

**Maximum Permissible Exposure Report****1. Product Information**

Applicant	: Shenzhen SEI Robotics Co., Ltd.
Address	: 12F, Kangtai Innovation Plaza Building A, No. 222 Kefa Road, Yue Hai Sub-district, Nanshan District, Shenzhen, China 518054
EUT	: GPON Router
Test Model	: SG1696D2VR (SG401C)
Additional Model No.	: SG401CX (X:A-Z)
Model Declaration	: PCB board, structure and internal of these model(s) are the same, The only difference is that the external ports are different, so a difference test is performed
Power Supply	: Input: 12.0V $\pm$ 1.5A For AC Adapter Input: 100-240V~, 50/60Hz, 0.5A Adapter Output: 12.0V $\pm$ 1.5A, 18.0W
Hardware Version	: V0.01
Software Version	: V1.1.0.7
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) IEEE 802.11ax: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: Antenna 1: Internal Antenna, 3.52dBi(Max.) Antenna 2: Internal Antenna, 5.42dBi(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	: Antenna 3: Internal Antenna, 5.24dBi(Max.) Antenna 4: Internal Antenna, 5.19dBi(Max.)
5.3G WLAN	:
Frequency Range	: 5250-5350MHz



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Channel Number	: 4 Channels for 20MHz bandwidth(5260MHz-5320MHz) 2 channels for 40MHz bandwidth(5270MHz~5310MHz) 1 channel for 80MHz bandwidth(5290MHz) 1 channel for 160MHz bandwidth(5250MHz)
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	: Antenna 3: Internal Antenna, 5.24dBi(Max.) Antenna 4: Internal Antenna, 5.19dBi(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) 1 channel for 160MHz bandwidth(5570MHz)
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	: Antenna 3: Internal Antenna, 5.24dBi(Max.) Antenna 4: Internal Antenna, 5.19dBi(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	: Antenna 3: Internal Antenna, 5.24dBi(Max.) Antenna 4: Internal Antenna, 5.19dBi(Max.)
Exposure category	: General population/uncontrolled environment
EUT Type	: Production Unit
Device Type	: Mobile Device



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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



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

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

6. Conducted Power

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted Power(dBm)	Ant 2 Max Conducted Power(dBm)
11B	1	2412	18.62	17.64
	6	2437	18.54	17.5
	11	2462	18.18	17.2
11G	1	2412	17.71	16.61
	6	2437	17.53	16.66
	11	2462	17.25	16.33
11N20 SISO	1	2412	16.94	15.92
	6	2437	16.93	15.86
	11	2462	16.26	15.5
11N40 SISO	3	2422	16.28	15.51
	6	2437	16.85	15.09
	9	2452	16.32	15.36
11AX20 SISO	1	2412	16.63	15.75
	6	2437	16.72	15.92
	11	2462	16.34	15.45
11AX40 SISO	3	2422	16.34	15.41
	6	2437	16.8	15.1
	9	2452	16.18	15.29

[5.2G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted Power(dBm)	Ant 2 Max Conducted Power(dBm)
11A	36	5180	16.87	16.96
	40	5200	16.76	17.15
	48	5240	15.26	15.55
11N20 SISO	36	5180	15.88	16.63
	40	5200	15.88	15.96
	48	5240	15.36	15.92
11N40 SISO	38	5190	15.94	15.31
	46	5230	15.13	15.82
11AC20 SISO	36	5180	15.79	15.42



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	40	5200	15.65	15.18
	48	5240	15.26	15.81
11AC40 SISO	38	5190	15.71	15.28
	46	5230	15.48	15.88
11AC80 SISO	42	5210	14.89	15.36
11AX20 SISO	36	5180	17.26	16.01
	40	5200	17.09	15.22
	48	5240	15.28	15.54
11AX40 SISO	38	5190	15.70	14.72
	46	5230	15.33	14.27
11AX80 SISO	42	5210	15.03	13.90

[5.3G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted Power(dBm)	Ant 2 Max Conducted Power(dBm)
11A	52	5260	13.03	11.8
	60	5280	12.97	11.14
	64	5320	12.97	11.52
11N20 SISO	52	5260	11.77	10.91
	60	5280	11.49	10.34
	64	5320	11.28	10.74
11N40 SISO	54	5270	10.92	9.7
	62	5310	10.1	10.6
11AC20 SISO	52	5260	11.31	10.93
	60	5280	11.91	10.41
	64	5320	11.67	10.76
11AC40 SISO	54	5270	10.94	9.69
	62	5310	11.76	9.52
11AC80 SISO	58	5290	10	9.2
11AX20 SISO	52	5260	11.99	11.11
	60	5280	11.5	10.46
	64	5320	11.8	10.77
11AX40 SISO	54	5270	10.82	9.7
	62	5310	10.51	9.49
11AX80 SISO	58	5290	10.19	9.27
11AC160 SISO	50	5250	14.54	14.49
11AX160 SISO	50	5250	15.27	15.25

[5.5G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted	Ant 2 Max Conducted
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			Power(dBm)	Power(dBm)
11A	100	5500	12.6	11.63
	116	5580	13.04	11.83
	140	5700	12.98	11.75
11N20 SISO	100	5500	12.01	10.8
	116	5580	11.43	10.07
	140	5700	11.3	9.91
11N40 SISO	102	5510	10.76	9.22
	110	5550	10.91	9.42
	134	5670	11.09	9.7
11AC20 SISO	100	5500	11.9	10.79
	116	5580	11.39	9.96
	140	5700	11.34	10
11AC40 SISO	102	5510	10.63	9.25
	110	5550	11.07	9.55
	134	5670	10.84	9.6
11AC80 SISO	106	5530	9.54	8.36
	122	5610	9.79	8.8
11AX20 SISO	100	5500	11.87	10.78
	116	5580	11.42	9.98
	140	5700	11.35	9.96
11AX40 SISO	102	5510	10.66	9.25
	110	5550	11.06	9.51
	134	5670	10.84	9.65
11AX80 SISO	106	5530	9.59	8.47
	122	5610	9.81	8.79
11AC160 SISO	114	5570	9.4	8.5
11AX160 SISO	114	5570	9.11	8.45

[5.8G WIFI]

Mode	Channel	Frequency (MHz)	Ant 1 Max Conducted Power(dBm)	Ant 2 Max Conducted Power(dBm)
11A	149	5745	16.73	16.75
	157	5785	15.92	15.88
	165	5825	15.53	15.54
11N20 SISO	149	5745	16.20	16.14
	157	5785	16.15	16.20
	165	5825	15.80	15.83
11N40 SISO	151	5755	16.93	15.60
	159	5795	15.95	15.62
11AC20 SISO	149	5745	16.99	16.19



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	157	5785	16.12	16.23
	165	5825	15.78	15.83
11AC40 SISO	151	5755	16.86	15.66
	159	5795	15.92	15.53
11AC80 SISO	155	5775	14.77	14.91
11AX20 SISO	149	5745	15.74	15.79
	157	5785	16.22	16.09
	165	5825	15.90	15.64
11AX40 SISO	151	5755	15.72	15.71
	159	5795	15.79	15.67
11AX80 SISO	155	5775	14.79	14.00

7. Manufacturing Tolerance

[2.4G WIFI Ant1]

11B (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
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	17.0	17.0	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	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX20(Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	16.0	16.0	16.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0

[2.4G WIFI Ant2]

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11



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Target (dBm)	17.0	17.0	17.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	16.0	16.0
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)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX20(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
11AX40(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

[5.2G WIFI Ant3]

11A(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	15.0	15.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	15.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channel 38	Channel 46	



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Target (dBm)	15.0		15.0
Tolerance ±(dB)	1.0		1.0
11AC80(Average)			
Channel	Channel 42		
Target (dBm)	14.0		
Tolerance ±(dB)	1.0		
11AX20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	17.0	17.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channel 38		Channel 46
Target (dBm)	15.0		15.0
Tolerance ±(dB)	1.0		1.0
11AX80(Average)			
Channel	Channel 42		
Target (dBm)	15.0		
Tolerance ±(dB)	1.0		
11AC160(Average)			
Channel	Channel 50		
Target (dBm)	14.0		
Tolerance ±(dB)	1.0		

[5.2G WIFI Ant4]

11A(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	17.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	16.0	15.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	15.0	15.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	15.0	15.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channel 38	Channel 46	



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Target (dBm)	15.0		15.0
Tolerance $\pm$ (dB)	1.0		1.0
11AC80(Average)			
Channel	Channel 42		
Target (dBm)	15.0		
Tolerance $\pm$ (dB)	1.0		
11AX20(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
11AX40(Average)			
Channel	Channel 38		Channel 46
Target (dBm)	14.0		14.0
Tolerance $\pm$ (dB)	1.0		1.0
11AX80(Average)			
Channel	Channel 42		
Target (dBm)	13.0		
Tolerance $\pm$ (dB)	1.0		
11AC160(Average)			
Channel	Channel 50		
Target (dBm)	14.0		
Tolerance $\pm$ (dB)	1.0		

[5.3G WIFI Ant3]

11A (AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	13.0	12.0	12.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 54	Channel 62	
Target (dBm)	10.0	10.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 54	Channel 62	



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Target (dBm)	10.0		11.0
Tolerance ±(dB)	1.0		1.0
11AC VHT80 (Average)			
Channel	Channel 58		
Target (dBm)	10.0		
Tolerance ± (dB)	1.0		
11AX20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 54		Channel 62
Target (dBm)	10.0		10.0
Tolerance ±(dB)	1.0		1.0
11AX80 (Average)			
Channel	Channel 58		
Target (dBm)	10.0		
Tolerance ± (dB)	1.0		
11AC160 (Average)			
Channel	Channel 50		
Target (dBm)	14.0		
Tolerance ± (dB)	1.0		
11AX160 (Average)			
Channel	Channel 50		
Target (dBm)	15.0		
Tolerance ± (dB)	1.0		

[5.3G WIFI Ant4]

11A (AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	11.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	10.0	10.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 54		Channel 62
Target (dBm)	9.0		10.0
Tolerance ±(dB)	1.0		1.0
11AC20(AVG)			
Channel	Channel 52	Channel 60	Channel 64



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Target (dBm)	10.0	10.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 54		Channel 62
Target (dBm)	9.0		9.0
Tolerance ±(dB)	1.0		1.0
11AC VHT80 (Average)			
Channel	Channel 58		
Target (dBm)	9.0		
Tolerance ± (dB)	1.0		
11AX20(AVG)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	10.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 54		Channel 62
Target (dBm)	9.0		9.0
Tolerance ±(dB)	1.0		1.0
11AX80 (Average)			
Channel	Channel 58		
Target (dBm)	9.0		
Tolerance ± (dB)	1.0		
11AC160 (Average)			
Channel	Channel 50		
Target (dBm)	14.0		
Tolerance ± (dB)	1.0		
11AX160 (Average)			
Channel	Channel 50		
Target (dBm)	15.0		
Tolerance ± (dB)	1.0		

[5.5G WIFI Ant3]

11A (AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	12.0	13.0	12.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	12.0	11.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 102	Channel 110	Channel 134



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Target (dBm)	10.0	10.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	11.0	11.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	10.0	11.0	10.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC VHT80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	9.0	9.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	11.0	11.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	10.0	11.0	10.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	9.0	9.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC160 (Average)			
Channel	Channel 114		
Target (dBm)	9.0		
Tolerance $\pm$ (dB)	1.0		
11AX160 (Average)			
Channel	Channel 114		
Target (dBm)	9.0		
Tolerance $\pm$ (dB)	1.0		

[5.5G WIFI Ant4]

11A (AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	11.0	11.0	11.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 100	Channel 116	Channel 140



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Target (dBm)	10.0	10.0	9.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	9.0	9.0	9.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	10.0	9.0	10.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	9.0	9.0	9.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AC VHT80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	8.0	8.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX20(AVG)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	10.0	9.0	9.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(AVG)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	9.0	9.0	9.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX80 (Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	8.0	8.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC160 (Average)			
Channel	Channel 114		
Target (dBm)	8.0		
Tolerance $\pm$ (dB)	1.0		
11AX160 (Average)			
Channel	Channel 114		
Target (dBm)	8.0		
Tolerance $\pm$ (dB)	1.0		

[5.8G WIFI Ant3]

11A (Average)			
Channel	Channel 149	Channel 157	Channel 165



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Target (dBm)	16.0	15.0	15.0
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)	16.0	15.0	
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)	16.0	15.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AC80(Average)			
Channel	Channel 155		
Target (dBm)	14.0		
Tolerance $\pm$ (dB)	1.0		
11AX20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	15.0	16.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	15.0	15.0	
Tolerance $\pm$ (dB)	1.0	1.0	
11AX80(Average)			
Channel	Channel 155		
Target (dBm)	14.0		
Tolerance $\pm$ (dB)	1.0		

[5.8G WIFI Ant4]

11A (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	15.0	15.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0
11N20(Average)			
Channel	Channel 149	Channel 157	Channel 165



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Target (dBm)	16.0	16.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(Average)			
Channel	Channel 151		Channel 159
Target (dBm)	15.0		15.0
Tolerance ±(dB)	1.0		1.0
11AC20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	16.0	16.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(Average)			
Channel	Channe151		Channel 159
Target (dBm)	15.0		15.0
Tolerance ±(dB)	1.0		1.0
11AC80(Average)			
Channel	Channel 155		
Target (dBm)	14.0		
Tolerance ±(dB)	1.0		
11AX20(Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	15.0	16.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11AX40(Average)			
Channel	Channe151		Channel 159
Target (dBm)	15.0		15.0
Tolerance ±(dB)	1.0		1.0
11AX80(Average)			
Channel	Channel 155		
Target (dBm)	14.0		
Tolerance ±(dB)	1.0		

8. Measurement Results

8.1 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	19.0	79.4328	3.52	2.2491	0.0355	1.0000
IEEE 802.11g	18.0	63.0957	3.52	2.2491	0.0282	1.0000



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IEEE 802.11n HT20	17.0	50.1187	3.52	2.2491	0.0224	1.0000
IEEE 802.11n HT40	17.0	50.1187	3.52	2.2491	0.0224	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	3.52	2.2491	0.0224	1.0000
IEEE 802.11ax HEW40	17.0	50.1187	3.52	2.2491	0.0224	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	18.0	63.0957	5.42	3.4834	0.0437	1.0000
IEEE 802.11g	17.0	50.1187	5.42	3.4834	0.0347	1.0000
IEEE 802.11n HT20	16.0	39.8107	5.42	3.4834	0.0276	1.0000
IEEE 802.11n HT40	16.0	39.8107	5.42	3.4834	0.0276	1.0000
IEEE 802.11ax HEW20	16.0	39.8107	5.42	3.4834	0.0276	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	5.42	3.4834	0.0276	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	5.24	3.3420	0.0333	1.0000
IEEE 802.11n HT20	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11n HT40	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11ac VHT20	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	5.24	3.3420	0.0210	1.0000
IEEE 802.11ax HEW20	18.0	63.0957	5.24	3.3420	0.0419	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11ax HEW80	16.0	39.8107	5.24	3.3420	0.0265	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	5.19	3.3037	0.0415	1.0000
IEEE 802.11n HT20	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11n HT40	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ac VHT20	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	5.19	3.3037	0.0208	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11ax HEW40	15.0	31.6228	5.19	3.3037	0.0208	1.0000
IEEE 802.11ax HEW80	14.0	25.1189	5.19	3.3037	0.0165	1.0000



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[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	14.0	25.1189	5.24	3.3420	0.0167	1.0000
IEEE 802.11n HT20	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11n HT40	11.0	12.5893	5.24	3.3420	0.0084	1.0000
IEEE 802.11ac VHT20	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ac VHT40	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ac VHT80	11.0	12.5893	5.24	3.3420	0.0084	1.0000
IEEE 802.11ax HEW20	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ax HEW40	11.0	12.5893	5.24	3.3420	0.0084	1.0000
IEEE 802.11ax HEW80	11.0	12.5893	5.24	3.3420	0.0084	1.0000
IEEE 802.11ac VHT160	15.0	31.6228	5.24	3.3420	0.0210	1.0000
IEEE 802.11ax HEW160	16.0	39.8107	5.24	3.3420	0.0265	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	12.0	15.8489	5.19	3.3037	0.0104	1.0000
IEEE 802.11n HT20	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11n HT40	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11ac VHT20	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11ac VHT40	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ac VHT80	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ax HEW20	12.0	15.8489	5.19	3.3037	0.0104	1.0000
IEEE 802.11ax HEW40	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ax HEW80	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ac VHT160	15.0	31.6228	5.19	3.3037	0.0208	1.0000
IEEE 802.11ax HEW160	16.0	39.8107	5.19	3.3037	0.0262	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	14.0	25.1189	5.24	3.3420	0.0167	1.0000
IEEE 802.11n HT20	13.0	19.9526	5.24	3.3420	0.0133	1.0000
IEEE 802.11n HT40	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ac VHT20	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ac VHT40	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ac VHT80	10.0	10.0000	5.24	3.3420	0.0066	1.0000
IEEE 802.11ax HEW20	12.0	15.8489	5.24	3.3420	0.0105	1.0000
IEEE 802.11ax HEW40	12.0	15.8489	5.24	3.3420	0.0105	1.0000



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IEEE 802.11ax HEW80	10.0	10.0000	5.24	3.3420	0.0066	1.0000
IEEE 802.11ac VHT160	10.0	10.0000	5.24	3.3420	0.0066	1.0000
IEEE 802.11ax HEW160	10.0	10.0000	5.24	3.3420	0.0066	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	12.0	15.8489	5.19	3.3037	0.0104	1.0000
IEEE 802.11n HT20	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11n HT40	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ac VHT20	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11ac VHT40	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ac VHT80	9.0	7.9433	5.19	3.3037	0.0052	1.0000
IEEE 802.11ax HEW20	11.0	12.5893	5.19	3.3037	0.0083	1.0000
IEEE 802.11ax HEW40	10.0	10.0000	5.19	3.3037	0.0066	1.0000
IEEE 802.11ax HEW80	9.0	7.9433	5.19	3.3037	0.0052	1.0000
IEEE 802.11ac VHT160	9.0	7.9433	5.19	3.3037	0.0052	1.0000
IEEE 802.11ax HEW160	9.0	7.9433	5.19	3.3037	0.0052	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	5.24	3.3420	0.0333	1.0000
IEEE 802.11n HT20	17.0	50.1187	5.24	3.3420	0.0333	1.0000
IEEE 802.11n HT40	17.0	50.1187	5.24	3.3420	0.0333	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	5.24	3.3420	0.0333	1.0000
IEEE 802.11ac VHT40	17.0	50.1187	5.24	3.3420	0.0333	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	5.24	3.3420	0.0210	1.0000
IEEE 802.11ax HEW20	17.0	50.1187	5.24	3.3420	0.0333	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	5.24	3.3420	0.0265	1.0000
IEEE 802.11ax HEW80	15.0	31.6228	5.24	3.3420	0.0210	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	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11n HT20	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11n HT40	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ac VHT20	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11ac VHT40	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ac VHT80	15.0	31.6228	5.19	3.3037	0.0208	1.0000



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IEEE 802.11ax HEW20	17.0	50.1187	5.19	3.3037	0.0329	1.0000
IEEE 802.11ax HEW40	16.0	39.8107	5.19	3.3037	0.0262	1.0000
IEEE 802.11ax HEW80	15.0	31.6228	5.19	3.3037	0.0208	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.

8.2 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	5GWIFI			
0.0437	0.0419	0.0856	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 = $PG/4\pi R^2$

9. Conclusion

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

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



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