Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

EMF ASSESSMENT REPORT

EN IEC 62311:2020

Report Reference No.....:	**GTS20211129024-1-5**
Compiled by (position+printed name+signature)..:	File administrators Peter Xiao
Supervised by (position+printed name+signature)..:	Test Engineer Oliver Ou
Approved by (position+printed name+signature)..:	Manager Simon Hu
Date of issue.....:	Dec.30, 2021
Representative Laboratory Name.:	**Shenzhen Global Test Service Co.,Ltd.**
Address .....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong
Applicant's name.....:	**ZHUHAI TAIXIN SEMICONDUCTOR CO.LTD**
Address .....:	3F, Building 2, Harbor 1 Science and Technology Park, No.1 Jin Tang Road, Tangjiawan Town, High-tech Zone, Zhuhai, Guangdong, China
Test specification .....**:**	
Standard .....:	**EN IEC 62311:2020**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF.....:	Dated 2014-12

Test item description .....:	**TX-AH module**
Trade Mark .....:	N/A
Manufacturer .....:	ZHUHAI TAIXIN SEMICONDUCTOR CO.LTD
Model/Type reference.....:	TX-AH-R900PNR-860M
Listed model .....:	TX-AH-R900P
Ratings .....:	DC 3.0-3.6V by Pinboard Recharged by DC 5.0V
Result.....:	**PASS**

EMF ASSESSMENT REPORT

Test Report No. :	**GTS20211129024-1-5**	Dec.30, 2021 Date of issue

Equipment under Test	:	TX-AH module
Model /Type	:	TX-AH-R900PNR-860M
Listed model	:	TX-AH-R900P
Applicant	:	**ZHUHAI TAIXIN SEMICONDUCTOR CO.LTD**
Address	:	3F, Building 2, Harbor 1 Science and Technology Park, No.1 Jin Tang Road, Tangjiawan Town, High-tech Zone, Zhuhai, Guangdong, China
Manufacturer	:	**ZHUHAI TAIXIN SEMICONDUCTOR CO.LTD**
Address	:	3F, Building 2, Harbor 1 Science and Technology Park, No.1 Jin Tang Road, Tangjiawan Town, High-tech Zone, Zhuhai, Guangdong, China

Test Result:	**PASS**

Contents

1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

●	/	M/N:	/
		Manufacturer:	/

1.2. Product Description

Product Name:	TX-AH module
Trade Mark:	N/A
Model/Type reference:	TX-AH-R900PNR-860M
List Model:	TX-AH-R900P
Model Declaration	Please see description of differences
Power supply:	DC 3.0-3.6V by Pinboard Recharged by DC 5.0V
Hardware Version	V1.1
Software Version	V1.3
SRD	
Frequency Range	863.0-865.0MHz, 865.0-868.0MHz
Channel Number	1 Channel to 2M(864.0MHz, 866.0MHz) 2 Channel to 1M(863.5MHz, 864.5MHz) 3 Channel to 1M(865.5MHz, 866.5MHz, 867.5MHz)
Channel Bandwidth	1MHz, 2MHz
Modulation Type	OFDM
Antenna Description	External Antenna,3.00dBi

1.3. Difference description

The difference between TX-AH-R900PNR-860M and TX-AH-R900P series is show in the below table:

Differences / Models	TX-AH-R900P	TX-AH-R900PNR-860M
Silk screen	Different	Different
Shielding cover	Same with shielding cover	The same
Module board	/	Add a Saw to the Switch
RF IC Chip-set	TXW8301	The same
Circuit/ schematics	/	Add a Saw to the Switch
Layout	/	Add a Saw to the Switch
BOM	/	Add a Saw to the Switch
Frequency bands	802.11ah 2M:866/864; 1M:863.5/864.5/865.5/866.5/867.5	The same
BT/ Wi-Fi antenna	External Antenna	The same
Appearance	The same	The same
Dimension	17mm*15mm*2.4mm	The same
Power Supply	The same	The same
Accessories	/	/

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

2.2. Test Facility

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

CNAS (No. CNAS L8169)
Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.
A2LA (Certificate No. 4758.01)
Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.
Industry Canada Registration Number. is 24189.
FCC Designation Number is CN1234.
FCC Registered Test Site Number is165725.

2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Method of measurement

3.1. Applicable Standard

EN 62311: Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)

Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz) (Official Journal L 197 of 30 July 1999).

3.2. Introduction

This International Standard provides simple conformity assessment methods for low-power electronic and electrical equipment to an exposure limit relevant to electromagnetic fields (EMF). If such equipment cannot be shown to comply with the applicable EMF exposure requirements using the methods included in this standard for EMF assessment, then other standards, including IEC 62311 or other (EMF) product standards, may be used for conformity assessment.

3.3. Limit

Basic restriction for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (mA/m^2)	Whole body average SAR(W/kg)	Localised SAR (head and trunk)(W/kg)	Localised SAR (limbs) (W/kg)	Power density, S (W/m^2)
0Hz	40	--	--	--	--	--
>0-1Hz	--	8	--	--	--	--
1-4Hz	--	8/f	--	--	--	--
4-1000Hz	--	2	--	--	--	--
1000Hz-100kHz	--	f/500	--	--	--	--
100kHz-10MHz	--	f/500	0.08	2	4	--
10MHz-10GHz	--	--	0.08	2	4	--
10-300GHz	--	--	--	--	--	10

Notes:
1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical in homogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by $\sqrt{2}$(=1.414). For pulses of duration t_p the equivalent frequency to apply in the basic restrictions should be calculated as=1/ ($2t_p$)
5. For frequencies up to 100 kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimeter but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dissymmetric quantities have conservation values relative to the exposure guidelines.
8. For pulses of duration t_p the equivalent frequency to apply in the basic restrictions should be calculated as=1/($2t_p$). Additionally, for pulsed exposures, in the frequency range 0.3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoplastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (uT)	Equivalent plane wave power density S_{eq}(W/m^2)
0-1Hz	--	3.2×10^4	4×10^4	--
1-8Hz	10000	$3.2\times10^4/f^2$	$4\times10^4/f^2$	--
8-25Hz	10000	4000/f	5000/f	--
0.025-0.8KHz	250/f	4/f	5/f	--
0.8-3KHz	250/f	5	6.25	--
3-150KHz	87	5	6.25	--
0.15-1MHz	87	0.73/f	0.92/f	--
1-10MHz	$87/f^{1/2}$	0.73/f	0.92/f	--
10-400MHz	28	0.073	0.092	2
400-2000MHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$0.0046f^{1/2}$	f/200
2-300GHz	61	0.16	0.20	10

Notes: 1. As indicated in the frequency range column.

2. For frequencies between 100 kHz and 10GHz, S_{eq}, E^2, H^2 and B^2 are to be averaged over any six-minute period.

3. For frequencies exceeding 10GHz, S_{eq}, E^2, H^2 and B^2 are to be averaged over any $68/f^{1.05}$-minute period (.in GHz).

4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

3.4. EMF Assessment Method

Predication of EMF limit at a given distance
Equation from page 26 of EN 62311, Edition 2008

$$E=\eta_0 H=\frac{\sqrt{30PG(\theta,\phi)}}{r}$$

Where:
E: E-field strength (V/m)
P: power input to antenna (Watt)
G: is the antenna gain relative to an isotropic antenna;
θ,ϕ : are elevation and azimuth angles to point of investigation;
r: is the distance from observation point to the antenna;
η_0 : is the characteristic impedance of free space.

As declared by the Applicant, the EUT transmits with the maximum soure-baed Duty Cycle of 100%, and the EUT is a wireless device used in a medical application, at least 20cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, r=20cm, as well as the gain of the used antenna is 3.0dBi for SRD, the RF power density can be obtained.

4. Test Result

Mode	Maximum Output Power(EIRP) (dBm)	Maximum Output Power (W)	Antenna Gain (dBi)	Minimum Separation Distance (cm)	E-field strength Limit (V/m)	E-field strength At 20 cm (V/m)
SRD	13.00	0.0200	3.00	20	40.39	5.464

5. Conclusion

The measurement results comply with the relevant limits for general public exposure specified as reference levels in the Council Recommendation 1999/519/EC.

.....End of Report.....