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: 21-0379
Issue Date: January 26, 2022

Total Pages in This Report: 24

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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: January 26, 2022

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: January 26, 2022

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:

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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. AP digital main board has been updated from v1.0 to v1.25 with the following changes: uP, PHY, Flash, CPLD, SRAM, Boot Prom, Latch all in the SOM XTAL frequencies are different. These changes effect only the digital circuits. The RF circuitry which is contained within a radio module is not affected by these changes.

2. The radio module within the AP device has been updated from the WIT608 v1.0 to WIT608 v1.1 with the following changes: A new VCC Power Supply 1st LO Power Supply, 2nd LO Power Supply, Added RXVCC control line and a new Output T/R switch. The rest of the circuits remain unchanged. The frequency determining circuits remain the same and unchanged.

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 December 3, 2021 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 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	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 Netgear	GS308P	Various	None	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	9/22/2022
SPECTRUM ANALYZER	8593E	HEWLETT PACKARD	3205A00124	1/29/2022
BICONICAL ANTENNA	3110B	EMCO	9306-1708	8/17/2023 2 yr
LOG PERIDOC ANTENNA	3146	EMCO	9305-3600	6/03/2023 2 yr
HORN ANTENNA	3115	EMCO	9107-3723	2/03/2023 2 yr.
PRE-AMPLIFIER	8449B	HEWLETT-PACKARD	3008A00914	8/27/2022
PRE-AMPLIFIER	8447D	HEWLETT-PACKARD	1937A02980	6/09/2022
TEMPERATURE CHAMBER	SM16/DR4 500A	THERMOTRON/ HONEYWELL	17095	4/20/2022

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.

2.3 EUT Antenna Requirements

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 or equivalent	Dipole	OEM181AM-608S	+2	Reverse SMA
Antenna 2	Cushcraft or equivalent	Patch	SL6081P	+2	Reverse SMA

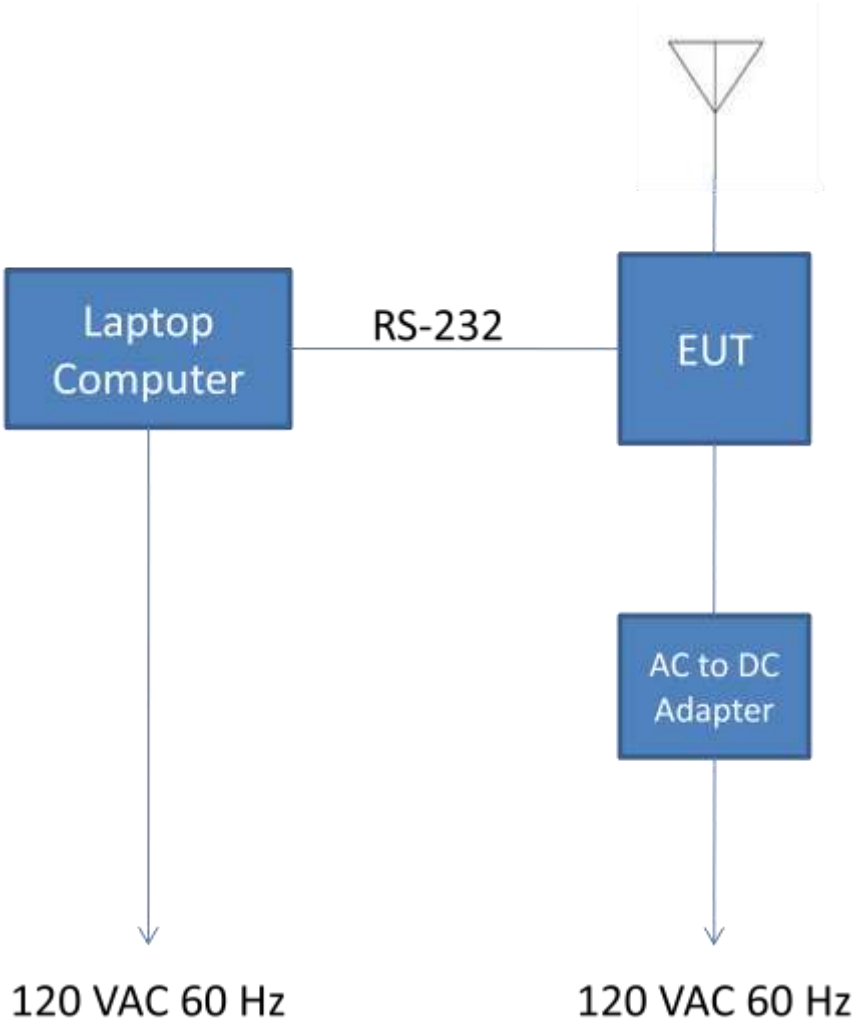


Figure 1. Test Configuration

2.4 WTMS Frequency Accuracy (CFR 95.2365)

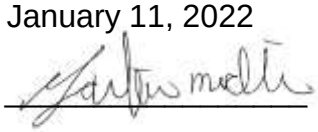
Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency accuracy such that all emissions are maintained within the designated bands of operation under all of the manufacturer's specified conditions.

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.

Frequency Stability vs. Temperature

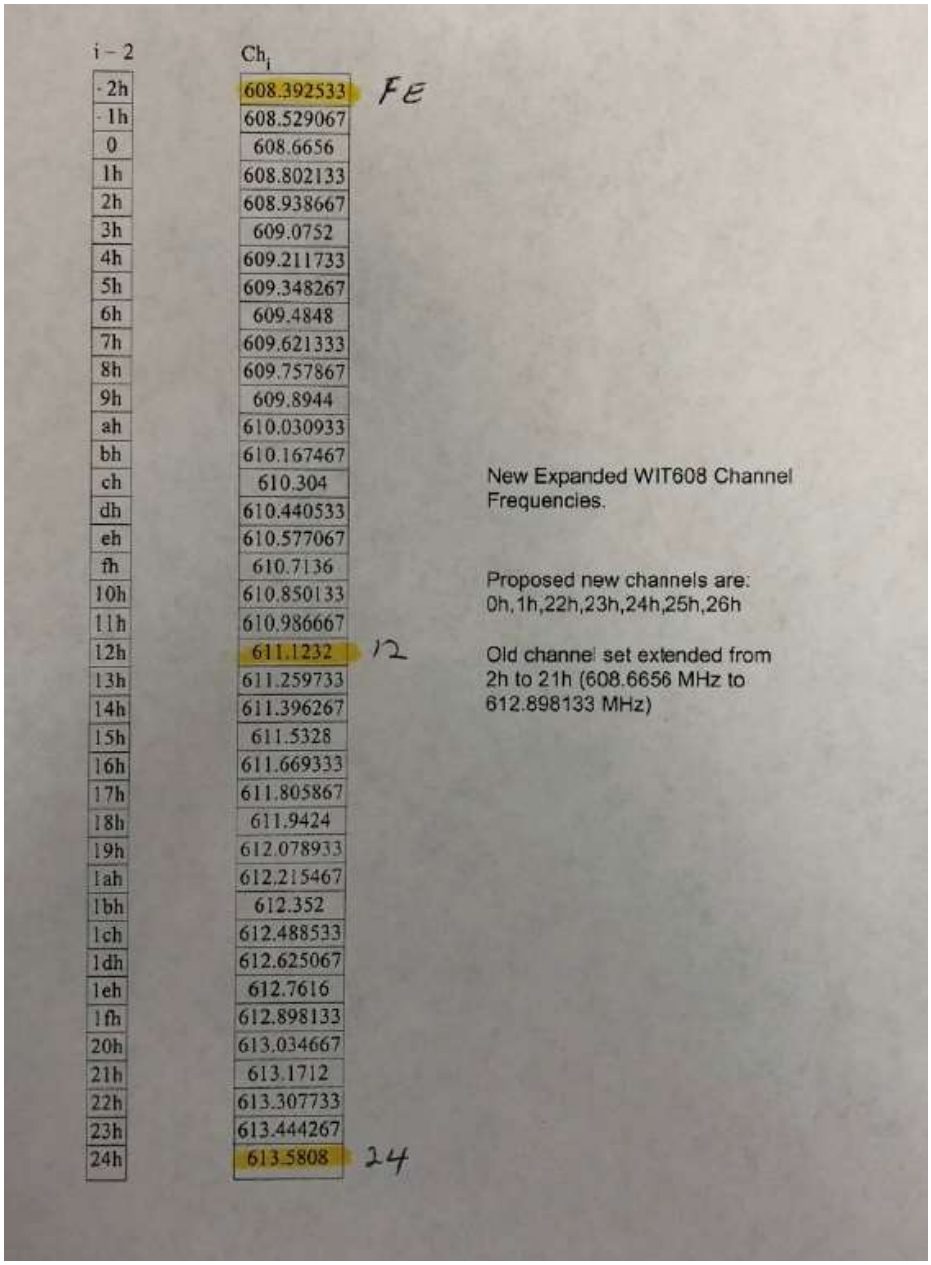
Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30	608.3688	6.2
-20	608.3688	6.2
-10	608.3638	-2.0
5	608.3638	-2.0
10	608.3737	14.3
20	608.3650	0.0
30	608.3663	2.1
40	608.3675	4.1
50	608.3600	-8.2

Maximum Deviation = +20ppm/-30ppm

Test Date: January 11, 2022
Tested By
Signature:  Name: Gabriel Medina

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.



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. Frequency Channels

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 4. Radiated Fundamental Emissions (Antenna 1)

Test: FCC Part 95, Para 95.2369					**Model:** 07APFH-AP			
Project: 21-0379								
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								
608.39	77.80	--	25.11	102.91	106.0	3m./HORZ	3.1	**QP**
Mid Channel								
610.71	80.28	--	25.11	105.39	106.0	3m./HORZ	0.6	**QP**
High Channel								
613.52	78.74	--	25.13	103.87	106.0	3m./HORZ	2.1	**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 608.39 MHz:

Magnitude of Measured Frequency	77.80	dBuV
+Antenna Factor	0.00	dB
+ Cable Loss+ Amplifier Gain	25.11	dB/m
Corrected Result	102.91	dBuV/m

Test Date: December 10, 14, 15, 28, 2021

Tested By
Signature: S. Mafakher Name: Shahram Mafakher

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

Test: FCC Part 95, Para 95.2369					**Model:** 07APFH-AP			
Project: 21-0379								
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								
608.33	80.45	--	24.71	105.16	106.0	3m./VERT	0.8	**QP**
Mid Channel								
610.77	79.90	--	24.71	104.61	106.0	3m./VERT	1.4	**QP**
High Channel								
613.63	79.74	--	24.83	104.57	106.0	3m./VERT	1.4	**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 608.33 MHz:

Magnitude of Measured Frequency	80.45	dBuV
+Antenna Factor	0.00	dB
+ Cable Loss+ Amplifier Gain	24.71	dB/m
Corrected Result	105.16	dBuV/m

Test Date: December 10, 14, 15, 28, 2021

Tested By
Signature: S. Mafakher Name: Shahram Mafakher

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

Test: FCC Part 95, Para 95.2379				**Model:** 07APFH-AP			
Project: 21-0379							
Frequency (MHz)	**Test Data (dBuV)**	**AF+CA -AMP (dB/m)**	**Results (dBuV/m)**	**Limits (dBuV/m)**	**Antenna Distance/ Polarization**	**Margin (dB)**	**Detector Mode**
103.83	53.98	-16.41	37.57	46.0	3m./HORZ	8.4	**PK**
149.96	50.07	-14.86	35.21	46.0	3m./HORZ	10.8	**PK**
200.00	55.61	-15.47	40.14	46.0	3m./HORZ	5.9	**PK**
375.09	52.50	-12.44	40.06	46.0	3m./HORZ	5.9	**PK**
662.57	44.72	-7.09	37.63	46.0	3m./HORZ	8.4	**QP**
850.18	34.28	-5.71	28.57	46.0	3m./HORZ	17.4	**QP**
35.07	55.59	-14.27	41.32	46.0	3m./VERT	4.7	**QP**
45.55	55.68	-16.29	39.39	46.0	3m./VERT	6.6	**QP**
104.29	49.51	-15.61	33.90	46.0	3m./VERT	12.1	**QP**
124.95	53.90	-15.30	38.60	46.0	3m./VERT	7.4	**PK**
460.18	47.16	-11.32	35.84	46.0	3m./VERT	10.2	**QP**
537.09	49.22	-10.23	38.99	46.0	3m./VERT	7.0	**PK**
850.18	42.98	-6.51	36.47	46.0	3m./VERT	9.5	**PK**

No emissions seen below 30 MHz that were more than 6 dB above the noise-floor. Emissions presented above are the worst case emissions, generated with the Patch Antenna (Antenna 2) connected to the EUT.

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 103.83 MHz:

Magnitude of Measured Frequency	53.98	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-16.41	dB/m
Corrected Result	37.57	dBuV/m

Test Date: December 10, 14, 15, 28, 2021

Tested By
Signature: S. Mafakher Name: Shahram Mafakher

Table 7. Radiated Emissions Test Data Above 960 MHz (Part 95.2379)

Test: FCC Part 95, Para 95.2379				**Model:** 07APFH-AP			
Project: 21-0379							
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 Antenna 1 (Dipole)							
1227.42	57.32	-10.21	47.11	54.0	3.0m./VERT	6.9	**PK**
1840.60	54.54	-8.35	46.19	54.0	3.0m./VERT	7.8	**PK**
3067.30	49.18	-4.96	44.22	54.0	3.0m./VERT	9.8	**PK**
3679.38	48.46	-3.08	45.38	54.0	3.0m./VERT	8.6	**PK**
4905.78	47.79	-2.67	45.12	54.0	3.0m./VERT	8.9	**PK**
5520.35	48.11	-0.15	47.96	54.0	3.0m./VERT	6.0	**PK**
6135.50	47.57	-0.30	47.27	54.0	1.0m./VERT	6.7	**PK**
1221.61	50.00	-10.38	39.62	54.0	3.0m./HORZ	14.4	**AVG**
1829.44	51.46	-8.67	42.79	54.0	3.0m./HORZ	11.2	**PK**
3053.30	50.15	-5.14	45.01	54.0	3.0m./HORZ	9.0	**PK**
3664.00	51.14	-3.02	48.12	54.0	3.0m./HORZ	5.9	**PK**
4890.40	47.82	-2.98	44.84	54.0	3.0m./HORZ	9.2	**PK**
5496.41	48.79	-0.15	48.64	54.0	3.0m./HORZ	5.4	**PK**
6107.00	48.00	-0.28	47.72	54.0	1.0m./HORZ	6.3	**PK**
1217.07	57.49	-10.08	47.41	54.0	3.0m./VERT	6.6	**PK**
1825.36	52.21	-8.51	43.70	54.0	3.0m./VERT	10.3	**PK**
2433.50	44.71	-7.10	37.61	54.0	3.0m./VERT	16.4	**AVG**
3041.90	49.22	-5.41	43.81	54.0	3.0m./VERT	10.2	**PK**
3650.40	48.09	-3.07	45.02	54.0	3.0m./VERT	9.0	**PK**
4258.82	36.67	-2.14	34.53	54.0	3.0m./VERT	19.5	**AVG**
4866.66	48.31	-2.88	45.43	54.0	3.0m./VERT	8.6	**PK**
5475.50	47.72	-0.13	47.59	54.0	3.0m./VERT	6.4	**PK**
6084.00	47.11	-0.22	46.89	54.0	1.0m./VERT	7.1	**PK**
EUT with Antenna 2 (Patch)							
1227.26	57.10	-10.21	46.89	54.0	3.0m./VERT	7.1	**PK**
1835.64	51.74	-8.40	43.34	54.0	3.0m./VERT	10.7	**PK**
2454.32	50.57	-6.86	43.71	54.0	3.0m./VERT	10.3	**PK**
3067.90	51.12	-4.96	46.16	54.0	3.0m./VERT	7.8	**PK**
3681.48	51.47	-3.08	48.39	54.0	3.0m./VERT	5.6	**PK**
4297.32	47.52	-2.36	45.16	54.0	3.0m./VERT	8.8	**PK**
4908.64	47.13	-2.36	44.77	54.0	3.0m./VERT	9.2	**PK**
5524.70	47.70	-0.07	47.63	54.0	3.0m./VERT	6.4	**PK**
6135.80	47.58	-0.30	47.28	54.0	1.0m./VERT	6.7	**PK**
1221.58	46.92	-10.24	36.68	54.0	3.0m./VERT	17.3	**AVG**
2442.85	50.91	-7.04	43.87	54.0	3.0m./VERT	10.1	**PK**
3053.33	51.21	-5.08	46.13	54.0	3.0m./VERT	7.9	**PK**

3664.53	52.50	-3.08	49.42	54.0	3.0m./VERT	4.6	**PK**
4274.49	50.95	-2.36	48.59	54.0	3.0m./VERT	5.4	**PK**
4886.00	49.42	-2.88	46.54	54.0	3.0m./VERT	7.5	**PK**
5475.50	47.72	-0.13	47.59	54.0	3.0m./VERT	6.4	**PK**
6404.50	47.21	-0.19	47.02	54.0	1.0m./VERT	7.0	**PK**
1216.80	57.14	-10.08	47.06	54.0	3.0m./VERT	6.9	**PK**
2470.00	51.71	-6.92	44.79	54.0	3.0m./VERT	9.2	**PK**
3650.30	53.05	-3.07	49.98	54.0	3.0m./VERT	4.0	**PK**
4259.20	51.08	-2.14	48.94	54.0	3.0m./VERT	5.1	**PK**
4868.50	49.28	-2.88	46.40	54.0	3.0m./VERT	7.6	**PK**
5475.50	47.07	-0.13	46.94	54.0	3.0m./VERT	7.1	**PK**
6084.50	48.56	-0.22	48.34	54.0	1.0m./VERT	5.7	**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 1227.42 MHz:

Magnitude of Measured Frequency	57.32	dBuV
+Antenna Factor + Cable Loss+ Amplifier Gain	-10.21	dB/m
Corrected Result	47.11	dBuV/m

Test Date: December 10, 14, 15, 28, 2021

Tested By
Signature: S. Mafakher Name: Shahram Mafakher

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 8. 99% Occupied Bandwidth

Frequency (MHz)	99% Occupied Bandwidth (kHz)
608.3925	254.0
611.1232	252.0
613.5808	254.0

Test Date: January 26, 2022

Tested By
Signature: S. Mafakher Name: Shahram Mafakher

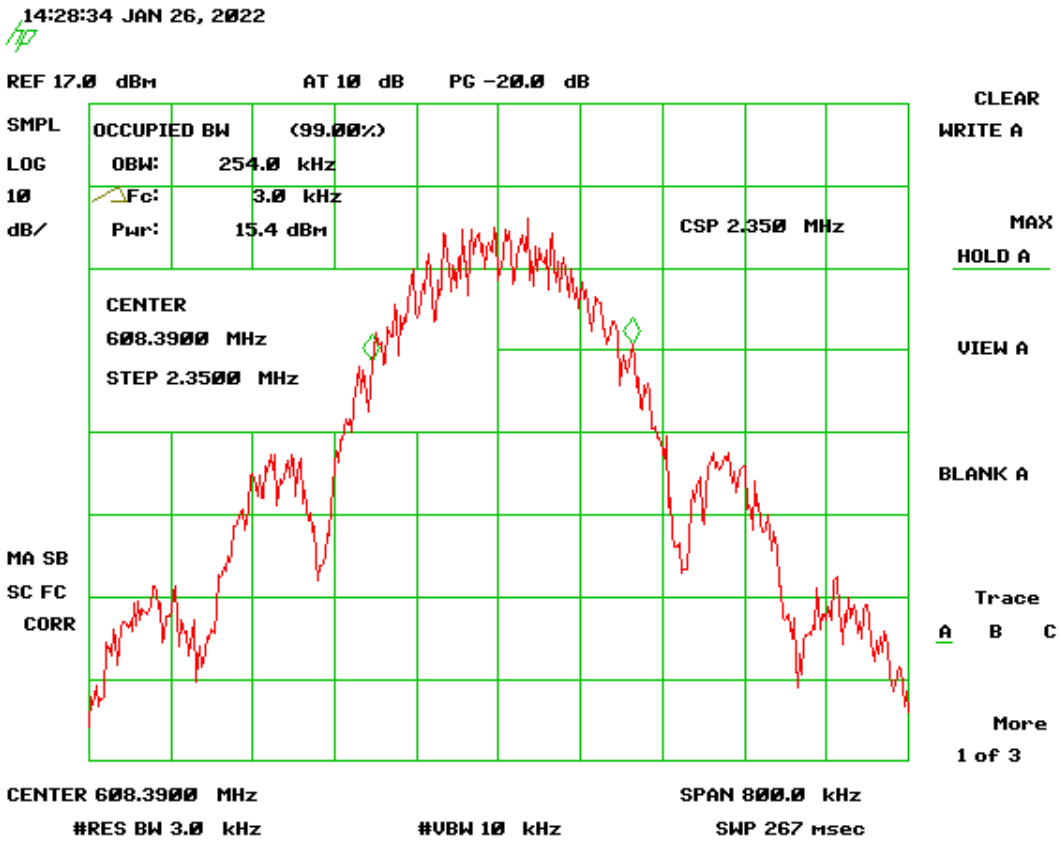


Figure 3. Bandwidth, Low Channel

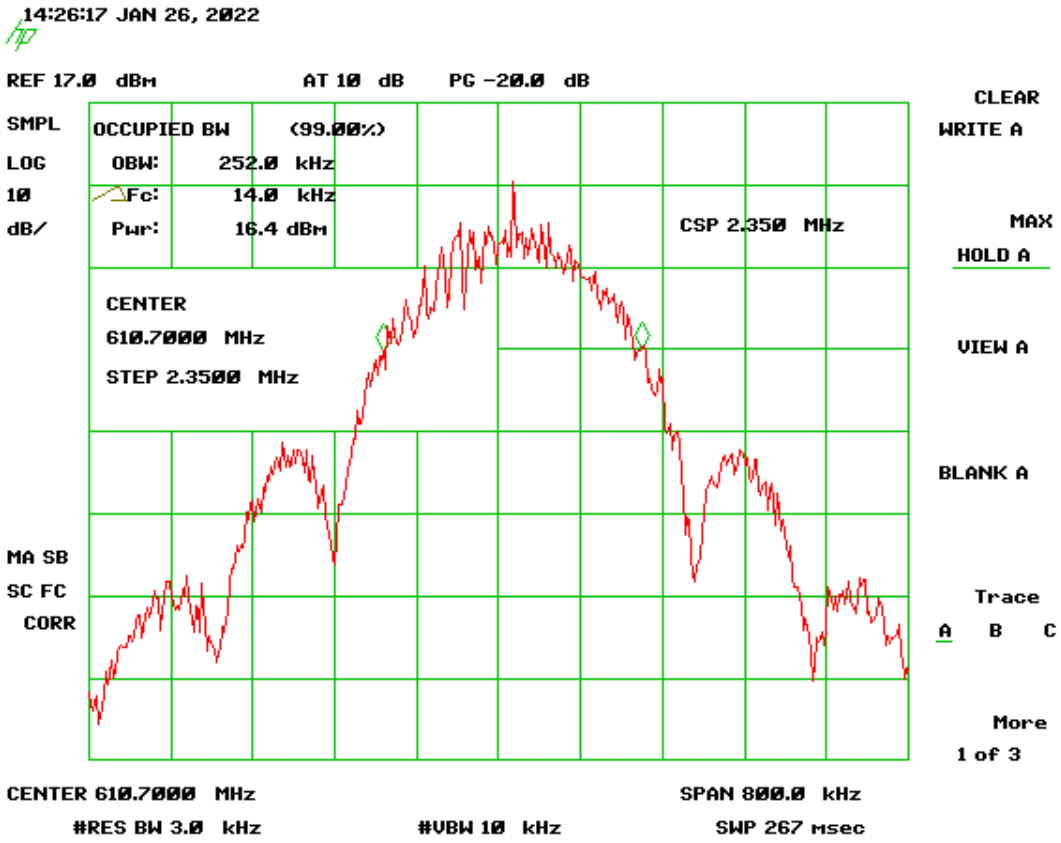


Figure 4. Bandwidth, Mid Channel

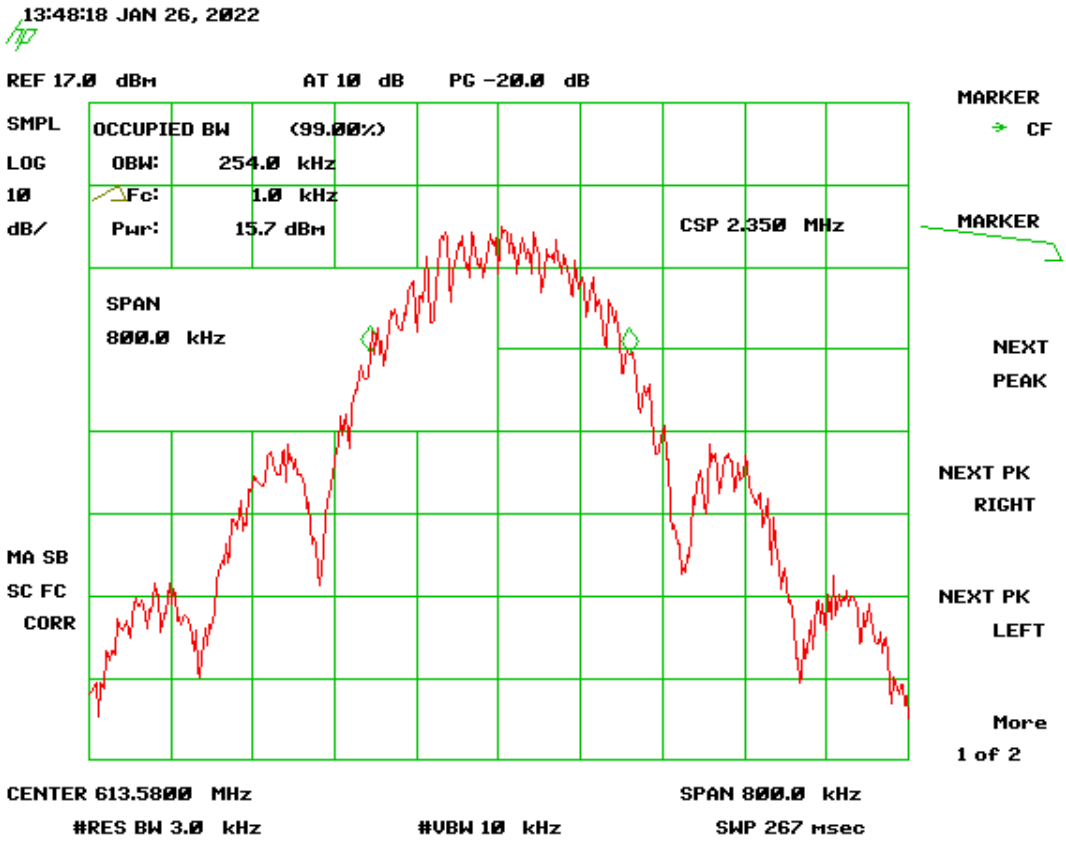


Figure 5. Bandwidth, High Channel

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 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	10.21	2.0 (both dipole & patch have same max gain value)	12.21 dBm (16.63mW)

MPE calculation:

The limit for this unit (uncontrolled exposure) is 0.4 mW/cm^2
RF Density Field Equation: S= (EIRP in mW)/($4\pi R^2$) and solving at 20cm for R.
S= (16.63)/($4*\pi*20^2$) = 16.63/5026.55 = 0.0033 mW/cm^2

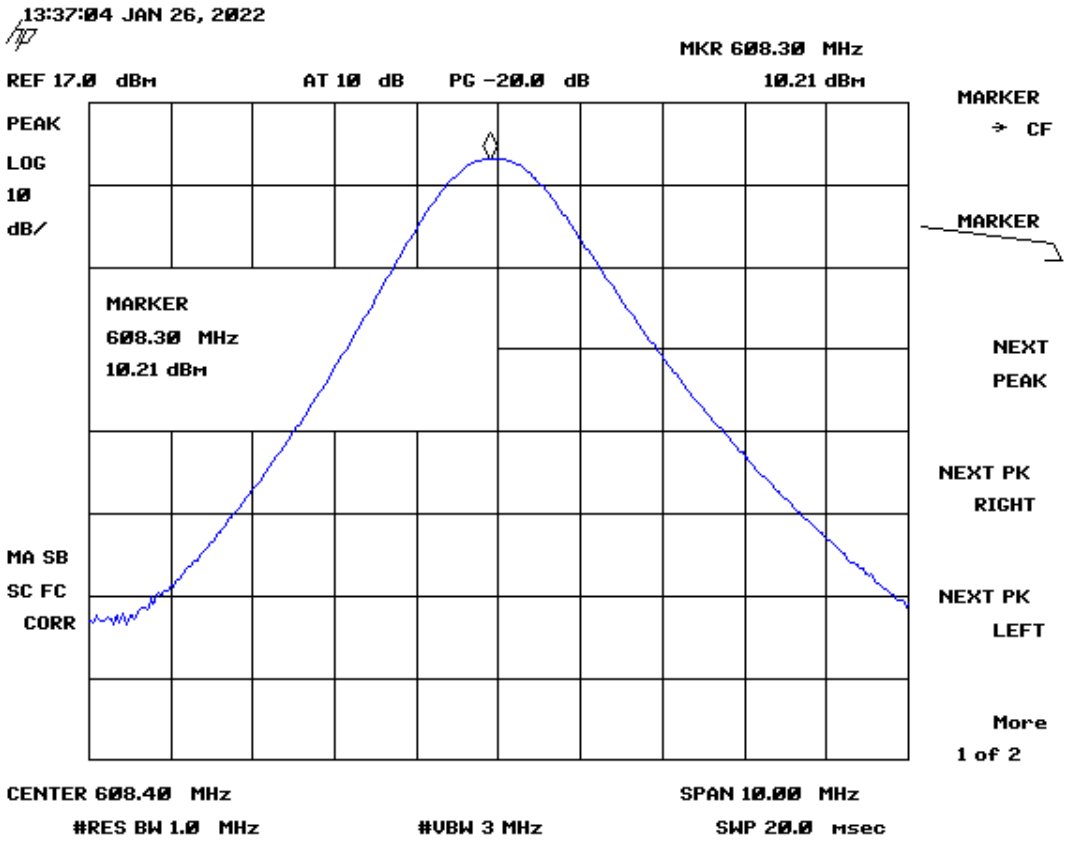


Figure 6. Maximum Conducted Output Power

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 is ±5.21dB.

3 Conclusions

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