



REPORT No. : SZ18050094S02

# RF EXPOSURE EVALUATION REPORT

**APPLICANT** : Thundercomm Technology Co., Ltd  
**PRODUCT NAME** : Thundersoft TurboX S626 SOM  
**MODEL NAME** : TurboX S626  
**BRAND NAME** : TurboX  
**FCC ID** : 2AOHHTURBOXSOMS626  
**STANDARD(S)** : 47CFR 2.1091  
KDB 447498  
**ISSUE DATE** : 2018-06-14

Tested by: *Gan Yueming*  
Gan Yueming (Test engineer)  
Approved by: *Peng Huarui*  
Peng Huarui (Supervisor)

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Change History		
Issue	Date	Reason for change
1.0	2018-06-14	First edition



# 1. Technical Information

**Note:** Provide by manufacturer.

## 1.1 Applicant and Manufacturer Information

<b>Applicant:</b>	Thundercomm Technology Co., Ltd
<b>Applicant Address:</b>	4 floor, Taixiang Building 1A# Longxiang Road Haidian District Beijing, China,100191
<b>Manufacturer:</b>	Thundercomm Technology Co., Ltd
<b>Manufacturer Address:</b>	4 floor, Taixiang Building 1A# Longxiang Road Haidian District Beijing, China,100191

## 1.2 Equipment Under Test (EUT) Description

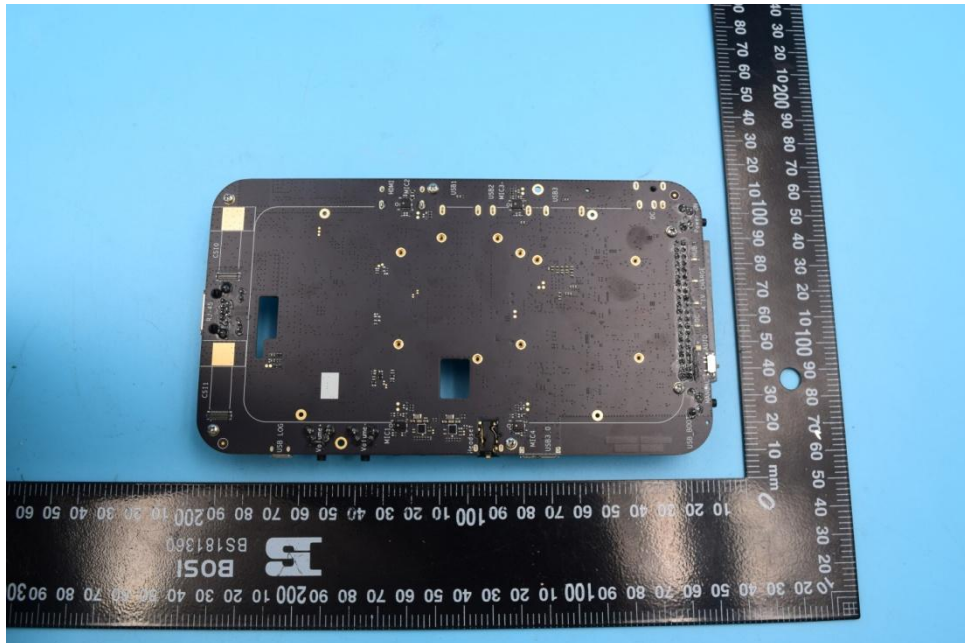
<b>EUT Type:</b>	Thundersoft TurboX S626 SOM
<b>Hardware Version:</b>	S625_SOM_V03
<b>Software Version:</b>	N/A
<b>Frequency Bands:</b>	WLAN 2.4GHz : 2412MHz-2472MHz WLAN 5.2GHz : 5180MHz-5240MHz WLAN 5.8GHz : 5745MHz-5825MHz Bluetooth : 2402MHz-2480MHz
<b>Modulation Mode:</b>	WLAN 2.4GHz : 802.11b : DSSS, WLAN 2.4GHz : 802.11g/n HT20/HT40 : OFDM WLAN 5GHz : 802.11a/n HT20/HT40 : OFDM WLAN 5GHz : 802.11ac-VHT20/VHT40/VHT80 : OFDM Bluetooth : GFSK, $\pi/4$ -DQPSK, 8-DPSK
<b>Antenna Type:</b>	PCB antenna
<b>Antenna Gain:</b>	4dBi

### 1.3 Photographs of the EUT

#### 1. EUT front view



#### 2. EUT rear view





### 1.3.1 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	S625_SOM_V03	N/A

## 1.4 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1091	Radio frequency Radiation Exposure Evaluation: mobile devices
2	KDB 447498 D01v06	General RF Exposure Guidance



## 2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

### Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

### GENERAL POPULATION / UNCONTROLLED EXPOSURE

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	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



### 3. Measurement of Conducted Output Power

**Conducted Power:**

	Mode	Channel	Frequency (MHz)	Peak power (dBm)	Power Setting
WLAN2.4GHz	802.11b 1Mbps	CH 1	2412	14.88	12
		CH 6	2437	14.52	12
		CH 11	2462	14.41	12
	802.11g 6Mbps	CH 1	2412	<b>19.79</b>	12
		CH 6	2437	19.61	12
		CH 11	2462	19.98	12
	802.11n-HT20 MCS0	CH 1	2412	19.67	12
		CH 6	2437	19.42	12
		CH 11	2462	19.64	12
	802.11n-HT40 MCS0	CH 3	2422	19.19	12
		CH 6	2437	18.79	12
		CH 9	2452	19.47	12

	Mode	Channel	Frequency (MHz)	Peak power (dBm)	Power Setting
WLAN 5.2GHz	802.11a 6Mbps	CH 36	5180	<b>20.41</b>	12
		CH 44	5220	20.33	12
		CH 48	5240	20.35	12
	802.11n-HT20 MCS0	CH 36	5180	20.35	12
		CH 44	5220	20.29	12
		CH 48	5240	20.41	12
	802.11n-HT40 MCS0	CH 38	5190	19.69	12
		CH 46	5230	19.22	12
	802.11ac-VHT20 MCS0	CH 36	5180	20.25	12
		CH 44	5220	20.18	12
		CH 48	5240	20.20	12
	802.11ac-VHT40 MCS0	CH 38	5190	18.75	12
		CH 46	5230	18.69	12
	802.11ac-VHT80 MCS0	CH 42	5210	18.98	12



WLAN 5.8GHz	Mode	Channel	Frequency (MHz)	Peak power (dBm)	Power Setting
	802.11a MCS0		CH 149	5745	17.52
CH 157			5785	17.48	12
CH 165			5825	18.11	12
802.11n-HT20 MCS0		CH 149	5745	17.55	12
		CH 157	5785	17.48	12
		CH 165	5825	<b>18.00</b>	12
802.11n-HT40 MCS0		CH 151	5755	17.14	12
		CH 159	5795	16.48	12
802.11ac-VHT20 MCS0		CH 149	5745	17.44	12
		CH 157	5785	17.20	12
		CH 165	5825	17.84	12
802.11ac-VHT40 MCS0		CH 151	5755	16.33	12
		CH 159	5795	16.09	12
802.11ac-VHT80 MCS0		CH 155	5775	16.37	12

Mode	Channel	Frequency (MHz)	Peak power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	10.51	10.43	10.76
	CH 39	2441	<b>11.30</b>	11.14	11.50
	CH 78	2480	8.92	8.94	9.46

Mode	Channel	Frequency (MHz)	Peak power (dBm)
			GFSK
LE	CH 00	2402	6.06
	CH 19	2440	6.42
	CH 39	2480	5.08



## 4. RF Exposure Evaluation

### Standalone transmission MPE evaluation

Bands	Conducted Peak Power (dBm)	Conducted Peak Power (mW)	EIRP (mW)	Power density (mW/cm <sup>2</sup> )	Limit for MPE (mW/cm <sup>2</sup> )
WLAN2.4GHz	19.79	95.28	239.33	0.048	1.0
WLAN5.2GHz	20.41	109.90	276.06	0.055	1.0
WLAN5.8GHz	18.0	63.10	158.49	0.032	1.0
Bluetooth	11.3	13.49	33.88	0.007	1.0

1. MPE calculation method

$$\text{Power Density} = \text{EIRP}/4\pi R^2$$

Where: EIRP = P·G

P = Peak output power

G = Antenna gain

R = Separation distance (20cm)

2. Antenna gain is 4dBi

3. WLAN2.4G&5G share the same RF port, therefore they cannot transmit simultaneously.

## 5. Conclusion

The test result is passed.



## Annex A General Information

### 1. Identification of the Responsible Testing Laboratory

Company Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Department:	Morlab Laboratory
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Responsible Test Lab Manager:	Mr. Su Feng
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### 2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
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