RF Exposure Evaluation Report

Application No.:	SZEM2008008634CR
Applicant:	Outform Science & Technology (Shenzhen) Co., Ltd.
Address of Applicant:	Unit 3, 1st Floor, Huada Building, Gongye 3rd Road Yanshan Community, Zhaoshang Subdistrict, Nanshan District, Shenzhen, 518067 China
Manufacturer/ Factory:	Outform Science & Technology (Shenzhen) Co., Ltd.
Address of Manufacturer / Factory:	Unit 3, 1st Floor, Huada Building, Gongye 3rd Road Yanshan Community, Zhaoshang Subdistrict, Nanshan District, Shenzhen, 518067 China
Equipment Under Test (EUT):	
EUT Name:	Touch Display
Model No.:	UIT432B-S11, UIT432X-XYY, UIA432X-XYY ♣
♣	Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID:	2AO9X-T432S11
Standards:	47 CFR Part 1.1307
	47 CFR Part 1.1310
	47 CFR Part 2.1091
Date of Receipt:	2020-08-31
Date of Test:	2020-09-03 to 2020-10-20
Date of Issue:	2020-10-20
Test Result :	PASS*

* 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		2020-10-20		Original

Authorized for issue by:				
		Damon Su		
		Damon Su/Project Engineer		
		Eric Fu		
		Eric Fu/Reviewer		

3 Contents

4 General Information

4.1 General Description of EUT

Rated Voltage:	DC 12V 5A.
Test Voltage:	DC 12V
Power adapter:	Model No.: LY001SPS-120500W3 Input: AC 100-240V 50/60Hz 2A Output: DC 12V 5A.
For BT:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, p/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Gain:	5dBi
Antenna Type:	Dipole Antenna
For BLE:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Gain:	5dBi
Antenna Type:	Dipole Antenna
For 2.4G:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Channel Spacing:	5MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	5dBi

For WCDMA/LTE	
Operation Frequency Band:	WCDMA Band II/ WCDMA Band V/ WCDMA Band IV LTE FDD Band 2, 4, 5, 12, 13, 14, 66, 71
Modulation Type:	QPSK for WCDMA; QPSK, 16QAM for LTE;
HSDPA UE Category:	13
HSUPA UE Category:	6
LTE Release Version:	R8
LTE Power Class:	Level 3
Antenna Type:	Dipole Antenna
Antenna Gain:	Antenna: 2dBi
Based on Module certification(FCC ID: XMR201808EC25AF)	

Remark: The EUT equipped with 4G module PCIE Quectel EC25-AF which support LTE FDD(Based on Module certification, FCC ID: XMR201808EC25AF, Date of Grant: 08/03/2018)

Declaration of EUT Family Grouping:

Model No.: UIT432B-S11, UIT432X-XYY, UIA432X-XYY

Only the model UIT432B-S11 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 the following:

Main number	Serial Model Number	Differences
UIT432B-S11	UIT432X-XYY	Same size as UIT432B-S11, The first "X" are letters from "A" to "D", A--Stands for 2.4G wifi, 16GB memory,no camera, B--Stands for 2.4G wifi, 32GB memory, with camera, C--Stands for 2.4G wifi, 32GB memory, no camera D--Stands for 2.4G wifi, 16GB memory, with camera The 2nd "X" are letters from "A" to "Z", Stands for customized color. YY is client numbers from “01” to “99”

	UIA432X-XYY	Same size as UIT432B-S11, but no touch function. The first "X" are letters from "A" to "D", A--Stands for 2.4G wifi, 16GB memory,no camera, B--Stands for 2.4G wifi, 32GB memory, with camera, C--Stands for 2.4G wifi, 32GB memory, no camera D--Stands for 2.4G wifi, 16GB memory, with camera The 2nd "X" are letters from "A" to "Z", Stands for customized color. YY is client numbers from “01” to “99”

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.

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
中国·深圳·科技园中区M-10栋一号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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: Pd = (Pout*G)/(4* Pi * R 2)

Where

Pd = power density in mW/cm2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

Pd id the limit of MPE, 1 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

For BT:
Antenna Gain: 5dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.
Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2480MHz	SISO	10.28	10.67	0.007	1.0	PASS

Note: Refer to report No. SZEM200800863402 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:
Antenna Gain: 5dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.
Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2480MHz	SISO	9.13	8.18	0.005	1.0	PASS

Note: Refer to report No. SZEM200800863403 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 2.4G WIFI:
Antenna Gain : 5dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.16 in linear scale.
Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Tx Type	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	Result
2437 MHz	SISO	17.81	60.39	0.038	1.0	PASS

Note: Refer to report No. SZEM200800863404 for EUT test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For WCDMA/LTE
Antenna Gain : 2.0dBi
Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.58 in linear scale.
Based on Module certification(FCC ID: XMR201808EC25AF), refer to report No. R1806A0301-M1V3 for LTE Module test Max Conducted Peak Output Power value.
The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

Band	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit	Result
WCDMA II	25.00	316.23	0.100	0.397	Pass
WCDMA IV	25.00	316.23	0.100	0.199	Pass
WCDMA V	25.00	316.23	0.100	0.550	Pass
LTE Band 2	25.00	316.23	0.100	0.397	Pass
LTE Band 4	25.00	316.23	0.100	0.199	Pass
LTE Band 5	25.00	316.23	0.100	0.550	Pass
LTE Band 12	25.00	316.23	0.100	0.470	Pass
LTE Band 13	25.00	316.23	0.100	0.520	Pass
LTE Band 14	25.00	316.23	0.100	0.530	Pass
LTE Band 66	25.00	316.23	0.100	1.00	Pass
LTE Band 71	25.00	316.23	0.100	0.450	Pass

The simultaneous transmission result between of BT/WiFi and GSM/WCDMA/LTE:
The SAR Exclusion Threshold Level:
=CPD1 / LPD1 + CPD2 / LPD2
(CPD = Calculation power density, LPD = Limit of power density)
= (0.038/1) +(0.100/0.199) = 0.541 < 1
Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

- End of the Report -