

FCC Test Report

Product Name	Panasonic VP4R-A
Model No	VP4R-A
FCC ID	ACJ-VP4RA

Applicant	Panasonic Corporation of North America
Address	Two Riverfront Plaza, 9th Floor, 07102-5490 Newark, New Jersey, USA

Date of Receipt	Apr. 10, 2017
Issued Date	Apr. 17, 2017
Report No.	1740217R-RFUSP05V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Test Report

Issued Date: Apr. 17, 2017

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Product Name	Panasonic VP4R-A
Applicant	Panasonic Corporation of North America
Address	Two Riverfront Plaza, 9th Floor, 07102-5490 Newark, New Jersey, USA
Manufacturer	Panasonic Automotive Systems Company
Model No.	VP4R-A
FCC ID.	ACJ-VP4RA
EUT Rated Voltage	DC 12V
EUT Test Voltage	DC 12V
Trade Name	Panasonic
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2015 ANSI C63.4: 2014, ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v01r03
Test Result	Complied

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(Senior Adm. Specialist / Jinn Chen)

Tested By : Ivan Chuang
(Senior Engineer / Ivan Chuang)


Approved By : 
(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Panasonic VP4R-A
Trade Name	Panasonic
FCC ID.	ACJ-VP4RA
Model No.	VP4R-A
Frequency Range	802.11a/n-20MHz: 5745-5825MHz 802.11n-40MHz: 5755-5795MHz 802.11ac-80MHz: 5775MHz
Number of Channels	802.11a/n-20MHz: 10; 802.11n-40MHz: 2 802.11ac-80MHz: 1
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 150Mbps 802.11ac-80MHz: up to 433.3MHz
Channel Control	Auto
Type of Modulation	802.11a/n/AC: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna type	PCB Antenna
Antenna Gain	Refer to the table "Antenna List"
Signal Cable	Non-shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Panasonic	N/A	PCB Antenna	1dBi For 5.725~5.825GHz

Note: 1. The antenna of EUT is conform to FCC 15.203.

2. Only the higher gain antenna was tested and recorded in this report

802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

802.11n-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency
Channel 151:	5755 MHz	Channel 159:	5795 MHz

802.11ac-80MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 155:	5775 MHz						

Note:

1. This device is a Panasonic VP4R-A with a built-in 802.11a/n/AC WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. At result of pretests, module supports dual-channel transmission, only the worst case is shown in the report.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
5. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmit (802.11a-6Mbps) Mode 2: Transmit (802.11n-20BW 7.2Mbps) Mode 3: Transmit (802.11n-40BW 15Mbps) Mode 4: Transmit (802.11ac-80BW-32.5Mbps)
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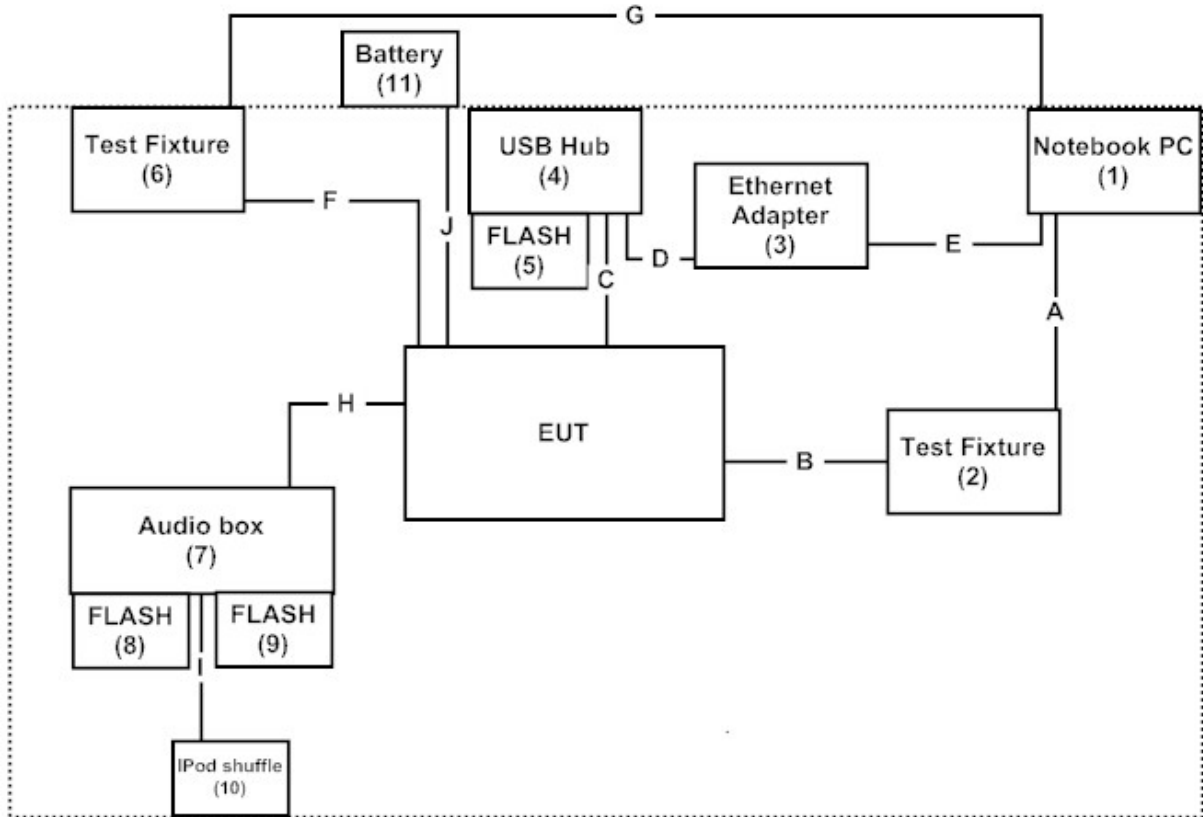
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord	
1	Notebook PC	DELL	P62G	416FJC2	Non-shielded, 1.8m
2	Test Fixture	AT4	N/A	N/A	N/A
3	Ethernet Adapter	TRIPPLITE	U236-000-R	N/A	N/A
4	USB Hub	D-LINK	DVB-H7	DL483G5006220	N/A
5	FLASH	Transcend	USB3.0 16G	N/A	N/A
6	Test Fixture	Intrepides	Value LAN3	131774	N/A
7	Audio box	N/A	N/A	N/A	N/A
8	FLASH 8GB	Kingston	DT100G3/8GB	N/A	N/A
9	FLASH 8GB	Kingston	DT100G3/8GB	N/A	N/A
10	iPod shuffle	APPLE	A1373	CC4PG9NGF4RY	N/A
11	Battery	YUASA	55B24L-CMF II	N/A	N/A

Signal Cable Type	Signal cable Description	
A	Signal Cable	Non-shielded, 0.8m
B	USB Cable	Non-shielded, 2m
C	USB Cable	Non-shielded, 1.2m
D	USB Cable	Non-shielded, 0.1m
E	LAN Cable	Non-shielded, 2.2m
F	Signal Cable	Non-shielded, 2m
G	USB Cable	Non-shielded, 1.1m
H	Signal Cable	Non-shielded, 1.5m
I	Audio Cable	Non-shielded, 1.8m
J	Power Cable	Non-shielded, 2m

1.4. Configuration of tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software "QCA RCT 3.0.174.0" on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press "OK" to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw/index_en

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
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Registration Number: 92195

Site Name: DEKRA Testing and Certification Co., Ltd.
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New Taipei City 24457, Taiwan.
TEL: 886-2-2602-7968 / FAX : 866-2-2602-3286
E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW1014

1.7. List of Test Equipment

For Conducted measurements /ASR3

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Temperature Chamber	KSON	THS-D4T-100	A0606	2017.03.31	2018.03.30
X	Spectrum Analyzer	R&S	FSV30	103464	2016.12.14	2017.12.13
X	Power Meter	Anritsu	ML2496A	1548003	2017.01.10	2018.01.09
X	Power Sensor	Anritsu	MA2411B	1531024	2016.12.06	2017.12.05
X	Power Sensor	Anritsu	MA2411B	1531025	2016.12.06	2017.12.05

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuiTek Conduction Test System V8.0.110

For Radiated measurements /ACB1

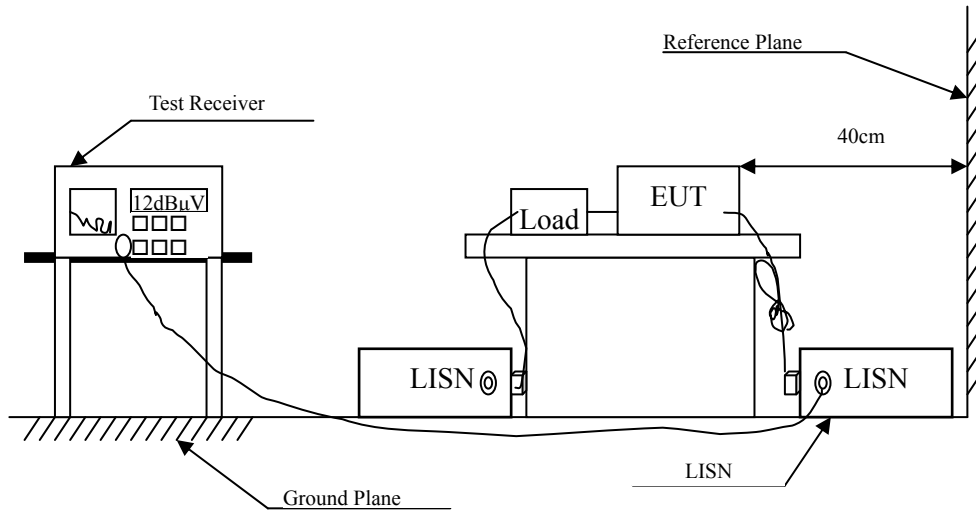
	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	A.H.	SAS-562B	272	2016.07.21	2017.07.20
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-674	2017.02.09	2018.02.08
X	Horn Antenna	ETS-Lindgren	3117	00203800	2016.10.13	2017.10.12
X	Horn Antenna	Com-Power	AH-840	101087	2016.05.03	2017.05.02
X	Pre-Amplifier	EMCI	EMC001330	980316	2016.04.27	2017.04.26
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2016.04.27	2017.04.26
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2016.04.28	2017.04.27
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2016.05.12	2017.05.11
	Filter	MICRO TRONICS	BRM50702	G251	2016.08.11	2017.08.10
X	Filter	MICRO TRONICS	BRM50716	G188	2016.08.11	2017.08.10
X	EMI Test Receiver	R&S	ESR7	101602	2016.12.15	2017.12.14
X	Spectrum Analyzer	R&S	FSV40	101149	2016.12.14	2017.12.13
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2016.05.25	2017.05.24
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2016.08.11	2017.08.10

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : QuiTek EMI 2.0 V2.1.113

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks : In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.10, 2014; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

2.4. Uncertainty

±2.35dB

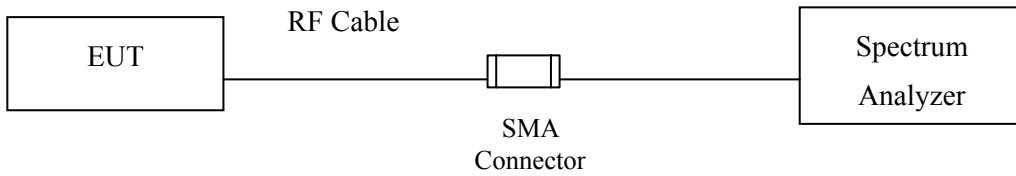
2.5. Test Result of Conducted Emission

Owing to the EUT use DC supply voltage, this test item is not performed.

3. Maximun conducted output power

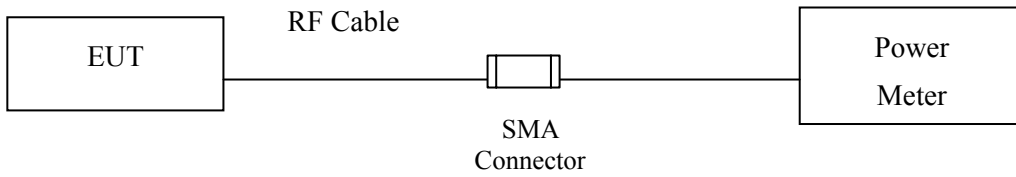
3.1. Test Setup

99% Occupied Bandwidth

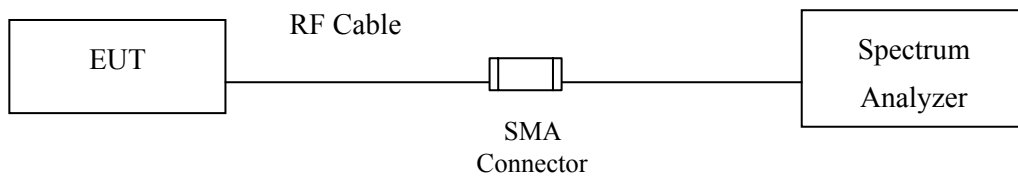


Conduction Power Measurement

Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.2. Limits

3.2.1. For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW \leq 40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D01 section F) procedure is used for measurements.

3.4. Uncertainty

Power Meter: ± 0.95 dB

Spectrum Analyzer: ± 1.30 dB

3.5. Test Result of Maximum conducted output power

Product : Panasonic VP4R-A
 Test Item : Maximum conducted output power
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)
 Test Date : 2017/04/12

Cable loss=1dB		Maximum conducted output power							
Channel No.	Frequency (MHz)	Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
		Measurement Level (dBm)							
149	5745	8.04	--	--	--	--	--	--	--
157	5785	8.07	8.01	7.97	7.92	7.85	7.83	7.75	7.71
165	5825	8.28	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	99% Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
149	5745	--	8.04	30	--
157	5785	--	8.07	30	--
165	5825	--	8.28	30	--

Note: Power Output Value =Reading value on average power meter + cable loss

Product : Panasonic VP4R-A
 Test Item : Maximum conducted output power
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)
 Test Date : 2017/04/12

Cable loss=1dB		Maximum conducted output power							
Channel No.	Frequency (MHz)	Data Rate (Mbps)							
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2
		Measurement Level (dBm)							
149	5745	5.22	--	--	--	--	--	--	--
157	5785	5.28	5.02	4.96	4.91	4.87	4.82	4.77	4.71
165	5825	5.43	--	--	--	--	--	--	--

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	99% Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
149	5745	--	5.22	30	--
157	5785	--	5.28	30	--
165	5825	--	5.43	30	--

Note: Power Output Value =Reading value on average power meter + cable loss

Product : Panasonic VP4R-A
 Test Item : Maximum conducted output power
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps)
 Test Date : 2017/04/12

Cable loss=1dB		Maximum conducted output power							
Channel No.	Frequency (MHz)	Data Rate (Mbps)							
		15	30	45	60	90	120	135	150
		Measurement Level (dBm)							
151	5755	5.28	--	--	--	--	--	--	--
159	5795	5.39	5.05	4.99	4.95	4.88	4.83	4.78	4.72

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

Maximum conducted output power Measurement:

Channel No	Frequency Range (MHz)	99% Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
151	5755	--	5.28	30	--
159	5795	--	5.39	30	--

Note: Power Output Value =Reading value on average power meter + cable loss

Product : Panasonic VP4R-A
 Test Item : Maximum conducted output power
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps)
 Test Date : 2017/04/12

Cable loss=1dB		Maximum conducted output power									
Channel No	Frequency (MHz)	Data Rate (Mbps)									
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9
155	5775	5.19	5.02	4.96	4.92	4.89	4.83	4.78	4.71	4.69	4.62

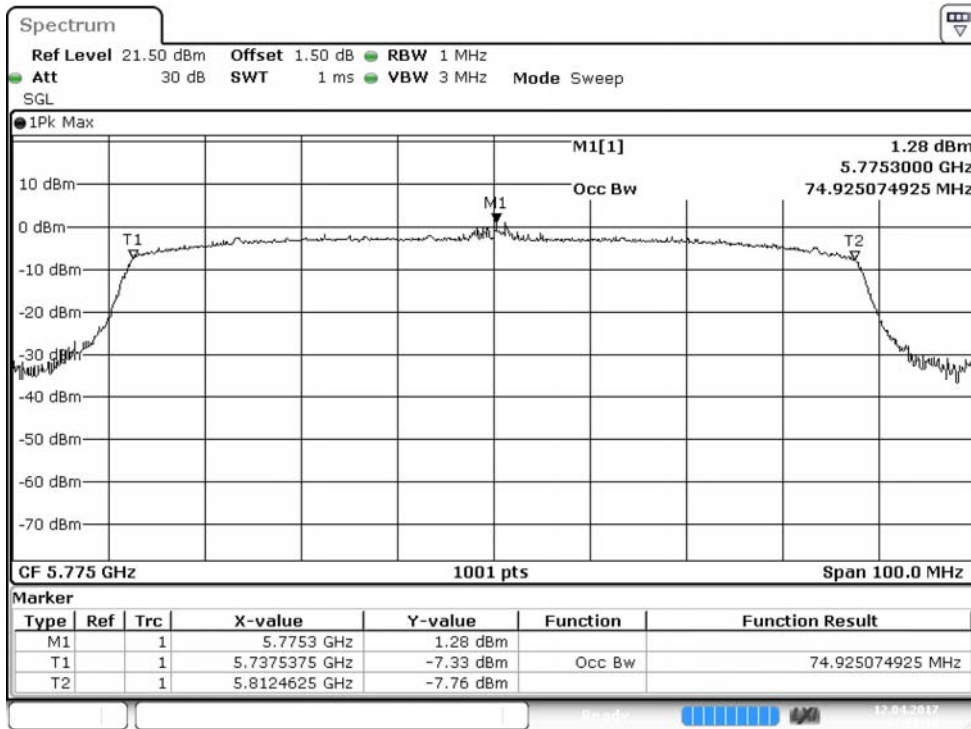
Note: Maximum conducted output power Value =Reading value on Spectrum Analyzer + cable loss

Maximum conducted output power Measurement

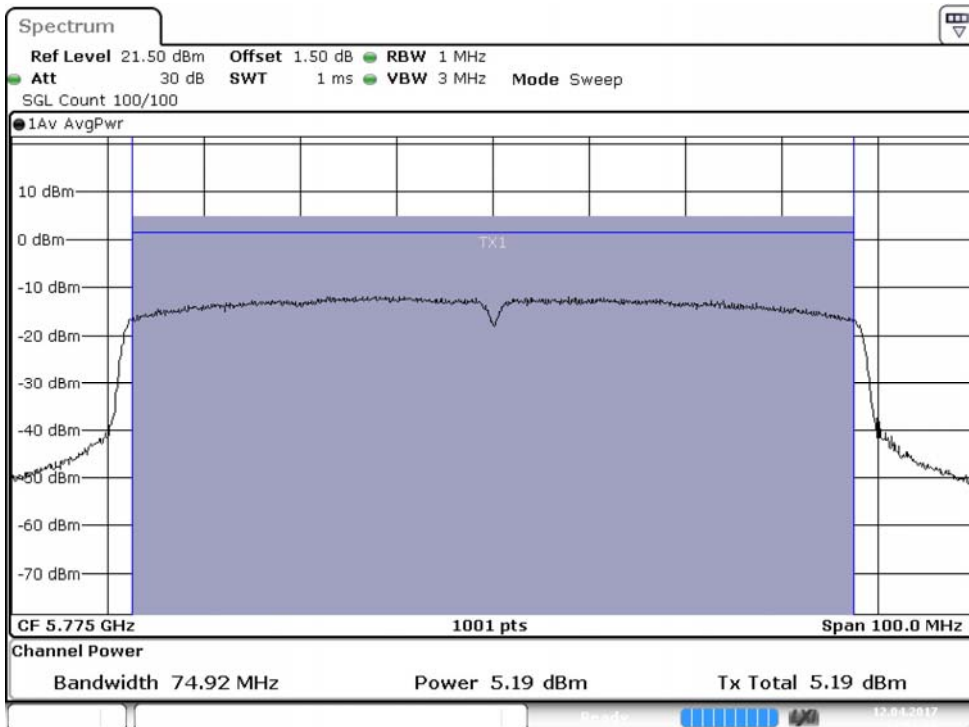
Channel No	Frequency Range	99% Bandwidth	Output Power	Output Power Limit		Result
	(MHz)	(MHz)	(dBm)	(dBm)	dBm+10log(BW)	
155	5775	--	5.19	30	--	Pass

Note: Power Output Value = Reading value on Spectrum Analyzer + cable loss

**99% Occupied Bandwidth:
Channel 155**

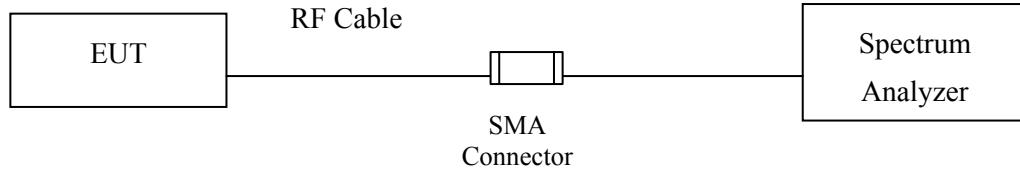


**Maximum conducted output power:
Channel 155**



4. Peak Power Spectral Density

4.1. Test Setup



4.2. Limits

- (1) For the band 5.15-5.25 GHz,
 - (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
 - (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
 - (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
 - (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+
- (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

- (3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

4.3. Test Procedure

The EUT was setup to ANSI C63.10, 2009; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.

SA-1 method is selected to run the test.

For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(500\text{ kHz}/100\text{ kHz}) = 6.98\text{ dB}$.

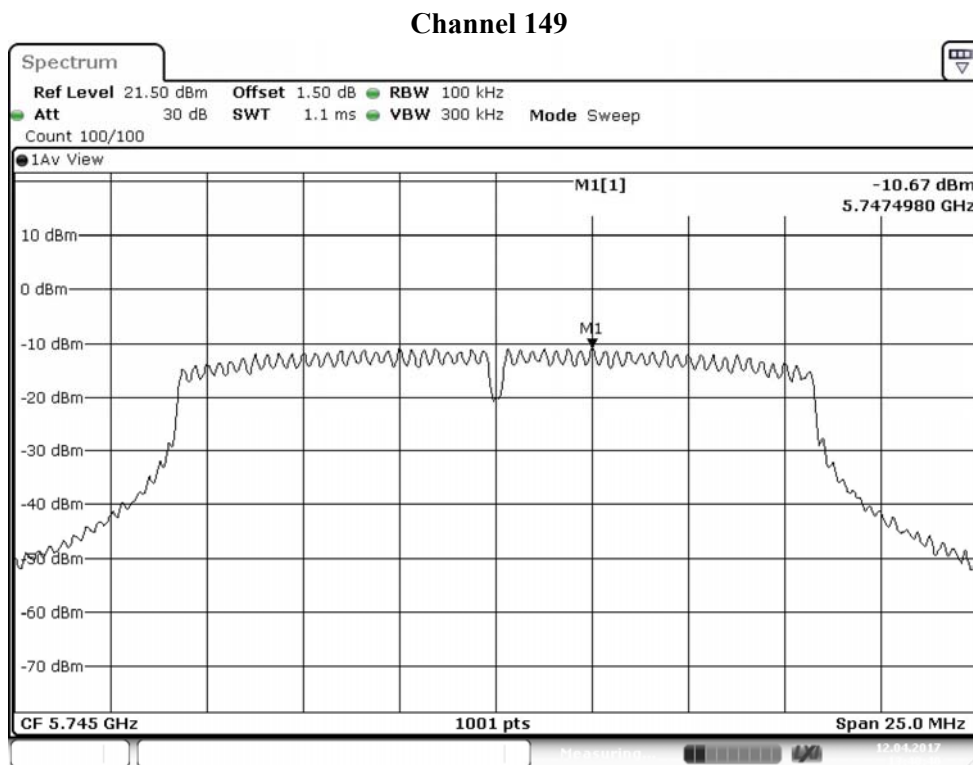
4.4. Uncertainty

$\pm 1.30\text{dB}$

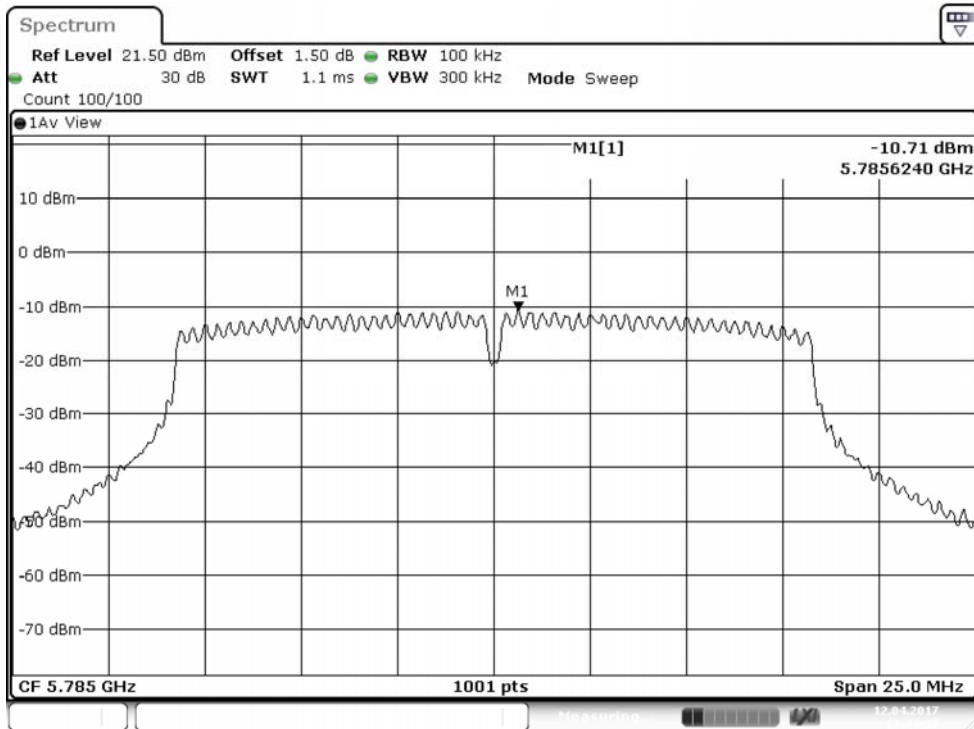
4.5. Test Result of Peak Power Spectral Density

Product : Panasonic VP4R-A
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)
 Test Date : 2017/04/12

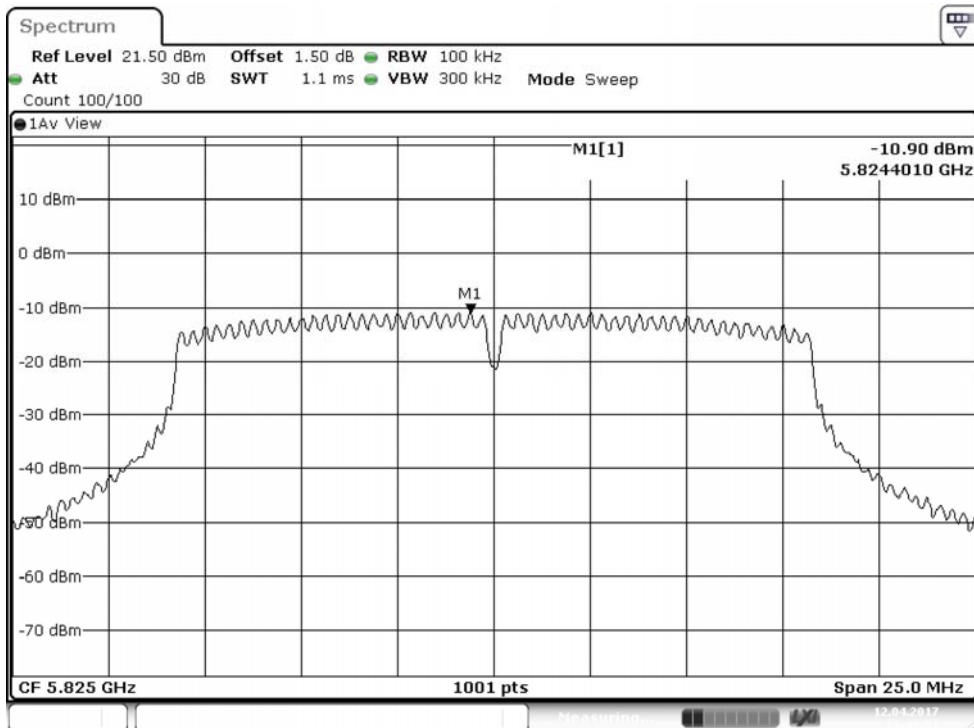
Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	6	-10.670	6.980	-3.690	<30	Pass
157	5785	6	-10.710	6.980	-3.730	<30	Pass
165	5825	6	-10.900	6.980	-3.920	<30	Pass



Channel 157



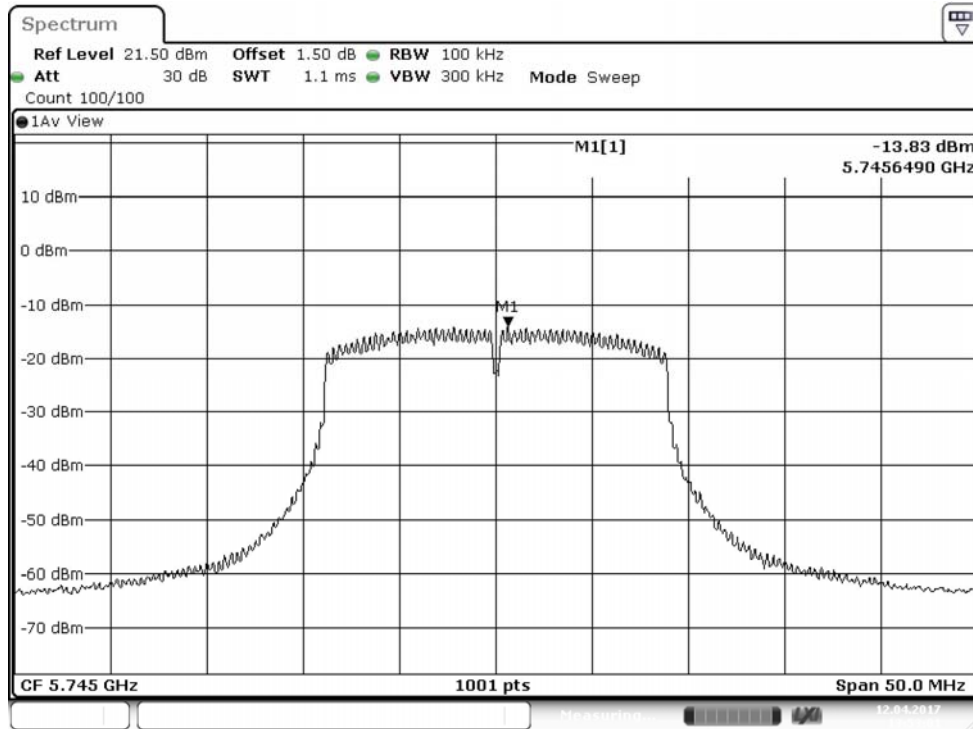
Channel 165



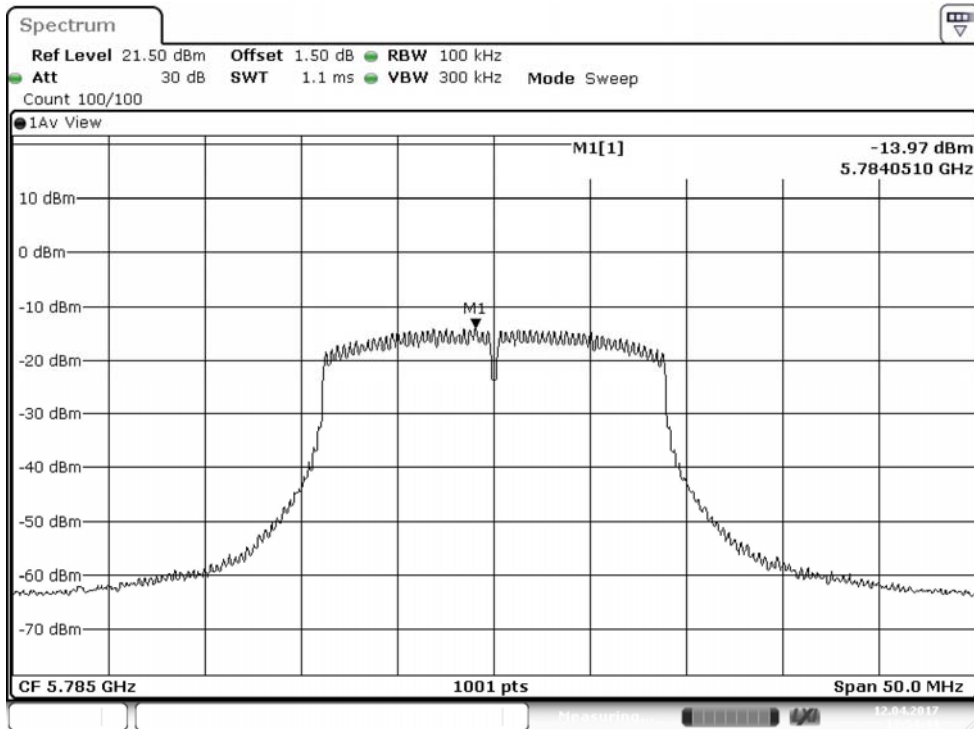
Product : Panasonic VP4R-A
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)
 Test Date : 2017/04/12

Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	7.2	-13.830	6.980	-6.850	<30	Pass
157	5785	7.2	-13.970	6.980	-6.990	<30	Pass
165	5825	7.2	-14.100	6.980	-7.120	<30	Pass

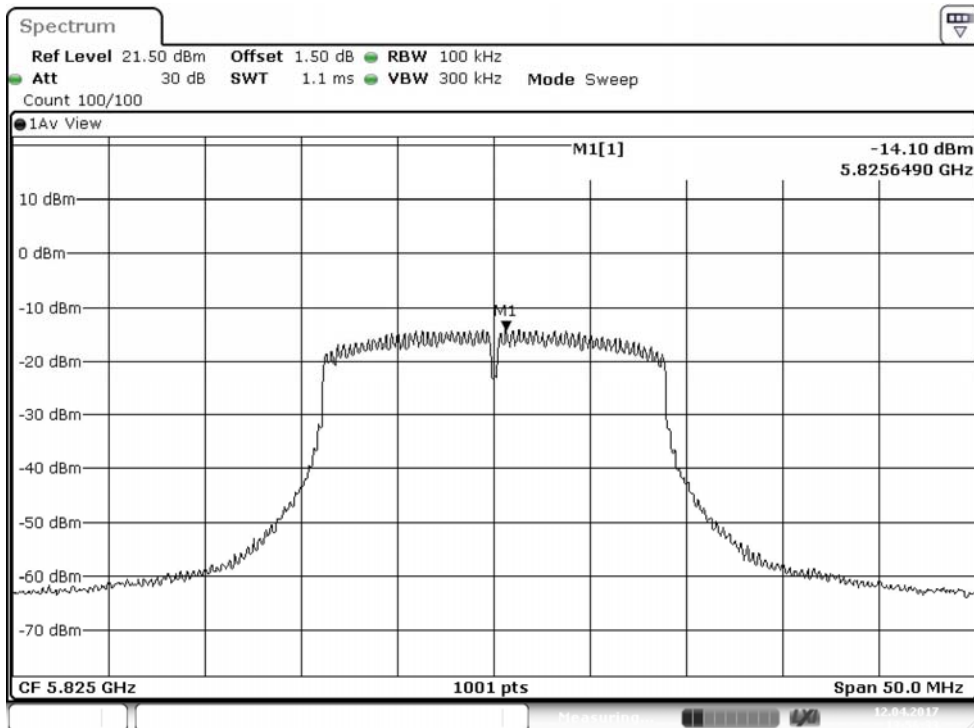
Channel 149



Channel 157



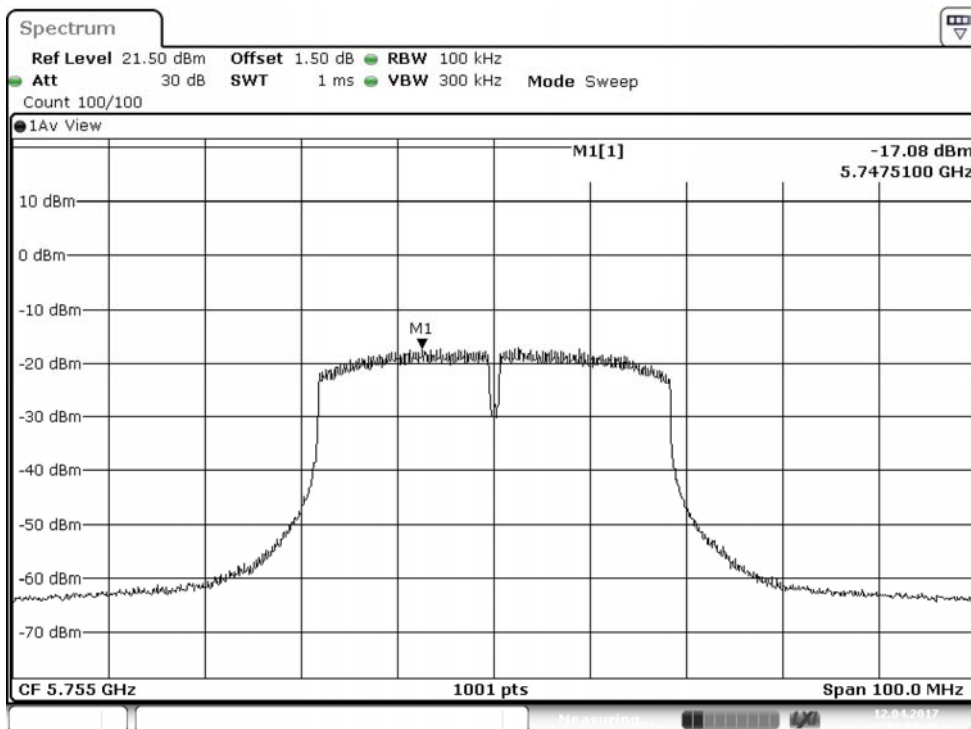
Channel 165



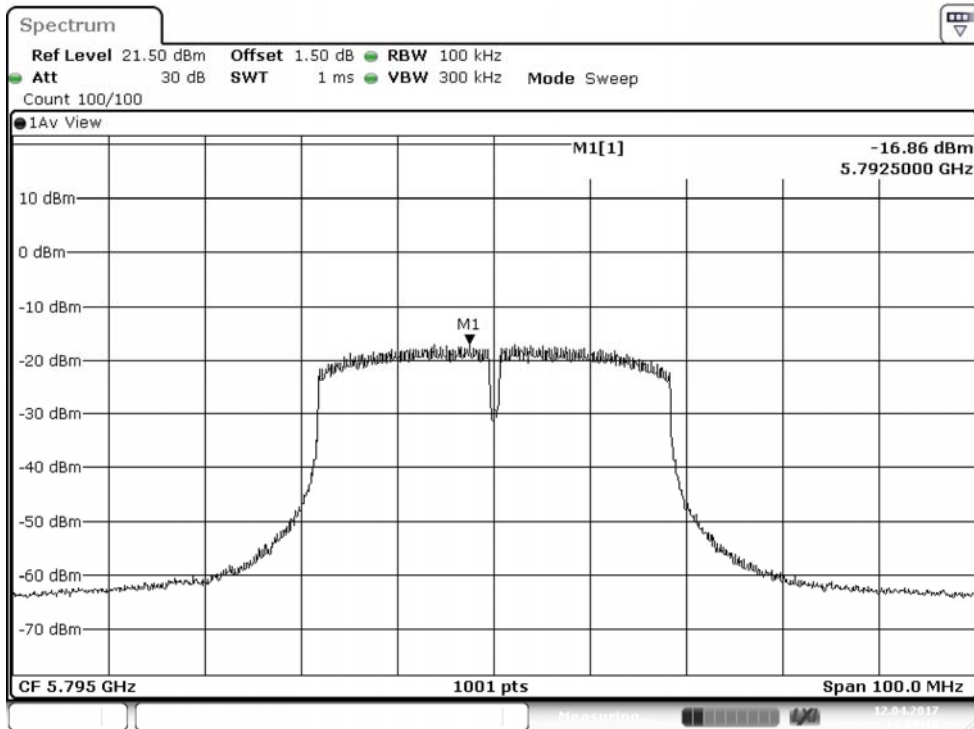
Product : Panasonic VP4R-A
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps)
 Test Date : 2017/04/12

Channel Number	Frequency (MHz)	Data Rate (Mbps)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
151	5755	15	-17.080	6.980	-10.100	<30	Pass
159	5795	15	-16.860	6.980	-9.880	<30	Pass

Channel 151



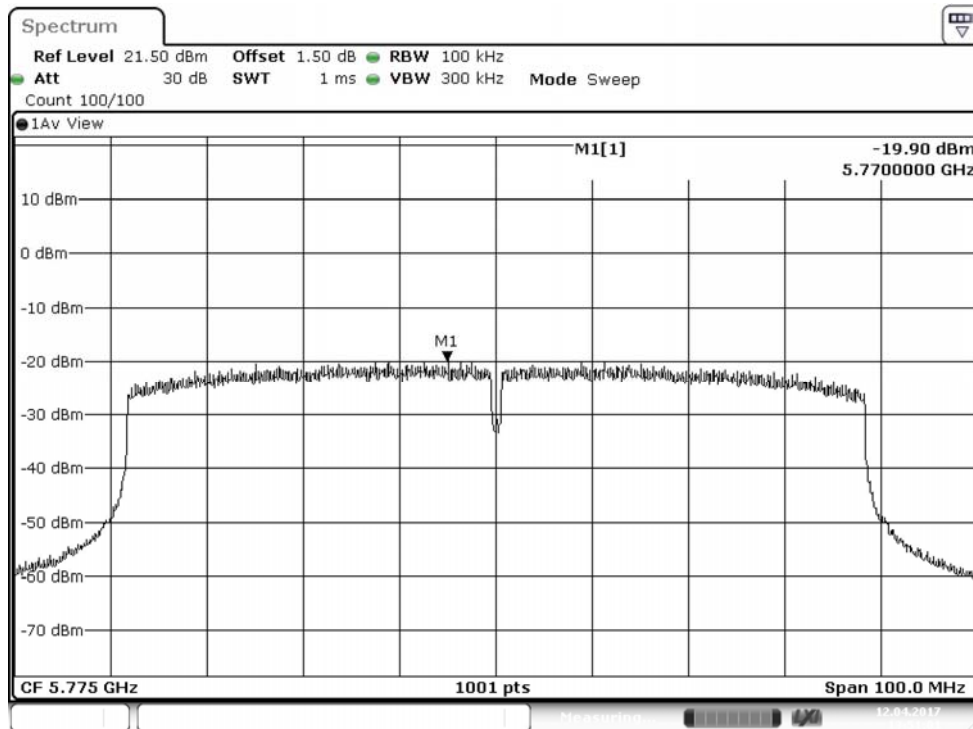
Channel 159



Product : Panasonic VP4R-A
 Test Item : Peak Power Spectral Density
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps)
 Test Date : 2017/04/12

Channel Number	Frequency (MHz)	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)1	Result
155	5775	-19.900	6.98	-12.920	<30

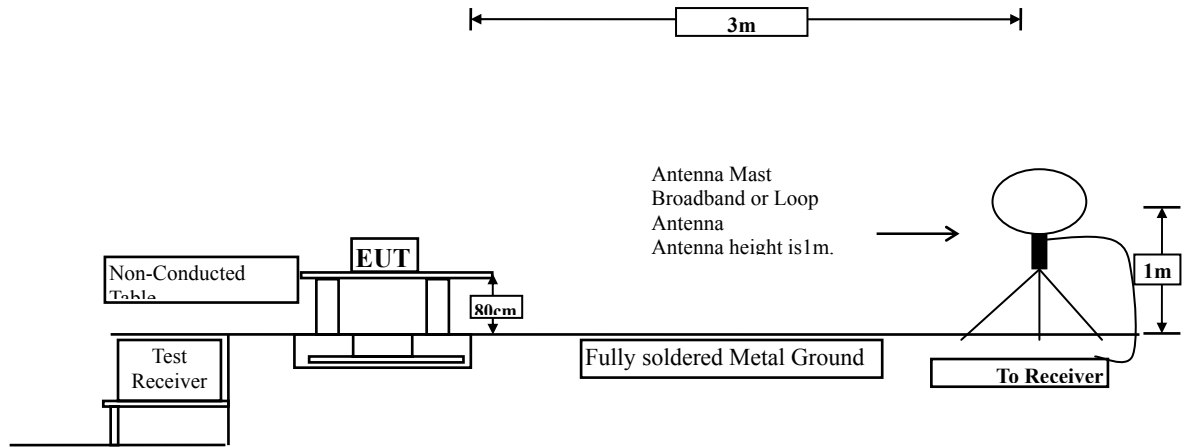
Channel 155



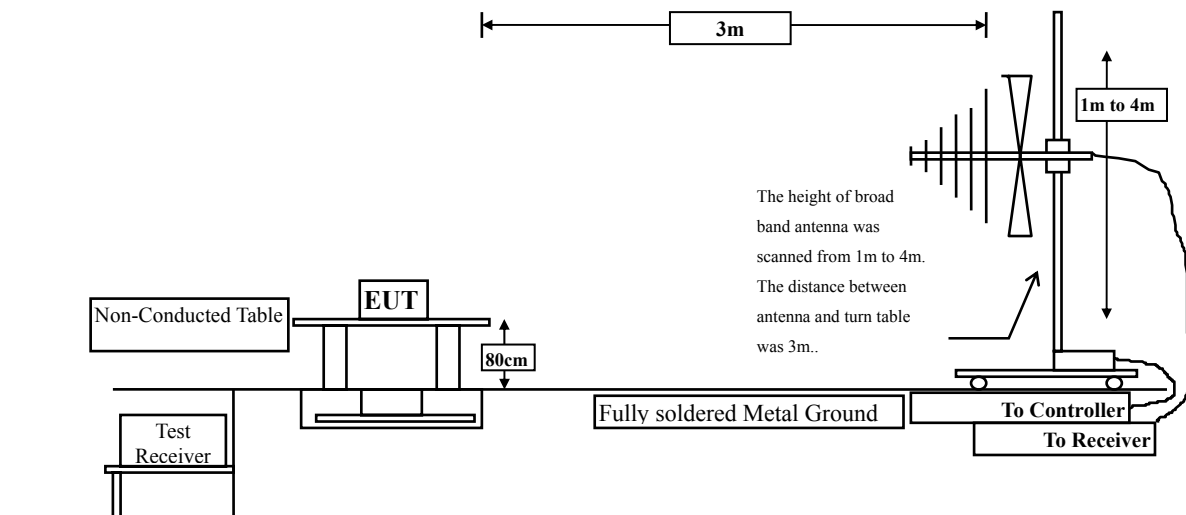
5. Radiated Emission

5.1. Test Setup

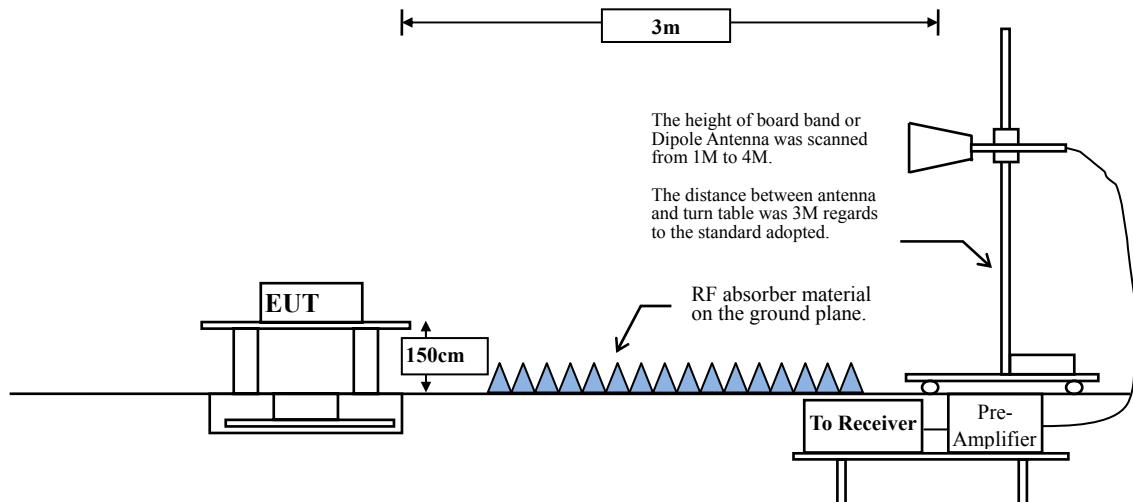
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



5.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dB μ V/m) = 20 log E field strength (uV/m)

5.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

5.4. Uncertainty

Horizontal polarization :

30-300MHz: ± 4.08 dB ; 300M-1GHz: ± 3.86 dB ; 1-18GHz: ± 3.77 dB ; 18-40GHz: ± 3.98 dB

Vertical polarization :

30-300MHz: ± 4.81 dB ; 300M-1GHz: ± 3.87 dB ; 1-18GHz : ± 3.83 dB ; 18-40GHz: ± 3.98 dB

5.5. Test Result of Radiated Emission

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5745MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11490.000	1.619	46.640	48.259	-25.741	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11490.000	1.619	46.010	47.629	-26.371	74.000
Average Detector:					
--					54.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5785MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11570.000	1.728	46.010	47.738	-26.262	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11570.000	1.728	45.230	46.958	-27.042	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5825MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dBµV	Measurement Level dBµV/m	Margin dB	Limit dBµV/m
Horizontal					
Peak Detector:					
11650.000	1.846	45.820	47.666	-26.334	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11650.000	1.846	45.630	47.476	-26.524	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5745MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11490.000	1.619	46.130	47.749	-26.251	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11490.000	1.619	45.620	47.239	-26.761	74.000
Average Detector:					
--					54.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5785MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dBμV	Measurement Level dBμV/m	Margin dB	Limit dBμV/m
Horizontal					
Peak Detector:					
11570.000	1.728	45.590	47.318	-26.682	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11570.000	1.728	46.010	47.738	-26.262	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5825MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dBµV	Measurement Level dBµV/m	Margin dB	Limit dBµV/m
Horizontal					
Peak Detector:					
11650.000	1.846	45.600	47.446	-26.554	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11650.000	1.846	45.500	47.346	-26.654	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5755MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11510.000	1.620	46.030	47.651	-26.349	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11510.000	1.620	46.340	47.961	-26.039	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5795MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11590.000	1.753	45.900	47.653	-26.347	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11590.000	1.753	45.730	47.483	-26.517	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps) (5775MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector:					
11550.000	1.718	46.720	48.438	-25.562	74.000
Average Detector:					
--					54.000
Vertical					
Peak Detector:					
11550.000	1.718	45.820	47.538	-26.462	74.000
Average Detector:					
--					54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Panasonic VP4R-A
 Test Item : General Radiated Emission
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5785MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector					
191.667	-13.656	56.052	42.395	-1.105	43.500
347.710	-9.263	50.642	41.379	-4.621	46.000
443.304	-7.016	49.259	42.243	-3.757	46.000
492.507	-6.146	49.667	43.521	-2.479	46.000
797.565	-1.736	46.957	45.221	-0.779	46.000
912.841	-0.182	43.363	43.181	-2.819	46.000
Vertical					
Peak Detector					
276.014	-11.092	50.877	39.785	-6.215	46.000
441.899	-7.050	51.185	44.135	-1.865	46.000
468.609	-6.541	49.673	43.132	-2.868	46.000
551.551	-5.202	45.632	40.430	-5.570	46.000
815.841	-1.479	46.284	44.805	-1.195	46.000
912.841	-0.182	44.837	44.655	-1.345	46.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- No emission found between lowest internal used/generated frequency to 30MHz.

Product : Panasonic VP4R-A
 Test Item : General Radiated Emission
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5785MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector					
119.971	-13.428	52.499	39.071	-4.429	43.500
271.797	-11.274	50.397	39.122	-6.878	46.000
360.362	-8.975	53.493	44.518	-1.482	46.000
432.058	-7.289	46.219	38.930	-7.070	46.000
815.841	-1.479	45.695	44.216	-1.784	46.000
912.841	-0.182	42.896	42.714	-3.286	46.000
Vertical					
Peak Detector					
191.667	-13.656	54.077	40.420	-3.080	43.500
360.362	-8.975	53.100	44.125	-1.875	46.000
432.058	-7.289	51.826	44.537	-1.463	46.000
515.000	-5.790	46.730	40.940	-5.060	46.000
815.841	-1.479	46.472	44.993	-1.007	46.000
858.014	-0.862	44.156	43.294	-2.706	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The emission levels of other frequencies are very lower than the limit and not show in test report.
8. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Panasonic VP4R-A
 Test Item : General Radiated Emission
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5755MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector					
191.667	-13.656	53.710	40.053	-3.447	43.500
252.116	-12.094	52.630	40.536	-5.464	46.000
335.058	-9.553	49.590	40.037	-5.963	46.000
432.058	-7.289	46.761	39.472	-6.528	46.000
720.246	-2.659	42.360	39.701	-6.299	46.000
815.841	-1.479	46.175	44.696	-1.304	46.000
Vertical					
Peak Detector					
263.362	-11.772	49.071	37.299	-8.701	46.000
432.058	-7.289	52.258	44.969	-1.031	46.000
455.957	-6.750	50.178	43.428	-2.572	46.000
529.058	-5.569	46.554	40.985	-5.015	46.000
817.246	-1.459	46.000	44.542	-1.458	46.000
912.841	-0.182	44.507	44.325	-1.675	46.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- No emission found between lowest internal used/generated frequency to 30MHz.

Product : Panasonic VP4R-A
 Test Item : General Radiated Emission
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps) (5775MHz)
 Test Date : 2017/04/12

Frequency MHz	Correct Factor dB	Reading Level dB μ V	Measurement Level dB μ V/m	Margin dB	Limit dB μ V/m
Horizontal					
Peak Detector					
119.971	-13.428	53.166	39.738	-3.762	43.500
276.014	-11.092	55.658	44.566	-1.434	46.000
419.406	-7.599	49.552	41.953	-4.047	46.000
467.203	-6.563	49.755	43.191	-2.809	46.000
775.072	-1.905	46.763	44.858	-1.142	46.000
815.841	-1.479	46.230	44.751	-1.249	46.000
Vertical					
Peak Detector					
271.797	-11.274	47.457	36.182	-9.818	46.000
444.710	-6.981	51.215	44.234	-1.766	46.000
624.652	-3.907	44.579	40.673	-5.327	46.000
786.319	-1.822	46.810	44.988	-1.012	46.000
815.841	-1.479	45.934	44.455	-1.545	46.000
912.841	-0.182	44.261	44.079	-1.921	46.000

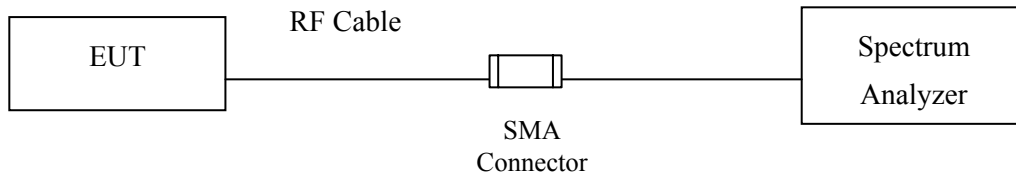
Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- No emission found between lowest internal used/generated frequency to 30MHz.

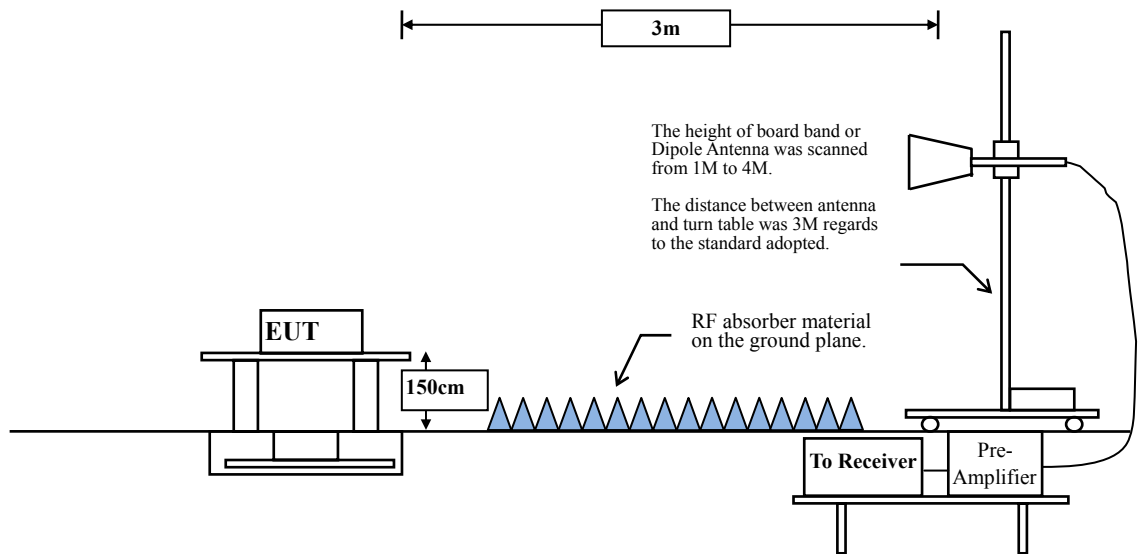
6. Band Edge

6.1. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



6.2. Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified in Section 15.209:

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dB μ V/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks :

1. RF Voltage (dB μ V) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

6.4. Uncertainty

Conducted: ± 1.23 dB

Radiated:

Horizontal polarization : 1-18GHz: ± 3.77 dB

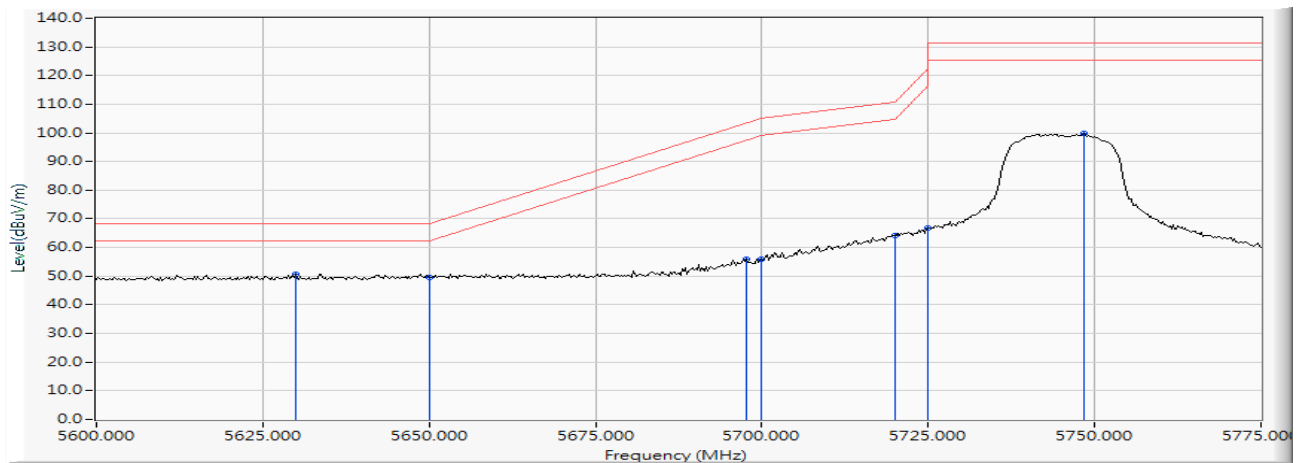
Vertical polarization : 1-18GHz : ± 3.83 dB

6.5. Test Result of Band Edge

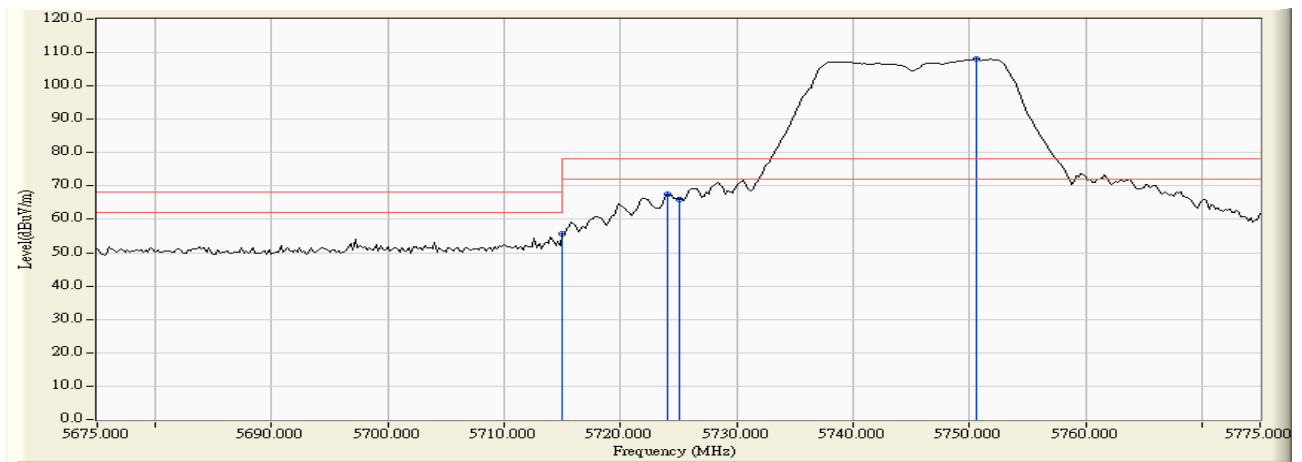
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5745MHz)
 Test Date : 2017/04/12

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5646.413	18.471	32.099	50.570	-17.650	68.220	Pass
Horizontal	5650.000	18.483	30.184	48.666	-19.554	68.220	Pass
Horizontal	5699.928	18.632	36.379	55.011	-50.136	105.147	Pass
Horizontal	5700.000	18.632	35.847	54.479	-50.721	105.200	Pass
Horizontal	5718.442	18.689	43.530	62.218	-48.146	110.364	Pass
Horizontal	5720.000	18.693	43.279	61.972	-48.828	110.800	Pass
Horizontal	5724.783	18.709	45.906	64.616	-57.089	121.705	Pass
Horizontal	5725.000	18.711	45.162	63.873	-58.327	122.200	Pass
Horizontal	5742.536	18.769	79.411	98.180	--	--	--



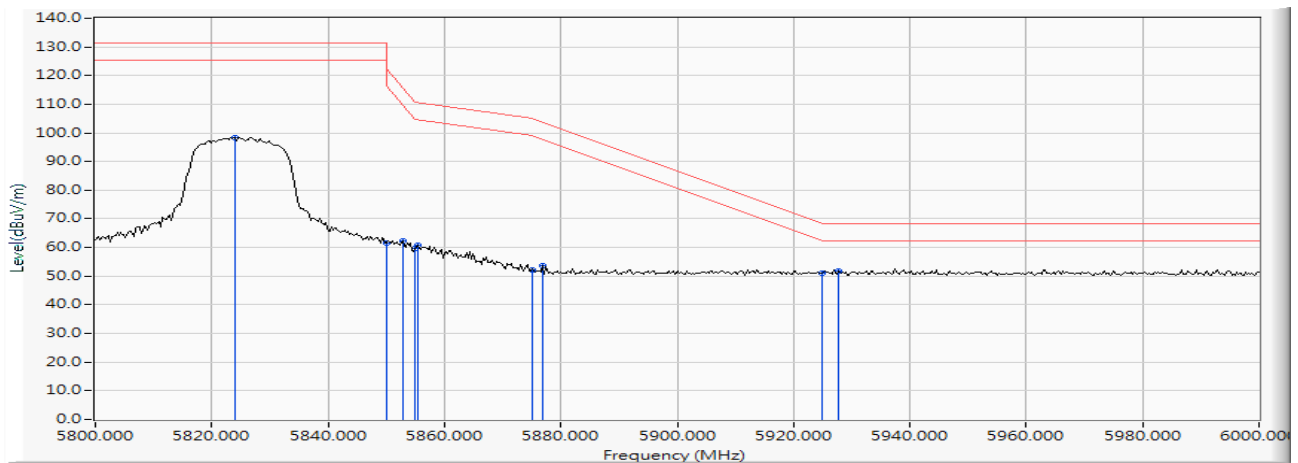
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5629.928	18.421	32.106	50.527	-17.693	68.220	Pass
Vertical	5650.000	18.483	30.948	49.430	-18.790	68.220	Pass
Vertical	5697.645	18.625	37.137	55.762	-47.696	103.458	Pass
Vertical	5700.000	18.632	37.118	55.750	-49.450	105.200	Pass
Vertical	5720.000	18.693	45.625	64.318	-46.482	110.800	Pass
Vertical	5725.000	18.711	47.978	66.689	-55.511	122.200	Pass
Vertical	5748.370	18.783	80.995	99.778	--	--	--



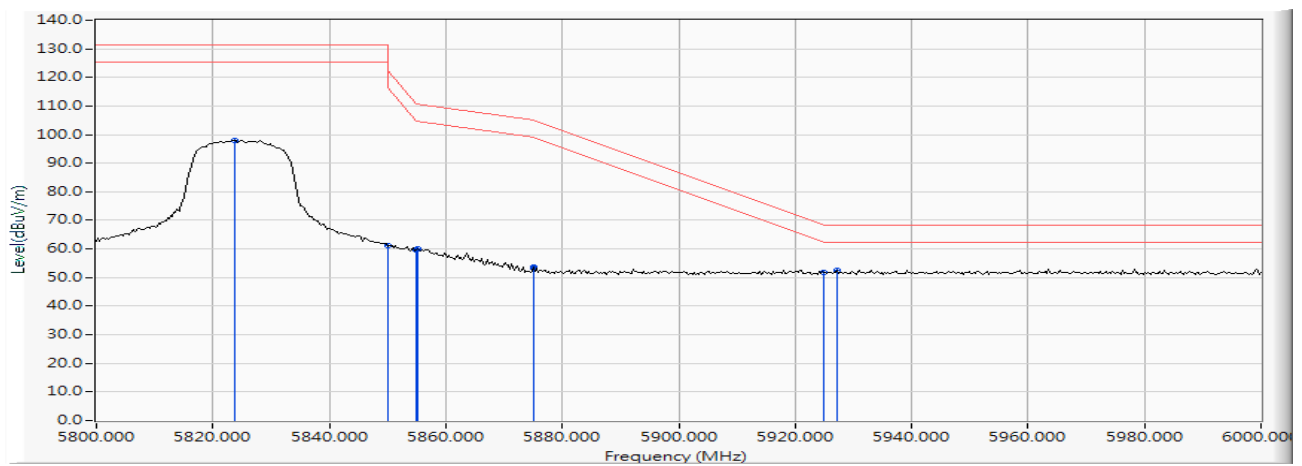
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps) (5825MHz)
 Test Date : 2017/04/12

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5824.058	19.022	79.297	98.319	--	--	--
Horizontal	5850.000	19.103	42.511	61.614	-60.586	122.200	Pass
Horizontal	5852.754	19.110	43.039	62.149	-53.772	115.921	Pass
Horizontal	5855.000	19.115	40.629	59.745	-51.055	110.800	Pass
Horizontal	5855.362	19.117	41.754	60.871	-49.828	110.699	Pass
Horizontal	5875.000	19.177	33.163	52.340	-52.860	105.200	Pass
Horizontal	5876.812	19.184	34.476	53.660	-50.199	103.859	Pass
Horizontal	5925.000	19.333	31.816	51.148	-17.052	68.200	Pass
Horizontal	5927.826	19.340	32.289	51.629	-16.571	68.200	Pass



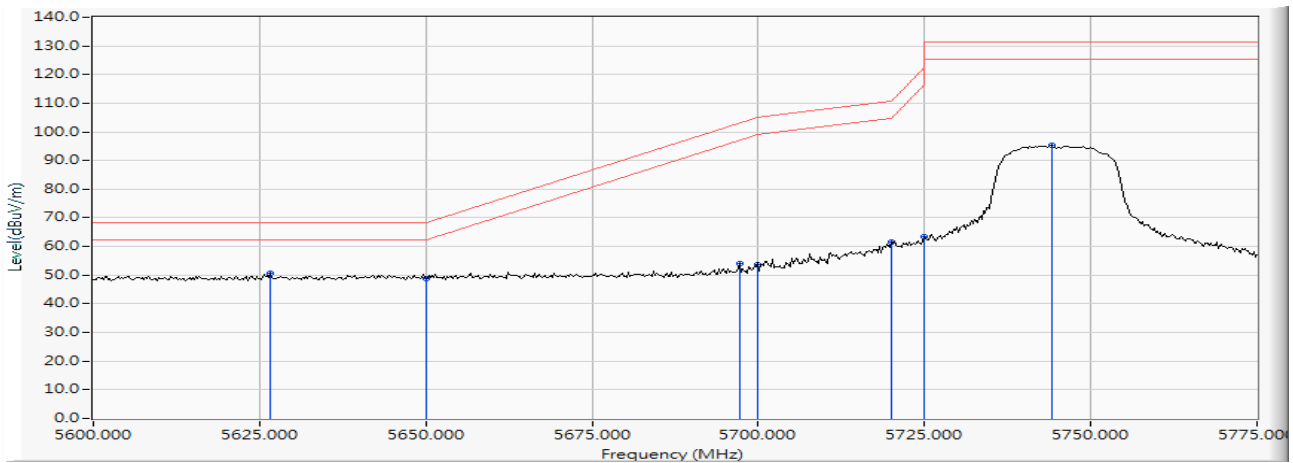
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5823.768	19.022	78.957	97.979	--	--	--
Vertical	5850.000	19.103	42.255	61.358	-60.842	122.200	Pass
Vertical	5855.000	19.115	40.748	59.864	-50.936	110.800	Pass
Vertical	5855.072	19.116	40.877	59.993	-50.787	110.780	Pass
Vertical	5875.000	19.177	34.112	53.289	-51.911	105.200	Pass
Vertical	5875.072	19.178	34.509	53.687	-51.460	105.147	Pass
Vertical	5925.000	19.333	32.490	51.822	-16.378	68.200	Pass
Vertical	5927.246	19.339	33.043	52.382	-15.818	68.200	Pass



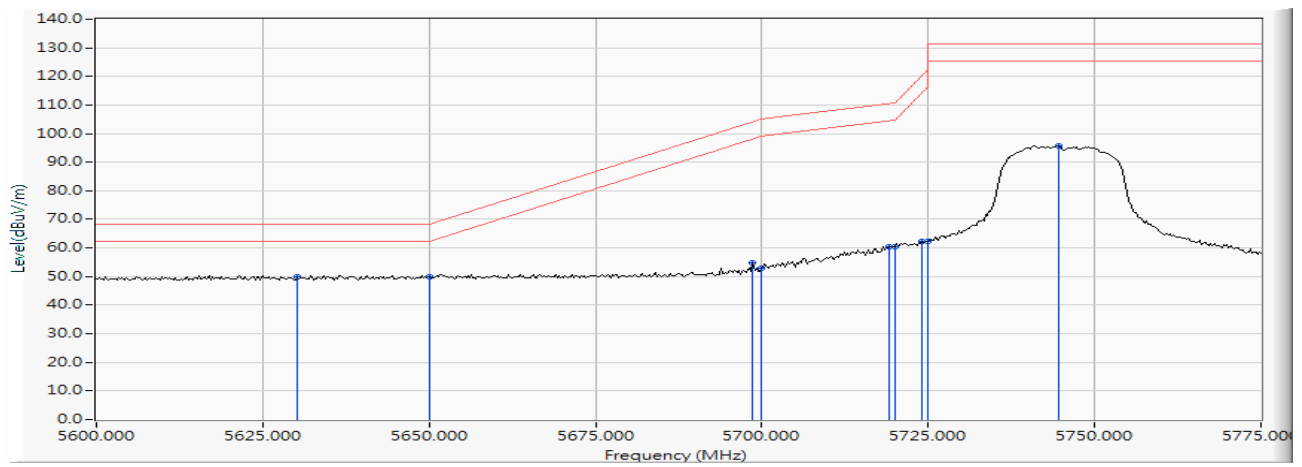
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5745MHz)
 Test Date : 2017/04/12

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5626.630	18.414	32.361	50.775	-17.445	68.220	Pass
Horizontal	5650.000	18.483	30.441	48.923	-19.297	68.220	Pass
Horizontal	5697.138	18.624	35.377	54.001	-49.082	103.083	Pass
Horizontal	5700.000	18.632	34.910	53.542	-51.658	105.200	Pass
Horizontal	5719.964	18.693	42.863	61.556	-49.234	110.790	Pass
Horizontal	5720.000	18.693	42.814	61.507	-49.293	110.800	Pass
Horizontal	5725.000	18.711	44.614	63.325	-58.875	122.200	Pass
Horizontal	5744.058	18.773	76.610	95.383	--	--	--



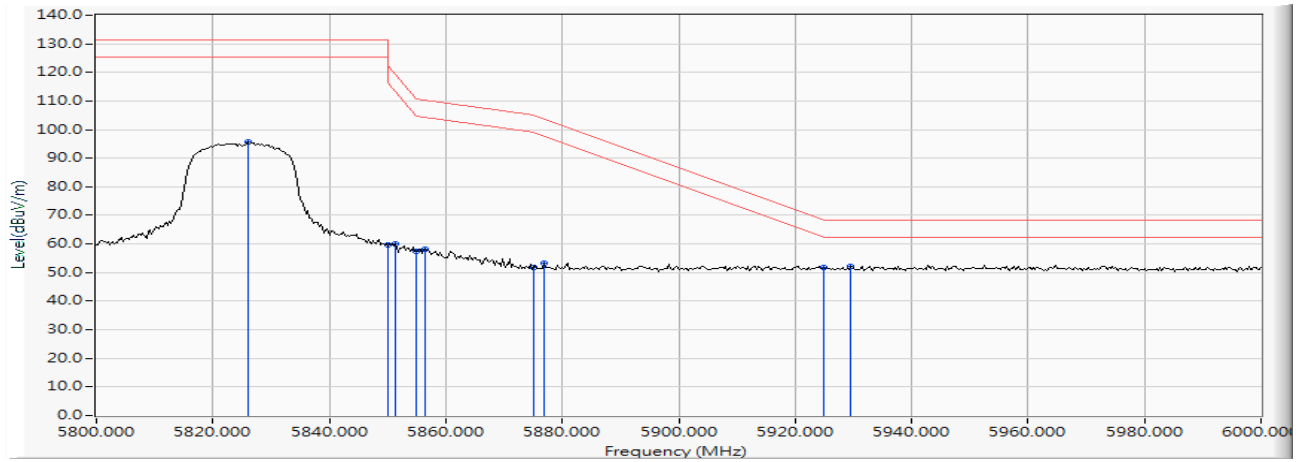
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5630.181	18.422	31.649	50.071	-18.149	68.220	Pass
Vertical	5650.000	18.483	31.341	49.823	-18.397	68.220	Pass
Vertical	5698.659	18.629	36.040	54.668	-49.540	104.208	Pass
Vertical	5700.000	18.632	34.399	53.031	-52.169	105.200	Pass
Vertical	5719.203	18.691	41.905	60.596	-49.981	110.577	Pass
Vertical	5720.000	18.693	41.879	60.572	-50.228	110.800	Pass
Vertical	5724.022	18.707	43.572	62.279	-57.691	119.970	Pass
Vertical	5725.000	18.711	43.520	62.231	-59.969	122.200	Pass
Vertical	5744.565	18.774	76.947	95.721	--	--	--



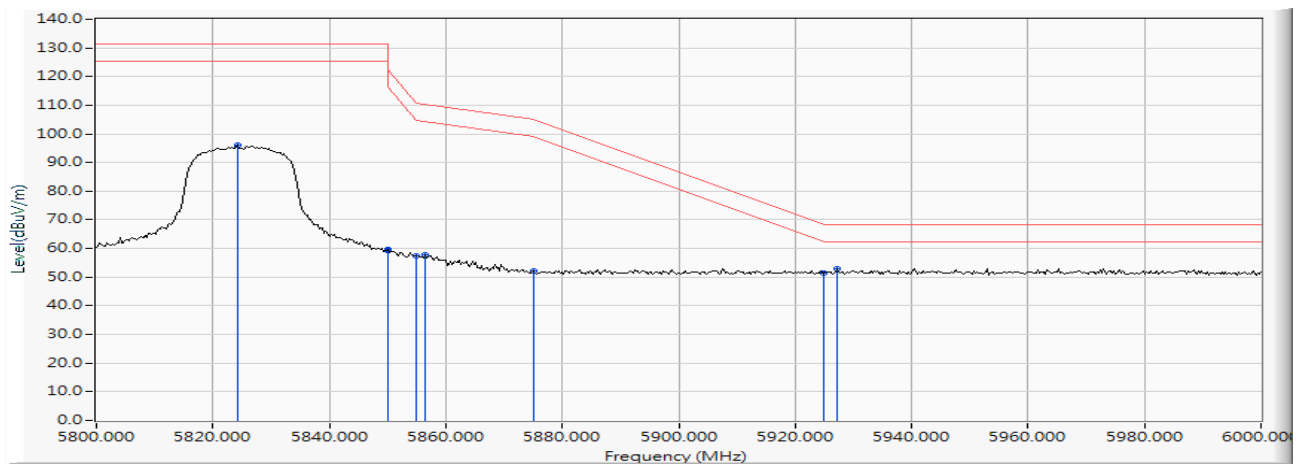
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps) (5825MHz)
 Test Date : 2017/04/12

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5826.087	19.026	76.590	95.616	--	--	--
Horizontal	5850.000	19.103	40.531	59.634	-62.566	122.200	Pass
Horizontal	5851.304	19.106	40.936	60.042	-59.185	119.227	Pass
Horizontal	5855.000	19.115	38.464	57.580	-53.220	110.800	Pass
Horizontal	5856.522	19.119	39.132	58.251	-52.123	110.374	Pass
Horizontal	5875.000	19.177	32.793	51.970	-53.230	105.200	Pass
Horizontal	5876.812	19.184	33.988	53.172	-50.687	103.859	Pass
Horizontal	5925.000	19.333	32.393	51.725	-16.475	68.200	Pass
Horizontal	5929.565	19.345	32.740	52.086	-16.114	68.200	Pass



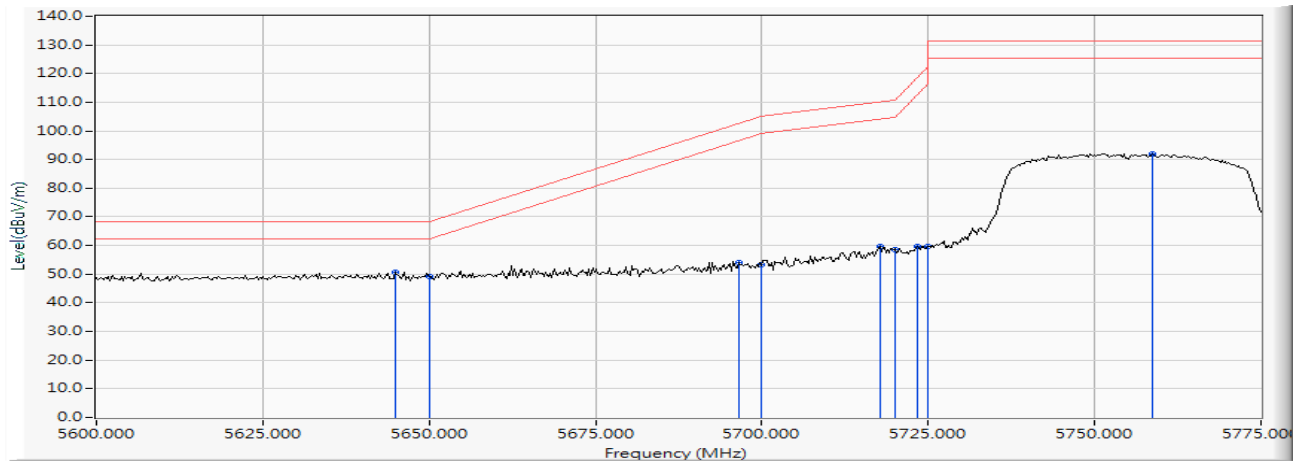
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5824.348	19.022	77.241	96.264	--	--	--
Vertical	5850.000	19.103	40.227	59.330	-62.870	122.200	Pass
Vertical	5850.145	19.104	40.403	59.506	-62.363	121.869	Pass
Vertical	5855.000	19.115	38.240	57.356	-53.444	110.800	Pass
Vertical	5856.522	19.119	38.857	57.976	-52.398	110.374	Pass
Vertical	5875.000	19.177	32.835	52.012	-53.188	105.200	Pass
Vertical	5925.000	19.333	31.993	51.325	-16.875	68.200	Pass
Vertical	5927.246	19.339	33.474	52.813	-15.387	68.200	Pass



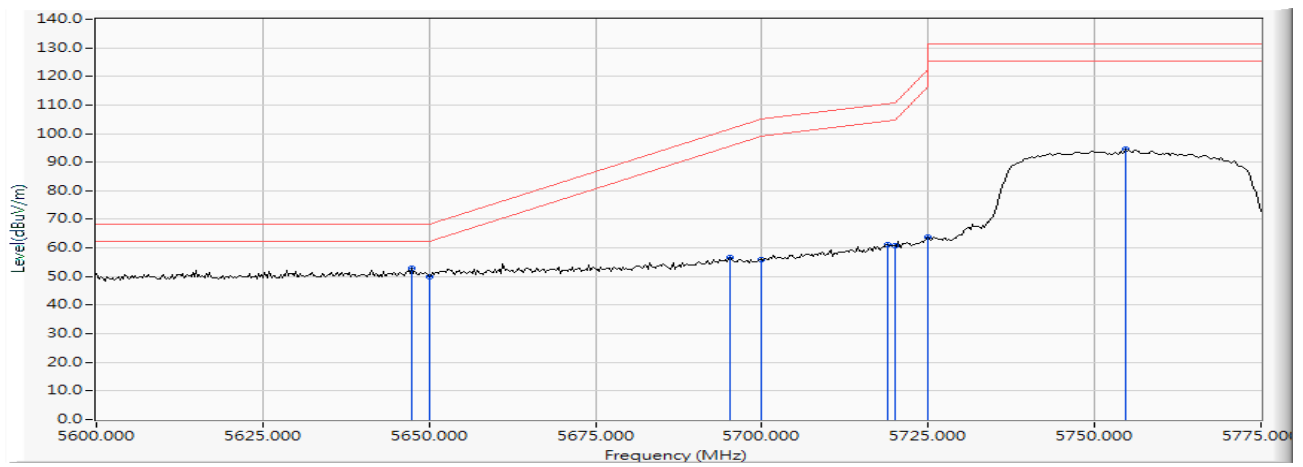
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5755MHz)
 Test Date : 2017/04/12

RF Radiated Measurement :

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5644.891	18.467	32.092	50.558	-17.662	68.220	Pass
Horizontal	5650.000	18.483	30.689	49.171	-19.049	68.220	Pass
Horizontal	5696.630	18.623	35.554	54.176	-48.532	102.708	Pass
Horizontal	5700.000	18.632	34.759	53.391	-51.809	105.200	Pass
Horizontal	5717.681	18.686	40.810	59.496	-50.655	110.151	Pass
Horizontal	5720.000	18.693	39.859	58.552	-52.248	110.800	Pass
Horizontal	5723.261	18.704	40.983	59.687	-58.548	118.235	Pass
Horizontal	5725.000	18.711	40.798	59.509	-62.691	122.200	Pass
Horizontal	5758.768	18.811	73.220	92.031	--	--	--



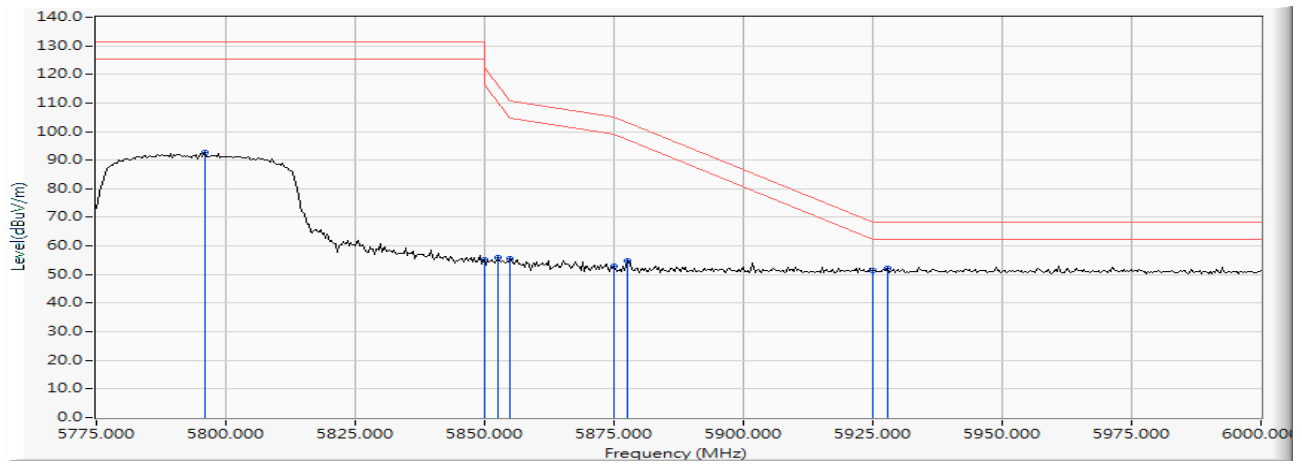
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5647.428	18.474	34.613	53.087	-15.133	68.220	Pass
Vertical	5650.000	18.483	31.385	49.867	-18.353	68.220	Pass
Vertical	5695.109	18.618	37.934	56.552	-45.031	101.583	Pass
Vertical	5700.000	18.632	37.349	55.981	-49.219	105.200	Pass
Vertical	5718.949	18.690	42.395	61.085	-49.421	110.506	Pass
Vertical	5720.000	18.693	42.131	60.824	-49.976	110.800	Pass
Vertical	5725.000	18.711	44.953	63.664	-58.536	122.200	Pass
Vertical	5754.710	18.798	75.614	94.413	--	--	--



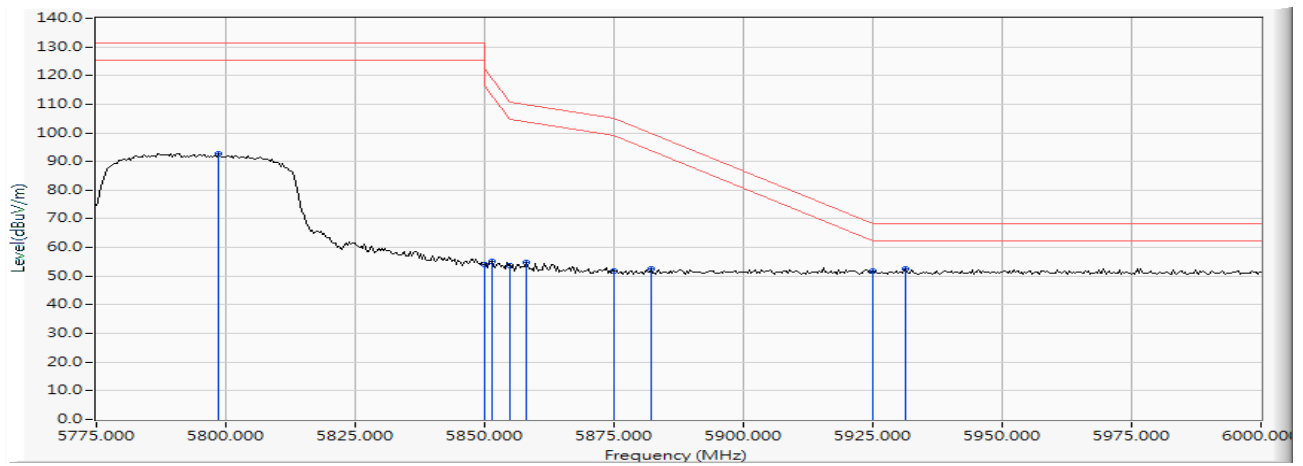
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps) (5795MHz)
 Test Date : 2017/04/12

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5795.870	18.935	73.816	92.752	--	--	--
Horizontal	5850.000	19.103	36.030	55.133	-67.067	122.200	Pass
Horizontal	5852.609	19.110	36.701	55.811	-60.440	116.251	Pass
Horizontal	5855.000	19.115	36.351	55.467	-55.333	110.800	Pass
Horizontal	5875.000	19.177	33.663	52.840	-52.360	105.200	Pass
Horizontal	5877.717	19.187	35.777	54.964	-48.225	103.189	Pass
Horizontal	5925.000	19.333	32.194	51.526	-16.674	68.200	Pass
Horizontal	5927.935	19.340	32.845	52.186	-16.014	68.200	Pass



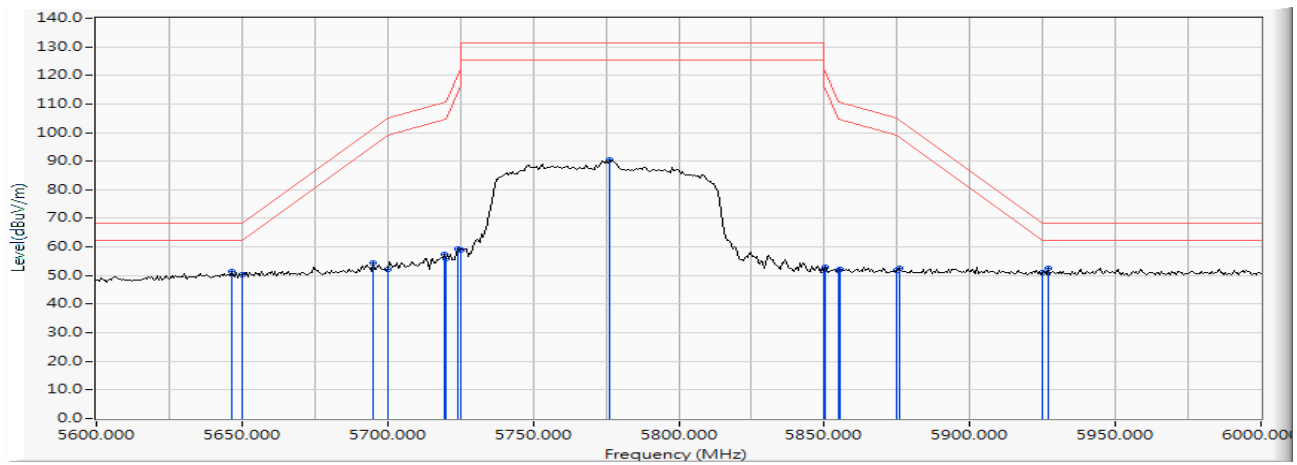
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5798.478	18.947	73.811	92.757	--	--	--
Vertical	5850.000	19.103	34.809	53.912	-68.288	122.200	Pass
Vertical	5851.304	19.106	35.932	55.038	-64.189	119.227	Pass
Vertical	5855.000	19.115	34.652	53.768	-57.032	110.800	Pass
Vertical	5858.152	19.123	35.613	54.736	-55.181	109.917	Pass
Vertical	5875.000	19.177	32.673	51.850	-53.350	105.200	Pass
Vertical	5882.283	19.204	33.449	52.652	-47.159	99.811	Pass
Vertical	5925.000	19.333	32.481	51.813	-16.387	68.200	Pass
Vertical	5931.196	19.350	33.046	52.396	-15.804	68.200	Pass



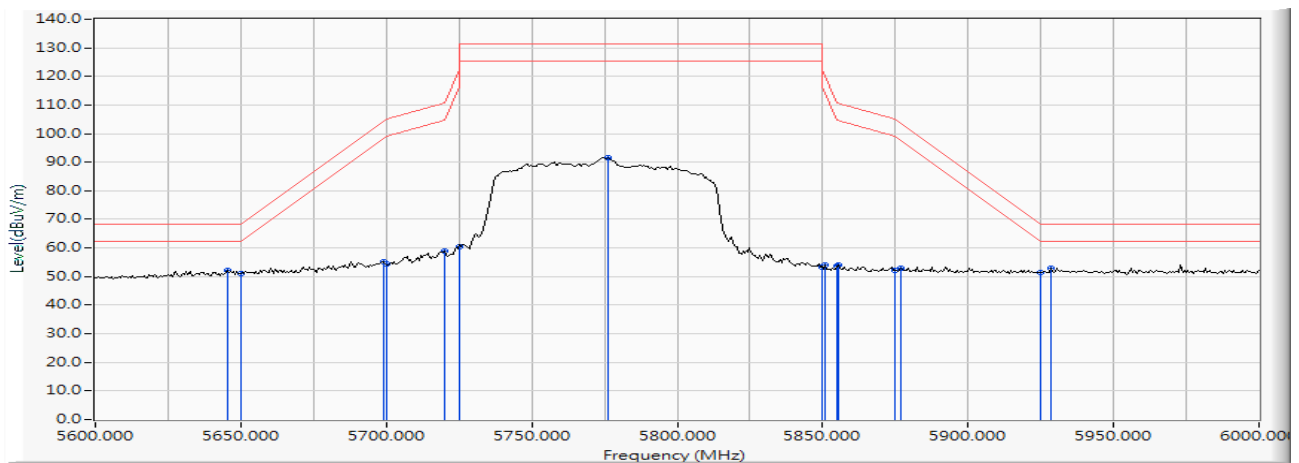
Product : Panasonic VP4R-A
 Test Item : Band Edge Data
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps) (5775MHz)
 Test Date : 2017/04/13

RF Radiated Measurement:

	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Horizontal	5646.377	18.471	33.135	51.606	-16.614	68.220	Pass
Horizontal	5650.000	18.483	31.731	50.213	-18.007	68.220	Pass
Horizontal	5695.072	18.618	35.790	54.408	-47.147	101.555	Pass
Horizontal	5700.000	18.632	33.410	52.042	-53.158	105.200	Pass
Horizontal	5719.420	18.691	38.865	57.556	-53.082	110.638	Pass
Horizontal	5720.000	18.693	37.062	55.755	-55.045	110.800	Pass
Horizontal	5724.058	18.707	40.494	59.201	-60.851	120.052	Pass
Horizontal	5725.000	18.711	40.347	59.058	-63.142	122.200	Pass
Horizontal	5776.232	18.873	71.478	90.351	--	--	--
Horizontal	5850.000	19.103	32.646	51.749	-70.451	122.200	Pass
Horizontal	5850.435	19.104	33.822	52.926	-68.282	121.208	Pass
Horizontal	5855.000	19.115	32.684	51.800	-59.000	110.800	Pass
Horizontal	5855.652	19.117	32.886	52.003	-58.614	110.617	Pass
Horizontal	5875.000	19.177	32.702	51.879	-53.321	105.200	Pass
Horizontal	5875.942	19.181	33.186	52.367	-52.136	104.503	Pass
Horizontal	5925.000	19.333	31.774	51.106	-17.094	68.200	Pass
Horizontal	5926.957	19.338	33.173	52.511	-15.689	68.200	Pass

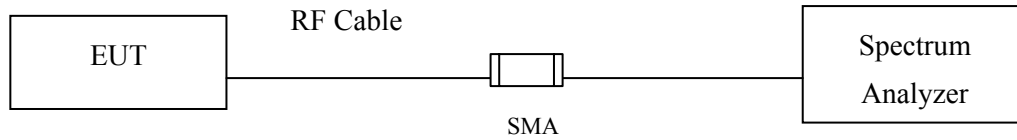


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBm)	Measure Level (dBm/m)	Margin (dB)	Limit (dBm/m)	Result
Vertical	5645.217	18.467	33.519	51.986	-16.234	68.220	Pass
Vertical	5650.000	18.483	32.723	51.205	-17.015	68.220	Pass
Vertical	5699.130	18.630	36.588	55.218	-49.339	104.557	Pass
Vertical	5700.000	18.632	35.676	54.308	-50.892	105.200	Pass
Vertical	5720.000	18.693	40.382	59.075	-51.725	110.800	Pass
Vertical	5725.000	18.711	41.813	60.524	-61.676	122.200	Pass
Vertical	5776.232	18.873	72.782	91.655	--	--	--
Vertical	5850.000	19.103	34.229	53.332	-68.868	122.200	Pass
Vertical	5851.014	19.106	34.777	53.883	-66.005	119.888	Pass
Vertical	5855.000	19.115	34.480	53.596	-57.204	110.800	Pass
Vertical	5855.652	19.117	34.943	54.060	-56.557	110.617	Pass
Vertical	5875.000	19.177	32.884	52.061	-53.139	105.200	Pass
Vertical	5877.101	19.185	33.631	52.816	-50.829	103.645	Pass
Vertical	5925.000	19.333	32.151	51.483	-16.717	68.200	Pass
Vertical	5928.696	19.343	33.592	52.935	-15.265	68.200	Pass



7. Occupied Bandwidth

7.1. Test Setup



7.2. Limits

For the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz

7.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

7.4. Uncertainty

$\pm 671.83\text{Hz}$

7.5. Test Result of Occupied Bandwidth

Product : Panasonic VP4R-A
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)
 Test Date : 2017/04/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	15150	>500	Pass
157	5785	15100	>500	Pass
165	5825	15200	>500	Pass

Figure Channel 149:

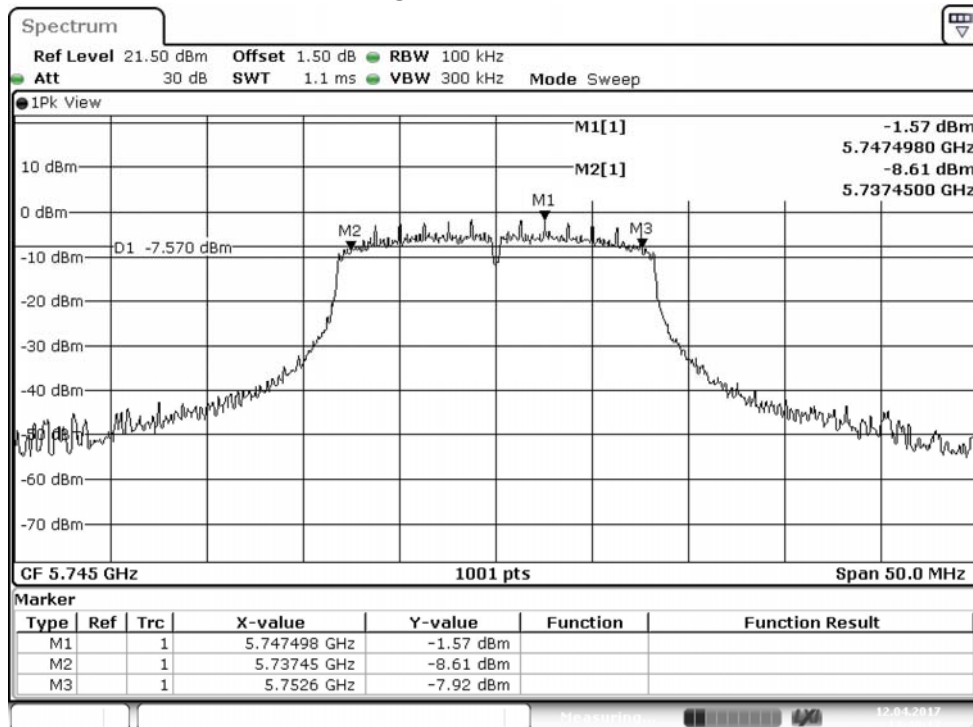


Figure Channel 157:

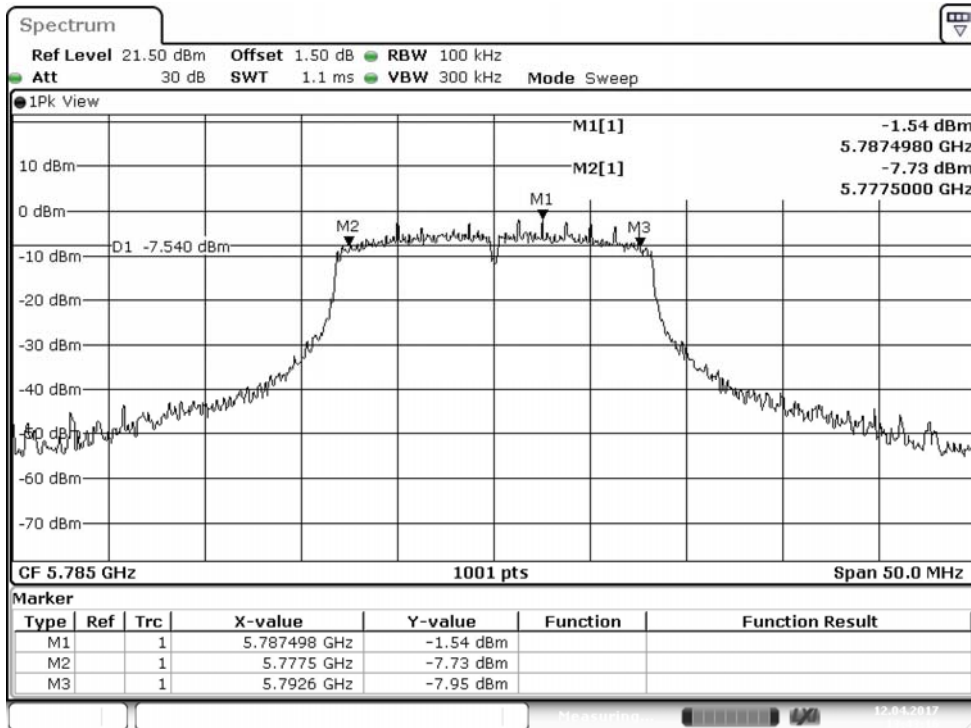
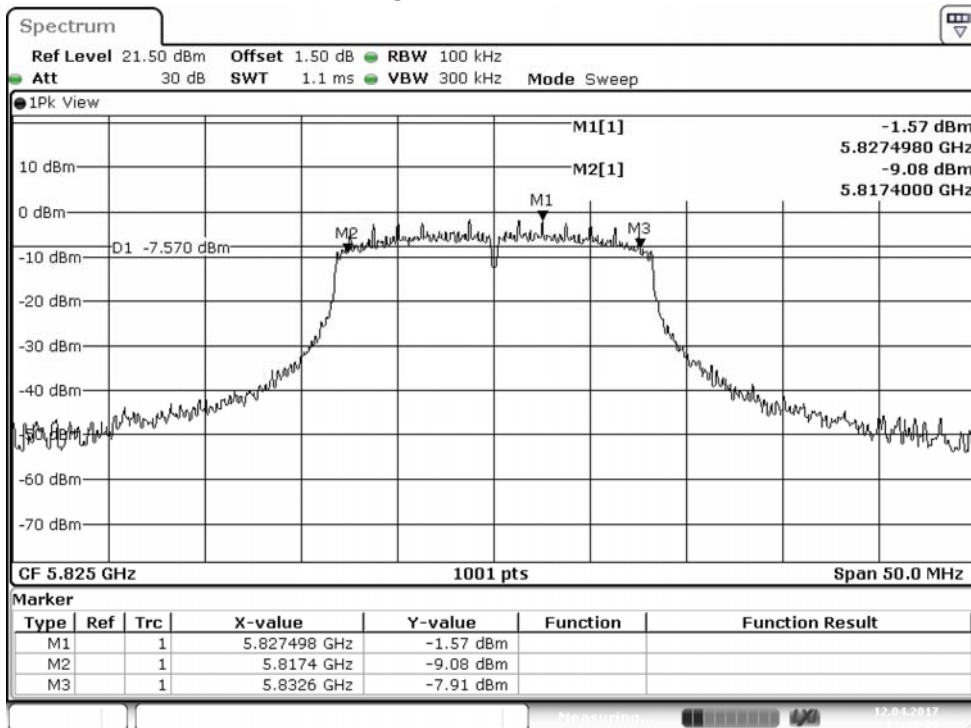


Figure Channel 165:



Product : Panasonic VP4R-A
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)
 Test Date : 2017/04/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
149	5745	15200	>500	Pass
157	5785	15150	>500	Pass
165	5825	15200	>500	Pass

Figure Channel 149:

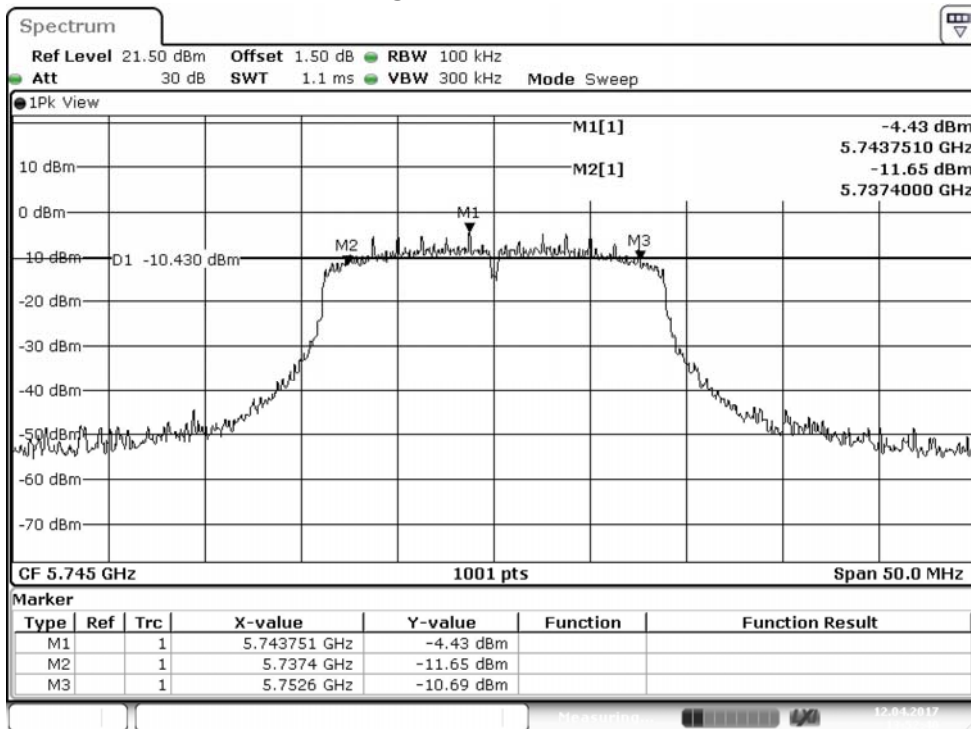


Figure Channel 157:

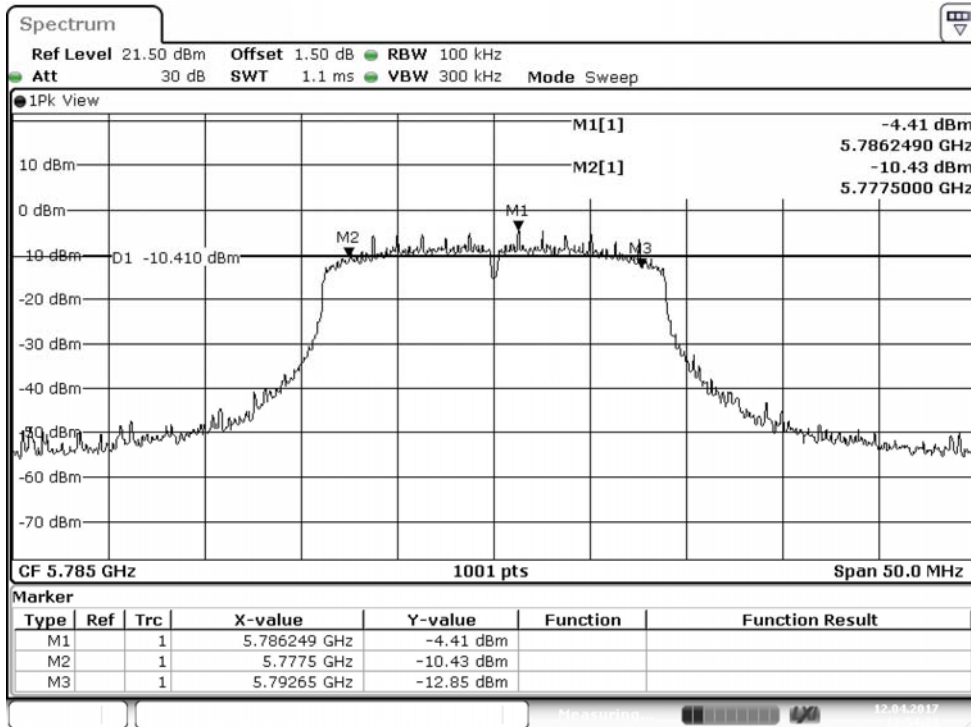
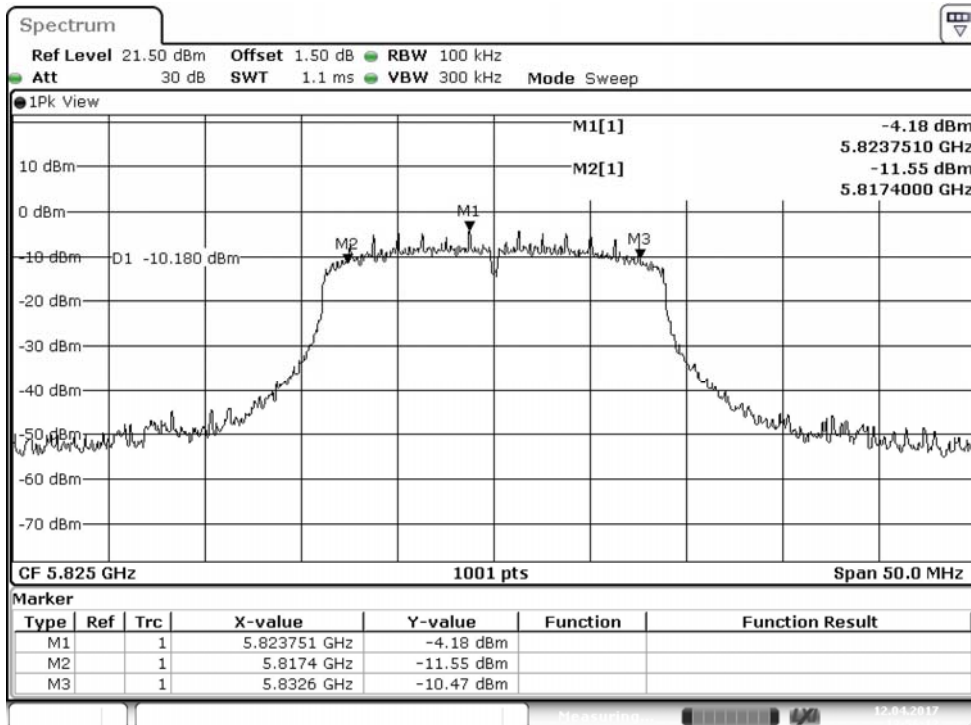


Figure Channel 165:



Product : Panasonic VP4R-A
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps)
 Test Date : 2017/04/12

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
151	5755	35300	>500	Pass
159	5795	35300	>500	Pass

Figure Channel 151:

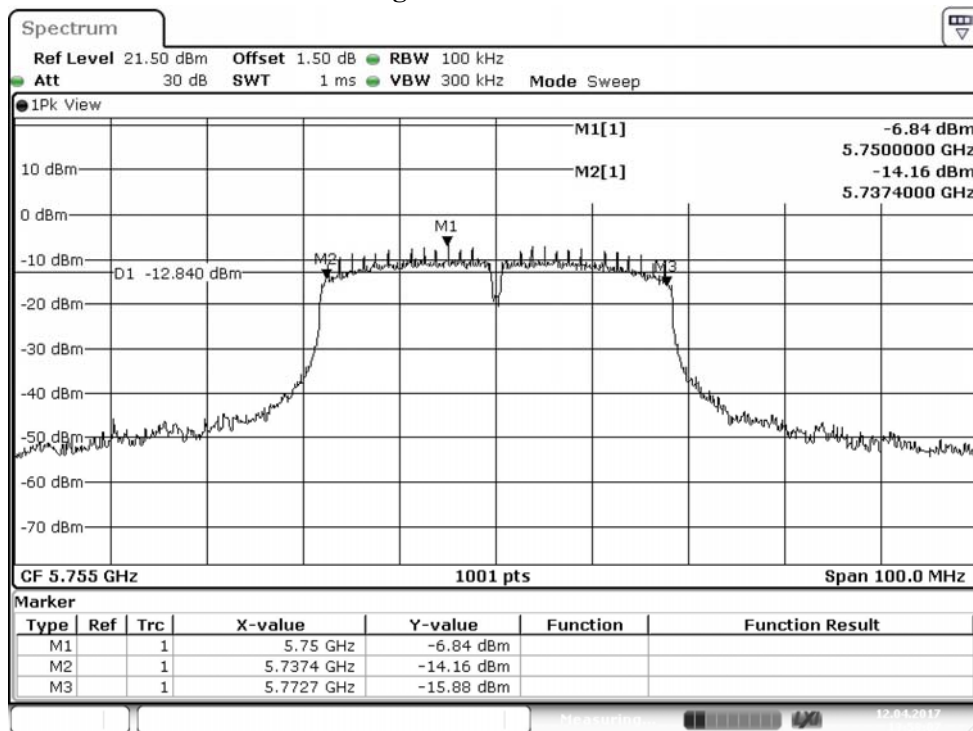
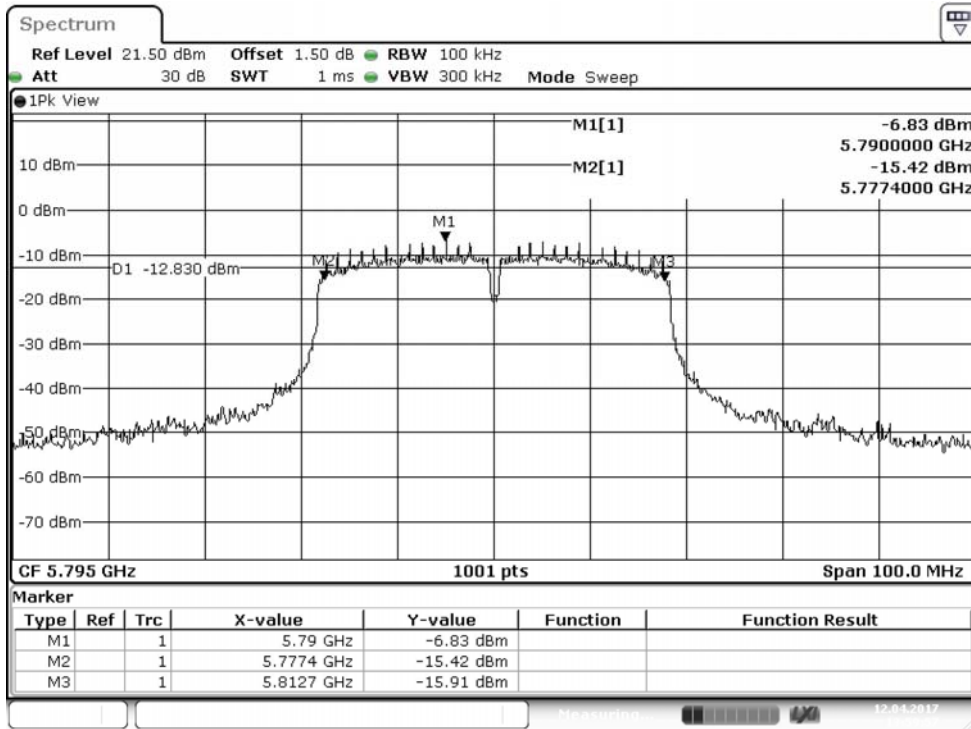


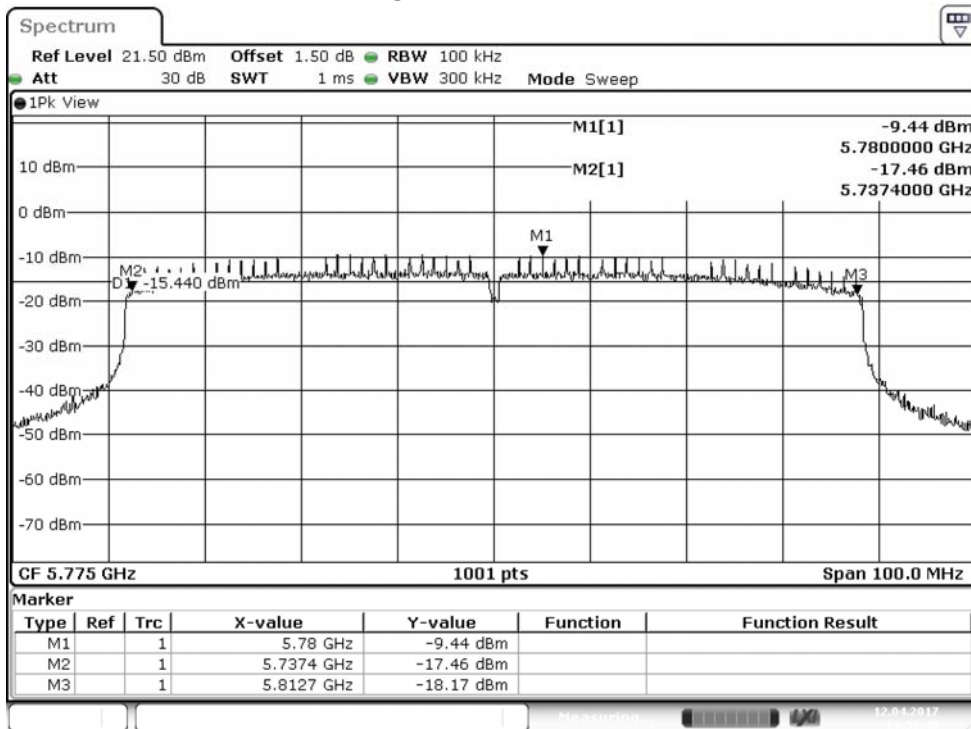
Figure Channel 159:



Product : Panasonic VP4R-A
 Test Item : Occupied Bandwidth Data
 Test Mode : Mode 4: Transmit (802.11ac-80BW-32.5Mbps)
 Test Date : 2017/04/12

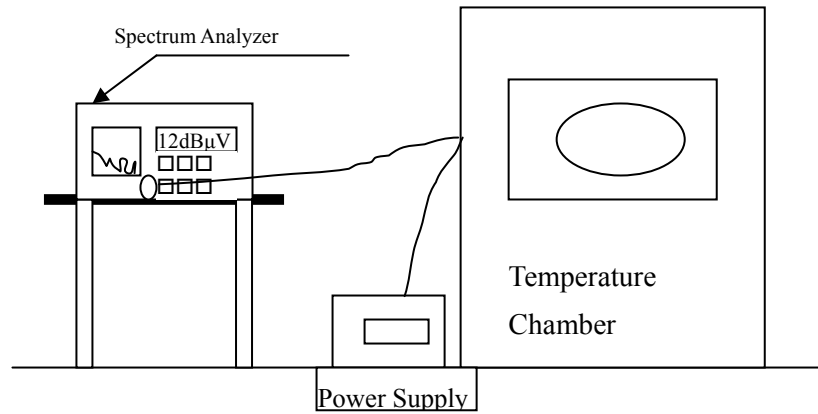
Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
155	5775	75300	>500	Pass

Figure Channel 155:



8. Frequency Stability

8.1. Test Setup



8.2. Limits

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified

8.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

8.4. Uncertainty

$\pm 671.83\text{Hz}$

8.5. Test Result of Frequency Stability

Product : Panasonic VP4R-A
 Test Item : Frequency Stability
 Test Mode : Carrier Wave
 Test Date : 2017/04/12

Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tnom (20)°C	Vnom (12)V	149	5745.0000	5745.0091	-0.0091
		151	5755.0000	5755.0020	-0.0020
		157	5785.0000	5785.0029	-0.0029
		159	5795.0000	5795.0063	-0.0063
		165	5825.0000	5825.0100	-0.0100
		155	5775.0000	5775.0023	-0.0023
Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tmax (50)°C	Vmax (13.8)V	149	5745.0000	5745.0025	-0.0025
		151	5755.0000	5755.0056	-0.0056
		157	5785.0000	5785.0049	-0.0049
		159	5795.0000	5795.0064	-0.0064
		165	5825.0000	5825.0034	-0.0034
		155	5775.0000	5775.0090	-0.0090
Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tmax (50)°C	Vmin (10.2)V	149	5745.0000	5745.0032	-0.0032
		151	5755.0000	5755.0081	-0.0081
		157	5785.0000	5785.0049	-0.0049
		159	5795.0000	5795.0102	-0.0102
		165	5825.0000	5825.0047	-0.0047
		155	5775.0000	5775.0093	-0.0093
Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tmin (-30)°C	Vmax (13.8)V	149	5745.0000	5745.0029	-0.0029
		151	5755.0000	5755.0061	-0.0061
		157	5785.0000	5785.0062	-0.0062
		159	5795.0000	5795.0020	-0.0020
		165	5825.0000	5825.0094	-0.0094
		155	5775.0000	5775.0097	-0.0097
Test Conditions		Channel	Frequency (MHz)	Frequency (MHz)	ΔF (MHz)
Tmin (-30)°C	Vmin (10.2)V	149	5745.0000	5745.0029	-0.0029
		151	5755.0000	5755.0061	-0.0061
		157	5785.0000	5785.0062	-0.0062
		159	5795.0000	5795.0020	-0.0020
		165	5825.0000	5825.0094	-0.0094
		155	5775.0000	5775.0115	-0.0115

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.