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Report No.: SZEM120700426801
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FCC 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
Operation Frequency: 13.56MHz
FCC ID: ZYFACD100P-CG
Standards: 47 CFR Part 15, Subpart C (2011)
Date of Receipt: 2012-07-31
Date of Test: 2012-09-27 to 2012-11-27
Date of Issue: 2012-12-07

| | |
|----------------------|---------------|
| 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.

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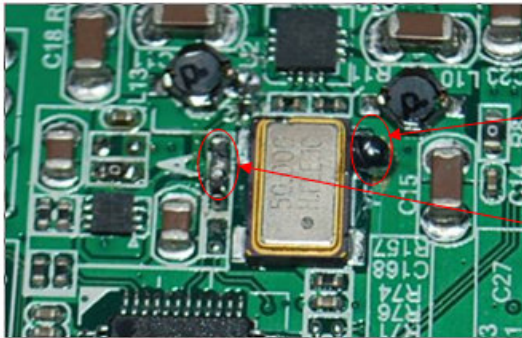
3 Test Summary

| Test Item | Section in CFR 47 | Result |
|-------------------------------------|-----------------------------------|--------|
| Radiated Emission | Section 15.209;15.225(a)(b)(c)(d) | Pass |
| Conducted Emission (150Hz to 30MHz) | 15.207 | Pass |
| Frequency Tolerance | Section 15.225(e) | Pass |
| Occupied Bandwidth | Section 15.215 | Pass |

Remark:

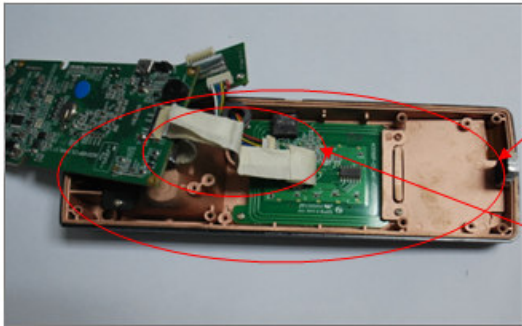
Pass: The EUT complies with the essential requirements in the standard.

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



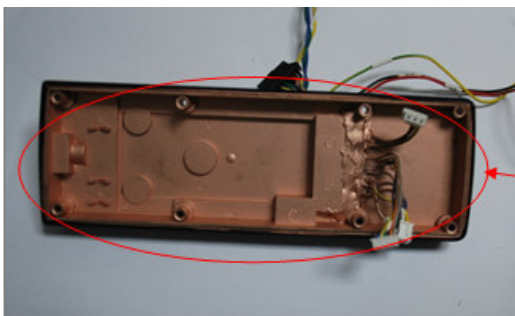
Connect the GND.

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

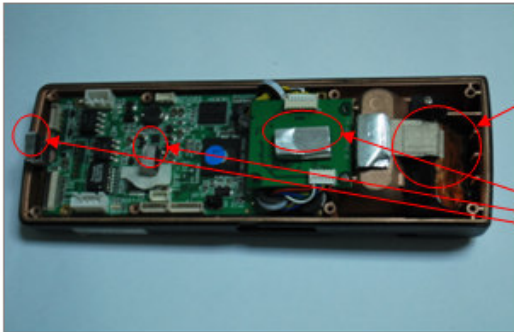


For the plastic casing spray the conductive material on it.

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

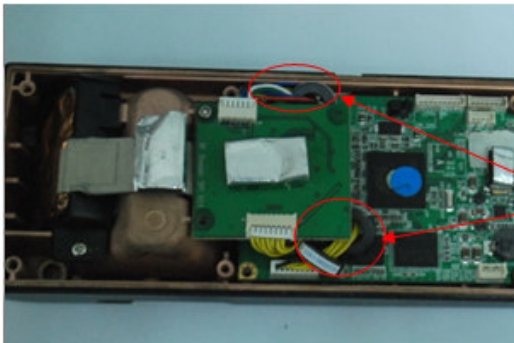


For the plastic casing spray the conductive material on it.

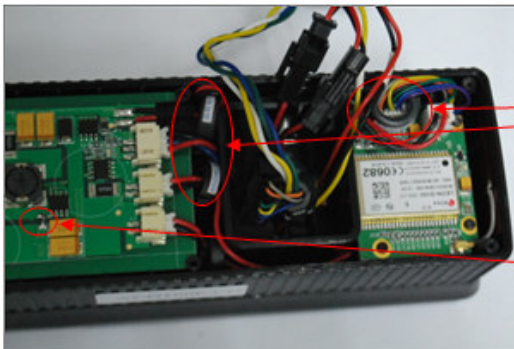


For the crust cover it with copper sheet and connect it with GND.

Add 4PCS sponge and connect with the GND.

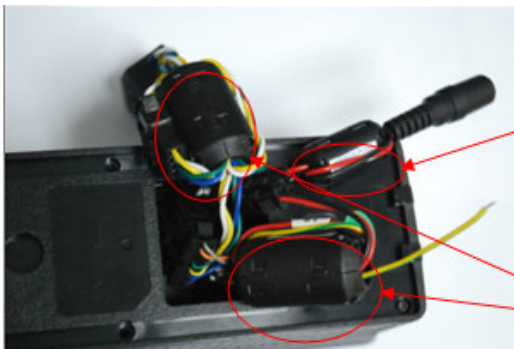


Add 4PCS EMI ferrite on the cable .
P/N:F5K T14*5*9



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



4 General Information

4.1 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: | TINWE INDUSTRIAL PARK PHASE 2, 6 LIUFANG RD, 67 AREA, BAOAN DISTRICT, SHENZHEN, GUANGDONG, 518101, CHINA |
| Factory: | Cogent Systems (Shenzhen), Inc |
| Address of Factory: | TINWE INDUSTRIAL PARK PHASE 2, 6 LIUFANG RD, 67 AREA, BAOAN DISTRICT, SHENZHEN, GUANGDONG, 518101, CHINA |

4.2 General Description of E.U.T.

| | | |
|---------------------------------------|---|--|
| Product Name: | Mini-Gate, Normal CPU, Philips card reader, standard + Battery + GPRS version | |
| Model No.: | ACD100P-CG | |
| Trade Mark: | 3M | |
| Operation Frequency: | 13.56MHz | |
| 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 | |

4.3 Test Environment and Modes

| | |
|-------------------------------|------------------------------------|
| Operating Environment: | |
| Temperature: | 24.0 °C |
| Humidity: | 55 % RH |
| Atmospheric Pressure: | 1015 mbar |
| Test mode: | |
| Transmitting mode: | Keep the EUT in transmitting mode. |

4.4 Description of Support Units

The EUT has been tested independent unit.



4.5 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.

4.6 Other Information Requested by the Customer

None.

4.7 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.



4.8 Equipment List

| RE in Chamber | | | | | |
|---------------|---------------------------------|------------------------------------|-----------|---------------|---------------------------|
| Item | Test Equipment | Manufacturer | Model No. | Inventory No. | Cal.Due date (yyyy-mm-dd) |
| 1 | 3m Semi-Anechoic Chamber | ETS-LINDGREN | N/A | SEL0017 | 2013-06-10 |
| 2 | EMI Test Receiver | Rohde & Schwarz | ESIB26 | SEL0023 | 2013-05-17 |
| 3 | EMI Test software | AUDIX | E3 | SEL0050 | N/A |
| 4 | Coaxial cable | SGS | N/A | SEL0027 | 2013-05-29 |
| 5 | Coaxial cable | SGS | N/A | SEL0189 | 2013-05-29 |
| 6 | Coaxial cable | SGS | N/A | SEL0121 | 2013-05-29 |
| 7 | Coaxial cable | SGS | N/A | SEL0178 | 2013-05-29 |
| 8 | BiConiLog Antenna (26-3000MHz) | ETS-LINDGREN | 3142C | SEL0015 | 2013-10-24 |
| 9 | Double-ridged horn (1-18GHz) | ETS-LINDGREN | 3117 | SEL0006 | 2013-10-24 |
| 10 | Pre-amplifier (0.1-1300MHz) | Agilent Technologies | 8447D | SEL0053 | 2013-05-17 |
| 11 | Pre-Amplifier (0.1-26.5GHz) | Compliance Directions Systems Inc. | PAP-0126 | SEL0168 | 2013-10-24 |
| 12 | Barometer | ChangChun | DYM3 | SEL0088 | 2013-05-24 |
| 13 | DC Power Supply | Zhao Xin | RXN-305D | SEL0117 | 2013-10-24 |
| 14 | Humidity/ Temperature Indicator | Shanghai Qixiang | ZJ1-2B | SEL0103 | 2013-10-24 |
| 15 | Signal Generator | Rohde & Schwarz | SMY01 | SEL0155 | 2013-10-24 |
| 16 | Signal Generator (10M-27GHz) | Rohde & Schwarz | SMR27 | SEL0067 | 2013-05-17 |
| 17 | Loop Antenna | Beijing Daze | ZN30401 | SEL0203 | 2013-06-04 |

Note: The calibration interval is one year, all the instruments are valid.

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5 Test Result & Measurement Data

5.1 Antenna Requirement

| | |
|---|-----------------------------|
| Standard requirement: | FCC Part15 C Section 15.203 |
| 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. | |

5.2 Radiated Emissions

| | |
|------------------------------|---|
| Test Requirement: | FCC Part15 C Section 15.225 |
| Test Method: | ANSI C63.10: 2009 |
| Measurement Distance: | 3m (Semi-Anechoic Chamber) |
| Requirements: | (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15.848 microvolts/meter at 30 meters. (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters. (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters. (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209. |
| Detector: | 0.009MHz to 30MHz QP RBW=9kHz VBW=30kHz 30MHz to 1000MHz QP RBW=100kHz VBW=300kHz |



| | |
|--------------------------|---|
| Test Procedure: | <ol style="list-style-type: none"> 1. The EUT is placed on a turntable, which is 0.8m above ground plane. 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. 3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance. 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. 6. Repeat above procedures until the measurements for all frequencies are complete. 7. The limit 1.705MHz to 30MHz in clause 4.3 are specified at 30 meters, and measurements were made at 3 meters, the limit is translated to 3 meters by using a formula as follows: Limit 3m = Limit30m + 40log(30m/3) |
| Test Instruments: | Refer to section 4.8 for details |
| Test Result: | The unit does meet the FCC Part 15 C Section 15.225 requirements. |

1.705-30MHz Mode

Test Procedure: For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.4: 2009, section 8.2.1. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

Measurement Data

Intentional emission

| Test Frequency (MHz) | Level (dBµV/m) | Limits (dBµV/m) | Margin (dB) |
|----------------------|----------------|-----------------|-------------|
| 13.56 | 79.09 | 124 | -44.91 |

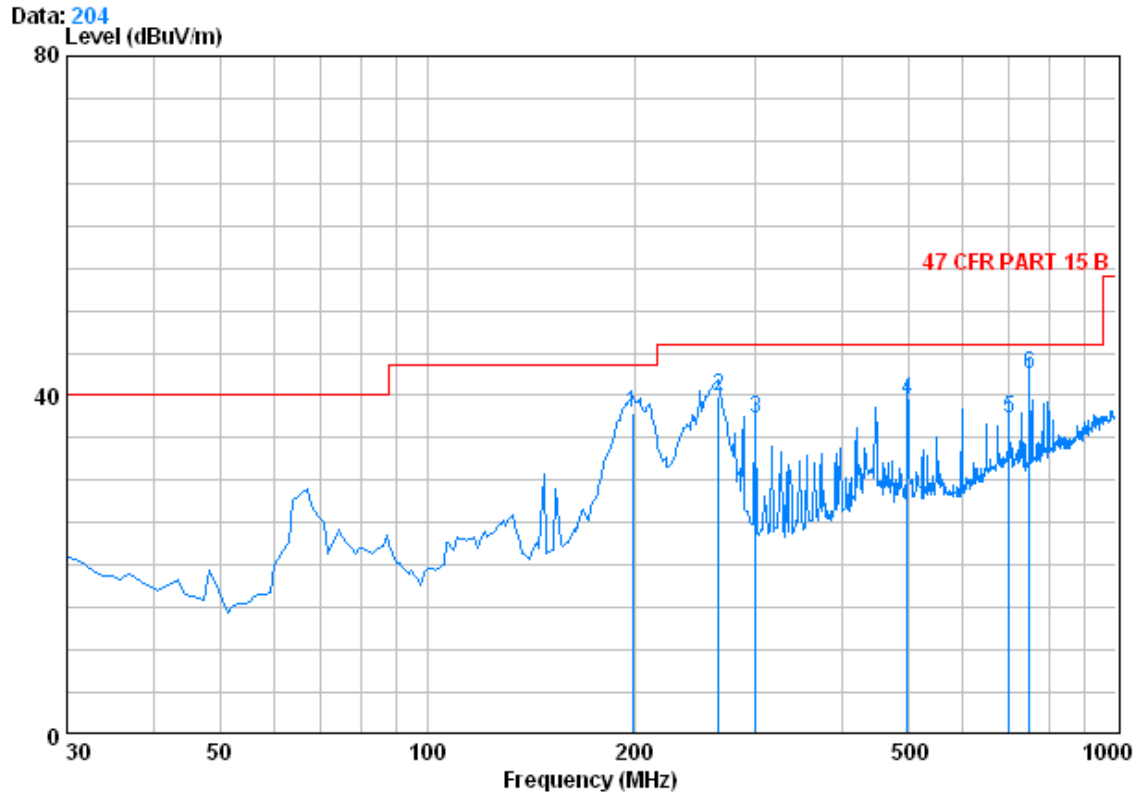
- Remark: 1. The EUT was tested at 3m in field chamber.
2. The EUT modulation type is ASK modulation, and duty is 100%.

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30MHz-1GHz

Horizontal



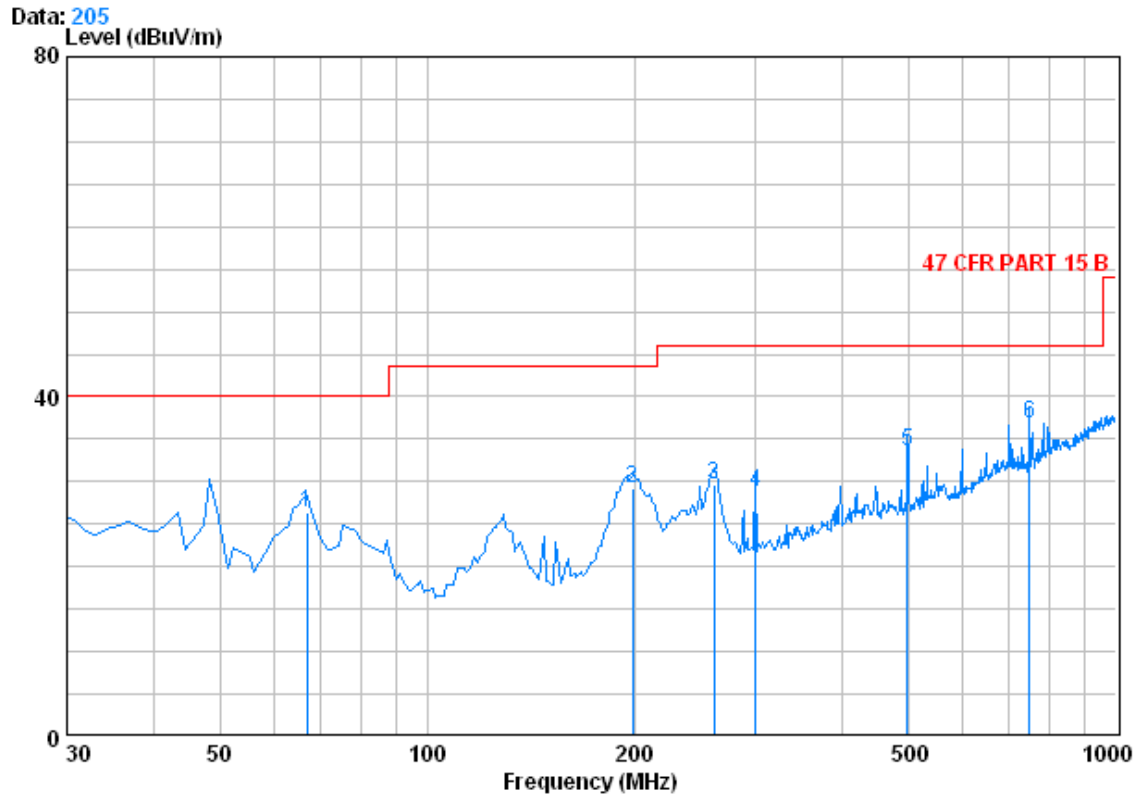
Condition : 47 CFR PART 15 B 3m 3142C HORIZONTAL
Job No. : 4268RF
Mode : Transmitting

| | Freq | Cable&antenna Loss | Antenna Factor | Preamp Factor | Read Level | Limit Level | Limit Line | Over Limit |
|---|---------|--------------------|----------------|---------------|------------|-------------|------------|------------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 198.780 | 1.40 | 10.19 | 26.70 | 53.12 | 38.00 | 43.50 | -5.50 |
| 2 | 264.740 | 1.74 | 12.61 | 26.49 | 52.10 | 39.96 | 46.00 | -6.04 |
| 3 | 299.660 | 1.90 | 13.85 | 26.41 | 47.92 | 37.26 | 46.00 | -8.74 |
| 4 | 498.510 | 2.59 | 17.80 | 27.70 | 46.83 | 39.52 | 46.00 | -6.48 |
| 5 | 699.300 | 2.90 | 21.60 | 27.41 | 40.30 | 37.38 | 46.00 | -8.62 |
| 6 | 749.740 | 3.06 | 21.70 | 27.35 | 45.00 | 42.40 | 46.00 | -3.60 |

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Vertical

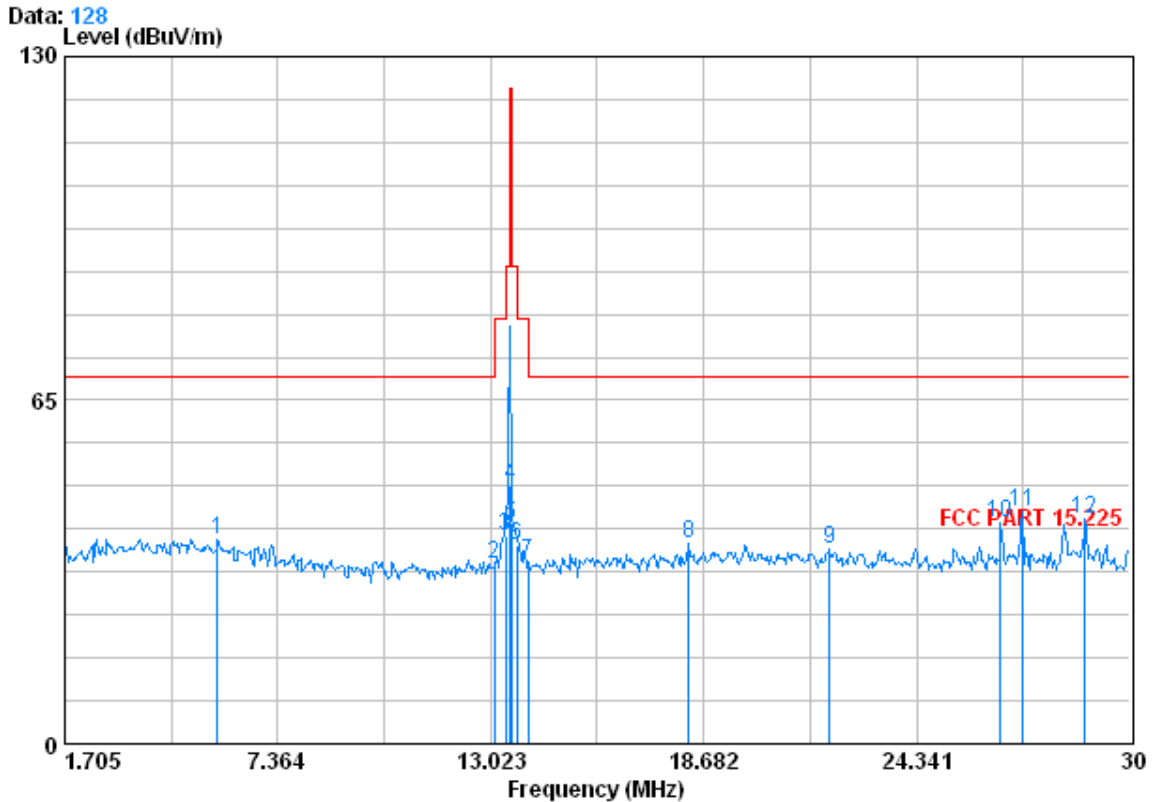


Condition : 47 CFR PART 15 B 3m 3142C VERTICAL
Job No. : 4268RF
Mode : Transmitting

| | Freq | CableAntenna Loss Factor | Preamp Factor | Read Level | Limit Level | Limit Line | Over Limit |
|---|---------|-----------------------------|------------------|---------------|----------------|---------------|---------------|
| | MHz | dB | dB/m | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 66.860 | 0.80 | 6.99 | 27.25 | 45.88 | 26.42 | 40.00 -13.58 |
| 2 | 198.780 | 1.40 | 10.19 | 26.70 | 44.38 | 29.26 | 43.50 -14.24 |
| 3 | 260.860 | 1.73 | 12.53 | 26.50 | 41.79 | 29.55 | 46.00 -16.45 |
| 4 | 299.660 | 1.90 | 13.85 | 26.41 | 39.50 | 28.84 | 46.00 -17.16 |
| 5 | 498.510 | 2.59 | 17.80 | 27.70 | 40.85 | 33.54 | 46.00 -12.46 |
| 6 | 749.740 | 3.06 | 21.70 | 27.35 | 39.44 | 36.85 | 46.00 -9.15 |



1.705-30MHz



Condition : FCC PART 15.225 3m LOOP-1
Job No. : 4268RF
Mode : Transmitting

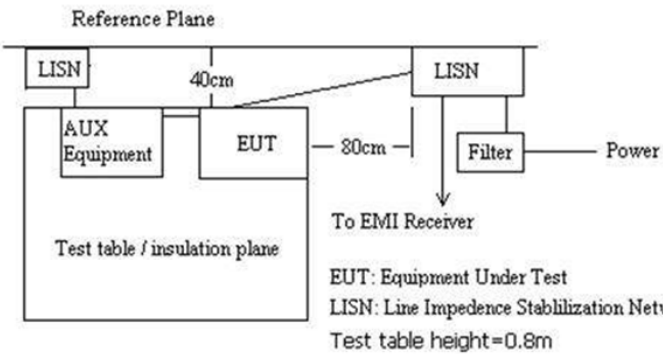
| | Freq | CableAntenna Loss | Antenna Factor | Preamp Factor | Read Level | Level | Limit | Over |
|------|--------|-------------------|----------------|---------------|------------|--------|--------|--------|
| | MHz | dB | dB/m | dB | dBuV | dBuV/m | dBuV/m | dB |
| 1 | 5.751 | 0.20 | 22.54 | 0.00 | 15.95 | 38.68 | 69.50 | -30.82 |
| 2 | 13.110 | 0.44 | 20.64 | 0.00 | 12.99 | 34.07 | 69.50 | -35.43 |
| 3 | 13.410 | 0.45 | 20.72 | 0.00 | 18.22 | 39.40 | 80.50 | -41.10 |
| 4 | 13.553 | 0.46 | 20.80 | 0.00 | 27.55 | 48.81 | 90.40 | -41.59 |
| 5 | 13.567 | 0.46 | 20.80 | 0.00 | 20.20 | 41.46 | 90.40 | -48.94 |
| 6 | 13.710 | 0.46 | 20.84 | 0.00 | 16.16 | 37.46 | 80.50 | -43.04 |
| 7 | 14.010 | 0.47 | 20.96 | 0.00 | 13.00 | 34.44 | 69.50 | -35.06 |
| 8 | 18.286 | 0.61 | 22.27 | 0.00 | 15.03 | 37.90 | 69.50 | -31.60 |
| 9 | 22.021 | 0.74 | 22.35 | 0.00 | 13.66 | 36.74 | 69.50 | -32.76 |
| 10 | 26.576 | 0.89 | 21.64 | 0.00 | 19.12 | 41.65 | 69.50 | -27.85 |
| 11 @ | 27.142 | 0.91 | 21.58 | 0.00 | 21.58 | 44.06 | 69.50 | -25.44 |
| 12 | 28.812 | 0.96 | 21.35 | 0.00 | 20.23 | 42.53 | 69.50 | -26.97 |

Remark: The disturbance 9kHz to 1.705MHz was very low, and no obvious signal can be found.



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5.3 Conducted Emissions

| | |
|--------------------------------|--|
| Test Requirement: | FCC Part 15.207 |
| Test Method: | ANSI C63.10: 2009 |
| Frequency Range: | 150kHz to 30MHz |
| Detector: | Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak if maximized peak within 6dB of Quasi-Peak limit |
| Plan View of Test Setup |  <p>EUT: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p> |
| Test Instruments: | Refer to section 4.8 for details |
| Test Results: | Pass |

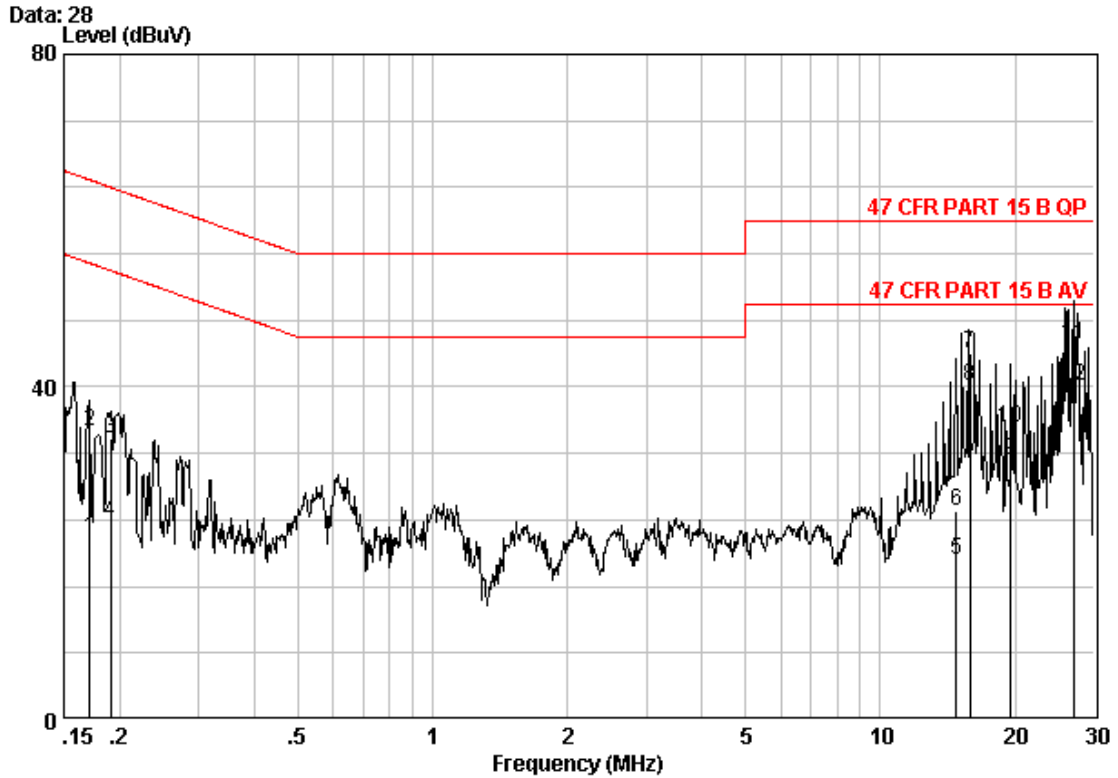
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



Live Line



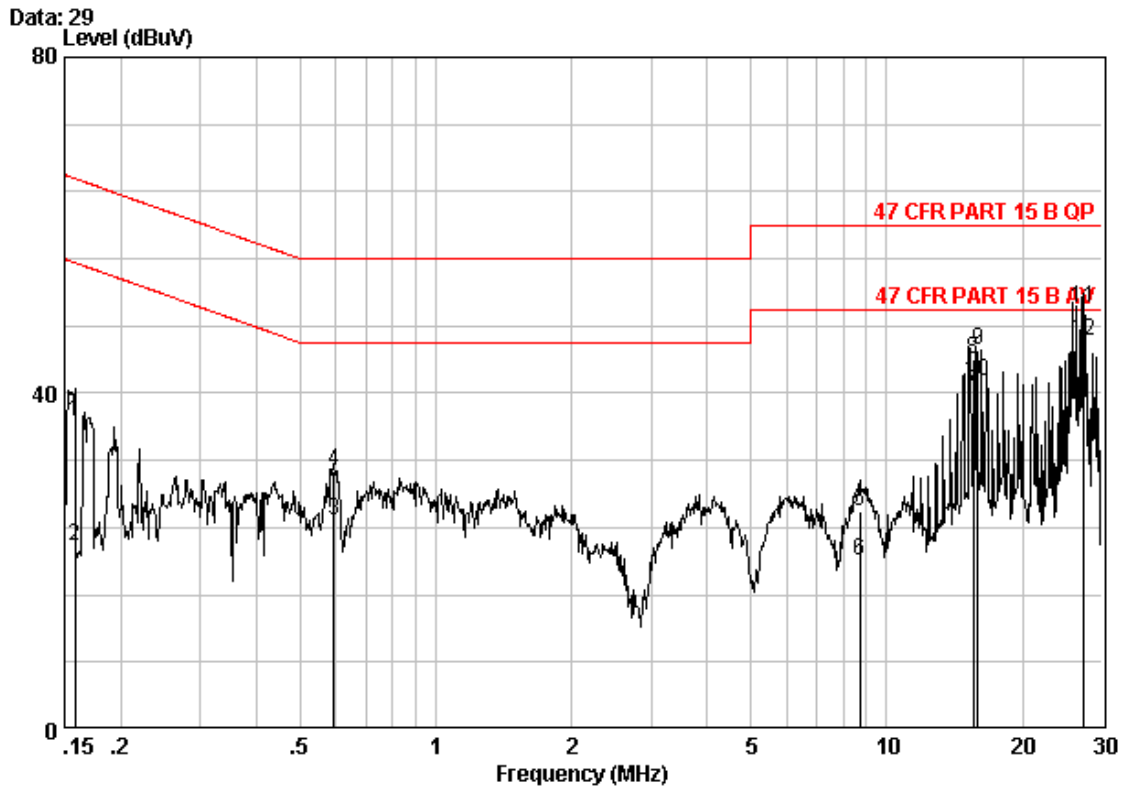
Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE LINE
Job No. : 4268RF
Mode : Charge

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|------|---------|------------|-------------|------------|-------|------------|------------|---------|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.17100 | 0.02 | 9.70 | 12.10 | 21.82 | 54.91 | -33.09 | Average |
| 2 | 0.17100 | 0.02 | 9.70 | 25.00 | 34.72 | 64.91 | -30.19 | QP |
| 3 | 0.19100 | 0.02 | 9.70 | 24.00 | 33.72 | 63.99 | -30.27 | QP |
| 4 | 0.19100 | 0.02 | 9.70 | 14.00 | 23.72 | 53.99 | -30.27 | Average |
| 5 | 14.750 | 0.01 | 10.09 | 9.00 | 19.10 | 50.00 | -30.90 | Average |
| 6 | 14.750 | 0.01 | 10.09 | 15.00 | 25.10 | 60.00 | -34.90 | QP |
| 7 | 15.830 | 0.02 | 10.10 | 34.00 | 44.12 | 60.00 | -15.88 | QP |
| 8 | 15.830 | 0.02 | 10.10 | 30.00 | 40.12 | 50.00 | -9.88 | Average |
| 9 | 19.530 | 0.02 | 10.10 | 21.00 | 31.12 | 50.00 | -18.88 | Average |
| 10 | 19.530 | 0.02 | 10.10 | 25.00 | 35.12 | 60.00 | -24.88 | QP |
| 11 | 27.110 | 0.03 | 10.10 | 35.00 | 45.13 | 60.00 | -14.87 | QP |
| 12 @ | 27.110 | 0.03 | 10.10 | 30.00 | 40.13 | 50.00 | -9.87 | Average |

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Neutral Line



Site : Shielding Room
Condition : 47 CFR PART 15 B QP CE NEUTRAL
Job No. : 4268RF
Mode : Charge

| | Freq | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark |
|------|---------|------------|-------------|------------|-------|------------|------------|---------|
| | MHz | dB | dB | dBuV | dBuV | dBuV | dB | |
| 1 | 0.15800 | 0.02 | 9.70 | 27.00 | 36.72 | 65.57 | -28.85 | QP |
| 2 | 0.15800 | 0.02 | 9.70 | 12.00 | 21.72 | 55.57 | -33.85 | Average |
| 3 | 0.59500 | 0.02 | 9.80 | 15.00 | 24.82 | 46.00 | -21.18 | Average |
| 4 | 0.59500 | 0.02 | 9.80 | 21.00 | 30.82 | 56.00 | -25.18 | QP |
| 5 | 8.730 | 0.01 | 10.00 | 16.00 | 26.01 | 60.00 | -33.99 | QP |
| 6 | 8.730 | 0.01 | 10.00 | 10.00 | 20.01 | 50.00 | -29.99 | Average |
| 7 | 15.530 | 0.02 | 10.01 | 30.00 | 40.03 | 50.00 | -9.97 | Average |
| 8 | 15.530 | 0.02 | 10.01 | 34.00 | 44.03 | 60.00 | -15.97 | QP |
| 9 | 15.911 | 0.02 | 10.02 | 35.00 | 45.04 | 60.00 | -14.96 | QP |
| 10 @ | 15.911 | 0.02 | 10.02 | 31.30 | 41.34 | 50.00 | -8.66 | Average |
| 11 @ | 27.250 | 0.03 | 10.10 | 40.00 | 50.13 | 60.00 | -9.87 | QP |
| 12 @ | 27.250 | 0.03 | 10.10 | 36.00 | 46.13 | 50.00 | -3.87 | Average |

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5.4 Frequency Tolerance

| | |
|-------------------------------|---|
| Test Requirement: | FCC Part 15 C Section 15.225(e) |
| Test Method: | ANSI C63.10: 2009 |
| Frequency Range: | Operation within the band 13.110-14.010 MHz |
| Requirements: | The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery. |
| Method of Measurement: | The EUT was placed in an environmental test chamber and powered such that control element received normal voltage and the transmitter provided maximum RF output. |
| Test Result: | The unit does meet the FCC Part 15 C Section 15.225(e) requirements. |

| Test Frequency: 13.56MHz | | | Temperature: 20°C | |
|--------------------------|-------------------|-----------------|-------------------|--------|
| Supply Voltage (V) DC | Test Result (MHz) | Deviation (kHz) | Limit (kHz) | Result |
| 7.4 | 13.559900 | 0.100 | 1.3560 | Pass |

| Test Frequency: 13.56MHz | | | Voltage: 7.4V | |
|--------------------------|-------------------|-----------------|---------------|--------|
| Temperature (°C) | Test Result (MHz) | Deviation (kHz) | Limit (kHz) | Result |
| -20 | 13.559823 | 0.177 | 1.3560 | Pass |
| -10 | 13.559621 | 0.379 | 1.3560 | |
| 0 | 13.559357 | 0.643 | 1.3560 | |
| 10 | 13.559307 | 0.693 | 1.3560 | |
| 20 | 13.559306 | 0.694 | 1.3560 | |
| 30 | 13.559604 | 0.396 | 1.3560 | |
| 40 | 13.559741 | 0.259 | 1.3560 | |
| 50 | 13.559506 | 0.494 | 1.3560 | |

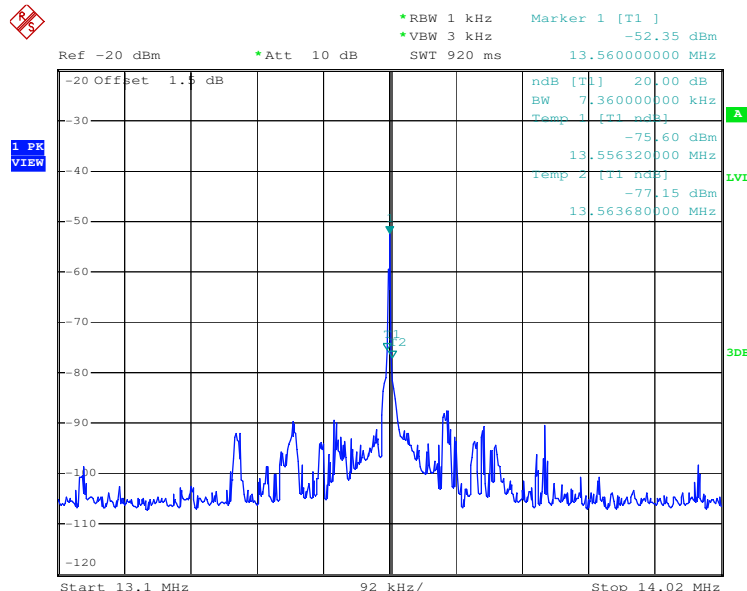
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5.5 Occupied Bandwidth

| | |
|-------------------------------|---|
| Test Requirement: | FCC Part 15 C Section 15.215 (C) |
| Test Method: | ANSI C63.10: 2009 |
| Frequency Range: | Operation within the band 13.110 – 14.010 MHz |
| Requirements: | Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation. |
| Method of Measurement: | The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. |
| Test Result: | The unit does meet the FCC Part 15 C Section 15.215 requirements. |

The graph as below: represents the emissions take for this device.



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