



STC Test Report

Date : 2013-05-31

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No. : DM111223

Applicant (DGS517):

Smart Technologies & Investment Ltd.
Units C&D, 18/F Spectrum Tower, No. 53 Hung To Road,
Kwun Tong, Kowloon, Hong Kong

Description of Sample(s):

Submitted sample(s) said to be
Product: GTO ACCESS WIRELESS ESTATE
INTERCOM
Brand Name: GTO / ACCESS SYSTEMS and GTO /
PRO
Model Number: F3100MBC
FCC ID: N9KGTOF3100

Date Sample(s) Received: 2013-05-15

Date Tested: 2013-05-21

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 and ANSI C63.4: 2009 for FCC Certification.

Conclusion(s):

The submitted product COMPLIED 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):

For additional model(s) details, see page 4



LONG Yun Jian, Along
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
STC (Dongguan) Company Limited

The Hong Kong Standards and Testing Centre Ltd.

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1.0 General Details

1.1 Equipment Under Test [EUT]

Description of Sample(s)

Submitted sample(s) said to be

Product:

GTO ACCESS WIRELESS ESTATE INTERCOM

Smart Electronic Industrial (Dong Guan) Co., Ltd.

Manufacturer:

Qing Long Road, Long Jian Tian-Cun, Huang Jiang-

Zhen, Dong Guan, Guang Dong, China

Brand Name:

GTO / ACCESS SYSTEMS and GTO / PRO

Model Number:

F3100MBC

Additional Model Number(s):

RF1257SMA

Rating:

12-24Vd.c. with Jack / 6Vd.c. ("AAA" size battery x 4)

The AC/DC adaptor was provided by the test lab with following details:

Brand name: N/A; Model no.: S-1200F; Input: 100-240Va.c. 50/60Hz 28.8W;

Output: 3-15Vd.c. 1200mA.

1.1.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Smart Electronic Industrial (Dong Guan) Co., Ltd. GTO ACCESS WIRELESS ESTATE INTERCOM. Entry code presses the CALL button on the keypad. The base (indoor) unit and the keypad will ring. A user at the base (indoor) unit answers the call by pressing the PUSH TO ANSWER/TALK button.

1.2 Date of Order

2013-05-15

1.3 Submitted Sample(s):

1 Sample

1.4 Test Duration

2013-05-21

1.5 Country of Origin

China

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2.0 Technical Details

2.1 Investigations Requested

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15 2012 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 / Severity | Test Result | | |
| | | | | Pass | Failed | N/A |
| Field Strength of Fundamental Emissions & Spurious Emissions | FCC 47CFR 15.231a | ANSI C63.4:2009 | N/A | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emissions | FCC 47CFR 15.209 | ANSI C63.4:2009 | N/A | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| AC Mains Conducted Emissions | FCC 47CFR 15.207 | ANSI C63.4:2009 | N/A | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Note: N/A - Not Applicable

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3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

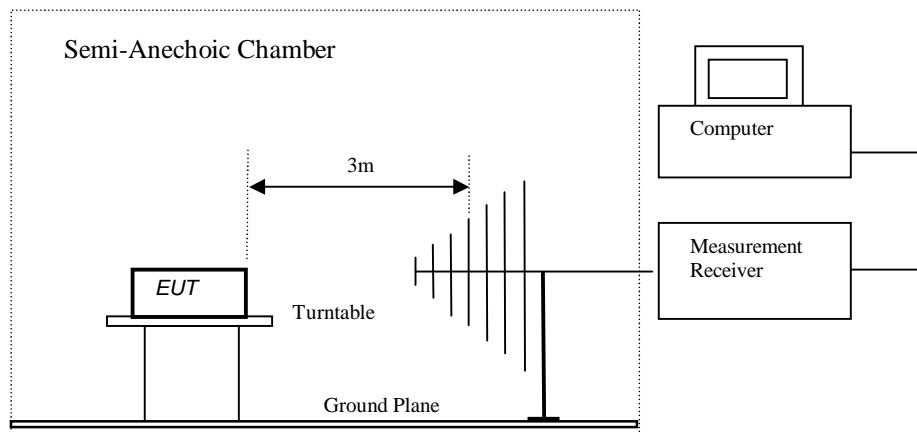
Test Requirement: FCC 47CFR 15.231a
Test Method: ANSI C63.4:2009
Test Date: 2013-05-21
Mode of Operation: Tx mode

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, rotated about all 3 axis (X, Y & Z) and considered 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 STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

Test Setup:



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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.231a]:

| Frequency Range of Fundamental [MHz] | Field Strength of Fundamental Emission [Average] [μ V/m] | Field Strength of Spurious Emission [Average] [μ V/m] |
|---|---|--|
| 40.66-40.70 | 2,250 | 225 |
| 70-130 | 1,250 | 125 |
| 130-174 | 1,250 to 3,750 * | 125 to 375 * |
| 174-260 | 3,750 | 375 |
| 260-470 | 3,750 to 12,500 * | 375 to 1,250 * |
| Above 470 | 12,500 | 1,250 |

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, μ V/m at 3 meters = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, μ V/m at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Results of Tx mode: PASS

| Field Strength of Fundamental Emissions Peak Value | | | | | | |
|---|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V | Correction Factor dB/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 317.69 | 61.7 | 15.8 | 77.5 | 7498.9 | 61,537.6 | Vertical |

| Field Strength of Spurious Emissions Peak Value | | | | | | |
|--|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|------------------------|---------------------|
| Frequency MHz | Measured Level @3m dB μ V | Correction Factor dB/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 635.38 | 30.1 | 22.4 | 52.5 | 421.7 | 6,153.8 | Vertical |
| 953.07 | 30.9 | 26.6 | 57.5 | 749.9 | 6,153.8 | Vertical |
| + 1588.45 | < 1.0 | 1.0 | < 2.0 | < 1.3 | 5,000.0 | Vertical |
| 1906.14 | 16.5 | 32.1 | 48.6 | 269.2 | 6,153.8 | Vertical |

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Results of Tx mode: PASS

| Field Strength of Fundamental Emissions | | | | | | |
|---|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Average Value | | | | | | |
| Frequency MHz | Measured Level @3m dB μ V | Correction Factor dB/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 317.69 | 49.5 | 15.8 | 65.3 | 1840.8 | 6,153.8 | Vertical |

| Field Strength of Spurious Emissions | | | | | | |
|--------------------------------------|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|------------------------|---------------------|
| Average Value | | | | | | |
| Frequency MHz | Measured Level @3m dB μ V | Correction Factor dB/m | Field Strength dB μ V/m | Field Strength μ V/m | Limit @3m μ V/m | E-Field Polarity |
| 635.38 | 17.9 | 22.4 | 40.3 | 103.5 | 615.4 | Vertical |
| 953.07 | 18.7 | 26.6 | 45.3 | 184.1 | 615.4 | Vertical |
| 1588.45 | < 1.0 | 1.0 | < 2.0 | < 1.3 | 500.0 | Vertical |
| 1906.14 | < 4.3 | 32.1 | < 36.4 | < 66.1 | 615.4 | Vertical |
| 2223.83 | < 1.0 | 17.2 | < 18.2 | < 8.1 | 500.0 | Vertical |

Remarks:

*: Adjusted by Duty Cycle = -12.2dB

FCC Limit for Average Measurement = $41.6667(317.69\text{MHz})-7083.3333=6153.8\mu\text{V/m}$

+: Denotes restricted band of operation.

Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 were not adjusted for averaging and the limits of FCC Rules Part 15 Section 15.209 were applied.

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

| Frequency Range [MHz] | Quasi-Peak Limits [μ 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 (9kHz - 30MHz): PASS

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

Result of Tx mode (30MHz – 1GHz): PASS

| Radiated Emissions Quasi-Peak | | | | | |
|----------------------------------|---------------------|------------------------------|------------------------------|---------------------------|---------------------------|
| Emission Frequency MHz | E-Field Polarity | Level @3m dB μ V/m | Limit @3m dB μ V/m | Level @3m μ V/m | Limit @3m μ V/m |
| 40.3 | Vertical | 32.4 | 40.0 | 41.7 | 100 |
| 200.0 | Vertical | 30.1 | 43.5 | 32.0 | 150 |

Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

(1GHz – 18GHz): 4.4dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst -case test results are recorded in this report.

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3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement: FCC 47CFR 15.207

Test Method: ANSI C63.4:2009

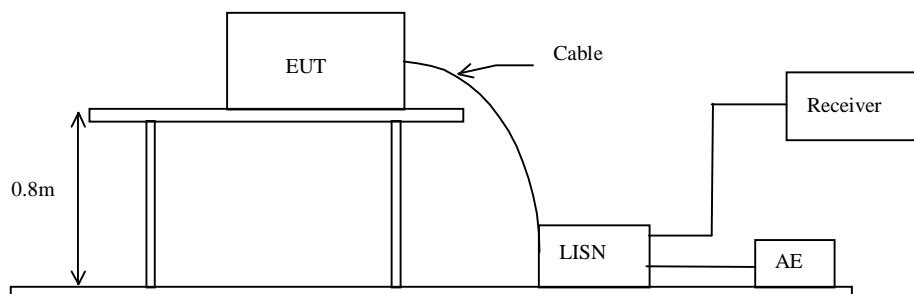
Test Date: 2013-05-21

Mode of Operation: Tx mode

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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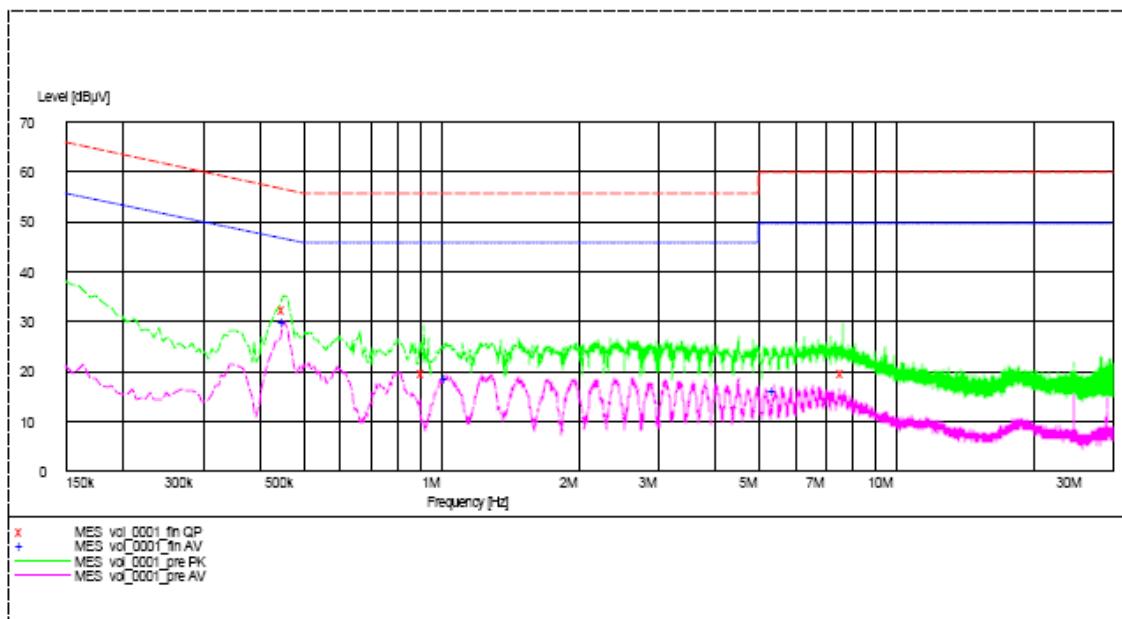
Limit for Conducted Emissions (FCC 47 CFR 15.207):

| Frequency Range [MHz] | Quasi-Peak Limits [dB μ V] | Average [dB μ V] |
|--------------------------|-----------------------------------|-------------------------|
| 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 Tx mode (L): PASS



| Conductor Live or Neutral | Frequency MHz | Quasi-peak | | Average | |
|------------------------------|------------------|---------------------|---------------------|---------------------|---------------------|
| | | Level dB μ V | Limit dB μ V | Level dB μ V | Limit dB μ V |
| Live | 0.455 | 32.4 | 57.0 | 29.9 | 47.0 |
| Live | 1.035 | -*- | -*- | 18.6 | 46.0 |
| Live | 5.420 | -*- | -*- | 16.3 | 50.0 |
| Live | 0.920 | 19.8 | 56.0 | -*- | -*- |
| Live | 7.665 | 19.9 | 60.0 | -*- | -*- |

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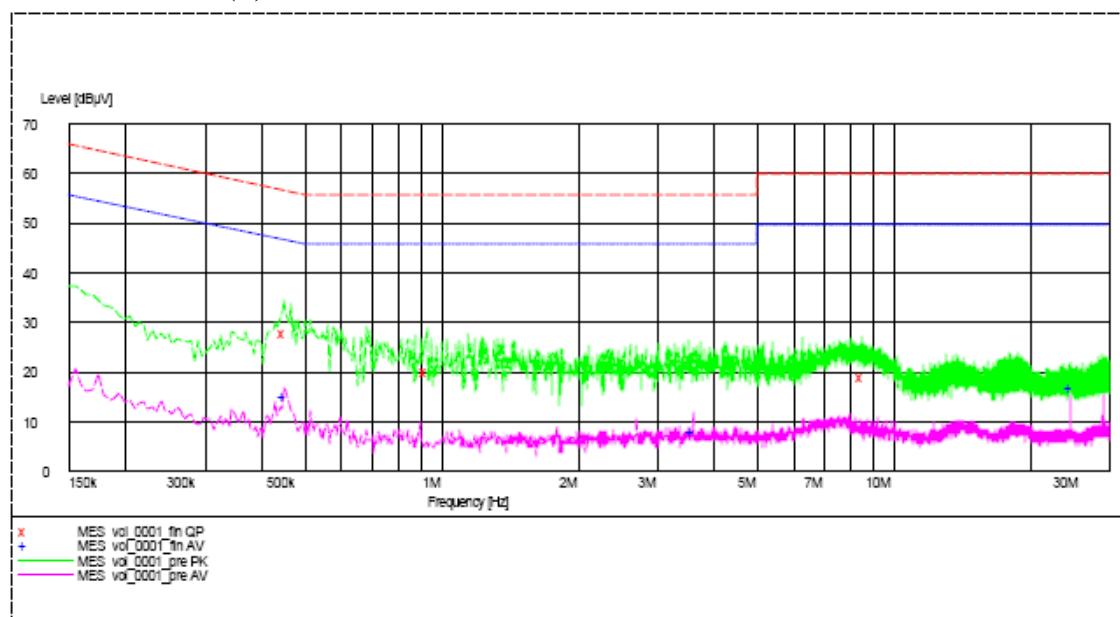
Limit for Conducted Emissions (FCC 47 CFR 15.207):

| Frequency Range [MHz] | Quasi-Peak Limits [dB μ V] | Average [dB μ V] |
|--------------------------|-----------------------------------|-------------------------|
| 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 Tx mode (N): PASS



| Conductor Live or Neutral | Frequency MHz | Quasi-peak | | Average | |
|------------------------------|------------------|---------------------|---------------------|---------------------|---------------------|
| | | Level dB μ V | Limit dB μ V | Level dB μ V | Limit dB μ V |
| Neutral | 0.450 | 27.8 | 57.0 | 15.4 | 47.0 |
| Neutral | 3.605 | -*- | -*- | 8.2 | 46.0 |
| Neutral | 24.575 | -*- | -*- | 16.9 | 50.0 |
| Neutral | 0.930 | 20.1 | 56.0 | 41.8 | 50.0 |
| Neutral | 8.545 | 19.0 | 60.0 | -*- | -*- |

Remarks:

Calculated measurement uncertainty (0.15MHz - 30MHz): 3.25dB

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

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3.2 20dB Bandwidth of Fundamental Emission

| | |
|--------------------|----------------------------------|
| Test Requirement: | FCC 47 CFR 15.231a |
| Test Method: | ANSI C63.4:2009 (Section 13.1.7) |
| Test Date: | 2013-05-21 |
| 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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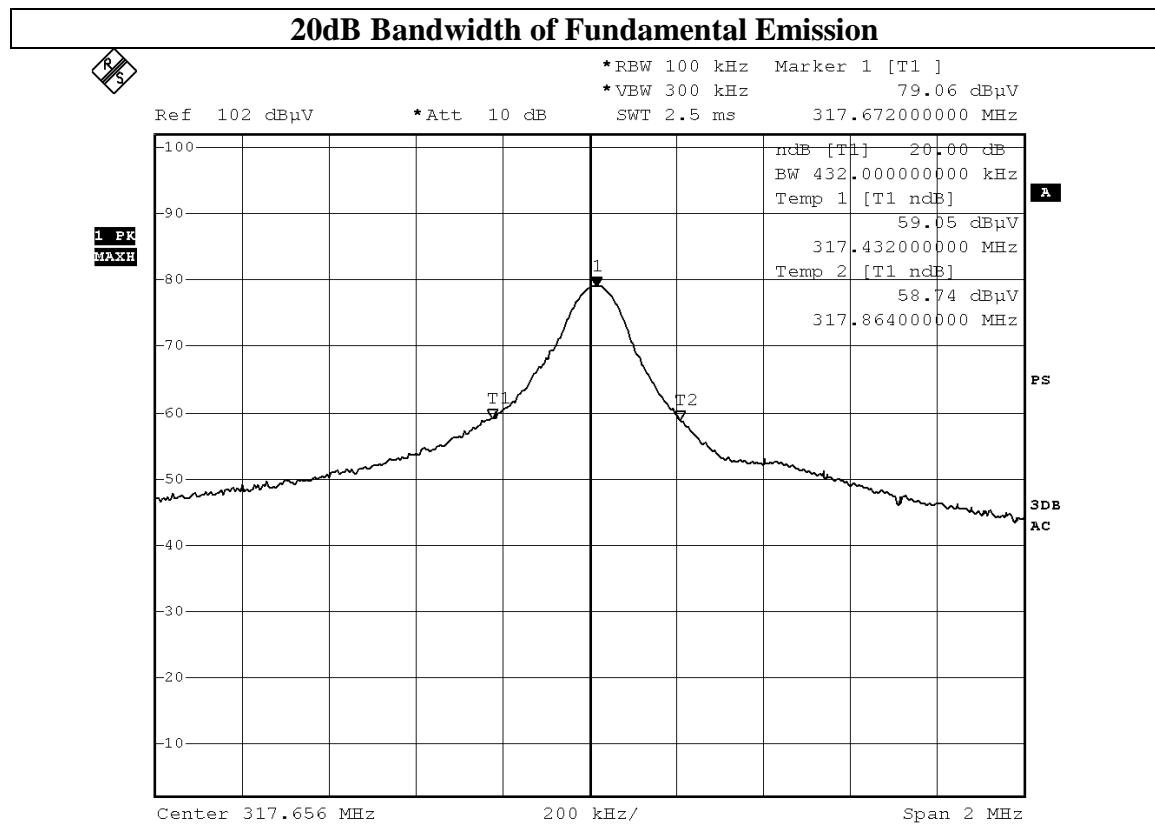
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Limits for 20 dB Bandwidth of Fundamental Emission:

| Frequency Range [MHz] | 20dB Bandwidth [kHz] | FCC Limits * [kHz] |
|--------------------------|-------------------------|-----------------------|
| 317.67 | 432.0 | 794.2 |

*: FCC Limit for Bandwidth measurement
 $= (0.25\%)(\text{Center Frequency})$
 $= (0.0025)(317.67)$
 $= 794.2\text{kHz}$



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Appendix A

List of Measurement Equipment

Radiated Emission

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---------|-------------------------------------|---------------------------|-----------|--------------|------------|------------|
| EMD015 | Signal Generator | MARCONI INSTRUMENTS | 2030 | 112191/012 | 2013.03.09 | 2014.03.08 |
| EMD036 | EMI Test Receiver | ROHDE & SCHWARZ | ESIB26 | 100388 | 2012.07.06 | 2013.07.05 |
| EMD061 | Biconilog Antenna | ETS.LINDGREN | 3142C | 00060439 | 2012.11.03 | 2014.11.02 |
| EMD062 | Double-Ridged Waveguide (1 – 18GHz) | ETS.LINDGREN | 3117 | 00075933 | 2012.11.28 | 2014.11.27 |
| EMD084 | MULTI-DVICE CONTROLLER | ETS.LINDGREN | 2090 | 00060107 | N/A | N/A |
| EMD088 | Video Contol Unit | ETS.LINDGREN | Y21953A | 2601073 | N/A | N/A |
| EMD093 | Monitor | ViewSonic | VA9036 | Q8X064201876 | N/A | N/A |
| EMD102 | Intelligent Frequency | Ainuo Instrument Co., Ltd | AN97005SS | 79707454 | N/A | N/A |
| EMD105 | FACT-3 EMC Chamber | ETS.LINDGREN | FACT-3 | 3803 | N/A | N/A |
| EMD124 | Loop Antenna | ETS-Lindgren | 6502 | 00104905 | 2012.03.26 | 2014.03.25 |

CONDUCTED EMISSION

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | LAST CAL |
|---------|---|---------------------------|-----------|------------|------------|------------|
| EMD003 | IMPULSEGRENZER PULSE LIMITER | ROHDE & SCHWARZ | ESH3-Z2 | 100071 | 2013.03.15 | 2014.03.14 |
| EMD004 | ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK | ROHDE & SCHWARZ | ESH3-Z5 | 100102 | 2013.03.15 | 2014.03.14 |
| EMD009 | PASSIVE VOLTAGE PROBE | ROHDE & SCHWARZ | ESH2-Z3 | 100020 | 2013.03.15 | 2014.03.14 |
| EMD036 | EMI TEST RECEIVER | ROHDE & SCHWARZ | ESIB26 | 100388 | 2012.07.06 | 2013.07.05 |
| EMD041 | TWO-LINE V-NETWORK | ROHDE & SCHWARZ | ENV216 | 100261 | 2012.07.06 | 2013.07.05 |
| EMD103 | INTELLIGENT FREQUENCY | AINUO INSTRUMENT CO., LTD | AN97005SS | 79707455 | N/A | N/A |
| EMD106 | SHIELDING ROOM #1 | ETS.LINDGREN | RFD-100 | 3802 | N/A | N/A |

Remarks:-

CM Corrective Maintenance

N/A Not Applicable

TBD To Be Determined

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Appendix B

Duty Cycle Correction During 100msec

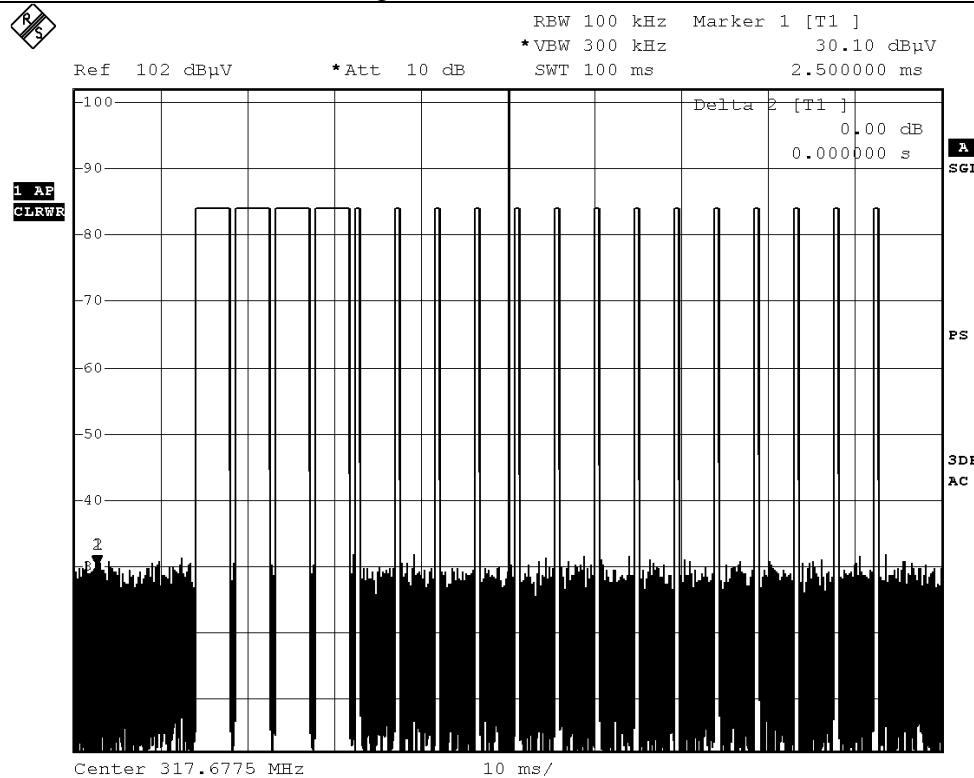
Each packet period (100msec) never exceeds a series of 4 (4.04msec) long and 14 (0.6msec) short pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered ($4 \times 4.04 + 14 \times 0.6$ msec per 100msec = 24.56% duty cycle. Figure A through C shows the characteristics of the pulses train for one of these functions.

Remarks:

Duty cycle factor = $20\log [(4.04*4+0.6*14)/100] = -12.2\text{dB}$

The following figures [Figure A to Figure C] showed the characteristics of the pulse train for one of these functions.

Figure A [Pulse Train]



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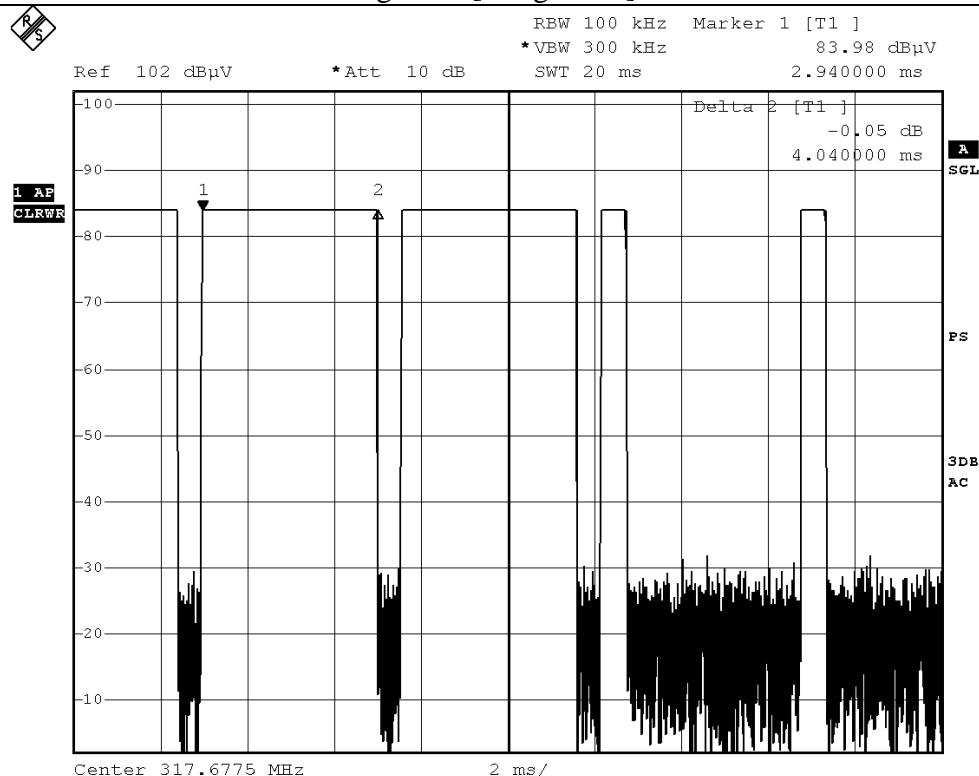
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Figure B [Long Pulse]



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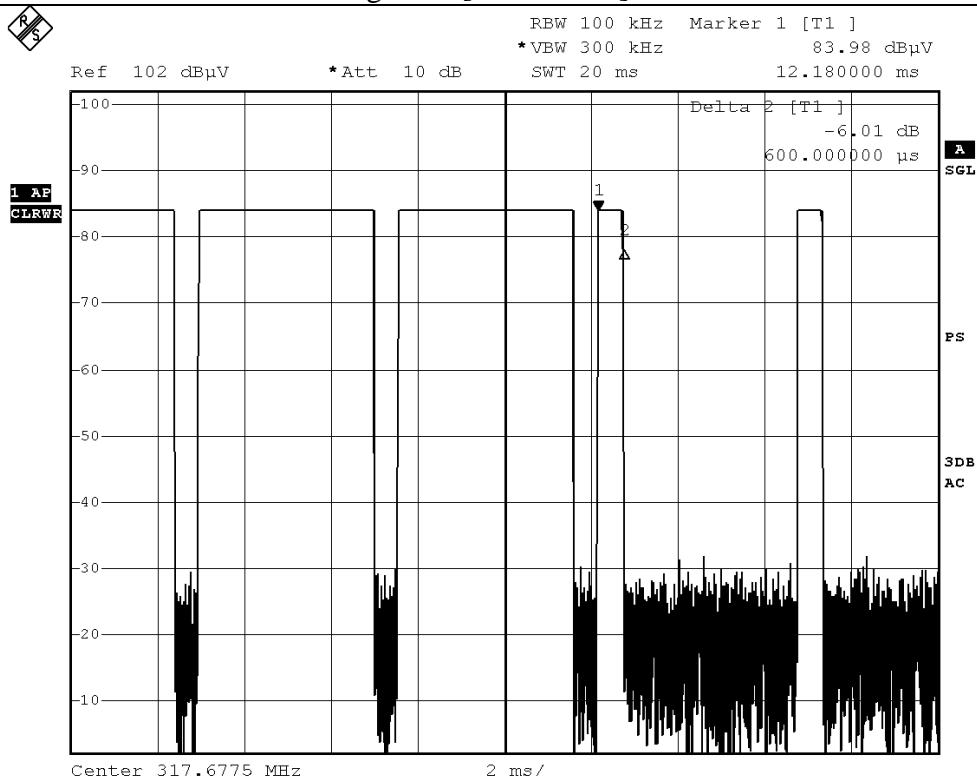
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Figure C [Short Pulse]



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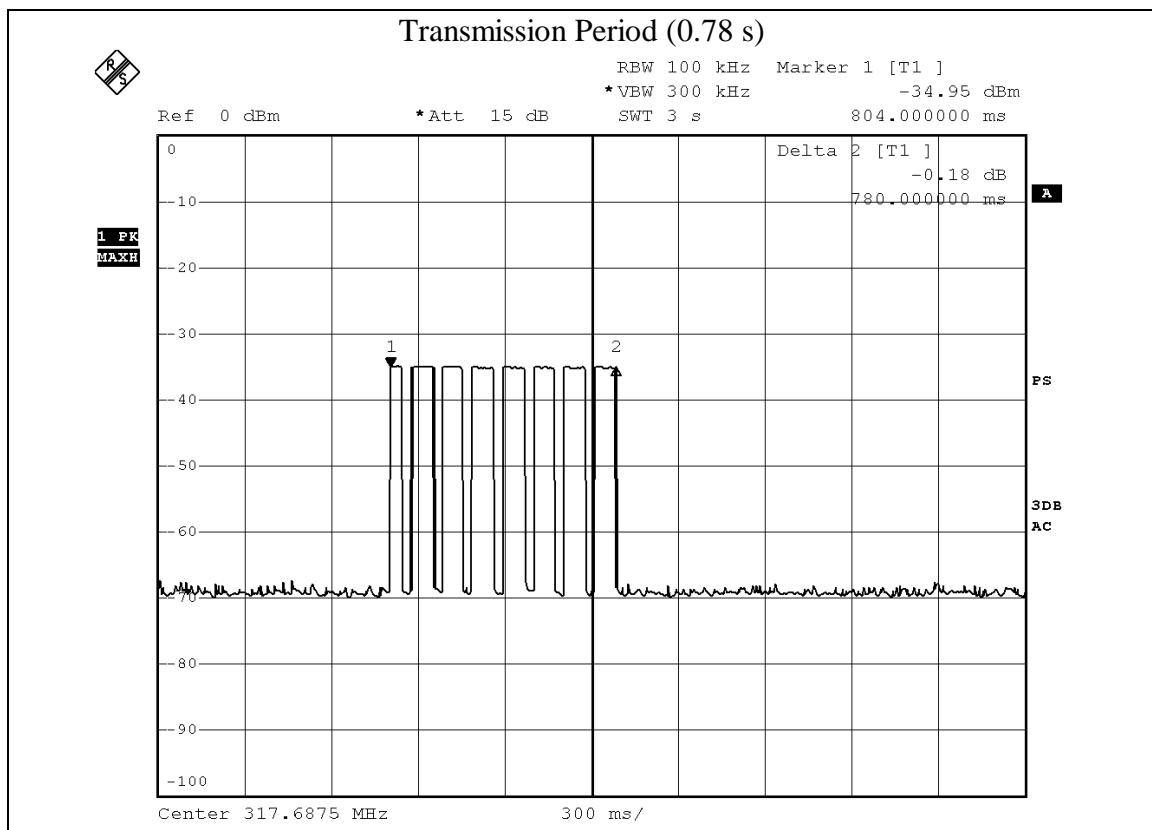
No. : DM111223

Appendix C

Periodic Operation [FCC 47CFR 15.231(a2)]

According to FCC 47CFR15.231 (a1). A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

The EUT ceases transmission almost immediately upon being released and appears to finish the current packet being transmitted. Therefore the longest period of time the transmitter should take to deactivate is a packet length.



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Appendix D

Photographs of EUT

Front View of the product



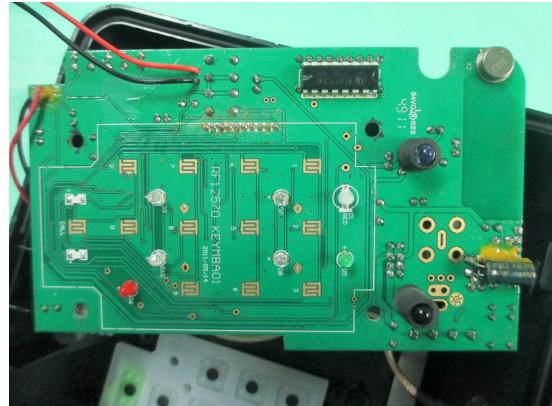
Rear View of the product



Inner Circuit Top View



Inner Circuit Bottom View



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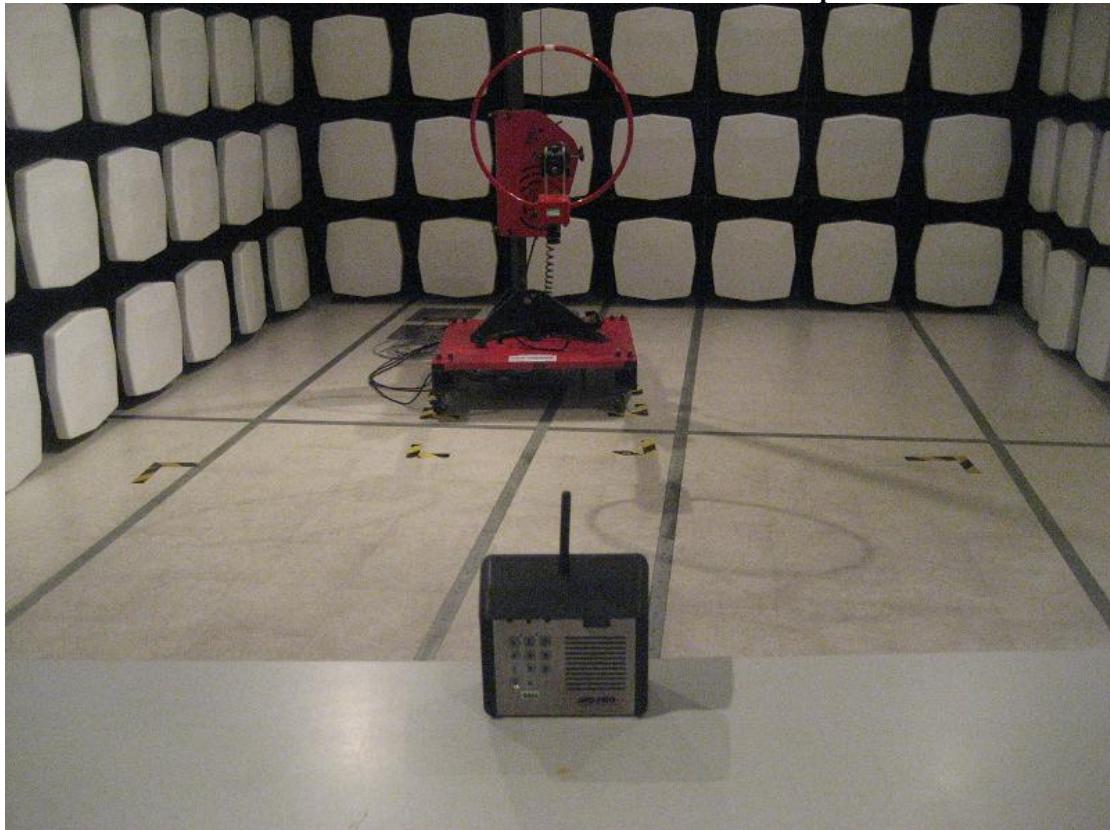
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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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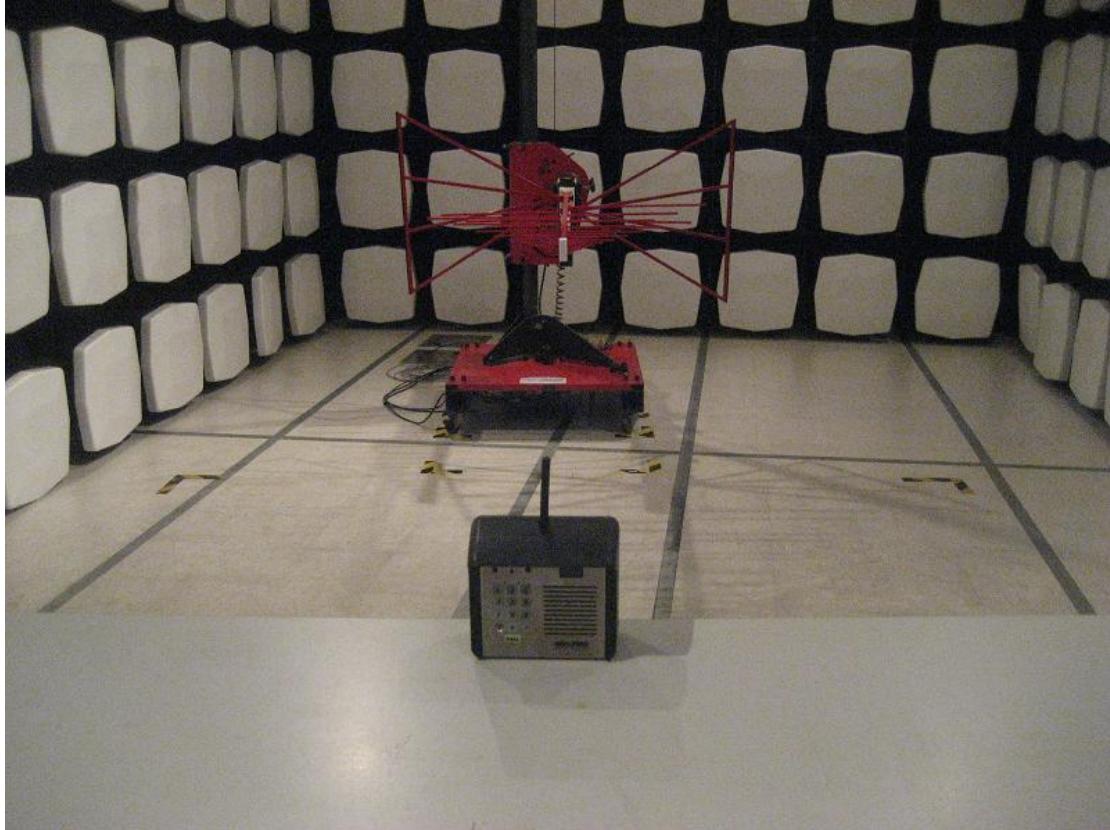
Date : 2013-05-31

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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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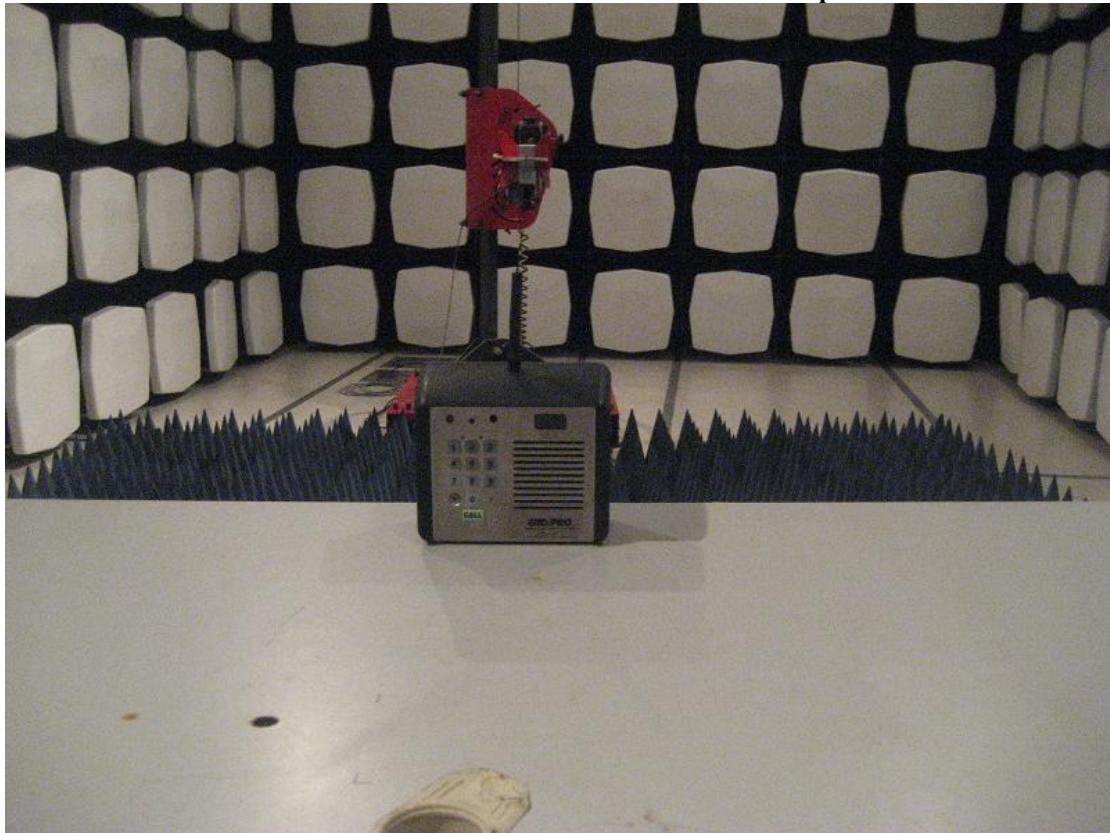
Date : 2013-05-31

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Photographs of EUT

Measurement of Radiated Emission Test Set Up



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Photographs of EUT

Measurement of Conducted Emission Test Set Up



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

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