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FCC Test Report

Product Name	Humly Room Display One
Model No	HUM1001
FCC ID	2APYB-HUM1001

Applicant	Certus Eiger Ltd.
Address	814, Houston Center, Mody Road, TST East Kowloon, Hong Kong

Date of Receipt	Oct. 08, 2019
Issued Date	Nov. 13, 2019
Report No.	19A0116R-RFUSP64V00
Report Version	V1.0

Testing Laboratory
3023

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.
The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report

Issued Date: Nov. 13, 2019
Report No.: 19A0116R-RFUSP64V00

Product Name	Humly Room Display One
Applicant	Certus Eiger Ltd.
Address	814, Houston Center, Mody Road, TST East Kowloon, Hong Kong
Manufacturer	Certus Eiger Ltd.
Model No.	HUM1001
FCC ID.	2APYB-HUM1001
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 110 V / 50 Hz
Trade Name	Humly
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033
Test Result	Complied

Documented By : Rita Huang

(Senior Adm. Specialist / Rita Huang)

Tested By : Yun Che Chen

(Engineer / Yunche Chen)

Approved By :

(Director / Vincent Lin)

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Attachment 1: EUT Test Photographs
Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Humly Room Display One
Trade Name	Humly
FCC ID.	2APYB-HUM1001
Model No.	HUM1001
Frequency Range	802.11a/n/ac-20MHz: 5180-5320MHz, 5500-5720MHz, 5745-5825MHz 802.11n/ac-40MHz: 5190-5310, 5510-5710MHz, 5755-5795MHz 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz, 5775MHz
Number of Channels	802.11a/n/ac-20MHz: 25, 802.11n/ac-40MHz: 12, 802.11ac-80MHz: 6
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 300Mbps 802.11ac-80MHz: up to 866.7Mbps
Type of Modulation	802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Channel Control	Auto
Antenna Type	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	ANJIE	AJDQ1J-B0027 (Main), AJDQ1J-W0020 (Aux)	PIFA Antenna	2.09dBi for 5.150-5.250 GHz 2.15dBi for 5.250-5.350 GHz 2.72dBi for 5.470-5.725 GHz 3.29dBi for 5.725~5.850 GH

Note: The antenna of EUT is conform to FCC 15.203

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 120:	5600 MHz	Channel 124:	5620 MHz	Channel 128:	5640 MHz
Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 MHz	Channel 144:	5720 MHz
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 54:	5270 MHz	Channel 62:	5310 MHz
Channel 102:	5510 MHz	Channel 110:	5550 MHz	Channel 118:	5590 MHz	Channel 126:	5630 MHz
Channel 134:	5670 MHz	Channel 142:	5710 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 58:	5290 MHz	Channel 106:	5530 MHz	Channel 122:	5610 MHz
Channel 138:	5690 MHz	Channel 155:	5775 MHz				

Note:

1. This device is a Humly Room Display One with built-in WLAN (802.11a/b/g/n/ac) and Bluetooth (5.0 and V3.0+HS, V2.1+EDR) transceiver,this report for 5GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
6. The consider Co-Location based on KDB 996369 D02 Question 1 and KDB 996369 D04 for Radiated Spurious Emission.

Test Mode	Mode 1: Transmit (802.11a) Mode 2: Transmit (802.11n20) Mode 3: Transmit (802.11n40) Mode 4: Transmit (802.11ac80) Mode 5: Transmit (802.11a+NFC) Mode 6: Transmit (802.11n20+NFC) Mode 7: Transmit (802.11n40+NFC) Mode 8: Transmit (802.11ac80+NFC)

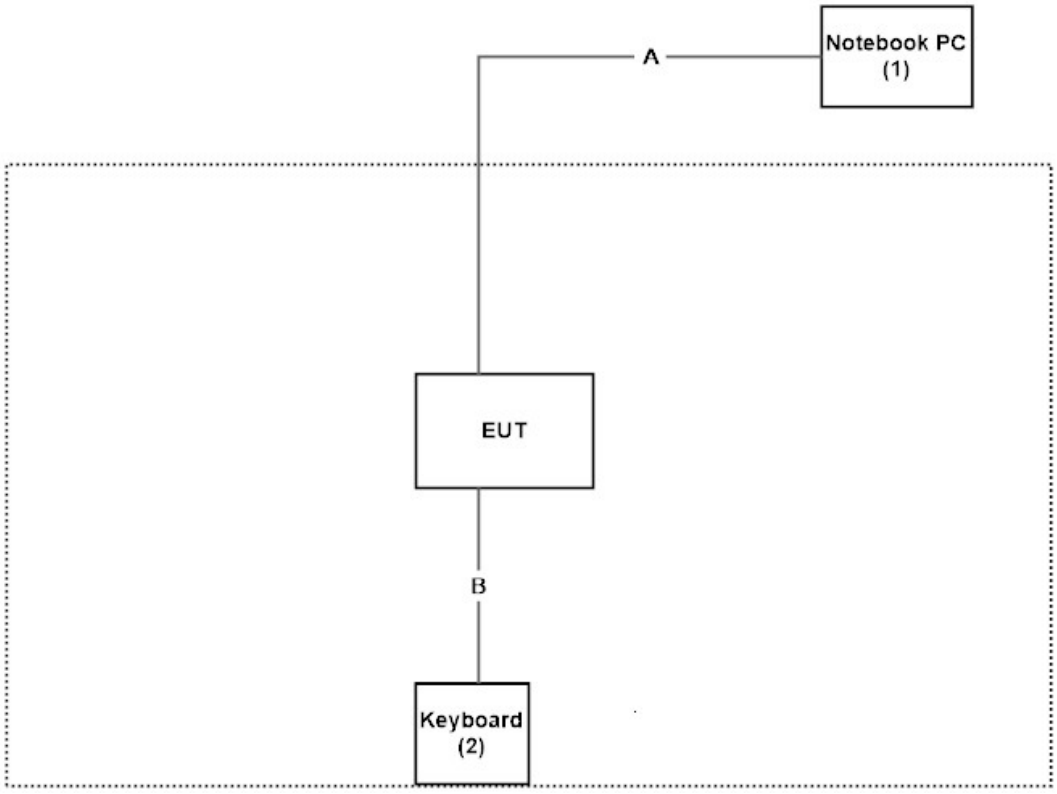
1.3. Tested System Datails

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

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude E5440	B6TYTZ1	Non-Shielded, 0.8m
2	Keyboard	Dell	SK-8175	MY-0W217F-71619-092-0497-A01	N/A

Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded, 2.0m
B	Keyboard Cable	Shielded, 1.8m

1.4. Configuration of tested System



1.5. EUT Exercise Software

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

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1.6. Test Facility

Ambient conditions in the laboratory:

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

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: http://www.dekra.com.tw

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1.7. List of Test Equipment

Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2019/02/26	2020/02/25
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
X	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/19	2019/11/18
X	LISN	R&S	ENV216	101105	2019/04/10	2020/04/09
X	LISN	R&S	ESH3-Z5	836679/014	2019/04/10	2020/04/09
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/20	2020/06/19

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version :DEKRA Conduction Test SystemV9.0.5.

For` Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/03/11	2020/03/10
X	Loop Antenna	Teseq	HLA6121	37133	2019/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2794	2019/06/23	2020/06/22
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2019/05/02	2020/05/01
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
X	Amplifier	EMCI	EMC051845SE	SN980632	2019/08/08	2020/08/07
X	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
X	Amplifier + Cable	EMCI	EMC184045SE	980369	2019/04/16	2020/04/15
	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2019/06/23	2020/06/22
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2019/06/28	2020/06/27
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
X	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version :QuieTek EMI System V2.1.134.

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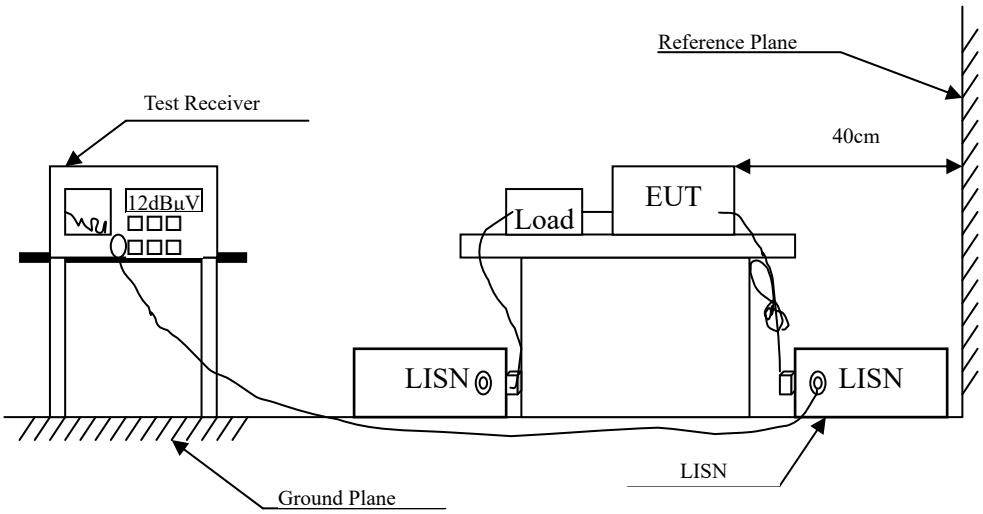
2. Conducted Emission

2.1. Test Setup



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2.2. Limits

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

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

2.3. Test Procedure

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

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2014 on conducted measurement.

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

The EUT was setup to ANSI C63.4, 2014; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

2.4. Uncertainty

± 2.26 dB

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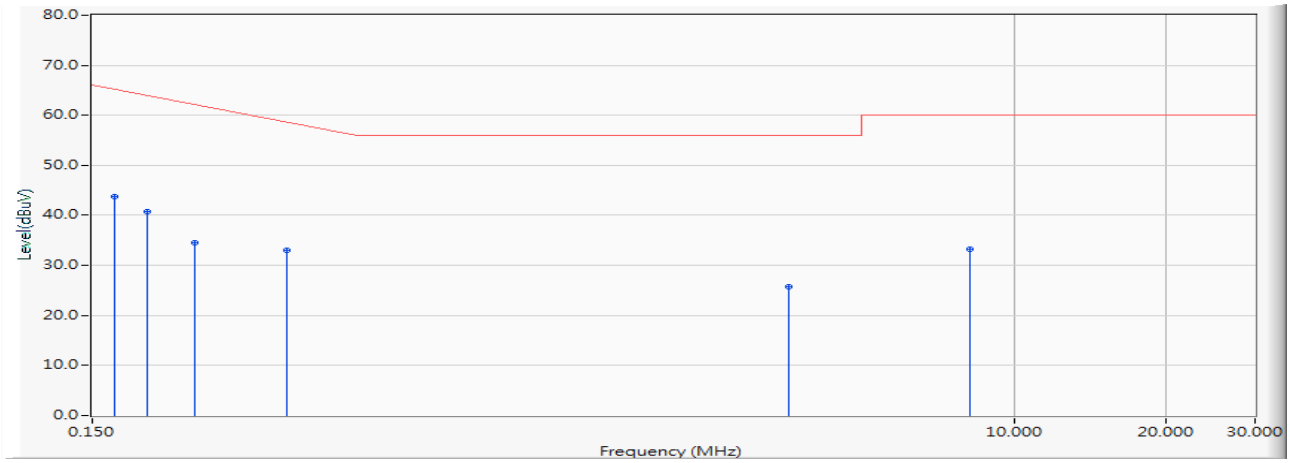
2.5. Test Result of Conducted Emission

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5210MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.166	9.669	34.140	43.809	-21.734	65.543	QUASIPEAK
2		0.193	9.670	30.990	40.660	-24.111	64.771	QUASIPEAK
3		0.240	9.673	24.770	34.443	-28.986	63.429	QUASIPEAK
4		0.365	9.679	23.450	33.129	-26.728	59.857	QUASIPEAK
5		3.591	9.831	15.980	25.811	-30.189	56.000	QUASIPEAK
6		8.166	9.965	23.280	33.245	-26.755	60.000	QUASIPEAK

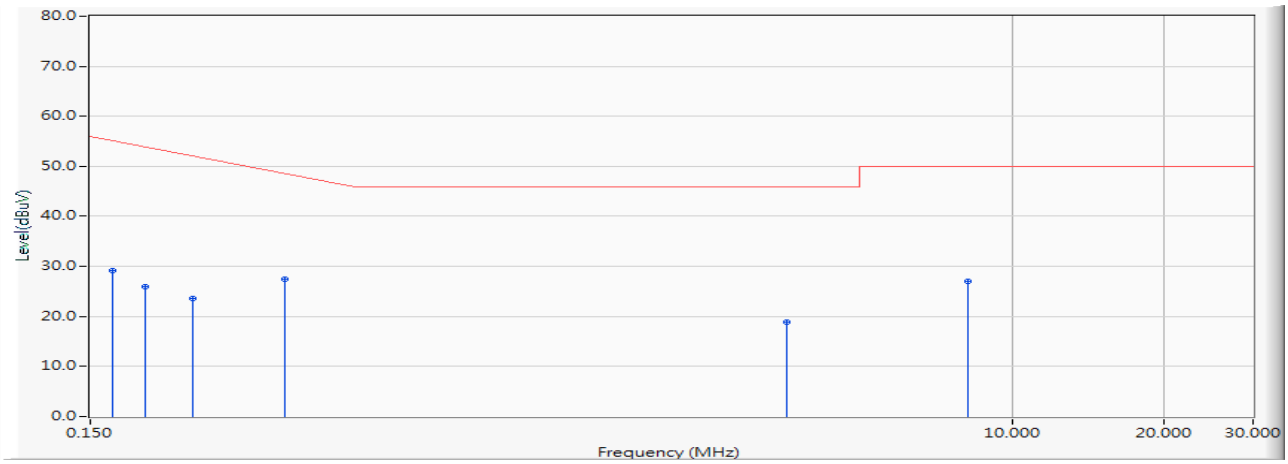
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5210MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.166	9.669	19.590	29.259	-26.284	55.543	AVERAGE
2		0.193	9.670	16.250	25.920	-28.851	54.771	AVERAGE
3		0.240	9.673	14.010	23.683	-29.746	53.429	AVERAGE
4	*	0.365	9.679	17.790	27.469	-22.388	49.857	AVERAGE
5		3.591	9.831	8.980	18.811	-27.189	46.000	AVERAGE
6		8.166	9.965	16.980	26.945	-23.055	50.000	AVERAGE

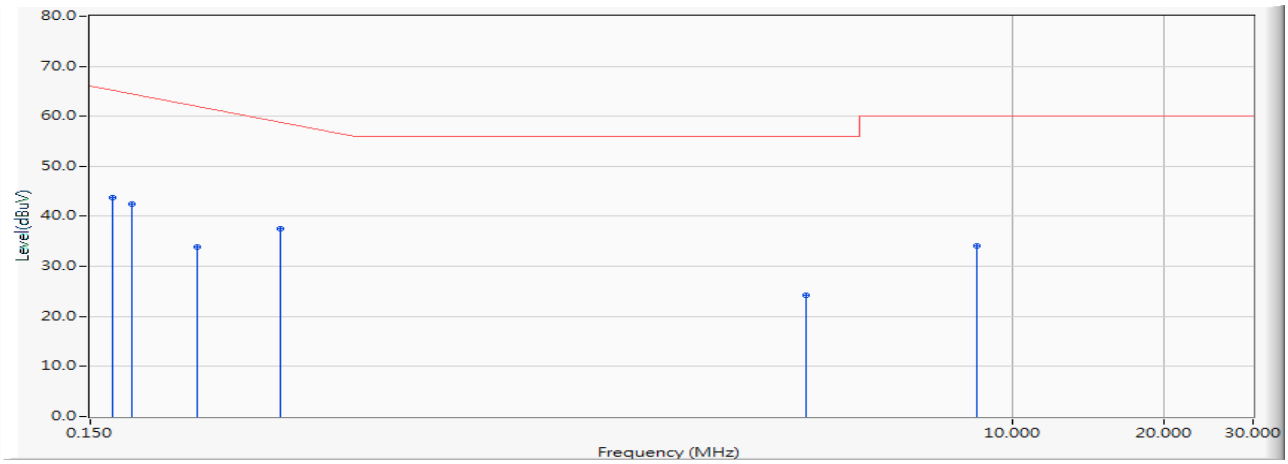
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5210MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.166	9.707	34.000	43.706	-21.837	65.543	QUASIPEAK
2		0.181	9.702	32.670	42.372	-22.742	65.114	QUASIPEAK
3		0.244	9.703	24.150	33.853	-29.461	63.314	QUASIPEAK
4		0.357	9.709	27.750	37.459	-22.627	60.086	QUASIPEAK
5		3.923	9.879	14.440	24.319	-31.681	56.000	QUASIPEAK
6		8.498	10.043	24.040	34.083	-25.917	60.000	QUASIPEAK

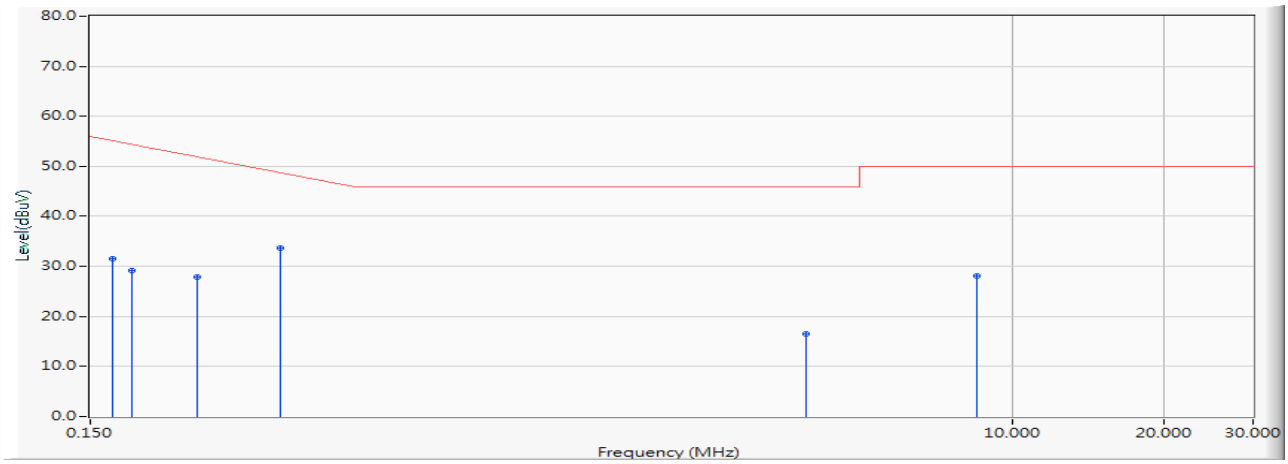
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5210MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.166	9.707	21.800	31.506	-24.037	55.543	AVERAGE
2		0.181	9.702	19.490	29.192	-25.922	55.114	AVERAGE
3		0.244	9.703	18.260	27.963	-25.351	53.314	AVERAGE
4	*	0.357	9.709	24.060	33.769	-16.317	50.086	AVERAGE
5		3.923	9.879	6.600	16.479	-29.521	46.000	AVERAGE
6		8.498	10.043	17.990	28.033	-21.967	50.000	AVERAGE

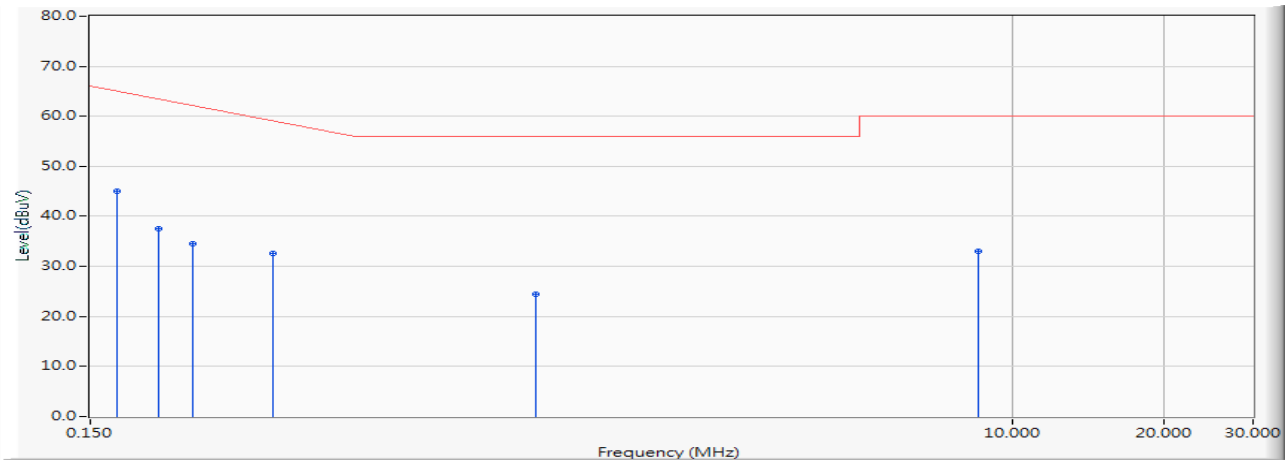
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5290MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.170	9.669	35.380	45.049	-20.380	65.429	QUASIPEAK
2		0.205	9.671	27.940	37.611	-26.818	64.429	QUASIPEAK
3		0.240	9.673	24.790	34.463	-28.966	63.429	QUASIPEAK
4		0.345	9.678	22.860	32.538	-27.891	60.429	QUASIPEAK
5		1.142	9.722	14.730	24.452	-31.548	56.000	QUASIPEAK
6		8.568	9.985	23.080	33.065	-26.935	60.000	QUASIPEAK

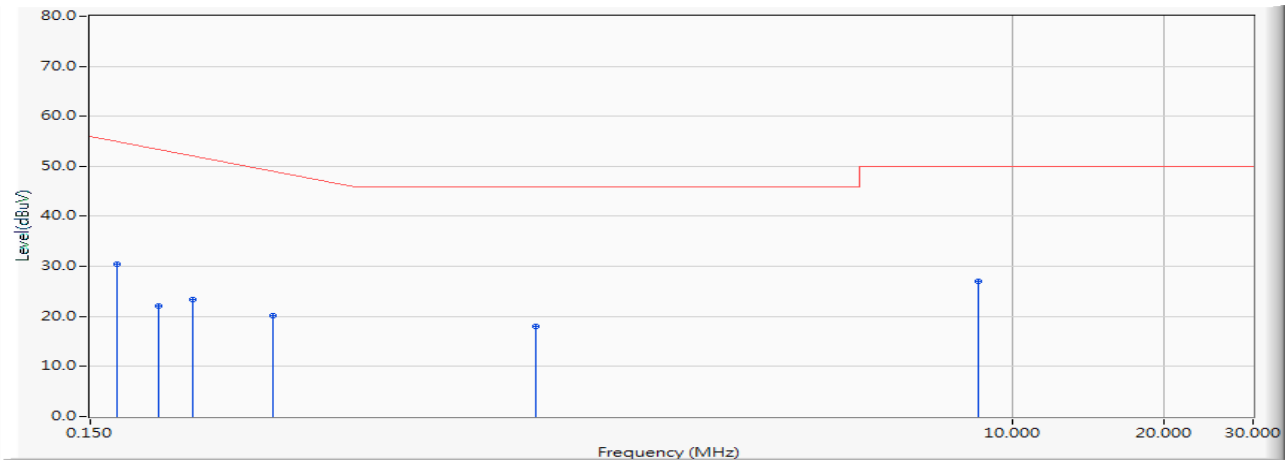
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5290MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.170	9.669	20.680	30.349	-25.080	55.429	AVERAGE
2		0.205	9.671	12.490	22.161	-32.268	54.429	AVERAGE
3		0.240	9.673	13.780	23.453	-29.976	53.429	AVERAGE
4		0.345	9.678	10.530	20.208	-30.221	50.429	AVERAGE
5		1.142	9.722	8.210	17.932	-28.068	46.000	AVERAGE
6	*	8.568	9.985	16.960	26.945	-23.055	50.000	AVERAGE

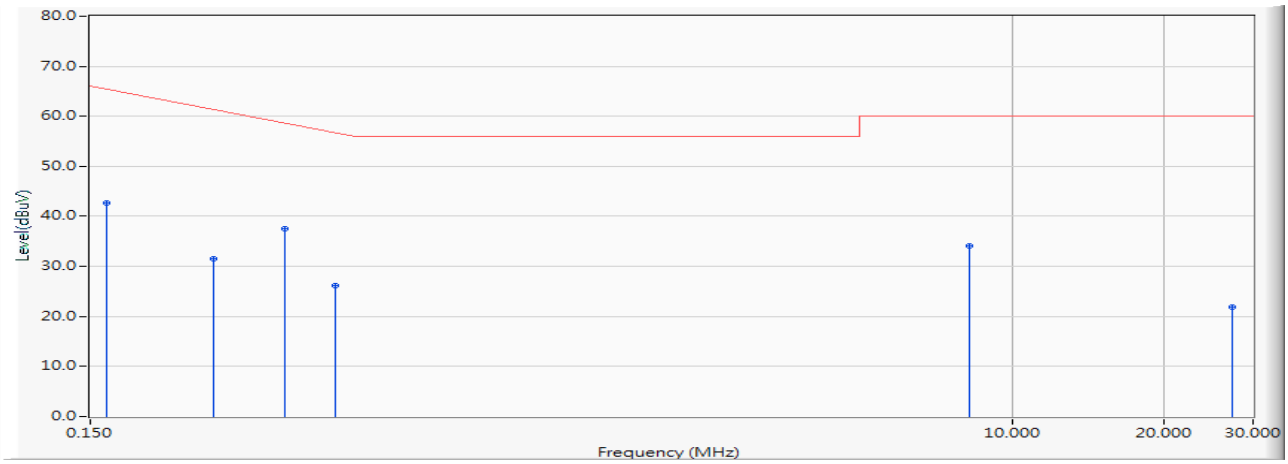
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5290MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.707	32.970	42.677	-22.980	65.657	QUASIPEAK
2		0.263	9.704	21.870	31.574	-31.197	62.771	QUASIPEAK
3	*	0.365	9.709	27.850	37.559	-22.298	59.857	QUASIPEAK
4		0.459	9.715	16.390	26.105	-31.066	57.171	QUASIPEAK
5		8.252	10.037	24.170	34.207	-25.793	60.000	QUASIPEAK
6		27.295	10.472	11.360	21.832	-38.168	60.000	QUASIPEAK

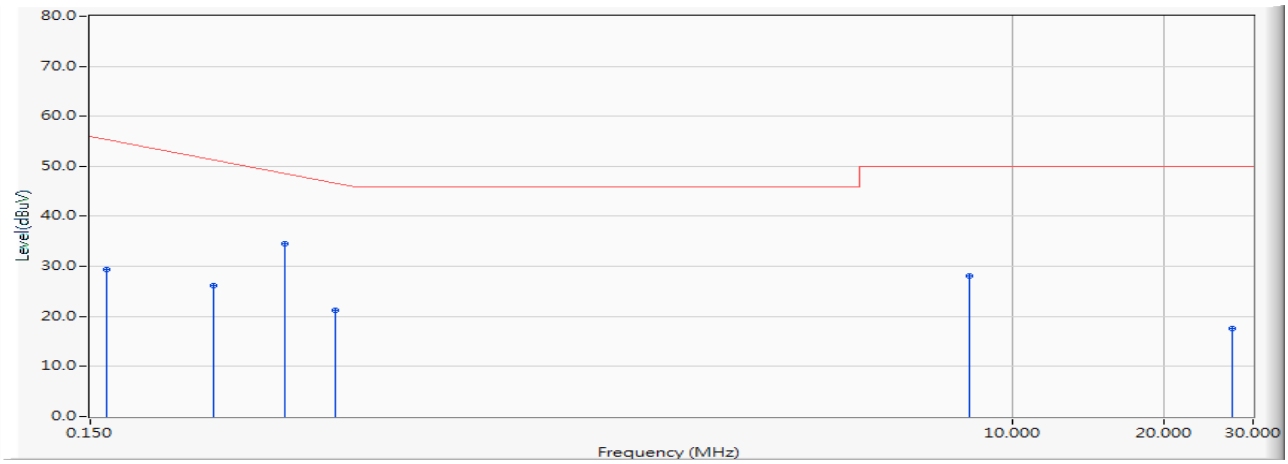
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5290MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.707	19.590	29.297	-26.360	55.657	AVERAGE
2		0.263	9.704	16.360	26.064	-26.707	52.771	AVERAGE
3	*	0.365	9.709	24.740	34.449	-15.408	49.857	AVERAGE
4		0.459	9.715	11.440	21.155	-26.016	47.171	AVERAGE
5		8.252	10.037	18.070	28.107	-21.893	50.000	AVERAGE
6		27.295	10.472	7.060	17.532	-32.468	50.000	AVERAGE

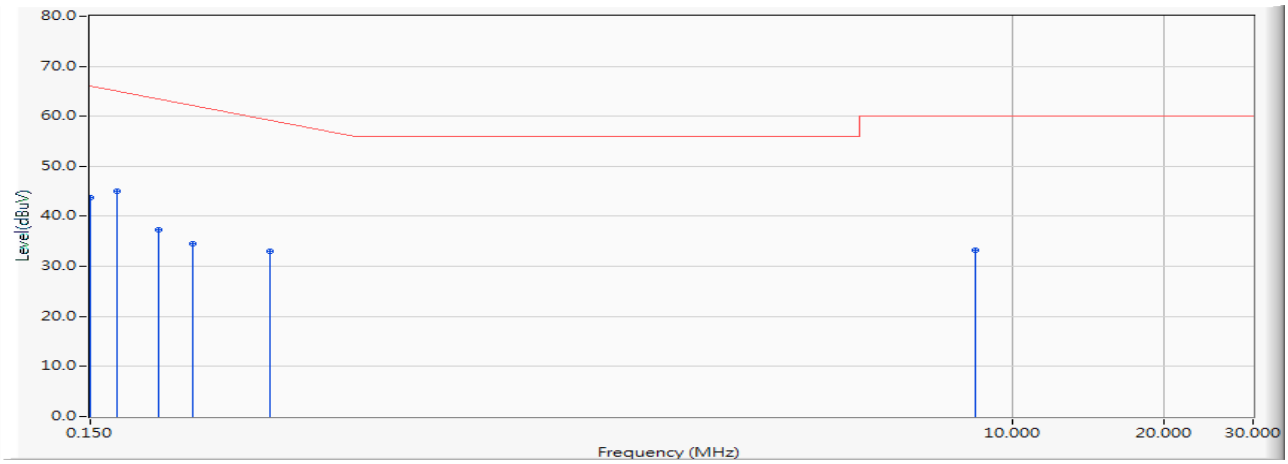
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5530MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.150	9.668	34.090	43.758	-22.242	66.000	QUASIPEAK
2	*	0.170	9.669	35.360	45.029	-20.400	65.429	QUASIPEAK
3		0.205	9.671	27.580	37.251	-27.178	64.429	QUASIPEAK
4		0.240	9.673	24.810	34.483	-28.946	63.429	QUASIPEAK
5		0.341	9.678	23.310	32.988	-27.555	60.543	QUASIPEAK
6		8.482	9.983	23.330	33.313	-26.687	60.000	QUASIPEAK

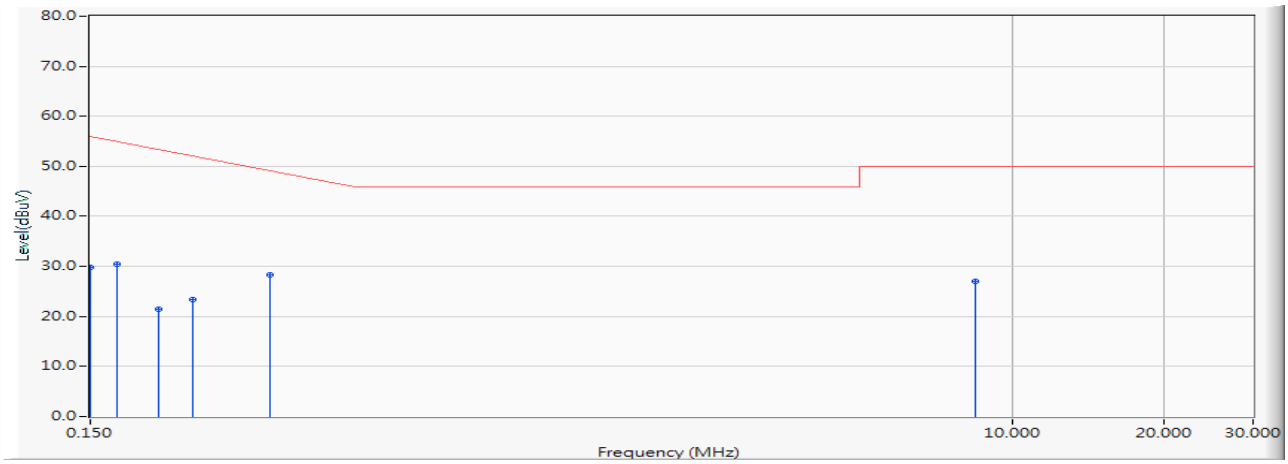
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5530MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.150	9.668	20.130	29.798	-26.202	56.000	AVERAGE
2		0.170	9.669	20.680	30.349	-25.080	55.429	AVERAGE
3		0.205	9.671	11.880	21.551	-32.878	54.429	AVERAGE
4		0.240	9.673	13.630	23.303	-30.126	53.429	AVERAGE
5	*	0.341	9.678	18.700	28.378	-22.165	50.543	AVERAGE
6		8.482	9.983	17.000	26.983	-23.017	50.000	AVERAGE

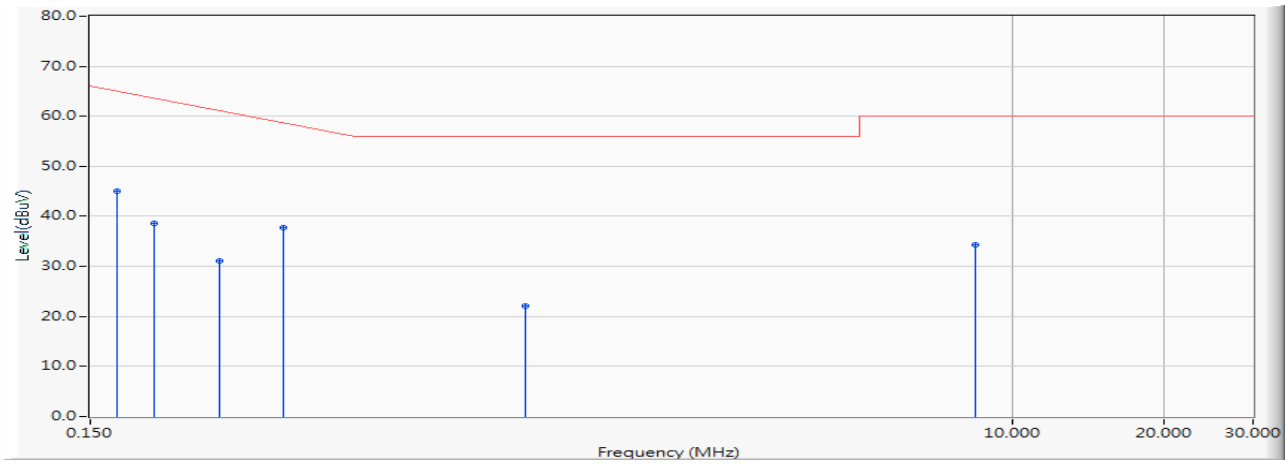
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5530MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.170	9.705	35.440	45.145	-20.284	65.429	QUASIPEAK
2		0.201	9.700	28.820	38.520	-26.023	64.543	QUASIPEAK
3		0.271	9.704	21.310	31.014	-31.529	62.543	QUASIPEAK
4		0.361	9.709	28.110	37.819	-22.152	59.971	QUASIPEAK
5		1.087	9.759	12.330	22.089	-33.911	56.000	QUASIPEAK
6		8.459	10.042	24.260	34.302	-25.698	60.000	QUASIPEAK

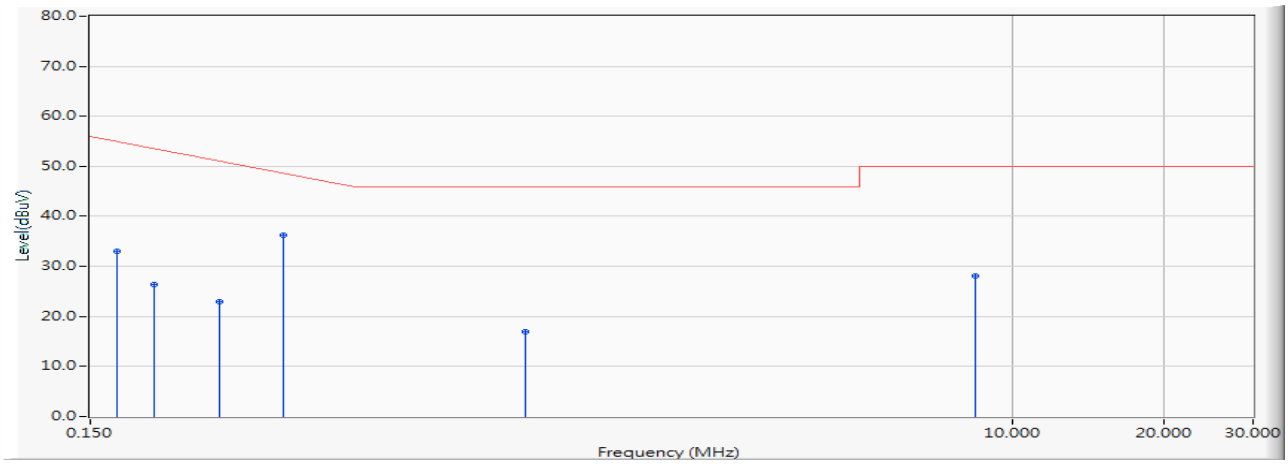
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5530MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.170	9.705	23.230	32.935	-22.494	55.429	AVERAGE
2		0.201	9.700	16.630	26.330	-28.213	54.543	AVERAGE
3		0.271	9.704	13.350	23.054	-29.489	52.543	AVERAGE
4	*	0.361	9.709	26.510	36.219	-13.752	49.971	AVERAGE
5		1.087	9.759	7.190	16.949	-29.051	46.000	AVERAGE
6		8.459	10.042	18.030	28.072	-21.928	50.000	AVERAGE

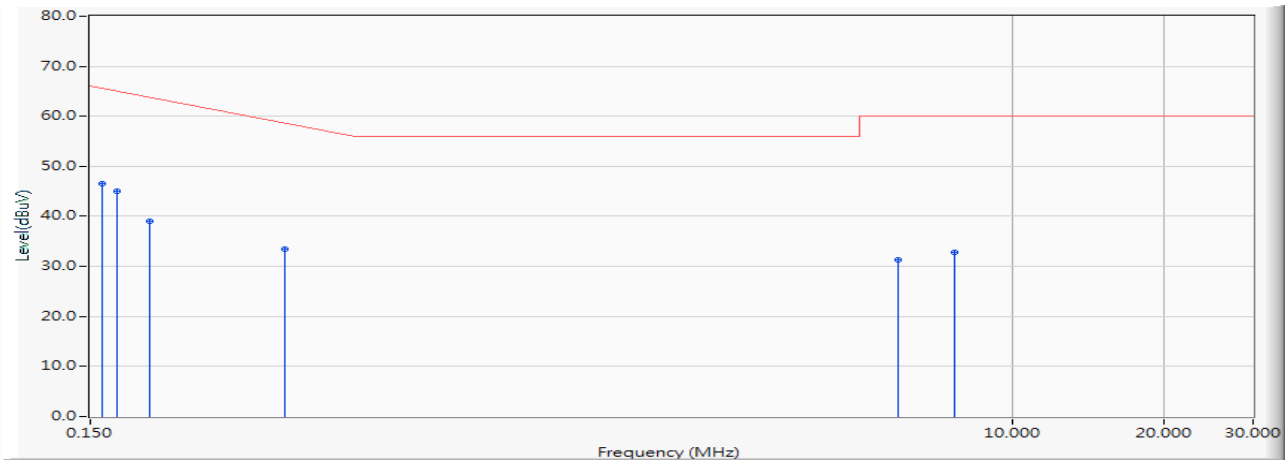
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5775MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.158	9.668	36.970	46.638	-19.133	65.771	QUASIPEAK
2		0.170	9.669	35.380	45.049	-20.380	65.429	QUASIPEAK
3		0.197	9.670	29.270	38.940	-25.717	64.657	QUASIPEAK
4		0.365	9.679	23.840	33.519	-26.338	59.857	QUASIPEAK
5		5.947	9.905	21.340	31.245	-28.755	60.000	QUASIPEAK
6		7.716	9.955	22.850	32.805	-27.195	60.000	QUASIPEAK

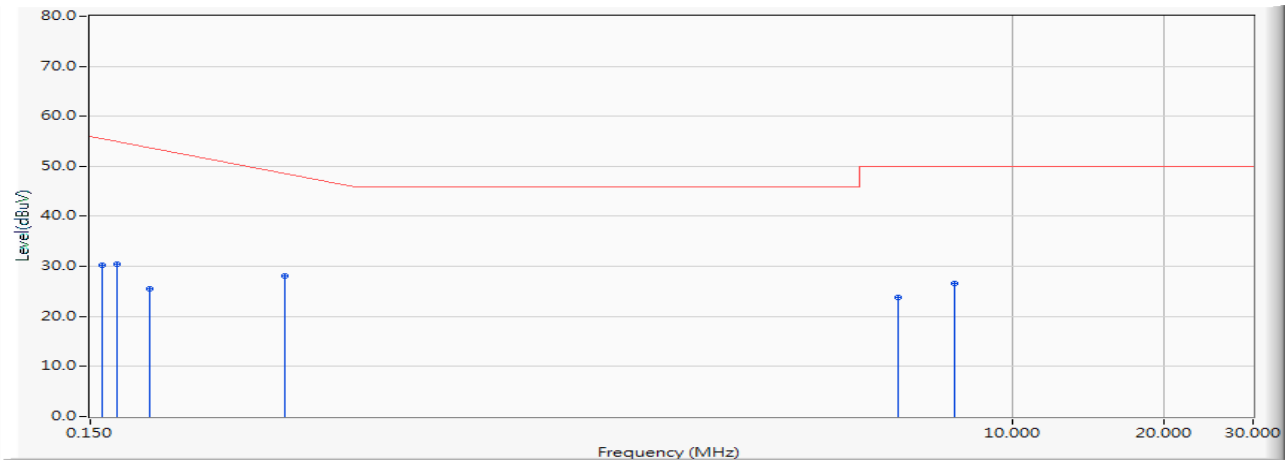
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5775MHz)

Line 1



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.158	9.668	20.530	30.198	-25.573	55.771	AVERAGE
2		0.170	9.669	20.680	30.349	-25.080	55.429	AVERAGE
3		0.197	9.670	15.900	25.570	-29.087	54.657	AVERAGE
4	*	0.365	9.679	18.420	28.099	-21.758	49.857	AVERAGE
5		5.947	9.905	13.840	23.745	-26.255	50.000	AVERAGE
6		7.716	9.955	16.590	26.545	-23.455	50.000	AVERAGE

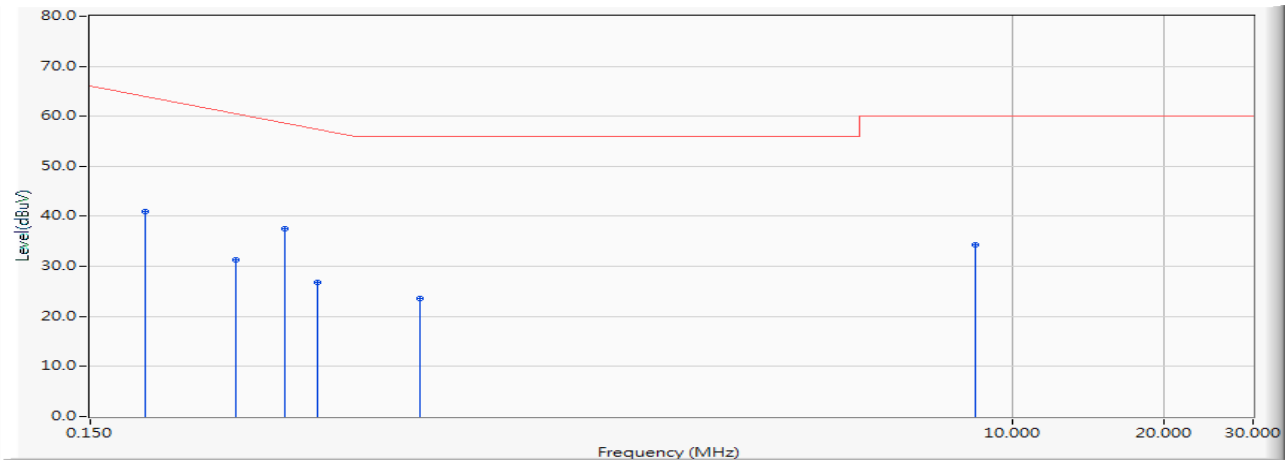
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5775MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.193	9.700	31.350	41.050	-23.721	64.771	QUASIPEAK
2		0.291	9.705	21.550	31.255	-30.716	61.971	QUASIPEAK
3	*	0.365	9.709	27.830	37.539	-22.318	59.857	QUASIPEAK
4		0.423	9.713	17.170	26.883	-31.317	58.200	QUASIPEAK
5		0.673	9.726	13.800	23.526	-32.474	56.000	QUASIPEAK
6		8.451	10.042	24.280	34.322	-25.678	60.000	QUASIPEAK

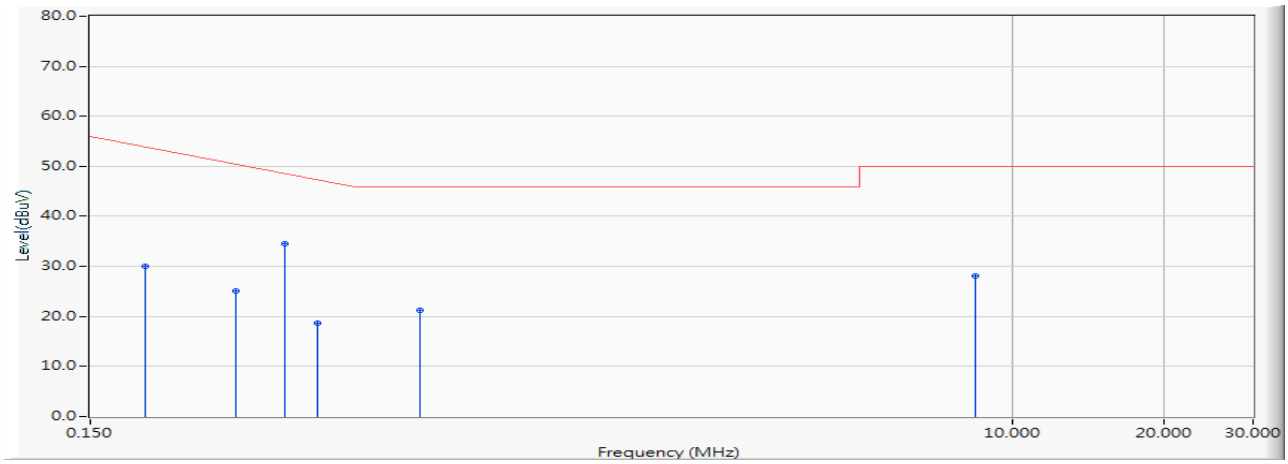
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

`

Product	:	Humly Room Display One
Test Item	:	Conducted Emission Test
Test Date	:	2019/11/02
Test Mode	:	Mode 4: Transmit (802.11ac80) (5775MHz)

Line 2



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.193	9.700	20.430	30.130	-24.641	54.771	AVERAGE
2		0.291	9.705	15.340	25.045	-26.926	51.971	AVERAGE
3	*	0.365	9.709	24.740	34.449	-15.408	49.857	AVERAGE
4		0.423	9.713	8.950	18.663	-29.537	48.200	AVERAGE
5		0.673	9.726	11.560	21.286	-24.714	46.000	AVERAGE
6		8.451	10.042	18.120	28.162	-21.838	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

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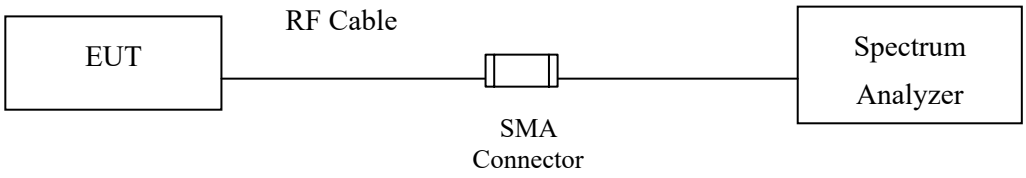
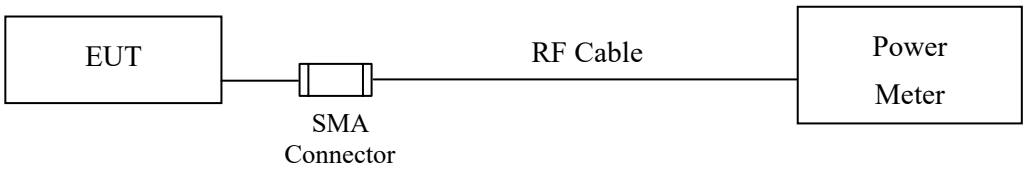
3. Maximun conducted output power

3.1. Test Setup

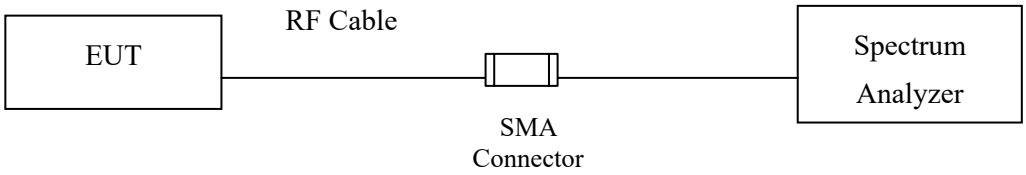
99% Occupied Bandwidth



Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.2. Limits

3.2.1. For the band 5.15-5.25 GHz,

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

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna

gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

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

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

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

3.3. Test Procedure

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

was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW≦40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)
Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

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

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

3.4. Uncertainty

± 1.62 dB

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3.5. Test Result of Maximum conducted output power

Product : Humly Room Display One
Test Item : Maximum conducted output power
Test Date : 2019/11/08
Test Mode : Mode 1: Transmit (802.11a)

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	13.47	--	--	--	--	--	--	--	<24dBm
40	5200	13.15	13.05	12.97	12.84	12.74	12.63	12.54	12.41	<24dBm
48	5240	13.21	--	--	--	--	--	--	--	<24dBm
52	5260	13.51	--	--	--	--	--	--	--	<24dBm
56	5280	13.38	13.26	13.15	13.02	12.93	12.89	12.77	12.66	<24dBm
64	5320	12.8	--	--	--	--	--	--	--	<24dBm
100	5500	9.59	--	--	--	--	--	--	--	<24dBm
120	5600	13.15	13.11	13.05	12.99	12.89	12.81	12.73	12.62	<24dBm
140	5700	8.33	--	--	--	--	--	--	--	<24dBm
149	5745	12.89	--	--	--	--	--	--	--	<30dBm
157	5785	13.03	12.97	12.92	12.88	12.82	12.73	12.62	12.57	<30dBm
165	5825	12.91	--	--	--	--	--	--	--	<30dBm

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

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	12.66	--	--	--	--	--	--	--	<24dBm
40	5200	13.17	13.1	12.99	12.94	12.86	12.8	12.68	12.65	<24dBm
48	5240	13.25	--	--	--	--	--	--	--	<24dBm
52	5260	13.16	--	--	--	--	--	--	--	<24dBm
56	5280	13.2	13.17	13.05	13	12.94	12.87	12.83	12.8	<24dBm
64	5320	12.04	--	--	--	--	--	--	--	<24dBm
100	5500	9.29	--	--	--	--	--	--	--	<24dBm
120	5600	13.12	13.02	12.95	12.86	12.82	12.69	12.57	12.46	<24dBm
140	5700	9.06	--	--	--	--	--	--	--	<24dBm
149	5745	13.14	--	--	--	--	--	--	--	<30dBm
157	5785	13.3	13.21	13.17	13.1	12.97	12.9	12.87	12.76	<30dBm
165	5825	13.27	--	--	--	--	--	--	--	<30dBm

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

Maximum conducted output power Measurement:

(CHAIN A+ B)

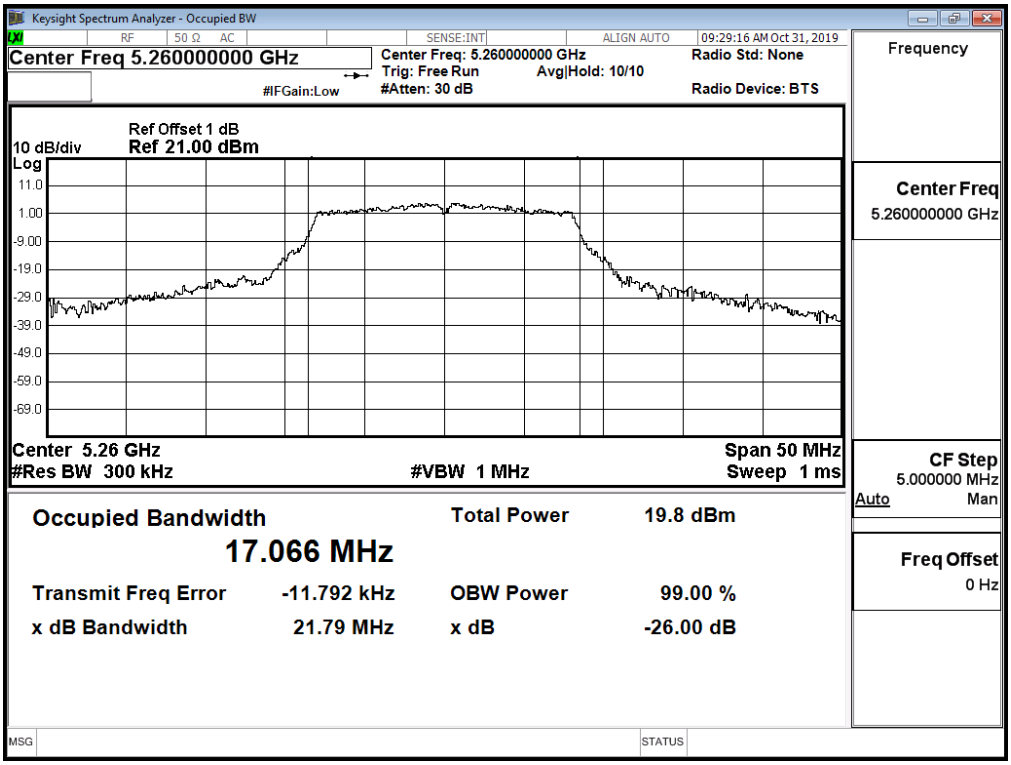
Channel Number	Frequency	26 dB Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	--	13.47	12.66	16.09	24	--
40	5200	--	13.15	13.17	16.17	24	--
48	5240	--	13.21	13.25	16.24	24	--
52	5260	21.790	13.51	13.16	16.35	24	24.38
56	5280	24.940	13.38	13.20	16.30	24	24.97
64	5320	21.540	12.80	12.04	15.45	24	24.33
100	5500	21.260	9.59	9.29	12.45	24	24.28
120	5600	21.360	13.15	13.12	16.15	24	24.30
140	5700	21.540	8.33	9.06	11.72	24	24.33
149	5745	--	12.89	13.14	16.03	30	--
157	5785	--	13.03	13.30	16.18	30	--
165	5825	--	12.91	13.27	16.10	30	--

Note:

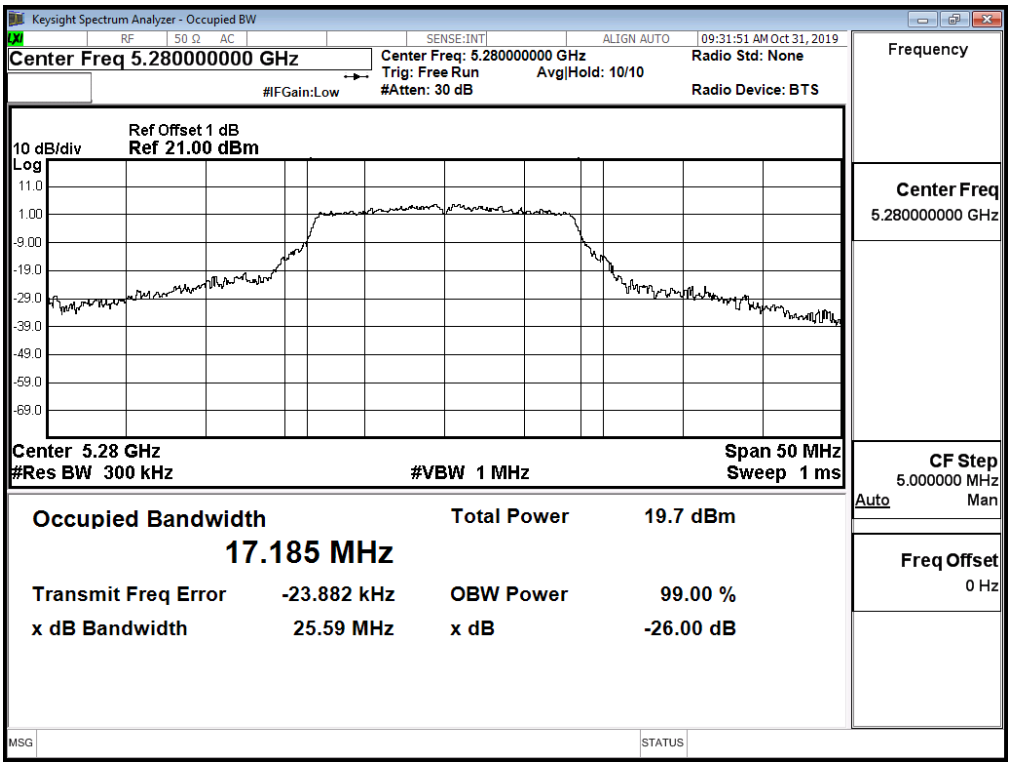
1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

26 dB Bandwidth:

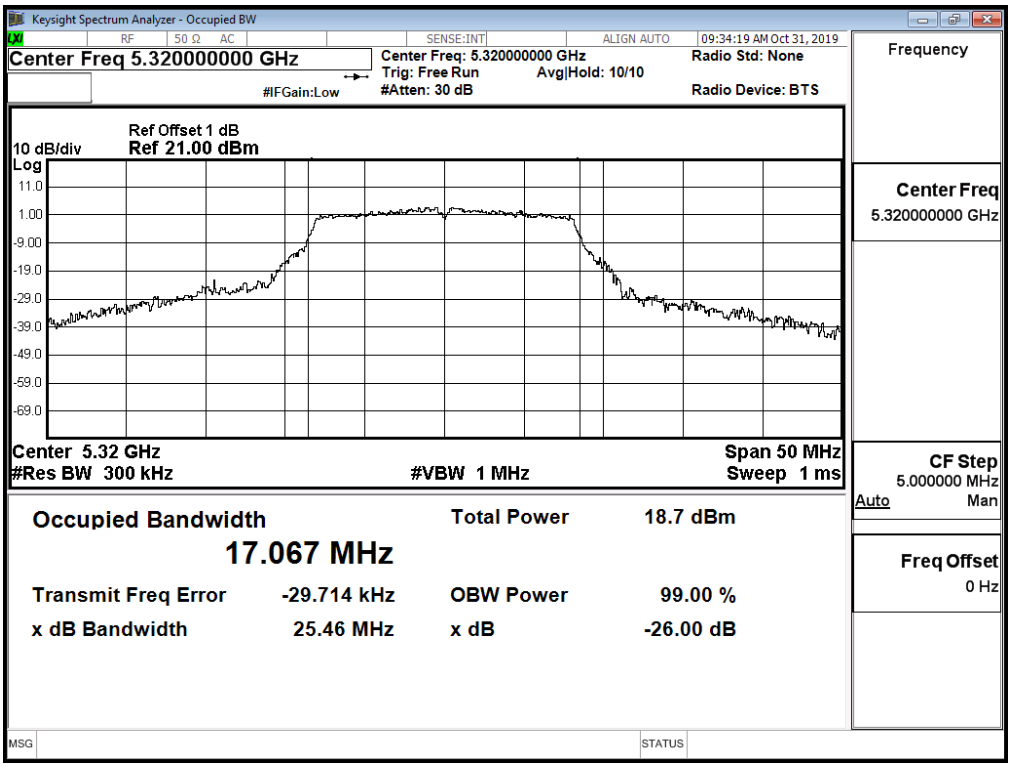
Channel 52 -Chain A



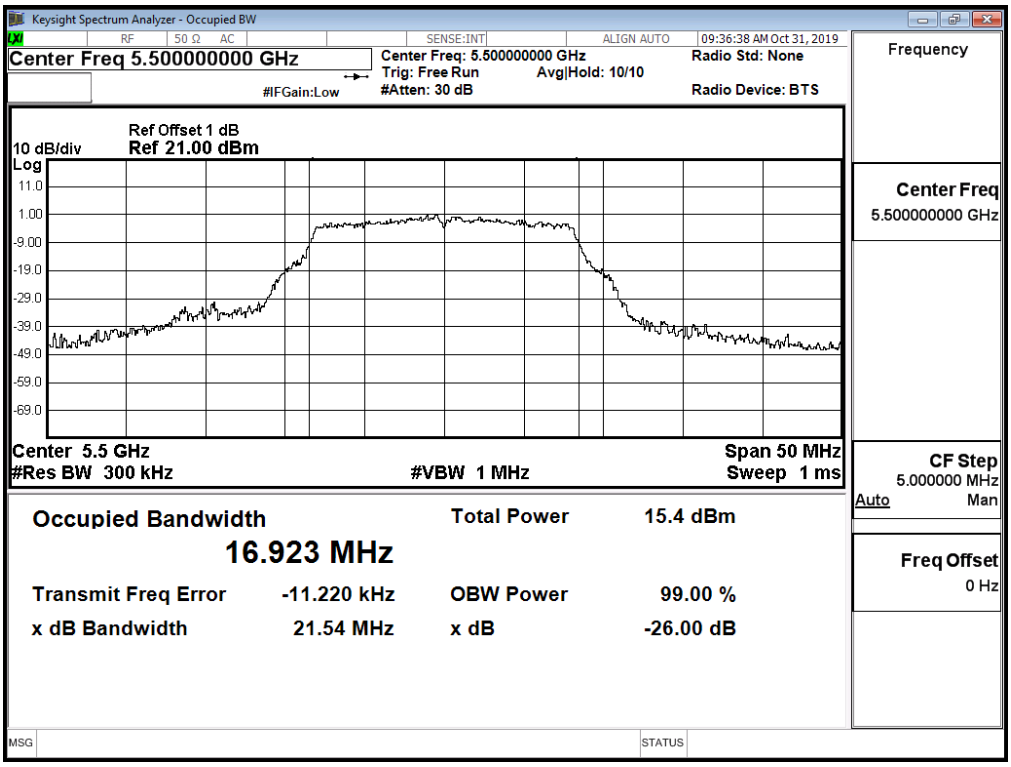
Channel 56 -Chain A



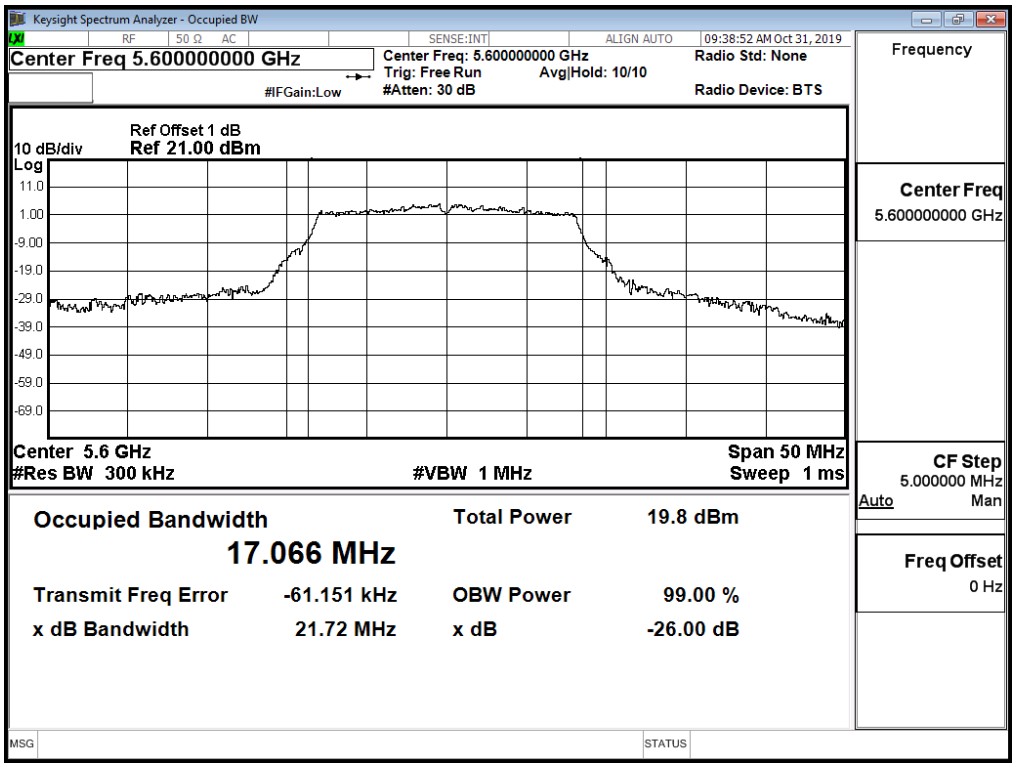
Channel 64 -Chain A



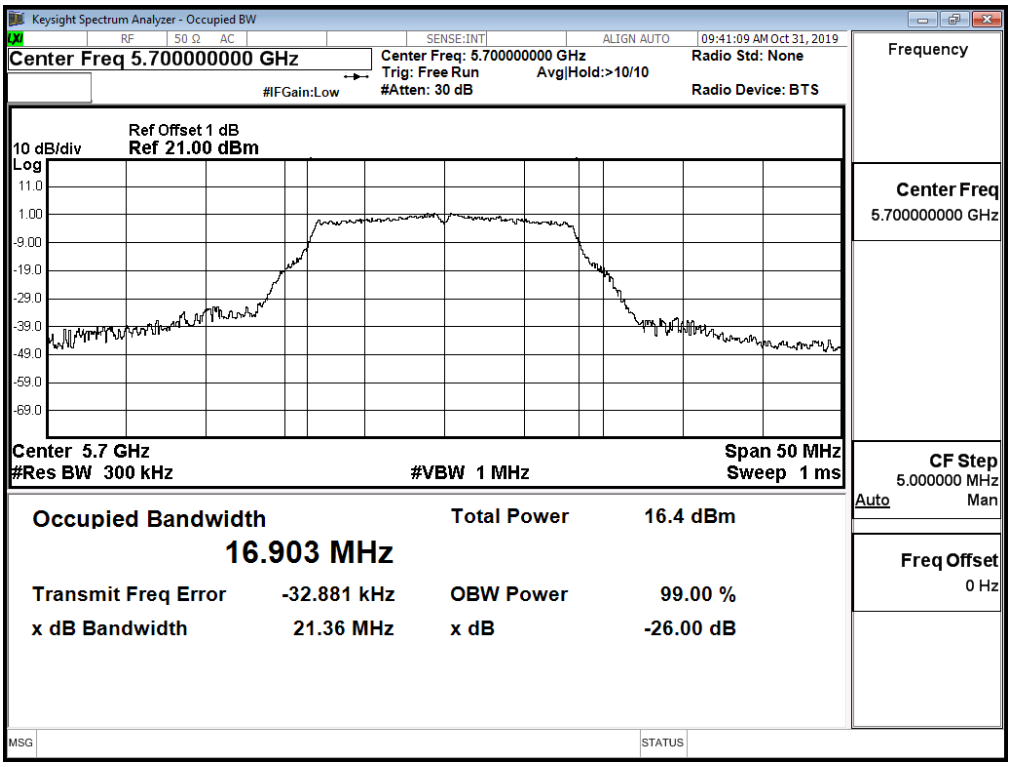
Channel 100 -Chain A



Channel 120 -Chain A



Channel 140 -Chain A



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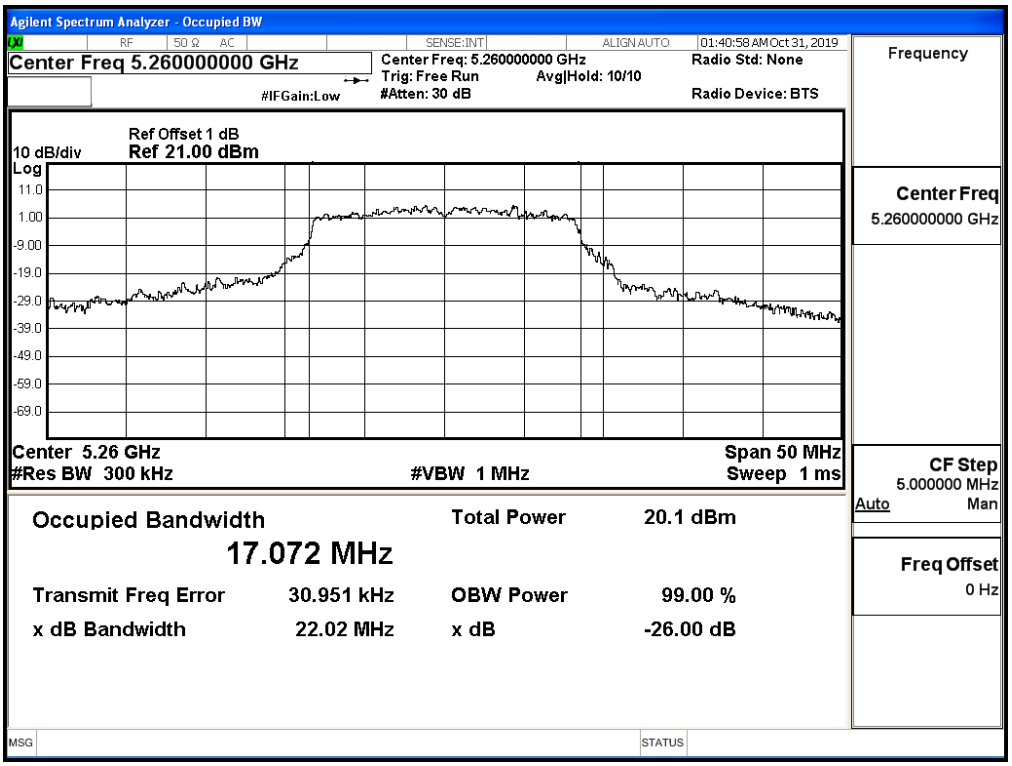
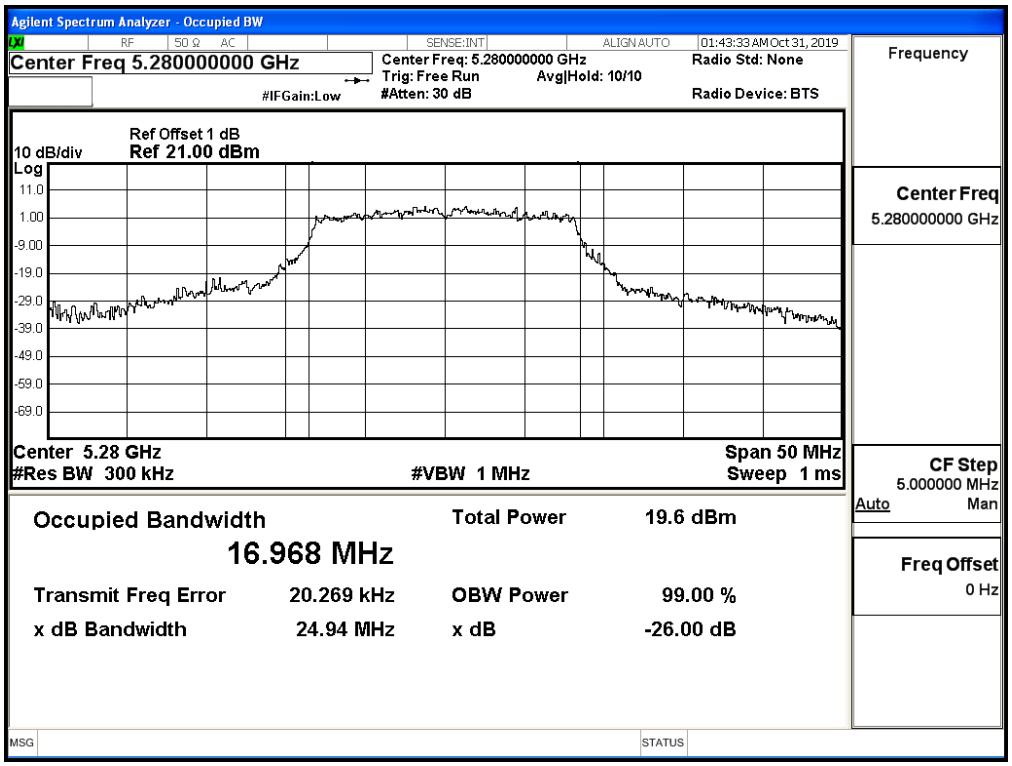
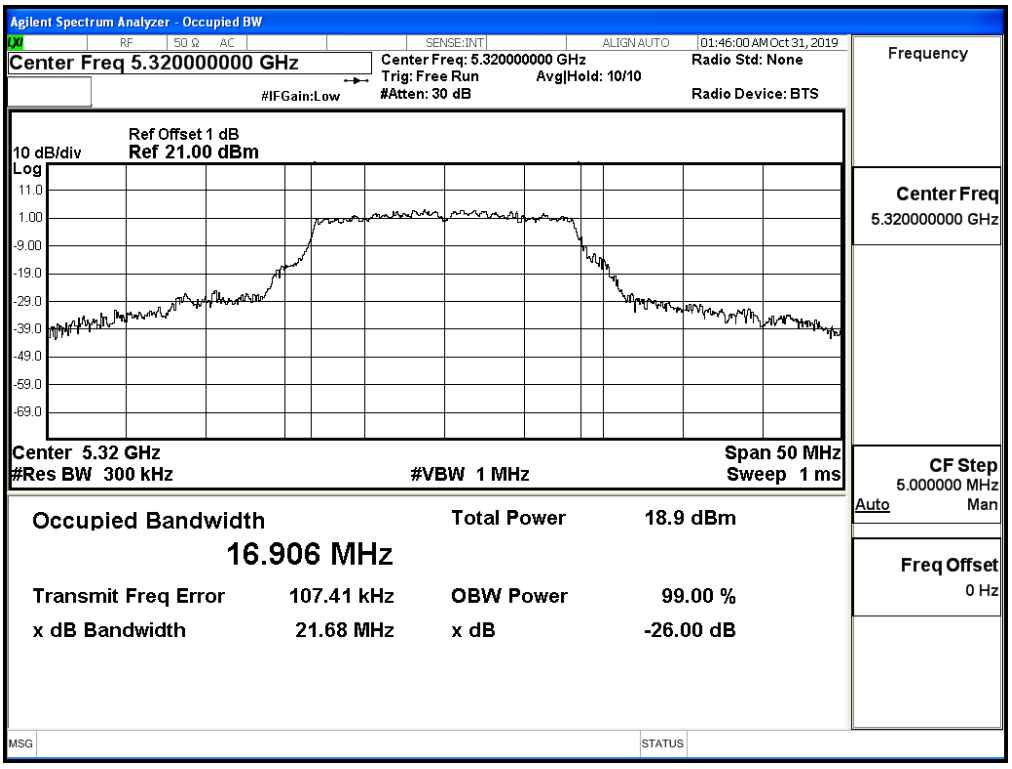
Channel 52 -Chain B



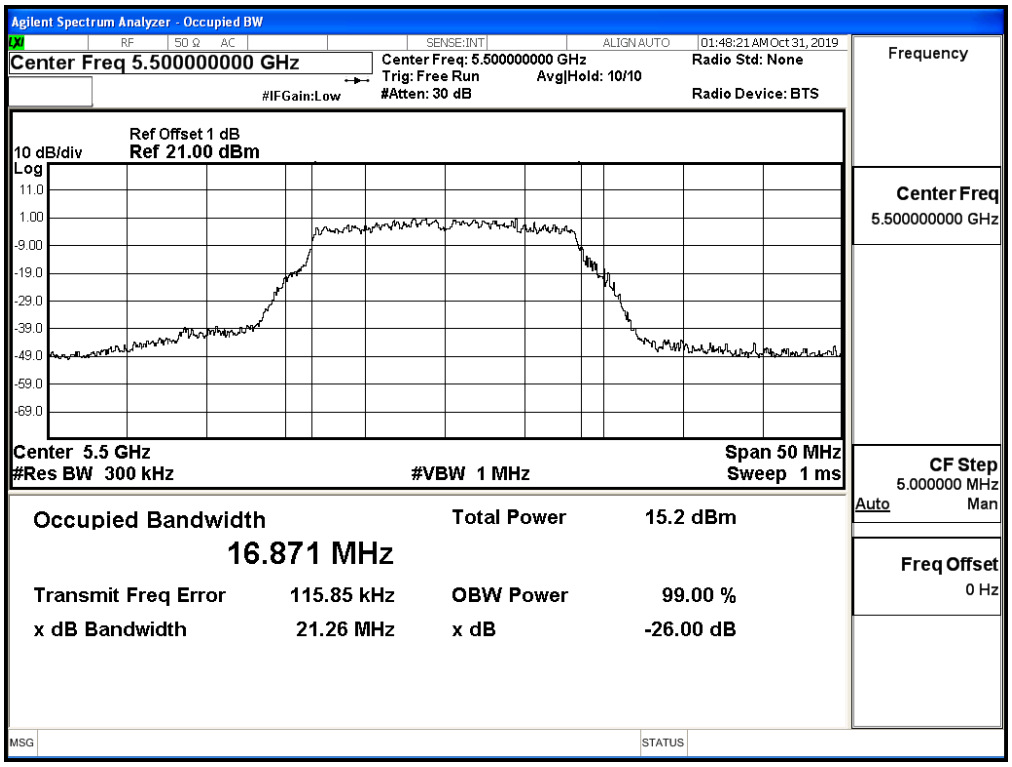
Channel 56 -Chain B



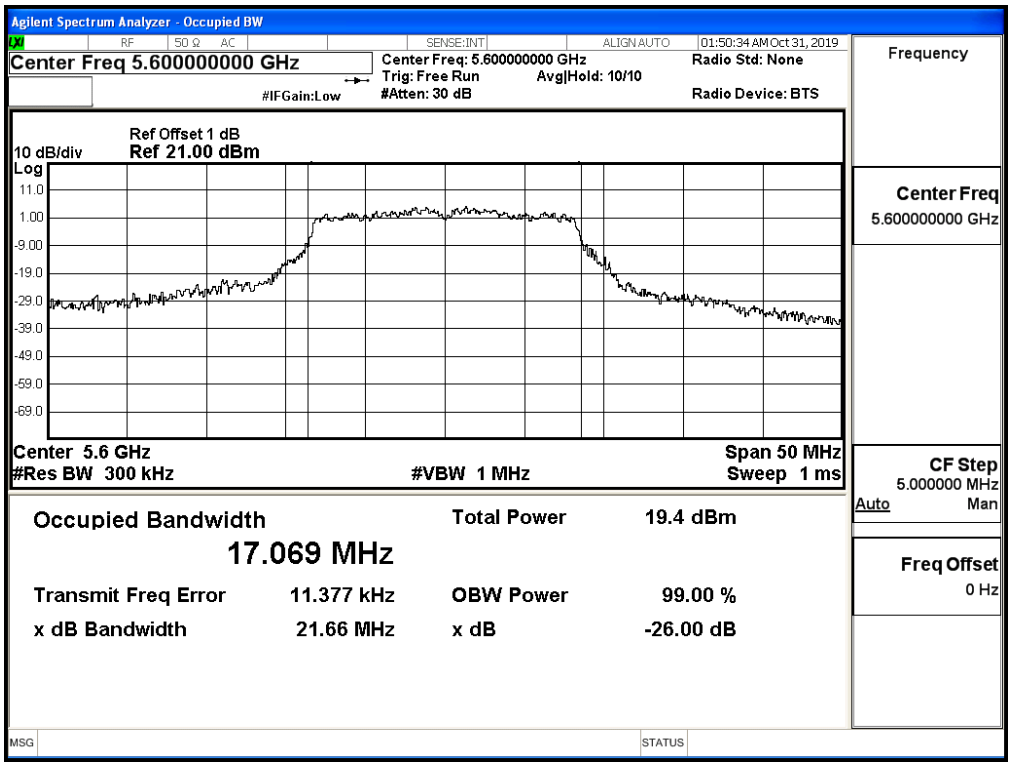
Channel 64 -Chain B



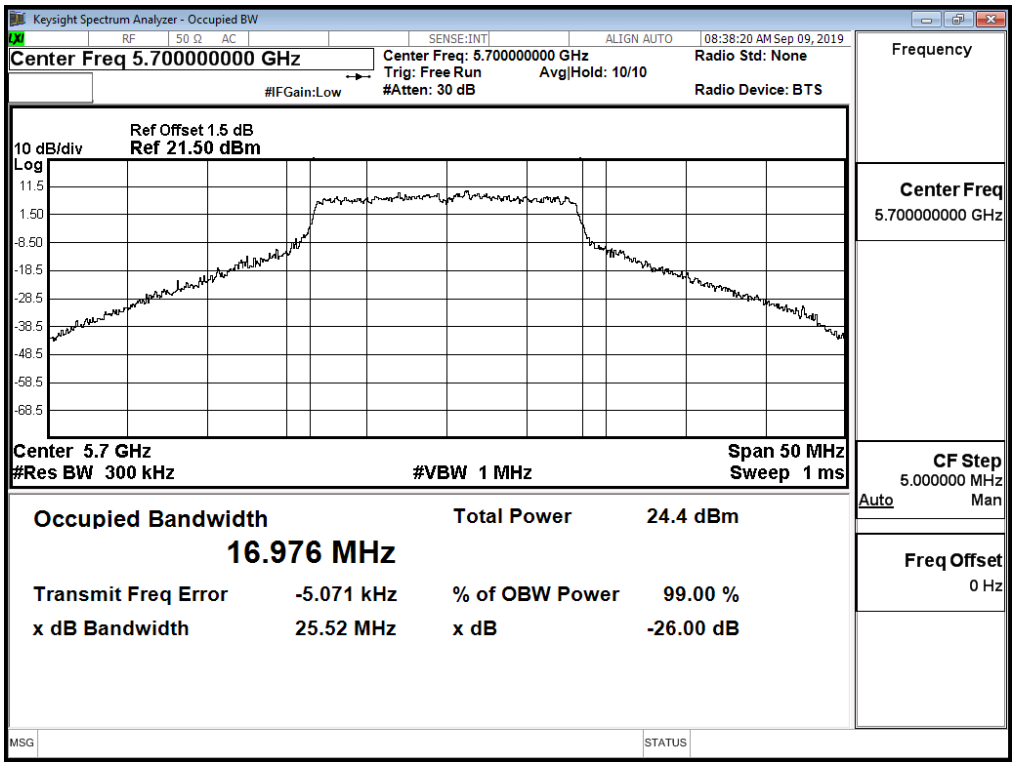
Channel 100 -Chain B



Channel 120 -Chain B



Channel 140 -Chain B



、 Product : Humly Room Display One
Test Item : Maximum conducted output power
Test Date : 2019/09/06
Test Mode : Mode 2: Transmit (802.11n20)

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
36	5180	12.63	--	--	--	--	--	--	--	<24dBm
40	5200	12.8	12.77	12.72	12.69	12.57	12.46	12.43	12.39	<24dBm
48	5240	12.6	--	--	--	--	--	--	--	<24dBm
52	5260	12.86	--	--	--	--	--	--	--	<24dBm
56	5280	12.8	12.72	12.67	12.61	12.56	12.51	12.39	12.27	<24dBm
64	5320	12.22	--	--	--	--	--	--	--	<24dBm
100	5500	10.19	--	--	--	--	--	--	--	<24dBm
120	5600	12.09	12	11.9	11.79	11.68	11.57	11.44	11.34	<24dBm
140	5700	9.32	--	--	--	--	--	--	--	<24dBm
144(Band3)	5720	11.34	11.28	11.25	11.12	11.07	11.04	10.97	10.84	<24dBm
144(Band4)	5720	4.1	3.97	3.85	3.73	3.66	3.62	3.55	3.46	<30dBm
149	5745	11.85	--	--	--	--	--	--	--	<30dBm
157	5785	12.34	12.25	12.14	12.03	11.99	11.86	11.76	11.72	<30dBm
165	5825	12.17	--	--	--	--	--	--	--	<30dBm

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

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
36	5180	11.95	--	--	--	--	--	--	--	<24dBm
40	5200	12.76	12.72	12.69	12.60	12.53	12.47	12.38	12.32	<24dBm
48	5240	12.87	--	--	--	--	--	--	--	<24dBm
52	5260	12.75	--	--	--	--	--	--	--	<24dBm
56	5280	12.74	12.69	12.57	12.52	12.44	12.38	12.33	12.29	<24dBm
64	5320	11.52	--	--	--	--	--	--	--	<24dBm
100	5500	9.72	--	--	--	--	--	--	--	<24dBm
120	5600	13.26	13.13	13	12.87	12.84	12.79	12.69	12.64	<24dBm
140	5700	9.34	--	--	--	--	--	--	--	<24dBm
144(Band3)	5720	12.58	12.5	12.39	12.27	12.14	12.01	11.9	11.85	<24dBm
144(Band4)	5720	5.04	4.95	4.82	4.74	4.70	4.61	4.55	4.47	<30dBm
149	5745	13.11	--	--	--	--	--	--	--	<30dBm
157	5785	13.35	13.22	13.18	13.15	13.08	13.05	13.01	12.91	<30dBm
165	5825	13.3	--	--	--	--	--	--	--	<30dBm

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

Maximum conducted output power Measurement:

(CHAIN A+ B)

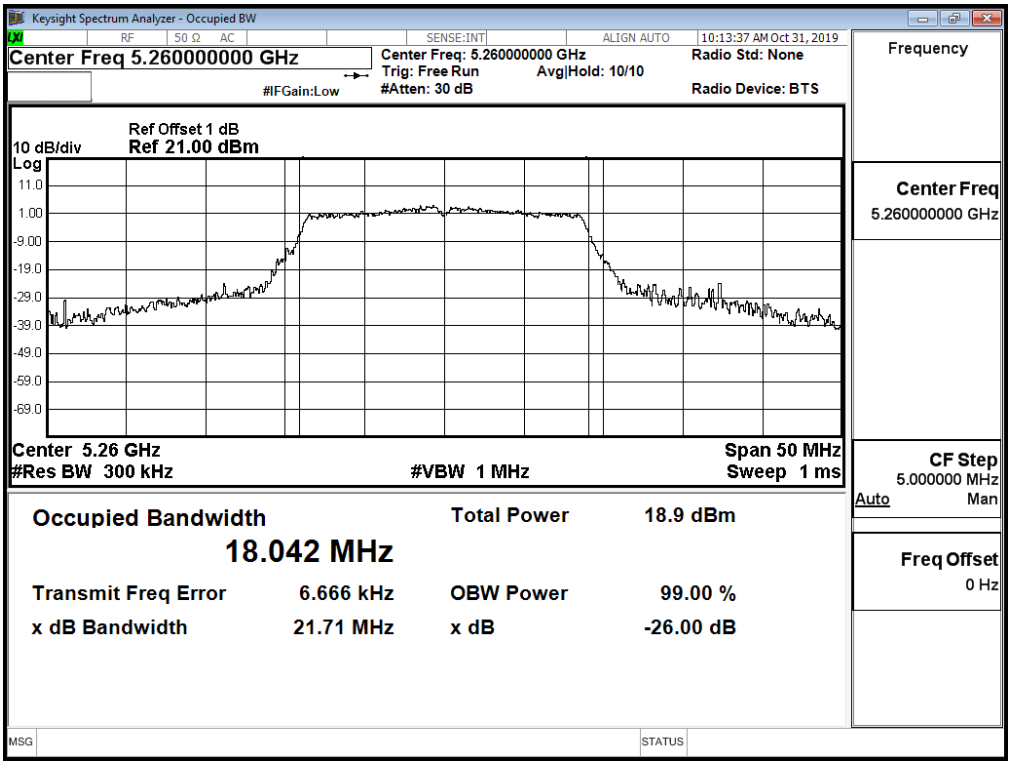
Channel Number	Frequency	26 dB Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
36	5180	--	12.63	11.95	15.31	24	--
40	5200	--	12.80	12.76	15.79	24	--
48	5240	--	12.60	12.87	15.75	24	--
52	5260	21.710	12.86	12.75	15.82	24	24.37
56	5280	21.570	12.80	12.74	15.78	24	24.34
64	5320	21.530	12.22	11.52	14.89	24	24.33
100	5500	21.460	10.19	9.72	12.97	24	24.32
120	5600	21.640	12.09	13.26	15.72	24	24.35
140	5700	21.270	9.32	9.34	12.34	24	24.28
144(Band3)	5720	15.950	11.34	12.58	15.01	24	23.03
144(Band4)	5720	--	4.10	5.04	7.61	30	--
149	5745	--	11.85	13.11	15.54	30	--
157	5785	--	12.34	13.35	15.88	30	--
165	5825	--	12.17	13.30	15.78	30	--

Note:

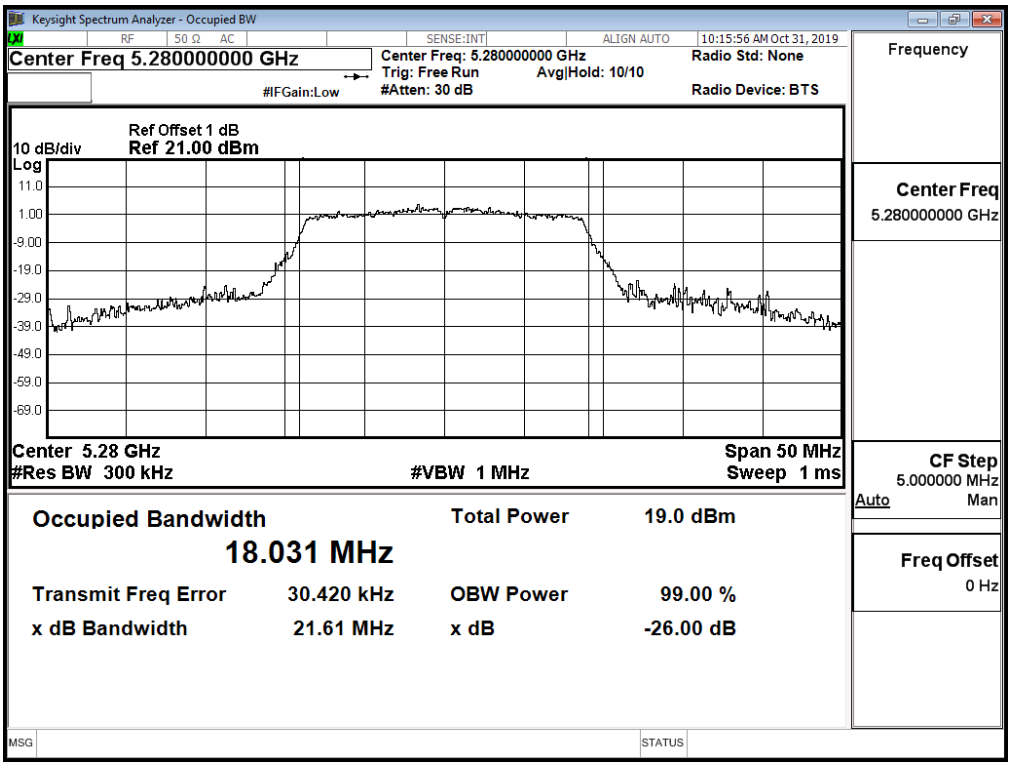
1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

26 dB Bandwidth:

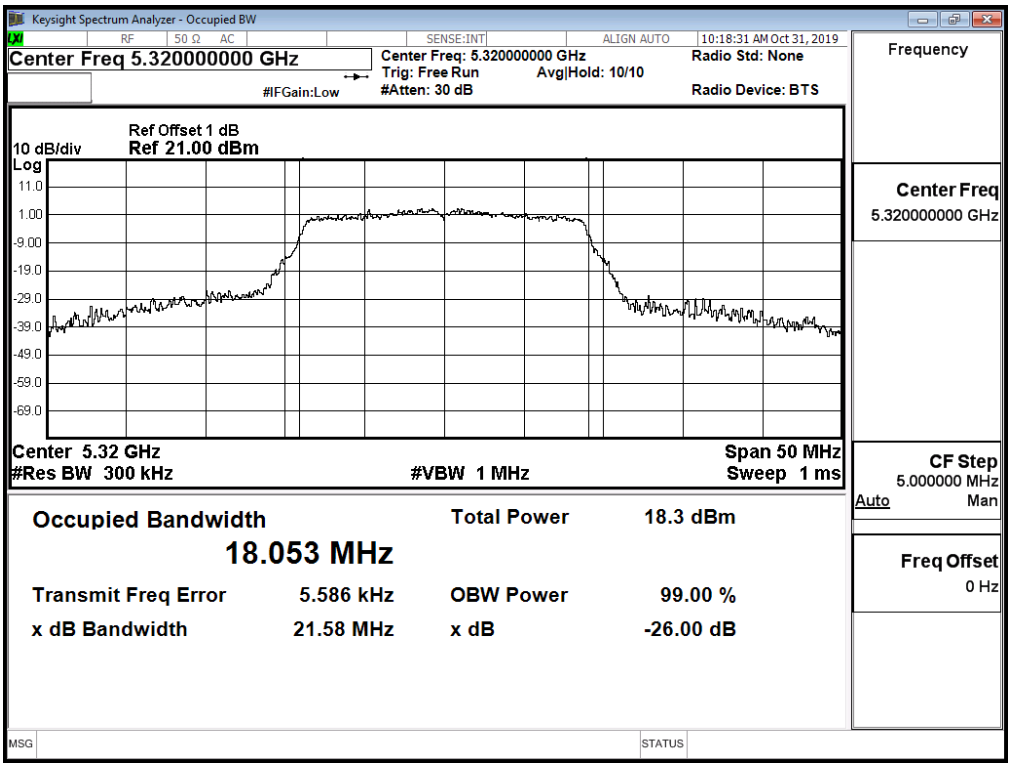
Channel 52 -Chain A



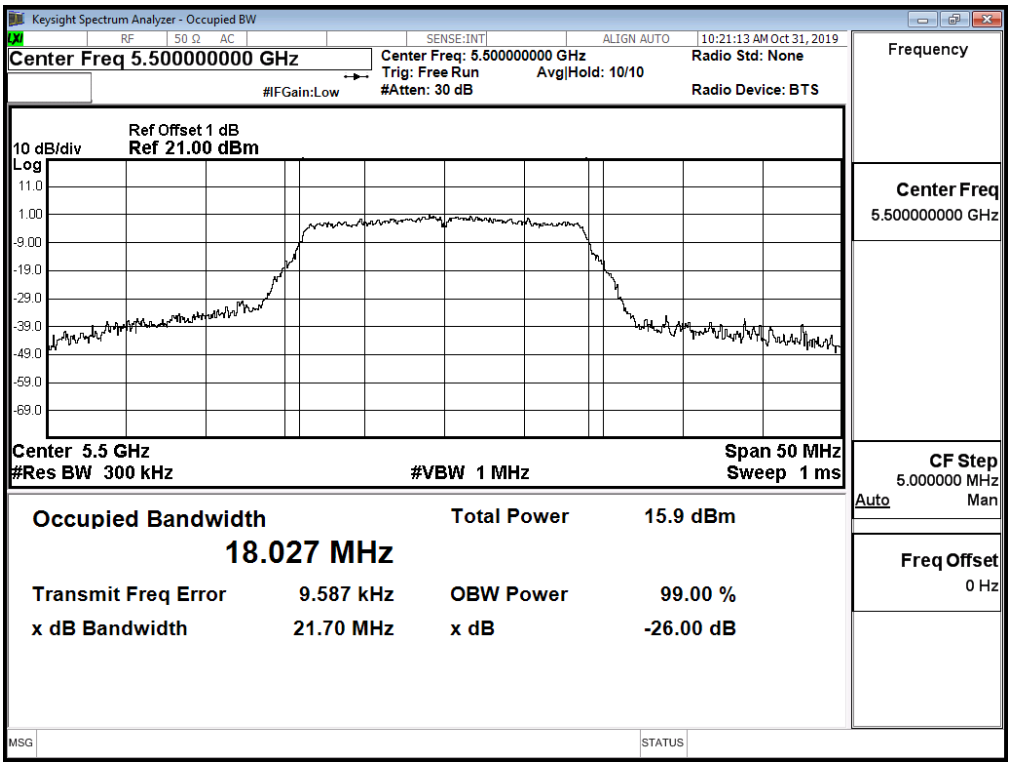
Channel 56 -Chain A



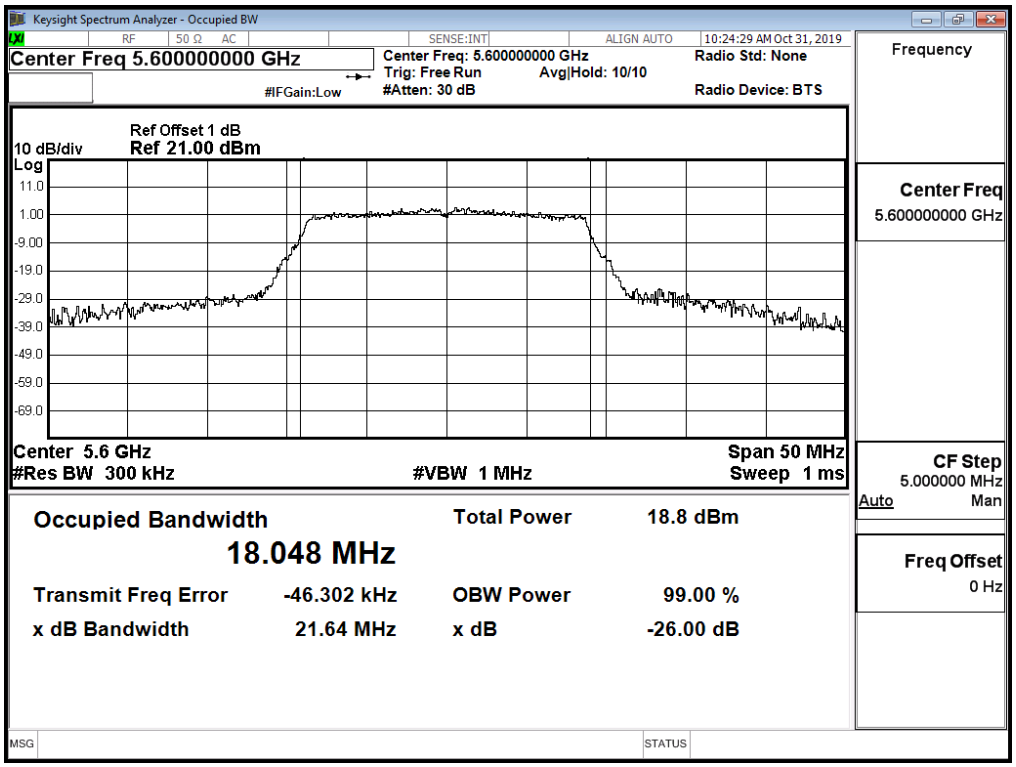
Channel 64 -Chain A



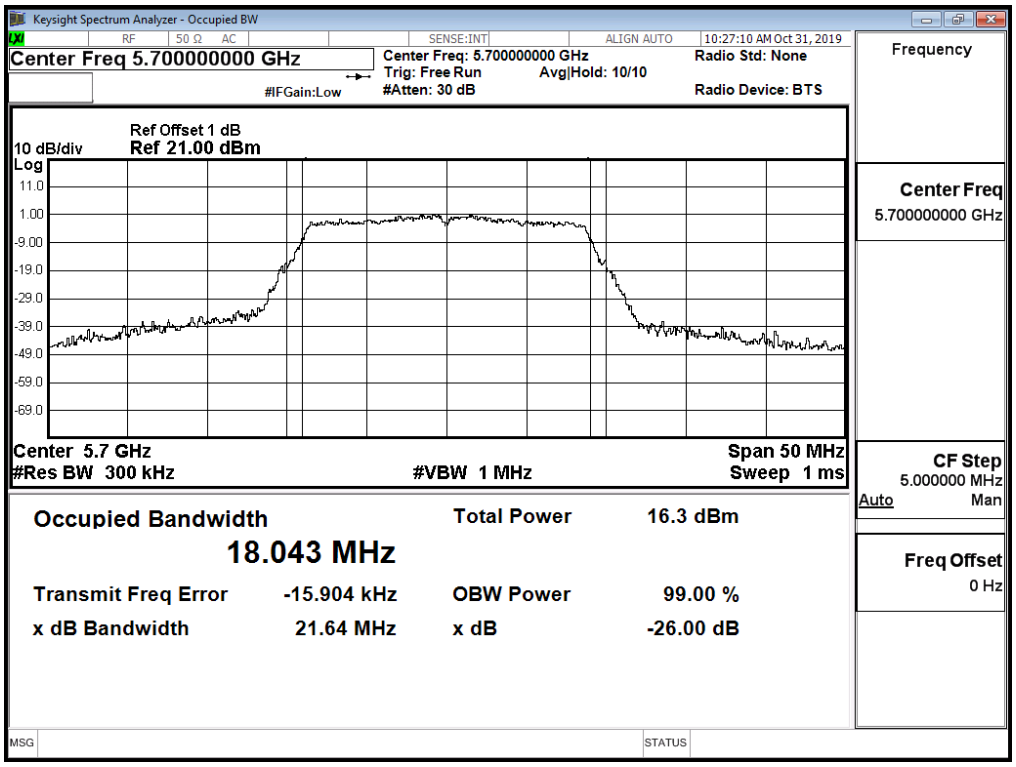
Channel 100 -Chain A



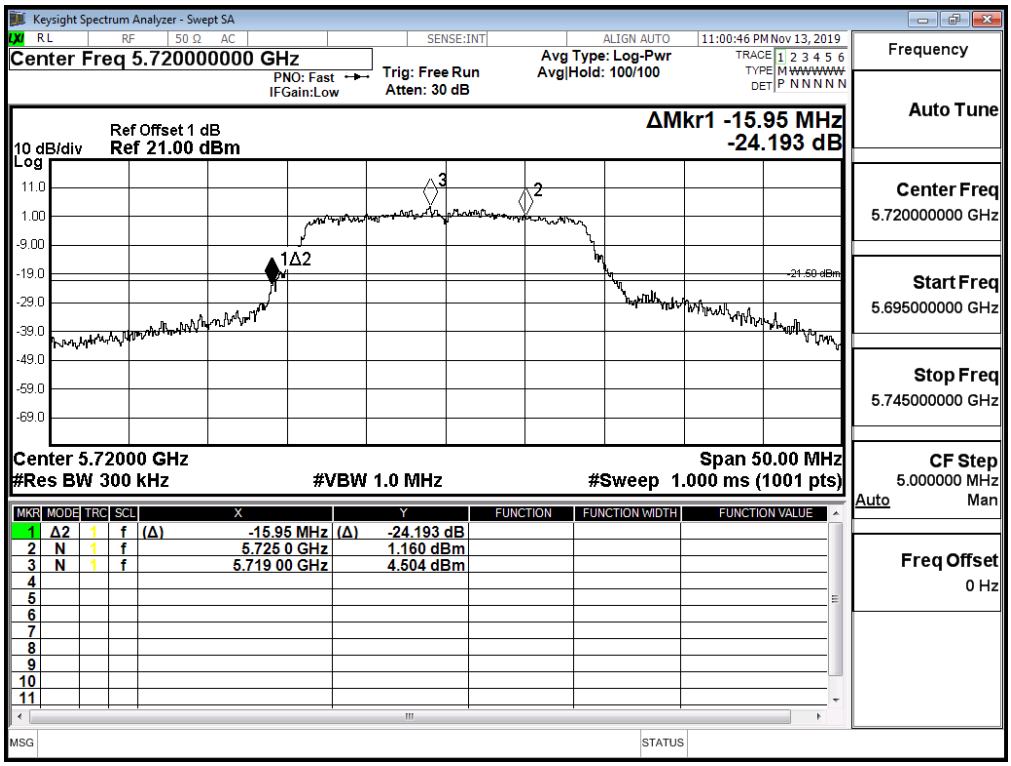
Channel 120 Chain A



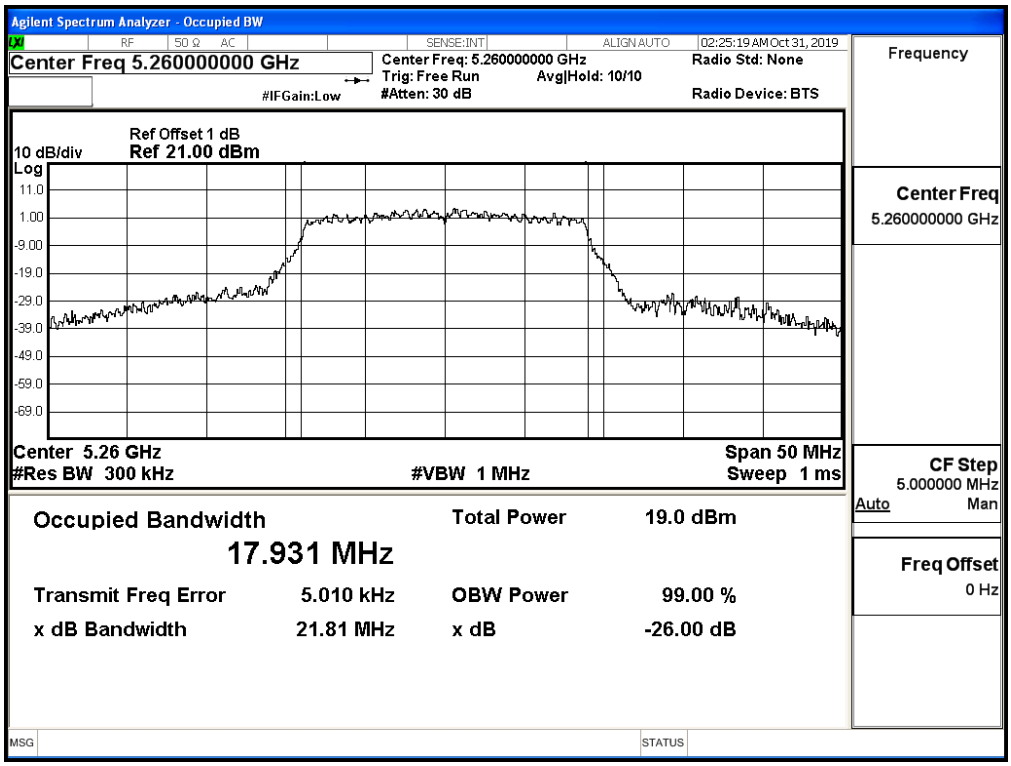
Channel 140 -Chain A



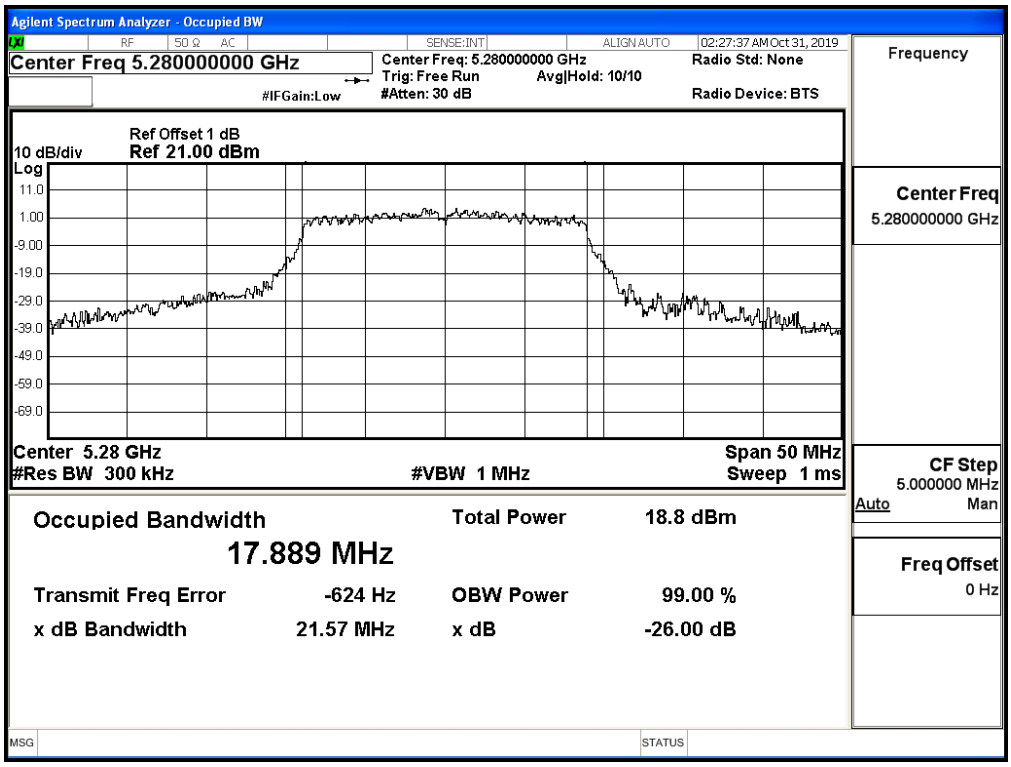
Channel 144 -Chain A



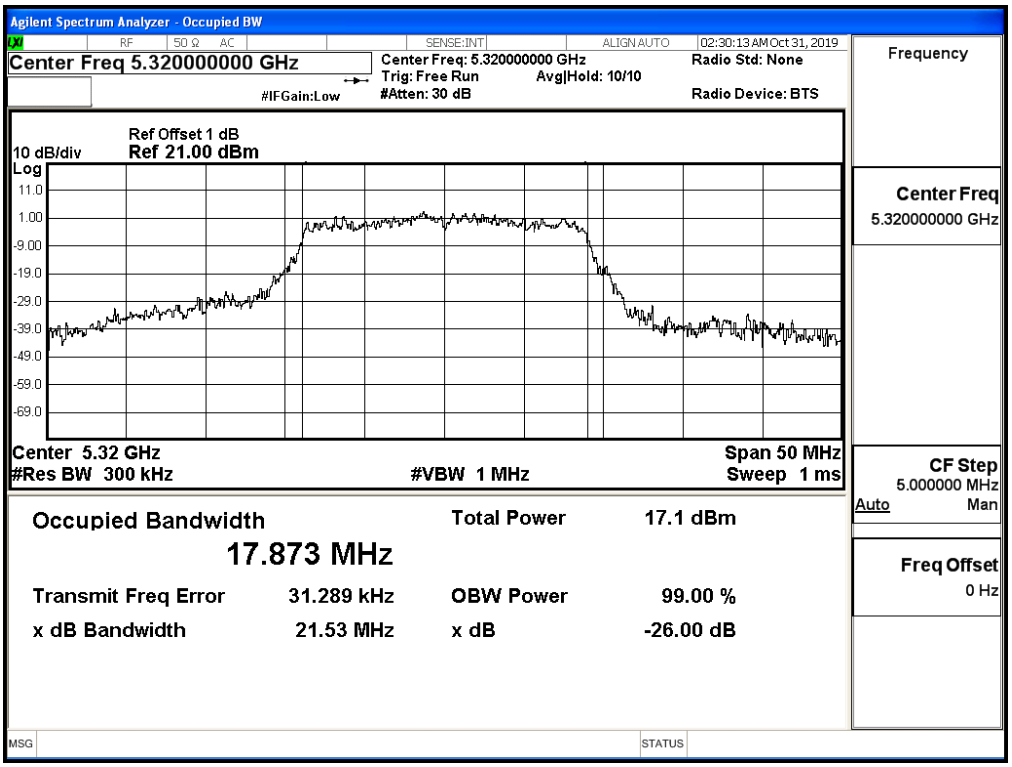
Channel 52 -Chain B



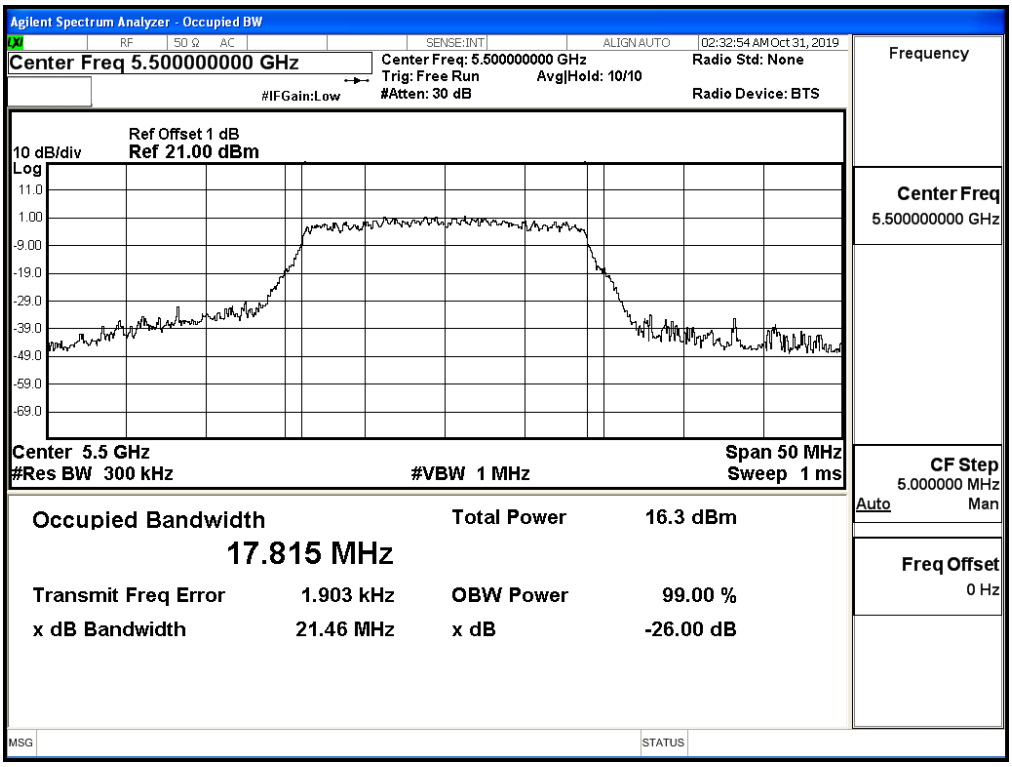
Channel 56 -Chain B



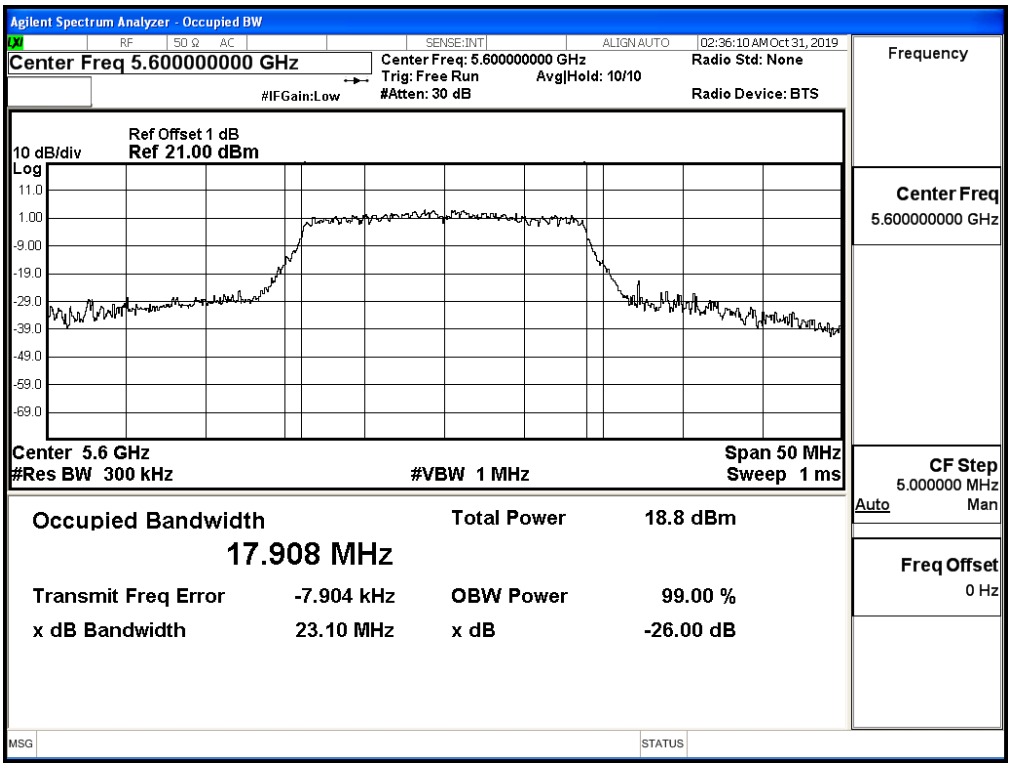
Channel 64 -Chain B



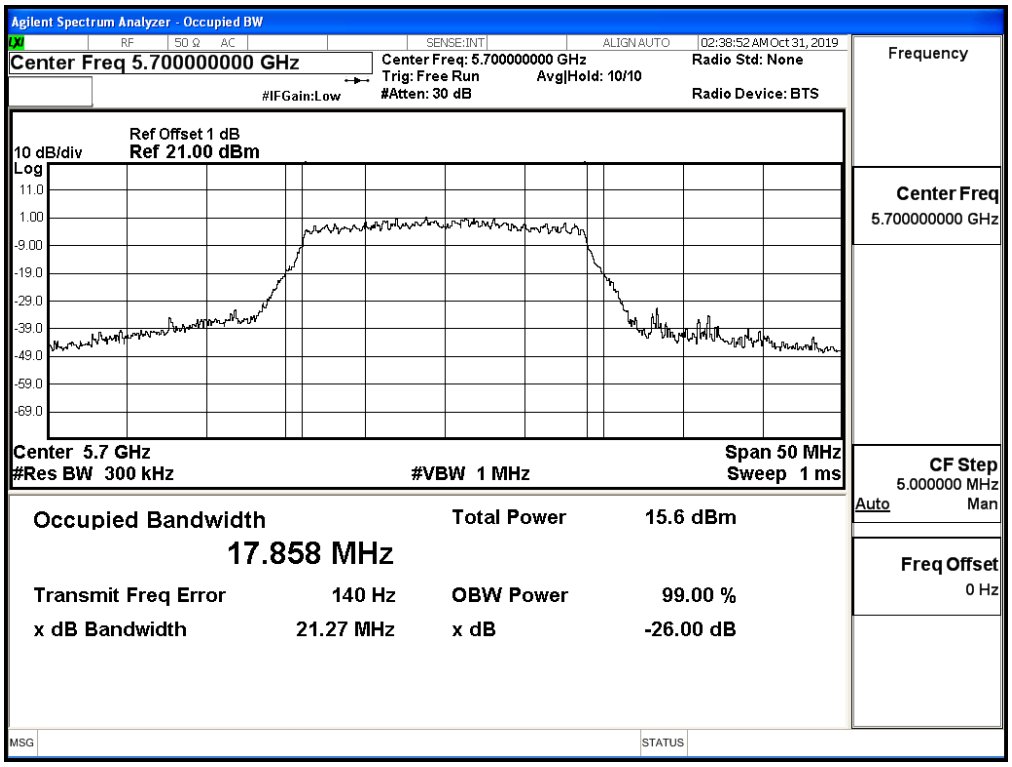
Channel 100 -Chain B



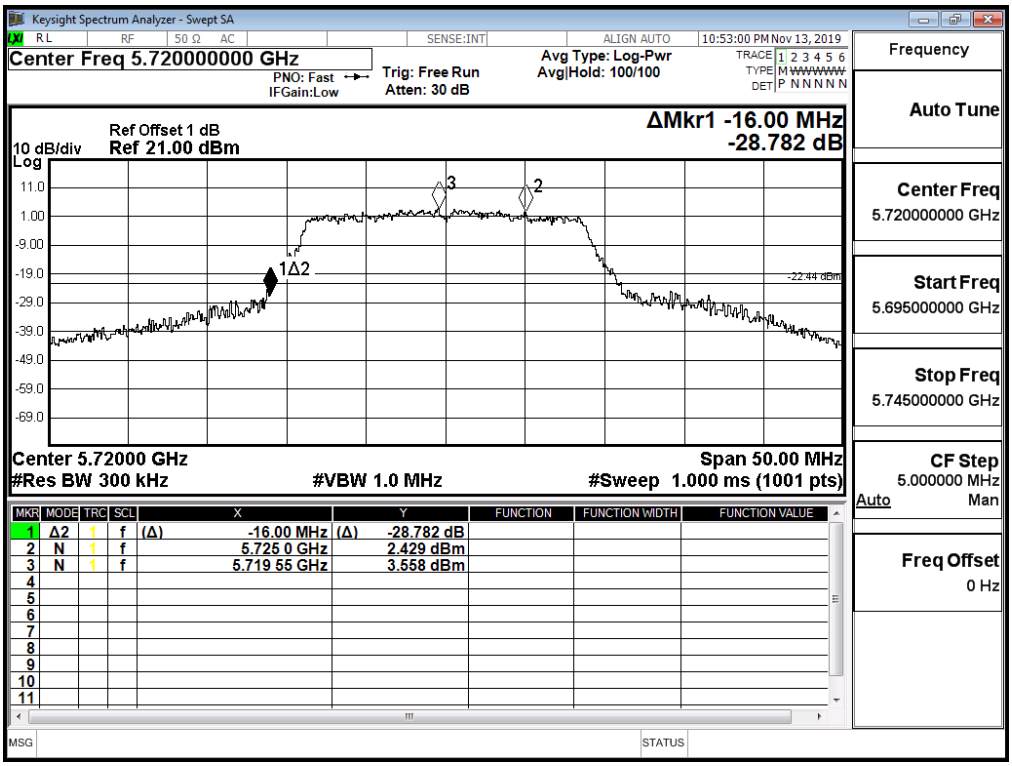
Channel 120 -Chain B



Channel 140 -Chain B



Channel 144 -Chain B



Maximum conducted output power:

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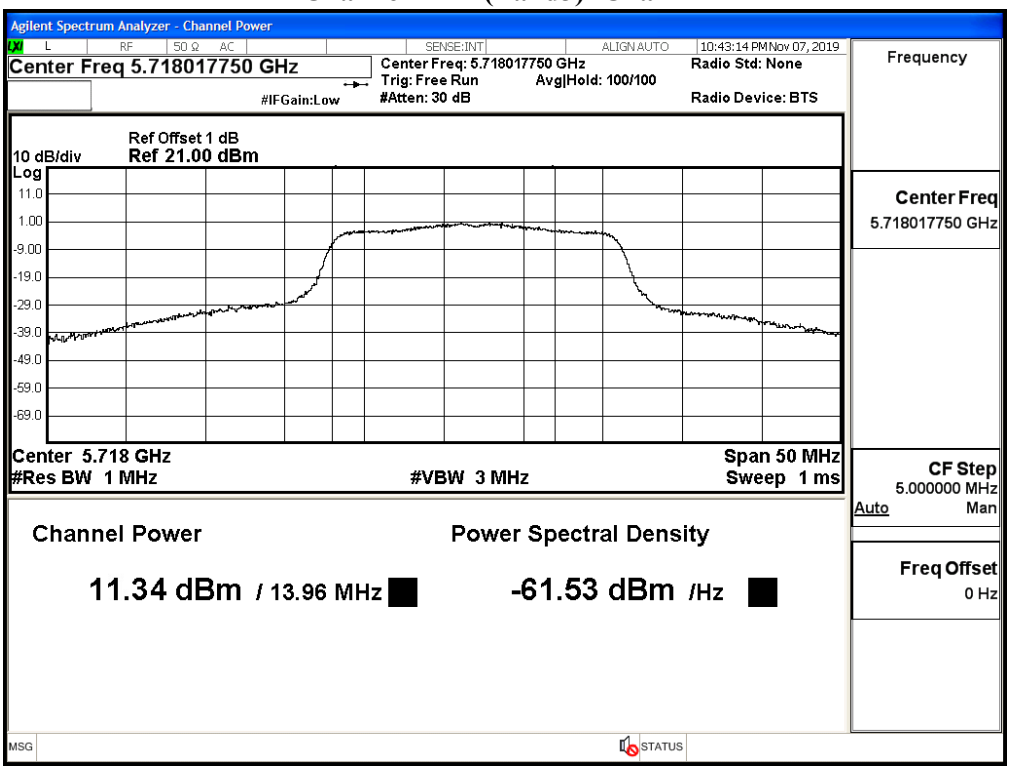
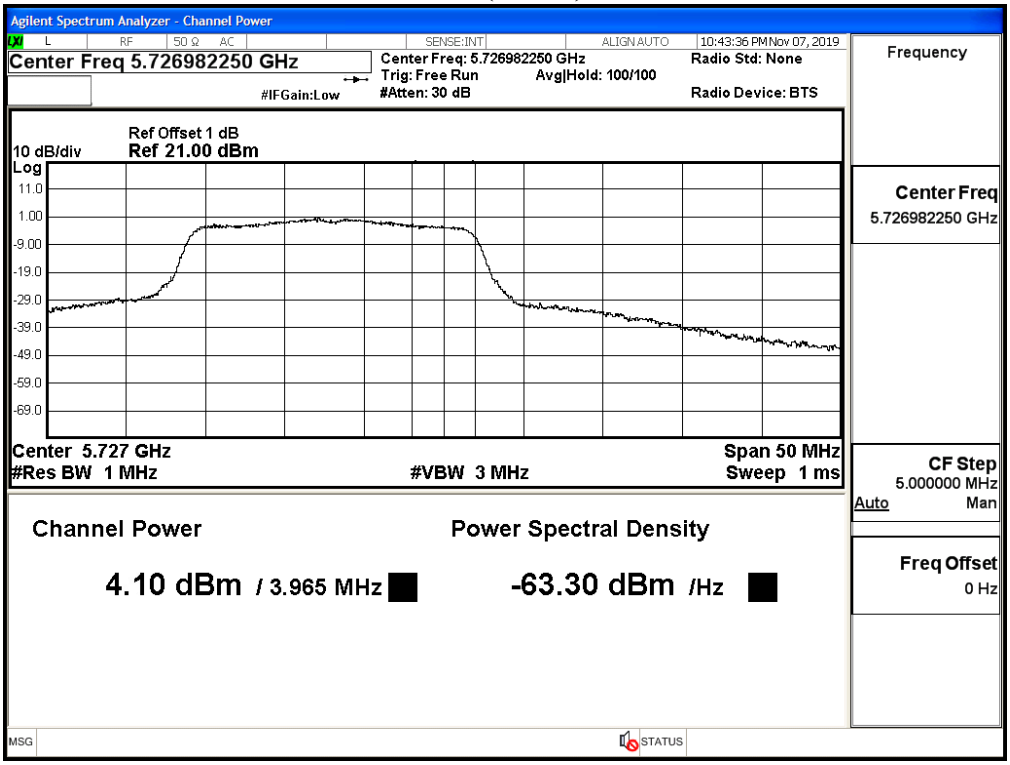
Channel 144F (Band3) -Chain A



Maximum conducted output power:

Channel 144F (Band4) -Chain A



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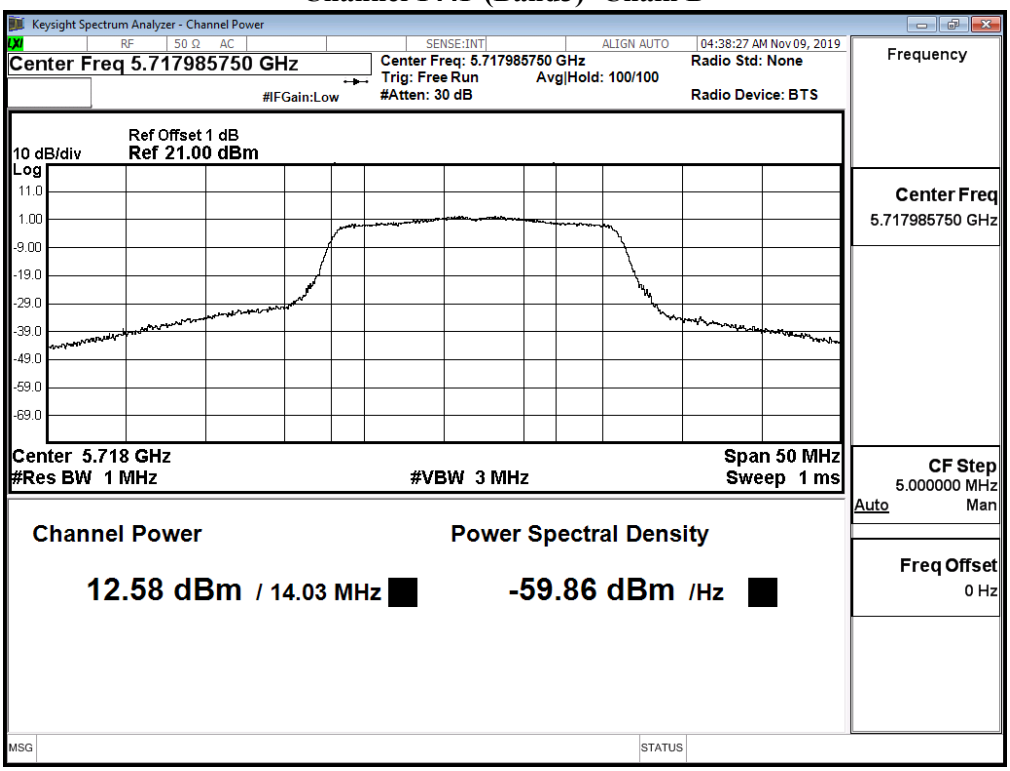
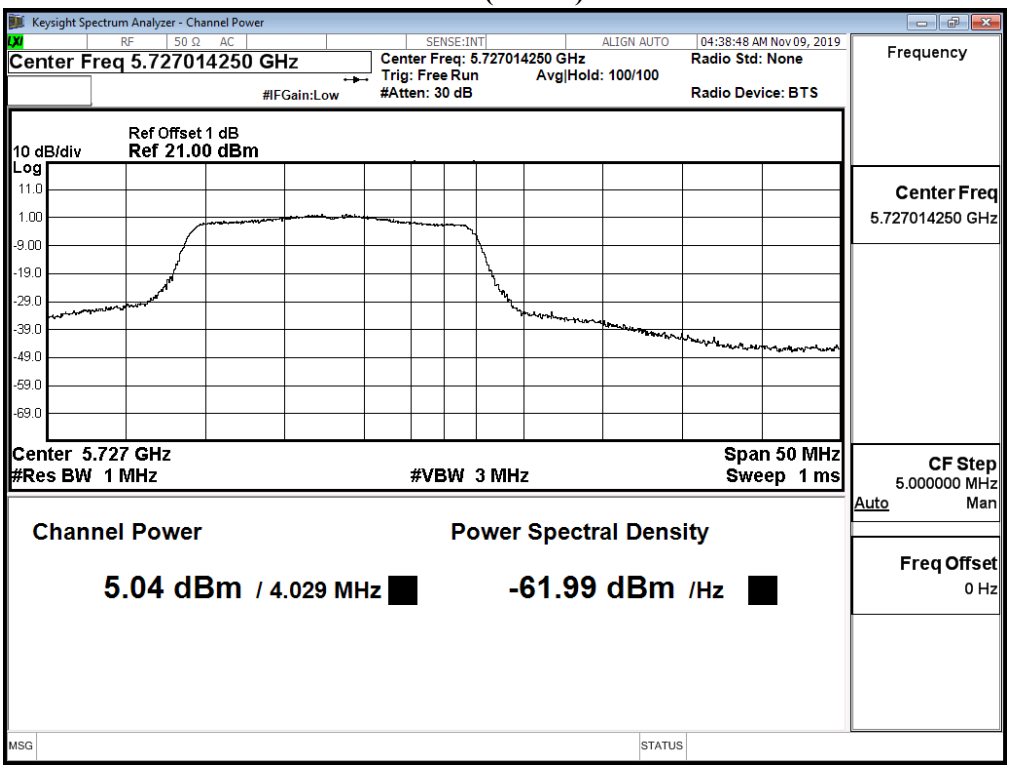
Maximum conducted output power:

Channel 144F (Band3) -Chain B



Maximum conducted output power:

Channel 144F (Band4) -Chain B



、 Product : Humly Room Display One
Test Item : Maximum conducted output power
Test Date : 2019/11/08
Test Mode : Mode 3: Transmit (802.11n40)

CHAIN A

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
38	5190	9.71	--	--	--	--	--	--	--	<24dBm
46	5230	12.31	12.24	12.16	12.07	12.00	11.91	11.86	11.79	<24dBm
54	5270	12.8	--	--	--	--	--	--	--	<24dBm
62	5310	11.71	11.58	11.45	11.36	11.27	11.15	11.10	11.04	<24dBm
102	5510	9.89	--	--	--	--	--	--	--	<24dBm
118	5590	11.96	11.87	11.81	11.69	11.62	11.50	11.43	11.31	<24dBm
134	5670	12.24	--	--	--	--	--	--	--	<24dBm
142(Band3)	5710	11.65	11.55	11.49	11.37	11.29	11.23	11.13	11.02	<24dBm
142(Band4)	5710	0.57	0.46	0.43	0.30	0.21	0.11	0.05	-0.05	<30dBm
151	5755	12.16	--	--	--	--	--	--	--	<30dBm
159	5795	12.26	12.14	12.07	12.00	11.91	11.87	11.84	11.73	<30dBm

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

CHAIN B

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		HT8	HT9	HT10	HT11	HT12	HT13	HT14	HT15	
		Measurement Level (dBm)								
38	5190	9.08	--	--	--	--	--	--	--	<24dBm
46	5230	12.87	12.8	12.73	12.66	12.59	12.46	12.42	12.38	<24dBm
54	5270	12.86	--	--	--	--	--	--	--	<24dBm
62	5310	10.88	10.83	10.7	10.61	10.56	10.52	10.39	10.30	<24dBm
102	5510	9.72	--	--	--	--	--	--	--	<24dBm
118	5590	13.15	13.07	13.03	12.97	12.92	12.81	12.72	12.59	<24dBm
134	5670	13.37	--	--	--	--	--	--	--	<24dBm
142(Band3)	5710	12.94	12.85	12.8	12.69	12.58	12.52	12.43	12.34	<24dBm
142(Band4)	5710	1.88	1.84	1.72	1.69	1.66	1.61	1.55	1.42	<30dBm
151	5755	13.43	--	--	--	--	--	--	--	<30dBm
159	5795	13.23	13.15	13.08	13.04	12.92	12.80	12.70	12.58	<30dBm

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

Maximum conducted output power Measurement:

(CHAIN A+ B)

Channel Number	Frequency	26 dB Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
38	5190	--	9.71	9.08	12.42	24	--
46	5230	--	12.31	12.87	15.61	24	--
54	5270	39.660	12.80	12.86	15.84	24	26.98
62	5310	39.720	11.71	10.88	14.33	24	26.99
102	5510	39.290	9.89	9.72	12.82	24	26.94
118	5590	39.300	11.96	13.15	15.61	24	26.94
134	5670	39.270	12.24	13.37	15.85	24	26.94
142F(Band3)	5710	35.200	11.65	12.94	15.35	24	26.47
142F(Band4)	5710	--	0.57	1.88	4.28	30	--
151	5755	--	12.16	13.43	15.85	30	--
159	5795	--	12.26	13.23	15.78	30	--

Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

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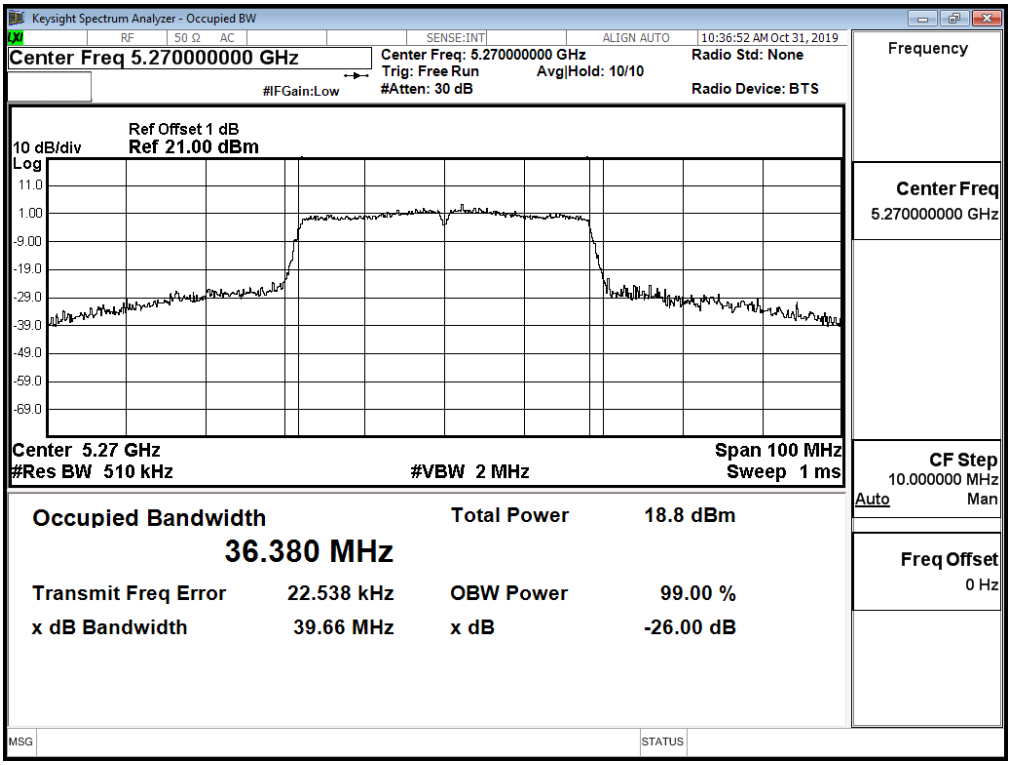
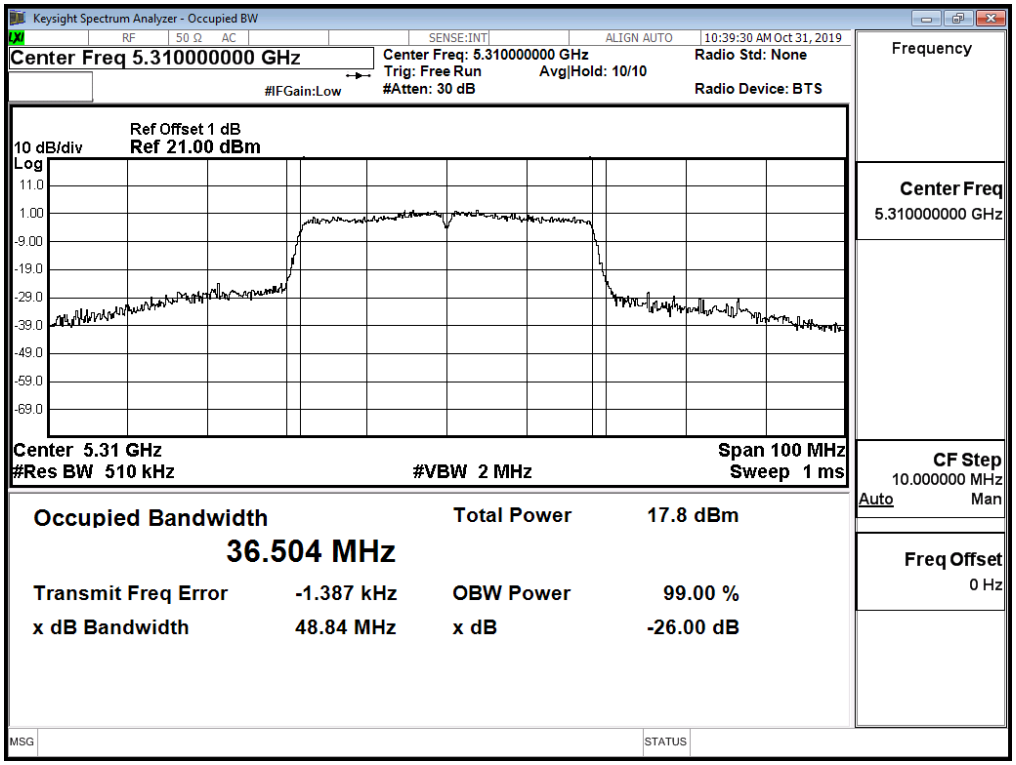
26 dB Bandwidth:

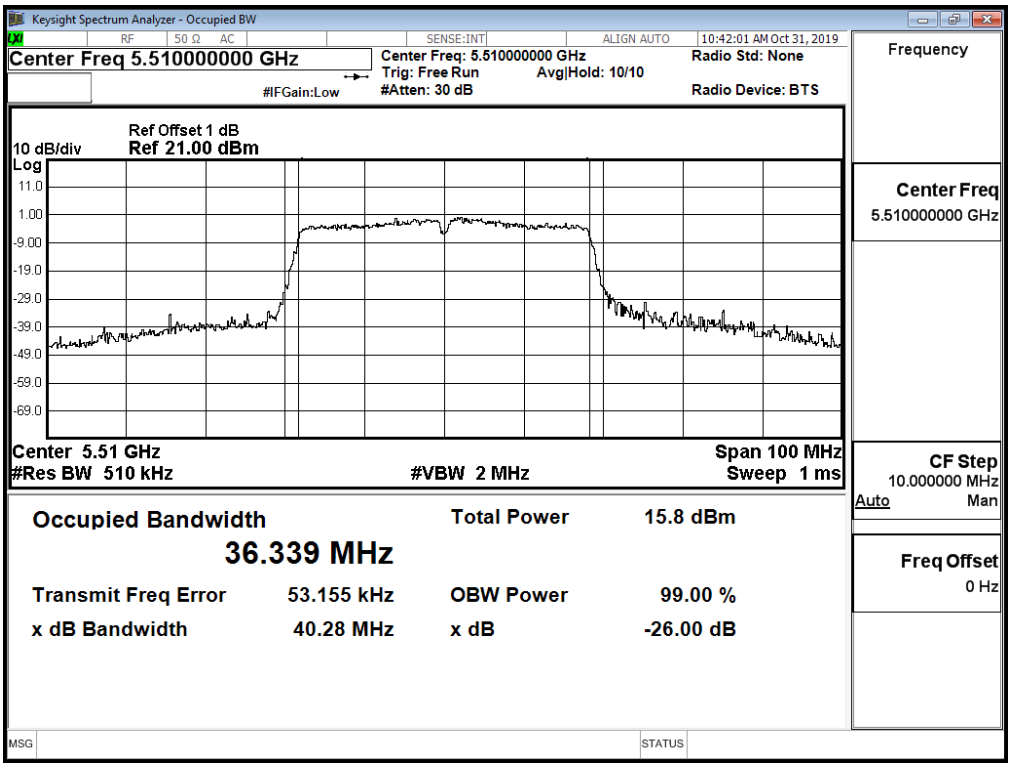
Channel 54 -Chain A



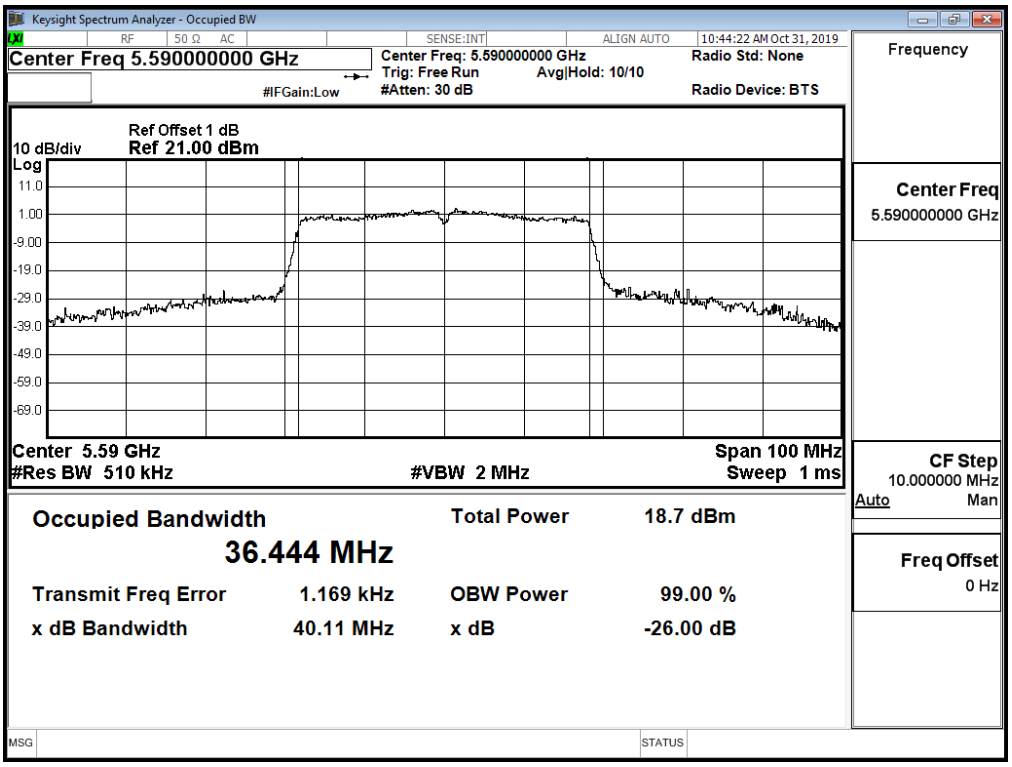
Channel 62 -Chain A



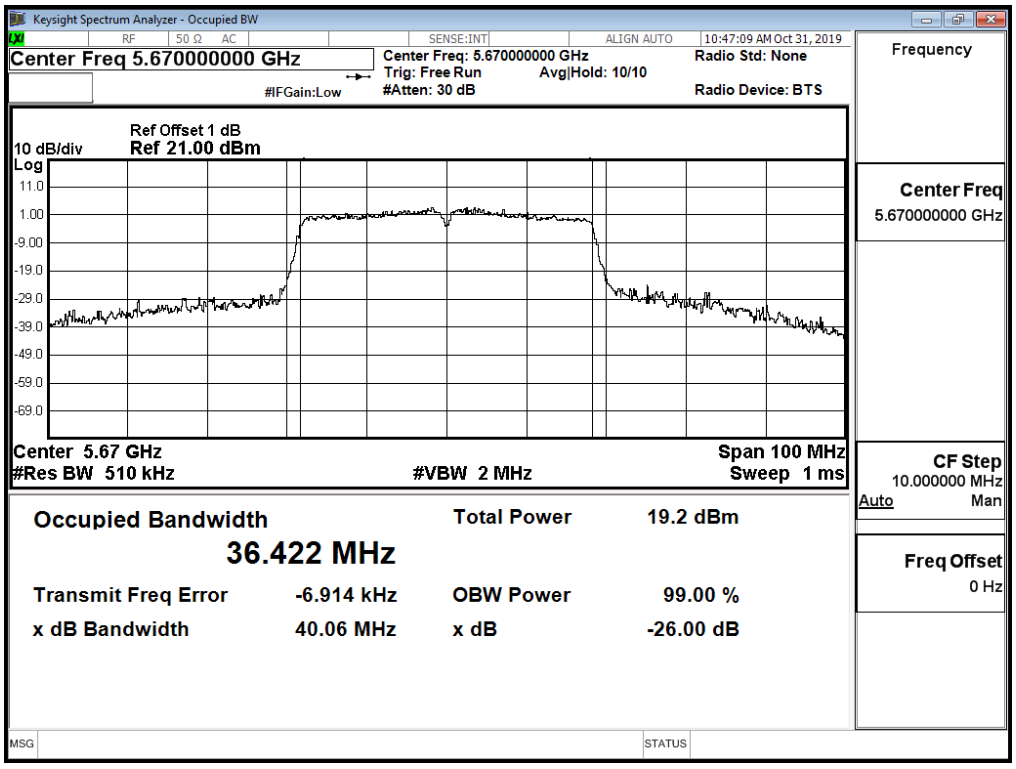
Channel 102 -Chain A



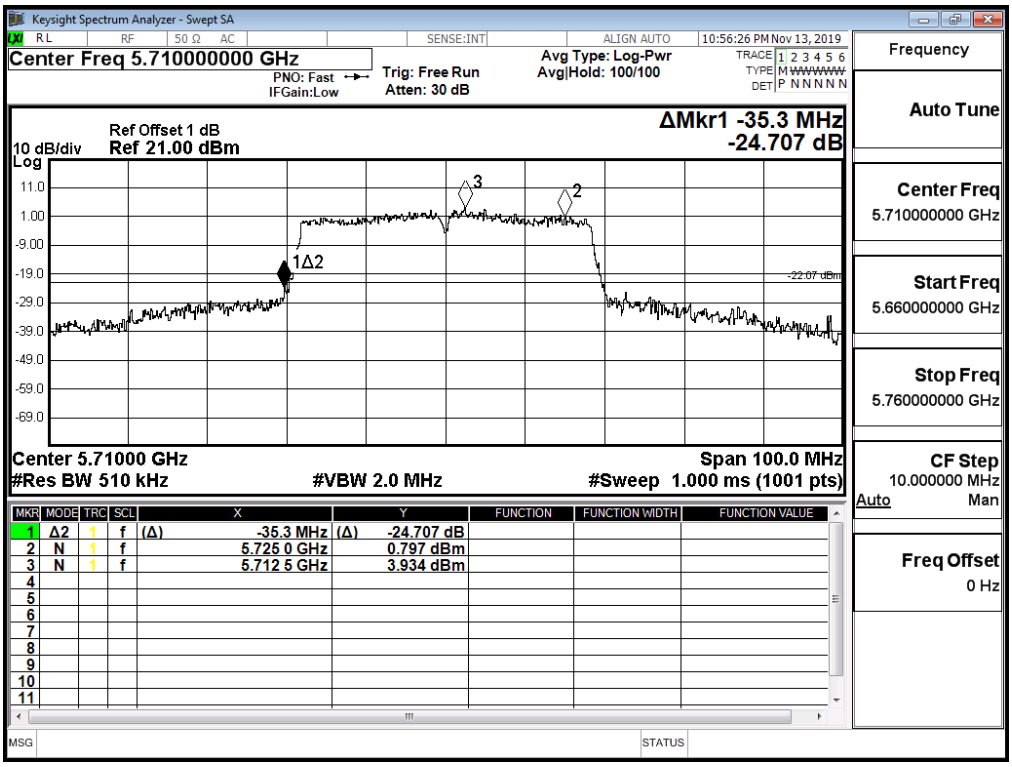
Channel 118 -Chain A



Channel 134 -Chain A



Channel 142 -Chain A



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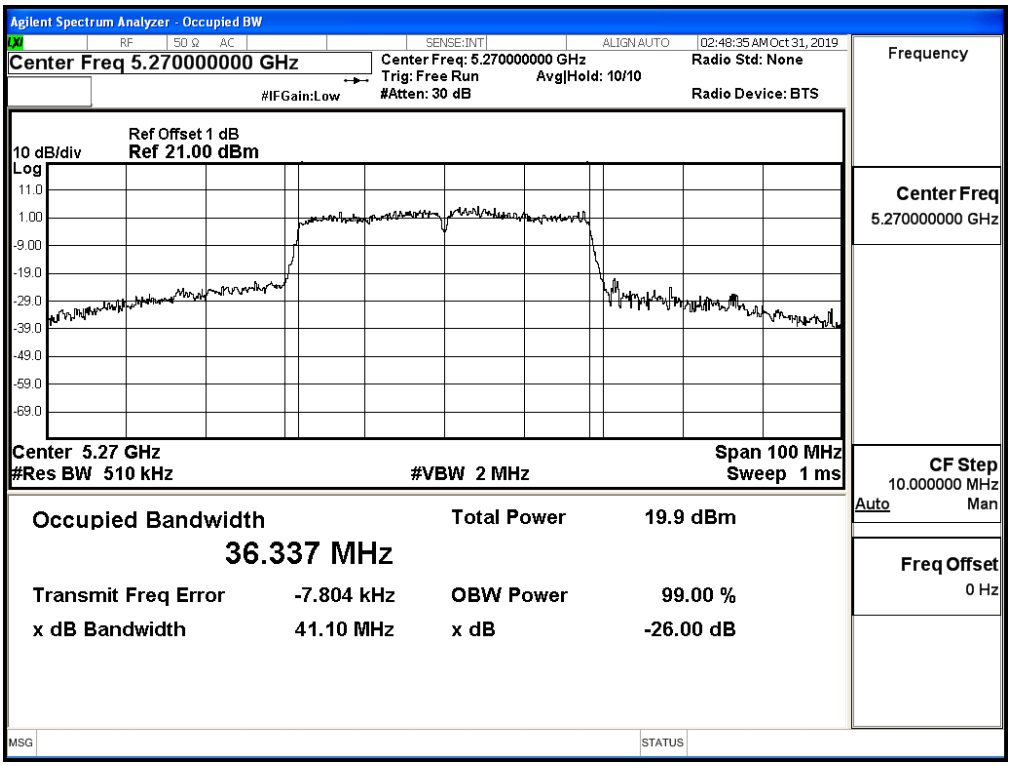
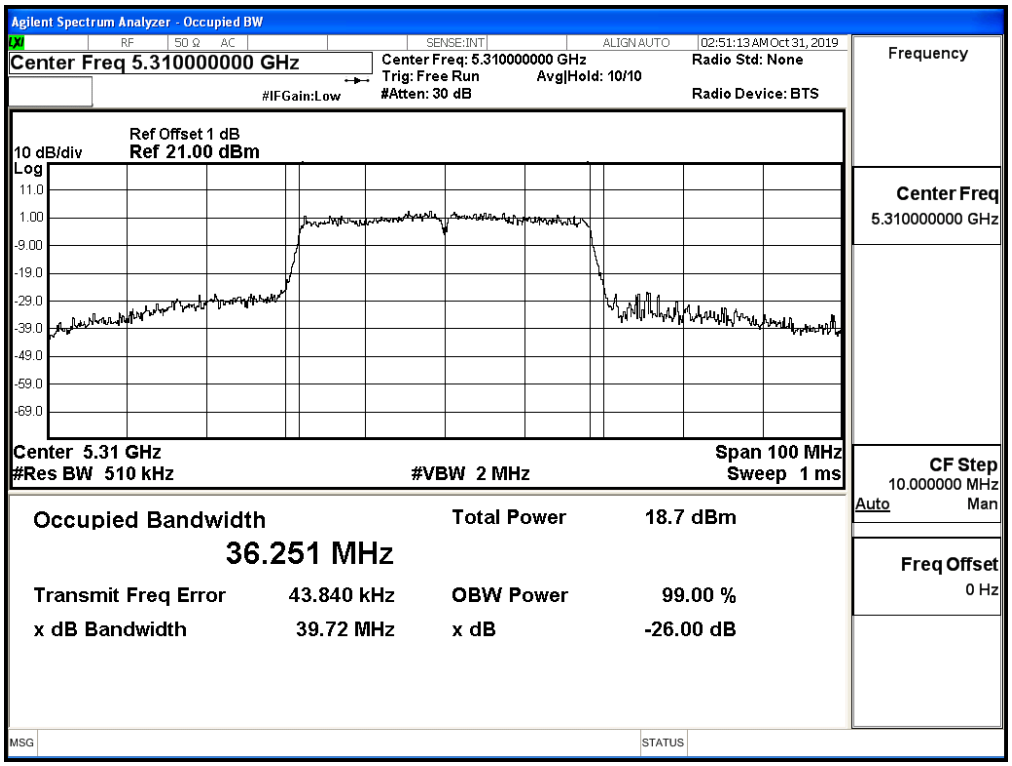
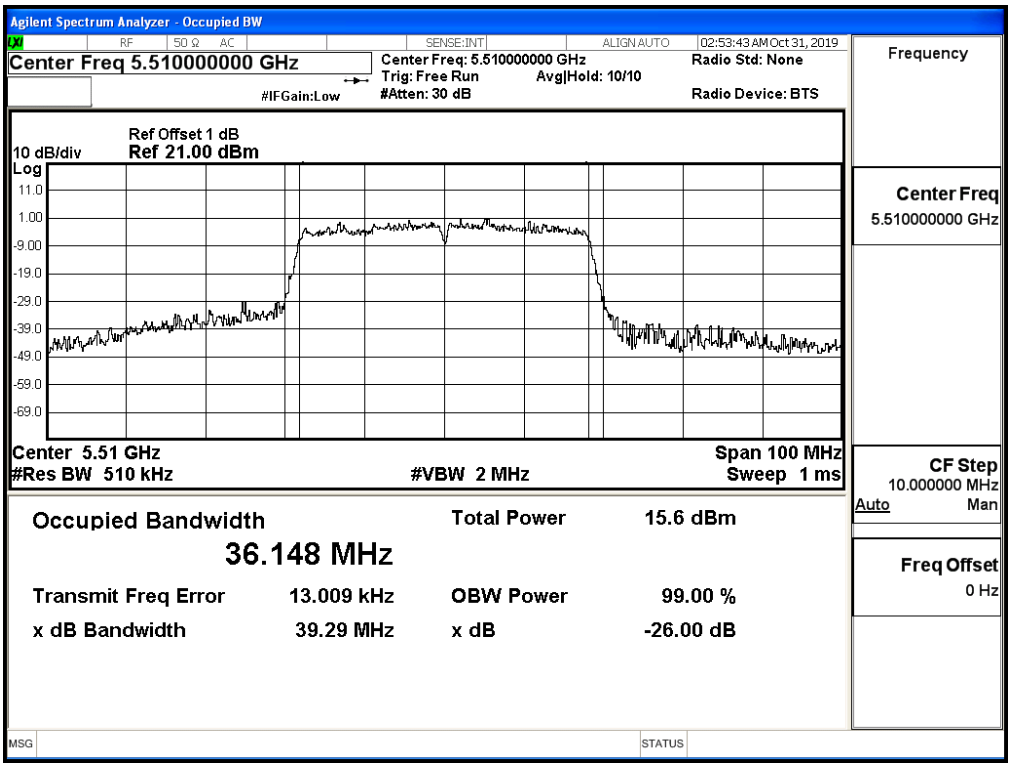
Channel 54 -Chain B



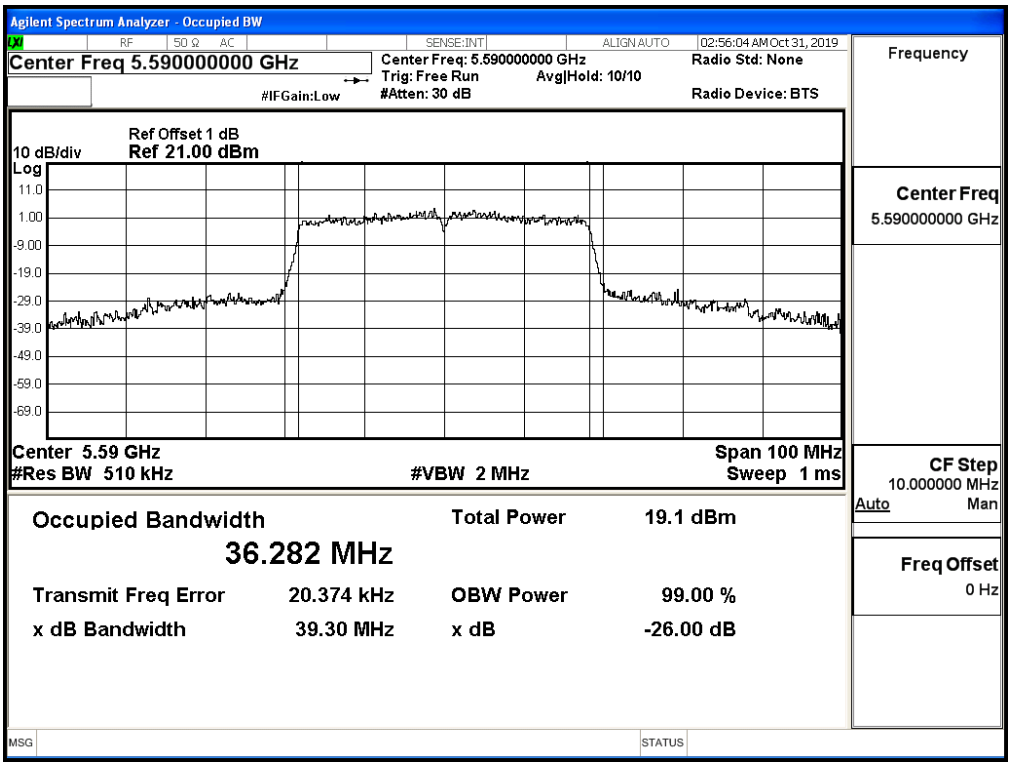
Channel 62 -Chain B



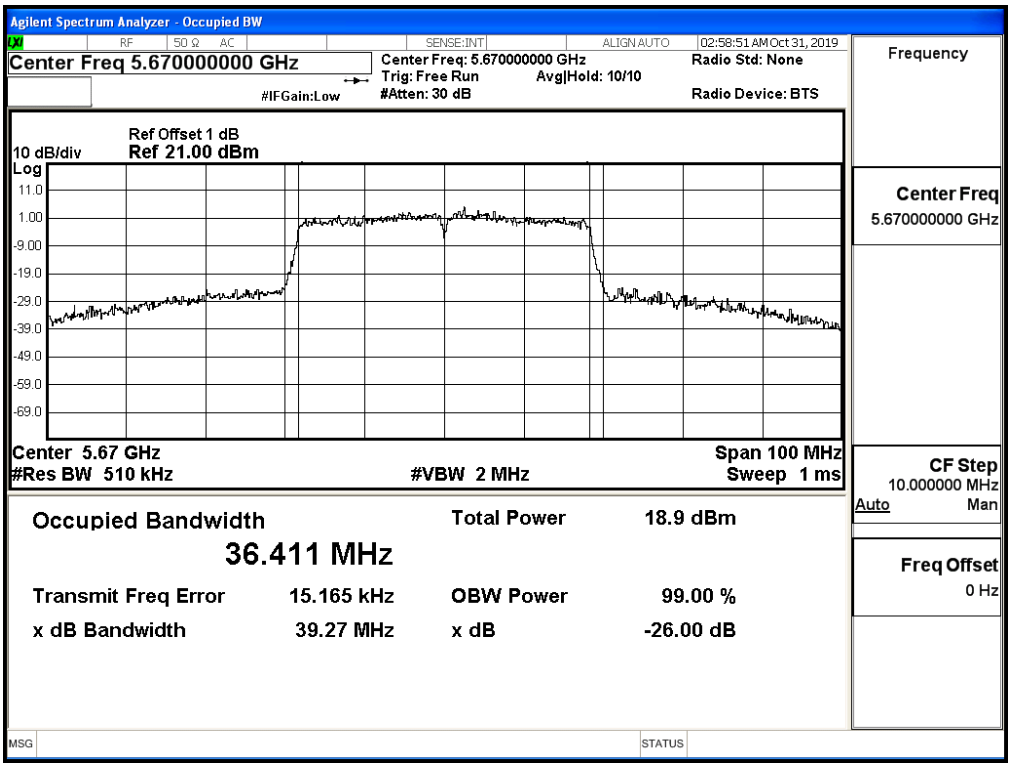
Channel 102 -Chain B



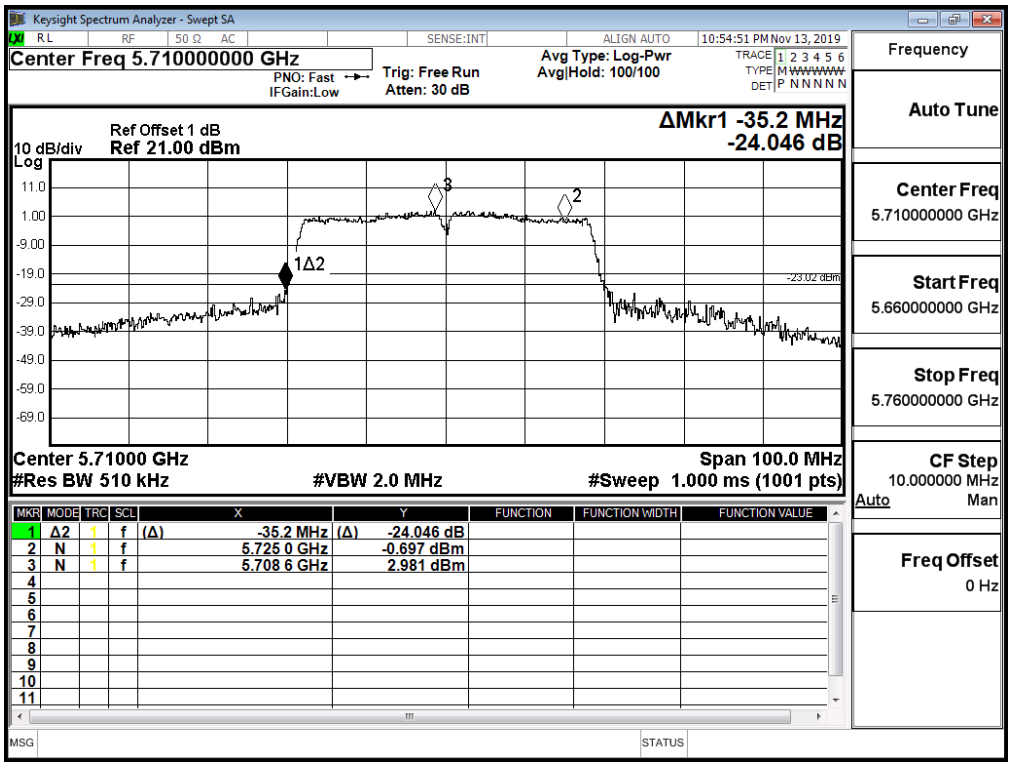
Channel 118 -Chain B



Channel 134 -Chain B



Channel 142 -Chain B



Maximum conducted output power:

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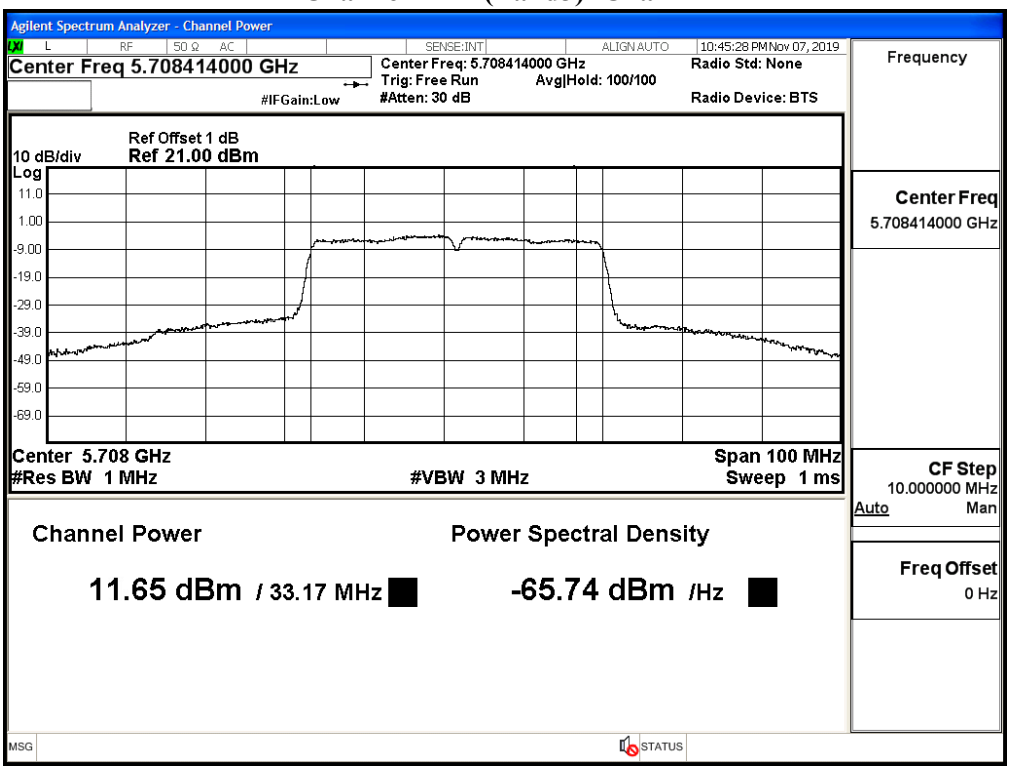
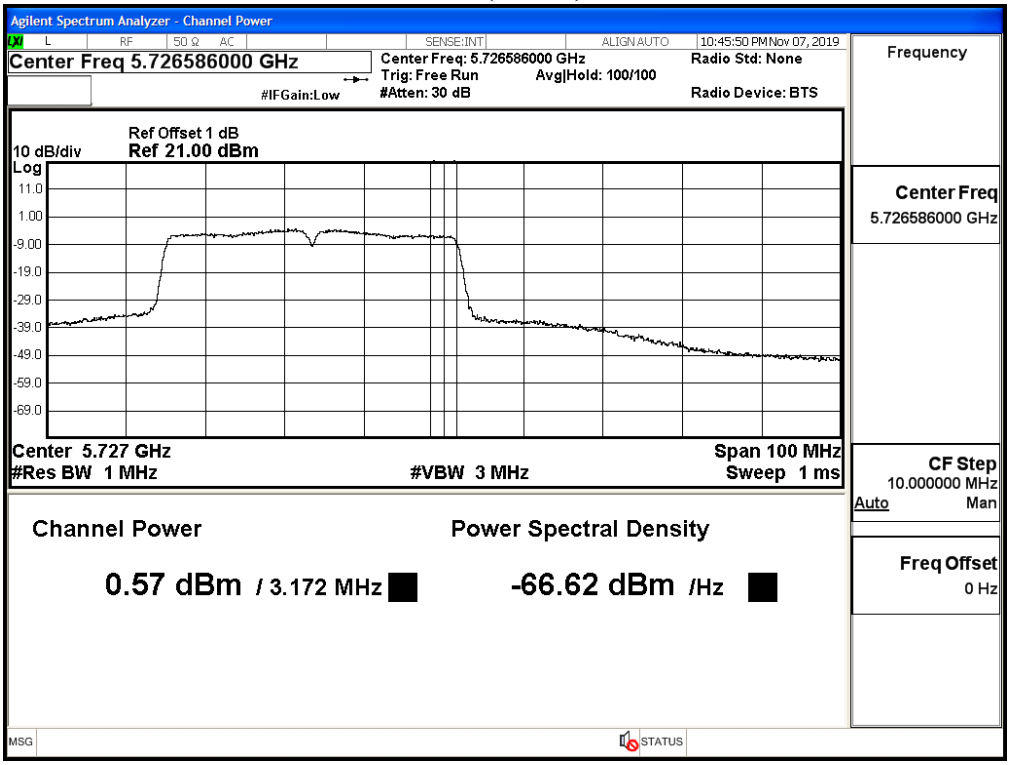
Channel 142F (Band3) -Chain A



Maximum conducted output power:

Channel 142F (Band4) -Chain A



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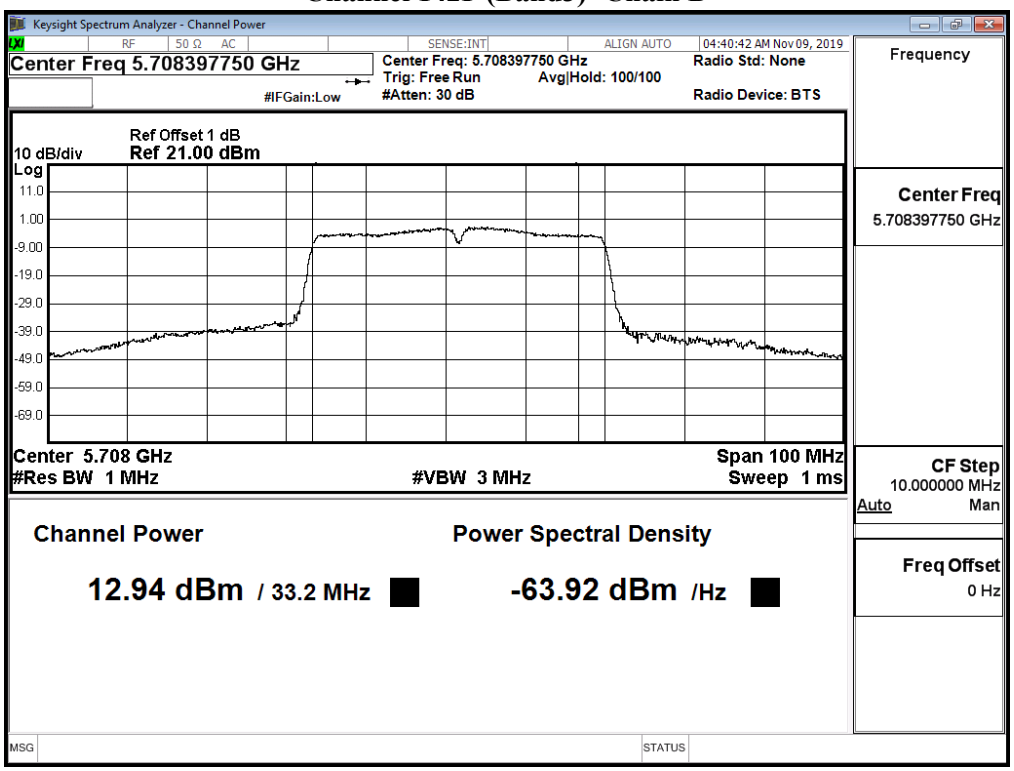
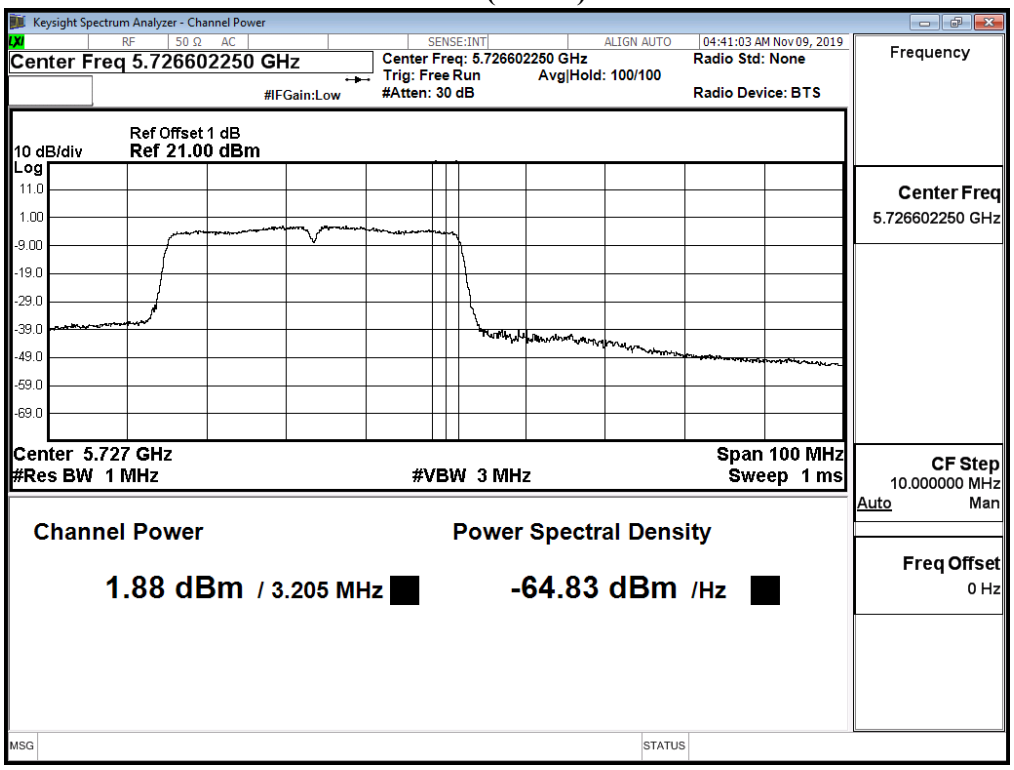
Maximum conducted output power:

Channel 142F (Band3) -Chain B



Maximum conducted output power:

Channel 142F (Band4) -Chain B



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Product : Humly Room Display One
Test Item : Maximum conducted output power
Test Date : 2019/11/08
Test Mode : Mode 4: Transmit (802.11ac80)

CHAIN A

Cable loss=1dB		Average Power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
42	5210	7.18	7.12	6.99	6.93	6.85	6.8	6.71	6.59	6.51	6.39	<24dBm
58	5290	9.82	9.79	9.69	9.56	9.53	9.41	9.34	9.21	9.08	9.02	<24dBm
106ac80	5530	8.36	8.31	8.19	8.13	8.05	8.02	7.95	7.84	7.79	7.75	<24dBm
122ac80	5610	11.15	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(Band3)	5690	10.79	10.66	10.55	10.46	10.35	10.23	10.18	10.08	10.01	9.9	<24dBm
138ac80(Band4)	5690	-4.93	-5.02	-5.1	-5.22	-5.35	-5.4	-5.48	-5.51	-5.56	-5.64	<24dBm
155ac80	5775	11.2	11.09	10.96	10.93	10.88	10.81	10.71	10.61	10.5	10.38	<30dBm

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

CHAIN B

Cable loss=1dB		Average Power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
42	5210	6.38	6.3	6.21	6.12	6.09	6.01	5.88	5.76	5.71	5.64	<24dBm
58	5290	9	8.89	8.82	8.72	8.65	8.54	8.44	8.38	8.26	8.14	<24dBm
106ac80	5530	8.19	8.11	8.04	8.01	7.97	7.86	7.75	7.72	7.67	7.61	<24dBm
122ac80	5610	12.26	--	--	--	--	--	--	--	--	--	<24dBm
138ac80(Band3)	5690	11.99	11.88	11.78	11.67	11.54	11.51	11.42	11.3	11.18	11.05	<24dBm
138ac80(Band4)	5690	-4	-4.12	-4.19	-4.3	-4.35	-4.47	-4.53	-4.62	-4.74	-4.8	<24dBm
155ac80	5775	12.32	12.19	12.16	12.08	12.05	11.92	11.87	11.82	11.78	11.69	<30dBm

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

Maximum conducted output power Measurement:

(CHAIN A+ B)

Channel Number	Frequency Range	26 dB Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit	
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)
42	5210	--	7.18	6.38	9.81	24	--
58	5290	81.120	9.82	9.00	12.44	24	30.09
106	5530	80.770	8.36	8.19	11.29	24	30.07
122	5610	81.500	11.15	12.26	14.75	24	30.11
138	5690	75.400	10.79	11.99	14.44	24	29.77
138ac80(Band4)	5690	--	-4.93	-4.00	-1.43	30	--
155	5775	--	11.20	12.32	14.81	30	--

Note:

1. Power Output Value =Reading value on average power meter + cable loss
2. Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))
3. 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

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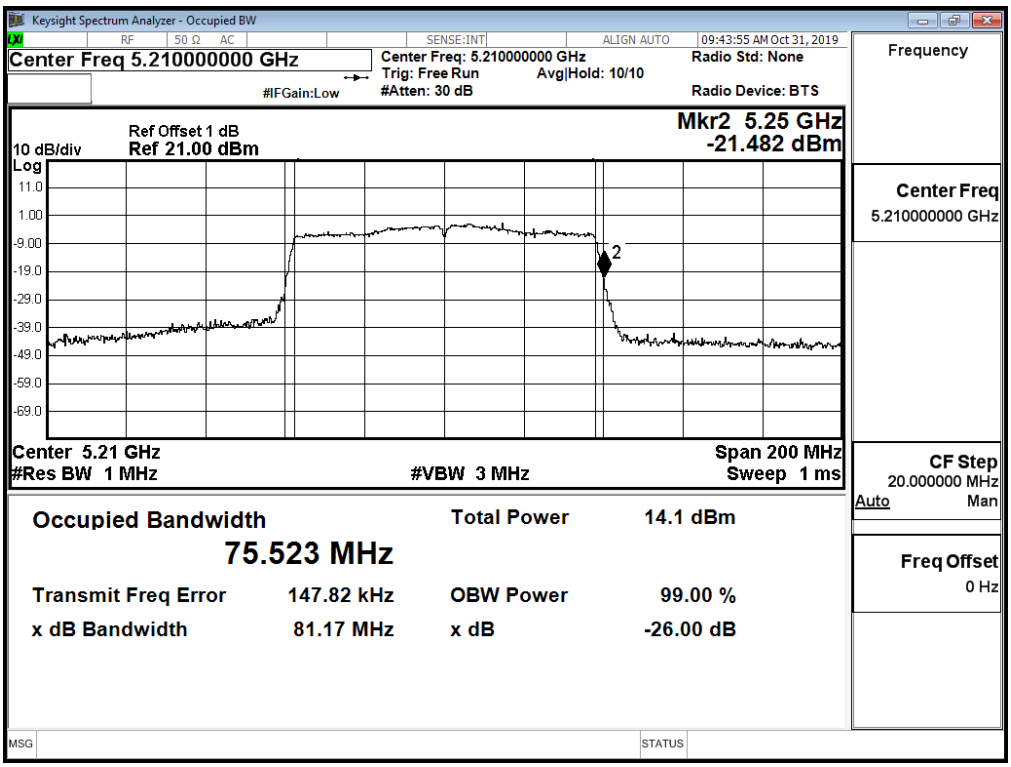
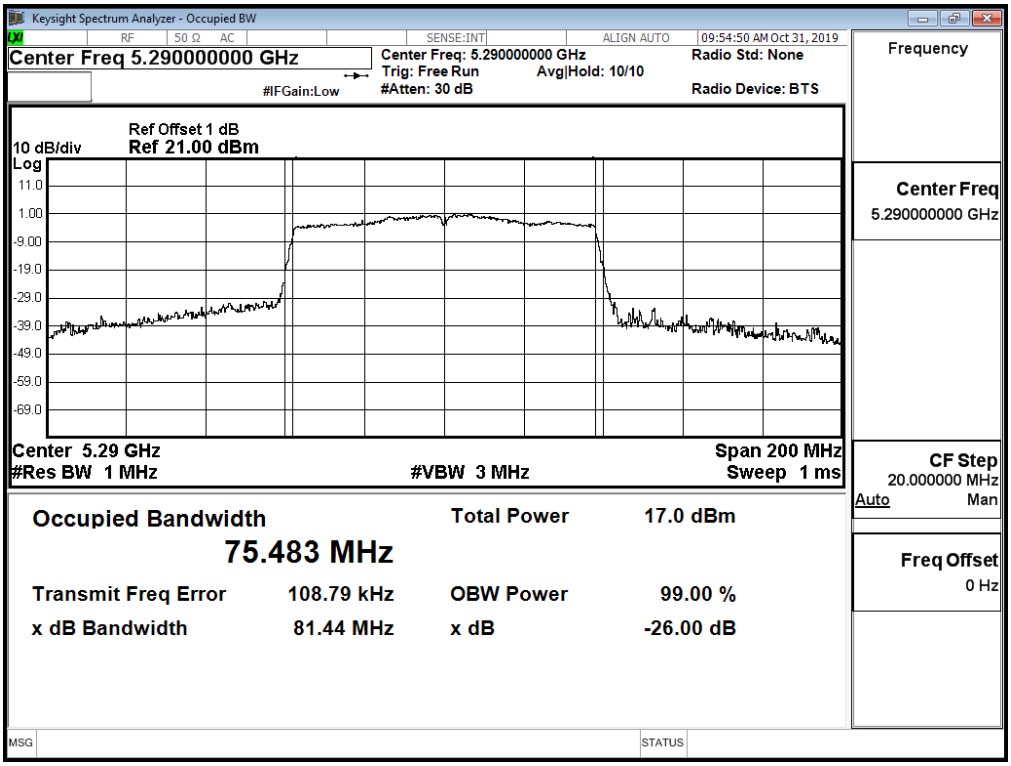
26 dB Bandwidth:

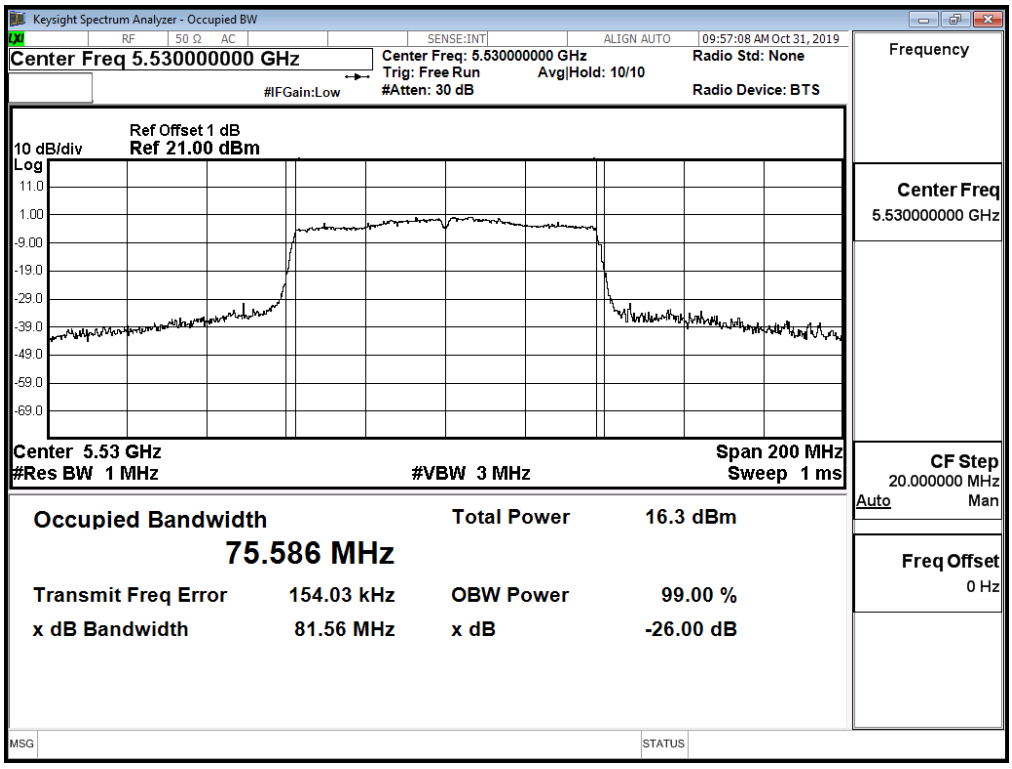
Channel 42 -Chain A



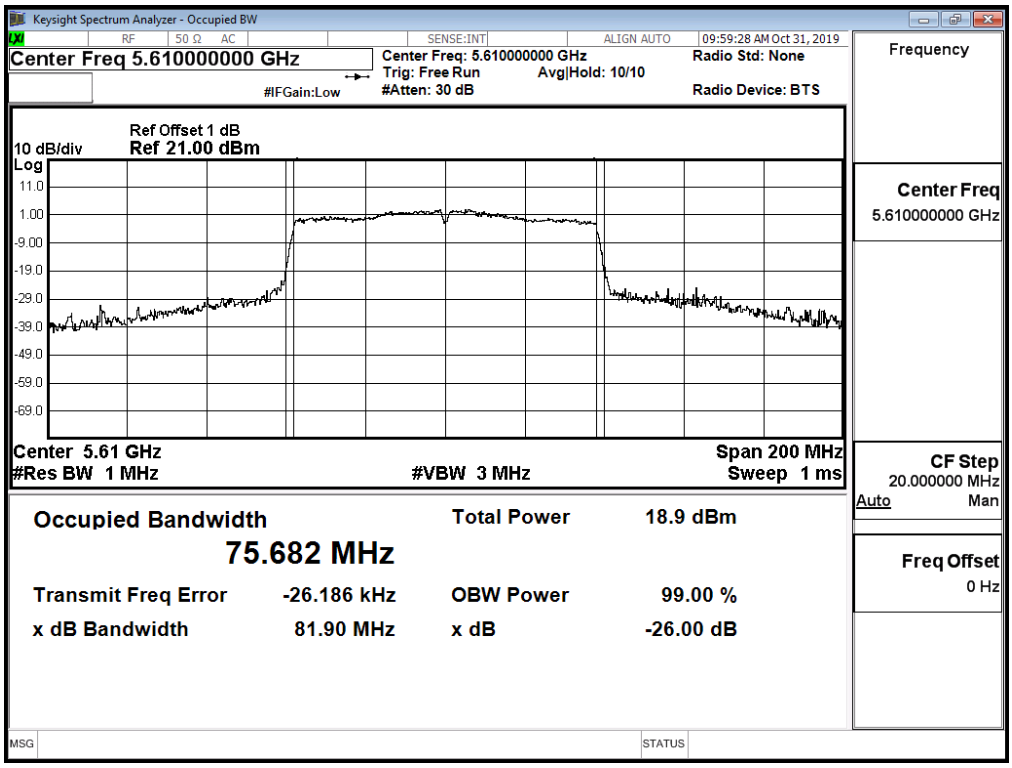
Channel 58 -Chain A



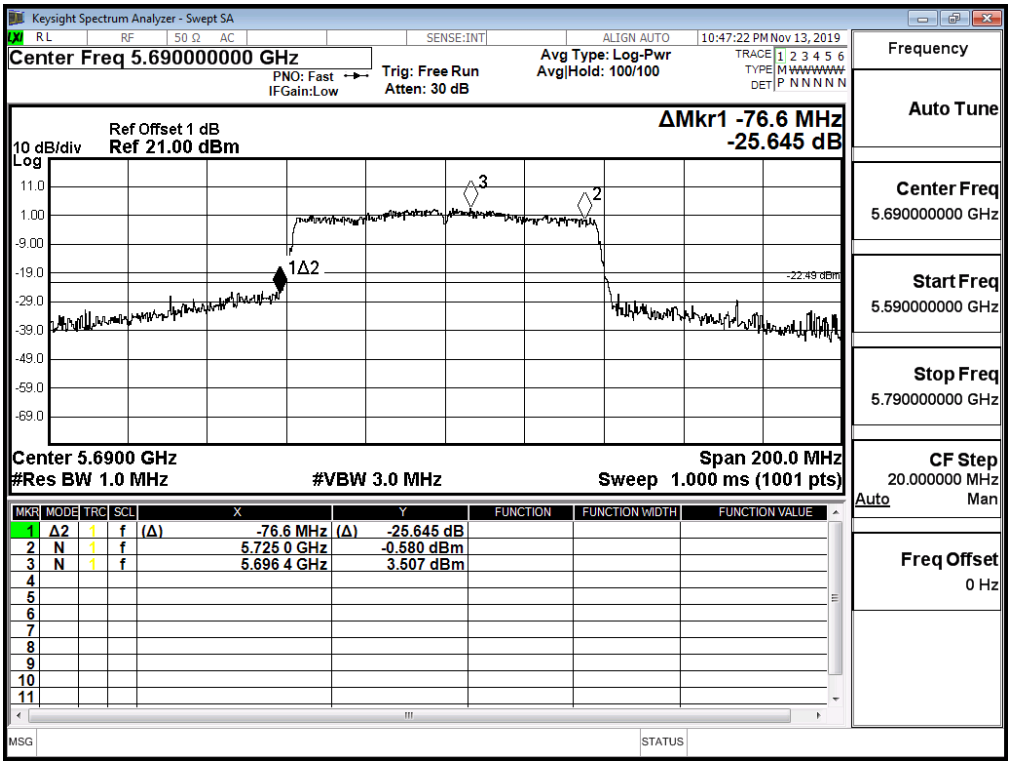
Channel 106 -Chain A



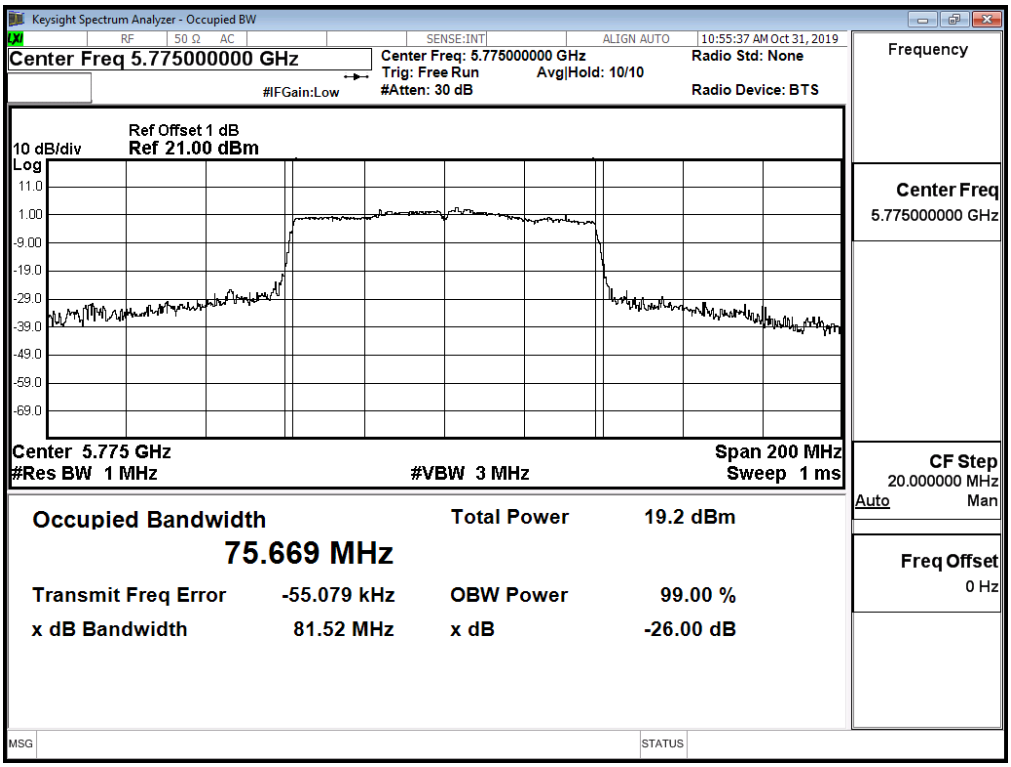
Channel 122 -Chain A



Channel 138 -Chain A



Channel 155 -Chain A



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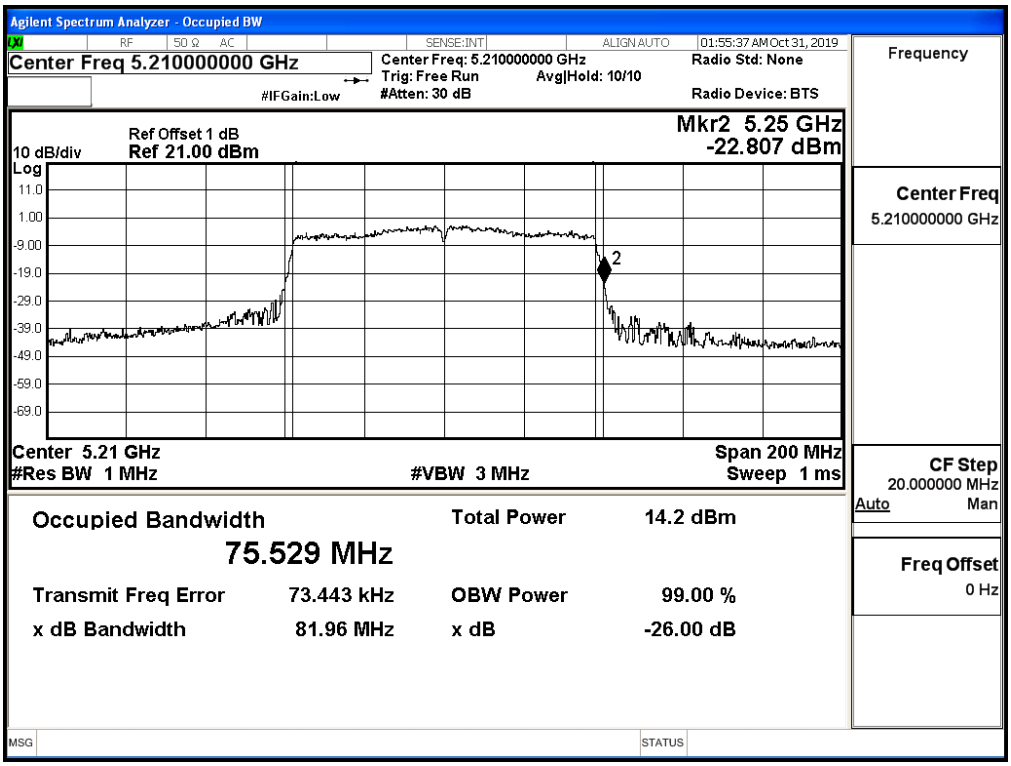
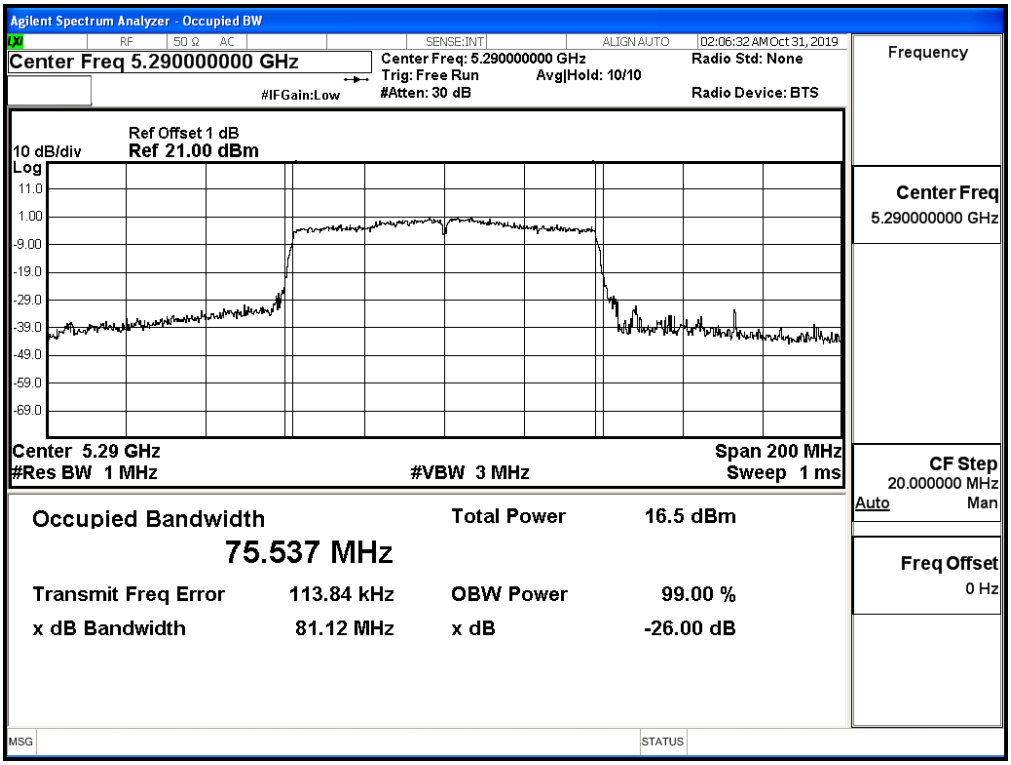
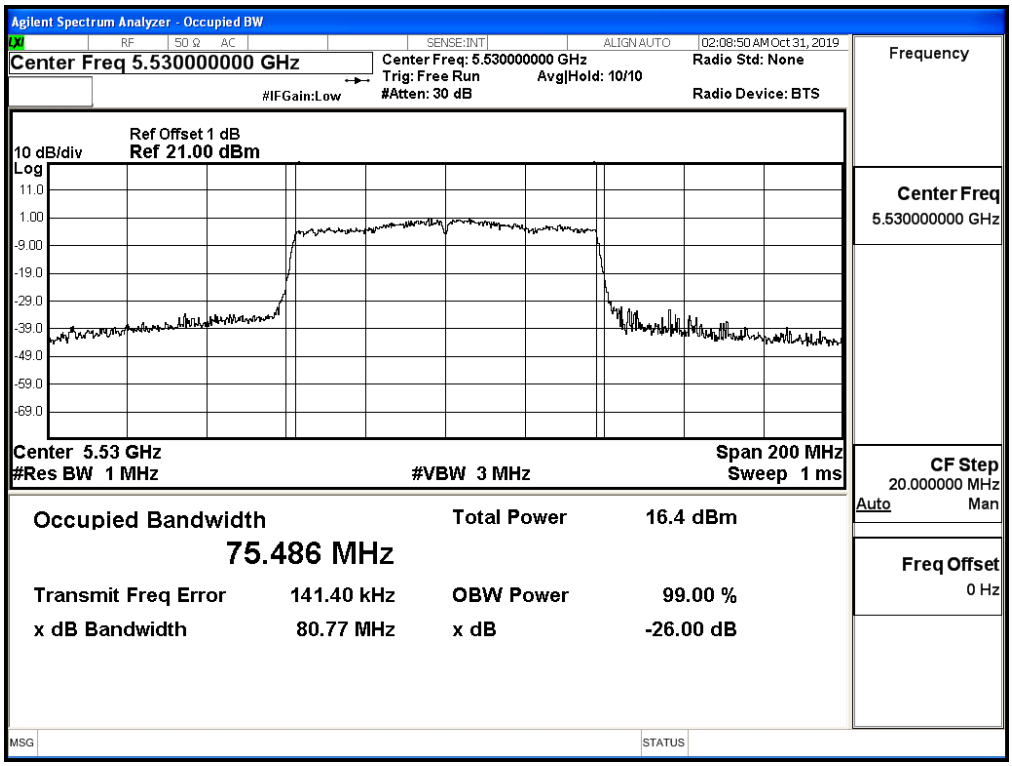
Channel 42 -Chain B



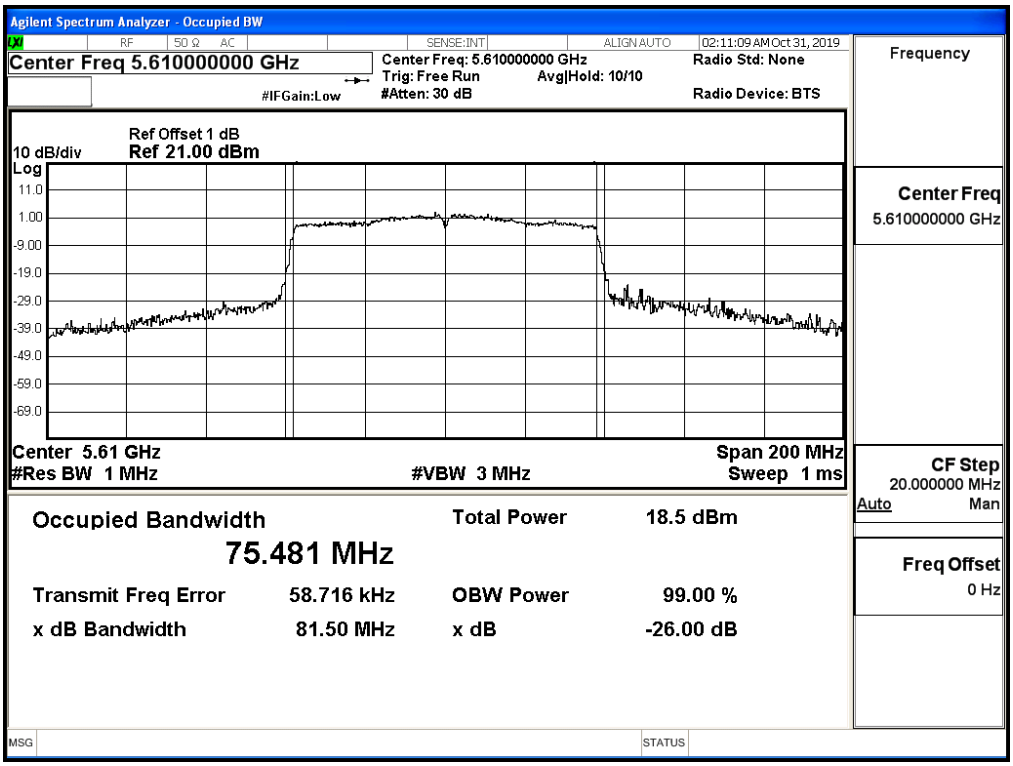
Channel 58 -Chain B



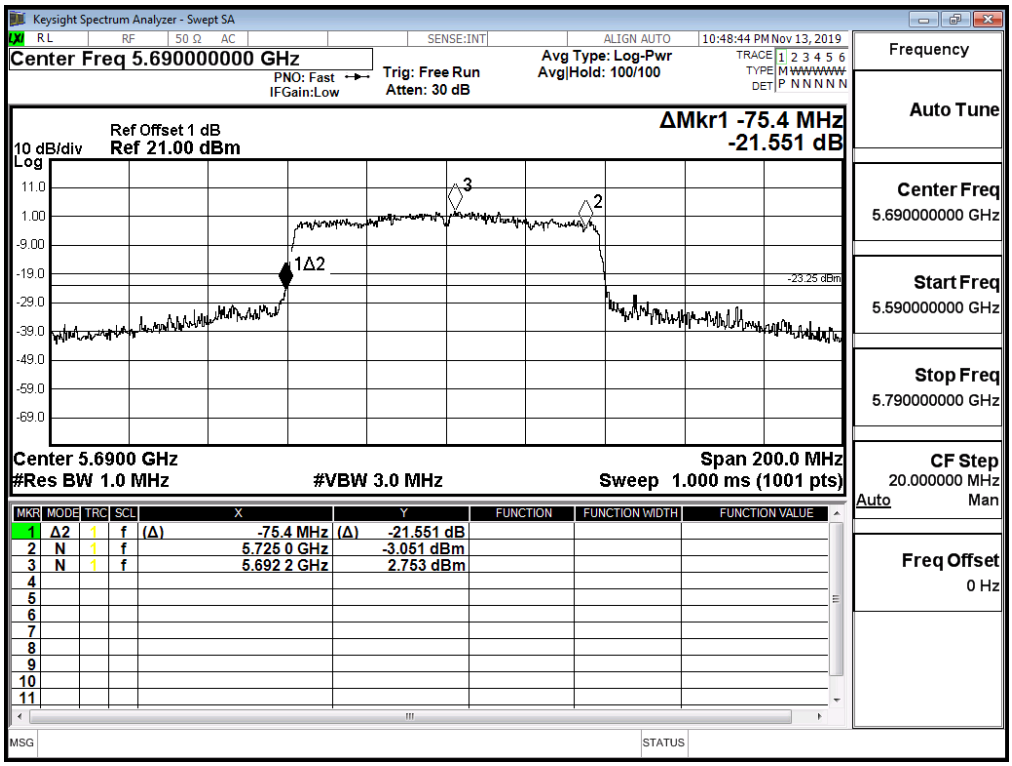
Channel 106 -Chain B



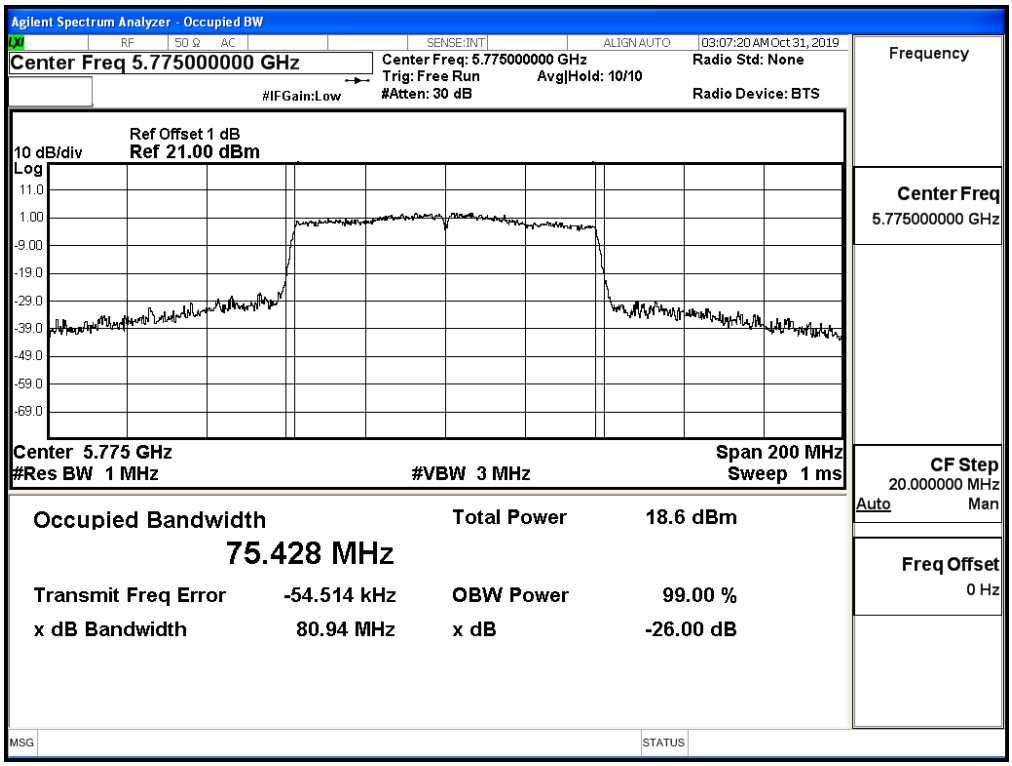
Channel 122 -Chain B



Channel 138 -Chain B



Channel 155 -Chain B



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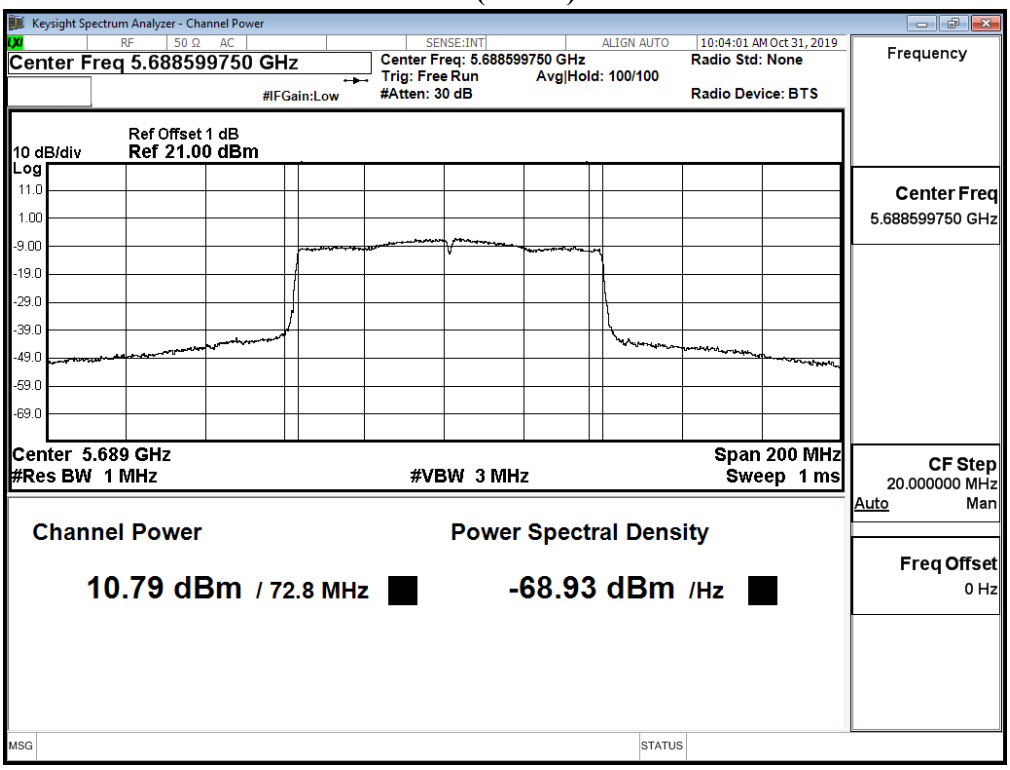
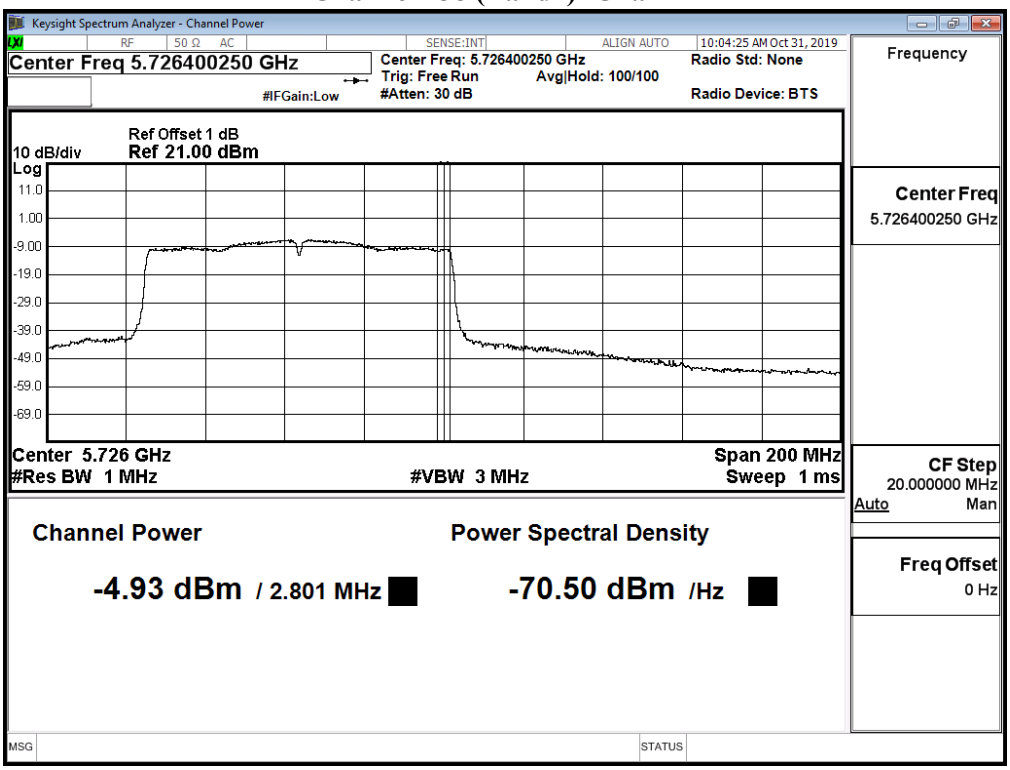
Maximum conducted output power:

Channel 138 (Band3) -Chain A



Maximum conducted output power:

Channel 138 (Band4) -Chain A



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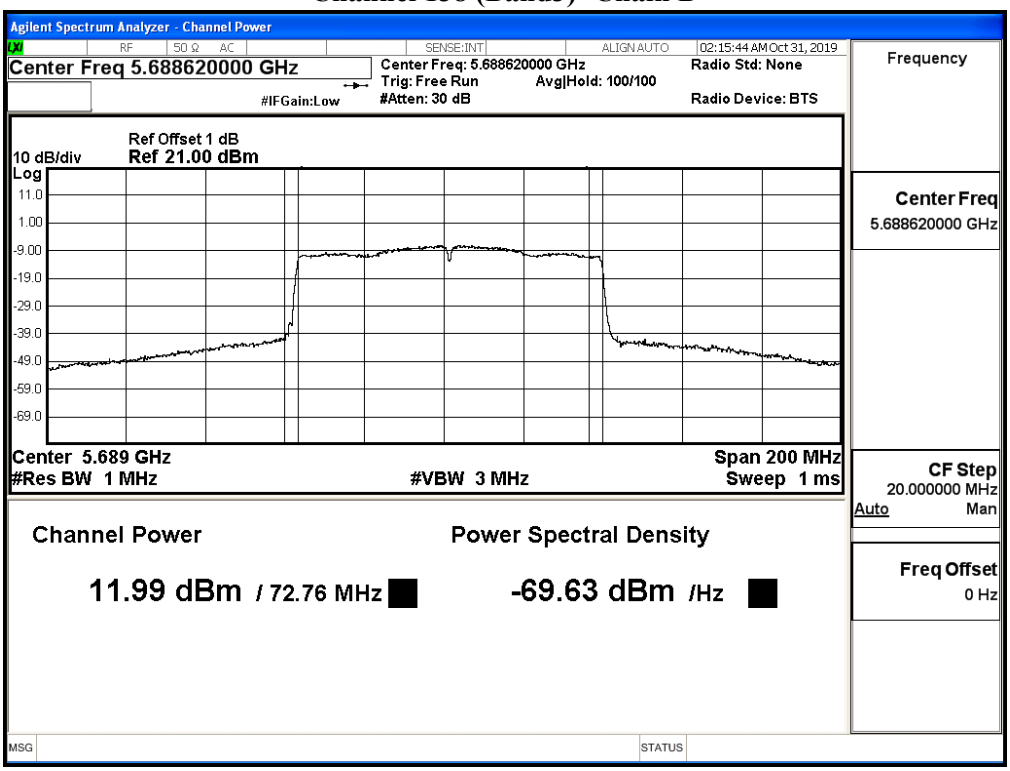
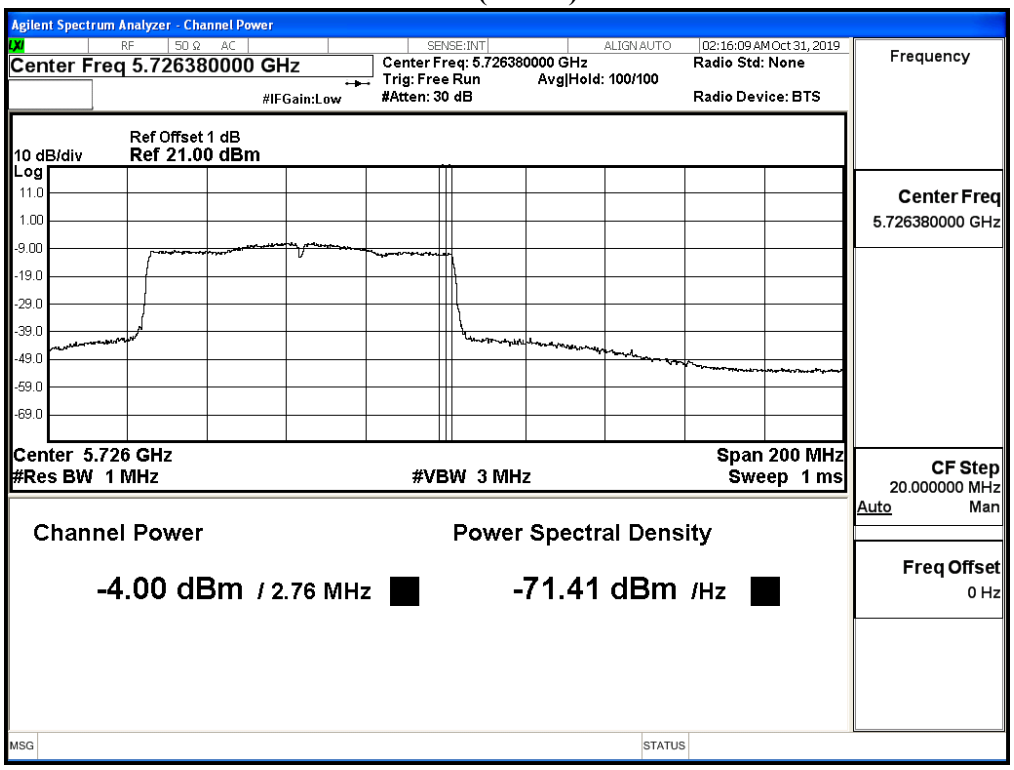
Maximum conducted output power:

Channel 138 (Band3) -Chain B



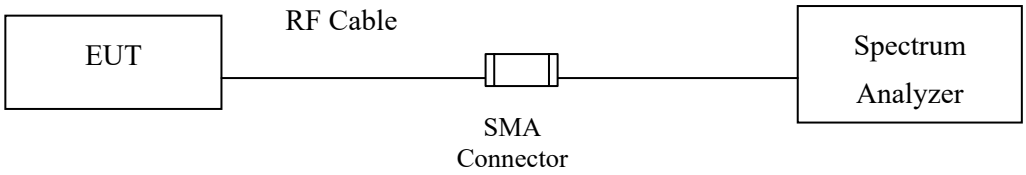
Maximum conducted output power:

Channel 138 (Band4) -Chain B



4. Peak Power Spectral Density

4.1. Test Setup



4.2. Limits

(1) For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.+

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the

maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

4.3. Test Procedure

The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.
The Peak Power Spectral Density using KDB 789033 section F) procedure, Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer.
SA-1 method is selected to run the test.
For the band 5.725-5.85 GHz, Scale the observed power level to an equivalent value in 500 kHz by adjusting (increase) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log (500 kHz/100 kHz) = 6.98 dB.

4.4. Uncertainty

± 1.62 dB

4.5. Test Result of Peak Power Spectral Density

Product : Humly Room Display One
Test Item : Peak Power Spectral Density
Test Mode : Mode 1: Transmit (802.11a)

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	Total PPSD (dBm)	Required Limit (dBm)	Result
36	5180	A	1.860	4.870	11	Pass
		B	1.710	4.720	11	Pass
40	5200	A	2.230	5.240	11	Pass
		B	2.280	5.290	11	Pass
48	5240	A	2.320	5.330	11	Pass
		B	2.060	5.070	11	Pass
52	5260	A	2.670	5.680	11	Pass
		B	2.610	5.620	11	Pass
56	5280	A	2.610	5.620	11	Pass
		B	2.480	5.490	11	Pass
64	5320	A	1.360	4.370	11	Pass
		B	1.620	4.630	11	Pass
100	5500	A	-1.770	1.240	11	Pass
		B	-1.920	1.090	11	Pass
120	5600	A	2.440	5.450	11	Pass
		B	2.290	5.300	11	Pass
140	5700	A	-0.870	2.140	11	Pass
		B	-1.710	1.300	11	Pass

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
149	5745	A	-6.350	6.980	3.640	<30	Pass
		B	-6.580	6.980	3.410	<30	Pass
157	5785	A	-6.400	6.980	3.590	<30	Pass
		B	-6.980	6.980	3.010	<30	Pass
165	5825	A	-7.010	6.980	2.980	<30	Pass
		B	-6.240	6.980	3.750	<30	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

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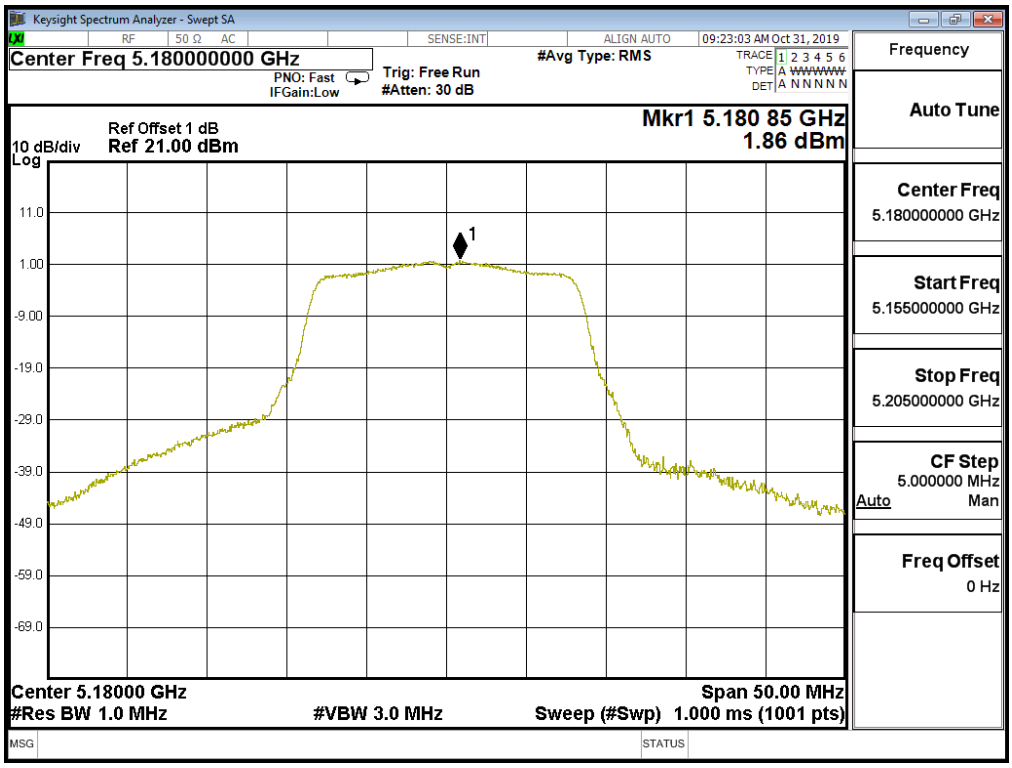
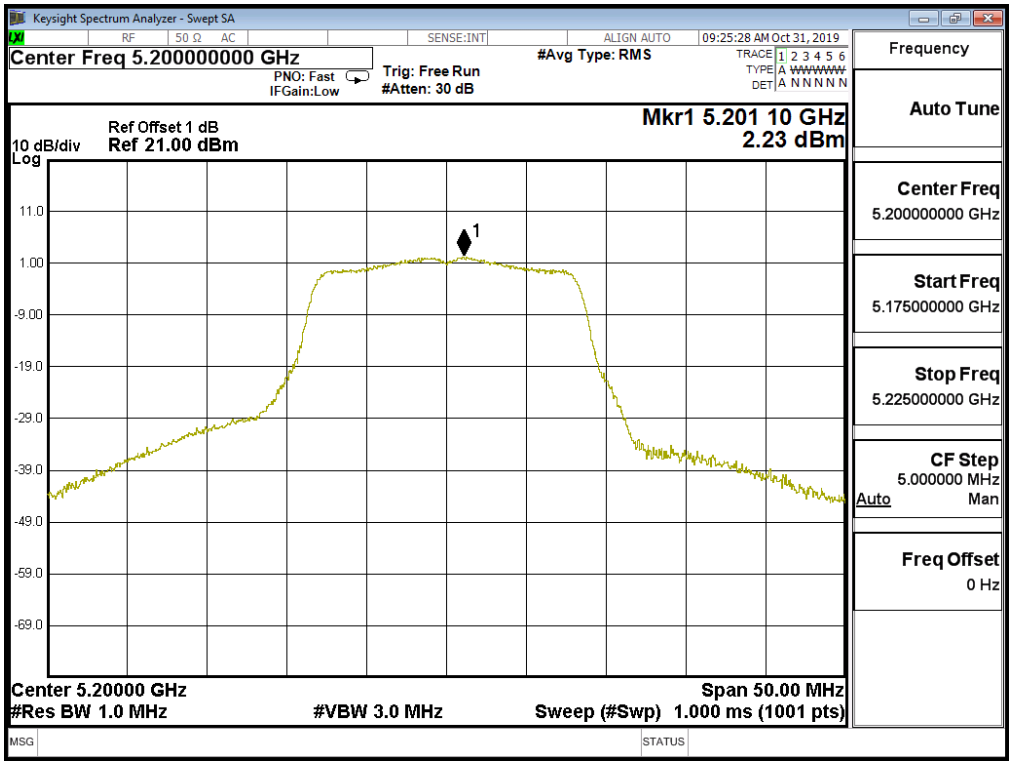
Channel 36 – Chain A



Channel 40 – Chain A



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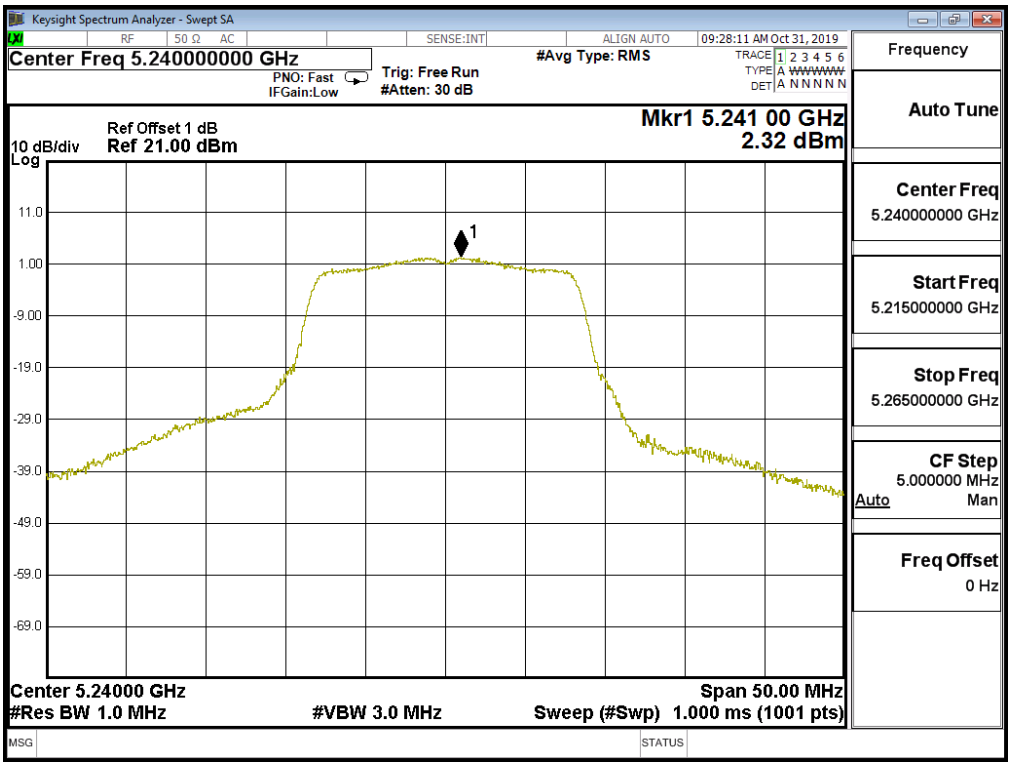
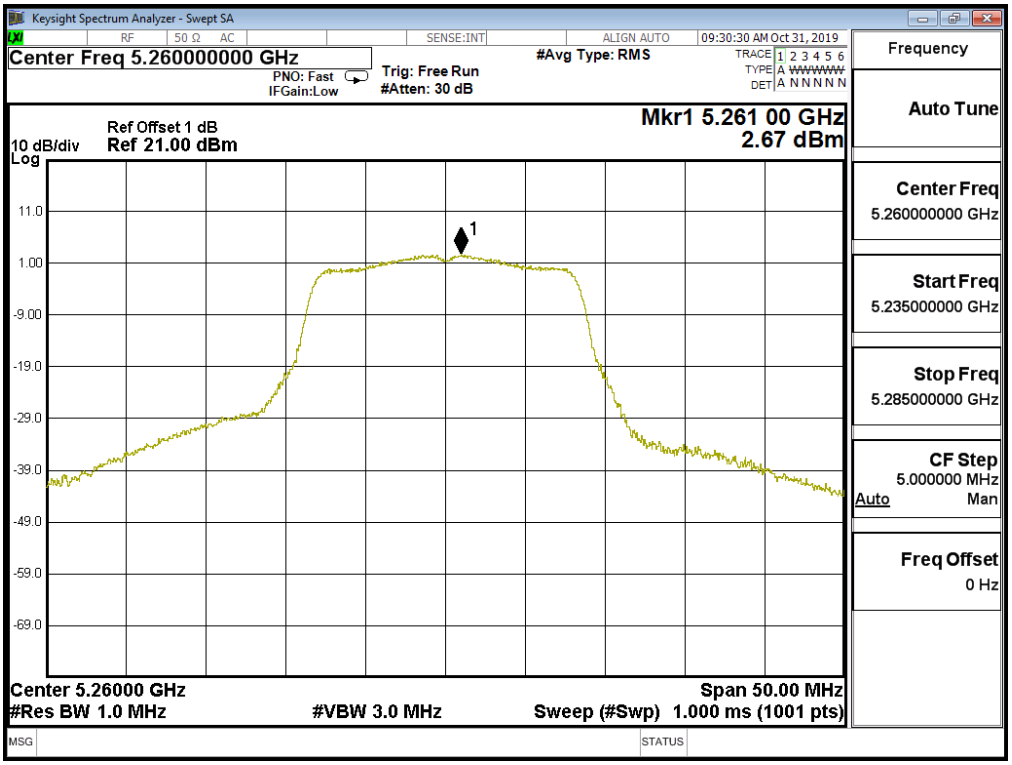
Channel 48 – Chain A



Channel 52 – Chain A



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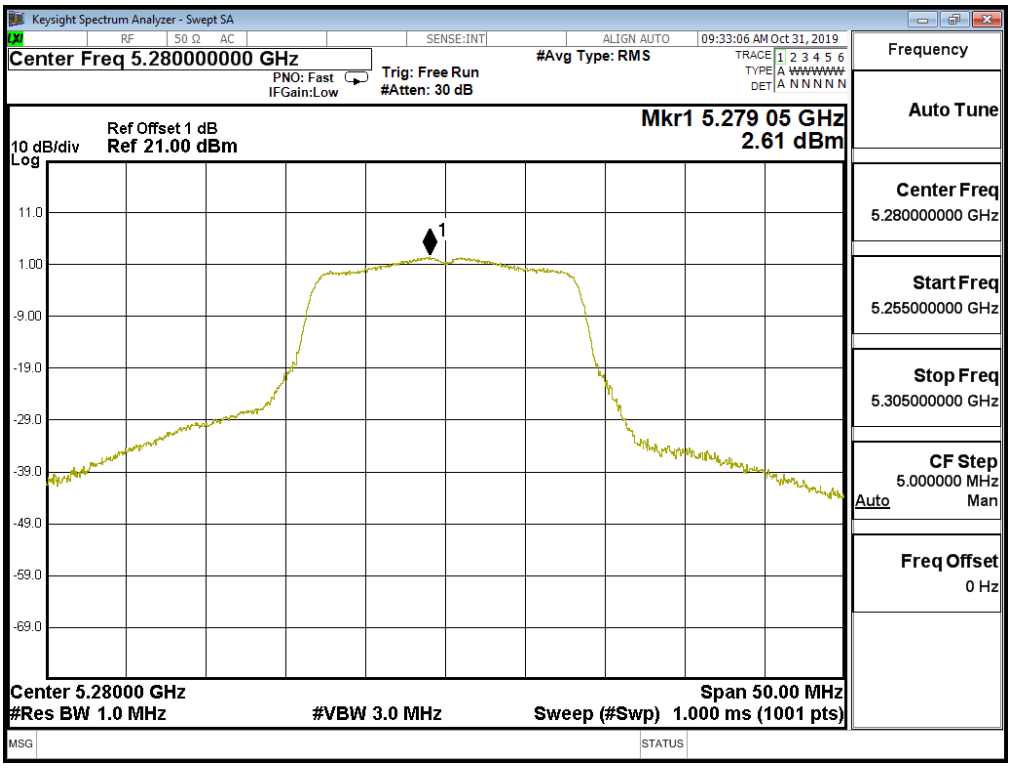
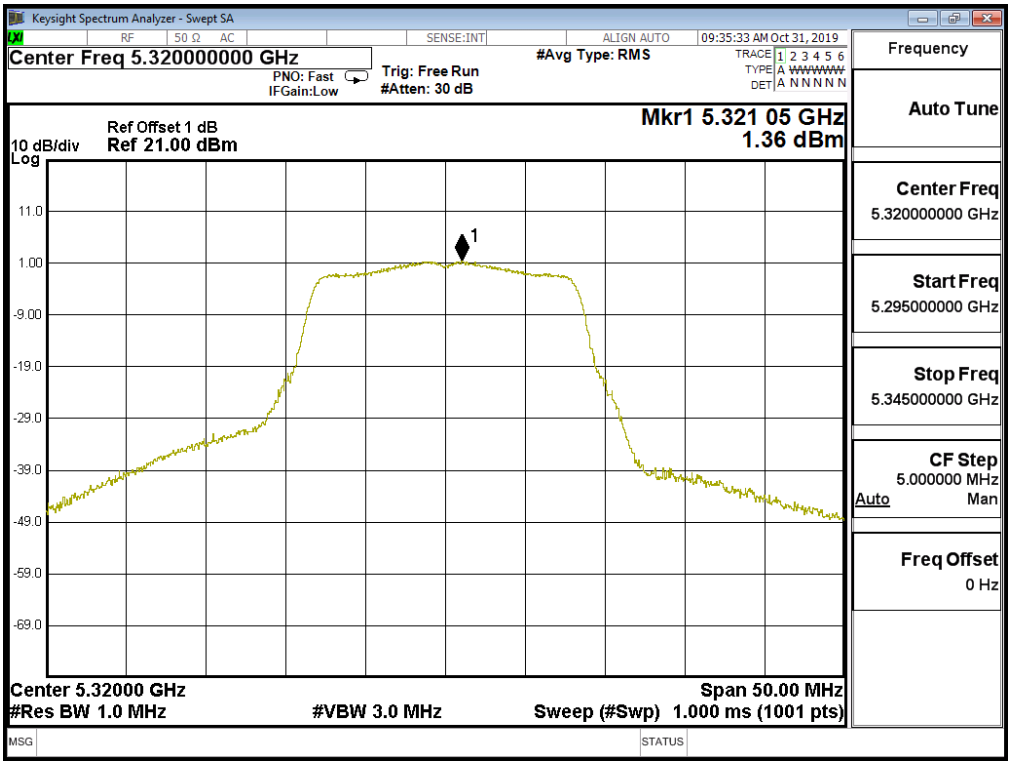
Channel 56 – Chain A



Channel 64 – Chain A



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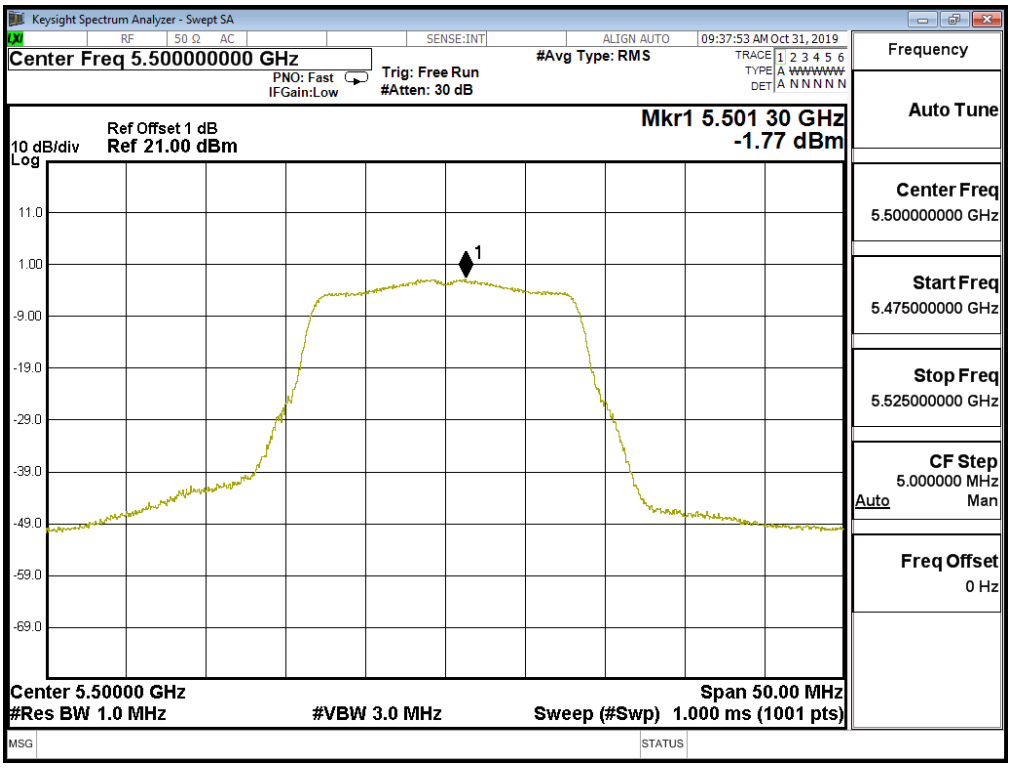
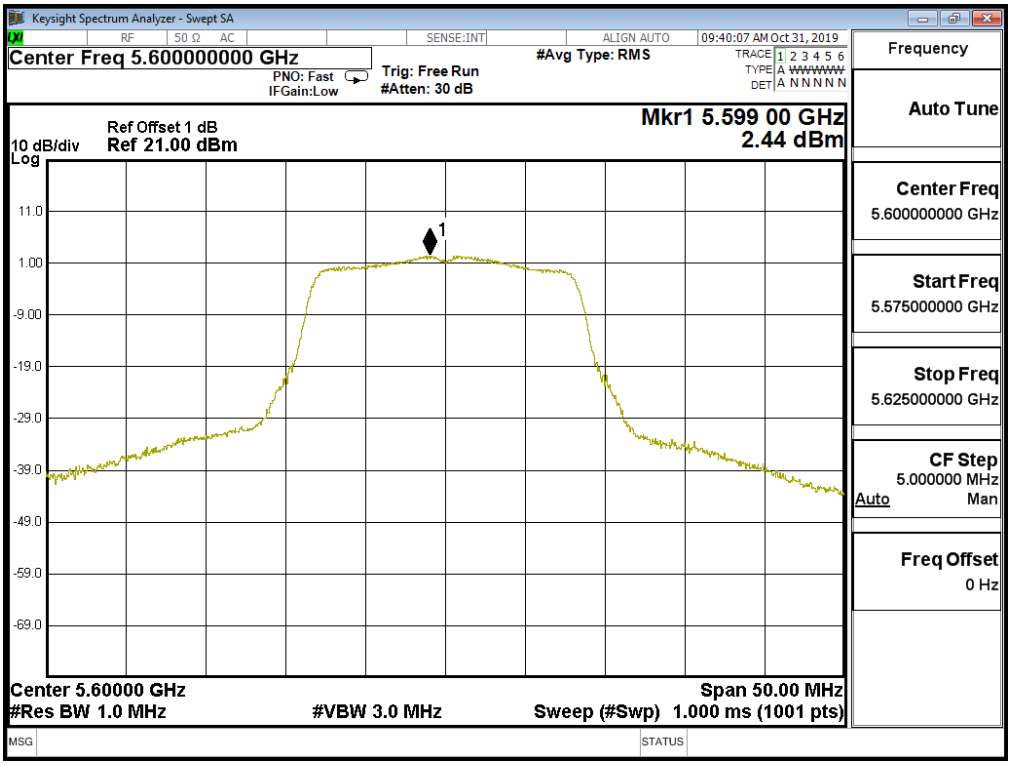
Channel 100 – Chain A



Channel 120 – Chain A



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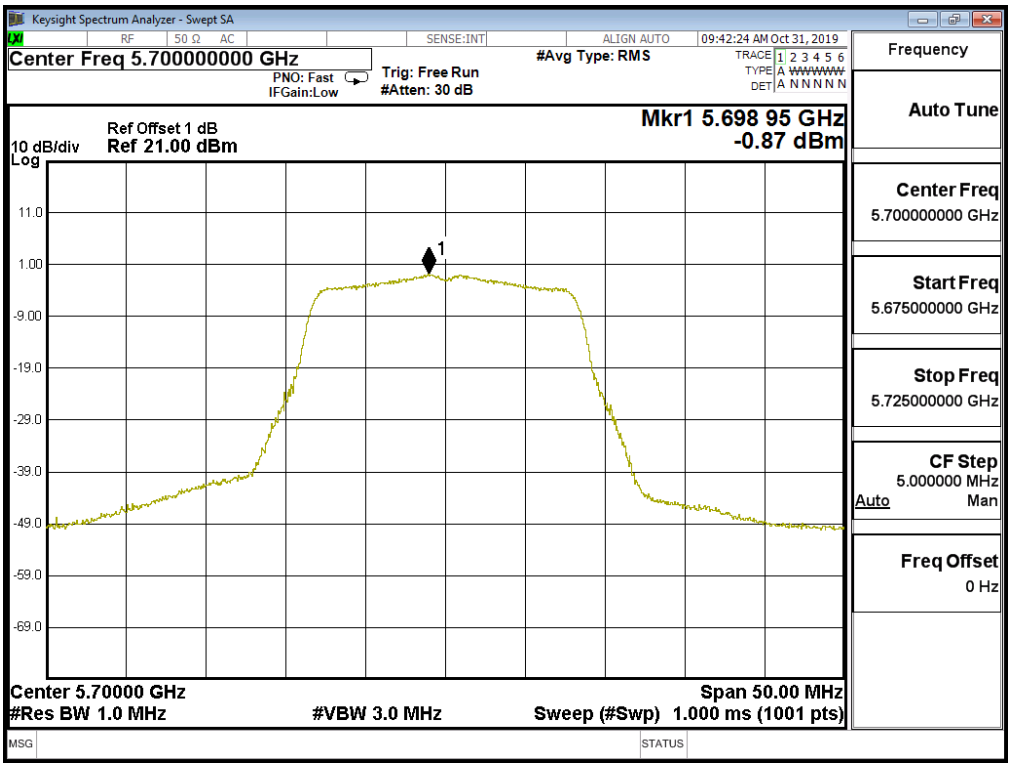
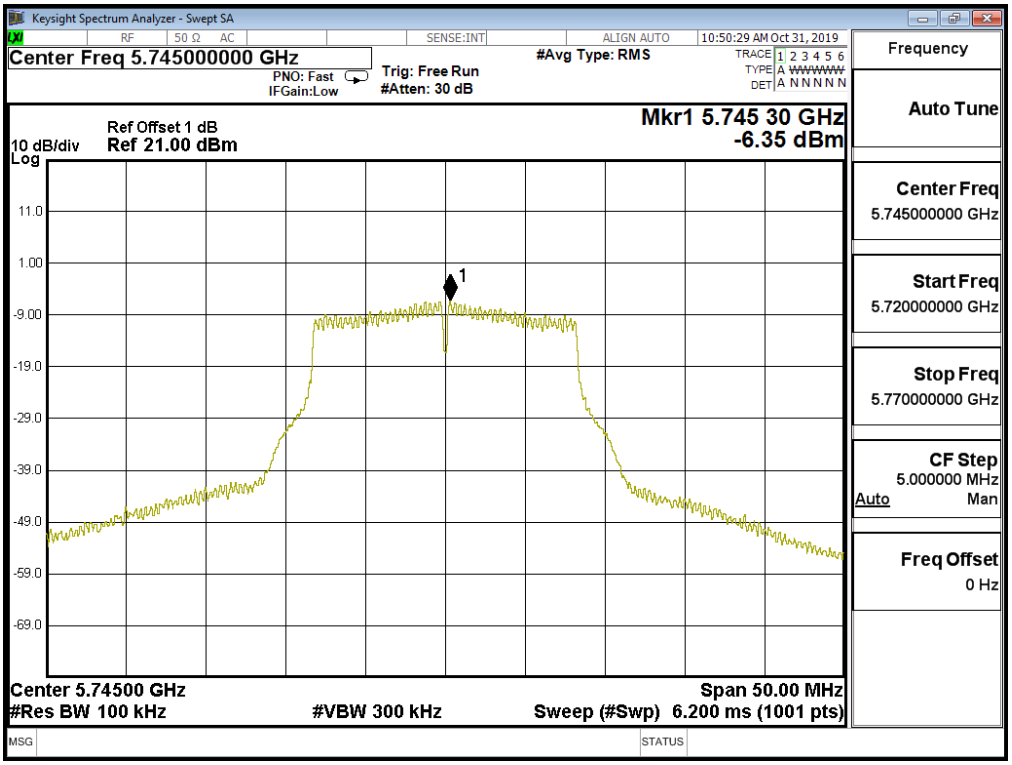
Channel 140 – Chain A



Channel 144 – Chain A



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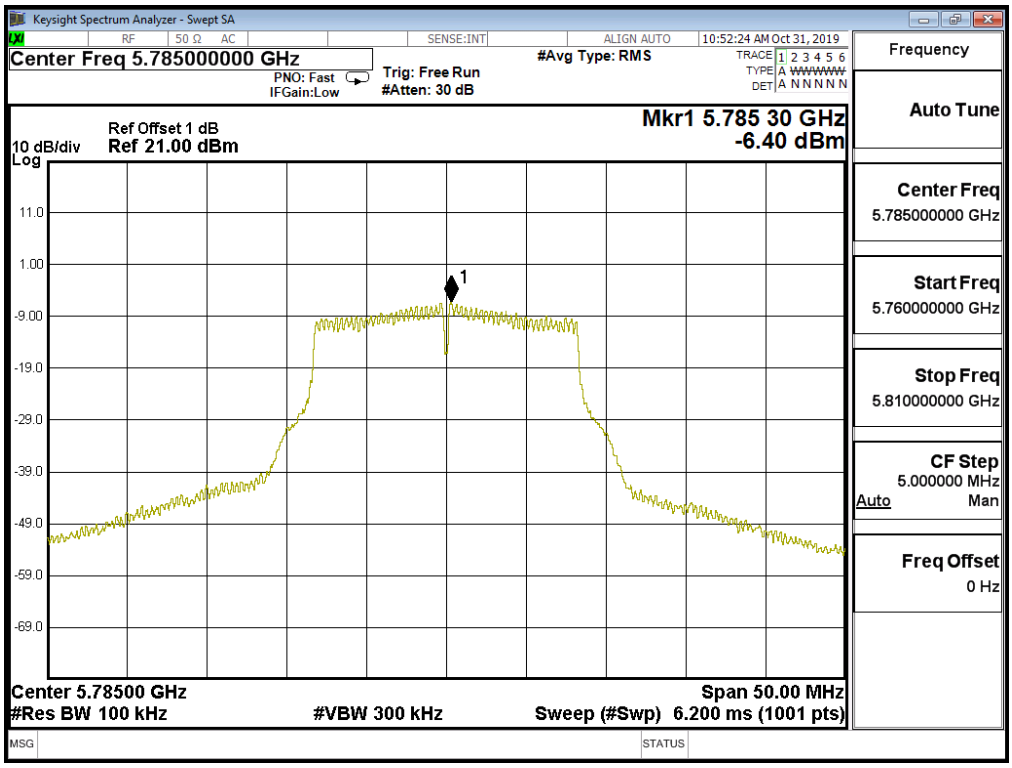
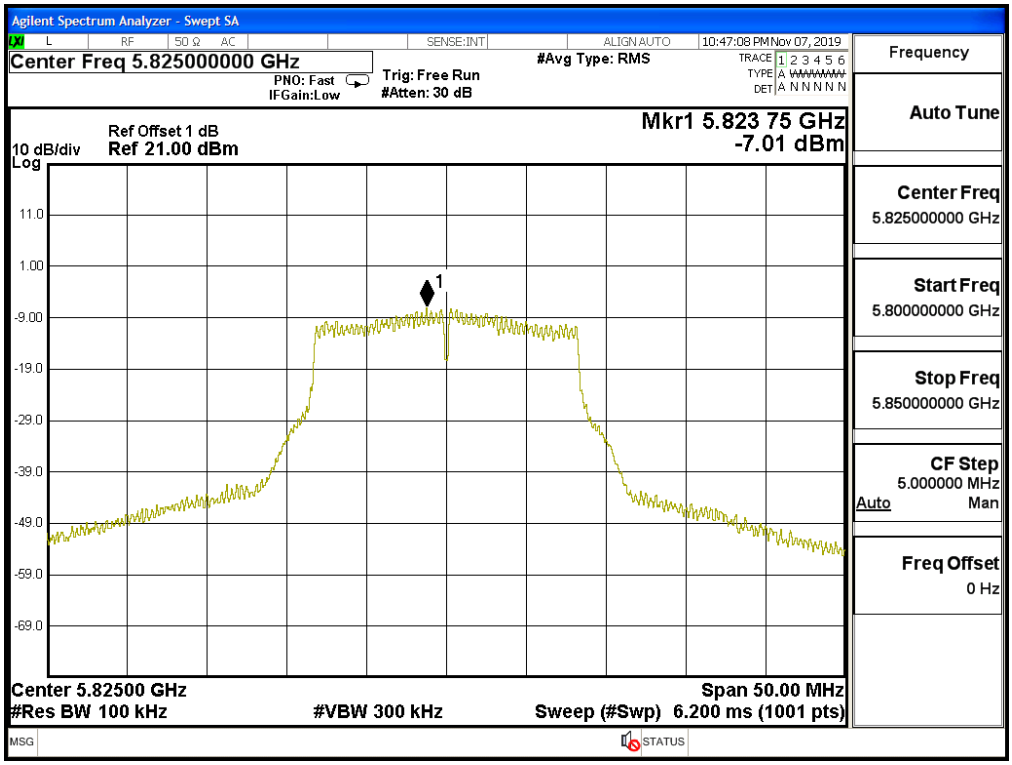
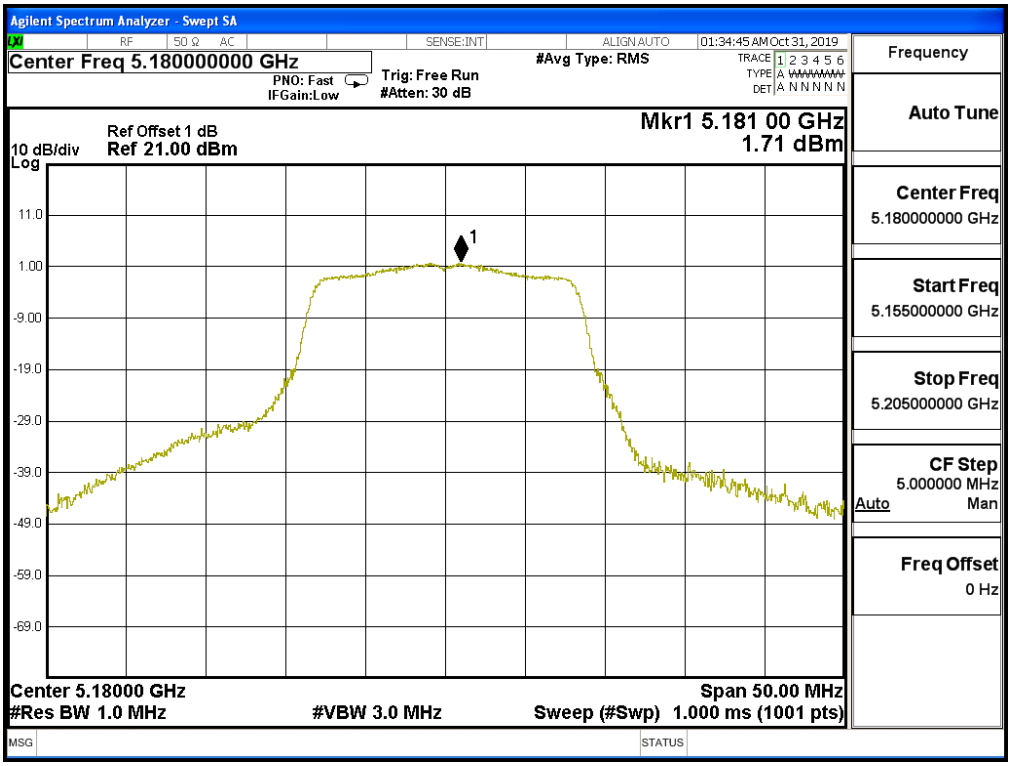
Channel 157 – Chain A



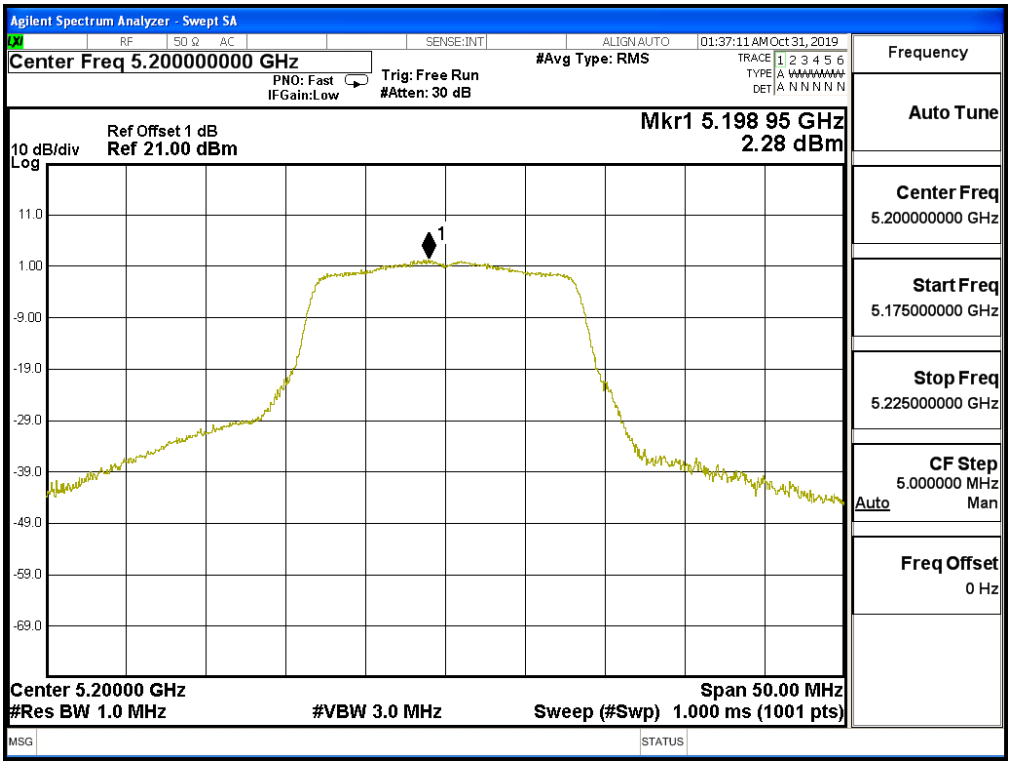
Channel 165 – Chain A



Channel 36 – Chain B



Channel 40 – Chain B



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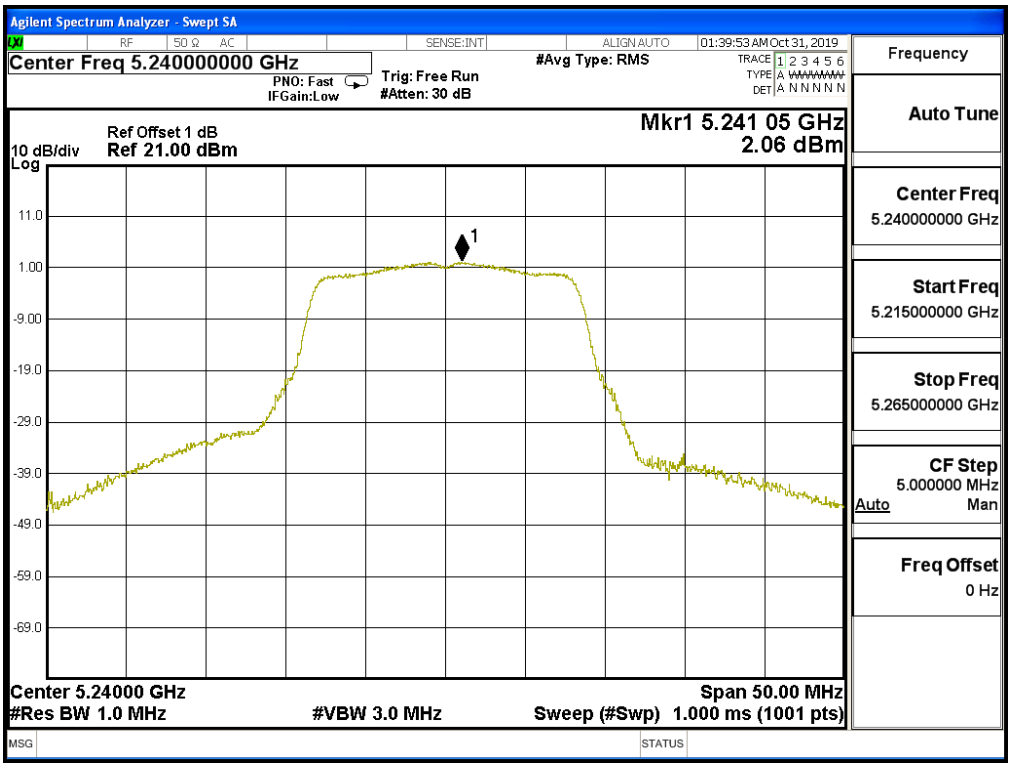
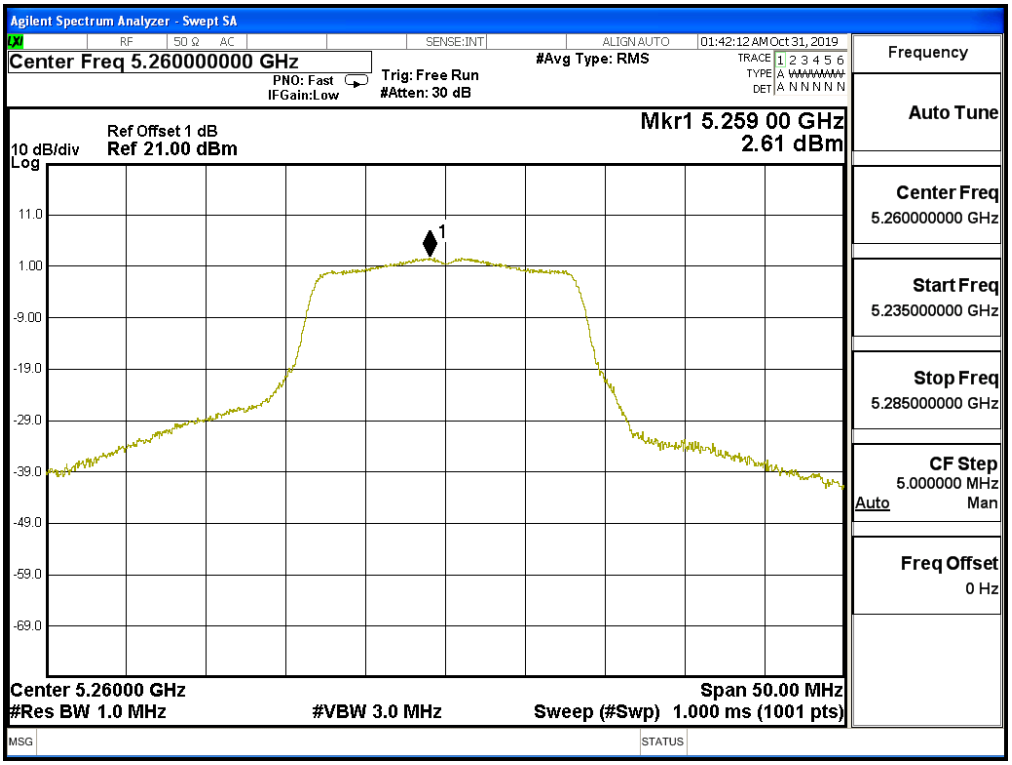
Channel 48 – Chain B



Channel 52 – Chain B



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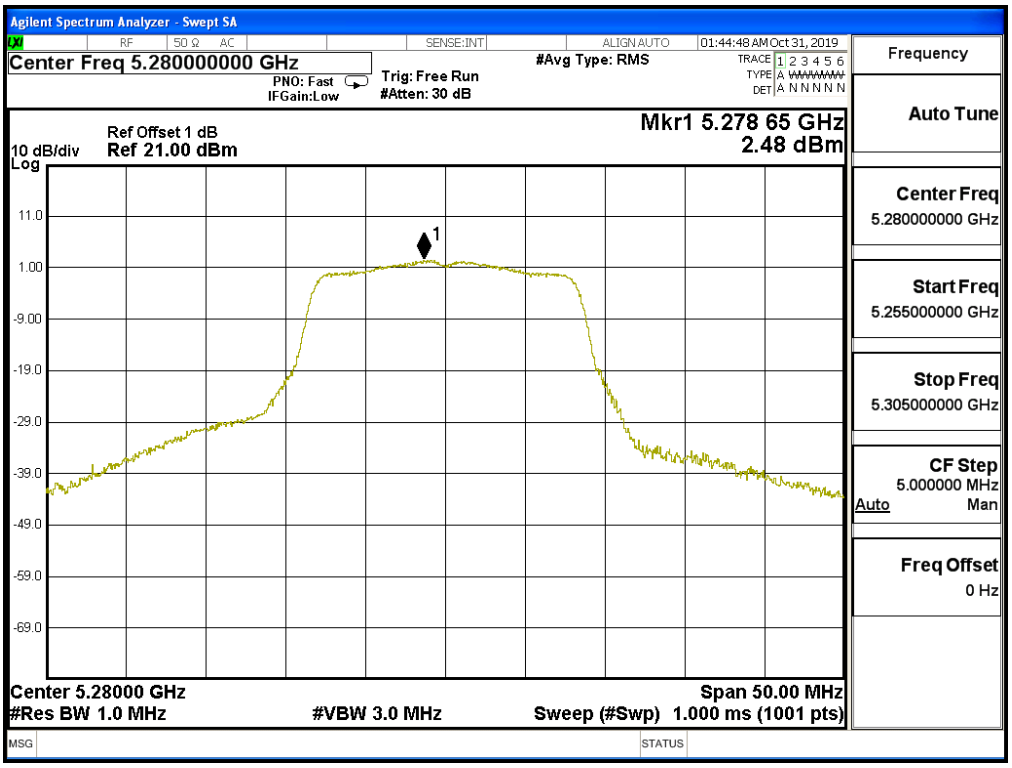
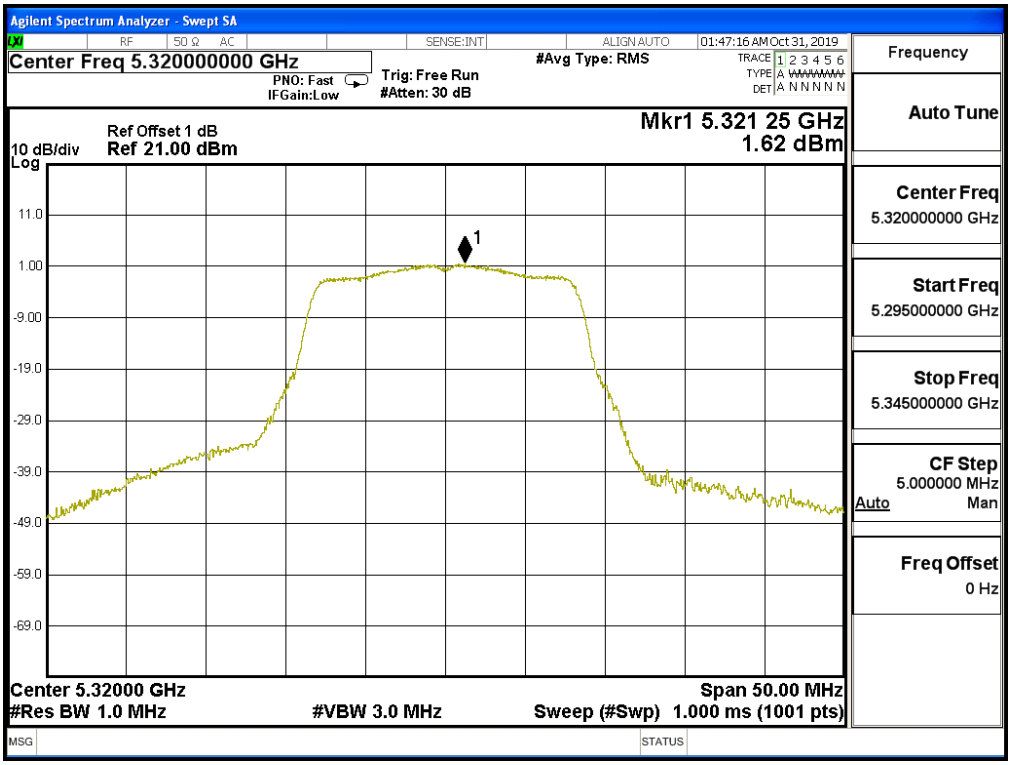
Channel 56 – Chain B



Channel 64 – Chain B



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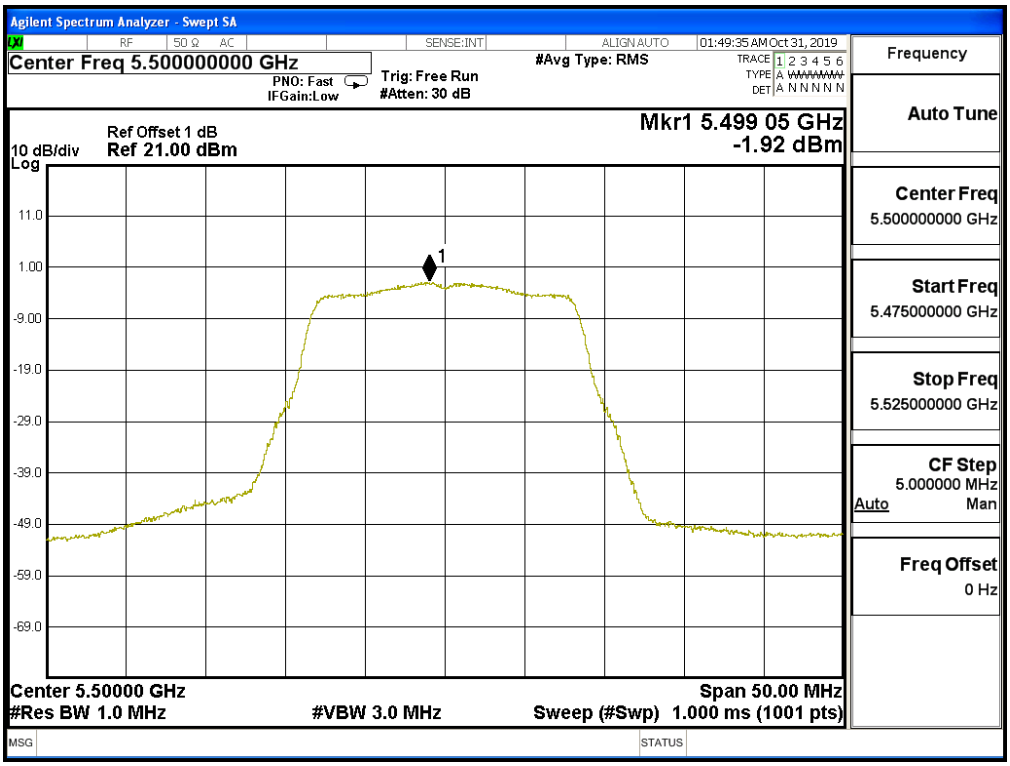
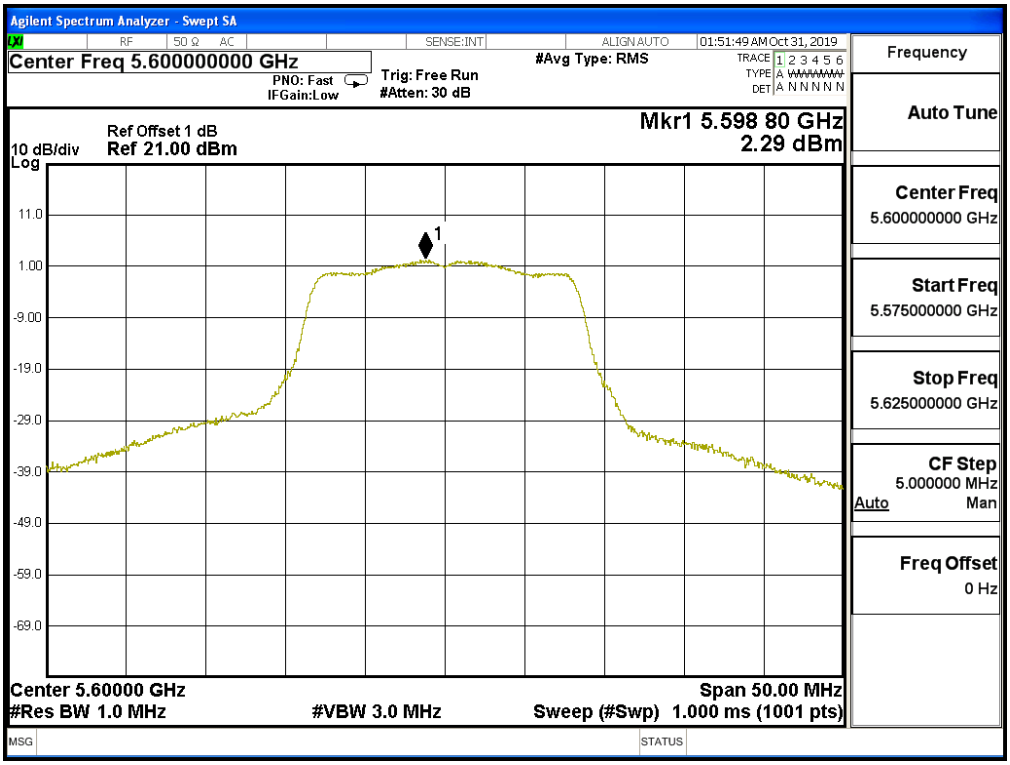
Channel 100 – Chain B



Channel 120 – Chain B



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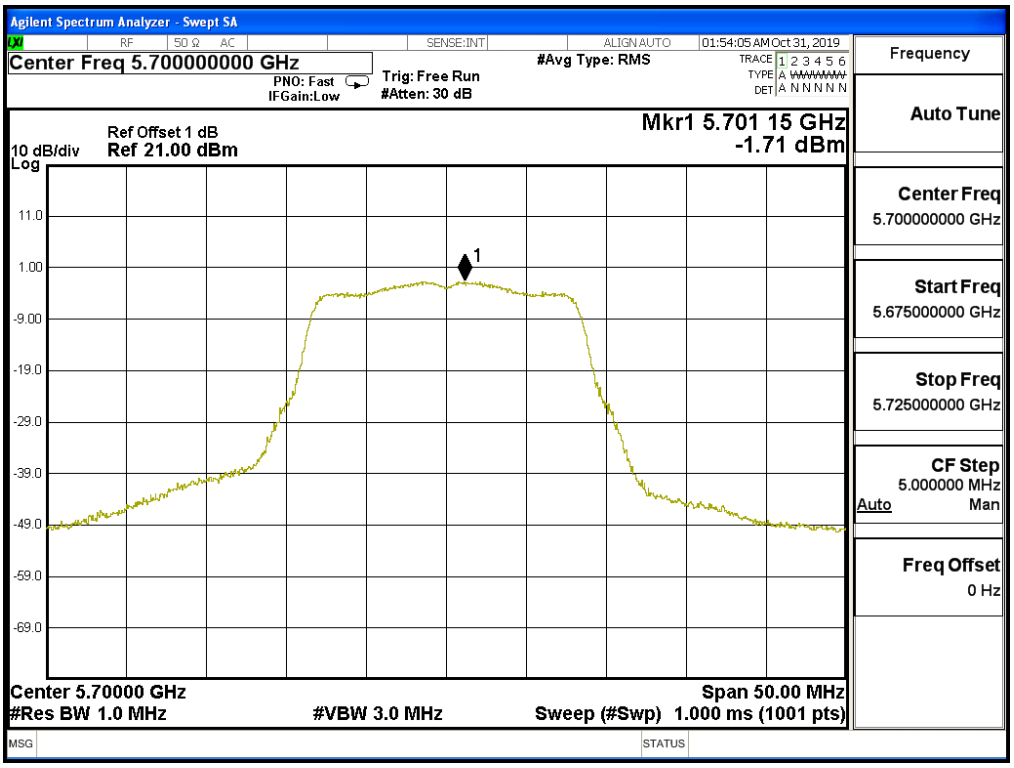
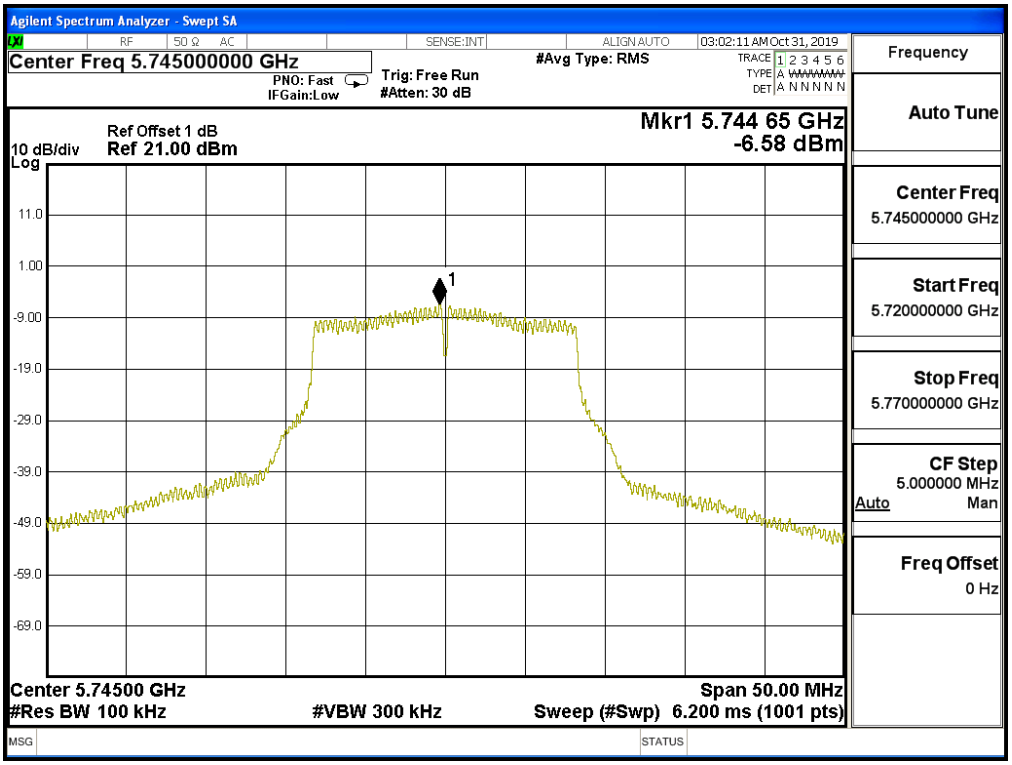
Channel 140 – Chain B



Channel 149 – Chain B



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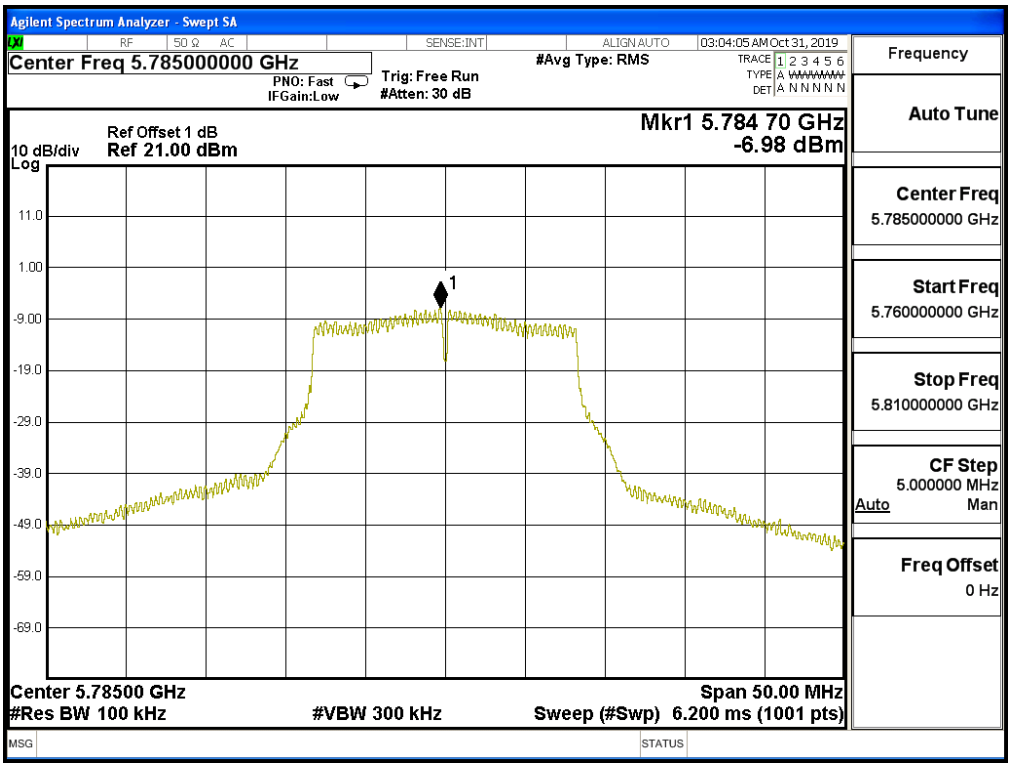
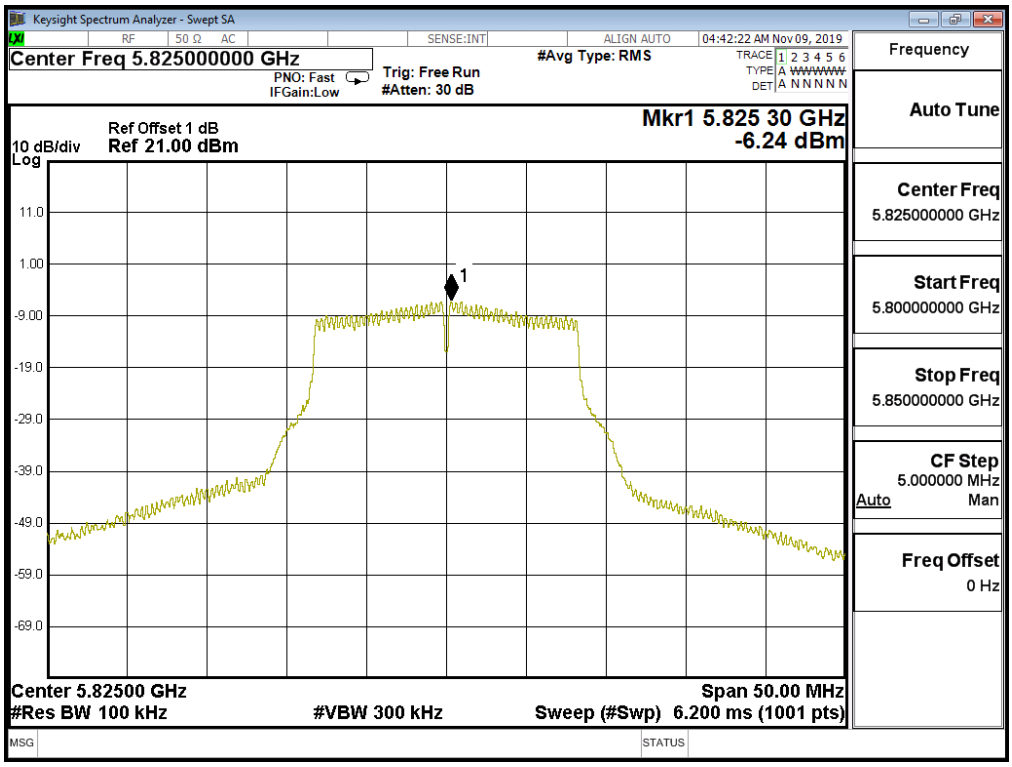
Channel 157 – Chain B



Channel 165 – Chain B



、 Product : Humly Room Display One
Test Item : Peak Power Spectral Density
Test Mode : Mode 2: Transmit (802.11n20)

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	Total PPSD (dBm)	Required Limit (dBm)	Result
36	5180	A	0.520	3.530	11	Pass
		B	0.290	3.300	11	Pass
40	5200	A	1.500	4.510	11	Pass
		B	1.580	4.590	11	Pass
48	5240	A	0.760	3.770	11	Pass
		B	0.790	3.800	11	Pass
52	5260	A	1.190	4.200	11	Pass
		B	1.150	4.160	11	Pass
56	5280	A	1.090	4.100	11	Pass
		B	1.040	4.050	11	Pass
64	5320	A	0.580	3.590	11	Pass
		B	0.450	3.460	11	Pass
100	5500	A	-2.080	0.930	11	Pass
		B	-2.070	0.940	11	Pass
120	5600	A	0.750	3.760	11	Pass
		B	1.050	4.060	11	Pass
140	5700	A	-1.660	1.350	11	Pass
		B	-2.510	0.500	11	Pass
144	5720(Band3)	A	0.410	3.420	11	Pass
		B	1.420	4.430	11	Pass

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Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
144	5720(Band4)	A	-11.030	6.980	-1.040	<30	Pass
		B	-9.000	6.980	0.990	<30	Pass
149	5745	A	-8.680	6.980	1.310	<30	Pass
		B	-8.250	6.980	1.740	<30	Pass
157	5785	A	-7.570	6.980	2.420	<30	Pass
		B	-8.440	6.980	1.550	<30	Pass
165	5825	A	-7.400	6.980	2.590	<30	Pass
		B	-8.750	6.980	1.240	<30	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

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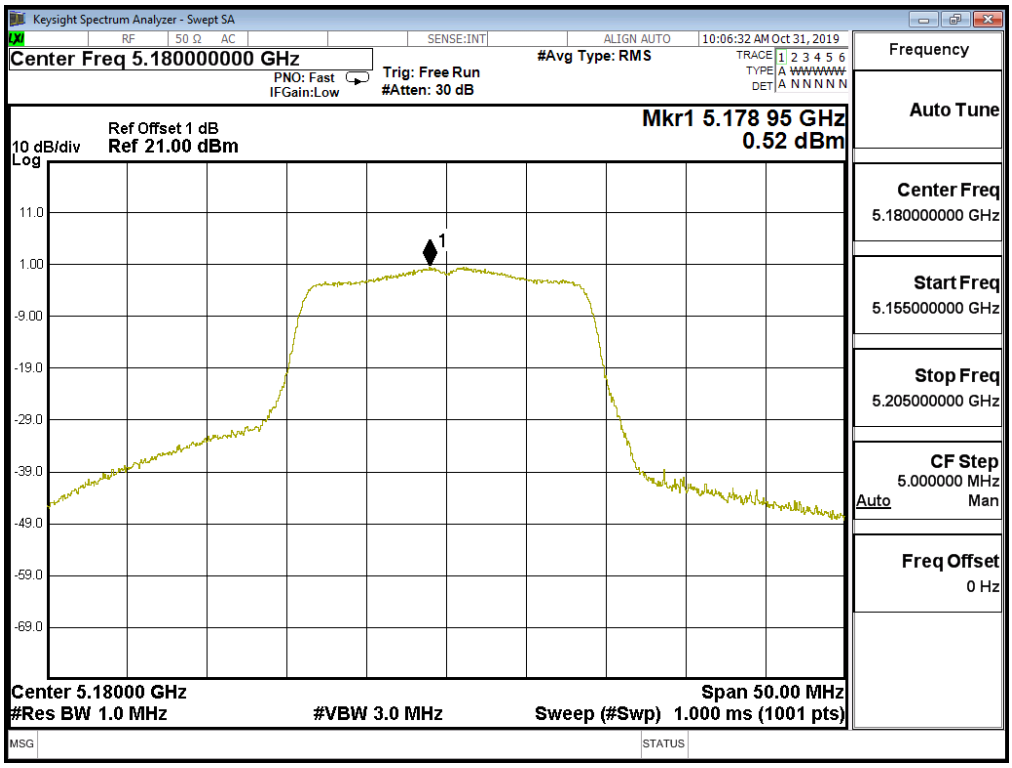
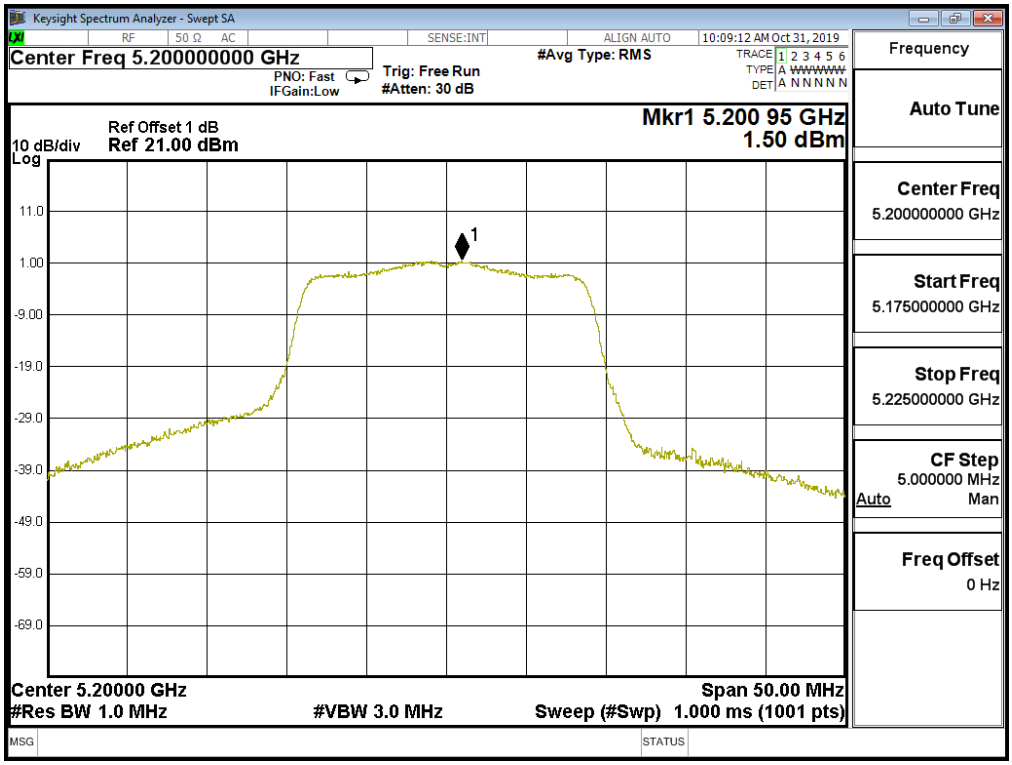
Channel 36 – Chain A



Channel 40 – Chain A



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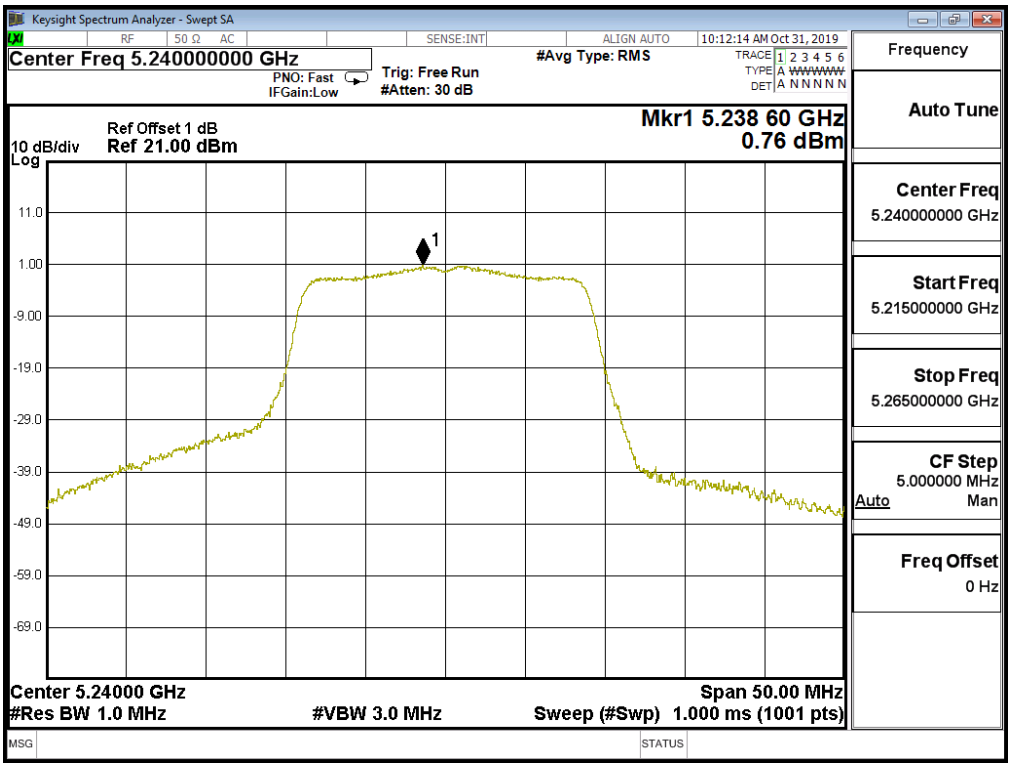
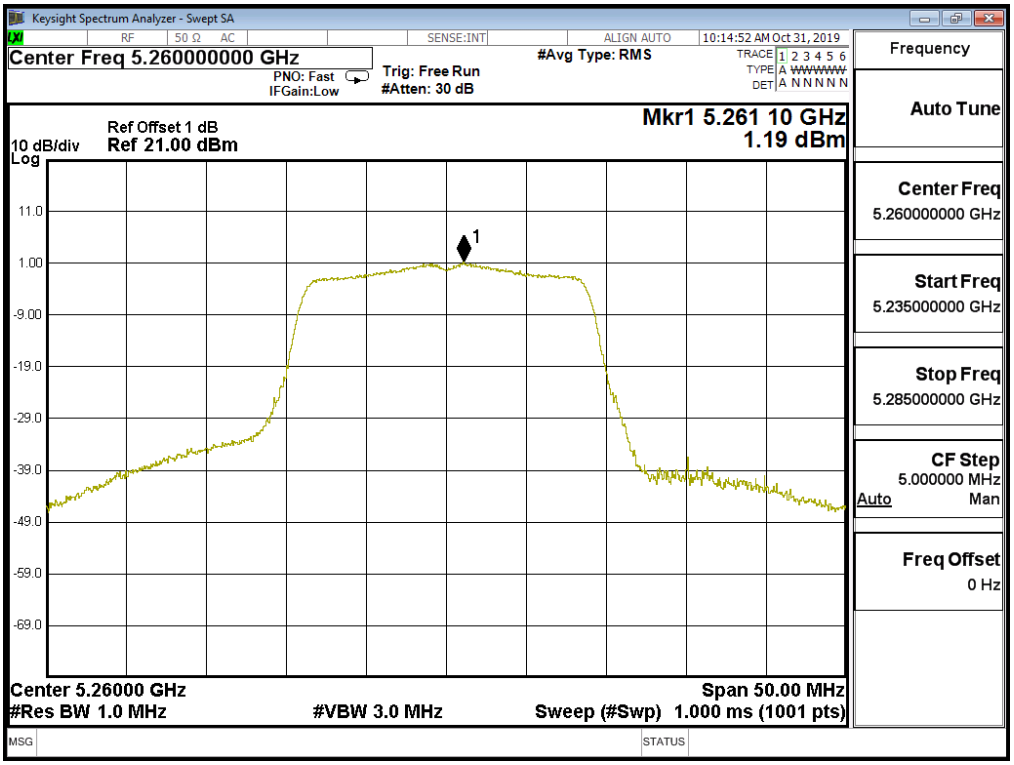
Channel 48 – Chain A



Channel 52 – Chain A



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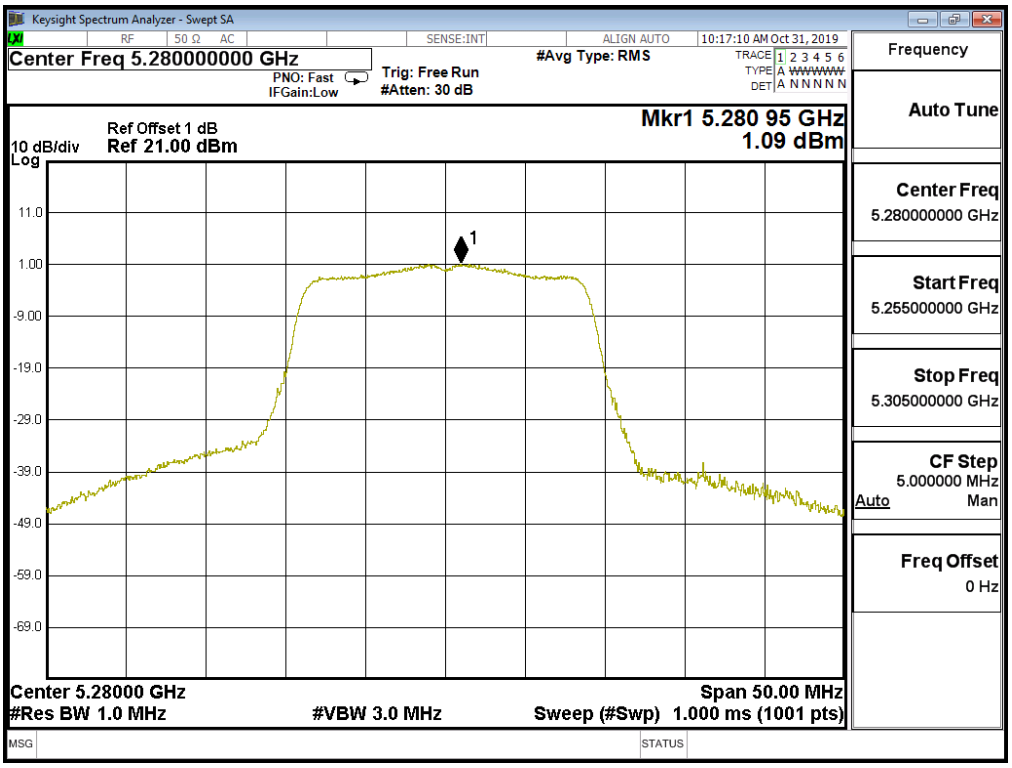
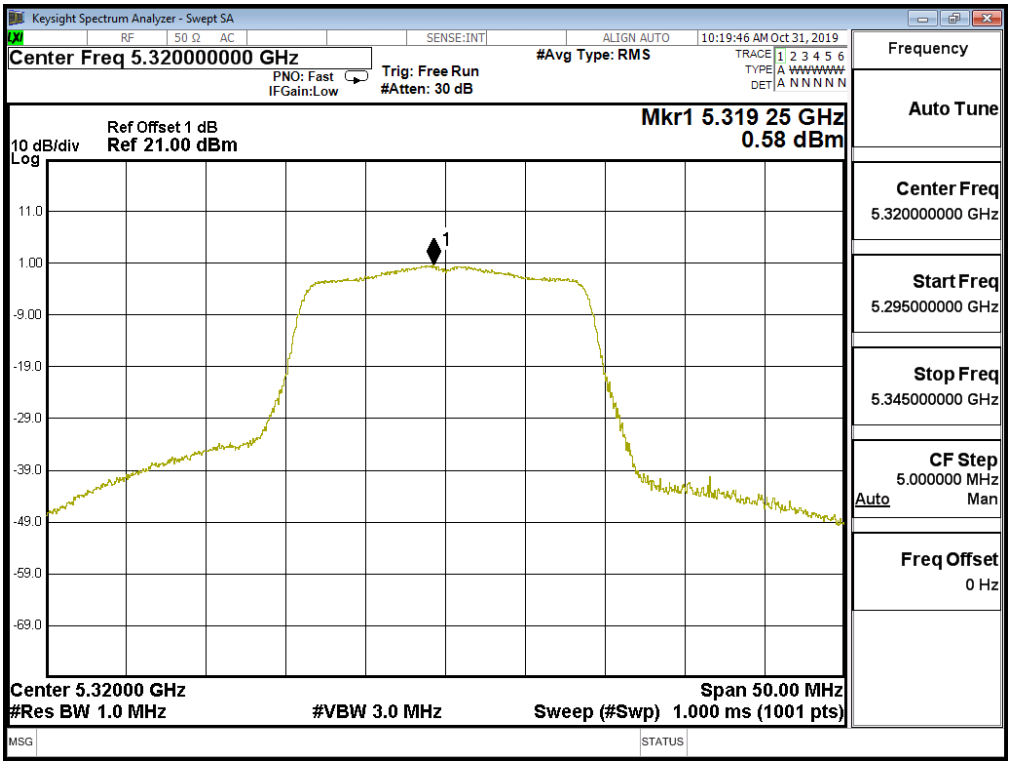
Channel 56 – Chain A



Channel 64 – Chain A



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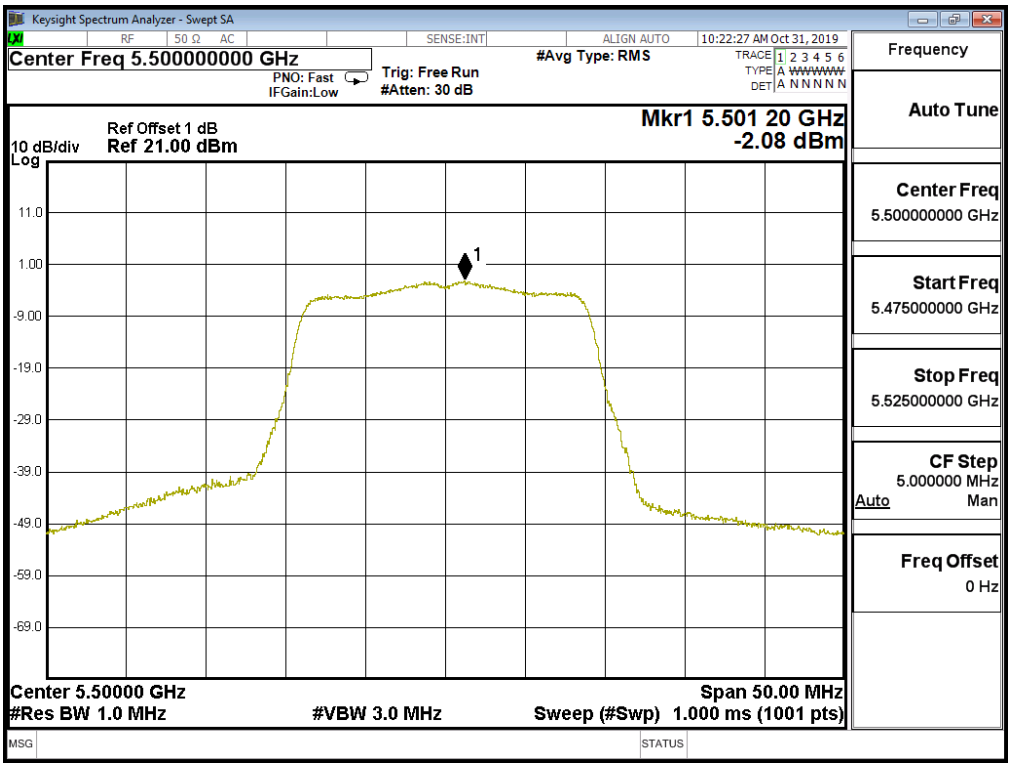
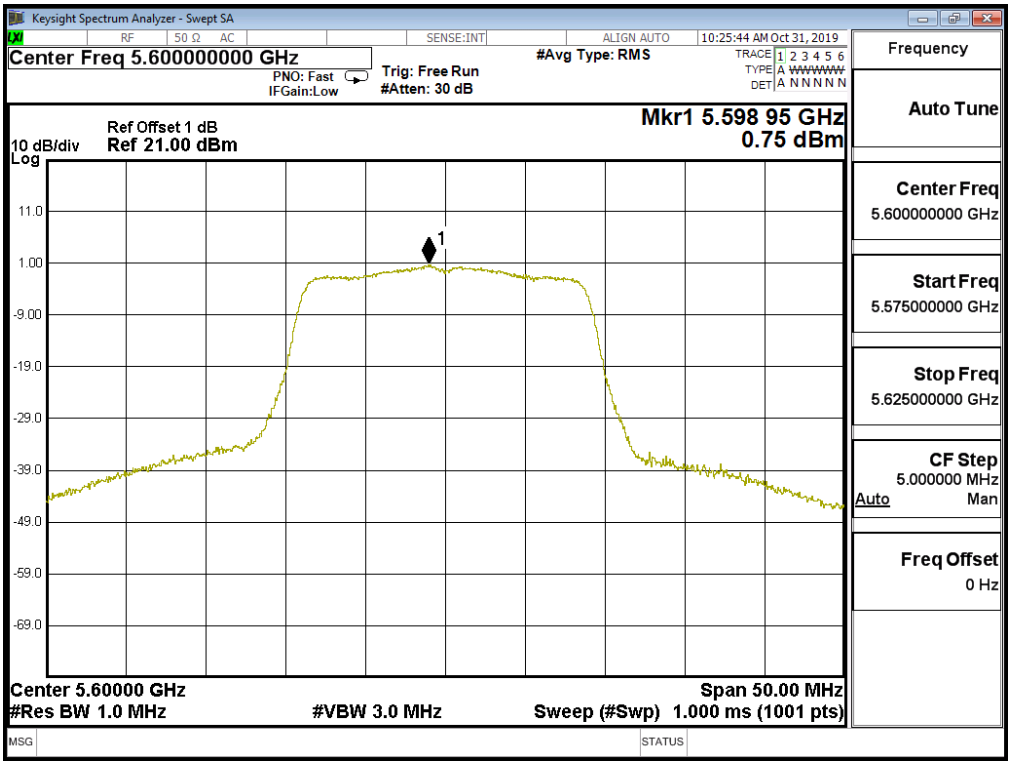
Channel 100 – Chain A



Channel 120 – Chain A



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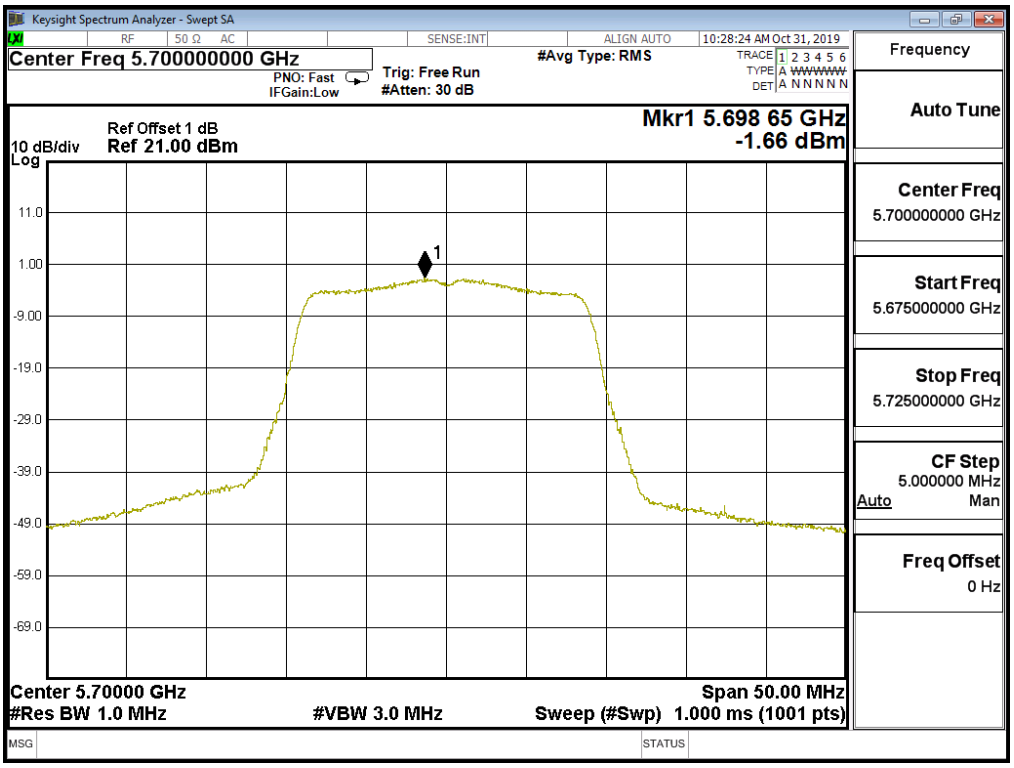
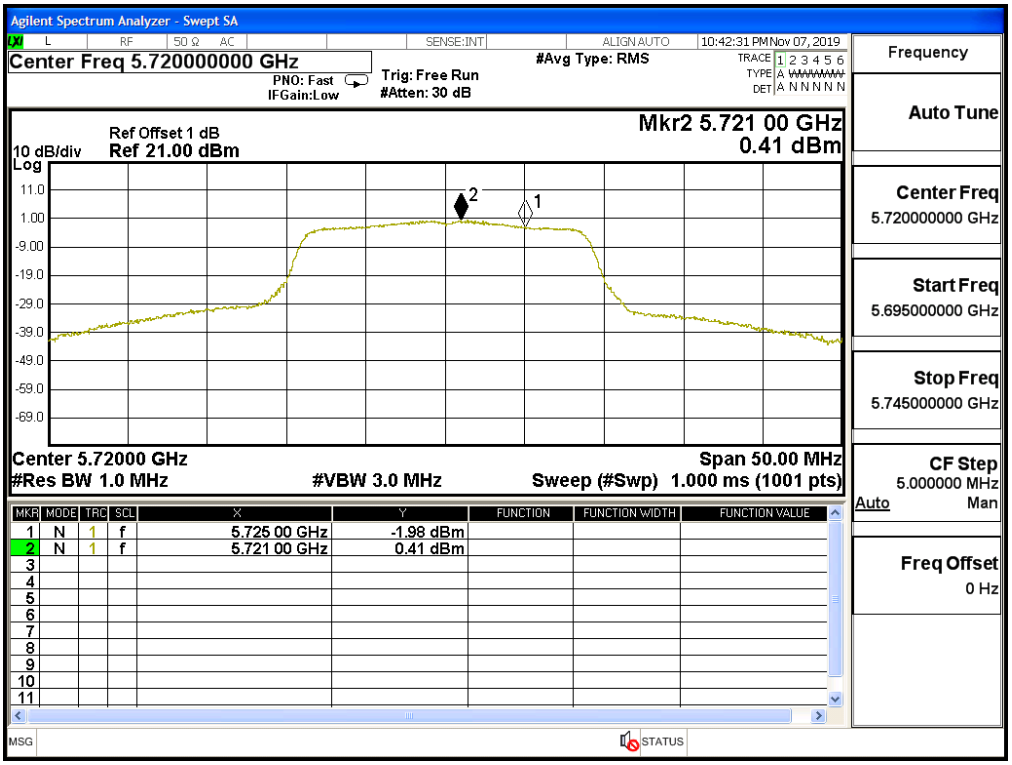
Channel 140 – Chain A

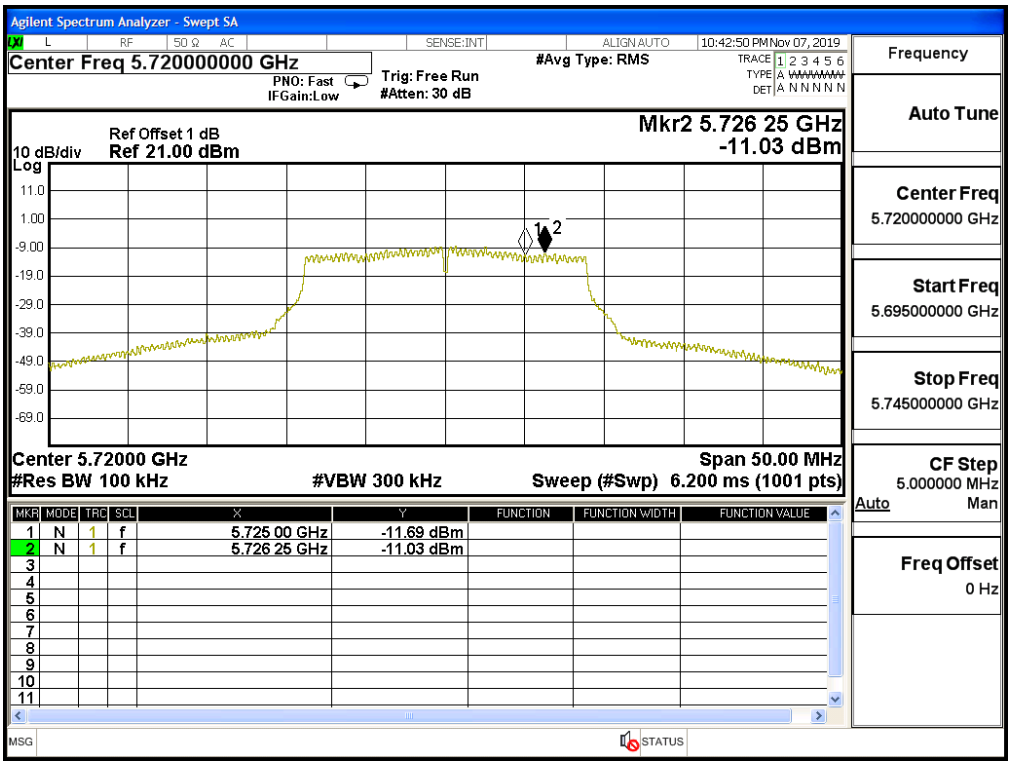


Channel 144 – Chain A-Band3

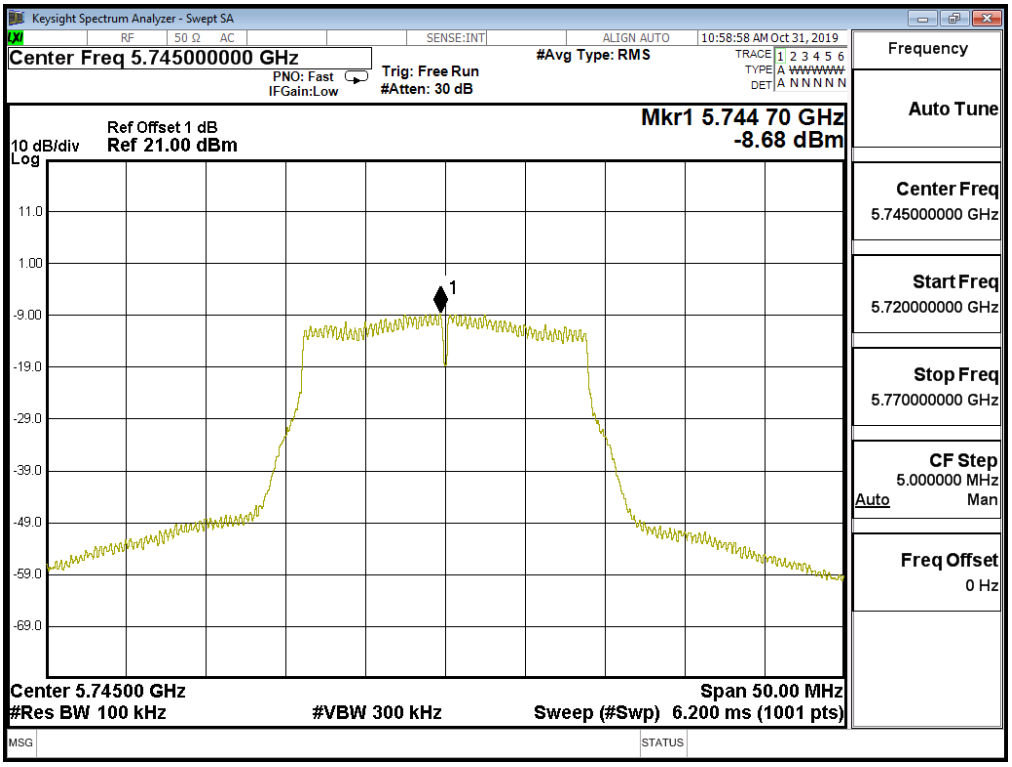


`

Channel 144 – Chain A-Band4



Channel 149 – Chain A



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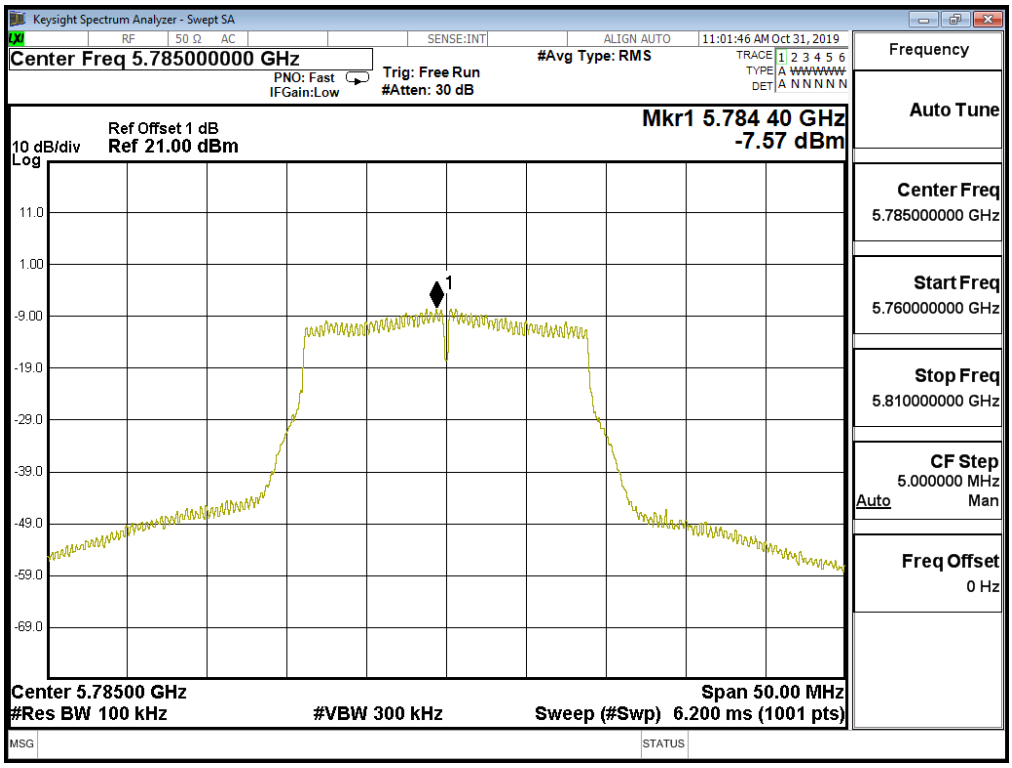
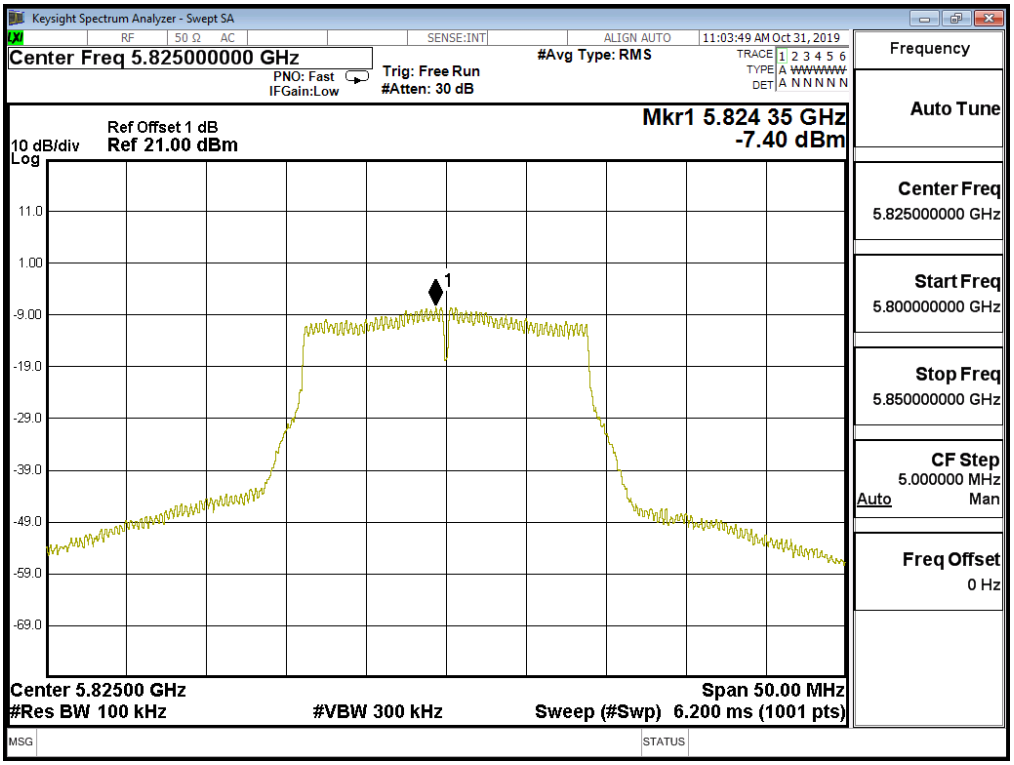
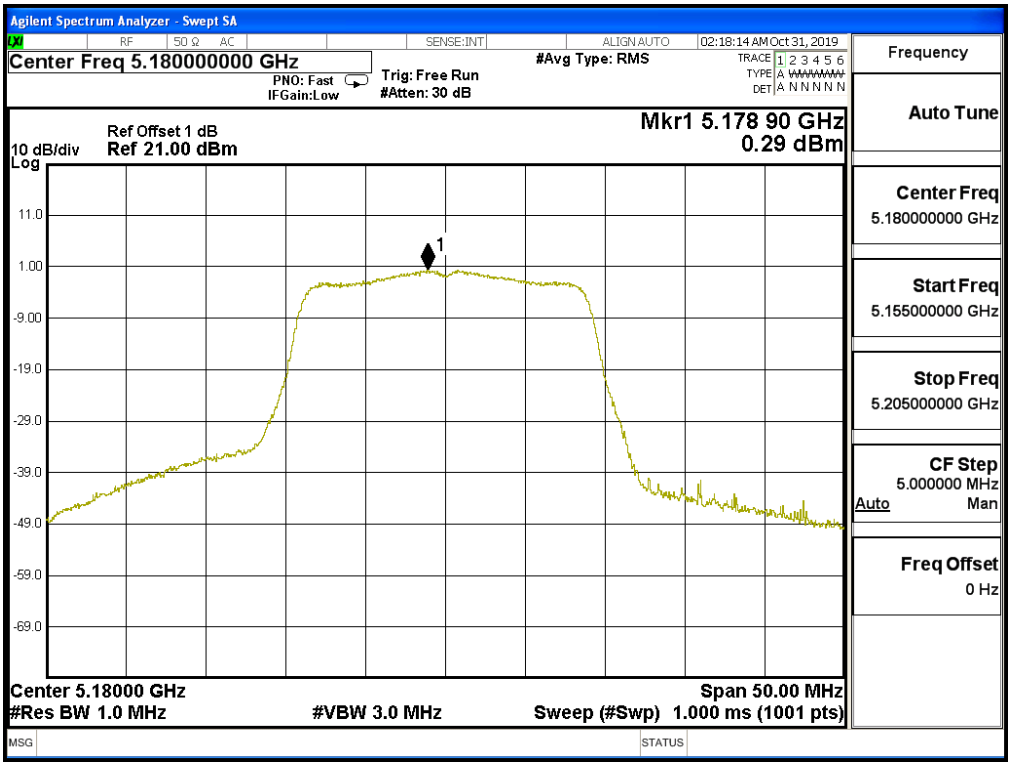
Channel 157 – Chain A



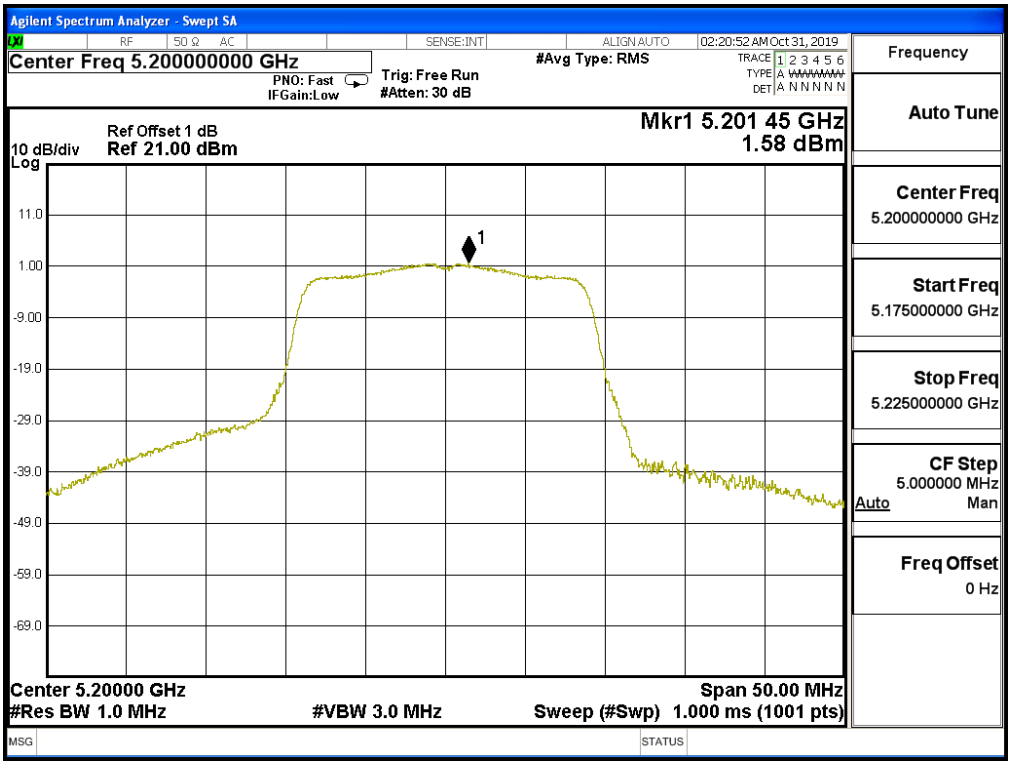
Channel 165 – Chain A



Channel 36 – Chain B



Channel 40 – Chain B



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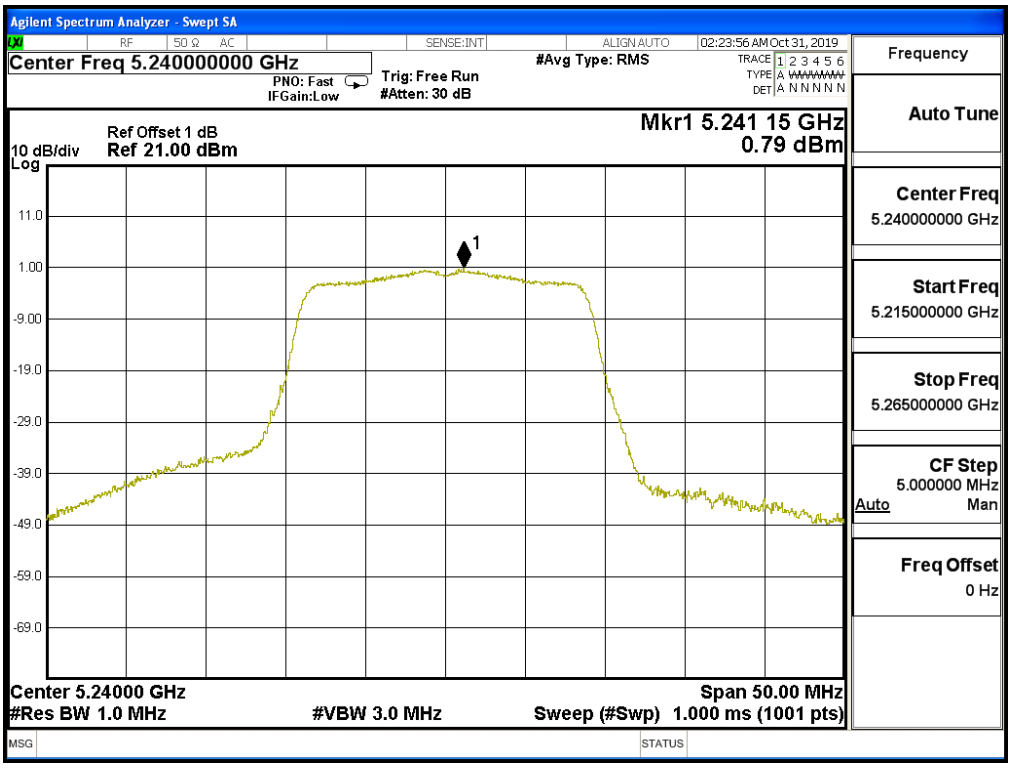
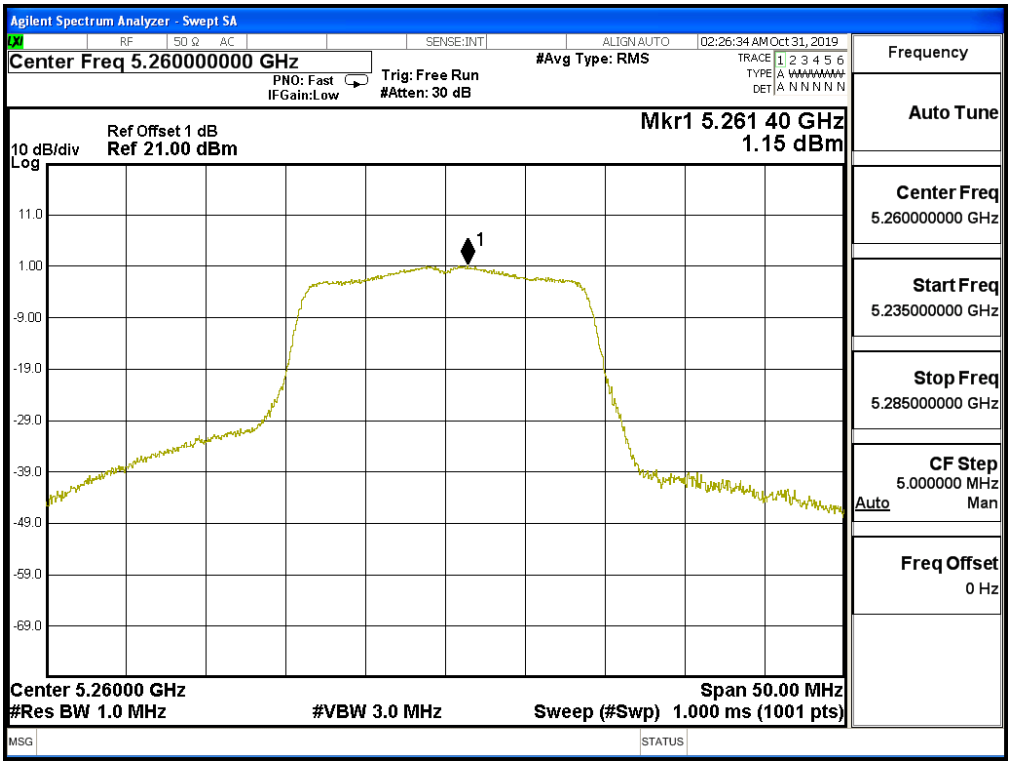
Channel 48 – Chain B



Channel 52 – Chain B



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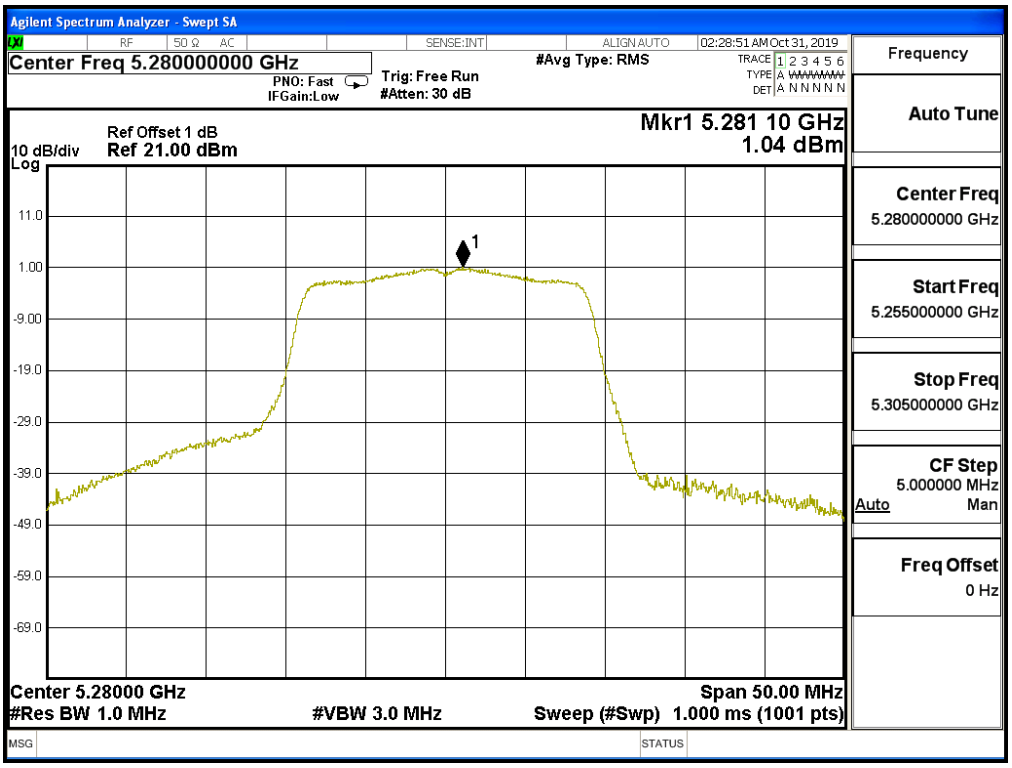
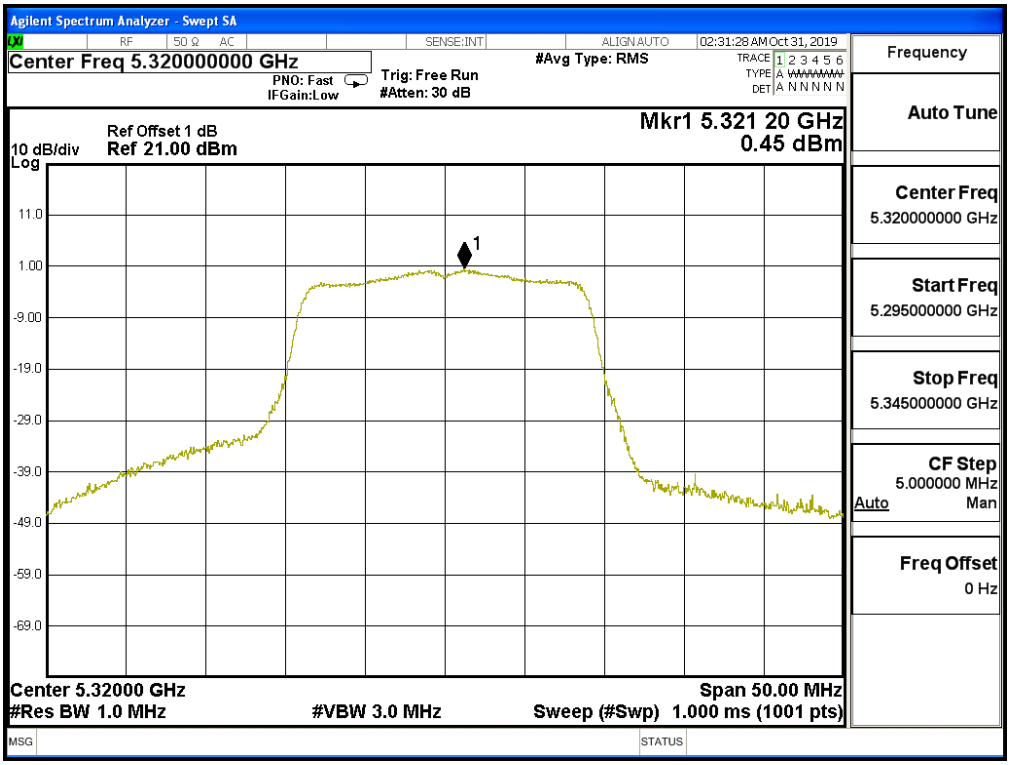
Channel 56 – Chain B



Channel 64 – Chain B



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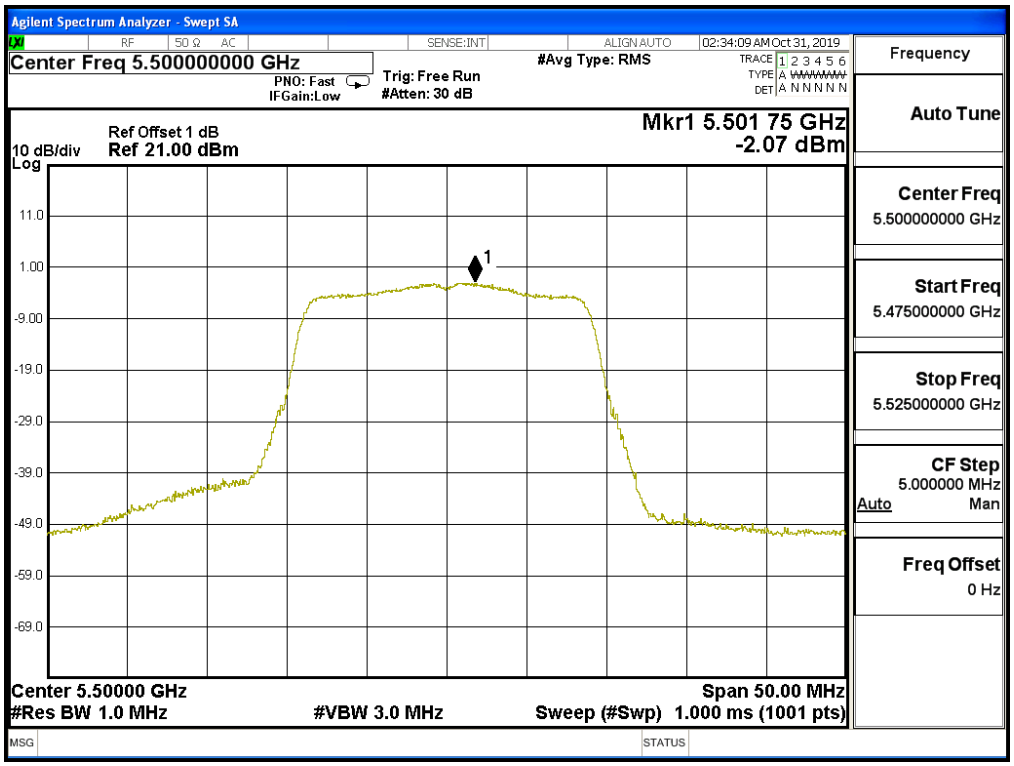
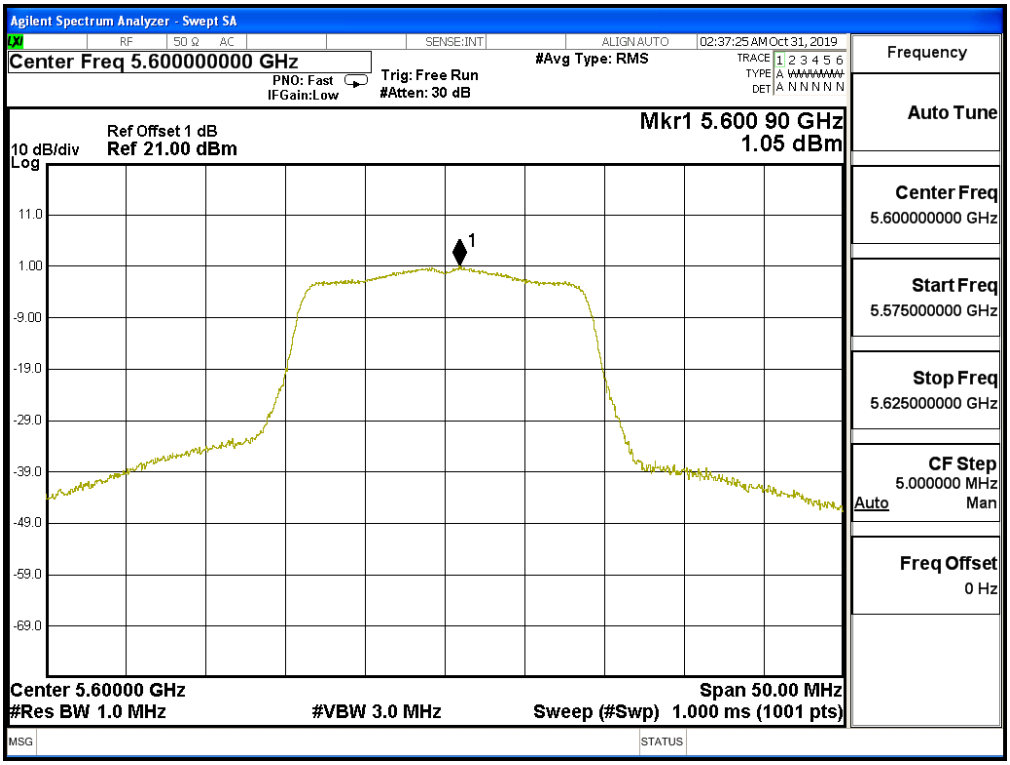
Channel 100 – Chain B



Channel 120 – Chain B



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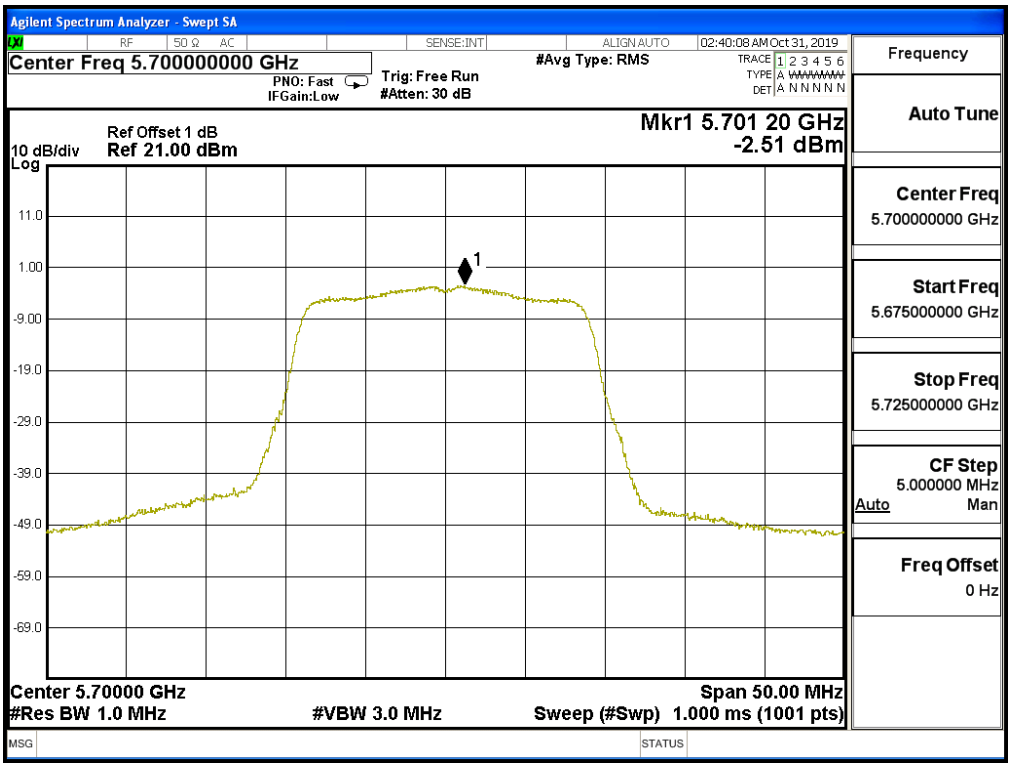
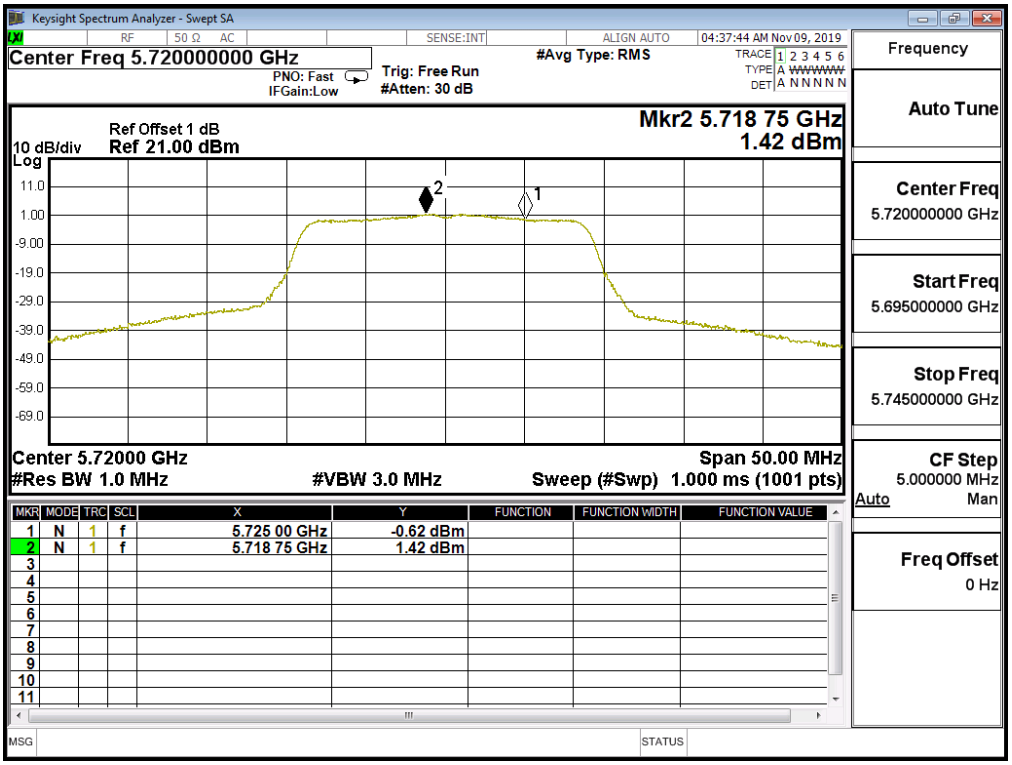
Channel 140 – Chain B



Channel 144 – Chain B-Band3



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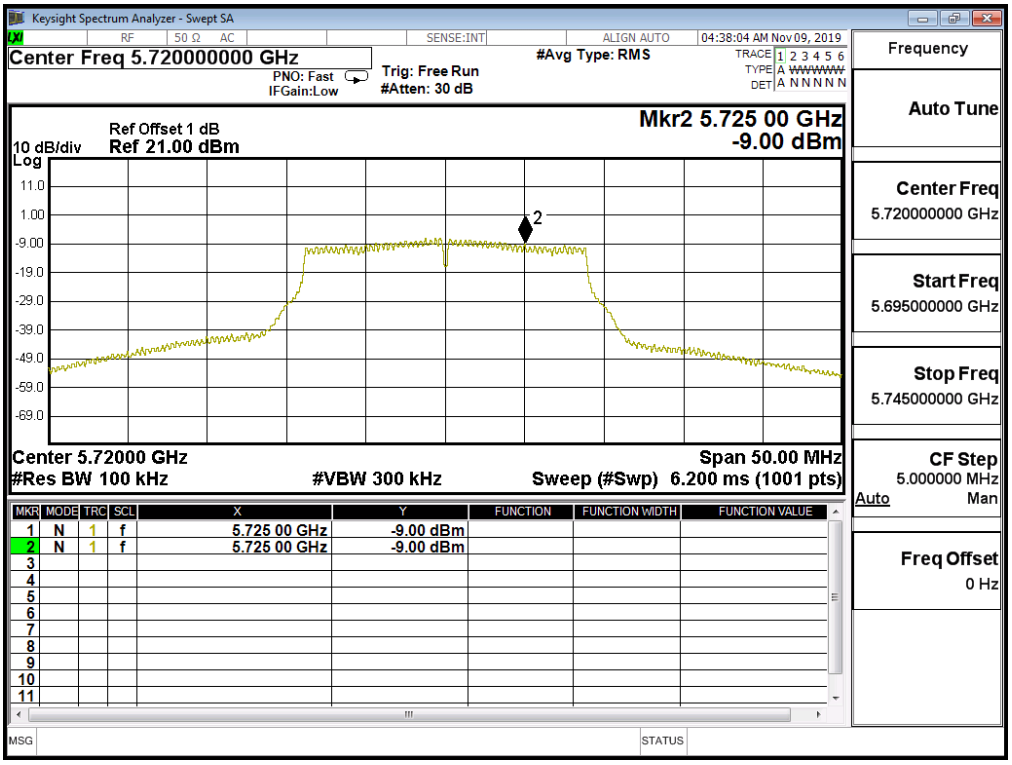
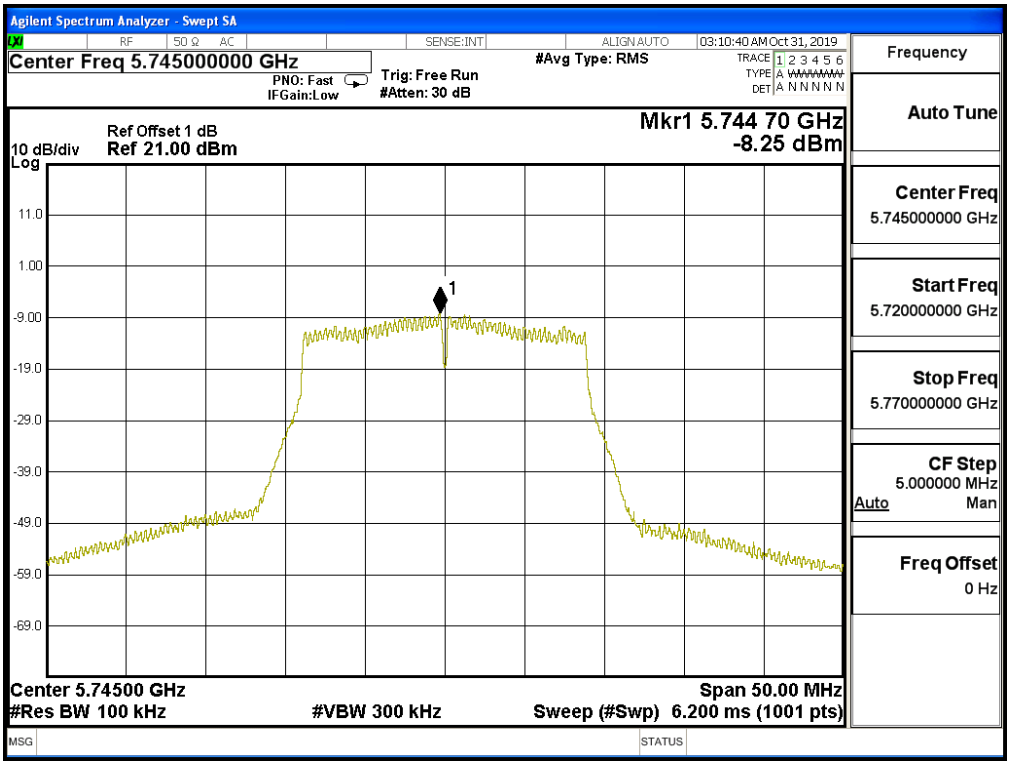
Channel 144 – Chain B-Band4



Channel 149 – Chain B



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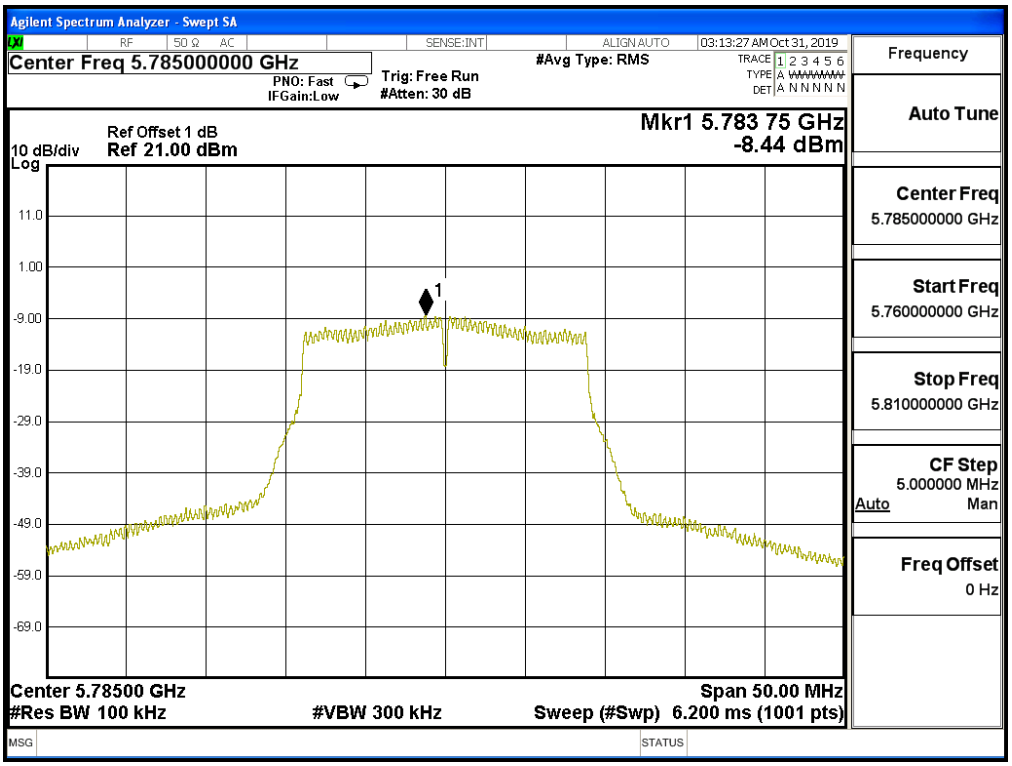
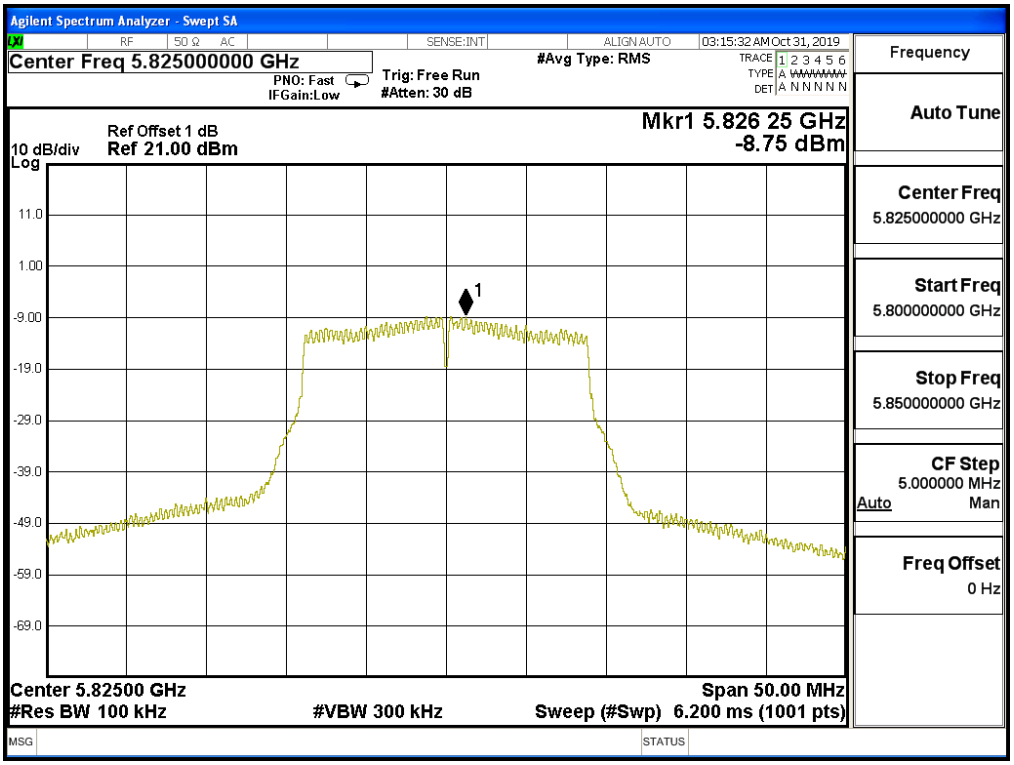
Channel 157 – Chain B



Channel 165 – Chain B



、 Product : Humly Room Display One
Test Item : Peak Power Spectral Density
Test Mode : Mode 3: Transmit (802.11n40)

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	Total PPSD (dBm)	Required Limit (dBm)	Result
38	5190	A	-6.010	-3.000	11	Pass
		B	-6.070	-3.060	11	Pass
46	5230	A	-2.450	0.560	11	Pass
		B	-3.140	-0.130	11	Pass
54	5270	A	-2.270	0.740	11	Pass
		B	-2.440	0.570	11	Pass
62	5310	A	-3.580	-0.570	11	Pass
		B	-3.540	-0.530	11	Pass
102	5510	A	-5.400	-2.390	11	Pass
		B	-5.380	-2.370	11	Pass
118	5590	A	-2.860	0.150	11	Pass
		B	-3.070	-0.060	11	Pass
134	5670	A	-2.580	0.430	11	Pass
		B	-3.400	-0.390	11	Pass
142	5710(Band3)	A	-3.370	-0.360	11	Pass
		B	-1.520	1.490	11	Pass

Channel Number	Frequency (MHz)	Chain	PPSD (dBm)	BWCF (dB)	Total PPSD (dBm)	Required Limit (dBm)	Result
142	5710(Band4)	A	-14.810	6.980	-4.820	<30	Pass
		B	-12.530	6.980	-2.540	<30	Pass
151	5755	A	-11.440	6.980	-1.450	<30	Pass
		B	-11.780	6.980	-1.790	<30	Pass
159	5795	A	-11.830	6.980	-1.840	<30	Pass
		B	-12.590	6.980	-2.600	<30	Pass

Note 1: The quantity 10*log 2 (two antennas) is added to the spectrum peak value according to document 662911 D01.

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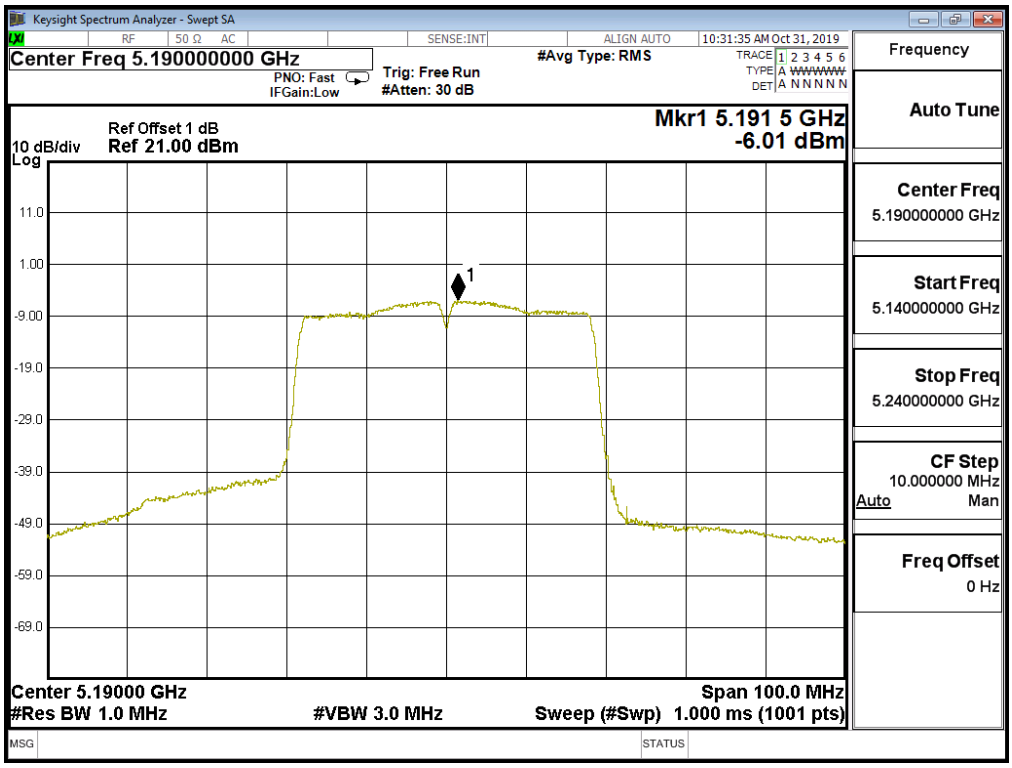
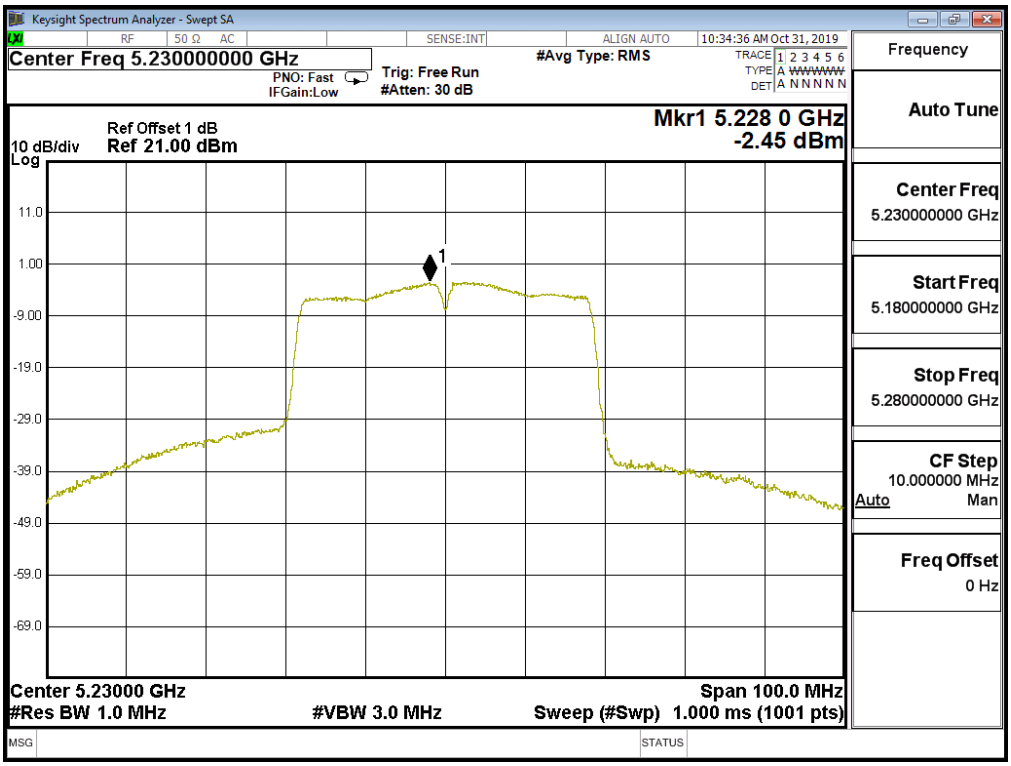
Channel 38 – Chain A



Channel 46 – Chain A