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No. : MH186344

Applicant (C00304): inature Hong Kong Limited

Flat C2, 5/F, Liberal Building, 3 Wing Ming Street, Cheung

Sha Wan, Kowloon, Hong Kong

Manufacturer: Group Sense Limited

Cai Wu Industrial Park, Wusha, Chang An, Dongguan,

P.R.C

Description of Sample(s): Product: Bluetooth Keyboard for Apple iPhone

4/4s

Brand Name: iNature Model Number: Kiano 4

FCC ID: COE-KIANO4

Date Sample(s) Received: 2012-01-11

Date Tested: 2012-01-31 to 2012-02-02

Investigation Requested: Perform ElectroMagnetic Interference measurement in

accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 and ANSI C63.4:2009 for FCC Certification.

Conclusion(s): The submitted product <u>COMPLIED</u> with the requirements of

Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this

Test Report.

Remark(s): ---

LONG Yun hang Along
Authorized Signatory

ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited



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1.0 General Details

1.1 Equipment Under Test [EUT] Description of Sample(s)

Product: Bluetooth Keyboard for Apple iPhone 4/4s

Manufacturer: Group Sense Limited

Brand Name: iNature Model Number: Kiano 4

Input Voltage: 3.7Vd.c. (rechargeable batteryx1)

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is an inature Hong Kong Limited, Bluetooth Keyboard case for iPhone 4/4s. the transmission signal is digital modulated with channel frequency range 2402-2480MHz.

1.2 Date of Order

2012-01-11

1.3 Submitted Sample(s):

1 Sample

1.4 Test Duration

2012-01-31 to 2012-02-02

1.5 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2010 Regulations and ANSI C63.4:2009 for FCC Certification.

2.2 Test Standards and Results Summary Tables

| EMISSION Results Summary | | | | | | | |
|---|---------------------------------|-----------------|----------|-------------|----------|-----|--|
| Test Condition | Test Requirement | Test Method | Class / | T | est Resi | ılt | |
| | | | Severity | Pass | Fail | N/A | |
| Output Power of Fundamental Emissions | FCC 47CFR 15.247(b)(1) | ANSI C63.4:2009 | N/A | | | | |
| Radiated Spurious Emissions | FCC 47CFR 15.209 | ANSI C63.4:2009 | N/A | | | | |
| AC Mains Conducted Emissions | FCC 47CFR 15.207 | N/A | N/A | | | | |
| Number of Operating Channel | FCC 47CFR 15.247(a)(2)(b)(1) | N/A | N/A | | | | |
| Band-edge compliance of Conducted Emission | FCC 47CFR 15.247© | N/A | N/A | | | | |
| Channel Separation | FCC 47CFR 15.247(a)(1) | N/A | N/A | | | | |
| Pseudorandom Hopping Algorithm | FCC 47CFR 15.247(a)(1) | N/A | N/A | | | | |
| Time of Occupancy | FCC 47CFR 15.247(a)(1)(iii) | N/A | N/A | | | | |
| 20dB Bandwidth | FCC 47CFR 15.247(a)(1) | N/A | N/A | \boxtimes | | | |
| Antenna requirement | FCC 47CFR 15.203 | N/A | N/A | \boxtimes | | | |

Note: N/A - Not Applicable



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3.0 Test Results

3.1 Emission

3.1.1 Maximum Peak Output Power

Test Requirement: FCC 47CFR 15.247(b)(1)

Test Method: N/A

Test Date: 2012-02-01 Ambient Temperature: 21 °C Relative Humidity: 49 % Mode of Operation: Tx mode

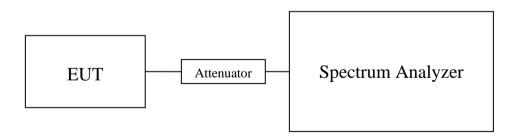
Test Method:

The RF output of the EUT was connected to the spectrum analyzer. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in mW.

Spectrum Analyzer Setting:

RBW = 3 MHz, VBW= 3MHz, Sweep = Auto, Span = 10MHz Detector = Peak, Trace = Max. hold

Test Setup:



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Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

The maximum peak output power shall not exceeded the following limits:

For frequency hopping systems employing at least 75 hopping channels: 1 Watt For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watts

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt

Results of Tx Mode (2402.0 MHz to 2480.0MHz) : Pass (TX Unit) Maximum conducted output power

| Transmitter Frequency (MHz) | Maximum conducted output power (mW) |
|------------------------------------|-------------------------------------|
| 2402 | 0.13 |

| Transmitter Frequency (MHz) | Maximum conducted output power (mW) |
|------------------------------------|-------------------------------------|
| 2441 | 0.11 |

| Transmitter Frequency (MHz) | Maximum conducted output power (mW) |
|-----------------------------|-------------------------------------|
| 2480 | 0.12 |

Limit: 0.125W (125.0mW)

Calculated measurement uncertainty : 30MHz to 1GHz 1.7dB

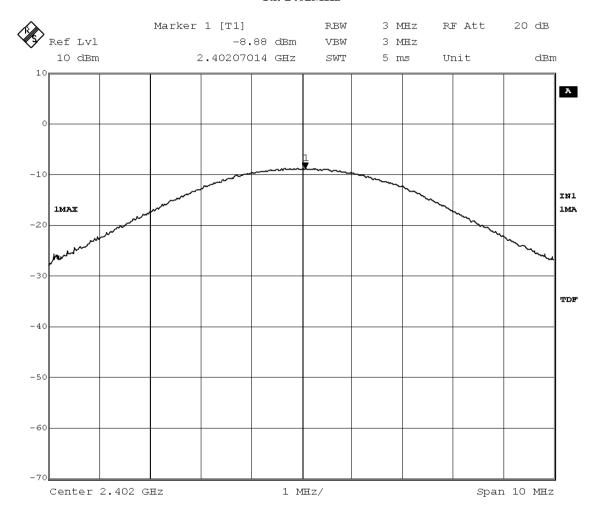
1GHz to 18GHz 1.7dB



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Tx: 2402MHz

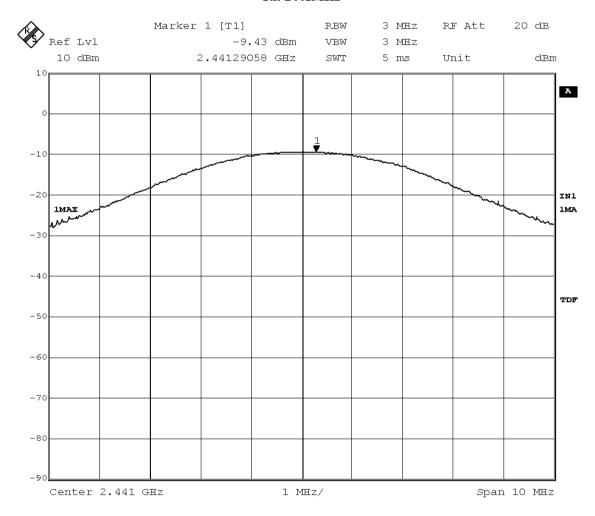




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Tx: 2441MHz

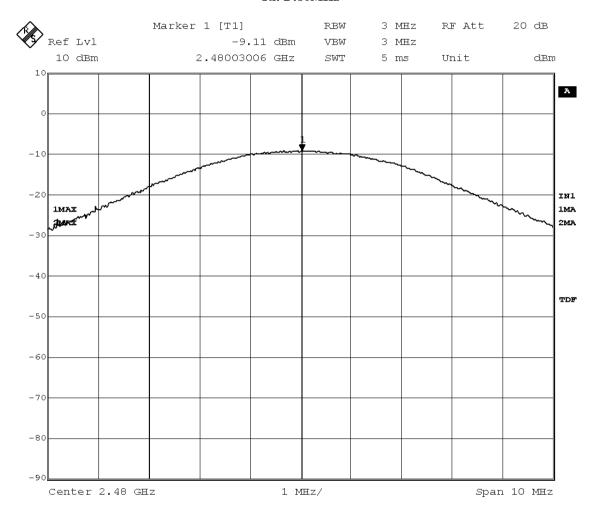




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Tx: 2480MHz





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3.1.2 Radiated Emissions

Test Requirement: FCC 47CFR 15.209
Test Method: ANSI C63.4:2009

Test Date: 2012-02-01
Ambient Temperature: 21 °C
Relative Humidity: 48 %
Mode of Operation: Tx mode

Test Method:

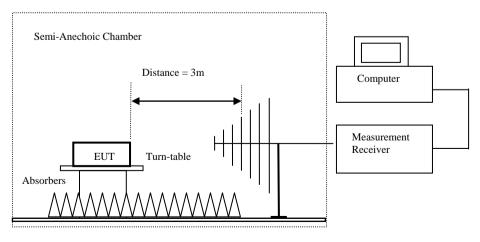
The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, onsidered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

* Semi-anechoic chamber located on the G/F of "STC (Dongguan) Company Limited" with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Spectrum Analyzer Setting:

Above 1GHz – RBW = 1MHz, VBW= 3MHz, Detector = Peak / Average, Below 1GHz to 30MHz – RBW = 120kHz, VBW = 120kHz Detector = Quasi-Peak, Below 30MHz to 9kHz – RBW = 10kHz, VBW = 30kHz Detector = Quasi-Peak, Sweep = Auto, Span = Fully capture the emissions being measured, Trace = Max. hold

Test Setup:



Ground Plane

Absorbers placed on top of the ground plane are for measurements above 1000MHz only.

ов нитип мал коаа, раналд, ролдушал, спіла. (дір соае : 523 770) Tel : (86 769) 8111 9888 Fax : (86 769) 8111 6222 E-mail : dgstc@dgstc.org Homepage : www.dgstc.org



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range | Quasi-Peak Limits |
|-----------------|-------------------|
| [MHz] | $[\mu V/m]$ |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode (2402.0 MHz): Pass

| result of 121 1/10 | esuit of 1x Mode (2402.0 MHz); Pass | | | | | |
|--------------------|--------------------------------------|---------------|--------------|---------------|--------|------------|
| | Field Strength of Harmonic Emissions | | | | | |
| | | | PeakValue | | | 1 |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field |
| | Level @3m | Factor | Strength | @3m | | Polarity |
| MHz | $dB\mu V$ | dB/m | dBμV/m | dBμV/m | dBμV/m | |
| 4804.0 | 4.6 | 41.5 | 46.1 | 74.0 | -27.9 | Horizontal |
| 4804.0 | 3.3 | 41.5 | 44.8 | 74.0 | -29.2 | Vertical |
| 7206.0 | 4.1 | 48.8 | 52.9 | 74.0 | -21.1 | Horizontal |
| 7206.0 | 3.5 | 48.8 | 52.3 | 74.0 | -21.7 | Vertical |
| | | Field Strengt | th of Harmor | nic Emissions | | |
| | | A | AverageValu | e | | |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field |
| | Level @3m | Factor | Strength | @3m | | Polarity |
| MHz | $dB\mu V$ | dB/m | dBμV/m | dBμV/m | dBμV/m | |
| 4804.0 | -15.4 | 41.5 | 26.1 | 54.0 | -27.9 | Horizontal |
| 4804.0 | -16.7 | 41.5 | 24.8 | 54.0 | -29.2 | Vertical |
| 7206.0 | -15.9 | 48.8 | 32.9 | 54.0 | -21.1 | Horizontal |
| 7206.0 | -16.5 | 48.8 | 32.3 | 54.0 | -21.7 | Vertical |

Remarks:

* Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB

1GHz to 18GHz 4.4dB

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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range | Quasi-Peak Limits |
|-----------------|-------------------|
| [MHz] | $[\mu V/m]$ |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode (2441.0 MHz): Pass

| Result of 1 x IVIO | esult of 1x Mode (2441.0 MHz): Pass | | | | | | |
|--------------------|--------------------------------------|------------|-------------|--------|--------|------------|--|
| | Field Strength of Harmonic Emissions | | | | | | |
| | PeakValue | | | | | | |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field | |
| | Level @3m | Factor | Strength | @3m | | Polarity | |
| MHz | $dB\mu V$ | dB/m | dBμV/m | dBμV/m | dBμV/m | | |
| 4882.0 | 4.3 | 41.4 | 45.7 | 74.0 | -28.3 | Horizontal | |
| 4882.0 | 3.2 | 41.4 | 44.6 | 74.0 | -29.4 | Vertical | |
| 7323.0 | 4.2 | 48.7 | 52.9 | 74.0 | -21.1 | Horizontal | |
| 7323.0 | 3.3 | 48.7 | 52.0 | 74.0 | -22.0 | Vertical | |
| | Field Strength of Harmonic Emissions | | | | | | |
| | | A | AverageValu | e | | | |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field | |
| | Level @3m | Factor | Strength | @3m | | Polarity | |
| MHz | $dB\mu V$ | dB/m | dBμV/m | dBμV/m | dBμV/m | | |
| 4882.0 | -15.7 | 41.4 | 25.7 | 54.0 | -28.3 | Horizontal | |
| 4882.0 | -16.8 | 41.4 | 24.6 | 54.0 | -29.4 | Vertical | |
| 7323.0 | -15.8 | 48.7 | 32.9 | 54.0 | -21.1 | Horizontal | |
| 7323.0 | -16.7 | 48.7 | 32.0 | 54.0 | -22.0 | Vertical | |

Remarks:

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB 1GHz to 18GHz 4.4dB

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Denotes restricted band of operation.



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range | Quasi-Peak Limits |
|-----------------|-------------------|
| [MHz] | $[\mu V/m]$ |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode (2480.0 MHz): Pass

| Nesult of 1 x 1v10 | esult of 1x Mode (2480.0 MHz): Pass | | | | | | |
|--------------------|--------------------------------------|---------------|--------------|---------------|--------|------------|--|
| | Field Strength of Harmonic Emissions | | | | | | |
| | PeakValue | | | | | | |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field | |
| | Level @3m | Factor | Strength | @3m | | Polarity | |
| MHz | dΒμV | dB/m | dBμV/m | dBμV/m | dBμV/m | | |
| 4960.0 | 5.2 | 41.4 | 46.6 | 74.0 | -27.4 | Horizontal | |
| 4960.0 | 3.9 | 41.4 | 45.3 | 74.0 | -28.7 | Vertical | |
| 7440.0 | 3.7 | 48.6 | 52.3 | 74.0 | -21.7 | Horizontal | |
| 7440.0 | 3.8 | 48.6 | 52.4 | 74.0 | -21.6 | Vertical | |
| | | Field Strengt | th of Harmor | nic Emissions | | | |
| | | A | AverageValu | e | | | |
| Frequency | Measured | Correction | Field | Limit | Margin | E-Field | |
| | Level @3m | Factor | Strength | @3m | | Polarity | |
| MHz | $dB\mu V$ | dB/m | dBμV/m | dBμV/m | dBμV/m | | |
| 4960.0 | -14.8 | 41.4 | 26.6 | 54.0 | -27.4 | Horizontal | |
| 4960.0 | -16.1 | 41.4 | 25.3 | 54.0 | -28.7 | Vertical | |
| 7440.0 | -16.3 | 48.6 | 32.3 | 54.0 | -21.7 | Horizontal | |
| 7440.0 | -16.2 | 48.6 | 32.4 | 54.0 | -21.6 | Vertical | |

Remarks:

Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB 1GHz to 18GHz 4.4dB

^{*} Denotes restricted band of operation.



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Frequency Range | Quasi-Peak Limits | | | |
|-----------------|-------------------|--|--|--|
| [MHz] | $[\mu V/m]$ | | | |
| 30-88 | 100 | | | |
| 88-216 | 150 | | | |
| 216-960 | 200 | | | |
| Above960 | 500 | | | |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Charge mode (Connected to PC) (9kHz - 30MHz): PASS

Emissions detected are more than 20 dB below the limit line(s)

Results of Charge mode (Connected to PC) (Above 30MHz): PASS

Please refer to the following table for result details

| Radiated Emissions Quasi-Peak | | | | | |
|----------------------------------|------------|--------|--------|-------|-------|
| Emission | E-Field | Level | Limit | Level | Limit |
| Frequency | Polarity | @3m | @3m | @3m | @3m |
| MHz | | dBµV/m | dBμV/m | μV/m | μV/m |
| 120.0 | Horizontal | 26.5 | 43.5 | 21.1 | 150 |
| 168.0 | Horizontal | 42.0 | 43.5 | 125.9 | 150 |
| 192.0 | Horizontal | 36.6 | 43.5 | 67.6 | 150 |
| 40.0 | Vertical | 29.6 | 40.0 | 30.2 | 100 |
| 144.0 | Vertical | 31.2 | 43.5 | 36.3 | 150 |
| 168.0 | Vertical | 39.5 | 43.5 | 94.4 | 150 |

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB

1GHz to 18GHz 4.4dB



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Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

| Emilis for Radiated Emissions [Fee 47 erk 15:26 | ,, cluss b]. |
|---|-------------------|
| Frequency Range | Quasi-Peak Limits |
| [MHz] | $[\mu V/m]$ |
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |
| | |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Communication mode with iPhone4 (9kHz - 30MHz): PASS

Emissions detected are more than 20 dB below the limit line(s)

Results of Communication mode with iPhone4 (Above 30MHz): PASS

Please refer to the following table for result details

| Radiated Emissions Quasi-Peak | | | | | |
|----------------------------------|------------|--------|--------|-------|-------|
| Emission | E-Field | Level | Limit | Level | Limit |
| Frequency | Polarity | @3m | @3m | @3m | @3m |
| MHz | | dBµV/m | dBμV/m | μV/m | μV/m |
| 40.1 | Vertical | 19.5 | 40.0 | 9.4 | 100 |
| 79.8 | Vertical | 16.9 | 40.0 | 7.0 | 100 |
| 115.2 | Vertical | 16.9 | 43.5 | 7.0 | 150 |
| 168.0 | Horizontal | 25.0 | 43.5 | 17.8 | 150 |
| 192.0 | Horizontal | 26.2 | 43.5 | 20.4 | 150 |
| 240.0 | Horizontal | 23.3 | 46.0 | 14.6 | 200 |

Remarks:

Correction Factor included Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty : 30MHz to 1GHz 4.6dB

1GHz to 18GHz 4.4dB



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3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207 Test Method: ANSI C63.4:2009

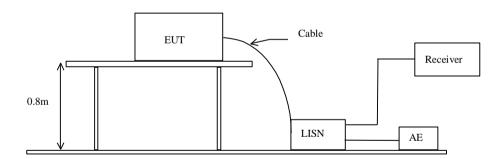
Test Date: 2012-01-31 Ambient Temperature: 21 °C Relative Humidity: 49 %

Mode of Operation: Charge mode (Connected to PC)

Test Method:

The test was performed in accordance with ANSI C63.4: 2009, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Setup:





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Limit for Conducted Emissions (FCC 47 CFR 15.207):

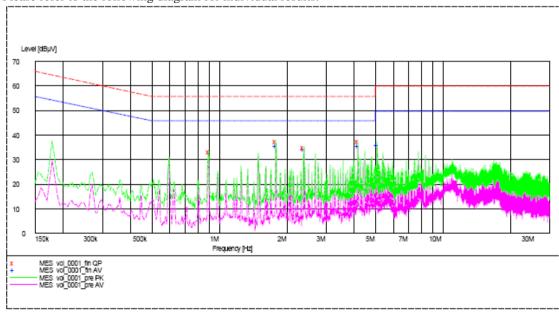
| Frequency Range | Quasi-Peak Limits | Average |
|-----------------|-------------------|-----------|
| [MHz] | [dBµV] | [dBµV] |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

^{*} Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Charge mode (Connected to PC) (L): Pass

Please refer to the following diagram for individual results.





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Results of Charge mode (Connected to PC) (L): Pass

| | | Quasi-peak | | Average | |
|-----------------|-----------|------------|-----------|-----------|-----------|
| Conductor | Frequency | Level | Limit | Level | Limit |
| Live or Neutral | MHz | $dB\mu V$ | $dB\mu V$ | $dB\mu V$ | $dB\mu V$ |
| Live | 0.900 | 33.1 | 56.0 | _*_ | _*_ |
| Live | 1.795 | 37.6 | 56.0 | 35.5 | 46.0 |
| Live | 2.395 | 35.1 | 56.0 | 34.4 | 46.0 |
| Live | 4.195 | 37.4 | 56.0 | 35.6 | 46.0 |
| Live | 5.090 | _*_ | _*_ | 36.1 | 50.0 |

Remarks:

Calculated measurement uncertainty: 3.7dB

-*- Emission(s) that is far below the corresponding limit line.



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Limit for Conducted Emissions (FCC 47 CFR 15.207):

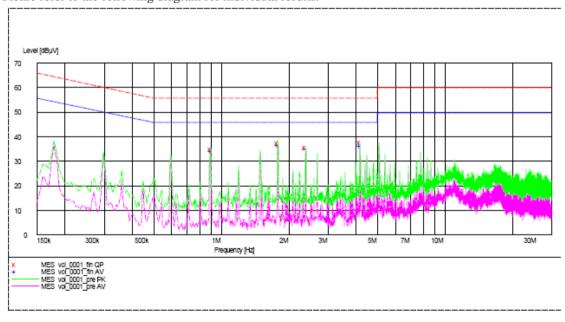
| Frequency Range | Quasi-Peak Limits | Average |
|-----------------|-------------------|-----------|
| [MHz] | [dBµV] | [dBµV] |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 60 | 50 |

^{*} Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of Charge mode (Connected to PC) (N): Pass

Please refer to the following diagram for individual results.





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Results of Charge mode (Connected to PC) (N): Pass

| | | Quasi-peak | | Average | |
|------------------------------|------------------|---------------|---------------|---------------|---------------|
| Conductor Live or Neutral | Frequency MHz | Level dBµV | Limit dBµV | Level dBµV | Limit dBµV |
| Neutral | 0.900 | 34.9 | 56.0 | 34.2 | 46.0 |
| Neutral | 1.795 | 37.6 | 56.0 | 36.8 | 46.0 |
| Neutral | 2.395 | 35.8 | 56.0 | 35.2 | 46.0 |
| Neutral | 4.195 | 37.9 | 56.0 | 36.5 | 46.0 |

Remarks:

Calculated measurement uncertainty: 3.7dB

-*- Emission(s) that is far below the corresponding limit line.



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3.1.4 20dB Bandwidth Measurement

Test Requirement: FCC 47CFR 15.247(a)(1)

Test Method: ANSI C63.4:2009

Test Date: 2012-02-02 Ambient Temperature: 22 °C Relative Humidity: 50 % Mode of Operation: Tx Mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.



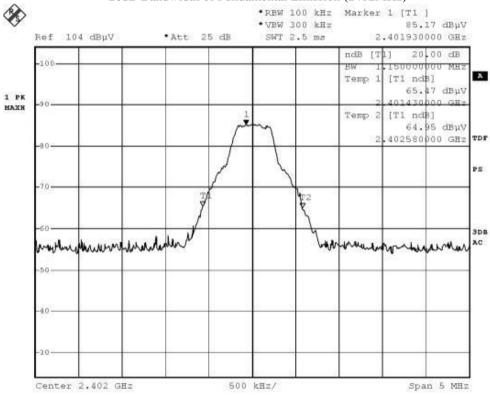
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Limits for 20dB Spectrum Bandwidth Measurement:

| Center Frequency | 20dB Bandwidth | FCC Limits |
|------------------|----------------|--------------------|
| [MHz] | [MHz] | [MHz] |
| 2402.0 | 1.15 | Within 2400-2483.5 |

20dB Bandwidth of Fundamental Emission (2412MHz)





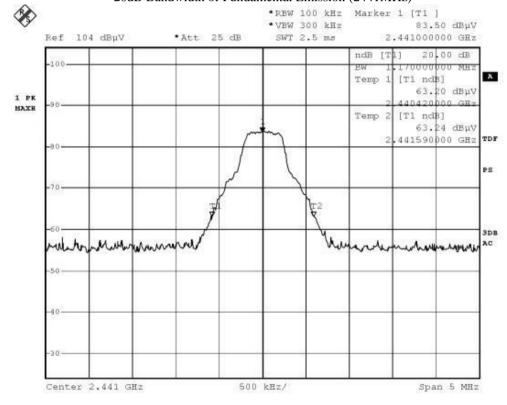
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Limits for 20dB Spectrum Bandwidth Measurement:

| Frequency Range | 20dB Bandwidth | FCC Limits |
|-----------------|----------------|--------------------|
| [MHz] | [MHz] | [MHz] |
| 2441.0 | 1.17 | Within 2400-2483.5 |

20dB Bandwidth of Fundamental Emission (2441MHz)





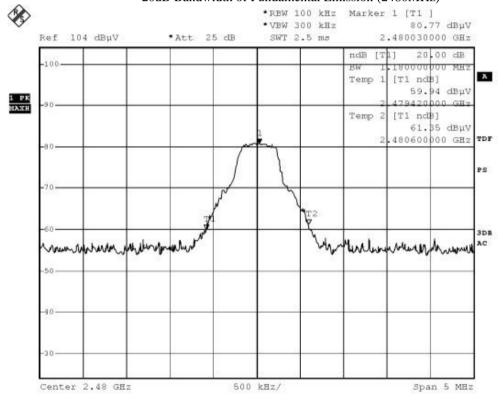
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Limits for 20dB Spectrum Bandwidth Measurement:

| Frequency Range | 20dB Bandwidth | FCC Limits |
|-----------------|----------------|--------------------|
| [MHz] | [MHz] | [MHz] |
| 2480.0 | 1.18 | Within 2400-2483.5 |

20dB Bandwidth of Fundamental Emission (2480MHz)





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Number of Operating Channel

Requirements:

27

28

29

30

2428

2429

2430

2431

57

58

59

60

lapping channels.

| | Frequency | | Frequency | | t least 15 non-over Frequency |
|------|-----------|------|-----------|------|-------------------------------|
| Item | (MHz) | Item | (MHz) | Item | (MHz) |
| 1 | 2402 | 31 | 2432 | 61 | 2462 |
| 2 | 2403 | 32 | 2433 | 62 | 2463 |
| 3 | 2404 | 33 | 2434 | 63 | 2464 |
| 4 | 2405 | 34 | 2435 | 64 | 2465 |
| 5 | 2406 | 35 | 2436 | 65 | 2466 |
| 6 | 2407 | 36 | 2437 | 66 | 2467 |
| 7 | 2408 | 37 | 2438 | 67 | 2468 |
| 8 | 2409 | 38 | 2439 | 68 | 2469 |
| 9 | 2410 | 39 | 2440 | 69 | 2470 |
| 10 | 2411 | 40 | 2441 | 70 | 2471 |
| 11 | 2412 | 41 | 2442 | 71 | 2472 |
| 12 | 2413 | 42 | 2443 | 72 | 2473 |
| 13 | 2414 | 43 | 2444 | 73 | 2474 |
| 14 | 2415 | 44 | 2445 | 74 | 2475 |
| 15 | 2416 | 45 | 2446 | 75 | 2476 |
| 16 | 2417 | 46 | 2447 | 76 | 2477 |
| 17 | 2418 | 47 | 2448 | 77 | 2478 |
| 18 | 2419 | 48 | 2449 | 78 | 2479 |
| 19 | 2420 | 49 | 2450 | 79 | 2480 |
| 20 | 2421 | 50 | 2451 | | |
| 21 | 2422 | 51 | 2452 | | |
| 22 | 2423 | 52 | 2453 | | |
| 23 | 2424 | 53 | 2454 | | |
| 24 | 2425 | 54 | 2455 | | |
| 25 | 2426 | 55 | 2456 | | |
| 26 | 2427 | 56 | 2457 | | |
| | | | | 1 | |

2458

2459

2460

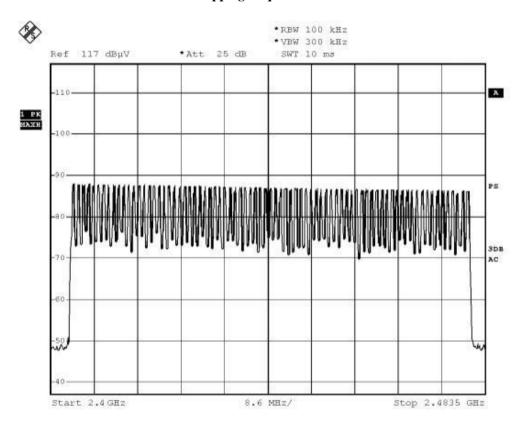
2461



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Number of Hopping frequencies = 79 Channels

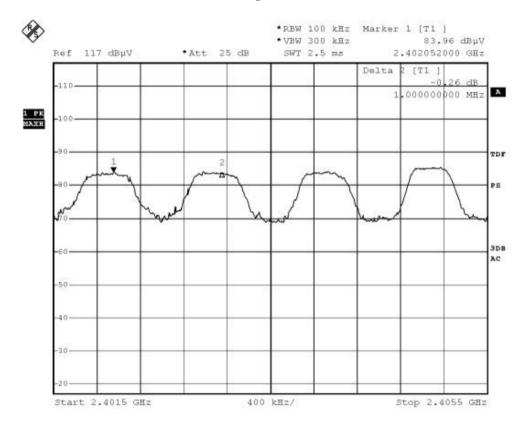




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Channel Separation(Lowest)

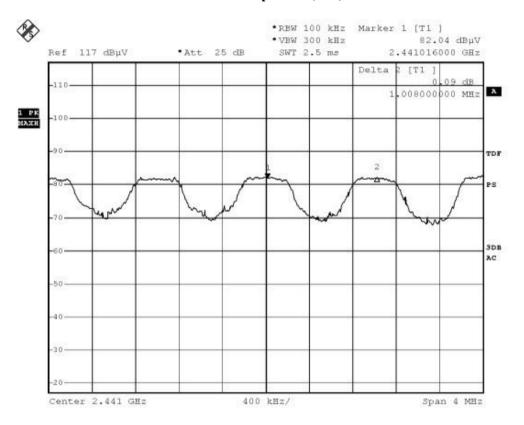




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Channel Separation(Mid)

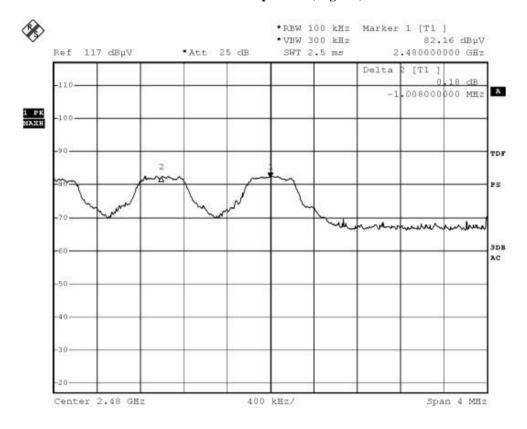




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Channel Separation(Highest)

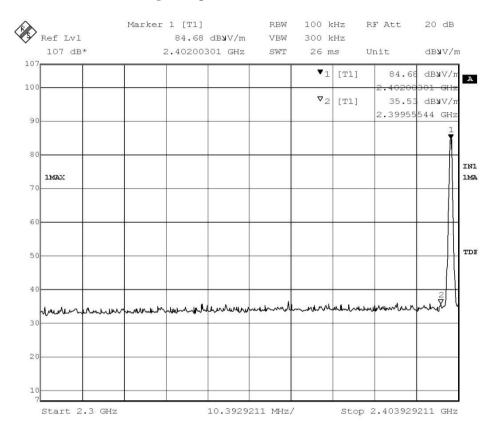




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Band-edge Compliance of RF Emissions - Lowest

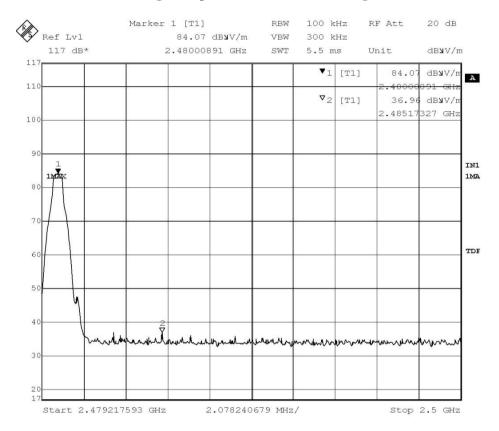




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Band-edge Compliance of RF Emissions - Highest





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Antenna Requirement

Test Requirements: § 15.203

Test Specification:

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 shall be considered sufficient to comply with the provisions of this section. 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.

Test Results:

The EUT has 1 Antenna which is permanently attached to the main unit and attached on PCB board, the antenna gain = 1.87dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.



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Pseudorandom Hopping Algorithm

Requirements:

The channel frequencies shall be selected from a pseudorandom ordered list of hopping frequencies. Each frequency must be used equally by the transmitter.

Pseudorandom Frequency Hopping

The embedded FHSS engine uses 79 hopping frequencies. Each channel frequency is selected from a pseudorandom ordered list of hopping frequencies, from 2402.0MHz to 2480.0MHz with separating in 1000.0 kHz apart from each of the channels. A single data frame is transmitted on each frequency location before skipping to the next hopping frequency in the list. Each channel is occupied 8 milliseconds.

Typically, the initiation of an FHSS communication is as follows

- 1. The initiating party sends a request via a predefined frequency or control channel.
- 2. The receiving party sends a number, known as a seed back to the initiating party.
- 3. The initiating party sends a synchronization signal acknowledging to the receiving party as it has successfully established a transmission link.
- 4. The communication begins, and both the receiving and the sending party change their frequencies along an unpredictable hopping sequence with pseudorandom properties.

System Receiver Input Bandwidth

The receiver bandwidth is equal to the receiver bandwidth in the 79 hopping channel mode, which is 1180. 0 kHz. The receiver bandwidth was verified during RF hopping to the relative channel.

Receiver Hopping Capability

The associated receiver has the ability to shift frequencies in synchronization with the transmitted signals, with they start connect with a same channel and then hop to next channel with a same formula among each other.



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Occupancy Time

Requirements:

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channel employed. No requirements for Digital Transmission System.

Measurement Data: Number of RF channel: 79

Observed duration of occupancy: 0.4x79=31.6s

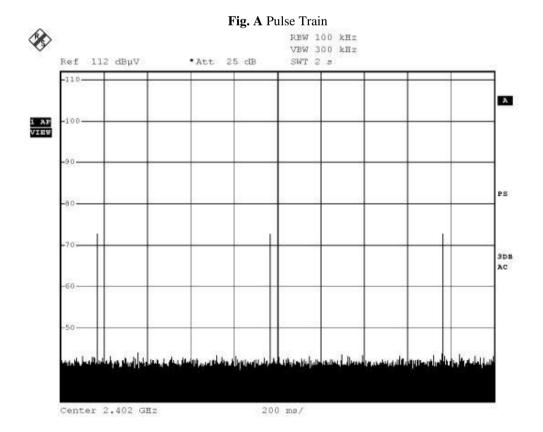
Period observed: 2s

Duration of short burst: 198µs

Time of occupancy: $(3 \times 0.000198) /2 \times 31.6 = 0.0093852$

See fig. A and B.

Remark: The Occupancy Time of the Lowest, Middle and Highest operating frequency has been examined and the worst case test result is recorded in this test report.

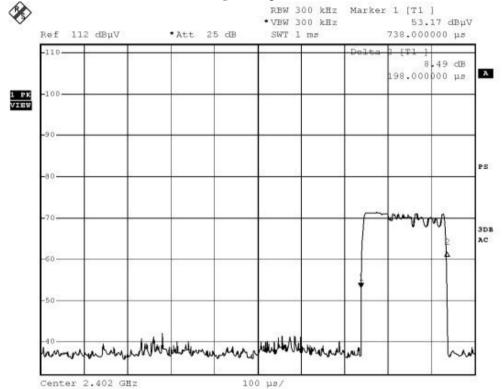




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Fig B . Single Pulse





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Appendix A

List of Measurement Equipment

Radiated Emission

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | DUE CAL |
|------------|---------------------------|------------------------------|---------------------|--------------------|------------|
| EMD015 | Signal Generator | MARCONI INSTRUMENTS | 2030 | 112191/012 | 2013.03.09 |
| EMD036 | EMI Test Receiver | ROHDE & SCHWARZ | ESIB26 | 100388 | 2012.09.07 |
| EMD061 | Biconilog Antenna | ETS.LINDGREN | 3142C | 00060439 | 2012.11.20 |
| EMD062 | Double-Ridged Waveguide | ETS.LINDGREN | 3117 | 00075933 | 2012.11.20 |
| EMD084 | MULTI-DVICE CONTROLLER | ETS.LINDGREN | 2090 | 00060107 | N/A |
| EMD088 | Video Contol Unit | ETS.LINDGREN | Y21953A | 2601073 | N/A |
| EMD093 | Monitor | ViewSonic | VA9036 | Q8X06420187 6 | N/A |
| EMD102 | Intelligent Frequency | Ainuo Instrument Co., Ltd | AN97005SS | 79707454 | N/A |
| EMD105 | FACT-3 EMC Chamber | ETS.LINDGREN | FACT-3 | 3803 | N/A |
| EMD130 | Horn Antenna | Chengdu AINFO lnc. | JXTXLB- 10180-SF | J20310909030 06 | 2012.08.21 |

Conducted Emission

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | DUE CAL |
|------------|---|------------------------------|-----------|---------------|------------|
| EMD003 | IMPULSEGRENZER PULSE LIMITER | ROHDE & SCHWARZ | ESH3-Z2 | 100071 | 2013.03.09 |
| EMD004 | ZWEILEITER-V- NETZNACHBILDUNG TWO- LINE V-NETWORK | ROHDE & SCHWARZ | ESH3-Z5 | 100102 | 2013.03.09 |
| EMD036 | EMI Test Receiver | ROHDE & SCHWARZ | ESIB26 | 100388 | 2012.09.07 |
| EMD103 | Intelligent Frequency | Ainuo Instrument Co., Ltd | AN97005SS | 79707455 | N/A |
| EMD106 | Shielding Room #1 | ETS.LINDGREN | RFD-100 | 3802 | N/A |

Remarks:-

CM Corrective Maintenance

N/A Not Applicable or Not Available

TBD To Be Determined

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Appendix B

Ancillary Equipment

| ITEM NO. | DESCRIPTION | MODEL NO. | FCC ID | REMARK |
|----------|---------------|-----------------------|------------|--|
| 1 | Adapter | HNK075120U | N/A | Two pins (Live / Neutral) only adapter, Input: 100-240Va.c. 50/60Hz 0.5A, Output: 7.5Vd.c. 1A. |
| 2 | iPhone 4 | A1332 EMC 380A | BCG-E2380A | 8GB, S/N: 7W105HRBA4S |
| 3 | DELL COMPUTER | DMC | N/A | N/A |
| 4 | DELL MONITOR | E551C | ARSCM356N | RESOLUTION:800x600(DURING TESTING) 1.0M UNSHIEDED POWER CORD CONNECTED TO THE COMPUTER 2.8M SHIELDED CABLE CONNECTED TO THE COMPUTER |
| 5 | DELL KEYBOARD | SK-8110 | N/A | 1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER |
| 6 | DELL MOUSE | N/A | N/A | 2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER |
| 7 | LASER PRINTER | HP LaserJet 1020 Plus | N/A | 1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER |



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Appendix C

Photographs of EUT

Front View of the product



Front View of the product



Inner Circuit Top View



Rear View of the product



Rear View of the product



Inner Circuit Bottom View



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Photographs of EUT

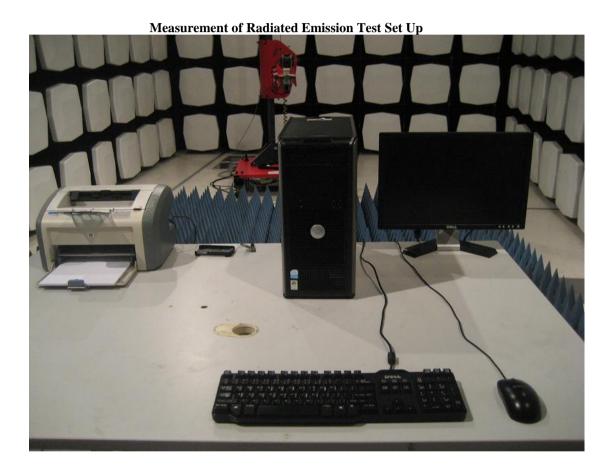




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Photographs of EUT

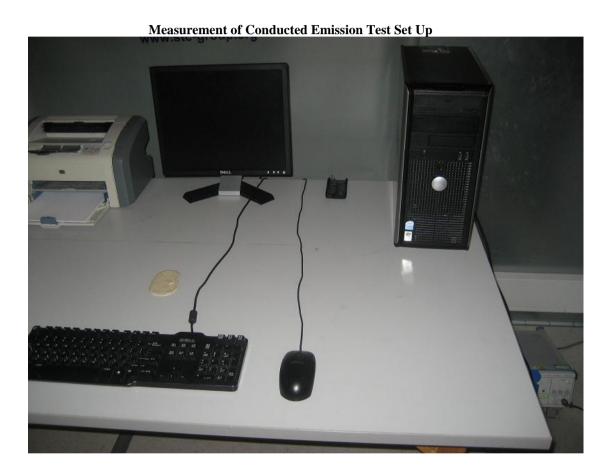




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Photographs of EUT



***** End of Test Report *****