SGS-CSTC Standards Technical Services Co., Ltd.

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RF Exposure Evaluation Report

Application No. :	SZEM1207004268RF
Applicant:	3M Cogent, Inc
Manufacturer:	Cogent Systems (Shenzhen), Inc.
Factory:	Cogent Systems (Shenzhen), Inc.
Product Name:	Mini-Gate, Normal CPU, Philips card reader, standard + Battery + GPRS version
Model No.(EUT):	ACD100P-CG
FCC ID:	ZYFACD100P-CG
Standards:	47 CFR Part 1.1307(2011)
	47 CFR Part 1.1310(2011)
Date of Receipt:	2012-07-31
Date of Test:	2012-09-27 to 2012-11-27
Date of Issue:	2013-01-04
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 Contents

3 General Information

3.1 Client Information

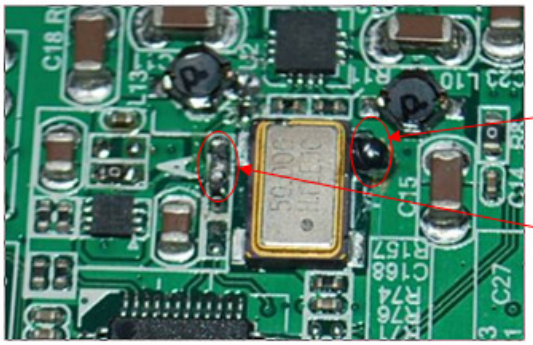
Applicant:	3M Cogent, Inc
Address of Applicant:	639 N. Rosemead Blvd. Pasadena, CA 91107, USA
Manufacturer:	Cogent Systems (Shenzhen), Inc.
Address of Manufacturer:	10/F TINWE INDUSTRIAL PARK PHASE 2, 6 LIUFANG RD, 67 AREA, BAOAN DISTRICT, SHENZHEN, GUANGDONG, 518101, CHINA
Factory:	Cogent Systems (Shenzhen), Inc.
Address of Factory:	10/F TINWE INDUSTRIAL PARK PHASE 2, 6 LIUFANG RD, 67 AREA, BAOAN DISTRICT, SHENZHEN, GUANGDONG, 518101, CHINA

3.2 General Description of EUT

Product Name:	Mini-Gate, Normal CPU, Philips card reader, standard + Battery + GPRS version	
Model No.:	ACD100P-CG	
Trade Mark:	3M	
Hardware Version:	V1.0	
Software Version:	V1.0	
IMEI:	351802052211525	
Test Power Grade:	GPRS 850MHz 33dBm GPRS 1900MHz 30dBm	
Frequency Band:	GPRS 850/1900	
Type of Emission:	GPRS(GMSK): 250KGXW	
GPRS Class	Class 10	
Modulation Type:	GPRS Mode with GMSK Modulation	
Sample Type:	Mobile production	
Antenna Type:	Integral	
Antenna Gain:	0dBi	
Power Supply:	AC adapter:	AC/DC Adapter MODEL:PA-1061-0 INPUT: AC 100-240V 50/60Hz 1.5A OUTPUT: DC 12V 5.0A
	Battery:	7.4V recharge battery
Test Voltage (Declared by client):	Normal voltage: 7.4V lowest voltage: 6.5V highest voltage: 8.4V	

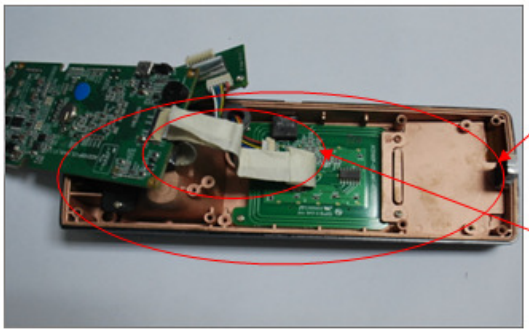
Remark:

The EUT passed the all tests after modification. See picture below:



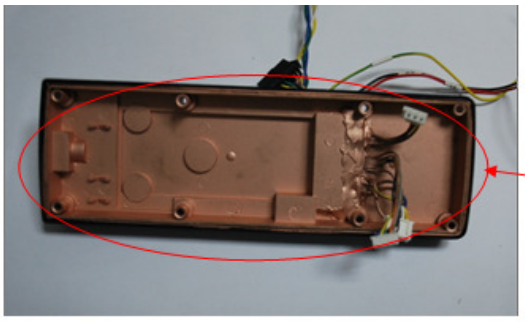
Connect the GND.

Change the resistance to 2PCS chip beads.
Mode:MMZ1005F470C

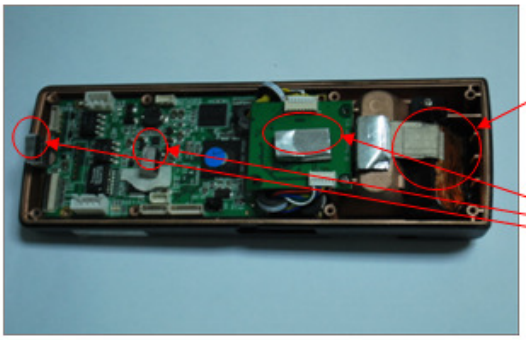


For the plastic casing spray the conductive material on it.

Paste the conductorial cloth on the cable and connect it with the GND.

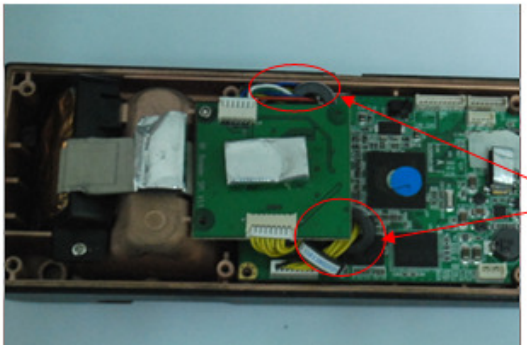


For the plastic casing spray the conductive material on it.

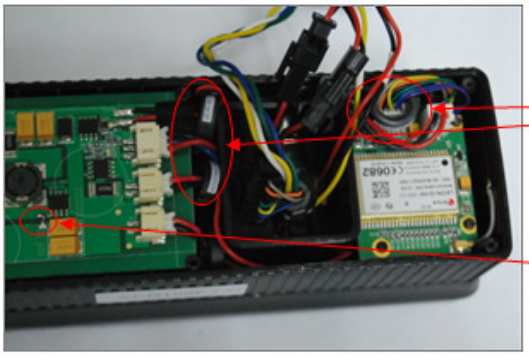


For the crust cover it with copper sheet and connect it with GND.

Add 4PCS sponge and connect with the GND.

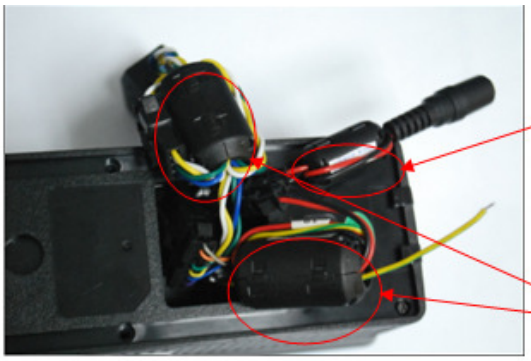


Add 4PCS EMI ferrite on the cable .
P/N:F5K T14*5*9



Add 3PCS EMI ferrite on the cable .
P/N:F5K T14*5*9

Add 1PC 102pF capacitor to GND.



Add 1PC EMI ferrite on the cable .
P/N:RC-70B

Add 2PCS EMI ferrite on the cable .
P/N:RC-90B

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

Where

Pd = power density in mW/cm^2

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/cm^2 . 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

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

4.1.3 EUT RF Exposure Evaluation

Max tune up :

GSM850		GSM1900	
PCL	**PWR**	**PCL**	**PWR**
5	32.2 ± 1 dBm	0	29.2 ± 1 dBm

Max EIRP :

GSM850		GSM1900	
Frequency (MHz)	**EIRP (dBm)**	**Frequency (MHz)**	**EIRP (dBm)**
824.2	32.17	1909.8	28.51

Max Power Density (mW/cm^2) at R = 20 cm

GSM850		GSM1900	
Power Density (mW/cm^2)	**Limit (mW/cm^2)**	**Power Density (mW/cm^2)**	**Limit (mW/cm^2)**
0.42	f/1500=0.55	0.21	1

Result: Passed

Note:

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

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

Refer to report No. SZEM120700426802 for EUT test GPRS Max EIRP value.

RFID function and GPRS function cannot simultaneously transmit.