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Report No.: SHEM141200318003

## 1 Cover Page

## FCC MPE REPORT

Application No.:	SHEM1412003180RF
Applicant:	Shanghai Xunzhao Communication Technology Co., Ltd
FCC ID:	2ADY6WC18R2211
Equipment Under Tes	t (EUT):
NOTE: The following sa	ample(s) was/were submitted and identified by the client as
Product Name:	WiFi Modular
Model No.(EUT):	WC18R2211
Standards:	FCC Rules 47 CFR §2.1091
	KDB447498 D01 General RF Exposure Guidance
Date of Receipt:	December 11, 2014
Date of Test:	December 23, 2014 to May 17, 2015
Date of Issue:	May 26, 2015
Test Result:	Pass*

<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.

Parlam Zhan

E&E Section Manager

SGS-CSTC (Shanghai) Co., Ltd.

SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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### 2 Version

	Revision Record											
Version	Chapter	Date	Modifier	Remark								
00	/	May 26, 2015	/	Original								

Authorized for issue by:		
Engineer	Eddy Zong	Eddy Zong
	Print Name	
Clerk	Susie Liu	Sustre Lin
	Print Name	
Reviewer	Keny Xu	Kony. xu
	Print Name	



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### 4 General Information

#### 4.1 Client Information

Applicant: Shanghai Xunzhao Communication Technology Co., Ltd

Address of Applicant: 1759 Jinshajiang road putuo district of Shanghai

Manufacturer: Shanghai Xunzhao Communication Technology Co., Ltd

Address of Manufacturer: 1759 Jinshajiang road putuo district of Shanghai

Factory: Shanghai Xunzhao Communication Technology Co., Ltd

Address of Factory: 1759 Jinshajiang road putuo district of Shanghai

## 4.2 General Description of E.U.T.

Product Description: 802.11 a/b/g/n/ac 2T/2R Dual Band USB Module

Brand Name: EBD

Power Supply: DC 5V from USB Interface

### 4.3 Details of E.U.T.

Operation Frequency: For 2.4G Band:

802.11 b/g/n20: 2412MHz-2462MHz; 802.11 n40: 2422MHz-2452MHz

For 5G U-NII Band:

802.11a/n(HT20)/ac(VHT20):U-NII 1:5180-5240MHz, U-NII 2A:5260-5320MHz,

U-NII-2C:5500-5720MHz, U-NII-3:5745-5825MHz

802.11n(HT40)/ac(VHT40): U-NII 1:5190-5230MHz, U-NII 2A:5270-5310MHz,

U-NII 2C:5500-5720MHz, U-NII 3:5755-5795MHz

802.11ac(VHT80): U-NII 1:5210 MHz, U-NII 2A:5290 MHz, U-NII 2C:5530-5690MHz, U-NII 3:5775 MHz

Modulation Technique: DSSS(CCK, DQPSK, DBPSK) for 802.11 b

OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)

Remark: 256QAM for 802.11 ac only

Data Rate: 802.11b: 1/2/5.5/11Mbps,

802.11g/a: 6/9/12/18/24/36/48/54Mbps

802.11n(HT20)/n(HT40): MCS0-7 up to 300Mbps

802.11ac(VHT20)/ac(VHT40)/ac(VHT80): MCS0-7 up to 866.3Mbps

DFS mode Client without radar detection

Support TPC: 

Yes 

No

Antenna Type 

Monopole Antenna

2\*2 MIMO without 802.11 beam forming function

2.4G and 5G technology cannot transmit at the same time.

Antenna Gain 3dBi

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#### 4.4 Test Location

All tests were performed at SGS E&E EMC lab

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

### 4.5 Test Facility

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

### CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

#### • FCC - Registration No.: 402683

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2017-09-16.

### Industry Canada (IC) – IC Assigned Code: 8617A

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

### VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.



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### 5 Test Standards and Limits

According to §1.1310 Radiofrequency radiation exposure limits:

The limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm²)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30



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## 6 Measurement and Calculation

## 6.1 Maximum transmit power

#### For 2.4G Band:

a. Single Input Single Output mode:

Taskmada	Test	Reading Po	ower (dBm)	Output Pov	wer (dBm)	Limit	Doordt
Test mode	Channel	annel Antenna A Antenna B Antenna A		Antenna B	(dBm)	Result	
	2412	20.43	21.84	20.93	22.34		Pass
802.11b	2437	20.59	22.14	21.09	22.64		Pass
	2462	20.93	22.23	21.43	22.73		Pass
	2412	21.01	22.28	21.51	22.78		Pass
802.11g	2437	21.12	22.35	21.62	22.85		Pass
	2462	21.33	22.72	21.83	23.22		Pass
	2412	18.78	20.19	19.28	20.69	30	Pass
802.11n20	2437	18.94	20.27	19.44	20.77		Pass
	2462	19.25	20.57	19.75	21.07		Pass
	2422	18.41	19.62	18.91	20.12		Pass
802.11n40	2437	18.70	19.92	19.20	20.42		Pass
	2452	18.94	20.07	19.44	20.57		Pass

b. Spatial Diversity Multiplexing-MIMO function mode:

Test mode	Test	Reading Po	ower (dBm)	Outp	out Power (de	Limit	Result	
rest mode	Channel	Antenna A	enna A Antenna B Antenna A		Antenna B	MIMO	(dBm)	riesuit
	2412	18.45	18.09	18.95	18.59	21.78		Pass
802.11n20	2437	18.57	17.03	19.07	17.53	21.38		Pass
	2462	17.93	17.79	18.43	18.29	21.37	30	Pass
	2422	16.26	16.17	16.76	16.67	19.73	30	Pass
802.11n40	2437	16.89	17.32	17.39	17.82	20.62		Pass
	2452	16.44	16.50	16.94	17.00	19.98		Pass



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#### For U-NII Band:

a. Single Input Single Output mode:

Test Mode	Band	CH No.	Freq	Reading	g (dBm)		ed Power Bm)	Limit	Result
			(MHz)	Ant A	Ant B	Ant A	Ant B	(dBm)	
		36	5180	10.07	11.72	10.57	12.22		Pass
	U-NII 1	40	5200	10.67	9.43	11.17	9.93		Pass
		48	5240	8.83	10.51	9.33	11.01		Pass
		52	5260	9.84	11.24	10.34	11.74		Pass
	U-NII 2A	56	5280	7.88	8.87	8.38	9.37		Pass
		64	5320	8.53	9.79	9.03	10.29	24	Pass
802.11a		100	5500	7.72	8.60	8.22	9.10		Pass
	U-NII 2C	120	5600	9.79	10.36	10.29	10.86		Pass
	U-IVII 2U	140	5700	10.90	13.13	11.40	13.63		Pass
		144	5720	11.26	11.69	11.76	12.19		Pass
	U-NII-3	149	5745	11.27	11.34	11.77	11.84		Pass
		157	5785	10.03	10.53	10.53	11.03	30	Pass
		165	5825	9.75	9.80	10.25	10.30		Pass
		36	5180	10.13	11.48	10.63	11.98		Pass
	U-NII 1	40	5200	10.64	12.00	11.14	12.50		Pass
		48	5240	11.89	13.34	12.39	13.84		Pass
		52	5260	12.38	14.08	12.88	14.58		Pass
	U-NII 2A	56	5280	12.88	14.28	13.38	14.78		Pass
000 11-		64	5320	7.17	8.32	7.67	8.82	24	Pass
802.11n (HT20)		100	5500	6.38	7.17	6.88	7.67		Pass
(11120)	U-NII 2C	120	5600	9.57	10.20	10.07	10.70		Pass
	U-INII ZU	140	5700	10.46	11.29	10.96	11.79		Pass
		144	5720	12.23	12.32	12.73	12.82		Pass
		149	5745	11.30	11.13	11.80	11.63		Pass
	U-NII-3	157	5785	10.38	10.75	10.88	11.25	30	Pass
		165	5825	11.00	9.91	11.50	10.41		Pass



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Test Mode	Band	CH No.	Freq	Reading	g (dBm)	Conducte (dE		Limit (dBm)	Result
			(MHz)	Ant A	Ant B	Ant A	Ant B	, ,	
	U-NII-1	38	5190	13.09	10.36	13.59	10.86		Pass
	O-IVII- I	46	5230	12.41	9.74	12.91	10.24		Pass
	U-NII 2A	54	5270	11.10	11.97	11.60	12.47		Pass
	U-INII ZA	62	5310	8.94	10.49	9.44	10.99		Pass
802.11n (HT40)		102	5510	8.37	9.04	8.87	9.54	24	Pass
	U-NII 2C	118	5590	9.83	10.46	10.33	10.96		Pass
	0-IVII 20	134	5670	10.70	11.18	11.20	11.68		Pass
		142	5710	11.50	12.45	12.00	12.95		Pass
	U-NII-3	151	5755	8.74	7.97	9.24	8.47	30	Pass
	O-INII-O	159	5795	8.49	8.50	8.99	9.00	30	Pass
		36	5180	9.69	8.83	10.19	8.47		Pass
	U-NII 1	40	5200	9.26	10.28	9.76	9.00		Pass
		48	5240	9.69	10.90	10.19	10.41		Pass
		52	5260	11.52	11.91	12.02	12.41		Pass
	U-NII 2A	56	5280	8.86	9.21	9.36	9.71	24	Pass
000 11		64	5320	9.12	9.00	9.62	9.50		Pass
802.11ac (VHT20)	U-NII 2C	100	5500	8.01	7.88	8.51	8.38		Pass
(****20)		120	5600	9.70	10.23	10.20	10.73		Pass
		140	5700	12.08	12.75	12.58	13.25		Pass
		144	5720	12.16	12.05	12.66	12.55		Pass
		149	5745	11.67	12.55	12.17	8.47		Pass
	U-NII-3	157	5785	10.99	11.87	11.49	9.00		Pass
		165	5825	10.80	10.59	11.30	10.41		Pass
	U-NII-1	38	5190	8.72	9.81	9.22	10.86		Pass
	0-1111-1	46	5230	9.95	8.75	10.45	10.24		Pass
	U-NII 2A	54	5270	9.90	10.67	10.40	11.17		Pass
	U-INII ZA	62	5310	8.96	9.80	9.46	10.30		Pass
802.11ac		102	5510	10.05	10.96	10.55	11.46	24	Pass
(VHT40)	U-NII 2C	118	5590	10.29	9.81	10.79	10.31		Pass
	U-IVII 2C	134	5670	10.61	10.35	11.11	10.85		Pass
		142	5710	11.24	11.64	11.74	12.14		Pass
	U-NII-3	151	5755	10.95	10.27	11.45	8.47	30	Pass
	ט-ווווי-ט	159	5795	10.11	9.10	10.61	9.00	30	Pass
	U-NII-1	42	5210	6.21	7.50	6.71	10.41		Pass
	U-NII 2A	58	5290	7.04	8.05	7.54	8.55		Pass
802.11ac		106	5530	5.50	5.70	6.00	6.20	24	Pass
(VHT80)	U-NII 2C	122	5610	5.64	5.21	6.14	5.71		Pass
	-	138	5690	5.47	5.75	5.97	6.25		Pass
	U-NII-3	155	5775	5.43	6.57	5.93	7.07	30	Pass

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b. Spatial Diversity Multiplexing-MIMO function mode:

Test	Band	CH No.	Freq	Reading		Conduc	ted Powe	r (dBm)	Limit	Result
Mode	Danu	CH NO.	(MHz)	Ant A	Ant B	Ant A	Ant B	MIMO	(dBm)	Result
		36	5180	5.39	11.07	5.89	11.57	13.11		Pass
	U-NII 1	40	5200	6.52	10.33	7.02	10.83	12.84		Pass
		48	5240	6.70	10.96	7.20	11.46	13.34		Pass
		52	5260	10.65	8.36	11.15	8.86	13.16		Pass
	U-NII 2A	56	5280	9.31	11.72	9.81	12.22	14.19		Pass
000.11		64	5320	7.42	7.41	7.92	7.91	10.93	24	Pass
802.11n (HT20)		100	5500	7.18	4.74	7.68	5.24	9.64		Pass
(11120)	LLNILOC	120	5600	10.63	7.13	11.13	7.63	12.73		Pass
	U-NII 2C	140	5700	10.25	7.41	10.75	7.91	12.57		Pass
		144	5720	10.81	9.76	11.31	10.26	13.83		Pass
	U-NII-3	149	5745	8.40	7.84	8.90	8.34	12.14		Pass
		157	5785	8.36	6.75	8.86	7.25	11.64	30	Pass
		165	5825	7.58	5.83	8.08	6.33	10.80		Pass
	LI NIII 4	38	5190	5.77	8.96	6.27	9.46	11.66		Pass
	U-NII-1	46	5230	5.72	9.91	6.22	10.41	12.31		Pass
	U-NII 2A	54	5270	6.12	7.05	6.62	7.55	10.12		Pass
	U-INII ZA	62	5310	5.27	6.47	5.77	6.97	9.42		Pass
802.11n		102	5510	6.54	6.99	7.04	7.49	10.28	24	Pass
(HT40)	U-NII 2C	118	5590	7.24	6.90	7.74	7.40	10.58		Pass
	U-INII 2C	134	5670	7.75	10.27	8.25	10.77	12.70		Pass
		142	5710	8.02	8.44	8.52	8.94	11.75		Pass
	LI NIII 2	151	5755	8.49	6.03	8.99	6.53	10.94	30	Pass
	U-NII-3	159	5795	6.99	5.87	7.49	6.37	9.98	30	Pass



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Test	Band	CH No.	Freq	Reading	g (dBm)	Condu	cted Power	(dBm)	Limit	Dogult
Mode	Danu	CH NO.	(MHz)	Ant A	Ant B	Ant A	Ant B	MIMO	(dBm)	Result
		36	5180	6.60	5.31	7.10	5.81	9.51		Pass
	U-NII 1	40	5200	6.76	7.31	7.26	7.81	10.55		Pass
		48	5240	7.88	7.13	8.38	7.63	11.03		Pass
		52	5260	11.16	12.10	11.66	12.60	15.17		Pass
	U-NII 2A	56	5280	8.00	9.57	8.50	10.07	12.37		Pass
000 44		64	5320	7.63	9.21	8.13	9.71	12.00	24	Pass
802.11ac (VHT20)		100	5500	7.90	7.93	8.40	8.43	11.43		Pass
( 111120)	LI NIII OC	120	5600	10.58	9.98	11.08	10.48	13.80		Pass
	U-NII 2C	140	5700	13.19	12.70	13.69	13.20	16.46		Pass
		144	5720	12.32	12.43	12.82	12.93	15.89		Pass
	U-NII-3	149	5745	7.60	9.22	8.10	9.72	12.00		Pass
		157	5785	6.26	8.88	6.76	9.38	11.27	30	Pass
		165	5825	5.41	8.27	5.91	8.77	10.58		Pass
	U-NII-1	38	5190	5.68	7.33	6.18	7.83	10.09		Pass
		46	5230	8.18	7.11	8.68	7.61	11.19		Pass
	U-NII 2A	54	5270	10.30	8.14	10.80	8.64	12.86		Pass
	U-INII ZA	62	5310	8.59	6.76	9.09	7.26	11.28		Pass
802.11ac		102	5510	10.19	5.52	10.69	6.02	11.96	24	Pass
(VHT40)	U-NII 2C	118	5590	10.95	6.49	11.45	6.99	12.78		Pass
	U-INII 2C	134	5670	11.77	7.82	12.27	8.32	13.74		Pass
		142	5710	11.77	9.04	12.27	9.54	14.13		Pass
	U-NII-3	151	5755	10.21	6.09	10.71	6.59	12.13	- 30	Pass
	U-INII-3	159	5795	3.85	7.06	4.35	7.56	9.26	30	Pass
	U-NII-1	42	5210	1.40	2.98	1.90	3.48	5.77		Pass
	U-NII 2A	58	5290	3.52	7.23	4.02	7.73	9.27		Pass
802.11ac		106	5530	3.05	5.31	3.55	5.81	7.84	24	Pass
(VHT80)	U-NII 2C	122	5610	2.37	6.74	2.87	7.24	8.59		Pass
		138	5690	2.42	6.60	2.92	7.10	8.50		Pass
	U-NII-3	155	5775	4.56	3.13	5.06	3.63	7.41	30	Pass

#### Remark:

- 1) Output Peak Power = Reading Power + Cable loss+ Duty Cycle Correction Factor
- 2) Cable loss= 0.5dB. Duty cycle of test signal is > 98%, duty factor is not required, reference Section 7.4
- 3) Per KDB 662911, the conducted powers at Antenna A and Antenna B were first measured separately during MIMO transmission as shown in section above. The measured values were then summed in linear power units then converted back to dBm.

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#### 6.2 MPE Calculation

According to the formula S=  $\frac{PG}{4R^2\pi}$  , we can calculate S which is MPE.

Note:

- P (Watts) = Power Input to antenna =  $10^{-10}$  / 1000
- G (Antenna gain in numeric) = 10<sup>^</sup> (Antenna gain in dBi /10)
- R = distance to the center of radiation of antenna (in meter) = 20cm
- MPE limit =  $1 \text{mW/cm}^2$

#### For 2.4G Band:

The Max Conducted Peak Output Power is 23.22dBm(209.89mW) in channel 6;

The best case gain of the antenna is 3dBi. 3dB logarithmic terms convert to numeric result is nearly

So, S= 
$$\frac{PG}{4R^2\pi}$$
 =  $\frac{192.75 \times 1.995}{4 \times 400 \times 3.14}$  = 0.0833 mW/cm<sup>2</sup>

#### For 5G U-NII Band:

The Max Conducted Peak Output Power is 16.46dBm(44.26mW) in channel 160;

The best case gain of the antenna is 3dBi. 3dB logarithmic terms convert to numeric result is nearly

So, S= 
$$\frac{PG}{4R^2\pi} = \frac{44.26 \times 1.995}{4 \times 400 \times 3.14} = 0.0177 \text{ mW/cm}^2$$

The BT and the DTS modules cann't simultaneous transmitting at frequency 2.4GHz band, according to the KDB447498 D01 section 7.2 determine the device is exclusion from SAR test.

#### **EUT Constructional Details**

Refer to the < WC18R2211\_External Photos > & < WC18R2211\_Internal Photos>.

-- End of the Report--