



RF EXPOSURE REPORT

FCC Per 47 CFR 2.1093(d)

Report Reference No.....: TRE1402009603 R/C: 17462

FCC ID.....: 2AB33-TST178

Compiled by

(position+printed name+signature)...: File administrators Jerome Luo

Jerome Luo

Supervised by

(position+printed name+signature)...: Test Engineer Yuchao Wang

yuchao.wang

Approved by

(position+printed name+signature)...: Manager Wenliang Li

Wenliang Li

Date of issue.....: Mar 24, 2014

Testing Laboratory Name: Shenzhen Huatongwei International Inspection Co., Ltd

Address.....: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Applicant's name.....: Thunder Software Technology(Shenzhen) Co.,Ltd.

Address.....: 7A03 Room, Microprofit Mansion, Nanshan District, Shenzhen City, China

Test specification:

Standard: FCC Per 47 CFR 2.1093(d)

TRF Originator.....: Shenzhen Huatongwei International Inspection CO., Ltd

Master TRF.....: Dated 2006-06

Shenzhen Huatongwei International Inspection Co., Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Huatongwei International Inspection Co., Ltd is acknowledged as copyright owner and source of the material. Shenzhen Huatongwei International Inspection Co., Ltd takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: PAD

Trade Mark: /

Manufacturer: Thunder Software Technology(Shenzhen) Co.,Ltd.

Model/Type reference.....: TST-178-A

Listed Models: TST-178-B

Operation Frequency.....: From 2412MHz to 2462MHz

Rating: Internal battery:3.7V, 3000mAh

Adaptor:Input 100-240Va.c., 50/60Hz, 0.5A; Output 5Vd.c., 2.5A

Result.....: PASS

RF EXPOSURE REPORT

Test Report No. : TRE1402009603	Mar 24, 2014
	Date of issue

Equipment under Test : PAD

Model /Type : TST-178-A

Listed Models : TST-178-B

Applicant : **Thunder Software Technology(Shenzhen) Co.,Ltd.**

Address : 7A03 Room, Microprofit Mansion, Nanshan District, Shenzhen City, China

Manufacturer : **Thunder Software Technology(Shenzhen) Co.,Ltd.**

Address : 7A03 Room, Microprofit Mansion, Nanshan District, Shenzhen City, China

Test Result:	PASS
---------------------	-------------

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.

Contents

<u>1.</u>	<u>SUMMARY</u>	<u>4</u>
1.1.	EUT configuration	4
1.2.	NOTE	4
<u>2.</u>	<u>TEST ENVIRONMENT</u>	<u>5</u>
2.1.	Address of the test laboratory	5
2.2.	Environmental conditions	5
2.3.	Statement of the measurement uncertainty	5
<u>3.</u>	<u>METHOD OF MEASUREMENT</u>	<u>5</u>
3.1.	Applicable Standard	5
3.2.	Limit	6
3.3.	RF Exposure	6
<u>4.</u>	<u>CONCLUSION</u>	<u>8</u>

1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○ Power Cable	Length (m) :	/
	Shield :	/
	Detachable :	/
○ Multimeter	Manufacturer :	/
	Model No. :	/

1.2. Product Description

The **Thunder Software Technology(Shenzhen) Co.,Ltd.** 's Model:TST-178-A or the "EUT" as referred to in this report; more general information as follows, for more details, refer to the user's manual of the EUT.

Name of EUT	PAD
Model Number	TST-178-A,TST-178-B
FCC ID	2AB33-TST178
WLAN	Supported 802.11b/802.11g/802.11n
Bluetooth	Not Supported
Antenna Type	Internal
WLAN FCC Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
WLAN Modulation	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)

1.3. NOTE

1. The EUT is a PAD with WLAN fuction,The functions of the EUT listed as below:

	Test Standards	Reference Report
WLAN	FCC Part 15 C 15.247	TRE1402009601
USB Port	FCC Part 15 Subpart B	TRE1402009602
RF Exposure	FCC Per 47 CFR 2.1093(d)	TRE1402009603

2. The frequency bands used in this EUT are listed as follows:

Frequency Band(MHz)	2400-2483.5	5150-5350	5470-5725	5725-5850
802.11b	√	—	—	—
802.11g	√	—	—	—
802.11n(20MHz)	√	—	—	—
802.11n(40MHz)	√	—	—	—

3. The EUT incorporates a SISO function,Physically,the EUT provides one completed transmitter and one completed receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (20MHz)	1TX
802.11n (40MHz)	1TX

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen Huatongwei International Inspection Co., Ltd
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2009) and CISPR Publication 22.

2.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

2.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3. Method of measurement

3.1. Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this 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.

According to §RSS-102, Devices that have a radiating element normally operating at separation distances greater than 20 cm between the user and the device shall undergo an RF exposure evaluation. SAR evaluation may be performed in lieu of an RF exposure evaluation for devices operating below 6 GHz with a separation distance of greater than 20 cm between the user and the device.

According to §1.1310, KDB447498 and §2.1093 RF exposure is required.

OET Bulletin 65 Supplement C [June 2001]: Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields

447498 D01 General RF Exposure Guidance v05r01: Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies

3.2. Limit

According to KDB447498 D01 General RF Exposure Guidance v05r01 Section 4.3.1 Standalone SAR test exclusion considerations:“ Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition, listed below, is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.²² The minimum test separation distance is determined by the smallest distance from the antenna and radiating structures or outer surface of the device, according to the host form factor, exposure conditions and platform requirements, to any part of the body or extremity of a user or bystander (see 5) of section 4.1). To qualify for SAR test exclusion, the test separation distances applied must be fully explained and justified by the operating configurations and exposure conditions of the transmitter and applicable host platform requirements, typically in the SAR measurement or SAR analysis report, according to the required published RF exposure KDB procedures. When no other RF exposure testing or reporting is required, a statement of justification and compliance must be included in the equipment approval, in lieu of the SAR report, to qualify for the SAR test exclusion. When required, the device specific conditions described in the other published RF exposure KDB procedures must be satisfied before applying these SAR test exclusion provisions; for example, handheld PTT two-way radios, handsets, laptops & tablets etc.²³ “

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR,}^{24} \text{ where}$$

- $f_{(\text{GHz})}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 5) in section 4.1 is applied to determine SAR test exclusion.

According to KDB447498 D01 General RF Exposure Guidance v05r01 Appendix A:SAR Test Exclusion Thresholds for 100 MHz-6 GHz and ≤ 50 mm, Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

3.3. RF Exposure

TEST RESULTS

From the EUT RF average output power and power drift from Tune-up Procedure provide by manufacturer as following states:

Manufacturing tolerance

802.11b (Peak)					
Channel Number	Frequency (MHz)	Power Drift	Channel Number	Frequency (MHz)	Power Drift
1	2412	8.7dBm±1.0dB	7	2442	8.7dBm±1.0dB
2	2417	8.7dBm±1.0dB	8	2447	8.7dBm±1.0dB
3	2422	8.7dBm±1.0dB	9	2452	8.7dBm±1.0dB
4	2427	8.7dBm±1.0dB	10	2457	8.7dBm±1.0dB
5	2432	8.7dBm±1.0dB	11	2462	8.7dBm±1.0dB
6	2437	8.7dBm±1.0dB			
802.11g (Peak)					
1	2412	8.0dBm±1.0dB	7	2442	8.0dBm±1.0dB
2	2417	8.0dBm±1.0dB	8	2447	8.0dBm±1.0dB
3	2422	8.0dBm±1.0dB	9	2452	8.0dBm±1.0dB
4	2427	8.0dBm±1.0dB	10	2457	8.0dBm±1.0dB
5	2432	8.0dBm±1.0dB	11	2462	8.0dBm±1.0dB
6	2437	8.0dBm±1.0dB			
802.11n(20MHz) (Peak)					
1	2412	8.0dBm±1.0dB	7	2442	8.0dBm±1.0dB
2	2417	8.0dBm±1.0dB	8	2447	8.0dBm±1.0dB
3	2422	8.0dBm±1.0dB	9	2452	8.0dBm±1.0dB
4	2427	8.0dBm±1.0dB	10	2457	8.0dBm±1.0dB
5	2432	8.0dBm±1.0dB	11	2462	8.0dBm±1.0dB
6	2437	8.0dBm±1.0dB			
802.11n(40MHz) (Peak)					
3	2422	8.0dBm±1.0dB	7	2442	8.0dBm±1.0dB
4	2427	8.0dBm±1.0dB	8	2447	8.0dBm±1.0dB
5	2432	8.0dBm±1.0dB	9	2452	8.0dBm±1.0dB
6	2437	8.0dBm±1.0dB			

For 802.11b @ WLAN

Test Frequency (MHz)	Output Power (dBm)	Output Power including Power Drift (dBm)	Output Power including Power Drift (mW)	Evaluated SAR test exclusion	SAR test exclusion thresholds	Verdict
2412	9.09	9.70	9.3325	2.8988	3.00	PASS
2437	9.68	9.70	9.3325	2.9138	3.00	PASS
2462	9.57	9.70	9.3325	2.9287	3.00	PASS

For 802.11g @ WLAN

Test Frequency (MHz)	Output Power (dBm)	Output Power including Power Drift (dBm)	Output Power including Power Drift (mW)	Evaluated SAR test exclusion	SAR test exclusion thresholds	Verdict
2412	8.56	9.00	7.9433	2.4673	3.00	PASS
2437	8.78	9.00	7.9433	2.4800	3.00	PASS
2462	8.81	9.00	7.9433	2.4927	3.00	PASS

For 802.11n(20MHz) @ WLAN

Test Frequency (MHz)	Output Power (dBm)	Output Power including Power Drift (dBm)	Output Power including Power Drift (mW)	Evaluated SAR test exclusion	SAR test exclusion thresholds	Verdict
2412	8.30	9.00	7.9433	2.4673	3.00	PASS
2437	8.67	9.00	7.9433	2.4800	3.00	PASS
2462	8.80	9.00	7.9433	2.4927	3.00	PASS

For 802.11n(40MHz) @ WLAN

Test Frequency (MHz)	Output Power (dBm)	Output Power including Power Drift (dBm)	Output Power including Power Drift (mW)	Evaluated SAR test exclusion	SAR test exclusion thresholds	Verdict
2422	8.03	9.00	7.9433	2.4724	3.00	PASS
2437	7.95	9.00	7.9433	2.4800	3.00	PASS
2452	8.05	9.00	7.9433	2.4877	3.00	PASS

4. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1093 for the uncontrolled RF Exposure and SAR Exclusion Threshold per KDB 447498 v05r01.

.....**End of Report**.....