Cirronet
FCC Part 15, Certification Application
WIT 934

UST Project: 07-0216
Issue Date: July 30, 2007

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Testing Tomorrow's Technology

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: **VP / Operations & Engineering**

Date: **July 30, 2007**

Cirronet
3079 Premiere Parkway
Suite 140
Duluth, GA 30097

By: _____

Name: _____

Title: _____

Date: _____

MEASUREMENT/TECHNICAL REPORT

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

Equipment type:
Spread-Spectrum Frequency Hopping RF modem that operates in the 902-928 MHz ISM band

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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TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

FIGURES

TABLES

SECTION 1

GENERAL INFORMATION

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1.1 Product Description

The Equipment Under Test (EUT) is the Cirronet WIT 934. The EUT is a Spread-Spectrum Frequency Hopping RF Modem operating in the 902-928 MHz ISM band.

1.2 Related Submittal(s)/Grant(s)

The EUT will be used to send/receive data. The transceiver presented in this report will be used with other like transceivers:

The EUT is subject to the following authorizations:

a) Certification as a transceiver (modular approval)
b) Verification as a digital device

The information contained in this report is presented for the certification & verification authorization(s) for the EUT. The manufacturer desires to seek a modular approval on this device.

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 (2003). 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 Figures 1a and 16. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2a -g.

The sample used for testing was received by U.S. Technologies on July 24, 2007 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 registered with the FCC, under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

2.3 Test Equipment

Table 2 describes test equipment used to evaluate this product.

2.4 Modifications

No modifications were made by US Tech, 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

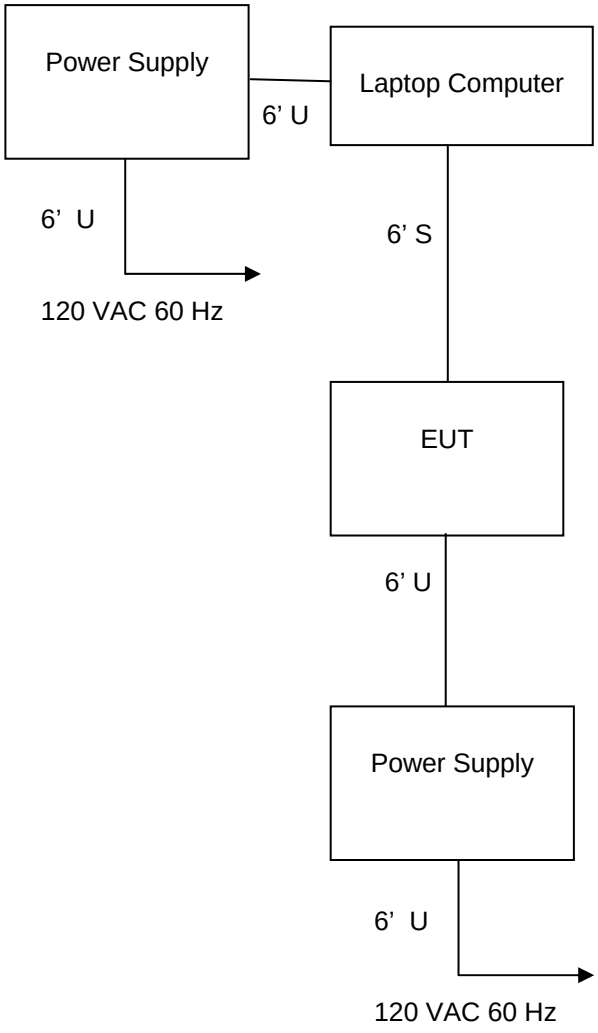


FIGURE 2a

Photograph(s) for Spurious Emissions

FIGURE 2b

Photograph(s) for Spurious Emissions

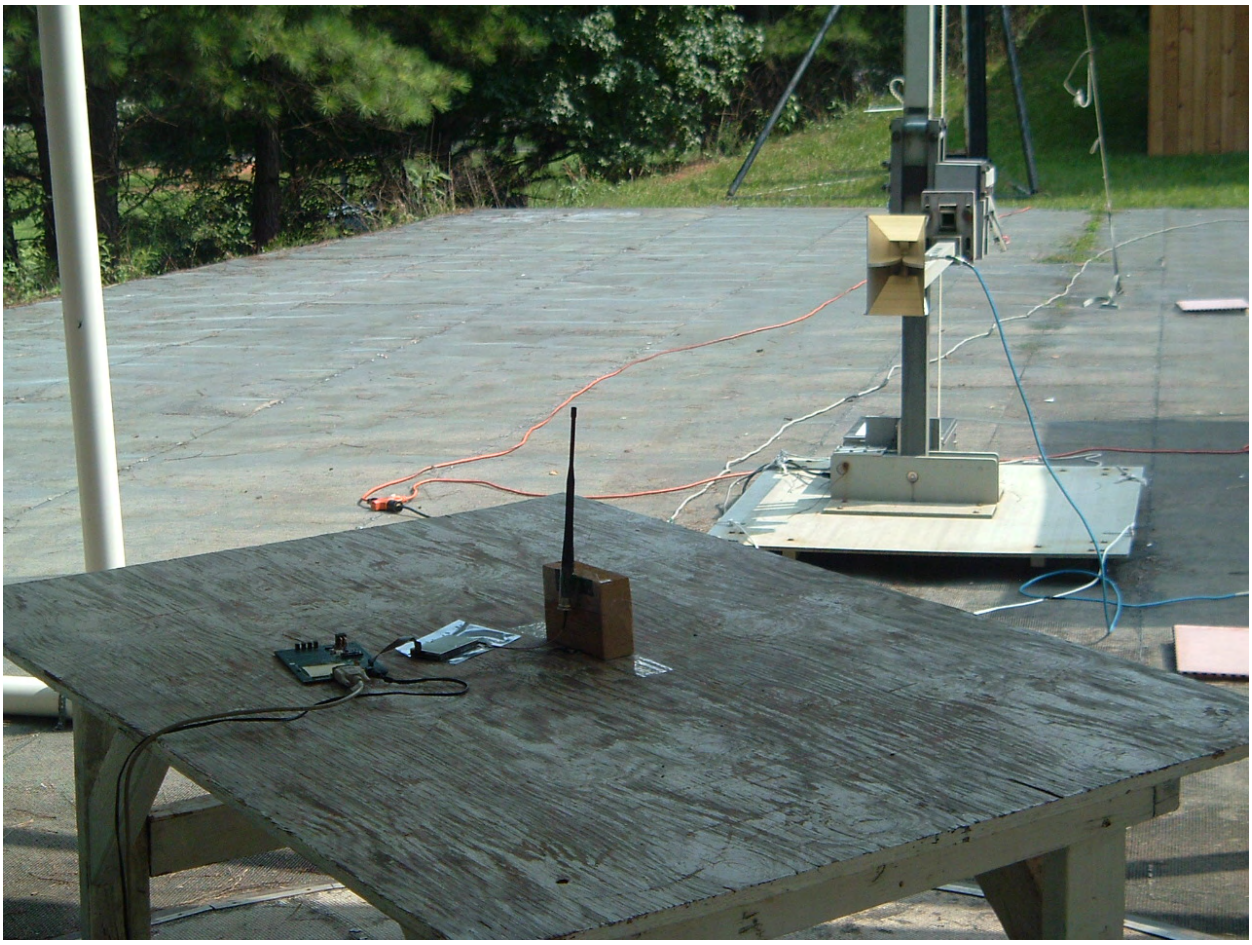


FIGURE 2c

Photograph(s) for Conducted Emissions

TABLE 1

EUT and Peripherals

PERIPHERAL MANU.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transmitter (EUT) Cirronet	WIT 934	None	HSW-934 (Pending)	6' S Serial 6' U Power
Radio Eval Board Cirronet.	800610	None	None	Plugged into transmitter via ribbon Cable
AC Adapter Compaq Computer Corp	PPP014L	PA-1900-15C2	None	6' U 120 VAC/ 60 Hz Power Cord
Laptop Computer IBM	Thinkpad	78-RG537	None	6' U
Power Supply Volgen	SPU-10R-1	None	None	6' U 120 VAC/ 60 Hz Power Cord

TABLE 2
TEST INSTRUMENTS

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8558B	HEWLETT-PACKARD	2332A10055	3/28/07
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	07/16/07
SIGNAL GENERATOR	8648B	HEWLETT-PACKARD	3642U01679	10/13/06
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	6/14/07
BICONICAL ANTENNA	3110B	EMCO	9307-1431	10/11/06
LOG PERIODIC	3146	EMCO	3110-3236	09/15/05 2 Yr.
LISN (x 2) 8028-50-TS24-BNC	8028	SOLAR ELE.	910494 & 910495	05/10/07
HORN ANTENNA	3115	EMCO	6107-3723	10/16/07
PREAMP	8449B	HEWLETT PACKARD	3008A00480	08/10/06
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	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.

Cirronet Corporation will sell the WIT 934 with the following antenna.

MANUFACTURER	TYPE OF ANTENNA	MODEL	GAIN dB	TYPE OR CONNECTOR
Mobile Antennas				
Cirronet	Omni	OMNI092	2 dBi	Reverse TNC to Reverse N via Cable

To ensure compliance with 15.203, Cirronet Corporation attaches reverse-sex TNC or N connectors to all antennas.

The customer then purchases an adapter cable from Cirronet Corporation that will connect the MMCX port on the module to the reverse-sex connector on the antenna. No other type of commercially available antenna will attach to this reverse-sex TNC or N connector. Given the nonstandard nature of the interconnect between module and antenna and the difficulty involved in circumventing that connection, Cirronet Corporation feel that this procedure meets the requirements called out in 15.203.

For this evaluation only one antenna is provided or approved for use with the WIT 934
.

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 ≥ RBW 6 dB bandwidth. The results of the measurements are given in Table 3 and Figure 3a1 through Figure 3a3.

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

Results shown are the measured and plotted values– cable loss (0.1 dB with short cable).

TABLE 3a
PEAK POWER OUTPUT

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (mW)*	FCC Limit (Watt)
902.570	22.56	0.180	0.250
914.605	22.71	0.187	0.250
926.645	22.43	0.175	0.250

*** Measurement includes 0.1 dB for cable loss**

Test Date: July 24, 2007

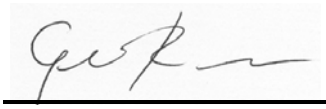
Tester Signature:  **Name: Gersop Riera**

Figure 3a1.
Peak Power per FCC Section 15.247(b) (Low Channel)

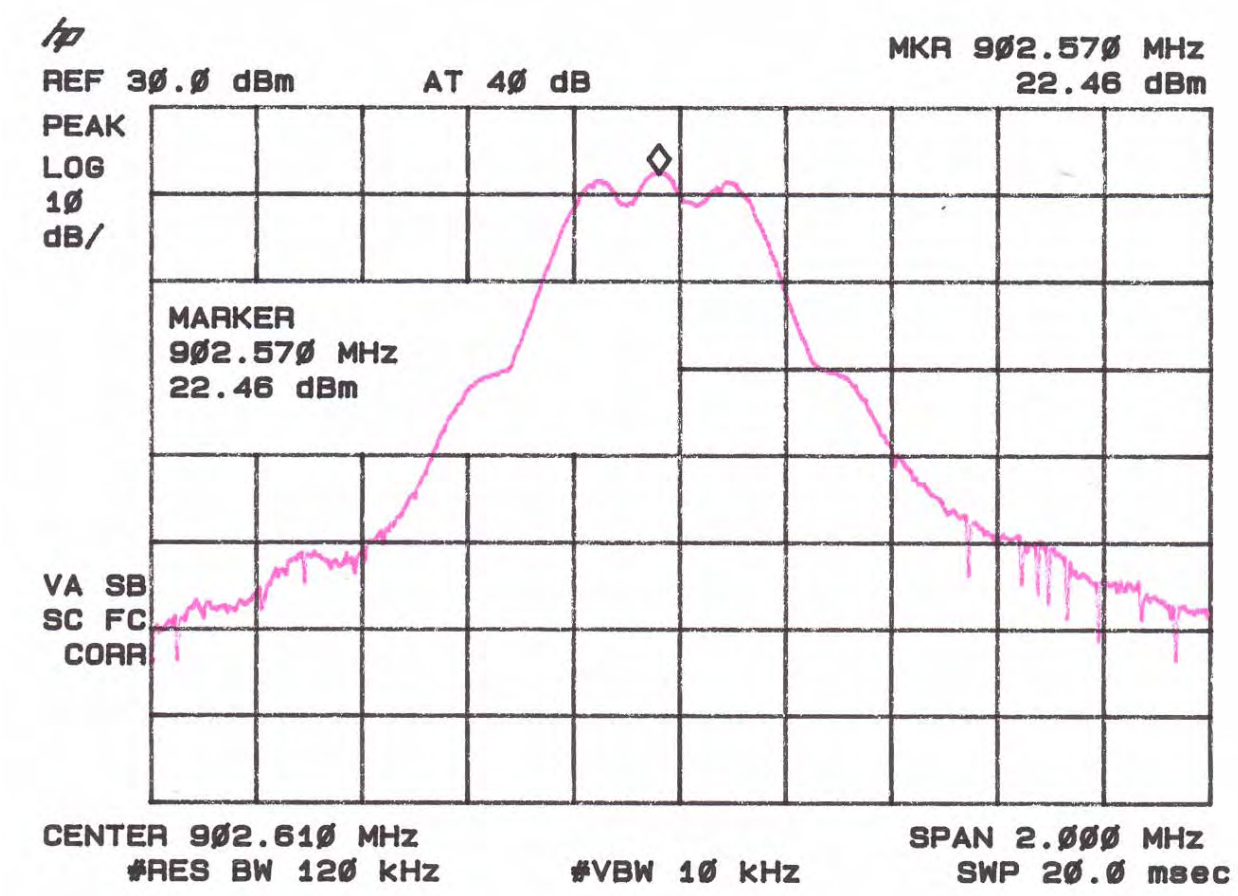


Figure 3a2.
Peak Power per FCC Section 15.247(b) (Mid Channel)

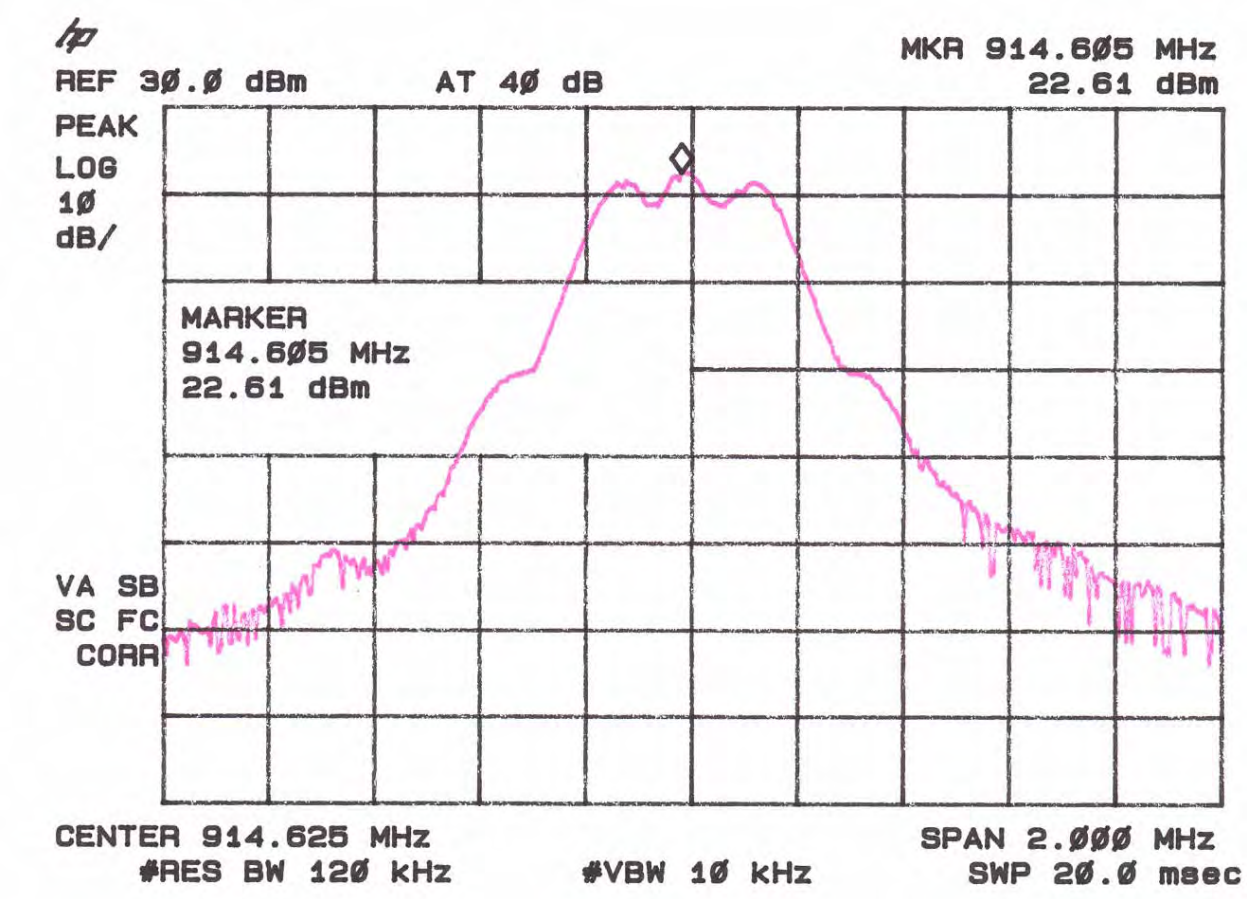
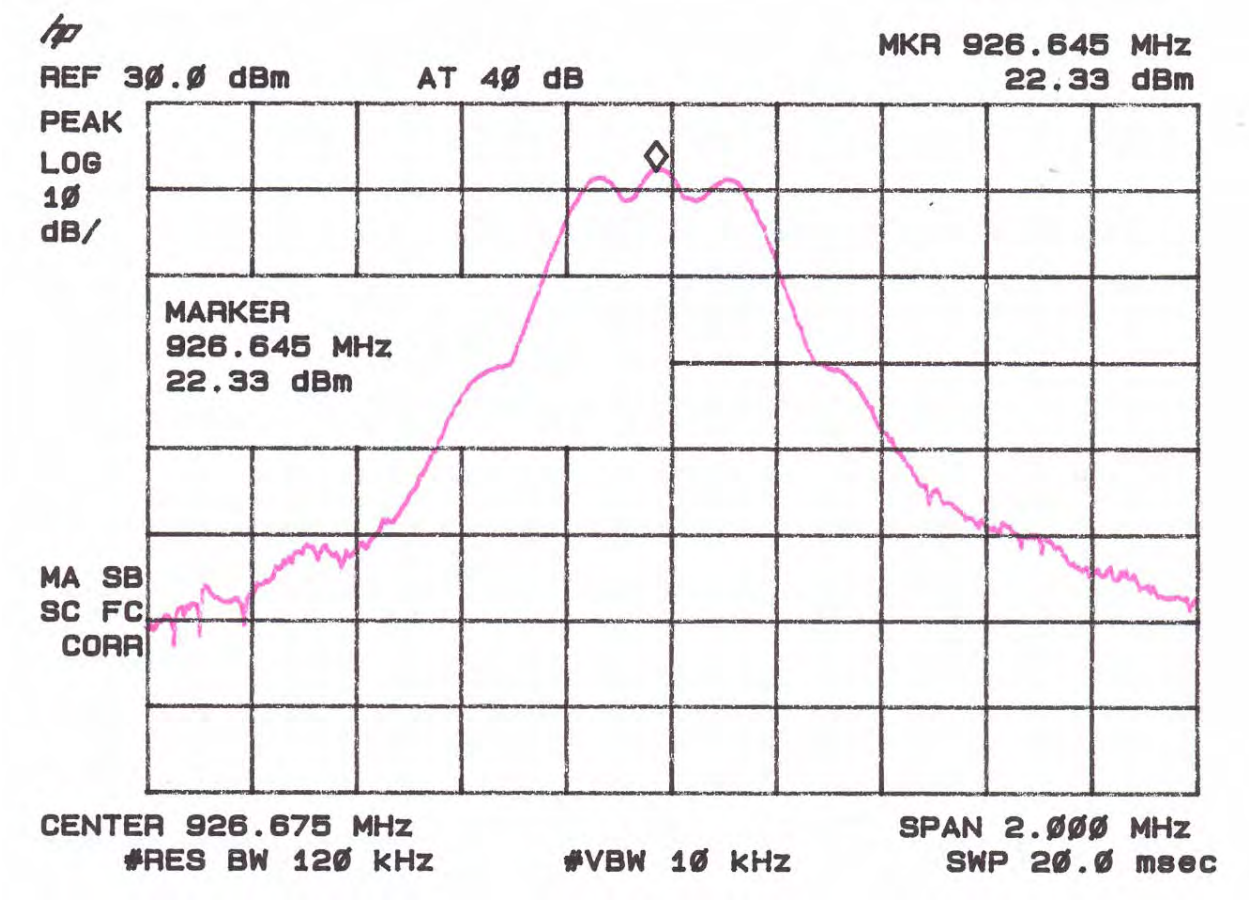


Figure 3a3.
Peak Power per FCC Section 15.247(b) (High Channel)



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 or conducted spurious emissions are given in Figure 4a through 4l.

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

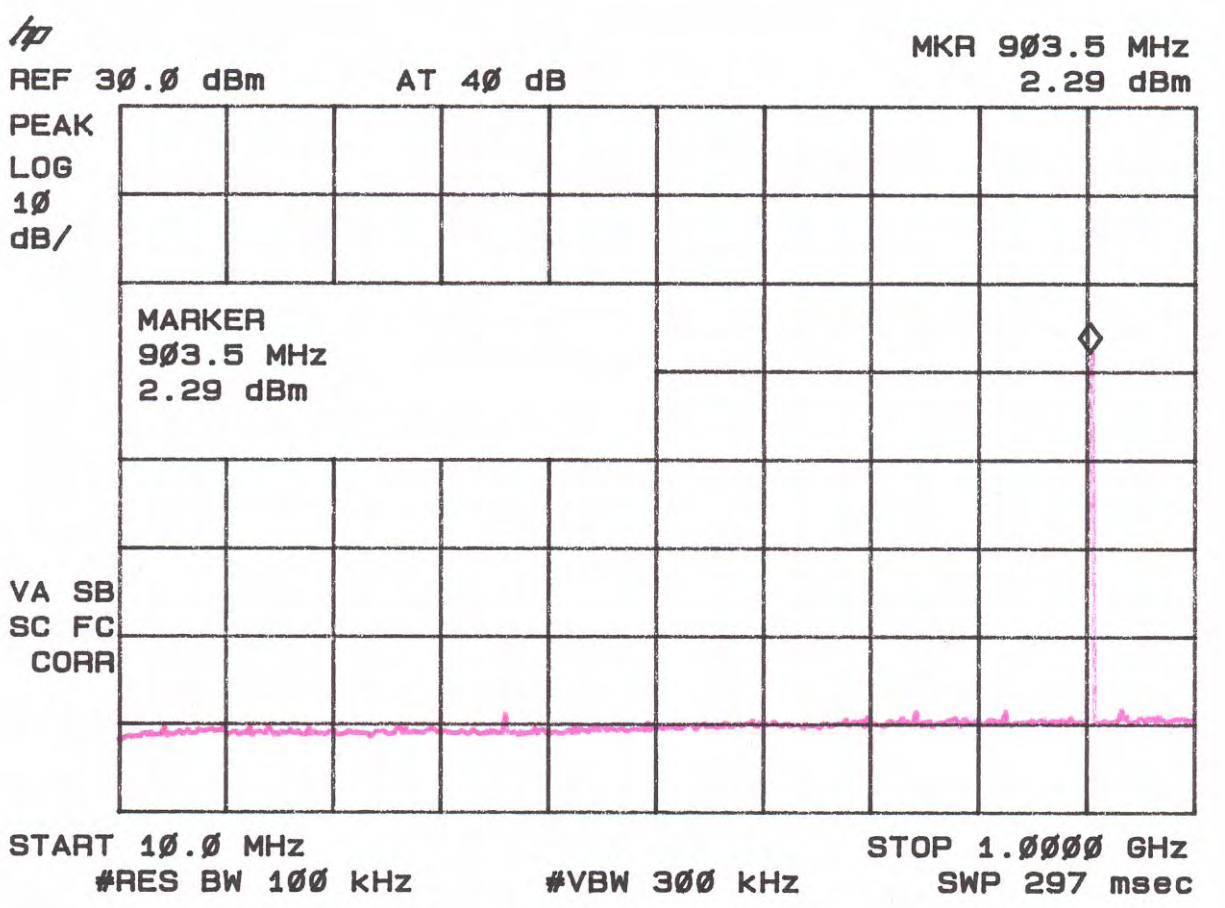


Figure 4b
Antenna Conducted Spurious Emissions 5.247(c) (Low Channel)

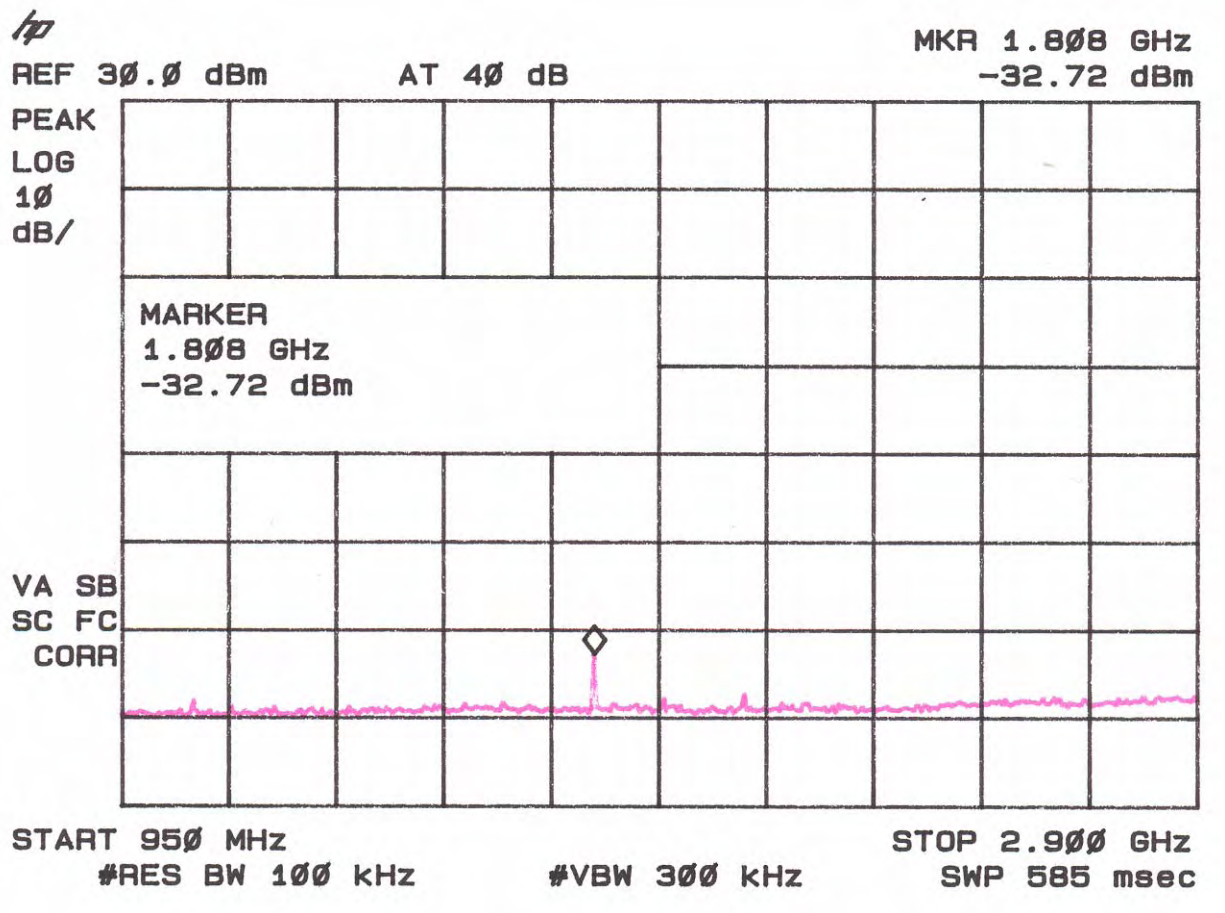


Figure 4c
Antenna Conducted Spurious Emissions 15.247(c) (Low Channel)

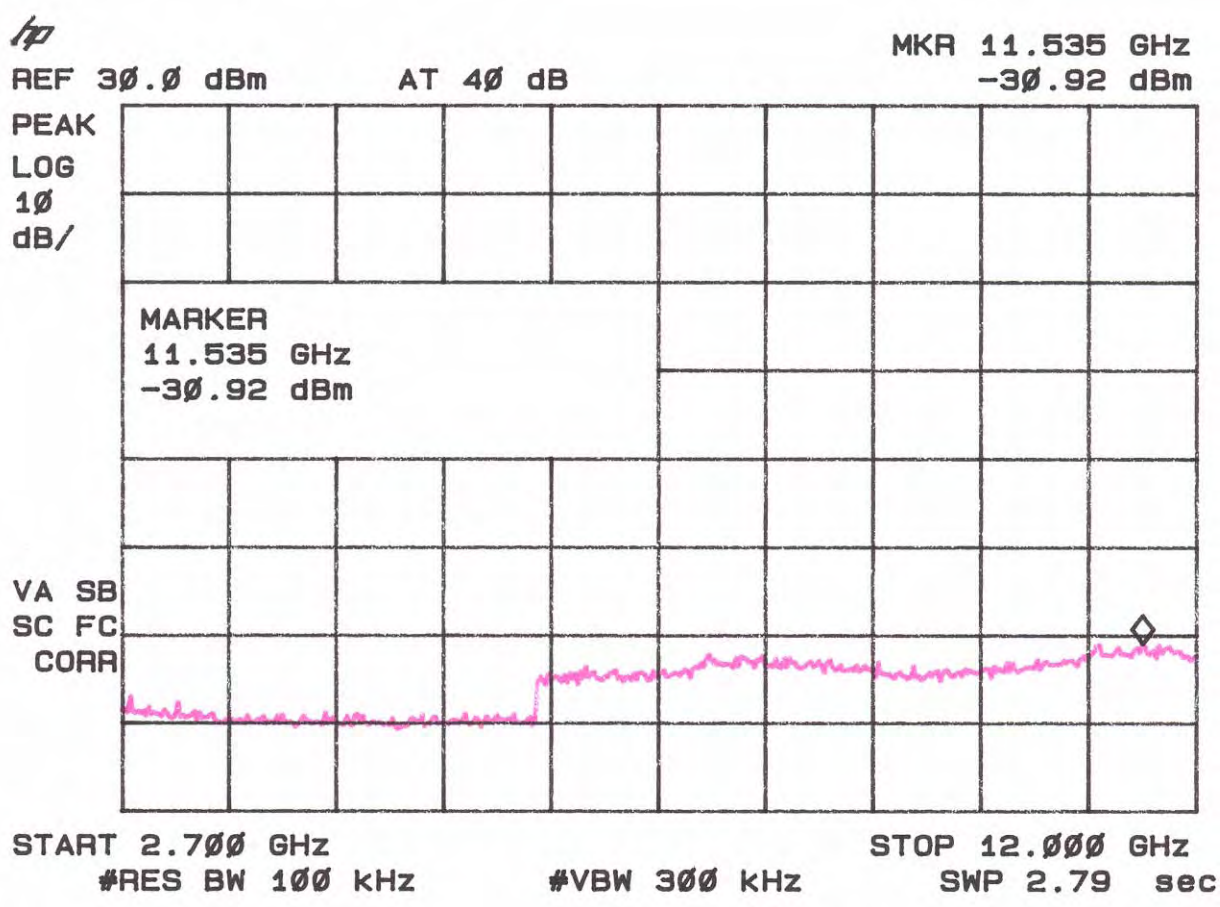


Figure 4d
Antenna Conducted Spurious Emissions 15.247(c)) (Mid Channel)

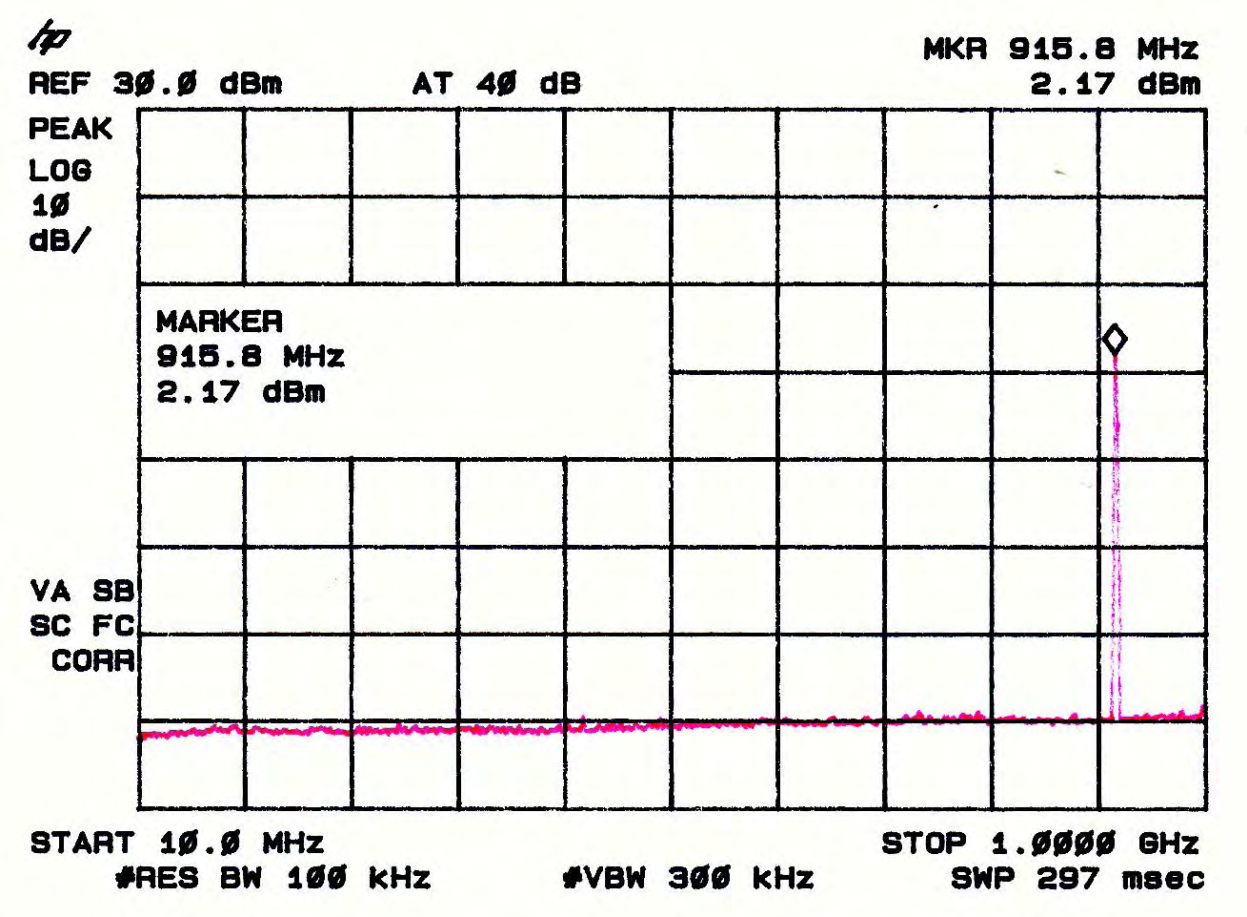


Figure 4e
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

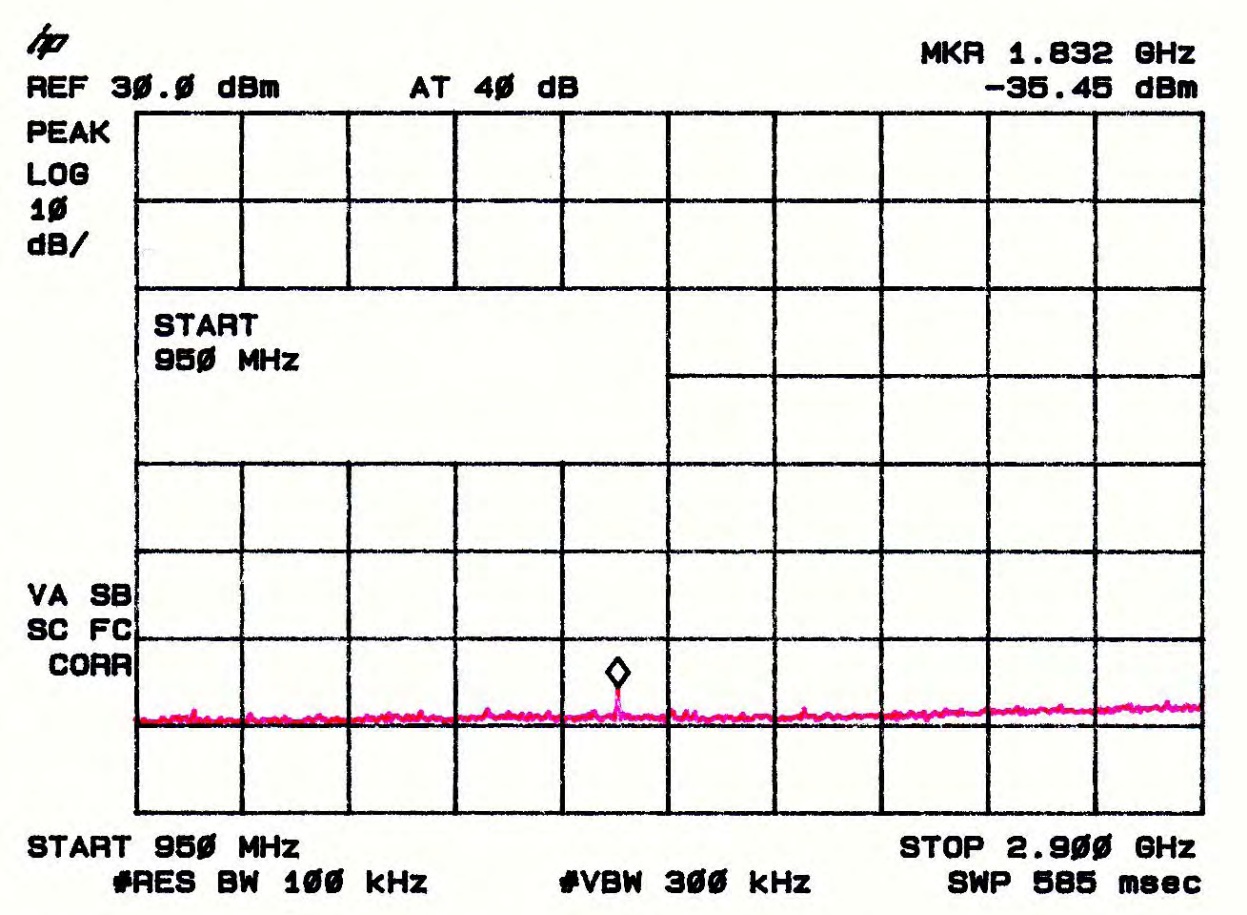


Figure 4f
Antenna Conducted Spurious Emissions 15.247(c) (Mid Channel)

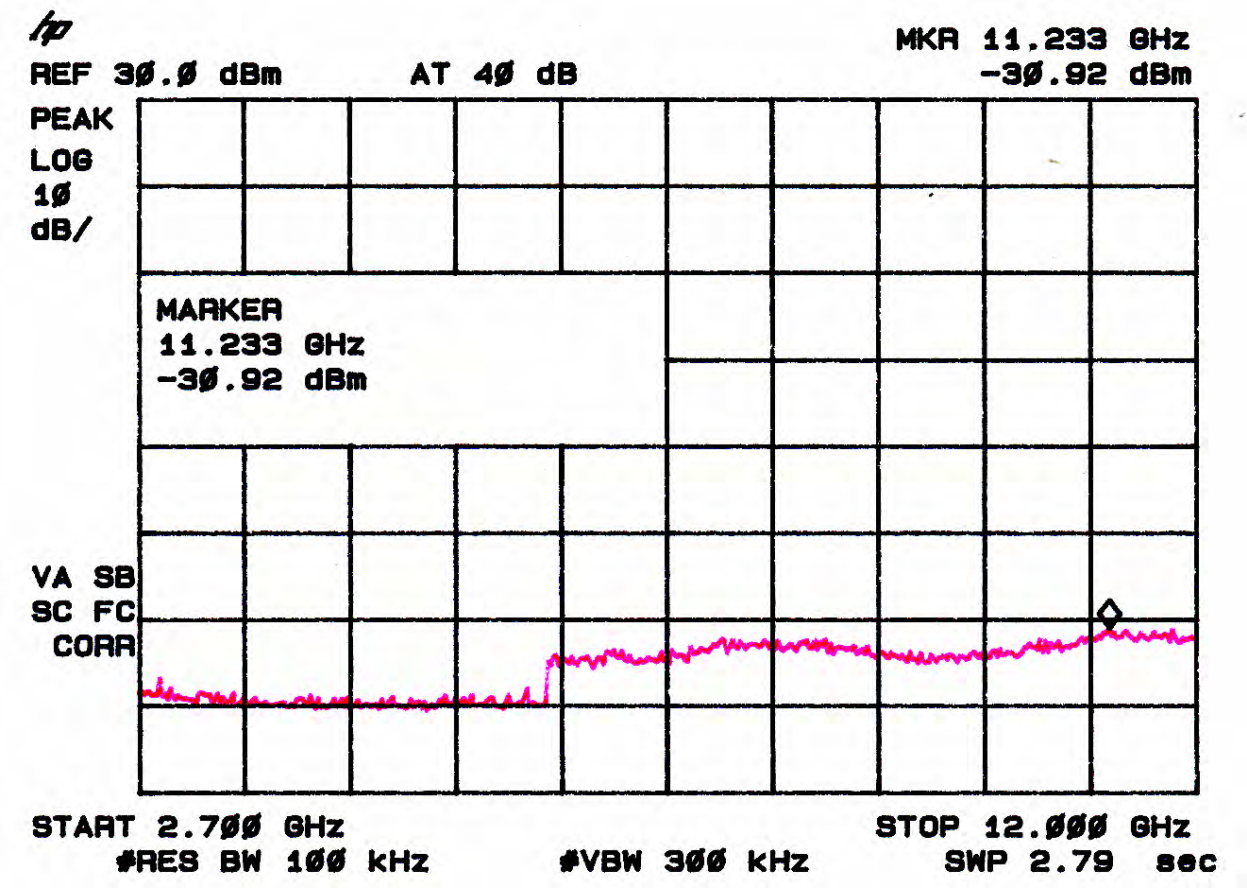


Figure 4g
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)

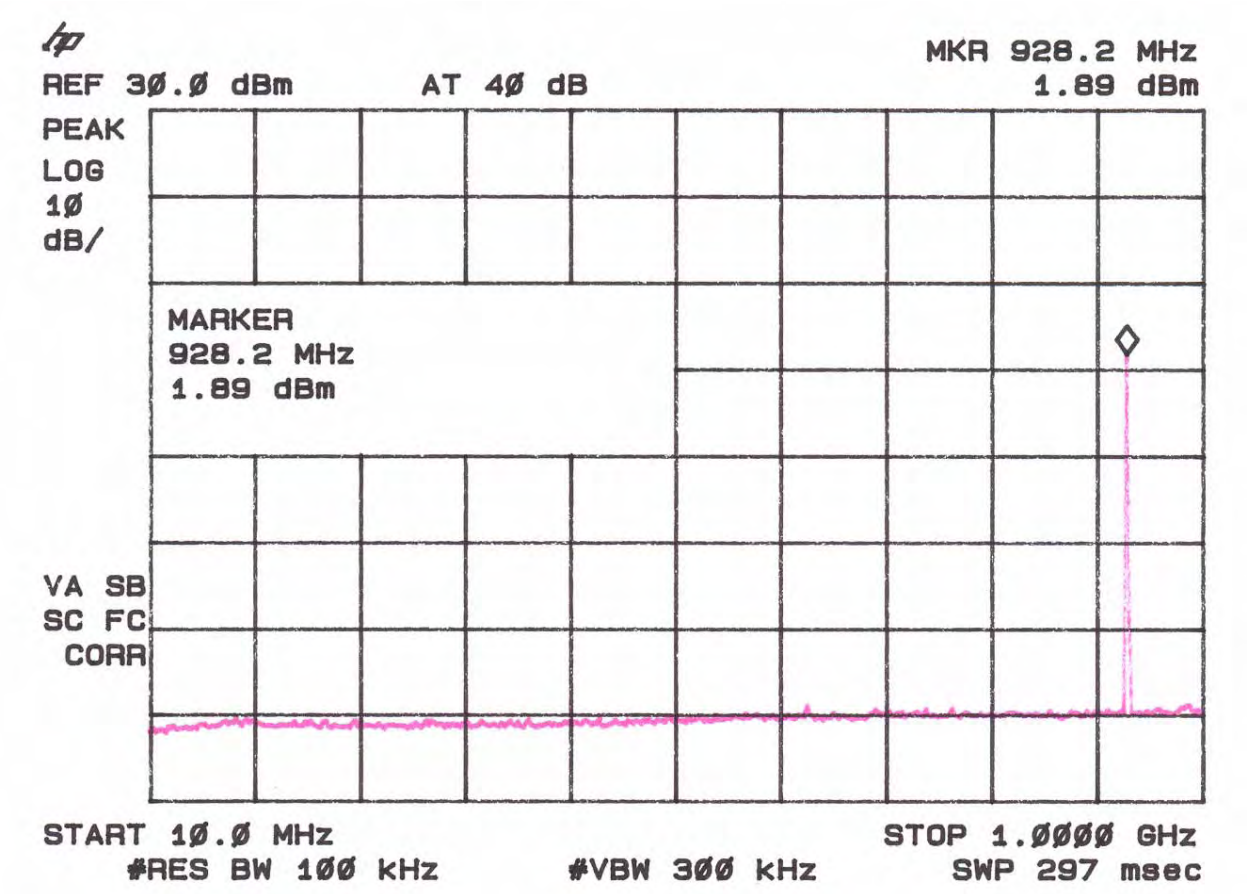


Figure 4h
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)

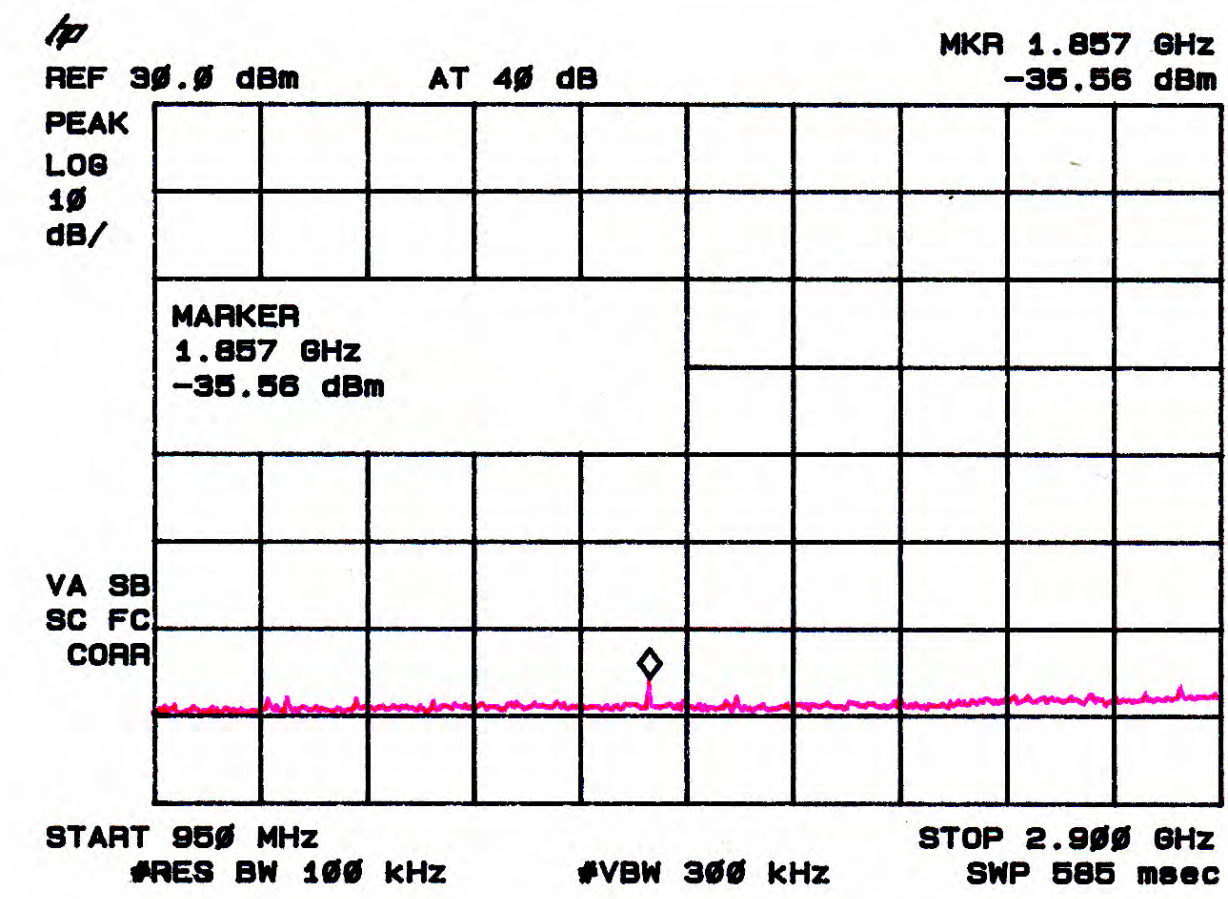


Figure 4i
Antenna Conducted Spurious Emissions 15.247(c) (High Channel)