U.S. TECH
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Data Critical Corporation
FCC Part 95H
Permissive Change Application

Model DR-10100

UST Project: 03-0376
January 15, 2004

3505 Francis Circle • Alpharetta, GA 30004
Tel: (770) 740-0717 • Fax: (770) 740-1508 • www.ustech-lab.com

U.S. TECH
A TRADITION IN TESTING SERVICES

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: Operations Manager

Date: January 15, 2004

Data Critical Corporation
15222 Del Amo Avenue
Tustin, CA 92780

By: _____

Name: _____

Title: _____

Date: _____

NVLAP accredited
Lab Code: 200162-0

3505 Francis Circle • Alpharetta, GA 30004
Tel: (770) 740-0717 • Fax: (770) 740-1508 • www.ustech-lab.com

American Council of Independent Laboratories, Inc.

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Data Critical Corporation**

MODEL: **DR-10100**

FCC ID: **BQI02DR-10100**

DATE: **January 15, 2004**

This report concerns (check one): Original grant____
Class II change__X__

Equipment type: **Low Power Transmitter (for Biomedical Applications)**

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 Data Critical Corporation Model DR-10100.

The DR-10100 is a wireless Access Point (AP) designed for use in medical monitoring applications. The DR-10100 receives patient monitoring data from similar radios attached to the patients in that hospital. The DR-10100 is linked to other DR-10100's, DR-10110 or DR-10000's through a 10Base-T Ethernet backbone. This backbone allows the AP's to pass patient data back to the end user of the system - a nurses monitoring station. The DR-10100 is composed of a 1400 MHz wireless transceiver and Ethernet conversion circuitry that passes data from the transceiver to the Ethernet backbone.

The DR-10100 requires external DC power but has its own internal voltage regulation. The DR-10100 is self contained in a plastic package and is designed to be installed on the ceiling of a hospital hallway.

Related Submittal(s)/Grant(s)

FCC ID: BQI02DR-10100

1.3 Descriptions of Changes in Certified Equipment

GE has requested to add some additional operating channels to the operating set of the WIT608 radio receiver contained inside of the DR-10100 unit. They have added 2 new channels at the bottom and 5 channels at the top of our 608-614 MHz frequency band.

WIT608 32 channel plan with
Crystal frequency=7.3728MHz

$Fx := 7.3728$

$Fref := \frac{Fx}{54}$

$Fref = 0.136533$

MHz

$FirstIF := 520 \cdot Fref$

$FirstIF = 70.997333$

$SecondIF := 18 \cdot Fref$

$SecondIF = 2.4576$

$SecondLO := 538 \cdot Fref$

$SecondLO = 73.454933$

$i := 0 .. 38$

$Ch_i := Fref \cdot (4456 + i)$

$RxCh_i := Fref \cdot (3938 + i)$

$TxCh_i := Fref \cdot (3920 + i)$

New Expanded WIT608 Channel Frequencies.
Proposed new channels are:
0_3 ,1h,22h,23h,24h,25h,26h

Old channel set extended from 2h to 21h (608.6656 MHz to 612.898133 MHz)

i	Ch_i
0	608.392533
1h	608.529067
2h	608.6656
3h	608.802133
4h	608.938667
5h	609.0752
6h	609.211733
7h	609.348267
8h	609.4848
9h	609.621333
ah	609.757867
bh	609.8944
ch	610.030933
dh	610.167467
eh	610.304
fh	610.440533
10h	610.577067
11h	610.7136
12h	610.850133
13h	610.986667
14h	611.1232
15h	611.259733
16h	611.396267
17h	611.5328
18h	611.669333
19h	611.805867
1ah	611.9424
1bh	612.078933
1ch	612.215467
1dh	612.352
1eh	612.488533
1fh	612.625067
20h	612.7616
21h	612.898133
22h	613.034667
23h	613.1712
24h	613.307733
25h	613.444267
26h	613.5808

1.4 Copy of Previous Grant

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the

Federal Communications Commission

By:

TCB

American TCB, Inc.
6731 Whittier Avenue Suite C110
McLean, VI 22101

Date of Grant: 12/13/2002

Application Dated: 12/13/2002

Data Critical Corporation
15222 Del Amo Avenue
Tustin, CA 92780
United States

Attention: Diana Thorson

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: BQI02DR-10100
Name of Grantee: Data Critical Corporation
Equipment Class: Licensed Non-Broadcast Station Transmitter
Notes: WMTS OPENNET LAN

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	95H	608.665 - 612.898	0.0158	30.0 PM	300KFXD

Power is conducted. This transmitter is approved for use with the two antenna(s) listed in the filing.

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. A block diagram of the tested system is shown in Figure 1. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2a through Figure 2c.

The sample used for testing was received by U.S. Technologies on November 24, 2003 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.

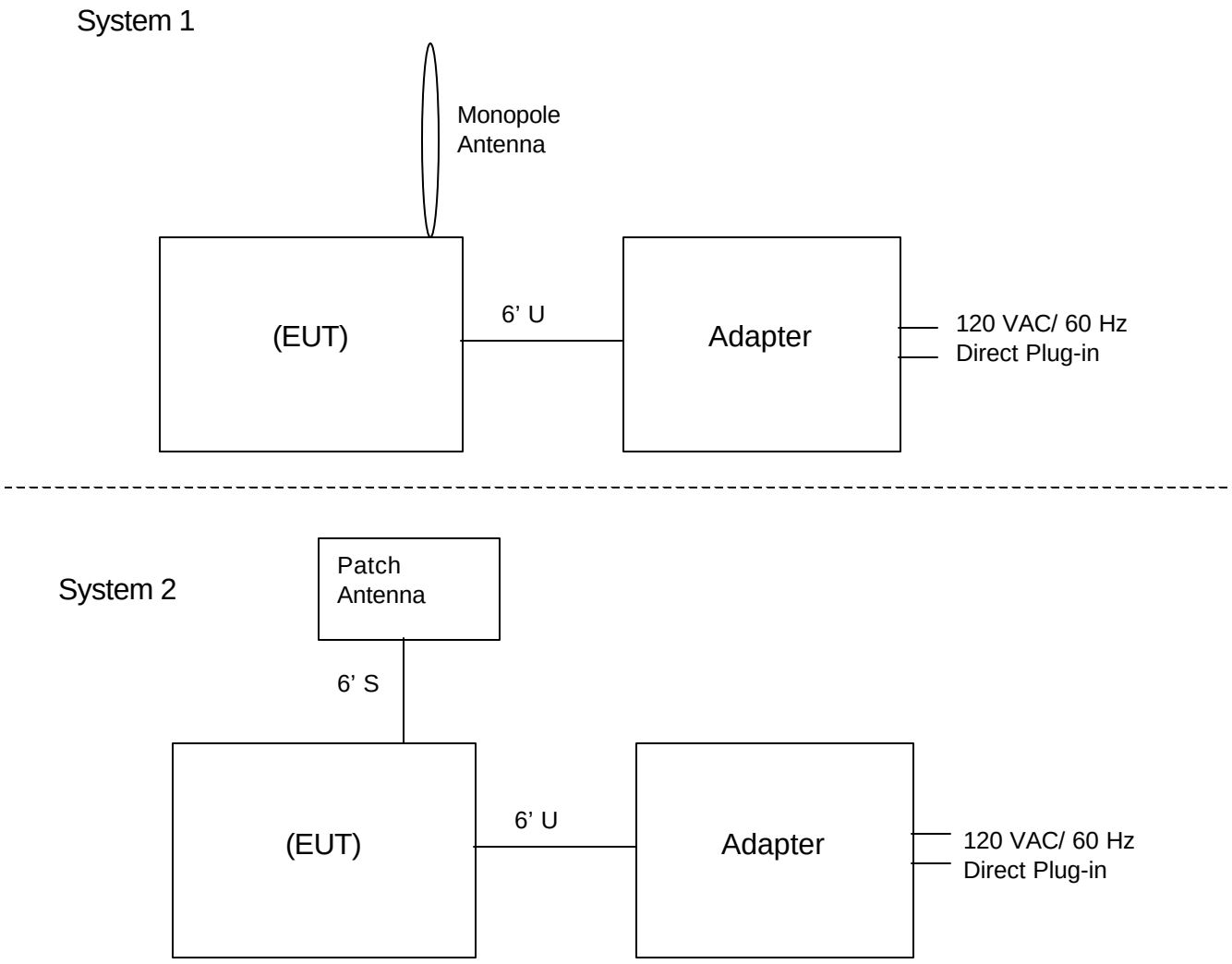
2.4 Modifications

No modifications were made by US Tech, to bring the EUT into compliance with FCC Part 95H limits for the transmitter portion of the EUT or the Class B Digital Device Requirements.

FIGURE 1

TEST CONFIGURATION

(RF, RECEIVER, & DIGITAL DEVICE TESTS)



S = Shielded
U = Unshielded

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
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Customer: Data Critical Corporation
Model: DR-10100

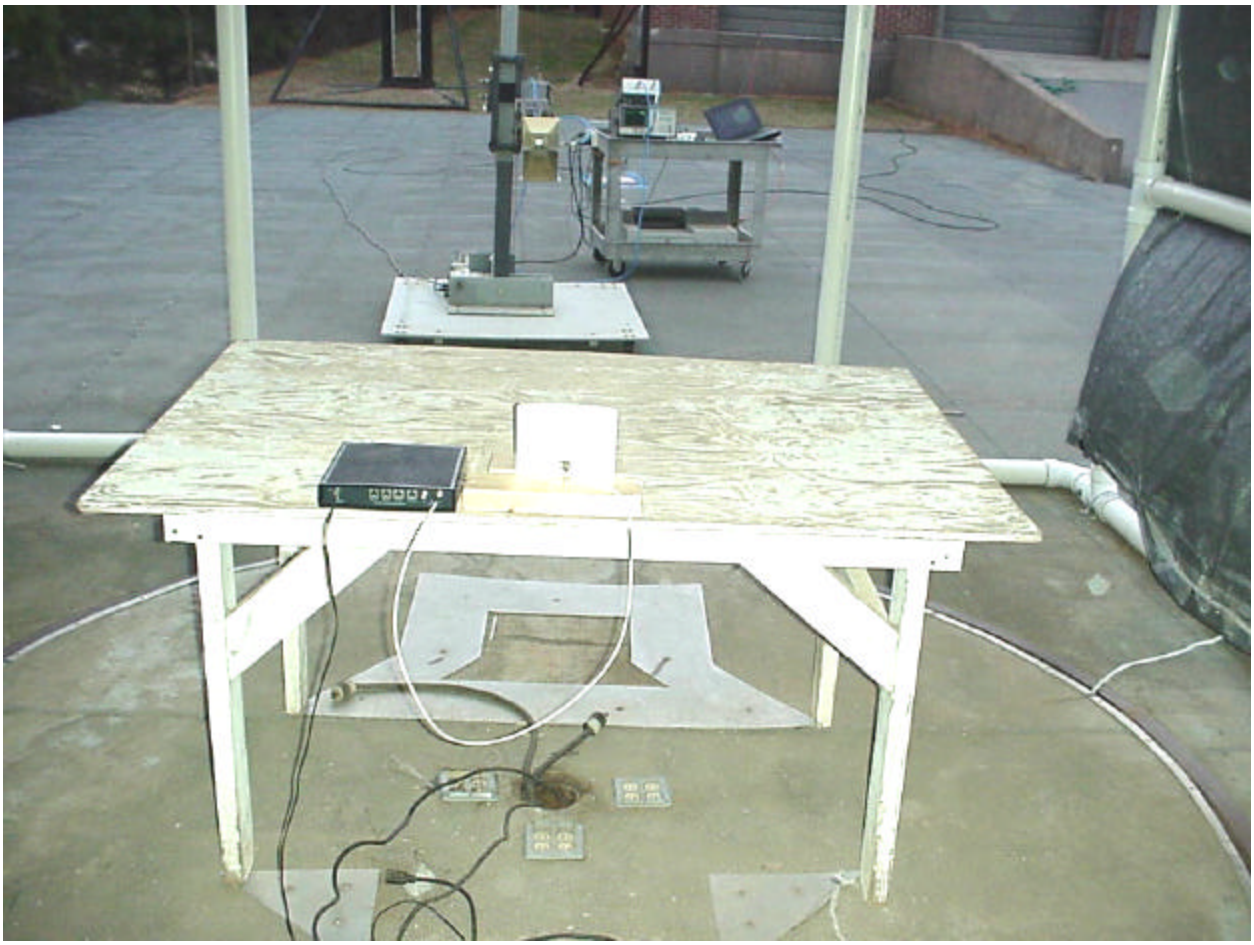
FIGURE 2a(1)
(Patch Antenna)

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

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

FIGURE 2a(2)
(Patch Antenna)

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



Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

FIGURE 2b(1)
(Monopole Antenna)

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

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

FIGURE 2b(2)
(Monopole Antenna)

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

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

FIGURE 2c
(Patch Antenna and Monopole Antenna)

Photograph(s) for Digital Device Conducted Emissions

Not Applicable

TABLE 1

EUT and Peripherals

(RF TRANSMITTER & RECIEVER/DIGITAL TESTS)

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transmitter (EUT) Data Critical Corporation	DR-10100	None	BQI02DR-10100	6' U
AC Adapter Volgen	SPU10R-2	None	N/A	120 VAC/ 60 Hz Direct Plug In
Antenna Nearson	OEM181AM (Monopole, 0 dBi)	None	None	None
Antenna Cushhcraft	SL6081P (Patch)	None	None	6' S

TABLE 2
TEST INSTRUMENTS

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8558B	HEWLETT-PACKARD	2332A10055	2/28/03
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	1/16/03
SIGNAL GENERATOR	8648B	HEWLETT-PACKARD	3642U01679	10/13/03
RF PREAMP	8449B	HEWLETT-PACKARD	3008A00480	6/19/03
HORN ANTENNA	3115	EMCO	9107-3723	7/11/03
LOG PERIODIC ANTENNA	3146	EMCO	3236	12/17/02
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

Note: The calibration interval of the above test instruments is 12 months and all calibrations are traceable to NIST/USA.

2.6 Antenna Description

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.

Antenna Descriptions

The Model DR-10100 may be used with the following antennas.

MANUFACTURER	MODEL	TYPE	CONNECTOR	GAIN dBi
Nearson Inc.	OEM181AM	Monopole	Monopole	0
Cushcraft	SL6081P	Patch Antenna	Omnidirection	1.5

The EUT and antenna incorporate standard SMA connectors. Due to the type of installation, this unit will only be professionally installed.

The DR-10100 has been designed exclusively for Data Critical Corporation. Data Critical Corporation designs and markets medical monitoring equipment to be used in hospital environments and is the only marketer of this product and is the sole installer. The units will not be marketed to the general public.

The DR-10100 will be installed in the hallway ceilings of hospitals. These units will receive monitoring data from similar radios that are attached to patients in the hospital. The system is very complicated and expensive (generally greater than $100k for a complete installation) and relies on professional installation and upkeep. Trained Data Critical Corporation personnel will be installing these units and will be solely responsible for their operation.

2.7a Field Strength of Fundamental Emission (47 CFR 95.639(g) & 95.1115(a)) (Patch Antenna)

Peak power within the band 608-614 MHz has been measured with a spectrum analyzer. Peak measurements were made using a peak or quasi-peak detector. Average emissions are not considered applicable since the measurement was below 1000 MHz.

The results of the measurements for peak fundamental emissions are given in Tables 3a - c.

Table 3a
FIELD STRENGTH OF FUNDAMENTAL EMISSION (Low Channel)

(Patch Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
608.58	-33.52*	25.7	91022.3	200,000	6.84

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-33.52 + 25.7 + 107)/20) = 91022.3
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature:  **Name: David Blethen**

Table 3b
FIELD STRENGTH OF FUNDAMENTAL EMISSION (Middle Channel)

(Patch Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
611.18	-33.4*	25.7	92620.6	200,000	6.67

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-33.4 + 25.7 + 107)/20) = 92620.6
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature:  **Name: David Blethen**

Table 3c
FIELD STRENGTH OF FUNDAMENTAL EMISSION (High Channel)

(Patch Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
613.48	-33.17*	25.8	85033.1	200,000	7.43

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-33.17 + 25.8 + 107)/20) = 85033.1
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: _____ **Name: David Blethen**

2.7b Field Strength of Fundamental Emission (47 CFR 95.639(g) & 95.1115(a)) (Monopole Antenna)

Peak power within the band 608-614 MHz has been measured with a spectrum analyzer. Peak measurements were made using a peak or quasi-peak detector. Average emissions are not considered applicable since the measurement was below 1000 MHz.

The results of the measurements for peak fundamental emissions are given in Tables 4a - c.

Table 4a
FIELD STRENGTH OF FUNDAMENTAL EMISSION (Low Channel)

(Monopole Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
608.43	-28.74*	25.7	157782.2	200,000	2.06

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-28.74 + 25.7 + 107)/20) = 157782.2
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David B. Blethen **Name: David Blethen**

Table 4b
FIELD STRENGTH OF FUNDAMENTAL EMISSION (Middle Channel)

(Monopole Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
610.98	-27.45*	25.7	183691.1	200,000	0.74

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-27.45 + 25.7 + 107)/20) = 183691.1
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature:  **Name: David Blethen**

Table 4c
FIELD STRENGTH OF FUNDAMENTAL EMISSION (High Channel)

(Monopole Antenna)

Test Date: January 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

QP Measurement
Highest Emission measured from Radio

FREQ. (MHz)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 3m	QP FCC LIMITS (uV/m) @ 3m	Margin (dB)
613.28	-28.41*	25.8	164994.0	200,000	1.67

*** - Quasi-Peak Measurement**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-28.41 + 25.8 + 107)/20) = 164994.0
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature:  **Name: David Blethen**

2.8a Field Strength Of Spurious Emissions in the Frequency Range 30 - 10000 MHz (47 CFR 95.1115(b)) (Patch Antenna)

A preliminary scan was performed on the EUT to determine frequencies that were caused by the transmitter portion of the product. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. The results of peak radiated spurious emissions are given in Tables 5a – c.

TABLE 5a

FIELD STRENGTH OF SPURIOUS EMISSIONS
2nd Harmonic, Peak Emissions
(Patch Antenna)

Test Date: December 9, &11, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.21728	-32.04	36.2	26.7	2.8	2573.4	**	**
1.22228	-27.46	36.2	26.7	2.8	4368.0	**	**
1.22728	-30.14	36.2	26.7	2.8	3214.2	**	**

**** - Not Applicable - For all peak harmonics measurements, no peak limits are specified above 1 GHz for FCC Part 95H. Peak measurements have been provided for derivation of Average Spurious Emissions measurement.**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-32.04 - 36.2 + 26.7 + 2.8 + 107)/20) = 2573.4
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David P. Blethen **Name: David Blethen**

TABLE 5b

FIELD STRENGTH OF SPURIOUS EMISSIONS
3rd Harmonic, Peak Emissions
(Patch Antenna)

Test Date: December 9, &11, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by
Signature: _____ **Name:** David Blethen

TABLE 5c

FIELD STRENGTH OF SPURIOUS EMISSIONS
4th Harmonic, Peak Emissions
(Patch Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by
Signature: David B. Blethen **Name:** David Blethen

2.8b Field Strength Of Spurious Emissions in the Frequency Range 30 - 10000 MHz (47 CFR 95.1115(b)) (Monopole)

A preliminary scan was performed on the EUT to determine frequencies that were caused by the transmitter portion of the product. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. The results of peak radiated spurious emissions are given in Tables 6a - c.

TABLE 6a
FIELD STRENGTH OF SPURIOUS EMISSIONS
2nd Harmonic, Peak Emissions
(Monopole Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.21798	-65.29	26.7	2.8	3345.8	**	**
1.22260	-65.29	26.7	2.8	3345.8	**	**
1.22701	-64.27	26.7	2.8	3762.7	**	**

**** - Not Applicable - For all peak harmonics measurements, no peak limits are specified above 1 GHz for FCC Part 95H. Peak measurements have been provided for derivation of Average Spurious Emissions measurement.**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-65.29 + 26.7 + 2.8 + 107)/20) = 3345.8
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David P. Blethen **Name: David Blethen**

TABLE 6b

FIELD STRENGTH OF SPURIOUS EMISSIONS
3rd Harmonic, Peak Emissions
(Monopole Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.8253	-40.47	35.4	28.3	3.0	1318.1	**	**
1.83355	-34.94	35.4	28.3	3.0	2504.0	**	**
1.84092	-29.29	35.4	28.3	3.0	4820.6	**	**

**** - Not Applicable - For all peak harmonics measurements, no peak limits are specified above 1 GHz for FCC Part 95H. Peak measurements have been provided for derivation of Average Spurious Emissions measurement.**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-40.47 – 35.4 + 28.3 + 3.0 + 107)/20) = 1318.1
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: _____ **Name:** David Blethen

TABLE 6c

FIELD STRENGTH OF SPURIOUS EMISSIONS
4th Harmonic, Peak Emissions
(Monopole Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Peak Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by Signature: David P. Blethen **Name:** David Blethen

2.9a Average Spurious Emission in the Frequency Range 30 - 10000 MHz (FCC Section 95.1115(b)) (Patch Antenna)

The Average measurement was derived from applying any possible duty cycle correction to the peak reading. The results of average radiated spurious emissions are given in Tables 7a-c.

Part 15.1115(b)(2) stipulates using an average detector. However the emissions of this device are considered pulsed in nature due to the frequency hopping nature of the TX. The FCC has historically not accepted average measurements on pulsed transmitters. Therefore the measurements device was corrected for duty cycle as normally acceptable to the FCC for testing of other types of transmitter with pulsed emissions.

Duty Cycle Correction During 100 msec:

The system is designed that the system hops at 35 msec per channel. The system will only be on one channel in any 100 msec period of time. During this 35 msec per channel, each transmitter is allotted only a small duration of this period (5 msec max).

Therefore the worse case duty cycle is:

Duty Cycle Correction = 20 log (0.05) = -26.0 dB

TABLE 7a
FIELD STRENGTH OF SPURIOUS EMISSIONS
2nd Harmonic, Average Emissions
(Patch Antenna)

Test Date: December 9, &11, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	AVERAGE FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.22728	-56.14	36.2	26.7	2.8	161.1	500	9.84
1.22228	-53.46	36.2	26.7	2.8	218.9	500	7.17
1.21728	-58.04	36.2	26.7	2.8	129.0	500	11.77

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-56.14 - 36.2 + 26.7 + 2.8 + 107)/20) = 161.1
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David B. Blethen **Name: David Blethen**

TABLE 7b

FIELD STRENGTH OF SPURIOUS EMISSIONS
3rd Harmonic, Average Emissions
(Patch Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by
Signature: _____ **Name:** David Blethen

TABLE 7c

FIELD STRENGTH OF SPURIOUS EMISSIONS
4th Harmonic, Average Emissions
(Patch Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by
Signature: _____ **Name:** David Blethen

2.9b Average Spurious Emission in the Frequency Range 30 - 10000 MHz (FCC Section 95.1115(b)) (Monopole Antenna)

The Average measurement was derived from applying any possible duty cycle correction to the peak reading. The results of average radiated spurious emissions are given in Tables 8a -c.

Part 15.1115(b)(2) stipulates using an average detector. However the emissions of this device are considered pulsed in nature due to the frequency hopping nature of the TX. The FCC has historically not accepted average measurements on pulsed transmitters. Therefore the measurements device was corrected for duty cycle as normally acceptable to the FCC for testing of other types of transmitter with pulsed emissions.

Duty Cycle Correction During 100 msec:

The system is designed that the system hops at 35 msec per channel. The system will only be on one channel in any 100 msec period of time. During this 35 msec per channel, each transmitter is allotted only a small duration of this period (5 msec max).

Therefore the worse case duty cycle is:

Duty Cycle Correction = 20 log (0.05) = -26.0 dB

TABLE 8a (Monopole Antenna)

FIELD STRENGTH OF SPURIOUS EMISSIONS
2nd Harmonic, Average Emissions

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	AVERAGE FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.22701	-90.27	26.7	2.8	188.6	500	8.47
1.22238	-91.29	26.7	2.8	167.7	500	9.49
1.21798	-91.29	26.7	2.8	167.7	500	9.49

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-90.27 + 26.7 + 2.8 + 107)/20) = 186.6
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David B. Blethen **Name: David Blethen**

TABLE 8b

FIELD STRENGTH OF SPURIOUS EMISSIONS
3rd Harmonic, Average Emissions
(Monopole Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
1.8253	-76.47	35.4	28.3	3.0	20.9	500	27.58
1.83355	-60.94	35.4	28.3	3.0	125.5	500	12.0
1.84092	-55,29	35.4	28.3	3.0	241.6	500	6.3

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-76.47 – 35.4 + 28.3 + 3.0 + 107)/20) = 20.9
CONVERSION FROM dBm TO dBuV = 107 dB

Tested by
Signature: David B. Blethen **Name: David Blethen**

TABLE 8c

FIELD STRENGTH OF SPURIOUS EMISSIONS
4th Harmonic, Average Emissions
(Monopole Antenna)

Test Date: December 8, 2003
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

Average Measurements

FREQ. (GHz.)	TEST DATA (dBm) @ 3m	AMP GAIN (dB)	ANTENNA FACTOR (dB)	CABLE LOSS (dB)	RESULTS (uV/m) @ 3m	PEAK FCC LIMITS (uV/m) @ 3m	MARGIN (dB)
No discernable emissions were detected above the Ground Floor							

Tested by
Signature: David P. Blethen **Name:** David Blethen

2.10 Power Line Conducted Emissions for Transmitter FCC Section 15.207

The conducted voltage measurements have been carried out in accordance with FCC Section 15.207, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmit. The results are given in Table 9.

Table 9. Conducted Emissions Data
Class B
(Patch Antenna and Monopole Antenna)

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Product: DR-10100

Frequency (MHz)	Test Data (dBm) Phase Neutral	RESULTS (uV) Phase Neutral	FCC Limits (uV)
Conducted Emissions were considered not applicable since the changes were only software related, no hardware changes were made.			

Tested by
Signature: _____ **Name:** David Blethen

2.11 Radiated Emissions (47 CFR 15.109a)

Radiated emissions were evaluated from 30 to 5000 MHz. Measurements were made with the analyzer's bandwidth set to 120 kHz measurements made less than 1 GHz and 1 MHz for both antennas are shown in Table 10a. Measurements made over 1 GHz results for both antennas are shown in Table 10b.

Table 10a. Radiated Emissions Data
Class B

(Patch Antenna and Monopole Antenna)

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Product: DR-10100

Measurements < 1 GHz

Frequency (MHz)	Receiver Reading (dBm) @3m	Correction Factor (dB)	Corrected Reading (uV/m)	FCC Limit (uV/m) @3m
Radiated Emissions were considered not applicable since the changes were only software related, no hardware changes were made.				

Tested by
Signature:  **Name:** David Blethen

Table 10b Radiated Emissions Data
Class B

(Patch Antenna and Monopole Antenna))

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Model: DR-10100

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) @ 3m
Radiated Emissions were considered not applicable since the changes were only software related, no hardware changes were made.						

Tested by Signature:  **Name:** David Blethen

2.12 Power Line Conducted Emissions for Digital Device FCC Section 15.107

The conducted voltage measurements have been carried out in accordance with FCC Section 15.107, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmit. The results are given in Table 11 for both antennas.

Table 11. Conducted Emissions Data – Digital Device
Class B
(Patch Antenna and Monopole Antenna)

Test Date: December 8, 9, 11, 2003 & January 8, 16, 2004
UST Project: 03-0376
Customer: Data Critical Corporation
Product: DR-10100

Frequency (MHz)	Test Data (dBm) Phase	Test Data (dBm) Neutral	RESULTS (uV) Phase	RESULTS (uV) Neutral	FCC Limits (uV)
Conducted Emissions were considered not applicable since the changes were software related, no hardware changes were made.					

Tested by
Signature: _____ **Name:** David Blethen

SECTION 4

BLOCK DIAGRAM & SCHEMATICS

BLOCK DIAGRAM & SCHEMATICS

Not Applicable. Changes were software related only, no changes were made to the hardware.

SECTION 4

PHOTOGRAPHS

PHOTOS OF THE TESTED EUT

Not Applicable. Changes were software related only, no changes were made to the hardware.