RF Exposure Evaluation Report

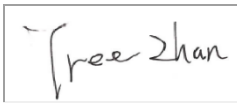
Application No.:	FYCR2209000375AT
Applicant:	DT Research, Inc.
Address of Applicant:	3RD FL NO 36 WUQUAN 7TH RD WUGU DISTRICT, NEW TAIPEI, Taiwan
Manufacturer:	DT Research, Inc.
Address of Manufacturer:	2000 Concourse Drive, San Jose, CA 95131, USA
Factory:	DT Research, Inc. Taiwan Branch
Address of Factory:	6F., No.36 Wuquan 7 th Rd., Wugu Dist. New Taipei City 248 Taiwan
Product Name:	Battery Powered Computer
Model No.:	581T, 581XXXXX (X is -, any alphanumeric or blank) ♣
♣	Please refer to section 3.1 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	DT Research
FCC ID:	YE3600-AX210NG
Standards:	47 CFR Part 1.1307, 47 CFR Part 1.1310, 47 CFR Part 2.1091
Date of Receipt:	2022-09-15
Date of Test:	2022-09-18 to 2022-10-23
Date of Issue:	2022-11-09
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Winkey Wang
EMC Technical Manager

1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2022-11-09		Original

Authorized for issue by:				
				
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3 General Information

3.1 General Description

Power supply:	AC Adapter Model: EM11011M-190 Input: AC 100-240V, 2.0~1.0A, 50/60Hz Output: DC 19V, 6.31A, 120W Li-ion Rechargeable Battery Pack Model: ACC-006-591 3INR19/66-3 DC:10.9V 8250mAh/90Wh Rated Capacity: 8250mAh Charge Current: 3.0A Max Nominal Voltage: 10.9V Charge Voltage: 12.3V Max
Test Voltage:	AC 120V, 60Hz Note: Both nominal AC 120V, 60Hz and AC 240 V, 60Hz are required for testing in accordance with FCC KDB174176, this report only shows the results of the worst test result(AC 120V, 60Hz);
Cable(s):	DC cable:114cm with a ferrite core
Internal Source:	More than 108MHz
For Bluetooth Classic mode	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.2
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	2.8dBi

For Bluetooth LE mode				
Operation Frequency:	2402MHz to 2480MHz			
Bluetooth Version:	V5.2			
Channel Spacing:	2MHz			
Modulation Type:	GFSK			
Number of Channels:	40			
Data rate:	1Mbps, 2Mbps			
Antenna Type:	PIFA Antenna			
Antenna Gain:	2.8dBi			
For 802.11b/g/n:				
Operation Frequency:	802.11b/g/n/ax(HT20): 2412MHz to 2472MHz 802.11n/ax(HT40): 2422MHz to 2462MHz			
Modulation Type:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(QPSK, BPSK, 16QAM, 64QAM) 802.11ax: OFDMA(QPSK, BPSK, 16QAM, 64QAM, 256QAM, 1024QAM)			
Channel Numbers:	802.11b/g, 802.11n/ax HT20: 13 Channels 802.11n/ax HT40: 9 Channels			
Antenna Type:	PIFA Antenna			
Antenna Gain:	Antenna1: 2.8dBi, Antenna2: 2.7dBi Note: MIMO for antenna1 and antenna2.			
For 802.11a/n/ac/ax: U-NII-1, U-NII-2A, U-NII-2C, U-NII-3				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n/ac/ax(HT20)	5180-5240	4
		802.11n/ac/ax(HT40)	5190-5230	2
		802.11ac/ax(HT80)	5210	1
		802.11ac/ax(HT160)	5250	1
	UNII Band II-A	802.11a/n/ac/ax(HT20)	5260-5320	4
		802.11n/ac/ax(HT40)	5270-5310	2

		802.11ac/ax(HT80)	5290	1
	UNII Band II-C	802.11a/n/ac/ax(HT20)	5500-5720	12
		802.11n/ac/ax(HT40)	5510-5710	6
		802.11ac/ax(HT80)	5530-5690	3
		802.11ac/ax(HT160)	5570	1
	UNII Band III	802.11a/n/ac/ax(HT20)	5745-5865	7
		802.11n/ac/ax(HT40)	5755-5835	3
		802.11ac/ax(HT80)	5775	1
Modulation Type:	802.11a: OFDM(QPSK, BPSK, 16QAM, 64QAM) 802.11n: OFDM(QPSK, BPSK, 16QAM, 64QAM) 802.11ac: OFDM(QPSK, BPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDMA(QPSK, BPSK, 16QAM, 64QAM, 256QAM, 1024QAM)			
DFS Function:	Slave without radar detection			
TPC Function:	Not support			
Antenna Type:	PIFA Antenna			
Antenna Gain:	Antenna1: 2.7dBi, Antenna2: 1.7dBi Note: MIMO for antenna1 and antenna2.			

Remark:

Model No.: 581T, 581XXXXX (X is -, any alphanumeric or blank)

Only the model 581T was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model No..

3.2 Test Location

All tests were performed at:

Compliance Certification Services（Kunshan）Inc. Shenzhen branch.

Fuyong lab. Xinlong TechnoPark,Fengtang Road, Fuyong Subdistrict, Bao'an, Shenzhen, China

Tel: +86 755 8866 3988 Fax: +86 755 2671 0594

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 6606.01)

Compliance Certification Services（Kunshan）Inc. Shenzhen branch is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6606.01.

• FCC –Designation Number: CN1322

Compliance Certification Services（Kunshan）Inc. Shenzhen branch has been recognized as an accredited testing laboratory.

Designation Number: CN1322. Test Firm Registration Number: 718073

• Innovation, Science and Economic Development Canada

Compliance Certification Services（Kunshan）Inc. Shenzhen branch has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0129.

IC#: 28189.

3.4 Deviation from Standards

None.

3.5 Abnormalities from Standard Conditions

None.

3.6 Other Information Requested by the Customer

None.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: 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 part1.1307(b)

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)
(A) Limits for Occupational/Controlled Exposures				
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
(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

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

For Uncontrolled Environment, the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm^2 . If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

1) Test Results

The max tune-up tolerance power Into Antenna1 & RF Exposure Evaluation Distance:

Type	Test Freq. (MHz)	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R=25cm (mW/cm^2)	Limit (mW/cm^2)	MPE Ratios	Result
BT	2402	2.8	1.91	11.5	14.13	0.0034	1.0000	0.0034	PASS
BLE	2402	2.8	1.91	10	10.00	0.0024	1.0000	0.0024	PASS
2.4G	2412	2.8	1.91	28.99	792.50	0.1923	1.0000	**0.1923**	PASS
5G	5180	2.7	1.86	23.96	248.89	0.0590	1.0000	0.0590	PASS
5.8G	5745	2.7	1.86	24.32	270.40	0.0641	1.0000	0.0641	PASS

The max tune-up tolerance power Into Antenna2 & RF Exposure Evaluation Distance:

Type	Test Freq. (MHz)	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R=25cm (mW/cm^2)	Limit (mW/cm^2)	MPE Ratios	Result
2.4G	2412	2.7	1.86	28.99	792.50	0.1879	1.0000	**0.1879**	PASS
5G	5180	1.7	1.48	23.96	248.89	0.0469	1.0000	0.0469	PASS
5.8G	5745	1.7	1.48	24.32	270.40	0.0509	1.0000	0.0509	PASS

Note: Refer to report No. 200611-03 or EUT test Max Conducted Peak Output Power value.
The distancer (4th column) calculated from the Fries transmission formula is far greater than 25 cm separation requirement, the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm^2.

The antenna1 and antenna2 can synchronous transmission at the same time.
The simultaneous transmission result between of antenna1 and antenna2:
The SAR Exclusion Threshold Level:
=CPD1 / LPD1 + CPD2 / LPD2
(CPD = Calculation power density, LPD = Limit of power density)
= (0.1923/1) +(0.1879/1) = 0.3802 < 1
Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply w ith SAR requirement without testing.

-End of Report-