



RF Exposure Evaluation

For

Shenzhen Four Seas Global Link Network Technology Co., Ltd

WiFi Extender

Test Model: CF-XR181

Additional Model No.: Please Refer to Page 6

Prepared for : Shenzhen Four Seas Global Link Network Technology Co., Ltd
Address : Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base,
Tenglong Road, Longhua District, Shenzhen, China

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,
Shajing Street, Baoan District, Shenzhen, 518000, China

Tel : (+86)755-82591330
Fax : (+86)755-82591332
Web : www.LCS-cert.com
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : March 14, 2025
Number of tested samples : 2
Sample No. : A250313083-1, A250313083-2
Serial number : Prototype
Date of Test : March 14, 2025 ~ March 26, 2025
Date of Report : March 27, 2025





RF Exposure Evaluation	
Report Reference No.	LCSA03135192EF
Date of Issue	March 27, 2025
Testing Laboratory Name	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China
Testing Location/ Procedure	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing method ☐
Applicant's Name	Shenzhen Four Seas Global Link Network Technology Co., Ltd
Address	Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China
Test Specification	
Standard	FCC KDB publication 447498 D01 General RF Exposure Guidance v06 FCC CFR 47 part1 1.1310 FCC CFR 47 part2 2.1091
Test Report Form No.	TRF-4-E-215 A/0
TRF Originator	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	Dated 2011-03
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Test Item Description.	
Trade Mark	N/A
Test Model	CF-XR181
Ratings	Please Refer to Page 6
Result	Positive

Compiled by:

Vera Deng/ Administrator

Supervised by:

Jack Liu/ Technique principal

Approved by:

Gavin Liang/ Manager





RF Exposure Evaluation

Test Report No. : LCSA03135192EF	<u>March 27, 2025</u> Date of issue
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EUT.....	: WiFi Extender
Test Model.....	: CF-XR181
Applicant.....	: Shenzhen Four Seas Global Link Network Technology Co., Ltd
Address.....	: Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: Shenzhen Four Seas Global Link Network Technology Co., Ltd
Address.....	: Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Factory.....	: Shenzhen Four Seas Global Link Network Technology Co., Ltd
Address.....	: Room 607-610, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China
Telephone.....	: /
Fax.....	: /

Test Result	Positive
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The test report merely corresponds to the test sample.

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





Revision History

Report Version	Issue Date	Revision Content	Revised By
000	March 27, 2025	Initial Issue	---





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1. Product Information

EUT	: WiFi Extender
Test Model	: CF-XR181
Additional Model No.	: CF-WR653AX, CF-WR631AX V2, CF-WR631AX V3, CF-E590AX, CF-E591AX, CF-E390AX, CF-E391AX, CF-E393AX, CF-E395AX
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested.
Ratings	: Input: 100-240V~, 50/60Hz, 0.2A, 10W
Hardware Version	: /
Software Version	: /
WIFI (2.4G Band)	:
Frequency Range	: 2412MHz~2462MHz
Channel Number	: 11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
Channel Spacing	: 5MHz
Modulation Type	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Antenna1: External Antenna, 2.85dBi (Max.) Antenna2: External Antenna, 2.85dBi (Max.)
WIFI (5.2G Band)	:
Frequency Range	: 5150MHz~5250MHz
Channel Number	: 4 channels for 20MHz bandwidth(5180MHz~5240MHz) 2 channels for 40MHz bandwidth(5190MHz~5230MHz) 1 channel for 80MHz bandwidth(5210MHz)
Modulation Type	: 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) IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Antenna3: External Antenna, 3.54dBi (Max.) Antenna4: External Antenna, 3.54dBi (Max.)
5.3G WLAN	:
Frequency Range	: 5250-5350MHz
Channel Number	: 4 Channels for 20MHz bandwidth(5260MHz-5320MHz) 2 channels for 40MHz bandwidth(5270MHz~5310MHz) 1 channel for 80MHz bandwidth(5290MHz)
Modulation Type	: 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) IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Antenna3: External Antenna, 3.54dBi (Max.)





Antenna4: External Antenna, 3.54dBi (Max.)

5.5G WLAN

Frequency Range : 5470-5725MHz

Channel Number : 11 Channels for 20MHz bandwidth(5500MHz-5700MHz)
5 Channels for 40MHz bandwidth(5510MHz-5670MHz)
2 Channels for 80MHz bandwidth (5530MHz, 5610MHz)

Modulation Type : 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)
IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)

Antenna Description : Antenna3: External Antenna, 3.54dBi (Max.)
Antenna4: External Antenna, 3.54dBi (Max.)

WIFI(5.8G Band)

Frequency Range : 5725MHz~5850MHz

Channel Number : 5 channels for 20MHz bandwidth(5745MHz~5825MHz)
2 channels for 40MHz bandwidth(5755MHz~5795MHz)
1 channel for 80MHz bandwidth(5775MHz)

Modulation Type : 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)
IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)

Antenna Description : Antenna3: External Antenna, 3.54dBi (Max.)
Antenna4: External Antenna, 3.54dBi (Max.)

Exposure category : General population/uncontrolled environment

EUT Type : Production Unit

Device Type : Mobile Device

Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.

2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.





3. Limit

3.1 Refer Evaluation Method

[ANSI C95.1-2019](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

[FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f ²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

4. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

5. Conducted Power

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted Power(dBm)	Ant 2 Max Conducted Power(dBm)
11B	1	2412	18.79	19.33
	6	2437	19.06	19.38
	11	2462	17.97	19.39
11G	1	2412	17.73	18.18
	6	2437	16.88	18.7



Shenzhen LCS Compliance Testing Laboratory Ltd.

Add: 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China

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	11	2462	17.5	18.55
11N20 SISO	1	2412	16.14	15.83
	6	2437	16.36	15.95
	11	2462	17.87	15.85
11N40 SISO	3	2422	15.69	14.42
	6	2437	15.82	14.61
	9	2452	15.91	14.6
11AX20 SISO	1	2412	18.79	19.33
	6	2437	19.06	19.38
	11	2462	17.97	19.39
11AX40 SISO	3	2422	17.73	18.18
	6	2437	16.88	18.7
	9	2452	17.5	18.55

[5.2G WIFI]

Mode	Channel	Frequency (MHz)	Ant 3 Max Conducted Power(dBm)	Ant 4 Max Conducted Power(dBm)
11A	36	5180	16.36	17.13
	40	5200	15.79	16.56
	48	5240	15.59	16.38
11N20 SISO	36	5180	17	16.93
	40	5200	16.51	16.41
	48	5240	16.78	16.18
11N40 SISO	38	5190	19.19	18.63
	46	5230	17.76	18.19
11AC20 SISO	36	5180	16.57	16.88
	40	5200	16.64	16.35
	48	5240	16.72	16.16
11AC40 SISO	38	5190	19.14	18.53
	46	5230	17.75	18.2
11AC80 SISO	42	5210	18.09	18.11
11AX20 SISO	36	5180	17.86	17.34
	40	5200	17.35	16.78
	48	5240	17.17	16.61
11AX40 SISO	38	5190	19.54	18.94
	46	5230	18.08	18.56
11AX80 SISO	42	5210	17.92	18.22





[5.3G WIFI]

Mode	Channel	Frequency (MHz)	Ant 3 Max Conducted Power(dBm)	Ant 4 Max Conducted Power(dBm)
11A	52	5260	17.47	16.46
	60	5280	16.91	15.89
	64	5320	16.50	16.39
11N20 SISO	52	5260	16.23	16.31
	60	5280	16.68	16.69
	64	5320	16.39	16.29
11N40 SISO	54	5270	15.85	15.75
	62	5310	15.21	15.13
11AC20 SISO	52	5260	16.23	16.20
	60	5280	16.69	16.64
	64	5320	16.36	16.30
11AC40 SISO	54	5270	15.77	15.68
	62	5310	15.19	15.09
11AC80 SISO	58	5290	15.10	15.27
11AX20 SISO	52	5260	16.70	16.69
	60	5280	16.18	16.10
	64	5320	16.75	16.76
11AX40 SISO	54	5270	15.14	15.05
	62	5310	14.52	14.43
11AX80 SISO	58	5290	14.15	14.01

[5.5G WIFI]

Mode	Channel	Frequency (MHz)	Ant 3 Max Conducted Power(dBm)	Ant 4 Max Conducted Power(dBm)
11A	100	5500	16.64	15.87
	116	5580	17.11	16.89
	140	5700	17.42	17.18
11N20 SISO	100	5500	17.06	16.58
	116	5580	16.95	16.56
	140	5700	16.46	17.02
11N40 SISO	102	5510	15.18	15.59
	110	5550	15.47	15.76
	134	5670	15.58	15.94
11AC20 SISO	100	5500	16.18	16.56
	116	5580	16.20	16.56
	140	5700	16.33	16.95
11AC40 SISO	102	5510	15.18	16.68
	110	5550	15.48	16.79



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	134	5670	15.57	15.00
11AC80 SISO	106	5530	14.01	14.79
	122	5610	14.09	14.15
11AX20 SISO	100	5500	16.62	17.04
	116	5580	16.71	16.25
	140	5700	16.76	16.42
11AX40 SISO	102	5510	15.61	15.02
	110	5550	15.79	15.11
	134	5670	15.93	15.26
11AX80 SISO	106	5530	14.29	14.99
	122	5610	14.00	14.13

[5.8G WIFI]

Mode	Channel	Frequency (MHz)	Ant 3 Max Conducted Power(dBm)	Ant 4 Max Conducted Power(dBm)
11A	149	5745	15.82	17.50
	157	5785	16.20	17.07
	165	5825	16.82	16.85
11N20 SISO	149	5745	16.48	16.54
	157	5785	16.08	16.12
	165	5825	15.85	15.86
11N40 SISO	151	5755	18.53	18.50
	159	5795	17.79	17.81
11AC20 SISO	149	5745	16.48	16.55
	157	5785	16.08	16.10
	165	5825	15.83	15.87
11AC40 SISO	151	5755	18.42	18.48
	159	5795	18.62	17.77
11AC80 SISO	155	5775	17.99	18.09
11AX20 SISO	149	5745	16.97	17.02
	157	5785	16.60	16.60
	165	5825	16.32	16.34
11AX40 SISO	151	5755	18.83	18.83
	159	5795	18.98	18.11
11AX80 SISO	155	5775	18.22	17.35

6. Manufacturing Tolerance

[2.4G WIFI Ant1]

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	18.0	19.0	17.0
Tolerance ±(dB)	1.0	1.0	1.0
11G (Peak)			





Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	17.0	16.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	16.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[2.4G WIFI Ant2]

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	19.0	19.0	19.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	18.0	18.0	18.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	14.0	14.0	14.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[5.2G WIFI Ant3]

11A(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	19.0	17.0	
Tolerance $\pm$ (dB)	1.0	1.0	





11AC20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	16.0	16.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channe 38	Channel 46	
Target (dBm)	19.0	17.0	
Tolerance ±(dB)	1.0	1.0	
11AC80(Average)			
Channel	Channel 42		
Target (dBm)	18.0		
Tolerance ±(dB)	1.0		
11AX20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	17.0	17.0	17.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channe 38	Channel 46	
Target (dBm)	19.0	18.0	
Tolerance ±(dB)	1.0	1.0	
11AX80(Average)			
Channel	Channel 42		
Target (dBm)	17.0		
Tolerance ±(dB)	1.0		

[5.2G WIFI Ant4]

11A(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	18.0	18.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(Average)			





Channel	Channe 38		Channel 46	
Target (dBm)	18.0		18.0	
Tolerance ±(dB)	1.0		1.0	
11AC80(Average)				
Channel	Channel 42			
Target (dBm)	18.0			
Tolerance ±(dB)	1.0			
11AX20(Average)				
Channel	Channel 36	Channel 40		Channel 48
Target (dBm)	17.0	16.0		16.0
Tolerance ±(dB)	1.0	1.0		1.0
11AX40(Average)				
Channel	Channe 38		Channel 46	
Target (dBm)	18.0		18.0	
Tolerance ±(dB)	1.0		1.0	
11AX80(Average)				
Channel	Channel 42			
Target (dBm)	18.0			
Tolerance ±(dB)	1.0			

[5.3G WIFI Ant3]

11A (AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	15.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	15.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC VHT80 (Average)			
Channel	Channel 58		





Target (dBm)	15.0		
Tolerance ± (dB)	1.0		
11AX20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	14.0	
Tolerance ±(dB)	1.0	1.0	
11AX80 (Average)			
Channel	Channel 58		
Target (dBm)	15.0		
Tolerance ± (dB)	1.0		

[5.3G WIFI Ant4]

11A (AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	15.0	16.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	15.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	15.0	
Tolerance ±(dB)	1.0	1.0	
11AC VHT80 (Average)			
Channel	Channel 58		
Target (dBm)	15.0		
Tolerance ± (dB)	1.0		
11AX20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	16.0	16.0	16.0





Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	15.0	14.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX80 (Average)			
Channel	Channel 58		
Target (dBm)	14.0		
Tolerance $\pm$ (dB)	1.0		

[5.5G WIFI Ant3]

11A (AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	16.0	17.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	16.	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC VHT80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	14.0	14.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0





11AX80 (Average)		
Channel	Channel 106	Channel 122
Target (dBm)	14.0	14.0
Tolerance $\pm$ (dB)	1.0	1.0

[5.5G WIFI Ant4]

11A (AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	15.0	16.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	16.0	16.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC VHT80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	14.0	14.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	14.0	14.0	
Tolerance $\pm$ (dB)	1.0	1.0	





[5.8G WIFI Ant3]

11A (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	15.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	17.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	18.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC80(Average)			
Channel	Channel 155		
Target (dBm)	17.0		
Tolerance $\pm$ (dB)	1.0		
11AX20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	18.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX80(Average)			
Channel	Channel 155		
Target (dBm)	18.0		
Tolerance $\pm$ (dB)	1.0		

[5.8G WIFI Ant4]

11A (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	17.0	17.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0





11N20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	17.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	17.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC80(Average)			
Channel	Channel 155		
Target (dBm)	18.0		
Tolerance $\pm$ (dB)	1.0		
11AX20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	17.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	18.0	18.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX80(Average)			
Channel	Channel 155		
Target (dBm)	17.0		
Tolerance $\pm$ (dB)	1.0		





7. Measurement Results

7.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r = 20\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[2.4G WIFI Ant1]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11b	20.0	100.0000	2.85	1.9275	0.0383	1.0000
IEEE 802.11g	18.0	63.0957	2.85	1.9275	0.0242	1.0000
IEEE 802.11n HT20	18.0	63.0957	2.85	1.9275	0.0242	1.0000
IEEE 802.11n HT40	16.0	39.8107	2.85	1.9275	0.0153	1.0000

[2.4G WIFI Ant2]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11b	20.0	100.0000	2.85	1.9275	0.0383	1.0000
IEEE 802.11g	19.0	79.4328	2.85	1.9275	0.0305	1.0000
IEEE 802.11n HT20	16.0	39.8107	2.85	1.9275	0.0153	1.0000
IEEE 802.11n HT40	15.0	31.6228	2.85	1.9275	0.0121	1.0000

[5.2G WIFI Ant3]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT40	20.0	100.0000	3.54	2.2594	0.0450	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	20.0	100.0000	3.54	2.2594	0.0450	1.0000
IEEE 802.11ac VHT80	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11ax HEW40	20.0	100.0000	3.54	2.2594	0.0450	1.0000
IEEE 802.11ax HEW80	18.0	63.0957	3.54	2.2594	0.0284	1.0000

[5.2G WIFI Ant4]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000





IEEE 802.11ac VHT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT80	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11ax HEW40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW80	19.0	79.4328	3.54	2.2594	0.0357	1.0000

[5.3G WIFI Ant3]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT80	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW80	16.0	39.8107	3.54	2.2594	0.0179	1.0000

[5.3G WIFI Ant4]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT80	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW80	15.0	31.6228	3.54	2.2594	0.0142	1.0000

[5.5G WIFI Ant3]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	3.54	2.2594	0.0142	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	3.54	2.2594	0.0225	1.0000





IEEE 802.11ax HEW40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW80	15.0	31.6228	3.54	2.2594	0.0142	1.0000

[5.5G WIFI Ant4]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	3.54	2.2594	0.0142	1.0000
IEEE 802.11ax HEW20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	3.54	2.2594	0.0179	1.0000
IEEE 802.11ax HEW80	15.0	31.6228	3.54	2.2594	0.0142	1.0000

[5.8G WIFI Ant3]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT80	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ax HEW40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW80	19.0	79.4328	3.54	2.2594	0.0357	1.0000

[5.8G WIFI Ant4]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11a	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11n HT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11n HT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	3.54	2.2594	0.0225	1.0000
IEEE 802.11ac VHT40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ac VHT80	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW20	18.0	63.0957	3.54	2.2594	0.0284	1.0000
IEEE 802.11ax HEW40	19.0	79.4328	3.54	2.2594	0.0357	1.0000
IEEE 802.11ax HEW80	18.0	63.0957	3.54	2.2594	0.0284	1.0000



**Remark:**

1. Output power including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.

7.2 Simultaneous Transmission MPE Evaluation

The EUT equipped with two 2.4GWIFI antenna, another two 5GWIFI antenna. So need consider simultaneous transmission

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\sum \sum$ of MPE ratios ≤ 1.0

<the worst simultaneous transmission operations result>

MAX				$\sum$ MPE ratios	Limit	Results
2.4GWIFI Ant1	2.4GWIFI Ant2	5GWIFI Ant3	5GWIFI Ant4			
0.0383	0.0383	0.0450	0.0357	0.1573	1.0	Pass

Remark:

1. Output power including tune-up tolerance;
2. 2.4G WIFI output power is burst peak power;
3. 5G WIFI output power is burst average power;
4. MPE evaluate distance is 20cm from user manual provide by manufacturer;
5. MPE values = $PG/4\pi R^2$

8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

9. Measurement Uncertainty

2.4GWIFI/5GWIFI:

Test Item		Frequency Range	Uncertainty	Note
Output power	:	1GHz-40GHz	$\pm 0.57\text{dB}$	(1)

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

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

