

EMC-TRF-03 Rev 1.0

Report No.: GZCR220100013305

Page: 1 of 13 FCC ID: YE3600-SC600TA

# RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2201000133AT

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

**Equipment Under Test (EUT):** 

EUT Name: Rugged Tablet

**Model No.:** 340Qxxxx(x= 0-9, A-Z, - or null) ♣

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

Trade Mark: DT Research

**Standard(s)**: 47 CFR Part 2.1091

47 CFR Part 1.1310, 47 CFR Part 1.1307

**Date of Receipt:** 2022-01-05

**Date of Evaluation:** 2022-01-06 to 2022-01-27

Date of Issue: 2022-02-09

Test Result: Pass\*

Kobe Jian EMC Laboratory Manager

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022-02-09		Original

Authorized for issue by:		
	Cof Vlu	
	Curry Wu/Project Engineer	
	Riday Liu	
	Ricky Liu/Reviewer	

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## 2 Evaluation Summary

Radio Spectrum Te	echnical Requirement			
Item Standard		Requirement	Method	Result
RF Exposure	47 CFR Part 2.1091 47 CFR Part 1.1310 47 CFR Part 1.1307	47 CFR Part 1.1310	47 CFR Part 1.1310	PASS

### **Declaration of EUT Family Grouping:**

Model No.: 340Qxxxx (x= 0-9, A-Z, - or null)

Only the model 340Q was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model No..



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## **General Information**

### 4.1 Details of E.U.T.

**AC** Adapter Power supply:

Model: A11-065N1A

Input: AC 100-240V, 50/60Hz, 1.7A

Output: DC 19V, 3.42A, 65W

Rechargeable lithium-Ion polymer battery Model: ACC-006-90K(3ICP7/36/115-2)

Rated Capacity: 8000mAh

Voltage: DC 11.4V Watt-Hour: 91.2Wh

Max Charge Voltage: 13.05V

AC 120V, 60Hz or AC 240V, 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);

Frequency Hopping Spread Spectrum(FHSS)

Cable(s): DC cable:175cm with a ferrite core

Internal Source: More than 108MHz

For Bluetooth Classic:

Test voltage:

Operation Frequency: 2402MHz to 2480MHz

Bluetooth Version: Bluetooth V4.2

Spectrum Spread

Technology:

GFSK, π/4DQPSK, 8DPSK Modulation Type:

Number of Channels: 79

Channel Spacing: 1MHz

Antenna Type: PIFA Antenna

Antenna Gain: 2.8dBi

For Bluetooth LE:

Operation Frequency: 2402MHz to 2480MHz

Bluetooth Version: Bluetooth V4.2

Channel Spacing: 2MHz

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Modulation Type: GFSK Number of Channels: 40

Antenna Type: PIFA Antenna

Antenna Gain: 2.8dBi

For 802.11b/g/n:

802.11b/g/n(HT20): 2412MHz to 2462MHz

Operation Frequency: 802.11n(HT40): 2422MHz to 2452MHz

802.11b: DSSS (CCK, DQPSK, DBPSK)

Modulation Type: 802.11g: OFDM (BPSK, QPSK, 16QAM, 64QAM)

802.11n(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)

802.11b/g, 802.11n HT20: 11 Channels

Channel Numbers:

802.11n HT40: 7 Channels

Antenna Type: PIFA Antenna

Antenna Gain: 2.8dBi

For 802.11a/n/ac:

Operation Frequency:

Band	Mode	Frequency	Number of
		Range(MHz)	channels
UNII	IEEE 802.11a/n(HT20)/ac(HT20)	5180-5240	4
Band I	IEEE 802.11n(HT40)/ac(HT40)	5190-5230	2
	IEEE 802.11ac(HT80)	5210	1
UNII	IEEE 802.11a/n(HT20)/ac(HT20)	5260-5320	4
Band II-A	IEEE 802.11n(HT40)/ac(HT40)	5270-5310	2
	IEEE 802.11ac(HT80)	5290	1
UNII	IEEE 802.11a/n(HT20)/ac(HT20)	5500-5700	8
Band II-C	IEEE 802.11n(HT40)/ac(HT40)	5510-5670	5
	IEEE 802.11ac(HT80)	5530,5610	2
UNII	IEEE 802.11a/n(HT20)/ac(HT20)	5745-5825	5
Band III	IEEE 802.11n(HT40)/ac(HT40)	5755-5795	2
	IEEE 802.11ac(HT80)	5775	1

Modulation Type: IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)

IEEE 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)

IEEE 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)



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DFS Function: Slave without radar detection

TPC Function: Not support

Sample Type: Fixed device

Antenna Type: PIFA antenna

Antenna Gain: 3.6dBi

## 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory, 198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059



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### 4.4 Test Facility

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

#### NVLAP (Lab Code: 200611-0)

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

#### ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.

### • SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

### • CNAS (Lab Code: L0167)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to

ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

### • FCC Recognized 2.948 Listed Test Firm(Registration No.: 282399)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

### • FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818, Jul 13, 2017.

#### Industry Canada (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

### VCCI (Registration No.: R-12460, C-12584, G-10449 and T-11179)

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-10449 and T-11179 respectively.

#### • CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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### 4.5 Deviation from Standards

None

### 4.6 Abnormalities from Standard Conditions

None



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## 5 Radio Spectrum Technical Requirement

## 5.1 RF Exposure

### 5.1.1 Requirement

In accordance with 47 CFR FCC Part 2.1091, this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

According to 47 CFR FCC Part 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 TO §1.1310(E)(1)—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
	(i) Limits for	Occupational/Contr	olled Exposure	
3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
	(ii) Limits for Ger	neral Population/Und	ontrolled Exposure	
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f²)	<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 MH	łz. * = Plane-wave equi	valent power density		



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#### **5.1.2** Method

According to IEEE C95.3:2002 section 5.5.1.1, the power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula:

$$S = \frac{PG}{4\pi d^2}$$

 $S = power density (mW/cm^2)$ 

P =the net power delivered to the antenna (mW)

G = gain of the antenna in linear scale

d = distance between observation point and center of the radiator (cm)

From the maximum EUT RF output power, as well as the gain of the used antenna, according toe the RF power density limit stated in above table, the mimimum distance between the antenna and human body will be calculated.



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#### 5.1.3 Conclusion

#### For Bluetooth

- 1. According to the test report GZCR220100013301, the tested maximum conducted power for Bluetooth is 12dBm = 0.016W = 16mW.
- 2. According to the declaration from the applicant, the permitted maximum antenna gain is 2.8dBi for single antenna.
- 3. The limit of Power Density (S)(mW/cm<sup>2</sup>) = 1mW/cm<sup>2</sup>

Maximum Antenna Gain (Numeric)	Total conducted power (mW)	Limit of Power Density (S) (mW/cm²)	Power Density at R=20cm (mW/cm²)
1.91	16	1	0.0061

#### For Bluetooth LE

- 1. According to the test report GZCR220100013302, the tested maximum conducted power for  $Bluetooth\ LE$  is 1.86dBm = 0.002W = 2.0mW.
- 2. According to the declaration from the applicant, the permitted maximum antenna gain is 2.8dBi for single antenna.
- 3. The limit of Power Density (S)(mW/cm<sup>2</sup>) = 1mW/cm<sup>2</sup>

Maximum Antenna	Total conducted	Limit of Power	Power Density at
Gain	power	Density (S)	R=20cm
(Numeric)	(mW)	(mW/cm²)	(mW/cm²)
1.91	2.0	1	

### For 2.4G WiFi

- 1. According to the test report GZCR220100013303, the tested maximum conducted power is 22.99dBm = 0.199W = 199.07mW.
- 2. According to the declaration from the applicant, the permitted maximum antenna gain is 2.8dBi for single antenna.
- 3. The limit of Power Density (S)(mW/cm<sup>2</sup>) = 1mW/cm<sup>2</sup>

Maximum Antenna	Total conducted	Limit of Power	Power Density at
Gain	power	Density (S)	R=20cm
(Numeric)	(mW)	(mW/cm²)	(mW/cm²)
1.91	199.07	1	



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#### For 5G WiFi

- 1. According to the test report GZCR220100013304, the tested maximum conducted power is 13.88dBm =0.024W = 24.43mW.
- 2. According to the declaration from the applicant, the permitted maximum antenna gain is 3.6dBi for single antenna.
- 3. The limit of Power Density (S)(mW/cm<sup>2</sup>) = 1mW/cm<sup>2</sup>

Maximum Antenna Gain (Numeric)	Total conducted power (mW)	Limit of Power Density (S) (mW/cm²)	Power Density at R=20cm (mW/cm²)
2.29	24.43	1	0.0111

Note: the 2.4G WLAN/Bluetooth antenna and 5G WLAN antenna cannot synchronous transmission at the same time.

### 5.2 EUT Constructional Details

Refer to Appendix - external and internal photos for GZCR2201000133AT.

- End of the Report -



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