Maximum Permissible Exposure Report

1. Product Information

FCC ID	:	2AO5F-9000N
EUT	:	NETWORK PLAYER
Test Model	:	9000N
Power Supply	:	Input: 100-120V~, 50/60Hz, 40W
Hardware Version	:	/
Software Version	:	/
WIFI(2.4G Band)		
Frequency Range	:	2412MHz~2462MHz
Channel Spacing	:	5MHz
Channel Number	:	11 Channels for 20MHz bandwidth (2412~2462MHz) 7 Channels for 40MHz bandwidth (2422~2452MHz)
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	:	External Antenna, 3.6dBi(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 channels 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)
Antenna Description	:	External Antenna, 3.71dBi(Max.)
WIFI(5.3G Band)		
Frequency Range	:	5250MHz~5350MHz
Channel Number	:	4 Channels for 20MHz bandwidth(5260MHz~5320MHz) 2 channels for 40MHz bandwidth(5270MHz~5310MHz) 1 channels 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)
Antenna Description	:	External Antenna, 3.71dBi(Max.)
WIFI(5.5G Band)		
Frequency Range	:	5470MHz~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)
Antenna Description	:	External Antenna, 3.71dBi(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 channels 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)
Antenna Description	:	External Antenna, 3.71dBi(Max.)
Exposure category	:	General population/uncontrolled environment
EUT Type	:	Production Unit
Device Type	:	Mobile Devices

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/f2)*	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/f2)*	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. Antenna Information

EUT can only use antennas certificated as follows provided by manufacturer;

Internal/External Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Notes
External	External Antenna	2412MHz~2462MHz 5180MHz~5240MHz 5260MHz~5320MHz 5500MHz~5700MHz 5745MHz~5825MHz	2.4GWIFI: 3.6dBi(Max) 5.2GWIFI/5.3GWIFI/ 5.8GWIFI: 3.71dBi(Max)	WiFi Antenna

6. Conducted Power

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)
IEEE 802.11b	1	2412	14.07
	6	2437	15.44
	11	2462	15.10
IEEE 802.11g	1	2412	14.30
	6	2437	15.57
	11	2462	15.14
IEEE 802.11n HT20	1	2412	14.21
	6	2437	14.18
	11	2462	14.77
IEEE 802.11n HT40	3	2422	13.52
	6	2437	13.31
	9	2452	12.88

[5.2G WIFI]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)
IEEE 802.11a	36	5180	13.37
	40	5200	13.32
	48	5240	12.42
IEEE 802.11n HT20	36	5180	13.18
	40	5200	13.15
	48	5240	12.79
IEEE 802.11n HT40	38	5190	13.73
	46	5230	12.80
IEEE 802.11ac VHT20	36	5180	12.92
	40	5200	13.34
	48	5240	12.97
IEEE 802.11ac VHT40	38	5190	12.56
	46	5230	12.64
IEEE 802.11ac VHT80	42	5210	11.72

[5.3G WIFI]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)
IEEE 802.11a	52	5260	12.70
	60	5300	12.69
	64	5320	12.60
IEEE 802.11n HT20	52	5260	11.44
	60	5300	13.67
	64	5320	12.01
IEEE 802.11n HT40	54	5270	12.54
	62	5310	12.63
IEEE 802.11ac VHT20	52	5260	12.59
	60	5300	13.33
	64	5320	13.51
IEEE 802.11ac VHT40	54	5270	11.49
	62	5310	12.93
IEEE 802.11ac VHT80	58	5290	12.02

[5.5G WIFI]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)
IEEE 802.11a	100	5500	11.82
	116	5580	12.50
	140	5700	12.54
IEEE 802.11n HT20	100	5500	11.32
	116	5580	11.62
	140	5700	12.19
IEEE 802.11n HT40	102	5510	10.65
	110	5550	11.14
	134	5670	11.10
IEEE 802.11ac VHT20	100	5500	10.39
	116	5580	11.02
	140	5700	11.10
IEEE 802.11ac VHT40	102	5510	11.17
	110	5550	10.83
	134	5670	11.53
IEEE 802.11ac VHT80	106	5530	11.42
	122	5610	10.17

[5.8G WIFI]

Mode	Channel	Frequency (MHz)	Max Conducted Power(dBm)
IEEE 802.11a	149	5745	12.04
	157	5785	11.96
	165	5825	11.65
IEEE 802.11n HT20	149	5745	11.80
	157	5785	12.16
	165	5825	11.91
IEEE 802.11n HT40	151	5755	10.79
	159	5795	11.29
IEEE 802.11ac VHT20	149	5745	12.35
	157	5785	11.50
	165	5825	11.56
IEEE 802.11ac VHT40	151	5755	11.42
	159	5795	11.22
IEEE 802.11ac VHT80	155	5775	9.36

7. Manufacturing Tolerance

[2.4G WLAN]

IEEE 802.11b(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	15.0	15.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11g(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	15.0	15.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n20(Peak)			
Channel	Channel 01	Channel 06	Channel 11
Target (dBm)	14.0	14.0	14.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n40(Peak)			
Channel	Channel 03	Channel 06	Channel 09
Target (dBm)	13.0	13.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0

[5.2G WLAN]

IEEE 802.11a (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	13.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	13.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	13.0	12.0	
Tolerance ± (dB)	1.0	1.0	
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	12.0	13.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 38	Channel 46	
Target (dBm)	12.0	12.0	
Tolerance ± (dB)	1.0	1.0	
IEEE 802.11ac VHT80(Average)			

Channel	Channel 42
Target (dBm)	11.0
Tolerance ± (dB)	1.0

[5.3GHz WLAN]

IEEE 802.11a (Average)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	12.0	12.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	11.0	13.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 54		Channel 62
Target (dBm)	12.0		12.0
Tolerance ± (dB)	1.0		1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 52	Channel 60	Channel 64
Target (dBm)	12.0	13.0	13.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 54		Channel 62
Target (dBm)	11.0		12.0
Tolerance ± (dB)	1.0		1.0
IEEE 802.11ac VHT80(Average)			
Channel	Channel 58		
Target (dBm)	12.0		
Tolerance ± (dB)	1.0		

[5.5GHz WLAN]

IEEE 802.11a (Average)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	11.0	12.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	11.0	11.0	12.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	10.0	11.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 100	Channel 116	Channel 140
Target (dBm)	10.0	11.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0

IEEE 802.11ac HT40 (Average)			
Channel	Channel 102	Channel 110	Channel 134
Target (dBm)	11.0	10.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT80(Average)			
Channel	Channel 106	Channel 122	
Target (dBm)	11.0	10.0	
Tolerance ± (dB)	1.0	1.0	

[5.8G WLAN]

IEEE 802.11a (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	12.0	11.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	11.0	12.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11n HT40 (Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	10.0	11.0	
Tolerance ± (dB)	1.0	1.0	
IEEE 802.11ac VHT20 (Average)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	12.0	11.0	11.0
Tolerance ± (dB)	1.0	1.0	1.0
IEEE 802.11ac VHT40 (Average)			
Channel	Channel 151	Channel 159	
Target (dBm)	11.0	11.0	
Tolerance ± (dB)	1.0	1.0	
IEEE 802.11ac VHT80(Average)			
Channel	Channel 155		
Target (dBm)	9.0		
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 =20cm, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[2.4GWLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11b	16.0	39.8107	3.6	2.2909	0.0181	1.0000
IEEE 802.11g	16.0	39.8107	3.6	2.2909	0.0181	1.0000
IEEE 802.11n HT20	15.0	31.6228	3.6	2.2909	0.0144	1.0000
IEEE 802.11n HT40	14.0	25.1189	3.6	2.2909	0.0114	1.0000

[5.2G WLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11n HT20	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11n HT40	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11ac VHT20	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11ac VHT40	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11ac VHT80	12.0	15.8489	3.71	2.3496	0.0074	1.0000

[5.3G WLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11n HT20	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11n HT40	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11ac VHT20	14.0	25.1189	3.71	2.3496	0.0117	1.0000
IEEE 802.11ac VHT40	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11ac VHT80	13.0	19.9526	3.71	2.3496	0.0093	1.0000

[5.5G WLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11n HT20	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11n HT40	12.0	15.8489	3.71	2.3496	0.0074	1.0000
IEEE 802.11ac VHT20	12.0	15.8489	3.71	2.3496	0.0074	1.0000
IEEE 802.11ac VHT40	12.0	15.8489	3.71	2.3496	0.0074	1.0000
IEEE 802.11ac VHT80	12.0	15.8489	3.71	2.3496	0.0074	1.0000

[5.8G WLAN]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11n HT20	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11n HT40	12.0	15.8489	3.71	2.3496	0.0074	1.0000
IEEE 802.11ac VHT20	13.0	19.9526	3.71	2.3496	0.0093	1.0000
IEEE 802.11ac VHT40	12.0	15.8489	3.71	2.3496	0.0074	1.0000
IEEE 802.11ac VHT80	10.0	10.0000	3.71	2.3496	0.0047	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 equiped with one antenna. So no need consider simultaneous transmission.

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----------