

FCC Test Report

Product Name : Active Ethernet Fiber 802.11ac Gateway with VoIP

Trade Name : BEC, Billion

Model No. : BEC 9900VA

FCC ID : QI3BEC-9900VA

Applicant : Billion Electric Co., Ltd.

Address : 8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New
Taipei City 231, Taiwan (R.O.C.)

Date of Receipt : Sep. 16, 2020

Issued Date : Nov. 11, 2020

Report No. : 2090564R-E3032110125

Report Version : V1.0



The test results relate only to the samples tested.

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Test Report Certification

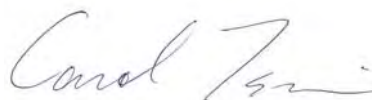
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Applicant : Billion Electric Co., Ltd.
Address : 8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
Manufacturer : Billion Electric Co., Ltd.
Address : 8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231, Taiwan (R.O.C.)
Model No. : BEC 9900VA
Trade Name : BEC, Billion
FCC ID : QI3BEC-9900VA
EUT Voltage : AC 100-240V, 50/60Hz
Testing Voltage : AC 120V/60Hz
Applicable Standard : FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2019 ANSI C63.10: 2013
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



(Carol Tsai / Senior Engineering Adm. Specialist)

Tested By :



(Scott Chang / Senior Engineer)

Approved By :



(Louis Hsu / Deputy Manager)

Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	Nov. 11, 2020

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1. General Information

1.1. EUT Description

Product Name	Active Ethernet Fiber 802.11ac Gateway with VoIP	
Trade Name	BEC, Billion	
Model No.	BEC 9900VA	
Frequency Range/ Channel Number	IEEE 802.11a/n/ac (20MHz)	5180~5240MHz / 4 Channels 5745~5825MHz / 5 Channels
	IEEE 802.11n/ac (40MHz)	5190~5230MHz / 2 Channels 5755~5795MHz / 2 Channels
	IEEE 802.11ac (80MHz)	5210~5210MHz / 1 Channel 5775~5775MHz / 1 Channel
Type of Modulation	IEEE 802.11a/n/ac	Orthogonal Frequency Division Multiplexing
Data Speed	IEEE 802.11a	6, 9, 18, 24, 36, 48, 54Mbps
	IEEE 802.11n	Support a subset of the combination of GI, MCS 0~MCS 31 and bandwidth defined in 802.11n
	IEEE 802.11ac	Support a subset of the combination of GI, MCS 0~MCS 9 and bandwidth defined in 802.11ac

Antenna Information					
Frequency	No.	Brand	Model No.	Ant. Type	Ant. Gain
2.4G	0	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	2.56 dBi
	1	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	2.56 dBi
5G	0	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	3.54 dBi
	1	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	3.54 dBi
	2	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	3.54 dBi
	3	Master Wave Technology Co., Ltd.	98612PRSX000	Diople	3.54 dBi

Accessories Information	
Ethernet Cable	Non-Shielded, 1.8m
Power Adapter	MFR: BILLION, M/N: BA040-150200EXU Input: 100-240V~1.0A 50/60Hz Output: DC 15V $\equiv$ 2.0A Cable Out: Non-Shielded, 1.58m

ANT-TX / RX & Bandwidth

ANT-TX / RX	TX			RX		
Mode/ Channel Bandwidth	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
IEEE802.11a	✓			✓		
IEEE802.11n	✓	✓		✓	✓	
IEEE802.11ac	✓	✓	✓	✓	✓	✓

IEEE 802.11a & IEEE 802.11n (20MHz) & IEEE 802.11ac (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz	48	5240 MHz
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz						

IEEE 802.11n (40MHz) & IEEE 802.11ac (40MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	151	5755 MHz	159	5795 MHz

IEEE 802.11ac (80MHz)

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
42	5210 MHz	155	5775 MHz

Note:

1. This device including 2.4GHz b/g/n and 5GHz a/n/ac transmitting and receiving functions.
2. The device supports diversity function in 802.11a modes, and the maximum power of Ant. 0 is higher than other antennas. So Ant. 0 is selected as the worst case to perform for all test items in 802.11a modes.
3. Regards to the frequency band operation; the lowest, middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. The EUT description is from the customer declaration.

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

Test Mode	Mode 1: Transmit Mode			
-----------	-----------------------	--	--	--

Test Items	Modulation	Channel	Antenna	Result
Conducted Emission	11ac(20MHz)	165	0/1/2/3	Complies
	11ac(40MHz)	46	0/1/2/3	Complies
26dB & 99% & DTS Bandwidth	a	36/44/48/149/157/165	0	Complies
	11ac(20MHz)	36/44/48/149/157/165	0/1/2/3	Complies
	11ac(40MHz)	38/46/151/159	0/1/2/3	Complies
	11ac(80MHz)	42/155	0/1/2/3	Complies
Maximum conducted output power	a	36/44/48/149/157/165	0/1/2/3	Complies
	11ac(20MHz)	36/44/48/149/157/165	0+1+2+3	Complies
	11ac(40MHz)	38/46/151/159	0+1+2+3	Complies
	11ac(80MHz)	42/155	0+1+2+3	Complies
Maximum power spectral density	a	36/44/48/149/157/165	0	Complies
	11ac(20MHz)	36/44/48/149/157/165	0+1+2+3	Complies
	11ac(40MHz)	38/46/151/159	0+1+2+3	Complies
	11ac(80MHz)	42/155	0+1+2+3	Complies
Radiated Emission	a	36/44/48/149/157/165	0	Complies
	11ac(20MHz)	36/44/48/149/157/165	0+1+2+3	Complies
	11ac(40MHz)	38/46/151/159	0+1+2+3	Complies
	11ac(80MHz)	42/155	0+1+2+3	Complies
Band Edge	a	36/44/48/149/157/165	0	Complies
	11ac(20MHz)	36/44/48/149/157/165	0+1+2+3	Complies
	11ac(40MHz)	38/46/151/159	0+1+2+3	Complies
	11ac(80MHz)	42/155	0+1+2+3	Complies

Note 1: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

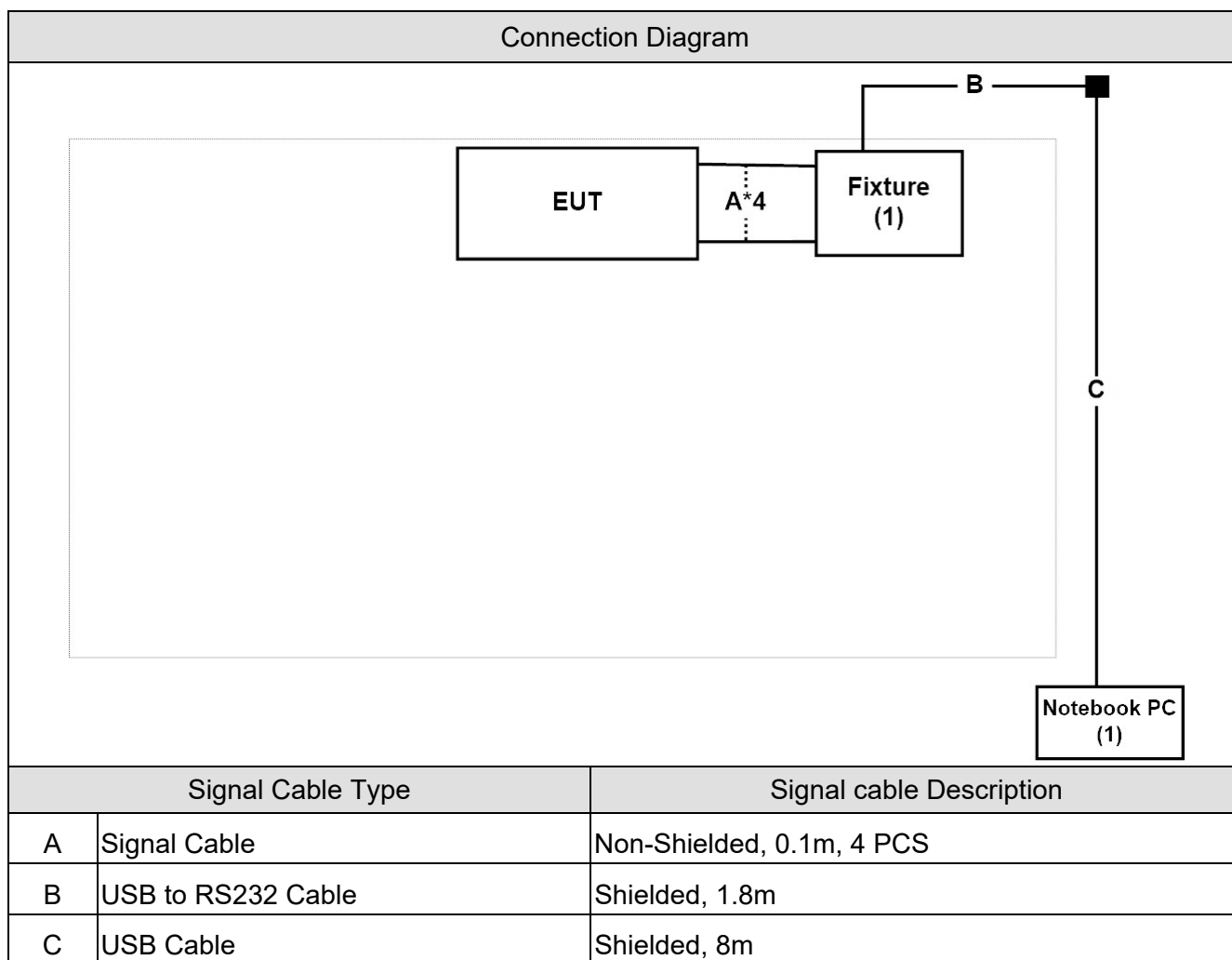
Note 2: Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

1.3. Tested System Details

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

Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Notebook PC	Lenove	Lenovo Ideapad 110 15IBR	PF01EUZD	DoC	Non-Shielded, 1.8 m
2	Fixture	Billion	Billion	--	DoC	--

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the Quantenna command
3	Configure test mode, test channel and data rate.
4	Let the EUT start transmitting signal continuously.
5	Verify that device is working properly.

1.6. Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required	Test Site
Temperature (°C)	FCC PART 15E 15.407	15 - 35	2
Humidity (%RH)	Conducted Emission	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	26dB & 99% & DTS Bandwidth	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Maximum conducted output power	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Maximum power spectral density	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Radiated Emission	25 - 75	
Temperature (°C)	FCC PART 15E 15.407	15 - 35	1
Humidity (%RH)	Band Edge	25 - 75	

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA	:	FCC Registration Number: TW3024
Canada	:	IC Registration Number: 22397-1 / 22397-2 / 22397-3

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

If you have any comments, please don't hesitate to contact us. Our test sites as below:

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
Email address	info.tw@dekra.com
Website	http://www.dekra.com.tw

1.8. List of Test Equipment

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2020/01/08	2021/01/07
Test Receiver	R&S	ESCS 30	836858/022	2020/02/25	2021/02/24
LISN	R&S	ENV216	100092	2020/06/22	2021/06/21

26dB & 99% & DTS Bandwidth / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02
Spectrum Analyzer	Keysight	N9010B	MY57110159	2020/04/15	2021/04/14
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29

Maximum conducted output power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2019/12/02	2020/12/01
Pulse Power Sensor	Anritsu	MA2411B	1531043	2019/12/02	2020/12/01
Pulse Power Sensor	Anritsu	MA2411B	1531044	2019/12/02	2020/12/01
Power Meter	Keysight	8990B	MY51000248	2020/05/20	2021/05/19
Power Sensor	Keysight	N1923A	MY57240005	2020/05/20	2021/05/19

Maximum power spectral density / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02
Spectrum Analyzer	Keysight	N9010B	MY57110159	2020/04/15	2021/04/14
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29

Radiated Emission / CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2020/06/12	2021/06/11
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2020/06/04	2021/06/03
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Horn Antenna	Schwarzbeck	BBHA 9170	203	2020/03/09	2021/03/08
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2019/12/03	2020/12/02
Pre-Amplifier	DEKRA	AP-400C	201801231	2019/12/03	2020/12/02
Band Reject Filter	Micro-Tronics	BRM50716	G089	2020/03/18	2021/03/17
Band Reject Filter	Micro-Tronics	BRM50716	G068	2020/03/09	2021/03/08
Coaxial Cable(13m)	Huber+Suhner	SF104	CB2-H	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB2-H	NA	NA

Band Edge / CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2020/02/21	2021/02/20
Bilog Antenna	Teseq	CBL6112D	23191	2020/06/12	2021/06/11
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2020/06/04	2021/06/03
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2019/12/27	2020/12/26
Horn Antenna	Schwarzbeck	BBHA 9170	203	2020/03/09	2021/03/08
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2019/12/03	2020/12/02
Pre-Amplifier	DEKRA	AP-400C	201801231	2019/12/03	2020/12/02
Band Reject Filter	Micro-Tronics	BRM50716	G089	2020/03/18	2021/03/17
Band Reject Filter	Micro-Tronics	BRM50716	G068	2020/03/09	2021/03/08
Coaxial Cable(13m)	Huber+Suhner	SF104	CB2-H	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB2-H	NA	NA

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

1.9. Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor(dB) linear voltage	Duty Factor(dB) Power	1/T Minimum VBW (kHz)
802.11a (SISO)	0.563	0.605	93.13%	0.617758	0.31	1.776
802.11ac 20 (MIMO)	1.285	1.356	94.76%	0.467131	0.23	0.778
802.11ac 40 (MIMO)	0.645	0.686	94.03%	0.534343	0.27	1.551
802.11ac 80 (MIMO)	0.327	0.369	88.68%	1.043660	0.52	3.054

Note:

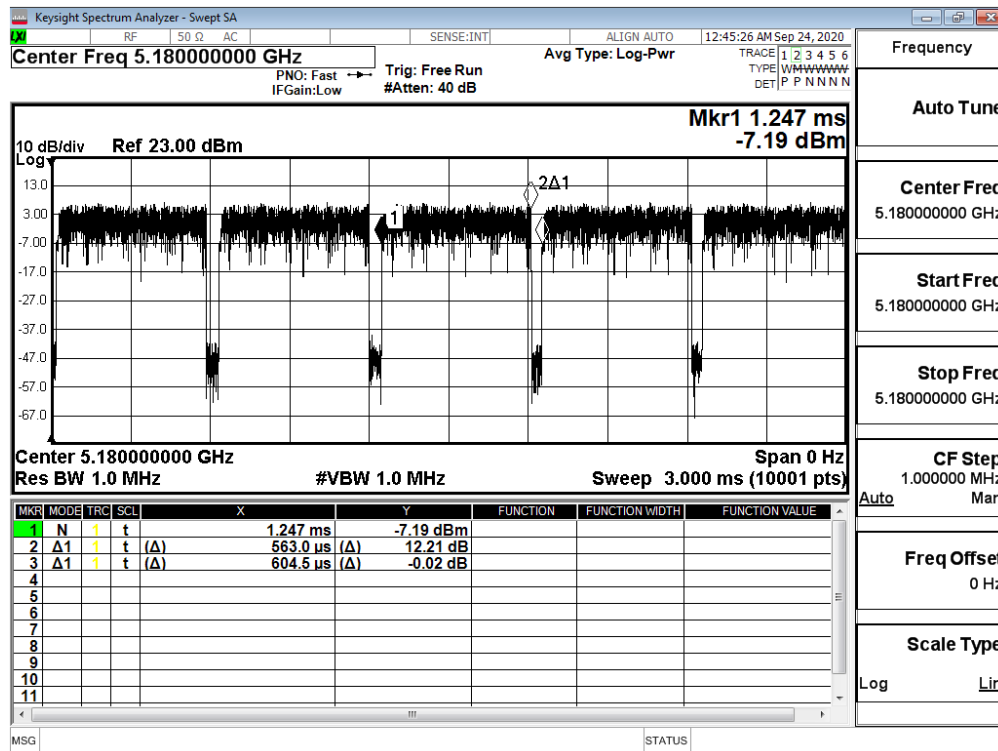
Offset = $20 \log(1/\text{duty cycle})$

Accotding to KDB 789033

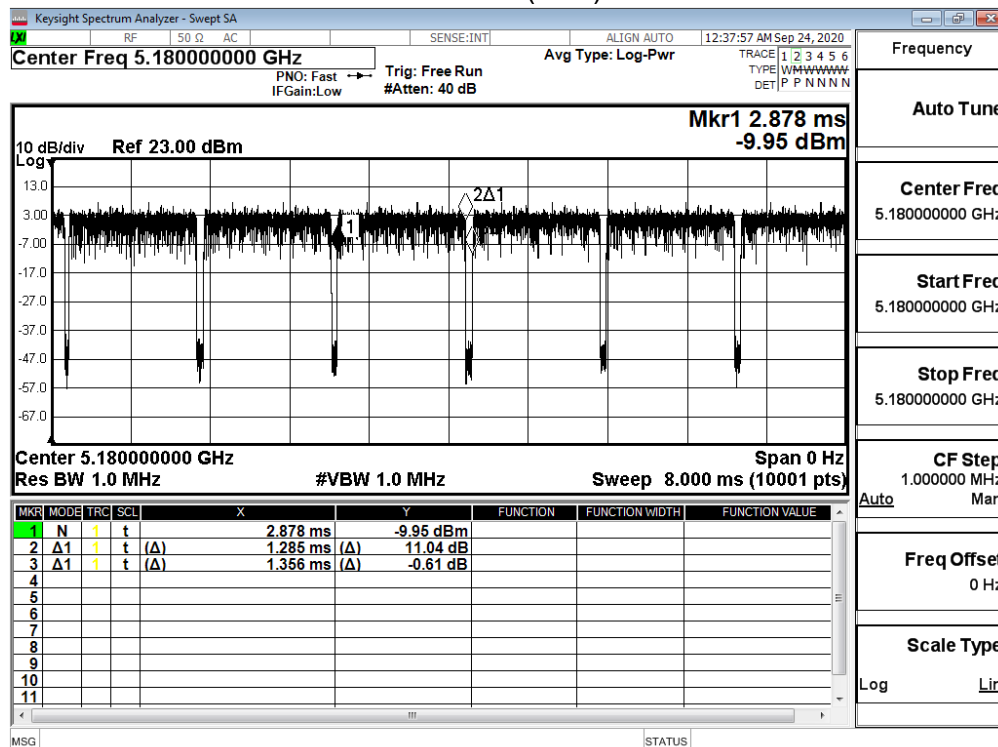
If power averaging (rms) mode was used in step (iv) above, the correction factor is $10 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB must be added to the measured emission levels.

If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB must be added to the measured emission levels.

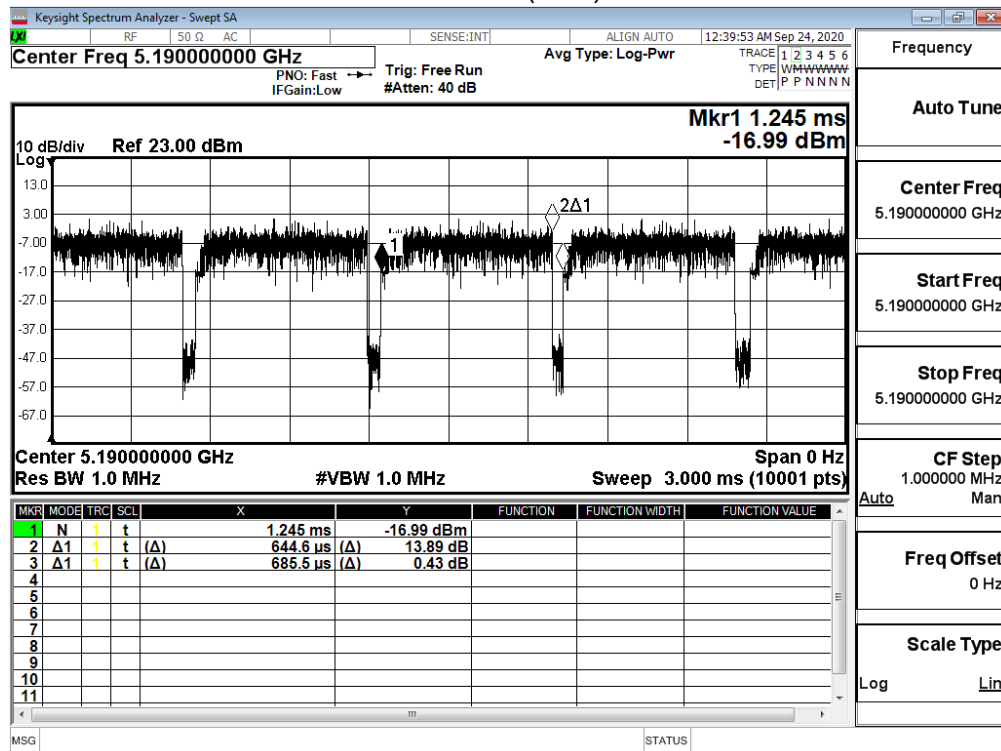
802.11a



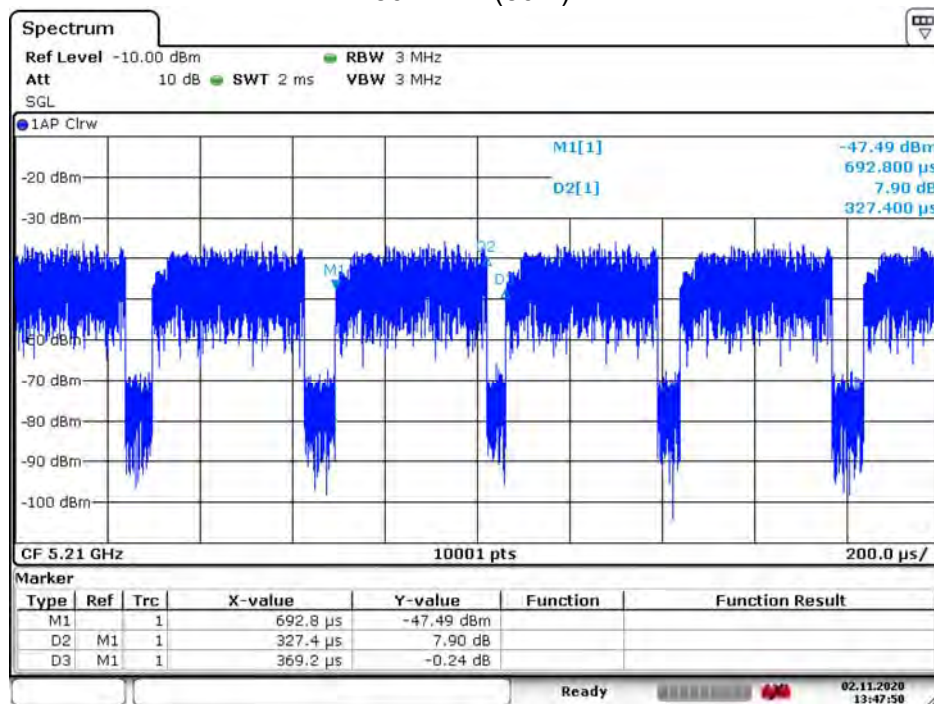
802.11ac(20M)



802.11ac(40M)



802.11ac(80M)



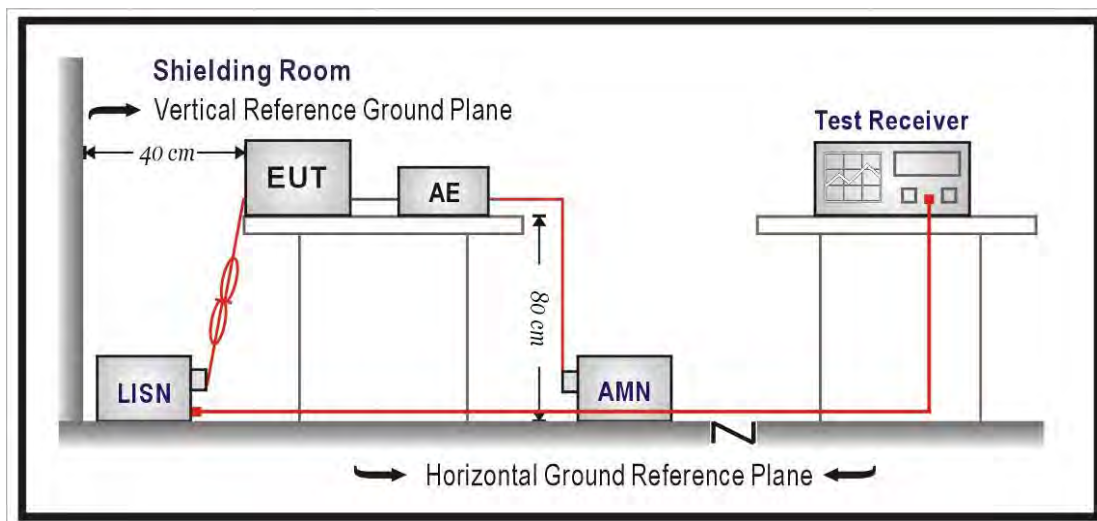
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1.10. Uncertainty

Test item	Uncertainty
Conducted Emission	± 2.26 dB
26dB & 99% & DTS Bandwidth	± 50 Hz
Maximum conducted output power	± 1.27 dB
Maximum power spectral density	± 1.27 dB
Radiated Emission	30MHz~1GHz as ± 3.43 dB 1GHz~26.5GHz as ± 3.65 dB
Band Edge	± 3.65 dB

2. Conducted Emission

2.1. Test Setup



2.2. Limits

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

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

2.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

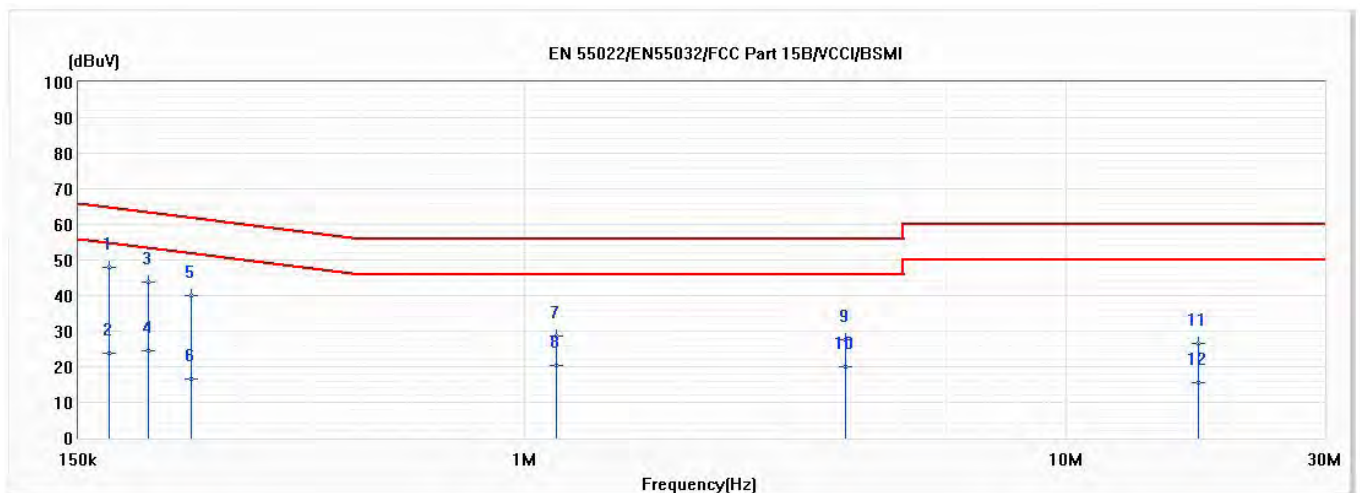
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.407: 2019

2.5. Test Result

Model No	BEC 9900VA	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/3
Test Mode	Mode 1: Transmit Mode	Engineer	Lion Wang
Phase	L	Temperature (°C)	23
Test Condition	802.11ac_40M_5230MHz	Humidity (%RH)	54

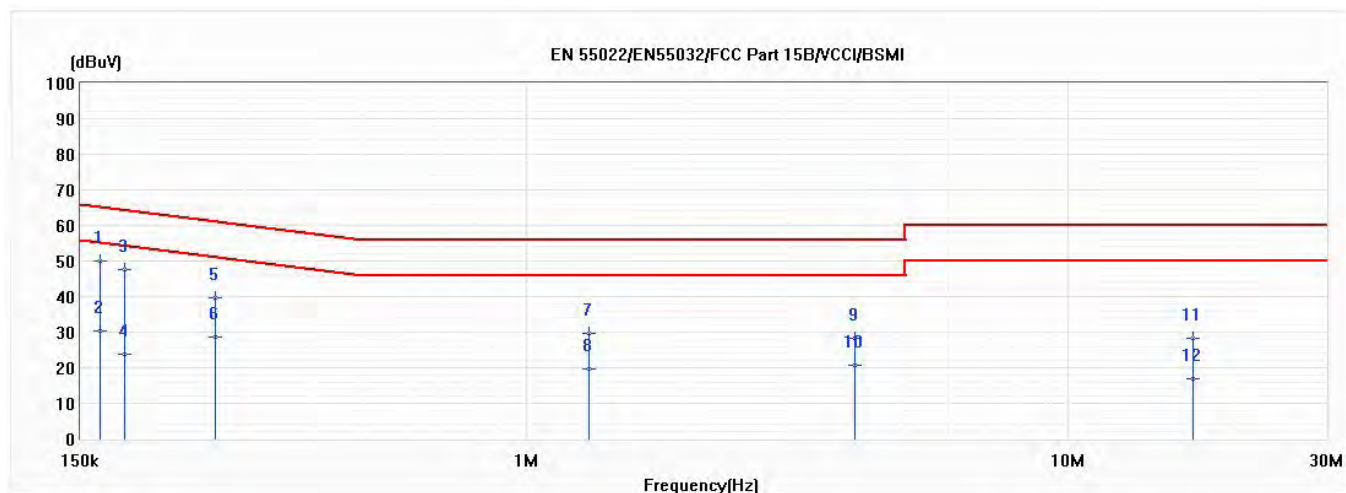


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.171	47.84	64.93	-17.09	38.19	9.65	QP
2	0.171	23.68	54.93	-31.25	14.03	9.65	AV
3	0.202	43.94	63.53	-19.59	34.29	9.65	QP
4	0.202	24.61	53.53	-28.92	14.96	9.65	AV
5	0.242	39.92	62.03	-22.11	30.27	9.65	QP
6	0.242	16.70	52.03	-35.34	7.04	9.65	AV
7	1.144	28.73	56.00	-27.27	18.98	9.75	QP
8	1.144	20.34	46.00	-25.66	10.59	9.75	AV
9	3.905	27.55	56.00	-28.45	17.66	9.89	QP
10	3.905	20.01	46.00	-25.99	10.12	9.89	AV
11	17.516	26.45	60.00	-33.55	16.13	10.32	QP
12	17.516	15.59	50.00	-34.41	5.27	10.32	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Model No	BEC 9900VA	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/3
Test Mode	Mode 1: Transmit Mode	Engineer	Lion Wang
Phase	N	Temperature (°C)	23
Test Condition	802.11ac_40M_5230MHz	Humidity (%RH)	54

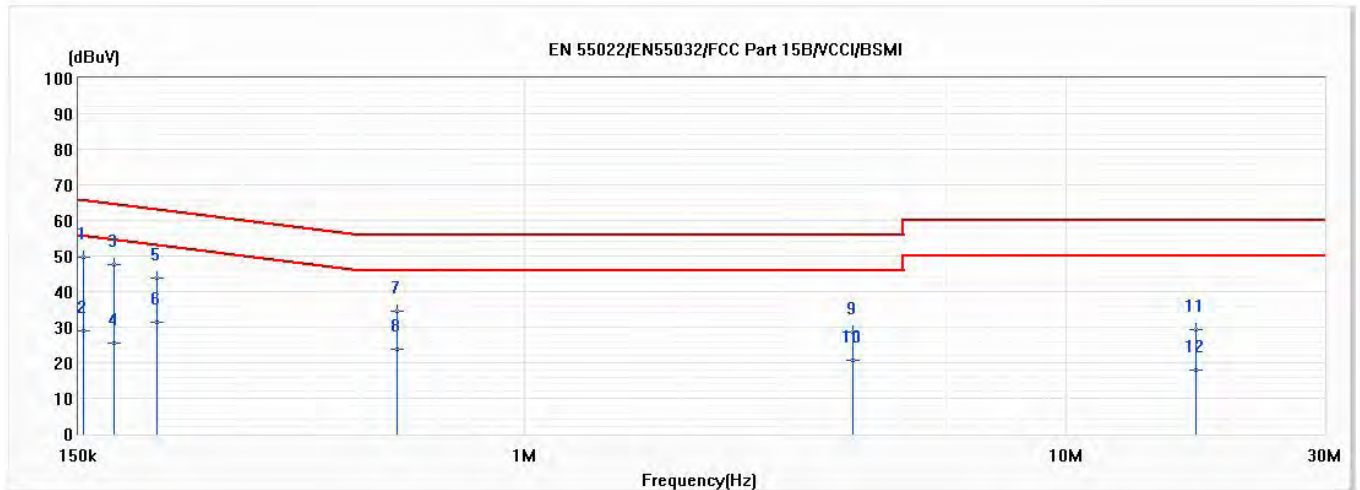


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.163	50.06	65.32	-15.25	40.42	9.64	QP
2	0.163	30.46	55.32	-24.86	20.82	9.64	AV
3	0.181	47.56	64.43	-16.87	37.92	9.63	QP
4	0.181	23.87	54.43	-30.56	14.24	9.63	AV
5	0.267	39.75	61.22	-21.47	30.10	9.64	QP
6	0.267	28.61	51.22	-22.61	18.97	9.64	AV
7	1.301	29.64	56.00	-26.36	19.90	9.74	QP
8	1.301	19.64	46.00	-26.36	9.90	9.74	AV
9	4.040	28.43	56.00	-27.57	18.55	9.88	QP
10	4.040	20.55	46.00	-25.45	10.66	9.88	AV
11	17.040	28.19	60.00	-31.81	17.77	10.42	QP
12	17.040	16.91	50.00	-33.09	6.49	10.42	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Model No	BEC 9900VA	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/3
Test Mode	Mode 1: Transmit Mode	Engineer	Lion Wang
Phase	N	Temperature (°C)	23
Test Condition	802.11ac_20M_5825MHz	Humidity (%RH)	54

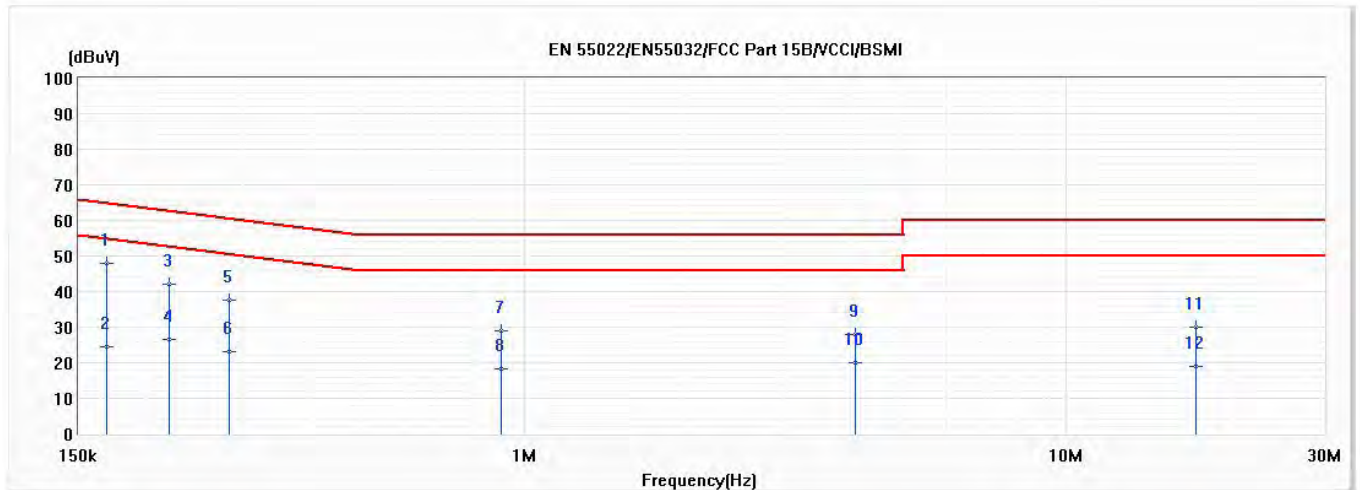


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.153	49.69	65.83	-16.14	40.05	9.64	QP
2	0.153	28.91	55.83	-26.91	19.27	9.64	AV
3	0.174	47.69	64.76	-17.07	38.05	9.64	QP
4	0.174	25.42	54.76	-29.34	15.78	9.64	AV
5	0.210	43.66	63.21	-19.55	34.03	9.64	QP
6	0.210	31.22	53.21	-21.99	21.58	9.64	AV
7	0.580	34.65	56.00	-21.35	24.97	9.69	QP
8	0.580	23.77	46.00	-22.23	14.09	9.69	AV
9	4.032	28.78	56.00	-27.22	18.90	9.88	QP
10	4.032	20.69	46.00	-25.31	10.81	9.88	AV
11	17.399	29.32	60.00	-30.68	18.89	10.44	QP
12	17.399	17.80	50.00	-32.20	7.37	10.44	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Model No	BEC 9900VA	Site	SR2-H
Test Voltage	AC 120V/60Hz	Test Date	2020/11/3
Test Mode	Mode 1: Transmit Mode	Engineer	Lion Wang
Phase	L	Temperature (°C)	23
Test Condition	802.11ac_20M_5825MHz	Humidity (%RH)	54



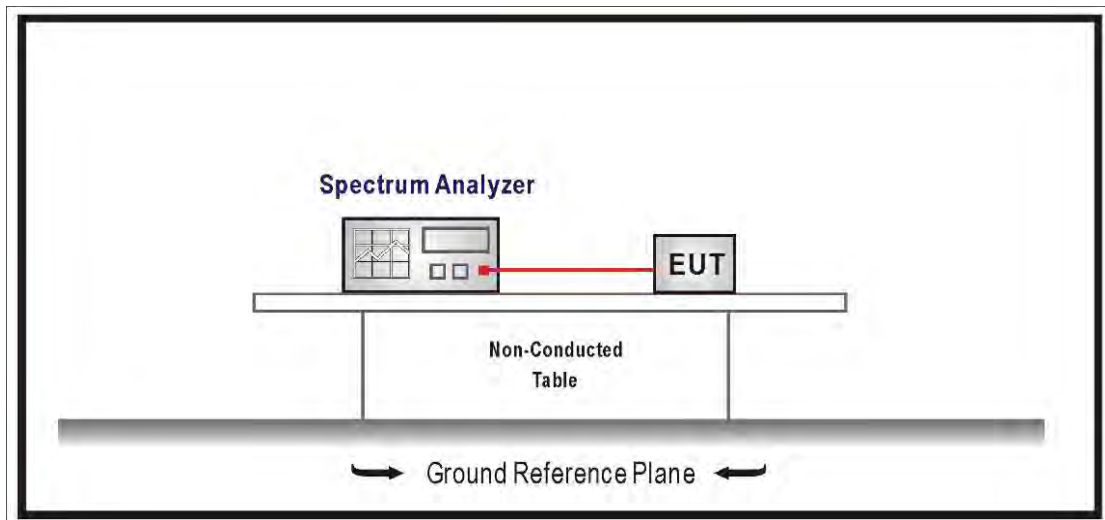
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
*1	0.169	48.07	65.00	-16.93	38.43	9.65	QP
2	0.169	24.37	55.00	-30.63	14.72	9.65	AV
3	0.221	42.20	62.78	-20.58	32.55	9.65	QP
4	0.221	26.52	52.78	-26.26	16.87	9.65	AV
5	0.285	37.49	60.66	-23.18	27.83	9.66	QP
6	0.285	23.23	50.66	-27.44	13.57	9.66	AV
7	0.904	28.80	56.00	-27.20	19.07	9.73	QP
8	0.904	18.31	46.00	-27.69	8.58	9.73	AV
9	4.077	27.92	56.00	-28.08	18.03	9.89	QP
10	4.077	20.00	46.00	-26.00	10.11	9.89	AV
11	17.391	29.96	60.00	-30.04	19.65	10.32	QP
12	17.391	18.80	50.00	-31.20	8.48	10.32	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

3. 26dB & 99% & DTS Bandwidth

3.1. Test Setup



3.2. Limits

99% & 26dB Bandwidth : No Required

6dB Bandwidth $\geq$ 500KHz

3.3. Test Procedure

99% & 26dB Bandwidth :

The EUT was tested according to U-NII test procedure of KDB 789033 D02 v02r01

Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

DTS Bandwidth :

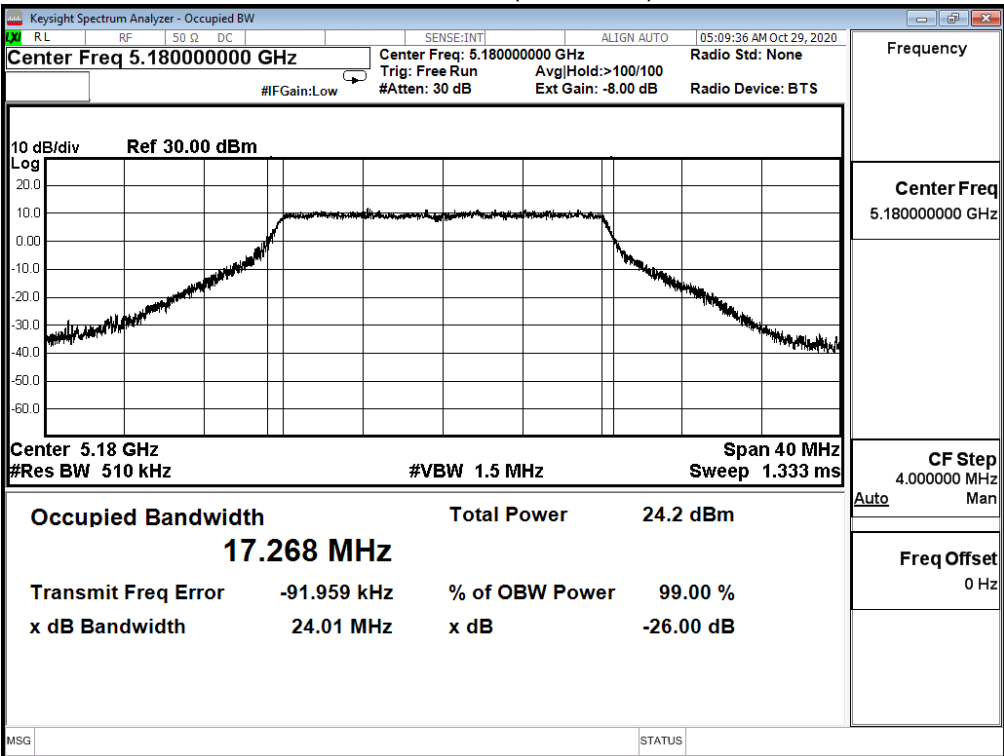
Set RBW = 100KHz, VBW $\geq$ 3xRBW, Sweep time=Auto, Set Peak detector.

3.4. Test Result

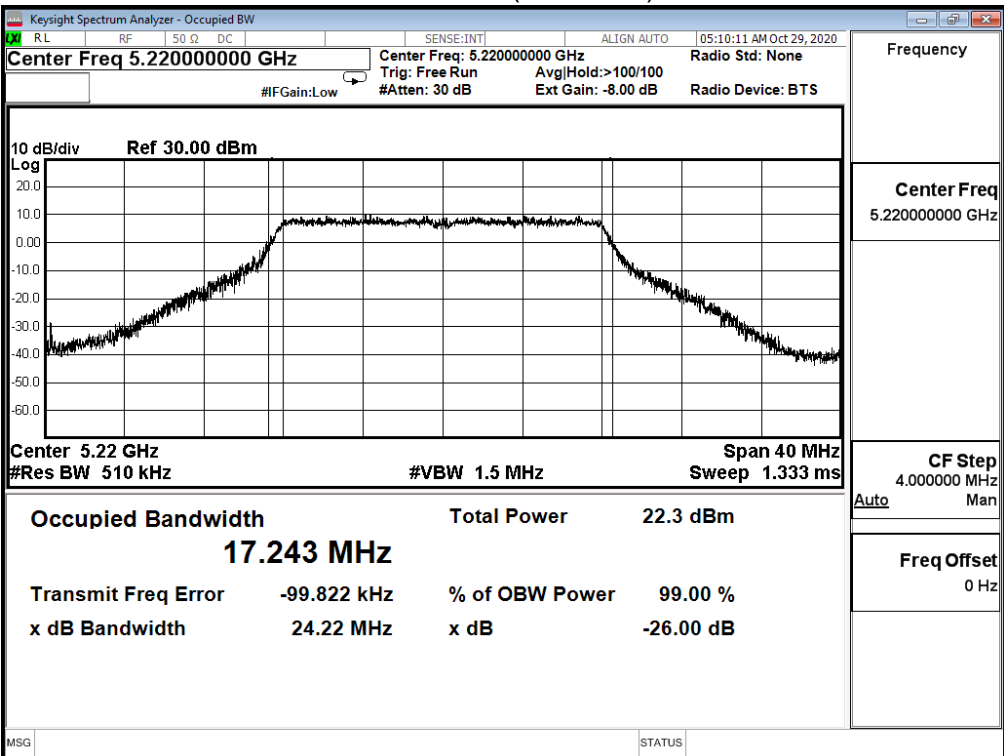
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (SISO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11a (ANT 0)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
36	5180	17.268	24.010	--	Pass
44	5220	17.243	24.220	--	Pass
48	5240	17.353	24.200	--	Pass
149	5745	17.360	N/A	--	Pass
157	5785	17.364		--	Pass
165	5825	17.273		--	Pass

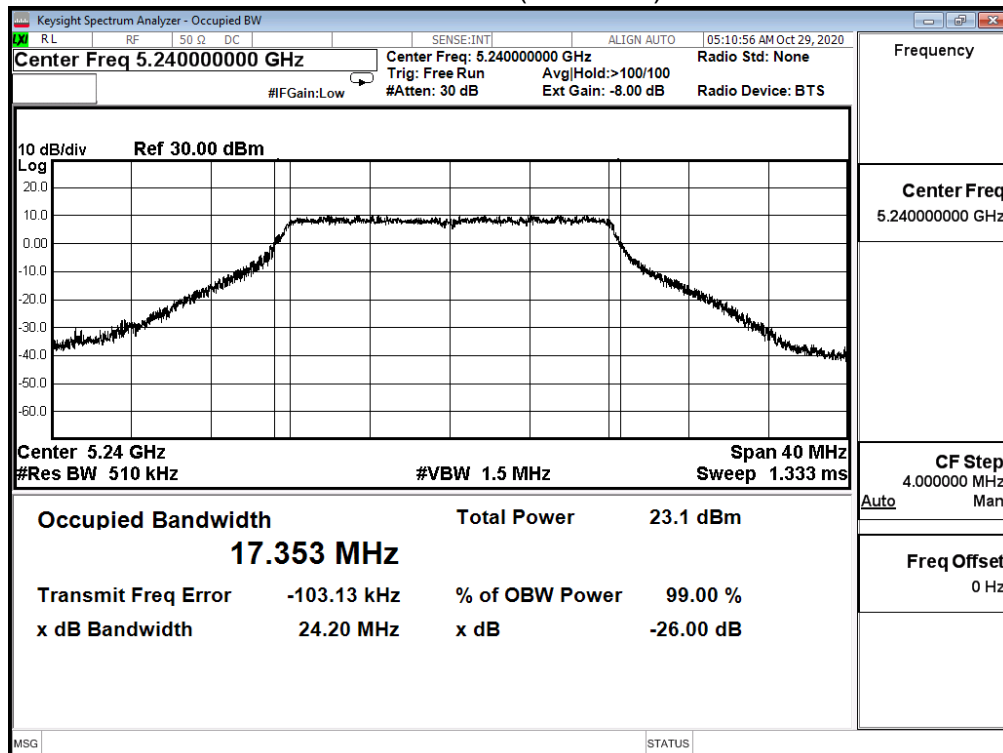
Channel 36 (5180MHz)



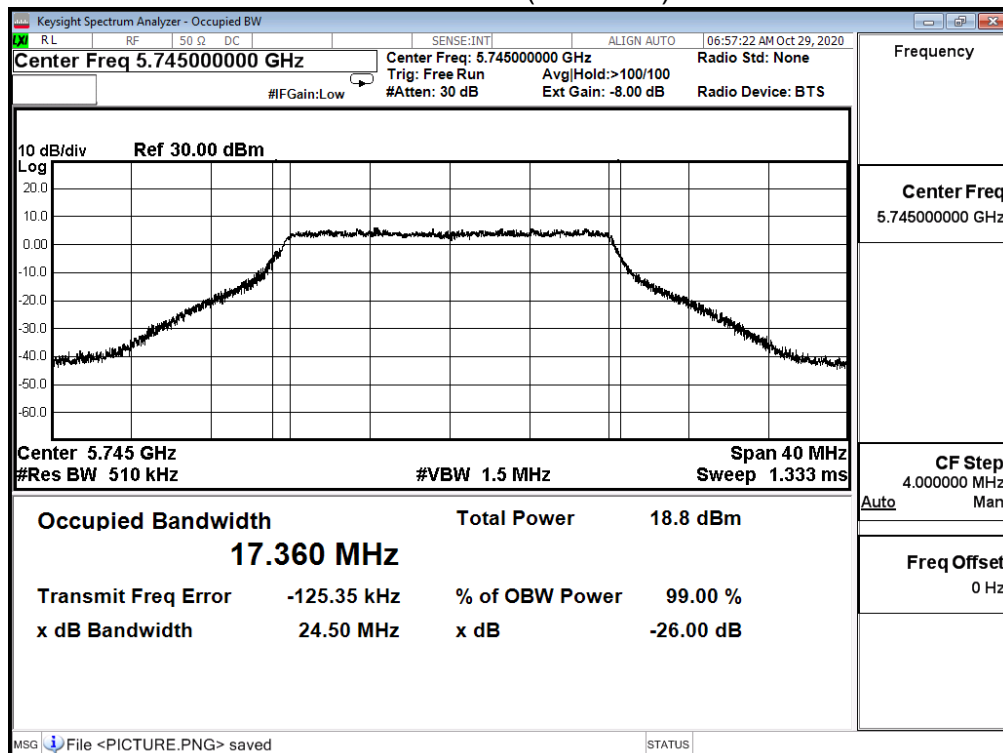
Channel 44 (5220MHz)



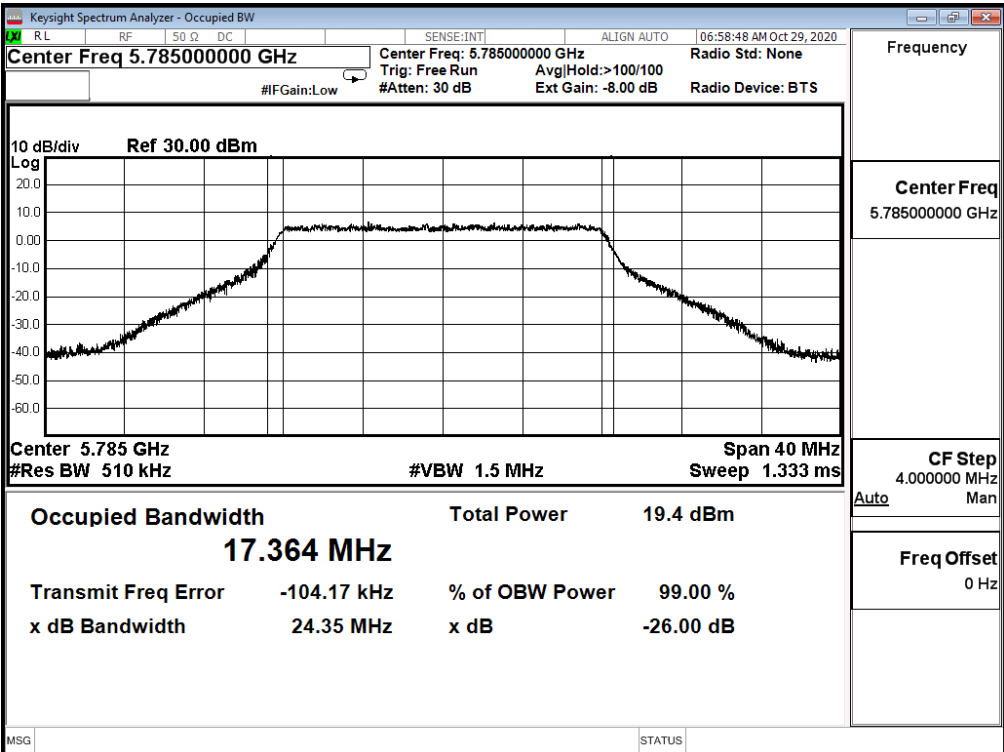
Channel 48 (5240MHz)



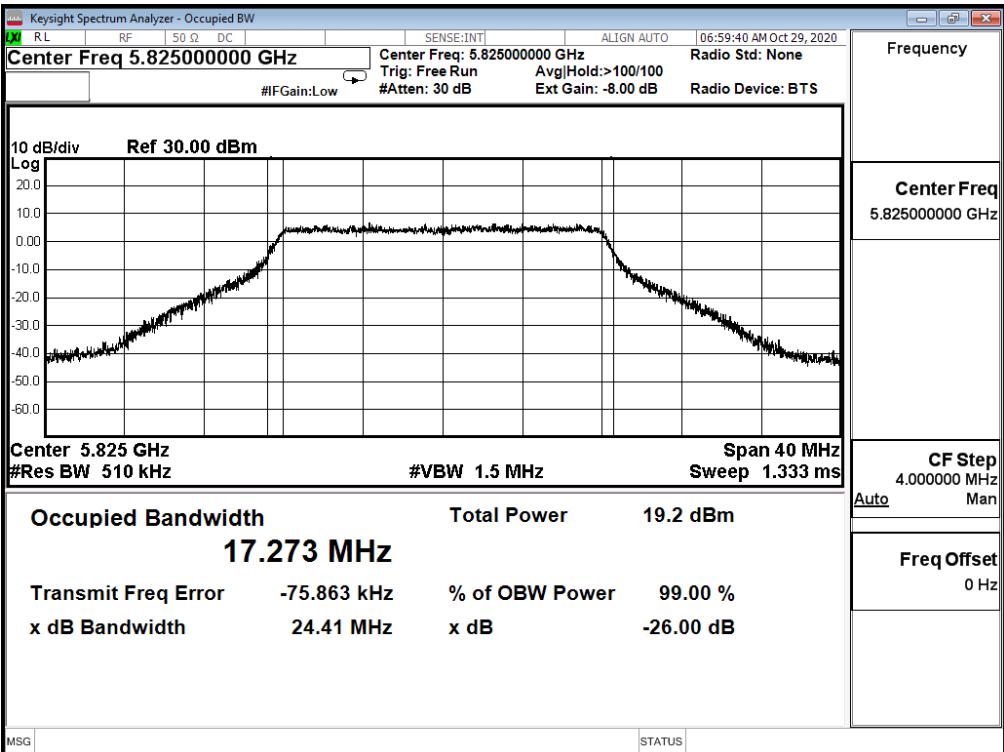
Channel 149 (5745MHz)



Channel 157 (5785MHz)



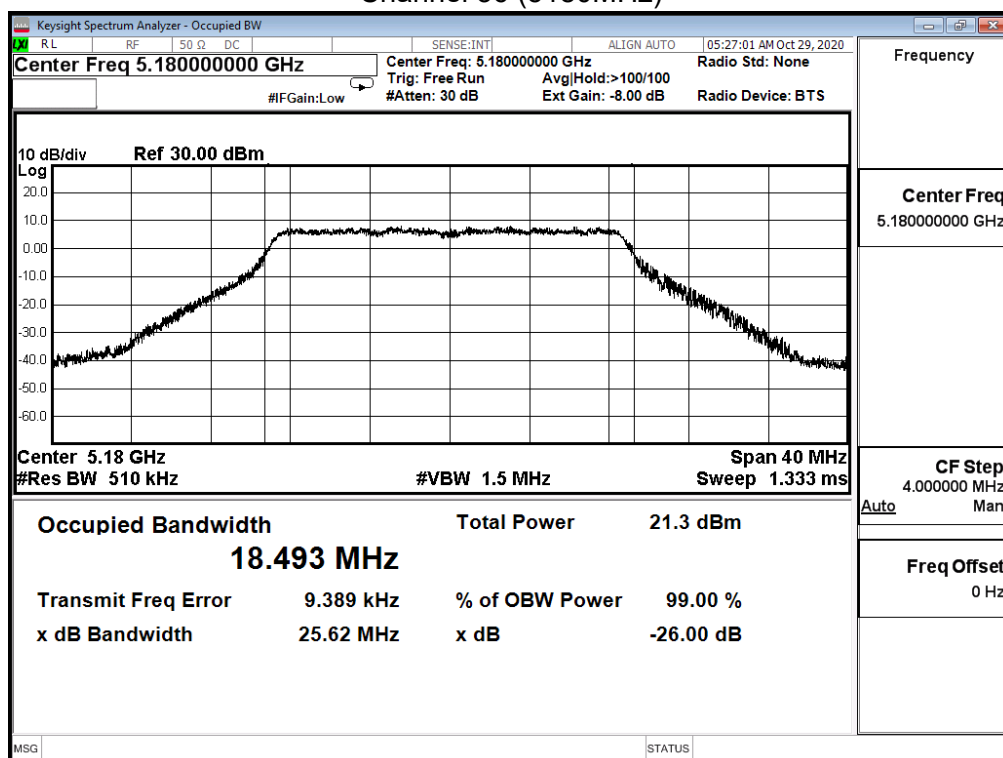
Channel 165 (5825MHz)



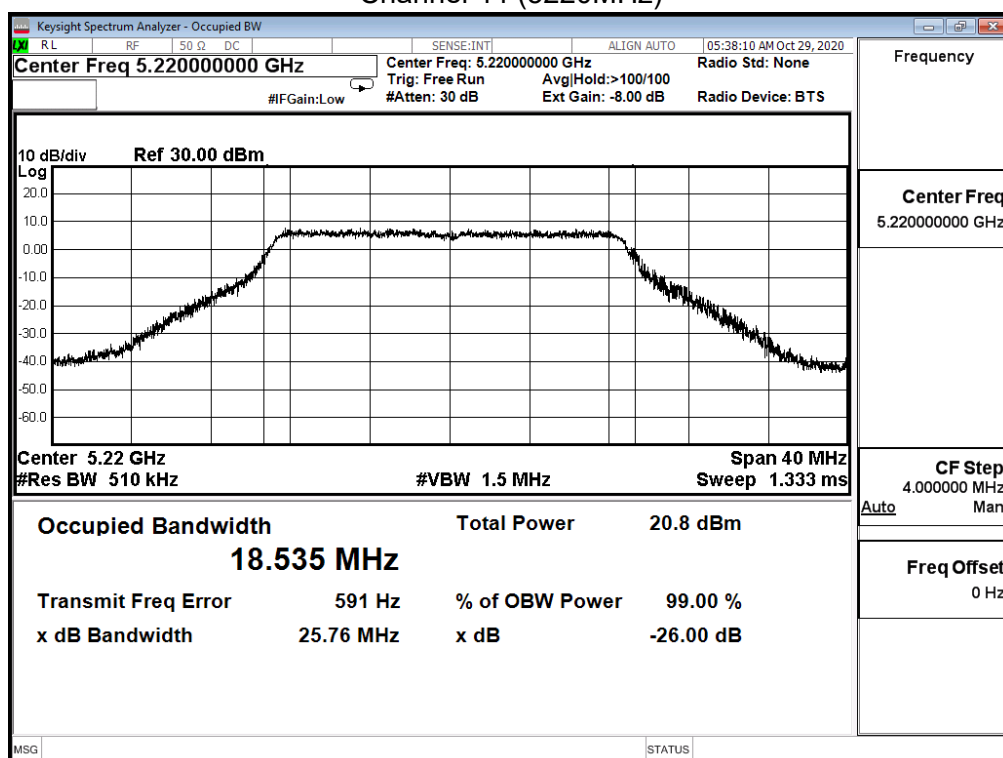
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 0)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
36	5180	18.493	25.620	--	Pass
44	5220	18.535	25.760	--	Pass
48	5240	18.438	25.710	--	Pass
149	5745	18.593	N/A	--	Pass
157	5785	18.558		--	Pass
165	5825	18.710		--	Pass

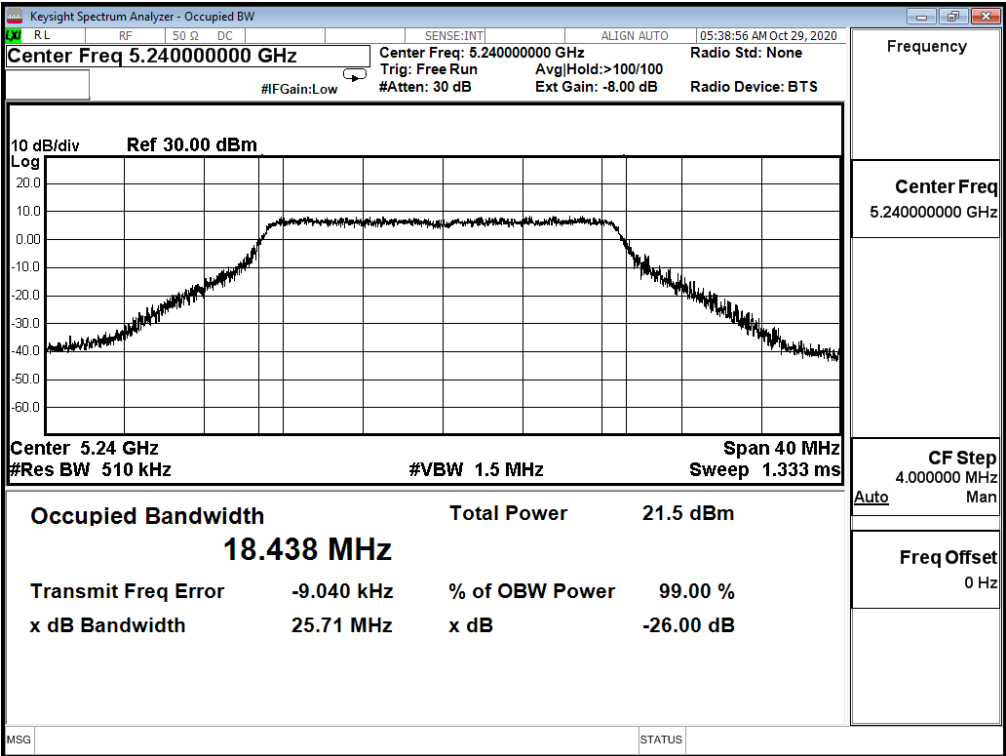
Channel 36 (5180MHz)



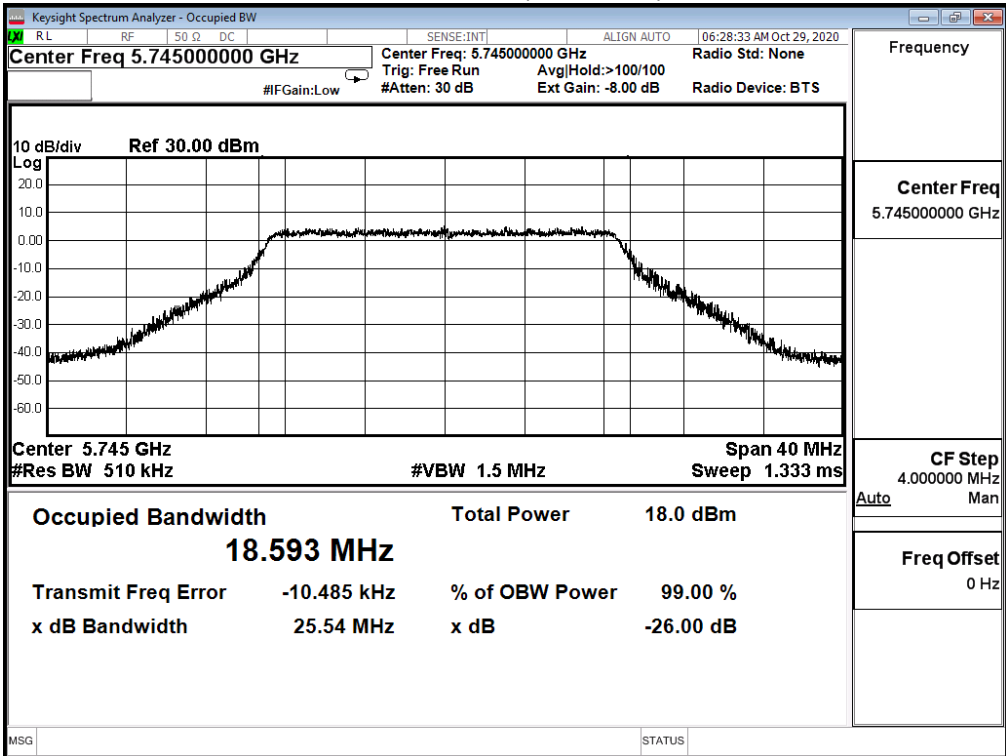
Channel 44 (5220MHz)



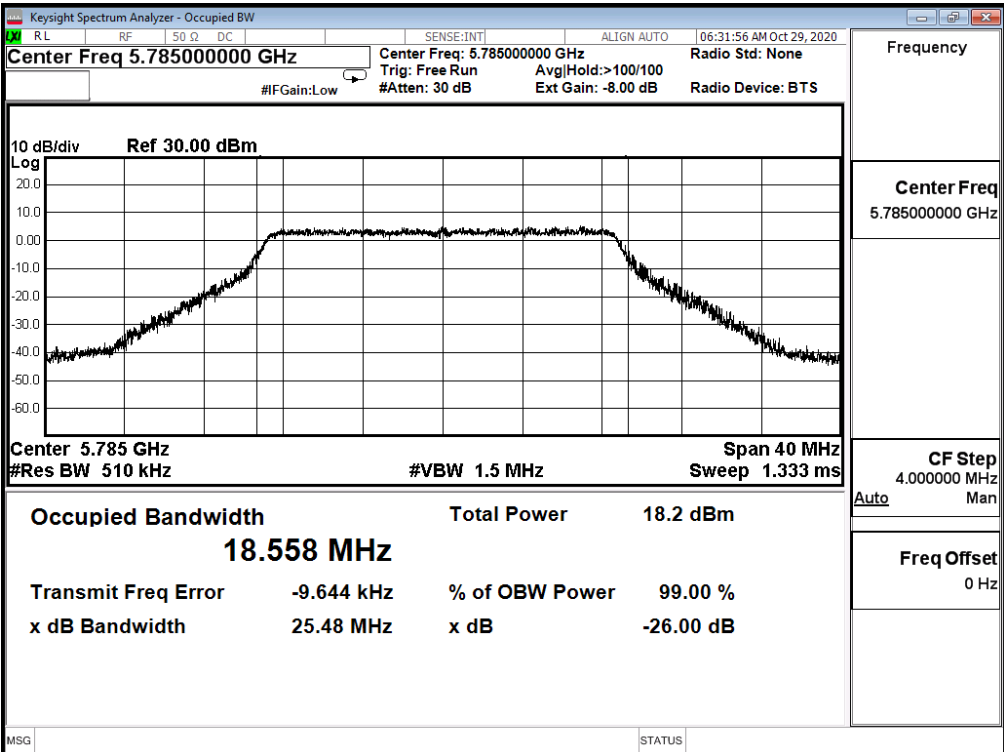
Channel 48 (5240MHz)



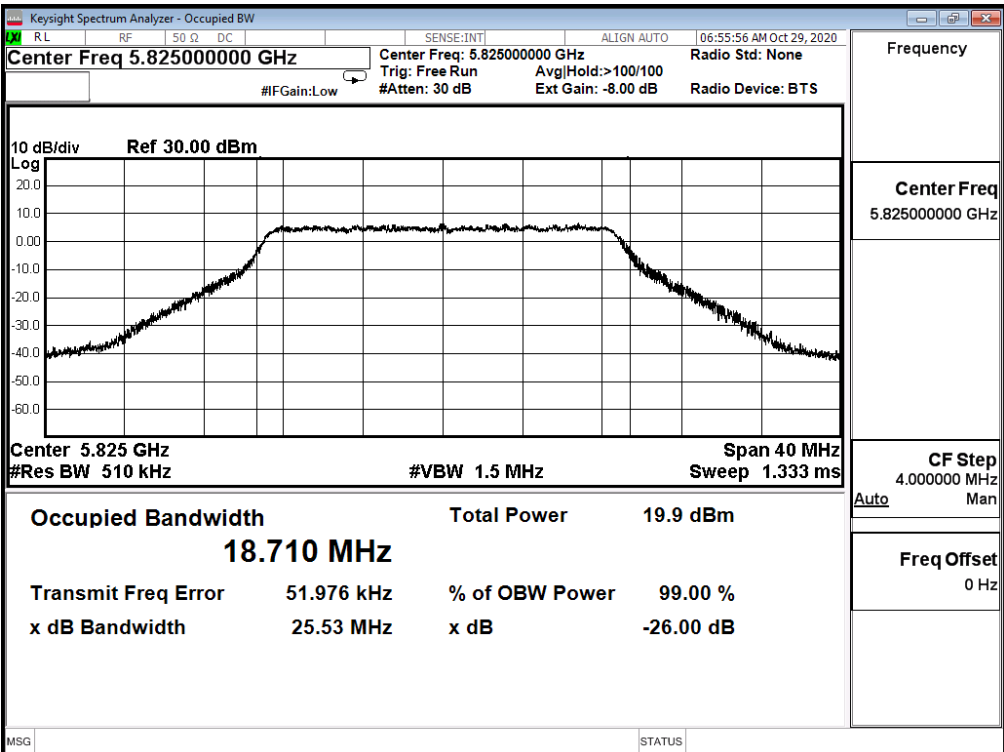
Channel 149 (5745MHz)



Channel 157 (5785MHz)



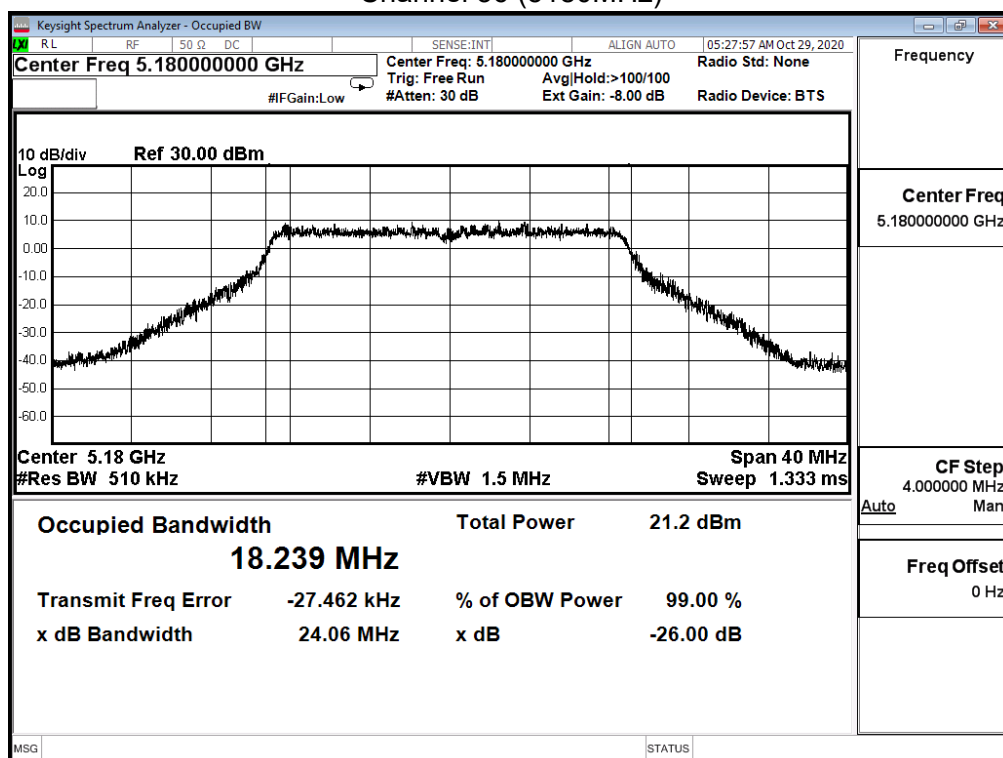
Channel 165 (5825MHz)



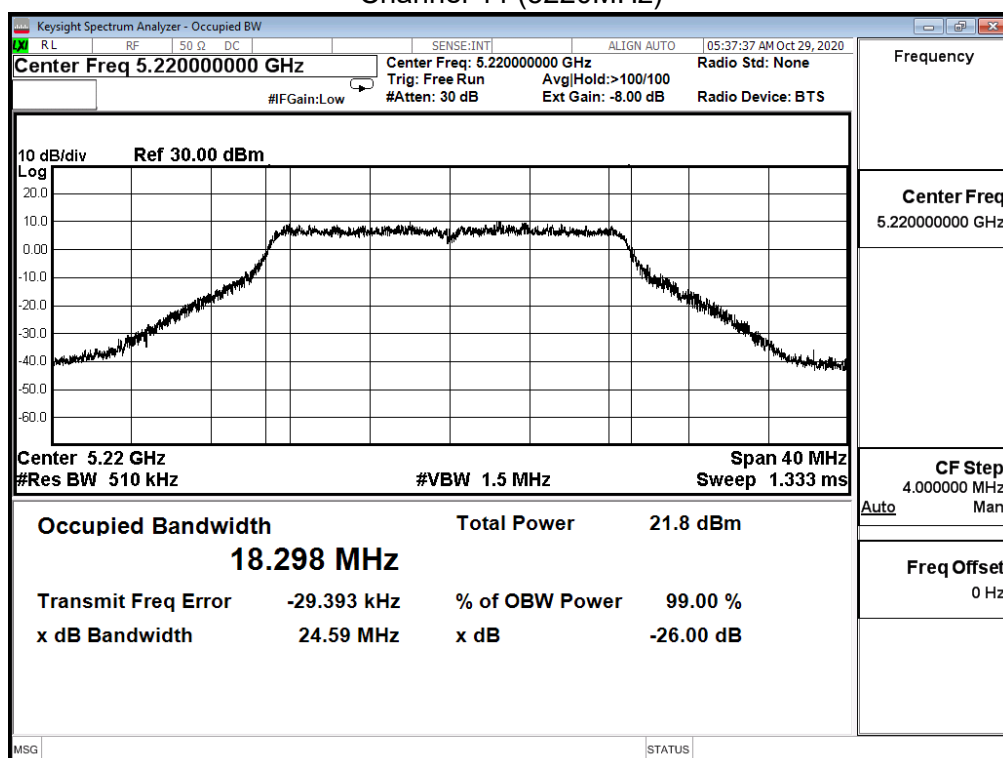
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 1)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
36	5180	18.239	24.060	--	Pass
44	5220	18.298	24.590	--	Pass
48	5240	18.313	24.920	--	Pass
149	5745	18.331	N/A	--	Pass
157	5785	18.392		--	Pass
165	5825	18.372		--	Pass

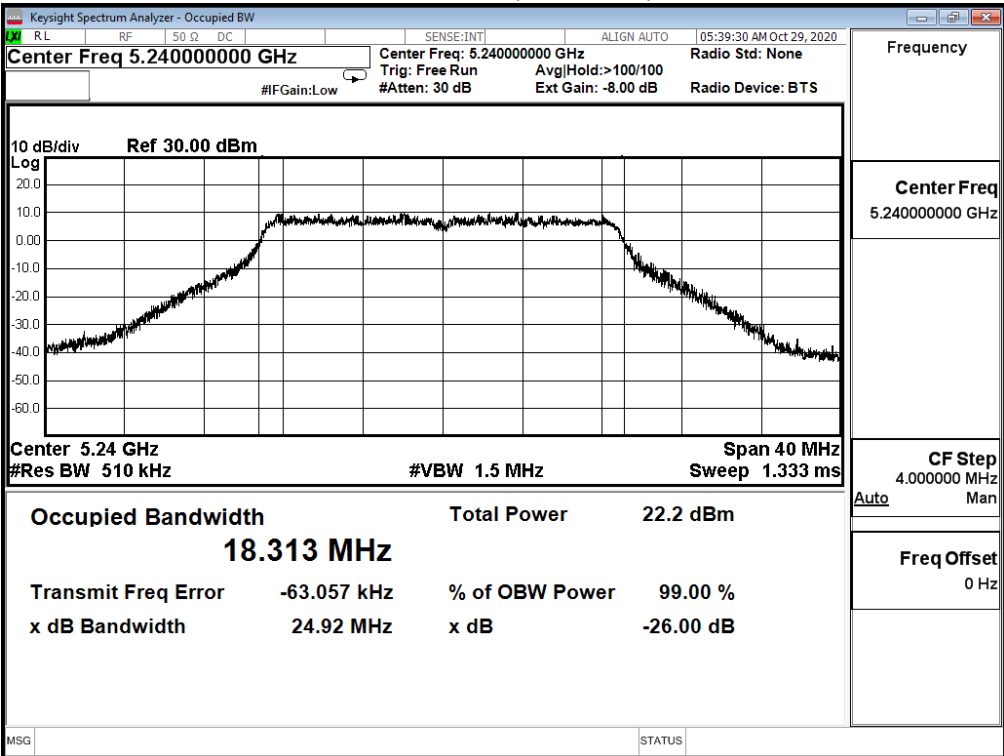
Channel 36 (5180MHz)



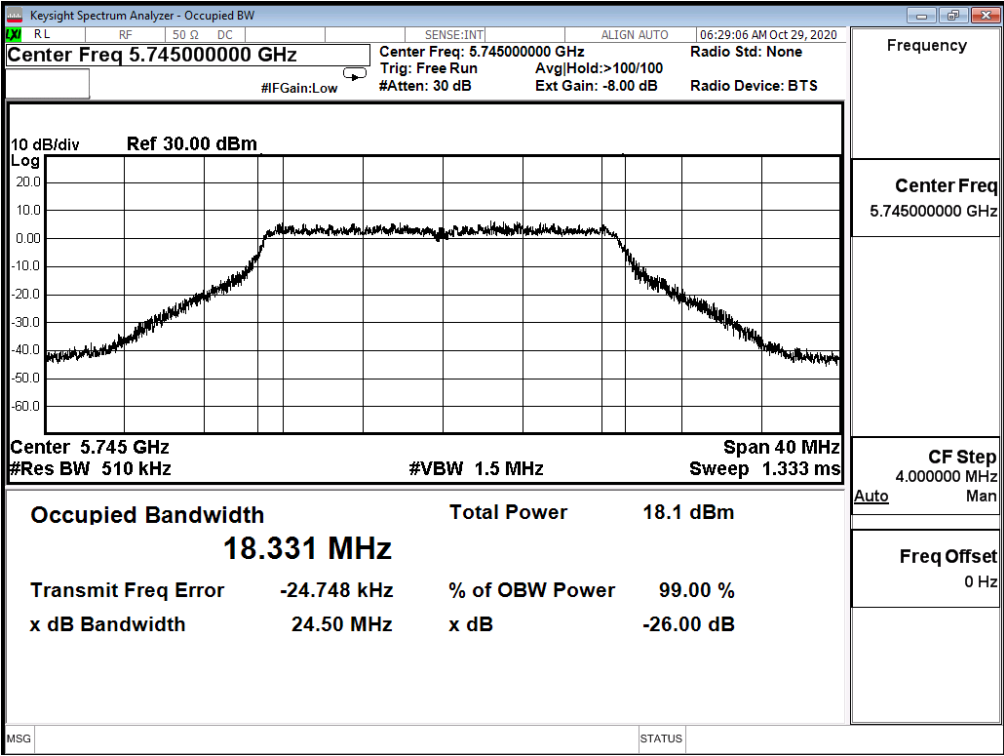
Channel 44 (5220MHz)



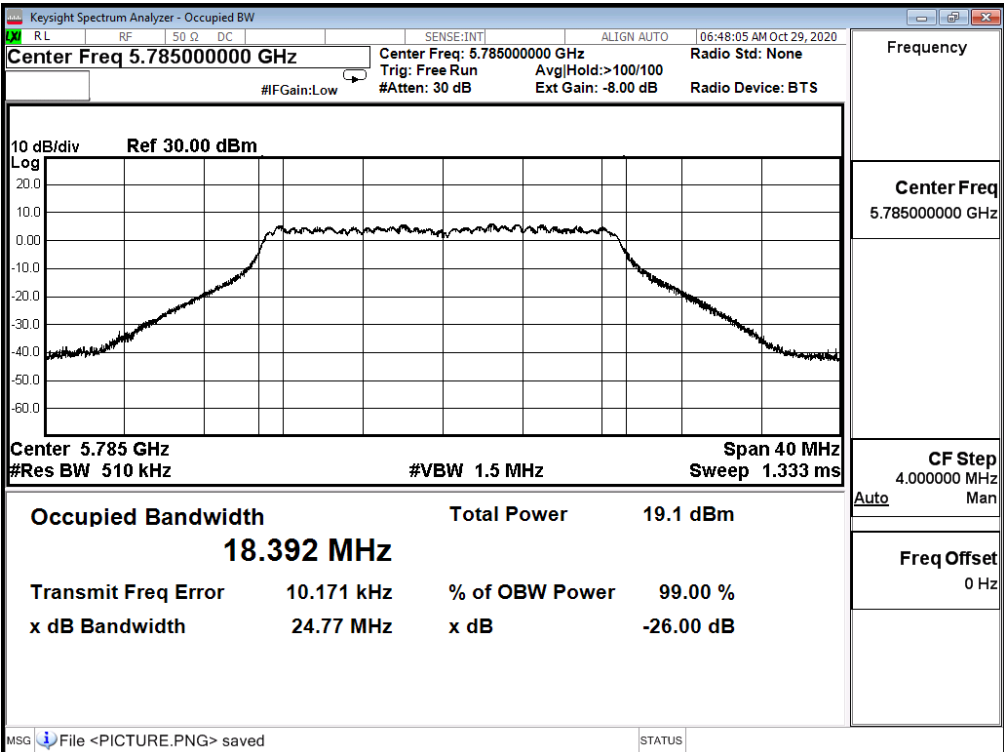
Channel 48 (5240MHz)



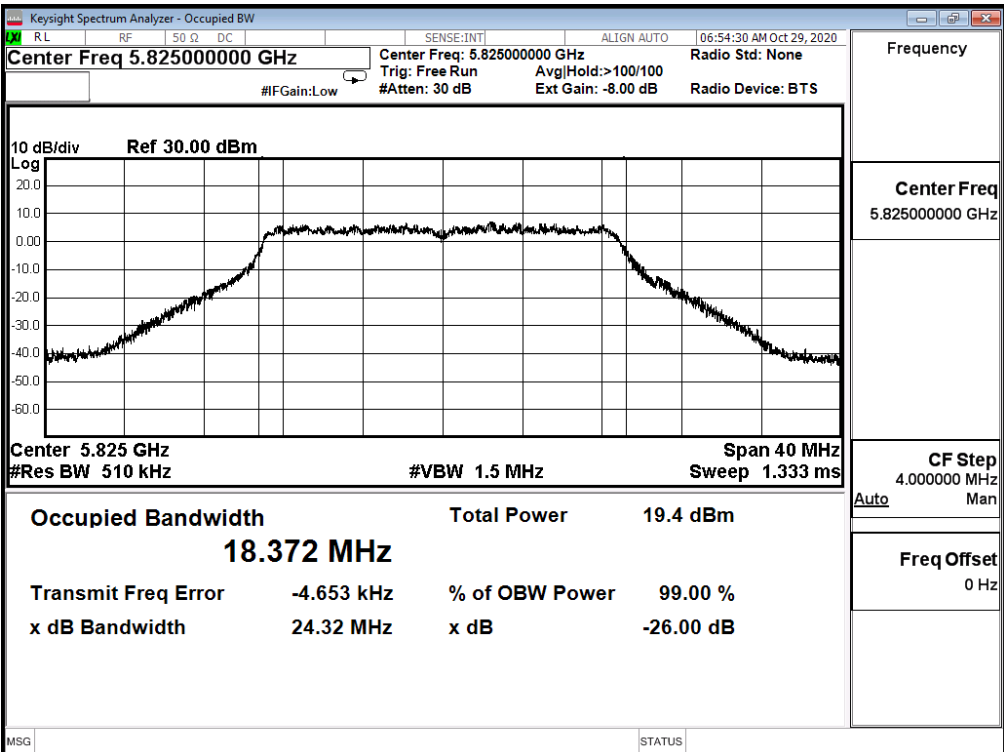
Channel 149 (5745MHz)



Channel 157 (5785MHz)



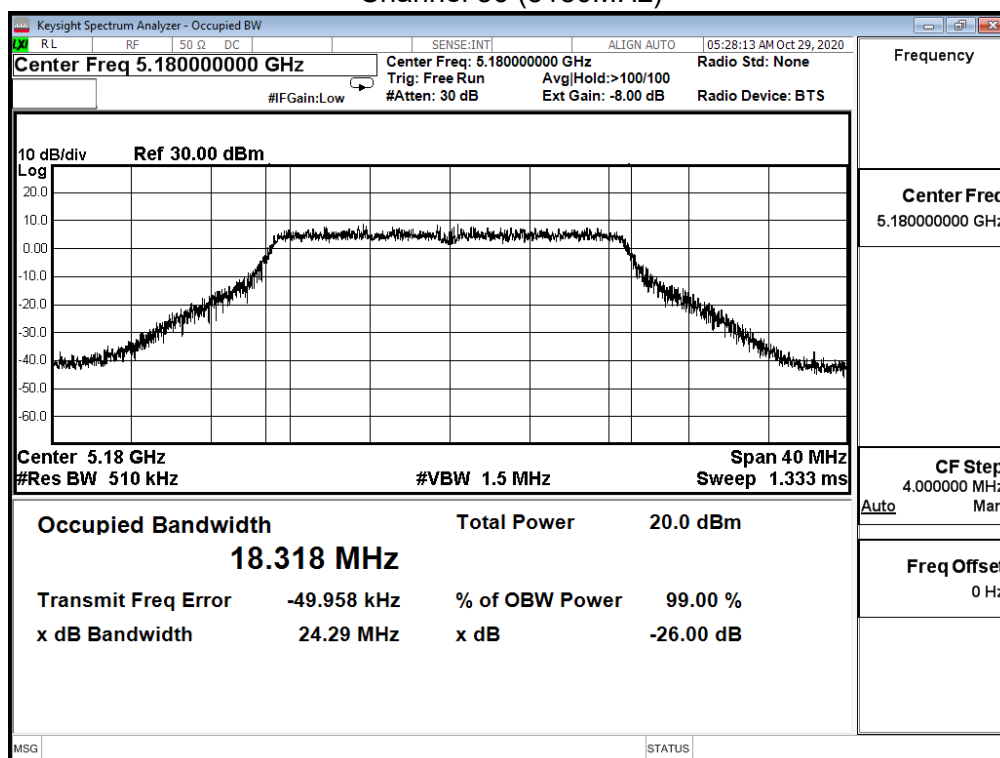
Channel 165 (5825MHz)



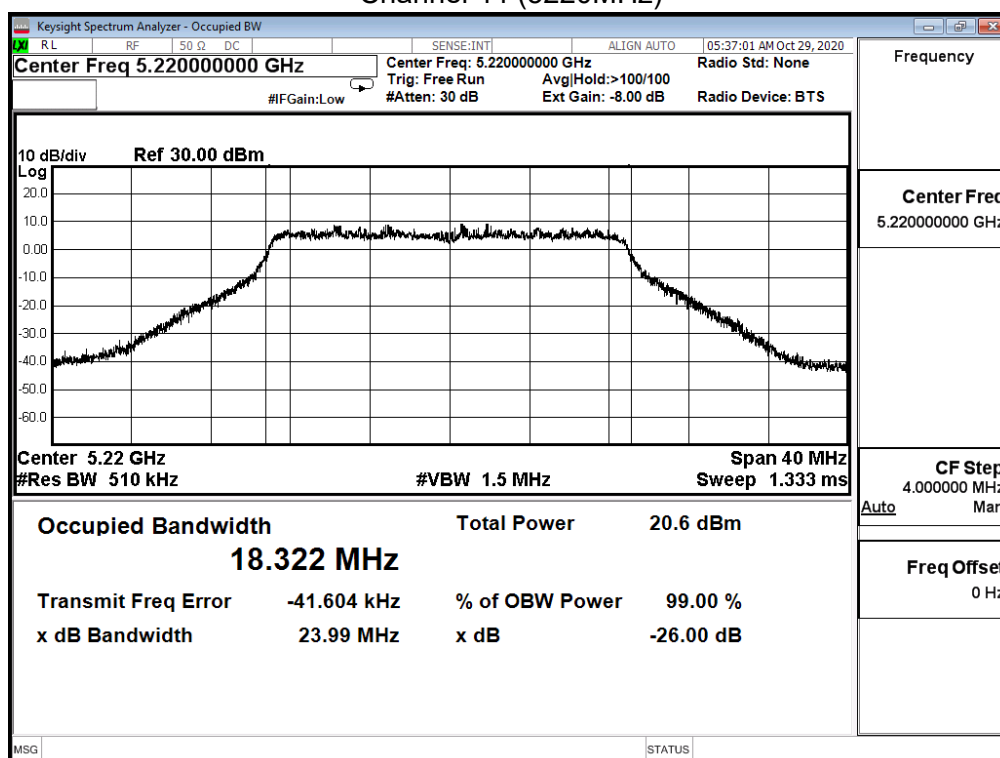
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 2)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
36	5180	18.318	24.290	--	Pass
44	5220	18.322	23.990	--	Pass
48	5240	18.339	24.110	--	Pass
149	5745	18.324	N/A	--	Pass
157	5785	18.332		--	Pass
165	5825	18.284		--	Pass

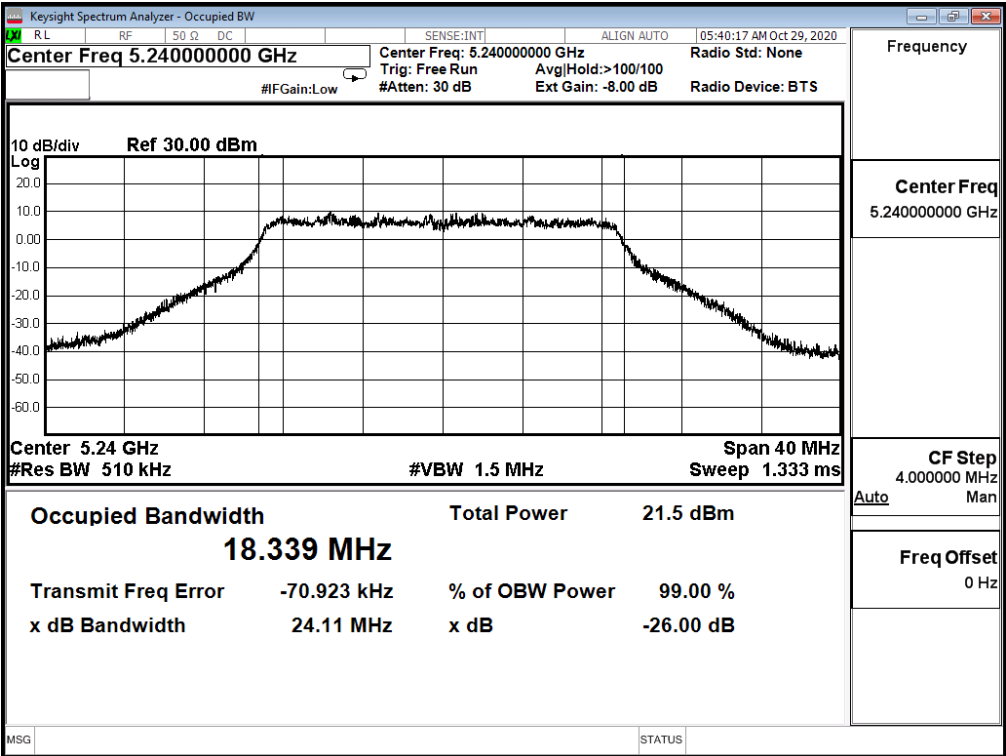
Channel 36 (5180MHz)



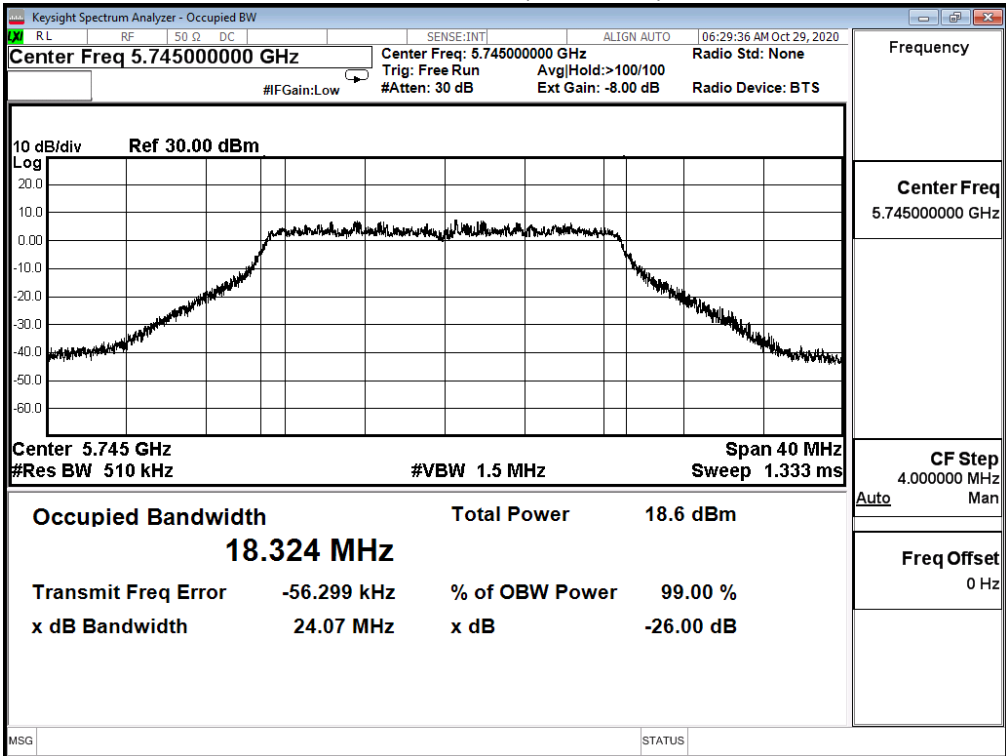
Channel 44 (5220MHz)



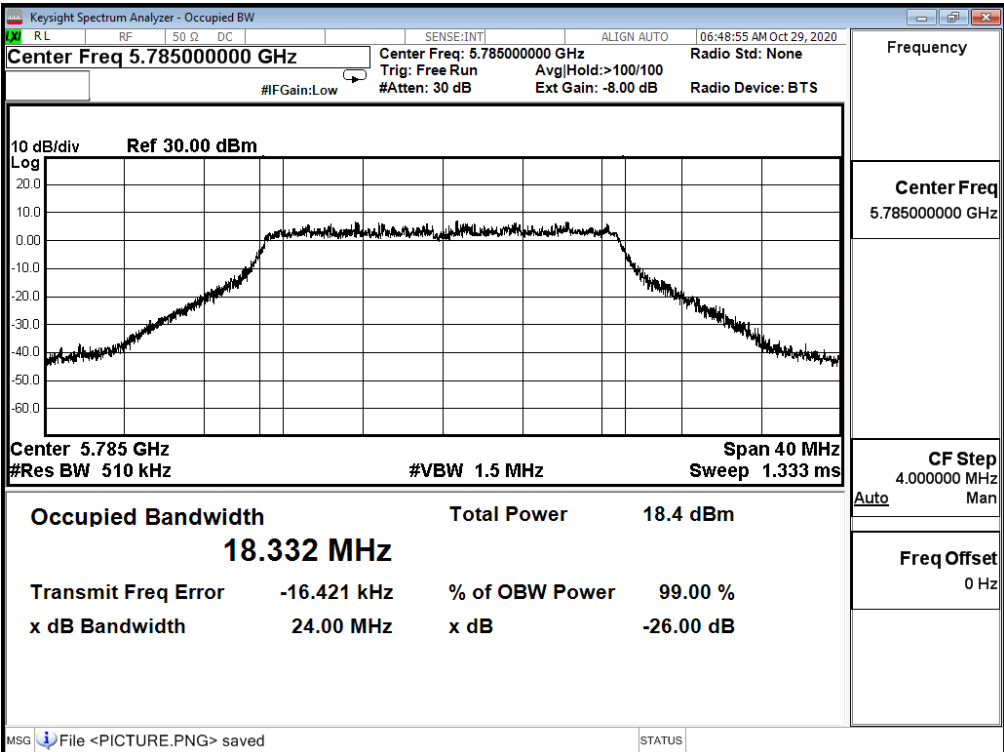
Channel 48 (5240MHz)



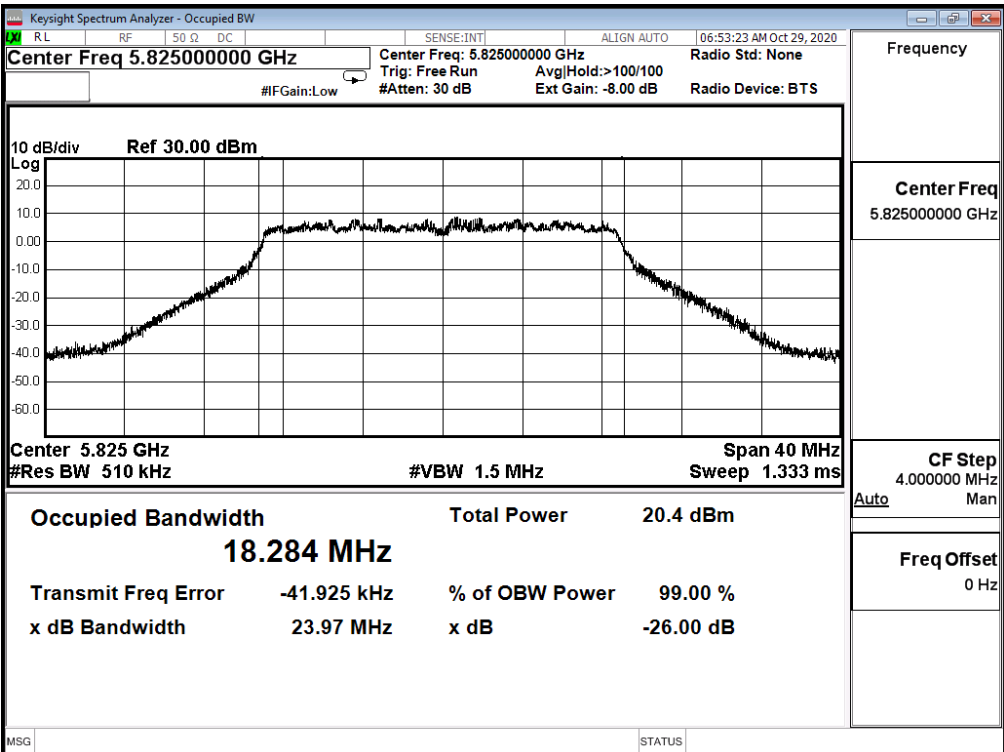
Channel 149 (5745MHz)



Channel 157 (5785MHz)



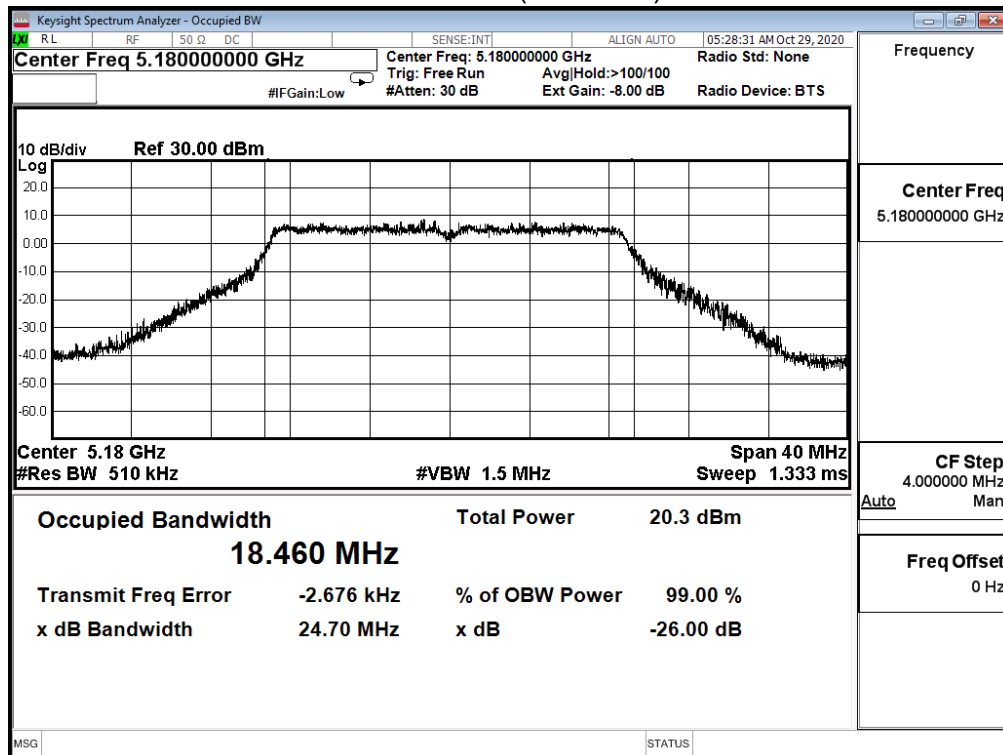
Channel 165 (5825MHz)



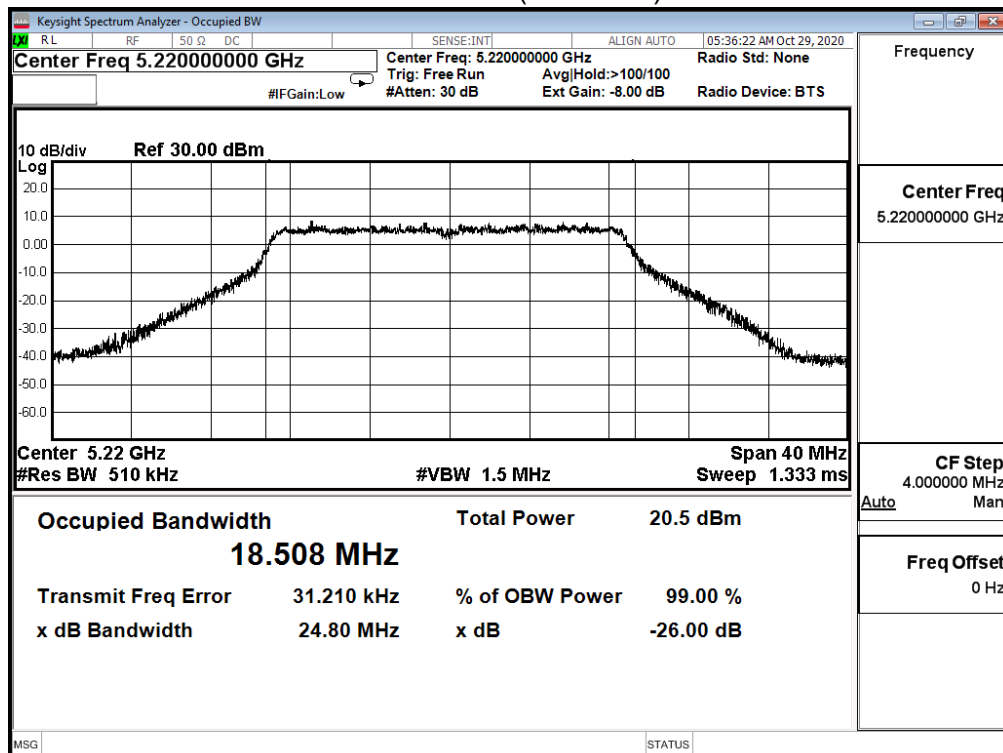
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 3)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
36	5180	18.460	24.700	--	Pass
44	5220	18.508	24.800	--	Pass
48	5240	18.480	24.840	--	Pass
149	5745	18.491	N/A	--	Pass
157	5785	18.520		--	Pass
165	5825	18.482		--	Pass

Channel 36 (5180MHz)



Channel 44 (5220MHz)



Keysight Spectrum Analyzer - Occupied BW

RL RF 50 Ω DC SENSE:INT ALIGN AUTO 05:41:02 AM Oct 29, 2020

Center Freq 5.240000000 GHz

#FGain:Low

Center Freq: 5.240000000 GHz
 Trig: Free Run
 #Atten: 30 dB

Avg/Hold: >100/100
 Ext Gain: -8.00 dB

Radio Std: None
 Radio Device: BTS

Frequency

Center Freq
 5.240000000 GHz

10 dB/div Ref 30.00 dBm

Center 5.24 GHz
 #Res BW 510 kHz

#VBW 1.5 MHz

Span 40 MHz
 Sweep 1.333 ms

Occupied Bandwidth

18.480 MHz

Total Power 21.9 dBm

Transmit Freq Error -6.614 kHz

% of OBW Power 99.00 %

x dB Bandwidth 24.84 MHz

x dB -26.00 dB

CF Step
 4.000000 MHz
 Auto Man

Freq Offset
 0 Hz

MSG STATUS

Keysight Spectrum Analyzer - Occupied BW

Center Freq 5.74500000 GHz

Center Freq: 5.74500000 GHz
 Trig: Free Run
 #Gain: Low
 #Atten: 30 dB
 Avg/Hold: >100/100
 Ext Gain: -8.00 dB

Radio Std: None
 Radio Device: BTS

Frequency

Center Freq
 5.74500000 GHz

CF Step
 4.000000 MHz
 Man

Auto

Freq Offset
 0 Hz

10 dB/div Ref 30.00 dBm

Log

Center 5.745 GHz
 #Res BW 510 kHz

#VBW 1.5 MHz

Span 40 MHz
 Sweep 1.333 ms

Occupied Bandwidth

Total Power

17.1 dBm

18.491 MHz

Transmit Freq Error

334 Hz

% of OBW Power

99.00 %

x dB Bandwidth

24.92 MHz

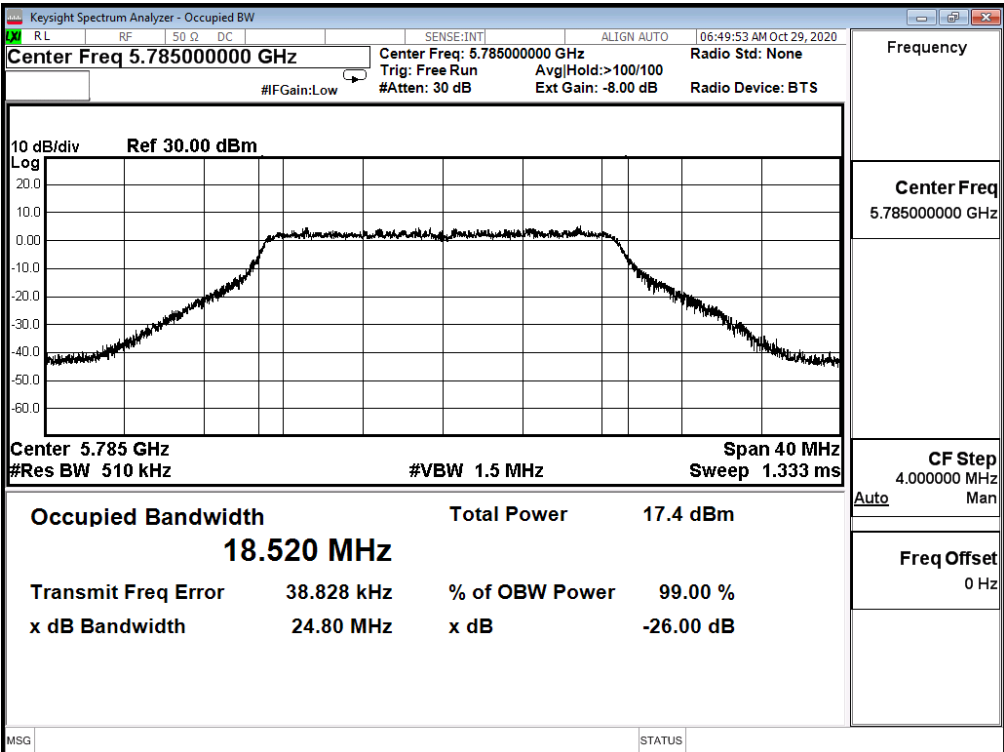
x dB

-26.00 dB

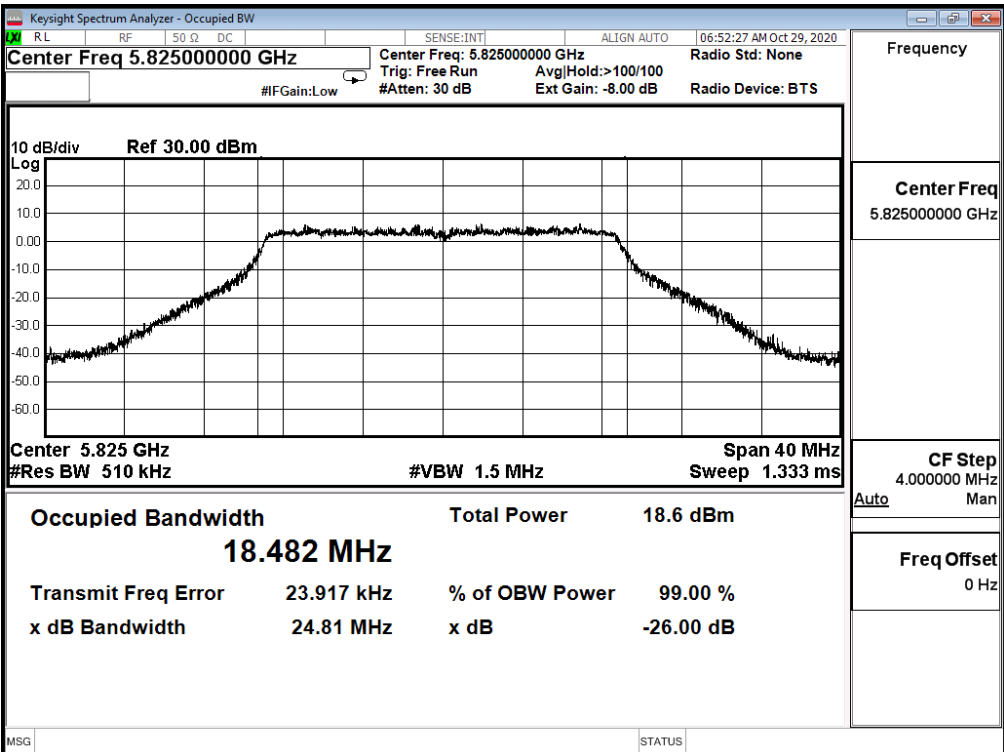
MSG

STATUS

Channel 157 (5785MHz)



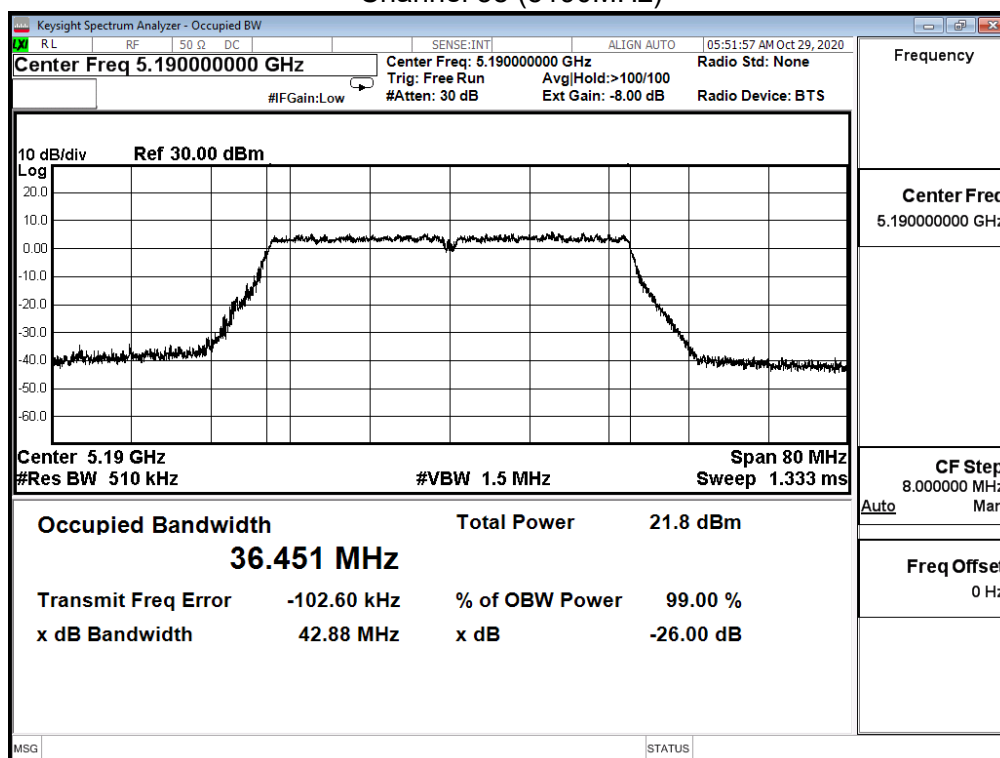
Channel 165 (5825MHz)



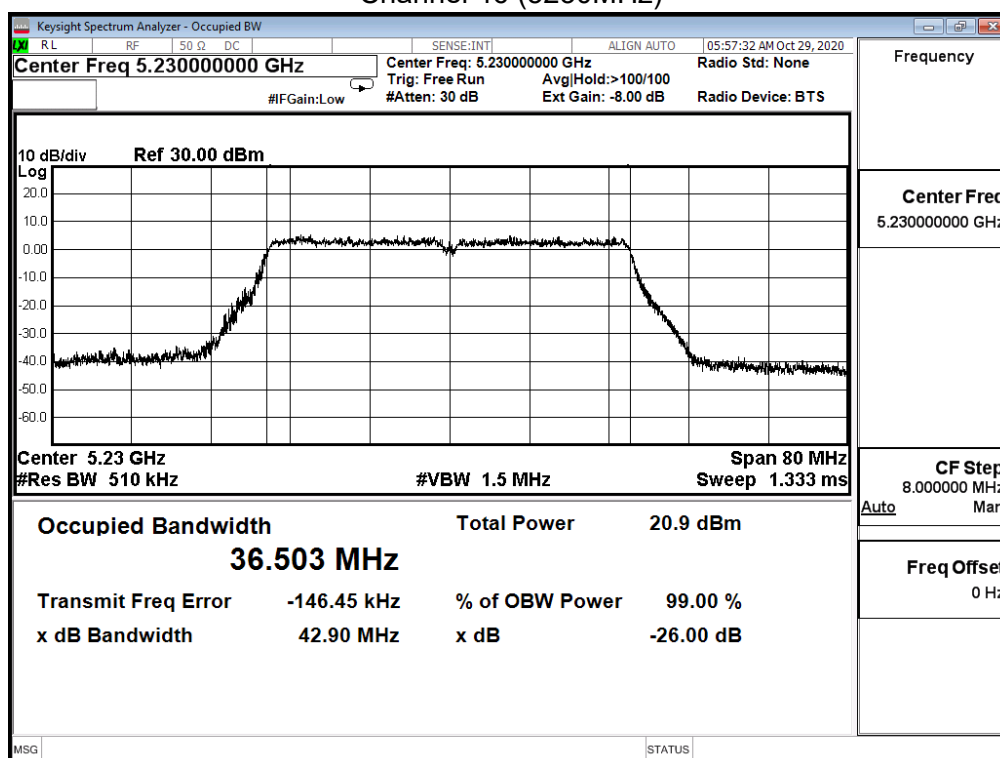
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 0)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
38	5190	36.451	42.880	--	Pass
46	5230	36.503	42.900	--	Pass
151	5755	36.523	N/A	--	Pass
159	5795	36.465		--	Pass

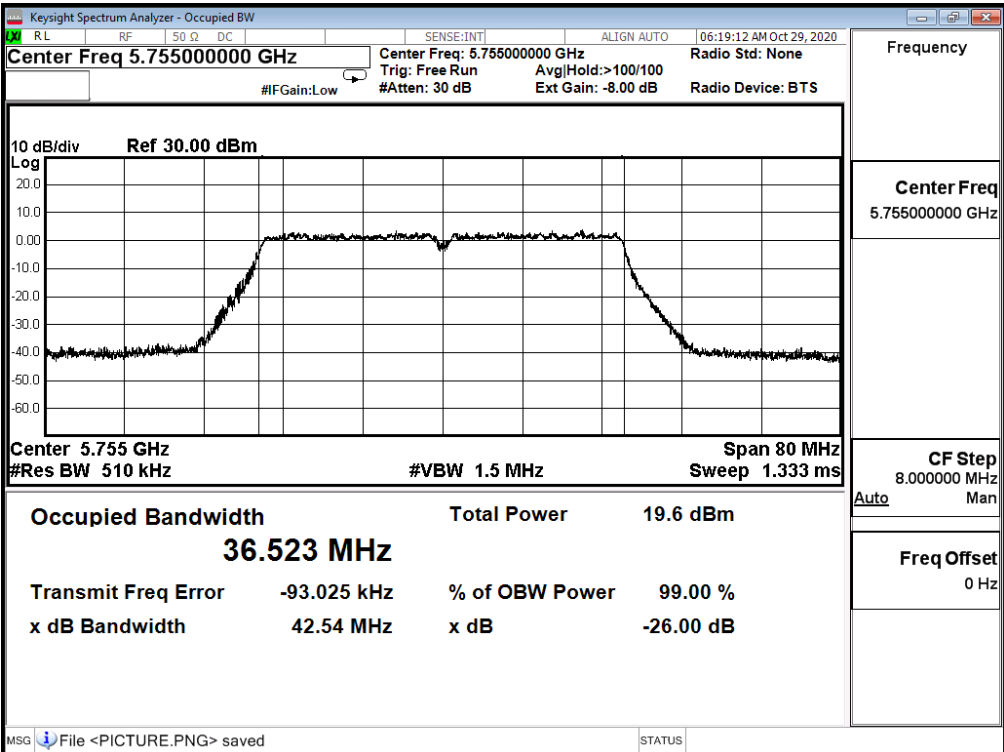
Channel 38 (5190MHz)



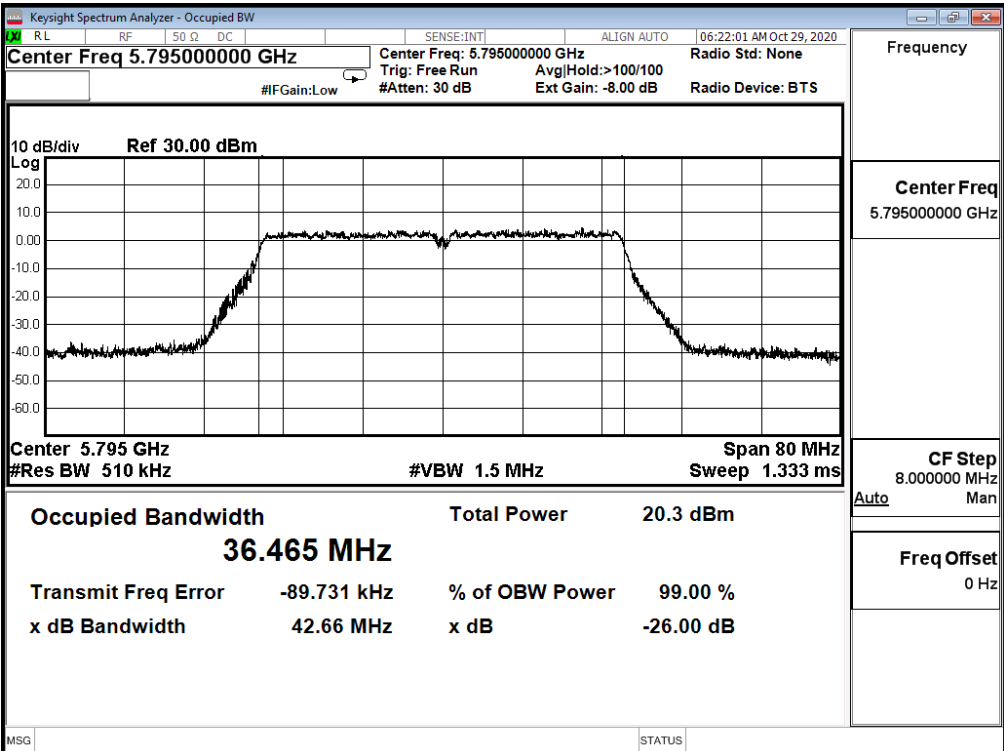
Channel 46 (5230MHz)



Channel 151 (5755MHz)



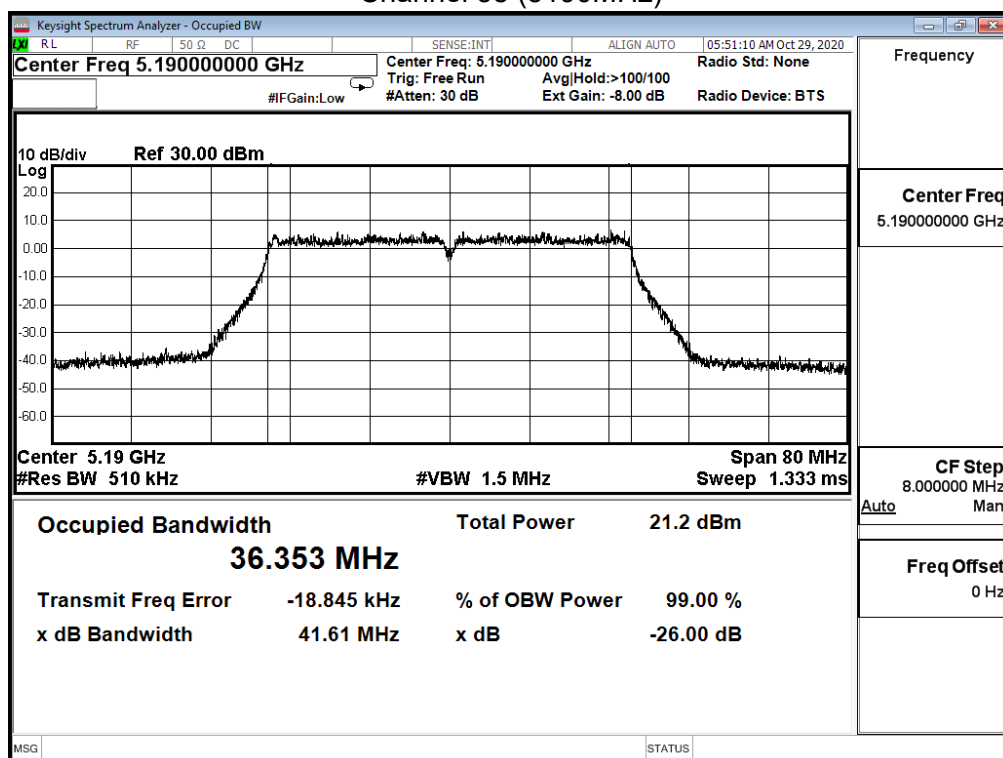
Channel 159 (5795MHz)



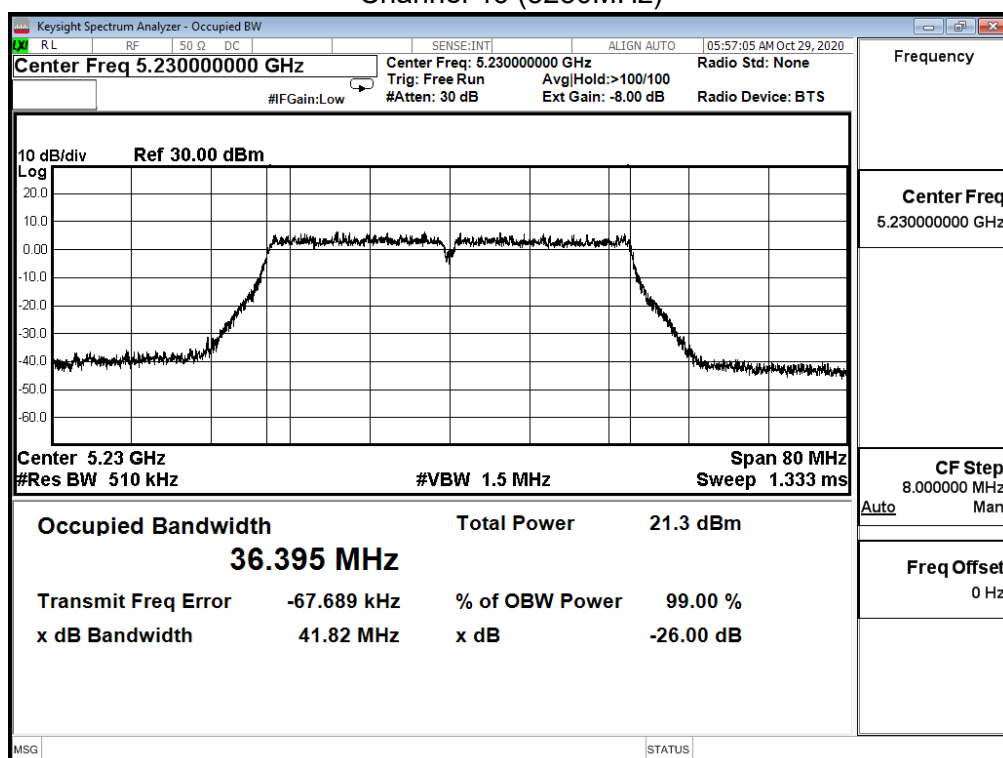
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 1)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
38	5190	36.353	41.610	--	Pass
46	5230	36.395	41.820	--	Pass
151	5755	36.382	N/A	--	Pass
159	5795	36.389		--	Pass

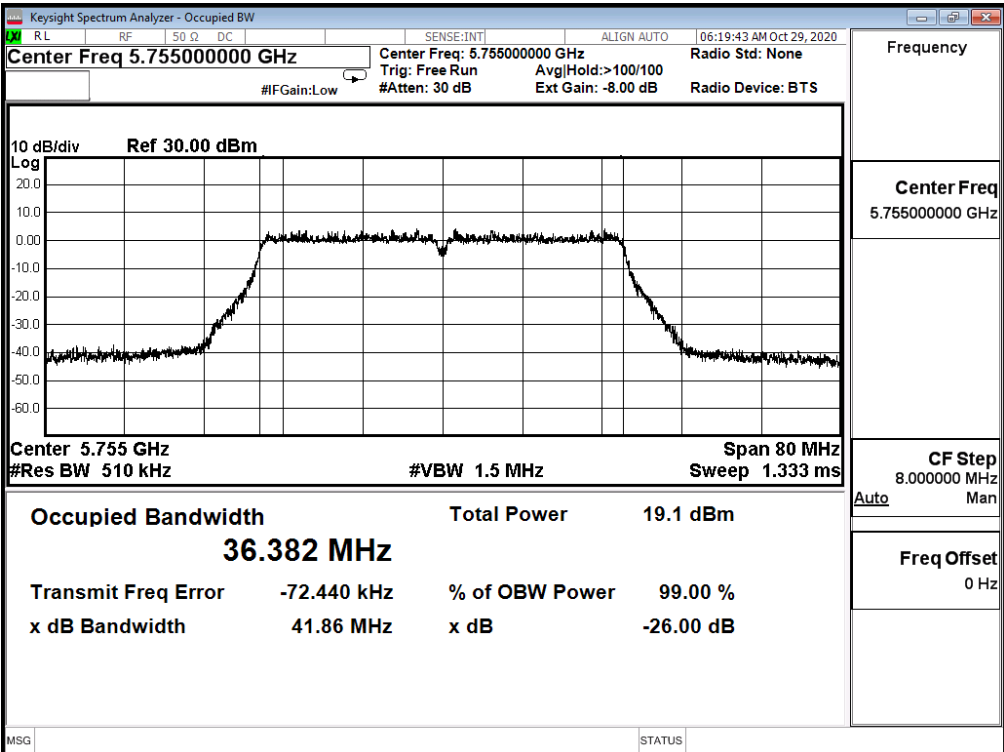
Channel 38 (5190MHz)



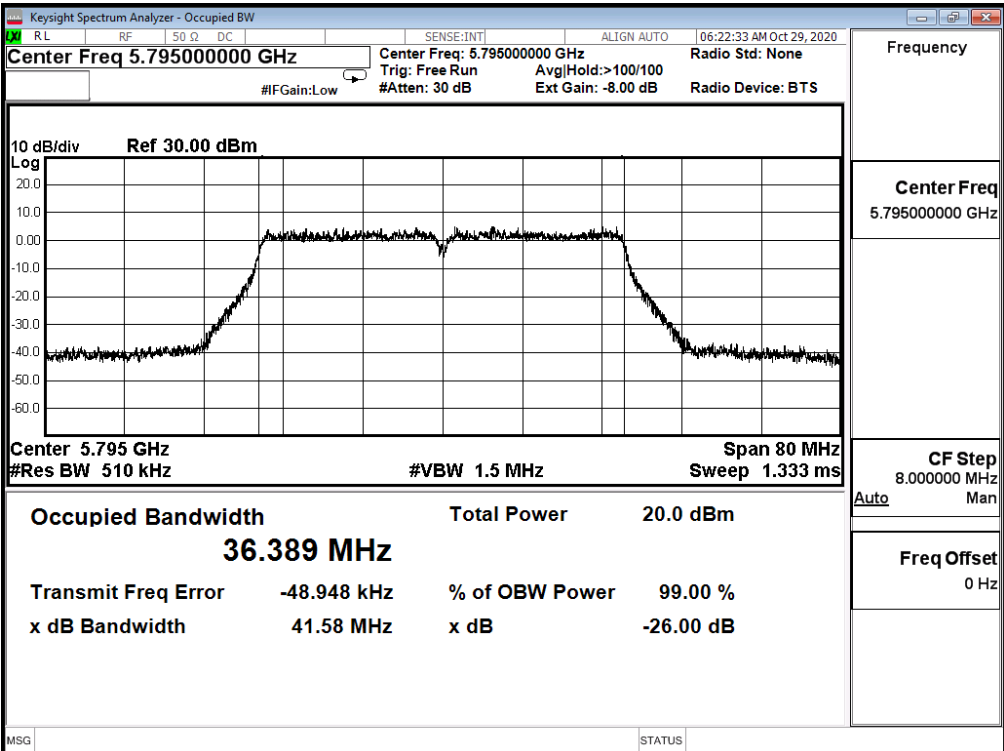
Channel 46 (5230MHz)



Channel 151 (5755MHz)



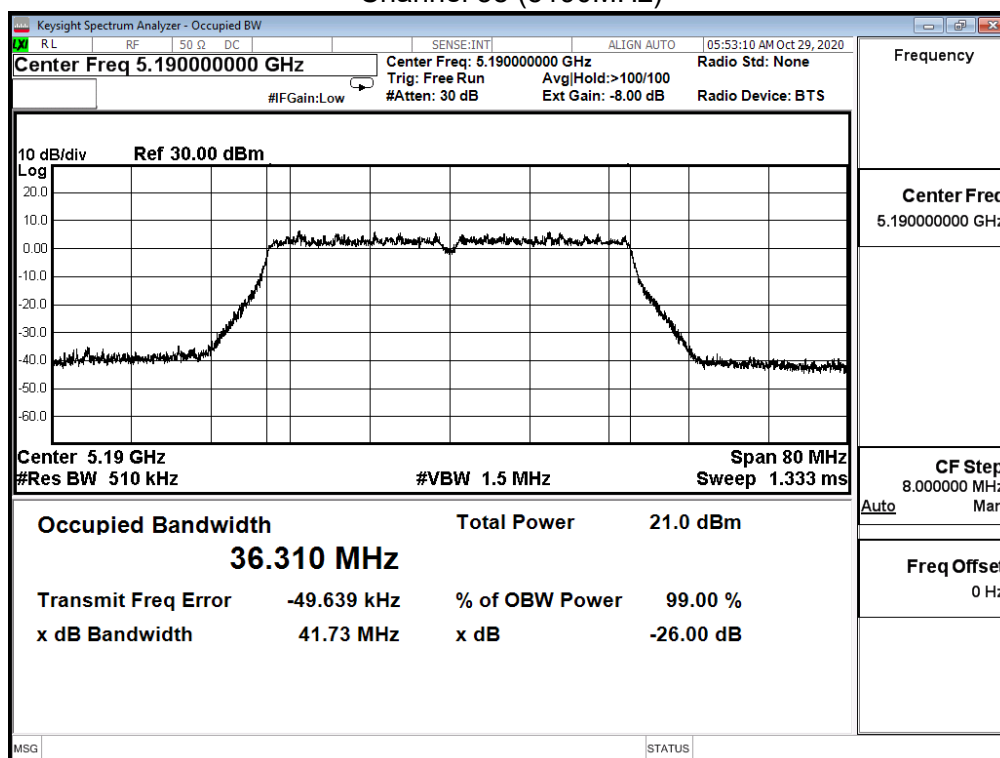
Channel 159 (5795MHz)



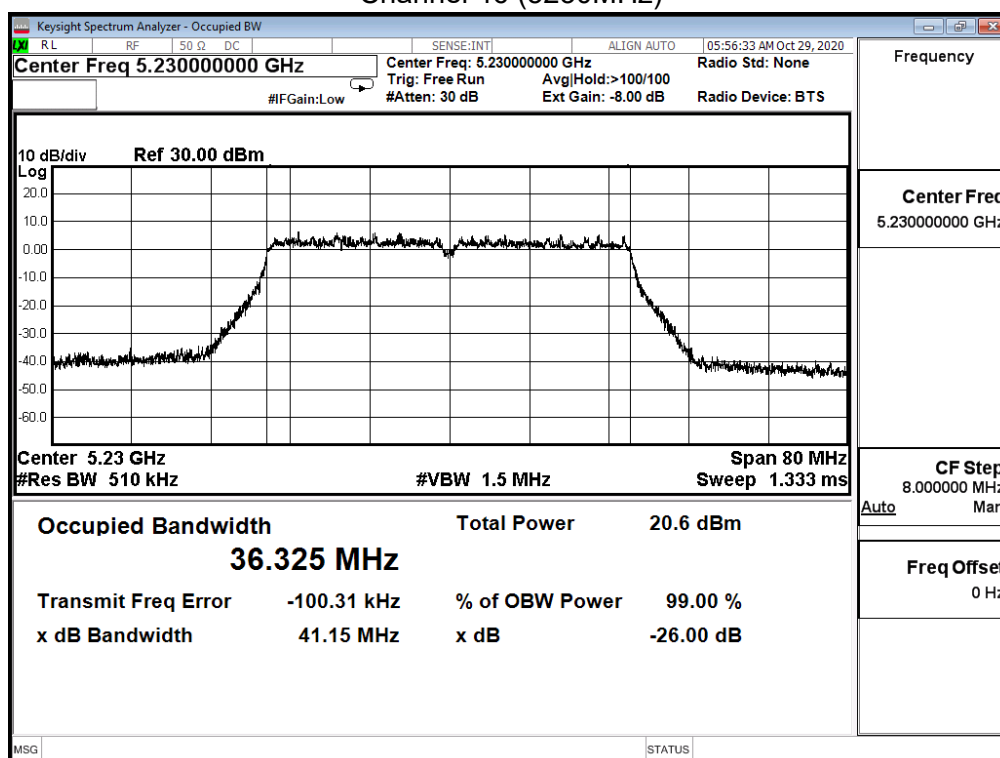
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 2)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
38	5190	36.310	41.730	--	Pass
46	5230	36.325	41.150	--	Pass
151	5755	36.374	N/A	--	Pass
159	5795	36.374		--	Pass

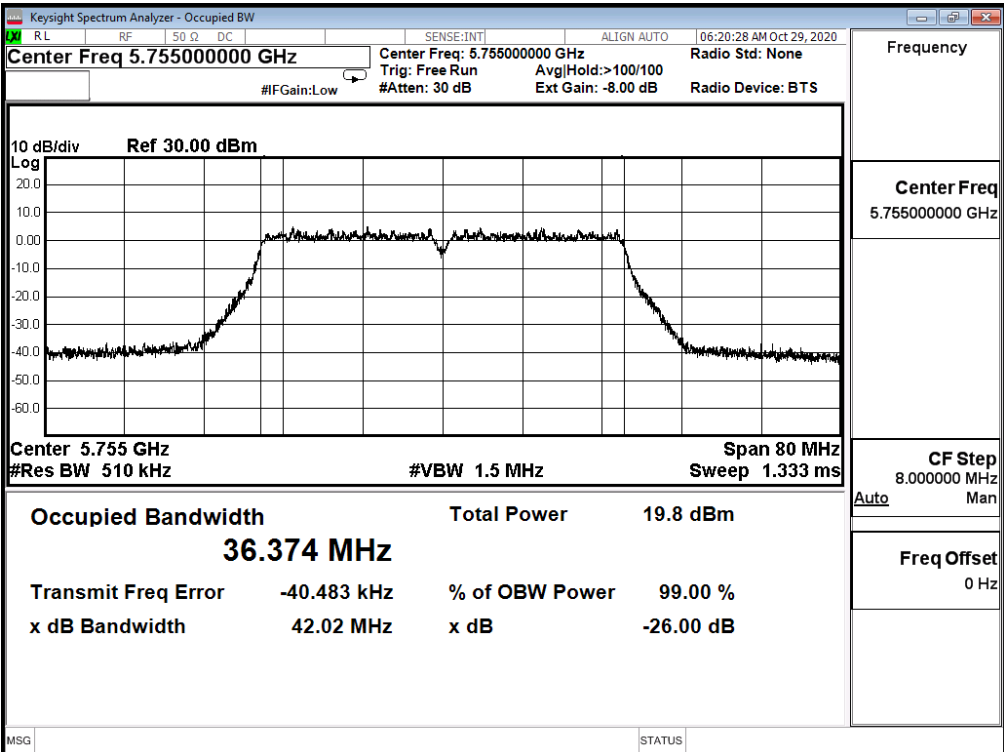
Channel 38 (5190MHz)



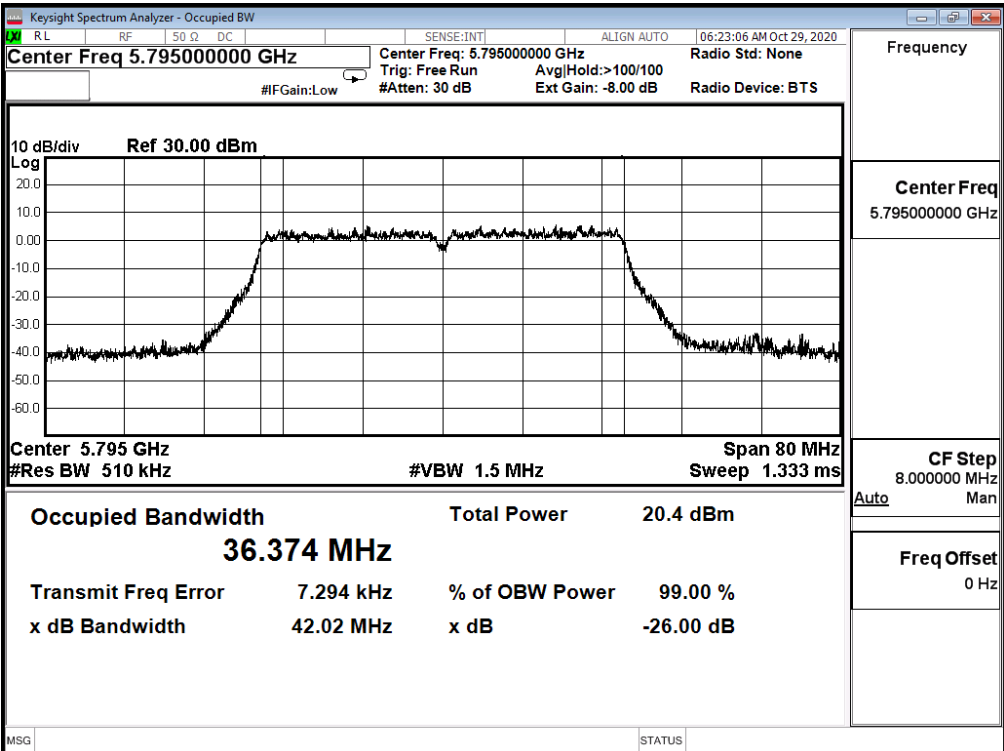
Channel 46 (5230MHz)



Channel 151 (5755MHz)



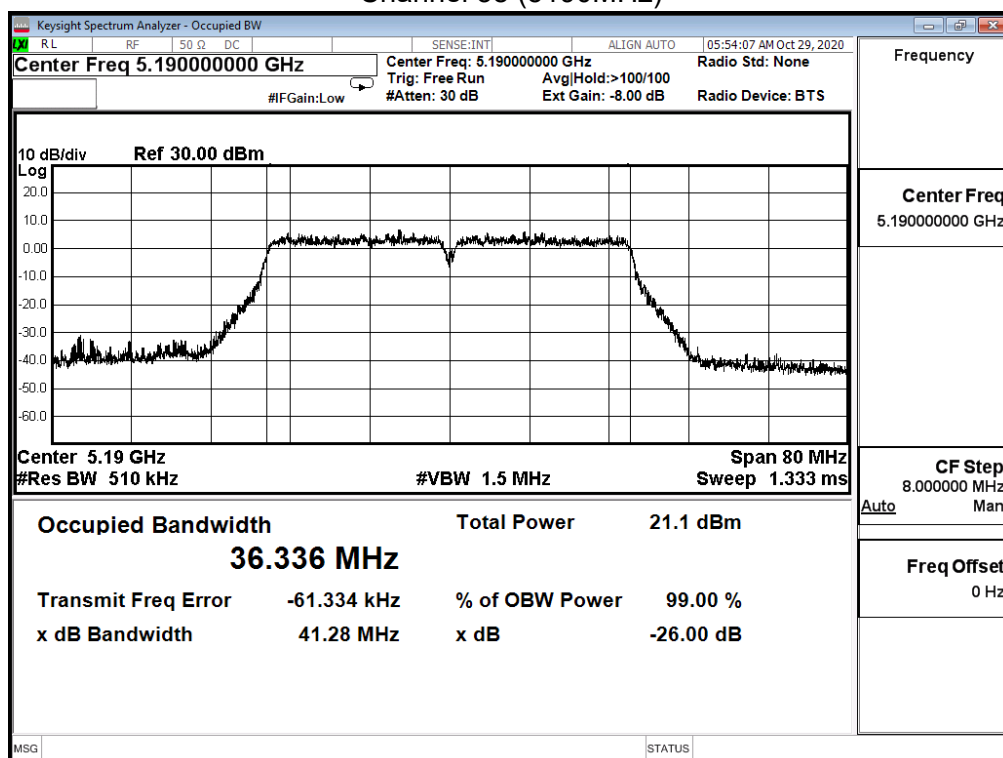
Channel 159 (5795MHz)



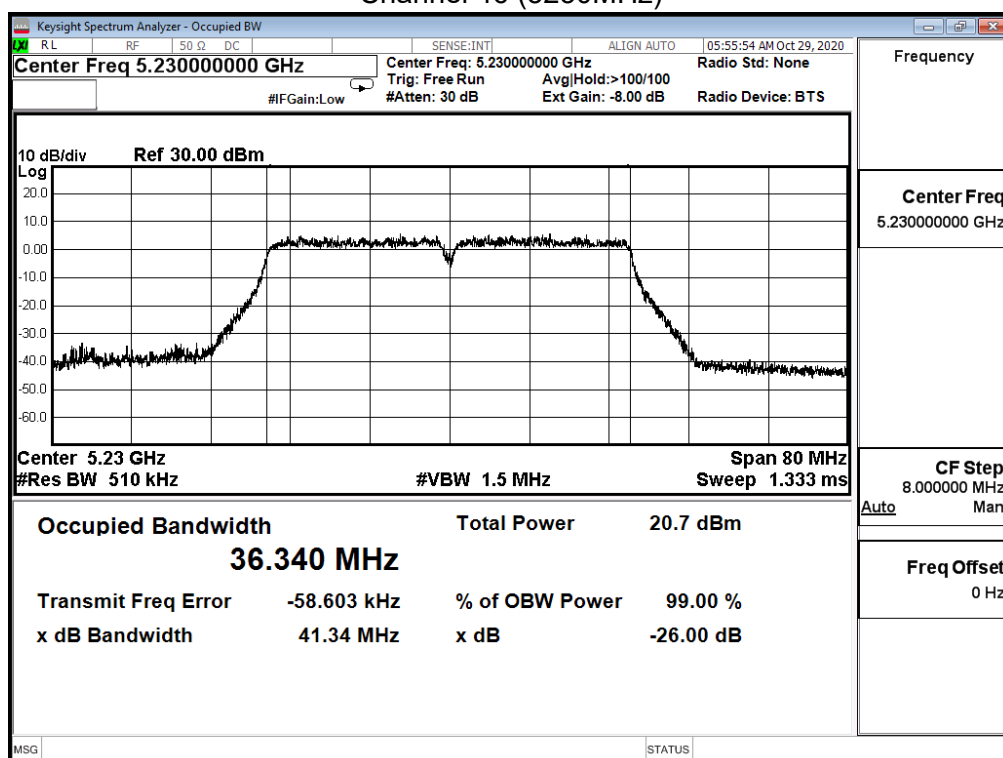
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 3)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
38	5190	36.336	41.280	--	Pass
46	5230	36.340	41.340	--	Pass
151	5755	36.347	N/A	--	Pass
159	5795	36.304		--	Pass

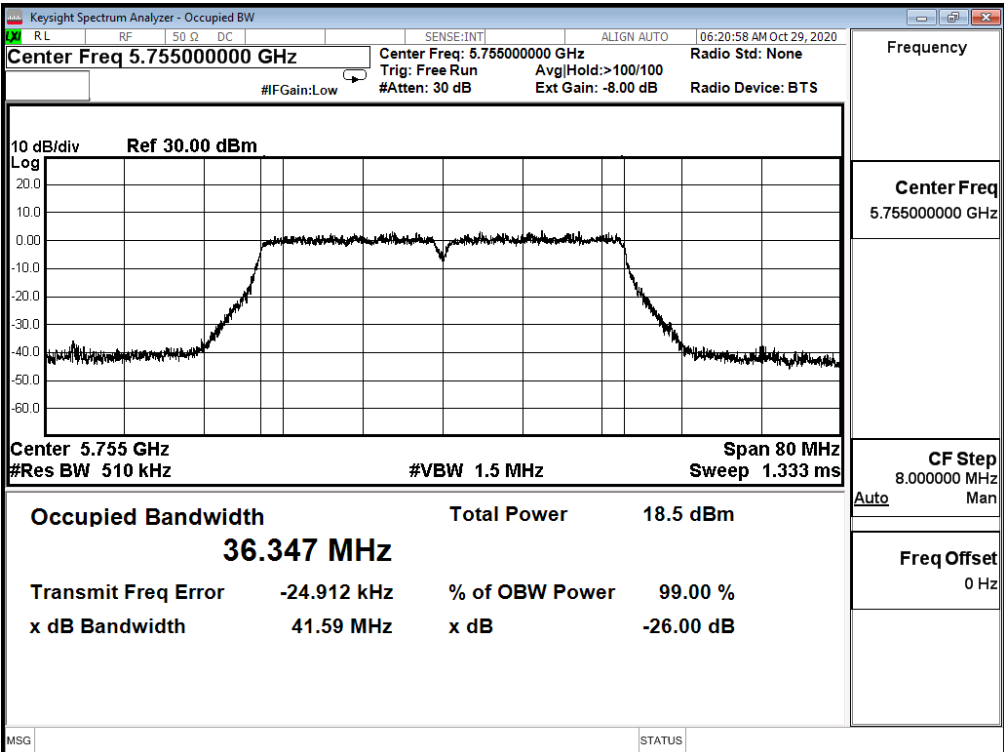
Channel 38 (5190MHz)



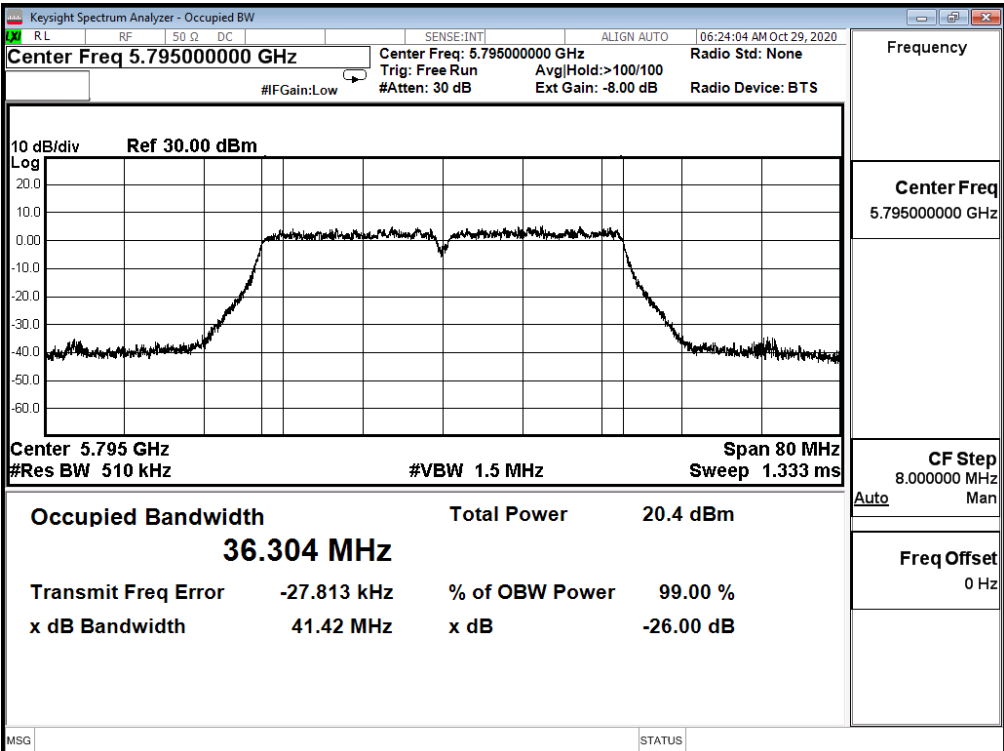
Channel 46 (5230MHz)



Channel 151 (5755MHz)



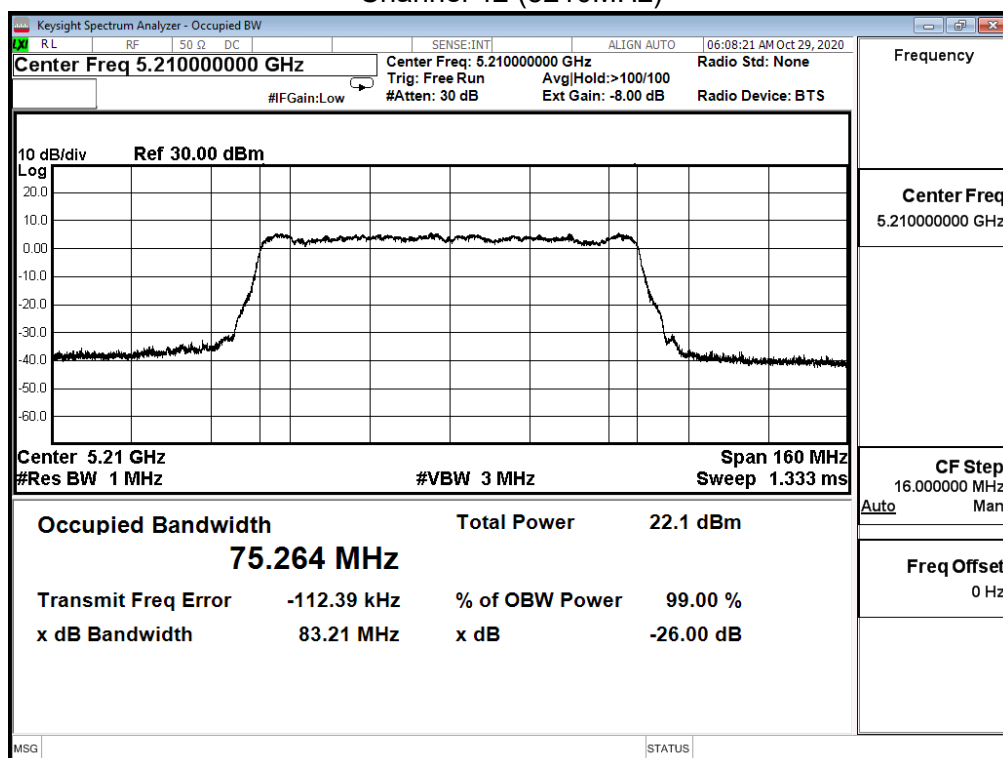
Channel 159 (5795MHz)



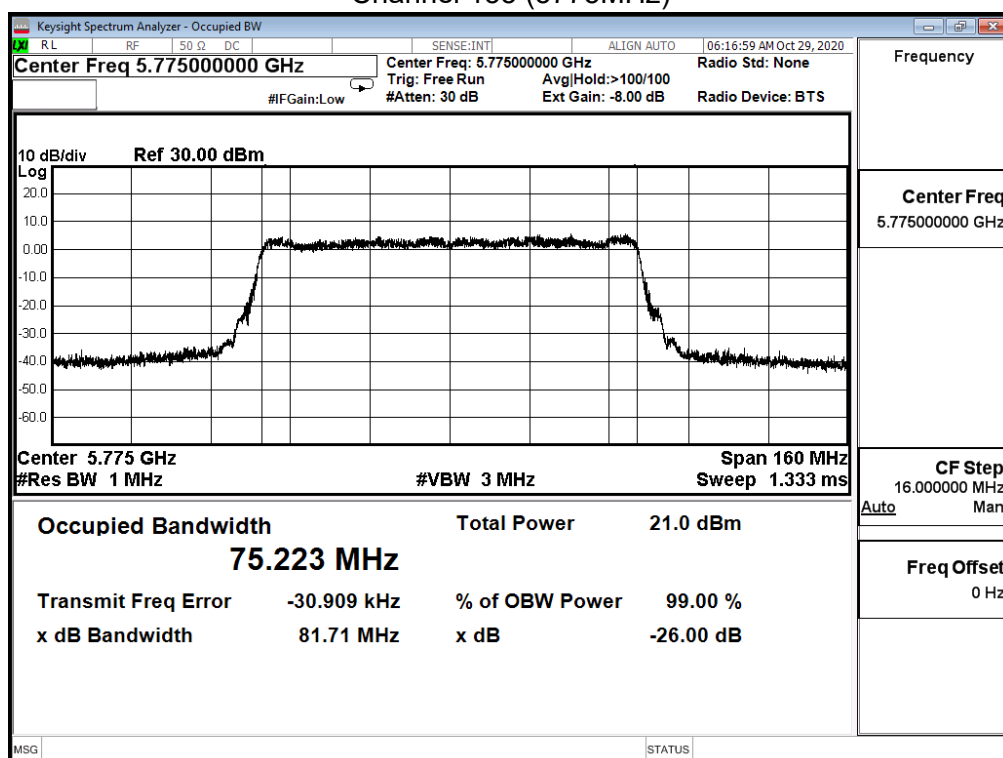
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 0)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
42	5210	75.264	83.210	--	Pass
155	5775	75.223	N/A	--	Pass

Channel 42 (5210MHz)



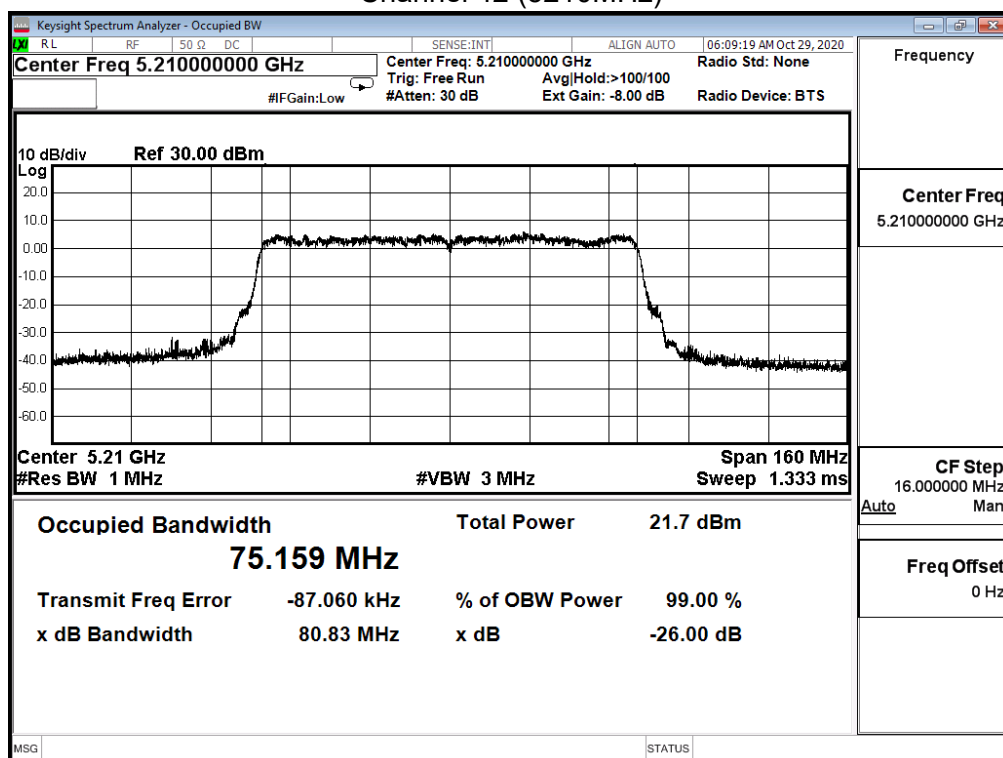
Channel 155 (5775MHz)



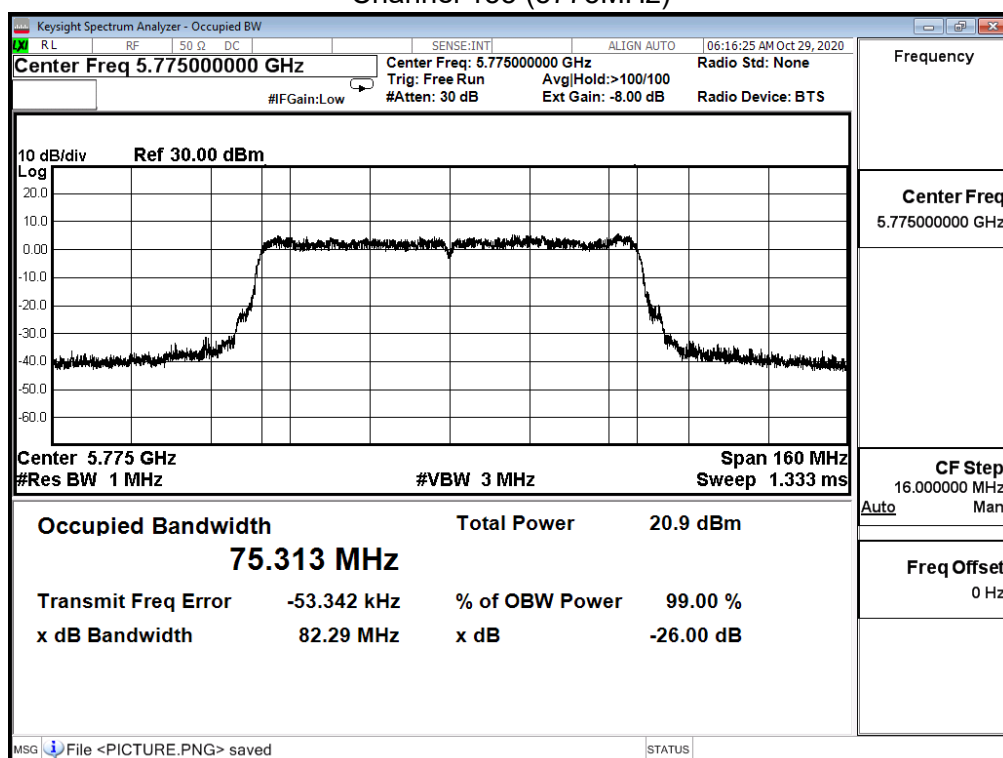
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 1)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
42	5210	75.159	80.830	--	Pass
155	5775	75.313	N/A	--	Pass

Channel 42 (5210MHz)



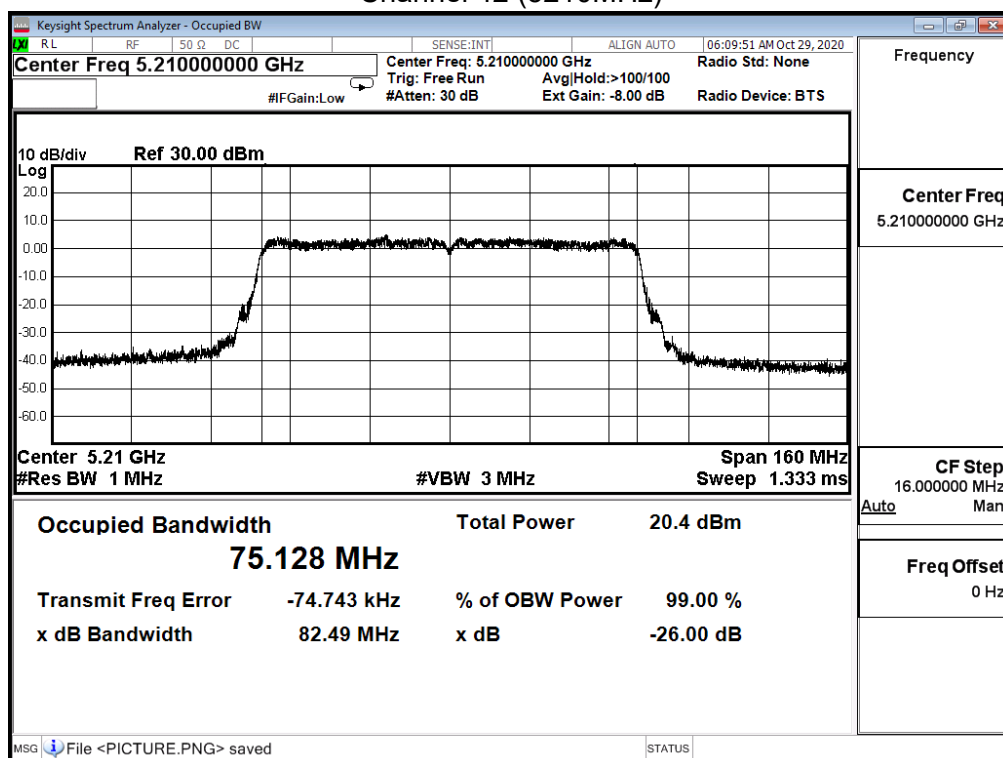
Channel 155 (5775MHz)



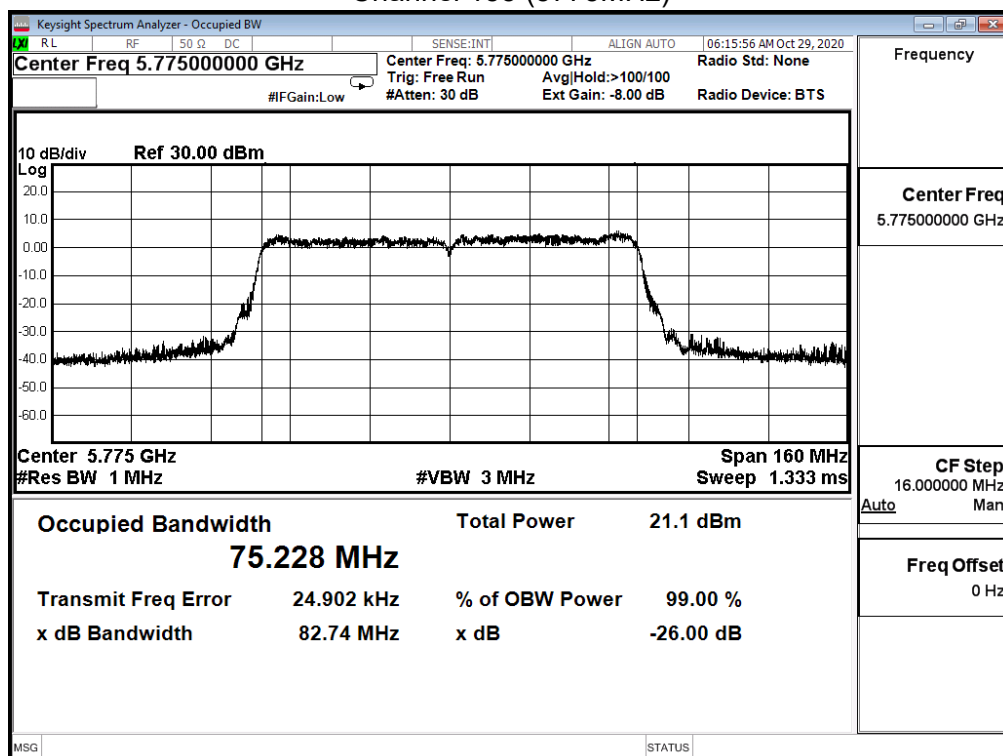
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 2)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
42	5210	75.128	82.490	--	Pass
155	5775	75.228	N/A	--	Pass

Channel 42 (5210MHz)



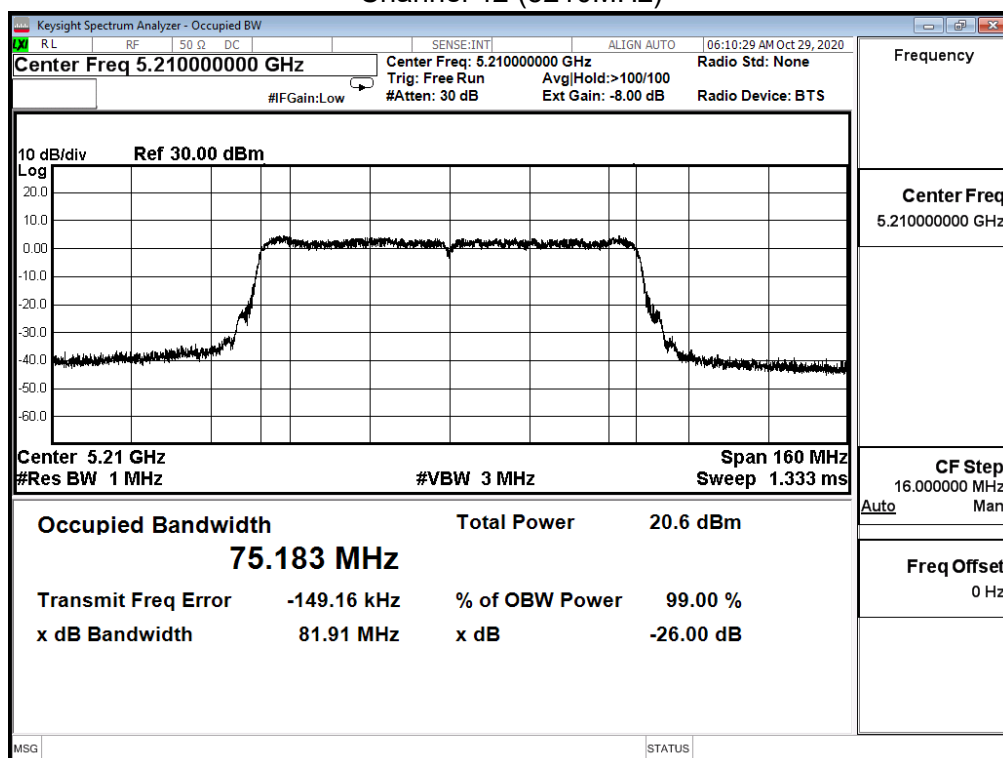
Channel 155 (5775MHz)



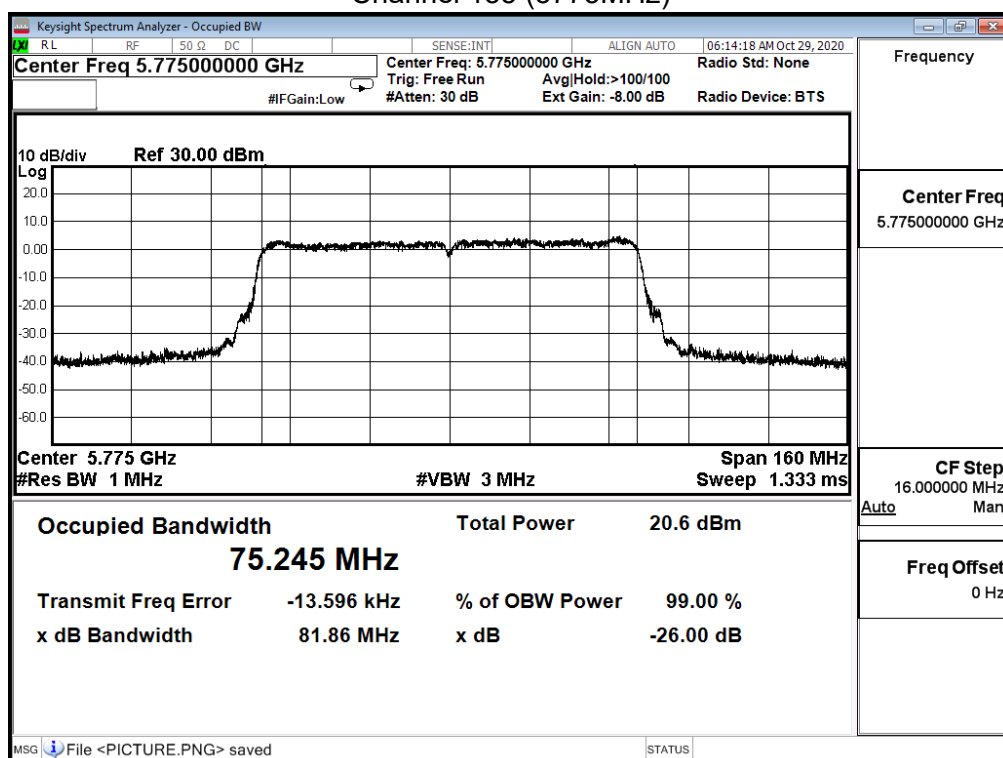
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	26dB & 99% Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 3)					
Channel No.	Frequency (MHz)	Measure Value		Limit (MHz)	Result
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)		
42	5210	75.183	81.910	--	Pass
155	5775	75.245	N/A	--	Pass

Channel 42 (5210MHz)



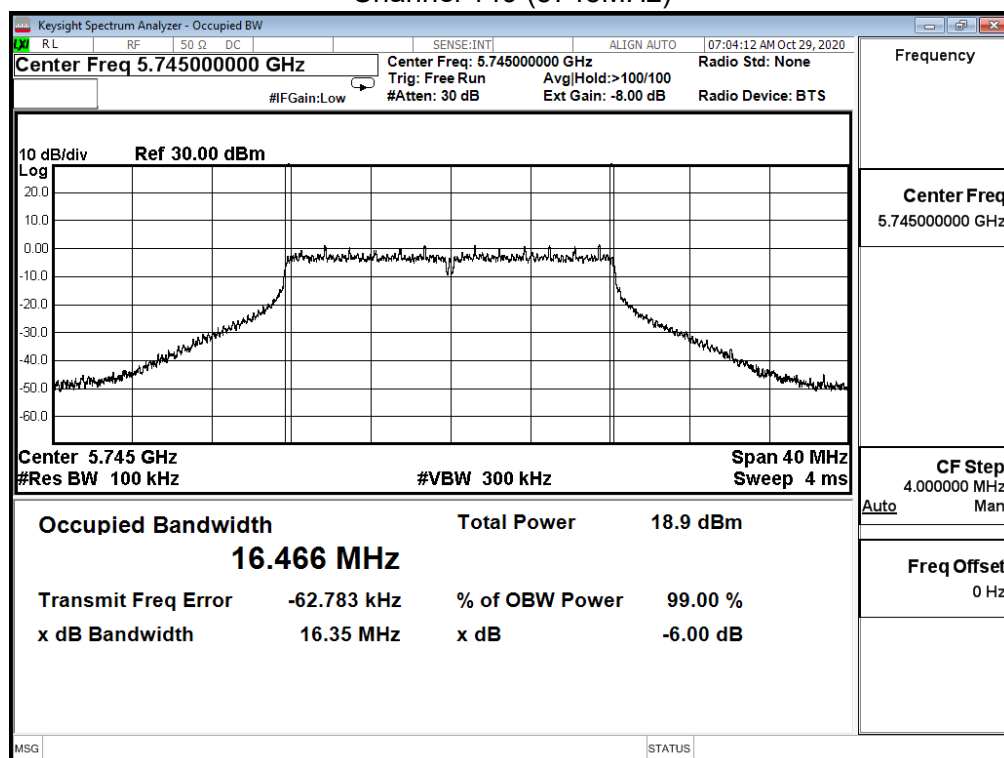
Channel 155 (5775MHz)



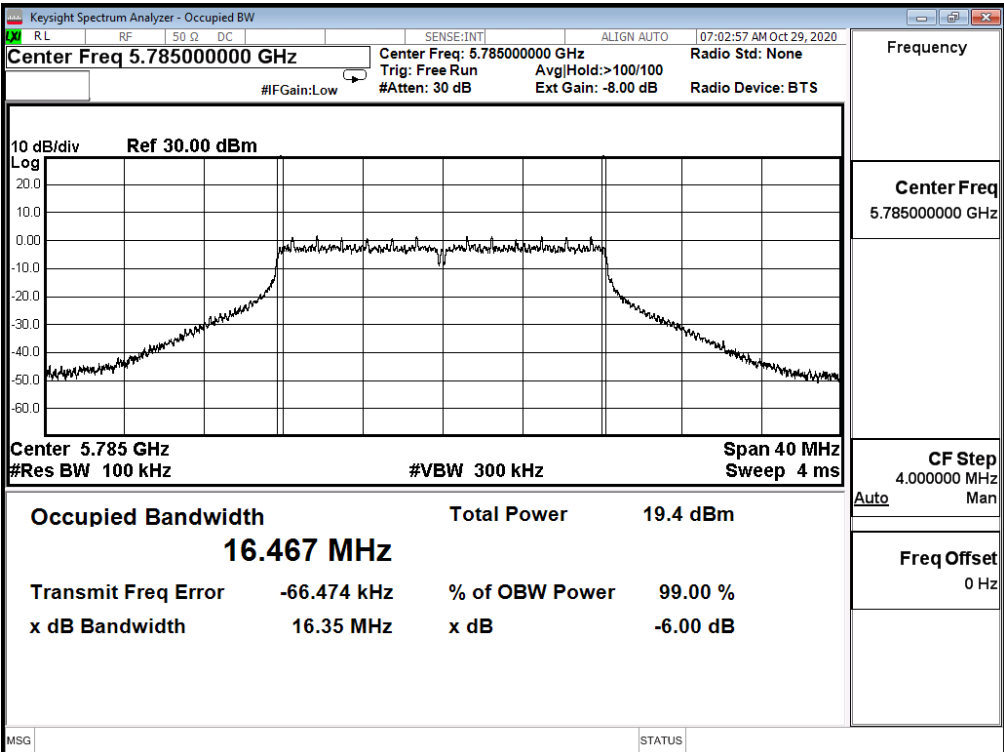
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (SISO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11a (ANT 0)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
149	5745	16.350	>0.5	Pass
157	5785	16.350	>0.5	Pass
165	5825	16.350	>0.5	Pass

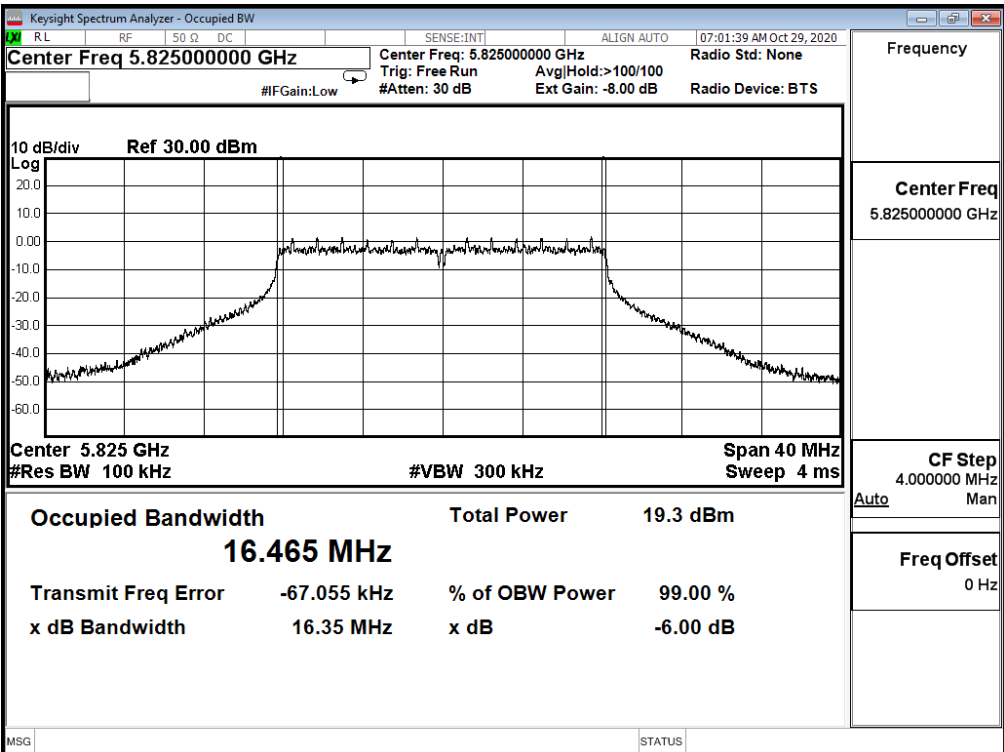
Channel 149 (5745MHz)



Channel 157 (5785MHz)



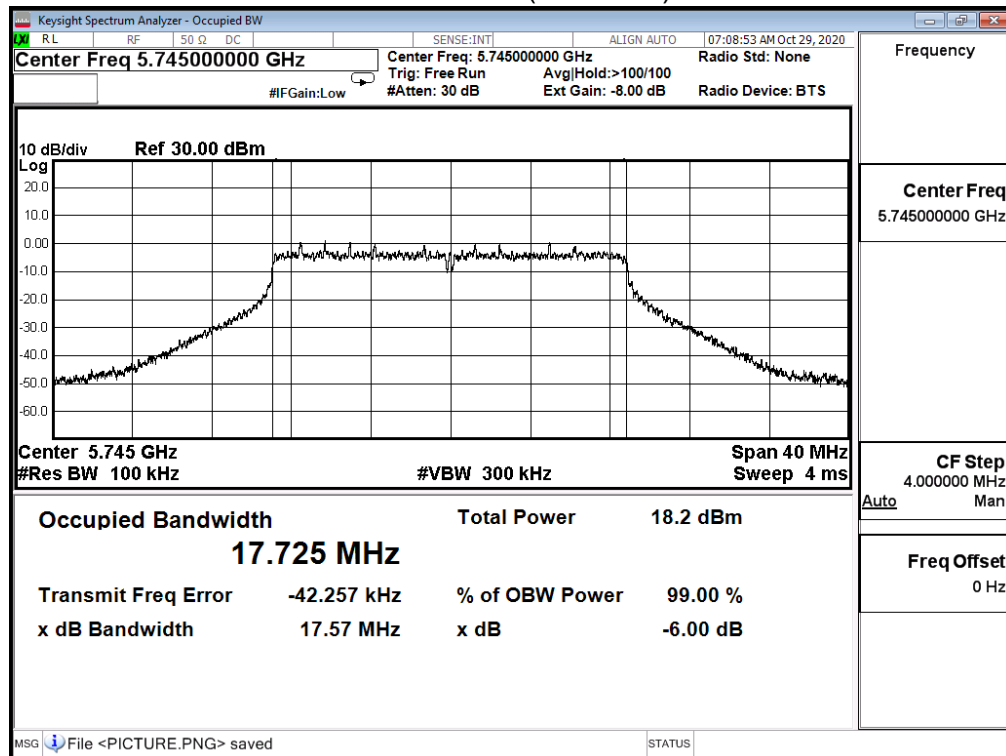
Channel 165 (5825MHz)



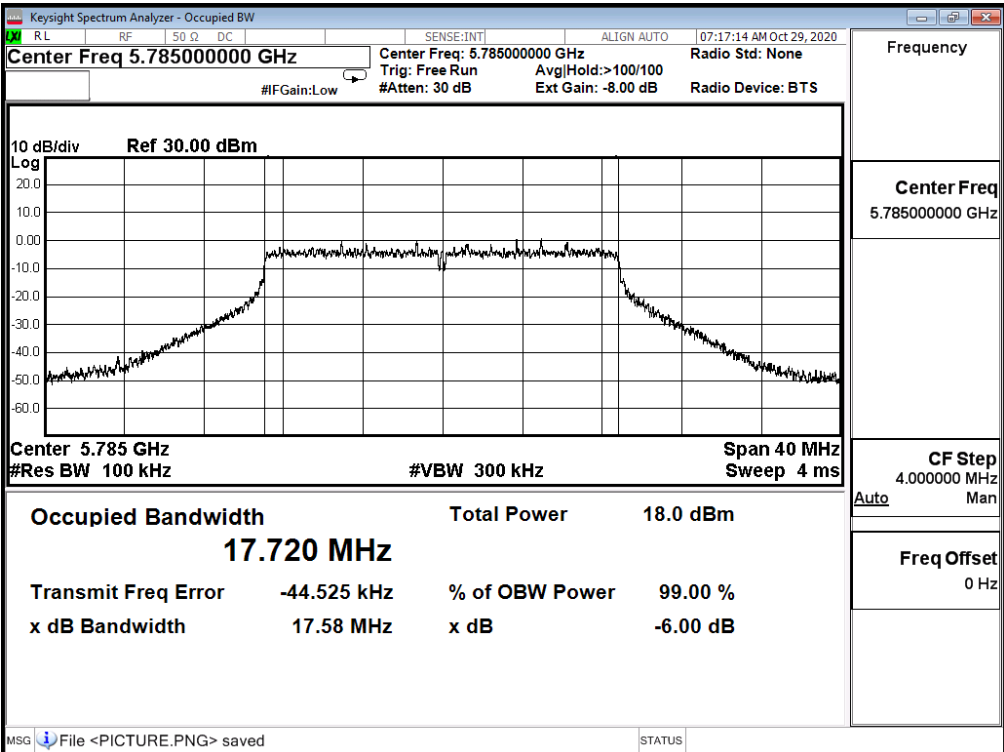
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
149	5745	17.570	>0.5	Pass
157	5785	17.580	>0.5	Pass
165	5825	17.580	>0.5	Pass

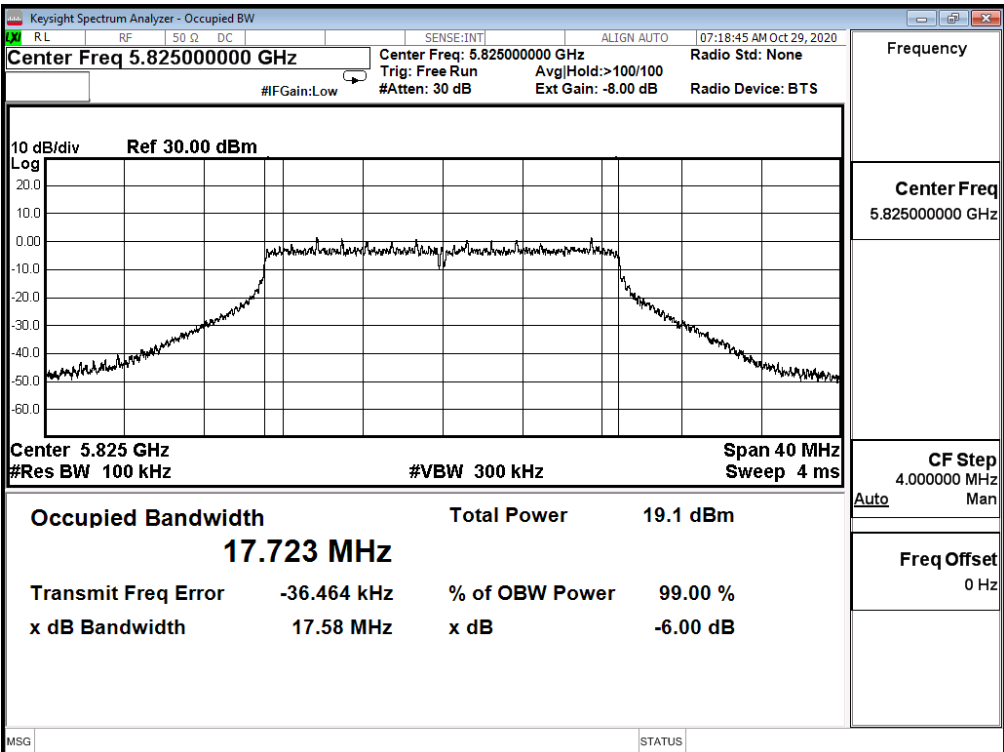
Channel 149 (5745MHz)



Channel 157 (5785MHz)



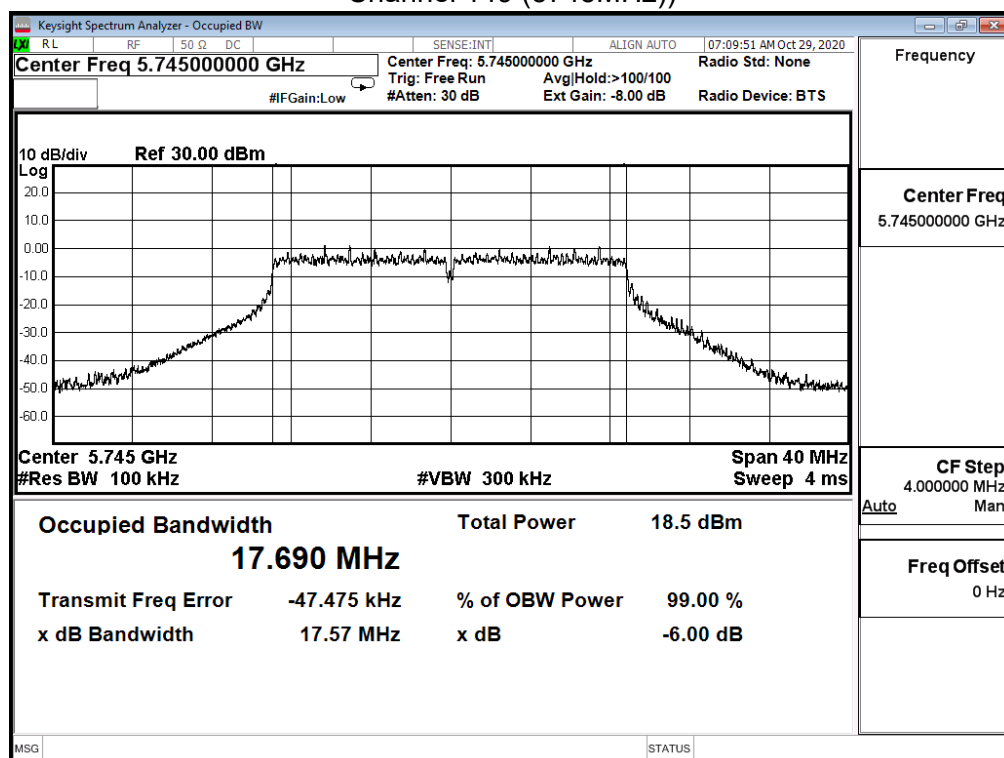
Channel 165 (5825MHz)



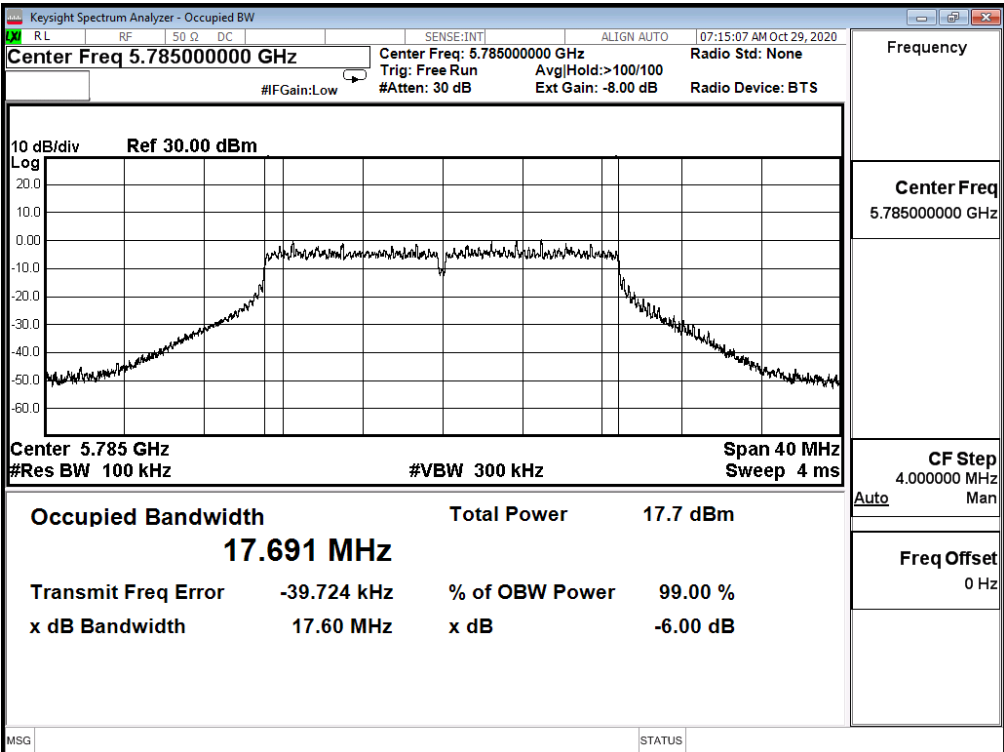
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
149	5745	17.570	>0.5	Pass
157	5785	17.600	>0.5	Pass
165	5825	11.570	>0.5	Pass

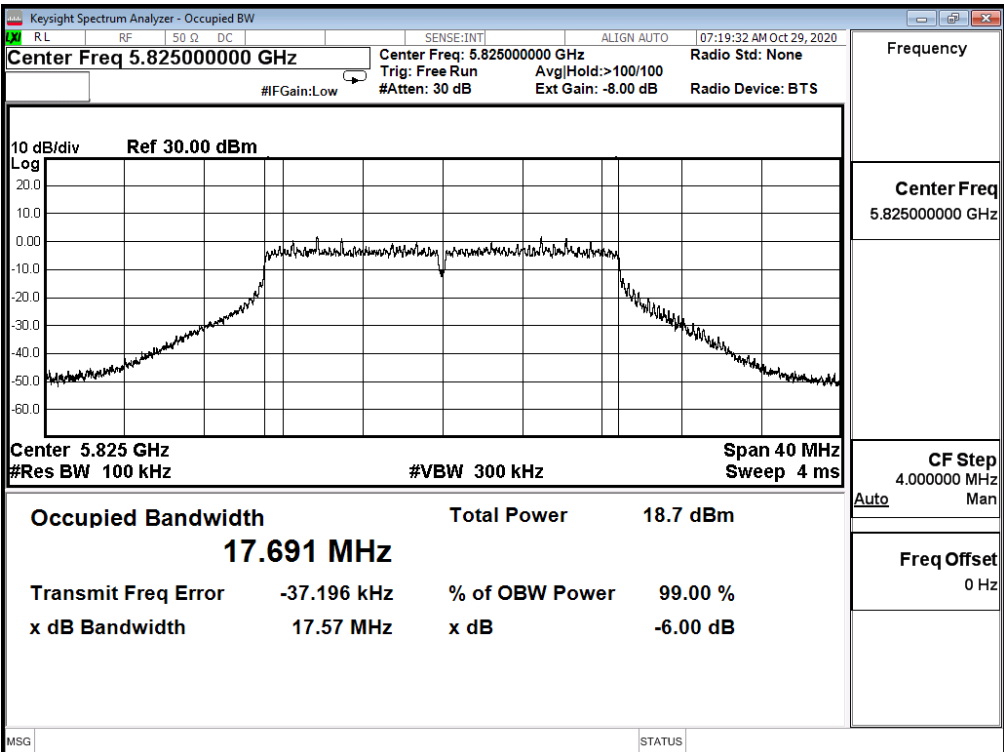
Channel 149 (5745MHz))



Channel 157 (5785MHz)



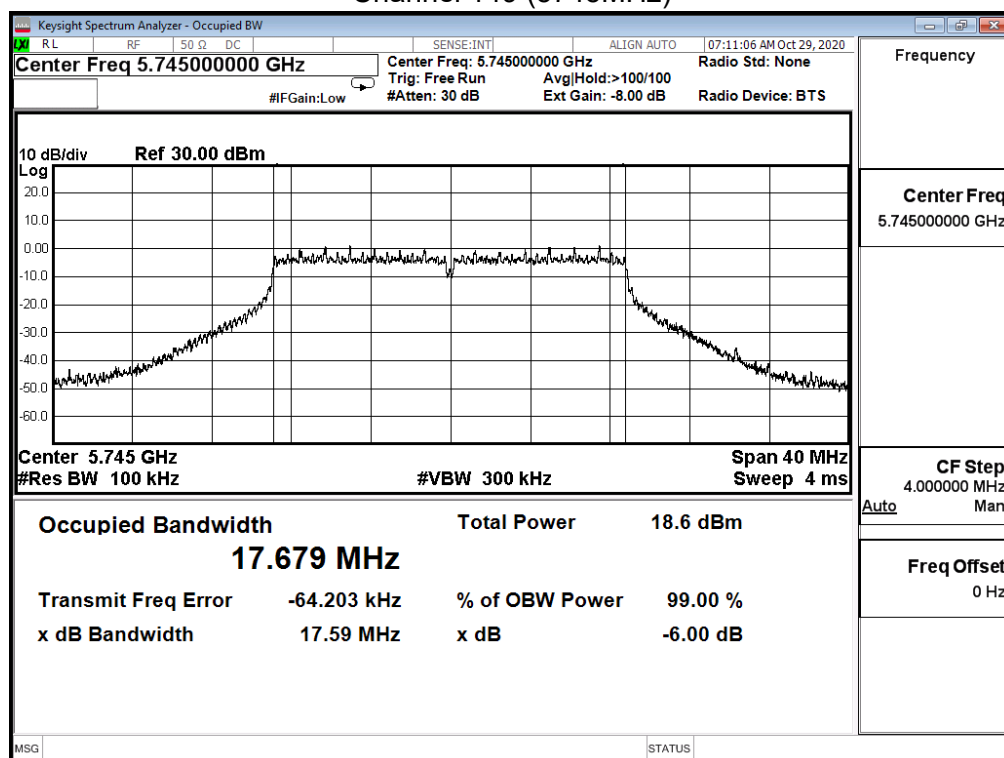
Channel 165 (5825MHz)



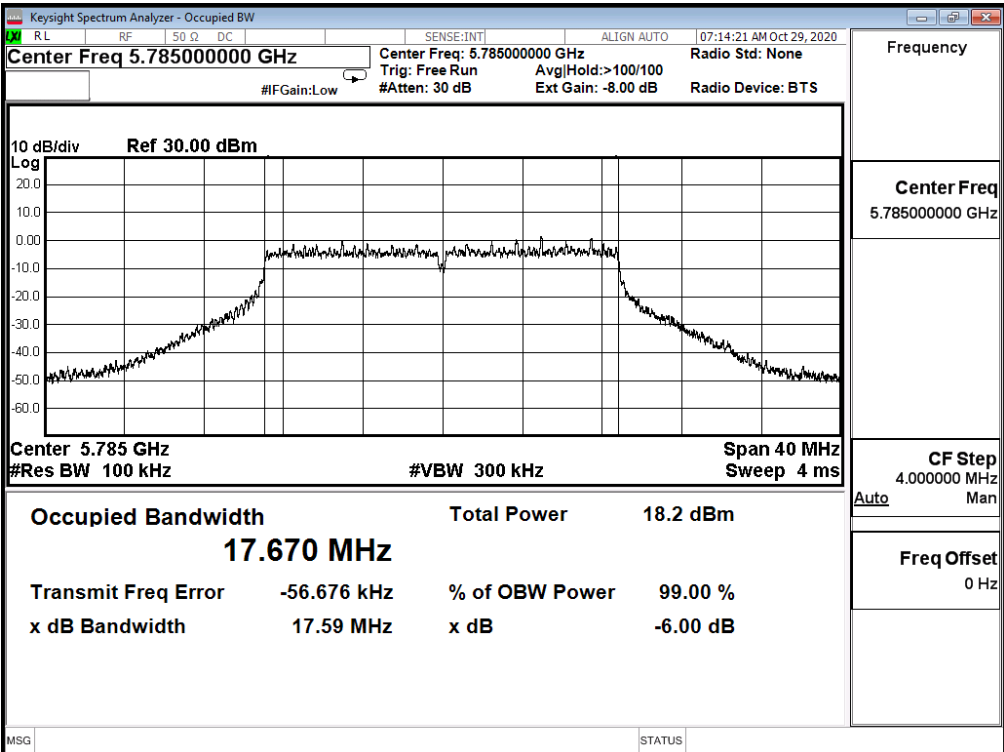
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 2)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
149	5745	17.590	>0.5	Pass
157	5785	17.590	>0.5	Pass
165	5825	17.610	>0.5	Pass

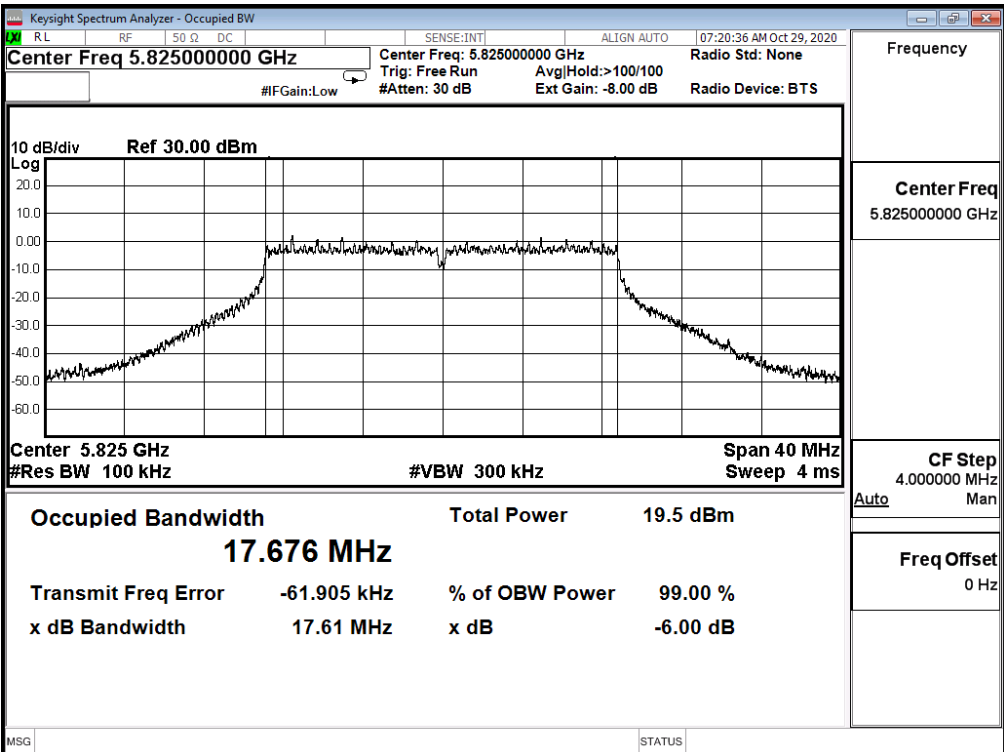
Channel 149 (5745MHz)



Channel 157 (5785MHz)



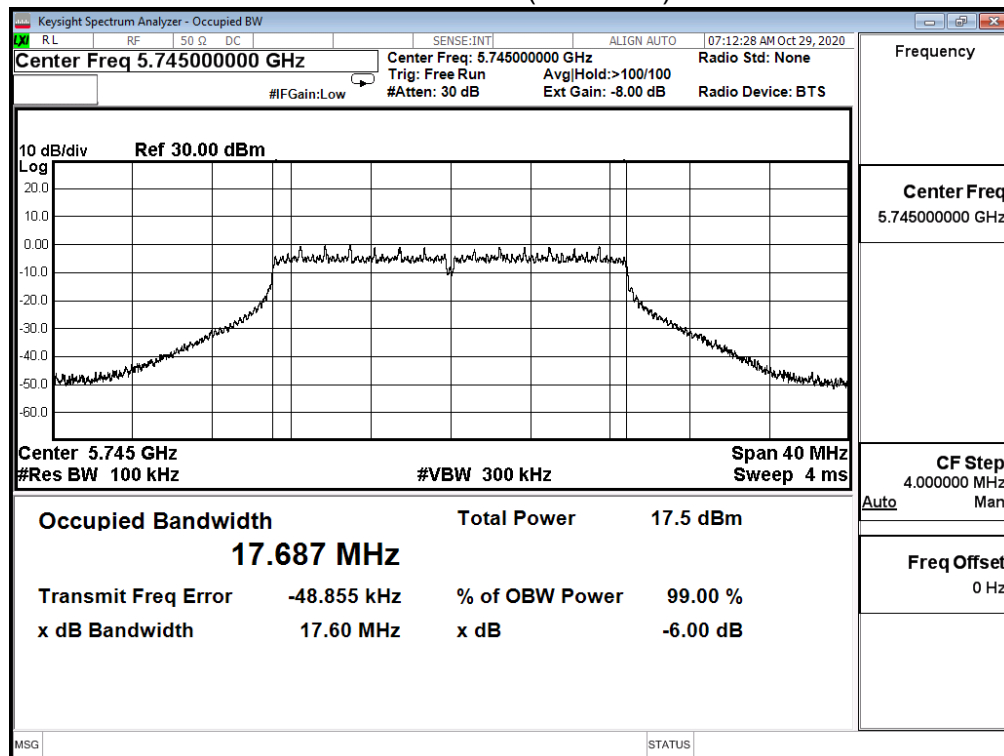
Channel 165 (5825MHz)



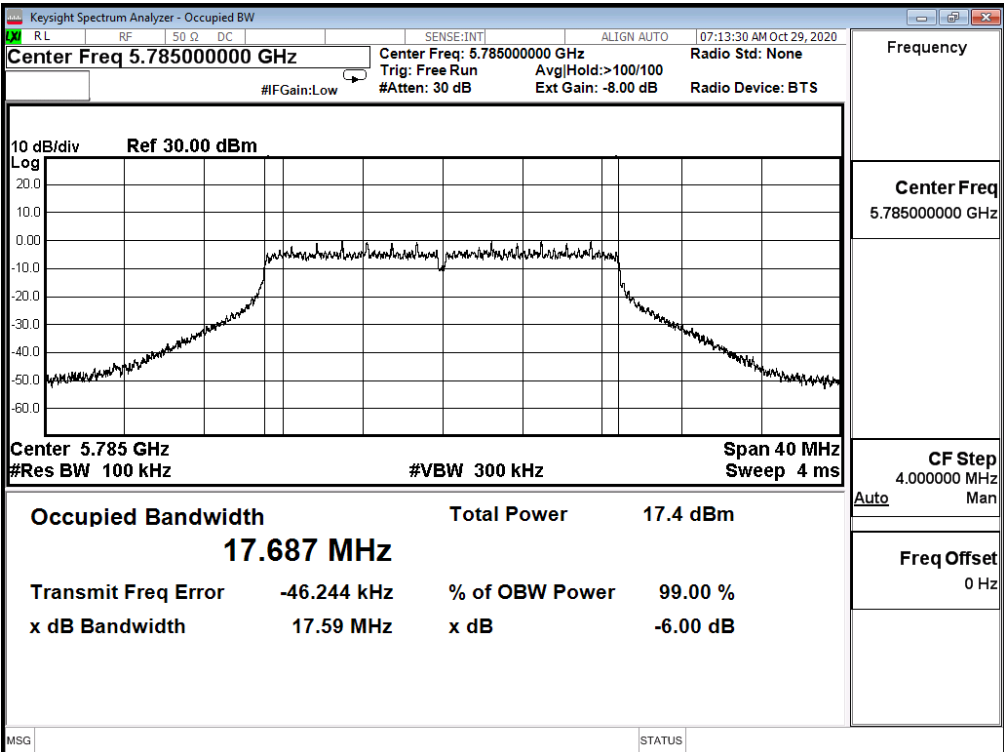
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_20M(ANT 3)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
149	5745	17.600	>0.5	Pass
157	5785	17.590	>0.5	Pass
165	5825	17.600	>0.5	Pass

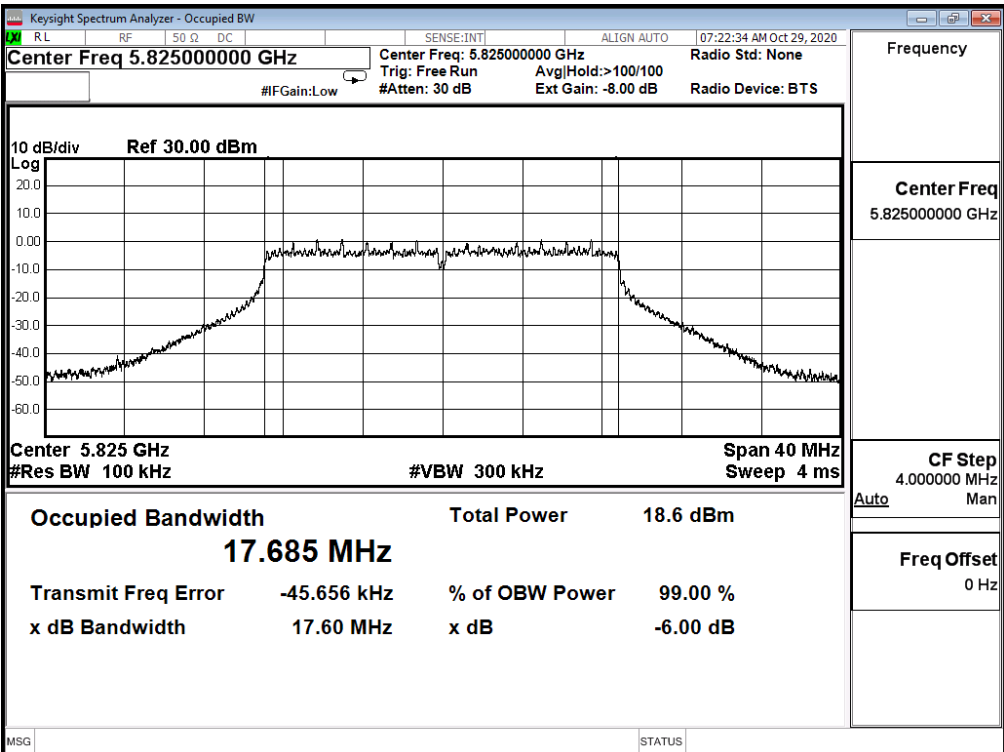
Channel 149 (5745MHz)



Channel 157 (5785MHz)



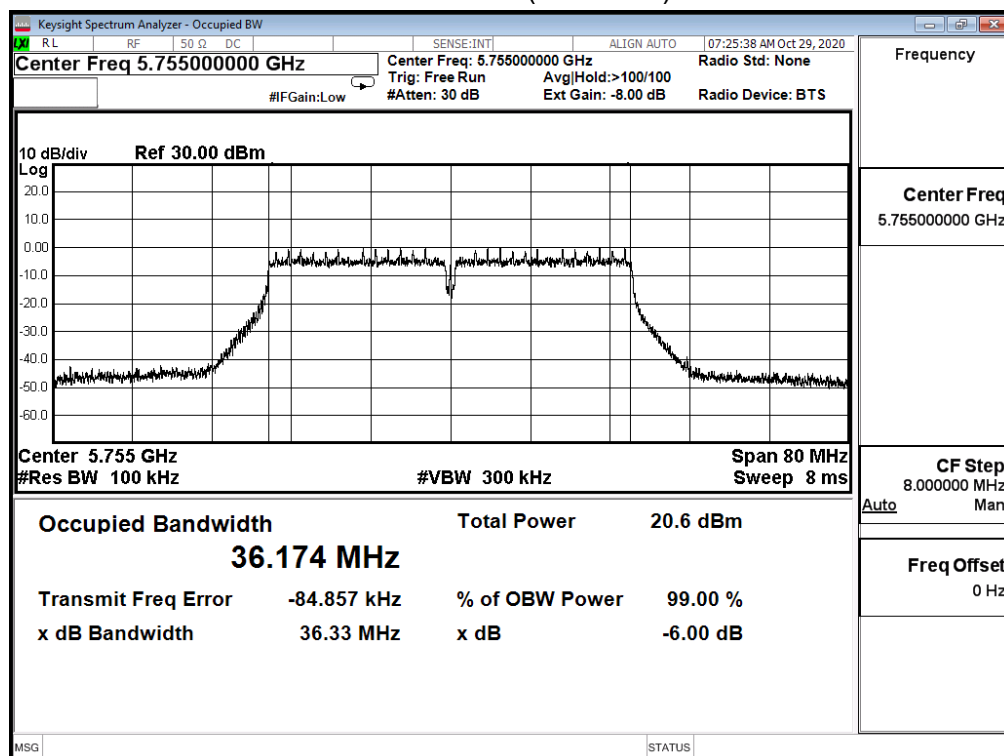
Channel 165 (5825MHz)



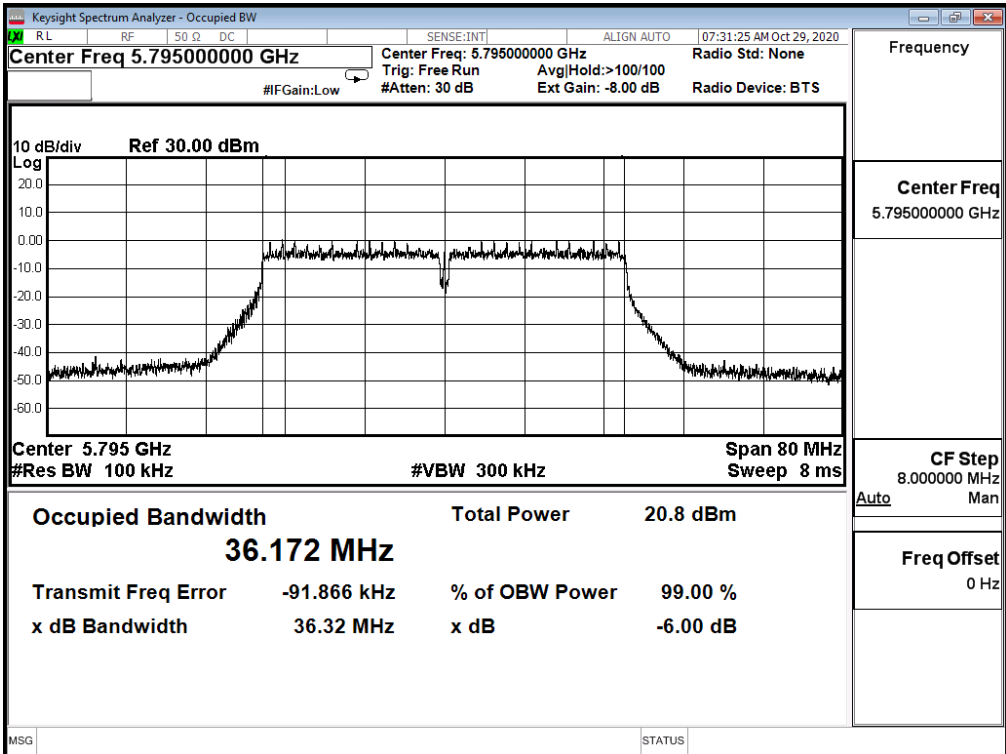
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
151	5755	36.330	>0.5	Pass
159	5795	36.320	>0.5	Pass

Channel 151 (5755MHz)



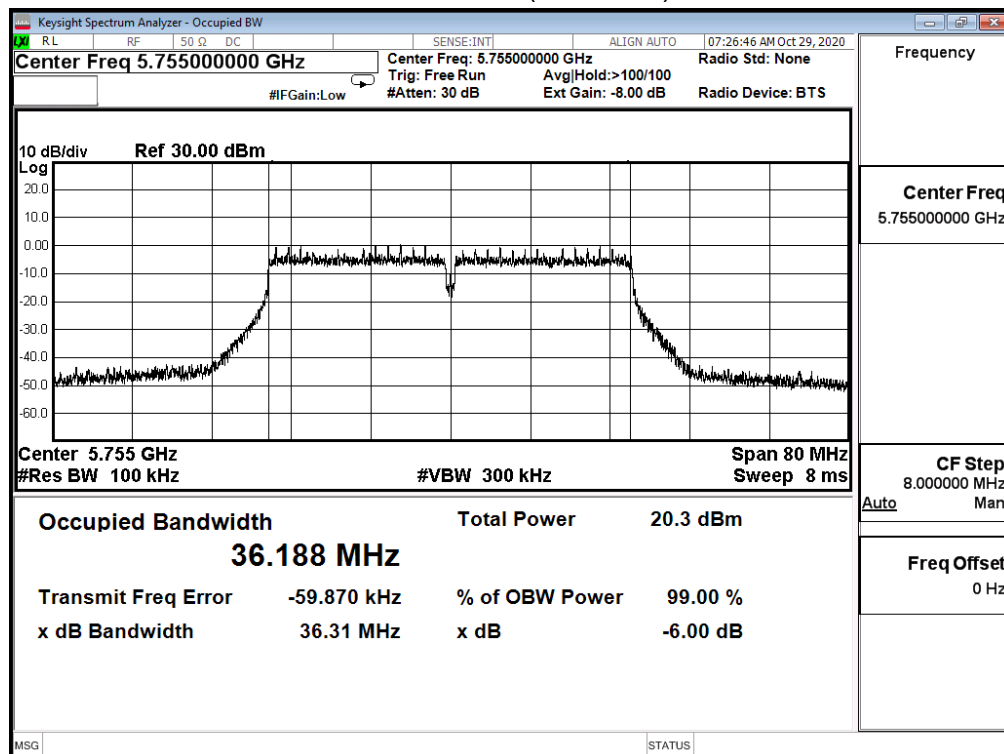
Channel 159 (5795MHz)



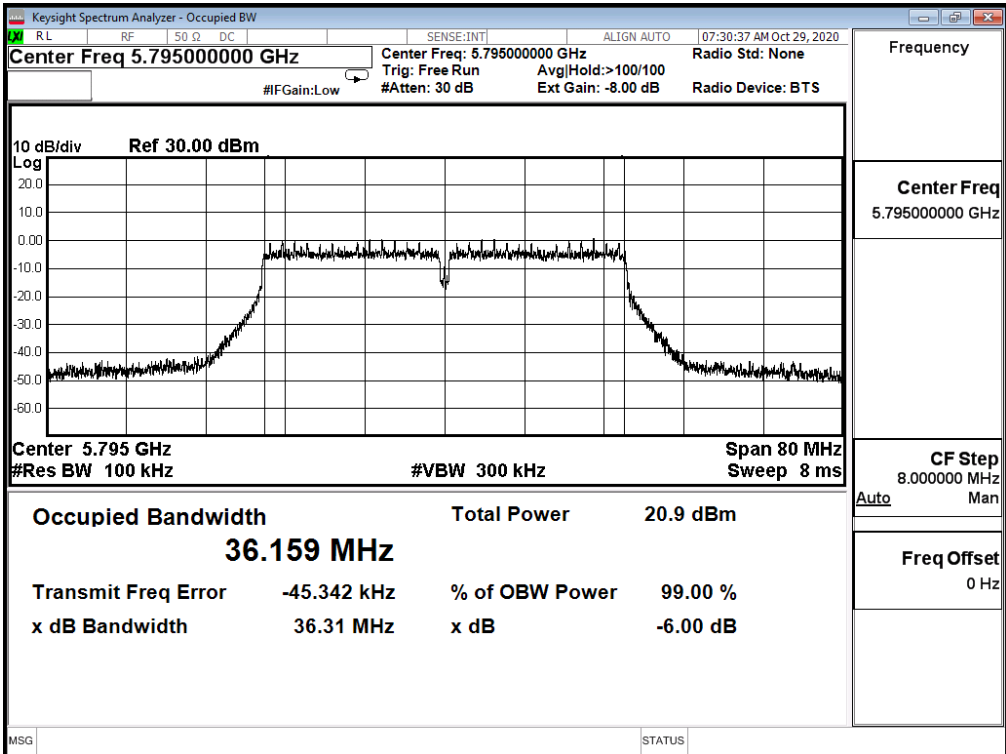
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
151	5755	36.310	>0.5	Pass
159	5795	36.310	>0.5	Pass

Channel 151 (5755MHz)



Channel 159 (5795MHz)

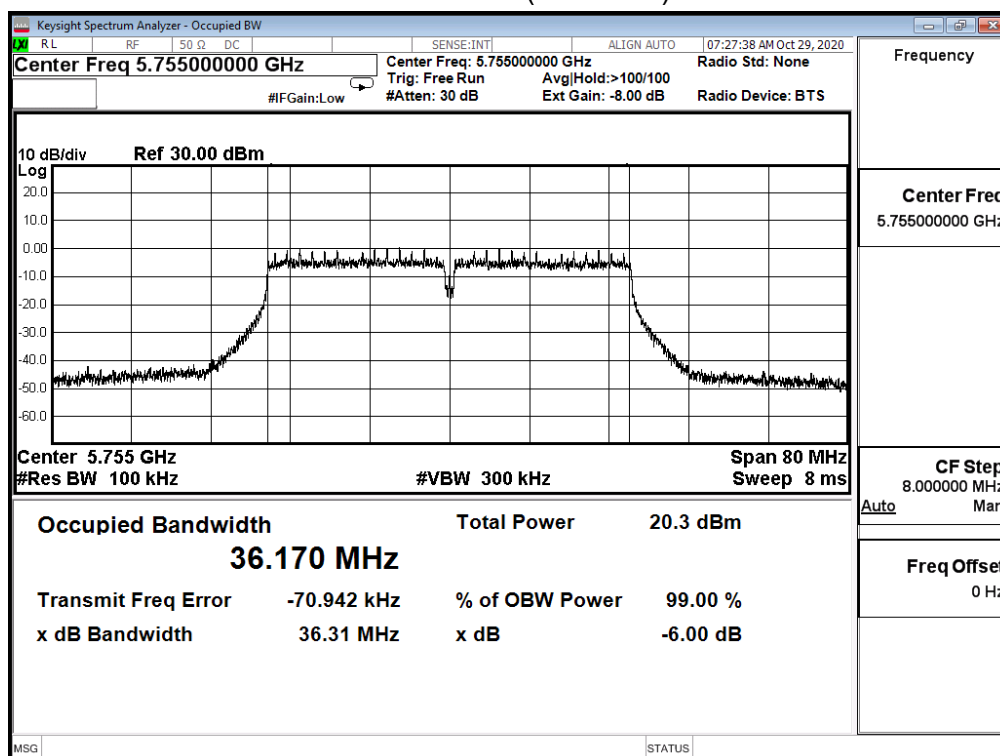


Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

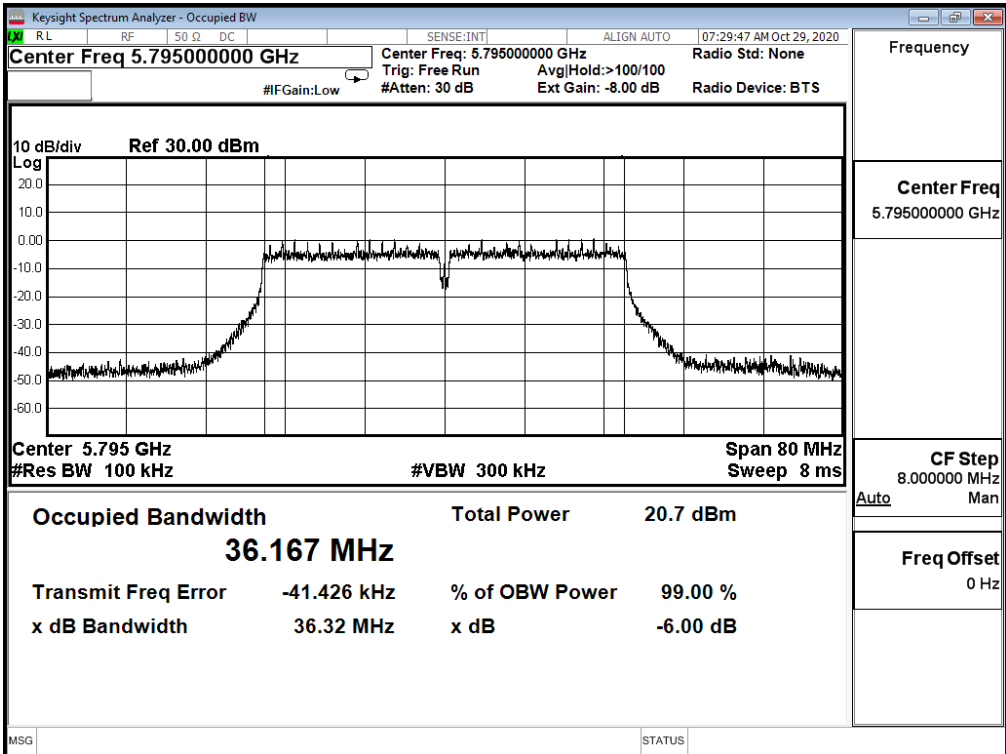
IEEE 802.11ac_40M(ANT 2)

Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
151	5755	36.310	>0.5	Pass
159	5795	36.320	>0.5	Pass

Channel 151 (5755MHz)



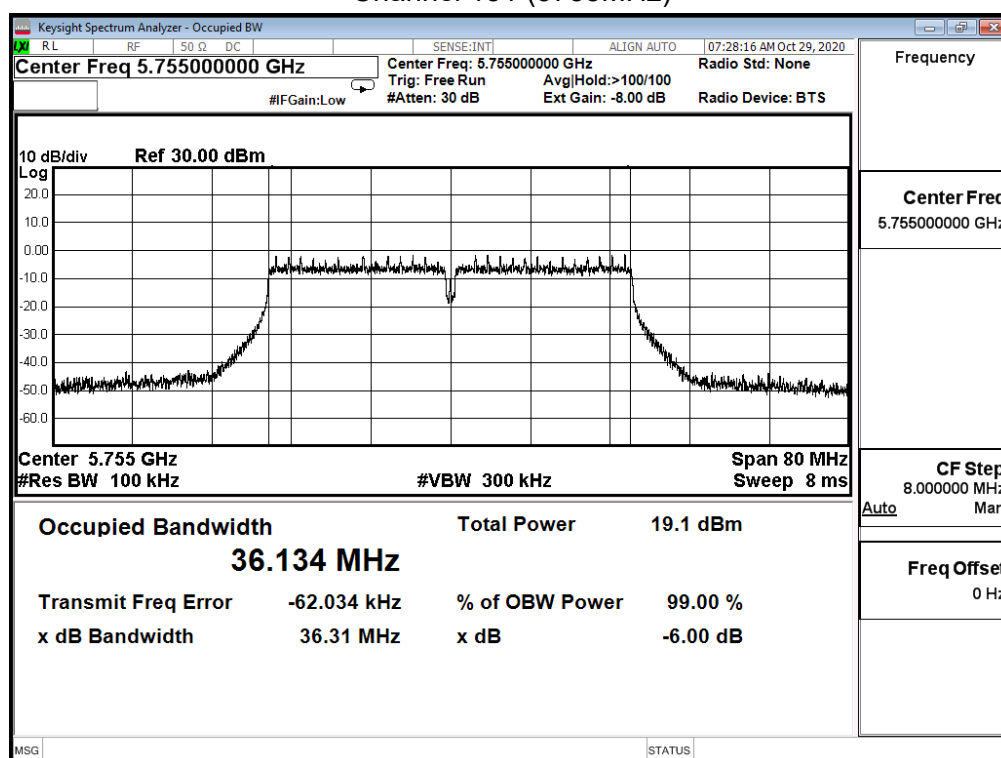
Channel 159 (5795MHz)



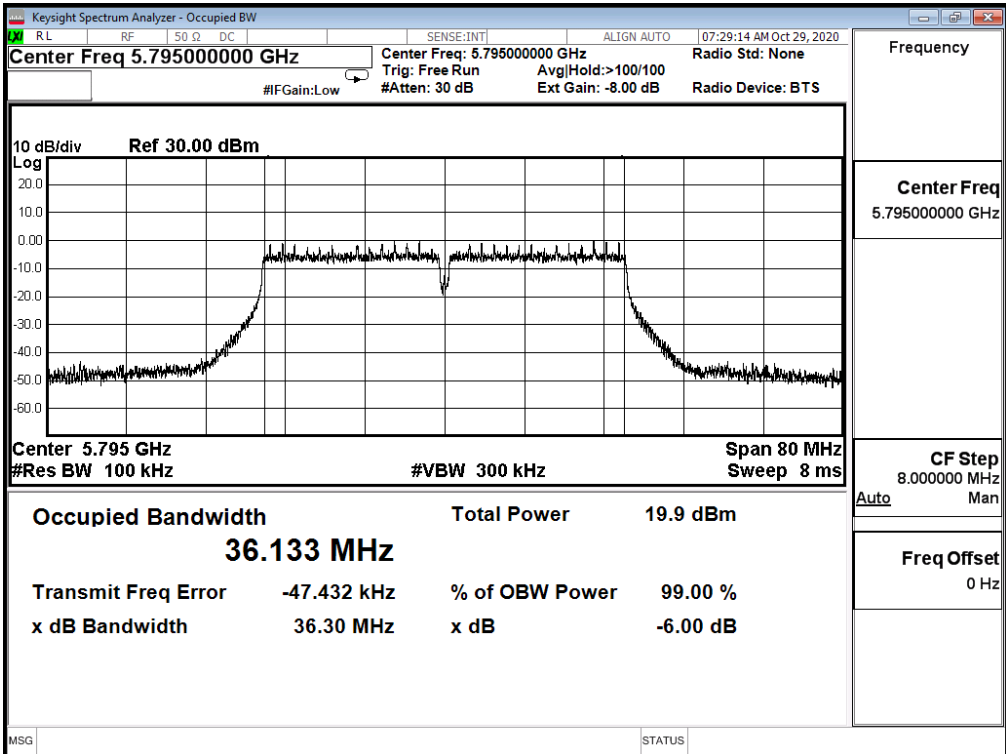
Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_40M(ANT 3)				
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
151	5755	36.310	>0.5	Pass
159	5795	36.300	>0.5	Pass

Channel 151 (5755MHz)



Channel 159 (5795MHz)

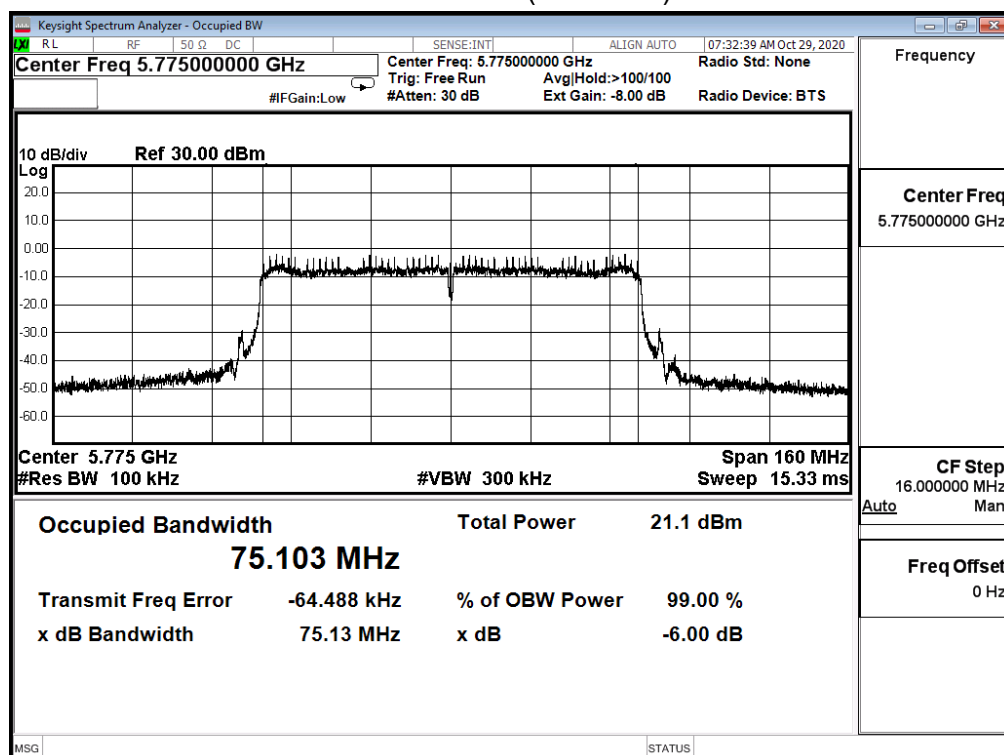


Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 0)

Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
155	5775	75.130	>0.5	Pass

Channel 155 (5775MHz)

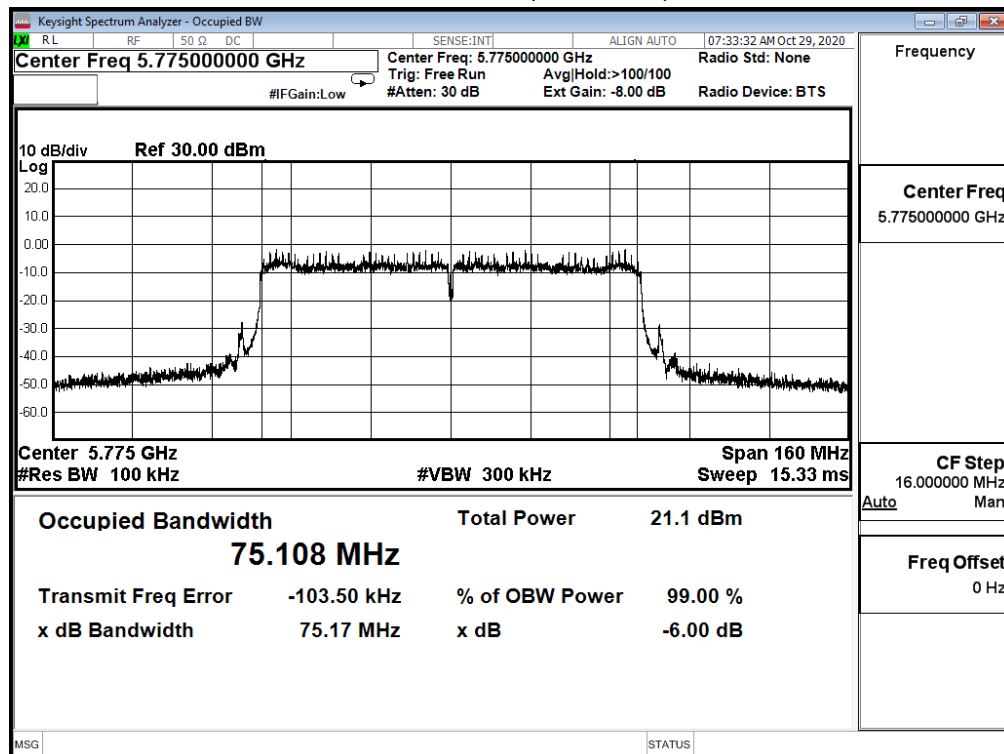


Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 1)

Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
155	5775	75.170	>0.5	Pass

Channel 155 (5775MHz)

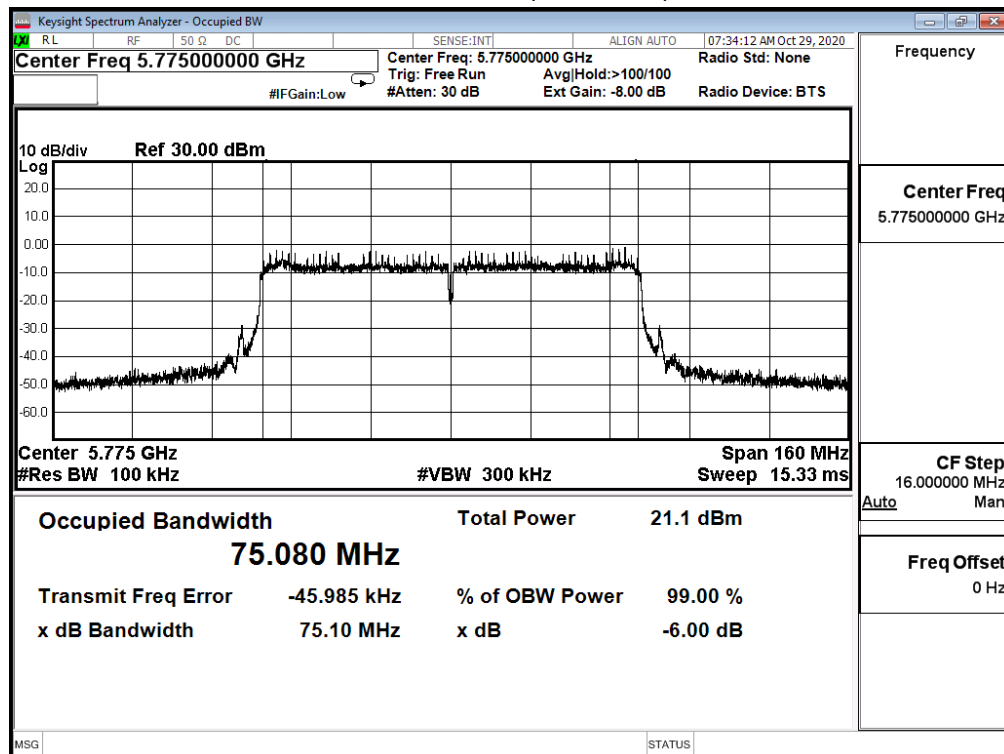


Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 2)

Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
155	5775	75.100	>0.5	Pass

Channel 155 (5775MHz)

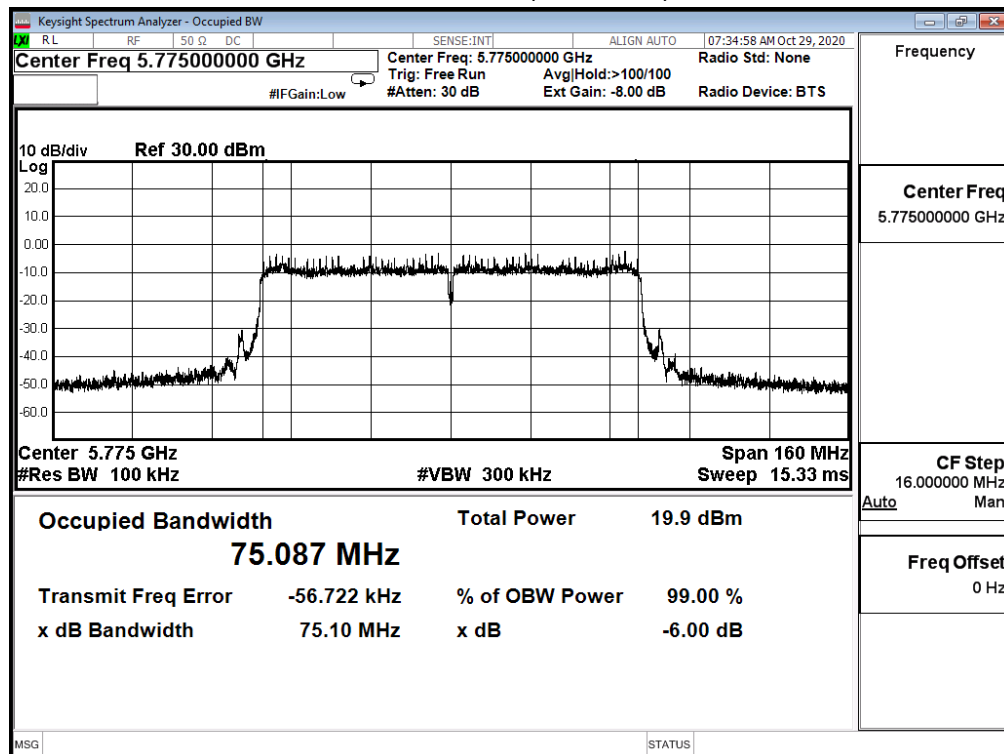


Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	DTS Bandwidth		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/29	Test Site	SR12-H
Temperature(°C)	24	Humidity (%RH)	64

IEEE 802.11ac_80M(ANT 3)

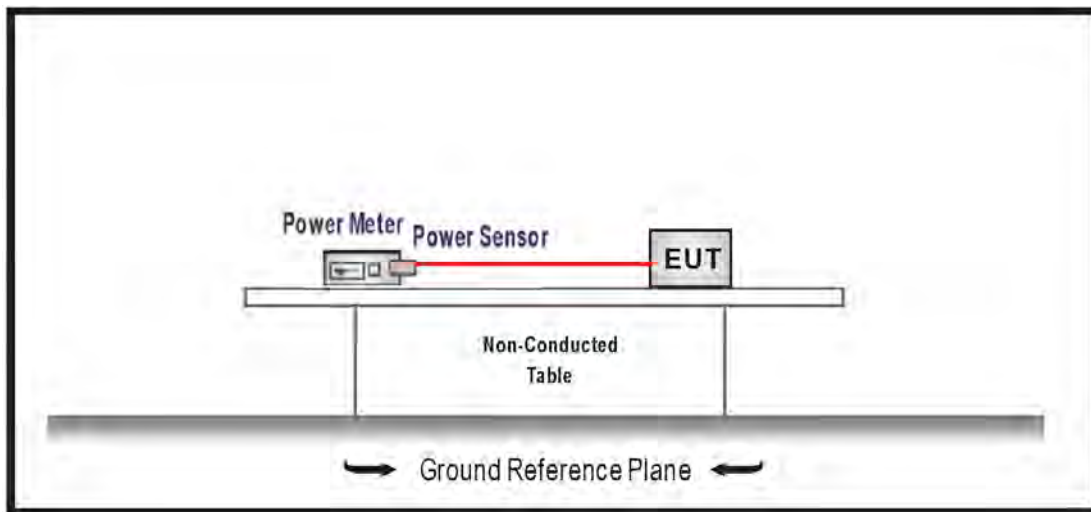
Channel No.	Frequency (MHz)	Measure Value (MHz)	Limit (MHz)	Result
155	5775	75.100	>0.5	Pass

Channel 155 (5775MHz)



4. Maximum conducted output power

4.1. Test Setup



4.2. Limits

1. For the band 5.15-5.25 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1W. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For 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. 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.
3. For the band 5.25-5.35 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
4. For the band 5.725-5.850 GHz, the Maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1W. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of KDB 789033 D02 v02r01 for compliance to FCC 47CFR Subpart E requirements. The Method PM-G of the Maximum conducted output power was used.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

4.4. Test Result

Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum conducted output power		
Test Mode	Mode 1: Transmit Mode (SISO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11a

5GHz UNII 1:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)				Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	
36	5180	18.440	18.350	17.920	17.870	≤30.000
44	5220	17.490	17.480	16.710	17.210	≤30.000
48	5240	18.150	18.120	17.560	18.110	≤30.000

The worst emission of data rate is 6 Mbps.

5GHz UNII 3:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)				Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	
149	5745	14.220	13.910	13.920	13.420	≤30.000
157	5785	14.210	13.410	13.770	12.910	≤30.000
165	5825	14.150	13.950	13.560	13.320	≤30.000

The worst emission of data rate is 6 Mbps.

Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum conducted output power		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11ac (20MHz)

5GHz UNII 1:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
36	5180	15.800	15.750	15.110	15.130	21.480	≤ 30.000
44	5220	15.850	15.520	15.140	15.210	21.460	≤ 30.000
48	5240	16.670	16.090	15.840	16.210	22.234	≤ 30.000

The worst emission of data rate is MCS0

5GHz UNII 3:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
149	5745	13.620	13.130	13.240	12.450	19.151	≤ 30.000
157	5785	13.220	12.760	12.350	12.150	18.660	≤ 30.000
165	5825	14.320	13.890	13.310	13.440	19.779	≤ 30.000

The worst emission of data rate is MCS0

Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum conducted output power		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11ac (40MHz)

5GHz UNII 1:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
38	5190	15.780	15.740	15.210	15.390	21.557	≤ 30.000
46	5230	16.190	16.050	15.260	15.440	21.773	≤ 30.000

The worst emission of data rate is MCS0

5GHz UNII 3:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
151	5755	15.050	14.590	14.560	14.000	20.586	≤ 30.000
159	5795	15.560	15.330	15.120	14.660	21.201	≤ 30.000

The worst emission of data rate is MCS0

Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum conducted output power		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11ac (80MHz)

5GHz UNII 1:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
42	5210	14.950	14.790	14.530	14.720	20.771	≤ 30.000

The worst emission of data rate is MCS0

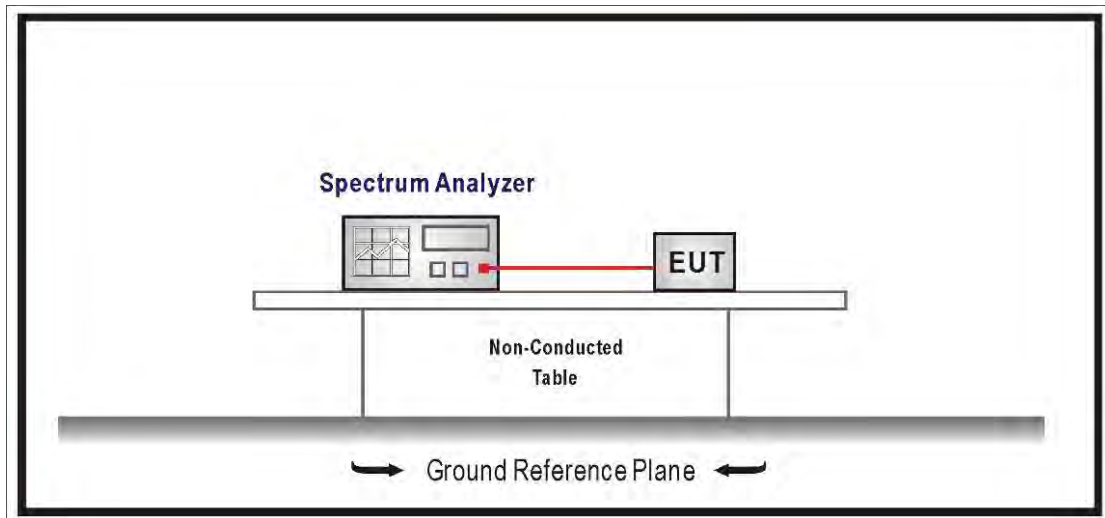
5GHz UNII 3:

Channel No.	Frequency (MHz)	Max. Conducted Output Power (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
155	5775	15.810	15.360	15.170	14.770	21.314	≤ 30.000

The worst emission of data rate is MCS0

5. Maximum power spectral density

5.1. Test Setup



5.2. Limits

1. For the band 5.15-5.25 GHz, the Maximum power spectral density shall not exceed 17 dBm in any 1MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For 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, 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
3. For the band 5.25-5.35 GHz, the Maximum power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
4. For the band 5.725-5.850 GHz, the Maximum power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi..

5.3. Test Procedure

The EUT was setup to ANSI C63.10: 2013; tested to U-NII test procedure of KDB 789033 D02 v02r01 for compliance to FCC 47CFR Subpart E requirements.

For Band1 : Set RBW=1MHz, VBW=3MHz with RMS detector. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging.

For Band4 : Set RBW=500KHz, VBW=1.5MHz with RMS detector. The PPSD is the highest level found across the emission in any 500KHz band after 100 sweeps of averaging.

5.4. Test Result

Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum power spectral density		
Test Mode	Mode 1: Transmit Mode (SISO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11a

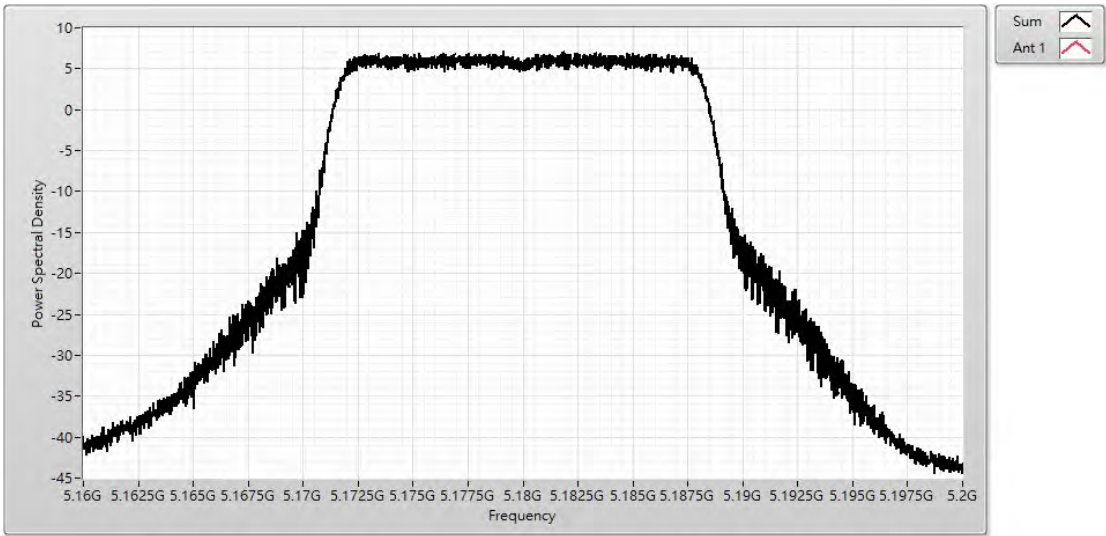
5GHz UNII 1:

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)
		Ant. 0	
36	5180	7.130	≤ 17
44	5220	6.110	≤ 17
48	5240	6.740	≤ 17

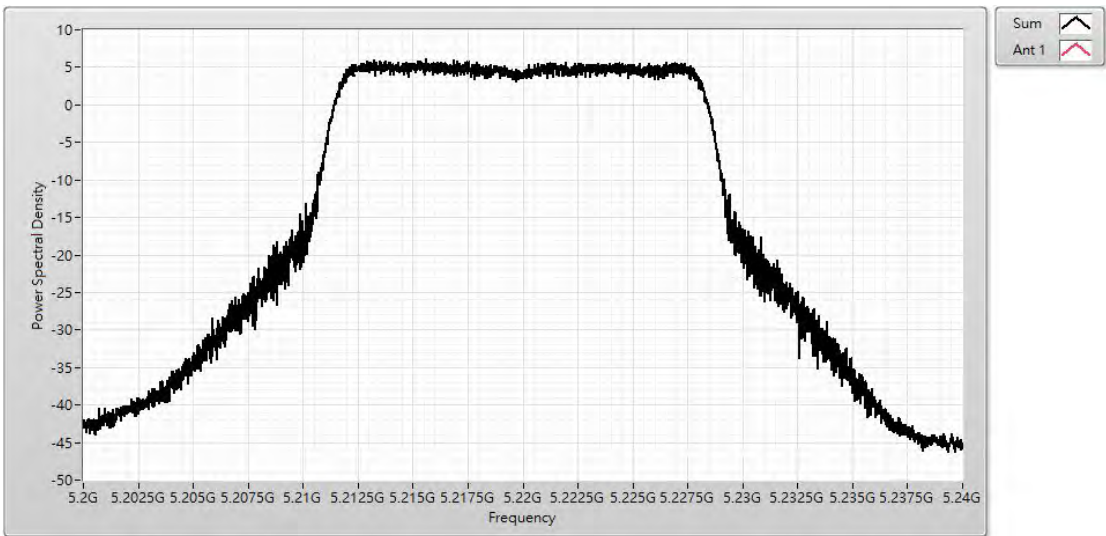
5GHz UNII 3:

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)
		Ant. 0	
149	5745	-0.390	≤ 30
157	5785	-0.400	≤ 30
165	5825	-0.380	≤ 30

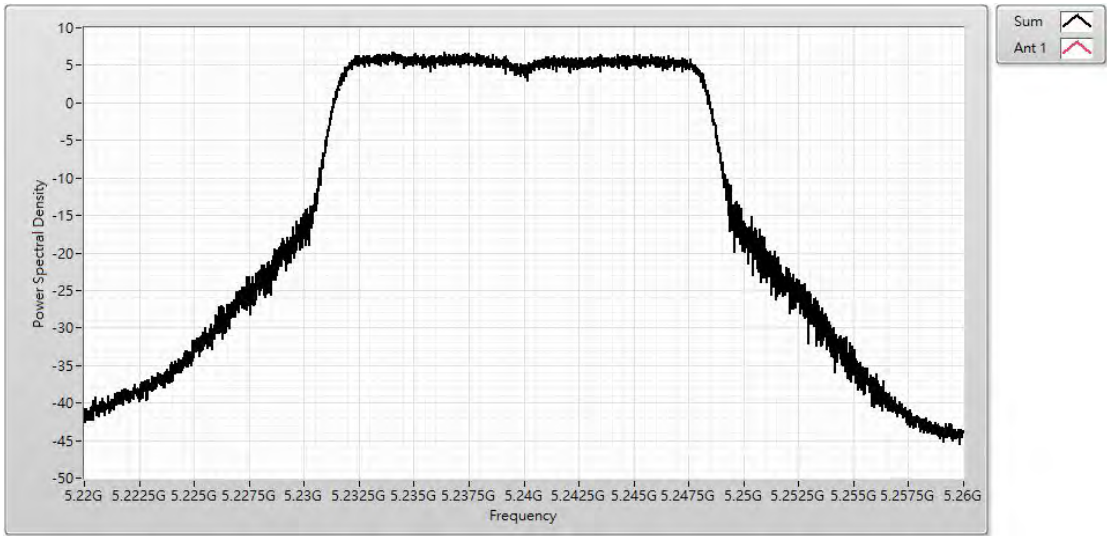
Channel 36 (5180MHz)



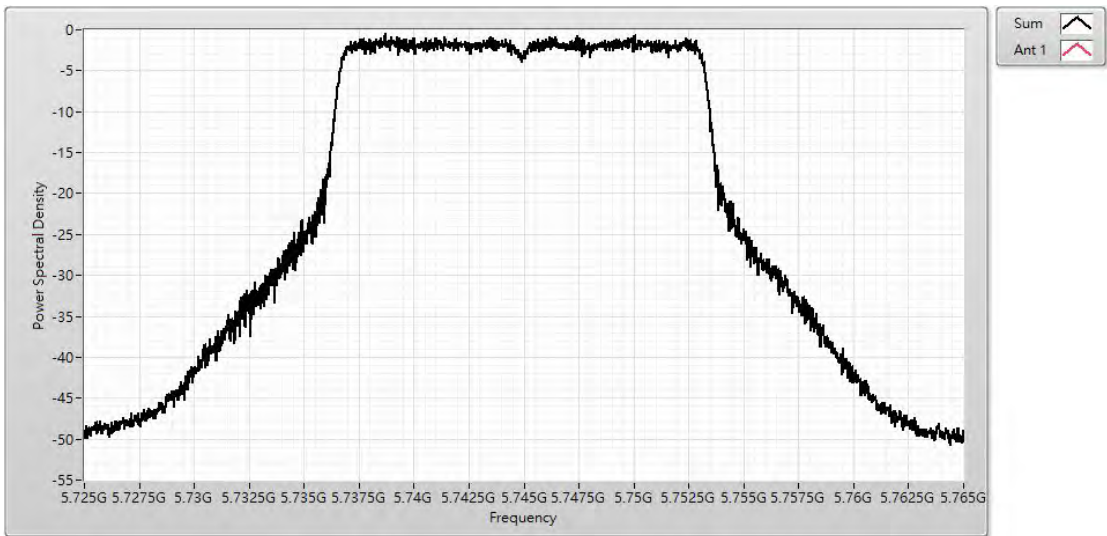
Channel 44 (5220MHz)



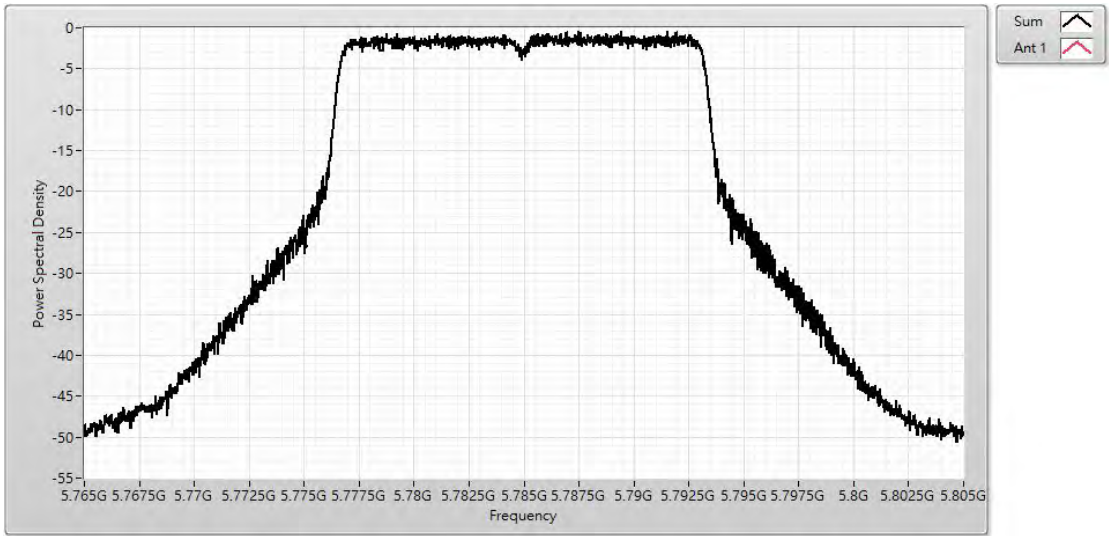
Channel 48 (5240MHz)



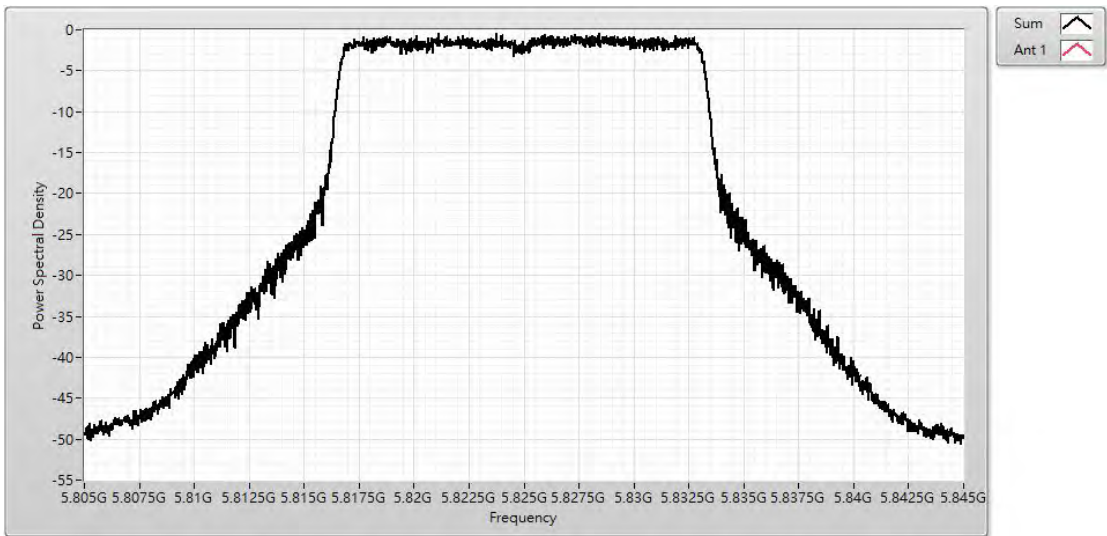
Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum power spectral density		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11ac (20MHz)

5GHz UNII 1:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
36	5180	4.42	4.42	3.63	3.98	9.46	≤ 17
44	5220	4.39	3.70	3.64	4.02	9.25	≤ 17
48	5240	5.24	4.66	4.21	4.28	10.15	≤ 17

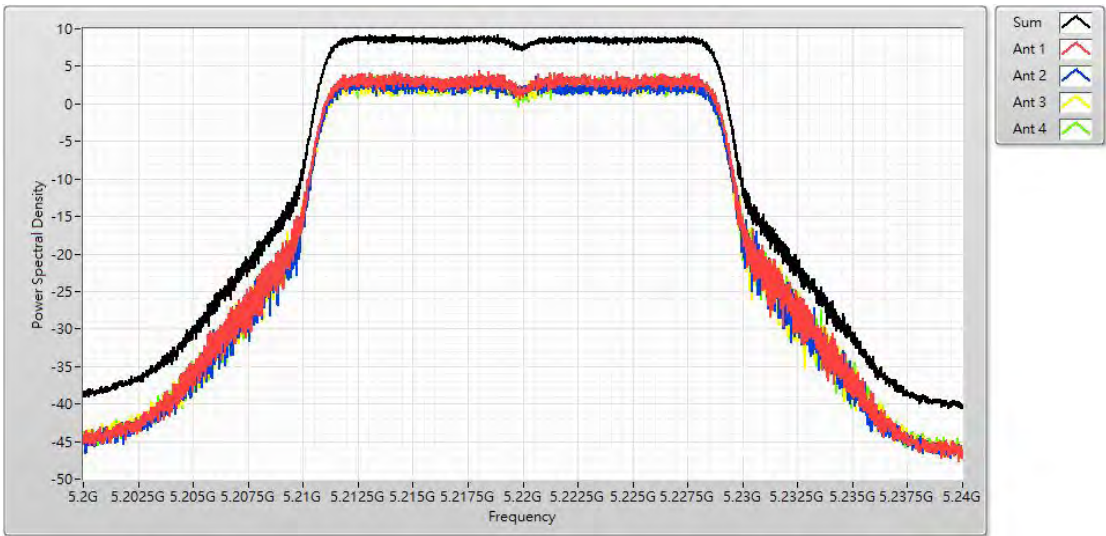
5GHz UNII 3:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
149	5745	-1.61	-2.14	-2.17	-2.65	3.19	≤ 30
157	5785	-1.53	-1.80	-2.60	-2.83	3.46	≤ 30
165	5825	-0.24	-1.12	-1.40	-1.18	4.59	≤ 30

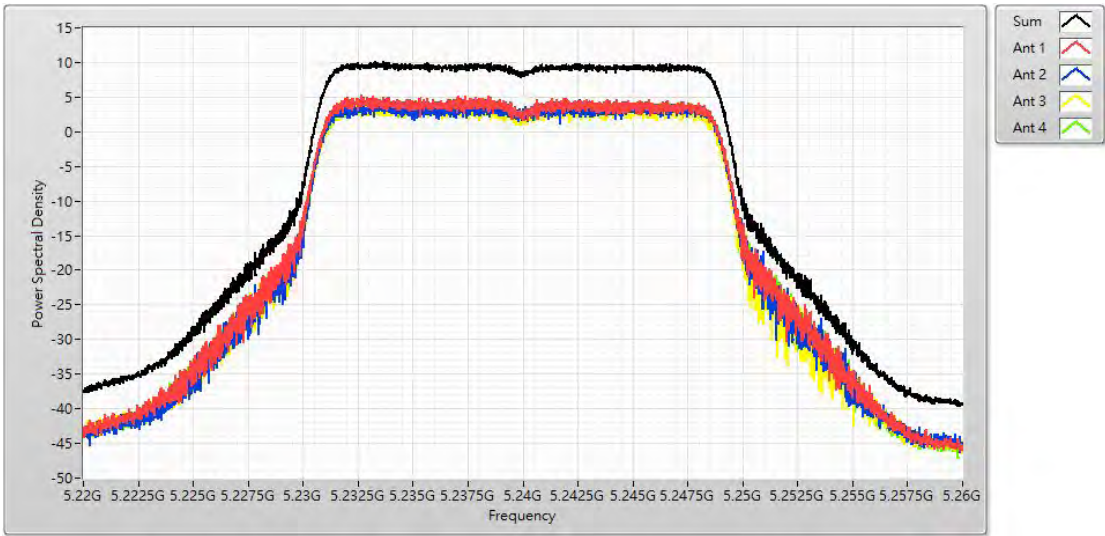
Channel 36 (5180MHz)



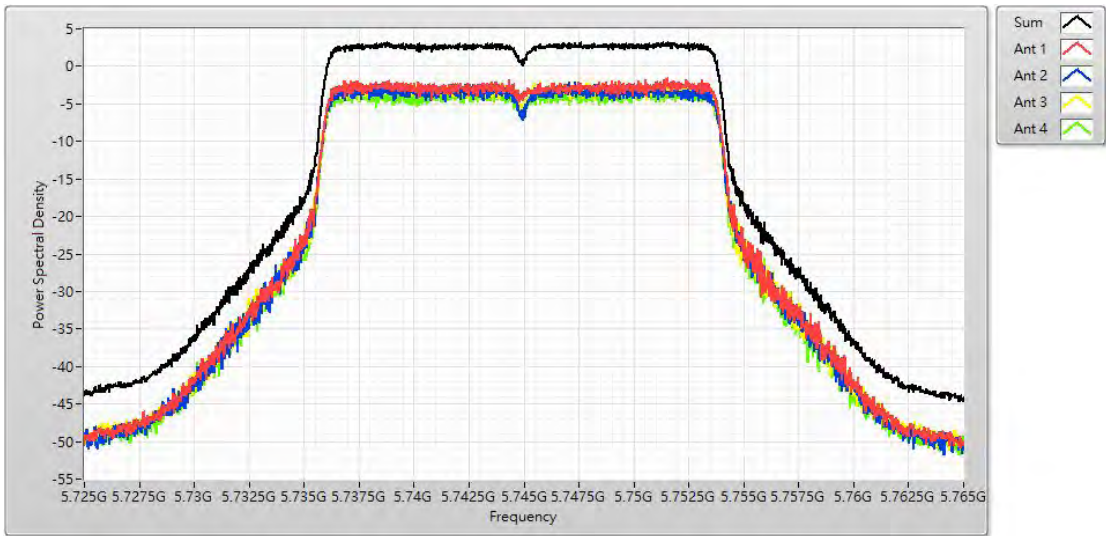
Channel 44 (5220MHz)



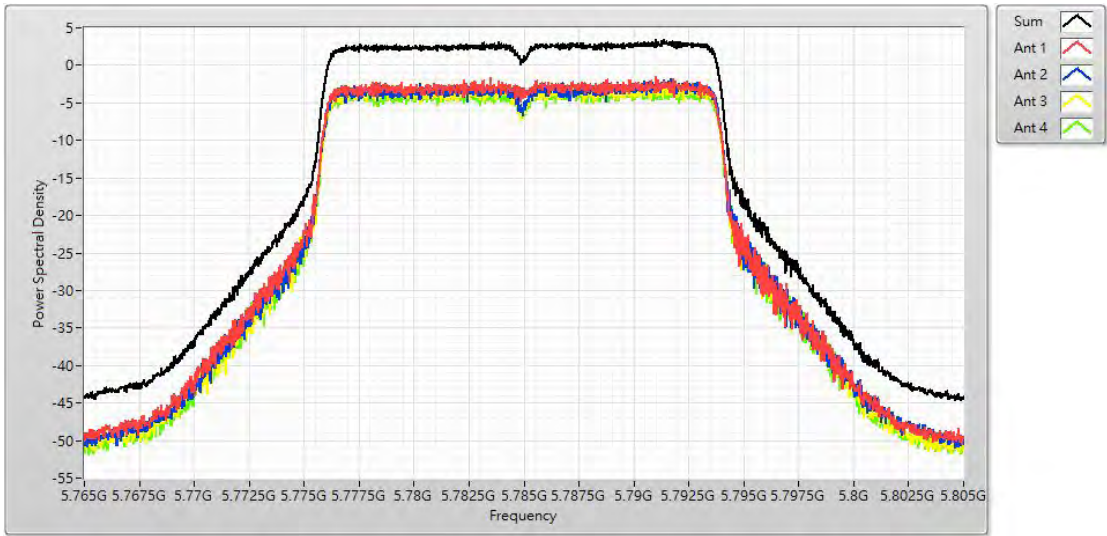
Channel 48 (5240MHz)



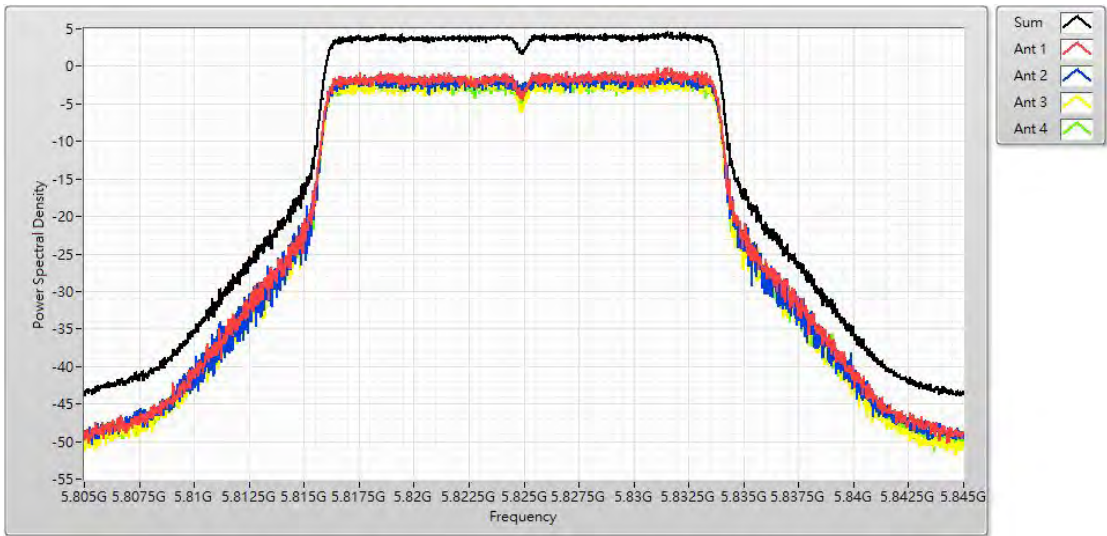
Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum power spectral density		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/10/26	Test Site	SR12-H
Temperature(°C)	22	Humidity (%RH)	55

IEEE 802.11ac (40MHz)

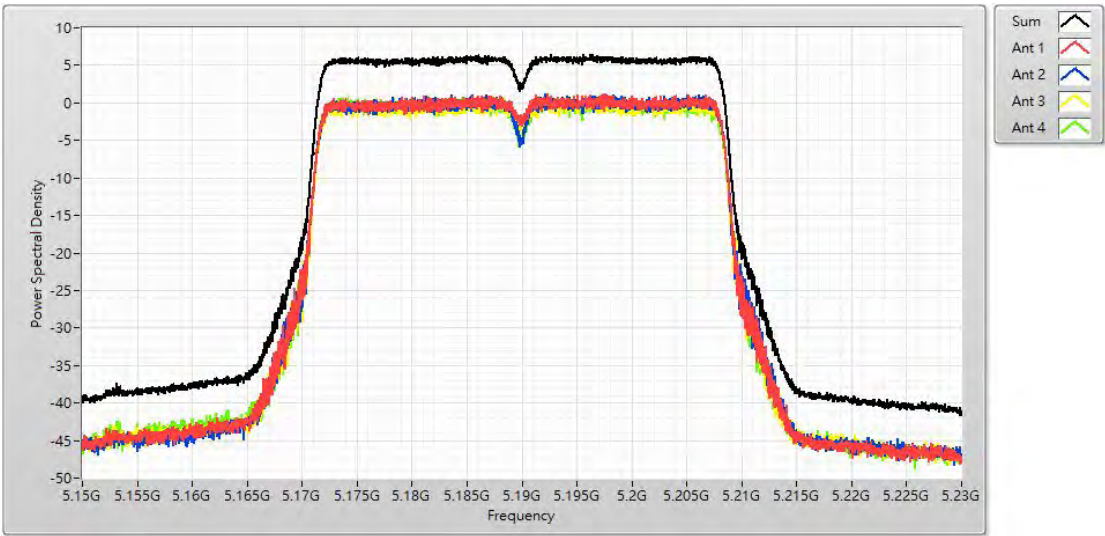
5GHz UNII 1:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
38	5190	1.25	1.15	0.78	0.81	6.48	≤ 17
46	5230	1.19	1.11	0.49	0.82	6.27	≤ 17

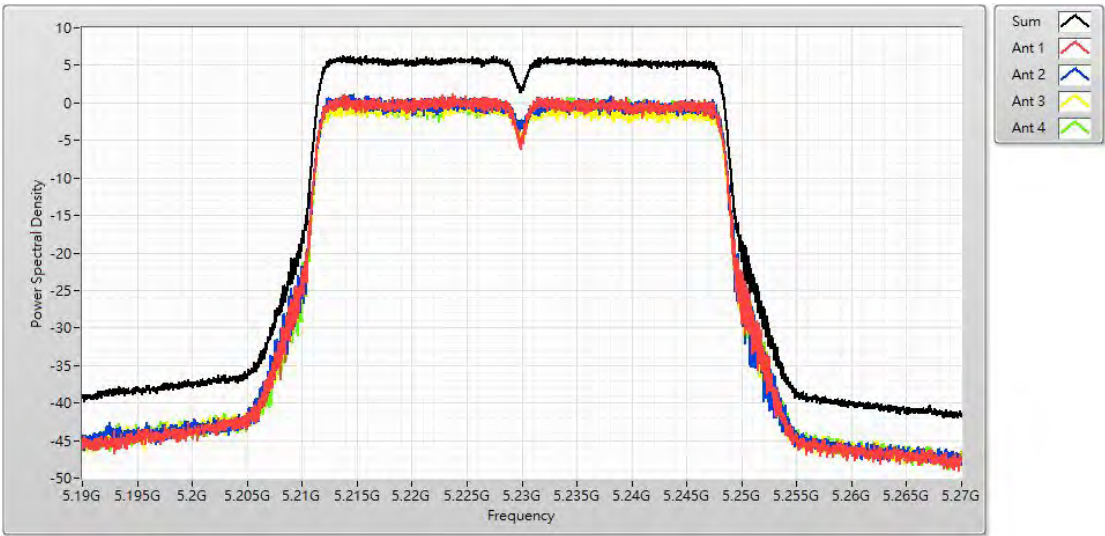
5GHz UNII 3:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
151	5755	-3.37	-4.00	-3.91	-4.75	1.44	≤ 30
159	5795	-1.96	-2.67	-2.84	-3.17	2.93	≤ 30

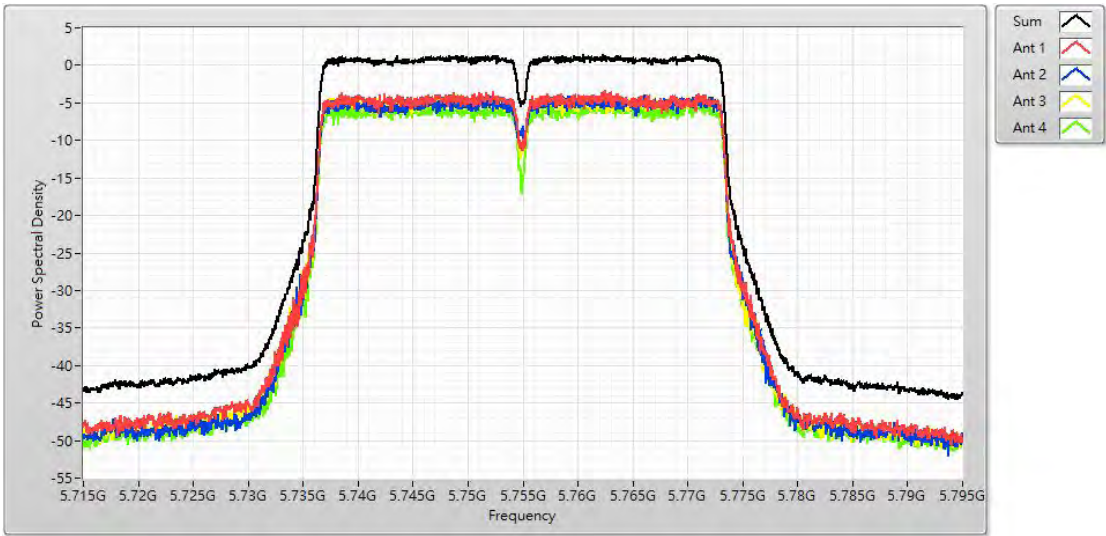
Channel 38 (5190MHz)



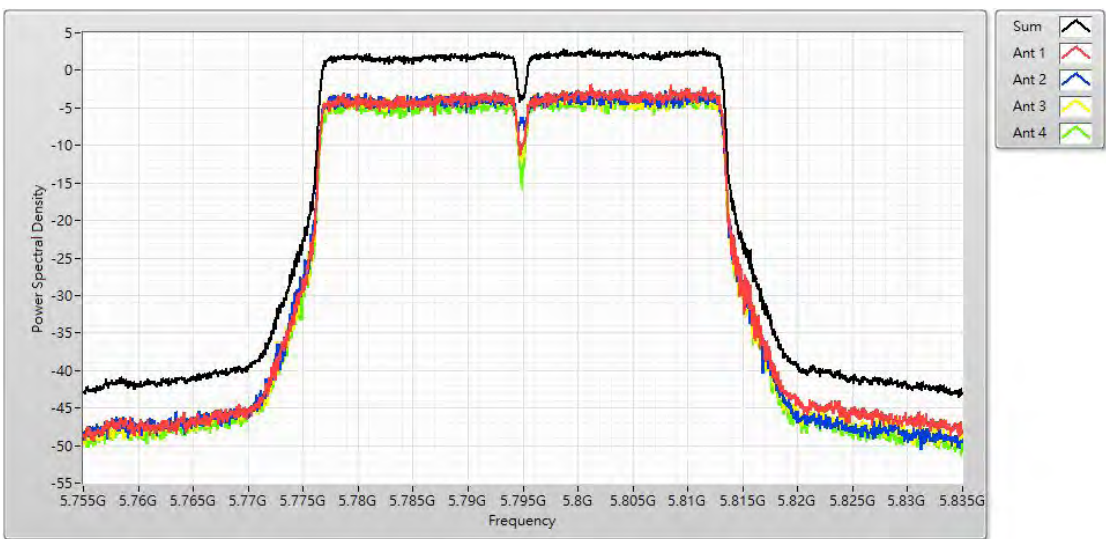
Channel 46 (5230MHz)



Channel 151 (5755MHz)



Channel 159 (5795MHz)



Product	Active Ethernet Fiber 802.11ac Gateway with VoIP		
Test Item	Maximum power spectral density		
Test Mode	Mode 1: Transmit Mode (MIMO)		
Date of Test	2020/09/12~2020/10/17	Test Site	SR12-H
Test Temperature	25.0°C	Test Humidity	61.0%

IEEE 802.11ac (80MHz)

5GHz UNII 1:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
42	5210	-2.73	-2.99	-3.06	-2.81	2.61	≤ 17

5GHz UNII 3:

Channel No.	Frequency (MHz)	Measure Level (dBm)					Limit (dBm)
		Ant. 0	Ant. 1	Ant. 2	Ant. 3	Total	
155	5775	-4.76	-5.31	-5.57	-5.12	0.43	≤ 30

Channel 42 (5210MHz)



Channel 155 (5775MHz)

