TEST REPORT

Test item description:	IP Camera
Trademark(s):	MITSUBA
Model/Type reference:	MITSUBA-CS623
Applicant's name:	MITSUBA SHOJI
Address:	4-6-11 Morikitamachi, Higashinadaku, Kobe 658-0001 JAPAN
Manufacturer:	MITSUBA SHOJI
Address:	4-6-11 Morikitamachi, Higashinadaku, Kobe 658-0001 JAPAN
Prepared By:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	Jun. 2, 2026
Sample tested Date:	Jun. 2, 2026 to Jun. 8, 2026
Issue Date:	Jun. 8, 2026
Report No.:	CTB26060201804RF02
Test Standards	MIC Notice No.88 Appendix No.45 Item 19-3
Test Results	PASS
Remark:	This is 5G WIFI radio test report.

Compiled by:	Reviewed by:	Approved by:
Kai Chen	Martin Feng	
Kai Chen	Martin Feng	Bin Mei / Director

Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. The tested sample(s) and the sample information are provided by the applicant. The authenticity, accuracy, and completeness of the provided information are the sole responsibility of the applicant. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The result decision rules of our laboratory are based solely on the direct comparison between the actual measured values of test results and the standard limits, without considering the measurement uncertainty."★" indicates the testing items were fulfilled by subcontracted lab. "⇘" indicates the items are not in CNAS accreditation scope.

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1.Version

Report No.	Issue Date	Description	Approved
CTB26060201804RF02	Jun. 8, 2026	Original	Valid

2.TEST PROCEDURES AND RESULTS

Test item	Test Requirement	Limit/Severity	Result
Antenna Requirement	Item 19-3 of Article 2 Paragraph 1	Notice 88 Appendix 43,B-1 (1)&(2)	PASS
Frequency Error	Item 19-3 of Article 2 Paragraph 1	+/-20ppm	PASS
Occupied Bandwidth (99%)	Item 19-3 of Article 2 Paragraph 1	W52: Occupied bandwidth: ≤20MHz (20MHz System, OFDM) Occupied bandwidth: ≤40MHz (40MHz System, OFDM) Occupied bandwidth: ≤80MHz (80MHz System, OFDM)	PASS
Adjacent Channel Emitted Power	Item 19-3 of Article 2 Paragraph 1	802.11a/n20/ac20: Fc ± 20MHz±10MHz BW : -25dBc Fc ± 20MHz±10MHz BW : -25dBc 802.11n40/ac40: Fc ± 40MHz±20MHz BW : -25dBc Fc ± 80MHz±20MHz BW : -40dBc 802.11ac80: Fc ± 80MHz ±40MHz BW : -25dBc	PASS
Antenna Power and Tolerance	Item 19-3 of Article 2 Paragraph 1	(1)10mW/MHz(OFDM, DSSS:20MHz system), (2)5mW/MHz(OFDM:40MHz system), (3)2.5mW/MHz(OFDM:80MHz system), (4)10mW/MHz(except above methods), Tolerance : W52: -80%~+20%, W56:-50%~+50%.	PASS
Unwanted Emission Strength	Item 19-3 of Article 2 Paragraph 1	Attachment 1	PASS
Interference Prevention Function	Item 19-3 of Article 2 Paragraph 1	Article 49	PASS
Carrier sense capability	Item 19-3 of Article 2 Paragraph 1	Article 49	PASS
Construction Protection Confirmation	Item 19-3 of Article 2 Paragraph 1	Article 49	PASS
Transmission Burst Length	Item 19-3 of Article 2 Paragraph 1	8ms or less	PASS
Secondary Radiated Emission Strength	Item 19-3 of Article 2 Paragraph 1	(1)Below 1GHz:4nW/100kHz or less (2)1GHz or higher:20nW/MHz or less	PASS

Dynamic Frequency selection(DFS)	Item 19-3 of Article 2 Paragraph 1	WAS/RLAN devices operating in slave mode (slave device) can be operated in a network controlled by aWAN/RLAN device operating in master mode (master device).	N/A

3.MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Parameter	**Uncertainty**
Frequency error / 99%&90% bandwidth	±54.3Hz
Total RF power, conducted	±1.0dB
Spurious emissions, conducted	±2.8dB
DC and low frequency voltages	±3%
Humidity	±5.3%
Temperature	±0.59℃

4.GENERAL INFORMATION

4.1 GENERAL DESCRIPTION OF EUT

Model/Type reference:	MITSUBA-CS623
Model Description:	N/A
Wi-Fi Specification:	IEEE 802.11a/n/ac
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel
Rate Output power:	802.11a: 4mW/MHz 802.11ac(VHT20): 4mW/MHz, 802.11n(VHT20): 4mW/MHz, 802.11n(HT40): 2mW/MHz, 802.11ac(VHT40): 2mW/MHz 802.11ac80: 2mW/MHz
Type of Modulation:	OFDM
Antenna installation:	External antenna
Antenna Gain:	2.93dBi
Ratings:	DC 12V 1A

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.2 Channel list

For 802.11a/n/ac(20M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz
For 802.11n/ac(40M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz
For 802.11ac(80M) Operation in the 5150MHz ~5250 MHz band			
Channel	Frequency	Channel	Frequency
42	5210MHz	NA	NA

4.3Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Gain(dBi)	NOTE
1	N/A	5.2G antenna	External antenna	2.93dBi	N/A

4.4 DESCRIPTION OF TEST MODES

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11a/n/ac(20M)	5150MHz ~5250 MHz	Channel 36	Channel 40	Channel 48
		5180MHz	5200MHz	5240MHz
802.11n/ac(40M)	5150MHz ~5250 MHz	Channel 38	N/A	Channel 46
		5190MHz	N/A	5230MHz
802.11ac(80M)	5150MHz ~5250 MHz	N/A	Channel 42	N/A
		N/A	5210MHz	N/A

4.5 TEST CONDITIONS

Supply Voltage				
	Adapter power V	Module input power V	Rated module power V	Tolerance (%)
Normal	12	3.3	3.3	
+10%	13.2	3.3	3.3	0
-10%	10.8	3.3	3.3	0
Others				
Temperature (°C)		20-25		
Relative humidity		54 %.		
ATM Pressure:		1010 mbar		
Note 1: When the input voltage is reduced or increased by 10%, the regulator voltage changes of less than 1%. So the following test items are conducted in the normal voltage.				

4.6 Block diagram showing the configuration of system tested

Transmitting mode

4.7 DESCRIPTION OF SUPPORT UNITS(CONDUCTEDMODE)

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	Test item description	Trademark(s)	Model/Type reference	Note
1	IP Camera	MITSUBA	MITSUBA-CS623	EUT

Item	Shielded Type	Ferrite Core	Length	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.
3. “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

4.8 MEASUREMENT INSTRUMENTS LIST

No.	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY52090073	A.14.16	2027/5/13
2	Power Sensor	Agilent	U2021XA	MY56120032	/	2027/5/13
3	Power Sensor	Agilent	U2021XA	MY56120034	/	2027/5/13
4	Communication test set	R&S	CMW500	108058	V3.5.80	2027/5/13
5	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2027/5/13
6	Signal Generator	Agilent	N5181A	MY50140365	A.01.60	2027/5/13
7	Vector signal generator	Agilent	N5182A	MY47420195	A.01.87	2027/5/13
8	Communication test set	Agilent	E5515C	MY50102567	B.19.07 (E1962B)	2027/5/13
9	2.4 GHz Filter	Shenxiang	MSF2400-2483.5MS-1154	20181015001	/	2027/5/15
10	5 GHz Filter	Shenxiang	MSF5150-5850MS-1155	20181015001	/	2027/5/15
11	Filter	Xingbo	XBLBQ-DZA120	190821-1-1	/	2027/5/16
12	BT&WI-FI Automatic test software	Micowave	MTS8310	Ver. 2.0.0.0	/	/
13	Temperature humidity chamber	Huihao	HT-HW-1000L	/	/	2026/7/12
14	234G Automatic test software	Micowave	MTS8200	Ver. 2.0.0.0	/	/
15	966 chamber	C.R.T.	966	/	/	2027/6/21
16	Receiver	R&S	ESPI	100362	RF_ATTEN_7 (104489/003)	2027/5/14
17	Amplifier	HP	8447E	2945A02747	/	2027/5/14
18	Amplifier	Agilent	8449B	3008A01838	/	2027/5/13

19	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2027/5/16
20	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA9120D	01911	/	2027/5/14
21	EMI test software	Fala	EZ-EMC	FA-03A2 RE	/	/
22	Power Meter	KEYSIGHT	N1912AP	N/A	A.05.00	2027/5/14
23	DC power supply	Agilent	E3640A	MY53050046	/	2027/5/14

Remark: Calibration institution "GRG METROLOGY & TEST GROUP Co., LTD."

Remark: Calibration based on Article 24-2, paragraph 4 of the Radio Act method c.

5. Antenna Requirement

Standard requirement
Applicable for equipment with an antenna terminal, including testing terminals) If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.
EUT Antenna
The best case gain of the antenna is 2.93dBi. External antenna
Result: An antenna connector is available; all relevant tests will be carried out conducted.

6. Frequency Error

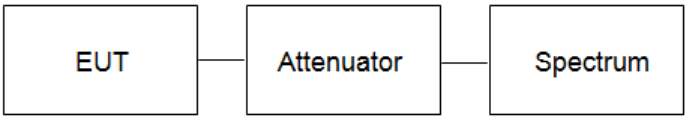
6.1 LIMIT

Item	Limits
Frequency Error	+/-20ppm

6.2 TEST PROCEDURE

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW=10k, VBW=10 kHz, Span = 1MHz.
4 'Maximum Hold'mode may be used to accumulate the measurement result over several scans provided emission is repetitive in nature.
5. Repeat above procedures until all frequency measured was complete.

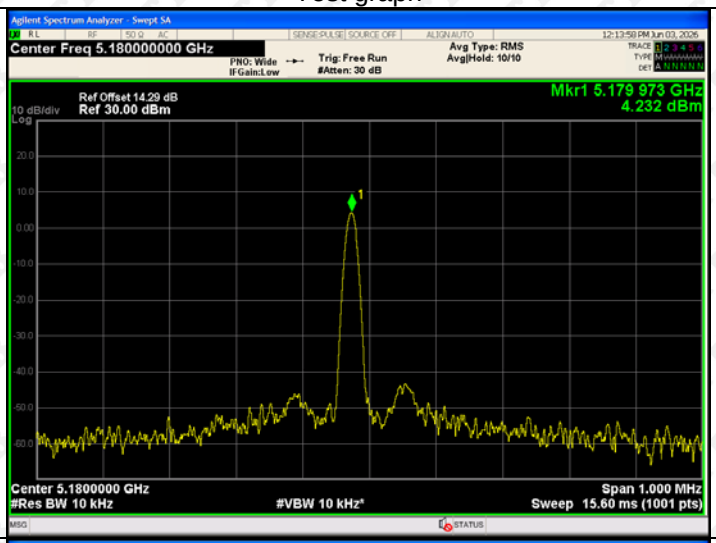
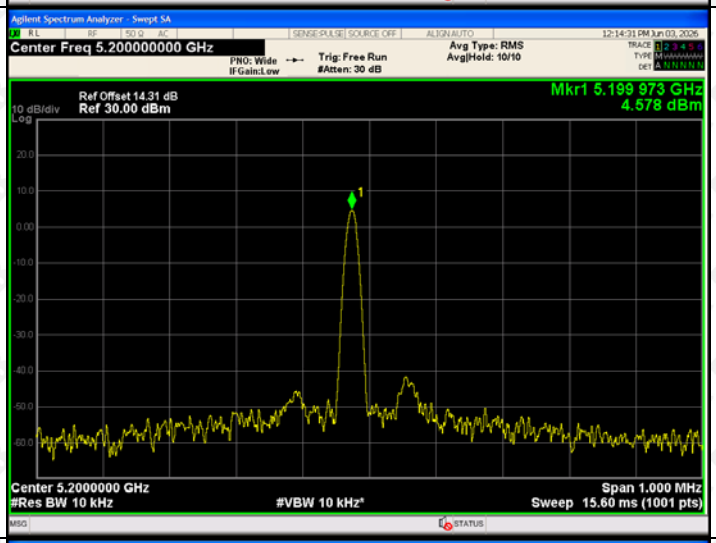
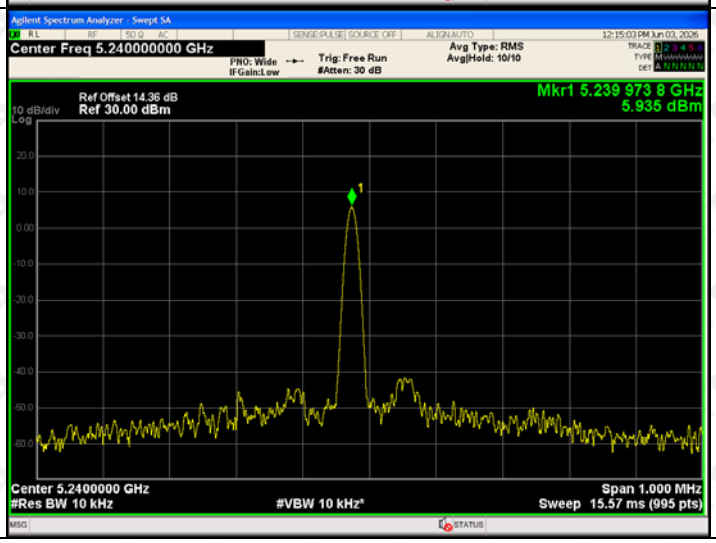
6.3Test Setup Block Diagram

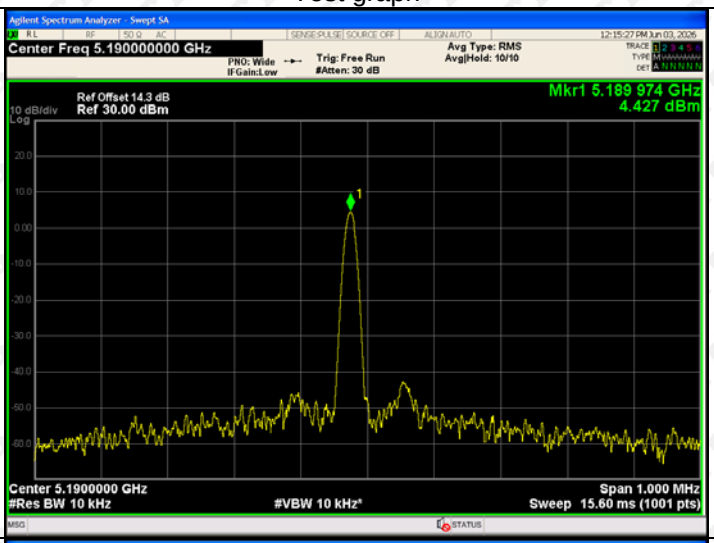
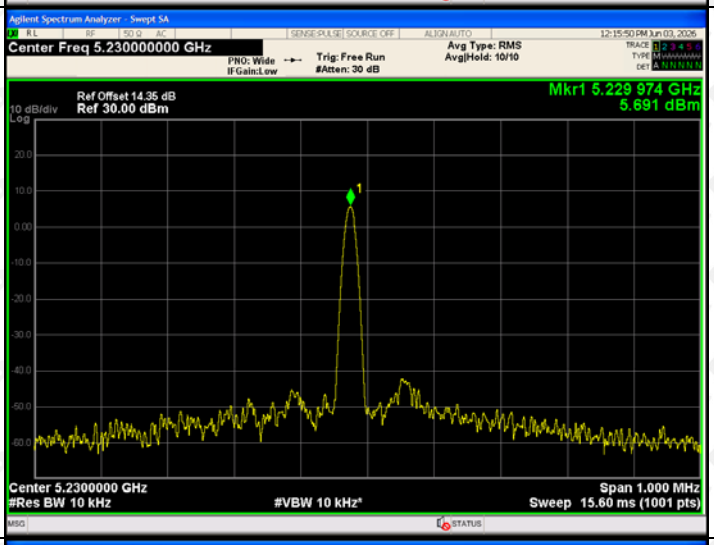
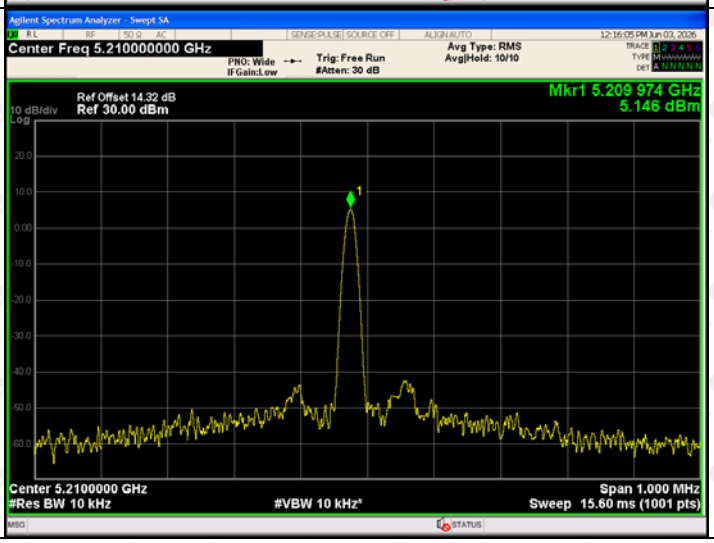


6.4 TEST RESULT

Test condition	Test Frequency	Measured	Tolerance	Test Result	Limit
	MHz	MHz	MHz	ppm	ppm
NVNT W52	5180	5179.973	-0.027	-5.212	+/-20
	5200	5199.973	-0.027	-5.192	+/-20
	5240	5239.974	-0.026	-4.962	+/-20
	5190	5189.974	-0.026	-5.010	+/-20
	5230	5229.974	-0.026	-4.971	+/-20
	5210	5209.974	-0.026	-4.990	+/-20

NVNT- W52

Channel(MHz)	Test graph
5180	
5200	
5240	

Channel(MHz)	Test graph
5190	
5230	
5210	

7. Occupied Bandwidth (99%)

7.1 LIMIT

W52:
Occupied bandwidth: ≤18MHz (20MHz System, DSSS)
Occupied bandwidth: ≤20MHz (20MHz System, OFDM)
Occupied bandwidth: ≤40MHz (40MHz System, OFDM)
Occupied bandwidth: ≤80MHz (80MHz System, OFDM)

7.2 TEST PROCEDURE

(1) Set up the spectrum analyzer as the follows:
Center frequency: Test frequency
Sweep bandwidth: 2 to 3.5 times of allowance
Resoluble bandwidth: less than 3% of allowance
Video bandwidth: Equivalent to resoluble bandwidth
Sweep time: Minimum time by which measuring accuracy is assured (In case of burst wave, 1 burst shall be contained per 1 sample)
Sampling points: More than 400 points
Sweep mode: Continuous sweeping
Detection mode: Positive peak
Display mode: Maximum holding

(2) Repeat the sweeping till no change was observed on the display and enter all values of data point to the computer as array variable.

(3) About all data, convert dB value to antilogarithm of electric power dimension.

(4) Add up the electric power of all data and record it as “Sum total of electric power”.

(5) Adding up data in order from the lowest frequency to upper frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of “Sum total of electric power”. Convert the limit point to frequency and record as “Lowest limit frequency”.

(6) Adding up data in order from the highest frequency to lower frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of “Sum total of electric power”. Convert the limit point to frequency and record as “Highest limit frequency”.

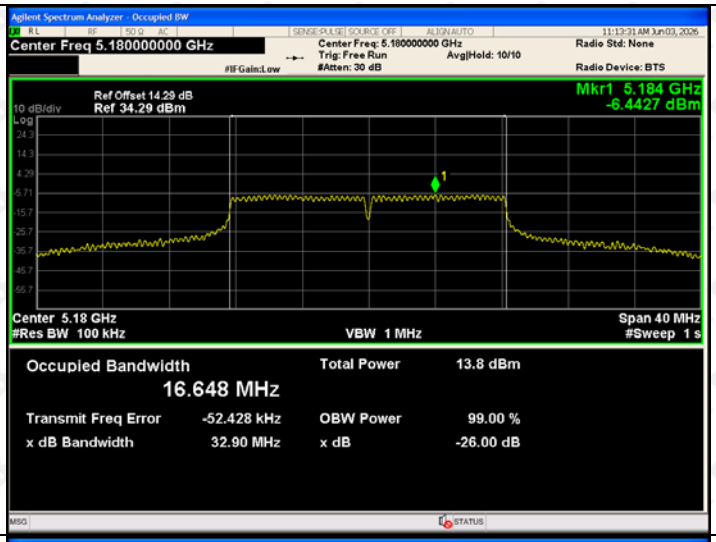
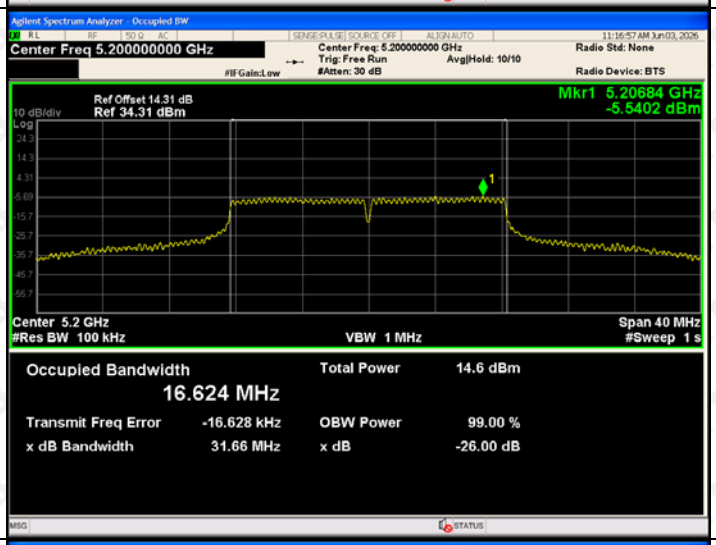
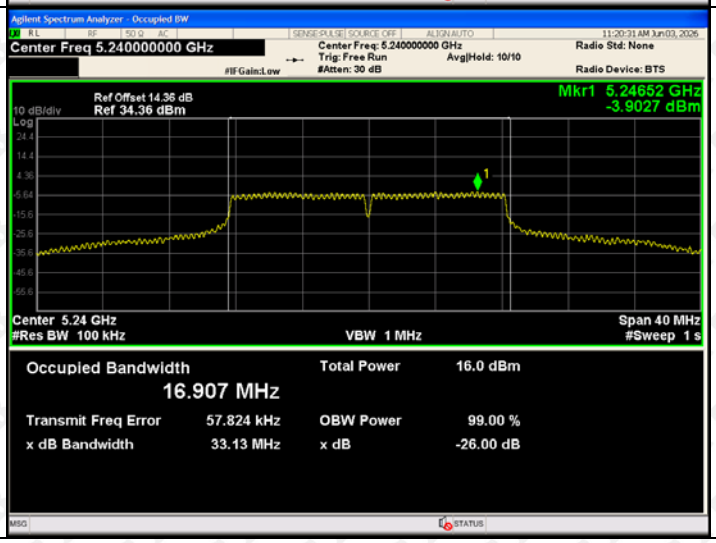
(7) Repeat above procedures until all frequency measured was complete.

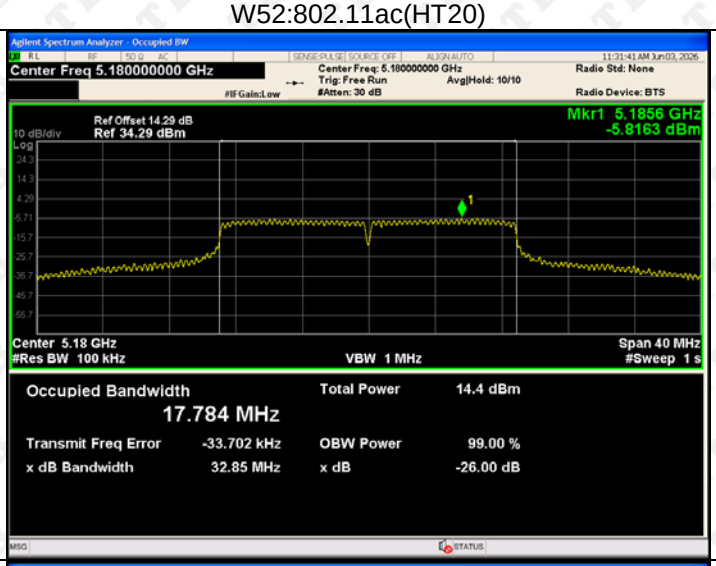
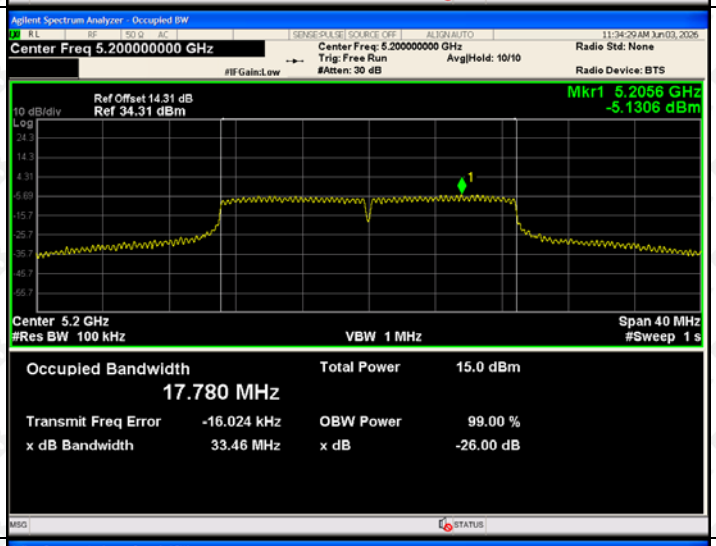
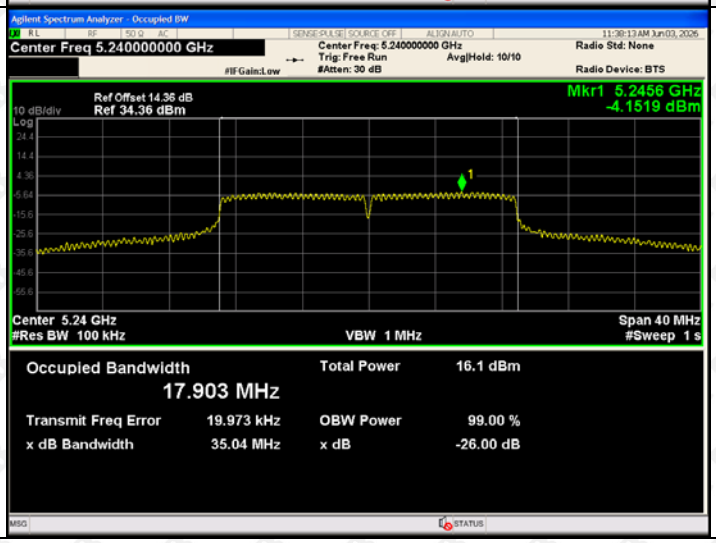
7.3 TEST SETUP BLOCK DIAGRAM

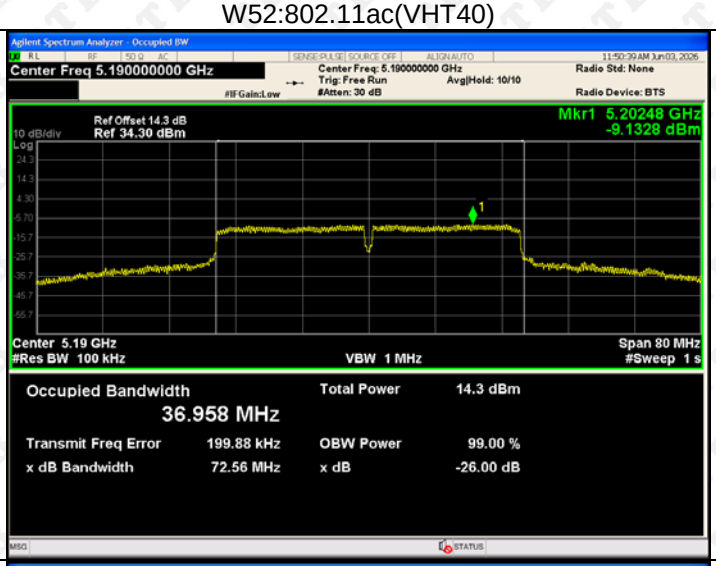
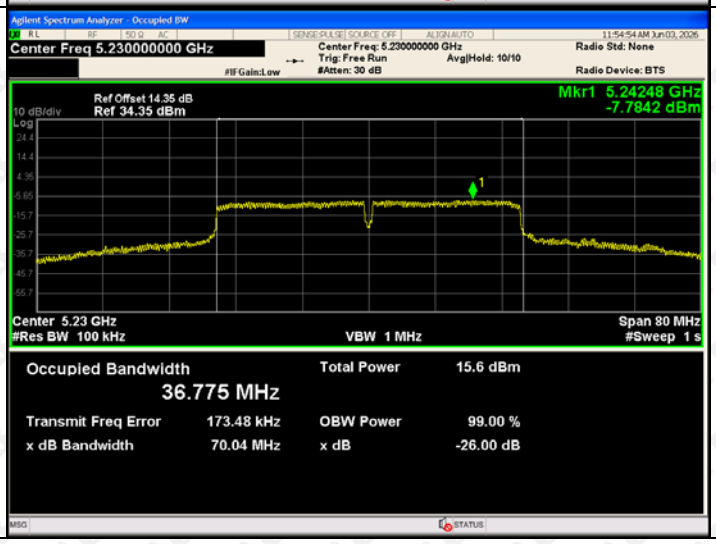
7.4 TEST RESULT

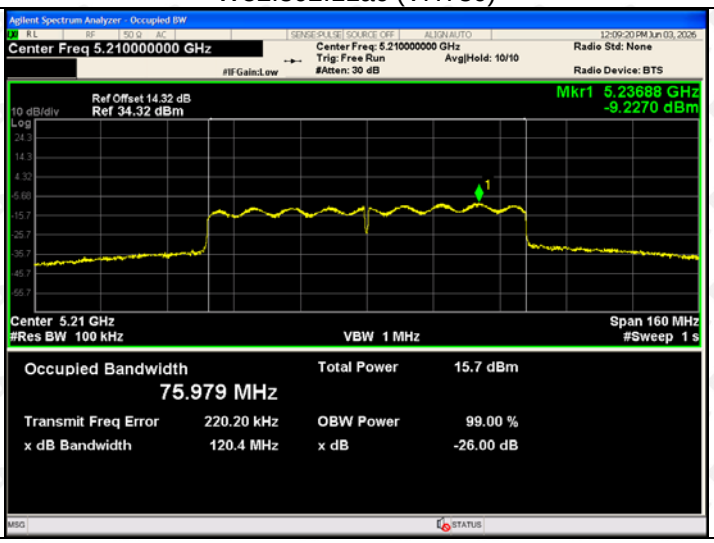
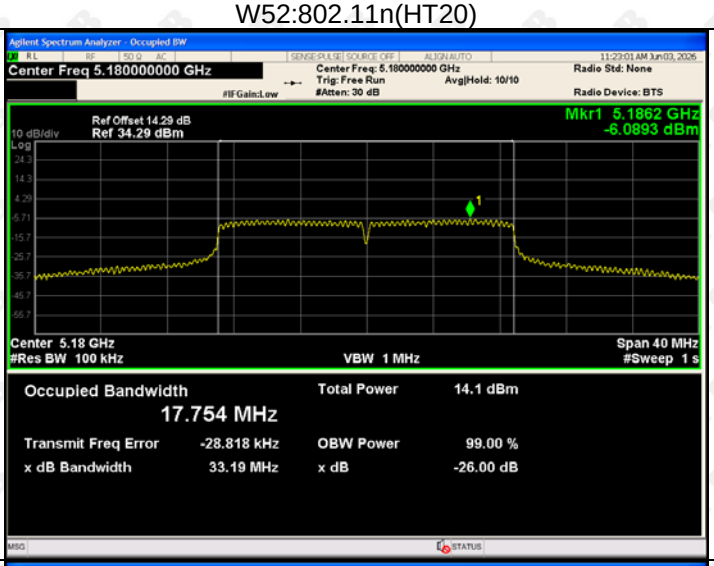
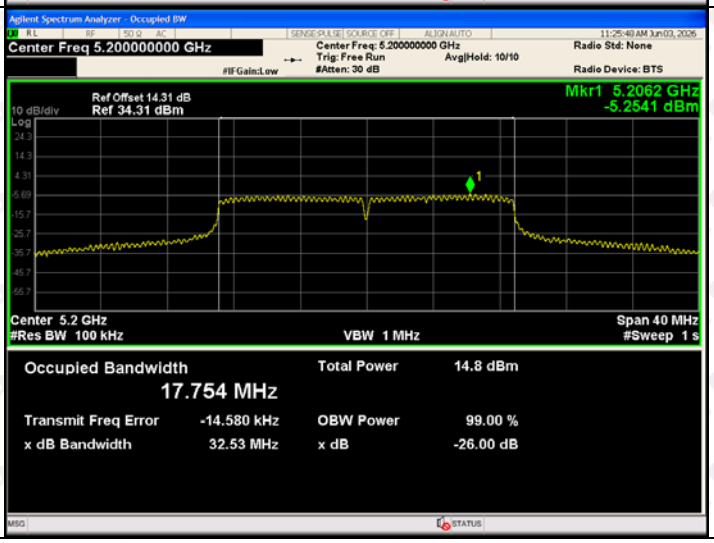
W52

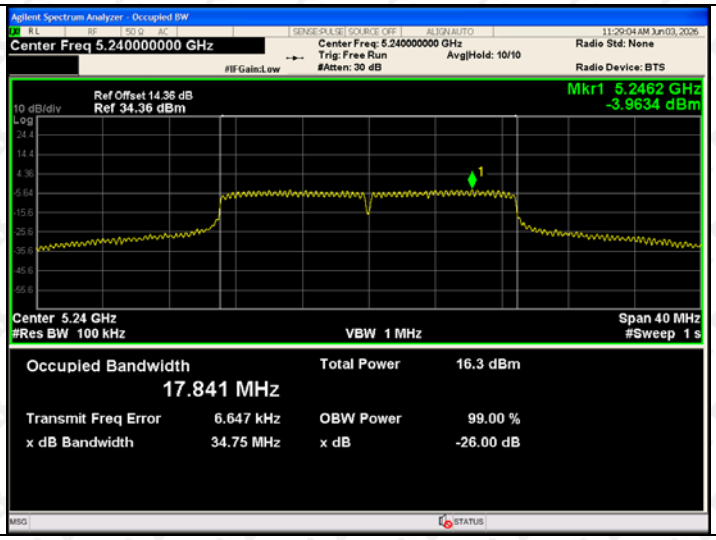
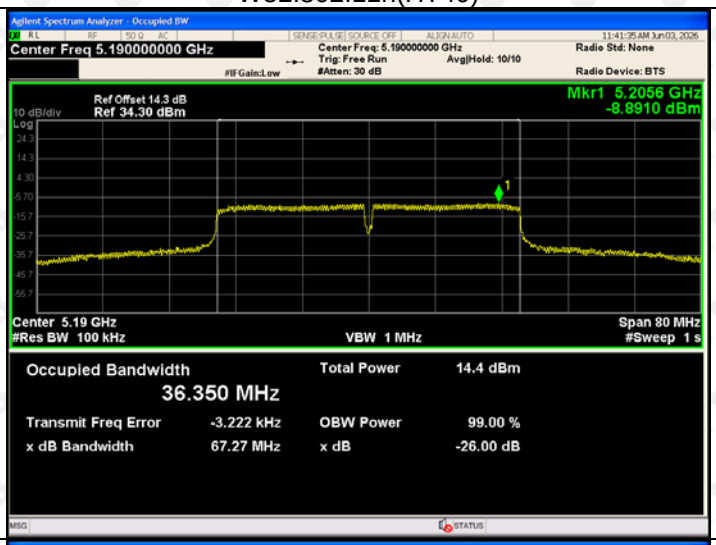
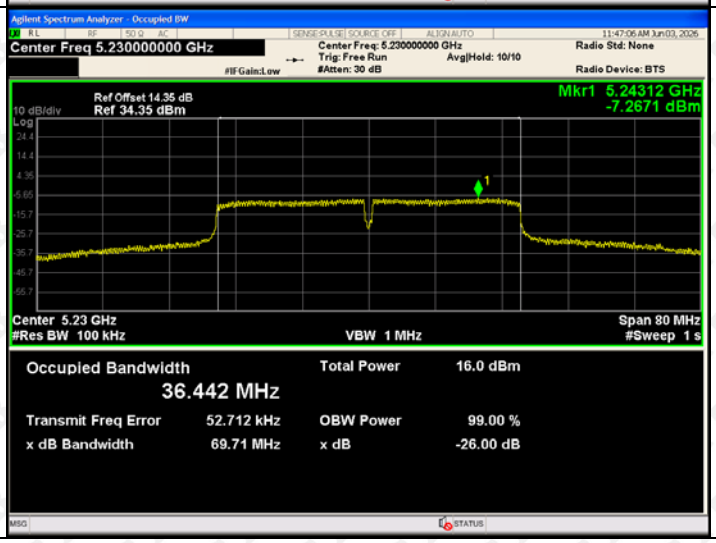
Normal Voltage			
Mode	Channel (MHz)	Occupy Bandwidth (MHz)	Limit (MHz)
802.11a	LCH	16.648	≤18
	MCH	16.624	
	HCH	16.907	
802.11ac(VHT20)	LCH	17.784	≤20
	MCH	17.780	
	HCH	17.903	
802.11ac(VHT40)	LCH	36.958	≤40
	MCH	/	
	HCH	36.775	
802.11ac(VHT80)	LCH	/	≤80
	MCH	75.979	
	HCH	/	
802.11n(HT20)	LCH	17.754	≤20
	MCH	17.754	
	HCH	17.841	
802.11n(HT40)	LCH	36.350	≤40
	MCH	/	
	HCH	36.442	
Result	Pass		

Channel(MHz)	W52:802.11a
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(HT20)
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(VHT40)
5190	
5230	

Channel(MHz)	W52:802.11ac (VHT80)
5210	
Channel(MHz)	W52:802.11n(HT20)
5180	
5200	

5240		
Channel(MHz)	W52:802.11n(HT40)	
5190		
5230		

8.Adjacent Channel Emitted Power

8.1 LIMIT

W52

For system OBW<20MHz

Fc ± 20MHz ±10MHz BW : -25dBc

Fc ± 40MHz ±10MHz BW : -40dBc

For system OBW≤20MHz

Fc ± 20MHz ±10MHz BW : -25dBc

Fc ± 40MHz ±10MHz BW : -40dBc

For system OBW≤40MHz

Fc ± 40MHz±20MHz BW : -25dBc

Fc ± 80MHz±20MHz BW : -40dBc

For system OBW≤80MHz

Fc ± 80MHz ±40MHz BW : -25dBc

For system OBW≤80MHz +80MHz (Not adjacent band)

Fc ± 80MHz ±40MHz BW : -25dBc

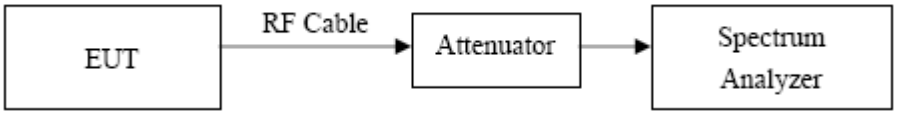
For system OBW≤160MHz

N/A

8.2 TEST PROCEDURE

(1) A spectrum In case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
(2) The measurement equipment shall be set for sample hold mode of operation.
(3) the transmitter shall be operated at the receiving mode.
(4) The resolution bandwidth shall be set to ref. the limits , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
(5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
(6) This measurement shall be repeated with the transmitter in standby mode where applicable.
(7) Repeat above procedures until all frequency measured was complete.

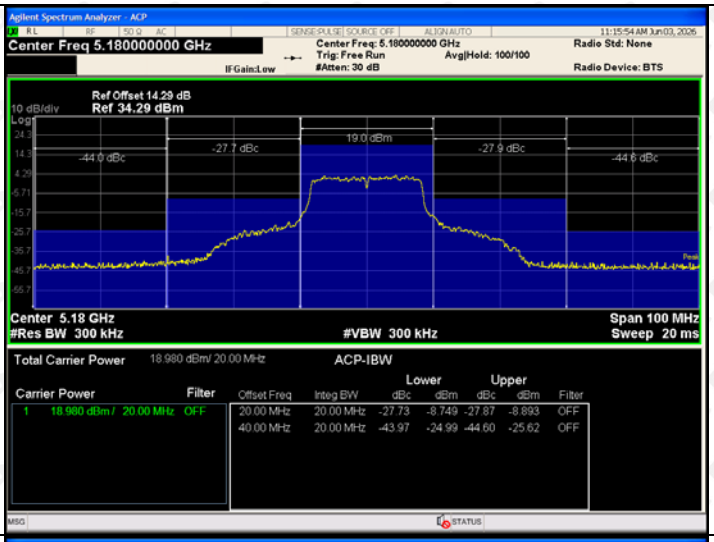
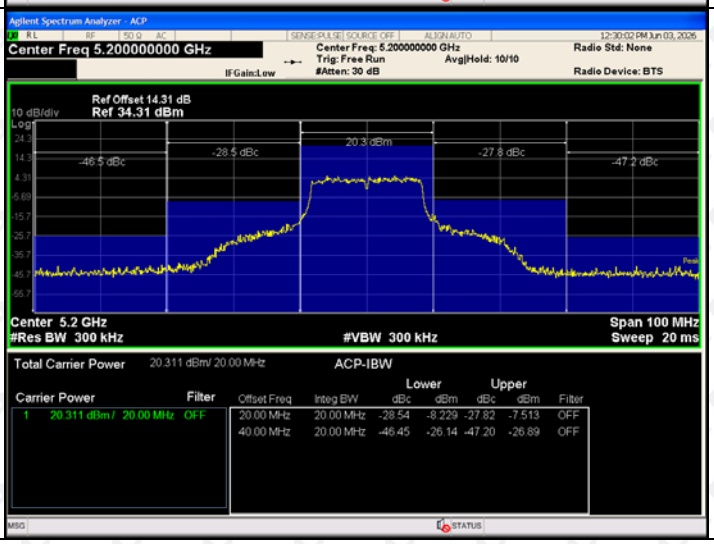
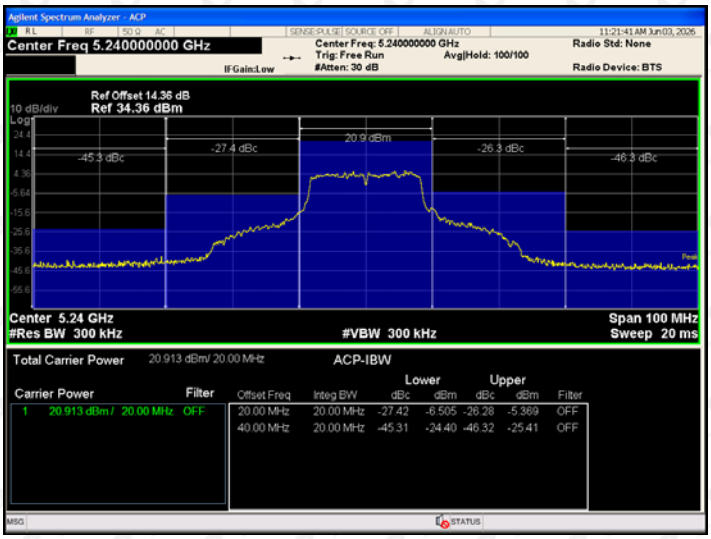
8.3 TEST SETUP Block Diagram

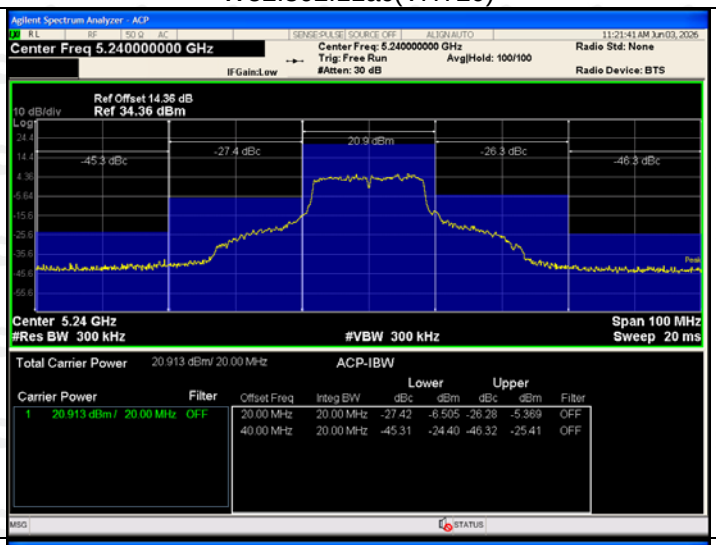
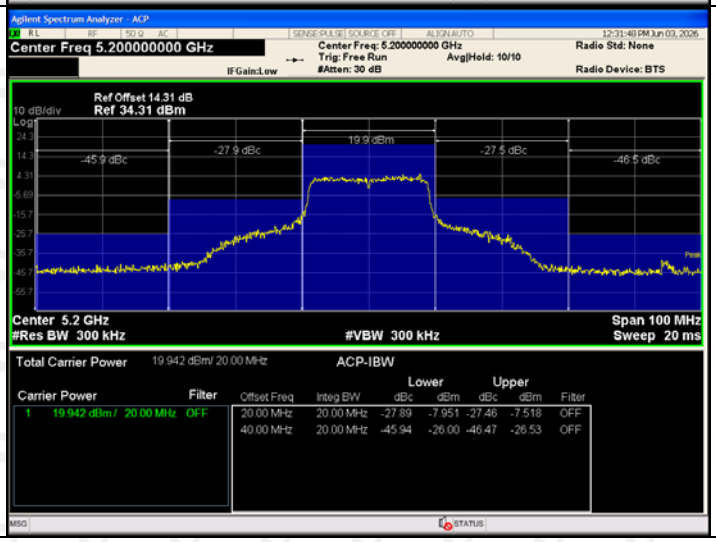
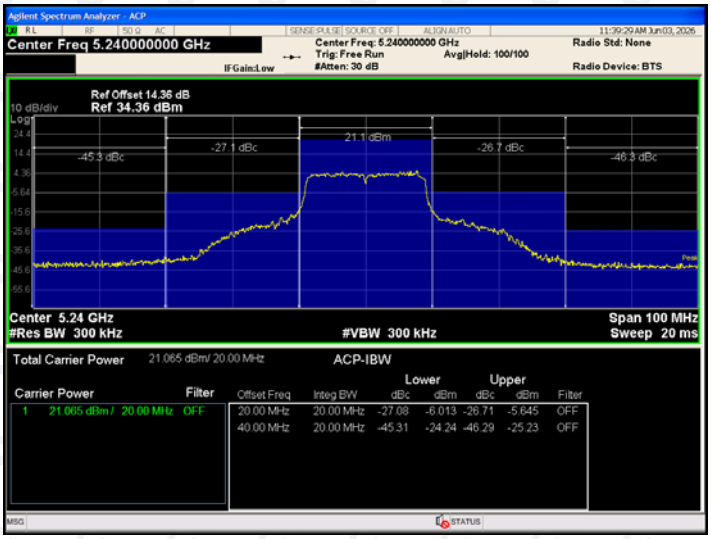


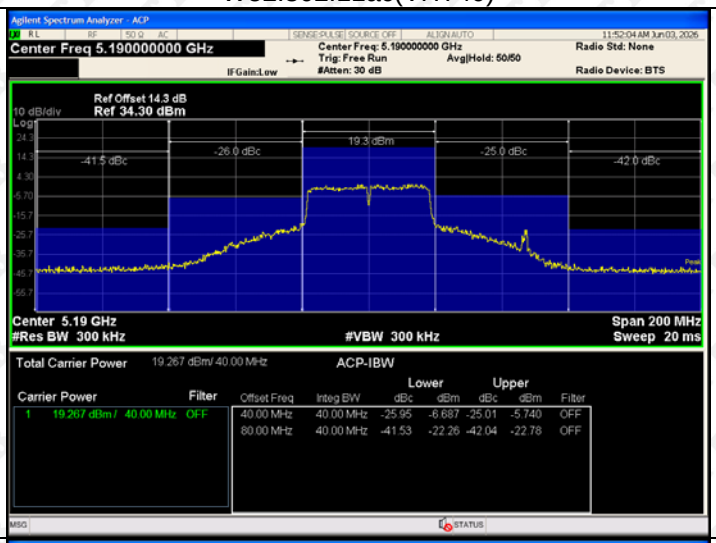
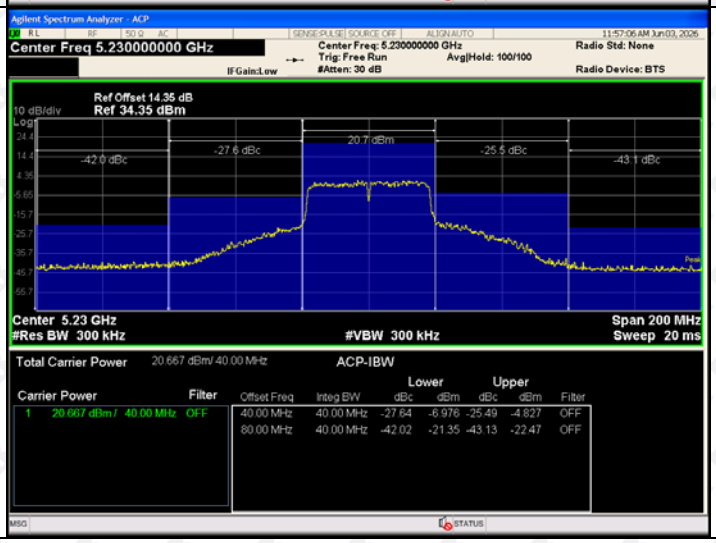
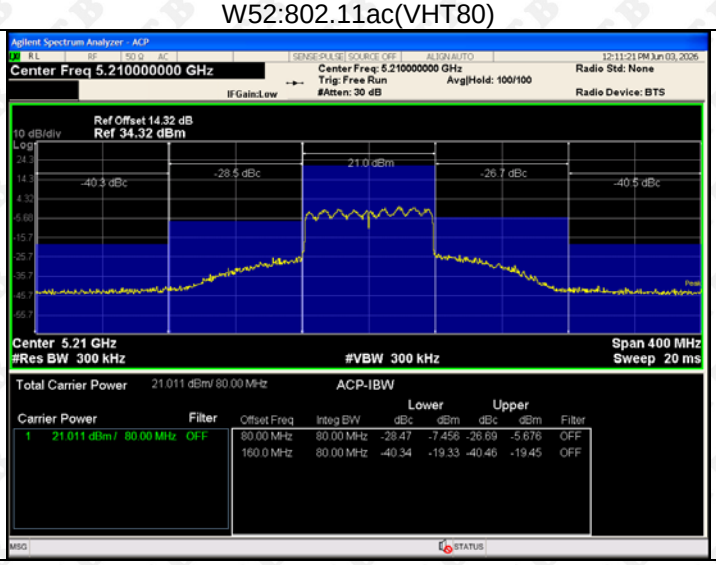
8.4 TEST RESULT

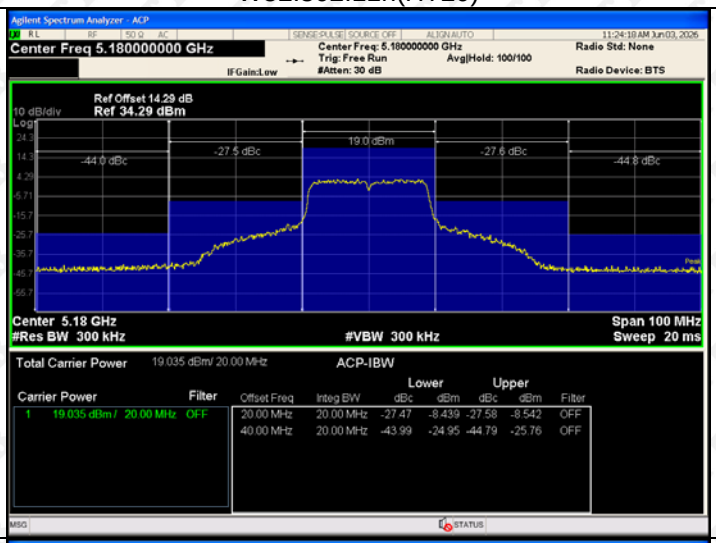
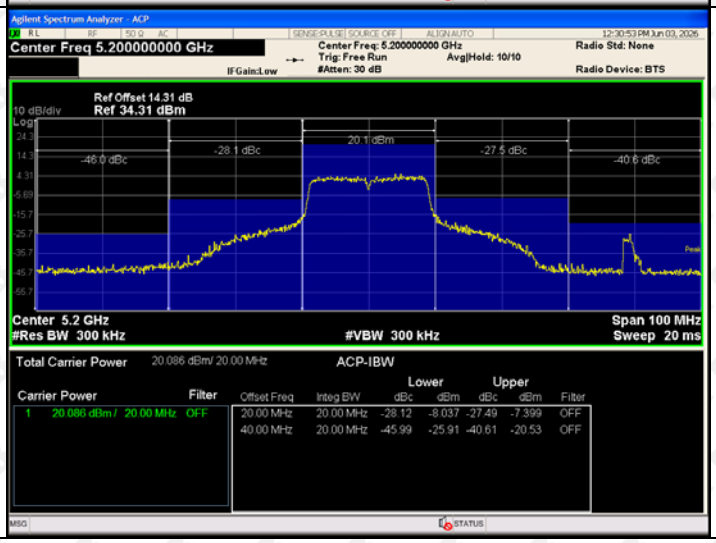
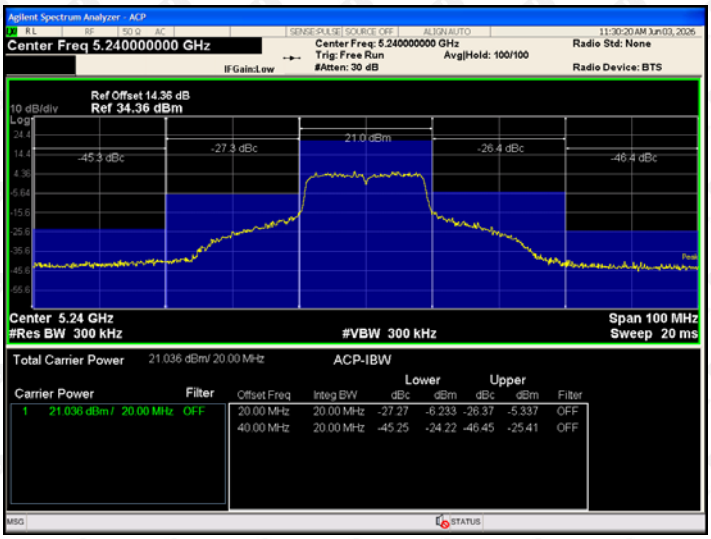
W52:

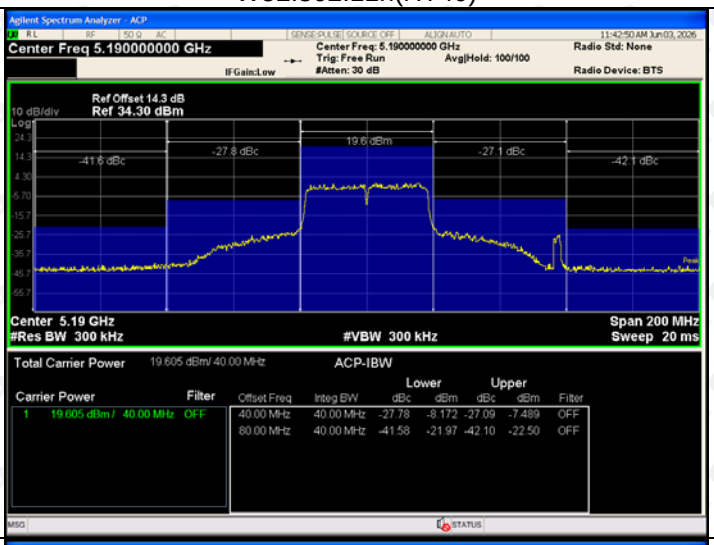
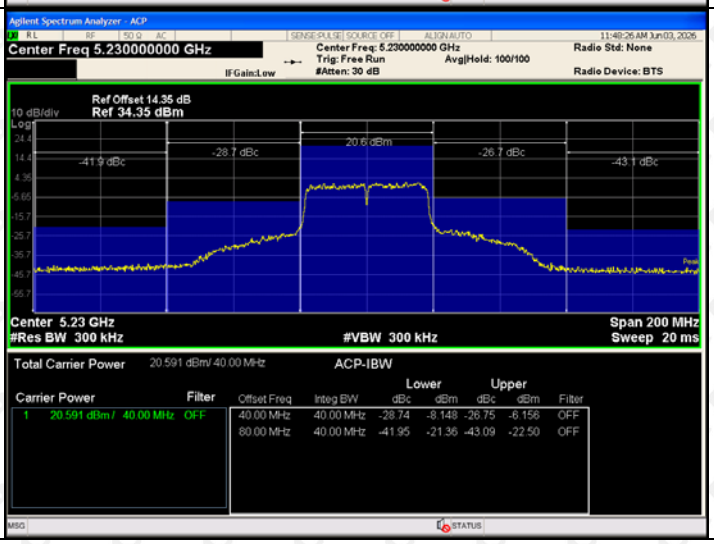
Normal Voltage						
Mode	detuning (MHz)		E.I.R.P (dBm/MHz)			Limit (dBm/MHz)
			LCH	MCH	HCH	
802.11a	20MHz	Lower	-27.73	-28.54	-27.42	-25dBc/20MHz
		Upper	-27.87	-27.82	-26.28	
	40MHz	Lower	-43.97	-46.45	-45.31	-40dBc/40MHz
		Upper	-44.6	-47.2	-46.32	
802.11ac(VHT20)	20MHz	Lower	-27.16	-27.89	-27.08	-25dBc/20MHz
		Upper	-27.68	-27.46	-26.71	
	40MHz	Lower	-44.13	-45.94	-45.31	-40dBc/40MHz
		Upper	-44.83	-46.47	-46.29	
802.11ac(VHT40)	40MHz	Lower	-25.95	/	-27.64	-25dBc/40MHz
		Upper	-25.01	/	-25.49	
	80MHz	Lower	-41.53	/	-42.02	-40dBc/80MHz
		Upper	-42.04	/	-43.13	
802.11ac(VHT80)	80MHz	Lower	/	-28.47	/	-25dBc/80MHz
		Upper	/	-26.69	/	
	160MHz	Lower	/	-40.34	/	-25dBc/80MHz
		Upper	/	-40.46	/	
802.11n(HT20)	20MHz	Lower	-27.47	-28.12	-27.27	-25dBc/20MHz
		Upper	-27.58	-27.49	-26.37	
	40MHz	Lower	-43.99	-45.99	-45.25	-40dBc/40MHz
		Upper	-44.79	-40.61	-46.45	
802.11n(HT40)	40MHz	Lower	-27.78	/	-28.74	-25dBc/40MHz
		Upper	-27.09	/	-26.75	
	80MHz	Lower	-41.58	/	-41.95	-40dBc/80MHz
		Upper	-42.1	/	-43.09	
Result	Pass					

Channel(MHz)	W52:802.11a
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(VHT20)
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(VHT40)
5190	
5230	
Channel(MHz)	W52:802.11ac(VHT80)
5210	

Channel(MHz)	W52:802.11n(HT20)
5180	
5200	
5240	

Channel(MHz)	W52:802.11n(HT40)
5190	
5230	

9Antenna Power and Tolerance

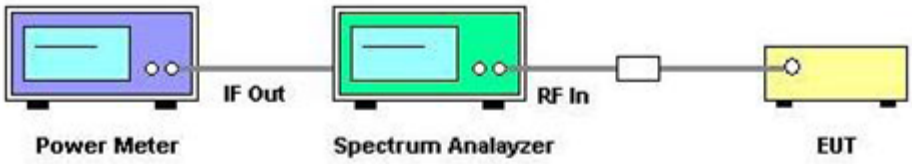
9.1 LIMIT

(1)10mW/MHz(OFDM, DSSS:20MHz system),
(2)5mW/MHz(OFDM:40MHz system),
(3)2.5mW/MHz(OFDM:80MHz system),
(4)1.25mW/MHz(OFDM:160MHz system),
(5)10mW/MHz(except above methods),
Tolerance: W52/W53: -80%~+20%,W56:-50%~+50%.

9.2 TEST PROCEDURE

A spectrum analyzer or similar device shall be used to observe a sample of the modulated transmitter's radio frequency power output.
(a) A sample detector function must be used.
(b) A measurement instrument with an integrated 1MHz power bandwidth function may be used to automate the test process.
(c) Connect the EUT to the RF input of the spectrum analyzer via a 50ohm attenuator.
(d) Set the RBW = 1MHz, VBW = 1MHz, center of frequency = operating frequency, Sweep = Auto.
(e) 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided emssion is repetitive in nature.
(f) Repeat above procedures until all frequency measured was complete.

9.3 Test Setup Block Diagram



9.4 TEST RESULT

W52

W52: Gain=1.0dBi								
Mode	Channel (MHz)	Average burst power(dBm)	Antenna power (mW/MHz)	E.I.R.P (mW/MHz)	Limit (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit
802.11a	LCH	2.824	1.916	3.762	10	4	-52.100	-80% ~ +20%
	MCH	3.657	2.321	4.557	10	4	-41.972	
	HCH	4.932	3.113	6.112	10	4	-22.171	
802.11ac (HT20)	LCH	3.002	1.996	3.919	10	4	-50.095	
	MCH	3.611	2.297	4.509	10	4	-42.583	
	HCH	4.793	3.015	5.920	10	4	-24.623	
802.11ac (VHT40)	LCH	-0.002	1.000	1.962	5	2	-50.023	
	HCH	1.301	1.349	2.649	5	2	-32.536	
802.11ac (VHT80)	MCH	0.155	1.036	2.035	2.5	2	-48.183	
802.11n20 (VHT20)	LCH	2.723	1.872	3.675	10	4	-53.201	
	MCH	3.421	2.198	4.316	10	4	-45.041	
	HCH	4.798	3.019	5.927	10	4	-24.536	
802.11n (HT40)	LCH	0.229	1.054	2.070	5	2	-47.293	
	HCH	1.669	1.469	2.883	5	2	-26.571	

10. Unwanted Emissions Strength

10.1 LIMIT

W52

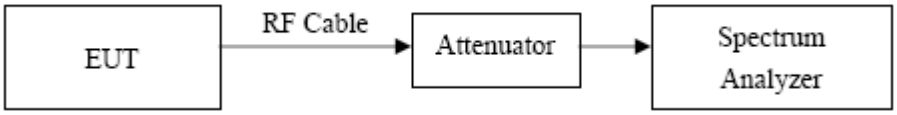
20MHz system	
OBW : 18MHz or less	OBW : 18 - 20 MHz
5,142 MHz or less : 2.5 μW/MHz	5,142 MHz or less : 2.5 μW/MHz
5,142 - 5,150 MHz : 15 μW/MHz	5,142 - 5,150 MHz : 15 μW/MHz
	5,250 - 5,250.2 MHz : $10^{1-(8/2)(f-9.75)}$ mW/MHz
5,250 - 5,251 MHz : $10^{1-(f-9)}$ mW/MHz	5,250.2 - 5,251 MHz : $10^{1-(f-9)}$ mW/MHz
5,251 - 5,260 MHz : $10^{-1-(8/90)(f-11)}$ mW/MHz	5,251 - 5,260 MHz : $10^{-1-(8/90)(f-11)}$ mW/MHz
5,260 - 5,266.7 MHz : $10^{-1.8-(6/50)(f-20)}$ mW/MHz	5,260 - 5,266.7 MHz : $10^{-1.8-(6/50)(f-20)}$ mW/MHz
5,266.7 MHz or more : 2.5 μW/MHz	5,266.7 MHz or more : 2.5 μW/MHz
f = MHz, Difference from 5240 (MHz)	f = MHz, Difference from 5240 (MHz)

40MHz system	80MHz system
5,141.6 MHz or less : 2.5 μW/MHz	5,123.2 MHz or less : 2.5 μW/MHz
5,141.6 - 5,150 MHz : 15 μW/MHz	5,123.2 - 5,150 MHz : 15 μW/MHz
5,250 - 5,251 MHz : $10^{-(f-20)+log(1/2)}$ mW/MHz	5,250 - 5,251 MHz : $10^{-(f-40)+log(1/4)}$ mW/MHz
5,251 - 5,270 MHz : $10^{-(8/190)(f-21)-1+\log(1/2)}$ mW/MHz	5,251 - 5,290 MHz : $10^{-(8/290)(f-41)-1+\log(1/4)}$ mW/MHz
5,270 - 5,278.4 MHz : $10^{-(8/50)(f-40)-1.8+\log(1/2)}$ mW/MHz	5,290 - 5,296.7 MHz : $10^{-(8/100)(f-80)-1.8+\log(1/4)}$ mW/MHz
5,278.4 MHz or more : 2.5 μW/MHz	5,296.7 MHz or more : 2.5 μW/MHz
f = MHz, Difference from 5230 (MHz)	f = MHz, Difference from 5210 (MHz)

10.2 TEST PROCEDURE

(1) A spectrumIn case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
(2) The measurement equipment shall be set for peak hold mode of operation.
(3) the transmitter shall be operated at the highest output power, or, in the case of equipment able to operate at more than one power level, at the lowest and highest output powers;
(4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
(5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
(5) This measurement shall be repeated with the transmitter in standby mode where applicable.
(6) Repeat above procedures until all frequency measured was complete.

10.3 TEST SETUP Block Diagram



10.4 TEST RESULT

W52

Test voltage	Test freq.	Test freq. range	Mkr(MHz)	Test result(dBm)	Limit Start(dBm)	Limit Stop (dBm)	Result
Normal Voltage	5180MHz	30MHz-5142MHz	3158.54	-38.34	-26	-26	PASS
		5142MHz-5150MHz	5149.49	-35.65	-18	-18	PASS
		5250MHz-5251MHz	5250.21	-36.25	0	-10	PASS
		5251MHz-5260MHz	5251.95	-38.01	-10	-18	PASS
		5260MHz-5266.7MHz	5260.96	-38.04	-18	-26	PASS
		5266.7MHz-26000MHz	25004.8	-35.25	-26	-26	PASS
	5200MHz	30MHz-5142MHz	3148.32	-39.56	-26	-26	PASS
		5142MHz-5150MHz	5149.6	-37.71	-18	-18	PASS
		5250MHz-5251MHz	5250.11	-37.44	0	-10	PASS
		5251MHz-5260MHz	5252.38	-38.11	-10	-18	PASS
		5260MHz-5266.7MHz	5265.43	-38.49	-18	-26	PASS
		5266.7MHz-26000MHz	24984.07	-34.93	-26	-26	PASS
	5240MHz	30MHz-5142MHz	3143.21	-39.48	-26	-26	PASS
		5142MHz-5150MHz	5148.86	-37.65	-18	-18	PASS
		5250MHz-5251MHz	5250.04	-6.68	0	-10	PASS
		5251MHz-5260MHz	5251.05	-11.2	-10	-18	PASS
		5260MHz-5266.7MHz	5260.01	-20.43	-18	-26	PASS
		5266.7MHz-26000MHz	5266.7	-31.16	-26	-26	PASS

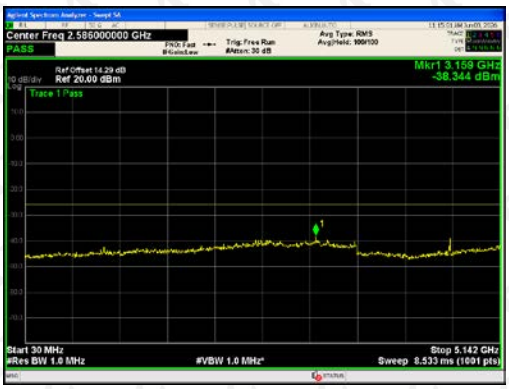
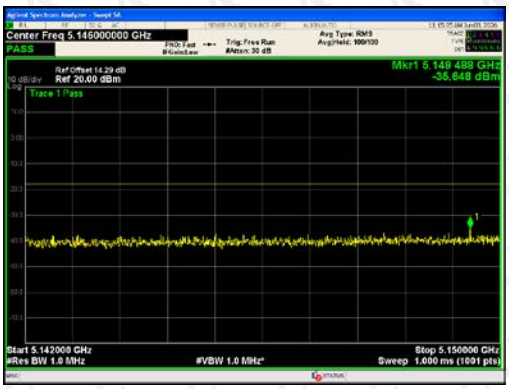
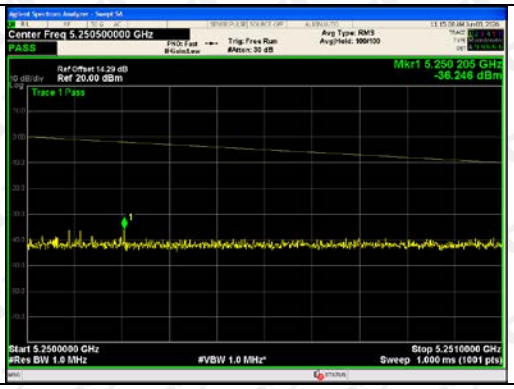
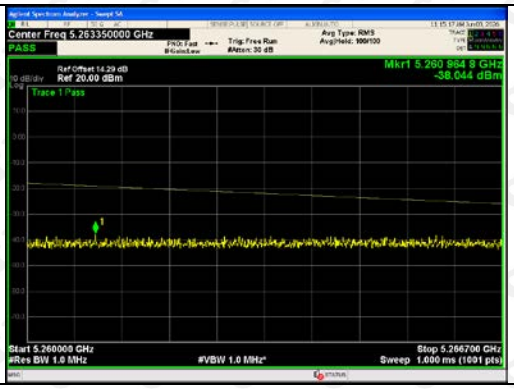
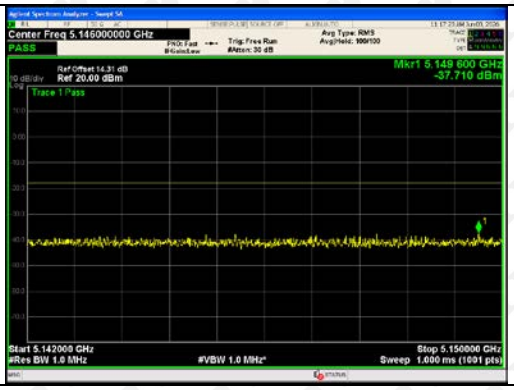
802.11ac

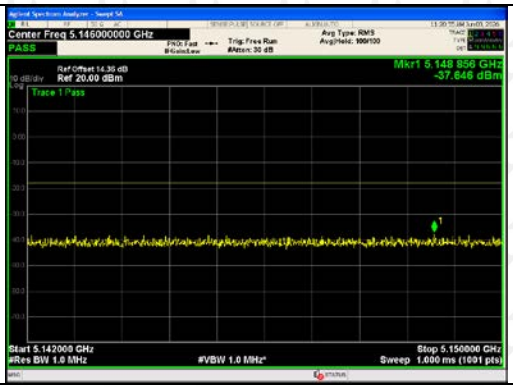
Test voltage	Test freq.	Test freq. range	Mkr(MHz)	Test result	Limit Start(dBm)	Limit Stop (dBm)	Result
Normal Voltage	5180MHz	30MHz-5142MHz	2672.9	-39.5	-26	-26	PASS
		5142MHz-5150MHz	5149.86	-36.82	-18	-18	PASS
		5250MHz-5251MHz	5250.21	-38.06	0	-10	PASS
		5251MHz-5260MHz	5254.96	-37.75	-10	-18	PASS
		5260MHz-5266.7MHz	5260.11	-38.01	-18	-26	PASS
		5266.7MHz-26000MHz	24984.07	-35.13	-26	-26	PASS
	5200MHz	30MHz-5142MHz	4600.13	-26.75	-26	-26	PASS
		5142MHz-5150MHz	5147.96	-38.15	-18	-18	PASS

		5250MHz-5251MHz	5250.27	-37.97	0	-10	PASS
		5251MHz-5260MHz	5251.91	-37.97	-10	-18	PASS
		5260MHz-5266.7MHz	5264.31	-38.04	-18	-26	PASS
		5266.7MHz-26000MHz	25025.53	-34.97	-26	-26	PASS
	5240MHz	30MHz-5142MHz	3138.1	-39.55	-26	-26	PASS
		5142MHz-5150MHz	5145.6	-38.1	-18	-18	PASS
		5250MHz-5251MHz	5250.02	-7.99	0	-10	PASS
		5251MHz-5260MHz	5251.01	-14.63	-10	-18	PASS
		5260MHz-5266.7MHz	5260	-22.67	-18	-26	PASS
		5266.7MHz-26000MHz	25751.2	-34.86	-26	-26	PASS
Normal Voltage	5190MHz	30MHz-5141.6MHz	5141.6	-36.64	-26	-26	PASS
		5141.6MHz-5150MHz	5148.68	-22.16	-18	-18	PASS
		5250MHz-5251MHz	5250.02	-34.94	-3	-13	PASS
		5251MHz-5270MHz	5251.65	-37.64	-13	-21	PASS
		5270MHz-5278.4MHz	5270.24	-37.9	-21	-26	PASS
		5278.4MHz-26000MHz	24984.64	-34.58	-26	-26	PASS
	5230MHz	30MHz-5141.6MHz	4599.77	-28.84	-26	-26	PASS
		5141.6MHz-5150MHz	5148.91	-36.79	-18	-18	PASS
		5250MHz-5251MHz	5250.02	-17.79	-3	-13	PASS
		5251MHz-5270MHz	5251.36	-23.01	-13	-21	PASS
		5270MHz-5278.4MHz	5273.12	-34.64	-21	-26	PASS
		5278.4MHz-26000MHz	25026.08	-34.78	-26	-26	PASS
Normal Voltage	5210MHz	30MHz-5123.2MHz	4599	-37.99	-26	-26	PASS
		5123.2MHz-5150MHz	5145.1	-24.85	-18	-18	PASS
		5250MHz-5251MHz	5250.01	-19.24	-6	-16	PASS
		5251MHz-5290MHz	5264.88	-20.02	-16	-24	PASS
		5290MHz-5296.7MHz	5290.59	-24.77	-24	-26	PASS
		5296.7MHz-26000MHz	5296.7	-34.31	-26	-26	PASS

802.11n

Test voltage	Test freq.	Test freq. range	Mkr(MHz)	Test result	Limit Start(dBm)	Limit Stop (dBm)	Result
Normal Voltage	5180MHz	30MHz-5142MHz	4600.13	-39.06	-26	-26	PASS
		5142MHz-5150MHz	5148.47	-36.3	-18	-18	PASS
		5250MHz-5251MHz	5250.31	-37.35	0	-10	PASS
		5251MHz-5260MHz	5259.44	-38.42	-10	-18	PASS
		5260MHz-5266.7MHz	5260.32	-38.39	-18	-26	PASS
		5266.7MHz-26000MHz	25004.8	-34.91	-26	-26	PASS
	5200MHz	30MHz-5142MHz	3061.42	-39.25	-26	-26	PASS
		5142MHz-5150MHz	5143.86	-37.46	-18	-18	PASS
		5250MHz-5251MHz	5250.68	-38.02	0	-10	PASS
		5251MHz-5260MHz	5256.16	-38.12	-10	-18	PASS
		5260MHz-5266.7MHz	5260.47	-38.56	-18	-26	PASS
		5266.7MHz-26000MHz	25004.8	-35.09	-26	-26	PASS
	5240MHz	30MHz-5142MHz	3051.19	-39.82	-26	-26	PASS
		5142MHz-5150MHz	5148.9	-38.31	-18	-18	PASS
		5250MHz-5251MHz	5250.02	-7.05	0	-10	PASS
		5251MHz-5260MHz	5251.05	-12.14	-10	-18	PASS
		5260MHz-5266.7MHz	5260.46	-21.11	-18	-26	PASS
		5266.7MHz-26000MHz	5266.7	-31.7	-26	-26	PASS
Normal Voltage	5190MHz	30MHz-5141.6MHz	5141.6	-34.61	-26	-26	PASS
		5141.6MHz-5150MHz	5145.4	-23.41	-18	-18	PASS
		5250MHz-5251MHz	5250.11	-36.23	-3	-13	PASS
		5251MHz-5270MHz	5251.59	-38.21	-13	-21	PASS
		5270MHz-5278.4MHz	5271.07	-38.36	-21	-26	PASS
		5278.4MHz-26000MHz	25005.36	-35.13	-26	-26	PASS
	5230MHz	30MHz-5141.6MHz	4599.77	-38.94	-26	-26	PASS
		5141.6MHz-5150MHz	5143.41	-36.83	-18	-18	PASS
		5250MHz-5251MHz	5250.03	-13.21	-3	-13	PASS
		5251MHz-5270MHz	5257.27	-16.01	-13	-21	PASS
		5270MHz-5278.4MHz	5272.9	-23.09	-21	-26	PASS
		5278.4MHz-26000MHz	5278.4	-34.11	-26	-26	PASS

Channel (MHz)	W52:802.11a	
5180		
	30MHz-5142MHz	5142MHz-5150MHz
		
	5250MHz-5251MHz	5251MHz-5260MHz
		
	5260MHz-5266.7	5266.7MHz-26000MHz
5200		
	30MHz-5142MHz	5142MHz-5150MHz

	5250MHz-5251MHz	5251MHz-5260MHz
	5260MHz-5266.7	5266.7MHz-26000MHz
5240		
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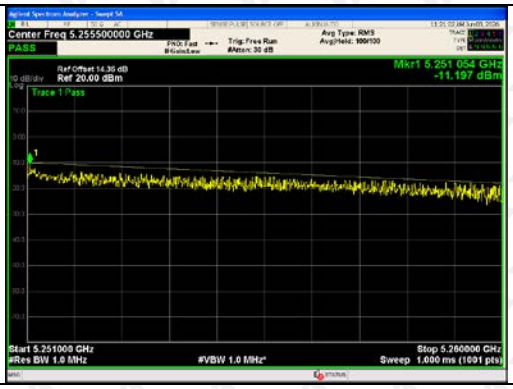
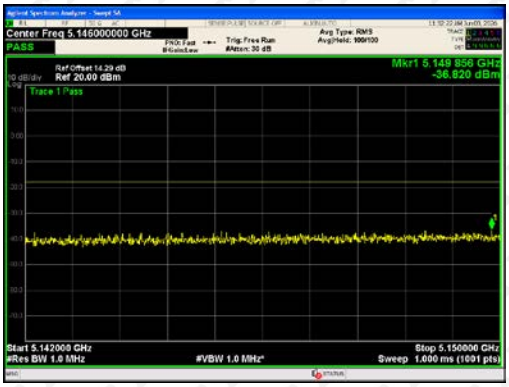
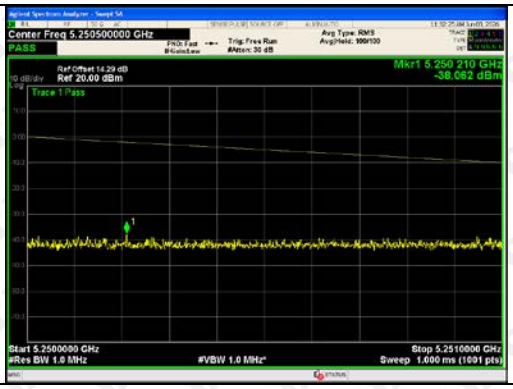
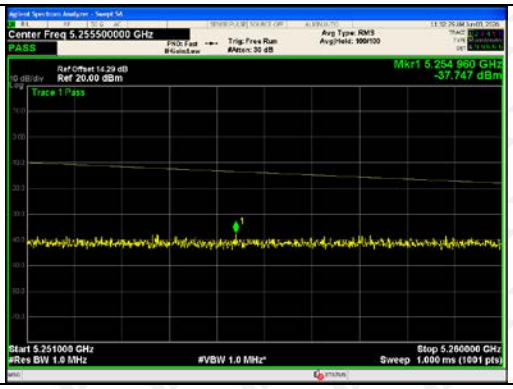
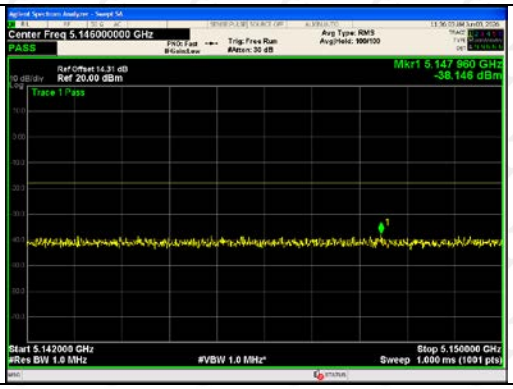
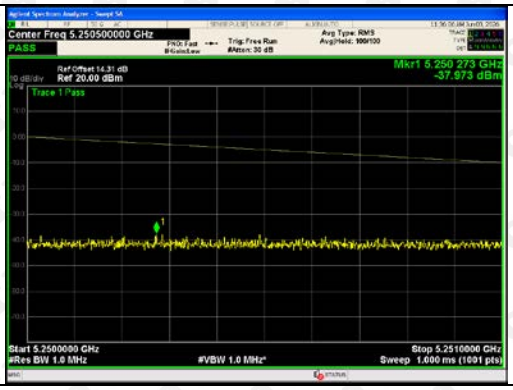
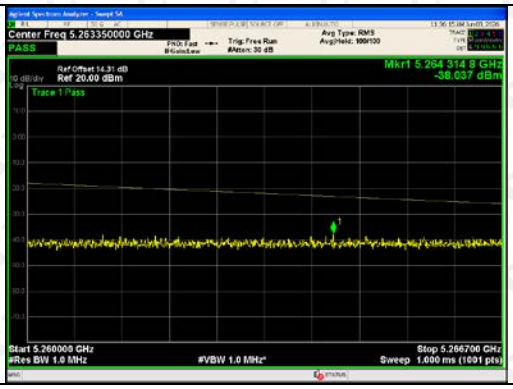
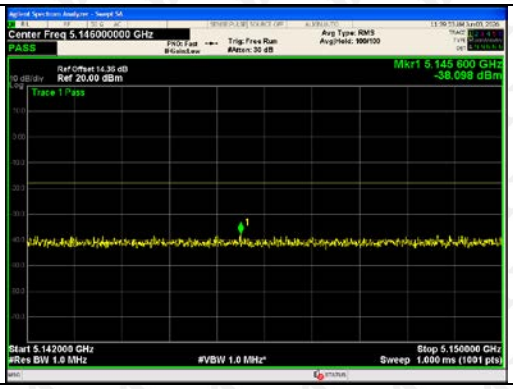
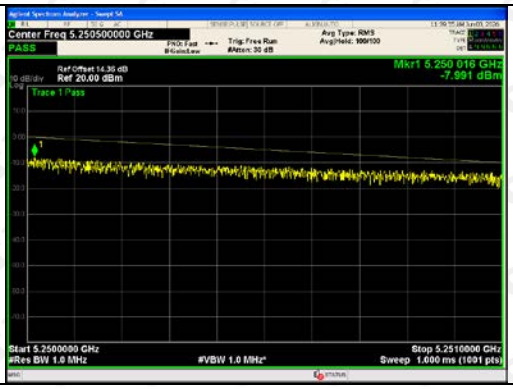
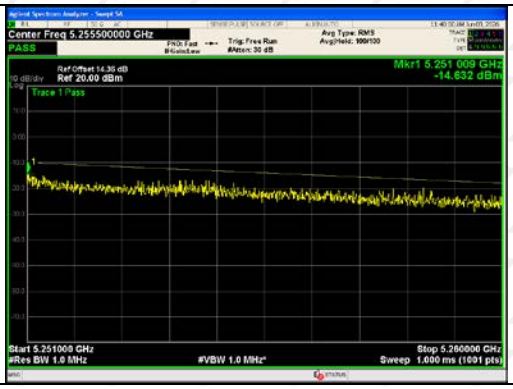
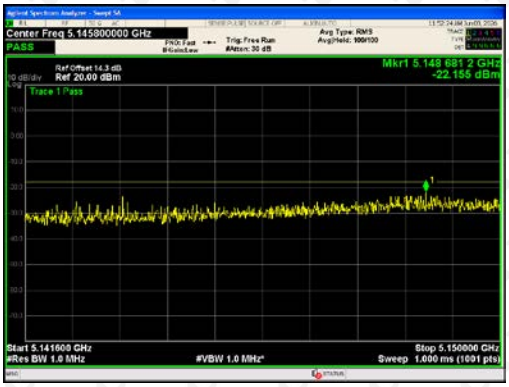
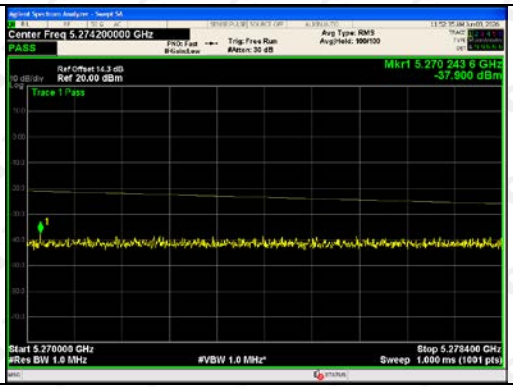
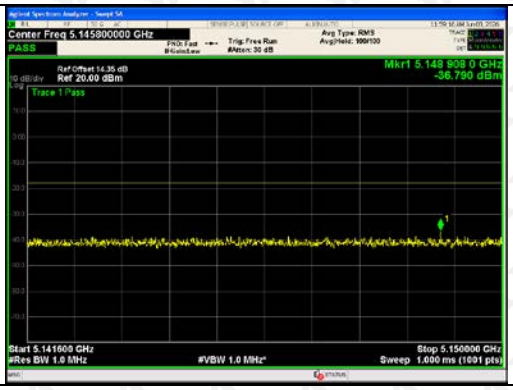
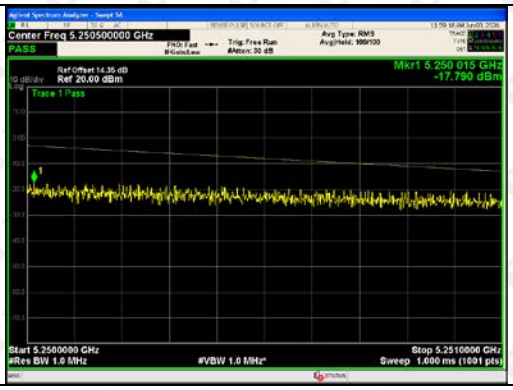
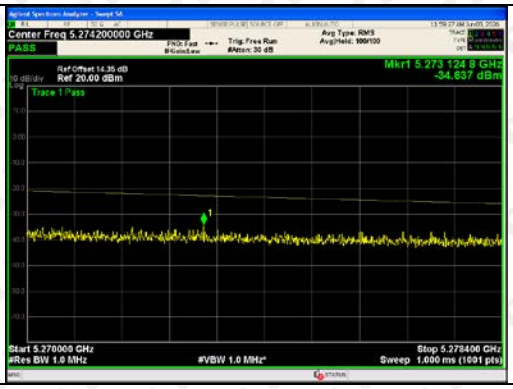
		
	5250MHz-5251MHz	5251MHz-5260MHz

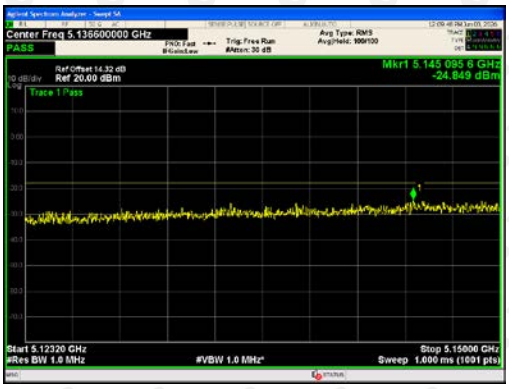
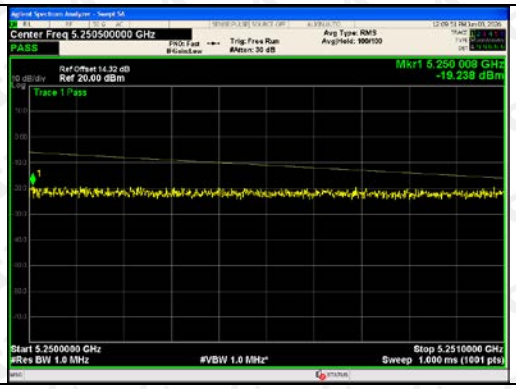
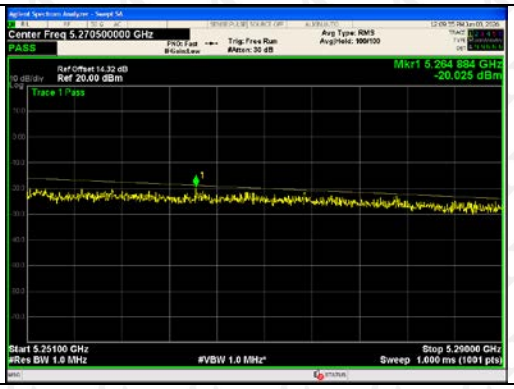
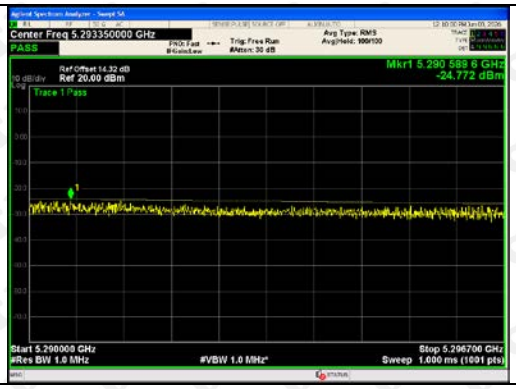
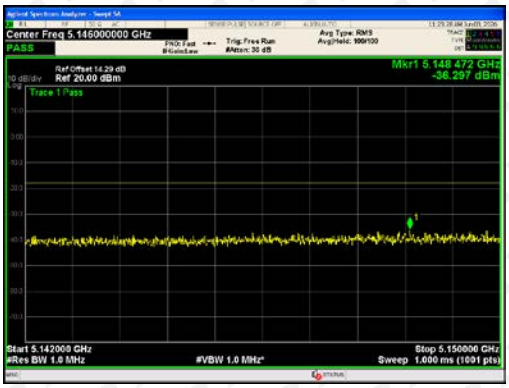
	5260MHz-5266.7	5266.7MHz-26000MHz

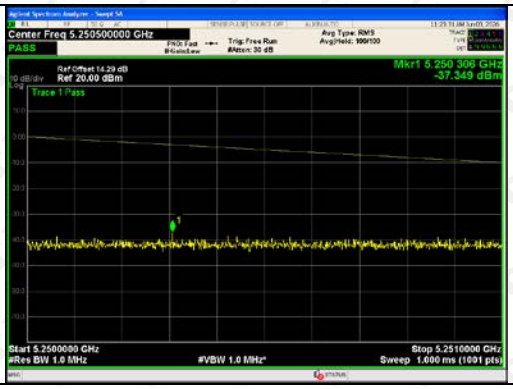
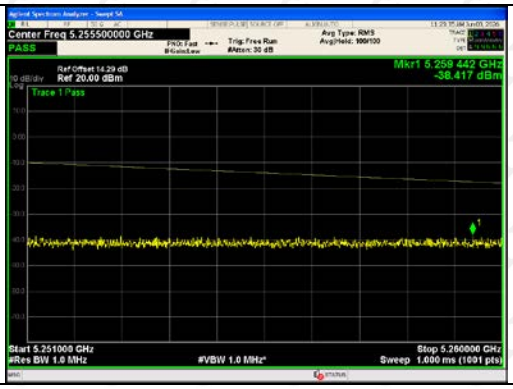
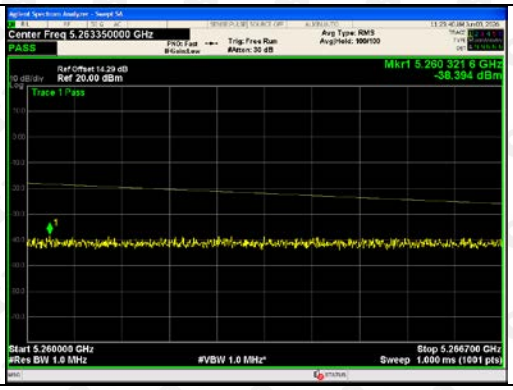
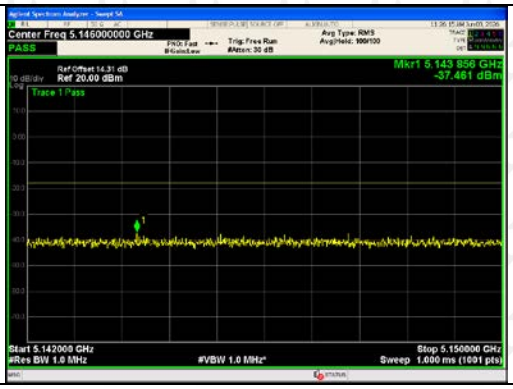
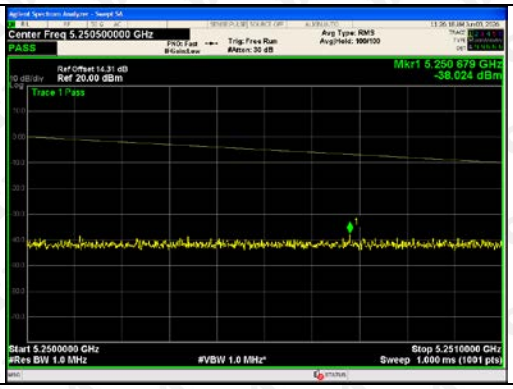
Channel (MHz)	W52:802.11ac(VHT20)	
5180	 	
	30MHz-5142MHz	5142MHz-5150MHz
	 	
	5250MHz~5251MHz	5251MHz-5260MHz
	5260MHz-5266.7MHz	5266.7MHz-26000MHz

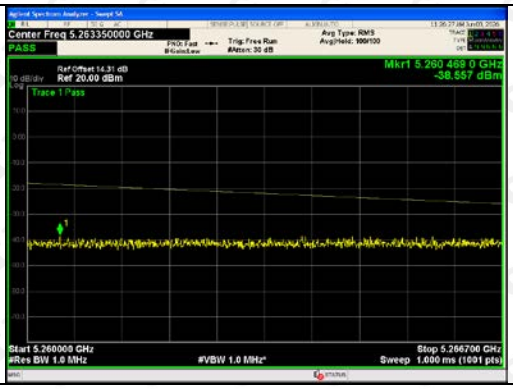
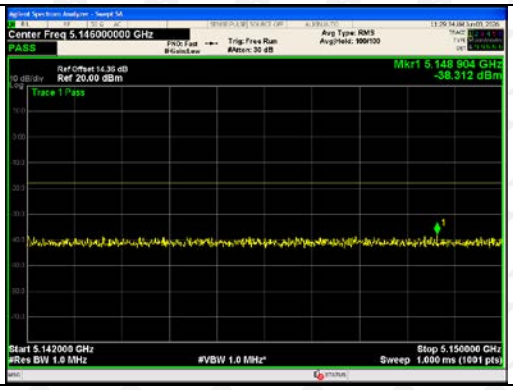
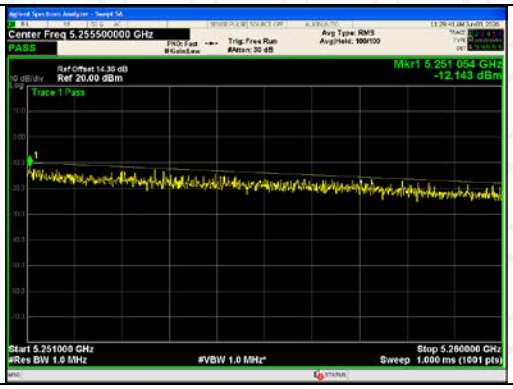
5200	 30MHz-5142MHz	 5142MHz-5150MHz
	 5250MHz~5251MHz	 5251MHz-5260MHz
	 5260MHz-5266.7MHz	 5266.7MHz-26000MHz
5240	 30MHz-5142MHz	 5142MHz-5150MHz

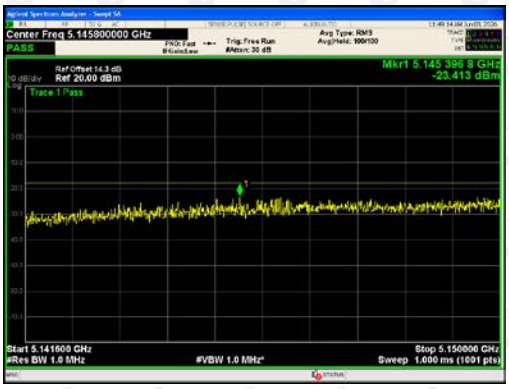
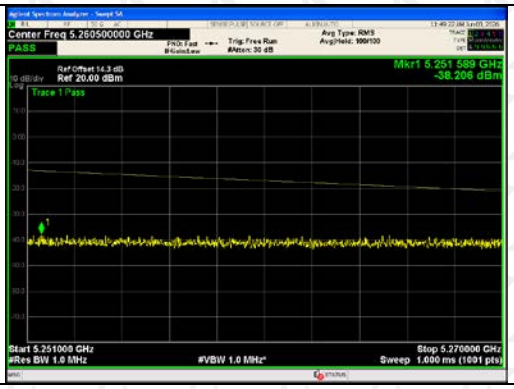
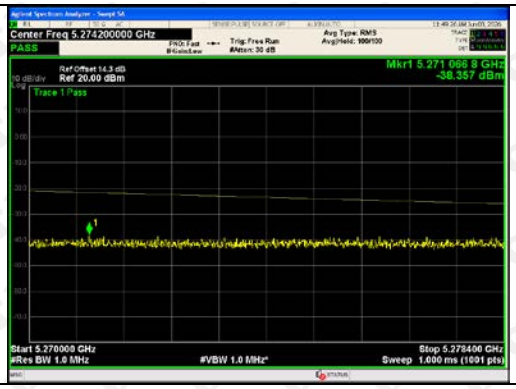
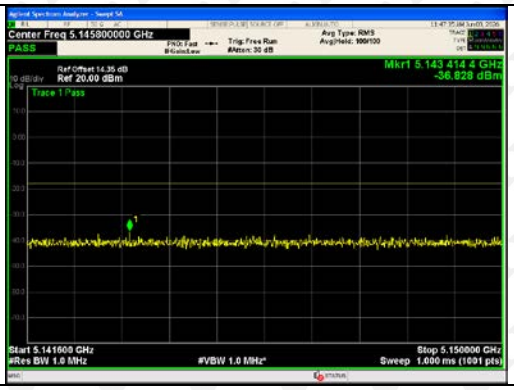
	 5250MHz~5251MHz	 5251MHz-5260MHz
	 5260MHz-5266.7MHz	 5266.7MHz-26000MHz
Channel (MHz)	W52:802.11ac(VHT40)	
5190	 30MHz-5141.6MHz	 5141.6MHz-5150MHz
	 5150MHz-5251MHz	 5251MHz-5270MHz

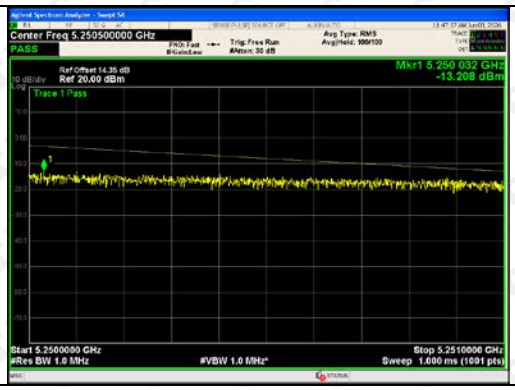
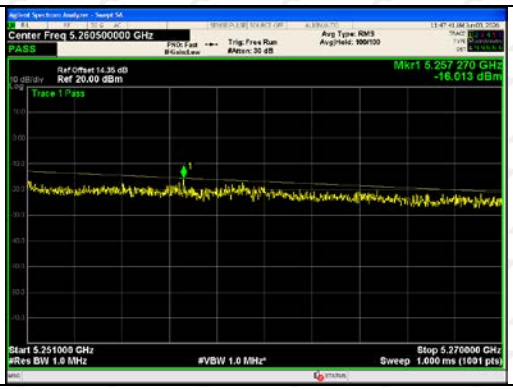
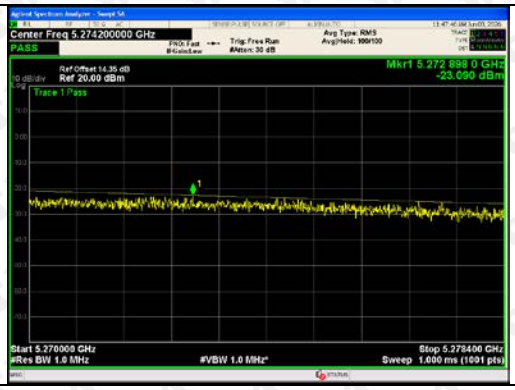
	 5270MHz-5278.4MHz	 5278.4MHz-26000MHz
5230	 30MHz-5141.6MHz	 5141.6MHz-5150MHz
	 5150MHz-5251MHz	 5251MHz-5270MHz
	 5270MHz-5278.4MHz	 5278.4MHz-26000MHz
Channel (MHz)	W52:802.11ac(VHT80)	

5210		
	30MHz-5123.2MHz	5123.2MHz-5150MHz
		
	5250MHz-5251MHz	5251MHz-5290MHz
		
	5290MHz-5296.7MHz	5296.7MHz-26000MHz
Channel (MHz)	W52:802.11n(HT20)	
5180		
	30MHz-5142MHz	5142MHz-5150MHz

	 5250MHz~5251MHz	 5251MHz-5260MHz
	 5260MHz-5266.7MHz	 5266.7MHz-26000MHz
5200	 30MHz-5142MHz	 5142MHz-5150MHz
	 5250MHz~5251MHz	 5251MHz-5260MHz

	 5260MHz-5266.7MHz	 5266.7MHz-26000MHz
5240	 30MHz-5142MHz	 5142MHz-5150MHz
	  5250MHz~5251MHz	 5251MHz-5260MHz
	  5260MHz-5266.7MHz	 5266.7MHz-26000MHz
Channel (MHz)	W52:802.11n(HT40)	

5190	 30MHz-5141.6MHz	 5141.6MHz-5150MHz
	  5150MHz-5251MHz	 5251MHz-5270MHz
	 5270MHz-5278.4MHz	 5278.4MHz-26000MHz
5230	 30MHz-5141.6MHz	 5141.6MHz-5150MHz

		
	5150MHz-5251MHz	5251MHz-5270MHz
		
	5270MHz-5278.4MHz	5278.4MHz-26000MHz

11 Interference Prevention Function

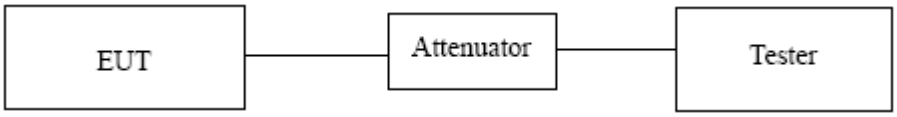
11.1 LIMIT

According to Item 19-3 of Article 2 Paragraph 1. The device shall have the function of automatic transmission or reception of identification code.

11.2 TEST PROCEDURE

1. Set the EUT in the usual operation condition
2. The radio equipment with automatic transmitting function of identification code
A. Transmit the assigned identification code from the radio equipment.
B. Confirm the identification code received by the demodulator.
3. The radio equipment with automatic receiving function of identification code
A. Transmit the assigned identification code from the opposite equipment.
B. Confirm that the usual communication is available.
C. Transmit the identification code distinct from the assigned one from the opposite equipment.
D. Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different.
4. The identification function shall be recorded with “Good” or “No”.

11.3 TEST SETUP LAYOUT



11.4 TEST RESULT

Transmitter:
The transmitting mode (the identification code is more than 48 bits) of EUT is on normal operating, the interference prevention function is good.

Receiver:
The transmitting mode of EUT is on normal operating, the interference prevention function is good.

MAC: 9C:A5:25:BA:87:F7

12Carrier sense capability

12.1 LIMIT

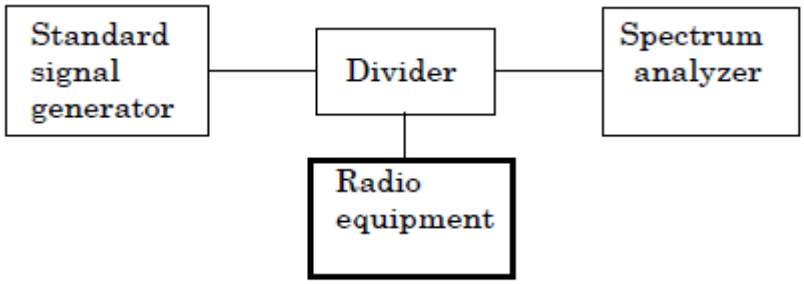
According to ORRE, art 49.20. The device shall have the carrier sensing function.

12.2 TEST PROCEDURE

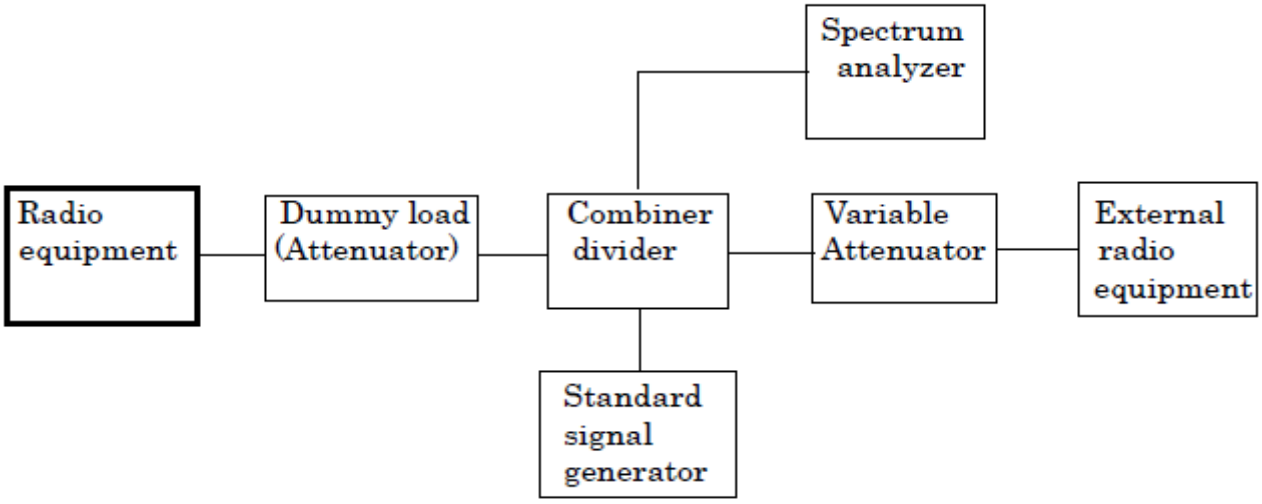
1. SG adjust the frequency as same as the EUT transmitted signal, unmodulation, power level 0dBm, Then turn off the RF signal
2. EUT have transmitted the maximum modulation signal and fixed channel
3. Setting of the SA following as RBW/VBW: 1/3MHz SPAN: 50MHz Sweep time: Auto continue PK
4. SG Signal on EUT shall be stop the transmitted, Then turn off the SG, The EUT shall be continuous transmitted signal.

12.3 TEST SETUP BLOCK DIAGRAM

(1) Test performed with the radio equipment to be tested only



(2) Test performed using the external radio equipment



12.4 TEST RESULT

EUT Stop RF transmission signal after carrier inject to EUT. Stop carrier inject, EUT will transmitting normal.)

13Construction Protection Confirmation

13.1Requirement

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily

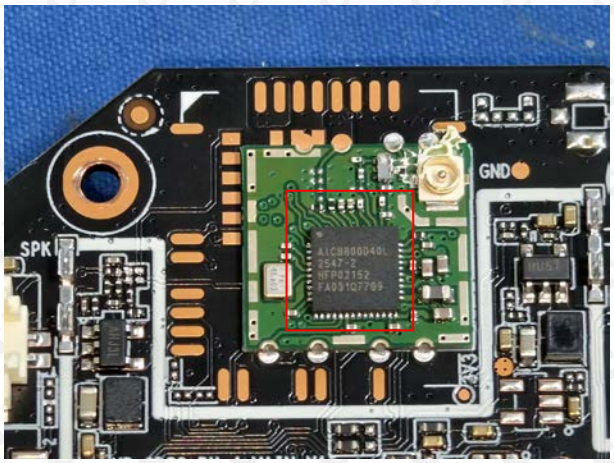
13.2 Confirmation method

☐	Sealed with special screws.
☐	Plastic chassis is being welded using ultrasonic wavs.
☐	Chassis is glued using a special adhesive.
☐	Metal covers are spot-fused.
☐	Cover is specially interlocked.
☐	RF and Modulation components are covered with shielding case and this shielding case is soldered.
☐	Shield case is welded ant RF and modulations parts, and ID-ROM is welded using BGA Method.
☐	Shield case is welded ant RF and modulations parts, and ID-ROM is glued at its lead with a special adhesive.
☐	Shield case is welded ant RF and modulations parts, and ID-ROM is glued with a non-transparent laminating agent.
☒	Other: All RF and modulation section packet in one IC, and IC is welded using QFN Method, and RF module is welded on the main board, end-User can't open it easily.

13.3 The photos of construction protection

The red circle is welding point.

The RF chip has a terminal distance to less than 1mm and has 44 terminal.



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14 Transmission Burst Length

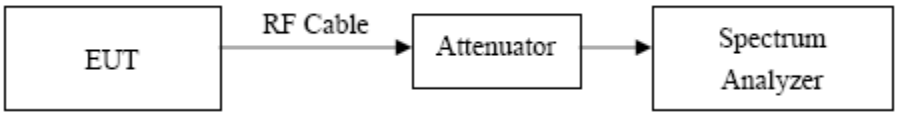
14.1 LIMIT

8ms or less

14.2 TEST PROCEDURE

Enable EUT under transmission mode and connected it to the spectrum analyzer through antenna output port as the block diagram show in TEST CONFIGURATION
Use Spectrum's ACP measurement function and set spectrum analyzer as fellow:
Spectrum Condition:
(1) Frequency: test frequency
(2) Span: 0Hz, RBW: 1MHz, VBW: 3MHz, Sweep time: Auto, Sweep mode: single
(3) Detector mode: Peak, Indication mode: Max hold

14.3 TEST SETUP BLOCK DIAGRAM

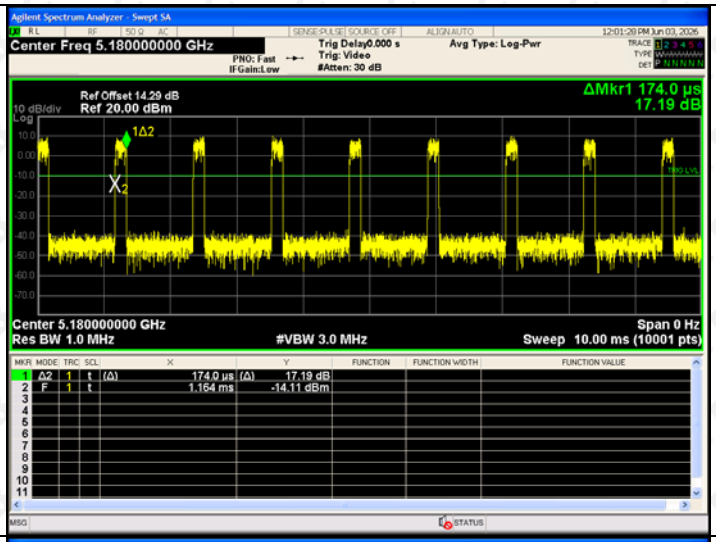
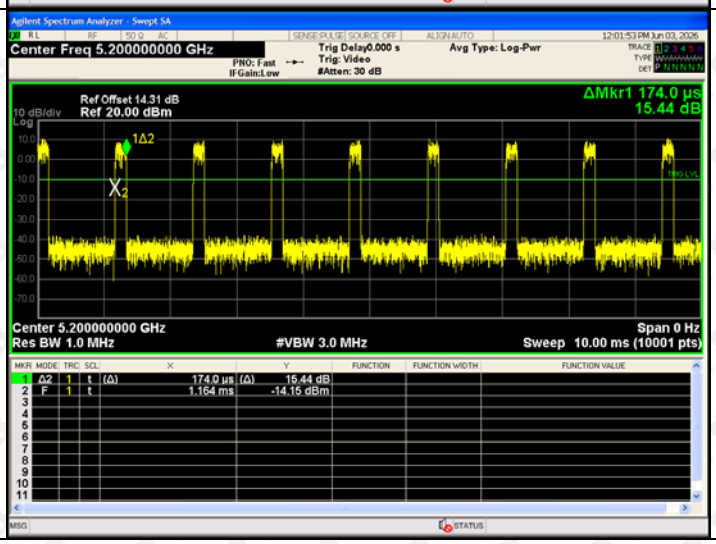
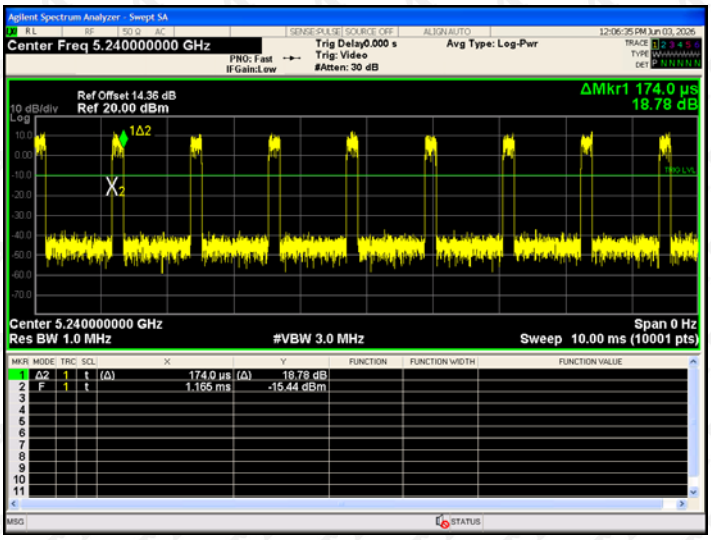


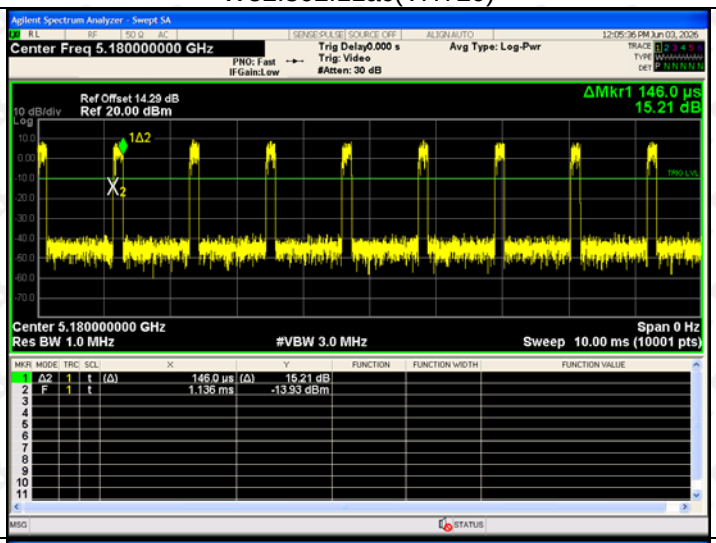
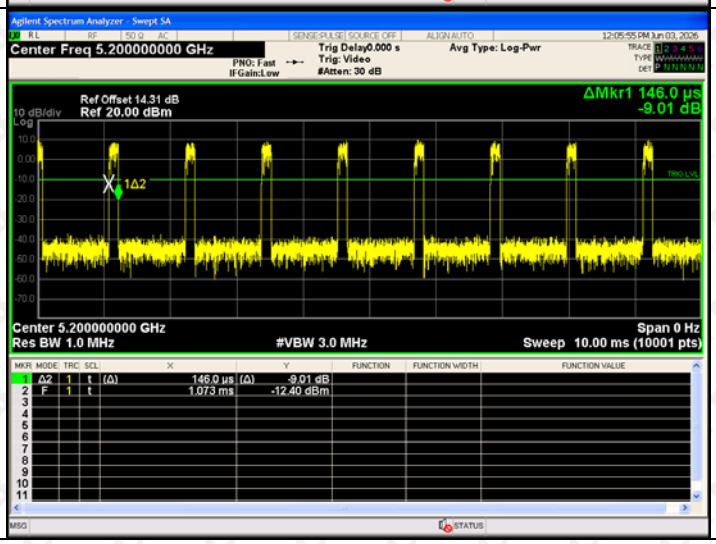
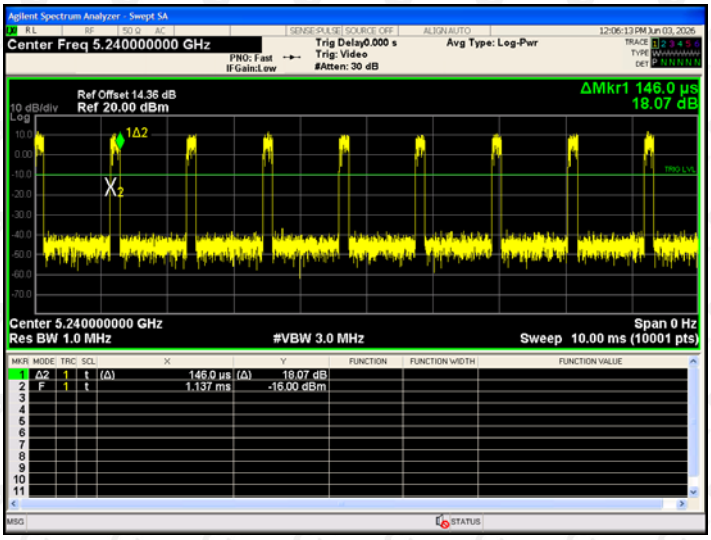
14.4 TEST RESULT

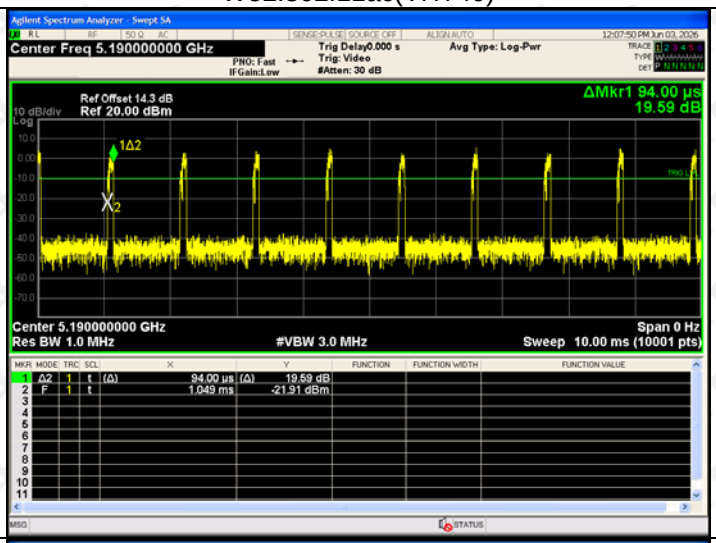
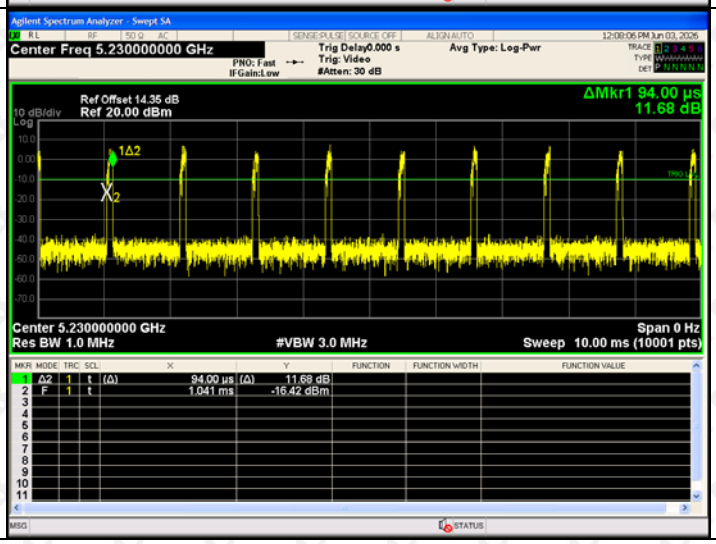
W52

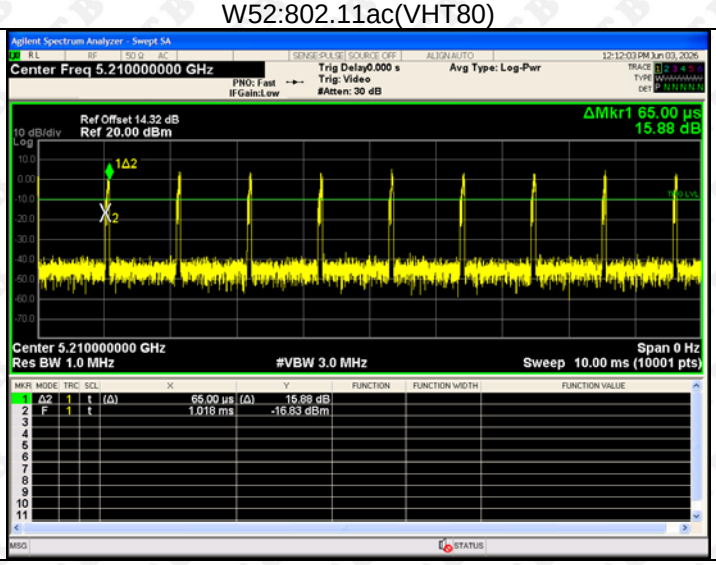
Normal Voltage			
Mode	Channel (MHz)	Read Level(dBm)	Limit (ms)
802.11a	LCH	0.174	8ms or less
	MCH	0.174	
	HCH	0.174	
802.11ac(VHT20)	LCH	0.146	
	MCH	0.146	
	HCH	0.146	
802.11ac(VHT40)	LCH	0.094	
	MCH	/	
	HCH	0.094	
802.11ac(VHT80)	LCH	/	
	MCH	0.065	
	HCH	/	
802.11n(HT20)	LCH	0.174	
	MCH	0.174	
	HCH	0.162	
802.11n(HT40)	LCH	0.098	
	MCH	/	
	HCH	0.098	

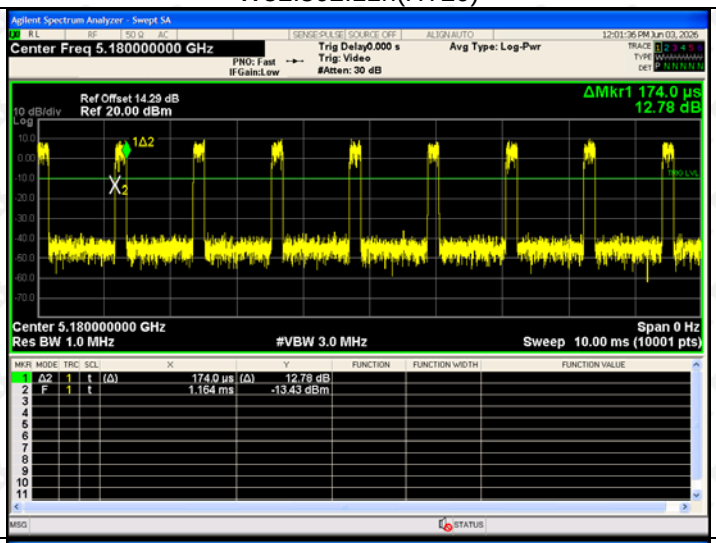
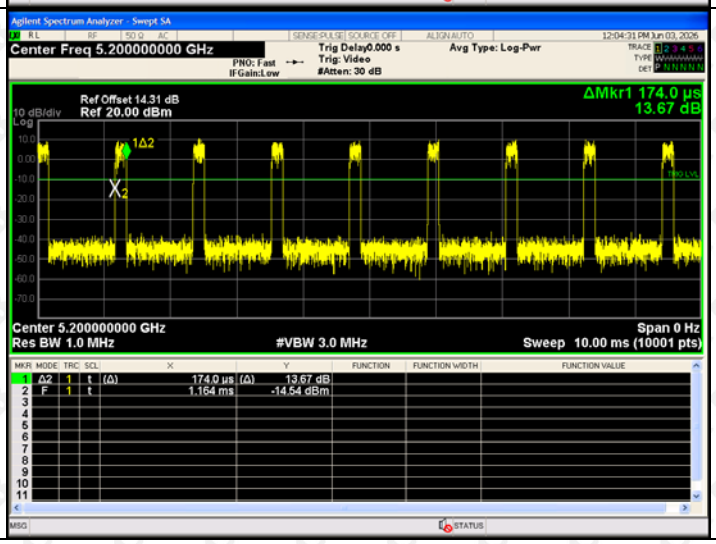
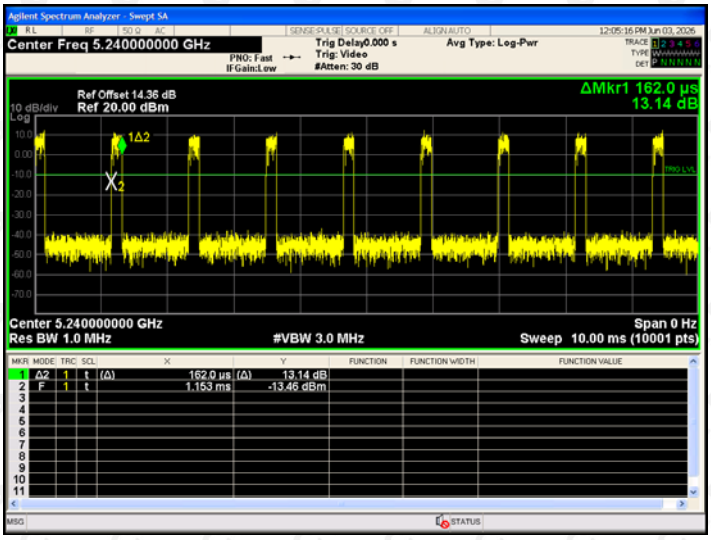
Test graph

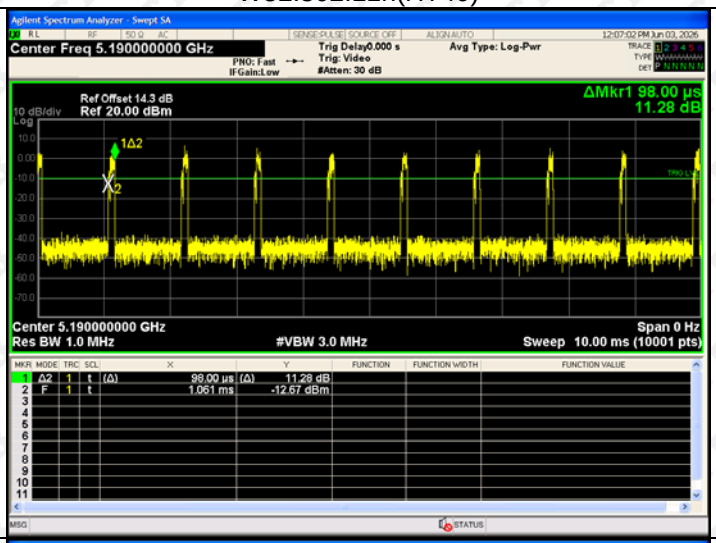
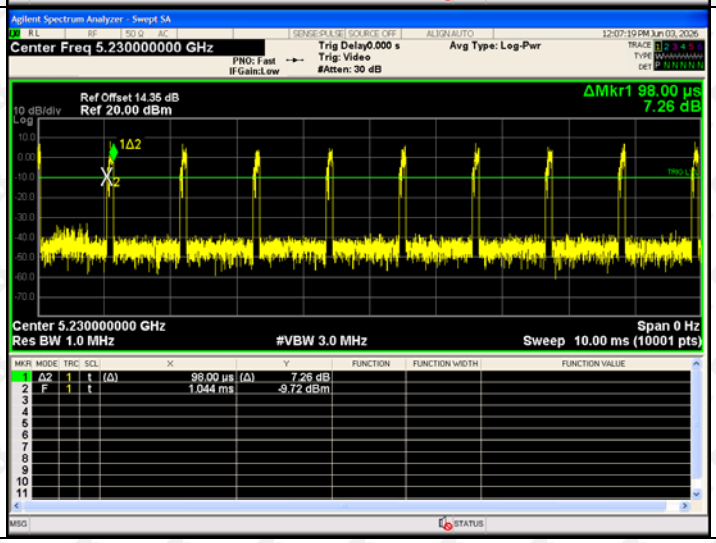
Channel(MHz)	W52:802.11a
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(VHT20)
5180	
5200	
5240	

Channel(MHz)	W52:802.11ac(VHT40)
5190	
5230	

Channel(MHz)	W52:802.11ac(VHT80)
5210	

Channel(MHz)	W52:802.11n(HT20)
5180	
5200	
5240	

Channel(MHz)	W52:802.11n(HT40)
5190	
5230	

15 Secondary Radiated Emitted Power

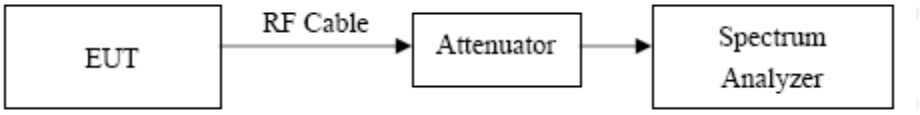
15.1 LIMIT

According to Item 19-3 of Article 2 Paragraph 1. The receiver spurious emissions shall not exceeded the following limit:
(1) Below 1GHz : 4nW/100kHz or less
(2) 1GHz or more : 20nW/MHz or more

15.2 TEST PROCEDURE

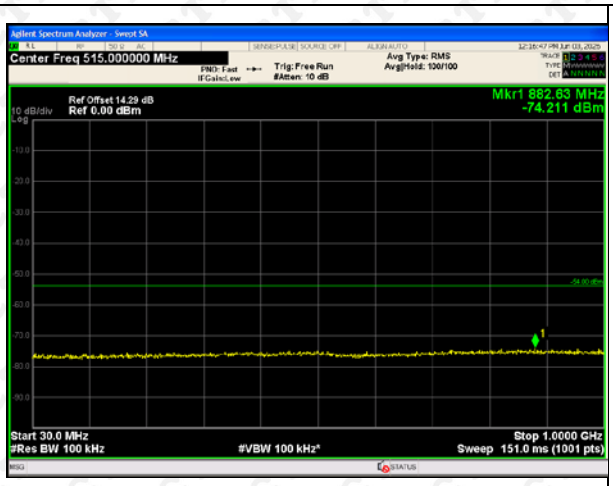
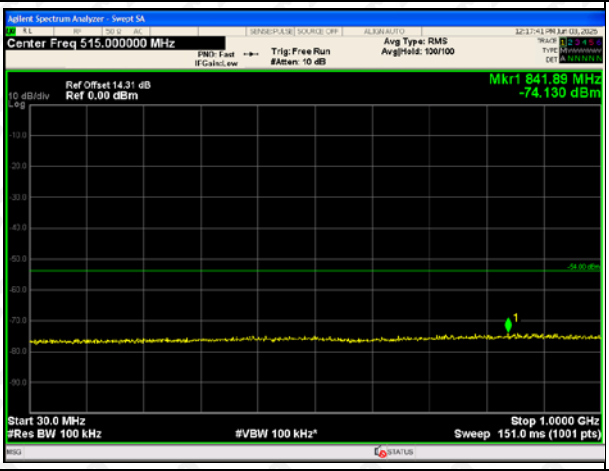
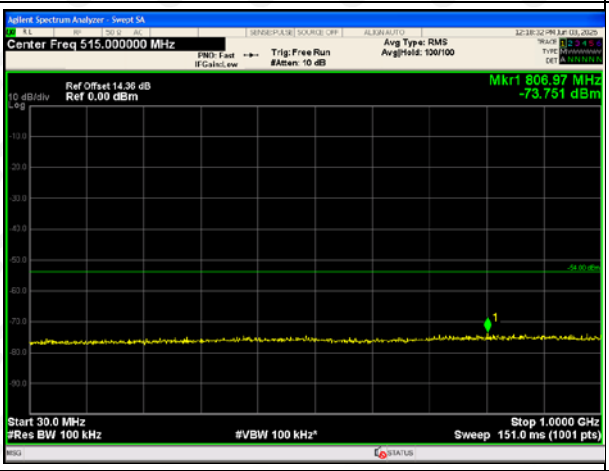
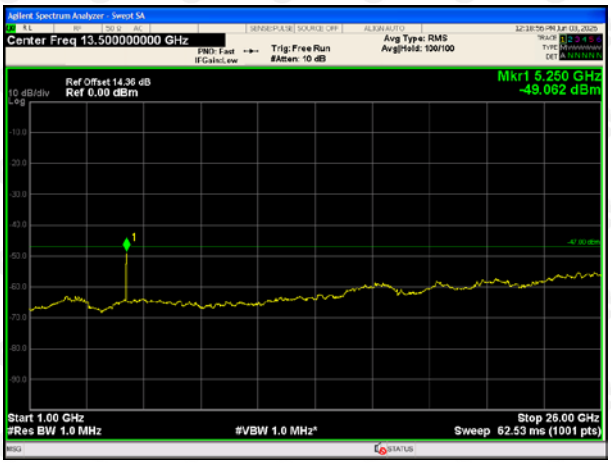
(1) A spectrumIn case of conducted measurements, the radio device shall be connected to the measuring equipment via a suitable attenuator.
(2) The measurement equipment shall be set for peak hold mode of operation.
(3) the transmitter shall be operated at the receiving mode.
(4) The resolution bandwidth shall be set to 100kHz from 10MHz to 1GHz, the resolution bandwidth shall be set to 1MHz above 1GHz , and the sweep time shall be set to auto mode, to ensure all major modulation products are captured.
(5) When the searched result is less than the specified limit, the maximum one shall be recorded, when the result is more than the specified limit, all measured values shall be recorded.
(5) This measurement shall be repeated with the transmitter in standby mode where applicable.
(6) Repeat above procedures until all frequency measured was complete.

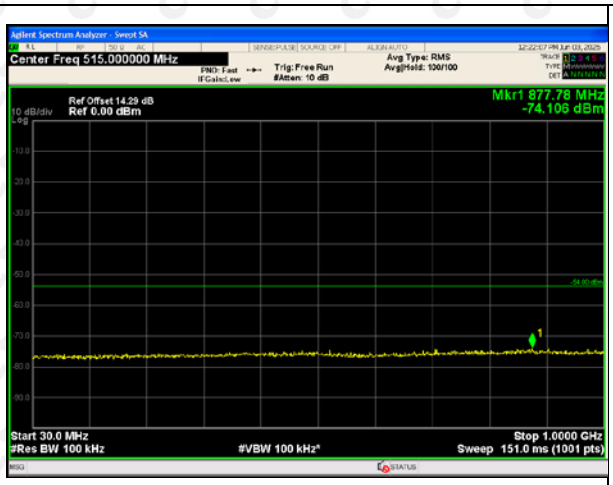
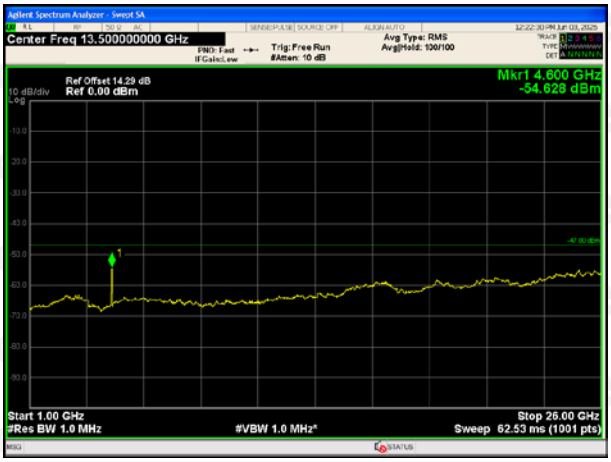
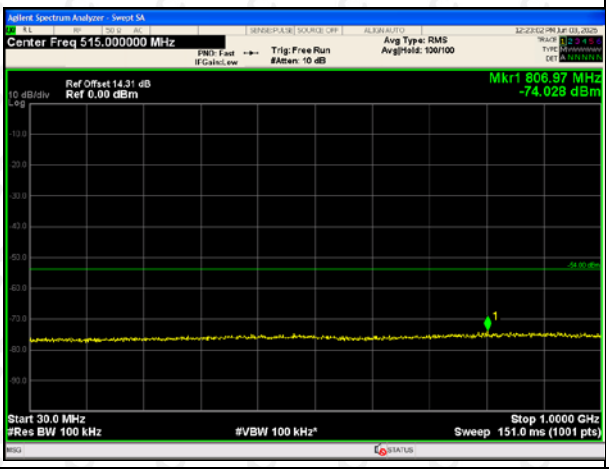
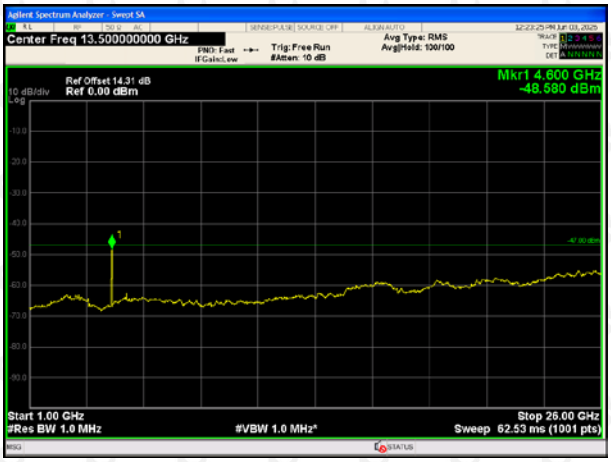
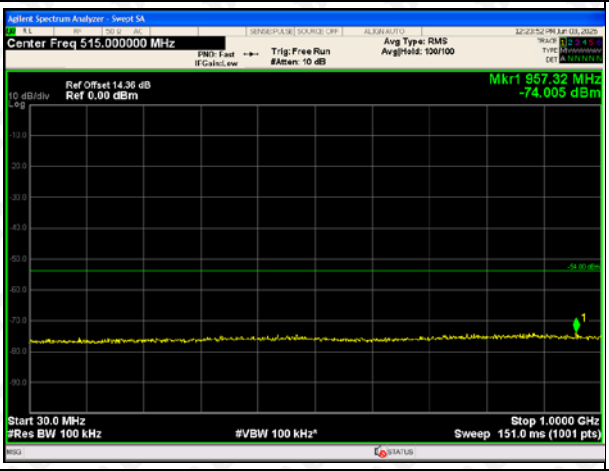
15.3 TEST SETUP BLOCK DIAGRAM

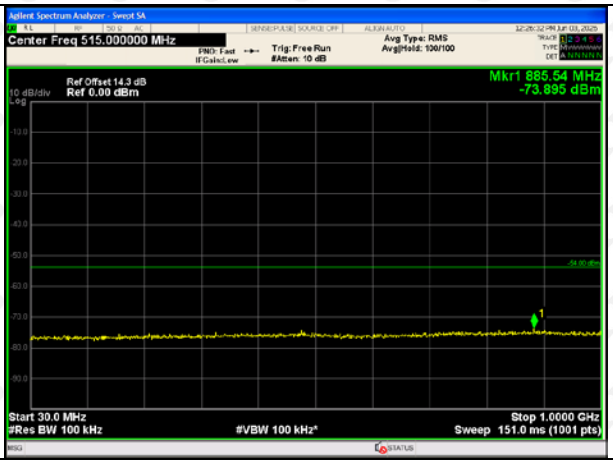
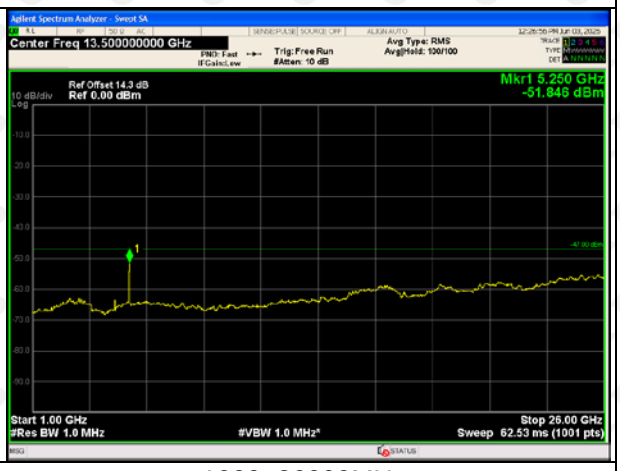
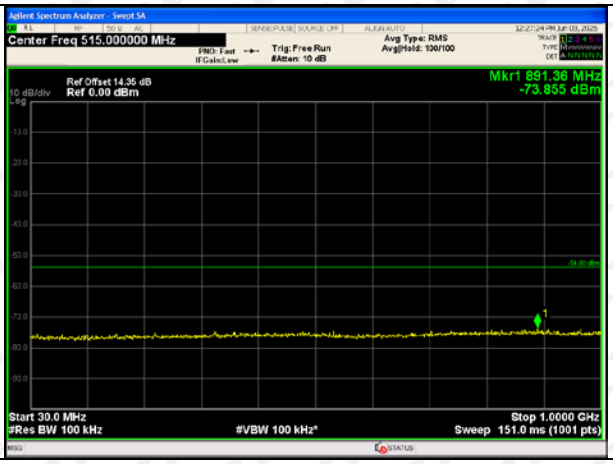
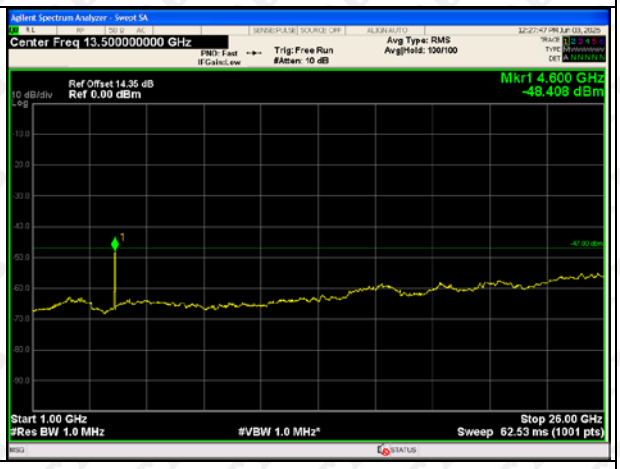


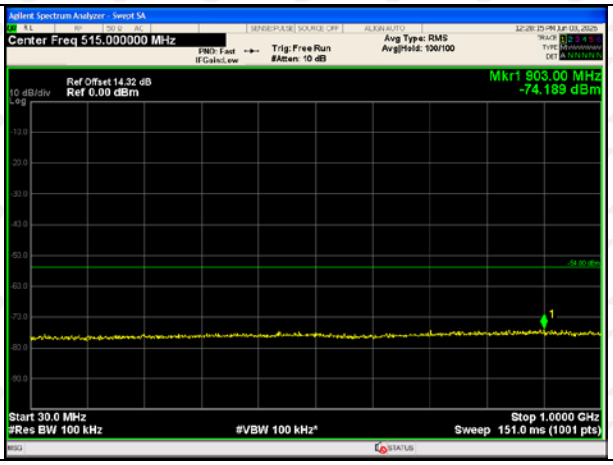
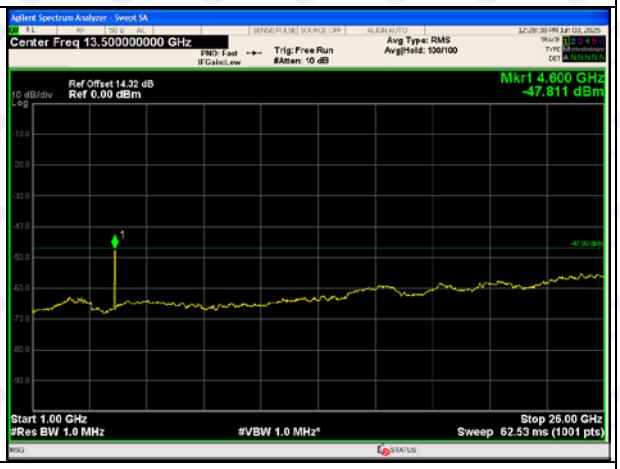
15.4 TEST RESULT
W52

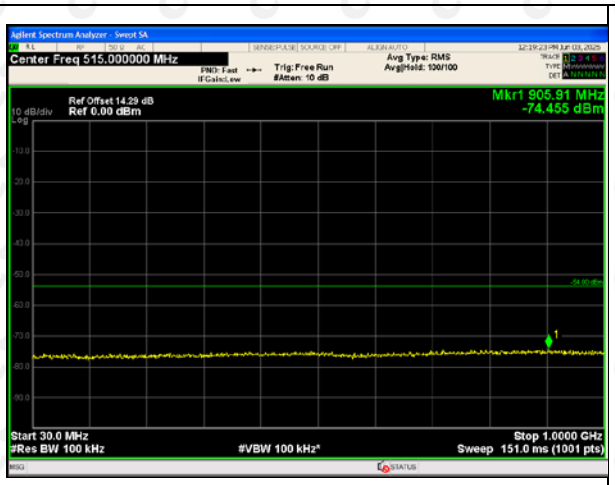
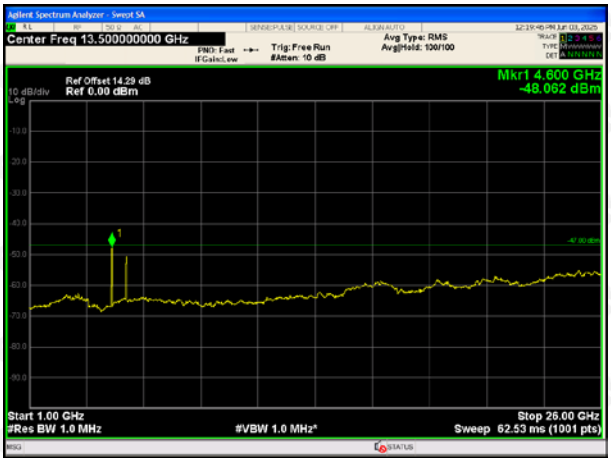
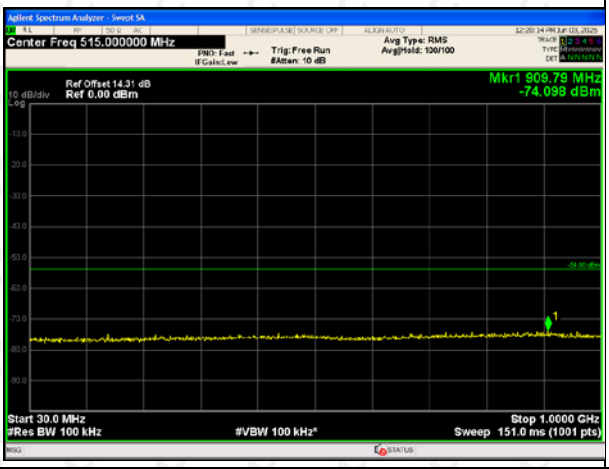
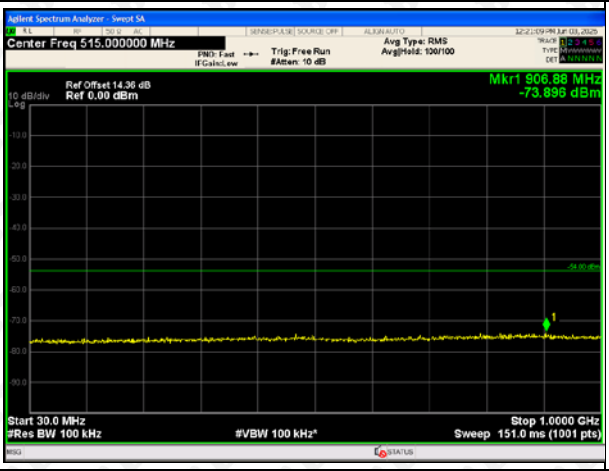
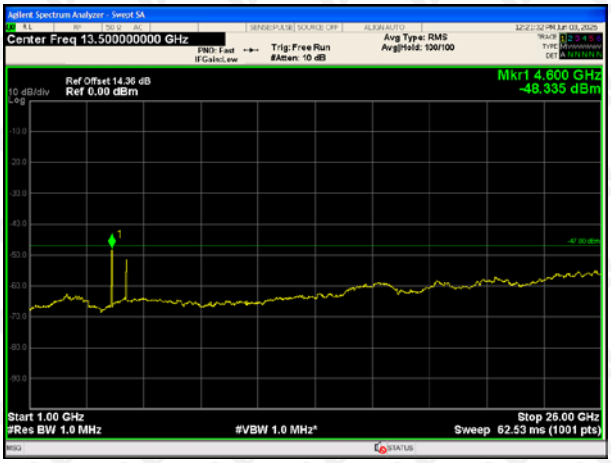
Normal Voltage						
Mode	Channel (MHz)	Frequency(MHz)	Mkr(MHz)	Test result(dBm)	Limit (dBm)	Result
802.11a	LCH	30~1000	882.63	-74.21	-54	Pass
		1000~26000	5250	-51.29	-47	Pass
	MCH	30~1000	841.89	-74.13	-54	Pass
		1000~26000	25000	-55.25	-47	Pass
	HCH	30~1000	806.97	-73.75	-54	Pass
		1000~26000	5250	-49.06	-47	Pass
802.11ac(VHT20)	LCH	30~1000	877.78	-74.11	-54	Pass
		1000~26000	4600	-54.63	-47	Pass
	MCH	30~1000	806.97	-74.03	-54	Pass
		1000~26000	4600	-48.58	-47	Pass
	HCH	30~1000	957.32	-74.01	-54	Pass
		1000~26000	5250	-53.95	-47	Pass
802.11ac(VHT40)	LCH	30~1000	885.54	-73.9	-54	Pass
		1000~26000	5250	-51.85	-47	Pass
	HCH	30~1000	891.36	-73.86	-54	Pass
		1000~26000	4600	-48.41	-47	Pass
802.11ac(VHT80)	MCH	30~1000	903	-74.19	-54	Pass
		1000~26000	4600	-47.81	-47	Pass
802.11n(HT20)	LCH	30~1000	905.91	-74.46	-54	Pass
		1000~26000	4600	-48.06	-47	Pass
	MCH	30~1000	909.79	-74.1	-54	Pass
		1000~26000	25000	-55.31	-47	Pass
	HCH	30~1000	906.88	-73.9	-54	Pass
		1000~26000	4600	-48.34	-47	Pass
802.11n(HT40)	LCH	30~1000	891.36	-74.22	-54	Pass
		1000~26000	5250	-51.26	-47	Pass
	HCH	30~1000	859.35	-73.73	-54	Pass
		1000~26000	25025	-55.06	-47	Pass

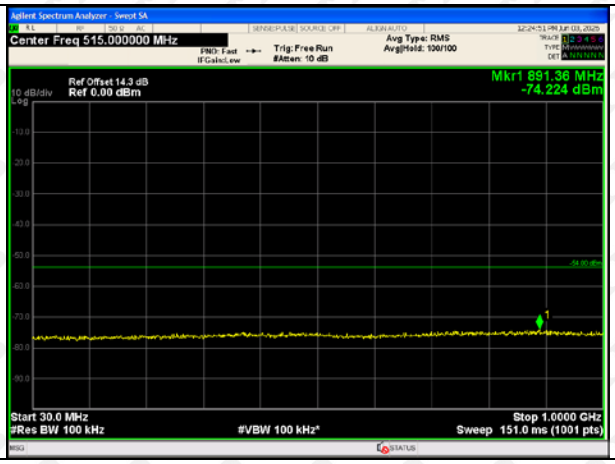
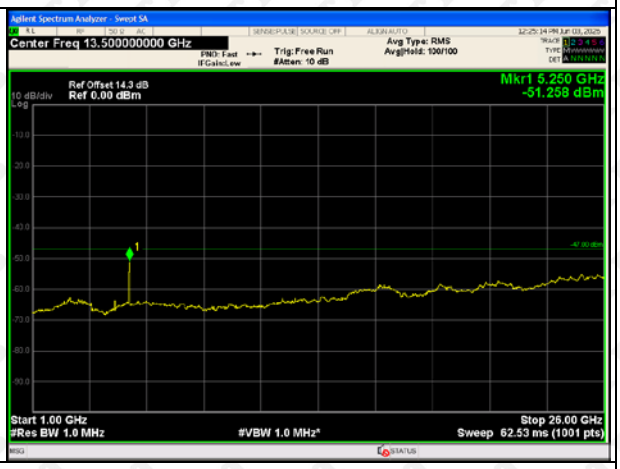
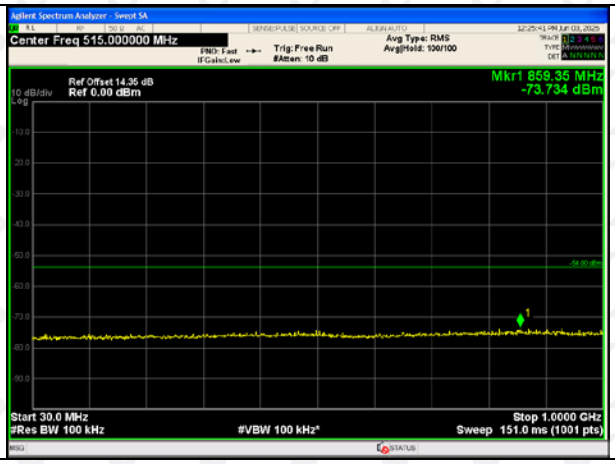
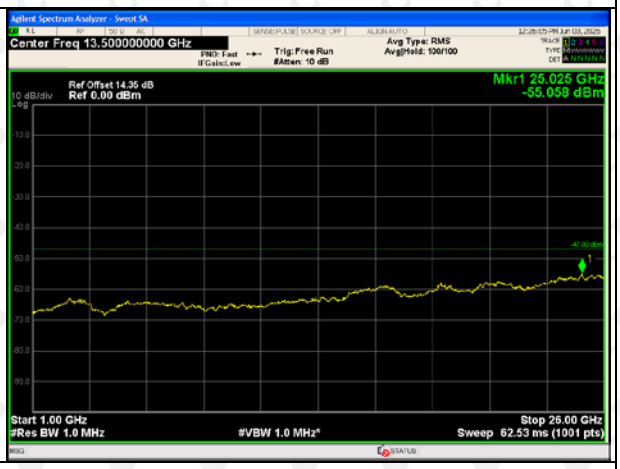
Channel(MHz)	W52:802.11a	
5180		
	30~1000MHz	1000~26000MHz
5200		
	30~1000MHz	1000~26000MHz
5240		
	30~1000MHz	1000~26000MHz

Channel(MHz)	W52:802.11ac(VHT20)	
5180		
	30~1000MHz	1000~26000MHz
5200		
	30~1000MHz	1000~26000MHz
5240		
	30~1000MHz	1000~26000MHz

Channel (MHz)	W52:802.11ac(VHT40)	
5190		
	30~1000MHz	1000~26000MHz
5230		
	30~1000MHz	1000~26000MHz

Channel (MHz)	W52:802.11ac(VHT80)	
5210		
	30~1000MHz	1000~26000MHz

Channel(MHz)	W52:802.11 n(HT20)	
5180		
	30~1000MHz	1000~26000MHz
5200		
	30~1000MHz	1000~26000MHz
5240		
	30~1000MHz	1000~26000MHz

Channel (MHz)	W52:802.11n(HT40)	
5190		
	30~1000MHz	1000~26000MHz
5230		
	30~1000MHz	1000~26000MHz

16DYNAMIC FREQUENCY SELECTION (SLAVE)

16.1 Standard Applicable

Article 2 paragraph 1 item (19-3)

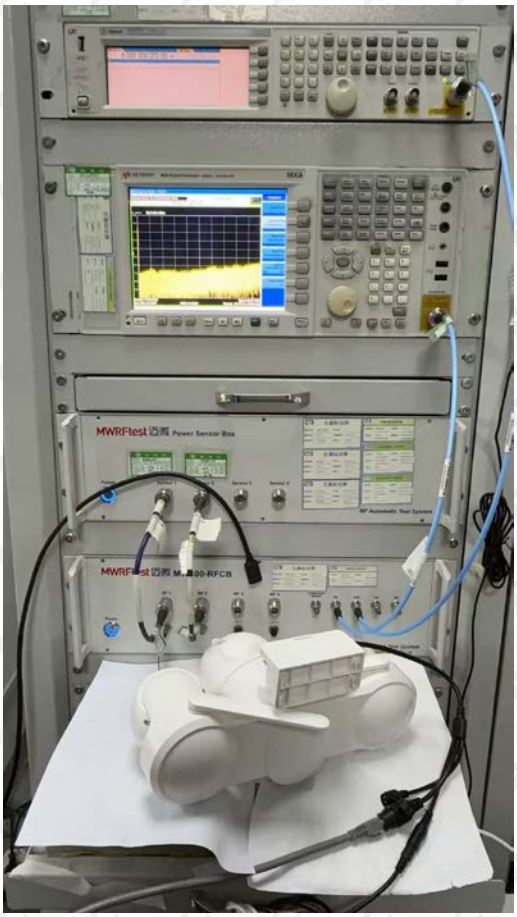
16.2 TEST PROCEDURE

Ordinance Regulating Radio Equipment No. 18, Article 49-20
WAS/RLAN devices operating in slave mode (slave device) can be operated in a network controlled by aWAN/RLAN device operating in master mode (master device).

16.3 Summary of Test Results

Can be operated in a network controlled by a WAN/RLAN device operating in master mode.
Pass

17 EUT TEST PHOTO



※※※※※ **END OF REPORT** ※※※※※