

Test Report # 3514 C

Equipment Under Test: Mobile Patient Monitor

Requirement(s): FCC 15.407, FCC 15.247, FCC 15.209
RSS-247, RSS-GEN

Test Date(s): September 20th to October 4th, 2021


Prepared for: GE Healthcare
Attn: Matthew Pekarske
8200 Tower Avenue
Milwaukee, WI 53223

Report Issued by: Zach Wilson, EMC Engineer

Signature: 

Date: 10/7/2021

Report Reviewed by: Adam Alger, Laboratory Manager

Signature: 

Date: 10/07/2021

Report Constructed by: Zach Wilson, EMC Engineer

Signature: 

Date: 9/29/2021

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Company: GE Healthcare	Page 1 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP

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Laird Connectivity Test Services in Review

The Laird Connectivity, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:



A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted



Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers



Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

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1 TEST REPORT SUMMARY

During **September 20th to October 4th, 2021** the Equipment Under Test (EUT), **Mobile Patient Monitor**, as provided by **GE Healthcare** was tested to the following requirements of the **Federal Communications Commission** and **Innovation, Science and Economic Development Canada**:

Operation in the 5.725 – 5.85 GHz band

FCC	ISED Canada	Test Description	Limit	Compliant
15.407 (a)(3)(i)	RSS-247 §6.2.4.1	Maximum Conducted Output Power	30 dBm	Yes
15.407 (a)(3)(i)	RSS-247 §6.2.4.1	Power Spectral Density	30 dBm/500kHz	Yes
15.1049	RSS-GEN §6.7	26dB / 99% Bandwidth	Reference Only	Yes
15.407 (b)(4)(i) 15.407 (b)(10) 15.205 (a)	RSS-247 §6.2.4.2 RSS-GEN	Radiated Emissions: Restricted and Band Edges	Mask (see section 5.2.4)	Yes
15.407(e)	RSS-247 §6.2.4.1	Minimum 6dB bandwidth	Greater than 500 kHz	Yes

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

2 CLIENT INFORMATION

Company Name	GE Healthcare
Contact Person	Matt Pekarske
Address	8200 Tower Avenue Milwaukee, WI 53223

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	Mobile Patient Monitor
Model Number	Portrait HUB01
Serial Number	SRW20440005SP
Module FCC ID	2A08L-WL18DBMOD
Host FCC ID	2A08L-HUB01
Module ISED ID	25821-WL18DBMOD
Host ISED ID	25821-HUB01

2.2 Product Description

GE WL18DBMOD WLAN 2.4/5 GHz Module. Battery powered. Dual antennas (top, bottom).

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Radio Programming Information

TI calibrator SW with the shell scripts from GE GIT repository wearable-wireless-tools rev. 4c3f017. Customer put device into the proper test modes.

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2.6 Antenna Information

- Integrated dual band monopole with parasitic element for 5GHz
- Top antenna (free space) max gain:
 - +6.0 dBi @ 2400-2483.5 MHz
 - +6.8 dBi @ 5170-5835 MHz
- Bottom antenna max gain:
 - +4.0 dBi @ 5170-5835 MHz

Tests using top antenna: Radiated Emissions, Power Spectral Density, Emission Bandwidth, Occupied Bandwidth, Output Power

Tests using bottom antenna: Power Spectral Density, Output Power

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3 REFERENCES

Publication	Edition	Date	AMD 1	AMD 2
eCFR	-	2021	-	-
ANSI C63.10	-	2013	-	-
RSS-247	2	2017	-	-
RSS-GEN	5	2018	2019	2021

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of $k = 2$.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty \pm
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

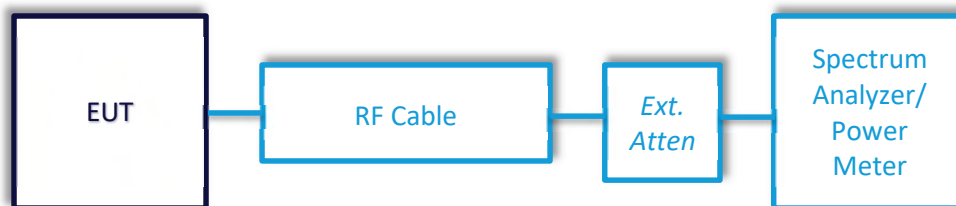
Parameter	ETSI U.C. \pm	U.C. \pm
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	<p>The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter.</p> <p>The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.</p>
Example Calculations	<p>Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm)</p> <p>Margin (dB) = Limit (dBm) – Corrected Reading (dBm)</p>

Block Diagram



5.1.1 Operation in the 5725-5850 MHz Band (UNII 3) – 26 dB Emission Bandwidth

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.2°C, 20.1°C, 20.5°C	R.H. %	47.3%, 45.7%, 48.9%
Test Date	9/22/2021, 9/23/2021, 9/24/2021	Location	Conducted RF Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.4.1

Limits

Reference Only

Test Parameters

Frequency	5745 MHz, 5785 MHz, 5825 MHz	Setup	Conducted
VBW	1 MHz	RBW	270 kHz
Span	40 MHz	Detector	Peak Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/22/2021	4/22/2022	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/22/2021	4/22/2022	Active Calibration

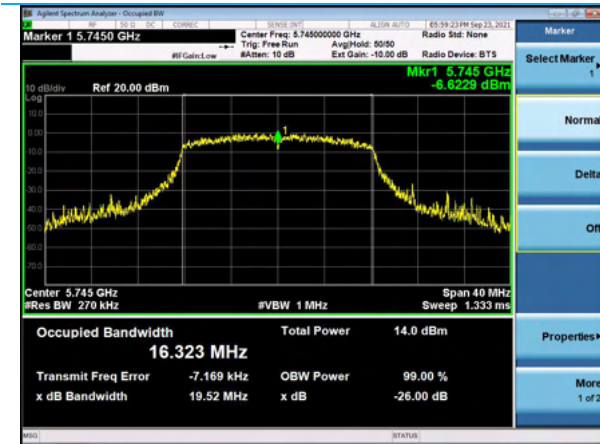
EUT Parameters

Input Power	5VDC via USB	Mode	WLAN 5GHz Transmit
Frequency	UNII 3	Channel	149, 157, 165
Serial	SRW20440013SP	Data Rates	802.11a (6Mbps, 54Mbps) 802.11n (MCS0, MCS7)
Antenna Port	Top		

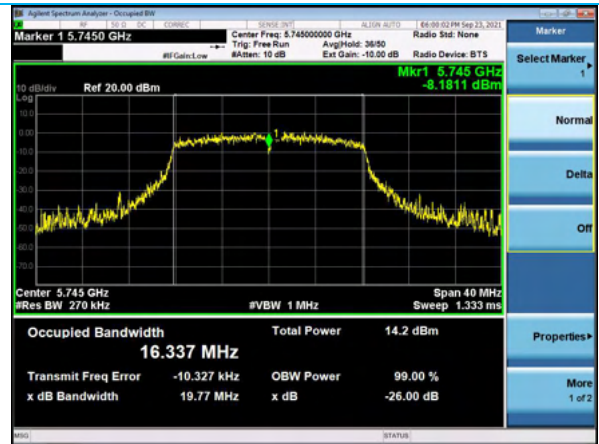
Data Table

Channel	Data Rate	26dB BW (MHz)
149	6 Mbps	19.5
149	54 Mbps	19.8
149	MCS0	20.8
149	MCS7	20.6
157	6 Mbps	32.5
157	54 Mbps	21.8
157	MCS0	33.7
157	MCS7	23.3
165	6 Mbps	29.1
165	54 Mbps	22.0
165	MCS0	24.1
165	MCS7	22.4

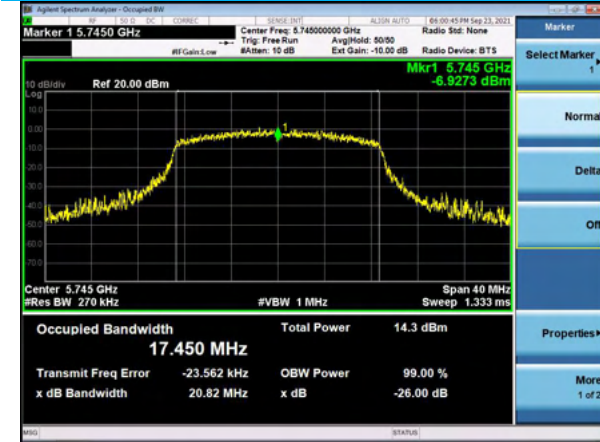
Plots



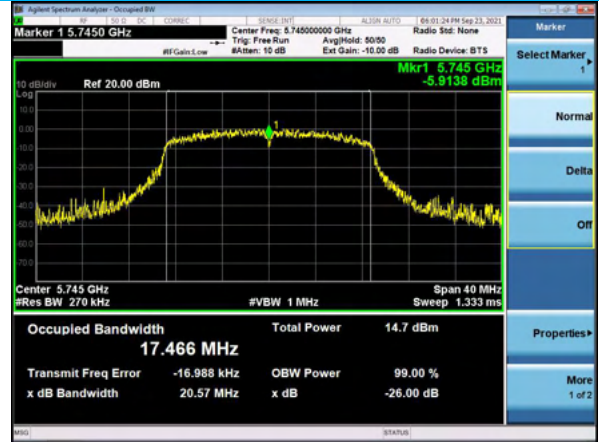
26 dB EBW, Channel 149, 6Mbps



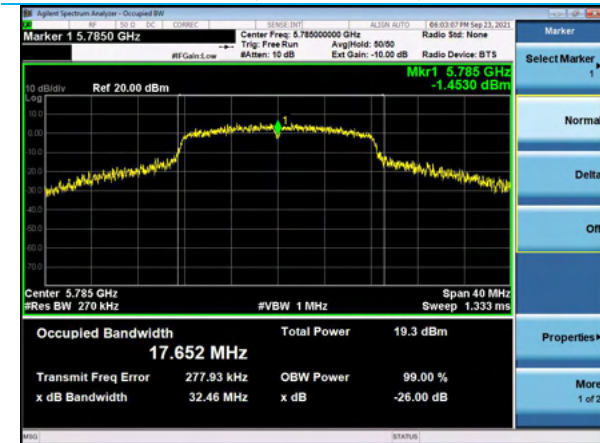
26 dB EBW, Channel 149, 54Mbps



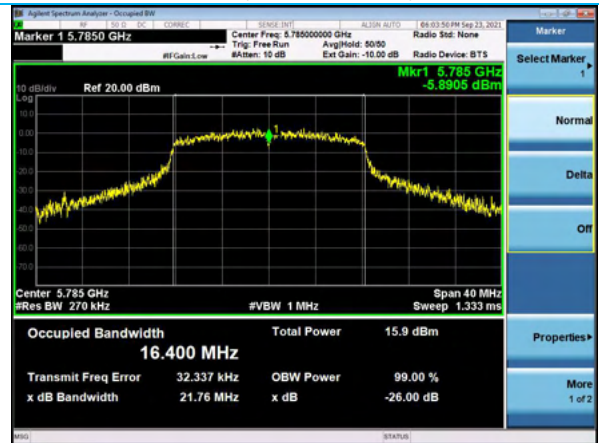
26 dB EBW, Channel 149, MCS0



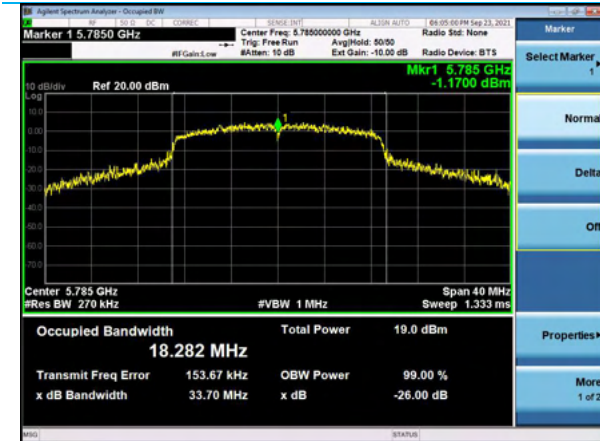
26 dB EBW, Channel 149, MCS7



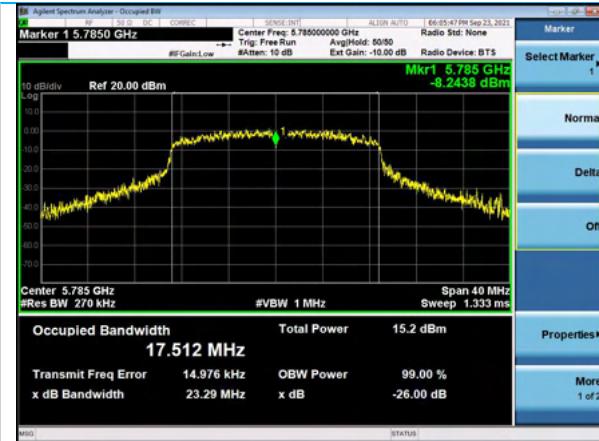
26 dB EBW, Channel 157, 6Mbps



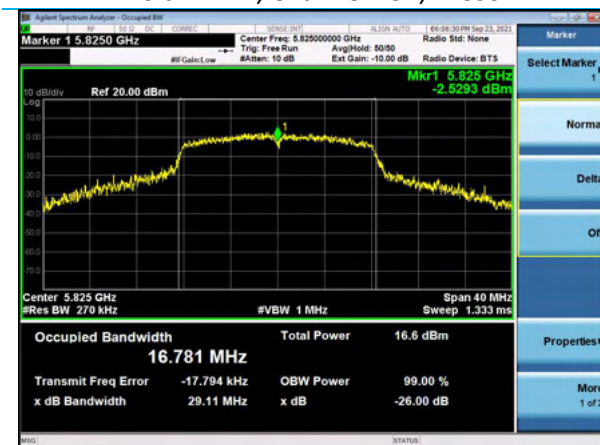
26 dB EBW, Channel 157, 54Mbps



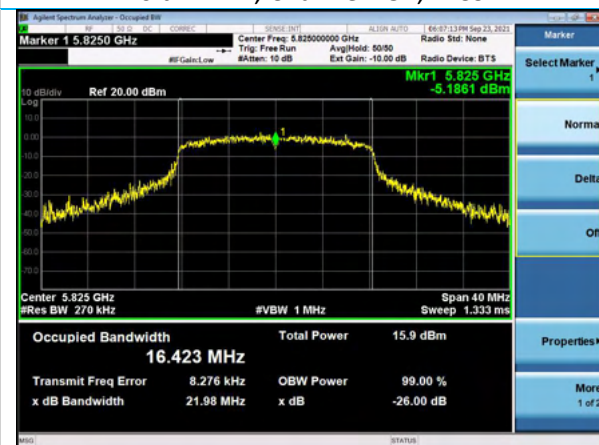
26 dB EBW, Channel 157, MCS0



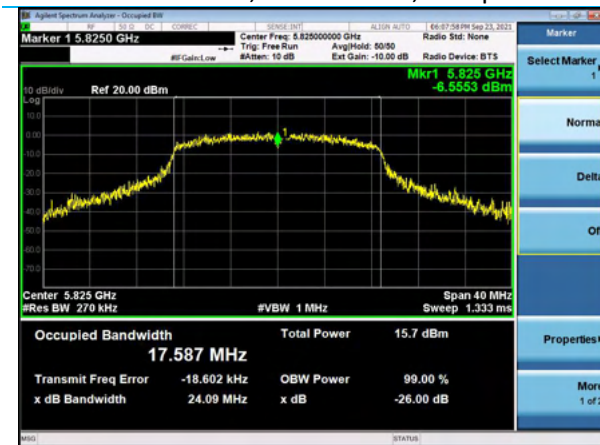
26 dB EBW, Channel 157, MCS7



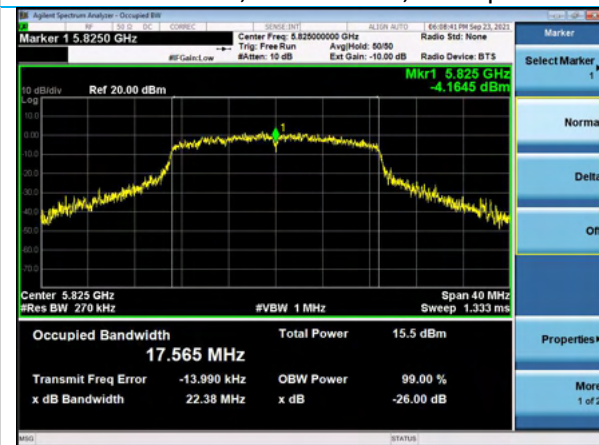
26 dB EBW, Channel 165, 6Mbps



26 dB EBW, Channel 165, 54Mbps



26 dB EBW, Channel 165, MCS0



26 dB EBW, Channel 165, MCS7

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5.1.2 Operation in the 5725-5850 MHz Band (UNII 3) – 99% Occupied Bandwidth

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.2°C, 20.1°C, 20.5°C	R.H. %	47.3%, 45.7%, 48.9%
Test Date	9/22/2021, 9/23/2021, 9/24/2021	Location	Conducted RF Bench
Requirement	FCC 2.1049, RSS-GEN	Method	ANSI C63.10 §6.9.3

Limits

Reference Only

Test Parameters

Frequency	5745 MHz, 5785 MHz, 5825 MHz	Setup	Conducted
VBW	620 kHz	RBW	200 kHz
Span	30 MHz	Detector	Peak Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/22/2021	4/22/2022	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/22/2021	4/22/2022	Active Calibration

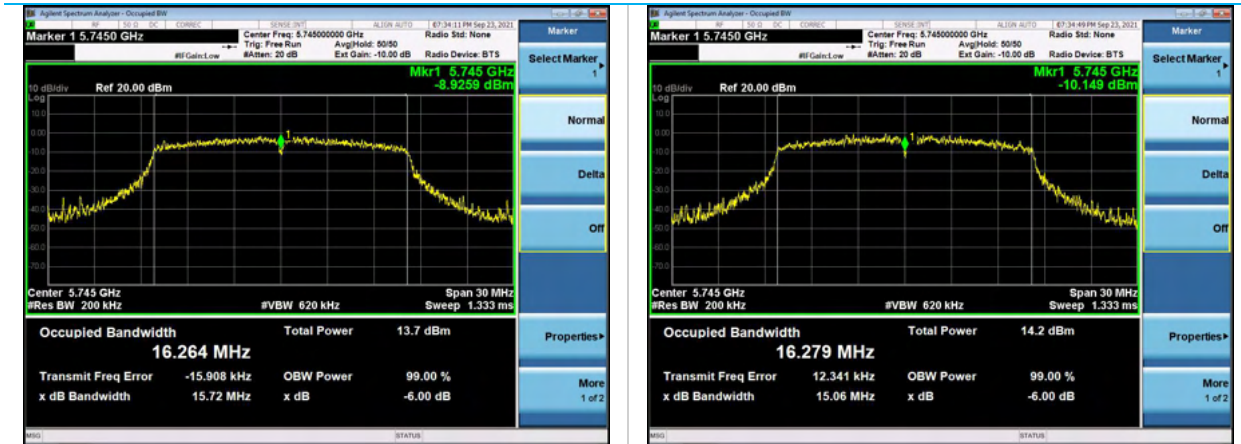
EUT Parameters

Input Power	5VDC via USB	Mode	WLAN 5GHz Transmit
Frequency	UNII 3	Channels	149, 157, 165
Serial	SRW20440013SP	Data Rates	802.11a (6Mbps, 54Mbps) 802.11n (MCS0, MCS7)
Antenna Port	Top		

Data Table

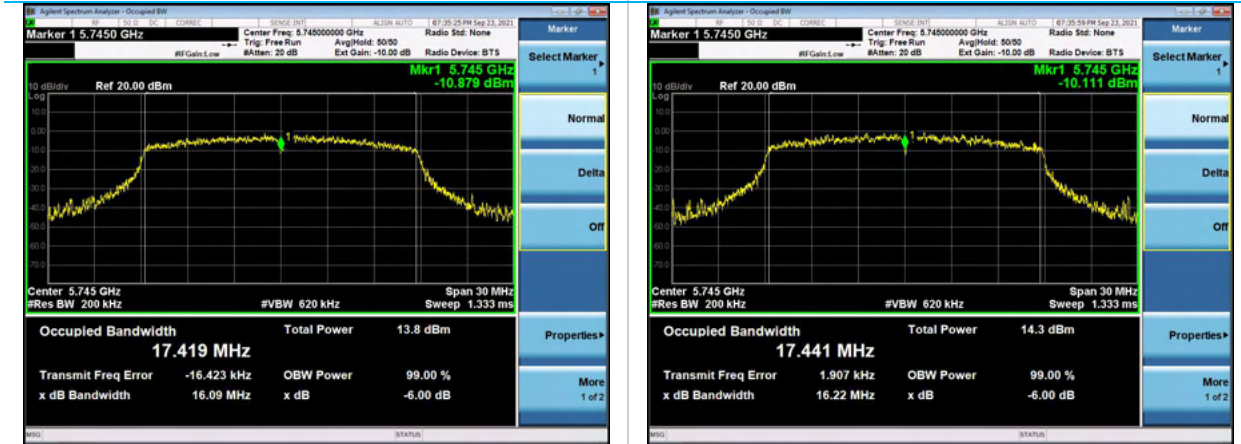
Channel	Data Rate	99% Bandwidth (MHz)
149	6 Mbps	16.3
149	54 Mbps	16.3
149	MCS0	17.4
149	MCS7	17.4
157	6 Mbps	17.1
157	54 Mbps	16.3
157	MCS0	17.9
157	MCS7	17.5
165	6 Mbps	16.6
165	54 Mbps	16.3
165	MCS0	17.5
165	MCS7	17.5

Plots



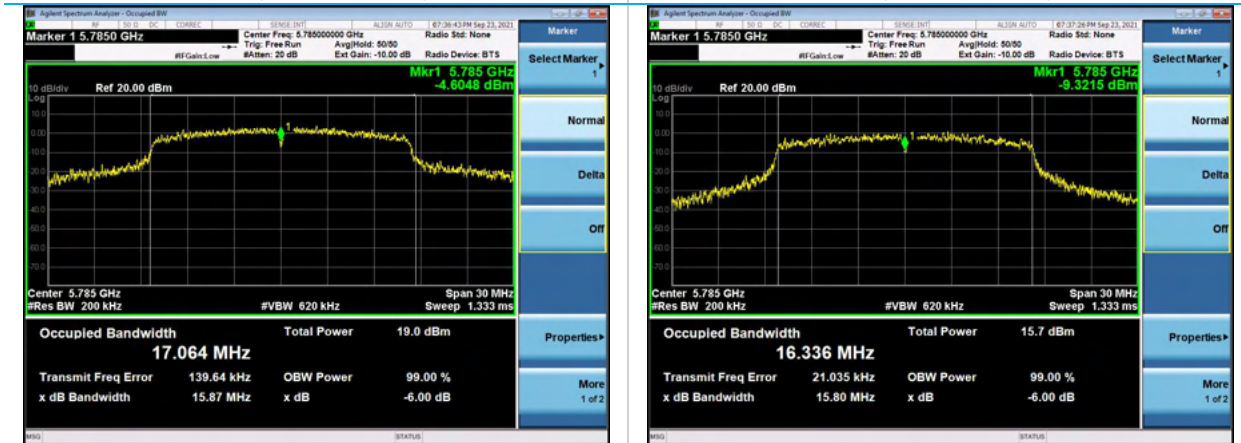
99% OCBW, Channel 149, 6Mbps

99% OCBW, Channel 149, 54Mbps



99% OCBW, Channel 149, MCS0

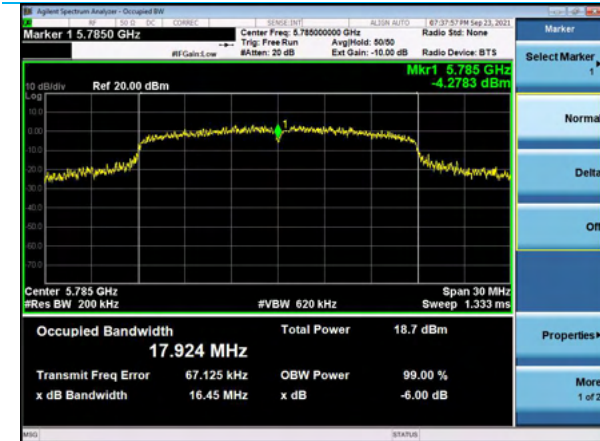
99% OCBW, Channel 149, MCS7



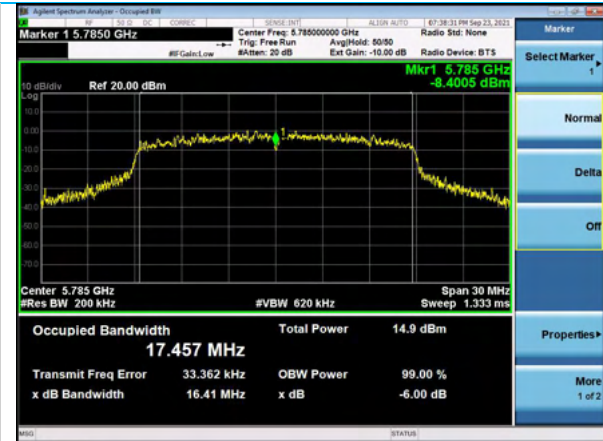
99% OCBW, Channel 157, 6Mbps

99% OCBW, Channel 157, 54Mbps

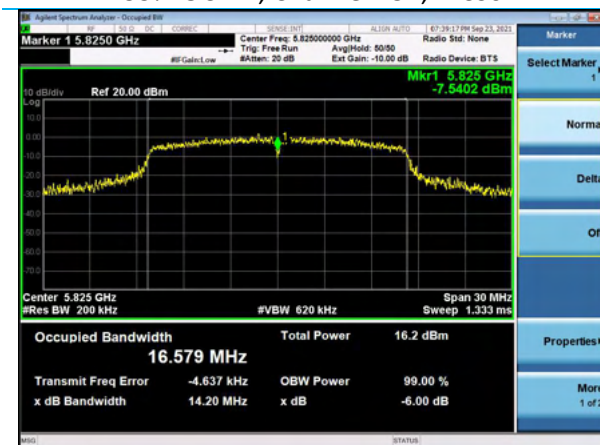
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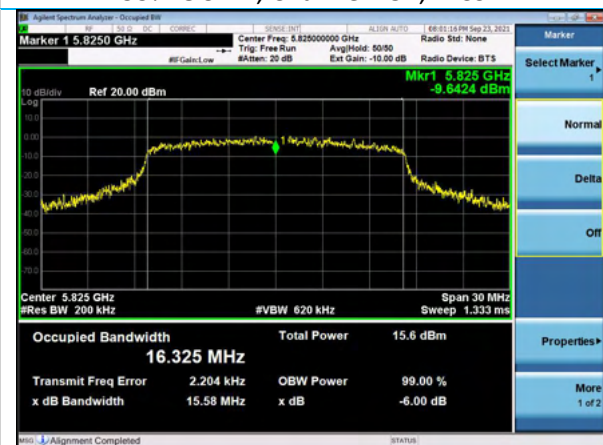
99% OCBW, Channel 157, MCS0



99% OCBW, Channel 157, MCS7



99% OCBW, Channel 165, 6Mbps



99% OCBW, Channel 165, 54Mbps



99% OCBW, Channel 165, MCS0



99% OCBW, Channel 165, MCS7

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5.1.3 Operation in the 5725-5850 MHz Band (UNII 3) – DTS Bandwidth (6 dB)

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.2°C, 20.1°C, 20.5°C	R.H. %	47.3%, 45.7%, 48.9%
Test Date	9/22/2021, 9/23/2021, 9/24/2021	Location	Conducted RF Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.4.1

Limits

Greater than 500 kHz

Test Parameters

Frequency	5745 MHz, 5785 MHz, 5825 MHz	Setup	Conducted
VBW	300 kHz	RBW	100 kHz
Span	40 MHz	Detector	Peak Max Hold

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/22/2021	4/22/2022	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/22/2021	4/22/2022	Active Calibration

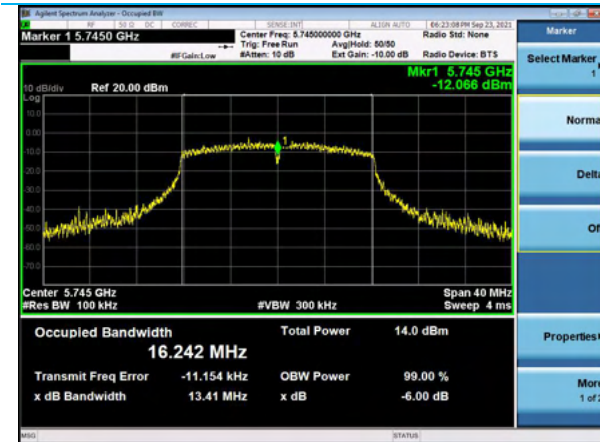
EUT Parameters

Input Power	5VDC via USB	Mode	WLAN 5GHz Transmit
Frequency	UNII 3	Channel	149, 157, 165
Serial	SRW20440013SP	Data Rates	802.11a (6Mbps, 54Mbps) 802.11n (MCS0, MCS7)
Antenna Port	Top		

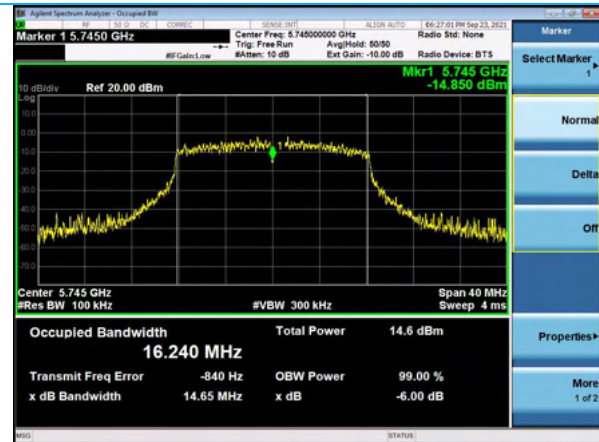
Data Table

Channel	Data Rate	6dB BW (kHz)	Minimum Limit (kHz)	Margin (kHz)
149	6 Mbps	1341.0	500.0	841.0
149	54 Mbps	1465.0	500.0	965.0
149	MCS0	1383.0	500.0	883.0
149	MCS7	1534.0	500.0	1034.0
157	6 Mbps	1575.0	500.0	1075.0
157	54 Mbps	1383.0	500.0	883.0
157	MCS0	1540.0	500.0	1040.0
157	MCS7	1586.0	500.0	1086.0
165	6 Mbps	1596.0	500.0	1096.0
165	54 Mbps	1566.0	500.0	1066.0
165	MCS0	1626.0	500.0	1126.0
165	MCS7	1560.0	500.0	1060.0

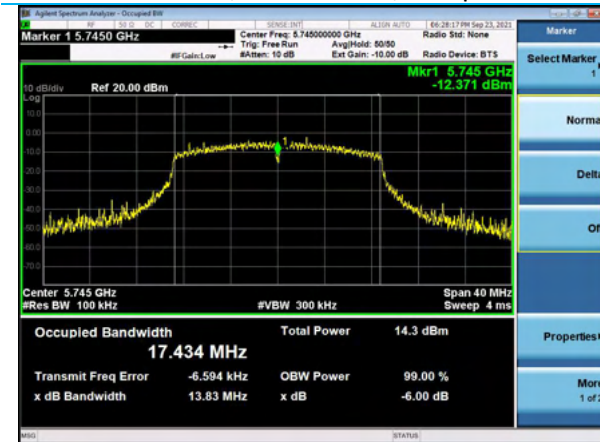
Plots



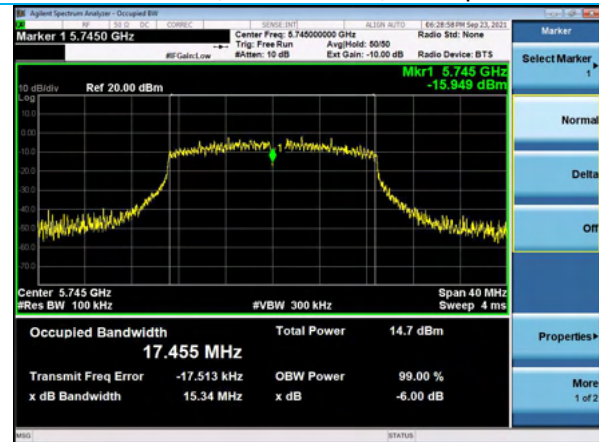
DTS BW, Channel 149, 6Mbps



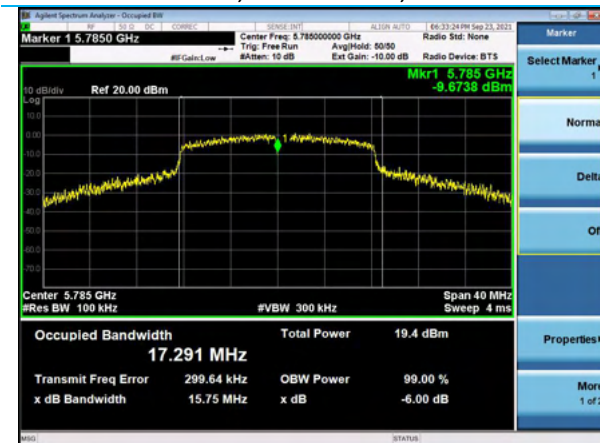
DTS BW, Channel 149, 54Mbps



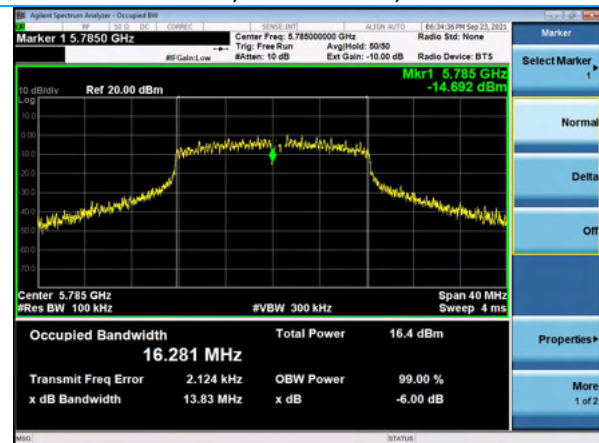
DTS BW, Channel 149, MCS0



DTS BW, Channel 149, MCS7

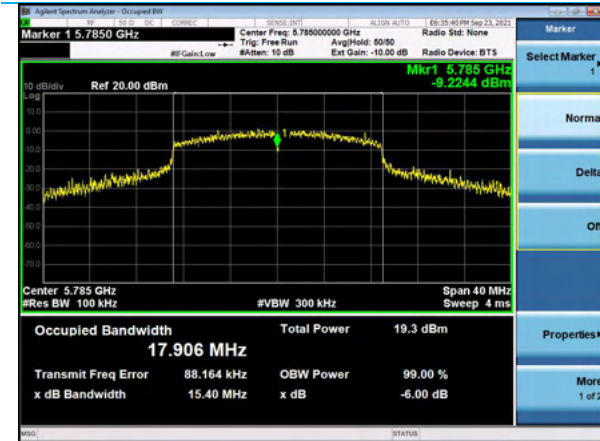


DTS BW, Channel 157, 6Mbps

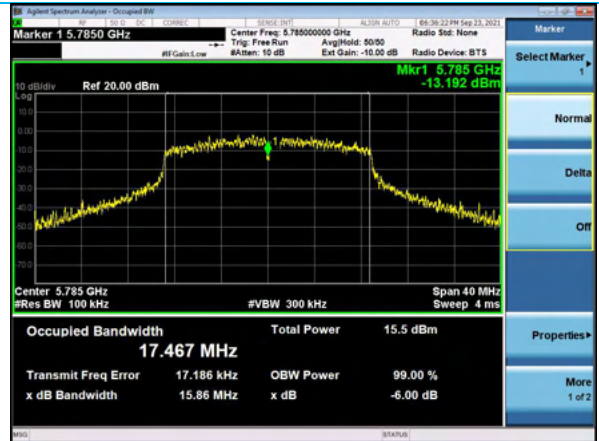


DTS BW, Channel 157, 54Mbps

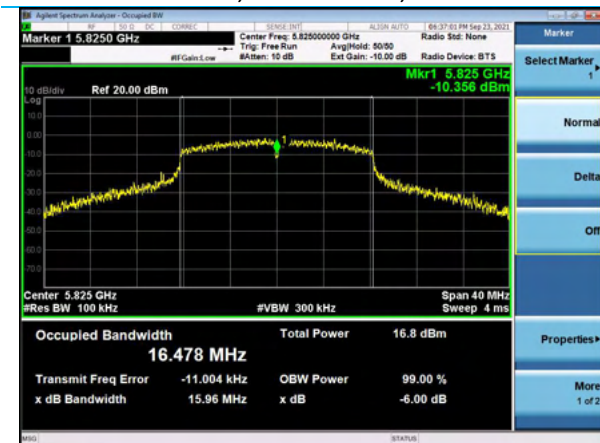
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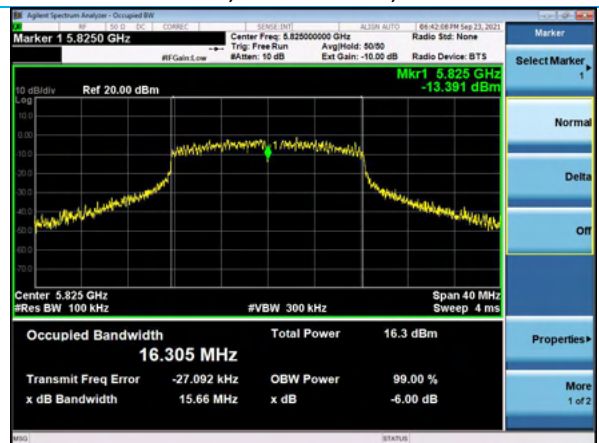
DTS BW, Channel 157, MCS0



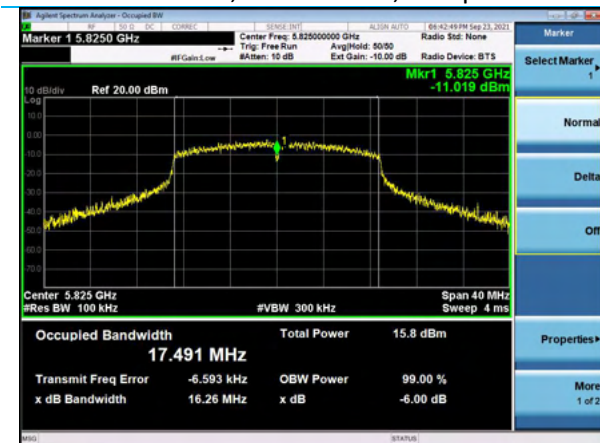
DTS BW, Channel 157, MCS7



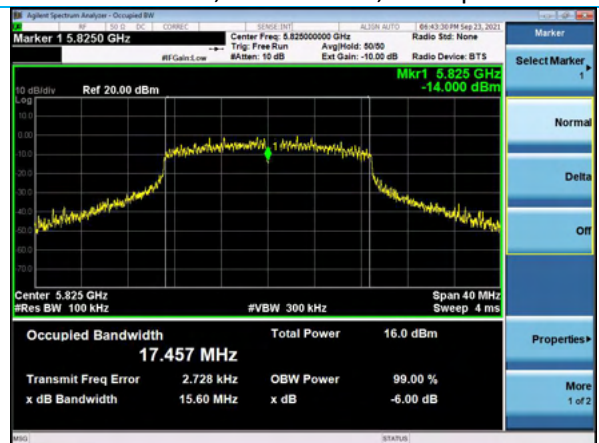
DTS BW, Channel 165, 6Mbps



DTS BW, Channel 165, 54Mbps



DTS BW, Channel 165, MCS0



DTS BW, Channel 165, MCS7

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5.1.4 Operation in the 5725-5850 MHz Band (UNII 3) – Maximum Conducted Output Power

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.2°C, 20.1°C, 20.5°C	R.H. %	47.3%, 45.7%, 48.9%
Test Date	9/22/2021, 9/23/2021, 9/24/2021, 10/4/2021	Location	Conducted RF Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.3.3.2 PM-G

Limit

30.0 dBm

Test Parameters

Frequency	5745 MHz, 5785 MHz, 5825 MHz	Setup	Conducted
Detector(s)	Average (gated)		
Notes	No duty cycle correction as measurements made over “ON” time of transmitter.		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/22/2021	4/22/2022	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/22/2021	4/22/2022	Active Calibration

EUT Parameters

Input Power	5VDC via USB	Mode	WLAN 5GHz Transmit
Frequency	UNII 3 Band	Channels	149, 157, 165
Serial	SRW20440013SP	Data Rates	802.11a (6Mbps, 54Mbps) 802.11n (MCS0, MCS7)
Antenna Port	Top, Bottom		

Data Table – Top Antenna Port

Channel	Data Rate	Output Power (dBm)	Limit (dBm)	Margin (dB)
149	6 Mbps	8.4	30.0	21.6
149	54 Mbps	8.5	30.0	21.5
149	MCS0	8.5	30.0	21.5
149	MCS7	8.6	30.0	21.4
157	6 Mbps	13.4	30.0	16.6
157	54 Mbps	9.9	30.0	20.1
157	MCS0	13.1	30.0	16.9
157	MCS7	9.1	30.0	20.9
165	6 Mbps	10.7	30.0	19.3
165	54 Mbps	9.8	30.0	20.2
165	MCS0	10.0	30.0	20.0
165	MCS7	9.5	30.0	20.5

Data Table – Bottom Antenna Port

Channel	Data Rate	Output Power (dBm)	Limit (dBm)	Margin (dB)
149	6 Mbps	7.2	30.0	22.8
149	54 Mbps	7.2	30.0	22.8
149	MCS0	7.4	30.0	22.6
149	MCS7	7.4	30.0	22.6
157	6 Mbps	11.6	30.0	18.4
157	54 Mbps	8.2	30.0	21.8
157	MCS0	11.3	30.0	18.7
157	MCS7	7.5	30.0	22.5
165	6 Mbps	9.3	30.0	20.7
165	54 Mbps	9.2	30.0	20.8
165	MCS0	9.2	30.0	20.8
165	MCS7	8.8	30.0	21.2

5.1.5 Operation in the 5725-5850 MHz Band (UNII 3) – Power Spectral Density

Operator	Anthony Smith	QA	Zach Wilson
Temperature	21.2°C, 20.1°C, 20.5°C	R.H. %	47.3%, 45.7%, 48.9%
Test Date	9/22/2021, 9/23/2021, 9/24/2021, 10/4/2021	Location	Conducted RF Bench
Requirement	FCC 15.407, RSS-247	Method	ANSI C63.10 §12.5 SA-2

Limit

30.0 dBm/500kHz

Test Parameters

Frequency	5745 MHz, 5785 MHz, 5825 MHz	Setup	Conducted
VBW	3 MHz	RBW	1 MHz
Span	Encompass 26 dB EBW	Detector	RMS with Average Hold
Duty Cycle Correction	10LOG(1/D), where D is the duty cycle		

Instrumentation

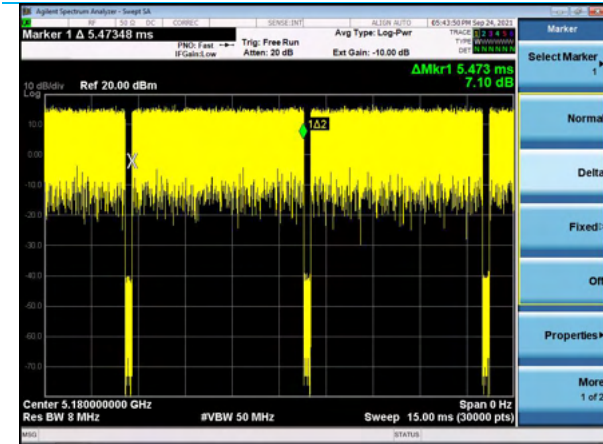
Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960143	Cable	Gore	EKD01D01048.0	5546519	2/3/2021	2/3/2022	Active Verification
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/22/2021	4/22/2022	Active Calibration
EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/22/2021	4/22/2022	Active Calibration

EUT Parameters

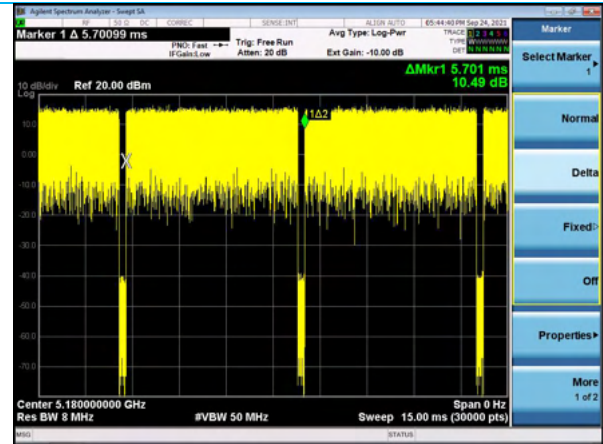
Input Power	5VDC via USB	Mode	WLAN 5GHz Transmit
Frequency	UNII 3 Band	Channels	149, 157, 165
Serial	SRW20440013SP	Data Rates	802.11a (6Mbps, 54Mbps) 802.11n (MCS0, MCS7)
Antenna Port	Top, Bottom		

Duty Cycle Information

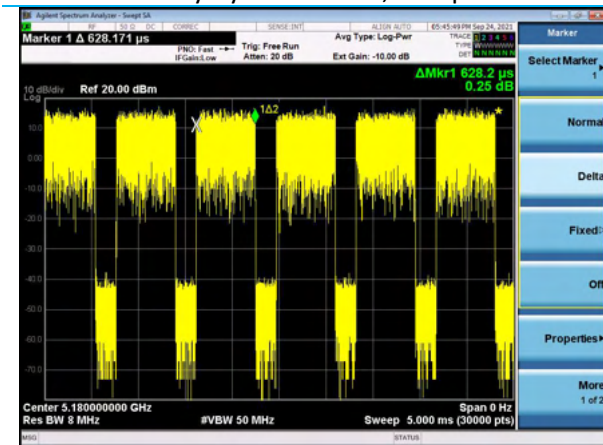
Data Rate	Duty Cycle	Correction (dB)
6Mbps	96.00%	0.177
54Mbps	73.80%	1.319
MCS0	95.68%	0.192
MCS7	68.36%	1.652



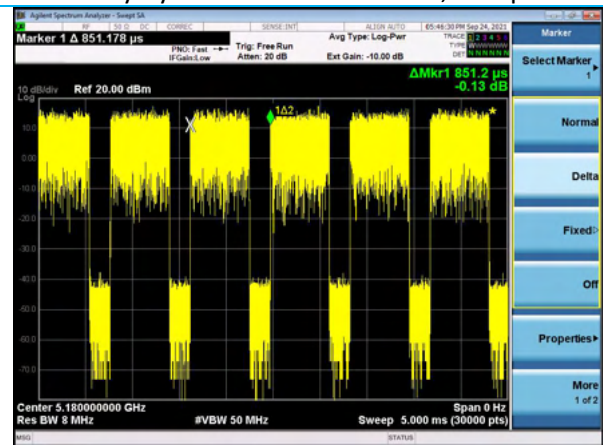
Duty Cycle On Time, 6Mbps



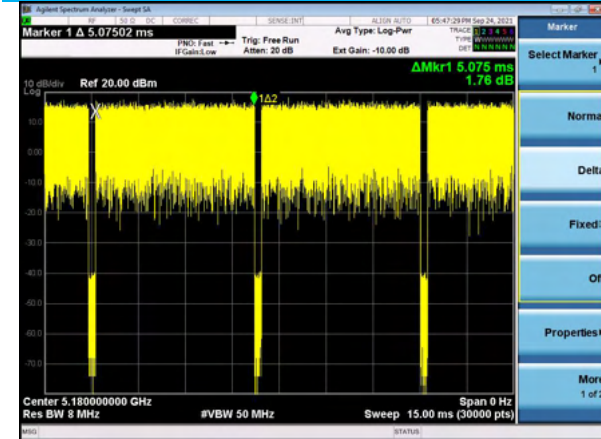
Duty Cycle Observation Period, 6Mbps



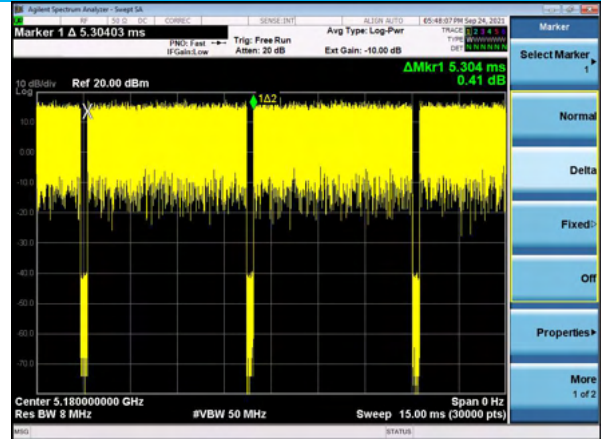
Duty Cycle On Time, 54Mbps



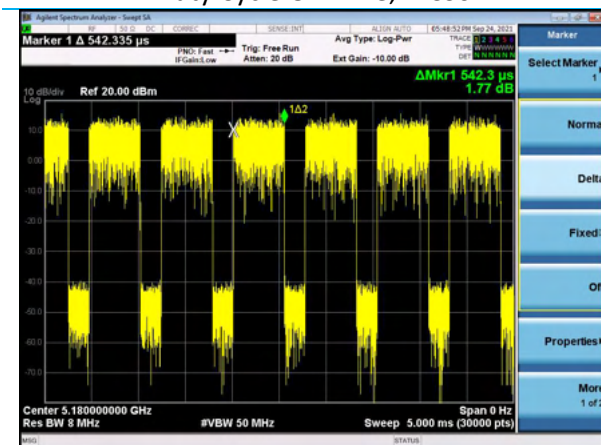
Duty Cycle Observation Period, 54Mbps



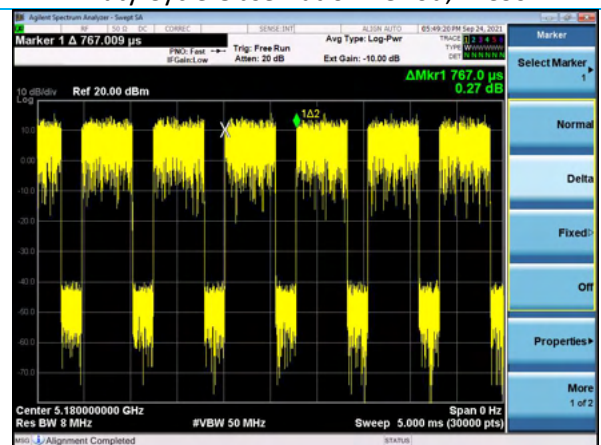
Duty Cycle On Time, MCS0



Duty Cycle Observation Period, MCS0



Duty Cycle On Time, MCS7



Duty Cycle Observation Period, MCS7

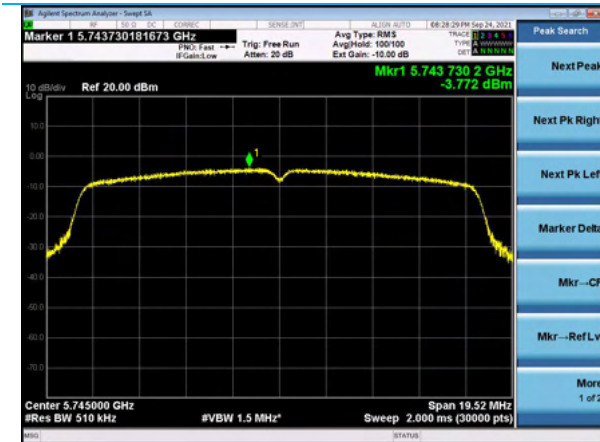
Data Table – Top Antenna Port

Channel	Data Rate	Peak PSD (dBm/500kHz)	Duty Cycle Correction (dB)	Corrected Peak PSD (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
149	6 Mbps	-3.8	0.2	-3.6	30.0	33.6
149	54 Mbps	-4.6	1.3	-3.3	30.0	33.3
149	MCS0	-3.6	0.2	-3.4	30.0	33.4
149	MCS7	-4.9	1.7	-3.2	30.0	33.2
157	6 Mbps	1.2	0.2	1.3	30.0	28.7
157	54 Mbps	-2.7	1.3	-1.4	30.0	31.4
157	MCS0	0.9	0.2	1.1	30.0	28.9
157	MCS7	-4.1	1.7	-2.5	30.0	32.5
165	6 Mbps	-1.5	0.2	-1.3	30.0	31.3
165	54 Mbps	-3.0	1.3	-1.7	30.0	31.7
165	MCS0	-2.2	0.2	-2.0	30.0	32.0
165	MCS7	-3.8	1.7	-2.2	30.0	32.2

Data Table – Bottom Antenna Port

Channel	Data Rate	Peak PSD (dBm/500kHz)	Duty Cycle Correction (dB)	Corrected Peak PSD (dBm/500kHz)	Limit (dBm/500kHz)	Margin (dB)
149	6 Mbps	-3.8	0.2	-3.6	30.0	31.8
149	54 Mbps	-4.6	1.3	-3.3	30.0	32.0
149	MCS0	-3.6	0.2	-3.4	30.0	31.8
149	MCS7	-4.9	1.7	-3.2	30.0	31.2
157	6 Mbps	1.2	0.2	1.3	30.0	27.5
157	54 Mbps	-2.7	1.3	-1.4	30.0	30.6
157	MCS0	0.9	0.2	1.1	30.0	27.9
157	MCS7	-4.1	1.7	-2.5	30.0	31.2
165	6 Mbps	-1.5	0.2	-1.3	30.0	29.7
165	54 Mbps	-3.0	1.3	-1.7	30.0	29.6
165	MCS0	-2.2	0.2	-2.0	30.0	29.7
165	MCS7	-3.8	1.7	-2.2	30.0	30.0

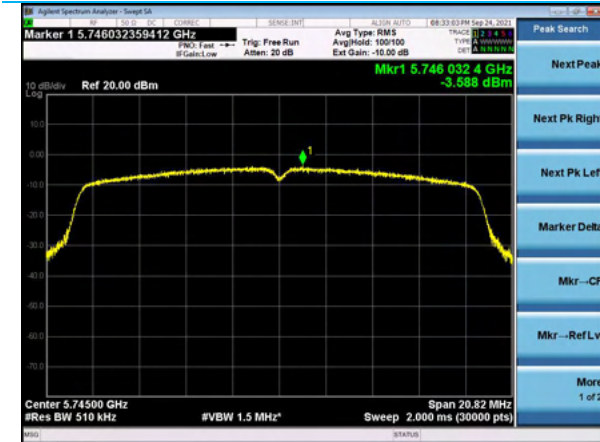
Plots – Top Antenna Port



Power Spectral Density, Channel 149, 6Mbps



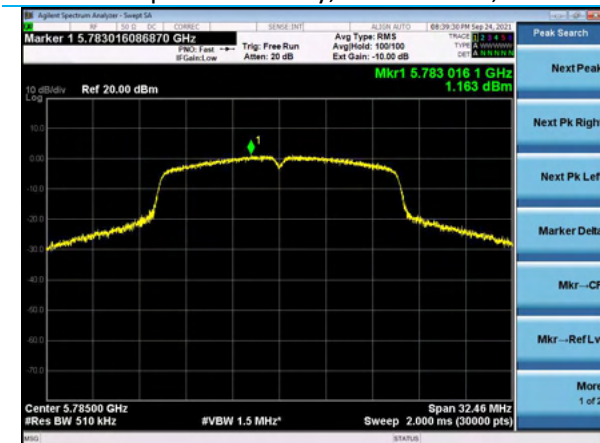
Power Spectral Density, Channel 149, 54Mbps



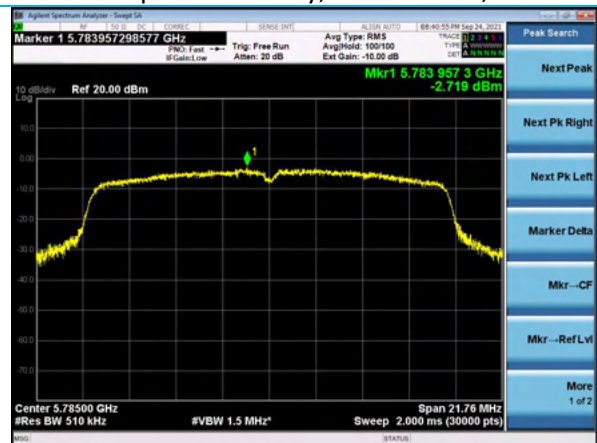
Power Spectral Density, Channel 149, MCS0



Power Spectral Density, Channel 149, MCS7

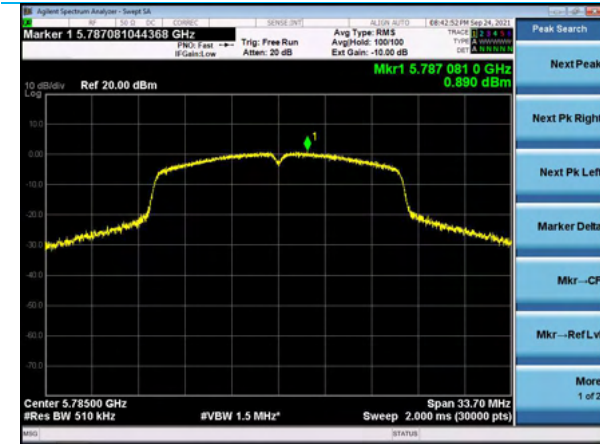


Power Spectral Density, Channel 157, 6Mbps

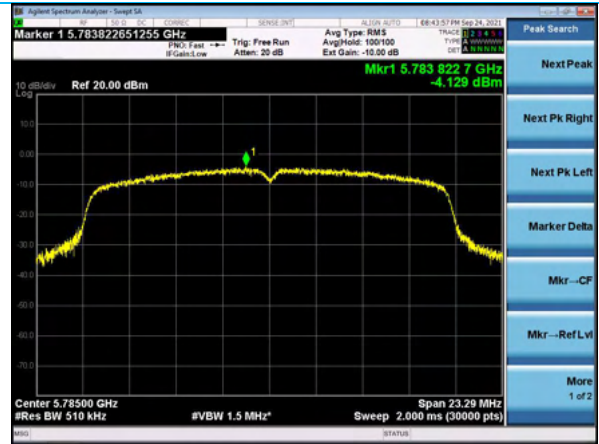


Power Spectral Density, Channel 157, 54Mbps

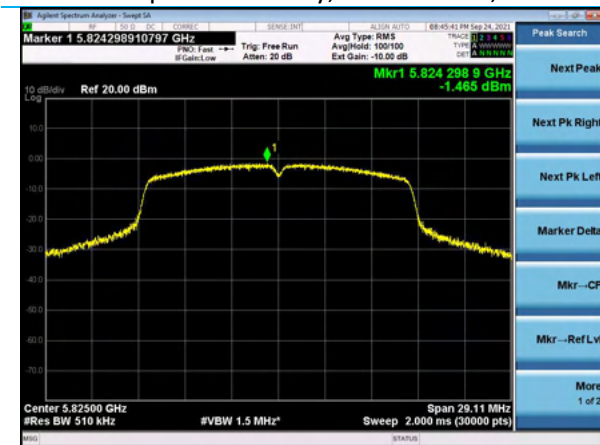
Company: GE Healthcare		Name: Mobile Patient Monitor
Report: TR3514 C	Page 29 of 41	Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP



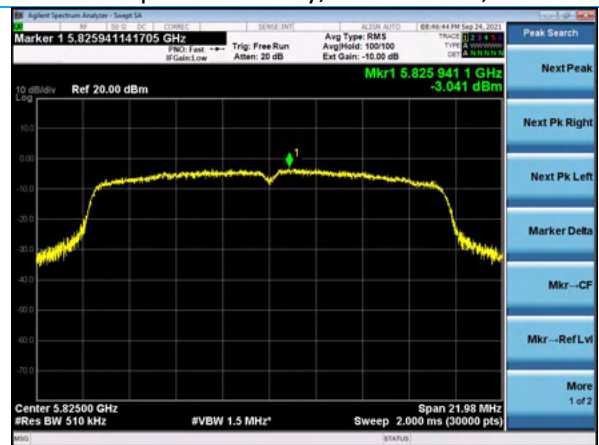
Power Spectral Density, Channel 157, MCS0



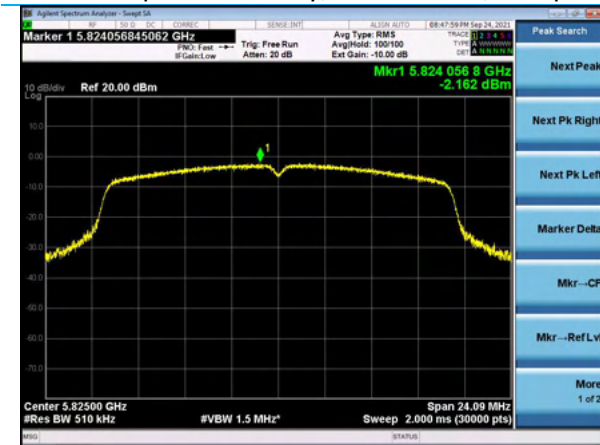
Power Spectral Density, Channel 157, MCS7



Power Spectral Density, Channel 165, 6Mbps



Power Spectral Density, Channel 165, 54Mbps



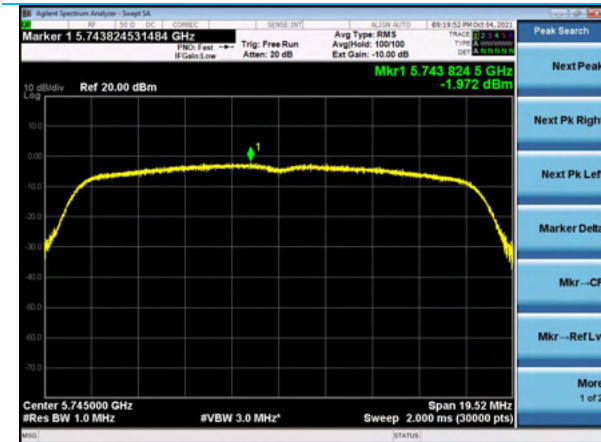
Power Spectral Density, Channel 165, MCS0



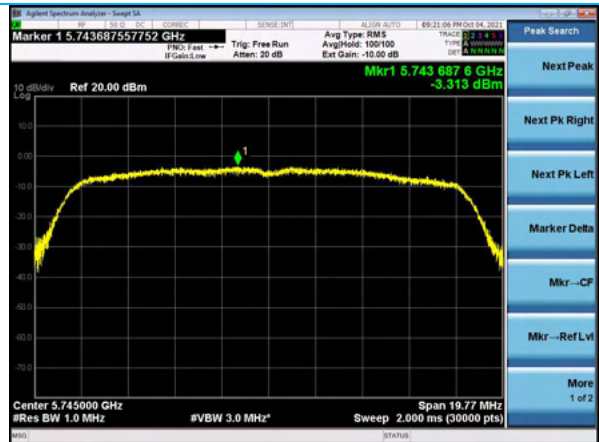
Power Spectral Density, Channel 165, MCS7

Company: GE Healthcare	Page 30 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP

Plots – Bottom Antenna Port



Power Spectral Density, Channel 149, 6Mbps



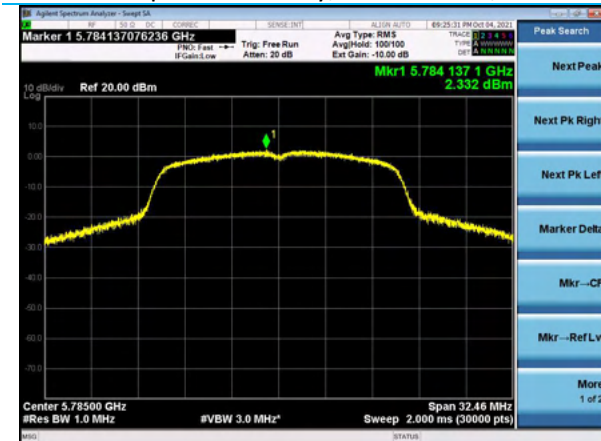
Power Spectral Density, Channel 149, 54Mbps



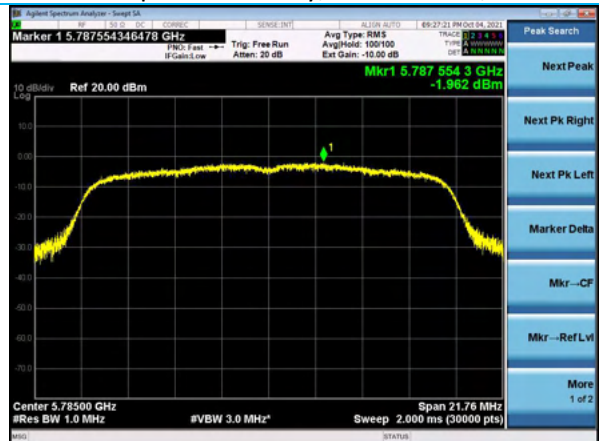
Power Spectral Density, Channel 149, MCS0



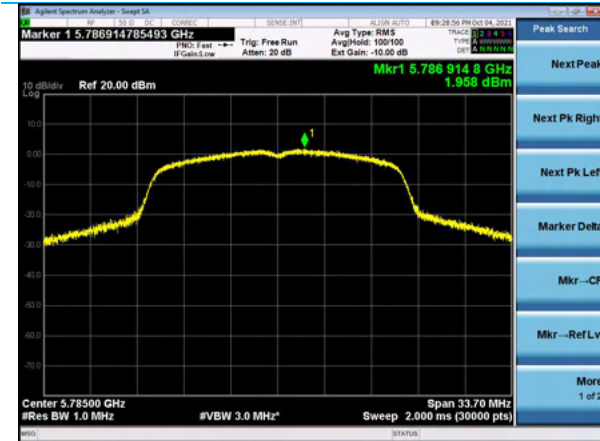
Power Spectral Density, Channel 149, MCS7



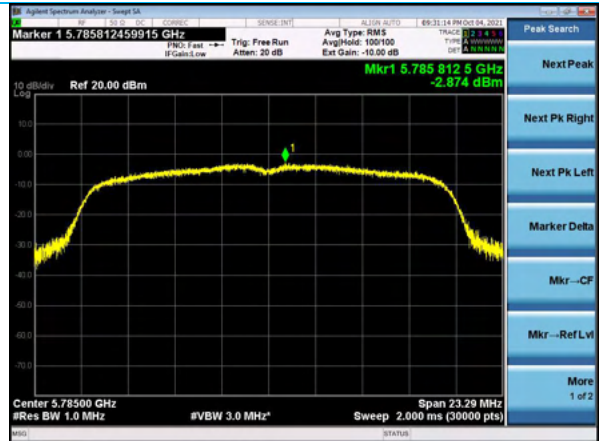
Power Spectral Density, Channel 157, 6Mbps



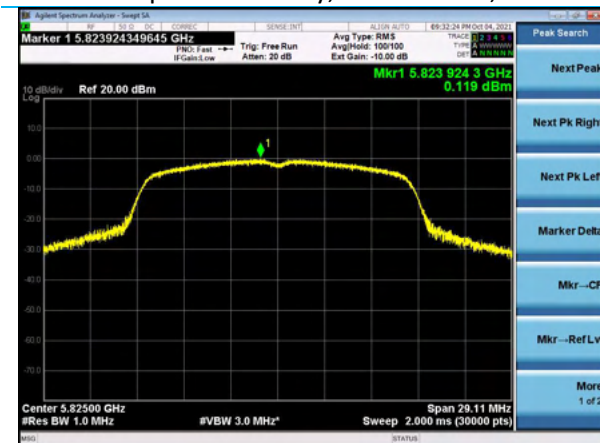
Power Spectral Density, Channel 157, 54Mbps



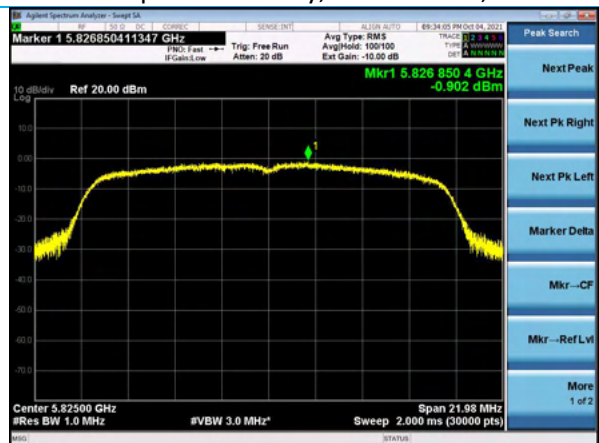
Power Spectral Density, Channel 157, MCS0



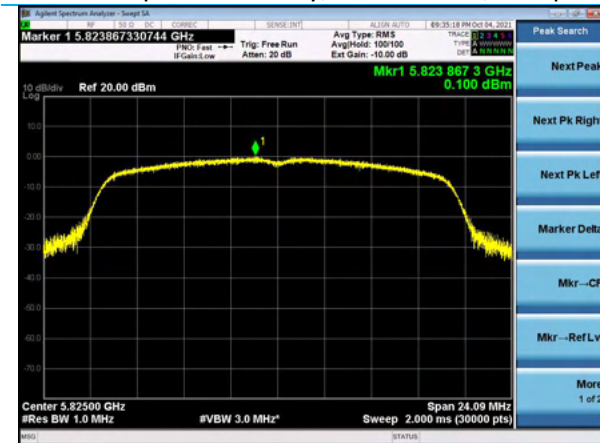
Power Spectral Density, Channel 157, MCS7



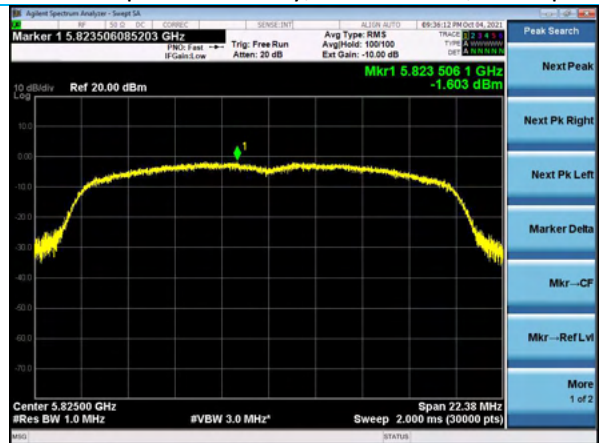
Power Spectral Density, Channel 165, 6Mbps



Power Spectral Density, Channel 165, 54Mbps



Power Spectral Density, Channel 165, MCS0



Power Spectral Density, Channel 165, MCS7

5.2 Radiated Emissions

<p>Description of Measurement</p>	<p>The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna.</p> <p>The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values.</p> <p>The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.</p>
<p>Example Calculations</p>	<p>Measurement (dBμV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBμV/m)</p> <p>Margin (dB) = Limit (dBμV/m) - Corrected Reading (dBμV/m)</p> <p>Example at 4000 MHz: Reading = 40 dBμV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBμV/m Average Limit = 20 log (500) = 54 dBμV/m Margin = 54 dBμV/m - 50.8 dBμV/m = 3.2 dB</p>

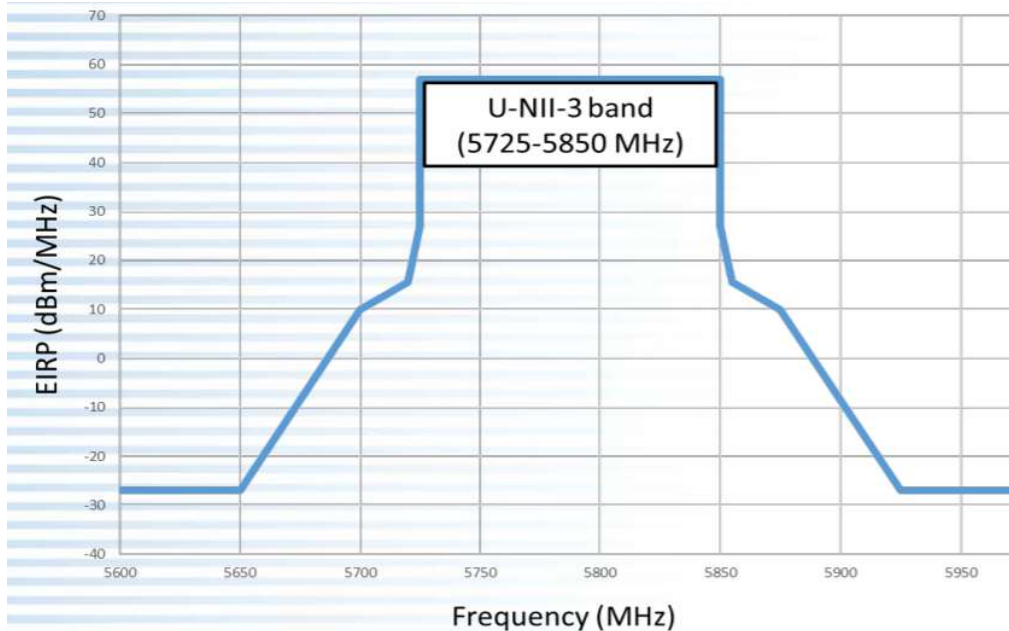
Block Diagram



5.2.1 Operation in the 5725-5850 MHz Band (UNII 3) - Radiated Emissions

Operator	Anthony Smith	QA	Zach Wilson
Temperature	20.7°C, 21.9°C	R.H. %	50.5%, 50%
Test Date	9/20/2021, 9/21/2021	Location	Chamber 5
Requirement	FCC 15.407, RSS-247, FCC 15.209	Method	ANSI C63.10

Limits



Test Parameters

Frequency	5600-5650 MHz, 5650-5700 MHz, 5700-5875 MHz, 5875-5925 MHz, 5925-6000 MHz, 40 GHz	Distance	3m
Detector(s)	Peak	Table height	150cm
RBW	1 MHz	VBW	3 MHz for peak 30 kHz for emission identification
Notes	Top antenna declared worst case		
Example Calculations	EIRP Limit dBm/MHz + 95.2 (free space conversion) = Limit in dBμV/m @ 3m		
Notes	No transmitter emissions found in the 8-40 GHz range. Low channel for each band shown.		

Instrumentation

Asset #	Description	Manufacturer	Model #	Serial #	Date	Due Date	Status
AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	8/23/2021	8/23/2022	Active Calibration
AA 960161	Filter - Highpass 5 GHz	K&L Microwave	11SH10-8000	2	4/21/2021	4/21/2022	Active Calibration
AA 960162	Cable	MegaPhase	EM2-S1S1-120	51503501 001	2/3/2021	2/3/2022	Active Verification
AA 960171	Cable	A.H. Systems, Inc.	SAC-26G-6	386	2/3/2021	2/3/2022	Active Verification
AA 960174	Antenna - Small Horn	ETS Lindgren	3116C-PA	00206880	9/1/2021	9/1/2022	Active Calibration
AA 960209	Antenna - Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	037101808	8/23/2021	8/23/2022	Active Calibration
EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	7/28/2021	7/28/2022	Active Calibration
EE 960198	Meter - Hygro-Thermometer	Control Company	90080-03	180045460	5/14/2021	5/14/2022	Active Calibration
EE 960203	Analyzer - EMI Receiver	Keysight	N9038A	MY56400072	4/20/2021	4/20/2022	Active Calibration

EUT Parameters

Input Power	Battery	Mode	WLAN Continuous TX
EUT	Module In Host	EUT	Top Antenna Only, EUT Vertical Orientation Only
Channels	149, 157, 165	Data Rates	802.11a 6Mbps for Band Edge 802.11n MCS0 for Harmonics

Setup Photos



EUT Setup

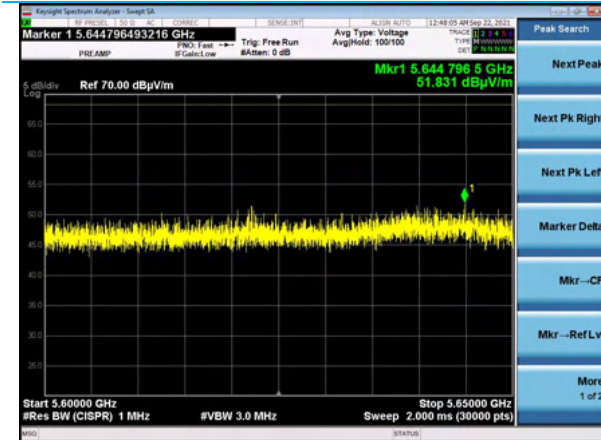


Chamber Setup

Data Tables

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dB μ V/m)	Peak Limit (dB μ V/m)	Peak Margin (dB)	Channel	Data Rate (Mbps)
5644.8	Vertical	100	263	51.8	68.2	16.4	149	MCS0
5697.6	Vertical	100	263	52.7	68.2	15.5	149	MCS0
5743.3	Vertical	100	263	105.4	122.2	16.8	149	MCS0
5909.9	Vertical	100	263	57.2	68.2	11.0	149	MCS0
5991.6	Vertical	100	263	50.7	68.2	17.5	149	MCS0
5629.2	Vertical	100	263	51.3	68.2	16.9	157	MCS0
5672.6	Vertical	100	263	51.6	68.2	16.6	157	MCS0
5783.8	Vertical	100	263	105.4	122.2	16.9	157	MCS0
5884.9	Vertical	100	263	52.0	68.2	16.2	157	MCS0
5950.5	Vertical	100	263	51.4	68.2	16.8	157	MCS0
5638.5	Vertical	100	263	50.9	68.2	17.3	165	MCS0
5671.6	Vertical	100	263	50.2	68.2	18.0	165	MCS0
5826.2	Vertical	100	263	104.9	122.2	17.3	165	MCS0
5885.1	Vertical	100	263	55.9	68.2	12.4	165	MCS0
5938.8	Vertical	100	263	51.2	68.2	17.0	165	MCS0

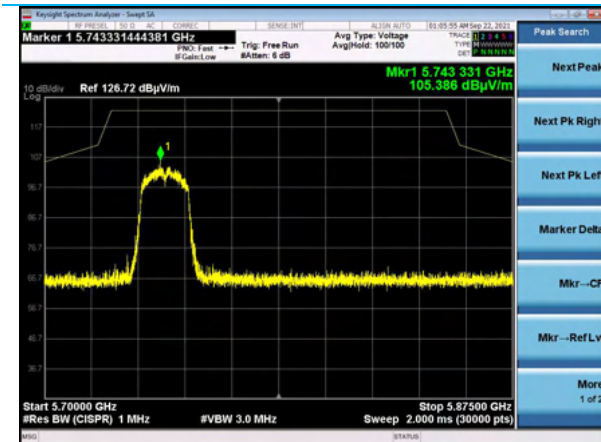
Plots



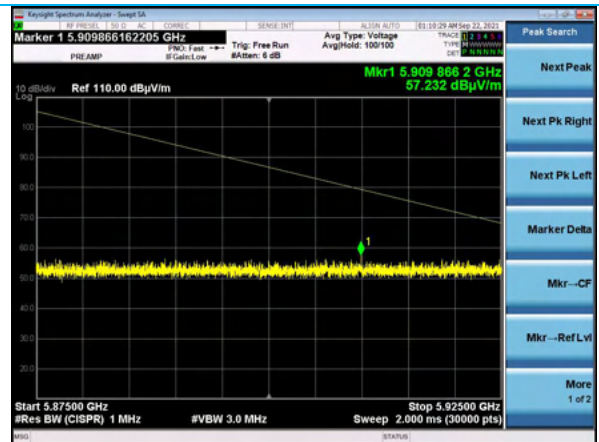
5600-5650 MHz, Channel 149, MCS0, Peak Vertical Antenna



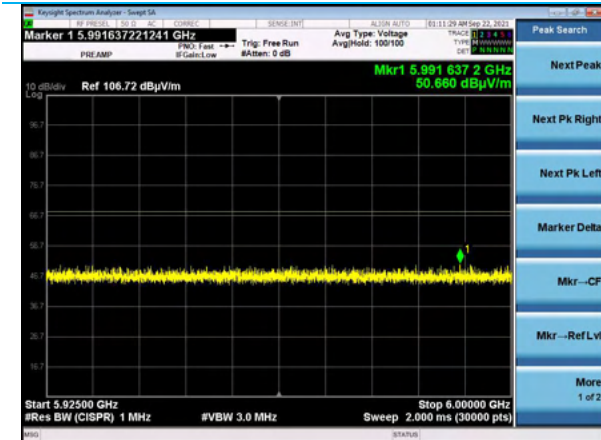
5650-5700 MHz, Channel 149, MCS0, Peak Vertical Antenna



5700-5875 MHz, Channel 149, MCS0, Peak Vertical Antenna

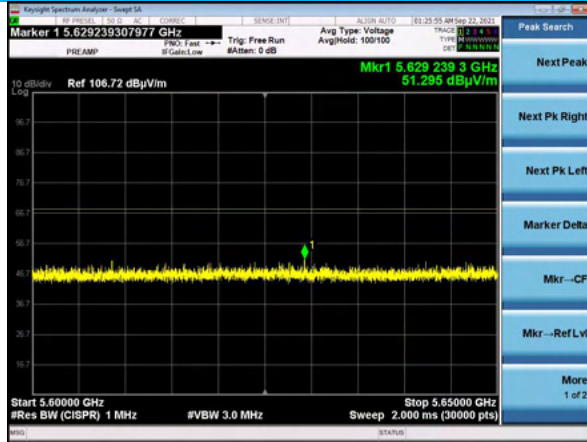


5875-5925 MHz, Channel 149, MCS0, Peak Vertical Antenna

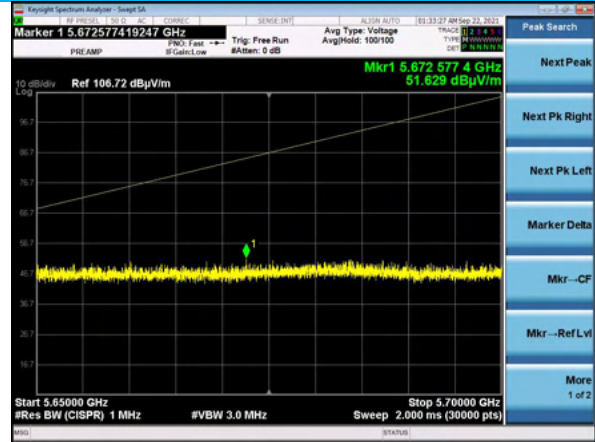


5925-6000 MHz, Channel 149, MCS0, Peak Vertical Antenna

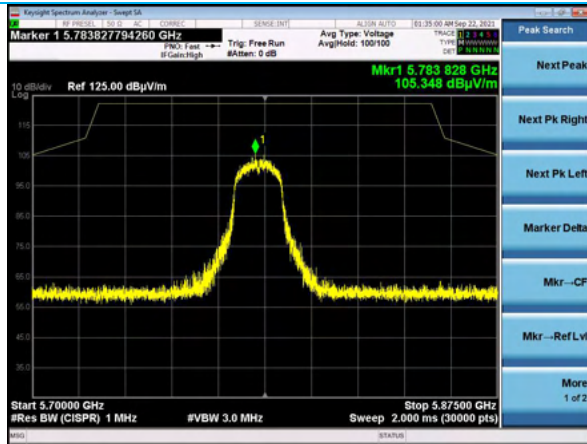
Company: GE Healthcare	Page 37 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP



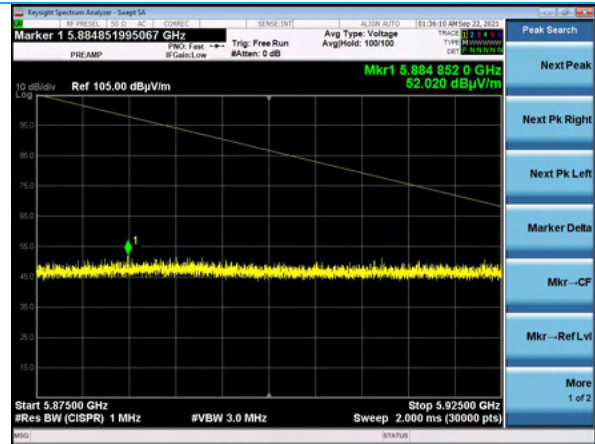
5600-5650 MHz, Channel 157, MCS0, Peak Vertical Antenna



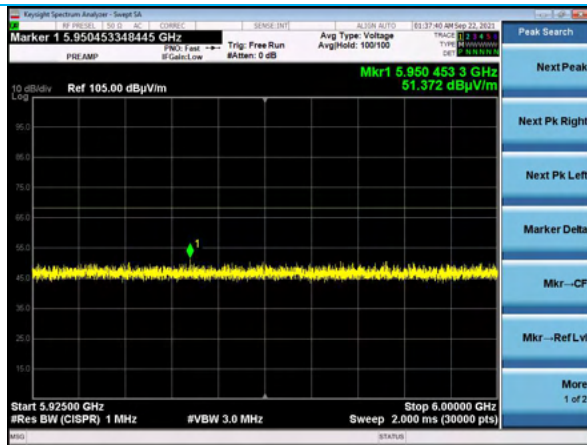
5650-5700 MHz, Channel 157, MCS0, Peak Vertical Antenna



5700-5875 MHz, Channel 157, MCS0, Peak Vertical Antenna

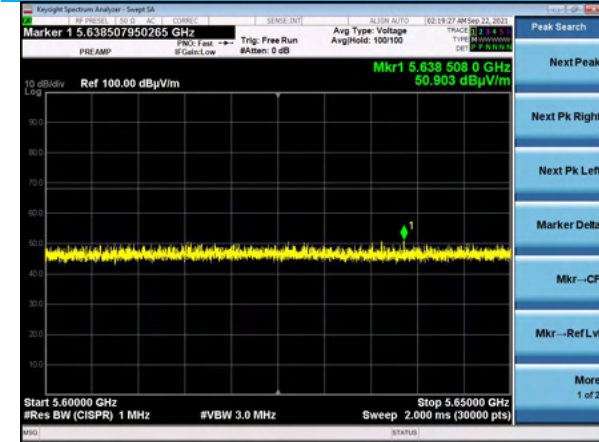


5875-5925 MHz, Channel 157, MCS0, Peak Vertical Antenna

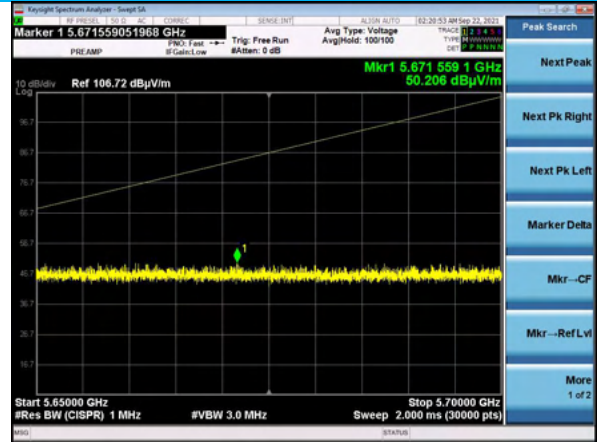


5925-6000 MHz, Channel 157, MCS0, Peak Vertical Antenna

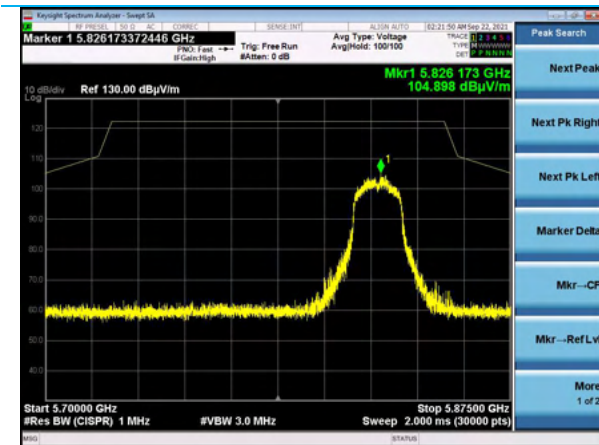
Company: GE Healthcare	Page 38 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP



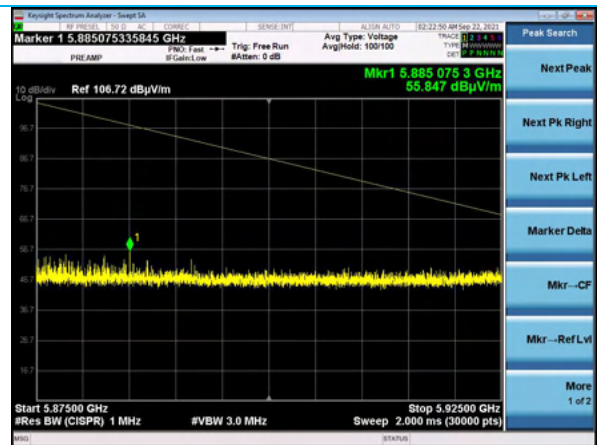
5600-5650 MHz, Channel 165, MCS0, Peak Vertical Antenna



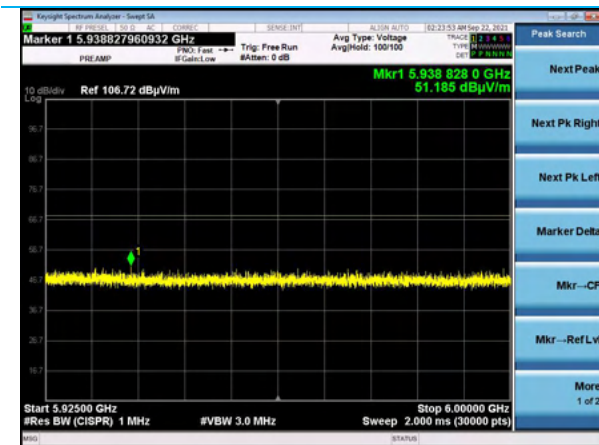
5650-5700 MHz, Channel 165, MCS0, Peak Vertical Antenna



5700-5875 MHz, Channel 165, MCS0, Peak Vertical Antenna



5875-5925 MHz, Channel 165, MCS0, Peak Vertical Antenna

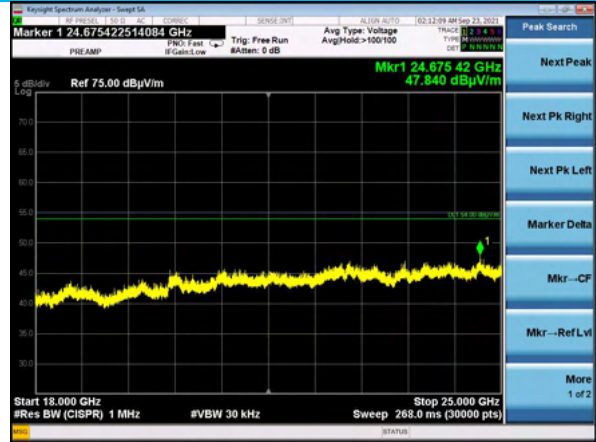


5925-6000 MHz, Channel 165, MCS0, Peak Vertical Antenna

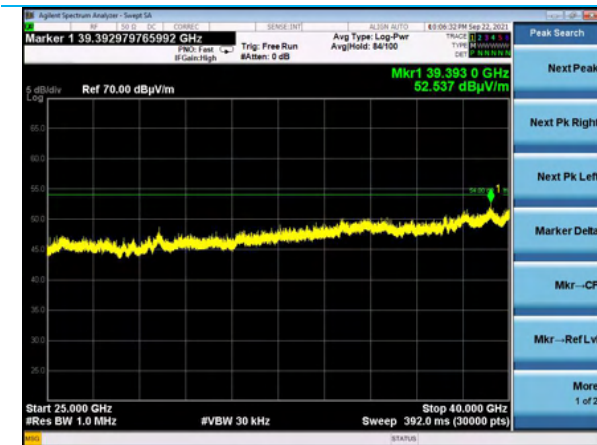
Company: GE Healthcare	Page 39 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
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8-18 GHz, Channel 149, MCS0, Peak
Vertical Antenna



18-25 GHz, Channel 149, MCS0, Peak
Vertical Antenna



25-40 GHz, Channel 149, MCS0, Peak
Vertical Antenna

Company: GE Healthcare	Page 40 of 41	Name: Mobile Patient Monitor
Report: TR3514 C		Model: Portrait HUB01
Quote: NBO-09-2021-004136		Serial: SRW20440005SP

6 REVISION HISTORY

Version	Date	Notes	Person
0	10-4-2021	Initial Draft	Zach Wilson
1	10-7-2021	Original report broken into three reports for size upload reasons	Zach Wilson

END OF REPORT