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: 24-0230
Issue Date: September 30, 2024

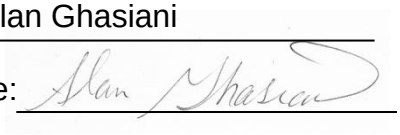
Total Pages in This Report: 22

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

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: September 30, 2024

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1. MEASUREMENT TECHNICAL REPORT

COMPANYS NAME: GE Medical Systems Information Technologies, Inc.

MODEL: 07APFH-AP

FCC ID: OU507APFH-AP

DATE: September 30, 2024

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

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:

Transmitter Section Changes:

1. U45- Replacement of the aging TA0326A SAW filter with a newer and more commercially available SF2469A SAW filter.
2. U19- Replacement of the obsolete AN26018A Driver amp with BGB741L all-purpose amplifier
3. D7- RF pin diode used instead of selectable resistor to precisely set output power during production of the product.

Receiver/Digital Section Changes:

4. U47- Replaced MAX2641 LNA with the BGB741 all-purpose amplifier
5. U27- Replaced the obsolete UPC2758TB downconverter mixer with the MAX2681 downconverter mixer.
6. U39- Replaced the obsolete SA636 FM demodulator with the AD608 FM demodulator.

The part substitutions are for electrically identical parts and perform the same functions as the parts that they replace. The changes do not result in a non-electrically equivalent device.

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 September 4, 2024 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.

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-E, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*

A list of EUT and Peripherals is found in Table 1. 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, GA 30004. 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	Engineering Sample	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**
PoE source Various	Various	Various	None	6 ft U P
Laptop Computer Various	Various	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	E4440A	Agilent	MY45304803	7/21/2025
SPECTRUM ANALYZER	E4407B	Agilent	US41442935	9/21/2024
BICONICAL ANTENNA	3110B	EMCO	9307-1431	1/13/2025
LOG PERIDOC ANTENNA	3146	EMCO	9110-3236	12/13/2024
HORN ANTENNA	3115	EMCO	9107-3723	3/13/2025
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00914	3/04/2025
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A01611	6/17/2025
TEMPERATURE CHAMBER	SM16/DR4 500A	THERMOTRON/ HONEYWELL	17095	4/17/2025

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

2.2 Modifications to EUT Hardware

No 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.

2.3 EUT Antenna Requirements

Only the antenna(s) listed 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 or equivalent	Dipole	OEM181AM-608S	+2	Reverse SMA
Antenna 2	Cushcraft or equivalent	Patch	SL6081P	+2	Reverse SMA

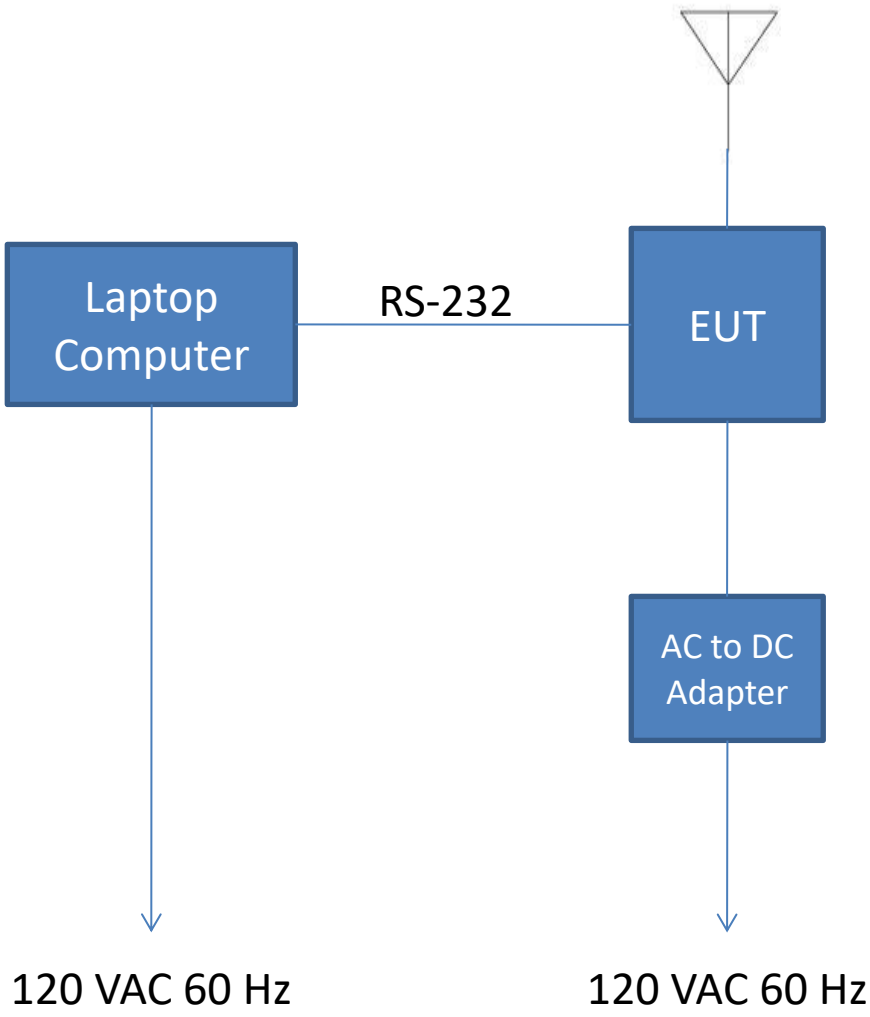


Figure 1. Test Configuration

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 +20/-30 ppm. This value was determined by the crystal used to stabilize the frequency synthesizer.

Table 4. Frequency Stability vs. Temperature

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	608.390000	11.0
-20	608.390000	11.0
-10	608.390000	11.0
5	608.373333	-16.4
10	608.383333	0.0
20	608.383333	0.0
30	608.390000	11.0
40	608.383333	0.0
50	608.390275	11.4

Maximum Deviation = +20ppm/-30ppm

Test Date: September 9, 2024
Tested By
Signature: Elliott T. Chaves Name: Elliott Chaves

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. This channel plan remains unchanged from the previous filing.

Table 5. Channel Frequency List

Hex Value	Channel- Frequency MHz	Hex Value	Channel- Frequency MHz
-2h	608.392533	12h	611.1232
-1h	608.529067	13h	611.259733
0	608.6656	14h	611.396267
1h	608.802133	15h	611.5328
2h	608.938667	16h	611.669333
3h	609.0752	17h	611.805867
4h	609.211733	18h	611.9424
5h	609.348267	19h	612.078933
6h	609.4848	1ah	612.215467
7h	609.621333	1bh	612.352
8h	609.757867	1ch	612.488533
9h	609.8944	1dh	612.325067
ah	610.030933	1eh	612.7616
bh	610.167467	1fh	612.898133
ch	610.304	20h	613.034667
dh	610.440533	21h	613.1712
eh	610.577067	22h	613.307733
fh	610.7136	23h	613.444267
10h	610.50133	24h	613.5808
11h	610.98667		

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 CISPR quasi-peak detector.

Table 6. Radiated Fundamental Emissions (Worst Case measurements- PATCH Antenna)

Test: FCC Part 95, Para 95.2369					**Model:** 07APFH-AP			
Project: 24-0230								
Frequency (MHz)	**Test Data (dBuV)**	**DC Factor (dB)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
Low Channel								
608.30	83.28	--	21.24	104.52	106.0	3m./VERT	1.5	**QP**
Mid Channel								
611.12	80.82	--	21.34	102.16	106.0	3m./VERT	3.8	**QP**
High Channel								
613.50	75.39	--	21.37	96.76	106.0	3m./VERT	9.2	**QP**

1. The EUT was placed in its normal operating position, and the transmitter was in constant broadcast mode. 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 608.30 MHz:

Magnitude of Measured Frequency	83.28	dBuV
+ DC Factor	0.00	dB
+ Cable Loss+ Amplifier Gain	21.24	dB/m
Corrected Result	104.52	dBuV/m

Test Date: September 4 – 5, 2024

Tested By
Signature: Elliott K. Chaves Name: Elliott Chaves

2.7 WMTS unwanted emissions limits (CFR P95.2379)

For spurious emissions, the EUT was evaluated to the following requirements:

(a) Unwanted emissions on frequencies below 960 MHz must not exceed 200 μV/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 μV/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 7. Radiated Emissions Test Data Below 960 MHz (Part 95.2379)

Test: FCC Part 95, Para 95.2379				**Model:** 07APFH-AP			
Project: 24-0230							
Frequency (MHz)	**Test Data (dBuV)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
31.20	44.92	-9.76	35.16	40.0	3m./VERT	4.8	**PK**
42.20	50.07	-12.05	38.02	40.0	3m./VERT	2.0	**PK**
46.45	52.82	-12.84	39.98	40.0	3m./VERT	0.0	**QP**
47.05	52.29	-13.01	39.28	40.0	3m./VERT	0.7	**QP**
100.00	52.70	-14.46	38.24	40.0	3m./VERT	1.8	**PK**
150.00	51.04	-13.45	37.59	43.5	3m./VERT	5.9	**PK**
200.00	45.48	-10.46	35.02	43.5	3m./VERT	8.5	**PK**
250.00	37.51	-7.58	29.93	46.0	3m./VERT	16.1	**PK**
374.99	41.59	-8.00	33.59	43.5	3m./VERT	9.9	**PK**
499.98	40.78	-10.37	30.41	46.0	3m./VERT	15.6	**PK**
686.92	35.61	-4.48	31.13	46.0	3m./VERT	14.9	**PK**
937.50	40.38	-0.55	39.84	46.0	3m./VERT	6.2	**PK**

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. No other signals detected within 20 dB of specification limit.

Sample Calculation at 31.20 MHz:

Magnitude of Measured Frequency	44.92	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-9.76	dB/m
Corrected Result	35.16	dBuV/m

Test Date: September 4 & 5, 2024

Tested By
Signature: Elliott T. Chaves Name: Elliott Chaves

Table 8. Radiated Emissions Test Data Above 960 MHz (Part 95.2379)

Test: FCC Part 95, Para 95.2379				**Model:** 07APFH-AP			
Project: 24-0230							
Frequency (MHz)	**Test Data (dBuV)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
EUT with PATCH Antenna							
1062.25	49.69	-8.46	41.23	54.0	3.0m./VERT	12.8	**PK**
1187.50	48.10	-9.61	38.49	54.0	3.0m./VERT	15.5	**PK**
1300.25	50.26	-10.49	39.77	54.0	3.0m./VERT	14.2	**PK**
1550.25	48.32	-9.42	38.90	54.0	3.0m./VERT	15.1	**PK**
1800.00	45.90	-7.84	38.06	54.0	3.0m./VERT	15.9	**PK**
2150.00	45.03	-7.72	37.31	54.0	3.0m./VERT	16.7	**PK**
3358.50	41.25	-2.93	38.32	54.0	3.0m./VERT	15.7	**PK**
6746.50	37.35	5.38	42.72	54.0	3.0m./VERT	11.3	**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 1062.25 MHz:

Magnitude of Measured Frequency	49.69	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-8.46	dB/m
Corrected Result	41.23	dBuV/m

Test Date: September 4 & 5, 2024

Tested By
Signature: Elliott R. Chaves Name: Elliott Chaves

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 ≥ RBW. The results of this test are given in Table 16 and Figures 29-31.

Table 9. 99% Occupied Bandwidth

Frequency (MHz)	99% Occupied Bandwidth (kHz)
608.3925	371.05
611.1232	380.44
613.5808	380.54

Test Date: September 5, 2024

Tested By
Signature: Elliott K. Chaves Name: Elliott Chaves

Figure 2. Bandwidth, Low Channel

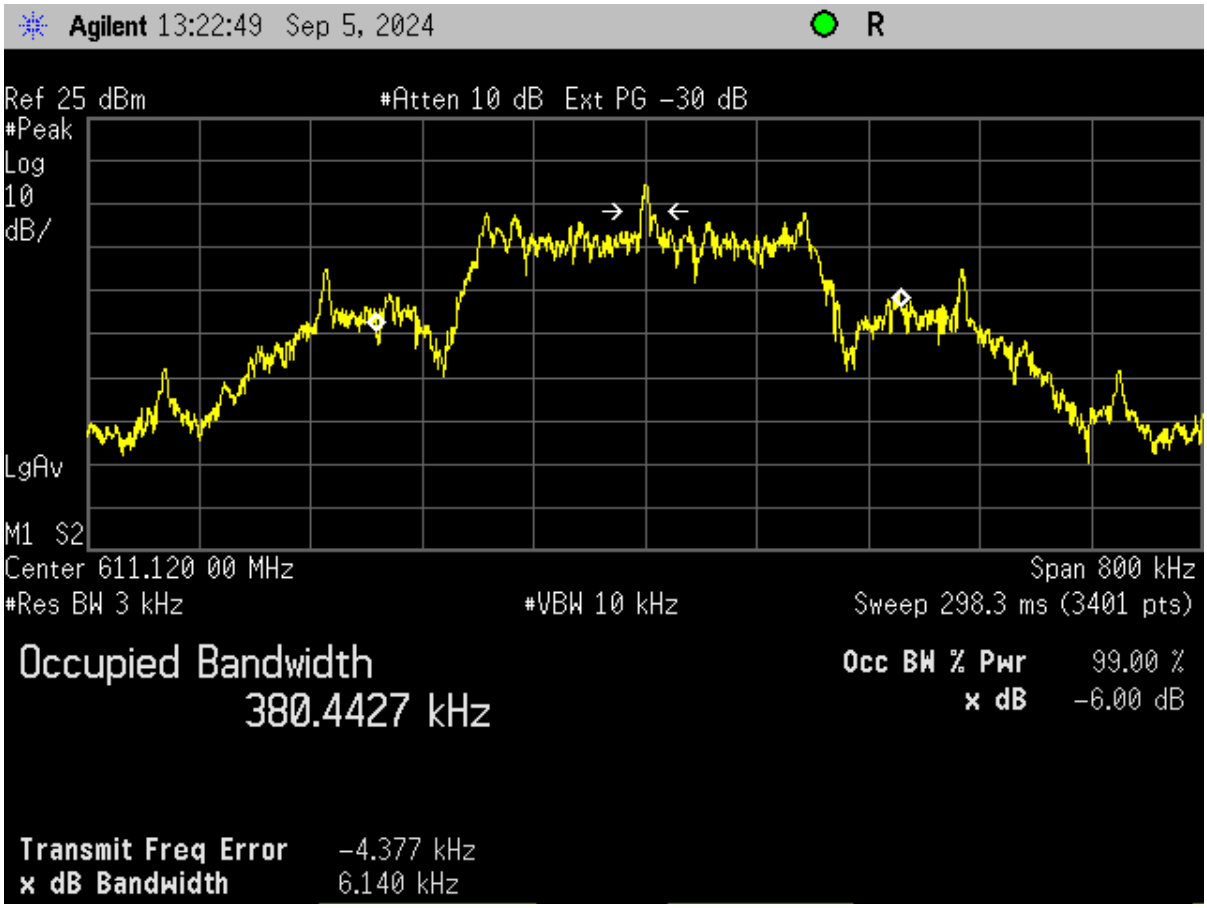


Figure 3. Bandwidth, Mid Channel

Figure 4. Bandwidth, High Channel

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 meet. An evaluation of the Spectrum Density (S) at 20 cm is provided here for reference.

Table 10. RF Exposure Evaluation

Frequency of Fundamental Signal (MHz)	Calculated Output Power reading dBm(EIRP)	Antenna Gain (dBi)	Power mW(EIRP)
608.39-613.58	9.26*	2.0 (both dipole & patch have same max gain value)	8.4

MPE calculation:

*Output power calculated by converting the field strength to dBm EIRP using the following formula: dBm (EIRP) = E(dBuV/m) + 20log (D) – 104.8; where D is the 3 meters.

*dBm(EIRP) = 104.52 dBuV/m + 20log (3) – 104.8 = 9.26 dBm(EIRP) = 8.4 mW

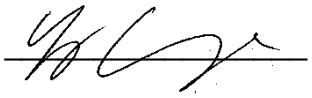
The limit for this unit (uncontrolled exposure) is 0.4 mW/cm^2

RF Density Field Equation: $S= (EIRP \text{ in } mW)/(4\pi R^2)$ and solving at 20cm for R.

$S= (8.4)/(4*\pi*20^2) = 8.4/5026.55 =$ 0.0017 mW/cm^2 << Limit

Calculations performed by:

Date: September 5, 2024

By
Signature:  Name: George Yang

2.10 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%.

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 (1 GHz to 18 GHz) is ± 5.21 dB.

3 Conclusions

The EUT continues to meet the requirements when tested in the configurations reported herein.

END TEST REPORT