Xetron Corporation
FCC Part 15, Certification Application
Hornet

May 24, 2000

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Xetron Corporation**

MODEL: **Hornet**

FCC ID: **MH9-HNT2400**

DATE: **May 24, 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

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

TABLES

SECTION 1

GENERAL INFORMATION

GENERAL INFORMATION

1.1 Product Description

The Equipment Under Test (EUT) is a Xetron Corporation, Model Hornet modular transceiver for the 2.4 GHz band. The unit is designed for point-to-point and point-to-multipoint data links requiring a high degree of portability and low power consumption. The transceiver applications include point of sale, medical, mobile computing, data collection, remote monitoring, and data entry systems. It is a frequency agile design in that four discrete frequencies (channels) are used for data transmission. These multiple frequencies and the use of Carrier Sense Multiple Access (CSMA) enables the unit to have excellent performance in congested environments. Prior to transmission, the radio searches to find a free channel for transmission and then proceeds to establish a link with the destination device. If a channel is not free the radio waits a random period of time before searching again for a free channel.

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 of like design.

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. 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 fundamental emissions are shown in Figure 2.

The sample used for testing was received by U.S. Technologies on December 15 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

Xetron Corporation had to make a few modifications in order to bring the EUT into compliance with FCC Part 15 limits for the transmitter portion of the EUT (Please refer to letter on following page). No modifications were necessary to bring the EUT into compliance with the Class B Digital Device Requirements.

XETRON
A SUBSIDIARY OF NORTHROP GRUMMAN CORPORATION

Mr. Tim Johnson
U.S. Technologies
3505 Francis Circle
Alpharetta, GA 30201

Subject: Hornet Radio FCC Items

Dear Tim:

Per Austin's request, I have included a Hornet radio without a shield for taking photographs. He also requested a list of the changes to bring the radio into compliance. The radio changes were as follows:

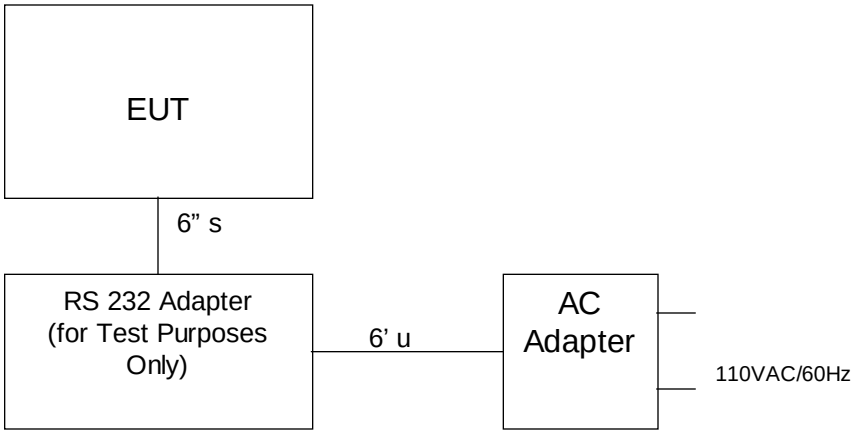
- More completely solder the shield around its base
- Put a 10 pf capacitor at pin 13 of the connector (comparator test pin)
- Put a 18 pf capacitor at pin 11 of the connector (3.3 volt supply input)

Sincerely,

Larry P. Ochs
Product Manager
Xetron Corp.
Enclosure (1)

FIGURE 1

TEST CONFIGURATION



Test Date: January 25, 2000
UST Project: 99-956
Customer: Xetron Corporation
Model: Hornet

FIGURE 2a

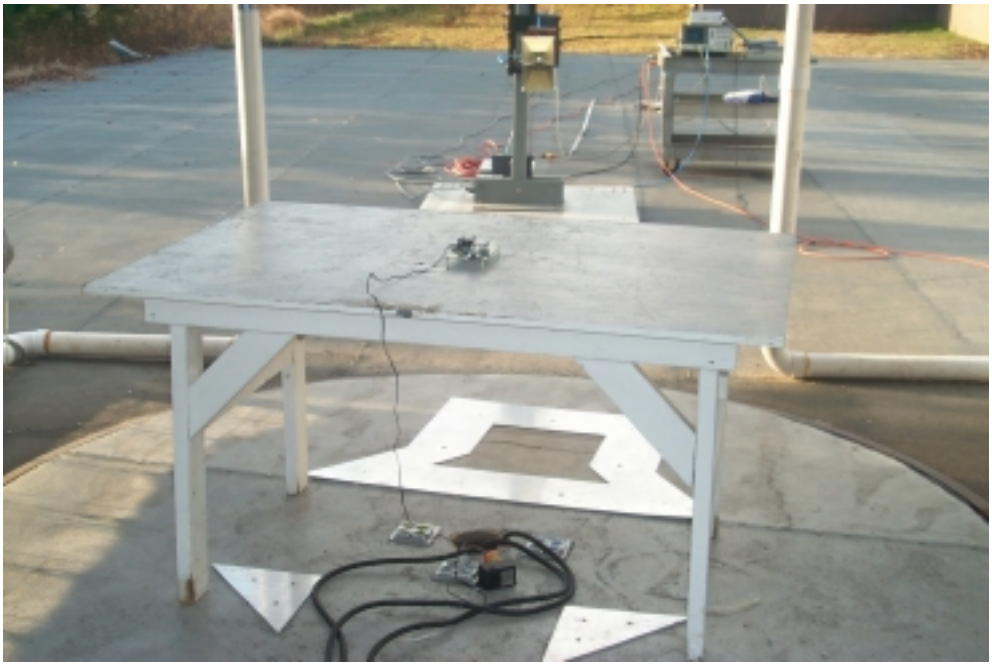
Photograph(s) for Spurious and Fundamental Emissions (Front)

Photograph Not Available

Test Date: January 25, 2000
UST Project: 99-956
Customer: Xetron Corporation
Model: Hornet

FIGURE 2b

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



Test Date: February 8, 2000
UST Project: 99-956
Customer: Xetron Corporation
Model: Hornet

FIGURE 2c

Photograph(s) for Digital Device Conducted Emissions

TABLE 1

EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
EUT Xetron Corporation	Hornet	004828	MH9-HNT2400 (Pending)	6” s
Hornet RS232 Adapter Xetron Corporation	360034 Rev C	None	None	None
AC Adapter Stancor	STA-4850	S8048	None	6’ u

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
HORN ANTENNA	EMCO	3116	9505-2255
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

2.5 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 Model Xetron Corporation Hornet incorporates an integrated antenna only.

2.6 Field Strength of Fundamental within the Band 2.4 – 2.4835 GHz per FCC Section 15.249(a)

Peak power within the band 2.4 – 2.4835 GHz has been measured with a spectrum analyzer. Since the fundamental emission is above 1000 MHz, both a peak and average limit are specified. Peak measurements were made using a peak detector. Average emissions were derived from applying an possible duty cycle correction to the peak reading.

The results of the measurements for peak fundamental emissions are given in Table 3a and Figure 3a through Figure 3c. The results for average measurements are given in Table 3b.

Duty Cycle Correction During 100 msec:

Xetron Corporation has provided a detailed explanation of their duty cycle. This is shown in Figure 3d through 3i.

Table 3a
FIELD STRENGTH OF FUNDAMENTAL EMISSION

Test Date: February 10, 20000
UST Project: 99-956
Customer: Xetron Corporation
Model: Hornet

Peak Measurements

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR (dB)	CABLE ATTEN. (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m
2.4068	-48.3	30.6	3.9	45,761	500,000
2.4320	-48.4	30.7	3.9	45,499	500,000
2.4767	-45.6	30.8	4.0	64,343	500,000

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-48.3 + 30.6 + 3.9 + 107)/20) = 45,761
CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
Reviewed By: _____ **Name:** Tim R. Johnson

Figure 3a.
Field Strength of Fundamental Emissions 15.249(a) (Low)

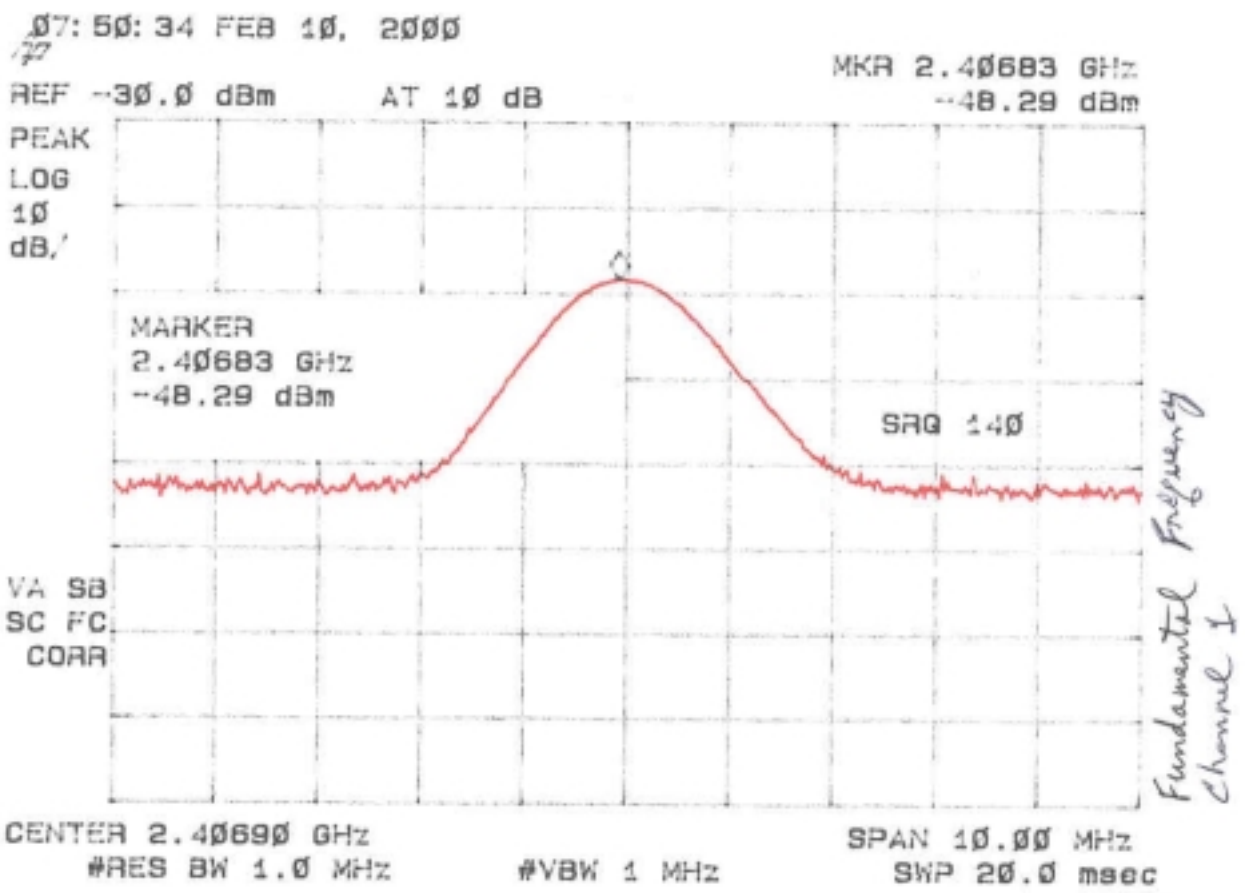


Figure 3b.
Field Strength of Fundamental Emissions 15.249(a) (Mid)

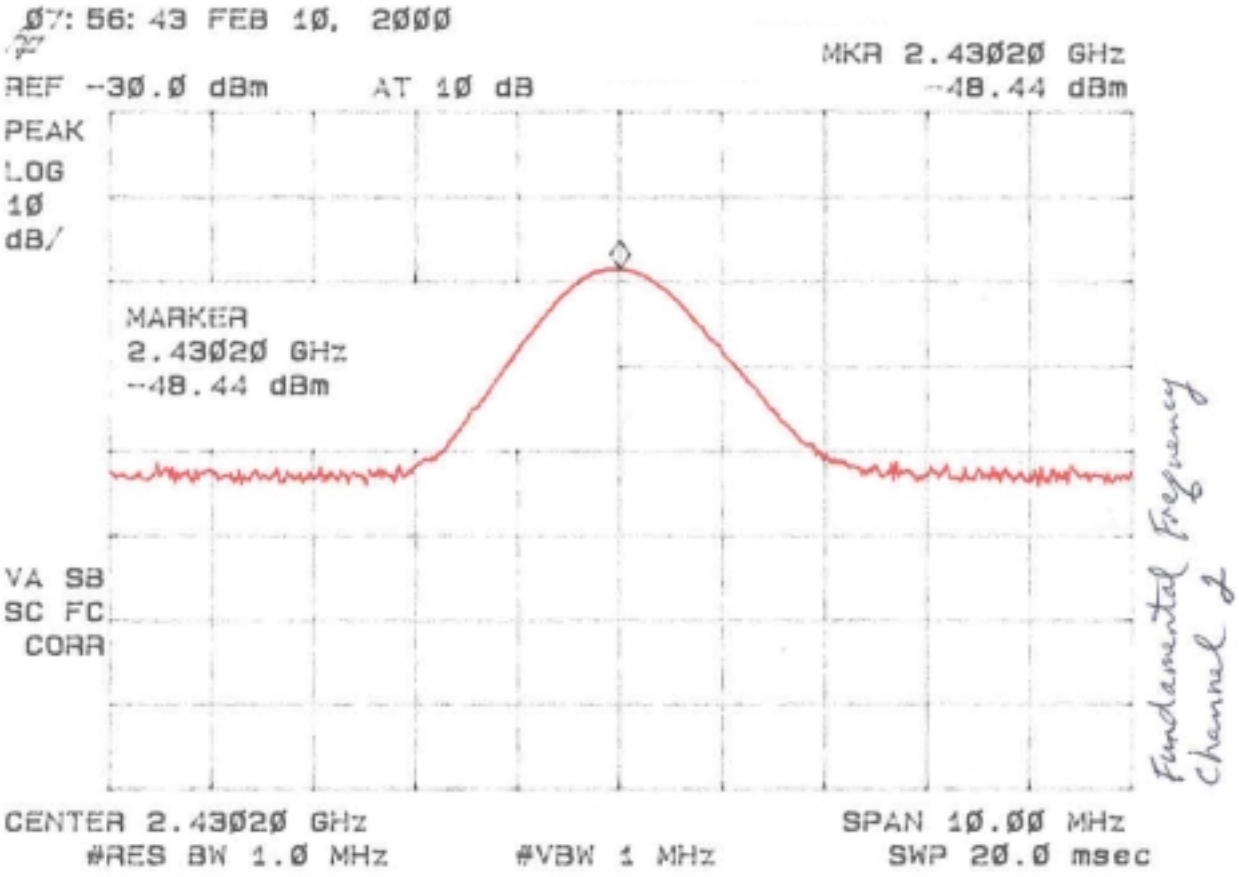


Figure 3c.
Field Strength of Fundamental Emissions 15.249(a) (High)

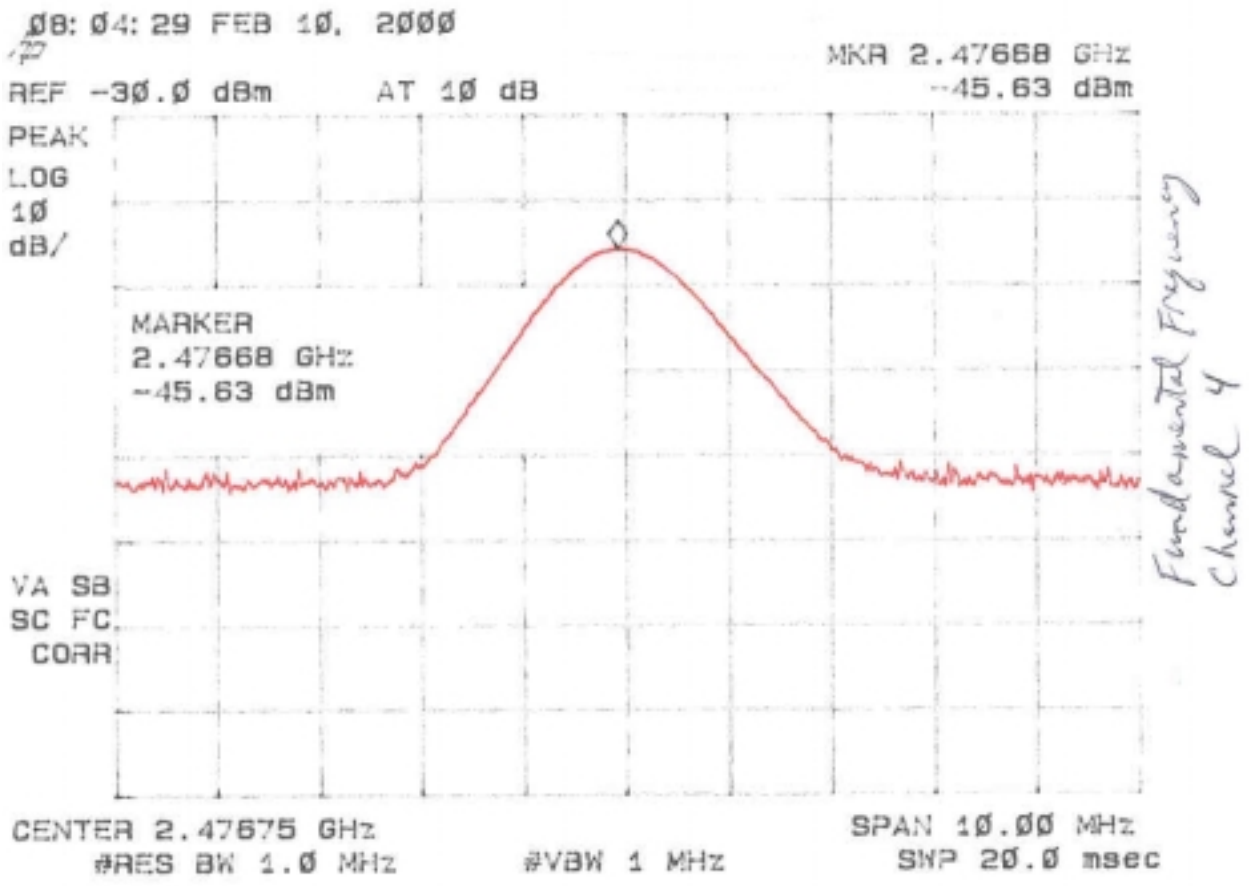


Table 3b
FIELD STRENGTH OF FUNDAMENTAL EMISSION

Test Date: February 10, 2000
UST Project: 99-956
Customer: Xetron Corporation
Model: Hornet

Average Measurements

FREQ. (MHz)	TEST DATA* (dBm) @ 3m	ANTENNA FACTOR (dB)	CABLE ATTEN. (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m
2.4068	-59.7	30.6	3.9	12,303	50,000
2.4320	-59.8	30.7	3.9	12,303	50,000
2.4767	-57.0	30.8	4.0	17,378	50,000

*** = Data adjusted for worse case duty cycle of 20 log (0.2706) = -11.4 dB**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-59.7 + 30.6 + 3.9 + 107)/20) = 12,303
CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
Reviewed By: _____ Name: Tim R. Johnson