DAkkS
Deutsche
Akkreditierungsstelle
D-PL-12121-01-01

Date: 2013-02-25

No.: DM110294

Applicant (DGS520):	OSAKI ELECTRIC CO., LTD. 1131, Fujikubo, Miyoshimachi, Iruma-gun, Saitama, 354-8501, JAPAN.
Manufacturer:	OSAKI ELECTRIC CO., LTD. 1131, Fujikubo, Miyoshimachi, Iruma-gun, Saitama, 354-8501, JAPAN.
Description of Sample(s):	Submitted sample(s) said to be Product: Watt hour meter Brand Name: OSAKI Model Number: WFD1 FCC ID: S8XWFD1
Date Sample(s) Received:	2012-10-17
Date Tested:	2012-10-23 to 2012-10-28
Investigation Requested:	Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2011 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):	---

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

CONTENT:

1.0 General Details

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

Product:	Watt hour meter
Manufacturer:	OSAKI ELECTRIC CO., LTD. 1131, Fujikubo, Miyoshimachi, Iruma-gun, Saitama, 354-8501, JAPAN.
Brand Name:	OSAKI
Model Number:	WFD1
Input Voltage:	120Va.c. 60Hz

1.2 Description of EUT Operation

The Equipment Under Test (EUT) is an OSAKI ELECTRIC CO., LTD., Watt hour meter. The transmitter operates in the 903 to 927MHz frequency band. The EUT continues to transmit while Key is being pressed. The transmitted signals were modulated in digital data and the type of modulation is GFSK.

1.3 Date of Order

2012-10-17

1.4 Submitted Sample(s):

1 Sample

1.5 Test Duration

2012-10-23 to 2012-10-28

1.6 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2011 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 / Severity	Test Result		
				Pass	Fail	N/A
Field Strength of Fundamental & Harmonics Emissions	FCC 47CFR 15.249	ANSI C63.4:2009	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2009	N/A	☒	☐	☐
AC Mains Conducted Emissions	FCC 47CFR 15.207	ANSI C63.4:2009	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2009
Test Date:	2012-11-28
Mode of Operation:	Tx mode

Test Method:

The sample was placed 0.8m above the ground plane on a standard radiated emission test site. 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. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

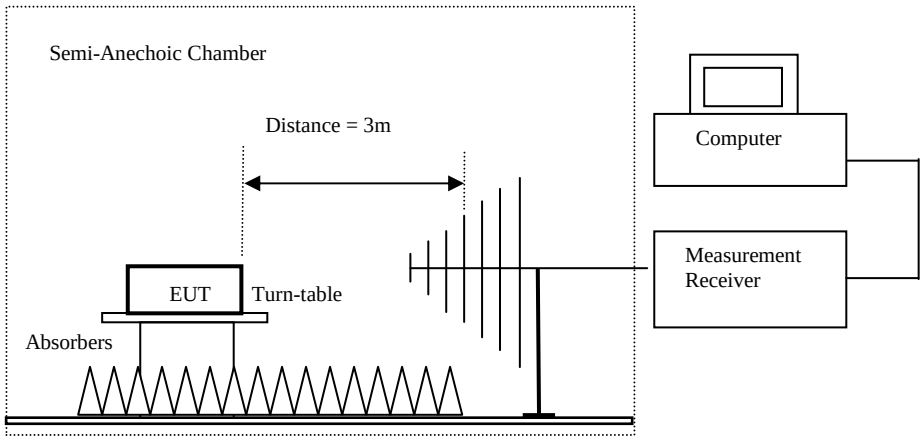
Remark: 3 orthogonal axis apply to hand-held device only.

*: 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.

Spectrum Analyzer Setting:

9KHz – 30MHz (Pk & Av)	RBW:	10kHz
	VBW:	30kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
30MHz – 1GHz (QP)	RBW:	120kHz
	VBW:	120kHz
	Sweep:	Auto
	Span:	Fully capture the emissions being measured
	Trace:	Max. hold
Above 1GHz (Pk & Av)	RBW:	3MHz
	VBW:	3MHz
	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.

Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [microvolts/meter]	Field Strength of Harmonics Emission [microvolts/meter]
902-928	500,000 [Quasi-Peak]	---
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Low Frequency Channel): Pass

Field Strength of Fundamental Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
903.0	63.8	26.4	90.2	32,359.4	500,000	Vertical
903.0	62.2	26.9	89.1	28,510.2	500,000	Horizontal

Radiated Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1806.0	16.0	32.7	48.7	272.3	5,000	Vertical
2709.0	29.8	36.7	66.5	2,113.5	5,000	Vertical
3612.0	13.2	40.4	53.6	478.6	5,000	Vertical
4515.0	17.5	42.3	59.8	977.2	5,000	Vertical
5418.0	13.6	42.8	56.4	660.7	5,000	Vertical

Radiated Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1806.0	-4.0	26.2	22.2	12.9	500	Vertical
2709.0	9.8	32.7	42.5	133.4	500	Vertical
3612.0	-6.8	36.7	29.9	31.3	500	Vertical
4515.0	-3.1	40.4	37.3	73.3	500	Vertical
5418.0	-2.5	42.3	39.8	97.7	500	Vertical

Results of Tx mode (Middle Frequency Channel): Pass

Field Strength of Fundamental Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
915.0	64.6	26.4	91.0	35,481.3	500,000	Vertical
915.0	62.4	26.9	89.3	29,174.3	500,000	Horizontal

Radiated Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1830.0	16.4	32.7	49.1	285.1	5,000	Vertical
2745.0	28.3	36.7	65.0	1,778.3	5,000	Vertical
3660.0	11.9	40.4	52.3	412.1	5,000	Vertical
4575.0	16.4	41.7	58.1	803.5	5,000	Vertical
5490.0	18.6	42.4	61.0	1,122.0	5,000	Vertical
6405.0	15.8	42.9	58.7	861.0	5,000	Vertical

Radiated Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1830.0	-3.6	32.7	29.1	28.5	500	Vertical
2745.0	8.3	36.7	45.0	177.8	500	Vertical
3660.0	-8.1	40.4	32.3	41.2	500	Vertical
4575.0	-3.6	41.7	38.1	80.4	500	Vertical
5490.0	-2.4	42.4	40.0	100.0	500	Vertical
6405.0	-4.2	42.9	38.7	86.1	500	Vertical

Results of Tx mode (High Frequency Channel): Pass

Field Strength of Fundamental Emissions Quasi-Peak						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
927.0	64.2	26.4	90.6	33,884.4	500,000	Vertical
927.0	62.5	27.0	89.5	29,853.8	500,000	Horizontal

Radiated Emissions Peak Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1854.0	20.8	32.7	53.5	473.2	5,000	Vertical
2781.0	39.1	36.7	75.8	6,166.0	5,000	Vertical
3696.0	9.7	40.4	50.1	319.9	5,000	Vertical
4635.0	19.0	41.6	60.6	1,071.5	5,000	Vertical
5562.0	15.9	42.5	58.4	831.8	5,000	Vertical
6496.0	15.7	43.0	58.7	861.0	5,000	Vertical

Radiated Emissions Average Value						
Frequency MHz	Measured Level @3m dBμV/m	Correction Factor dBμV/m	Field Strength dBμV/m	Field Strength μV/m	Limit @3m μV/m	E-Field Polarity
1854.0	0.8	32.7	33.5	47.3	500	Vertical
2781.0	9.1	36.7	45.8	195.0	500	Vertical
3696.0	-10.3	40.4	30.1	32.0	500	Vertical
4635.0	-1.0	41.6	40.6	107.2	500	Vertical
5562.0	-4.1	42.5	38.4	83.2	500	Vertical
6496.0	-4.3	43.0	38.7	86.1	500	Vertical

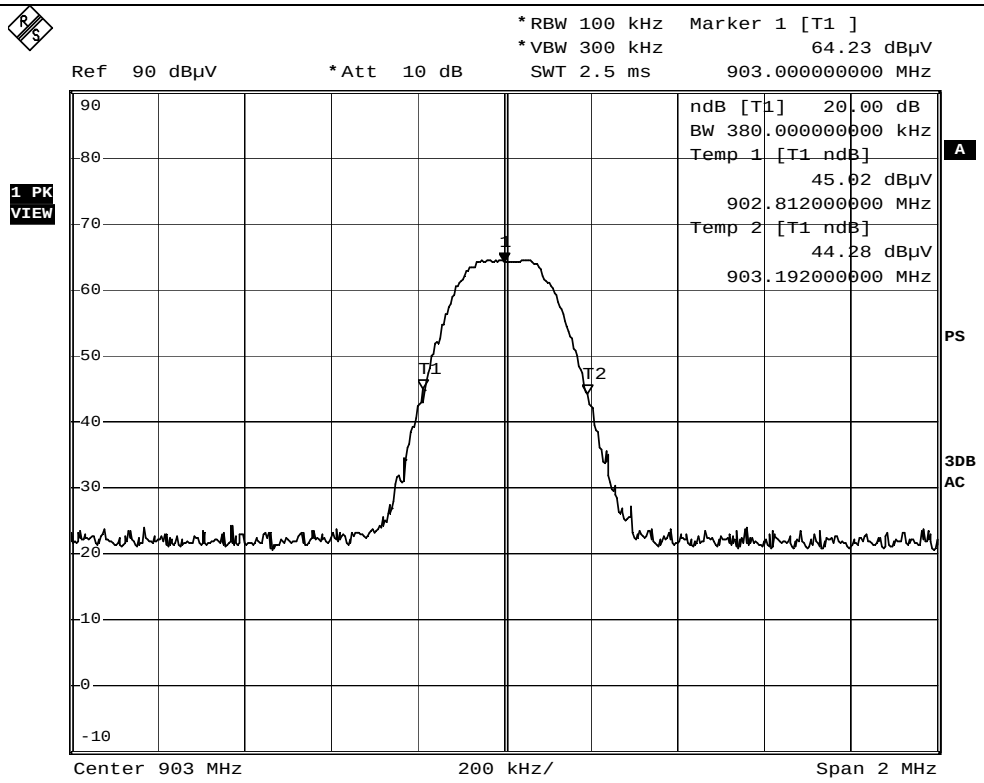
Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Calculated measurement uncertainty (30MHz - 1GHz): 4.6dB
(1GHz - 18GHz): 4.4dB

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

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]
903.0	380

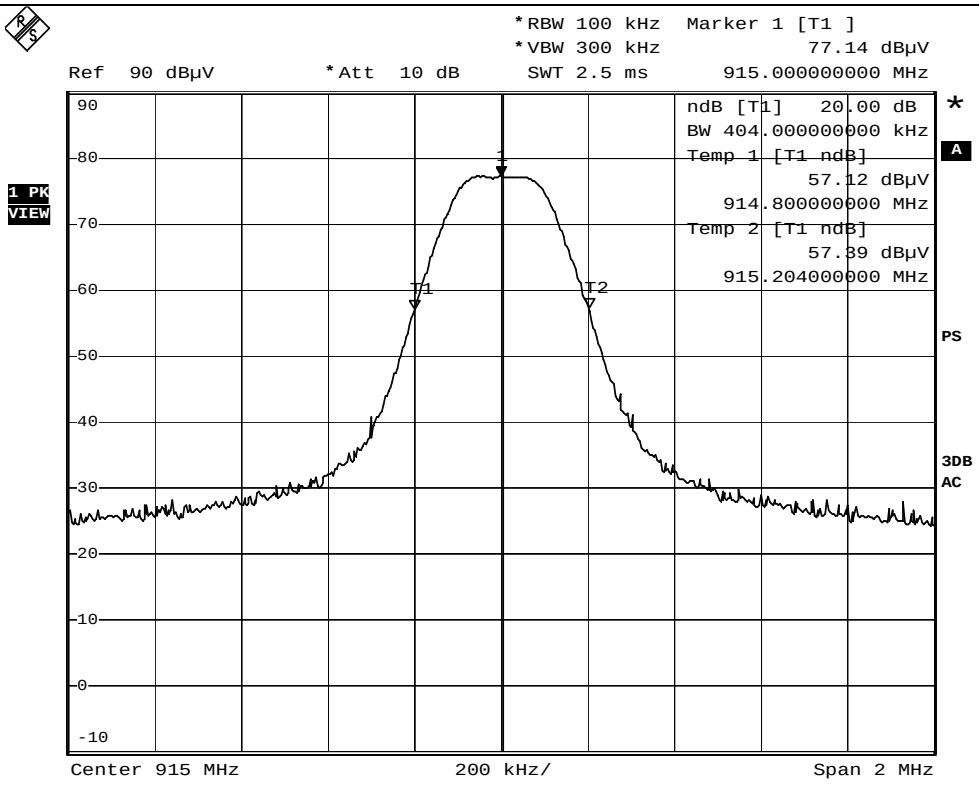
20dB Bandwidth of Fundamental Emission



Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]
915	404

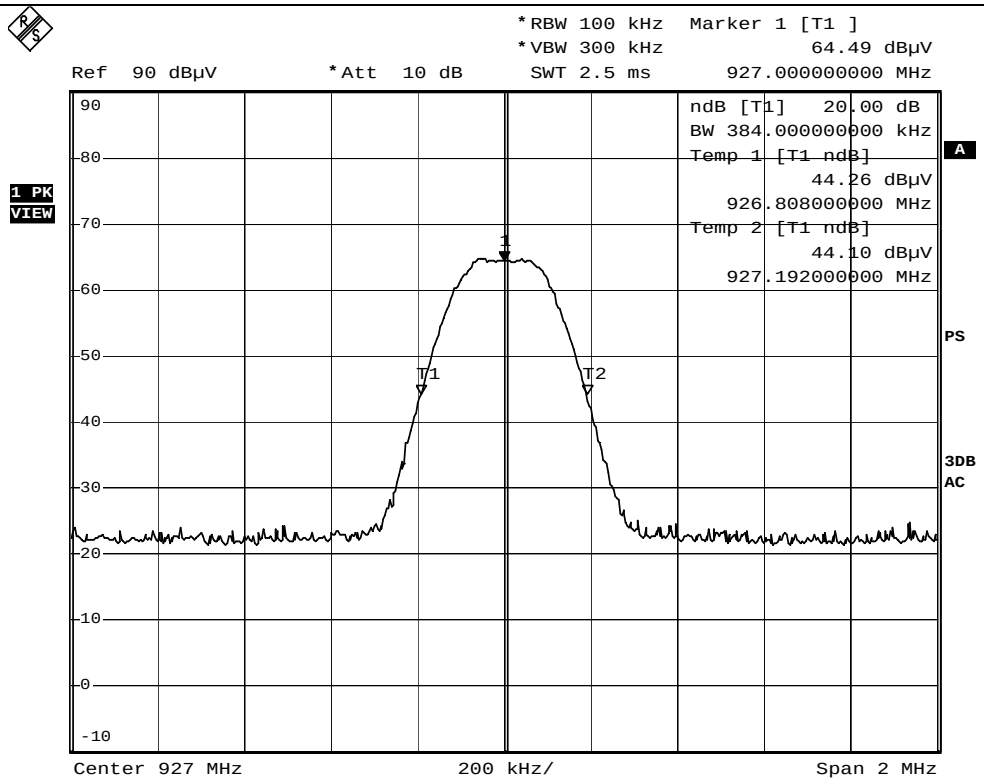
20dB Bandwidth of Fundamental Emission



Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [kHz]
927	384

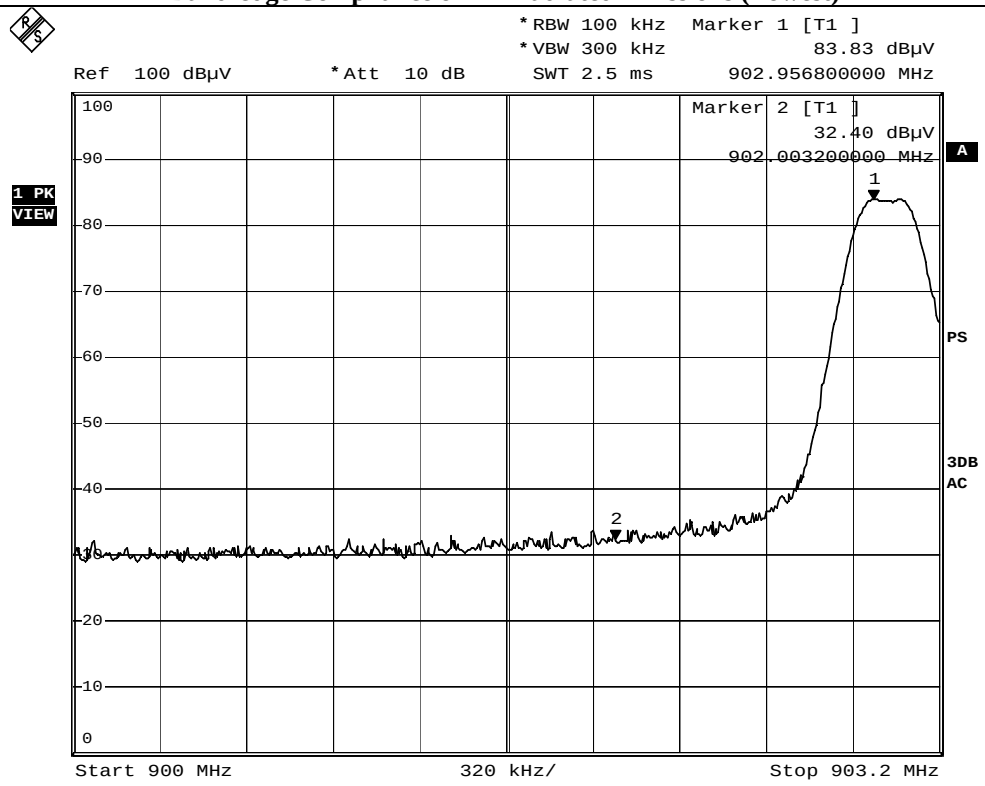
20dB Bandwidth of Fundamental Emission



Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
902.0 – Lowest Fundamental	32.4

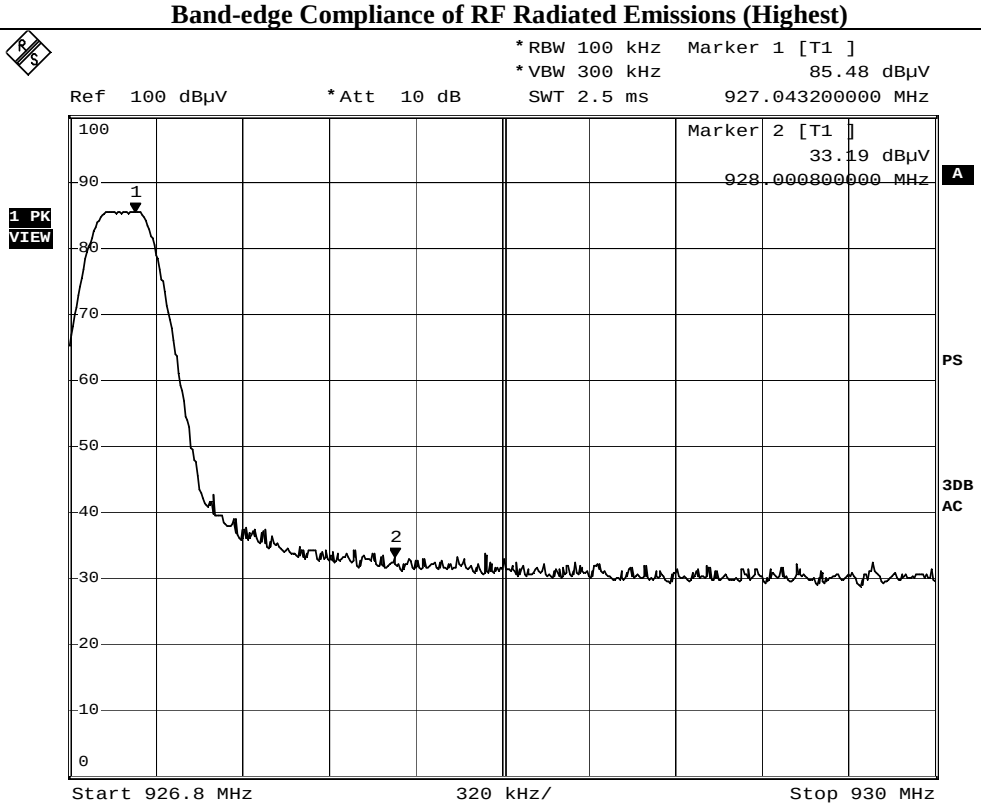
Band-edge Compliance of RF Radiated Emissions (Lowest)



Band Edge Measurement:

Frequency Range [MHz]	Radiated Emission Attenuated below the Fundamental [dB]
927.0 - Highest Fundamental	33.19

Band-edge Compliance of RF Radiated Emissions (Highest)



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

Frequency Range [MHz]	Quasi-Peak Limits [µV/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.

Results of Operation mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the FCC Limits
Results of Operation mode (30MHz – 1GHz): PASS

Radiated Emissions Quasi-Peak					
Emission Frequency MHz	E-Field Polarity	Level @3m dBµV/m	Limit @3m dBµV/m	Level @3m µV/m	Limit @3m µV/m
30.2	Horizontal	31.4	40.0	37.2	100
35.8	Horizontal	27.7	40.0	24.3	100
515.9	Horizontal	36.8	46.0	69.2	200
37.4	Vertical	27.4	40.0	23.4	100
372.4	Vertical	31.4	46.0	37.2	200
514.8	Vertical	37.2	46.0	72.4	200

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

Frequency Range	Quasi-Peak Limits
[MHz]	[μV/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 Rx mode (1GHz – 18GHz): PASS
Emissions detected are more than 20 dB below the FCC Limits

Remarks:
Calculated measurement uncertainty (9kHz – 30MHz): 3.3dB
(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.

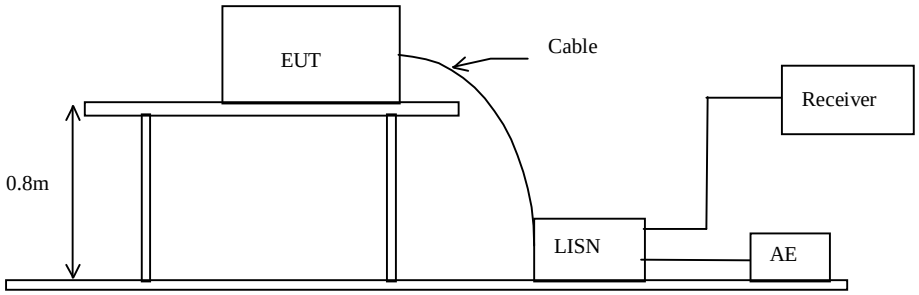
3.1.3 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2009
Test Date:	2012-10-23
Mode of Operation:	Operating 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:



Limit for Conducted Emissions (FCC 47 CFR 15.207):

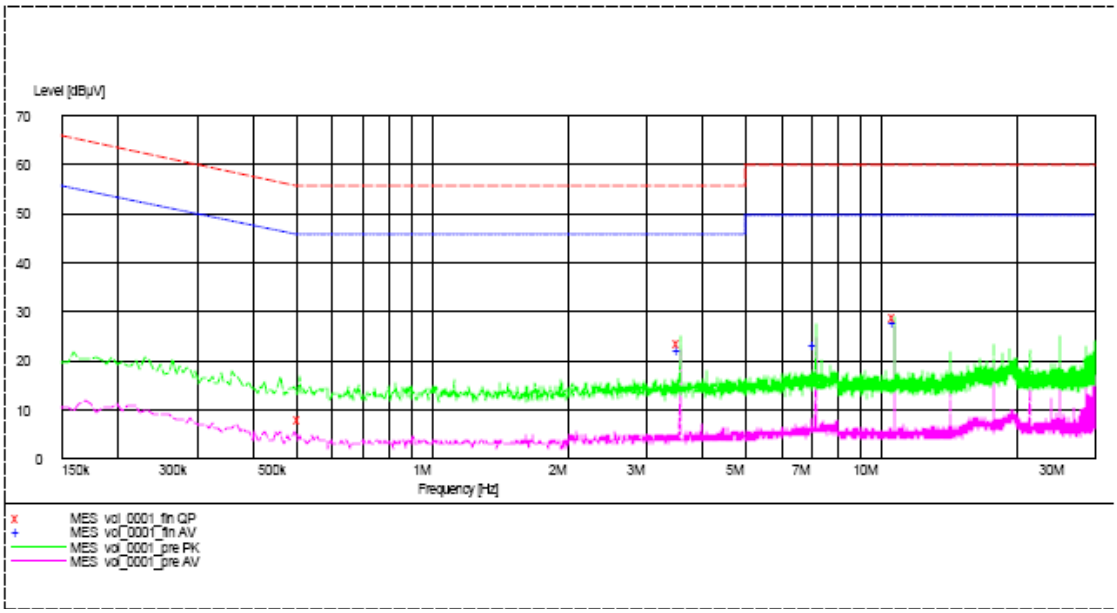
Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 Operating mode (L): Pass

Please refer to the following diagram for individual results.



Results of Operating mode (L): Pass

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBµV	Limit dBµV	Level dBµV	Limit dBµV
Live	0.510	-*-	-*-	8.1	56.0
Live	3.580	-*-	-*-	23.7	56.0
Live	10.740	-*-	-*-	28.8	60.0
Live	3.580	22.2	46.0	-*-	-*-
Live	7.160	23.2	50.0	-*-	-*-
Live	10.740	28.0	50.0	-*-	-*-

Limit for Conducted Emissions (FCC 47 CFR 15.207):

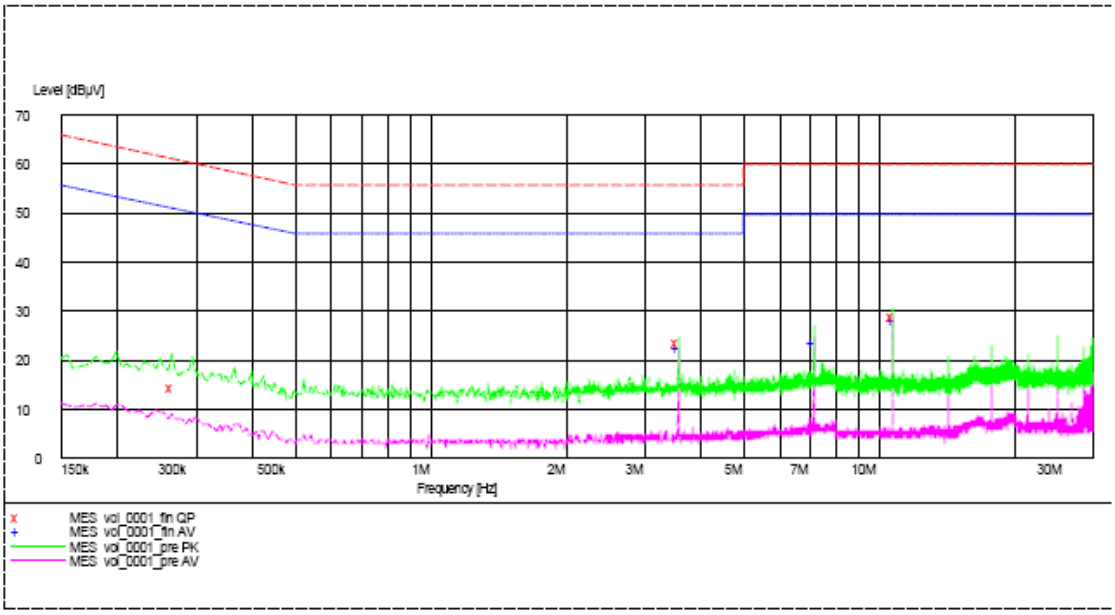
Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* 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 Operating mode (N): Pass

Please refer to the following diagram for individual results.



Results of Operating mode (N): Pass

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Neutral	0.265	-*-	-*-	14.4	61.0
Neutral	3.580	-*-	-*-	23.8	56.0
Neutral	10.740	-*-	-*-	29.1	60.0
Neutral	3.580	22.5	46.0	-*-	-*-
Neutral	7.140	23.6	50.0	-*-	-*-
Neutral	10.740	28.2	50.0	-*-	-*-

Remarks:
Calculated measurement uncertainty (0.15MHz – 30MHz): 3.2dB
-*- Emission(s) that is far below the corresponding limit line.

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	2012.03.09	2013.03.09
EMD036	EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	100388	2012.07.06	2013.07.06
EMD061	Biconilog Antenna	ETS.LINDGREN	3142C	00060439	2012.11.03	2014.11.03
EMD062	Double-Ridged Waveguide	ETS.LINDGREN	3117	00075933	2012.11.28	2014.11.28
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 lnstrument 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	EMD124
EMD131	Standard Gain Horn Antenna	Chengdu AINFO lnc.	JXTXLB-42-15-C-KF	J2021100721001	2011.01.25	2013.01.25

Conducted Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EMD003	IMPULSEGRENZER PULSE LIMITER	ROHDE & SCHWARZ	ESH3-Z2	100071	2012.03.09	2013.03.09
EMD004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ROHDE & SCHWARZ	ESH3-Z5	100102	2012.03.09	2013.03.09
EMD022	EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	100314	2012.03.09	2013.03.09
EMD103	Intelligent Frequency	Ainuo lnstrument 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 or Not Available
TBD To Be Determined

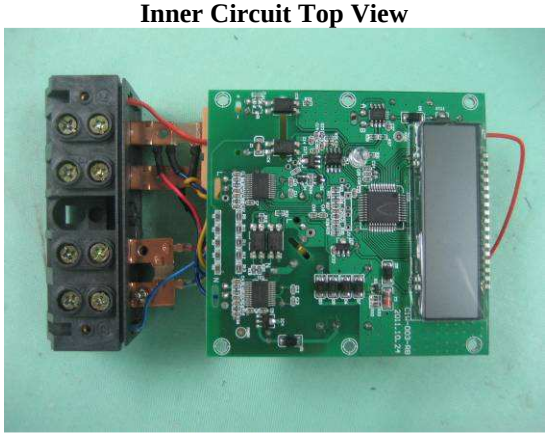
Appendix B

Photographs of EUT

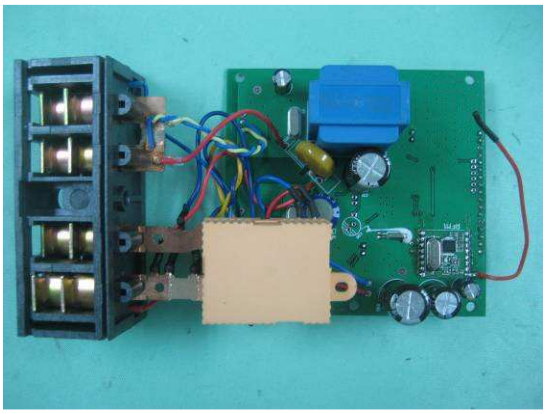
Front View of the product

Rear View of the product

Inner Circuit Top View

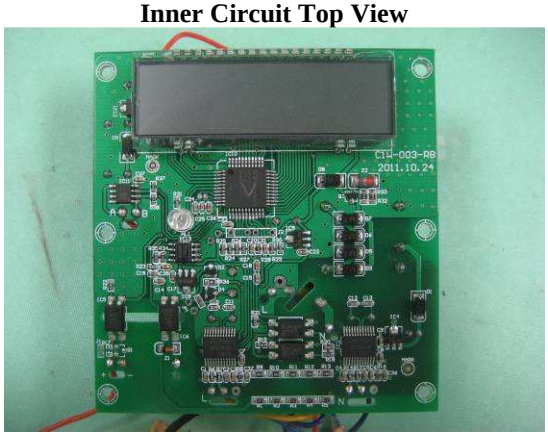


Inner Circuit Bottom View

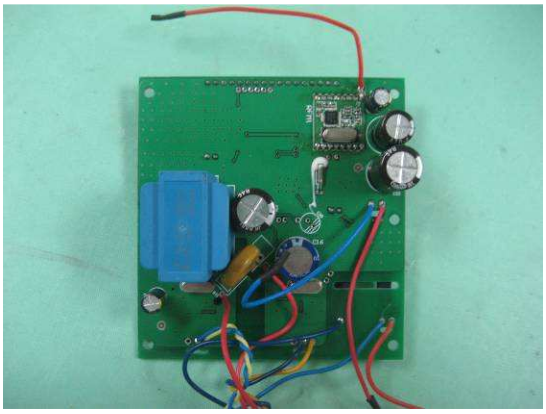


Photographs of EUT

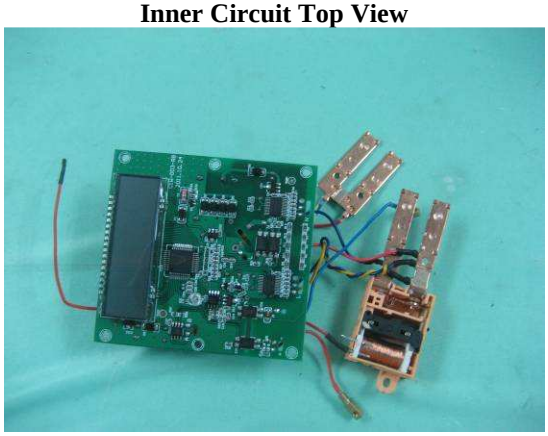
Inner Circuit Top View



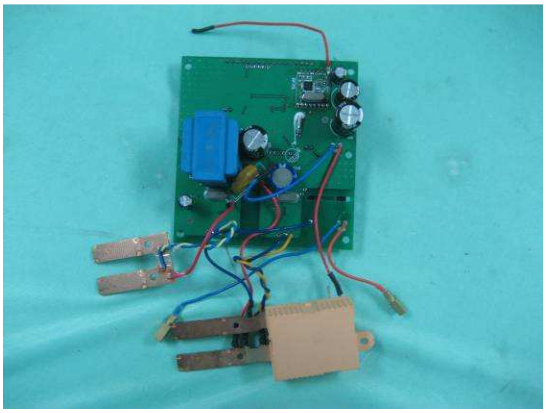
Inner Circuit Bottom View



Inner Circuit Top View

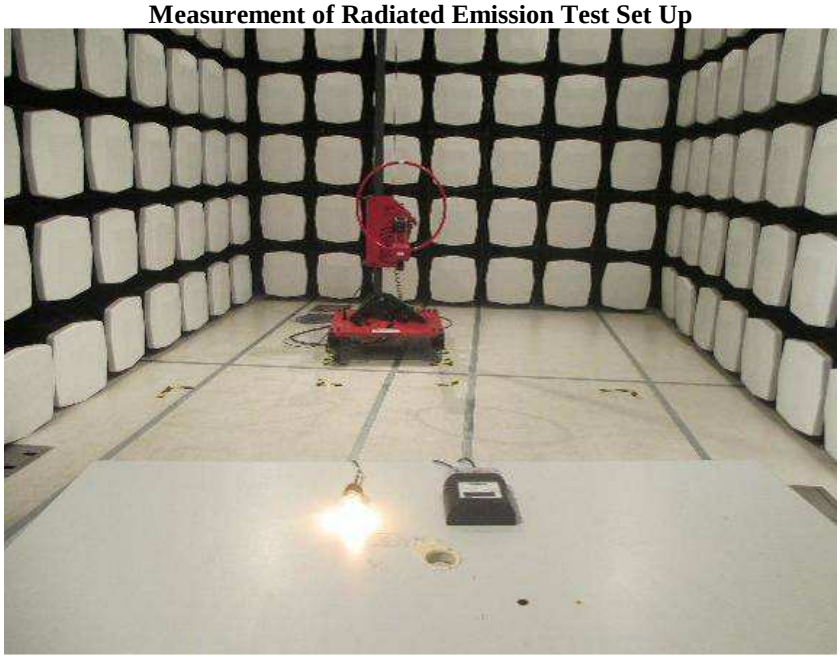


Inner Circuit Bottom View

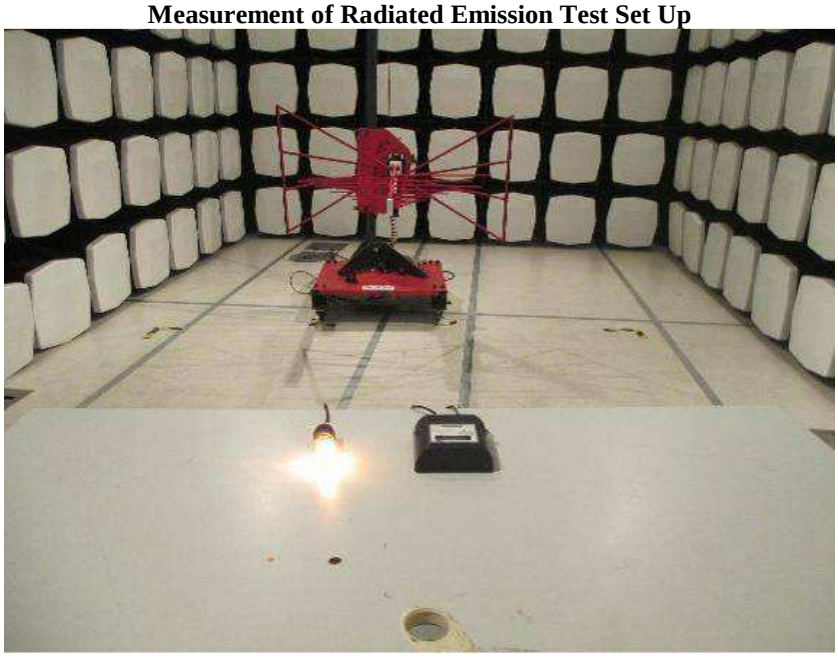


Photographs of EUT

Measurement of Radiated Emission Test Set Up

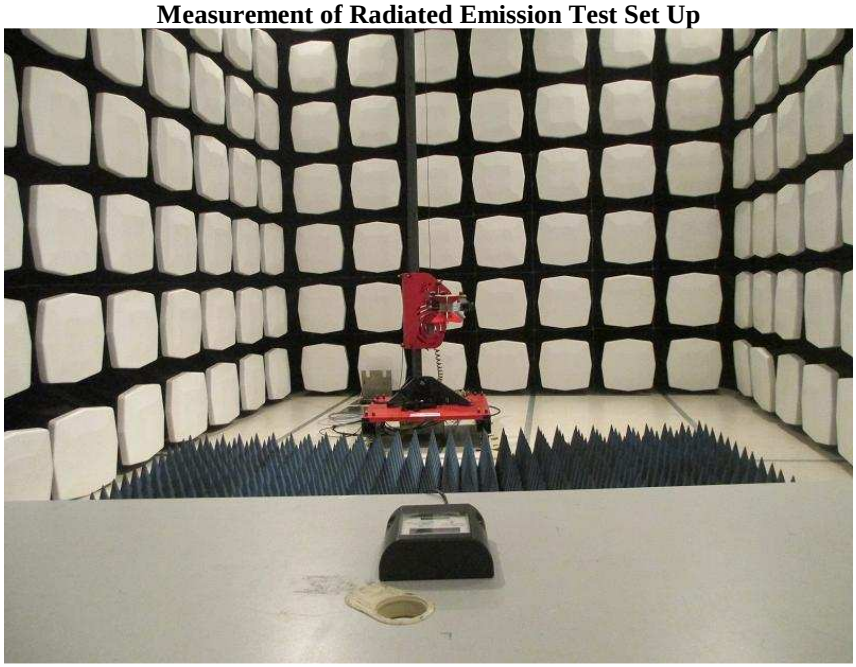


Measurement of Radiated Emission Test Set Up

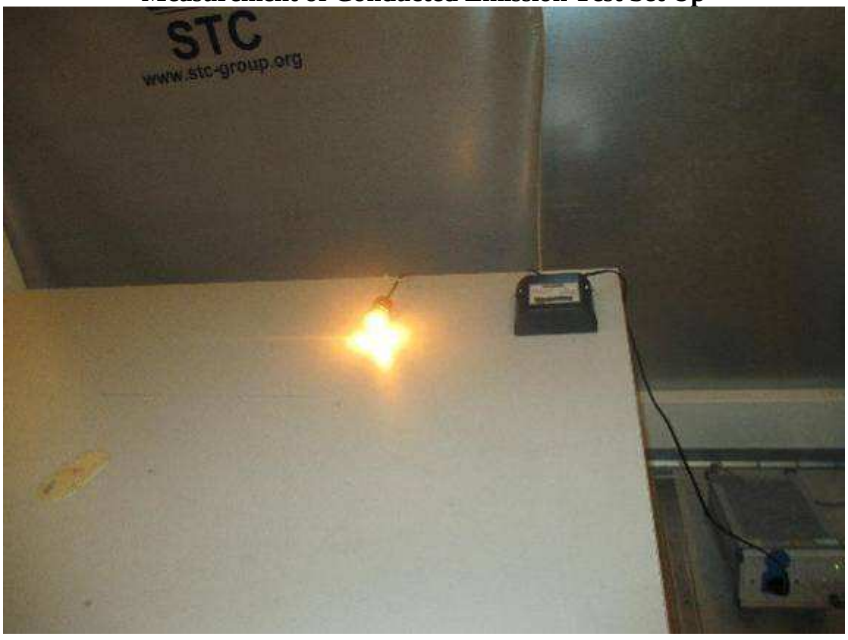


Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



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