



TEST REPORT

The tests have been carried out according to the requirements of the following standards:

ARTICLE 2 SECTION 1 ITEM 19

MEASUREMENT AND TEST REPORT

For

Beijing Makera Technology Co., Ltd.

Room 101, 1st Floor, Building 9, No.801 Changlin, Xi Sanqi, Qinghe Subdistrict, Haidian District,
Beijing, China

Model: Z1, Z1Pro

2026-09-03

This Report Concerns: ☒ Original Report	Equipment Type: Makera Z1 Desktop CNC Machine
Test Engineer: Shawn Lei/ <i>Shawn Lei</i>	
Report Number: R2605RF20301	
Test Date: 2026-06-05 to 2026-09-01	
Reviewed By: Blue Hu/ <i>Blue Hu</i>	
Approved By: Neo Dong/ <i>Neo Dong</i>	
Prepared By: Shenzhen Tong Chuang Tian Hai Technology Service Co., Ltd. 124, No.66, Zhangge Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, China Tel: +86-23761910 http://www.sztcth.com	

Note: This test report is limited to the above client company and the product model only. The test results in the report only apply to the tested sample. It may not be duplicated without prior written consent of Shenzhen Tong Chuang Tian Hai Technology Service Co., Ltd.



TEST REPORT

Article 2 Section 1 Item 19

Report Reference No..... R2605RF20301

Tested by (signature)..... Shawn Lei/Test engineer

Shawn Lei

Reviewed by (signature)..... Blue Hu/Project engineer

Blue Hu

Approved by (signature)..... Neo Dong/Laboratory Manager

Neo Dong

Date of issue..... 2026-09-03

Testing Laboratory Name..... **Shenzhen Tong Chuang Tian Hai Technology Service Co., Ltd.**

Address..... 124, No.66, Zhangge Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, China

Testing location..... Same as above

Applicant's Name..... **Beijing Makera Technology Co., Ltd.**

Address..... Room 101, 1st Floor, Building 9, No.801 Changlin, Xi Sanqi, Qinghe Subdistrict, Haidian District, Beijing, China

Manufacturer's Name..... **Huaibei Makera Technology Co., Ltd**

Address..... 1st floor, building C1, e-commerce Industrial Park, Suixi Economic Development Zone, Suixi County, Huaibei City, Anhui Province, China

Test specification

Standard..... Article 2 Section 1 Item 19

MIC Notice No.88 Appendix No. 43

TRF Originator..... Shenzhen Tong Chuang Tian Hai Technology Service Co., Ltd.

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The test report merely corresponds to the test sample.

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Test item description..... **Makera Z1 Desktop CNC Machine**

Trade mark..... MAKERA CARVERA

Model and/or type reference..... Z1, Z1Pro

Model Difference..... RF module and antenna are identical for Z1 and Z1Pro. Only motor and motor-driver PCB are different.

IEEE 802.11b:DSSS(CCK.DQPSK.DBPSK)

Modulation Type..... IEEE 802.11g: OFDM(64QAM,16QAM,QPSK, BPSK)

IEEE 802.11n HT20: OFDM (64QAM.16QAM.QPSK.BPSK)

EEE 802.11n HT40: OFDM (64QAM.16QAM.QPSK.BPSK)

Operation Frequency..... WIFI: 2412~2472MHz

Note..... /



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1. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

Test Standard	Description of Test	Result
MIC NoticeNo.88 AppendixNo.43 Article 2Paragraph 1 Item19	Antenna power	Complies
	Antenna Power Tolerance	Complies
	Frequency Tolerance	Complies
	Occupied Bandwidth	Complies
	Spread Bandwidth	Complies
	Spreading factor	Complies
	Number of Carriers	Complies
	Dwell Time	N/A
	Spurious Emissions	Complies
	Interference prevention function	Complies
	Carrier sensing function	Complies
	Transmission Radiated Angle Width (3dB Beam Bandwidth)	N/A
	Antenna Absolute Gain	N/A
	Secondary Radiated Emissions	Complies
Note 1; NA = Not Applicable		



1.1 measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics;Part 1" and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Bontek Compliance Testing Laboratory quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Items	Measurement Uncertainty	Notes
RF Output Power	± 0.352 dB	
Transmitter power conducted	± 1.24 dB	(1)
Power Spectral Density	± 1.50 dB	(1)
Occupied Channel Bandwidth	$\pm 0.0005\%$	(1)
Duty cycle, Tx-sequence and Tx-gap&Medium utilization	$\pm 0.566\%$	(1)
Adjacent channel power	± 0.751 dB	(1)
Conducted spurious emission (30-1000HMz)	± 0.746 dB	(1)
Conducted spurious emission (1000-12750HMz)	± 1.328 dB	(1)
Conducted spurious emission (12750-26000HMz)	± 1.04 dB	(1)
All emission, radiated	± 6 dB	(1)

Note:

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

(3) The measurement uncertainty is not included in the test result.



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Name of EUT:	Makera Z1 Desktop CNC Machine
Model Number:	Z1, Z1Pro
Operation frequency:	IEEE 802.11b:2412-2472MHz IEEE 802.11g:2412-2472MHz IEEE 802.11n HT20:2412-2472MHZ IEEE 802.11n HT40:2422-2462MHz
Modulation Type:	IEEE 802.11b:DSSS(CCK.DQPSK.DBPSK) IEEE 802.11g: OFDM(64QAM,16QAM,QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM.16QAM.QPSK.BPSK) EEE 802.11n HT40: OFDM (64QAM.16QAM.QPSK.BPSK)
Channel number:	13 Channel for IEEE 802.11b/g/n(HT20) 9 Channel for IEEE 802.11n(HT40)
Channel Separation:	5MHz
HW-Release No:	1.1
SW-Release No:	1.0
Antenna Type:	PCB Antenna
Antenna Gain:	1.63dBi (Provided by customer)
Ratings:	AC100-240V, 50/60Hz, 300W
Sample No.:	TCL2605RED203-01

NOTE:

1. For the test results, the EUT had been tested with all conditions.
2. The above EUT information was declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or user's manual.



2.2 DESCRIPTION OF TEST CHANNELS

IEEE 802.11b/g/n: Thirteen channels are provided to the DUT

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (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		

NOTE:

1. The channels which were indicated in bold type of the above channel list were selected as representative test channel. Therefore only the data of the test channels were recorded in this report.
2. By means of test software for EspRFTTestTool_v5.2 provided by manufacture, the power levels during the tests were set according to the following codes:

IEEE 802.11b/g/n (20MHz & 40MHz)	
BANDWIDTH	POWER SETTING
20MHz	Default
40MHz	Default



2.3 TEST CONDITIONS

Test conditions	Voltage (Vdc)
V_{normal}	3.3
V_{max}	3.6
V_{min}	2.97

Apply the input DC voltage to the EUT and vary the DC input voltage with +10% and -10%, then check how much the "output voltage" varies at two measuring points within the radio section:

1) Measure the output voltage in the RF circuit

2) Measure the output voltage at the modulation circuit

a). If the voltage variation at both parts appears to be more than 1%, then it is mandatory to perform further testing at 3 voltage levels ($V-10\%$, $V_{nominal}$, $V+10\%$).

b). If the voltage variation at both parts appears to be less than 1%, then you only have to conduct further testing at $V_{nominal}$.

During the input supply voltage to the EUT from the external power source, EUT only operated in normal voltage to test all regulations.

Test Voltage Information		
Power supply voltage 3.3V DC (Normal)	Power supply voltage 3.6V DC(+10%)	Power supply voltage 2.97V DC(-10%)
RF module voltage DC 3.3V	RF module voltage DC 3.3V	RF module voltage DC 3.3V
When EUT be operated at 10% from the normal supply voltage, the supply voltage of RF part was varied within 1%. All test cases were done under the normal supply voltage.		

2.4 ASSEMBLY

The radio frequency circuit is located inside the device under test, and its casing consists of a metal shielding cover.

2.5 ANTENNA SPECIFICATIONS

2.5.1 ANTENNA GAIN

Ant. Type	Connector Type	Highest Peak Gain (dBi) 2.4GHz ~ 2.5GHz
PCB Antenna	N/A	1.63

2.5.2 ANTENNA PATTERN

Please refer to the attached file (Antenna report).

2.6 TEST LOCATION

All tests were performed at Shenzhen Tianhai Test Technology Co., Ltd.

124, No.66, Zhangge Road, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong Province, P.R. China



2.7 EQUIPMENTS USED DURING THE TEST

RF Test System					
Kind of Equipment	Manufacturer	Type	S/N	Calibration time	Calibrate until
Wideband radio communication tester	R&S	CMW500	131134	2025-11-14	2026-11-13
EXA Signal Analyzer	Keysight	N9010A	MY54488841	2026-05-04	2027-05-05
MXG Vector Signal Generator	Agilent	N5182B	MY59100603	2025-07-21	2026-07-20
MXG Vector Signal Generator	Agilent	N5182B	MY59100603	2026-07-21	2027-07-22
Signal Generator	R&S	SMB100A	113650	2026-05-04	2027-05-05
RF control unit	Tonscend	JS0806-2	21C8060397	2026-05-04	2027-05-05
DC Power supply	Agilent	E3632A	MY50120052	2026-05-04	2027-05-05
Oscilloscope	Agilent	DSO9254A	MY59567894	2026-05-04	2027-05-05
RF test system	Tonscend	/	Ver: V3.7.90	/	/
Attenuator	COM-MW	18G2W 10dB	/	/	/
Calibration Agencies: GRG Metrology (Shenzhen) Co., Ltd.					

NOTE:

- 1.The calibration interval of the above test instruments is 12 months
- 2.Calibration by the calibration agencies listed in the table correspond to paragraph 4 (ii) (c) of Article 24-2 in the Radio Law.
- 3.The instrument RF Control unit contains power meter.



3. TEST TYPES AND RESULTS

3.1 ANTENNA POWER MEASUREMENT

3.1.1 LIMITS OF ANTENNA POWER

Modulation system	Frequency band used	Antenna power (max.)
DS.OFDM (Narrow-Band)	2,400 – 2,4835 MHz	10mW/MHz
OFDM (Wide-Band)	2,400 – 2,4835 MHz	5mW/MHz
DTS	2,400 – 2,4835 MHz	10mW

Tolerance of antenna power shall be +20%.

According article 49.20 f(2)The angular width of the principal radiation in the horizontal and vertical planes of the transmitting antenna shall not exceed the value obtained by the following expression. $360/A$ degree
A represents the value determined by dividing an equivalent isotropically radiated power by the value obtained by applying an antenna power with the mean power of 10 mW to the transmitting antenna with its absolute gain being 2.14 dB, and shall be 1 when it is lower than 1

3.1.2 TEST SETUP



3.1.3 TEST PROCEDURES

1. A power meter is connected on the IF output port of the spectrum analyzer.
2. EUT turn to test frequency channel and keep continuous transmitting.
3. Connected the equipment to be measured. Using the following settings of the spectrum analyzer in combination with “max hold” function, find the frequency of highest power output in the power envelope: center frequency equal to operation frequency; RBW & VBW: 1 MHz; detector mode: positive peak; averGaing: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument’ range.
4. Reading the output power from the Power meter as PEUT
5. The antenna power of EUT is “P EUT”.
6. EIRP power=“P EUT” + antenna gain

between + 20% to - 80% power range that base on manufacturer declare the conducted power density.



3.1.4 Conducted output power

Test plots of normal input voltage mode as below:

Environmental Conditions				23.8 deg.C, 53.9% RH		
Mode	Frequency (MHz)	Conducted RF output power density (dBm/ MHz)	Conducted RF output power density (mW/MHz)	Rated power density (mW/MHz)	Antenna power tolerance (%)	Limit of antenna power tolerance (%)
IEEE 802.11b	2412	9.17	8.2604	10	-17.40	+20%
	2442	9.16	8.2414	10	-17.59	
	2472	9.17	8.2604	10	-17.40	
IEEE 802.11g	2412	8.52	7.1121	10	-28.88	
	2442	8.66	7.3451	10	-26.55	
	2472	8.60	7.2444	10	-27.56	
IEEE 802.11n HT20	2412	8.77	7.5336	10	-24.66	
	2442	8.86	7.6913	10	-23.09	
	2472	8.59	7.2277	10	-27.72	
IEEE 802.11n HT40	2422	3.60	2.2909	5	-54.18	
	2442	4.46	2.7925	5	-44.15	
	2462	5.64	3.6644	5	-26.71	

NOTE:

1. The rated output power density is 10 mW/MHz for IEEE 802.11 b/g/n HT20 mode, and 5 mW/MHz for IEEE 802.11n HT40 mode.
2. See the section 3.4 for the spread bandwidth

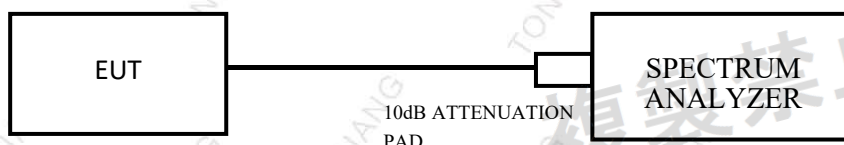


3.2 FREQUENCY TOLERANCE MEASUREMENT

3.2.1 LIMITS OF FREQUENCY TOLERANCE MEASUREMENT

ITEM	LIMITS (See Article 5, Table1 of the Ordinance Regulating Radio Equipment)
Frequency Error	±50ppm

3.2.2 TEST SETUP



3.2.3 TEST PROCEDURES

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)
2. Setting of SA is following as: RBW:10 kHz / VBW:10 kHz / SPAN: 1MHz / AT: 30dB / Ref: 15dBm
3. Center Frequency: The center frequency of testing for EUT
4. Sweep time: Auto
5. Sweep mode: Continuous sweep
6. Detect mode: Positive peak
7. EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value, f_c is declaring of channel frequency.
Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ±50ppm



3.2.4 TEST RESULTS

Test plots of normal input voltage mode as below:

802.11b / 802.11g / 802.11n (HT20)

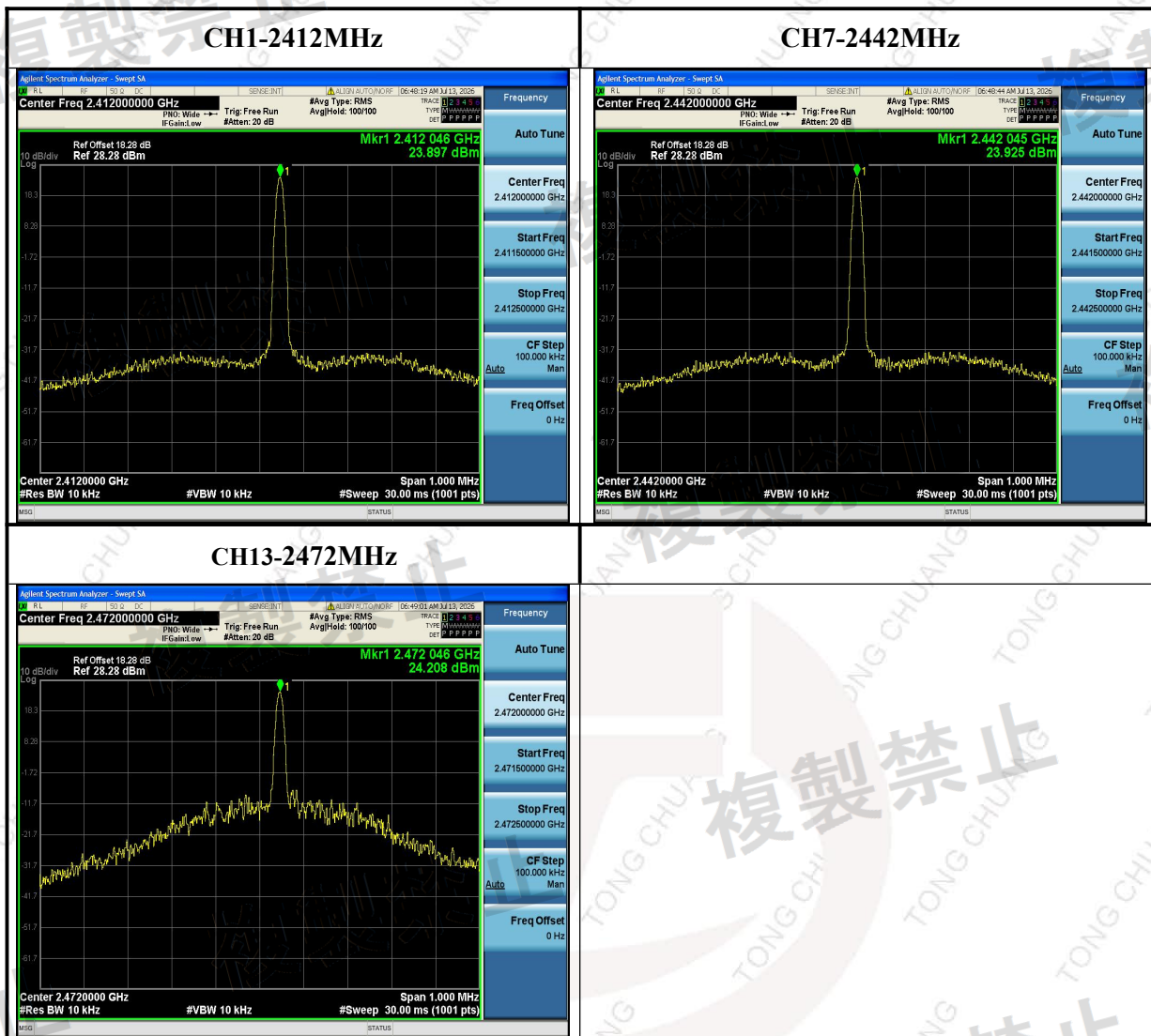
Environmental Conditions				24.5 deg.C, 49 % RH	
Channel	Frequency (MHz)	Measured (MHz)	Tolerance (MHz)	Result[ppm]	Limit[ppm]
1	2412	2412.046	0.046	19.071	±50
7	2442	2442.045	0.045	18.428	
13	2472	2472.046	0.046	18.608	

802.11n (HT40)

Environmental Conditions				24.5 deg.C, 49 % RH	
Channel	Frequency (MHz)	Measured (MHz)	Tolerance (MHz)	Result[ppm]	Limit[ppm]
3	2422	2422.049	0.049	20.23	±50
7	2442	2442.049	0.049	20.07	
11	2462	2462.046	0.045	18.68	

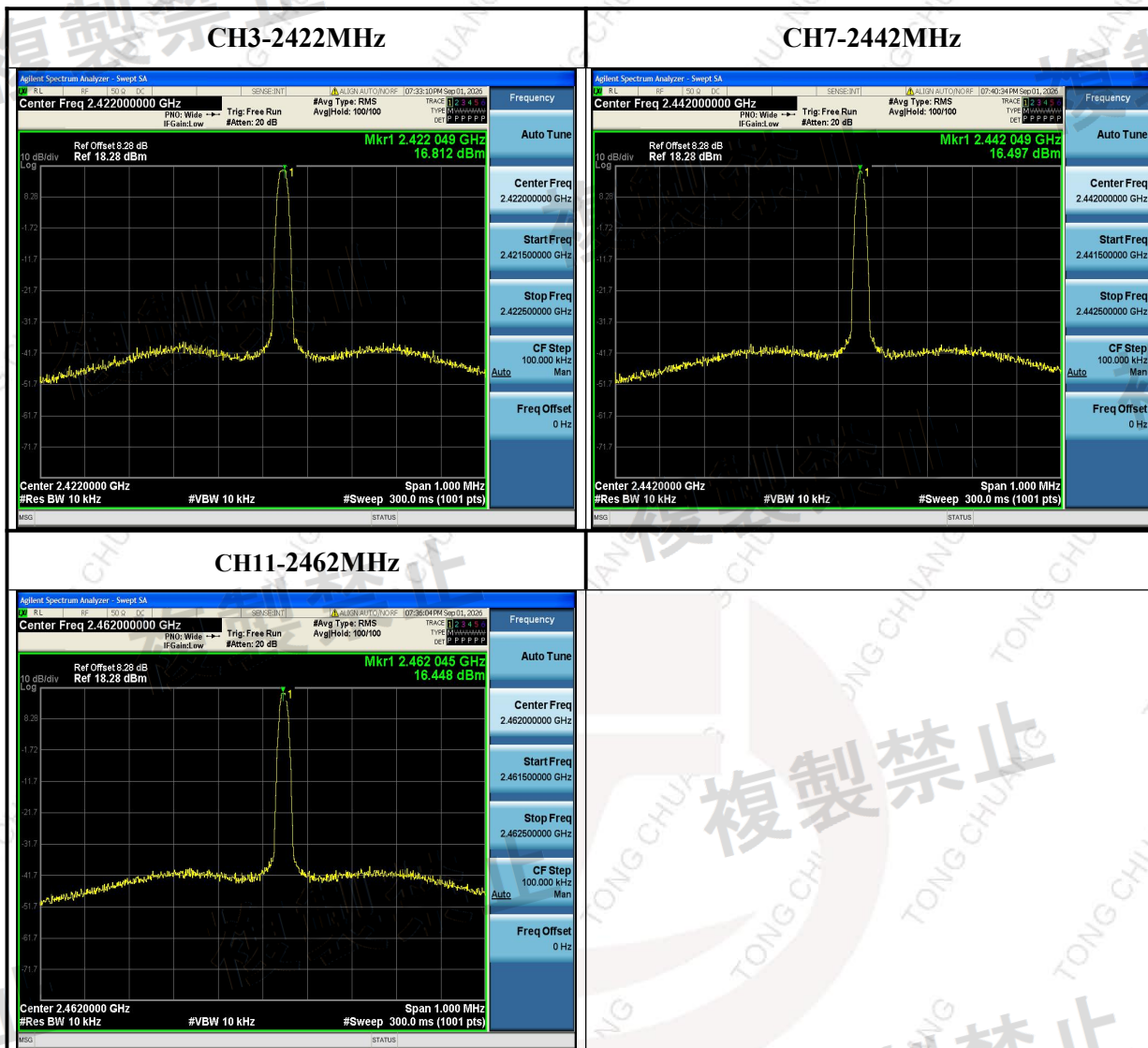


802.11b / 802.11g / 802.11n (HT20)





802.11n (HT40)





3.3 OCCUPIED BANDWIDTH MEASUREMENT (99% POWER BANDWIDTH)

3.3.1 LIMITS OF OCCUPIED BANDWIDTH MEASUREMENT

ITEM	LIMIT	REMARK
Occupied bandwidth	$\leq 26\text{MHz}$	FH hopping system & hybrid FH+DS/FH+OFDM
Occupied bandwidth	$\leq 26\text{MHz}$	802.11b/g/n HT20, BT-LE(GFSK), DS modulation & other general OFDM
Occupied bandwidth	$\leq 40\text{ MHz}$	802.11n HT40 (OFDM2)
Spreading Bandwidth	$\geq 500\text{ kHz}$	Only for FH hopping & DS spread spectrum devices

Permissible value for occupied bandwidth using the FH system, a hybrid system combining DS and FH systems, or a hybrid system combining FH and OFDM systems shall be 83.5 MHz or less, while necessary bandwidth (minimum occupied bandwidth sufficient to ensure information transmission of required quality at a required transmission rate for the system used under specified conditions for a given emission type) using a system other than any of the above shall be 26 MHz or less.

3.3.2 TEST SETUP



3.3.3 TEST PROCEDURES

- (1) Configure EUT and assistant system according to Clause I (General Common Conditions) of Notification No.88 Table No.43.
- (2) Set EUT work in carrier Tx (continuous un-modulated transmission) mode as described in “Condition of EUT” sub-clause under each respective test item of Table No.43.
- (3) Connected the EUT’s antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:

Centre Frequency: The centre frequency of the channel under test.

Resolution BW: 300 KHz

Video BW: 300 KHz

Span: Wide enough to cover the complete power envelope of the signal of the EUT.

Detector: Peak.

Trace Mode: Max Hold.

- (4) When the trace is complete, measure the occupied bandwidth (99% bandwidth) with spectrum analyzer’s bandwidth measure function.



3.3.4 TEST RESULTS

Test plots of normal input voltage mode as below:

Nvironmental Conditions		24.5 Deg.C, 49 % Rh		
Mode	Condition	CH	Result (MHz)	Limit (MHz)
IEEE802.11b	Normal	CH1	12.983	26
		CH7	13.341	26
		CH13	13.234	26
IEEE802.11g	Normal	CH1	16.455	26
		CH7	16.550	26
		CH13	16.497	26
IEEE802.11n HT20	Normal	CH1	17.274	26
		CH7	17.324	26
		CH13	17.276	26
IEEE802.11n HT40	Normal	CH3	35.443	40
		CH7	35.592	40
		CH11	35.423	40
Conclusion: PASS				

Note: For the test plots please refer to the below pages.



IEEE802.11b

CH1-2412(MHz)



CH7-2442(MHz)



CH13-2472(MHz)





IEEE802.11g

CH1-2412(MHz)



CH7-2442(MHz)



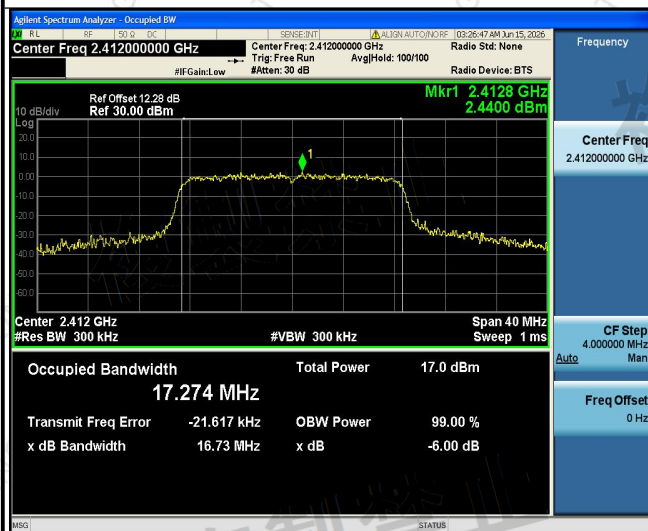
CH13-2472(MHz)



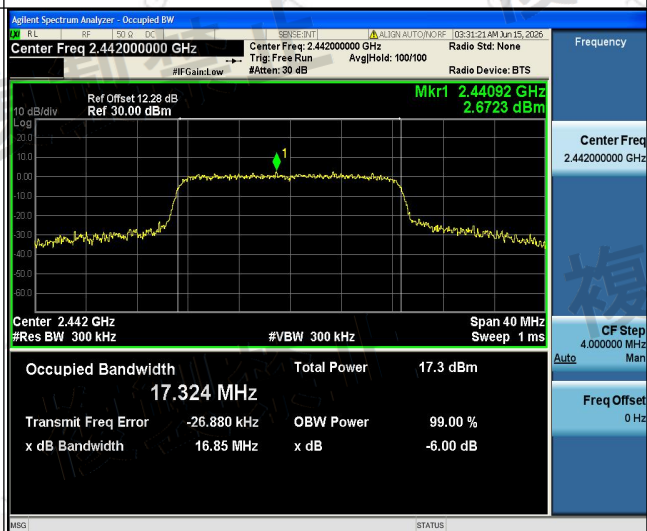


IEEE802.11n20

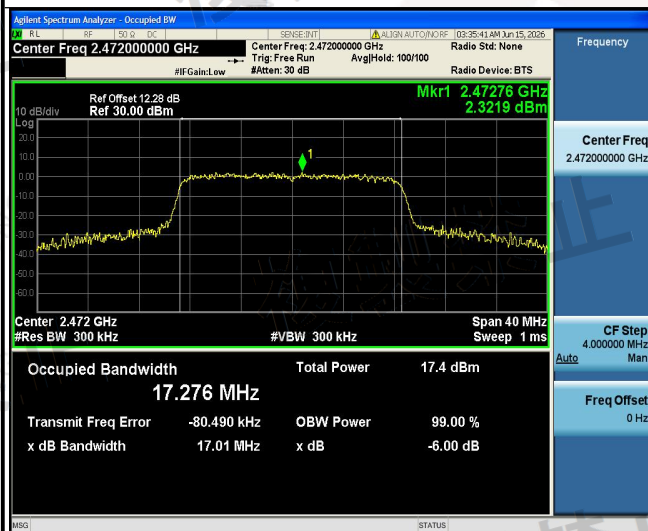
CH1-2412(MHz)



CH7-2442(MHz)



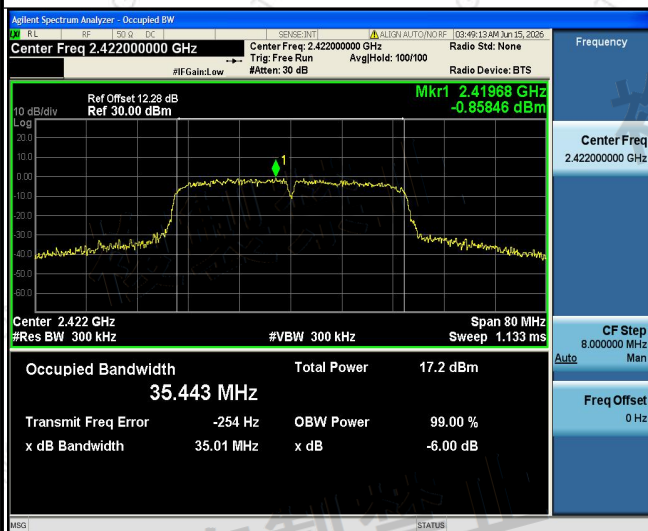
CH13-2472(MHz)





IEEE802.11n40

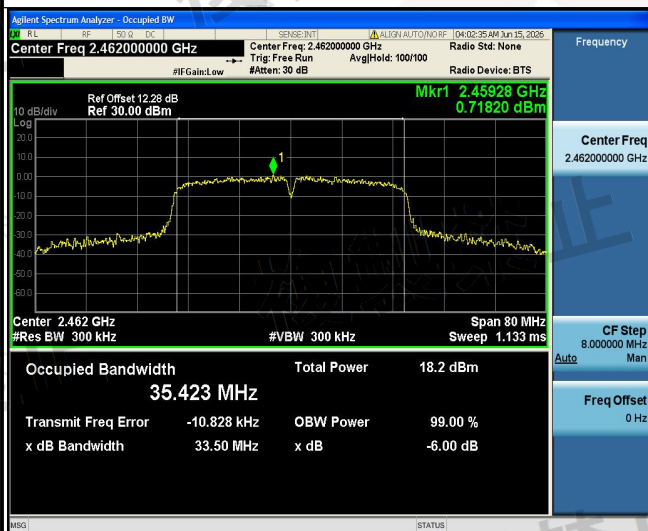
CH3-2422(MHz)



CH7-2442(MHz)



CH11-2462(MHz)



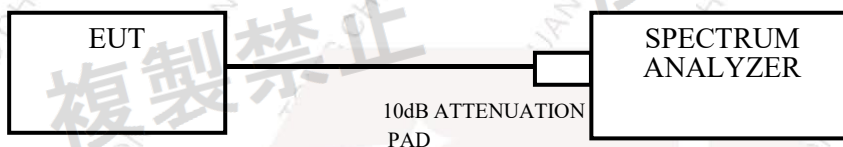


3.4 SPREADING BANDWIDTH MEASUREMENT (90% POWER BANDWIDTH)

3.4.1 LIMITS OF SPREADING BANDWIDTH AND SPREADING FACTOR

ITEM	LIMIT	REMARK
SPREADING BANDWIDTH	$\geq 500\text{kHz}$	
SPREADING FACTOR	≥ 5	Operating frequency 2400 to 2483MHz
	≥ 10	Operating frequency 2471 to 2497MHz

3.4.2 TEST SETUP



3.4.3 TEST PROCEDURES

- (1) Configure EUT and assistant system according to Clause I (General Common Conditions) of Notification No.88 Table No.43.
- (2) Set EUT work in carrier Tx (continuous un-modulated transmission) mode as described in “Condition of EUT” sub-clause under each respective test item of Table No.43.
- (3) Connected the EUT’s antenna port to the Spectrum Analyzer by suitable attenuator, set the Spectrum Analyzer as below:
 - Centre Frequency: The centre frequency of the channel under test.
 - Resolution BW: 300 KHz
 - Video BW: 300 KHz
 - Span: Wide enough to cover the complete power envelope of the signal of the EUT.
 - Detector: Peak.
 - Trace Mode: Max Hold.
- (4) When the trace is complete, measure the occupied bandwidth (90% bandwidth) with spectrum analyzer’s bandwidth measure function.



3.4.4 TEST RESULTS

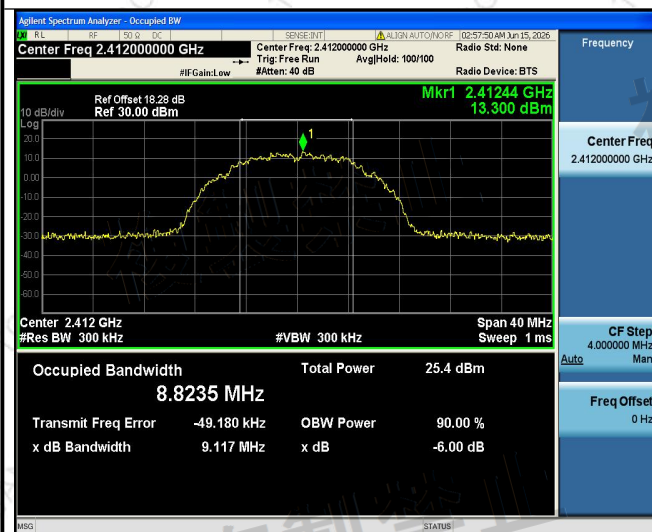
Test plots of normal input voltage mode as below:

Nvironmental Conditions		24.5 deg.C, 49 % RH		
Mode	Condition	CH	Result (MHZ)	Limit (MHZ)
IEEE802.11b	Normal	CH1	8.824	≧0.5
		CH7	9.070	≧0.5
		CH13	9.032	≧0.5
IEEE802.11g	Normal	CH1	14.534	≧0.5
		CH7	14.564	≧0.5
		CH13	14.541	≧0.5
IEEE802.11n HT20	Normal	CH1	14.995	≧0.5
		CH7	15.046	≧0.5
		CH13	14.995	≧0.5
IEEE802.11n HT40	Normal	CH3	30.164	≧0.5
		CH7	30.602	≧0.5
		CH11	30.147	≧0.5
Conclusion: PASS				

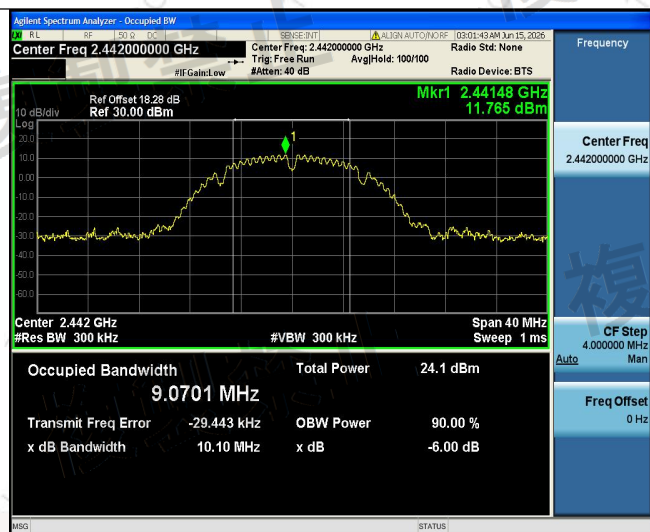


IEEE802.11b

CH1-2412(MHz)



CH7-2442(MHz)



CH13-2472(MHz)





IEEE802.11g

CH1-2412(MHz)



CH7-2442(MHz)



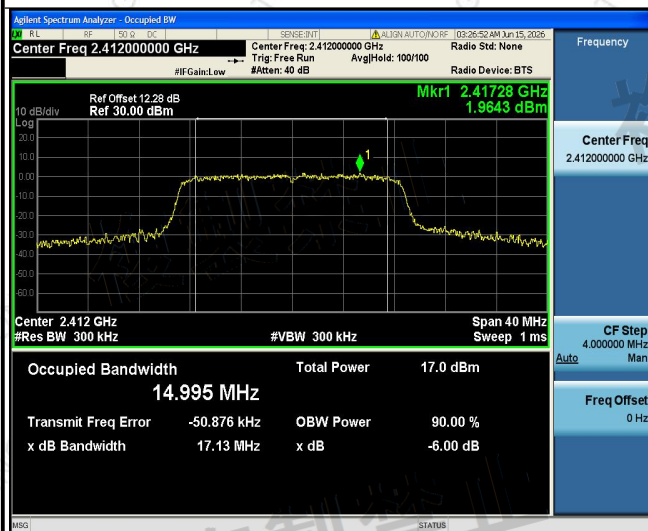
CH13-2472(MHz)



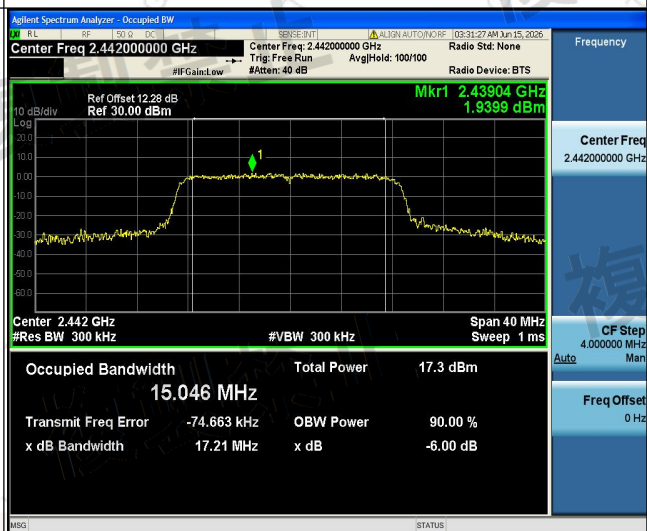


IEEE802.11n20

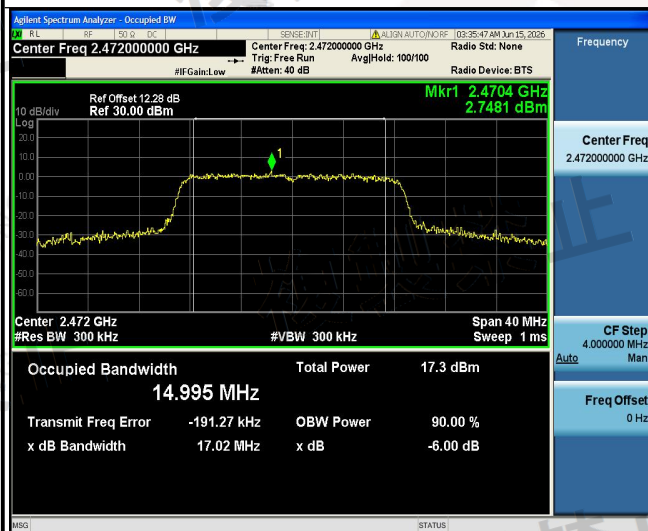
CH1-2412(MHz)



CH7-2442(MHz)



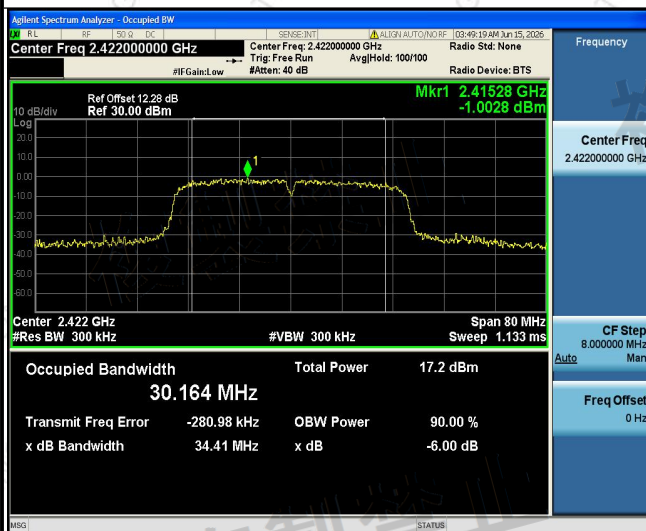
CH13-2472(MHz)





IEEE802.11n40

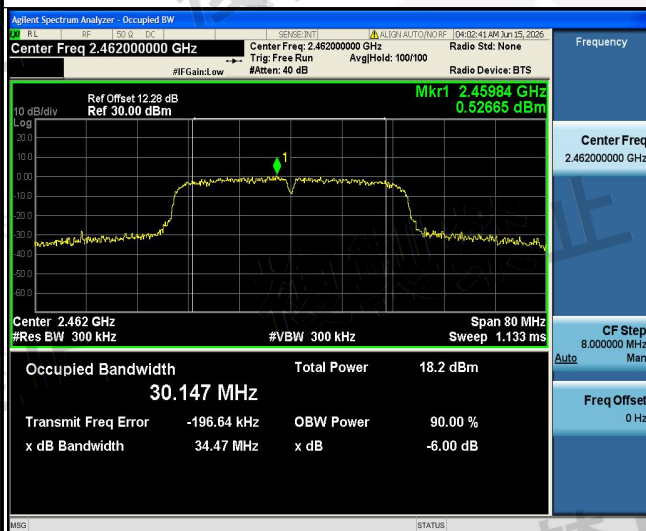
CH3-2422(MHz)



CH7-2442(MHz)



CH11-2462(MHz)



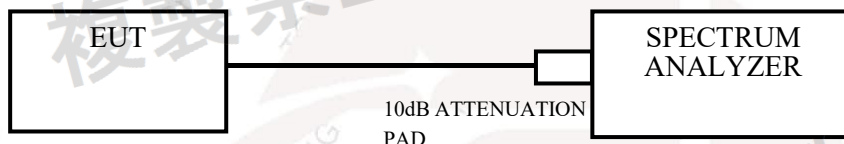


3.5 SPURIOUS EMISSIONS FOR TRANSMITTER MEASUREMENT

3.5.1 LIMITS OF SPURIOUS EMISSIONS

FREQUENCIES (MHz)	LIMIT
Operating frequency 2400 to 2483.5MHz	
30.0MHz to 1000.0MHz	$\leq 0.25 \mu\text{W}/100\text{kHz}$
1000.0MHz to 2387MHz	$\leq 2.5\mu\text{W}/\text{MHz}$
2387.0MHz to 2400.0MHz	$\leq 25\mu\text{W}/\text{MHz}$
2483.5MHz to 2496.5MHz	$\leq 25\mu\text{W}/\text{MHz}$
2496.5MHz to 12500.0MHz	$\leq 2.5\mu\text{W}/\text{MHz}$

3.5.2 TEST SETUP



3.5.3 TEST PROCEDURES

Spectrum Analyzer	Setting
Attenuation	Auto
RBW	100 KHz: $30 \text{ MHz} \leq f < 1000 \text{ MHz}$ 1 MHz: $1000 \text{ MHz} \leq f < 5\text{th Harmonics}$
VBW	100 KHz: $30 \text{ MHz} \leq f < 1000 \text{ MHz}$ 1 MHz: $1000 \text{ MHz} \leq f < 5\text{th Harmonics}$
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

- 1.EUT have the continuous reception mode and fixed only one channelize.
- 2.Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than $0.25\mu\text{W}$.
- 3.Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.
- 4.SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}$.
- 5.SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than $25\mu\text{W}$.
- 6.SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than $2.5\mu\text{W}$.



3.5.4 TEST RESULTS

Test plots of normal input voltage mode as below:

802.11b

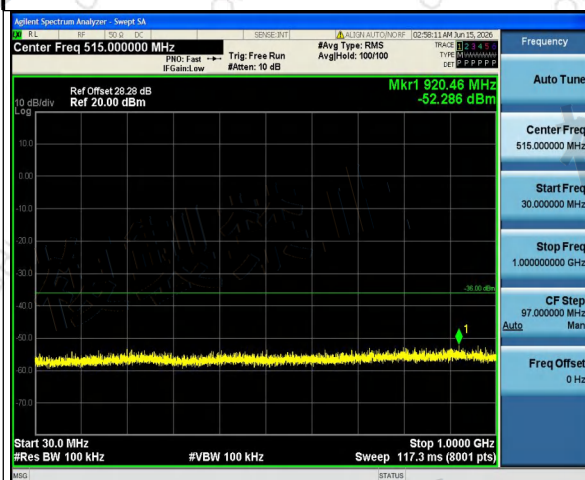
ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH							
TEST CHANNEL		CH1 (2412MHz)			CH7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
V _{normal}	30.0MHz to 1000.0MHz	920.46	-52.29	0.00590	925.19	-52.24	0.00597	0.25uW	PASS
	1000.0MHz to 2387MHz	2385.61	-35.42	0.28708	2380.93	-40.51	0.08892	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.3858	-29.12	1.22462	2398.5343	-37.53	0.17660	25uW	PASS
	2483.5MHz to 2496.5MHz	2495.9605	-41.06	0.07834	2489.7335	-39.58	0.11015	25uW	PASS
	2496.5MHz to 12500.0MHz	5748.5000	-41.93	0.06412	2509.6000	-41.52	0.07047	2.5uW	PASS

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH					
TEST CHANNEL		CH13 (2472MHz)				LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)			
V _{normal}	30.0MHz to 1000.0MHz	819.94	-52.61	0.00548		0.25uW	PASS
	1000.0MHz to 2387MHz	2381.4500	-42.67	0.05408		2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.9220	-40.75	0.08414		25uW	PASS
	2483.5MHz to 2496.5MHz	2484.0850	-27.34	1.84502		25uW	PASS
	2496.5MHz to 12500.0MHz	2499.1000	-36.60	0.21878		2.5uW	PASS

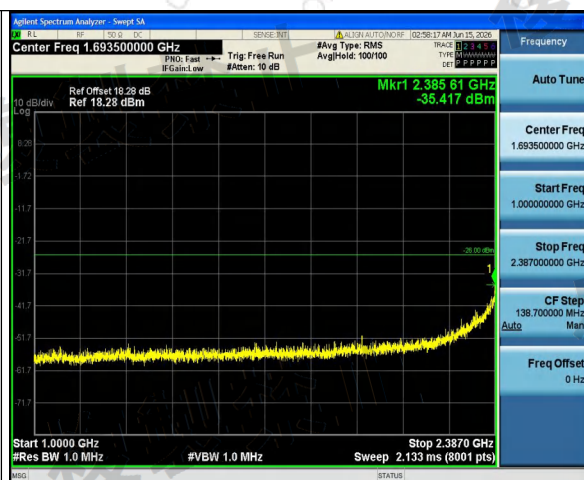


802.11b

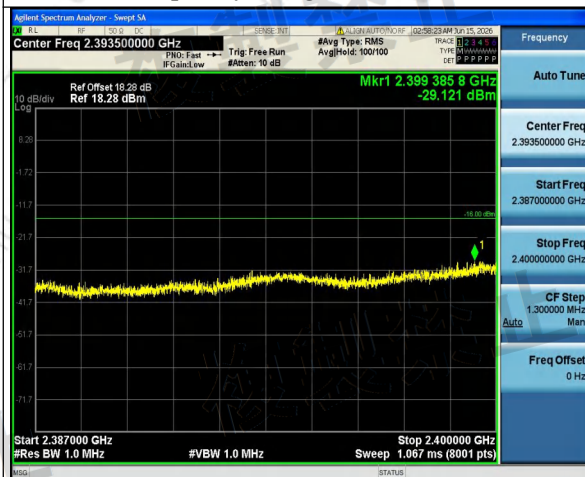
Channel 1



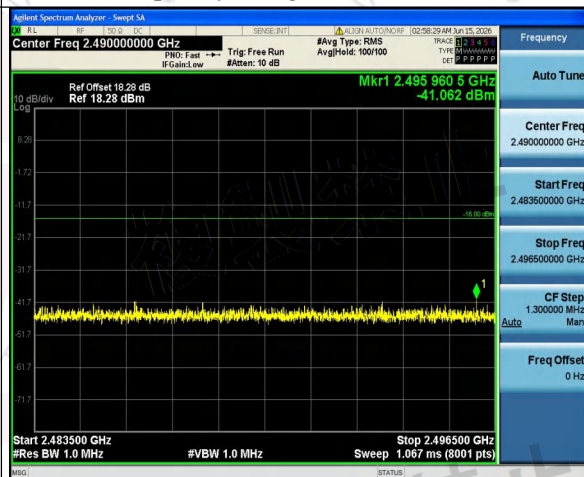
Test Frequency Range: 30MHz – 1GHz



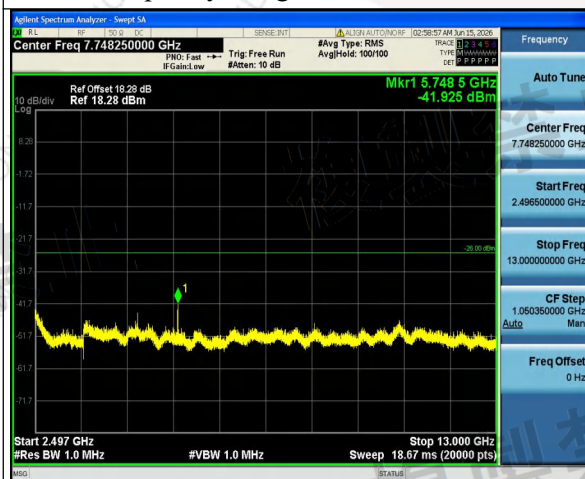
Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz



Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

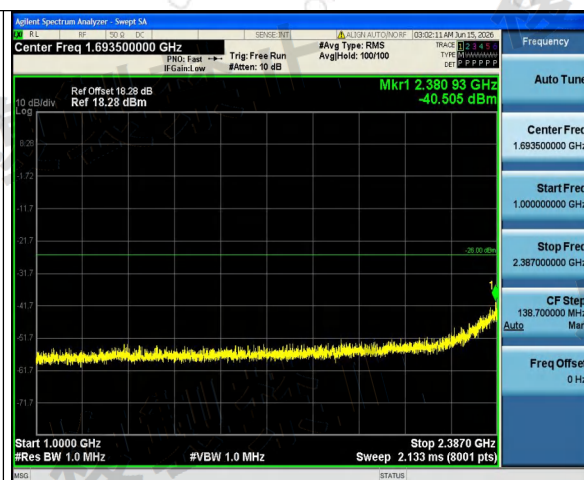


802.11b

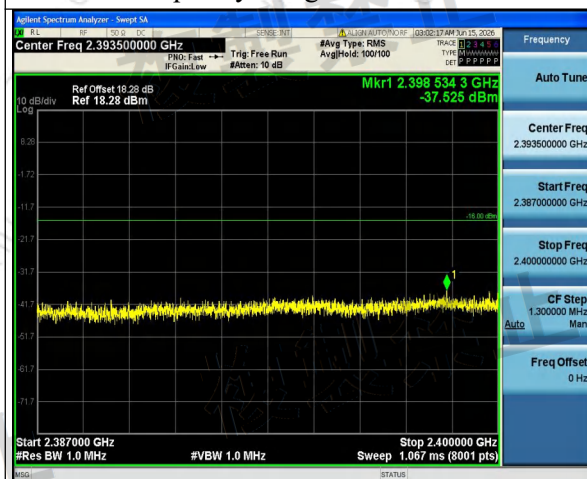
Channel 7



Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz



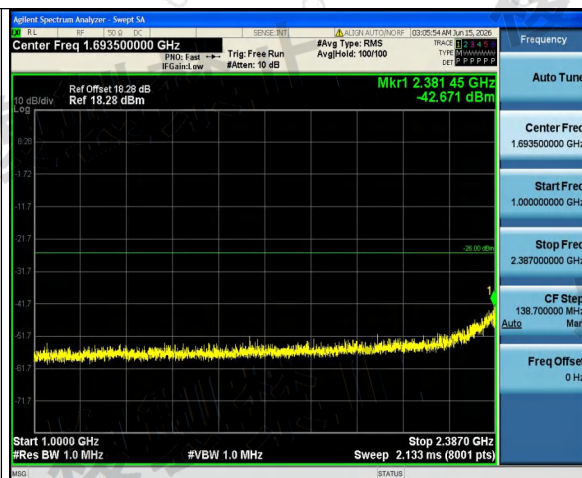
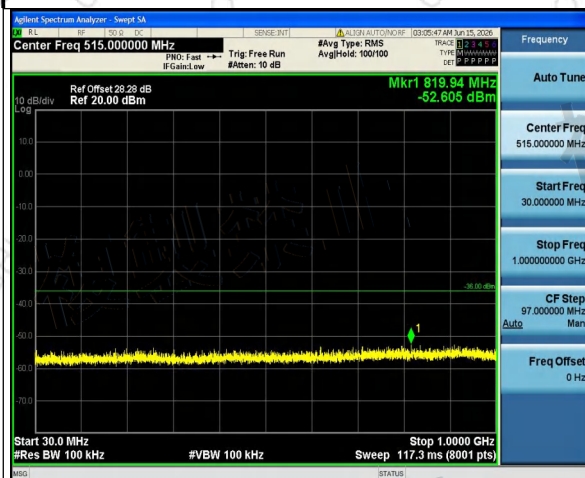
Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

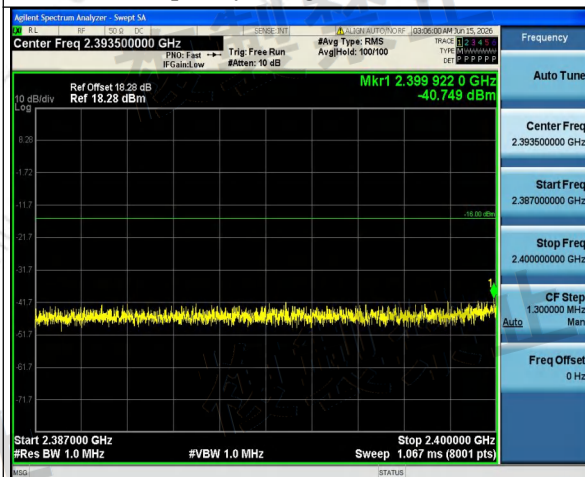


802.11b
Channel 13



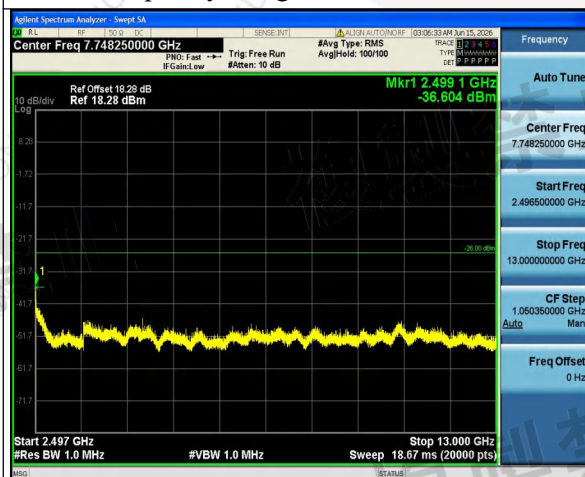
Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

Note: SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.



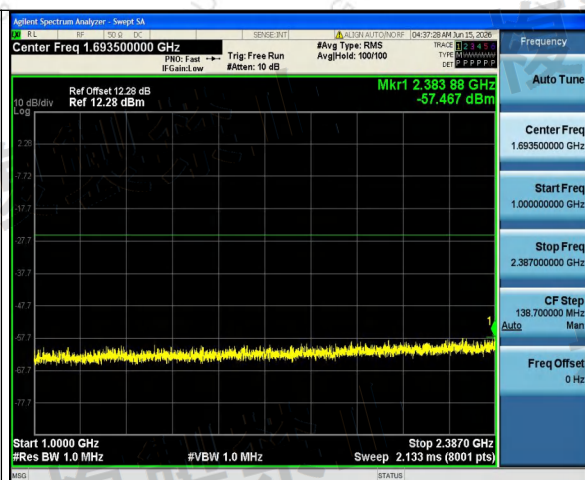
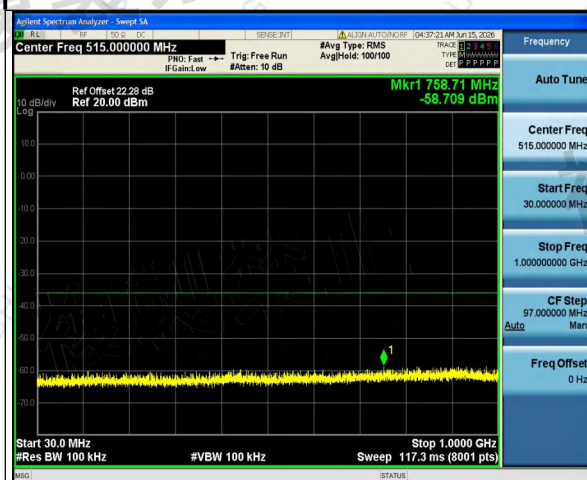
802.11g

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH							
TEST CHANNEL		CH1 (2412MHz)			CH7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
Vnormal	30.0MHz to 1000.0MHz	758.71	-58.71	0.00135	823.58	-58.43	0.00144	0.25uW	PASS
	1000.0MHz to 2387MHz	2383.88	-57.47	0.00179	2387.00	-47.26	0.01879	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2393.9583	-58.25	0.00150	2399.2606	-40.59	0.08730	25uW	PASS
	2483.5MHz to 2496.5MHz	2489.3728	-57.93	0.00161	2486.5859	-42.49	0.05636	25uW	PASS
	2496.5MHz to 12500.0MHz	5751.2000	-49.14	0.01219	2496.5000	-45.89	0.02576	2.5uW	PASS

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH				
TEST CHANNEL		CH13 (2472MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
Vnormal	30.0MHz to 1000.0MHz	892.21	-58.60	0.00138	0.25uW	PASS
	1000.0MHz to 2387MHz	2198.19	-56.48	0.00225	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2395.9213	-57.64	0.00172	25uW	PASS
	2483.5MHz to 2496.5MHz	2486.5989	-58.06	0.00156	25uW	PASS
	2496.5MHz to 12500.0MHz	5751.7000	-50.21	0.00953	2.5uW	PASS

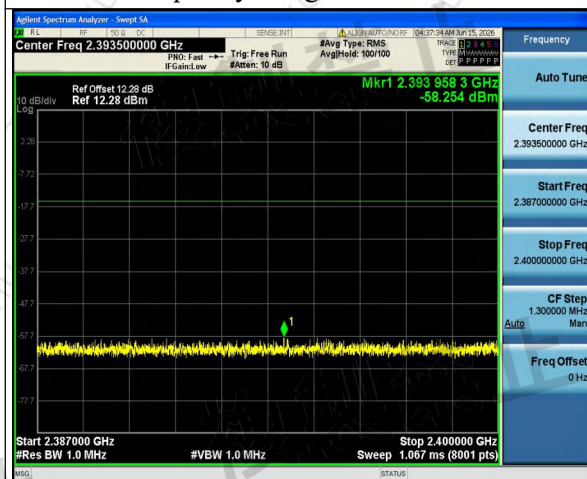


802.11g
Channel 1



Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

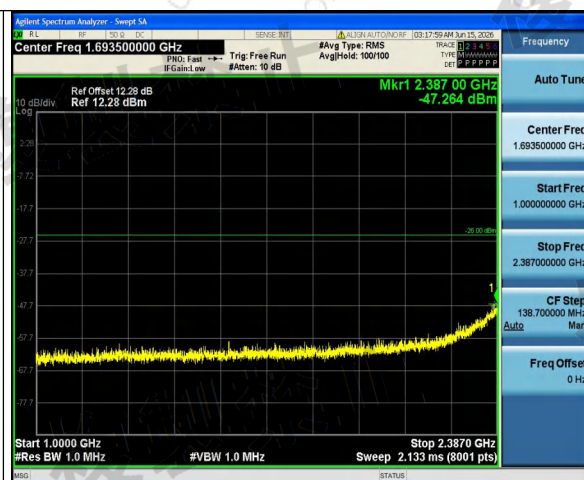
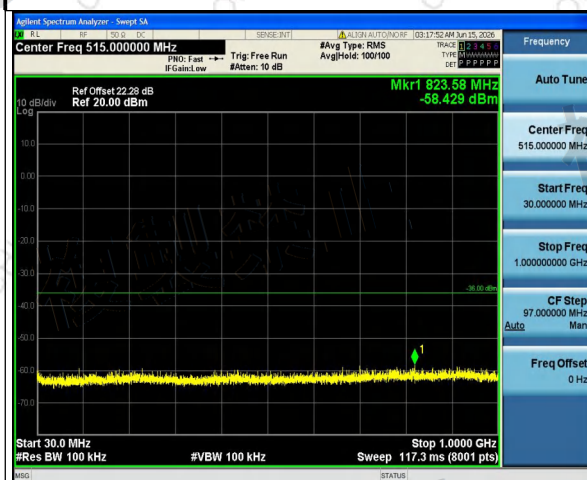
Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

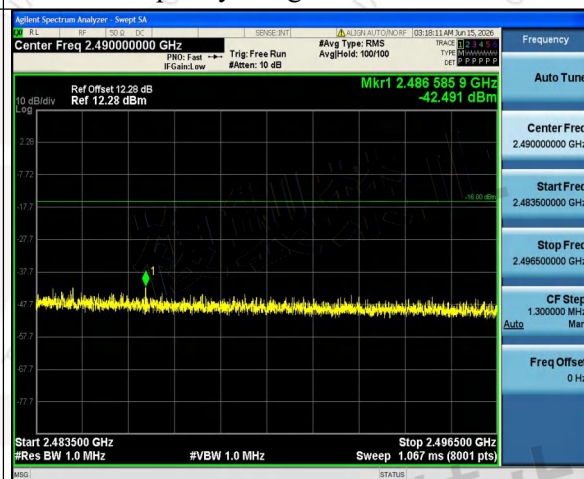
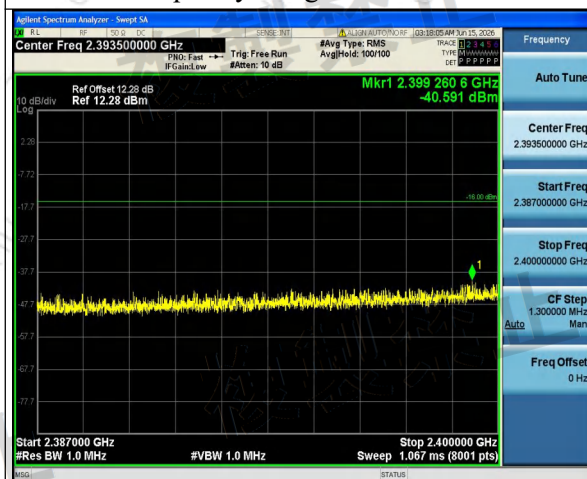


802.11g
Channel 7



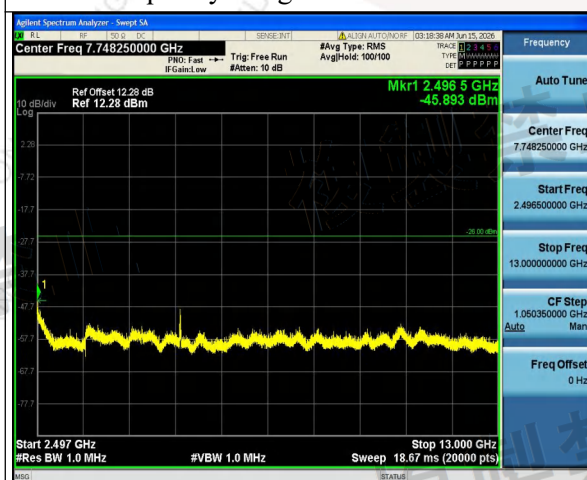
Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

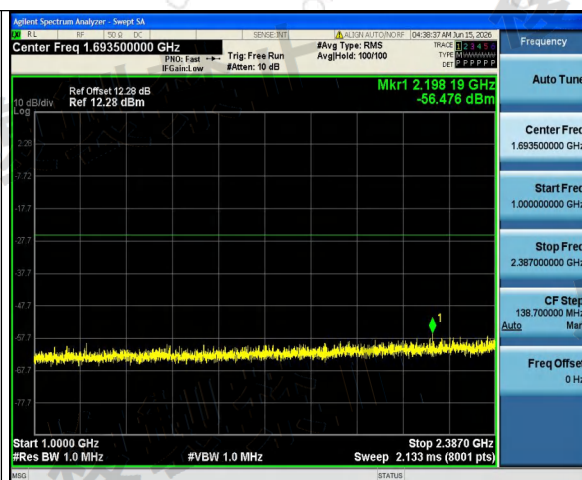
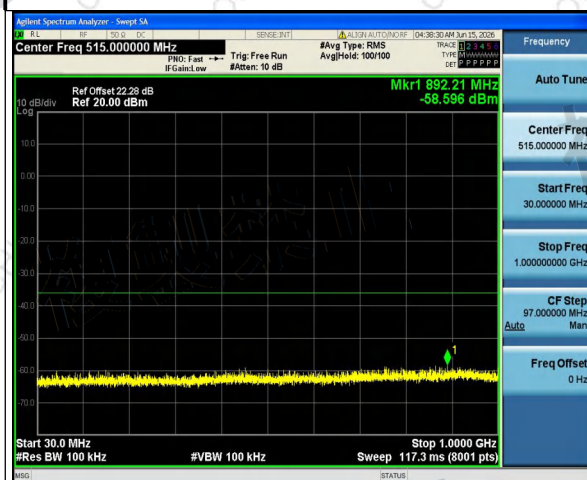
Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

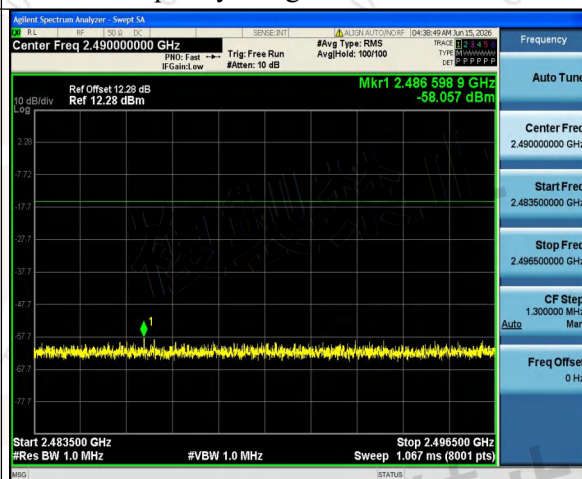
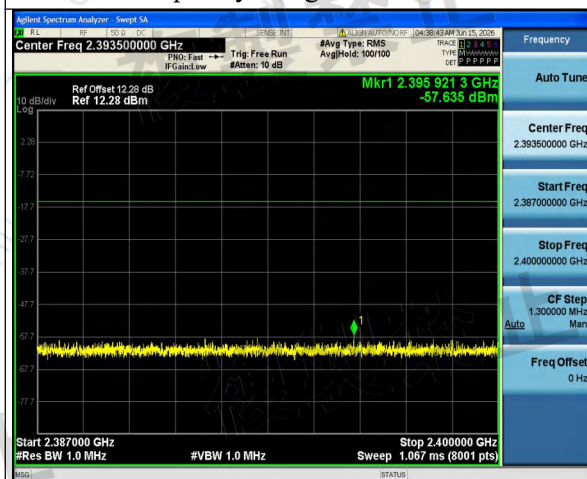


802.11g
Channel 13



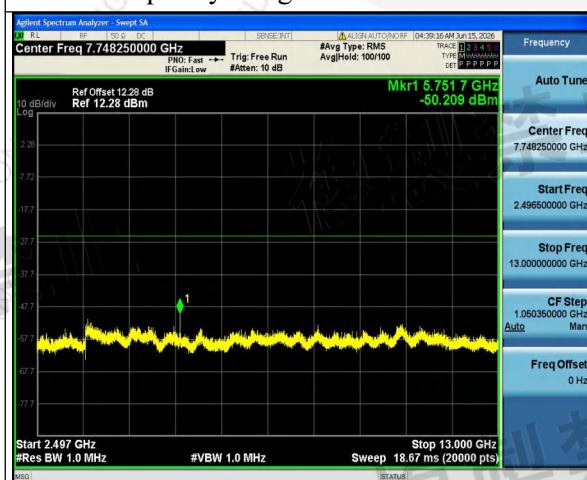
Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

Note: SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.



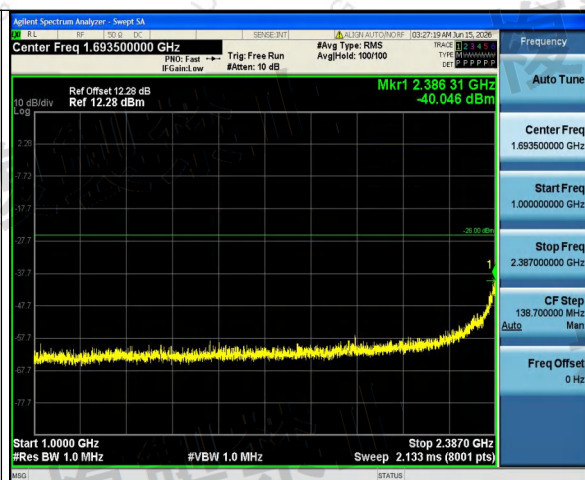
802.11n (HT20)

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH							
TEST CHANNEL		CH1 (2412MHz)			CH7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
Vnormal	30.0MHz to 1000.0MHz	870.99	-58.10	0.00155	755.56	-58.62	0.00137	0.25uW	PASS
	1000.0MHz to 2387MHz	2386.31	-40.05	0.09886	2383.01	-47.47	0.01791	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.6360	-20.52	8.87156	2397.3870	-41.65	0.06839	25uW	PASS
	2483.5MHz to 2496.5MHz	2487.9866	-48.43	0.01435	2484.5595	-44.29	0.03724	25uW	PASS
	2496.5MHz to 12500.0MHz	2519.6000	-48.90	0.01288	2497.6000	-48.35	0.01462	2.5uW	PASS

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH				
TEST CHANNEL		CH13 (2472MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
Vnormal	30.0MHz to 1000.0MHz	954.77	-58.27	0.00149	0.25uW	PASS
	1000.0MHz to 2387MHz	2380.07	-49.17	0.01211	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2399.8960	-47.62	0.01730	25uW	PASS
	2483.5MHz to 2496.5MHz	2487.9866	-48.42	0.01439	25uW	PASS
	2496.5MHz to 12500.0MHz	2496.5000	-37.54	0.17620	2.5uW	PASS

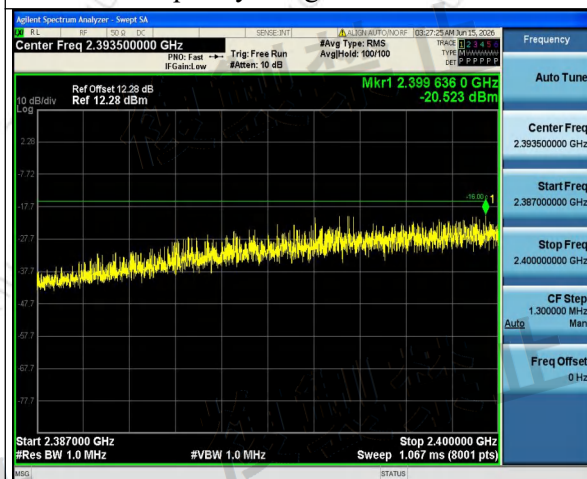


802.11n HT20
Channel 1



Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

Test Frequency Range: 2.4835GHz – 2.4965GHz

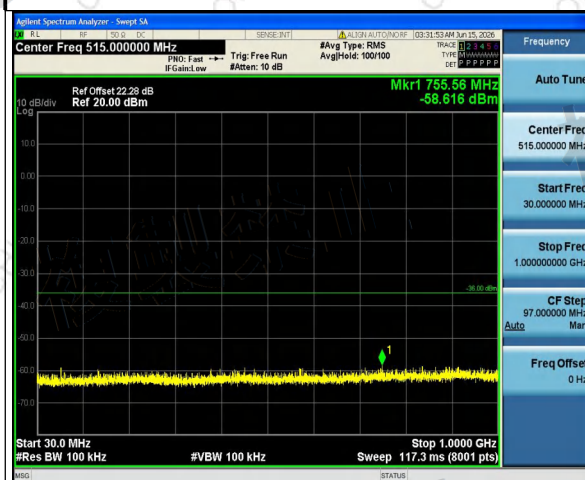


Test Frequency Range: 2.4965GHz – 13GHz

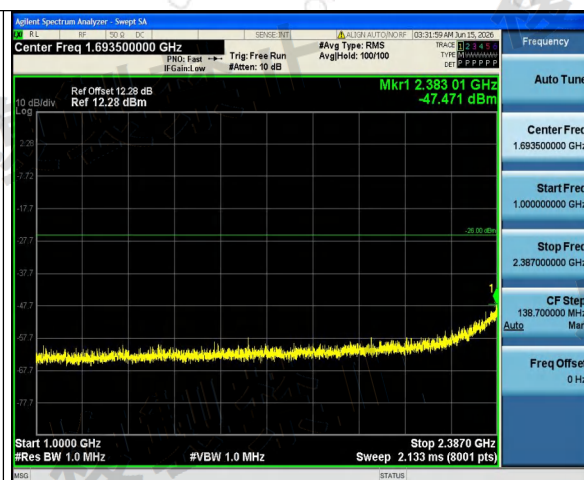


802.11n HT20

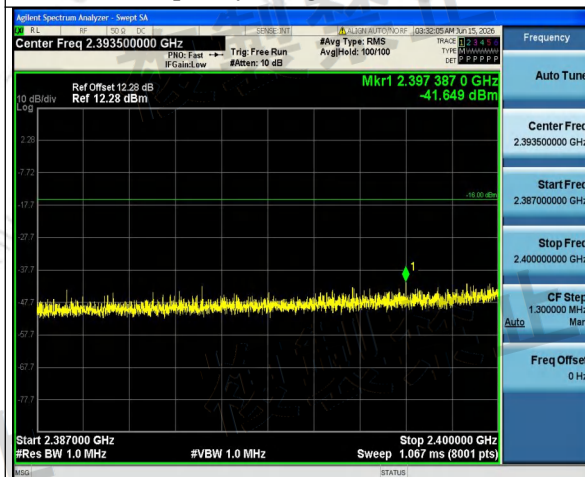
Channel 7



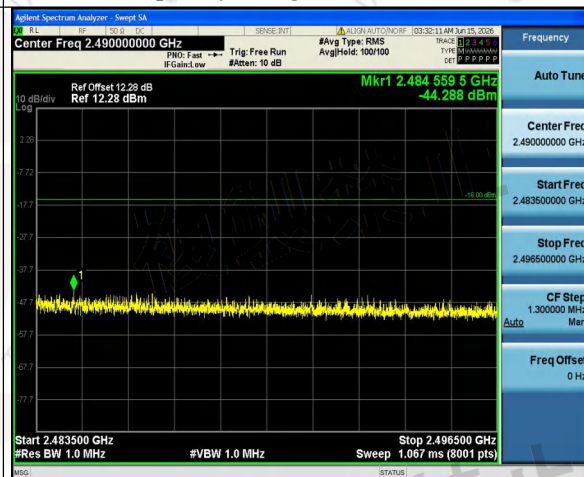
Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz



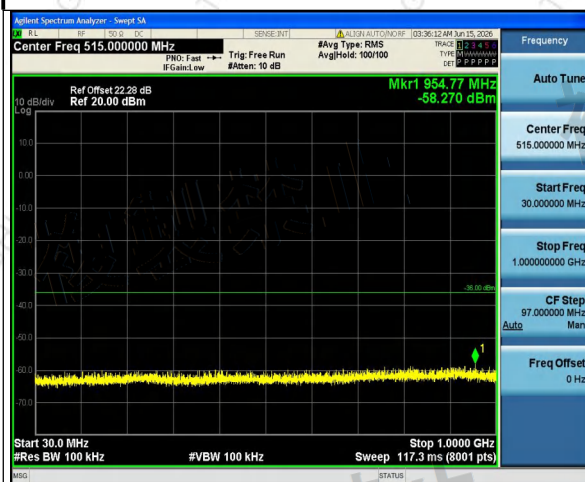
Test Frequency Range: 2.4835GHz – 2.4965GHz



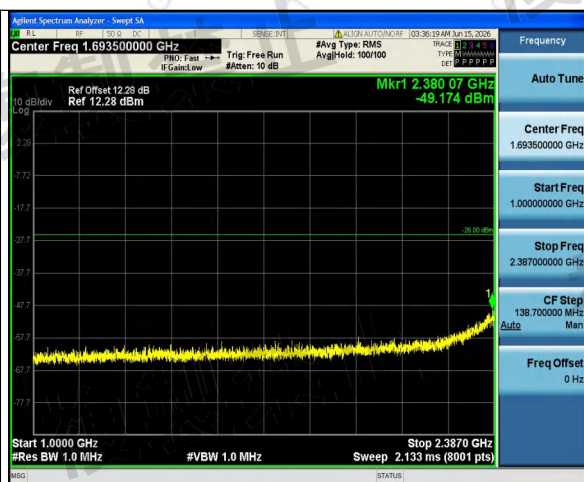
Test Frequency Range: 2.4965GHz – 13GHz



802.11n HT20
Channel 13



Test Frequency Range: 30MHz – 1GHz



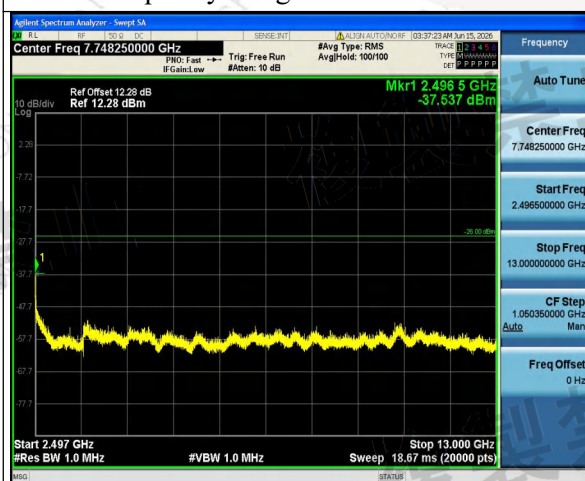
Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz



Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

Note: SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.



802.11n (HT40)

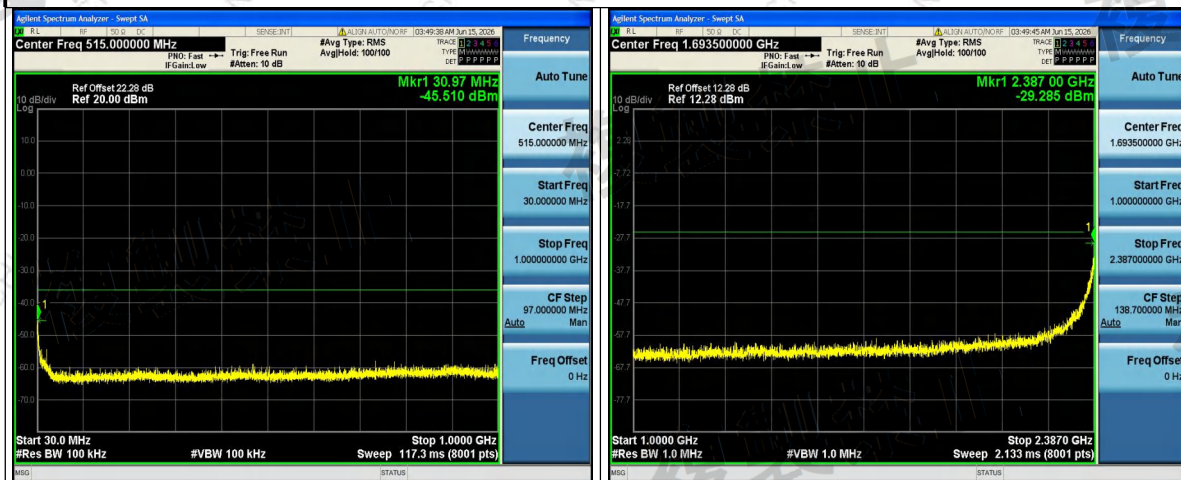
ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH							
TEST CHANNEL		CH3 (2422MHz)			CH7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)		
V _{normal}	30.0MHz to 1000.0MHz	30.97	-45.51	0.02812	30.00	-43.94	0.04036	0.25uW	PASS
	1000.0MHz to 2387MHz	2387.00	-29.29	1.17761	2377.64	-42.97	0.05047	2.5uW	PASS
	2387.0MHz to 2400.0MHz	2395.0860	-23.94	4.03645	2399.8363	-31.69	0.67764	25uW	PASS
	2483.5MHz to 2496.5MHz	2484.6993	-46.14	0.02432	2483.5081	-30.15	0.96605	25uW	PASS
	2496.5MHz to 12500.0MHz	2497.6000	-47.28	0.01871	2499.1000	-43.79	0.04178	2.5uW	PASS

ENVIRONMENTAL CONDITIONS		24.2 deg.C, 58% RH					
TEST CHANNEL		CH11 (2462MHz)				LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (μW)			
V _{normal}	30.0MHz to 1000.0MHz	844.68	-58.79	0.00132		0.25uW	PASS
	1000.0MHz to 2387MHz	2364.63	-56.93	0.00203		2.5uW	PASS
	2387.0MHz to 2400.0MHz	2395.2956	-57.48	0.00179		25uW	PASS
	2483.5MHz to 2496.5MHz	2493.8366	-58.69	0.00135		25uW	PASS
	2496.5MHz to 12500.0MHz	5750.1000	-48.94	0.01276		2.5uW	PASS



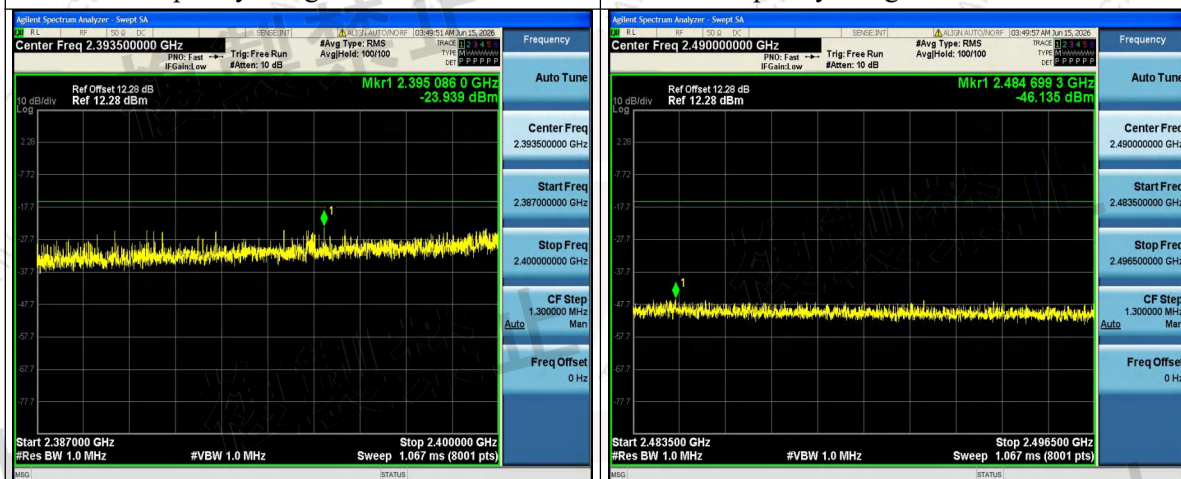
802.11n HT40

Channel 3



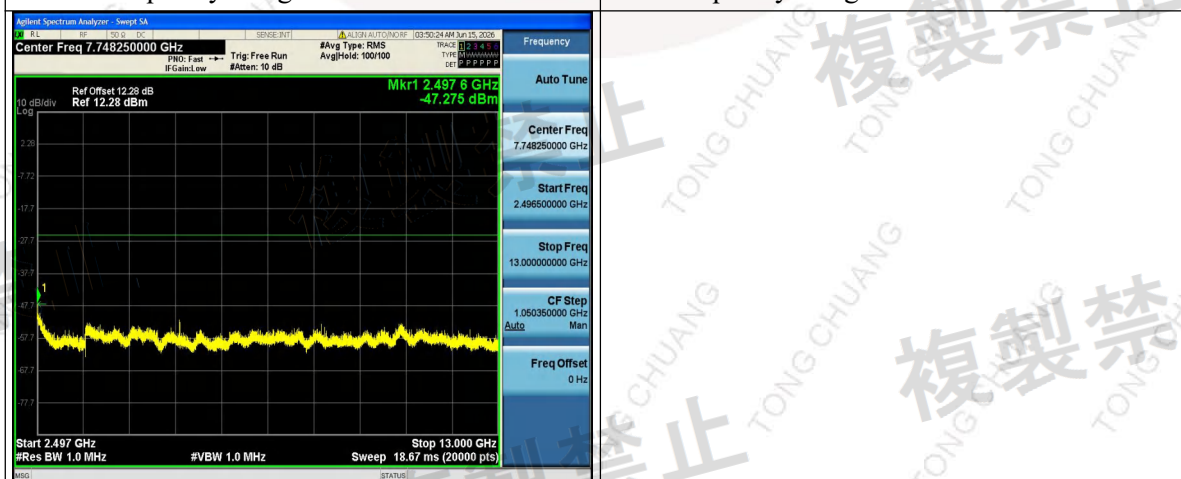
Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

Test Frequency Range: 2.4835GHz – 2.4965GHz

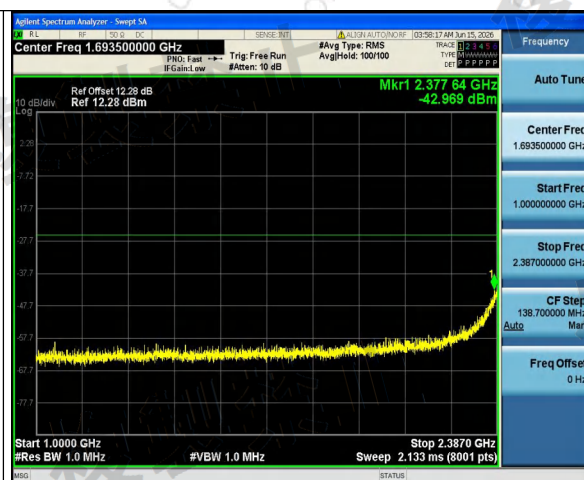
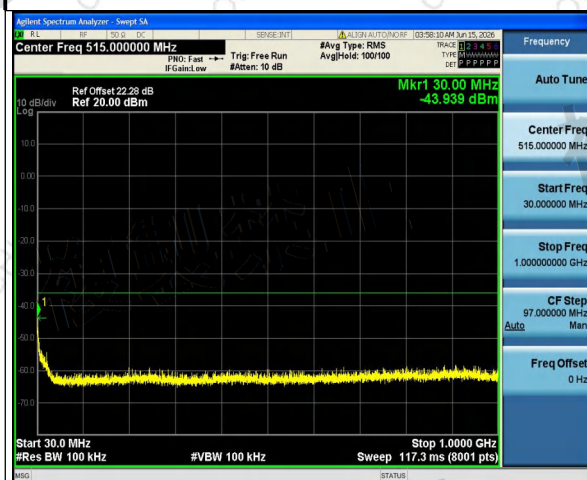


Test Frequency Range: 2.4965GHz – 13GHz



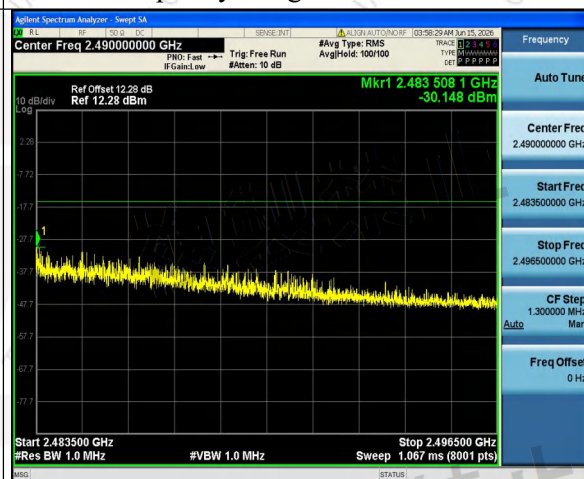
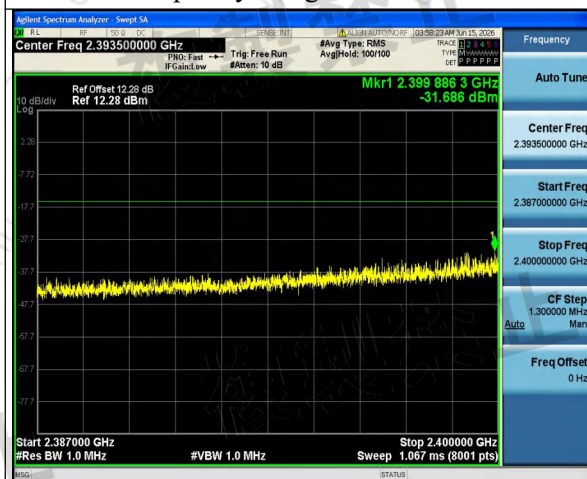
802.11n HT40

Channel 7



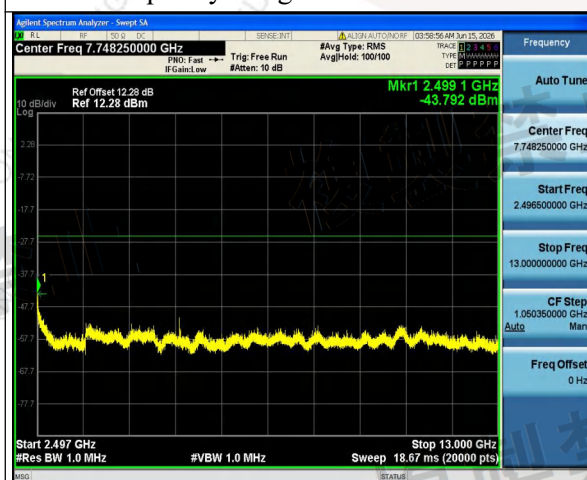
Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz

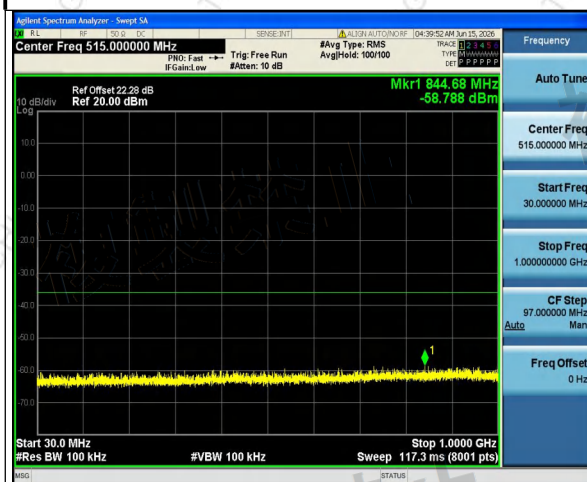
Test Frequency Range: 2.4835GHz – 2.4965GHz



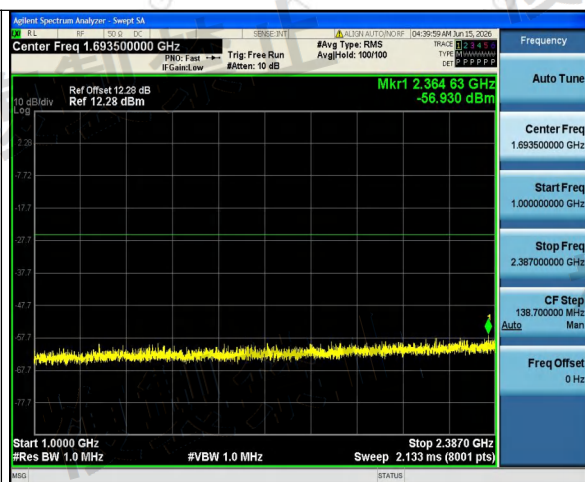
Test Frequency Range: 2.4965GHz – 13GHz



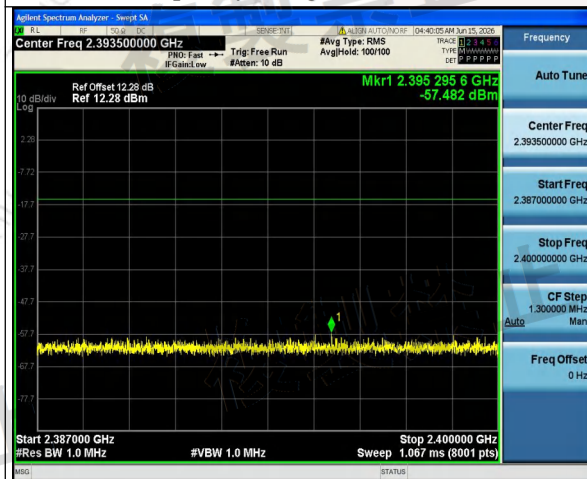
802.11n HT40
Channel 11



Test Frequency Range: 30MHz – 1GHz



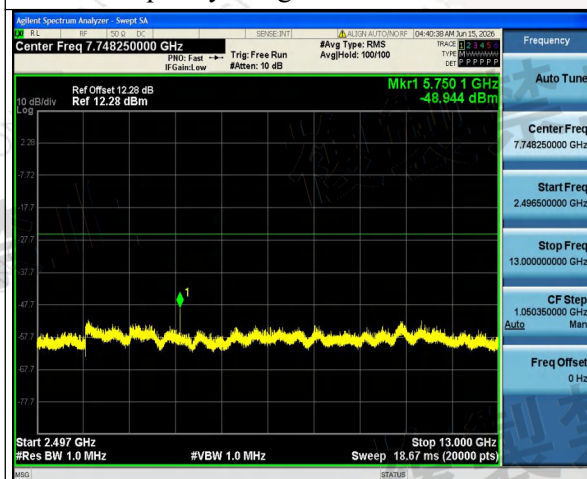
Test Frequency Range: 1GHz – 2.387GHz



Test Frequency Range: 2.387GHz – 2.4GHz



Test Frequency Range: 2.4835GHz – 2.4965GHz



Test Frequency Range: 2.4965GHz – 13GHz

Note: SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.

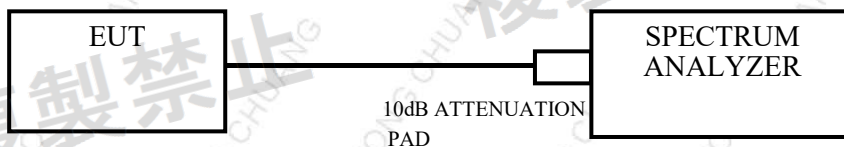


3.6 SPREADING FACTOR

3.6.1 LIMIT

Spreading factor (value obtained by dividing the spread bandwidth by a frequency equal to the transmission rate of the modulation signal; this also applies hereafter) in the spread spectrum system shall be 5 or more.

3.6.2 TEST SETUP



3.6.3 TEST PROCEDURES

- (1) Configure EUT and assistant system according clause 2.3 and 8.3
- (2) Set EUT work in test mode as described in clause 2.4

3.6.4 TEST RESULTS

Test plots of normal input voltage mode as below:

Mode	Frequency (MHz)	90% bandwidth	Rate	Spreading Factor	Limits	Result
IEEE802.11b	2412	8.824	1.375	6.417	≥ 5	PASS
	2442	9.070	1.375	6.596	≥ 5	PASS
	2472	9.032	1.375	6.569	≥ 5	PASS

Note: 802.11b: Frequency corresponding to transmission rate=1.375



IEEE802.11b

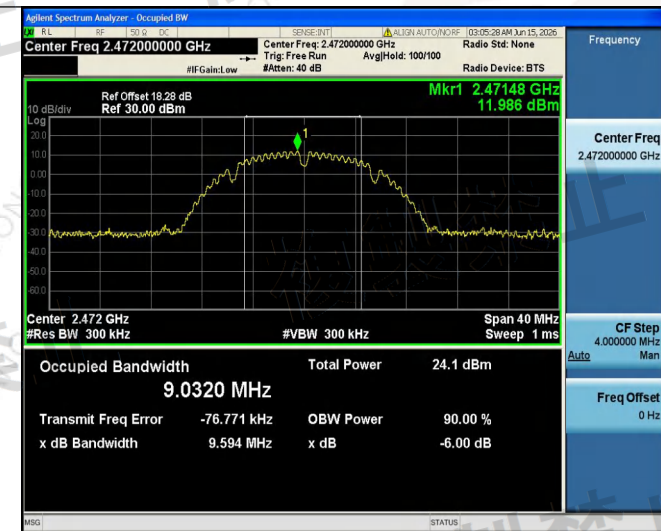
CH1-2412(MHz)



CH7-2442(MHz)



CH13-2472(MHz)



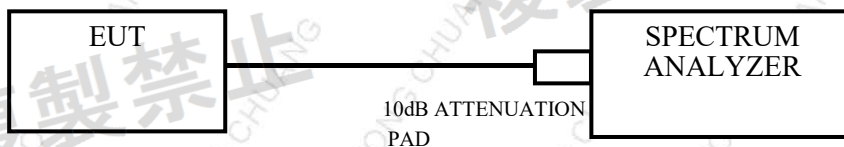


3.7 NUMBER OF CARRIERS

3.7.1 LIMIT

The OFDM system shall have one or more carriers per 1 MHz bandwidth.

3.7.2 TEST SETUP



3.7.3 TEST PROCEDURES

- (1) Configure EUT and assistant system according clause 2.3 and 8.3
- (2) Set EUT work in test mode as described in clause 2.4

3.7.4 TEST RESULTS

Test plots of normal input voltage mode as below:

Nvironmental Conditions		24.5 deg.C, 49 % RH	
EUT:	Makera Z1 Desktop CNC Machine	Pressure:	1011 hPa
Test result:	CONFORM		

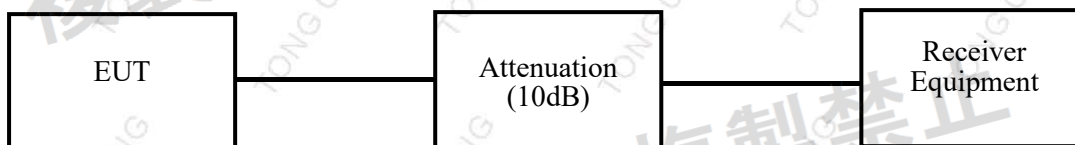


3.8 INTERFERENCE PREVENTION FUNCTION

3.8.1 LIMITS OF INTERFERENCE PREVENTION FUNCTION

ITEM	LIMITS
Identification	≥48 bits

3.8.2 TEST SETUP



3.8.3 TEST PROCEDURES

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

3.8.4 TEST RESULTS

Test plots of normal input voltage mode as below:

Nvironmental Conditions		24.2 deg.C, 46 % RH
Link Mode	Test Result	Identification Code
IEEE802.11b	PASS	7A:E8:3C:21:4C:EE
IEEE802.11g	PASS	7A:E8:3C:21:4C:EE
IEEE802.11n HT20	PASS	7A:E8:3C:21:4C:EE
IEEE802.11n HT40	PASS	7A:E8:3C:21:4C:EE

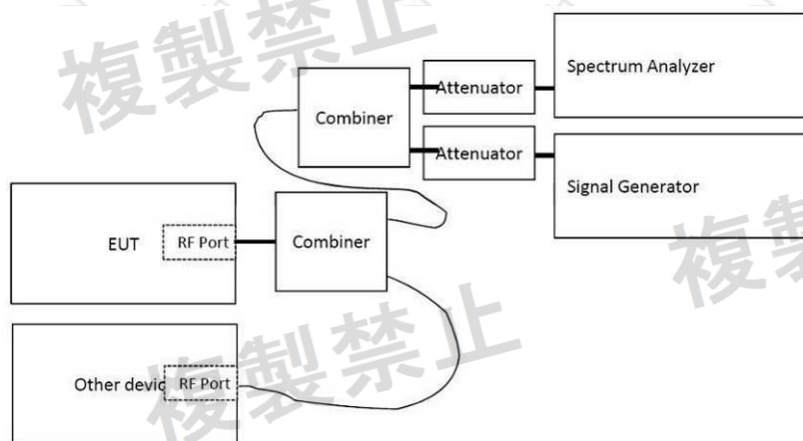


3.9 CARRIER SENSING FUNCTION

3.9.1 LIMITS

The device shall not transmit radio wave when receiving 100Mw/m

3.9.2 TEST SETUP



3.9.3 TEST PROCEDURES

The device is configured to communicate with another device as shown below. Once the communications link is established the signal generator is configured to produce a CW signal at the center frequency of the operating channel. The level of the signal generator is increased from a level approximately 30dB lower then the required carrier sense detection threshold (calculated based on the **lowest** antenna gain to be used with the device) until the device stops transmitting. This level is recorded as the carrier sense detection threshold.

3.9.4 TEST RESULTS

Test Voltage	Channel	Results
LV	Low	GOOD
	Middle	GOOD
	High	GOOD
NV	Low	GOOD
	Middle	GOOD
	High	GOOD
HV	Low	GOOD
	Middle	GOOD
	High	GOOD

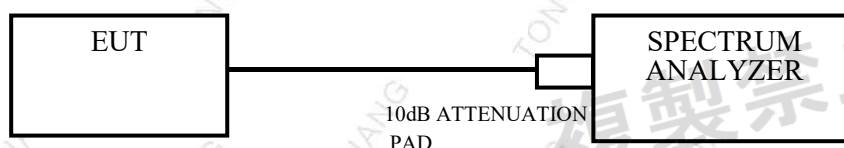


3.10 SPURIOUS EMISSIONS FOR RECEIVER

3.10.1 LIMITS OF SPURIOUS EMISSIONS FOR RECEIVER

Frequencies (MHz)	Limit
Below 1GHz	$\leq 4\text{nW}$ (-54dBm)
Above 1GHz	$\leq 20\text{nW}$ (-47dBm)

3.10.2 TEST SETUP



3.10.3 TEST PROCEDURES

Spectrum Analyzer	Setting
Attenuation	Auto
RBW	100 KHz: 30 MHz $\leq f < 1000$ MHz 1 MHz: 1000 MHz $\leq f < 5\text{th Harmonics}$
VBW	100 KHz: 30 MHz $\leq f < 1000$ MHz 1 MHz: 1000 MHz $\leq f < 5\text{th Harmonics}$
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

- 1.EUT have the continuous reception mode and fixed only one channelize.
- 2.Start frequency 30MHz and Stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
- 3.Start frequency 1000MHz and Stop frequency 5th Harmonics. Search to mark peak reading value + cable loss shall be less than 20nW
- 4.Max. frequency point of power level of lower emissions is to be indicated in each paragraph.

3.10.4 TEST RESULTS



Test plots of normal input voltage mode as below:

802.11b

TEST CHANNEL		CH 1 (2412MHz)			CH 7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)		
Vnormal	below 1GHz	867.84	-79.11	0.01227	685.24	-79.83	0.01040	4nW	PASS
	above 1GHz	5752.60	-53.02	4.98884	5752.00	-57.49	1.78238	20nW	PASS
TEST CHANNEL		CH 13 (2472MHz)						LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)		MEASURE VALUE (dBm)	MEASURE VALUE (nW)				
Vnormal	below 1GHz	914.64		-79.47	0.01130			4nW	PASS
	above 1GHz	2459.40		-61.76	0.66681			20nW	PASS

802.11g

TEST CHANNEL		CH 1 (2412MHz)			CH 7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)		
Vnormal	below 1GHz	899.00	-78.96	0.01271	893.54	-79.07	0.01239	4nW	PASS
	above 1GHz	2461.10	-61.65	0.68391	5741.10	-57.92	1.61436	20nW	PASS
TEST CHANNEL		CH 13 (2472MHz)						LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)		MEASURE VALUE (dBm)	MEASURE VALUE (nW)				
Vnormal	below 1GHz	909.67		-79.46	0.01132			4nW	PASS
	above 1GHz	5752.60		-54.68	3.40408			20nW	PASS



802.11n (HT20)

TEST CHANNEL		CH 1 (2412MHz)			CH 7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASUREVALUE (nW)		
Vnormal	below 1GHz	842.10	-79.90	0.01023	867.35	-79.46	0.01132	4nW	PASS
	above 1GHz	2460.60	-61.66	0.68234	2460.60	-58.18	1.52055	20nW	PASS
TEST CHANNEL		CH 13 (2472MHz)						LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)		MEASURE VALUE (dBm)		MEASURE VALUE (nW)			
Vnormal	below 1GHz	922.52		-79.46		0.01132		4nW	PASS
	above 1GHz	2461.7		-60.61		0.86896		20nW	PASS

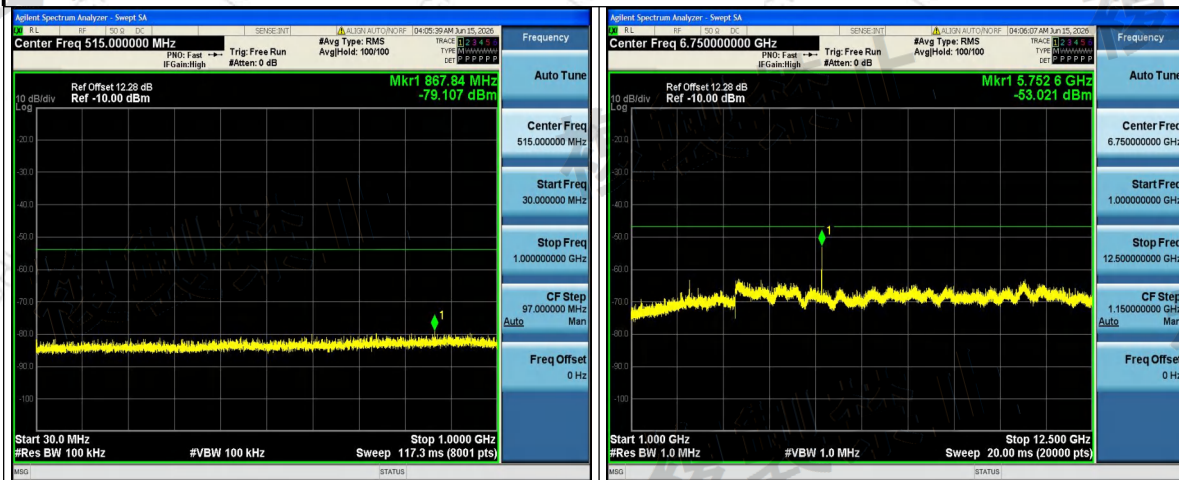
802.11n (HT40)

TEST CHANNEL		CH 3 (2422MHz)			CH 7 (2442MHz)			LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)	FREQUENCY (MHz)	MEASURE VALUE (dBm)	MEASURE VALUE (nW)		
Vnormal	below 1GHz	878.87	-78.90	0.01288	913.06	-79.16	0.01213	4nW	PASS
	above 1GHz	2461.10	-60.44	0.90365	5751.50	-56.32	2.33346	20nW	PASS
TEST CHANNEL		CH 11 (2462MHz)						LIMIT	RESULT
TEST CONDITION	FREQUENCY RANGE	FREQUENCY (MHz)		MEASURE VALUE (dBm)		MEASURE VALUE (nW)			
Vnormal	below 1GHz	795.57		-79.79		0.01050		4nW	PASS
	above 1GHz	5753.20		-58.33		1.46893		20nW	PASS



802.11b

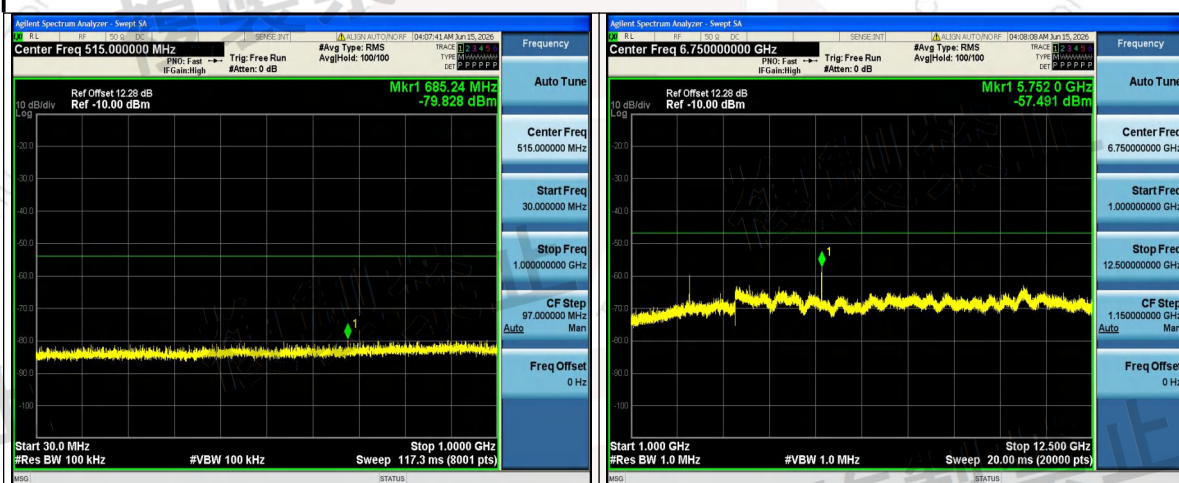
Channel 1



Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz - 12.5GHz

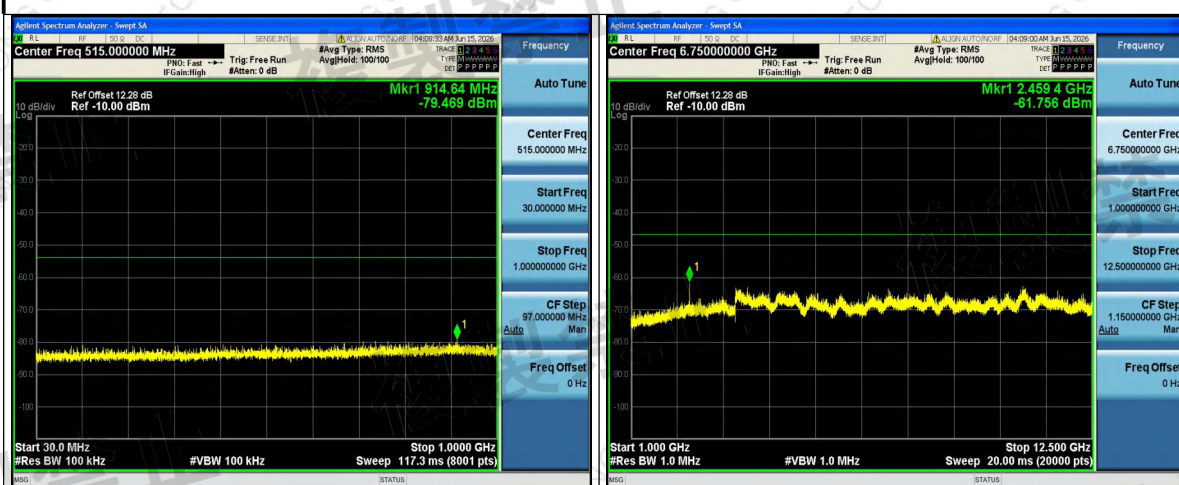
Channel 7



Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz - 12.5GHz

Channel 13



Test Frequency Range: 30MHz – 1GHz

Test Frequency Range: 1GHz - 12.5GHz



802.11g

Channel 1



Test Frequency Range: 30MHz – 1GHz

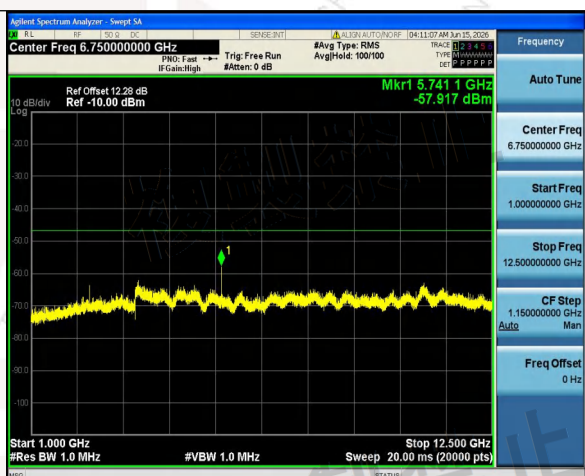


Test Frequency Range: 1GHz - 12.5GHz

Channel 7

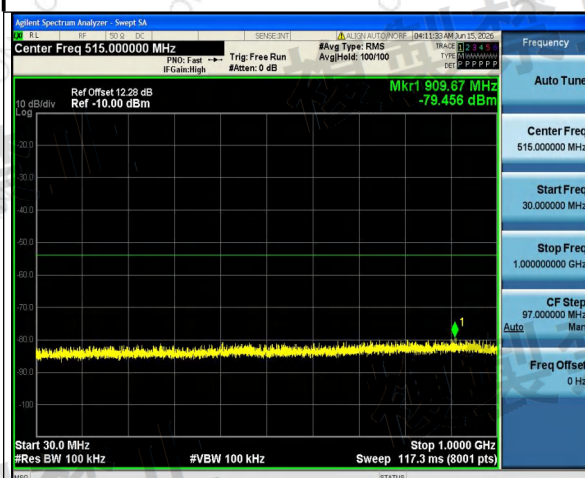


Test Frequency Range: 30MHz – 1GHz

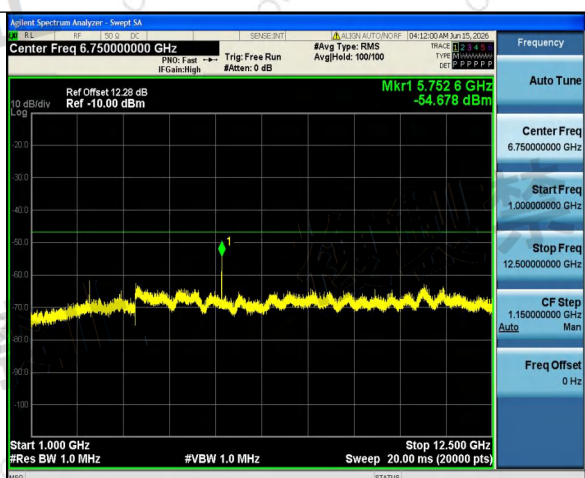


Test Frequency Range: 1GHz - 12.5GHz

Channel 13



Test Frequency Range: 30MHz – 1GHz

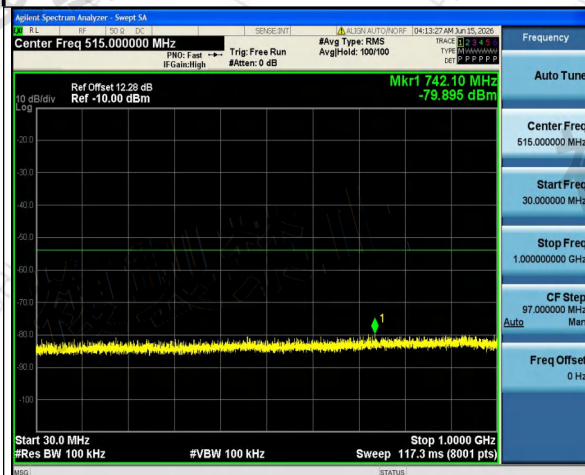


Test Frequency Range: 1GHz - 12.5GHz

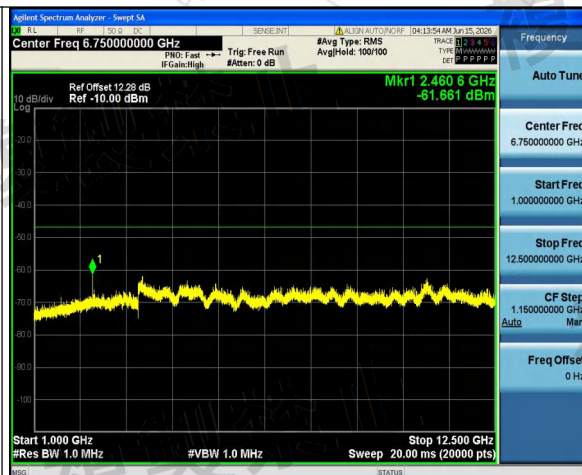


11n HT20

Channel 1

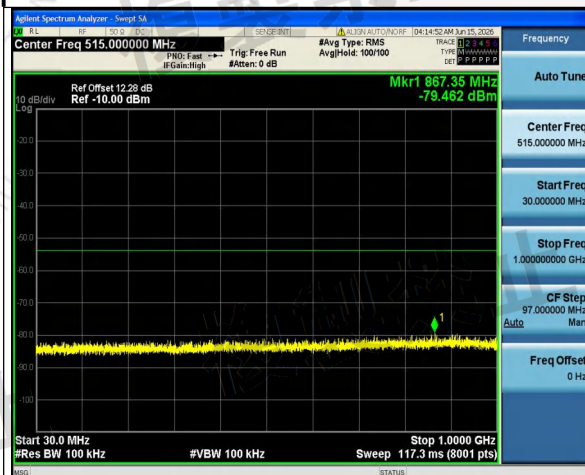


Test Frequency Range: 30MHz – 1GHz

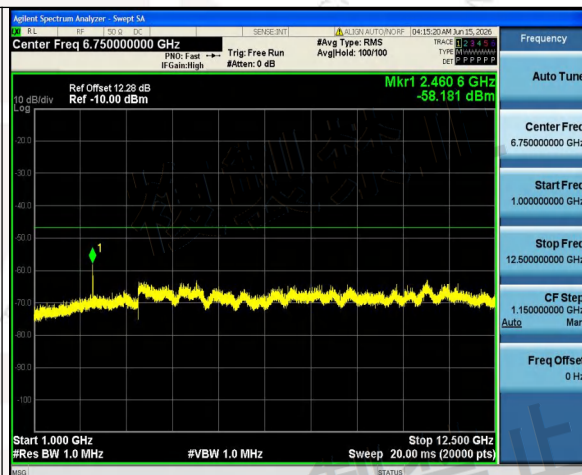


Test Frequency Range: 1GHz - 12.5GHz

Channel 7

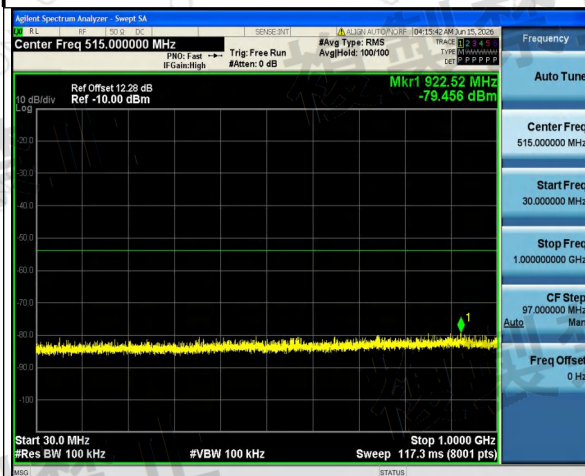


Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz - 12.5GHz

Channel 13



Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz - 12.5GHz

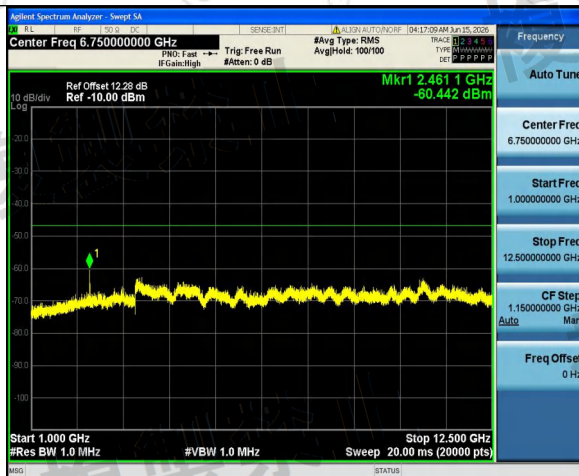


11n HT40

Channel 3



Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz - 12.5GHz

Channel 7



Test Frequency Range: 30MHz – 1GHz

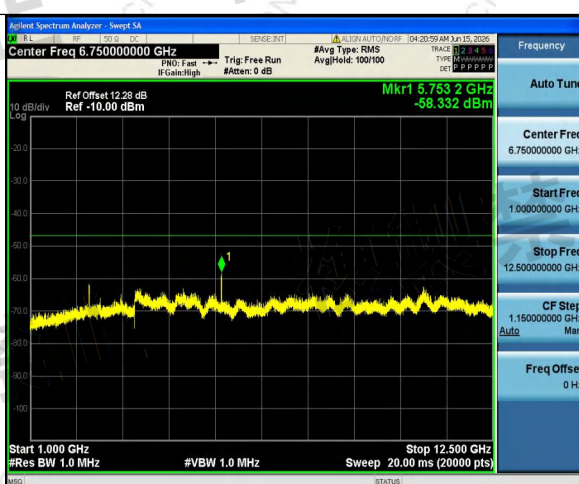


Test Frequency Range: 1GHz - 12.5GHz

Channel 11



Test Frequency Range: 30MHz – 1GHz



Test Frequency Range: 1GHz - 12.5GHz



3.11 TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

3.11.1 LIMITS

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional ^{Note1}
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1 ^{Note2}	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH,FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

Note 1: The half-value angle of the beam directivity must be less than $360 \div A$ degrees. A shall be the rate at which the EIRP exceeds the upper limit of the omnidirectional EIRP.

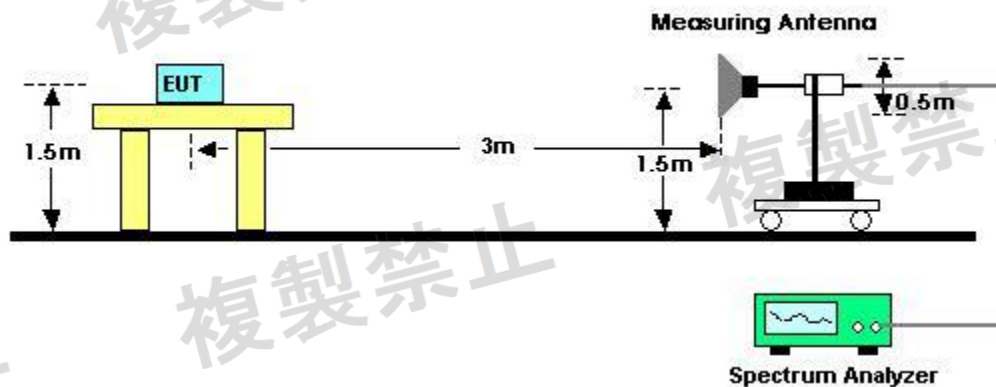
Note 2: OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26 MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

Note 3: This test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

3.11.2 TEST SETUP

See section for test setup description for the antenna port.

For EUT radiation measurement





3.11.3 TEST PROCEDURES

1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with RBW=1MHz, VBW=1MHz, Detector=Peak, Trace mode=Max Hold, and tune reference level to observe receiving signal position.
3. Move the measuring antenna height up and down within $\pm 50\text{cm}$ 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".
4. 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
5. Swing the replacing antenna give a maximum receiving level.
6. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
7. 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 ($\pm 1\text{dB}$). Record the Pt.
8. Calculate EIRP by the formula below $EIRP = G_t - L + P_t$.
Gt: gain of replacing antenna (dBi)
L: feeder loss between SSG and replacing antenna
Pt: Output power of the SSG
9. 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.

3.11.4 TEST DEVIATION

There is no deviation with the original standard.

3.11.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.11.6 TEST RESULTS

Note: Not applicable. The peak antenna gain of the EUT which is less than 2.14dBi.



3.12 TRANSMISSION RADIATION ANGLE WIDTH (3dB Beamwidth)

3.12.1 LIMITS

Item	Limit
3dB antenna beam width	$360/A$ (If $A < 1$; then $A = 1$) $A = \{ \text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM} \}$ or $A = \{ \text{EIRP Power [mW]} / 4.9 \text{ for FH} \}$
Note: This test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

3.12.2 TEST SETUP

See section 4.3.4 for test setup description for the antenna port.

3.12.3 TEST PROCEDURES

- 1 Set EUT and measuring antenna at the same height and roughly facing each other.
- 2 Set spectrum analyzer with RBW=1 MHz, VBW=1 KHz, Y scale=5 dB, Detector=Peak, Trace mode=Max Hold, and tune reference level to observe receiving signal position.
- 3 Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
- 4 Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E"
- 5 Calculate 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 $A = 1$). $A = \{ \text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM} \}$ or $A = \{ \text{EIRP Power [mW]} / 4.9 \text{ for FH} \}$

3.12.4 TEST DEVIATION

There is no deviation with the original standard.

3.12.5 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.12.6 Test Result

Not Applicable.



4. PHOTOGRAPHS OF THE TEST CONFIGURATION



*****END OF THE REPORT*****