

FCC Radio Test Report

FCC ID: 2AWU4-CL-250W

Original Grant

Report No. : TB-FCC174065
Applicant : Shenzhen Cloudecho Audio Co.,Ltd

Equipment Under Test (EUT)

EUT Name : Hi-Fi Wifi Stereo Audio Amplifier

Model No. : CL-250W

Series Model No. N/A

Brand Name : Cloudyx

Sample ID : TBBJ-20200629-12-1# & TBBJ-20200629-12-2#

Receipt Date : 2020-07-07

Test Date : 2020-07-08 to 2020-08-10

Issue Date : 2020-08-11

Standards : FCC Part 15, Subpart E 15.407

Test Method : ANSI C63.10: 2013

Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC and IC requirements

Test/Witness Engineer :  Jack Deng

Test/Witness Engineer :  Ivan Su

Approved& Authorized :  Ray Lai



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1.0

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Revision History

1. General Information about EUT

1.1 Client Information

Applicant	:	Shenzhen Cloudecho Audio Co.,Ltd
Address	:	Rm707, Biwan Building, Biwan Road, Baoan District, Shenzhen, P.R.China
Manufacturer	:	Shenzhen Cloudecho Audio Co.,Ltd
Address	:	Rm707, Biwan Building, Biwan Road, Baoan District, Shenzhen, P.R.China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Hi-Fi Wifi Stereo Audio Amplifier
Models No.	:	CL-250W
Model Difference	:	N/A
Product Description	:	<p>Operation Frequency: U-NII-1: 5180MHz~5240MHz</p> <p>Antenna Gain: 2dBi External Antenna provided by the applicant.</p> <p>Modulation Type:</p> <ul style="list-style-type: none"> 802.11a: OFDM (QPSK, BPSK, 16QAM) 802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM) 802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM) <p>Bit Rate of Transmitter:</p> <ul style="list-style-type: none"> 802.11a: 6/9/12/18/24/36/48/54 Mbps 802.11n: up to 150Mbps 802.11ac: at most 433.3 Mbps
Power Rating	:	<p>Adapter(3205000)</p> <p>Input: AC 100~240V, 50/60Hz 2.2A MAX</p> <p>Output: DC 32V, 5A.</p>
Software Version	:	V38
Hardware Version	:	V1.0
Remark	:	The adapter and antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.

Note:

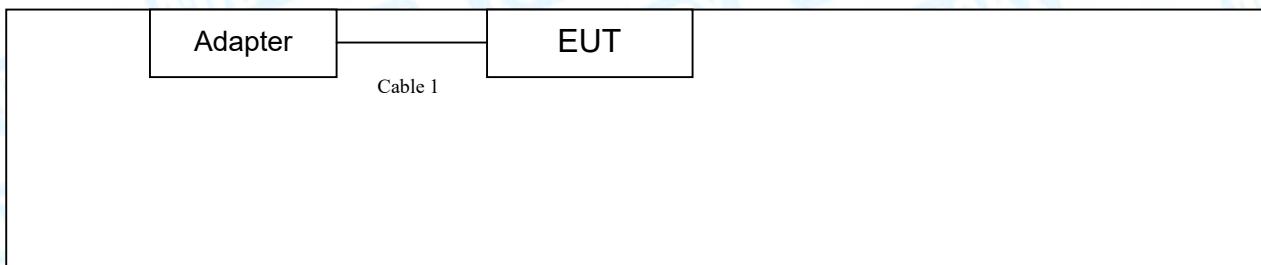
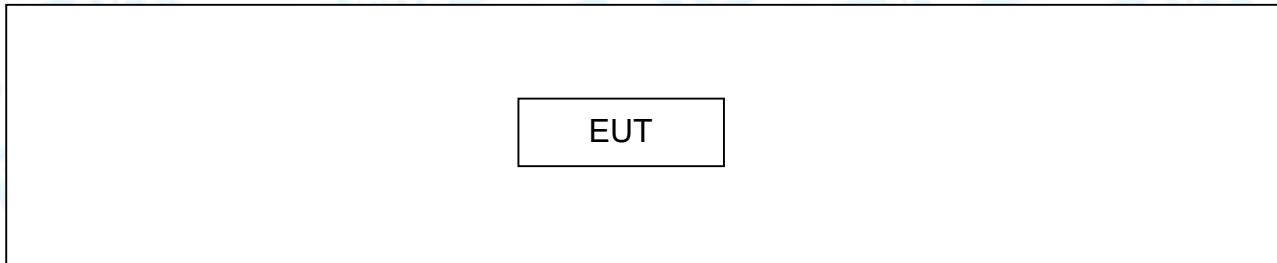
(1) This Test Report is FCC Part 15, Subpart E(15.407) for 802.11a/n/ac, the test procedure follows the KDB 789033 D02 General U-NII Test Procedures New Rules v02r01. More detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List:

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5180~5240MHz (U-NII-1)	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz		

For 20 MHz Bandwidth, use channel 36, 40, 44, 48. For 40 MHz Bandwidth, use channel 38, 46.
For 80 MHz Bandwidth, use channel 42.

1.3 Block Diagram Showing the Configuration of System Tested

Charging + TX Mode**TX Mode**

1.4 Description of Support Units

The EUT has been test as an independent unit.

1.5 Description of Test Mode

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

For Conducted Test		
Final Test Mode	Description	
Mode 1	Charging + TX a Mode(5180MHz)	
For Radiated Test Below 1GHz		
Final Test Mode	Description	
Mode 2	Charging + TX a Mode(5180MHz)	
For Radiated Test Above 1GHz		
Test Band	Final Test Mode	Description
U-NII-1	Mode 3	TX Mode 802.11a Mode Channel 36/40/48
	Mode 4	TX Mode 802.11n(HT20) Mode Channel 36/40/48
	Mode 5	TX Mode 802.11ac(VHT20) Mode Channel 36/40/48
	Mode 6	TX Mode 802.11n(HT40) Mode Channel 38/46
	Mode 7	TX Mode 802.11ac(VHT40) Mode Channel 38/46
	Mode 8	TX Mode 802.11ac(VHT80) Mode Channel 42

Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

802.11a Mode: OFDM (6 Mbps)

802.11n (HT20) Mode: MCS 0

802.11n (HT40) Mode: MCS 0

802.11a(VHT20) Mode: MCS 0

802.11a(VHT40) Mode: MCS 0

802.11a(VHT80) Mode: MCS 0

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a Fixde unit; it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel& Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN.

Test Software: LaunchEngmode		
Test Mode: Continuously transmitting		
U-NII-1		
Mode	Frequency (MHz)	Parameters
802.11a	5180	DEF
	5200	DEF
	5240	DEF
802.11n(HT20)	5180	DEF
	5200	DEF
	5240	DEF
802.11ac(VHT20)	5180	DEF
	5200	DEF
	5240	DEF
802.11n(HT40)	5190	DEF
	5230	DEF
802.11ac(VHT40)	5190	DEF
	5230	DEF
802.11ac(VHT80)	5210	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.50 dB ± 3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.8 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at: 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A.

2. Test Summary

FCC Part 15 Subpart E(15.407)				
Standard Section	Test Item	Test Sample(s)	Judgment	Remark
FCC				
15.203	Antenna Requirement	TBBJ-20200629-1 2-2#	PASS	N/A
15.207	Conducted Emission	TBBJ-20200629-1 2-1#	PASS	N/A
15.407(b)	Band Edge Emissions	TBBJ-20200629-1 2-2#	PASS	N/A
15.407(a)	26dB Bandwidth&99% Bandwidth	TBBJ-20200629-1 2-2#	PASS	N/A
15.407(e)	6dB Bandwidth	TBBJ-20200629-1 2-2#	PASS	N/A
15.407(a)	AVG Output Power	TBBJ-20200629-1 2-2#	PASS	N/A
15.407(a)	Power Spectral Density	TBBJ-20200629-1 2-2#	PASS	N/A
15.209 15.407(b)	Transmitter Radiated Spurious Emission	TBBJ-20200629-1 2-1# TBBJ-20200629-1 2-2#	PASS	N/A
15.407(a)	Peak Excursion	TBBJ-20200629-1 2-2#	PASS	N/A
15.407(g)	Frequency Stability	TBBJ-20200629-1 2-1# TBBJ-20200629-1 2-2#	PASS	N/A
	Note: "/" for no requirement for this test item. N/A is an abbreviation for Not Applicable.			

3. Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted Measurement	MTS-8310	MWRFtest	V2.0.0.0

4. Test Equipment

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 06, 2020	Jul. 05, 2021
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 06, 2020	Jul. 05, 2021
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 06, 2020	Jul. 05, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 06, 2020	Jul. 05, 2021
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2021
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.01, 2020	Feb. 28, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 06, 2020	Jul. 05, 2021
Pre-amplifier	Sonoma	310N	185903	Mar.01, 2020	Feb. 28, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar.01, 2020	Feb. 28, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar.01, 2020	Feb. 28, 2021
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 06, 2020	Jul. 05, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 16, 2019	Sep. 15, 2020
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 16, 2019	Sep. 15, 2020
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 16, 2019	Sep. 15, 2020
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO26	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO29	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO31	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17I00015SNO33	Sep. 16, 2019	Sep. 15, 2020

5. Conducted Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard
FCC Part 15.207

5.1.2 Test Limit

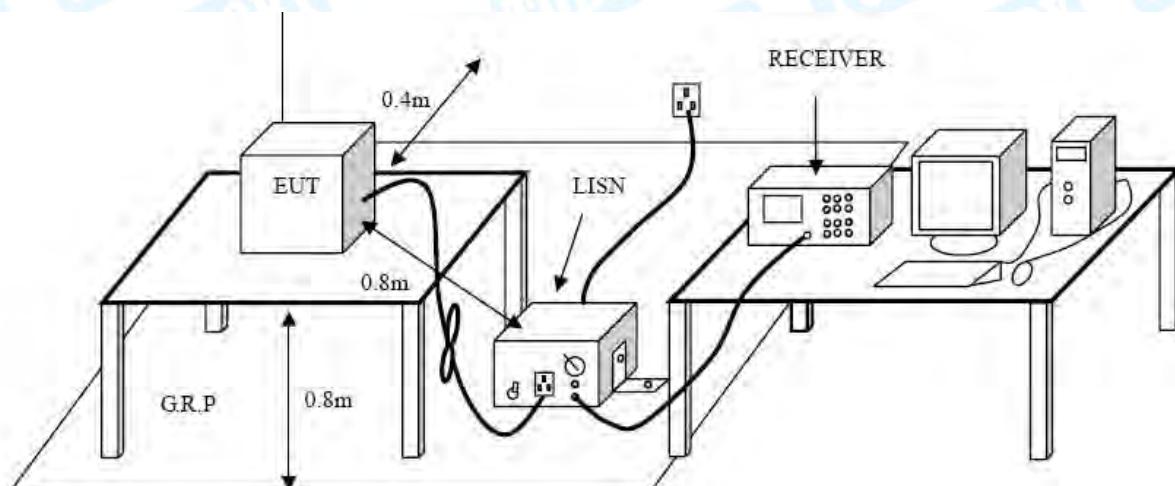
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.2 Test Setup



5.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A.

6. Radiated Emission Test

6.1 Test Standard and Limit

6.1.1 Test Standard
FCC Part 15.209

6.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

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 of 3m (dBuV/m)	
	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	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
	-27(Note 2)	68.3
	10(Note 2)	105.3
	15.6(Note 2)	110.9
	27(Note 2)	122.3

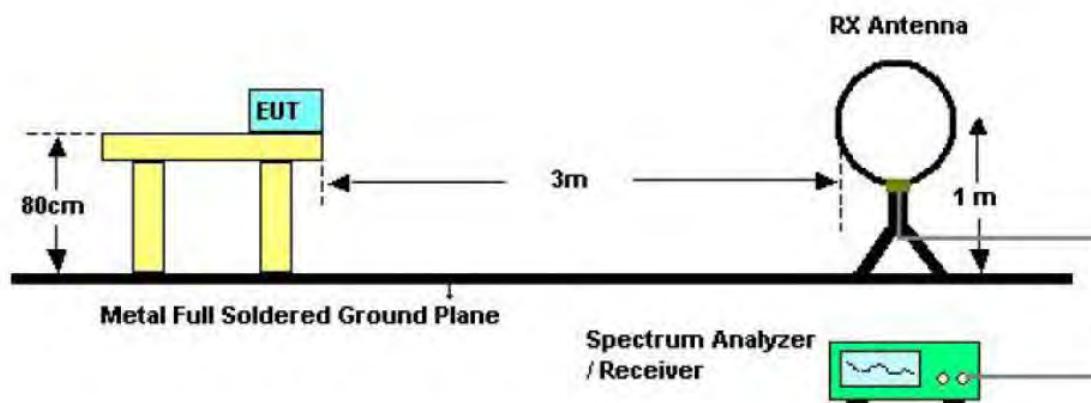
NOTE:

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

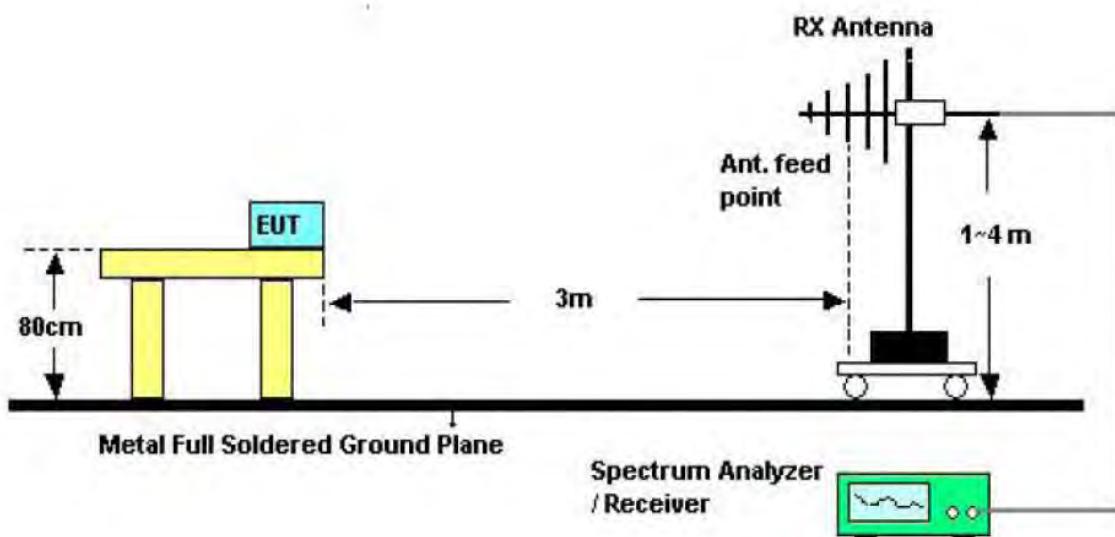
$$E = \frac{1000000\sqrt{30P}}{3} \text{ uV/m, where } P \text{ is the eirp (Watts)}$$

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.

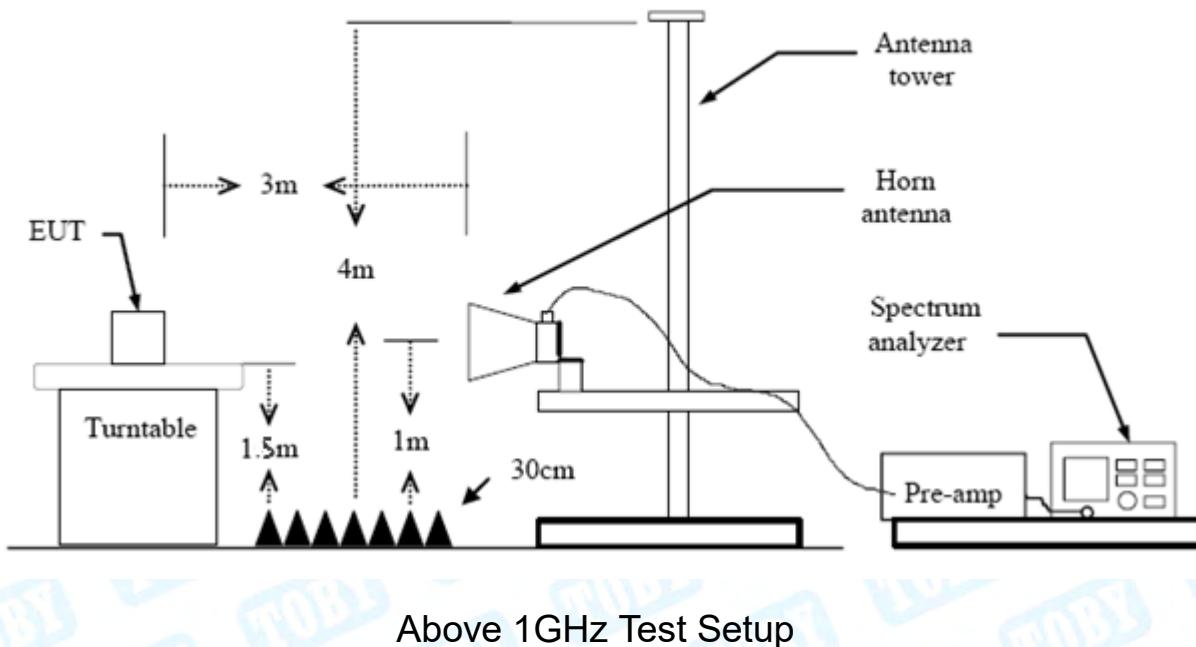
6.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical Antenna Or set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment B.

7. Band Edge Emissions

7.1 Test Standard and Limit

7.1.1 Test Standard

FCC Part 15.407(b)

7.1.2 Test Limit

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.3
5250~5350	-27	68.3
5470~5725	-27	68.3
5725~5825	-27(Note 2)	68.3
	10(Note 2)	105.3
	15.6(Note 2)	110.9
	27(Note 2)	122.3

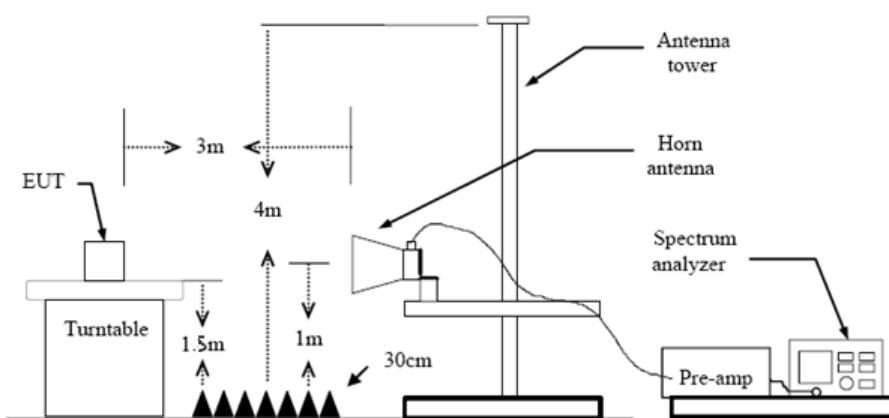
NOTE:

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

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

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.

7.2 Test Setup



7.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical Antenna 0re set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

7.6 Test Data

Please refer to the Attachment C.

8. Bandwidth Test

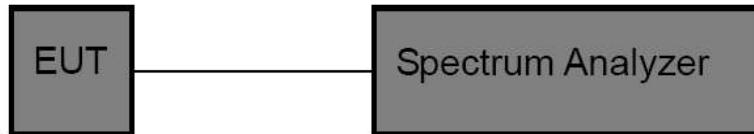
8.1 Test Standard and Limit

8.1.1 Test Standard
FCC Part 15.407

8.1.2 Test Limit

FCC Part 15 Subpart C(15.407)/RSS-210		
Test Item	Limit	Frequency Range (MHz)
26 Bandwidth	N/A	5150~5250
		5250~5350
		5500~5700
6 dB Bandwidth	>500kHz	5725~5850

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) 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

6dB Bandwidth Test	
Spectrum Parameters	Setting
Attenuation	Auto
Span	>6 dB Bandwidth
RBW	100 kHz
VBW	VBW>=3*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	≥ 3RBW
Detector	Peak
Trace	Max Hold

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

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

8.6 Test Data

Please refer to the Attachment D.

9. Output Power Test

9.1 Test Standard and Limit

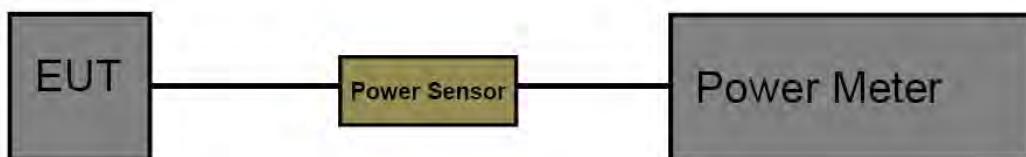
9.1.1 Test Standard

FCC Part 15.407 (a)

9.1.2 Test Limit

FCC Part 15 Subpart E(15.407)/RSS-210		
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)	5500~5700
	1 Watt (30dBm)	5725~5850

9.2 Test Setup



9.3 Test Procedure

The measurement is according to section 3 of KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.

The EUT was connected to RF power meter via a broadband power sensor as show the block above.

9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

9.6 Test Date

Please refer to the Attachment E.

10. Power Spectral Density Test

10.1 Test Standard and Limit

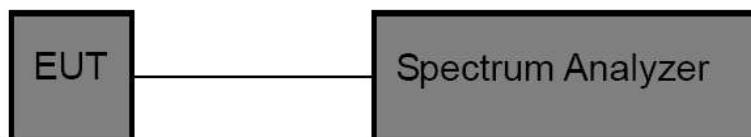
10.1.1 Test Standard

FCC Part 15.407 (a)

10.1.2 Test Limit

FCC Part 15 Subpart E(15.407)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	Other than Mobile and Portable : 17dBm/MHz	5150~5250
	Mobile and Portable : 11dBm/MHz	5250~5350
	11dBm/MHz	5500~5700
	30dBm/500kHz	5725~5850

9.2 Test Setup



10.3 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 U-NII 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.

10.4 Deviation From Test Standard

No deviation

10.5 EUT Operating Condition

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

10.6 Test Data

Please refer to the Attachment F.

11. Frequency Stability Measurement

11.1 Test Standard and Limit

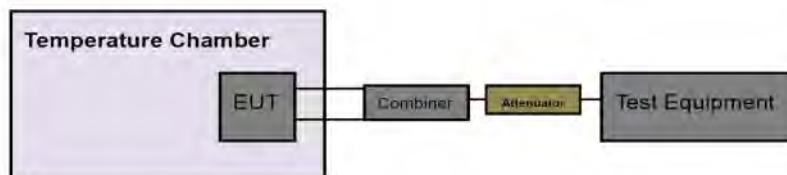
11.1.1 Test Standard

FCC Part 15.407

11.1.2 Test Limit

FCC Part 15 Subpart C(15.407)		
Test Item	Limit	Frequency Range(MHz)
Peak Excursion Measurement	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual	5150~5250
		5250~5350
		5500~5700
		5725~5850

11.2 Test Setup



11.3 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) Extreme temperature is 0°C~50°C

11.4 Deviation From Test Standard

No deviation

11.5 EUT Operating Condition

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

11.6 Test Data

Please refer to the Attachment G.

12. Antenna Requirement

12.1 Standard Requirement

12.1.1 Standard

FCC Part 15.203

12.1.2 Requirement

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.

12.2 Antenna Connected Construction

The gains of the antenna used for transmitting is 2dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

12.3 Deviation From Test Standard

No deviation

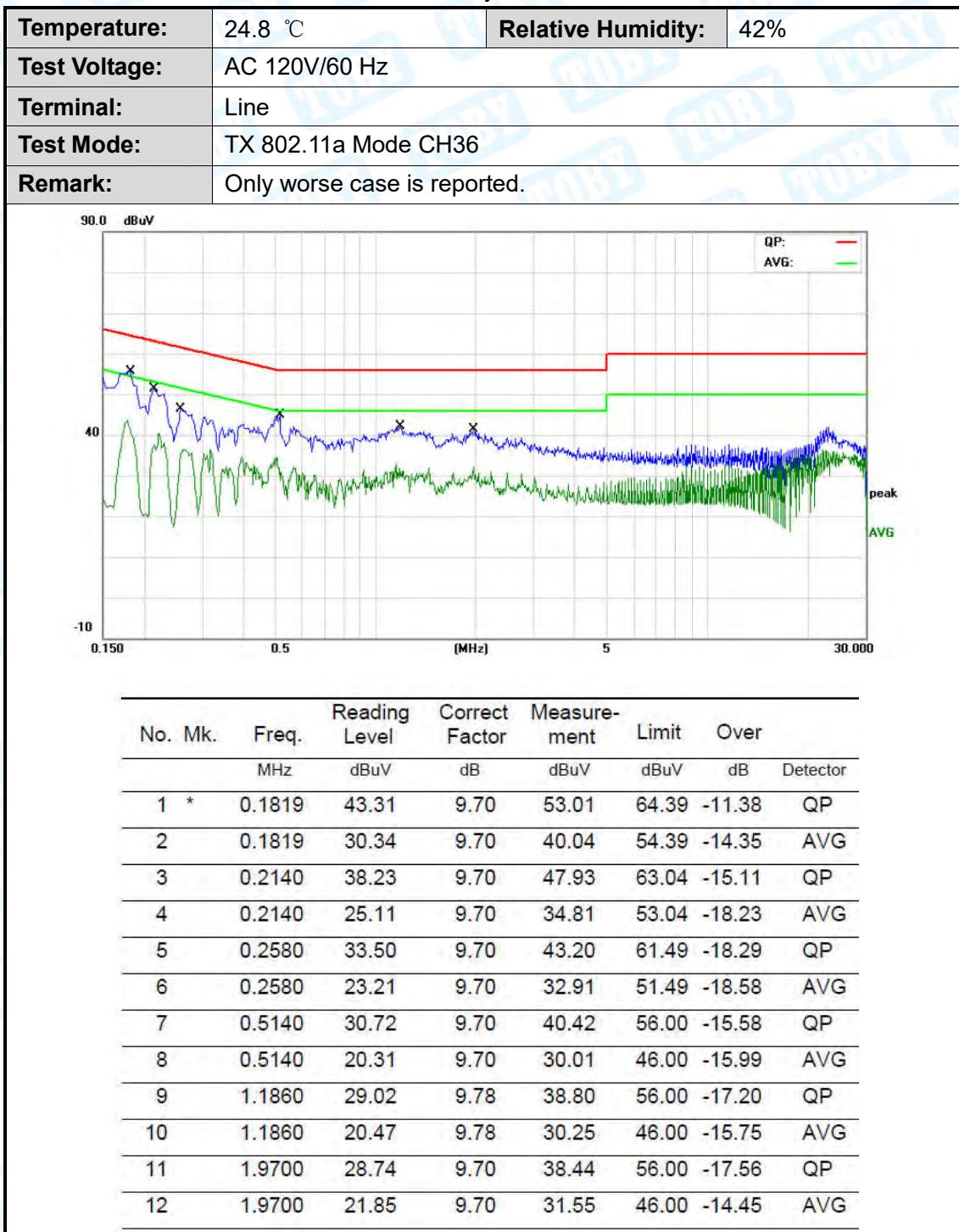
12.4 Result

The EUT antennas are External Antenna. It complies with the standard requirement.

Antenna Type
<input type="checkbox"/> Permanent attached antenna
<input checked="" type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna

Attachment A-- Conducted Emission Test Data

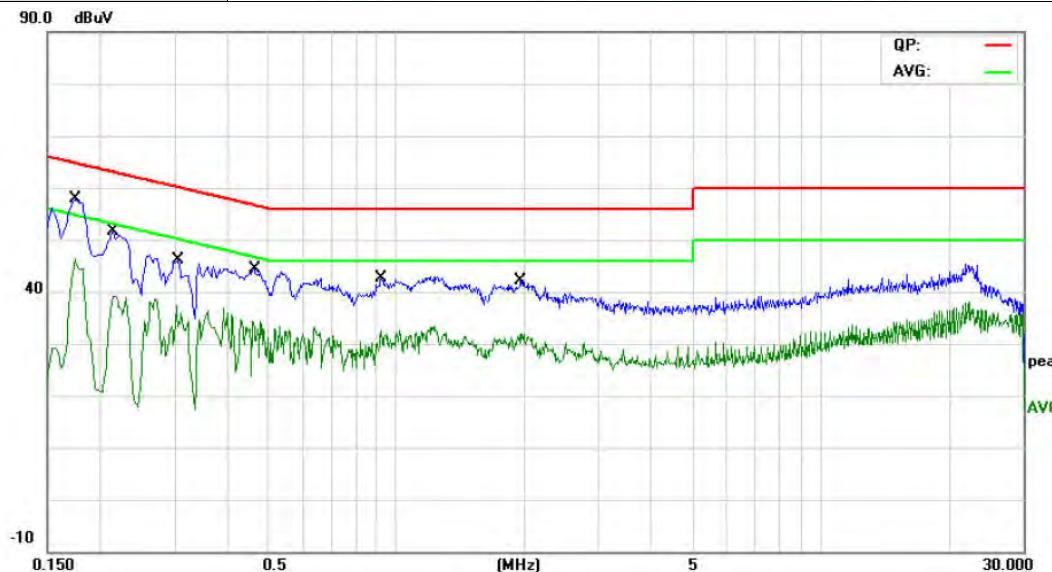
Remark: All channels have been tested and Shows only the worst channels.



*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

Temperature:	24.8 °C	Relative Humidity:	42%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	TX 802.11a Mode CH36		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB	dBuV	dBuV	dB
1	*	0.1740	45.05	9.80	54.85	64.76	-9.91
2		0.1740	32.46	9.80	42.26	54.76	-12.50
3		0.2140	38.72	9.80	48.52	63.04	-14.52
4		0.2140	25.69	9.80	35.49	53.04	-17.55
5		0.3060	31.93	9.80	41.73	60.08	-18.35
6		0.3060	24.17	9.80	33.97	50.08	-16.11
7		0.4620	32.40	9.80	42.20	56.66	-14.46
8		0.4620	20.83	9.80	30.63	46.66	-16.03
9		0.9220	30.03	9.80	39.83	56.00	-16.17
10		0.9220	21.69	9.80	31.49	46.00	-14.51
11		1.9660	28.56	9.80	38.36	56.00	-17.64
12		1.9660	20.25	9.80	30.05	46.00	-15.95

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

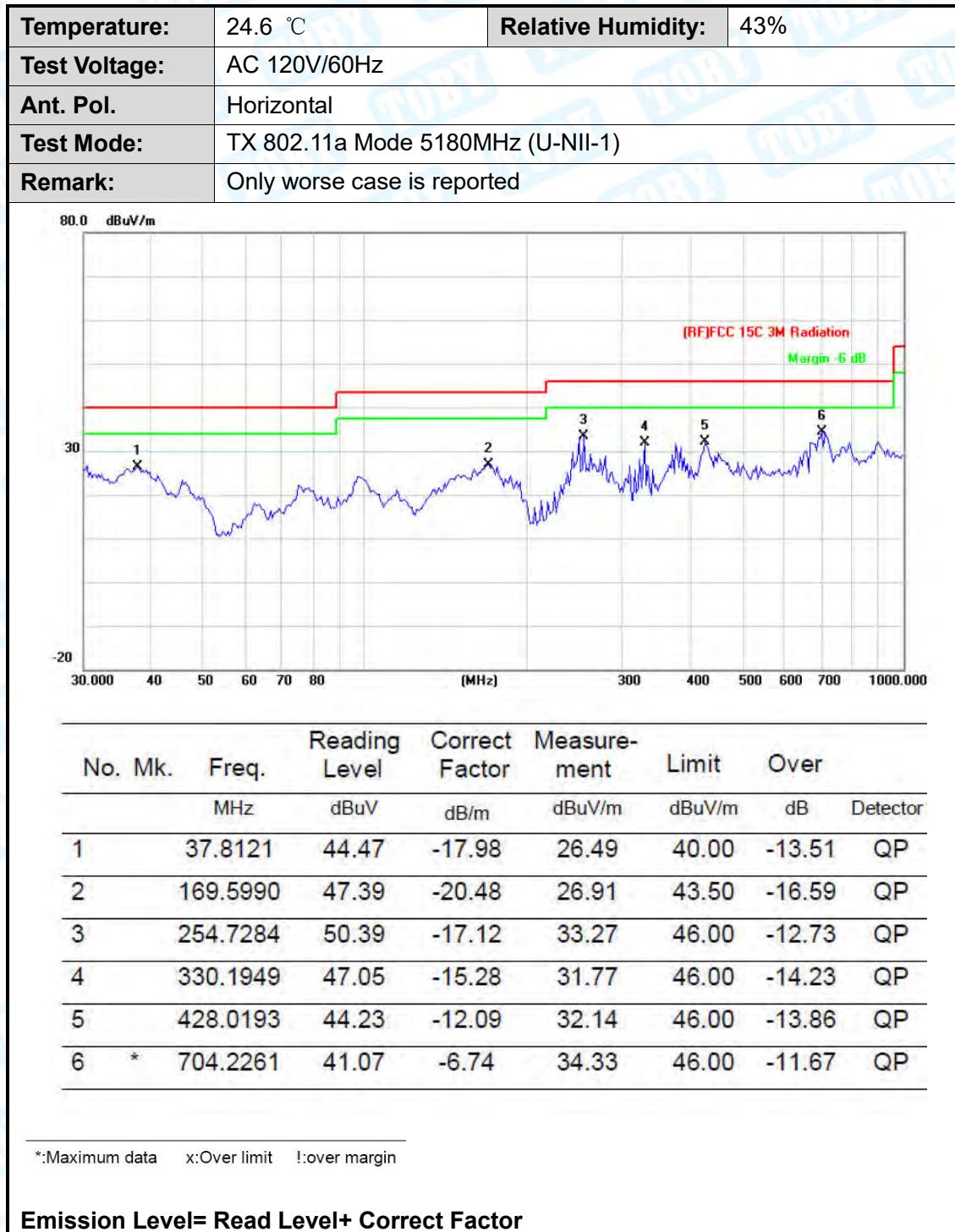
Attachment B-- Radiated Emission Test Data

9 KHz~30 MHz

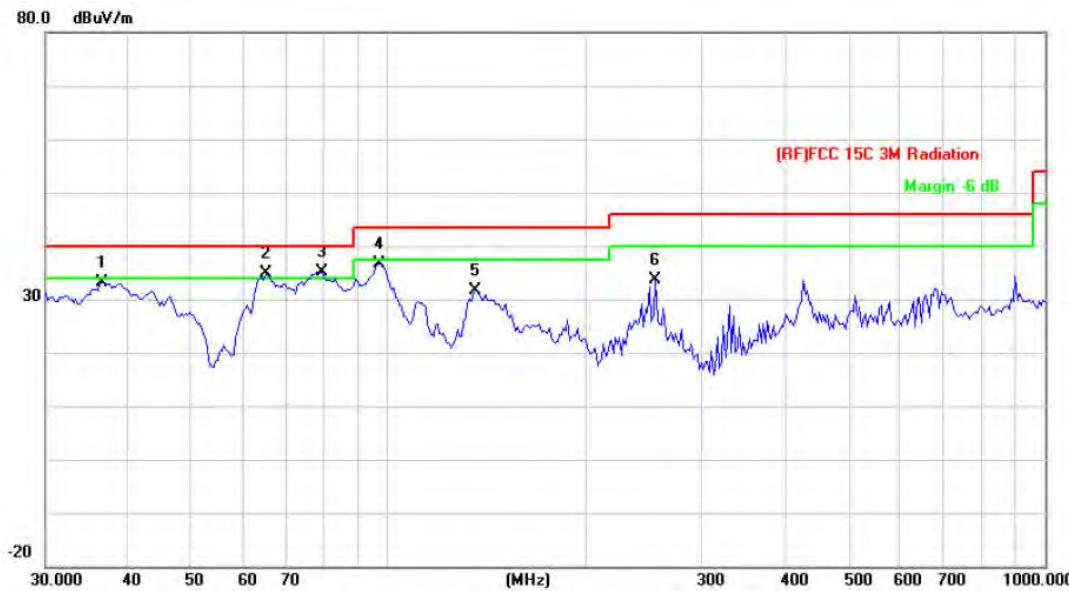
From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz~1GHz



Temperature:	24.6 °C	Relative Humidity:	43%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)		
Remark:	Only worse case is reported.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		36.5092	50.60	-17.37	33.23	40.00	-6.77	QP
2	!	64.8865	58.63	-23.82	34.81	40.00	-5.19	QP
3	*	78.9652	57.69	-22.56	35.13	40.00	-4.87	QP
4		96.7749	58.59	-21.92	36.67	43.50	-6.83	QP
5		135.5062	53.92	-22.37	31.55	43.50	-11.95	QP
6		254.7284	50.85	-17.12	33.73	46.00	-12.27	QP

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

5180MHz-5240MHz(U-NII-1)

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit. Only worse case is reported.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		10360.261	35.80	20.50	56.30	68.30	-12.00 peak
2	*	10360.656	25.41	20.50	45.91	54.00	-8.09 AVG
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%					
Test Voltage:	DC 32V								
Ant. Pol.	Vertical								
Test Mode:	TX 802.11a Mode 5180MHz (U-NII-1)								
Remark:	No report for the emission which more than 10 dB below the prescribed limit. Only worse case is reported.								
<hr/>									
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dB	Detector		
1		10360.361	33.61	20.50	54.11	68.30	-14.19 peak		
2	*	10360.526	22.73	20.50	43.23	54.00	-10.77 AVG		
<hr/>									
Emission Level= Read Level+ Correct Factor									

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11a Mode 5200MHz (U-NII-1)		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detect
1		10399.364	35.04	20.56	55.60	68.30	-12.70	peak
2	*	10399.562	24.00	20.56	44.56	54.00	-9.44	AVC

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11a Mode 5200MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10399.264	25.75	20.56	46.31	54.00	-7.69 AVG
2		10399.562	37.90	20.56	58.46	68.30	-9.84 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11a Mode 5240MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10479.546	24.71	20.68	45.39	54.00	-8.61 AVG
2		10481.655	35.68	20.68	56.36	68.30	-11.94 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%						
Test Voltage:	DC 32V									
Ant. Pol.	Vertical									
Test Mode:	TX 802.11a Mode 5240MHz (U-NII-1)									
Remark:	No report for the emission which more than 10 dB below the prescribed limit.									
<hr/>										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector			
1		10480.563	34.45	20.68	55.13	68.30	-13.17 peak			
2	*	10481.361	24.55	20.68	45.23	54.00	-8.77 AVG			
<hr/>										
Emission Level= Read Level+ Correct Factor										

Temperature:	25 °C		Relative Humidity:	55%							
Test Voltage:	DC 32V										
Ant. Pol.	Horizontal										
Test Mode:	TX 802.11n(HT20) Mode 5180MHz (U-NII-1)										
Remark:	No report for the emission which more than 10 dB below the prescribed limit.										
<hr/>											
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB/m	dBuV/m	dB	Detector				
1	*	10358.462	23.15	20.50	43.65	54.00	-10.35 AVG				
2		10358.612	34.12	20.50	54.62	68.30	-13.68 peak				
<hr/>											
Emission Level= Read Level+ Correct Factor											

Temperature:	25 °C		Relative Humidity:	55%							
Test Voltage:	DC 32V										
Ant. Pol.	Vertical										
Test Mode:	TX 802.11n(HT20) Mode 5180MHz (U-NII-1)										
Remark:	No report for the emission which more than 10 dB below the prescribed limit.										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB/m	dBuV/m	dB	Detector				
1		10360.639	34.63	20.50	55.13	68.30	-13.17 peak				
2	*	10361.262	25.73	20.50	46.23	54.00	-7.77 AVG				
Emission Level= Read Level+ Correct Factor											

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11n(HT20) Mode 5200MHz (U-NII-1)		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB	Detector	
1	*	10398.562	24.67	20.56	45.23	54.00	-8.77	AVG
2		10399.612	34.70	20.56	55.26	68.30	-13.04	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11n(HT20) Mode 5200MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	*	10400.673	23.86	20.56	44.42	54.00	-9.58 AVG
2		10401.870	33.74	20.56	54.30	68.30	-14.00 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%					
Test Voltage:	DC 32V								
Ant. Pol.	Horizontal								
Test Mode:	TX 802.11n(HT20) Mode 5240MHz (U-NII-1)								
Remark:	No report for the emission which more than 10 dB below the prescribed limit.								
<hr/>									
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		10480.364	34.41	20.68	55.09	68.30	-13.21 peak		
2	*	10480.562	24.58	20.68	45.26	54.00	-8.74 AVG		
<hr/>									
Emission Level= Read Level+ Correct Factor									

Temperature:	25 °C		Relative Humidity:	55%					
Test Voltage:	DC 32V								
Ant. Pol.	Vertical								
Test Mode:	TX 802.11n(HT20) Mode 5240MHz (U-NII-1)								
Remark:	No report for the emission which more than 10 dB below the prescribed limit.								
<hr/>									
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dB	Detector		
1		10480.394	33.58	20.68	54.26	68.30	-14.04 peak		
2	*	10480.562	22.77	20.68	43.45	54.00	-10.55 AVG		
<hr/>									
Emission Level= Read Level+ Correct Factor									

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11ac(VHT20) Mode 5180MHz (U-NII-1)		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading	Correct Factor	Measure-	Limit	Over
			Level		ment		
1	*	10360.364	22.84	20.50	43.34	54.00	-10.66 AVG
2		10360.462	32.79	20.50	53.29	68.30	-15.01 peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%					
Test Voltage:	DC 32V							
Ant. Pol.	Vertical							
Test Mode:	TX 802.11ac(VHT20) Mode 5180MHz (U-NII-1)							
Remark:	No report for the emission which more than 10 dB below the prescribed limit.							
<hr/>								
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dB	Detector	
1		10360.546	32.76	20.50	53.26	68.30	-15.04	peak
2	*	10360.623	23.06	20.50	43.56	54.00	-10.44	AVG
<hr/>								
Emission Level= Read Level+ Correct Factor								

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11ac(VHT20) Mode 5200MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		10399.346	34.76	20.56	55.32	68.30	-12.98 peak
2	*	10401.563	24.73	20.56	45.29	54.00	-8.71 AVG
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11ac(VHT20) Mode 5200MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10399.646	24.70	20.56	45.26	54.00	-8.74 AVG
2		10401.792	34.83	20.56	55.39	68.30	-12.91 peak
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11 ac(VHT20) Mode 5240MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10478.563	23.88	20.68	44.56	54.00	-9.44 AVG
2		10480.392	33.68	20.68	54.36	68.30	-13.94 peak
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%						
Test Voltage:	DC 32V									
Ant. Pol.	Vertical									
Test Mode:	TX 802.11ac(VHT20) Mode 5240MHz (U-NII-1)									
Remark:	No report for the emission which more than 10 dB below the prescribed limit.									
<hr/>										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector			
1	*	10478.139	23.71	20.68	44.39	54.00	-9.61 AVG			
2		10480.392	33.68	20.68	54.36	68.30	-13.94 peak			
<hr/>										
Emission Level= Read Level+ Correct Factor										

Temperature:	25 °C		Relative Humidity:	55%							
Test Voltage:	DC 32V										
Ant. Pol.	Horizontal										
Test Mode:	TX 802.11n(HT40) Mode 5190MHz (U-NII-1)										
Remark:	No report for the emission which more than 10 dB below the prescribed limit.										
<hr/>											
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over				
		MHz	dBuV	dB/m	dBuV/m	dB	Detector				
1	*	10380.462	24.86	20.53	45.39	54.00	-8.61 AVG				
2		10380.626	34.63	20.53	55.16	68.30	-13.14 peak				
<hr/>											
Emission Level= Read Level+ Correct Factor											

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11n(HT40) Mode 5190MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	10380.332	24.73	20.53	45.26	54.00	-8.74
2		10380.497	34.60	20.53	55.13	68.30	-13.17
							AVG peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11n(HT40) Mode 5230MHz (U-NII-1)		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	10460.592	23.61	20.65	44.26	54.00	-9.74	AVG
2		10460.959	33.69	20.65	54.34	68.30	-13.96	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C		Relative Humidity:	55%						
Test Voltage:	DC 32V									
Ant. Pol.	Vertical									
Test Mode:	TX 802.11n(HT40) Mode 5230MHz (U-NII-1)									
Remark:	No report for the emission which more than 10 dB below the prescribed limit.									
<hr/>										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector			
1	*	10460.391	23.81	20.65	44.46	54.00	-9.54 AVG			
2		10460.962	33.71	20.65	54.36	68.30	-13.94 peak			
<hr/>										
Emission Level= Read Level+ Correct Factor										

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11ac(VHT40) Mode 5190MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10380.462	25.10	20.53	45.63	54.00	-8.37 AVG
2		10380.792	34.86	20.53	55.39	68.30	-12.91 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%						
Test Voltage:	DC 32V									
Ant. Pol.	Vertical									
Test Mode:	TX 802.11ac(VHT40) Mode 5190MHz (U-NII-1)									
Remark:	No report for the emission which more than 10 dB below the prescribed limit.									
<hr/>										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector			
1	*	10380.466	24.76	20.53	45.29	54.00	-8.71 AVG			
2		10380.613	34.73	20.53	55.26	68.30	-13.04 peak			
<hr/>										
Emission Level= Read Level+ Correct Factor										

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11ac(VHT40) Mode 5230MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10460.236	24.58	20.65	45.23	54.00	-8.77 AVG
2		10460.392	34.69	20.65	55.34	68.30	-12.96 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

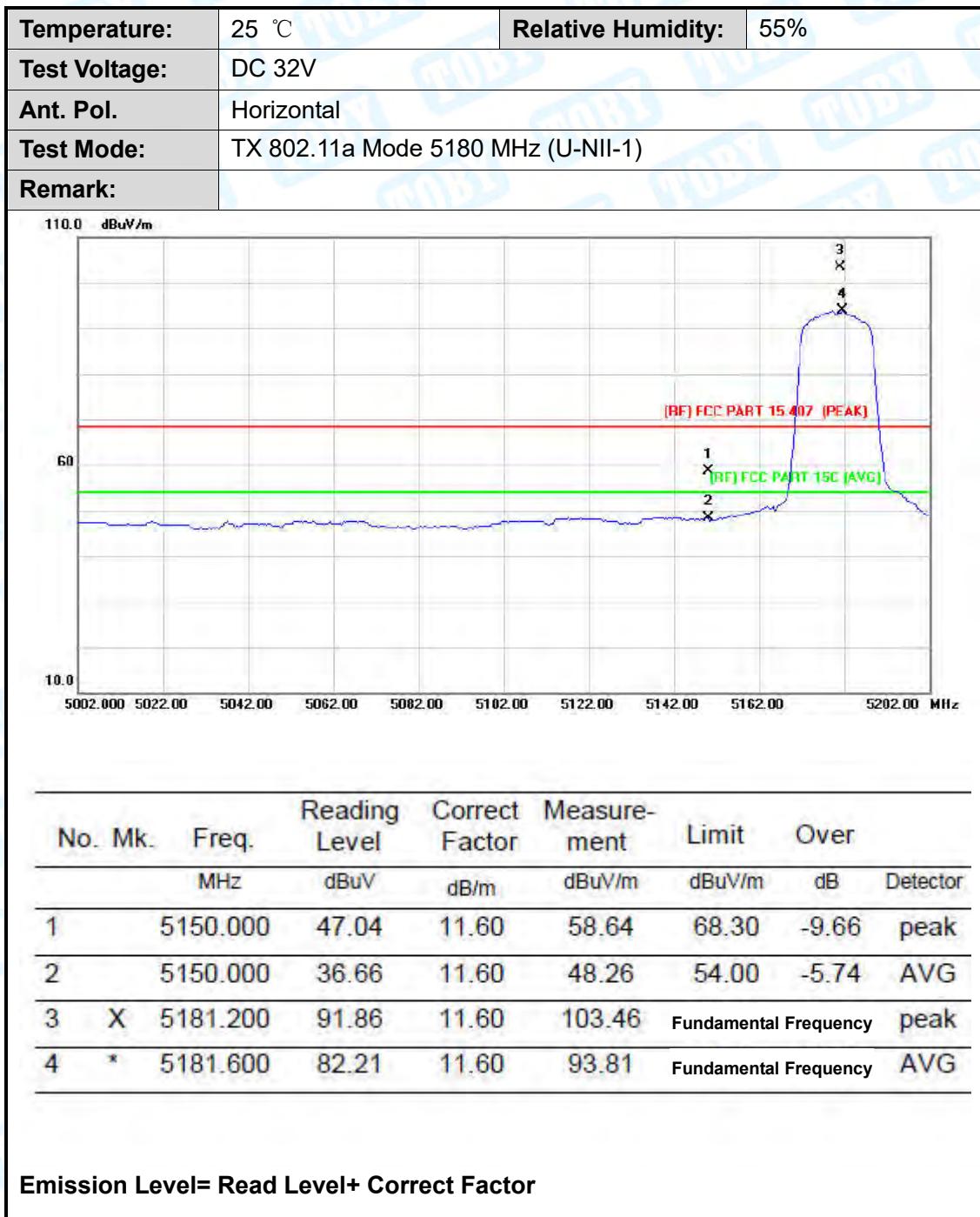
Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11ac(VHT40) Mode 5230MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	10460.353	24.58	20.65	45.23	54.00	-8.77 AVG
2		10460.462	34.81	20.65	55.46	68.30	-12.84 peak
<hr/>							
Emission Level= Read Level+ Correct Factor							

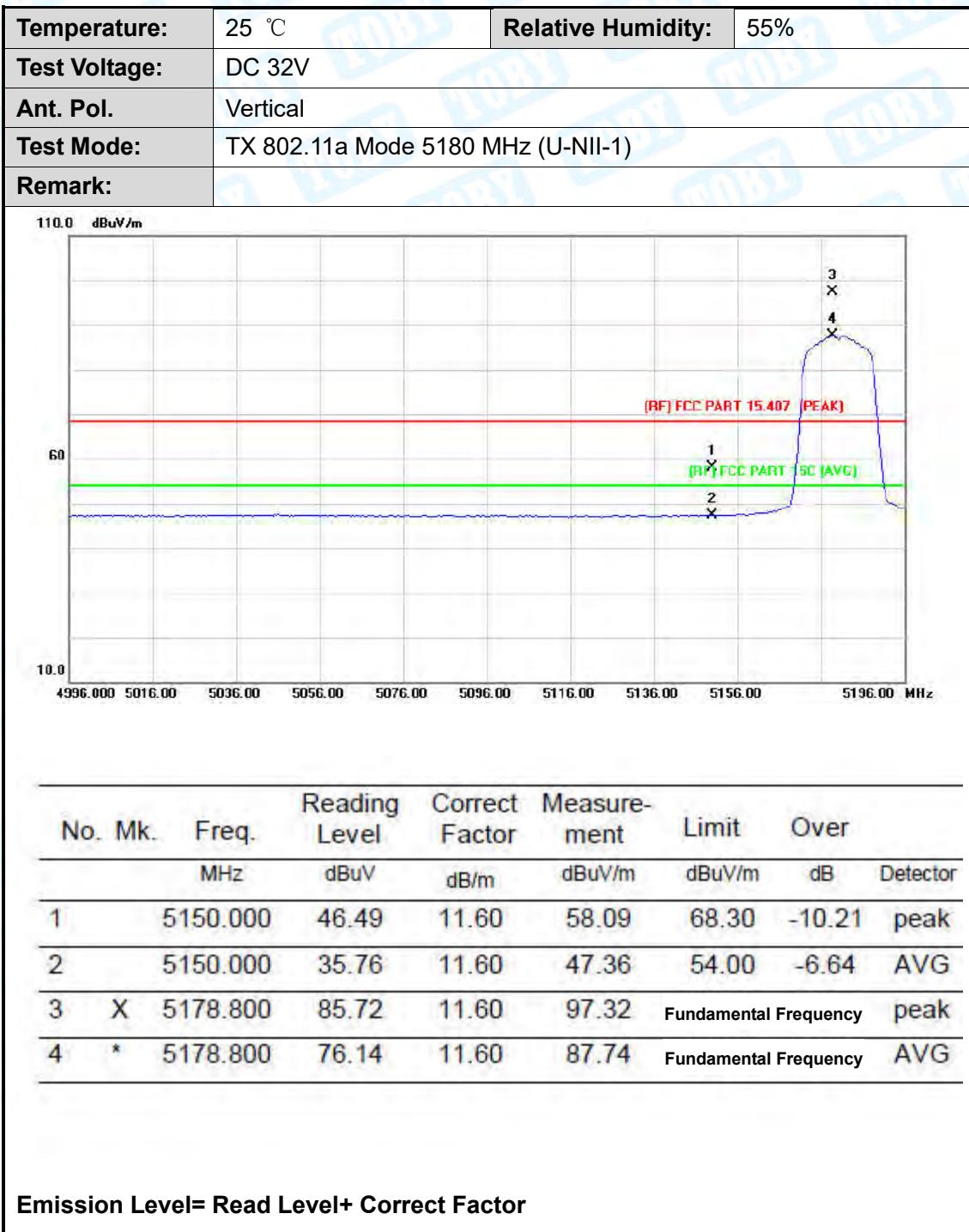
Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11ac(VHT80) Mode 5210MHz (U-NII-1)						
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
<hr/>							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		10420.613	34.70	20.59	55.29	68.30	-13.01 peak
2	*	10420.622	24.77	20.59	45.36	54.00	-8.64 AVG
<hr/>							
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C		Relative Humidity:	55%						
Test Voltage:	DC 32V									
Ant. Pol.	Vertical									
Test Mode:	TX 802.11ac(VHT80) Mode 5210MHz (U-NII-1)									
Remark:	No report for the emission which more than 10 dB below the prescribed limit.									
<hr/>										
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over			
		MHz	dBuV	dB/m	dBuV/m	dB	Detector			
1		10420.395	33.68	20.59	54.27	68.30	-14.03 peak			
2	*	10420.562	24.03	20.59	44.62	54.00	-9.38 AVG			
<hr/>										
Emission Level= Read Level+ Correct Factor										

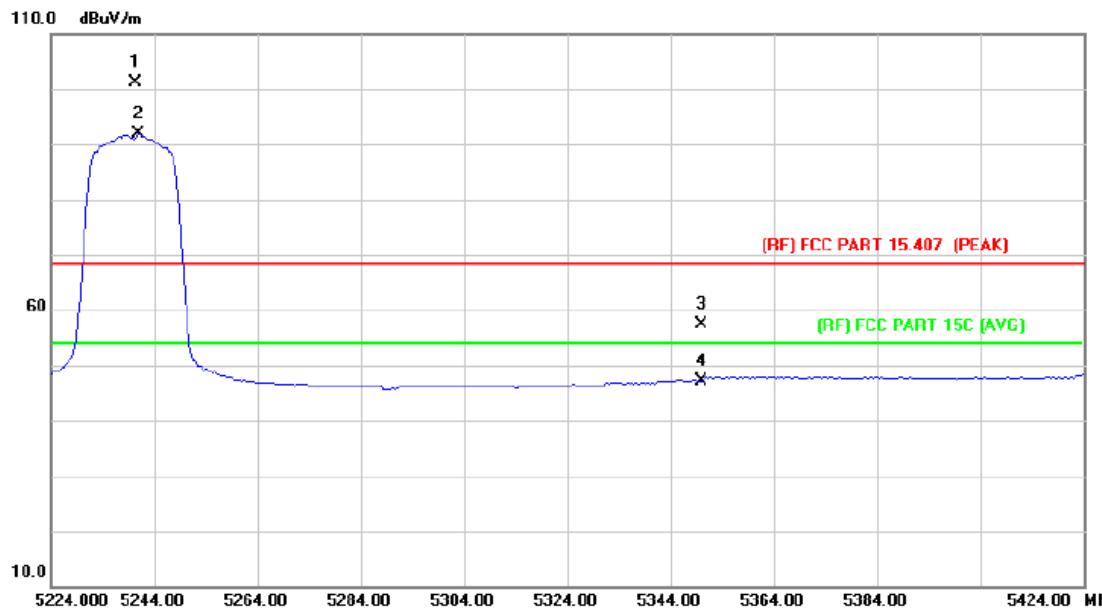
Attachment C-- Restricted Bands Requirement and Band-edge Test Data

(1) Radiation Test



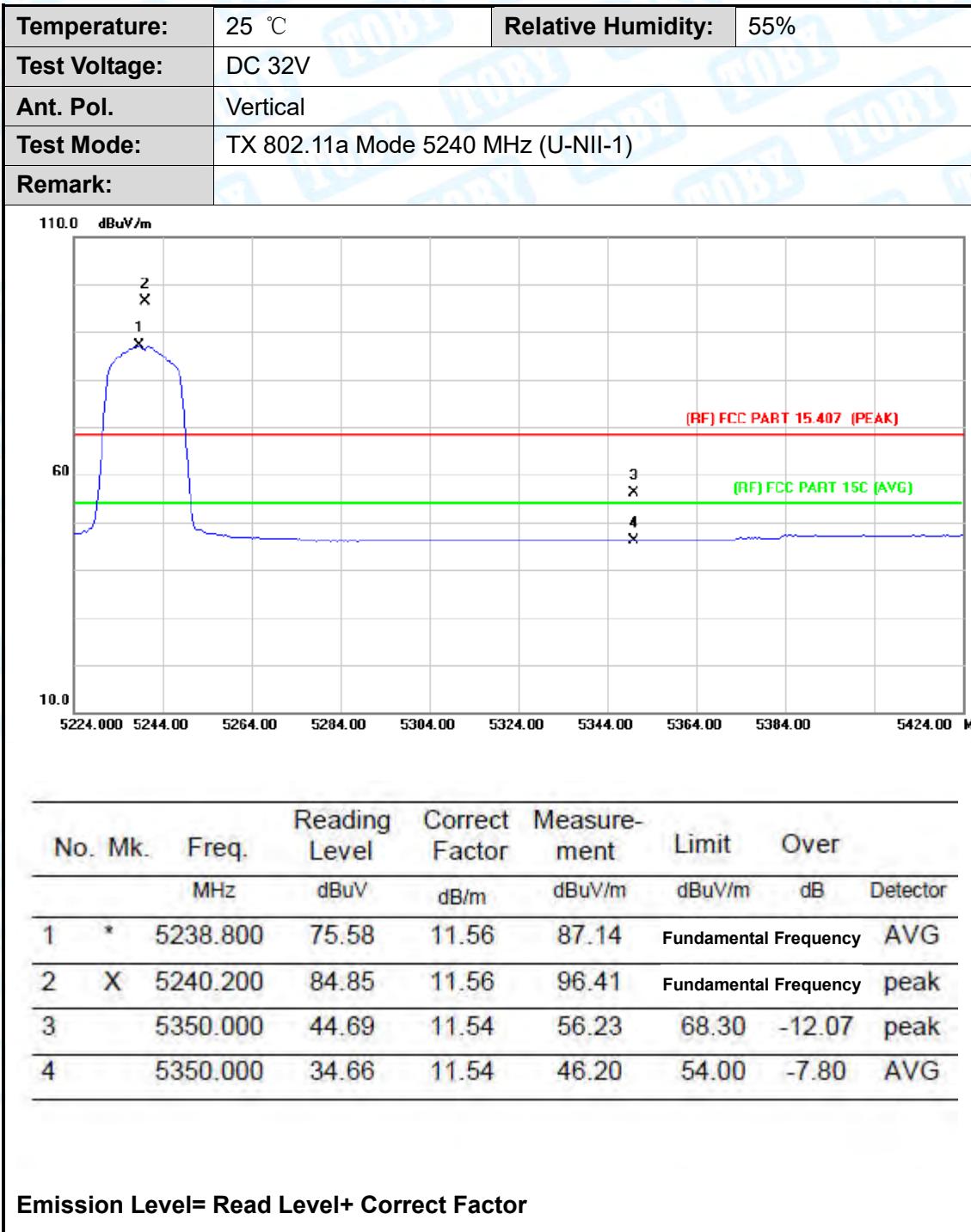


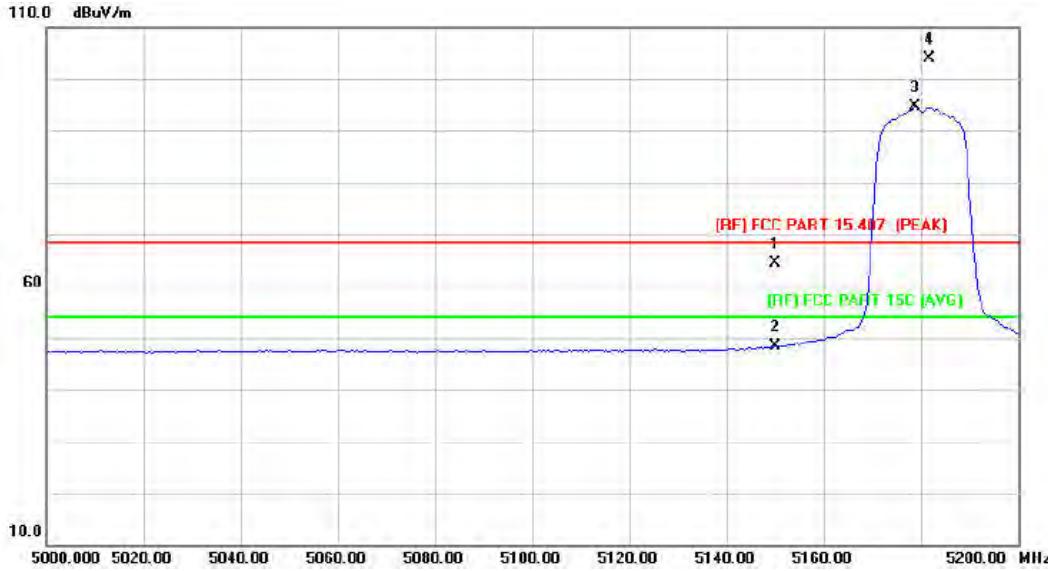
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11a Mode 5240 MHz (U-NII-1)		
Remark:			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	X	5240.300	89.68	11.56	101.24	Fundamental Frequency	
2	*	5240.800	80.27	11.57	91.84	Fundamental Frequency	
3		5350.000	45.77	11.54	57.31	68.30	-10.99 peak
4		5350.000	35.62	11.54	47.16	54.00	-6.84 AVG

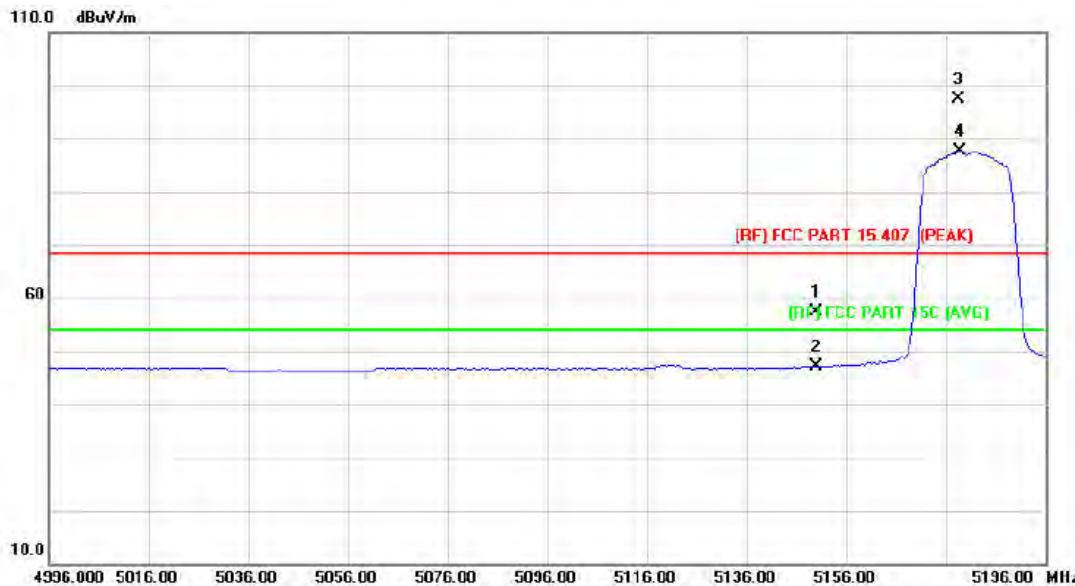
Emission Level= Read Level+ Correct Factor



Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Horizontal						
Test Mode:	TX 802.11n(HT20) Mode 5180 MHz (U-NII-1)						
Remark:							
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		5150.000	52.83	11.60	64.43	68.30	-3.87 peak
2		5150.000	36.76	11.60	48.36	54.00	-5.64 AVG
3	*	5178.800	82.92	11.60	94.52	Fundamental Frequency	AVG
4	X	5181.600	92.39	11.60	103.99	Fundamental Frequency	peak

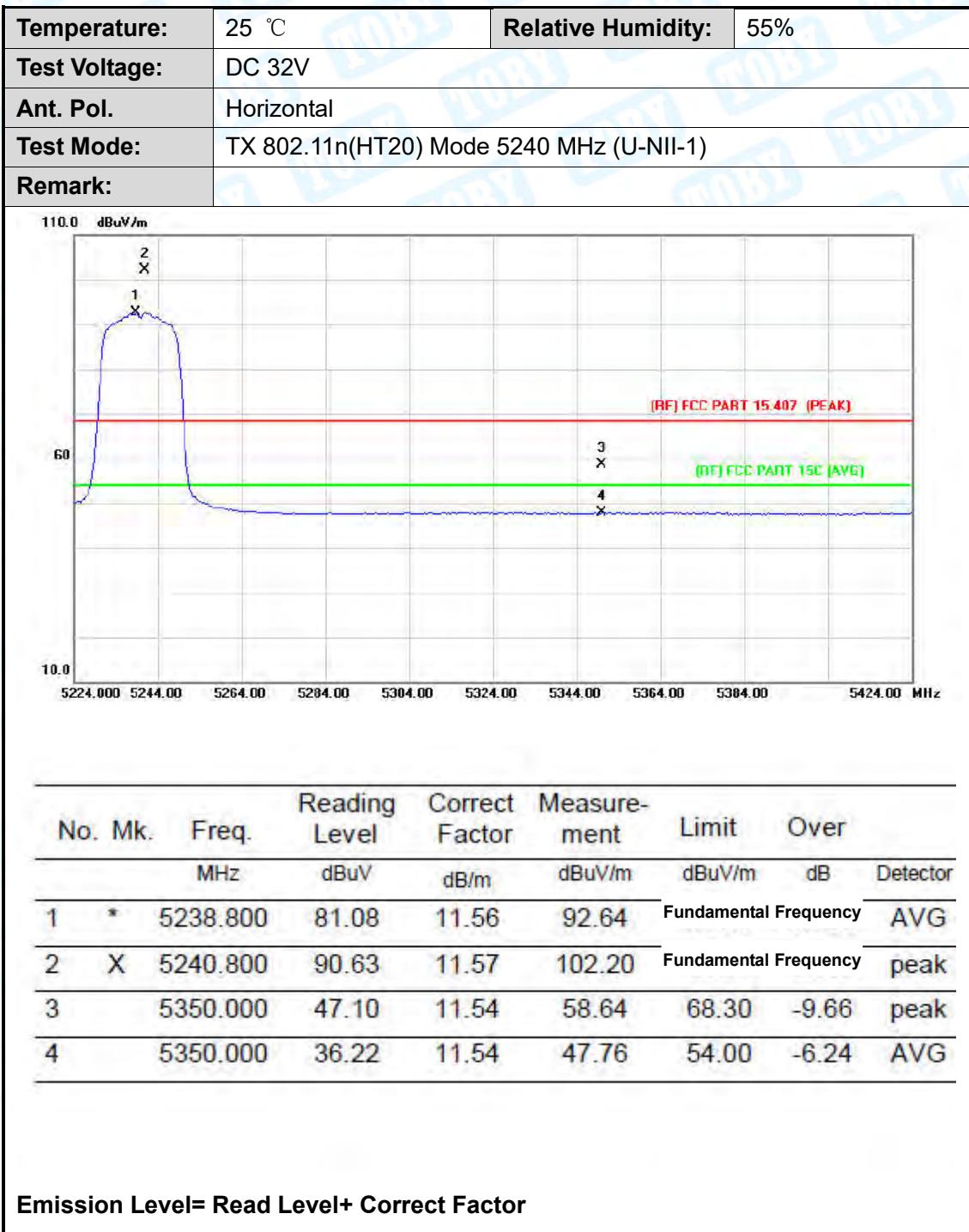
Emission Level= Read Level+ Correct Factor

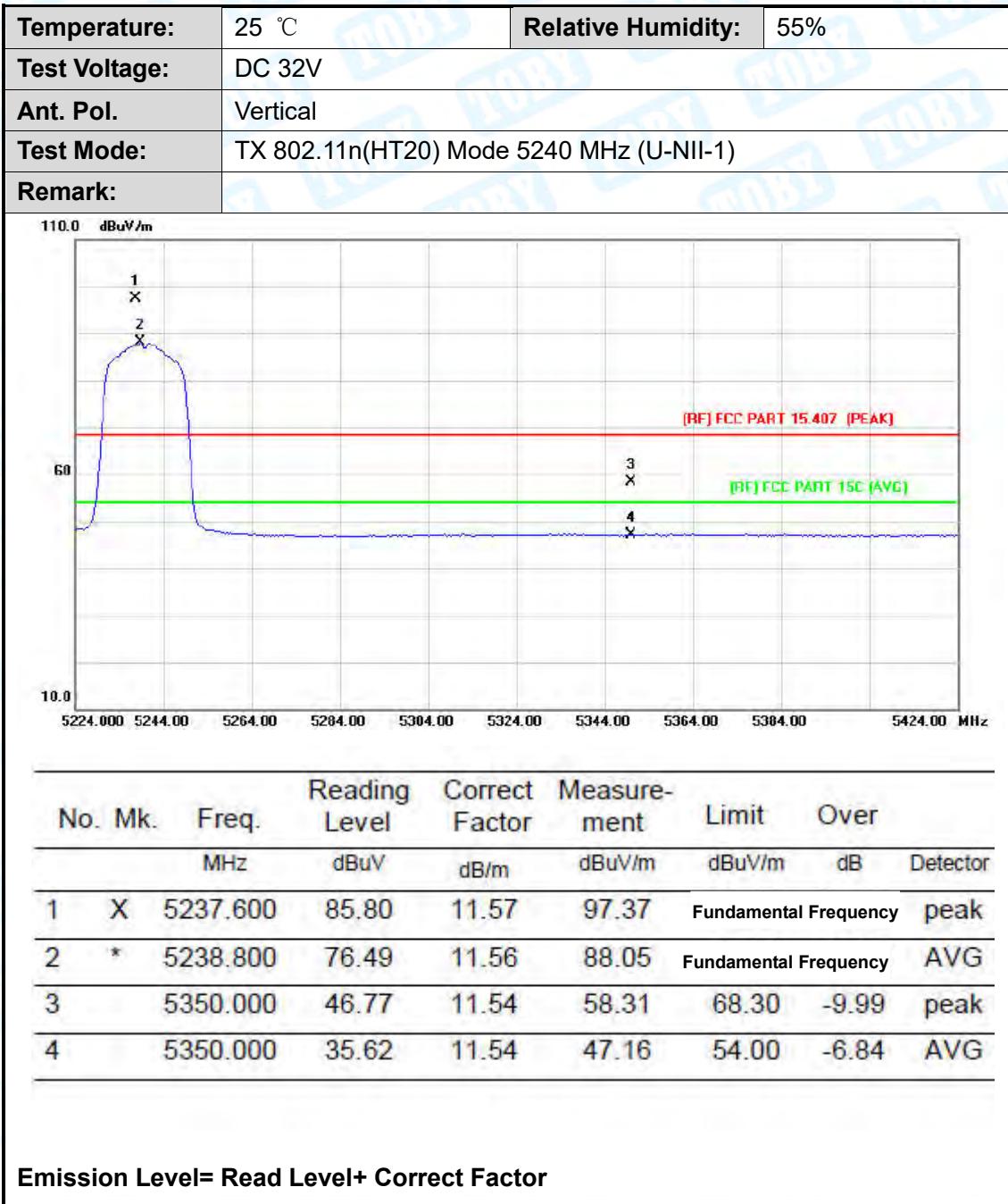
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11n(HT20) Mode 5180 MHz (U-NII-1)		
Remark:			

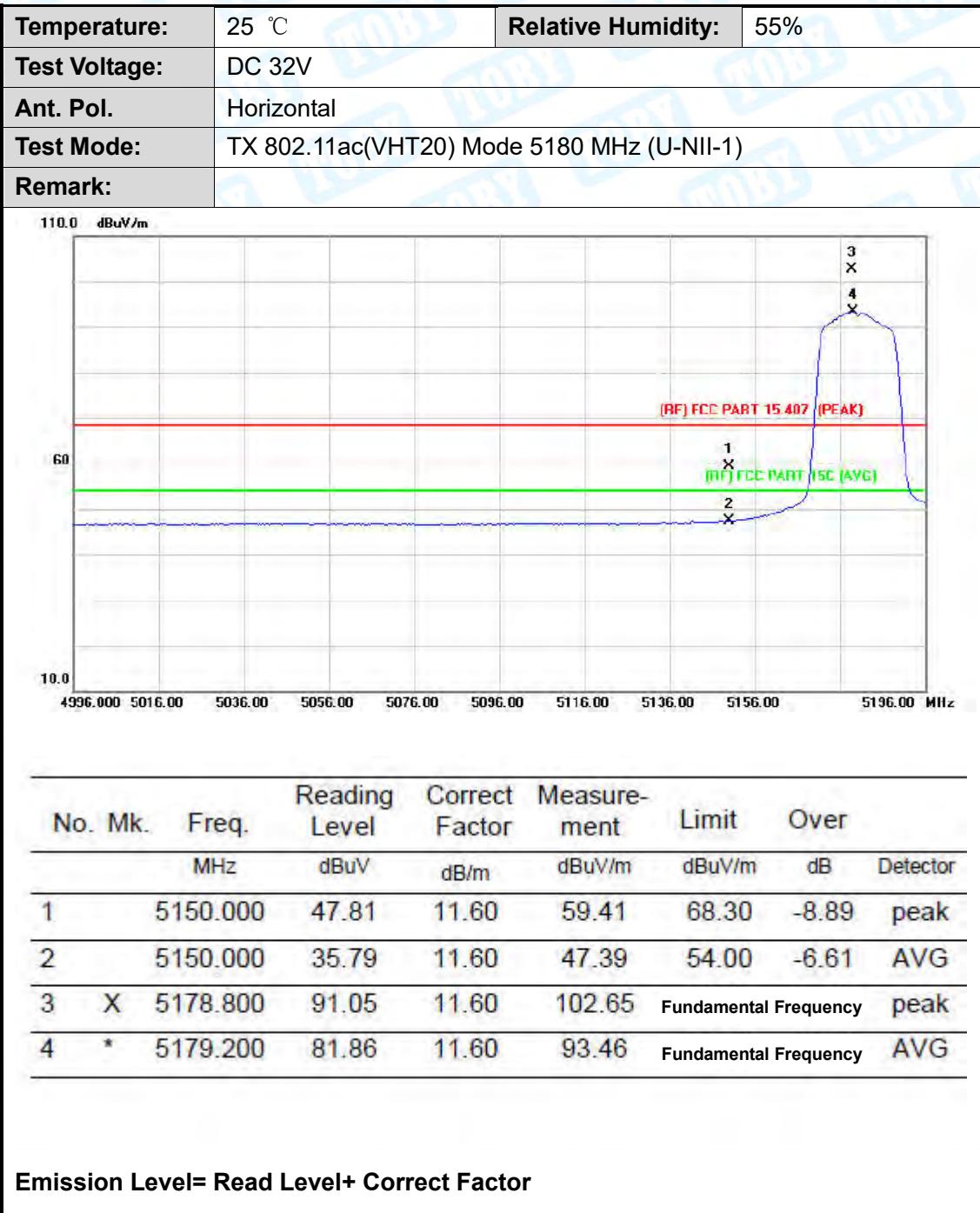


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over
			Level	Factor	ment		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		5150.000	45.75	11.60	57.35	68.30	-10.95 peak
2		5150.000	35.54	11.60	47.14	54.00	-6.86 AVG
3	X	5178.600	85.66	11.60	97.26	Fundamental Frequency	peak
4	*	5178.800	76.15	11.60	87.75	Fundamental Frequency	AVG

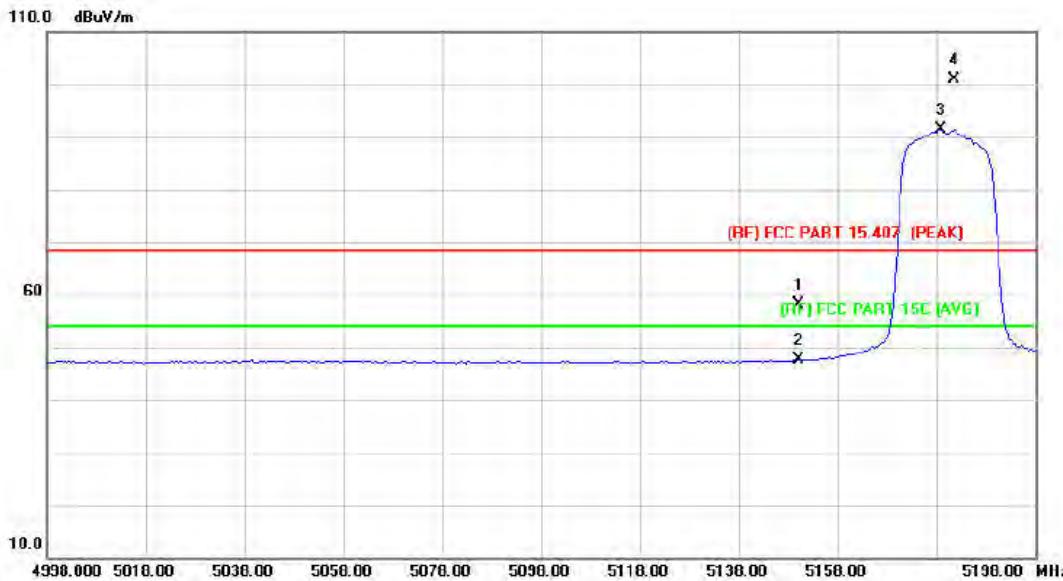
Emission Level= Read Level+ Correct Factor





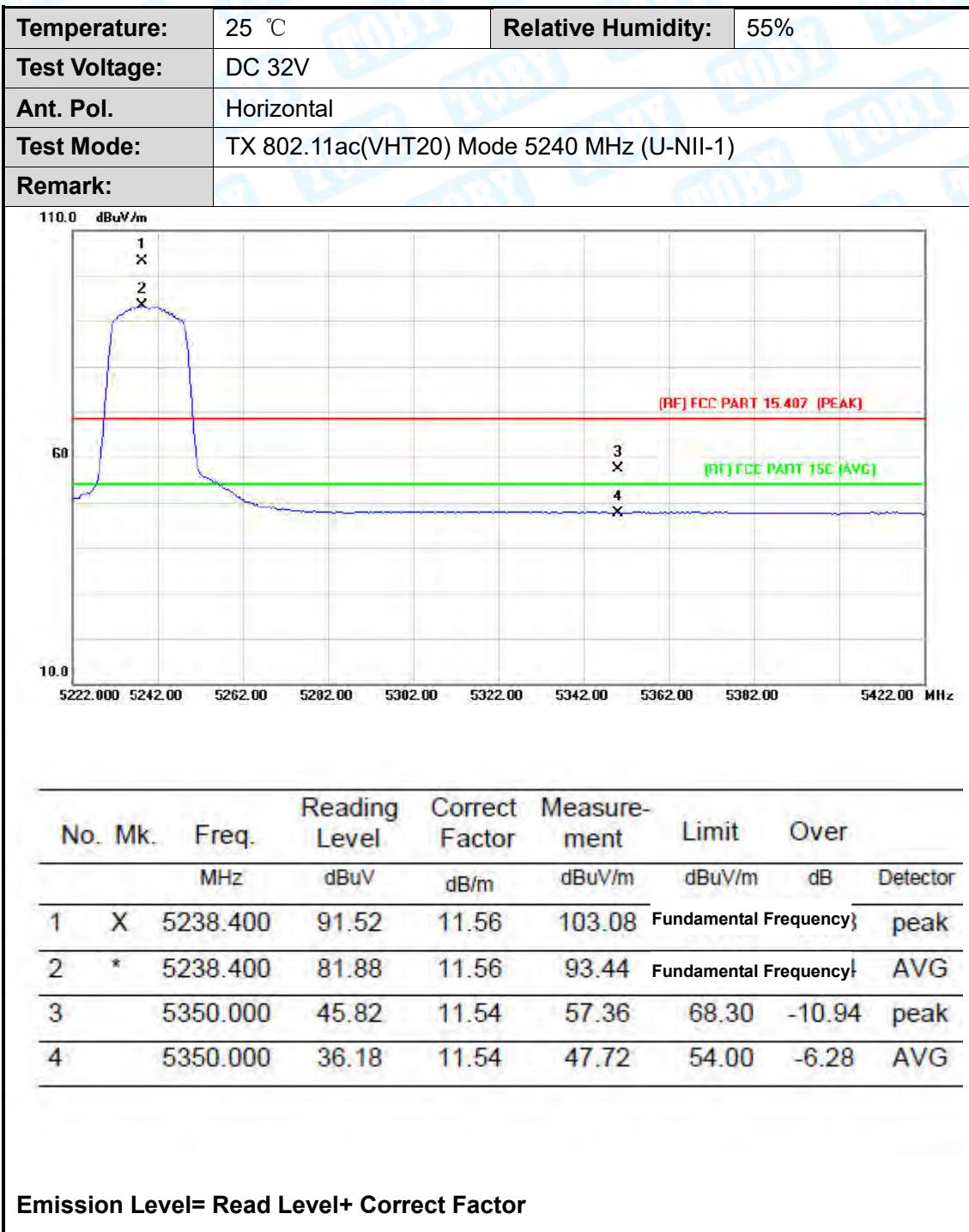


Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11ac(VHT20) Mode 5180 MHz (U-NII-1)		
Remark:			

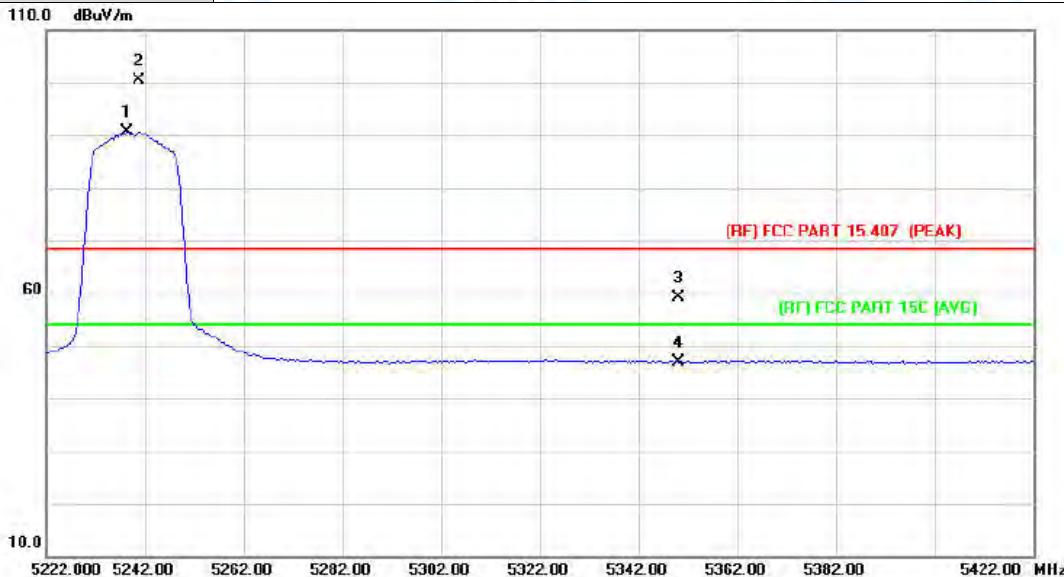


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		5150.000	46.46	11.60	58.06	68.30	-10.24 peak
2		5150.000	36.00	11.60	47.60	54.00	-6.40 AVG
3	*	5178.800	79.88	11.60	91.48	Fundamental Frequency	AVG
4	X	5181.600	89.21	11.60	100.81	Fundamental Frequency	peak

Emission Level= Read Level+ Correct Factor

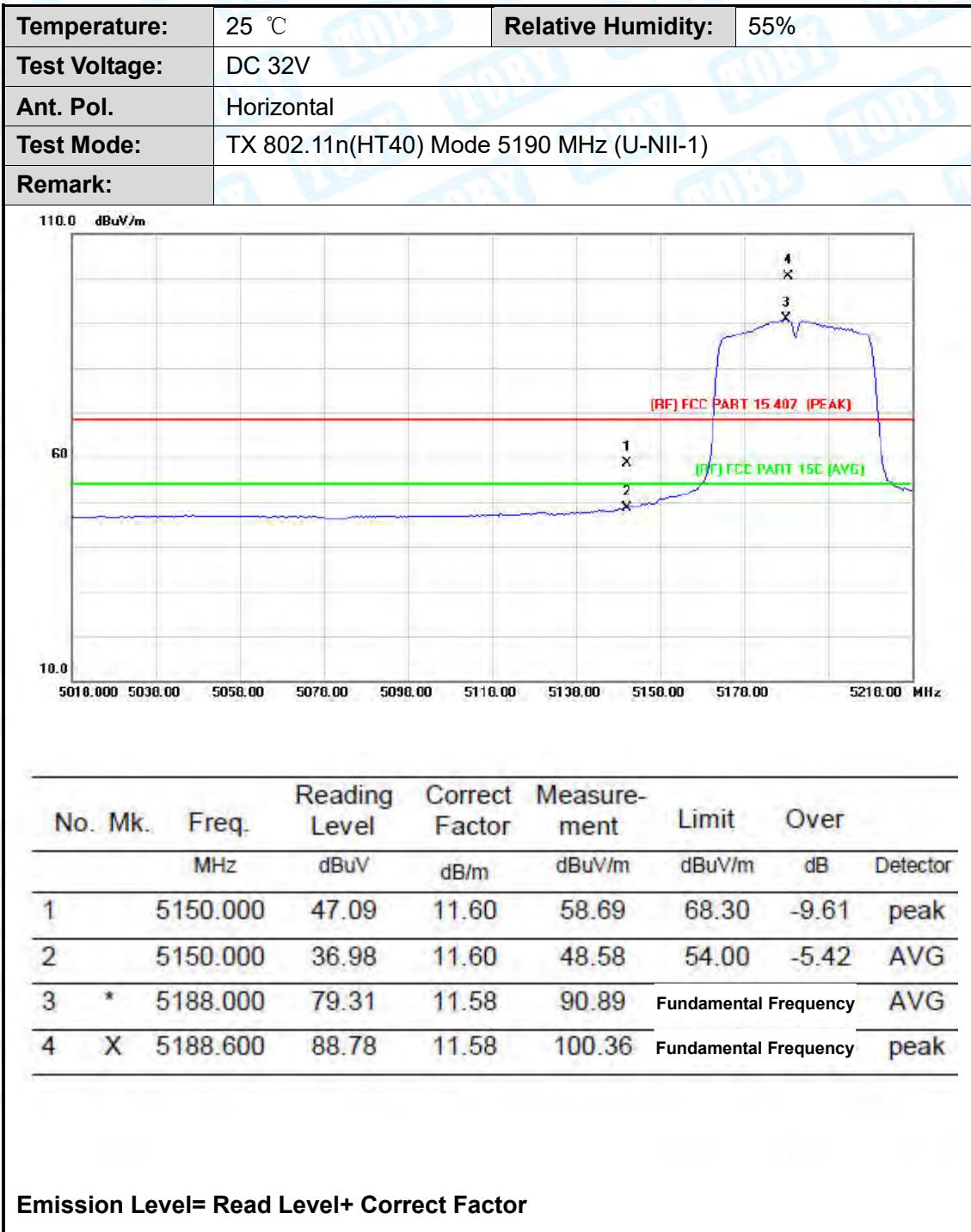


Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11ac(VHT20) Mode 5240 MHz (U-NII-1)		
Remark:			

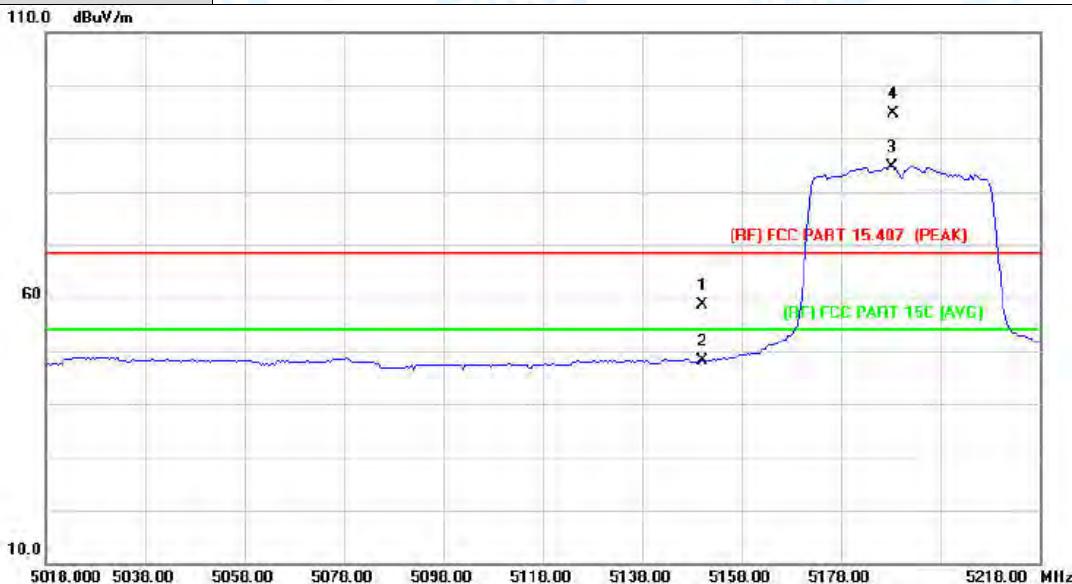


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	5238.400	79.05	11.56	90.61	Fundamental Frequency	AVG	
2	X	5240.800	88.79	11.57	100.36	Fundamental Frequency	peak	
3		5350.000	47.64	11.54	59.18	68.30	-9.12	peak
4		5350.000	35.40	11.54	46.94	54.00	-7.06	AVG

Emission Level= Read Level+ Correct Factor



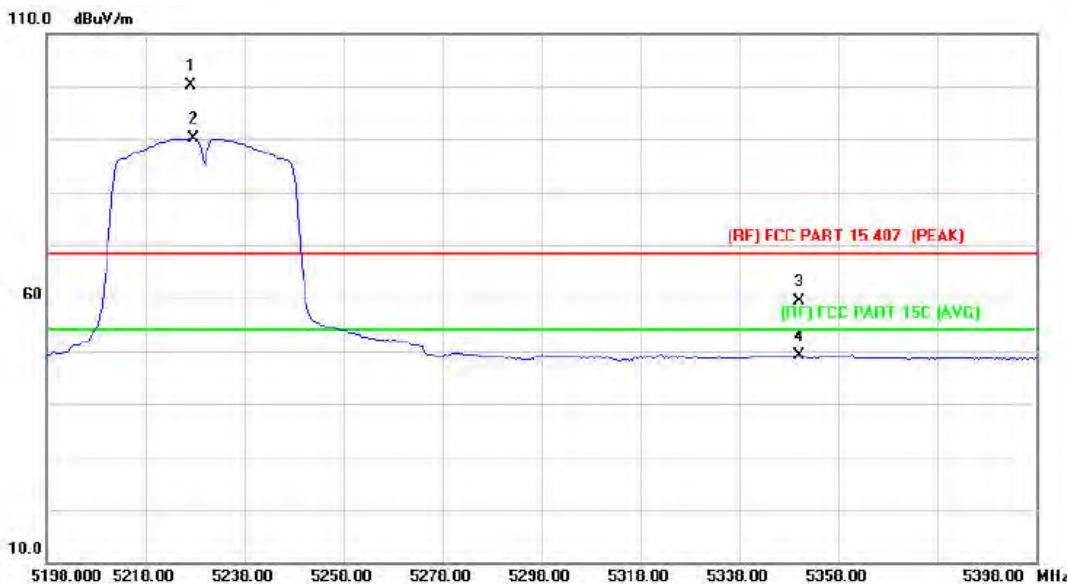
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Vertical		
Test Mode:	TX 802.11n(HT40) Mode 5190 MHz (U-NII-1)		
Remark:			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		5150.000	46.99	11.60	58.59	68.30	-9.71 peak
2		5150.000	36.46	11.60	48.06	54.00	-5.94 AVG
3	*	5188.400	73.10	11.58	84.68	Fundamental Frequency	AVG
4	X	5188.600	83.08	11.58	94.66	Fundamental Frequency	peak

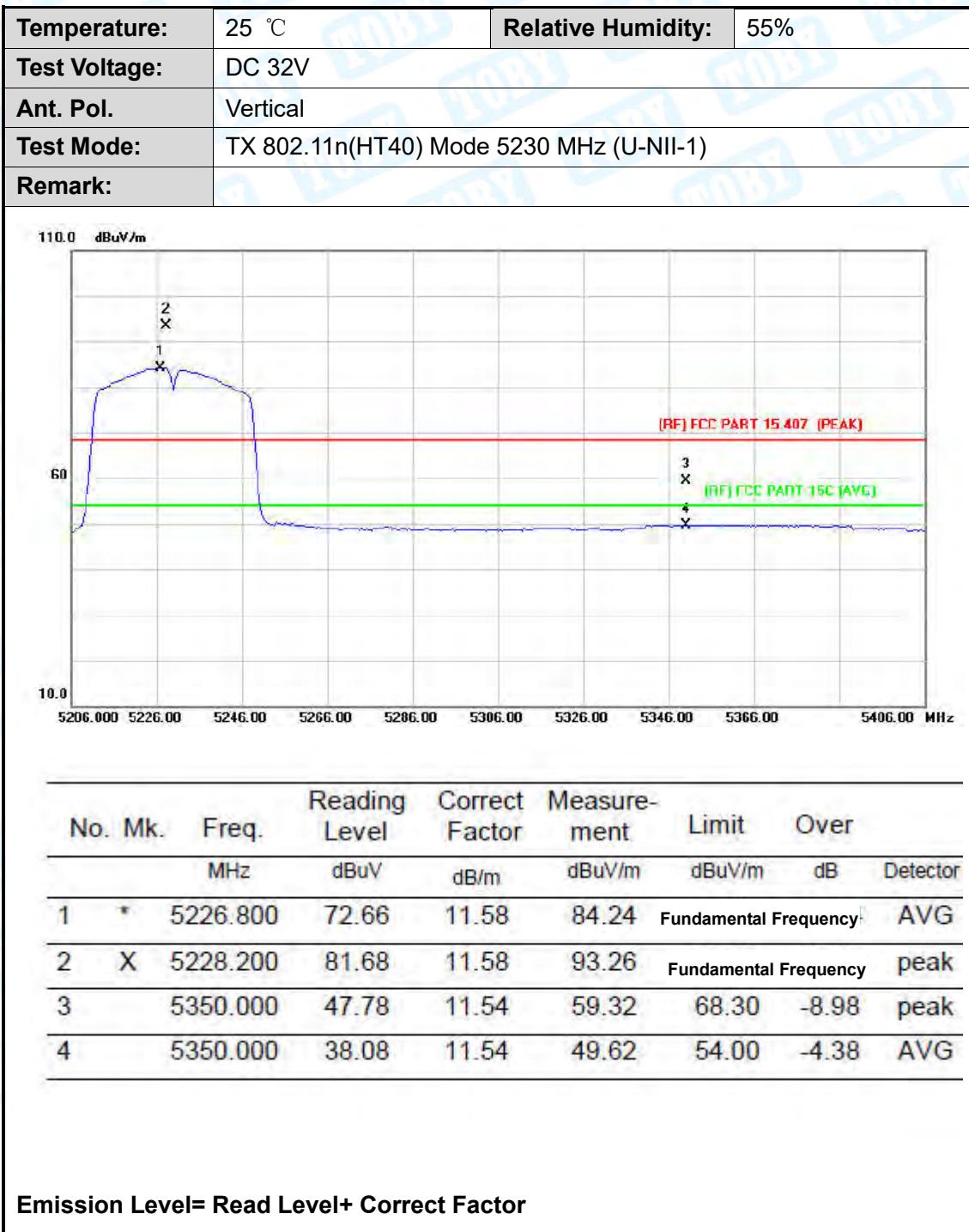
Emission Level= Read Level+ Correct Factor

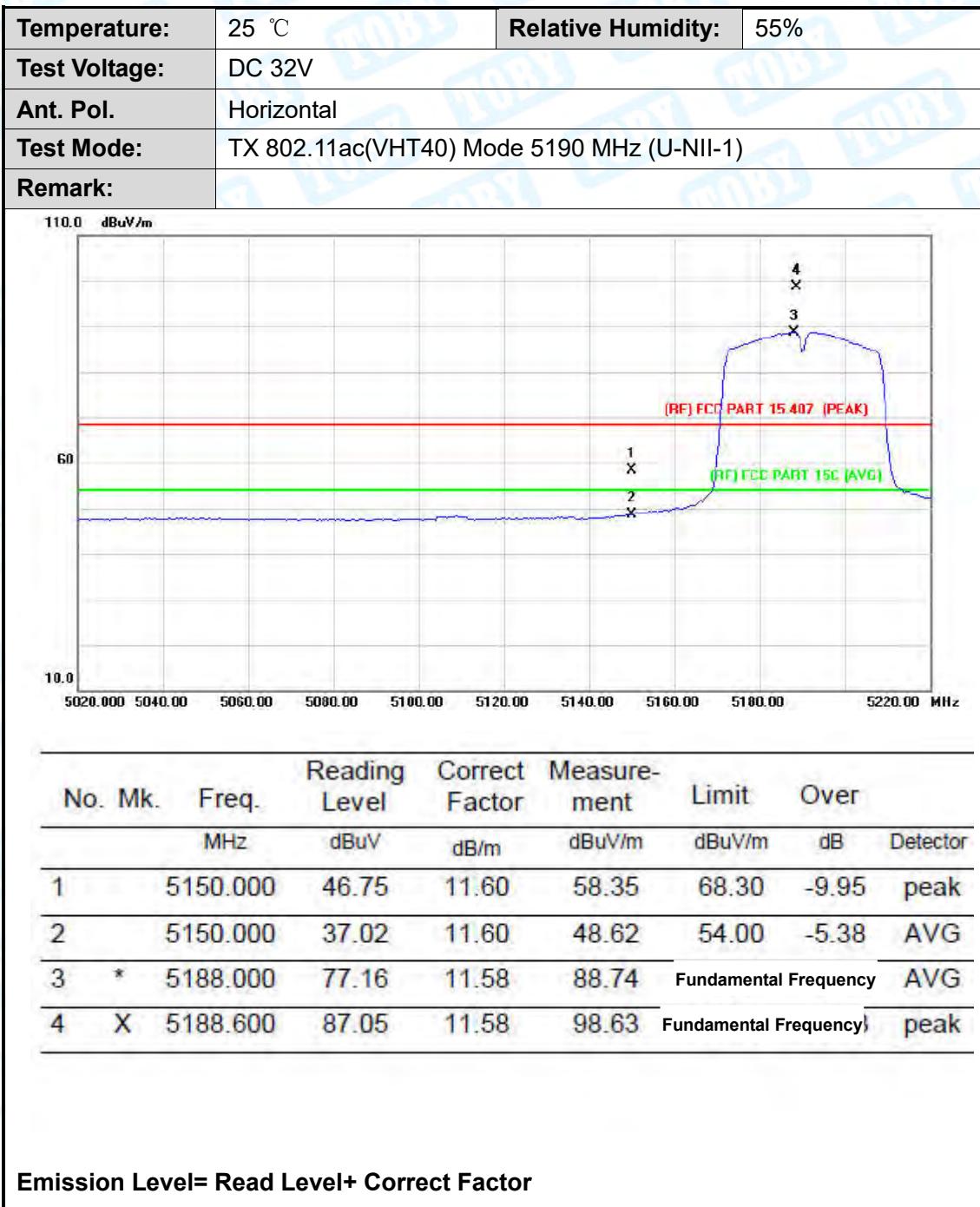
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11n(HT40) Mode 5230 MHz (U-NII-1)		
Remark:			

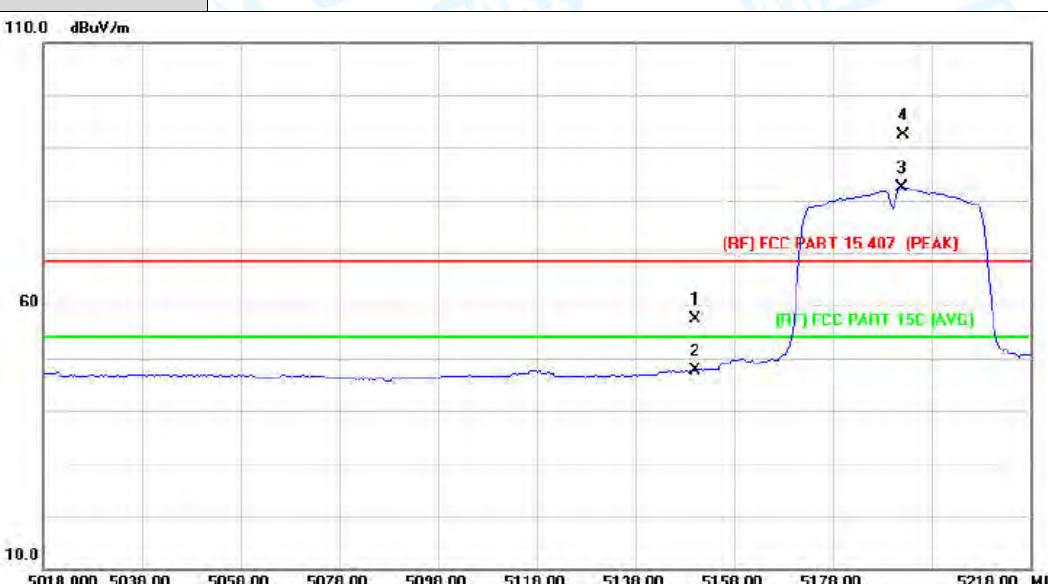


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector
			Level	Factor	ment			
		MHz	dB _{UV}	dB/m	dB _{UV} /m			
1	X	5227.300	88.48	11.58	100.06	Fundamental Frequency	peak	
2	*	5227.600	78.49	11.58	90.07	Fundamental Frequency	AVG	
3		5350.000	47.78	11.54	59.32	68.30	-8.98	peak
4		5350.000	37.69	11.54	49.23	54.00	-4.77	AVG

Emission Level= Read Level+ Correct Factor

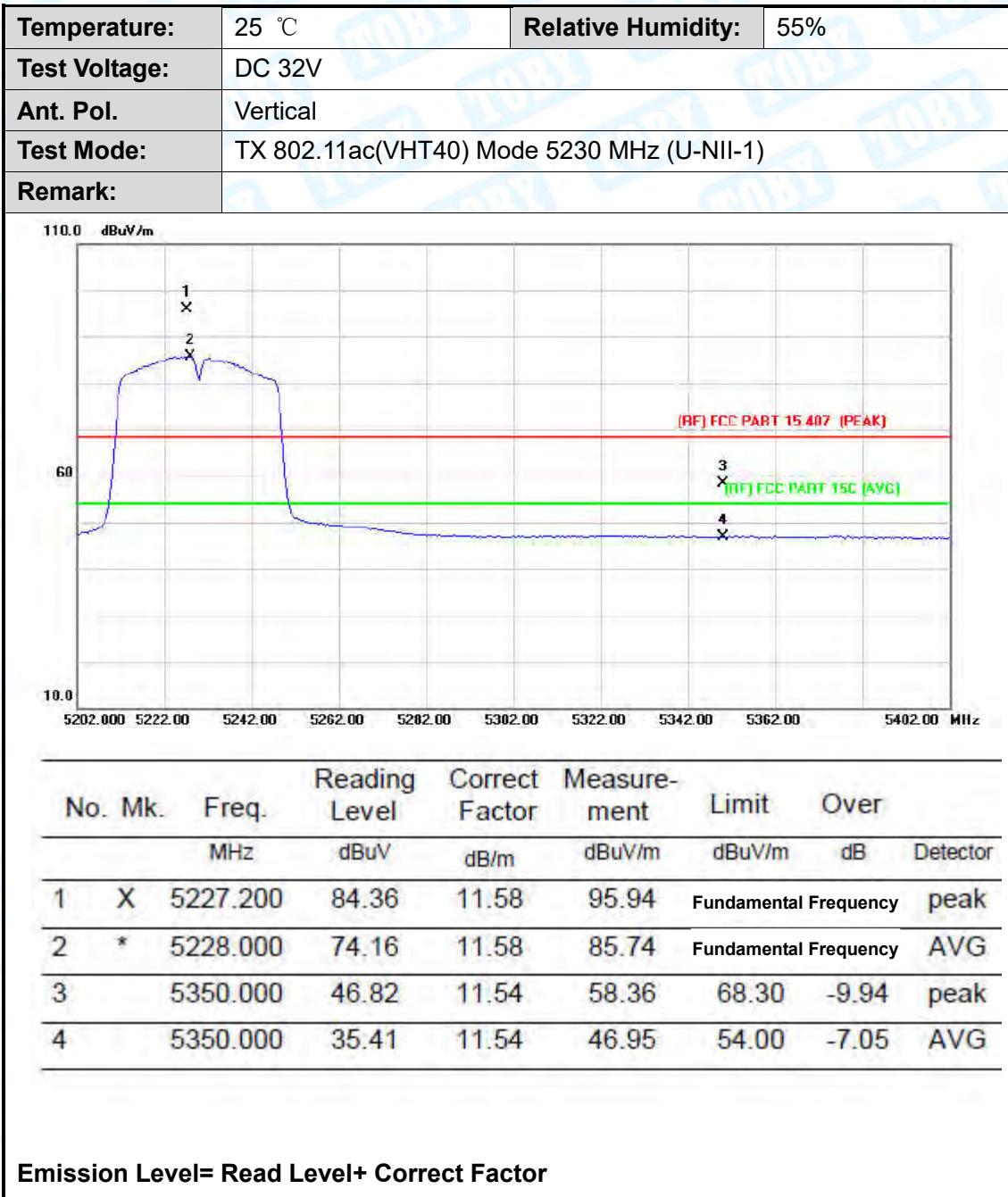




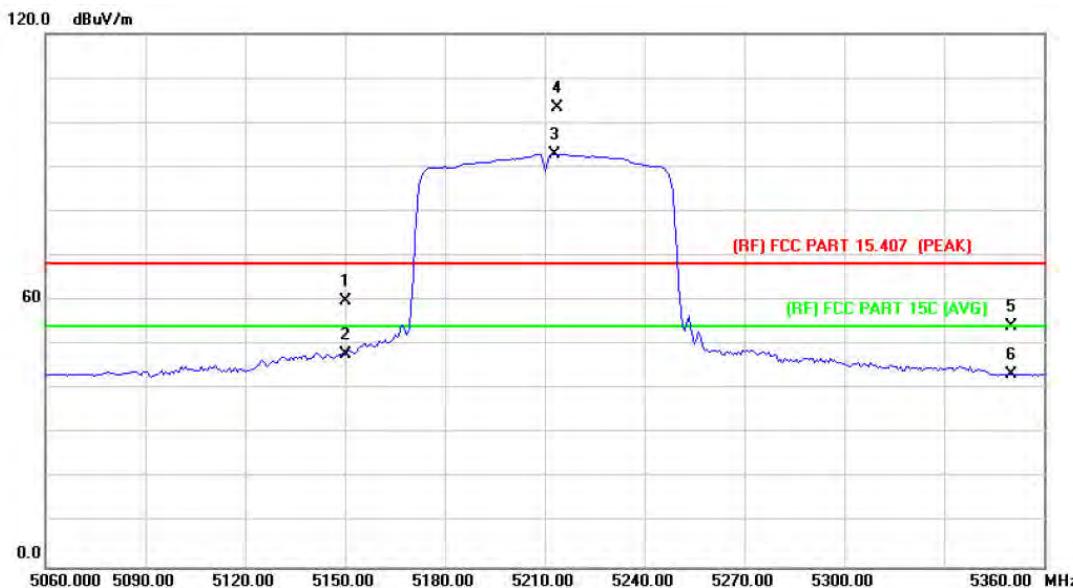
Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	DC 32V						
Ant. Pol.	Vertical						
Test Mode:	TX 802.11ac(VHT40) Mode 5190 MHz (U-NII-1)						
Remark:							
							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		5150.000	45.76	11.60	57.36	68.30	-10.94 peak
2		5150.000	36.00	11.60	47.60	54.00	-6.40 AVG
3	*	5192.000	70.85	11.58	82.43	Fundamental Frequency	AVG
4	X	5192.300	80.83	11.58	92.41	Fundamental Frequency	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%																																																
Test Voltage:	DC 32V																																																		
Ant. Pol.	Horizontal																																																		
Test Mode:	TX 802.11ac(VHT40) Mode 5230 MHz (U-NII-1)																																																		
Remark:																																																			
<table border="1"> <thead> <tr> <th>No.</th> <th>Mk.</th> <th>Freq.</th> <th>Reading Level</th> <th>Correct Factor</th> <th>Measure-ment</th> <th>Limit</th> <th>Over</th> </tr> <tr> <th></th> <th></th> <th>MHz</th> <th>dBuV</th> <th>dB/m</th> <th>dBuV/m</th> <th>dB</th> <th>Detector</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>*</td> <td>5228.000</td> <td>75.75</td> <td>11.58</td> <td>87.33</td> <td>Fundamental Frequency</td> <td>AVG</td> </tr> <tr> <td>2</td> <td>X</td> <td>5228.300</td> <td>85.03</td> <td>11.58</td> <td>96.61</td> <td>Fundamental Frequency</td> <td>peak</td> </tr> <tr> <td>3</td> <td></td> <td>5350.000</td> <td>47.59</td> <td>11.54</td> <td>59.13</td> <td>68.30</td> <td>-9.17</td> </tr> <tr> <td>4</td> <td></td> <td>5350.000</td> <td>37.56</td> <td>11.54</td> <td>49.10</td> <td>54.00</td> <td>-4.90</td> </tr> </tbody> </table>				No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over			MHz	dBuV	dB/m	dBuV/m	dB	Detector	1	*	5228.000	75.75	11.58	87.33	Fundamental Frequency	AVG	2	X	5228.300	85.03	11.58	96.61	Fundamental Frequency	peak	3		5350.000	47.59	11.54	59.13	68.30	-9.17	4		5350.000	37.56	11.54	49.10	54.00	-4.90
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over																																												
		MHz	dBuV	dB/m	dBuV/m	dB	Detector																																												
1	*	5228.000	75.75	11.58	87.33	Fundamental Frequency	AVG																																												
2	X	5228.300	85.03	11.58	96.61	Fundamental Frequency	peak																																												
3		5350.000	47.59	11.54	59.13	68.30	-9.17																																												
4		5350.000	37.56	11.54	49.10	54.00	-4.90																																												
<p>Emission Level= Read Level+ Correct Factor</p>																																																			

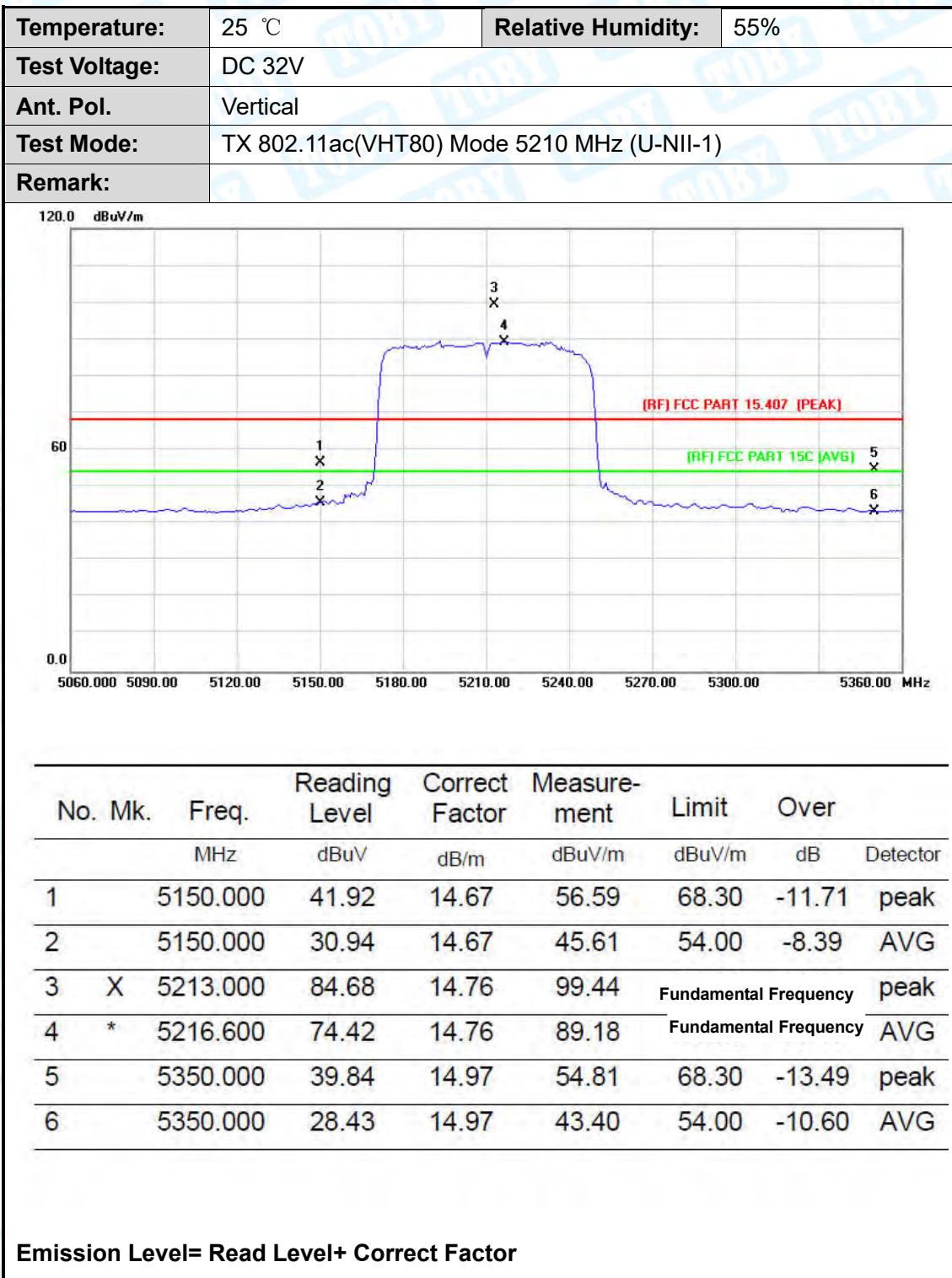


Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Ant. Pol.	Horizontal		
Test Mode:	TX 802.11ac(VHT80) Mode 5210 MHz (U-NII-1)		
Remark:			



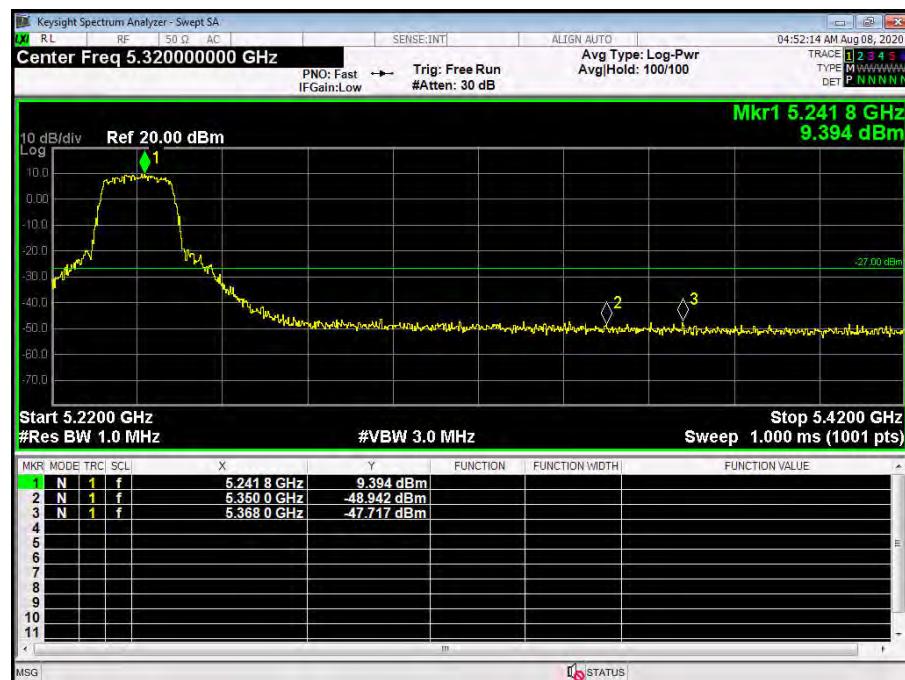
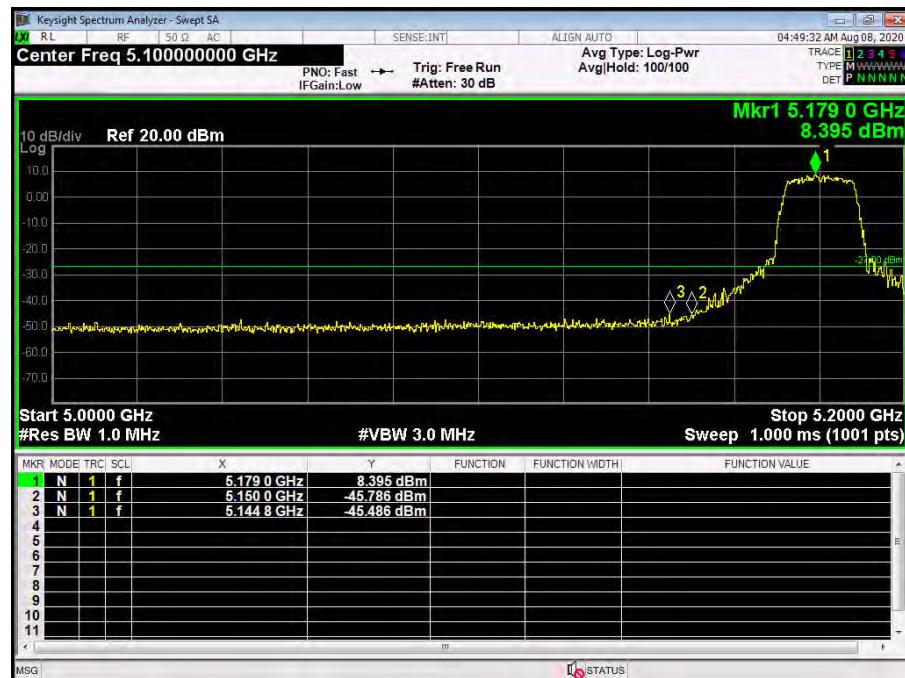
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		5150.000	45.21	14.67	59.88	68.30	-8.42	peak
2		5150.000	33.21	14.67	47.88	54.00	-6.12	AVG
3	*	5213.000	78.21	14.76	92.97	Fundamental Frequency		AVG
4	X	5213.600	88.59	14.76	103.35	Fundamental Frequency		peak
5		5350.000	39.24	14.97	54.21	68.30	-14.09	peak
6		5350.000	28.37	14.97	43.34	54.00	-10.66	AVG

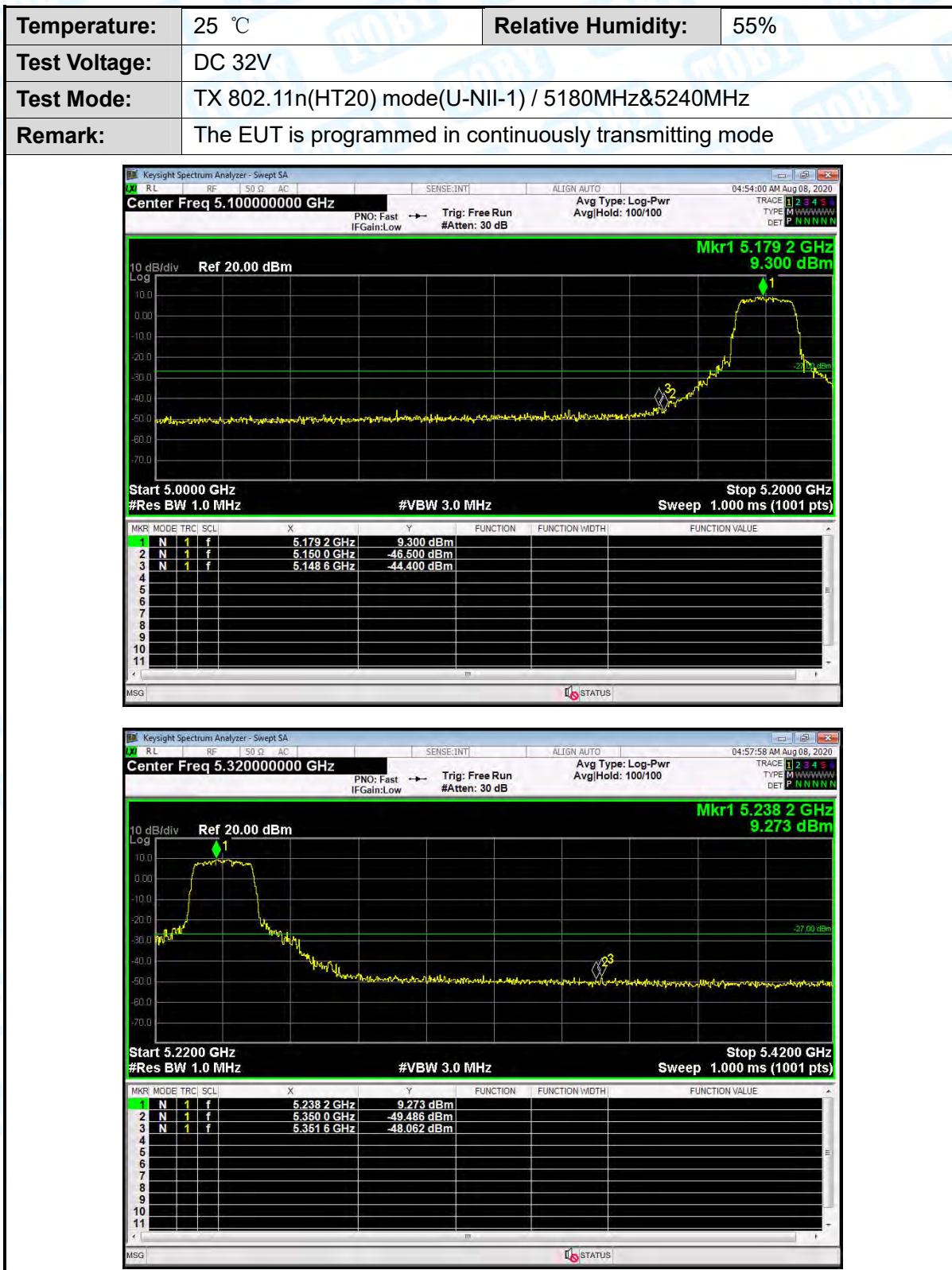
Emission Level= Read Level+ Correct Factor



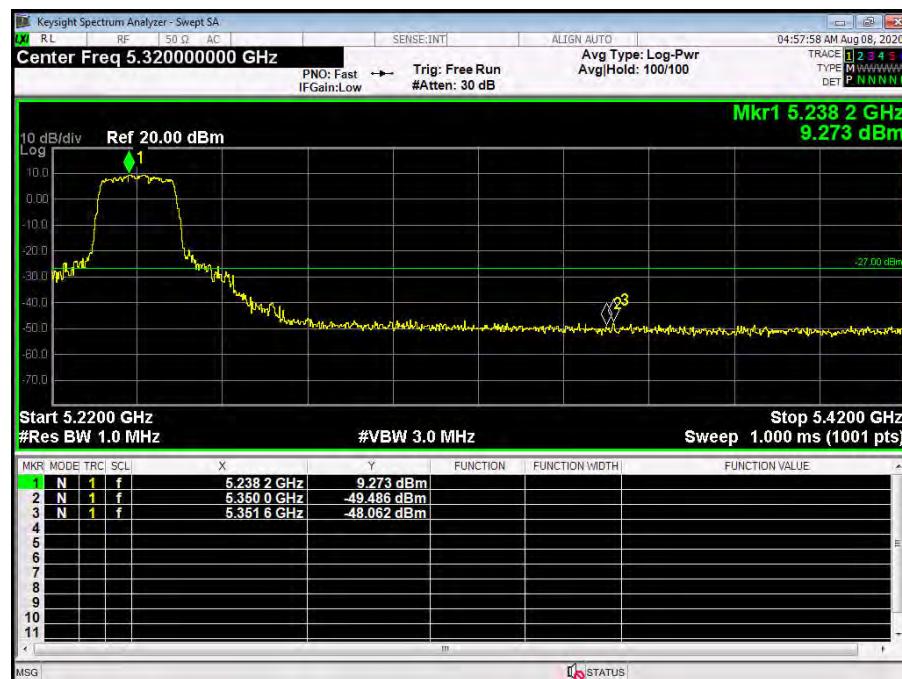
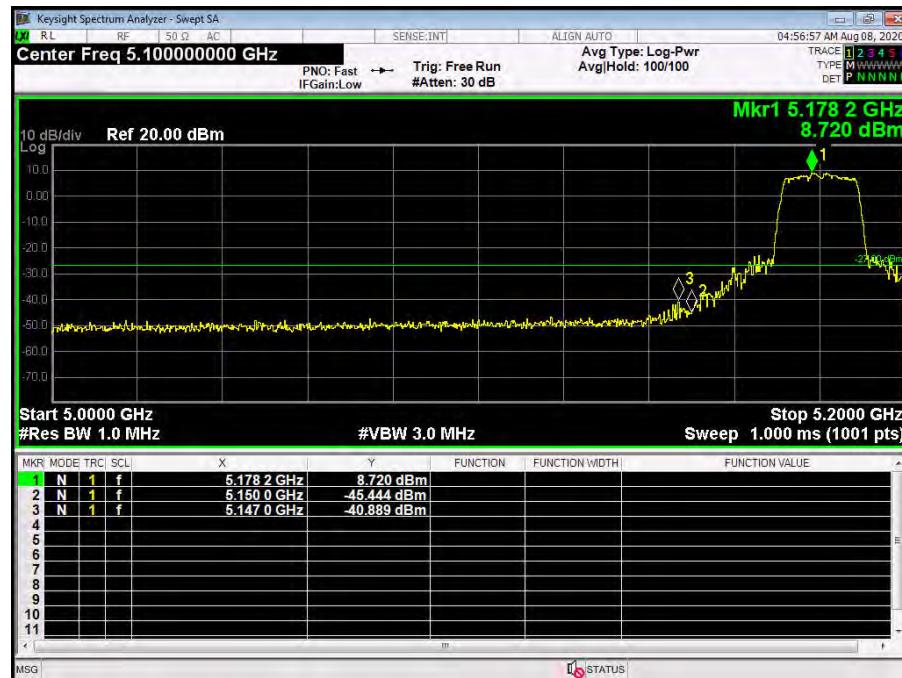
(1) Conducted Test

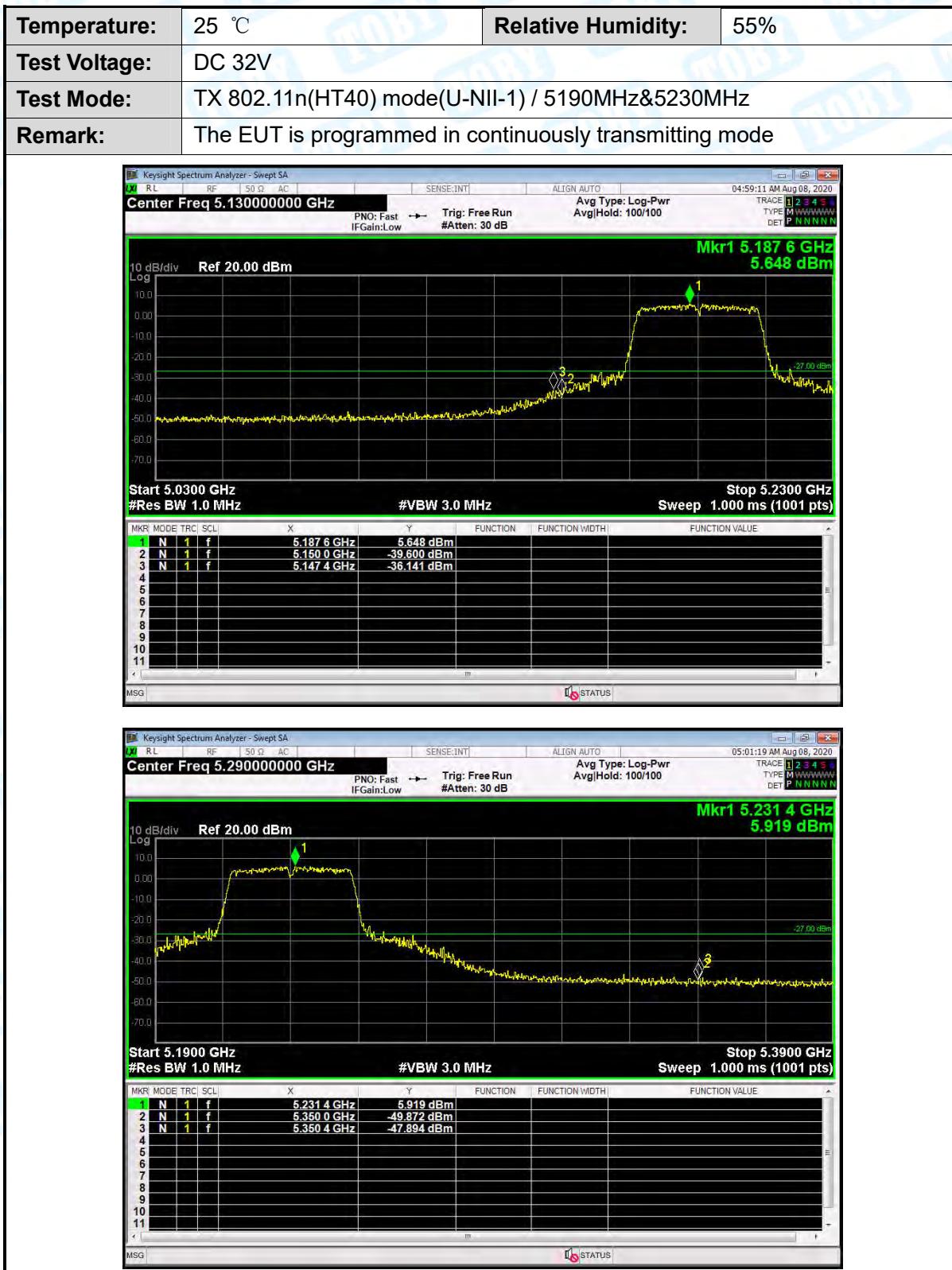
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Test Mode:	TX 802.11a mode(U-NII-1) / 5180MHz&5240MHz		
Remark:	The EUT is programmed in continuously transmitting mode		



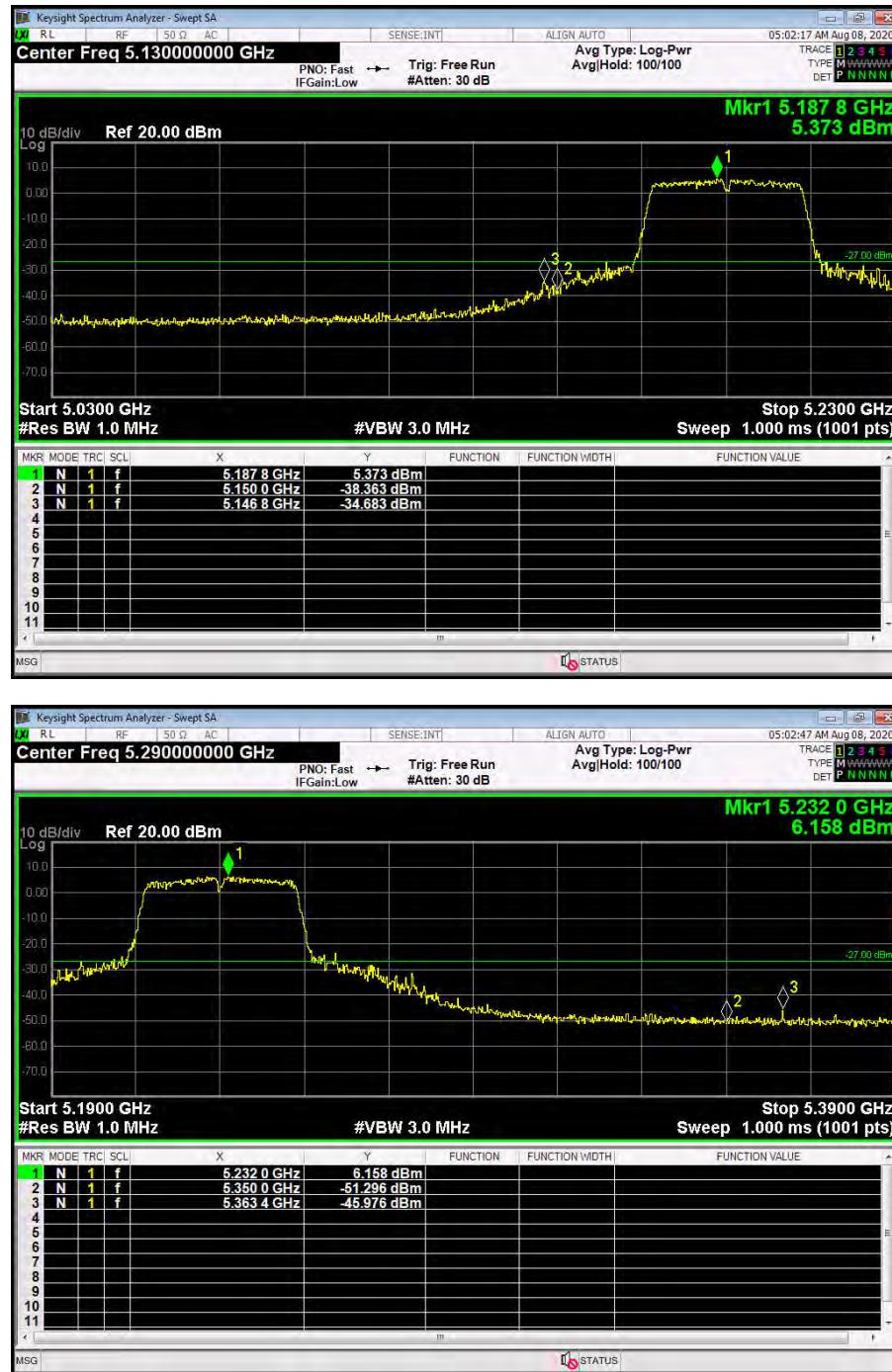


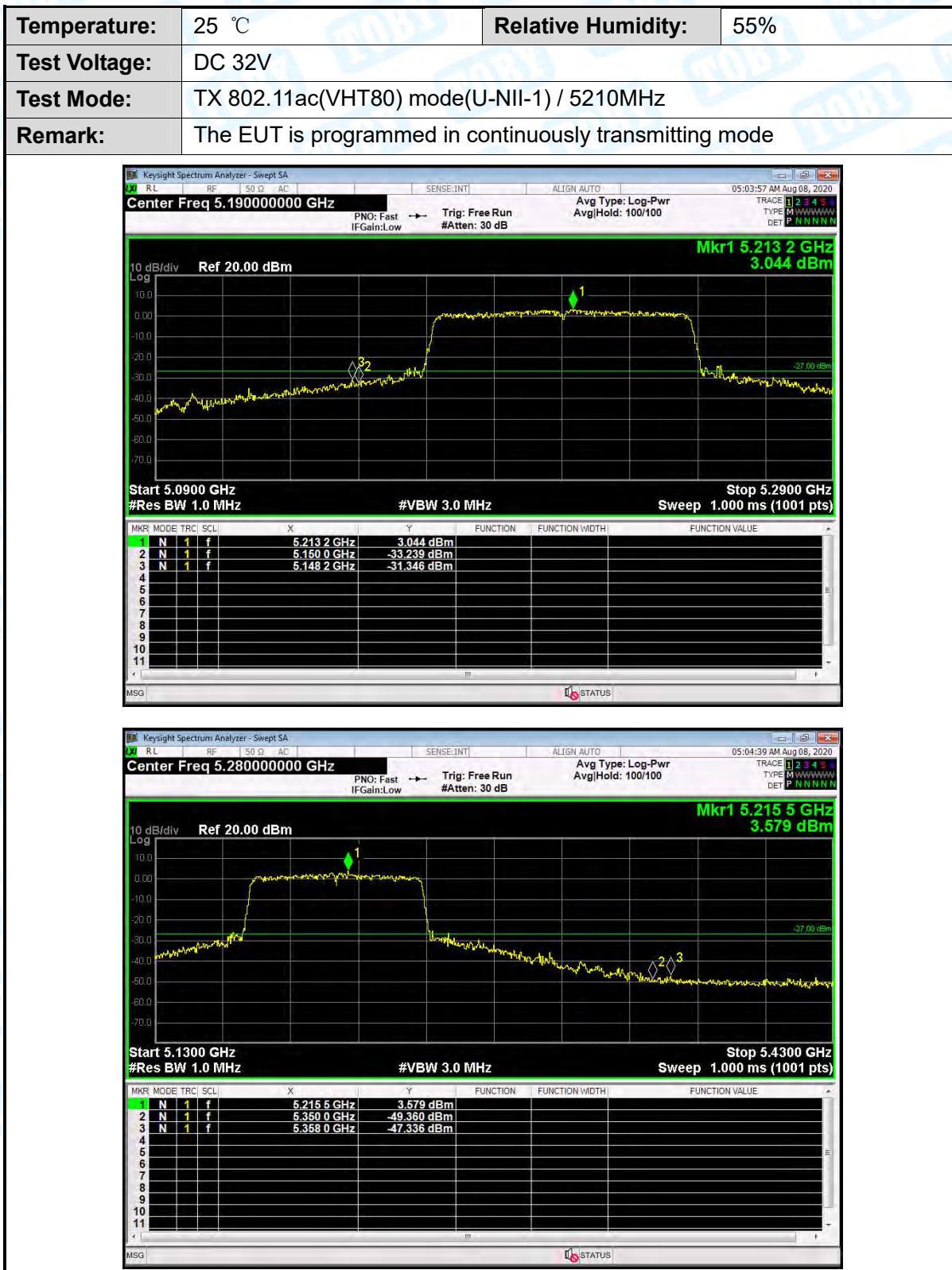
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Test Mode:	TX 802.11ac(VHT20) mode(U-NII-1) / 5180MHz&5240MHz		
Remark:	The EUT is programmed in continuously transmitting mode		



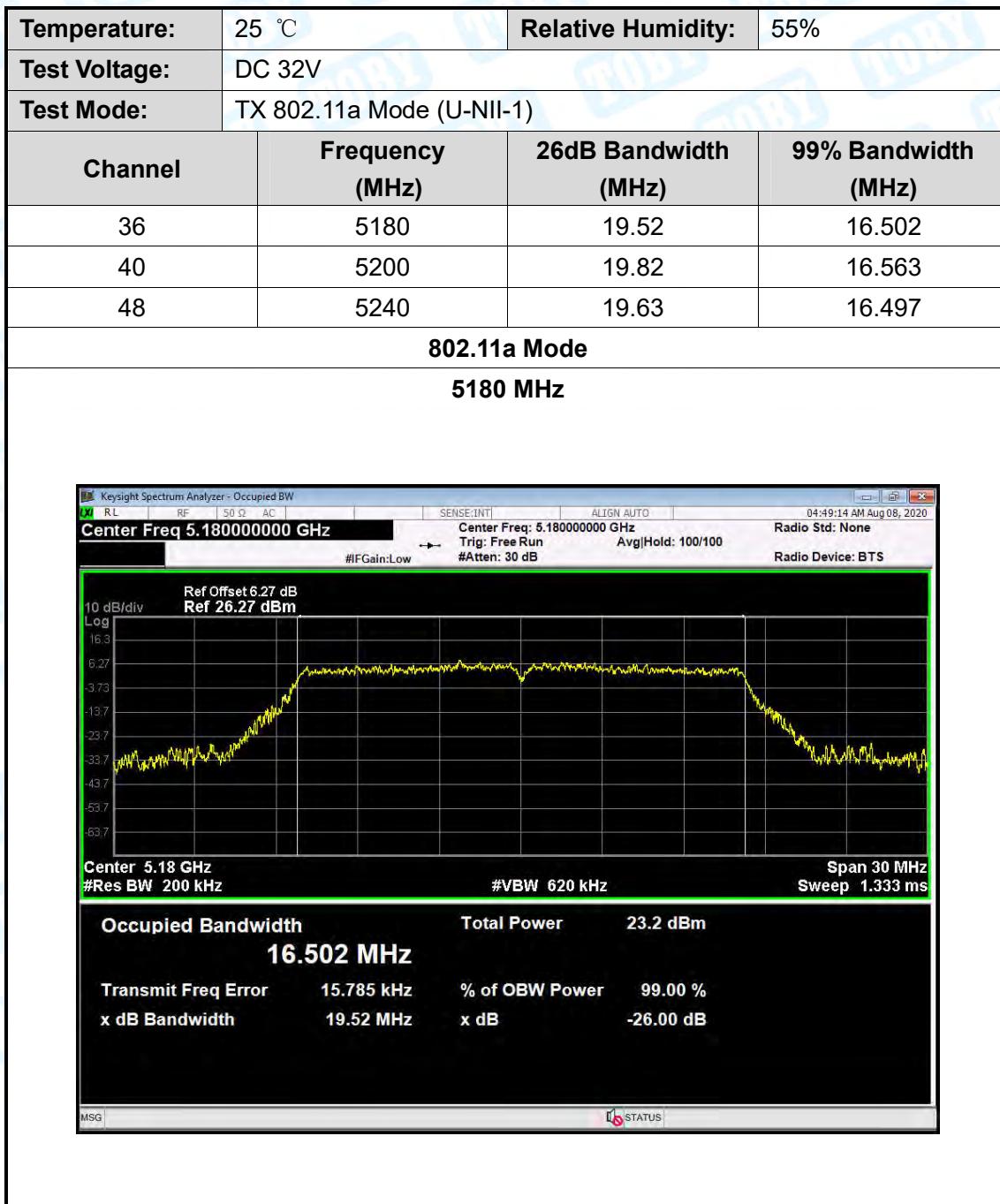


Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
Test Mode:	TX 802.11ac(VHT40) mode(U-NII-1) / 5190MHz&5230MHz		
Remark:	The EUT is programmed in continuously transmitting mode		



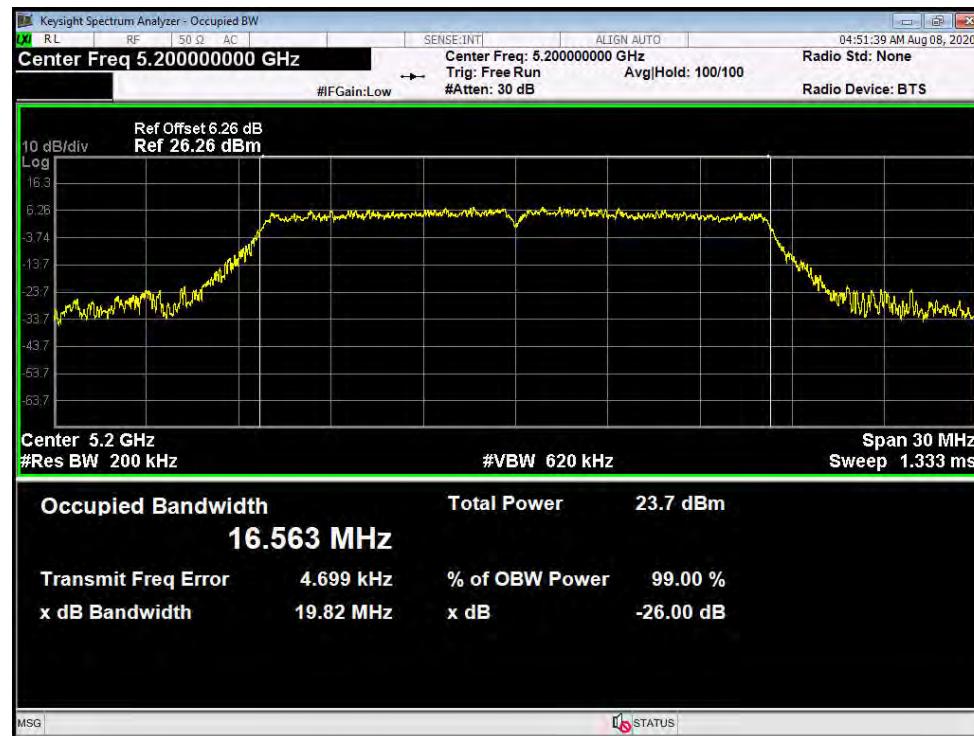


Attachment D--Bandwidth Test Data



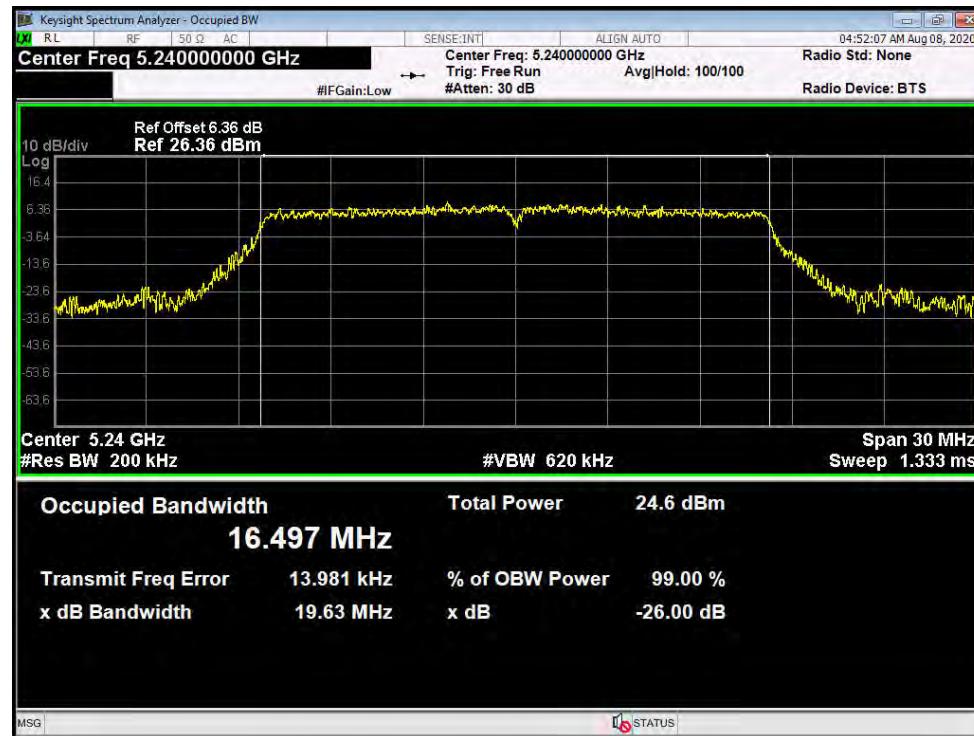
802.11a Mode

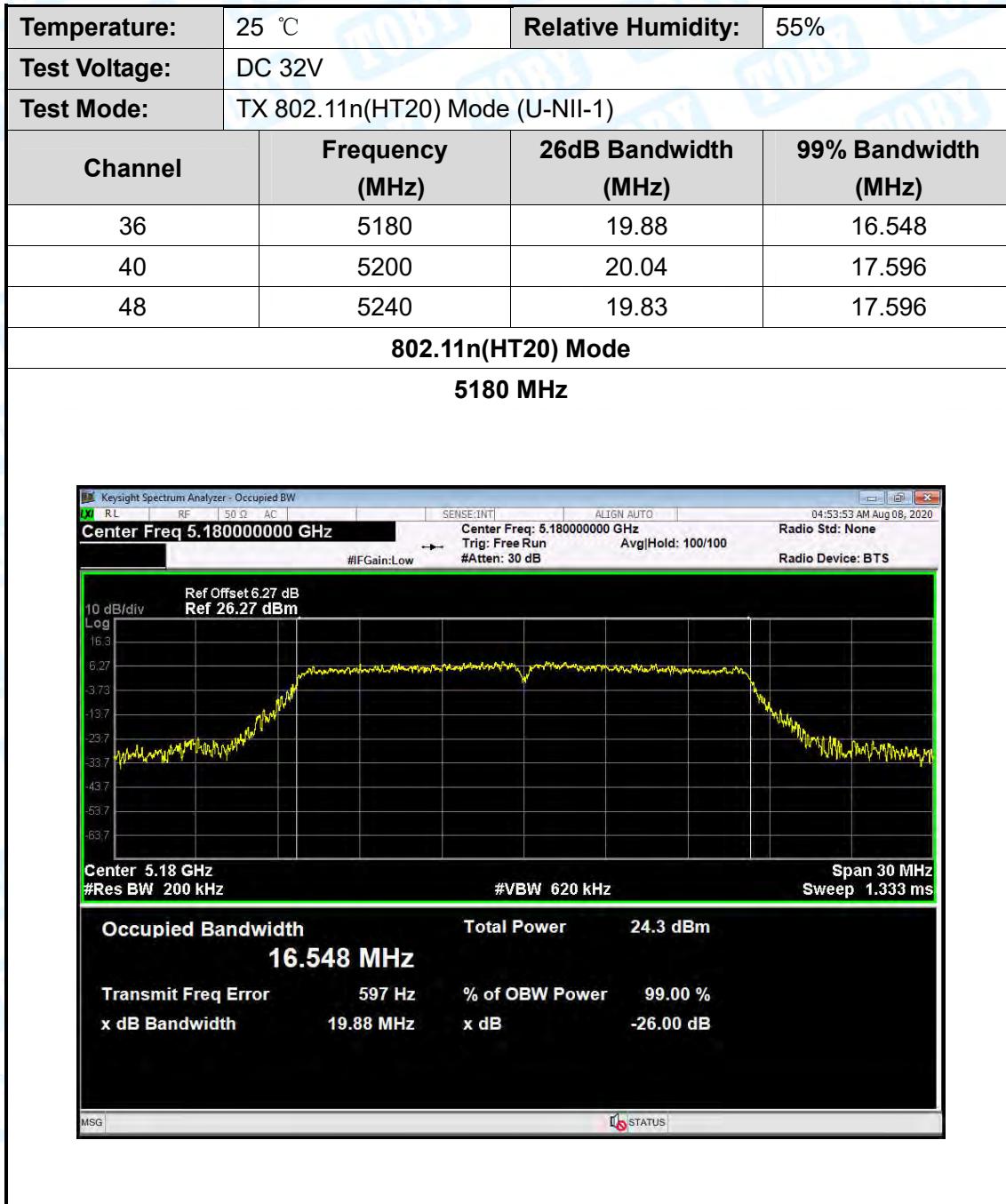
5200 MHz



802.11a Mode

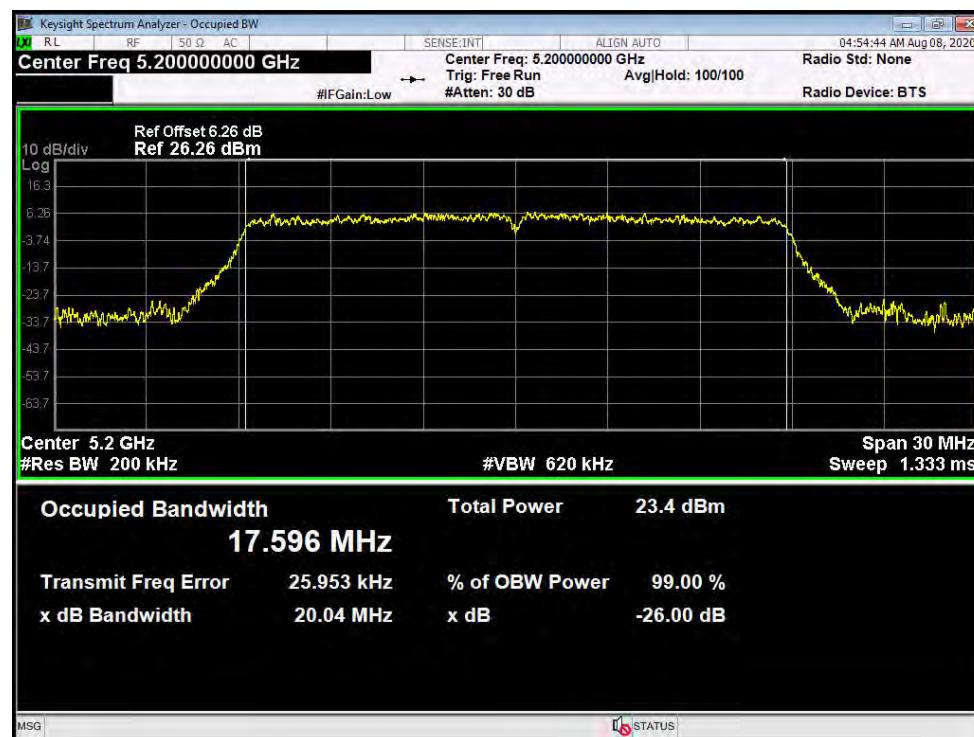
5240 MHz





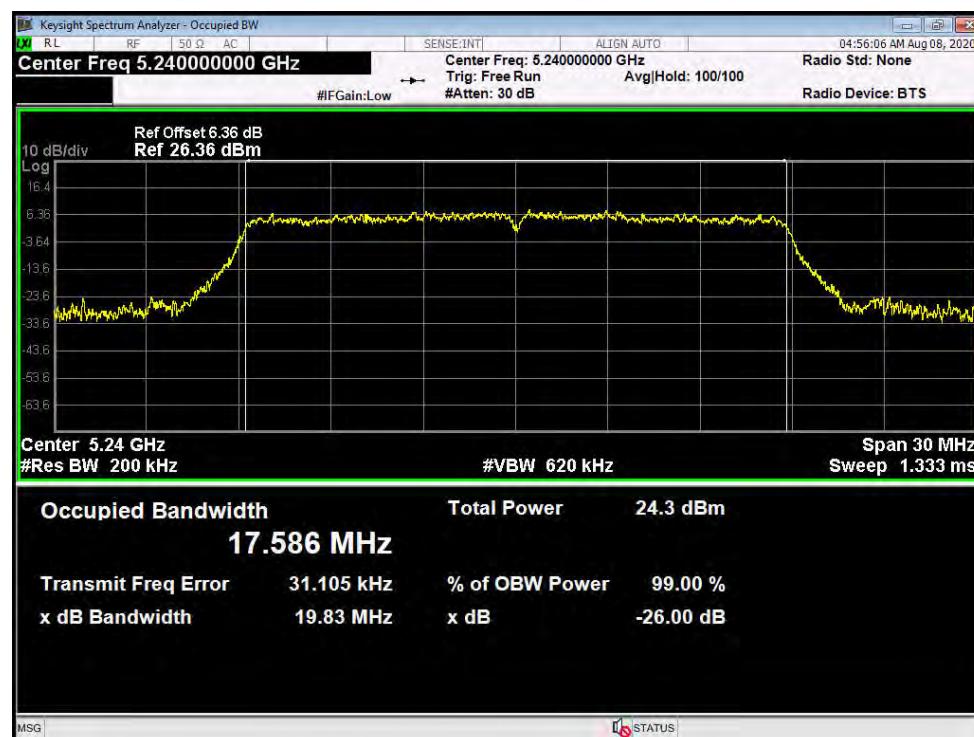
802.11n(HT20) Mode

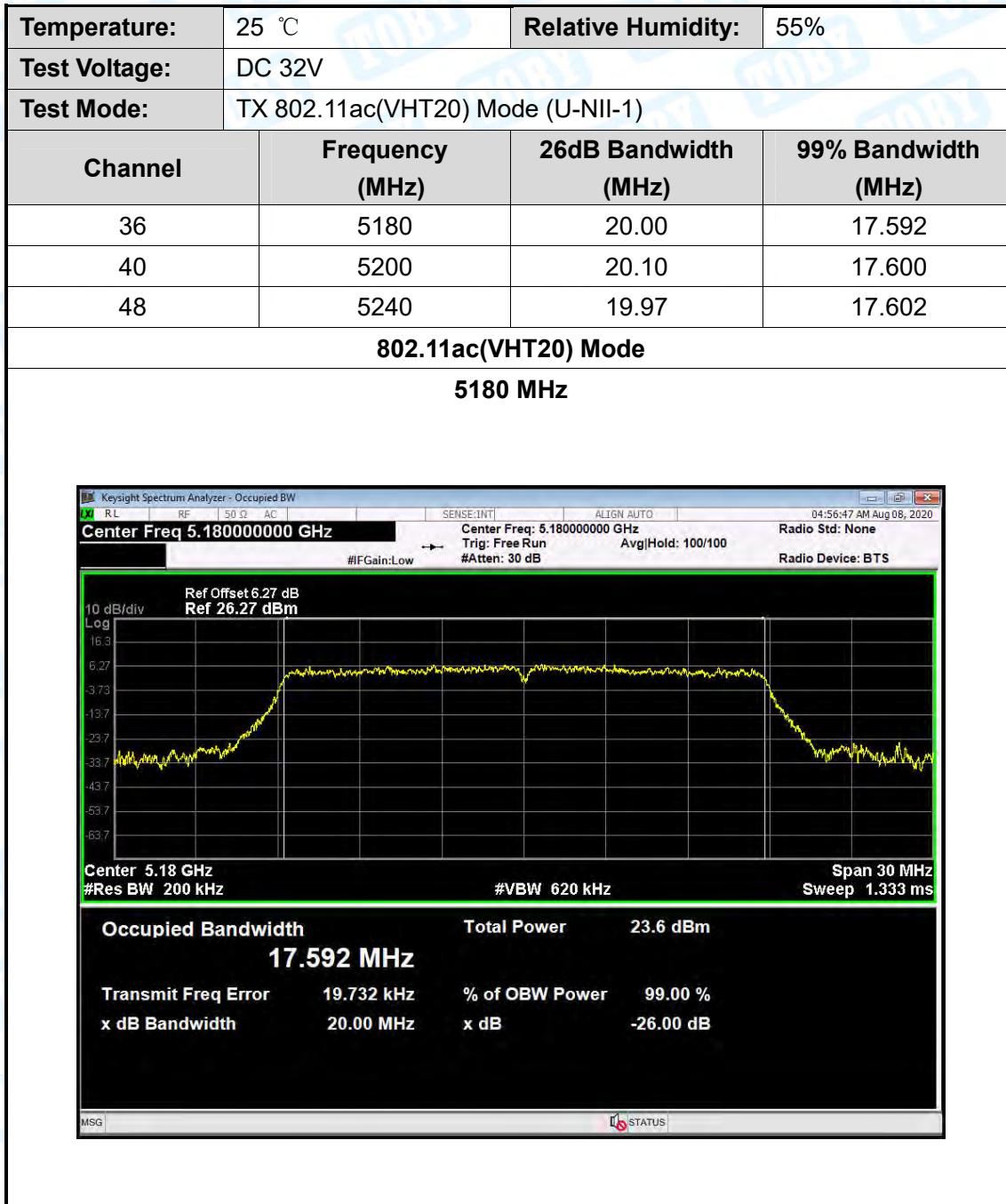
5200 MHz



802.11n(HT20) Mode

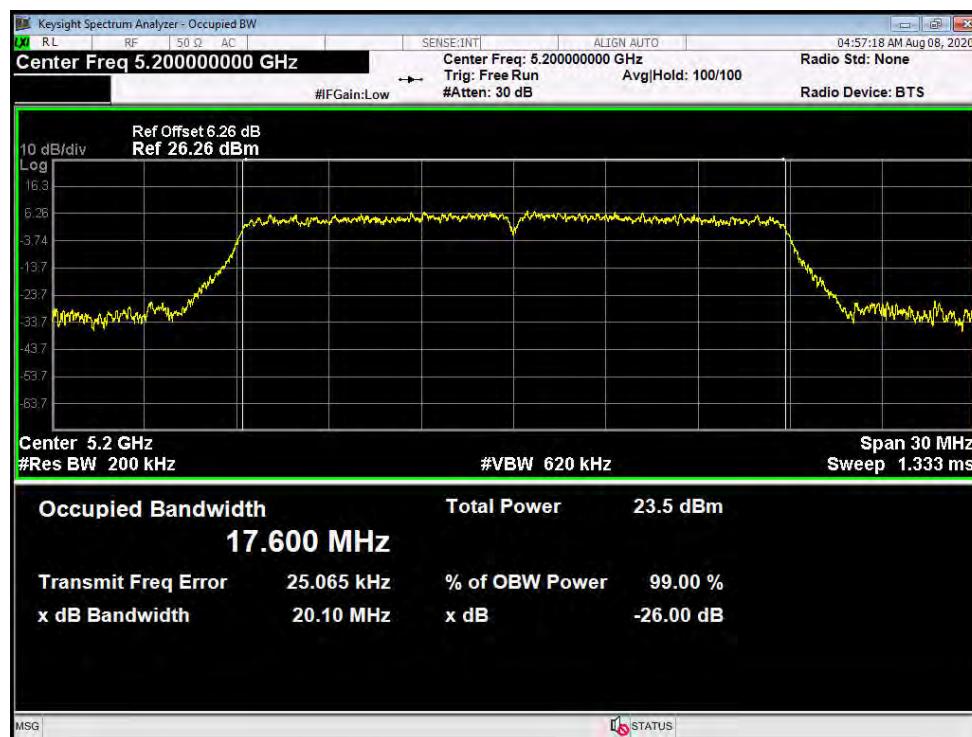
5240 MHz





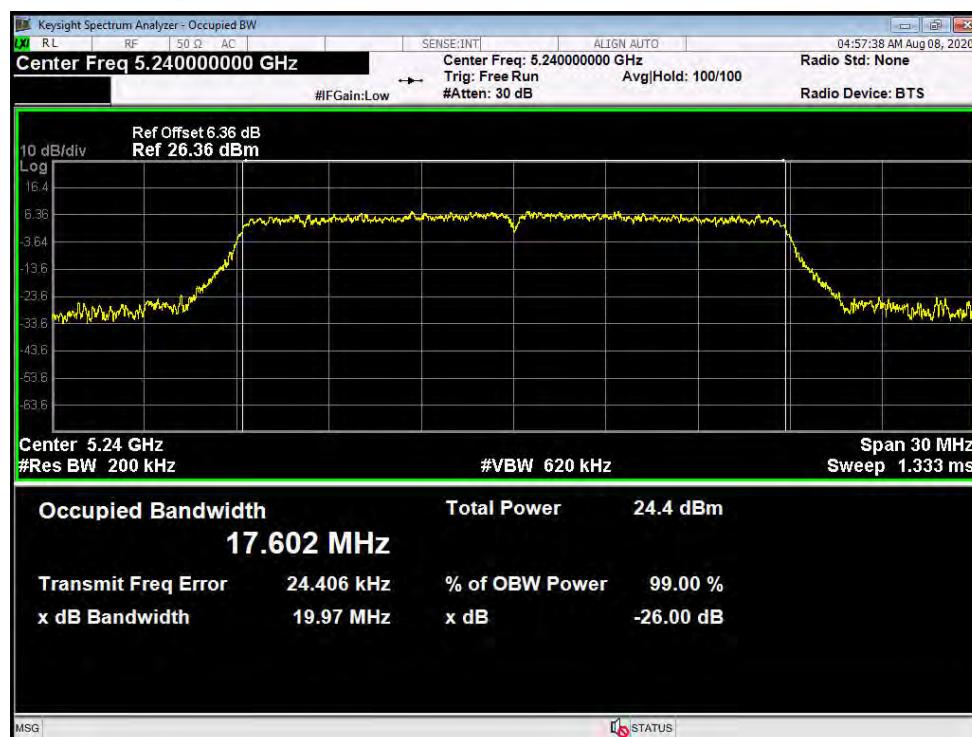
802.11ac(VHT20) Mode

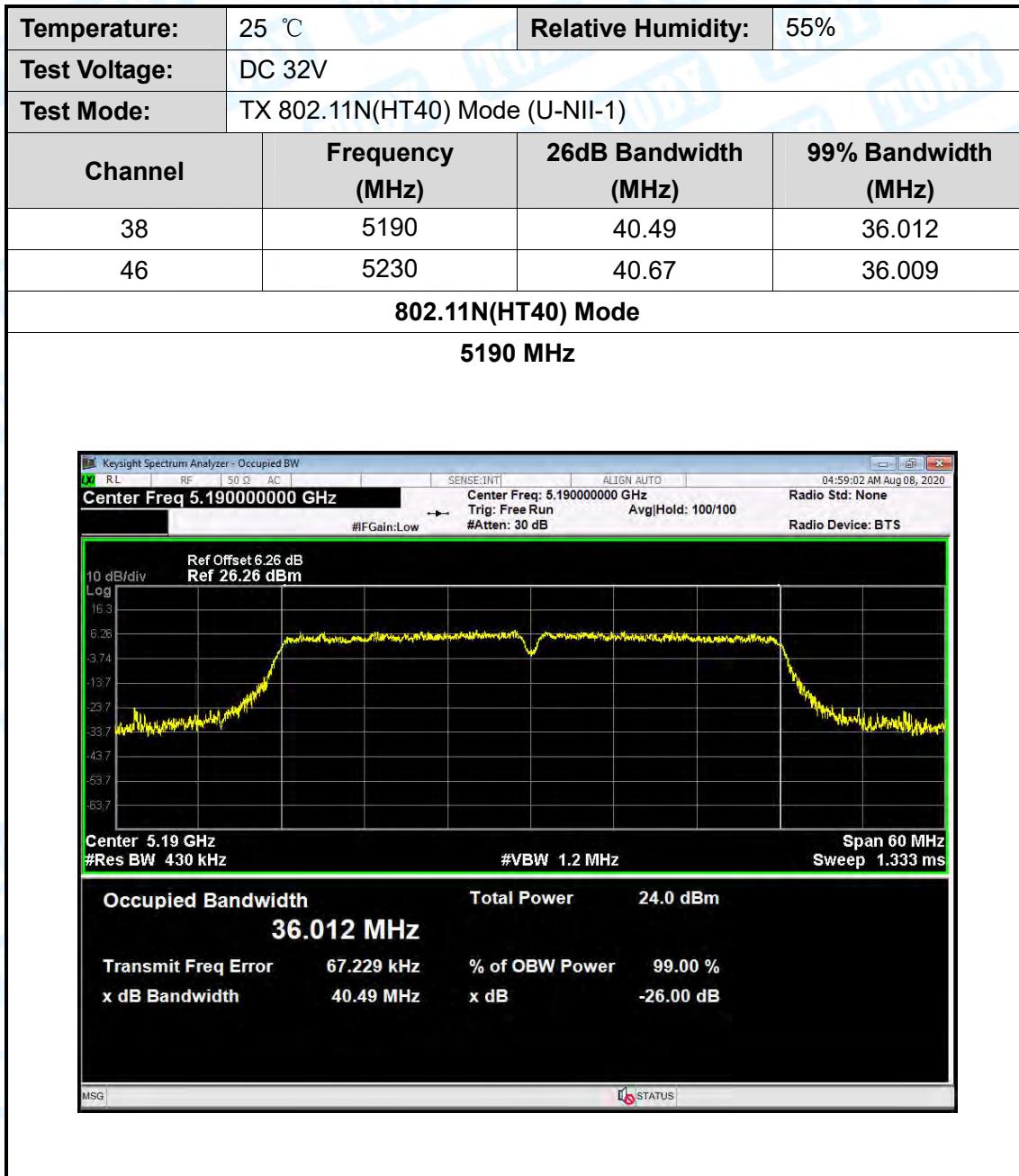
5200 MHz

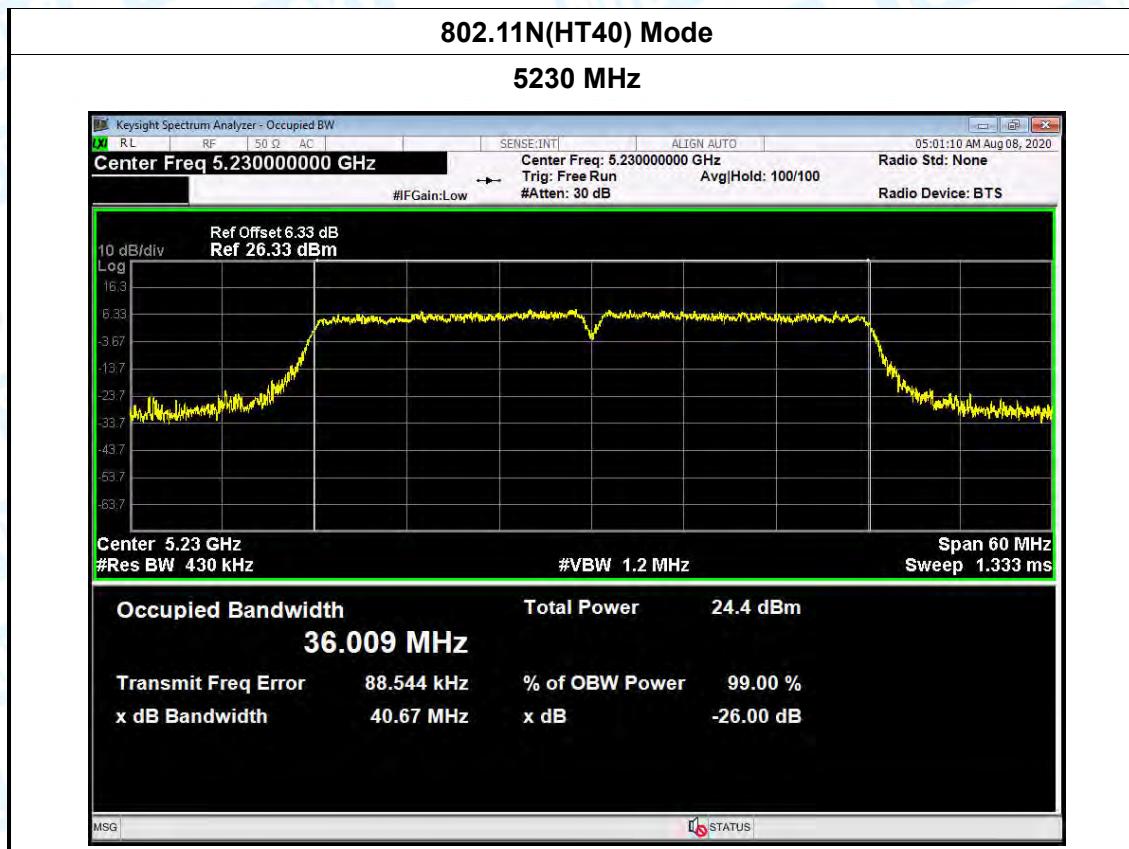


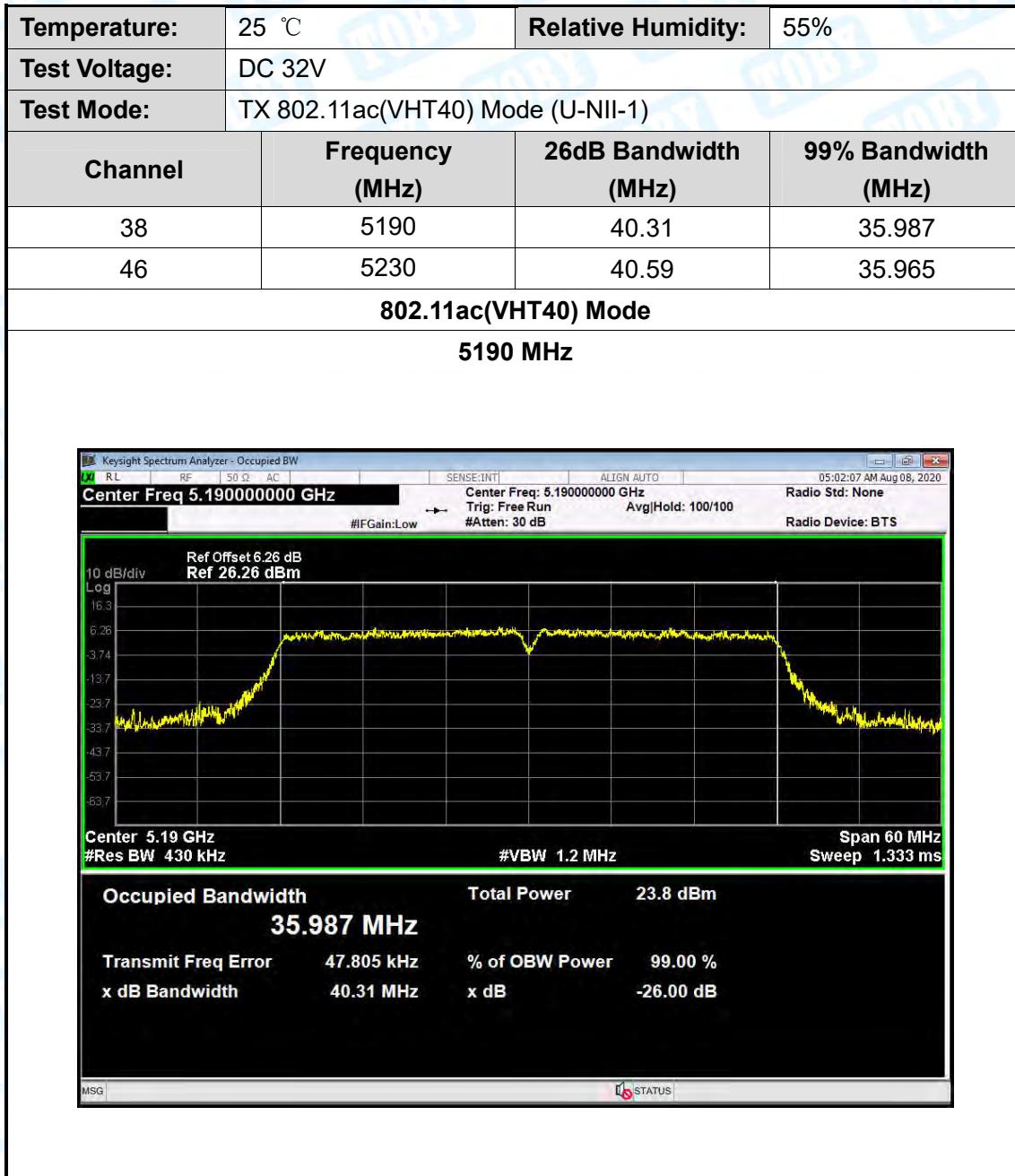
802.11ac(VHT20) Mode

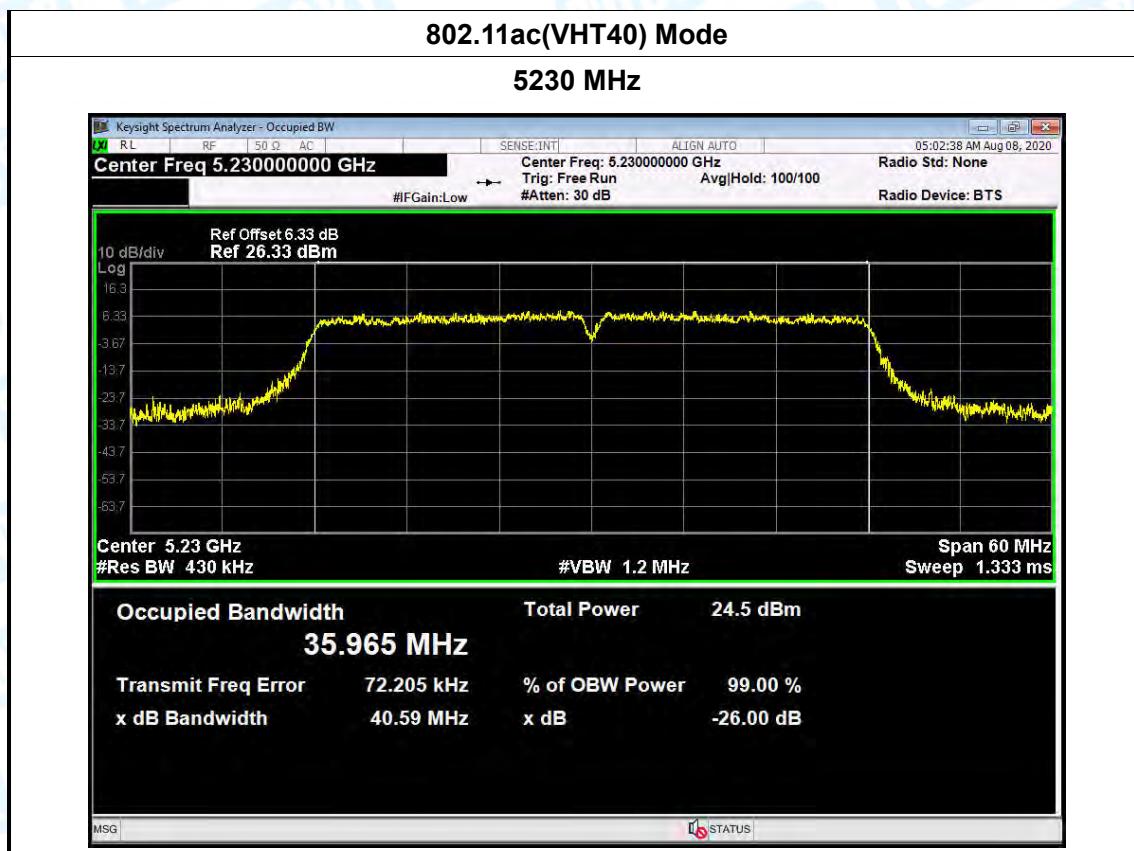
5240 MHz

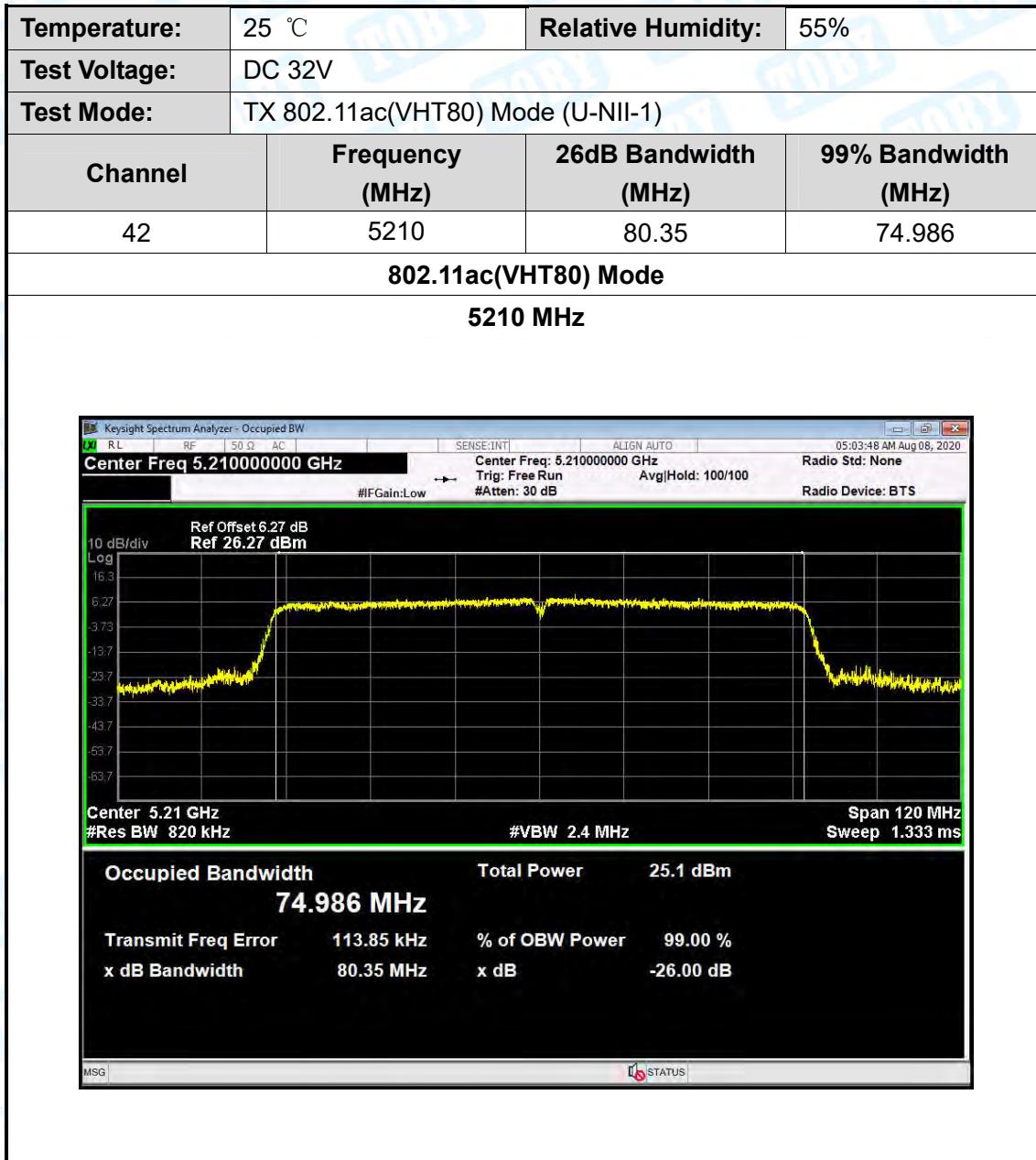












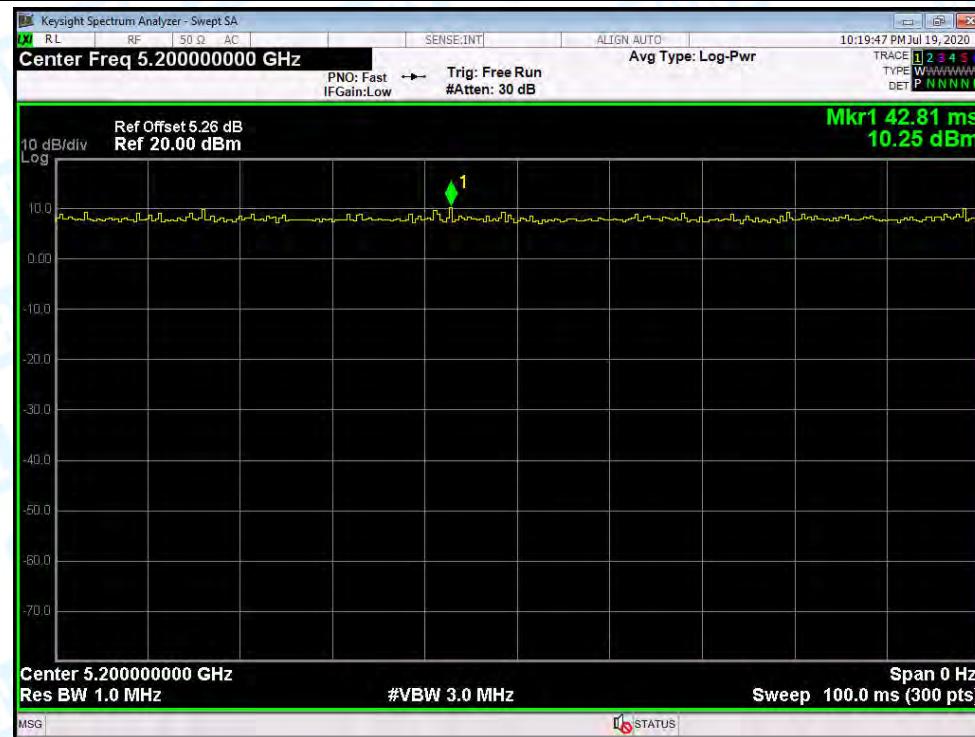
Attachment E--AVG Output Power Test Data

Temperature:	25 °C	Relative Humidity:	55%			
Test Voltage:	DC 32V					
U-NII-1						
Test Mode	Frequency (MHz)	Test Data			Limit (dBm)	
		Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)		
802.11a	5180	12.28	0	12.28	24	
	5200	12.15	0	12.15		
	5240	12.41	0	12.41		
802.11n (HT20)	5180	12.15	0	12.15		
	5200	12.84	0	12.84		
	5240	12.36	0	12.36		
802.11ac (VHT20)	5180	12.19	0	12.19		
	5200	12.18	0	12.18		
	5240	12.73	0	12.73		
802.11n (HT40)	5190	11.52	0	11.52		
	5230	11.86	0	11.86		
802.11 ac(VHT40)	5190	11.67	0	11.67		
	5230	11.94	0	11.94		
802.11 ac(VHT80)	5210	11.61	0	11.61		
Result: PASS						
Remark: the Directional Gain=2dBi<6 dBi. So $P_{out} = P_{limit} = 24\text{dBm}$						

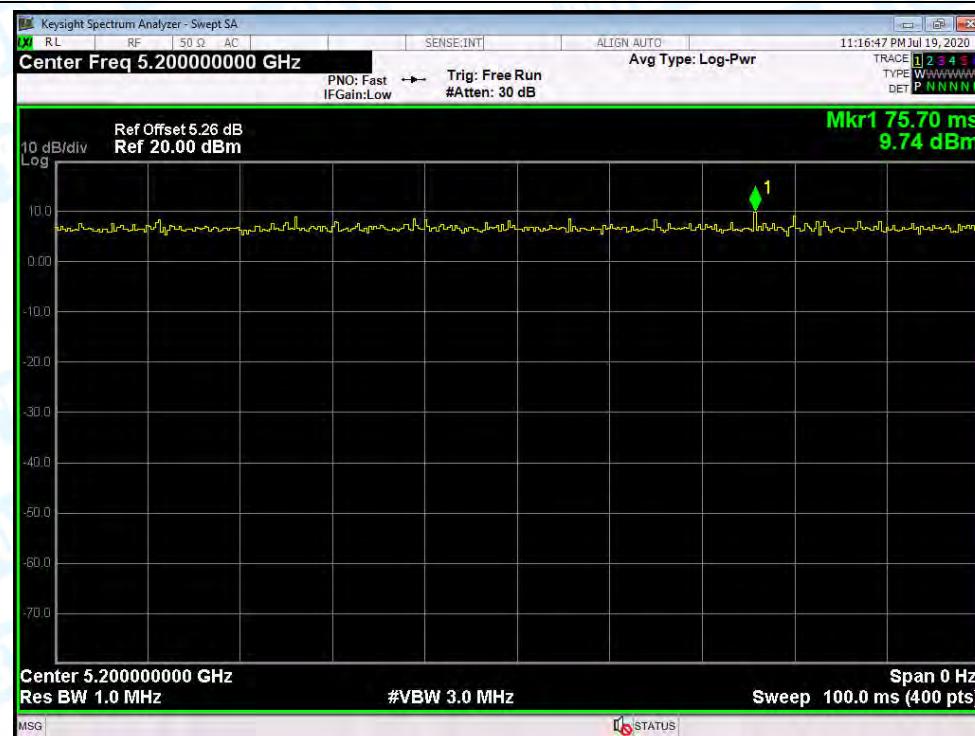
Test Mode		Duty cycle
U-NII-1	802.11 a	>98%
	802.11 n(HT20)	
	802.11 ac(VHT20)	
	802.11 n(HT40)	
	802.11 ac(VHT40)	
	802.11 ac(VHT80)	

Please see the next plots.

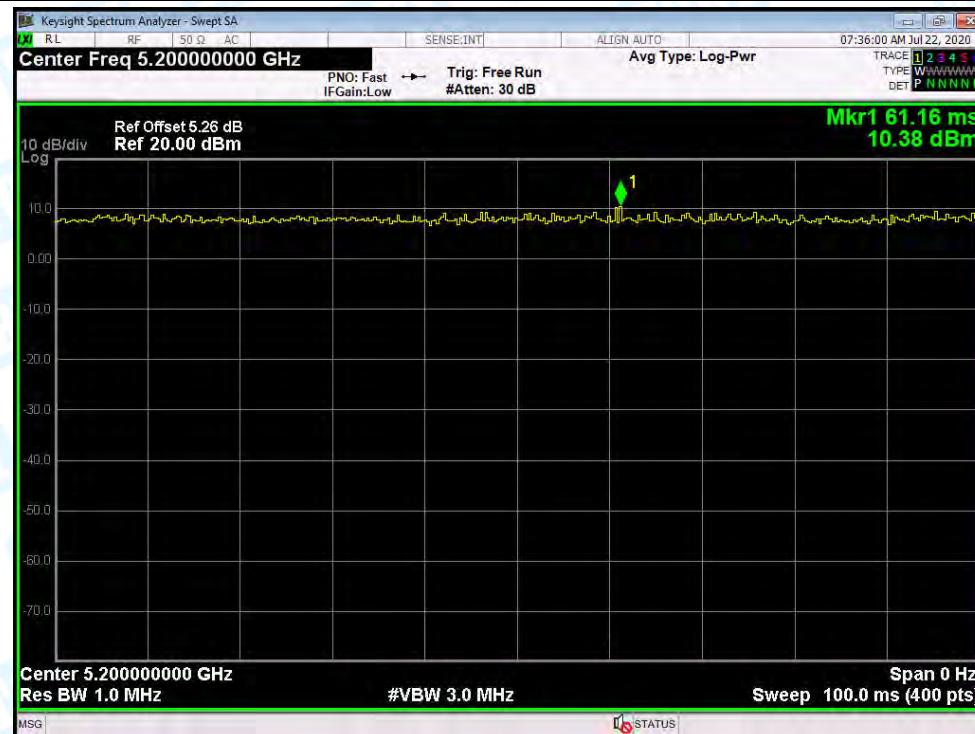
802.11 a 5200MHz U-NII-1



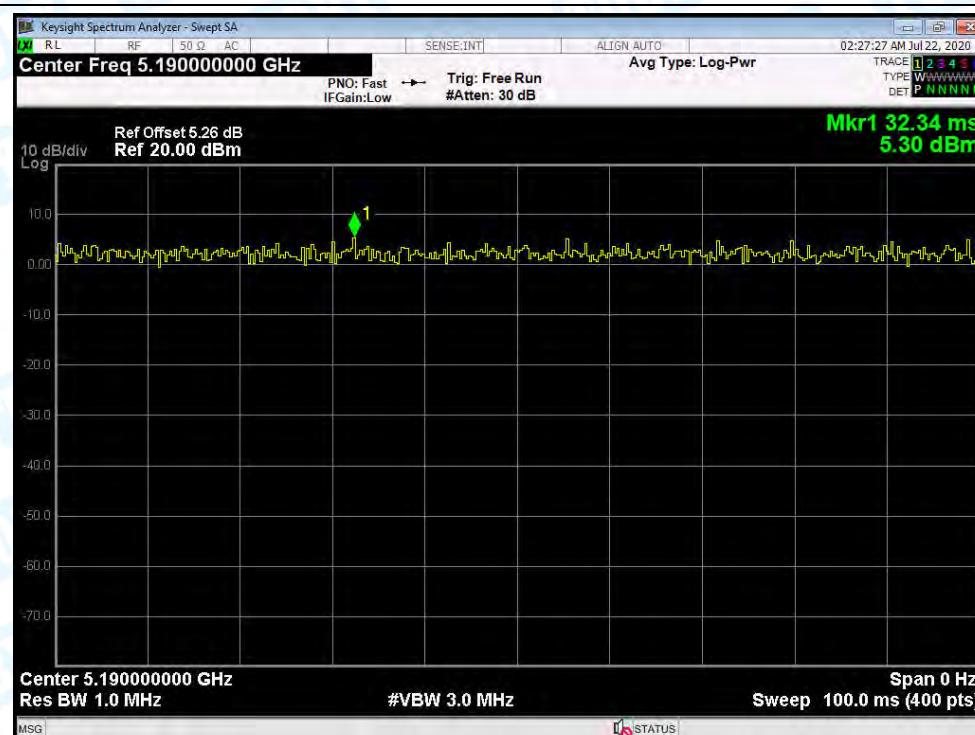
802.11 n(HT20) 5200MHz U-NII-1



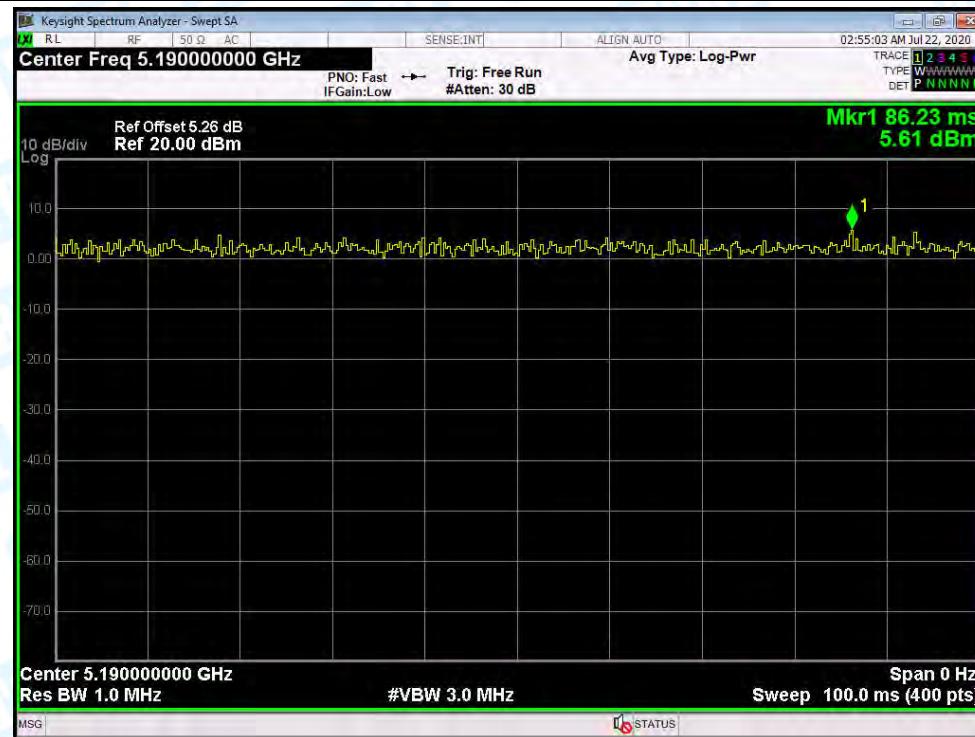
802.11 ac(HT20) 5200MHz U-NII-1



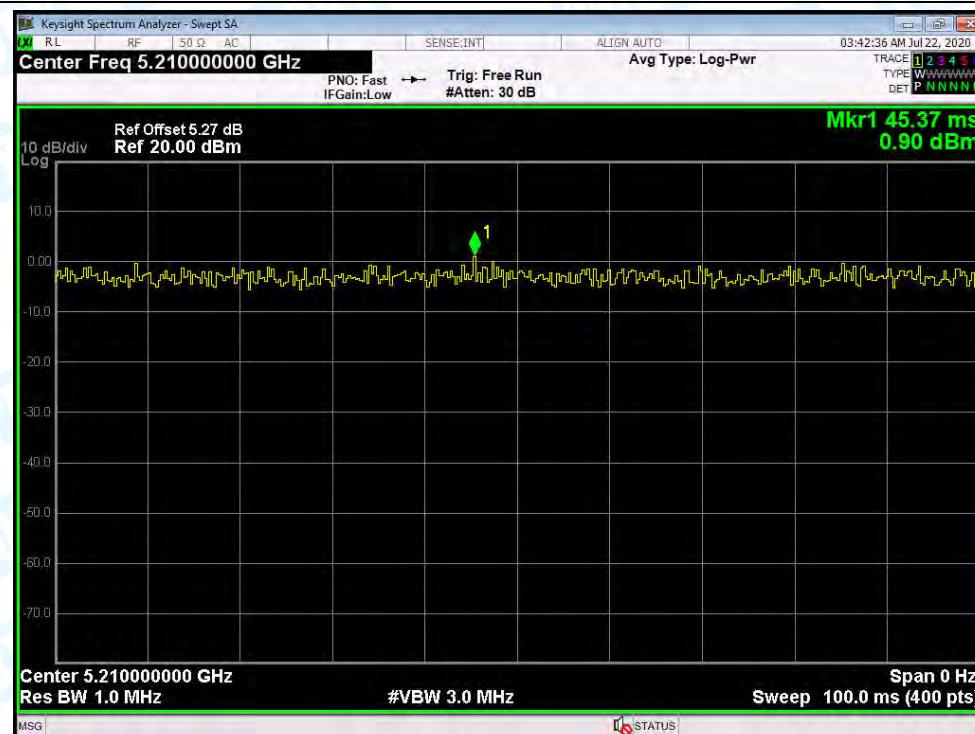
802.11 n(HT40) 5190MHz U-NII-1



802.11 ac(VHT40) 5190MHz U-NII-1



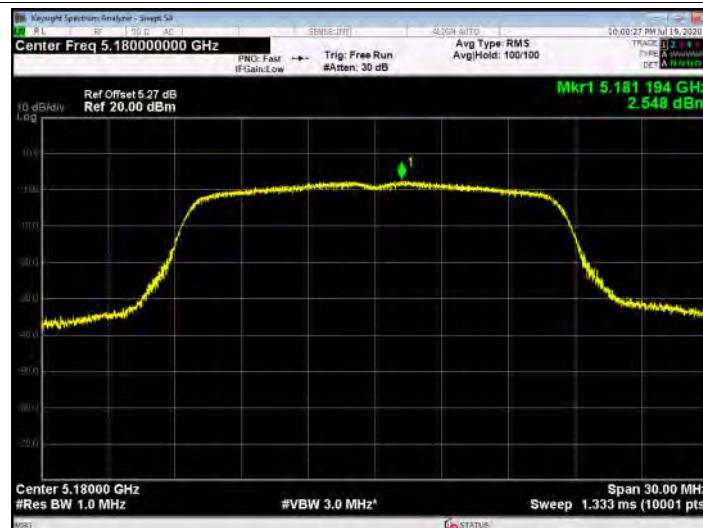
802.11 ac(HT80) 5210MHz U-NII-1



Attachment F-- Power Spectral Density Test Data

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 32V		
U-NII-1			
Test Mode	Frequency (MHz)	Test Data	Limit (dBm/MHz)
		Power Density (dBm/MHz)	
802.11a	5180	2.548	11
	5200	2.542	
	5240	2.567	
802.11n (HT20)	5180	2.270	
	5200	1.084	
	5240	2.546	
802.11ac (VHT20)	5180	2.197	
	5200	1.063	
	5240	1.115	
802.11n (HT40)	5190	-1.107	
	5230	-0.914	
802.11ac(VHT40)	5190	-1.019	
	5230	-1.094	
802.11ac(VHT80)	5210	-4.067	
Result: PASS			
Remark: the Directional Gain=2dBi<6 dBi. So $P_{out} = P_{limit}$			
Test plots please refer to below pages:			

802.11 a 5180 MHz



802.11 a 5200 MHz



802.11 a 5240 MHz



802.11 n(HT20) 5180 MHz



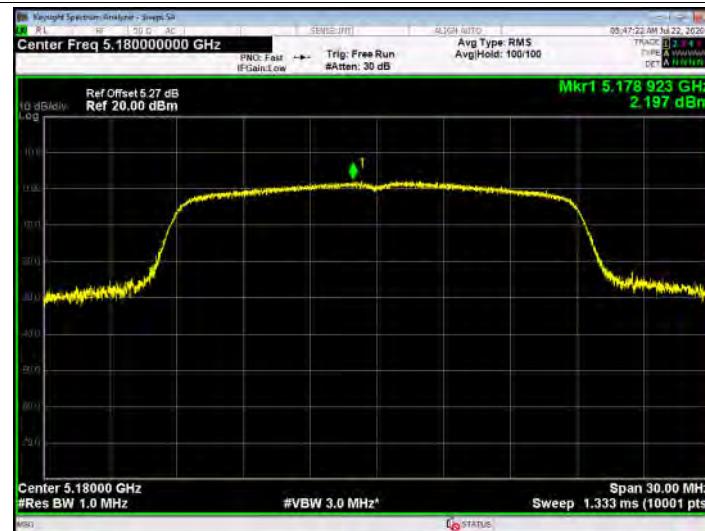
802.11 n(HT20) 5200 MHz



802.11 n(HT20) 5240 MHz



802.11 ac(VHT20) 5180 MHz

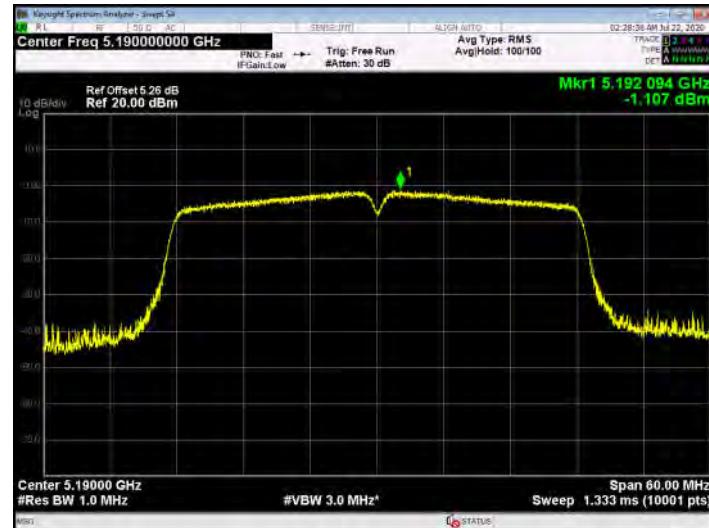


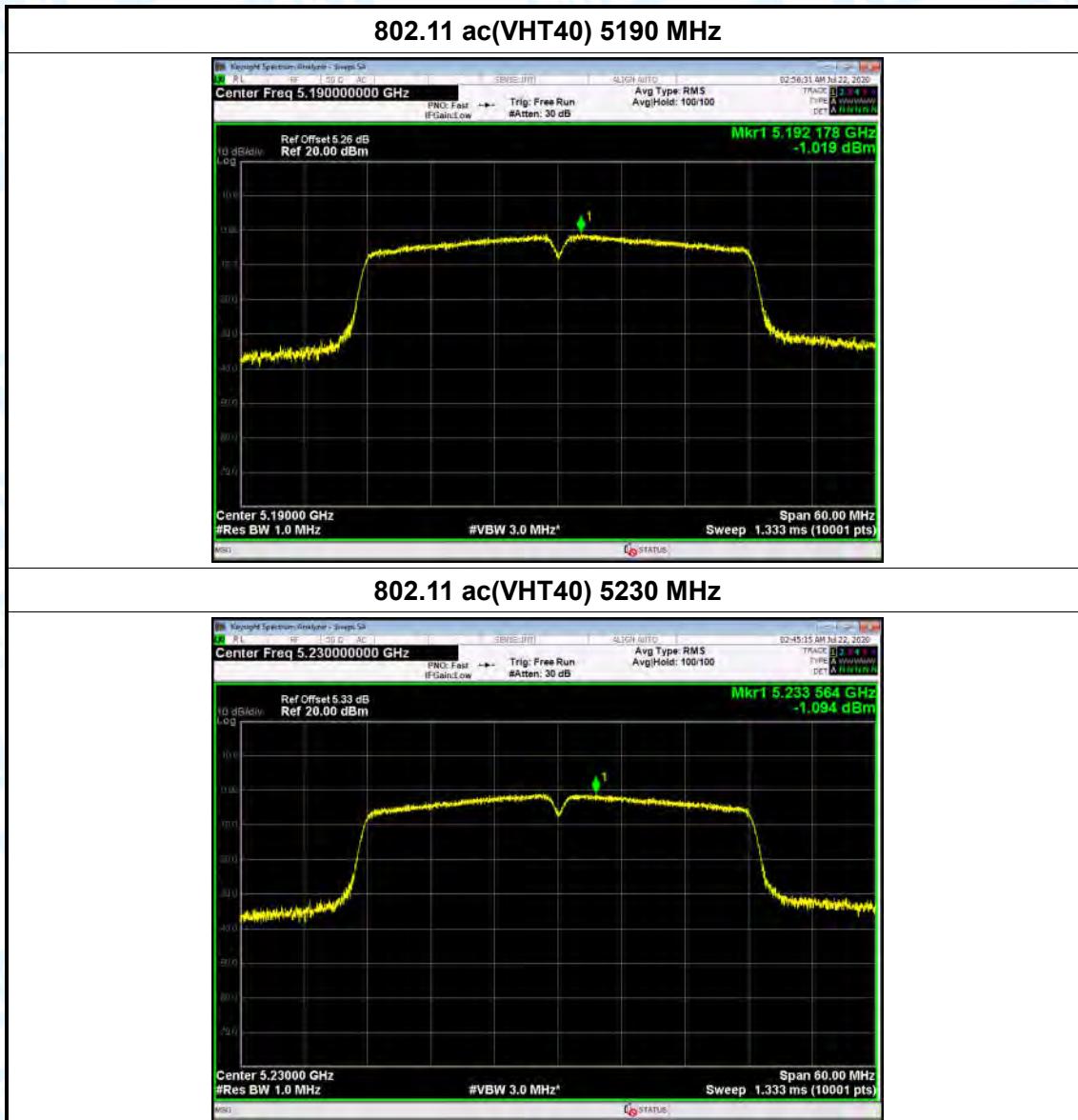
802.11 ac(VHT20) 5200 MHz



802.11 ac(VHT20) 5240 MHz



802.11 n(HT40) 5190 MHz**802.11 n(HT40) 5230 MHz**





Attachment G----Frequency Stability Measurement Data

Only show the worst case 802.11 a Mode 5180MHz.

801.11a U-NII-1: 5180 MHz	
Voltage vs. Frequency Stability	
Voltage (V)	Measurement Frequency (MHz)
132	5180.0400
120	5180.0100
118	5180.0300
Limit Range (MHz)	5150-5250
Result	PASS
Temperature vs. Frequency Stability	
Temperature (°C)	Measurement Frequency (MHz)
0	5180.0700
10	5180.0100
20	5180.0200
30	5180.0300
40	5180.0500
50	5180.0200
Limit Range (MHz)	5150-5250
Result	PASS

-----END OF REPORT-----