



RF Exposure Evaluation Report

Application No.: SZEM2010010866CR
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: Medical-Grade Integrated LCD System
Model No.: 504XX-XXX (X=blank, A~Z or 0~9) ♣
♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark: DT Research, Inc.
FCC ID: YE3600-AX200NG
47 CFR Part 1.1307
Standards: 47 CFR Part 1.1310
47 CFR Part 2.1091
Date of Receipt: 2020-10-29
Date of Test: 2020-10-29 to 2020-12-16
Date of Issue: 2020-12-17

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-12-17		Original

Authorized for issue by:				
				
		Edison Li/Project Engineer		
				
		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
Test voltage:	AC 120V, 60Hz
Battery:	Rechargeable Lithium Battery Model: ACC-006-524N(3INR9/66) Rated Capacity: 2300mAh Voltage: DC 10.8V Watt-Hour: 24.84Wh
EUT Interfaces:	USB3.0*4+USB2.0*2, RJ45*2, 1.7mm DC-in Jack, HDMI*1, 3.5mm Headset Jack, Serial*3, POAG Jack*1
Internal Source:	Max 3.8GHz
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:	2.1dBi
For Bluetooth LE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Channel Spacing:	2MHz





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Modulation Type:	GFSK			
Number of Channels:	40			
Antenna Type:	PIFA Antenna			
Antenna Gain:	2.1dBi			
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/ax(HT20 and HT40): OFDM (BPSK, QPSK, 16QAM, 64QAM)			
Channel Numbers:	802.11b/g, 802.11n/ax HT20: 13 Channels 802.11n/ax HT40: 9 Channels			
Antenna Type:	PIFA Antenna			
Antenna Gain:	Antenna1: 1.9dBi, Antenna2: 2.1dBi 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	IEEE 802.11a/n/ax(HT20)	5180-5240	4
		IEEE 802.11n/ax(HT40)	5190-5230	2
		IEEE 802.11ac/ax(HT80)	5210	1
		IEEE 802.11ac/ax(HT160)	5250	1
	UNII Band II-A	IEEE 802.11a/n/ax(HT20)	5260-5320	4
		IEEE 802.11n/ax(HT40)	5270-5310	2
		IEEE 802.11ac/ax(HT80)	5290	1
	UNII Band II-C	IEEE 802.11a/n/ax(HT20)	5500-5720	12
		IEEE 802.11n/ax(HT40)	5510-5710	6
		IEEE 802.11ac/ax(HT80)	5530-5690	3
		IEEE 802.11ac/ax(HT160)	5570	1
	UNII Band III	IEEE 802.11a/n/ax(HT20)	5745-5825	5
IEEE 802.11n/ax(HT40)		5755-5795	2	
IEEE 802.11ac/ax(HT80)		5775	1	
Modulation Type:	IEEE 802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) IEEE 802.11ac/ax: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			



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DFS Function:	Slave without radar detection
TPC Function:	Not support
Antenna Type:	PIFA Antenna
Antenna Gain:	Antenna1: 3.1dBi, Antenna2: 3.2dBi



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4.2 Test Location

All tests were performed at:

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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.



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

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = 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.





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
Ant1	2.1	1.62	11	12.59	0.0041	1	0.0041	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
Ant1	2.1	1.62	10.50	11.22	0.0036	1	0.0036	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
Ant2	2.1	1.62	14.5	28.18	0.0091	1	0.0091	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.





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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	3.2	2.09	13.5	22.39	0.0093	1	0.0093	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	5.11	3.24	17.27	53.33	0.0344	1	0.0344	PASS

Note: Direectional Gain= $G_{ANT} + 10 \cdot \log(N_{ANT}/N_{SS}) = 2.1 + 10 \cdot \log(2/1) = 5.11 \text{ dBi}$.

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
Ant2	6.21	4.18	16.51	44.77	0.0372	1	0.0372	PASS

Note: Direectional Gain= $G_{ANT} + 10 \cdot \log(N_{ANT}/N_{SS}) = 3.2 + 10 \cdot \log(2/1) = 6.21 \text{ dBi}$.

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

-End of Report-



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