

TEST REPORT

Applicant Name & : Chili Technology LLC
Address : 144 Talbert Pointe Drive Suite 103 Mooresville, NC 28117,USA

Sample Description

Product : Electric heating and cooling mattress
Model No. : Chili Cube
Electrical Rating : 150W, AC90~230V, 50/60Hz
FCC ID : 2ABA9-CP-CUBE-01

Date Received : 14 October 2013

Date Test Conducted : 14 October 2013 –17 December 2013

Test standards : FCC Part 15:2011

Test Result : Pass

Conclusion : The submitted samples complied with the above rules/standards.

Remark : None.

*****End of Page*****

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06 Jan., 2014 Date

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1

TEST RESULTS SUMMARY

Classification of EUT: Class B

| Test Item | Standard | Result |
|---------------------------|-------------------------------------|---------------|
| Conducted Emission | FCC Part 15, Subpart B: 2011 | Pass |
| Radiated Emission | FCC Part 15, Subpart B: 2011 | Pass |

Remark: 1. The symbol “N/A” in above table means Not Applicable.

2. When determining the test results, measurement uncertainty of tests has been considered.

2

Test Results Conclusion (with Justification)

RE: EMC Testing Pursuant to FCC Part 15, Subpart B: 2011 Performed On the Electric heating and cooling mattress, Model: Chili Cube.

We tested Electric heating and cooling mattress, Model: Chili Cube, to determine if it was in compliance with the relevant FCC rules as marked on the Test Results Summary. We found that the unit met the requirement of FCC Part 15, Subpart B: 2011 when tested as received. The worst case's test data was presented in this test report. Test items Conducted Emission and Radiated Emission were subcontracted.

The Equipment Under Test (EUT) is controlled by a controller, the controller is an intentional radiator using 433.92MHz frequency.

Antenna Type: Integral wire antenna.

The controller option of this receiver is subject to Certification procedure.

The data on the below test result table lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

According 15.107, the worst case conducted emission at 20.15MHz

Judgement: Passed by -10.22 dB

According 15.109, the worst case radiated emission at 68.40 MHz

Judgement: Passed by -2.5 dB

The production units are required to conform to the initial sample as received when the units are placed on the market.

3

LABORATORY MEASUREMENTS

Configuration Information

Equipment Under Test (EUT): Electric heating and cooling mattress

Model: Chili Cube

Serial No. Not Labelled

Support Equipment: A controller

Rated Voltage: AC90~230V, 50/60Hz

Condition of Environment: Temperature : 15~35°C
Relative Humidity: 35~60%
Atmosphere Pressure 86~106kPa

Notes:

1. Test Environment

If ambient levels of emissions exceed the appropriate limit, the following steps were taken to assure compliance. First, the measurement bandwidth was reduced, if this did not affect the peak readings. Such a reduction can allow much closer examination of emissions close to local ambient signals. Second, the antenna could be brought closer to the EUT. Finally, in severe cases, testing was re-performed at night or other times when the offending signal was off the air. The measurements were made at nominal room temperature ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$).

2. Test Site

All of the tests are performed at:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch. Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD Guangzhou, China. This test facility and site measurement data have been fully placed on file with the FCC, test firm registration number is 549654.

3. Test Platform

Radiated emission and Conducted emission tests were made on 12mm thick insulating material on the reference ground plane. The vertical conducting plane or wall of a screened room shall be located 40 cm to the rear of the EUT. All other surfaces of EUT shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

4. Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

4 TEST RESULTS

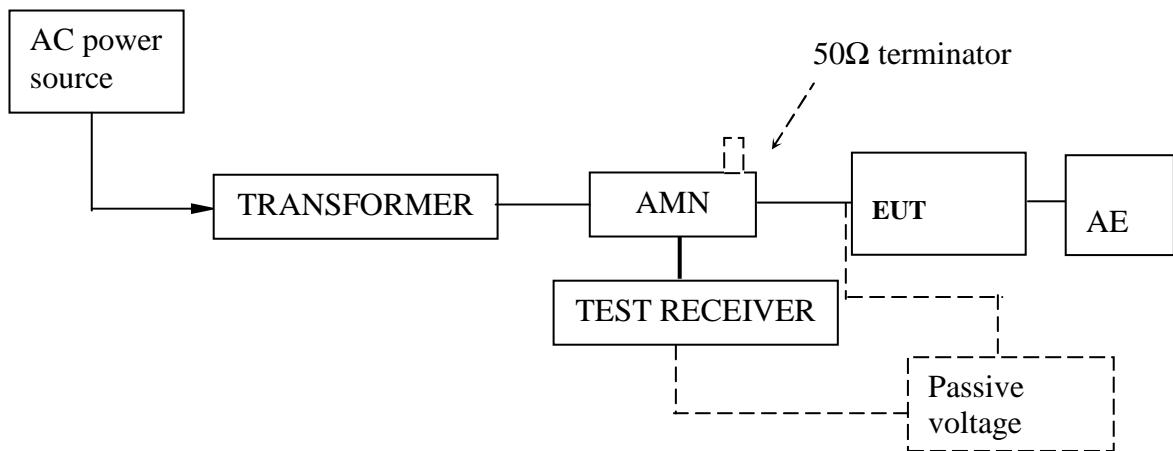
4.1 Conducted Emission Test

Test Result: Pass

4.1.1 Used Test Equipment

| Equip No. | Description | Manufacturer | Model No. | Cal. Date | Due Date |
|--------------|-------------------|---------------|-----------|-------------|-------------|
| EM 080-05 | EMI Test Receiver | Rohde&Schwarz | ESCI | 26 Oct 2013 | 26 Oct 2014 |
| EM 006-05 | LISN | Rohde&Schwarz | ENV216 | 22 Oct 2013 | 22 Oct 2014 |
| EM 006-06-01 | RF Cable | FUJIKURA | 3D-2W | 28 Apr 2013 | 28 Apr 2014 |

4.1.2 Block Diagram of Test Setup



4.1.3 Test Setup and Procedure

Test was performed according to ANSI C63.4: 2009. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The vertical conducting plane or wall of a screened room shall be located 40 cm to the rear of the EUT. All other surfaces of tabletop EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs. The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane(Ground Reference Plane). And for floor standing EUT, was placed on a 12mm high non-metallic supported on GRP. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

4.1.4 Test Data

At main terminal: Pass

Operation Mode: EUT ON (Cooling)

L line:

| EDIT PEAK LIST (Final Measurement Results) | | | | |
|--|------------|------------------|--------|----------|
| Trace1: | FCC15-QP | | | |
| Trace2: | FCC15-AV | | | |
| Trace3: | --- | | | |
| TRACE | FREQUENCY | LEVEL dB μ V | DELTA | LIMIT dB |
| 2 Average | 21.57 MHz | 35.02 L1 | -14.97 | |
| 2 Average | 10.538 MHz | 33.92 L1 | -16.07 | |
| 1 Quasi Peak | 2.11 MHz | 39.78 L1 | -16.21 | |
| 2 Average | 198 kHz | 36.87 L1 | -16.82 | |
| 1 Quasi Peak | 2.202 MHz | 39.16 L1 | -16.84 | |
| 2 Average | 10.198 MHz | 33.08 L1 | -16.91 | |
| 2 Average | 1.99 MHz | 29.00 L1 | -17.00 | |
| 2 Average | 6.07 MHz | 32.82 L1 | -17.17 | |
| 1 Quasi Peak | 262 kHz | 43.96 L1 | -17.40 | |
| 2 Average | 266 kHz | 33.64 L1 | -17.60 | |
| 1 Quasi Peak | 3.65 MHz | 38.32 L1 | -17.67 | |
| 1 Quasi Peak | 22.034 MHz | 41.98 L1 | -18.02 | |
| 2 Average | 2.302 MHz | 27.87 L1 | -18.12 | |
| 1 Quasi Peak | 9.918 MHz | 41.24 L1 | -18.75 | |
| 1 Quasi Peak | 166 kHz | 46.19 L1 | -18.96 | |
| 1 Quasi Peak | 10.422 MHz | 40.28 L1 | -19.71 | |
| 1 Quasi Peak | 458 kHz | 33.68 L1 | -23.04 | |
| 1 Quasi Peak | 790 kHz | 31.28 L1 | -24.71 | |

N line:

| EDIT PEAK LIST (Final Measurement Results) | | | | |
|--|------------|------------------|--------|----------|
| Trace1: | FCC15-QP | | | |
| Trace2: | FCC15-AV | | | |
| Trace3: | --- | | | |
| TRACE | FREQUENCY | LEVEL dB μ V | DELTA | LIMIT dB |
| 2 Average | 20.15 MHz | 39.77 L1 | -10.22 | |
| 1 Quasi Peak | 1.918 MHz | 44.23 L1 | -11.76 | |
| 1 Quasi Peak | 20.15 MHz | 47.78 L1 | -12.22 | |
| 2 Average | 1.93 MHz | 33.21 L1 | -12.78 | |
| 2 Average | 16.434 MHz | 36.83 L1 | -13.16 | |
| 2 Average | 6.69 MHz | 35.84 L1 | -14.15 | |
| 2 Average | 3.514 MHz | 31.17 L1 | -14.82 | |
| 2 Average | 4.478 MHz | 31.09 L1 | -14.90 | |
| 1 Quasi Peak | 4.026 MHz | 40.84 L1 | -15.15 | |
| 2 Average | 198 kHz | 38.42 L1 | -15.27 | |
| 1 Quasi Peak | 2.682 MHz | 40.62 L1 | -15.37 | |
| 1 Quasi Peak | 7.366 MHz | 43.85 L1 | -16.14 | |
| 1 Quasi Peak | 15.522 MHz | 42.87 L1 | -17.12 | |
| 1 Quasi Peak | 262 kHz | 43.45 L1 | -17.91 | |
| 1 Quasi Peak | 150 kHz | 48.06 L1 | -17.93 | |
| 2 Average | 262 kHz | 32.68 L1 | -18.68 | |
| 1 Quasi Peak | 1.222 MHz | 35.32 L1 | -20.67 | |
| 2 Average | 1.17 MHz | 24.23 L1 | -21.76 | |
| 1 Quasi Peak | 550 kHz | 33.93 L1 | -22.06 | |

Operation Mode: EUT ON (Heating)

L line:

| EDIT PEAK LIST (Final Measurement Results) | | | | |
|--|------------|------------------|--------|----------|
| Trace1: | FCC15-QP | | | |
| Trace2: | FCC15-AV | | | |
| Trace3: | --- | | | |
| TRACE | FREQUENCY | LEVEL dB μ V | DELTA | LIMIT dB |
| 2 Average | 23.474 MHz | 34.83 L1 | -15.16 | |
| 2 Average | 10.546 MHz | 34.51 L1 | -15.48 | |
| 1 Quasi Peak | 28.198 MHz | 43.76 L1 | -16.23 | |
| 1 Quasi Peak | 154 kHz | 49.52 L1 | -16.25 | |
| 2 Average | 2.126 MHz | 29.45 L1 | -16.54 | |
| 2 Average | 1.998 MHz | 29.37 L1 | -16.62 | |
| 2 Average | 198 kHz | 37.05 L1 | -16.63 | |
| 2 Average | 5.786 MHz | 32.98 L1 | -17.01 | |
| 2 Average | 6.138 MHz | 32.75 L1 | -17.25 | |
| 1 Quasi Peak | 266 kHz | 43.76 L1 | -17.47 | |
| 2 Average | 266 kHz | 33.58 L1 | -17.66 | |
| 1 Quasi Peak | 4.134 MHz | 38.12 L1 | -17.87 | |
| 1 Quasi Peak | 2.146 MHz | 37.87 L1 | -18.12 | |
| 1 Quasi Peak | 10.546 MHz | 41.66 L1 | -18.33 | |
| 1 Quasi Peak | 10.102 MHz | 41.36 L1 | -18.63 | |
| 1 Quasi Peak | 478 kHz | 34.51 L1 | -21.86 | |
| 1 Quasi Peak | 1.538 MHz | 31.84 L1 | -24.15 | |
| 1 Quasi Peak | 786 kHz | 31.26 L1 | -24.73 | |

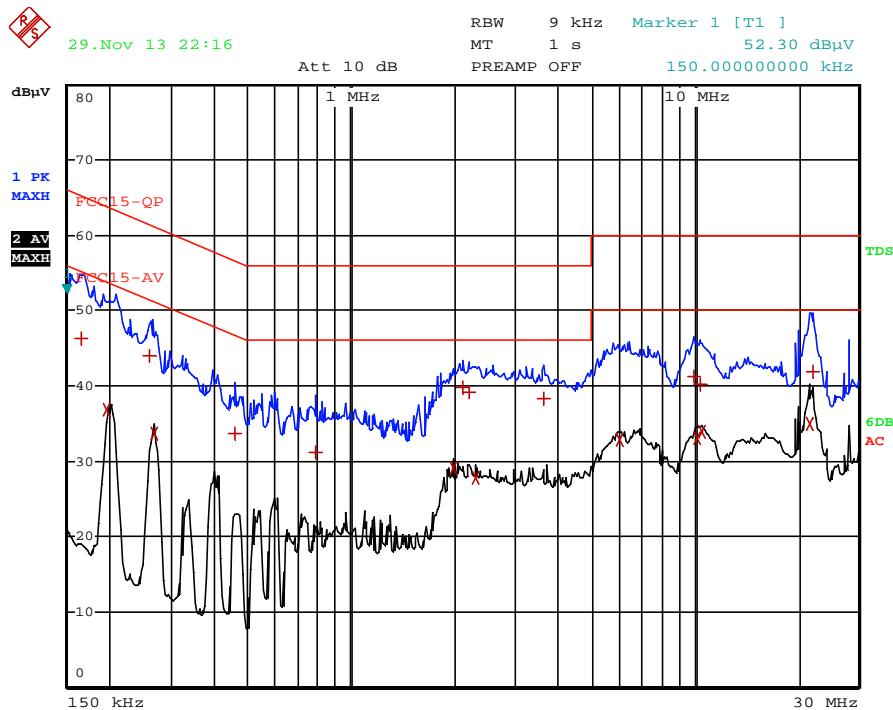
N line:

| EDIT PEAK LIST (Final Measurement Results) | | | | |
|--|------------|------------------|--------|----------|
| Trace1: | FCC15-QP | | | |
| Trace2: | FCC15-AV | | | |
| Trace3: | --- | | | |
| TRACE | FREQUENCY | LEVEL dB μ V | DELTA | LIMIT dB |
| 2 Average | 21.886 MHz | 38.65 L1 | -11.34 | |
| 2 Average | 16.11 MHz | 37.46 L1 | -12.53 | |
| 2 Average | 1.862 MHz | 33.38 L1 | -12.61 | |
| 1 Quasi Peak | 1.886 MHz | 42.62 L1 | -13.37 | |
| 2 Average | 198 kHz | 39.07 L1 | -14.62 | |
| 1 Quasi Peak | 6.202 MHz | 45.11 L1 | -14.88 | |
| 2 Average | 3.518 MHz | 31.03 L1 | -14.96 | |
| 2 Average | 6.63 MHz | 34.92 L1 | -15.07 | |
| 1 Quasi Peak | 21.37 MHz | 44.86 L1 | -15.14 | |
| 1 Quasi Peak | 2.866 MHz | 40.72 L1 | -15.27 | |
| 1 Quasi Peak | 3.93 MHz | 40.71 L1 | -15.28 | |
| 2 Average | 4.686 MHz | 30.66 L1 | -15.33 | |
| 1 Quasi Peak | 15.918 MHz | 43.61 L1 | -16.38 | |
| 1 Quasi Peak | 262 kHz | 43.91 L1 | -17.45 | |
| 2 Average | 262 kHz | 33.33 L1 | -18.03 | |
| 1 Quasi Peak | 154 kHz | 47.42 L1 | -18.36 | |
| 1 Quasi Peak | 1.17 MHz | 36.66 L1 | -19.33 | |
| 2 Average | 1.098 MHz | 24.81 L1 | -21.18 | |
| 1 Quasi Peak | 458 kHz | 31.39 L1 | -25.33 | |

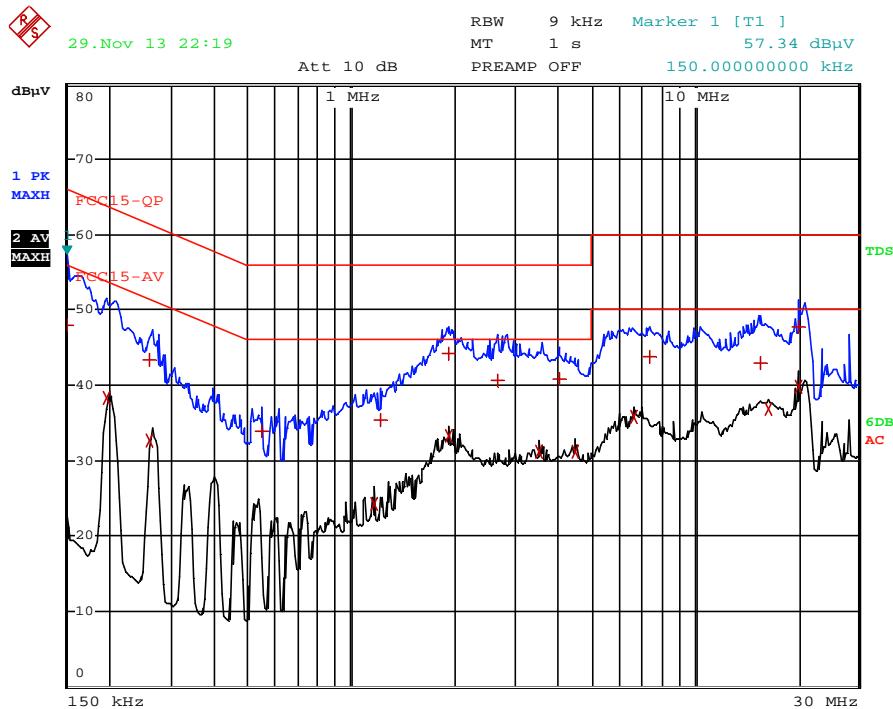
4.1.5 Emission Curve

Operation Mode: EUT ON (Cooling)

Tested Wire: Live

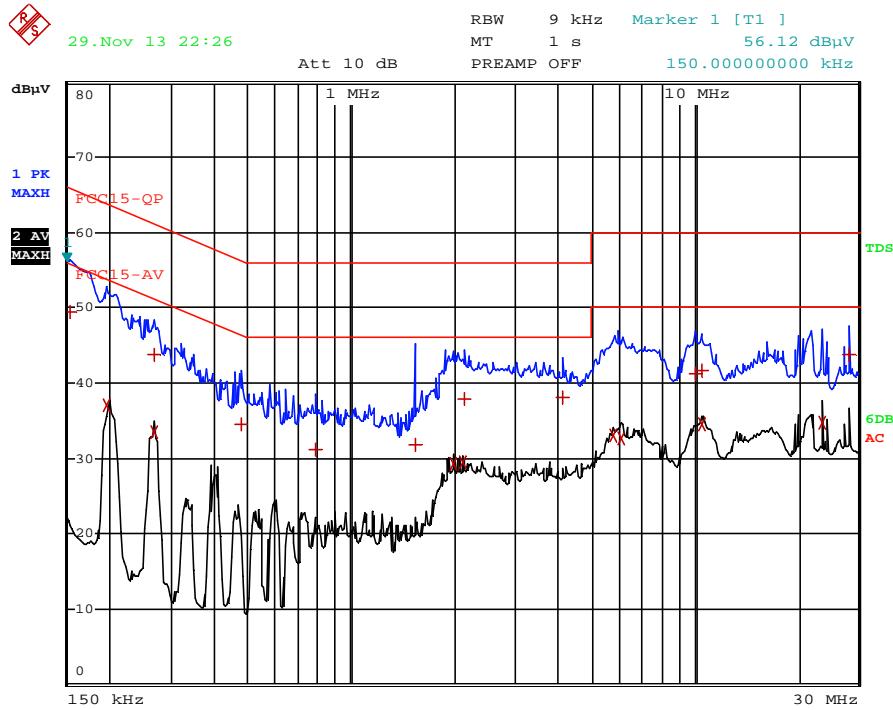


Tested Wire: Neutral

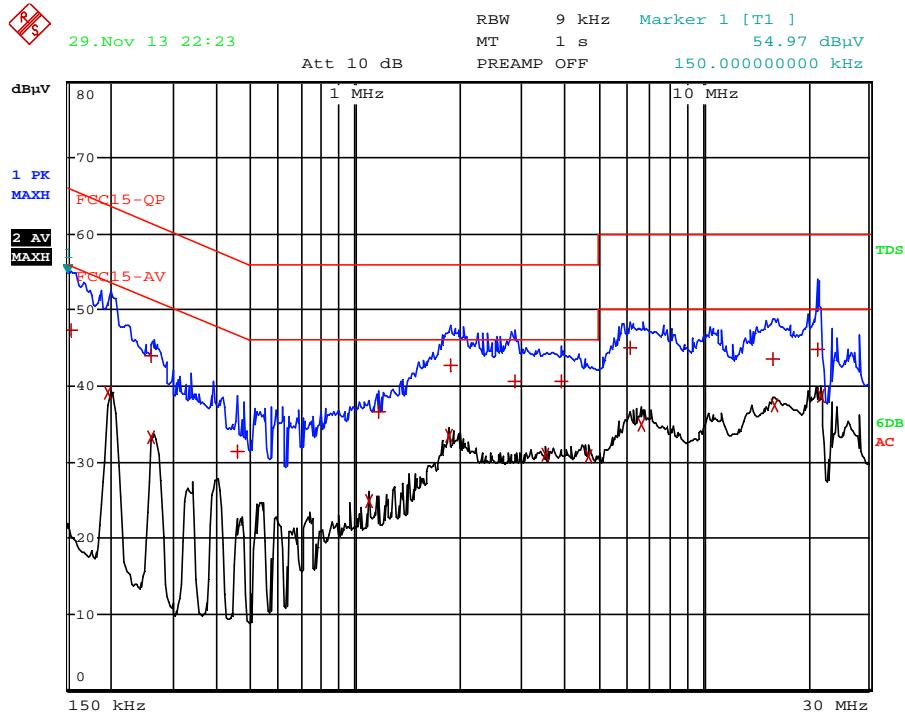


Operation Mode: EUT ON (Heating)

Tested Wire: Live



Tested Wire: Neutral



4.1.6 Measurement Uncertainty

Uncertainty: 2.50 dB at a level of confidence of 95%

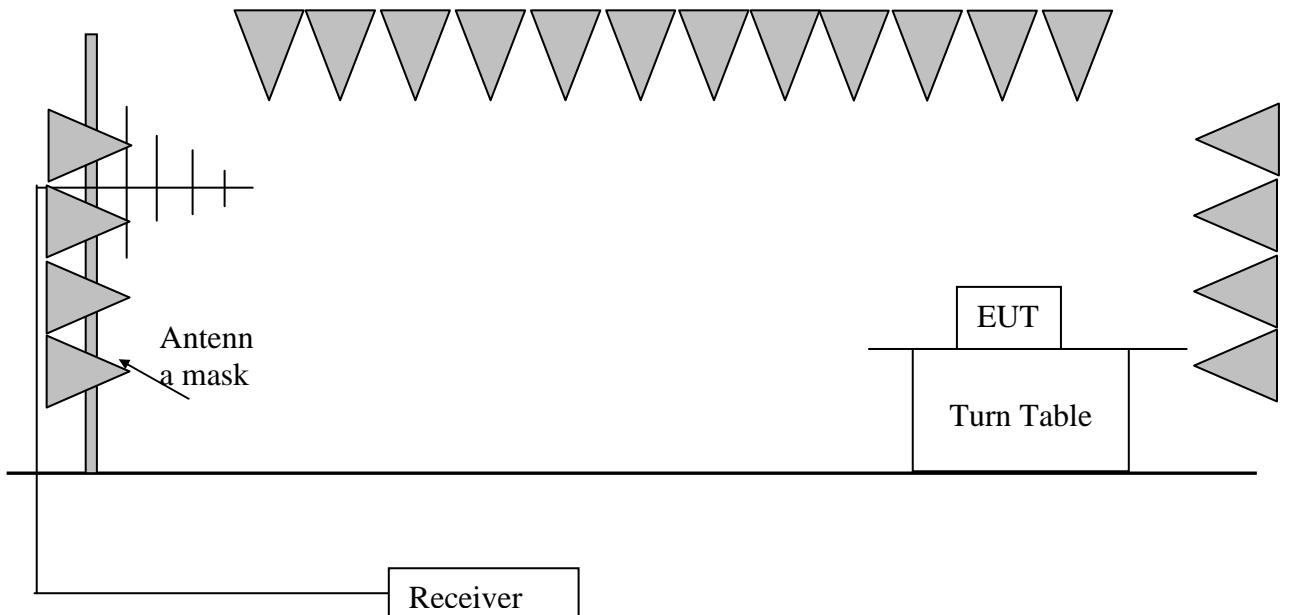
4.2 Radiated Emission

Test Result: Pass

4.2.1 Used Test Equipment

| Equipment No. | Equipment | Manufacturer | Model No. | Cal. Date | Due Date |
|---------------|-------------------|--------------|------------|-------------|-------------|
| EM031-02 | EMI Test Receiver | R&S | R&S ESR7 | 03-Jun-2013 | 03-Jun-2014 |
| EM061-03 | Bilog Antenna | SCHWARZBECK | VULB 9161 | 25-May-2013 | 25-May-2014 |
| EM031-02-01 | Coaxial cable | R&S | / | 03-Jun-2013 | 03-Jun-2014 |
| EM031-03 | Spectrum Analyzer | R&S | R&S FSV40 | 03-Jun-2013 | 03-Jun-2014 |
| EM033-02 | Horn Antenna | R&S | R&S HF907 | 25-May-2013 | 25-May-2014 |
| EM031-02-01 | Coaxial cable | R&S | / | 03-Jun-2013 | 03-Jun-2014 |
| EM080-05 | EMI receiver | R&S | ESCI | 26-Oct-2013 | 26-Oct-2014 |
| EM033-02-01 | Signal Amplifier | R&S | R&S SCU-18 | 25-May-2013 | 25-May-2014 |

4.2.2 Block Diagram of Test Setup



4.2.3 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

$$\begin{aligned} \text{FS} &= \text{RA} + \text{AF} + \text{CF} - \text{AG} + \text{AV} \\ \rightarrow \quad \text{FS} &= \text{RA} + \text{Correct Factor} + \text{AV} \\ \text{where FS} &= \text{Field Strength in } \text{dB}\mu\text{V/m} \\ \text{RA} &= \text{Receiver Amplitude (including preamplifier) in } \text{dB}\mu\text{V} \\ \text{CF} &= \text{Cable Attenuation Factor in dB} \\ \text{AF} &= \text{Antenna Factor in dB} \\ \text{AG} &= \text{Amplifier Gain in dB} \\ \text{AV} &= \text{Average Factor in -dB} \\ \text{Correct Factor} &= \text{AF} + \text{CF} - \text{AG} \end{aligned}$$

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$\text{FS} = \text{RA} + \text{Correct Factor} + \text{AV}$$

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} \text{RA} &= 52.0 \text{ dB}\mu\text{V/m} \\ \text{AF} &= 7.4 \text{ dB} \\ \text{CF} &= 1.6 \text{ dB} \\ \text{AG} &= 29.0 \text{ dB} \\ \text{AV} &= -5.0 \text{ dB} \\ \text{Correct Factor} &= -20 \\ \text{FS} &= 52.0 - 20 - 5.0 = 27.0 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$

4.2.4 Test Setup and Procedure

The measurement was applied in a 3 m semi-anechoic chamber. The EUT was placed on a 12mm thick insulating material above the reference ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mask. The antenna moved up and down between from 1 meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 requirement during radiated test. The bandwidth setting on R&S Test Receiver was 120 kHz. The frequency range from 30MHz to 2000MHz was checked

4.2.5 Test Data

Radiated Emissions

Pursuant to FCC 15.109: Emissions Requirement: 30MHz-1GHz

Operation mode: EUT ON (Cooling)

| Polarization | Frequency (MHz) | Reading (dB μ V) | Correction factor (dB) | Net at 3m (dB μ V/m) | Limit at 3m (dB μ V/m) | Margin (dB) |
|--------------|-----------------|----------------------|------------------------|--------------------------|----------------------------|-------------|
| Horizontal | 72.680 | 14.0 | 8.1 | 22.1 | 40.00 | -17.9 |
| Horizontal | 82.865 | 13.7 | 8.0 | 21.7 | 40.00 | -18.3 |
| Horizontal | 108.813 | 11.0 | 12.0 | 23.0 | 43.50 | -20.6 |
| Horizontal | 160.223 | 13.5 | 10.5 | 24.0 | 43.50 | -19.5 |
| Horizontal | 169.195 | 12.9 | 11.0 | 23.9 | 43.50 | -19.6 |
| Horizontal | 217.695 | 12.3 | 11.4 | 23.7 | 46.00 | -22.3 |
| Vertical | 39.960 | 18.7 | 13.5 | 32.2 | 40.00 | -10.7 |
| Vertical | 48.200 | 16.5 | 13.6 | 30.1 | 40.00 | -9.9 |
| Vertical | 68.400 | 28.5 | 9.0 | 37.5 | 40.00 | -2.5 |
| Vertical | 93.520 | 15.7 | 11.7 | 27.4 | 43.50 | -18.1 |
| Vertical | 163.600 | 14.0 | 10.7 | 24.7 | 43.50 | -18.8 |
| Vertical | 269.600 | 17.0 | 14.3 | 21.3 | 46.0 | -24.7 |

Operation mode: EUT ON (Heating)

| Polarization | Frequency (MHz) | Reading (dB μ V) | Correction factor (dB) | Net at 3m (dB μ V/m) | Limit at 3m (dB μ V/m) | Margin (dB) |
|-------------------|-----------------|----------------------|------------------------|--------------------------|----------------------------|-------------|
| Horizontal | 69.040 | 7.3 | 8.8 | 16.1 | 40.00 | -23.9 |
| Horizontal | 101.520 | 8.0 | 12.4 | 20.4 | 43.50 | -23.1 |
| Horizontal | 120.680 | 8.7 | 10.8 | 19.5 | 43.50 | -24.0 |
| Horizontal | 152.720 | 8.1 | 9.6 | 17.7 | 43.50 | -25.8 |
| Horizontal | 225.960 | 8.1 | 11.9 | 20.0 | 46.00 | -26.0 |
| Horizontal | 362.240 | 6.2 | 17.1 | 23.3 | 46.00 | -22.8 |
| Vertical | 39.440 | 16.4 | 13.6 | 30.0 | 40.00 | -10 |
| Vertical | 68.400 | 27.8 | 9.0 | 36.8 | 40.00 | -3.2 |
| Vertical | 93.760 | 20.3 | 11.7 | 32.0 | 43.50 | -11.5 |
| Vertical | 120.680 | 15.7 | 10.8 | 26.5 | 43.50 | -17.0 |
| Vertical | 171.880 | 8.6 | 10.9 | 19.5 | 43.50 | -24.0 |
| Vertical | 289.240 | 6.4 | 15.3 | 21.7 | 46.0 | -24.3 |

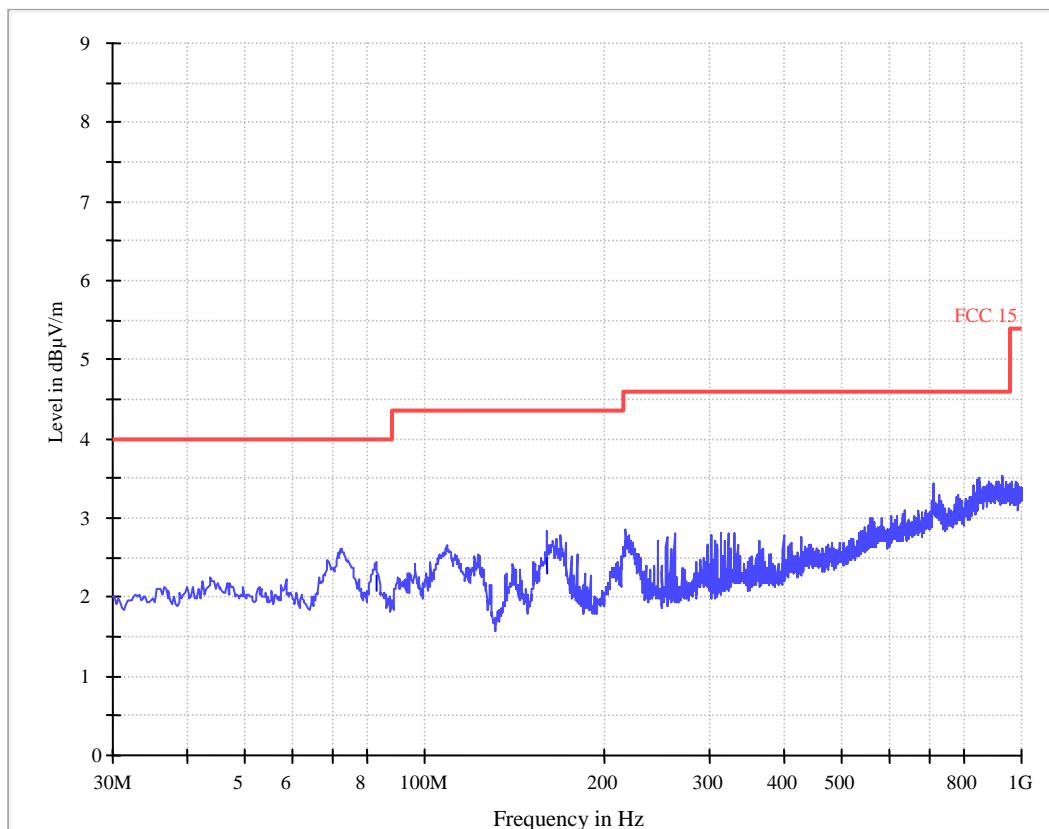
Notes:

1. Quasi-peak detector was used at below 1GHz, peak detector was used at above 1GHz.
2. All measurements were made at 3 meter.
3. Negative value in the margin column shows emission below limit.
4. When tested above 1GHz, the emissions found were at least 20 dB below the limit.

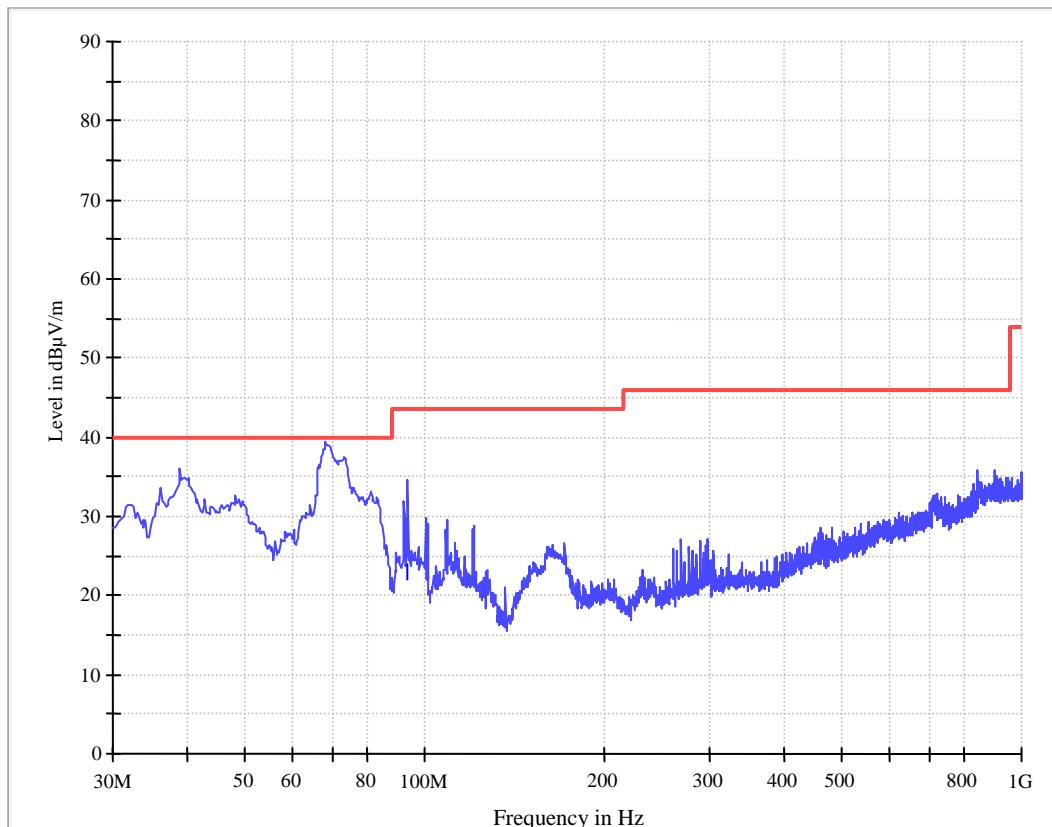
4.2.6 Test Curve

Operation mode: EUT ON (Cooling)

Horizontal:

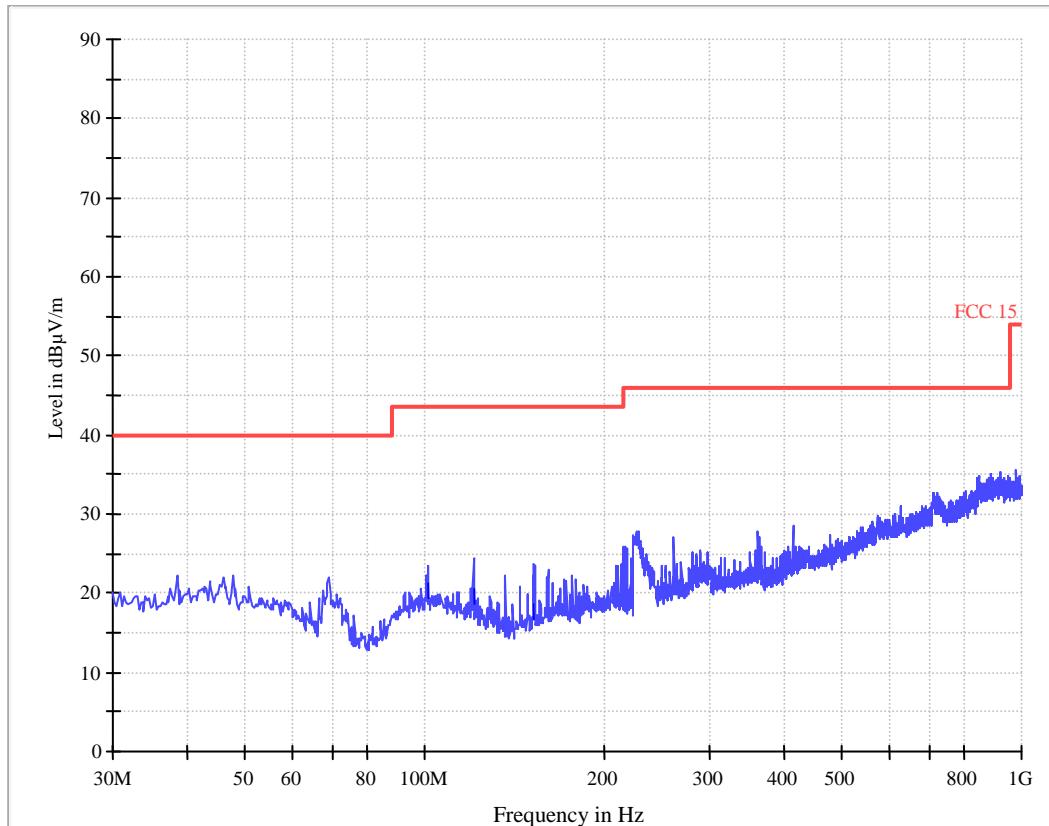


Vertical:

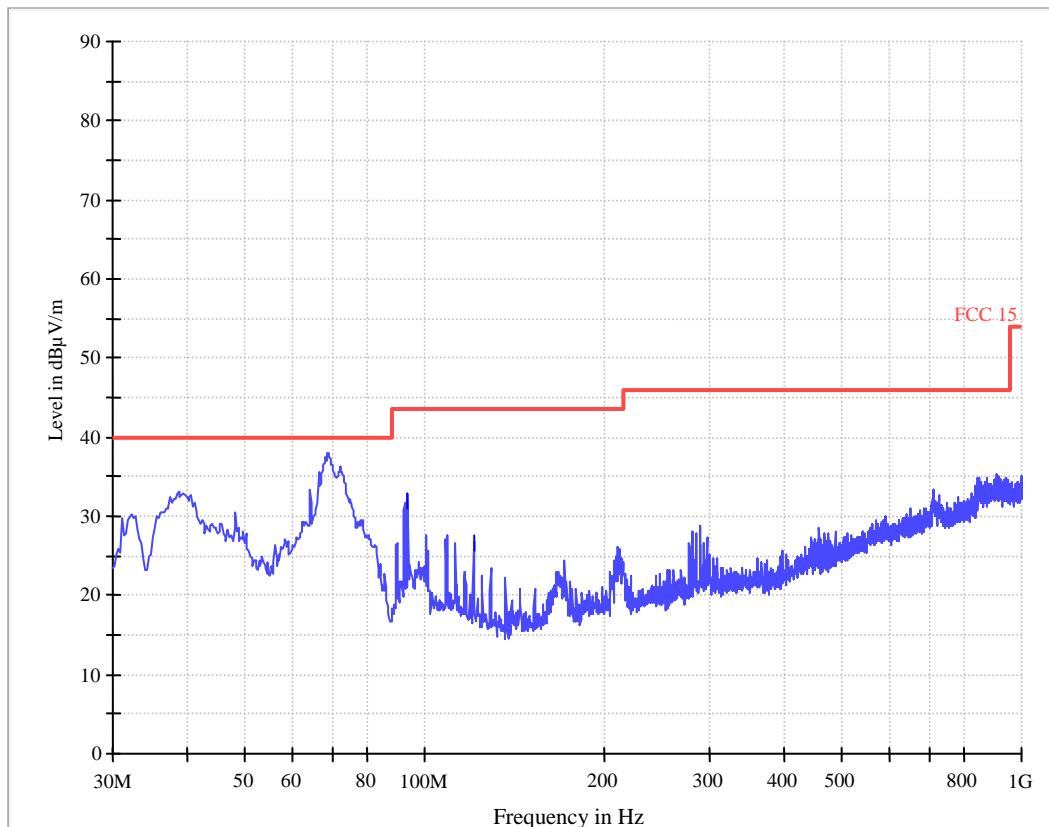


Operation mode: EUT ON (Heating)

Horizontal:



Vertical:



4.2.7 Measurement uncertainty

Uncertainty: 4.8 dB at a level of confidence of 95%