



中认信通

CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)



TEST REPORT

Applicant: Winner Wave Limited

Address: Unit 1615 Peninsula Tower, 538 Castle Peak Road Lai Chi Kok Kowloon
Hong Kong

FCC ID: 2ADFSTYSB01WP

Product Name: Wireless Presentation System

Standard(s): 47 CFR Part 15, Subpart E(15.407)
ANSI C63.10-2013
KDB 789033 D02 General U-NII Test Procedures New
Rules v02r01

The above equipment has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: CR230206439-00CA1

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR230206439-00CA1	Original Report	2023/6/5

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

1.1.1 General:

EUT Name:	Wireless Presentation System
EUT Model:	TY-SB01WP
Operation Frequency:	5260-5320 MHz (802.11a/n ht20/ac vht20) 5270-5310 MHz(802.11n ht40/ac vht40) 5290 MHz(802.11ac vht80) 5500-5720 MHz (802.11a/n ht20/ac vht20) 5510-5710 MHz(802.11n ht40/ac vht40) 5530-5690 MHz(802.11ac vht80)
Maximum Average Output Power (Conducted):	14.61 dBm (5250-5350 MHz) 15.12 dBm (5470-5725 MHz)
Modulation Type:	OFDM-BPSK, QPSK, 16QAM, 64QAM,256QAM
Rated Input Voltage:	DC 12V
Serial Number:	21FA-1
EUT Received Date:	2023/2/17
EUT Received Status:	Good
Test Purpose:	
This is Class II permissive Change Test for FCC ID: 2ADFSTYSB01WP, the changes was below, which was provided by manufacturer ▲:	
1. Enabled 2.4G WiFi by software.	
2. Enabled 5G WiFi 5250-5350MHz and 5470-5725 MHz band by software.	
The changes were not effect the original function and bands. This report is only for the new enabled 5250-5350MHz and 5470-5725 MHz band.	

1.1.2 Operation Frequency Detail:

For 802.11a/n ht20/ac vht20:

5250-5350 MHz Band		5470-5725 MHz Band	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	100	5500
56	5280	104	5520
60	5300	108	5540
64	5320	112	5560
		116	5580
/	/	120	5600
/	/	124	5620
/	/	128	5640
/	/	132	5660
/	/	136	5680
/	/	140	5700
/	/	144	5720

Per section 15.31(m), the above in bold frequencies were performed the test.

Note: Additional channels 5720MHzcross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

For 802.11n ht40/ac vht40:

5250-5350 MHz Band		5470-5725 MHz Band	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	102	5510
62	5310	110	5550
/	/	118	5590
/	/	126	5630
/	/	134	5670
/	/	142	5710
Per section 15.31(m), the above in bold frequencies were performed the test.			

Note: Additional channels 5710MHz cross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/ Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

For 802.11ac vht80:

5250-5350 MHz Band		5470-5725 MHz Band	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
58	5290	106	5530
/	/	122	5610
/	/	138	5690
Per section 15.31(m), the above in bold frequencies were performed the test.			

Note: Additional channels 5710MHz cross the band 5470-5725MHz and 5725-5850 MHz, Conducted output power/ Power Spectral Density/bandwidth test with the additional channel to compliance with stricter limit of the two bands(5470-5725MHz more stricter).

Antenna Information Detail ▲:

Antenna Chain	Manufacturer	Antenna Type	input impedance (Ohm)	Frequency Range	Antenna Gain
0 (ANT 1)	Winner Wave Limited	Rod	50	5150-5850MHz	5.0 dBi
1 (ANT 2)		Rod	50	5150-5850MHz	5.0 dBi

The Method of §15.203 Compliance:

- ☐ Antenna must be permanently attached to the unit.
☒ Antenna must use a unique type of connector to attach to the EUT.
☐ Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
/	/	/	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:			The system was configured for testing in Engineering Mode, which was provided by the manufacturer.		
Equipment Modifications:			No		
EUT Exercise Software:			MP_Kit_RTL11ac_8822BU_USB_v0.45.exe		
The software was provided by manufacturer. The maximum power was configured as below, that was provided by the manufacturer▲:					
5250-5350 MHz Band:					
Test Modes	Test Channels	Test Frequency (MHz)	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11a	Lowest	5260	6Mbps	40	40
	Middle	5280	6Mbps	40	40
	Highest	5320	6Mbps	40	40
802.11n ht20	Lowest	5260	MCS0	40	40
	Middle	5280	MCS0	40	40
	Highest	5320	MCS0	40	40
802.11n ht40	Lowest	5270	MCS0	40	40
	Highest	5310	MCS0	40	40
802.11ac vht80	Middle	5290	MCS0	40	40

5470-5725 MHz Band:

Test Modes	Test Channels	Test Frequency (MHz)	Data rate	Power Level Setting	
				Chain 0	Chain 1
802.11a	Lowest	5500	6Mbps	36	36
	Middle	5580	6Mbps	36	36
	Highest	5700	6Mbps	36	36
	Cross	5720	6Mbps	36	36
802.11n ht20	Lowest	5500	MCS8	38	38
	Middle	5580	MCS8	38	38
	Highest	5700	MCS8	40	40
	Cross	5720	MCS8	40	40
802.11n ht40	Lowest	5510	MCS8	40	40
	Middle	5550	MCS8	40	40
	Highest	5670	MCS8	40	40
	Cross	5710	MCS8	40	40
802.11ac vht80	Lowest	5530	MCS8	40	40
	Highest	5610	MCS8	40	40
	Cross	5690	MCS8	40	40

The system support 802.11a/n ht20/n ht40/ac vht20/ac vht40/ac vht80, the vht20/vht40 were reduced since the identical parameters with 802.11n ht20 and ht40.

The above are the worst-case data rates, which are determined for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations.

The device supports SISO and MIMO in all modes, per pretest, 2T2R mode was the worst mode and reported.

1.2.2 Support Equipment List and Details

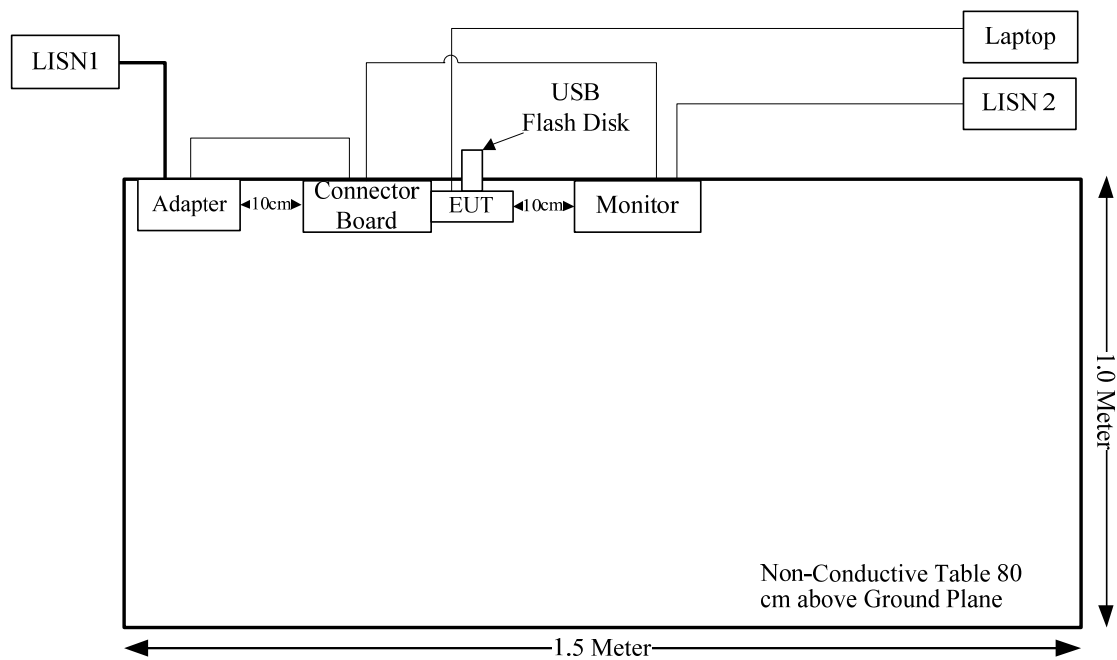
Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	E450	PF-OMRADG
DELL	Monitor	P2721Q	CN-0XJ46C-FCC00-135-AA8L-A03
Darwin	Connector board	HDMI transfer BD	HDMI transfer BD
KenZhen	Adapter	KZ1203050	KZ1203050
SANDisk	USB Flash Disk	16G	BL201026331

1.2.3 Support Cable List and Details

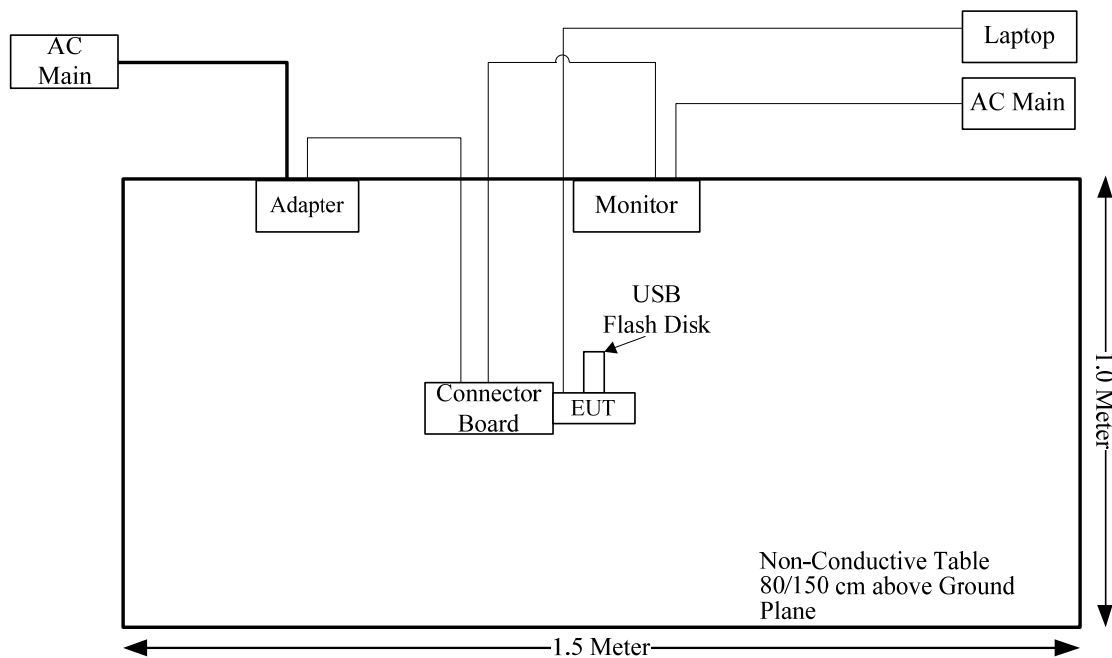
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Cable	Yes	No	1	Adapter	Connector board
HDMI Cable	Yes	No	1.2	Monitor	Connector board
RJ45 Cable	No	No	1	Laptop	EUT

1.2.4 Block Diagram of Test Setup

AC line conducted emissions:



Spurious Emissions:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Power Spectral Density, conducted	±0.61 dB
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB, 200M~1GHz: 5.61 dB, 1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB, 18G~26.5G: 5.47 dB, 26.5G~40G: 5.63 dB
Unwanted Emissions, conducted	±1.26 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

2. SUMMARY OF TEST RESULTS

Standard(s) Section	Test Items	Result
FCC§15.207(a)	AC line conducted emissions	Compliant
FCC§15.205& §15.209 &§15.407(b)	Radiated Spurious Emissions	Compliant
FCC§15.407(a) (e)	Emission Bandwidth	Compliant
FCC§15.407(a)	Conducted Transmitter Output Power	Compliant
FCC§15.407 (a)	Power Spectral Density	Compliant
FCC§15.203	Antenna Requirement	Compliant
FCC§15.407 (h)	Dynamic Frequency Selection (DFS)	Compliant ^{Note}
§15.407 (f) & §1.1307 & §2.1091	RF Exposure Evaluation	Compliant

Note: Dynamic Frequency Selection (DFS) test please refer to the DFS report: CR230206439-00DA1.

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 Applicable Standard

FCC§15.207(a).

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

(b) The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

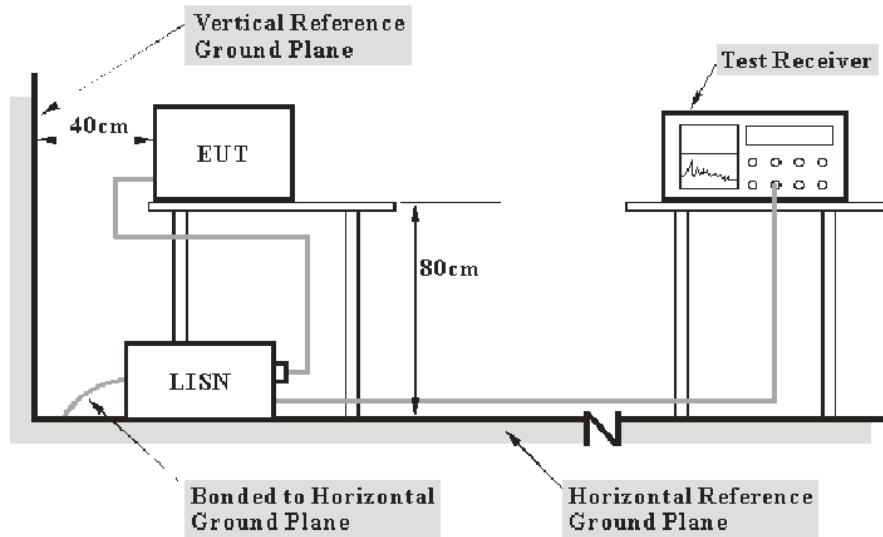
(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 μ V within the frequency band 535-1705 kHz, as measured using a 50 μ H/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

3.1.2 EUT Setup



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

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter or EUT was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.3 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.4 Test Procedure

The frequency and amplitude of the six highest ac power-line conducted emissions relative to the limit, measured over all the current-carrying conductors of the EUT power cords, and the operating frequency or frequency to which the EUT is tuned (if appropriate), should be reported, unless such emissions are more than 20 dB below the limit. AC power-line conducted emissions measurements are to be separately carried out only on each of the phase (“hot”) line(s) and (if used) on the neutral line(s), but not on the ground [protective earth] line(s). If less than six emission frequencies are within 20 dB of the limit, then the noise level of the measuring instrument at representative frequencies should be reported. The specific conductor of the power-line cord for each of the reported emissions should be identified. Measure the six highest emissions with respect to the limit on each current-carrying conductor of each power cord associated with the EUT (but not the power cords of associated or peripheral equipment that are part of the test configuration). Then, report the six highest emissions with respect to the limit from among all the measurements identifying the frequency and specific current-carrying conductor identified with the emission. The six highest emissions should be reported for each of the current-carrying conductors, or the six highest emissions may be reported over all the current-carrying conductors.

3.1.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor = attenuation caused by cable loss + voltage division factor of AMN

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiation Spurious Emissions

3.2.1 Applicable Standard

FCC §15.407 (b);

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

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of - 27 dBm/MHz.

(4) For transmitters operating solely in the 5.725-5.850 GHz band:

(i) All emissions shall be limited to a level of - 27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in § 15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

(8) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(9) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in § 15.207.

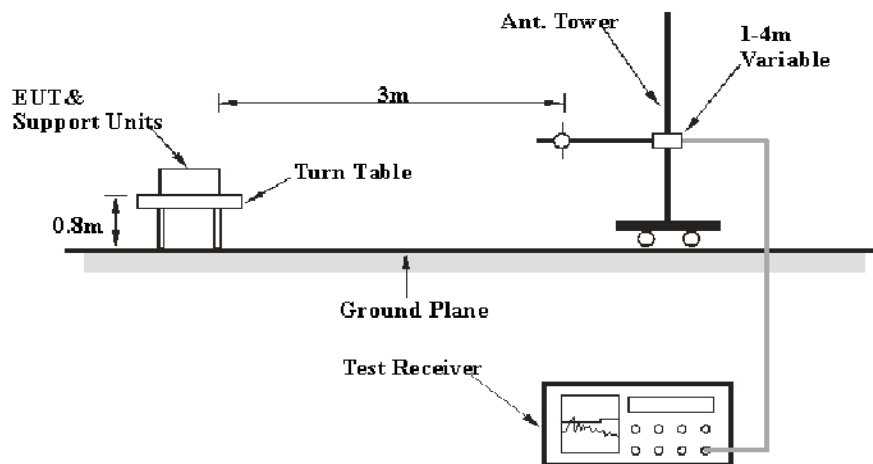
(10) The provisions of § 15.205 apply to intentional radiators operating under this section.

(11) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

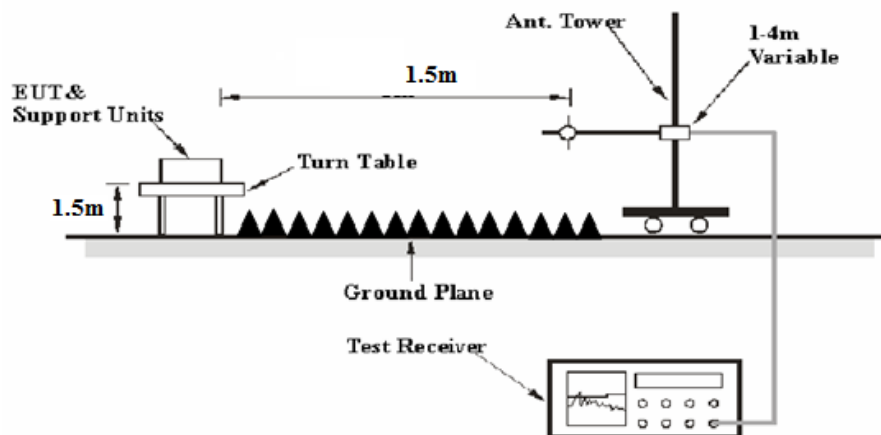
(c) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

3.2.2 EUT Setup

Below 1GHz:



1-40 GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was FCC 15.209, FCC 15.407 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

3.2.3 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

30MHz-1000MHz:

Measurement	RBW	Video B/W	IF B/W
QP	120 kHz	300 kHz	120kHz

1GHz- 40GHz:

Measurement	Duty cycle	RBW	Video B/W
PK	Any	1MHz	3 MHz
AV	>98%	1MHz	10 Hz
	<98%	1MHz	1/T

Note: T is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.4 Test Procedure

During the radiated emission test, the adapter was connected to the first AC floor outlet.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz, peak and Average detection modes for frequencies above 1GHz.

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, emission shall be computed as: $E [dB\mu V/m] = EIRP[dBm] + 95.2$, for $d = 3$ meters.

According to C63.10, the above 1G test result shall be extrapolated to the specified distance using an extrapolation Factor of 20dB/decade from 3m to 1.5m

Distance extrapolation Factor = $20 \log (\text{specific distance } [3m] / \text{test distance } [1.5m])$ dB = 6.02 dB

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.5 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Factor = Antenna Factor + Cable Loss- Amplifier Gain

For 30MHz-1GHz:

Result = Reading + Factor

For 1GHz-40GHz

Result = Reading + Factor-Distance extrapolation Factor

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.3 Emission Bandwidth:

3.3.1 Applicable Standard

FCC §15.407 (a)

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

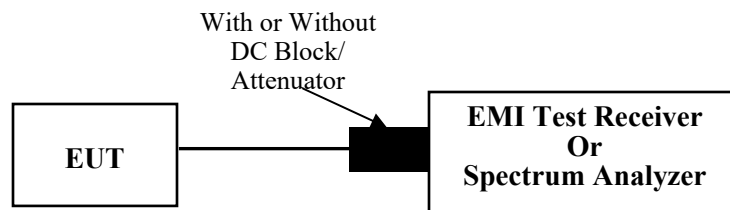
FCC §15.407 (e)

Within the 5.725-5.850 GHz and 5.850-5.895 GHz bands, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

FCC §15.407 (h)

(h)(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26 dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems.

3.3.2 EUT Setup



3.3.3 Test Procedure

26dB Emission Bandwidth:

According to ANSI C63.10-2013 Section 12.4.1

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = peak.
- Trace mode = max hold
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the instrument. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6 dB emission bandwidth:

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

- a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) ≥ 3 RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
- Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described in this section. For devices that use channel aggregation refer to III.A and III.C for determining emission bandwidth.

99% Occupied Bandwidth:

According to ANSI C63.10-2013 Section 12.4.2&6.9.3

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

- a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than $[10 \log (\text{OBW}/\text{RBW})]$ below the reference level. Specific guidance is given in 4.1.5.2.
- d) Step a) through step c) might require iteration to adjust within the specified range.
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
- g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
- h) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

3.4 Maximum Conducted Output Power:

3.4.1 Applicable Standard

FCC §15.407(a) (1)

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

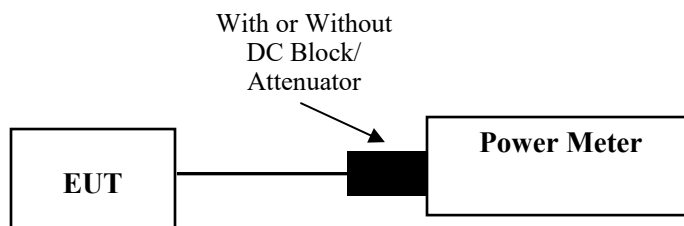
FCC §15.407(a) (2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC §15.407(a) (3)(i)

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.4.2 EUT Setup



3.4.3 Test Procedure

According to ANSI C63.10-2013 Section 12.3.3.2

Method PM-G is measurement using a gated RF average power meter. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

3.5 Maximum Power Spectral Density:

3.5.1 Applicable Standard

FCC §15.407(a) (1)

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

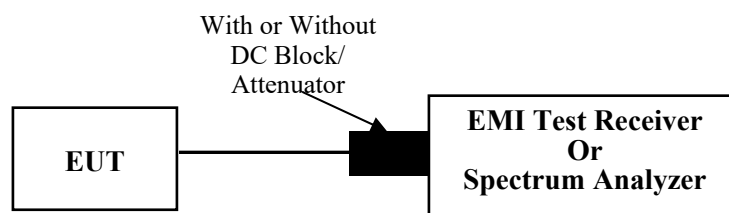
FCC §15.407(a) (2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

FCC §15.407(a) (3)(i)

For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

3.5.2 EUT Setup



3.5.3 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Duty cycle $\geq 98\%$

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-1 **Alternative** should be applied.

Duty cycle $< 98\%$, duty cycle variations are less than $\pm 2\%$

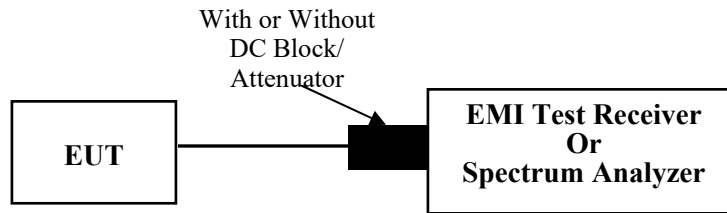
KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-2 **Alternative** should be applied.

Duty cycle $< 98\%$, duty cycle variations exceed $\pm 2\%$

KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Method SA-3 should be applied.

3.7 Duty Cycle:

3.7.1 EUT Setup



3.7.2 Test Procedure

According to ANSI C63.10-2013 Section 12.2

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- 1) Set the center frequency of the instrument to the center frequency of the transmission.
- 2) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- 3) Set $VBW \geq RBW$. Set detector = peak or average.
- 4) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)

3.8 Antenna Requirement

3.8.1 Applicable Standard

FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

3.8.2 Judgment

Result: Compliant. Please refer to the Antenna Information detail in Section 1.

4. Test DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	21FA-1	Test Date:	2023/03/14
Test Site:	CE	Test Mode:	Transmitting
Tester:	Bob Yang	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24	Relative Humidity: (%)	46	ATM Pressure: (kPa)	101.7
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2022/04/01	2023/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

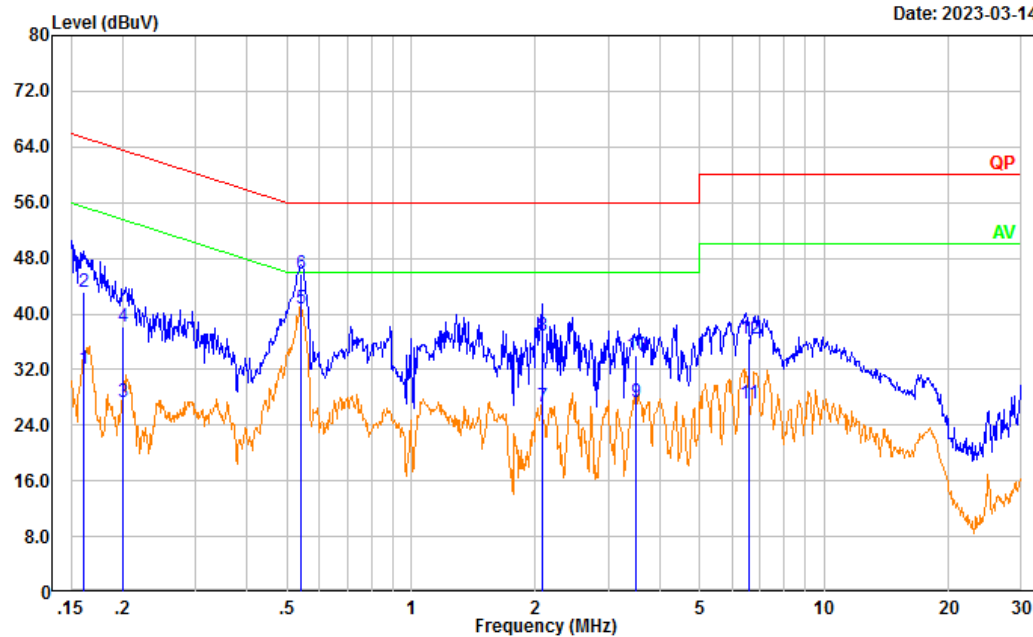
** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Mode: Transmitting

Port: Line

Note:

Date: 2023-03-14

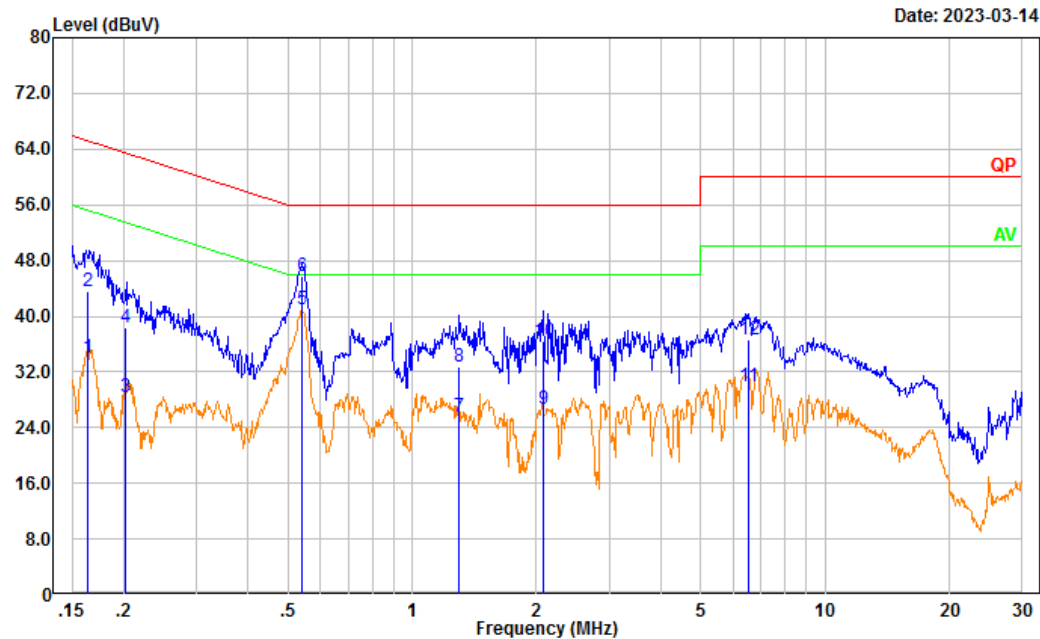


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.160	22.45	9.61	32.06	55.44	23.38	Average
2	0.160	33.61	9.61	43.22	65.44	22.22	QP
3	0.201	17.77	9.61	27.38	53.57	26.19	Average
4	0.201	28.46	9.61	38.07	63.57	25.50	QP
5	0.541	31.20	9.61	40.81	46.00	5.19	Average
6	0.541	36.19	9.61	45.80	56.00	10.20	QP
7	2.080	17.06	9.63	26.69	46.00	19.31	Average
8	2.080	27.12	9.63	36.75	56.00	19.25	QP
9	3.510	17.74	9.65	27.39	46.00	18.61	Average
10	3.510	24.49	9.65	34.14	56.00	21.86	QP
11	6.556	17.42	9.66	27.08	50.00	22.92	Average
12	6.556	26.79	9.66	36.45	60.00	23.55	QP

Test Mode: Transmitting

Port: neutral

Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1	0.163	24.46	9.61	34.07	55.29	21.22	Average
2	0.163	34.03	9.61	43.64	65.29	21.65	QP
3	0.202	18.74	9.61	28.35	53.54	25.19	Average
4	0.202	28.67	9.61	38.28	63.54	25.26	QP
5	0.540	31.26	9.61	40.87	46.00	5.13	Average
6	0.540	36.20	9.61	45.81	56.00	10.19	QP
7	1.298	16.00	9.62	25.62	46.00	20.38	Average
8	1.298	23.17	9.62	32.79	56.00	23.21	QP
9	2.081	17.04	9.63	26.67	46.00	19.33	Average
10	2.081	26.85	9.63	36.48	56.00	19.52	QP
11	6.508	20.25	9.66	29.91	50.00	20.09	Average
12	6.508	26.88	9.66	36.54	60.00	23.46	QP

4.2 Radiation Spurious Emissions

Serial Number:	21F6-7	Test Date:	2023/04/03~2023/04/25
Test Site:	966-2,966-1	Test Mode:	Transmitting
Tester:	Vic Du, coco Tian	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24.8~26.9	Relative Humidity: (%)	58~62	ATM Pressure: (kPa)	100.5~100.9
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2022/07/17	2023/07/16
Sonoma	Amplifier	310N	186165	2022/07/17	2023/07/16
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020/10/13	2023/10/12
R&S	Spectrum Analyzer	FSV40	101591	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2022/08/07	2023/08/06
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2022/08/07	2023/08/06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/09	2023/11/08
Audix	Test Software	E3	201021 (V9)	N/A	N/A
PASTERNAK	Horn Antenna	PE9852/2F-20	112002	2021/02/05	2024/02/04
Quinstar	Preamplifier	QLW-18405536-JO	15964001005	2022/9/16	2023/9/15
MICRO-COAX	Coaxial Cable	UFB142A-1-2362-200200	235772-001	2022/08/07	2023/08/06
E-Microwave	Band Rejection Filter	5150-5850MHz	OE01902423	2022/08/07	2023/08/06
Mini Circuits	High Pass Filter	VHF-6010+	31119	2022/08/07	2023/08/06
PASTERNAK	Horn Antenna	PE9850/2F-20	072001	2021/02/05	2024/02/04

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

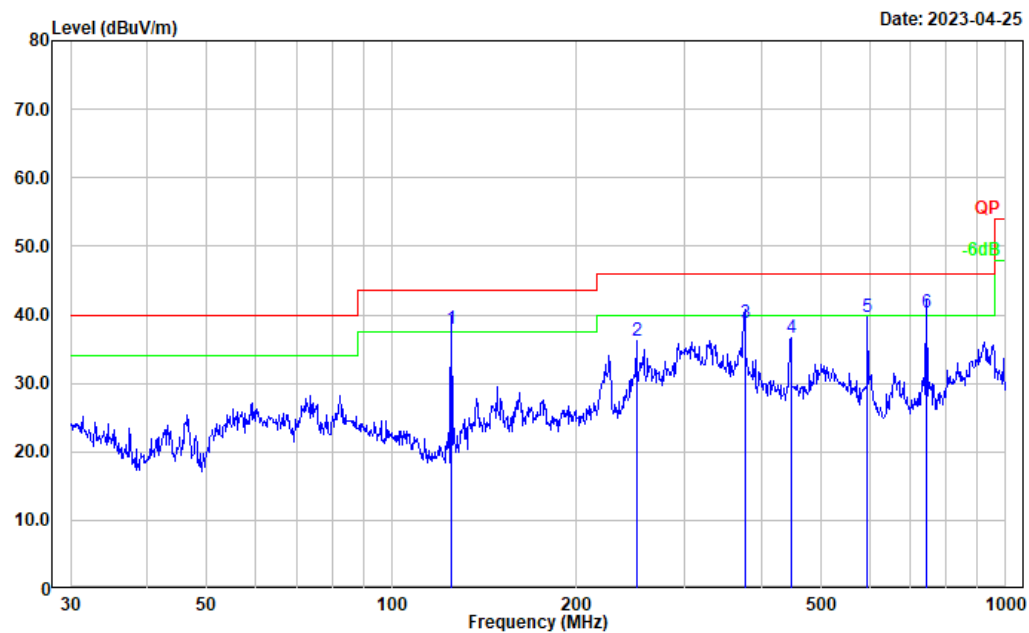
Test Data:

Please refer to the below table and plots.

Note: The device can be mounted in multiple orientations, test was performed with X,Y, Z Axis according to C63.10 figure 8, the worst orientation was photographed and it's data was recorded.

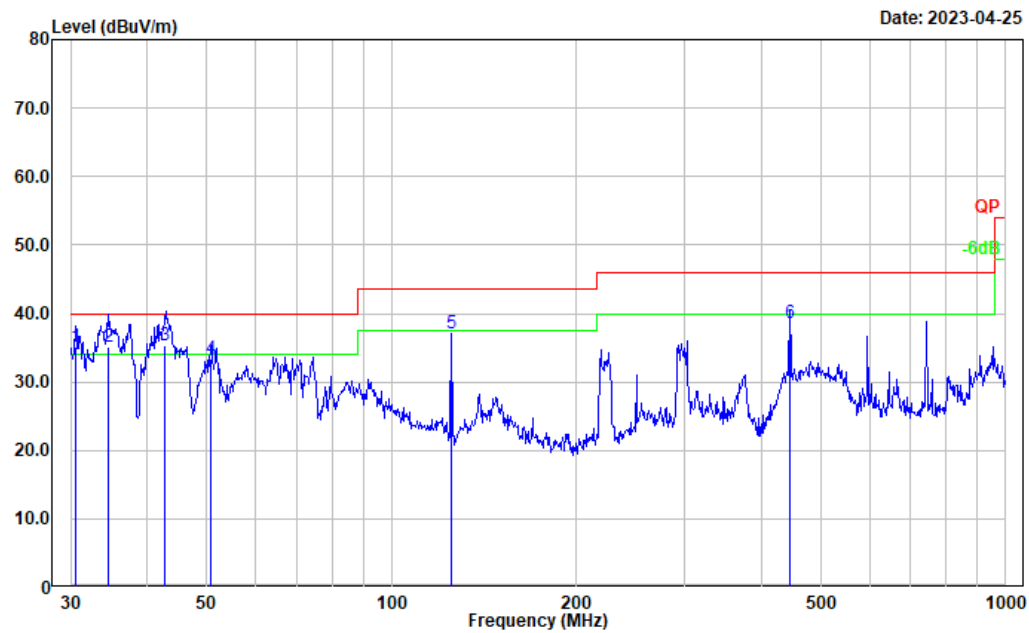
1) 30MHz-1GHz(802.11a chain 0 5785MHz was the worst)

Test Mode: Transmitting
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBUV)	Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector
1	125.007	49.26	-11.31	37.95	43.50	5.55	QP
2	250.301	49.28	-13.08	36.20	46.00	9.80	Peak
3	375.939	48.15	-9.29	38.86	46.00	7.14	QP
4	446.414	43.69	-7.08	36.61	46.00	9.39	Peak
5	595.133	44.89	-5.15	39.74	46.00	6.26	Peak
6	742.259	43.30	-2.93	40.37	46.00	5.63	QP

Test Mode: Transmitting
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	30.531	39.22	-4.00	35.22	40.00	4.78	QP
2	34.611	42.35	-7.17	35.18	40.00	4.82	QP
3	42.721	48.18	-12.90	35.28	40.00	4.72	QP
4	50.764	50.59	-17.19	33.40	40.00	6.60	QP
5	125.007	48.34	-11.31	37.03	43.50	6.47	Peak
6	444.851	45.71	-7.14	38.57	46.00	7.43	QP

2) 1GHz-40GHz:**5250-5350MHz****802.11a (2TX was the worst):**

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5260MHz							
5260.000	67.80	PK	H	38.90	100.68	N/A	N/A
5260.000	59.23	AV	H	38.90	92.11	N/A	N/A
5260.000	74.63	PK	V	38.90	107.51	N/A	N/A
5260.000	66.08	AV	V	38.90	98.96	N/A	N/A
5150.000	29.64	PK	V	38.64	62.26	74.00	11.74
5150.000	16.54	AV	V	38.64	49.16	54.00	4.84
10520.000	36.42	PK	V	18.93	49.33	68.20	18.87
15780.000	35.42	PK	V	22.26	51.66	74.00	22.34
15780.000	22.53	AV	V	22.26	38.77	54.00	15.23
Middle Channel: 5280 MHz							
5280.000	68.16	PK	H	38.91	101.05	N/A	N/A
5280.000	59.50	AV	H	38.91	92.39	N/A	N/A
5280.000	74.95	PK	V	38.91	107.84	N/A	N/A
5280.000	66.42	AV	V	38.91	99.31	N/A	N/A
10560.000	36.54	PK	V	19.20	49.72	68.20	18.48
15840.000	35.74	PK	V	22.34	52.06	74.00	21.94
15840.000	22.84	AV	V	22.34	39.16	54.00	14.84
High Channel: 5320 MHz							
5320.000	68.23	PK	H	38.97	101.18	N/A	N/A
5320.000	59.61	AV	H	38.97	92.56	N/A	N/A
5320.000	75.06	PK	V	38.97	108.01	N/A	N/A
5320.000	66.51	AV	V	38.97	99.46	N/A	N/A
5350.000	31.87	PK	V	39.03	64.88	74.00	9.12
5350.000	18.26	AV	V	39.03	51.27	54.00	2.73
10640.000	36.78	PK	V	19.50	50.26	74.00	23.74
10640.000	23.59	AV	V	19.50	37.07	54.00	16.93
15960.000	35.64	PK	V	22.22	51.84	74.00	22.16
15960.000	22.71	AV	V	22.22	38.91	54.00	15.09

802.11n ht20(2TX was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5260MHz							
5260.000	67.86	PK	H	38.90	100.74	N/A	N/A
5260.000	58.75	AV	H	38.90	91.63	N/A	N/A
5260.000	76.79	PK	V	38.90	109.67	N/A	N/A
5260.000	66.25	AV	V	38.90	99.13	N/A	N/A
5150.000	30.24	PK	V	38.64	62.86	74.00	11.14
5150.000	16.82	AV	V	38.64	49.44	54.00	4.56
10520.000	34.65	PK	V	18.93	47.56	68.20	20.64
15780.000	33.46	PK	V	22.26	49.70	74.00	24.30
15780.000	20.57	AV	V	22.26	36.81	54.00	17.19
Middle Channel: 5280 MHz							
5280.000	68.00	PK	H	38.91	100.89	N/A	N/A
5280.000	58.36	AV	H	38.91	91.25	N/A	N/A
5280.000	76.78	PK	V	38.91	109.67	N/A	N/A
5280.000	66.36	AV	V	38.91	99.25	N/A	N/A
10560.000	34.08	PK	V	19.20	47.26	68.20	20.94
15840.000	32.78	PK	V	22.34	49.10	74.00	24.90
15840.000	20.07	AV	V	22.34	36.39	54.00	17.61
High Channel: 5320 MHz							
5320.000	68.31	PK	H	38.97	101.26	N/A	N/A
5320.000	58.84	AV	H	38.97	91.79	N/A	N/A
5320.000	76.82	PK	V	38.97	109.77	N/A	N/A
5320.000	66.71	AV	V	38.97	99.66	N/A	N/A
5350.000	33.21	PK	V	39.03	66.22	74.00	7.78
5350.000	19.65	AV	V	39.03	52.66	54.00	1.34
10640.000	33.45	PK	V	19.50	46.93	74.00	27.07
10640.000	20.12	AV	V	19.50	33.60	54.00	20.40
15960.000	35.24	PK	V	22.22	51.44	74.00	22.56
15960.000	22.32	AV	V	22.22	38.52	54.00	15.48

802.11n ht40(2TX was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5270 MHz							
5270.000	66.76	PK	H	38.91	99.65	N/A	N/A
5270.000	57.02	AV	H	38.91	89.91	N/A	N/A
5270.000	73.12	PK	V	38.91	106.01	N/A	N/A
5270.000	63.38	AV	V	38.91	96.27	N/A	N/A
5150.000	29.88	PK	V	38.64	62.50	74.00	11.50
5150.000	17.03	AV	V	38.64	49.65	54.00	4.35
10540.000	35.49	PK	V	19.07	48.54	68.20	19.66
15810.000	35.78	PK	V	22.28	52.04	74.00	21.96
15810.000	22.69	AV	V	22.28	38.95	54.00	15.05
High Channel: 5310 MHz							
5310.000	60.75	PK	H	38.95	93.68	N/A	N/A
5310.000	51.78	AV	H	38.95	84.71	N/A	N/A
5310.000	67.80	PK	V	38.95	100.73	N/A	N/A
5310.000	59.11	AV	V	38.95	92.04	N/A	N/A
5350.000	33.75	PK	V	39.03	66.76	74.00	7.24
5350.000	19.51	AV	V	39.03	52.52	54.00	1.48
10620.000	34.67	PK	V	19.49	48.14	74.00	25.86
10620.000	21.35	AV	V	19.49	34.82	54.00	19.18
15930.000	35.24	PK	V	22.33	51.55	74.00	22.45
15930.000	22.53	AV	V	22.33	38.84	54.00	15.16

802.11ac vht80(2TX was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Middle Channel: 5290 MHz							
5290.000	60.15	PK	H	38.92	93.05	N/A	N/A
5290.000	51.03	AV	H	38.92	83.93	N/A	N/A
5290.000	66.09	PK	V	38.92	98.99	N/A	N/A
5290.000	57.09	AV	V	38.92	89.99	N/A	N/A
5150.000	29.37	PK	V	38.64	61.99	74.00	12.01
5150.000	16.84	AV	V	38.64	49.46	54.00	4.54
5350.000	32.76	PK	V	39.03	65.77	74.00	8.23
5350.000	19.91	AV	V	39.03	52.92	54.00	1.08
10580.000	34.07	PK	V	19.34	47.39	68.20	20.81
15870.000	35.66	PK	V	22.39	52.03	74.00	21.97
15870.000	22.37	AV	V	22.39	38.74	54.00	15.26

Note:

Result = Reading + Factor- Distance extrapolation Factor

Distance extrapolation Factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1.5m]})$ dB= 6.02 dB

5470-5725MHz:**802.11a (2TX was the worst):**

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5500 MHz							
5500.000	69.62	PK	H	39.32	102.92	N/A	N/A
5500.000	60.29	AV	H	39.32	93.59	N/A	N/A
5500.000	70.45	PK	V	39.32	103.75	N/A	N/A
5500.000	62.13	AV	V	39.32	95.43	N/A	N/A
5470.000	32.68	PK	V	39.27	65.93	68.20	2.27
11000.000	34.12	PK	V	19.83	47.93	74.00	26.07
11000.000	21.06	AV	V	19.83	34.87	54.00	19.13
16500.000	34.98	PK	V	22.73	51.69	68.20	16.51
Middle Channel: 5580 MHz							
5580.000	69.74	PK	H	39.43	103.15	N/A	N/A
5580.000	60.81	AV	H	39.43	94.22	N/A	N/A
5580.000	70.27	PK	V	39.43	103.68	N/A	N/A
5580.000	61.83	AV	V	39.43	95.24	N/A	N/A
11160.000	33.64	PK	V	19.97	47.59	74.00	26.41
11160.000	20.78	AV	V	19.97	34.73	54.00	19.27
16740.000	35.07	PK	V	23.68	52.73	68.20	15.47
High Channel: 5700 MHz							
5700.000	68.79	PK	H	39.51	102.28	N/A	N/A
5700.000	59.86	AV	H	39.51	93.35	N/A	N/A
5700.000	70.02	PK	V	39.51	103.51	N/A	N/A
5700.000	61.58	AV	V	39.51	95.07	N/A	N/A
5725.000	32.64	PK	V	39.48	66.10	122.20	56.10
11400.000	35.02	PK	V	20.93	49.93	74.00	24.07
11400.000	21.97	AV	V	20.93	36.88	54.00	17.12
17100.000	35.47	PK	V	26.19	55.64	68.20	12.56

802.11n ht20(2TX was the worst):

211

802.11n ht40(2TX was the worst):

Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5510 MHz							
5510.000	63.58	PK	H	39.35	96.91	N/A	N/A
5510.000	52.34	AV	H	39.35	85.67	N/A	N/A
5510.000	66.04	PK	V	39.35	99.37	N/A	N/A
5510.000	55.12	AV	V	39.35	88.45	N/A	N/A
5470.000	33.24	PK	V	39.27	66.49	68.20	1.71
11020.000	32.76	PK	V	19.85	46.59	74.00	27.41
11020.000	19.38	AV	V	19.85	33.21	54.00	20.79
16530.000	33.67	PK	V	23.02	50.67	68.20	17.53
Middle Channel: 5550 MHz							
5550.000	63.35	PK	H	39.46	96.79	N/A	N/A
5550.000	52.17	AV	H	39.46	85.61	N/A	N/A
5550.000	65.88	PK	V	39.46	99.32	N/A	N/A
5550.000	54.85	AV	V	39.46	88.29	N/A	N/A
11100.000	32.01	PK	V	19.95	45.94	74.00	28.06
11100.000	18.79	AV	V	19.95	32.72	54.00	21.28
16650.000	33.57	PK	V	23.65	51.20	68.20	17.00
High Channel: 5670 MHz							
5670.000	66.76	PK	H	39.50	100.24	N/A	N/A
5670.000	55.48	AV	H	39.50	88.96	N/A	N/A
5670.000	68.55	PK	V	39.50	102.03	N/A	N/A
5670.000	58.37	AV	V	39.50	91.85	N/A	N/A
5725.000	31.09	PK	V	39.48	64.55	68.20	3.65
11340.000	31.46	PK	V	20.77	46.21	74.00	27.79
11340.000	18.35	AV	V	20.77	33.10	54.00	20.90
17010.000	33.46	PK	V	25.56	53.00	68.20	15.20

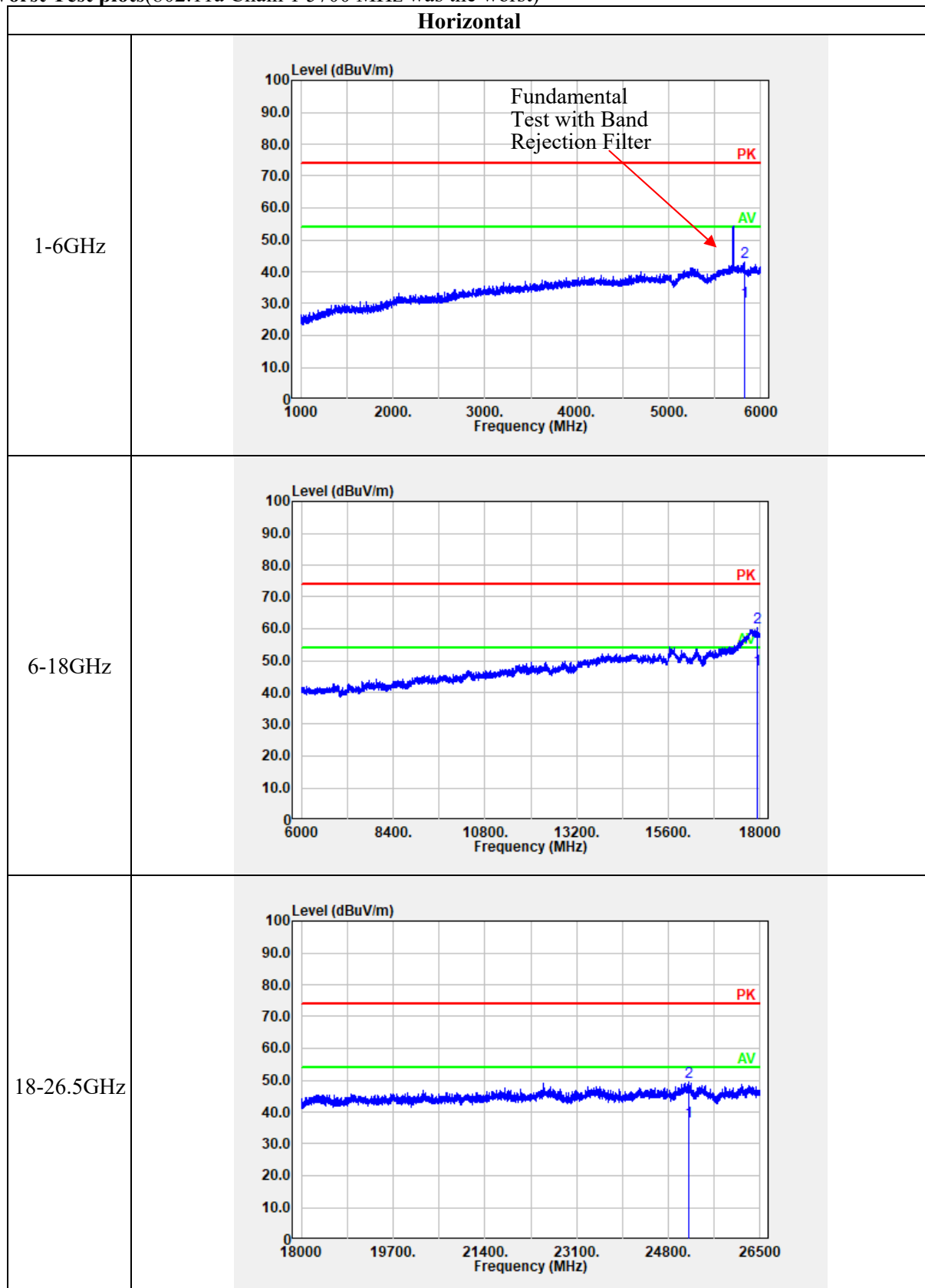
802.11ac vht80(2TX was the worst):

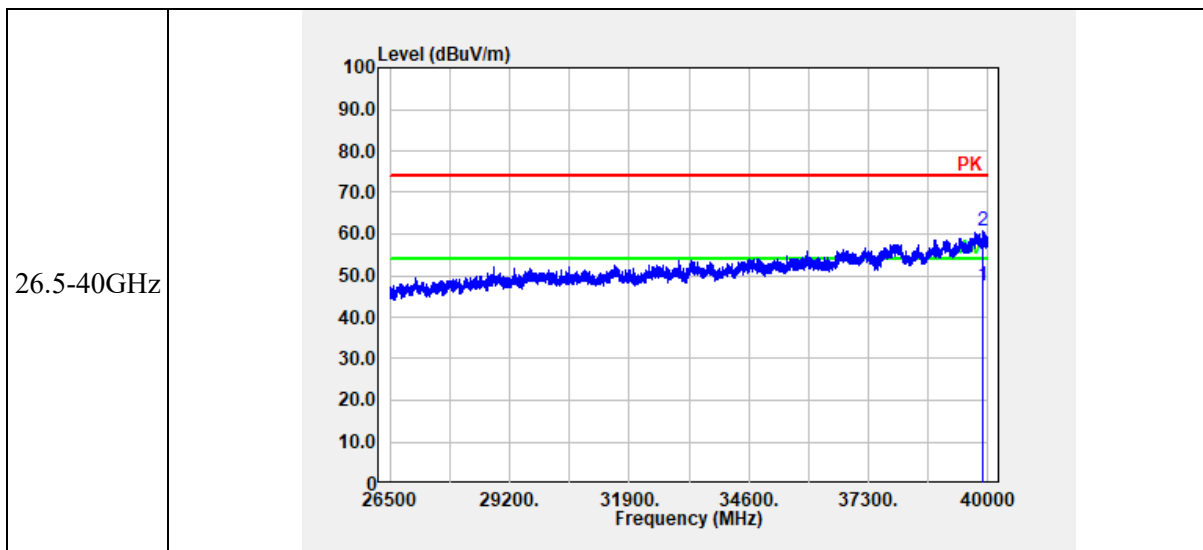
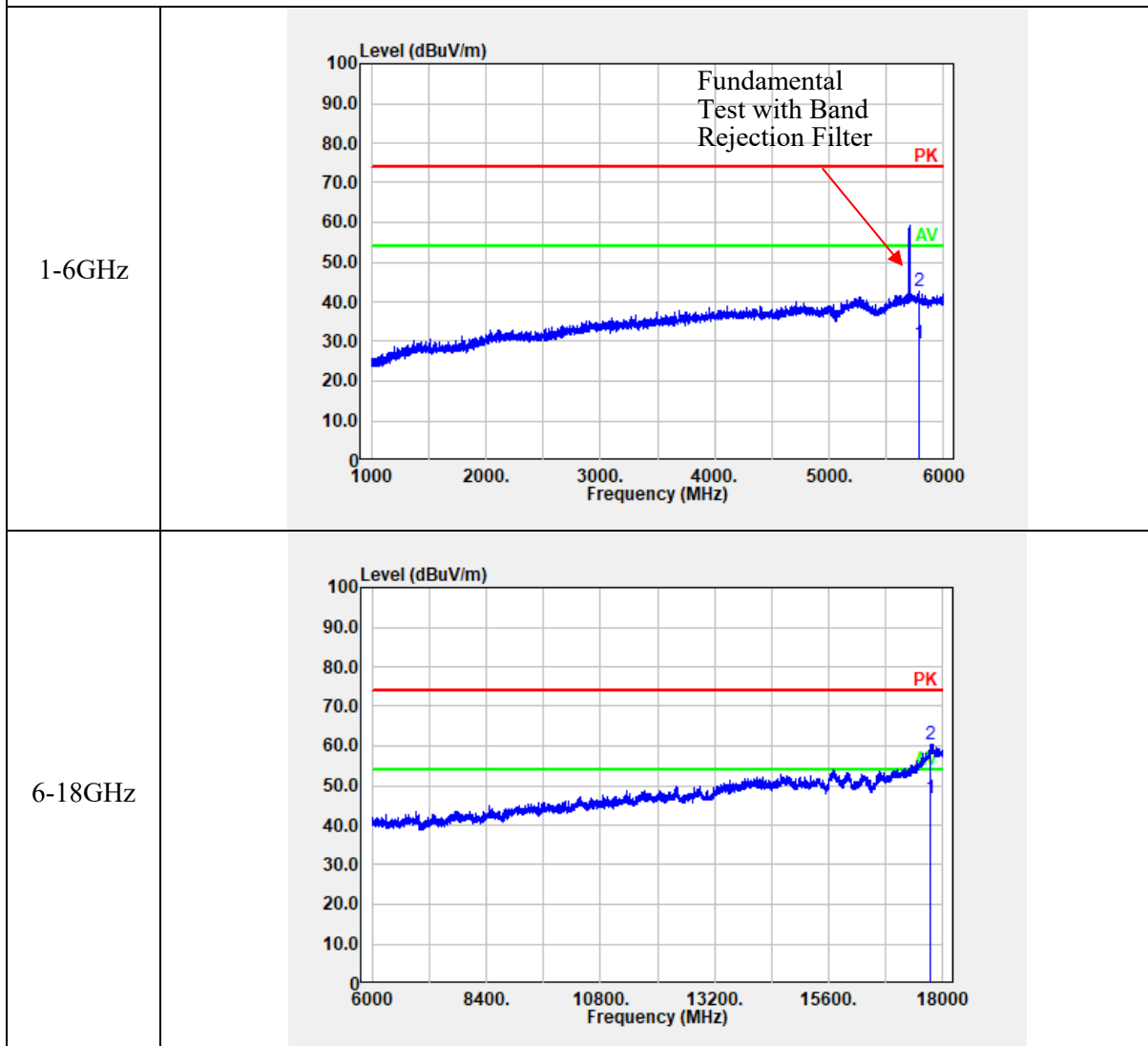
Frequency (MHz)	Receiver		Polar (H/V)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	Detector					
Low Channel: 5530 MHz							
5530.000	58.79	PK	H	39.40	92.17	N/A	N/A
5530.000	48.93	AV	H	39.40	82.31	N/A	N/A
5530.000	65.83	PK	V	39.40	99.21	N/A	N/A
5530.000	55.40	AV	V	39.40	88.78	N/A	N/A
5470.000	33.93	PK	V	39.27	67.18	68.20	1.02
11060.000	32.67	PK	V	19.90	46.55	74.00	27.45
11060.000	19.65	AV	V	19.90	33.53	54.00	20.47
16590.000	34.02	PK	V	23.59	51.59	68.20	16.61
High Channel: 5610 MHz							
5610.000	56.02	PK	H	39.43	89.43	N/A	N/A
5610.000	46.23	AV	H	39.43	79.64	N/A	N/A
5610.000	63.29	PK	V	39.43	96.70	N/A	N/A
5610.000	53.46	AV	V	39.43	86.87	N/A	N/A
5725.000	31.29	PK	V	39.48	64.75	68.20	3.45
11220.000	32.49	PK	V	20.13	46.60	74.00	27.40
11220.000	19.66	AV	V	20.13	33.77	54.00	20.23
16830.000	33.91	PK	V	24.13	52.02	68.20	16.18

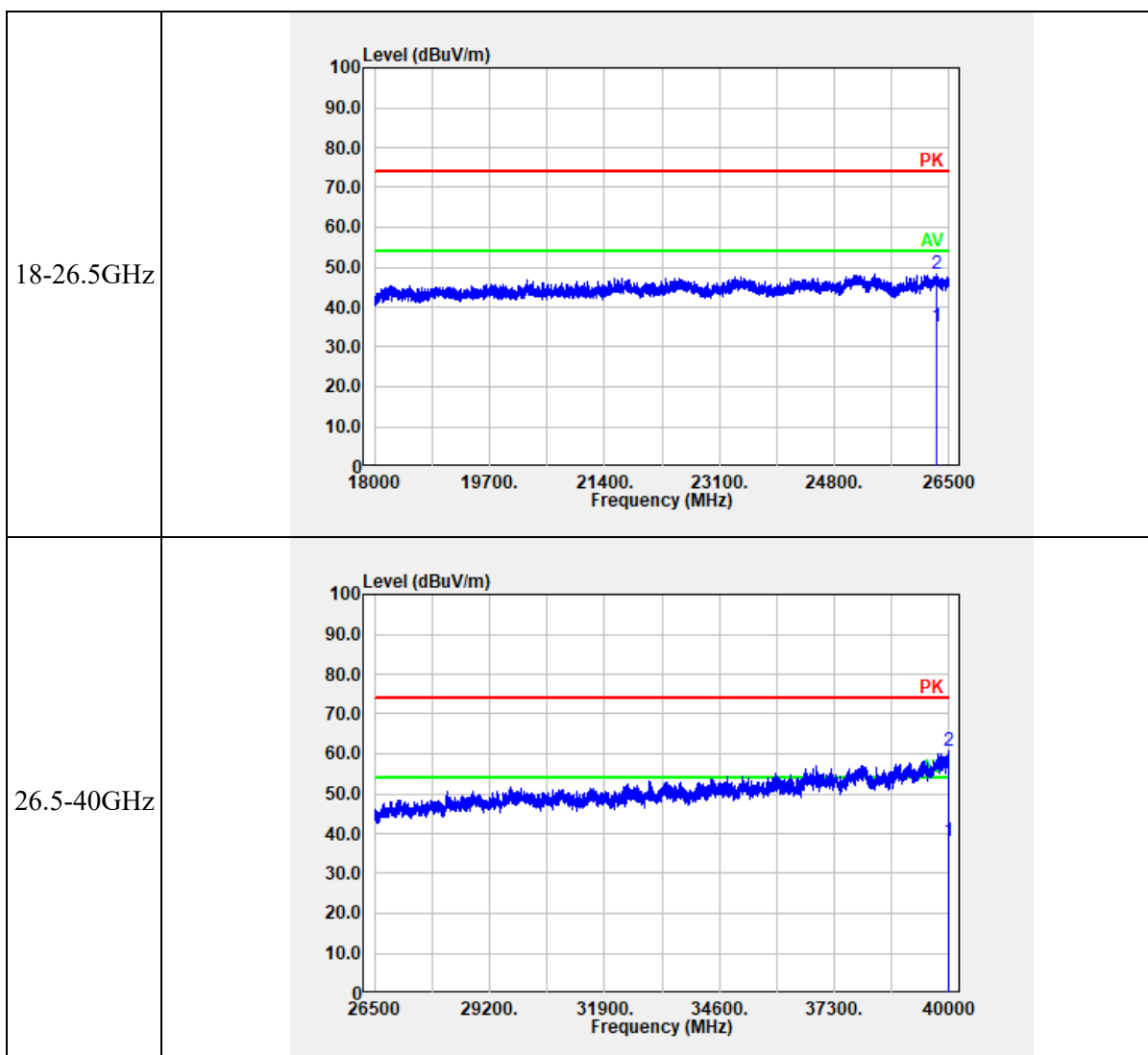
Note:

Result = Reading + Factor- Distance extrapolation Factor

Distance extrapolation Factor = $20 \log (\text{specific distance [3m]}/\text{test distance [1.5m]})$ dB= 6.02 dB

Worst Test plots(802.11a Chain 1 5700 MHz was the worst)

**Vertical**



4.3 Emission Bandwidth:

Serial Number:	21FA-1	Test Date:	2023/04/10~2023/06/04
Test Site:	RF	Test Mode:	Transmitting
Tester:	Jim Wei	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	22.9~23.4	Relative Humidity: (%)	56~74	ATM Pressure: (kPa)	100.4~101.1
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
R&S	Spectrum Analyzer	FSV40	101943	2022/7/25	2023/7/24
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

Test Data:

5250-5350 MHz:

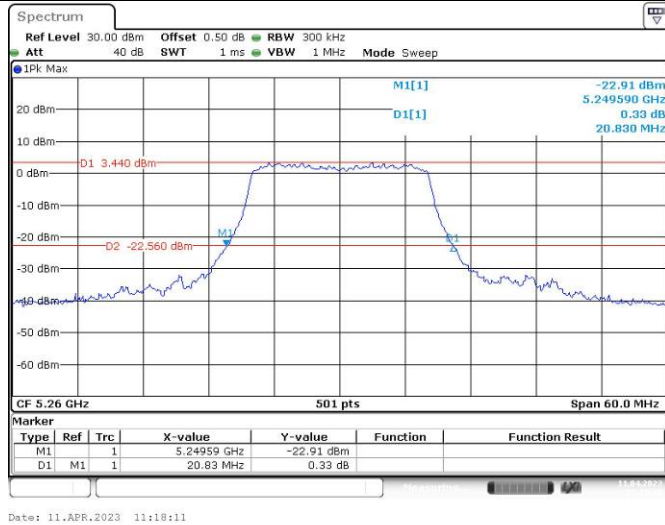
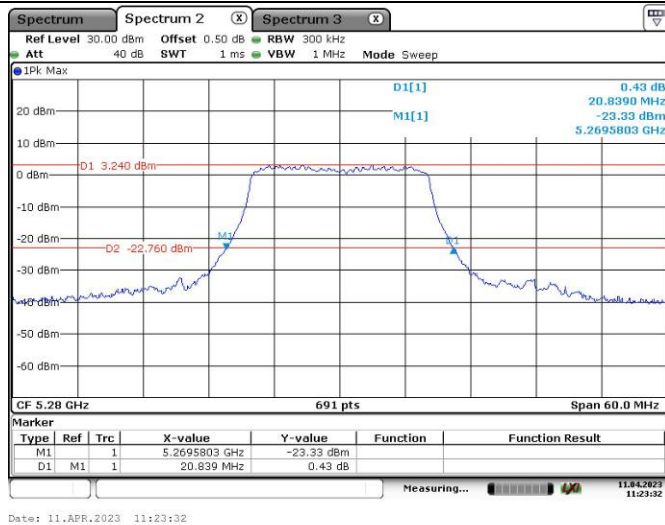
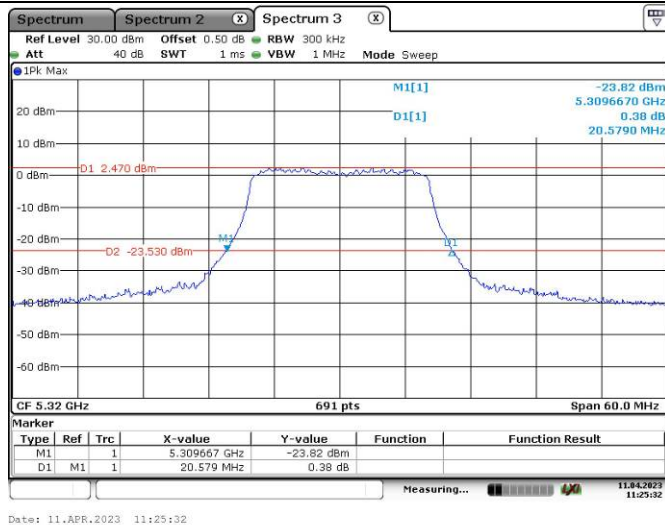
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5260	20.83	16.766
	5280	20.84	16.687
	5320	20.58	16.687
802.11n ht20	5260	21.34	17.645
	5280	21.27	17.645
	5320	21.1	17.645
802.11n ht40	5270	42.84	36.886
	5310	43.27	36.886
802.11ac vht80	5290	80.75	75.689
Note: Test only was performed at Chain 0.			

5470-5725 MHz:

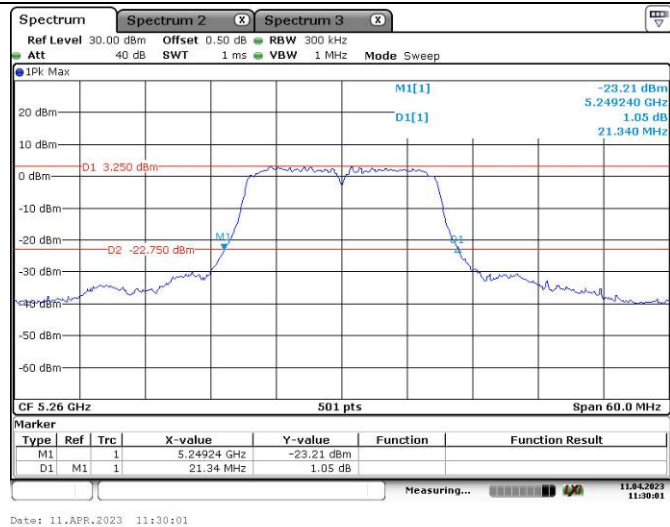
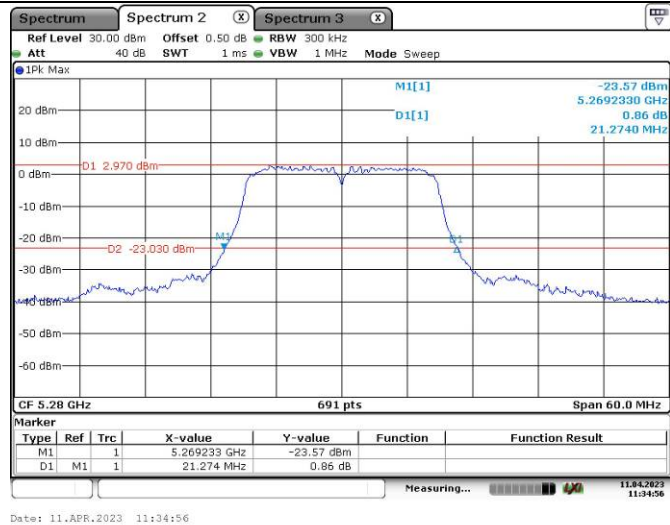
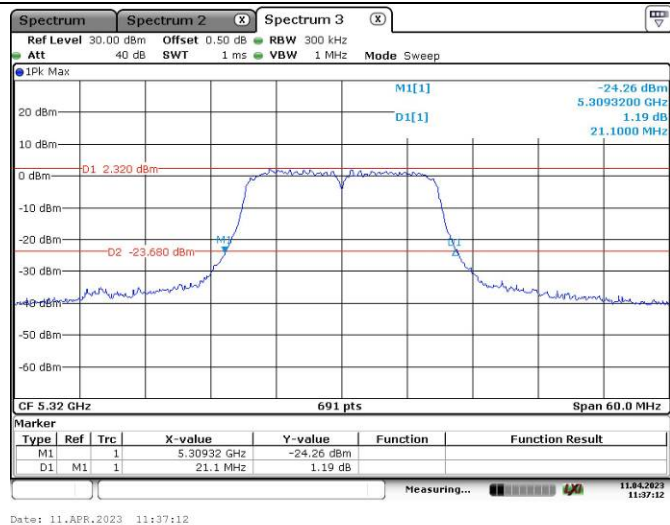
Test Modes	Test Frequency (MHz)	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
802.11a	5500	21.83	16.687
	5580	21.19	16.729
	5700	21.36	16.671
	5720	21.274	16.671
802.11n ht20	5500	21.58	17.725
	5580	21.447	17.713
	5700	21.534	17.645
	5720	21.881	17.656
802.11n ht40	5510	42.63	36.727
	5550	42.4	36.886
	5670	41.82	36.886
	5710	41.95	36.726
802.11ac vht80	5530	83.77	75.689
	5610	82.728	76.008
	5690	83.21	75.689
Note: Test only was performed at Chain 0.			

5250-5350MHz:

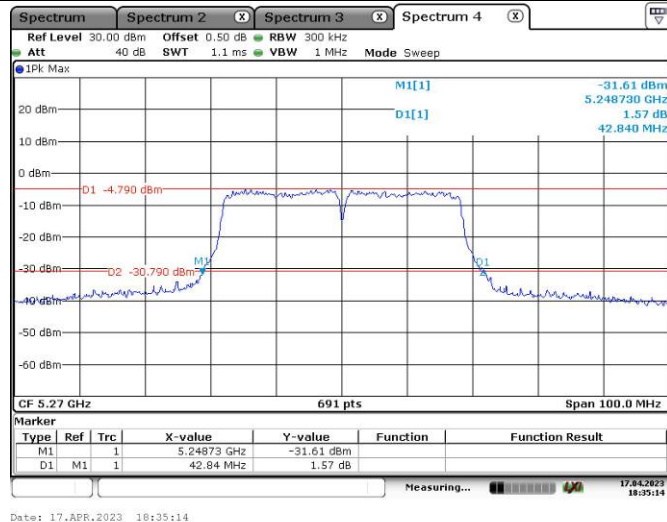
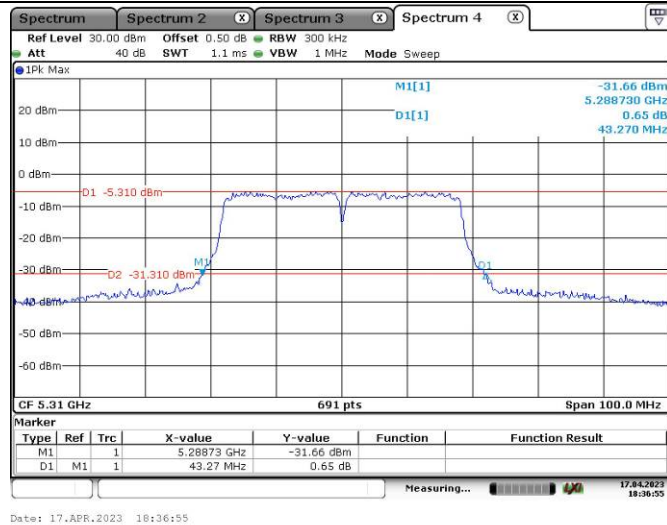
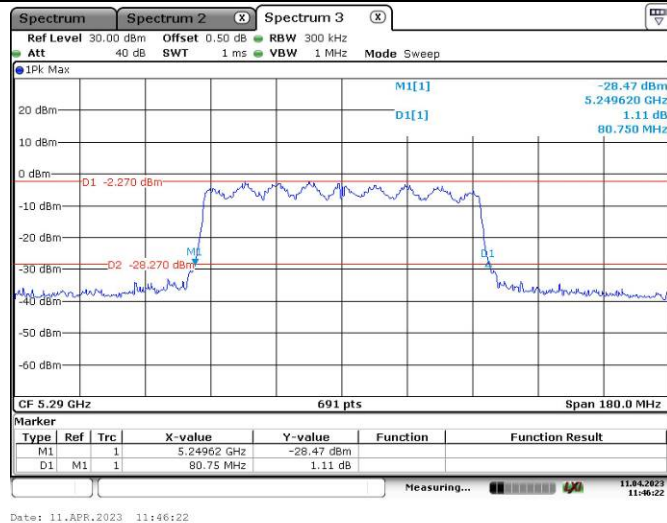
26dB Emission Bandwidth

802.11a
Lowest Channel802.11a
Middle Channel802.11a
Highest Channel

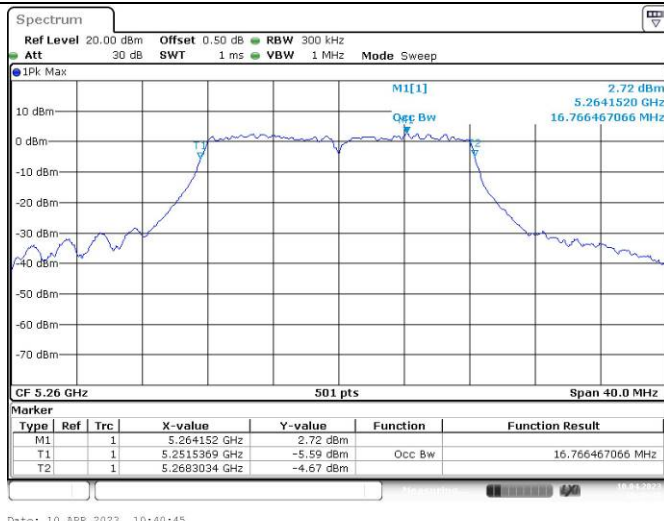
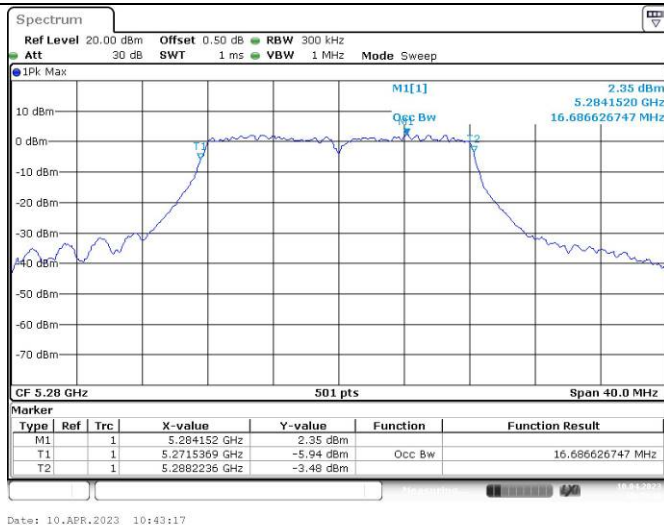
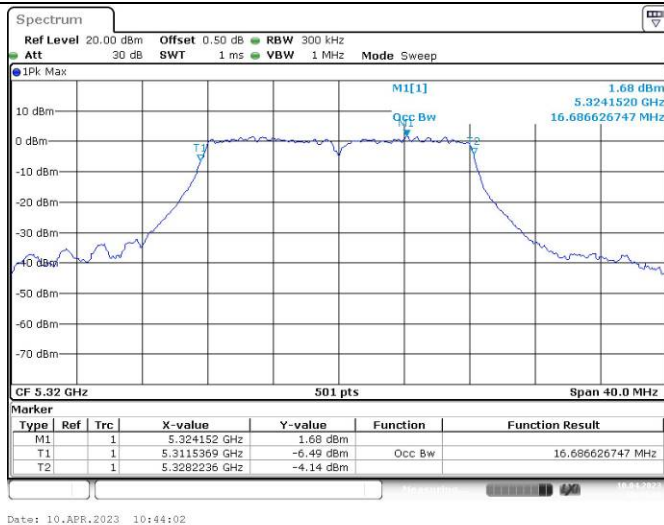
26dB Emission Bandwidth

802.11n ht20
Lowest Channel802.11n ht20
Middle Channel802.11n ht20
Highest Channel

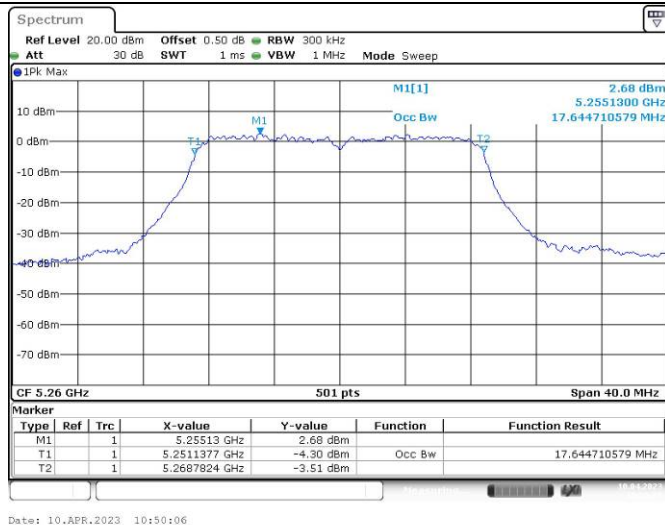
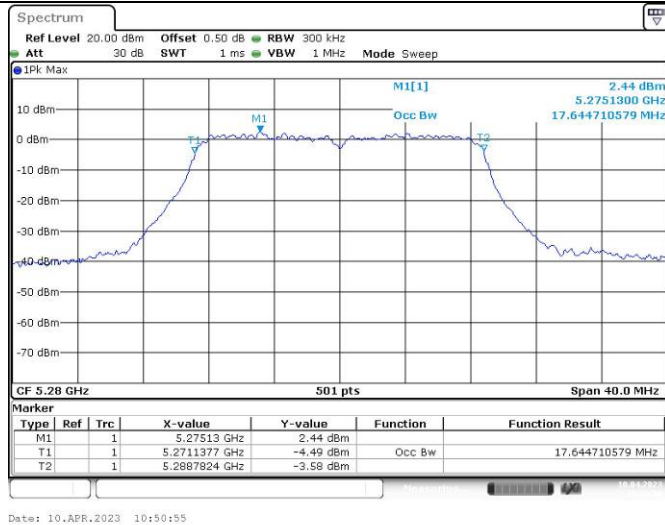
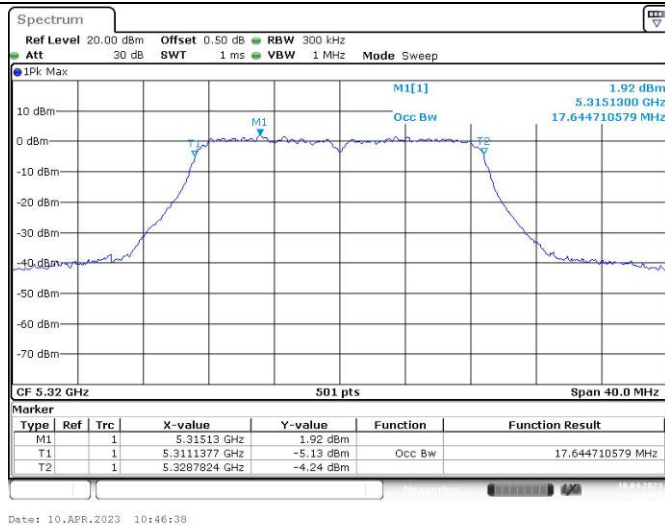
26dB Emission Bandwidth

802.11n ht40
Lowest Channel802.11n ht40
Highest Channel802.11ac vht80
Middle Channel

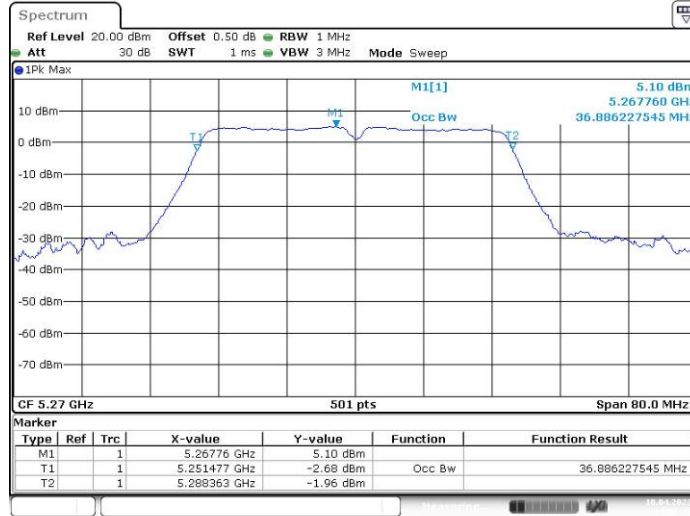
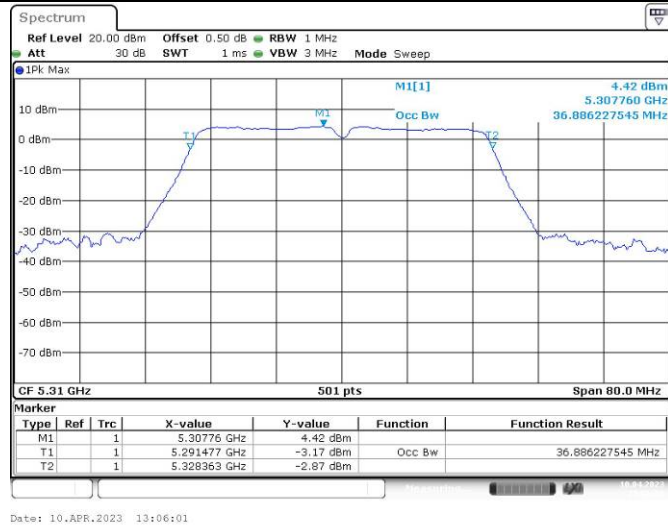
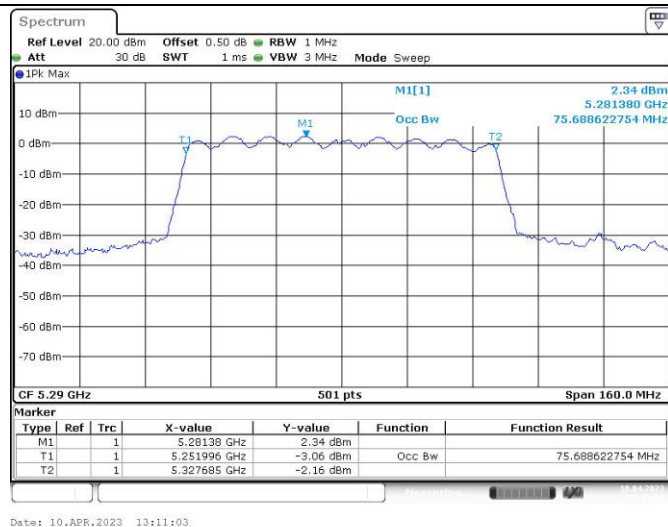
99% Emission Bandwidth

802.11a
Lowest Channel802.11a
Middle Channel802.11a
Highest Channel

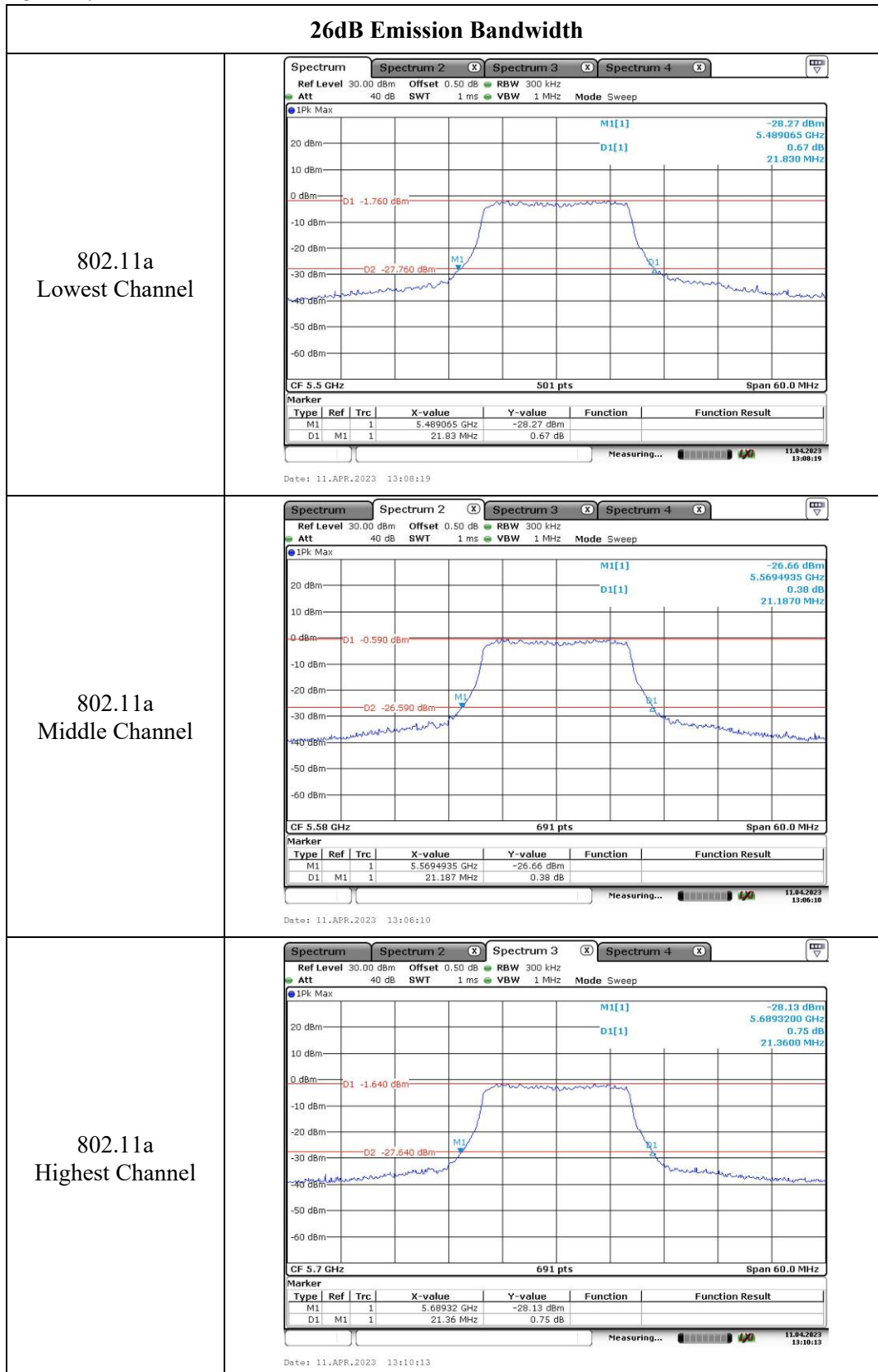
99% Emission Bandwidth

802.11n ht20
Lowest Channel802.11n ht20
Middle Channel802.11n ht20
Highest Channel

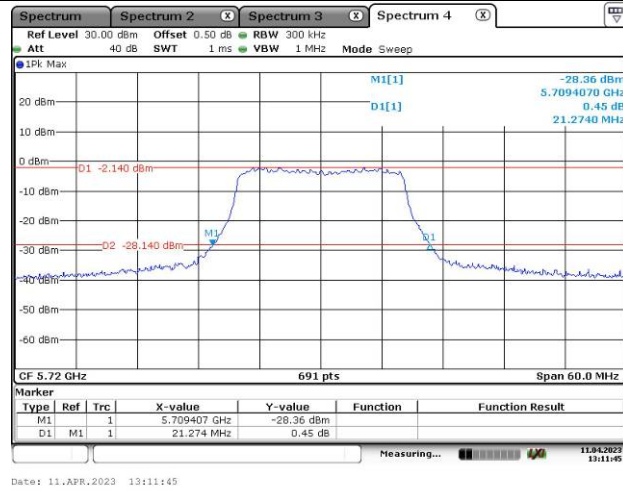
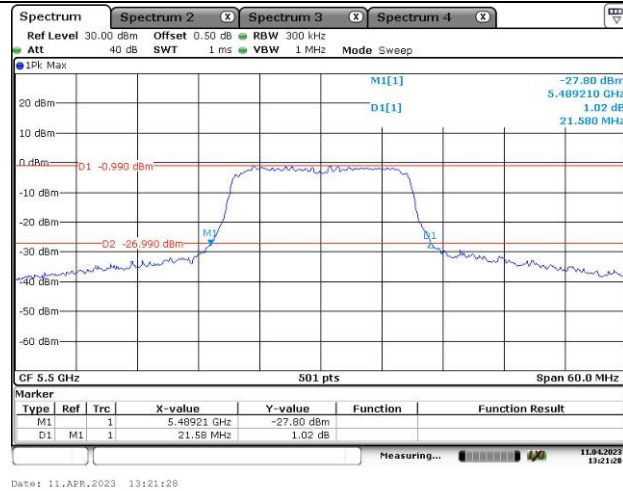
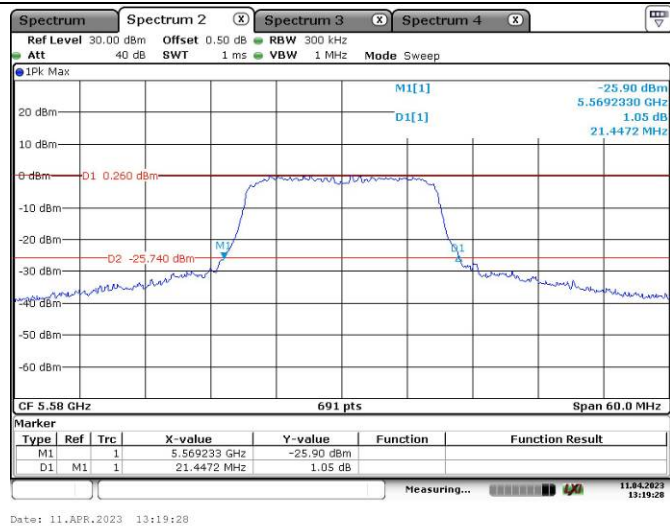
99% Emission Bandwidth

802.11n ht40
Lowest Channel802.11n ht40
Highest Channel802.11ac vht80
Middle Channel

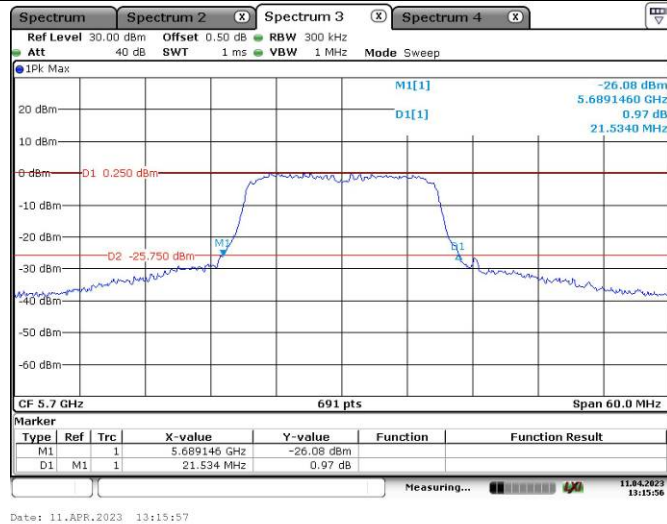
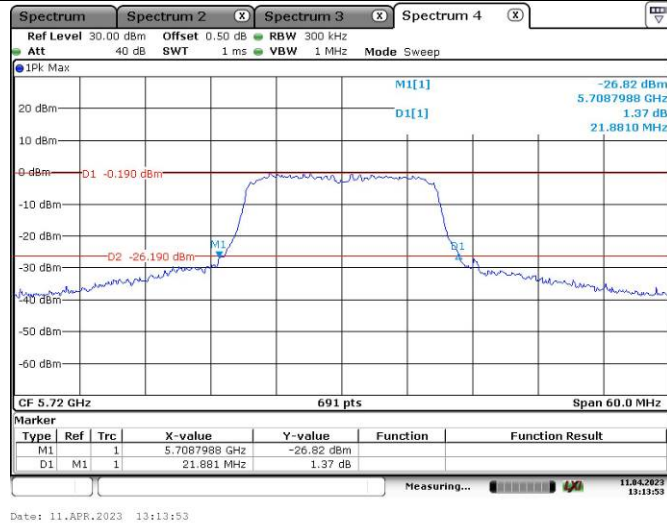
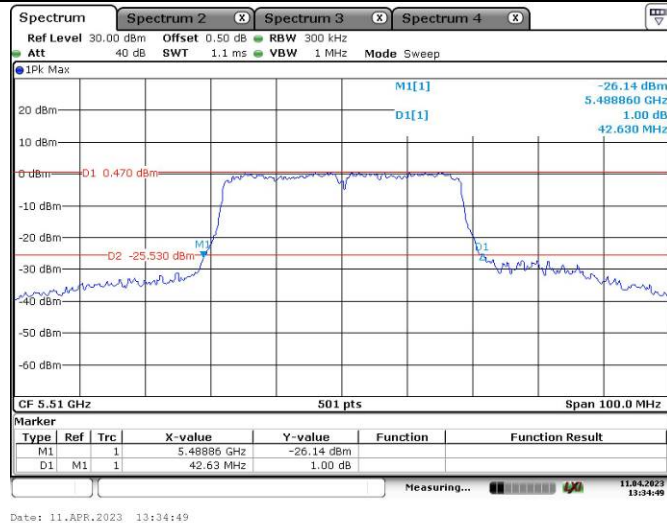
5470-5725MHz:



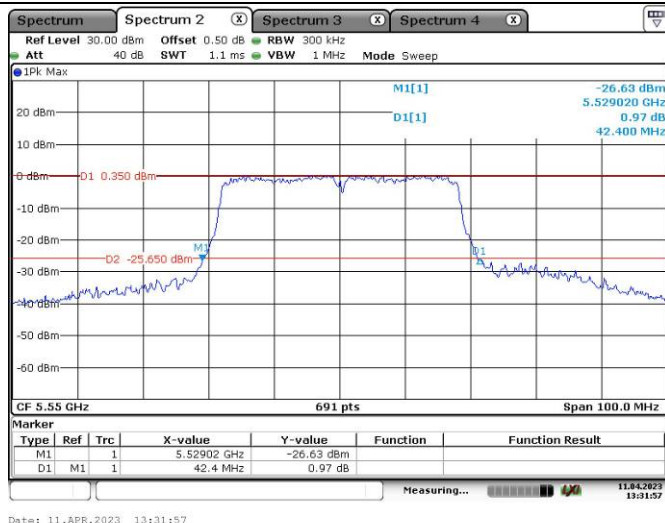
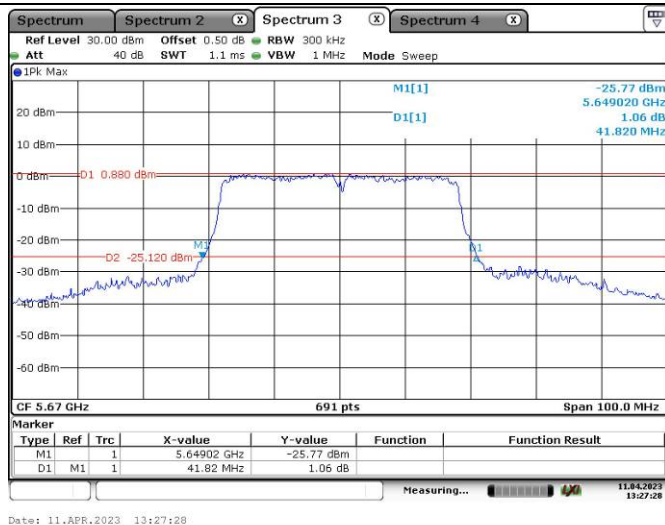
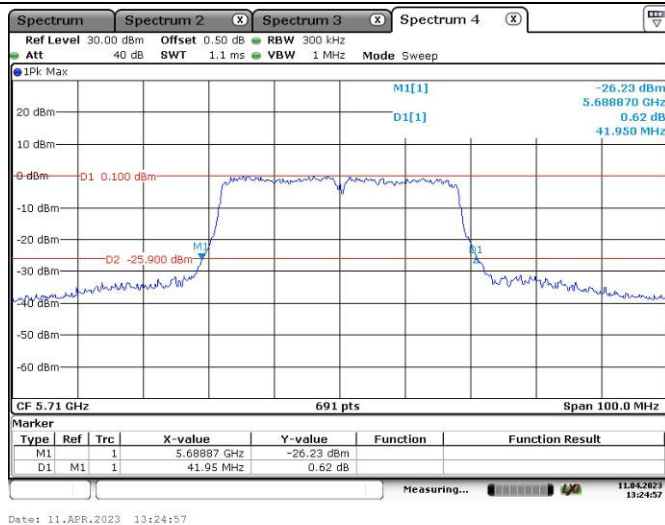
26dB Emission Bandwidth

802.11a
Additional Channel802.11n ht20
Lowest Channel802.11n ht20
Middle Channel

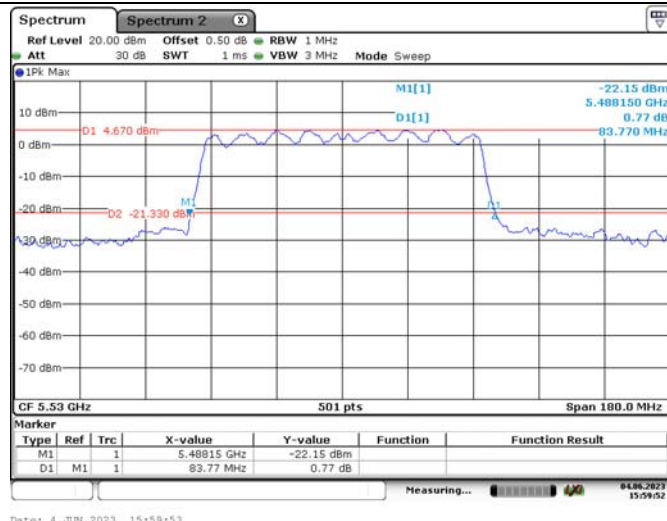
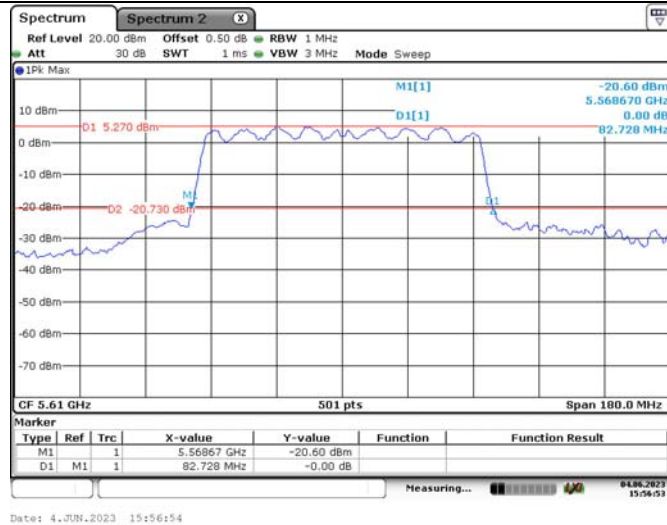
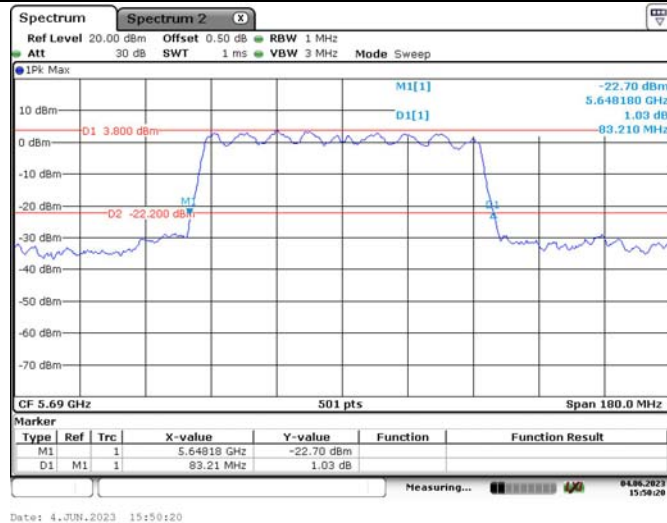
26dB Emission Bandwidth

802.11n ht20
Highest Channel802.11n ht20
Additional Channel802.11n ht40
Lowest Channel

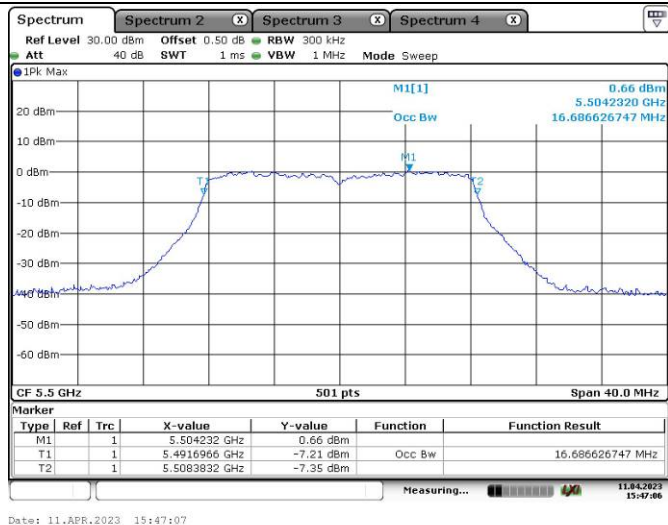
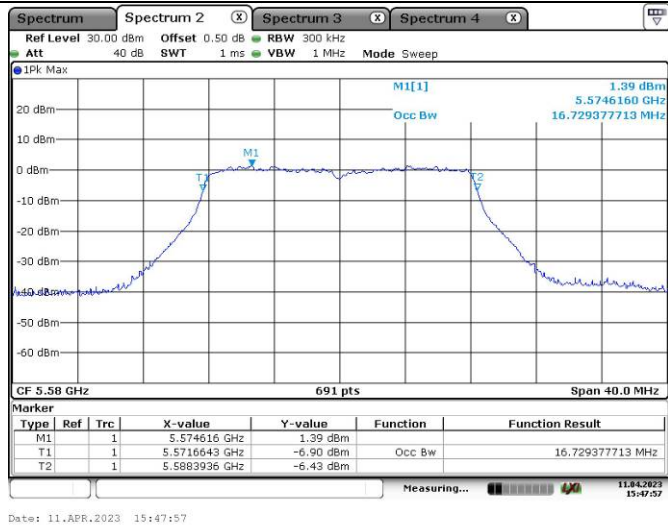
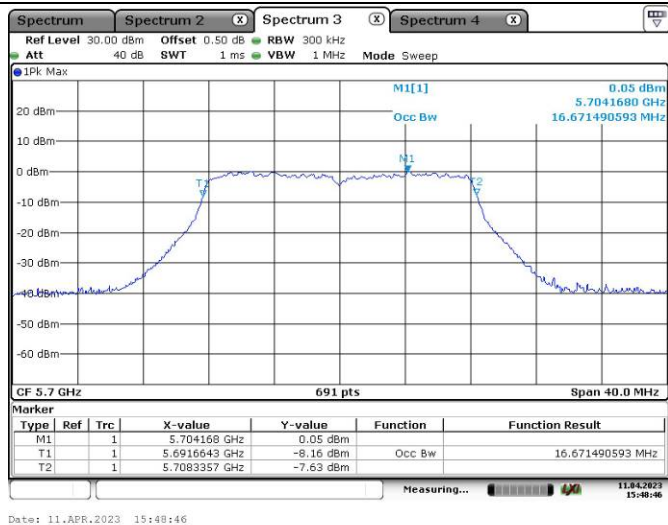
26dB Emission Bandwidth

802.11n ht40
Middle Channel802.11n ht40
Highest Channel802.11n ht40
Additional Channel

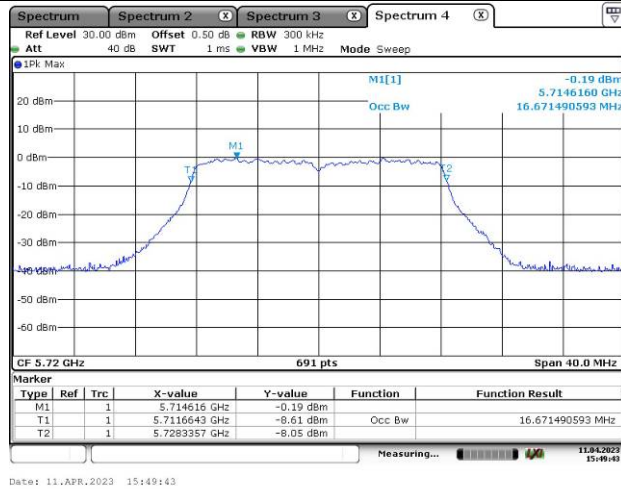
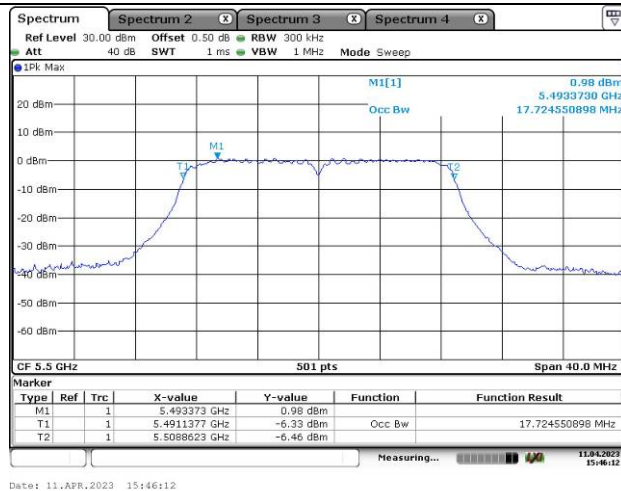
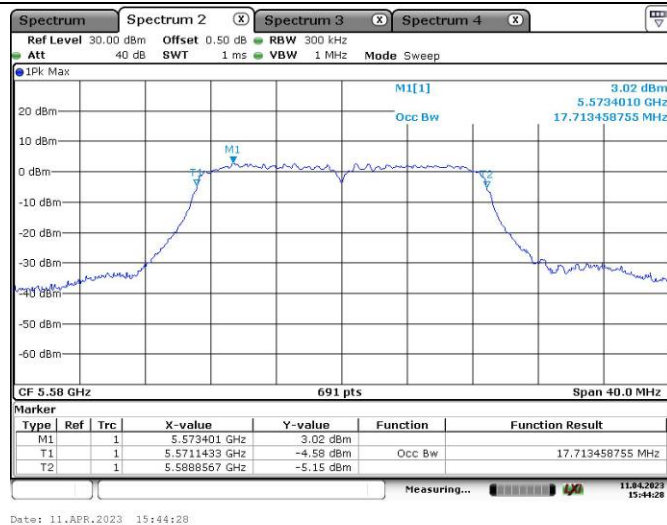
26dB Emission Bandwidth

802.11ac vht80
Lowest Channel802.11ac vht80
Highest Channel802.11ac vht80
Additional Channel

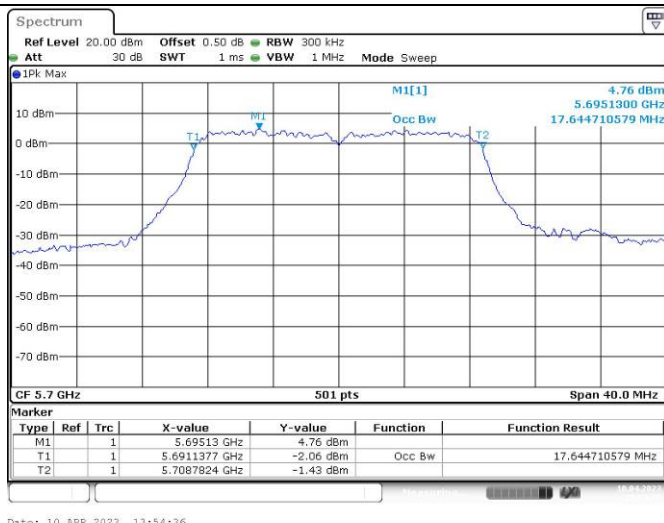
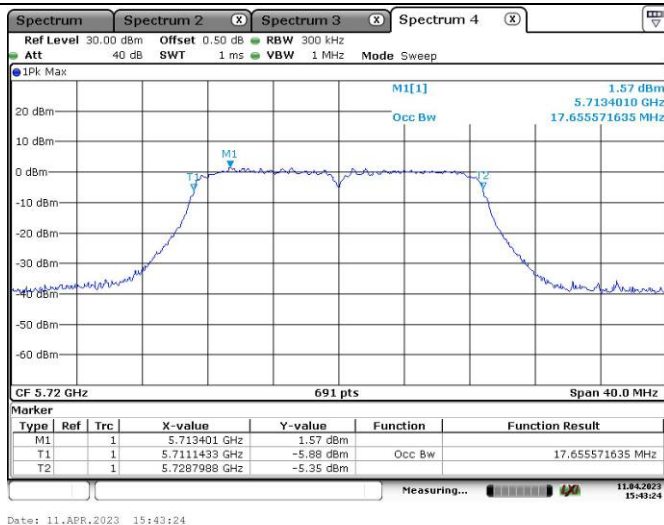
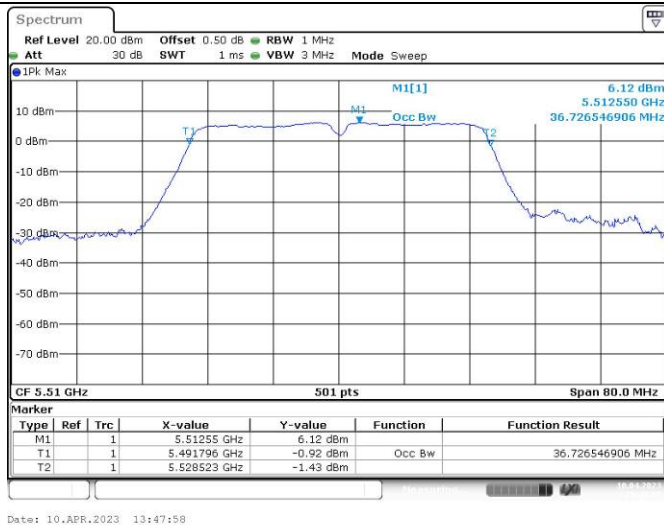
99% Emission Bandwidth

802.11a
Lowest Channel802.11a
Middle Channel802.11a
Highest Channel

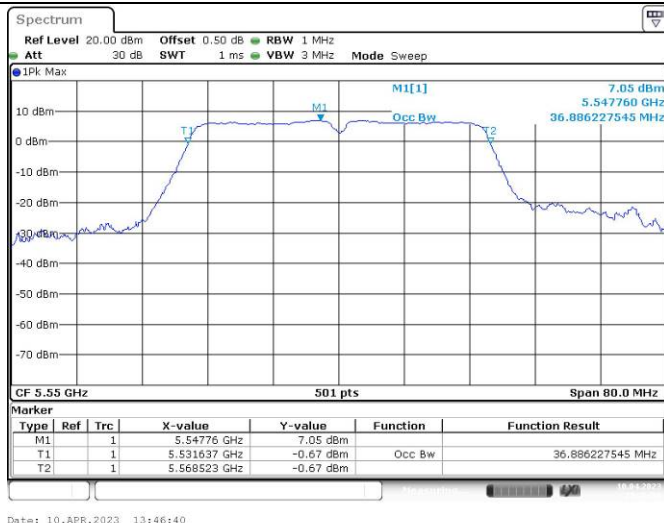
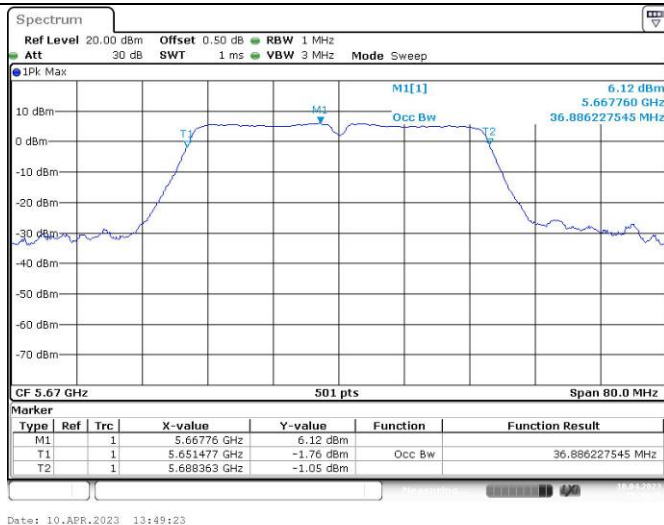
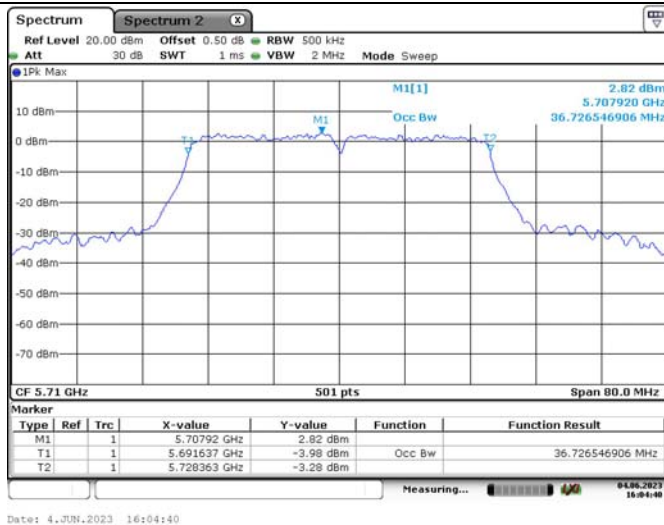
99% Emission Bandwidth

802.11a
Additional Channel802.11n ht20
Lowest Channel802.11n ht20
Middle Channel

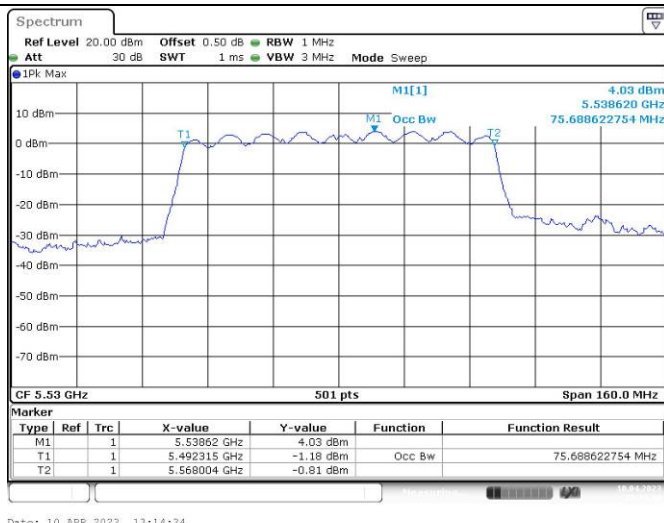
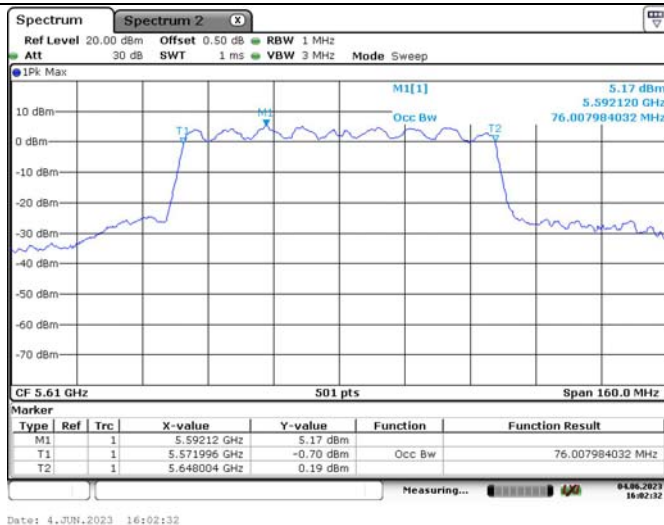
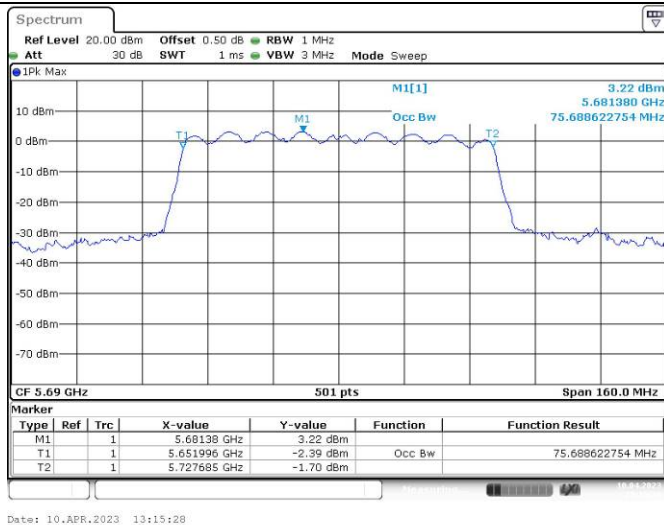
99% Emission Bandwidth

802.11n ht20
Highest Channel802.11n ht20
Additional Channel802.11n ht40
Lowest Channel

99% Emission Bandwidth

802.11n ht40
Middle Channel802.11n ht40
Highest Channel802.11n ht40
Additional Channel

99% Emission Bandwidth

802.11ac vht80
Lowest Channel802.11ac vht80
Middle Channel802.11ac vht80
Highest Channel

4.4 Maximum Conducted Output Power:

Serial Number:	21FA-1	Test Date:	2023/04/10
Test Site:	RF	Test Mode:	Transmitting
Tester:	Jim Wei	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	23.4	Relative Humidity: (%)	56	ATM Pressure: (kPa)	101.1
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	USB Wideband Power Sensor	U2021XA	MY54080015	2022/7/15	2023/7/14
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
eastsheep	Coaxial Attenuator	2W-SMA-JK-18G	21060301	Each time	N/A

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

5250-5350 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5260	11.37	11.81	14.61	24
	5280	11.24	11.61	14.44	24
	5320	10.66	11.05	13.87	24
802.11n ht20	5260	11.31	11.64	14.49	24
	5280	11.01	11.57	14.31	24
	5320	10.78	11.07	13.94	24
802.11n ht40	5270	11.32	11.72	14.53	24
	5310	10.85	11.23	14.05	24
802.11ac vht80	5290	10.61	10.92	13.78	24

Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$

5470-5725 MHz:

Test Modes	Test Frequency (MHz)	Max. Conducted Average Output Power (dBm)			
		Chain 0	Chain 1	Total	Limit
802.11a	5500	10.38	9.88	13.15	24
	5580	10.9	10.34	13.64	24
	5700	9.88	9.56	12.73	24
	5720	9.51	9.21	12.37	24
802.11n ht20	5500	11.31	10.9	14.12	24
	5580	11.82	11.32	14.59	24
	5700	11.81	11.58	14.71	24
	5720	11.59	11.07	14.35	24
802.11n ht40	5510	11.58	11.01	14.31	24
	5550	11.66	11.36	14.52	24
	5670	12.21	12.01	15.12	24
	5710	11.77	11.38	14.59	24
802.11ac vht80	5530	12.14	11.58	14.88	24
	5610	12.29	11.68	15.01	24
	5690	11.53	11.03	14.30	24

Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power measurements on IEEE 802.11 devices:
 Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$

4.5 Maximum power spectral density:

Serial Number:	21FA-1	Test Date:	2023/04/17
Test Site:	RF	Test Mode:	Transmitting
Tester:	Jim Wei	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24.6	Relative Humidity: (%)	62	ATM Pressure: (kPa)	100.5
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Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
zhuoxiang	Coaxial Cable	SMA-178	211001	Each time	N/A
R&S	Spectrum Analyzer	FSV40	101943	2022/7/25	2023/7/24
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A

* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data:

5250-5350 MHz:

Test Modes	Test Frequency (MHz)	Reading (dBm/MHz)		Duty cycle (dB)	Maximum Power Spectral Density (dBm/MHz)	
		Chain 0	Chain 1		Total	Limit
802.11a	5260	-0.72	-0.07	0.19	2.82	9
	5280	-0.77	-0.24	0.19	2.7	9
	5320	-1.54	-0.78	0.19	2.06	9
802.11n ht20	5260	-1.15	-0.18	0.12	2.49	9
	5280	-1.33	-0.38	0.12	2.3	9
	5320	-1.97	-1.07	0.12	1.63	9
802.11n ht40	5270	-3.88	-3.23	0.28	-0.25	9
	5310	-4.49	-3.93	0.28	-0.91	9
802.11ac vht80	5290	-6.88	-6.38	0.59	-3.02	9

Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:

Array Gain = $10 \log(N_{\text{ANT}}/N_{\text{SS}})$ dB

Directional gain= $5+3=8$ dBi

5470-5725 MHz:

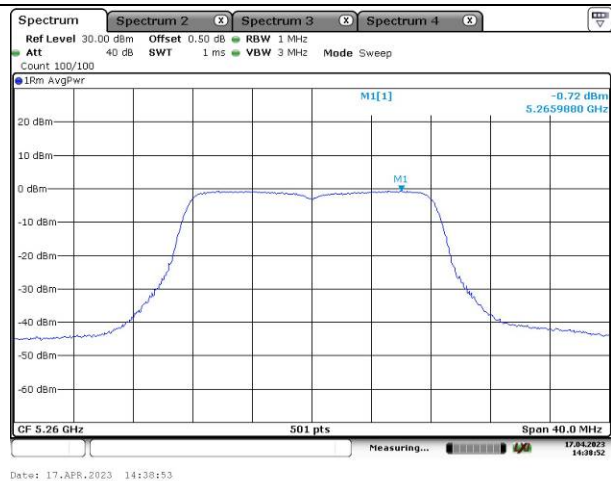
Test Modes	Test Frequency (MHz)	Reading (dBm/MHz)		Duty cycle (dB)	Maximum Power Spectral Density (dBm/MHz)	
		Chain 0	Chain 1		Total	Limit
802.11a	5500	-0.85	-1.95	0.19	1.84	9
	5580	-0.06	-1.33	0.19	2.55	9
	5700	-1.08	-2.46	0.19	1.48	9
	5720	-1.71	-2.69	0.19	1.03	9
802.11n ht20	5500	-0.48	-1.28	0.12	2.27	9
	5580	0.42	-0.44	0.12	3.14	9
	5700	0.27	-0.7	0.12	2.94	9
	5720	-0.07	-1.08	0.12	2.58	9
802.11n ht40	5510	-3.28	-4.09	0.28	-0.38	9
	5550	-2.55	-3.61	0.28	0.24	9
	5670	-1.99	-3.02	0.28	0.82	9
	5710	-2.57	-3.84	0.28	0.13	9
802.11ac vht80	5530	-5.42	-5.73	0.59	-1.97	9
	5610	-5	-5.38	0.59	-1.59	9
	5690	-6.03	-5.93	0.59	-2.38	9

Note: The device employed Cyclic Delay Diversity (CDD) for 802.11 MIMO transmitting, per KDB 662911 D01 Multiple Transmitter Output v02r01, for power spectral density (PSD) measurements on the devices:
 Array Gain = $10 \log(N_{\text{ANT}}/N_{\text{SS}})$ dB
 Directional gain= 5+3=8dBi

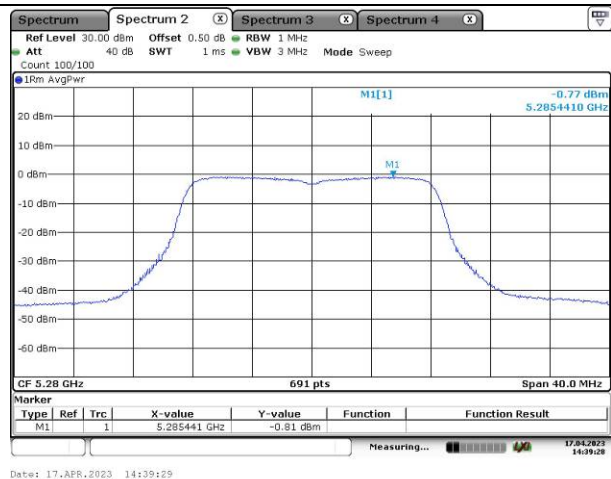
Chain 0:
5250-5350MHz:

Maximum power spectral density

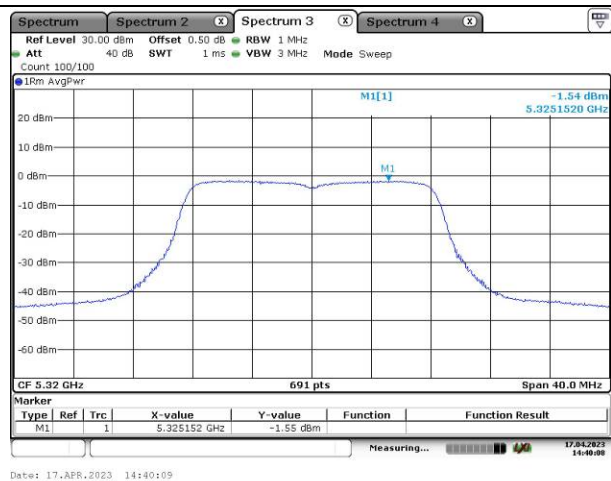
802.11a
Lowest Channel



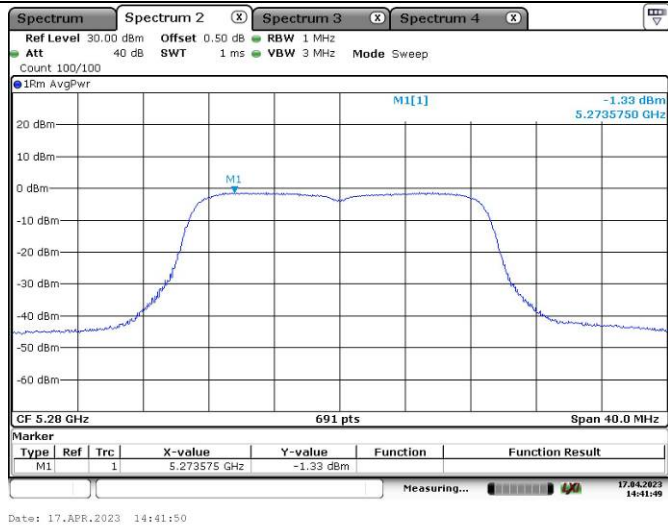
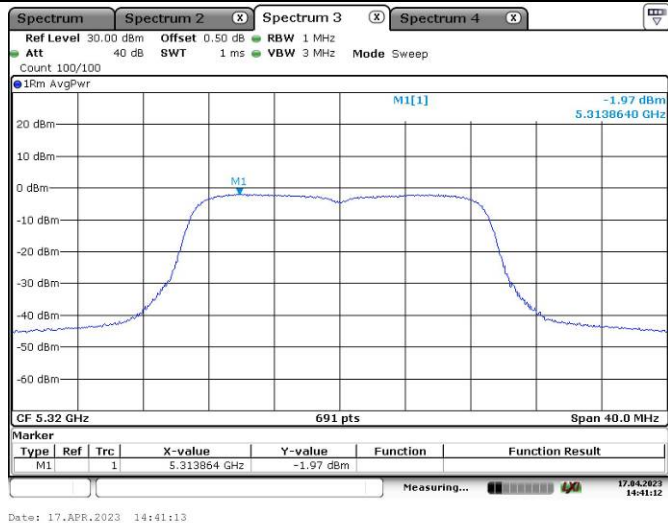
802.11a
Middle Channel



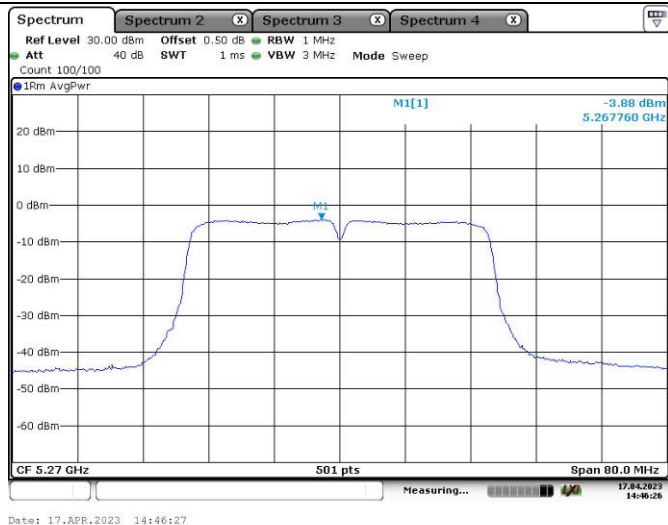
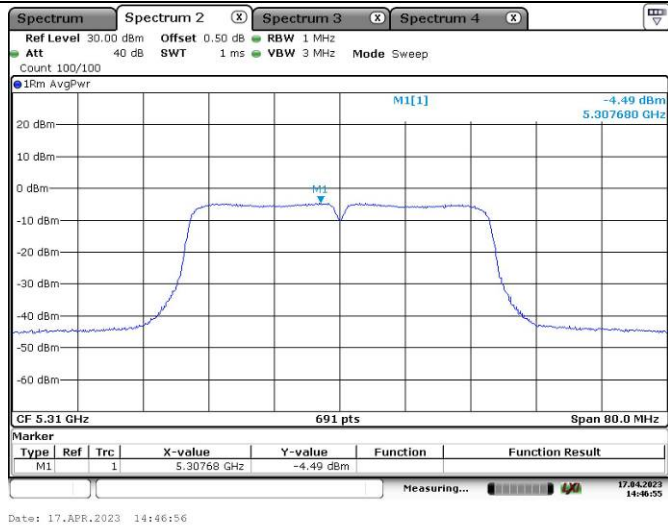
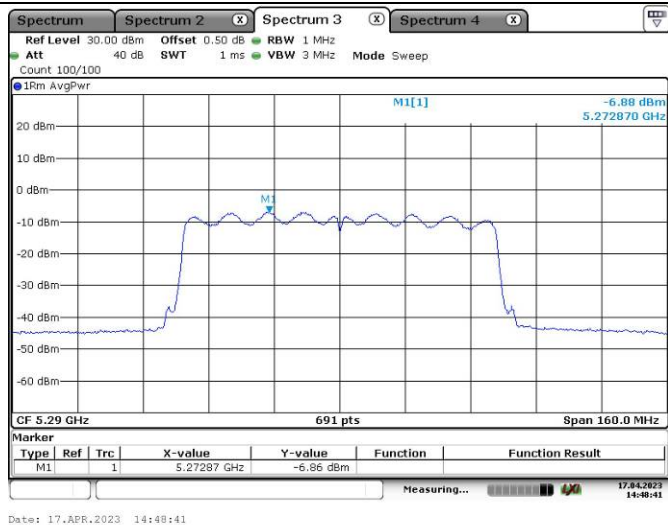
802.11a
Highest Channel



Maximum power spectral density

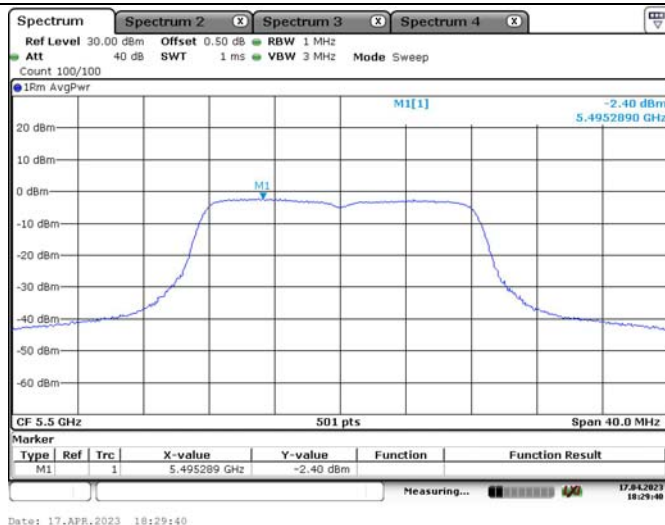
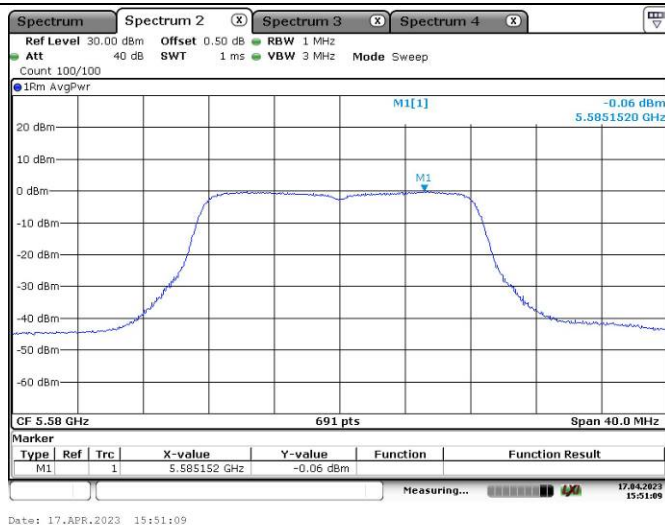
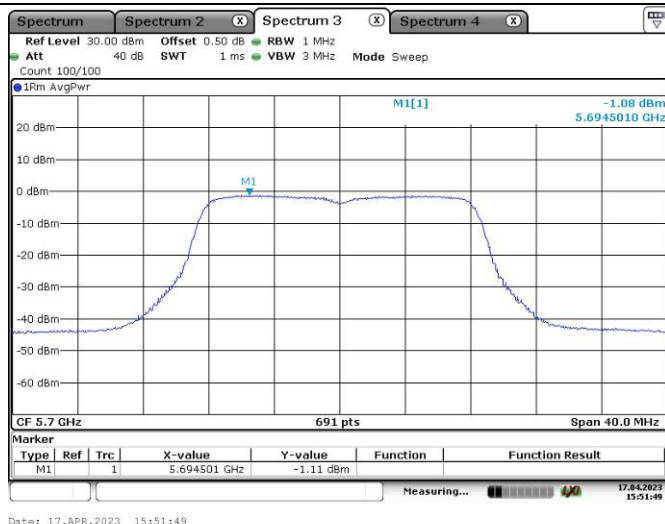
802.11n ht20
Lowest Channel802.11n ht20
Middle Channel802.11n ht20
Highest Channel

Maximum power spectral density

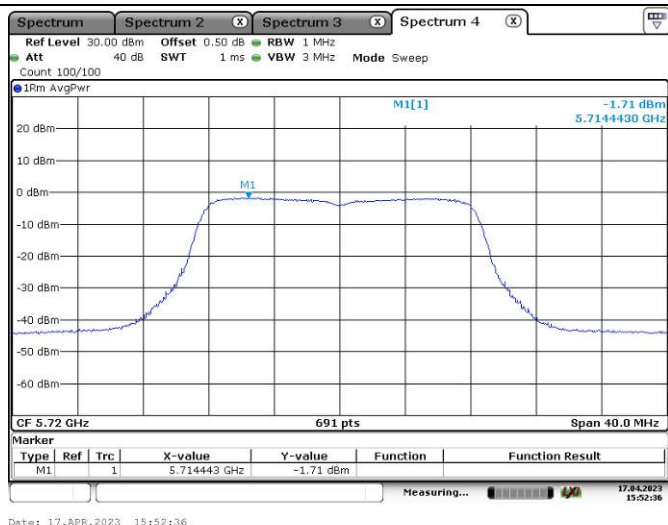
802.11n ht40
Lowest Channel802.11n ht40
Highest Channel802.11ac vht80
Middle Channel

5470-5725 MHz

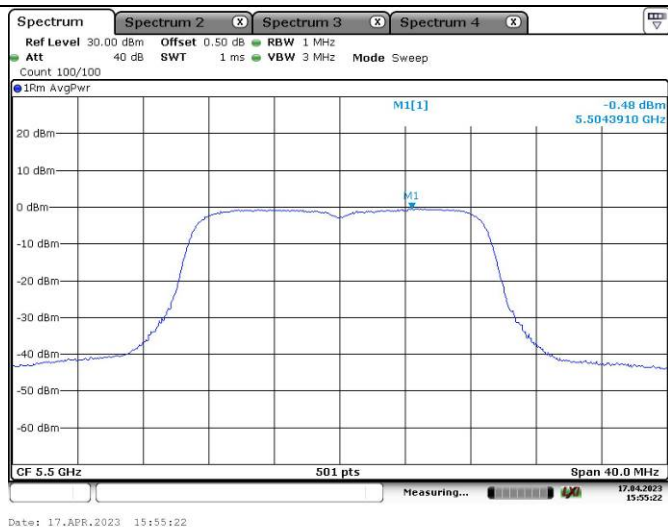
Maximum power spectral density

802.11a
Lowest Channel802.11a
Middle Channel802.11a
Highest Channel

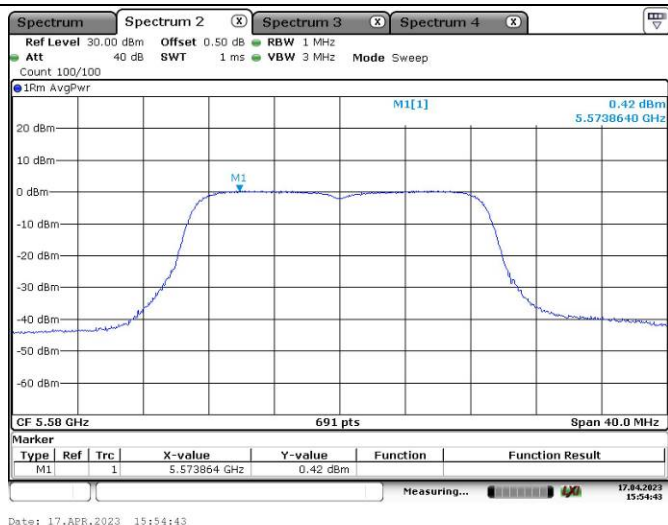
802.11a
Additional Channel



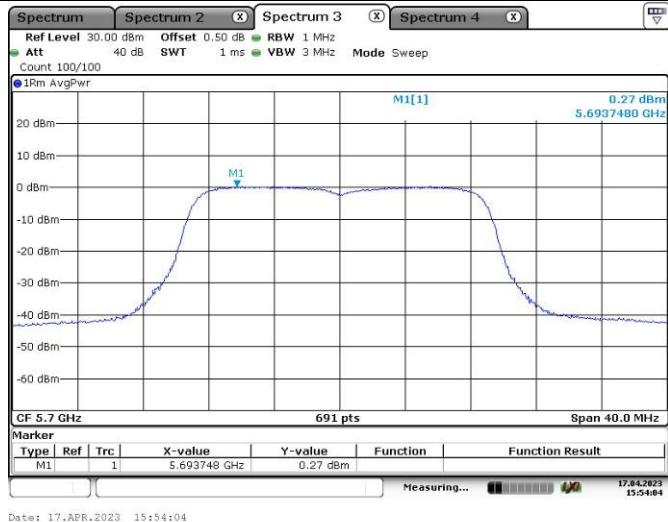
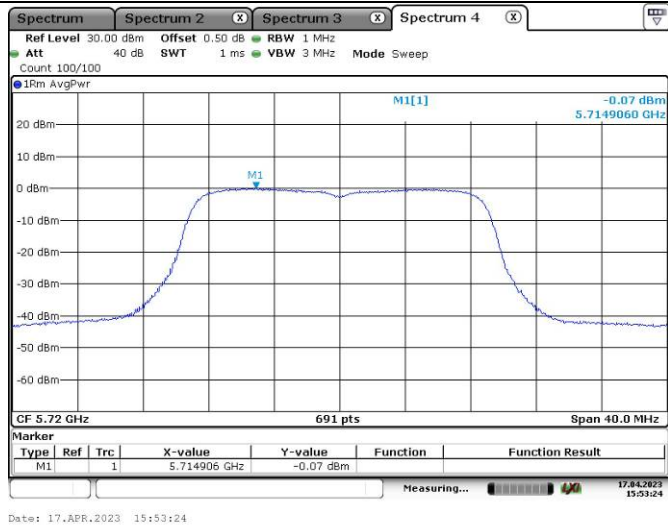
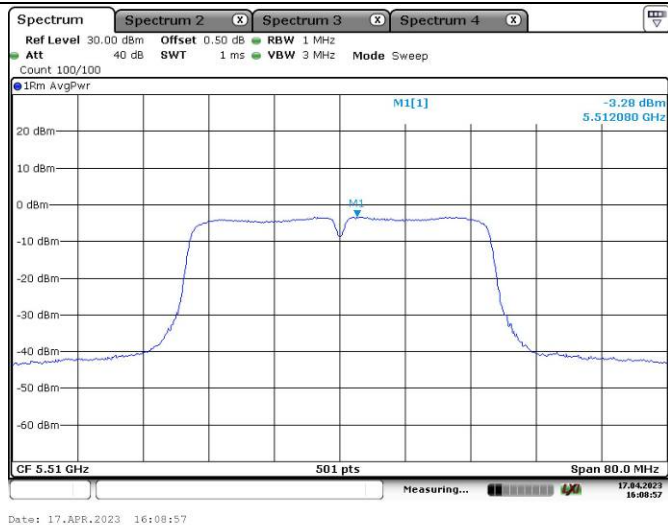
802.11n ht20
Lowest Channel



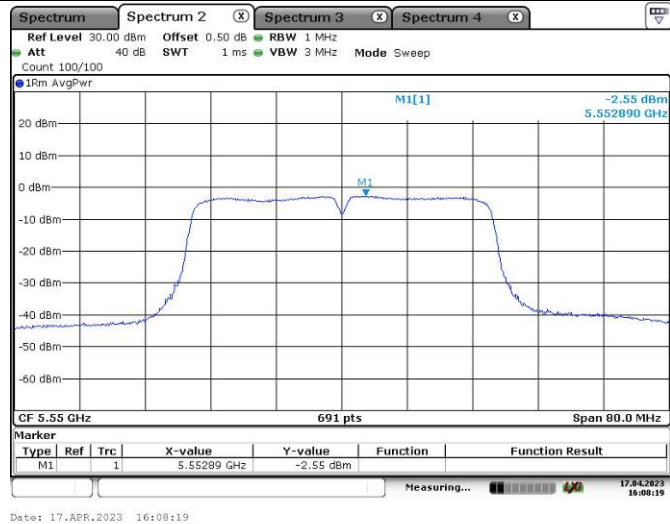
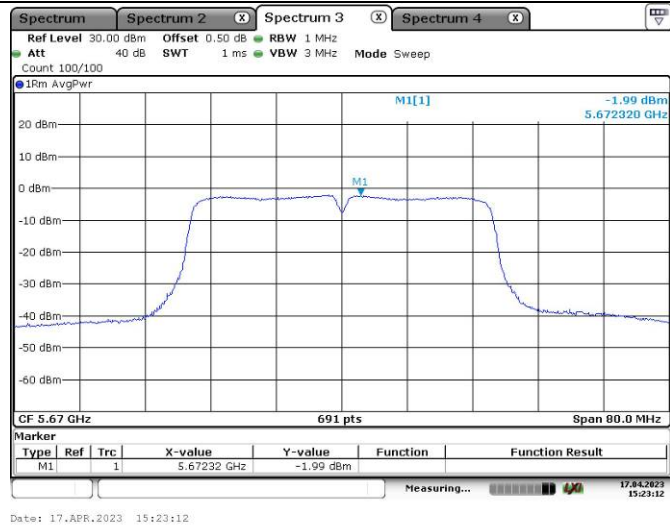
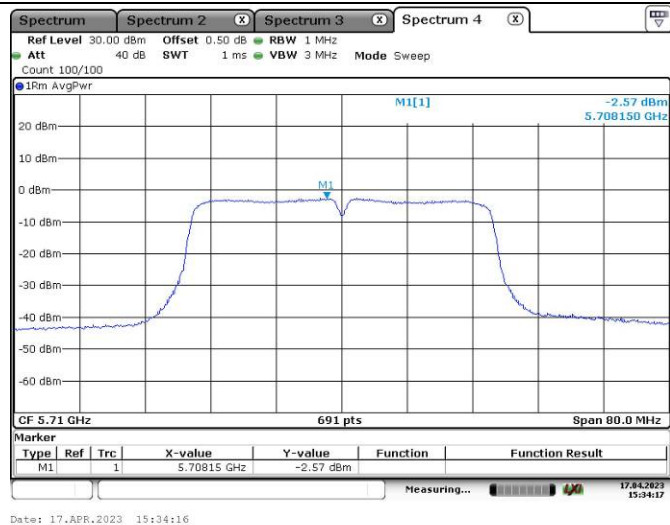
802.11n ht20
Middle Channel



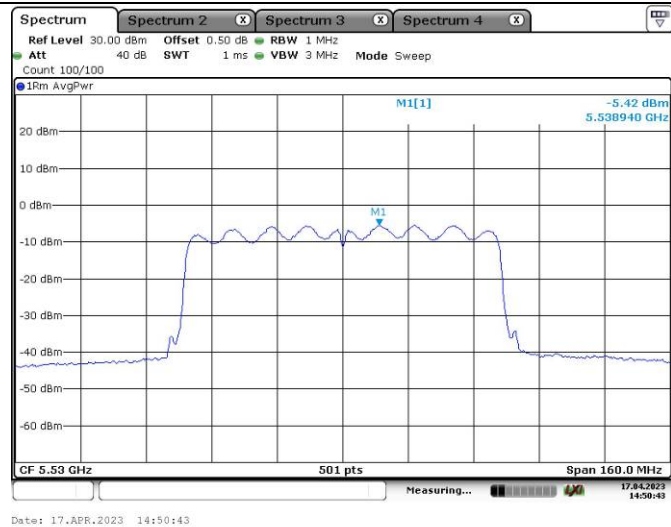
Maximum power spectral density

802.11n ht20
Highest Channel802.11n ht20
Additional Channel802.11n ht40
Lowest Channel

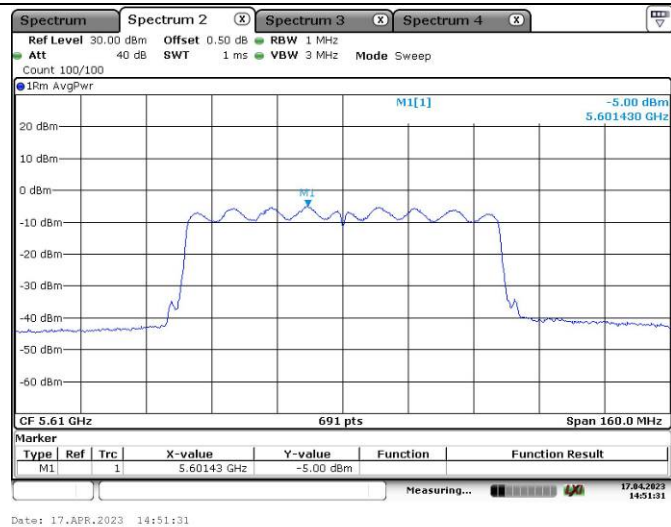
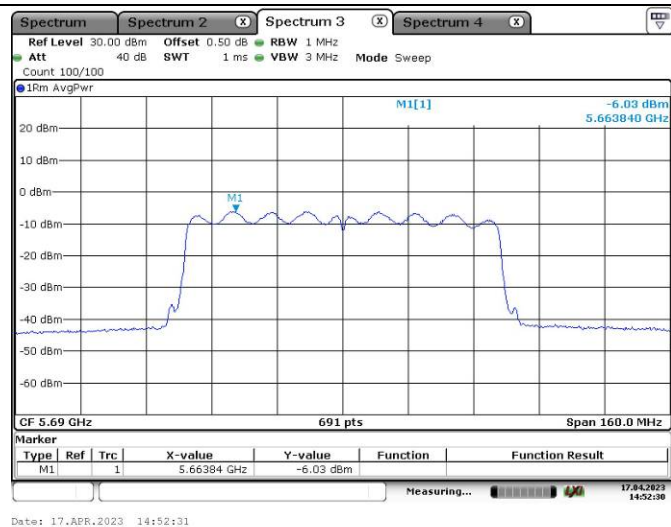
Maximum power spectral density

802.11n ht40
Middle Channel802.11n ht40
Highest Channel802.11n ht40
Additional Channel

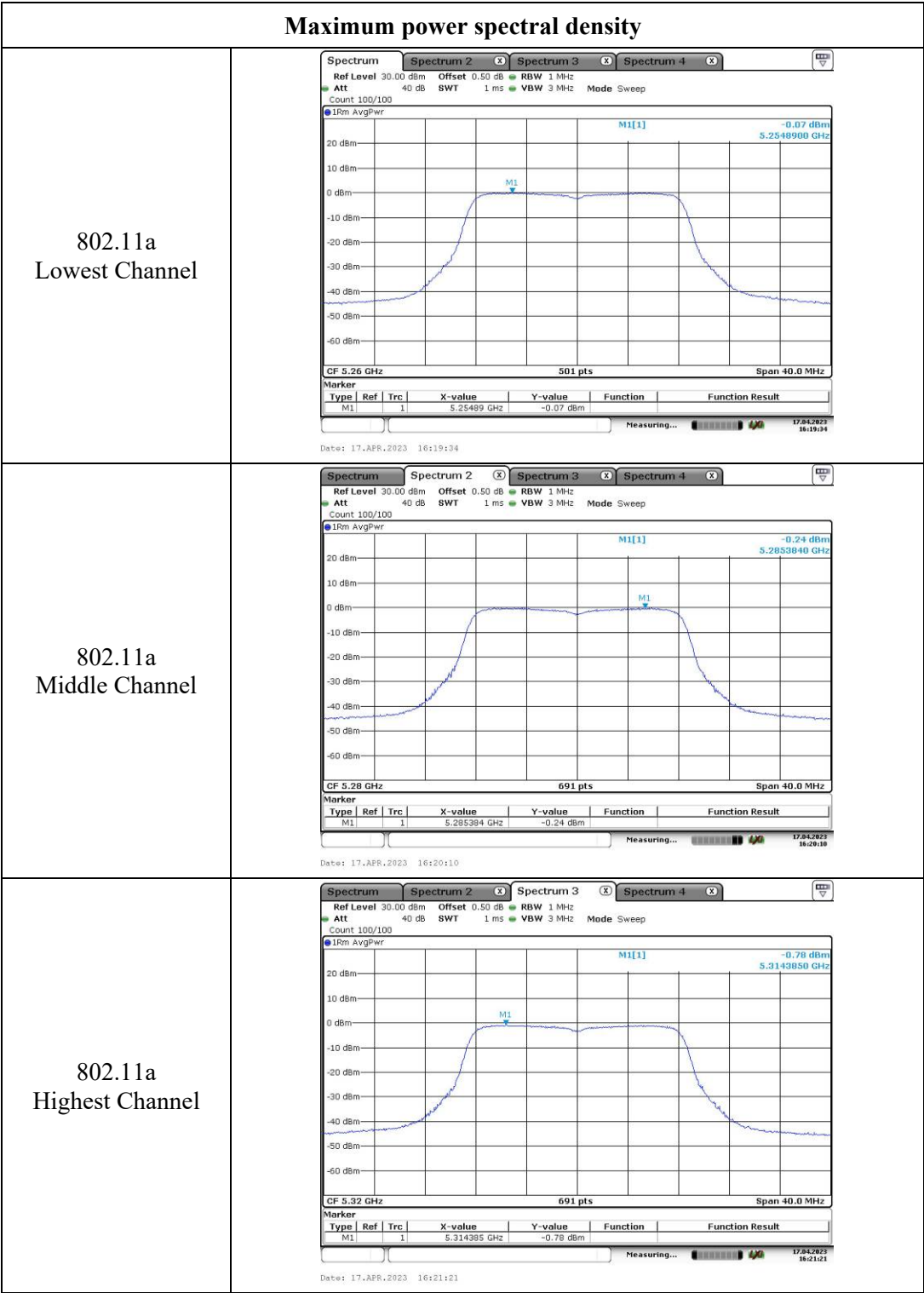
802.11ac vht80
Lowest Channel



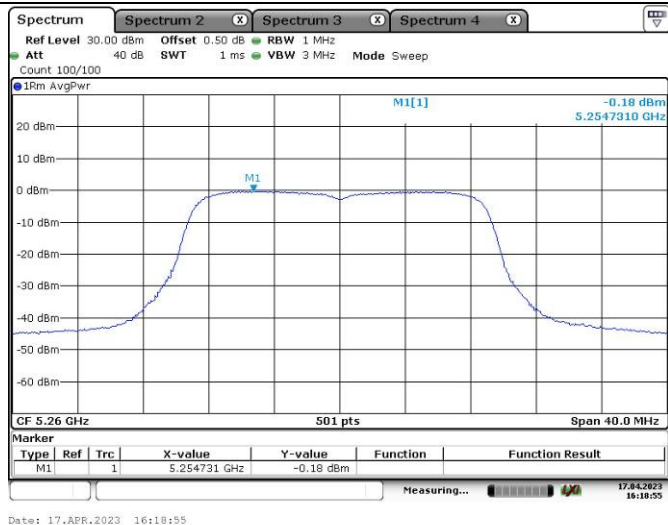
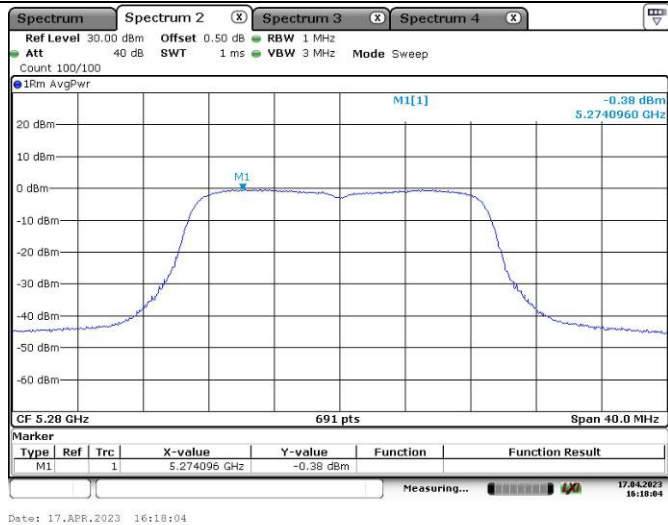
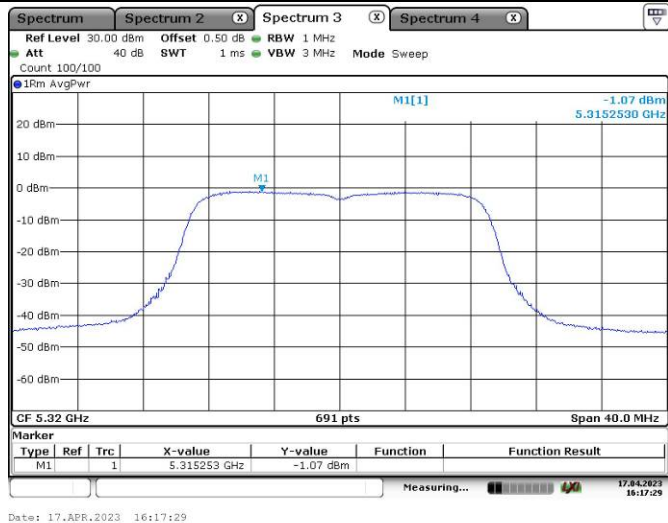
802.11ac vht80
Middle Channel

802.11ac vht80
Highest Channel

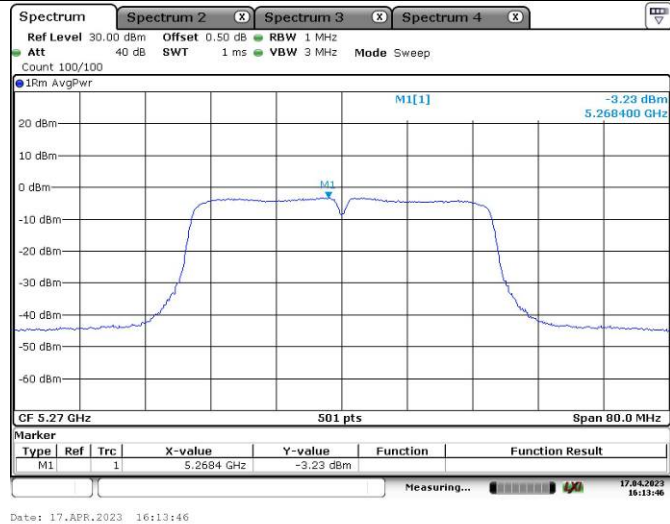
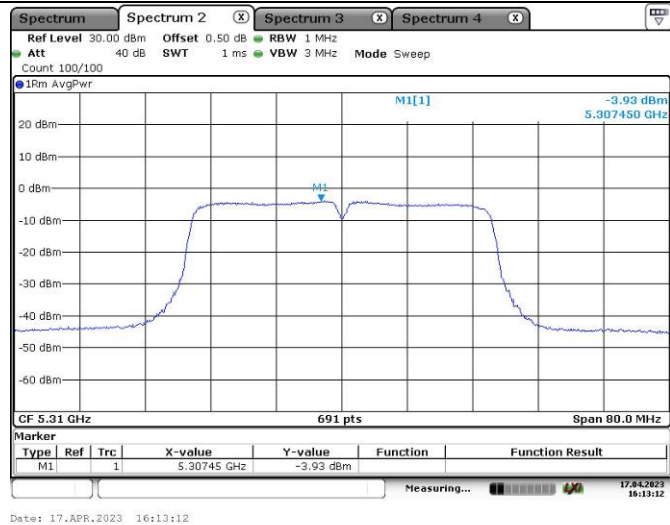
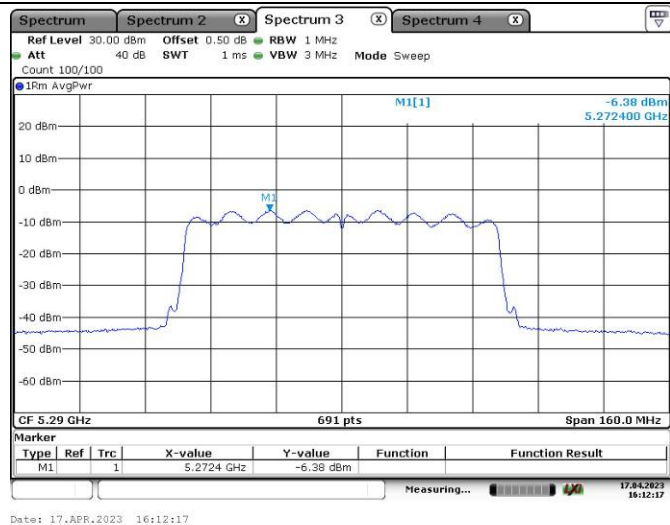
Chain 1:
5250-5350MHz:



Maximum power spectral density

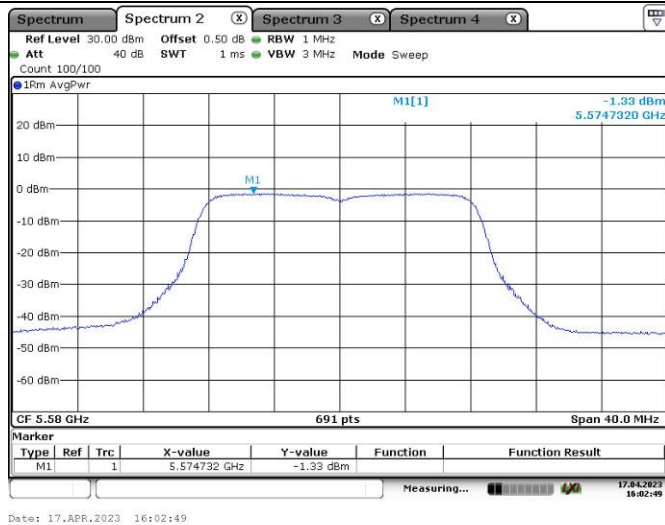
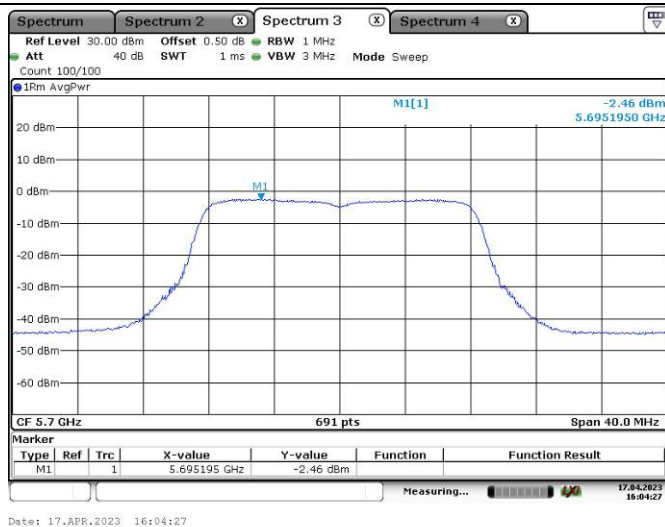
802.11n ht20
Lowest Channel802.11n ht20
Middle Channel802.11n ht20
Highest Channel

Maximum power spectral density

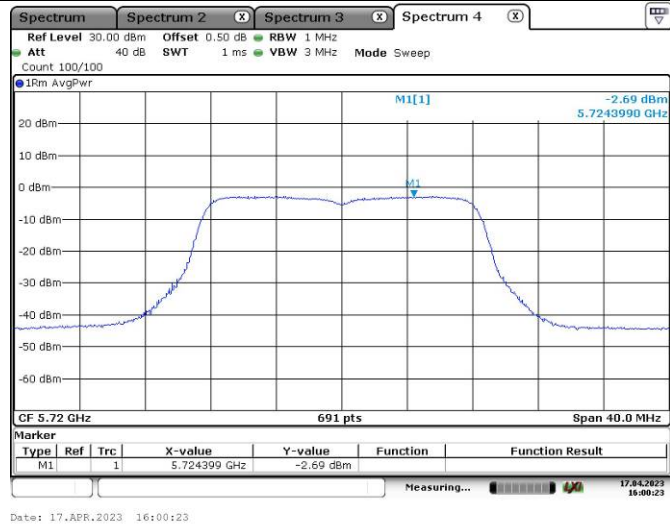
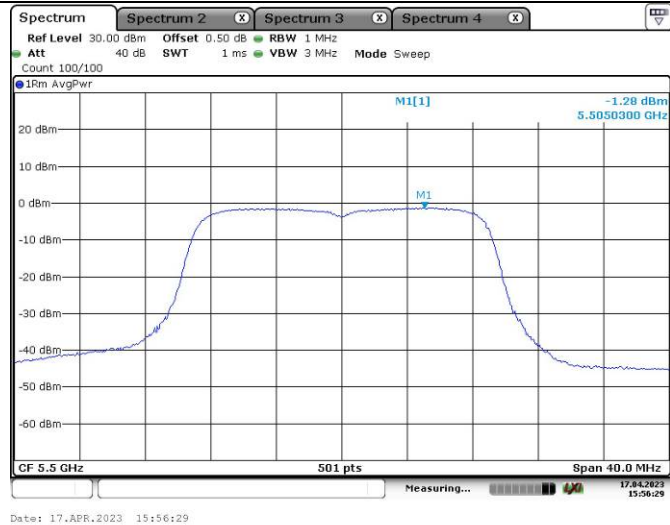
802.11n ht40
Lowest Channel802.11n ht40
Highest Channel802.11ac vht80
Middle Channel

5470-5725 MHz

Maximum power spectral density

802.11a
Lowest Channel802.11a
Middle Channel802.11a
Highest Channel

Maximum power spectral density

802.11a
Additional Channel802.11n ht20
Lowest Channel802.11n ht20
Middle Channel