



Maximum Permissible Exposure Report

1. Product Information

FCC ID	: 2A75OTR3A
EUT	: Pawfit 3s pet location and activity tracker
Test Model	: TR3A
Power Supply	: Input: 5V $\overline{\text{---}}$ 1000mA For AC Adapter Input: 100-240V~, 50/60Hz, 0.25A Max Adapter Output: 5V $\overline{\text{---}}$ 1000mA DC 3.8V by Rechargeable Li-ion Battery, 680mAh
Hardware Version	: TR3A-PCB-08
Software Version	: 4.10.2
Bluetooth	:
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 40 channels for Bluetooth V5.1 (DTS)
Channel Spacing	: 2MHz for Bluetooth V5.1 (DTS)
Modulation Type	: GFSK for Bluetooth V5.1 (DTS)
Bluetooth Version	: V5.1
Antenna Description	: Internal Antenna, -2.25dBi (Max.)
WIFI(2.4G Band)	:
Frequency Range	: 2412MHz~2462MHz
Channel Number	: 11 Channels for 20MHz bandwidth (2412~2462MHz)
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	: Internal Antenna, 0.57dBi (Max.)
LTE	:
Support Band	: ☒ E-UTRA Band 2(U.S.-Band) ☒ E-UTRA Band 4(U.S.-Band) ☒ E-UTRA Band 12(U.S.-Band)
LTE Release Version	: R13
Type Of Modulation	: QPSK/16QAM
Antenna Description	: Internal Antenna 1.42dBi (max.) For E-UTRA Band 2 2.44dBi (max.) For E-UTRA Band 4 -0.21dBi (max.) For E-UTRA Band 12
Power Class	: Class 3
GPS function	: Support and only RX



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Extreme temp. Tolerance	:	-30°C to +50°C
Extreme vol. Limits	:	3.4VDC to 4.35VDC (nominal: 3.8VDC)
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 C95.1-1999](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz 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/Controlled 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



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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

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

Internal Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain	Notes
Antenna	Internal Antenna	2400 MHz – 2500 MHz	-2.25dBi	BT Antenna
Antenna	Internal Antenna	2400 MHz – 2500 MHz	0.57dBi	WiFi Antenna
Antenna	Internal Antenna	600 MHz – 3000 MHz	1.42dBi (max.) For E-UTRA Band 2 2.44dBi (max.) For E-UTRA Band 4 -0.21dBi (max.) For E-UTRA Band 12	LTE Antenna

6. Conducted Power and Manufacturing Tolerance

<BT LE>

Mode	Channel	Frequency (MHz)	Peak Conducted Output Power (dBm)	ANT Max. Tune Up Power (dBm)
GFSK	0	2402	-1.73	-1.0±1.0
	19	2440	-1.82	-1.0±1.0
	39	2480	-1.77	-1.0±1.0
GFSK	0	2402	-2.46	-2.0±1.0
	19	2440	-2.11	-2.0±1.0
	39	2480	-2.16	-2.0±1.0

[2.4GWLAN Max Conducted Power]

Mode	Channel	Frequency(MHz)	Max Conducted Power (dBm)	ANT Max. Tune Up Power (dBm)
IEEE 802.11b	1	2412	15.04	15.0±1.0
	6	2437	14.54	14.0±1.0
	11	2462	14.22	14.0±1.0
IEEE 802.11g	1	2412	14.41	14.0±1.0
	6	2437	14.56	14.0±1.0
	11	2462	14.08	14.0±1.0
IEEE 802.11n HT20	1	2412	13.21	13.0±1.0
	6	2437	13.28	13.0±1.0
	11	2462	12.87	12.0±1.0



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[LTE Max Average Power]

Test Mode		Channel	Max Average Power (dBm)	ANT Max. Tune Up Power (dBm)
LTE	Band 2	LCH	20.62	20.0±1.0
		MCH	20.48	20.0±1.0
		HCH	20.70	20.0±1.0
	Band 4	LCH	21.17	21.0±1.0
		MCH	20.92	20.0±1.0
		HCH	20.83	20.0±1.0
	Band 12	LCH	20.81	20.0±1.0
		MCH	20.84	20.0±1.0
		HCH	21.03	21.0±1.0



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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 50 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r=50\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.

[BT LE]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
GFSK	0	1.0000	-2.25	0.5957	0.000119	1.0000
GFSK	-1	0.7943	-2.25	0.5957	0.000094	1.0000

[2.4GWIFI]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
IEEE 802.11b	16.00	39.8107	0.57	1.1402	0.009035	1.0000
IEEE 802.11g	15.00	31.6228	0.57	1.1402	0.007177	1.0000
IEEE 802.11n HT20	14.00	25.1189	0.57	1.1402	0.005701	1.0000

[LTE]

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
LTE Band 2	21.00	125.8925	1.42	1.3868	0.034750	1.0000
LTE Band 4	22.00	158.4893	2.44	1.7539	0.055329	1.0000
LTE Band 12	22.00	158.4893	-0.21	0.9528	0.030057	0.47

Remark:

1. Output power including turn-up tolerance;
2. Output power is burst average power;
3. MPE evaluate distance is 50cm from user manual provide by manufacturer;
4. MPE values = $PG/4\pi R^2$



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7.2 Simultaneous Transmission MPE

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;
 $\sum$ of MPE ratios ≤ 1.0

Mode	MPE ₁ Max.	MPE ₁ Max.	MPE ₃ Max.	$\sum$ MPE ratios	Limit	Results
BT LE+2.4GWIFI+LTE	0.000119	0.009035	0.055329	0.064483	1.000	Pass

8. 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-----

