TEST REPORT

Test item description:	Waterproof Single Channel Wireless Receiver
Trademark(s):	N/A
Model/Type reference:	LPC10 (K7W/K7R)
Applicant's name:	Linden Products Ltd.
Address:	12 Mere Drive, Sutton Coldfield, Birmingham, West Midlands, B75 5AN. United Kingdom
Manufacturer:	Dongguan DFM Electronics Co.,Ltd.
Address:	Room 201, No. 146, Gongchang Road, Huangjiang Town,Dongguan City, Guangdong Province
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:	May. 06, 2026
Sample tested Date:	May. 06, 2026 to Jun. 17, 2026
Issue Date:	Jun. 17, 2026
Report No.:	CTB26050604101RF02
Test Standards	MIC Public Notice 88:2004, annex 1 and annex 43 Ordinance Article 2 paragraph 1 item (19) ARIB STD-T66 V3.7
Test Results	PASS
Remark:	This is WIFI-2.4GHz band radio test report.

Compiled by:	Reviewed by:	Approved by:
Kai Chen	Martin Feng	Bin Mei
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.

Table of Contents **Page**

1 . TEST SUMMARY 5

2 . GENERAL INFORMATION 8

2.1 GENERAL DESCRIPTION OF EUT 8

2.2 Carrier Frequency of Channels 9

2.3 Table for Filed Antenna 9

2.4 DESCRIPTION OF TEST MODES 9

2.5 TESTCONDITIONS 10

2.6 DESCRIPTION OF SUPPORT UNITS(CONDUCTEDMODE) 10

2.7 MEASUREMENT INSTRUMENTS LIST 11

3 . RF SHIELDINGMETHOD 13

4 FREQUENCYERROR 14

4.1 LIMIT 14

4.2 MEASURING INSTRUMENTS AND SETTING 14

4.3 TEST PROCEDURE 14

4.4 TEST SETUP LAYOUT 14

4.5 EUT OPERATION DURING TEST 14

4.6 TEST RESULT 15

5ANTENNAPOWER 17

5.1 LIMIT 17

5.2 MEASURING INSTRUMENTS AND SETTING 17

5.3 TEST PROCEDURE 17

5.4 TEST SETUP LAYOUT 18

5.5 TEST RESULT 18

6OCCUPIEDBANDWITH and Spread Factor 22

6.1 LIMIT 22

6.2 MEASURING INSTRUMENTS AND SETTING 22

6.3 TEST PROCEDURE 22

6.4 TEST SETUP LAYOUT 22

6.5 EUT OPERATION DURING TEST 22

6.6 TEST RESULT 23

7UNWANTED EMISSION INTENSITY MEASUREMENT 27

7.1 LIMIT 27

7.2 MEASURING INSTRUMENTS AND SETTING 27

7.3 TEST PROCEDURE 27

Table of Contents **Page**

7.4 TEST SETUP LAYOUT 28
7.5 TEST RESULT 28
8UNWANTED EMISSION INTENSITYMEASUREMENT 40
8.1 LIMIT 40
8.2 MEASURING INSTRUMENTS AND SETTING 40
8.3 TEST PROCEDURE 40
8.4 TEST RESULT 41
9 TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT 44
9.1 LIMIT 44
9.2 MEASURING INSTRUMENTS AND SETTING 44
9.3 TEST PROCEDURE 44
9.4 TEST SETUP LAYOUT 45
9.5 EUT OPERATION DURING TEST 45
9.6 TEST RESULT 45
10TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT 46
10.1 LIMIT 46
10.2 MEASURING INSTRUMENTS AND SETTING 46
10.3 TEST PROCEDURE 46
10.4 TEST SETUP LAYOUT 47
10.5 EUT OPERATION DURING TEST 47
10.6 TEST RESULT 47
11RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT 48
11.1 LIMIT 48
11.2 MEASURING ID CODE SOFTWARE 48
11.3 TEST PROCEDURE 48
11.4 TEST SETUP LAYOUT 48
11.5 EUT OPERATION DURING TEST 48
11.6 TEST RESULT 48
12CARRIER SENSING FUNCTION 49
12.1 TEST REQUIREMENT 49
12.2 BLOCK DIAGRAM OF TEST SETUP 49
12.3 TEST PROCEDURE 49
12.4 TEST RESULT 49
13 NUMBER OF CARRIERS 50

Table of Contents **Page**

15 EUT TEST PHOTO 51

1. TEST SUMMARY

1.1Version

Report No.	Issue Date	Description	Approved
CTB26050604101RF02	Jun. 17, 2026	Original	Valid

1.2TEST PROCEDURES AND RESULTS

Part	Rule Section	Description of Test	Result
4.1	3	Frequency Error	Complies
4.3	4	Occupied Bandwidth (99%), Spread-spectrum Bandwidth (90%)	Complies
4.4	5	Unwanted Emission Intensity	Complies
4.2	6	Antenna Power Error	Complies
4.5	7	Limitation of Collateral Emission of Receiver	Complies
4.6	8	Transmission Antenna Gain (EIRP Antenna Power)	N/A
4.7	9	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
4.8	10	Radio Interference Prevention Capability	Complies
4.9	Note 2	Carrier Sense Capability	N/A
4.10	Note 3	Number of carriers	Complies

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report
(2) Note2:MIC Public Notice 88:2004, annex 1 and annex 43
(3) Note3:MIC Ordinance Regulating Radio Equipment Section 4.17 of Article 49.20

1.3 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.

Item	Uncertainty
Occupancy bandwidth	54.3kHz
Conducted output power Above 1G	0.9dB
Conducted output power below 1G	0.9dB
Power Spectral Density , Conduction	0.9dB
Conduction spurious emissions	2.0dB
Out of band emission	2.0dB
3m camber Radiated spurious emission(30MHz-1GHz)	4.6dB
3m chamber Radiated spurious emission(1GHz-18GHz)	5.1dB
3m chamber Radiated spurious emission(18GHz-40GHz)	3.4dB
Frequency Error	54.3Hz
Adjacent channel power below 1G	2.6dB
Adjacent channel power Above 1G	2.8dB
humidity uncertainty	5.5%
Temperature uncertainty	0.63℃
frequency	1×10^{-7}

2. GENERAL INFORMATION

2.1GENERAL DESCRIPTION OF EUT

Model/Type reference:	LPC10 (K7W/K7R)
Model Description:	N/A
Wi-Fi Specification:	IEEE 802.11b/g/n
Hardware Version:	K7W V0.1.0
Software Version:	K7W-EE30H
Operation Frequency:	IEEE 802.11b/g/n 20: 2412-2472MHz
Max. RF output power:	802.11b: 2mW/MHz 802.11g: 2mW/MHz 802.11n20: 2mW/MHz
Type of Modulation:	802.11b: DSSS(CCK/DQPSK/DBPSK) 802.11g: OFDM(BPSK/QPSK/16QAM/64QAM) 802.11n (HT20)): OFDM (64QAM, 16QAM, QPSK, BPSK)
Transmit Data Rate:	802.11b: 1M/2M/5.5M/11M bps 802.11g: 6M/9M/12M/18M/24M/36M/48M/54M bps 802.11n20: up to 75M bps
Antenna installation:	PCB Antenna
Antenna Gain:	2.06dBi
Ratings:	AC 100-240V~50/60Hz, 10A, 1100W

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. This report is for Wi-Fi test report.

2.2 Carrier Frequency of Channels

Channel List for 802.11b/g/n(20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	05	2432	09	2452	13	2472
02	2417	06	2437	10	2457	/	/
03	2422	07	2442	11	2462	/	/
04	2427	08	2447	12	2467	/	/

Mode	Low channel (MHz)	Middle channel(MHz)	High channel(MHz)
b	2412	2442	2472
g	2412	2442	2472
n20	2412	2442	2472

2.3 Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Gain(dBi)	NOTE
1	N/A	Waterproof Single Channel Wireless Receiver	PCB Antenna	2.06dBi	N/A

2.4DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX
Mode 2	RX

2.5TESTCONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Supply Voltage				
	PC supply power V	Module input power V	Rated module power V	Tolerance (%)
Normal	100	3.3	3.3	
+10%	110	3.3	3.3	0
-10%	90	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.				

BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Mode 1:

2.6DESCRIPTION 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	Waterproof Single Channel Wireless	N/A	LPC10 (K7W/K7R)	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”.

2.7MEASUREMENT 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.

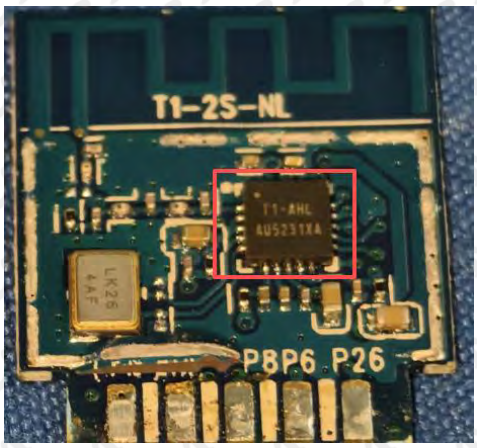
3. RF SHIELDINGMETHOD

We apply the product for Japan RF certification. The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

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 SMT Method, and RF module is welded on the main board, end-User can't open it easily.

The red circle is welding point.



4 FREQUENCYERROR

4.1 LIMIT

Item	Limits
Frequency Error	+/-50ppm

4.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

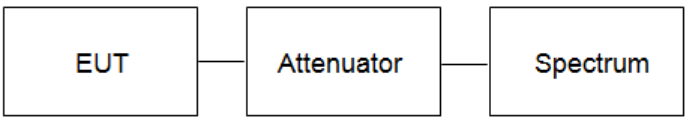
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.3 TEST PROCEDURE

1. In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.
2. In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.
3. In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer connected a frequency meter.
4. In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation.

In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

4.4 TEST SETUP LAYOUT



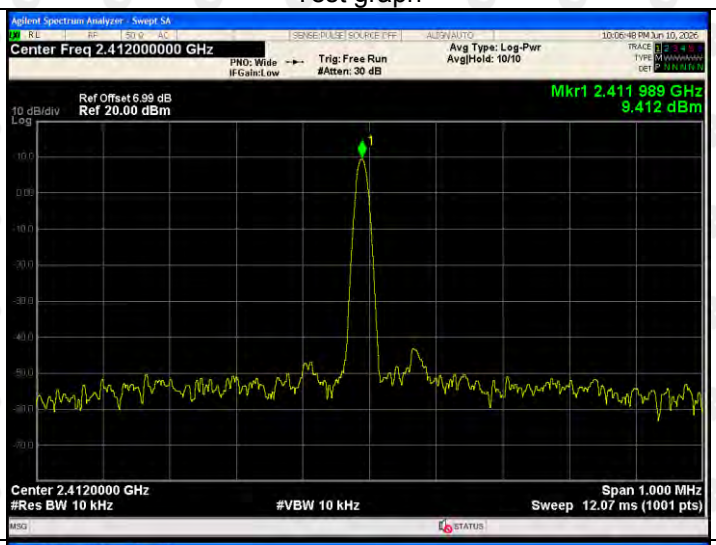
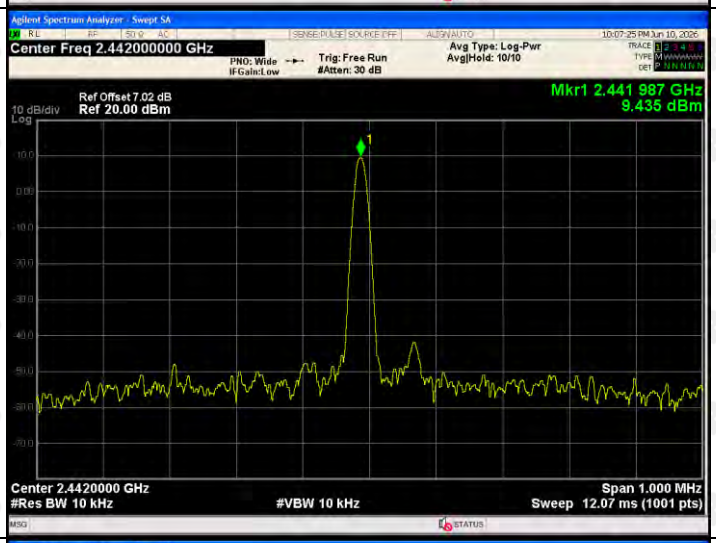
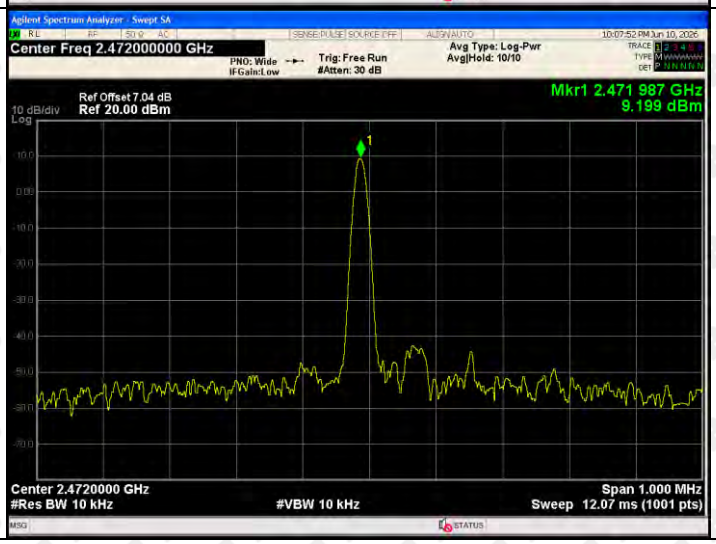
4.5 EUT OPERATION DURING TEST

The EUT was placed on the test table and programmed in un-modulation function.

4.6 TEST RESULT

Temperature:	23℃	Relative Humidity:	54%
Test Mode:	TX Mode	Pressure:	101kPa

Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2412	2411.989	-4.561	±50	PASS
	2442	2441.987	-5.324	±50	PASS
	2472	2471.987	-5.259	±50	PASS

Mode	Channel	Test graph
Normal Voltage	Low	
	Middle	
	High	

5ANTENNAPOWER

5.1 LIMIT

Item	Limits
Antenna Power Density	802.11b,g,n(HT20):10mW/MHz
Antenna Power Error	+20%(Base on manufacturer declare antenna power density)

5.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

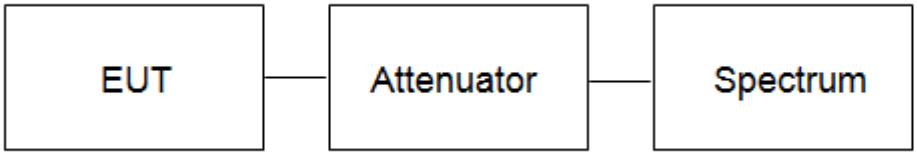
Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3 TEST PROCEDURE

Attenuation of the attenuator shall be set to provide an optimum input level to the spectrum analyzer.

1. Set the spectrum analyzer as follows for searching the frequency that outputs the maximum antenna power:
   Center frequency: Test frequency
   Frequency sweep width: Approximately twice of the occupied bandwidth
   Resolution bandwidth: 1MHz
   Video bandwidth: Approximately three times of the resolution bandwidth
   Y-axis scale: 10dB/Div
   Sweep time:Minimum time to ensure the measuring accuracy
   (In the case of burst wave, one burst shall be included per data point.)
   Trigger condition: Free run
   Data points: 400 points or more
   Sweep mode: Continuous sweep
   Detection mode: Positive peak
   Display mode: Maximum hold
2. When the trace is complete, find the peak value of the power envelope and record.
   In the case of bandwith above RBW, connect to power meter directly.
3. Calculate antenna power density by the formula below
   PT(mW/MHz) = Total Output Power (mW) / Burst Ratio / Spread Bandwidth (MHz) Burst Ratio =ON Time / OFF Time
4. Antenna Power Error is definition that actual measure antenna power tolerance between + 20% to -80% power range that base on manufacturer declare the conducted power density.

5.4 TEST SETUP LAYOUT

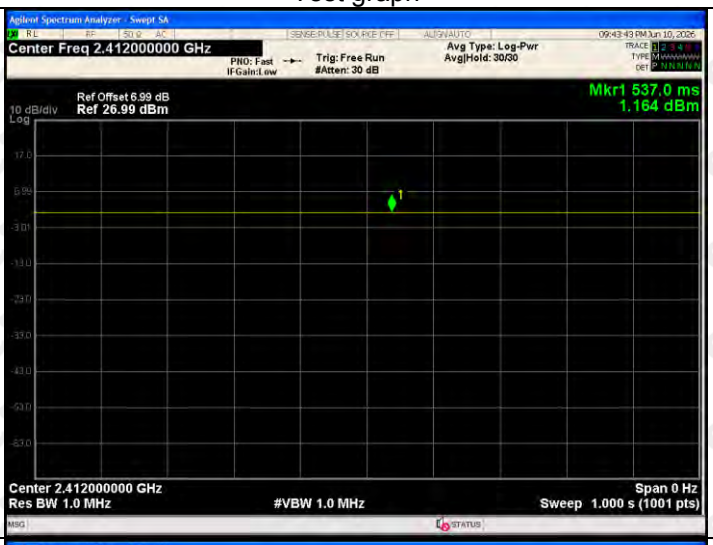
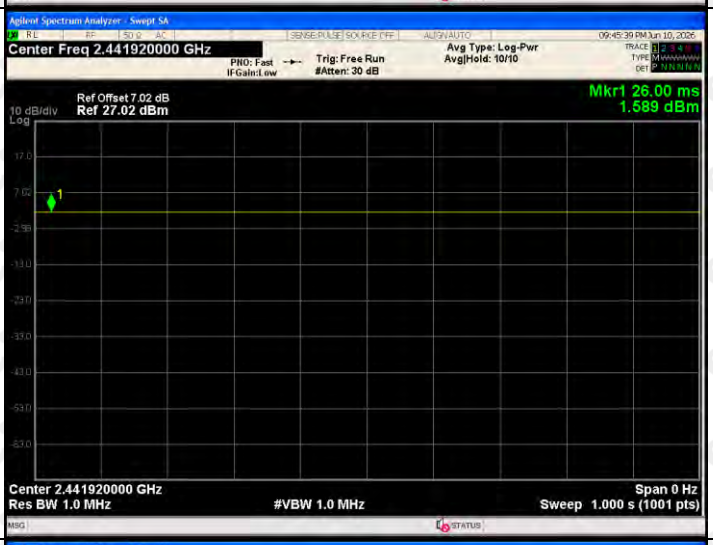


EST DEVIATION
There is no deviation with the original standard.

5.5 TEST RESULT

Temperature:	23℃	Relative Humidity:	54%
Test Mode:	TX Mode		101kPa

Test voltage (V)	Mode	Channel (MHz)	Antenna Power (dBm/MHz)	output power (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit
Normal	802.11b	2412	1.164	1.307	2	-34.63	10mW/MHz +20%
		2442	1.589	1.442	2	-27.91	
		2472	1.114	1.292	2	-35.38	
	802.11g	2412	0.407	1.098	2	-45.09	
		2442	1.786	1.509	2	-24.57	
		2472	0.806	1.204	2	-39.80	
	802.11n(HT20)	2412	1.649	1.462	2	-26.91	
		2442	0.859	1.219	2	-39.06	
		2472	0.246	1.058	2	-47.09	

Normal Voltage		
Mode	Channel	Test graph
802.11b	Low	
	Middle	
	High	

Normal Voltage		
Mode	Channel	Test graph
802.11g	Low	
	Middle	
	High	

Normal Voltage		
Mode	Channel	Test graph
802.11n/HT20	Low	
	Middle	
	High	

6OCCUPIEDBANDWITH and Spread Factor

6.1 LIMIT

Item	Limits
Occupied Band Width	26MHz or less

6.2 MEASURING INSTRUMENTS AND SETTING

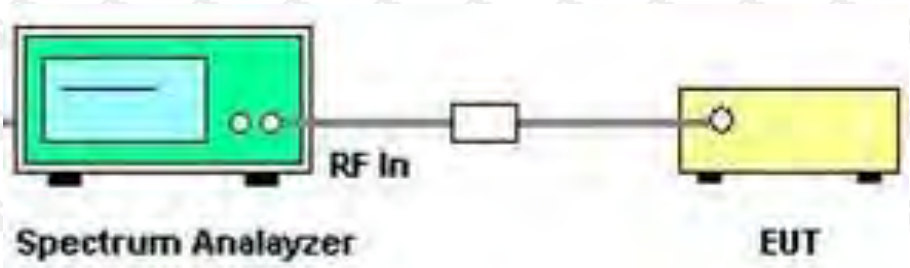
The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

6.3 TEST PROCEDURE

1. Setting of SA is following as: RB: 300kHz / VB: 300kHz / SPAN: 40MHz / AT: 30dB Ref: 20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.
   The modulation rate: MR=1.375 for 802.11b,MR=1.5 for 802.11g/n20,MR=3 for 802.11n40.

6.4 TEST SETUP LAYOUT



EST DEVIATION
There is no deviation with the original standard.

6.5 EUT OPERATION DURING TEST

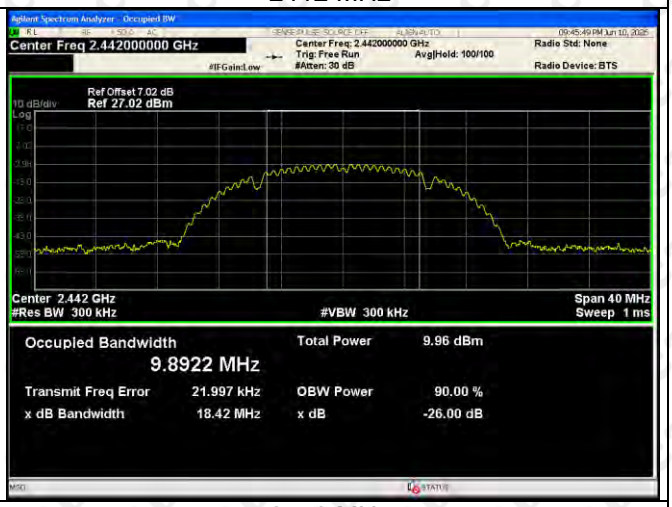
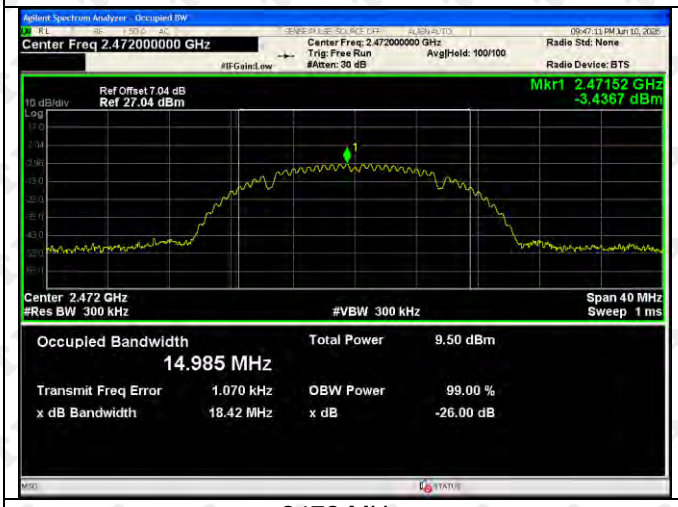
The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

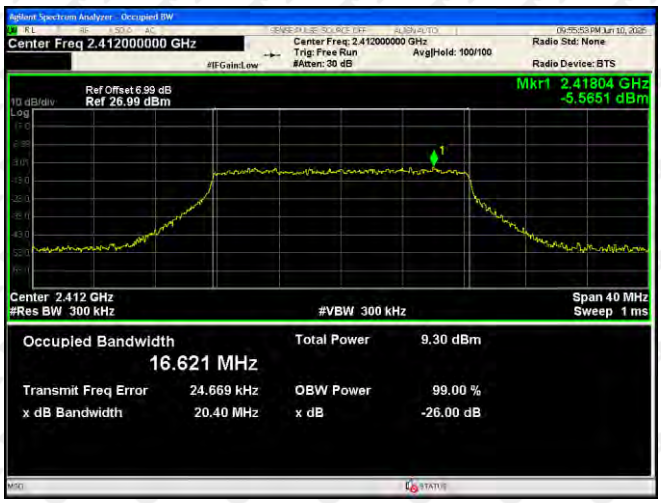
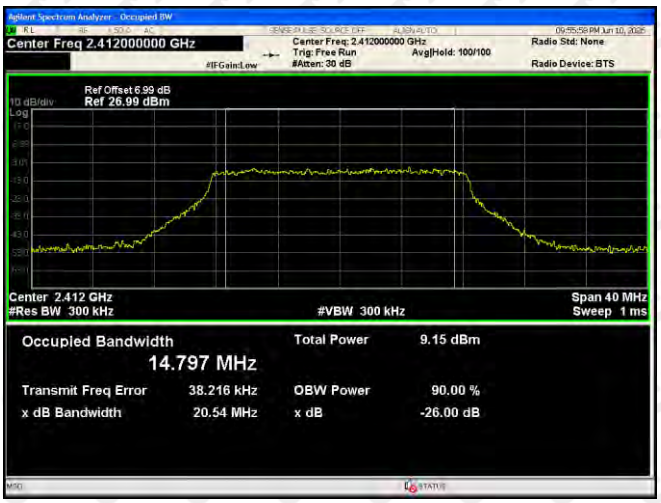
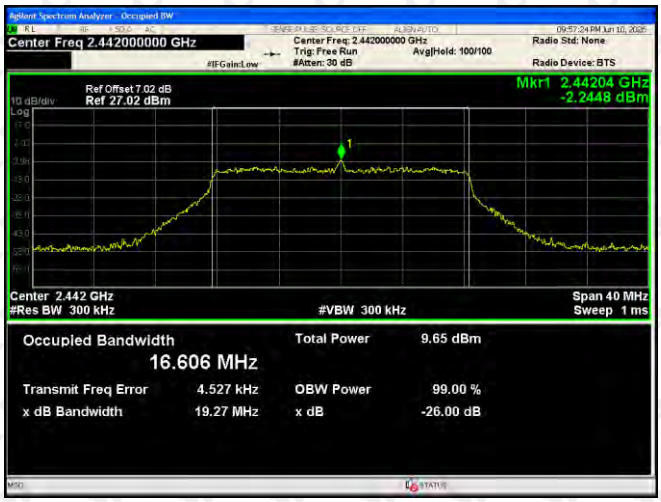
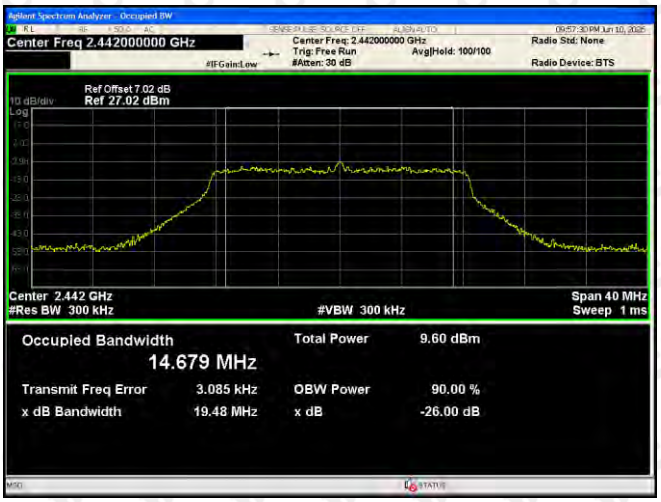
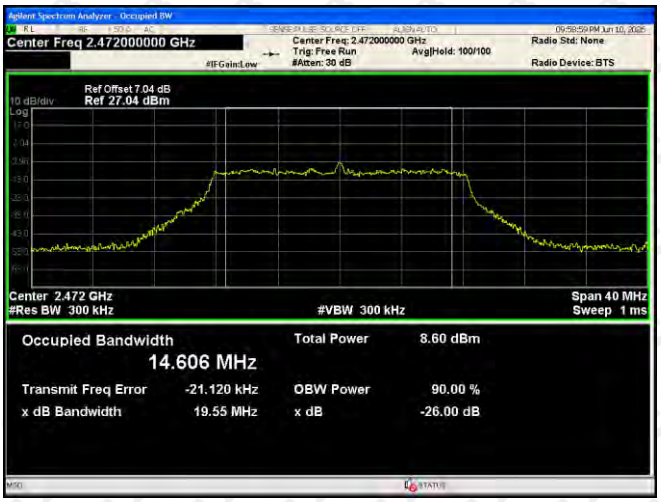
Temperature:	23℃	Relative Humidity:	54%
Test Mode:	TX Mode	Pressure:	101kPa

Mode	Test Voltage	Frequency (MHz)	Occupied Bandwidth 99%(MHz)	Spread Bandwidth 90%(MHz)
802.11b	Normal	2412	14.9386	9.8860
		2442	14.9535	9.8922
		2472	14.9854	9.9015
802.11g	Normal	2412	16.6209	14.7969
		2442	16.6057	14.6790
		2472	16.5911	14.6055
802.11n/HT 20	Normal	2412	17.7195	15.6180
		2442	17.7195	15.5515
		2472	17.6991	15.6626

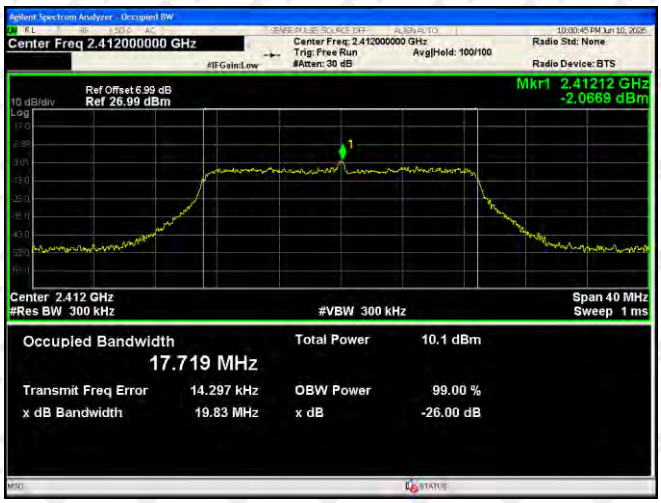
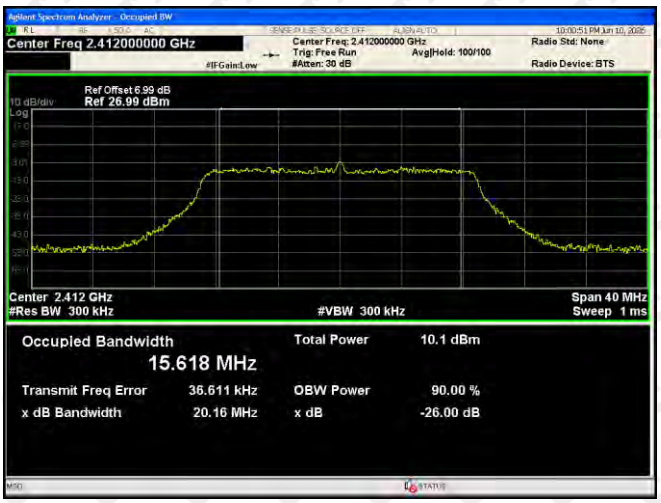
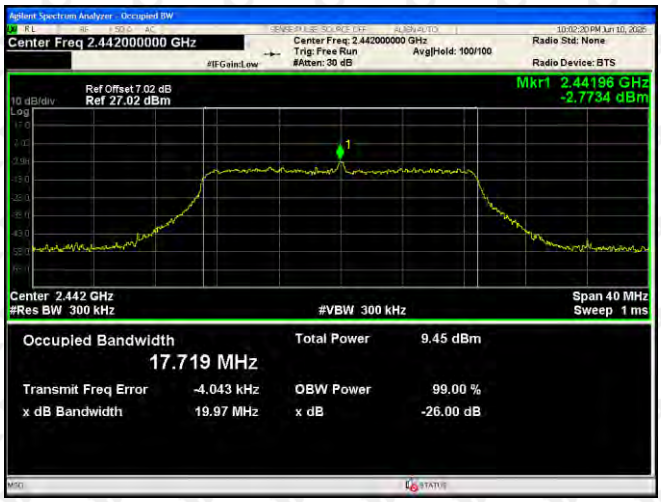
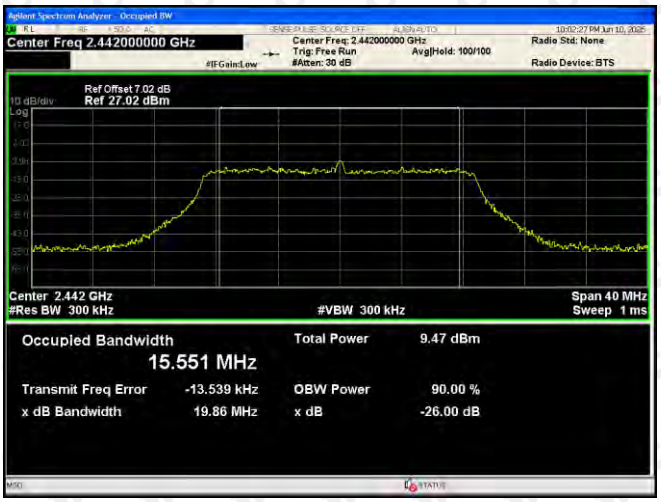
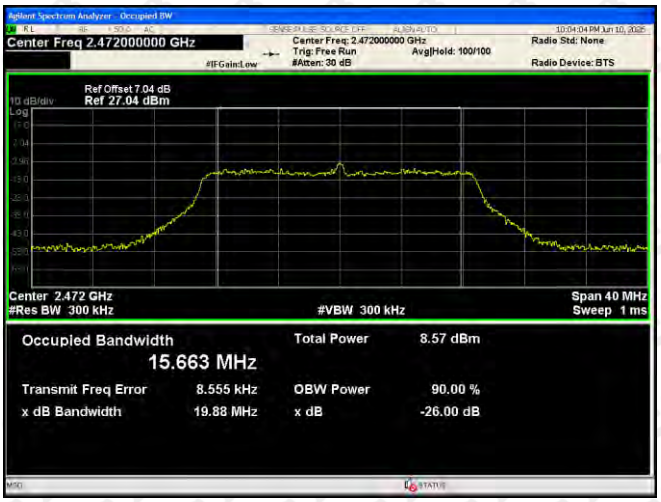
802.11b Normal Voltage

99% Bandwidth	90% Bandwidth
2412MHz	2412 MHz
	
2442 MHz	2442 MHz
	
2472 MHz	2472 MHz

802.11g Normal Voltage

99% Bandwidth	90% Bandwidth
	
2412MHz	2412 MHz
	
2442 MHz	2442 MHz
	
2472 MHz	2472 MHz

802.11n/HT20 Normal Voltage

99% Bandwidth	90% Bandwidth
	
2412MHz	2412 MHz
	
2442 MHz	2442 MHz
	
2472 MHz	2472 MHz

7UNWANTED EMISSION INTENSITY MEASUREMENT

7.1 LIMIT

Item	Limits
TX Spurious Emission	≤2.5 μW/MHz(30MHz≤f≤1000MHz)
	≤2.5 μW/MHz (1000MHz<f≤2387MHz)
	≤25 μW/MHz (2387MHz<f≤2400MHz)
	≤25 μW/MHz (2483.5MHz≦f<2496.5MHz)
	≤2.5 μW/MHz (2496.5MHz≤f<12500MHz)

7.2 MEASURING INSTRUMENTS AND SETTING

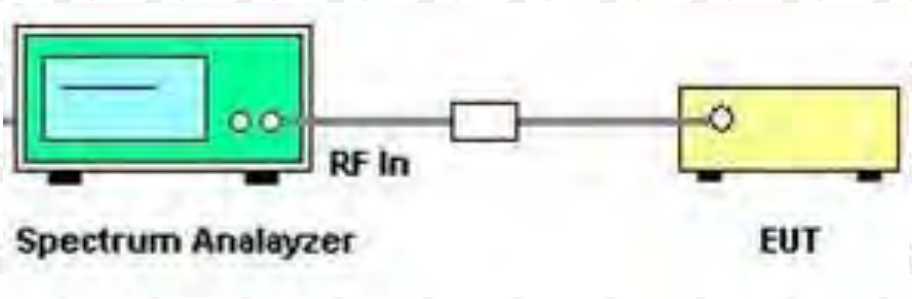
The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.3 TEST PROCEDURE

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100kHz / VB:100kHz
   Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 0dBm / Sweep time: Auto
   Sweep Mode: Continuous sweep / Detect mode: Positive peak
   Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
8. Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result_Value = Meaured_ Value + 15.2 [dBm]
9. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result_Value.

7.4 TEST SETUP LAYOUT



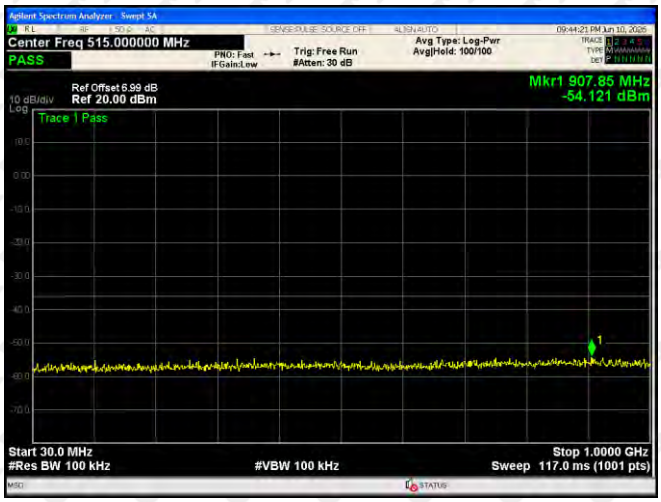
EST DEVIATION
There is no deviation with the original standard.

7.5 TEST RESULT

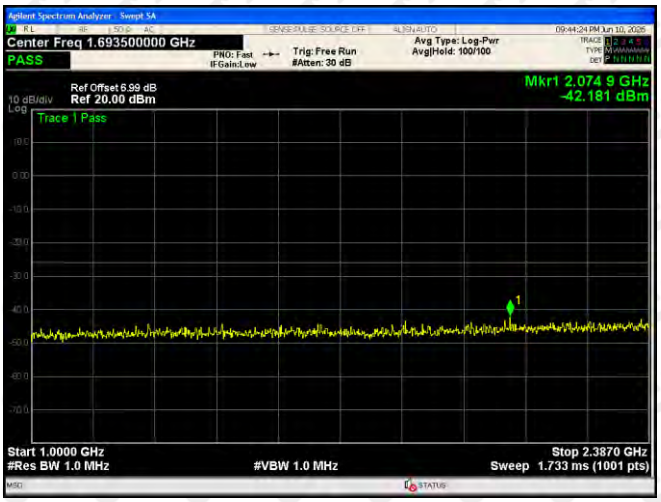
Temperature:	23℃	Relative Humidity:	54%
Test Voltage:	Normal Voltage	Pressure:	101kPa

Test mode	Test Channel	Test freq. range	Emission Frequency (MHz)	Test result (dBm/MHz)	Test result (uW/MHz)	limits (uW/MHz)	Result
802.11b	Low	30MHz≤f≤1000MHz	907.85	-54.12	0.039	2.5	PASS
		1000MHz＜f≤2387MHz	2074.92	-42.18	0.061	2.5	PASS
		2387MHz＜f≤2400MHz	2399.9	-40.68	0.086	25	PASS
		2483.5MHz≤f＜2496.5MHz	2496.42	-41.8	0.066	25	PASS
		2496.5MHz≤f＜12750MHz	5275.2	-36.53	0.222	2.5	PASS
	Middle	30MHz≤f≤1000MHz	878.75	-53.92	0.004	2.5	PASS
		1000MHz＜f≤2387MHz	2087.41	-42.48	0.056	2.5	PASS
		2387MHz＜f≤2400MHz	2390.64	-43.11	0.049	25	PASS
		2483.5MHz≤f＜2496.5MHz	2491.14	-42.51	0.056	25	PASS
		2496.5MHz≤f＜12750MHz	12104.03	-41.19	0.076	2.5	PASS
	High	30MHz≤f≤1000MHz	790.48	-53.98	0.004	2.5	PASS
		1000MHz＜f≤2387MHz	2098.5	-42.33	0.058	2.5	PASS
		2387MHz＜f≤2400MHz	2397.65	-42.21	0.060	25	PASS
		2483.5MHz≤f＜2496.5MHz	2483.5	-40.36	0.092	25	PASS
		2496.5MHz≤f＜12750MHz	4588.21	-39.89	0.103	2.5	PASS

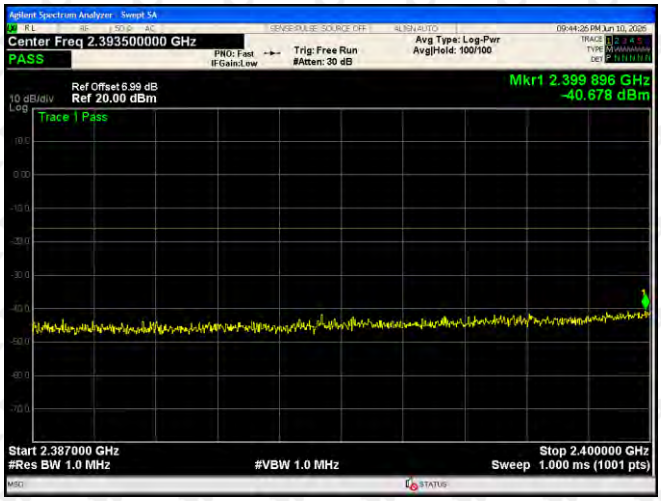
Test mode:	802.11b	Test channel:	Low



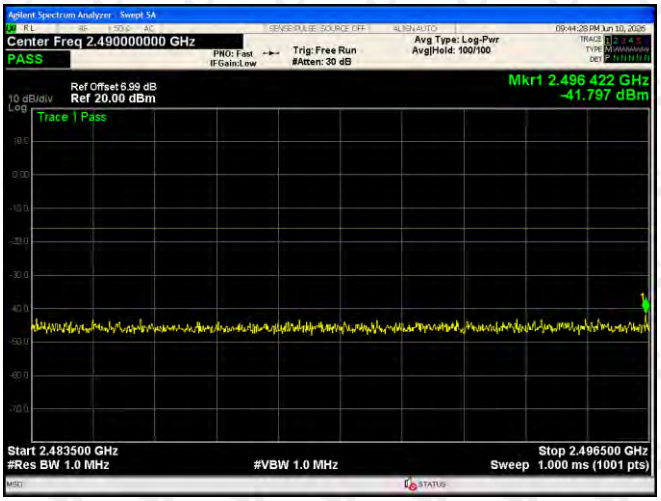
30MHz~1GHz



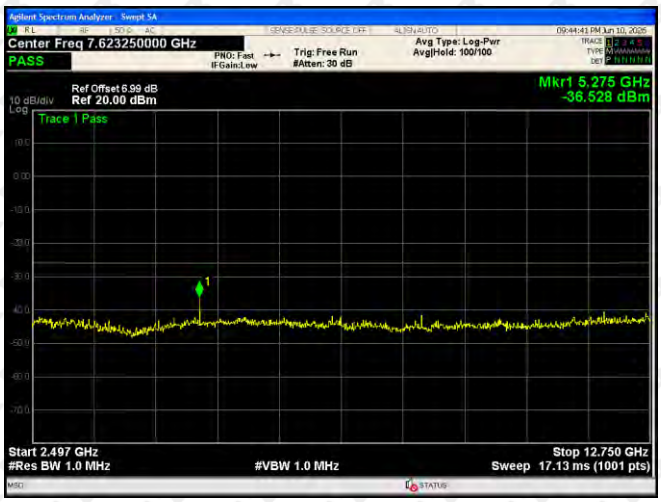
1GHz~2.387GHz



2.387GHz~2.4 GHz

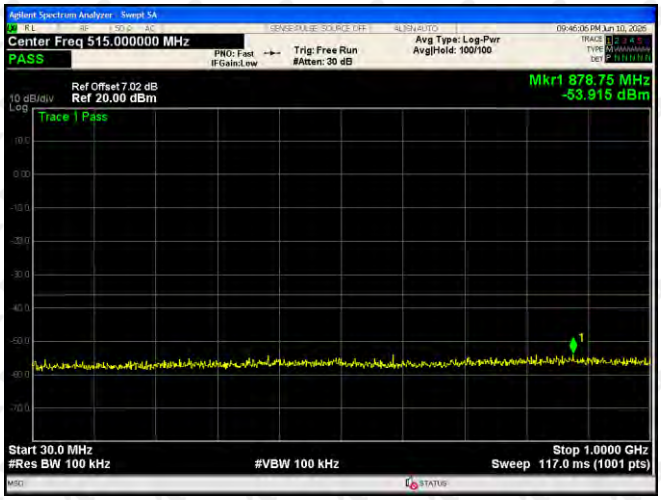


2.4835GHz~2.4965GHz

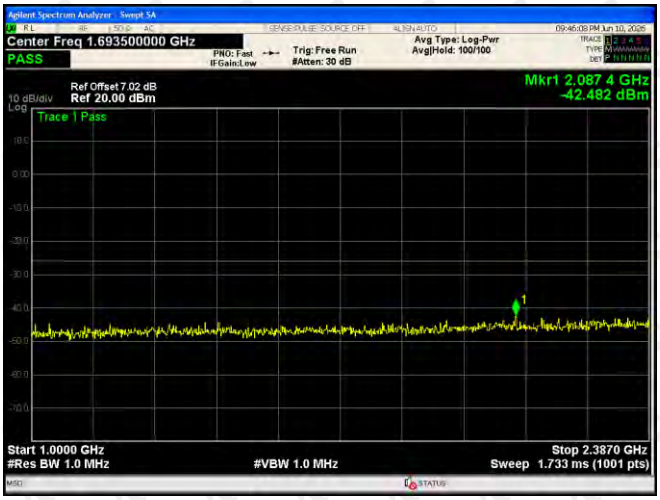


2.4965GHz~12.5GHz

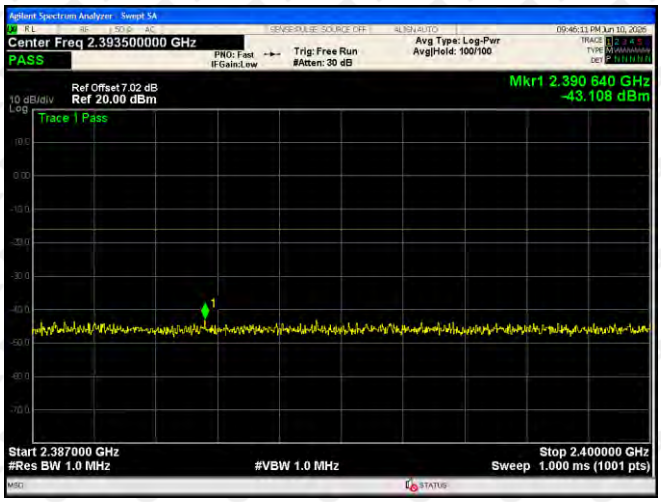
Test mode:	802.11b	Test channel:	Middle



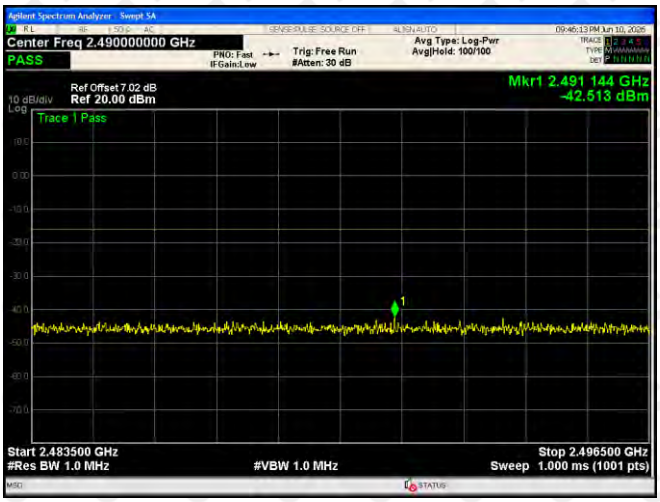
30MHz~1GHz



1GHz~2.387GHz



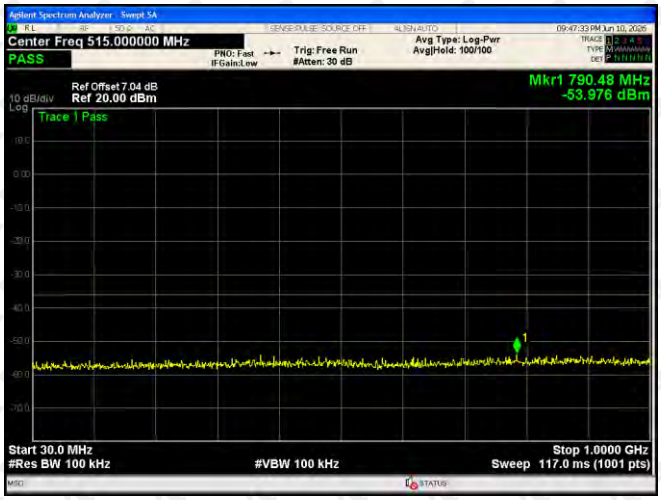
2.387GHz~2.4 GHz



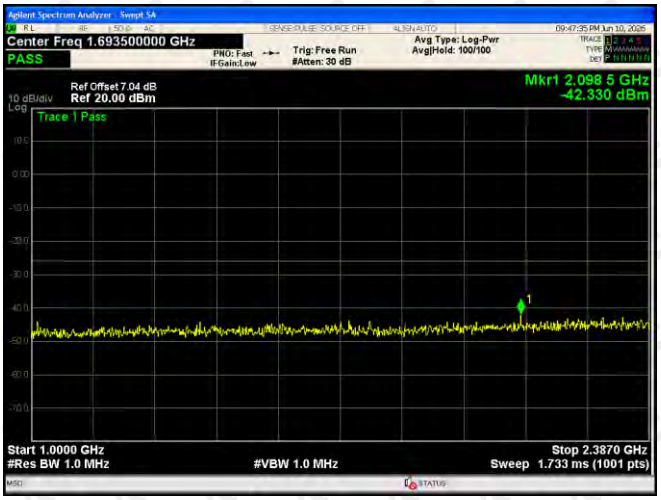
2.4835GHz~2.4965GHz

2.4965GHz~12.5GHz

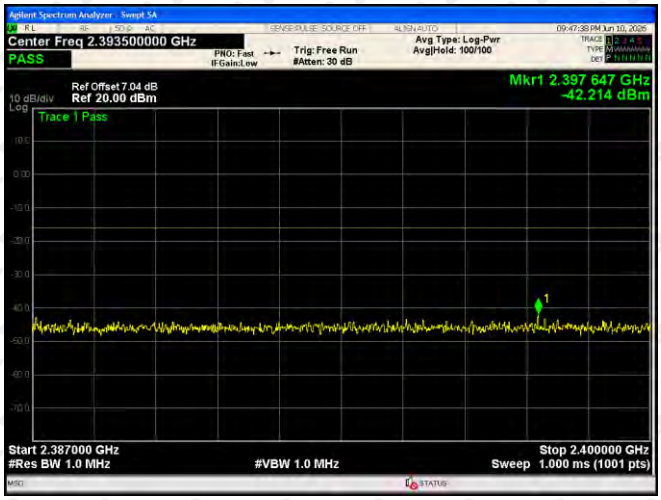
Test mode:	802.11b	Test channel:	High



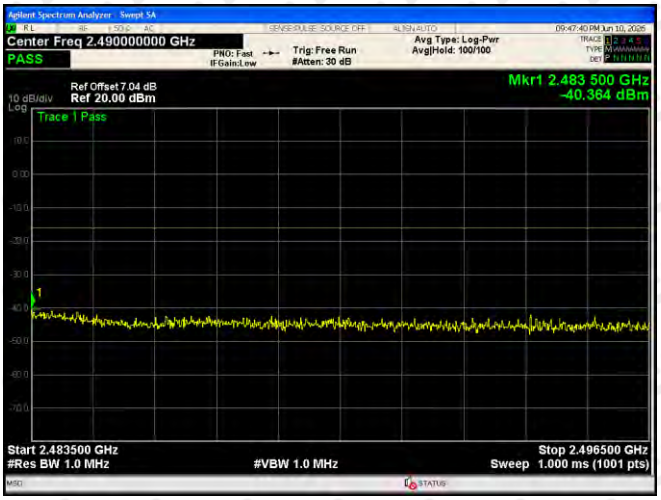
30MHz~1GHz



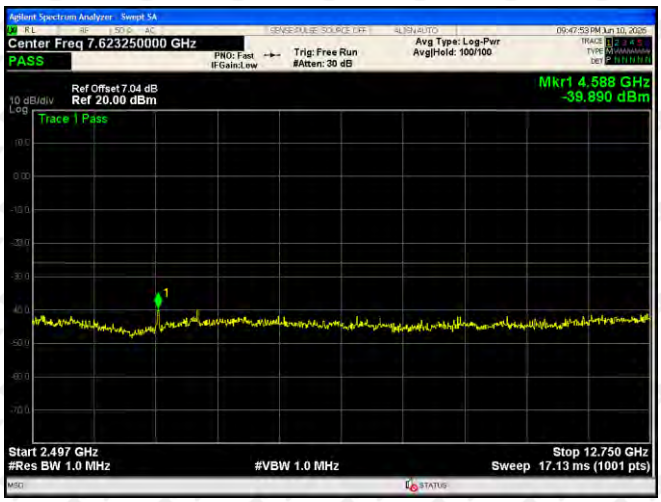
1GHz~2.387GHz



2.387GHz~2.4 GHz



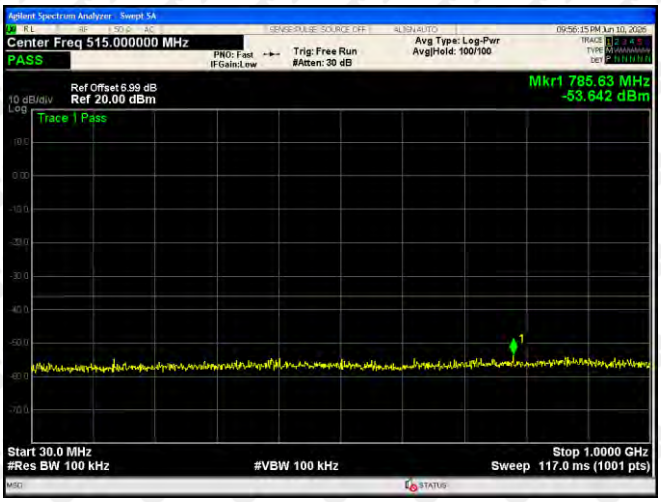
2.4835GHz~2.4965GHz



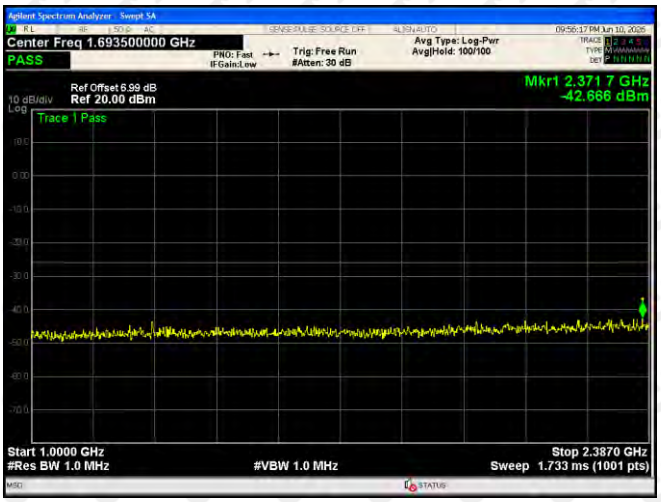
2.4965GHz~12.5GHz

Test mode	Test Channel	Test freq. range	Emission Frequency (MHz)	Test result (dBm/MHz)	Test result (uW/MHz)	limits (uW/MHz)	Result
802.11g	Low	30MHz≤f≤1000MHz	785.63	-53.64	0.043	2.5	PASS
		1000MHz＜f≤2387MHz	2371.74	-42.67	0.054	2.5	PASS
		2387MHz＜f≤2400MHz	2399.96	-30.93	0.807	25	PASS
		2483.5MHz≤f＜2496.5MHz	2495.43	-42.66	0.054	25	PASS
		2496.5MHz≤f＜12750MHz	12175.8	-41.23	0.075	2.5	PASS
	Middle	30MHz≤f≤1000MHz	924.34	-53.34	0.005	2.5	PASS
		1000MHz＜f≤2387MHz	2349.55	-42.79	0.053	2.5	PASS
		2387MHz＜f≤2400MHz	2388.9	-42.98	0.050	25	PASS
		2483.5MHz≤f＜2496.5MHz	2495.25	-42.55	0.056	25	PASS
		2496.5MHz≤f＜12750MHz	5285.45	-30.56	0.879	2.5	PASS
	High	30MHz≤f≤1000MHz	828.31	-53.82	0.004	2.5	PASS
		1000MHz＜f≤2387MHz	2262.17	-42.87	0.052	2.5	PASS
		2387MHz＜f≤2400MHz	2391.38	-42.61	0.055	25	PASS
		2483.5MHz≤f＜2496.5MHz	2483.5	-29.84	1.038	25	PASS
		2496.5MHz≤f＜12750MHz	4629.23	-35.6	0.275	2.5	PASS

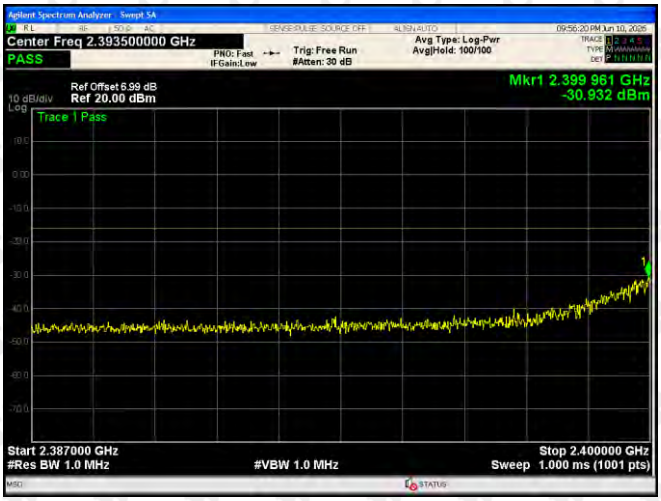
Test mode:	802.11g	Test channel:	Low



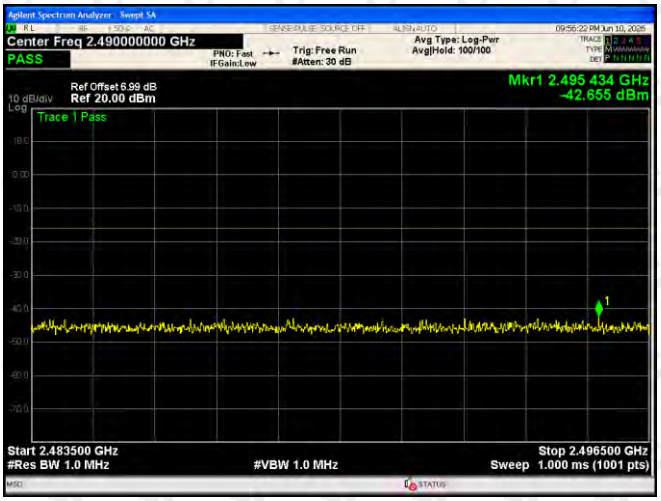
30MHz~1GHz



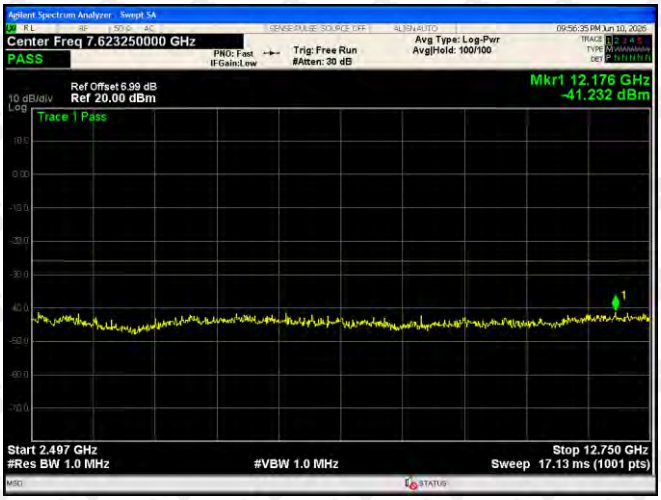
1GHz~2.387GHz



2.387GHz~2.4 GHz

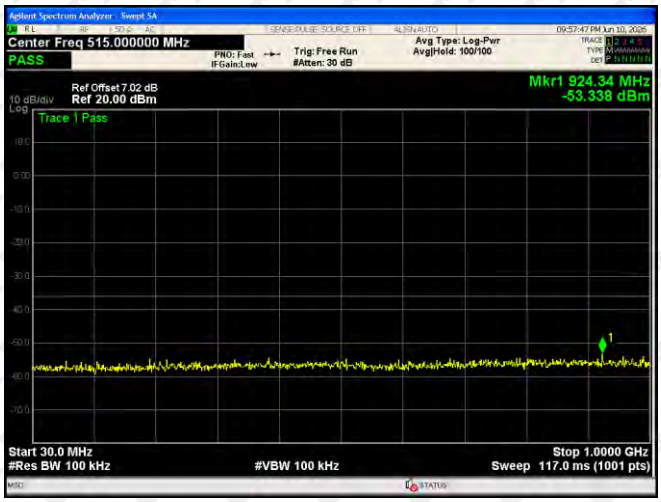


2.4835GHz~2.4965GHz

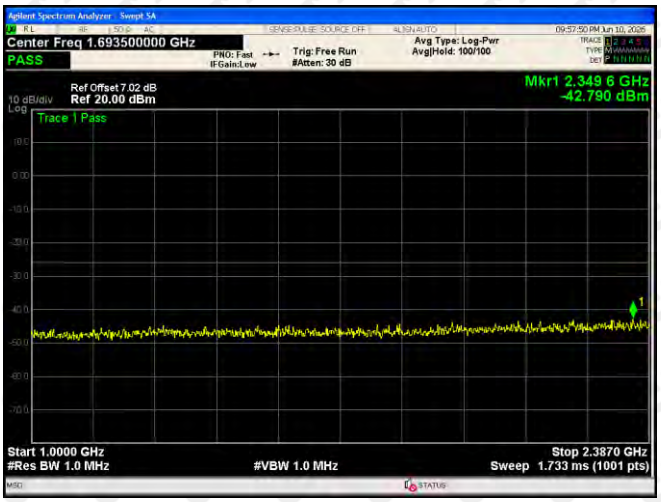


2.4965GHz~12.5GHz

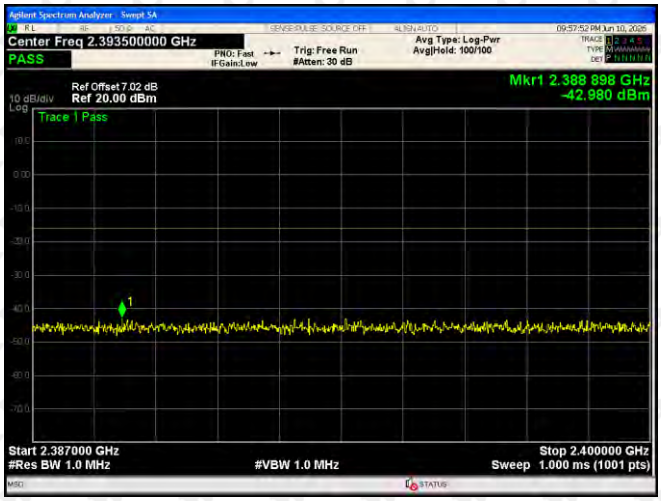
Test mode:	802.11g	Test channel:	Middle



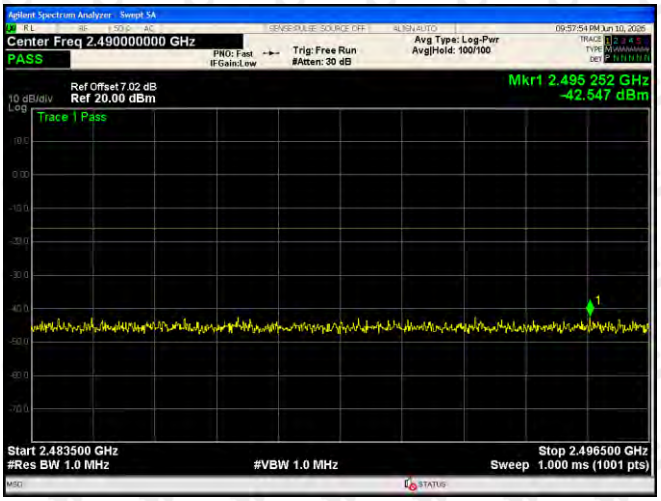
30MHz~1GHz



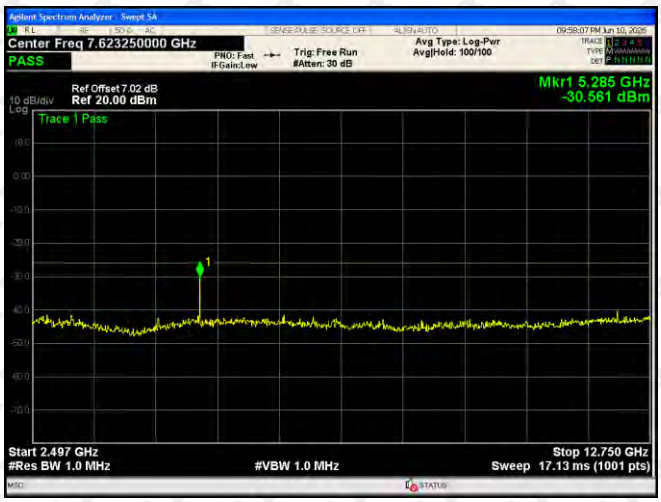
1GHz~2.387GHz



2.387GHz~2.4 GHz

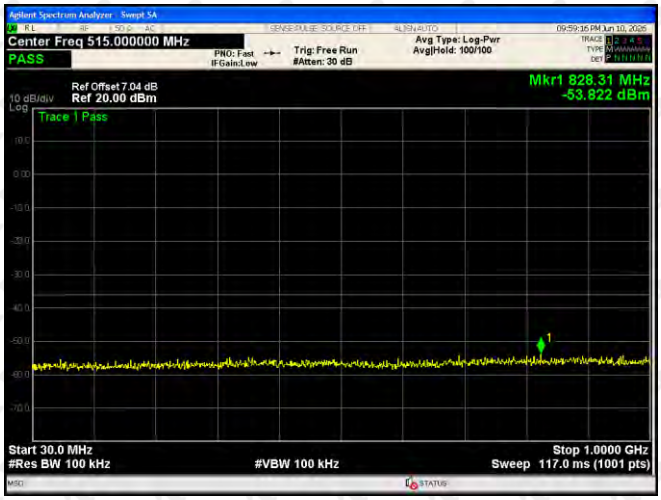


2.4835GHz~2.4965GHz

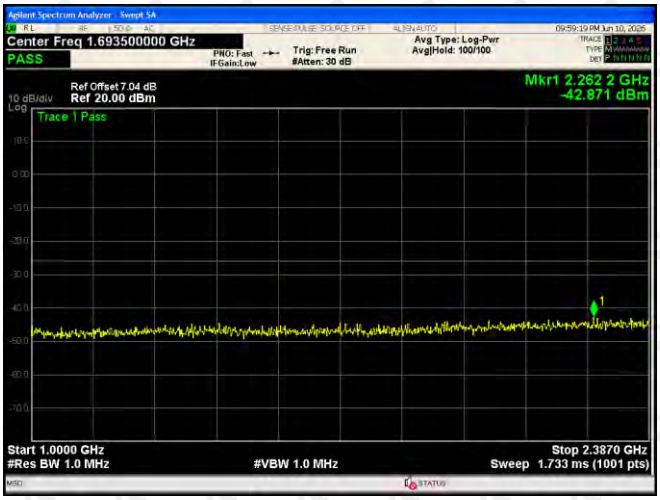


2.4965GHz~12.5GHz

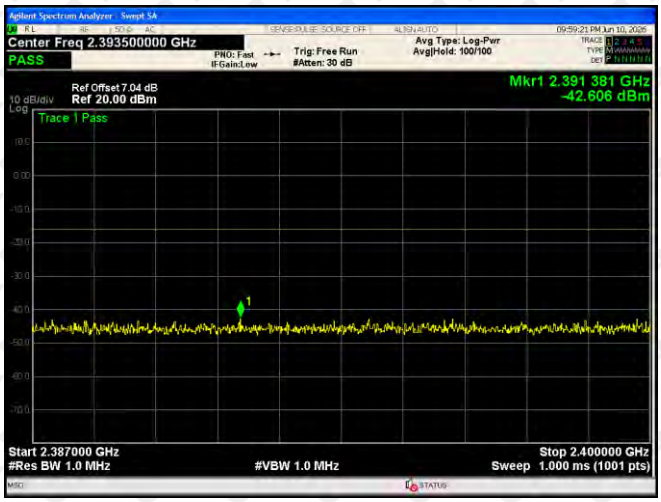
Test mode:	802.11g	Test channel:	High



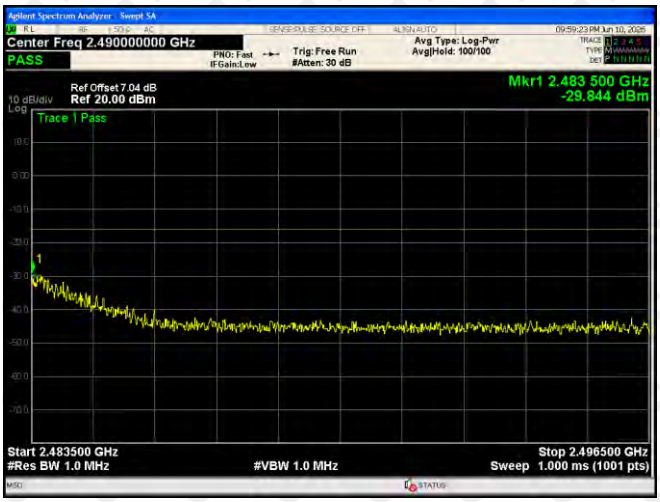
30MHz~1GHz



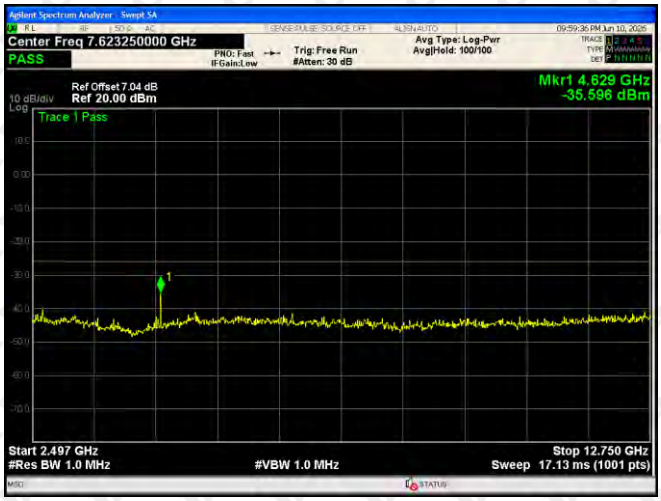
1GHz~2.387GHz



2.387GHz~2.4 GHz



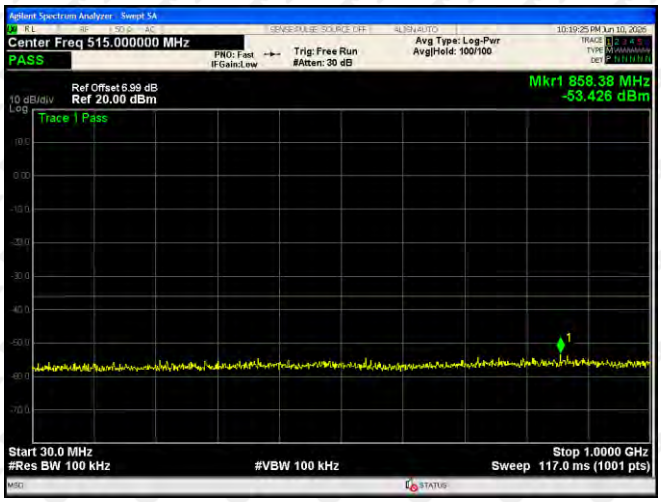
2.4835GHz~2.4965GHz



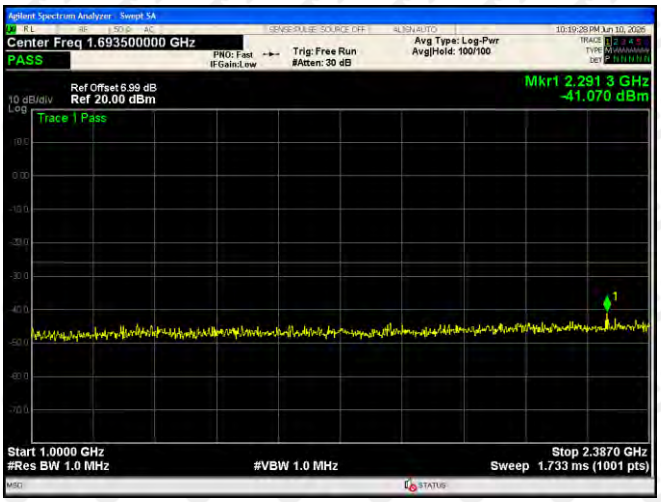
2.4965GHz~12.5GHz

Test mode	Test Channel	Test freq. range	Emission Frequency (MHz)	Test result（dBm/MHz）	Test result（uW/MHz）	limits（uW/MHz）	Result
802.11n 20	Low	30MHz≤f≤1000MHz	858.38	-53.43	0.045	2.5	PASS
		1000MHz＜f≤2387MHz	2291.3	-41.07	0.078	2.5	PASS
		2387MHz＜f≤2400MHz	2398.8	-41.89	0.065	25	PASS
		2483.5MHz≤f＜2496.5MHz	2495.92	-42.79	0.053	25	PASS
		2496.5MHz≤f＜12750MHz	8956.21	-41.16	0.077	2.5	PASS
	Middle	30MHz≤f≤1000MHz	894.27	-53.91	0.004	2.5	PASS
		1000MHz＜f≤2387MHz	2367.58	-43.08	0.049	2.5	PASS
		2387MHz＜f≤2400MHz	2396.52	-42.31	0.059	25	PASS
		2483.5MHz≤f＜2496.5MHz	2483.73	-42.68	0.054	25	PASS
		2496.5MHz≤f＜12750MHz	4629.23	-29.24	1.191	2.5	PASS
	High	30MHz≤f≤1000MHz	880.69	-53.58	0.004	2.5	PASS
		1000MHz＜f≤2387MHz	2306.55	-42.79	0.053	2.5	PASS
		2387MHz＜f≤2400MHz	2398.63	-42.46	0.057	25	PASS
		2483.5MHz≤f＜2496.5MHz	2483.51	-28.54	1.400	25	PASS
		2496.5MHz≤f＜12750MHz	2640.05	-41.04	0.079	2.5	PASS

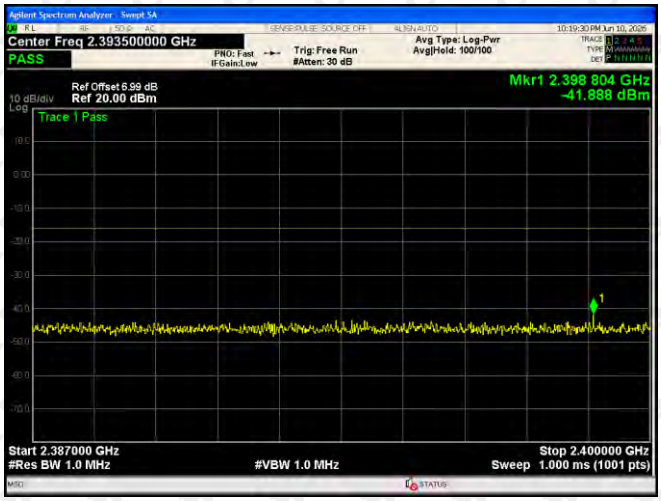
Test mode:	802.11n/HT20	Test channel:	Low



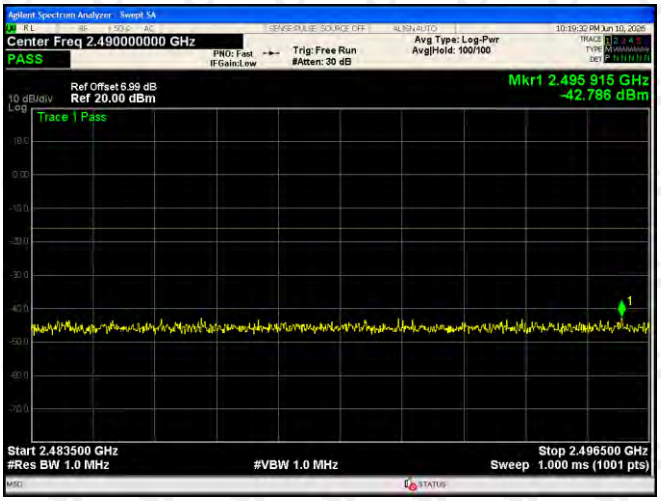
30MHz~1GHz



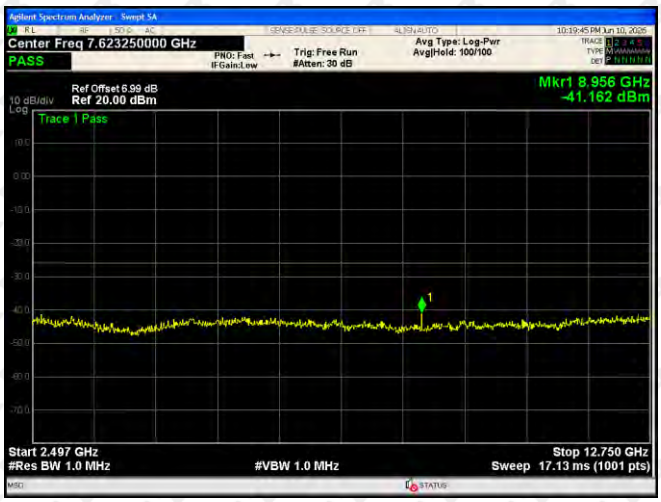
1GHz~2.387GHz



2.387GHz~2.4 GHz

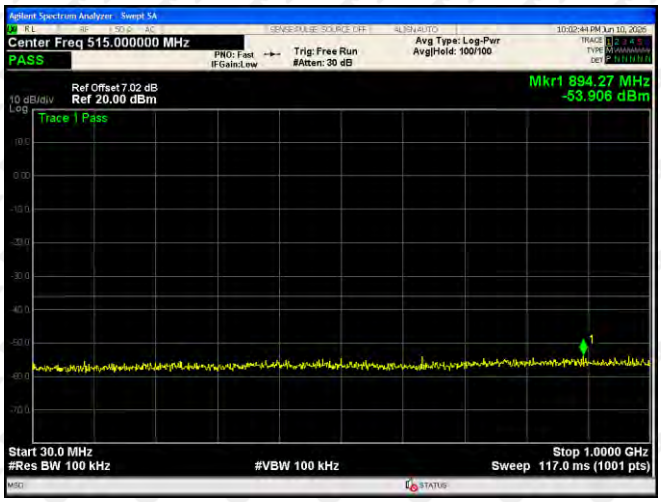


2.4835GHz~2.4965GHz

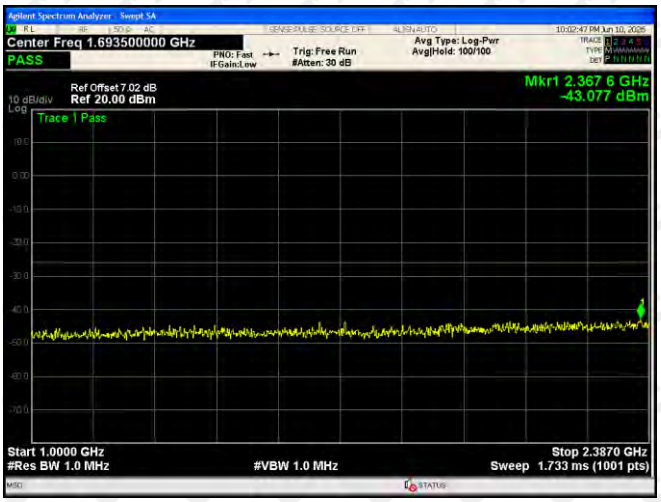


2.4965GHz~12.5GHz

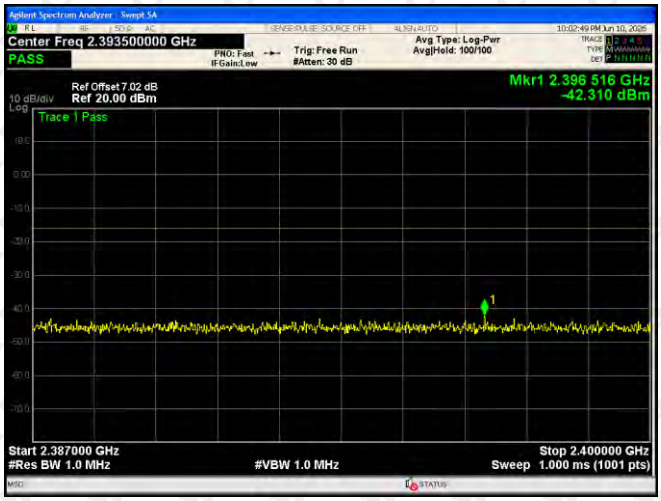
Test mode:	802.11n/HT20	Test channel:	Middle



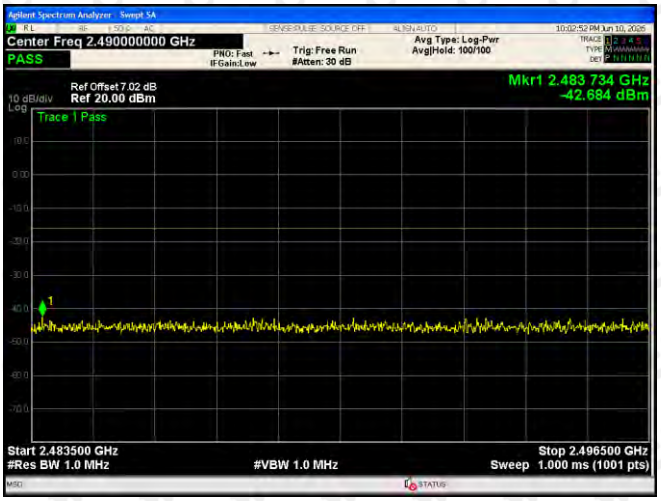
30MHz~1GHz



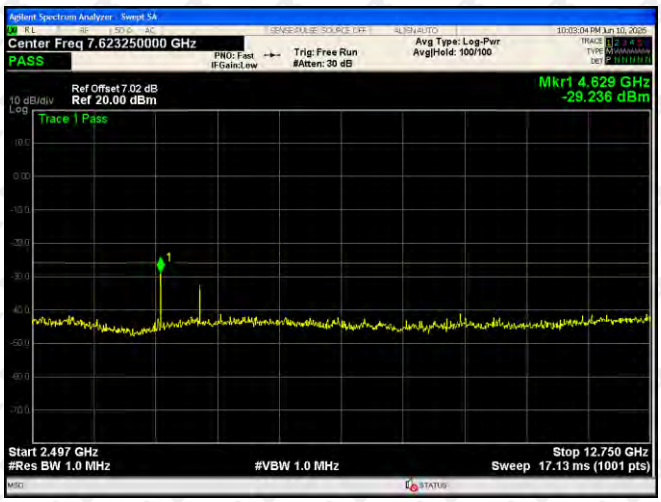
1GHz~2.387GHz



2.387GHz~2.4 GHz

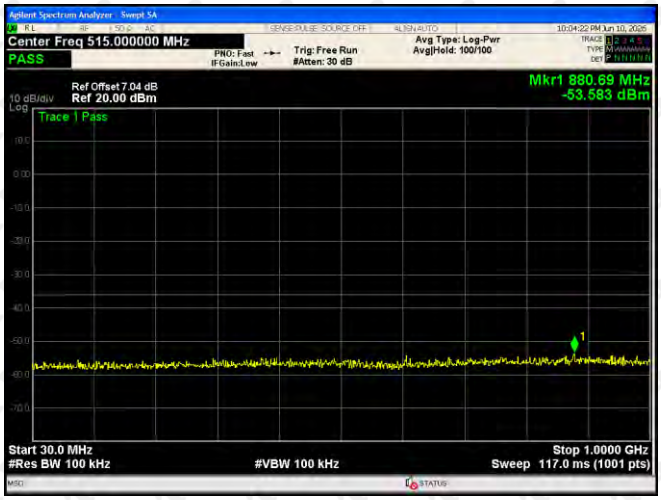


2.4835GHz~2.4965GHz

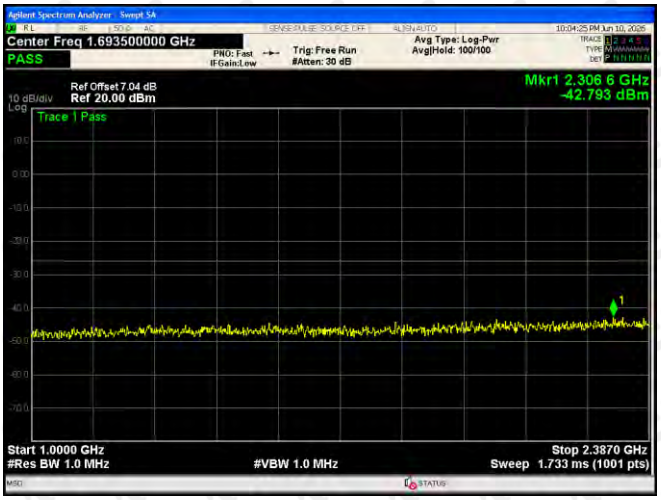


2.4965GHz~12.5GHz

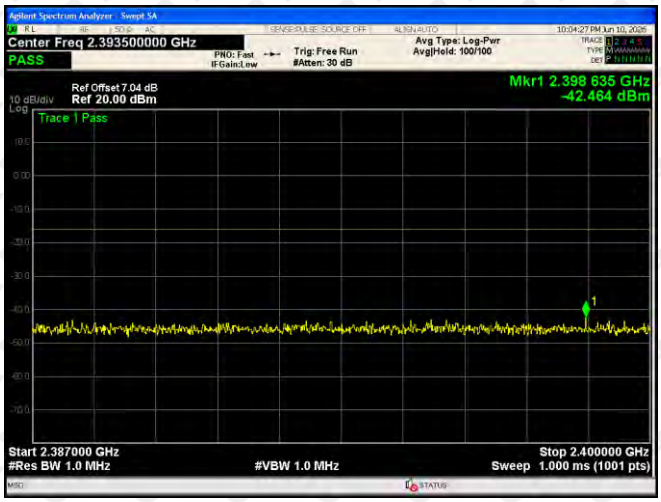
Test mode:	802.11n/HT20	Test channel:	High



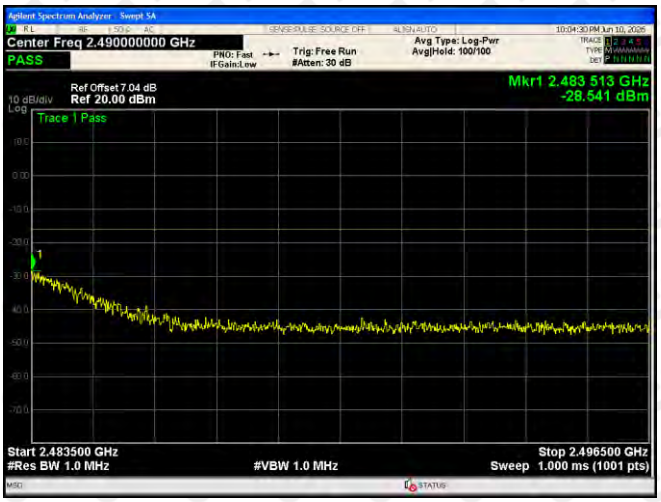
30MHz~1GHz



1GHz~2.387GHz



2.387GHz~2.4 GHz



2.4835GHz~2.4965GHz

2.4965GHz~12.5GHz

8UNWANTED EMISSION INTENSITYMEASUREMENT

8.1 LIMIT

Item	Limits
RX Spurious Emission	≤4nW (f＜1GHz)
	≤20nW (1GHz≤f)

8.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

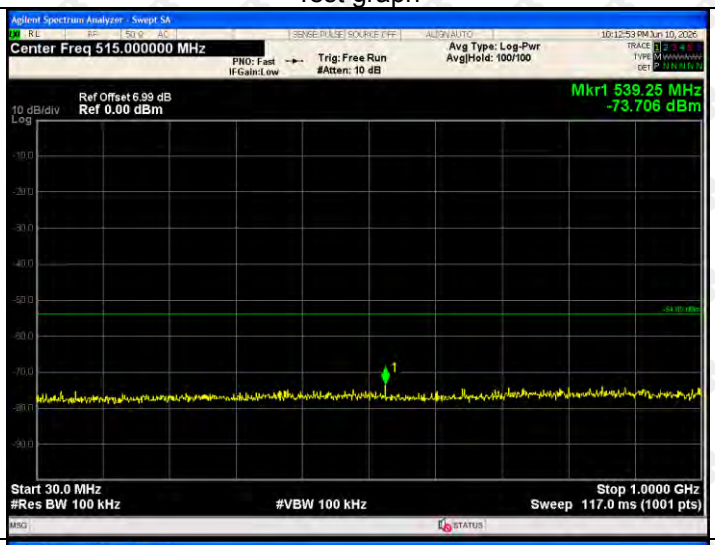
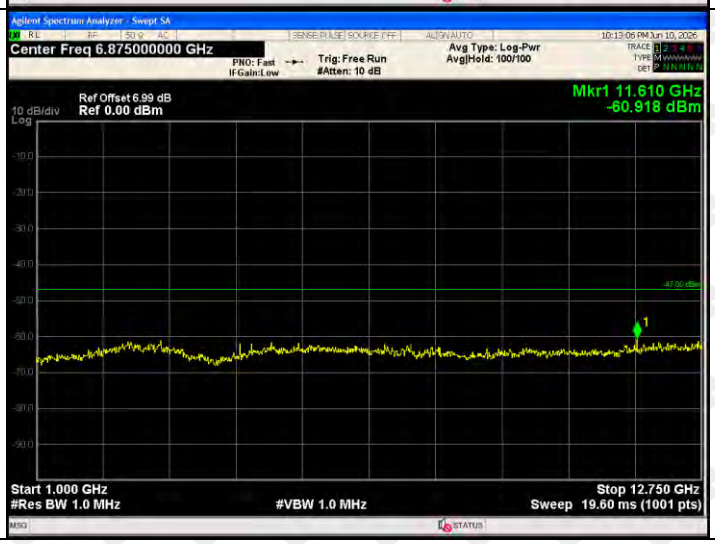
8.3 TEST PROCEDURE

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as
   RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
   AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep /
   Detect mode: Positive peak / Trace mode: Max hold
3. SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. If power level of lower emissions are more than 1/10 of limit (.0.4nW for f < 1GHz, 2nW for f >= 1GHz), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

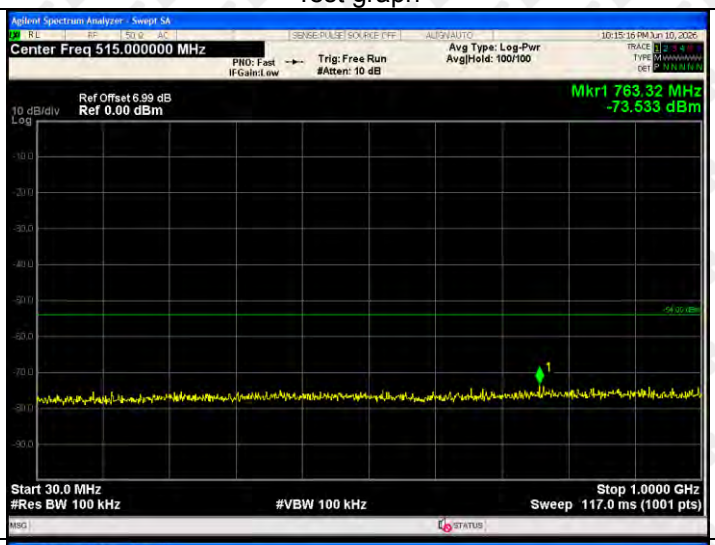
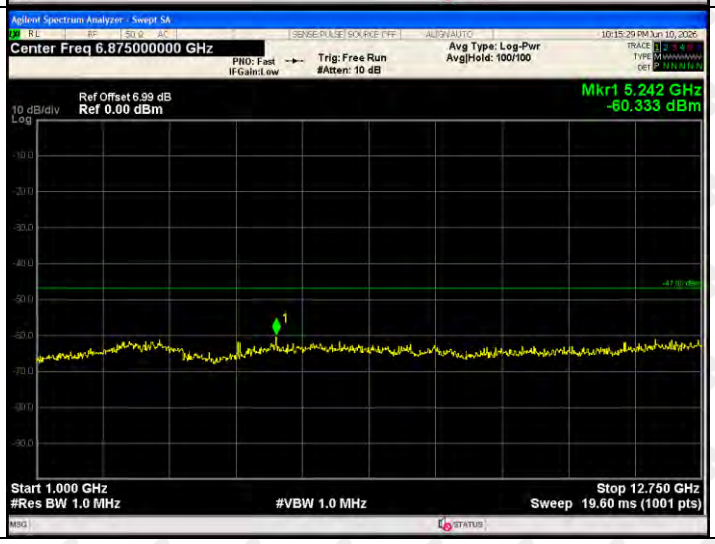
8.4 TEST RESULT

Temperature:	23℃	Relative Humidity:	54%
Test Voltage:	Normal Voltage	Pressure:	101kPa

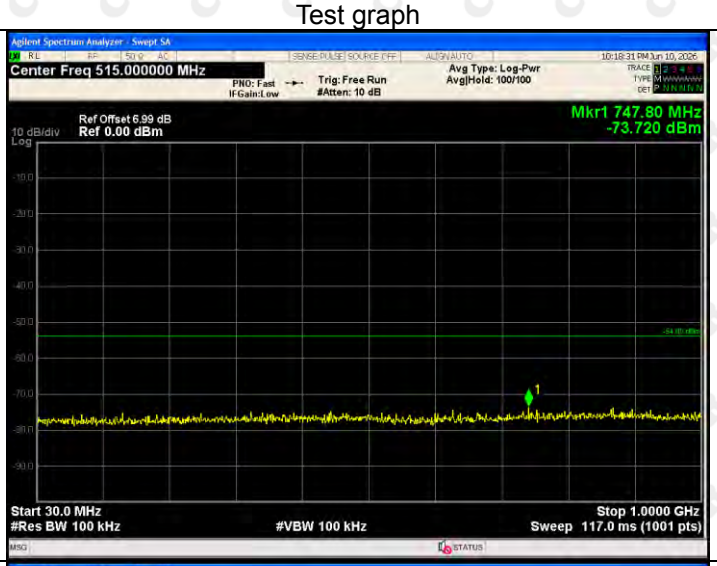
Test mode	Test freq. range	Emission Frequency (MHz)	Test result dBm	Test result nW	Limit nW	Result
b mode	30MHz≤f≤1000MHz	539.25	-73.71	0.043	4	PASS
	1000MHz＜f≤12750MHz	11610.25	-60.92	0.809	20	PASS

Test freq.	Test graph
30 MHz ≦ f < 1000 MHz	
1000 MHz ≦ f < 12750 MHz	

Test mode	Test freq. range	Emission Frequency (MHz)	Test result dBm	Test result nW	Limit nW	Result
g mode	30MHz≤f≤1000MHz	763.32	-73.53	0.044	4	PASS
	1000MHz＜f≤12750MHz	5241.75	-60.33	0.927	20	PASS

Test freq.	Test graph
30 MHz ≦ f < 1000 MHz	
1000 MHz ≦ f < 12750 MHz	

Test mode	Test freq. range	Emission Frequency (MHz)	Test result dBm	Test result nW	Limit nW	Result
N20 mode	30MHz≤f≤1000MHz	747.8	-73.72	0.042	4	PASS
	1000MHz＜f≤12750MHz	3044.5	-61.22	0.755	20	PASS

Test freq.	Test graph
30 MHz ≦ f < 1000 MHz	
1000 MHz ≦ f <12750 MHz	

9 TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

9.1 LIMIT

Item	Limits
EIRP Power Density	≦6.91dBm/MHz (FH form 2427 - 2470.75 MHz) ≦12.14dBm/MHz (OFDM,DS from 2400~2483.5MHz) ≦12.14dBm (Other from 2400~2483.5MHz)
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will be notapplied to the transmission antenna which has a gain of 2.14dBi or less	

9.2 MEASURING INSTRUMENTS AND SETTING

The following table is the setting of Spectrum Analyzer.

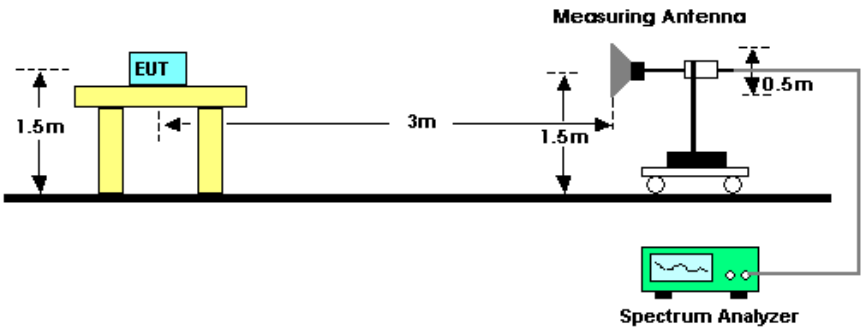
Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

9.3 TEST PROCEDURE

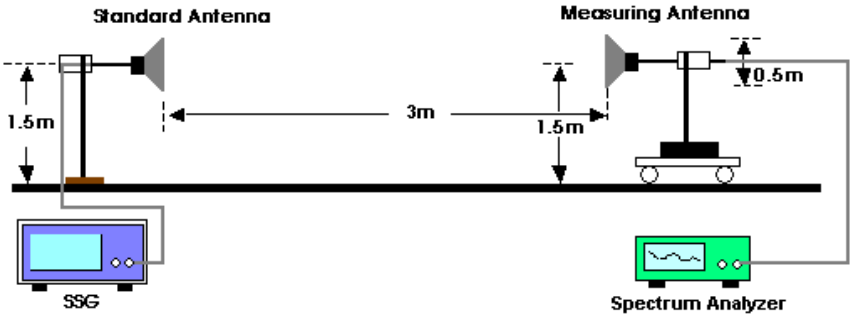
1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa “E“.
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within ± 50cm of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of “E” or caluate Pt with SSG output which gives the nearest of “E” and difference (± 1dB). Record the Pt.
7. Calculate EIRP by the formula below EIRP = Gt – L + Pt. Gt: gain of replacing antenna (dBi)
   L: feeder loss between SSG and replacing antenna Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

9.4 TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



TEST DEVIATION

There is no deviation with the original standard.

9.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

9.6 TEST RESULT

Test voltage	Test modulation	Output power (dBm/MHz)	Gain (dBi)	EIRP (dBm/MHz)	Result
Normal Voltage	802.11b	7.315	2.06	9.375	Pass
	802.11g	7.762	2.06	9.822	
	802.11n/HT20	7.651	2.06	9.711	

10TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

10.1 LIMIT

Item	Limits
3dB antenna beam width	360/A (If A<1; then A=1) A = {EIRP Power [mW] / 16.36 for DS, OFDM} or A = {EIRP Power [mW] / 4.9 for FH}
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

10.2 MEASURING INSTRUMENTS AND SETTING

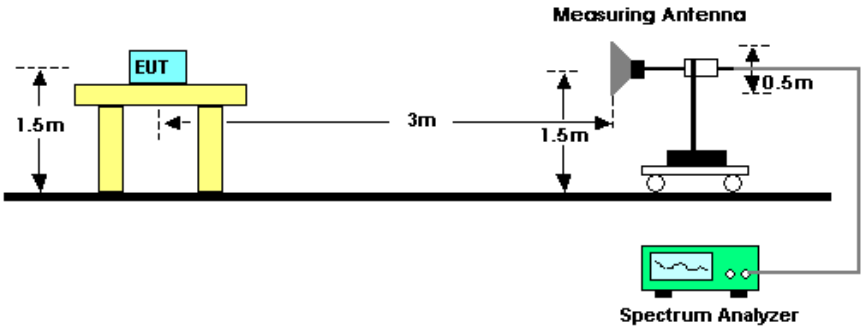
The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0MHz
RB	1MHz
VB	1KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.3 TEST PROCEDURE

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receving signal position.
3. Rotate directions of the EUT horizontally and ertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within ± 50cm of EUT height and swing it to find the maximum output of measuing antenna. The output level at the spectrum analyzer is read as “E”
5. Caluate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below 360/A (If A<1; then A=1). A = {EIRP Power [mW] / 16.36 for DS, OFDM} orA = {EIRP Power [mW] / 4.9 for FH}

10.4 TEST SETUP LAYOUT



TEST DEVIATION
There is no deviation with the original standard.

10.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

10.6 TEST RESULT
N/A
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz

11RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

11.1 LIMIT

Item	Limits
Identification code	≧48 bits

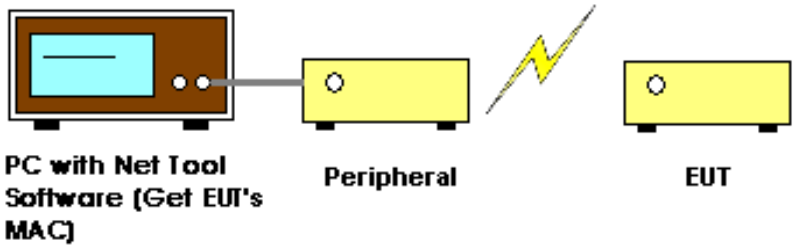
11.2 MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

11.3 TEST PROCEDURE

1. In the case that the EUT has the function of automatically transmitting the identification code:
   a. Transmit the predetermined identification codes form EUT.
   b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification ocde:
   a. Transmit the predetermined identification codes form the counterpart.
   b . Check if communication is normal.
   c. Transmit the signals other than predetermined ID codes formthe counterpart.
   d. check if the EUT stops the transmission, or if it displays that idnetification codes are different from the predetermined ones.

11.4 TEST SETUP LAYOUT



EST DEVIATION
There is no deviation with the original standard.

11.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

11.6 TEST RESULT

Temperature:	23℃	Relative Humidity:	54%
Pressure:	101kPa		
Test Result:	CONFORM		

MAC: 9CA525BA87F7

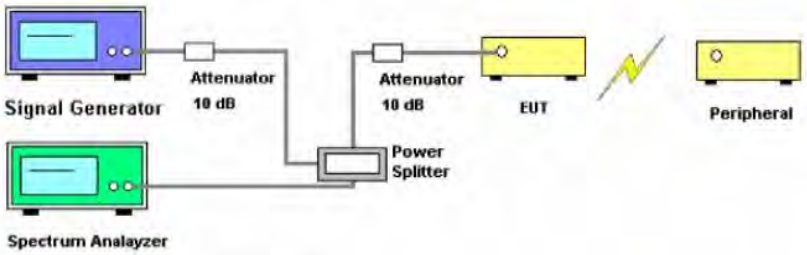
12CARRIER SENSING FUNCTION

12.1 TEST REQUIREMENT

MIC Notice No.88 Appendix No.43
Article 2, Paragraph 1, Item 19 Rules Section 10

12.2 BLOCK DIAGRAM OF TEST SETUP

❖ Measurement System Diagram



❖ Conditions of Application Equipment (EUT)

- The EUT state shall be "normal mode link with wireless router".

12.3 TEST PROCEDURE

1. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is (on 22.79+G-20*log(f)dBm)(G is the antenna gain, f is the test frequency).
2. Turn off the RF signal of the SG.
3. EUT have transmitted the maximum modulation signal and fixed channelize.
4. Setting of SA:RBW/VBW=1MHz/1MHz,span=50MHz,Sweep time=auto, Sweep mode=continuous, Detect mode=positive peak
5. SG RF signal on.
6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous

12.4 TEST RESULT

N/A

13 NUMBER OF CARRIERS

This device has more than 1 subcarrier in 1MHz, compliance with the requirement.

15 EUT TEST PHOTO

※※※※※ **END OF REPORT** ※※※※※