

Testing Tomorrow's Technology

**GE HealthCare
FCC Part 95 Application
Model 07APFH-AP**

June 19, 2007

**3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com**

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: GE HealthCare

MODEL: 07APFH-AP

FCC ID: OU507APFH-AP

DATE: June 19, 2007

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

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

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes No

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

LETTER OF CONFIDENTIALITY

SECTION 1

GENERAL INFORMATION

Product Description

SECTION 2

TESTS AND MEASUREMENTS

Configuration of Tested

Test Facility

Modifications

Test Equipment

Modifications

Antenna Description

Field Strength of Fundamental

Field Strength of Spurious Emissions

Radiated Digital Device Emissions

Power Line Conducted Emissions for Digital Device, Transmitter, and Receiver

Emissions Type

Frequency Stability

SECTION 3

LABELING INFORMATION

SECTION 4

BLOCK DIAGRAM(S)/SCHEMATICS

SECTION 5

THEORY OF OPERATION

SECTION 6

PHOTOGRAPHS

SECTION 7

RF EXPOSURE INFORMATION

SECTION 8

USER'S MANUAL

LIST OF FIGURES AND TABLES

FIGURES

Test Configuration
Photograph(s) for Fundamental, Spurious, and Digital Device Emissions
Photograph(s) for Conducted Emissions
Field Strength of Fundamental Emission
Field Strength of Spurious Emissions

TABLES

EUT and Peripherals
Test Instruments
Field Strength of Fundamental Emission
Field Strength of Spurious Emissions
Radiated Digital Device Emissions
Power Line Conducted Emissions for Digital Device, Transmitter, and Receiver

SECTION 1

GENERAL INFORMATION

GENERAL INFORMATION

Product Description

The Equipment Under Test (EUT) is a GE Healthcare, 07APFH-AP. The 07APFH-AP is a wireless Access Point (AP) designed for use in medical monitoring applications. The 07APFH-AP receives patient monitoring data from similar radios attached to the patients in the hospital. The 07APFH-AP is linked to other 07APFH-AP 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 07APFH-AP is composed of a 608-614 MHz wireless transceiver and Ethernet conversion circuitry that passes data from the transceiver to the Ethernet backbone.

The 07APFH-AP may operate with three different types of antennas: a 0 dBi monopole to provide omni-directional coverage, a +2 dBi patch antenna to provide unidirectional coverage, and a -2 dBi Circular polarization Patch. The unit requires external DC power but has its own internal voltage regulation. The 07APFH-AP is self contained in a metal package and is designed to be installed on the ceiling of a hospital hallway.

Related Submittal(s)/Grant(s)

None

SECTION 2

TESTS AND MEASUREMENTS

TESTS AND MEASUREMENTS

Configuration of Tested System

Since Part 95 stipulates radiated field strength limits and not dBc limits. Therefore as allowed by 2.947(a)(3), 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 (2003). Please note that the FCC has also shown a history of accepting other applications using ANSI C63.4 as the test methodology for devices tested under 95.1115. 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 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 registered with the FCC, under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

Modifications

No modifications were made to the EUT for compliance with FCC Part 95.

Test Equipment

Table 2 describes test equipment used to evaluate this product.

FIGURE 1
TEST CONFIGURATION

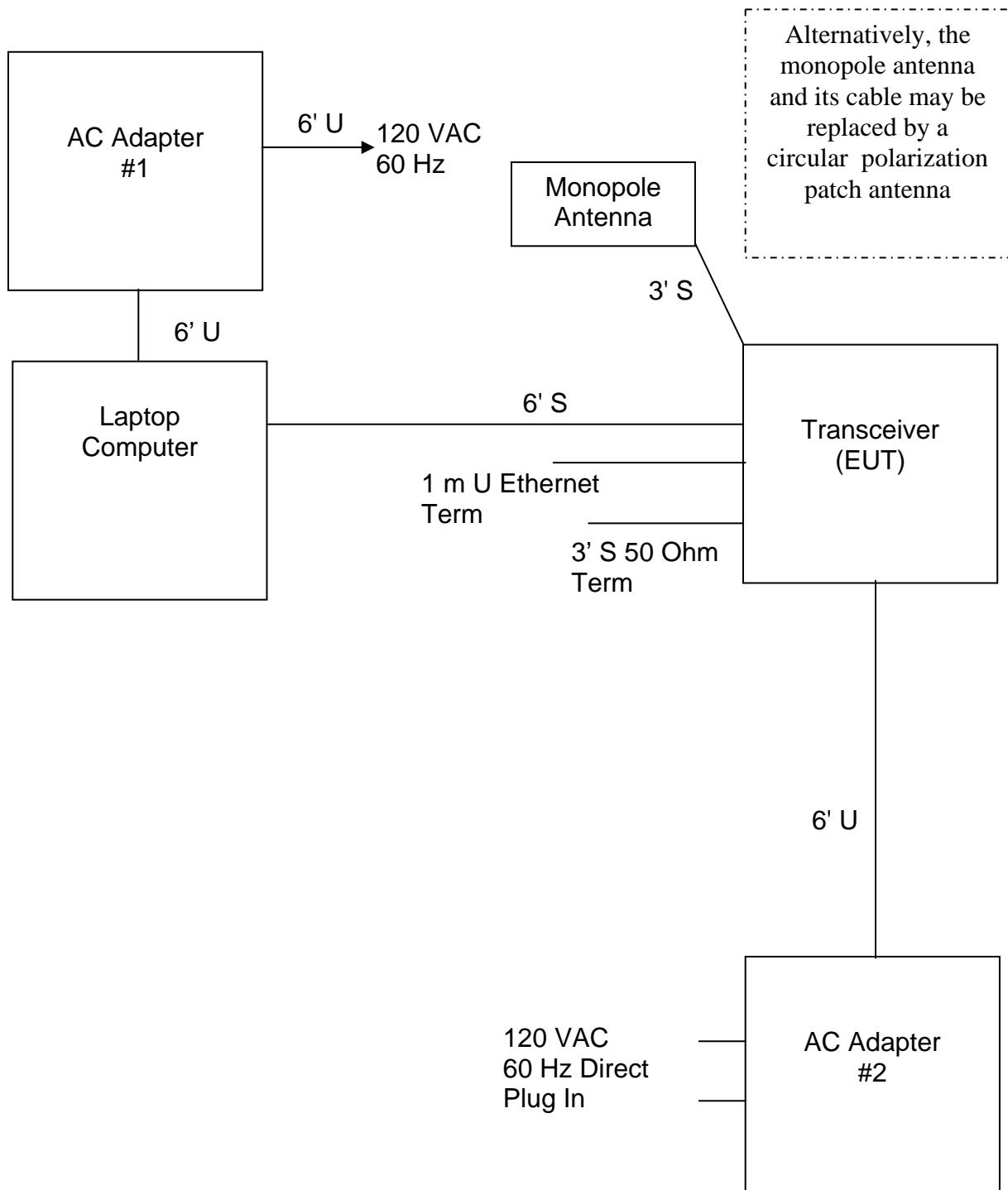


TABLE 1

EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Transmitter GE HealthCare (EUT)	07APFH-AP	None	OU507APFH-AP (Pending)	6' S 3' S 50 Ohm Term. 1 m U, Ethernet Term
Antenna Nearson, Inc.	P-24A48G (Monopole, 0 dBi)	None	None	None
Antenna GE Healthcare	EA-ANT-600- 6G-OMN (Circular Polar Patch, -2 dBi)	0645061	N/A	2' S
AC Adapter #1 Dell	55522	P38312318777	N/A	6' U Power Cord
AC Adapter #2 Volgen	SPU10R-2	None	N/A	6'U Direct Plug In
Computer Dell	Inspiron 3200	TS3043	IIRTS30HT	6' U

TABLE 2

TEST INSTRUMENTS

TYPE	MANUFACTURER	MODEL	SN.	Last Calibration Date
SPECTRUM ANALYZER	HEWLETT-PACKARD	8593E	3205A00124	07/16/06
SPECTRUM ANALYZER	HEWLETT-PACKARD	8558B	2010A09206	03/28/07
S A DISPLAY	HEWLETT-PACKARD	853A	2404A02387	03/28/07
RF PREAMP	HEWLETT-PACKARD	8447D	1937A03355	06/14/06
RF PREAMP	HEWLETT-PACKARD	8449B	3008A00480	08/21/06
HORN ANTENNA	EMCO	3115	3723	10/16/06 2 year
LISN	SOLAR ELE.	8028	910495 & 910494	05/10/07

Antenna Descriptions

The Model 07APFH-AP may be used with the following antennas.

MANUFACTURER	MODEL	TYPE	CONNECTOR	GAIN dBi
GE Healthcare	EA-ANT-600-6G-OMN	Circular Polar Patch	SMA	-2
Nearson Inc.	P-24A48G	Monopole	SMA	0

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

The 07APFH-AP has been designed exclusively for GE HealthCare. GE HealthCare 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 07APFH-AP are to 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 GE HealthCare personnel will be installing these units and will be solely responsible for their operation.

Frequency Range of Fundamental(s) (47 CFR 95.630 & 95.1115(d))

The EUT may operate in the frequency bands specified below:

608-614 MHz

The EUT is designed to operate on the following frequency list:

608.6656
608.802133
608.938667
609.0752
609.211733
609.348267
609.4848
609.621333
609.757867
609.8944
610.030933
610.167467
610.304
610.440533
610.577067
610.7136
610.850133
610.986667
611.1232
611.259733
611.396267
611.5328
611.669333
611.805867
611.9424
612.078933
612.215467
612.352
612.488533
612.625067
612.7616
612.898133

Frequency Range of Fundamental(s) (47 CFR 95.1115(d)(2))

In the 608-614 MHz band, wireless medical telemetry devices utilizing broadband technologies such as spread spectrum shall be capable of operating within one or more of the following channels of 1.5 MHz each, up to a maximum of 6 MHz, and shall operate on the minimum number of channels necessary to avoid harmful interference to any other wireless medical telemetry devices.

608.0 – 609.5 MHz

609.5 – 611.0 MHz

611.0 – 612.5 MHz

612.5 – 614.0 MHz

The device operates on the frequencies given on the previous page. Alternatively the radio may be operated on sub-band 2, consisting of 8 channels:

Sub-band 1	Sub-band 2	Sub-band 3	Sub-band 4
608.6656	609.757867	610.850133	611.9424
608.802133	609.8944	610.986667	612.078933
608.938667	610.030933	611.1232	612.215467
609.0752	610.167467	611.259733	612.352
609.211733	610.304	611.396257	612.488533
609.348267	610.440533	611.5328	612.625067
609.4848	610.577067	611.669333	612.7616
609.621333	610.7136	611.805867	612.898133

Sub-band 2 meets with the requirements specified above.

Sub Bands 1, 3, and 4 are not used.

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

Measurements were made using a peak detector. Field strength of the peak fundamental emission is shown in Tables 3a through 3c. The radio was checked with all three antennas and for a typical low, middle, and high channel with the radio hop-stopped and transmitting on a single channel. The fundamental frequency was maximized, and a QP measurement was taken. The worst case results are shown for each antenna (low, middle, and high transmit channel)).

TABLE 3a

FIELD STRENGTH OF FUNDAMENTAL EMISSION

Test Date: January 25, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

QP Measurement (Low, Mid, High Fundamentals - Monopole)
Highest Emission measured from Radio

Radiated Emissions									
Test By:	Test:	Radiated Emissions - Fundamentals			Client:	GE HealthCare - Monopole			
P.A.P.	Project:	06-0237		Class:	Model:	07APFH-AP			
Frequency (MHz)	Test Data (dBm)	AF Table	Test Data (dBuV)	AF+C A-AMP (dB)	Results (uV/m)	Limits (uV/m)	Distance / Polarity	Margin (dB)	PK = n / QP
608.71	-26.3*	2LP3mH	80.7	23.6	163168.0	200000.0	3m./HORZ	1.8	QP
611.10	-27.8*	2LP3mH	79.2	23.6	138756.9	200000.0	3m./HORZ	3.2	QP
613.88	-28.8*	2LP3mH	78.2	23.7	124021.2	200000.0	3m./HORZ	4.2	QP

Note: Conducted output power is typically about +12 dBm (15.8 mW) when measured at the output of the module using wide RBW/VBW settings (i.e. 1 MHz). Occupied bandwidth is specified as 300 kHz.

* - Quasi-Peak Measurement

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog $((-26.3 + 23.6 + 107)/20) = 163,168.0$
 CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
 Reviewed By: 

Name: Paul Picard

Plot 1a. Worst Case Fundamental Emissions (Monopole)

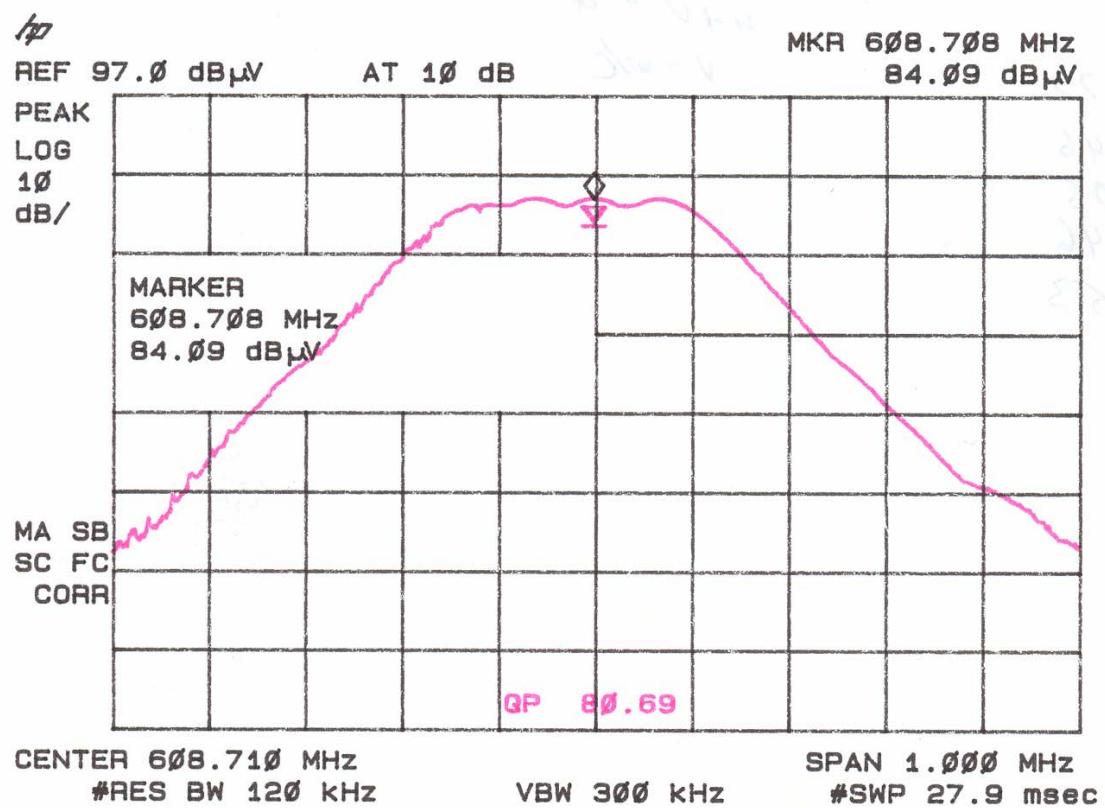


TABLE 3b
FIELD STRENGTH OF FUNDAMENTAL EMISSION

Test Date: January 25, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

QP Measurement (Low, Mid, High Fundamentals – ANT 685)
Highest Emission measured from Radio

Radiated Emissions									
Test By:	Test:	Radiated Emissions - Fundamentals				Client:	GE HealthCare – ANT 685		
P.A.P.	Project:	06-0237		Class:		Model:	07APFH-AP		
Frequency	Test Data	AF	Test Data	AF+C A-AMP	Results	Limits	Distance /	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(uV/m)	(uV/m)	Polarity	(dB)	/ QP
608.38	-32.3*	2lp3mv	74.7	23.7	82797.4	200000.0	3m./VERT	7.7	608.38
611.13	-31.7*	2lp3mv	75.3	23.7	88921.5	200000.0	3m./VERT	7.0	611.13
613.888	-34.5*	2lp3mv	72.5	23.7	64565.4	200000.0	3m./VERT	9.8	613.888

Note: Conducted output power is typically about +12 dBm (15.8 mW) when measured at the output of the module using wide RBW/VBW settings (i.e. 1 MHz). Occupied bandwidth is specified as 300 kHz.

* - Quasi-Peak Measurement

SAMPLE CALCULATIONS:

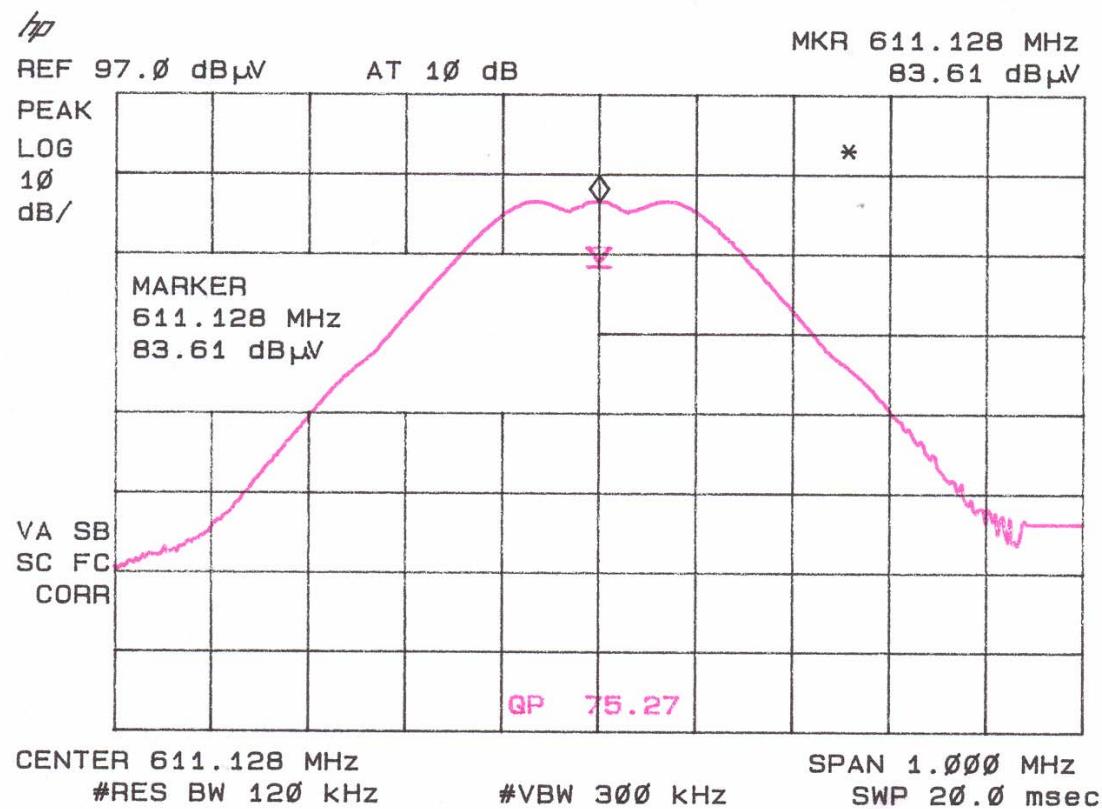
RESULTS uV/m @ 3m = Antilog $((-32.3 + 23.7 + 107)/20) = 82797.4$
CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
Reviewed By: _____



Name: Paul Picard

Plot 1b. Worst Case Fundamental Emissions (GE)



Field Strength Of Spurious Emissions (47 CFR 95.1115(b))

Measurements were made using a peak detector. Field strength of Spurious Emissions are shown in Tables 4a through 4b and Figure 3. For comparison to the average limits, duty cycle corrections were made as shown below.

Part 95.1115(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.

Calculation of Maximum Transmit Duty Cycle

Each remote AP unit can transmit only once during a dwell time. The maximum length of the transmitted packet from each remote is set by the system design and cannot be adjusted by the user. That packet length 5ms every 35 ms.

The maximum amount of time that an AP transmitter can operate in any 35 millisecond period is 5ms. Therefore, our source-averaged transmit duty cycle becomes 0.143 (5ms/ 35 ms). Note that this duty cycle is not dependent on use of Frequency Hopping. There is no averaging of power over the number of hops. The above calculation is strictly based on the maximum amount of time an AP transmitter can transmit in any 35 ms time period – regardless of the channel the radio happens to be on at the time.

$$\text{Duty Cycle correction} = 20 \log (5/35) = -16.9 \text{ dBm}$$

TABLE 4a
FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Date: January 25, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

Peak Measurements (Monopole Antenna)

Radiated Emissions									
Test By:	Test:	Radiated Emissions - Harmonics				Client:	GE HealthCare - Monopole		
PAP	Project:	06-0237		Class:		Model:	07APFH-AP		
Frequency (MHz)	Test Data (dBm)	AF Table	Test Data (dBuV)	AF+CA-AMP (dB)	Results (uV/m)	Limits (uV/m)	Distance / Polarity	Margin (dB)	PK = n / QP
1217.33	-78.9*	1HN3mV	28.1	-7.2	11.0	500.0	3m./VERT	33.1	PK
1825.68	-76.3*	1HN3mV	30.7	-4.7	20.0	500.0	3m./VERT	28.0	PK
2434.70	-80.8*	1HN3mV	26.2	-2.7	15.0	500.0	3m./VERT	30.5	PK
									PK
1222.15	-81.7*	1HN3mV	25.3	-7.2	8.0	500.0	3m./VERT	35.9	PK
1833.49	-79.6*	1HN3mV	27.4	-4.6	13.8	500.0	3m./VERT	31.2	PK
									PK
1227.43	-81.6*	1HN3mV	25.4	-7.2	8.1	500.0	3m./VERT	35.8	PK
1840.763	-83.0*	1HN3mV	24.0	-4.6	9.3	500.0	3m./VERT	34.6	PK
2455.263	-81.9*	1HN3mV	25.1	-2.6	13.3	500.0	3m./VERT	31.5	PK

***Measurement corrected by duty cycle correction factor=-16.9**

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog $(-78.9 - 7.2 + 107)/20 = 11.0$

CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
Signature: _____



Name: Paul Picard

Plot 2a. Worst Case Spurious Emission (Monopole)

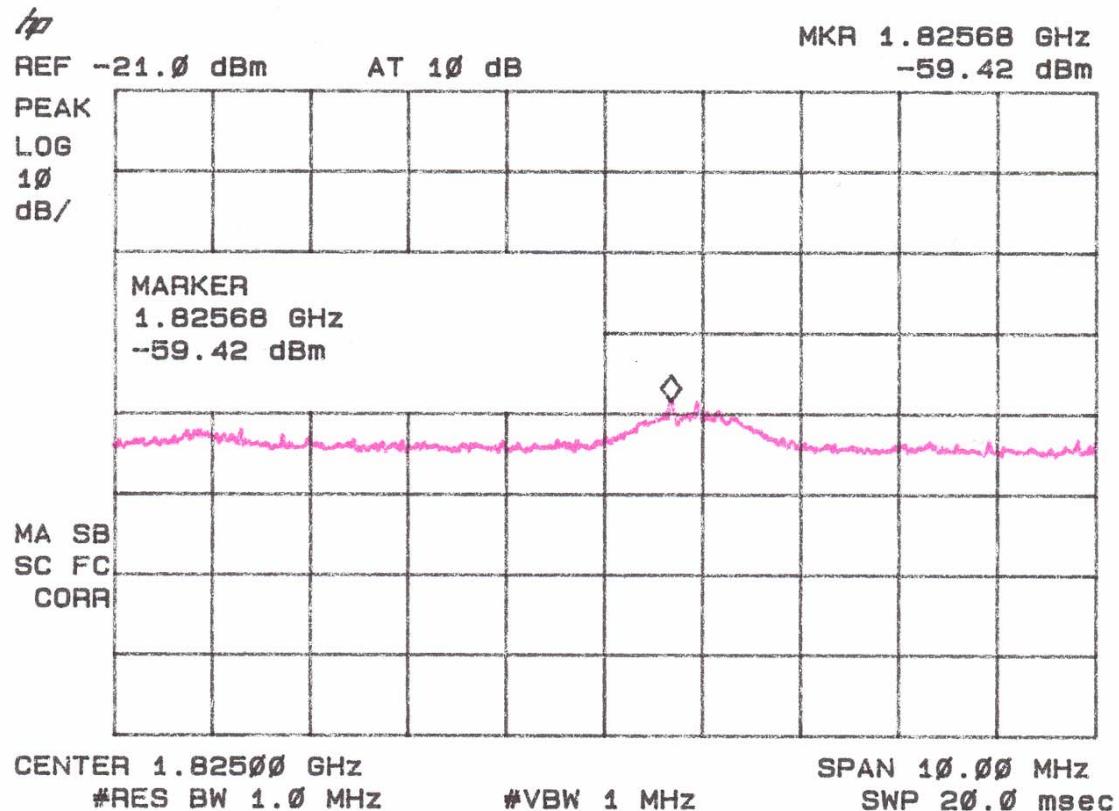


TABLE 4b
FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Date: January 25, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: 07APFH-AP

Peak Measurements (ANT 685 Antenna)

Radiated Emissions									
Test By:	Test:	Radiated Emissions - Harmonics				Client:	GE HealthCare – ANT 685		
PAP	Project:	06-0237		Class:		Model:	07APFH-AP		
Frequency (MHz)	Test Data (dBm)	AF Table	Test Data (dBuV)	AF+CA-AMP (dB)	Results (uV/m)	Limits (uV/m)	Distance / Polarity	Margin (dB)	PK = n / QP
1822.45	-79.0	1hn3mV	28.0	-3.9	16.0	500.0	3m./VERT	29.9	PK
2434.48	-75.9	1hn3mH	31.1	-1.6	29.8	500.0	3m./HORZ	24.5	PK
1833.23	-79.6	1hn3mV	27.4	-3.9	15.0	500.0	3m./VERT	30.5	PK
2444.1	-78.4	1hn3mH	28.6	-1.6	22.4	500.0	3m./HORZ	27.0	PK
1840.72	-80.5	1hn3mH	26.6	-3.6	14.0	500.0	3m./HORZ	31.0	PK
2454.5	-79.5	1hn3mH	27.5	-1.5	19.8	500.0	3m./HORZ	28.1	PK

*Measurement corrected by duty cycle correction factor=-16.9

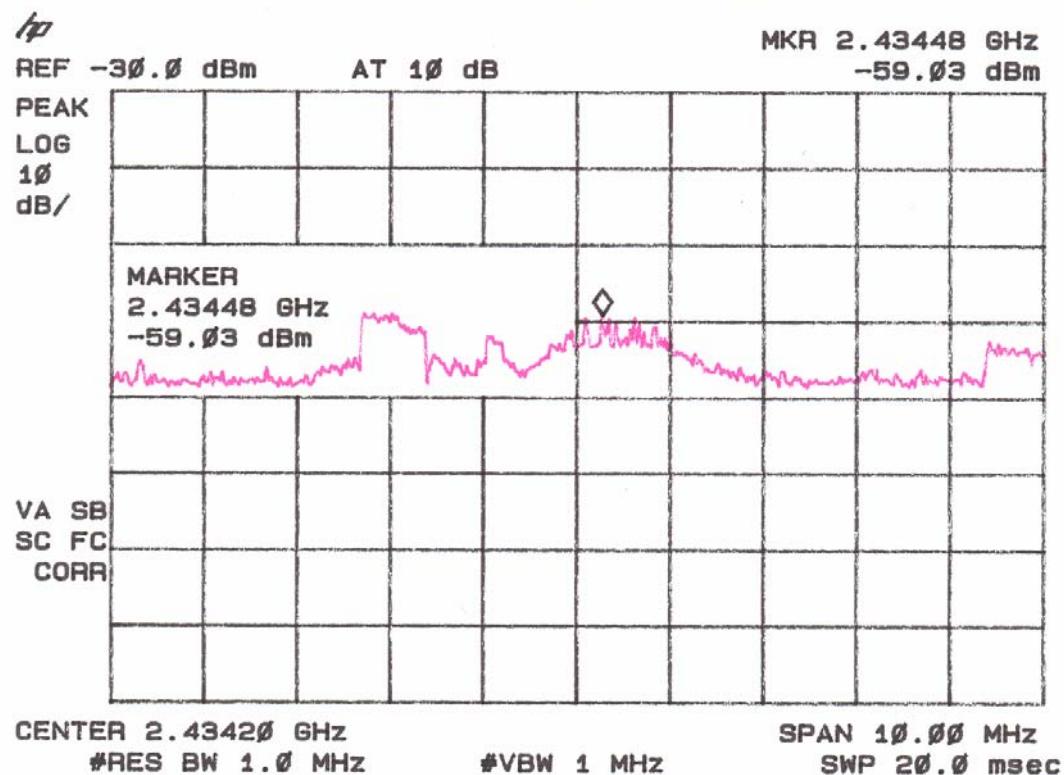
SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog $(-79.0 - 3.9 + 107)/20 = 16.0$
CONVERSION FROM dBm TO dBuV = 107 dB

Test Results
Signature: 

Name: Paul Picard

Plot 2b. Worst Case Spurious Emission (GE)



Radiated Digital Device Emissions (47 CFR 15.109a)

Radiated emissions were evaluated from 30 MHz to 6.5 GHz with the EUT set to a receive mode of operation. Measurements were made with the analyzer's bandwidth set to 120 kHz for measurements below 1 GHz and 1 MHz for measurements above greater than or equal to 1 GHz. Results of these emissions are shown in Tables 5a and 5b.

TABLE 5a

CLASS B
RADIATED EMISSIONS

Test Date: May 31, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

Measurements 30 MHz – 1 GHz

Radiated Emissions									
Test By:	Test:	15 B				Client:	GE HealthCare		
LAF	Project:	06-0237		Class:		Model:	DR-10100		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Distance /	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(uV/m)	(uV/m)	Polarity	(dB)	/ QP
33.10	-94.0	1bi3mv	13.0	13.2	20.4	100.0	3m./VERT	13.8	PK
65.1	-94.0	1bi3mv	13.0	10.4	14.7	100.0	3m./VERT	16.6	PK
82.5	-96.0	1bi3mv	11.0	11.1	12.7	100.0	3m./VERT	17.9	PK
220	-86.0	2lp3mv	21.0	14.0	56.0	200.0	3m./VERT	11.1	PK
321	-87.0	2LP3MH	20.0	18.3	82.4	200.0	3m./HORZ	7.7	PK
342	-86.0	2LP3MH	21.0	18.1	89.8	200.0	3m./HORZ	7.0	PK
360	-82.0	2lp3mh	25.0	18.6	151.9	200.0	3m./HORZ	2.4	PK
362	-87.0	2lp3mv	20.0	18.4	83.5	200.0	3m./VERT	7.6	PK
400	-90.0	2lp3mh	17.0	19.4	66.3	200.0	3m./HORZ	9.6	PK
440	-84.0	2lp3mh	23.0	20.8	154.1	200.0	3m./HORZ	2.3	PK
460	-86.0	2lp3mh	21.0	21.0	126.2	200.0	3m./HORZ	4.0	PK
482	-88.0	2lp3mh	19.0	22.2	114.5	200.0	3m./HORZ	4.8	PK
579	-87.0	2LP3mh	20.0	23.0	140.5	200.0	3m./HORZ	3.1	PK
662	-88.0	2lp3mv	19.0	24.9	156.8	200.0	3m./VERT	2.1	PK
701	-90.0	2LP3MH	17.0	26.2	144.0	200.0	3m./HORZ	2.9	PK

Note: All measurements above are Peak measurements. All data is listed for the worse case configurations with the antenna terminated in a monopole Antenna.

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m =

Antilog $((-94.0 + 13.2 + 107)/20) = 20.4$

CONVERSION FROM dBm TO dBuV = 107 dB

Test Results

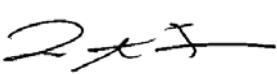
Signature: Name: Louis A. Feudi

TABLE 5b

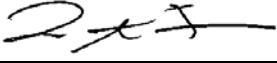
CLASS B
RADIATED EMISSIONS

Test Date: May 31, 2007
UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

Peak Measurements >1 GHz

Radiated Emissions									
Test By:	Test:	15 B				Client:	GE HealthCare		
LAF	Project:	06-0237		Class:		Model:	DR-10100		
Frequency (MHz)	Test Data (dBm)	AF Table	Test Data (dBuV)	AF+CA- AMP (dB)	Results (uV/m)	Limits (uV/m)	Distance / Polarity	Margin (dB)	PK = n / QP
Nothing seen within 20 dB of the FCC limit above > 1 GHz									

Test Results

Signature: Name: Louis A. Feudi

**Power Line Conducted Emissions for Digital Device, Transmitter, and Receiver
(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 an continuous transmit or a continuous mode of receive. Since no difference was noted due to transmit or receive operation, only one set of results is shown. The results are given in Tables 6a - 6b.

TABLE 6a
CONDUCTED EMISSIONS DATA
CLASS B

UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

PHASE MEASUREMENT (Peak/QP versus Average Limits)

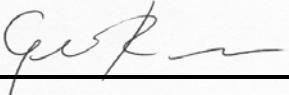
Conducted Emissions									
Test By:	Test:	Conducted Emissions				Client:	GE HealthCare		
GR	Project:	06-0237		Class:	B	Model:	DR-10100		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Distance /	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(dBuV)	(dBuV)	Polarity	(dB)	/ QP
0.21	-61.2	LISNP	45.8	-0.1	45.7	52.6	PHASE	6.9	PK
0.3066	-65.4	LISNP	41.6	-0.1	41.6	50.2	PHASE	8.6	PK
0.8275	-68.9	LISNP	38.1	0.0	38.1	46.0	PHASE	7.9	PK
9.612	-69.0	LISNP	38.0	0.4	38.4	50.0	PHASE	11.6	PK
10.63	-69.0	LISNP	38.0	0.4	38.3	50.0	PHASE	11.7	PK
11.98	-69.1	LISNP	37.9	0.5	38.4	50.0	PHASE	11.6	PK

SAMPLE CALCULATIONS:

RESULTS dBuV = Antilog (45.8 + - 0.1) = 45.7

Test Date: June 7, 2007

Tested Results

Signature: 

Name: Gersop Riera

TABLE 6b
CONDUCTED EMISSIONS DATA
CLASS B

UST Project: 06-0237
Customer: GE HealthCare
Model: DR-10100

NEUTRAL MEASUREMENT (Peak/QP versus Average Limits)

Conducted Emissions									
Test By:	Test:	Conducted Emissions				Client:	GE HealthCare		
GR	Project:	06-0237		Class:	B	Model:	DR-10100		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Distance /	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(dBuV)	(dBuV)	Polarity	(dB)	/ QP
0.2051	-61.0	LISNN	46.0	-0.1	45.9	53.6	NEUTRAL	7.7	PK
0.2375	-61.0	LISNN	46.0	-0.1	45.9	52.6	NEUTRAL	6.7	PK
0.62	-70.7	LISNN	36.3	0.0	36.3	46.0	NEUTRAL	9.7	PK
9.1	-70.6	LISNN	36.4	0.4	36.8	50.0	NEUTRAL	13.2	PK
12.68	-69.7	LISNN	37.3	0.6	37.9	50.0	NEUTRAL	12.1	PK
10.9	-69.9	LISNN	37.1	0.5	37.5	50.0	NEUTRAL	12.5	PK

SAMPLE CALCULATIONS:

RESULTS dBuV = Antilog (46.0 +- 0.1) = 45.9

Test Date: June 7, 2007

Tested Results

Signature: 

Name: Gersop Riera

Emissions Type (47 CFR Section 95.631(i), 95.1115(c), and 95.1117)

A wireless medical telemetry device may transmit any emission type appropriate for communications in this service, except for video and voice. Waveforms such as electrocardiograms (ECG's) are not considered video.

Basic Description of Transmitter Emissions

The EUT utilizes spread spectrum (frequency hopping) type technology and GFSK (Gaussian filtered, Frequency Shift Keying) as its modulation approach.

The devices emissions designator according to the manufacturer is 300KFXD.

Frequency Stability (47 CFR Section 95.1115(e))

Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all of the manufacturer's specified conditions.

According to the manufacturer, the frequency drift of the transmitter is +/- 30 ppm over a temperature range of -20 to + 70 degrees C. This value was determined by the crystal used (manufacturers data) to stabilize the frequency synthesizer. The +/- 30 ppm corresponds to an actual frequency drift of 6+/- kHz.

Testing was interrupted during the evaluation, so the results are grouped by 2 temp results, both comparing to 20 degrees C nominal/9 V dc nominal and one voltage result, varying the voltage by +/- 10 % at 20 degrees C.

FCC Certification
Frequency Stability vs. Temperature (At Startup)

Test Results Reviewed By:

[Signature]

Measured

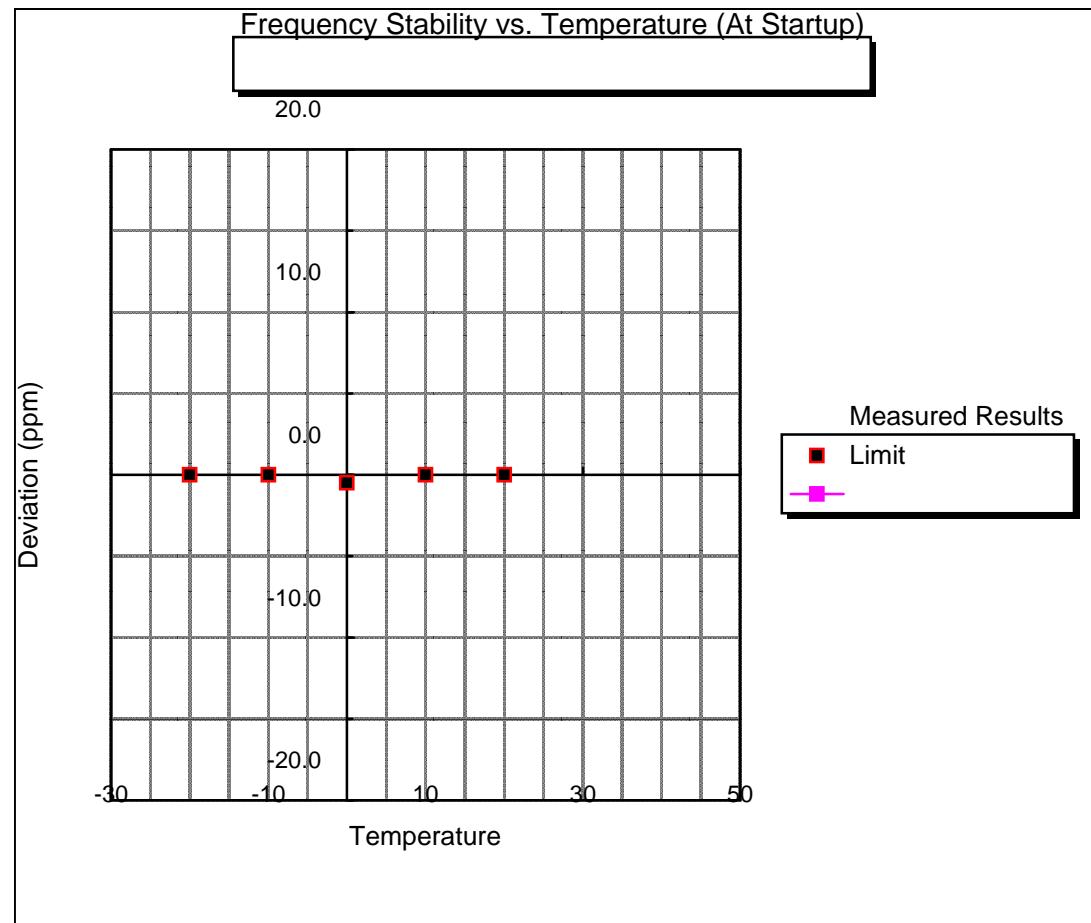
Temperature	Frequency (MHz)	Deviation (ppm)
-20	610.733500	0.0
-10	610.733500	0.0
0	610.733200	-0.5
10	610.733500	0.0
20	610.733500	0.0

610.733500

Actual TX Frequency was:

Maximum Deviation = 0.0001% or 10ppm

Reference Point from 20 degrees C: 610.7335 MHz
MHz



FCC Certification
Frequency Stability vs. Temperature (At Startup)

Test Results Reviewed By:

[Signature]

Measured

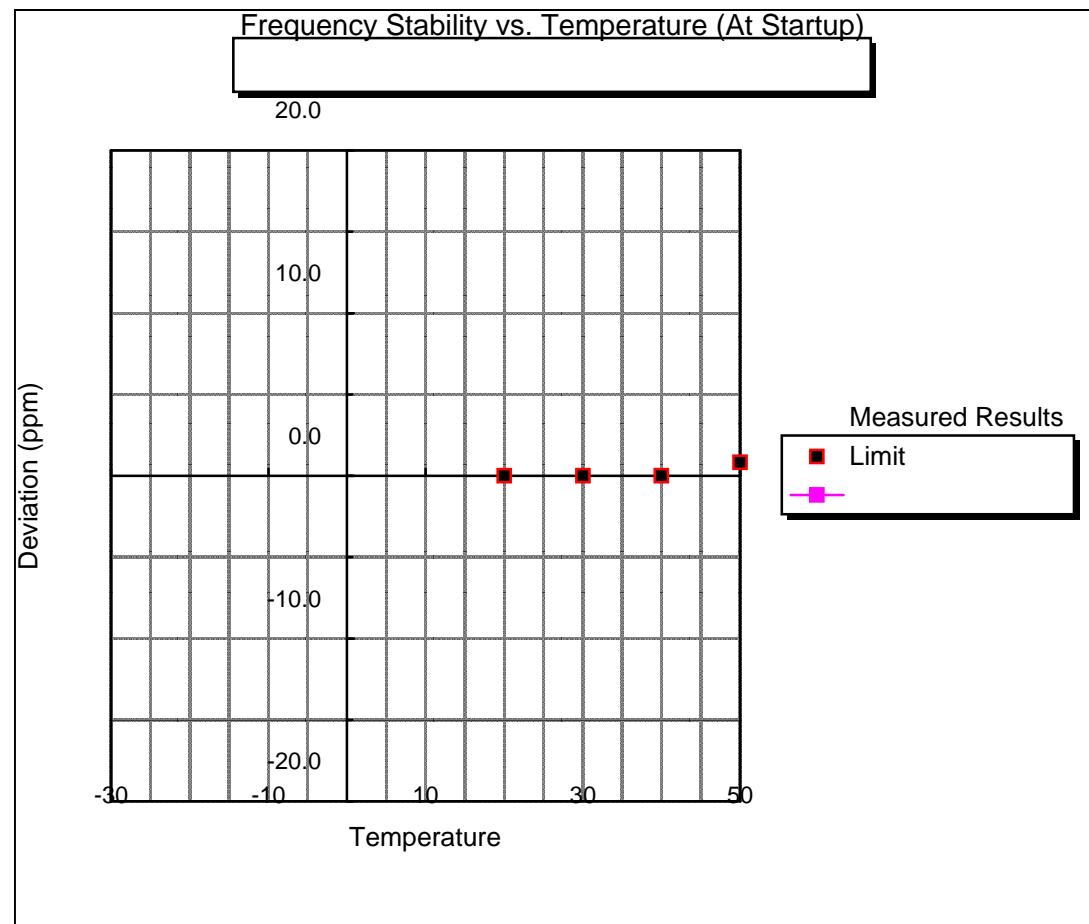
Temperature	Frequency (MHz)	Deviation (ppm)
20	610.729000	0.0
30	610.729000	0.0
40	610.729000	0.0
50	610.729500	0.8

610.729000

Actual TX Frequency was:

Maximum Deviation = 0.0001% or 10ppm
Reference Point from 20 degrees C: 610.7290 MHz

MHz



FCC Certification
Frequency Stability vs. Voltage (At Startup)

Test Results Reviewed By:

[Signature]

Measured

Voltage Vdc	Frequency (MHz)	Deviation (ppm)
7.65	610.856600	-1.6
9	610.857600	0.0
10.35	610.856600	-1.6

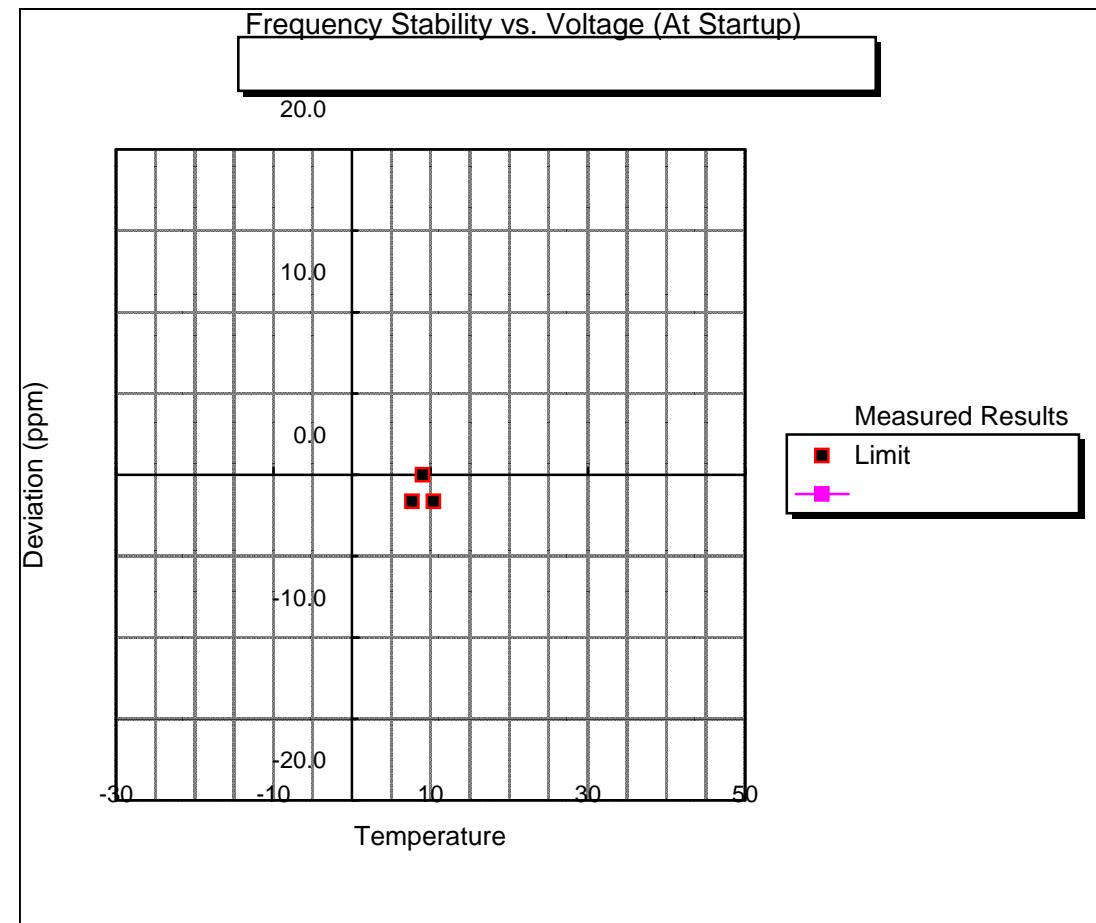
610.857600

Actual TX Frequency was:

Maximum Deviation = 0.0001% or 10ppm

Reference Point from 20 degrees C: 610.857600 MHz

MHz



Peak Output Power

Peak power within the band 608-614 MHz has been measured with a spectrum analyzer by connecting the spectrum analyzer directly via a short cable to the antenna output terminals. The spectrum analyzer was set for a 50Ω impedance with the $\text{VBW} \geq \text{RBW}$ 6 dB bandwidth. The results of the measurements are given in Table 7 and Figure 3a through Figure 3c.

Fundamental Frequencies were measured at Low Channel, Mid Channel, and High Channel.

TABLE 7
CONDUCTED PEAK POWER OUTPUT

Test Date: July 3, 2007
UST Project: 06-0237
Customer: GE Healthcare
Product: 07APFH-AP

Frequency of Fundamental (MHz)	Measurement (dBm)*	Measurement (mW)*	FCC Limit (Watt)
608.587	11.97	15.73	1.0
611.164	12.23	16.71	1.0
613.465	12.11	16.25	1.0

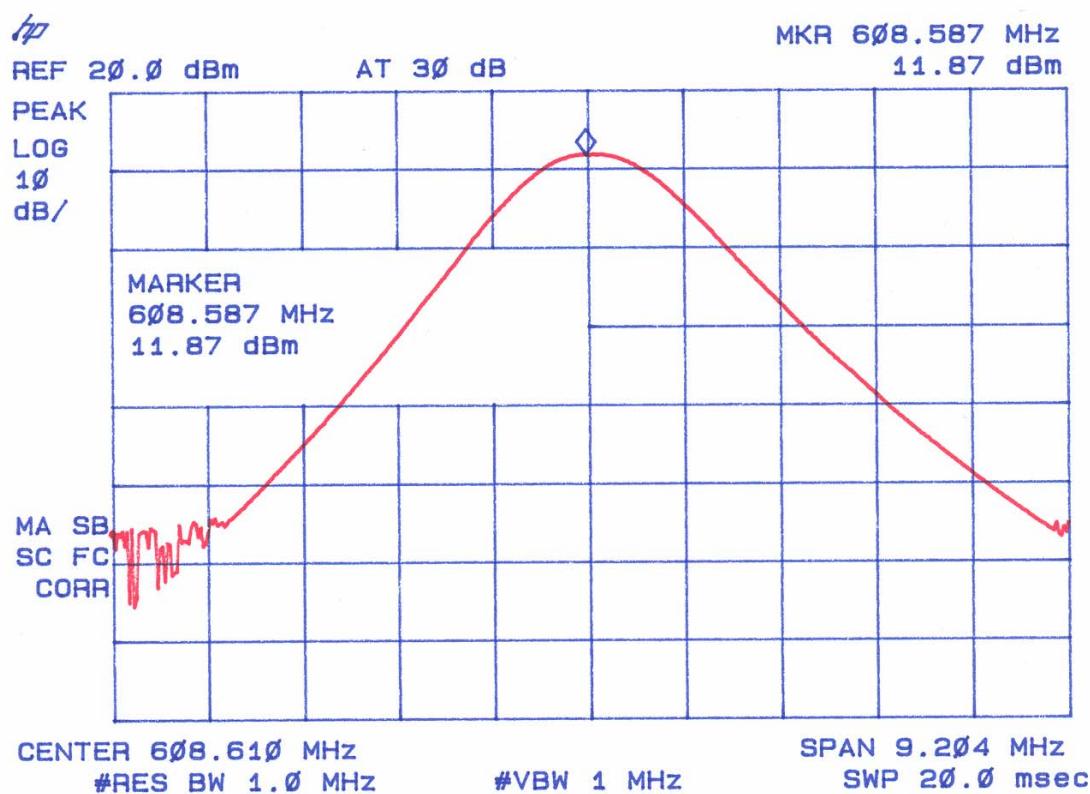
* Measurement includes 0.1 dB for cable loss

Tester

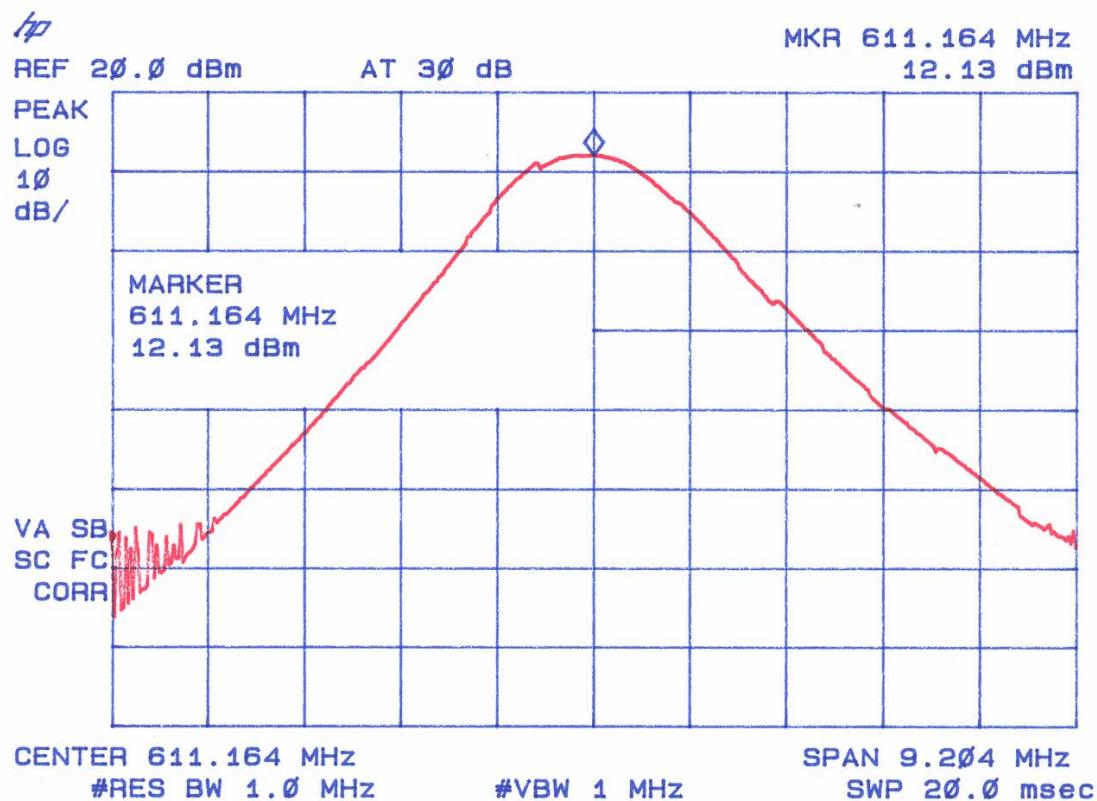
Signature: 

Name: Gersop Riera

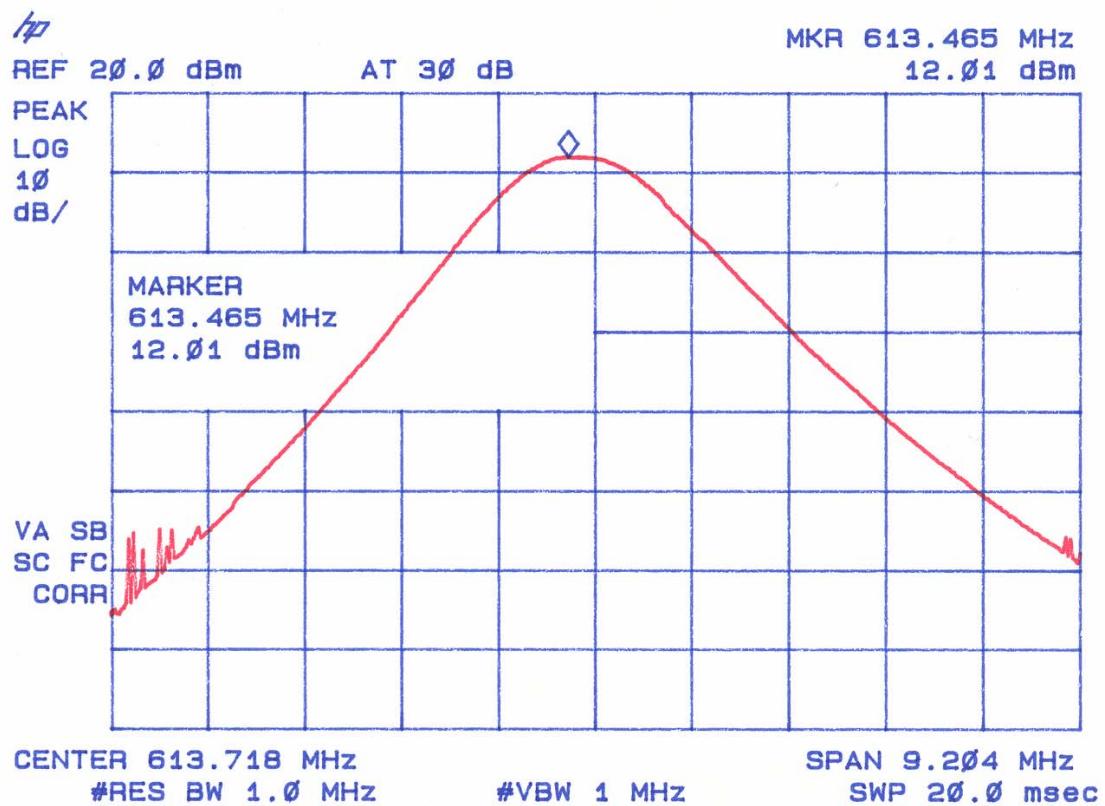
Plot 3a. Conducted Power (Low)



Plot 3b. Conducted Power (Mid)



Plot 3c. Conducted Power (High)



20 dB Bandwidth

The antenna port was connected to a spectrum analyzer that was set for a 50Ω impedance with the RBW = approximately 1/100 of the manufacturers claimed RBW & VBW > RBW. The results of this test are given in Table 8 and Figure 4a through 4c

TABLE 6
20 dB Bandwidth

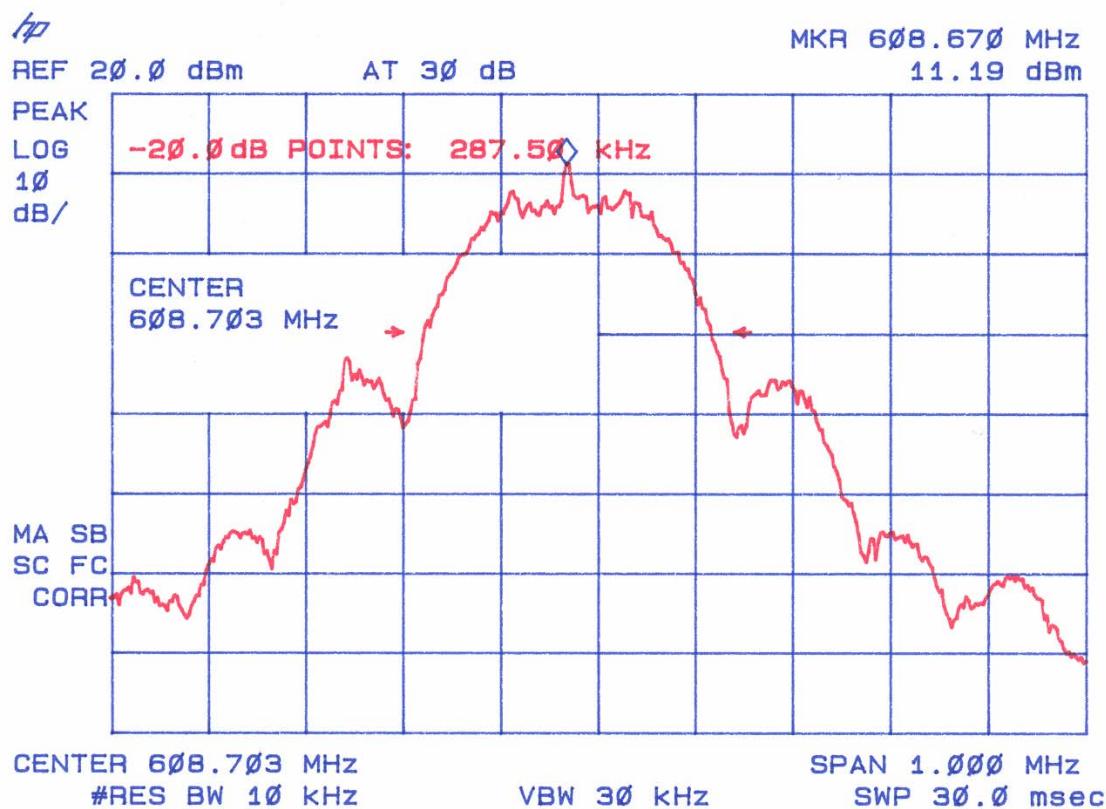
Test Date: July 20, 2007
UST Project: 06-0237
Customer: GE Healthcare
Model: 07APFH-AP

Frequency (GHz)	20 dB Bandwidth (kHz)
608.670	287.5
611.128	282.5
613.585	287.5

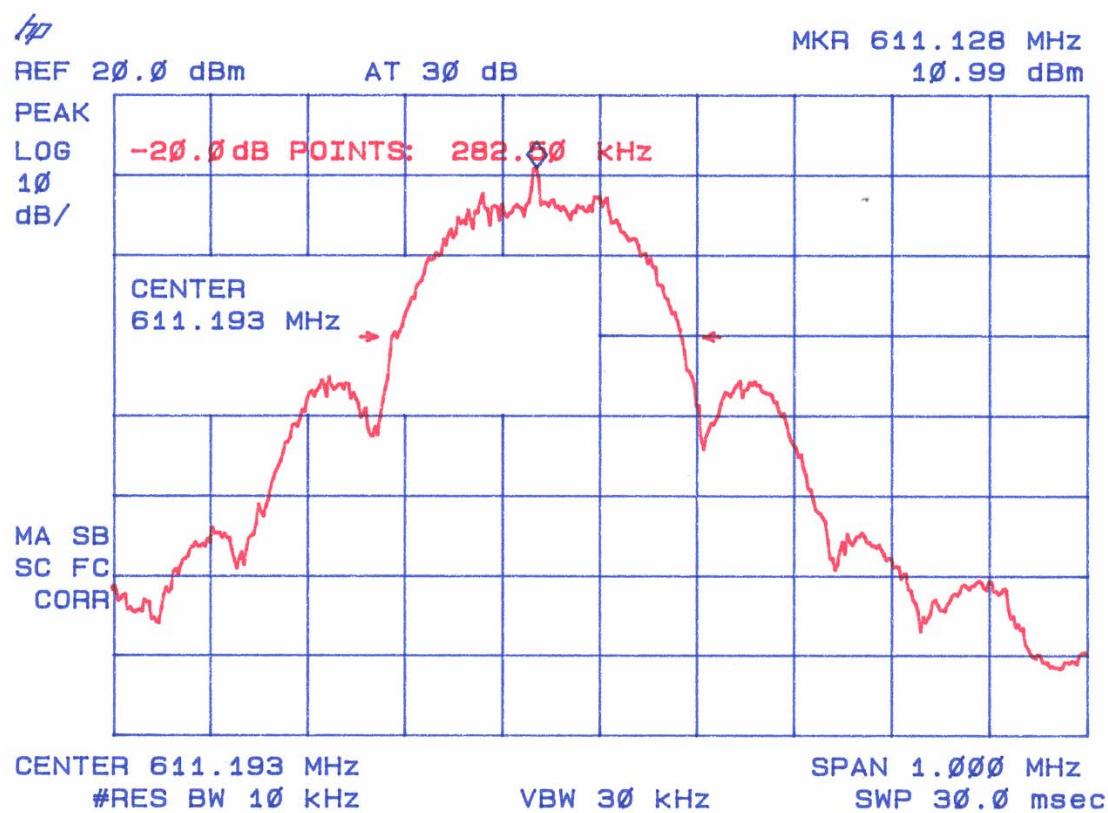
Tester
Signature: 

Name: Gersop Riera

Plot 3a. Low Channel



Plot 3b. Mid Channel



Plot 3c. High Channel

