



RF EXPOSURE Test Report

Report No.: MTi211125016-03E4

Date of issue: 2023-09-22

Applicant: Shenzhen Teneth Technology Co., Ltd.

Product name: Cutting Plotter

Model(s): X7-180GB, X7-230GB, C7-180GB, C7-230GB

FCC ID: 2A33R-X7-180GB

Shenzhen Microtest Co., Ltd.

<http://www.mtitest.com>



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Test Result Certification	
Applicant:	Shenzhen Teneth Technology Co., Ltd
Address:	No.161, Pinghu Street, Pinghu Town, Longgang District, Shenzhen City, Guangdong Province, China.
Manufacturer:	Shenzhen Teneth Technology Co., Ltd
Address:	No.161, Pinghu Street, Pinghu Town, Longgang District, Shenzhen City, Guangdong Province, China.
Product description	
Product name:	Cutting Plotter
Trademark:	TENETH
Model name:	X7-180GB
Series Model:	X7-230GB, C7-180GB, C7-230GB
Standards:	N/A
Test method:	KDB 447498 D01 v06
Date of Test	
Date of test:	2021-01-20 ~ 2022-07-25
Test result:	Pass

Test Engineer :

Yanice Xie

(Yanice Xie)

Reviewed By: :

Leon Chen

(Leon Chen)

Approved By: :

Tom Xue

(Tom Xue)

RF EXPOSURE EVALUATION

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) Radiation as specified in §1.1307(b)

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)
(A) 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
300-1,500			f/300	6
1,500-100,000			5	6
(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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = Power density in mW/cm²

P_{out} = output power to antenna in mW

G = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm (20cm)

P_d the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.



Measurement Result

BT/BLE:

Operation Frequency: 2402-2480MHz,

Power density limited: 1mW/ cm²

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz,

802.11n HT40: 2422-2452MHz,

Power density limited: 1mW/ cm²

Antenna Type:

BT/BLE: PCB Antenna;

2.4G WIFI: FPC Antenna

BT/BLE antenna gain: -0.1 dBi

R=20cm

$mW=10^{(dBm/10)}$

antenna gain Numeric= $10^{(dBi/10)}=10^{(-0.1/10)}=0.98$

WIFI antenna gain: 3.06 dBi

R=20cm

$mW=10^{(dBm/10)}$

antenna gain Numeric= $10^{(dBi/10)}=10^{(3.06/10)}=2.02$

BT:

Chann el Freq. (MHz)	modulation n	conducte d power	Tune- up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/c m2)
				(dBm)	(mW)	(dBi)	Num eric		
2402	GFSK	-3.06	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2441		-3.37	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2480		-4.5	(-4)±1	-3	0.501	-0.1	0.98	0.0001	1
2402	π/4- DQPSK	-2.48	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2441		-2.79	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2480		-3.84	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2402	8DPSK	-2.08	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2441		-2.41	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1
2480		-3.56	(-3)±1	-2	0.631	-0.1	0.98	0.0001	1

BLE:

Chann el Freq. (MHz)	modulation	conducte d power	Tune- up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm2)	(mW/cm 2)
				(dBm)	(mW)	(dBi)	Num eric		
2402	GFSK	-1.42	-1±1	0	1.000	-0.1	0.98	0.0002	1
2440		-1.63	-1±1	0	1.000	-0.1	0.98	0.0002	1
2480		-2.89	-2±1	-1	0.794	-0.1	0.98	0.0002	1

2.4GWiFi:

Channel Freq. (MHz)	modulation	conducted power	Tune- up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm2)	(mW/cm2)
				(dBm)	(mW)	Numeric		
		Ant A	Ant A	Ant A	Ant A	Ant A	Ant A	
2412	802.11b	12.63	13±1	14	25.119	2.02	0.01011	1
2437		13.30	13±1	14	25.119	2.02	0.01011	1
2462		12.79	13±1	14	25.119	2.02	0.01011	1
2412	802.11g	10.61	11±1	12	15.849	2.02	0.00638	1
2437		11.35	12±1	13	19.953	2.02	0.00803	1
2462		10.86	11±1	12	15.849	2.02	0.00638	1
2412	802.11n H20	10.49	11±1	12	15.849	2.02	0.00638	1
2437		11.42	12±1	13	19.953	2.02	0.00803	1
2462		10.80	11±1	12	15.849	2.02	0.00638	1
2422	802.11n H40	12.52	13±1	14	25.119	2.02	0.01011	1
2437		12.67	13±1	14	25.119	2.02	0.01011	1
2452		12.60	13±1	14	25.119	2.02	0.01011	1

Conclusion:

Simultaneous transmit:

 $BT+2.4G\ WiFi=0.0001+0.01011=0.01021$
 $BLE+2.4G\ WiFi=0.0002+0.01011=0.01031$

 For the max result: $0.01031 \leq 1.0$ SAR, No SAR is required.

----END OF REPORT----