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Report No.: SHEM180500381907

Page: 1 of 9

**1 Cover Page**

***RF Exposure Evaluation Report***

<b>Application No.:</b>	SHEM1805003819CR
<b>Applicant:</b>	NXP SEMICONDUCTORS (SHANGHAI) CO., LTD.
<b>Equipment Under Test (EUT):</b>	
<b>NOTE:</b> The following sample(s) was/were submitted and identified by the client as	
<b>Product Name:</b>	MCIMX7ULP-EVK
<b>Model No.(EUT):</b>	MCIMX7ULP-EVK
<b>Standards:</b>	EN 62311:2008
<b>Date of Receipt:</b>	2018-05-24
<b>Date of Test:</b>	2018-06-05 to 2018-06-13
<b>Date of Issue:</b>	2018-08-27
<b>Test Result:</b>	<b>Pass*</b>

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.




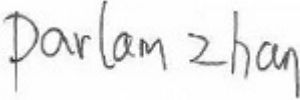
Parlam Zhan  
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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Revision Record			
Version	Description	Date	Remark
00	Original	2018-08-27	/

<b>Authorized for issue by:</b>			
			
		<hr/>	
		<b>Eddy Zong / Project Engineer</b>	
			
		<hr/>	
		<b>Parlam Zhan / Reviewer</b>	



## 2 Contents

	Page
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 CONTENTS .....</b>	<b>3</b>
<b>3 GENERAL INFORMATION.....</b>	<b>4</b>
3.1 CLIENT INFORMATION.....	4
3.2 GENERAL DESCRIPTION OF E.U.T. (MCIMX8M-EVK).....	4
3.3 DETAILS OF E.U.T. ....	4
3.4 TEST LOCATION.....	6
3.5 TEST FACILITY .....	6
<b>4 TEST STANDARDS AND LIMITS .....</b>	<b>7</b>
<b>5 CALCULATION FORMULA AND TEST RESULT .....</b>	<b>9</b>
5.1 CALCULATION FORMULA.....	9
5.2 TEST RESULTS .....	9



### 3 General Information

#### 3.1 Client Information

Applicant:	NXP SEMICONDUCTORS (SHANGHAI) CO., LTD.
Address of Applicant:	No.192 Liangjiang Rd., Pudong New Area, Shanghai 201203, P.R.China
Manufacturer:	NXP SEMICONDUCTORS (SHANGHAI) CO., LTD.
Address of Manufacturer:	No.192 Liangjiang Rd., Pudong New Area, Shanghai 201203, P.R.China
Factory:	Trivo (Taicang) Technologies Co., Ltd
Address of Factory:	Building No.9, YuSheng Industry Park, No.33 North Changsheng Road, Taicang, Jiangsu, China

#### 3.2 General Description of E.U.T. (MCIMX8M-EVK)

Power supply:	AC Adapter Model NO.: ATS024T-A050 Input: AC100-240V, 50-60Hz 0.58A Output: DC 5V 4A
Test voltage:	AC 230V 50Hz
Cable:	AC Cable: 120cm DC Cable: 100cm Type C to USB cable: 22cm HDMI type-A cable: 100cm USB cable micro/std A: 100cm

#### 3.3 Details of E.U.T.

Operation Frequency:	BT: 2402MHz~2480MHz DTS: 2412MHz-2472MHz
Modulation Technique:	BT: GFSK, $\pi/4$ DQPSK, 8DPSK DTS: 802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
Number of Channel:	BT: 79 DTS: 13
Antenna Type	Integral Antenna
Antenna Gain	3 dBi



**2.4G WiFi:**

Adaptive Type	LBE under LBT based DAA
Antenna Gain	3dBi
Antenna Type	Integral Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n(HT20 and HT40):
Number of Channels	802.11b/g/n(HT20): 13 802.11n(HT40):9
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2472MHz 802.11n(HT40): 2422MHz to 2462MHz
Power Class	>=10mW

**5G WiFi**

Adaptive Type	Load Based & Responding & Supervised device
Antenna Gain	3dBi
Antenna Type	Integral Antenna
DFS Function	Slave without Radar detection

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	Band 1	802.11a/n(HT20)/ac(HT20)	5180-5240	4
		802.11n(HT40)/ac(HT40)	5190-5230	2
		802.11ac(HT80)	5210	1
	Band 2	802.11a/n(HT20)/ac(HT20)	5260-5320	4
		802.11n(HT40)/ac(HT40)	5270-5310	2
		802.11ac(HT80)	5290	1
	Band 3	802.11a/n(HT20)/ac(HT20)	5500-5700	11
		802.11n(HT40)/ac(HT40)	5510-5670	5
		802.11ac(HT80)	5530	2
Band 4	802.11a/n(HT20)/ac(HT20)	5745-5825	5	
	802.11n(HT40)/ac(HT40)	5755-5795	2	
	802.11ac(HT80)	5775	1	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Channel Spacing:	802.11a/n(HT20)/ac(HT20): 20MHz 802.11n(HT40)/ac(HT40): 40MHz 802.11ac(HT80): 80MHz			



5.8G WiFi:

Antenna Gain	3dBi
Operation Frequency	5725MHz-5850MHz

### 3.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

### 3.5 Test Facility

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

• **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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.

• **NVLAP (Certificate No. 201034-0)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program(NVLAP). Certificate No. 201034-0.

• **FCC –Designation Number: CN5033**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

Designation Number: CN5033. Test Firm Registration Number: 479755.

• **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

• **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

## 4 Test Standards and Limits

The evaluation has been performed on the EUT, pursuant to the relevant requirements of the following document(s) and the harmonized EN standard(s) covering essential requirements under article 3.1 of the RED Directive (2014/53/EU).

Identity	Document Title	Version
Council Recommendation of 12 July 1999(1999/519/EC)	On the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz)	1999
EN 62311	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)	2008

**Limit:** According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )
0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\ 000/f$	$5\ 000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Note:

1.  $f$  as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz,  $S_{eq}$ ,  $E_2$ ,  $H_2$ , and  $B_2$  are to be averaged over any six-minute period.



3. For frequencies exceeding 10 GHz, Seq, E2, H2, and B2 are to be averaged over any  $68/f$  1.05 -minute period ( $f$  in GHz).

4. No E-field value is provided for frequencies  $< 1$  Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.

**The limit of power density is 10W/m<sup>2</sup>.**



## 5 Calculation Formula and Test Result

### 5.1 Calculation Formula

$$Pd = (P_{out} * G) / 4\pi R^2$$

Where:

Pd = Power density in W/m<sup>2</sup>

P<sub>out</sub> = Output power to antenna in W

G = Antenna Gain in linear scale

π = 3.14

R = distance to the center of radiation of antenna (in meter) = 0.2m

**NOTE:** Pd limit = 10W/m<sup>2</sup>.

### 5.2 Test Results

The EIRP Data is based on the RF Test Report SHEM180500381902, SHEM180500381903, SHEM180500381904, SHEM180500381905, SHEM180500381906.

*For BT:*

The Max Conducted Peak Output Power is 7.79dBm (6.01mW);

$$\text{So, } S = \frac{PG}{4R^2\pi} = \frac{6.01}{4 \times 0.04 \times 3.14} = 0.024 \text{W/m}^2$$

*For Wi-Fi:*

The Max Conducted Peak Output Power is 16.92dBm (49.20mW);

$$\text{So, } S = \frac{PG}{4R^2\pi} = \frac{49.20}{4 \times 0.04 \times 3.14} = 0.20 \text{W/m}^2$$

Which is below the max permitted sending level of 10W/m<sup>2</sup>, and then the EUT is not need to conduct SAR measurement.

**--The End of Report--**