

Emissions Test Report

EUT Name: MViQCSYSZ-CCCC

Model No.: 7260HMW

CFR 47 Part 15.407: 2019

Prepared for:

GE Inspection Technologies, LP
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Skaneateles, NY 13152

Prepared by:

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Report/Issue Date: April 7, 2020
Job # 234122550
Report Number: 32061308.001

Revisions

Revision No.	Date MM/DD/YYYY	Reason for Change	Author
0	4/7/2020	Original Document	JB

Note: Latest revision report will replace all previous reports.

Statement of Compliance

Manufacturer: GE Inspection Technologies, LP
721 Visions Drive
Skaneateles, NY 13152
Requester / Applicant: GE Inspection Technologies, LP
Name of Equipment: MViQCSYSZ-CCCC
Model No. 7260HMMW
Type of Equipment: Intentional Radiator
Application of Regulations: CFR 47 Part 15.407: 2019
Test Dates: March 30, 2020 to March 31, 2020

Guidance Documents:

Emissions: ANSI C63.10-2013, KDB 558074 D01 DTS Measurement Guidance v05r02, KDB 662911 D01 Multiple Transmitter Output v02r01, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

Test Methods:

Emissions: ANSI C63.10-2013, KDB 558074 D01 DTS Measurement Guidance v05r02, KDB 662911 D01 Multiple Transmitter Output v02r01, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

James Borrott

Date April 7, 2020

Rachana Khanduri

Date April 7, 2020



Testing Cert #3331.02



US1131

ISED

2932D

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1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.407: 2019 based on the results of testing performed on March 30, 2020 to March 31, 2020 on the 7260HMW manufactured by GE Inspection Technologies, LP. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report. The 5725MHz – 5825MHz frequency band is covered in this document.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C 63.10 & C63.4	Worse Case (Measured)	Result
Out of Band Emissions: Band Mask	CFR47 15.407(b)(4)(i)	>6dB Margin from 15.409(b)(4)(i) Limits	Complied
Out of Band Transmitter Spurious Emissions	CFR47 15.209, 15.407(b)	>6dB Margin from 15.209 and 15.409(b) Limits	Complied

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission



TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No. US1131). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

2.1.2 NIST / A2LA



TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2017. The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 ISED

The Pleasanton 5-meter Semi-Anechoic Chamber, has been accepted by ISED to perform testing to 3 and 5 meters based on the test procedures described in ANSI C63.4-2014. The Fremont 10-meter Semi-Anechoic Chamber, has been accepted by ISED to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2014. Under 2932D

2.1.4 Japan – VCCI



The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0326

VCCI Registration No. for Fremont: A-0327

2.1.5 Acceptance by Mutual Recognition Arrangement



The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member

country.

2.2 Test Facilities

Test facilities are located at 5015 Brandin Ct, Fremont, California, 94538, USA and 1279 Quarry Lane, Pleasanton, California 94566, USA (Fremont is the Pleasanton Annex).

2.2.1 Emission Test Facility

The Semi-Anechoic Chambers and AC Line Conducted measurement facilities used to collect radiated and conducted emissions data have been constructed in accordance with ANSI C63.7:1992. The Fremont 10 meter semi-anechoic chamber has been measured in accordance with and verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2014 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04), at test distances of 3 and 10 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02). The Pleasanton 5 meter semi-anechoic chamber has been verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2009 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04) at a test distance of 3 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02).

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurement and the fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dB μ V)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dB μ V/m)

$$25 \text{ dB}\mu\text{V/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dB}\mu\text{V/m}$$

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	U _{lab}	U _{cispr}
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is $\pm 5.0\%$.	Per CISPR 16-4-2 Methods
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2.3.3 Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is $\pm 8.2\%$.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated combined standard uncertainty for power frequency magnetic field immunity is $\pm 2.9\%$.	Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is $\pm 2.6\%$.
The estimated combined standard uncertainty for surge immunity measurements is $\pm 2.6\%$.
The estimated combined standard uncertainty for voltage variation and interruption measurements is $\pm 1.74\%$.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2017. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The Model 7260HMMW is an industrial remote visual inspection video borescope. It is used to visually inspect high value assets without having to tear them down. i.e., power gen turbines and aircraft engines.

The EUT will be in compliance with regulatory standards of regions it will be operating in.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

Worse case modes were leveraged from the existing grant.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing. Worse case modes were leveraged from the existing grant.

3.4 Unique Antenna Connector

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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The MViQCSYSZ-CCCC utilizes an Ethertronics 1000418 antenna that has a maximum gain of 4.2 dBi. It is attached using a non-standard connector and is not easily accessible to the end user.

4 Emissions

Testing was performed in accordance with CFR47 15.407 (b)(4)(i): 2019. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1 Out of Band Emissions: UNII-3 Band Mask

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

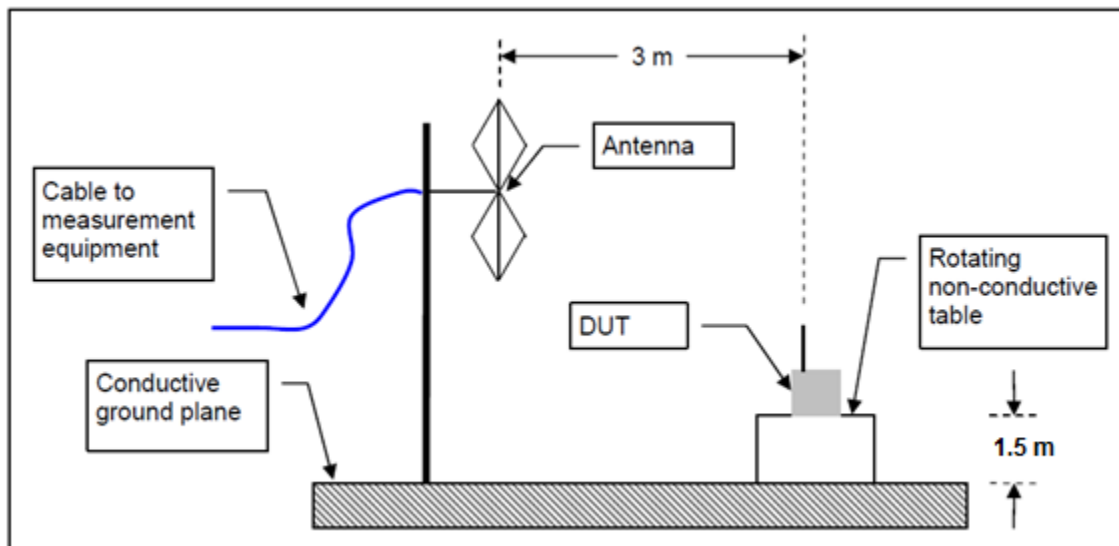
4.1.1 Test Method

Radiated measurements per ANSI C63.10-2013 Section 12.7.7.3 were used to measure the undesirable emission requirement in restricted bands. The measurement was performed with modulation. This test was conducted on the low channel for the low and high channel, in each applicable mode on the EUT. Worse case modes (as stated in Section 3.3) were tested and are displayed below.

Test Setup:

Spectrum Analyzer Settings:

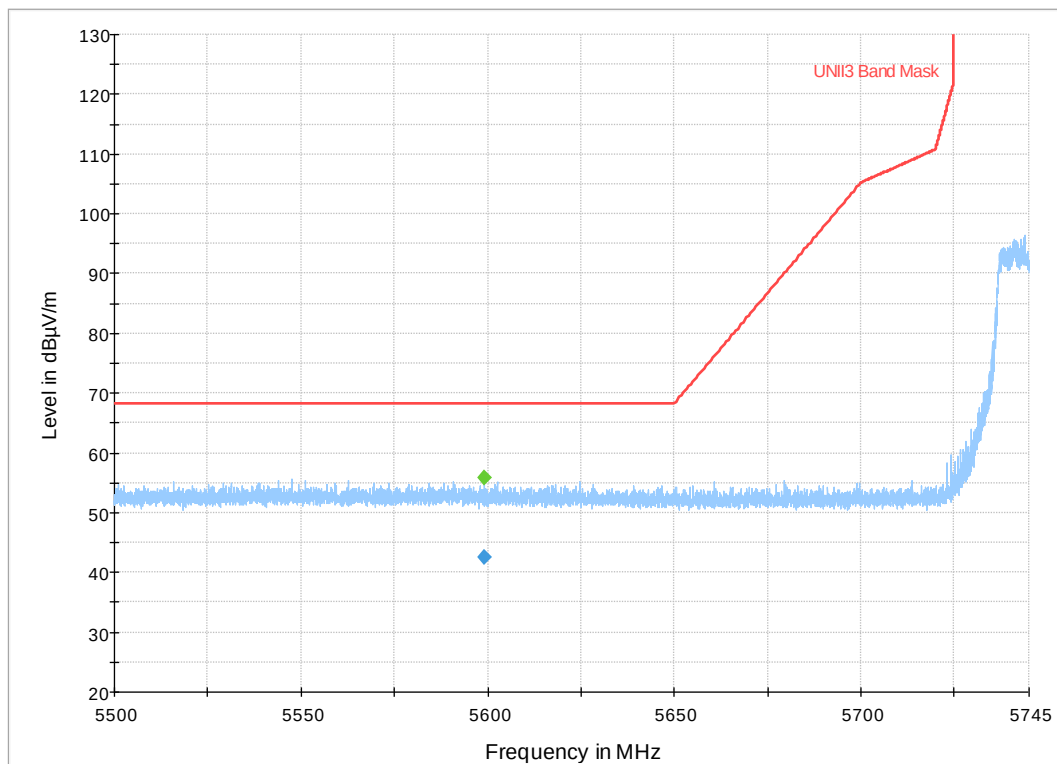
	Peak Measurement
Detector	Peak
Trace	Max Hold
RBW	1 MHz
VBW	3 MHz
Sweep Points	20001
Span	See Plots



4.1.2 Results

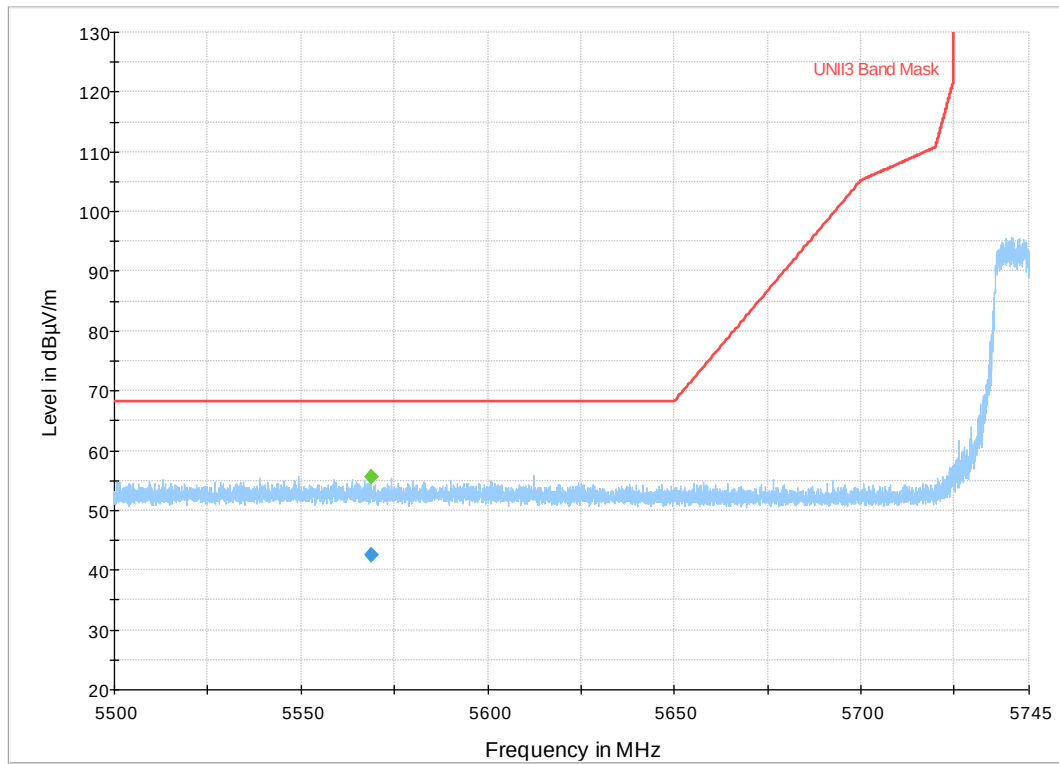
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5599.102500	---	55.73	---	---	1000.000	150.0	V	142.0
5599.102500	42.61	---	68.16	25.55	1000.000	150.0	V	142.0



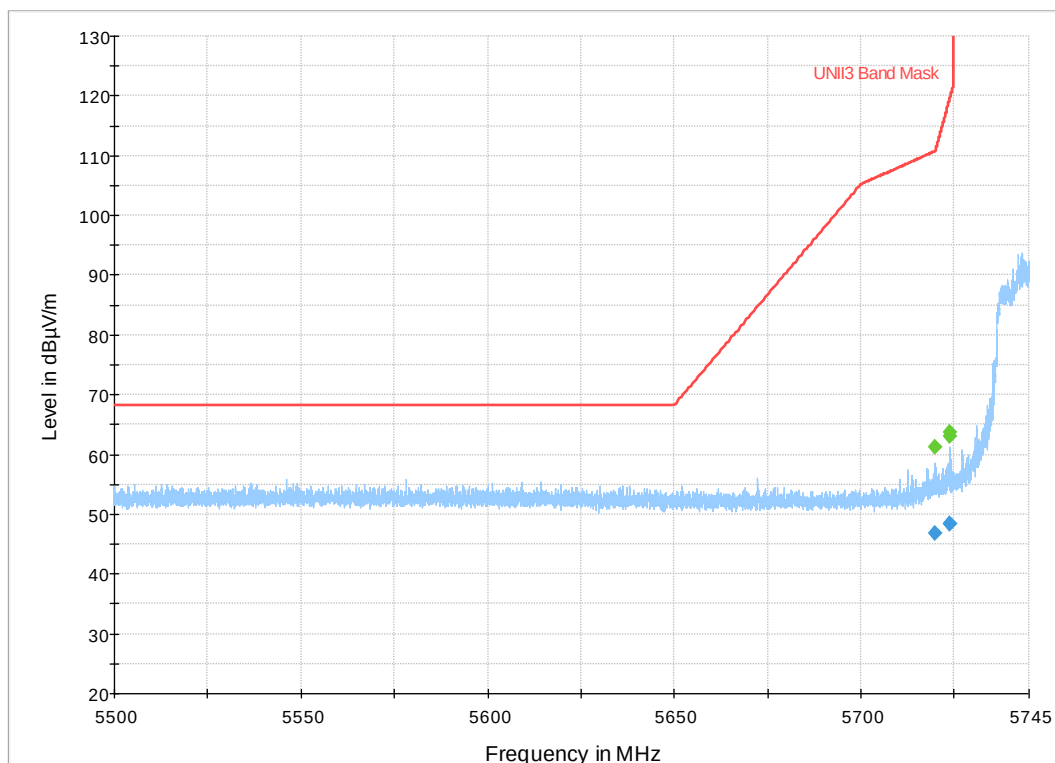
802.11a, Channel 149, 20MHz BW, 6MBPS

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5568.649000	---	55.69	---	---	1000.000	103.0	V	-109.0
5568.649000	42.62	---	68.16	25.54	1000.000	103.0	V	-109.0



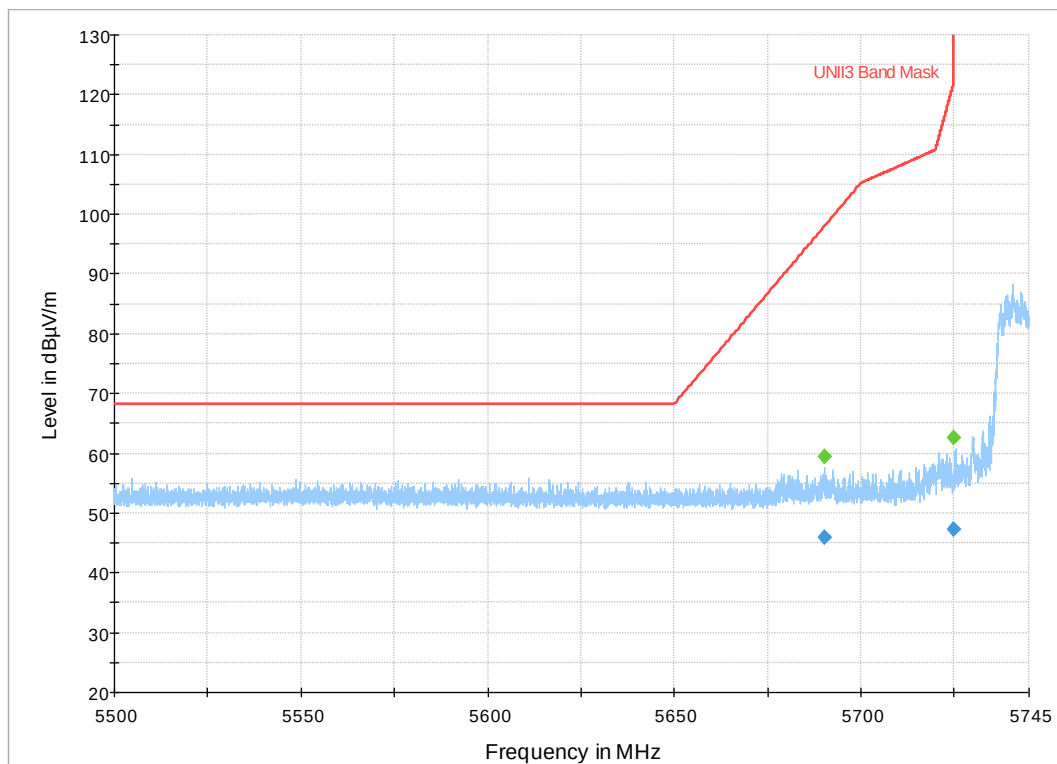
802.11n, Channel 149, 20MHz BW, HT4

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5719.642500	---	61.17	---	---	1000.000	220.0	H	180.0
5719.642500	46.90	---	110.66	63.76	1000.000	220.0	H	180.0
5723.660500	48.38	---	119.11	70.73	1000.000	216.0	H	-180.0
5723.660500	---	63.08	---	---	1000.000	216.0	H	-180.0
5723.783000	48.50	---	119.39	70.88	1000.000	207.0	H	-180.0
5723.783000	---	63.81	---	---	1000.000	207.0	H	-180.0



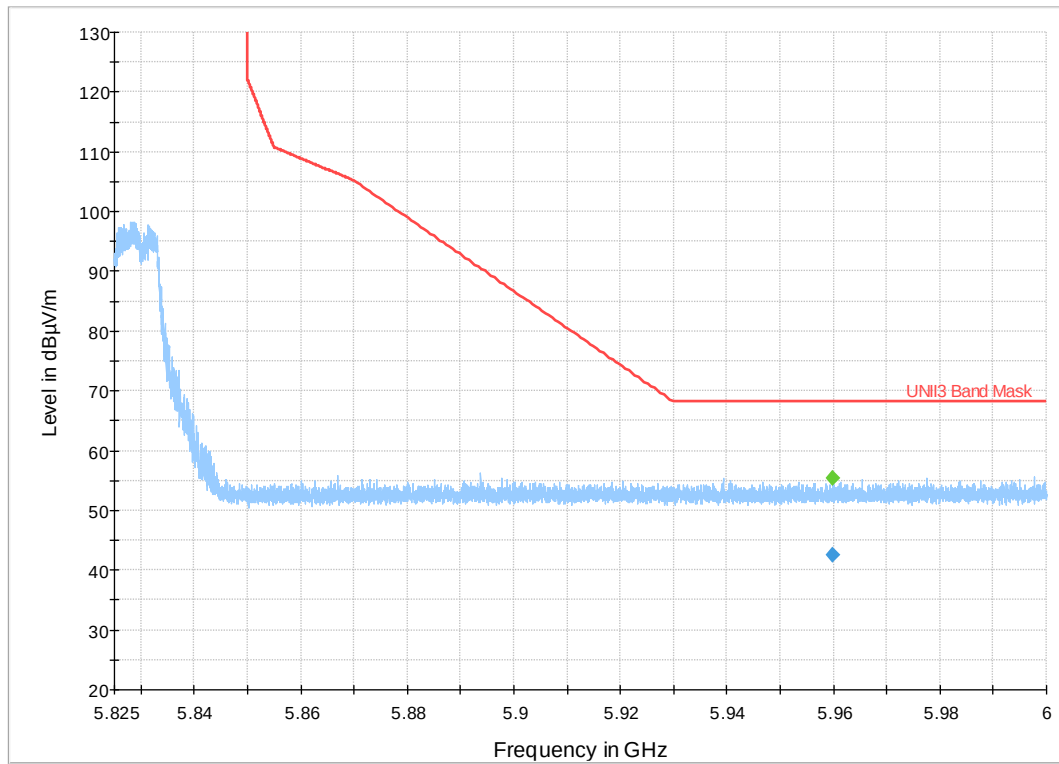
802.11n, Channel 151, 40MHz BW, HT8

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5690.095500	---	59.34	---	---	1000.000	217.0	H	-171.0
5690.095500	45.82	---	97.83	52.01	1000.000	217.0	H	-171.0
5724.934500	---	62.50	---	---	1000.000	209.0	H	180.0
5724.934500	47.19	---	122.01	74.82	1000.000	209.0	H	180.0



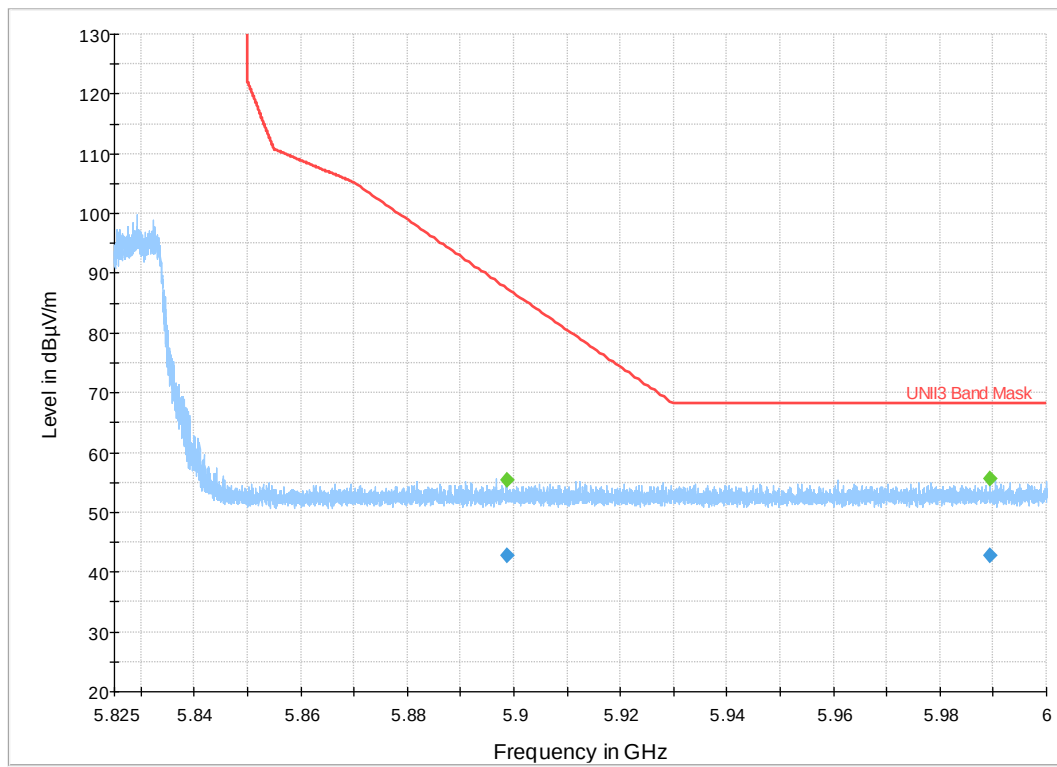
802.11ac, Channel 155, 80MHz BW, VHT6

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5959.855000	---	55.36	---	---	1000.000	103.0	H	69.0
5959.855000	42.60	---	68.16	25.56	1000.000	103.0	H	69.0



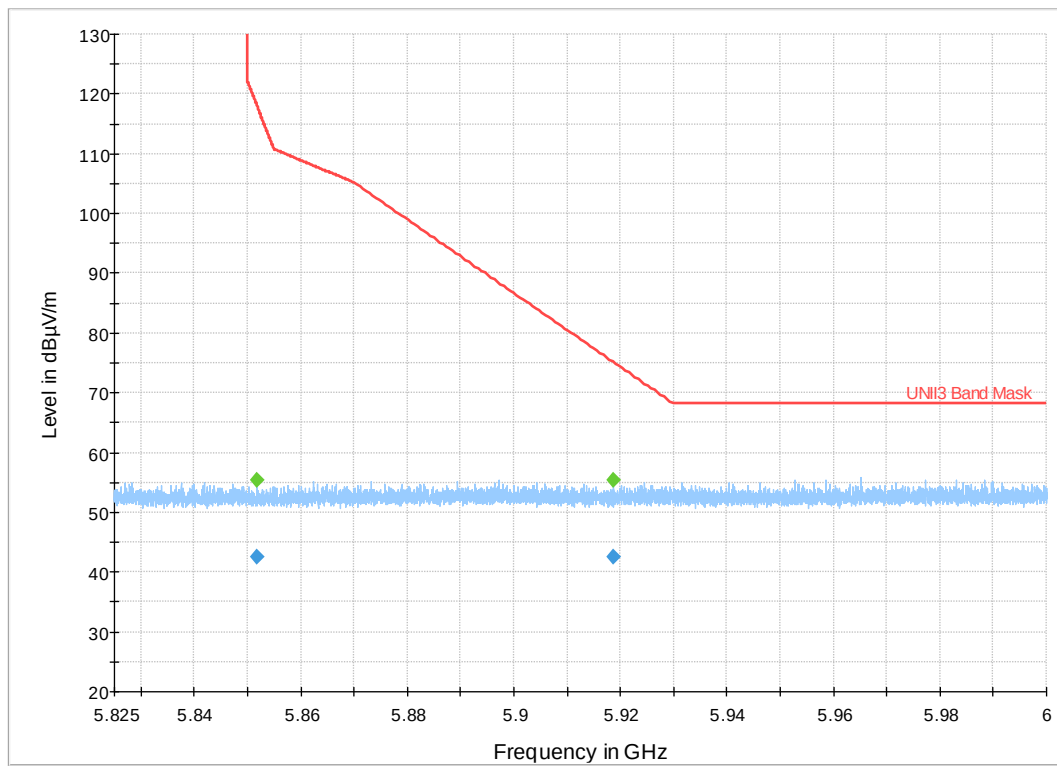
802.11a, Channel 165, 20MHz BW, 6MBPS

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5898.762500	---	55.44	---	---	1000.000	183.0	H	180.0
5898.762500	42.78	---	87.42	44.65	1000.000	183.0	H	180.0
5989.325000	---	55.59	---	---	1000.000	197.0	H	-35.0
5989.325000	42.74	---	68.16	25.42	1000.000	197.0	H	-35.0



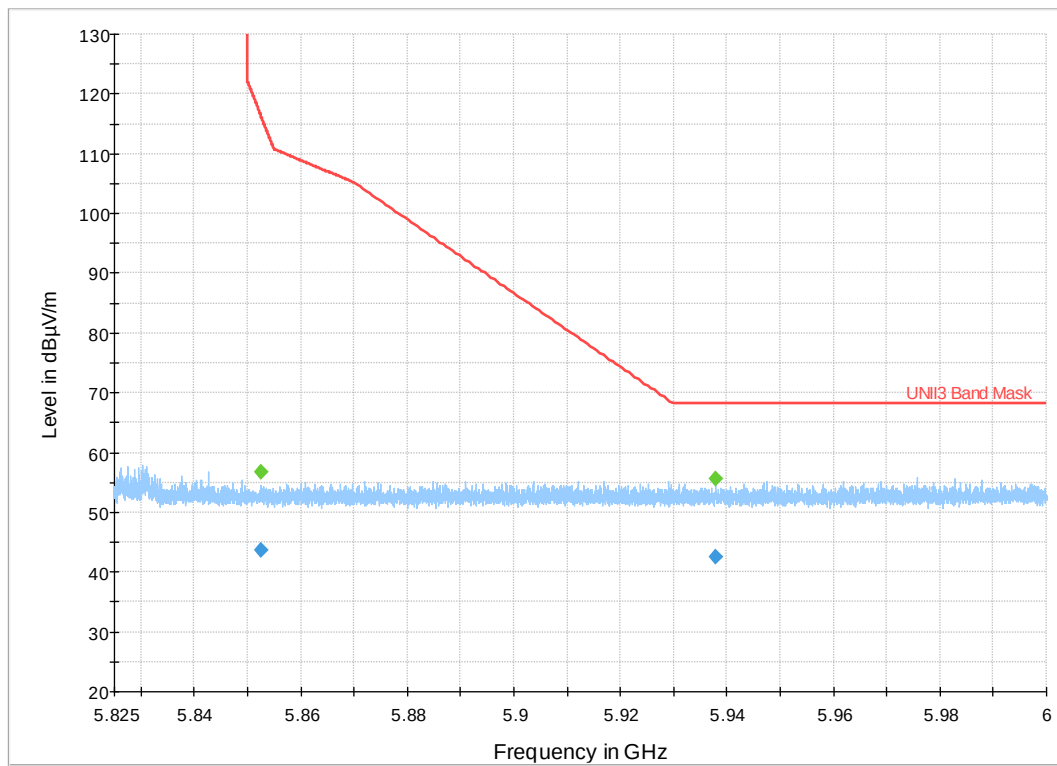
802.11n, Channel 165, 20MHz BW, HT4

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5851.792500	---	55.39	---	---	1000.000	204.0	H	45.0
5851.792500	42.45	---	118.07	75.63	1000.000	204.0	H	45.0
5918.590000	---	55.34	---	---	1000.000	104.0	V	-162.0
5918.590000	42.63	---	75.20	32.57	1000.000	104.0	V	-162.0



802.11n, Channel 159, 40MHz BW, HT8

Frequency (MHz)	Average (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
5852.615000	---	56.80	---	---	1000.000	204.0	H	-180.0
5852.615000	43.67	---	116.20	72.52	1000.000	204.0	H	-180.0
5937.857500	---	55.58	---	---	1000.000	170.0	V	44.0
5937.857500	42.57	---	68.16	25.59	1000.000	170.0	V	44.0



802.11ac, Channel 155, 80MHz BW, VHT6

4.2 Transmitter Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.209, 15.407(b)

4.2.1 Test Methodology

4.2.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pre-scans were performed to determine the worst data rate / chains.

4.2.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, then the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

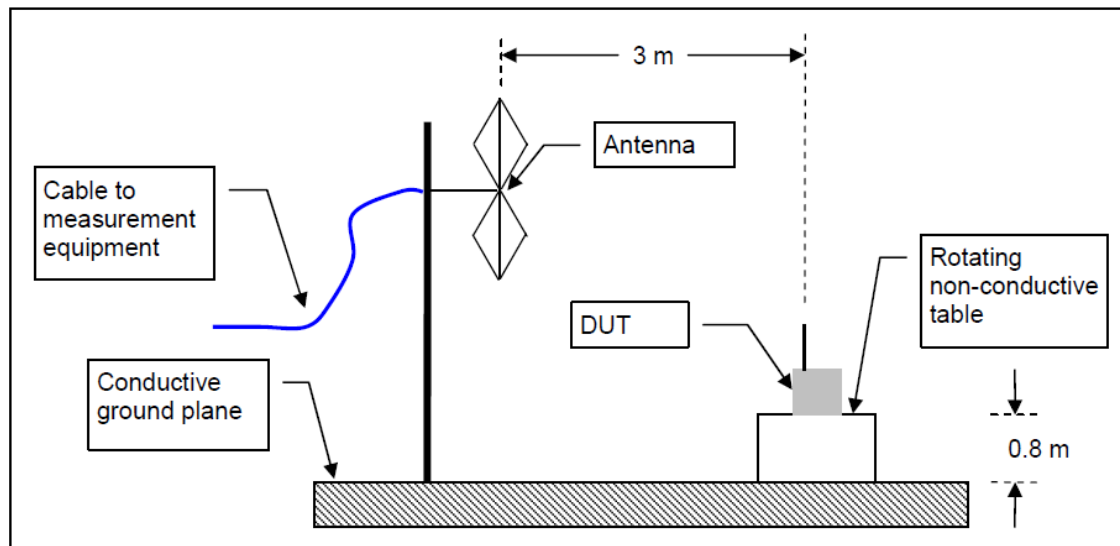
4.2.1.3 Deviations

None.

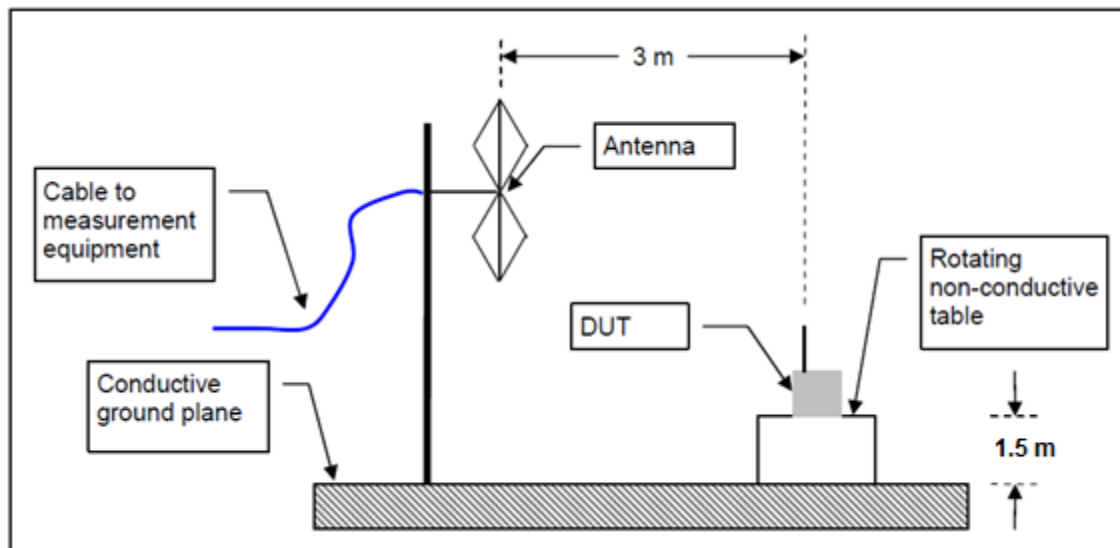
4.2.2 Radiated Test Setup

All tests were conducted at full power on low, middle, and high channels. The DUT was stimulated by manufacturer provided test software that is not available to the end user.

30MHz-1GHz



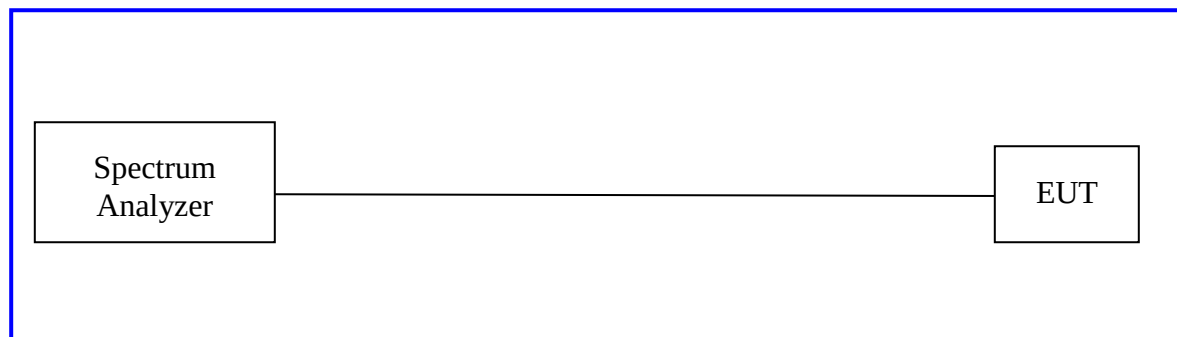
1-40GHz



Spectrum Analyzer Settings:

	Peak Measurement
Detector	Peak
Trace	Max Hold
RBW	1 MHz
VBW	3 MHz
Sweep Points	20001
Span	See Plots

4.2.3 Conducted Test Setup



4.2.4 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2019

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F (kHz)	300
0.490-1.705.....	24000/F (kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

The spurious unrestricted band emissions shall not exceed the value in CFR47 Part 15.407(b) of -27dBm/MHz

4.2.5 Test Results

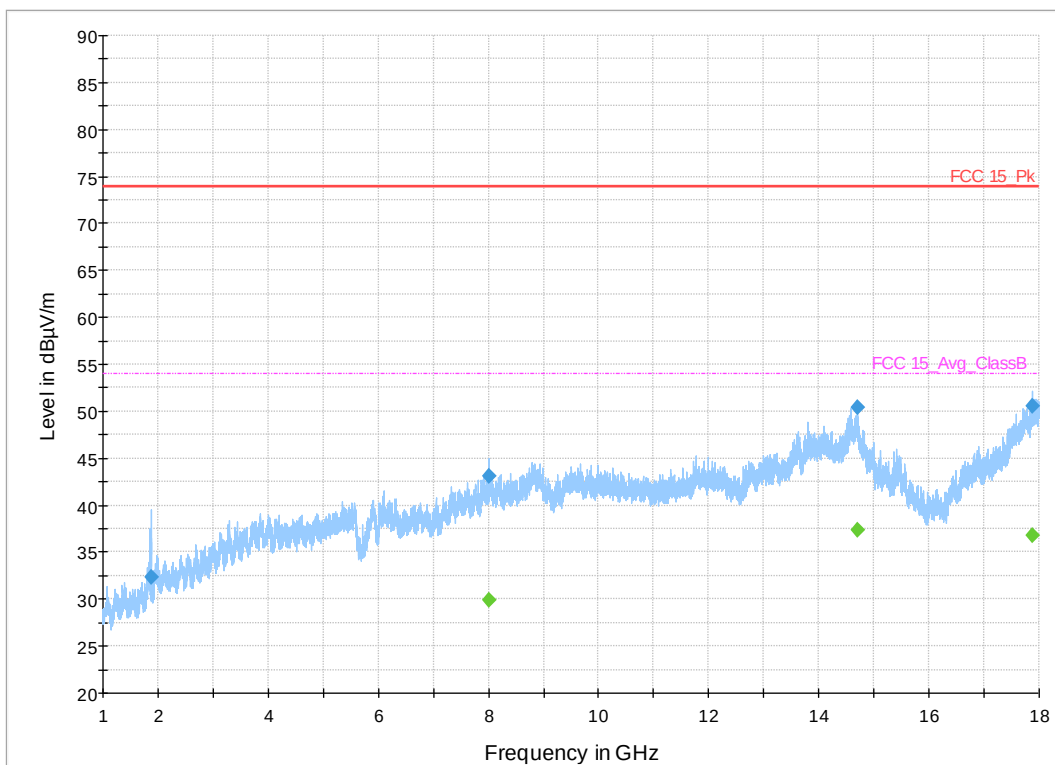
The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Worse case configurations/modes shown below, all plots taken using a peak detector in order to identify frequencies of interest. No emissions were observed below 30MHz or above 26GHz.

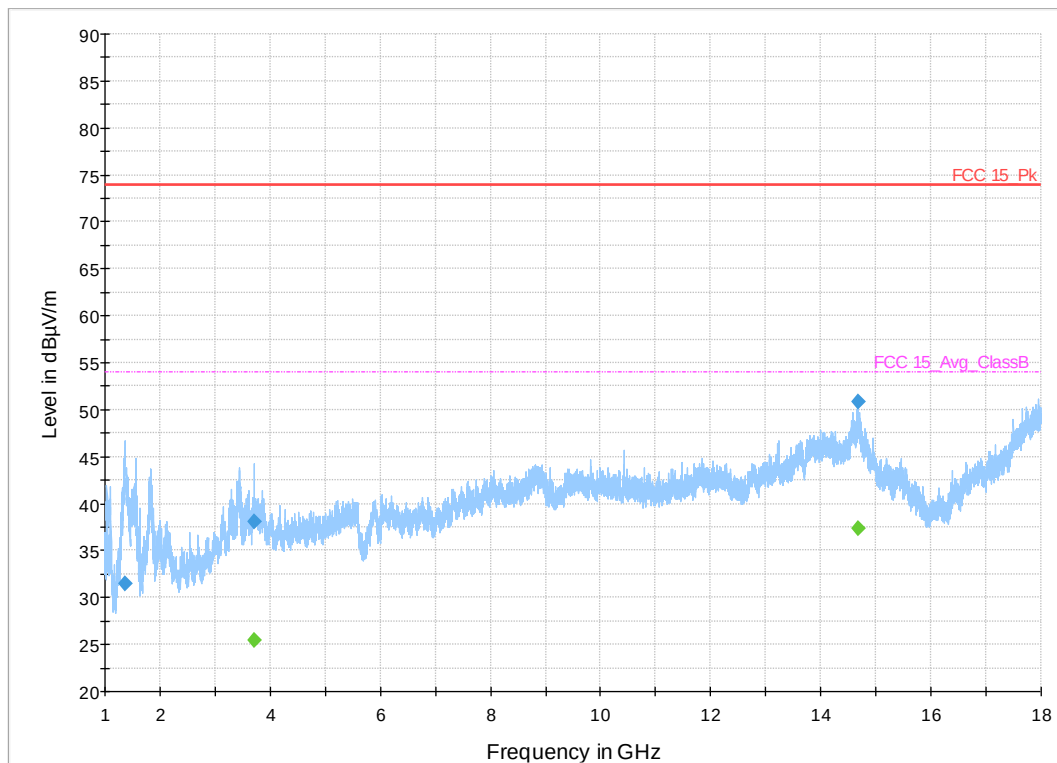
4.2.5.1 Radiated Measurement Plots

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1878.215000	---	19.51	54.00	34.49	1000.000	103.0	V	-180.0
1878.215000	32.36	---	74.00	41.64	1000.000	103.0	V	-180.0
8011.923000	---	29.85	54.00	24.15	1000.000	103.0	V	-180.0
8011.923000	43.13	---	74.00	30.87	1000.000	103.0	V	-180.0
14691.378000	---	37.36	54.00	16.64	1000.000	103.0	V	-180.0
14691.378000	50.35	---	74.00	23.65	1000.000	103.0	V	-180.0
17884.260000	---	36.81	54.00	17.19	1000.000	103.0	V	96.0
17884.260000	50.54	---	74.00	23.46	1000.000	103.0	V	96.0



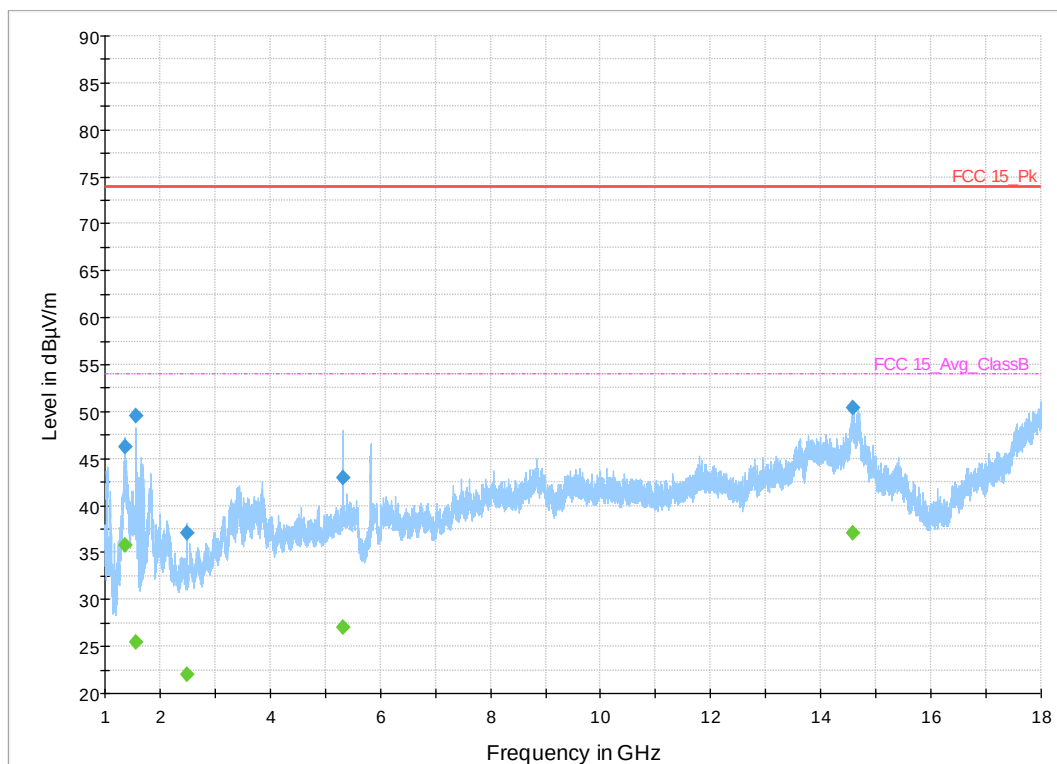
1GHz-18GHz 802.11a, Channel 149, 20MHz BW, 6MBPS

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1366.450500	31.48	---	74.00	42.52	1000.000	202.0	H	23.0
1366.450500	---	18.78	54.00	35.22	1000.000	202.0	H	23.0
3704.700000	38.14	---	74.00	35.86	1000.000	200.0	H	-27.0
3704.700000	---	25.50	54.00	28.50	1000.000	200.0	H	-27.0
14683.861500	---	37.37	54.00	16.63	1000.000	103.0	V	-143.0
14683.861500	50.87	---	74.00	23.13	1000.000	103.0	V	-143.0



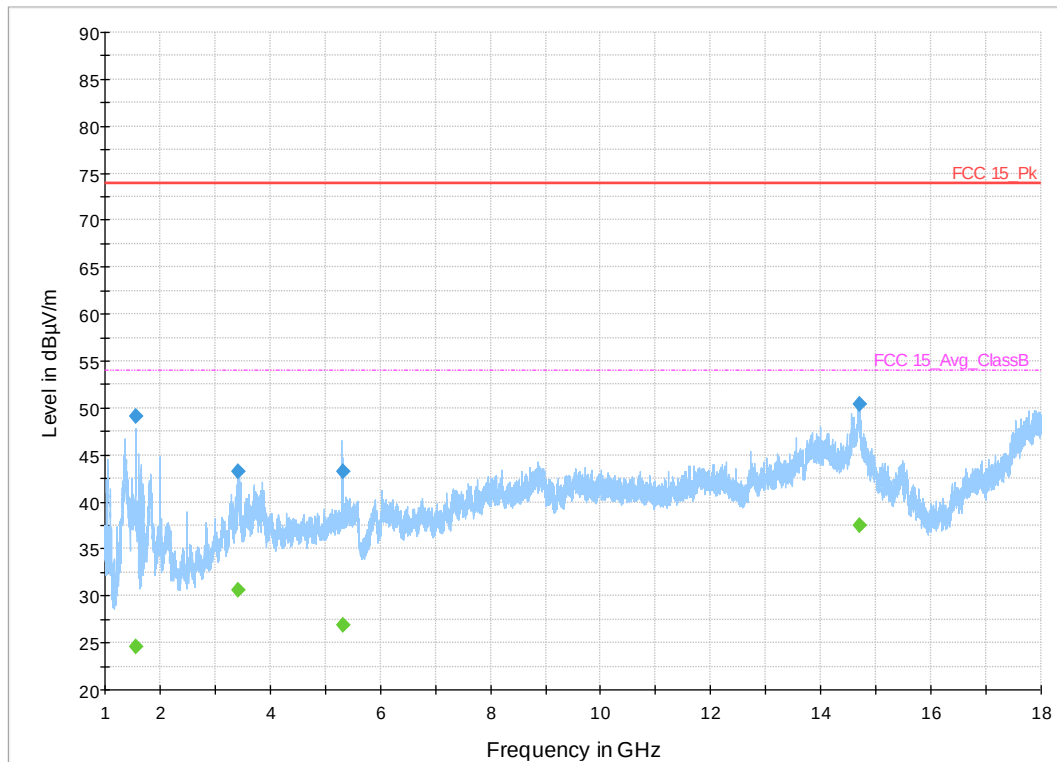
1GHz-18GHz 802.11a, Channel 157, 20MHz BW, 6MBPS

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1364.215000	46.24	---	74.00	27.76	1000.000	200.0	H	43.0
1364.215000	---	35.85	54.00	18.15	1000.000	200.0	H	43.0
1566.470000	---	25.50	54.00	28.50	1000.000	202.0	V	-180.0
1566.470000	49.55	---	74.00	24.45	1000.000	202.0	V	-180.0
2492.391500	---	22.02	54.00	31.98	1000.000	104.0	H	180.0
2492.391500	37.13	---	74.00	36.87	1000.000	104.0	H	180.0
5313.591500	---	27.04	54.00	26.96	1000.000	202.0	H	180.0
5313.591500	42.92	---	74.00	31.08	1000.000	202.0	H	180.0
14590.353000	50.35	---	74.00	23.65	1000.000	104.0	V	132.0
14590.353000	---	37.00	54.00	17.00	1000.000	104.0	V	132.0



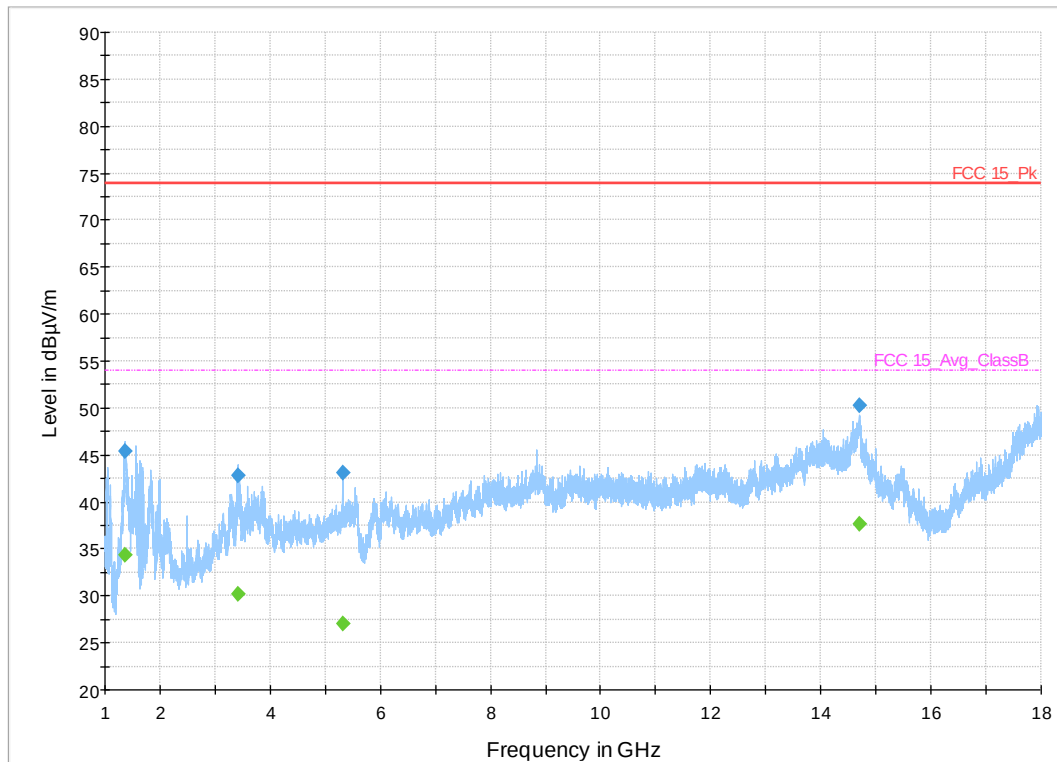
1GHz-18GHz 802.11a, Channel 165, 20MHz BW, 6MBPS

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1563.729000	---	24.53	54.00	29.47	1000.000	202.0	V	-120.0
1563.729000	49.09	---	74.00	24.91	1000.000	202.0	V	-120.0
3413.016000	43.22	---	74.00	30.78	1000.000	202.0	H	32.0
3413.016000	---	30.57	54.00	23.43	1000.000	202.0	H	32.0
5311.411000	---	26.94	54.00	27.06	1000.000	202.0	H	180.0
5311.411000	43.29	---	74.00	30.71	1000.000	202.0	H	180.0
14701.456000	50.48	---	74.00	23.52	1000.000	103.0	V	-180.0
14701.456000	---	37.44	54.00	16.56	1000.000	103.0	V	-180.0



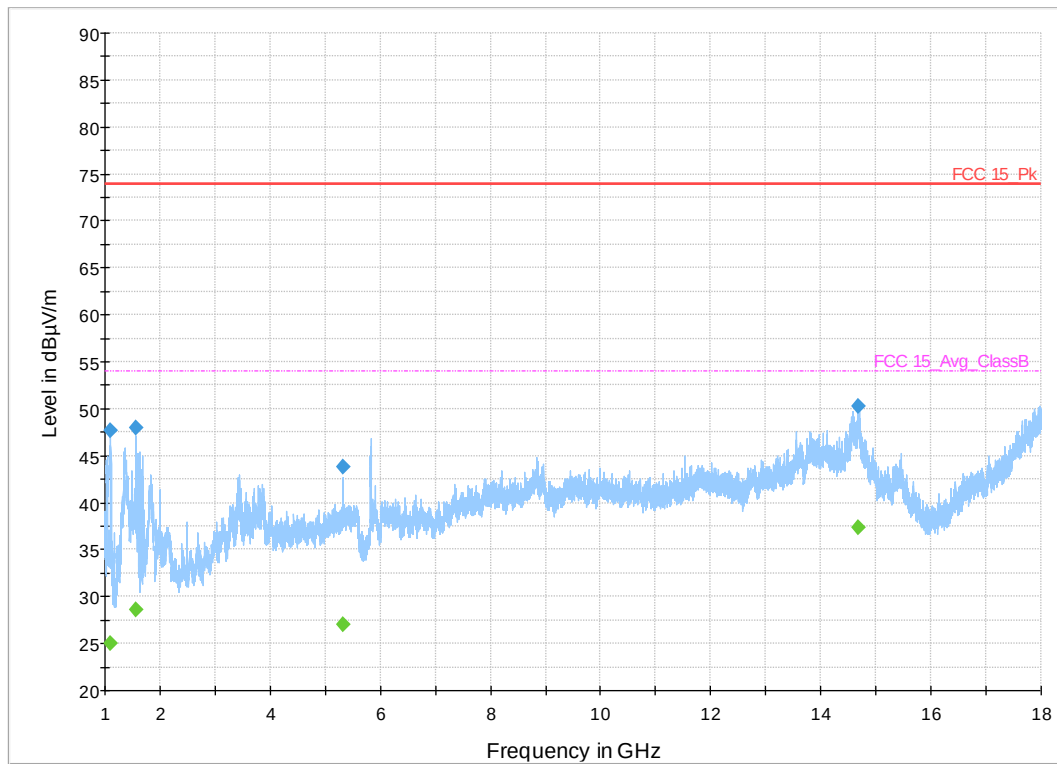
1GHz-18GHz 802.11n, Channel 149, 20MHz BW, HT4

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1369.878500	45.42	---	74.00	28.58	1000.000	200.0	H	-52.0
1369.878500	---	34.29	54.00	19.71	1000.000	200.0	H	-52.0
3416.450000	42.81	---	74.00	31.19	1000.000	202.0	H	23.0
3416.450000	---	30.21	54.00	23.79	1000.000	202.0	H	23.0
5328.595000	---	27.03	54.00	26.97	1000.000	202.0	H	-180.0
5328.595000	43.14	---	74.00	30.86	1000.000	202.0	H	-180.0
14690.435000	---	37.58	54.00	16.42	1000.000	103.0	V	-180.0
14690.435000	50.28	---	74.00	23.72	1000.000	103.0	V	-180.0



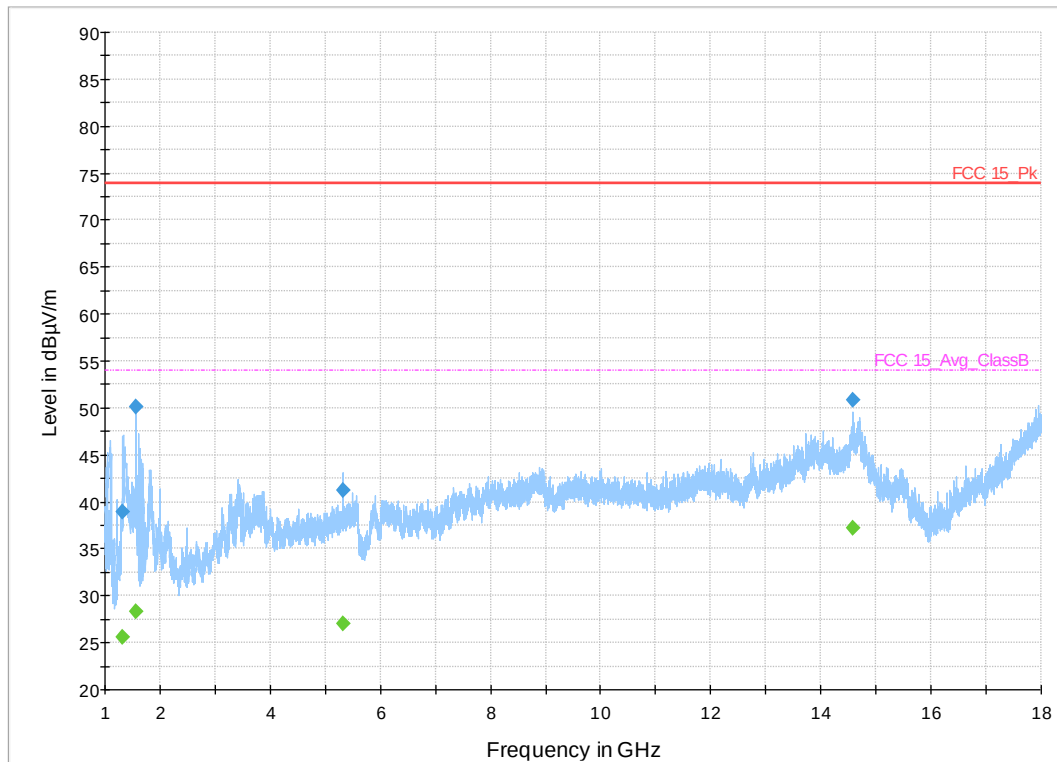
1GHz-18GHz 802.11n, Channel 157, 20MHz BW, HT4

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1102.535500	47.68	---	74.00	26.32	1000.000	152.0	V	180.0
1102.535500	---	25.07	54.00	28.93	1000.000	152.0	V	180.0
1567.535000	---	28.54	54.00	25.46	1000.000	103.0	V	-180.0
1567.535000	47.95	---	74.00	26.05	1000.000	103.0	V	-180.0
5325.890000	---	27.09	54.00	26.91	1000.000	152.0	H	-180.0
5325.890000	43.83	---	74.00	30.17	1000.000	152.0	H	-180.0
14675.476000	50.22	---	74.00	23.78	1000.000	103.0	V	-76.0
14675.476000	---	37.29	54.00	16.71	1000.000	103.0	V	-76.0



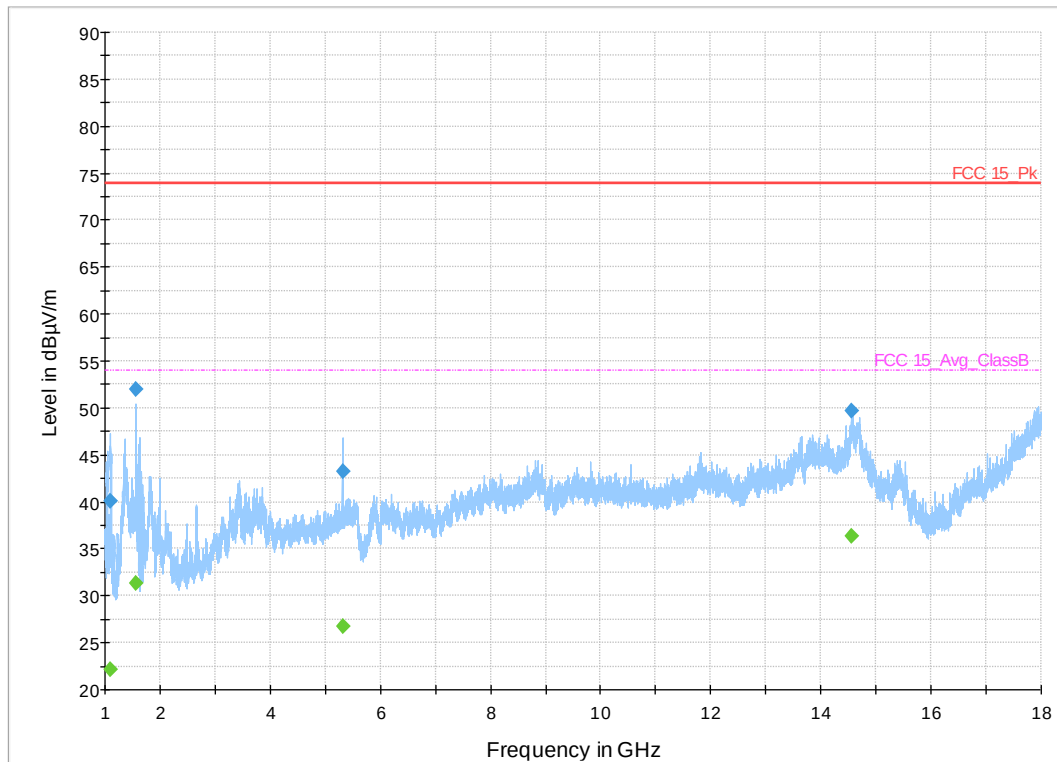
1GHz-18GHz 802.11n, Channel 165, 20MHz BW, HT4

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1328.093500	38.95	---	74.00	35.05	1000.000	103.0	H	-110.0
1328.093500	---	25.54	54.00	28.46	1000.000	103.0	H	-110.0
1562.530500	50.06	---	74.00	23.94	1000.000	104.0	H	-141.0
1562.530500	---	28.37	54.00	25.63	1000.000	104.0	H	-141.0
5330.751000	---	27.03	54.00	26.97	1000.000	152.0	H	180.0
5330.751000	41.27	---	74.00	32.73	1000.000	152.0	H	180.0
14578.231000	---	37.20	54.00	16.80	1000.000	104.0	V	180.0
14578.231000	50.78	---	74.00	23.22	1000.000	104.0	V	180.0



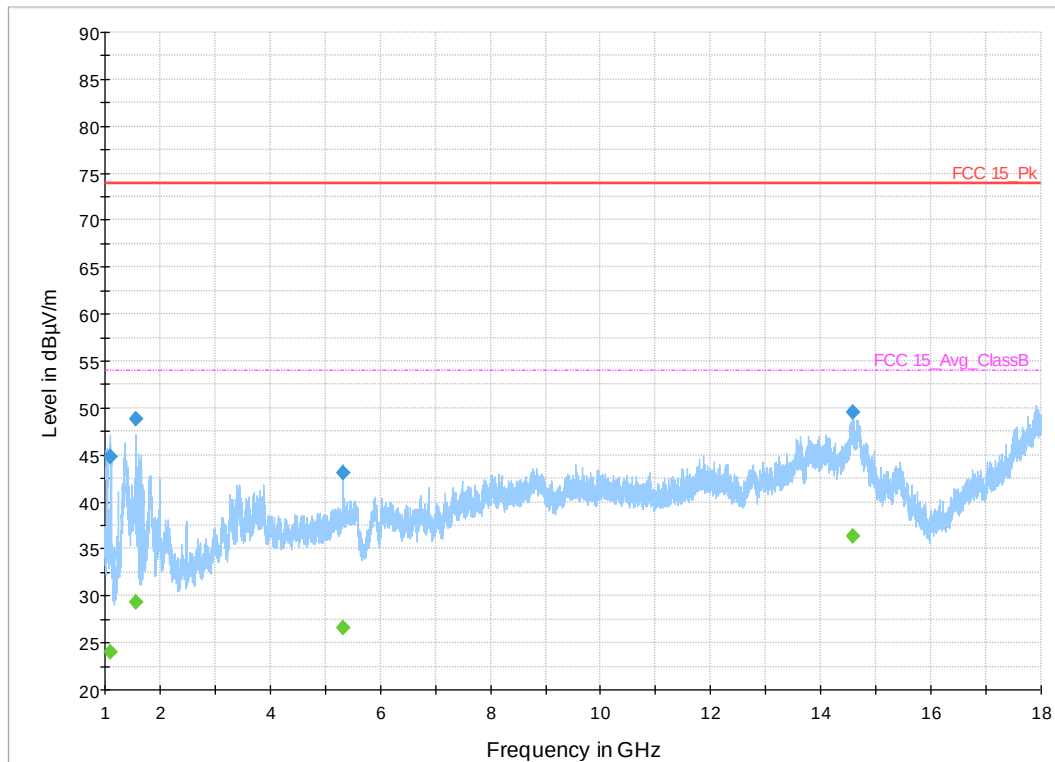
1GHz-18GHz 802.11n, Channel 151, 40MHz BW, HT8

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1107.012500	---	22.16	54.00	31.84	1000.000	103.0	H	-149.0
1107.012500	40.01	---	74.00	33.99	1000.000	103.0	H	-149.0
1564.671000	52.06	---	74.00	21.94	1000.000	200.0	H	154.0
1564.671000	---	31.37	54.00	22.63	1000.000	200.0	H	154.0
5312.682000	43.23	---	74.00	30.77	1000.000	201.0	H	-180.0
5312.682000	---	26.73	54.00	27.27	1000.000	201.0	H	-180.0
14563.313000	---	36.42	54.00	17.58	1000.000	104.0	V	180.0
14563.313000	49.65	---	74.00	24.35	1000.000	104.0	V	180.0



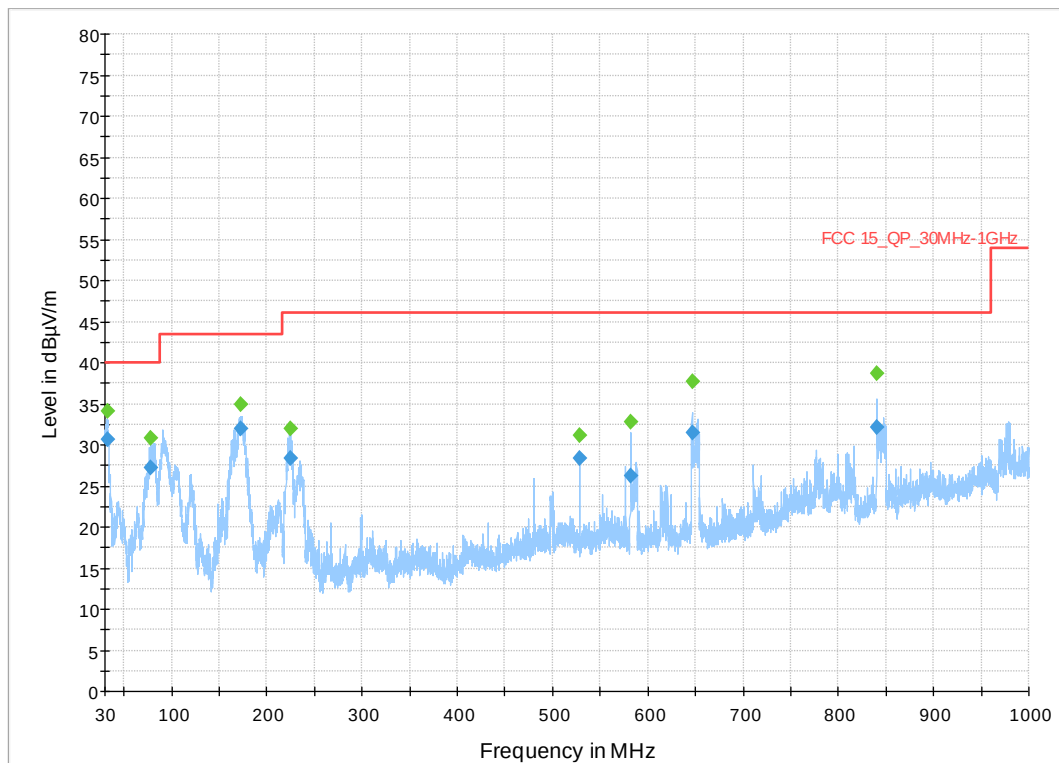
1GHz-18GHz 802.11n, Channel 159, 40MHz BW, HT8

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
1102.487500	44.83	---	74.00	29.17	1000.000	201.0	V	180.0
1102.487500	---	23.98	54.00	30.02	1000.000	201.0	V	180.0
1561.950500	---	29.30	54.00	24.70	1000.000	103.0	V	-180.0
1561.950500	48.89	---	74.00	25.11	1000.000	103.0	V	-180.0
5318.428000	---	26.63	54.00	27.37	1000.000	201.0	H	180.0
5318.428000	43.06	---	74.00	30.94	1000.000	201.0	H	180.0
14585.449500	49.49	---	74.00	24.51	1000.000	103.0	V	-96.0
14585.449500	---	36.35	54.00	17.65	1000.000	103.0	V	-96.0



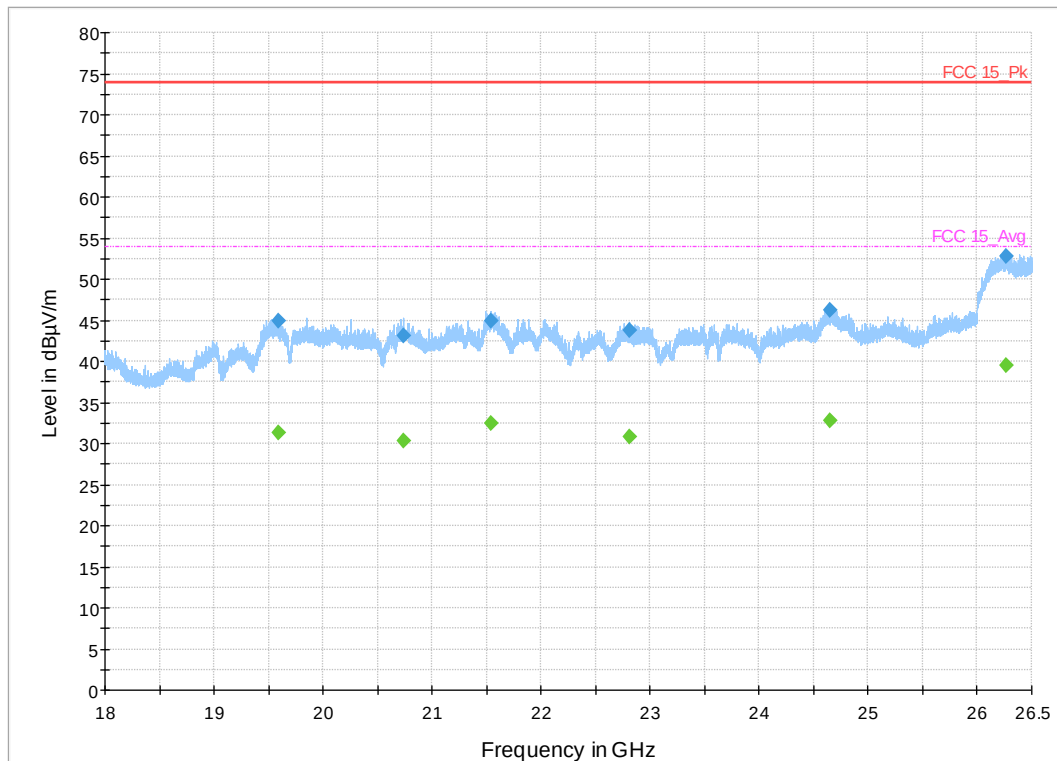
1GHz-18GHz 802.11ac, Channel 155, 80MHz BW, VHT6

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
32.301720	---	34.08	---	---	120.000	103.0	V	-180.0
32.301720	30.59	---	40.00	9.41	120.000	103.0	V	-180.0
77.307280	27.19	---	40.00	12.81	120.000	202.0	V	180.0
77.307280	---	30.75	---	---	120.000	202.0	V	180.0
172.474800	---	34.97	---	---	120.000	202.0	V	-12.0
172.474800	31.95	---	43.52	11.57	120.000	202.0	V	-12.0
224.990520	---	31.90	---	---	120.000	103.0	H	22.0
224.990520	28.31	---	46.00	17.69	120.000	103.0	H	22.0
527.991520	28.43	---	46.00	17.57	120.000	202.0	H	-175.0
527.991520	---	31.10	---	---	120.000	202.0	H	-175.0
581.799640	26.16	---	46.00	19.84	120.000	202.0	H	165.0
581.799640	---	32.75	---	---	120.000	202.0	H	165.0
646.398720	---	37.66	---	---	120.000	103.0	H	152.0
646.398720	31.39	---	46.00	14.61	120.000	103.0	H	152.0
840.418760	32.17	---	46.00	13.83	120.000	202.0	V	149.0
840.418760	---	38.66	---	---	120.000	202.0	V	149.0



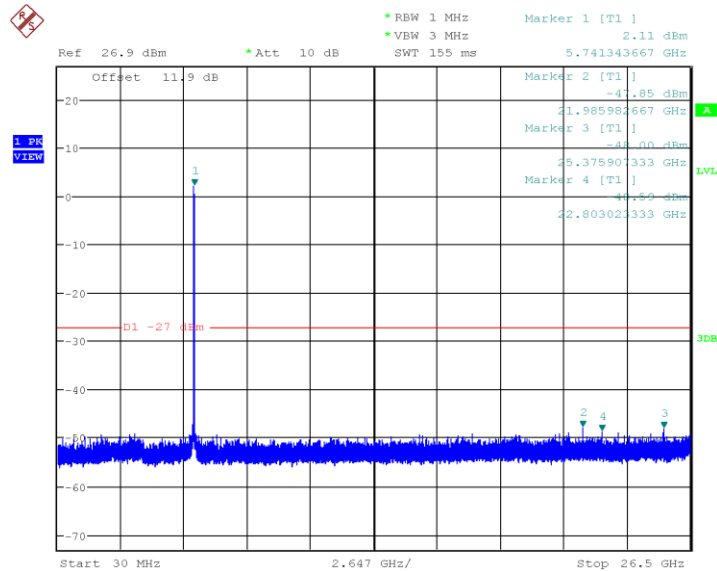
30MHz-1GHz 802.11n, Channel 157, 20MHz BW, HT4

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
19589.207500	---	31.36	54.00	22.64	1000.000	216.0	H	-180.0
19589.207500	44.95	---	74.00	29.05	1000.000	216.0	H	-180.0
20736.081875	43.09	---	74.00	30.91	1000.000	225.0	V	-180.0
20736.081875	---	30.31	54.00	23.69	1000.000	225.0	V	-180.0
21540.095000	45.00	---	74.00	29.00	1000.000	225.0	V	-178.0
21540.095000	---	32.43	54.00	21.57	1000.000	225.0	V	-178.0
22807.903750	43.72	---	74.00	30.28	1000.000	175.0	V	-180.0
22807.903750	---	30.80	54.00	23.20	1000.000	175.0	V	-180.0
24646.222500	---	32.75	54.00	21.25	1000.000	101.0	V	-104.0
24646.222500	46.16	---	74.00	27.84	1000.000	101.0	V	-104.0
26264.929375	52.73	---	74.00	21.27	1000.000	175.0	V	-171.0
26264.929375	---	39.55	54.00	14.45	1000.000	175.0	V	-171.0



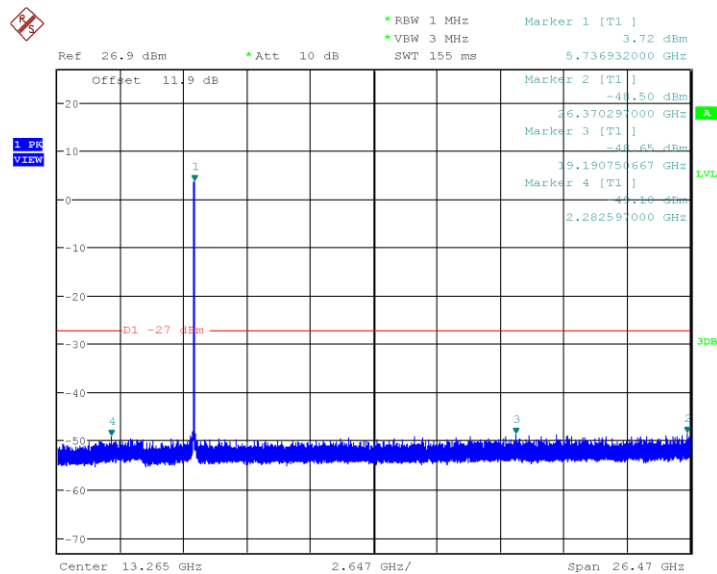
18-26GHz 802.11n, Channel 157, 20MHz BW, HT4

4.2.5.2 Conducted Measurement Plots



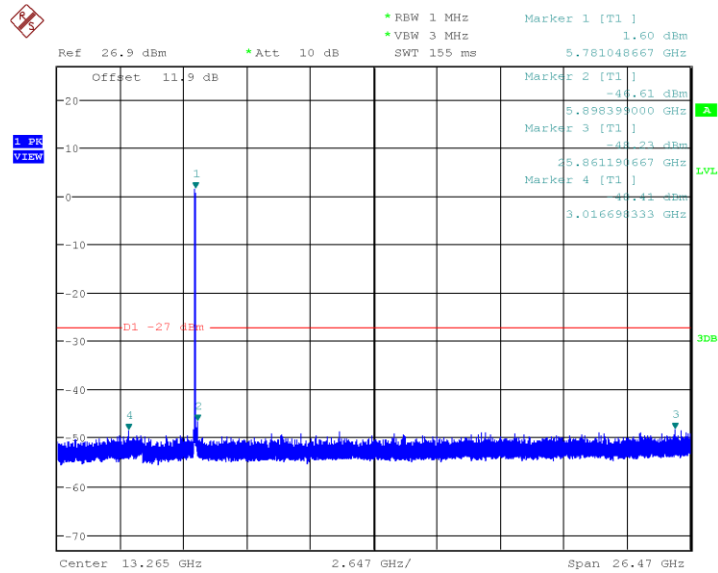
Date: 31.MAR.2020 13:06:54

30MHz-26.5GHz 802.11a, Channel 149, 20MHz BW, 6MBPS – Chain A



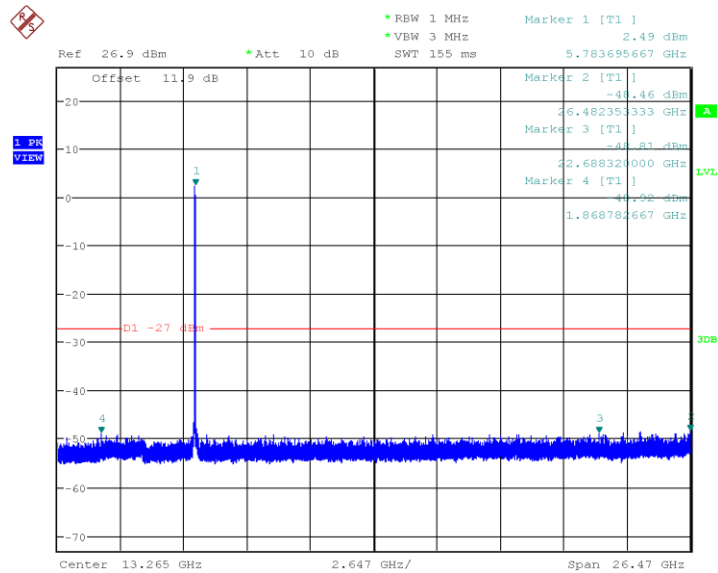
Date: 31.MAR.2020 13:56:48

30MHz-26.5GHz 802.11a, Channel 149, 20MHz BW, 6MBPS – Chain B



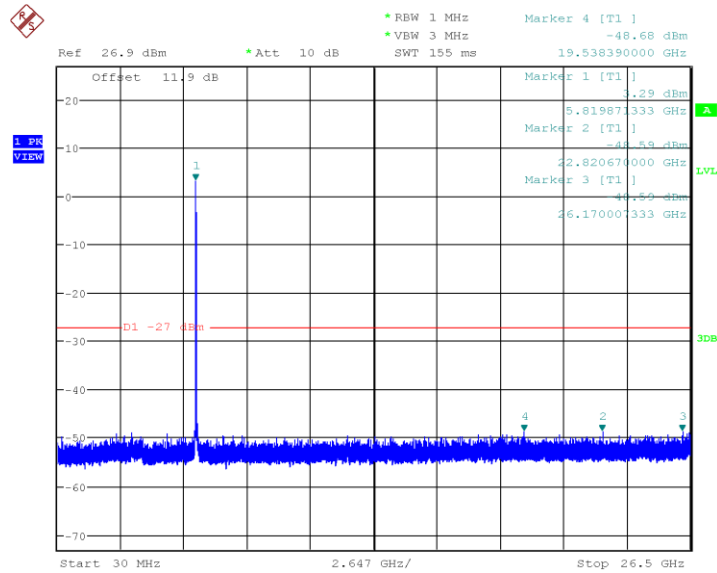
Date: 31.MAR.2020 13:11:18

30MHz-26.5GHz 802.11a, Channel 157, 20MHz BW, 6MBPS – Chain A



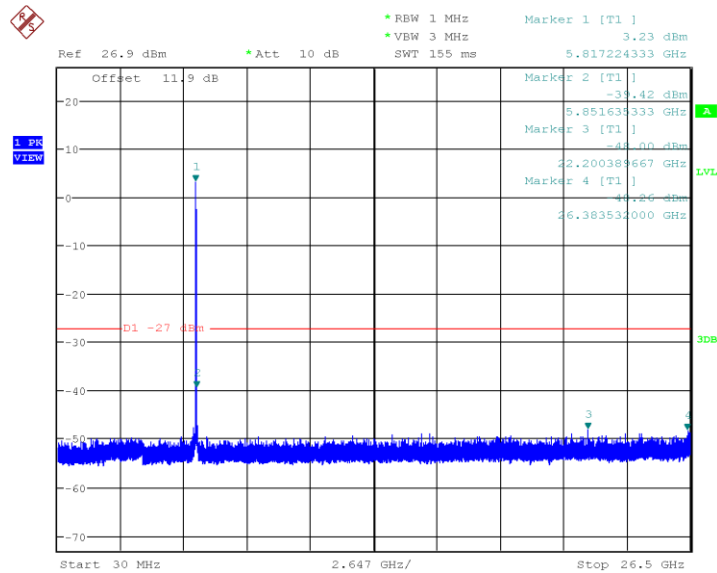
Date: 31.MAR.2020 14:00:30

30MHz-26.5GHz 802.11a, Channel 157, 20MHz BW, 6MBPS – Chain B



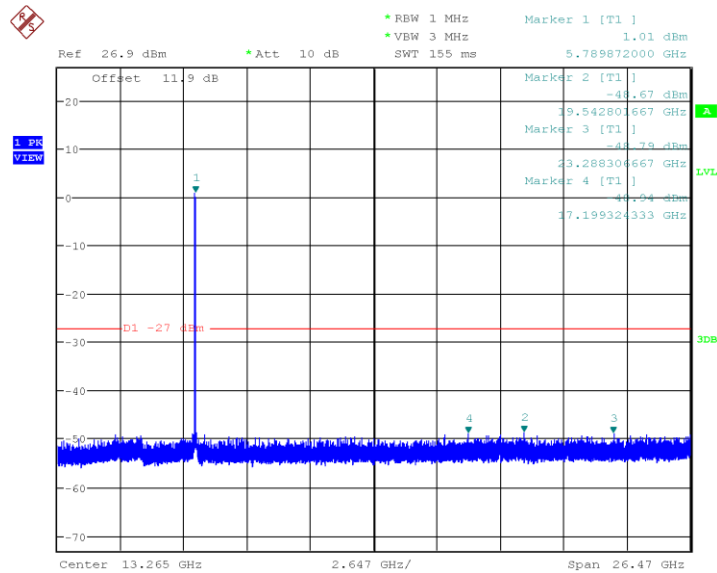
Date: 31.MAR.2020 13:19:21

30MHz-26.5GHz 802.11a, Channel 165, 20MHz BW, 6MBPS – Chain A



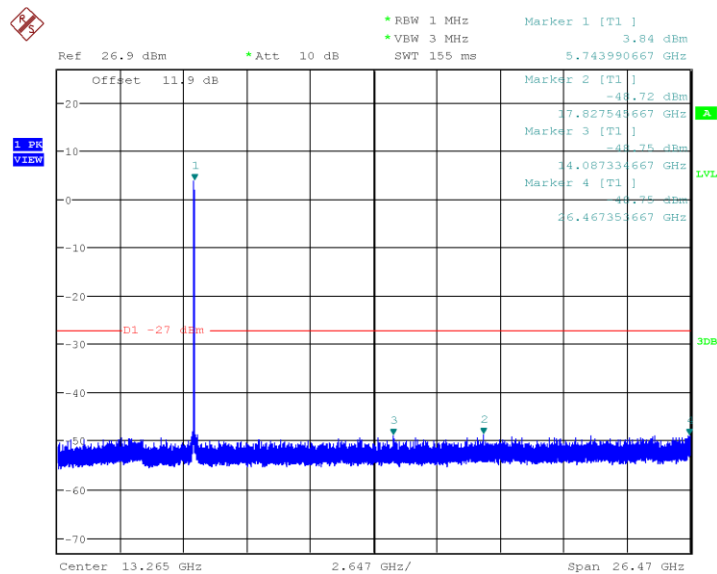
Date: 31.MAR.2020 14:09:12

30MHz-26.5GHz 802.11a, Channel 165, 20MHz BW, 6MBPS – Chain B



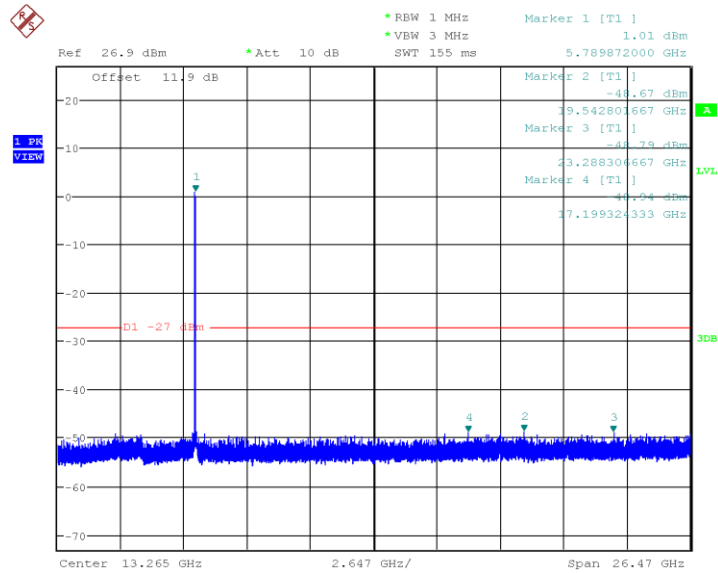
Date: 31.MAR.2020 13:30:43

30MHz-26.5GHz 802.11n, Channel 149, 20MHz BW, HT4 – Chain A



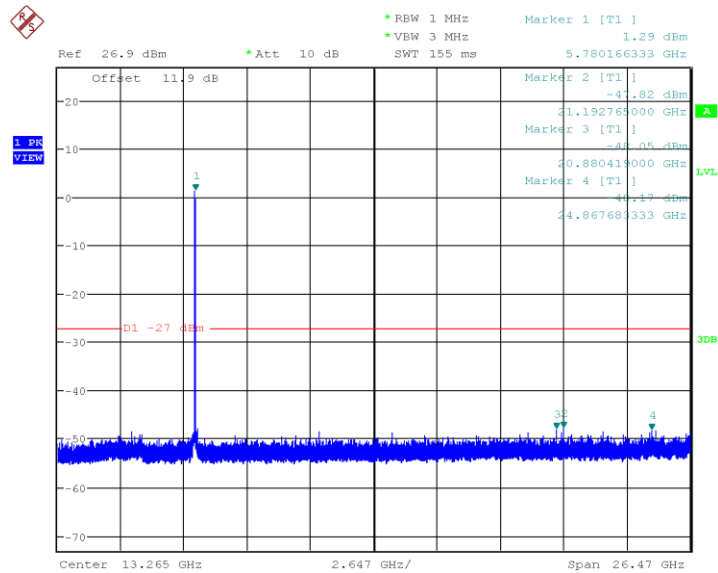
Date: 31.MAR.2020 14:17:32

30MHz-26.5GHz 802.11n, Channel 149, 20MHz BW, HT4 – Chain B



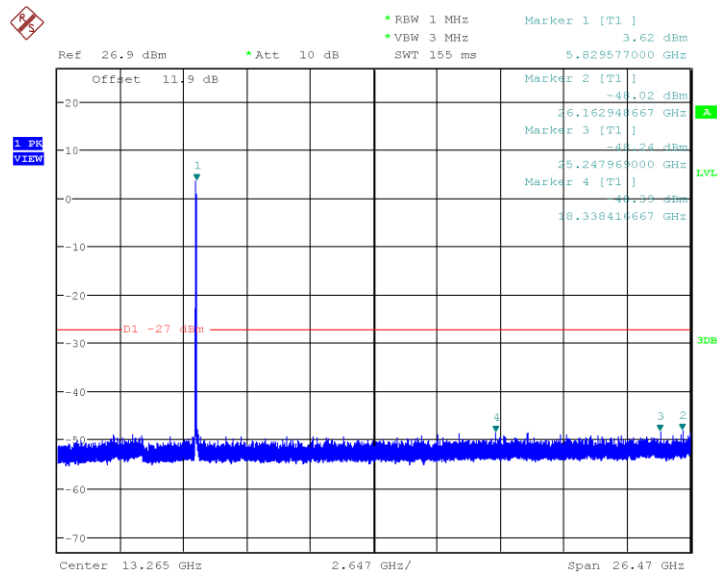
Date: 31.MAR.2020 13:30:43

30MHz-26.5GHz 802.11n, Channel 157, 20MHz BW, HT4 – Chain A



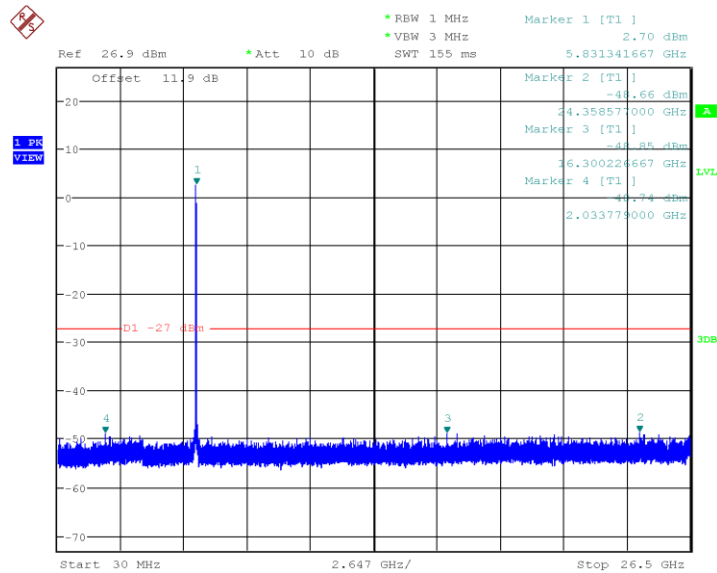
Date: 31.MAR.2020 14:14:48

30MHz-26.5GHz 802.11n, Channel 157, 20MHz BW, HT4 – Chain B



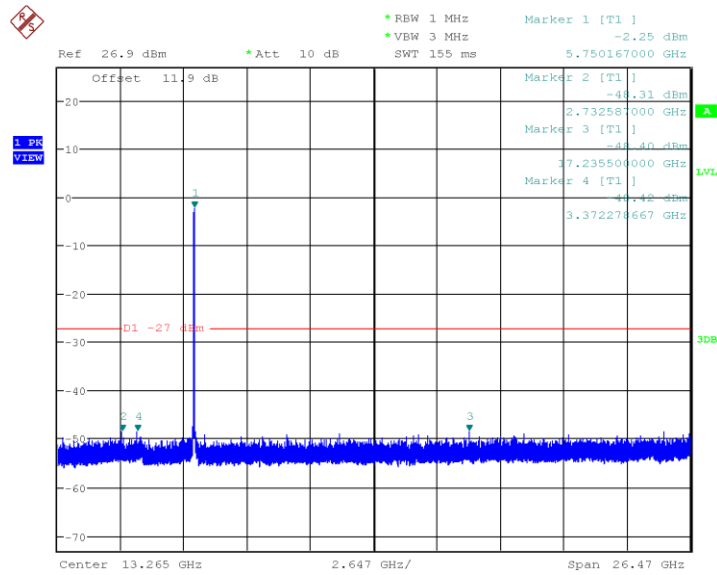
Date: 31.MAR.2020 13:23:25

30MHz-26.5GHz 802.11n, Channel 165, 20MHz BW, HT4 – Chain A



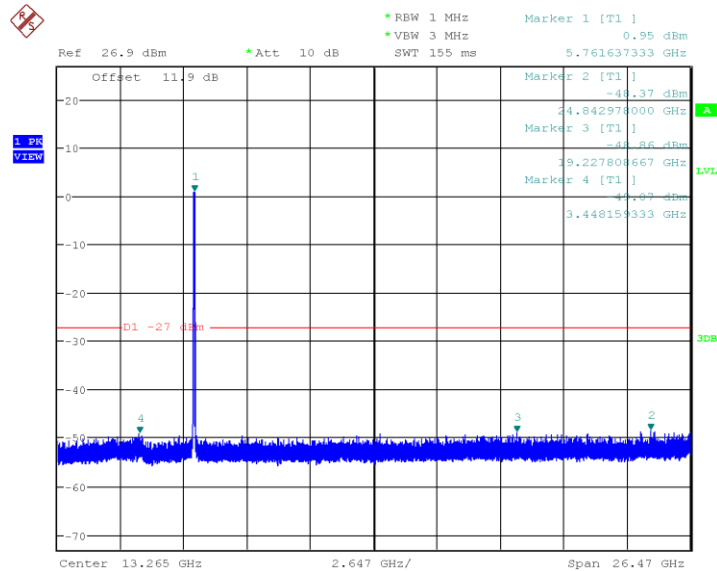
Date: 31.MAR.2020 14:11:27

30MHz-26.5GHz 802.11n, Channel 165, 20MHz BW, HT4 – Chain B



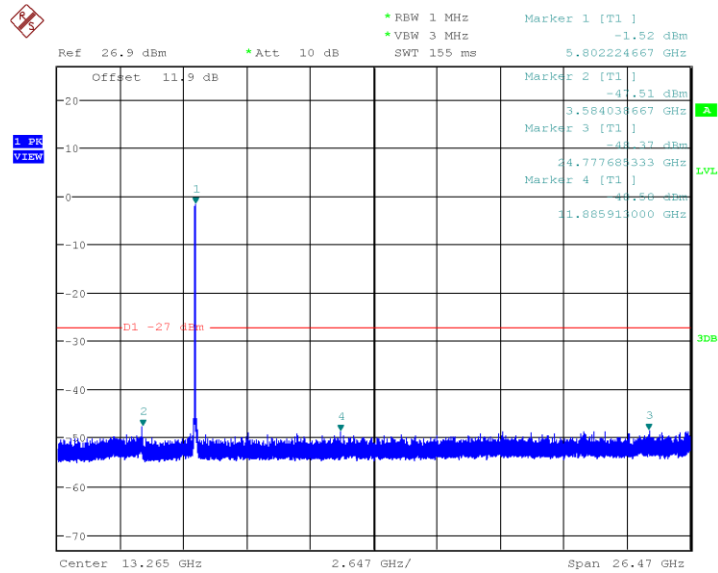
Date: 31.MAR.2020 13:36:39

30MHz-26.5GHz 802.11n, Channel 151, 40MHz BW, HT8 – Chain A



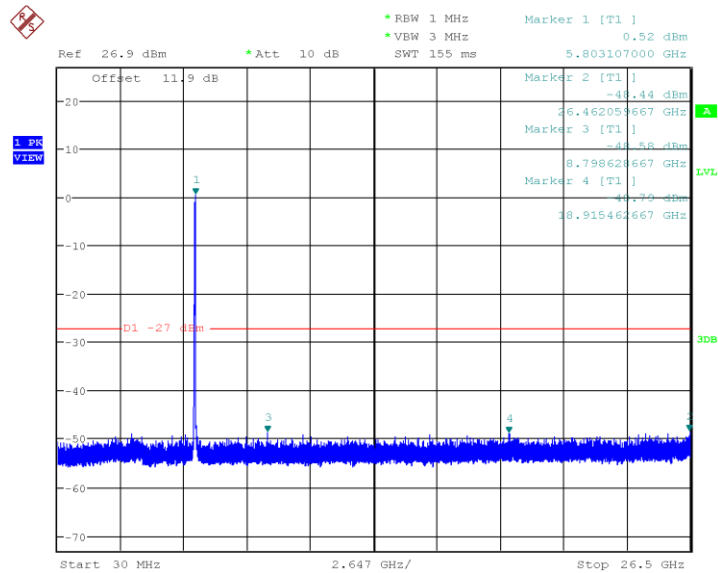
Date: 31.MAR.2020 14:20:30

30MHz-26.5GHz 802.11n, Channel 151, 40MHz BW, HT8 – Chain B



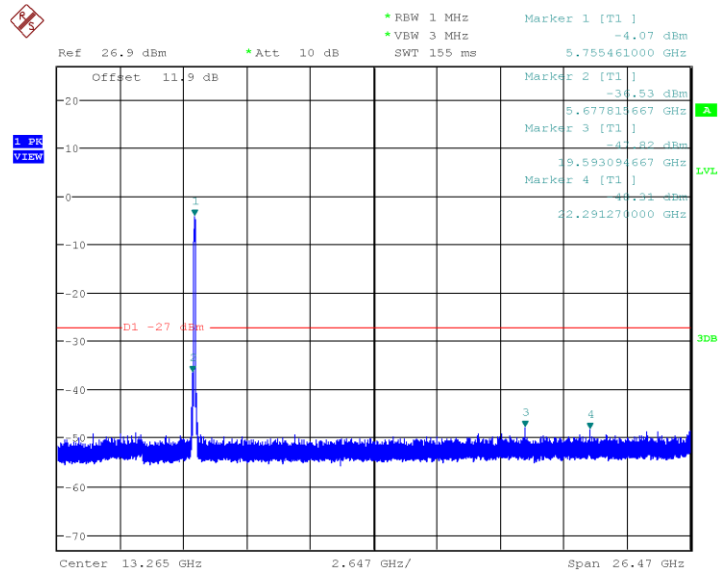
Date: 31.MAR.2020 13:41:07

30MHz-26.5GHz 802.11n, Channel 159, 40MHz BW, HT8 – Chain A



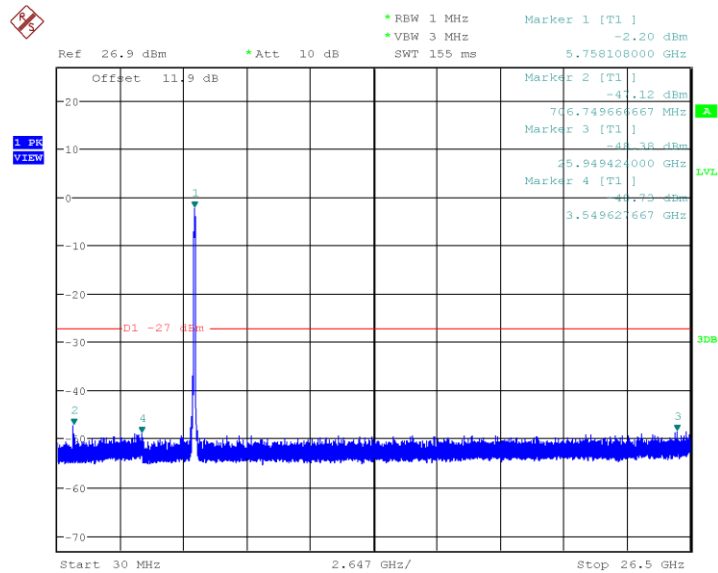
Date: 31.MAR.2020 14:25:06

30MHz-26.5GHz 802.11n, Channel 159, 40MHz BW, HT8 – Chain B



Date: 31.MAR.2020 13:45:16

30MHz-26.5GHz 802.11ac, Channel 155, 80MHz BW, VHT6 – Chain A



Date: 31.MAR.2020 13:51:16

30MHz-26.5GHz 802.11ac, Channel 155, 80MHz BW, VHT6 – Chain B

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yyyy	Next Cal mm/dd/yyyy
Spectrum Analyzer	Rohde & Schwarz	FSU26.5	1166.1660.26	02/23/2020	02/23/2021
EMI Receiver	Rohde & Schwarz	ESW44	101663-dv	07/18/2019	07/18/2021
Preamplifier, 9 kHz – 1 GHz	Sonoma	310N	213221	01/16/2019	01/16/2021
Bilog Antenna	Sunol Sciences	JB3	A061907	12/19/2018	12/19/2020
Amplifier	Miteq	TTA1800-30-HG	1842452	01/15/2019	01/15/2021
Horn Antenna	Sunol Sciences	DRH-118	A040806	03/05/2019	03/05/2021
Amplifier	HP	8449B	3008A01013	01/15/2019	01/15/2021
Horn Antenna	EMCO	RA42-K-F-B-C	020131-004	03/04/2019	03/04/2021
Amplifier	Rohde & Schwarz	TS-PR26	3545.7014.03	03/04/2019	03/04/2021
Amplifier	Sonoma	310N	185516	N/A (See Note)	
5725-5825MHZ Band Pass Filter	Microtronics	BRM50702	009	N/A (See Note)	

Note: Equipment is characterized before use.

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 2: Customer Information

Company Name	GE Inspection Technologies, LP
Address	721 Visions Drive
City, State, Zip	Skaneateles, NY 13152
Country	USA

Table 3: Technical Contact Information

Name	Scott Lockhart
E-mail	scott.lockhart@bakerhughes.com

6.3 Equipment Under Test (EUT)

The information provided in the following table should be listed as it should appear in the final report. For those products that have only a model name, list the model number as *non-applicable* and vice-versa.

Table 4: EUT Designation

Product Name	MViQCSYSZ-CCCC
Model Number	7260HMW

6.4 Product Specifications

Table 5: EUT Specifications

EUT Specifications	
Environment	Indoor/Outdoor
Operating Temperature Range:	-20 to +46°C
Multiple Feeds:	☒ Yes and how many 2 ☐ No
Product Marketing Name (PMN)	MViQCSYSZ-CCCC
Hardware Version Identification Number (HVIN)	C
Firmware Version Identification Number (FVIN)	3.40.20055.1
RF Software Version	Intel DRTU 1.6.0-0510
Operating Modes	802.11 a/n/ac
Transmitter Frequency Band	5745MHz-5825MHz
TX/RX Chain (s)	SISO/MIMO
Type of Equipment	☐ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☒ Other:
Note: EUT will be on / transmitted at all times with the highest power levels and antenna gains per channel.	

Table 6: Antenna Information

Number	Antenna Type	Description	Max Gain (dBi)
Antenna 0	Stamped Metal	Internal Antenna	4.2
Antenna 1	Stamped Metal	Internal Antenna	4.2

Table 7: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
USB - Serial	USB	No	☒ Metric: < 3.0m	N/A

Table 8: Accessory Equipment

Equipment	Manufacturer	Model	Serial	Comment
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Note: None				

Table 9: Ancillary Equipment (used for test purposes only)

Equipment	Manufacturer	Model	Serial	Used for
USB Mouse	HP	N/A	N/A	Used to set test software
Note: None.				

Table 10: Description of Sample used for Testing

Device	Serial	RF Connection	CFR47 Part 15.407
7260HMW	N/A	Integrated Antenna	Radiated Emissions
		Direct via SMA Connection	Conducted Emissions

Table 11: Description of Test Configuration used for Radiated Measurement.

Device	Mode	Setup Photo (X-Axis)	Setup Photo (Y-Axis)	Setup Photo (Z-Axis)
7260HMW	Transmit	EUT Upright	--	--
Note: Worse case during radiated measurements were found when EUT was set on its “X-Axis”. All testing completed from this Axis (See Test setup for Images)				

6.5 Test Specifications

Table 12: Test Specifications

Emissions and Immunity	
Standard	Requirement
CFR 47 Part 15.407: 2019	All
RSS 247 Issue 2, 2017	All

END OF REPORT