FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

For

CONSUMER CAMERA

MODEL NUMBER: IPC-B46EN

ADDITIONAL MODEL NUMBER: IPC-B46EP;IPC-K36BP;IPC-K36B;IPC-K36BP;IPC-K36BN;IPC-K36BP-4M;IPC-K36BN-4M;LC-K36BP;LC-K36BN;LC-K36BP-4M;LC-K36BN-4M;IPC-B46EP-imou;IPC-B46EN-imou

PROJECT NUMBER: 4789551937

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Prepared for

Hangzhou Huacheng Network Technology Co., Ltd.

Prepared by

UL-CCIC COMPANY LIMITED
No. 2, Chengwan Road, Suzhou Industrial Park, People's Republic of China
Tel: +86 769 22038881
Fax: +86 769 33244054
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	7/28/2020	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Hangzhou Huacheng Network Technology Co., Ltd.
Address:	No.2930, Nanhuan Road, Binjiang District, Hangzhou, China

Manufacturer Information

Company Name:	Hangzhou Huacheng Network Technology Co., Ltd.
Address:	No.2930, Nanhuan Road, Binjiang District, Hangzhou, China

EUT Description

Product Name:	CONSUMER CAMERA
Model Name:	IPC-B46EN
Additional No. :	IPC-B46EP;IPC-K36BP;IPC-K36B;IPC-K36BP;IPC-K36BN; IPC-K36BP-4M;IPC-K36BN-4M;LC-K36BP;LC-K36BN;LC-K36BP-4M; LC-K36BN-4M;IPC-B46EP-imou;IPC-B46EN-imou
Sample Number:	3177792
Data of Receipt Sample:	Jul. 07, 2020
Date Tested:	Jul. 07, 2020~ Jul. 27, 2020

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Pass

Summary of Test Results			
Clause	Test Items	FCC Rules	Test Results
1	6/26db Bandwidth	FCC 15.407 (a)&(e)	PASS
2	Maximum Average Conducted Output Power	FCC 15.407 (a)	PASS
3	Power Spectral Density	FCC 15.407 (a)	PASS
4	Radiated Bandedge and Spurious Emission	FCC 15.407 (a) FCC 15.209 FCC 15.205	PASS
5	Conducted Emission Test For AC Power Port	FCC 15.207	PASS
6	Frequency Stability	FCC 15.407 (g)	PASS
7	Dynamic Frequency Selection	FCC 15.407 (h)	PASS
8	Antenna Requirement	FCC 15.203	PASS
Remark: 1) The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15E> when <Accuracy Method> decision rule is applied. 2) For this product, it has two antennas, antenna1 and antenna2, but the ant1 and ant2 can't transmitter at the same time under all test modes.			

Prepared By:

Jason Yang

Jason Yang
Engineer

Reviewed By:

Tom Tang

Tom Tang
Engineer Project Associate

Authorized By:

Chris Zhong

Chris Zhong
Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15E, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01, KDB 662911 D01 Multiple Transmitter Output v02r01, and KDB414788 D01 Radiated Test Site v01r01.

3. FACILITIES AND ACCREDITATIO

Accreditation Certificate	**A2LA (Certificate No.: 4829.01)** **UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.** **FCC (FCC Designation No.: CN1247)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.** **IC (IC Designation No.: 25056)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.**

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.00dB
Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	3.31dB
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	3.31dB
Radiation Emission test (1GHz to 40GHz)(include Fundamental emission)	3.83dB (1GHz-18Gz)
	4.13dB (18GHz-26.5Gz)
	4.53dB (26.5GHz-40Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	CONSUMER CAMERA
Model No.:	IPC-B46EN
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11a/n 20MHz:5180MHz to 5240MHz, 5260MHz to 5320MHz, 5500MHz to 5700MHz , 5745MHz to 5825MHz
	Remark: For this test report just for the 5GHz part
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11a: OFDM (BPSK,QPSK,16QAM,64QAM)
Channels Step:	Channels with 5MHz step
Sample Type:	Fixed production
Test power grade:	5180MHz to 5240MHz: 45 (manufacturer declare); 5260MHz to 5320MHz: 45 (manufacturer declare); 5500MHz to 5700MHz: 40 (manufacturer declare); 5745MHz to 5825MHz: 45 (manufacturer declare).
Test software of EUT:	Secure CRT (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	Ant1&Ant2:3.58dBi
	Remark: This data is provided by customer and our lab isn't responsible for this data
Adapter	MODEL:NBS10B050200VUU INPUT:100-240V,50/60Hz, 0.3A OUTPUT:5.0V⎓ 2.0A

Remark:
Model No.:

Number:	Name:	Number:	Name:	Number:	Name:
1	IPC-B46EN	2	IPC-B46EP	3	IPC-K36BP
4	IPC-K36B	5	IPC-K36BP	6	IPC-K36BN
7	IPC-K36BP-4M	8	IPC-K36BN-4M	9	LC-K36BP
10	LC-K36BN	11	LC-K36BP-4M	12	LC-K36BN-4M
13	IPC-B46EP-imou	14	IPC-B46EN-imou		

Only the main model **IPC-B46EN** was tested and only the data of this model is shown in this test report. Since Their electrical circuit design, layout, components used and internal wiring are identical, only the model name and selling area are different.

5.2. CHANNELS LIST

20 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	36	5180
	40	5200
	44	5220
	48	5240
UNII-2A	52	5260
	56	5280
	60	5300
	64	5320
UNII-2C	132	5660
	136	5680
	140	5700
UNII-3	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

Remark:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected

5.1. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1&2	5150-5825	PCB Antenna	3.58

Test Mode	Transmit and Receive Mode	Description
802.11a	1TX, 2RX	Antenna 1 and Antenna2 can both be used as transmitting/receiving antenna.
802.11n HT20	1TX, 2RX	Antenna 1 and Antenna2 can both be used as transmitting/receiving antenna.
Remark: For this product, it has two antennas, antenna1 and antenna2, but the ant1 and ant2 can't transmitter at the same time under all test modes.		

5.2. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
	TL	-20°C
	TH	50°C
Voltage :	VL	AC108
	VN	AC 120V/60Hz
	VH	AC132

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.1. WORST-CASE CONFIGURATIONS

IEE Std. 802.11	Modulation Technology	Modulation Type	Data Rate (Mbps)	Worst Case (Mbps)
a	OFDM	BPSK,QPSK,16QAM, 64QAM	54/48/36/24/18/12/9/6	6

IEE Std. 802.11	Modulation Technology	Modulation Type	Data Rate	Worst Case
n HT20	OFDM	BPSK, QPSK, 16QAM, 64QAM	(MCS0~MCS23)	MCS0

5.2. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E550c	N/A
2	Fixed Frequency Board	N/A	N/A	Supply by UL Lab

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	USB	USB	USB-VGA	100cm Length (Supply by UL Lab)	N/A

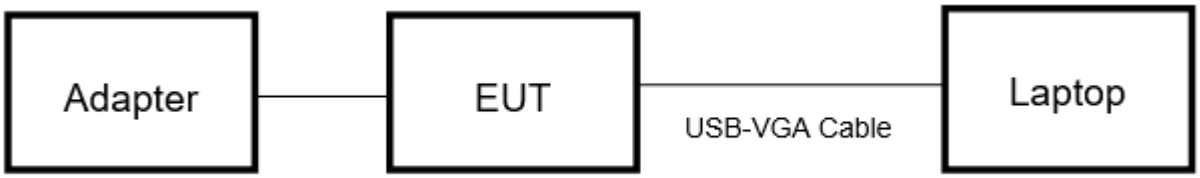
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	NA	NA	NA	NA

TEST SETUP

The EUT can work in engineering mode with a software through a PC.

SETUP DIAGRAM FOR TEST



5.3. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	126700	2018-12-13	2019-12-12	2020-12-11
☑	Two-Line V-Network	R&S	ENV216	126701	2018-12-13	2019-12-12	2020-12-11
☑	Artificial Mains Networks	R&S	ENY81	126711	2018-12-13	2019-12-12	2020-12-11
Software							
Used	Description		Manufacturer		Name	Version	
☑	Test Software for Conducted disturbance		R&S		EMC32	Ver. 9.25	
Radiated Emissions (Instrument**)**							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	MY57110128	2019-05-29	2020-05-10	2021-05-09
☑	EMI test receiver	R&S	ESR26	1267603	2018-12-13	2019-12-22	2020-12-21
☑	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	513-265	N/A	2018-06-15	2021-06-14
☑	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1	126704	N/A	2019-01-28	2022-01-27
☑	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2019-01-26	2020-01-26	2021-01-25
☑	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170	126706	2019-02-06	2020-02-05	2021-02-04
☑	Receiver Antenna (26.5GHz-40GHz)	TOYO	HAP 26-40W	00000012	2018-07-25	2019-07-23	2020-07-22
☑	Pre-amplification (To 1GHz)	R&S	SCU-03D	134666	2019-02-06	2020-02-05	2021-02-04
☑	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G18-50	14140-13467	2019-03-18	2020-02-20	2021-02-19
☑	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	134668	2019-02-06	2020-02-05	2021-02-04
☑	Band Reject Filter	Wainwright	WRCJV12-5120-5150-5350-5380-40SS	3	2019-05-29	2020-05-10	2021-05-09
☑	Band Reject Filter	Wainwright	WRCJV16-5440-5470-5725-5755-40SS	4	2019-05-29	2020-05-10	2021-05-09
☑	Band Reject Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	5	2019-05-29	2020-05-10	2021-05-09
☑	Highpass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	6	2019-05-29	2020-05-10	2021-05-09

Software					
Used	Description	Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance	Tonscend	JS32	V1.0	

Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	MY57110128	2019-05-29	2020-05-10	2021-05-09
☑	Power Meter	Keysight	U2021XA	MY57110002	2019-06-12	2020-05-10	2021-05-09

Remark: For the date of Radiated Spurious Emissions testing is processing during Jul. 07, 2020~ Jul. 18, 2020 .

5.4. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

RESULTS

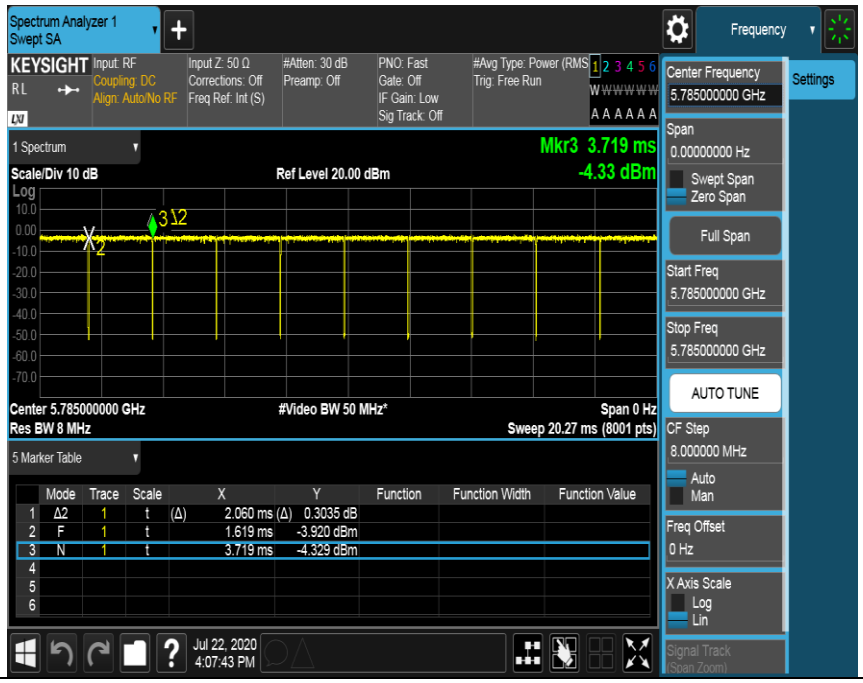
UNII Band III

Mode	ON Time (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (KHz)
11a 1TX	2.0600	2.1000	0.9810	98.10%	0.083	0.49
11n HT20	1.9150	1.9562	0.9789	97.89%	0.093	0.52

Remark:

1) Duty Cycle Correction Factor=10log(1/x).
2) Where: x is Duty Cycle(Linear)
3) UNII Band I and UNII Band III have the same duty cycle, only UNII Band III data is shown in this report.
4) Antenna 1 and Antenna 2 have the same duty cycle, only Antenna 1 data show here.
5) If that calculated VBW is not available on the analyzer then the next higher value should be used.
6) Pre-testing all test modes and channels, only the data of the worst case is shown in this report.

DUTY CYCLE 802.11a MODE(THE WORST CASE)



DUTY CYCLE 802.11n HT20 MODE(THE WORST CASE)

5.5. 6/26 dB BANDWIDTH

LIMITS

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	5470-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

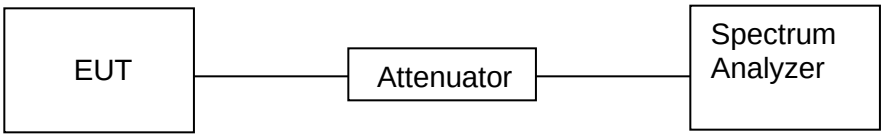
TEST PROCEDUREC

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1% of the emission bandwidth.
VBW	For 6dB Bandwidth : VBW=300kHz For 26dB Bandwidth : >3RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6/26 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

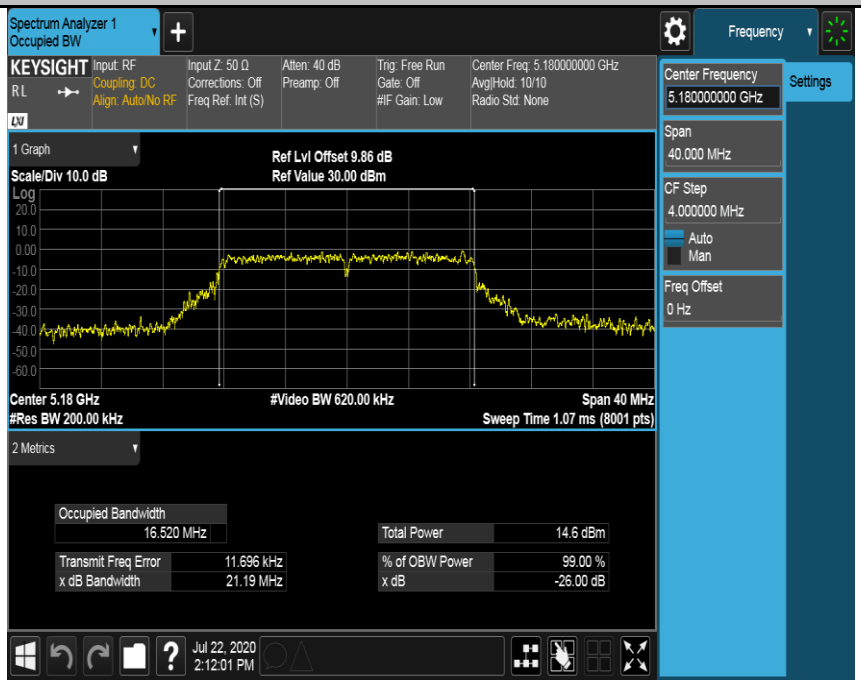
RESULTS

Test Antenna	Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
Antenna 1	11A20	36	21.19	---	PASS
	11A20	40	20.81	---	PASS
	11A20	48	21.01	---	PASS
	11A20	52	20.63	---	PASS
	11A20	56	20.61	---	PASS
	11A20	64	20.82	---	PASS
	11A20	100	20.92	---	PASS
	11A20	116	20.55	---	PASS
	11A20	140	20.81	---	PASS
	11A20	149	16.51	0.5	PASS
	11A20	157	16.34	0.5	PASS
	11A20	165	16.34	0.5	PASS
	11n HT20	36	22.17	---	PASS
	11n HT20	40	21.03	---	PASS
	11n HT20	48	21.15	---	PASS
	11n HT20	52	21.41	---	PASS
	11n HT20	56	21.00	---	PASS
	11n HT20	64	21.09	---	PASS
	11n HT20	100	21.42	---	PASS
	11n HT20	116	21.07	---	PASS
	11n HT20	140	20.71	---	PASS
	11n HT20	149	17.74	0.5	PASS
	11n HT20	157	17.65	0.5	PASS
	11n HT20	165	17.67	0.5	PASS
	11A20	36	20.83	---	PASS
	11A20	40	20.80	---	PASS
	11A20	48	20.97	---	PASS
	11A20	52	21.04	---	PASS
	11A20	56	21.04	---	PASS
	11A20	64	20.92	---	PASS
	11A20	100	20.70	---	PASS

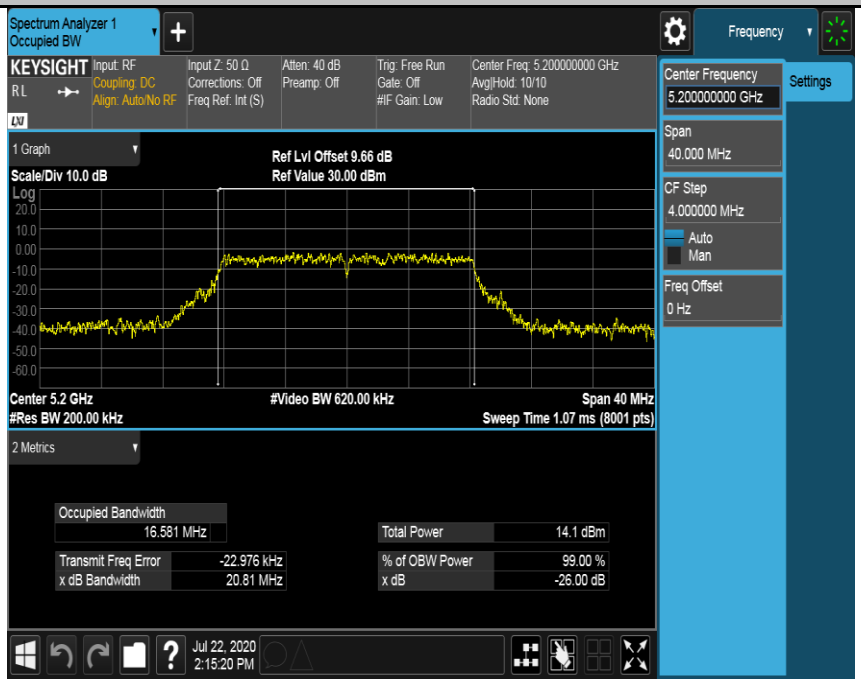
Antenna 2	11A20	116	20.92	---	PASS
	11A20	140	20.88	---	PASS
	11A20	149	21.38	0.5	PASS
	11A20	157	16.52	0.5	PASS
	11A20	165	16.33	0.5	PASS
	11n HT20	36	21.21	---	PASS
	11n HT20	40	20.85	---	PASS
	11n HT20	48	21.41	---	PASS
	11n HT20	52	21.70	---	PASS
	11n HT20	56	20.82	---	PASS
	11n HT20	64	20.87	---	PASS
	11n HT20	100	21.89	---	PASS
	11n HT20	116	21.10	---	PASS
	11n HT20	140	20.90	---	PASS
	11n HT20	149	17.58	0.5	PASS
	11n HT20	157	17.32	0.5	PASS
	11n HT20	165	17.56	0.5	PASS

Test Graphs
Antenna1

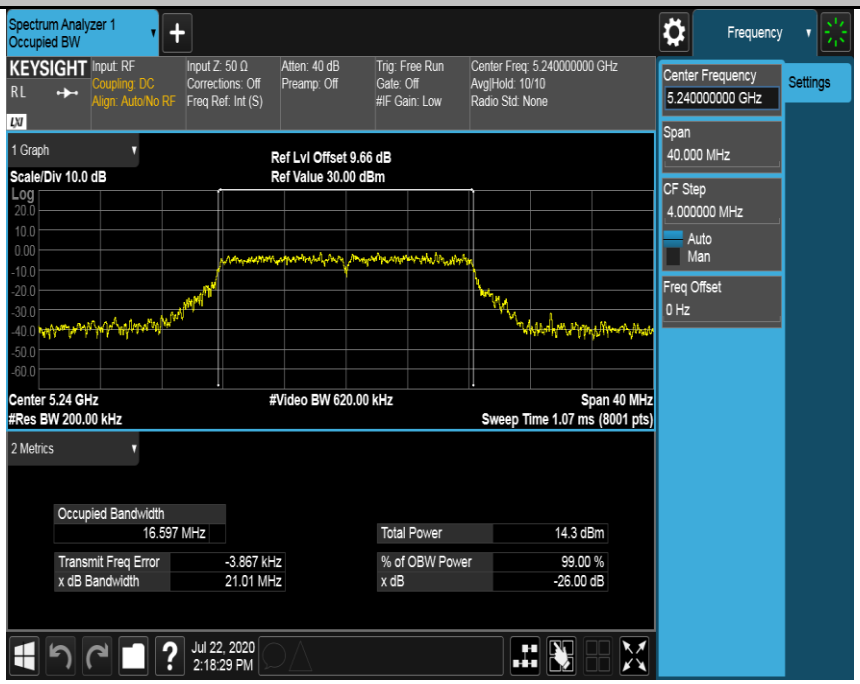
TEST PLOT
Emission Bandwidth Measurement_11A20_CH36



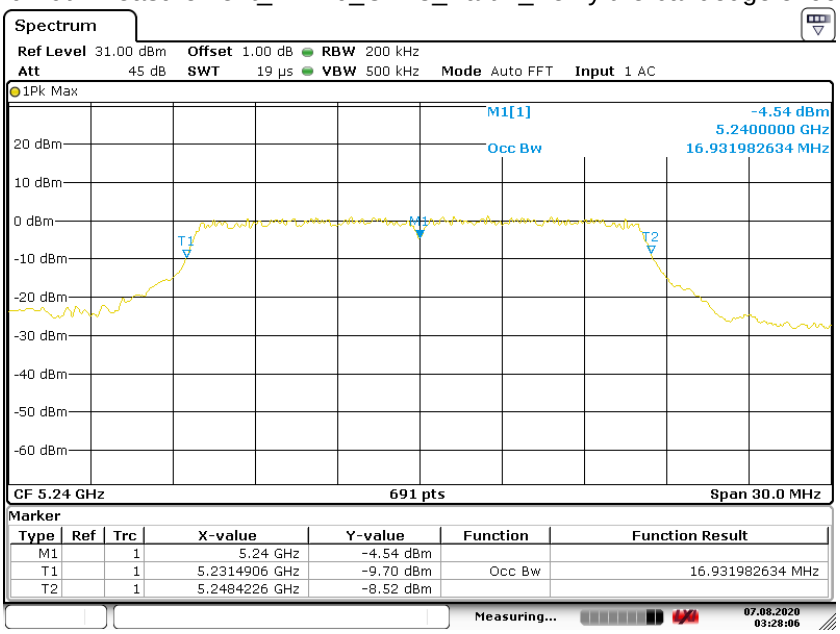
Emission Bandwidth Measurement_11A20_CH40



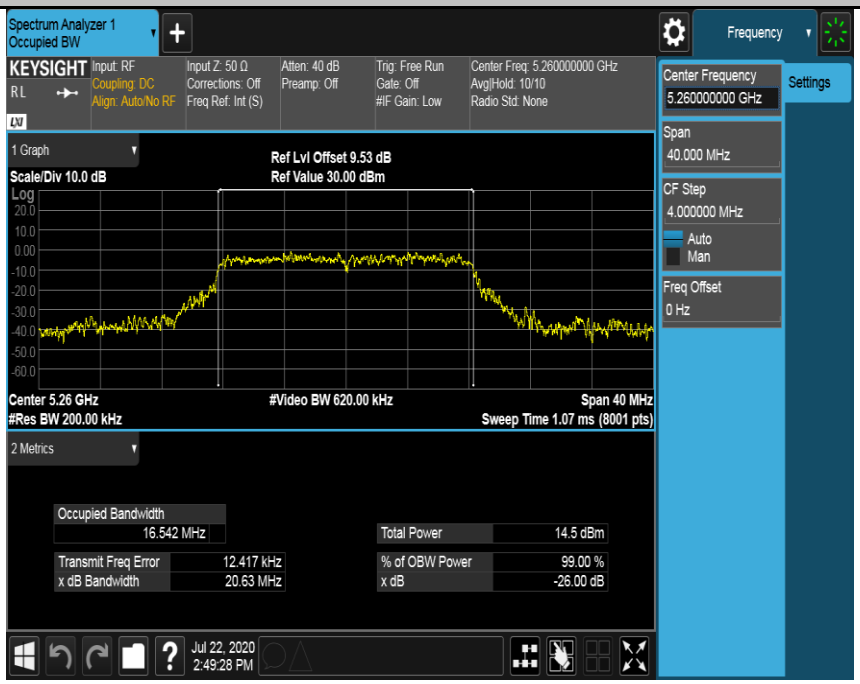
Emission Bandwidth Measurement_11A20_CH48_Part 1



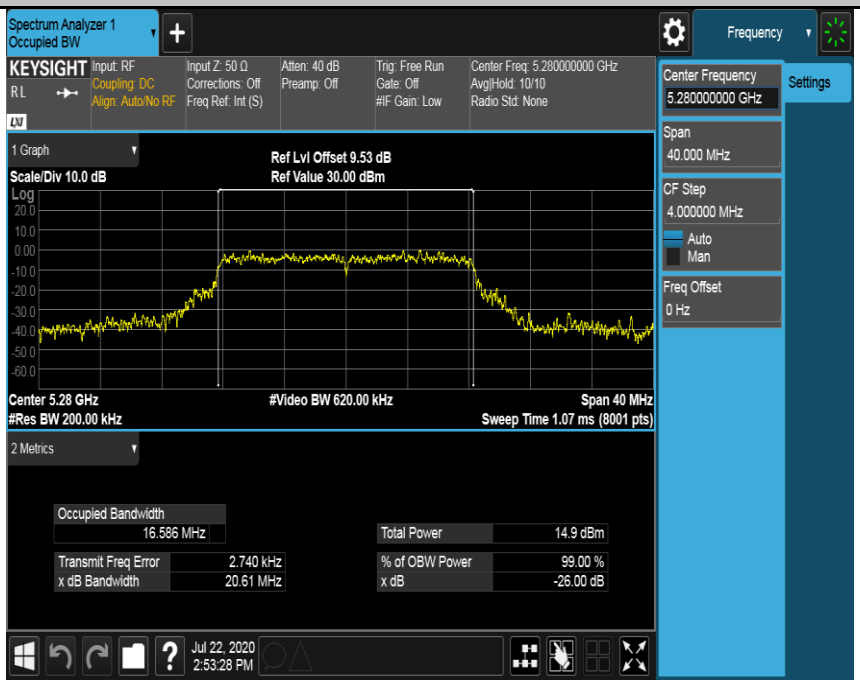
Emission Bandwidth Measurement_11A20_CH48_Part 2_Verify the bandedge of 99% bandwidth



Emission Bandwidth Measurement_11A20_CH52



Emission Bandwidth Measurement_11A20_ CH56



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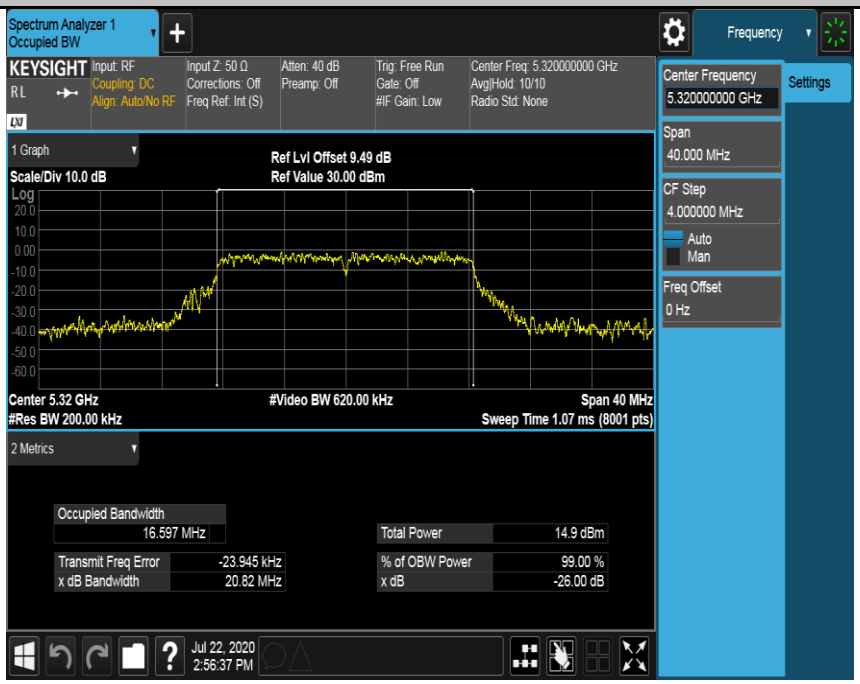
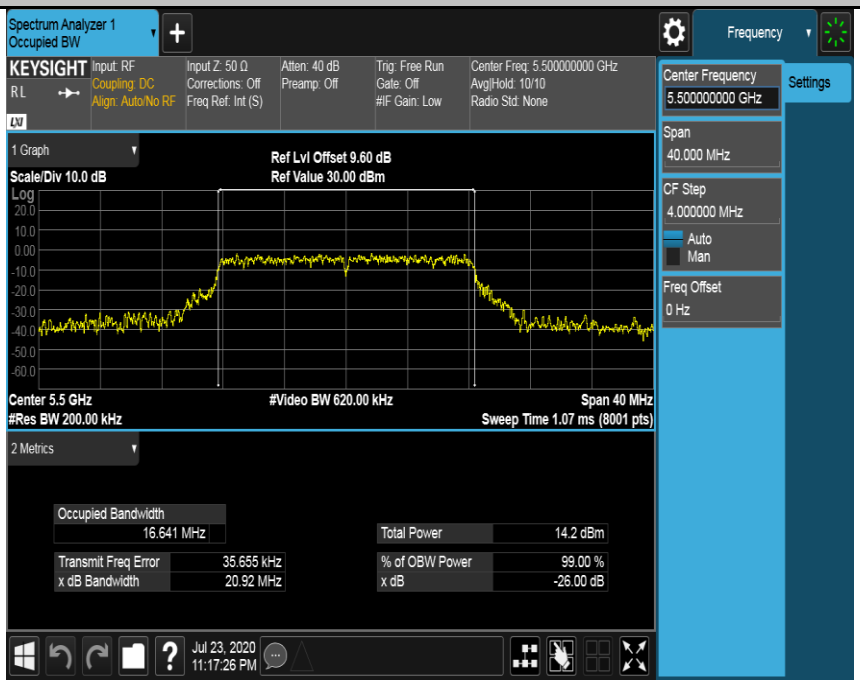
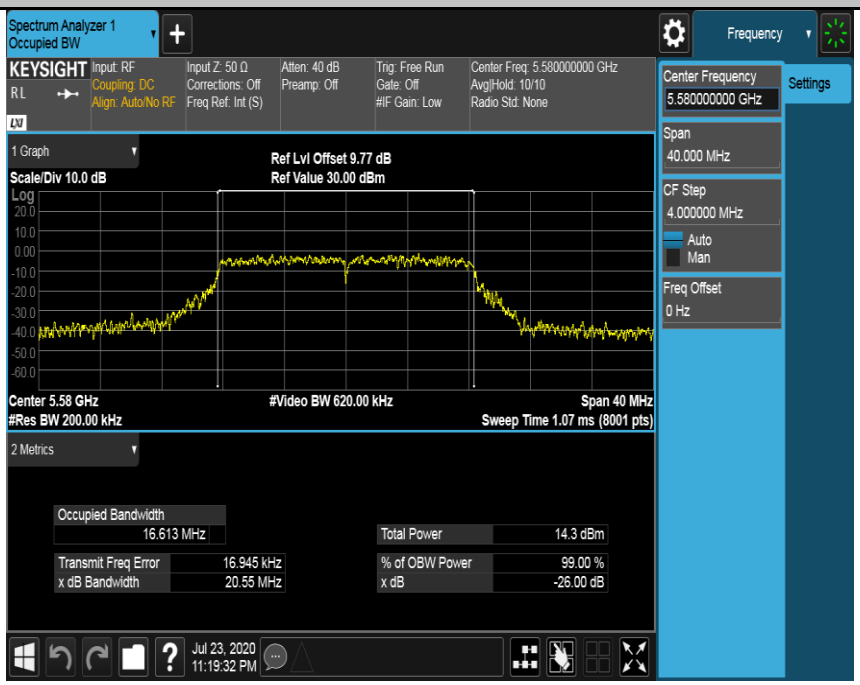


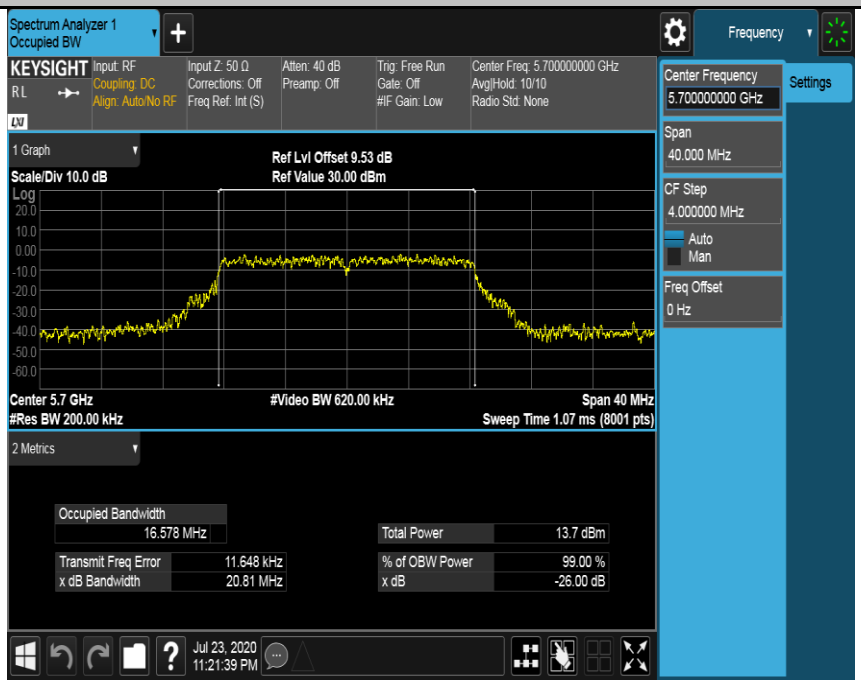
Emission Bandwidth Measurement_11A20_ CH100



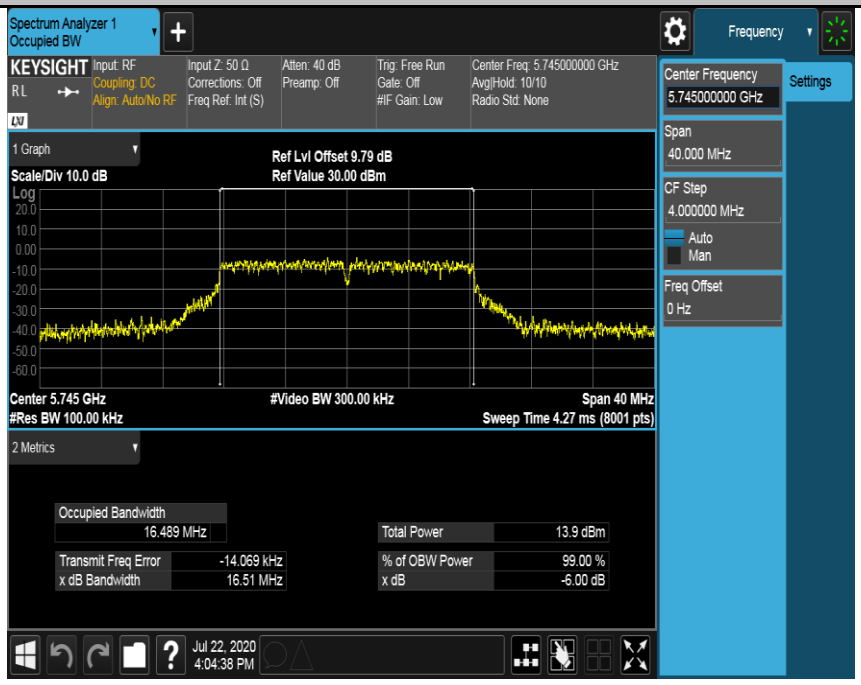
Emission Bandwidth Measurement_11A20_CH116



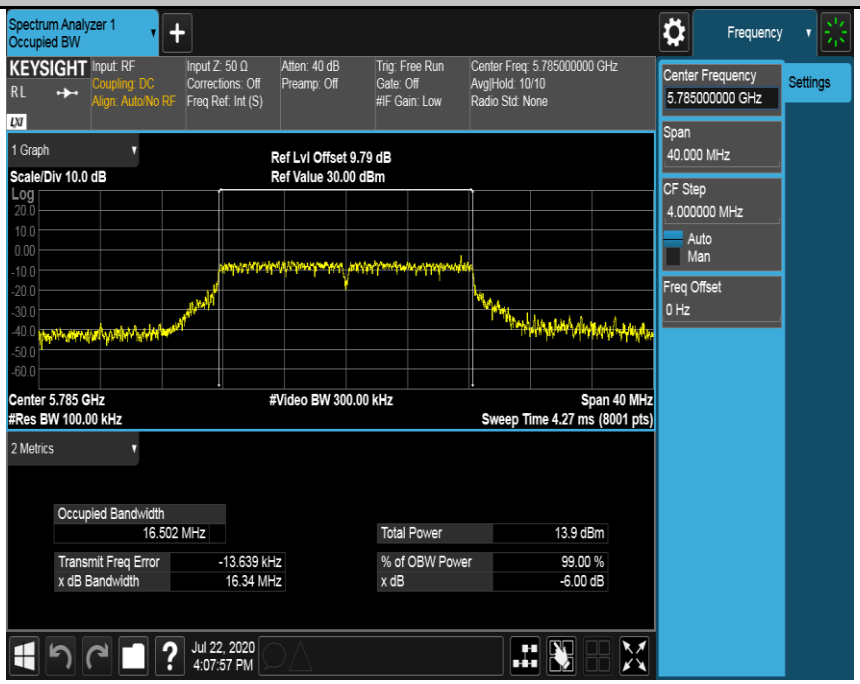
Emission Bandwidth Measurement_11A20_ CH140



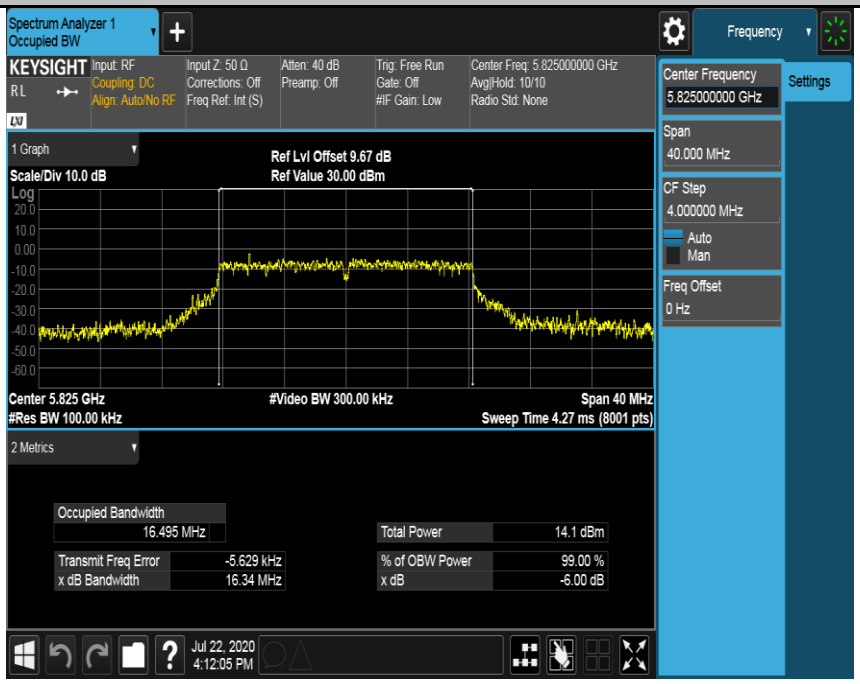
Emission Bandwidth Measurement_11A20_ CH149



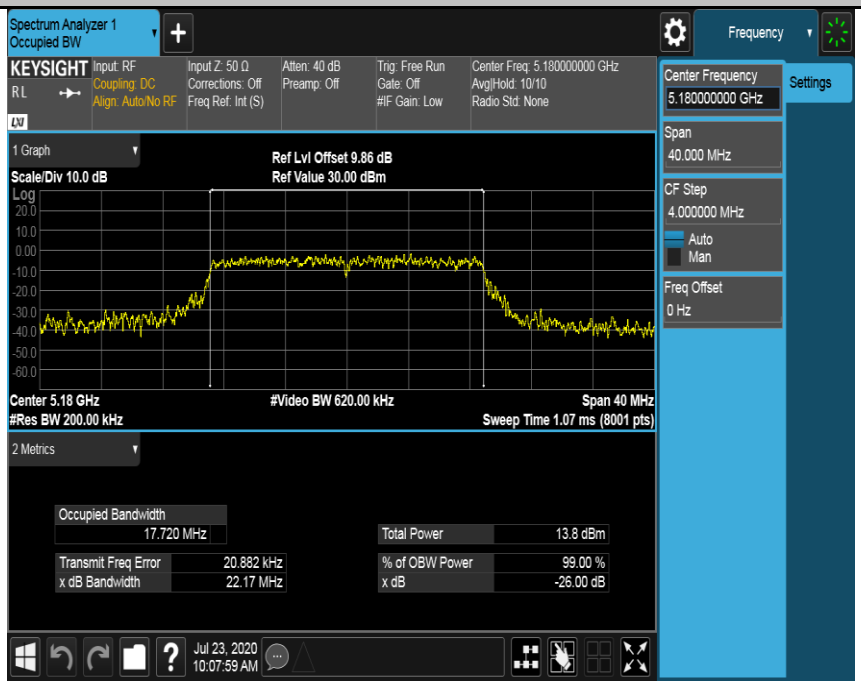
Emission Bandwidth Measurement_11A20_ CH157



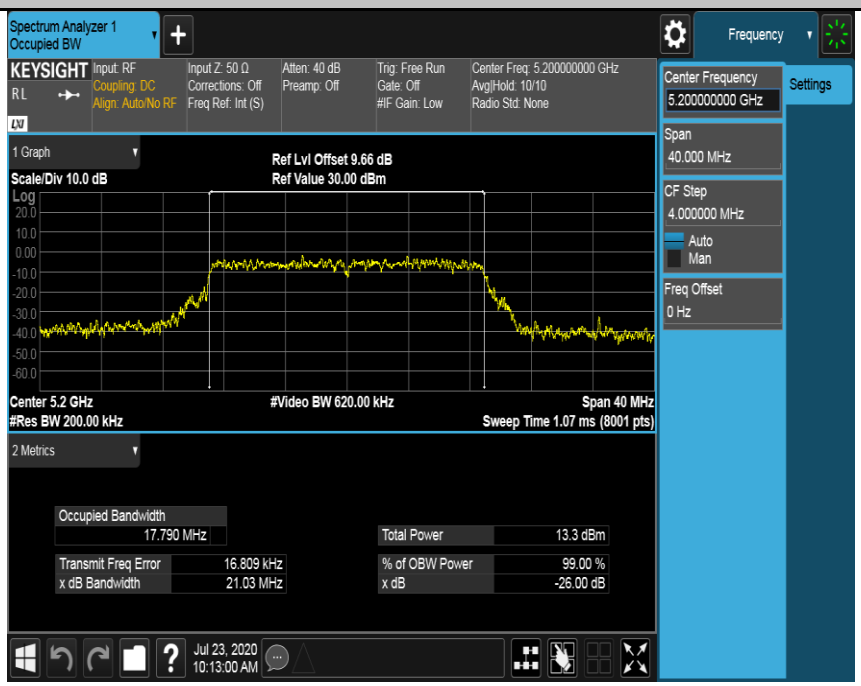
Emission Bandwidth Measurement_11A20_ CH165



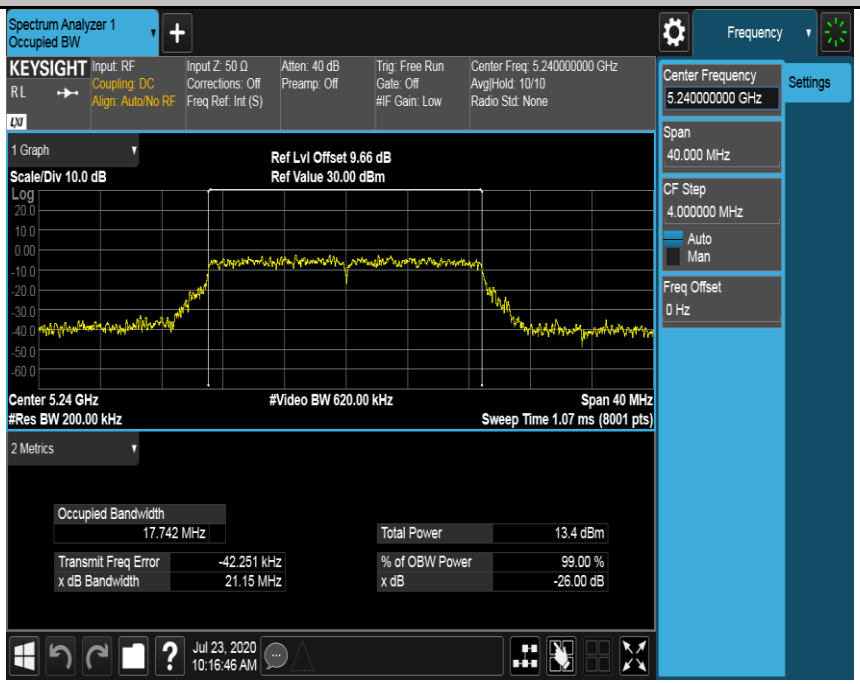
TEST PLOT
Emission Bandwidth Measurement_11N20_CH36



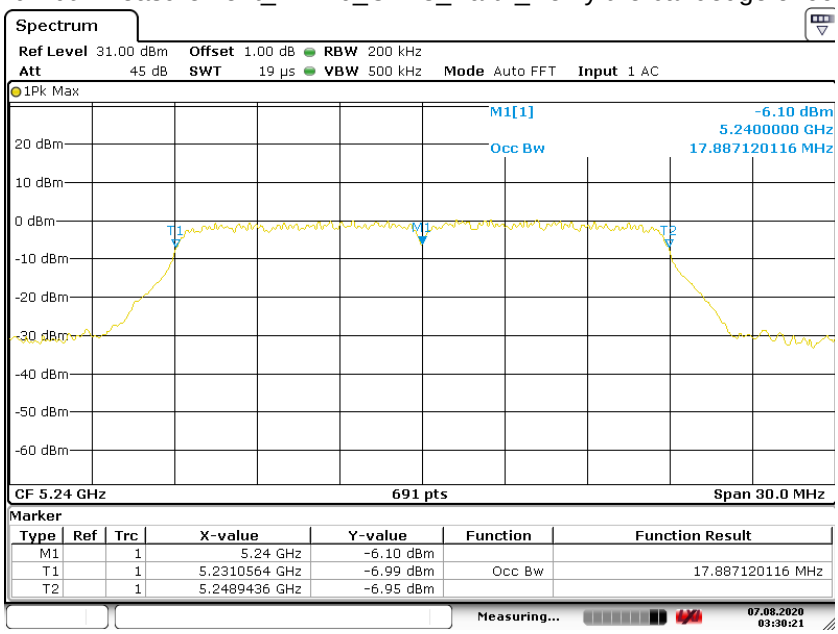
Emission Bandwidth Measurement_11N20_CH40



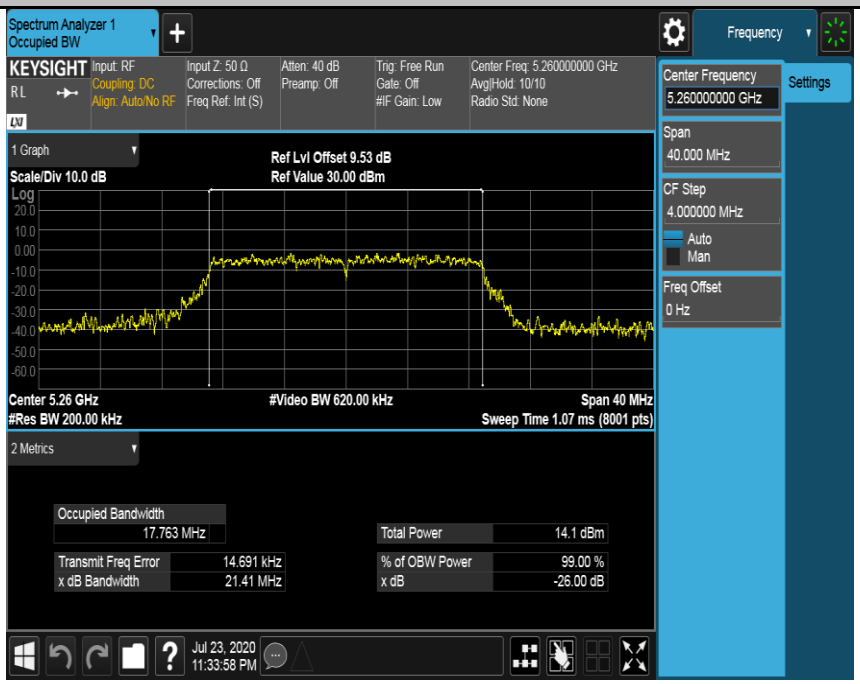
Emission Bandwidth Measurement_11N20_CH48



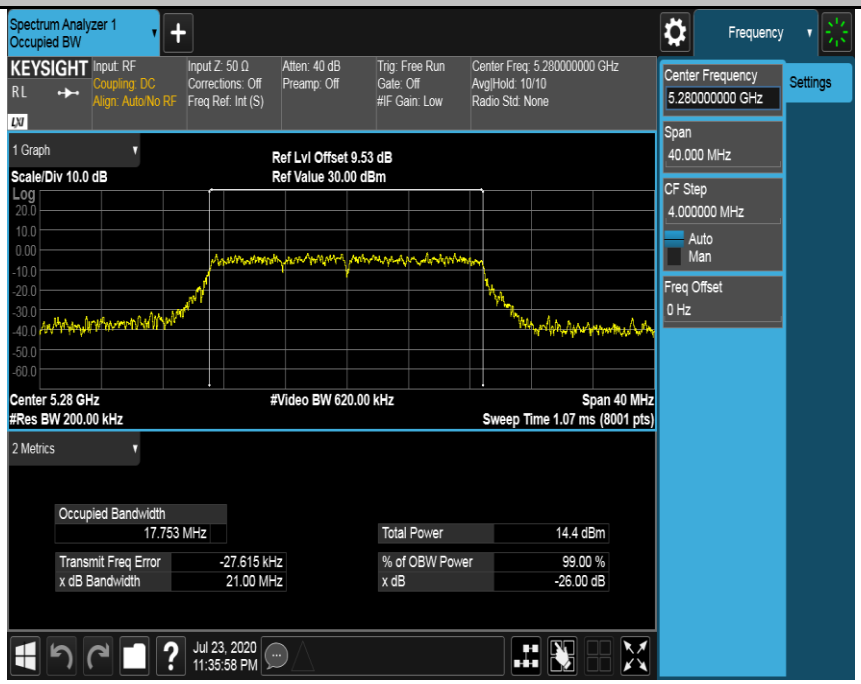
Emission Bandwidth Measurement_11A20_CH48_Part2_Verify the bandedge of 99% bandwidth



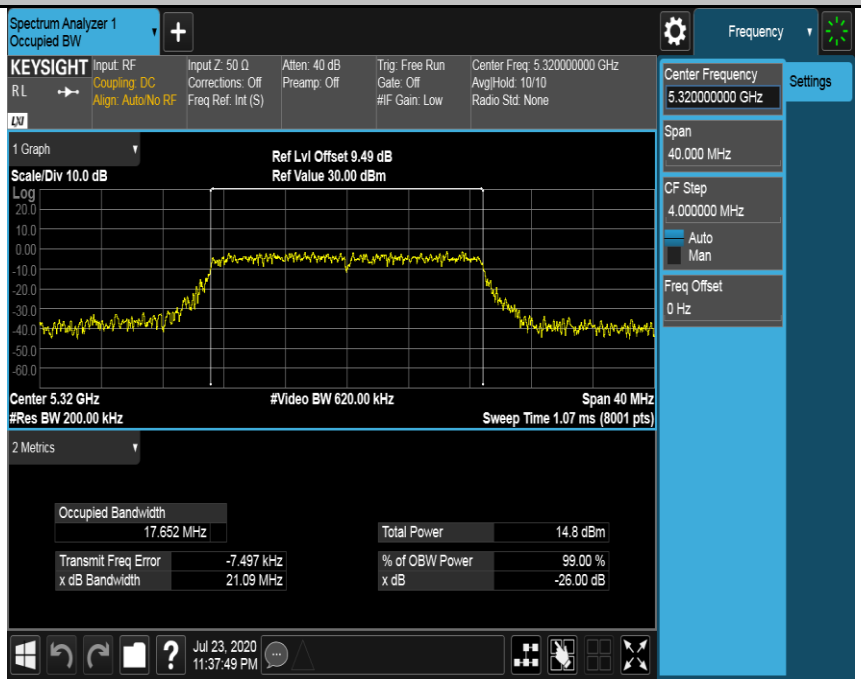
Emission Bandwidth Measurement_11N20_CH52



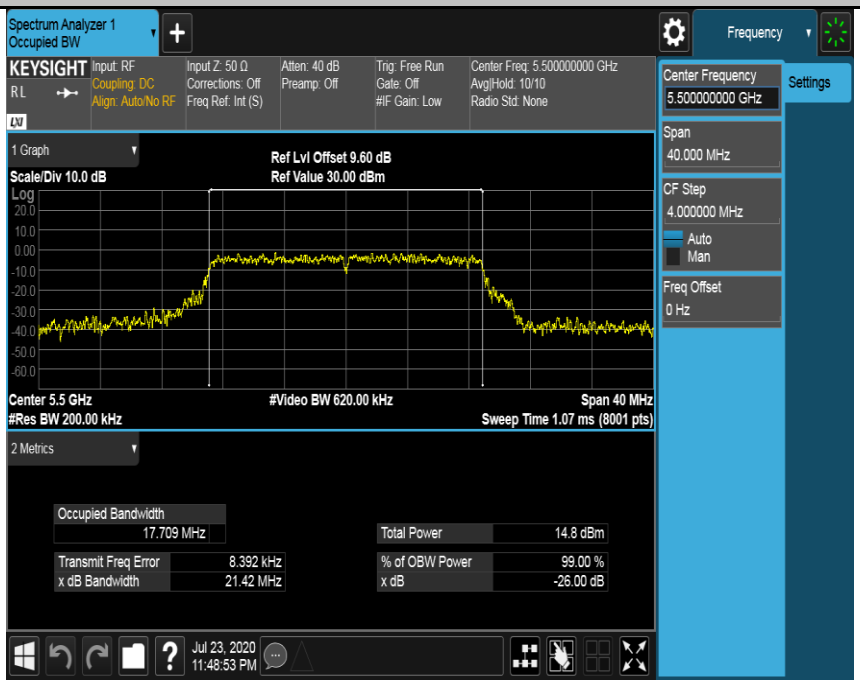
Emission Bandwidth Measurement_11N20_ CH56



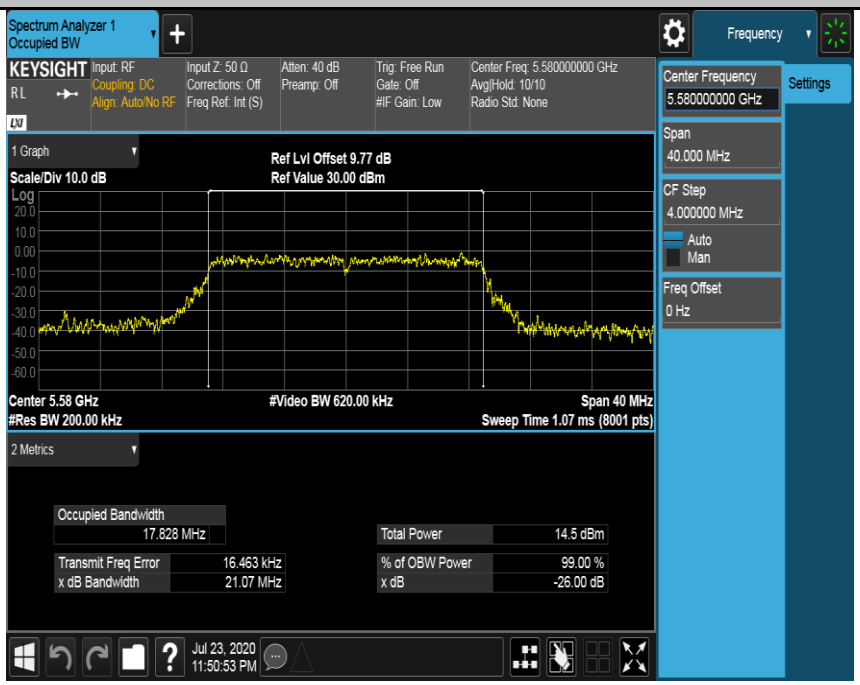
Emission Bandwidth Measurement_11N20_ CH64



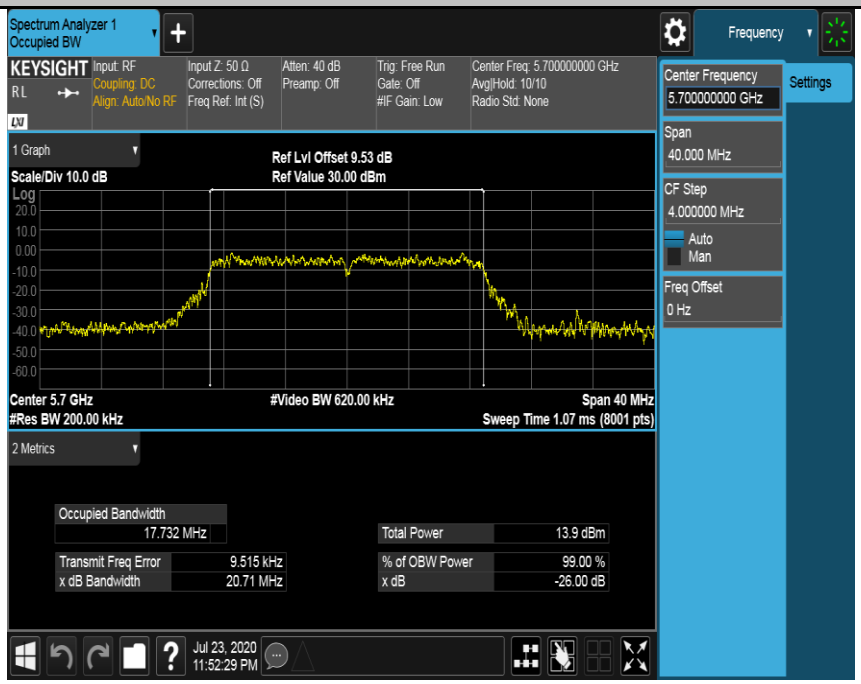
Emission Bandwidth Measurement_11N20_ CH100



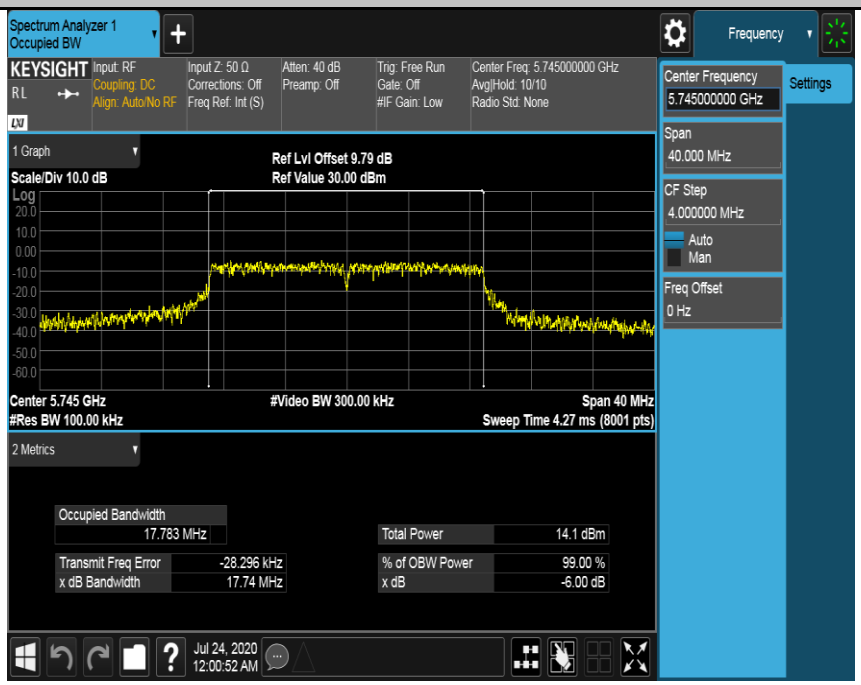
Emission Bandwidth Measurement_11N20_ CH116

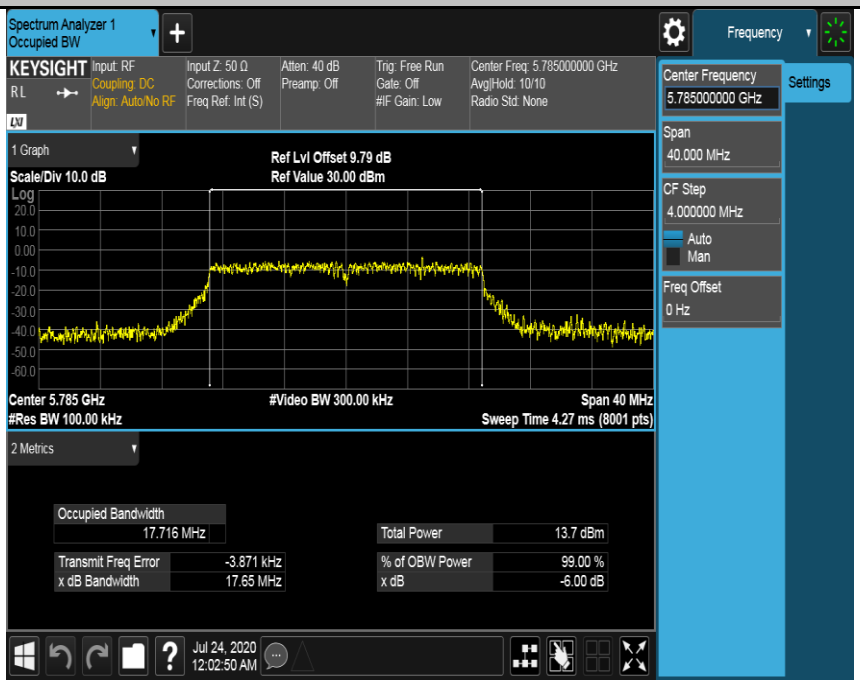


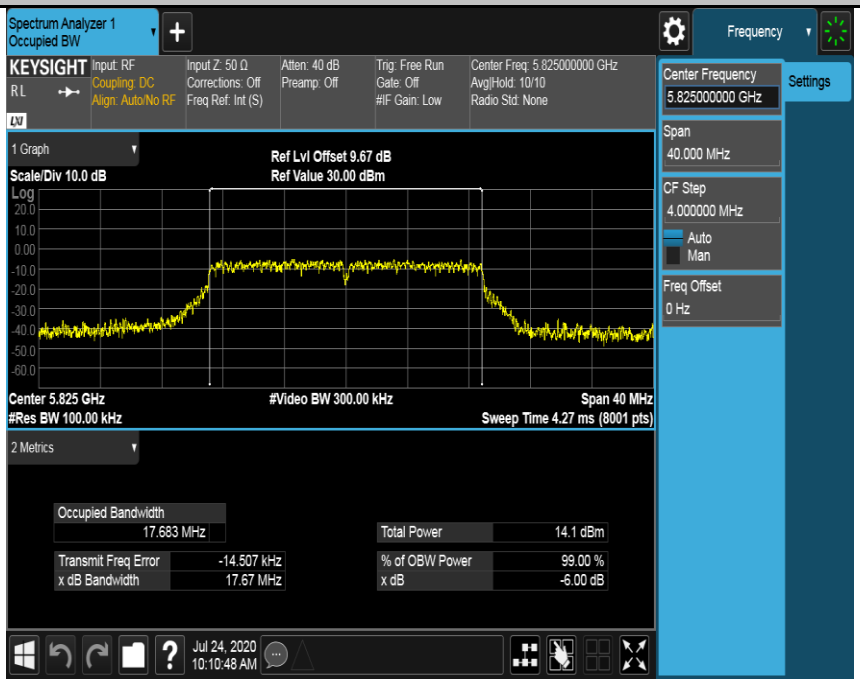
Emission Bandwidth Measurement_11N20_ CH140



Emission Bandwidth Measurement_11N20_ CH149

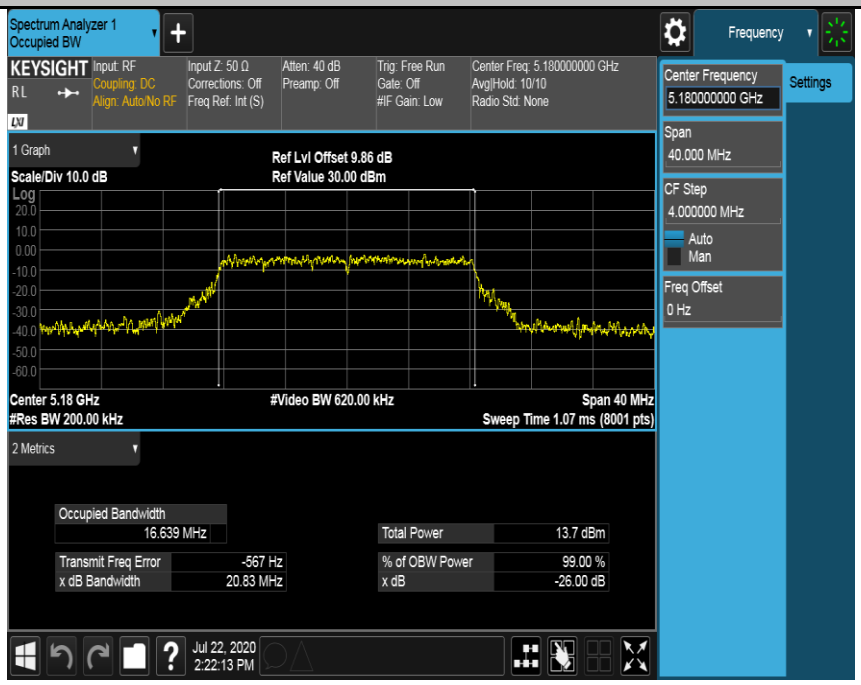


Emission Bandwidth Measurement_11N20_ CH157


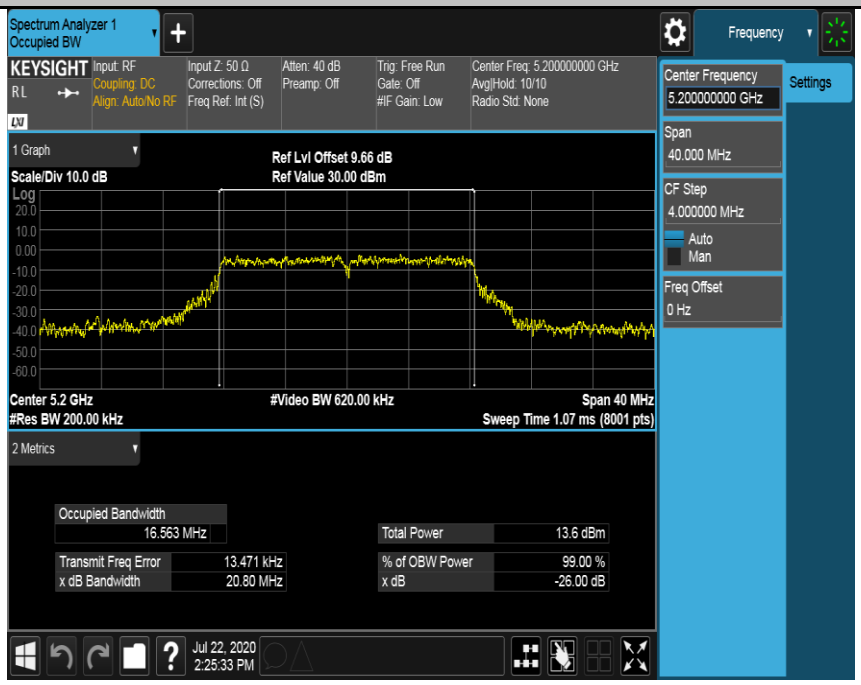
Emission Bandwidth Measurement_11N20_ CH165


Antenna2:

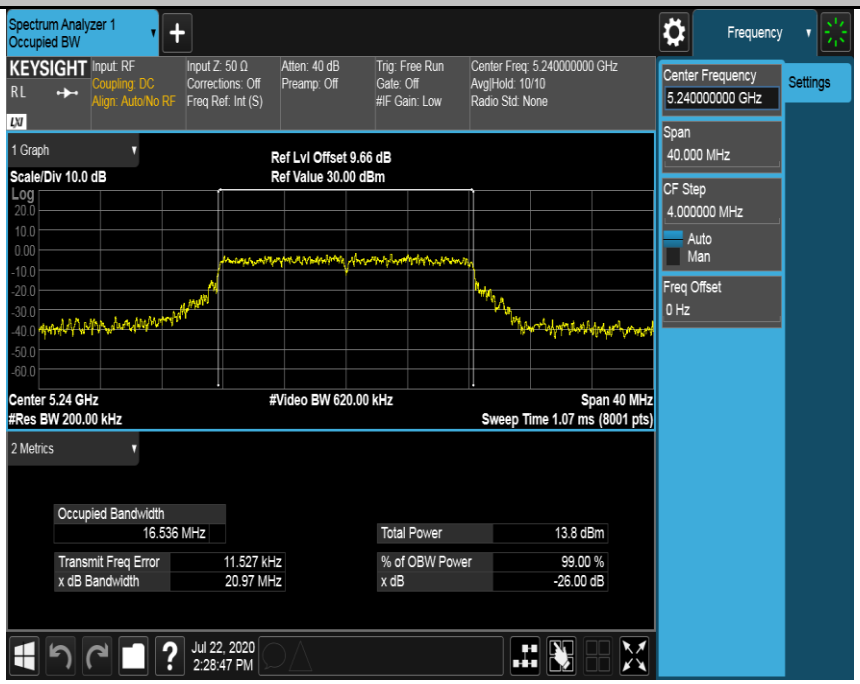
TEST PLOT
Emission Bandwidth Measurement_11A20_CH36



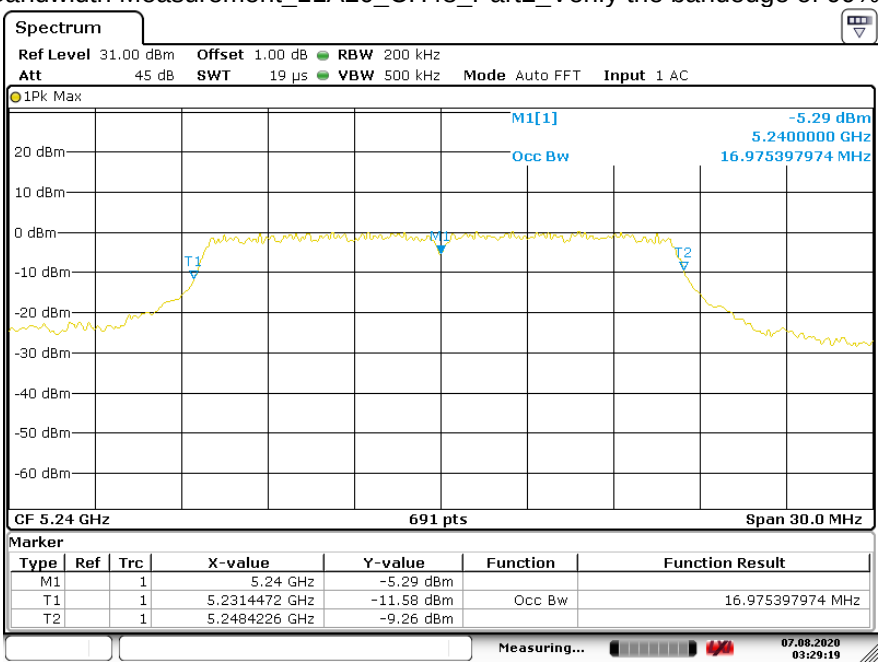
Emission Bandwidth Measurement_11A20_CH40

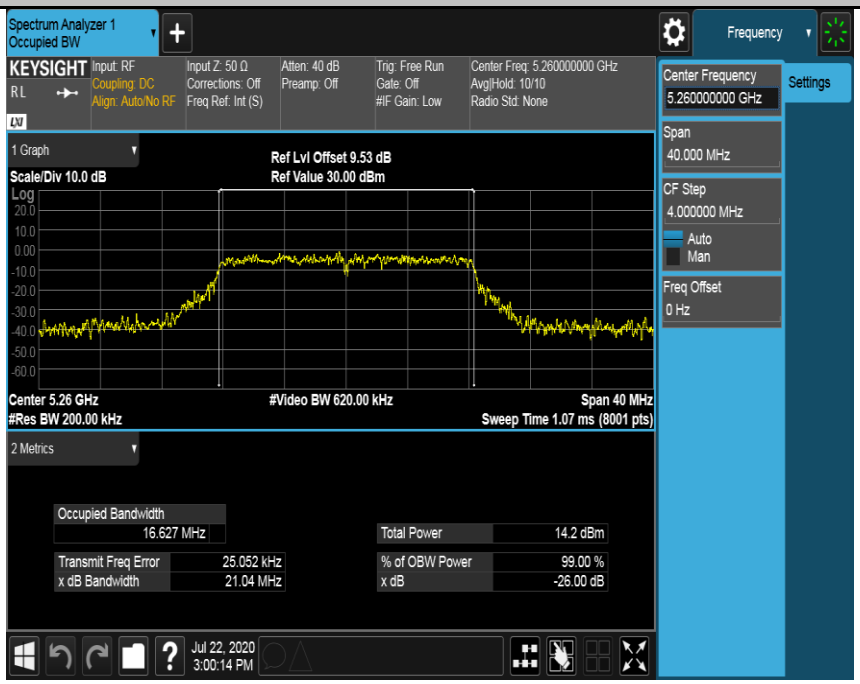


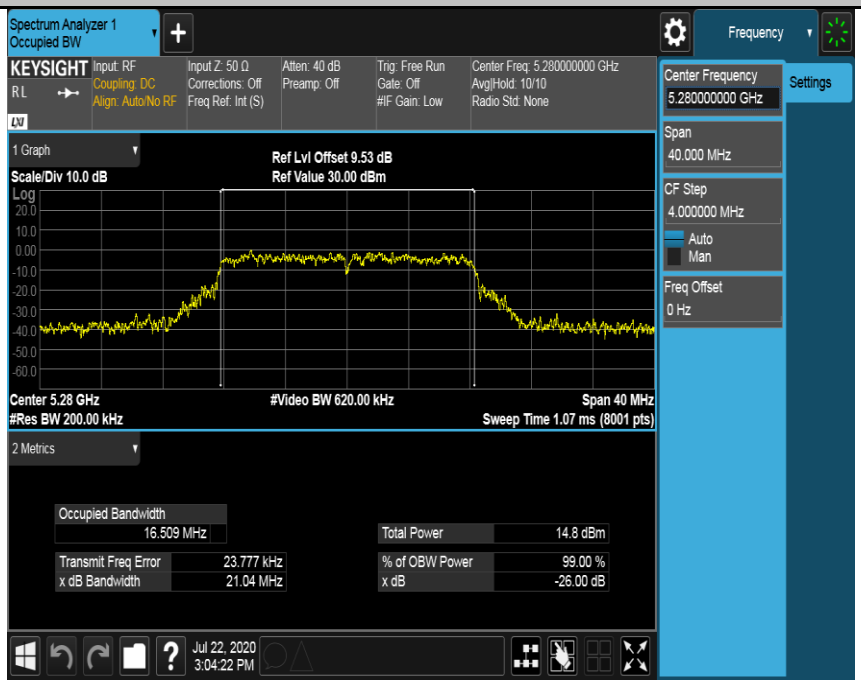
Emission Bandwidth Measurement_11A20_CH48_ part 1

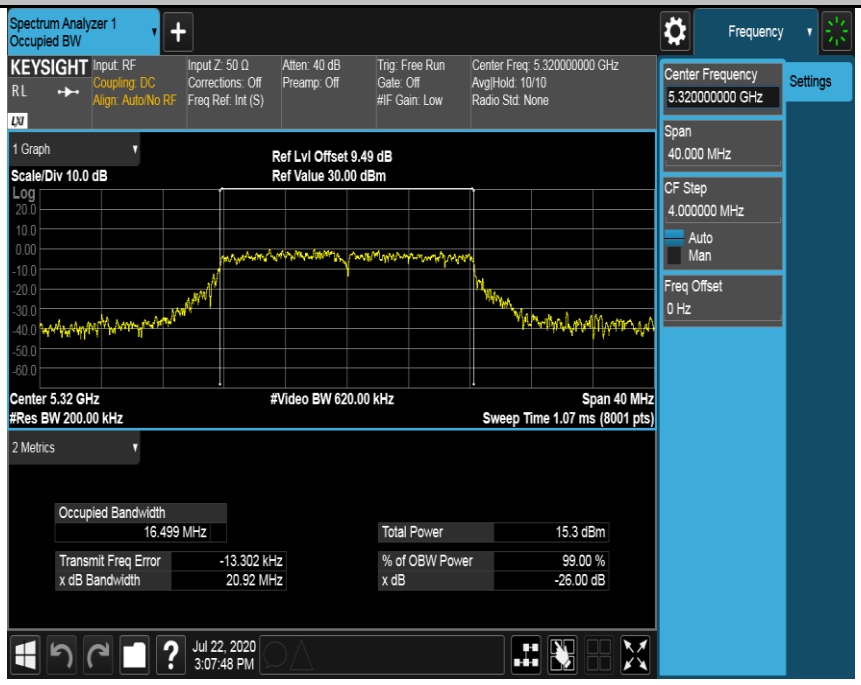


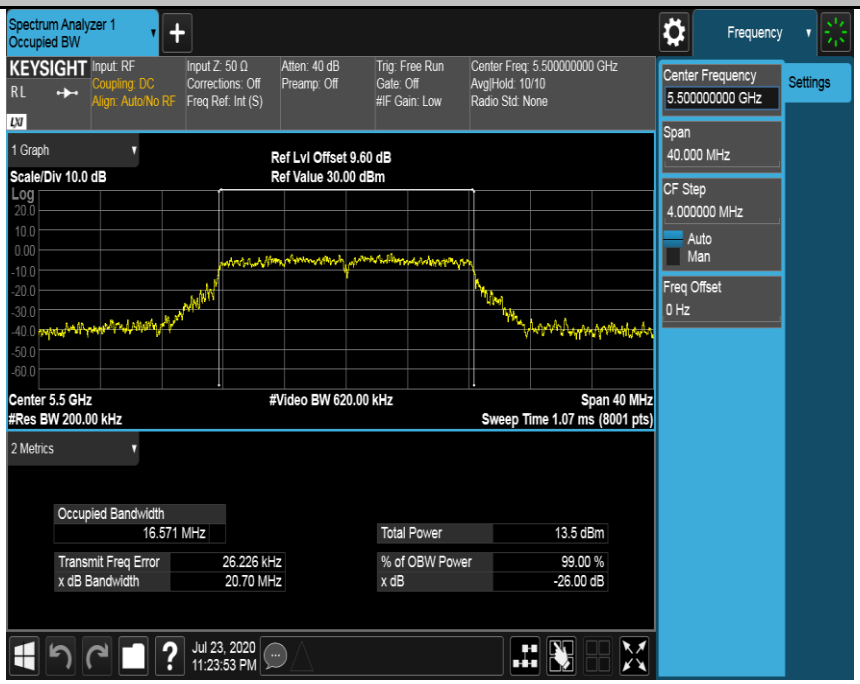
Emission Bandwidth Measurement_11A20_CH48_Part2_Verify the bandedge of 99% bandwidth

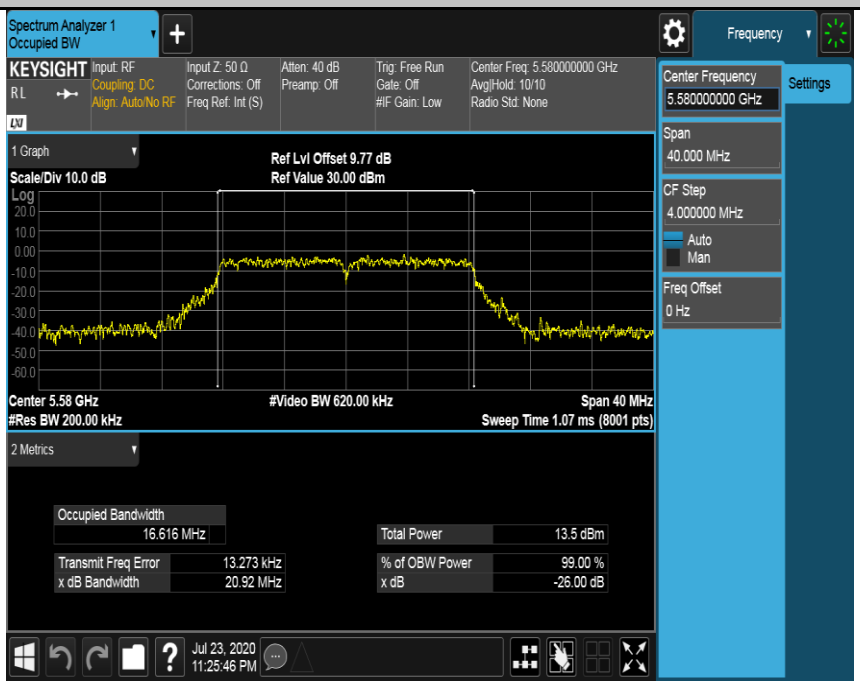


Emission Bandwidth Measurement_11A20_CH52


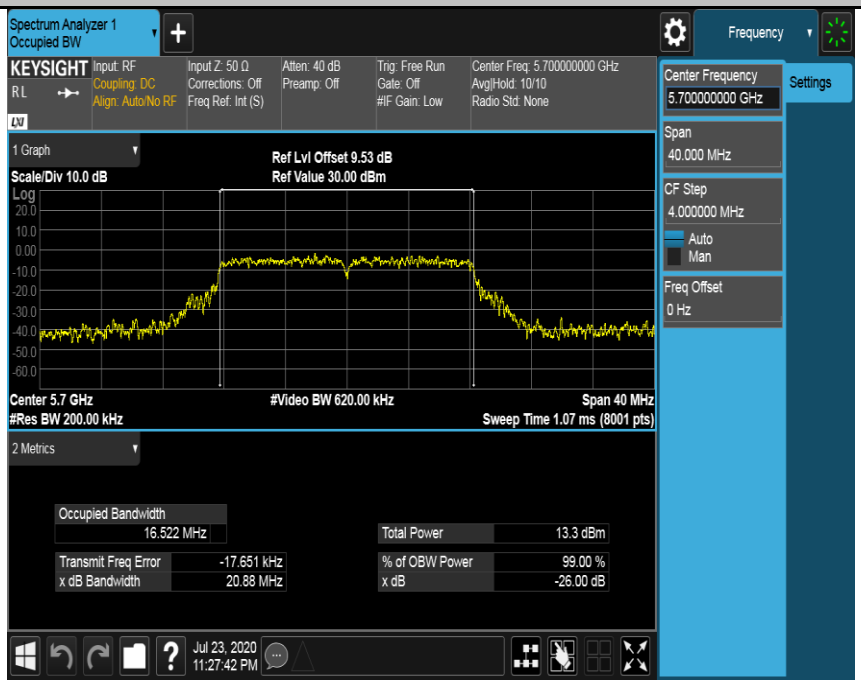
Emission Bandwidth Measurement_11A20_ CH56


Emission Bandwidth Measurement_11A20_ CH64


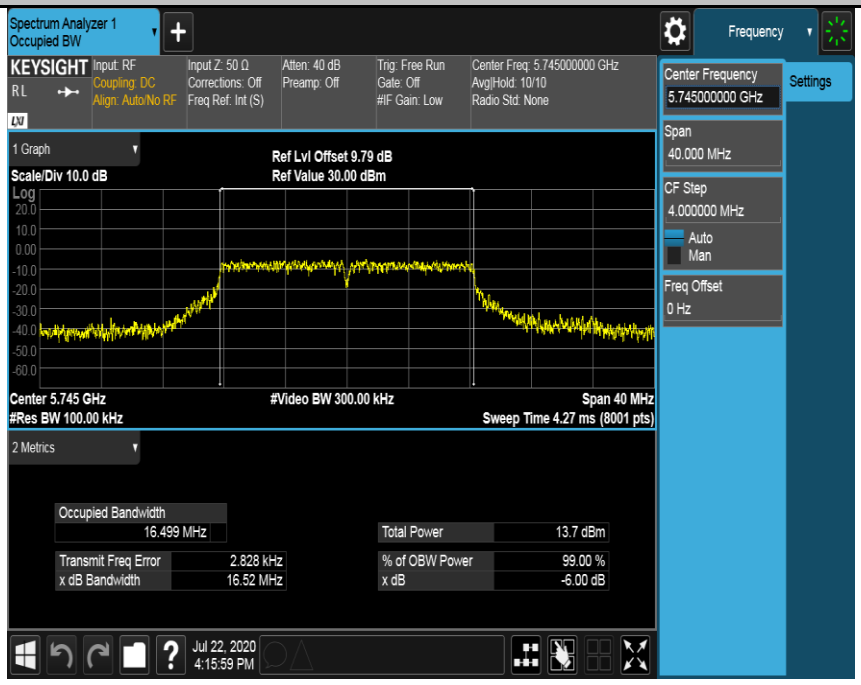
Emission Bandwidth Measurement_11A20_ CH100


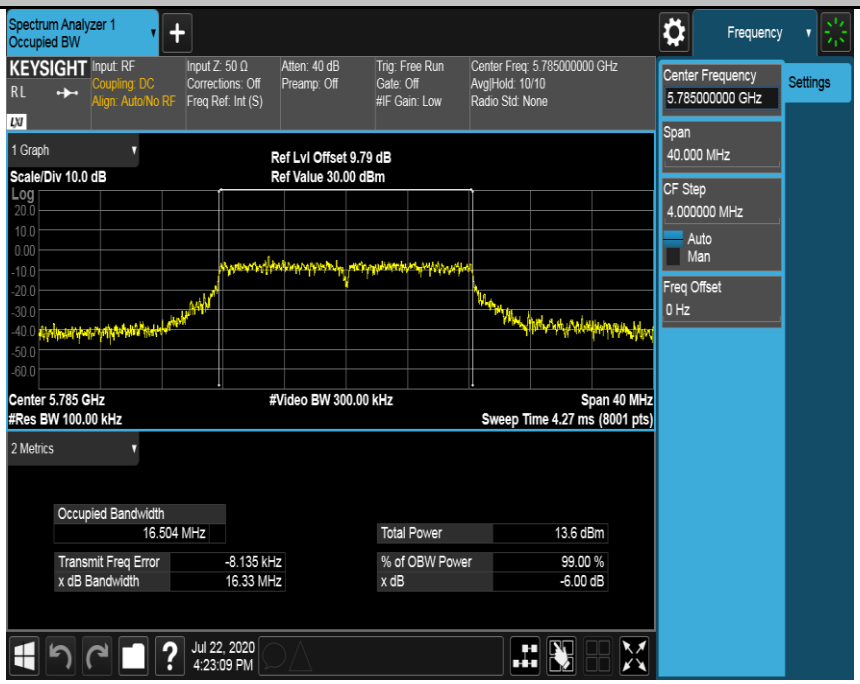
Emission Bandwidth Measurement_11A20_CH116


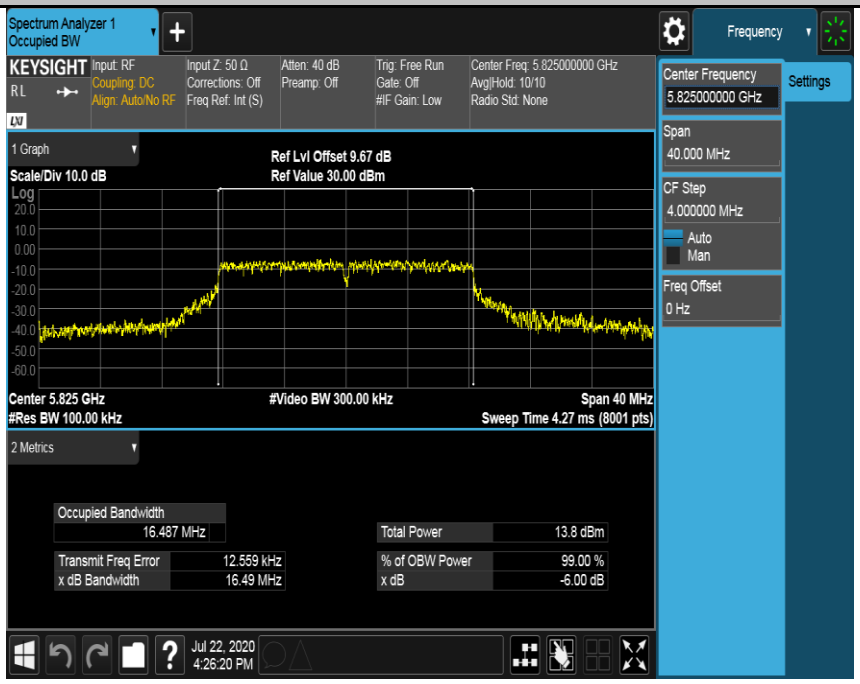
Emission Bandwidth Measurement_11A20_ CH140



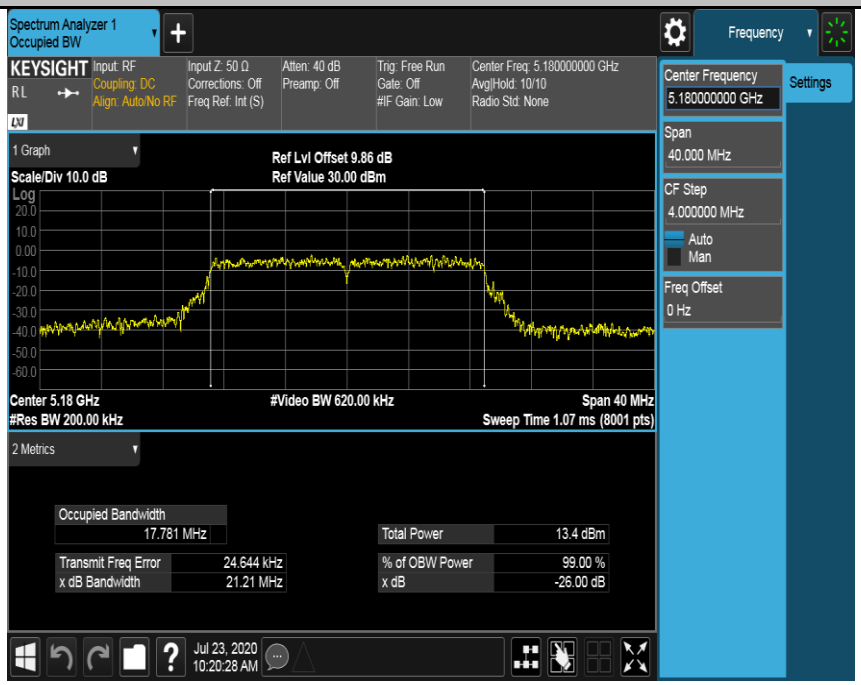
Emission Bandwidth Measurement_11A20_ CH149



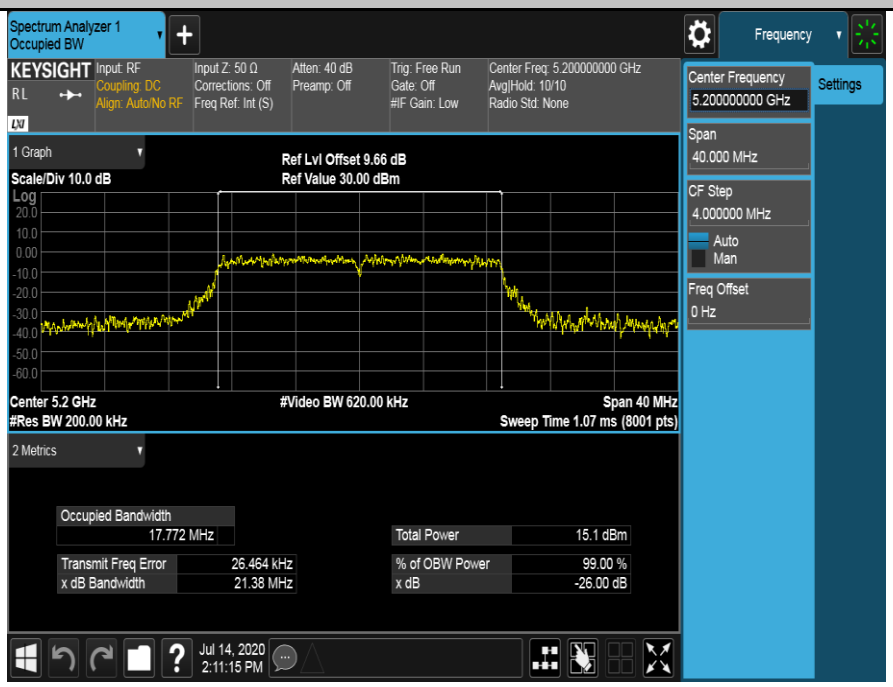
Emission Bandwidth Measurement_11A20_ CH157


Emission Bandwidth Measurement_11A20_ CH165


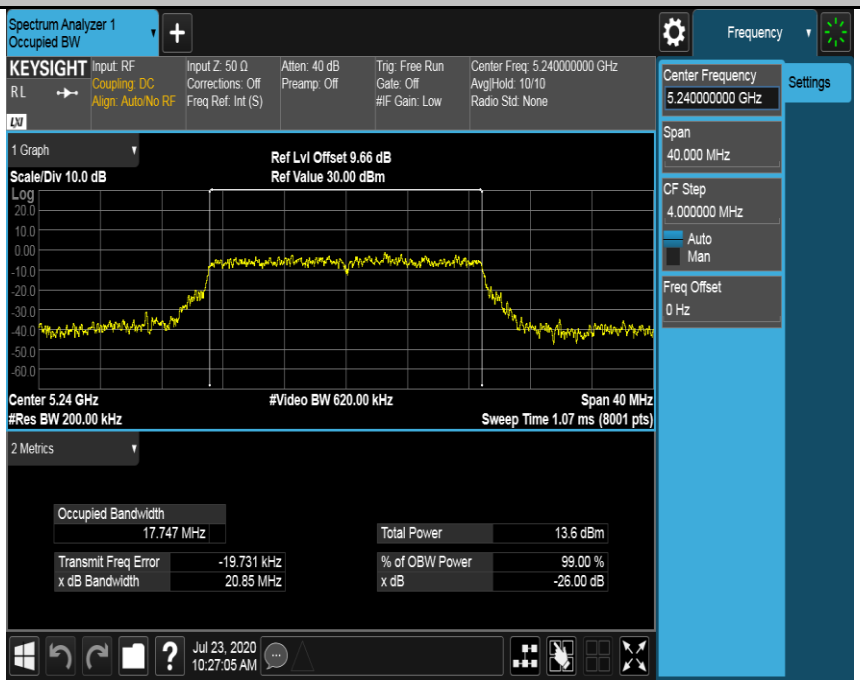
TEST PLOT
Emission Bandwidth Measurement_11N20_CH36



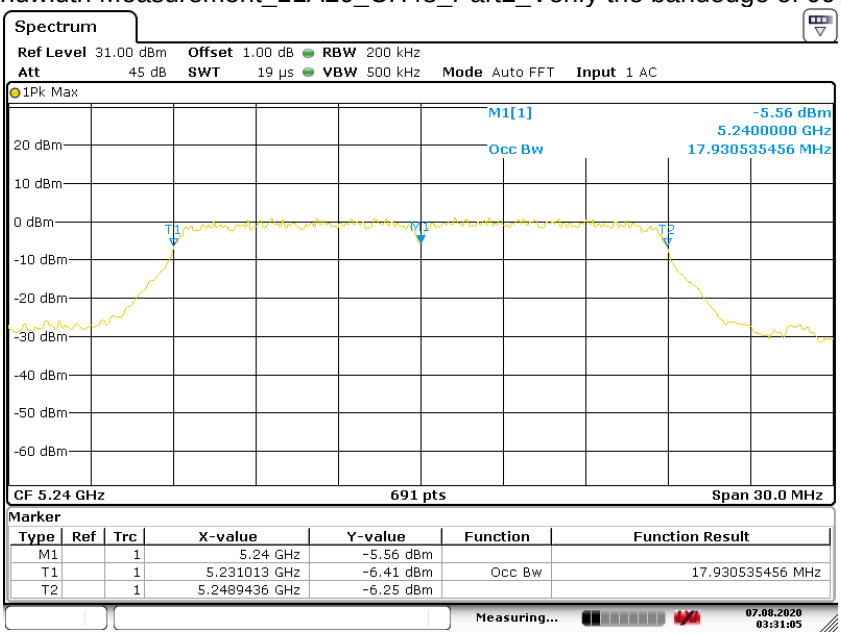
Emission Bandwidth Measurement_11N20_CH40

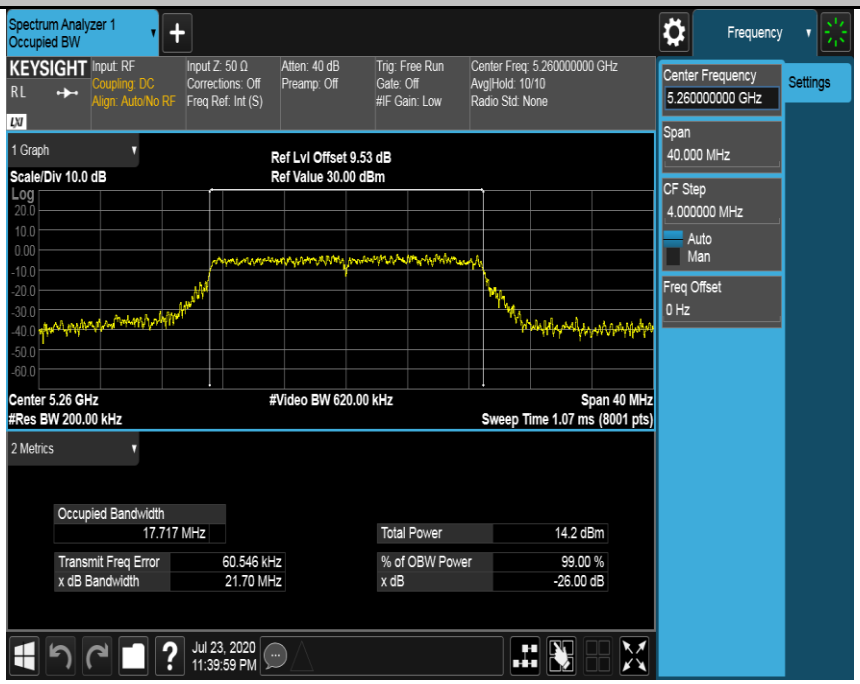


Emission Bandwidth Measurement_11N20_CH48_Part 1

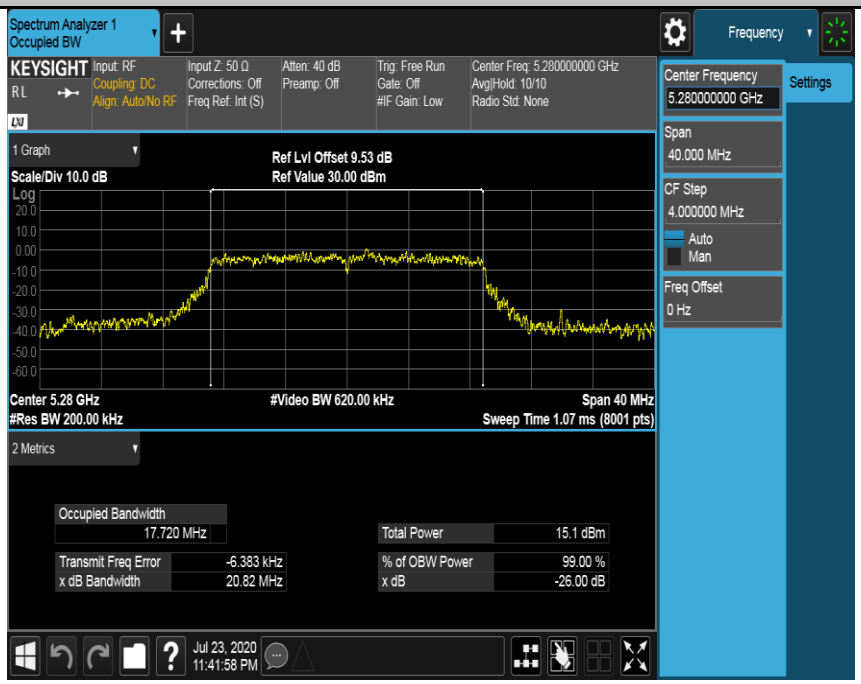


Emission Bandwidth Measurement_11A20_CH48_Part2_Verify the bandedge of 99% bandwidth

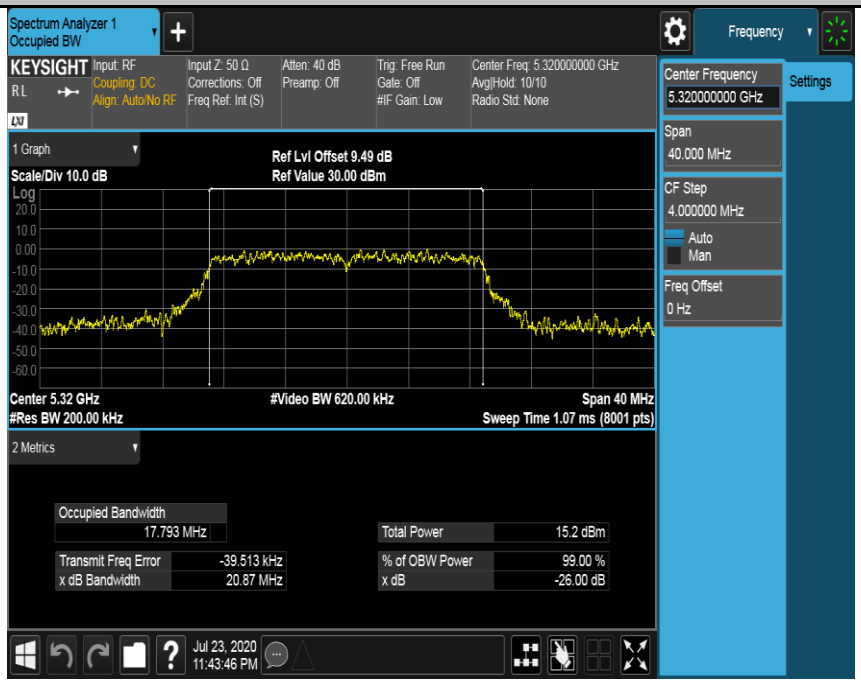


Emission Bandwidth Measurement_11N20_CH52


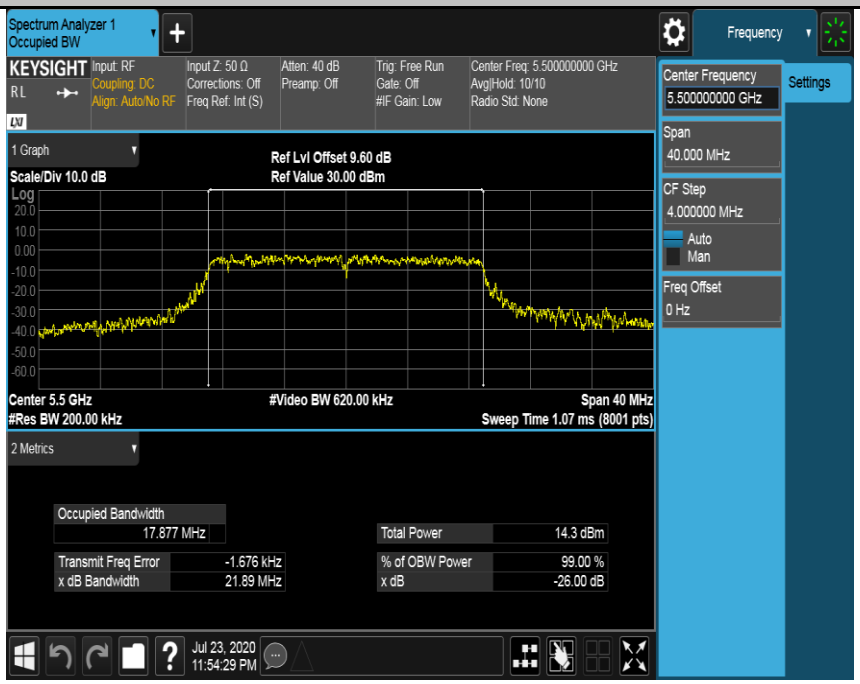
Emission Bandwidth Measurement_11N20_ CH56



Emission Bandwidth Measurement_11N20_ CH64



Emission Bandwidth Measurement_11N20_ CH100



Emission Bandwidth Measurement_11N20_ CH116