

FCC TEST REPORT

Product Name: WIFI Module
Trade Mark: N/A
Model No.: WF-M68B-UWK1
Add. Model No.: N/A
Report Number: 210109012RFC-4
Test Standards: FCC 47 CFR Part 15 Subpart E
FCC ID: 2AQ5RWF-M68B-UWK1
Test Result: PASS
Date of Issue: March 30, 2021

Prepared for:

Shenzhen KTC Commercial Display Technology CO.,LTD.
No.4023, Northern Wuhe Road, Bantian Street, Longgang District,
Shenzhen City, Guangdong Province, P.R.China

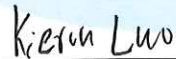
Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and
technology park, Longhua district, Shenzhen, China

TEL: +86-755-2823 0888

FAX: +86-755-2823 0886

Prepared by:



Kieron Luo

Project Engineer

Reviewed by:



Eric Yu

Project Supervisor

Approved by:


Kevin Liang
Assistant Manager

Date: March 30, 2021

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

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Version

Version No.	Date	Description
V1.0	March 30, 2021	Original



Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Shenzhen KTC Commercial Display Technology CO.,LTD.
Address of Applicant:	No.4023, Northern Wuhe Road, Bantian Street, Longgang District, Shenzhen City, Guangdong Province, P.R.China
Manufacturer:	Shenzhen KTC Commercial Display Technology CO.,LTD.
Address of Manufacturer:	No.4023, Northern Wuhe Road, Bantian Street, Longgang District, Shenzhen City, Guangdong Province, P.R.China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	WIFI Module		
Model No.:	WF-M68B-UWK1		
Add. Model No.:	N/A		
Trade Mark:	N/A		
DUT Stage:	Production Unit		
EUT Supports Function:	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth 5.0	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
Software Version:	00015394& 0.0.4.36		
Hardware Version:	JUI7.820.0781-2		
Sample Received Date:	January 9, 2021		
Sample Tested Date:	January 19, 2021 to March 5, 2021		

1.2.2 Description of Accessories

None.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Bands:	5150 MHz to 5250 MHz (U-NII-1)	
	5250 MHz to 5350 MHz (U-NII-2A)	
	5470 MHz to 5725 MHz (U-NII-2C)	
	5 725 MHz to 5 850 MHz (U-NII-3)	
Frequency Ranges:	5180 MHz to 5240 MHz	
	5260 MHz to 5320 MHz	
	5500 MHz to 5700 MHz	
	5 745 MHz to 5 825 MHz	
Support Standards:	IEEE 802.11a/n/ac	
TPC Function:	Not Support	
DFS Operational mode:	Slave without radar Interference detection function	
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)	
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)	
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz	
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz	
	IEEE 802.11ac-VHT80: 80 MHz	
Data Rate:	IEEE 802.11a: Up to 54 Mbps	
	IEEE 802.11n-HT20: Up to MCS15	
	IEEE 802.11n-HT40: Up to MCS15	
	IEEE 802.11ac-VHT20: Up to MCS8	
	IEEE 802.11ac-VHT40: Up to MCS9	
	IEEE 802.11ac-VHT80: Up to MCS9	
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11acVHT80	
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11acVHT80	
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20 5 for IEEE 802.11n-HT40/ac-VHT40 2 for IEEE 802.11ac-VHT80	
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80	
Antenna Type:	Chain 0	Integral Antenna
	Chain 1	Integral Antenna
Antenna Gain:	Chain 0	5150 MHz to 5250 MHz: 2.7 dBi
		5250 MHz to 5350 MHz: 2.7 dBi
		5470 MHz to 5725 MHz: 2.7 dBi
		5725 MHz to 5850 MHz: 2.7 dBi

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Fax: +86-755-28230886

E-mail: info@uttlab.com

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	Chain 1	5150 MHz to 5250 MHz: 2.7 dBi			
		5250 MHz to 5350 MHz: 2.7 dBi			
		5470 MHz to 5725 MHz: 2.7 dBi			
		5725 MHz to 5850 MHz: 2.7 dBi			
Maximum Conducted Output Power(dBm):	SISO_Chain 0	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	14.95	15.50	15.45	14.95
	SISO_Chain 1	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11a:	15.43	15.17	15.13	15.01
	MIMO_Chain 0+1	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
	IEEE 802.11n-HT20:	17.26	17.08	17.77	17.48
	IEEE 802.11n-HT40:	17.45	17.28	16.61	16.57
	IEEE 802.11ac-VHT20:	15.75	15.50	15.79	15.66
	IEEE 802.11ac-VHT40:	15.81	15.56	16.29	16.28
	IEEE 802.11ac-VHT80:	15.84	15.45	14.77	14.58
Normal Test Voltage:		3.3 Vdc			

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1.4 OTHER INFORMATION

Operation Frequency Each of Channel				
	U-NII-1	U-NII-2A	U-NII-2C	U-NII-3
IEEE 802.11a, IEEE 802.11n-HT20, IEEE 802.11ac-VHT20	f = 5000 + 5k, k = 32 + 4n			f = 5000 + 5k, k = 145 + 4n
	n = 1,..., 4	n = 5,..., 8	n = 17,..., 27	n = 1,..., 5
IEEE 802.11n-HT40, IEEE 802.11ac-VHT40	f = 5000 + 5k, k = 30 + 8n			f = 5000 + 5k, k = 143 + 8n
	n = 1, 2	n = 1,..., 5	n = 9,..., 13	n = 1, 2
IEEE 802.11ac-VHT80	f = 5000 + 5k, k = 26 + 16n			f = 5000 + 5k, k = 155
	n = 1	n = 1, 2	n = 5, 6	
Note: f is the operating frequency (MHz); k is the operating channel.				

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	DELL	Latitude 3400	6GJQKT2	UnionTrust
Notebook	Lenovo	E450	SL10G10780	UnionTrust
Wireless Home Router	SAGEMCOM	FAST5280	N/A	UnionTrust
PC	DELL	XPS8900	2015AP3055	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China 518109

Telephone: +86 (0) 755 2823 0888

Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

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Fax: +86-755-28230886

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Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.2 dB
2	Conducted emission 150KHz-30MHz	±2.7 dB
3	Radiated emission 9KHz-30MHz	± 4.7 dB
4	Radiated emission 30MHz-1GHz	± 4.6 dB
5	Radiated emission 1GHz-18GHz	± 4.4 dB
6	Radiated emission 18GHz-26GHz	± 4.6 dB
7	Radiated emission 26GHz-40GHz	± 4.6 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart E Test Cases			
Test Item	Test Requirement	Test Method	Result
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203 FCC 47 CFR Part 15 Subpart C Section 15.407(a)(1) (2)	N/A	PASS
26 dB emission bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(2)(5)	KDB 789033 D02 v02r01 Section C.1	PASS
6 dB bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (e)	KDB 789033 D02 v02r01 Section C.2	PASS
Maximum conducted output power	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v02r01 Section E.3.a (Method PM)	PASS
Peak Power Spectral Density	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v02r01 Section F	PASS
Radiated Emissions and Band Edge Measurement	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6) FCC 47 CFR Part 15 Subpart C Section 15.209/205	KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6	PASS
Dynamic Frequency Selection	FCC 47 CFR Part 15 Subpart E Section 15.407 (h)	KDB 905462 D03 Client Without DFS New Rules v01r02	PASS
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6) FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013, Section 6.2.	PASS

For Dynamic Frequency Selection

Test Case	Result
Channel Availability Check Time	N/A ¹
U-NII Detection Bandwidth	N/A ¹
Channel Closing Transmission Time	PASS
Channel Move Time	PASS
DFS Detection Threshold	N/A ¹
Non- Occupancy Period	N/A ¹
Note:	
1) The EUT is slave, NA In this whole report not applicable.	

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 18, 2020	Nov. 17, 2021
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 10, 2020	Nov. 9, 2021
☒	Loop Antenna	ETS-LINDGREN	6502	00202525	Nov. 14, 2020	Nov. 13, 2022
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 14, 2020	Nov. 13, 2022
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 14, 2020	Nov. 13, 2022
☒	Preamplifier	HP	8447F	2805A02960	Nov. 10, 2020	Nov. 9, 2021
☐	Broadband Antenna (Pre-amplifier)	ETS-LINDGREN	3142E-PA	00201891	May. 30, 2020	May. 9, 2021
☐	6dB Attenuator	Talent	RA6A5-N-18	18103002	Nov. 18, 2020	Nov. 17, 2021
☐	Horn Antenna	ETS-LINDGREN	3117	00164202	Nov. 14, 2020	Nov. 13, 2022
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	May. 30, 2020	May. 29, 2021
☐	Horn Antenna	ETS-LINDGREN	3116C	00200180	Jun. 19, 2020	Jun. 18, 2021
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 14, 2020	Nov. 13, 2022
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	Receiver	R&S	ESR7	1316.3003K07-101181-K3	Nov. 18, 2020	Nov. 17, 2021
☒	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Nov. 18, 2020	Nov. 17, 2021
☒	LISN	R&S	ESH2-Z5	860014/024	Nov. 18, 2020	Nov. 17, 2021
☐	LISN	ETS-Lindgren	3816/2SH	00201088	Nov. 18, 2020	Nov. 17, 2021
☒	Test Software	Audix	e3	Software Version: 9.160323		

Conducted RF test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 10, 2020	Nov. 9, 2021
☒	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Nov. 10, 2020	Nov. 9, 2021
☐	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	Nov. 10, 2020	Nov. 9, 2021
☒	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	Nov. 10, 2020	Nov. 9, 2021

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Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

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4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage	Relative Humidity (%)
NT/NV	+15 to +35	3.3Vdc	20 to 75
Remark:			
1) NV: Normal Voltage; NT: Normal Temperature			

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (kPa)	Tested by
AC Power Line Conducted Emission	20.5	47	99.97	Tripp Jiang
26 dB emission bandwidth	24.0	35	101.8	Leo Li
Maximum conducted output power	24.0	35	101.8	Leo Li
Peak Power Spectral Density	24.0	35	101.8	Leo Li
6 dB bandwidth	24.0	35	101.8	Leo Li
Dynamic Frequency Selection	24.0	35	101.8	Leo Li
Radiated Emissions and Band Edge Measurement	25.6	50	100.08	Andy Lin

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Channel 36	Channel 44	Channel 48
		5180 MHz	5220 MHz	5240 MHz
	5250 MHz to 5350 MHz	Channel 52	Channel 60	Channel 64
		5260 MHz	5300 MHz	5320 MHz
	5470 MHz to 5725 MHz	Channel 100	Channel 116	Channel 140
		5500 MHz	5580 MHz	5700 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5250 MHz to 5350 MHz	Channel 54	--	Channel 62
		5270 MHz	--	5310 MHz
	5470 MHz to 5725 MHz	Channel 102	Channel 110	Channel 134
		5510 MHz	5550 MHz	5670 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
IEEE 802.11ac-VHT80	5150 MHz to 5250 MHz	--	Channel 42	--
		--	5210 MHz	--
	5250 MHz to 5350 MHz	--	Channel 58	--
		--	5290 MHz	--
	5470 MHz to 5725 MHz	Channel 106	--	Channel 122
		5530 MHz	--	5610 MHz
	5725 MHz to 5850 MHz	--	Channel 155	--
		--	5775 MHz	--

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11a/n/ac	1Tx/1Rx or 2Tx/2Rx	1. Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

Power Setting								
Mode	U-NII-1		U-NII-2A		U-NII-2C		U-NII-3	
	Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1	Chain 0	Chain 1
IEEE 802.11a	1F	1A	20	1A	20	1D	20	1D
IEEE 802.11n-HT20	19	19	19	19	1C	1C	1C	1C
IEEE 802.11n-HT40	19	19	19	19	19	19	19	19
IEEE 802.11ac-VHT20	16	16	16	16	18	18	18	18
IEEE 802.11ac-VHT40	16	16	16	16	19	19	19	19
IEEE 802.11ac-VHT80	16	16	16	16	16	16	16	16

Test Software
Test software name: QATool_Dbg.exe;

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4.4 PRE-SCAN

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Following data rate was (were) selected for the final test as listed below

Mode	Worst-case data rates
IEEE 802.11a	6 Mbps
IEEE 802.11n-HT20	MCS0
IEEE 802.11n-HT40	MCS0
IEEE 802.11ac-VHT20	MCS0
IEEE 802.11ac-VHT40	MCS0
IEEE 802.11ac-VHT80	MCS0

4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

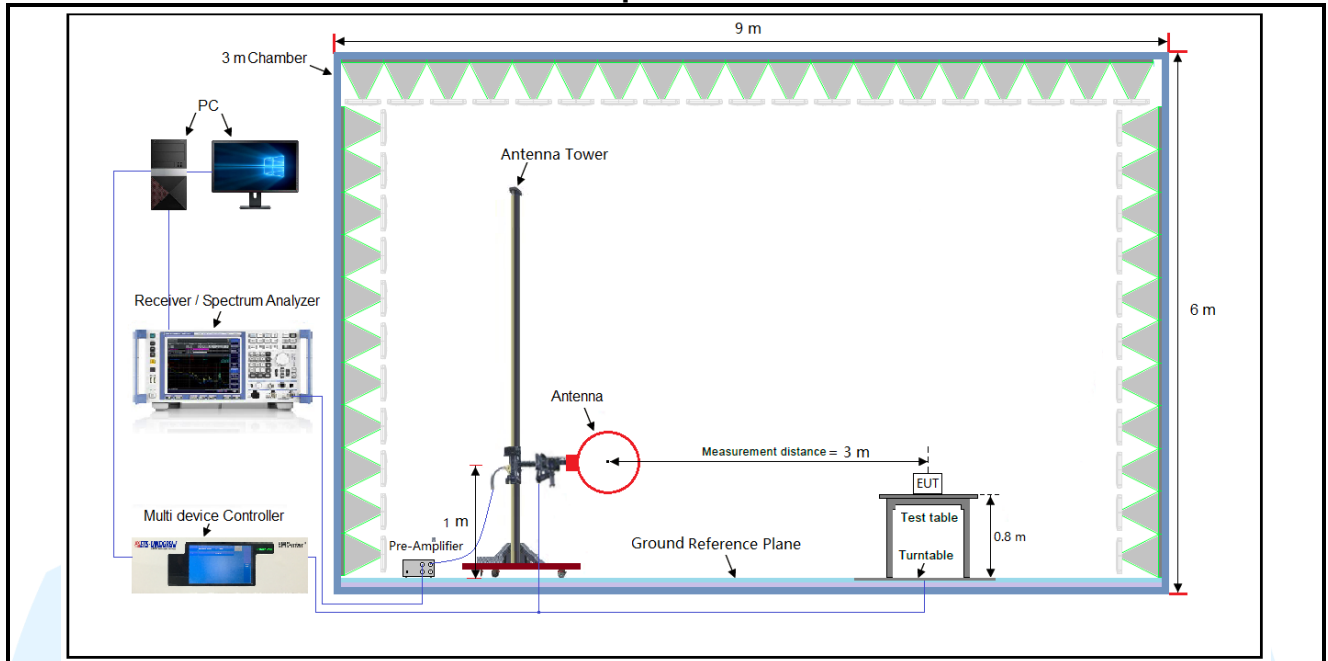


Figure 1. Below 30MHz

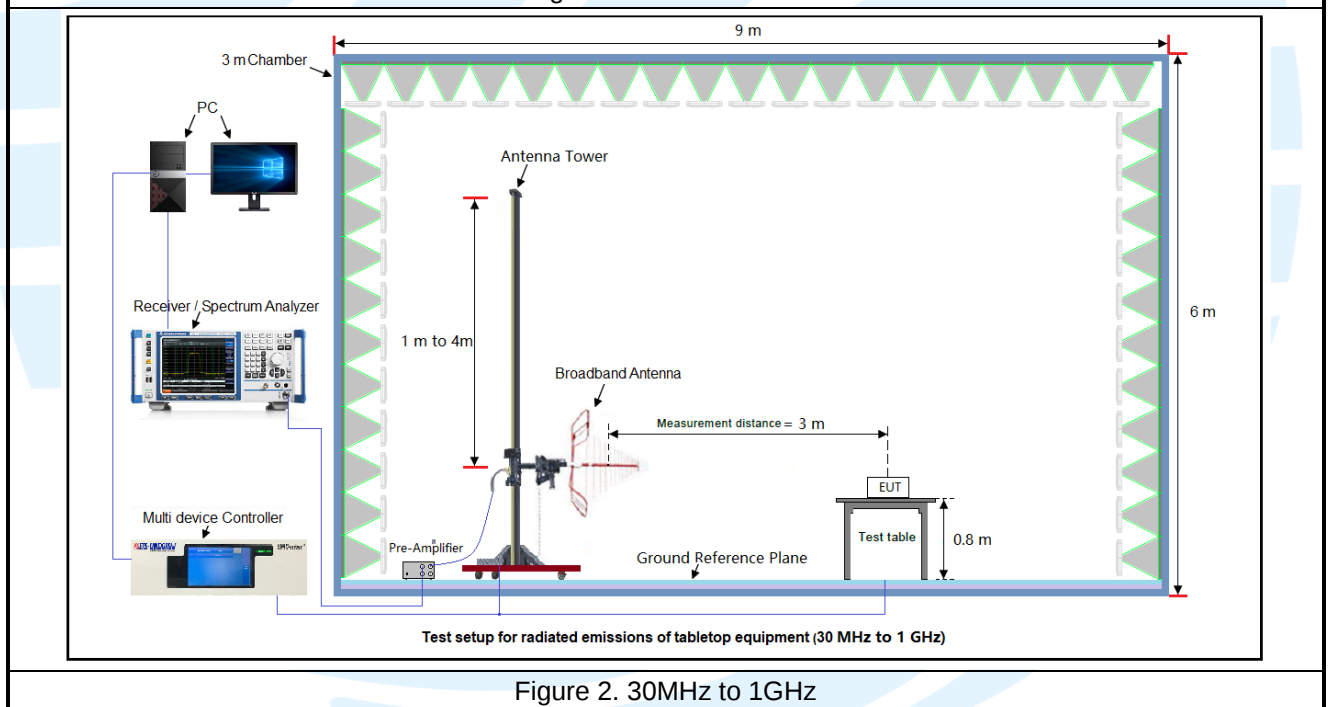
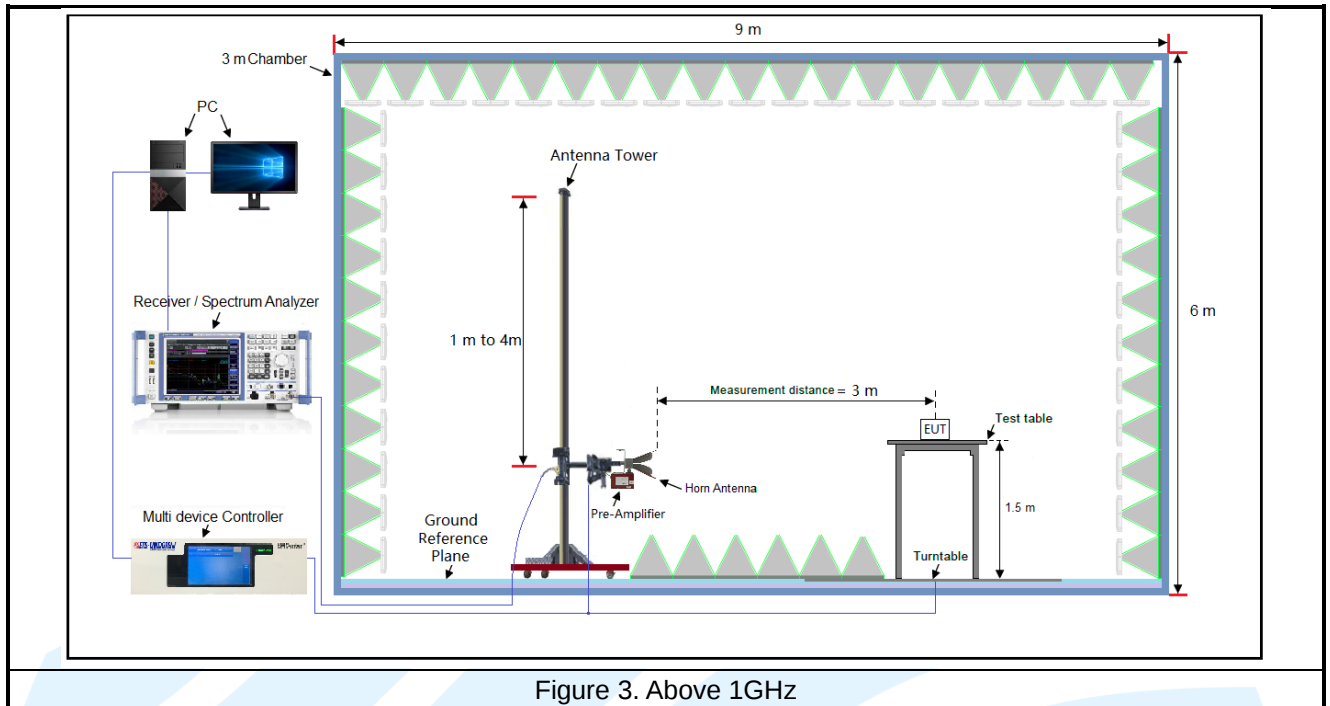
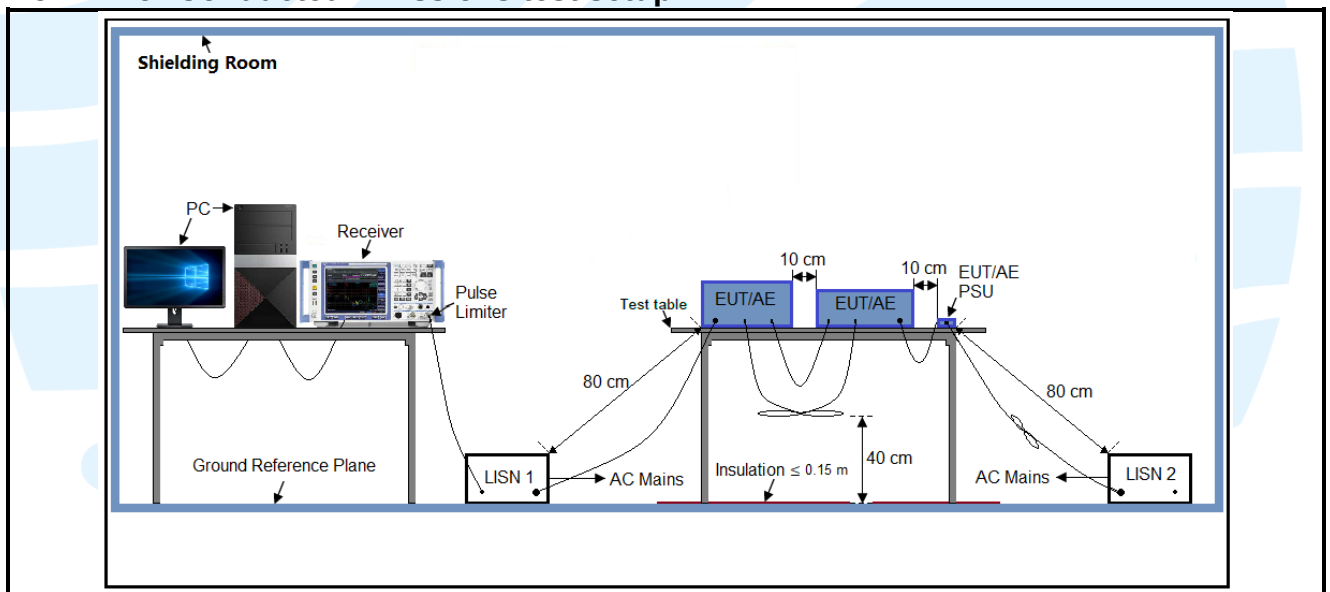


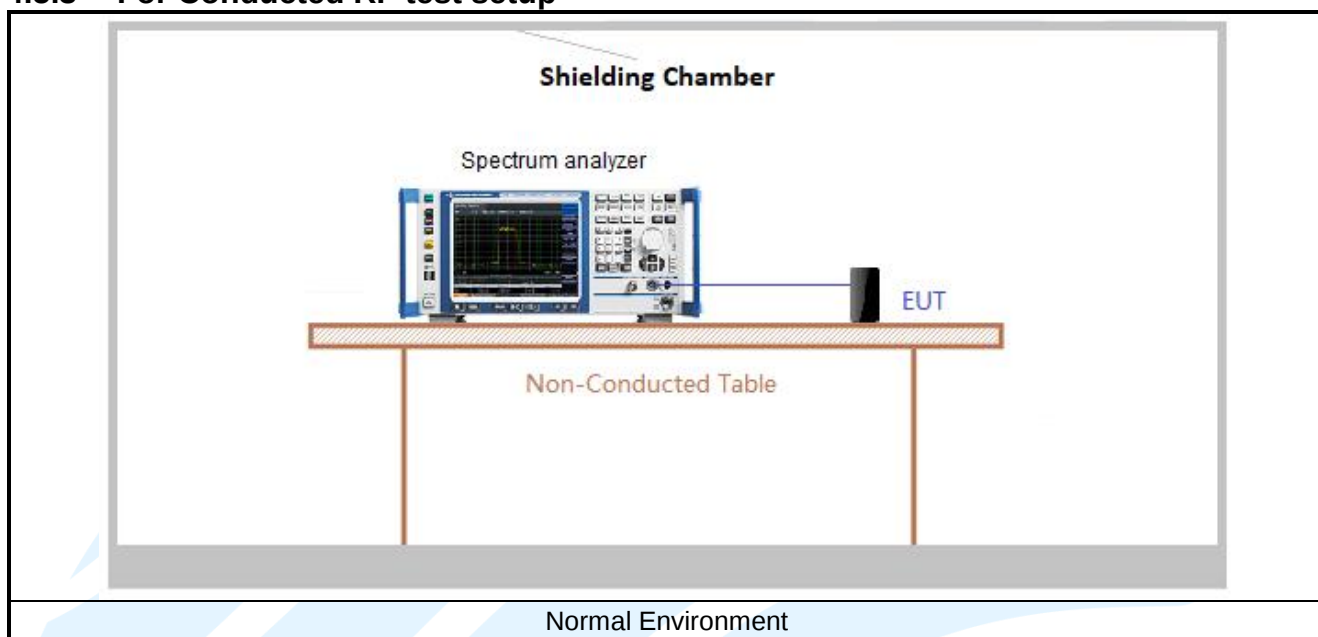
Figure 2. 30MHz to 1GHz



4.5.2 For Conducted Emissions test setup



4.5.3 For Conducted RF test setup



4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency	Mode	Antenna Port	Worst-case axis positioning
Above 1GHz	1TX	Chain 0	Z axis
	1TX	Chain 1	Z axis
	2TX	Chain 0+1	Z axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.7 DUTY CYCLE

Test Procedure: ANSI C63.10-2013 Clause 12.2.

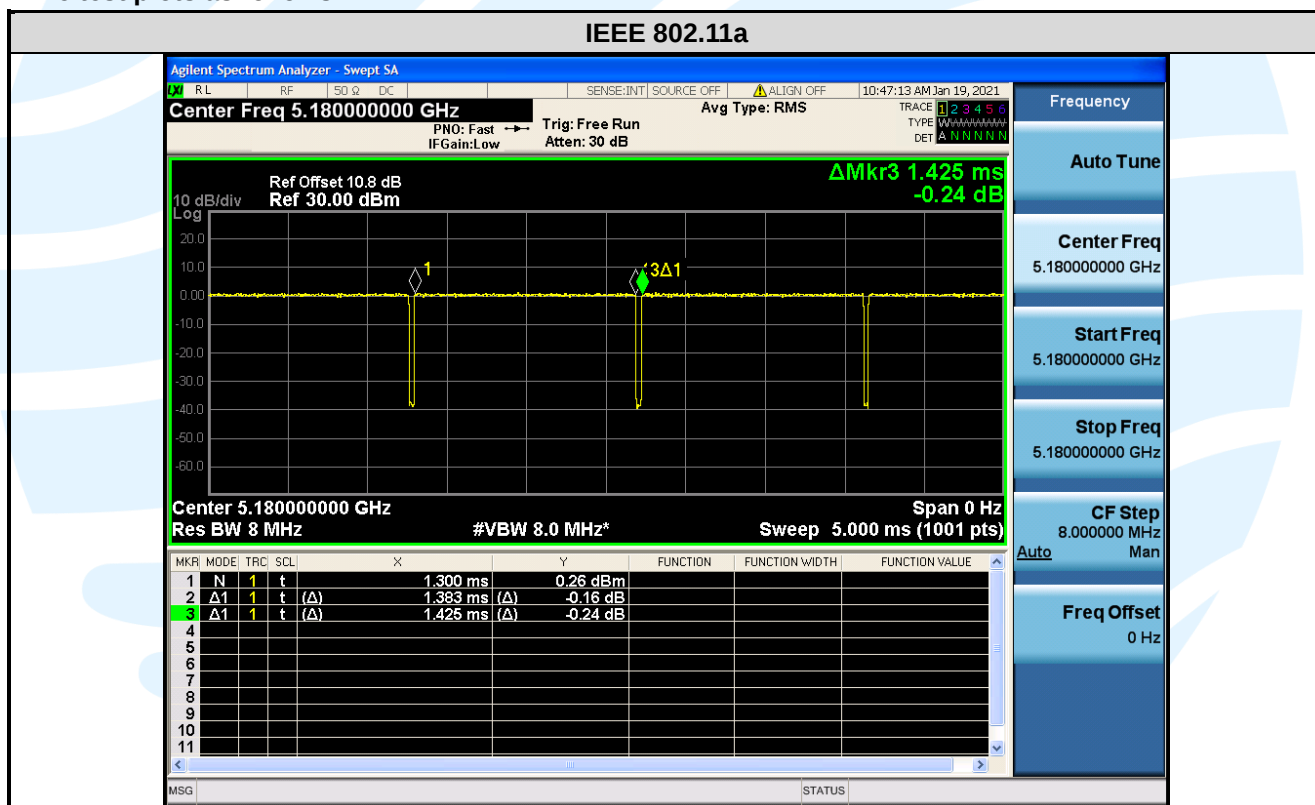
Test Results

Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
IEEE 802.11a	6	1.3830	1.4250	0.97	97.05	0.13	0.72	-0.26
IEEE 802.11n-HT20	MCS0	1.2930	1.3350	0.97	96.85	0.14	0.77	-0.28
IEEE 802.11n-HT40	MCS0	0.6435	0.6845	0.94	94.01	0.27	1.55	-0.54
IEEE 802.11ac-VHT20	MCS0	1.3080	1.3450	0.97	97.25	0.12	0.76	-0.24
IEEE 802.11ac-VHT40	MCS0	0.6485	0.6895	0.94	94.05	0.27	1.54	-0.53
IEEE 802.11ac-VHT80	MCS0	0.3235	0.3645	0.89	88.75	0.52	3.09	-1.04

Remark:

- 1) Duty cycle= On Time/ Period;
- 2) Duty Cycle factor = $10 * \log(1/ \text{Duty cycle})$;
- 3) Average factor = $20 \log_{10} \text{Duty Cycle}$.

The test plots as follows



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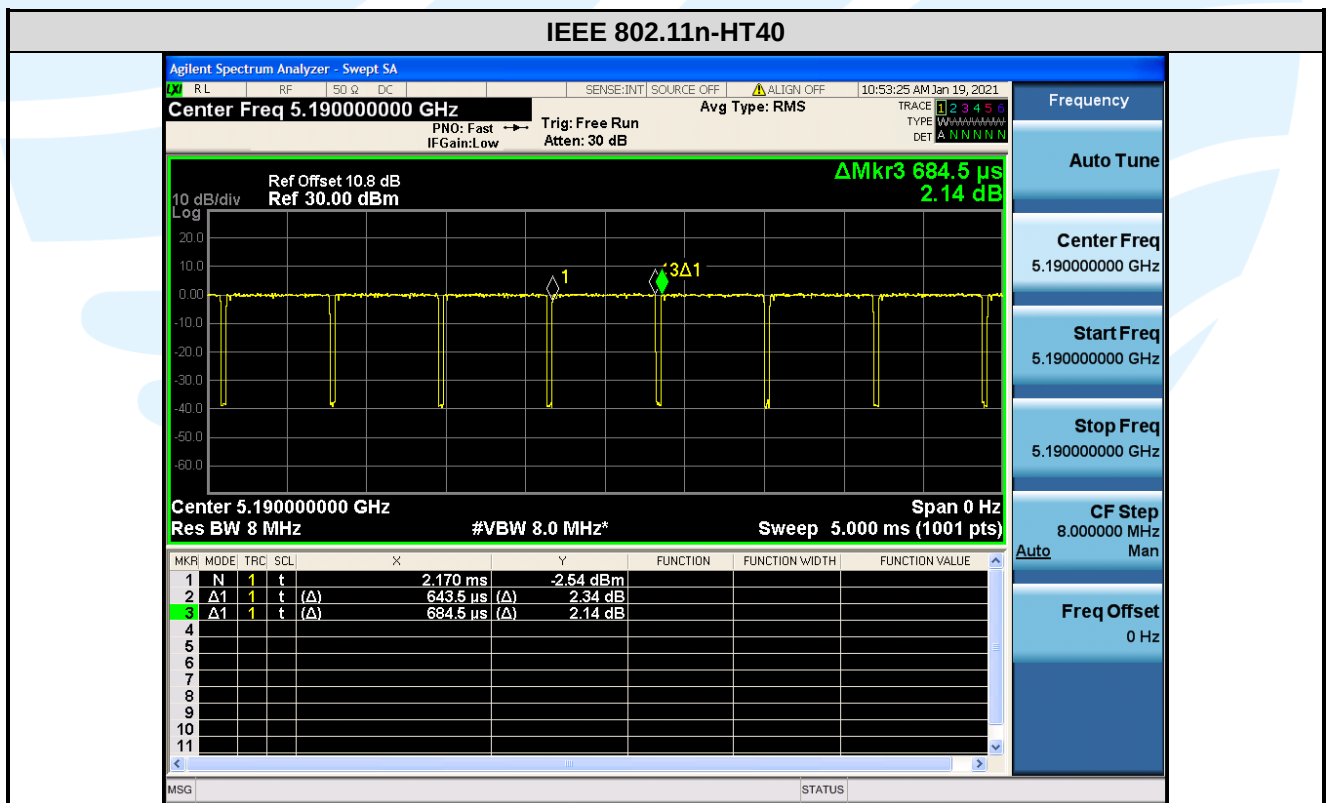
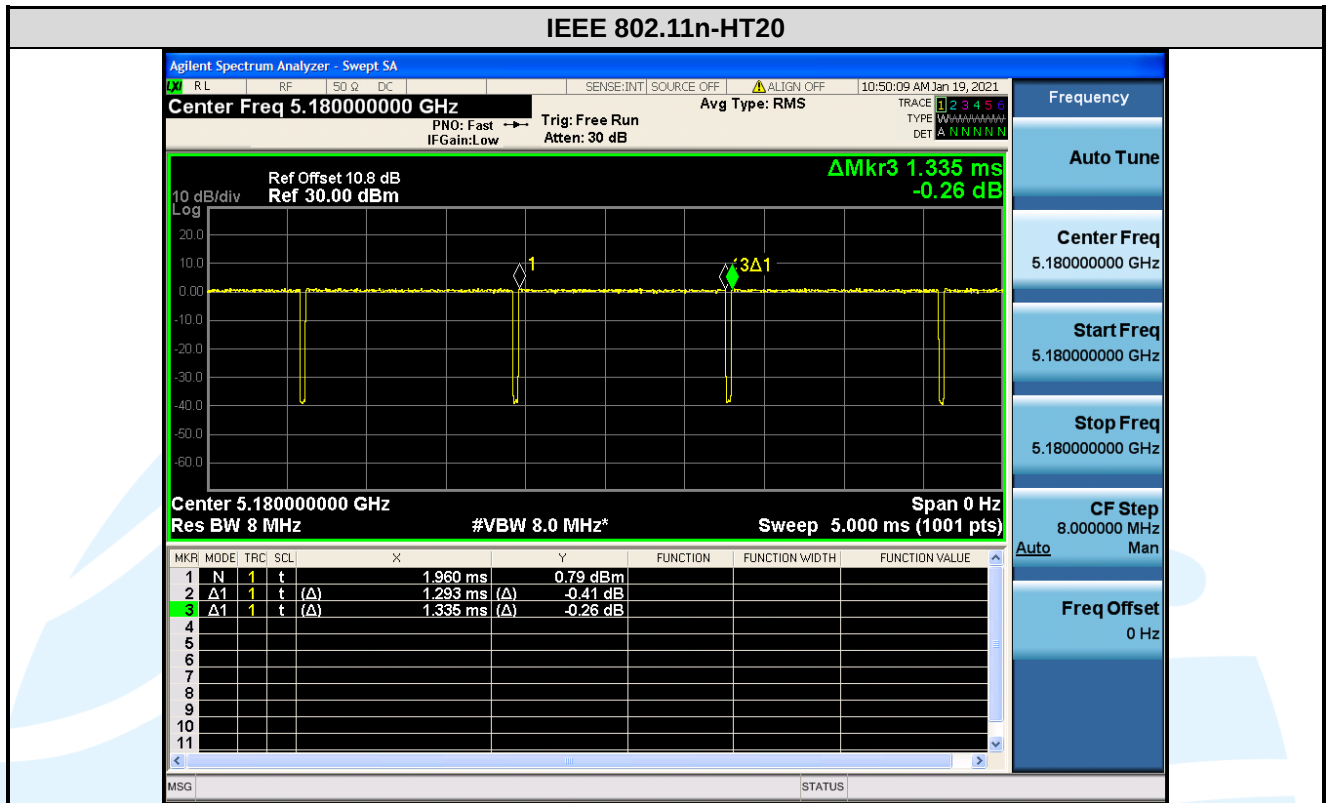
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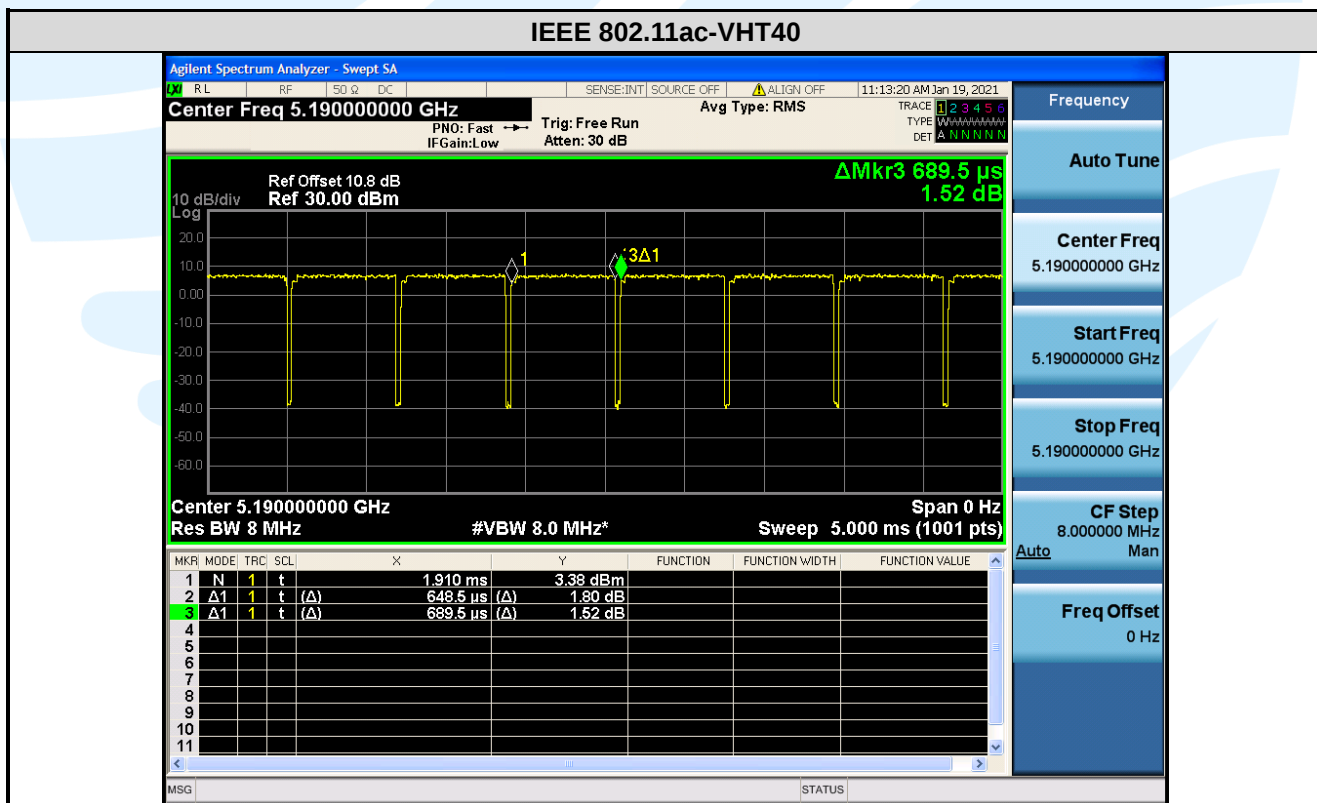
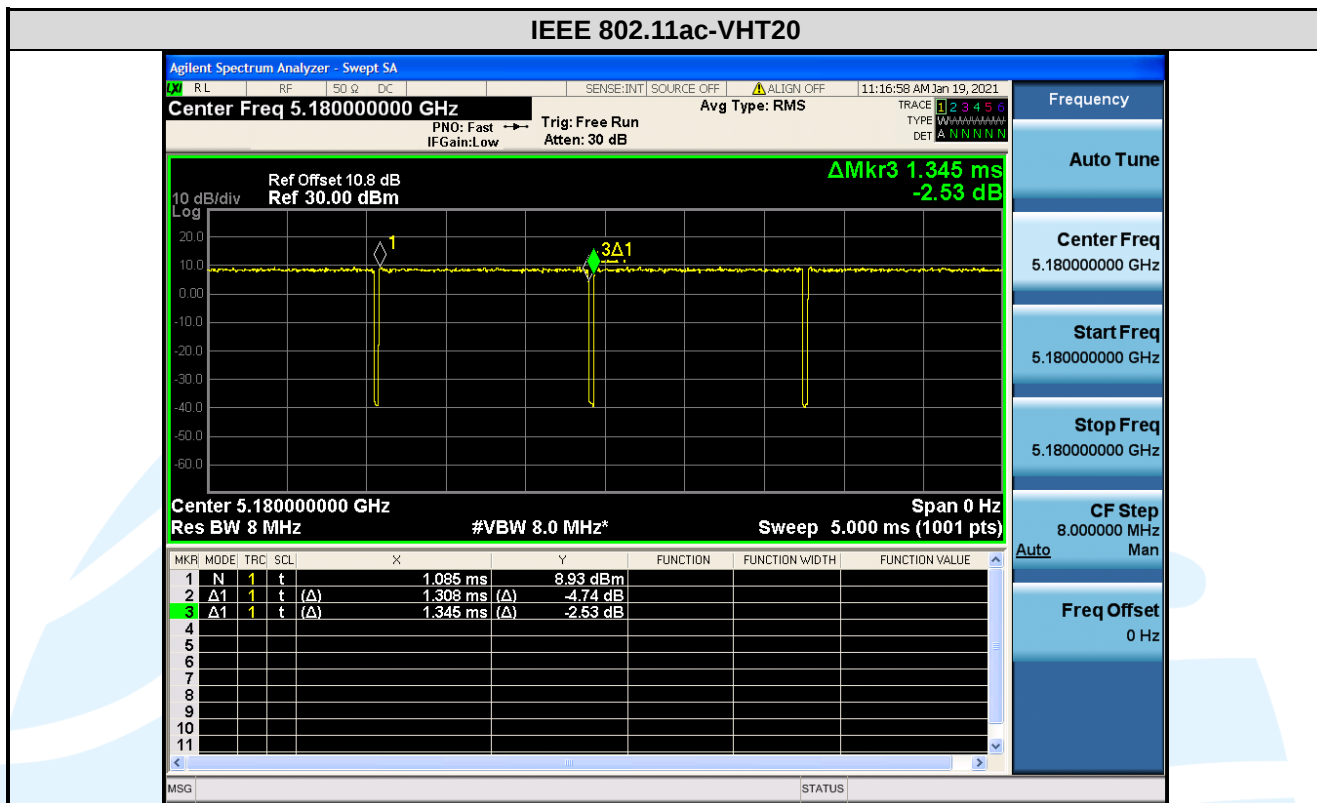
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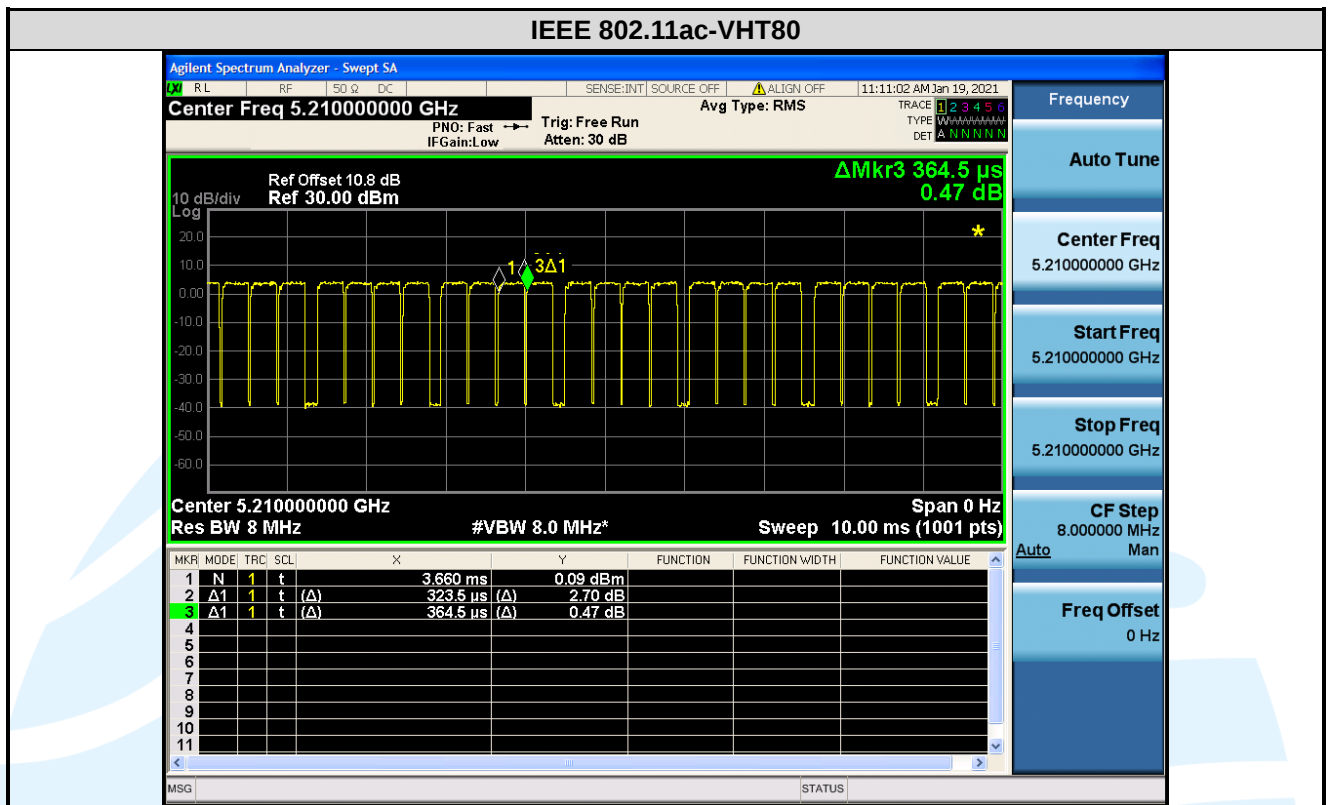
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<http://www.uttlab.com>

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Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

<http://www.uttlab.com>

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5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
4	KDB 789033 D02 General UNII Test Procedures New Rules v02r01	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15, subpart E
5	KDB 905462 D06 802.11 Channel Plans New Rules v02	Operation in U-NII bands -802.11 channel PLAN(\$15.407)
6	KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02	Compliance measurement procedures for Unlicensed –National Information Infrastructure devices operates in the frequency bands 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz bands incorporating dynamic frequency selection
7	KDB 905462 D03 Client Without DFS New Rules v01r02	U-NII client devices without radar detection capability
8	KDB 662911 D01 Multiple Transmitter Output v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band

5.2 ANTENNA REQUIREMENT

Standard Requirement
15.203 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, 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. 15.407(a)(1) (2) requirement: The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi. EUT Antenna: Both antenna in the interior of the equipment and no consideration of replacement. The transmit signals are correlated with each other and the antenna gain of both chains is completely consistent, the best case directional gain of the antenna is 5.71 dBi (See section 5.5).

5.326 DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a) (2)(5)

Test Method: KDB 789033 D02 v02r01 Section C.1

Limit: None; for reporting purposes only.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.

Spectrum analyzer according to the following Settings:

a) Set RBW = approximately 1 % of the emission bandwidth.

b) Set the VBW > RBW.

c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Mode	Channel	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		Chain 0	Chain 1	Chain 0	Chain 1
IEEE 802.11a	36 (5180)	21.38	19.84	16.797	16.687
	44 (5220)	21.38	20.00	16.680	16.710
	48 (5240)	22.29	19.90	16.664	16.617
	52 (5260)	21.18	19.90	16.678	16.662
	60 (5300)	23.30	20.06	16.714	16.701
	64 (5320)	21.50	20.01	16.724	16.667
	100 (5500)	22.28	19.94	16.701	16.685
	116 (5580)	22.39	19.80	16.710	16.590
	140 (5700)	23.54	20.10	16.698	16.718
IEEE 802.11n-HT20	36 (5180)	20.74	20.27	17.689	17.555
	44 (5220)	20.96	20.41	17.674	17.568
	48 (5240)	20.77	20.26	17.672	17.557
	52 (5260)	20.32	20.71	17.678	17.555
	60 (5300)	20.37	20.46	17.668	17.569
	64 (5320)	20.25	20.72	17.675	17.557
	100 (5500)	20.93	20.32	17.667	17.525
	116 (5580)	20.49	20.56	17.704	17.546
	140 (5700)	20.77	20.89	17.674	17.566
IEEE 802.11n-HT40	38 (5190)	40.51	40.13	36.272	36.214
	46 (5230)	41.17	40.17	36.307	36.283
	54 (5270)	40.60	40.15	36.262	36.263
	62 (5310)	40.48	40.29	36.267	36.242
	102 (5510)	40.58	40.17	36.229	36.229
	110 (5550)	40.39	40.24	36.194	36.213
	134 (5670)	40.56	40.12	36.264	36.284

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China

Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com

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IEEE 802.11ac-VHT20	36 (5180)	20.33	19.97	17.645	17.526
	44 (5220)	20.27	19.98	17.646	17.516
	48 (5240)	20.40	20.00	17.640	17.493
	52 (5260)	20.24	19.93	17.631	17.508
	60 (5300)	20.37	20.01	17.642	17.537
	64 (5320)	20.27	19.96	17.642	17.516
	100 (5500)	20.27	19.89	17.635	17.503
	116 (5580)	20.30	20.01	17.658	17.504
	140 (5700)	20.26	19.94	17.656	17.504
IEEE 802.11ac-VHT40	38 (5190)	40.38	40.18	36.141	36.222
	46 (5230)	40.59	39.82	36.205	36.193
	54 (5270)	40.49	39.84	36.188	36.228
	62 (5310)	40.49	40.06	36.168	36.207
	102 (5510)	40.29	39.98	36.187	36.220
	110 (5550)	40.56	39.96	36.170	36.242
	134 (5670)	40.17	40.09	36.209	36.185
IEEE 802.11ac-VHT80	42 (5230)	82.10	80.62	75.875	75.550
	58 (5290)	82.09	80.80	75.809	75.574
	106 (5530)	82.25	80.68	75.950	75.606

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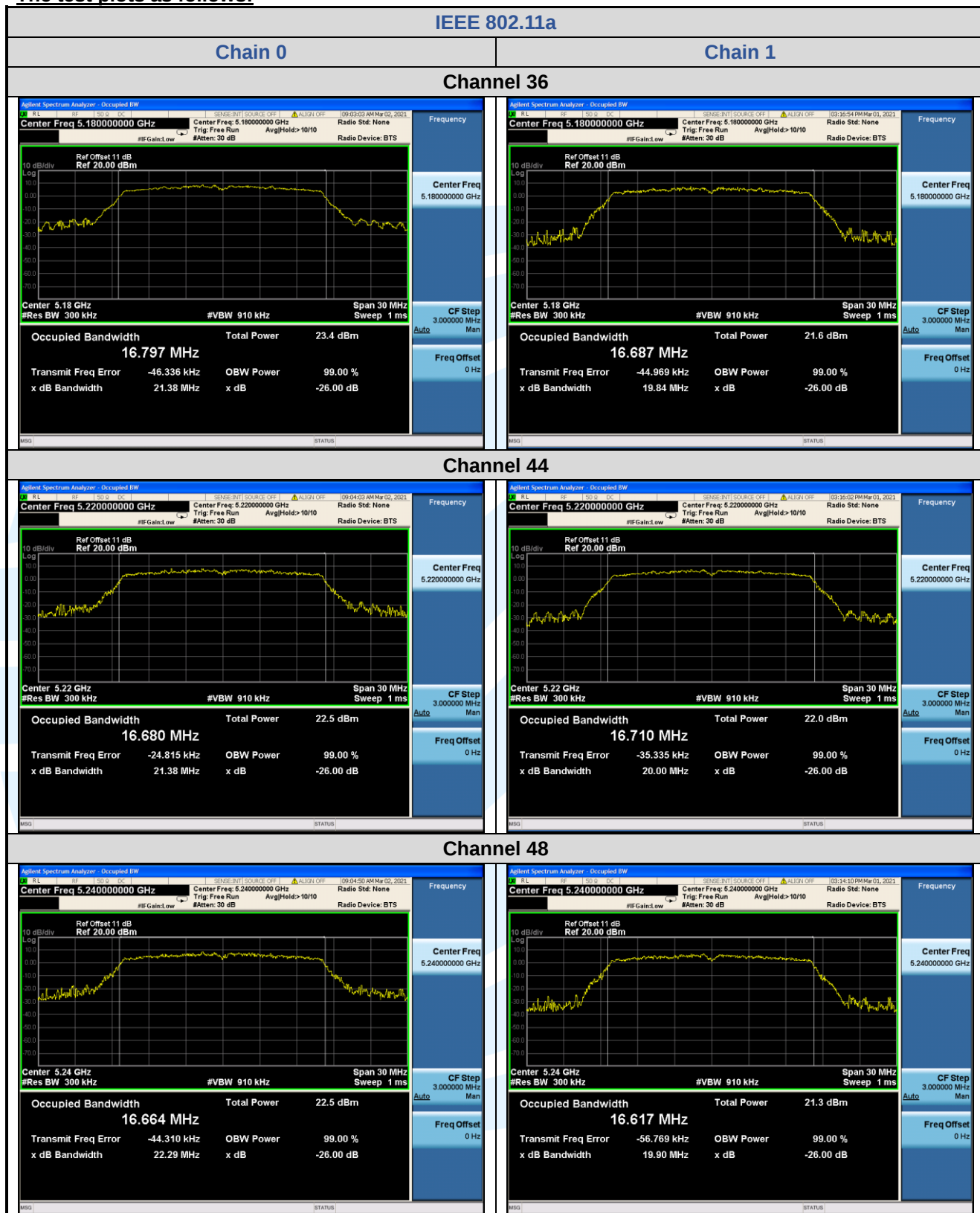
Tel: +86-755-28230888

Fax: +86-755-28230886

E-mail: info@uttlab.com
<http://www.uttlab.com>

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