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Report No.: SZEM120900505103

Page: 1 of 7

RF Exposure Evaluation Report

Application No.: SZEM1209005051RF
Applicant: Stonex Europe Srl
Manufacturer: Stonex Europe Srl
Factory: Stonex Europe Srl
Host Product Name: GPS Receiver
Host Model No.: S8N GNSS
Bluetooth Module FCC ID: Y44-B2029
GPRS Module FCC ID: RI7GC864Q2
Standard: 47 CFR Part 1.1307(2011)
47 CFR Part 1.1310(2011)
Date of Receipt: 2012-09-05
Date of Test: 2012-09-10 to 2012-09-25
Date of Issue: 2013-05-09

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang
EMC Laboratory 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.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Contents

1	COVER PAGE	1
2	CONTENTS	2
3	GENERAL INFORMATION	3
3.1	CLIENT INFORMATION	3
3.2	GENERAL DESCRIPTION OF EUT	3
3.3	TEST LOCATION	5
3.4	TEST FACILITY	5
3.5	DEVIATION FROM STANDARDS	5
3.6	ABNORMALITIES FROM STANDARD CONDITIONS.....	5
3.7	OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	5
4	RF EXPOSURE EVALUATION	6
4.1	RF EXPOSURE COMPLIANCE REQUIREMENT	6
4.1.1	Limits.....	6
4.1.2	Test Procedure.....	6
4.2	EUT RF EXPOSURE EVALUATION.....	7

3 General Information

3.1 Client Information

Applicant:	Stonex Europe Srl
Address of Applicant:	Via Zucchi 1, 20090 Monza (MB), Italy
Manufacturer:	Stonex Europe Srl
Address of Manufacturer:	Via Zucchi 1, 20090 Monza (MB), Italy
Factory:	Stonex Europe Srl
Address of Factory:	Via Zucchi 1, 20090 Monza (MB), Italy

3.2 General Description of EUT

Host Product Name:	GPS Receiver
Host Model No.:	S8N GNSS
Bluetooth Module FCC ID:	Y44-B2029
GPRS Module FCC ID:	RI7GC864Q2
Trade Mark:	STONEX
Bluetooth:	
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	2.0 +EDR
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Sample Type:	Mobile production
Test Power Grade:	50 (manufacturer declare)
Test Software of EUT:	CSR BlueSuite (manufacturer declare)
Antenna Type:	Integral
Antenna Gain:	0.9dBi
GPRS 850/1900:	
IMEI:	359551033540278
Support Frequency Band:	GPRS 850/1900
Modulation Type:	GMSK
Sample Type:	Mobile production
Test Power Grade:	GPRS 850MHz 33dBm GPRS 1900MHz 30dBm
Antenna Gain	2.0dBi



Power Supply:	AC Adapter:	MODEL:PSA18R-120P INPUT: AC 100-240V 0.5A 50-60Hz 40-60VA OUTPUT : DC 12V 1.5A
	Battery Charger:	Type: CH-S932X84 INPUT: 12V DC 1.5A max OUTPUT: 2*8.4V DC 400mA max
EUT Power Supply:	Type: BT-S9374 DC 7.4V 2500mAh 18.5Wh Li-Ion Battery	
Test Voltage:	DC 7.4V	

3.3 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.

3.4 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 3m Semi-anechoic chamber, Full-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.: R-2197, G-416, 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)**
The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1.

3.5 Deviation from Standards

None.

3.6 Abnormalities from Standard Conditions

None.

3.7 Other Information Requested by the Customer

None.





4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

Pd = power density in mW/cm²

Pout = 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

Pd id the limit of MPE, 1 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.

4.1.2 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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4.2 EUT RF Exposure Evaluation

Bluetooth:

Antenna Gain: 0.9dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.230 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	E.I.R.P. (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Level/Limit (%)
Lowest	2402	-0.10dBm	0.977mW	0.000239	1.0	0.023

Note: Refer to report No. SZEM120900505101 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

GPRS 850/1900:

Antenna Gain: 2.0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.585 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

GPRS 850

Channel	Frequency (MHz)	E.R.P. (dBm)	E.R.P. (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Level/Limit (%)
Lowest	128/824.2	28.81	760.326	0.240	0.55	44

GPRS 1900

Channel	Frequency (MHz)	E.I.R.P (dBm)	E.I.R.P. (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	Level/Limit (%)
Highest	810/1909.8	28.23	665.273	0.210	1.0	21

Note: Refer to report No. SZEM120900505102 for EUT test ERP/EIRP.

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

Total Level/Limit (%) =0.023+44+21 =65.023 % < 1

In test, the GPRS and Bluetooth function transmitting at the same time.

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