

February 21, 2001

Mr. Mark Tucker  
Vice President of Engineering  
Digital Wireless  
5375 Oakbrook Parkway  
Norcross, GA 30093

Dear Mr. Tucker:

In our opinion, the Digital Wireless Corporation HN-1510 meets FCC Part 15, Class A Verification requirements when tested in the configuration described in our enclosed test report.

Please sign the signature page of the report and keep it in your files as proof that the product has been tested.

Also enclosed for your information, are instructions on Part 15 labeling requirements. If you have any questions, please don't hesitate to call. Thank you for your business.

Sincerely,



Timothy R. Johnson  
Engineering Manager  
NARTE Certified EMC Engineer  
No. EMC-002205-NE



**Part 15, Class A Verification Test Report  
of the  
Digital Wireless Corporation  
HN-1510**

**Issue Date: February 21, 2001  
UST Project No: 00-0600**

**Total Number of Pages Contained Within This Report: 15**

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: Timothy R. Johnson  
Title: Engineering Manager  
NARTE Certified EMC Engineer  
No. EMC-002205-NE

Date: February 21, 2001

**Digital Wireless Corporation**  
**5375 Oakbrook Parkway**  
**Norcross, GA 30093**

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

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

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

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

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## **FCC CLASS A LABELING INFORMATION**

### **MANUAL**

(a) For a Class A digital device or peripheral, the user instructions must include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### **15.21 INFORMATION TO USER**

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **15.27 SPECIAL ACCESSORIES**

Accessory items that can be readily obtained from multiple retail outlets are not considered to be special accessories and are not required to be marketed with the equipment. The manual included with the equipment must specify what additional components or accessories are required to be used in order to ensure compliance (i.e. shielded cables), and it is the responsibility of the user to provide and use those components and accessories.

### **15.19 LABELING REQUIREMENTS**

This device shall bear the following statement in a conspicuous location on the device:

#### **LABEL**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## **NOTICE TO CUSTOMERS SELLING DIGITAL DEVICES IN CANADA**

### **CANADIAN MANDATORY EMI REGULATION**

As of January 31, 1989, Canada has implemented mandatory EMI regulations which apply to every digital apparatus manufactured or imported into Canada as of January 31, 1989.

The technical requirements of the Canadian regulations are equivalent to the US FCC Part 15, and Canada will accept tests performed using the ANSI C63.4 procedure. Equipment compliant with FCC Part 15 is also compliant with the Canadian regulation. Canada still requires their specific labeling to be placed on equipment.

The device shall bear the following statement in a conspicuous location:

"This (Class A/Class B)\* digital apparatus complies with Canadian ICES-003."

"Cet appareil numérique (de la classe A/de la classe B)\* est conforme à la norme NMB-003 Canada."

It is recommended that the label be written in both French and English, especially in French speaking areas of Canada.

Where because of insufficient space or other restrictions it is not feasible to affix a label to the apparatus, the labeling may be in the form of a statement included in the user's manual, but the following information should still be applied to the label:

"ICES-003/(A/B)\*"

\*Indicate only the class of digital apparatus which is appropriate for the specific application.

### **NOTICE FOR PRODUCTS WHICH CONTAIN A PREVIOUSLY APPROVED MODULAR TRANSMITTER/TRANSCEIVER**

In some cases, Industry Canada may require additional information regarding your approved transmitter/transceiver. If your company requires assistance with submittal of any information, please contact U.S. Tech at (770)740-0717.

## **EXHIBIT A EVALUATION REPORT**

### **A. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT):**

The Equipment Under Test (EUT) is the Digital Wireless Corporation HN-1510. The transceiver was modularly approved, and only the receiver test was needed for Class A Part 15 Verification at this time. The HN-1510 is an industrial wireless modem housed in an environmentally rugged enclosure. The circuitry inside the modem includes a modularly approved WIT2410 frequency hopping transceiver (HSW-2410M), interface, and power conditioning circuitry. The user communicates with the device through the DB-9 serial port connection. Power is applied through a 2 pin Conxall connector. A 2.4 GHz antenna connects to the TNC port on the front panel.

### **B. TEST PROCEDURE (GENERAL):**

The EUT was configured as shown in the following block diagram(s) and photograph(s). 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 on the spectrum analyzer was OFF throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions. Table A3 describes other instruments and accessories used to evaluate this product.

Since the transmitter portion of the EUT was considered modularly approved, only the digital device emissions were tested. Additionally, since the EUT will not be connected in close proximity to a computer, the EUT was not connected to a full PC configuration as specified in ANSI C63.4.

### **C. CHARACTERIZATION OF SAMPLE TESTED**

The sample used for testing was received by U.S. Technologies on December 12, 2000 in good condition.

### **D. EUT ELECTRICAL MODE OF OPERATION**

The primary mains voltage was for the EUT was 120 VAC/ 60 Hz.

## **E. TEST SOFTWARE AND/OR EXERCISING OF EUT**

Software was not needed to operate the unit. The units are already pre-programmed by Digital Wireless to operate in test mode.

## **F. TEST SITE:**

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 IC2982.

## **G. MODIFICATIONS:**

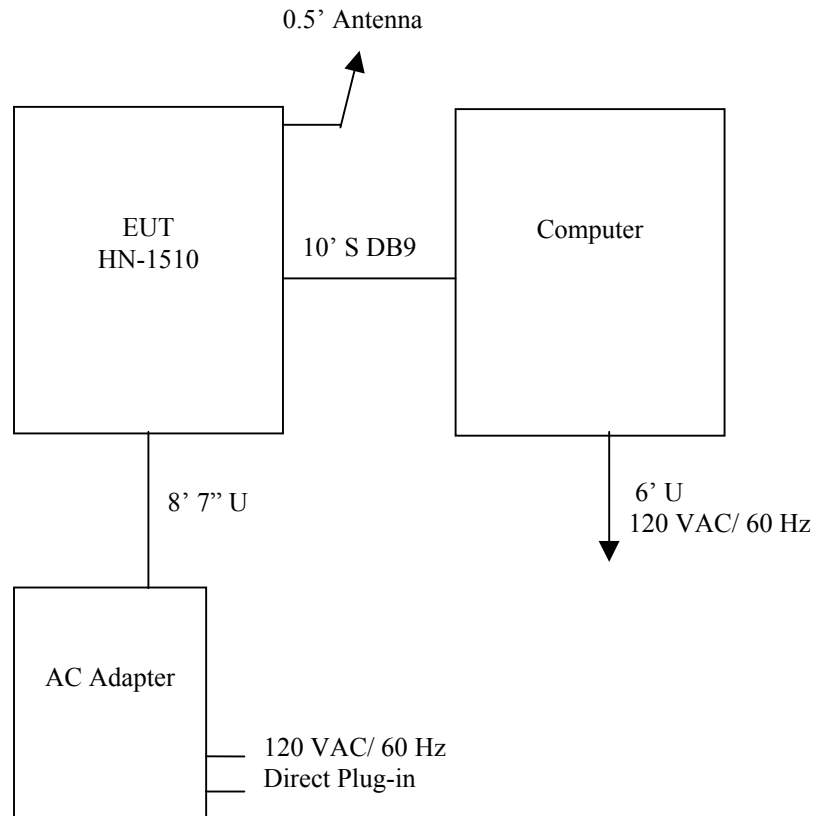
No modifications were necessary to bring the EUT into compliance with Part 15, Class A FCC Rules and Regulations.

## **H. TEST RESULTS:**

The worst-case radiated emission was 11.5 dB below the Class A limit at 40.3 MHz. All other radiated emissions were at least 16.3 dB below the limit.

The worst-case conducted emission was 13.0 dB below the Class A limit at 0.46 MHz. All other conducted emissions were at least 14.0 dB below the limit.

### **Configuration of Tested System**





Report Number: 00-0600

Customer: Digital Wireless

Model: HN-1510

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**EUT and Peripherals**

<b>PERIPHERAL MANU.</b>	<b>MODEL NUMBER</b>	<b>SERIAL NUMBER</b>	<b>FCC ID:</b>	<b>CABLES P/D</b>
Industrial Wireless Modem (EUT) Digital Wireless	121200	N/A	N/A	0.5' Antenna 10' S
Computer Toshiba	PA1184VU	09543879-1	CJ6K323	6' U 120 VAC/ 60 Hz Power Cord
AC Adapter Radio Shack	273-1612A	F-4 00 JUN	None	8' 7" U 120 VAC/ 60 Hz Direct Plug-in

**TABLE A1. RADIATED EMISSIONS DATA  
CLASS A****Measurements 30 MHz – 1 GHz**

<b>FREQ. (MHz)</b>	<b>TEST DATA (dBm) @ 10m</b>	<b>ANTENNA FACTOR + CABLE ATTEN.</b>	<b>RESULTS (uV/m) @ 10m</b>	<b>LIMITS (uV/m) @ 10m</b>	<b>MARGIN BELOW LIMIT (dB)</b>
40.3	-92.0	12.6	23.9	90.0	11.5
47.8	-96.0	11.0	13.8	90.0	16.3

**SAMPLE CALCULATIONS:****RESULTS uV/m @ 10m =****Antilog  $((-92.0 + 12.6 + 107)/20) = 23.9$** **CONVERSION FROM dBm TO dBuV = 107 dB****Test Date: February 6, 2001****Tested by****Signature:** **Name:** Austin E. Thompson, Jr.

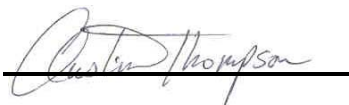
Report Number: 00-0600

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**TABLE A2. RADIATED EMISSIONS DATA  
CLASS A****Peak Measurements > 1 GHz**

FREQ. (GHz)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANT. FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 10m	FCC LIMITS (uV/m) @ 10m	MARGIN BELOW LIMIT (dB)
Since frequencies generated or used within the digital device portion of the product did not exceed 108 MHz, testing above 1 GHz was deemed unnecessary.							

**Test Date: February 2, 2001****Tested By  
Signature:****Name: Austin E. Thompson, Jr.**

**TABLE A2. CONDUCTED EMISSIONS DATA****CLASS A**

FREQ (MHz)	TEST DATA (dBm)		RESULTS (uV)		FCC LIMITS (uV)	MARGIN BELOW LIMIT (dB)	MARGIN BELOW LIMIT (dB)
	PHASE	NEUTRAL	PHASE	NEUTRAL		PHASE	NEUTRAL
0.46	-60.0	-63.0	223.9	158.5	1000	-13.0	-16.0
0.52	-61.0	-65.0	199.5	125.9	1000	-14.0	-18.0
0.54	-61.0	-65.0	199.5	125.9	1000	-14.0	-18.0
0.56	-61.0	-65.0	199.5	125.9	1000	-14.0	-18.0
0.57	-62.0	-66.0	177.8	112.2	1000	-15.0	-19.0
0.60	-62.0	-66.0	177.8	112.2	1000	-15.0	-19.0

**SAMPLE CALCULATIONS:****RESULTS uV =****Antilog  $((-60.0 + 107)/20) = 223.9$** **CONVERSION FROM dBm TO dBuV = 107 dB****Test Date: January 26, 2001****Tested by****Signature:** **Name: Austin E. Thompson, Jr.**

Report Number: 00-0600

Customer: Digital Wireless

Model: HN-1510

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**TABLE A3. INSTRUMENTS AND ACCESSORIES**

TYPE	SPECIFICATIONS	MANUFACTURER	MODEL
SPECTRUM ANALYZER	0.1 - 1500 MHz	HEWLETT-PACKARD	8558B
SPECTRUM ANALYZER	9 kHz - 22 GHz	HEWLETT-PACKARD	8593E
COMB GENERATOR		HEWLETT-PACKARD	8406A
TEST RECEIVER	20 - 1000 MHz	ROHDE & SCHWARZ	ESV
RF PREAMP	0.1 - 1300 MHz	HEWLETT-PACKARD	8447D
RF PREAMP	1 - 26.5 GHz	HEWLETT-PACKARD	8449B
LISN 8012-50-R-24-BNC	120V	SOLAR ELE.	8012
HORN ANTENNA	1 – 18 GHz	EMCO	3115
BICONICAL ANTENNA	30 MHz - 300 MHz	EMCO	3110
LOG PERIODIC ANTENNA	200 MHz - 1 GHz	EMCO	3146
LISN (x 2) 8028-50-TS24-BNC	600V	SOLAR ELE.	8028

### **RADIATED CONFIGURATION PHOTOGRAPH(S)**



**Photograph Shows Worse Case Configuration**

### **RADIATED CONFIGURATION PHOTOGRAPH(S) CONTINUED**



**Photograph Shows Worse Case Configuration**

### **CONDUCTED CONFIGURATION PHOTOGRAPH**



**Photograph Shows Worse Case Configuration**