

Report No.: SZEM200900888607

Page: 1 of 11

# RF Exposure Evaluation Report

**Application No.:**

SZEM2009008886CR

**Applicant:**

HARXON CORPORATION

**Address of Applicant:**9/F, Block B, D3 Building, TCL International E City, No.1001  
Zhongshanyuan Road, Nanshan District, Shenzhen, China.**Manufacturer:**

HARXON CORPORATION

**Address of Manufacturer:**9/F, Block B, D3 Building, TCL International E City, No.1001  
Zhongshanyuan Road, Nanshan District, Shenzhen, China.**Factory:**

HARXON CORPORATION

**Address of Factory:**9/F, Block B, D3 Building, TCL International E City, No.1001  
Zhongshanyuan Road, Nanshan District, Shenzhen, China.**Product Name:**

Wireless data transceiver

**Model No.:**

HX-DU8616DPRO

**Trade Mark:**

eRadio

**FCC ID:**

2ACRAHX-DU8616DPRO

47 CFR Part 1.1307

**Standards:**

47 CFR Part 1.1310

47 CFR Part 2.1091

**Date of Receipt:**

2020-09-04

**Date of Test:**

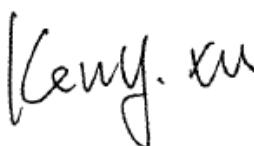
2020-09-20 to 2020-10-19

**Date of Issue:**

2020-10-20

<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



SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch Inspection & Testing Service Laboratory

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-10-20		Original

Authorized for issue by:			
			
		Edison Li /Project Engineer	
			
		Eric Fu /Reviewer	



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### **3 Contents**

	<b>Page</b>
<b>1 COVER PAGE</b>	<b>1</b>
<b>2 VERSION</b>	<b>2</b>
<b>3 CONTENTS</b>	<b>3</b>
<b>4 GENERAL INFORMATION</b>	<b>4</b>
4.1 GENERAL DESCRIPTION OF EUT	4
4.2 TEST LOCATION	6
4.3 TEST FACILITY	6
4.4 DEVIATION FROM STANDARDS	6
4.5 ABNORMALITIES FROM STANDARD CONDITIONS	6
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
<b>5 RF EXPOSURE EVALUATION</b>	<b>7</b>
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	7
5.1.1 <i>Limits</i>	7
5.1.2 <i>Test Procedure</i>	7
5.1.3 <i>EUT RF Exposure Evaluation</i>	8



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## 4 General Information

### 4.1 General Description of EUT

Power supply:	DC 12V
Internal source:	More than 108MHz
Classification:	Population/Uncontrolled Environment
<b>For Bluetooth classic mode:</b>	
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Hopping Channel Type:	Adaptive Frequency Hopping systems
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Sample Type:	Fixed device
Antenna Type:	Ceramic Antenna
Antenna Gain:	2dBi
<b>For Bluetooth LE mode:</b>	
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Modulation Type:	GFSK
Data rate:	1Mbps, 2Mbps
Number of Channels:	40
Sample Type:	Fixed device
Antenna Type:	Ceramic Antenna
Antenna Gain:	2dBi
<b>For WCDMA/LTE:</b>	
Operation Frequency Band:	WCDMA Band II/V; LTE FDD Band 2,4,5,12,13,
Modulation Type:	WCDMA: QPSK LTE: QPSK, 16QAM
HSDPA UE Category:	24
HSUPA UE Category:	6
LTE Category:	4
Antenna Type:	PCB Antenna
Antenna Gain:	5dBi



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Report No.: SZEM200900888607  
Page: 5 of 11

For UHF:	
Frequency Range:	410MHz to 470MHz
Modulation Type:	GMSK, 4FSK
Channel Separation:	12.5KHz
Number of Channels:	The equipment is able to operate on any designated channel within the specified frequency range.
Antenna Type:	TNC Antenna Connector
Antenna Gain:	5.5dBi



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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:

- **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.

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

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

For Uncontrolled Environment, the MPE limit of 300MHz to 1500MHz is f/1500 mW/cm<sup>2</sup> , the MPE limit of 1500MHz to 100000MHz is 1.0 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

#### 1) Test Results

Note: The Bluetooth, WCDMA/LTE and UHF can synchronous transmission at the same time.

##### For Bluetooth classic mode:

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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant1	2	1.58	8	6.31	0.00002	1	0.00002	PASS

Note: Refer to report No. SZEM200900888602 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

##### For Bluetooth LE mode:

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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant1	2	1.58	6	3.98	0.00001	1	0.00001	PASS

Note: Refer to report No. SZEM200900888603 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

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**For WCDMA Band V(824MHz-849MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	24	251.19	0.0014	0.5497	<b>0.0026</b>	PASS

Note: Refer to report No. SZEM200900888604 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

**For LTE Band 5(824MHz-849MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	23	199.53	0.0011	0.5498	0.0021	PASS

Note: Refer to report No. SZEM200900888605 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

**For WCDMA Band II(1850MHz-1910MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	24	251.19	0.0014	1	0.0014	PASS

Note: Refer to report No. SZEM200900888604 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.



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**For LTE Band 2(1850MHz-1910MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	23	199.53	0.0011	1	0.0011	PASS

Note: Refer to report No. SZEM200900888605 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

**For LTE Band 4(1710MHz-1755MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	23	199.53	0.0011	1	0.0011	PASS

Note: Refer to report No. SZEM200900888605 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

**For LTE Band 12(699MHz-716MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	23	199.53	0.0011	0.4665	0.0024	PASS

Note: Refer to report No. SZEM200900888605 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.



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**For LTE Band 13(777MHz-787MHz):**

The max tune-up tolerance power Into Antenna &amp; 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 =210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant2	5	3.16	23	199.53	0.0011	0.5197	0.0022	PASS

Note: Refer to report No. SZEM200900888605 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

**For UHF(410MHz-470MHz):**

The max tune-up tolerance power Into Antenna &amp; 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=210cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
Ant3	5.5	3.55	46.00	39810.72	0.2549	0.2733	<b>0.9325</b>	PASS

Note: Refer to report No. SZEM200900888606 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 210 cm separation requirement.

The simultaneous transmission result between of Bluetooth,WCDMA/LTE and UHF:

The SAR Exclusion Threshold Level:

=CPD1 / LPD1 + CPD2 / LPD2 + CPD3 / LPD3

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

= (0.00002/1) +(0.0014/0.5497) +(0.2549/0.2733)= 0.9351 &lt; 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 Report

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