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### **TEST REPORT**

Test Result :	PASS *
Date of Issue:	2023/12/29
Date of Test:	2023/12/14 to 2023/12/29
Date of Receipt:	2023/11/27
Standards:	FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart E
FCC ID:	2AANY-FWANATM
Trade Mark:	inhand
Model No.:	FWA02-NATM,FWA03-NATM, FWA12-NATM,FWA32-NATM, FWA62-NATM,FWA92-NATM
EUT Description:	5G Fixed Wireless Access
Address of Manufacturer:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing
Manufacturer:	Beijing InHand Networks Technology Co., Ltd.
Address of Applicant:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing
Applicant:	Beijing InHand Networks Technology Co., Ltd.
Application No.:	SEWM2311000482RG

In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

лен

Well Wei Wireless Laboratory Manager



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#### 1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023/12/29		Original

Prepared By	(Ives Cheng) / Test Engineer
Checked By	Stone Ju (Stone Gu) / Reviewer



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Test Item	Band <sup>[1]</sup>	FCC rules No.	Test Requirements	Test Result	Result
Antenna Requirement		15.203/15.407(a)		Clause 4.1	PASS
26dB Emission Bandwidth	26dB nission Band I 15.407(a)(1) ndwidth		No limit.	Clause 4.5	For Report Purpose
6dB Emission Bandwidth	Band III	15.407(e)	≥ 500 kHz.	Clause 4.6	PASS
99% Occupied Bandwidth	Band I Band III	KDB 789033 D02§ D	No limit.	Clause 4.7	For Report Purpose
Duty Cycle	Band I Band III		No limit.	Clause 4.3	For Report Purpose
Maximum	Band I	15.407(a)(ii)	<1W	Clausa	
Conducted Output Power	Band III	15.407(a)(3)	< 1W	4.4	PASS
Maximum	Band I	15.407(a)(ii)	< 17dBm/MHz		
Power Spectral Density	Band III	15.407(a)(3)	<30dBm/500KHz	Clause 4.8	PASS
	Band I	15.209 15.407(b)	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		PASS
Radiated Spurious Emissions	Band III	15.407(b) 15.205/15.209	F<1GHz: §15.209 limit (QP) F≥1GHz &out-restricted:(PK) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. F≥1GHz & in-restricted: §15.209 limit (AV&PK).	Clause 4.9	PASS
Restricted bands around	Band I Band III	15.407(b) 15.205/15.209		Clause 4.10	PASS

#### 2 Test Summary



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			Tayo. + O	000	
fundamental frequency					
AC Power Line Conducted Emissions	Band I Band III	15.207		Clause 4.2	PASS
Frequency Stability	Band I Band III	15.407(g)	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	N/A	N/A
Note 1: Band I: 5150-5250MHz Band III: 5725-5850MHz					

Remark:

According to the Declaration letter from client, these models are the same in these:appearance,PCB layout and basic software function; The only difference is that the products are used in different markets.

Therefore in this report only the Model No.(FWA02-NATM) was tested, and internal wiring were identical for all above items. Only different on model No. for marketing requirement.



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#### **3** General Information

#### 3.1 Details of Client

Applicant:	Beijing InHand Networks Technology Co., Ltd.
Address of Applicant:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing
Manufacturer:	Beijing InHand Networks Technology Co., Ltd.
Address of Manufacturer:	Room 501, floor 5, building 3, yard 18, ziyue road, chaoyang district, Beijing

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	King-p Li, Ives Cheng

#### 3.3 Test Facility

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

A2LA (Certificate No. 6336.01)
 SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.
 Innovation, Science and Economic Development Canada
 SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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	3.4	General	Descrip	otion	of	EU.	T
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EUT Description:	5G Fixed W	/ireless Access		
Model No.:	FWA02-NA FWA12-NA FWA62-NA	FWA02-NATM,FWA03-NATM, FWA12-NATM,FWA32-NATM, FWA62-NATM,FWA92-NATM		
Trade Mark:	inhand			
Hardware Version:	V2.0			
Software Version:	V1.2			
Power Supply:	12V			
	RF Conduc	ted	865018060005093	
	RSE & AC	power line	865018060004850	
	802.11a:	20 MHz chann	el bandwidth	
	802.11n:	20 MHz / 40 M	IHz channel bandwidth	
WLAN Mode Supported:	802.11ac:	20 MHz / 40 M	IHz / 80 MHz channel bandwidth	
	802.11ax:	20 MHz / 40 M	IHz / 80 MHz channel bandwidth	
Operation Frequency:	5150MHz to 5250MHz 5725MHz to 5850MHz			
	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM)		, QPSK, 16QAM, 64QAM)	
	802.11n:	OFDM (BPSK,	, QPSK, 16QAM, 64QAM)	
Modulation Type:	802.11ac:	OFDM (BPSK,	, QPSK, 16QAM, 64QAM, 256QAM)	
	802.11ax:	OFDM/OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)		
	20MHz:	802.11a/n(HT2	20)/ac(VHT20)/ax(HE20)	
Channel Spacing:	40MHz:	802.11n(HT40)/ac(VHT40)/ax(HE40)		
	80MHz:	802.11ac(VHT80)/ax(HE80)		
Antenna Type:	External	, ⊠Integrated		
Antenna Gain:	5150MHz to 5250MHz: 3.55dBi(Ant1); 3.55dBi(Ant2); 3.55dBi(Ant3); 3.55dBi(Ant4) 5725MHz to 5850MHz: 4.9dBi(Ant1); 4.9dBi(Ant2); 4.9dBi(Ant3); 4.9dBi(Ant4)			
	Note:			
	The antenn manufactur	The antenna gain are derived from the gain information report provided by the manufacturer.		
	SISO 🛛	802.11a/n		
Smart System:		802.11ac/ax	:: 4Tx & 4Rx	
		y CDD: 802.11a: 4Tx & 4Rx		
TPC Function:	Support, Not Support			



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Use Conditions:	Indoor
RF Cable:	2dB
Remark:	

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Remark:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency range over which device operates	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

For UNII Band I:						
Mode	Channel	Frequency(MHz)				
	The Lowest channel	5180				
IEEE 802.11a/n/ac/ax 20MHz	The Middle channel	5200				
	The Highest channel	5240				
	The Lowest channel	5190				
	The Highest channel	5230				
IEEE 802.11ac/ax 80MHz	The Middle channel	5210				

For UNII Band III:							
Mode	Channel	Frequency(MHz)					
	The Lowest channel	5745					
IEEE 802.11a/n/ac/ax 20MHz	The Middle channel	5785					
	The Highest channel	5825					
	The Lowest channel	5755					
	The Highest channel	5795					
IEEE 802.11ac/ax 80MHz	The Middle channel	5775					



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#### 3.5 Test Environment and Mode

Environment Parameter	101 kPa Selected Values During Tests			
Relative Humidity	44-46 % RH Ambient			
Value	Temperature(°C) Voltage(V)			
NTNV	22~23	12		
Remark:				
NV: Normal Voltage				
NT: Normal Temperature				

#### 3.6 Description of Support Units

Description	Manufacturer	Model No.			
Adapter	ShenZhen Kuanten Limited	KT36W120300US			
Remark: The information of table are provided by client.					

#### 3.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

Modulation Type	SISO - Data Rate	CDD/MIMO - Data Rate
802.11a	6 Mbps	/
802.11n (HT 20)	MCS0	/
802.11n (HT 40)	MCS0	/
802.11ac (VHT 20)	/	MCS0
802.11ac (VHT 40)	/	MCS0
802.11ac (VHT 80)	/	MCS0
802.11ax (HE 20)	/	MCS0
802.11ax (HE 40)	/	MCS0
802.11ax (HE 80)	/	MCS0



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#### 4 Test results and Measurement Data

#### 4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15 Section 15.203

The antenna is Integrated Antenna and no consideration of replacement. The best case gain of the antenna is 5150MHz to 5250MHz:

3.55dBi(Ant1); 3.55dBi(Ant2); 3.55dBi(Ant3); 3.55dBi(Ant4)\*

5725MHz to 5850MHz:

4.9dBi(Ant1); 4.9dBi(Ant2); 4.9dBi(Ant3); 4.9dBi(Ant4)\*

\*Note:

The antenna gain are derived from the gain information report provided by the manufacturer. Remark:

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#### Cyclic Delay Diversity (CDD) System:

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices, *Array Gain* = 10 log(N<sub>ANT</sub>/N<sub>SS</sub> = 1) dB.
- For power measurements on IEEE 802.11 devices: Array Gain = 0 dB (i.e., no array gain) for N<sub>ANT</sub> ≤ 4;

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain.

#### The Power and PSD limit should be modified if the directional gain of eut is over 6dbi.

The EUT supports CDD System. All antennas have the same gain:

Operation Frequency	ANT Gain1 (dBi)	ANT Gain2 (dBi)	ANT Gain3 (dBi)	ANT Gain4 (dBi)	Directional gain For Power (dBi)	Directional gain For PSD (dBi)	Power Limit Reduction (dBm)	PSD Limit Reduction (dBm)
5150MHz to 5250MHz	3.55	3.55	3.55	3.55	3.55	9.57	0	3.57
5725MHz to 5850MHz	4.9	4.9	4.9	4.9	4.9	10.92	0	4.92

5150MHz to 5250MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0

PSD Limit Reduction = Directional gain - 6dBi, (Directional gain > 6dBi) = 9.57-6=3.57 5725MHz to 5850MHz:

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0

PSD Limit Reduction = Directional gain - 6dBi, (Directional gain > 6dBi) = 10.92-6=4.92



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#### Test Requirement: 47 CFR Part 15 Section 15.207 Test Method: ANSI C63.10: 2013 Section 6.2 **Test Frequency Range:** 150kHz to 30MHz **Receiver Setup:** RBW = 9kHz, VBW = 30kHzLimit: Limit (dBuV) Frequency range (MHz) Quasi-peak Average 66 to 56\* 56 to 46\* 0.15-0.5 0.5-5 56 46 5-30 60 50 \* Decreases with the logarithm of the frequency. **Test Procedure:** 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a $50\Omega/50\mu$ H + $5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

#### 4.2 AC Power Line Conducted Emissions



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#### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



6 Remark:

3

4

5

0.6360

2.0760

18.2085

1. The following Quasi-Peak and Average measurements were performed on the EUT:

35.16

30.24

22.88

22.74

56.44

56.00

56.00

60.00

21.28

25.76

33.12

37.26

17.06

4.93

1.99

4.28

28.57

16.41

13.54

16.23

46.44

46.00

46.00

50.00

17.87

29.59

32.46

33.77

PASS

PASS

PASS

PASS

2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).

23.65

18.76

11.33

10.79

Margin = Limit[dBµV] – Value[dBµV]

11.51

11.48

11.55

11.95



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Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).

3. Margin = Limit[dBµV] – Value[dBµV]



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#### 4.3 Duty Cycle

Test Requirement:	ANSI C63.10 :2013 Section 12.2			
Test Method:	ANSI C63.10 :2013 Section 12.2			
Test Setup:	PC       Image: Signal Certain Analyzer         Image: Signal Certain Certai			
Instruments Used:	Refer to section 6 for details			
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates			
Final Test Mode:	Refer to section 3.7 for details.			
Limit:	No restriction limits			
Test Results:	For report purpose			
The detailed test data see: A	ppendix			



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#### 4.4 Conducted Output Power



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#### 4.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a), KDB 789033 D02& C			
Test Method:	ANSI C63.10: 2013 Section 12.4.1			
Test Setup:	PC PC PC PC PC PC PC PC PC PC			
Instruments Used:	Refer to section 6 for details.			
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates			
Final Test Mode:	Refer to section 3.7 for details.			
Limit:	No restriction limits			
Test Results:	For Report Purpose			
The detailed test data see: Appendix				



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#### Test Requirement: 47 CFR Part 15 Section 15.407(e) Test Method: ANSI C63.10: 2013 Section 12.4.1 Test Setup: SGS Test system 0 PC $\circ$ Tester Uni 0 0 E.U.T Analog Signal G 9 DC Powe 00000 Ground Reference Plane **Test Instruments:** Refer to section 6 for details. Exploratory Test Mode: Transmitting with all kind of modulations, data rates Final Test Mode: Refer to section 3.7 for details. **Frequency Band** Limit: Limit 5725-5850MHz At lease 500kHz **Test Results:** Pass The detailed test data see: Appendix

#### 4.6 6dB Emission Bandwidth



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#### Test Requirement: KDB 789033 D02§ D Test Method: ANSI C63.10: 2013 Section 12.4.2 Test Setup: SGS Test system 0 PC Oŏ q Unit 0 0 0 E.U.T Analog Signal Ge DC Powe ļ Ground Reference Plane Instruments Used: Refer to section 6 for details. Exploratory Test Mode: Transmitting with all kind of modulations, data rates Final Test Mode: Refer to section 3.7 for details. Limit: No restriction limits **Test Results:** For Report Purpose The detailed test data see: Appendix

#### 4.7 99% Occupied Bandwidth



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Test Requirement:	47 CFR Part 15 Sec	tion 15.407(a)			
Test Method:	ANSI C63.10: 2013 Section 12.5				
	KDB 789033 D02 v0	2r01, Section F.			
Test Setup:		Image: Segset of the system   Image: Segset of the system Image: Segset of the sys			
Instruments Used:	Refer to section 6 fo	r details.			
Exploratory Test Mode:	Transmitting with all	kind of modulations, data rates			
Final Test Mode:	Refer to section 3.7	for details.			
Limit:	Frequency Band	d Limit			
	5150-5250MHz The power spectral density less than 17dBm/1MH				
	5725-5850MHz The power spectral density less than <30dBm/500KHz				
Test Results:	Pass				
The detailed test data see: A	ppendix				

#### 4.8 Power Spectral Density



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4.9 Radiated Spurious Emissions

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	E Cor pack augmented amigaian the FUT was arrended to its wards and a start
	e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	g. Test the EUT in the outermost channels.
	<ul> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.</li> </ul>
	i. Repeat above procedures until all frequencies measured was complete.
	j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported
	k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.
	I. At a measurement distance of 1 meter the limit line was increased by $20*LOG(3/1) = 9.54 \text{ dB}.$
Test Configuration:	Measurements below 30MHz
	• RBW = 10 kHz
	• VBW = 30 kHz
	<ul> <li>Detector = Peak &amp; Average &amp; Quasi-peak</li> </ul>
	<ul> <li>Trace mode = max hold</li> </ul>
	Measurements Below 1000MHz
	• RBW = 120 kHz
	• VBW = 300 kHz
	<ul> <li>Detector = Quasi-peak</li> </ul>
	<ul> <li>Trace mode = max hold</li> </ul>
	Peak Measurements Above 1000 MHz
	• RBW = 1 MHz
	• VBW ≥ 3 MHz
	• Detector = Peak
	• Sweep time = auto
	Irace mode = max hold
	Average Measurements Above TUUUMHZ
	<ul> <li>NDW = 1 MIRZ</li> <li>VRW = 10Hz, when duty evelopic no loss than 08 percent.</li> </ul>
	• VBW = 10Hz, when duty cycle is no less than 96 percent. • VBW $\ge$ 1/T, when duty cycle is less than 98 percent where Tis the minimum.
	transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Refer to section 3.7 for details.
	For below 1GHz part, through pre-scan all channels, but only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass



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ĺ	The detailed test data see: Appendix		



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#### 4.10Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)						
Test Method:	ANSI C63.10: 2013 Section 12.7						
Test Site:	Measurement Distance: 3m	(Semi-Anechoic Chaml	per)				
Limit:	Frequency	Limit (dBuV/m)	Remark				
	30MHz-88MHz	40.0	Quasi-peak				
	88MHz-216MHz	43.5	Quasi-peak				
	216MHz-960MHz	46.0	Quasi-peak				
	960MHz-1GHz	54.0	Quasi-peak				
		54.0	Average Value				
		74.0	Peak Value				

#### Test Setup:

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		Im or 3m Im or
Test Procedure:	a.	The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
	b.	The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
	c.	The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
	d.	For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
	e.	The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	f.	Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.
	g.	Test the EUT in the outermost channels.
	h.	The radiation measurements are performed in X, Y, Z axis positioning for



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	Transmitting mode, And found the X axis positioning which it is worse case.				
	i. Repeat above procedures until all frequencies measured was complete.				
Test Configuration:	Measurements Below 1000MHz				
	• RBW = 120 kHz				
	• VBW = 300 kHz				
	<ul> <li>Detector = Quasi-peak</li> </ul>				
	Trace mode = max hold				
	Peak Measurements Above 1000 MHz				
	• RBW = 1 MHz				
	• VBW ≥ 3 MHz				
	• Detector = Peak				
	Sweep time = auto				
	Trace mode = max hold				
	Average Measurements Above 1000MHz				
	• RBW = 1 MHz				
	<ul> <li>VBW = 10Hz, when duty cycle is no less than 98 percent.</li> </ul>				
	<ul> <li>VBW ≥ 1/T, when duty cycle is less than 98 percent where Tis the minimum transmission duration over which the transmitter is on and is transmitting at its</li> </ul>				
	maximum power control level for the tested mode of operation.				
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.				
Final Test Mode:	Refer to section 3.7 for details.				
Instruments Used:	Refer to section 6 for details.				
Test Results: Pass					
The detailed test data see	The detailed test data see: Appendix				



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#### Measurement Uncertainty (95% confidence levels, k=2) 5

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	±1.0 %
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	±1.0 %
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)
		± 3.13dB (9k -30MHz)
o	Padiated Emission	± 4.8dB (30M -1GHz)
o	Radialed Emission	± 4.8dB (1GHz to 18GHz)
		± 4.80dB (Above 18GHz)
Remark:		

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The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>cisp/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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#### 6 Equipment List

RF Test Equipment							
Test Equipment	Manufacturer Model No		Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)		
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2023/02/06	2024/02/05		
Signal Analyzer	ROHDE& SCHWARZ	FSV3030	SUWI-01-02-02	2023/05/11	2024/05/10		
Measurement Software	Tonscend	JS1120-3 Test System V 3.3.20	SUWI-02-09-09	NCR	NCR		
Signal Analyzer	ROHDE& SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10		
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2023/02/06	2024/02/05		
Wideband Radio Communication Tester	ROHDE& SCHWARZ	CMW500	SUWI-01-16-05	2023/02/06	2024/02/05		
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2023/02/06	2024/02/05		
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2023/11/21	2024/11/20		
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2023/11/21	2024/11/20		

Conduction Test Equipment								
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)			
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07			
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2023/02/07	2024/02/06			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-03	2023/02/08	2024/02/07			
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-04	2023/02/08	2024/02/07			
Measurement Software	Tonscend	JS32-CE V4.0.0.2	SUWI-02-09-05	NCR	NCR			



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RSE Test System							
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)		
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2023/02/07	2024/02/06		
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2023/05/11	2024/05/10		
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-07	2023/11/21	2024/11/20		
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2023/02/08	2024/02/07		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2023/05/13	2024/05/12		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2023/05/13	2024/05/12		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2023/05/12	2024/05/11		
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2023/05/13	2024/05/12		
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2023/02/06	2024/02/05		
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2023/02/06	2024/02/05		
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2023/02/08	2024/02/07		
Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-04	NCR	NCR		



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#### 7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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# Appendix



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#### Emission Bandwidth

**Test Result** 

TestMode	Antenna	Frequency[MHz]	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Verdict
11a	Ant3	5180	20.64	5169.64	5190.28	
11a	Ant3	5220	21.76	5209.72	5231.48	
11a	Ant3	5240	20.32	5229.92	5250.24	
11a	Ant3	5745	20.16	5734.96	5755.12	
11a	Ant3	5785	20.12	5774.80	5794.92	
11a	Ant3	5825	20.24	5814.84	5835.08	
11n20SISO	Ant3	5180	20.72	5169.60	5190.32	
11n20SISO	Ant3	5220	23.88	5209.68	5233.56	
11n20SISO	Ant3	5240	20.56	5229.68	5250.24	
11n20SISO	Ant3	5745	20.48	5734.76	5755.24	
11n20SISO	Ant3	5785	20.56	5774.68	5795.24	
11n20SISO	Ant3	5825	20.64	5814.72	5835.36	
11n40SISO	Ant3	5190	40.16	5169.92	5210.08	
11n40SISO	Ant3	5230	40.40	5209.84	5250.24	
11n40SISO	Ant3	5755	40.40	5734.92	5775.32	
11n40SISO	Ant3	5795	40.88	5774.44	5815.32	
11ax20MIMO	Ant1	5180	26.16	5167.48	5193.64	1
11ax20MIMO	Ant2	5180	25.88	5167.40	5193.28	
11ax20MIMO	Ant3	5180	25.92	5165.88	5191.80	
11ax20MIMO	Ant4	5180	25.96	5168.08	5194.04	1
11ax20MIMO	Ant1	5220	26.80	5205.92	5232.72	
11ax20MIMO	Ant2	5220	23.36	5208.56	5231.92	
11ax20MIMO	Ant3	5220	25.16	5208.92	5234.08	
11ax20MIMO	Ant4	5220	23.44	5208.64	5232.08	_
11ax20MIMO	Ant1	5240	20.00	5229.96	5249.96	For
11ax20MIMO	Ant2	5240	20.04	5229.96	5250.00	Report
11ax20MIMO	Ant3	5240	20.04	5230.00	5250.04	Purpose
11ax20MIMO	Ant4	5240	20.04	5230.00	5250.04	
11ax20MIMO	Ant1	5745	22.20	5733.60	5755.80	
11ax20MIMO	Ant2	5745	22.36	5733.68	5756.04	
11ax20MIMO	Ant3	5745	26.32	5731.04	5757.36	
11ax20MIMO	Ant4	5745	32.56	5731.16	5763.72	
11ax20MIMO	Ant1	5785	22.52	5773.96	5796.48	
11ax20MIMO	Ant2	5785	26.04	5772.28	5798.32	
11ax20MIMO	Ant3	5785	27.60	5769.00	5796.60	1
11ax20MIMO	Ant4	5785	26.32	5770.60	5796.92	
11ax20MIMO	Ant1	5825	29.08	5810.52	5839.60	
11ax20MIMO	Ant2	5825	25.92	5811.80	5837.72	
11ax20MIMO	Ant3	5825	27.08	5810.92	5838.00	
11ax20MIMO	Ant4	5825	26.56	5813.12	5839.68	
11ax40MIMO	Ant1	5190	39.44	5170.24	5209.68	
11ax40MIMO	Ant2	5190	39.36	5170.32	5209.68	
11ax40MIMO	Ant3	5190	39.84	5170.08	5209.92	
11ax40MIMO	Ant4	5190	39.20	5170.40	5209.60	1
11ax40MIMO	Ant1	5230	39.60	5210.24	5249 84	1
11ax40MIMO	Ant2	5230	39.44	5210.32	5249 76	1
11ax40MIMO	Ant3	5230	39.68	5210.16	5249 84	1
11ax40MIMO	Ant4	5230	39.60	5210.16	5249 76	1
11ax40MIMO	Ant1	5755	39.44	5735 24	5774 68	1
11ax40MIMO	Ant2	5755	39.68	5735.16	5774.84	1



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11ax40MIMO	Ant3	5755	39.52	5735.16	5774.68	
11ax40MIMO	Ant4	5755	39.68	5735.16	5774.84	
11ax40MIMO	Ant1	5795	39.68	5775.08	5814.76	
11ax40MIMO	Ant2	5795	39.68	5775.16	5814.84	
11ax40MIMO	Ant3	5795	39.76	5775.08	5814.84	
11ax40MIMO	Ant4	5795	39.76	5775.08	5814.84	
11ax80MIMO	Ant1	5210	80.32	5169.84	5250.16	
11ax80MIMO	Ant2	5210	80.48	5169.84	5250.32	
11ax80MIMO	Ant3	5210	80.32	5170.00	5250.32	
11ax80MIMO	Ant4	5210	80.32	5169.84	5250.16	
11ax80MIMO	Ant1	5775	80.32	5734.84	5815.16	
11ax80MIMO	Ant2	5775	80.32	5734.84	5815.16	
11ax80MIMO	Ant3	5775	80.48	5734.84	5815.32	
11ax80MIMO	Ant4	5775	80.64	5734.68	5815.32	

Remark: For 802.11ax mode /ac mode, the whole testing have assessed only, ax mode by referring to their higher output power.



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### **Test Graphs**



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#### Occupied channel bandwidth Test Result

TestMode	Antenna	Frequency[MHz]	OCB [MHz]	FL[MHz]	FH[MHz]	Verdict
11a	Ant3	5180	17.242	5171.3761	5188.6186	
11a	Ant3	5220	17.183	5211.3898	5228.5730	
11a	Ant3	5240	17.174	5231.3962	5248.5699	
11a	Ant3	5745	17.075	5736.4625	5753.5379	
11a	Ant3	5785	17.171	5776.3902	5793.5615	
11a	Ant3	5825	17.085	5816.4442	5833.5290	
11n20SISO	Ant3	5180	18.101	5170.9444	5189.0458	
11n20SISO	Ant3	5220	18.102	5210.9708	5229.0727	
11n20SISO	Ant3	5240	18.077	5230.9479	5249.0246	
11n20SISO	Ant3	5745	17.937	5736.0324	5753.9689	
11n20SISO	Ant3	5785	17.974	5775.9976	5793.9718	
11n20SISO	Ant3	5825	18.014	5815.9633	5833.9773	
11n40SISO	Ant3	5190	36.085	5172.0856	5208.1703	
11n40SISO	Ant3	5230	36.156	5211.9334	5248.0891	
11n40SISO	Ant3	5755	36.031	5737.0202	5773.0511	
11n40SISO	Ant3	5795	36.061	5776.9996	5813.0605	
11ax20MIMO	Ant1	5180	19.267	5170.3770	5189.6440	
11ax20MIMO	Ant2	5180	19.302	5170.3351	5189.6368	
11ax20MIMO	Ant3	5180	19.297	5170.3293	5189.6262	
11ax20MIMO	Ant4	5180	19.334	5170.3199	5189.6534	
11ax20MIMO	Ant1	5220	19.371	5210.2889	5229.6603	
11ax20MIMO	Ant2	5220	19.331	5210.3419	5229.6733	
11ax20MIMO	Ant3	5220	19.303	5210.2826	5229.5854	
11ax20MIMO	Ant4	5220	19.322	5210.3405	5229.6628	
11ax20MIMO	Ant1	5240	18.99	5230.4942	5249.4845	For
11ax20MIMO	Ant2	5240	18.924	5230.5230	5249.4467	Poport
11ax20MIMO	Ant3	5240	18.935	5230.5353	5249.4706	Purpose
11ax20MIMO	Ant4	5240	18.923	5230.5183	5249.4412	i uipose
11ax20MIMO	Ant1	5745	19.36	5735.3134	5754.6738	
11ax20MIMO	Ant2	5745	19.36	5735.3048	5754.6649	
11ax20MIMO	Ant3	5745	19.278	5735.3725	5754.6505	
11ax20MIMO	Ant4	5745	19.418	5735.2902	5754.7081	
11ax20MIMO	Ant1	5785	19.392	5775.3086	5794.7007	
11ax20MIMO	Ant2	5785	19.346	5775.3268	5794.6727	
11ax20MIMO	Ant3	5785	19.389	5775.2483	5794.6371	
11ax20MIMO	Ant4	5785	19.294	5775.3267	5794.6211	
11ax20MIMO	Ant1	5825	19.466	5815.3258	5834.7919	
11ax20MIMO	Ant2	5825	19.413	5815.2478	5834.6608	
11ax20MIMO	Ant3	5825	19.264	5815.3555	5834.6196	
11ax20MIMO	Ant4	5825	19.307	5815.3129	5834.6197	
11ax40MIMO	Ant1	5190	37.569	5171.2753	5208.8443	
11ax40MIMO	Ant2	5190	37.582	5171.2125	5208.7946	
11ax40MIMO	Ant3	5190	37.58	5171.1821	5208.7622	
11ax40MIMO	Ant4	5190	37.619	5171.2316	5208.8509	
11ax40MIMO	Ant1	5230	37.575	5211.2341	5248.8093	
11ax40MIMO	Ant2	5230	37.529	5211.2529	5248.7815	
11ax40MIMO	Ant3	5230	37.559	5211.2217	5248.7810	
11ax40MIMO	Ant4	5230	37.627	5211.2054	5248.8326	
11ax40MIMO	Ant1	5755	37.549	5736.2823	5773.8316	
11ax40MIMO	Ant2	5755	37.582	5/36.2767	5773.8586	
	Ant3	5755	37.59	5/36.2142	5773.8047	
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11ax40MIMO	Ant1	5795	37.465	5776.2594	5813.7247	
11ax40MIMO	Ant2	5795	37.566	5776.1780	5813.7436	
11ax40MIMO	Ant3	5795	37.521	5776.2164	5813.7371	
11ax40MIMO	Ant4	5795	37.521	5776.2532	5813.7740	
11ax80MIMO	Ant1	5210	76.665	5171.8091	5248.4740	
11ax80MIMO	Ant2	5210	76.848	5171.7898	5248.6379	
11ax80MIMO	Ant3	5210	76.719	5171.8121	5248.5309	
11ax80MIMO	Ant4	5210	76.694	5171.9083	5248.6019	
11ax80MIMO	Ant1	5775	76.697	5736.7198	5813.4165	
11ax80MIMO	Ant2	5775	76.709	5736.6598	5813.3685	
11ax80MIMO	Ant3	5775	76.732	5736.6781	5813.4104	
11ax80MIMO	Ant4	5775	76.558	5736.8062	5813.3638	

Remark: For 802.11ax mode /ac mode, the whole testing have assessed only, ax mode by referring to their higher output power.



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