SGS-CSTC Standards Technical Services Co., Ltd.

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RF Exposure Evaluation Report

Application No.:	SZEM1503001440HR
Applicant:	Fortify Technologies, LLC.
Manufacturer:	Fortify Technologies Asia, Inc.
Factory	Fortify Technologies Asia, Inc.
Product Name:	2G Sync Station
Model No.(EUT):	FD800
FCC ID:	2ADZKFD800
Standards:	47 CFR Part 1.1307 (2014) 47 CFR Part 1.1310 (2014)
Date of Receipt:	2015-04-09
Date of Test:	2015-04-21 to 2015-05-13
Date of Issue:	2015-05-15
Test Result :	**PASS***

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

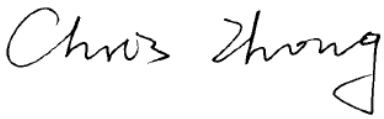
Authorized Signature:

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.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2015-05-15		Original

Authorized for issue by:				
Tested By		 **(Chris Zhong) /Project Engineer**		2015-05-13 **Date**
Prepared By		 **(Hedy Wen) /Clerk**		2015-05-15 **Date**
Checked By		 **(Jim Huang) /Reviewer**		2015-05-15 **Date**

3 Contents

4 General Information

4.1 Client Information

Applicant:	Fortify Technologies, LLC.
Address of Applicant:	6200 Shingle Creek pkwy, Suite400, Minneapolis, Minnesota, US 55430
Manufacturer:	Fortify Technologies Asia, Inc.
Address of Manufacturer:	MEPZ1, Ibo Road, Lapu-lapu City, 6015, Cebu, Philippines
Factory:	Fortify Technologies Asia, Inc.
Address of Factory:	MEPZ1, Ibo Road, Lapu-lapu City, 6015, Cebu, Philippines

4.2 General Description of EUT

Product Name:	2G Sync Station
Model No.:	FD800
Sample Type:	Fixed production
Antenna Type:	Dipole
Antenna Gain:	5.3dBi for Bluetooth 2dBi for GSM850/ GSM1900
Power Supply:	USB 5V

4.3 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.

4.4 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 10m Semi-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.: G-823, R-4188, 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)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.

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: $Pd = (Pout*G)/(4* Pi * R^2)$

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.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

1）. exposure conditions for standalone operations

For Bluetooth

Antenna Gain: 5.3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.39 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Mode	Tune up limit(dBm)	Max. time-averaged EIRP(dBm)	Max. time-averaged EIRP(mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	MPE Ratios	Result
BLE	2	7.3	5.4	0.001	1.0	0.001	PASS

Note: Refer to report No. SZEM150300144002 for EUT test Max Conducted Peak Output Power value.

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

For GSM

Antenna Gain: 2dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.58 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

1) GSM850

Mode	Tune up Limit (dBm)	Max. Time-averaged Conducted Power(dBm)	Max. time-averaged EIRP(dBm)	Max. time-averaged EIRP(mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	MPE Ratios	Result
1TS	33	23.81	25.81	381	0.075797	0.549	0.138	PASS
2TS	33	26.82	28.82	762	0.151595	0.549	0.276	PASS
3TS	33	28.58	30.58	1143	0.227392	0.549	**0.414**	PASS
4TS	30.5	27.33	29.33	857	0.170494	0.549	0.311	PASS

2) GSM1900

Mode	Tune up limit (dBm)	Max. Time-averaged Conducted Power(dBm)	Max. time-averaged EIRP (dBm)	Max. time-averaged EIRP(mW)	Power Density at R = 20 cm (mW/cm^2)	Limit	MPE Ratios	Result
1TS	28.5	19.31	21.31	135	0.026857	1.0	0.027	PASS
2TS	28.5	22.32	24.32	270	0.053715	1.0	0.054	PASS
3TS	28.5	24.08	26.08	405	0.080572	1.0	0.081	PASS
4TS	28.5	25.33	27.33	540	0.107429	1.0	**0.107**	PASS

Note:

1) Refer to Appendix B of Test Report SZEM150300144003 for EUT test Max Conducted Peak Output Power value.

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

3) CMU200 measures GSM peak and average output power for active timeslots. For MPE the time based average power is relevant. The difference in between depends on the duty cycle of the TDMA signal:

No. of timeslots	1	2	3	4
Duty Cycle	1:8.3	1:4.15	1:2.77	1:2.075
Time based avg. power compared to slotted avg. power	-9.19	-6.18	-4.42	-3.17

4) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8

5) The Max Time-averaged Conducted Power=

Tune-up Limit+ Time based avg. power compared to slotted avg. power

2）. exposure conditions for simultaneous transmission operations

Simultaneous transmission MPE test is not required,because the Max. sum of the MPE ratios for GSM and BT is 0.414+0.001=0.415＜1