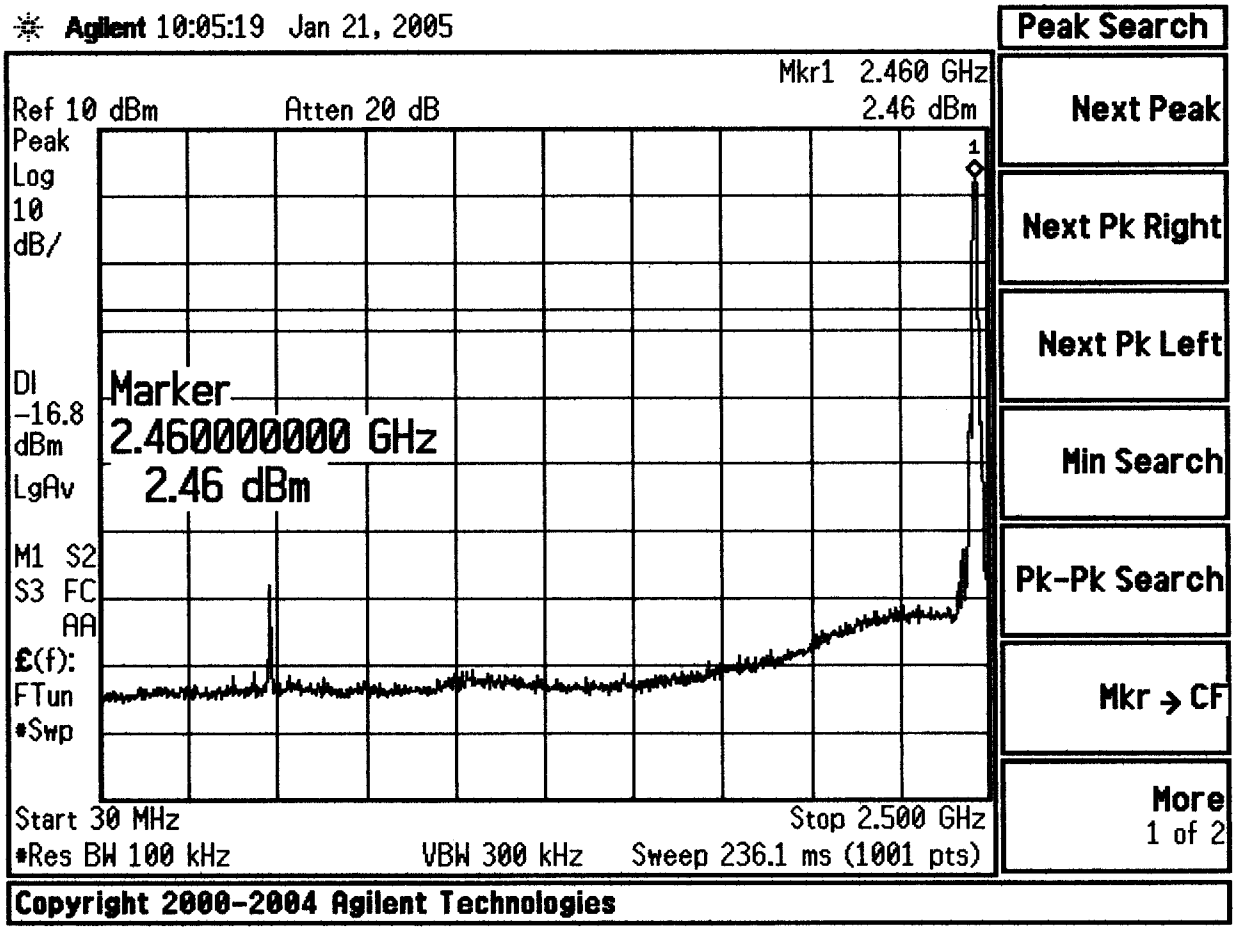
Ch #1 Spurious plot #2



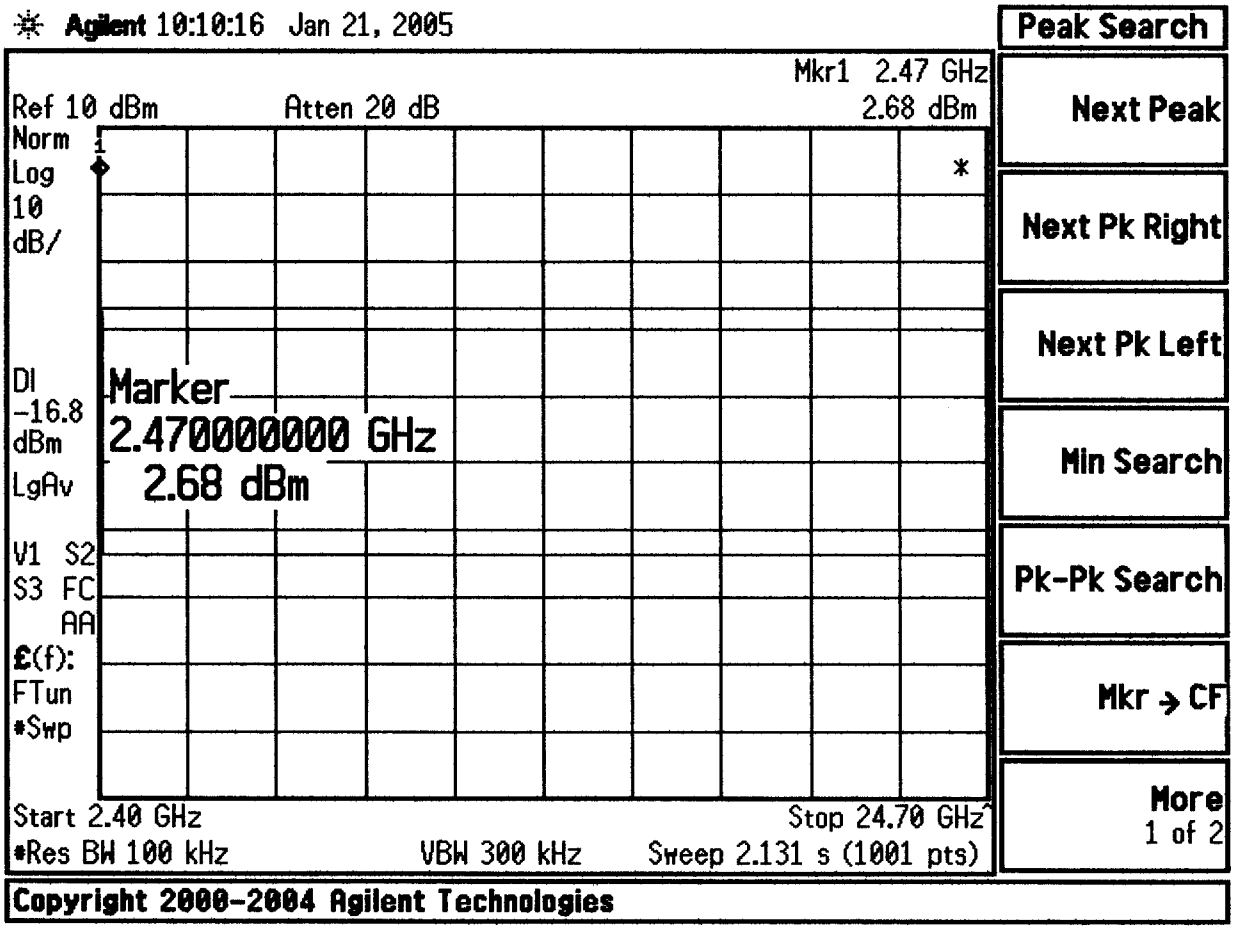
Channel 6 spurious emission plot



Ch # 6 spurious emission plot



Ch # 11 spurious emission plot



Ch #11 spurious emission plot

Radiated Emissions in Restricted Bands

Specifications:
FCC Specification: Paragraph: 15.247 (d)
IC Specification: N/A

The *Radiated Emissions in Restricted Band* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	21-Oct-05
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	14-Aug-05
2689	8566B	Hewlett-Packard	Spectrum Analyzer	2416A00321	31-Jan-05
2674	85662A	Hewlett-Packard	Analyzer Display	2050A02007	31-Jan-05
3962	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-2	Code B 08-Feb-05
3957	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 17-Oct-05
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	24-Nov-05
2478	AWT-18037	Avantek	Preamplifier 8-18 GHz	1001-9226	Code B 24-May-05
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B 25-May-05
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
2788	3116	Electro-Mechanics (EMCO)	Ridge Guide Ant 18-40 GHz	2005	27-Sep-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	1 of 3

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
NO SPURIOUS EMISSIONS DETECTED V OR H POLARIZATIONS AT ALL AZIMUTHS.						
NOISE FLOOR MEASUREMENTS.						
112.043 MHz	29.95 Qp	0.89 / 9.41 / 25.94 / 0.0	14.3	V / 1.00 / 0	-29.2	n/a
500.0 MHz	26.3 Qp	1.9 / 17.46 / 27.06 / 0.1	18.7	V / 1.00 / 0	-27.3	n/a
900.0 MHz	25.5 Qp	2.59 / 22.4 / 26.7 / 0.2	23.99	V / 1.00 / 0	-22.01	n/a
2.0 GHz	39.46 Av	3.9 / 28.03 / 43.4 / 0.0	27.99	V / 1.00 / 0	n/a	-26.01
7.0 GHz	39.05 Av	8.1 / 35.4 / 44.99 / 0.0	37.56	V / 1.00 / 0	n/a	-16.44
10.0 GHz	40.08 Av	9.71 / 38.01 / 44.42 / 0.0	43.38	V / 1.00 / 0	n/a	-10.62
18.0 GHz	31.5 Pk	13.5 / 45.42 / 45.0 / 0.0	45.42	V / 1.00 / 0	n/a	-8.58*
END OF SCAN 30MHz - 25GHz.						

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	2 of 3

Measurement summary for limit1: FCC-B <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
900.0 MHz	25.5 Qp	2.59 / 22.4 / 26.7 / 0.2	23.99	V / 1.00 / 0	-22.01
500.0 MHz	26.3 Qp	1.9 / 17.46 / 27.06 / 0.1	18.7	V / 1.00 / 0	-27.3
112.043 MHz	29.95 Qp	0.89 / 9.41 / 25.94 / 0.0	14.3	V / 1.00 / 0	-29.2

Measurement summary for limit2: FCC B >1GHz 3m (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC B >1GHz 3m
10.0 GHz	40.08 Av	9.71 / 38.01 / 44.42 / 0.0	43.38	V / 1.00 / 0	-10.62
7.0 GHz	39.05 Av	8.1 / 35.4 / 44.99 / 0.0	37.56	V / 1.00 / 0	-16.44
2.0 GHz	39.46 Av	3.9 / 28.03 / 43.4 / 0.0	27.99	V / 1.00 / 0	-26.01
18.0 GHz	31.5 Pk	13.5 / 45.42 / 45.0 / 0.0	45.42	V / 1.00 / 0	-8.58*

Tested by: RMJ

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Reviewed by: TKS

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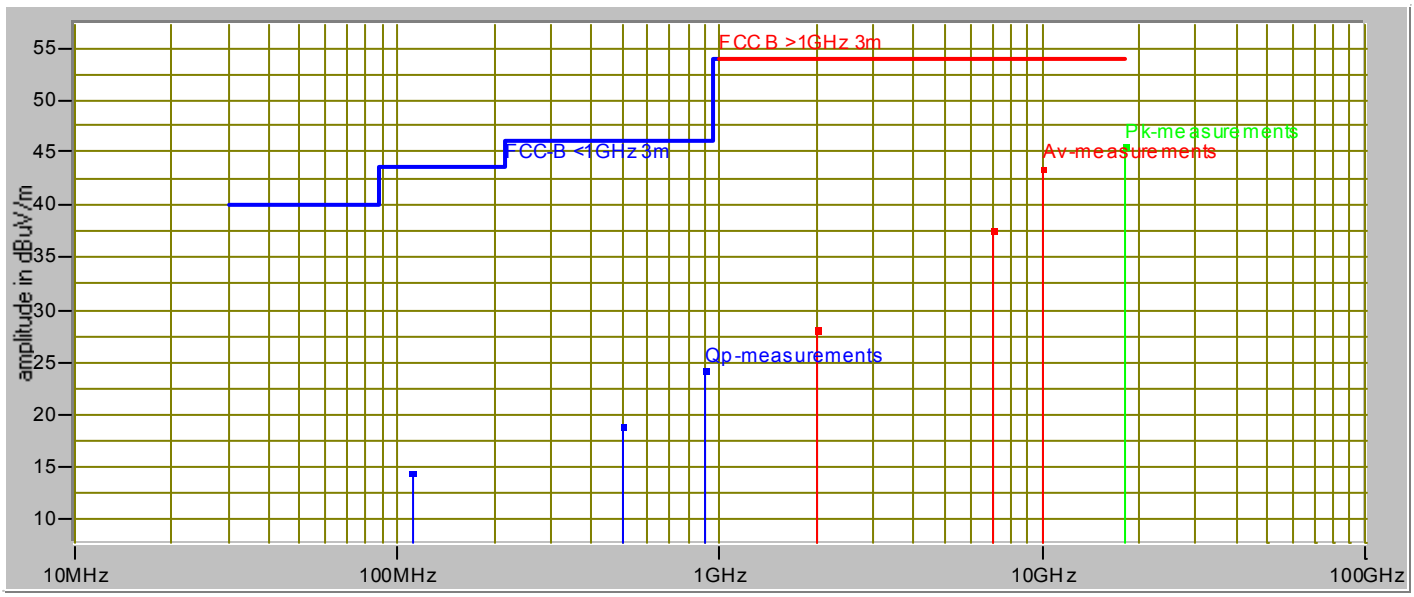
RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	3 of 3

Graph:



Tested by: RMJ

Printed _____ Signature _____

Reviewed by: TKS

Printed _____ Signature _____

Radiated Emissions in Restricted Bands (2.4 GHz Band Edges)

Specifications:
FCC Specification: Paragraph: 15.247 (d)
IC Specification: N/A

The *Radiated Emissions in Restricted Band* – Band Edge measurements were performed at the following test location:

☐ **- Test not applicable**

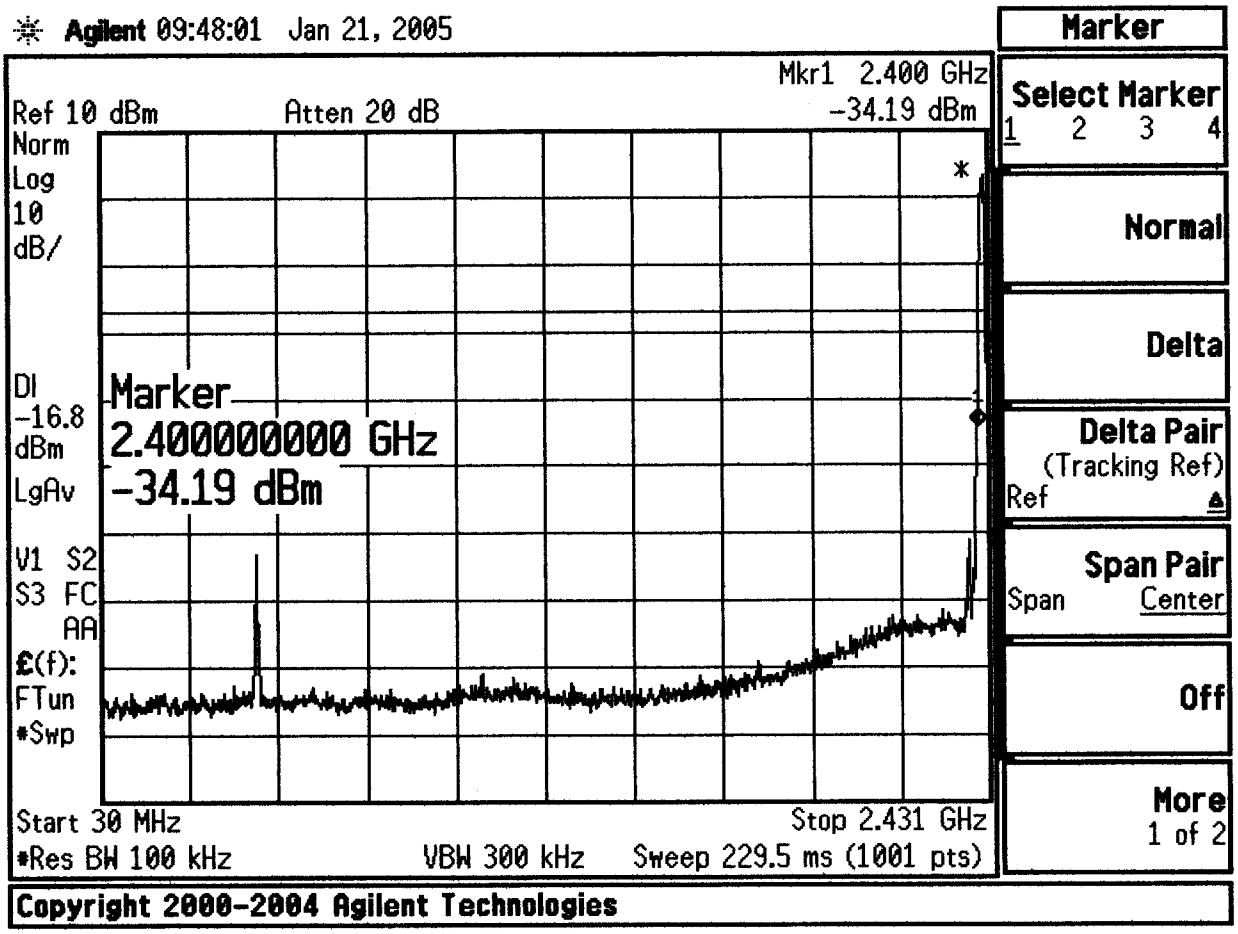
■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	25-Aug-05
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	21-Oct-05
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	14-Aug-05
2689	8566B	Hewlett-Packard	Spectrum Analyzer	2416A00321	31-Jan-05
2674	85662A	Hewlett-Packard	Analyzer Display	2050A02007	31-Jan-05
3962	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-2	Code B 08-Feb-05
3957	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 17-Oct-05
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	24-Nov-05
2478	AWT-18037	Avantek	Preamplifier 8-18 GHz	1001-9226	Code B 24-May-05
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B 25-May-05
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
2788	3116	Electro-Mechanics (EMCO)	Ridge Guide Ant 18-40 GHz	2005	27-Sep-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

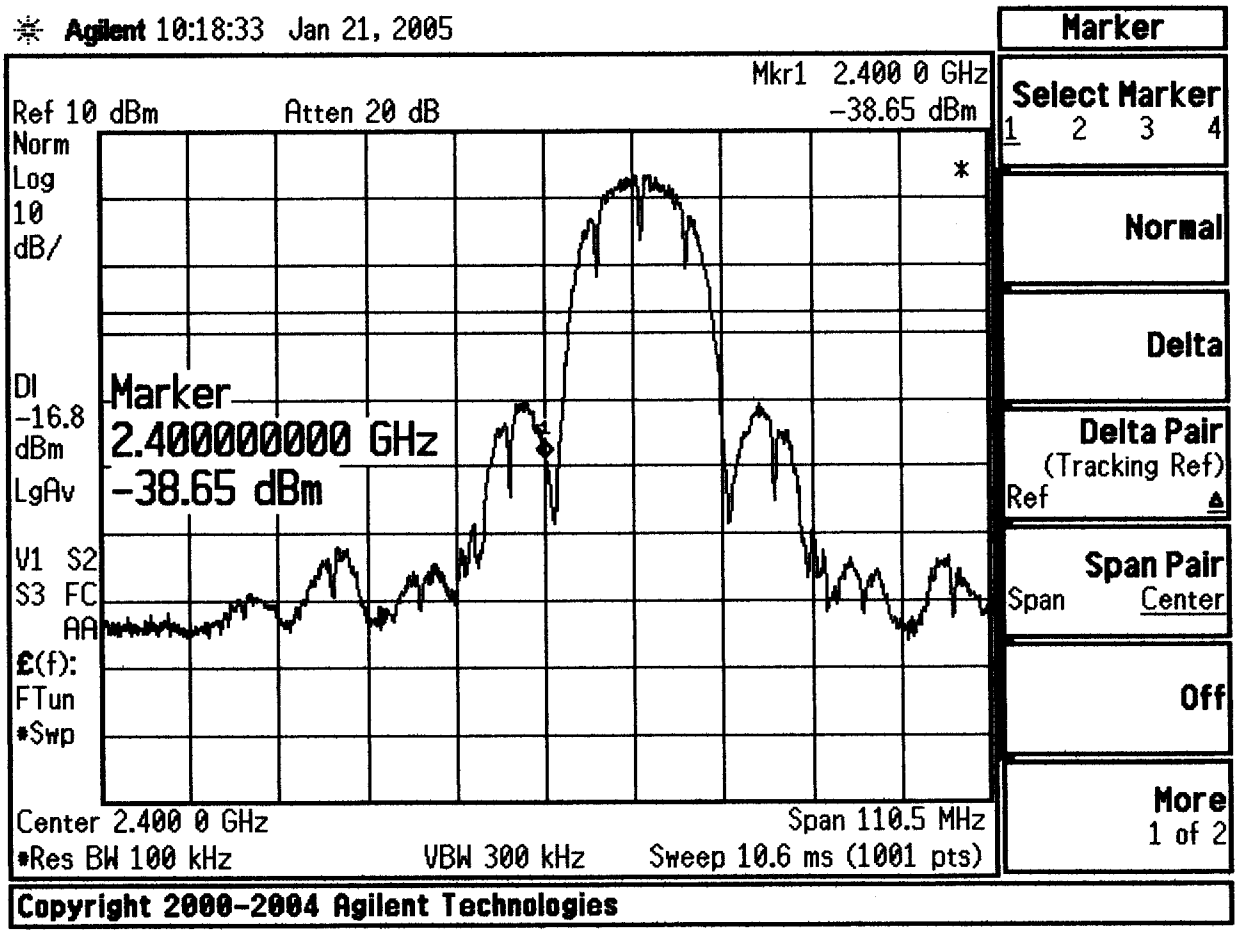
All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.



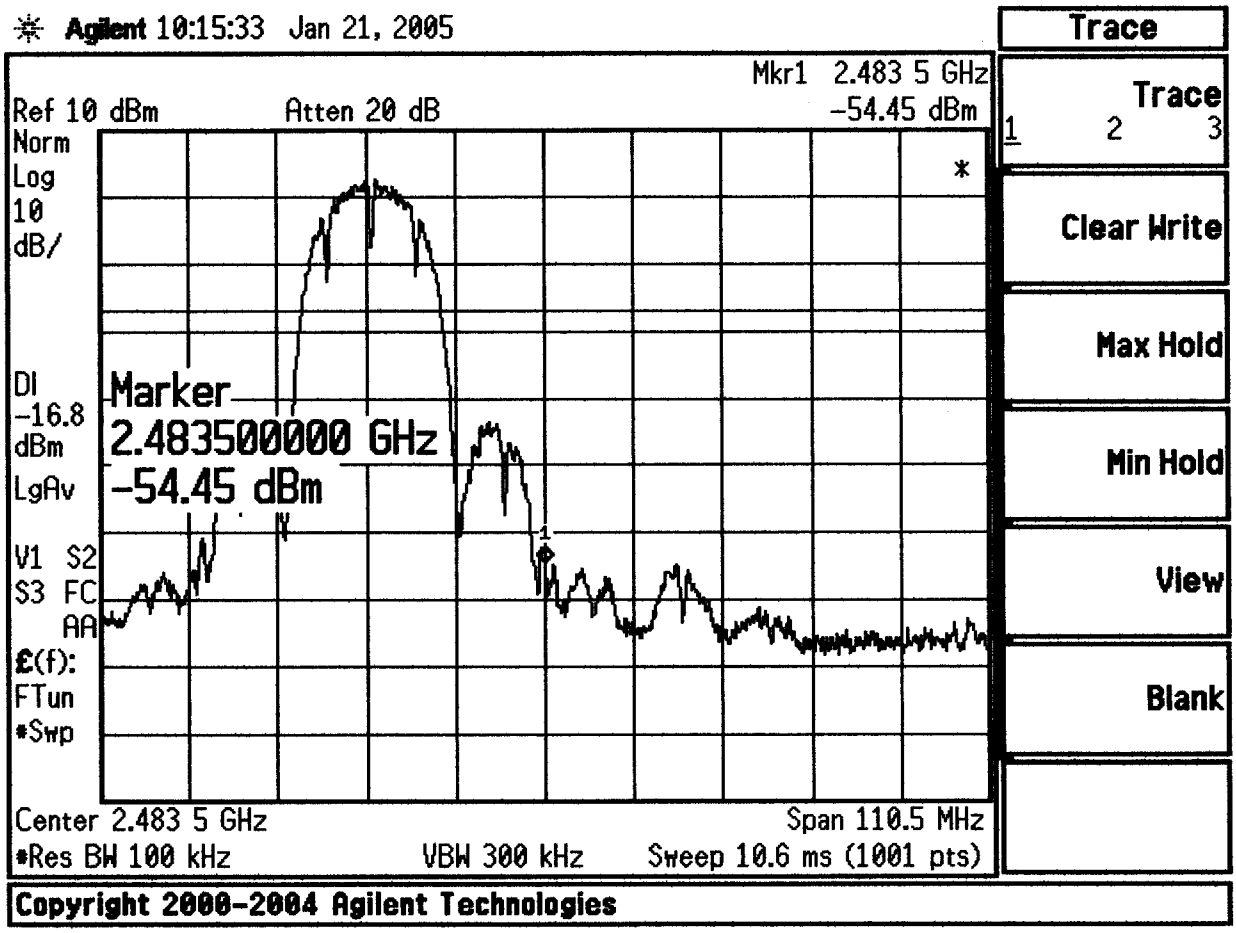
Ch #1 Band edge & Spurious plot #1

Spectrum Analyzer # 3367

Cable # 3897



Ch #1 Band edge



Channel #11 Bandedge

AC Line Conducted Emissions

Specifications:
CISPR 22

The *AC Line Conducted Emission* measurements were performed at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

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Receiver Spurious Radiated Emissions

Specifications:
FCC Specification: Paragraph: 15.109

The *Receiver Spurious Emission* measurements were performed at the following test location:

☐ **- Test not applicable**

■ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room

Test equipment used :

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	21-Oct-05
2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	14-Aug-05
2689	8566B	Hewlett-Packard	Spectrum Analyzer	2416A00321	31-Jan-05
2674	85662A	Hewlett-Packard	Analyzer Display	2050A02007	31-Jan-05
3962	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-2	Code B 08-Feb-05
3957	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 17-Oct-05
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	24-Nov-05
2478	AWT-18037	Avantek	Preamplifier 8-18 GHz	1001-9226	Code B 24-May-05
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B 25-May-05
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
2788	3116	Electro-Mechanics (EMCO)	Ridge Guide Ant 18-40 GHz	2005	27-Sep-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	1 of 3

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
NO SPURIOUS EMISSIONS DETECTED V OR H POLARIZATIONS AT ALL AZIMUTHS.						
NOISE FLOOR MEASUREMENTS.						
112.043 MHz	29.95 Qp	0.89 / 9.41 / 25.94 / 0.0	14.3	V / 1.00 / 0	-29.2	n/a
500.0 MHz	26.3 Qp	1.9 / 17.46 / 27.06 / 0.1	18.7	V / 1.00 / 0	-27.3	n/a
900.0 MHz	25.5 Qp	2.59 / 22.4 / 26.7 / 0.2	23.99	V / 1.00 / 0	-22.01	n/a
2.0 GHz	39.46 Av	3.9 / 28.03 / 43.4 / 0.0	27.99	V / 1.00 / 0	n/a	-26.01
7.0 GHz	39.05 Av	8.1 / 35.4 / 44.99 / 0.0	37.56	V / 1.00 / 0	n/a	-16.44
10.0 GHz	40.08 Av	9.71 / 38.01 / 44.42 / 0.0	43.38	V / 1.00 / 0	n/a	-10.62
18.0 GHz	31.5 Pk	13.5 / 45.42 / 45.0 / 0.0	45.42	V / 1.00 / 0	n/a	-8.58*
END OF SCAN 30MHz - 25GHz.						

Tested by: RMJ

Printed

Signature

Reviewed by: TKS

Printed

Signature

RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	2 of 3

Measurement summary for limit1: FCC-B <1GHz 3m (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
900.0 MHz	25.5 Qp	2.59 / 22.4 / 26.7 / 0.2	23.99	V / 1.00 / 0	-22.01
500.0 MHz	26.3 Qp	1.9 / 17.46 / 27.06 / 0.1	18.7	V / 1.00 / 0	-27.3
112.043 MHz	29.95 Qp	0.89 / 9.41 / 25.94 / 0.0	14.3	V / 1.00 / 0	-29.2

Measurement summary for limit2: FCC B >1GHz 3m (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC B >1GHz 3m
10.0 GHz	40.08 Av	9.71 / 38.01 / 44.42 / 0.0	43.38	V / 1.00 / 0	-10.62
7.0 GHz	39.05 Av	8.1 / 35.4 / 44.99 / 0.0	37.56	V / 1.00 / 0	-16.44
2.0 GHz	39.46 Av	3.9 / 28.03 / 43.4 / 0.0	27.99	V / 1.00 / 0	-26.01
18.0 GHz	31.5 Pk	13.5 / 45.42 / 45.0 / 0.0	45.42	V / 1.00 / 0	-8.58*

Tested by: RMJ

Printed

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Reviewed by: TKS

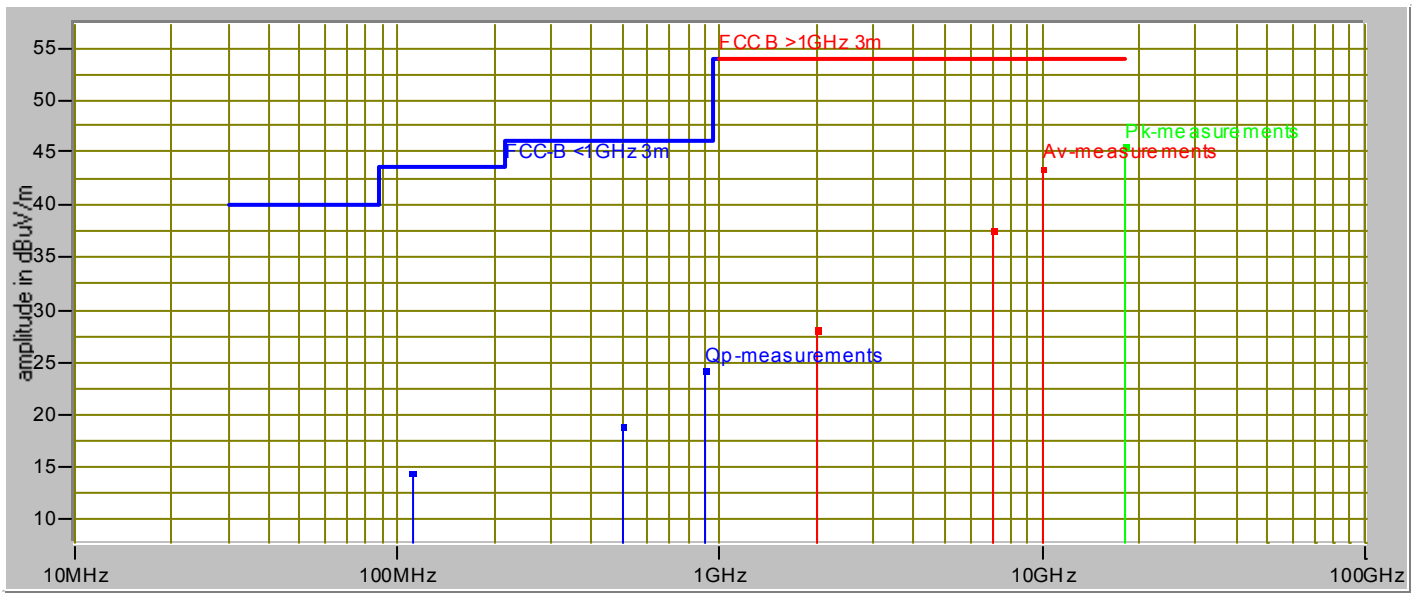
Printed

Signature

RADIATED EMISSIONS

Test Report #:	WC500169 Run 1	Test Area:	LTS		
EUT Model #:	SA-0085-01	Date:	1/19/05		
EUT Serial #:	N/A	EUT Power:	14VDC	Temperature:	23.0 °C
Test Method:	FCC 15.247			Air Pressure:	97.0 kPa
Customer:	XATA CORP			Rel. Humidity:	40.0 %
EUT Description:	2.4GHz SS TRANSMITTER				
Notes:	SPURIOUS SCAN.				
Data File Name:	0169.dat			Page:	3 of 3

Graph:



Tested by: RMJ

Printed _____ Signature _____

Reviewed by: TKS

Printed _____ Signature _____