



Testing Tomorrow's Technology

Class II Permissive Change Application

For

**Certification for an Intentional Radiator per Title 47
Part 95, Subpart H, Wireless Medical Telemetry Service (WMTS) paragraphs
95.2365, 95.2369, 95.2379
and
Part 2, Subpart J, Equipment Authorization Procedures**

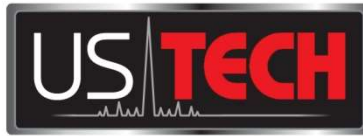
For the

**GE Medical Systems Information Technologies, Inc.
Model: 07APFH-AP**

**FCC ID: OU507APFH-AP
UST Project: 18-0041
Issue Date: May 8, 2018**

Total Pages in This Report: 24

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




Testing Tomorrow's Technology

I certify that I am authorized to sign for the Test Agency 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:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name: 

Title: Compliance Engineer – President

Date: May 8, 2018



TESTING

NVLAP LAB CODE 200162-0

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1. MEASUREMENT TECHNICAL REPORT

COMPANYS NAME: GE Medical Systems Information Technologies, Inc.

MODEL: 07APFH-AP

FCC ID: OU507APFH-AP

DATE: May 8, 2018

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

Equipment type: WMTS Transceiver

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

If yes, defer until: N/A
date

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:

US Tech
3505 Francis Circle
Alpharetta, GA30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

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1 General Information

1.1 Purpose of this Report

The purpose of this report is to file for a Class II Permissive Change for the following reasons:

1. The operating frequency band has been expanded to cover additional channels near the bandedges in the 608-614 MHz operating band. No hardware/component changes were required for this modification.

2. The amplifier in the transmit chain has been changed because the previous amplifier is being discontinued.

3. The monopole antenna gain has been increased to +2.0 dB and the Patch antenna gain has been increased to +2.0 dB.

The following tests were performed to show that the EUT continues to comply with the relevant subpart:

- WMTS frequency accuracy
- Field strength limits
- Unwanted emissions limits
- RF Exposure (see RF Exposure Exhibit)

1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on March 15, 2018 in good operating condition.

1.3 Product Description

The Equipment under Test is a GE Medical Systems Information Technologies, Inc., 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-APs through a 10Base-T Ethernet backbone. This backbone allows the APs to pass patient data back to the end user of the system. 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.

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1.4 Configuration of Tested System

The Test Sample was tested per *ANSI C63.10:2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices* as well as *TIA 603-D, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs are provided in separate Appendices.

1.5 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA30004. This site has been fully described and registered with the FCC under registration number US5301.

Table 1. EUT and Peripherals

EUT	MODEL NUMBER	SERIAL NUMBER	FCC ID	CABLES P/D
GE Medical Systems Information Technologies, Inc. (EUT)	07APFH-AP	170924114 Rev B	OU507APFH-AP	6 ft S D 6 ft U P
Antenna See antenna details in Table 4	--	--	--	--
PERIPHERAL/ MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Power Supply GlobeTek, Inc	GT-21088-0909-W2	02066848/03	N/A	6 ft U P
Laptop Computer Dell	D630	Various	Various	6 ft S P

U= Unshielded S= Shielded P= Power D= Data

2 Tests and Measurements

2.1 Test Equipment

The table below lists test equipment used to evaluate this product. Model numbers, serial numbers and their calibration status are indicated.

Table 2. Test Instruments

TEST INSTRUMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	CALIBRATION DUE
SPECTRUM ANALYZER	E4407B	AGILENT	US41442935	6/22/2018
SPECTRUM ANALYZER	N9342CN	AGILENT	SG05310114	7/21/2018
BICONICAL ANTENNA	3110B	EMCO	9306-1708	5/2/2019 2 yr
LOG PERIDOC ANTENNA	3146	EMCO	9110-3236	9/21/2019 2 yr
LOG PERIDOC ANTENNA	3146	EMCO	9305-3600	5/1/2019 2 yr
HORN ANTENNA	3115	EMCO	9107-3723	9/22/2018 2 yr.
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00480	12/1/2018
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	3/7/2019

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

2.2 Modifications to EUT Hardware

No physical modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 95, Subpart H Intentional Radiator Limits for the transmitter portion of the EUT.

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2.3 EUT Antenna Requirements

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. Only the antenna(s) listed in Table 4 will be used with this module.

Table 3. Allowed Antenna(s)

REPORT REFERENCE	MANUFACTURER	TYPE OF ANTENNA	PART NO.	GAIN dB _i	TYPE OF CONNECTOR
Antenna 1	Nearson	Dipole	OEM181AM- 608S	+2	SMA
Antenna 2	Cushcraft	Patch	SL6081P	+2	SMA

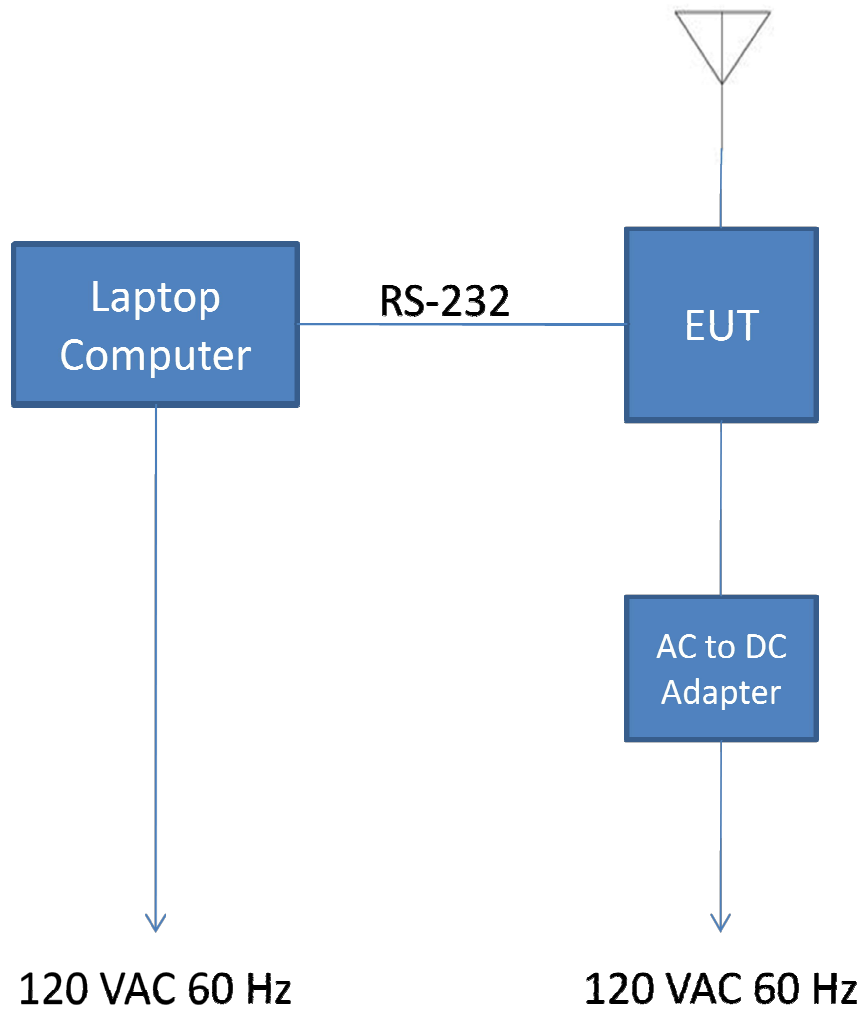


Figure 1. Test Configuration

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2.4 WTMS Frequency Accuracy (CFR 95.2365)

Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency accuracy such that all emissions are maintained within the designated bands of operation under all of the manufacturer's specified conditions.

According to the manufacturer the frequency drift of the transmitter is +/- 30 ppm. This value was determined by the crystal used to stabilize the frequency synthesizer. The +/- 30 ppm corresponds to an actual frequency drift of +/- 6 kHz.

Frequency stability measurements were performed. The test data is presented below:

Frequency Stability vs. Temperature (At Startup)

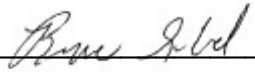
Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-20	N/A	N/A
-10	610.8689	0.8
5	610.8667	-2.9
10	610.8663	-3.5
20	610.8680	-0.7
30	610.8678	-1.0
40	610.8676	-1.3
50	610.8667	-2.9

Maximum Deviation = 0.0003% or 30ppm

Note: EUT shuts down at -20°C.

Test Date: April 4, 2018

Tested By

Signature: 

Name: Bruce Arnold

US Tech Test Report:
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 Issue Date:
 Customer:
 Model:

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2.5 WMTS Frequency Bands and Channels (CFR 95.2363)

The channel plan for this radio is presented below. The channels fall within the operating frequency band, 608-614 MHz for WMTS devices.

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

New Expanded WIT608 Channel Frequencies.

Proposed new channels are:
 0h, 1h, 22h, 23h, 24h, 25h, 26h

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

Figure 2. Expanded Frequency Channels

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2.6 WMTS field strength limits (CFR 95.2369(a))

For WMTS transmitter types operating in the 608-614 band, the field strength of the transmitted signal must not exceed 200 mV/m, measured at a distance of 3 meters, using instrumentation with an ISPR quasi-peak detector.

Table 4. Quasi-Peak Radiated Fundamental Emissions (Antenna 1)

Test: FCC Part 95, Para 95.2369					Model: 07APFH-AP			
Project: 18-0041								
Frequency (MHz)	Test Data (dBuV)	Factor (dB)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
Low Channel - QP								
608.43	81.49	--	24.33	105.82	106.0	3m./HORZ	0.2	QP
Mid Channel - QP								
611.15	80.00	--	24.44	104.44	106.0	3m./HORZ	1.6	QP
High Channel - QP								
613.63	81.02	--	24.44	105.46	106.0	3m./HORZ	0.5	QP

Table 5. Quasi-Peak Radiated Fundamental Emissions (Antenna 2)

Test: FCC Part 95, Para 95.2369					Model: 07APFH-AP			
Project: 18-0041								
Frequency (MHz)	Test Data (dBuV)	Factor (dB)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
Low Channel - QP								
608.41	79.79	--	23.83	103.62	106.0	3m./VERT	2.4	QP
Mid Channel - QP								
611.15	80.02	--	24.04	104.06	106.0	3m./VERT	1.9	QP
High Channel - QP								
613.60	79.87	--	24.04	103.91	106.0	3m./VERT	2.1	QP

1. The EUT was placed in its normal operating position and the transmitter was in constant broadcast mode, with a duty cycle of less than 15%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 608.41 MHz:

Magnitude of Measured Frequency	79.79	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	23.83	dB/m
Corrected Result	103.62	dBuV/m

Test Date: May 4, 2018

Tested By
 Signature: Bruce Arnold

Name: Bruce Arnold

US Tech Test Report:
FCC ID:
Test Report Number:
Issue Date:
Customer:
Model:

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2.7 WMTS unwanted emissions limits (CFR P95.2379)

Each WMTS transmitter must be designed to comply with the following requirements:

(a) Unwanted emissions on frequencies below 960 MHz must not exceed 200 $\mu\text{V/m}$, measured at a distance of 3 meters using measuring instrumentation with a CISPR quasi-peak detector (46 dBuV/m).

(b) Unwanted emissions on frequencies above 960 MHz must not exceed 500 $\mu\text{V/m}$, measured at a distance of 3 meters using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth. (54 dBuV/m)

Table 6. Radiated Emissions Test Data Below 960 MHz (Part 95.2379)

Test: FCC Part 95, Para 95.2379				Model: 07APFH-AP			
Project: 18-0041							
Frequency (MHz)	Test Data (dBuV)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
40.00	48.56	-15.99	32.57	46.0	3m./VERT	13.4	PK
94.00	45.40	-15.94	29.46	46.0	3m./VERT	16.5	PK
535.59	51.67	-7.05	44.62	46.0	3m./VERT	1.4	QP
214.99	42.82	-13.97	28.85	46.0	3m./HORZ	17.2	PK
540.04	46.05	-6.35	39.70	46.0	3m./HORZ	6.3	QP

1. No other signals detected within 20 dB of specification limit.
2. The EUT was placed in its normal operating position and the transmitter was in constant broadcast (test) mode, with a duty cycle of greater than its normal operating duty cycle. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 40.00 MHz:

Magnitude of Measured Frequency	48.56	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-15.99	dB/m
Corrected Result	32.57	dBuV/m

Test Date: May 1, 2018

Tested By
Signature: Bruce Arnold

Name: Bruce Arnold

US Tech Test Report:
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Table 7. Radiated Emissions Test Data Above 960 MHz (Part 95.2379)

Test: FCC Part 95, Para 95.2379				Model: 07APFH-AP			
Project: 18-0041							
Frequency (MHz)	Test Data (dBuV)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
1216.75	35.57	-6.86	28.71	54.0	3.0m./VERT	25.3	AVG
1222.42	35.69	-6.86	28.83	54.0	3.0m./VERT	25.2	AVG
1227.00	35.10	-6.79	28.31	54.0	3.0m./VERT	25.7	AVG
2433.59	48.24	-0.31	47.93	54.0	3.0m./VERT	6.1	PK
2444.65	46.98	-0.32	46.66	54.0	3.0m./VERT	7.3	PK
2454.40	47.85	-0.38	47.47	54.0	3.0m./VERT	6.5	PK


1. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
2. The EUT was placed in its normal operating position and the transmitter was in constant broadcast (test) mode, with a duty cycle of greater than its normal operating duty cycle. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 1216.75 MHz:

Magnitude of Measured Frequency	35.75	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-6.86	dB/m
Corrected Result	28.71	dBuV/m

Test Date: May 7, 2018

Tested By

Signature: 

Name: Bruce Arnold

US Tech Test Report:
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Customer:
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2.8 Occupied Bandwidth (CFR 2.1049)

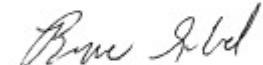
These measurements were performed while the EUT was in a constant transmit mode. A method similar to the marker delta method was used to capture the points. The RBW was set to approximately 1/100 of the manufacturers claimed RBW and with the VBW \geq RBW. The results of this test are given in Table 16 and Figures 29-31.

Table 8. 20 dB Bandwidth and 99% Occupied Bandwidth

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
608.3925	262.1	257.4
611.1232	263.5	257.8
613.5808	264.6	258.3

Test Date: May 7, 2018

Tested By

Signature: 

Name: Bruce Arnold

US Tech Test Report:
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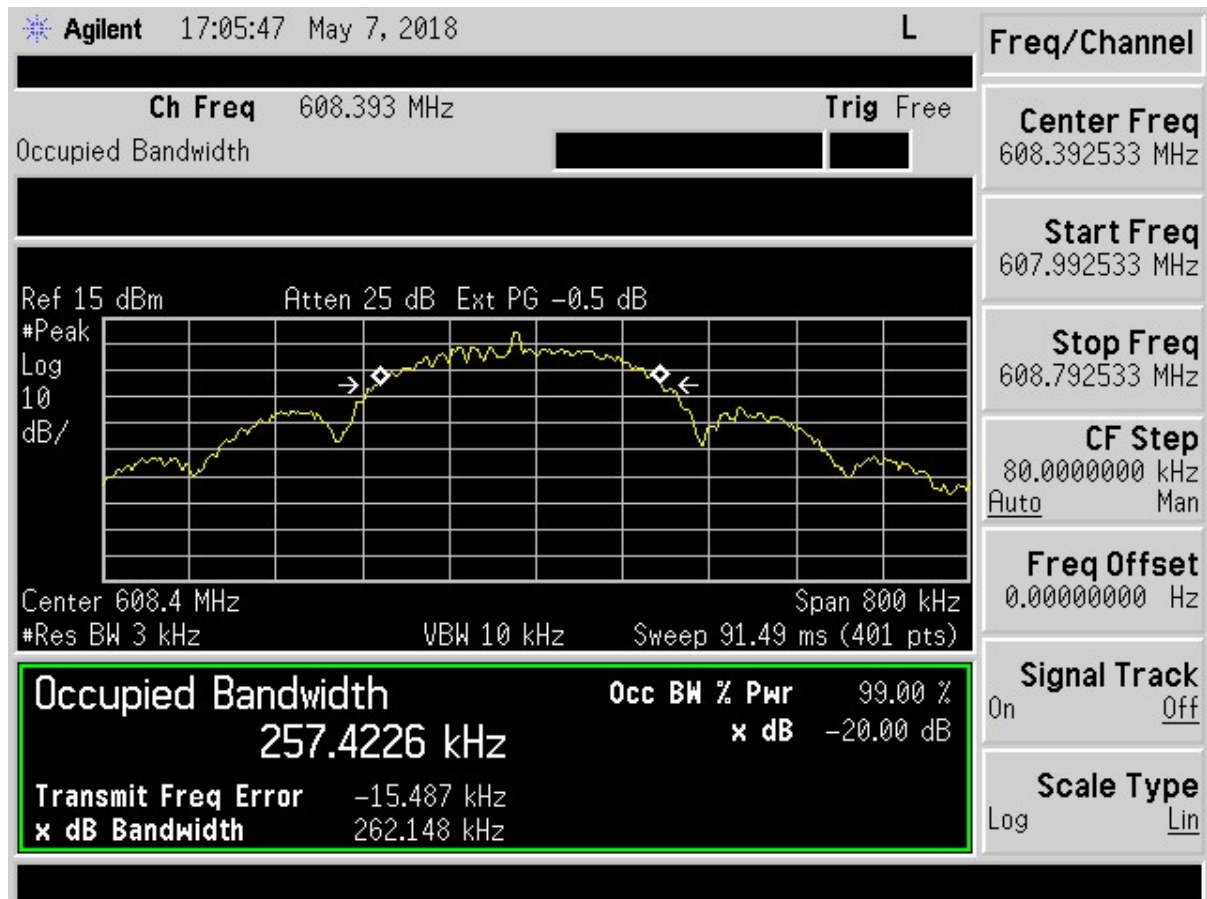


Figure 3. 20dB / 99% Bandwidth, Low

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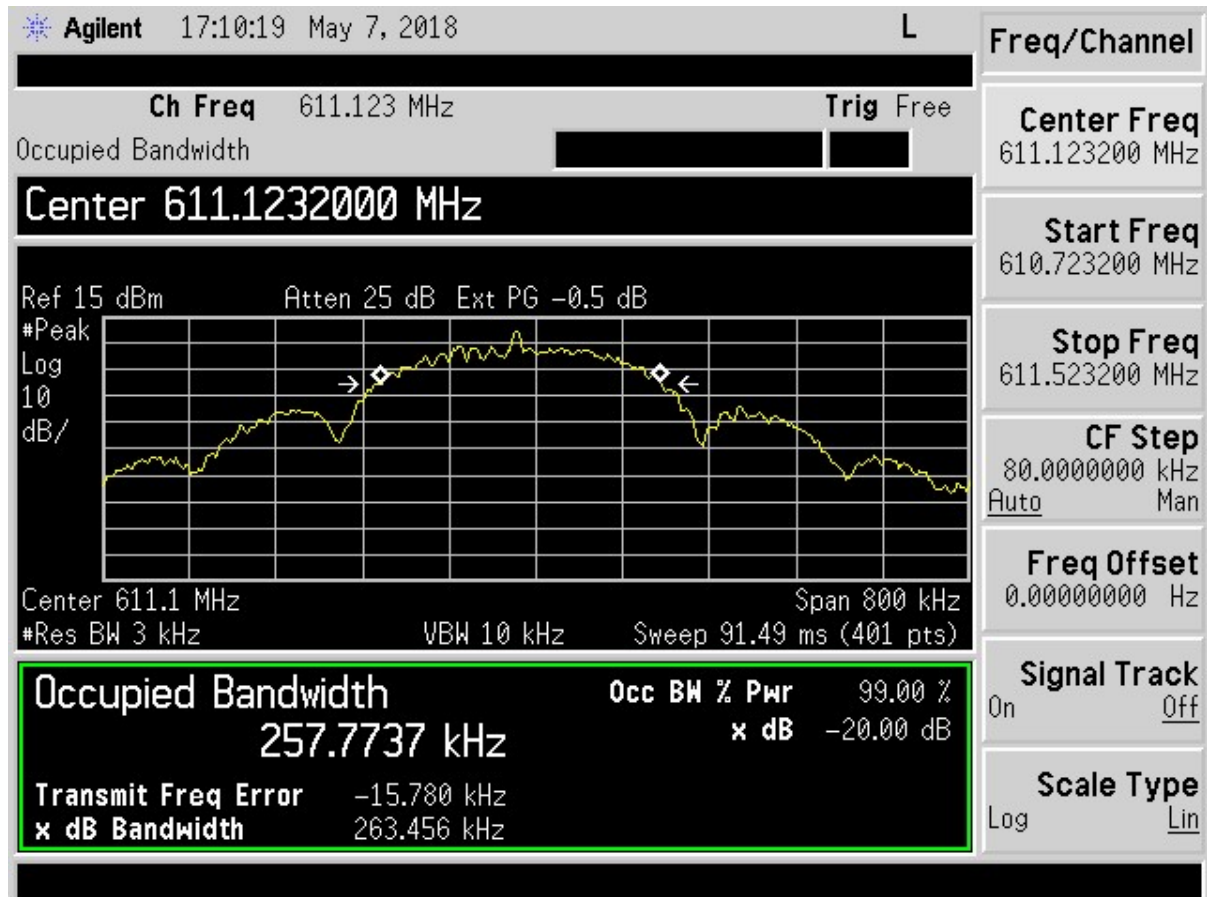


Figure 4. 20dB / 99% Bandwidth, Mid

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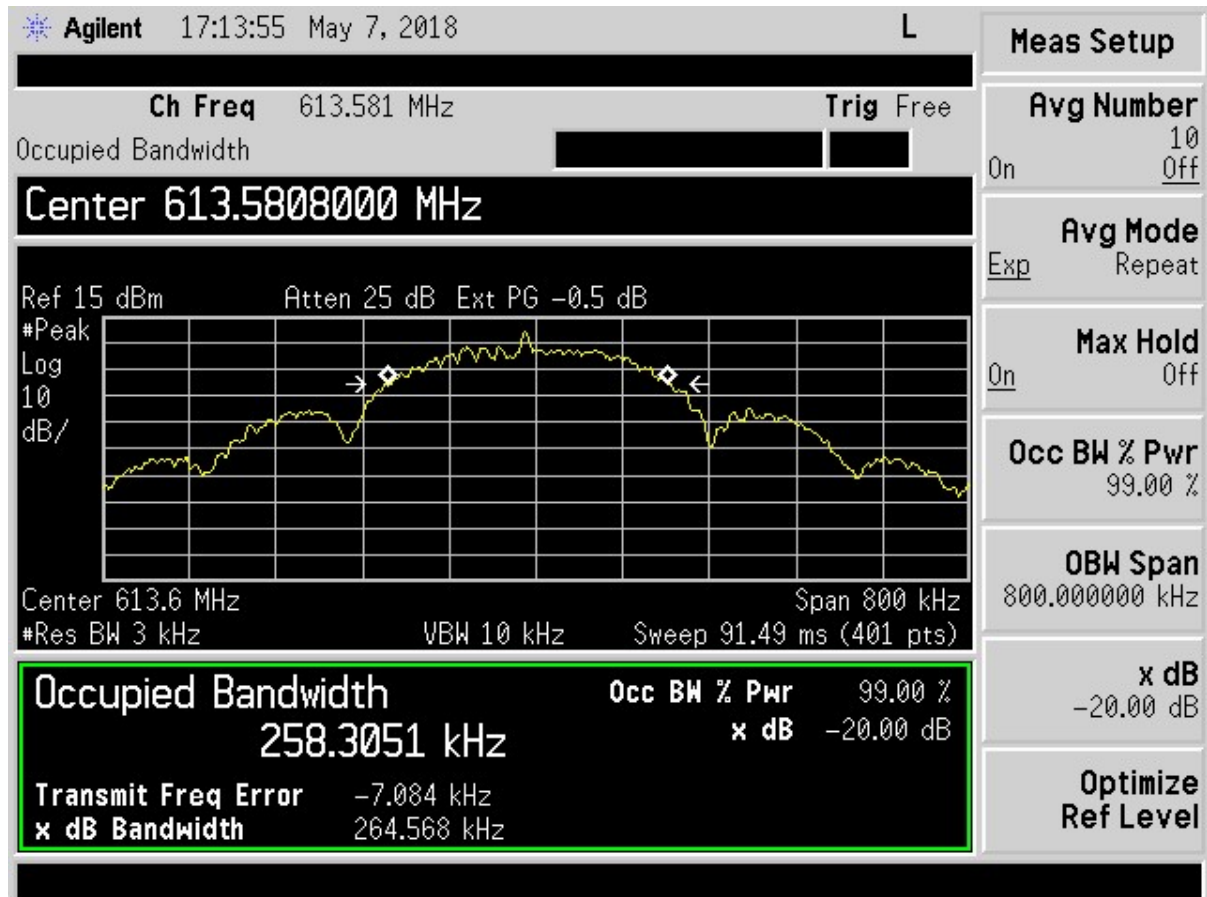


Figure 5. 20dB / 99% Bandwidth, High

2.9 WMTS RF Exposure Evaluation (CFR 95.2385)

The EUT does not meet the definition of a portable device per Part 2.1093(b) because the EUT is a transmitting device designed to be used so that the radiating structure of the device is greater than 20 cm of the body of the user. The user's manual includes instructions to the installer to ensure this separation distance is met. An evaluation of the Spectrum Density (S) at 20 cm is provide here for reference.

Table 9. RF Exposure Evaluation

Frequency of Fundamental Signal (MHz)	Max Conducted Output Power reading (dBm)	Antenna Gain (dBi)	Power (eirp)
608.39-613.58	10.84	2.0 (both dipole & patch have same max gain value)	12.84 dBm (19.23mW)

MPE calculation:

The limit for this unit (uncontrolled exposure) is 0.4 mW/cm^2
RF Density Field Equation: $S = (\text{EIRP in mW}) / (4\pi R^2)$ and solving at 20cm for R.
 $S = (19.23) / (4 * \pi * 20^2) = 19.23 / 5026.55 = 0.0038 \text{ mW/cm}^2$

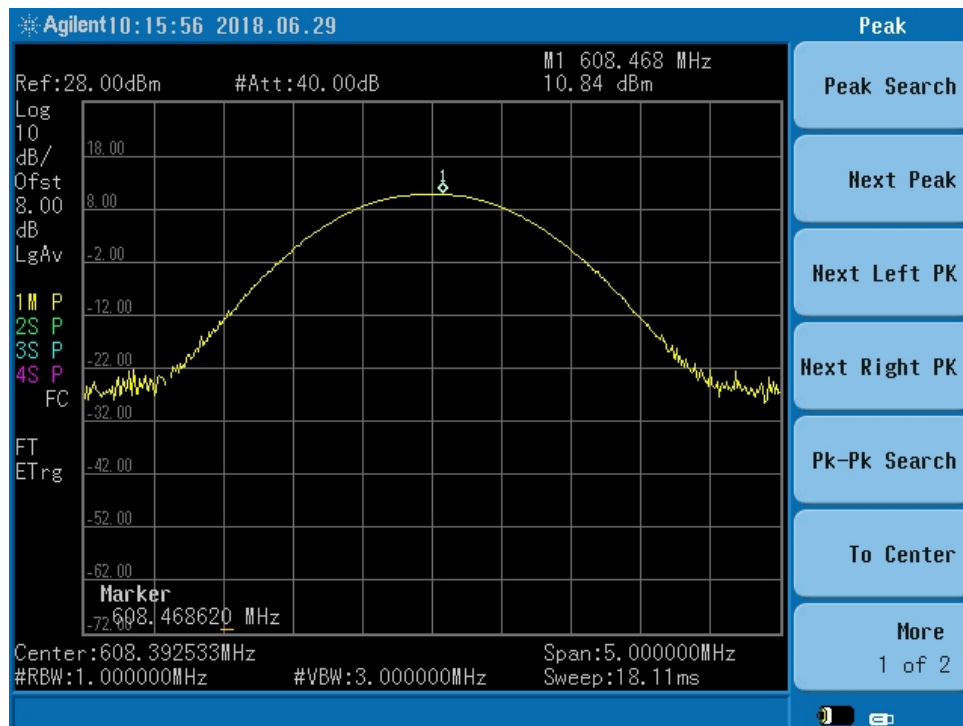


Figure 6. Maximum Conducted Output Power

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2.10 Unintentional Radiated Emissions Limits (CFR 15.109)

This data is presented here to show that the EUT meets the applicable Self Declaration of Conformity requirements for verification of a Digital device to Part 15.109(b) Class A device limits.

Table 10. Radiated Emissions Test Data Below 960 MHz (Part 15.109)

Test: FCC Part 15.109, Class A				Model: 07APFH-AP			
Project: 18-0041							
Frequency (MHz)	Test Data (dBuV)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
100.40	40.87	-26.96	13.91	43.5	3m./HORZ	29.6	PK
40.00	48.56	-26.49	22.07	39.0	3m./VERT	16.9	PK
94.00	45.40	-26.44	18.96	43.5	3m./VERT	24.5	PK
535.59	57.67	-17.55	40.12	46.4	3m./VERT	6.3	PK
214.99	42.82	-24.47	18.35	43.5	3m./HORZ	25.2	PK
540.00	46.05	-16.85	29.20	46.4	3m./HORZ	17.2	QP

1. No other signals detected within 20 dB of specification limit.
2. The EUT was placed in its normal operating position and the transmitter was in constant broadcast (test) mode, with a duty cycle of greater than its normal operating duty cycle. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.
- 3.

Sample Calculation at 100.4 MHz:

Magnitude of Measured Frequency	40.87	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-26.96	dB/m
Corrected Result	13.91	dBuV/m

Test Date: May 1, 2018

Tested By
Signature: 

Name: Bruce Arnold

US Tech Test Report:
 FCC ID:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 95 Certification
 OU507APFH-AP
 18-0041
 May 8, 2018
 GE Medical Systems Information Technologies, Inc.
 07APFH-AP

Table 11. Radiated Emissions Test Data Above 960 MHz (Part 15.109)

Test: FCC Part 15.109, Class A				Model: 07APFH-AP			
Project: 18-0041							
Frequency (MHz)	Test Data (dBuV)	AF+CA -AMP (dB/m)	Results (dBuV/m)	Limits (dBuV/m)	Antenna Distance/ Polarization	Margin (dB)	Detector Mode
1216.75	35.57	-6.86	28.71	54.0	3.0m./VERT	25.3	AVG
1222.42	35.69	-6.86	28.83	54.0	3.0m./VERT	25.2	AVG
1227.00	35.10	-6.79	28.31	54.0	3.0m./VERT	25.7	AVG
2433.59	48.24	-0.31	47.93	54.0	3.0m./VERT	6.1	PK
2444.65	46.98	-0.32	46.66	54.0	3.0m./VERT	7.3	PK
2454.40	47.85	-0.38	47.47	54.0	3.0m./VERT	6.5	PK

1. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10th harmonic
2. The EUT was placed in its normal operating position and the transmitter was in constant broadcast (test) mode, with a duty cycle of greater than its normal operating duty cycle. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 1216.75 MHz:

Magnitude of Measured Frequency	35.75	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-6.86	dB/m
Corrected Result	28.71	dBuV/m

Test Date: May 7, 2018

Tested By

Signature: 

Name: Bruce Arnold

US Tech Test Report:
 FCC ID:
 Test Report Number:
 Issue Date:
 Customer:
 Model:

FCC Part 95 Certification
 OU507APFH-AP
 18-0041
 May 8, 2018
 GE Medical Systems Information Technologies, Inc.
 07APFH-AP

2.11 Conducted Power Line Emissions (CFR 15.107)

This data is presented here to show that the EUT meets the applicable Self Declaration of Conformity requirements for verification of a Digital devices to Part 15.107, Power line conducted emissions.

Table 12. Power Line Conducted Emissions (Part 15.107)

150 KHz to 30 MHz with Class A Limits						
Frequency (MHz)	Test Data (dBuV)	LISN+CL-PA (dB)	Results (dBuV)	AVG Limits (dBuV)	Margin (dB)	Detector PK, QP, or AVG
120 VAC, 60 Hz Phase						
0.1526	52.93	0.60	53.53	65.9*	12.3	PK
0.1883	34.51	0.48	34.99	54.1	19.1	AVG
0.5650	32.29	0.29	32.58	46.0	13.4	PK
2.0800	39.90	0.32	40.22	46.0	5.8	PK
5.2000	34.60	0.39	34.99	50.0	15.0	PK
15.3000	28.62	0.71	29.33	50.0	20.7	PK
23.8800	29.07	0.81	29.88	50.0	20.1	PK
120 VAC, 60 Hz Neutral						
0.1902	38.40	0.36	38.76	54.0	15.3	PK
0.7550	27.54	0.13	27.67	46.0	18.3	PK
1.9900	38.14	0.16	38.30	46.0	7.7	PK
5.7620	33.32	0.26	33.58	50.0	16.4	PK
15.8200	27.66	0.60	28.26	50.0	21.7	PK
25.4200	30.26	0.76	31.02	50.0	19.0	PK

Note: (*) Indicates that the limit used is Quasi-Peak (QP)

Sample Calculation at 0.1526 MHz:

Magnitude of Measured Frequency	52.93 dBuV
+Correction Factors	0.60 dB
Corrected Result	53.53 dBuV

Test Date: April 26, 2018

Tested by
 Signature: 

Name: Bruce Arnold

US Tech Test Report:
FCC ID:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 95 Certification
OU507APFH-AP
18-0041
May 8, 2018
GE Medical Systems Information Technologies, Inc.
07APFH-AP

2.12 Measurement Uncertainty

The measurement uncertainties given were calculated using the method detailed in CISPR 16-4. A coverage factor of $k=2$ was used to give a level of confidence of approximately 95%.

2.12.1 Conducted Emissions Measurement Uncertainty

Measurement uncertainty (within a 95% confidence level) for this test is ± 2.78 dB.

2.12.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ± 5.39 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ± 5.18 dB

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ± 5.21 dB.

3 Conclusions

The EUT meets the requirements when tested in the configurations tested herein.