

ISED CABid: ES1909

Lab. Company Number: 4621A

Test Report No:

77793RRF.003A1

Partial Test Report

USA FCC Part 15.407, 15.209

CANADA RSS-247, RSS-Gen

(*) Identification of item tested	Telematic control unit with wireless technologies, used in automotive industry
(*) Trademark	VW AG
(*) Model and /or type reference	TKCMOD12N00
(*) Derived model not tested	TKCMOD12E00, TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00, TKCMOD12T00 and TKCMOD13C00
Other identification of the product	FCC ID: T8GCONMOD IC: 6434ACONMOD
(*) Features	GSM, UMTS, LTE, 5G, GNSS, Wi-Fi, BTLE, BT EDR HW version: H25 SW version: X638
Applicant	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR., 16, 76307, KARLSBAD, GERMANY
Test method requested, standard	USA FCC Part 15.407 (10-1-23) Edition: Unlicensed National Information Infrastructure (U-NII) Devices. General technical requirements. USA FCC Part 15.209 (10-1-23) Edition: Radiated emission limits; general requirements. CANADA RSS-247 Issue 3 (August 2023). CANADA RSS-Gen Issue 5 Amendment 2 (February 2021). Guidance for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017. ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
Approved by (name / position & signature)	José Manuel Gómez Galván EMC Consumer & RF Lab. Manager
Date of issue	2024-08-12
Report template No	FDT08_25 (*) "Data provided by the client"

INDEX	2
ACRONYMS	3
COMPETENCES AND GUARANTEES	3
GENERAL CONDITIONS	4
UNCERTAINTY	4
DATA PROVIDED BY THE CLIENT	4
USAGE OF SAMPLES	4
TEST SAMPLE DESCRIPTION	9
IDENTIFICATION OF THE CLIENT	10
TESTING PERIOD AND PLACE	10
DOCUMENT HISTORY	10
ENVIRONMENTAL CONDITIONS	10
REMARKS AND COMMENTS	11
TESTING VERDICTS	12
SUMMARY	12
APPENDIX A: TEST RESULTS FOR THE U-NII-3 BAND 5.725 - 5.85 GHZ	13

Acronyms

Acronym ID	Acronym Description
Avg Power	Maximum Average Conducted Output Power
DC	Duty Cycle
Detector	Detector used
Ebw	Emission Bandwidth
Freq	Frequency
Freq Rng	Frequency Range
MP	Measurement Point
Max EIRP	Maximum Burst EIRP
Mod	Modulation
Mode	MIMO Mode
Occ Ch BW	Occupied Channel Bandwidth
Operation Band	Operation Band
PSD	Power Spectral Density
Pol	Polarization
Port	Active Port
TPC	TPC
Unwanted Freq	Unwanted Emissions Frequency
Unwanted Lvl	Unwanted Emissions Level

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with appropriate scope of accreditation that covers the performed tests in this report.

DEKRA Testing and Certification S.A.U. is an ISED-recognized accredited testing laboratory, CABid: ES1909, Company Number: 4621A, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Testing and Certification S.A.U.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the radiated emissions of EUT from 30 MHz to 1 GHz is:
Measurement uncertainty $\leq \pm 5,35$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the radiated emissions of EUT from 1 GHz to 17 GHz is:
Measurement uncertainty $\leq \pm 4,32$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the radiated emissions of EUT from 17 GHz to 40 GHz is:
Measurement uncertainty $\leq \pm 5,55$ dB with factor ($k = 2$).

The total uncertainty of the measurement system for the conducted testing of EUT is:

RF Average Output Power: Measurement uncertainty $\leq \pm 2,01$ dB

Duty Cycle: Measurement uncertainty $\leq \pm 0,84$ ms

Power Spectral Density: Measurement uncertainty $\leq \pm 2,01$ dB

Occupied/26 dBc Bandwidth: Measurement uncertainty

$\leq \pm 57,76$ kHz for BW 20MHz;

$\leq \pm 115,53$ kHz for BW 40MHz; and

$\leq \pm 231,06$ kHz for BW 80MHz.

6 dB Bandwidth: Measurement uncertainty

$\leq \pm 34,67$ kHz for BW 20MHz;

$\leq \pm 46,22$ kHz for BW 40MHz; and

$\leq \pm 80,90$ kHz for BW 80MHz.

Conducted Band-edge spurious emissions: Measurement uncertainty $\leq \pm 2,57$ dB

DFS Channel closing & Move time: Measurement uncertainty $\leq \pm 0,84$ ms

DFS Detection Threshold Level: Measurement uncertainty $\leq \pm 1,81$ dB

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").
2. The sample of the model TKCMOD12N00 is a telematics control unit with wireless technologies, used in automotive, equipped with one modem, OEM. This unit was designed for automotive usage and contains the following features: GSM, UMTS, LTE, 5G, GNSS, WiFi (a, b, g, n, ac), Bluetooth Low Energy (BTLE) and Bluetooth EDR.
3. Declaration of similarity:

HARMAN AUTOMOTIVE DIVISION
HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GÖRING-STRASSE 16
76307 KARLSBAD, GERMANY



Declaration of similarity

To whom it may concern,

We, **Harman Becker Automotive Systems GmbH**, located in
Becker-Goering-Str. 16; 76307 Karlsbad, Germany

Hereby declare that the following units: TKCMOD12E00, TKCMOD12N00,
TKCMOD11000, TKCMOD12C00, TKCMOD12J00, TKCMOD12R00,
TKCMOD12T00 and TKCMOD13C00

have integrated the same BT/Wifi chipset.

The different naming comes from country specific, features enabled or network
access device type.

Targeted countries	Product Name	Type	NAD-HW	GNSS	Bluetooth h WLAN	NAD Services	CV2X
Rest of the world (offline variant)	TKCMOD11000	V046	EU	x	x		
EU + some other countries	TKCMOD12E00	V037, V042, V043, V044, V049	EU	x	x	x	
Canada/Mexico/USA	TKCMOD12N00	V038, V039, V047	NA	x	x	x	
China (without CV2X)	TKCMOD12C00	V105	CN	x	x	x	
Japan	TKCMOD12J00	V045	RW	x	x	x	
Armenia/Belarus/Kazakhstan/Russia/Uzbekistan	TKCMOD12R00	V048	EU	x	x	x	
Turkey	TKCMOD12T00	V040	EU	x	x	x	
China (with CV2X)	TKCMOD13C00	V106	CN	x	x	x	x

This declaration is intended to be included in the test reports where applies

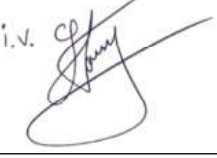
Regards

HARMAN AUTOMOTIVE DIVISION
Harman Becker Automotive Systems GmbH
Becker-Göring-Straße 16
76307 Karlsbad, Germany

By: Andrei-Daniel CALIN
Title: Regulatory Product Compliance Expert
Company: Harman Becker
Telephone: +40 799 305 814
e-mail: andreidaniel.calin@harman.com

By: Iulian-George Stoica
Title: Regulatory Product Compliance Expert
Company: Harman Becker
Telephone: +40799 306 699
e-mail: iulian.stoica@harman.com

4. Declaration of Comparability.

 HARMAN A SAMSUNG COMPANY	
Declaration of Comparability	
HARMAN BECKER Automotive Systems GmbH Becker-Göring-Str. 16 D-76307 Karlsbad, Germany	
declares under our sole responsibility, that the product	
Description of object	: Telematic system with BT, WLAN, GNSS, GSM, UMTS, LTE, 5G
Brand/ Customer	: VW AG / VW-Group
Model name	: TKCMOD12E00/ TKCMOD11000 (CONMOD PPE)
Variant	: V037/ V046
Hardware / Software version	: H22 / X152 (corresponds CL1/2/3/4)
Is comparable to:	
Description of object	: Telematic system with BT, WLAN, GNSS, GSM, UMTS, LTE, 5G
Brand/ Customer	: VW AG / VW-Group
Model name	: TKCMOD12E00/ TKCMOD11000 (CONMOD PPE)
Variant	: V037/ V046
Hardware / SW version	: H25 / X638 (corresponds CL6)
We declare as authorized responsible person, that the products above have HW and SW changes which have no impact for the certification activities. The application SW is changed from X152 to X638 version and HW is changed from H22 to H25. These changes do not impact the following parameters: used frequency ranges / used frequency bands, the used modulation type, the maximum RF power, the circumstances under which the transmitter operates, the basic frequency and/or stabilizing circuitry, frequency multiplication stages, the basic modulator circuitry or maximum RF power, the field strength ratings, slew rates for clocking of output pins and drivers. In conclusion, we can say that all HW and SW updates do not influence any type approval for TKCMOD12E00 / TKCMOD11000 (ConMod PPE) in Cluster 6 (H25/X638) – variants listed above.	
Declared by:	checked by: Daniel Galln (PM) / 17.07.2024
Mr. STOICA Iulian, Customer Lead Certification	
Bucharest (Place)	17.07.2024 (Date)
	(Signature)
Mr. OLTEANU Marius, Product Compliance Expert.	
Bucharest (Place)	17.07.2024 (Date)
	(Signature)

HW Changes on TCU side.

From HW perspective: all the updates performed on HW level are listed below.

- Change of PCB solder mask to enable the population of a shield at a voltage regulator to improve EMC behavior (1)
- Add shield at voltage regulator to improve EMC behavior (1)
- Add two capacitors at functional LED lines to improve EMC behavior (2)
- Value change of two resistors at backlight LED line to improve EMC behavior (2)
- CAN transceiver replacement, same silicon, same datasheet but better CAN FD performance (3)
- Capacitor value change to improve the switch on behavior of A2B power supply (4)
- Introduce second source for switching transistor in GNSS power supply (5)
- Introduce second source (TDK) for A2B bus inductors (6)

More details please find in the attached document :

- „ConMod-HW-Changes-CL6-H22toH25“



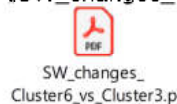
SW Changes on TCU side – X152 version to X638 version:

For Cluster 6, the SW update from X152 version to X638 version is listed in the following documents:

- Harman
 - „ConMOD_changes_X152_X638“



- Conti
 - „SW_changes_Cluster6_vs_Cluster3“



- E-Solutions
 - „Delta X152-X638 Pol“



There have been:

- No changes of the used frequency ranges / bands
- No changes of the used modulation type
- No changes of the maximum RF power
- No changes of the circumstances under which the transmitter operates
- No changes of the basic frequency and/or stabilizing circuitry
- No changes of the frequency multiplication stages
- No changes of the basic modulator circuitry or maximum RF power
- No changes of the field strength ratings
- No changes of slew rates for clocking of output pins and drivers

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial N°	Date Reception	of	Application
S/01	77793B_5.1	Telematic control unit with wireless technologies, used in automotive industry.	TKCMOD12N00	V04789R081900013	2024-05-16		Element Under Test
S/01	77617B_15.1	Power cable (OABR Adapter Cable)	-	-	2023-11-20		Auxiliary Element
S/01	77617B_94.1	Harness	-	-	2024-02-20		Auxiliary Element
S/02	77793B_5.1	Telematic control unit with wireless technologies, used in automotive industry.	TKCMOD12N00	V04789R081900013	2024-05-16		Element Under Test
S/02	67003B_17.1	BT_WLAN 2 antenna	-	-	2021-09-07		Auxiliary Element
S/02	67003B_226.1	BT_WLAN3 antenna	5B4.035.510	-	2021-12-10		Auxiliary Element
S/02	77617B_162.1	Harness	-	-	2024-04-05		Auxiliary Element
S/02	77617B_22.1	Yellow Box	-	14886	2023-11-20		Auxiliary Element

Notes referenced to samples during the project:

Id	Type
S/01	Conducted tests.
S/02	Radiated tests.

Test sample description

Ports..... :	Port name and description		Cable				
			Specified max length [m]	Attached during test	Shielded	Coupled to patient ⁽³⁾	
	RF connector - code			[]	[X]	[]	
	RF connector - code			[X]	[X]	[]	
	RF connector - code			[X]	[]	[]	
--							
Supplementary information to the ports..... :	--						
Rated power supply	Voltage and Frequency			Reference poles			
				L1	L2	L3	N
	[]	AC:	[]	[]	[]	[]	[]
[X]		DC: 12V car battery (4.8 VDC inside of TCU)					
Rated Power	12V DC						
Clock frequencies.....	See Block Diagram						
Other parameters	See Technical description						
Software version	X638						
Hardware version	H25						
Dimensions in cm (W x H x D)	260 x 148 x 26mm						
Mounting position	[]	Table top equipment					
	[]	Wall/Ceiling mounted equipment					
	[]	Floor standing equipment					
	[]	Hand-held equipment					
	[X]	Other: Automotive telematics control unit					
Modules/parts..... :	Module/parts of test item			Type		Manufacturer	
	--						
Accessories (not part of the test item)	Description			Type		Manufacturer	
	Cable Harness			--			
	2G/3G4G/5G Antenna			--		Hirschmann/ Molex	
	eCall button/LED			--			
	SOS Loudspeaker			--			
	Wake-up unit Box			--			
	--						
Documents as provided by the applicant..... :	Description			File name		Issue date	
	Technical Description						
	--						

⁽³⁾ Only for Medical Equipment

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR., 16, 76307, KARLSBAD, GERMANY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2024-05-27
Date (finish)	2024-06-14

Document history

Report number	Date	Description
77793RRF.003	2024-07-18	First release.
77793RRF.003A1	2024-08-12	Second release. This test report is modified due to typos and missing information. This modification test report cancels and replaces the test report 77793RRF.003.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 20 % Max. = 75 %

Remarks and comments

The tests have been performed by the technical personnel: José Manuel Jiménez González and Rafael Fernandez Martin.

Used instrumentation:

Control No.	Equipment	Model	Manufacturer	Next Calibration
07760	DIGITAL MULTIMETER	175	FLUKE	2024-11-08
06615	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
06609	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-22
07040	EXTENSION FOR OPEN SWITCH UNIT UP TO 40GHz	OSP-B157Wx	ROHDE AND SCHWARZ	2025-04-19
09029	HIGH PASS FILTER 17-40 GHZ	STHP-17-40G-92	TEMSTRON/TEM WELL	2025-03-29
07091	HIGH PASS FILTER 7-18 GHZ	ST-7GA3619-HS	TEMSTRON/TEM WELL	2025-04-08
04657	HORN ANTENNA 18-40GHz	BBHA 9170	SCHWARZBECK	2026-06-12
07193	MULTI-DEVICE CONTROLLER	CO3000	INNCO	N/A
08848	OPEN SWITCH UNIT UP TO 7.5 GHz	OSP-B157W8 PLUS	ROHDE & SCHWARZ	2024-12-21
03335	POWER SENSOR 10MHz-8GHz	NRP-Z11	ROHDE AND SCHWARZ	2024-05-29
00922	POWER SUPPLY DC 40 V / 40 A	NGPE 40/40	ROHDE AND SCHWARZ	N/A
08856	PRE-AMPLIFIER G>30dB 18-40GHz	BLMA 1840-4A	BONN ELEKTRONIK	2025-02-27
06142	PRE-AMPLIFIER G>38dB 30MHz-6GHz	BLNA 0360-01N	BONN ELEKTRONIK	2024-06-28
06791	SEMIANECHOIC ABSORBER LINED CHAMBER IV	FACT 3 200 STP	ETS LINDGREN	N/A
06793	SHIELDED ROOM	S101	ETS LINDGREN	N/A
06668	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2024-12-14
07794	SIGNAL AND SPECTRUM ANALYZER 10Hz-40GHz	FSV40	ROHDE AND SCHWARZ	2025-04-21
04848	EMC/RF MEASUREMENT SOFTWARE	EMC32	ROHDE AND SCHWARZ	N/A
06611	TEMPERATURE AND HUMIDITY PROBE	HWg-STE	HW GROUP	2025-04-04
07798	EMC/RF MEASUREMENT SOFTWARE	WMS32	ROHDE AND SCHWARZ	N/A

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

Summary

A. U-NII-3 Band: 5.725 - 5.85 GHz

FCC PART 15 PARAGRAPH / RSS-247			
Requirement – Test case		Verdict	Remark
FCC 15.407 (a)(3) / RSS-247 6.2.4.1	Transmitter Maximum conducted Output Power	P	(1)
FCC 15.407 (e) / RSS-247 6.2.4.1	6 dB bandwidth.	P	(1)
FCC 15.407 (a)(3) / RSS-247 6.2.4.1	Transmitter Maximum Power Spectral Density	P	(1)
FCC 15.407 (b)(4)(6) / RSS-247 6.2.4.2	Transmitter Out of Band and Band Edge Radiated Emissions	P	(1)
Duty Cycle		P	(1)
99% Occupied Bandwidth		P	(1)
26 dB Emission Bandwidth (EBW)		P	(1)
<u>Supplementary information and remarks:</u>			
(1) Only tests for MIMO 2x2 requested.			

Appendix A: Test results for the U-NII-3 Band 5.725 - 5.85 GHz

TEST CONDITIONS	15
TEST CASES DETAILS	20
<i>RSS-247 6.2.4.1 / FCC 15.407 (a) (3) [Avcp] Maximum Conducted output power UNII-3</i>	<i>20</i>
<i>RSS-247 6.2.4.1 / FCC 15.407 (a) (3) [Psd] Transmitter Maximum Power Spectral Density UNII-3</i>	<i>24</i>
<i>RSS-247 6.2.4.1 / FCC 15.407 (e) [6dBw] 6 dB Emission Bandwidth</i>	<i>44</i>
<i>RSS-247 6.2.4.2 / FCC 15.407 (b) (4) (6) [Rse] Transmitter Out of Band and Band Edge Radiated Emissions for transmitters operating solely in the 5.725-5.850 GHz band</i>	<i>64</i>
<i>RSS-Gen 6.6 / RSS-247 6.2. [99dBW] Transmitter 99% Occupied Bandwidth</i>	<i>121</i>
<i>Section 15.407 Subclause 15.403(i) [Ebw] Transmitter 26 dB Emission Bandwidth (EBW).....</i>	<i>141</i>

TEST CONDITIONS

(*): Data provided by the client.

POWER SUPPLY (*):

Vnominal: 12 Vdc
Type of Power Supply: Vehicle Battery.

ANTENNAS:

Type of Antenna: External.

	Mode	Maximum Declared Antenna Gain	Effective Declared Antenna Gain
Configuration #1:	SISO – Port 2 MIMO – Port 2 and Port 3	+3.2dBi	+2.3dBi
Configuration #2:	SISO – Port 2 MIMO – Port 2 and Port 3	+5dBi	+2.5dBi

Technology Tested:	WLAN (IEEE 802.11 a/n/ac): U-NII-3 band	
Modes:	802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps	
	802.11n HT20: MCS0 to MCS7	
	802.11n HT40: MCS0 to MCS7	
	802.11ac VHT20: MCS0 to MCS8	
	802.11ac VHT40: MCS0 to MCS9	
	802.11ac VHT80: MCS0 to MCS9	
Beamforming:	No	
Frequency Range:	5725 MHz to 5850 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Low: 149	5745
	Middle: 157	5785
	High: 165	5825
Channel Spacing:	40 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Low: 151	5755
	High: 159	5795
Channel Spacing:	80 MHz	
Transmit Channels	Middle: 155	5775

POWER SETTING (*):

UNII-3:

Channel	Frequency	11a	11n	11ac
149	5745 MHz	14	14	14
157	5785 MHz	14	14	14
165	5825 MHz	14	14	14
151	5755 MHz	14	14	14
159	5795 MHz		14	14
155	5775 MHz		14	14

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode on the lowest and highest channels at the rated power for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied instructions to configure the EUT. The customer supplied a document containing the setup instructions.

The worst cases for testing were identified for output power and spurious levels at the band edges which were selected based on preliminary testing that correspond to next data rates:

- 802.11 a20: 6 Mbps
- 802.11 n HT20: MCS0
- 802.11 n HT40: MCS0
- 802.11 ac VHT20: MCS0
- 802.11 ac VHT40: MCS0
- 802.11 ac VHT80: MCS0

CONDUCTED MEASUREMENTS:

The equipment under test was set up in a shielded room and it is connected to the TS8997 using a low loss RF cable. The reading of the spectrum analyser is corrected taking into account the cable loss.



RADIATED MEASUREMENTS:

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna (Bilog antenna for the range between 30 MHz to 1000 MHz and 1 GHz-17 GHz Double ridge horn antenna) is situated at a distance of 3 m and at a distance of 1.5 m for the frequency range 17 GHz-26 GHz (17 GHz-40 GHz horn antenna).

For radiated emissions in the range 17 GHz-26 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

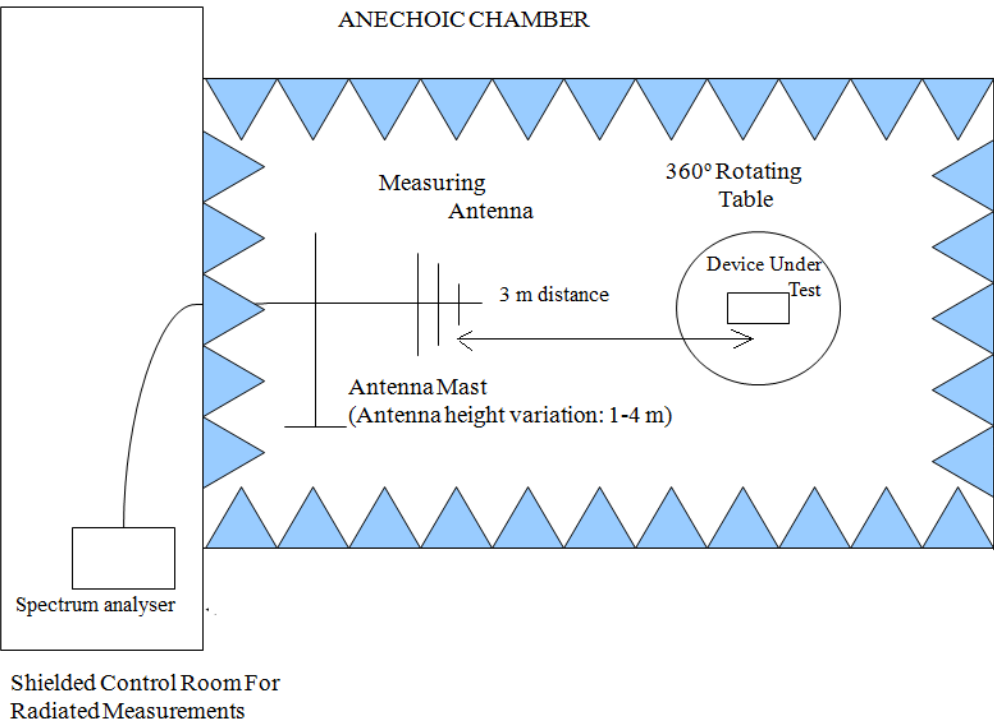
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height (Bilog antenna and Double ridge horn antenna) was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

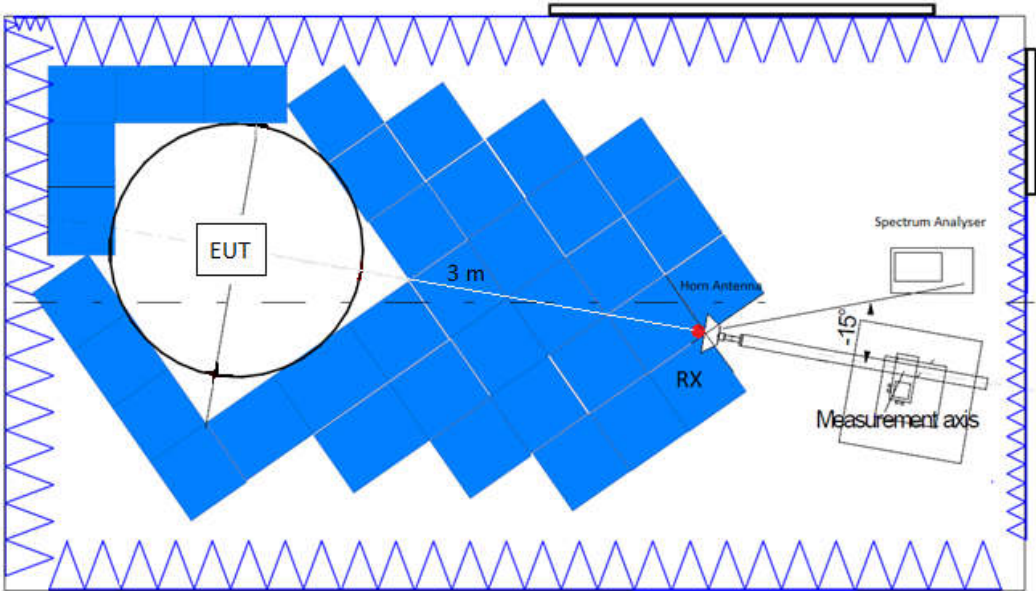
The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

A resolution bandwidth/video bandwidth of 100 kHz / 300 kHz was used for frequencies below 1 GHz and 1 MHz / 3 MHz for frequencies above 1 GHz.

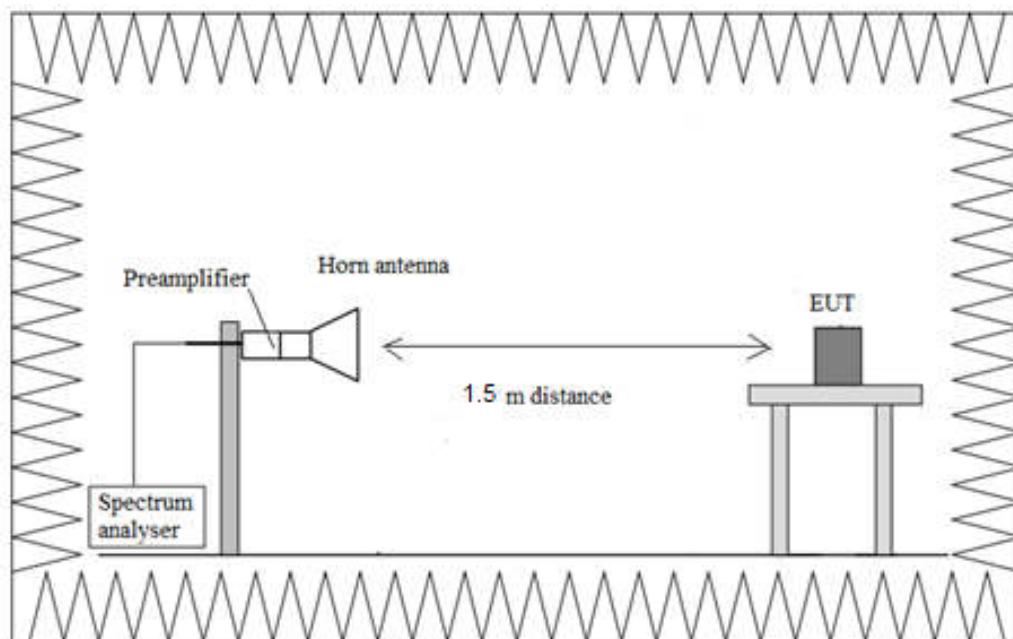
Radiated measurements setup from 30 MHz to 1 GHz:



Radiated measurements setup from 1 GHz to 17 GHz:



Radiated measurements setup $f > 17$ GHz:



TEST CASES DETAILS

RSS-247 6.2.4.1 / FCC 15.407 (a) (3) [Avcp] Maximum Conducted output power UNII-3

Limits

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30 dBm). 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.

CONFIGURATION 2:

Modulation: 802.11a (OFDM 6 Mbit/s)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5745.00000	No	13.13	15.63
		5785.00000		14.12	16.62
		5825.00000		13.08	15.58

Modulation: 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5745.00000	No	13.19	15.69
		5785.00000		13.79	16.29
		5825.00000		13.12	15.62

Modulation: 802.11ac VHT20 (OFDM MCS0)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5745.00000	No	13.09	15.59
		5785.00000		13.98	16.48
		5825.00000		13.00	15.50

Modulation: 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5755.00000	No	10.33	12.83
		5795.00000		10.67	13.17

Modulation: 802.11ac VHT40 (OFDM MCS0)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5755.00000	No	10.91	13.41
		5795.00000		10.75	13.25

Modulation: 802.11ac VHT80 (OFDM MCS0)

Mode: SISO

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	3	5775.00000	No	10.52	13.02

Verdict

Pass

CONFIGURATION 2:

Modulation: 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

The maximum conducted output power was measured according to 789033 D02 General UNII Test Procedures New Rules v02r01 clause E.3.b) (Method PM-G) (duty cycle is < 98%).

For all modes of operation, the antenna gain is less than 6 dBi.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

Assuming CDD (modulation OFDM), and NSS = 1 (worst case):

Array Gain = 0 dB (NANT ≤ 4)

Directional Gain = GANT + Array Gain = 2.5 dBi + 0 dB = 2.5 dBi

Maximum Declared Antenna Gain for RF Output Power: 2.5 dBi

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5745.00000	No	10.28	12.78
		5785.00000		9.98	12.48
		5825.00000		9.95	12.45

Modulation: 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5755.00000	No	9.29	11.79
		5795.00000		8.55	11.05

Modulation: 802.11a (OFDM 6 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5745.00000	No	10.46	12.96
		5785.00000		10.10	12.60
		5825.00000		10.21	12.71

Modulation: 802.11ac VHT20 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5745.00000	No	10.35	12.85
		5785.00000		9.96	12.46
		5825.00000		10.01	12.51

Modulation: 802.11ac VHT40 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5755.00000	No	9.30	11.80
		5795.00000		8.56	11.06

Modulation: 802.11ac VHT80 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Avg Power (dBm)	Max EIRP (dBm)
[5725, 5850]	1+2	5775.00000	No	9.26	11.76

Verdict

Pass

RSS-247 6.2.4.1 / FCC 15.407 (a) (3) [Psd] Transmitter Maximum Power Spectral Density UNII-3

Limits

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, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Results

For all modes of operation, the antenna gain is less than 6 dBi.
The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

Assuming CDD (modulation OFDM), and NSS = 1 (worst case):
Array Gain = 10 log(NANT/NSS) dB = 10 log(2) = 3.01 dB
Directional Gain = GANT + Array Gain = 2.5 dBi + 3.01 dB = 5.51 dBi

CONFIGURATION 2:

Modulation: 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
MIMO Mode: MIMO CDD Mode 2x2

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5745.00000	No	5744.405941	-5.49
		5785.00000		5784.405941	-5.71
		5825.00000		5825.594059	-5.64

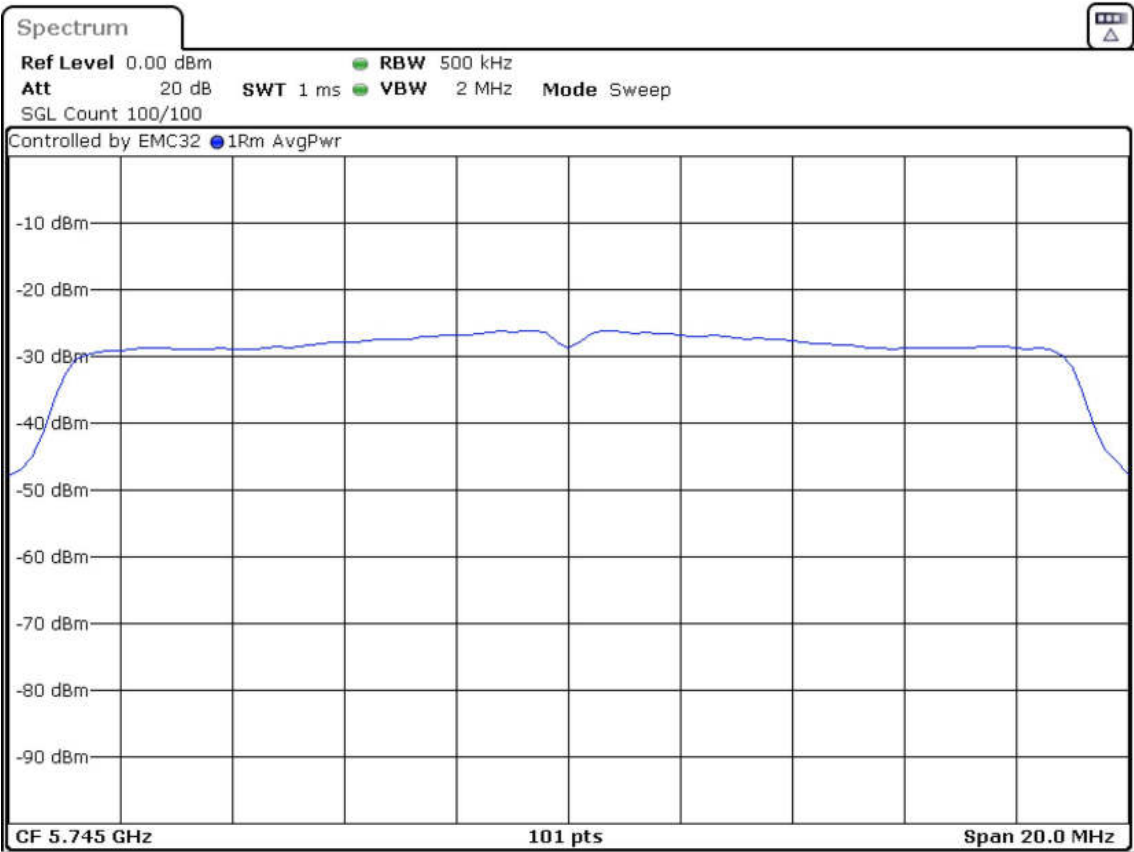
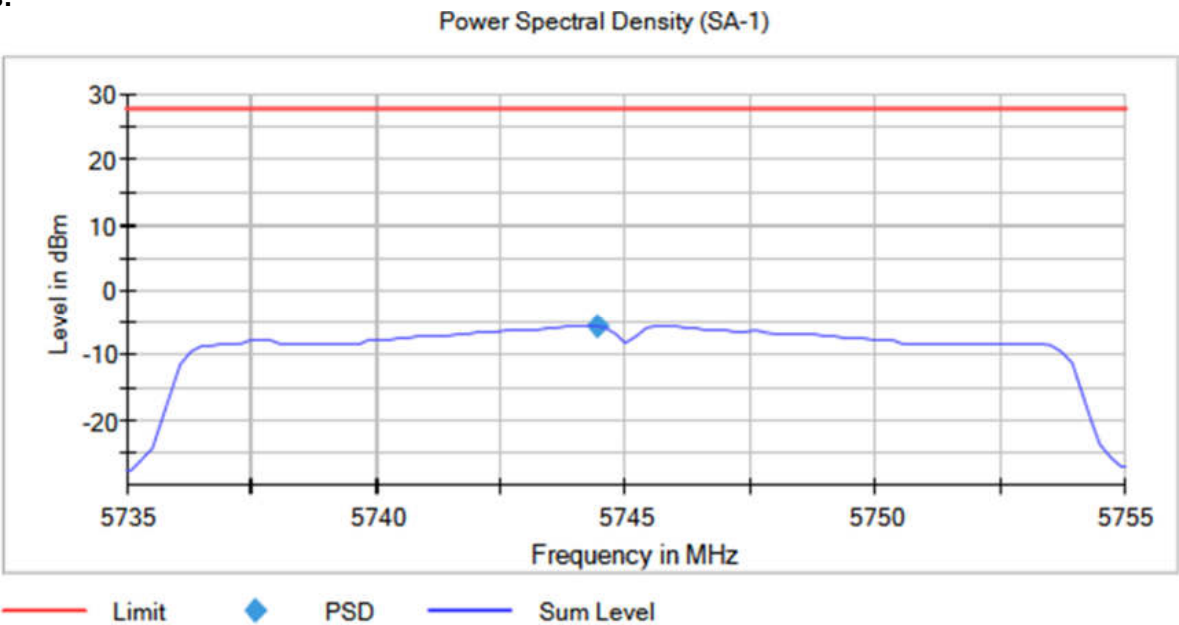
Verdict

Pass

Attachments

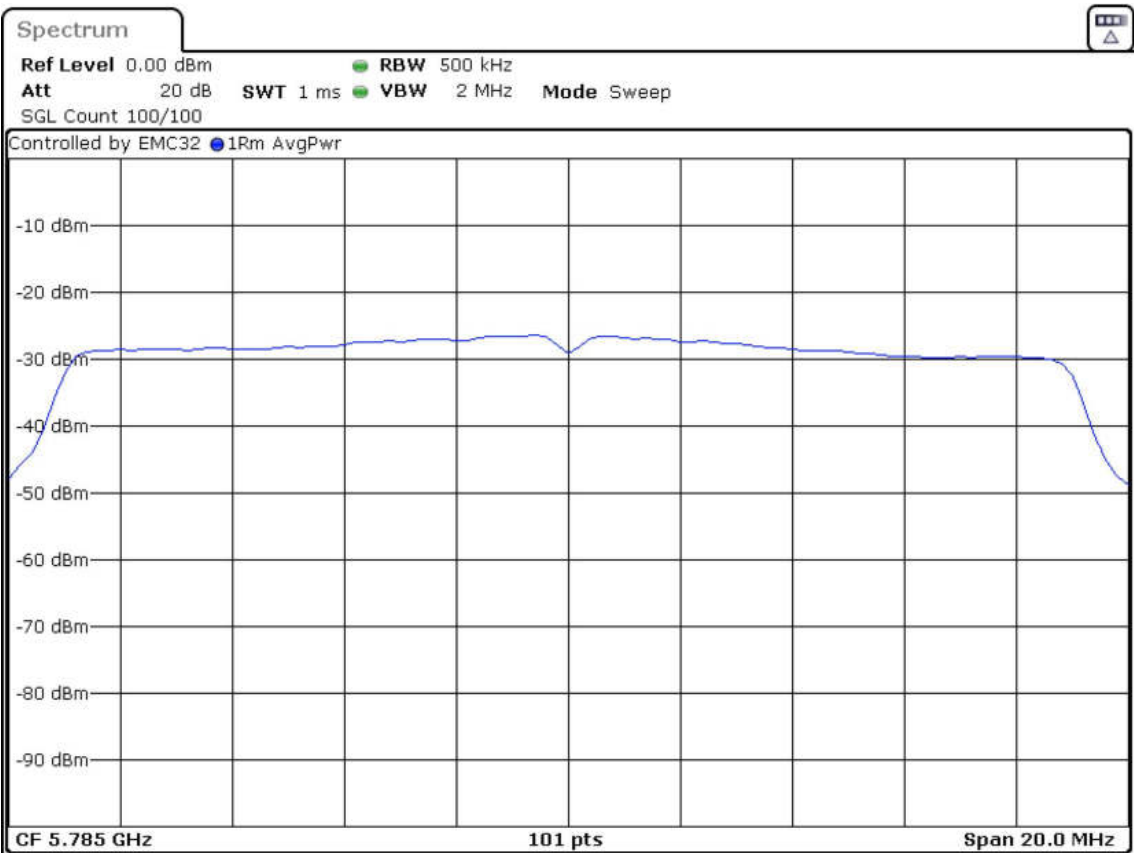
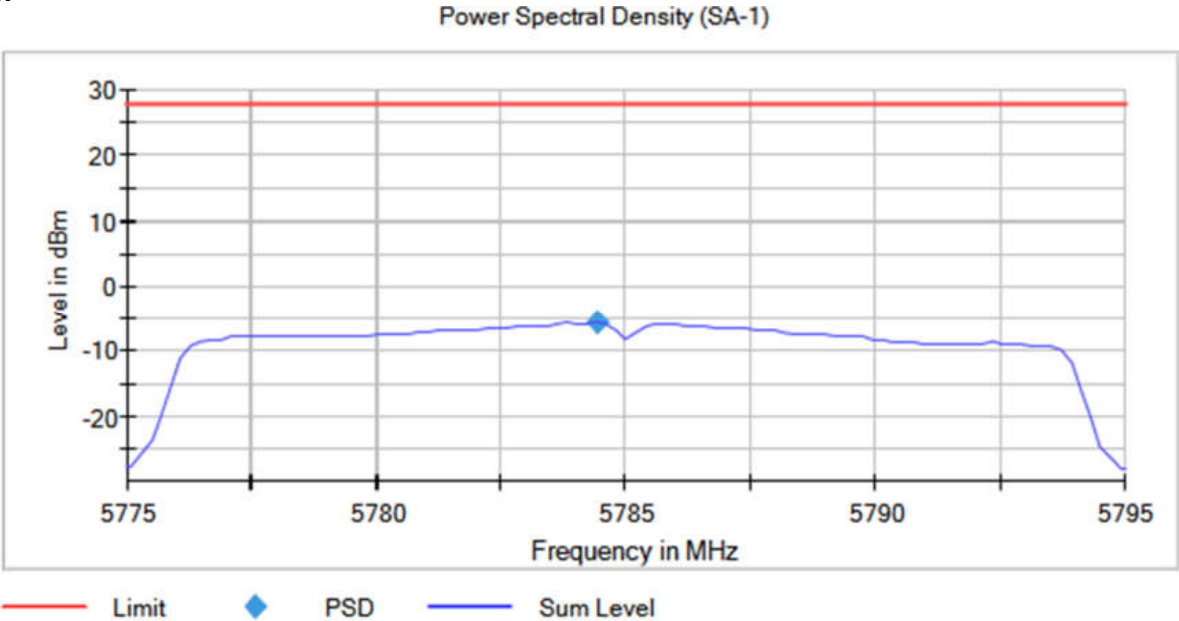
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



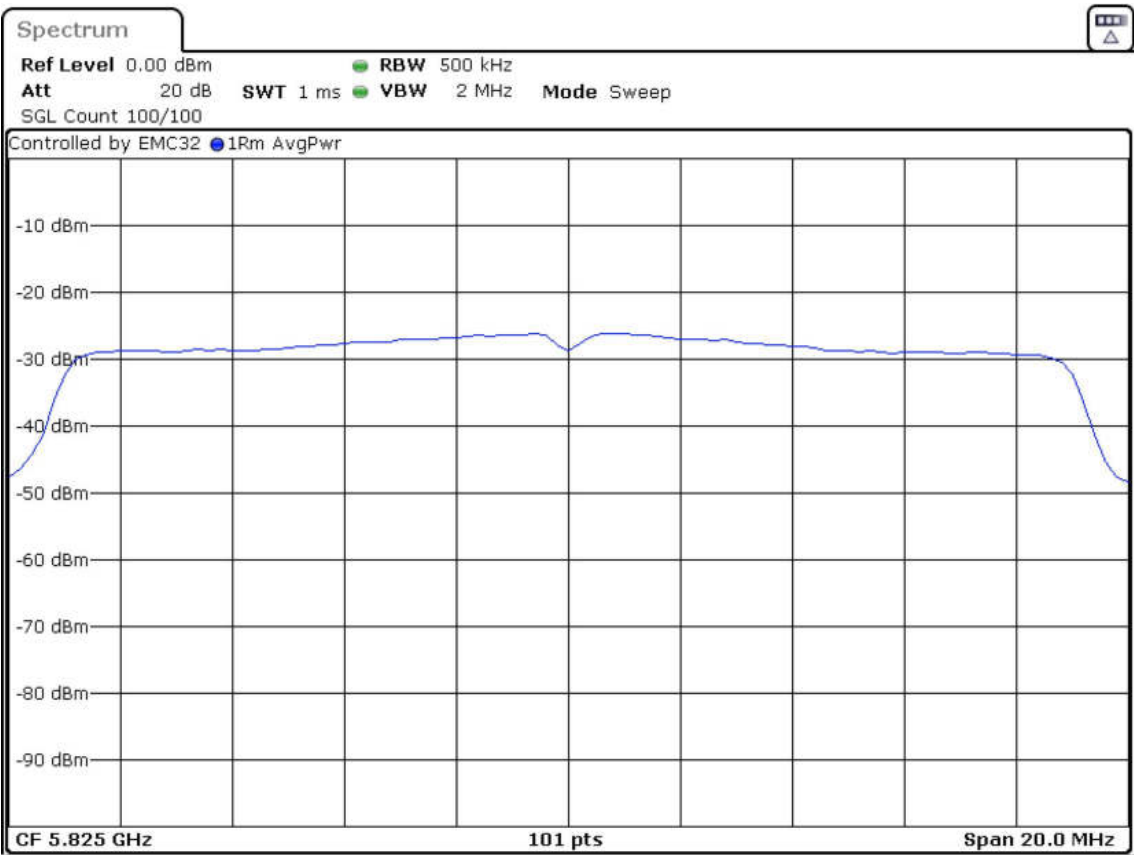
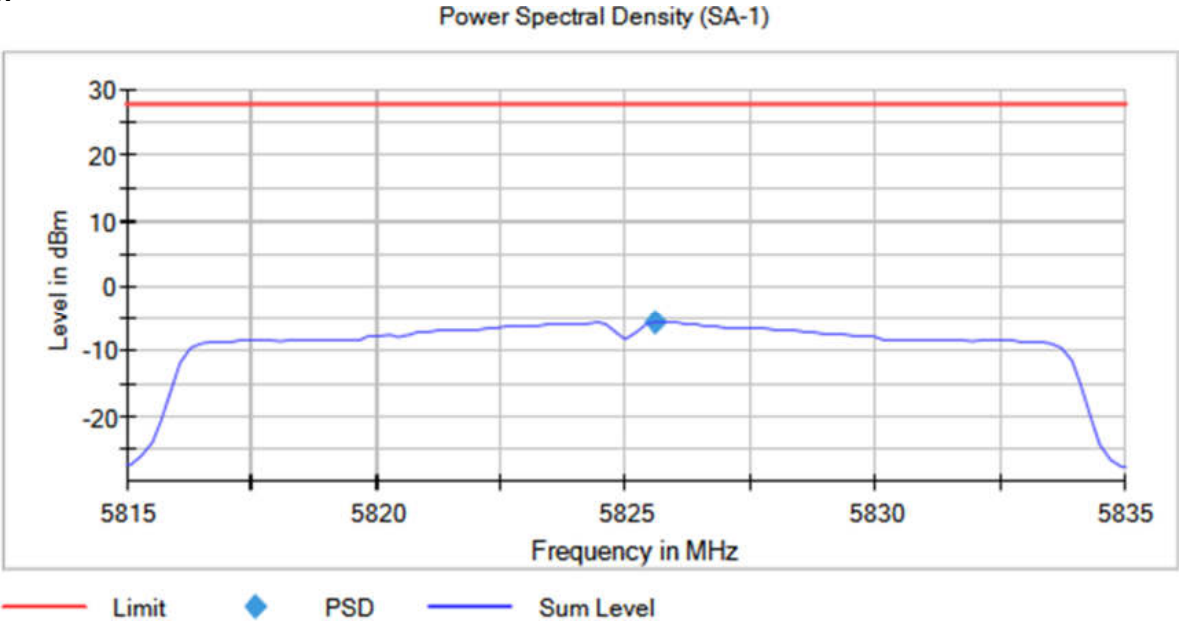
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5755.00000	No	5752.875000	-10.66
		5795.00000		5797.625000	-11.22

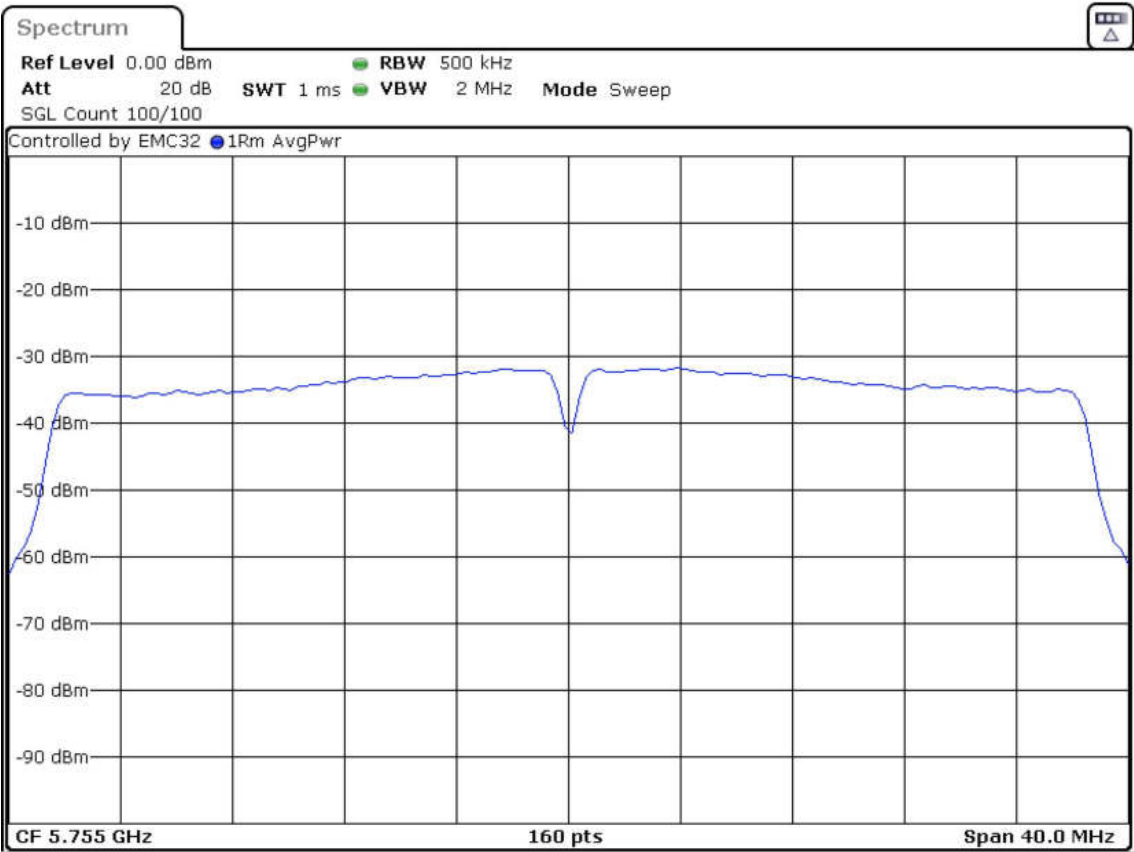
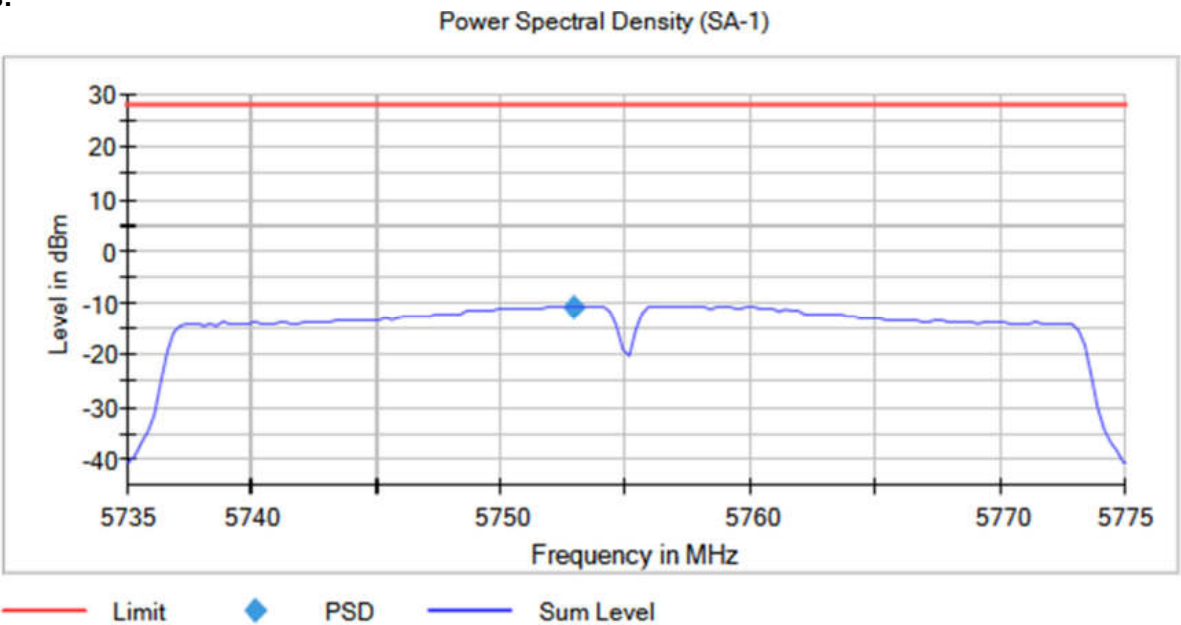
Verdict

Pass

Attachments

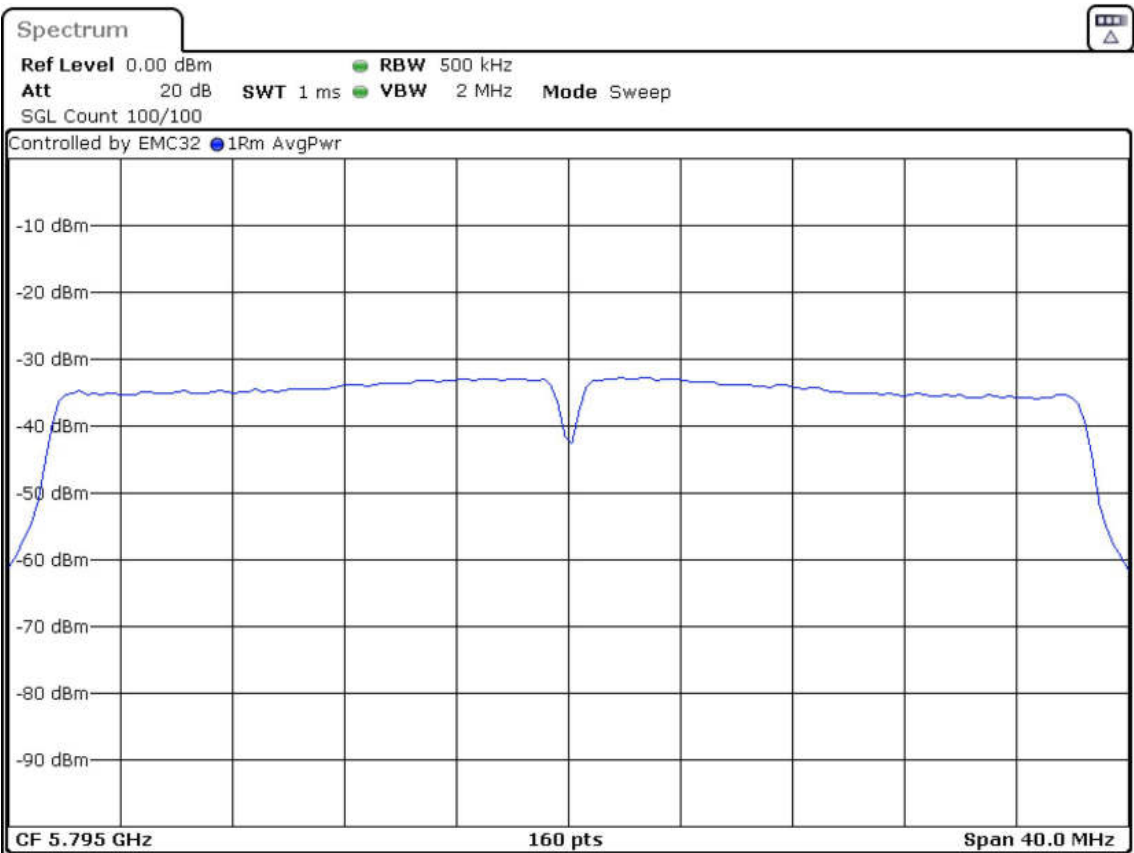
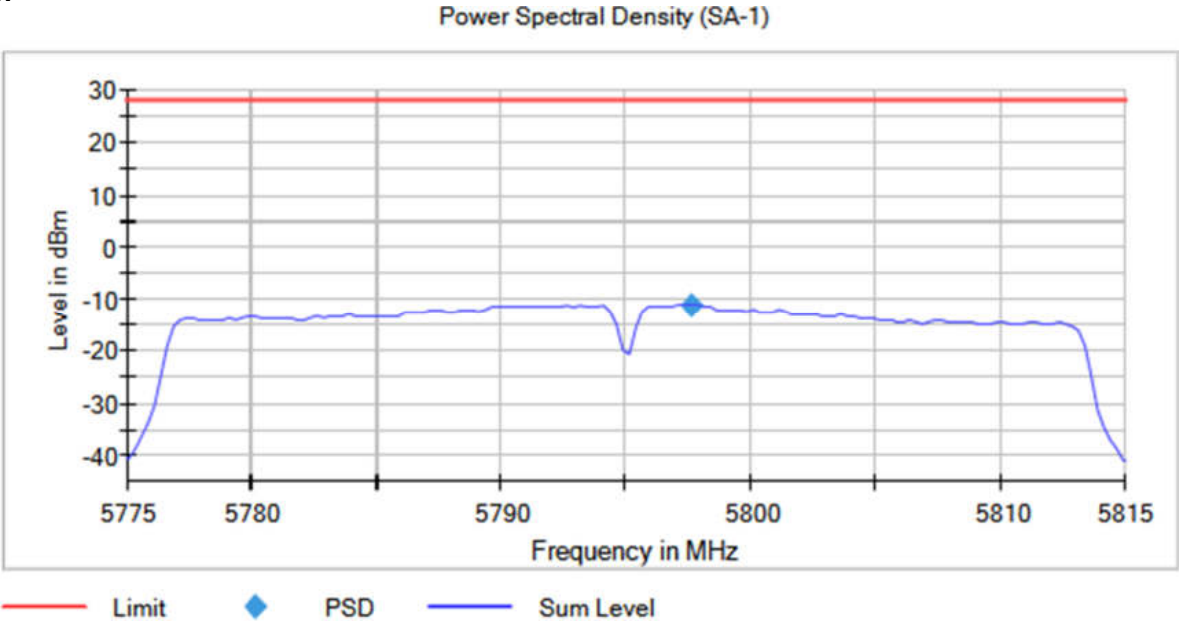
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5755.00000 Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5795.00000 Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11a (OFDM 6 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5745.00000	No	5744.405941	-4.29
		5785.00000		5784.405941	-4.32
		5825.00000		5825.792079	-4.49

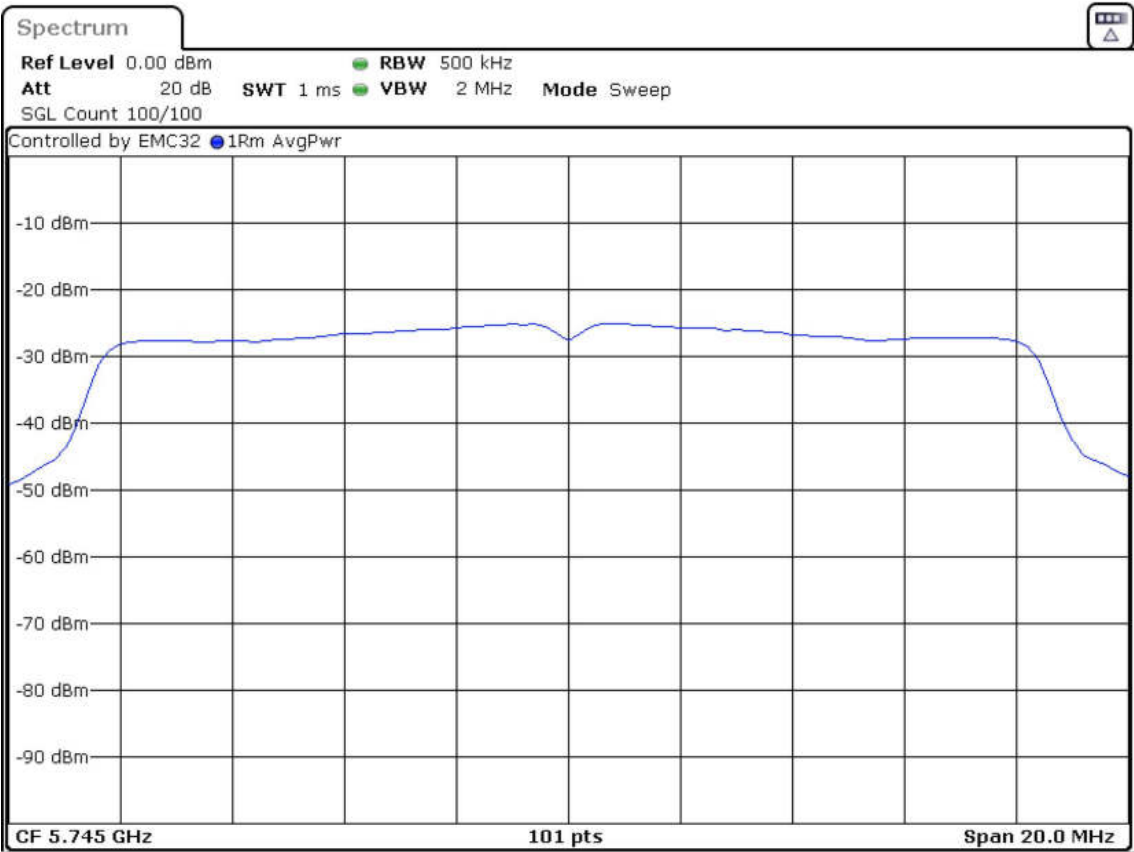
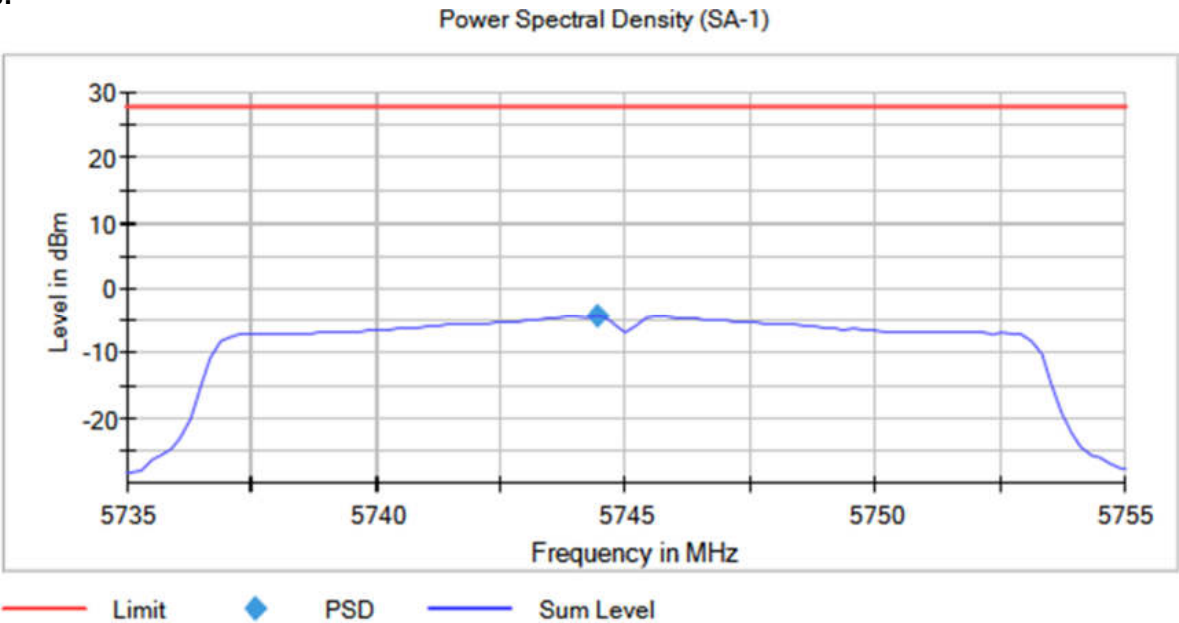
Verdict

Pass

Attachments

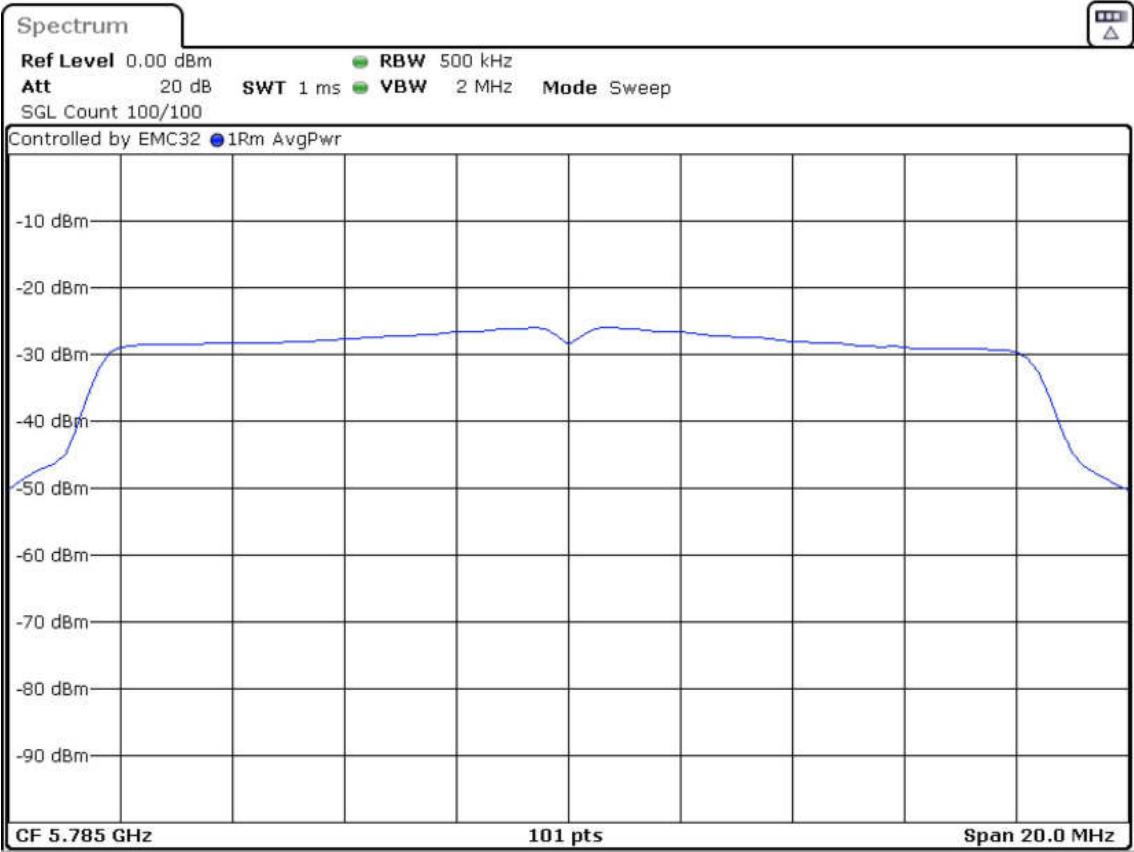
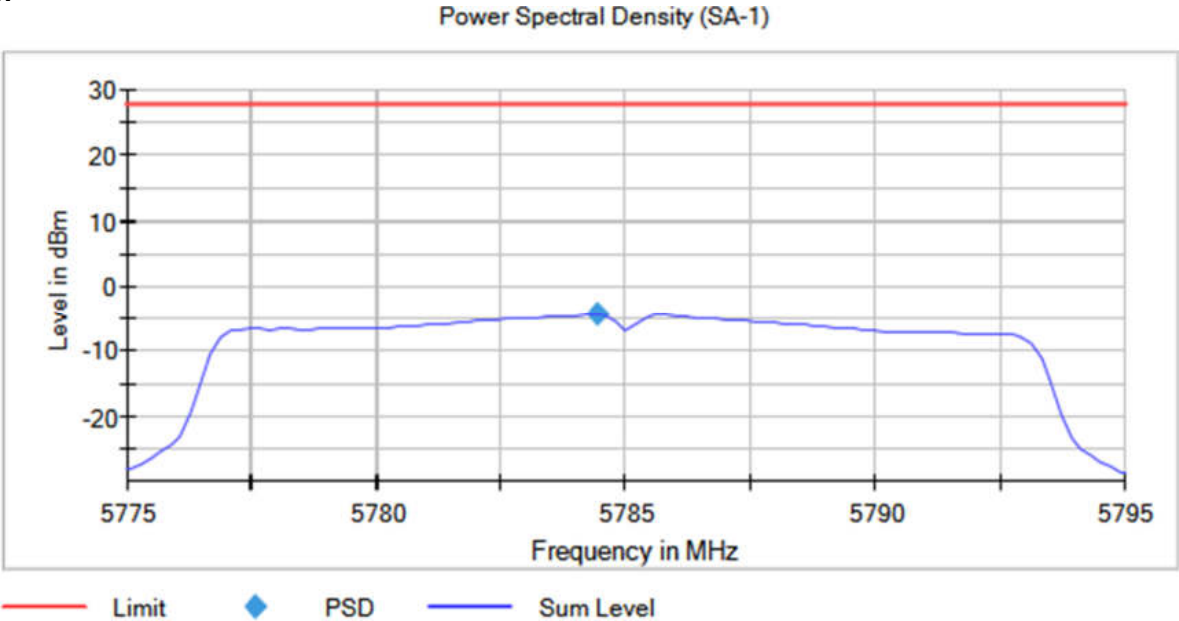
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



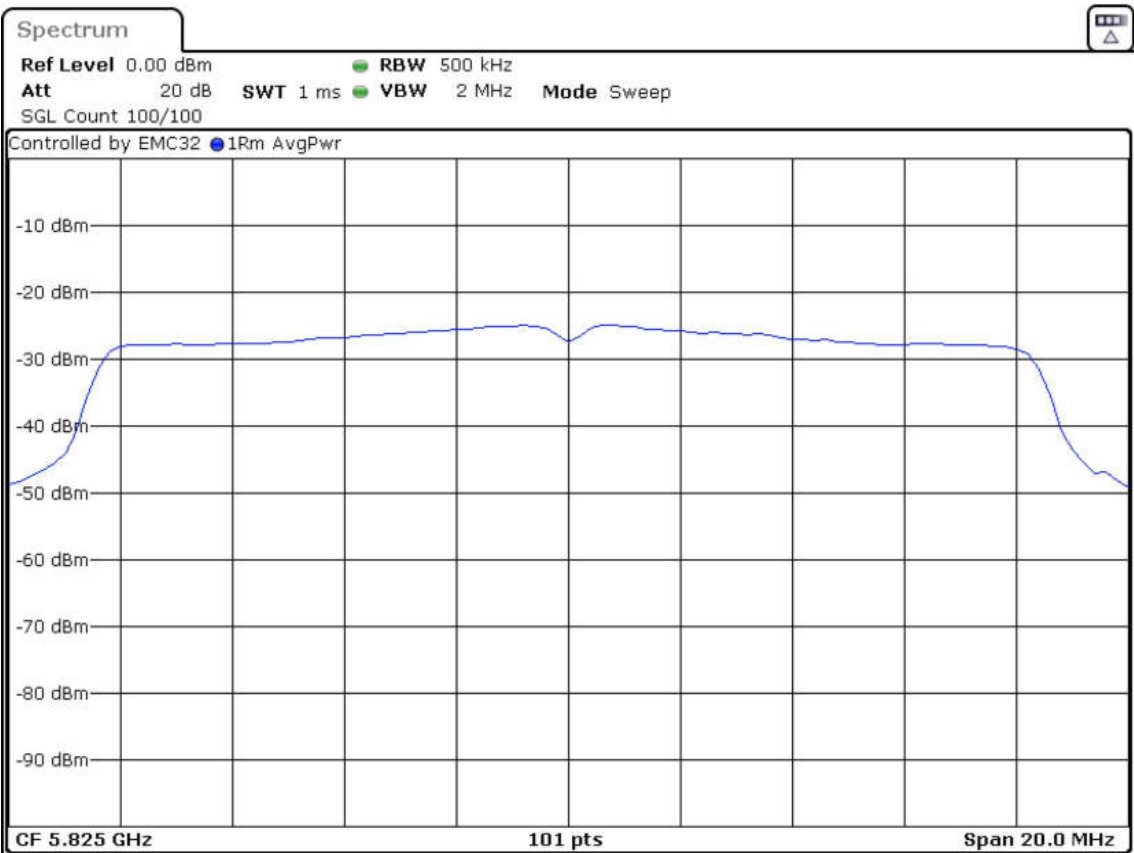
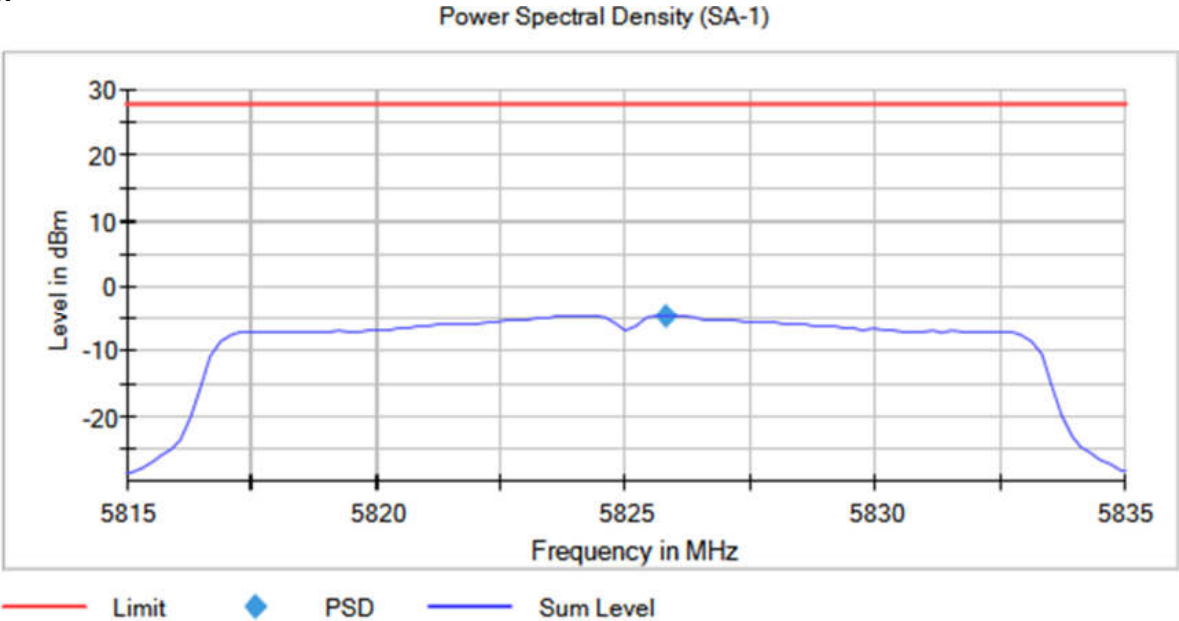
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT20 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5745.00000	No	5745.792079	-5.64
		5785.00000		5784.207921	-5.65
		5825.00000		5825.792079	-5.57

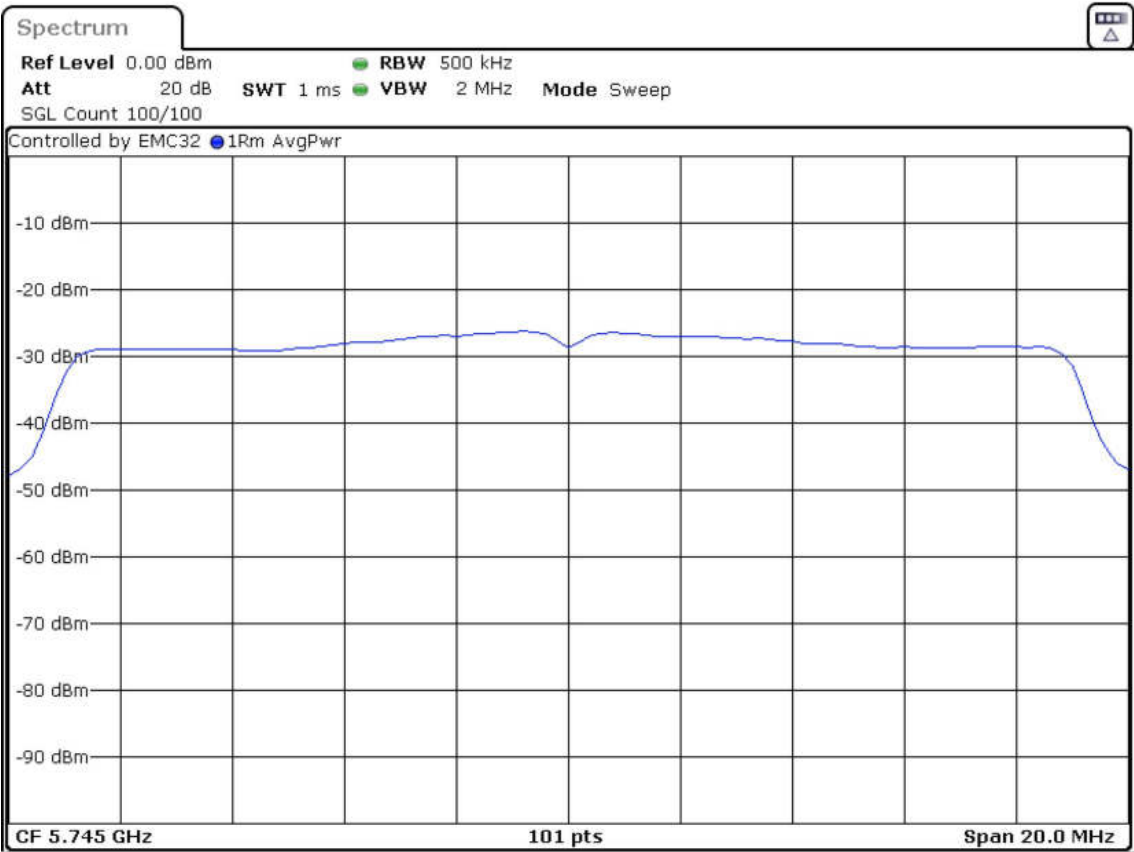
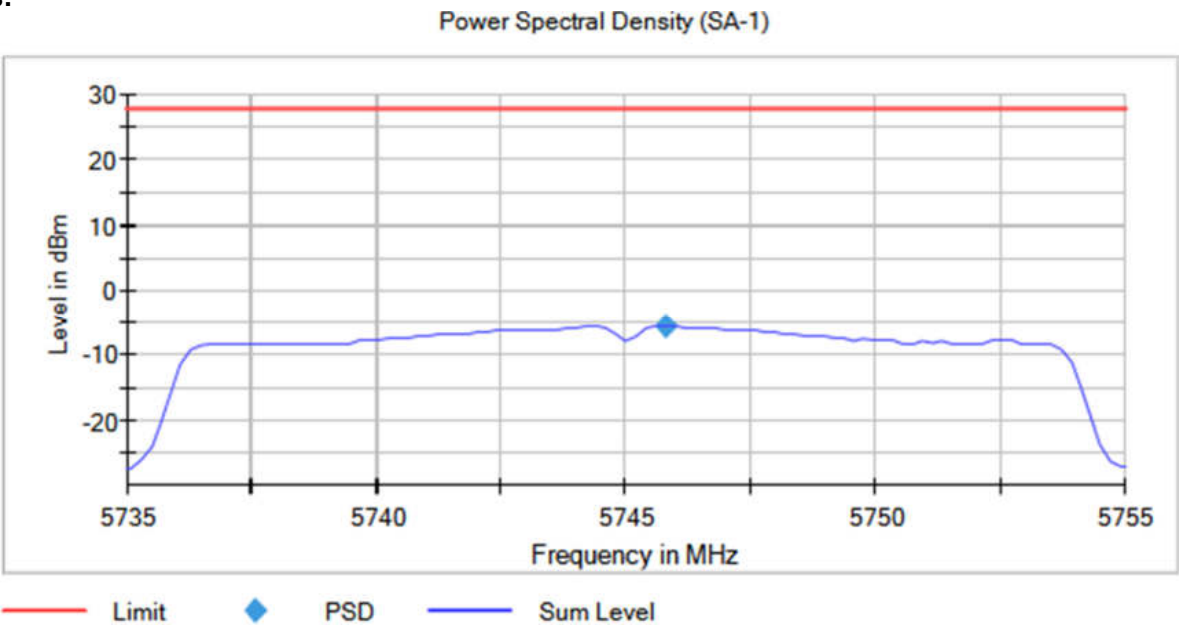
Verdict

Pass

Attachments

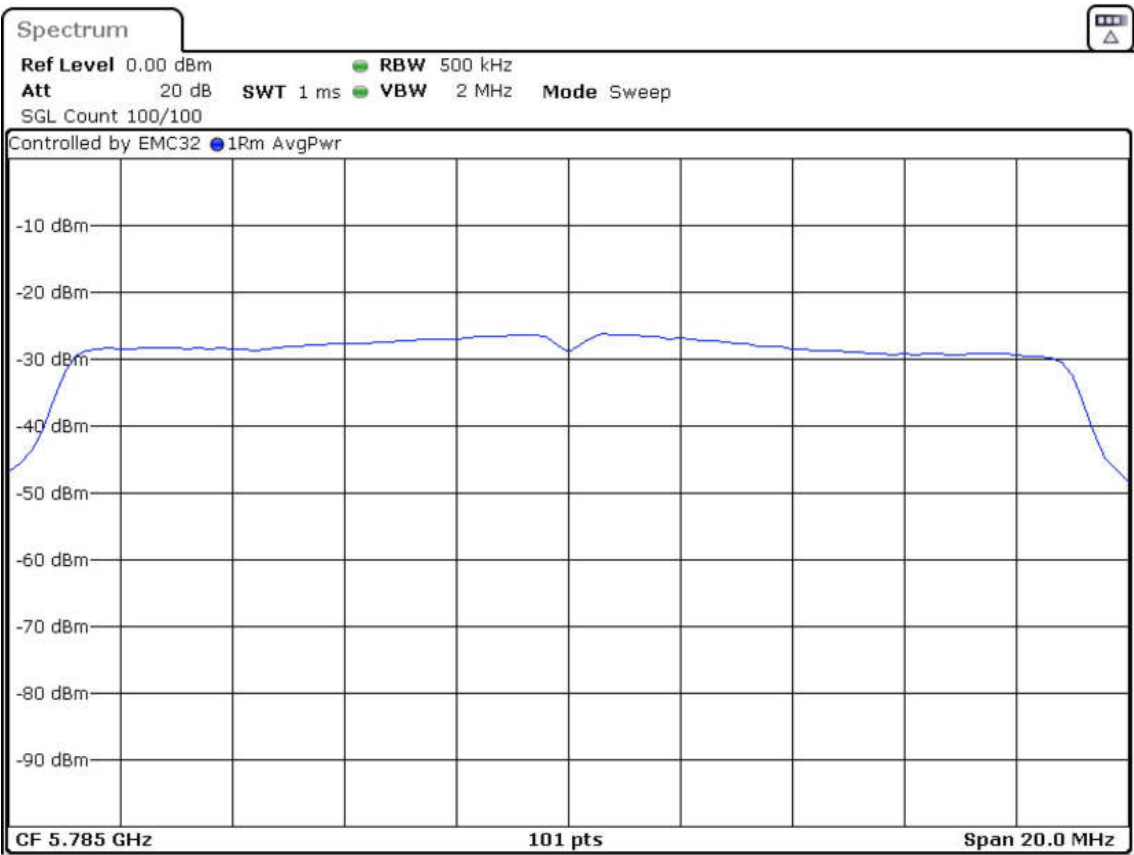
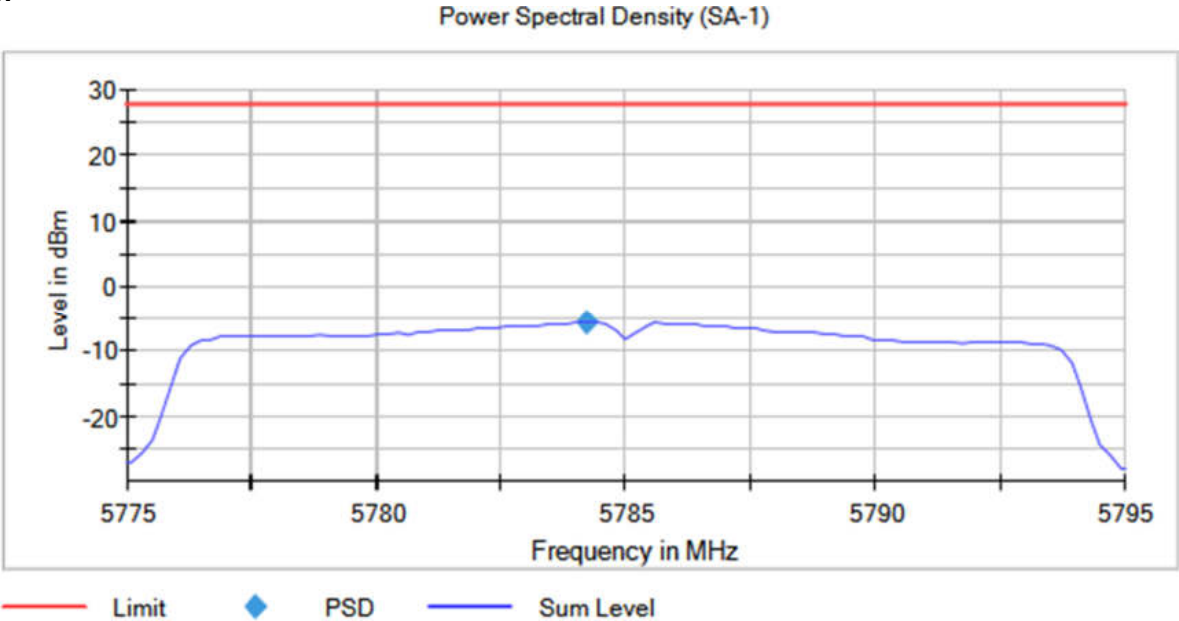
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



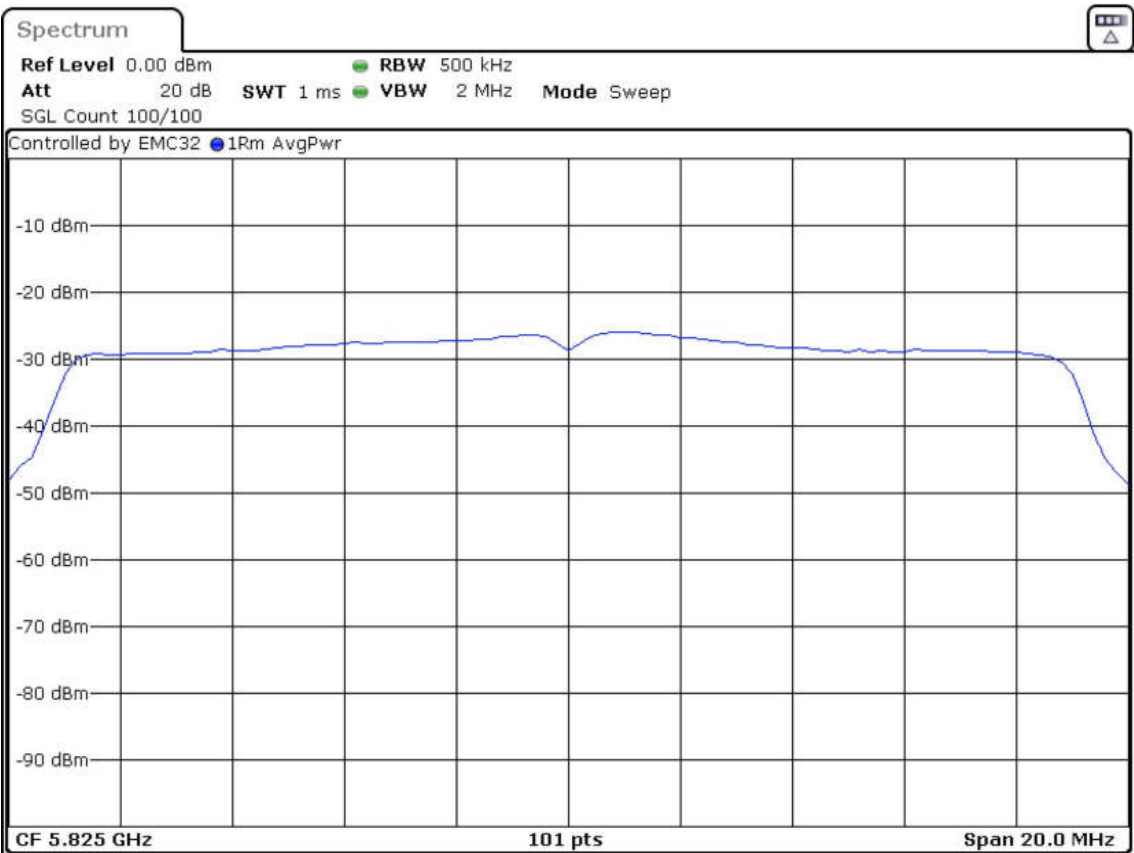
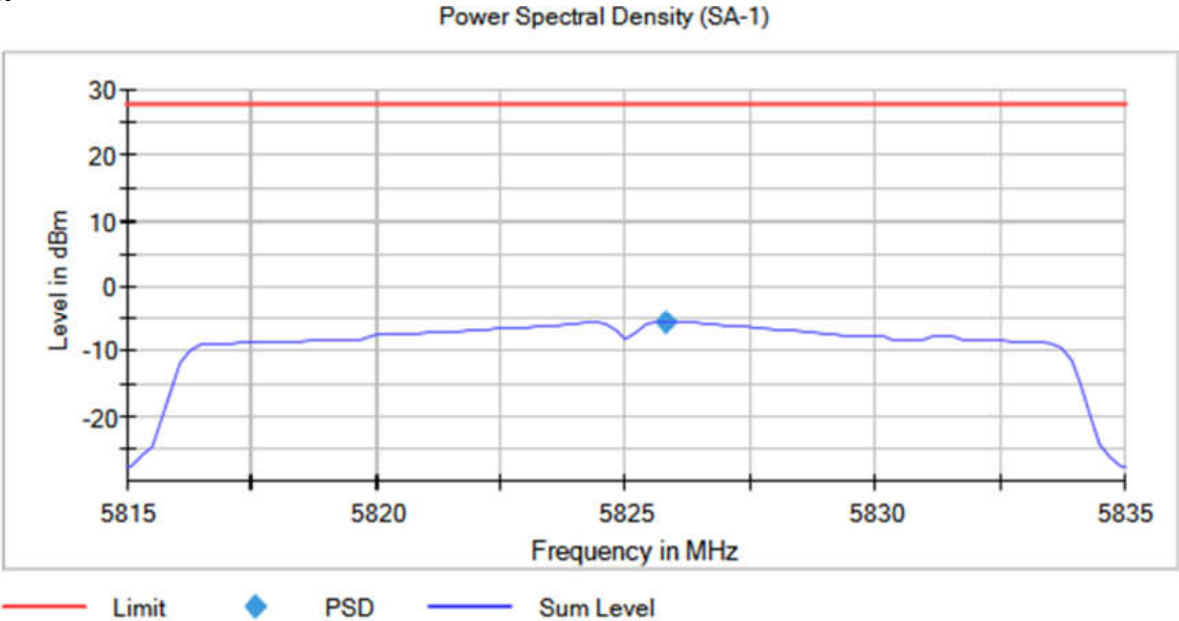
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT40 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5755.00000	No	5755.875000	-10.56
		5795.00000		5792.625000	-11.23

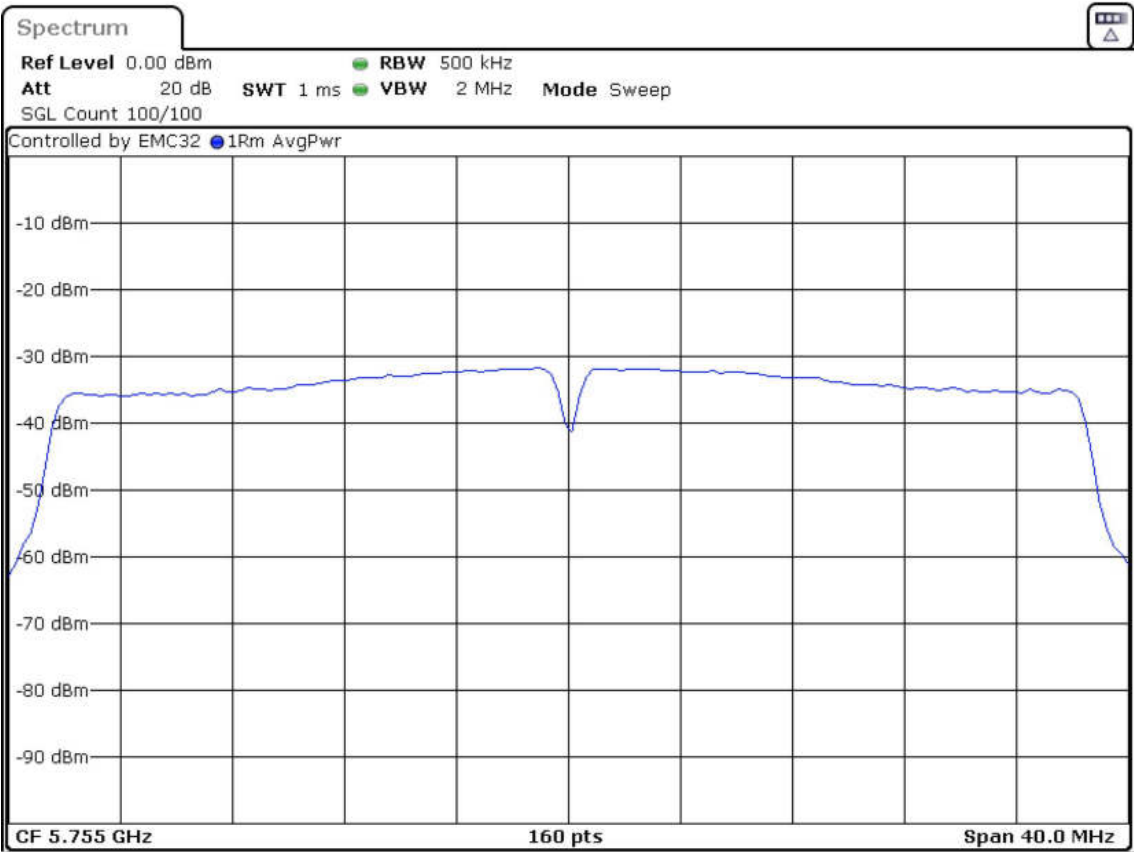
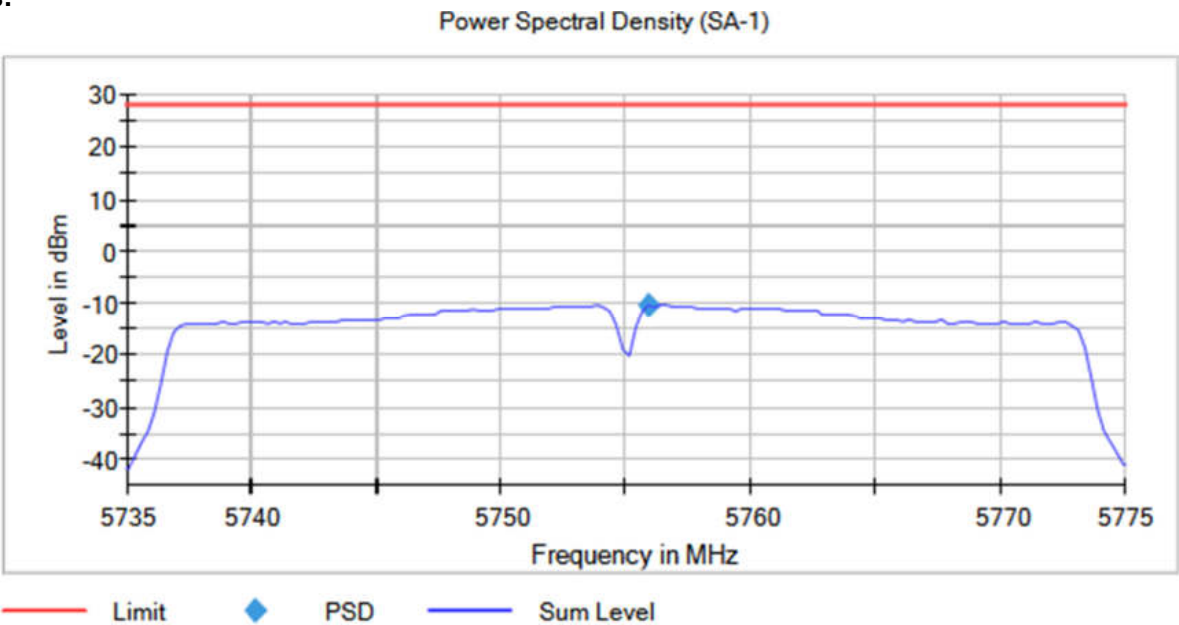
Verdict

Pass

Attachments

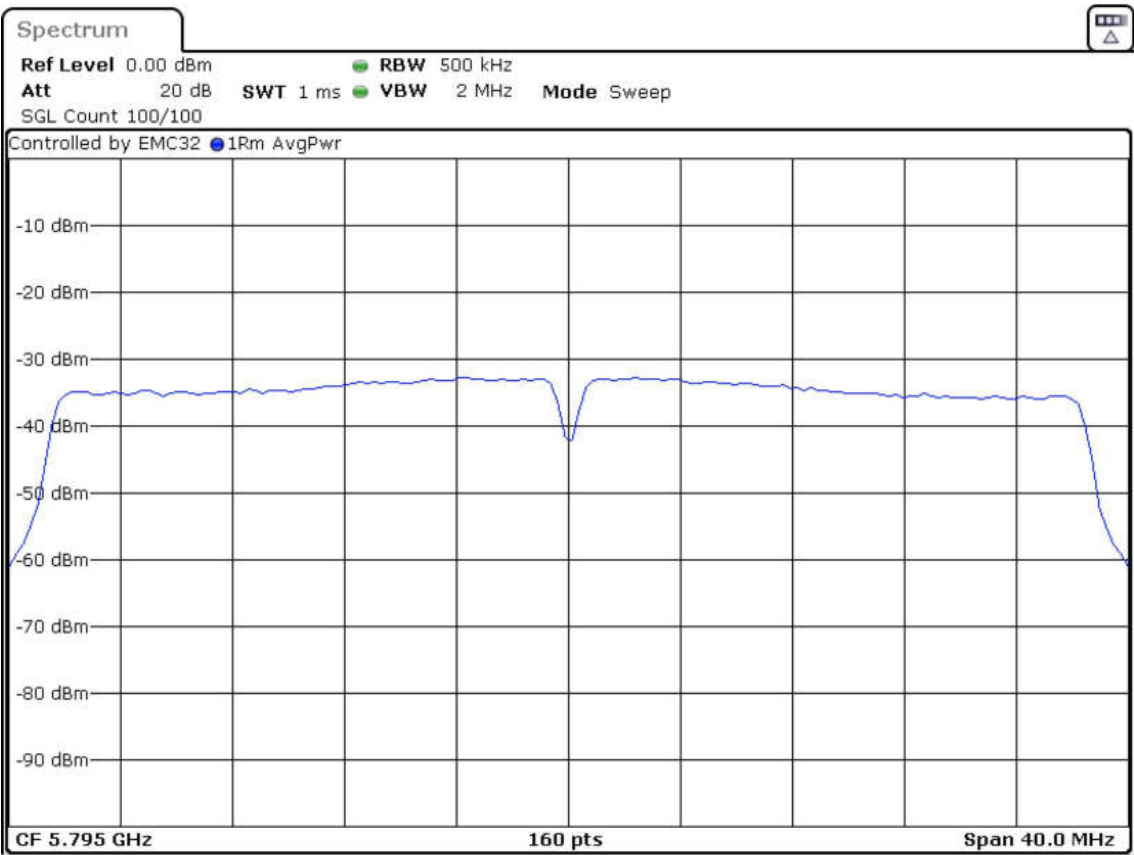
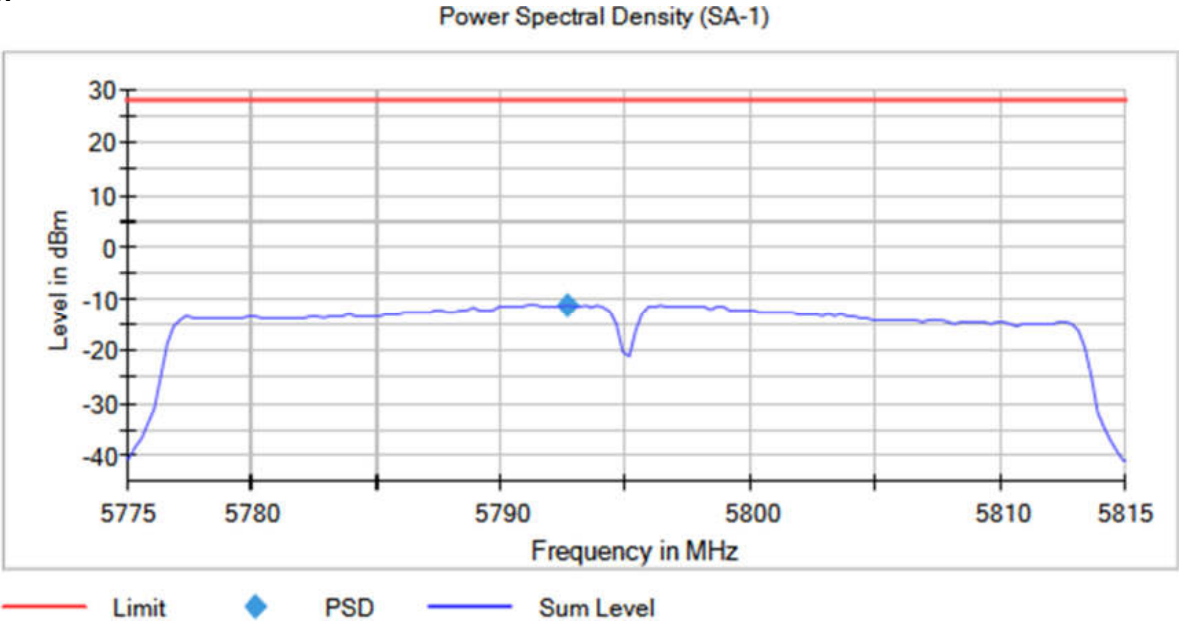
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5755.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5795.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT80 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	TPC	Freq (MHz)	PSD (dBm)
[5725, 5850]	1+2	5775.00000	No	5779.875000	-14.89

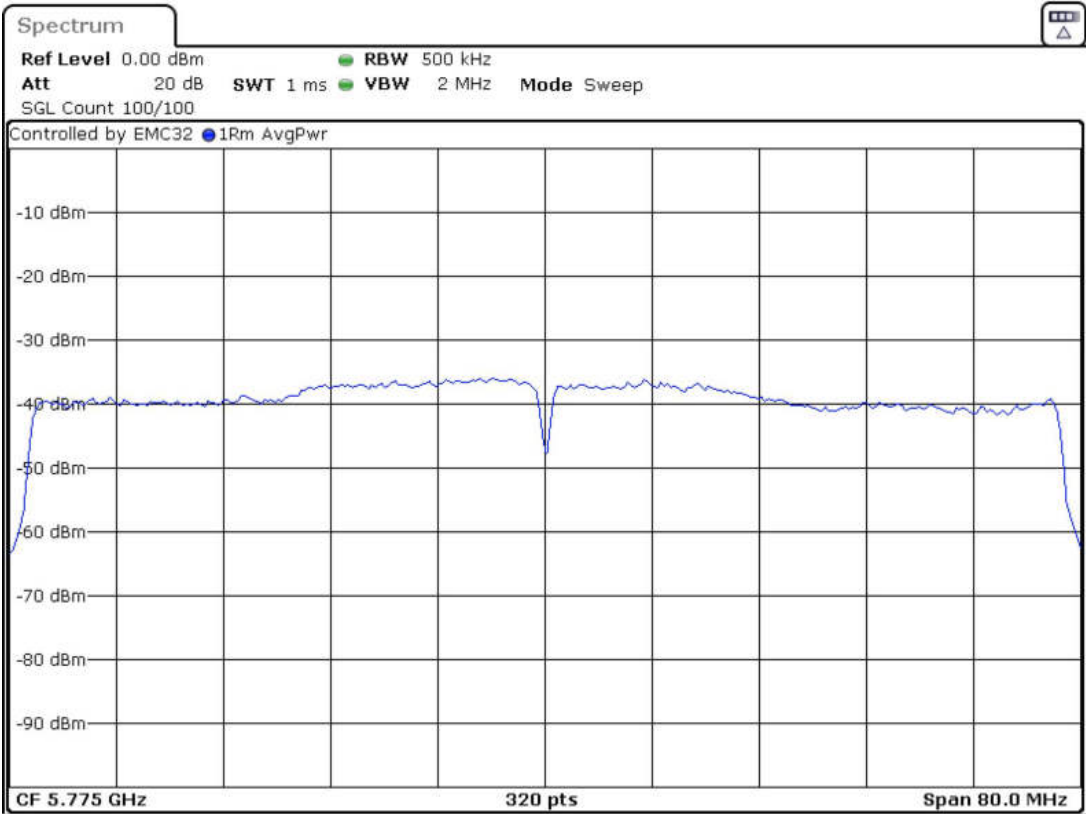
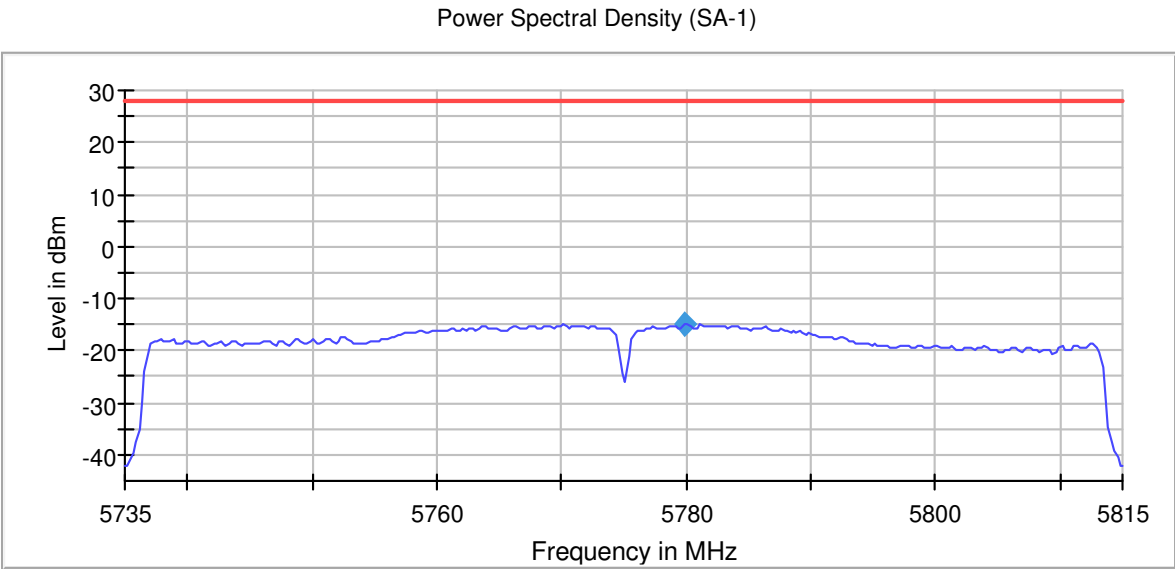
Verdict

Pass

Attachments

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5775.00000 Modulation = 802.11ac VHT80 (OFDM MCS0)
TPC = No MIMO Mode = MIMO CDD Mode 2x2

Images:



RSS-247 6.2.4.1 / FCC 15.407 (e) [6dBw] 6 dB Emission Bandwidth

Limits

The minimum 6 dB bandwidth shall be at least 500 kHz.

CONFIGURATION 2:

Modulation: 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5745.00000	17.650
		5785.00000	17.650
		5825.00000	17.650

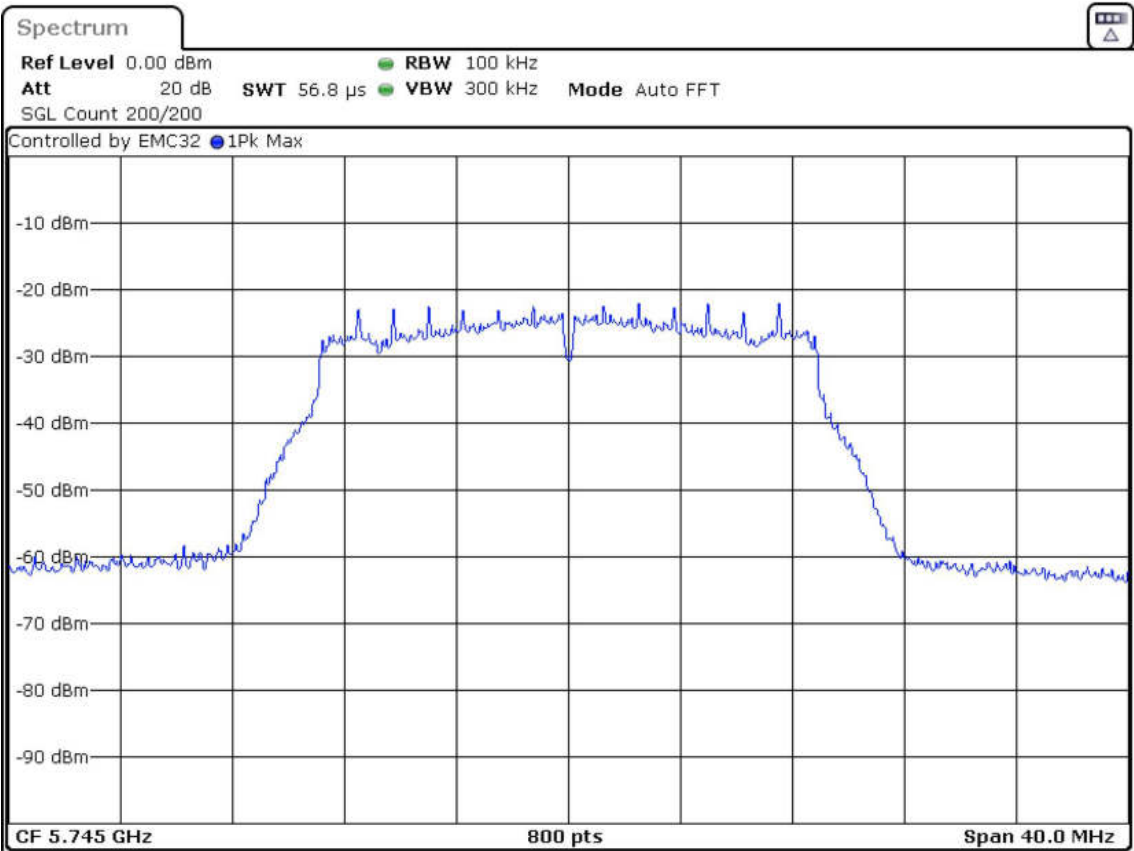
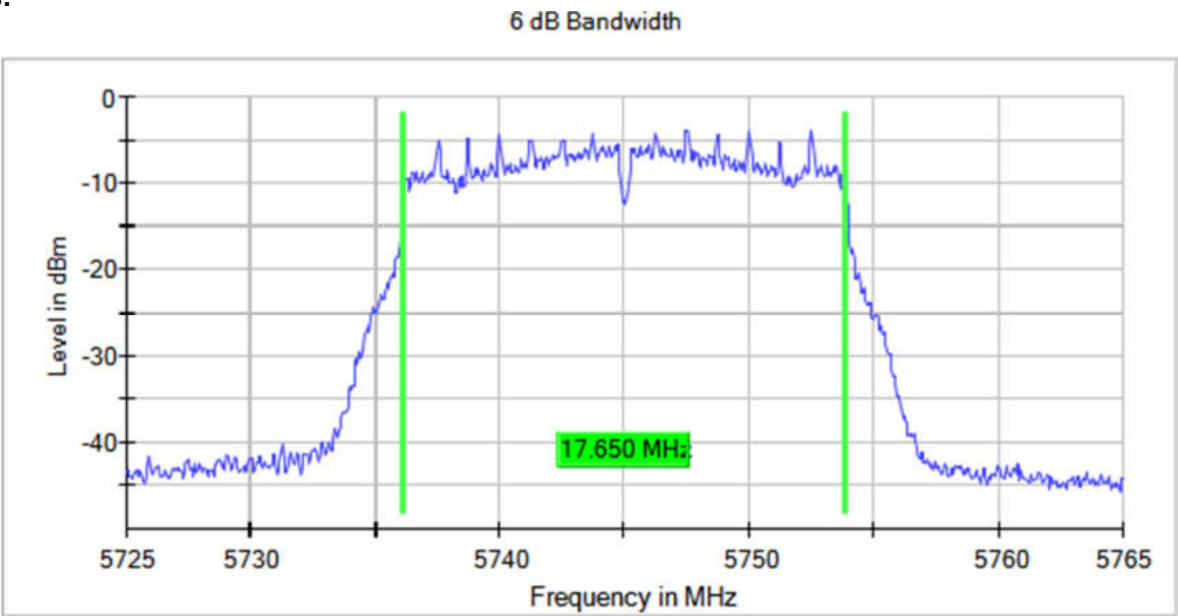
Verdict

Pass

Attachments

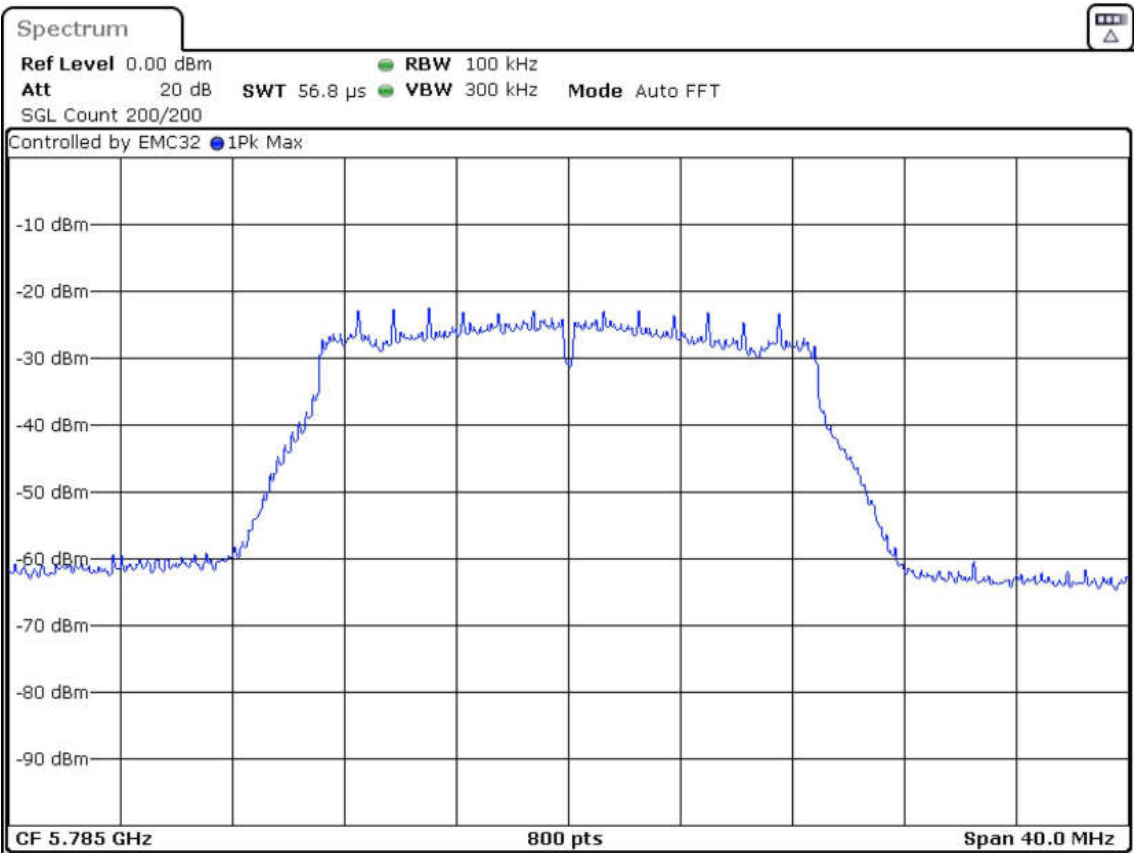
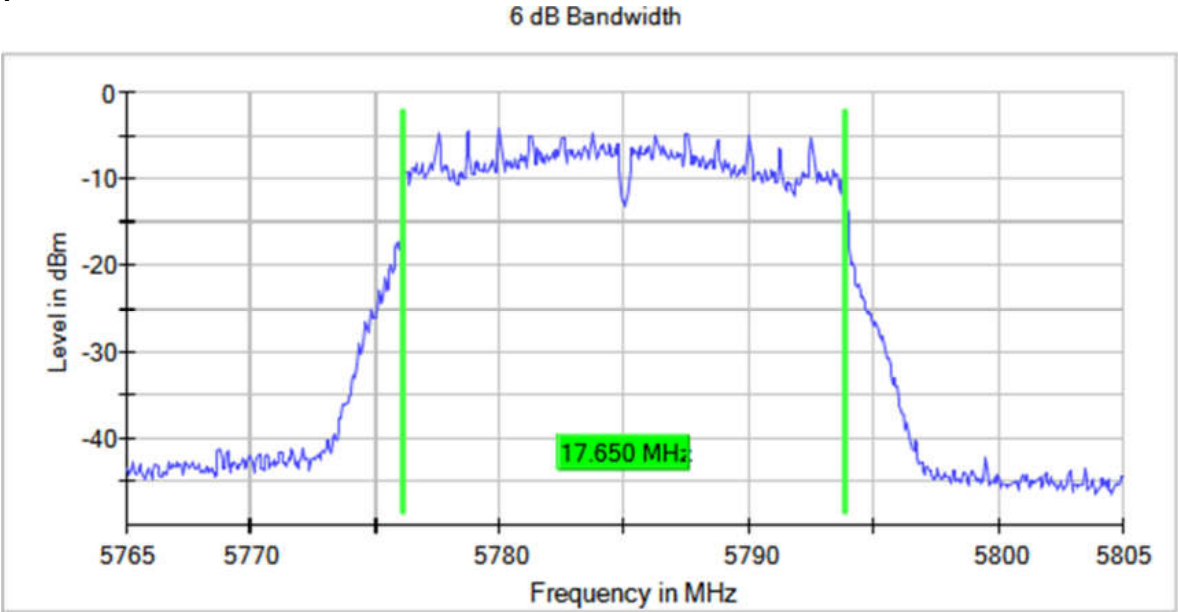
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



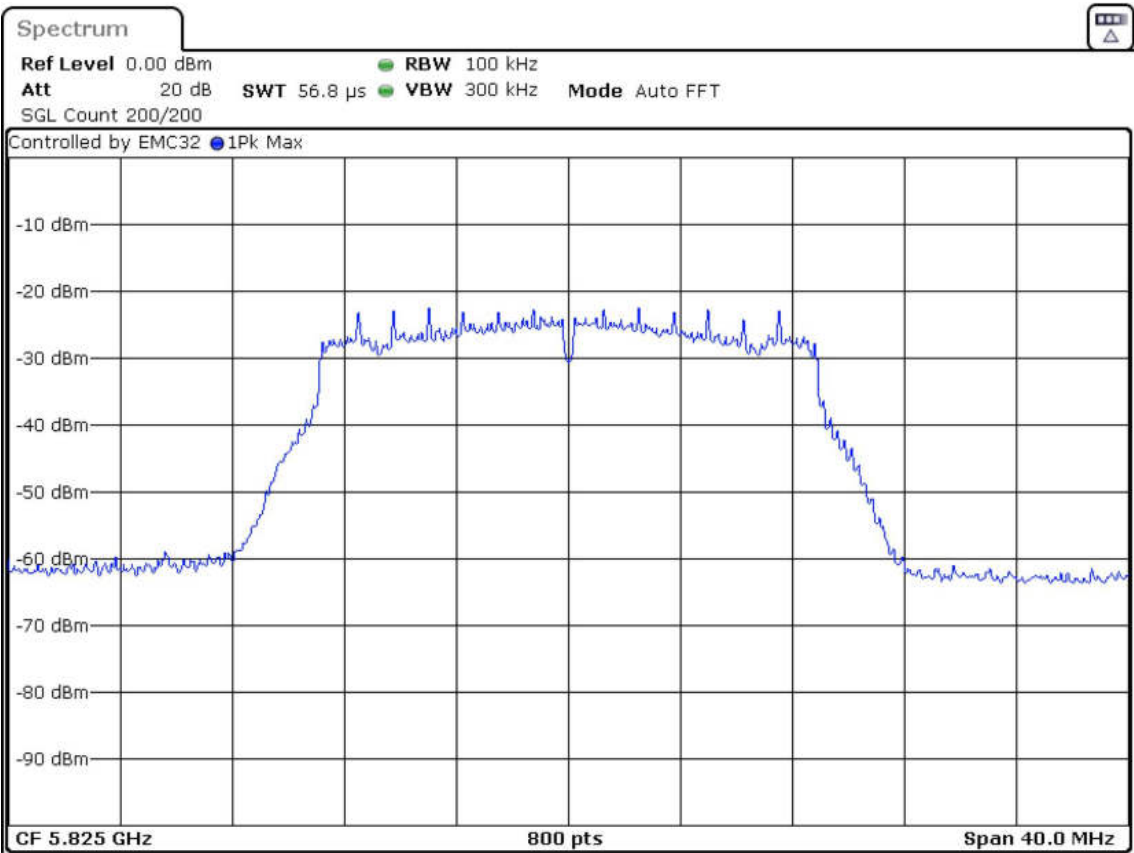
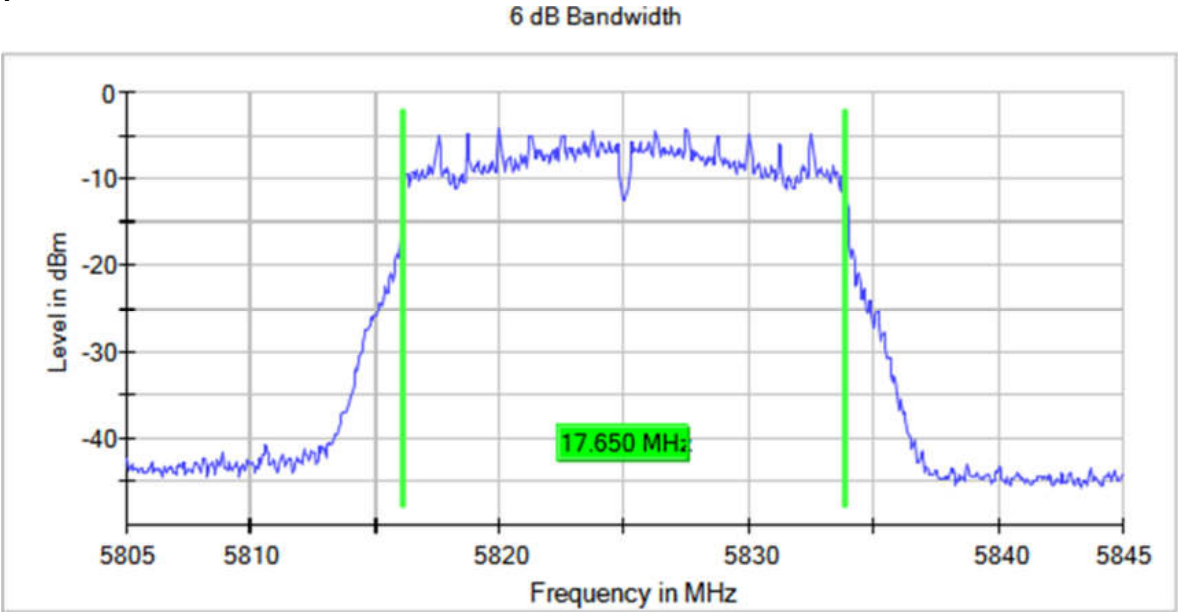
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11n HT20 (OFDM MCS0 6.5 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5755.00000	35.550
		5795.00000	36.000

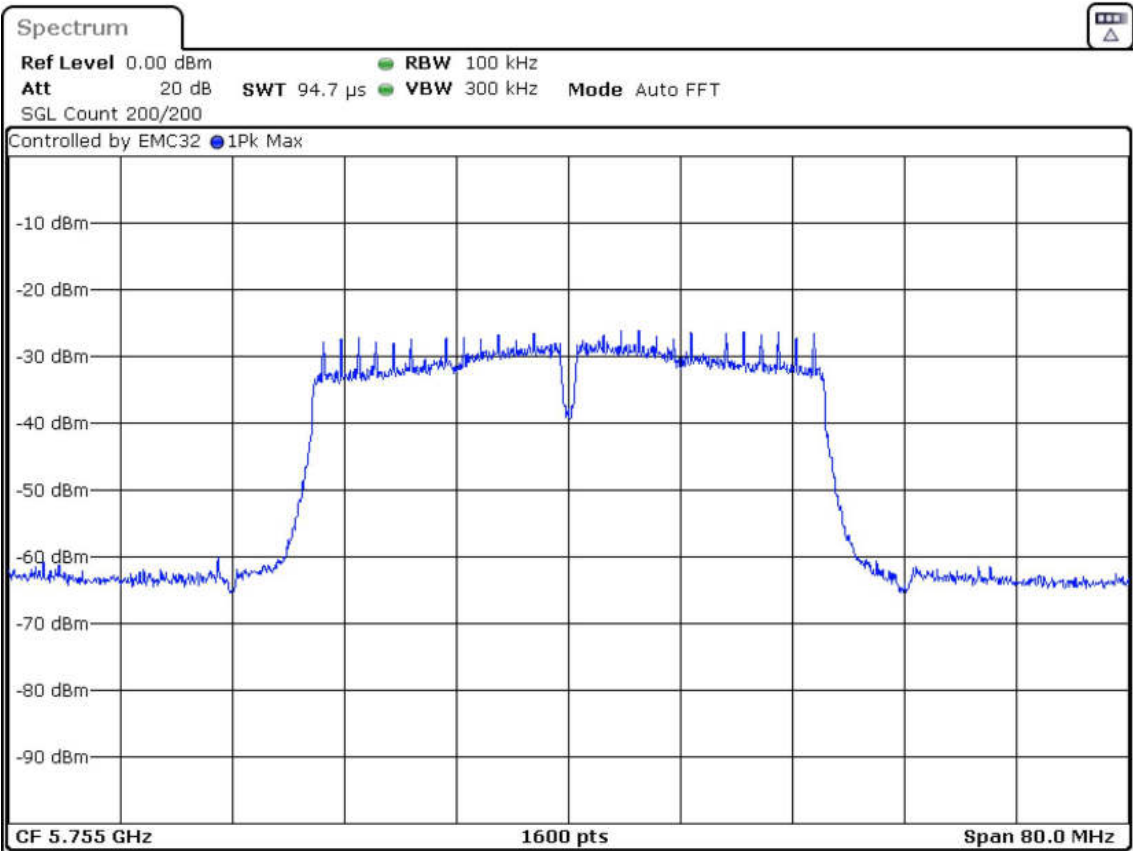
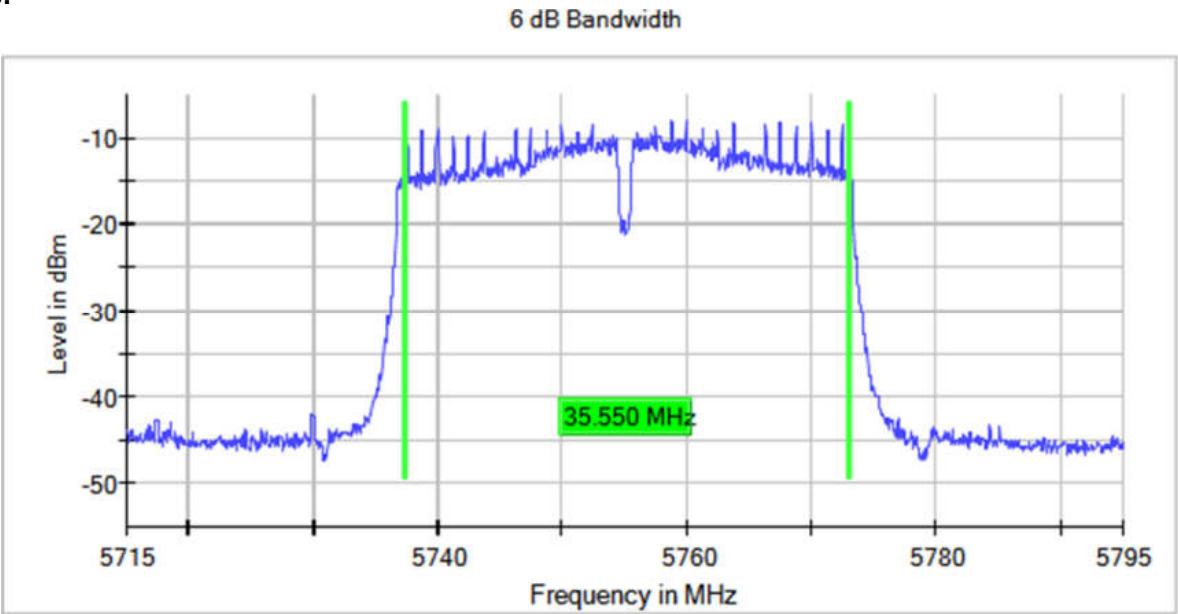
Verdict

Pass

Attachments

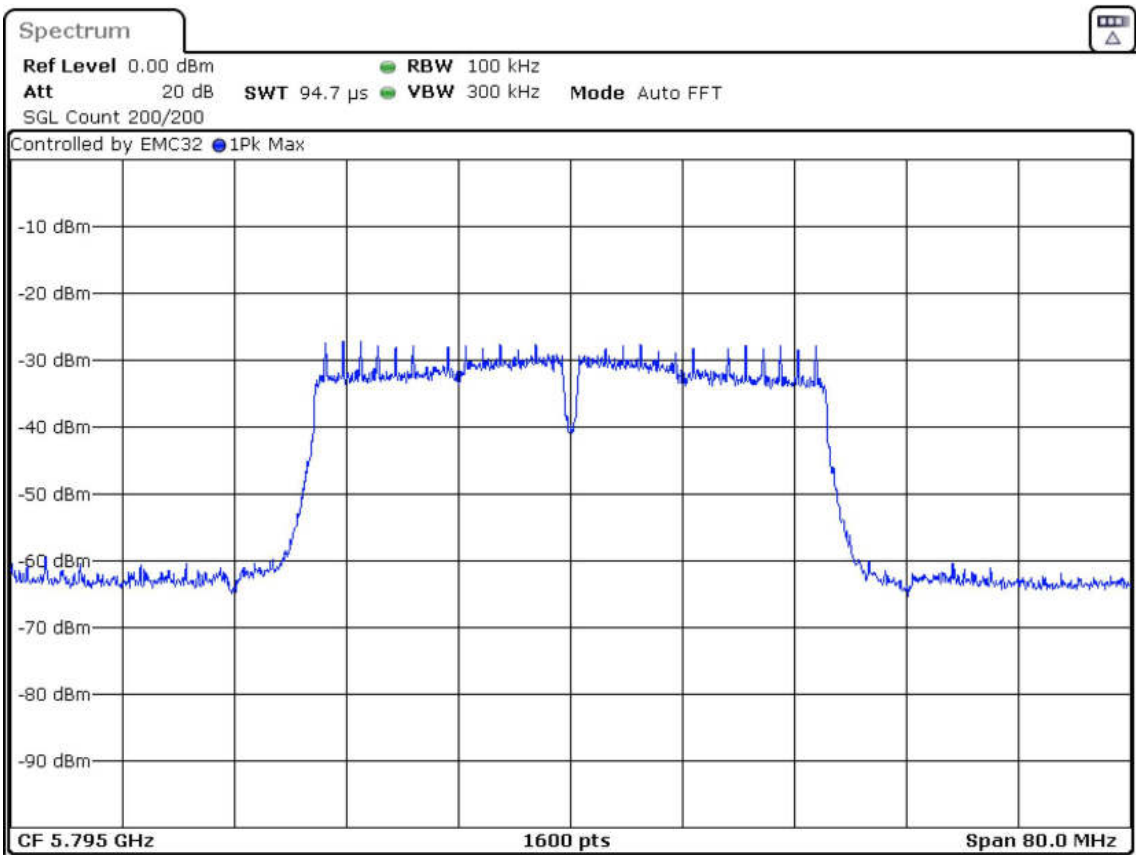
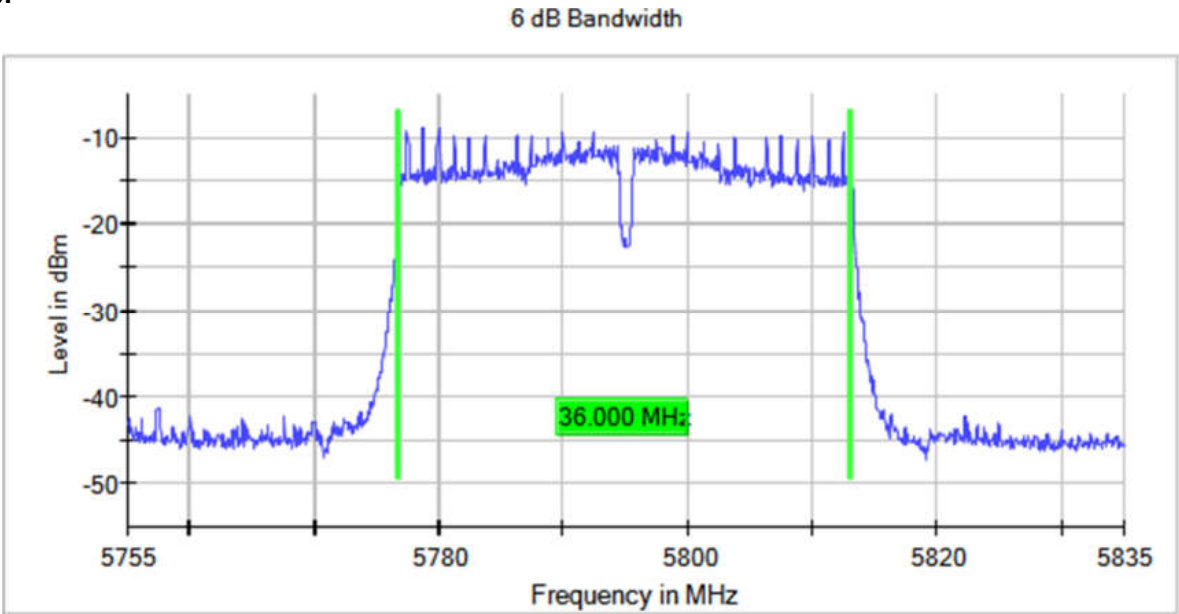
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5755.00000 Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5795.00000 Modulation = 802.11n HT40 (OFDM MCS0 13.5 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11a (OFDM 6 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5745.00000	16.450
		5785.00000	16.400
		5825.00000	16.450

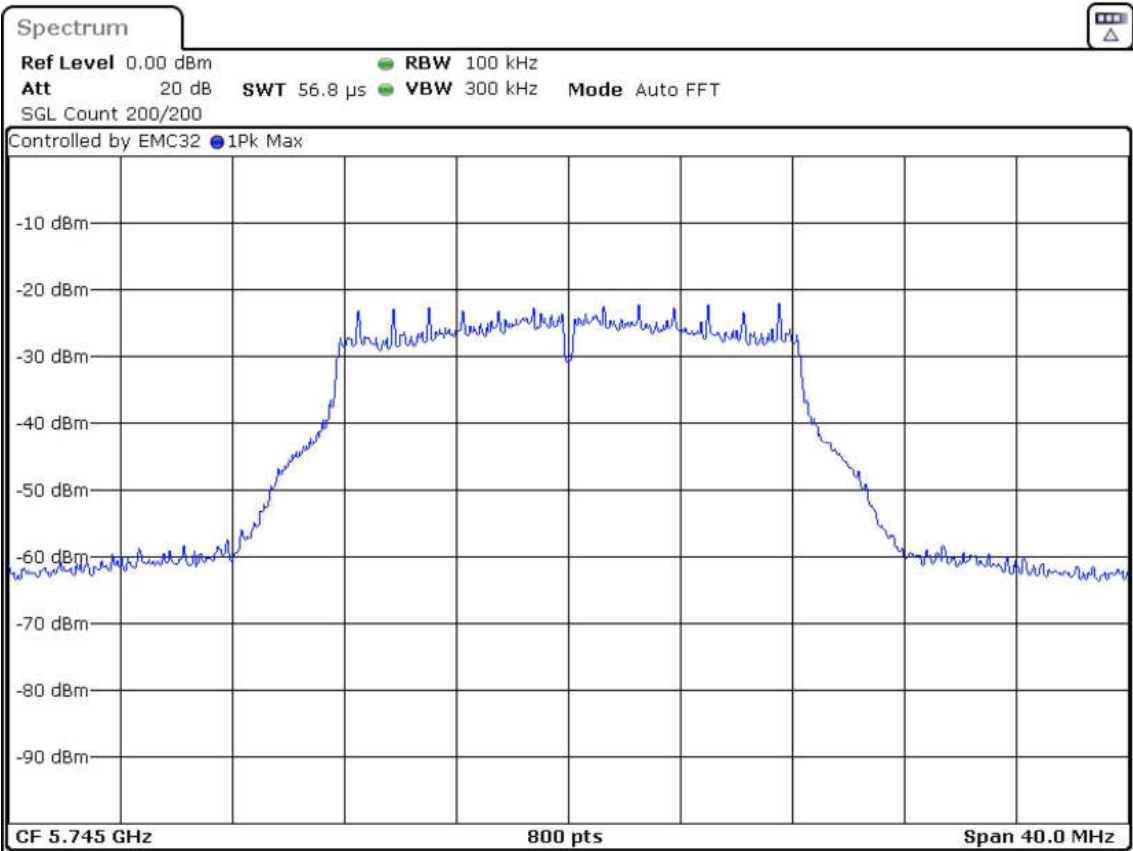
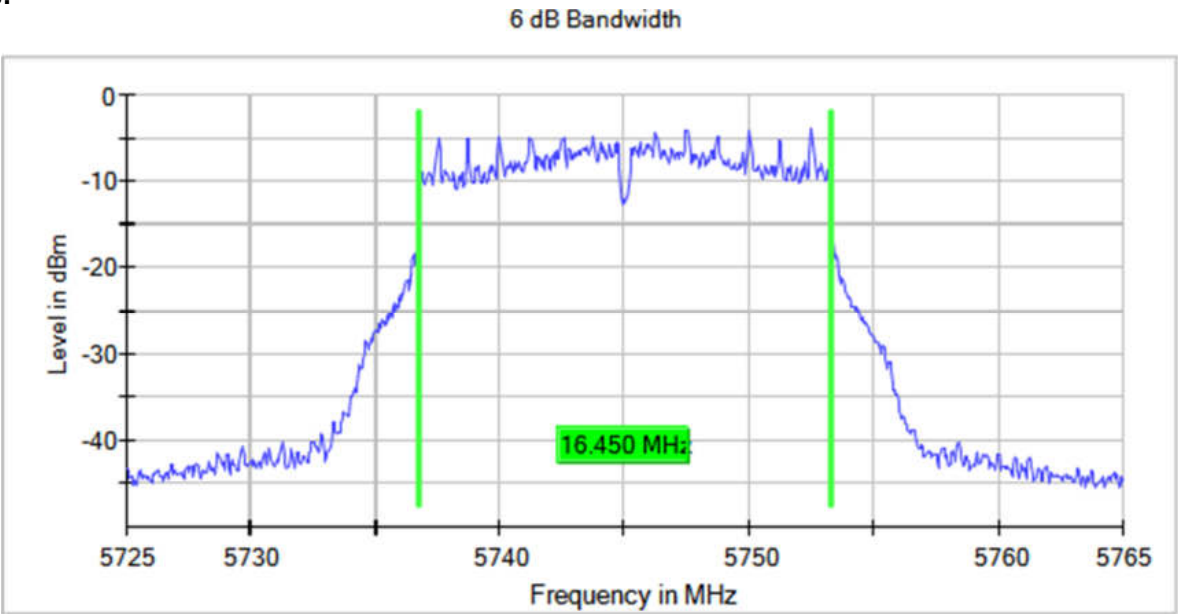
Verdict

Pass

Attachments

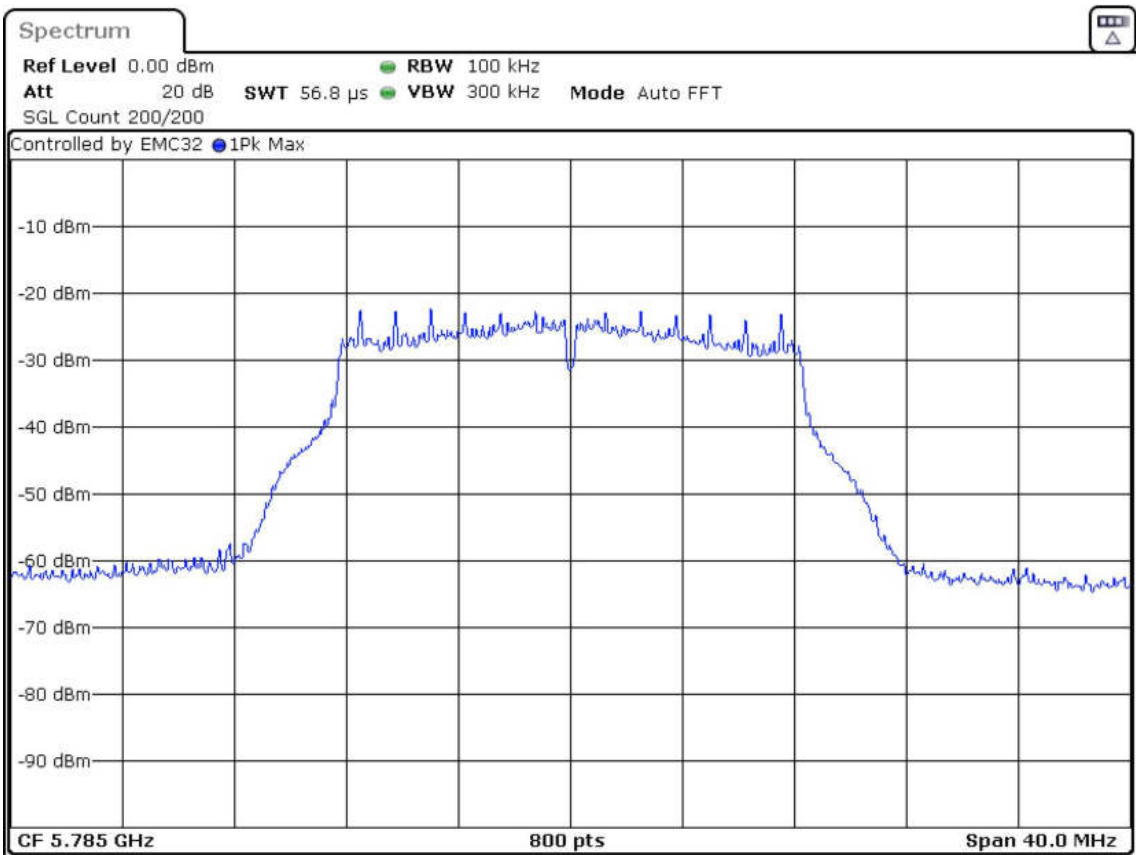
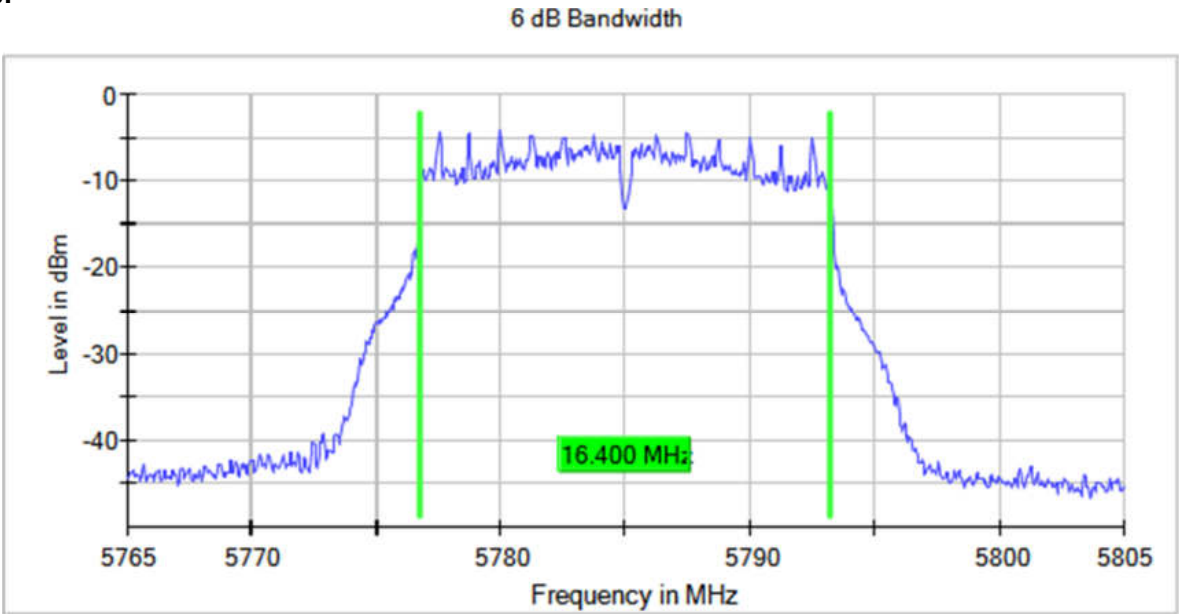
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



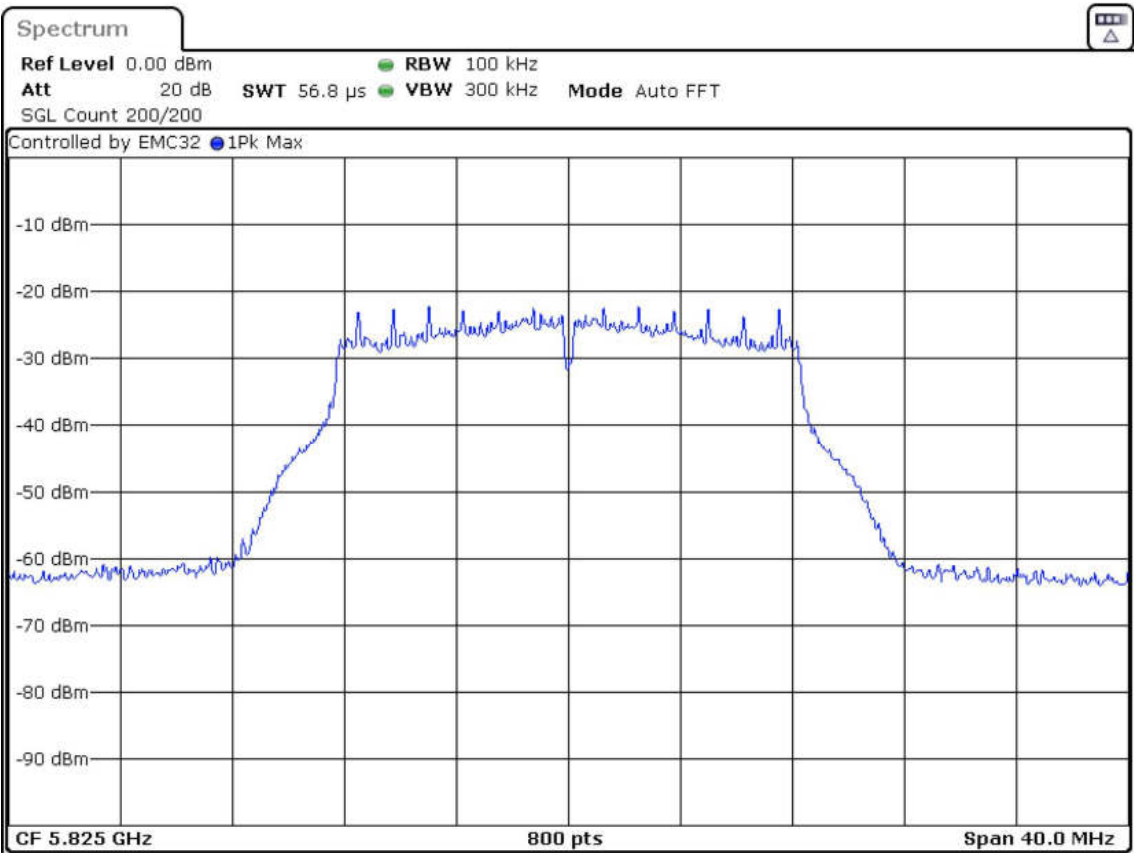
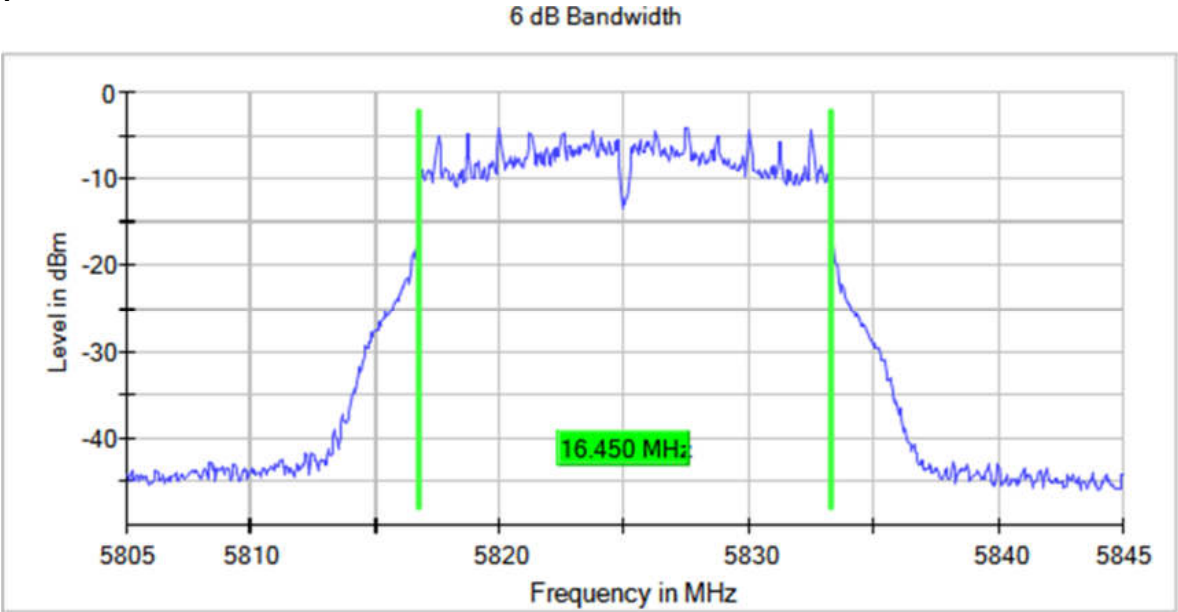
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11a (OFDM 6 Mbit/s)
MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT20 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5745.00000	17.650
		5785.00000	17.650
		5825.00000	17.650

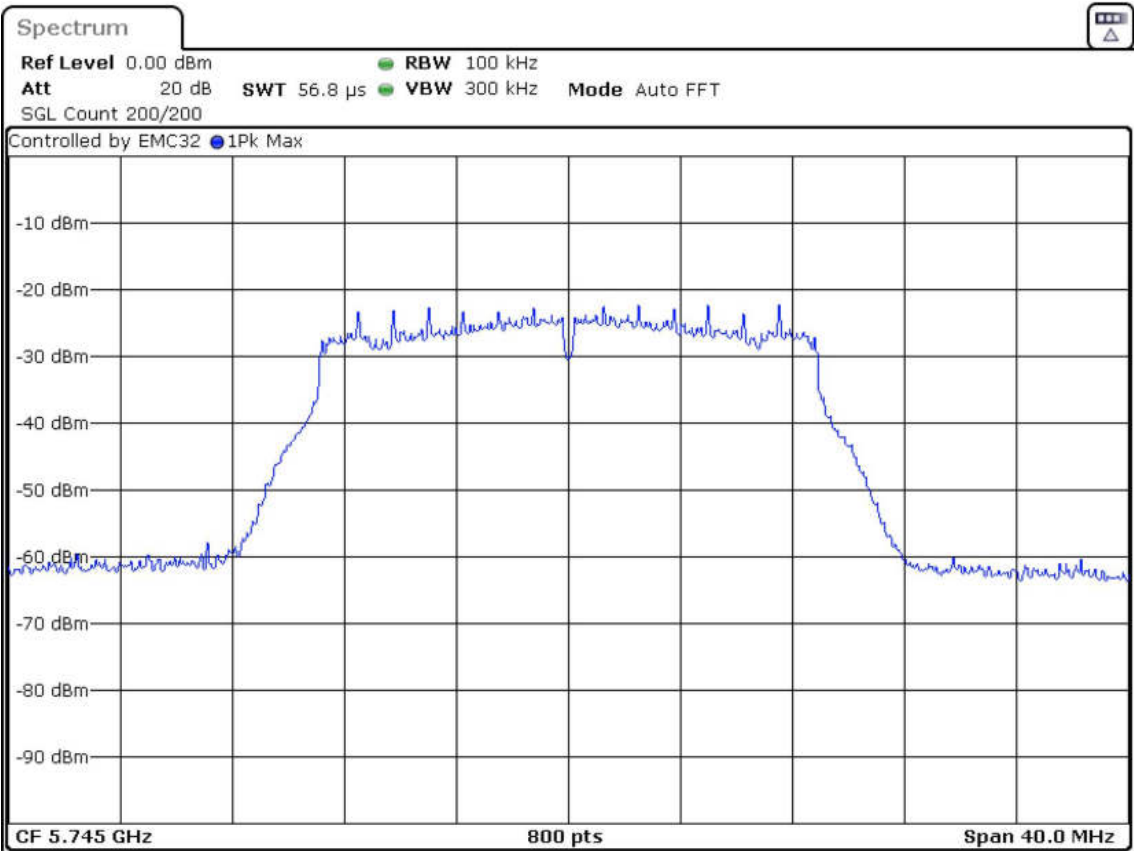
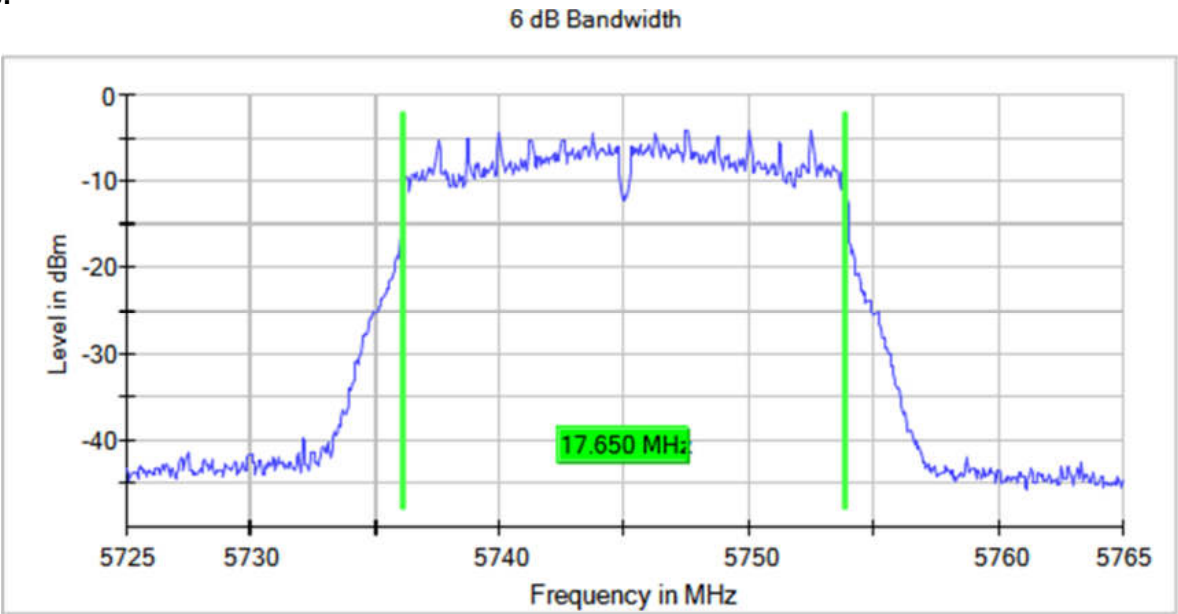
Verdict

Pass

Attachments

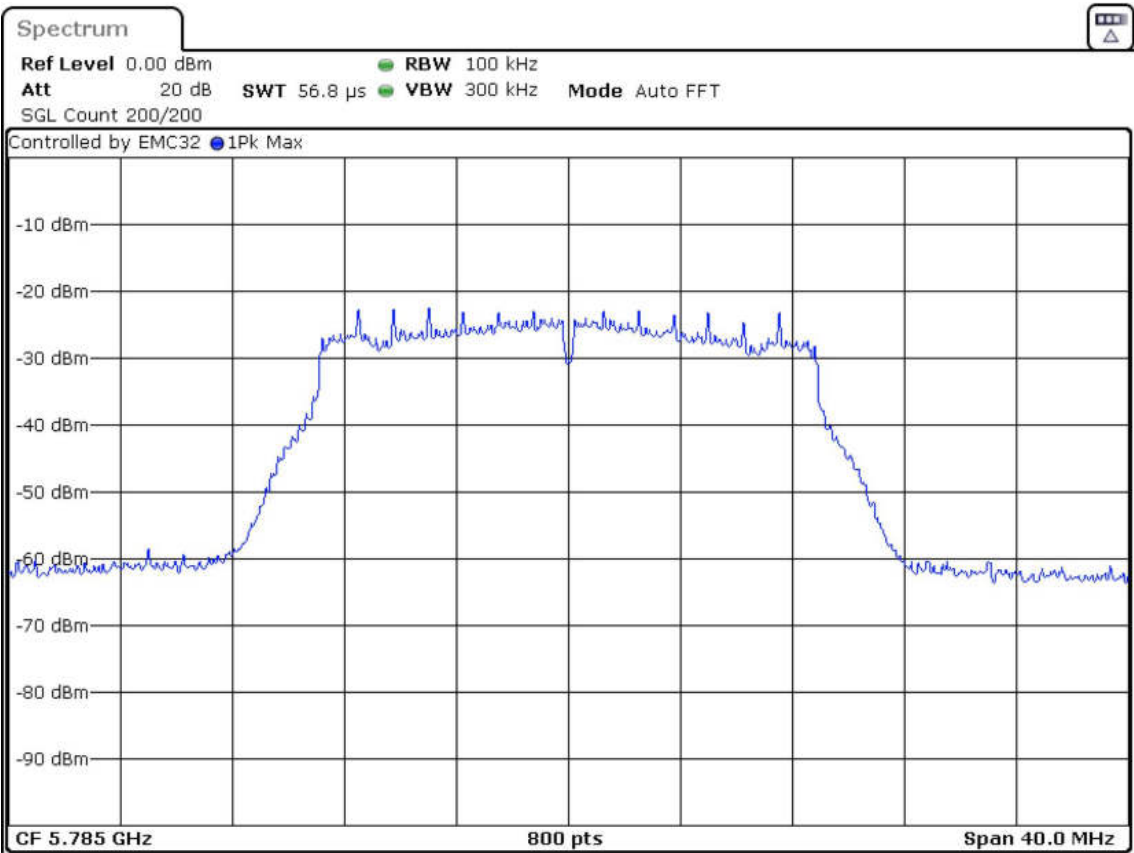
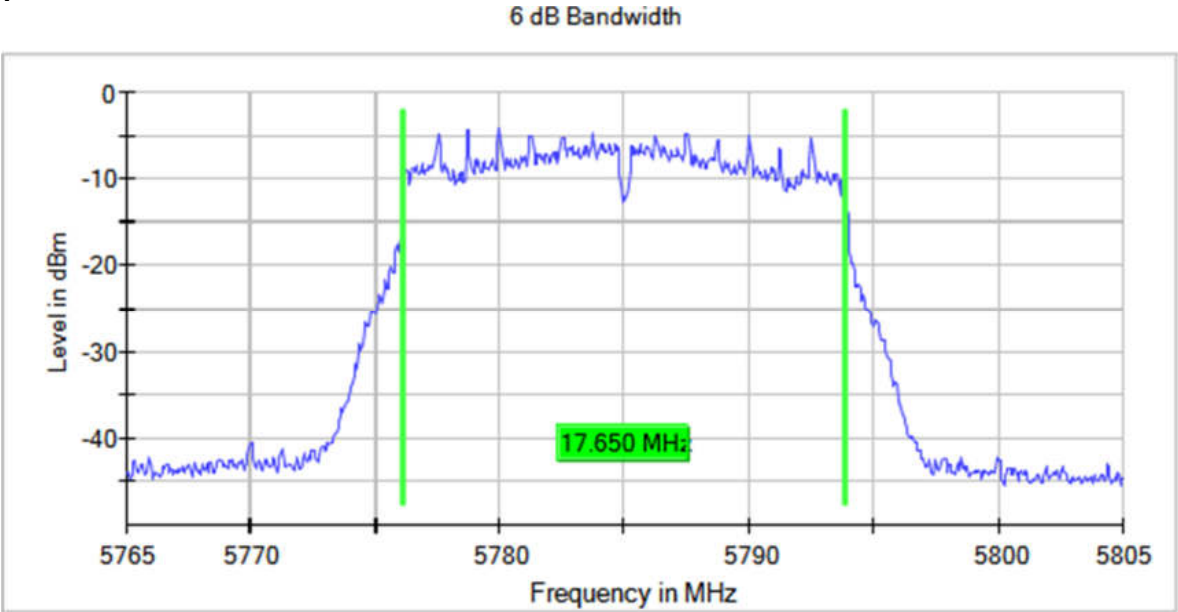
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5745.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



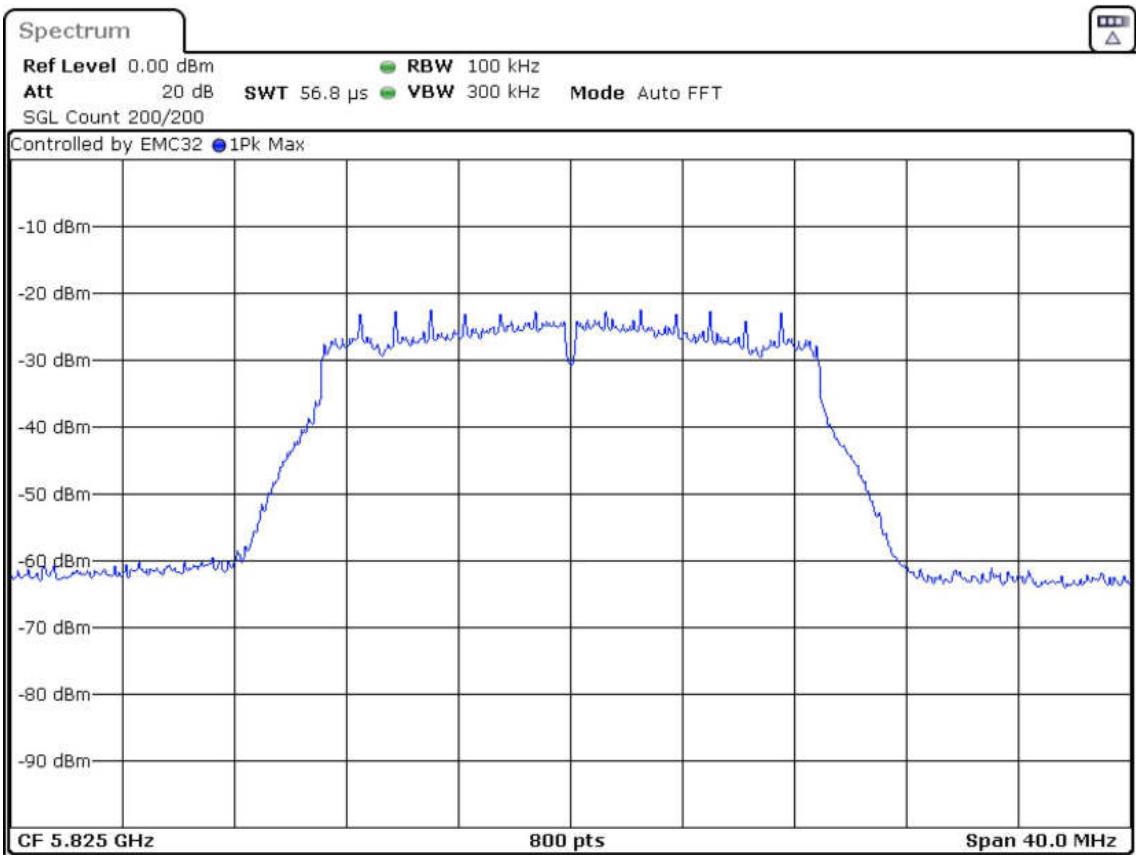
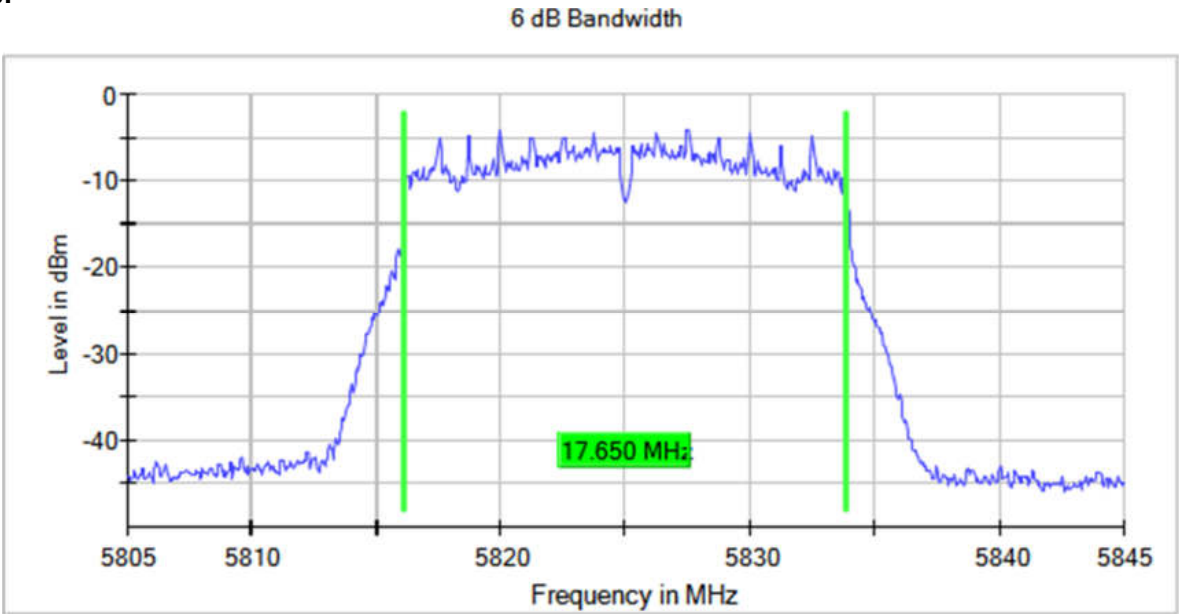
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5785.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5825.00000 Modulation = 802.11ac VHT20 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT40 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5755.00000	35.550
		5795.00000	35.600

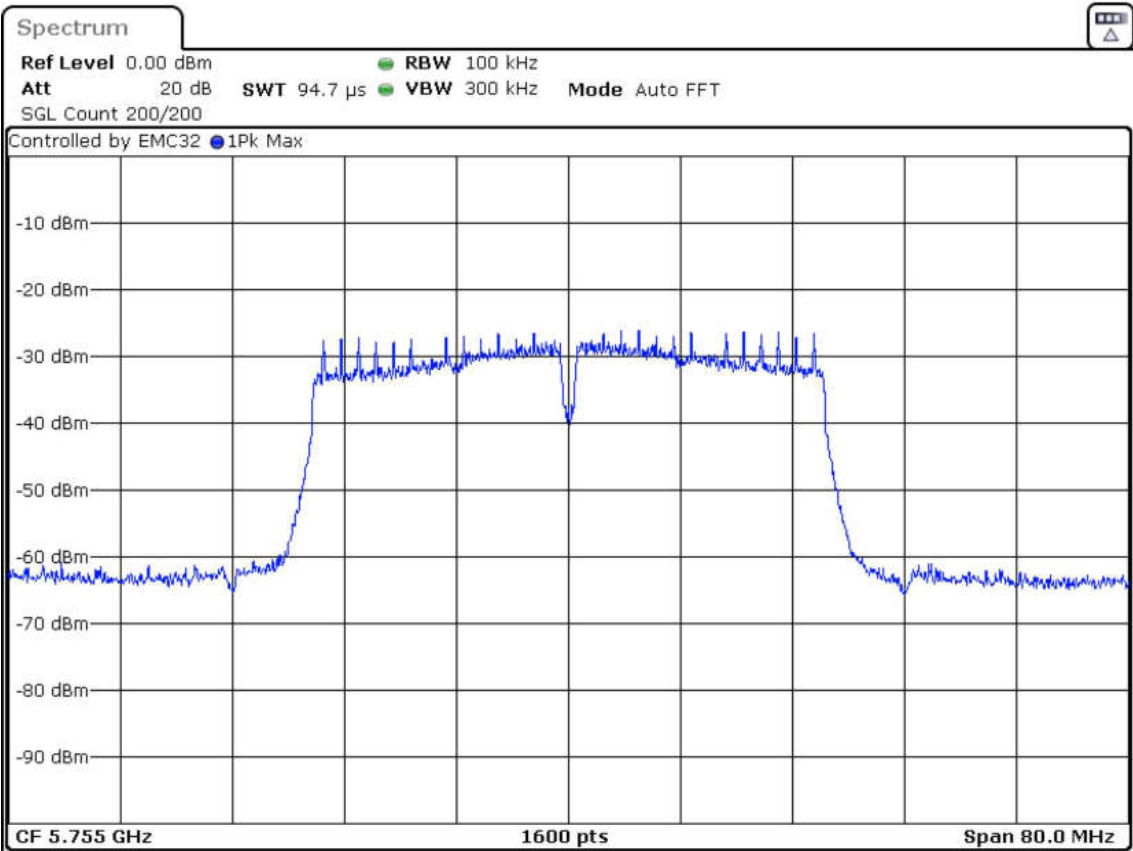
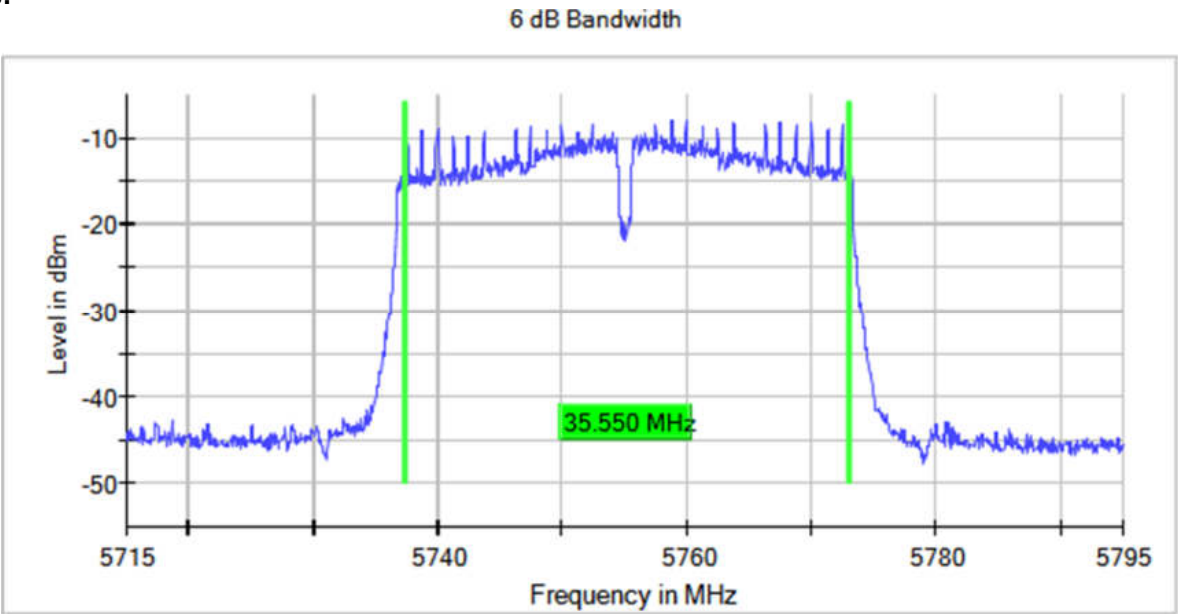
Verdict

Pass

Attachments

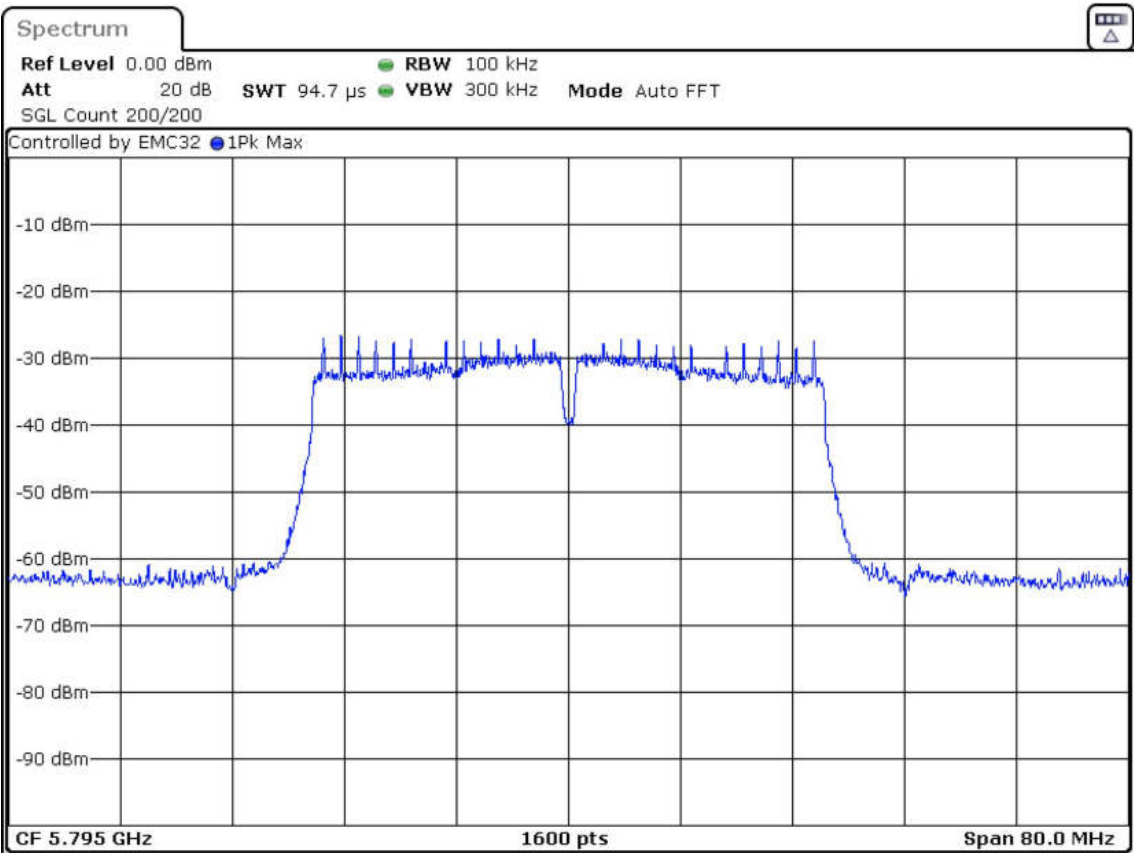
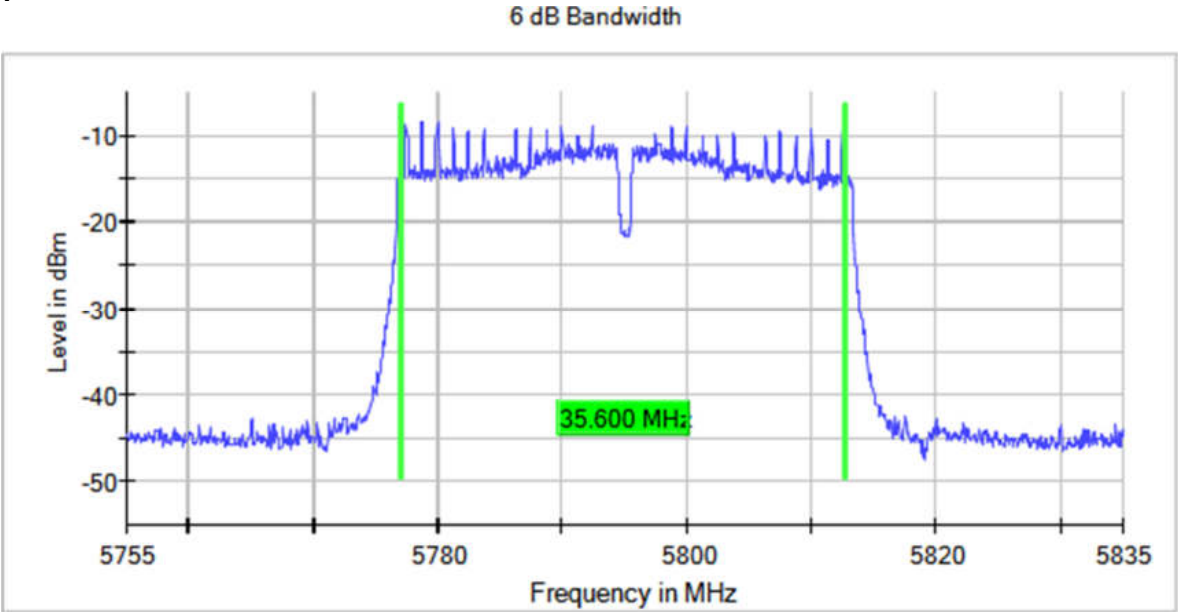
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5755.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5795.00000 Modulation = 802.11ac VHT40 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



CONFIGURATION 2:

Modulation: 802.11ac VHT80 (OFDM MCS0)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq (MHz)	Ebw (MHz)
[5725, 5850]	1+2	5775.00000	75.250

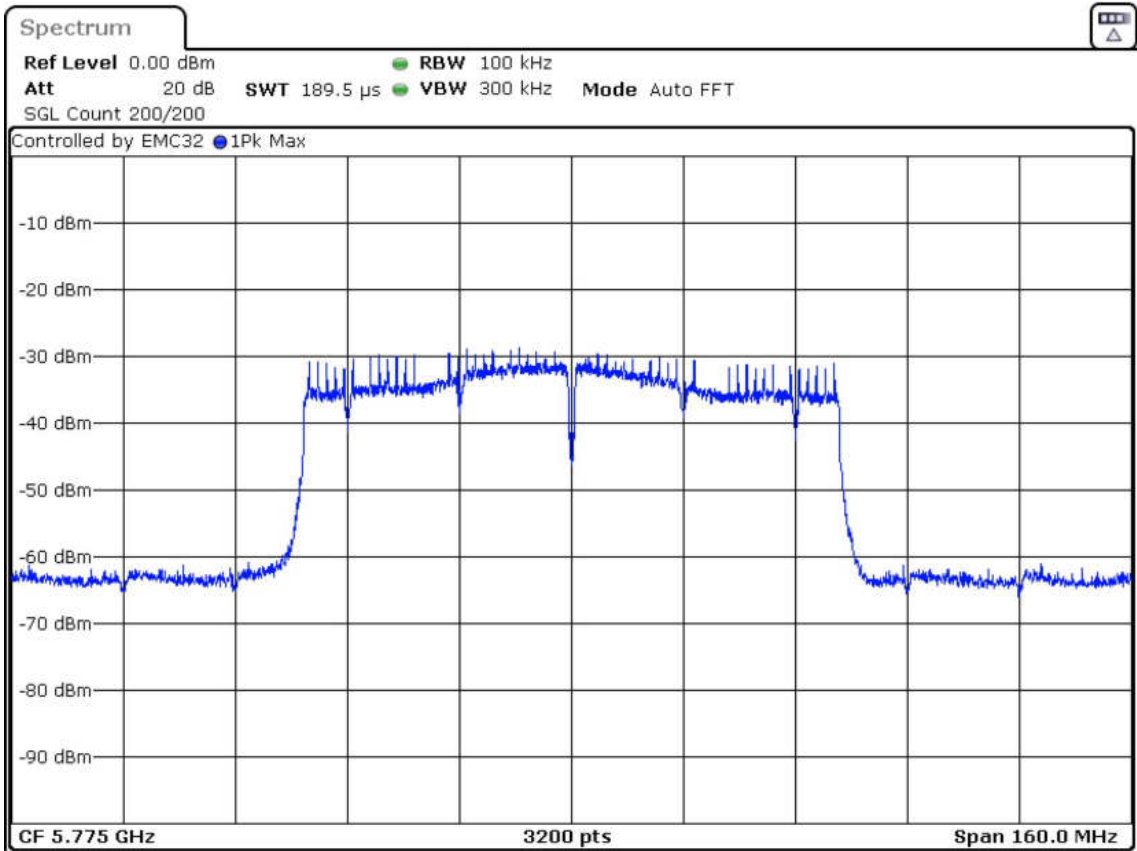
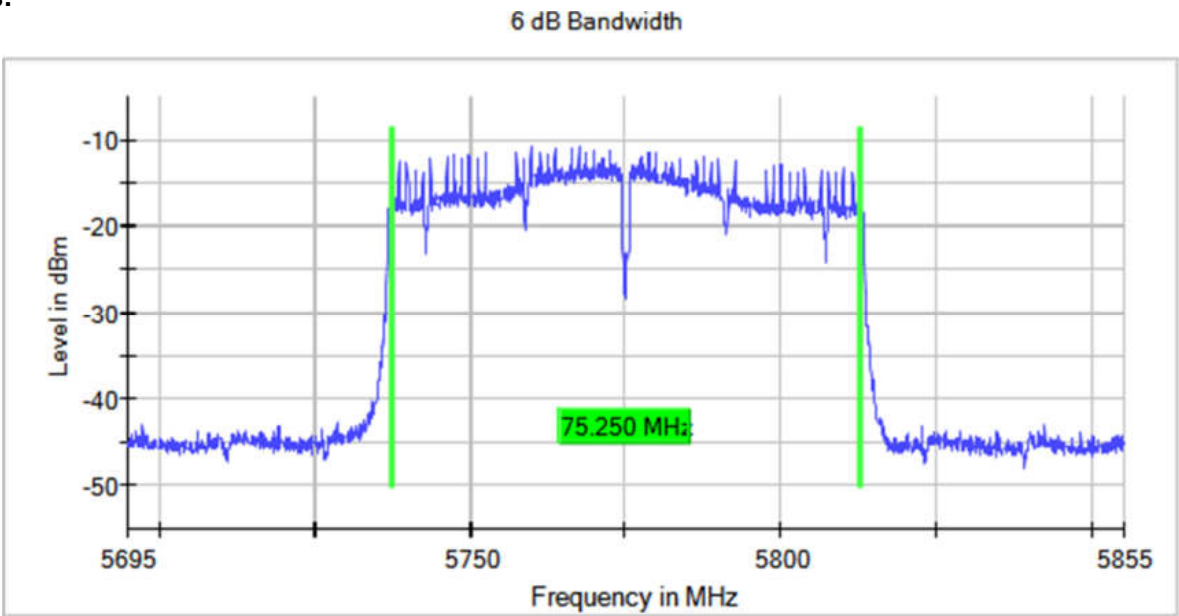
Verdict

Pass

Attachments

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency MHz = 5775.00000 Modulation = 802.11ac VHT80 (OFDM MCS0)
MIMO Mode = MIMO CDD Mode 2x2

Images:



RSS-247 6.2.4.2 / FCC 15.407 (b) (4) (6) [Rse] Transmitter Out of Band and Band Edge Radiated Emissions for transmitters operating solely in the 5.725-5.850 GHz band

Limits

For transmitters operating in the 5.725–5.85 GHz band: All emissions shall be limited to a level of –27 dBm/MHz (68.23 dBμV/m at 3 m distance) 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.

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.

Frequency range tested for Radiated emissions:

Start frequency: no radiofrequency signal generated in the device found below 10th sub-harmonic, no further investigation required.

Stop frequency: it has been performed the radiated spurious emissions until 10th harmonic

Results

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3m for the frequency range 1 GHz-17 GHz and a distance of 1m for frequency range 17GHz-40GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyser. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

OUT OF BAND EMISSIONS: For spurious emissions outside of the U-NII-3 band edge mask of 5.65-5.925 GHz, the worst-case was determined after preliminary measurements of the E.I.R.P. density (radiated).

The worst-case was determined by measuring the eirp density (radiated). Test performed on the worst-case.

CONFIGURATION 2:

Modulation: 802.11a (OFDM 6 Mbit/s) as worst case

MIMO Mode: MIMO CDD Mode 2x2

Operation Band (MHz)	Port	Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
[5725, 5850]	1+2	[0.03, 1]	5745.00000	124.999	35.30	V	PK
				124.999	33.34	V	QP
				249.978	43.50	H	PK
				249.978	41.55	H	QP
				40.943	36.95	V	PK
				40.943	30.25	V	QP
				479.989	41.96	H	PK
				479.989	40.62	H	QP
				48.006	37.49	V	PK
				48.006	29.84	V	QP
				960.048	40.76	V	PK
				960.048	36.46	V	QP
			5785.00000	124.969	34.66	V	PK
				124.969	32.39	V	QP
				250.008	42.77	H	PK
				250.008	41.62	H	QP
				42.155	36.55	V	PK
				42.155	28.83	V	QP
				47.824	40.25	V	PK
				47.824	31.83	V	QP
				49.188	37.09	V	PK
				49.188	29.40	V	QP
				859.805	39.77	H	PK
				859.805	34.44	H	QP
			5825.00000	124.999	35.23	V	PK
				124.999	33.50	V	QP
				249.978	40.60	V	PK
				249.978	38.98	V	QP
				374.956	39.45	H	PK
				374.956	35.77	H	QP
				42.519	36.16	V	PK

Operation Band (MHz)	Port	Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
				42.519	28.16	V	QP
				47.551	38.05	V	PK
				47.551	31.12	V	QP
				944.680	37.49	V	PK
				944.680	31.82	V	QP
		[1, 6.5]	5785.00000	4982.200	54.94	V	PK
				4982.200	41.64	V	AVG
				4993.600	56.83	V	PK
				4993.600	42.24	V	AVG
		[6.5, 17]	5745.00000	11487.080	63.82	H	PK
				11487.080	51.65	H	AVG
			5785.00000	11576.330	61.41	H	PK
				11576.330	49.86	H	AVG
			5825.00000	11647.520	54.63	H	PK
				11647.520	42.56	H	AVG

Verdict

Pass

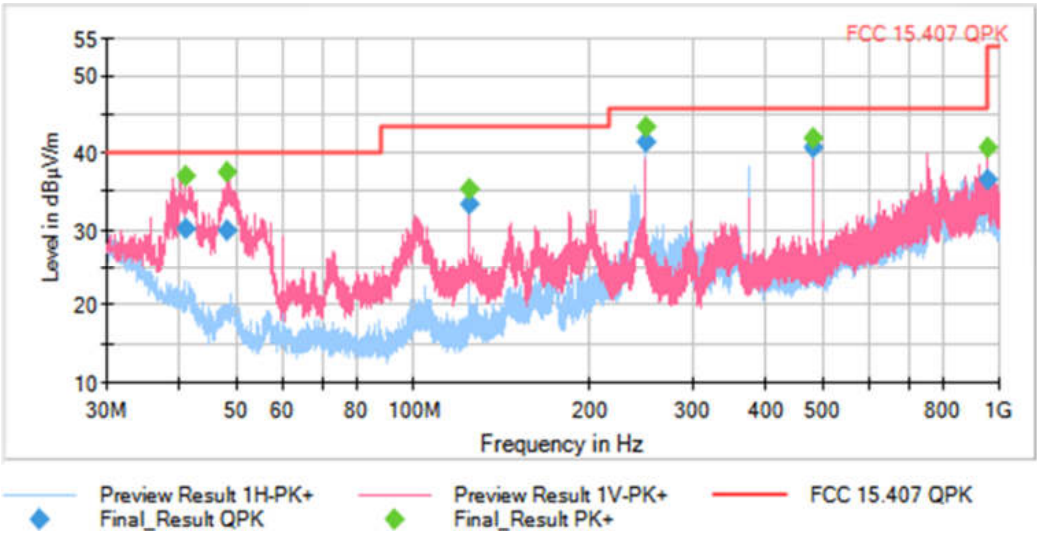
Attachments

The measurement settings for each range of frequency is as follows:

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 1 GHz - 6,5 GHz	100 kHz	PK+ ; AVG	1 MHz	1 s	0 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB
Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [ESW 44] 17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

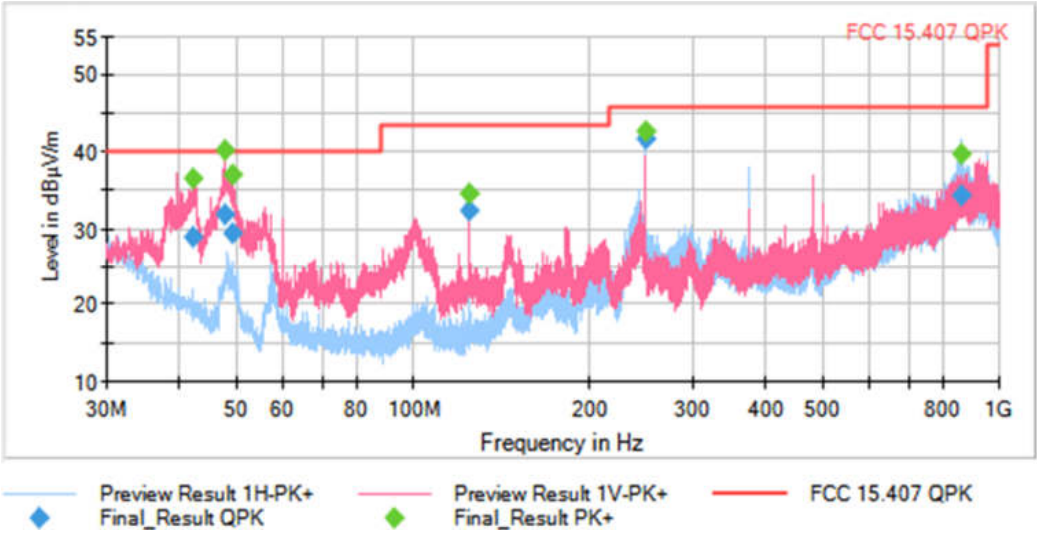


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

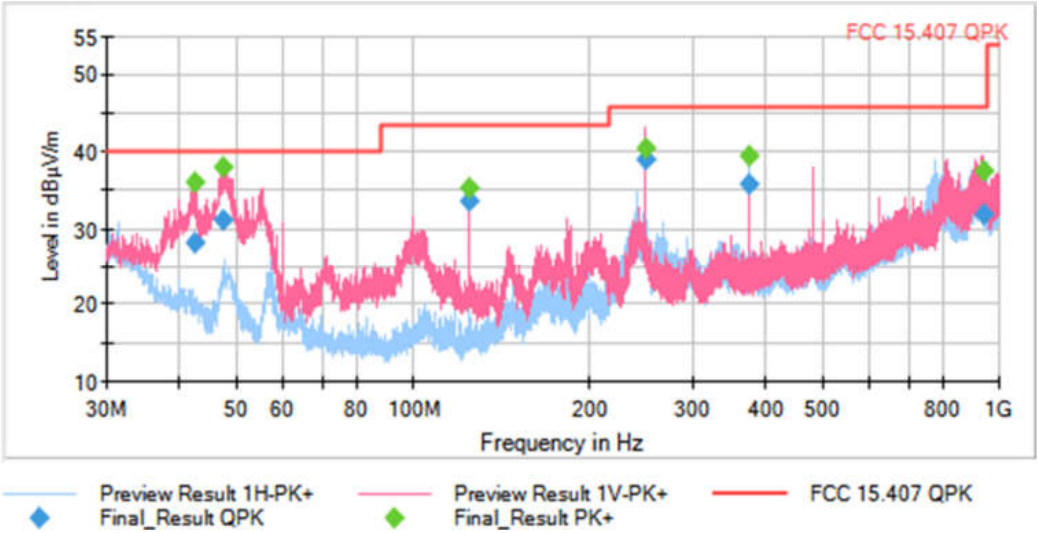


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

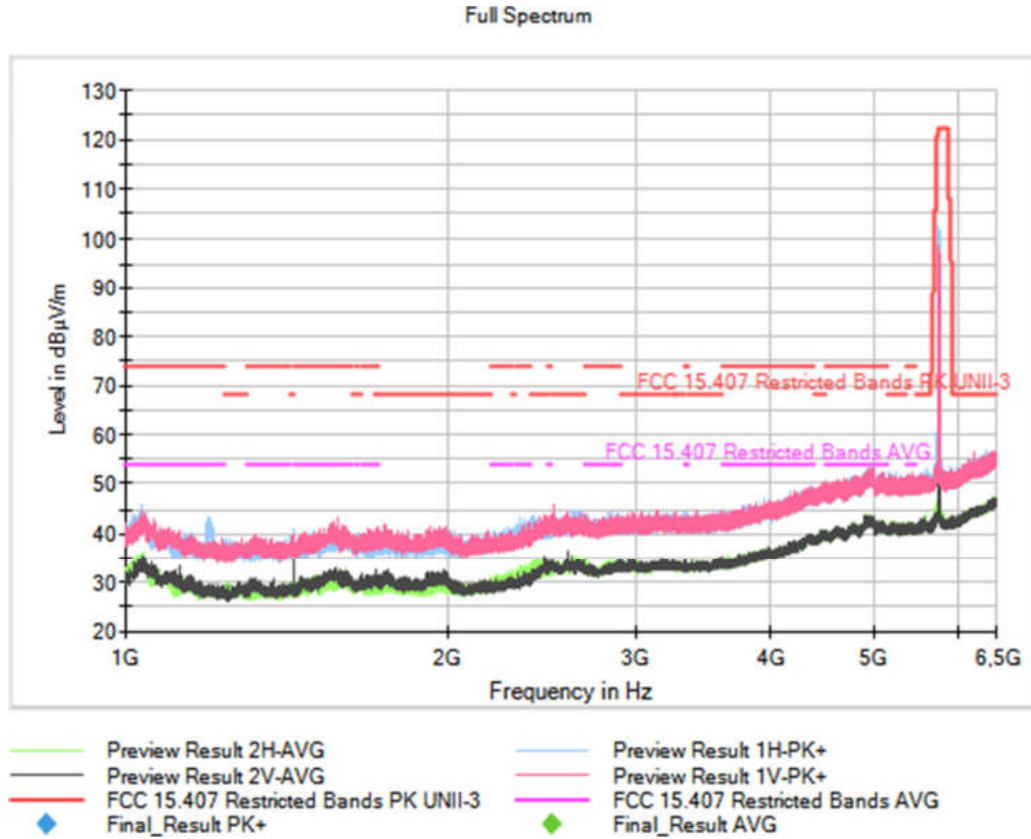


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	30 dB

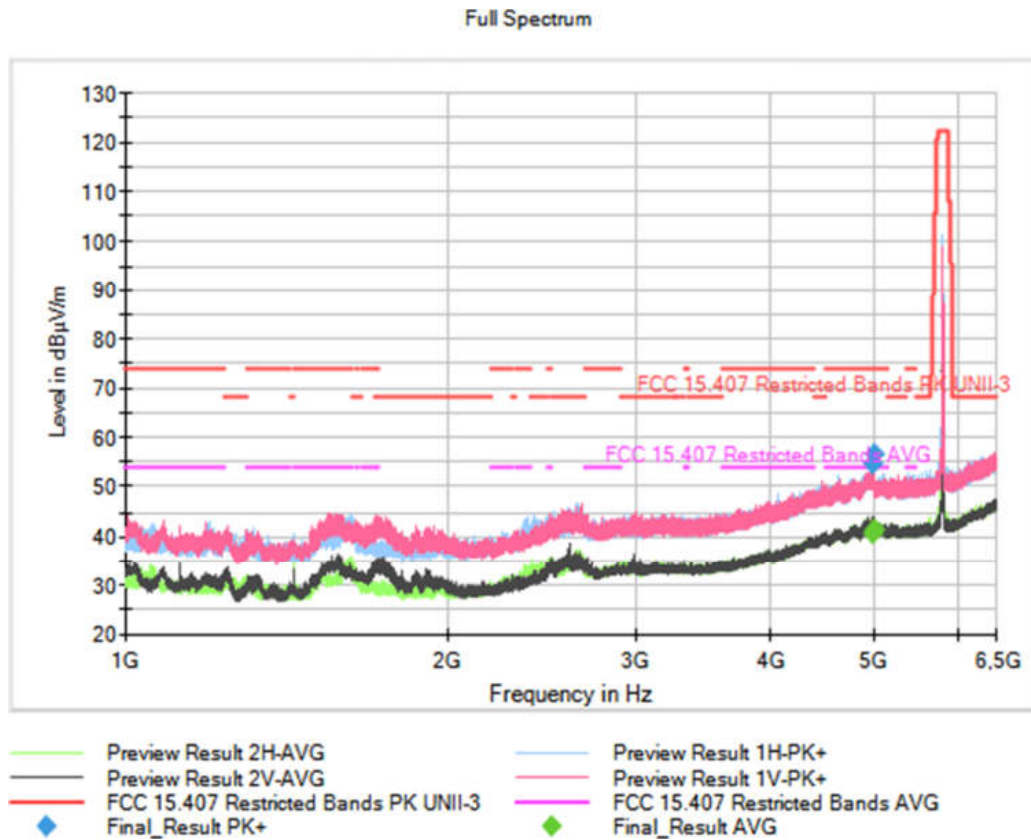
Operation Band MHz = [5725, 5850] Active Port = 1+2
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



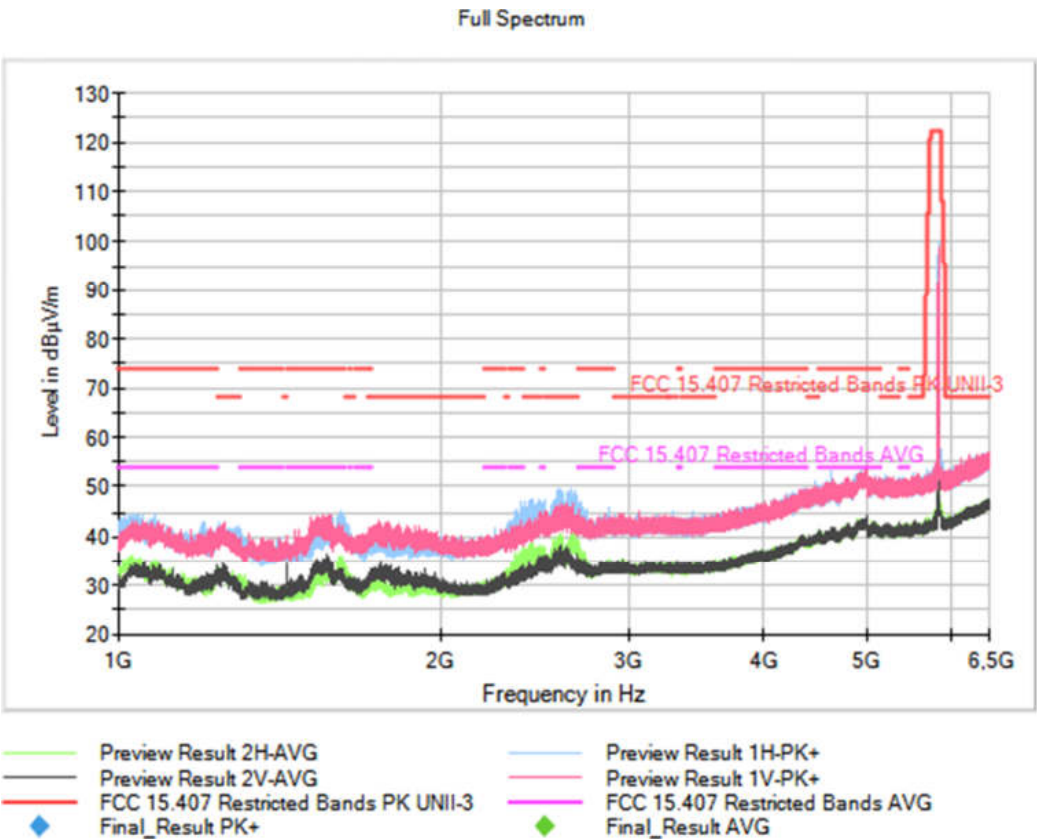
Operation Band MHz = [5725, 5850] Active Port = 1+2
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5785.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



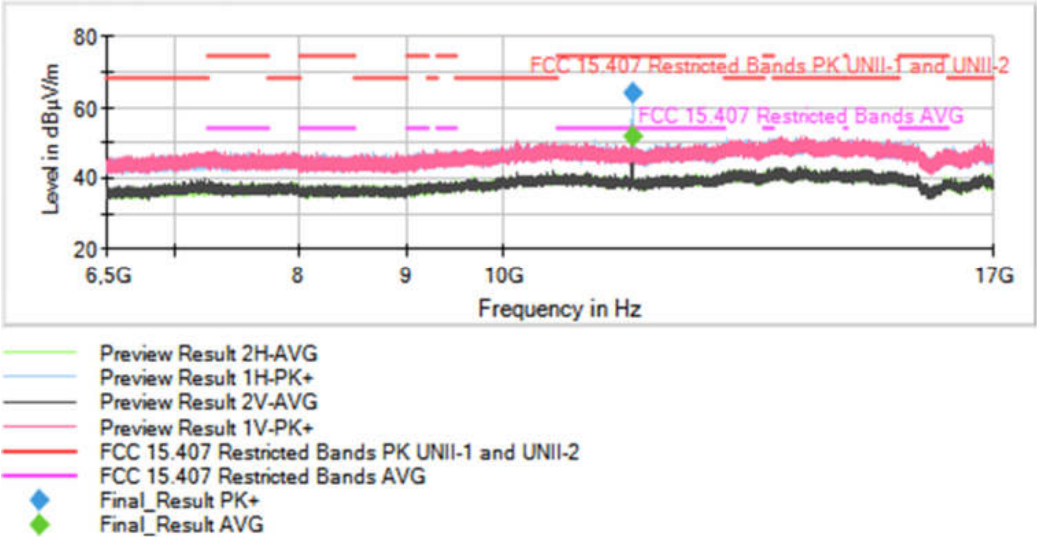
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [1, 6.5] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



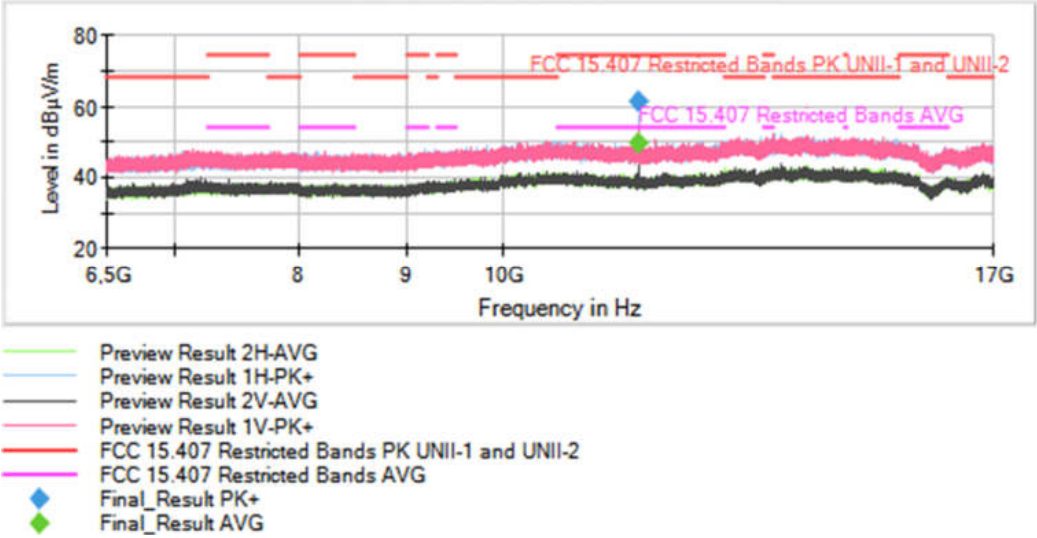
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



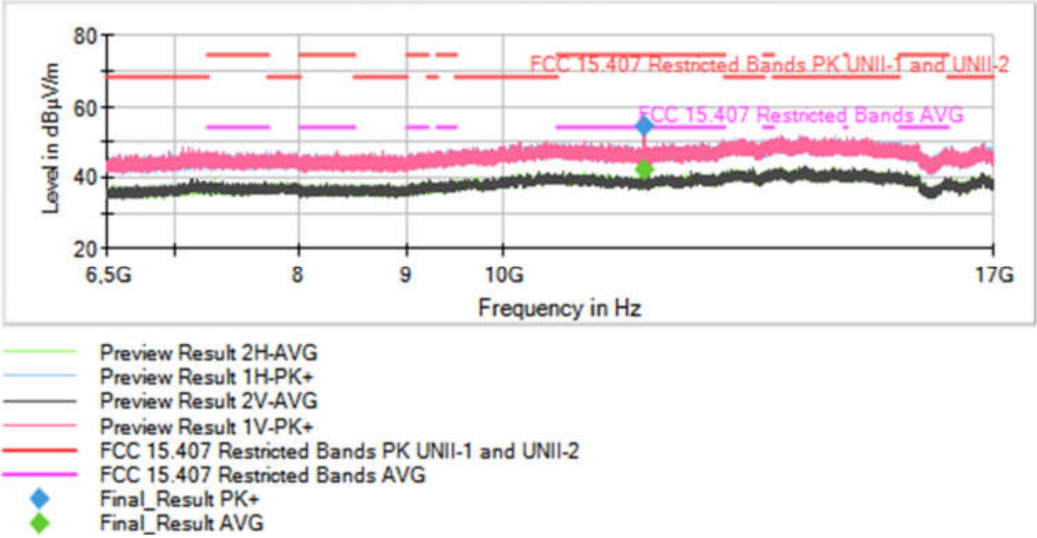
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



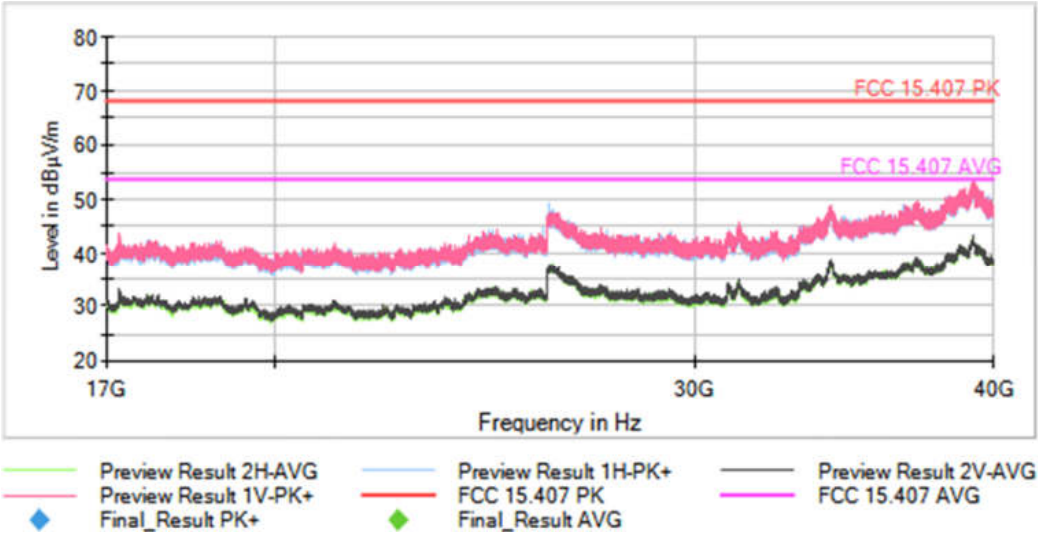
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [17, 40] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



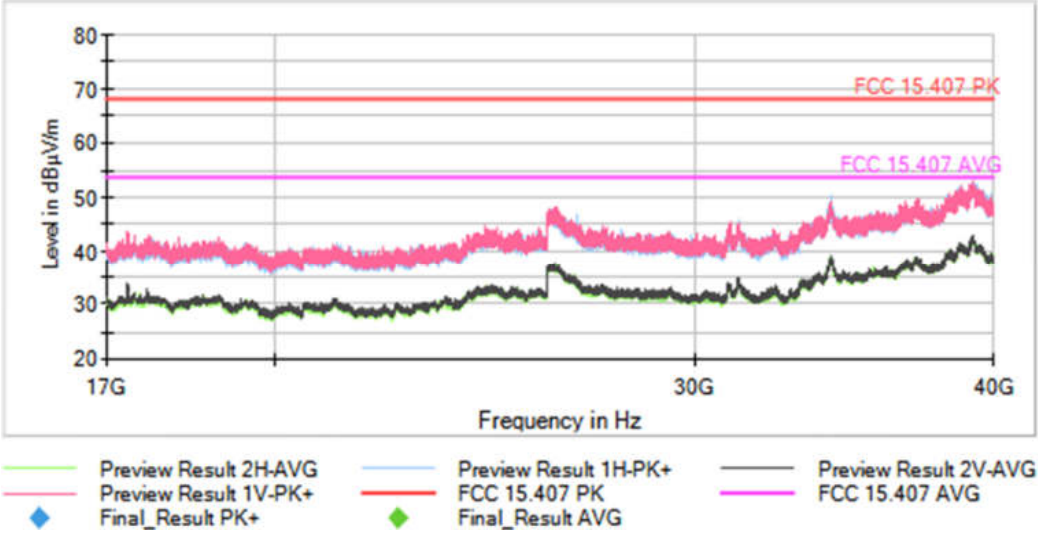
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [17, 40] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

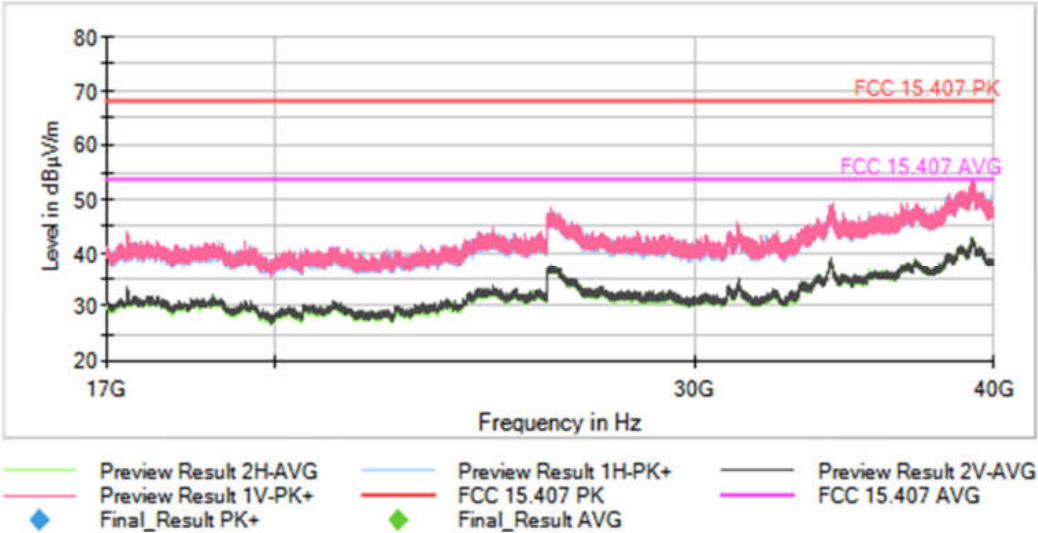


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [17, 40] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

CONFIGURATION 1:

Modulation: 802.11a (OFDM 6 Mbit/s)

MIMO Mode: MIMO CDD Mode 2x2

Results

Operation Band (MHz)	Port	Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	PoI	Detector
[5725, 5850]	1+2	[0.03, 1]	5745.00000	124.969	31.03	V	PK
				124.969	28.44	V	QP
				242.309	40.28	H	PK
				242.309	32.32	H	QP
				249.978	42.81	V	PK
				249.978	41.28	V	QP
				47.703	33.56	V	PK
				47.703	27.21	V	QP
				479.959	38.52	H	PK
				479.959	36.40	H	QP
				54.402	34.72	V	PK
				54.402	26.36	V	QP
				64.223	34.47	V	PK
				64.223	28.73	V	QP
			5785.00000	124.969	38.29	V	PK
				124.969	36.69	V	QP
				374.987	37.70	H	PK
				374.987	34.95	H	QP
		5825.00000	5825.00000	124.999	29.47	V	PK
				124.999	27.79	V	QP
				374.987	37.73	H	PK
				374.987	35.05	H	QP
		[1, 6.5]	5745.00000	1125.200	38.32	V	PK
				1198.500	41.26	H	PK
				1675.600	41.85	V	PK
				1682.200	41.85	V	PK
			5785.00000	1124.900	39.42	V	PK
				1201.500	42.62	H	PK
				1391.600	40.77	V	PK
				1439.800	41.12	V	PK
				2399.900	43.71	H	PK
			5825.00000	1124.600	38.38	V	PK
				1202.500	43.43	H	PK
				1390.900	40.41	V	PK
				1439.800	41.66	H	PK

Operation Band (MHz)	Port	Freq Rng (GHz)	Freq (MHz)	Unwanted Freq (MHz)	Unwanted Lvl (dBµV/m)	Pol	Detector
		[6.5, 17]		2400.100	42.90	H	PK
				11490.650	64.23	H	PK
			5745.00000	11490.650	53.29	H	AVG
				11569.190	61.66	H	PK
			5785.00000	11569.190	50.27	H	AVG
				11652.140	63.39	H	PK
			5825.00000	11652.140	52.17	H	AVG

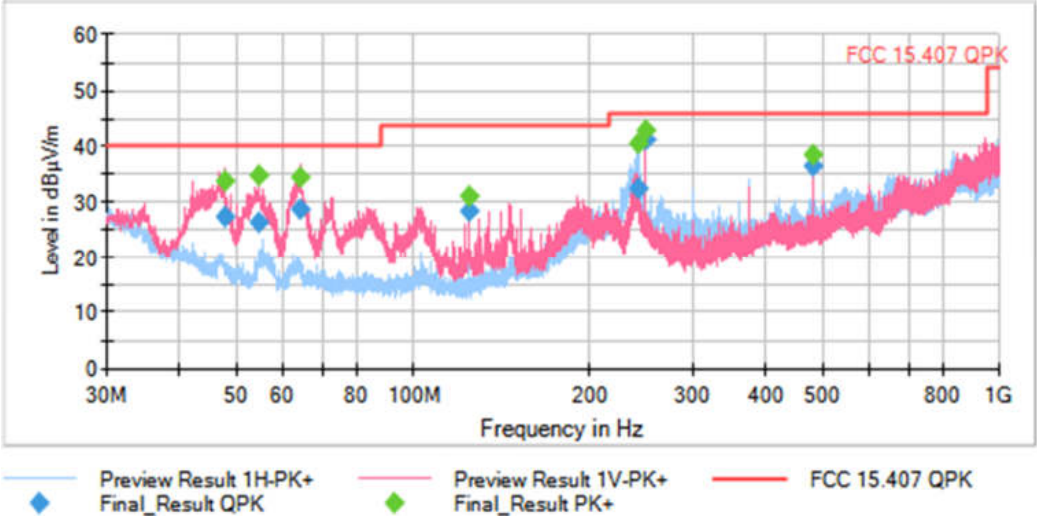
Verdict

Pass

Attachments

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



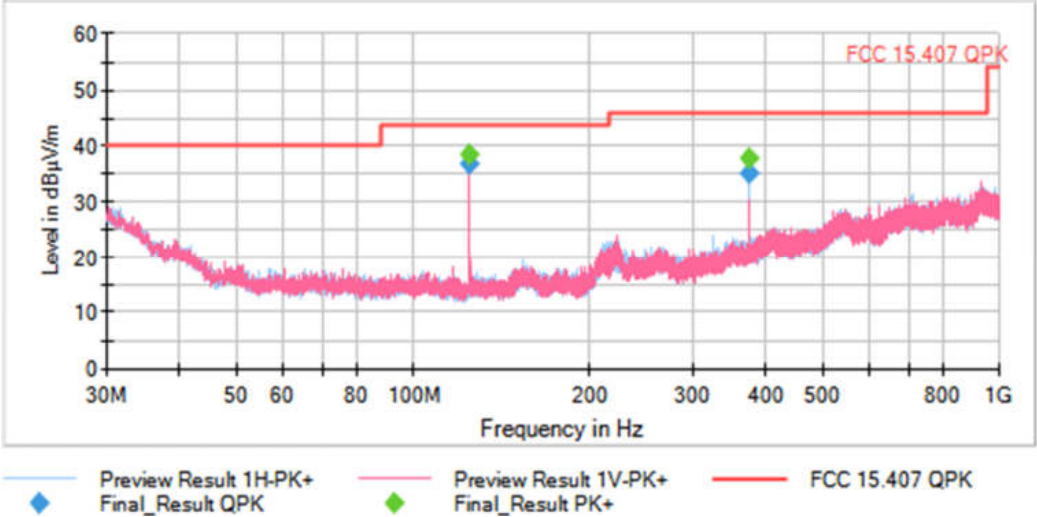
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 26]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	0 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

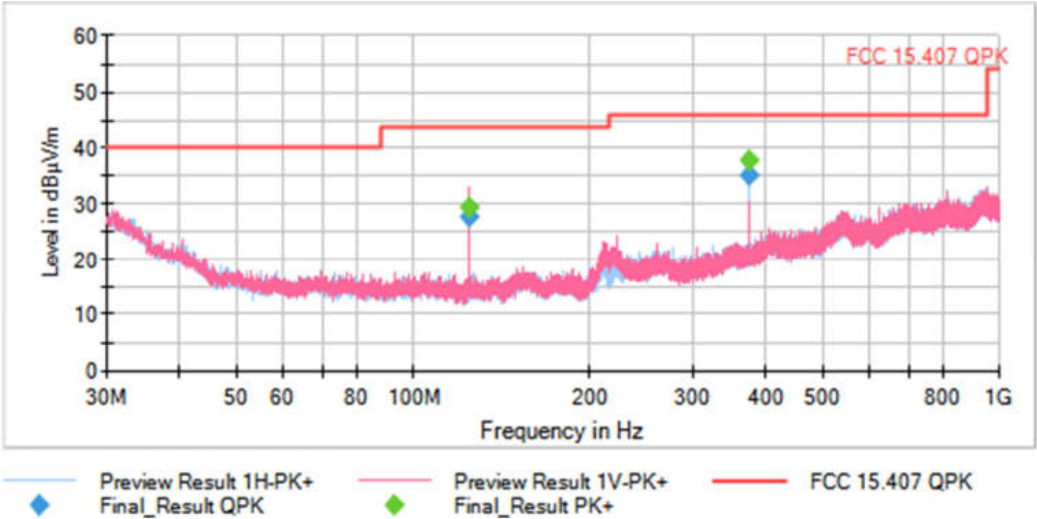


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 26]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [0.03, 1] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

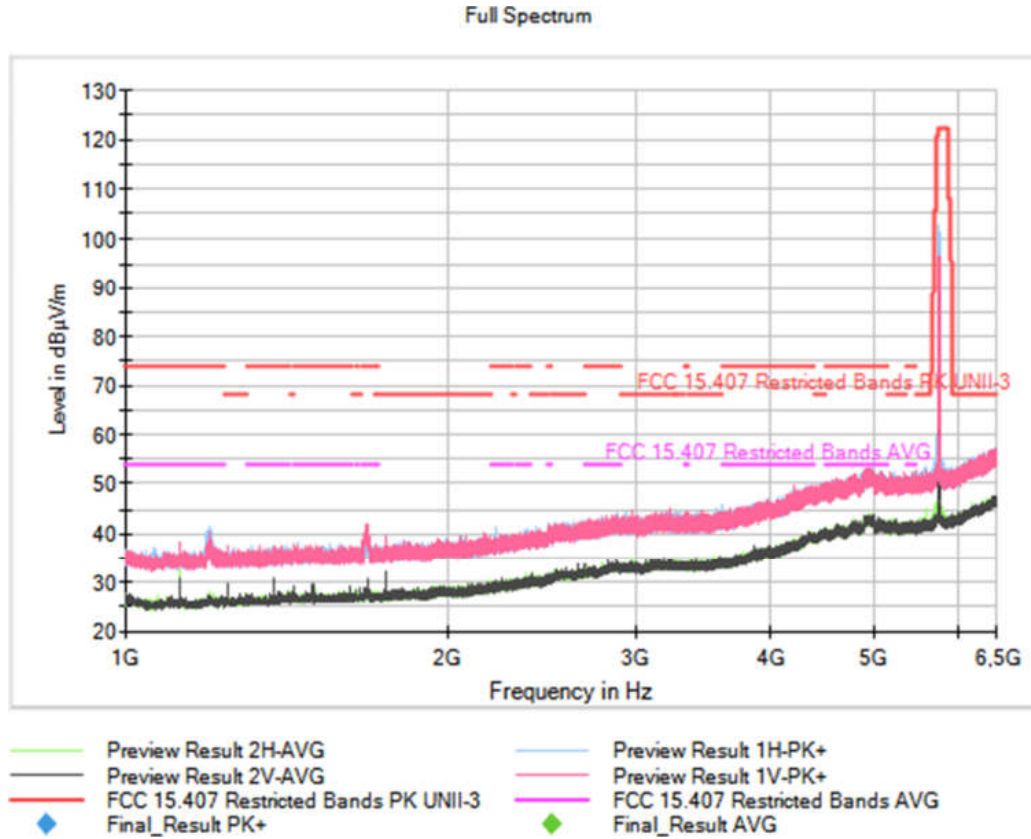


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 26]					
	30 MHz - 1 GHz	30,312 kHz	PK+	100 kHz	1 s	30 dB

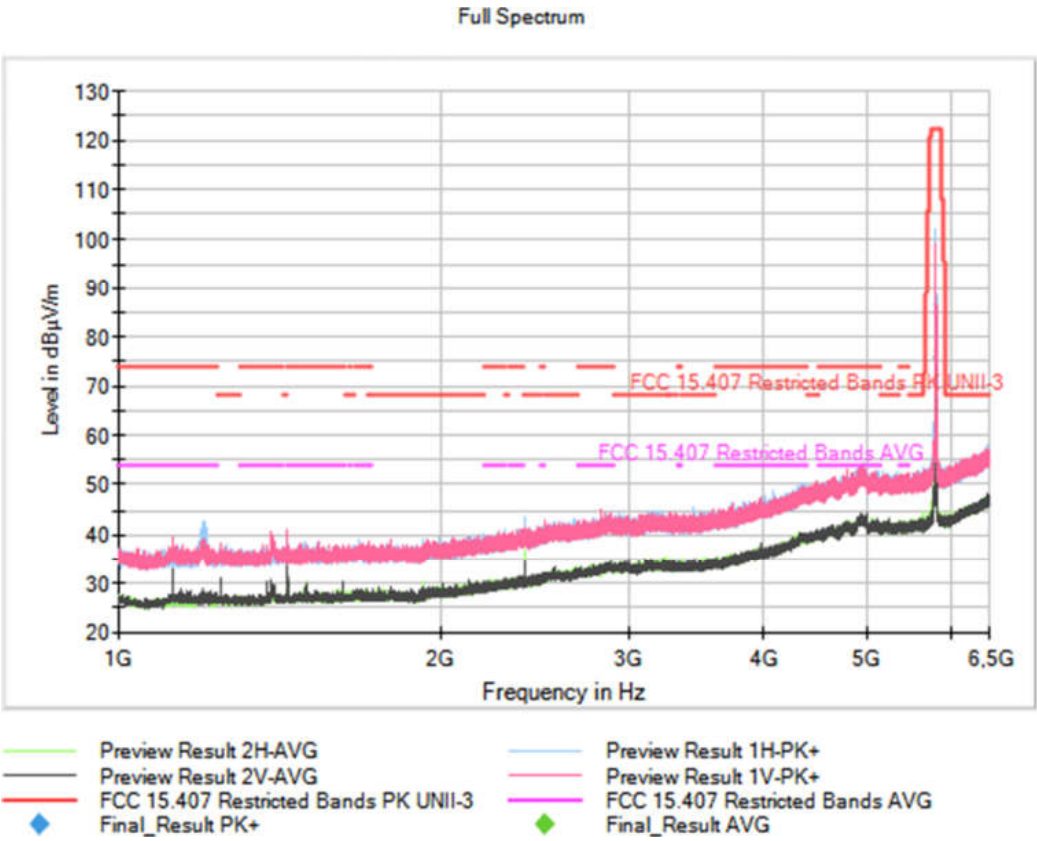
Operation Band MHz = [5725, 5850] Active Port = 1+2
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5745.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



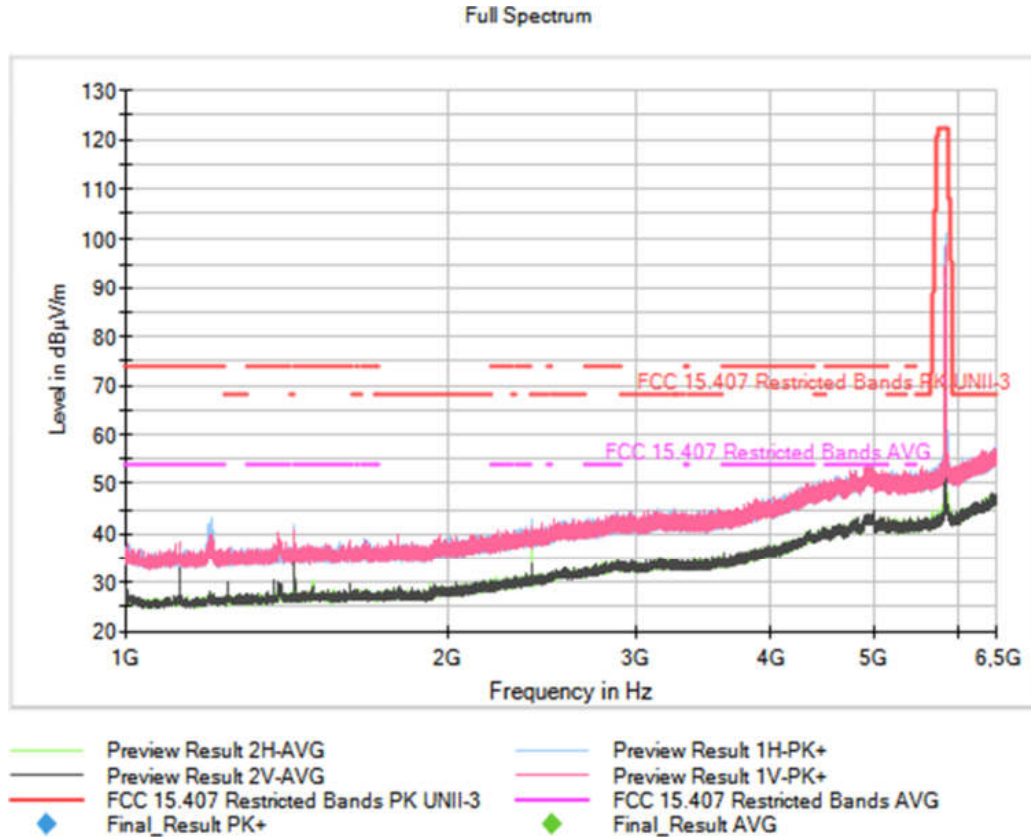
Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [1, 6.5] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



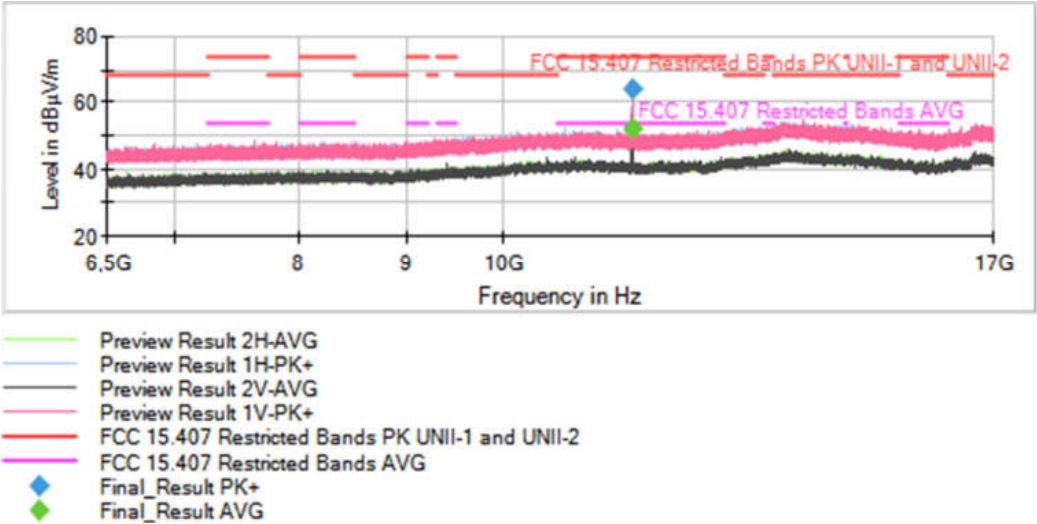
Operation Band MHz = [5725, 5850] Active Port = 1+2
 Frequency Range GHz = [1, 6.5] Frequency MHz = 5825.00000
 Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



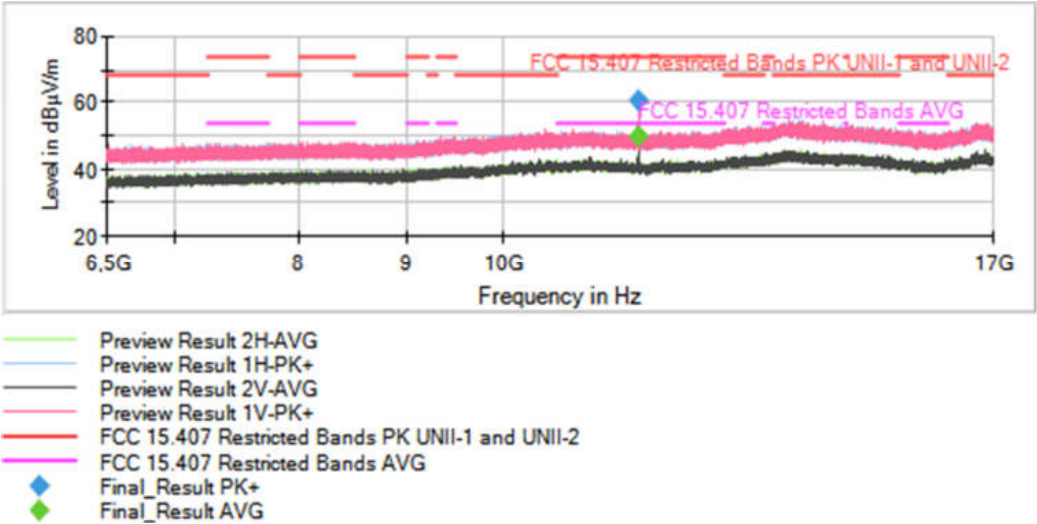
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

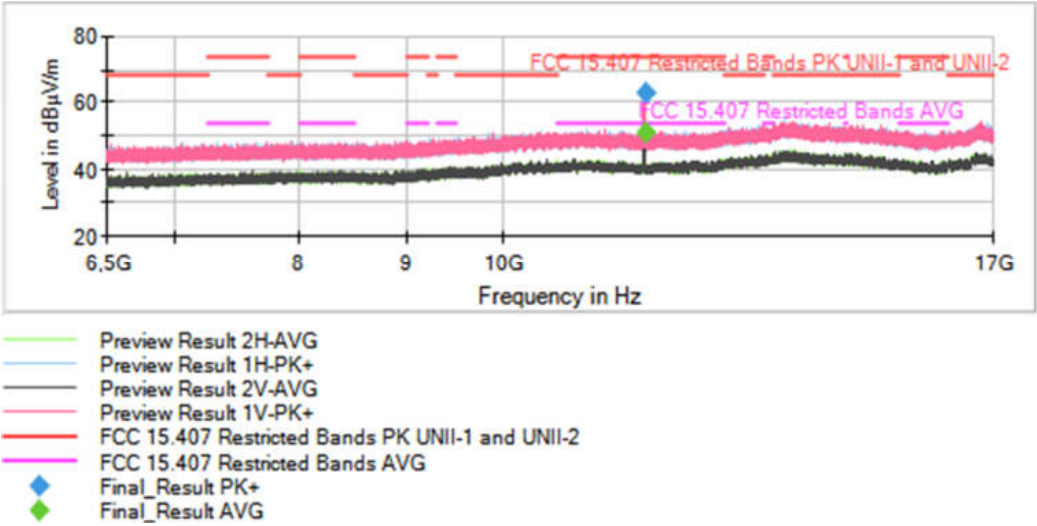


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [6.5, 17] Frequency MHz = 5825.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



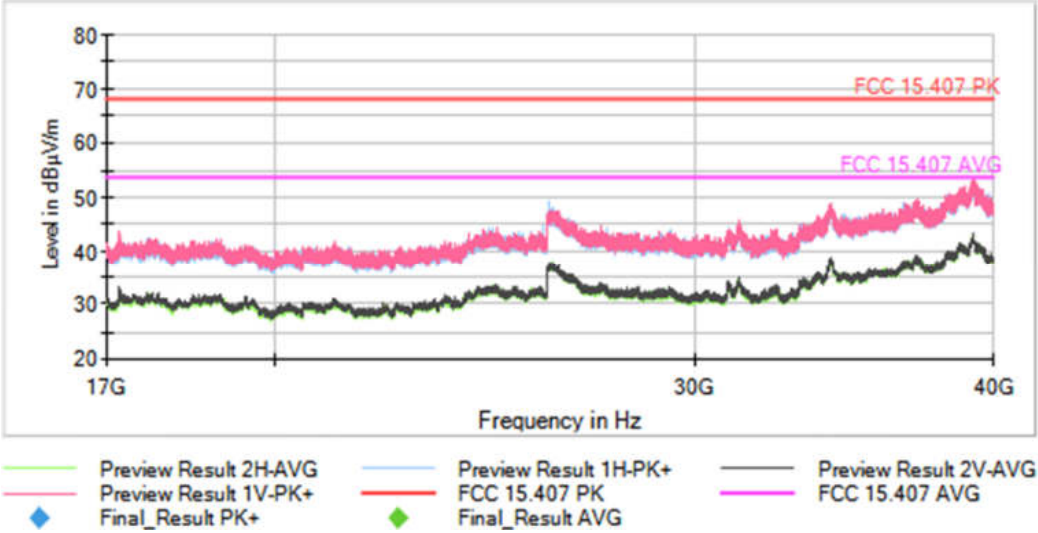
Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	6,5 GHz - 17 GHz	105 kHz	PK+ ; AVG	1 MHz	1 s	30 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [17, 40] Frequency MHz = 5745.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:

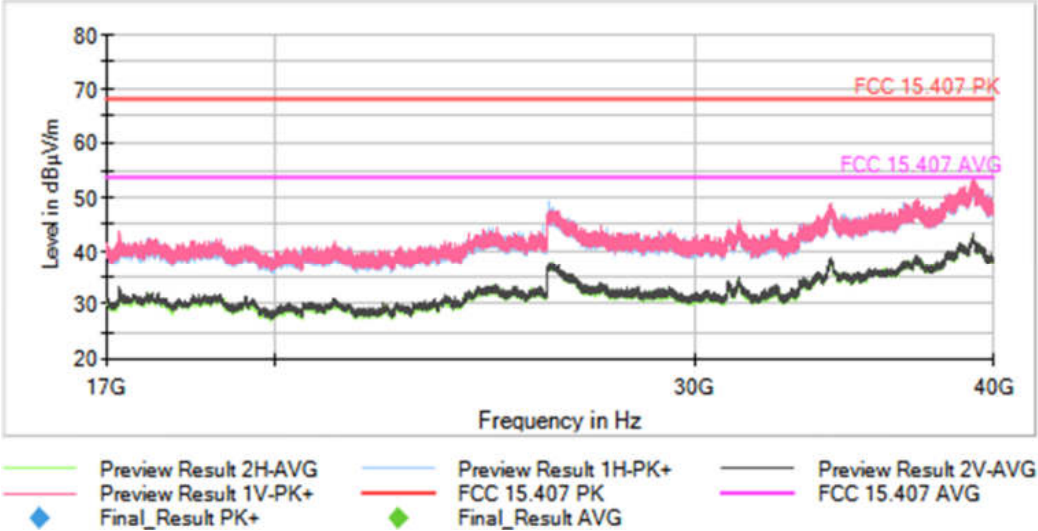


Tables:
Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Operation Band MHz = [5725, 5850] Active Port = 1+2
Frequency Range GHz = [17, 40] Frequency MHz = 5785.00000
Modulation = 802.11a (OFDM 6 Mbit/s) MIMO Mode = MIMO CDD Mode 2x2

Images:



Tables:

Spectrum Analyzer Parameters

	Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
	Receiver: [ESW 44]					
	17 GHz - 40 GHz	766,667 kHz	PK+ ; AVG	1 MHz	1 s	0 dB