ADC Broadband Communications
FCC Part 15, Certification Application
Local Status Monitor (LSM)

March 28, 2000

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **ADC Broadband Communications**

MODEL: **Local Status Monitor (LSM)**

FCC ID: **OW8LSM01400**

DATE: **March 28, 2000**

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

Equipment type: _____

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

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

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SECTION 1

GENERAL INFORMATION

GENERAL INFORMATION

1.1 Product Description

The Equipment Under Test (EUT) is a ADC Broadband Communications, Model Local Status Monitor (LSM). The ADC Broadband Communications LSM is an upgrade kit that can be installed in an ADC Network Amplifier (an RF Amplifier installed on cable lines). The main purpose for the LSM is to become a two-way wireless link between the RF amplifier and a ground located hand held smart terminal (LST – Local Smart Terminal) with a portable LSM Controller so that technicians can monitor the network.

The EUT is offered in two models, the LSM-01-U and the LSM-01-C. The difference between these two models is the housing cover that is supplied with the LSM, and is a factor of the RF amplifier that the unit is being installed in.

The EUT is designed to operate on one of two different channel sets. Please refer to the following letter from ADC Broadband Communications.

ADC BROADBAND COMMUNICATIONS
A Division of ADC Telecommunications, Inc.
4500 River Green Parkway
Suite 110
Duluth, GA. 30096

Federal Communications Commission
P.O. Box 429
Columbia, MD. 21045

Date: February 25, 2000

EXHIBIT:

Subject: Frequency planning for LSM-01 and LSMC-01

1)System A frequencies (in MHz) are:

2400.5 + (channel # - 1) * 1 MHz
range: 2400.5 - 2478.5 MHz

2)System B frequencies are:

2401 + (channel # - 1) * 1 MHz
range: 2401 – 2479 MHz

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 another transceiver, which has been submitted under FCC ID: OW8LSMC01400

The EUT is subject to the following authorizations:

a) Certification as a transmitter
b) Verification as a 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. Interconnecting cables were manipulated as necessary to maximize emissions. A block diagram of the tested system is shown in Figure 1. Test configuration photographs for spurious and digital device emissions are shown in Figure 2.

The sample used for testing was received by U.S. Technologies on January 10, 2000 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.

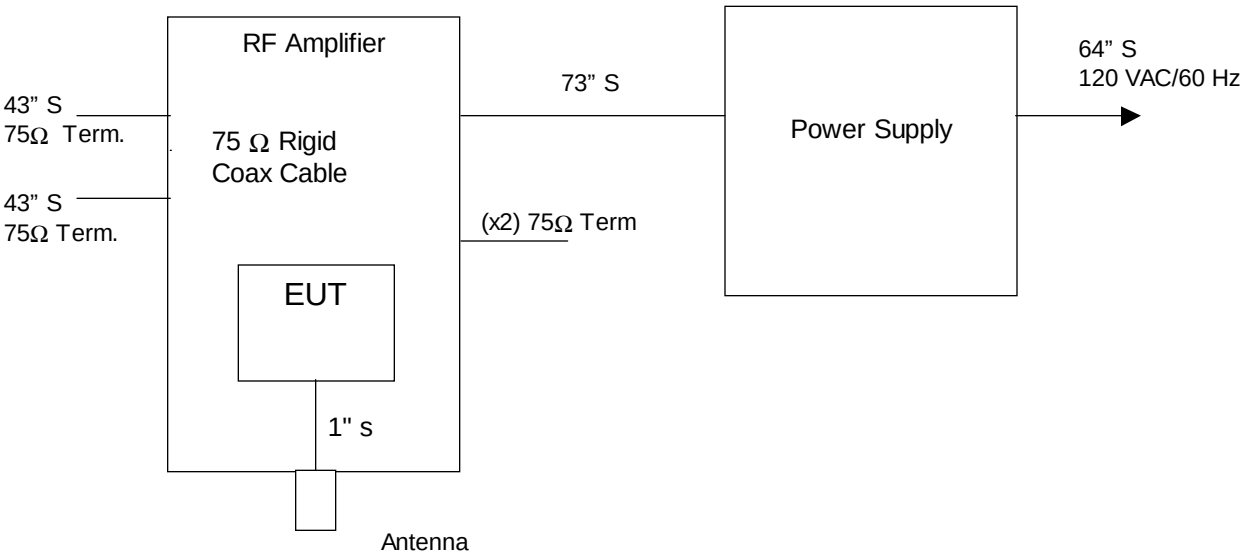
2.4 Modifications

The following modifications were made by ADC Broadband Communications in order to bring the EUT into compliance with FCC Part 15 limits for the transmitter portion of the EUT and the Class A Digital Device Requirements:

1) A timing change was made on the firmware so that synthesizer enable turn “on” occurred 2 msec before the RF transmit dc supply turn “on”. Also, a RF transmit dc supply turn “off” was made to occur 1 msec before the synthesizer enable turn “on” to change the local oscillator frequency.

FIGURE 1

TEST CONFIGURATION



Test Date: January 11, 2000
UST Project: 99-968
Customer: ADC Broadband Communications
Model: Local Status Monitor (LSM)

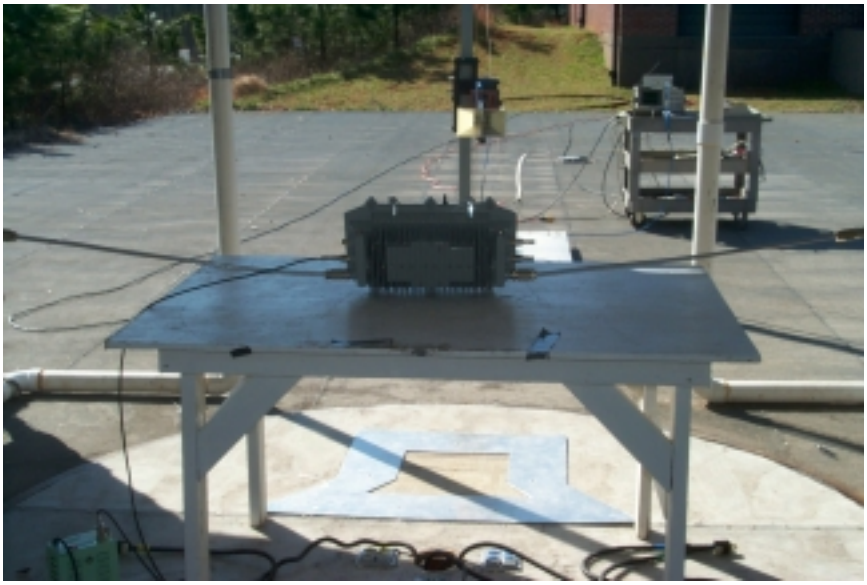
FIGURE 2a

Photograph(s) for Spurious and Fundamental Emissions (Front)

Test Date: January 11, 2000
UST Project: 99-968
Customer: ADC Broadband Communications
Model: Local Status Monitor (LSM)

FIGURE 2b

Photograph(s) for Spurious and Fundamental Emissions (Back)



Test Date: January 13 & February 20, 2000
UST Project: 99-968
Customer: ADC Broadband Communications
Model: Local Status Monitor (LSM)

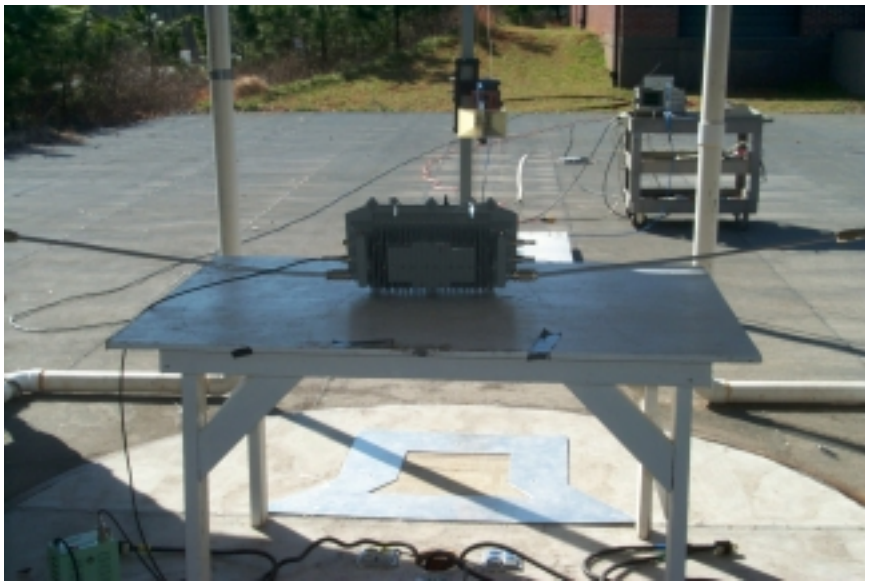
FIGURE 2c

Photograph(s) for Digital Device Emissions (Front)

Test Date: January 13 & February 20, 2000
UST Project: 99-968
Customer: ADC Broadband Communications
Model: Local Status Monitor (LSM)

FIGURE 2d

Photograph(s) for Digital Device Emissions (Back)



Test Date: February 16, 2000
UST Project: 99-968
Customer: ADC Broadband Communications
Model: Local Status Monitor (LSM)

FIGURE 2e

Photograph(s) for Digital Device Conducted Emissions

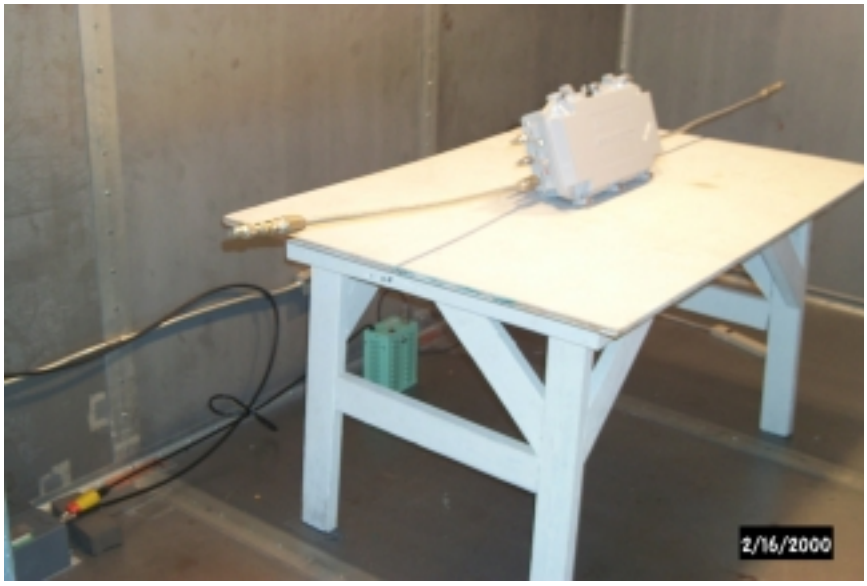


TABLE 1

EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transceiver (EUT) ADC Broadband Communications	LSM	None	OW8LSM01400 (Pending)	Internal to RF Network Amplifier
RF Network Amplifier ADC Broadband Communications	Pathworx 1054215	210573131	N/A	73" S 64" U Power Cord
Ferro-resonant Power Supply Lectro	MINIMITE, 4A, 60 VAC	GQ321A0104	N/A	(x2) 43" S Rigid Coax Cable w/ 75 ΩTerm. (x2) 75 Ω Term.

TABLE 2
TEST INSTRUMENTS

TYPE	MANUFACTURER	MODEL	SN.
SPECTRUM ANALYZER	HEWLETT-PACKARD	8593E	3205A00124
SPECTRUM ANALYZER	HEWLETT-PACKARD	8558B	2332A09900
S A DISPLAY	HEWLETT-PACKARD	853A	2404A02387
COMB GENERATOR	HEWLETT-PACKARD	8406A	1632A01519
RF PREAMP	HEWLETT-PACKARD	8447D	1937A03355
RF PREAMP	HEWLETT-PACKARD	8449B	3008A00480
HORN ANTENNA	EMCO	3115	3723
BICONICAL ANTENNA	EMCO	3110	9307-1431
LOG PERIODIC ANTENNA	EMCO	3146	9110-3600
LISN	SOLAR ELE.	8012	865577
LISN	SOLAR ELE.	8028	910494
LISN	SOLAR ELE.	8028	910495
THERMOMETER	FLUKE	52	5215250
MULTIMETER	FLUKE	85	53710469
FUNCTION GENERATOR	TEKTRONIX	CFG250	CFG250TW15059
PLOTTER	HEWLETT-PACKARD	7475A	2325A65394

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 ADC Broadband Communications Local Status Monitor (LSM) incorporates the following antenna only.

Manufacturer: MAXRAD, Inc.

Type: 1/4 wave whip

Model Number: Z574B

Gain: 0 dBi

Connector: Soldered Pig Tail

(Please refer to the following letter from ADC Broadband Communications).

ADC BROADBAND COMMUNICATIONS
A Division of ADC Telecommunications, Inc.
4500 River Green Parkway
Suite 110
Duluth, GA. 30096

Federal Communications Commission
P.O. Box 429
Columbia, MD. 21045

Date: February 25, 2000

EXHIBIT:

Subject: LSM Antenna Description

The antenna for LSM-01-C and LSM-01-U is a 2.4 GHz to 2.48 GHz quarter wave whip antenna with 0.0 dBi gain. The antenna has a RG188 cable with a pig tail that is soldered on the antenna pad of the PWB. MAXRAD, INC. manufactures the antenna and the model number is Z574B.

2.7 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 Ω impedance with the VBW ≥ RBW 6 dB bandwidth. The results of the measurements are given in Table 3 and Figure 3a through Figure 3c.

The EUT did not incorporate any antennas of directional gain greater than 6 dBi, therefore the output power has not been reduced as required by 15.247(b)(3).

TABLE 3
PEAK POWER OUTPUT

Test Date: **February 23, 2000**
UST Project: **99-968**
Customer: **ADC Broadband Communications**
Model: **Local Status Monitor (LSM)**

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (Watt)*	FCC Limit (Watt)
2401.4	16.3	0.0427	1.0
2440.6	17.6	0.0575	1.0
2479.6	17.4	0.0550	1.0

*** Measurement includes 0.5 dB cable loss**

Tester
Signature: _____ **Name:** **Tim R. Johnson**

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

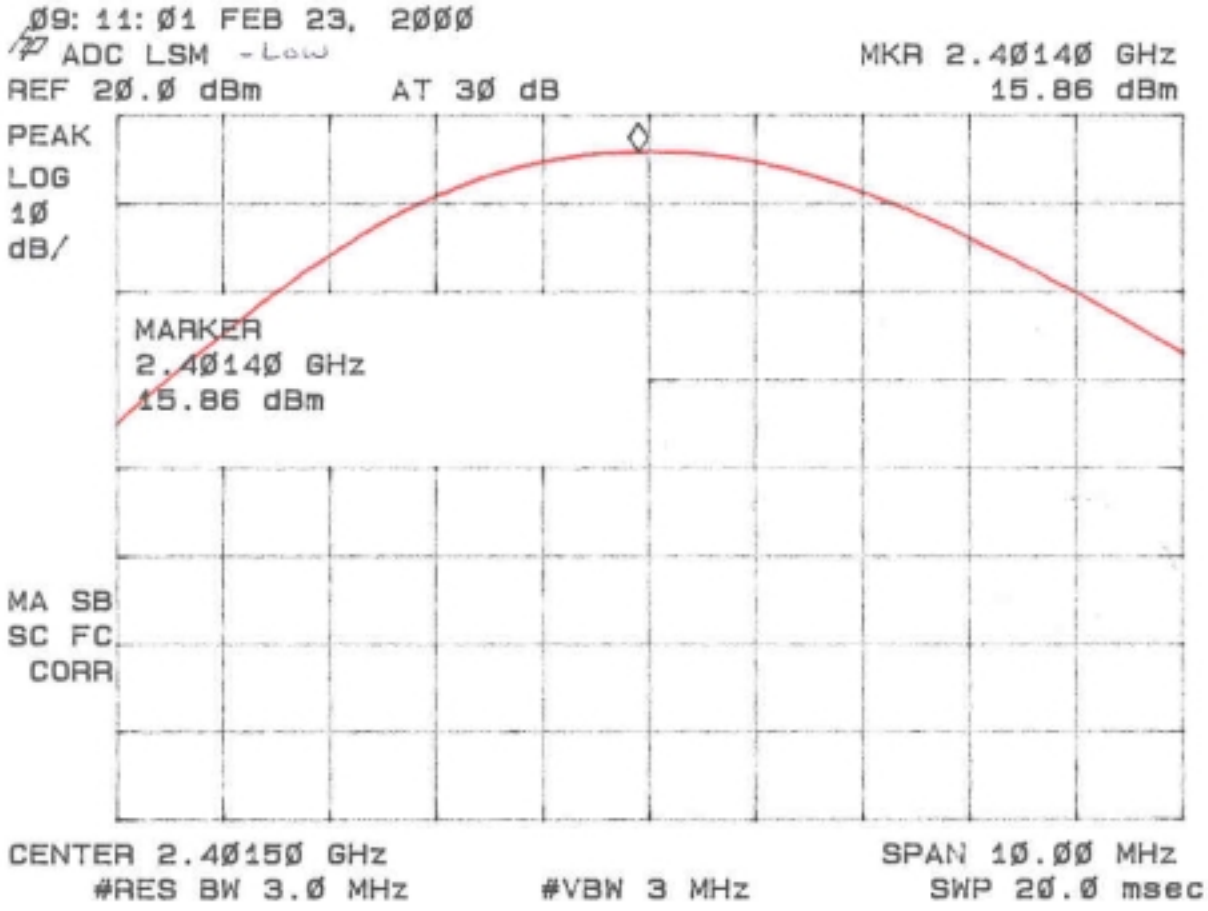


Figure 3b.
Peak Power per FCC Section 15.247(b) (Mid)

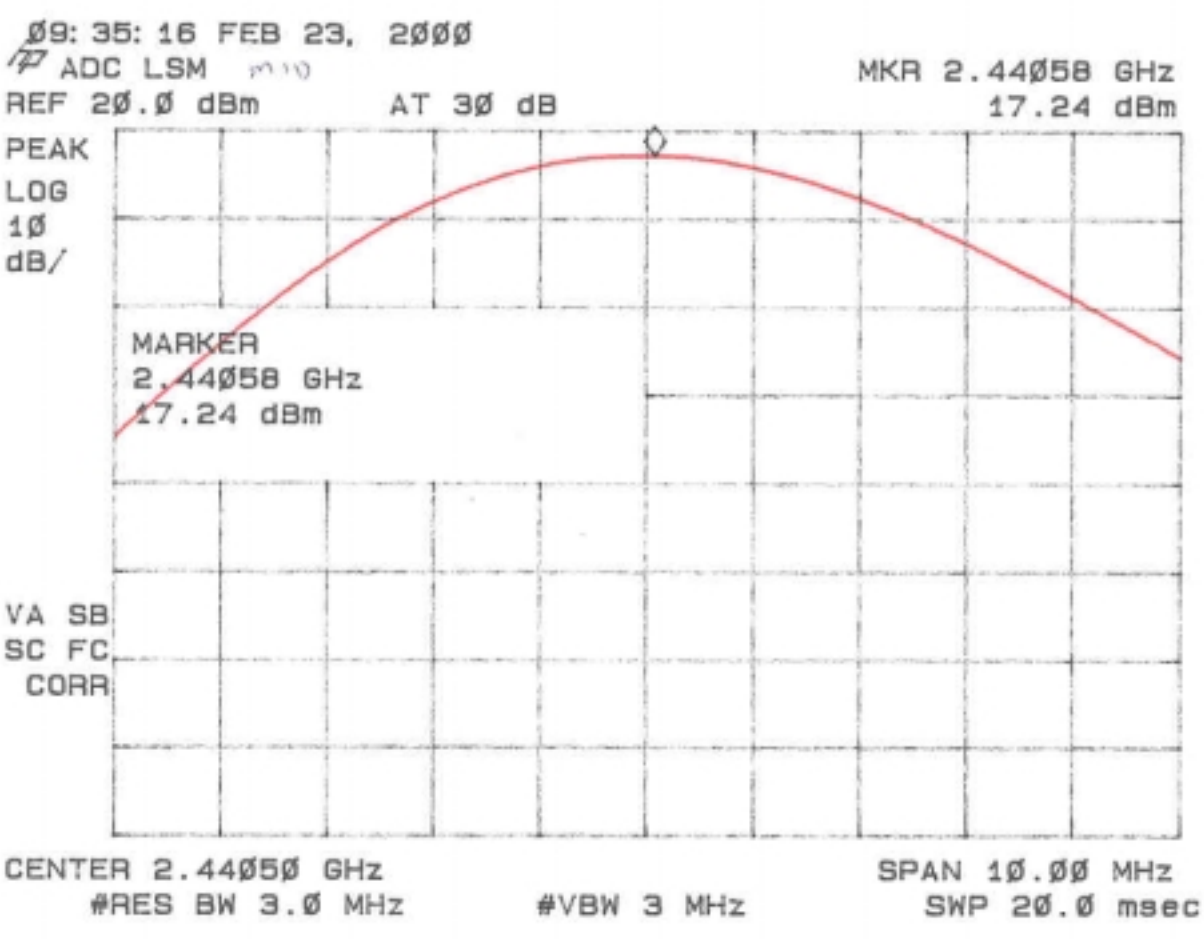
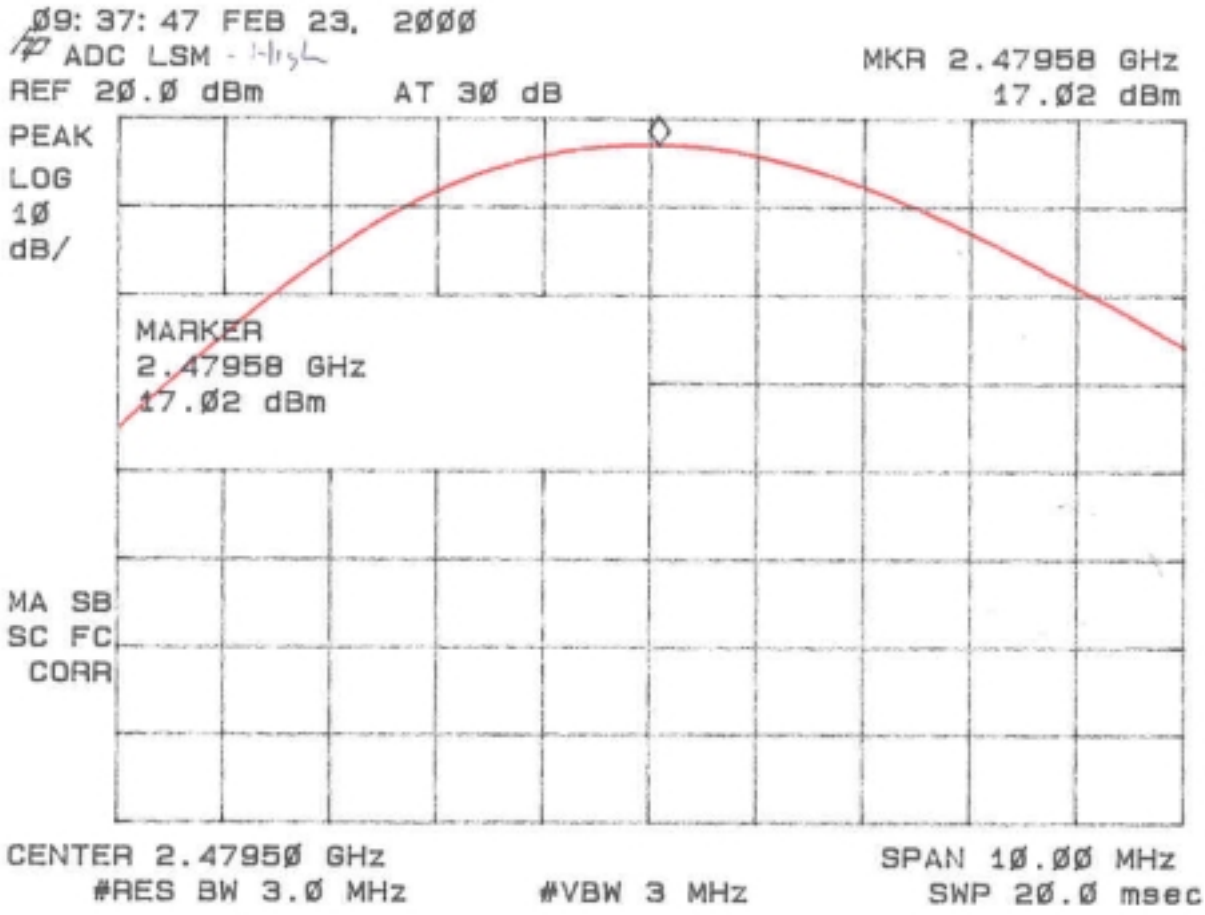


Figure 3c.
Peak Power per FCC Section 15.247(b) (High)



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

Spurious emissions in the frequency range 30 - 25000 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 Figure 4l.

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

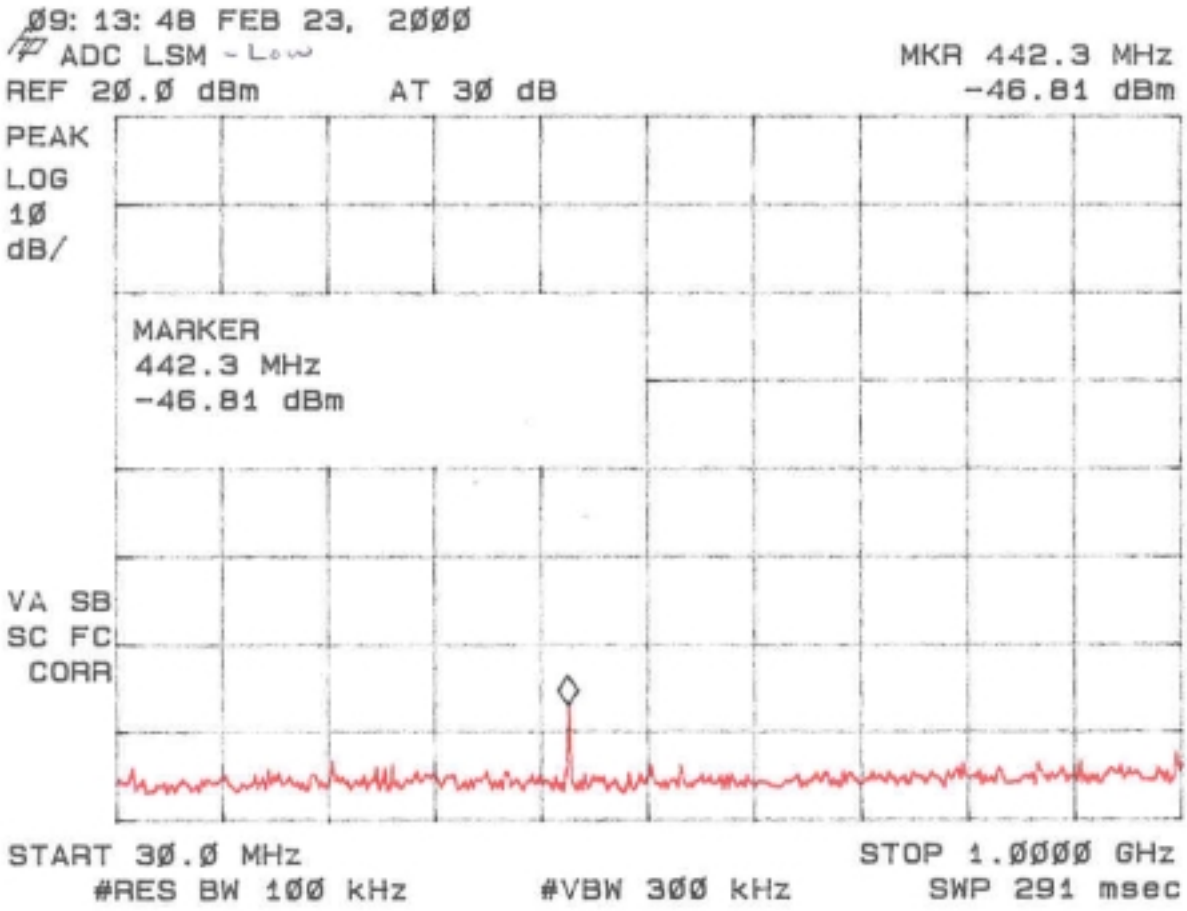


Figure 4b
Antenna Conducted Spurious Emissions 5.247(c) Low

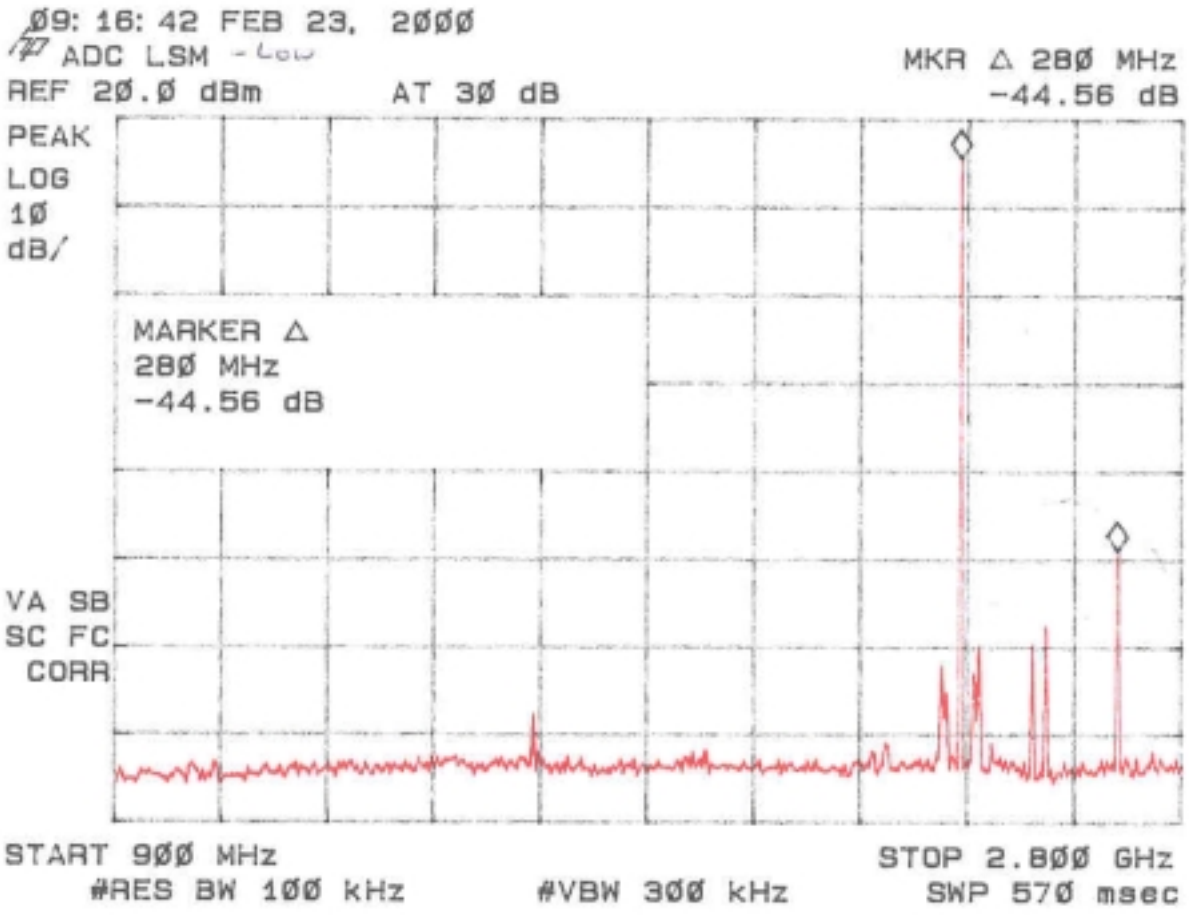


Figure 4c
Antenna Conducted Spurious Emissions 15.247(c) Low

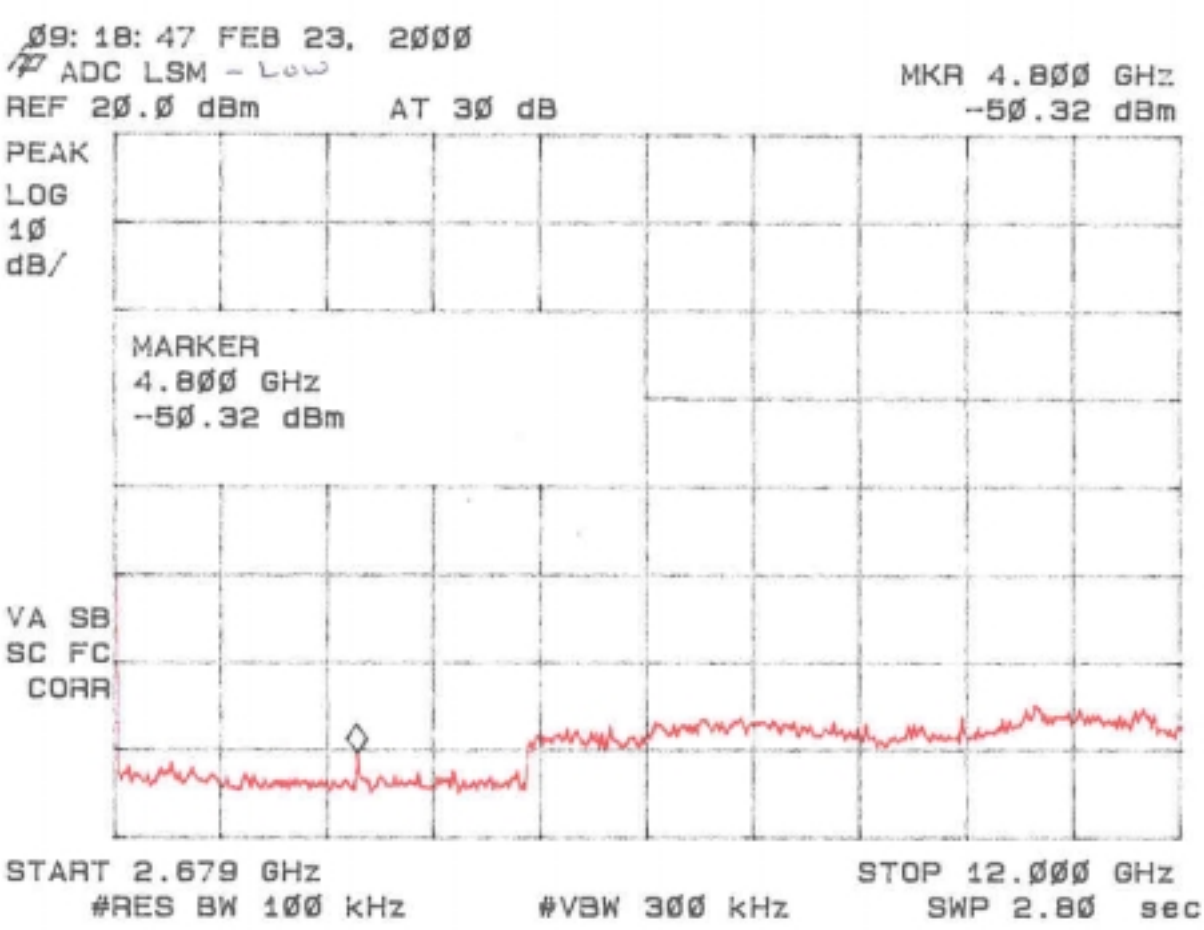


Figure 4d
Antenna Conducted Spurious Emissions 15.247(c) Low

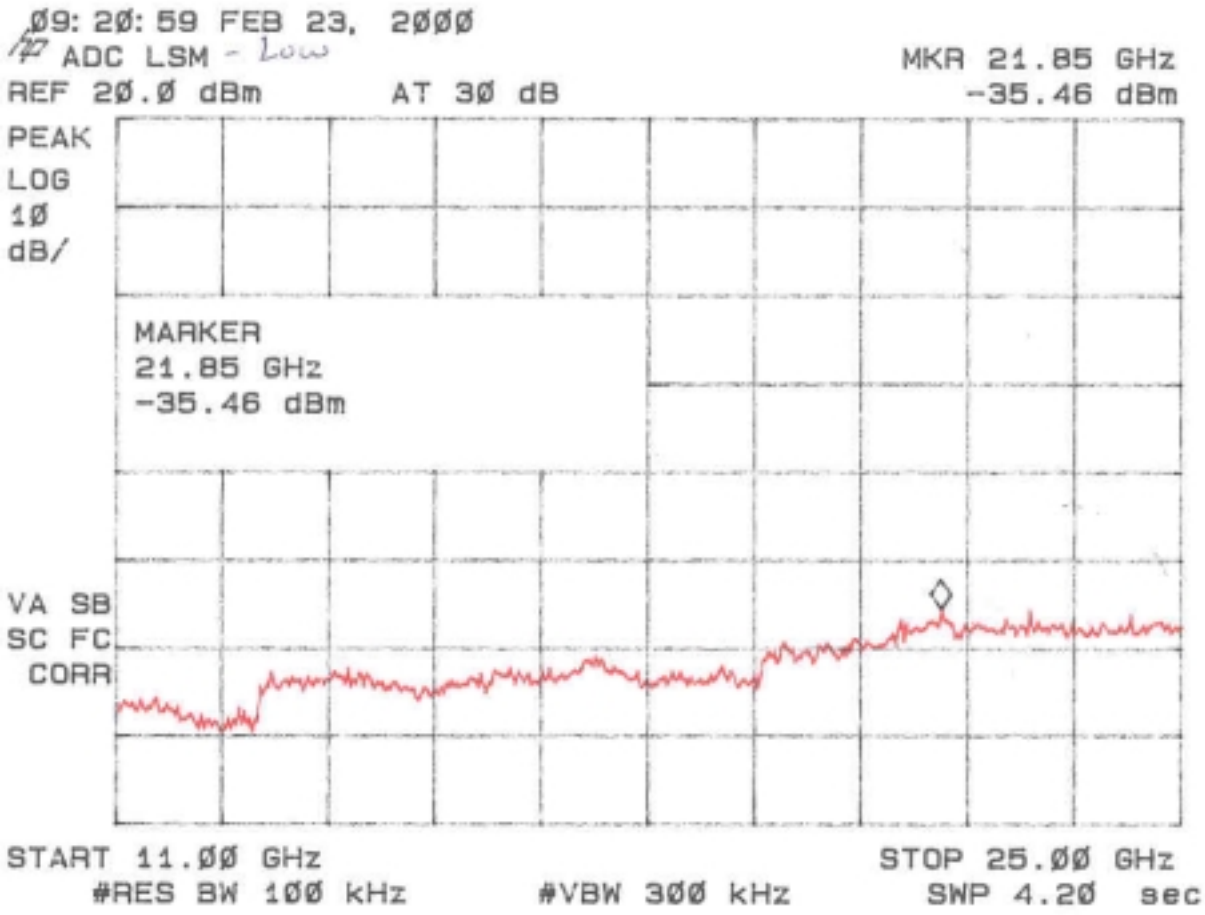


Figure 4e
Antenna Conducted Spurious Emissions 15.247(c) Mid

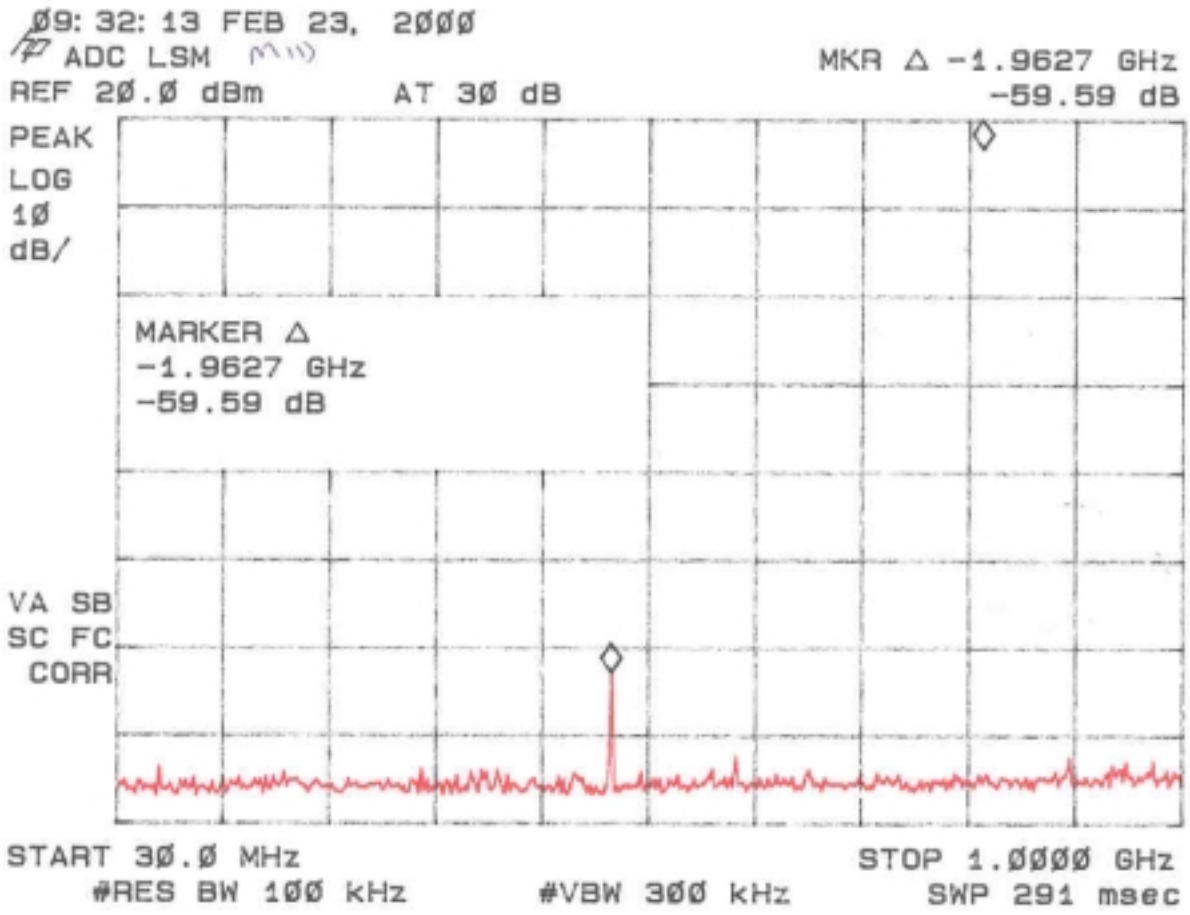


Figure 4f
Antenna Conducted Spurious Emissions 15.247(c) Mid

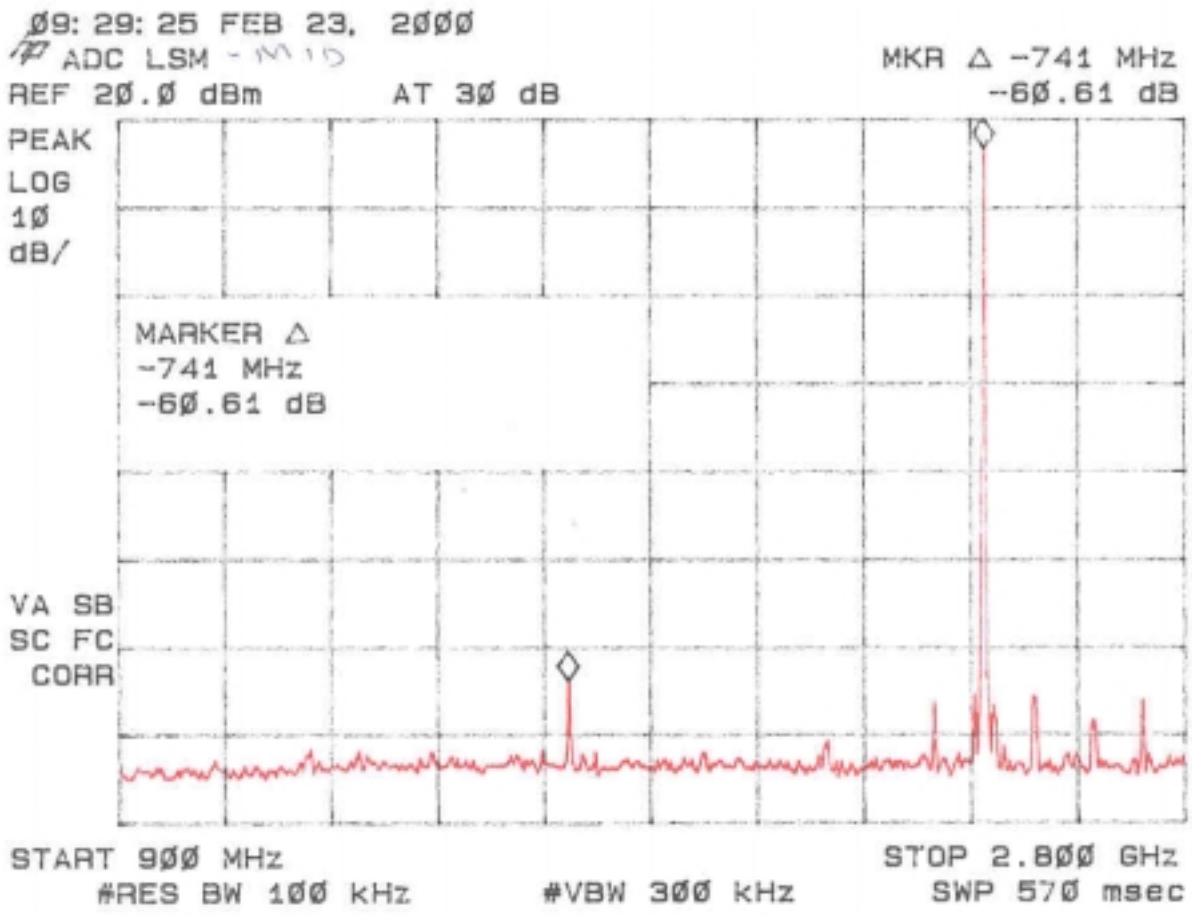


Figure 4g
Antenna Conducted Spurious Emissions 15.247(c) Mid

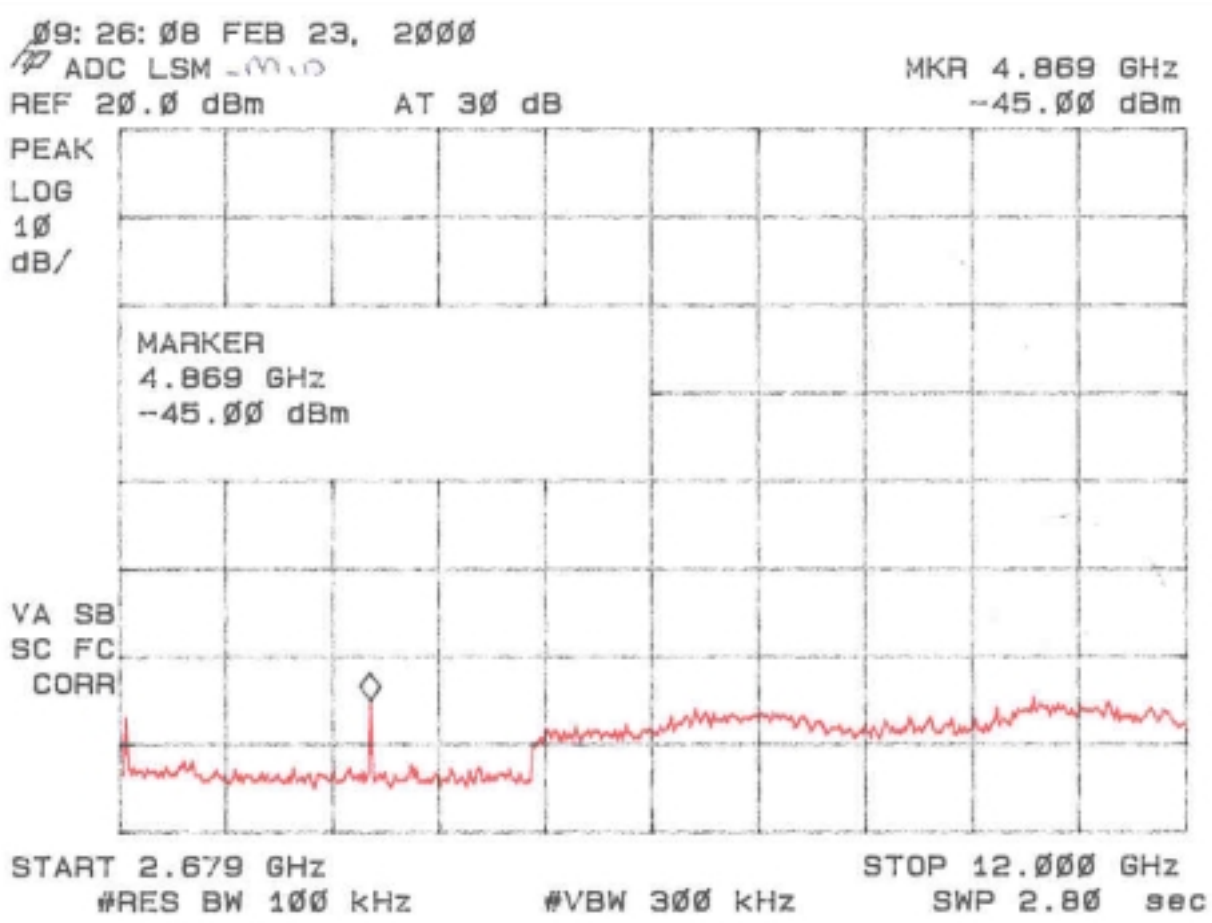


Figure 4h
Antenna Conducted Spurious Emissions 15.247(c) Mid

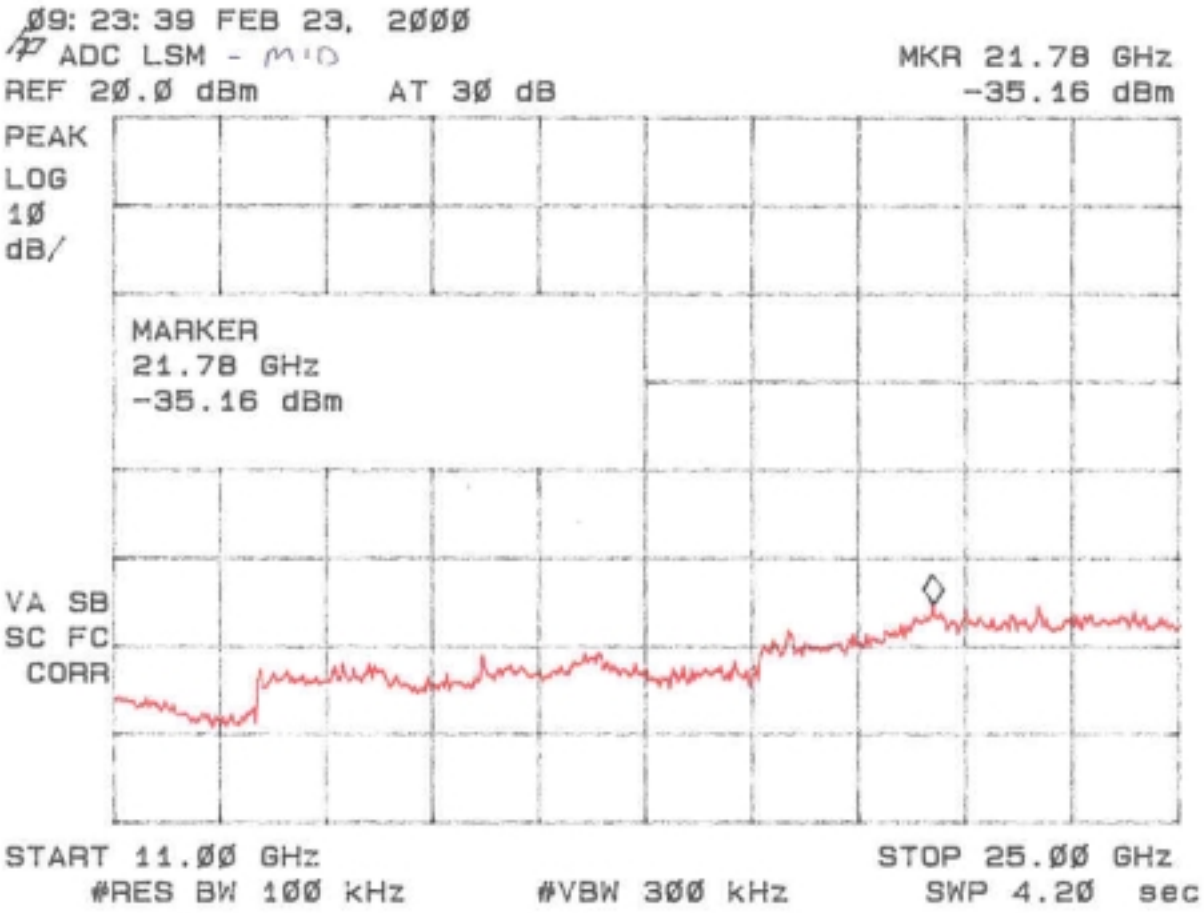


Figure 4i
Antenna Conducted Spurious Emissions 15.247(c) High

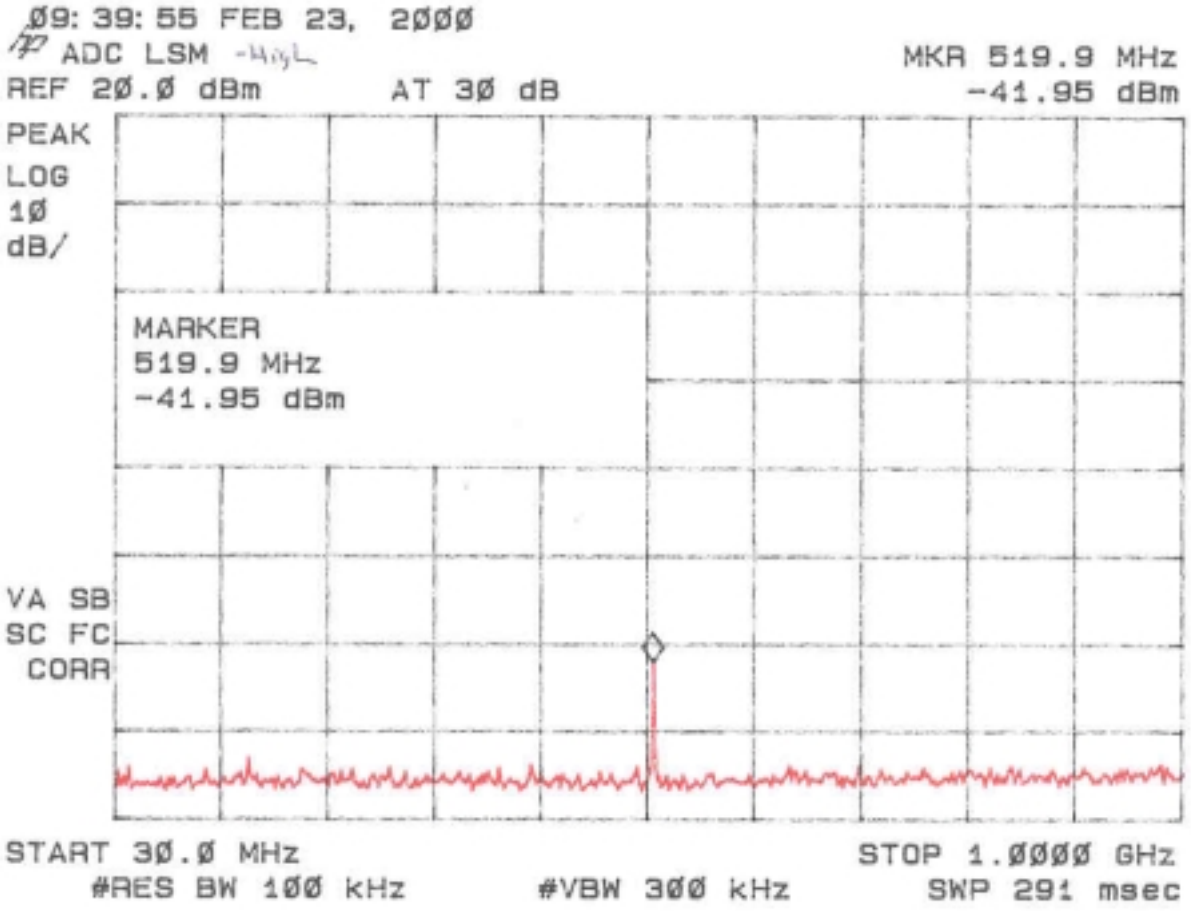


Figure 4j
Antenna Conducted Spurious Emissions 15.247(c) High

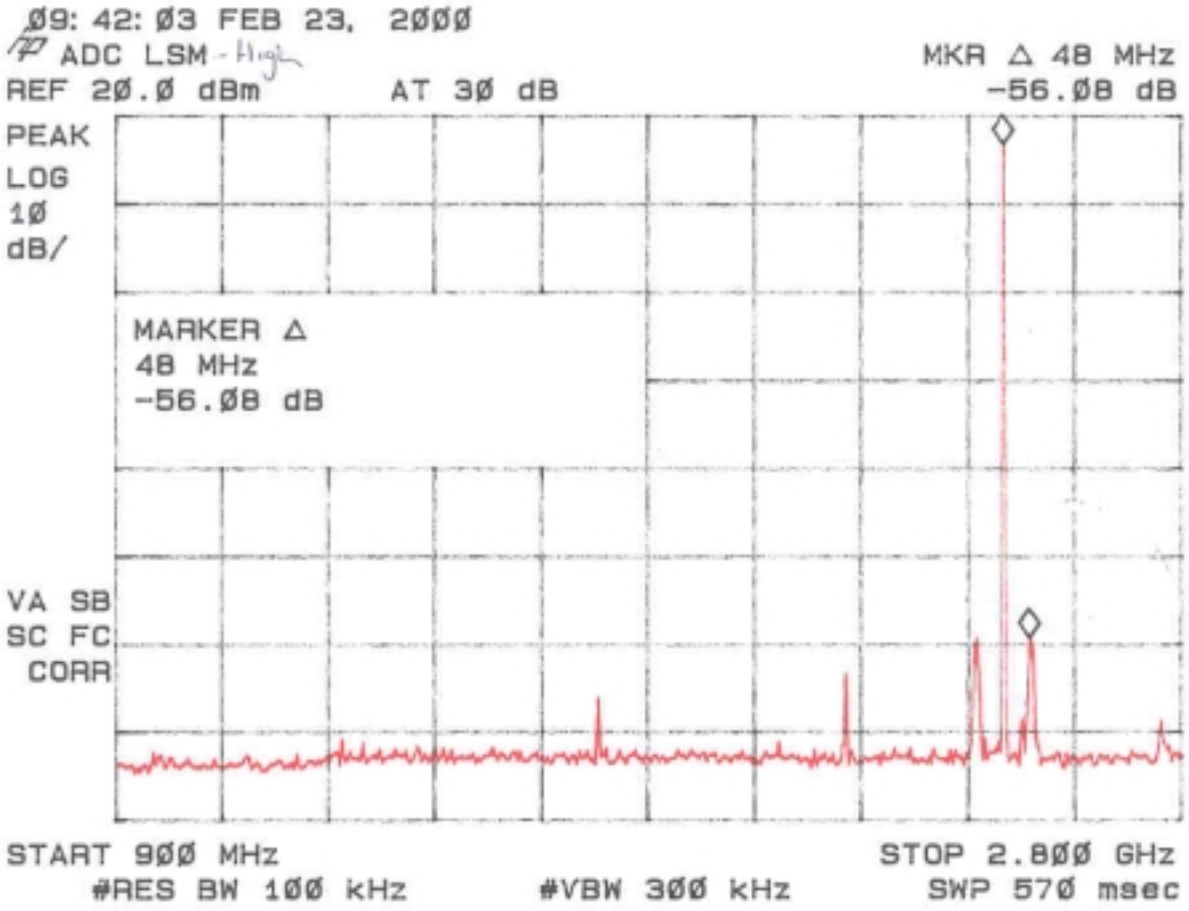


Figure 4k
Antenna Conducted Spurious Emissions 15.247(c) High

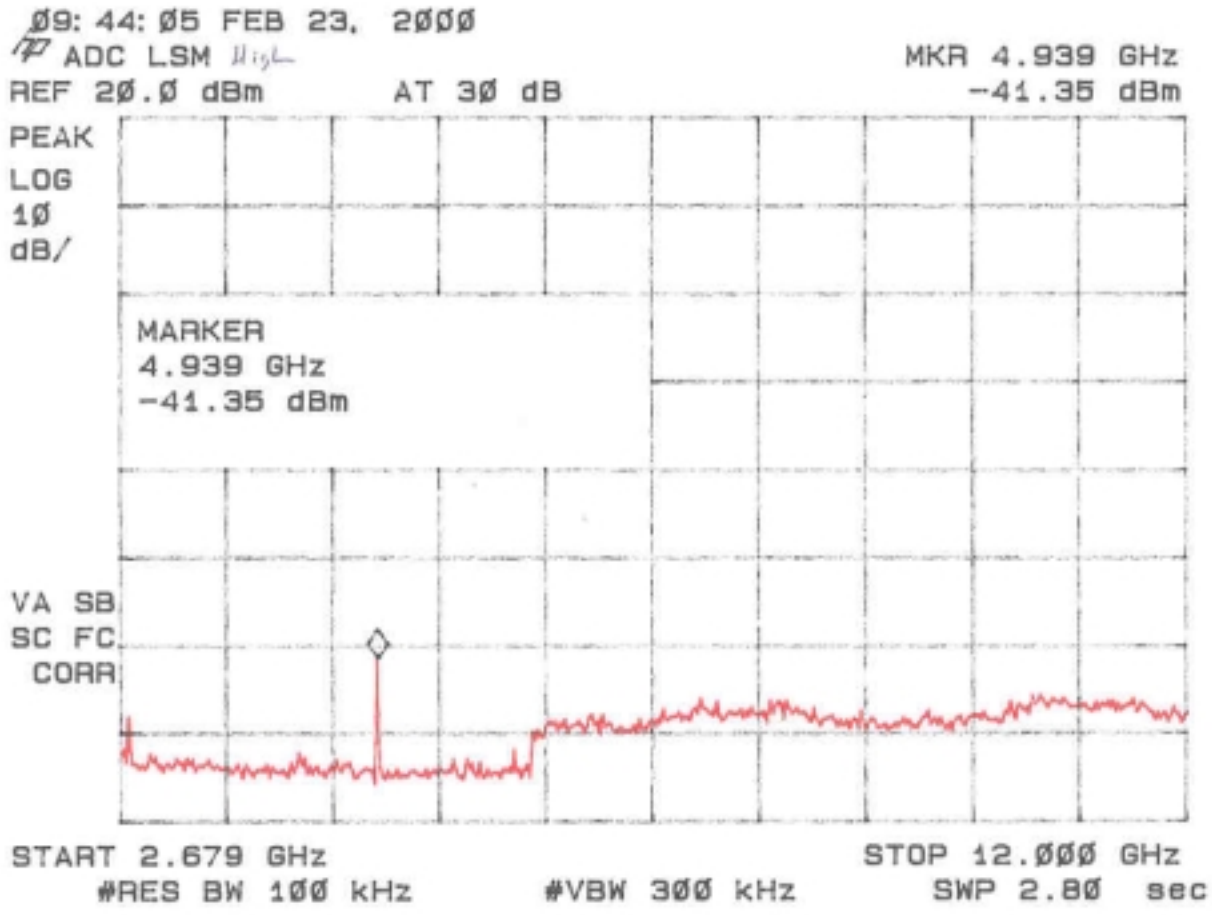


Figure 4l
Antenna Conducted Spurious Emissions 15.247(c) High