



Microtest
微 测 检 测

Test Report

Report No.: MTi220601010-01E1

Date of issue: 2022-08-24

Applicant: SHENZHEN ZHUOPAI ELECTRONIC
TECHNOLOGY CO., LTD

Product name: Tesla instrument display

Model(s): T3, T5

FCC ID: 2A7EP-T3

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.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	15
5.3.1	Limit	15
5.3.2	Test procedure	15
5.3.3	Test setup	15
5.3.4	Test results	16
5.4	POWER LINE CONDUCTED EMISSION	18
5.4.1	Limits	18
5.4.2	Test setup	18
5.4.3	Test procedure	19
5.4.4	Test results	19
5.5	26dB EMISSION BANDWIDTH AND OCCUPIED BANDWIDTH	20
5.5.1	Limit	20
5.5.2	Test procedure	20
5.5.3	Test setup	20
5.5.4	Test results	21
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.....		93



TEST RESULT CERTIFICATION	
Applicant's name	SHENZHEN ZHUOPAI ELECTRONIC TECHNOLOGY CO., LTD
Address	1001-1003, Floor 10, Building A9, Tianrui Industrial Park, No.35, Fuyuan Road, Xinghe Community, Fuhai Street, Bao'an District, Shenzhen
Manufacturer's Name	SHENZHEN ZHUOPAI ELECTRONIC TECHNOLOGY CO., LTD
Address	1001-1003, Floor 10, Building A9, Tianrui Industrial Park, No.35, Fuyuan Road, Xinghe Community, Fuhai Street, Bao'an District, Shenzhen
Product description	
Product name	Tesla instrument display
Trademark	N/A
Model Name	T3
Series Model	T5
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..... :	2022-06-24 ~2022-08-24
Test Result	Pass

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:	Tesla instrument display
Model name:	T3
Series model:	T5
Model difference:	All the models are the same circuit and module, except the model name, Screen size, Screen interface and Screen Resolution. The screen of the T3 model is LVDS interface, its size is 8.9 inches, and its resolution is 1920*720. The screen of the T5 model is MIPI interface, the size is 10.26 inches, and its resolution is 1600*600.
Frequency range:	U-NII-1: 5150 MHz to 5250 MHz, U-NII-3: 5725 MHz to 5850 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:	FPC antenna
Antenna gain:	U-NII-1: 5.13dBi U-NII-3: 5.11dBi
Max. output power:	U-NII-1: 14.374dBm U-NII-3: 14.184dBm
Hardware version:	V0.2.X
Software version:	V0.3.X
Power supply:	Input: DC 12~18V, 800mA MAX
Adapter information:	N/A
Battery:	N/A
Serial number:	T3: MTi220601010-01-S0001 T5: MTi220601010-01-S0002



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
Accumulator	55D23LX	/	CAMEL	/

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	N/A	
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:	15°C~35°C
Humidity	20%~75%
Atmospheric pressure	98kPa~101kPa



3.3 Measurement uncertainty

The reported uncertainty of measurement $y \pm U$ where expanded 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	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

3.4 Test software

Software Name	Manufacturer	Model	Version
Bluetooth and WiFi Test System	Shenzhen JS tonskend 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	schwarzbeck	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 Signal 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	schwarzbeck	BBHA 9120D	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 1519B	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 FPC 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: 5.13dBi, U-NII-3: 5.11dBi.

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:

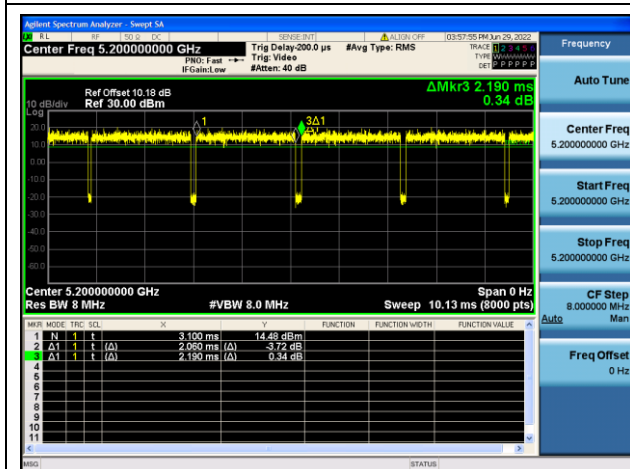
Test Mode	Transmission Duration (ms)	Transmission Period (ms)	Duty Cycle (%)	Duty cycle factor (dB)
11a	2.06	2.19	94.06	0.267
11n (HT20)	1.92	1.98	96.97	0.134
11n (HT40)	0.94	1.09	86.24	0.643
11ac (HT20)	1.93	2.05	94.15	0.262
11ac (HT40)	0.95	1.12	84.82	0.715
11ac (HT80)	0.46	0.64	71.88	1.444

Remark:

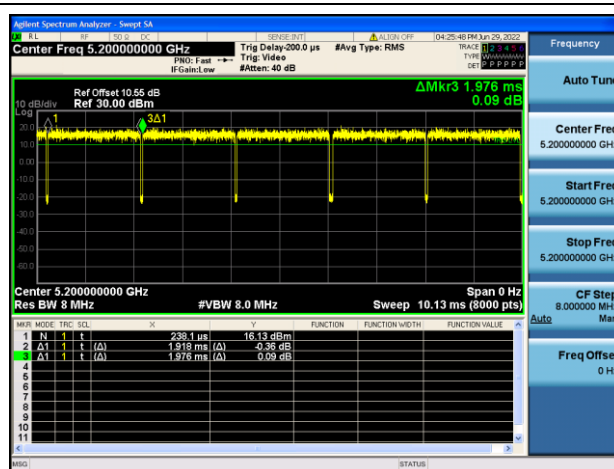
- 1) Duty cycle = On time/period
- 2) Duty cycle factor = $10 \cdot \log(1/\text{Duty cycle})$



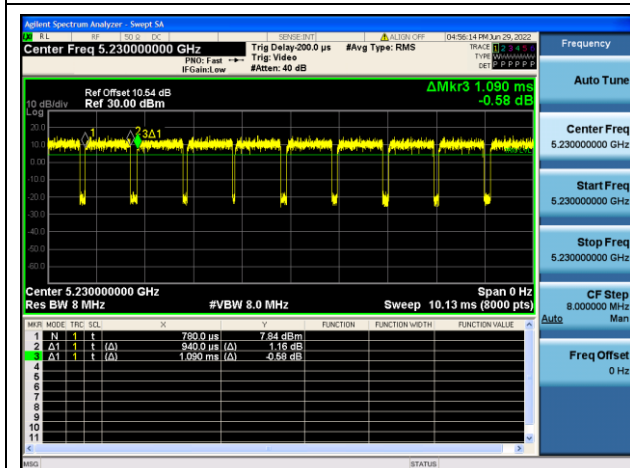
11a



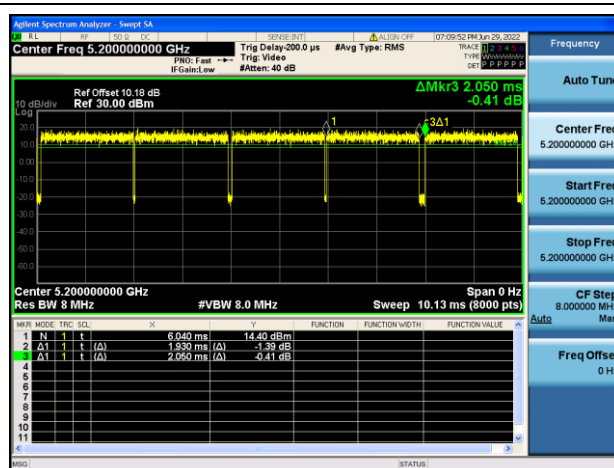
11n (HT20)



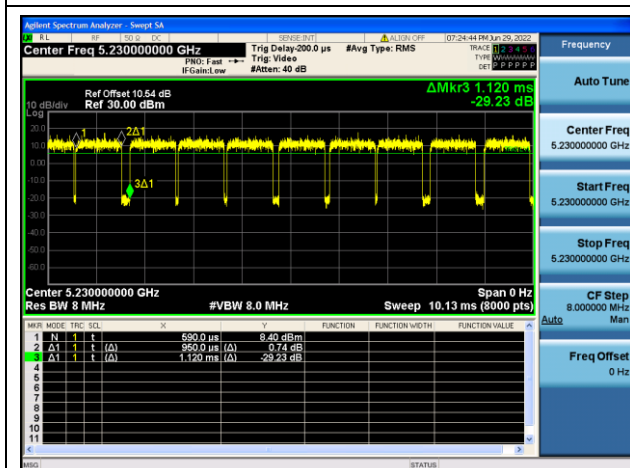
11n (HT40)



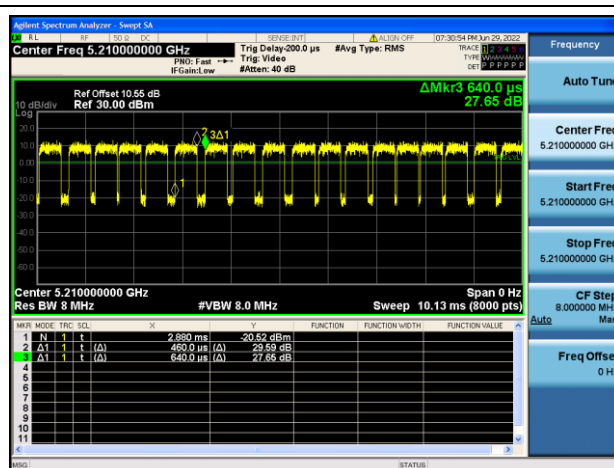
11ac (HT20)



11ac (HT40)



11ac (HT80)



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 $11 \text{ dBm} + 10 \log B$, 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.

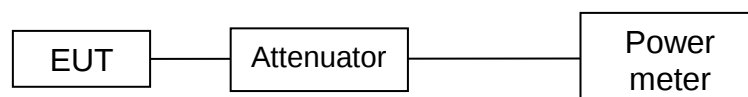
For the band 5.725-5.85 GHz

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)	12.51	0.267	12.777	24
11a	CH40 (5200)	12.82	0.267	13.087	24
11a	CH48 (5240)	12.28	0.267	12.547	24
11n (HT20)	CH36 (5180)	12.77	0.134	12.904	24
11n (HT20)	CH40 (5200)	12.18	0.134	12.314	24
11n (HT20)	CH48 (5240)	12.71	0.134	12.844	24
11n (HT40)	CH38 (5190)	12.66	0.643	13.303	24
11n (HT40)	CH46 (5230)	12.12	0.643	12.763	24

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11ac (HT20)	CH36 (5180)	12.8	0.262	13.062	24
11ac (HT20)	CH40 (5200)	12.57	0.262	12.832	24
11ac (HT20)	CH48 (5240)	12.16	0.262	12.422	24
11ac (HT40)	CH38 (5190)	12.83	0.715	13.545	24
11ac (HT40)	CH46 (5230)	12.87	0.715	13.585	24
11ac (HT80)	CH42 (5210)	12.93	1.444	14.374	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)	12.50	0.267	12.767	30
11a	CH157 (5785)	12.22	0.267	12.487	30
11a	CH165 (5825)	12.71	0.267	12.977	30
11n (HT20)	CH149 (5745)	12.38	0.134	12.514	30
11n (HT20)	CH157 (5785)	12.46	0.134	12.594	30
11n (HT20)	CH165 (5825)	12.90	0.134	13.034	30
11n (HT40)	CH151 (5755)	12.45	0.643	13.093	30
11n (HT40)	CH159 (5795)	12.62	0.643	13.263	30

Modulation mode	Channel/ Frequency (MHz)	Average Conducted Power (dBm)			Limit (dBm)
		Meas power	Duty Cycle Factor	Corr'd power	
11ac (HT20)	CH149 (5745)	12.22	0.262	12.482	30
11ac (HT20)	CH157 (5785)	12.02	0.262	12.282	30
11ac (HT20)	CH165 (5825)	12.62	0.262	12.882	30
11ac (HT40)	CH151 (5755)	11.91	0.715	12.625	30
11ac (HT40)	CH159 (5795)	12.34	0.715	13.055	30
11ac (HT80)	CH155 (5775)	12.74	1.444	14.184	30



5.4 Power line conducted emission

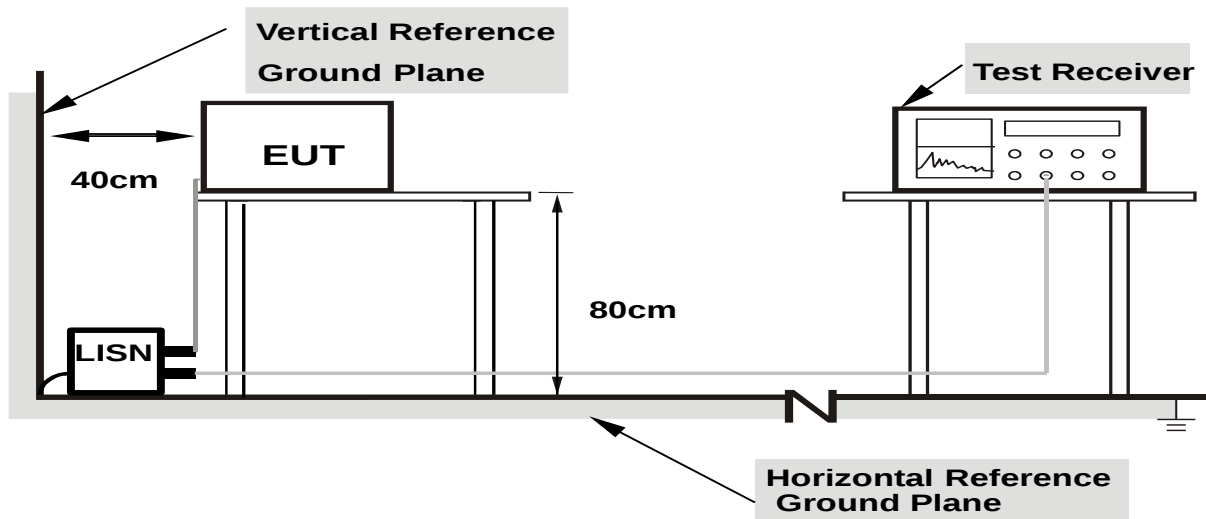
5.4.1 Limits

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

Note: The device is power by DC power source and does not apply to conducted emissions.



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 $\geq 3 \times \text{RBW}$

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

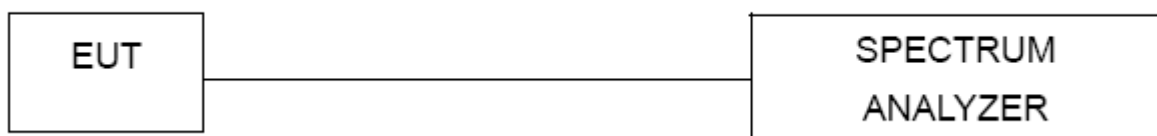
Set RBW = 1% to 5% of the OBW.

Set VBW $\geq 3 \times \text{RBW}$, 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	20.28	16.614	/	Pass
11a	CH40	5200	20.50	16.606	/	Pass
11a	CH48	5240	20.53	16.601	/	Pass
11n (HT20)	CH36	5180	20.72	17.613	/	Pass
11n (HT20)	CH40	5200	20.61	17.634	/	Pass
11n (HT20)	CH48	5240	20.67	17.637	/	Pass
11n (HT40)	CH38	5190	40.84	36.180	/	Pass
11n (HT40)	CH46	5230	40.87	36.199	/	Pass

Channel	Test Channel	Frequency (MHz)	26dB bandwidth (MHz)	99% bandwidth	Limit (kHz)	Result
11ac (HT20)	CH36	5180	20.62	17.677	/	Pass
11ac (HT20)	CH40	5200	21.29	17.617	/	Pass
11ac (HT20)	CH48	5240	21.09	17.638	/	Pass
11ac (HT40)	CH38	5190	41.85	36.189	/	Pass
11ac (HT40)	CH46	5230	41.59	36.326	/	Pass
11ac (HT80)	CH42	5210	82.49	75.530	/	Pass



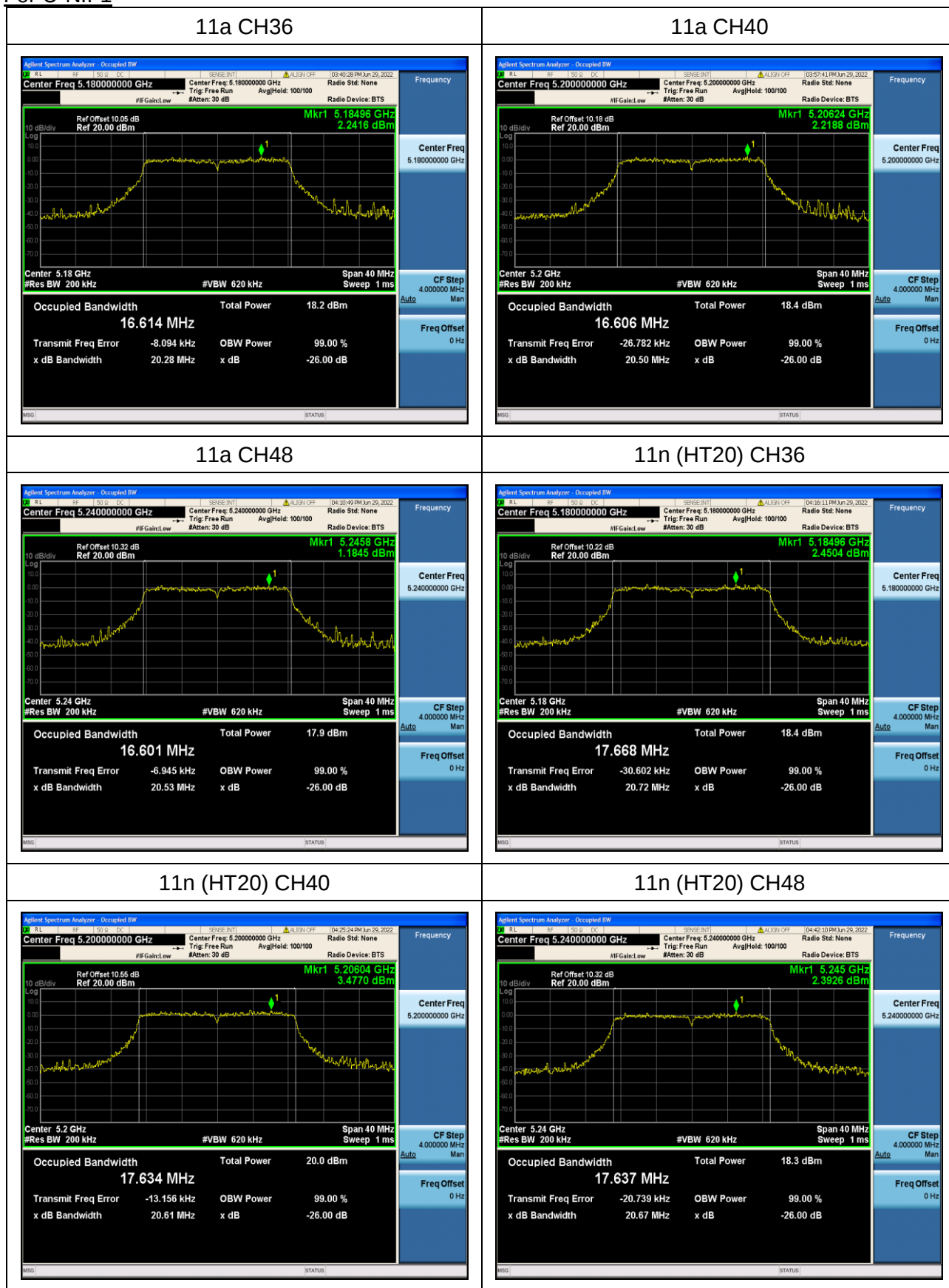
For U-NII-3

Channel	Test Channel	Frequency (MHz)	26dB bandwidth (MHz)	99% bandwidth	Limit (kHz)	Result
11a	CH149	5745	34.70	17.698	/	Pass
11a	CH157	5785	33.40	17.385	/	Pass
11a	CH165	5825	35.27	17.406	/	Pass
11n (HT20)	CH149	5745	35.78	17.903	/	Pass
11n (HT20)	CH157	5785	37.03	18.413	/	Pass
11n (HT20)	CH165	5825	36.64	18.356	/	Pass
11n (HT40)	CH151	5755	57.92	36.528	/	Pass
11n (HT40)	CH159	5795	67.82	37.240	/	Pass

Channel	Test Channel	Frequency (MHz)	26dB bandwidth (MHz)	99% bandwidth	Limit (kHz)	Result
11ac (HT20)	CH149	5745	35.70	18.197	/	Pass
11ac (HT20)	CH157	5785	36.27	18.144	/	Pass
11ac (HT20)	CH165	5825	30.28	17.830	/	Pass
11ac (HT40)	CH151	5755	64.05	37.076	/	Pass
11ac (HT40)	CH159	5795	70.64	38.234	/	Pass
11ac (HT80)	CH155	5775	92.98	75.736	/	Pass

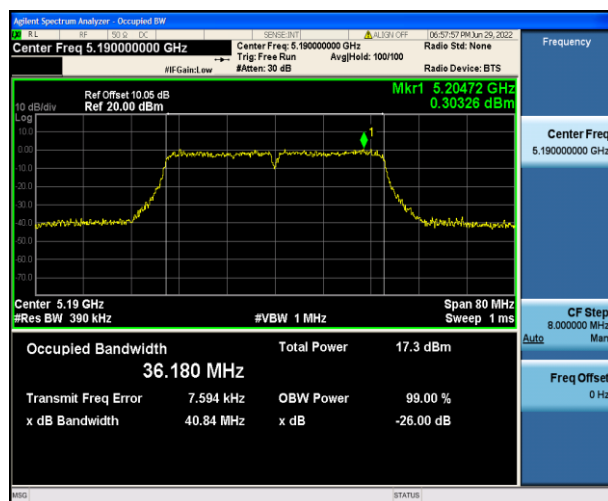


Test plots:
For U-NII-1

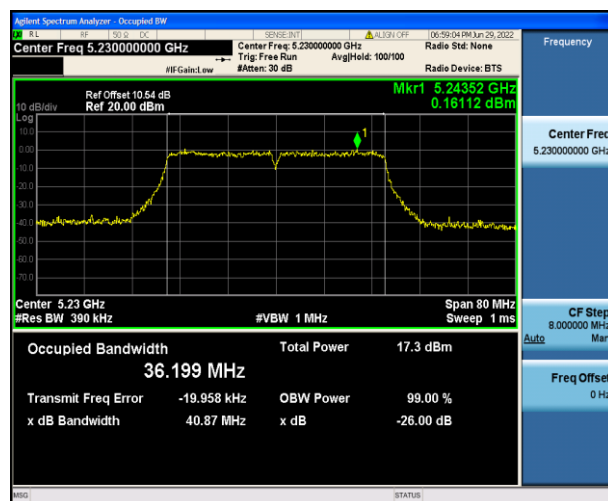




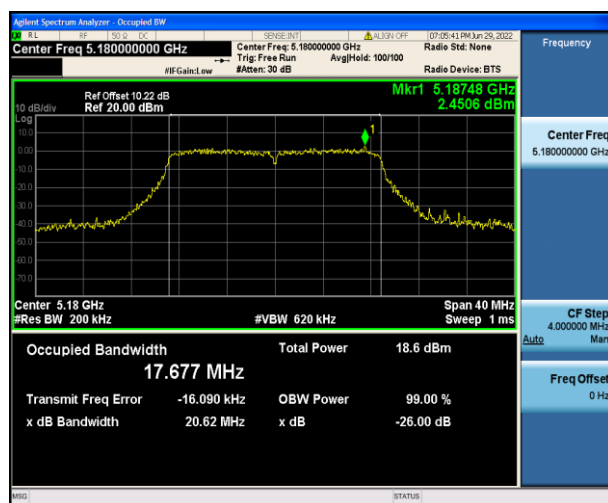
11n (HT40) CH38



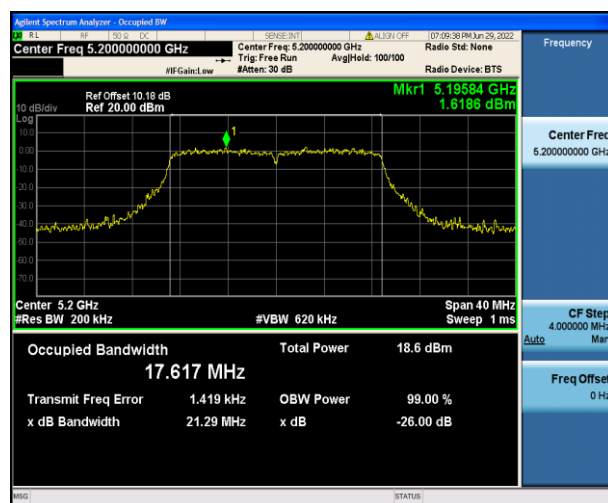
11n (HT40) CH46



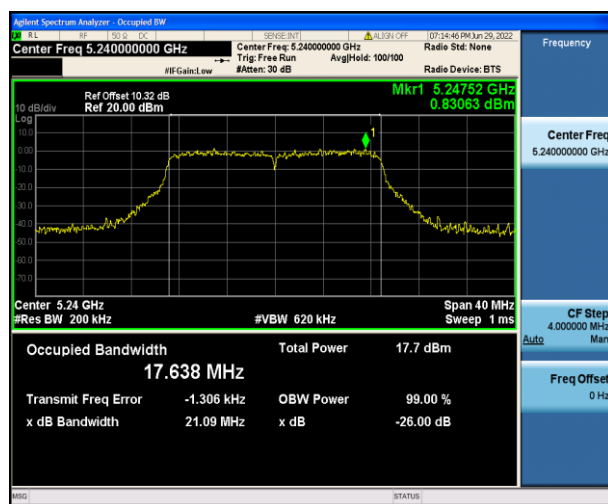
11ac (HT20) CH36



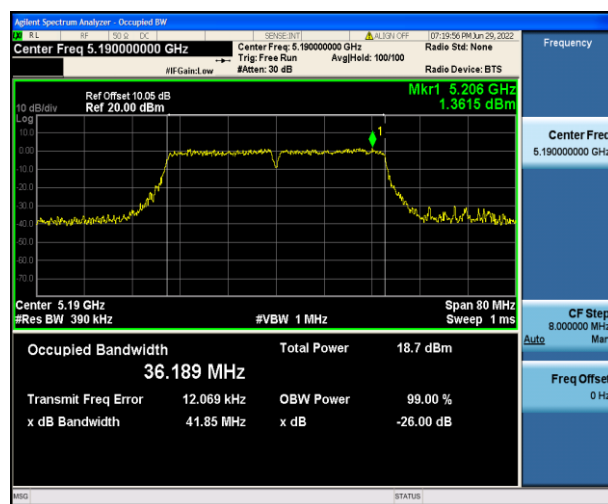
11ac (HT20) CH40



11ac (HT20) CH48

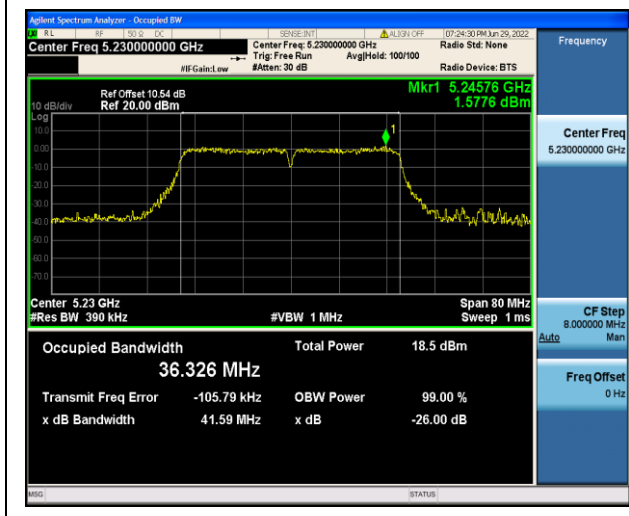


11ac (HT40) CH38

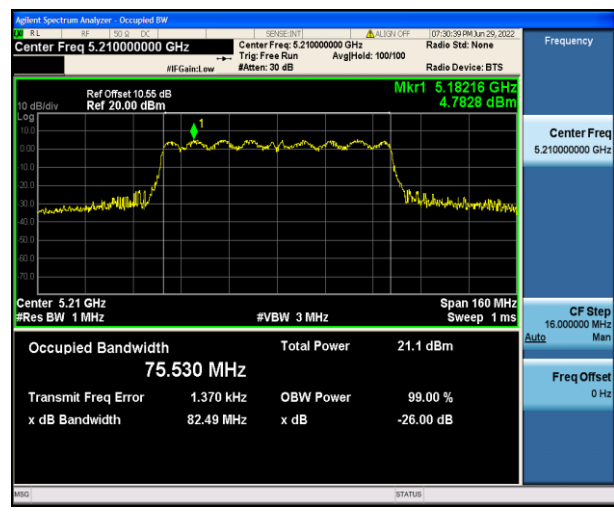




11ac (HT40) CH46

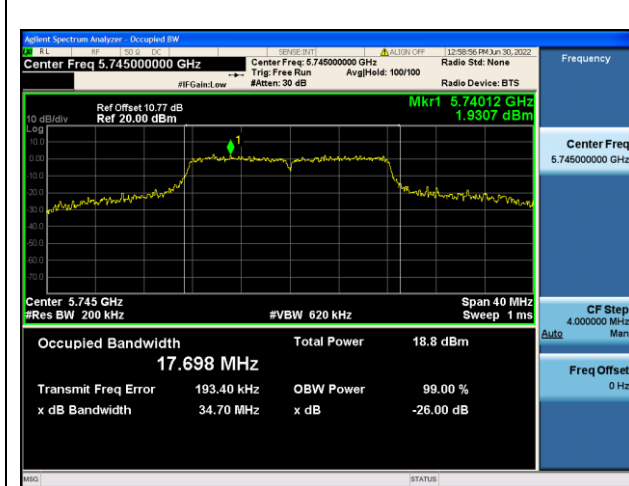


11ac (HT80) CH42

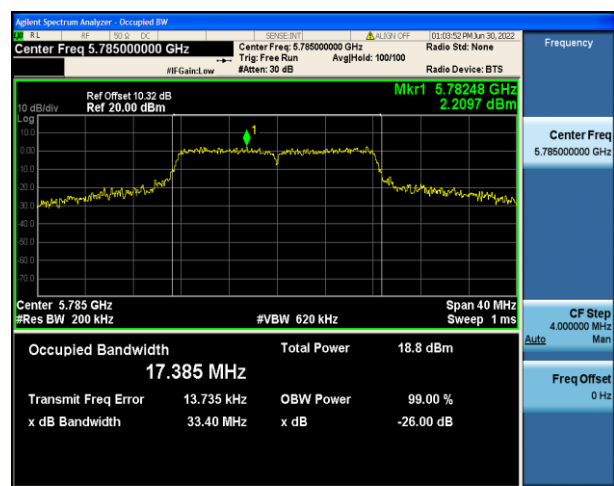


For U-NII-3

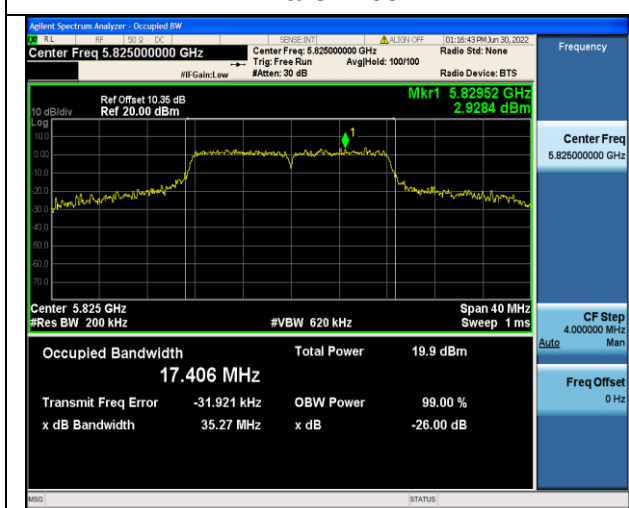
11a CH149



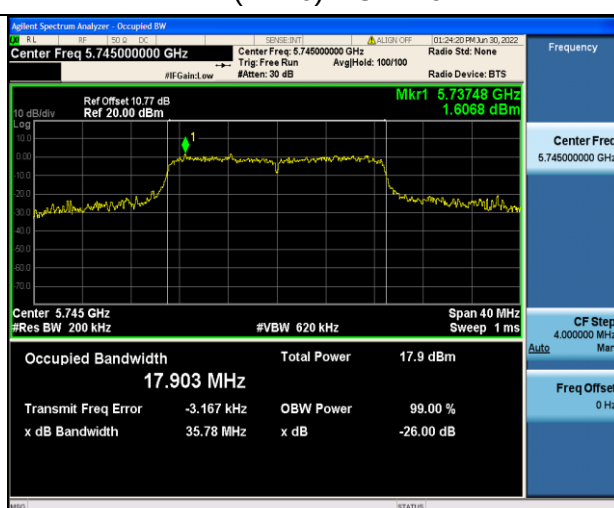
11a CH157

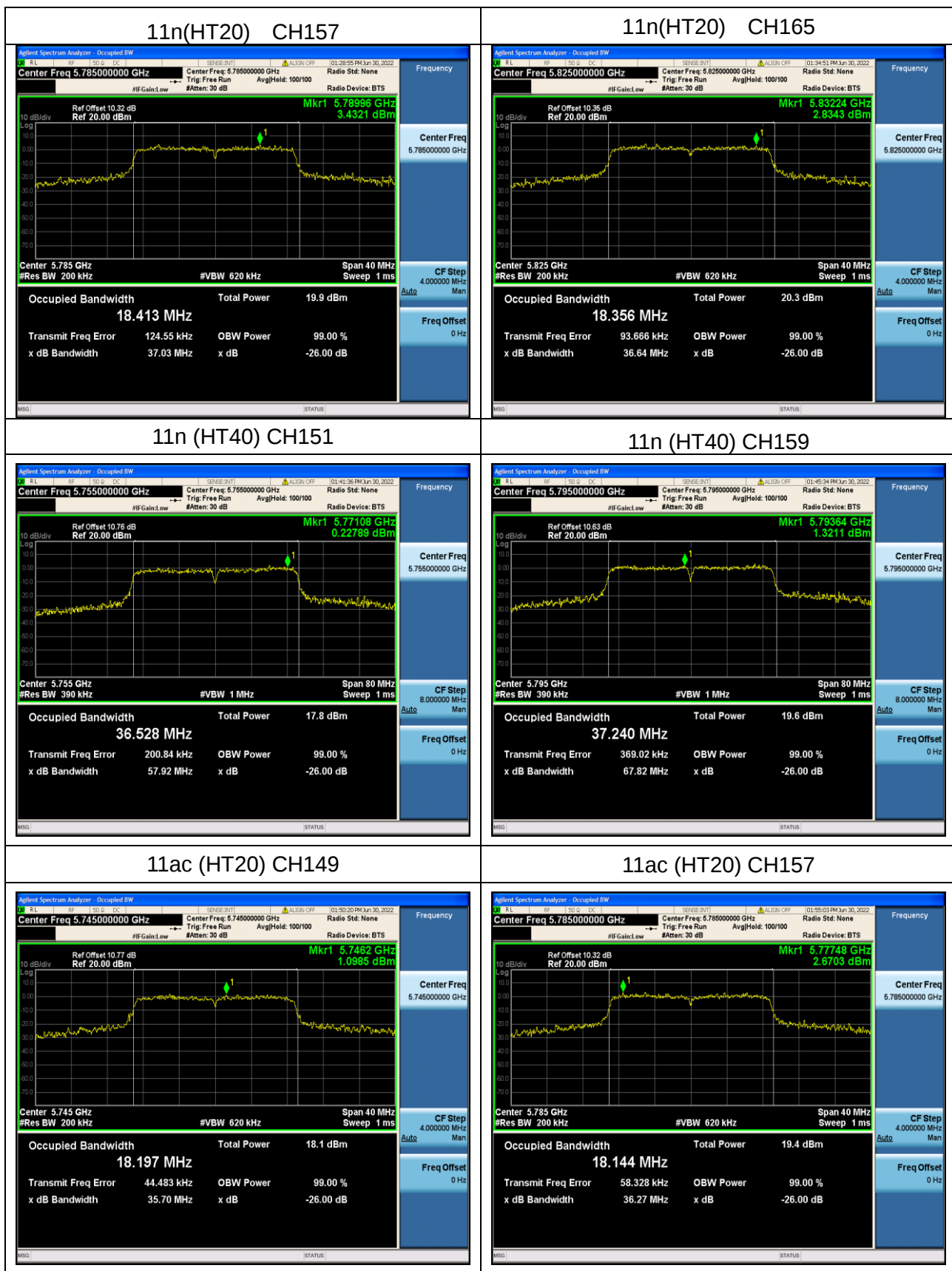


11a CH165



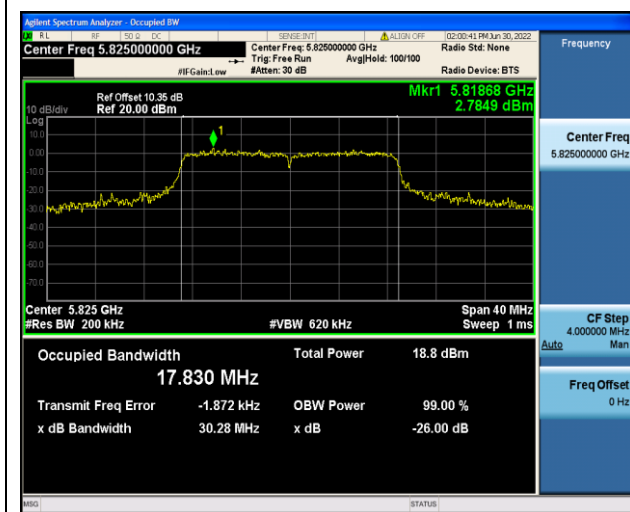
11n(HT20) CH149



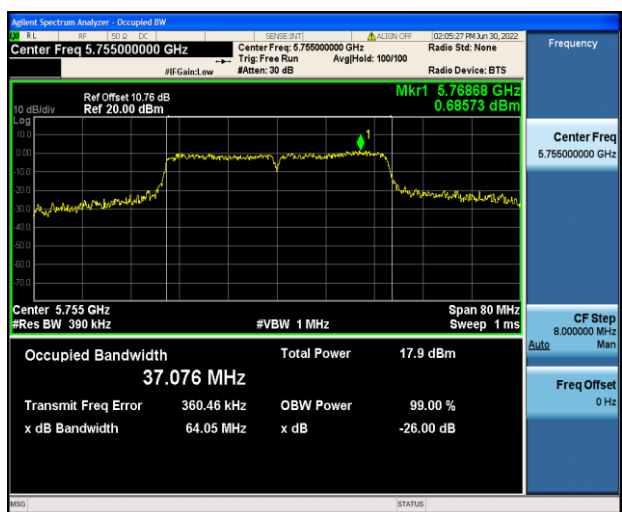




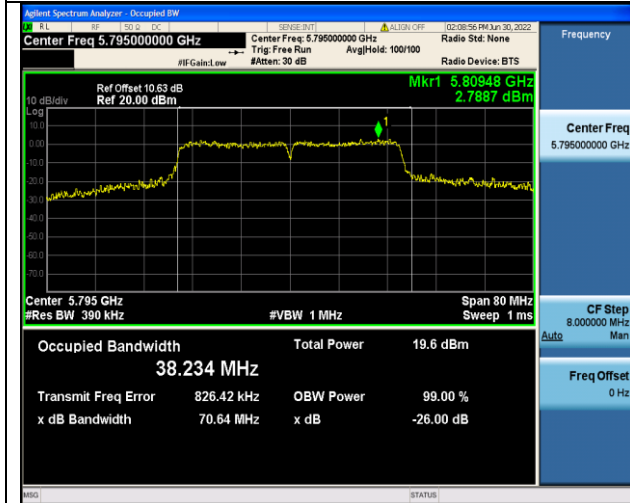
11ac(HT20) CH165



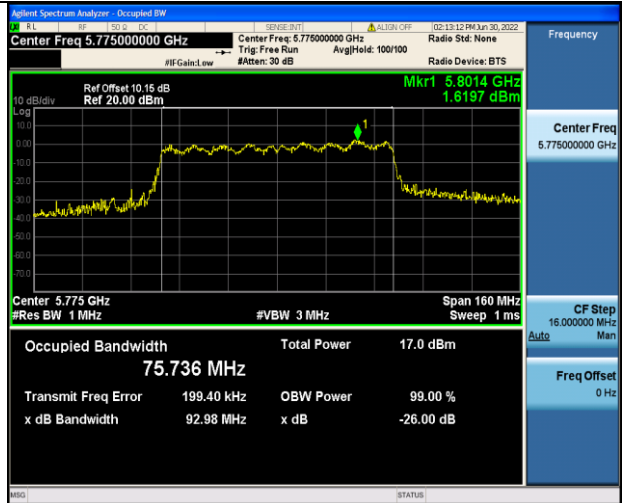
11ac(HT40) CH151



11ac(HT40) CH159



11ac (HT80) CH155



5.6 6dB Bandwidth

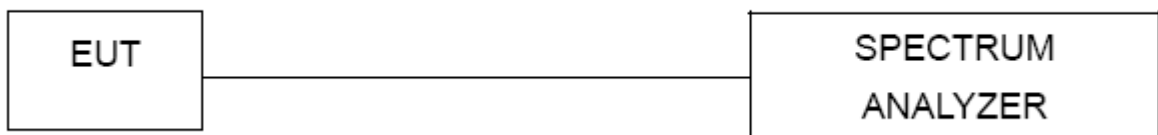
5.6.1 Limit

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) $\geq 3 \times$ 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



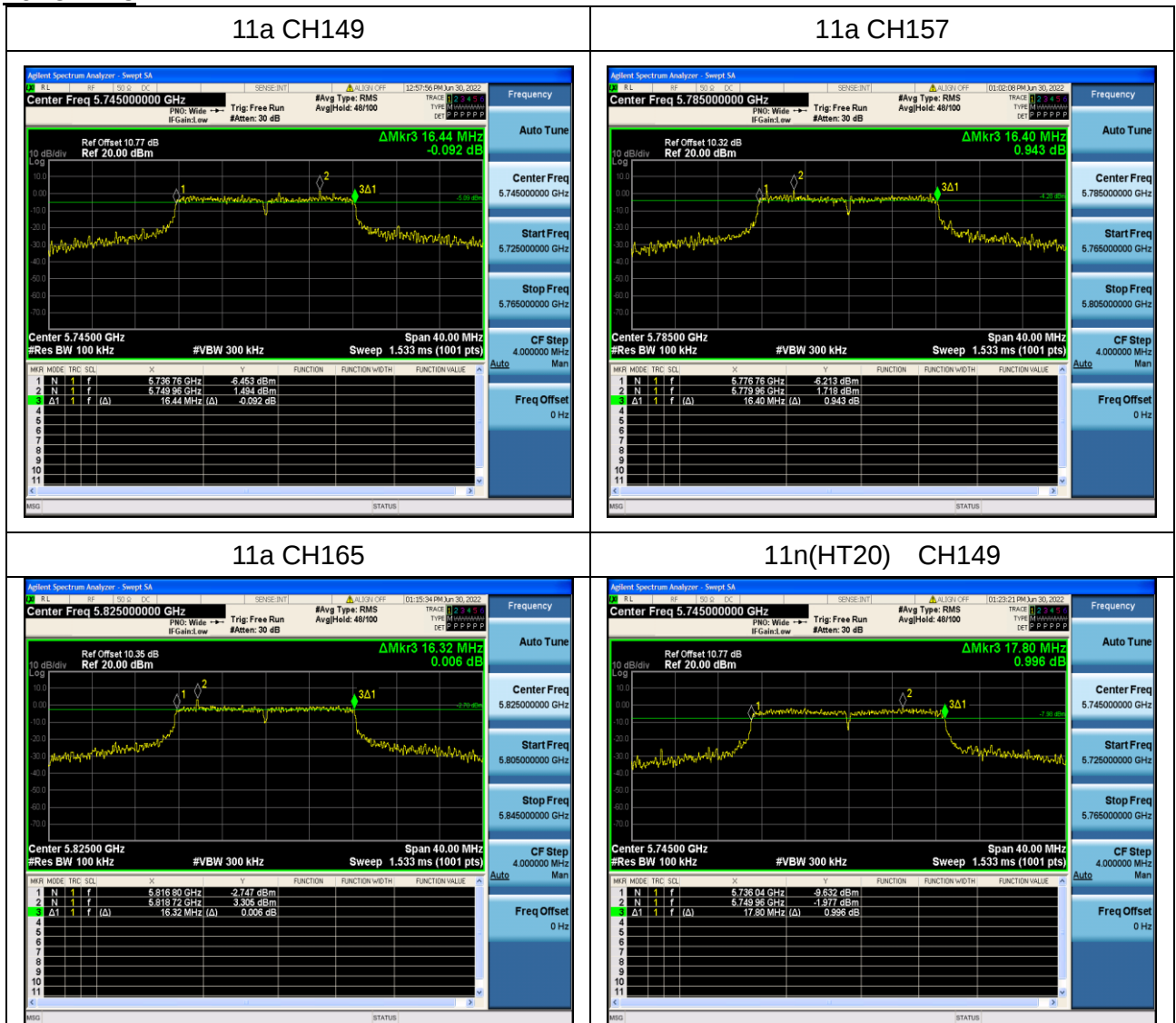
For U-NII-3

Channel	Test Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
11a	CH149	5745	16.440	500	Pass
11a	CH157	5785	16.400	500	Pass
11a	CH165	5825	16.320	500	Pass
11n (HT20)	CH149	5745	17.800	500	Pass
11n (HT20)	CH157	5785	17.400	500	Pass
11n (HT20)	CH165	5825	17.800	500	Pass
11n (HT40)	CH151	5755	35.840	500	Pass
11n (HT40)	CH159	5795	34.960	500	Pass

Channel	Test Channel	Frequency (MHz)	6dB bandwidth (MHz)	Limit (kHz)	Result
11ac (HT20)	CH149	5745	16.960	500	Pass
11ac (HT20)	CH157	5785	17.760	500	Pass
11ac (HT20)	CH165	5825	17.680	500	Pass
11ac (HT40)	CH151	5755	35.600	500	Pass
11ac (HT40)	CH159	5795	36.400	500	Pass
11ac (HT80)	CH155	5775	73.120	500	Pass

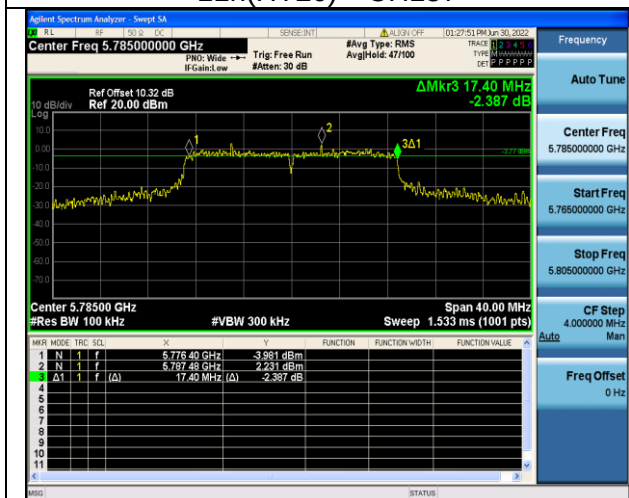
Test plots:

For U-NII-3

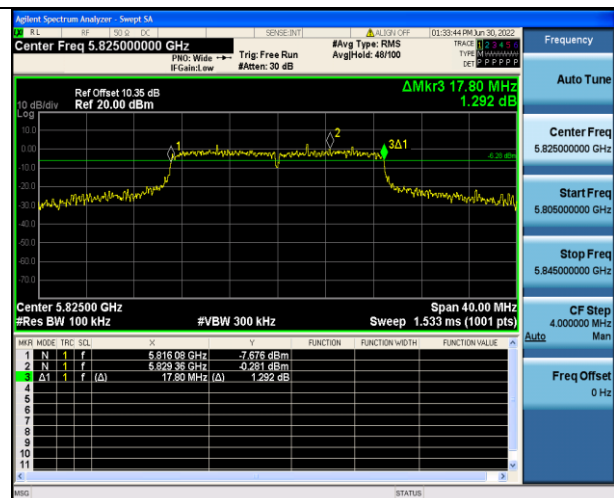




11n(HT20) CH157



11n(HT20) CH165



11n (HT40) CH151



11n (HT40) CH159



11ac (HT20) CH149



11ac (HT20) CH157

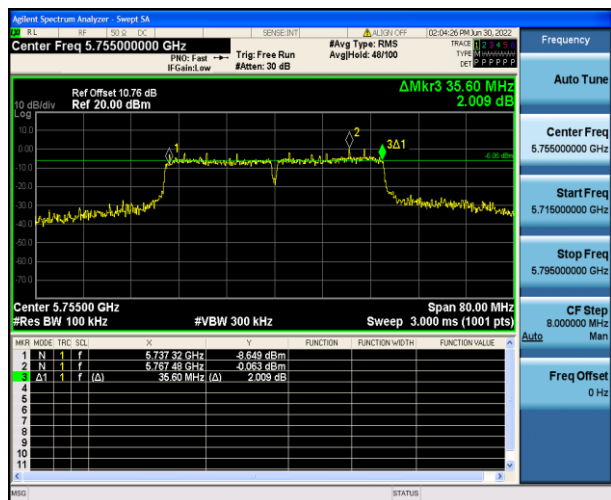




11ac(HT20) CH165



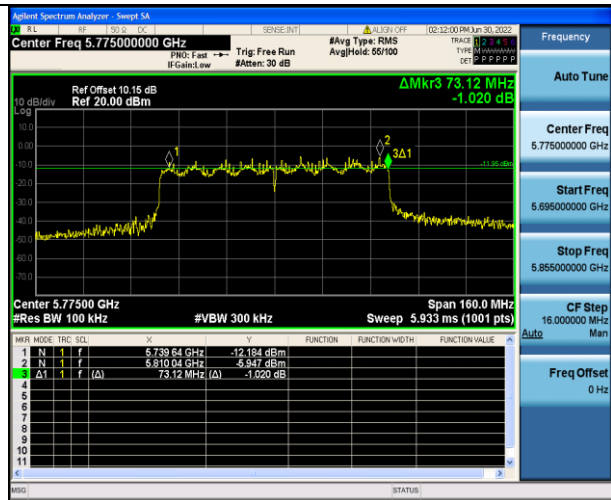
11ac(HT40) CH151



11ac(HT40) CH159



11ac(HT80) CH155





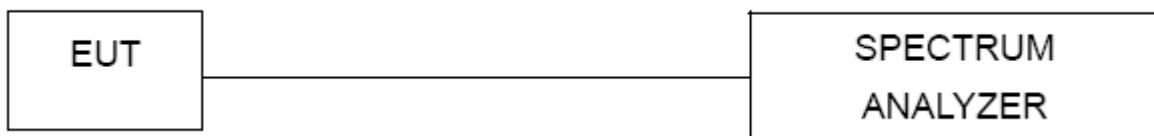
5.7 Conducted spurious emission

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 $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

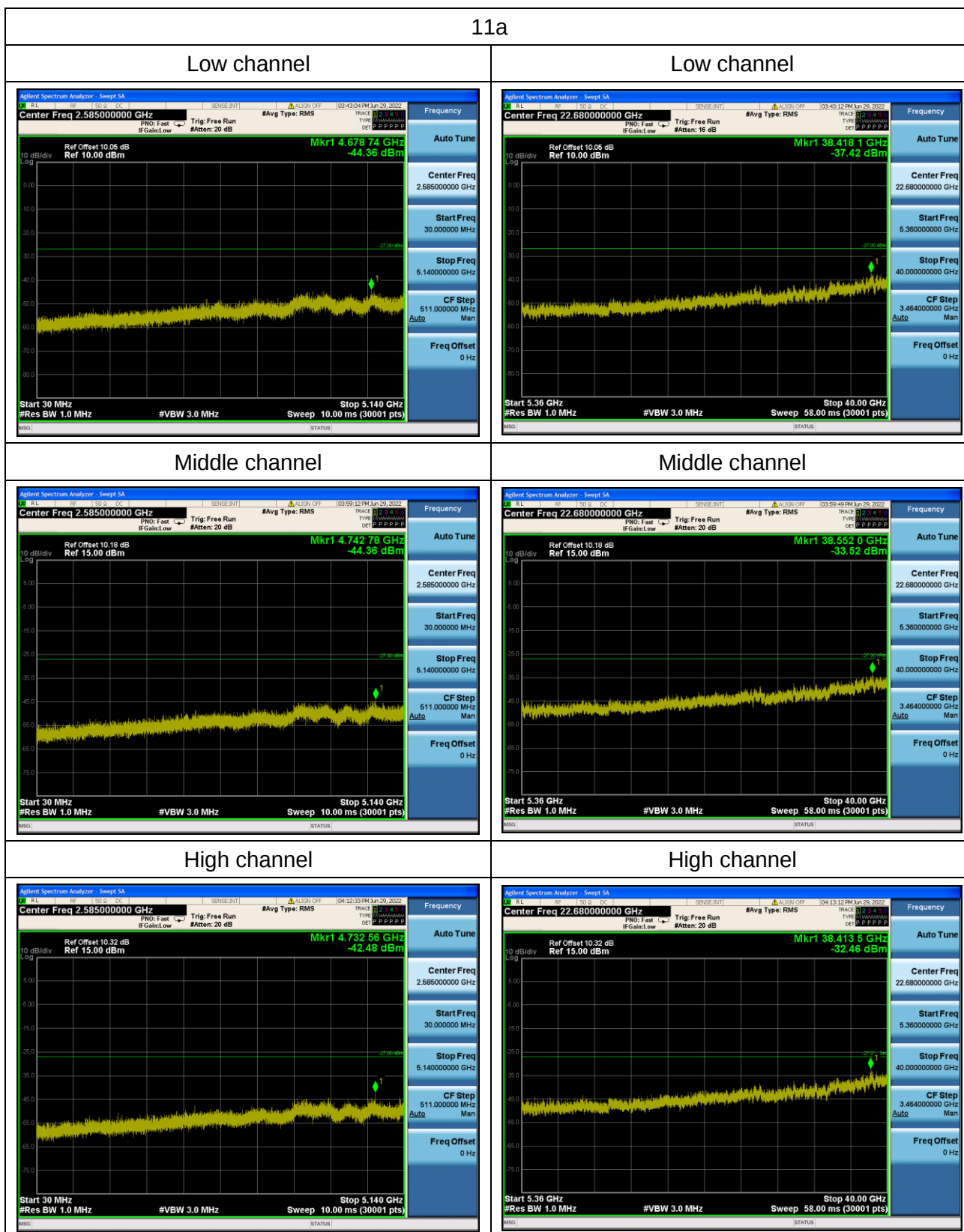
Trace = max hold

Allow the trace to stabilize

5.7.4 Test results

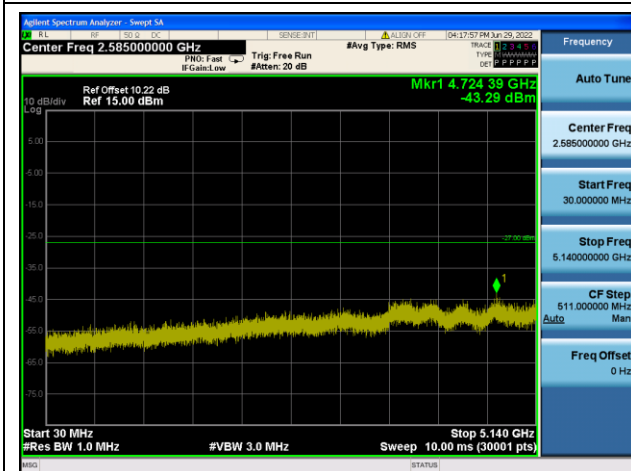
For U-NII-1

11a

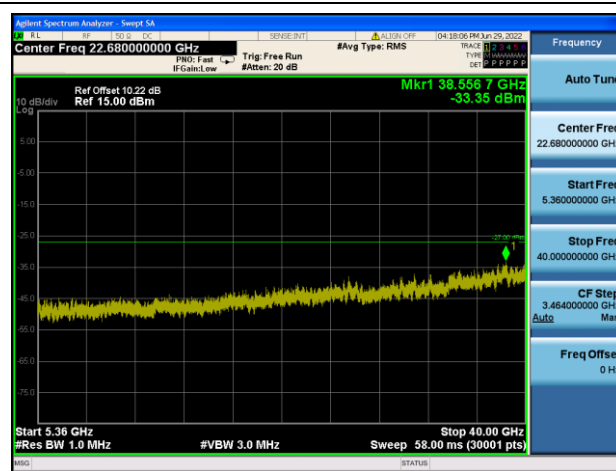


11n20

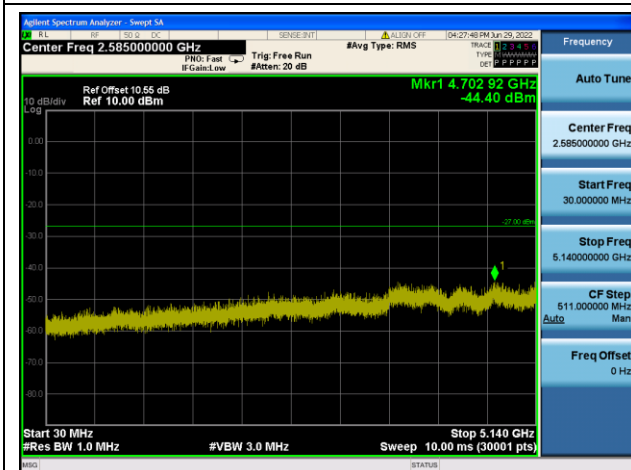
Low channel



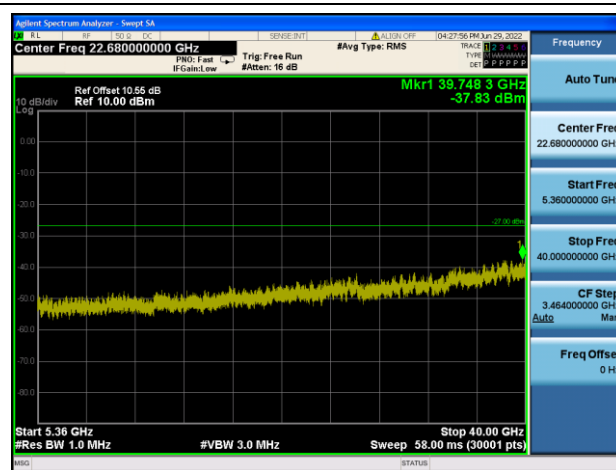
Low channel



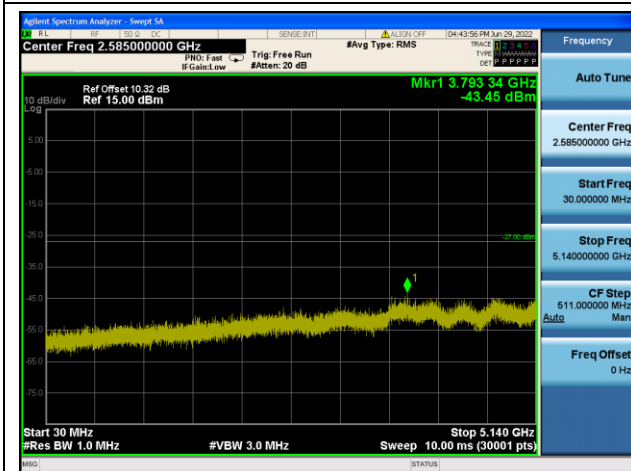
Middle channel



Middle channel



High channel



High channel

