



Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

TEST REPORT

FCC PART 15 SUBPART E 15.407

Report Reference No..... : CTA22012500101

FCC ID..... : 2AKZY-JZ807A

Compiled by

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Approved by

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Eric Wang

Date of issue..... : Jan. 27, 2022

Testing Laboratory Name..... : Shenzhen CTA Testing Technology Co., Ltd.

Address..... : Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name..... : SHENZHEN JIZHAO INFORMATION TECHNOLOGY CO.,LTD.

Address..... : BUILDING NO.1ZHONGKENUO INDUSTRIAL PARK,HEZHOU ROAD XIXIANG STREET BAOAN DISTRICT,SHENZHEN CITY,CHINA

Test specification..... :

Standard..... : FCC Part 15 Subpart E 15.407

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Test item description..... : Tablet PC

Trade Mark..... : N/A

Manufacturer..... : SHENZHEN JIZHAO INFORMATION TECHNOLOGY CO.,LTD.

Model/Type reference..... : JZ807A

Listed Models : AMICUS-Prime, PowerPong-Omega, JZ708

Modulation : OFDM

Frequency..... : From 5180MHz-5240MHz

Rating..... : DC 3.85V From Battery and DC 5V From external circuit

Result..... : PASS

Shenzhen CTA Testing Technology Co., Ltd.

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TEST REPORT

Equipment under Test : Tablet PC

Model /Type : JZ807A

Series Model No. AMICUS-Prime, PowerPong-Omega, JZ708

Applicant : SHENZHEN JIZHAO INFORMATION TECHNOLOGY CO.,LTD.

Address : BUILDING NO.1ZHONGKENUO INDUSTRIAL PARK,HEZHOU
ROAD XIXIANG STREET BAOAN DISTRICT,SHENZHEN
CITY,CHINA

Manufacturer : Dongguan Xilan Technology Co., Ltd.

Address : Room 01,room 203,building 2,Tian An digital city, Fenggang
section,208 Dongshen Road,Dongguan City,Guangdong
Province,China

Test Result:

PASS

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Part 15, Subpart E(15.407) - for 802.11a/n/ac, the test procedure follows the FCC KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

KDB 789033: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E .

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.

1.2. Test Description

FCC Part 15 Subpart E(15.407)			
Test Item	Test require	Result	Test Engineer
Antenna Requirement	15.203	Pass	Kevin Liu
Conducted Emission	15.207	Pass	Kevin Liu
Band Edge Emissions	15.407(b)	Pass	Kevin Liu
26dB Bandwidth & 99% Bandwidth	15.407(a)	Pass	Kevin Liu
6dB Bandwidth (only for UNII-3)	15.407(e)	N/A	N/A
Maximum Conducted Output Power	15.407(a)	Pass	Kevin Liu
Maximum Power Spectral Density	15.407(a)	Pass	Kevin Liu
Transmitter Radiated Spurious Emission	15.407(b)	Pass	Kevin Liu
Peak Excursion	15.407(a)	Pass	Kevin Liu
Frequency Stability	15.407(g)	Pass	Kevin Liu
Transmitter Power Control	15.407(h)(1)	N/A	N/A
Conducted Spurious Emission	15.407	Pass	Kevin Liu

Note:

- 1.The measurement uncertainty is not included in the test result.
2. Transmit Power Control was not tested as the maximum EIRP is less than 500mW (27dBm) in U-NII Bands 2&3.
3. "N/A" is an abbreviation for "Not Applicable".

1.3. Test Facility

1.3.1 Address of the test laboratory

Shenzhen CTA Testing Technology Co., Ltd.

Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community, Fuhai Street, Bao'an District, Shenzhen, China

1.3.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 517856 Designation Number: CN1318

Shenzhen CTA Testing Technology Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6534.01

Shenzhen CTA Testing Technology Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

1.4. 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 compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen CTA Testing Technology Co., Ltd. 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.

Hereafter the best measurement capability for Shenzhen CTA Testing Technology Co., Ltd.:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Radiated Emission	18-40GHz	5.38 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.5. Environmental conditions

Normal Condition	Temperature	15 °C to +35 °C
	Relative humidity	20 % to 75 %.
	Voltage	The equipment shall be the nominal voltage for which the equipment was designed.
Extreme Condition	Temperature	Measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer

Normal Condition	T _N =Normal Temperature	25 °C
Extreme Condition	T _L =Lower Temperature	-20 °C
	T _H =Higher Temperature	50 °C

2. GENERAL INFORMATION

2.1. General Description of EUT

Test Sample Number:	1-1-1(Normal Sample),1-1-2(Engineering Sample)
Product Name:	Tablet PC
Trademark:	N/A
Model/Type reference:	JZ807A
Listed models:	AMICUS-Prime, PowerPong-Omega, JZ708
Model Difference:	All models have the same circuit and RF module, except for the different appearance shape.
Power supply:	DC 3.85V From Battery and DC 5V From external circuit
Adapter information (Auxiliary test supplied by testing Lab)	Model: EP-TA20CBC Input:AC 100-240V 50/60Hz Output:DC 5V 2A
Hardware version:	R863-RK3566-V1.0-E2
Software version:	V1.0

Technical index for 5G WIFI					
Operation Band:	☒ U-NII-1	☐ U-NII-2A	☐ U-NII-2C	☐ U-NII-3	
Operation Frequency Range:	U-NII-1:	5150MHz~5250MHz			
	U-NII-2A:	/			
	U-NII-2C:	/			
	U-NII-3:	/			
Support bandwidth:	802.11a	☒ 20MHz			
	802.11n	☒ 20MHz	☒ 40MHz		
	802.11ac	☒ 20MHz	☒ 40MHz	☒ 80MHz	☐ 160MHz
Modulation:	802.11a: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM)				
Bit Rate of Transmitter:	802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150Mbps 802.11ac: at most 433.3 Mbps				
Max Peak Output Power:	802.11a: 6.71 dBm 802.11n (HT20): 6.70 dBm 802.11n (HT40): 5.89 dBm 802.11ac (HT20):5.99dBm 802.11ac (HT40): 6.54 dBm 802.11ac (HT80): 6.69 dBm				
Antenna type:	FPC Antenna				
Antenna gain:	0.75dBi				

2.2. Operation state

➤ Frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Band	Test Channel	20MHz		40MHz		80MHz	
		Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
I	CH _L	36	5180	38	5190	-	-
	CH _M	40	5200	-	-	42	5210
	CH _H	48	5240	46	5230	-	-

➤ Data Rated

Preliminary tests were performed in different data rate, and found which the below bit rate is worst case mode, so only show data which it is a worst case mode.

Mode	Data rate (worst mode)
802.11a	6Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0
802.11ac(HT20)/(HT40)/(HT80)	MCS0

➤ Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the WLAN AP under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

2.3. Measurement Instruments List

Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2021/08/06	2022/08/05
LISN	R&S	ENV216	CTA-314	2021/08/06	2022/08/05
EMI Test Receiver	R&S	ESPI	CTA-307	2021/08/06	2022/08/05
EMI Test Receiver	R&S	ESCI	CTA-306	2021/08/06	2022/08/05
Spectrum Analyzer	Agilent	N9020A	CTA-301	2021/08/06	2022/08/05
Spectrum Analyzer	R&S	FSP	CTA-337	2021/08/06	2022/08/05
Vector Signal generator	Agilent	N5182A	CTA-305	2021/08/06	2022/08/05
Analog Signal Generator	R&S	SML03	CTA-304	2021/08/06	2022/08/05
Universal Radio Communication	CMW500	R&S	CTA-302	2021/08/06	2022/08/05
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2021/08/06	2022/08/05
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2021/08/07	2022/08/06
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2021/08/07	2022/08/06
Loop Antenna	Zhinan	ZN30900C	CTA-311	2021/08/07	2022/08/06
Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2021/08/06	2022/08/05
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2021/08/06	2022/08/05
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2021/08/06	2022/08/05
Directional coupler	NARDA	4226-10	CTA-303	2021/08/06	2022/08/05
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2021/08/06	2022/08/05
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2021/08/06	2022/08/05
Automated filter bank	Tonscend	JS0806-F	CTA-404	2021/08/06	2022/08/05
Power Sensor	Agilent	U2021XA	CTA-405	2021/08/06	2022/08/05
Amplifier	Schwarzbeck	BBV9719	CTA-406	2021/08/06	2022/08/05
Spectrum Analyzer	R&S	FSV40-N	CTA-407	2021/08/06	2022/08/05
Pre-Amplifier	Schwarzbeck	BBV-9721	CTA-408	2021/08/06	2022/08/05
Horn Antenna	Schwarzbeck	BBHA 9170	CTA-409	2021/08/06	2022/08/05

Note:

1)The Cal. Interval was one year.

2)The cable loss has calculated in test result which connection between each test instruments.

3. TEST ITEM AND RESULTS

3.1. Antenna Requirement

Standard Requirement

FCC CFR Title 47 Part 15 Subpart C Section 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, 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.

Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

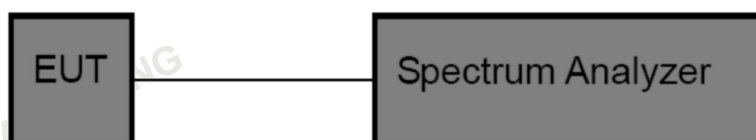
3.2. Conducted Output Power Test

Limit

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

FCC Part 15 Subpart E(15.407)		
Test Item	Limit	Frequency Range(MHz)
Conducted Output Power	Fixed: 1 Watt (30dBm) Mobile and Portable: 250mW (24dBm)	5150~5250
	250mW (24dBm)	5250~5350
	250mW (24dBm)	5470~5725
	1 Watt (30dBm)	5725~5850

Test Configuration



Test Procedure

1. The EUT was tested according to section 3 of KDB 789033 D02 General UNII Test Procedures New Rules V02r01.
2. The maximum conducted output power may be measured using a broadband AVG RF power meter.
3. Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
4. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
5. Record the measurement data.

Test Mode

Please refer to the clause 2.2.

Test Result

Band	Test Mode	Channel (MHz)	Output Power (dBm)	Limit(MHz)	Result
U-NII-1	802.11a	5180	6.63	24	Pass
		5200	6.65		
		5240	6.71		
	802.11n(HT20)	5180	6.52		
		5200	6.60		
		5240	6.70		
	802.11n(HT40)	5190	5.28		
		5230	5.89		
	802.11ac(HT20)	5180	5.99		
		5200	5.32		
		5240	5.93		
	802.11ac(HT40)	5190	6.13		
		5230	6.54		
	802.11ac(HT80)	5210	6.69		
Remark: The EUT provides one antennas for transmitting and receiving. Gain=-1.0dBi< 6dBi So P _{out} =P _{limit}					

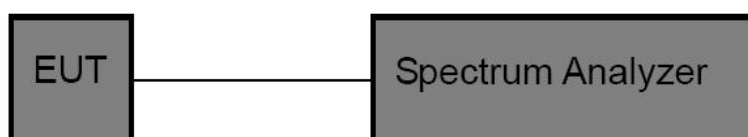
3.3. Maximum Power Spectral Density Test

Limit

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

FCC Part 15 Subpart E(15.407)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	Other than Mobile and Portable : 17dBm/MHz Mobile and Portable : 11dBm/MHz	5150~5250
	11dBm/MHz	5250~5350
	11dBm/MHz	5470~5725
	30dBm/500kHz	5725~5850

Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Set analyser centre frequency to transmitting frequency.

(3) Set the span to encompass the entire emissions bandwidth (EBW)(alternatively, the entire 99% OBW) of the signal.

(4) Set the RBW to: 1 MHz

(5) Set the VBW to: 3 MHz

(6) Detector: RMS

(7) Trace: Max Hold

(7) Sweep time: auto

(8) Trace average at least 100 traces in power averaging.

(9) User the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.

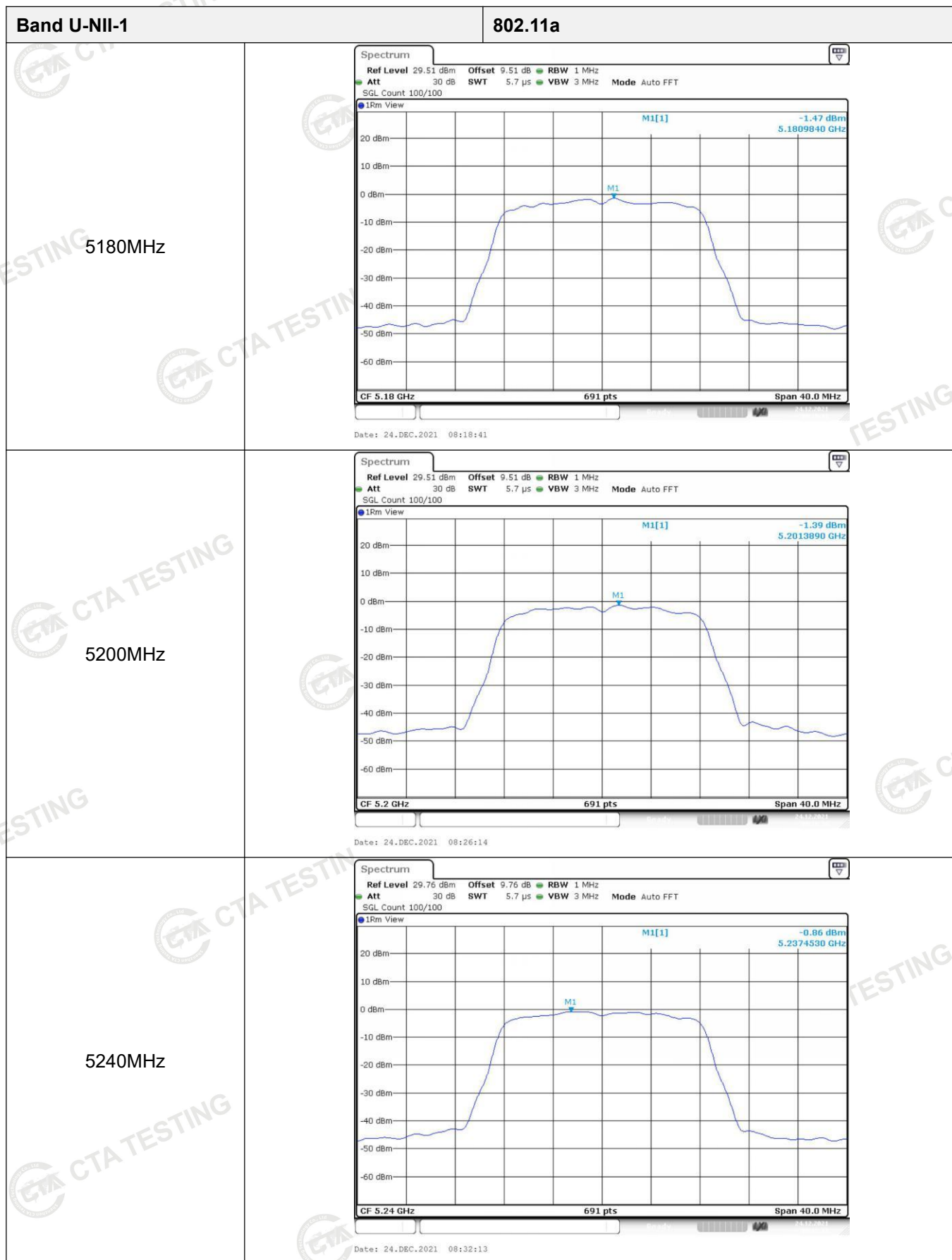
NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

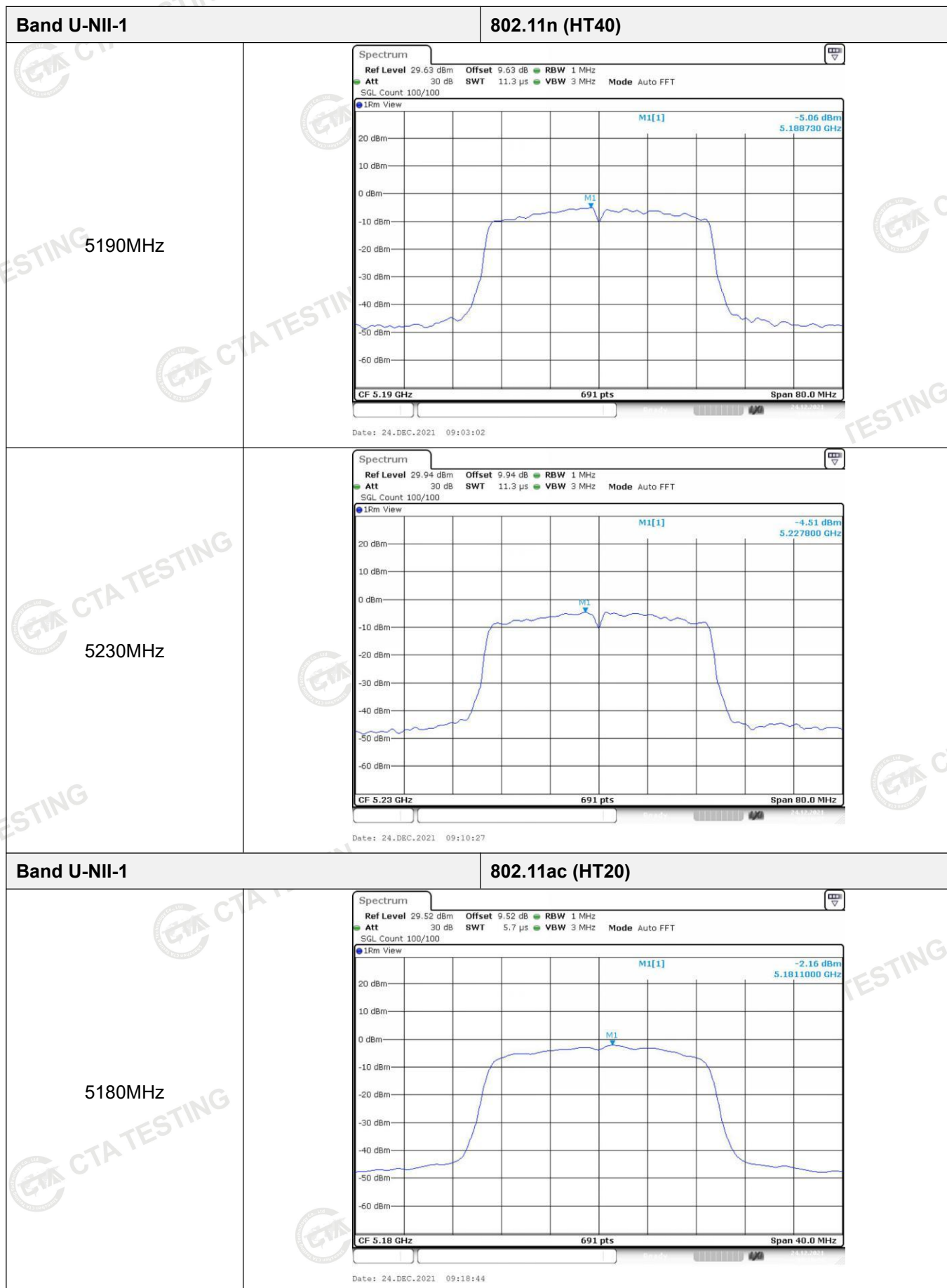
Please refer to the clause 2.2.

Test Result

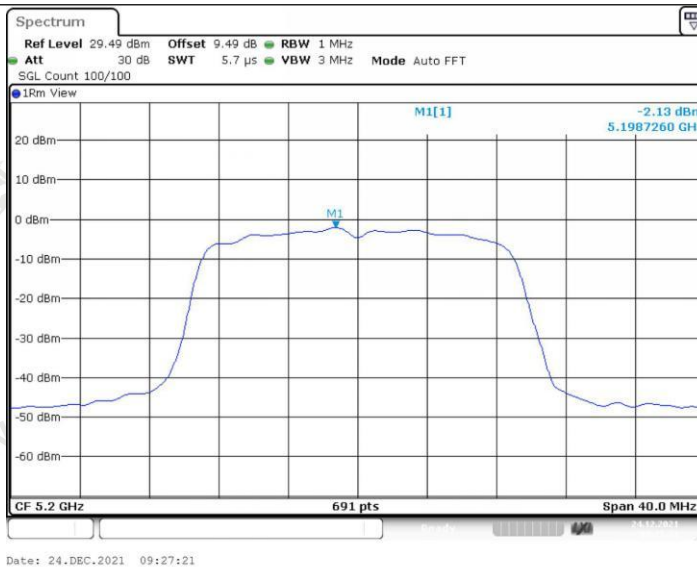
Band	Test Mode	Channel (MHz)	Power Spectral Density (dBm/MHz)	Limit(dBm/MHz)	Result
U-NII-1	802.11a	5180	-1.47	11	Pass
		5200	-1.39		
		5240	-0.86		
	802.11n(HT20)	5180	-2.09		
		5200	-1.63		
		5240	0.31		
	802.11n(HT40)	5190	-5.06		
		5230	-4.51		
	802.11ac(HT20)	5180	-2.16		
		5200	-2.13		
		5240	-1.95		
	802.11ac(HT40)	5190	-5.5		
		5230	-4.83		
	802.11ac(HT80)	5210	-7.51		







5200MHz



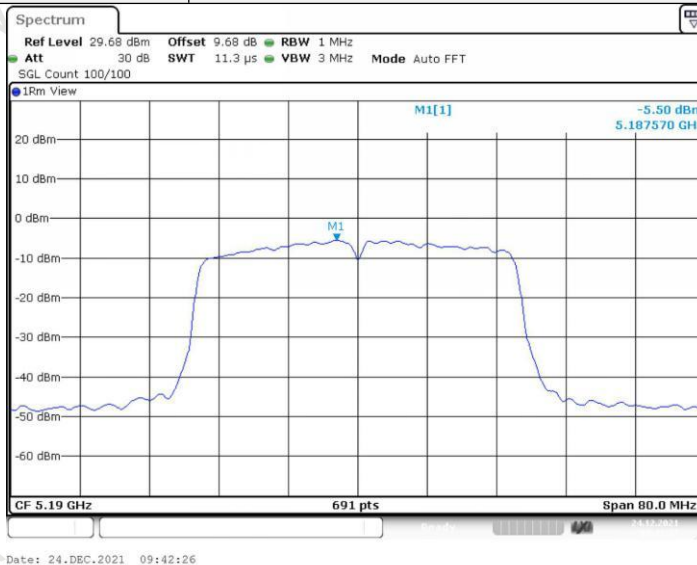
5240MHz



Band U-NII-1

802.11ac (HT40)

5190MHz





Band U-NII-1

802.11ac (HT80)



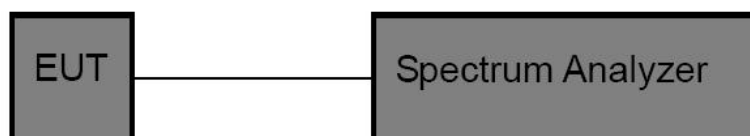
3.4. 26dB Bandwidth and 99% Occupied Bandwidth Test

Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

FCC Part 15 Subpart C(15.407)		
Test Item	Limit	Frequency Range (MHz)
26 dB Bandwidth	N/A	5150~5250
		5250~5350
		5470~5725
6 dB Bandwidth	>500kHz	5725~5850

Test Configuration



Test Procedure

1. According KDB 789033 D02 – Section C
2. Connect the antenna port(s) to the spectrum analyzer input.
3. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
 Center Frequency = Channel center frequency
 Span = 2 x emission bandwidth
 RBW = 1% to 5% of the emission bandwidth
 VBW > 3 x RBW
 Sweep time = auto couple
 Detector = Peak
 Trace mode = max hold
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission, and use the 99 % power bandwidth function of the instrument

The setting of the spectrum analyser as below:

26dB Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
Span	>26 dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW>RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto
99% Occupied Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
RBW	1% to 5% of the OBW
VBW	$\geq 3\text{RBW}$
Detector	Peak
Trace	Max Hold

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

Test Mode

Please refer to the clause 2.2.

Test Results

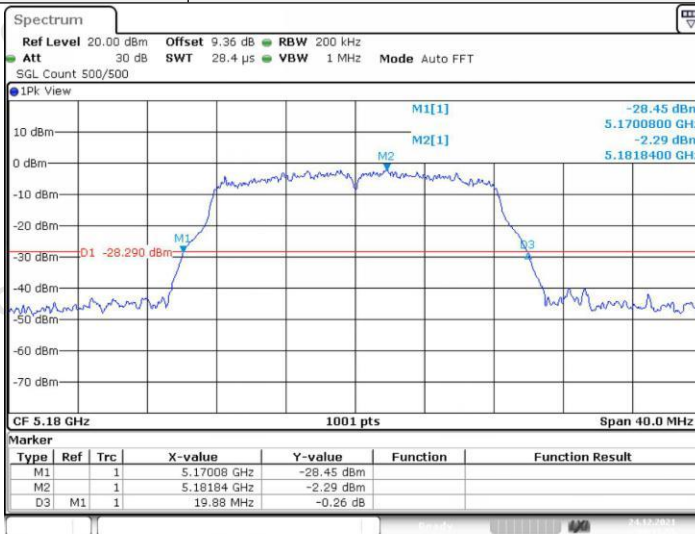
Band	Test Mode	Channel (MHz)	26dB Bandwidth [MHz]	99% Occupied bandwidth (MHz)	Result
U-NII-1	802.11a	5180	19.88	17.023	Pass
		5200	19.96	16.983	Pass
		5240	19.76	16.943	Pass
	802.11n(HT20)	5180	19.88	17.982	Pass
		5200	20.04	17.822	Pass
		5240	20.00	17.862	Pass
	802.11n(HT40)	5190	40.16	36.284	Pass
		5230	40.88	36.044	Pass
	802.11ac(HT20)	5180	19.96	17.782	Pass
		5200	19.92	17.942	Pass
		5240	20.08	17.742	Pass
	802.11ac(HT40)	5190	40.64	36.204	Pass
		5230	40.56	35.964	Pass
	802.11ac(HT80)	5210	79.52	75.285	Pass

Band U-NII-1

26dB bandwidth

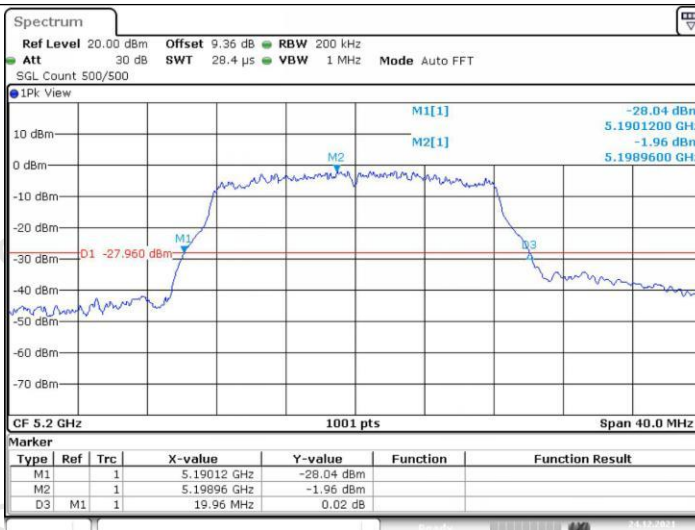
802.11a

5180MHz



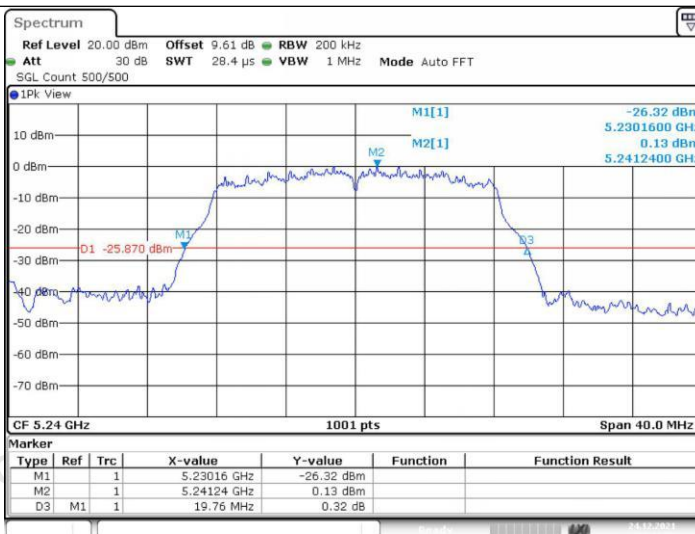
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5200MHz

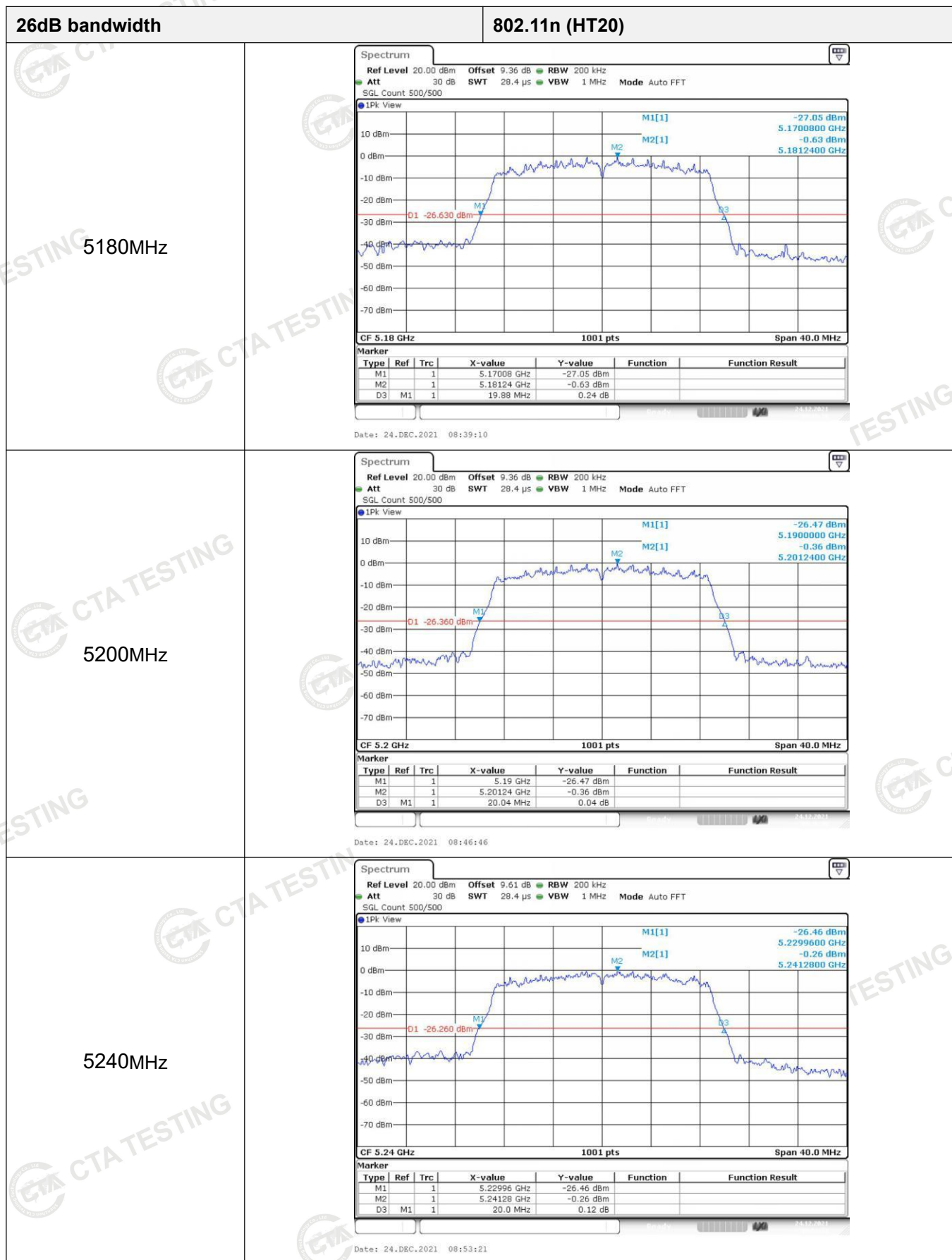


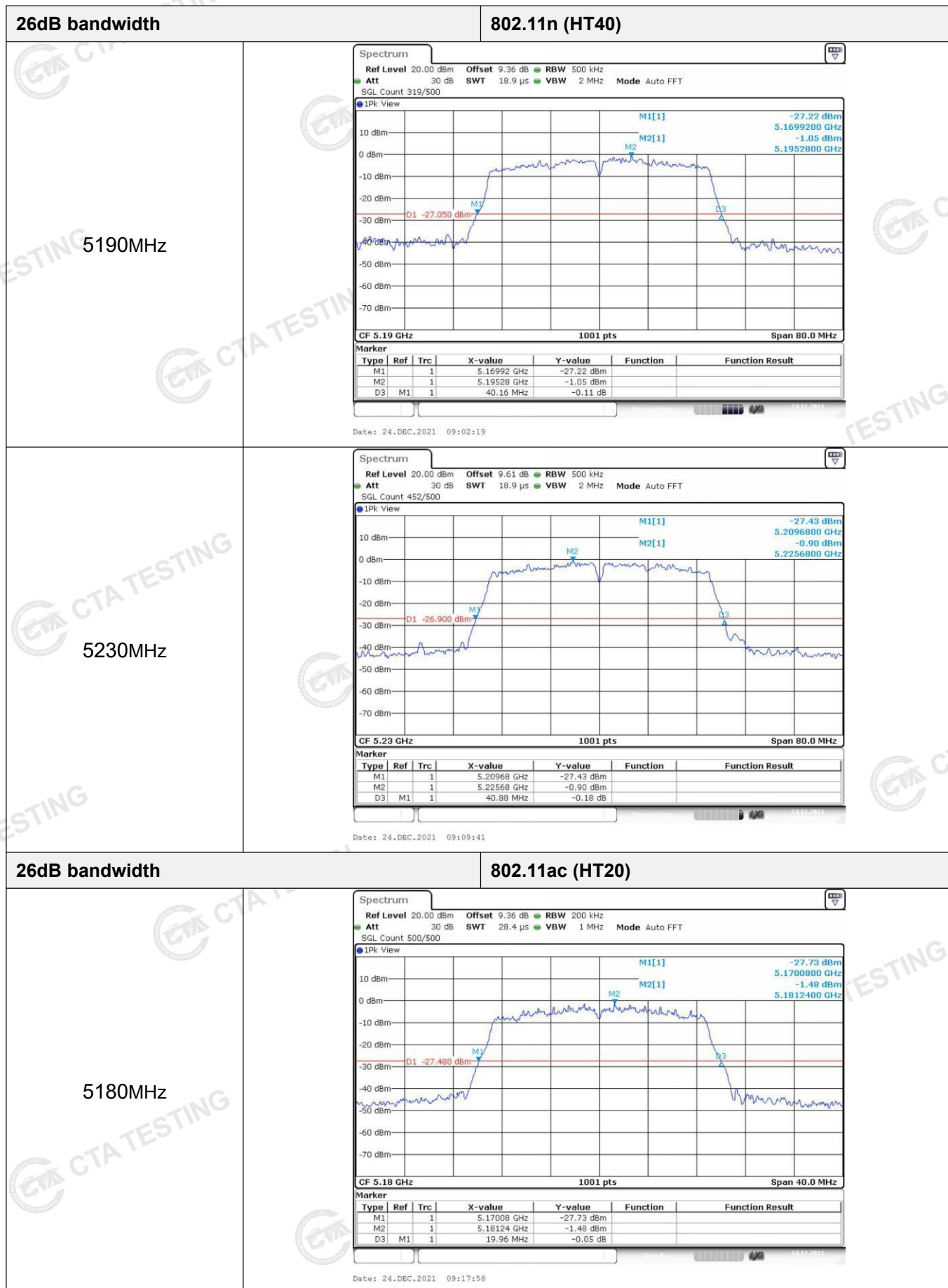
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5240MHz

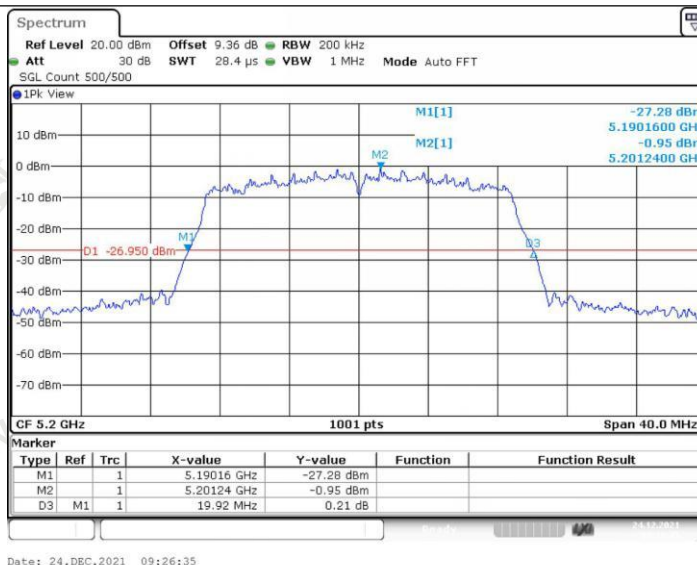


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5200MHz



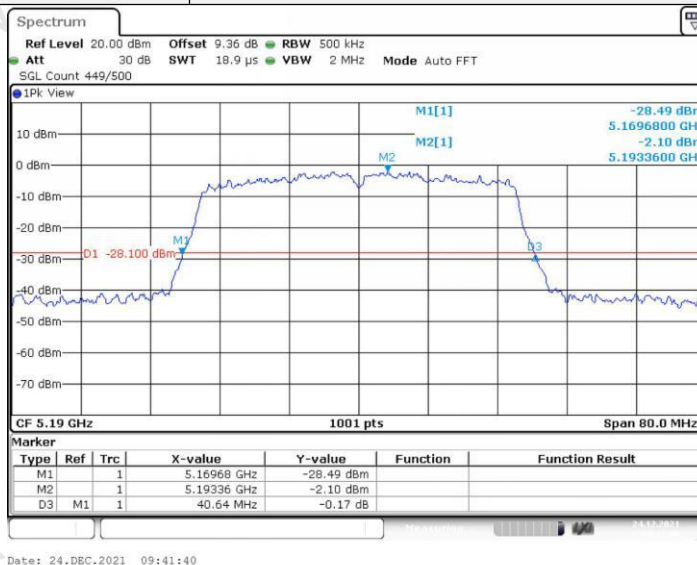
5240MHz



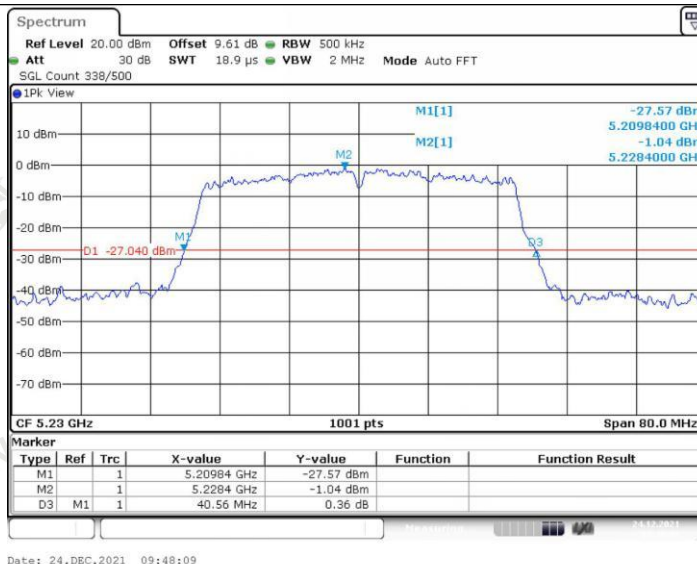
26dB bandwidth

802.11ac (HT40)

5190MHz



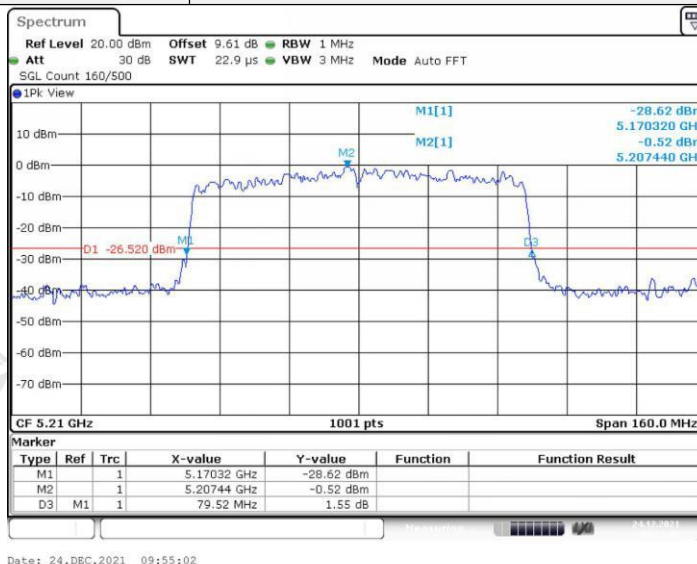
5230MHz



26dB bandwidth

802.11ac (HT80)

5210MHz



Band U-NII-1

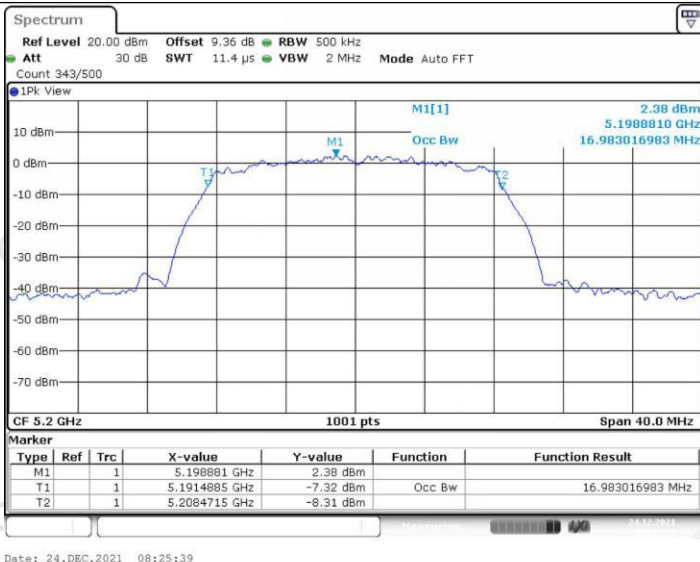
99% Occupied bandwidth

802.11a

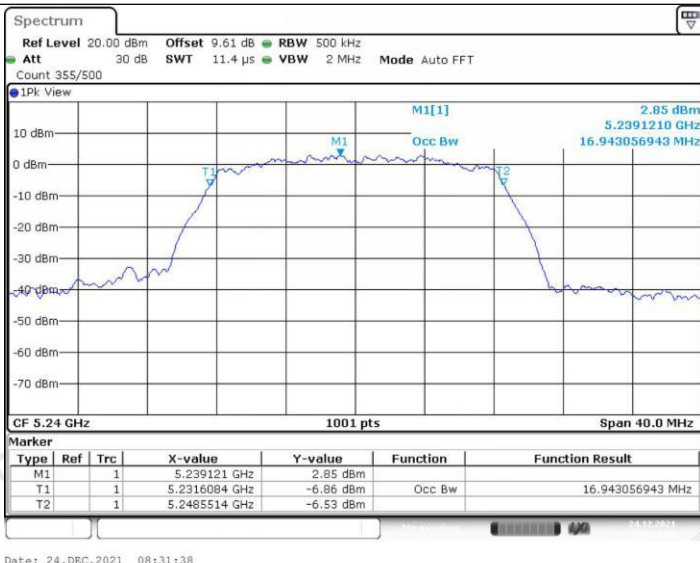
5180MHz

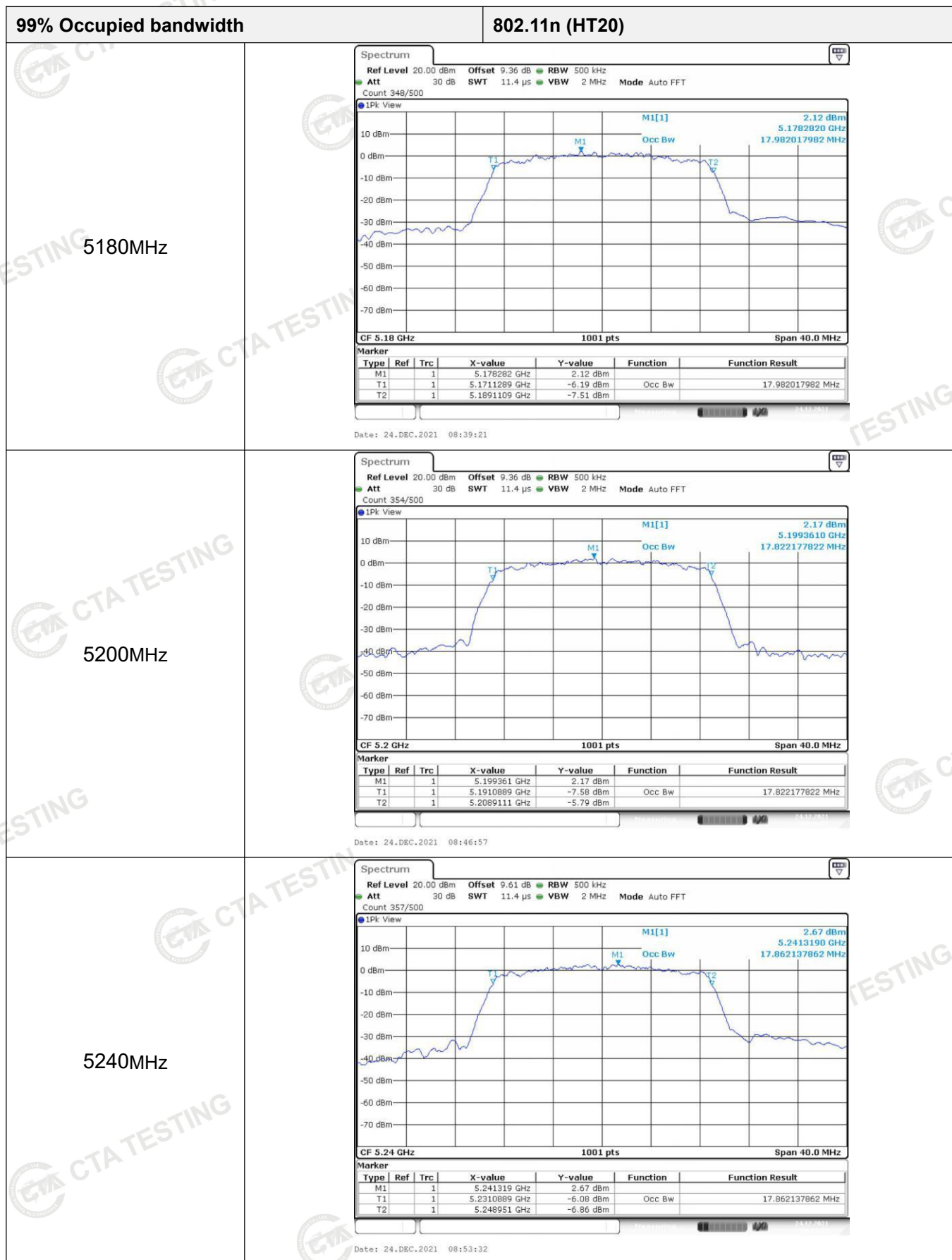


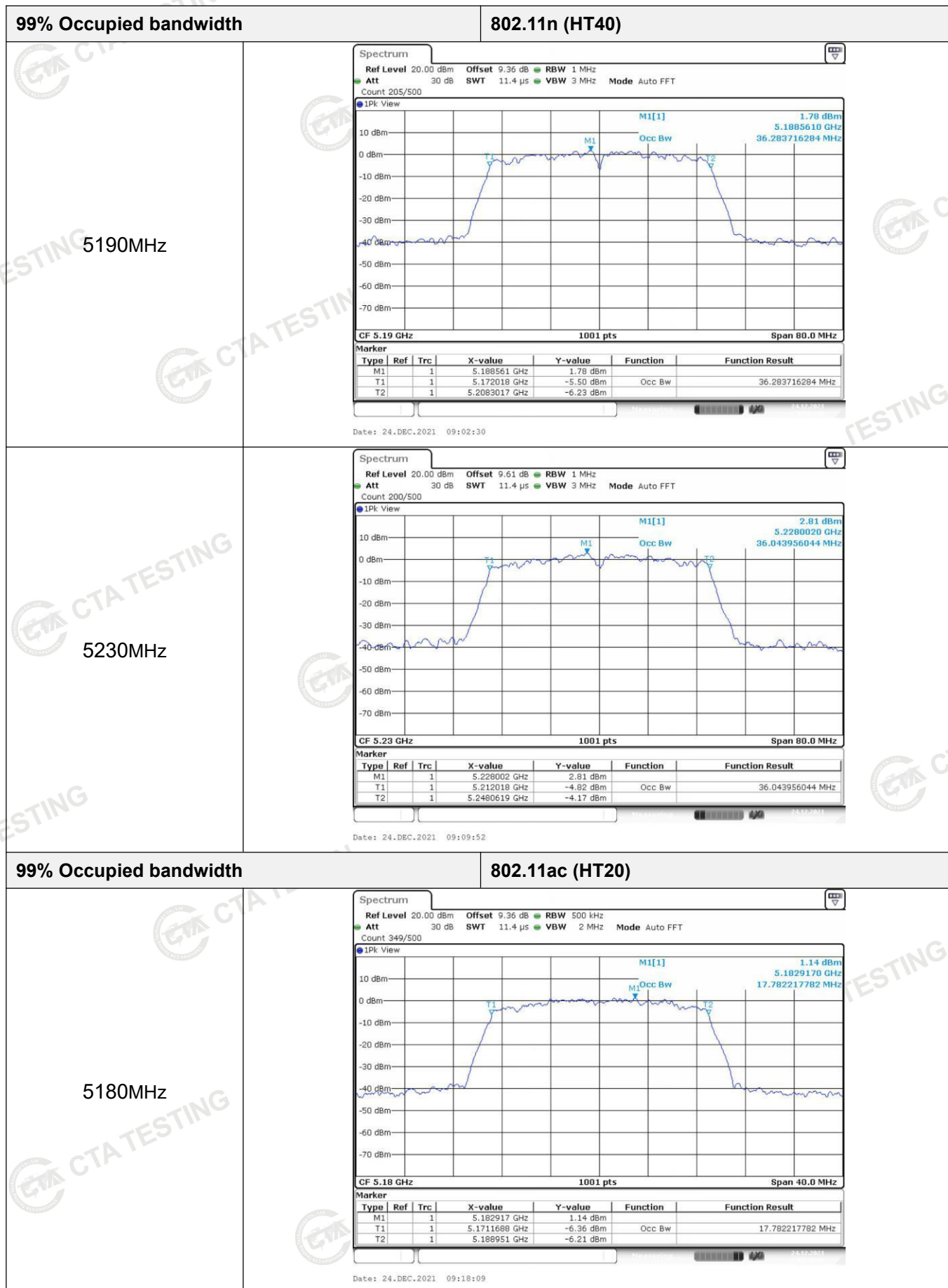
5200MHz



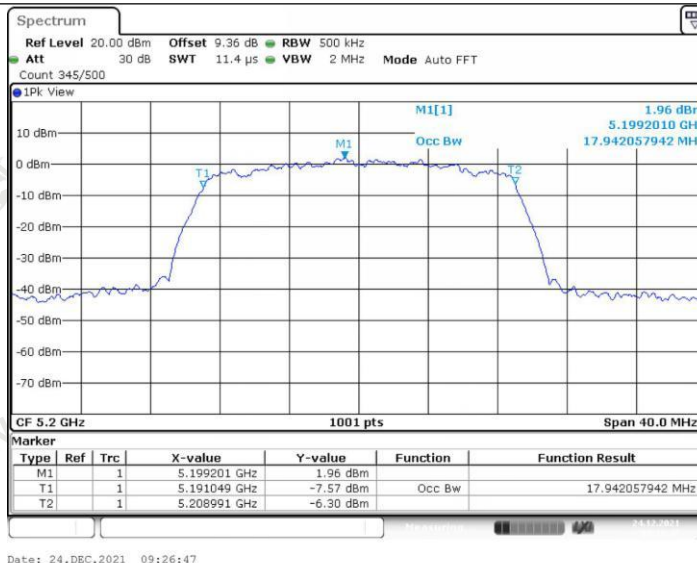
5240MHz



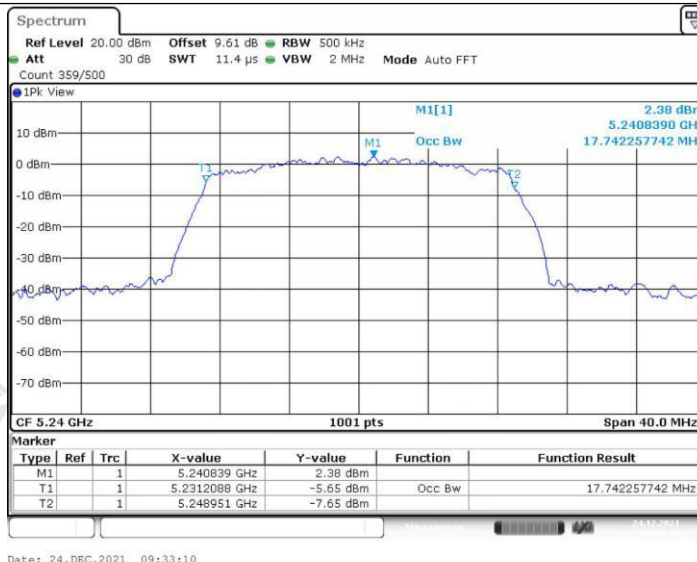




5200MHz



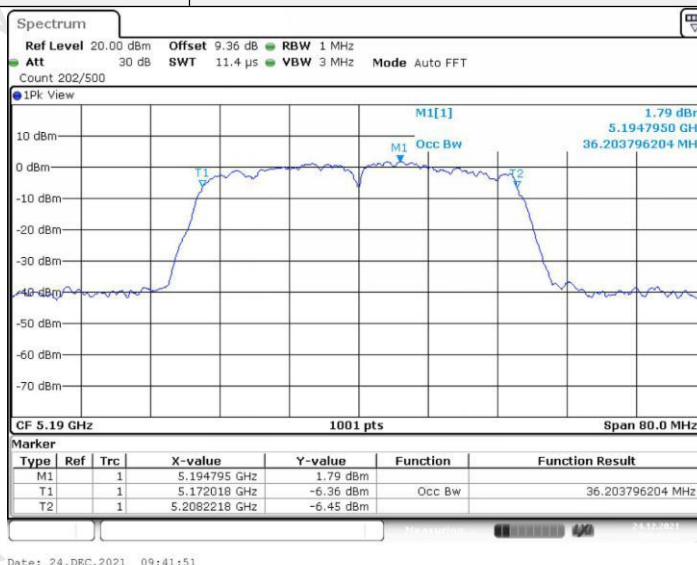
5240MHz



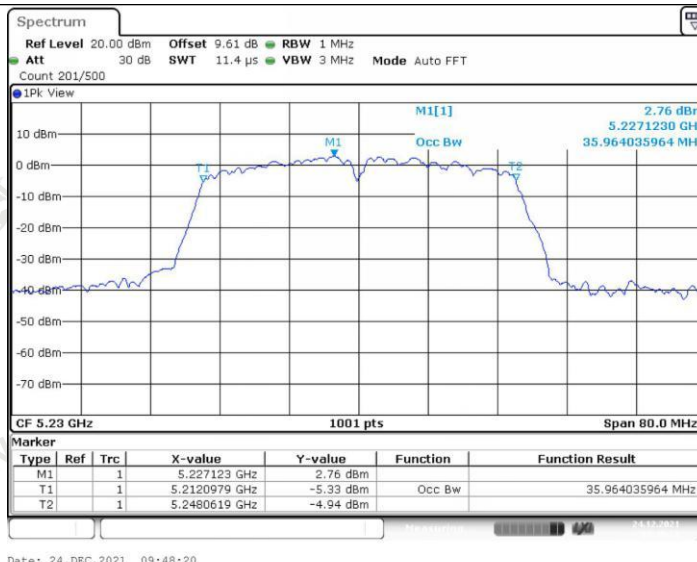
99% Occupied bandwidth

802.11ac (HT40)

5190MHz



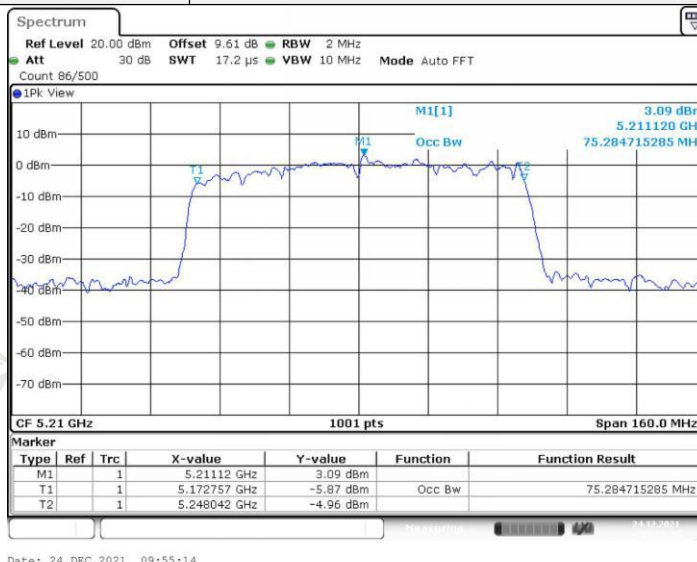
5230MHz



99% Occupied bandwidth

802.11ac (HT80)

5210MHz

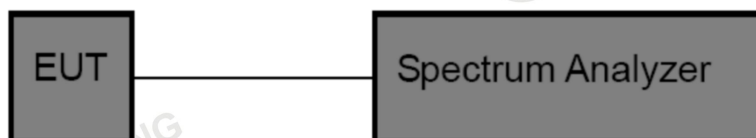


3.5. Frequency Stability Measurement

Limit

FCC Part 15 Subpart C(15.407)		
Test Item	Limit	Frequency Range(MHz)
Peak Excursion Measurement	Specified in the user's manual, the transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification)	5150~5250
		5250~5350
		5470~5725
		5725~5850

Test Configuration



Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser centre frequency to transmitting frequency.
- (3) Set the span to encompass the entire emissions bandwidth (EBW) of the signal.
- (4) Set the RBW to: 10 kHz, VBW=10 kHz with peak detector and maxhold settings.
- (5) The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.
- (6) Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency.
- (7) Turn EUT off and set the chamber temperature to -20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency.
- (8) Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

NOTE: The EUT was set to continuously transmitting in continuously un-modulation transmitting mode.

Test Mode

Please refer to the clause 2.2.

Test Result

Pre-scan 802.11a/n(HT20/HT40)/ac(HT20/HT40/HT80) modulation, and found the 802.11a modulation 5180MHz which it is worse case, so only show the test data for worse case.

Band U-NII-1	
801.11a	5180 MHz
Voltage vs. Frequency Stability	
Voltage (V)	Measurement Frequency (Hz)
3.7	-7000
3.33	-7000
4.07	-7000
Max. Deviation (Hz)	0
Max. Deviation (ppm)	0
Limit (ppm)	20
Result	Pass
Temperature vs. Frequency Stability	
Temperature (°C)	Measurement Frequency (Hz)
-30	-7000
-20	-7000
-10	-7000
0	-7000
10	-7000
20	-7000
30	-8000
40	-7000
50	-8000
Max. Deviation (Hz)	1000
Max. Deviation (ppm)	0.193171
Limit (ppm)	20
Result	Pass

3.6. Band Edge Emissions(Radiated)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.407(b):

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.2
5250~5350	-27	68.2
5470~5725	-27	68.2
5725~5850	-27(Note 2)	68.2
	10(Note 2)	105.2
	15.6(Note 2)	110.8
	27(Note 2)	122.2

NOTE:

1, The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

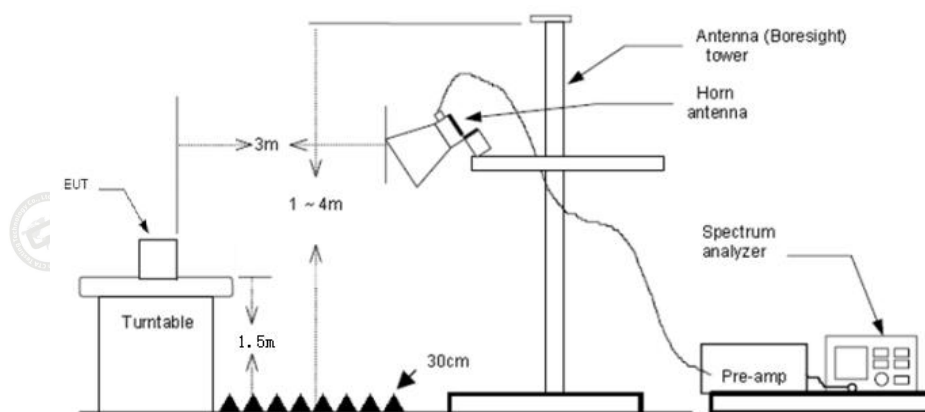
$$E = \frac{1000000\sqrt{30P}}{3} \text{ uV/m, where P is the eirp (Watts)}$$

2, According to FCC 16-24, 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 25MHz 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 27dBm/MHz at the band edge.

* Increase/Decreases with the linearity of the frequency.

For emission above 1GHz and in restricted band, according to FCC KDB 789033 D02 General UNII Test Procedure, all emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit. $E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2$, for $d = 3$ meters.

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

5. The receiver set as follow:

RBW=1MHz, VBW=3MHz PEAK detector for Peak value.

RBW=1MHz, VBW=10Hz RMS detector for Average value.

Test Mode

Please refer to the clause 2.2.

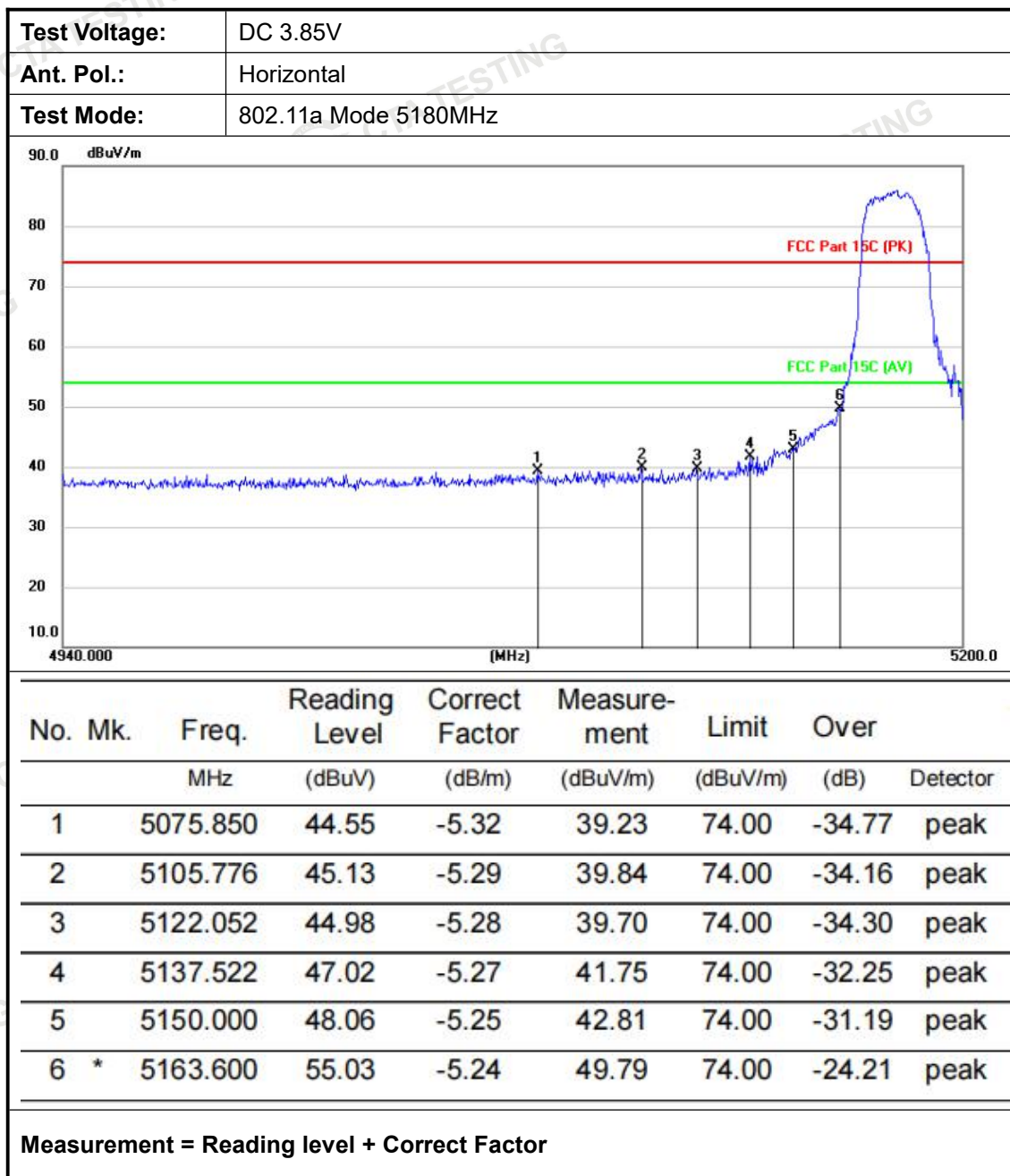
Test Results

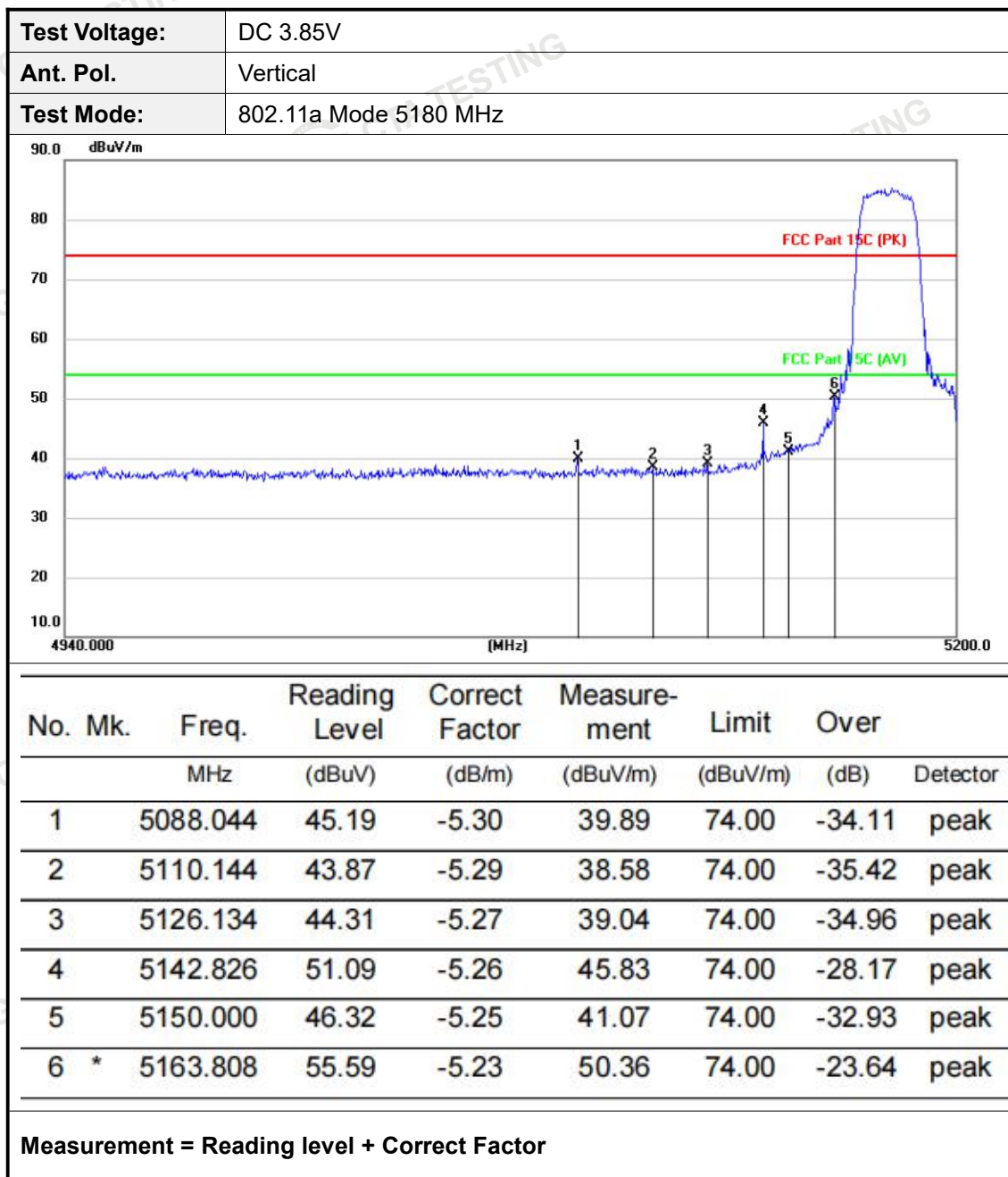
Note:

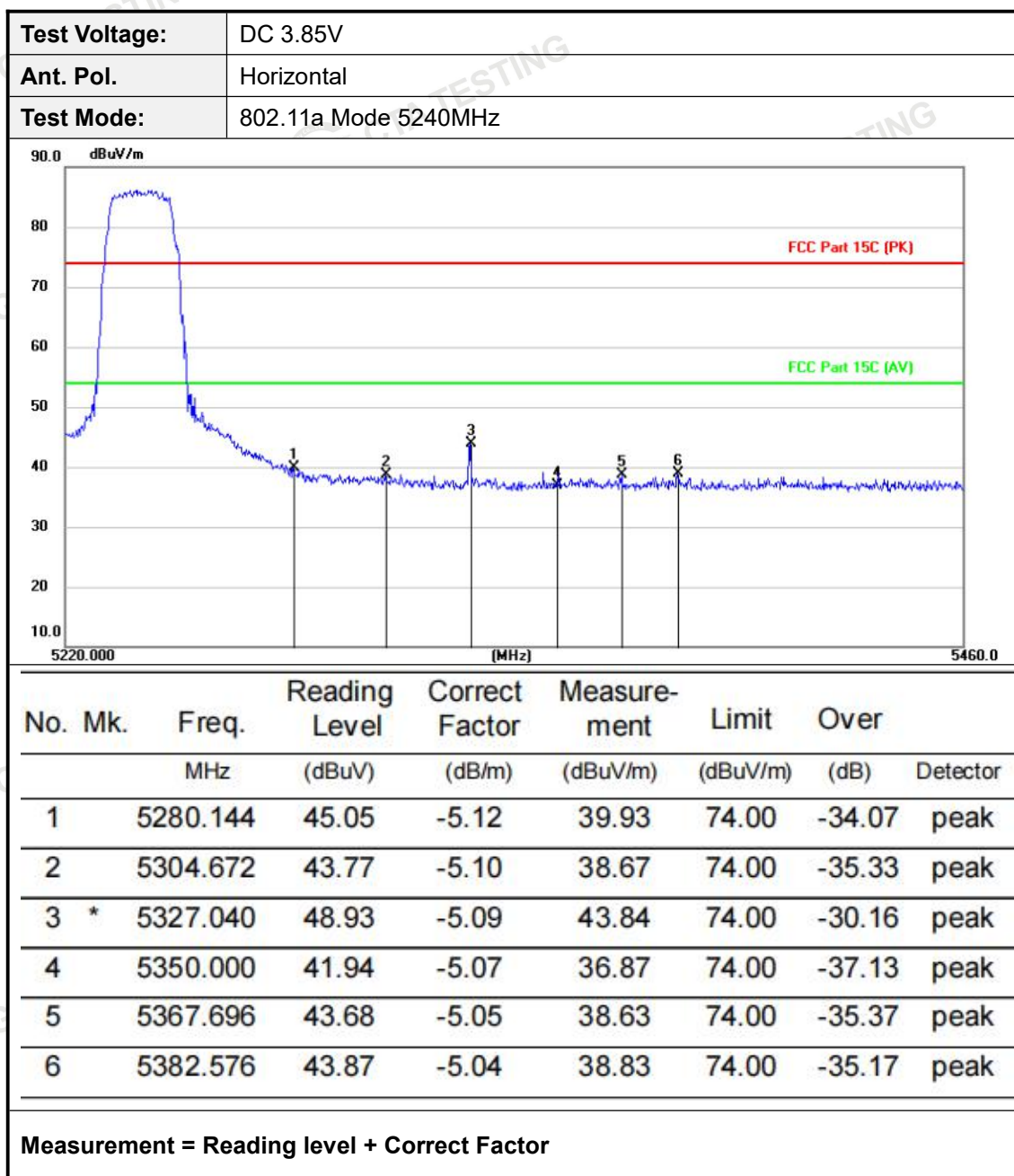
1.Measurement = Reading level + Correct Factor

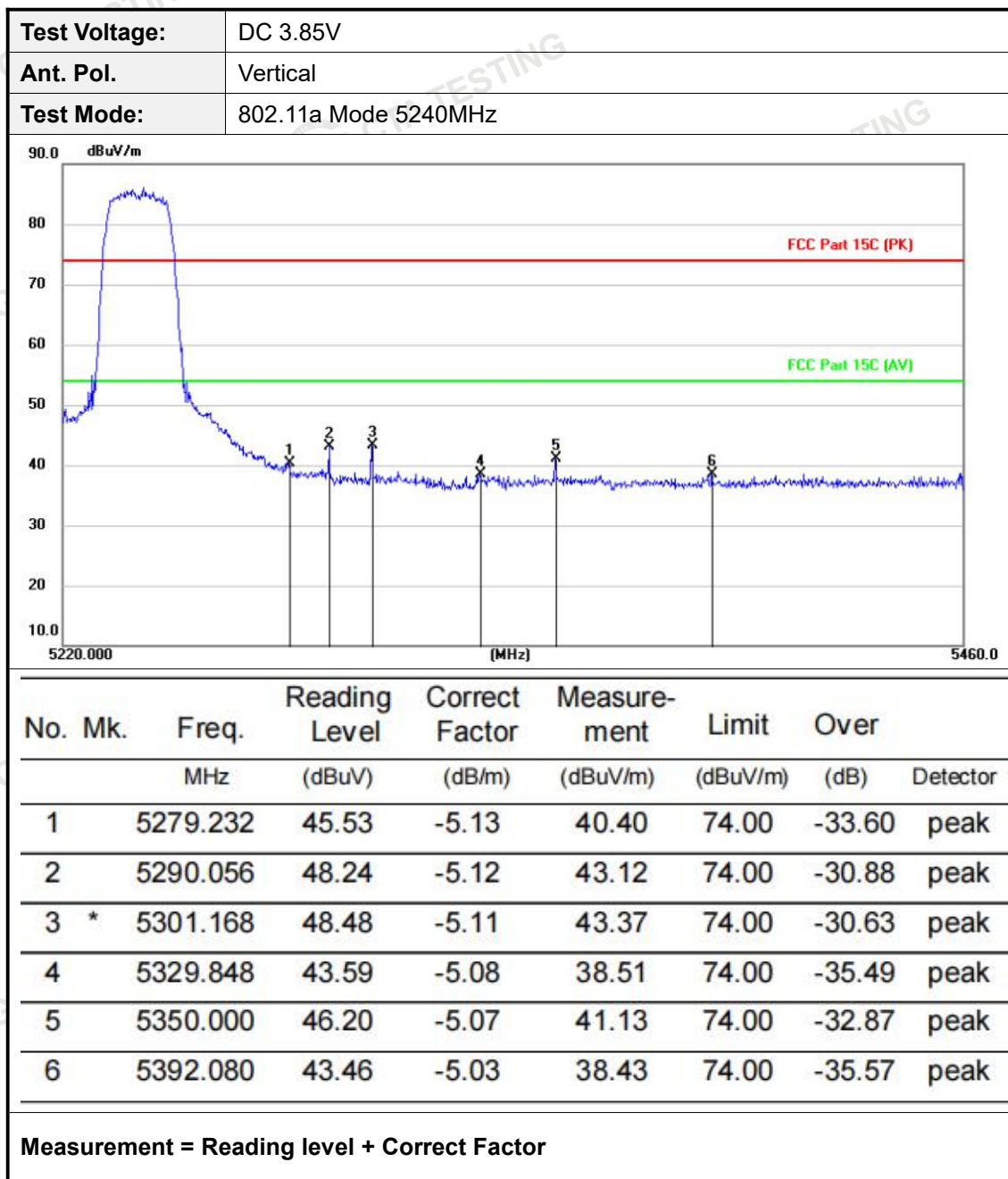
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor

2.Pre-scan 802.11a/n(HT20/HT40)/ac(HT20/HT40/HT80) modulation, and found the 802.11a modulation which it is worse case for above 1GHz, so only show the test data for worse case.









3.7. Radiated Spurious Emissions

Limit

FCC CFR Title 47 Part 15 Subpart E Section 15.407(b):

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Distance Meters(at 3m)	
	Peak	Average
Above 1000	74	54

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)= 20log Emission Level (uV/m)

Limits of unwanted emission out of the restricted bands

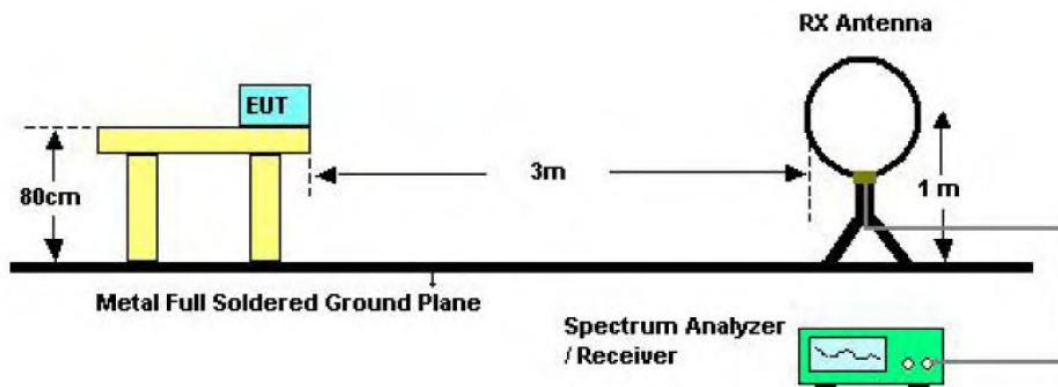
Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.2
5250~5350	-27	68.2
5470~5725	-27	68.2
5725~5850	-27(Note 2)	68.2
	10(Note 2)	105.2
	15.6(Note 2)	110.8
	27(Note 2)	122.2

NOTE:

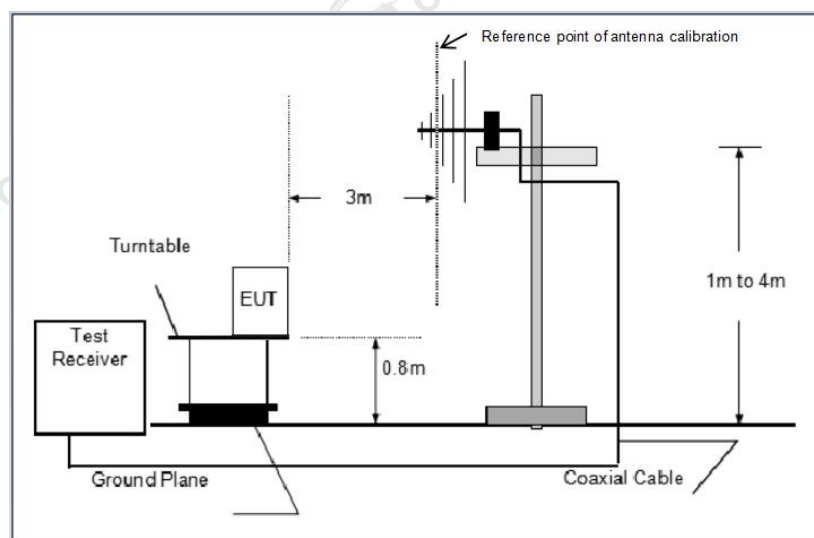
1, The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000 \sqrt{30P}}{3} \text{ uV/m, where P is the eirp (Watts)}$$

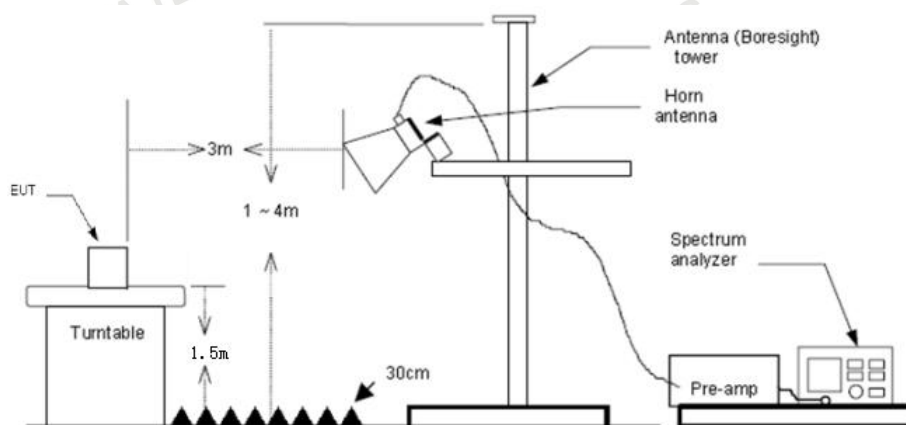
2, According to FCC 16-24, All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

Test Configuration

Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=10Hz RMS detector for Average value.

Test Mode

Please refer to the clause 2.2.

Test Result

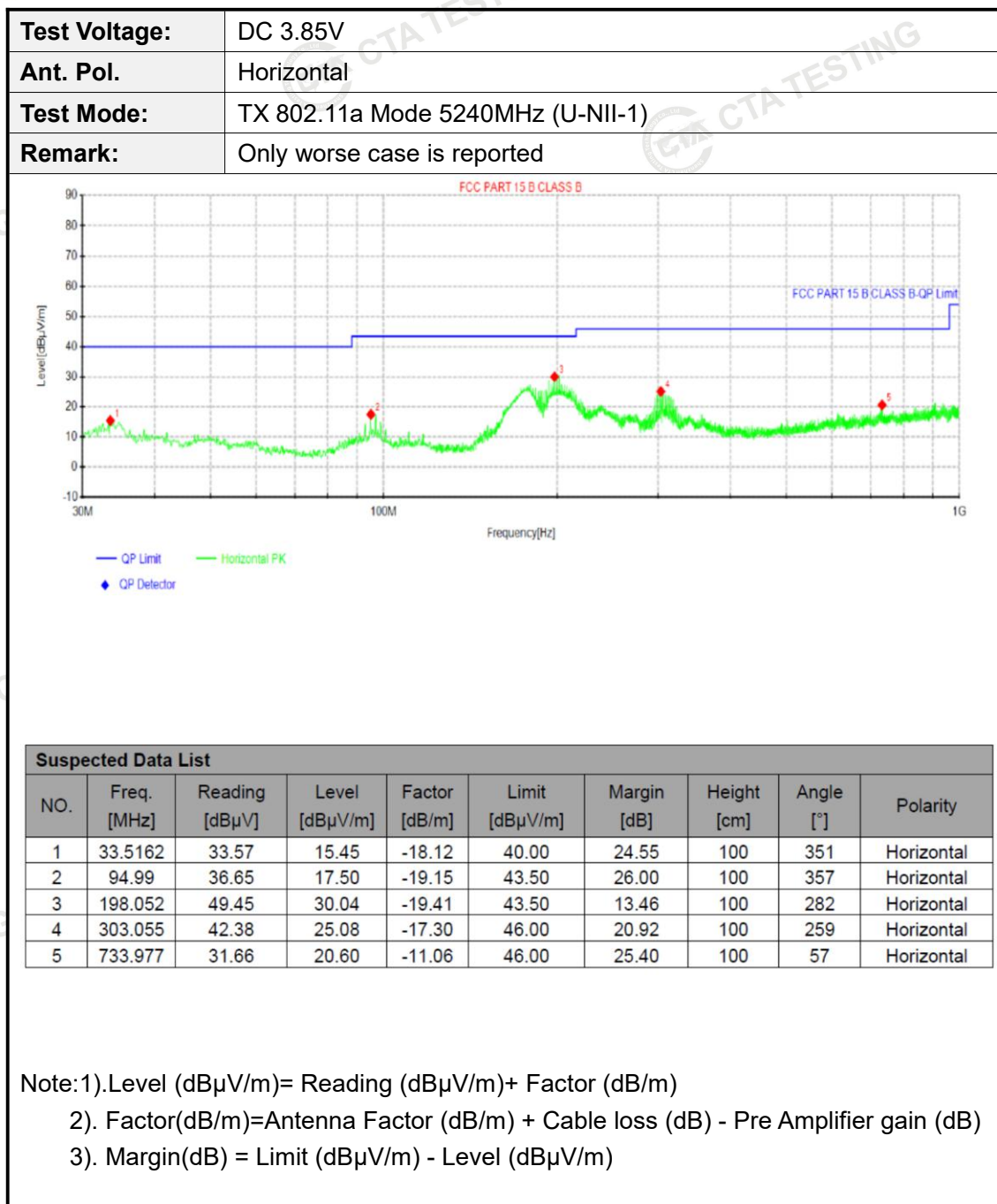
9 KHz~30 MHz and 18GHz~40GHz

From 9 KHz~30 MHz and 18GHz~40GHz: Conclusion: PASS

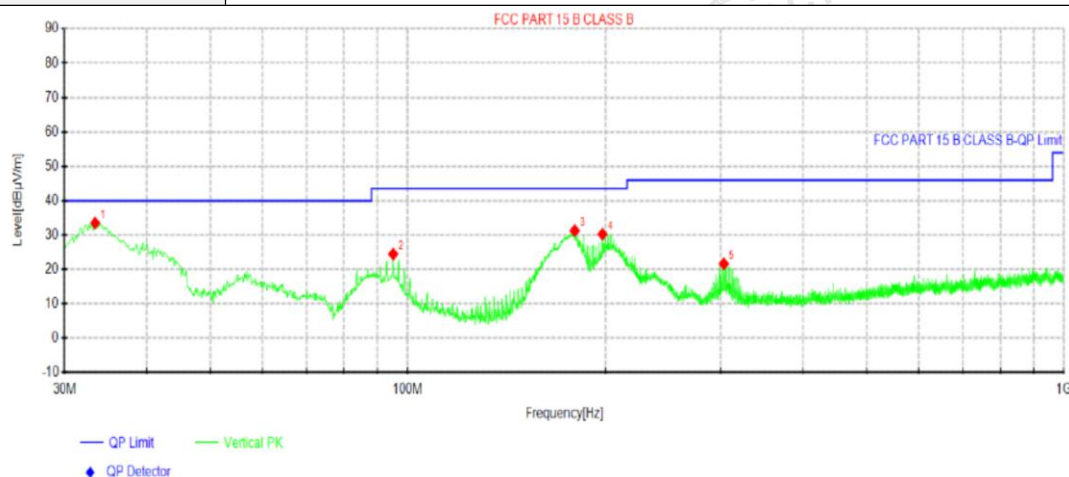
Note:

- 1) Measurement = Reading level + Correct Factor
Correct Factor=Antenna Factor + Cable Loss -Preamplifier Factor
- 2) The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
- 3) The emission levels of other frequencies are very lower than the limit and not show in test report.
- 4) The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
- 5) Pre-scan 802.11a/n(HT20/HT40)/ac(HT20/HT40/HT80) modulation, and found the 802.11a modulation 5240MHz which it is worse case for 30MHz-1GHz , so only show the test data for worse case.
- 6) Pre-scan 802.11a/n(HT20/HT40)/ac(HT20/HT40/HT80) modulation, and found the 802.11a modulation which it is worse case for above 1GHz, so only show the test data for worse case.

30MHz-1GHz



Test Voltage:	DC 3.85V
Ant. Pol.	Vertical
Test Mode:	TX 802.11a Mode 5240MHz (U-NII-1)
Remark:	Only worse case is reported



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	33.395	51.65	33.51	-18.14	40.00	6.49	100	273	Vertical
2	94.99	43.64	24.49	-19.15	43.50	19.01	100	360	Vertical
3	179.622	51.85	31.29	-20.56	43.50	12.21	100	156	Vertical
4	198.052	49.67	30.26	-19.41	43.50	13.24	100	359	Vertical
5	303.176	38.94	21.64	-17.30	46.00	24.36	100	234	Vertical

Note: 1). Level (dBμV/m) = Reading (dBμV/m) + Factor (dB/m)

2). Factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin (dB) = Limit (dBμV/m) - Level (dBμV/m)

Adobe 1GHz

