

Home Wireless Networks, Inc.
FCC Part 15, Certification Application
95-0016-XXX

May 25, 2000

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Home Wireless Networks, Inc.**

MODEL: **95-0016-XXX**

FCC ID: **NSK0016B**

DATE: **May 25, 2000**

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

Equipment type: **Direct Sequence Spread Spectrum**

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 Home Wireless Networks, Inc., Model 95-0016-XXX. The Model 95-0016-XXX is an IEEE 802.11 Wireless Ethernet Transceiver Module (2.4 GHz) with diversity which may be used as either a self contained unit or attached to Home Wireless Networks, Inc. NCU controller (model 95-0005-XXX) for added functionality and communication with other Home Wireless Networks, Inc. products.

When utilized as a self contained unit, the EUT obtains power through use of an external AC adapter. Units used with a NCU controller are connected directly to the bottom side of the NCU and obtain their power from the NCU through the interface connecting the two units.

The following is a list of the channels designed into the EUT:

RF Frequencies HWN IEEE 802.11 Wireless Ethernet Module		
RF CHANNEL	TRANSMIT/RECEIVE FREQUENCY (MHZ)	RF LOCAL OSCILLATOR FREQUENCY (Internal radio version only)
1	2412	2038
2	2417	2043
3	2422	2048
4	2427	2053
5	2432	2058
6	2437	2063
7	2442	2068
8	2447	2073
9	2452	2078
10	2457	2083
11	2462	2088

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 transceivers. The EUT may also be used along with a Home Wireless Networks, Inc. Model 95-0005-XXX which has been previously submitted and approved under FCC ID: NSK0005A.

The EUT is subject to the following authorizations:

- a) Certification as a transmitter
- b) Certification or DoC as a computer peripheral device
- c) Verification as a receiver and digital device

The information contained in this report is presented for the certification portion of the EUT. A separate report (UST # 00-0173) has been issued which covers the requirements for the DoC & 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 EUT is internally identical for both versions (self contained versus for use with NCU). The unit that connects to a NCU controller was selected for testing since it consists of additional electrical devices connected to the EUT. Since AC power is supplied either directly to the unit in a self contained configuration, or through the NCU when used in it is connected to the EUT, two separate conducted emissions tests were performed.

The sample used for testing was received by U.S. Technologies on April 19, 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

No modifications were made by US Tech, to bring the EUT into compliance with FCC Part 15 limits for the transmitter portion of the EUT.

FIGURE 1a
TEST CONFIGURATION

Configuration for Radiated and Conducted Tests, EUT with NCU

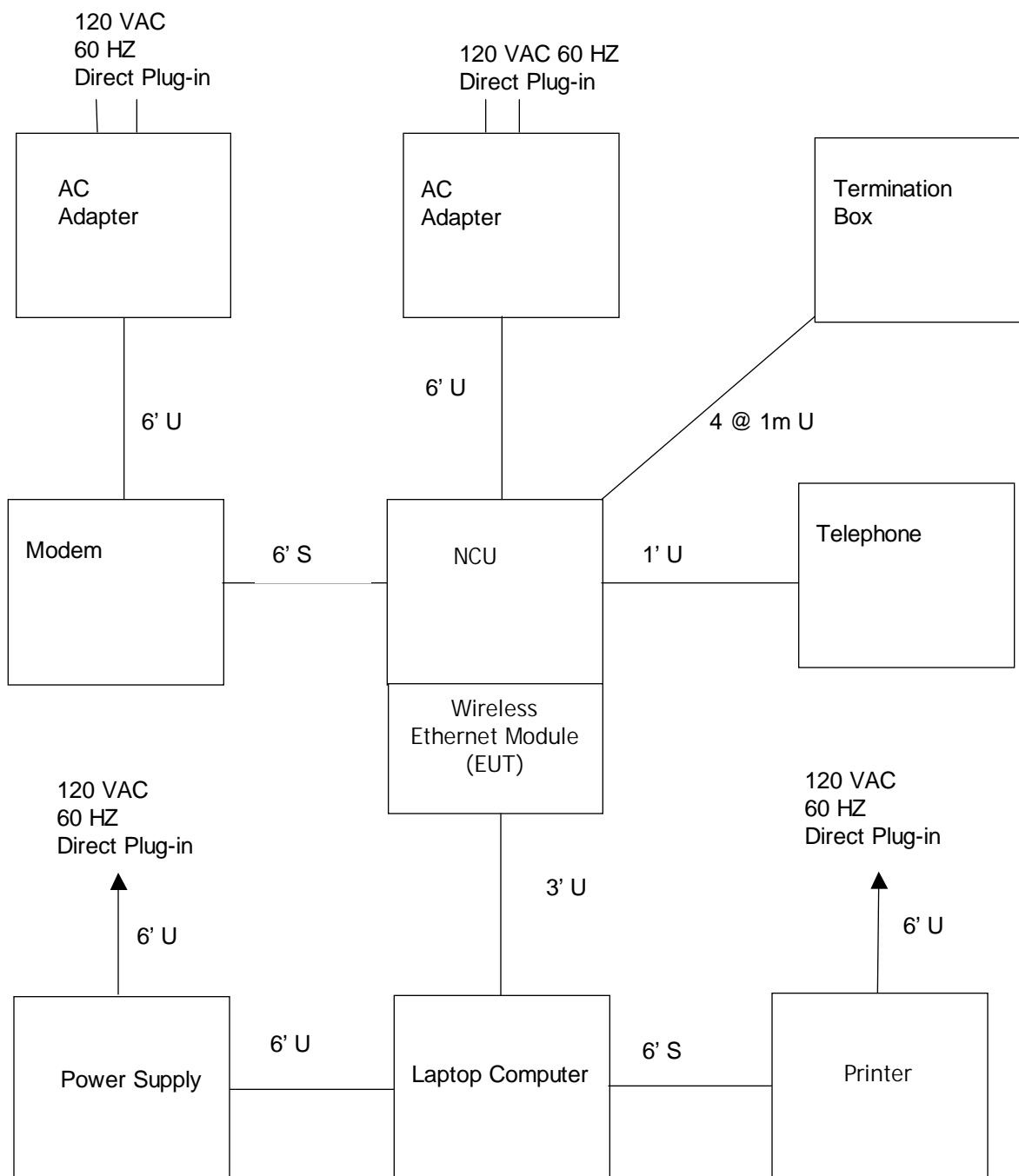
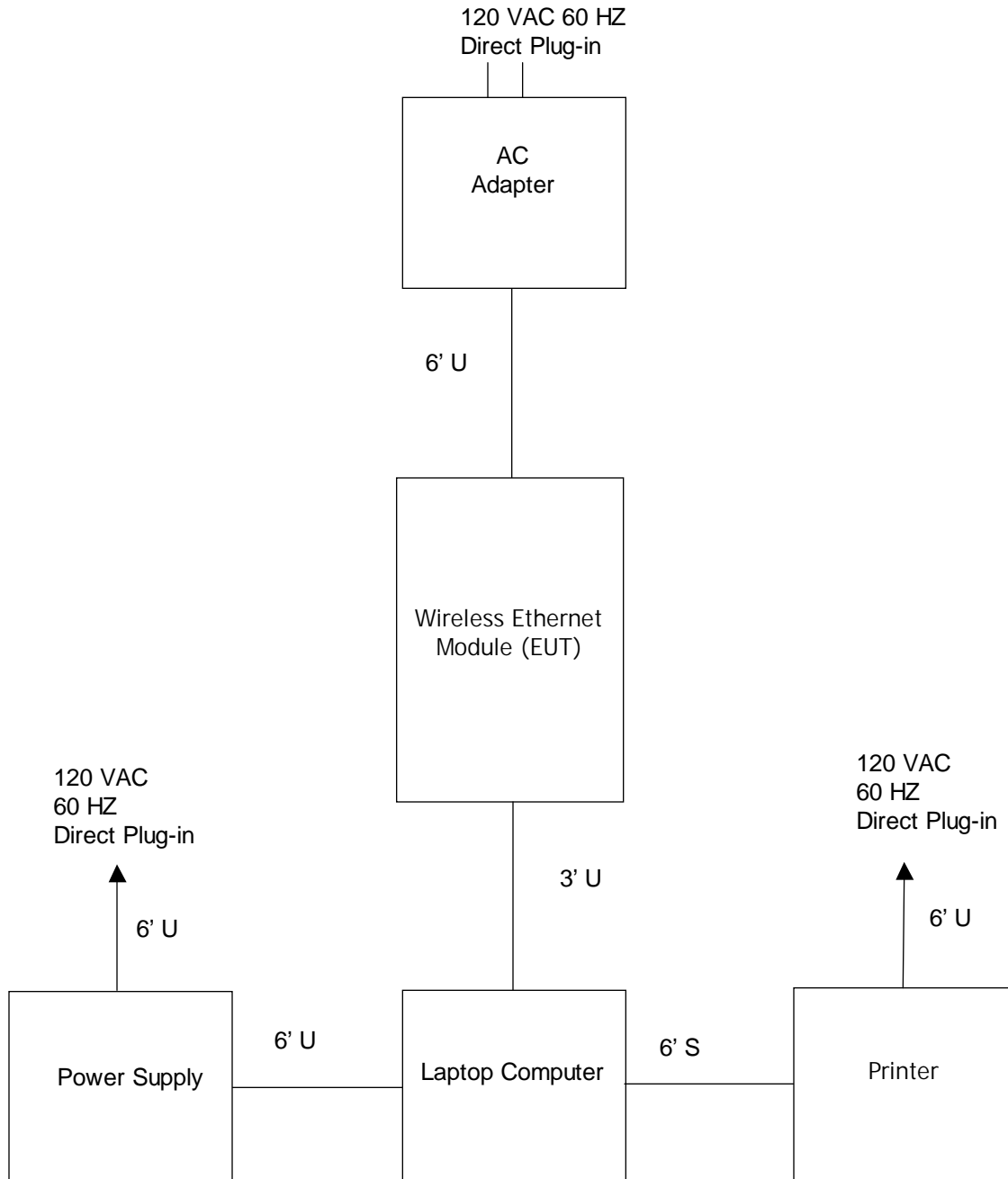


FIGURE 1b
TEST CONFIGURATION

Conducted Test, EUT as Self Contained Unit



Test Date: May 1, 2000
UST Project: 00-0161
Customer: Home Wireless Networks, Inc.
Model: 95-0016-XXX

FIGURE 2a

Photograph(s) for Spurious Emissions (Front)



Test Date: May 1, 2000
UST Project: 00-0161
Customer: Home Wireless Networks, Inc.
Model: 95-0016-XXX

FIGURE 2b

Photograph(s) for Spurious Emissions (Back)



Test Date: April 19, 2000
UST Project: 00-0161
Customer: Home Wireless Networks, Inc.
Model: 95-0016-XXX

FIGURE 2c

Photograph(s) for Conducted Emissions During Transmit

Photograph Not Available

TABLE 1a

EUT and Peripherals for Configuration with NCU

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Wireless Ethernet Transceiver Module (EUT) Home Wireless Networks, Inc.	95-0016- XXX	Unknown	NSK0016B	3' U
NCU Transceiver Module Home Wireless Networks, Inc.	95-0005- XXX	Unknown	NSK0005A	4 @ 1 m U
AC Adapter Home Wireless Networks, Inc.	AD-072A	Unknown	None	6' U
Telephone Lucent Technologies	Unknown	B143GD	None	1' U
Modem U.S. Robotics	Sportster 2400	0033-0307442	CJE-0104	6' S
AC Adapter Radio Shack	273-1631	F-4 99 May	None	6' U
Laptop	Unknown	Unknown	DoC Approved	
Power Supply	Unknown	Unknown	None	6' U 6' U Power Cord
Printer Panasonic	KX-P1180	1CKARQ99923	ACJ5Z6KX- P1180	6' S 6' U Power Cord
Termination Box Home Wireless Networks, Inc.	None	None	None	4@ 1 m U

TABLE 1b**EUT and Peripherals for Configuration as Self Contained Unit**

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Wireless Ethernet Transceiver Module (EUT) Home Wireless Networks, Inc.	95-0016- XXX	Unknown	NSK0016B	3' U
AC Adapter Home Wireless Networks, Inc.	AD-072A	Unknown	None	6' U
Laptop	Unknown	Unknown	DoC Approved	
Power Supply	Unknown	Unknown	None	6' U 6' U Power Cord
Printer Panasonic	KX-P1180	1CKARQ99923	ACJ5Z6KX- P1180	6' S 6' U Power Cord

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

2.6 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 Home Wireless Networks, Inc. 95-0016-XXX incorporates 2 internal antennas with 0 dBi gain.

2.7 Peak power within the band 2.4 – 2.4835 GHz per FCC Section 15.247(b)

Peak power within the band 2.4–2.4835 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 \geq RBW 6 dB bandwidth. The results of the measurements are given in Tables 3a through 3b and Figures 3a through Figure 3f.

The spectrum analyzer did not have a RBW greater than the 6 dB bandwidth for the largest fundamental bandwidth, therefore this data was taken using the channel power function of the spectrum analyzer.

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: April 28, 2000
UST Project: 00-0161
Customer: Home Wireless Networks, Inc.
Model: 95-0016-XXX

ANTENNA A

Frequency of Fundamental (GHz)	Measurement (dBm)*	Measurement (Watt)*	FCC Limit (Watt)
2.412	20.4	0.1096	1.0
2.437	21.3	0.1349	1.0
2.462	19.8	0.0955	1.0

ANTENNA B

Frequency of Fundamental (GHz)	Measurement (dBm)*	Measurement (Watt)*	FCC Limit (Watt)
2.412	19.9	0.0977	1.0
2.437	21.0	0.1259	1.0
2.462	19.4	0.0871	1.0

*** Measurement includes 0.4 dB cable loss**

Test Results

Reviewed By

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

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

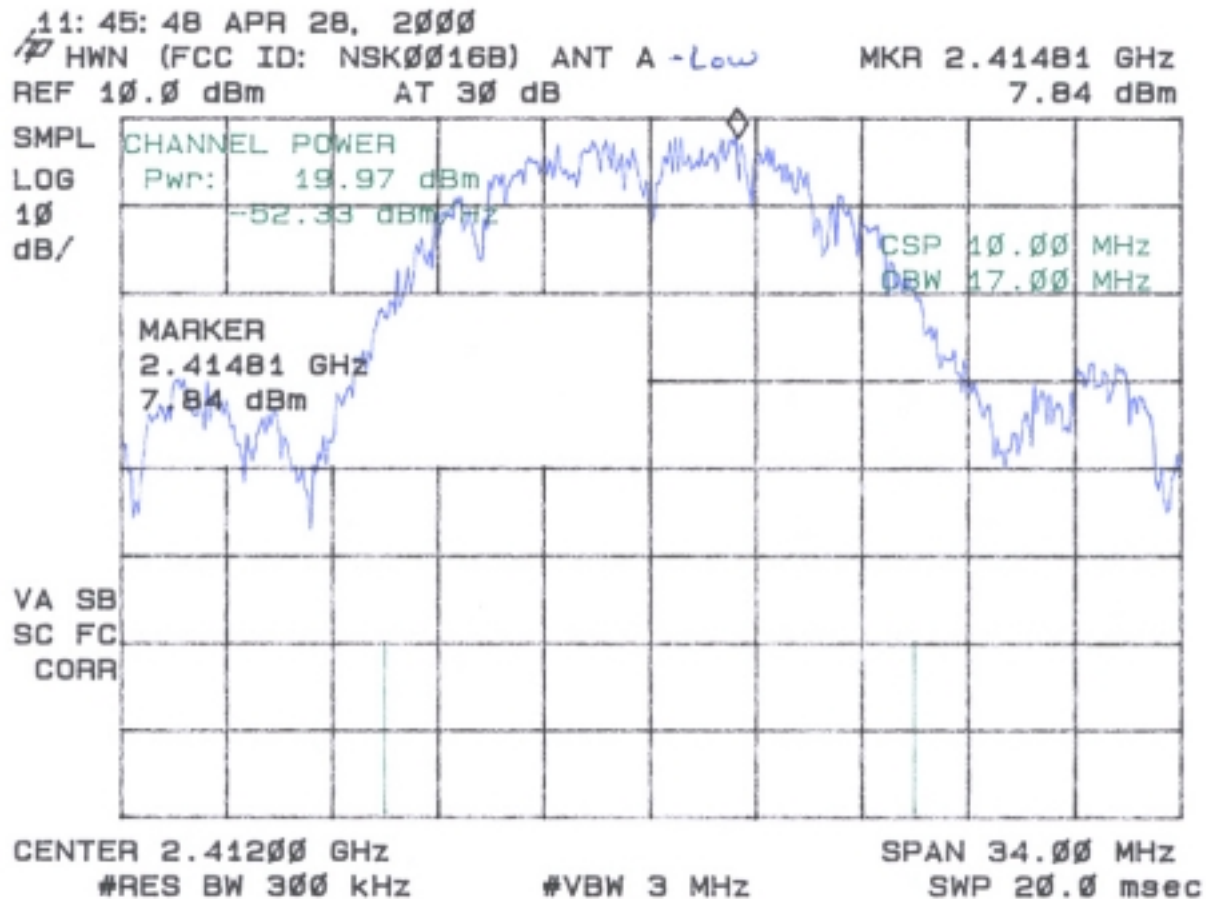


Figure 3b.
Peak Power per FCC Section 15.247(b) (Antenna A - Mid)

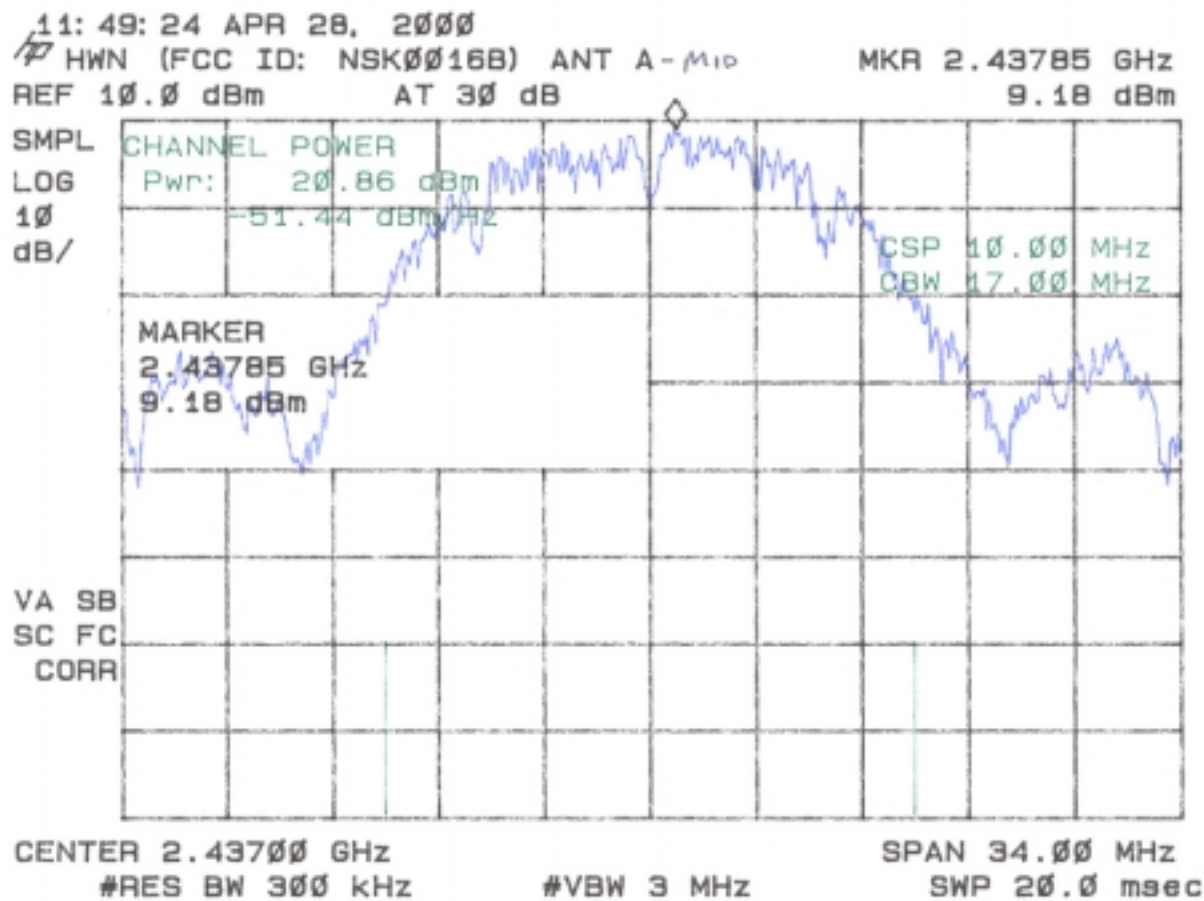


Figure 3c.
Peak Power per FCC Section 15.247(b) (Antenna A - High)

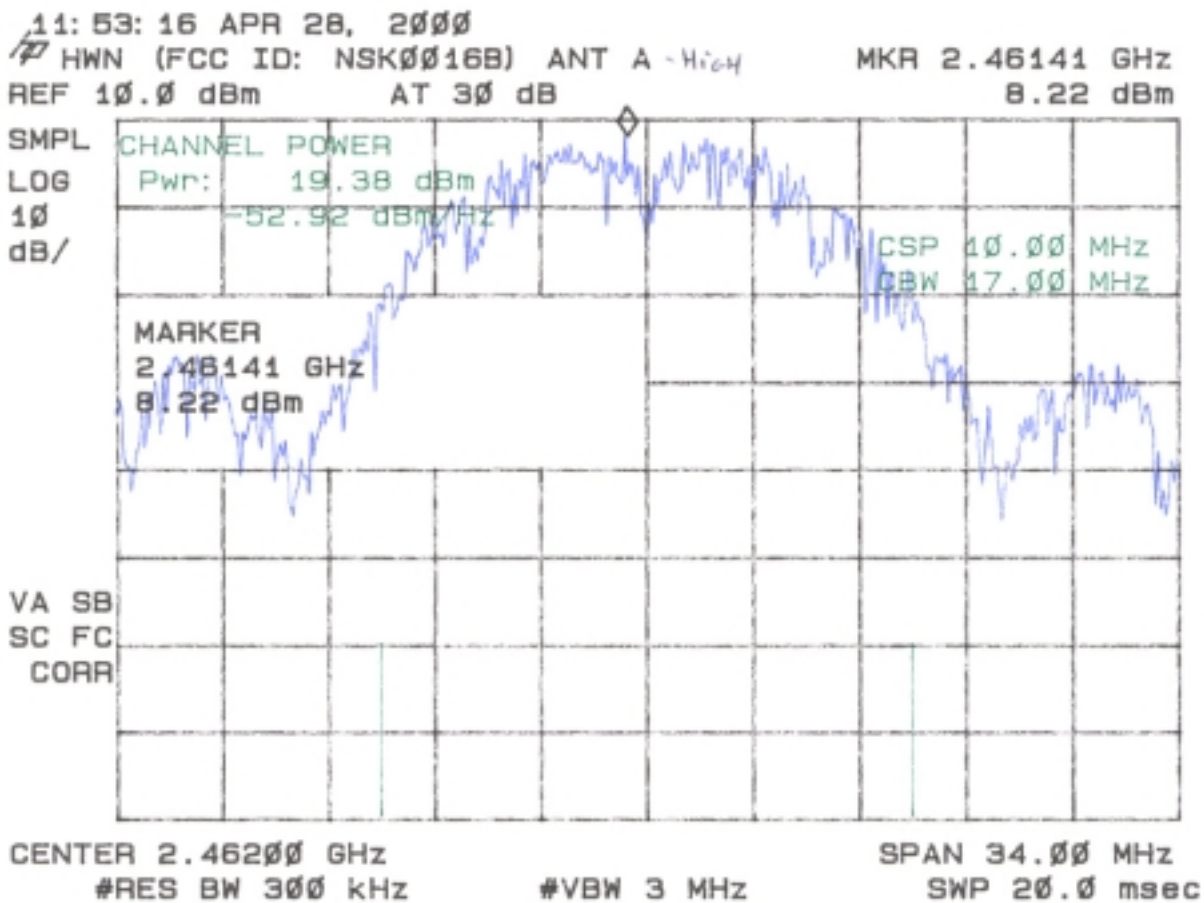


Figure 3d.
Peak Power per FCC Section 15.247(b) (Antenna B - Low)

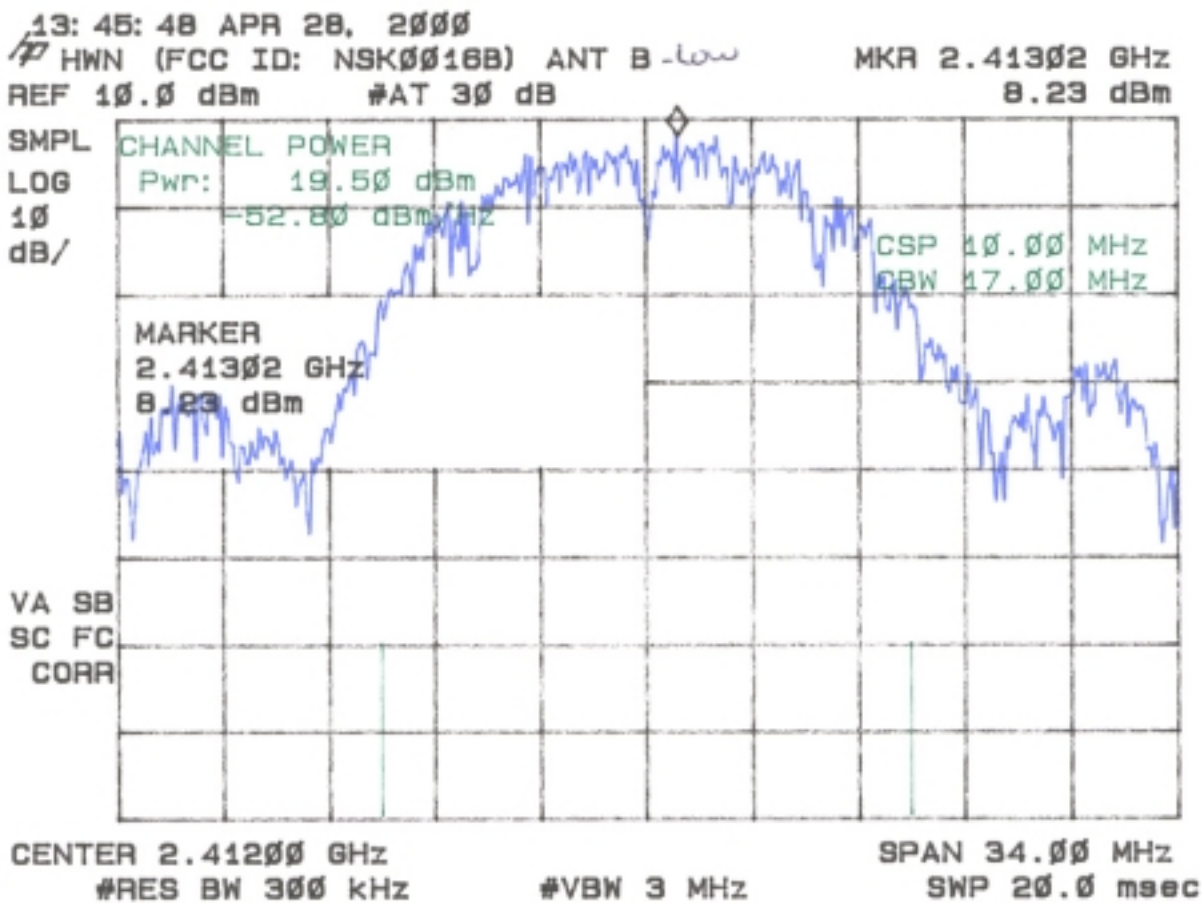


Figure 3e.
Peak Power per FCC Section 15.247(b) (Antenna B - Mid)

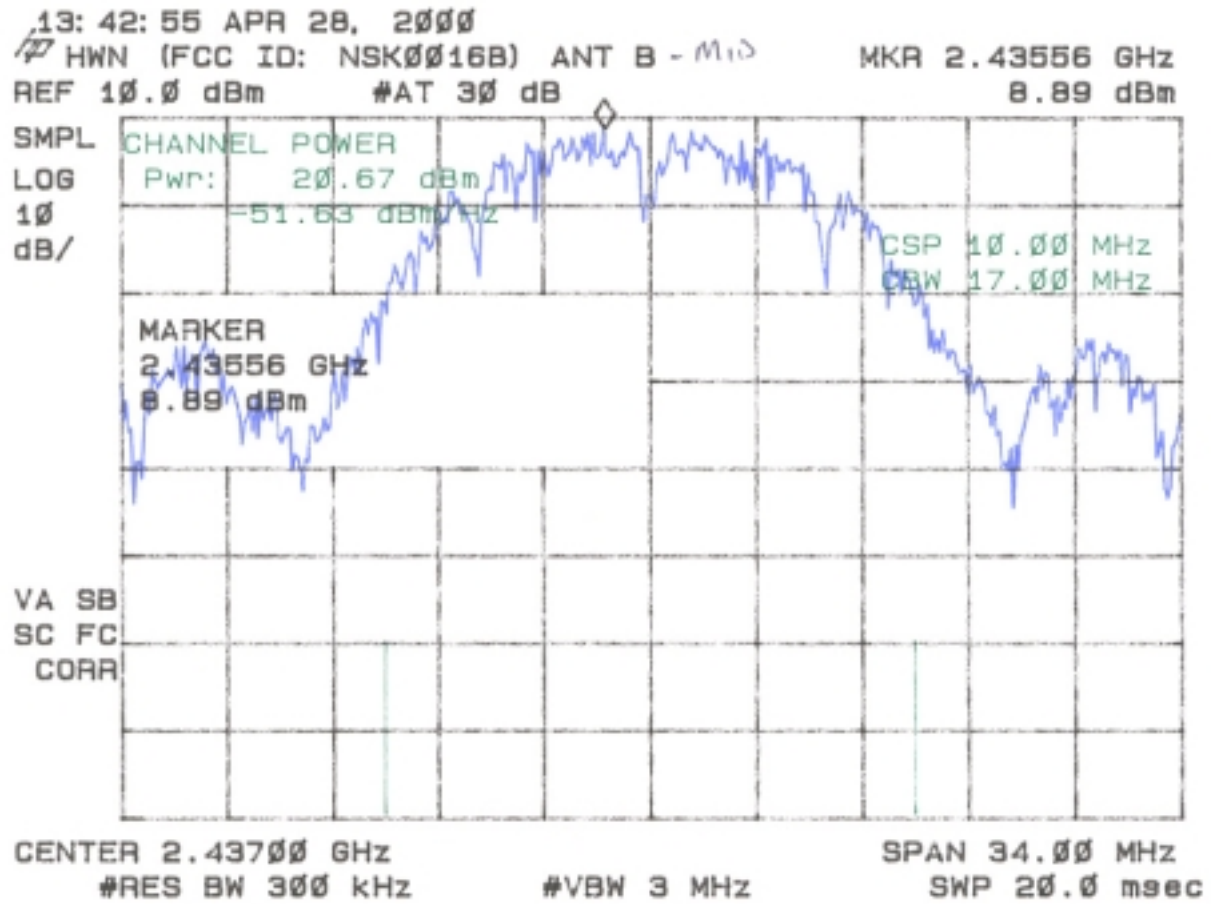


Figure 3f.
Peak Power per FCC Section 15.247(b) (Antenna B - High)

