



*Testing Tomorrow's Technology*

**Ferguson Manufacturing Company, Inc.  
FCC Part 15, Certification Application  
RFM10 Spread Spectrum Transceiver**

**UST Project: 06-0198  
Issue Date: November 21, 2006**

**3505 Francis Circle Alpharetta, GA 30004  
PH: 770-740-0717 Fax: 770-740-1508  
[www.ustech-lab.com](http://www.ustech-lab.com)**



*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: November 21, 2006

**Ferguson Manufacturing Company, Inc.**  
3880 N. Glenn Ave.  
Winston-Salem, NC 27105-3831

By: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

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## MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Ferguson Manufacturing Company, Inc.**MODEL: **RFM10**FCC ID: **L5E-RFM10**DATE: **November 21, 2006**

This report concerns (check one): Original grant X  
Class II change \_\_\_\_\_

Equipment type: **903-925.4 MHz Spread Spectrum Transceiver**Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes \_\_\_\_\_ No XIf yes, defer until: \_\_\_\_\_  
dateN.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  
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# SECTION 1

## GENERAL INFORMATION

## GENERAL INFORMATION

### 1.1 Product Description

The Equipment Under Test (EUT) is a Ferguson Manufacturing Company, Inc., Model RFM10 modular 903-925.4 MHz spread spectrum transceiver.

## **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. Block 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 October 17, 2006 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 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 1a**  
**TEST CONFIGURATION**

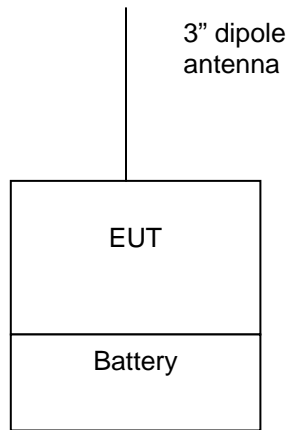


TABLE 1

Test Date: September 28, October 27, 28, 29, 30, 2006  
UST Project: 06-0198  
Customer: Ferguson Manufacturing Company, Inc.  
Model: RFM10

EUT and Peripherals

PERIPHERAL MANU.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
(EUT) Ferguson Manufacturing Company, Inc.	RFM10	None	None	None

**TABLE 2**  
**TEST INSTRUMENTS**

<b>EQUIPMENT</b>	<b>MODEL NUMBER</b>	<b>MANUFACTURER</b>	<b>SERIAL NUMBER</b>	<b>DATE OF LAST CALIBRATION</b>
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	7/3/06
SIGNAL GENERATOR	8648B	HEWLETT-PACKARD	3642U01679	10/1306
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	5/24/06
BICONICAL ANTENNA	3110B	EMCO	9307-1431	10/11/06
LOG PERIODIC	3146	EMCO	3110-3236	9/15/05 2 Yr.
LISN (x 2) 8028-50-TS24-BNC	8028	SOLAR ELE.	910494 & 910495	3/29/06
HORN ANTENNA	SAS-571	A. H. SYSTEMS	605	04/1/05 2 Yr.
PREAMP	8449B	HEWLETT PACKARD	3008A00480	8/10/06
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

## **2.5 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 antenna provided is a 3 - 3/8 in wire soldered to the pcb.**

## **2.6 Peak power within the band 2400 – 2483.5 GHz per FCC Section 15.247(b)**

Peak power within the band 2400-2483.5 GHz 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  $\Omega$  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, and High Channel.

**TABLE 3**  
**PEAK POWER OUTPUT**

**Test Date:** October 27, 2006  
**UST Project:** 06-0198  
**Customer:** Ferguson Manufacturing Company, Inc.  
**Model:** RFM10

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (mW)*	FCC Limit (Watt)
903.950	11.75	14.96	1.0
915.125	11.73	14.89	1.0
926.812	11.63	14.55	1.0

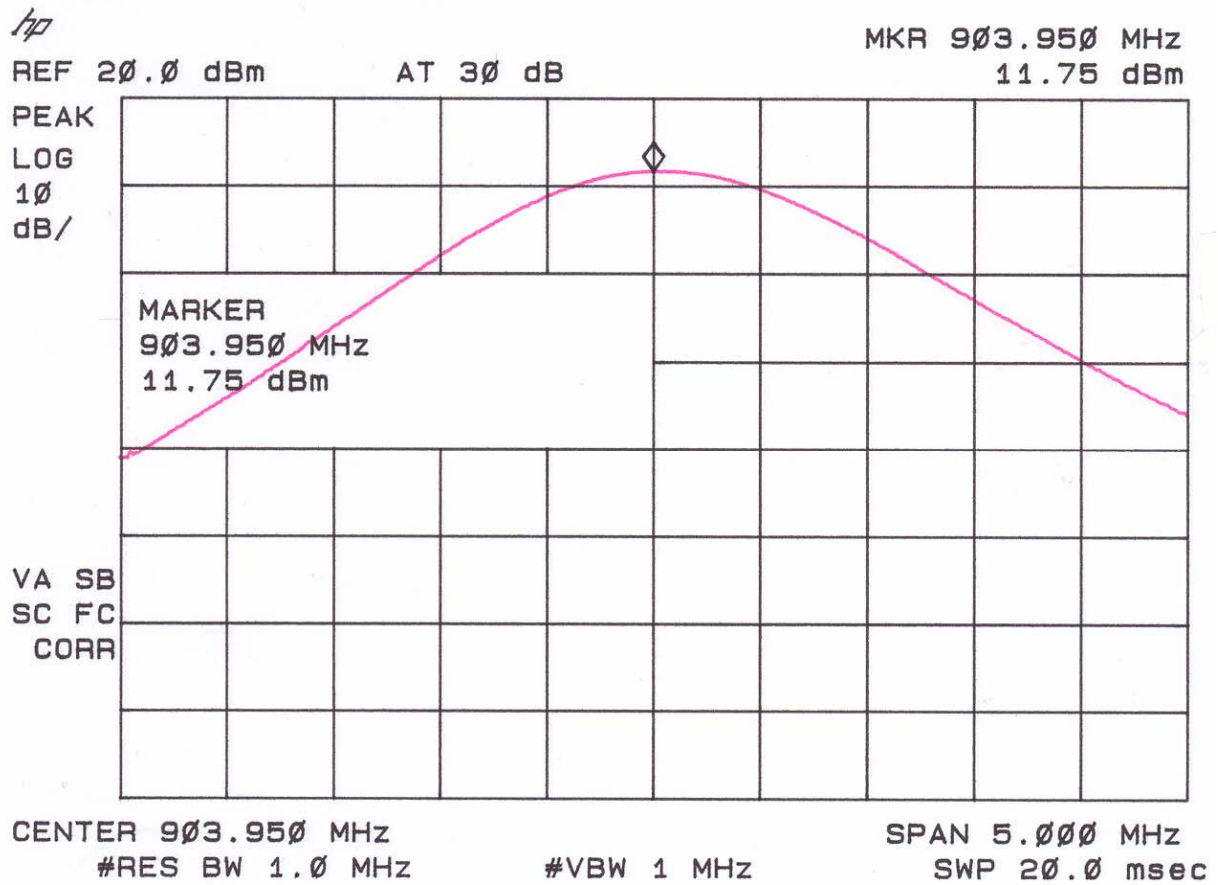
\* Measurement includes 0.1 dB for cable loss

**Tester**  
**Signature:** 

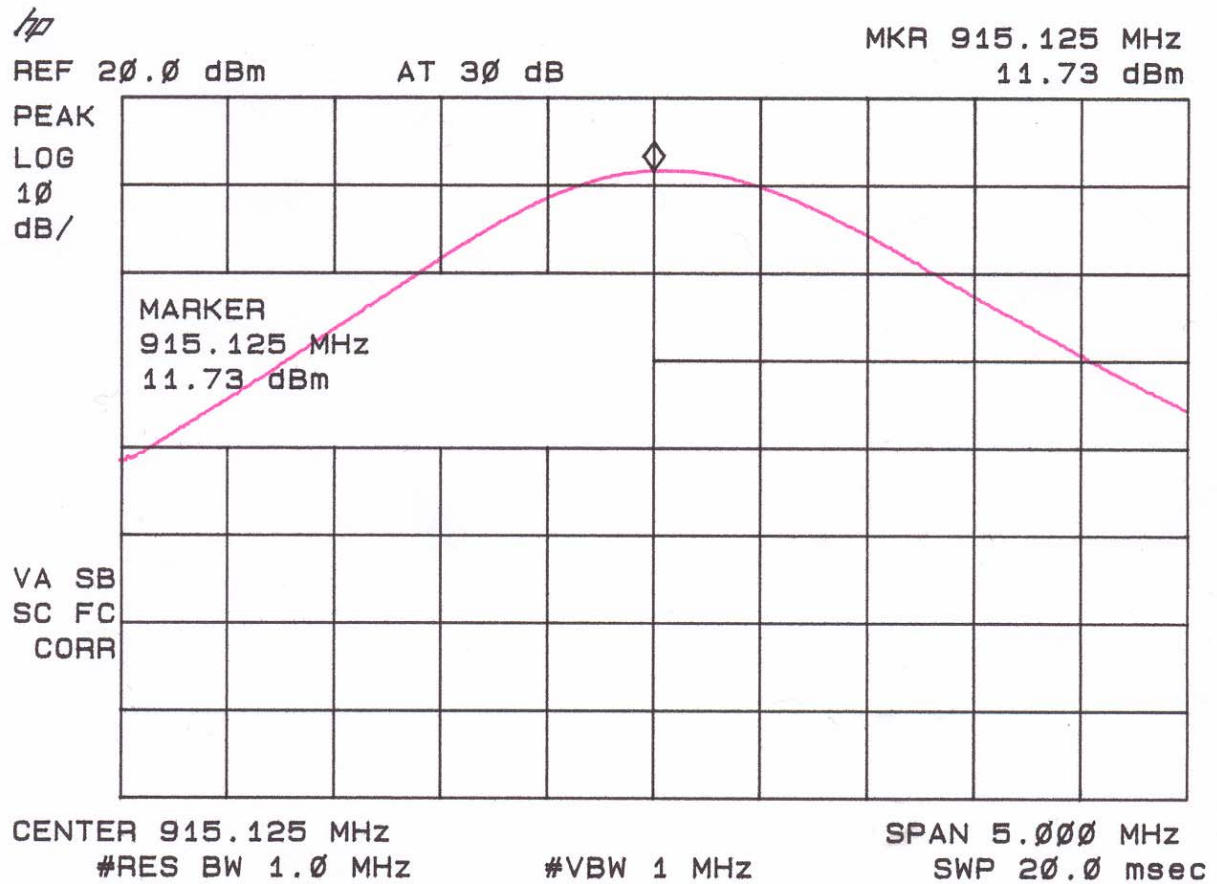
**Name:** Austin Thompson



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



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

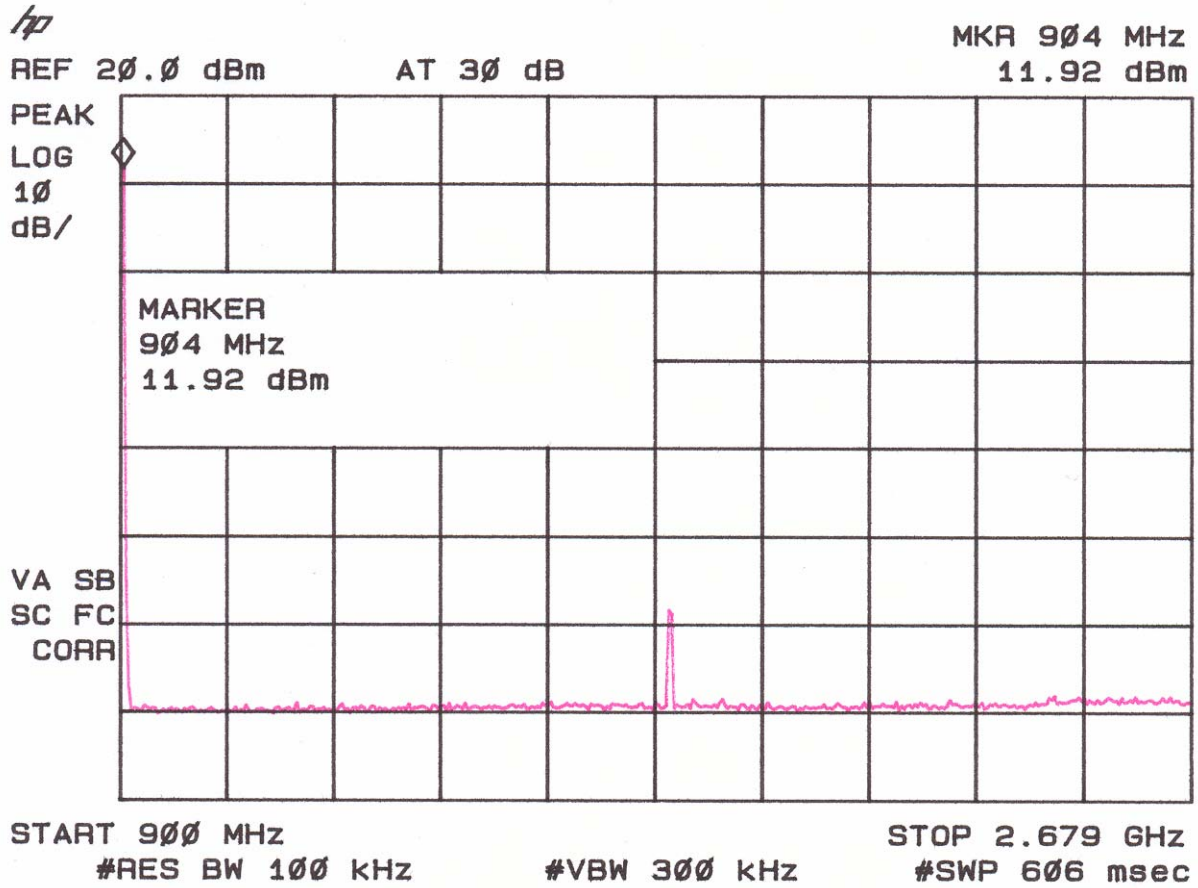




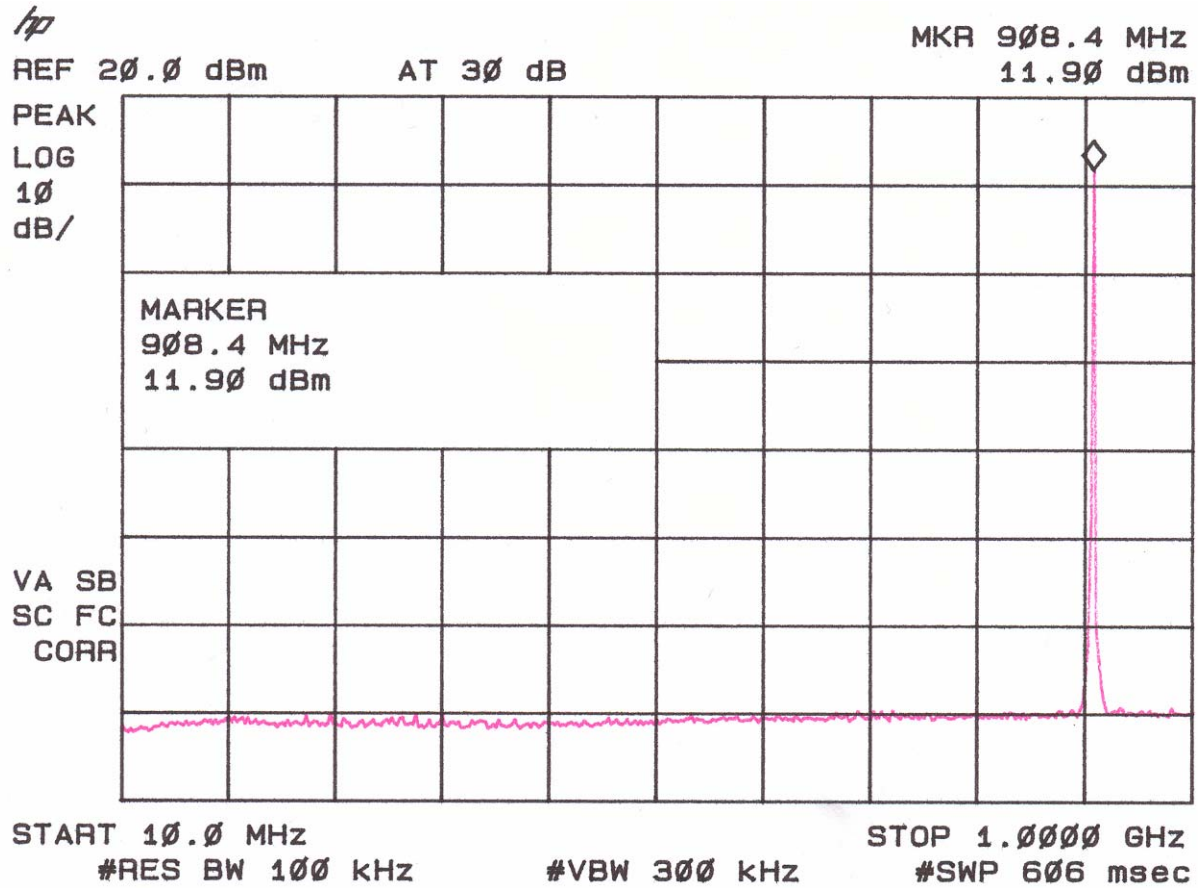
**2.7 Antenna Conducted Spurious Emission the Frequency Range 30 – 25000 MHz (FCC Section 15.247(c))**

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  $\Omega$  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 4r.

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



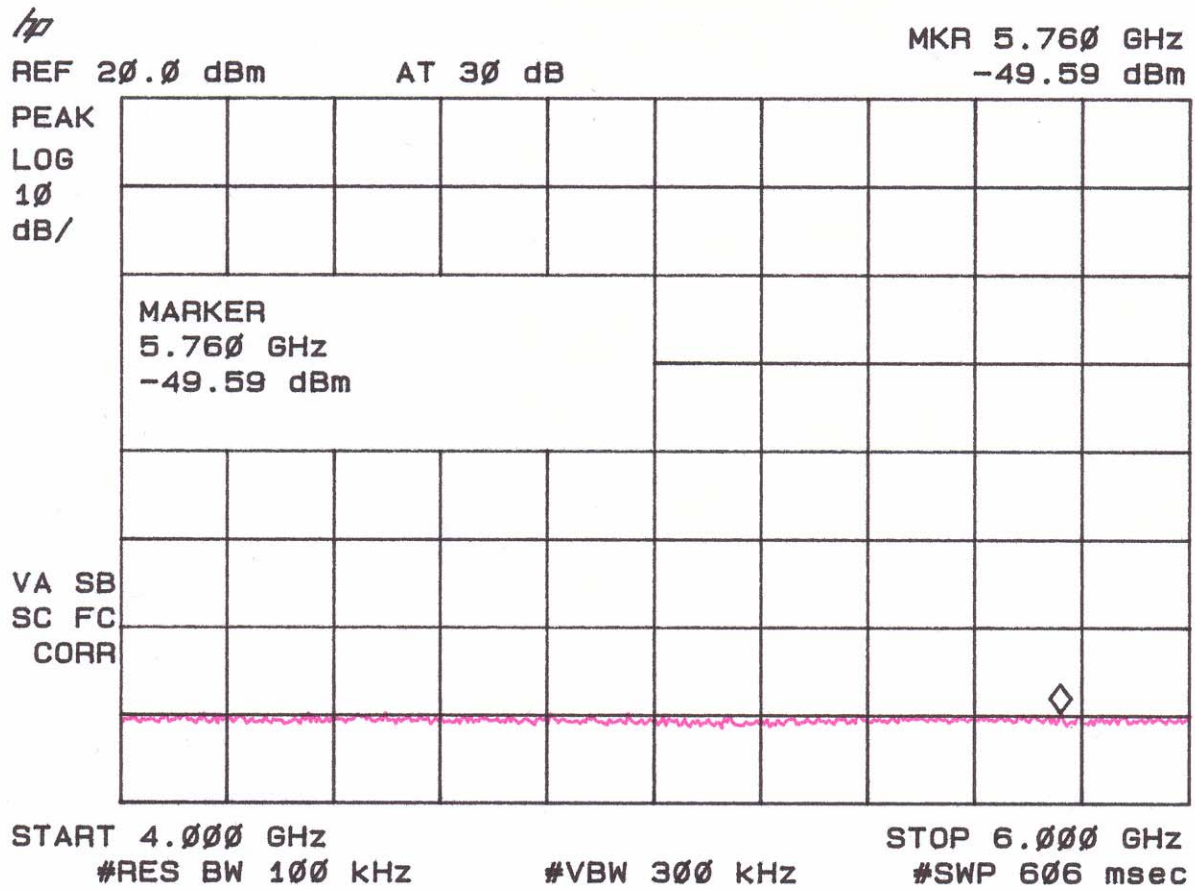
**Figure 4b**  
**Antenna Conducted Spurious Emissions 5.247(c) Low**



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

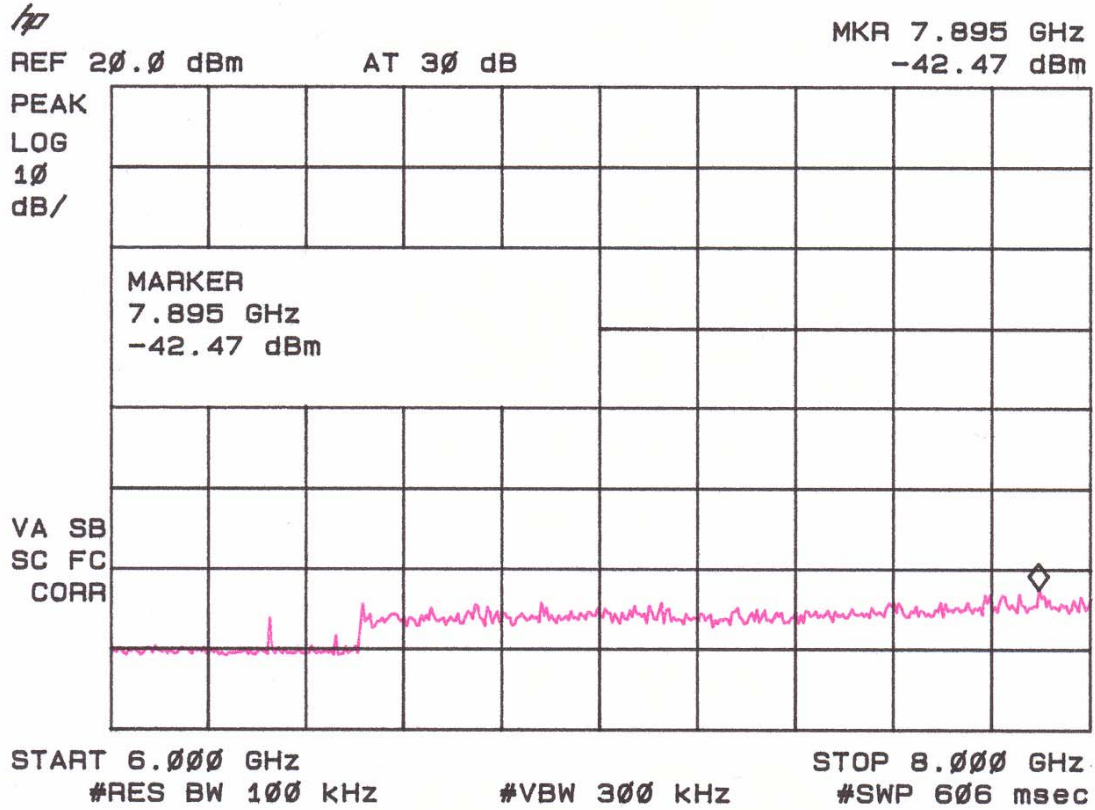


**Figure 4d**  
**Antenna Conducted Spurious Emissions 15.247(c) Low**

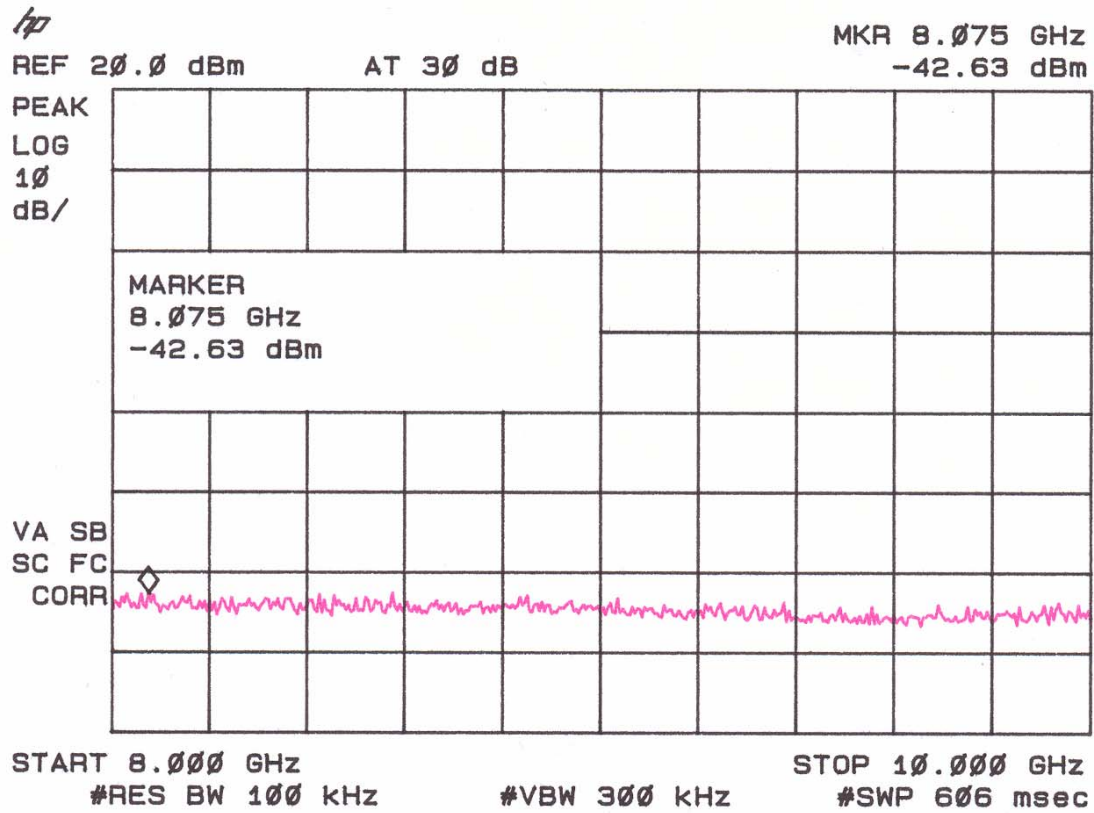




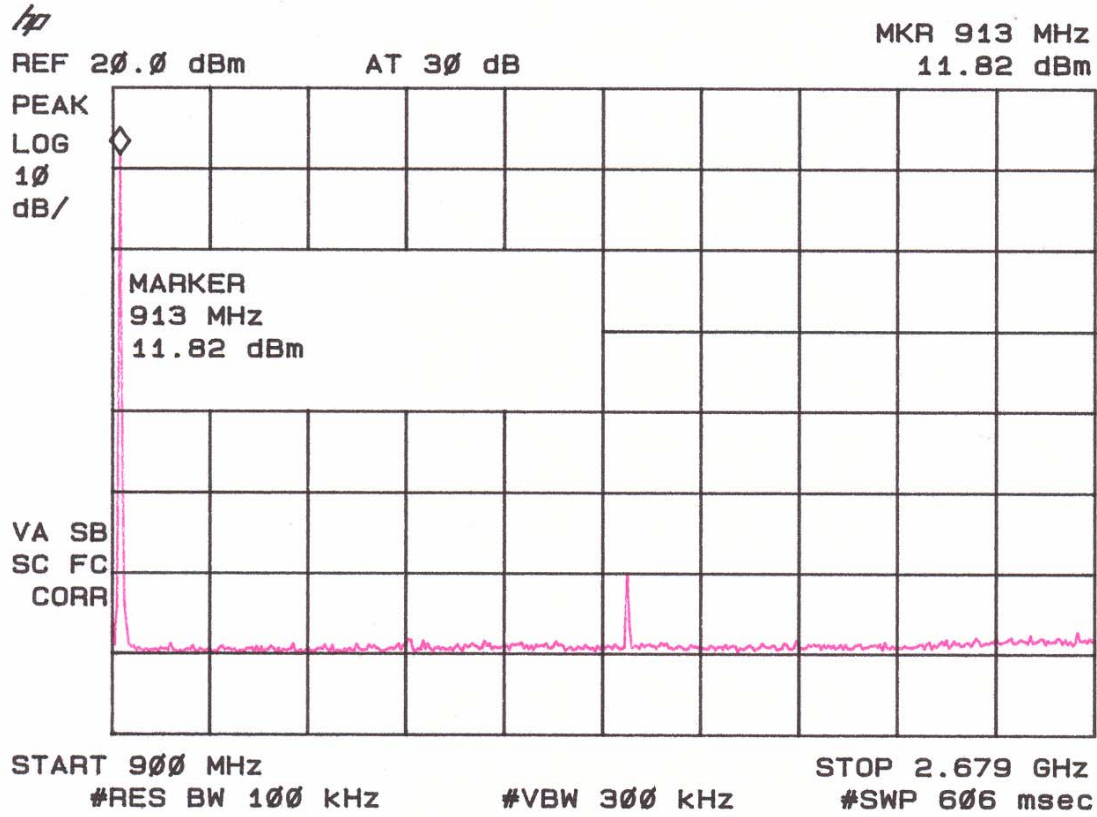
**Figure 4e**  
**Antenna Conducted Spurious Emissions 15.247(c) Low**



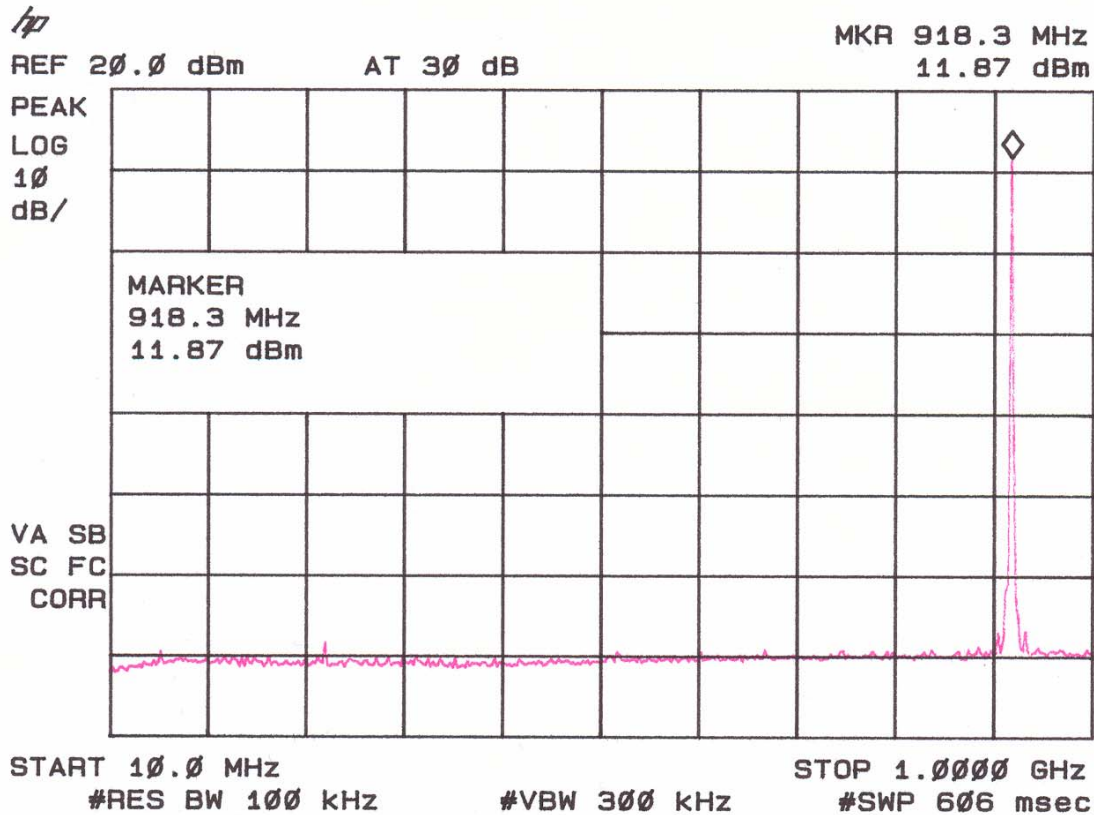
**Figure 4f**  
**Antenna Conducted Spurious Emissions 15.247(c) Low**



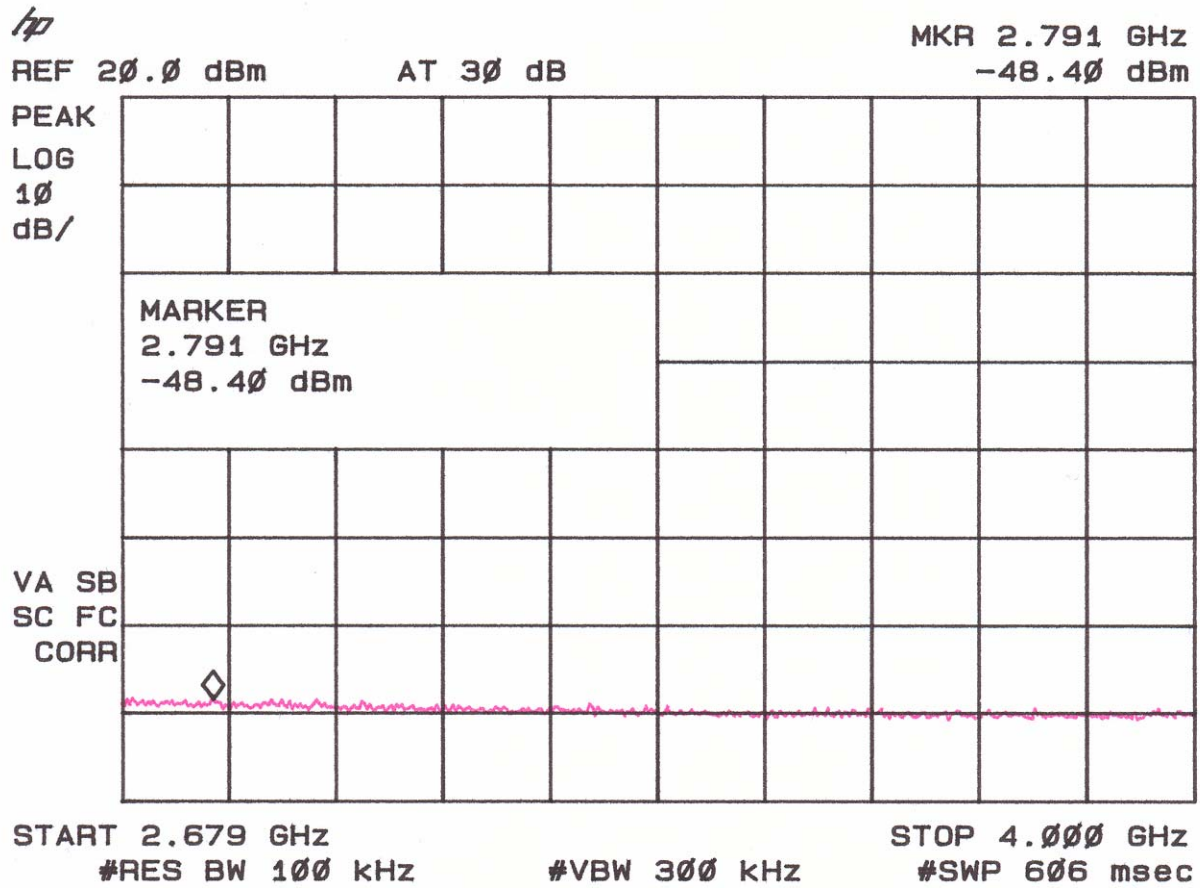
**Figure 4g**  
**Antenna Conducted Spurious Emissions 15.247(c) Mid**

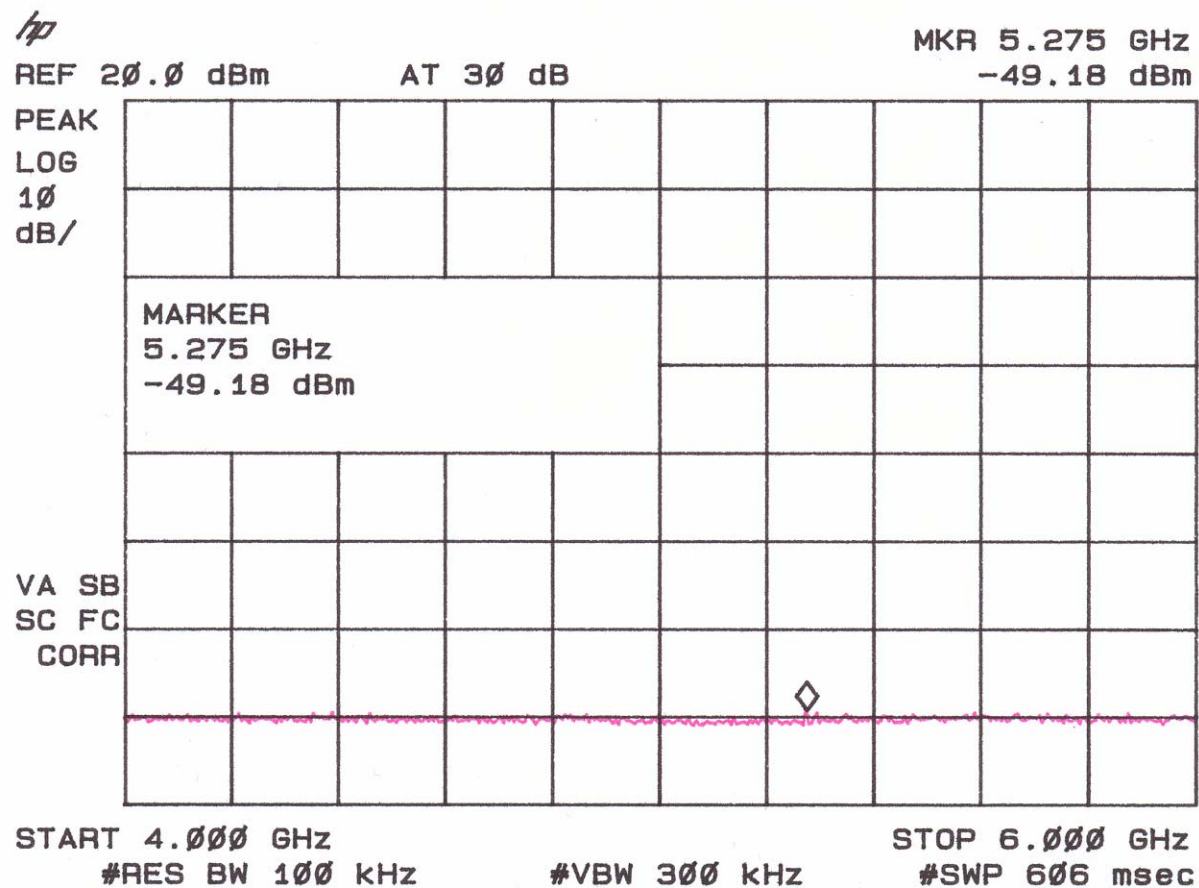


**Figure 4h**  
**Antenna Conducted Spurious Emissions 15.247(c) Mid**

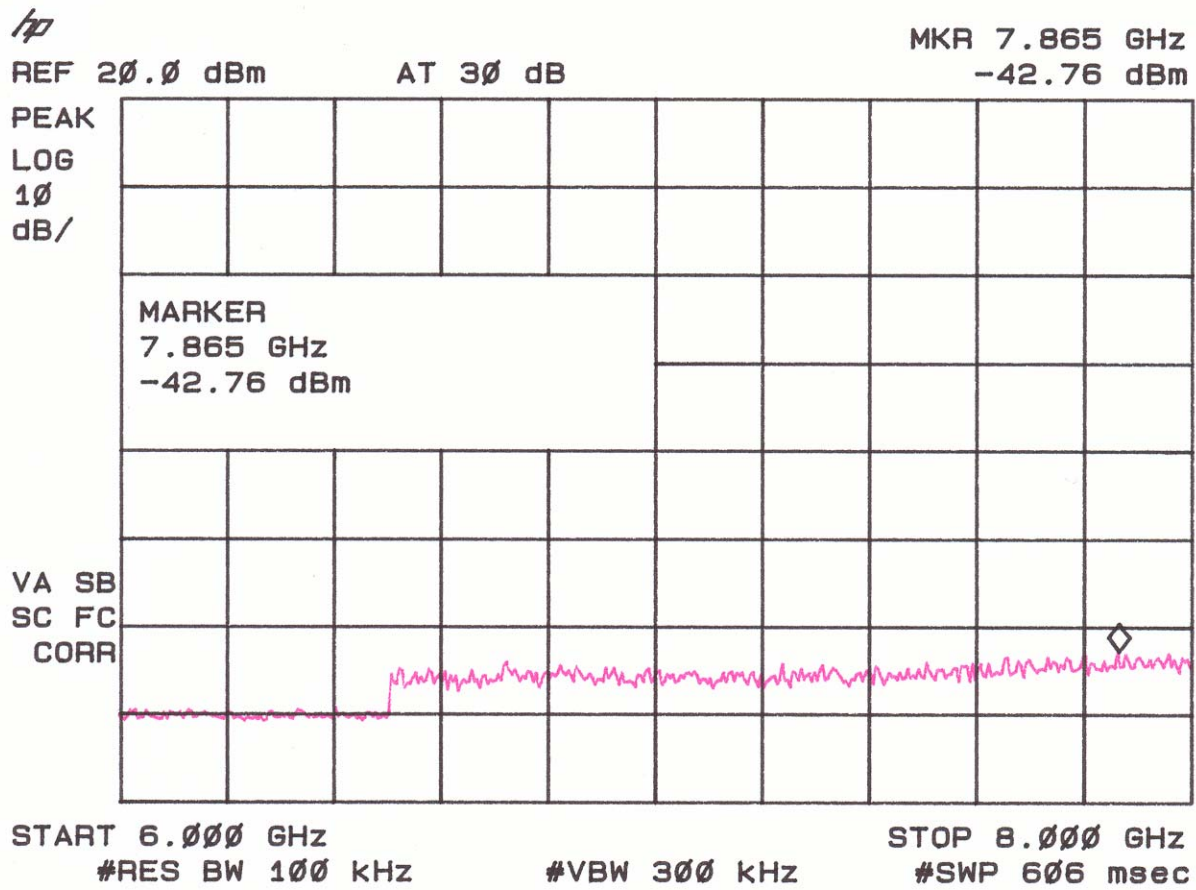


**Figure 4i**  
**Antenna Conducted Spurious Emissions 15.247(c) Mid**





**Figure 4k**  
**Antenna Conducted Spurious Emissions 15.247(c) Mid**





**Figure 4l**  
**Antenna Conducted Spurious Emissions 15.247(c) Mid**

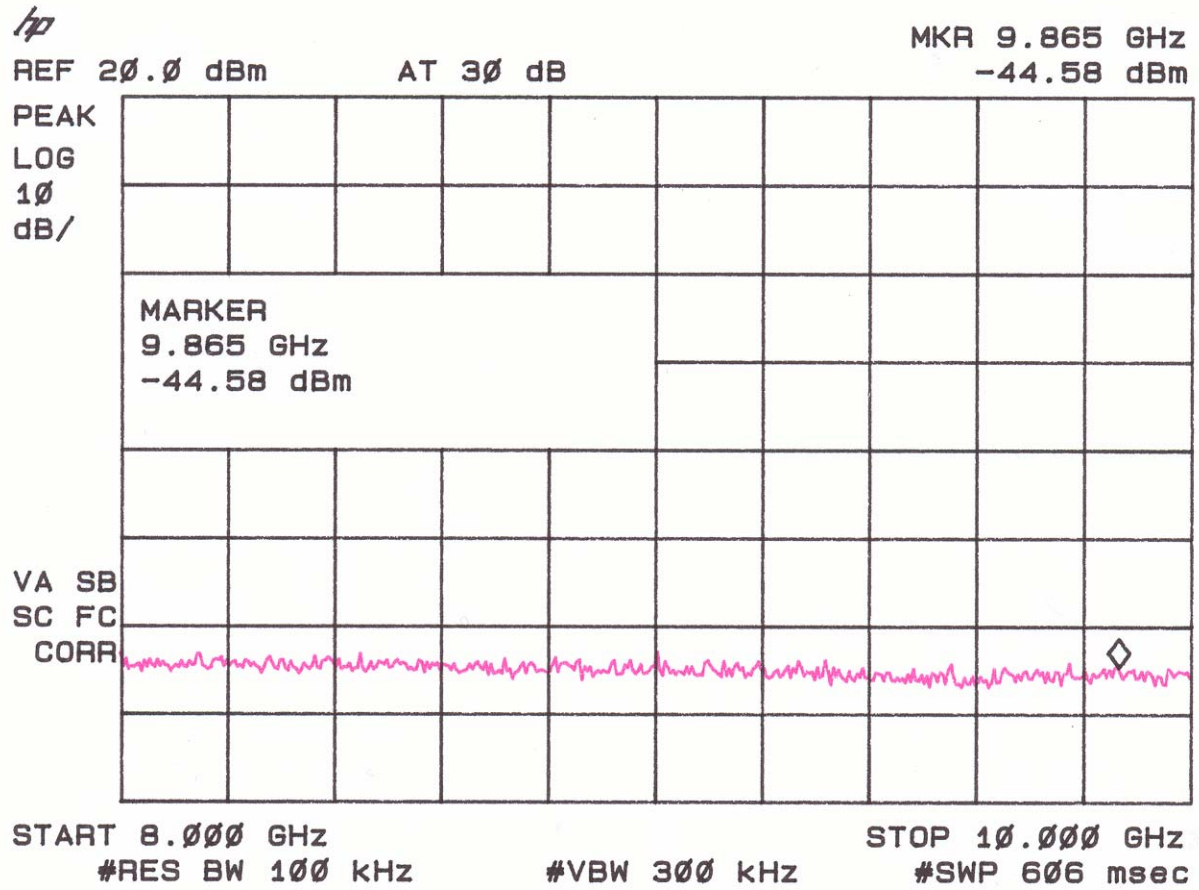
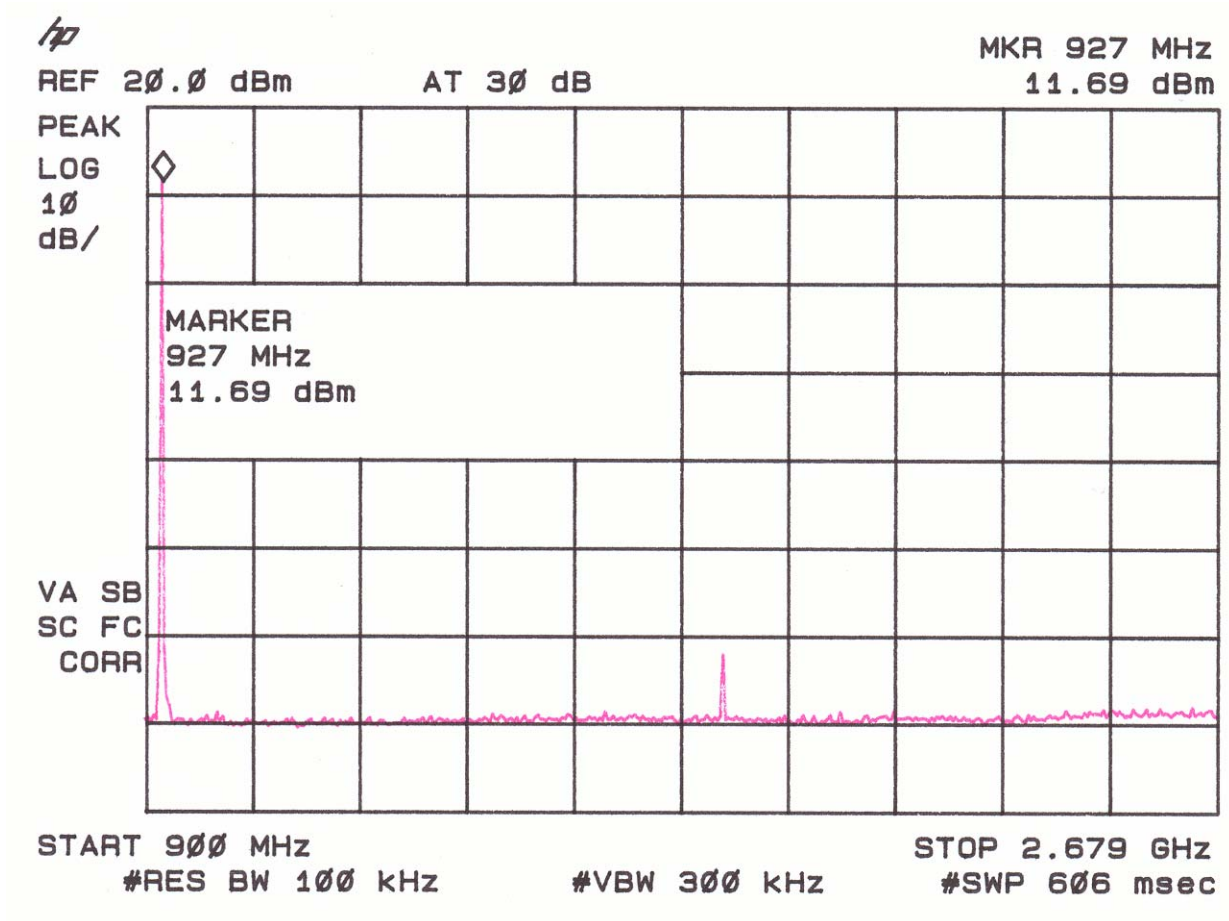




Figure 4m

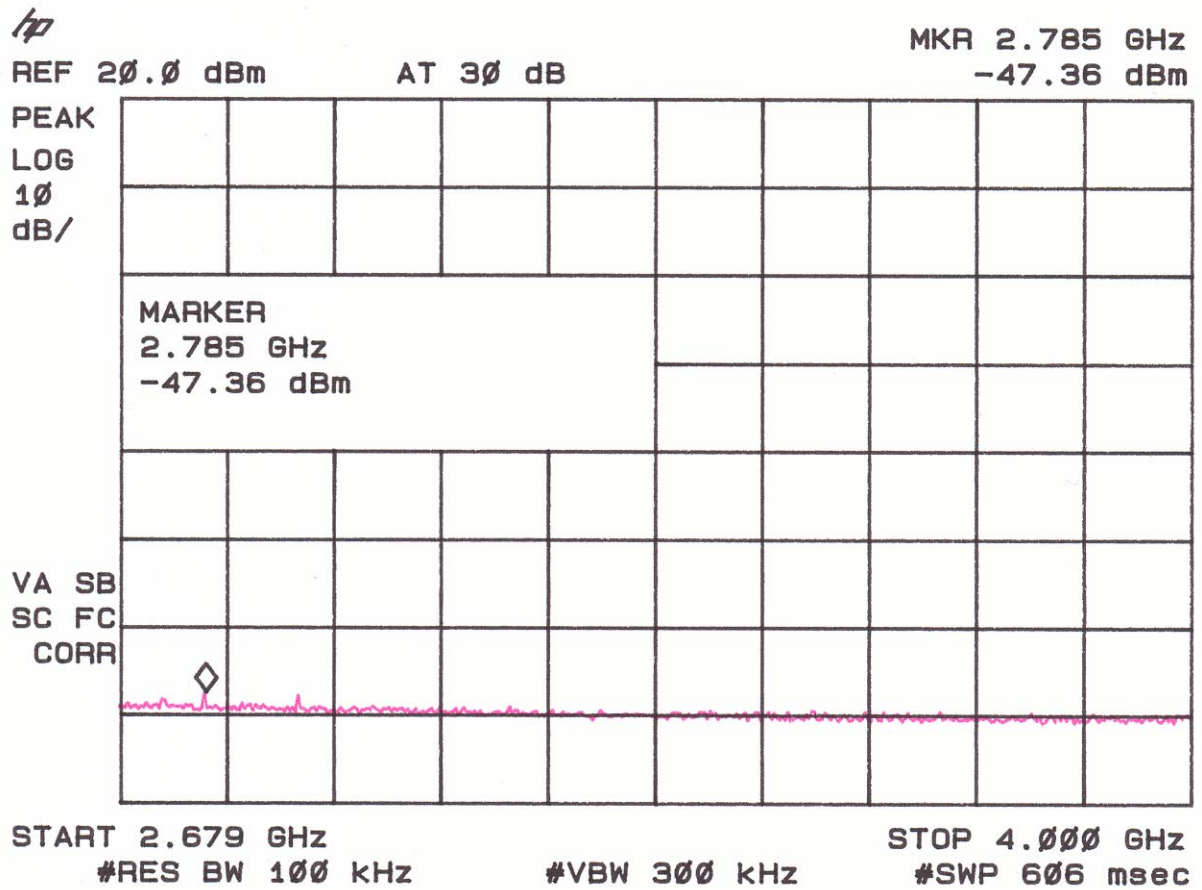
Antenna Conducted Spurious Emissions 15.247(c) High



### Antenna Conducted Spurious Emissions 15.247(c) High

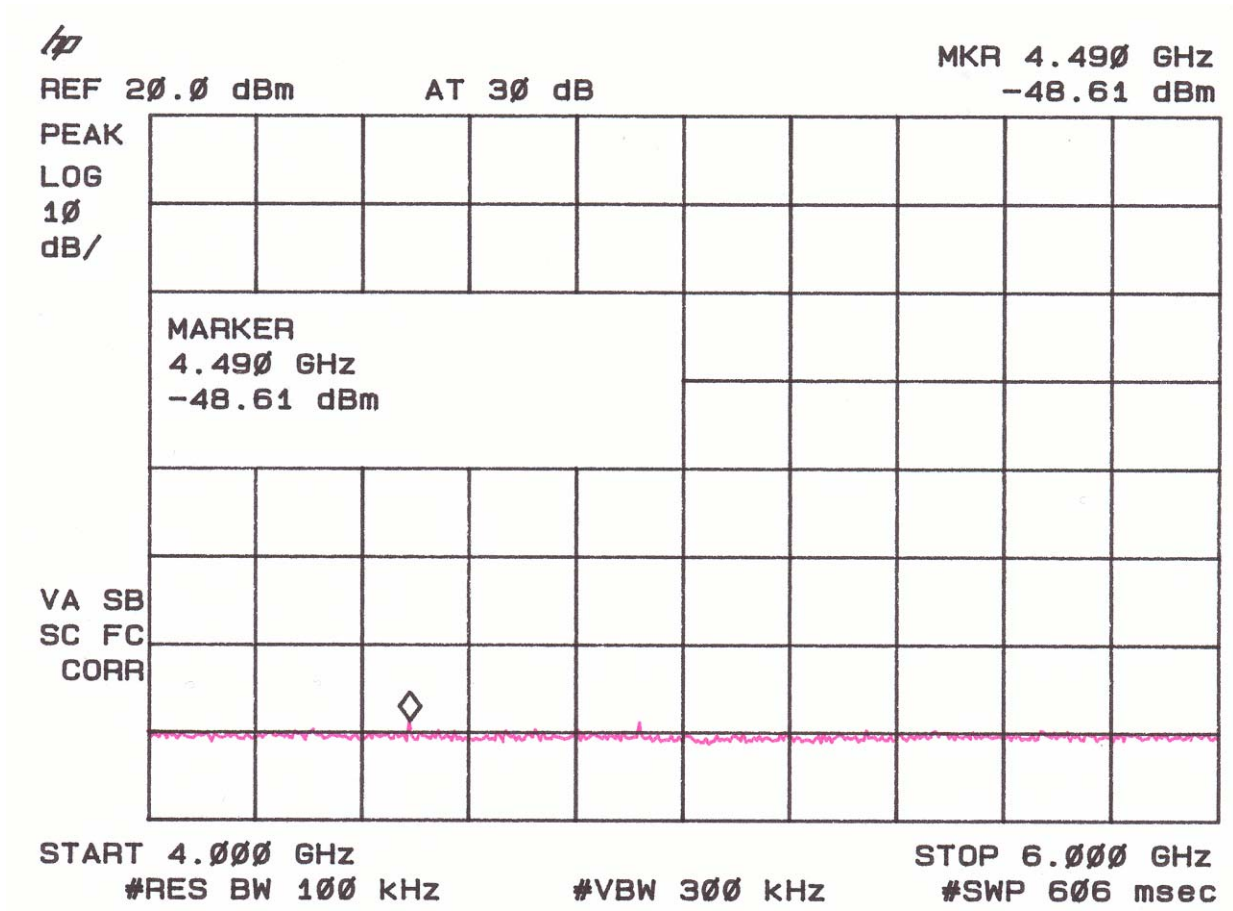
### Figure 4o

Antenna Conducted Spurious Emissions 15.247(c) High



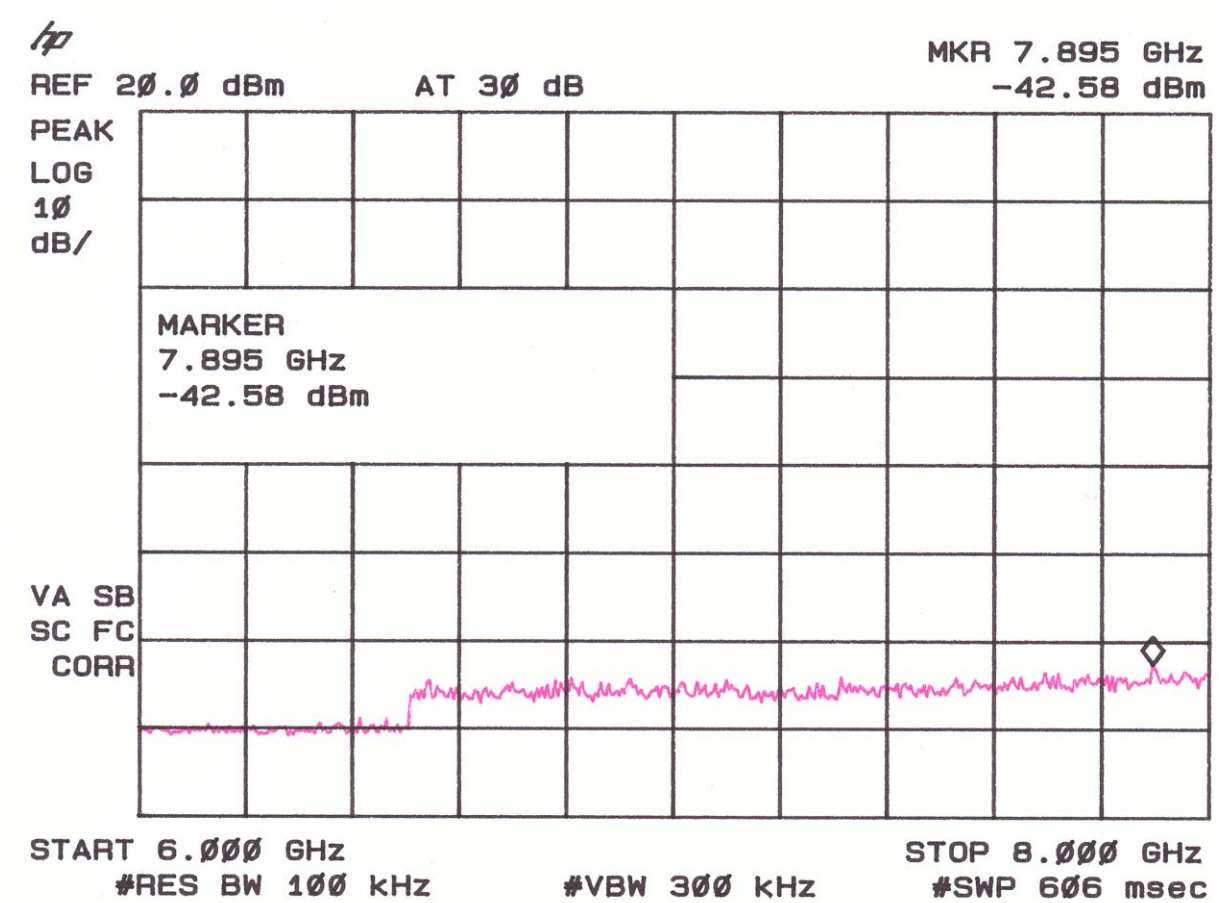
**Figure 4p**

Antenna Conducted Spurious Emissions 15.247(c) High



**Figure 4q**

Antenna Conducted Spurious Emissions 15.247(c) High



**Figure 4r**

Antenna Conducted Spurious Emissions 15.247(c) High

