Test Report

Report No.:	MTi220114004-04E2
Date of issue:	2022-08-19
Applicant:	INSTAR Deutschland GmbH
Product name:	IP / NETWORK CAMERA
Model(s):	IN-9408 2K+, IN-9406 2K+, IN-9409 2K+, IN-9016 2K+
FCC ID:	SO6-IN9408

Shenzhen Microtest Co., Ltd.
http://www.mtitest.com

Address: 101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China.
Tel: (86-755)88850135 Fax: (86-755) 88850136 Web: www.mtitest.com E-mail: mti@51mti.com

Instructions

1. The report shall not be partially reproduced without the written consent of the laboratory;
2. The test results of this report are only responsible for the samples submitted;
3. This report is invalid without the seal and signature of the laboratory;
4. This report is invalid if transferred, altered or tampered with in any form without authorization;
5. Any objection to this report shall be submitted to the laboratory within 15 days from the date of receipt of the report.

Table of Contents

1 GENERAL INFORMATION 6

1.1 DESCRIPTION OF EUT 6
1.2 OPERATION CHANNEL LIST 7
1.3 TEST CHANNEL LIST 7
1.4 ANCILLARY EQUIPMENT LIST 8
1.5 DESCRIPTION OF SUPPORT UNITS 8

2 SUMMARY OF THE TEST RESULTS 9

3 TEST FACILITIES AND ACCREDITATIONS 10

3.1 TEST LABORATORY 10
3.2 ENVIRONMENTAL CONDITIONS 10
3.3 MEASUREMENT UNCERTAINTY 11
3.4 TEST SOFTWARE 11

4 EQUIPMENT LIST 12

5 TEST RESULTS 13

5.1 ANTENNA REQUIREMENT 13
5.1.1 Standard requirement 13
5.1.2 EUT Antenna 13
5.2 DUTY CYCLE 13
5.3 RF OUTPUT POWER 14
5.3.1 Limit 14
5.3.2 Test procedure 14
5.3.3 Test setup 14
5.3.4 Test results 15
5.4 POWER LINE CONDUCTED EMISSION 17
5.4.1 Limits 17
5.4.2 Test setup 17
5.4.3 Test procedure 18
5.4.4 Test results 19
5.5 26DB EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH 23
5.5.1 Limit 23
5.5.2 Test procedure 23
5.5.3 Test setup 23
5.5.4 Test results 24
5.6 6DB BANDWIDTH 28
5.6.1 Limit 28
5.6.2 Test procedure 28
5.6.3 Test setup 28
5.6.4 Test results 28
5.7 CONDUCTED SPURIOUS EMISSION 33
5.7.1 Limits 33
5.7.2 Test setup 33
5.7.3 Test procedure 33
5.7.4 Test results 34
5.8 CONDUCTED BAND EDGE EMISSION 49
5.8.1 Limits 49
5.8.2 Test setup 49
5.8.3 Test procedure 49
5.8.4 Test results 50
5.9 RADIATED SPURIOUS EMISSION 54
5.9.1 Radiated Emission Limits 54

5.9.2 Test procedure *56*
5.9.3 Test setup *56*
5.9.4 Test results *58*
5.10 POWER SPECTRAL DENSITY 77
5.10.1 Limit *77*
5.10.2 Test procedure *77*
5.10.3 Test setup *78*
5.10.4 Test results *78*
5.11 FREQUENCY STABILITY MEASUREMENT 86
5.11.1 Test Results *86*

PHOTOGRAPHS OF THE TEST SETUP 92

PHOTOGRAPHS OF THE EUT 94

TEST RESULT CERTIFICATION

Applicant's name.....	INSTAR Deutschland GmbH
Address.....	Auf Der Hostert 17, 65510 Hünstetten Bechtheim, Germany
Manufacturer's Name	INSTAR Deutschland GmbH
Address.....	Auf Der Hostert 17, 65510 Hünstetten Bechtheim, Germany
Product description	
Product name	IP / NETWORK CAMERA
Trademark	INSTAR
Model Name	IN-9408 2K+
Series Model	IN-9406 2K+, IN-9409 2K+, IN-9016 2K+
Standards.....	FCC Part 15.407
Test procedure	ANSI C63.10-2013 KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Date of Test	
Date (s) of performance of tests..... :	2022-07-26 ~ 2022-08-19
Test Result ..... :	Pass

This device described above has been tested by Shenzhen Microtest Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Testing Engineer : Cindy Qin

(Cindy Qin)

Technical Manager : Leon Chen

(Leon Chen)

Authorized Signatory : Tom Xue

(Tom Xue)

1 General information

1.1 Description of EUT

Equipment:	IP / NETWORK CAMERA
Model name:	IN-9408 2K+
Series model:	IN-9406 2K+, IN-9409 2K+, IN-9016 2K+
Model difference:	All the models are the same circuit and module, except the model name.
Frequency range:	U-NII-1: 5180 MHz to 5240 MHz, U-NII-3: 5745 MHz to 5825 MHz
Modulation type:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
Transfer rate:	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40): MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40):NSS1, MCS0-MCS9 802.11ac(VHT80) :NSS1,MCS0-MCS9
Channel bandwidth:	802.11a: 20 MHz 802.11n: 20 MHz, 40 MHz 802.11ac: 20 MHz, 40 MHz, 80MHz
Antenna type:	External antenna
Antenna gain:	U-NII-1: 2.52dBi U-NII-3: 1.9dBi
Max. output power:	U-NII-1: 17.38dBm U-NII-3: 16.49dBm
Hardware version:	2021_04_26 V1.0
Software version:	0.1a
Power supply:	Input: DC 12V/2A
Adapter information:	Adapter: MODEL: FJ-SW1202000N INPUT: 100-240V~50/60Hz 0.6A Max OUTPUT: 12.0V⎓2.0A, 24.0W
Test sample number:	MTi220114004-04-S0001

1.2 Operation channel list

For U-NII-1:

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
36	5180	38	5190	42	5120
40	5200	46	5230	--	--
44	5220	--	--	--	--
48	5240	--	--	--	--

For U-NII-3:

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
149	5745	151	5755	155	5775
153	5765	159	5795	--	--
157	5785	--	--	--	--
161	5805	--	--	--	--
165	5825	--	--	--	--

1.3 Test channel list

U-NII-1 (5150 - 5250 MHz)			U-NII-3(5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
36	Low	5180	149	Low	5745
44	Mid	5220	157	Mid	5785
48	High	5240	165	High	5825

80 MHz	
Channel Number	Frequency (MHz)
42	5210

For 802.11n/ac (HT40)

U-NII-1 (5150 - 5250 MHz)			U-NII-3(5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
38	Low	5190	151	Low	5755
46	High	5230	159	High	5795

80 MHz	
Channel Number	Frequency (MHz)
155	5775

1.4 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
/	/	/	/	/

1.5 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
/	/	/	/	/	/
/	/	/	/	/	/

Note:

(1)The support equipment was authorized by Declaration of Confirmation.

(2)For detachable type I/O cable should be specified the length in cm in『Length』column.

2 Summary of the Test Results

Test procedures according to the technical standards:

No.	Standard Section	Test Item	Result	Remark
1	15.203/15.407	Antenna Requirement	Pass	
2	15.407(a)	RF Output Power	Pass	
3	15.207	Power Line Conducted Emission	Pass	
4	15.407(a)	26dB Emission Bandwidth and Occupied bandwidth	Pass	
5	15.407(e)	6 dB bandwidth	Pass	
6	15.407(a)	Power Spectral Density	Pass	
7	15.407(b) 15.209	Radiation Spurious Emission	Pass	
8	15.407(b)	Conducted emission at the band edge	Pass	
9	15.407(b)	Conducted spurious emissions	Pass	
10	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01 Chapter II Section B	Duty Cycle	Pass	

3 Test Facilities and Accreditations

3.1 Test laboratory

Test Laboratory	Shenzhen Microtest Co., Ltd
Location	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China.
FCC Registration No.:	448573

3.2 Environmental conditions

Temperature:	15ºC~35ºC
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa

3.3 Measurement uncertainty

The reported uncertainty of measurement y ± U · where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 · providing a level of confidence of approximately 95 %

No.	Item	Uncertainty
1	Conducted Emission Test	±1.38dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(<1G)	±4.68dB
5	All emissions, radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

3.4 Test software

Software Name	Manufacturer	Model	Version
Bluetooth and WiFi Test System	Shenzhen JS tonscend co., ltd	JS1120-3	2.5.77.0418

4 Equipment list

Equipment No.	Equipment Name	Manufacturer	Model	Serial No.	Calibration date	Due date
MTI-E043	EMI Test Receiver	Rohde&schwarz	ESCI7	101166	2022/05/05	2023/05/04
MTI-E044	TRILOG Broadband Antenna	schwarabeck	VULB 9163	9163-1338	2021/05/30	2023/05/29
MTI-E047	Amplifier	Hewlett-Packard	8447F	3113A06150	2022/05/05	2023/05/04
MTI-E089	ESG Vector Signal Generator	Agilent	N5182A	MY49060455	2022/05/05	2023/05/04
MTI-E058	ESG Series Analog Ssignal Generator	Agilent	E4421B	GB40051240	2022/05/05	2023/05/04
MTI-E062	PXA Signal Analyzer	Agilent	N9030A	MY51350296	2022/05/05	2023/05/04
MTI-E066	MXA Signal Analyzer	Agilent	N9020A	MY50143483	2022/05/05	2023/05/04
MTi-E067	RF Control Unit	Tonscend	JS0806-1	19D8060152	2022/05/05	2023/05/04
MTI-E078	Synthesized Sweeper	Agilent	83752A	3610A01957	2022/05/05	2023/05/04
MTI-E079	DC Power Supply	Agilent	E3632A	MY40027695	2022/05/05	2023/05/04
MTI-E045	Double Ridged Broadband Horn Antenna	schwarabeck	BBHA 9120 D	9120D-2278	2021/05/30	2023/05/29
MTI-E021	EMI Test Receiver	Rohde&schwarz	ESCS30	100210	2022/05/05	2023/05/04
MTI-E022	Pulse Limiter	Schwarzbeck	VSTD 9561-F	00679	2022/05/05	2023/05/04
MTI-E023	Artificial mains network	Schwarzbeck	NSLK 8127	NSLK 8127 #841	2022/05/05	2023/05/04
MTI-E046	Active Loop Antenna	Schwarzbeck	FMZB 1519 B	00044	2021/05/30	2023/05/29
MTI-E048	Amplifier	Agilent	8449B	3008A02400	2022/05/05	2023/05/04
MTI-E072	Thermometer Clock Humidity Monitor	-	HTC-1	/	2022/05/05	2023/05/04
Note: the calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to international system unit (SI).						

5 Test Results

5.1 Antenna requirement

5.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

5.1.2 EUT Antenna

The antenna is External antenna, which was permanently affixed to the device and un-replaced, complies with 15.203. In addition, the maximum antenna gain is U-NII-1: 2.52dBi, U-NII-3: 1.9dBi.

5.2 Duty cycle

5GHz (NII) operation is possible in 20MHz, 40MHz and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 8MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	Duty cycle factor (dB)
11a	--	--	100	0
11n (HT20)	--	--	100	0
11n (HT40)	--	--	100	0
11ac (HT20)	--	--	100	0
11ac (HT40)	--	--	100	0
11ac (HT80)	--	--	100	0

Remark:
1) Duty cycle = On time/period
2) Duty cycle factor =10*log(1/ Duty cycle)

5.3 RF output power

5.3.1 Limit

For the 5.15-5.25 GHz band

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz band

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. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

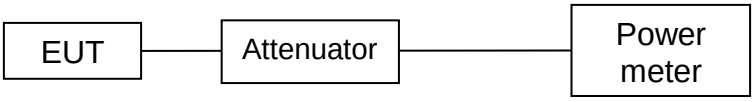
For the band 5.725-5.85 GHz

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. 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.

5.3.2 Test procedure

The maximum peak conducted output power may be measured using a broadband Average RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector.

5.3.3 Test setup



5.3.4 Test results

For U-NII-1

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11a	CH36 (5180)	15.99	0	15.99	24
11a	CH40 (5200)	17.38	0	17.38	24
11a	CH48 (5240)	15.76	0	15.76	24
11n (HT20)	CH36 (5180)	15.69	0	15.69	24
11n (HT20)	CH40 (5200)	14.95	0	14.95	24
11n (HT20)	CH48 (5240)	14.48	0	14.48	24
11n (HT40)	CH38 (5190)	14.12	0	14.12	24
11n (HT40)	CH46 (5230)	14.1	0	14.1	24

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11ac (HT20)	CH36 (5180)	12.56	0	12.56	24
11ac (HT20)	CH40 (5200)	12.55	0	12.55	24
11ac (HT20)	CH48 (5240)	12.46	0	12.46	24
11ac (HT40)	CH38 (5190)	12.11	0	12.11	24
11ac (HT40)	CH46 (5230)	12.15	0	12.15	24
11ac (HT80)	CH42 (5210)	13.04	0	13.04	24

Remak:
1. Corr'd power = Meas power + Duty Cycle Factor

For U-NII-3

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11a	CH149 (5745)	15.84	0	15.84	30
11a	CH157 (5785)	16.02	0	16.02	30
11a	CH165 (5825)	16.49	0	16.49	30
11n (HT20)	CH149 (5745)	14.35	0	14.35	30
11n (HT20)	CH157 (5785)	15.01	0	15.01	30
11n (HT20)	CH165 (5825)	15.26	0	15.26	30
11n (HT40)	CH151 (5755)	14.52	0	14.52	30
11n (HT40)	CH159 (5795)	14.8	0	14.8	30

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11ac (HT20)	CH149 (5745)	11.89	0	11.89	30
11ac (HT20)	CH157 (5785)	13.01	0	13.01	30
11ac (HT20)	CH165 (5825)	13.19	0	13.19	30
11ac (HT40)	CH151 (5755)	12.23	0	12.23	30
11ac (HT40)	CH159 (5795)	12.38	0	12.38	30
11ac (HT80)	CH155 (5775)	14.02	0	14.02	30

Remak:
1. Corr'd power = Meas power + Duty Cycle Factor

5.4 Power line conducted emission

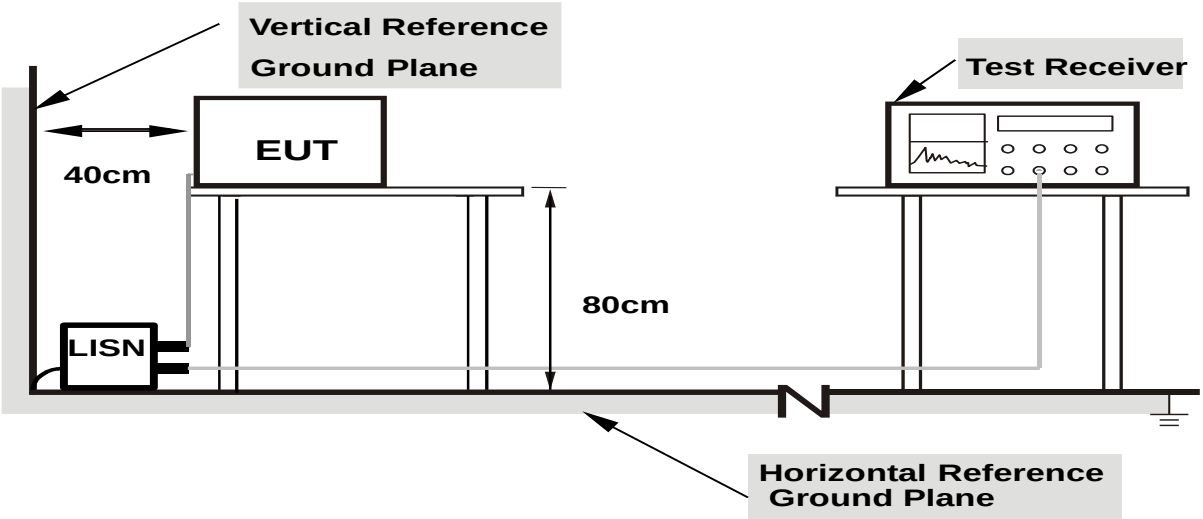
5.4.1 Limits

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note

1. The tighter limit applies at the band edges.
2. The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.4.2 Test setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.4.3 Test procedure

a. EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b. The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

c. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

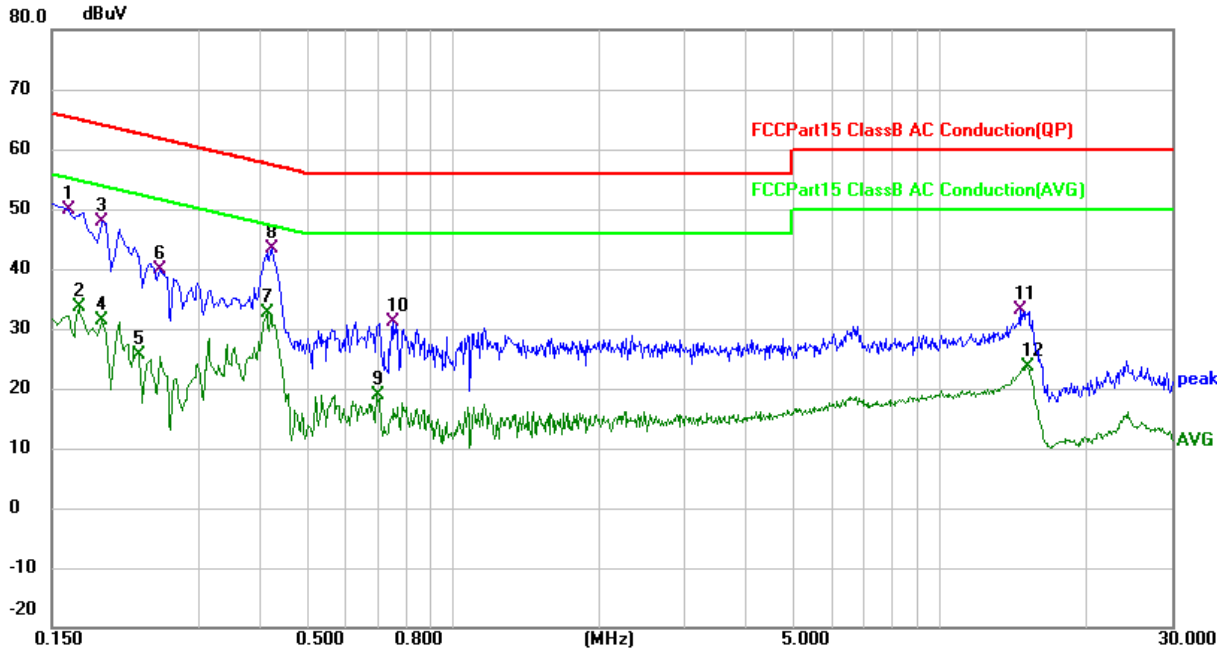
e. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

f. LISN at least 80 cm from nearest part of EUT chassis.

For the actual test configuration, please refer to the related Item –EUT Test Photos.

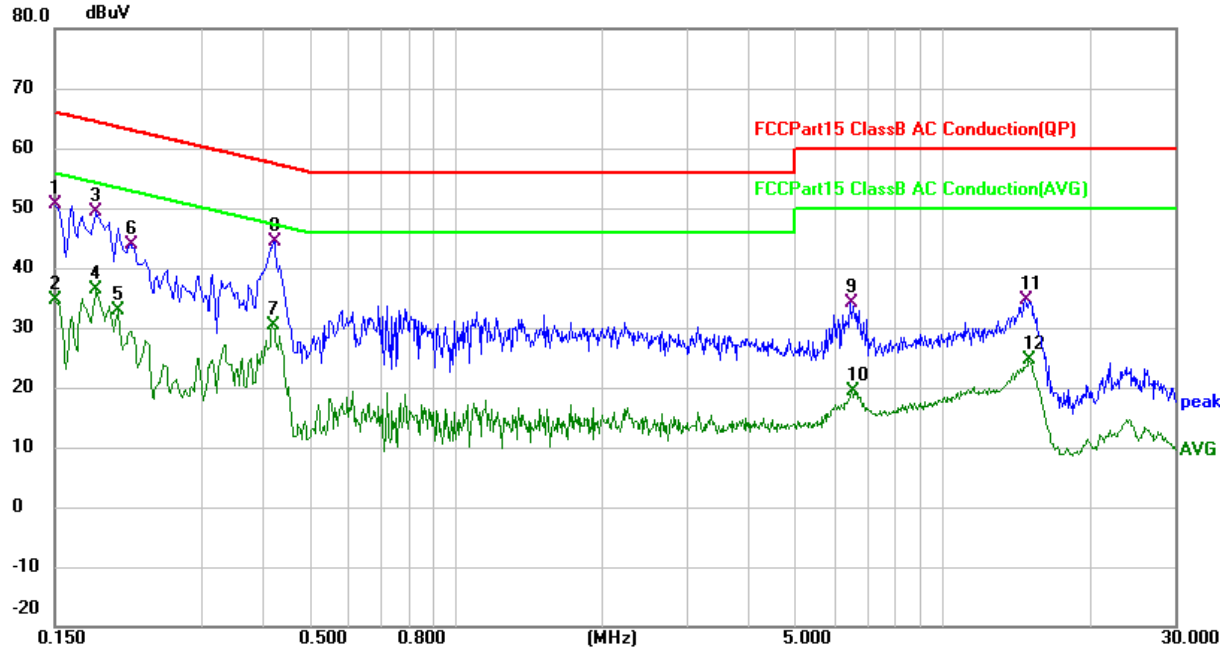
5.4.4 Test results

EUT:	IP / NETWORK CAMERA	Model Name:	IN-9408 2K+
Pressure:	1010hPa	Phase:	L
Test Voltage:	DC 12V from adapter AC 120V/60Hz	Test Mode:	Charging+TX



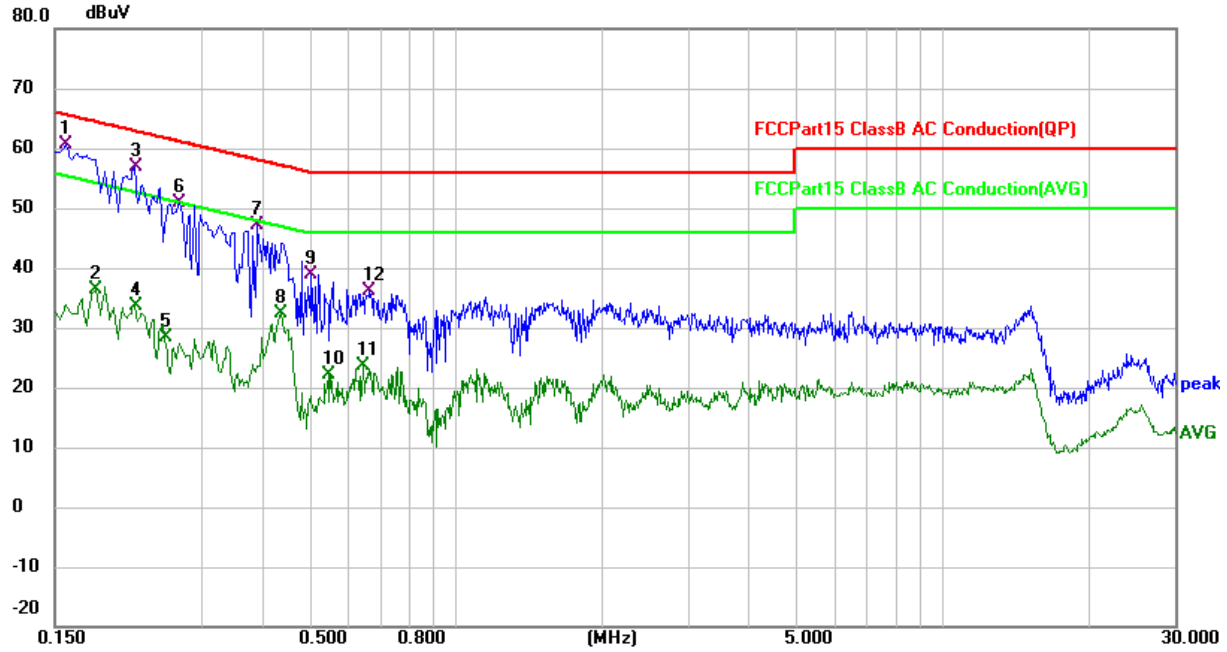
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1620	39.55	10.28	49.83	65.36	-15.53	QP
2		0.1700	23.24	10.28	33.52	54.96	-21.44	AVG
3		0.1900	37.28	10.66	47.94	64.04	-16.10	QP
4		0.1900	20.74	10.66	31.40	54.04	-22.64	AVG
5		0.2260	14.93	10.73	25.66	52.60	-26.94	AVG
6		0.2500	29.20	10.77	39.97	61.76	-21.79	QP
7		0.4140	21.43	11.12	32.55	47.57	-15.02	AVG
8	*	0.4220	32.29	11.14	43.43	57.41	-13.98	QP
9		0.6980	7.07	11.77	18.84	46.00	-27.16	AVG
10		0.7580	19.35	11.89	31.24	56.00	-24.76	QP
11		14.6060	22.63	10.51	33.14	60.00	-26.86	QP
12		15.0660	13.14	10.51	23.65	50.00	-26.35	AVG

EUT:	IP / NETWORK CAMERA	Model Name:	IN-9408 2K+
Pressure:	1010hPa	Phase:	N
Test Voltage:	DC 12V from adapter AC 120V/60Hz	Test Mode:	Charging+TX



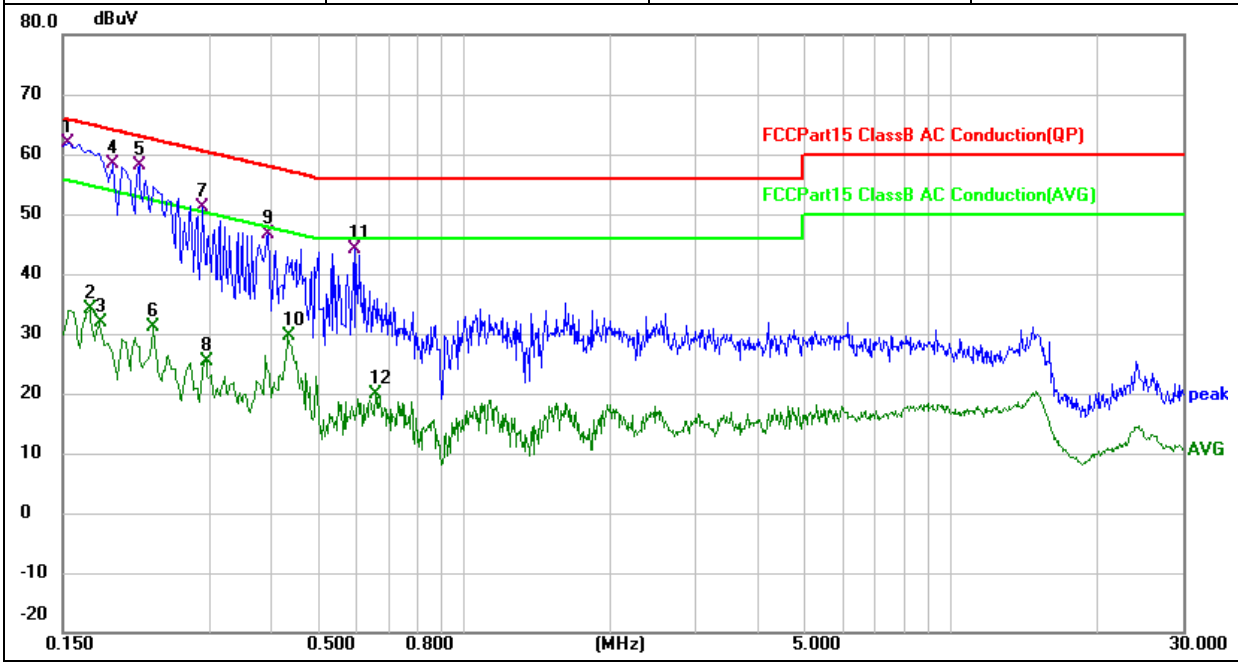
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1500	40.46	10.29	50.75	66.00	-15.25	QP
2		0.1500	24.46	10.29	34.75	56.00	-21.25	AVG
3		0.1819	38.77	10.59	49.36	64.40	-15.04	QP
4		0.1819	25.79	10.59	36.38	54.40	-18.02	AVG
5		0.2020	22.29	10.60	32.89	53.53	-20.64	AVG
6		0.2140	33.20	10.62	43.82	63.05	-19.23	QP
7		0.4180	19.40	11.09	30.49	47.49	-17.00	AVG
8	*	0.4220	33.30	11.10	44.40	57.41	-13.01	QP
9		6.4820	23.82	10.28	34.10	60.00	-25.90	QP
10		6.4980	9.00	10.28	19.28	50.00	-30.72	AVG
11		14.8260	24.16	10.49	34.65	60.00	-25.35	QP
12		15.0180	14.06	10.49	24.55	50.00	-25.45	AVG

EUT:	IP / NETWORK CAMERA	Model Name:	IN-9408 2K+
Pressure:	1010hPa	Phase:	L
Test Voltage:	DC 5V from adapter AC 240V/60Hz	Test Mode:	Charging+TX



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1580	50.39	10.28	60.67	65.57	-4.90	QP
2		0.1819	25.86	10.64	36.50	54.40	-17.90	AVG
3		0.2180	46.21	10.72	56.93	62.89	-5.96	QP
4		0.2180	23.01	10.72	33.73	52.89	-19.16	AVG
5		0.2521	17.62	10.77	28.39	51.69	-23.30	AVG
6		0.2700	40.14	10.81	50.95	61.12	-10.17	QP
7		0.3899	36.11	11.08	47.19	58.07	-10.88	QP
8		0.4380	21.19	11.19	32.38	47.10	-14.72	AVG
9		0.5060	27.57	11.34	38.91	56.00	-17.09	QP
10		0.5460	10.81	11.43	22.24	46.00	-23.76	AVG
11		0.6460	12.02	11.65	23.67	46.00	-22.33	AVG
12		0.6660	24.44	11.69	36.13	56.00	-19.87	QP

EUT:	IP / NETWORK CAMERA	Model Name:	IN-9408 2K+
Pressure:	1010hPa	Phase:	N
Test Voltage:	DC 5V from adapter AC 240V/60Hz	Test Mode:	Charging+TX



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.1539	51.70	10.28	61.98	65.79	-3.81	QP
2		0.1700	23.76	10.26	34.02	54.96	-20.94	AVG
3		0.1780	21.72	10.24	31.96	54.58	-22.62	AVG
4		0.1900	47.71	10.60	58.31	64.04	-5.73	QP
5		0.2140	47.53	10.62	58.15	63.05	-4.90	QP
6		0.2300	20.57	10.67	31.24	52.45	-21.21	AVG
7		0.2900	40.33	10.82	51.15	60.52	-9.37	QP
8		0.2940	14.66	10.82	25.48	50.41	-24.93	AVG
9		0.3940	35.50	11.02	46.52	57.98	-11.46	QP
10		0.4340	18.45	11.13	29.58	47.18	-17.60	AVG
11		0.5940	32.56	11.53	44.09	56.00	-11.91	QP
12		0.6580	8.10	11.69	19.79	46.00	-26.21	AVG

Note:

1. All the mode has been tested for this test, just incarnate report the worst mode 11a CH36 data.
2. Emission Level =Reading Level + Factor, Margin= Emission Level- Limit, Factor = LISN modulus + Cable Loss.

5.5 26dB Emission Bandwidth and Occupied bandwidth

5.5.1 Limit

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier

5.5.2 Test procedure

26d Emission bandwidth

Set RBW = approximately 1% of the emission bandwidth.

Set VBW ≥ 3*RBW

Detector = Peak.

Trace mode = Max hold.

Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

Occupied Bandwidth

Set Span = 1.5 times to 5.0 times the OBW

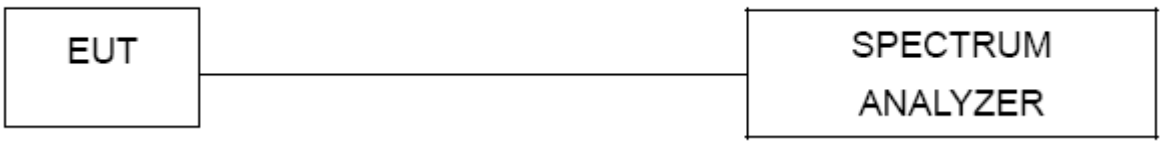
Set RBW = 1% to 5% of the OBW.

Set VBW ≥ 3*RBW, Detector = Peak.

Trace mode = Max hold.

Use the 99% power bandwidth function of the instrument.

5.5.3 Test setup



5.5.4 Test results

For U-NII-1

Channel	Test Channel	Frequency (MHz)	26dB bandwidth (MHz)	99% bandwidth	Limit (kHz)	Result
11a	CH36	5180	20.64	16.606	/	Pass
11a	CH40	5200	20.43	16.576	/	Pass
11a	CH48	5240	20.77	16.623	/	Pass
11n (HT20)	CH36	5180	21.30	17.709	/	Pass
11n (HT20)	CH40	5200	20.56	17.646	/	Pass
11n (HT20)	CH48	5240	20.84	17.652	/	Pass
11n (HT40)	CH38	5190	40.01	36.088	/	Pass
11n (HT40)	CH46	5230	41.59	36.273	/	Pass

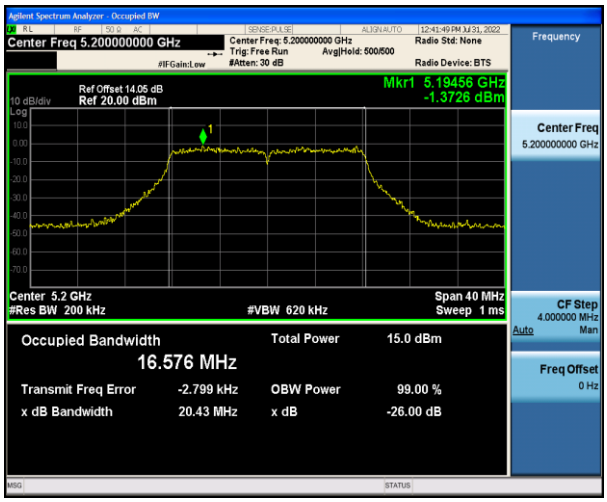
Channel	Test Channel	Frequency (MHz)	26dB bandwidth (MHz)	99% bandwidth	Limit (kHz)	Result
11ac (HT20)	CH36	5180	20.99	17.662	/	Pass
11ac (HT20)	CH40	5200	20.84	17.675	/	Pass
11ac (HT20)	CH48	5240	20.97	17.692	/	Pass
11ac (HT40)	CH38	5190	41.32	36.213	/	Pass
11ac (HT40)	CH46	5230	41.69	36.223	/	Pass
11ac (HT80)	CH42	5210	82.36	75.877	/	Pass

Test plots:

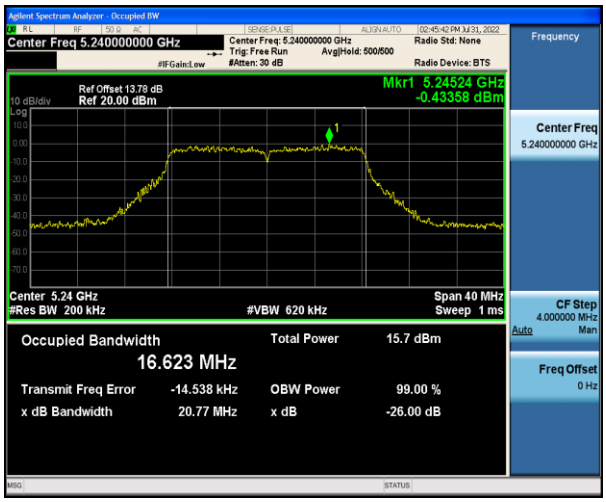
For U-NII-1

11a CH36

11a CH40



11a CH48



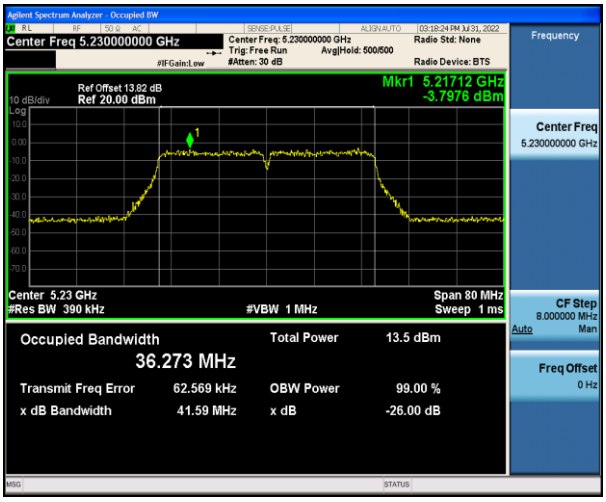
11n (HT20) CH36

11n (HT20) CH40

11n (HT20) CH48

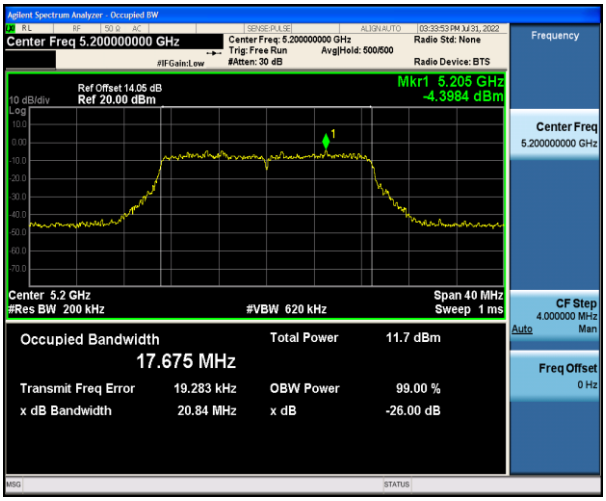
11n (HT40) CH38

11n (HT40) CH46



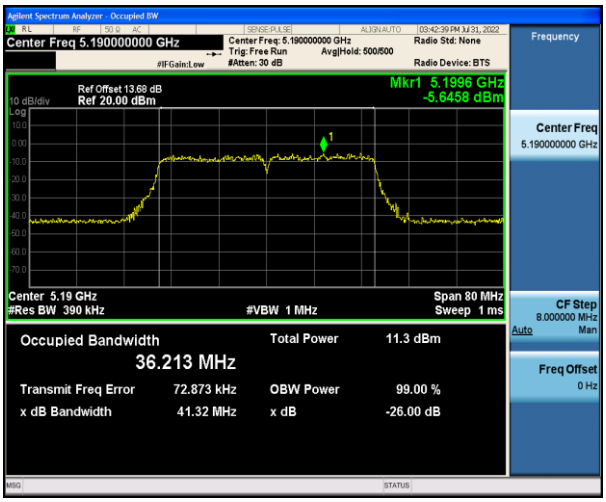
11ac (HT20) CH36

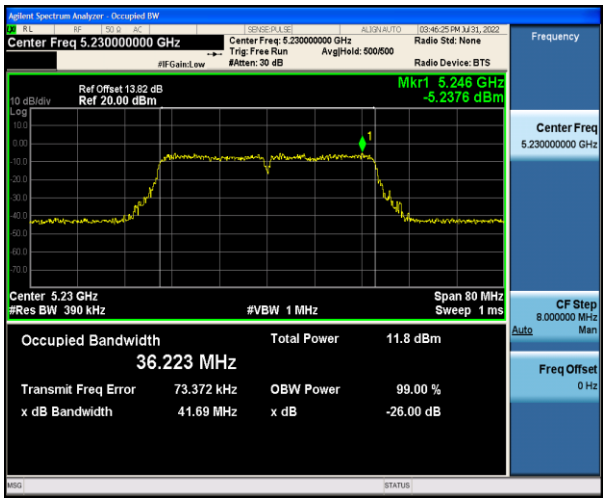
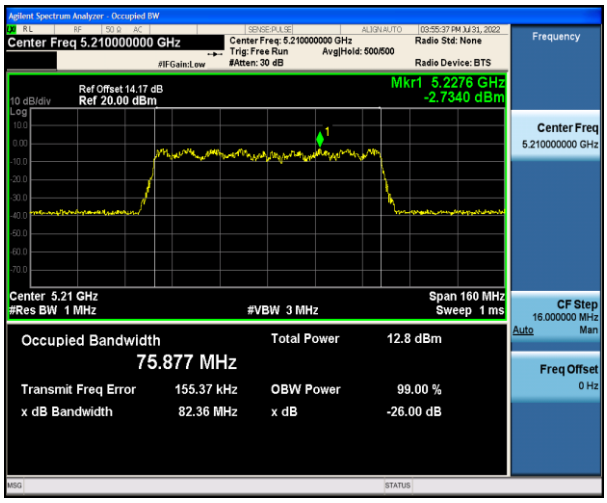
11ac (HT20) CH40



11ac (HT20) CH48

11ac (HT40) CH38



11ac (HT40) CH46	11ac (HT80) CH42
	

5.6 6dB Bandwidth

5.6.1 Limit

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier

5.6.2 Test procedure

1. Set RBW= 100 kHz.

2. Set the video bandwidth (VBW) ≥ 3 x RBW.

3. Detector = Peak.

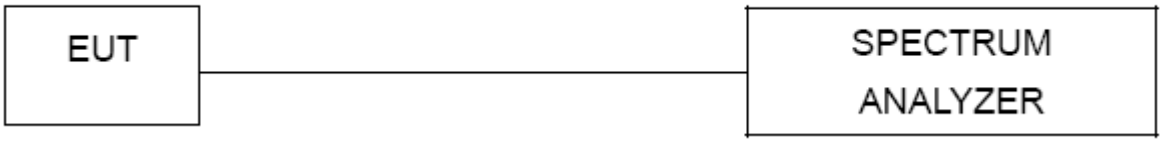
4. Trace mode = max hold.

5. Sweep = auto couple.

6. Allow the trace to stabilize.

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

5.6.3 Test setup



5.6.4 Test results

For U-NII-3

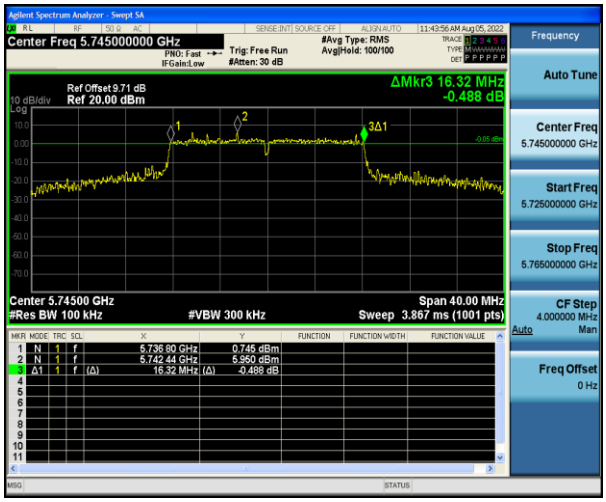
Channel	Test Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
11a	CH149	5745	16.320	500	Pass
11a	CH157	5785	15.680	500	Pass
11a	CH165	5825	16.280	500	Pass
11n (HT20)	CH149	5745	17.560	500	Pass
11n (HT20)	CH157	5785	17.560	500	Pass
11n (HT20)	CH165	5825	17.560	500	Pass
11n (HT40)	CH151	5755	35.920	500	Pass
11n (HT40)	CH159	5795	35.040	500	Pass

Channel	Test Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
11ac (HT20)	CH149	5745	17.560	500	Pass
11ac (HT20)	CH157	5785	17.280	500	Pass
11ac (HT20)	CH165	5825	17.560	500	Pass
11ac (HT40)	CH151	5755	35.520	500	Pass
11ac (HT40)	CH159	5795	35.440	500	Pass
11ac (HT80)	CH155	5775	75.040	500	Pass

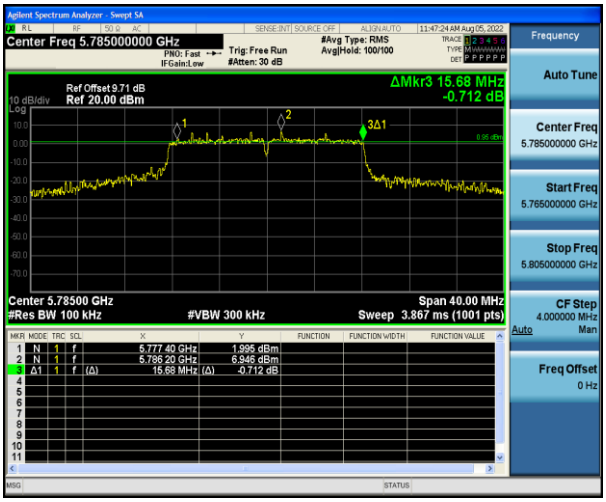
Test plots:

For U-NII-3

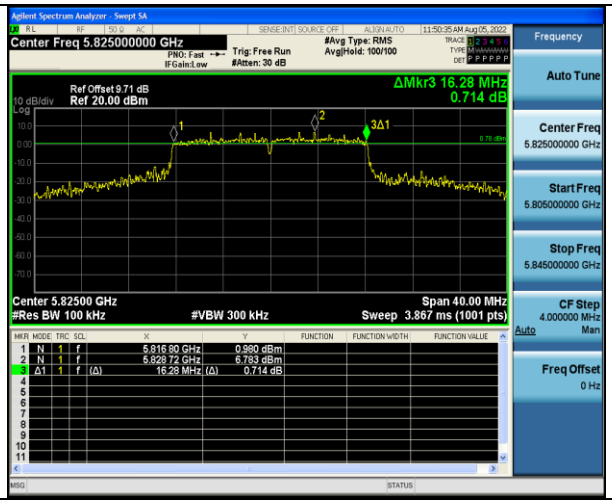
11a CH149



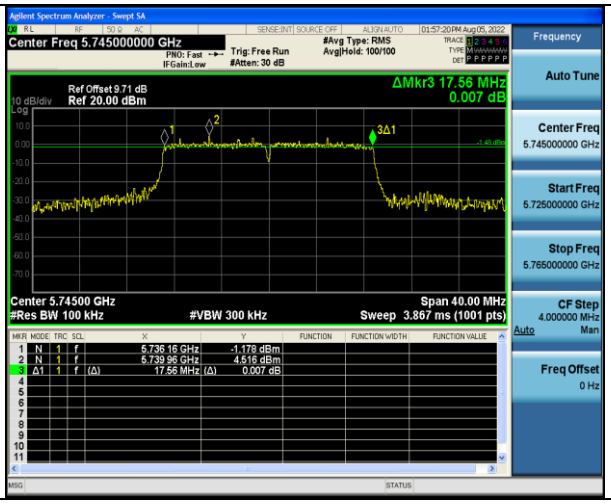
11a CH157



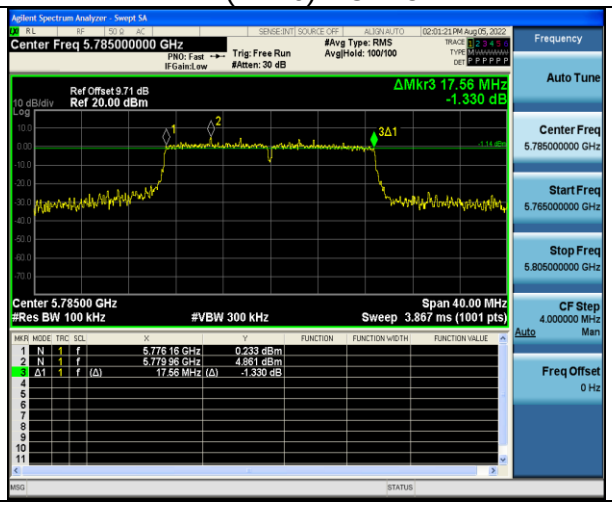
11a CH165



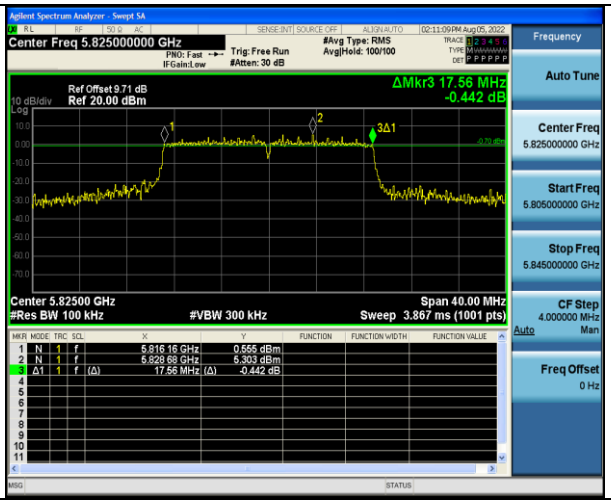
11n(HT20) CH149



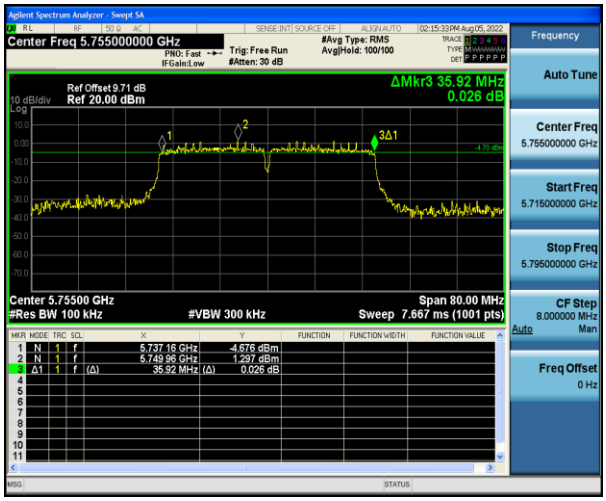
11n(HT20) CH157



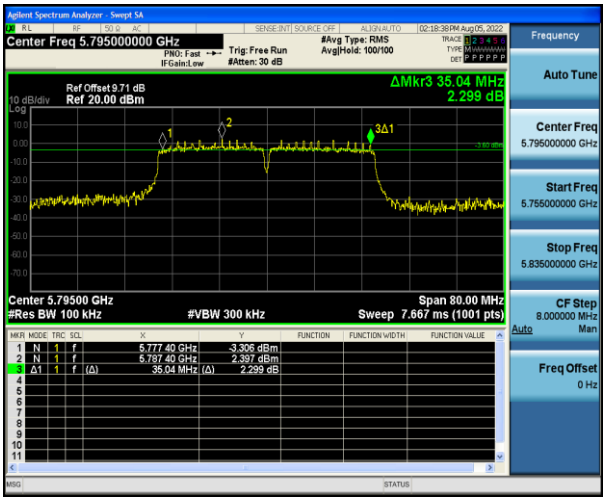
11n(HT20) CH165



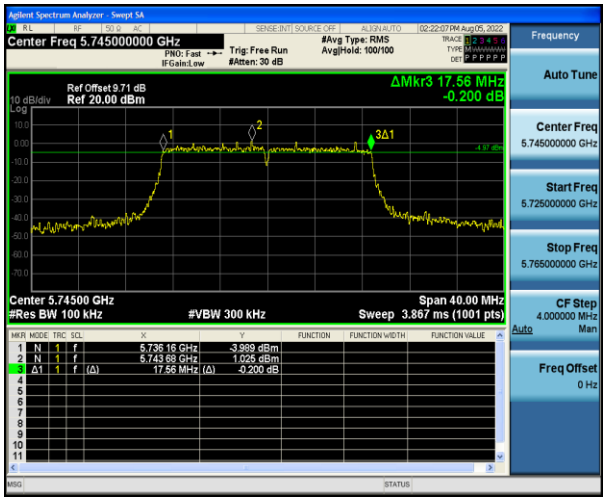
11n (HT40) CH151



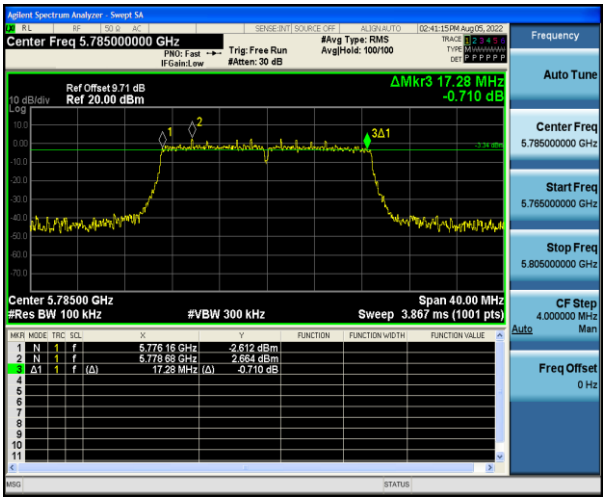
11n (HT40) CH159



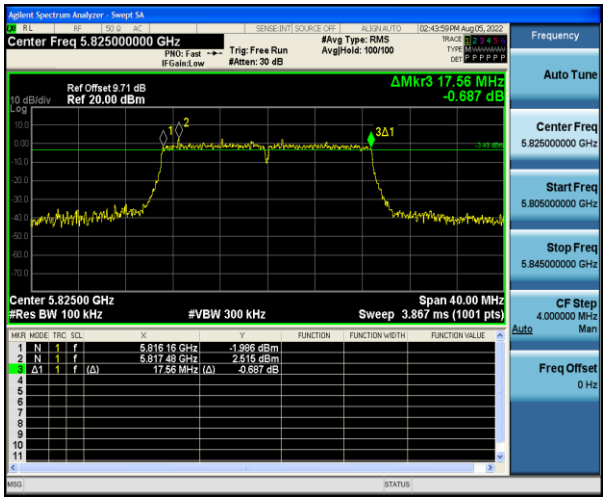
11ac (HT20) CH149



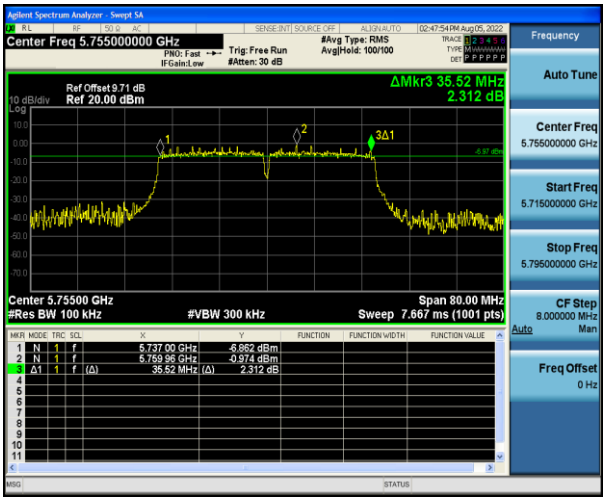
11ac (HT20) CH157

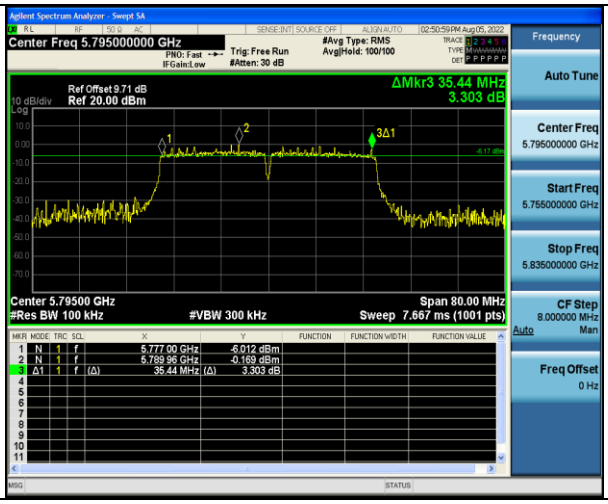
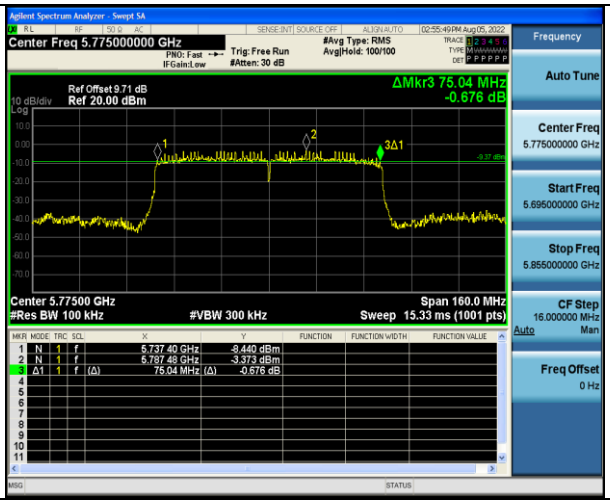


11ac(HT20) CH165



11ac(HT40) CH151



11ac(HT40) CH159	11ac(HT80) CH155
	

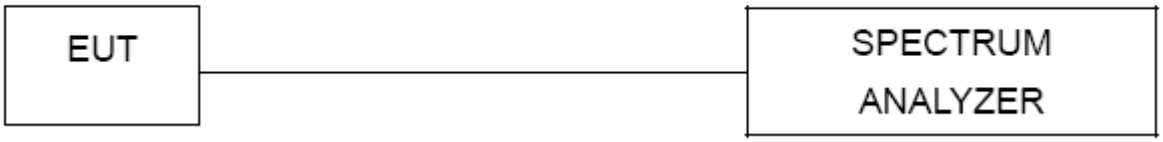
5.7 Conducted spurious emission

5.7.1 Limits

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

Frequency Band (MHz)	Limit
5150 - 5250	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5250 - 5350	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5470 - 5725	Outside of the 5.47-5.725 GHz band: e.i.r.p. -27 dBm
5725 - 5850	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.7.2 Test setup

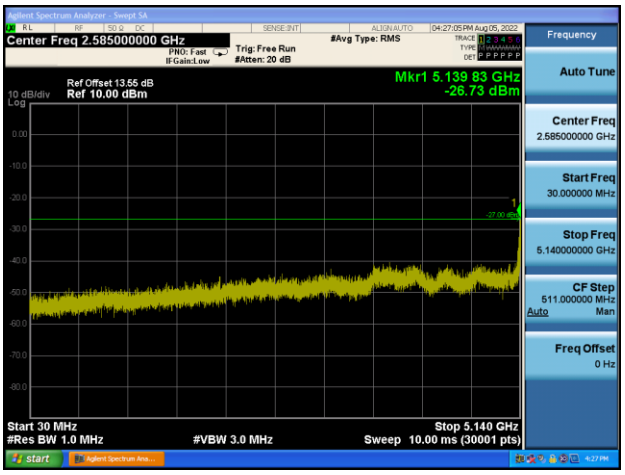
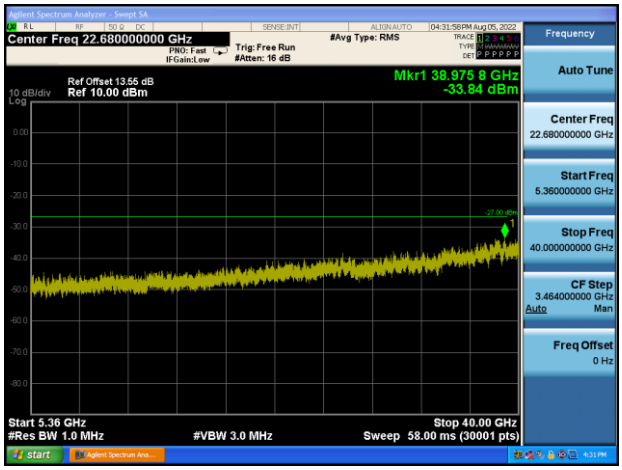
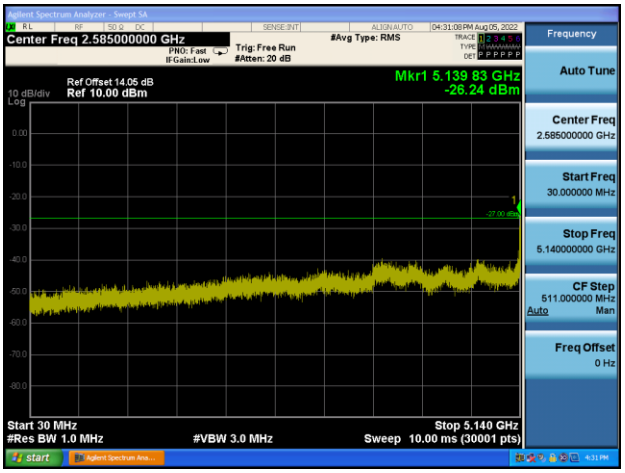
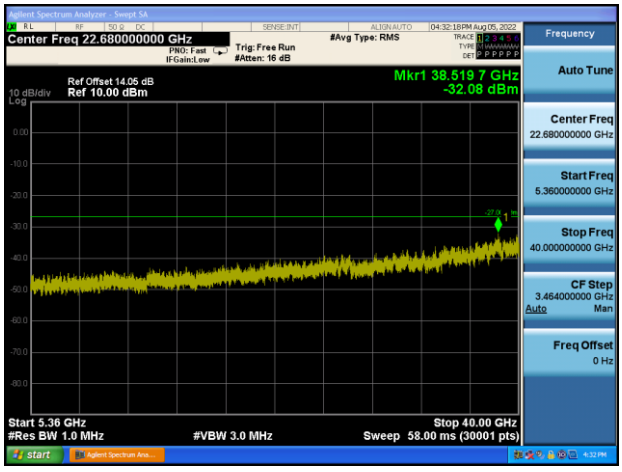
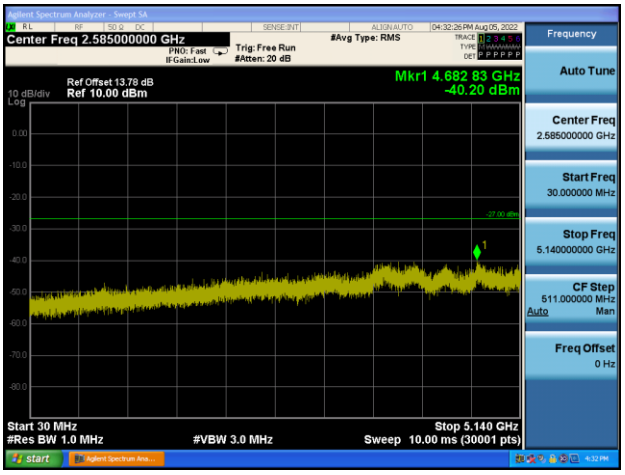
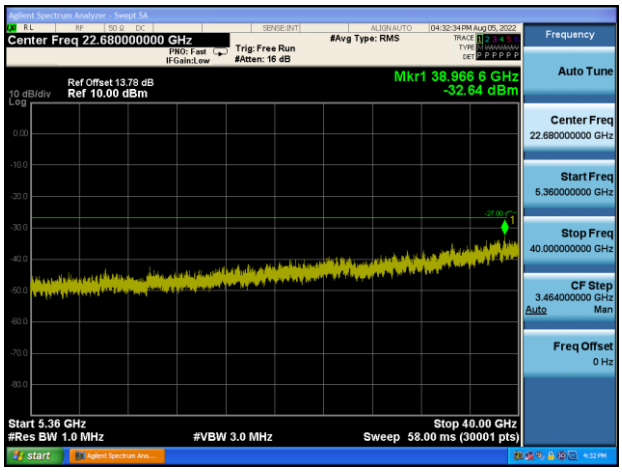


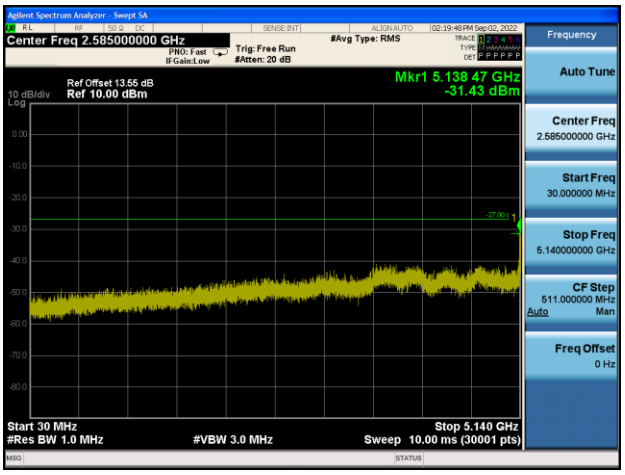
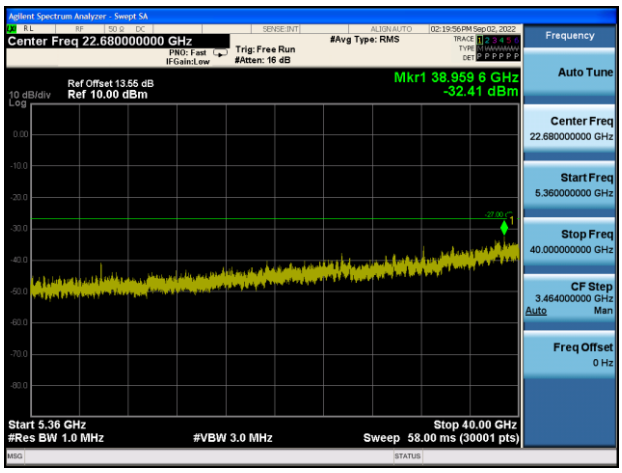
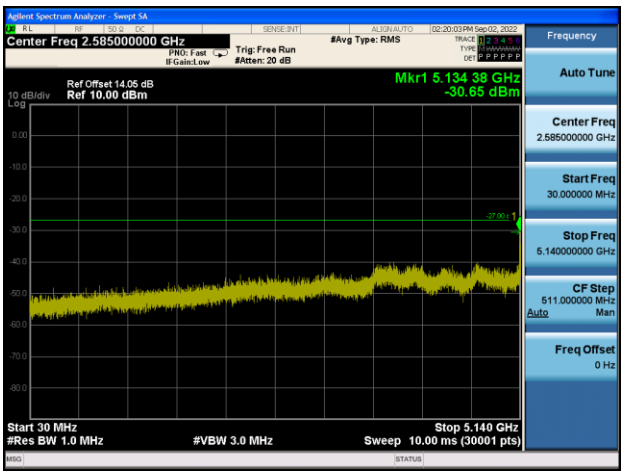
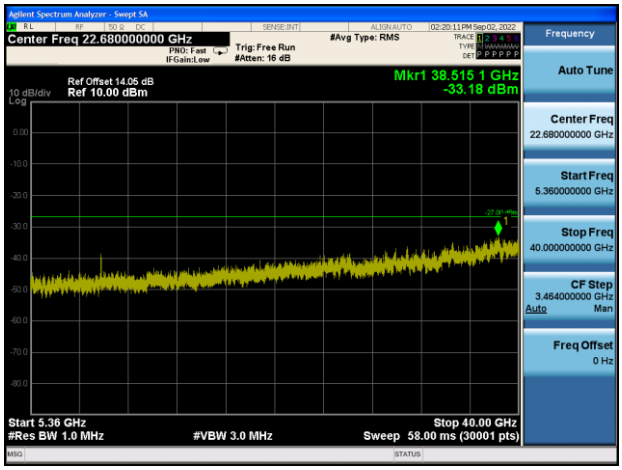
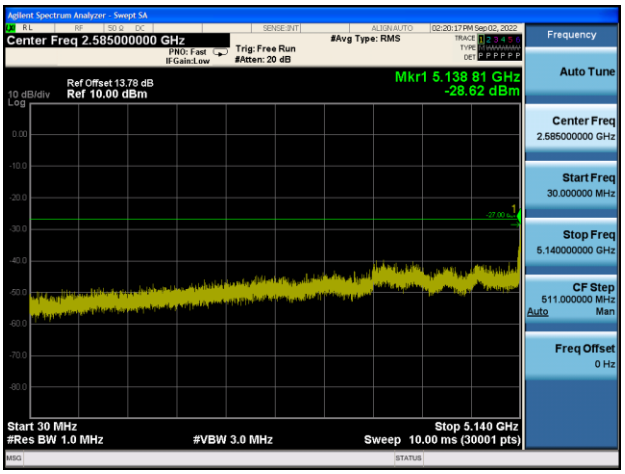
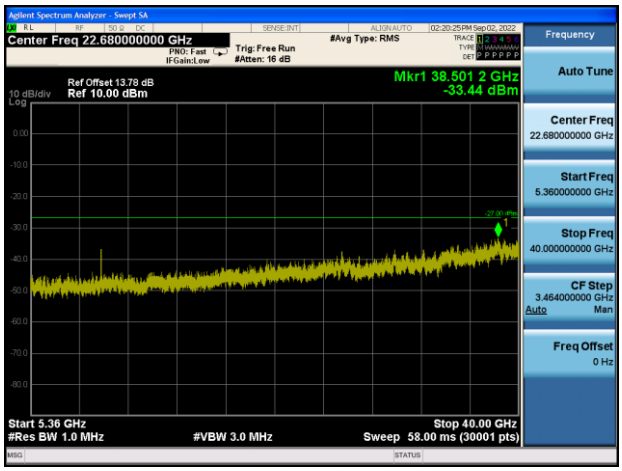
5.7.3 Test procedure

Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
RBW = 1 MHz for f ≥ 1 GHz, 100 kHz for f < 1 GHz
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
Allow the trace to stabilize

5.7.4 Test results

For U-NII-1

11a	
Low channel	Low channel
	
Middle channel	Middle channel
	
High channel	High channel
	

11n20	
Low channel	Low channel
	
Middle channel	Middle channel
	
High channel	High channel