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Wireless Detection

FCC Part 15, Certification Application
Fire Warning System
Model SM-002 Rev 02 System Manager

March 28, 2005

UST Project Number: 05-0039

NVLAP accredited Lab Code: 200162-0

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American Council of Independent Laboratories, Inc.

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I certify that I am authorized to sign for the manufacturer and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

UNITED STATES TECHNOLOGIES, INC. (AGENT RESPONSIBLE FOR TEST):

By: _____

Name: Louis A. Feudi

Title: Operations Manager

Date: March 28, 2005

Wireless Detection
79 Tyee Drive
Point Roberts, WA 98281

By:

Name:

Title:

Date:

Report Number: 05-0039 Issue Date: March 28, 2005
Customer: Wireless Detection
Model: SM-002 Rev 02 System Manager

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Wireless Detection**
MODEL: **SM-002 Rev 02 System Manager**
FCC ID: **SZX-SM002**
DATE: **March 28, 2005**

This report concerns (check one): Original grant X
Class II change_____

Equipment type: **Spread Spectrum Transceiver**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until:_____
date

N.A. agrees to notify the Commission by N.A.
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

United States Technologies, Inc.
3505 Francis Circle
Alpharetta, GA 30004

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GENERAL INFORMATION

GENERAL INFORMATION

1.1 Product Description

The Equipment Under test (EUT) is the Wireless Detection's Fire Warning System, Model SM-002 Rev 02 System Manager. Under normal operation the System Manager (SM-002) is in receive mode. When a data transmission is received and the data is determined to be valid, then the System Manager responds with an acknowledge transmission and also sends the data to a computer via an RS232 link. With each reception only one transmission is sent.

The changing of channels is normally controlled via the Smoke Detector transceiver. When the Smoke Detector sends a status report, the Smoke Detector ends the transmission of data, either after the acknowledgement is received or after a timeout of 7 transmissions. The status is currently sent every 30 minutes; it may be set as low as 15 minutes.

The modes that will put the Smoke Detector in the FHSS mode is as follows:

When the Smoke Detector detects an Alarm condition, which is either the detection of smoke, the temperature rate of rise condition has been met and or the maximum temperature has been exceeded, the unit is being tampered with, the unit is in test mode via the user push to test button.

During these conditions the Smoke Detector ignores acknowledgement reception and continues to transmit until the alarm condition is no longer present.

When the unit is in FHSS mode, ten transmissions of alarm is sent followed by five transmissions of channel data. When the System Manager receives the channel data, the unit will change the transceiver channel to the instructed channel as sent by the Smoke Detector. The way this is controlled is by counting the transmissions, after 15 transmissions, the unit is incremented to the next channel. The format of the data transmissions is fixed. The transmit time will never increase or decrease.

When a data transmission is sent the transmit time is 2.84 ms. After a data transmission, the unit is put into the receive mode, the receive time before the next transmit time is 23.8 ms; if no acknowledgement has been received or the acknowledge transmission is inhibited. Each transmit and receive cycle is 26.24 ms. The channel occupancy is 15 transmissions @ 2.84 ms per transmission, which provides channel occupancy of 46.6 ms per channel. With a range of 62 separate channels; the total transmit and receive time is 0.3758 ms per channel. The cycle time of 62 channels is 23.2996 seconds.

1.2 Related Submittal(s)/Grant(s)

The EUT will be used with part of a system to send/receive data. The transceiver presented in this report will be used with other like transmitters.

The EUT is subject to the following authorizations:

a) Certification as a transceiver
b) Verification as a receiver and digital device

The information contained in this report is presented for the certification & verification authorization(s) for the EUT.

SECTION 2

TESTS AND MEASUREMENTS

TEST AND MEASUREMENTS

2.1 Configuration of Tested System

The sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (1992). Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions. Bock diagrams of the tested systems are shown in Figure 1. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2a -b. Test configuration photograph for conducted digital emissions is shown in Figure 2c.

The sample used for testing was received by U.S. Technologies on March 2, 2005 in good condition.

2.2 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and submitted to the FCC, and accepted in their letter marked 31040/SIT. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number IC2982.

2.3 Test Equipment

Table 2 describes test equipment used to evaluate this product.

2.4 Modifications

No modifications were made to bring the EUT into compliance with FCC Part 15, Class B Limits for the transmitter portion of the EUT or the Class B Digital Device Requirements:

FIGURE 1

TEST CONFIGURATION

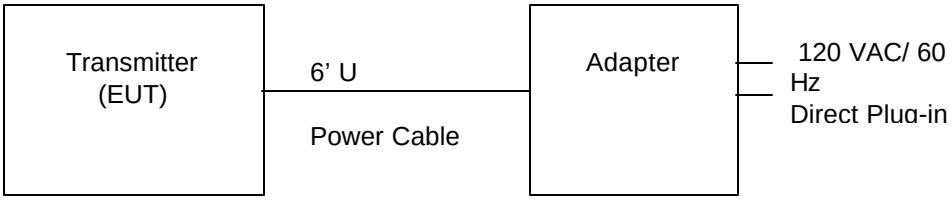


FIGURE 2a

Photograph(s) for Spurious Emissions

FIGURE 2b

Photograph(s) for Spurious Emissions

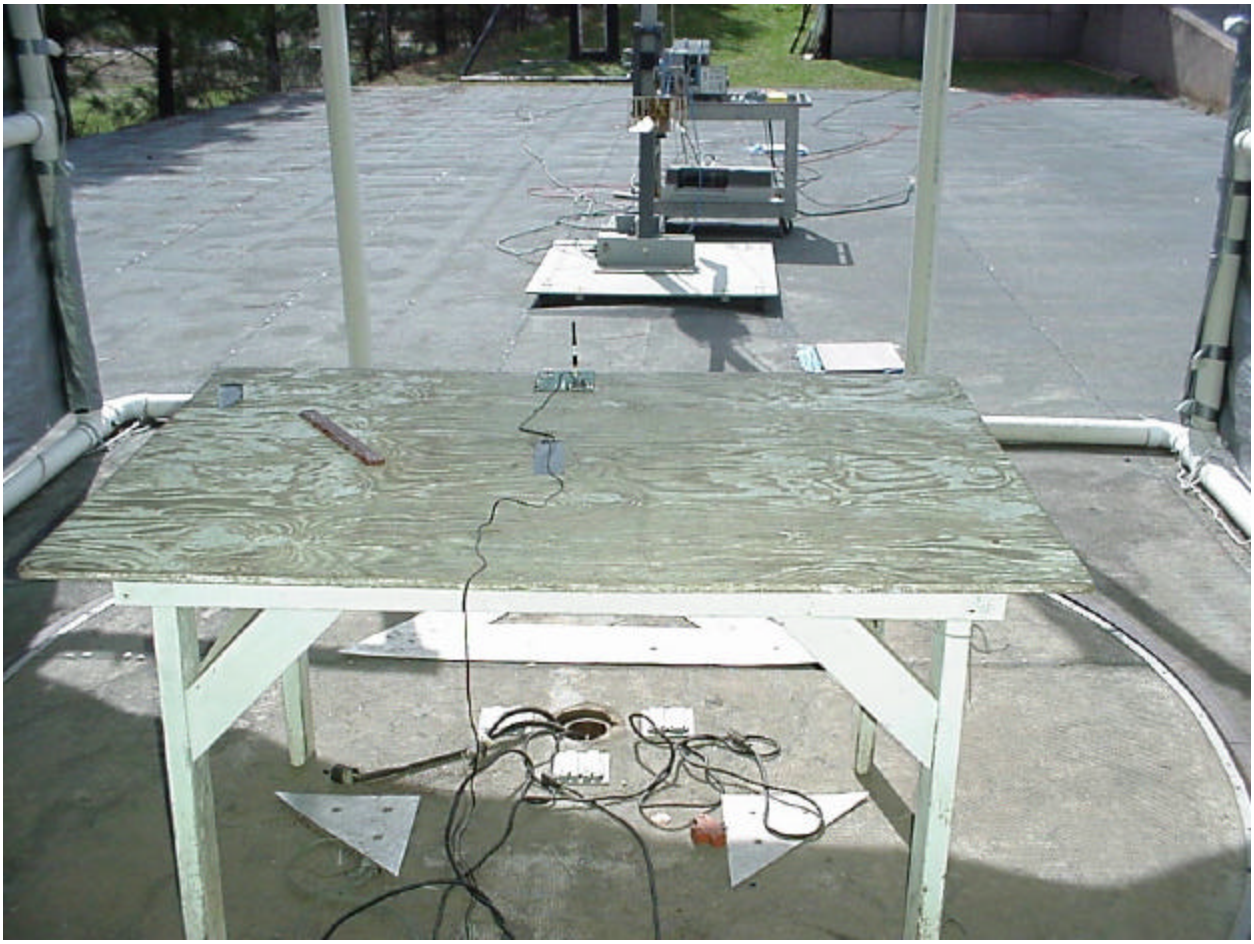


FIGURE 2c

Photograph(s) for Conducted Emissions

TABLE 1
EUT and Peripherals

PERIPHERAL MANU.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transmitter (EUT) Wireless Detection	SM-002 Rev 02 System Manager	None	None	6' U Power Cable
Adapter Cui, Inc.	DV-1230-B11	None	None	120 VAC/ 60 Hz Direct Connect

Detail of I/O Cables Attached to EUT

DESCRIPTION OF CABLE	DETAILS OF CABLE			CABLE LENGTH
Power Cable	**Manufacturer and Part Number**			6’
	Shield Type	**Shield Termination**	**Type of Backshell**	
	N/A	N/A	N/A	

TABLE 2
TEST INSTRUMENTS

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8558B	HEWLETT-PACKARD	2332A10055	2/25/05
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	3/1/05
SIGNAL GENERATOR	8648B	HEWLETT-PACKARD	3642U01679	4/29/04
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	3/1/05
BICONICAL ANTENNA	3110B	EMCO	9307-1431	5/18/04
LOG PERIODIC	3146	EMCO	3110-3236	6/30/04
LISN (x 2) 8028-50-TS24-BNC	8028	SOLAR ELE.	910494 & 910495	1/27/05
HORN ANTENNA	SAS-571	A. H. SYSTEMS	605	04/26/04
PREAMP	8449B	HEWLETT PACKARD	3008A00480	6/23/04
CALCULATION PROGRAM	N/A	N/A	EMCCALC	N/A

2.6 Antenna Description (Paragraph 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The Model Wireless Detection SM-002 Rev 02 System Manager uses the following antenna:

Linx Technologies
¼ Wave Whip Antenna
Model ANT-916-JJB-ST
Gain = 3.0 dBi

The antenna mounts on a unique reverse SMA connector.

2.7 Peak power within the band 902 – 928 MHz per FCC Section 15.247(b)

Peak power within the band 902 – 928 MHz has been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer. The spectrum analyzer was set for a 50 Ω impedance with the VBW $\geq$ RBW 6 dB bandwidth. The results of the measurements are given in Table 3 and Figure 3a through Figure 3c.

Fundamental Frequencies were measured at Low Channel, Mid Channel, High Channel.

TABLE 3
PEAK POWER OUTPUT

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (mW)*	FCC Limit (Watt)
902.324	24.11	257.63	1.0
915.024	22.95	197.24	1.0
927.320	23.23	210.38	1.0

Power = Antilog (dBm/10) = Antilog (24.11/10) = Antilog 2.411 = 257.63
*** Measurement includes 0.1 dB for cable loss**

Test Date: February 15, 2005

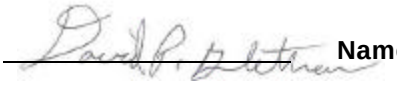
Tester Signature:  **Name: David Blethen**

Figure 3a.
Peak Power per FCC Section 15.247(b) (Low Channel)

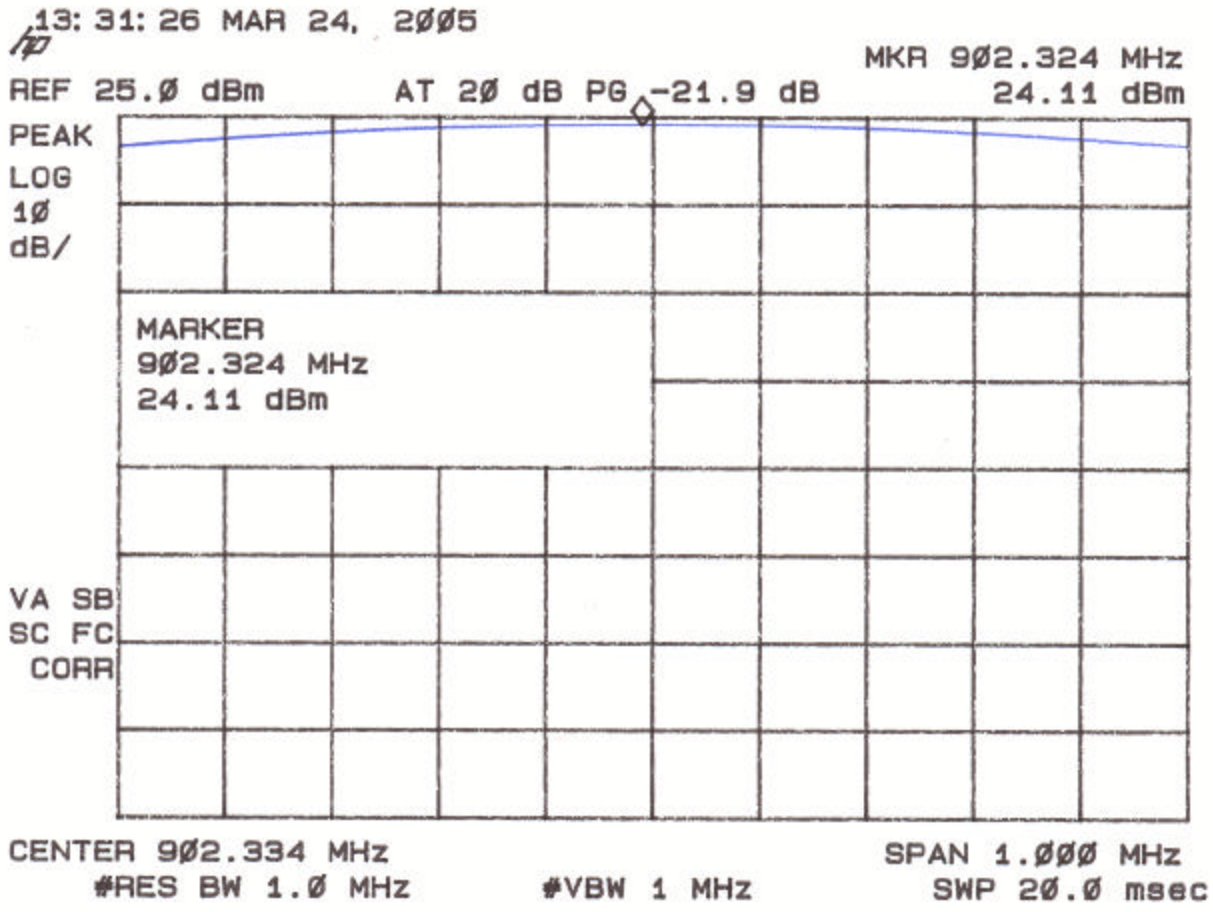


Figure 3b.
Peak Power per FCC Section 15.247(b) (Mid Channel)

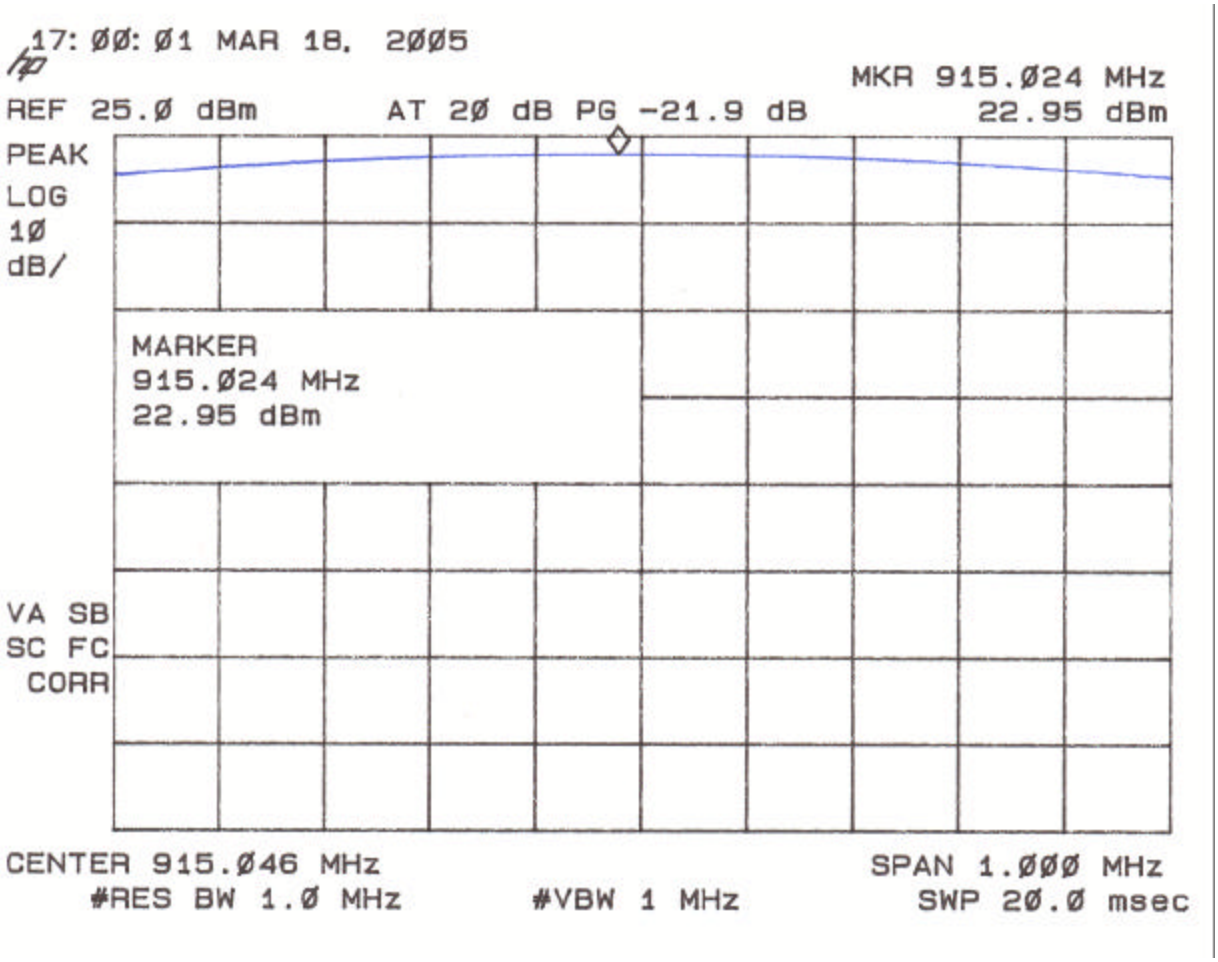
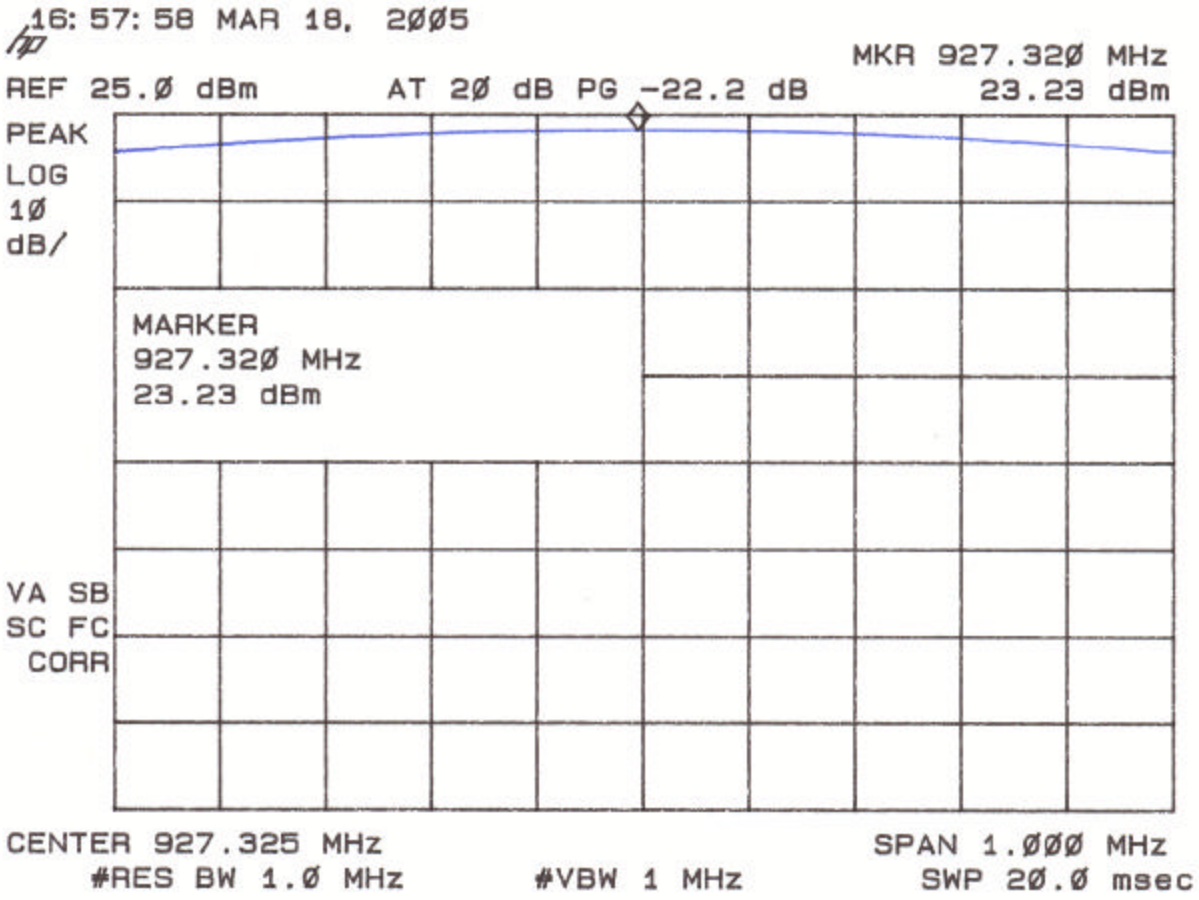


Figure 3c.
Peak Power per FCC Section 15.247(b) (High Channel)



2.8 Antenna Conducted Spurious Emission the Frequency Range 30 – 25000 MHz (FCC Section 15.247(c))

Spurious emissions in the frequency range 30 – 25000 MHz have been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals or across the antenna leads on the PCB as specified by the manufacturer. The spectrum analyzer was set for a 50 Ω impedance with the RBW = 100 kHz & VBW> RBW. All spurious emissions were measured to be greater than 20 dB down from the fundamental. The results of conducted spurious emissions are given in Figure 4a through 4l.

Figure 4a
Antenna Conducted Spurious Emissions 15.247(c) (Low Channel)

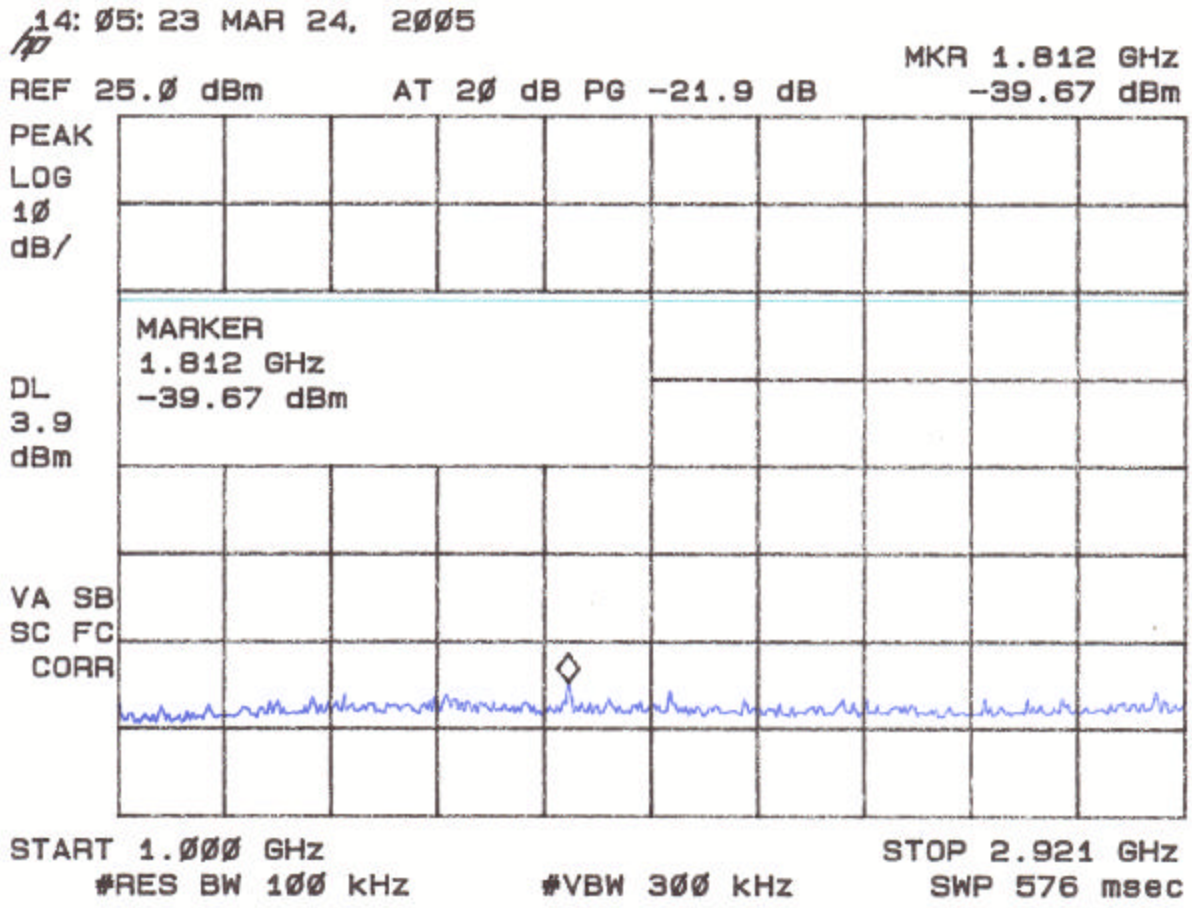


Figure 4b
Antenna Conducted Spurious Emissions 5.247(c) (Low Channel)

NOTE: Due to large span used, frequency appears off. Actual Frequency of the fundamental is 902.324 MHz.

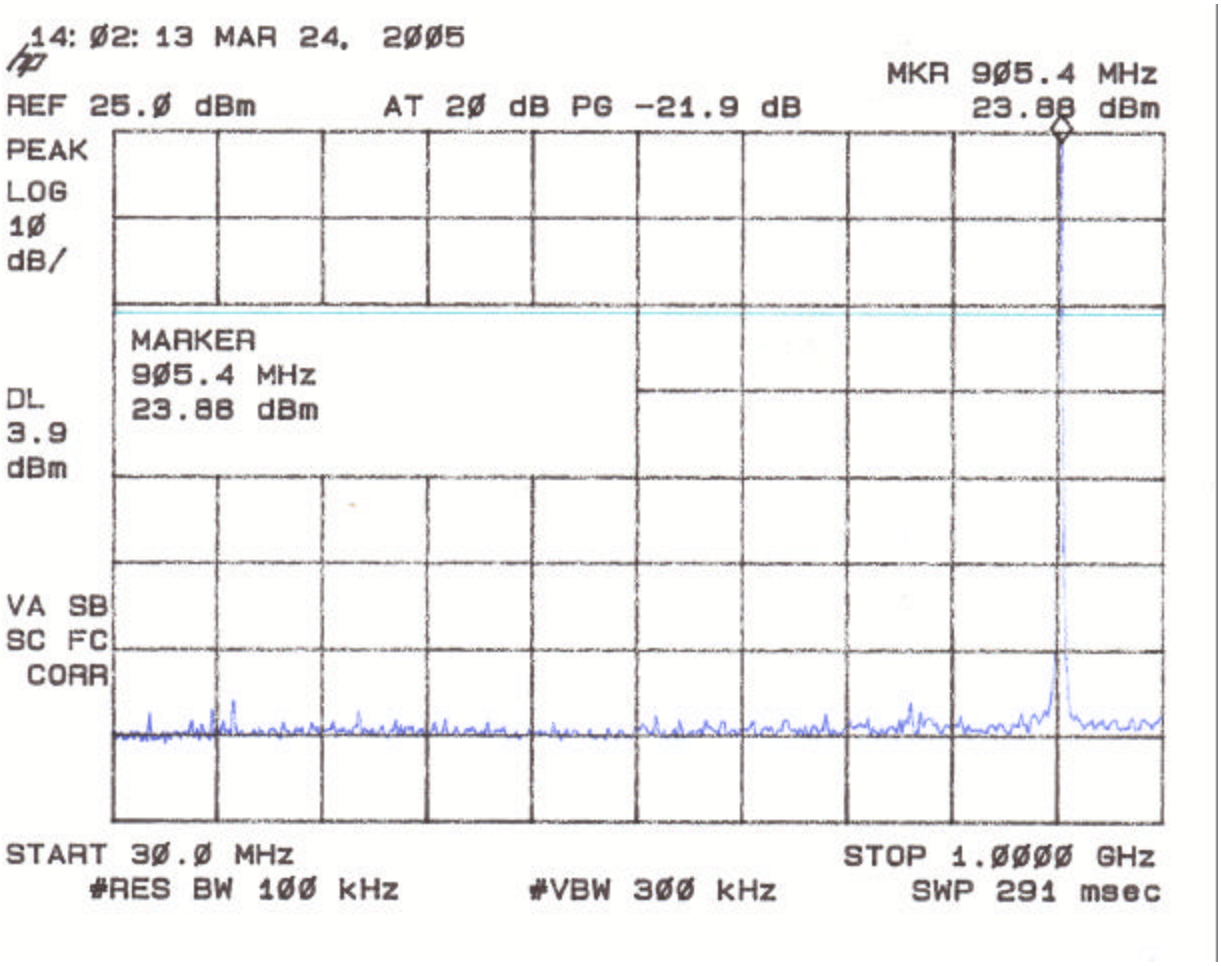


Figure 4c
Antenna Conducted Spurious Emissions 15.247(c) (Low Channel)

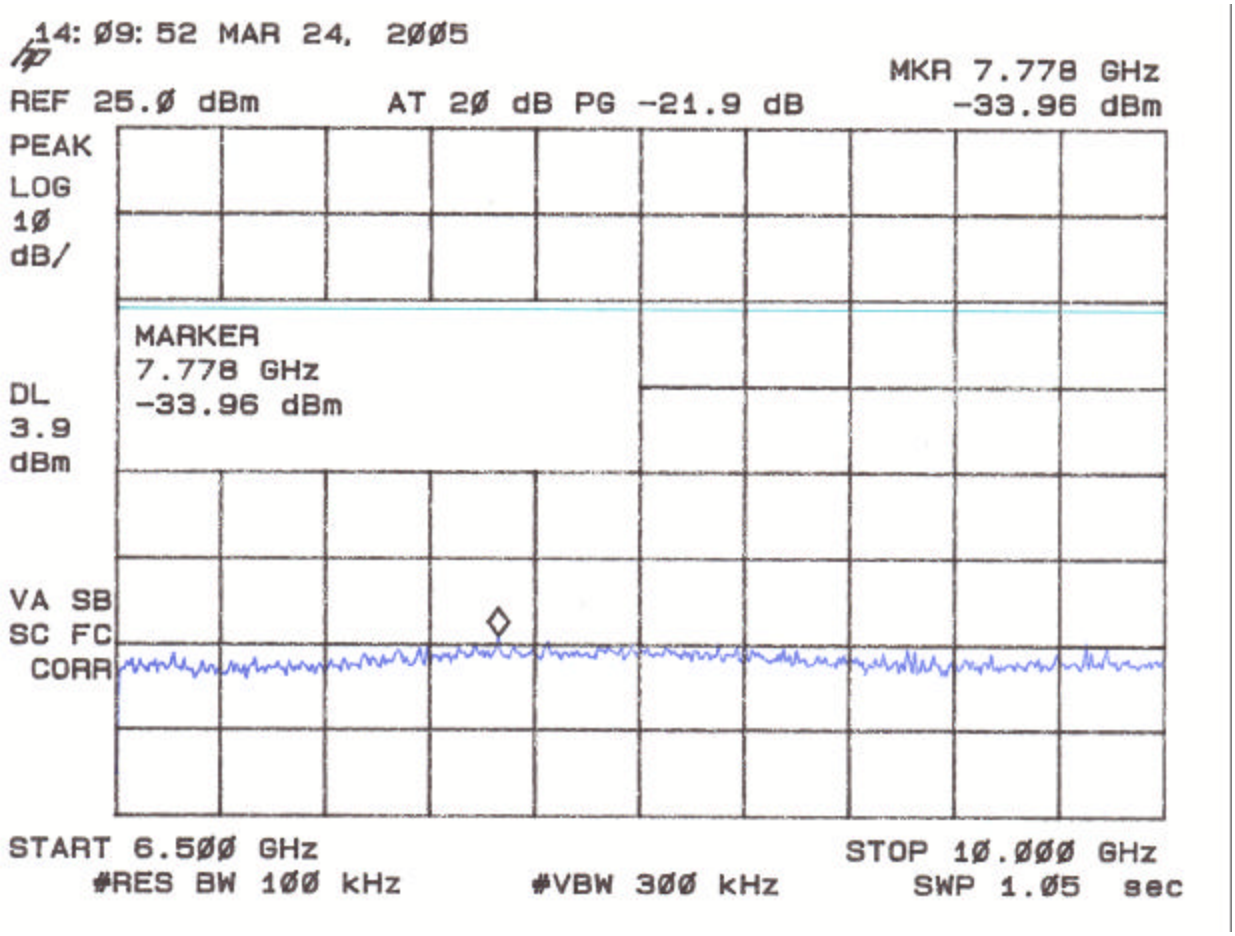


Figure 4d
Antenna Conducted Spurious Emissions 15.247(c) (Low Channel)

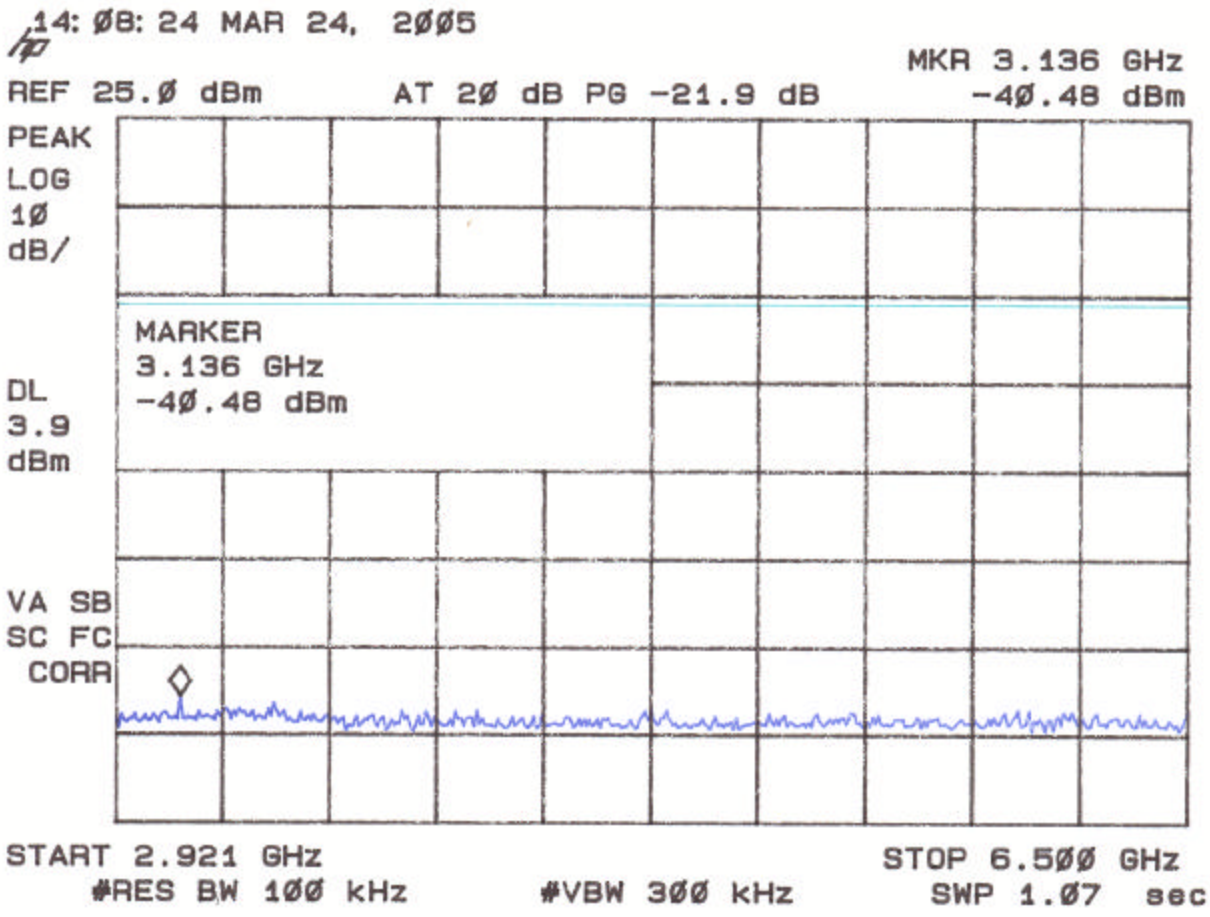


Figure 4e
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

NOTE: Due to large span used, frequency appears off. Actual Frequency of the fundamental is 915.024 MHz.

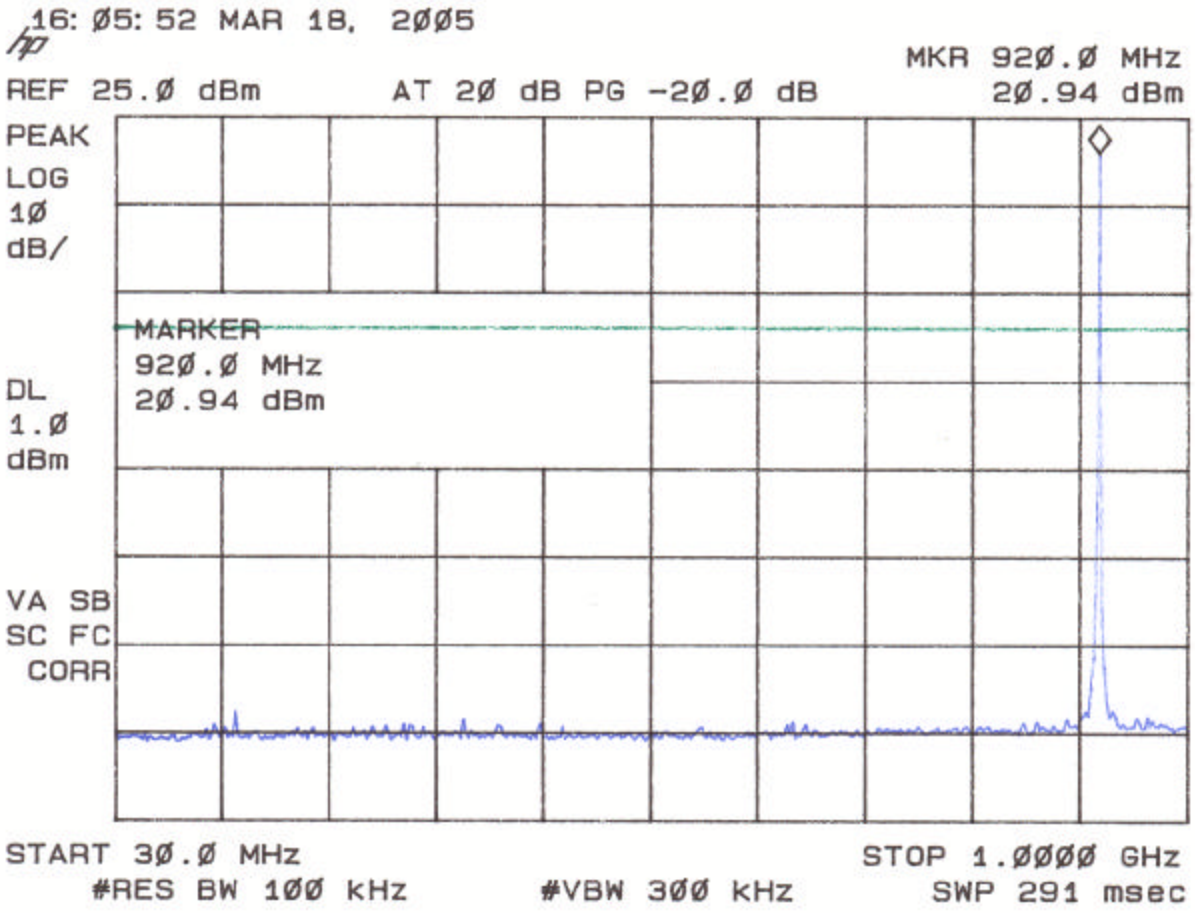


Figure 4f
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

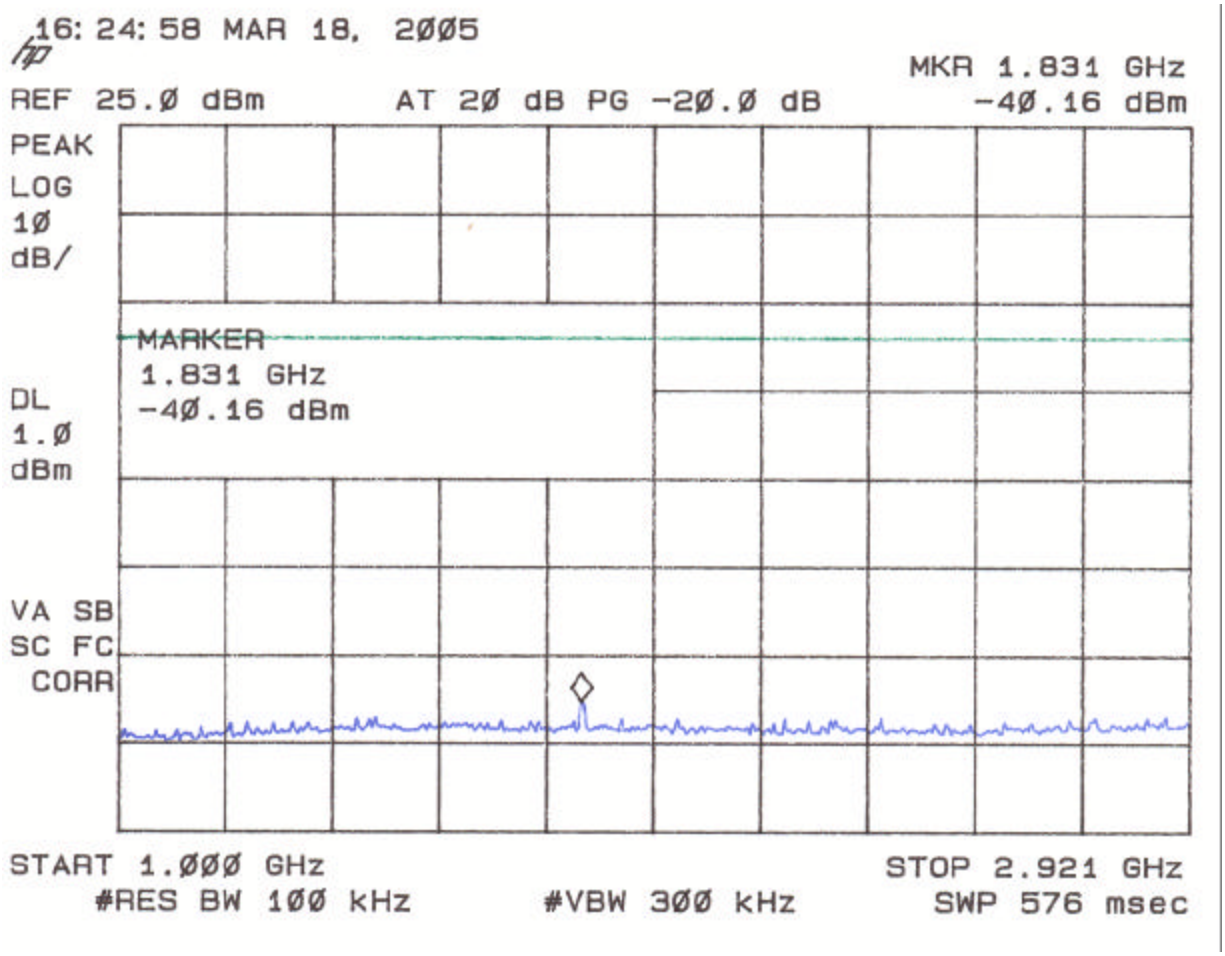


Figure 4g
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

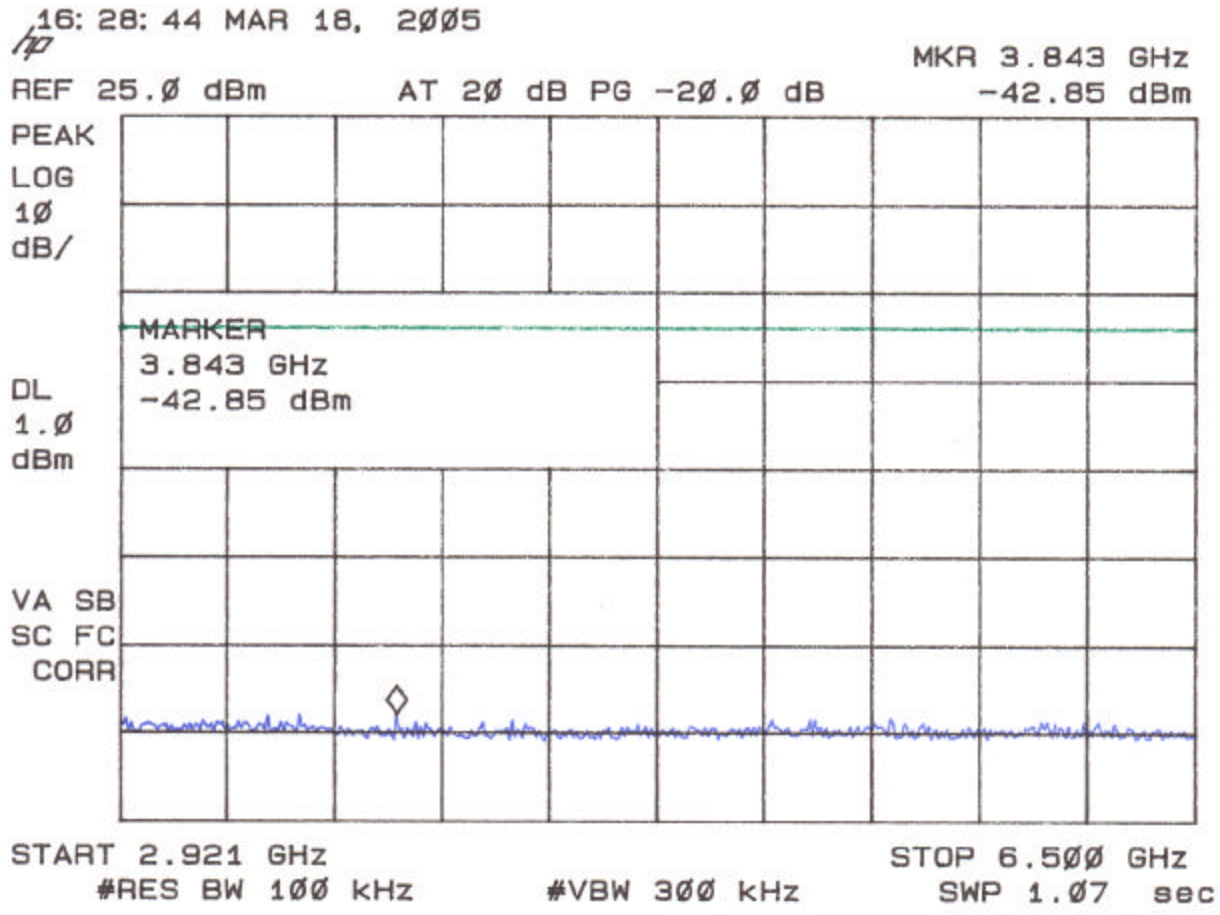


Figure 4h
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

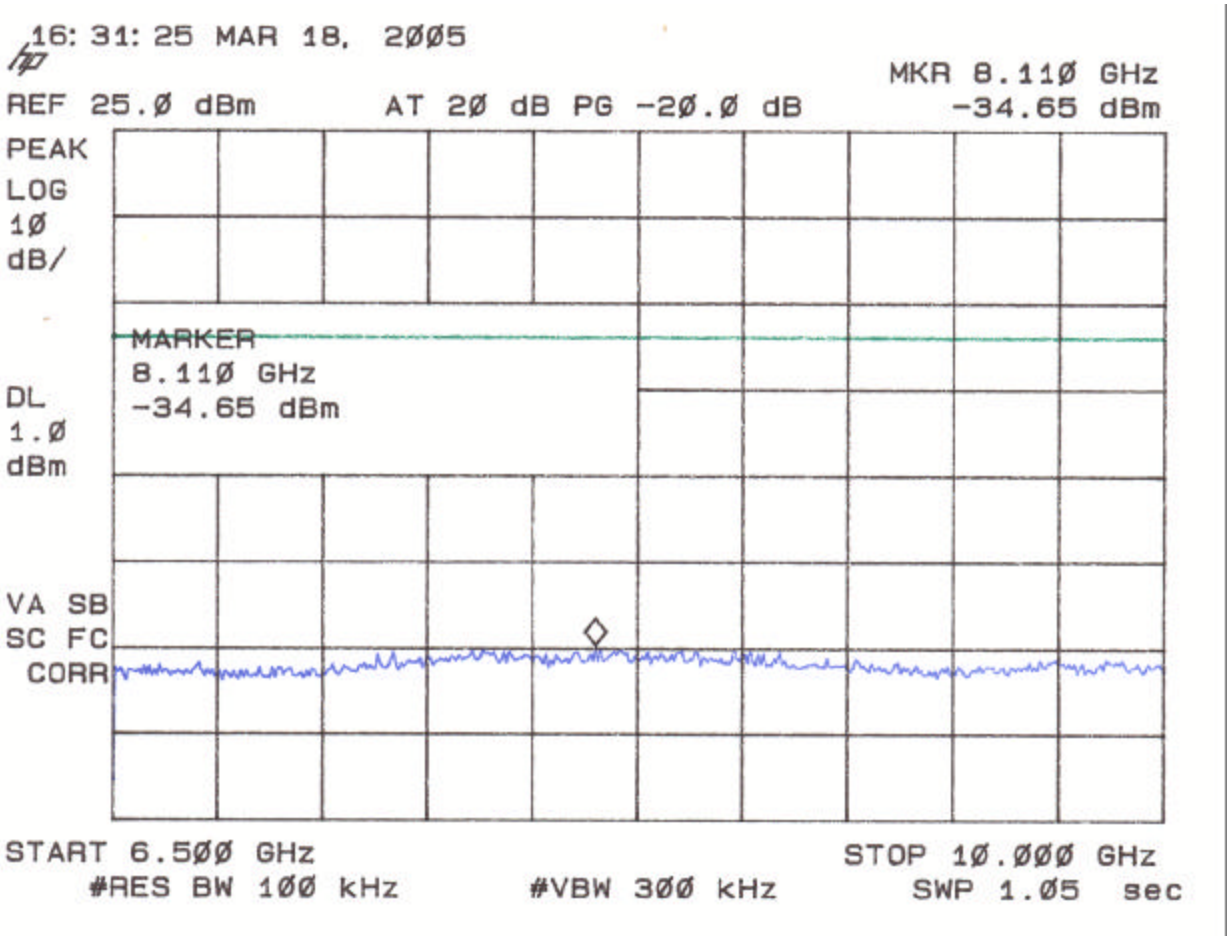


Figure 4i
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)

NOTE: Due to large span used, frequency appears off. Actual Frequency of the fundamental is 927.320 MHz.

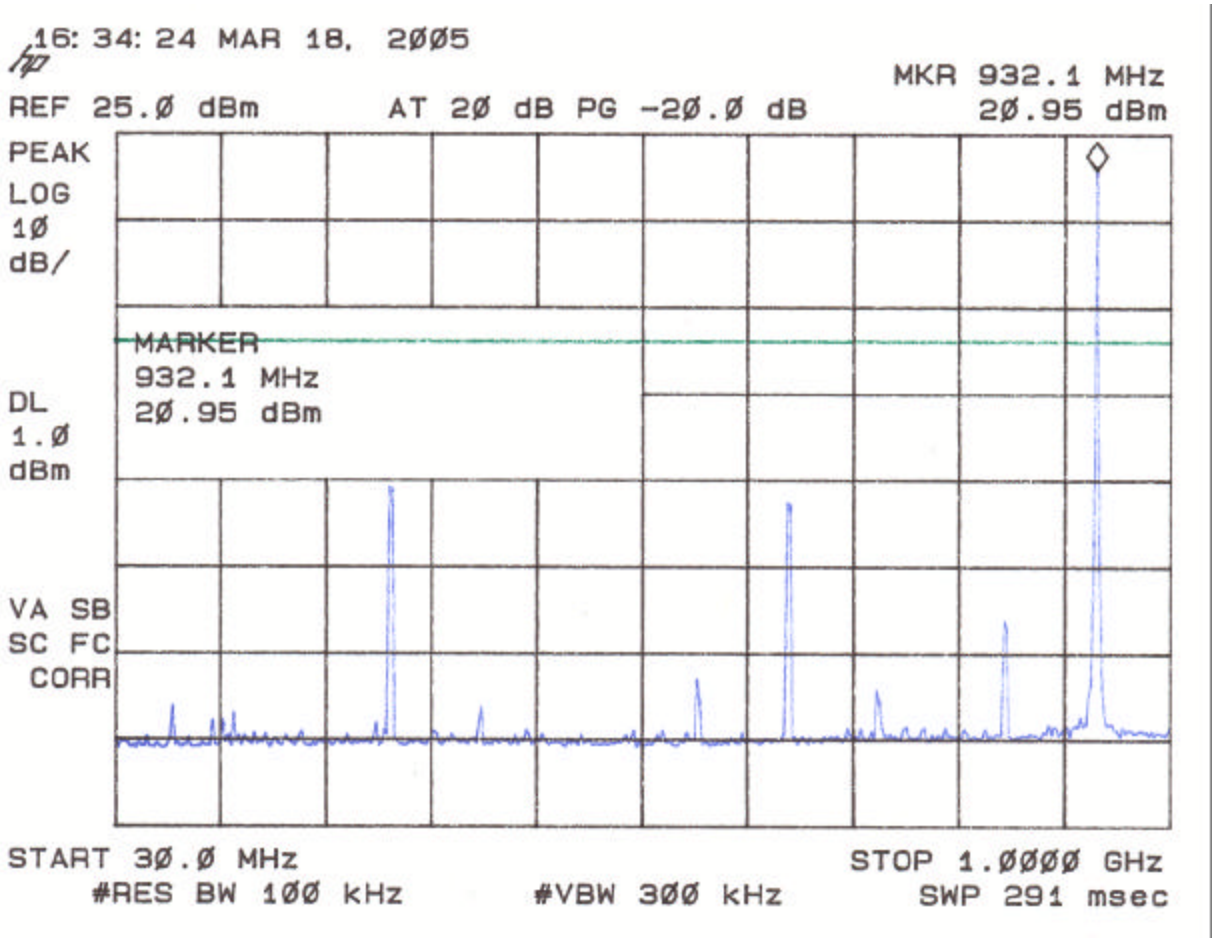


Figure 4j
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)

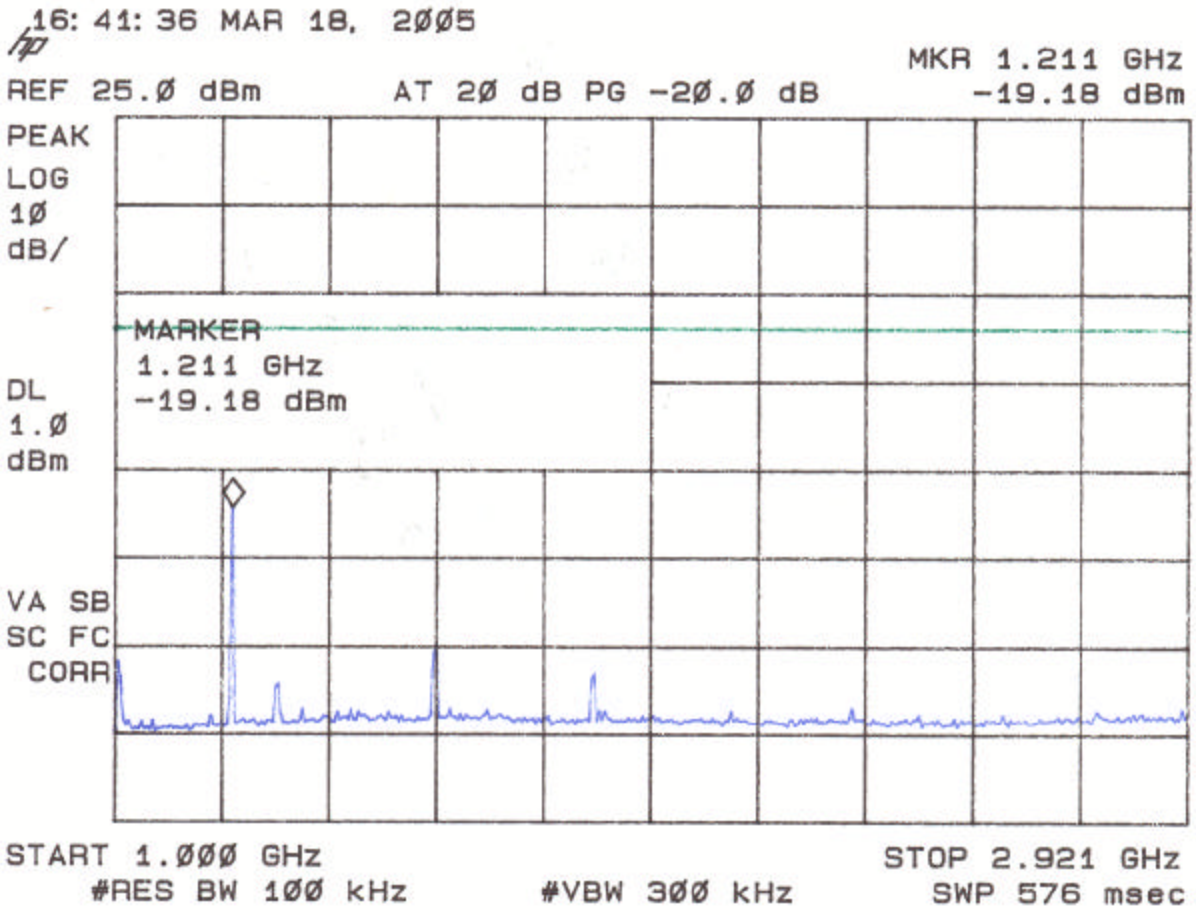


Figure 4k
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)

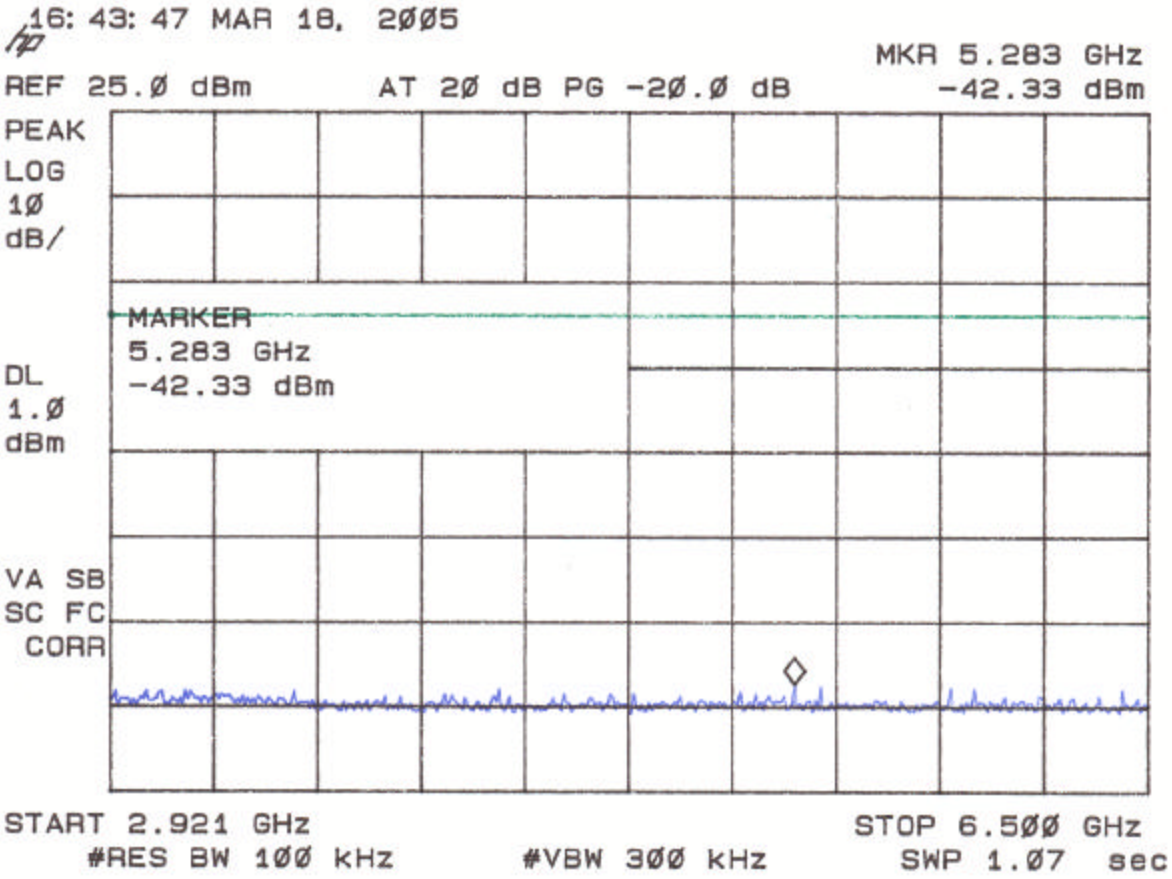


Figure 4l
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)