




RF Exposure Evaluation Report

Application No.: SZEM2102001727CR
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 all-in-one computer
Model No.: 584XXX-XXX (X=blank, A-Z or 0-9) ♣
 ♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.

Trade Mark: 

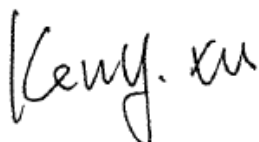
FCC ID: YE3600-AX200NG
 47 CFR Part 1.1307

Standards: 47 CFR Part 1.1310
 47 CFR Part 2.1091

Date of Receipt: 2021-02-01
Date of Test: 2021-02-14 to 2021-03-10
Date of Issue: 2021-03-12

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
 EMC Laboratory Manager





2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-03-12		Original

Authorized for issue by:			
			
		<hr/>	
		Edison Li/Project Engineer	
			
		<hr/>	
		Eric Fu/Reviewer	



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4 General Information

4.1 General Description of EUT

Power adapter:	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 or AC 230V, 50Hz Note: Both nominal AC 120V, 60Hz and AC 240 V, 50Hz are required for testing in accordance with FCC KDB174176, this report only shows the results of the worst test result(AC 120V, 60Hz);
Port:	DC-out(Optional) ports, Audio jack ports, DC-in ports, Ethernet ports, COM ports, HDMI ports, USB ports, Power buttons, Function buttons, LED reading light, Battery packs(Optional)
Cable(s):	DC cable:114cm with a ferrite core
Internal Source:	More than 108MHz
Sample Type:	Fixed device
Classification:	Uncontrolled Environment
For Bluetooth Classic:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	Bluetooth V5.0
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz





Antenna Type:	PIFA Antenna			
Antenna Gain:	3.0dBi			
For Bluetooth LE:				
Operation Frequency:	2402MHz to 2480MHz			
Bluetooth Version:	V5.0			
Channel Spacing:	2MHz			
Modulation Type:	GFSK			
Number of Channels:	40			
Antenna Type:	PIFA Antenna			
Antenna Gain:	3.0dBi			
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: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ax(HT20 and HT40): OFDM (BPSK, QPSK, 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: 2.7dBi, Antenna2: 3.0dBi Note: MIMO for 802.11n/ax.			
For 802.11a/n/ac/ax:				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n/ax(HT20)	5180-5240	4
		802.11n/ax(HT40)	5190-5230	2
		802.11ac/ax(HT80)	5210	1
		802.11ac/ax(HT160)	5250	1
	UNII Band II-A	802.11a/n/ax(HT20)	5260-5320	4
		802.11n/ax(HT40)	5270-5310	2
		802.11ac/ax(HT80)	5290	1
	UNII Band II-C	802.11a/n/ax(HT20)	5500-5720	12



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		802.11n/ax(HT40)	5510-5710	6
		802.11ac/ax(HT80)	5530-5690	3
		802.11ac/ax(HT160)	5570	1
	UNII Band III	802.11a/n/ax(HT20)	5745-5825	5
		802.11n/ax(HT40)	5755-5795	2
		802.11ac/ax(HT80)	5775	1
Modulation Type:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) 802.11ax: OFDM (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)			
DFS Function:	Slave without radar detection			
TPC Function:	Not support			
Antenna Type:	PIFA Antenna			
Antenna Gain:	Antenna1: 4.1dBi, Antenna2: 4.1dBi Note: MIMO for 802.11n/ac/ax			

Remark:

Model No.: 584XXX-XXX (X=blank, A-Z or 0-9)

Only the model 584T 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. and External ports(with DC OUT Port or without DC OUT Port).



4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

For Uncontrolled Environment, the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm². 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.

5.1.2 Test Procedure

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



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5.1.3 EUT RF Exposure Evaluation

1) Test Results

For Bluetooth Classic:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant2	2.6	1.82	11	12.59	0.0046	1	0.0046	PASS

Note: Refer to report No. 181210-03.TR05 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For Bluetooth LE:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant2	2.6	1.82	10.50	11.22	0.0041	1	0.0041	PASS

Note: Refer to report No. 181210-03.TR04 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 2.4G WiFi:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1	2.9	1.95	14.5	28.18	0.0109	1	0.0109	PASS

Note: Refer to report No. 181210-03.TR04 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



For 5G WiFi:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant2	4.7	2.95	13.5	22.39	0.0131	1	0.0131	PASS

Note: Refer to report No. 181210-03.TR01 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 2.4G WiFi MIMO:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1+2	5.91	3.90	17.27	53.33	0.0414	1	0.0414	PASS

Note: Directional Gain= $G_{ANT} + 10 \cdot \log(N_{ANT}/N_{SS}) = 2.9 + 10 \cdot \log(2/1) = 5.91 \text{dBi}$.

For 5G WiFi MIMO:

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

Antenna	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 = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1+2	7.71	5.90	16.51	44.77	0.0526	1	0.0526	PASS

Note: Directional Gain= $G_{ANT} + 10 \cdot \log(N_{ANT}/N_{SS}) = 4.7 + 10 \cdot \log(2/1) = 7.71 \text{dBi}$.

Note: The Bluetooth, 2.4G WiFi and 5G WiFi cannot synchronous transmission at the same time.

-End of Report-

