

# 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-K36BP;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** 

REPORT NUMBER: 4789551937-2

FCC ID: 2AVYF-IPC-BX6E1

**ISSUE DATE: Jul. 28, 2020** 

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



Page 2 of 200

## **Revision History**

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



## **TABLE OF CONTENTS**

1.	AT	TESTATION OF TEST RESULTS	5
2.	TES	ST METHODOLOGY	7
3.	FA	CILITIES AND ACCREDITATIO	7
4.	CA	LIBRATION AND UNCERTAINTY	8
4	1.1.	MEASURING INSTRUMENT CALIBRATION	8
4	1.2.	MEASUREMENT UNCERTAINTY	8
5.	EQ	UIPMENT UNDER TEST	9
5	5.1.	DESCRIPTION OF EUT	g
5	5.2.	CHANNELS LIST	10
5	5.1.	DESCRIPTION OF AVAILABLE ANTENNAS	
	5.2.	TEST ENVIRONMENT	
	5.1.	WORST-CASE CONFIGURATIONS	
	5.2.	DESCRIPTION OF TEST SETUP	
	5.3.	MEASURING INSTRUMENT AND SOFTWARE USED	
6.	AN	TENNA PORT TEST RESULTS	
6	6.1.		
		MITSST ENVIRONMENT	
		SULTS	
6	5.2.		
		MITSST PROCEDUREC	
		ST SETUP	
		ST ENVIRONMENT	
	RE	SULTS	
6	6.3.	MAXIMUM AVERAGE CONDUCTED OUTPUT POWER	
		MITSST PROCEDURE	
		ST SETUP	
		ST ENVIRONMENT	
6	6.4.	POWER SPECTRAL DENSITY	
		MITS	
		ST PROCEDUREST SETUP	
		SULTS	
		st Graphs	



Page 4 of 200

7. R	ADIATED TEST RESULTS	81
7.1.	LIMITS	81
7.2.	TEST SETUP AND PROCEDURE	83
7.3.	TEST ENVIRONMENT	86
7.4.	RESTRICTED BANDEDGE(WORSE CASE)	87
7.5.	HARMONICS AND SPURIOUS EMISSIONS	120
7.6.	SPURIOUS EMISSIONS 18~26.5GHz	169
7.7.	SPURIOUS EMISSIONS 26.5~40GHz	172
7.8.	SPURIOUS EMISSIONS 26.5GHz TO 40GHz (WORST-CASE CONFIGURATION)	173
7.9.	SPURIOUS EMISSIONS 30M ~ 1 GHz	175
7.10	). SPURIOUS EMISSIONS BELOW 30M (WORST-CASE CONFIGURATION)	178
8. FF	REQUENCY STABILITY	182
9. D'	YNAMIC FREQUENCY SELECTION	187
10.	AC POWER LINE CONDUCTED EMISSIONS	196
11.	ANTENNA REQUIREMENTS	200



Page 5 of 200

### 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-K36BP;IPC-K36BP;

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



Page 6 of 200

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:

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:	Reviewed By:		
Jason Yang	Tom Tang		
Jason Yang Engineer	Tom Tang Engineer Project Associate		
Authorized By:			
Chris Zhong			
Chris Zhong Laboratory Leader	<del></del>		

<sup>1)</sup> 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, an



Page 7 of 200

#### 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.



Page 8 of 200

### 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	3.83dB (1GHz-18Gz)
(1GHz to 40GHz)( include Fundamental emission)	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.

Page 9 of 200

## 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)		
	36	5180		
UNII-1	40	5200		
OIVII-1	44	5220		
	48	5240		
	52	5260		
UNII-2A	56	5280		
UNII-ZA	60	5300		
	64	5320		
	132	5660		
UNII-2C	136	5680		
	140	5700		
	149	5745		
	153	5765		
UNII-3	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



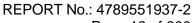
Page 11 of 200

#### 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.





Page 12 of 200

## 5.2. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests			
Relative Humidity	55	5 ~ 65%		
Atmospheric Pressure:	1025Pa			
	TN	23 ~ 28°C		
Temperature	TL	-20°C		
	TH	50°C		
	VL	AC108		
Voltage :	VN	AC 120V/60Hz		
	VH	AC132		

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



Page 13 of 200

## 5.1. WORST-CASE CONFIGURATIONS

IEE Std.	Modulation	Modulation Type	Data Rate	Worst Case
802.11	Technology		(Mbps)	(Mbps)
а	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



Page 14 of 200

#### 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

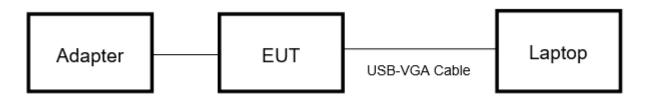
#### **ACCESSORY**

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**





Page 15 of 200

## 5.3. MEASURING INSTRUMENT AND SOFTWARE USED

	Conducted Emissions (Instrument)								
		COI	lauctea		Sions (mshur	•			
Used	Equipment	Manufacturer	Model	No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.	
$\checkmark$	EMI Test Receiver	R&S	ESR	3	126700	2018-12-13	2019-12-12	2020-12-11	
<b>V</b>	Two-Line V-Network	R&S	ENV2	16	126701	2018-12-13	2019-12-12	2020-12-11	
V	Artificial Mains Networks	R&S	ENY8	31	126711	2018-12-13	2019-12-12	2020-12-11	
				Soft	ware				
Used	Used Description Manufacturer Name Version								
$\checkmark$	Test Software for 0	Conducted distur	bance		R&S	EMC32	Ver. 9.25		
		Ra	diated E	miss	ions (Instrum	ent)			
Used	Equipment	Manufacturer	Model		Serial No.	Upper Last Cal.	Last Cal.	Next Cal.	
$\overline{\checkmark}$	Spectrum Analyzer	Keysight	N9010	)B	MY57110128	2019-05-29	2020-05-10	2021-05-09	
<b>V</b>	EMI test receiver	R&S	ESR2	26	1267603	2018-12-13	2019-12-22	2020-12-21	
V	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1	513	513-265	N/A	2018-06-15	2021-06-14	
V	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1		126704	N/A	2019-01-28	2022-01-27	
V	Receiver Antenna (1GHz-18GHz)	R&S	HF90	)7	126705	2019-01-26	2020-01-26	2021-01-25	
V	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9	170	126706	2019-02-06	2020-02-05	2021-02-04	
V	Receiver Antenna (26.5GHz-40GHz)	TOYO	HAP 26-	40W	00000012	2018-07-25	2019-07-23	2020-07-22	
V	Pre-amplification (To 1GHz)	R&S	SCU-0	3D	134666	2019-02-06	2020-02-05	2021-02-04	
$\checkmark$	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G1	18-50	14140-13467	2019-03-18	2020-02-20	2021-02-19	
V	Pre-amplification (To 26.5GHz)	R&S	SCU-2	6D	134668	2019-02-06	2020-02-05	2021-02-04	
<b>V</b>	Band Reject Filter	Wainwright	WRCJV 5120-51 5350-53 4083	150- 380-	3	2019-05-29	2020-05-10	2021-05-09	
<b>V</b>	Band Reject Filter	Wainwright	WRCJV16- 5440-5470- 5725-5755- 40SS		4	2019-05-29	2020-05-10	2021-05-09	
<b>V</b>	Band Reject Filter	Wainwright	WRCJV12- 5695-5725- 5850-5880- 40SS		5	2019-05-29	2020-05-10	2021-05-09	
<b>V</b>	Highpass Filter	Wainwright	WHKX 5850-65 1800-40	500-	6	2019-05-29	2020-05-10	2021-05-09	



Page 16 of 200

	Software								
Used	Desci	ription		Manufac	lanufacturer Name		Version		
<b>V</b>	Test Software for R	adiated disturbar	nce	Tonsce	end		JS32	V1.0	
	Other instruments								
Used	Equipment	Manufacturer	Mod	del No.	Seria	al No.	Upper Last Cal.	Last Cal.	Next Cal.
$\checkmark$	Spectrum Analyzer	Keysight	N9	9010B	MY57	110128	2019-05-29	2020-05-10	2021-05-09
$\overline{\checkmark}$	Power Meter	Keysight	U20	021XA	MY57	110002	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**

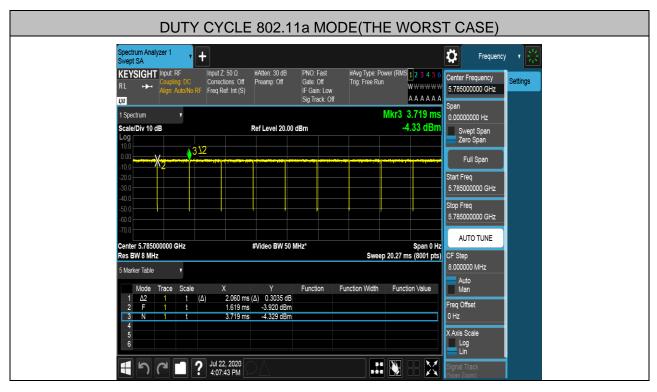
#### **UNII Band III**

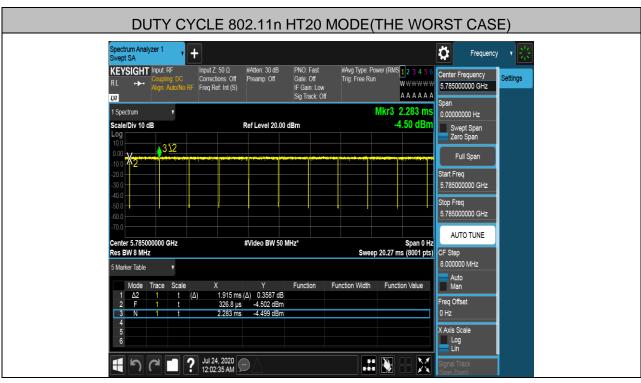
Mode	ON Time (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (KHz)
11a 1TX	2.0600	2.1000	0.9810	98.10%	0.083	0.49
11n HT20	1.9150	1.9562	0.9789	97.89%	0.093	0.52

#### 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.









5.5. 6/26 dB BANDWIDTH

#### **LIMITS**

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

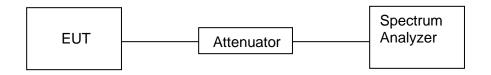
#### **TEST PROCEDUREC**

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.
1VBW	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**



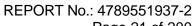
#### **TEST ENVIRONMENT**

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
	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
Antenna 1	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





Page 21 of 200

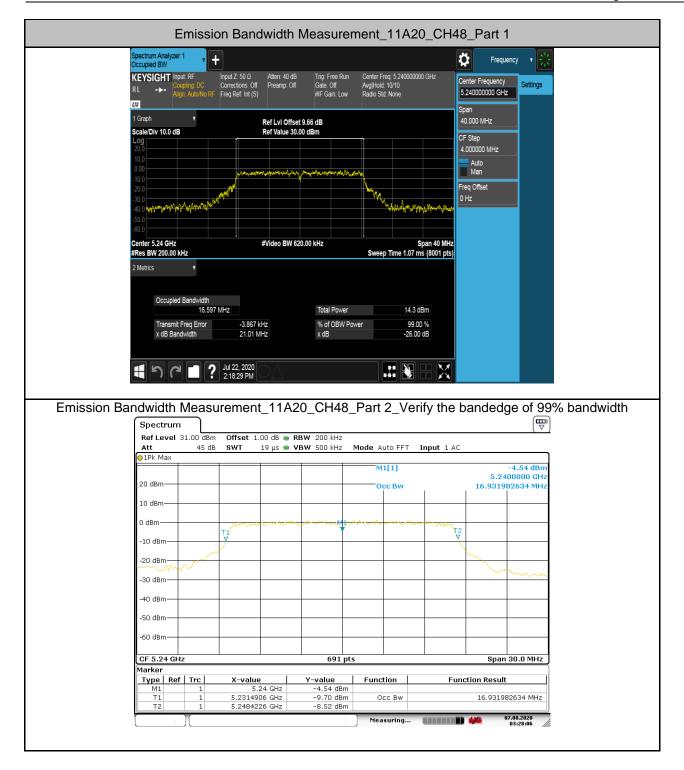
					1
Antenna 2	11A20	116	20.92		PASS
	11A20	140	20.88		PASS
	11A20	149	21.38	0.5	PASS
	11A20	157	16.52	0.5	PASS
	11A20	165	16.33	0.5	PASS
	11n HT20	36	21.21		PASS
	11n HT20	40	20.85		PASS
	11n HT20	48	21.41		PASS
	11n HT20	52	21.70		PASS
	11n HT20	56	20.82		PASS
	11n HT20	64	20.87		PASS
	11n HT20	100	21.89		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



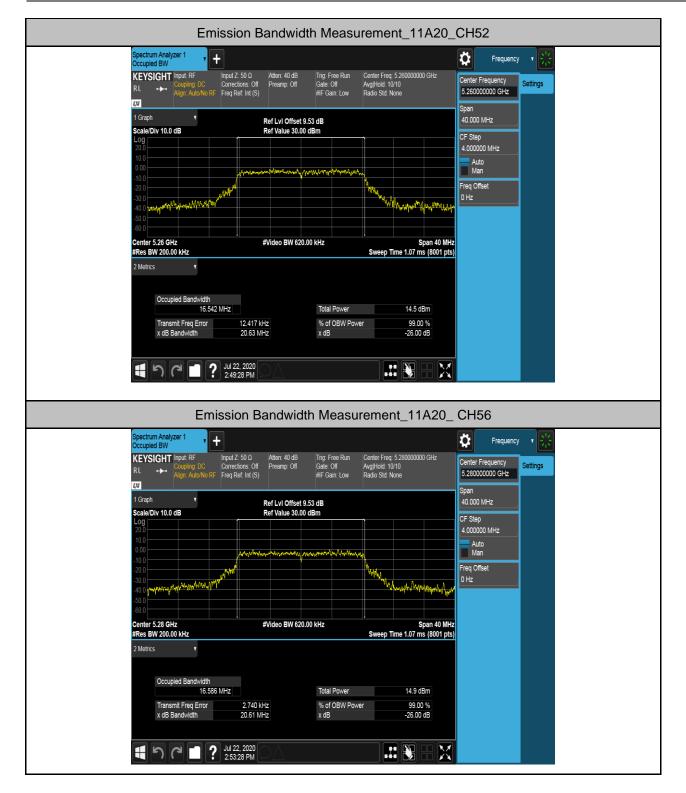
Test Graphs





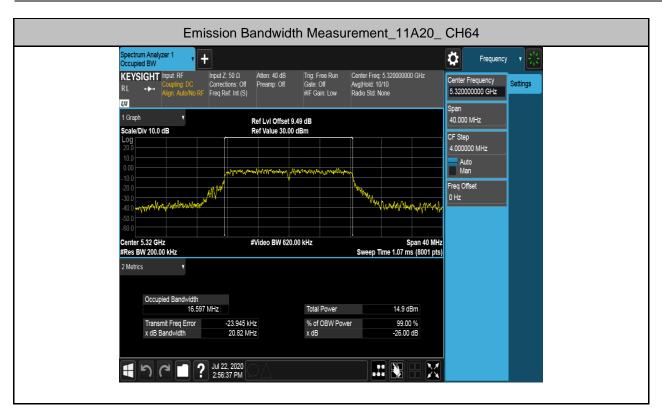








Page 25 of 200





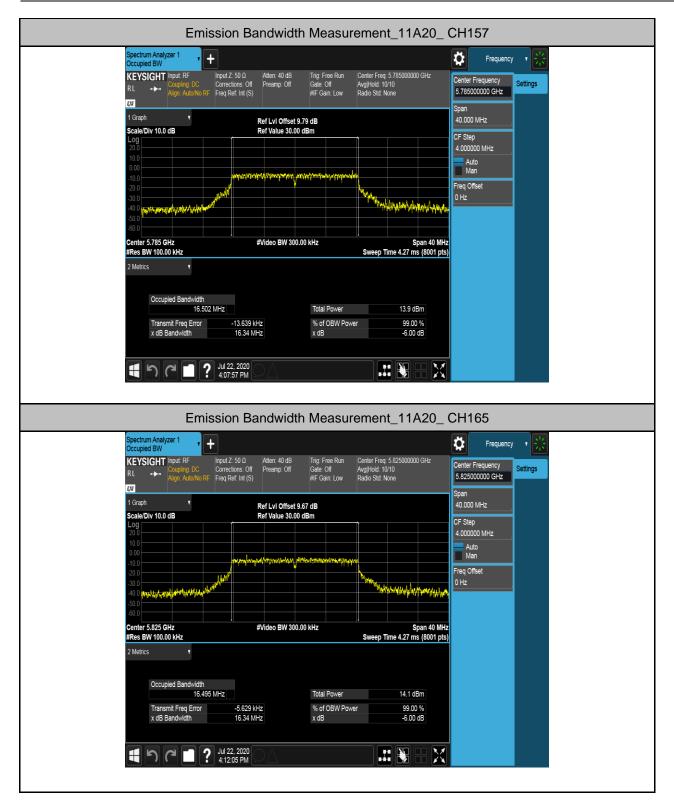
Emission Bandwidth Measurement\_11A20\_ CH100 pectrum Analyzer : ccupied BW **Ö** Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.500000000 GHz KEYSIGHT Input RF Settings 5.500000000 GHz L)XI Ref LvI Offset 9.60 dB 40.000 MHz Scale/Div 10.0 dB Ref Value 30.00 dBm CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz Center 5.5 GHz #Res BW 200.00 kHz Span 40 MHz Sweep Time 1.07 ms (8001 pts) #Video BW 620.00 kHz Occupied Bandwidth 16.641 MHz Total Power 14.2 dBm % of OBW Power 35.655 kHz 20.92 MHz 99.00 % -26.00 dB Transmit Freq Error x dB Bandwidth x dB **9** Jul 23, 2020 11:17:26 PM # 1 Emission Bandwidth Measurement\_11A20\_CH116 pectrum Analyzer 1 ccupied BW ø Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Center Freq: 5.580000000 GHz Avg|Hold: 10/10 Radio Std: None Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF 5.580000000 GHz LXI 1 Graph Ref Lvl Offset 9.77 dB Ref Value 30.00 dBm 40.000 MHz Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset Center 5.58 GHz #Res BW 200.00 kHz #Video BW 620.00 kHz Sweep Time 1.07 ms (8001 pts) 16.613 MHz Total Power 14.3 dBm 16.945 kHz 20.55 MHz 99.00 % -26.00 dB Transmit Freq Error % of OBW Power x dB Bandwidth x dB Jul 23, 2020 \_\_\_\_\_ # 1







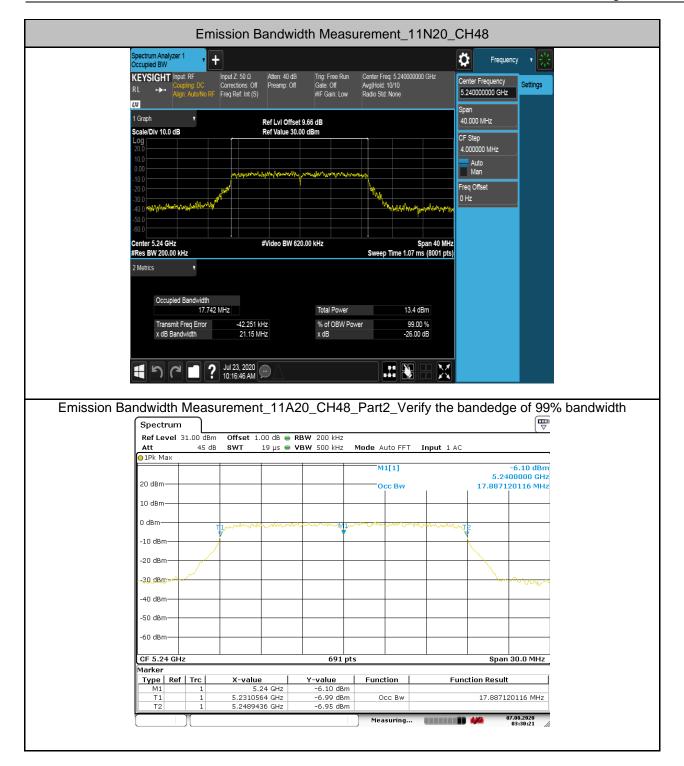
Page 28 of 200





TEST PLOT Emission Bandwidth Measurement\_11N20\_CH36 Ö Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.180000000 GHz KEYSIGHT Input RF Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) 5.180000000 GHz LXI 1 Graph Ref Lvl Offset 9.86 dB Ref Value 30.00 dBm 40.000 MHz Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz Center 5.18 GHz #Res BW 200.00 kHz #Video BW 620.00 kHz Span 40 MHz Sweep Time 1.07 ms (8001 pts) 17.720 MHz 13.8 dBm Total Power Transmit Freq Error 20.882 kHz 22.17 MHz % of OBW Power 99.00 % -26.00 dB x dB 10:07:59 AM Emission Bandwidth Measurement\_11N20\_CH40 ø Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) KEYSIGHT Input: RF Settings Avg|Hold: 10/10 Radio Std: None 5.200000000 GHz #IF Gain: Low 1 Graph 40.000 MHz Ref LvI Offset 9.66 dB Ref Value 30.00 dBm Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz #Video BW 620.00 kHz Sweep Time 1.07 ms (8001 pts) Occupied Bandwidth 17.790 MHz Total Power 13.3 dBm Transmit Freq Error 16.809 kHz % of OBW Power 99.00 % 21.03 MHz -26.00 dB Jul 23, 2020 \_\_\_\_\_ # 1



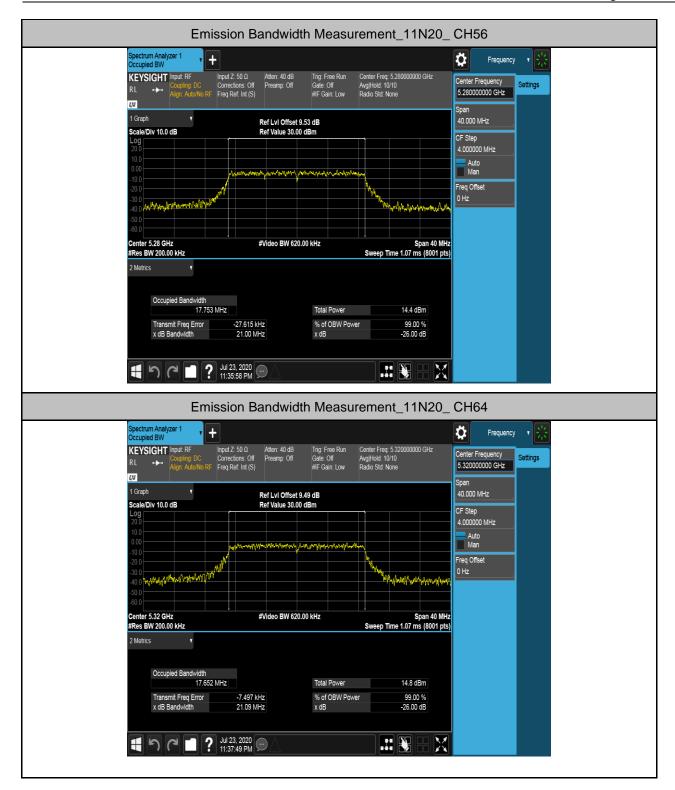




Page 31 of 200





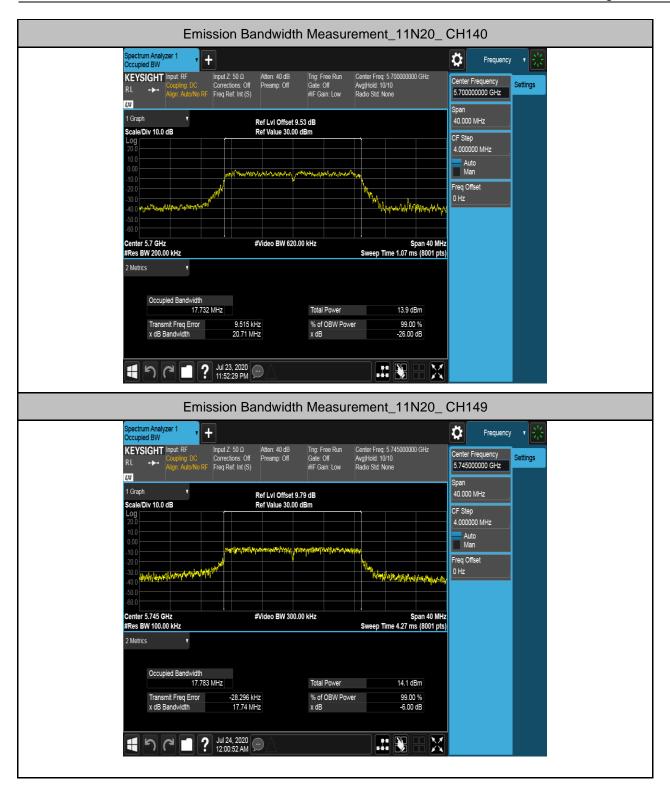




Emission Bandwidth Measurement\_11N20\_ CH100 pectrum Analyzer : ccupied BW **Ö** Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.500000000 GHz KEYSIGHT Input: RF Settings 5.500000000 GHz L)XI Ref Lvl Offset 9.60 dB Ref Value 30.00 dBm 40.000 MHz Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz harakadalayralitylishilaharakan Center 5.5 GHz #Res BW 200.00 kHz Span 40 MHz #Video BW 620.00 kHz Sweep Time 1.07 ms (8001 pts) Occupied Bandwidth 17.709 MHz Total Power 14.8 dBm % of OBW Power 8.392 kHz 21.42 MHz 99.00 % -26.00 dB Transmit Freq Error x dB Bandwidth x dB **9** Jul 23, 2020 11:48:53 PM # 1 Emission Bandwidth Measurement\_11N20\_ CH116 pectrum Analyzer 1 ccupied BW ø Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Center Freq: 5.580000000 GHz Avg|Hold: 10/10 Radio Std: None Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input RF 5.580000000 GHz LXI 1 Graph Ref Lvl Offset 9.77 dB Ref Value 30.00 dBm 40.000 MHz Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset Center 5.58 GHz #Res BW 200.00 kHz #Video BW 620.00 kHz Sweep Time 1.07 ms (8001 pts) 17.828 MHz Total Power 14.5 dBm 16.463 kHz 21.07 MHz 99.00 % -26.00 dB Transmit Freq Error % of OBW Power x dB Bandwidth x dB Jul 23, 2020 11:50:53 PM # 1



Page 34 of 200





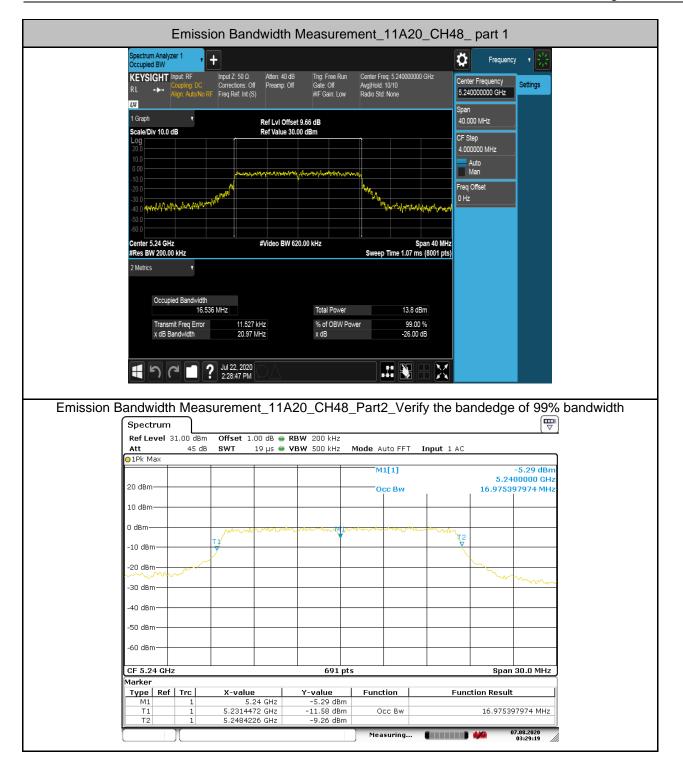
Emission Bandwidth Measurement\_11N20\_ CH157 pectrum Analyzer 1 ccupied BW Ö Input Z: 50 Ω Corrections: Off Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.785000000 GHz KEYSIGHT Input RF Settings 5.785000000 GHz L)XI Ref LvI Offset 9.79 dB 40.000 MHz Scale/Div 10.0 dB Ref Value 30.00 dBm CF Step 4.000000 MHz Auto Man Freq Offset 0 Hz <sup>PROC</sup>ANDAPANAPANAPANAPANAPANAPANA Span 40 MHz Sweep Time 4.27 ms (8001 pts) Center 5.785 GHz #Res BW 100.00 kHz #Video BW 300,00 kHz 2 Metrics Occupied Bandwidth 17.716 MHz Total Power 13.7 dBm % of OBW Power -3.871 kHz 17.65 MHz 99.00 % -6.00 dB Transmit Freq Error x dB Bandwidth x dB 12:02:50 AM # ₩ Emission Bandwidth Measurement\_11N20\_ CH165 Ö nput: RF Input Z: 50 Ω coupling: DC Corrections: Off lign: Auto/No RF Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low Center Freq: 5.825000000 GHz KEYSIGHT Input RF Center Frequency Avg|Hold: 10/10 Radio Std: None 5.825000000 GHz LXI 1 Graph 40.000 MHz Ref Lvl Offset 9.67 dB Ref Value 30.00 dBm Scale/Div 10.0 dB CF Step 4.000000 MHz Auto Man Freq Offset enter 5.825 GHz #Video BW 300.00 kHz Span 40 MHz #Res BW 100.00 kHz Sweep Time 4.27 ms (8001 pts) Occupied Bandwidth 17.683 MHz Total Power 14.1 dBm Transmit Freq Error -14.507 kHz % of OBW Power 99.00 % -6.00 dB x dB Bandwidth 17.67 MHz x dB # 1



Antenna2:

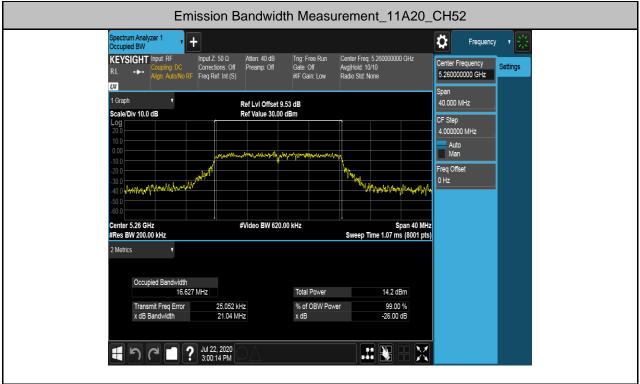




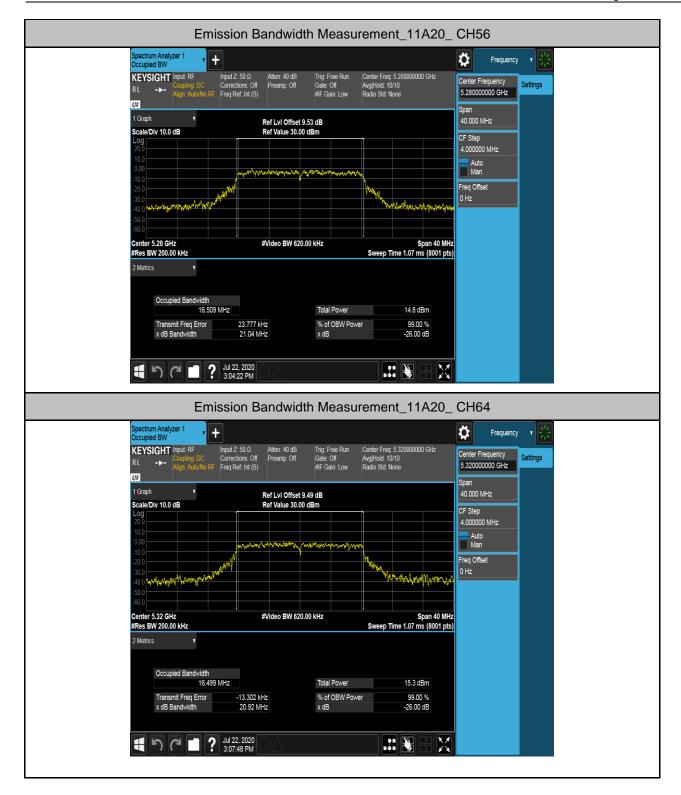




Page 38 of 200

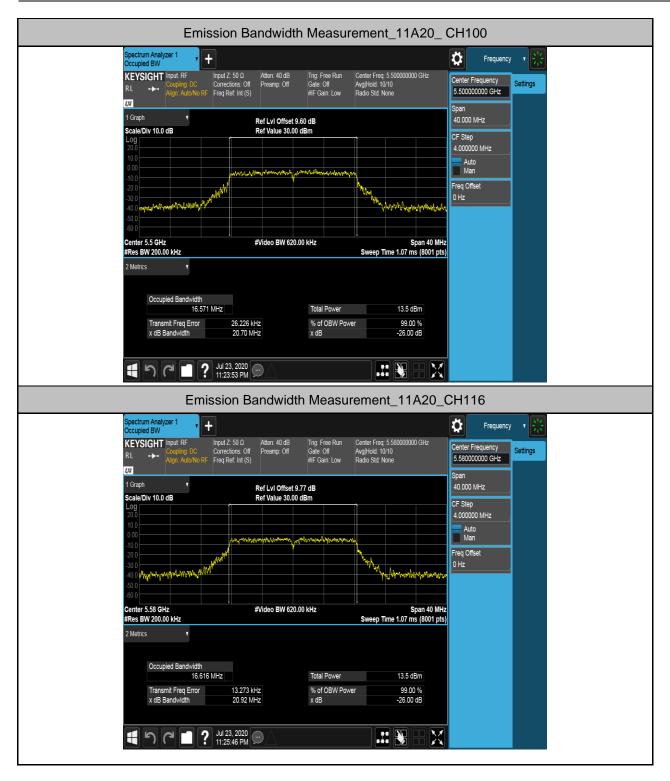






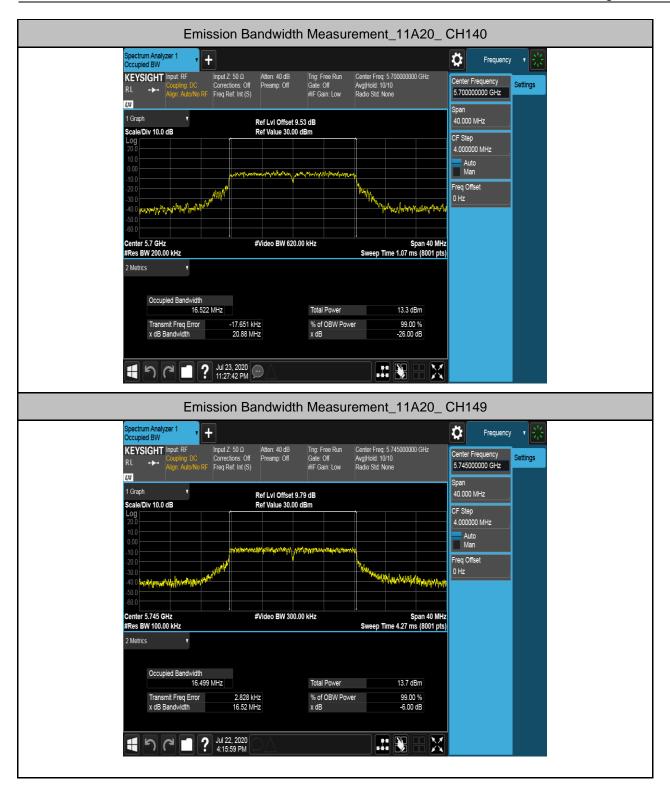


Page 40 of 200



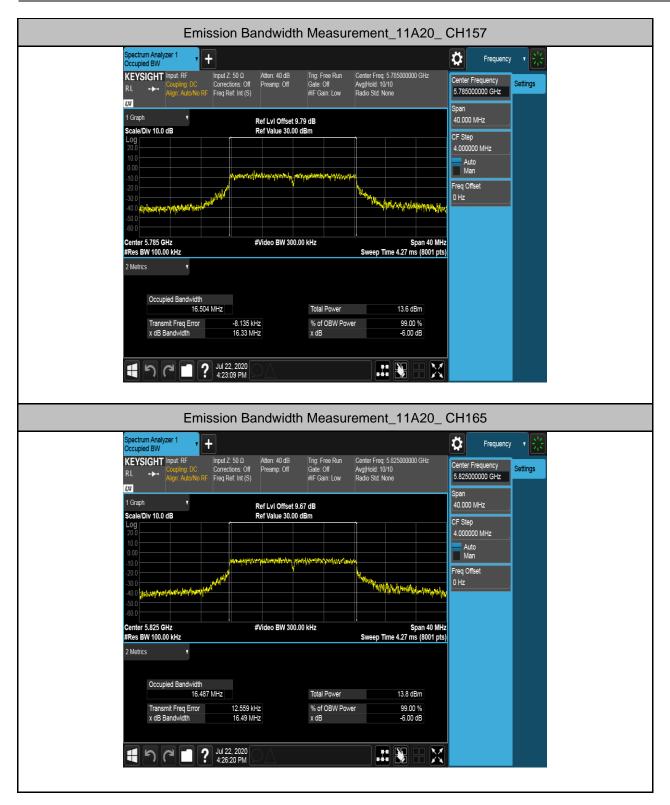


Page 41 of 200





Page 42 of 200

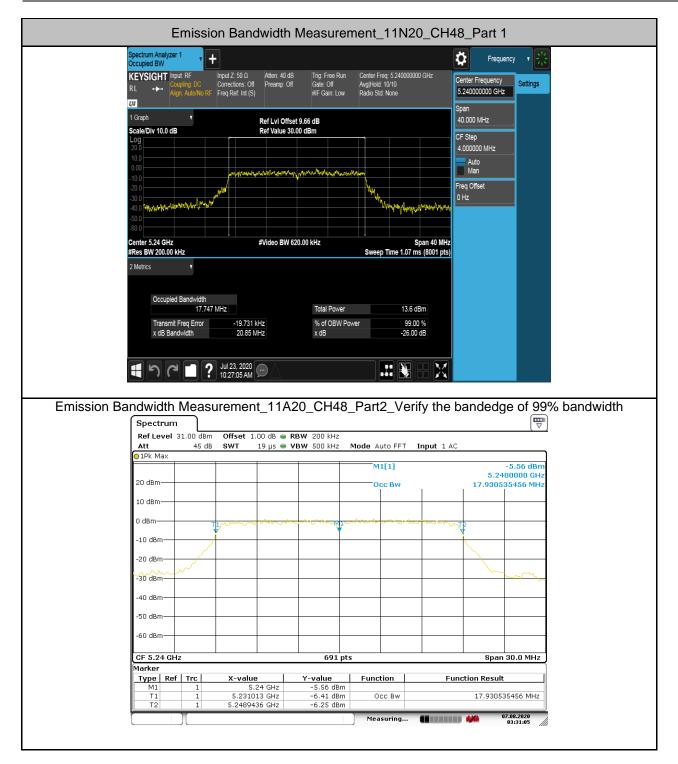




Page 43 of 200









Page 45 of 200

