



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

Test Result :	PASS*
----------------------	--------------

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.
Attention: To check the authenticity of testing/inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Center EMC Laboratory

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



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		





3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL INFORMATION	4
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
5 RF EXPOSURE EVALUATION	7
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	7
5.1.1 Limits	7
5.1.2 Test Procedure	7
5.1.3 EUT RF Exposure Evaluation	8





4 General Information

4.1 General Description of EUT

Power supply:	DC 12V
Internal source:	More than 108MHz
Classification:	Population/Uncontrolled Environment
For Bluetooth classic mode:	
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, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79
Sample Type:	Fixed device
Antenna Type:	Ceramic Antenna
Antenna Gain:	2dBi
For Bluetooth LE mode:	
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
For WCDMA/LTE:	
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



Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing /inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

SGS-CSTC Standards Technical Services Co., Ltd. No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.ssgsgroup.com.cn
Shenzhen Branch Testing Center, EEC Laboratory. 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



**SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch**

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



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch (CMAA) Testing Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

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

Member of the SGS Group (SGS SA)



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.



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch EMC Laboratory

Unless otherwise agreed in writing, this document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Documents.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Attention: To check the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-755) 8307 1443, or email: CN.Doccheck@sgs.com

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

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

For Uncontrolled Environment, the MPE limit of 300MHz to 1500MHz is f/1500 mW/cm², the MPE limit of 1500MHz to 100000MHz is 1.0 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

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 ²)	Limit (mW/cm ²)	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 ²)	Limit (mW/cm ²)	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.





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

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 ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant2	5	3.16	24	251.19	0.0014	0.5497	0.0026	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 & 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 ²)	Limit (mW/cm ²)	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 & 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 ²)	Limit (mW/cm ²)	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.





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

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 ²)	Limit (mW/cm ²)	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 & 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 ²)	Limit (mW/cm ²)	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 & 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 ²)	Limit (mW/cm ²)	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.





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

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 ²)	Limit (mW/cm ²)	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 & 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 ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant3	5.5	3.55	46.00	39810.72	0.2549	0.2733	0.9325	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:

$$= \text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2} + \text{CPD3} / \text{LPD3}$$

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

$$= (0.00002/1) + (0.0014/0.5497) + (0.2549/0.2733) = 0.9351 < 1$$

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

