



FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

For

4MP Dual Band Pan/Tilt Wireless IP Camera

MODEL NUMBER: IP4M-1051B

ADDITIONAL MODEL NUMBER: IP4M-1051B-, IP4M-1051B-***;
IP4M-1051W; IP4M-1051W-**, IP4M-1051W-***;
** can be "A-Z", or "0-9", or blank**

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Prepared for

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	6/1/2017	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Amcrest Technologies LLC
Address: 16727 Park Row Dr, Houston, TX 77084

Manufacturer Information

Company Name: Amcrest Technologies LLC
Address: 16727 Park Row Dr, Houston, TX 77084

Factory Information

Company Name: ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD
Address: No.1199, Bin'an road, Binjiang District, Hangzhou,
P.R.China.

Company Name: ZHEJIANG DAHUA ZHILIAN CO.,LTD.
Address: No.28, Dongqiao Road, Dongzhou Street, Fuyang District,
Hangzhou,P.R.China.

EUT Description

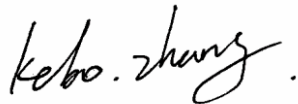
Product Name 4MP Dual Band Pan/Tilt Wireless IP Camera
Model Name IP4M-1051B
Additional No. IP4M-1051B-**; IP4M-1051B-***;
IP4M-1051W; IP4M-1051W-**; IP4M-1051W-***;
"*" can be "A-Z", or "0-9", or blank
Sample Number 1542101-001
Data of Receipt Sample April. 24, 2018
Date Tested April. 25, 2018 ~ May. 25, 2018

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	Antenna Requirement	FCC 15.203	PASS
7	Frequency Stability	FCC 15.407 (g)	PASS

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

Tested By:

Checked By:



Kebo Zhang
Engineer
Approved By:

Shawn Wen
Laboratory Leader



Stephen Guo
Laboratory Manager

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 15, KDB 789033 D02 v02r01, KDB 662911 D01 v02r01, and KDB414788 D01 Radiated Test Site v01.

3. FACILITIES AND ACCREDITATIO

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. The Certificate Registration Number is 4102.01. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The Designation Number is CN1187. UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. EMC Laboratory has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320.

Note:

1. All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
2. The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch 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.
3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OATS.

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
Uncertainty for Conduction emission test	2.90dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB
Uncertainty for Radiation Emission test (1GHz to 40GHz)(include Fundamental emission)	5.04dB(1-6GHz)
	5.30dB (6GHz-18Gz)
	5.23dB (18GHz-26Gz)
	5.64 dB (26GHz-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:	4MP Dual Band Pan/Tilt Wireless IP Camera
Model No.:	IP4M-1051B
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz IEEE 802.11a/n/ac 20MHz:5180MHz to 5240MHz, 5745 MHz -5825 MHz IEEE 802.11n/ac 40MHz:5190MHz to 5230MHz, 5755 MHz -5795 MHz IEEE 802.11ac 80MHz: 5230MHz, 5775 MHz
	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 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11a: OFDM (BPSK,QPSK,16QAM,64QAM) IEEE for 802.ac : OFDM (BPSK,QPSK,16QAM,64QAM,256QAM)
Sample Type:	Fixed production
Test power grade:	50 (manufacturer declare)
Test software of EUT:	Secure CRT (manufacturer declare)
Antenna Type:	PCB Antenna
Antenna Gain:	1.99 dBi
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	IP4M-1051B	2	IP4M-1051B-**	3	IP4M-1051B-***
4	IP4M-1051W	5	P4M-1051W-**	6	IP4M-1051W-***
Remark: "*" can be "A-Z", or "0-9", or blank					

Only the main model **IP4M-1051B** 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, color and selling area are different.

5.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	IEE Std. 802.11	Frequency (MHz)	Max Power (dBm)	Max EIRP (dBm)
UNII-1	a	5150-5250	14.91	16.9
UNII-3	a	5725-5850	17.01	19.00
UNII-1	n(HT20)	5150-5250	15.75	17.74
UNII-3	n(HT20)	5725-5850	17.51	19.50
UNII-1	n(HT40)	5150-5250	15.15	17.14
UNII-3	n(HT40)	5725-5850	19.27	21.26
UNII-1	ac(HT20)	5150-5250	16.85	18.84
UNII-3	ac(HT20)	5725-5850	17.98	19.97
UNII-1	ac(HT40)	5150-5250	14.51	16.50
UNII-3	ac(HT40)	5725-5850	16.39	18.38
UNII-1	ac(HT80)	5150-5250	13.62	15.61
UNII-3	ac(HT80)	5725-5850	15.39	17.38

5.3. CHANNELS LIST

UNII-1		UNII-1		UNII-1	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

UNII-3		UNII-3		UNII-3	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795		
157	5785				
161	5805				
165	5825				

5.4. TEST CHANNELS

For UNII Band I

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n/ac 40MHz	The Lowest channel	5190
	The Highest channel	5230
IEEE 802.11ac 80MHz	One Channel	5210

For UNII Band III

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac 20MHz	The Lowest channel	5745
	The Middle channel	5785
	The Highest channel	5825
IEEE 802.11n/ac 40MHz	The Lowest channel	5755
	The Highest channel	5795
IEEE 802.11ac 80MHz	One Channel	5775

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

5.5. TEST MODES

Test Mode	Test Modes Description
11a	IEEE 802.11a with data rate of 6 Mbps using SISO mode.
11n20	IEEE 802.11n with data rate of MCS0 and bandwidth of 20 MHz using SISO mode.
11n40	IEEE 802.11n with data rate of MCS0 and bandwidth of 40 MHz using SISO mode.
11ac20	IEEE 802.11ac with data rate of MCS0 and bandwidth of 20 MHz using SISO mode.
11ac40	IEEE 802.11ac with data rate of MCS0 and bandwidth of 40 MHz using SISO mode.
11ac80	IEEE 802.11ac with data rate of MCS0 and bandwidth of 80 MHz using SISO mode.
Remark: Worst cases for each IEEE 802.11 mode are selected to perform tests.	

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

IEE Std. 802.11	Transmit and Receive Mode	Description
a	1TX, 1RX	ANTENNA 1 can be used as transmitting/receiving antenna.
n(MCS0-15)	1TX, 1RX	ANTENNA 1 can be used as transmitting/receiving antenna.
ac(MCS0-9)	1TX, 1RX	ANTENNA 1 can be used as transmitting/receiving antenna.
Note: 1. The EUT supports the diversity function for WLAN. 2. All the modes had been tested but only the worst data in the report.		

5.7. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	23 ~ 28°C
Voltage :	VL	N/A
	VN	AC 120V/60Hz
	VH	N/A

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

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	Laptop	ThinkPad	T410	N/A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	Network port	physical	Network Cable	2M	Supply by UL SSL Lab

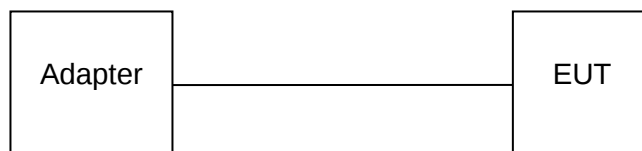
ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	SD Card	Kingston	32GB	Supply by UL SSL Lab
2	Earphone	PHILIPS	N/A	Supply by UL SSL Lab

TEST SETUP

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

SETUP DIAGRAM FOR TEST



5.9. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions(Instrument)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	EMI Test Receiver	R&S	ESR3	101961	Dec.12, 2017	Dec.11, 2018
☒	Two-Line V-Network	R&S	ENV216	101983	Dec.12, 2017	Dec.11, 2018
☒	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.12, 2017	Dec.11, 2018
Software						
Used	Description		Manufacturer	Name		Version
☒	Test Software for Conducted disturbance		UL	Antenna port		Ver. 7.2
Radiated Emissions(Instrument)						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec. 12, 2017	Dec. 11, 2018
☒	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Jan.09, 2019
☒	Preamplifier	HP	8447D	2944A09099	Dec. 12, 2017	Dec. 11, 2018
☒	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12, 2017	Dec.11, 2018
☒	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Jan. 09, 2019
☒	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Jan.06, 2016	Jan.06, 2019
☒	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec. 12, 2017	Dec. 11, 2018
☒	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12, 2017	Dec.11, 2018
☒	Loop antenna	Schwarzbeck	1519B	00008	Mar. 26, 2016	Mar. 26, 2019
☒	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Dec.12, 2017	Dec.11, 2018
Software						
Used	Description		Manufacturer	Name		Version
☒	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1
R&S TS 8997 Test System						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Due. Date
☒	Power sensor, Power Meter	R&S	OSP-B157W8	100921	April.28,2018	April.28,2019

☒	RF Switch	R&S	OSP-120	100921	April.28,2018	April.28,2019
☒	Vector Signal Generator	R&S	SMBV100A	261637	Dec.12,2017	Dec.12,2018
☒	Signal Generator	R&S	SMB100A	178553	Dec.12,2017	Dec.11,2018
☒	Signal Analyzer	R&S	FSV40	A1512015	Dec.12,2017	Dec.11,2018
Software						
Used	Description	Manufacturer	Name		Version	
☒	For R&S TS 8997 Test System	Rohde & Schwarz	R&S EMC 32		V1.0	
Other instruments						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
☒	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.12, 2017	Dec.11, 2018
☒	Power Meter	Keysight	N9031A	MY55416024	Dec.12, 2017	Dec.11, 2018
☒	Power Sensor	Keysight	N9323A	MY55440013	Dec.12, 2017	Dec.11, 2018
Remake:						
1) For the OSP-B157W8 can support the bandwidth up to 160MHZ;						
2) OSP-B157W8 is embedded in OSP120, they are a whole, so use the same S/N number.						

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

RESULTS

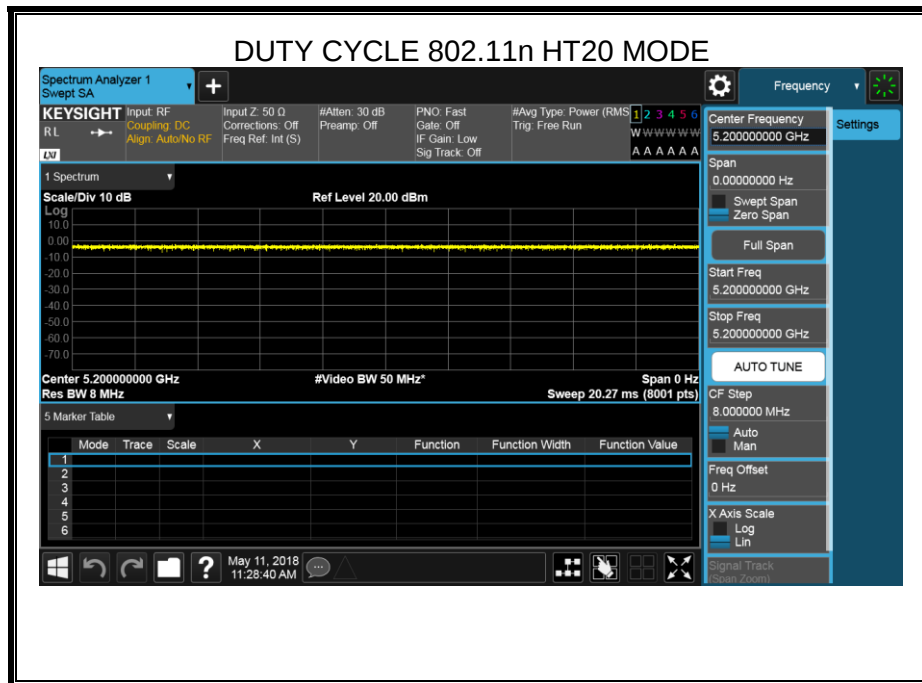
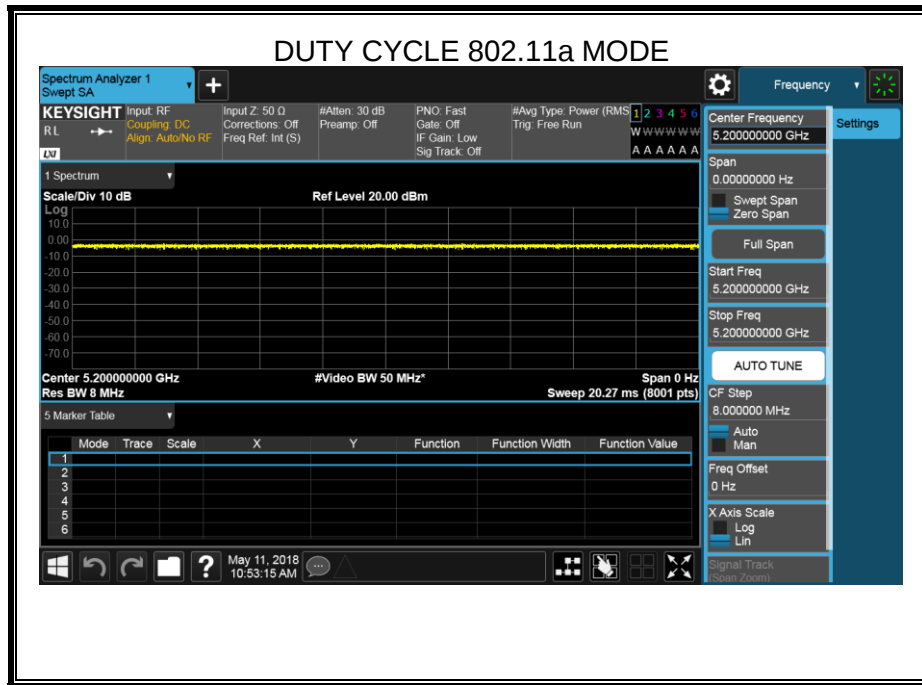
UNII Band I

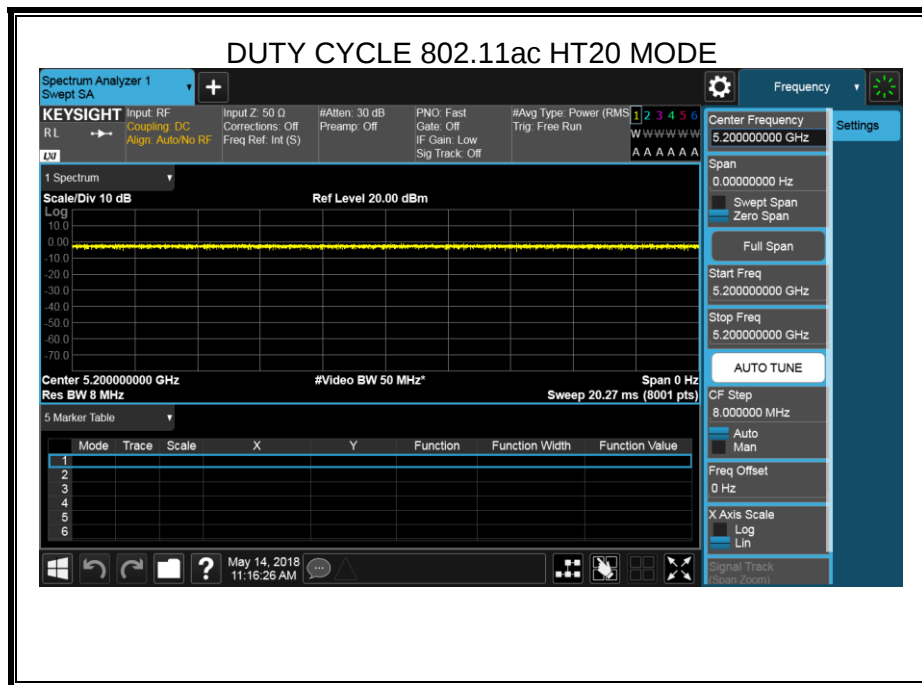
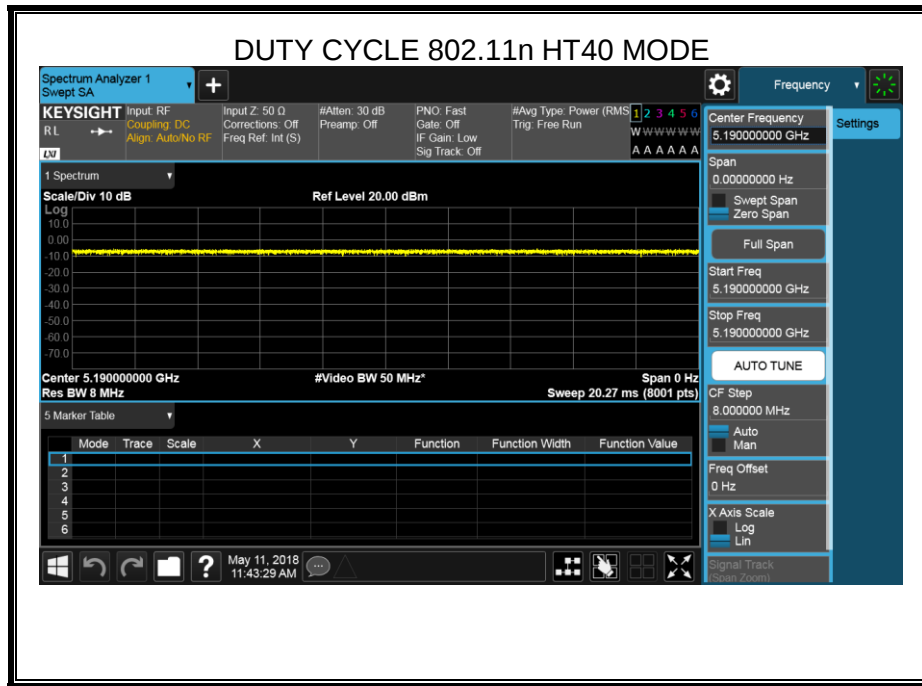
Mode	ON Time (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (KHz)
11a 1TX	100	100	1	100%	0	0.01
11n HT20 CDD	100	100	1	100%	0	0.01
11n HT40 CDD	100	100	1	100%	0	0.01
11ac HT20 CDD	100	100	1	100%	0	0.01
11ac HT40 CDD	100	100	1	100%	0	0.01
11ac HT80 CDD	100	100	1	100%	0	0.01

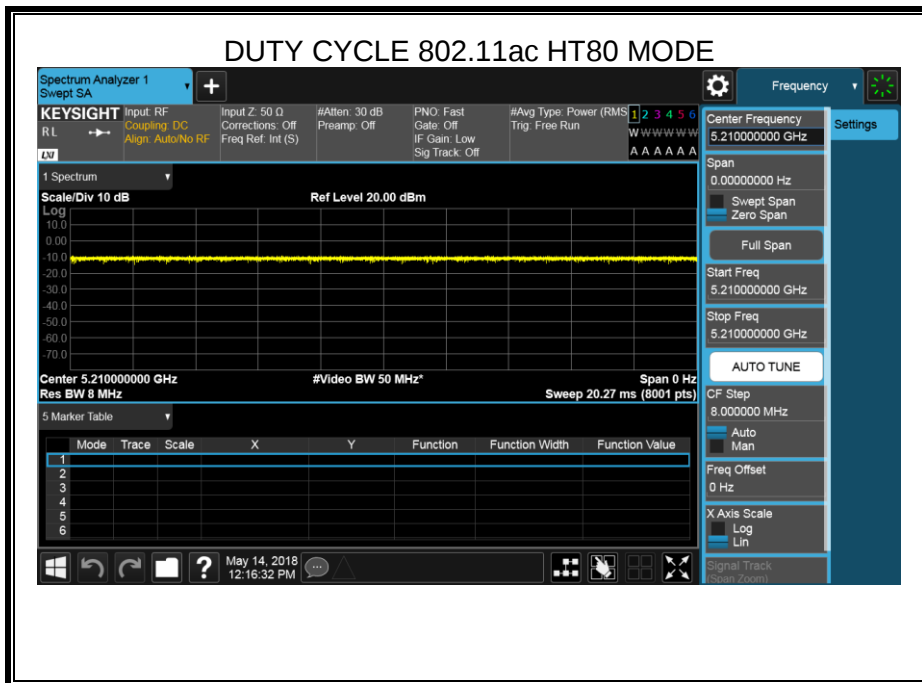
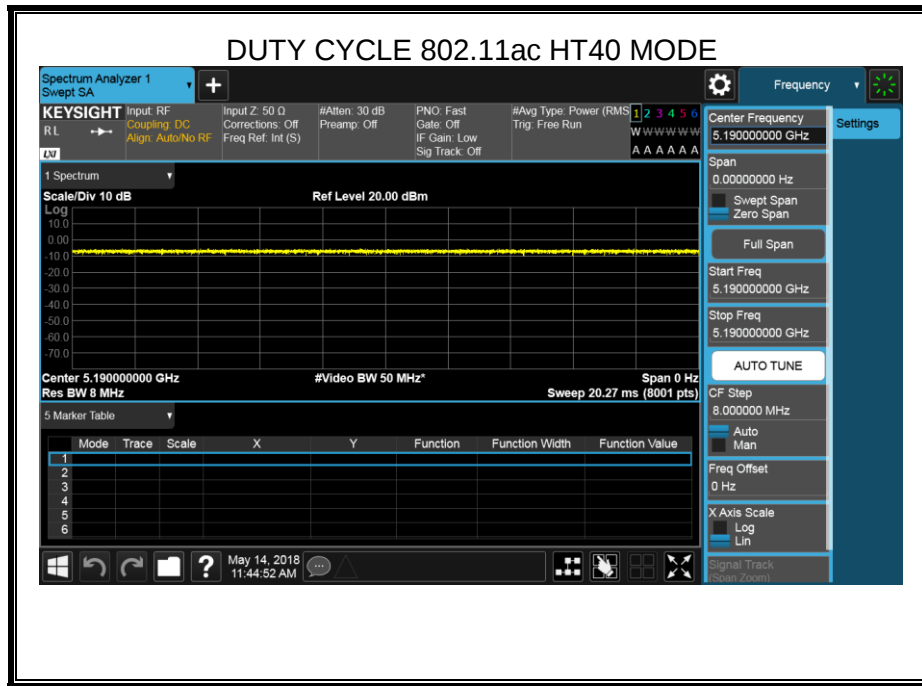
Note: Duty Cycle Correction Factor= $10\log(1/x)$.

Where: x is Duty Cycle(Linear)

UNII Band I and UNII Band III have the same duty cycle, only UNII Band I data is shown in this report.







6.2. 6/26 dB BANDWIDTH

6.2.1. LIMITS

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

6.2.2. TEST PROCEDUREC

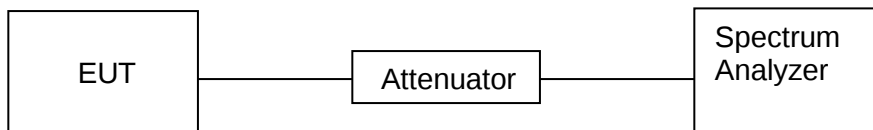
Connect the UUT to the spectrum analyser and use the following settings:

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.

Note: 99% Bandwidth measurement, the measured data can fulfil 15.407(b) (1) requirement .

6.2.3. TEST SETUP

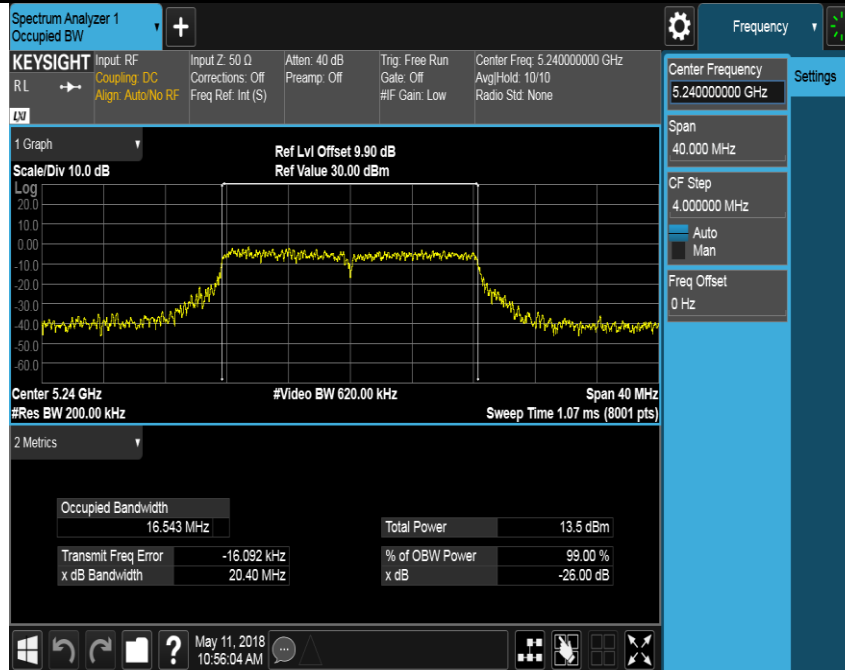


RESULTS

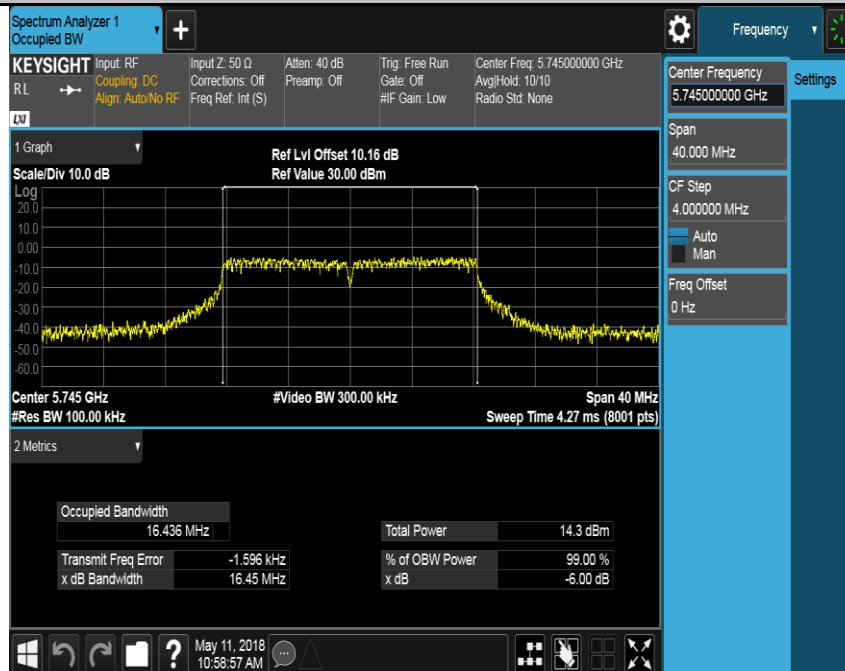
Test Mode	Test Channel	Ant	EBW[MHz]	Limit[MHz]	Verdict
11A	5180	Ant1	20.50	---	PASS
11A	5200	Ant1	20.96	---	PASS
11A	5240	Ant1	20.40	---	PASS
11A	5745	Ant1	16.45	0.5	PASS
11A	5785	Ant1	16.50	0.5	PASS
11A	5825	Ant1	16.47	0.5	PASS
11N20	5180	Ant1	21.07	---	PASS
11N20	5200	Ant1	20.47	---	PASS
11N20	5240	Ant1	20.83	---	PASS
11N20	5745	Ant1	17.70	0.5	PASS
11N20	5785	Ant1	17.70	0.5	PASS
11N20	5825	Ant1	17.64	0.5	PASS
11N40	5190	Ant1	40.71	---	PASS
11N40	5230	Ant1	41.23	---	PASS
11N40	5755	Ant1	36.41	0.5	PASS
11N40	5795	Ant1	36.43	0.5	PASS
11AC20	5180	Ant1	21.13	---	PASS
11AC20	5200	Ant1	20.99	---	PASS
11AC20	5240	Ant1	21.94	---	PASS
11AC20	5745	Ant1	17.73	0.5	PASS
11AC20	5785	Ant1	17.79	0.5	PASS
11AC20	5825	Ant1	17.76	0.5	PASS
11AC40	5190	Ant1	41.86	---	PASS
11AC40	5230	Ant1	41.22	---	PASS
11AC40	5755	Ant1	36.49	0.5	PASS
11AC40	5795	Ant1	36.40	0.5	PASS
11AC80	5210	Ant1	82.01	---	PASS
11AC80	5775	Ant1	75.07	0.5	PASS



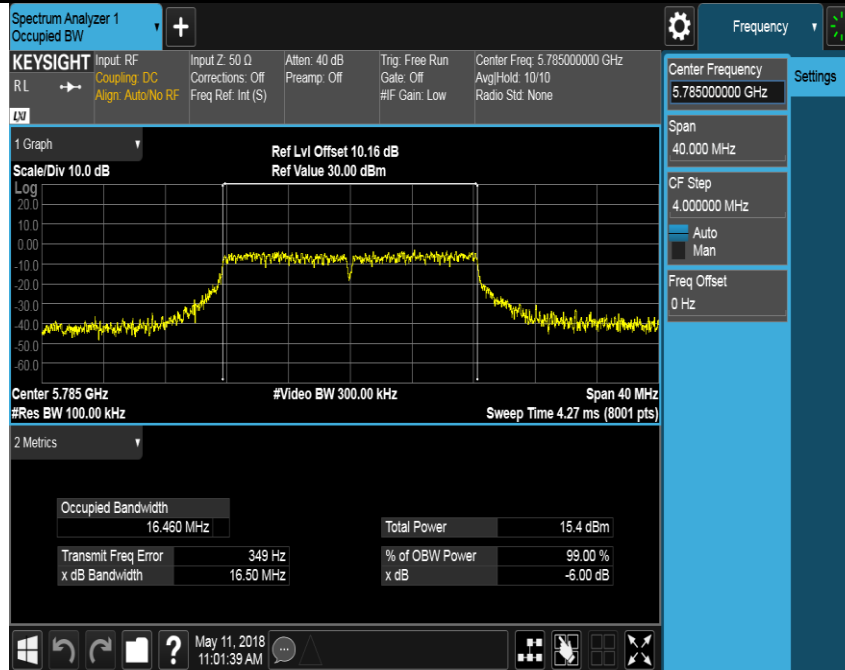
Emission Bandwidth Measurement_11A_5240_Ant1



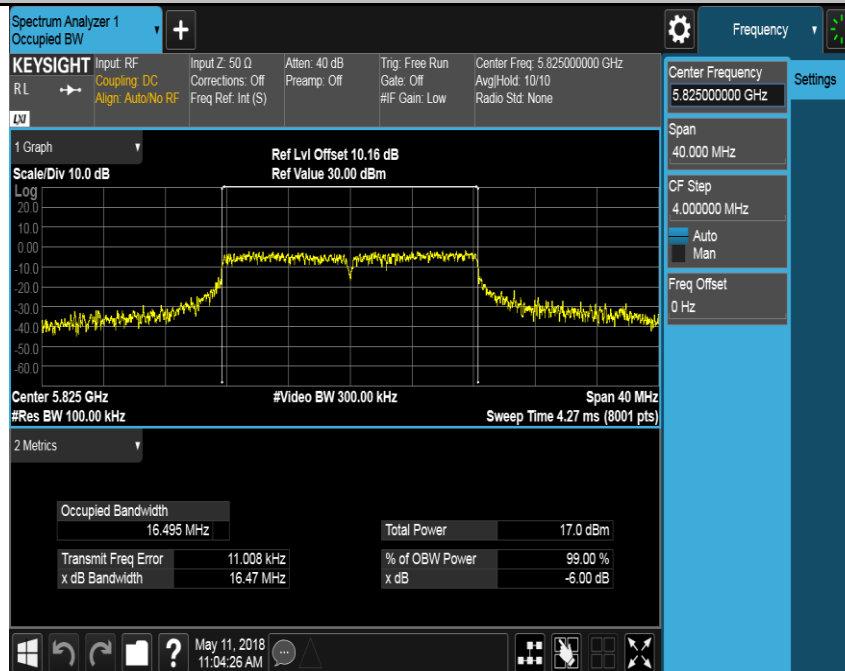
Emission Bandwidth Measurement_11A_5745_Ant1



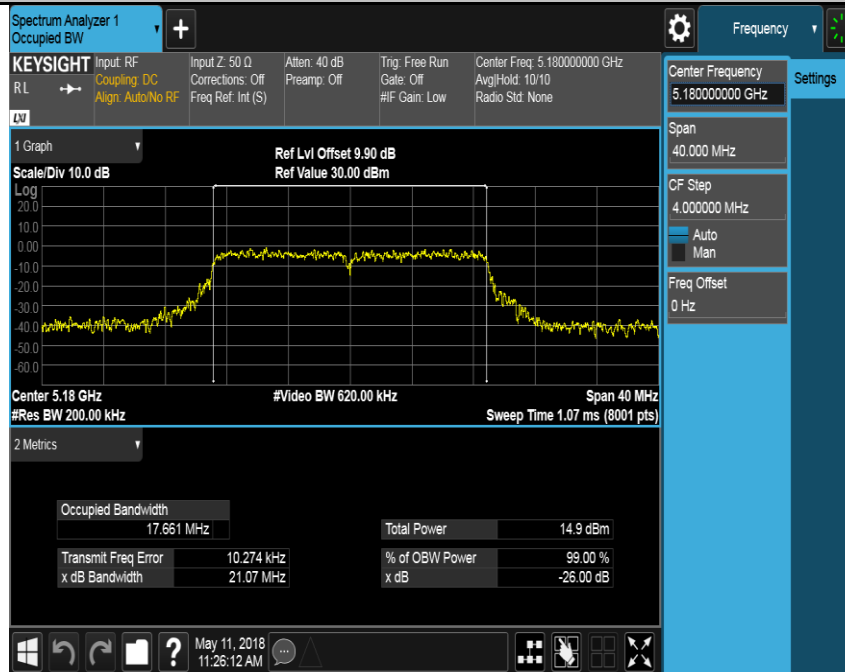
Emission Bandwidth Measurement_11A_5785_Ant1



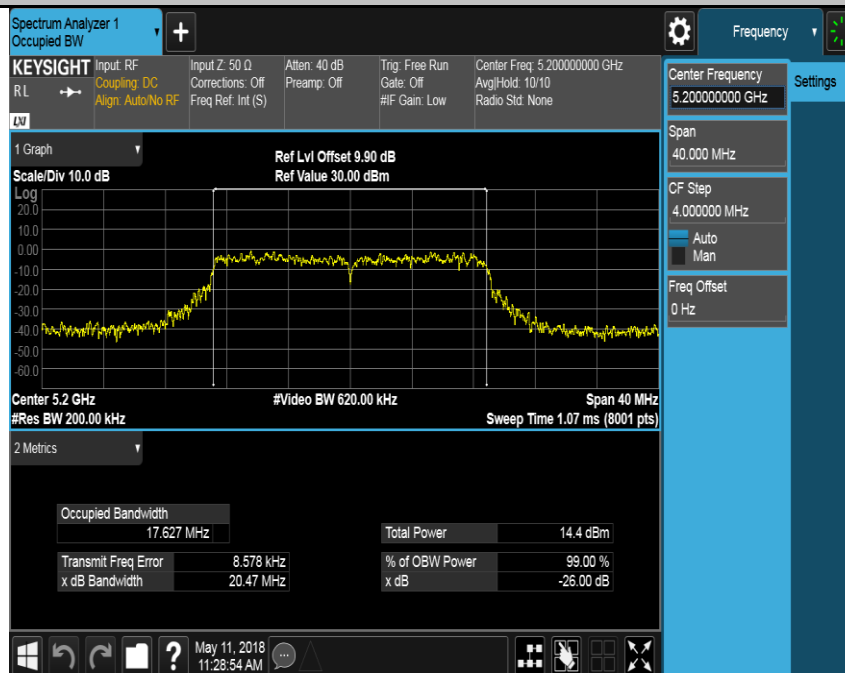
Emission Bandwidth Measurement_11A_5825_Ant1



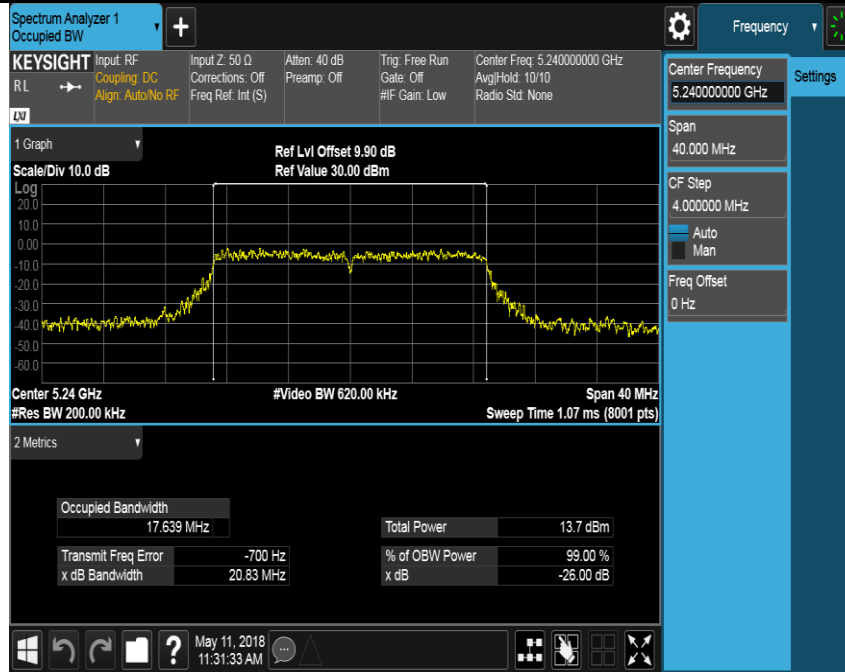
Emission Bandwidth Measurement_11N20_5180_Ant1



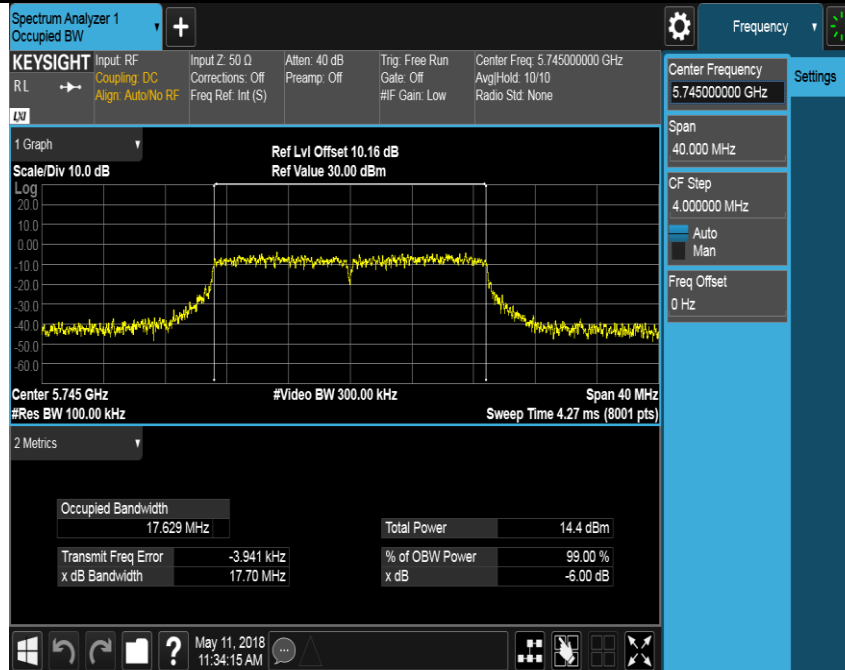
Emission Bandwidth Measurement_11N20_5200_Ant1



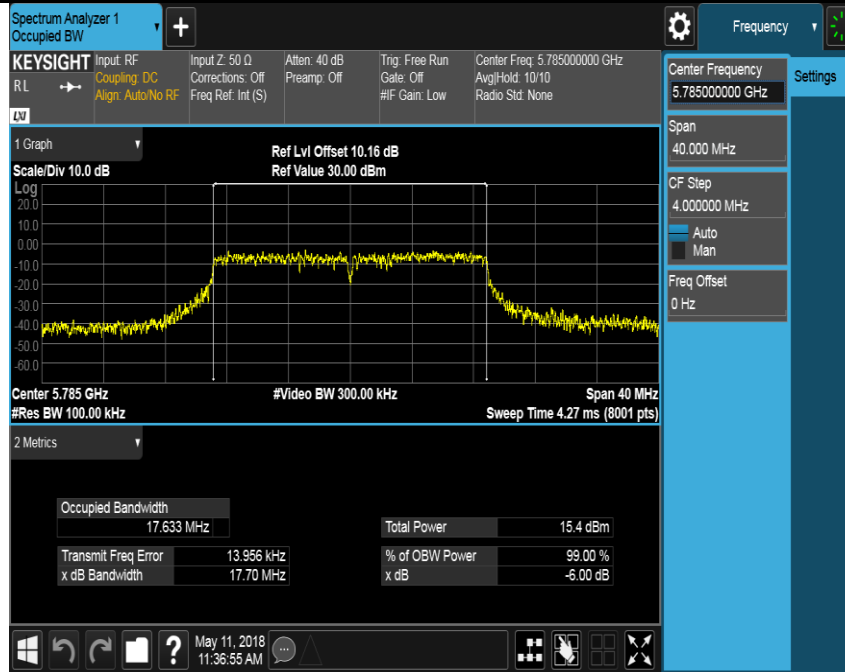
Emission Bandwidth Measurement_11N20_5240_Ant1



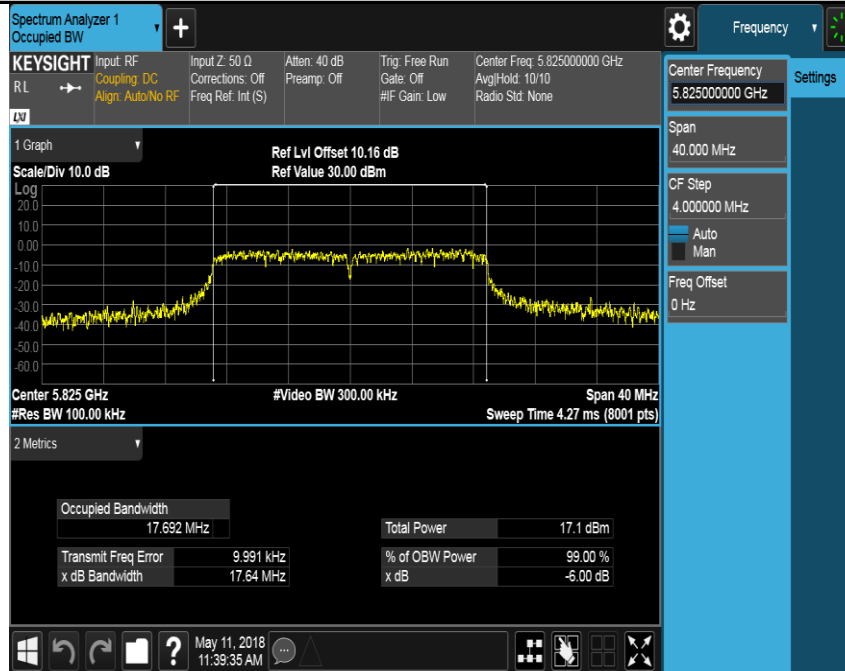
Emission Bandwidth Measurement_11N20_5745_Ant1



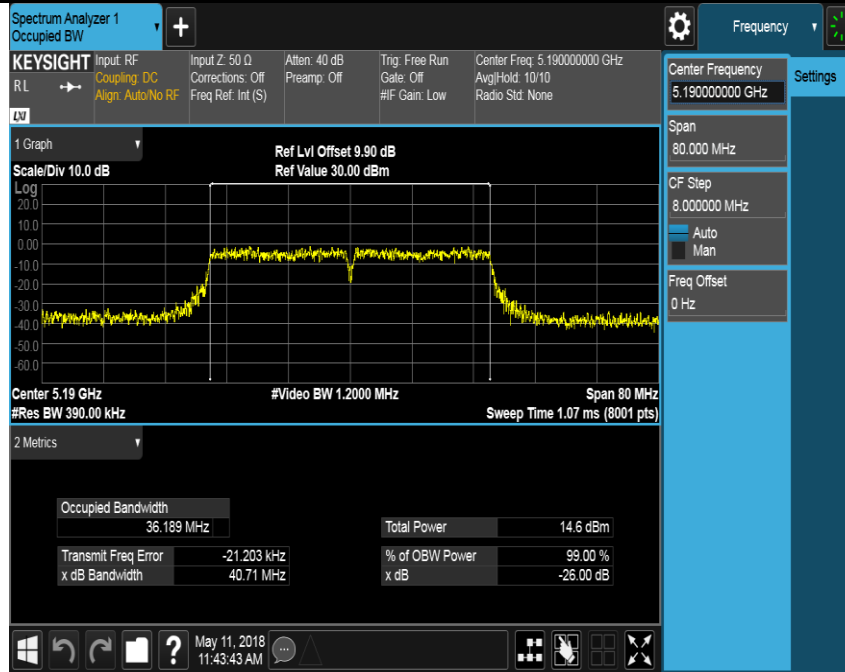
Emission Bandwidth Measurement_11N20_5785_Ant1



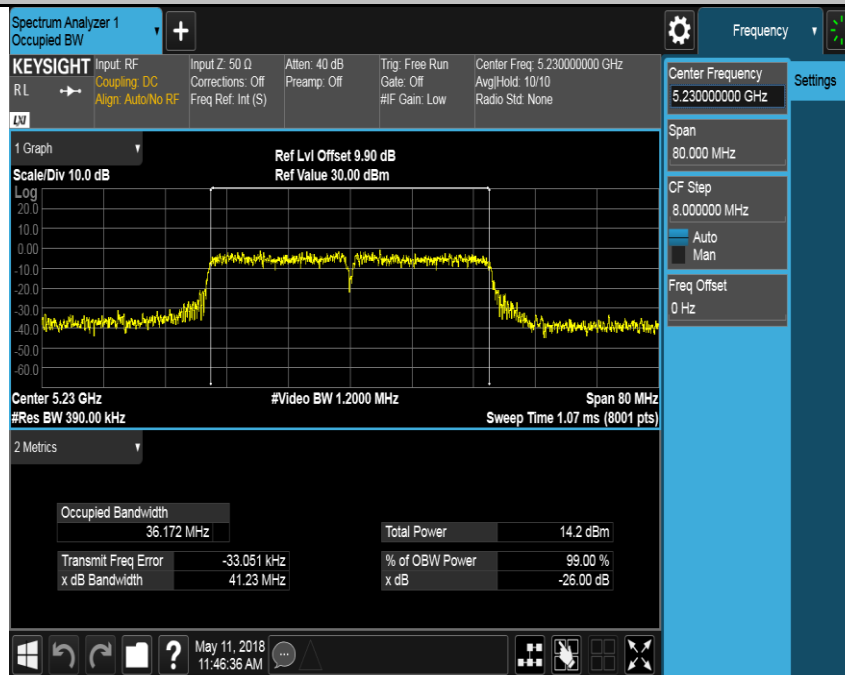
Emission Bandwidth Measurement_11N20_5825_Ant1



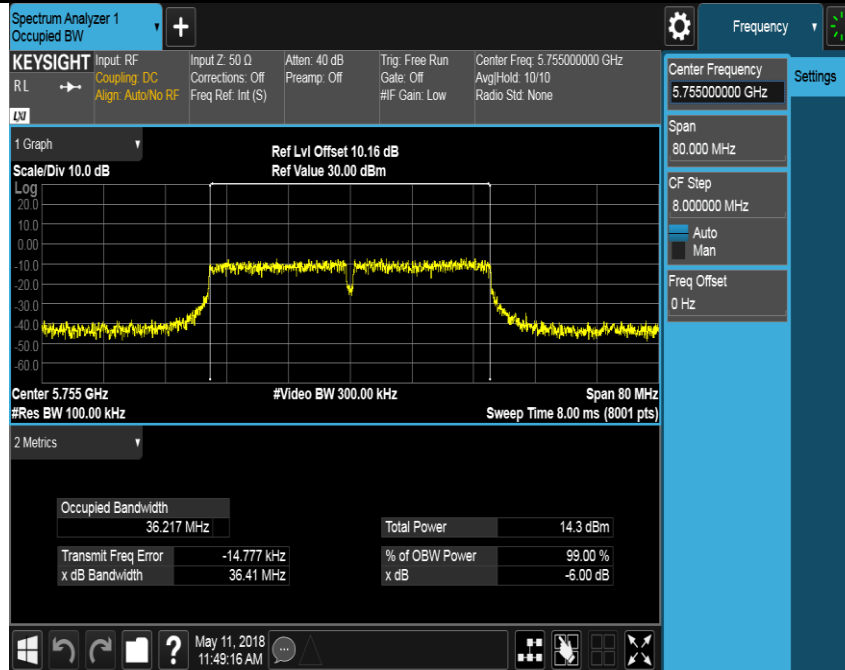
Emission Bandwidth Measurement_11N40_5190_Ant1



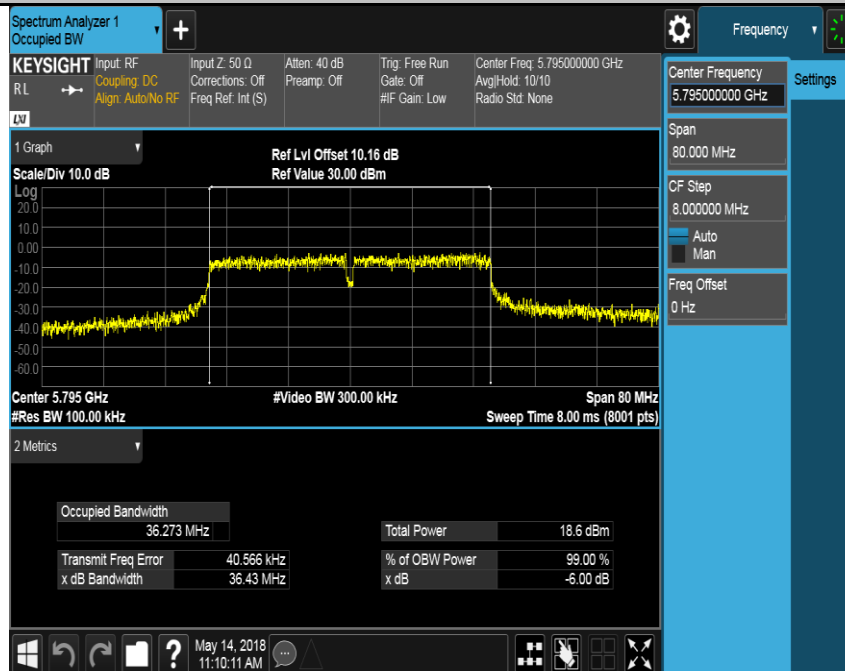
Emission Bandwidth Measurement_11N40_5230_Ant1



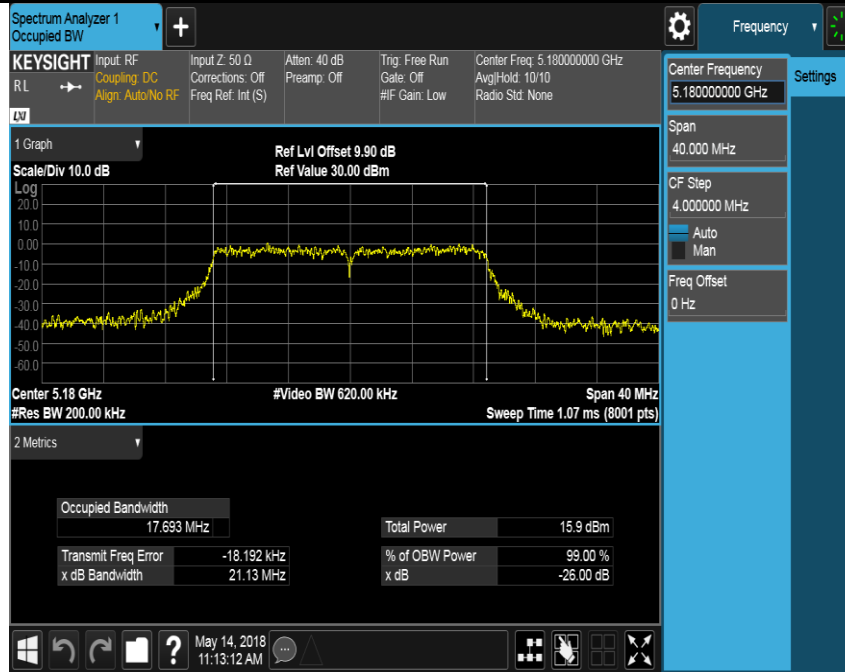
Emission Bandwidth Measurement_11N40_5755_Ant1



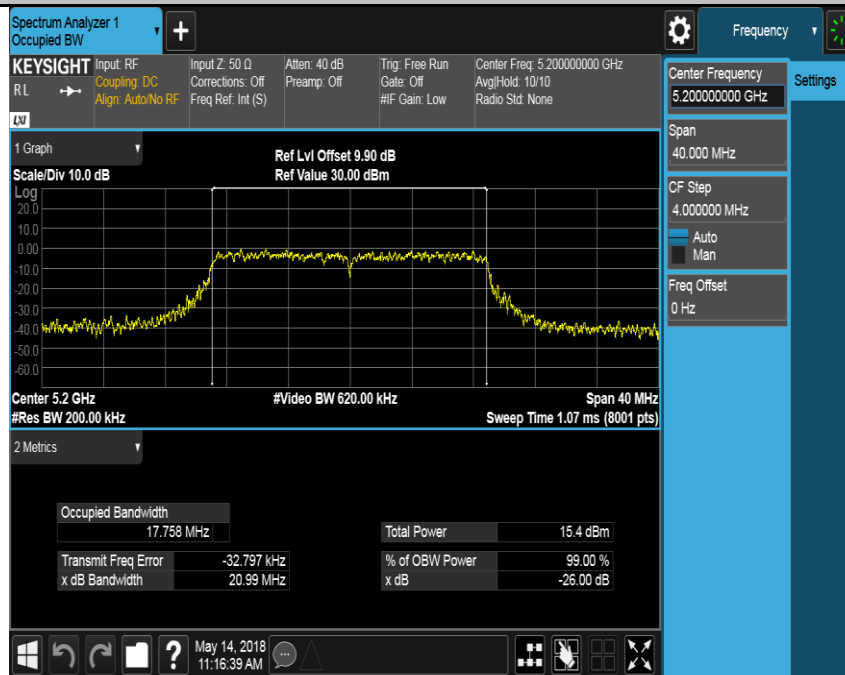
Emission Bandwidth Measurement_11N40_5795_Ant1



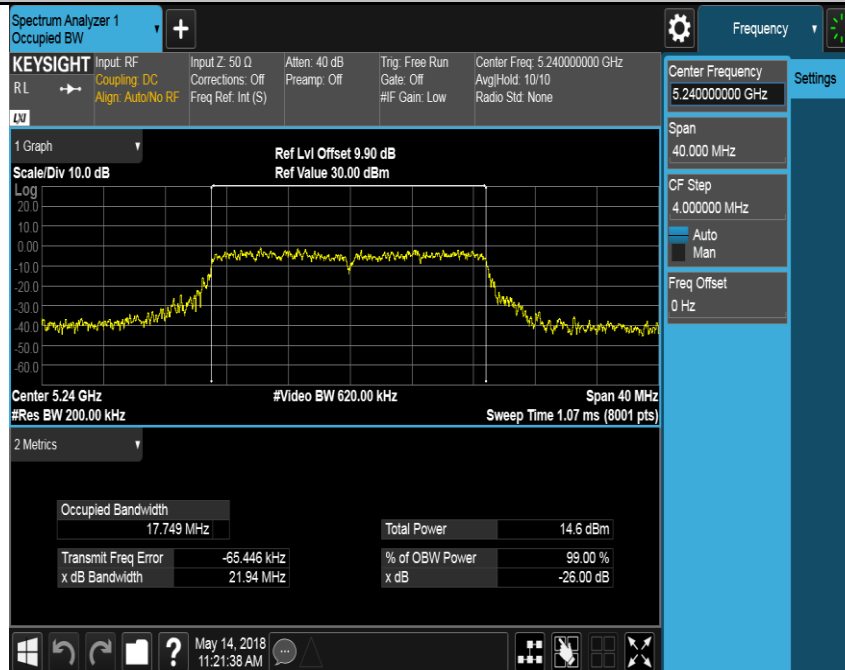
Emission Bandwidth Measurement_11AC20_5180_Ant1



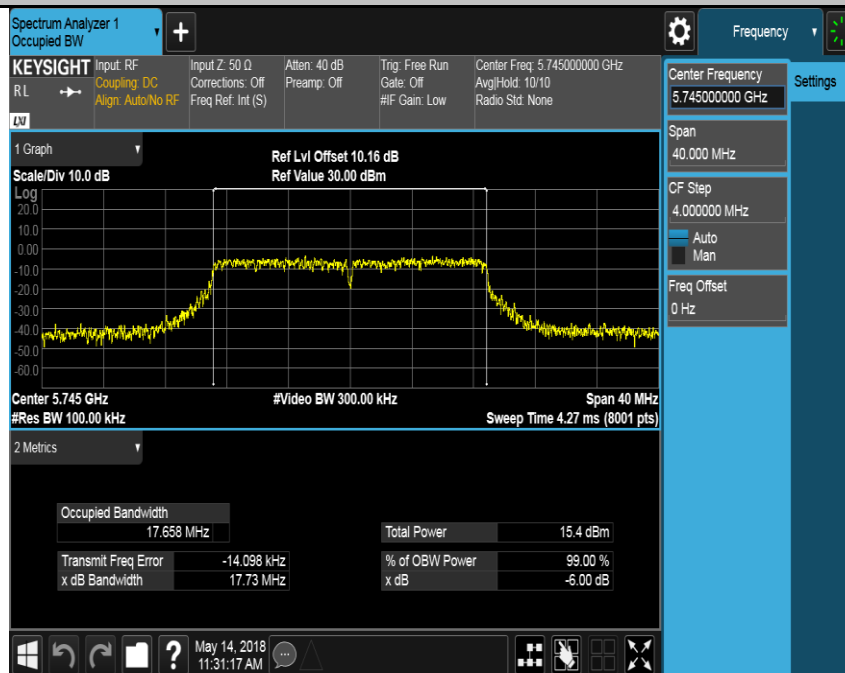
Emission Bandwidth Measurement_11AC20_5200_Ant1



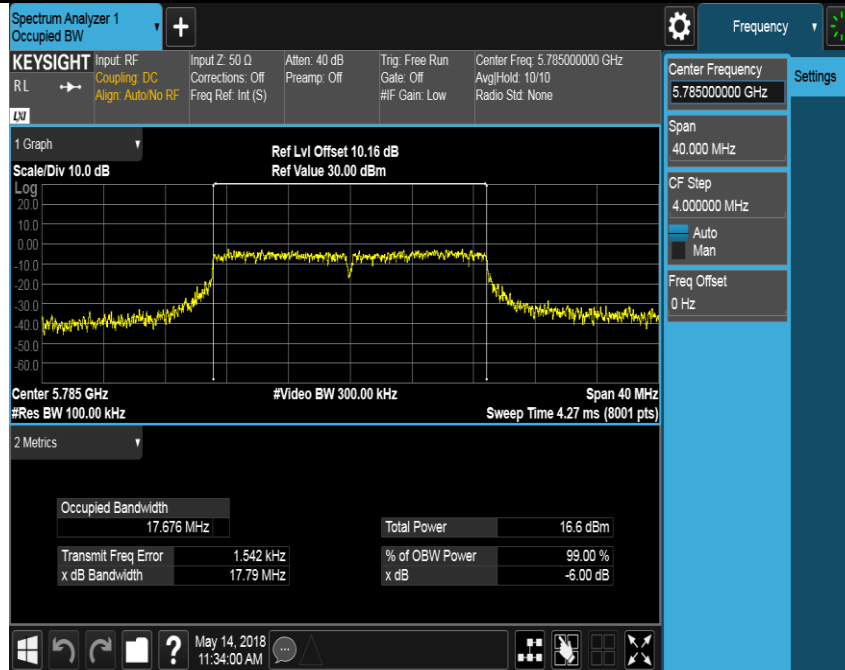
Emission Bandwidth Measurement_11AC20_5240_Ant1



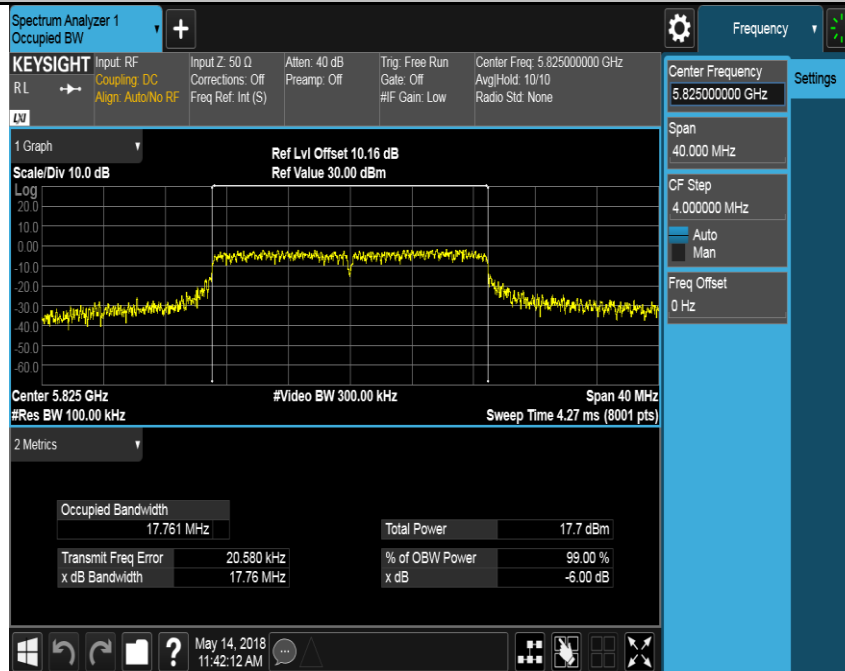
Emission Bandwidth Measurement_11AC20_5745_Ant1



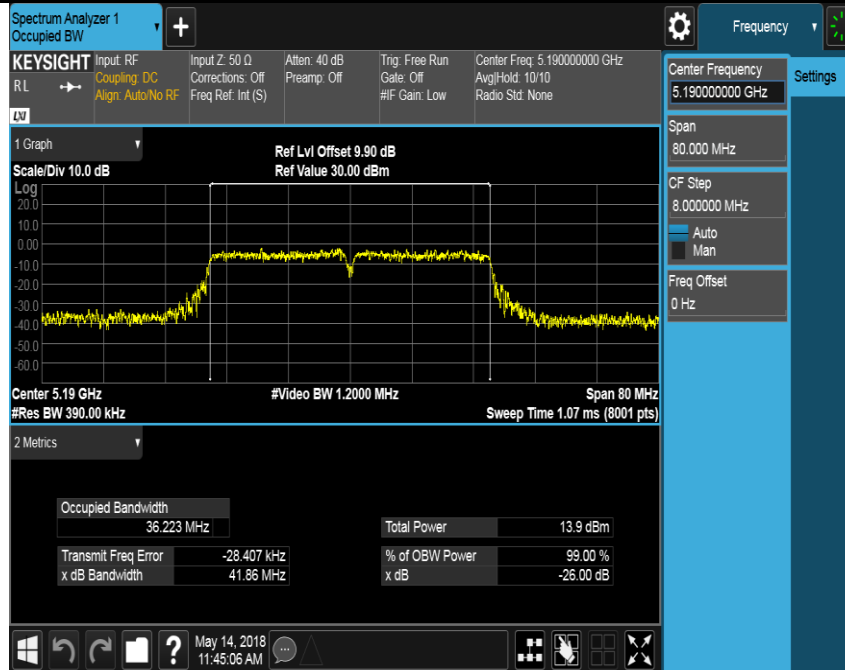
Emission Bandwidth Measurement_11AC20_5785_Ant1



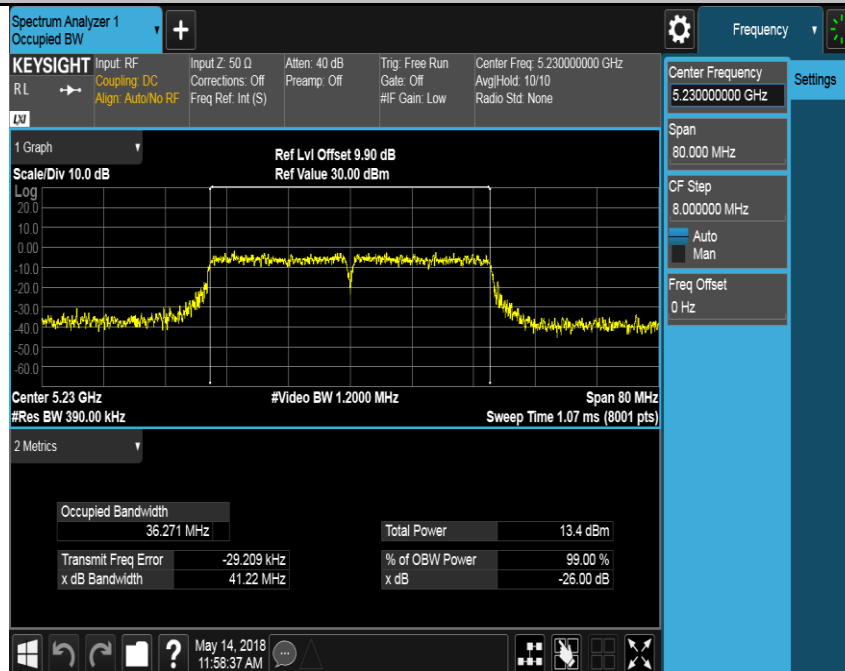
Emission Bandwidth Measurement_11AC20_5825_Ant1



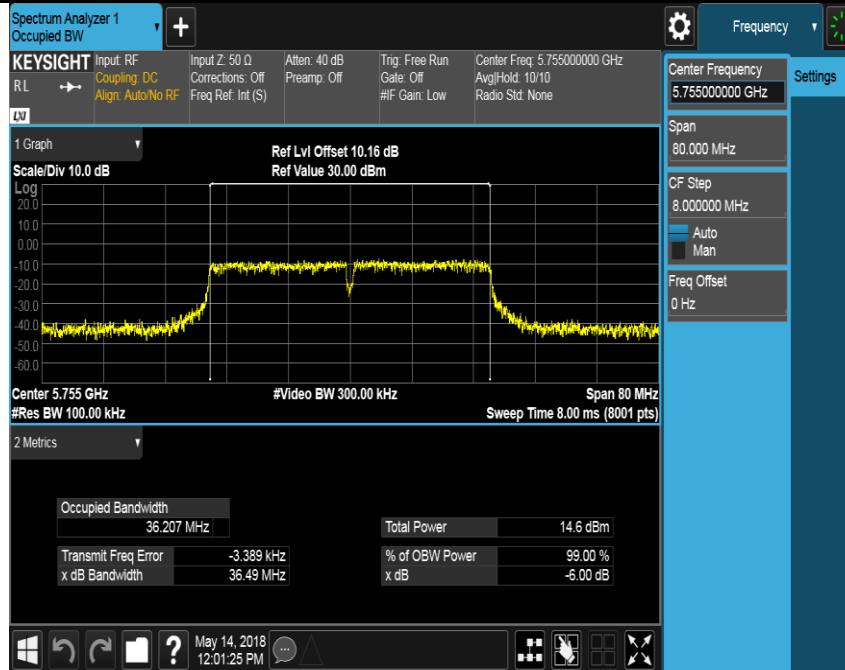
Emission Bandwidth Measurement_11AC40_5190_Ant1



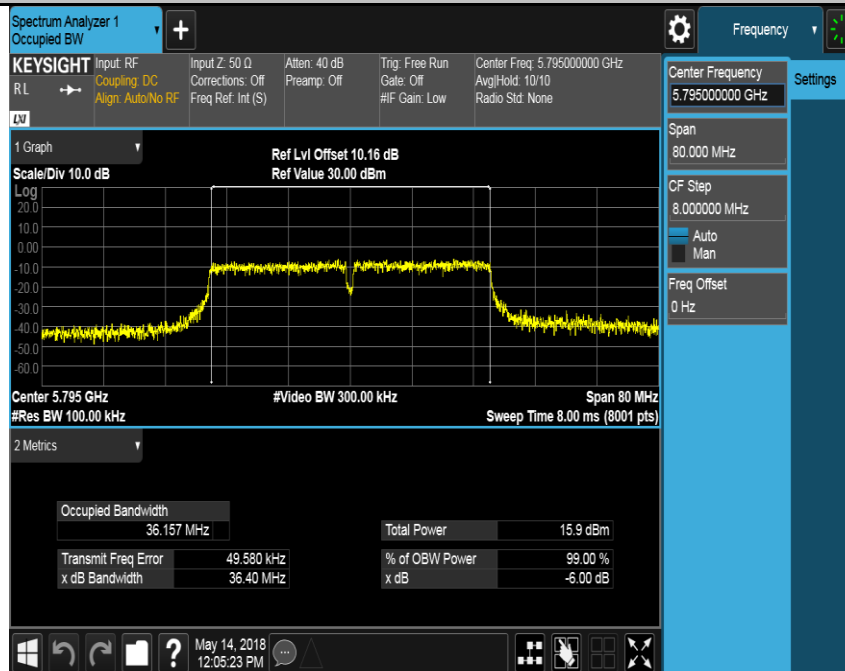
Emission Bandwidth Measurement_11AC40_5230_Ant1



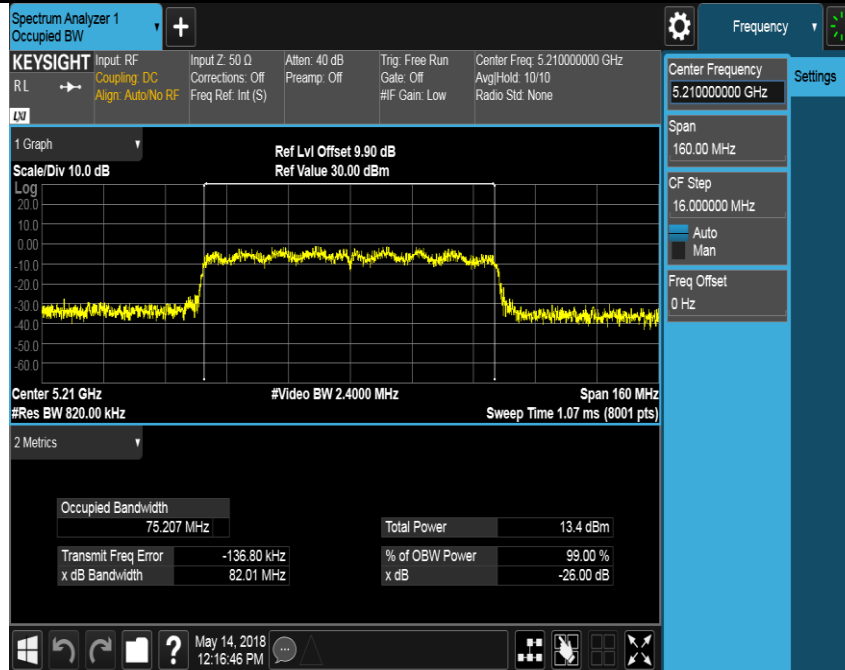
Emission Bandwidth Measurement_11AC40_5755_Ant1



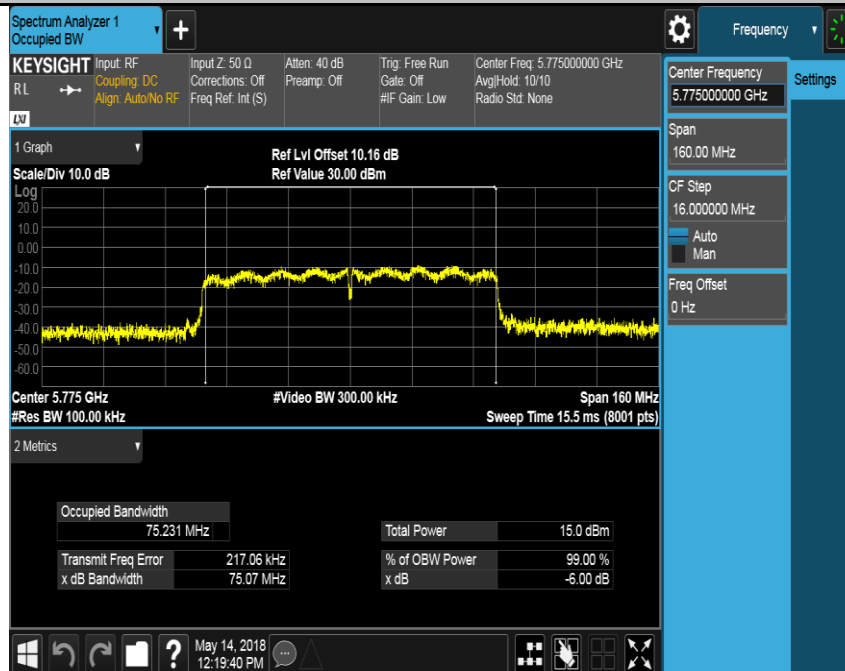
Emission Bandwidth Measurement_11AC40_5795_Ant1



Emission Bandwidth Measurement_11AC80_5210_Ant1



Emission Bandwidth Measurement_11AC80_5775_Ant1



6.3. MAXIMUM AVERAGE CONDUCTED OUTPUT POWER

6.3.1. LIMITS

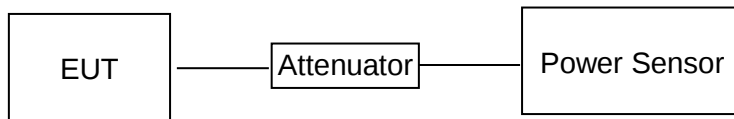
FCC Part15, Subpart E/ RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices :250mW (24dBm)	5150-5250
	1 Watt (30dBm)	5725-5850

6.3.2. TEST PROCEDURE

Refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Connect the EUT to the a broadband average(RMS) RF power meter, the power meter shall have a video bandwidth that is greater than or equal to the bandwidth and shall utilize a fast-responding diode detector.

6.3.3. TEST SETUP



RESULTS

Test Mode	Test Channel	Ant	Level [dBm]	10log(1/x) Factor [dB]	Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
11A	5180	Ant1	14.91	0.00	14.91	16.9	24	PASS
11A	5200	Ant1	14.68	0.00	14.68	16.67	24	PASS
11A	5240	Ant1	14.25	0.00	14.25	16.24	24	PASS
11A	5745	Ant1	14.56	0.00	14.56	16.55	30.00	PASS
11A	5785	Ant1	15.49	0.00	15.49	17.48	30.00	PASS
11A	5825	Ant1	17.01	0.00	17.01	19	30.00	PASS
11N20	5180	Ant1	15.75	0.00	15.75	17.74	24	PASS
11N20	5200	Ant1	15.5	0.00	15.50	17.49	24	PASS
11N20	5240	Ant1	14.85	0.00	14.85	16.84	24	PASS
11N20	5745	Ant1	15.13	0.00	15.13	17.12	30.00	PASS
11N20	5785	Ant1	16	0.00	16.00	17.99	30.00	PASS
11N20	5825	Ant1	17.51	0.00	17.51	19.5	30.00	PASS
11N40	5190	Ant1	15.15	0.00	15.15	17.14	24	PASS
11N40	5230	Ant1	14.79	0.00	14.79	16.78	24	PASS
11N40	5755	Ant1	15.57	0.00	15.57	17.56	30.00	PASS
11N40	5795	Ant1	19.27	0.00	19.27	21.26	30.00	PASS
11AC20	5180	Ant1	16.85	0.00	16.85	18.84	24	PASS
11AC20	5200	Ant1	16.55	0.00	16.55	18.54	24	PASS
11AC20	5240	Ant1	15.5	0.00	15.50	17.49	24	PASS
11AC20	5745	Ant1	15.76	0.00	15.76	17.75	30.00	PASS
11AC20	5785	Ant1	16.74	0.00	16.74	18.73	30.00	PASS
11AC20	5825	Ant1	17.98	0.00	17.98	19.97	30.00	PASS
11AC40	5190	Ant1	14.51	0.00	14.51	16.5	24	PASS
11AC40	5230	Ant1	13.95	0.00	13.95	15.94	24	PASS
11AC40	5755	Ant1	15.35	0.00	15.35	17.34	30.00	PASS
11AC40	5795	Ant1	16.39	0.00	16.39	18.38	30.00	PASS
11AC80	5210	Ant1	13.62	0.00	13.62	15.61	24	PASS
11AC80	5775	Ant1	15.39	0.00	15.39	17.38	30.00	PASS

NOTE: 1.EIRP= Maximum Conducted Output Power + ANT GAIN
2. Maximum Conducted Output Power= Conducted Output Power+ Correction Factor
3. About correction Factor please refer to section 6.1

6.4. POWER SPECTRAL DENSITY

6.4.1. LIMITS

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	For FCC: Other than Mobile and portable:17dBm/MHz Mobile and portable:11dBm/MHz	5150-5250
	30dBm/500kHz	5725-5850

6.4.2. TEST PROCEDURE

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

For U-NII-1,:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

For U-NII-3:

Center Frequency	The center frequency of the channel under test
Detector	RMS
RBW	300KHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Trace	Max hold
Sweep time	Auto

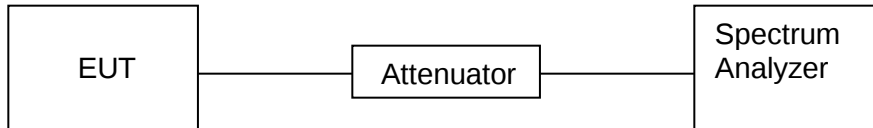
Note:

1. For UNII-3, according to KDB publication 789033 D02 General UNII Test Procedures New Rules v01, section II.F.5., it is acceptable to set RBW at 1MHz and VBW at 3MHz if the spectrum analyzer does not have 500kHz RBW.

2. The value measured with RBW=1MHz is to be added with $10\log(500\text{kHz}/1\text{MHz})$ which is - 3dB. For example, if the measured value is +10dBm using RBW=1MHz (that is +10dBm/MHz), then the converted value will be +7dBm/500kHz.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

6.4.3. TEST SETUP



6.4.4. RESULTS

6.4.4.1. UNII-I BAND

Test Mode	Test Channel	Ant	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
11A	5180	Ant1	6.81	17	PASS
11A	5200	Ant1	6.58	17	PASS
11A	5240	Ant1	6.42	17	PASS
11N20	5180	Ant1	7.09	17	PASS
11N20	5200	Ant1	6.89	17	PASS
11N20	5240	Ant1	6.39	17	PASS
11N40	5190	Ant1	4.48	17	PASS
11N40	5230	Ant1	3.88	17	PASS
11AC20	5180	Ant1	8.33	17	PASS
11AC20	5200	Ant1	7.92	17	PASS
11AC20	5240	Ant1	7.30	17	PASS
11AC40	5190	Ant1	3.27	17	PASS
11AC40	5230	Ant1	2.79	17	PASS
11AC80	5210	Ant1	0.43	17	PASS

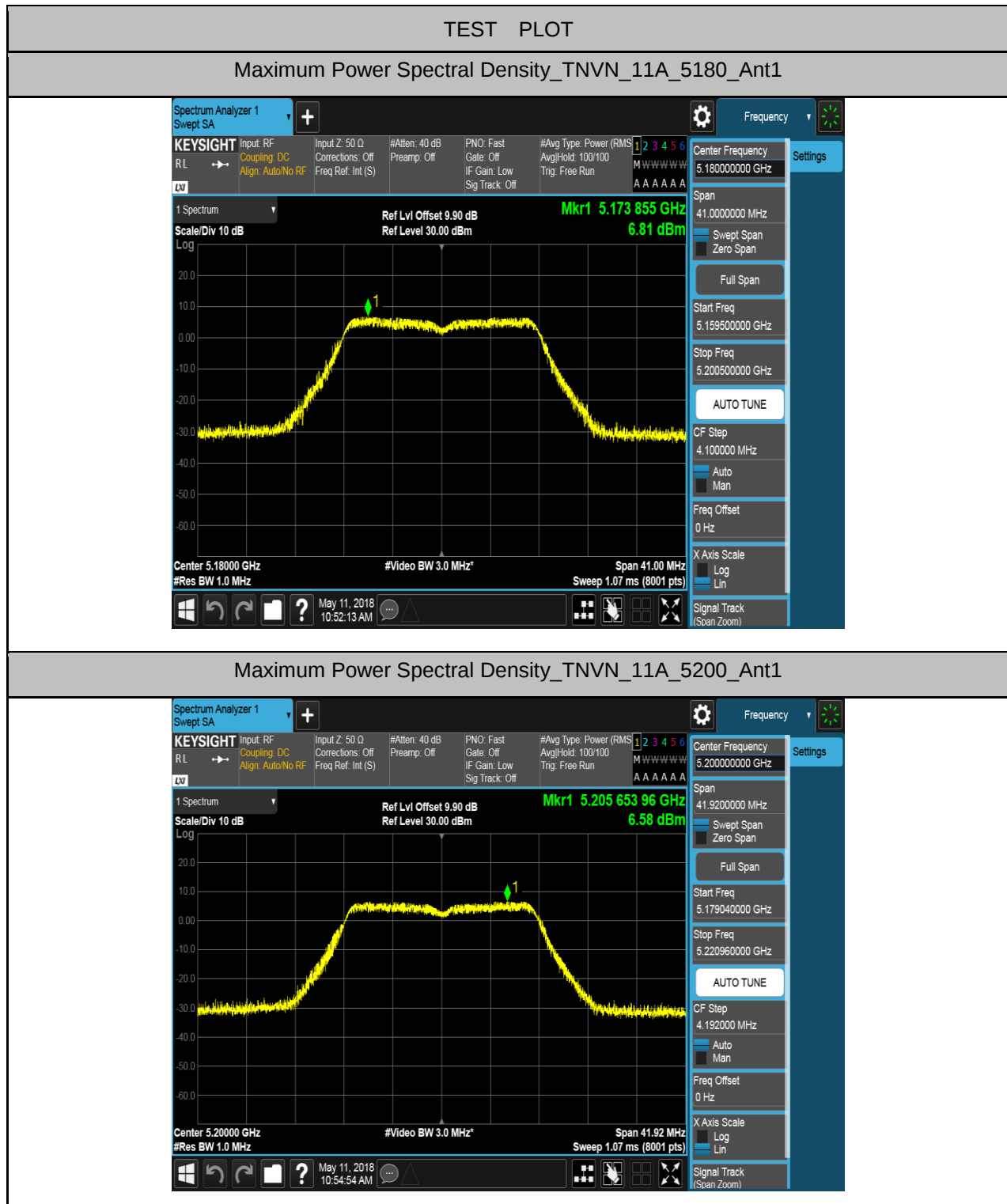
Note: 1. About correction Factor please refer to section 6.1

6.4.4.2. UNII-III BAND

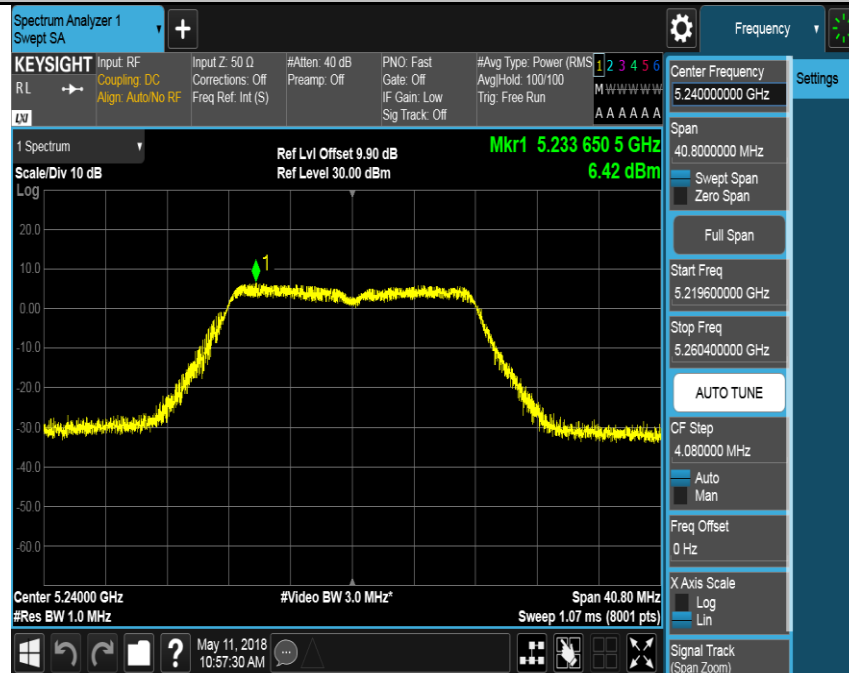
Test Mode	Test Channel	Ant	Level [dBm/500kHz]	10log(1/x) Factor[dB]	10log(500kHz/RBW) Factor [dB]	PSD [dBm/500kHz]	Limit [dBm/500kHz]	Verdict
11A	5745	Ant1	1.356	0	2.21848749616356	3.574	30.00	PASS
11A	5785	Ant1	2.471	0	2.21848749616356	4.689	30.00	PASS
11A	5825	Ant1	3.665	0	2.21848749616356	5.883	30.00	PASS
11N20	5745	Ant1	1.523	0	2.21848749616356	3.741	30.00	PASS
11N20	5785	Ant1	1.951	0	2.21848749616356	4.169	30.00	PASS
11N20	5825	Ant1	3.595	0	2.21848749616356	5.813	30.00	PASS
11N40	5755	Ant1	-0.816	0	2.21848749616356	1.402	30.00	PASS
11N40	5795	Ant1	2.632	0	2.21848749616356	4.85	30.00	PASS
11AC20	5745	Ant1	1.822	0	2.21848749616356	4.04	30.00	PASS
11AC20	5785	Ant1	2.733	0	2.21848749616356	4.951	30.00	PASS
11AC20	5825	Ant1	4.354	0	2.21848749616356	6.572	30.00	PASS
11AC40	5755	Ant1	-1.167	0	2.21848749616356	1.051	30.00	PASS
11AC40	5795	Ant1	-0.177	0	2.21848749616356	2.041	30.00	PASS
11AC80	5775	Ant1	-3.19	0	2.21848749616356	-0.972	30.00	PASS

Note: 1.PSD=Meas. Level+ Correction Factor
2. About correction Factor please refer to section 6.1

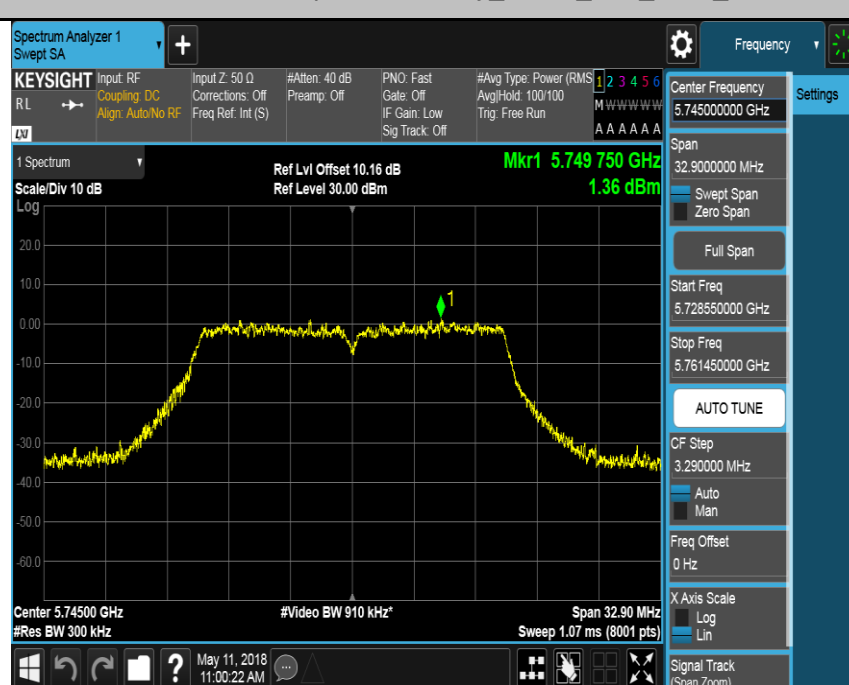
6.4.5. Test Graphs



Maximum Power Spectral Density_TNVN_11A_5240_Ant1



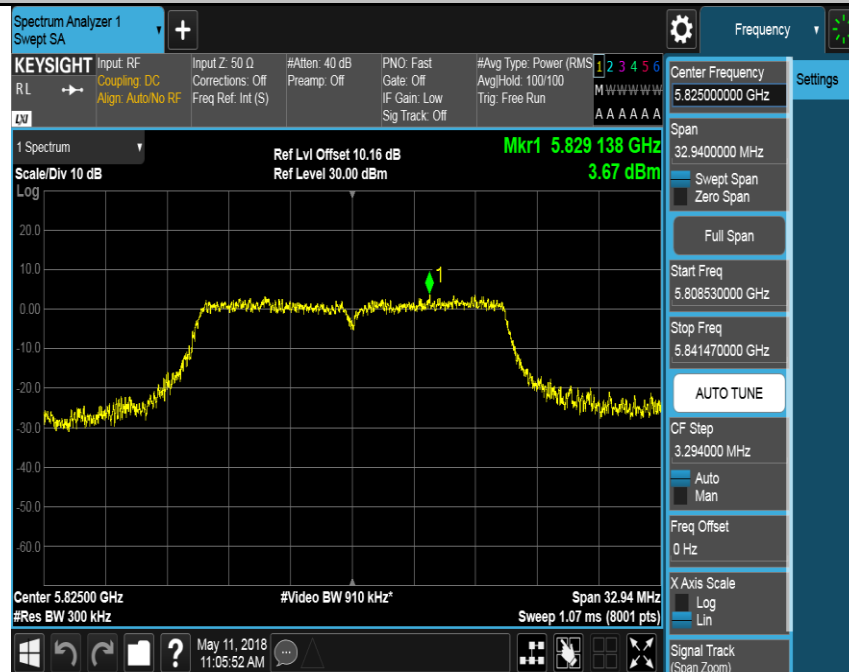
Maximum Power Spectral Density_TNVN_11A_5745_Ant1



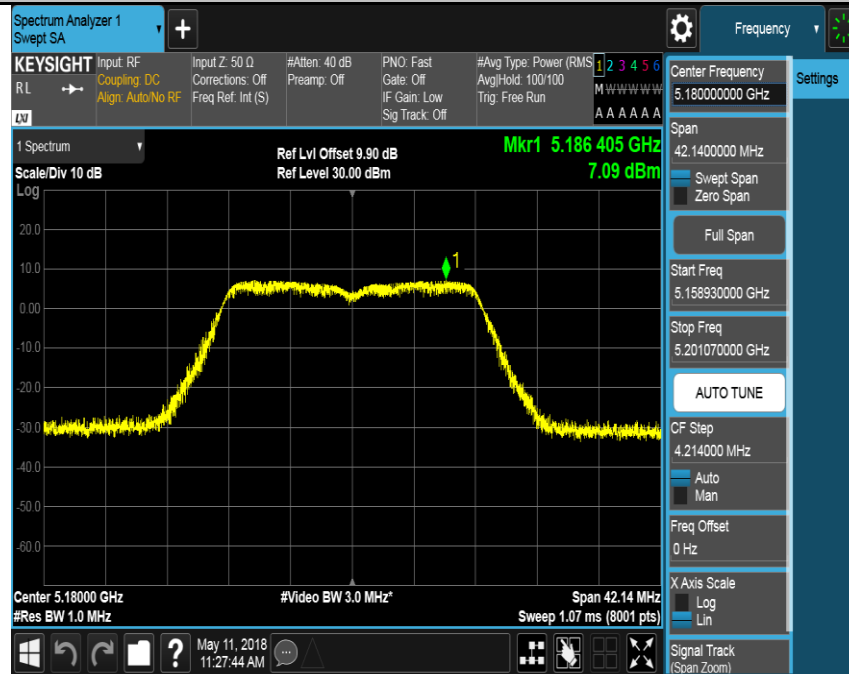
Maximum Power Spectral Density_TNVN_11A_5785_Ant1



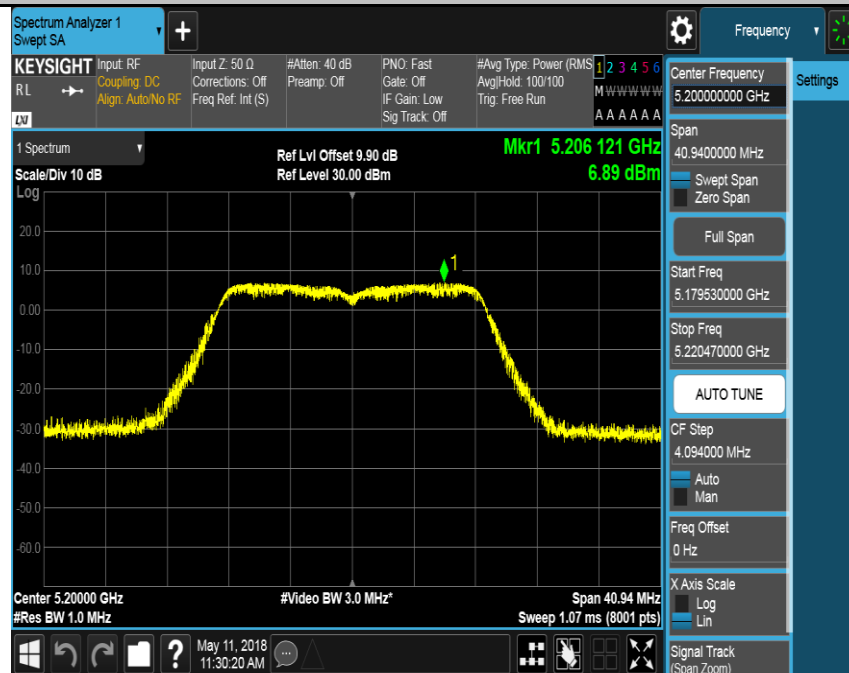
Maximum Power Spectral Density_TNVN_11A_5825_Ant1



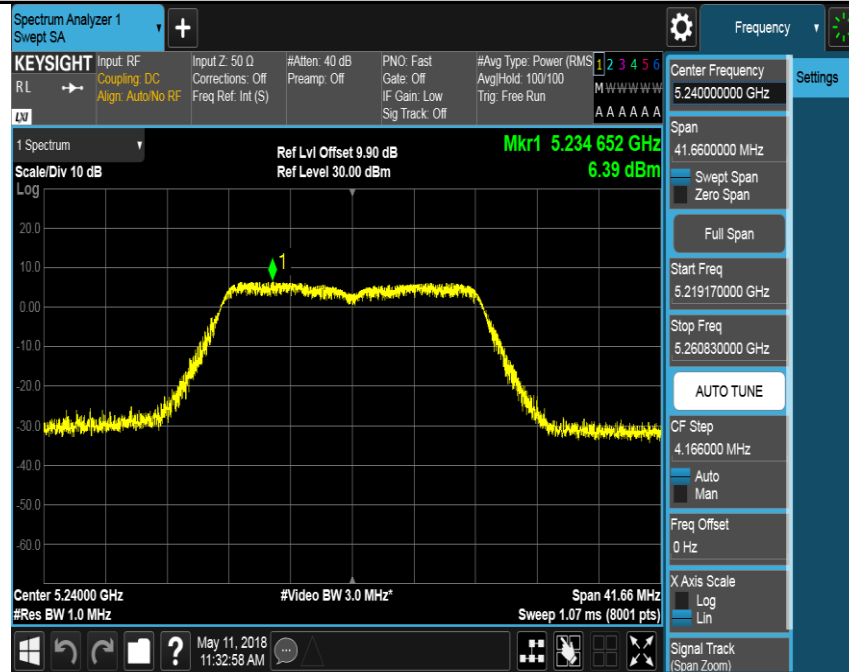
Maximum Power Spectral Density_TNVN_11N20_5180_Ant1



Maximum Power Spectral Density_TNVN_11N20_5200_Ant1



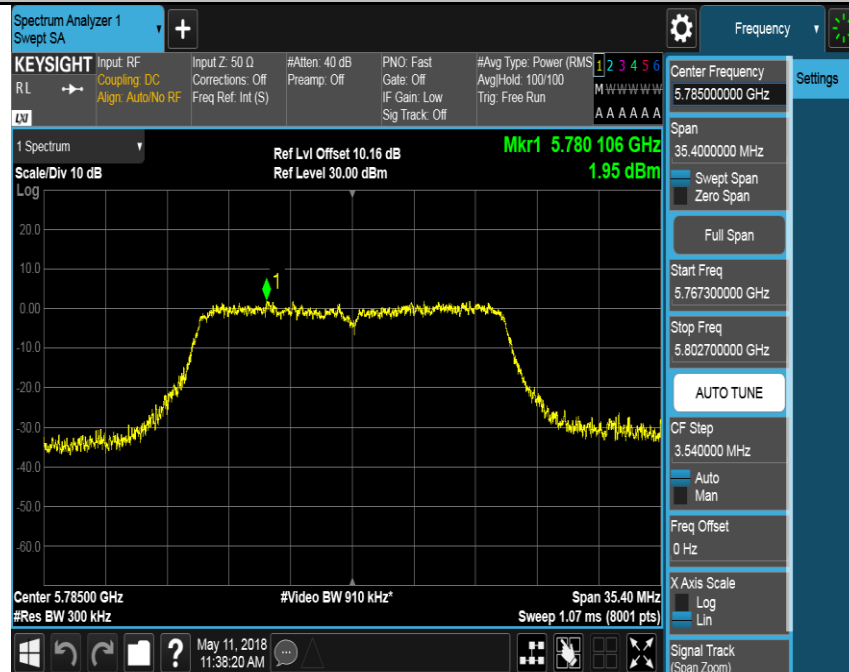
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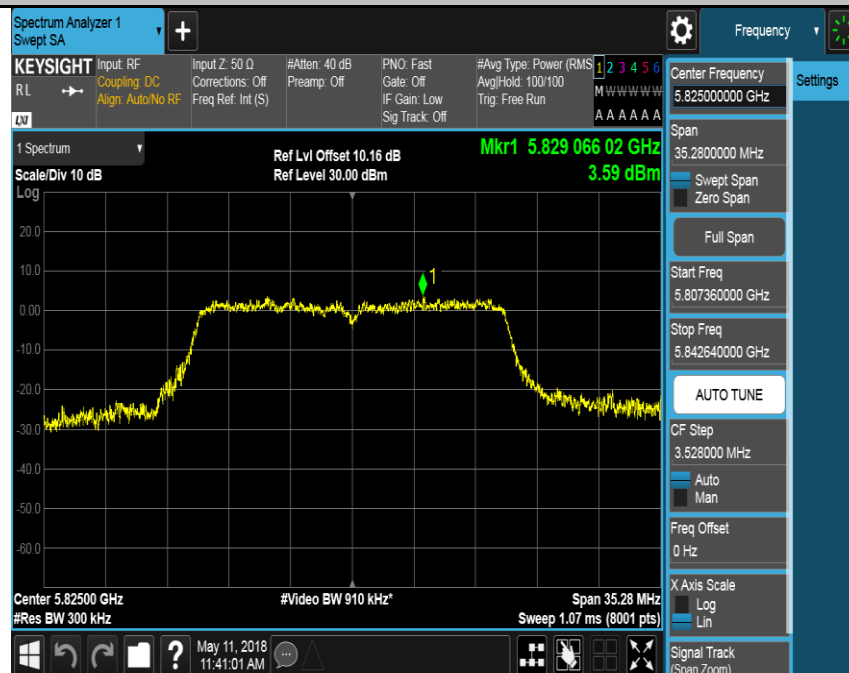
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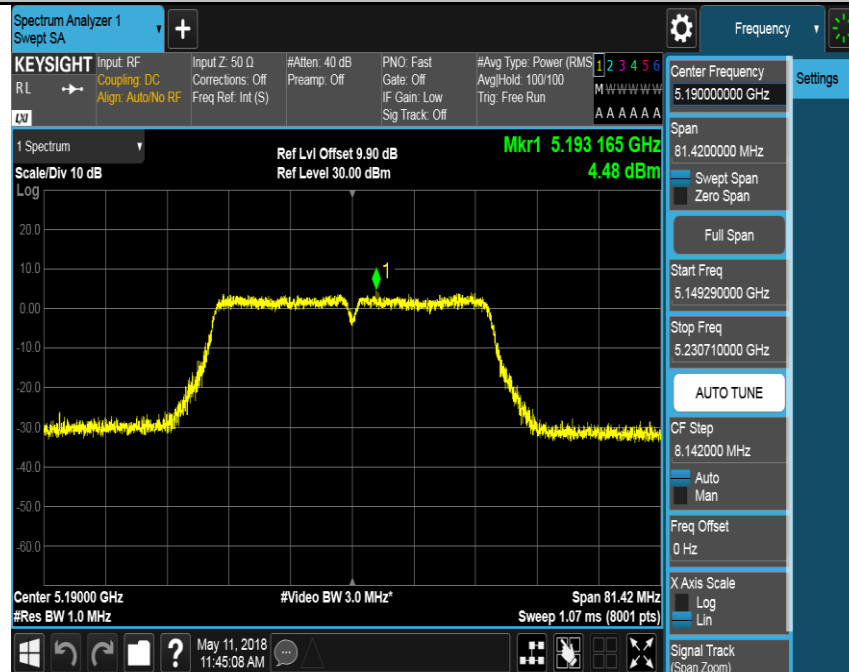
Maximum Power Spectral Density_TNVN_11N20_5785_Ant1



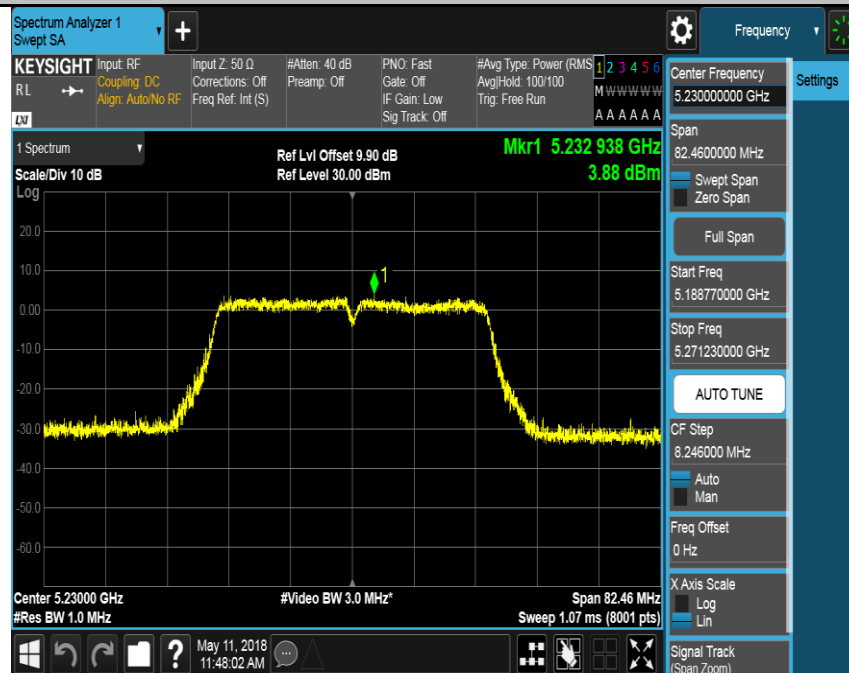
Maximum Power Spectral Density_TNVN_11N20_5825_Ant1



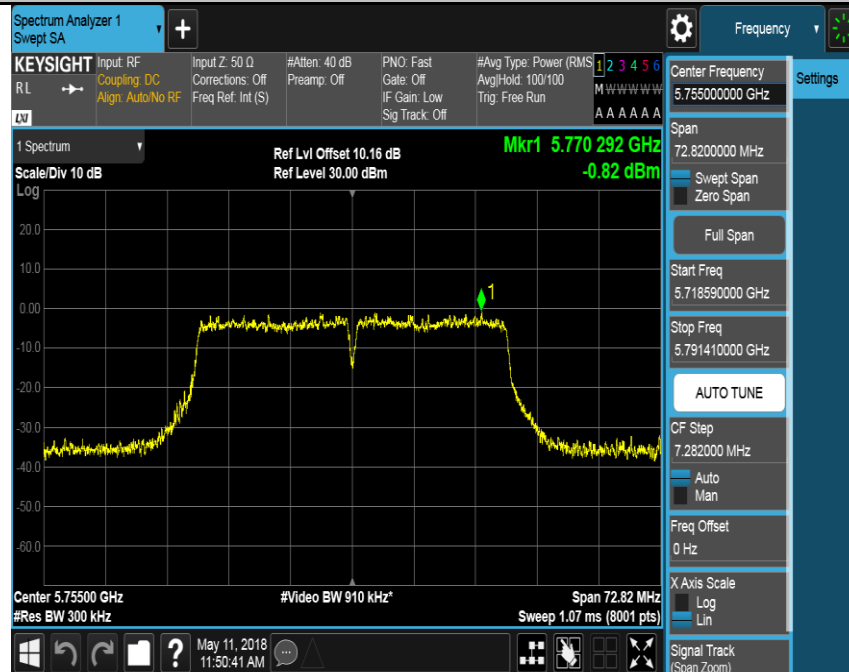
Maximum Power Spectral Density_TNVN_11N40_5190_Ant1



Maximum Power Spectral Density_TNVN_11N40_5230_Ant1



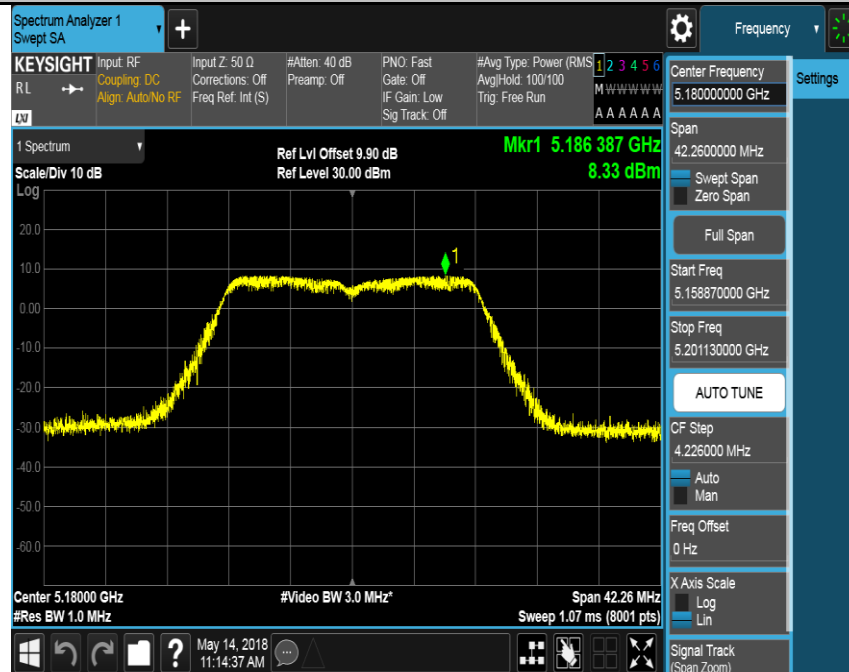
Maximum Power Spectral Density_TNVN_11N40_5755_Ant1



Maximum Power Spectral Density_TNVN_11N40_5795_Ant1



Maximum Power Spectral Density_TNVN_11AC20_5180_Ant1



Maximum Power Spectral Density_TNVN_11AC20_5200_Ant1

