



# RF Exposure Evaluation Report

**Application No.:** SZEM2007006574CR  
**Applicant:** Solaborate Inc.  
**Address of Applicant:** 8300 Utica Ave #283 Rancho Cucamonga California 91730 3852 United States  
**Manufacturer:** Solaborate Inc.  
**Address of Manufacturer:** 8300 Utica Ave #283 Rancho Cucamonga California 91730 3852 United States

**Equipment Under Test (EUT):**  
**Product Name:** HELLO2  
**Model No.:** HELLO2  
**FCC ID:** 2AW3M-HELLO2  
**Standards:** 47 CFR Part 1.1307  
 47 CFR Part 1.1310  
 47 CFR Part 2.1091

**Date of Receipt:** 2020-07-24  
**Date of Test:** 2020-07-20 to 2020-08-31  
**Date of Issue:** 2020-09-04

<b>Test Result :</b>	<b>PASS*</b>
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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		2020-09-04		Original

<b>Authorized for issue by:</b>			
			
		<hr/> <b>Harry Wu/Project Engineer</b>	
			
		<hr/> <b>Eric Fu/Reviewer</b>	



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## 4 General Information

### 4.1 General Description of EUT

Power supply:	AC 100-240V, 50-60Hz
Power adapter:	Model: EA1019AVRS-050 Input: AC 100-240V, 50-60Hz, 0.8A Output: DC 5.0V, 3.0A
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 Type:	FPC Antenna
Antenna Gain:	2.98dBi
For BLE:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	1Mb/s,2Mb/s
Antenna Type:	FPC Antenna
Antenna Gain:	2.98dBi
For 2.4GHz Wifi:	
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:	FPC Antenna
Antenna Gain:	Antenna 0 & 1: 2.98dBi



Remark:	Two Antennas can simultaneous transmit WIFI signal at 802.11n(HT20) mode.			
For 5GHz Wifi:				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	IEEE 802.11a	5180-5240	4
		IEEE 802.11n/ac 20MHz	5180-5240	4
		IEEE 802.11n/ac 40MHz	5190-5230	2
		IEEE 802.11ac 80MHz	5210	1
	UNII Band II-A	IEEE 802.11a	5260-5320	4
		IEEE 802.11n/ac 20MHz	5260-5320	4
		IEEE 802.11n/ac 40MHz	5270-5310	2
		IEEE 802.11ac 80MHz	5290	1
	UNII Band II-C	IEEE 802.11a	5500-5700	11
		IEEE 802.11n/ac 20MHz	5500-5700	11
		IEEE 802.11n/ac 40MHz	5510-5670	5
		IEEE 802.11ac 80MHz	5530-5690	3
	UNII Band III	IEEE 802.11a	5745-5825	5
		IEEE 802.11n/ac 20MHz	5745-5825	5
		IEEE 802.11n/ac 40MHz	5755-5795	2
		IEEE 802.11ac 80MHz	5775	1
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)			
DFS mode:	Slave without radar detection			
Antenna Type	FPC Antenna			







Antenna Gain	Antenna 0 & 1: 3.5dBi
Remark1:	Two Antennas can simultaneous transmit WIFI signal at 802.11n(HT20), 802.11n(HT40), 802.11ac(HT20), 802.11ac(HT40), 802.11ac(HT80) modes.



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 Shenzhen Branch / CSTC Shenzhen Laboratory

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## 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.



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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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	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/cm<sup>2</sup>

$P_{out}$  = 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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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

For BT:

Antenna Gain: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
2402 MHz	SISO	7.28	5.35	0.002	1.0	PASS

Note: Refer to report No. SZEM200700657402 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: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
2402 MHz	SISO	7.55	5.69	0.002	1.0	PASS

Note: Refer to report No. SZEM200700657403 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.



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For 2.4G WIFI:

Antenna Gain 0 & 1: 2.98dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.99 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 <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
2412 MHz	MIMO	23.27	212.32	0.084	1.0	PASS

Note: Refer to report No. SZEM200700657404 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 5G WIFI:

Antenna Gain 0 & 1: 3.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.24 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 <sup>2</sup> )	Limit	Result
5745 MHz	MIMO	19.34	85.90	0.038	1.0	PASS

Note: Refer to report No. SZEM200700657405 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.

The simultaneous transmission result between of Bluetooth, WiFi :

The SAR Exclusion Threshold Level:

$$= \text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2}$$

(CPD = Calculation power density, LPD = Limit of power density)

$$= (0.002/1) + (0.084/1) = 0.086 < 1$$

Since the conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

- End of the Report -

