REPORT No.: SZ22050203S01

RF EXPOSURE EVALUATION REPORT

APPLICANT	:	Beijing Davinci Technology Co., Ltd
PRODUCT NAME	:	T-BOX
MODEL NAME	:	MTB-100A
BRAND NAME	:	DAVINCI
FCC ID	:	2A7NPMTB100A
STANDARD(S)	:	FCC 47 CFR Part 2(2.1091)
RECEIPT DATE	:	2022-06-23
TEST DATE	:	2022-07-08
ISSUE DATE	:	2022-09-19

Edited by: Xie Yiyun (Rapporteur)

Approved by: Shen Junsheng (Supervisor)

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DIRECTORY

Change History		
Version	Date	Reason for Change
1.0	2022-09-19	First edition

1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Beijing Davinci Technology Co., Ltd
Applicant Address:	A517, ThuStar BaJia, Shuangqing Rd.Haidian, Beijing, China
Manufacturer:	Wuhan Intest Electronic Technology Co., Ltd.
Manufacturer Address:	No.308,Guanggu Avenue,Donghu New Technology Development Zone,Wuhan City,Hubei Province,China

1.2 Equipment under Test (EUT) Description

Product Name:	T-BOX	
Product Serial No.:	1#	
Hardware Version:	H001	
Software Version:	S001	
Frequency Bands:	WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 12: 699 MHz ~ 716 MHz Bluetooth: 2402 MHz ~ 2480 MHz	
Modulation Mode:	WCDMA: QPSK,16QAM LTE: QPSK,16QAM Bluetooth LE: GFSK	
Antenna Type:	WWAN: Fixed Internal Antenna Bluetooth: PCB Antenna	
Antenna Gain:	Frequency Bands	Antenna Gain (dBi)
	WCDMA Band II	1.5
	WCDMA Band IV	1.5
	WCDMA Band V	-0.5
	LTE Band 2	1.5
	LTE Band 4	1.5
	LTE Band 12	-1.0
	Bluetooth	-1.15

Note: When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% Confidence intervals.

1.3 Applied Reference Documents

Leading reference documents for testing:

Identity	Document Title	Method determination /Remark
FCC 47CFR Part 2(2.1091)	Radio Frequency Radiation Exposure Assessment: mobile devices	No deviation
KDB 447498 D04v01	General RF Exposure Guidance	No deviation
Note 1: The test item is not applicable. **Note 2:** Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.		

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^2)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	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

3. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial No./ SW Version	Calibration	
				Last Cal.	Due Date
Anritsu	Network Emulator	MT8820C	6200985414	2021.10.21	2022.10.20

Note:

The EUT was connected to Base Station Anritsu MT8820C referred to the Setup Configuration. For the maximum power, it was established between EUT and Base Station with following setting:

1. For WCDMA testing, Power Ctrl Mode = All Up bits, and the transmitted maximum output power was recorded.
2. For LTE testing, the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and different configurations.

4. RF Output Power

Remark: The output power of WCDMA/LTE/Bluetooth refers to the annex B of this report.
The output power of Bluetooth is derived from the report SZ22050203W03.

5. RF Exposure Assessment

➢ **Standalone Transmission Assessment**

Bands	Frequency (MHz)	Tune-up Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	PD (mW/cm²)	Limit Value (mW/cm²)
WCDMA II	1880	24.5	1.5	398.11	0.079	1.0
WCDMA IV	1732.6	24.5	1.5	398.11	0.079	1.0
WCDMA V	836.4	24.5	-0.5	251.19	0.050	0.558
LTE Band 2	1880	24	1.5	354.81	0.071	1.0
LTE Band 4	1732.5	24	1.5	354.81	0.071	1.0
LTE Band 12	707.5	24	-1.0	199.53	0.040	0.472
Bluetooth	2402	-5.5	-1.15	0.22	0.000	1.0

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring assessment, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

$$S = PG/4\pi R^2$$

Where: S= Power density (in appropriate units, e.g. mW/cm^2)

P = Time-average maximum tune-up power (in appropriate units, e.g. dBm)

G = numeric gain of the antenna (in appropriate units, e.g. dBi)

R = Separation distance to the centre of radiation of the antenna (20cm)

➢ **Simultaneous Transmission Assessment**

Multi-Band Simultaneous Transmission Consideration

Simultaneous Transmission Consideration	Position	Applicable Combination
	Body	WWAN + Bluetooth

1. This device contains transmitters that may operate simultaneously, therefore simultaneous transmission analysis is required.
2. The worst condition for WWAN & Bluetooth will be calculated for transmitting simultaneously.
   Formula: Result=Power density$_1$/ limit$_1$ + Power density$_2$/ limit$_2$ ≤1.

Transmission Bands	Power Density/ SAR	Limit	Simultaneous Transmission Result
WWAN	0.079	1.0	0.079
Bluetooth	0.000	1.0	

➢ **Conclusion:**

According to 47 CFR §2.1091, this device complies with human exposure basic restrictions.

Note:

The main report is end here and the other Annex B will be submitted separately.

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd.
Address:	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

The FCC designation number is CN1192, the test firm registration number is 226174.

Note：

The main report is end here and the other Annex B will be submitted separately.

END OF REPORT