Maximum Permissible Exposure Report

1. Product Information

EUT	:	Network Media Player
Test Model	:	Pro One 8K
Additional Model No.	:	Pro One 8K Plus, Pro One 8K, Pro 8K, Pro 8K Plus, Pro Matrix 8K, Pro Cinema 8K, Solo 8K, Solo Matrix 8K, Solo Cinema 8K, Duo 8K, Duo Matrix 8K, Duo Cinema 8K, Max 8K, Max Matrix 8K, Max Cinema 8K, Ultra 8K, Ultra Matrix 8K, Ultra Cinema 8K
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	:	Input: DC 12V For Adapter Input: 100-240V~, 50/60Hz, 1.2A MAX For Adapter Output: 12.0V⎓3.0A
Hardware Version	:	/
Software Version	:	/
Bluetooth		
Frequency Range	:	2402MHz ~ 2480MHz
Channel Number	:	79 channels for Bluetooth V5.0(DSS)
Channel Spacing	:	1MHz for Bluetooth V5.0 (DSS)
Modulation Type	:	GFSK, π/4-DQPSK, 8-DPSK for Bluetooth V5.0(DSS)
Bluetooth Version	:	V5.0
Antenna Description	:	Ant0: External Antenna, 3.0dBi(Max.)
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	:	Ant0: External Antenna, 3.0dBi(Max.) Ant1: External Antenna, 3.0dBi(Max.)
WIFI(5.2G Band)		
Frequency Range	:	5180MHz~5240MHz
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	:	Ant0: External Antenna, 3.0dBi(Max.)

		Ant1: External Antenna, 3.0dBi(Max.)
WIFI(5.8G Band)		
Frequency Range	:	5745MHz-5825MHz
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	:	Ant0: External Antenna, 3.0dBi(Max.) Ant1: External Antenna, 3.0dBi(Max.)
Exposure category	:	General population/uncontrolled environment
EUT Type	:	Production Unit
Device Type	:	Mobile Device

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/cm²)	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/cm²)	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. 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	2400-2500MHz 5000-5800MHZ	3.0dBi	BT/WIFI Antenna 0
	External Antenna	2400-2500MHz 5000-5800MHZ	3.0dBi	WIFI Antenna 1

6. Conducted Power

[BT]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
GFSK	0	2402	-3.9
	39	2441	-1.43
	78	2480	-2.8
π/4-DQPSK	0	2402	-1.95
	39	2441	0.42
	78	2480	-0.99
8DPSK	0	2402	-1.42
	19	2441	0.89
	39	2480	-0.6

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Ant 0 Peak Conducted Output Power (dBm)	Ant 1 Peak Conducted Output Power (dBm)
11B	1	2412	16.07	14.96
	6	2437	16.31	15.34
	11	2462	15.28	13.83
11G	1	2412	14.6	14.52
	6	2437	14.4	14.34
	11	2462	12.58	13.44
11N20 SISO	1	2412	14.06	14.94
	6	2437	13.9	14.89
	11	2462	13.32	13.81
11N40 SISO	3	2422	13.64	13.46
	6	2437	12.81	12.8
	9	2452	13.92	13.75

[2.4G WIFI]

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)
11N20 MIMO	1	2412	17.53
	6	2437	17.43
	11	2462	16.58
11N40 MIMO	3	2422	16.56
	6	2437	15.82
	9	2452	16.85

[5.2G WIFI]

Mode	Channel	Frequency (MHz)	Ant 0 Average Conducted Output Power (dBm)	Ant 1 Average Conducted Output Power (dBm)
11A	36	5180	13.15	12.86
	40	5200	12.46	12.57
	48	5240	10.94	10.79
11N20 SISO	36	5180	13.39	13.2
	40	5200	12.66	12.94
	48	5240	11.35	11.19
11N40 SISO	38	5190	12.79	12.86
	46	5230	11.34	11.36
11AC20 SISO	36	5180	13.24	13.08
	40	5200	12.66	12.94
	48	5240	11.34	11.1
11AC40 SISO	38	5190	12.82	12.88
	46	5230	11.29	11.29
11AC80 SISO	42	5210	11.99	12

[5.2G WIFI]

Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
11N20 MIMO	36	5180	16.31
	40	5200	15.81
	48	5240	14.28
11N40 MIMO	38	5190	15.84
	46	5230	14.36
11AC20 MIMO	36	5180	16.17
	40	5200	15.81
	48	5240	14.23
11AC40 MIMO	38	5190	15.86
	46	5230	14.30
11AC80 MIMO	42	5210	15.01

[5.8G WIFI]

Mode	Channel	Frequency (MHz)	Ant 0 Average Conducted Output Power (dBm)	Ant 1 Average Conducted Output Power (dBm)
11A	149	5745	10.69	10.67
	157	5785	9.87	8.72
	165	5825	8.55	6.8
11N20 SISO	149	5745	11	10.91
	157	5785	10.15	9.02
	165	5825	8.84	7.04
11N40 SISO	151	5755	10.55	10.24
	159	5795	9.18	8.1
11AC20 SISO	149	5745	10.88	11.28
	157	5785	10.17	9.41
	165	5825	8.87	7.42
11AC40 SISO	151	5755	10.37	10.29
	159	5795	9.09	7.98
11AC80 SISO	155	5775	9.56	8.99

[5.8G WIFI]

Mode	Channel	Frequency (MHz)	Average Conducted Output Power (dBm)
11N20 MIMO	149	5745	13.97
	157	5785	12.63
	165	5825	11.04
11N40 MIMO	151	5755	13.41
	159	5795	11.68
11AC20 MIMO	149	5745	14.09
	157	5785	12.82
	165	5825	11.22
11AC40 MIMO	151	5755	13.34
	159	5795	11.58
11AC80 MIMO	155	5775	12.29

7. Manufacturing Tolerance

[BT]

GFSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	-3.0	-1.0	-2.0
Tolerance ±(dB)	1.0	1.0	1.0
π/4-DQPSK (Peak)			
Channel	Channel 0	Channel 39	Channel 78
Target (dBm)	-1.0	0	0
Tolerance ±(dB)	1.0	1.0	1.0
8DPSK (Peak)			
Channel	Channel 0	Channel 19	Channel 39
Target (dBm)	-1.0	0	0
Tolerance ±(dB)	1.0	1.0	1.0

[2.4G WIFI Ant0]

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	16.0	15.0	15.0
Tolerance ±(dB)	1.0	1.0	1.0
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	14.0	12.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	13.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	13.0	12.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0

[2.4G WIFI Ant1]

11B (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	15.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
11G (Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	14.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(Peak)			
Channel	Channel 1	Channel 6	Channel 11
Target (dBm)	14.0	14.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(Peak)			
Channel	Channel 3	Channel 6	Channel 9
Target (dBm)	13.0	12.0	13.0
Tolerance ±(dB)	1.0	1.0	1.0

[5.2G WIFI Ant0]

11A (AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	12.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	12.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 38	Channel 46	
Target (dBm)	12.0	11.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	12.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channe 38	Channel 46	
Target (dBm)	12.0	11.0	
Tolerance ±(dB)	1.0	1.0	
11AC80(AVG)			
Channel	Channel 42		
Target (dBm)	11.0		
Tolerance ±(dB)	1.0		

[5.2G WIFI Ant1]

11A (AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	12.0	12.0	10.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	12.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 38	Channel 46	
Target (dBm)	12.0	11.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 36	Channel 40	Channel 48
Target (dBm)	13.0	12.0	11.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channe 38	Channel 46	
Target (dBm)	12.0	11.0	
Tolerance ±(dB)	1.0	1.0	
11AC80(AVG)			
Channel	Channel 42		
Target (dBm)	12.0		
Tolerance ±(dB)	1.0		

[5.8G WIFI Ant0]

11A (AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	9.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	11.0	10.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 151	Channel 159	
Target (dBm)	10.0	9.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	10.0	8.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channe151	Channel 159	
Target (dBm)	10.0	9.0	
Tolerance ±(dB)	1.0	1.0	
11AC80(AVG)			
Channel	Channel 155		
Target (dBm)	9.0		
Tolerance ±(dB)	1.0		

[5.8G WIFI Ant1]

11A (AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	8.0	6.0
Tolerance ±(dB)	1.0	1.0	1.0
11N20(AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	10.0	9.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0
11N40(AVG)			
Channel	Channel 151	Channel 159	
Target (dBm)	10.0	8.0	
Tolerance ±(dB)	1.0	1.0	
11AC20(AVG)			
Channel	Channel 149	Channel 157	Channel 165
Target (dBm)	11.0	9.0	7.0
Tolerance ±(dB)	1.0	1.0	1.0
11AC40(AVG)			
Channel	Channe151	Channel 159	
Target (dBm)	10.0	7.0	
Tolerance ±(dB)	1.0	1.0	
11AC80(AVG)			
Channel	Channel 155		
Target (dBm)	8.0		
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.

[BT]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
GFSK	0	1.0000	3.0	1.9953	0.0004	1.0000
π/4-DQPSK	1.0	1.2589	3.0	1.9953	0.0005	1.0000
8-DPSK	1.0	1.2589	3.0	1.9953	0.0005	1.0000

[2.4G WIFI Ant0]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11b	17.0	50.1187	3.0	1.9953	0.0199	1.0000
IEEE 802.11g	15.0	31.6228	3.0	1.9953	0.0126	1.0000
IEEE 802.11n HT20	15.0	31.6228	3.0	1.9953	0.0126	1.0000
IEEE 802.11n HT40	14.0	25.1189	3.0	1.9953	0.0100	1.0000

[2.4G WIFI Ant1]

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	3.0	1.9953	0.0158	1.0000
IEEE 802.11g	15.0	31.6228	3.0	1.9953	0.0126	1.0000
IEEE 802.11n HT20	15.0	31.6228	3.0	1.9953	0.0126	1.0000
IEEE 802.11n HT40	14.0	25.1189	3.0	1.9953	0.0100	1.0000

[5.2G WIFI Ant0]

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	3.0	1.9953	0.0100	1.0000
IEEE 802.11n HT20	14.0	25.1189	3.0	1.9953	0.0100	1.0000
IEEE 802.11n HT40	13.0	19.9526	3.0	1.9953	0.0079	1.0000
IEEE 802.11ac VHT20	14.0	25.1189	3.0	1.9953	0.0100	1.0000
IEEE 802.11ac VHT40	13.0	19.9526	3.0	1.9953	0.0079	1.0000
IEEE 802.11ac VHT80	12.0	15.8489	3.0	1.9953	0.0063	1.0000

[5.2G WIFI Ant1]

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	3.0	1.9953	0.0079	1.0000
IEEE 802.11n HT20	14.0	25.1189	3.0	1.9953	0.0100	1.0000
IEEE 802.11n HT40	13.0	19.9526	3.0	1.9953	0.0079	1.0000
IEEE 802.11ac VHT20	14.0	25.1189	3.0	1.9953	0.0100	1.0000
IEEE 802.11ac VHT40	13.0	19.9526	3.0	1.9953	0.0079	1.0000
IEEE 802.11ac VHT80	12.0	15.8489	3.0	1.9953	0.0063	1.0000

[5.8G WIFI Ant0]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11n HT20	12.0	15.8489	3.0	1.9953	0.0063	1.0000
IEEE 802.11n HT40	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11ac VHT20	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11ac VHT40	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11ac VHT80	10.0	10.0000	3.0	1.9953	0.0040	1.0000

[5.8G WIFI Ant1]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm2)	MPE Limits (mW/cm2)
	dBm	mW				
IEEE 802.11a	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11n HT20	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11n HT40	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11ac VHT20	12.0	15.8489	3.0	1.9953	0.0063	1.0000
IEEE 802.11ac VHT40	11.0	12.5893	3.0	1.9953	0.0050	1.0000
IEEE 802.11ac VHT80	9.0	7.9433	3.0	1.9953	0.0032	1.0000

Remark:
1. Output power including tune-up tolerance;
2. Output power was adjusted 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 BT/2.4GWIFI/5.2G WIFI/5.8GWIFI antenna and one 2.4GWIFI/5.2G WIFI/5.8GWIFI antenna. So, need consider simultaneous transmission;
According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
∑∑of MPE ratios ≤ 1.0

Simultaneous Transmission									
BT MPE ratios	2.4GWIFI MAX MPE ratios		5.2GWIFI MAX MPE ratios		5.8GWIFI MAX MPE ratios		∑ MPE ratios	Limit	Results
	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1			
/	0.0199	0.0158	/		/	/	0.0357	1.0	Pass
0.0005	0.0199	/	/	/	/	/	0.0204	1.0	Pass
/	/	/	0.0100	0.0100	/	/	0.0200	1.0	Pass
0.0005	/	/	0.0100	/	/	/	0.0105	1.0	Pass
/	/	/	/	/	0.0063	0.0063	0.0126	1.0	Pass
0.0005	/	/	/	/	0.0063	/	0.0068	1.0	Pass

Remark:
1. Output power including turn-up tolerance;
2. BT/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 = $PG/4\pi R^2$
6. Bluetooth Antenna is Antenna0.

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----------