STC Test Report

Applicant (BEE001): Avnera Corporation
16505 NW Bethany Court, Suite 100 Beaverton, Oregon 97006, United States

Manufacturer: Beautiful Enterprise Co., Ltd.
26th Floor, Beautiful Group Tower, 77 Connaught Road, Central, Hong Kong.

Description of Samples:

Product:	AM1.5G USB SENDER
Brand Name:	AVNERA
Model Number:	AVRB7201
FCC ID:	V3CAVRB7201

Date Samples Received: 2009-01-14

Date Tested: 2009-01-16 to 2009-01-22

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2008 and ANSI C63.4:2003 for FCC Certification.

Conclusions: 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.

Remarks: ----

Dr. LEE Kam Chuen,
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

CONTENT:

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Avnera Corporation
16505 NW Bethany Court, Suite 100 Beaverton, Oregon 97006, United States

Manufacturer

Beautiful Enterprise Co., Ltd.
26th Floor, Beautiful Group Tower, 77 Connaught Road, Central, Hong Kong.

1.3 Equipment Under Test [EUT]

Description of Sample

Product:	AM1.5G USB SENDER
Manufacturer:	Beautiful Enterprise Co., Ltd.
Brand Name:	AVNERA
Model Number:	AVRB7201
Input Voltage:	The product draws power from PC

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Avnera Corporation., the transmission signal is frequency hopping with channel frequency range 2.405-2.477 GHz.

1.4 Date of Order

2009-01-14

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2009-01-16 to 2009-01-22

1.7 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: 2008 Regulations and ANSI C63.4:2003 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 C63.4:2003	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐
Conducted Emissions on AC, 0.15MHz to 30MHz	FCC 47CFR 15.207	ANSI C63.4:2003	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

3.1.1 Radiated Emissions

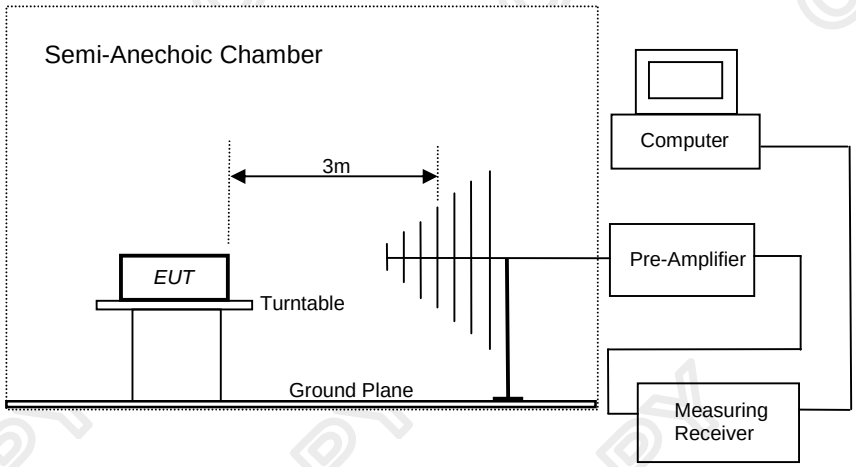
Test Requirement:	FCC 47CFR 15.249
Test Method:	ANSI C63.4:2003
Test Date:	2009-01-21
Mode of Operation:	Tx mode, Communication mode with PC

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 G/F of The Hong Kong Standards and Testing Centre Ltd. with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



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	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Channel 1): Pass

Field Strength of Fundamental 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
2405.0	62.6	34.8	97.4	74,131.0	500,000	Horizontal
* 4810.0	**No Emission Detected**				500	Vertical
7215.0					500	Vertical
9620.0					500	Vertical
* 12025.0					500	Vertical
14430.0					500	Vertical
16835.0					500	Vertical
* 19240.0					500	Vertical
21645.0					500	Vertical
24050.0					500	Vertical

Field Strength of Fundamental 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
2405.0	42.6	34.8	77.4	7,413.1	50,000	Horizontal

Remarks:

*: 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 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Channel 18): Pass

Field Strength of Fundamental 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
2441.0	65.0	34.9	99.9	98,855.3	500,000	Horizontal
* 4882.0	**No Emission Detected**				500	Vertical
7323.0					500	Vertical
9764.0					500	Vertical
* 12205.0					500	Vertical
14646.0					500	Vertical
17087.0					500	Vertical
* 19528.0					500	Vertical
21969.0					500	Vertical
24410.0					500	Vertical

Field Strength of Fundamental 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
2441.0	45.0	34.9	79.9	9,885.5	50,000	Horizontal

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: 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 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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	50,000 [Average]	500 [Average]
2400-2483.5	50,000 [Average]	500 [Average]

Results of Tx mode (Channel 36): Pass

Field Strength of Fundamental 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
2477.0	64.0	35.0	99.0	89,125.1	500,000	Horizontal
* 4954.0	**No Emission Detected**				500	Vertical
7431.0					500	Vertical
9908.0					500	Vertical
* 12385.0					500	Vertical
14862.0					500	Vertical
17339.0					500	Vertical
* 19816.0					500	Vertical
22293.0					500	Vertical
24770.0					500	Vertical

Field Strength of Fundamental 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
2477.0	44.0	35.0	79.0	8,912.5	50,000	Horizontal

Remarks:
No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
*: 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 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

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

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

Results of Communication Mode with PC: 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
Emissions detected are more than 20 dB below the FCC Limits					

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Correction Factor included Antenna Factor and Cable Attenuation.

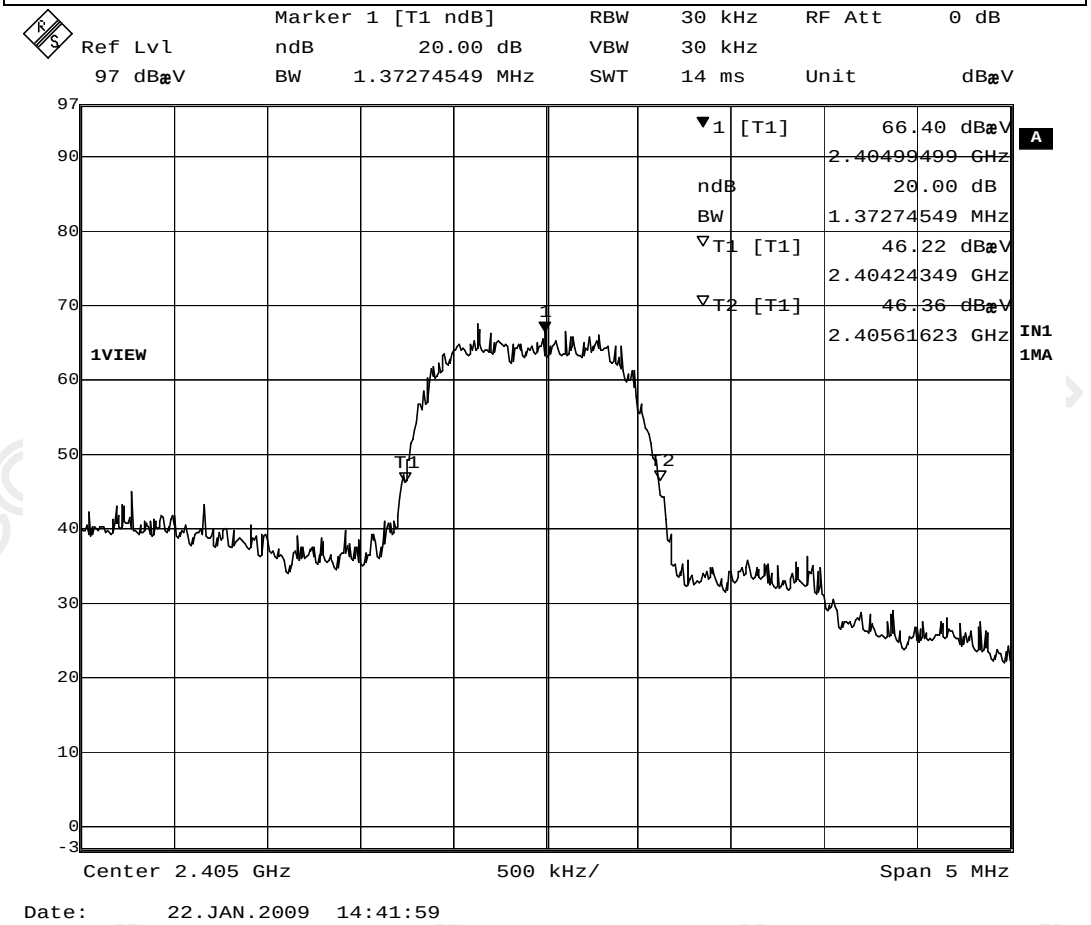
Calculated measurement uncertainty : 30MHz to 1GHz 5.2dB
1GHz to 18GHz 5.1dB

Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]
2405	1.37

Channel 1

20dB Bandwidth of Fundamental Emission

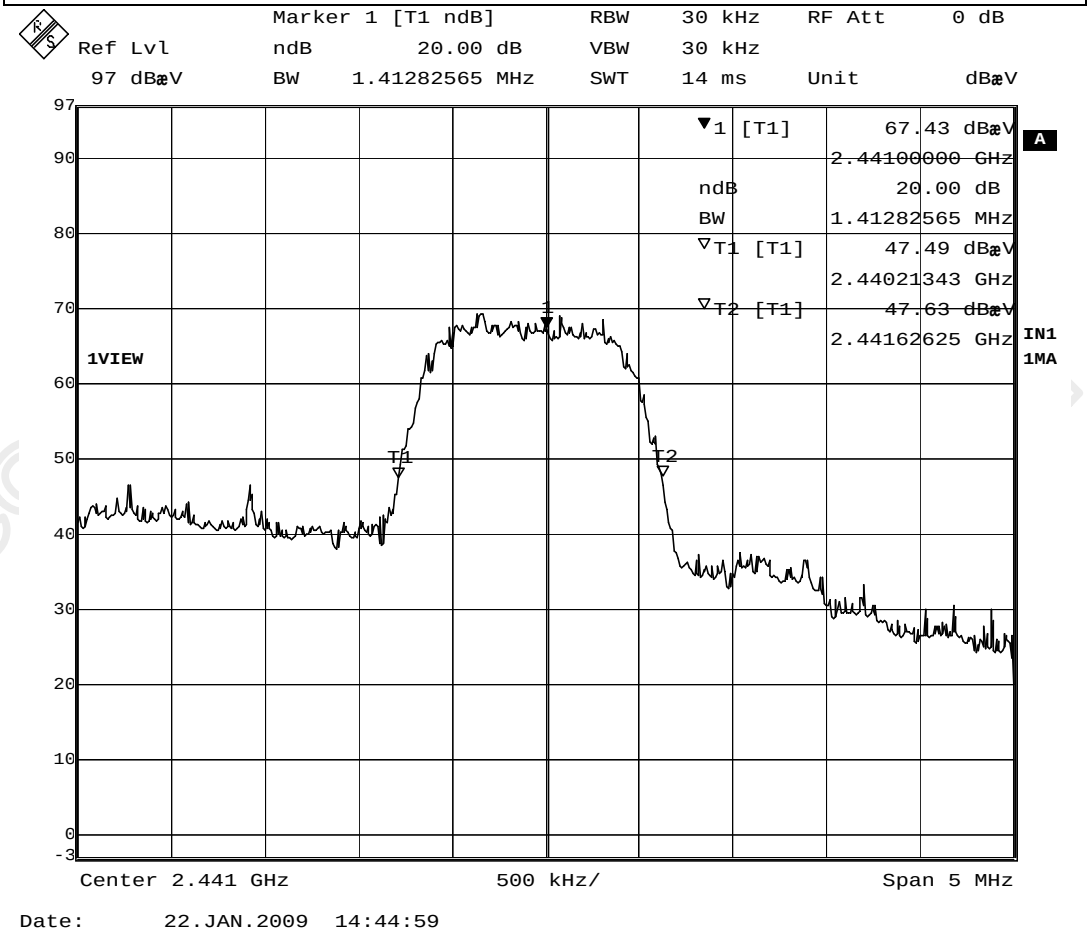


Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]
2441	1.42

Channel 18

20dB Bandwidth of Fundamental Emission

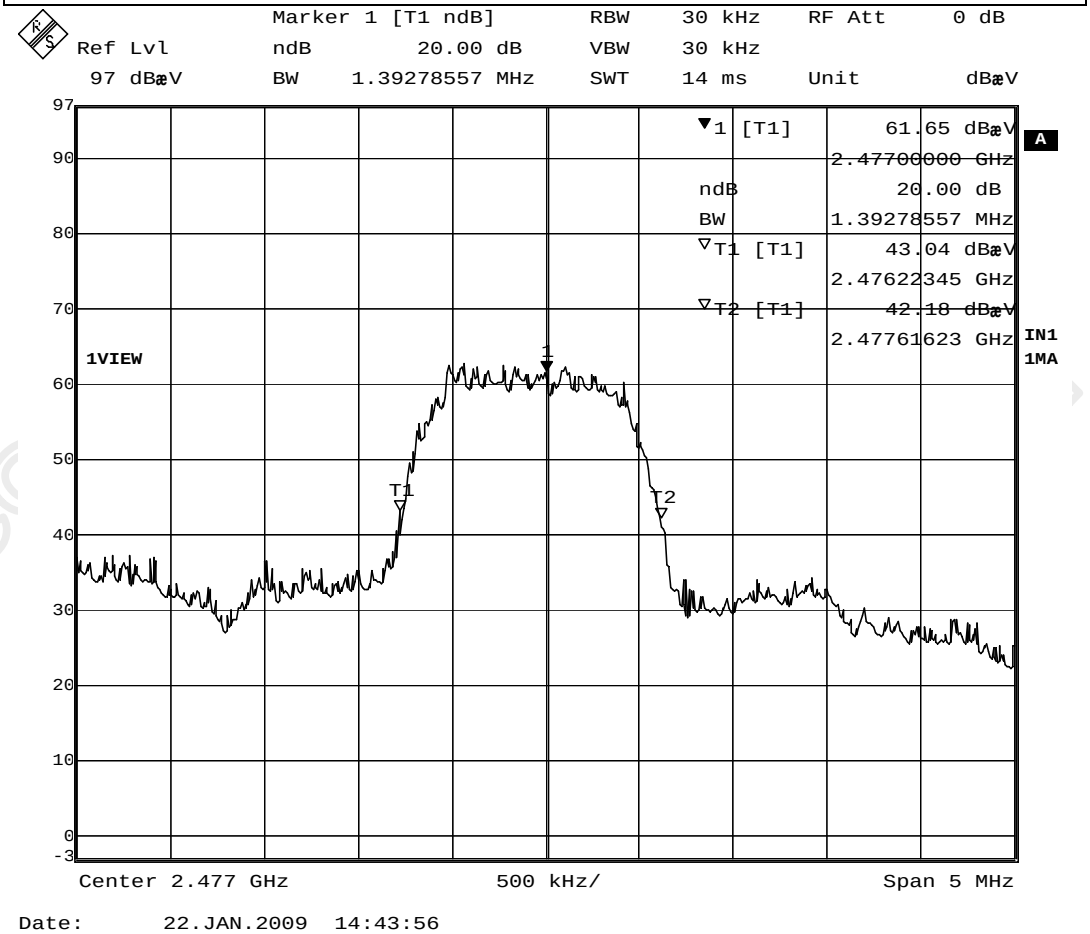


Limits for 20dB Bandwidth of Fundamental Emission:

Frequency Range [MHz]	20dB Bandwidth [KHz]
2477	1.39

Channel 36

20dB Bandwidth of Fundamental Emission



Date: 22.JAN.2009 14:43:56

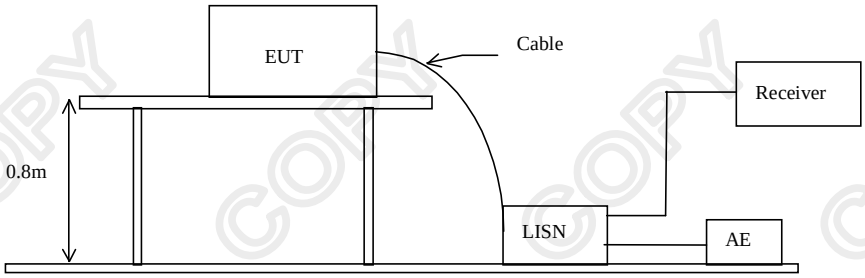
3.1.2 Conducted Emissions (0.15MHz to 30MHz)

Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2003
Test Date:	2009-01-16
Mode of Operation:	Communication Mode with PC (PC mains)

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, 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:



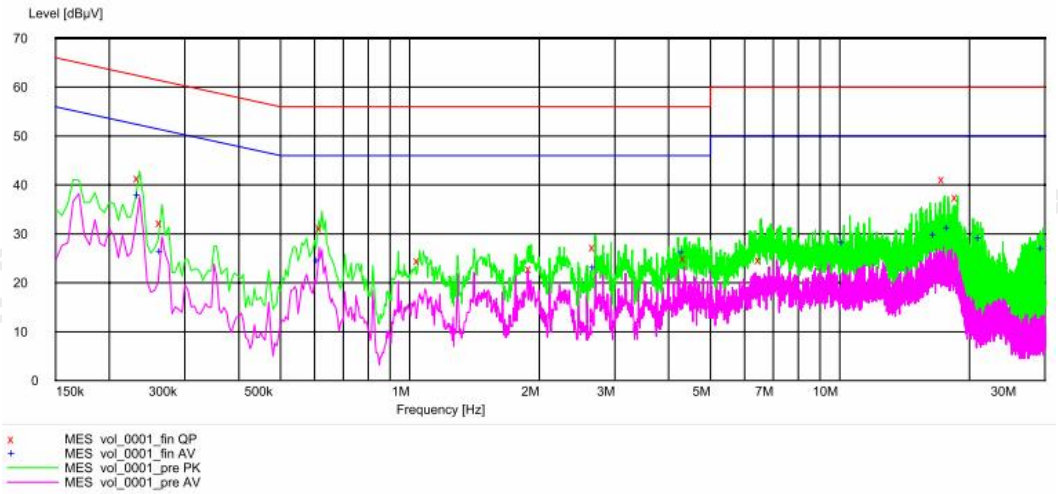
Limit for Conducted Emissions (FCC 47 CFR 15.207):

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 Communication Mode with PC (PC Mains): PASS



Results of Communication Mode with PC (PC Mains): PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level μV	Limit μV
Live	0.235	41.4	62.0	37.9	52.0
Live	0.265	32.3	61.0	26.4	51.0
Live	0.615	-*-	-*-	24.5	46.0
Live	0.625	31.3	56.0	-*-	-*-
Live	1.055	24.5	56.0	-*-	-*-
Neutral	1.915	22.9	56.0	-*-	-*-
Neutral	2.700	27.3	56.0	23.1	46.0
Neutral	4.345	-*-	-*-	26.2	46.0
Neutral	4.385	25.0	56.0	-*-	-*-
Neutral	6.565	24.7	60.0	-*-	-*-
Neutral	10.215	-*-	-*-	28.2	50.0
Neutral	16.670	-*-	-*-	29.8	50.0
Neutral	17.495	41.2	60.0	-*-	-*-
Neutral	17.965	-*-	-*-	31.2	50.0
Neutral	18.785	37.5	60.0	-*-	-*-
Neutral	21.250	-*-	-*-	29.1	50.0
Neutral	29.705	-*-	-*-	27.0	50.0

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- 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
EM020	HORN ANTENNA	EMCO	3115	4032	2006/07/11	2009/07/11
EM215	MULTIDEVICE CONTROLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2006/05/02	2009/05/02
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2008/01/24	2010/01/24
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2006/07/26	2009/07/26

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2007/10/30	2009/10/30
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2008/06/16	2009/06/16
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2009/01/23	2010/01/23

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	DELL COMPUTER	DMC	N/A	N/A
2	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
3	DELL KEYBOARD	SK-8110	N/A	1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER
4	DELL MOUSE	N/A	N/A	2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER
5	PARALLEL PRINTER	DMP3000	DE2850CDMP3000	1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER

Remarks:-

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

Appendix B

Duty Cycle Correction During 100msec

The host computer control the EUT to sends a different series of characters, but each pulse period (100msec) never exceeds a series of (3.4msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered 3.4msec per 100msec=3.4% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Remarks:

Duty Cycle Correction = 20Log (0.034) =-29.4dB = -20dB (if calculated value >-20dB)

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

Figure A [Pulse Train]

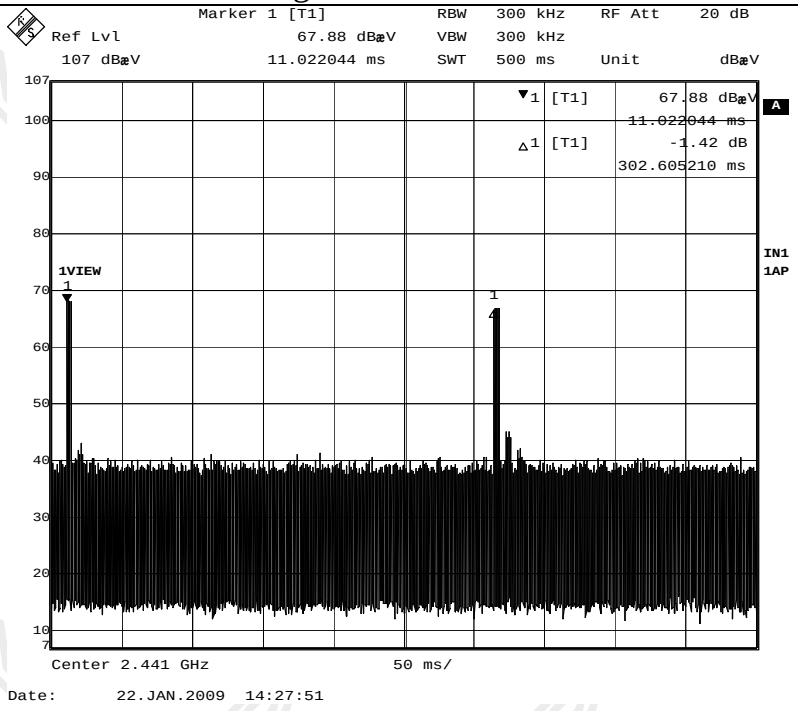
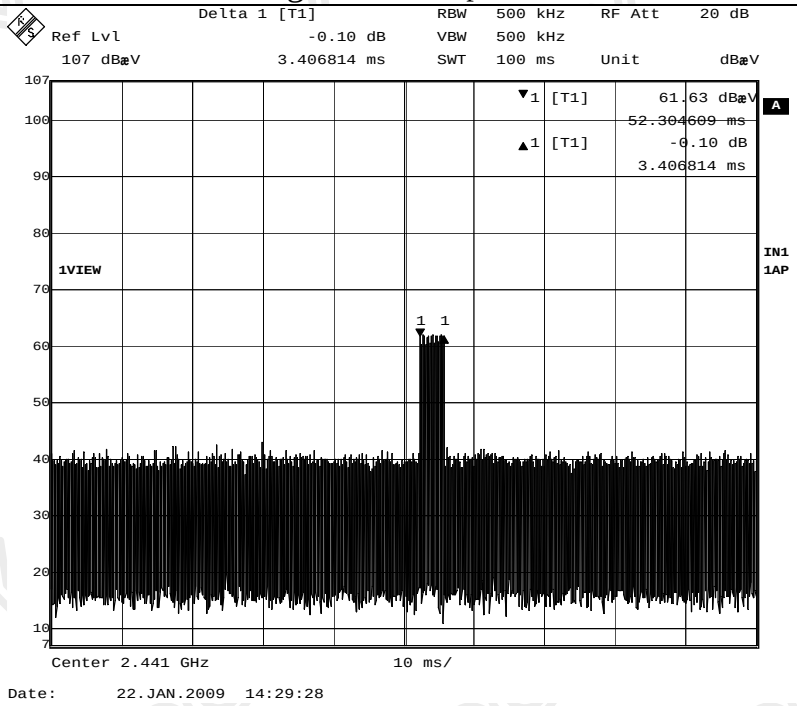


Figure B [Sweep Time]



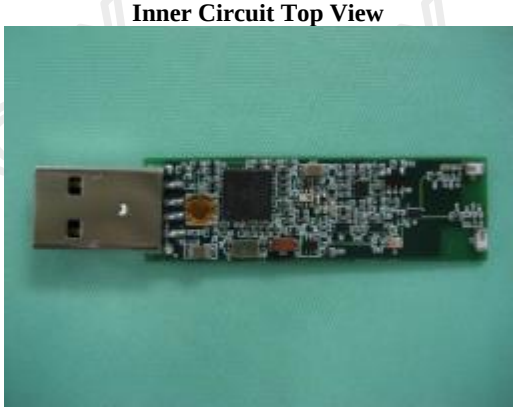
Appendix C

Photographs of EUT

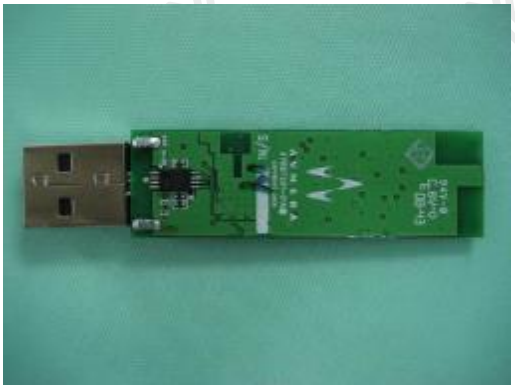
Front View of the product

Rear View of the product

Inner Circuit Top View

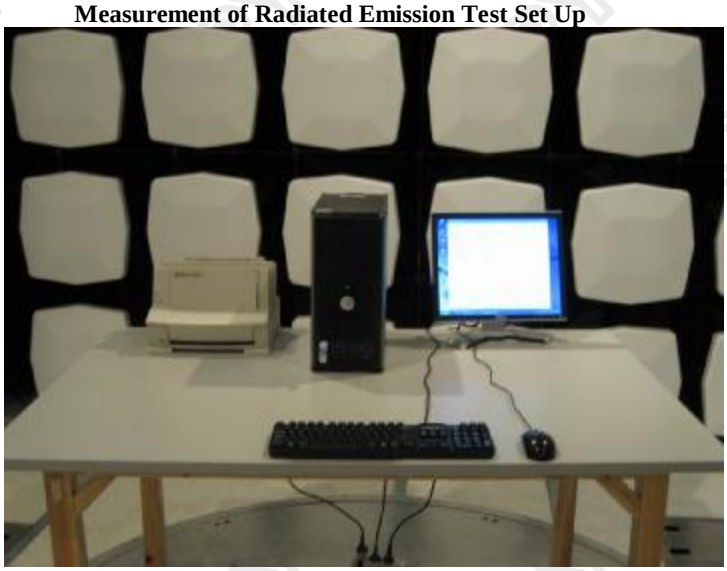


Inner Circuit Bottom View

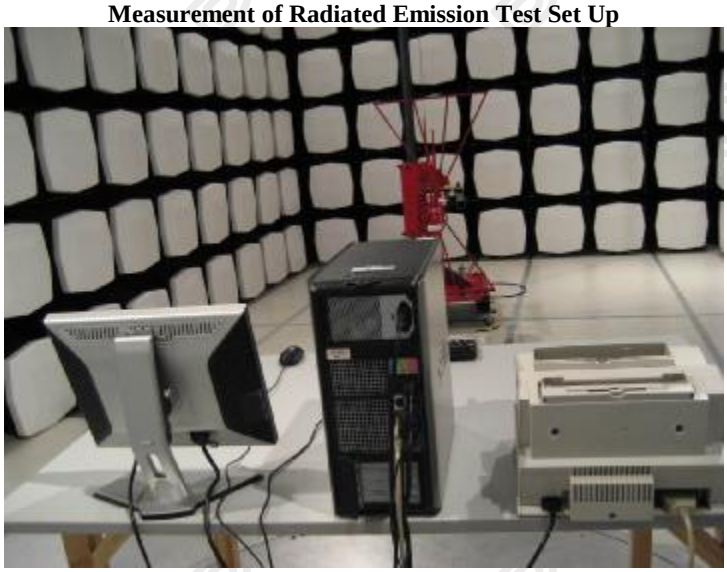


Photographs of EUT

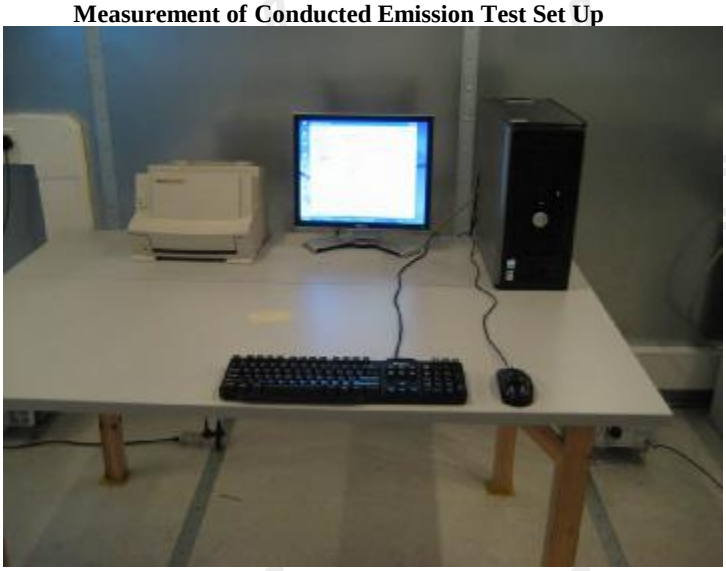
Measurement of Radiated Emission Test Set Up



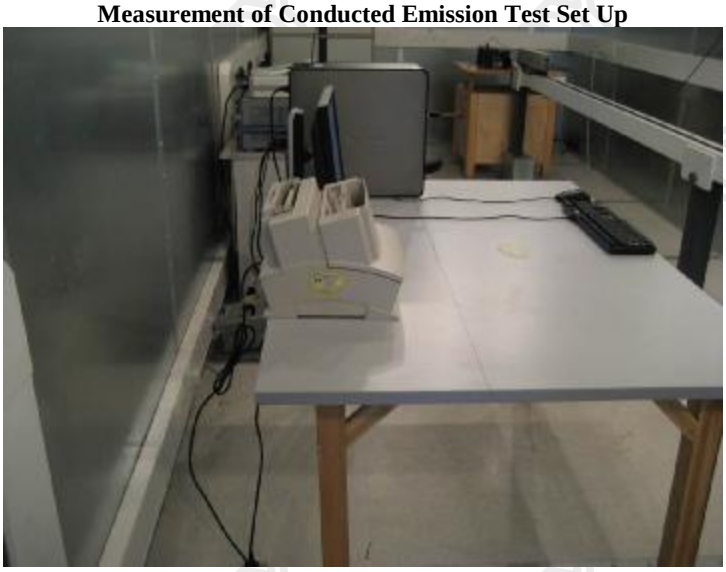
Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



Measurement of Conducted Emission Test Set Up



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

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