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Report No.: SZEM150700454407

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# RF Exposure Evaluation Report

**Application No:** SZEM1507004544CR

**Applicant:** DEI Sales, Inc. dba Definitive Technology

**Manufacturer:** DEI Sales, Inc. dba Definitive Technology

**Factory:** Zhao Yang Electronic (ShenZhen) Co., Ltd.

**Product Name:** W Studio Micro System

**Model No.(EUT):** W STUDIO MICRO SOUNDBAR

**Trade mark:** Definitive Technology

**FCC ID:** IPUSTUDIOOMICRO

**Standards:** 47 CFR Part 1.1307 (2014)

47 CFR Part 1.1310 (2014)

**Date of Receipt:** 2015-07-24

**Date of Test:** 2015-08-06 to 2015-08-24

**Date of Issue:** 2015-08-26

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

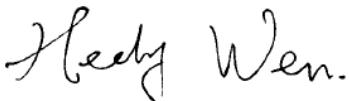
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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2015-08-26		Original

Authorized for issue by:			
			2015-08-24
Tested By		(Chris Zhong) /Project Engineer	Date
			2015-08-26
Prepared By		(Hedy Wen) /Clerk	Date
			2015-08-26
Checked By		(Eric Fu) /Reviewer	Date

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## 4 General Information

### 4.1 Client Information

Applicant:	DEI Sales, Inc. dba Definitive Technology
Address of Applicant:	1 Viper Way, Vista, CA 92081 USA
Manufacturer:	DEI Sales, Inc. dba Definitive Technology
Address of Manufacturer:	1 Viper Way, Vista, CA 92081 USA
Factory:	Zhao Yang Electronic (ShenZhen) Co., Ltd.
Address of Factory:	Section A, 4th Floor, Building 1 & Building 2, De Yong Jia Industrial Park, Guang Qiao Road, Yu Lv Community, Gong Ming Street, Guang Ming New District, Shenzhen, Guangdong, P.R.C

### 4.2 General Description of EUT

Product Name:	W Studio Micro System
Model No.:	W STUDIO MICRO SOUNDBAR
Trade Mark:	Definitive Technology
Sample Type:	Fixed production
Antenna Type:	Integral
EUT Power Supply:	Adapter Model: DYS902-240400W Input: AC 100-240V 50/60Hz 1.5A MAX Output: DC 24.0V 4.0A Remote Control: DC 3.0V (1*3.0V "CR2032" Button Cell)
Test Voltage:	AC 120V 60Hz
<b>For 2.4GHz Wireless:</b>	
Operation Frequency:	2.4G Wireless(2403.5MHz-2477.3MHz)
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	FSK
Number of Channel:	49
Antenna Gain:	2.28dBi
<b>For 2.4GHz Wi-Fi:</b>	
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE802.11n(HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Test Power Grade:	802.11b :15dBm@11Mbps; 802.11g:14dBm@54Mbps;

	802.11n20(2.4G):13dBm@MCS7; 802.11n40(2.4G) :10dBm@MCS7 (manufacturer declare)			
Test Software of EUT:	teraterm.exe (manufacturer declare )			
Antenna Gain:	2.28dBi			
Antenna Delivery:	1TX+1RX			
<b>For 5GHz Wi- Fi:</b>				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	IEEE 802.11a	5180-5240	4
		IEEE 802.11n 20MHz	5180-5240	4
		IEEE 802.11n 40MHz	5190-5230	2
	UNII Band II-A	IEEE 802.11a	5260-5320	4
		IEEE 802.11n 20MHz	5260-5320	4
		IEEE 802.11n 40MHz	5270-5310	2
	UNII Band II-C	IEEE 802.11a	5500-5700	11
		IEEE 802.11n 20MHz	5500-5700	11
		IEEE 802.11n 40MHz	5510-5670	5
	UNII Band III	IEEE 802.11a	5745-5825	5
		IEEE 802.11n 20MHz	5745-5825	5
		IEEE 802.11n 40MHz	5755-5795	2
Type of Modulation:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM)			
Test Power Grade:	802.11a :13 dBm@54Mbps; 802.11n20(5G) :11 dBm@MCS7; 802.11n40(5G) :11 dBm@MCS7 (manufacturer declare )			
Test Software of EUT:	teraterm.exe (manufacturer declare )			
Antenna Gain:	3.92dBi			
Antenna Delivery:	1TX+1RX			

### 4.3 Test Location

All tests were performed at:

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

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.

#### **4.4 Test Facility**

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen 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 No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-2.

#### **4.5 Deviation from Standards**

None.

#### **4.6 Abnormalities from Standard Conditions**

None.

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

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = 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,  $1 \text{ mW/cm}^2$ . 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.

## 5.2 4.1.3 EUT RF Exposure Evaluation

### For 2.4GHz Wireless:

Antenna Gain: 2.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Lowest	2403.5	5.39	3.46	0.0012	1.0	PASS

Note: Refer to report No. SZEM150700454402 for EUT test Max Conducted Peak Output Power value.

### For 2.4GHz Wi- Fi:

Antenna Gain: 2.28dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

1) Antenna 0

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Middle	2437	21.16	130.62	0.044	1.0	PASS

2) Antenna 1

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Middle	2437	19.67	92.68	0.031	1.0	PASS

Note: Refer to report No. SZEM150700454404 for EUT test Max Conducted Peak Output Power value.



**For 5GHz Wi-Fi:**

Antenna Gain: 3.92dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.47 in linear scale.

Output Power Into Antenna &amp; RF Exposure Evaluation Distance:

1) Antenna 0

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Highest	5700	12.72	18.71	0.0092	1.0	PASS

2) Antenna 1

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit	Result
Highest	5240	11.76	15.00	0.0074	1.0	PASS

Note: Refer to report No. SZEM150700454405 for EUT test Max Conducted Peak Output Power value.

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