



Compliance Testing, LLC

Previously Flom Test Lab

RF, EMC and Safety Testing Experts Since 1963

toll-free: (866) 311-3268

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<http://www.ComplianceTesting.com>

info@ComplianceTesting.com

Date: October 29, 2009

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Blackboard, Inc.
Equipment: PS4100
FCC ID: TMEPS4100X005
FCC Rules: 15.225

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

John Erhard: Engineering Manager



List Of Exhibits

(FCC **Certification** (Transmitters) - Revised 9/28/98)

Applicant: Blackboard, Inc.

FCC ID: TMEPS4100X005

By Applicant:

1. Letter Of Authorization
2. Identification Drawings
 - _ Id Label
 - _ Location Info
 - _ Attestation Statement(S)
 - _ Location of Compliance Statement
3. Documentation: 2.1033(B)
 - (3) User Manual(S)
 - (4) Operational Description
 - (5) Block Diagram
 - (5) Schematic Diagram
 - (7) External Photographs
 - Internal Photographs
 - Parts List
 - Active Devices

By Compliance Testing:

- A. Testimonial & Statement of Certification
- B. Statement of Qualifications



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Test Report

for

FCC ID: TMEPS4100X005

Model: PS4100

to

Federal Communications Commission

Rule Part(s)15.225

Date Of Report: October 29, 2009

On the Behalf of the Applicant: Blackboard, Inc.
22601 North 19th Ave, Suite 200
Phoenix, AZ 85027

Attention of: Tom Kuestersteffen
623-476-1263
email: tkuestersteffen@blackboard.com
and/or Tim Mattson
623-476-1400

John Erhard: Engineering Manager

Supervised By:



Test Report Revision History

Revision	Date	Revised By	Reason for revision
1.0	October 29, 2009	J. Erhard	Original Document



The applicant has been cautioned as to the following:

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.



Testimonial And Statement Of Certification

This is to certify that:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

A handwritten signature in black ink that reads "John Erhard".

John Erhard: Engineering Manager

Certifying Engineer:



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Required information per ISO 17025-2005, paragraph 5.10.2:

a) **Test Report**

b) Laboratory: Compliance Testing
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044A-1) Chandler, AZ 85225

c) Report Number: d09a0019

d) Client: Blackboard, Inc.

e) Identification: PS4100

Description: 13.56 MHz Point of Sale Device

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: October 29, 2009

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with Compliance Testing internal quality manual.

m) Supervised by:

John Erhard: Engineering Manager

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.



List Of General Information Required For Certification

In Accordance with FCC Rules and Regulations, Volume II, Part 2 and to 15.225

Sub-Part 2.1033

(c)(1):

Name and Address of Applicant: Blackboard, Inc.

(c)(2): **FCC ID:** TMEPS4100X005

Model Number: PS4100

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type of Emission:** AM

(c)(5): **FREQUENCY RANGE, MHz:** 13.56

(c)(6): **Power Rating, W:** N/A
 Switchable Variable N/A

(c)(7): **Maximum Power Rating, W:** 5 mW

15.203: Antenna Requirement:

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- The EUT must be professionally installed
- The antenna requirement does not apply



Subpart 2.1033 (continued)

(c)(8): **Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

(c)(9): **Label Information:**

Please See Attached Exhibits

(c)(10): **Photographs:**

Please See Attached Exhibits

(c)(11): **Digital Modulation Description:**

Attached Exhibits

N/A

(c)(12): **Test And Measurement Data:**

Follows



Sub-part
2.1033(b):

Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts, 15.225.

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-2009 unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

A2LA

“A2LA has accredited Compliance Testing in Chandler, AZ for technical competence in the field of Electrical testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO 17025:2005 ‘General Requirements for the Competence of Testing and Calibration Laboratories’ and any additional program requirements in the identified field of testing.”

Please refer to www.a2la.org for current scope of accreditation.

Certificate number: 2152.01



TESTING CERT# 2152.01

FCC OATS Reg. #933597

IC Reg. # 2044A-1



Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.225(a)	Fundamental Field Strength	Pass	
15.225(b)(c)(d)	Out of Band Spurious Emissions	Pass	
15.225(e)	Frequency Stability	Pass	
12.209	Radiated Emissions	Pass	
12.207	Conducted Powerline Emissions	Pass	
RSS-210	99% Occupied Bandwidth	Pass	



Name of Test: Field Strength
Specification: 15.225(a)(b)(c)(d)
Test Equipment Utilized: i00326, i00033

Engineer: J. Erhard
Test Date: 10/27/2009

Test Procedure

The UUT was tested on an anechoic chamber at a distance of 1 meter from the receiving loop antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Fundamental Field Strength. The antenna correction and distance correction factors were summed with the quasi-peak measurement to ensure accurate readings were obtained. The following table indicates the highest emission in each of the indicated bands.

Test Setup



Field Strength

Frequency Band (MHz)	Measured Frequency (MHz)	Monitored Level (dBuV/m)	Distance CF (dB)	Antenna CF (dB)	Corrected Measurement (dBuV/m)	Limit (dBuV/m)	Result
13.110_13.410	13.3492	50.03	59.1	17.8	-26.87	40.51	Pass
13.410_13.553	13.548	53.78	59.1	17.8	-23.12	50.47	Pass
13.553_13.567	13.56	76.54	59.1	17.8	-0.36	84.00	Pass
13.567_13.710	13.5703	54.56	59.1	17.8	-22.34	50.47	Pass
13.710_14.010	13.7716	44.76	59.1	17.8	-32.14	40.51	Pass

*Note - Cable correction factors are not included in this measurement as the low loss of the high quality TWINAX cable at low frequencies is practically non-existent.

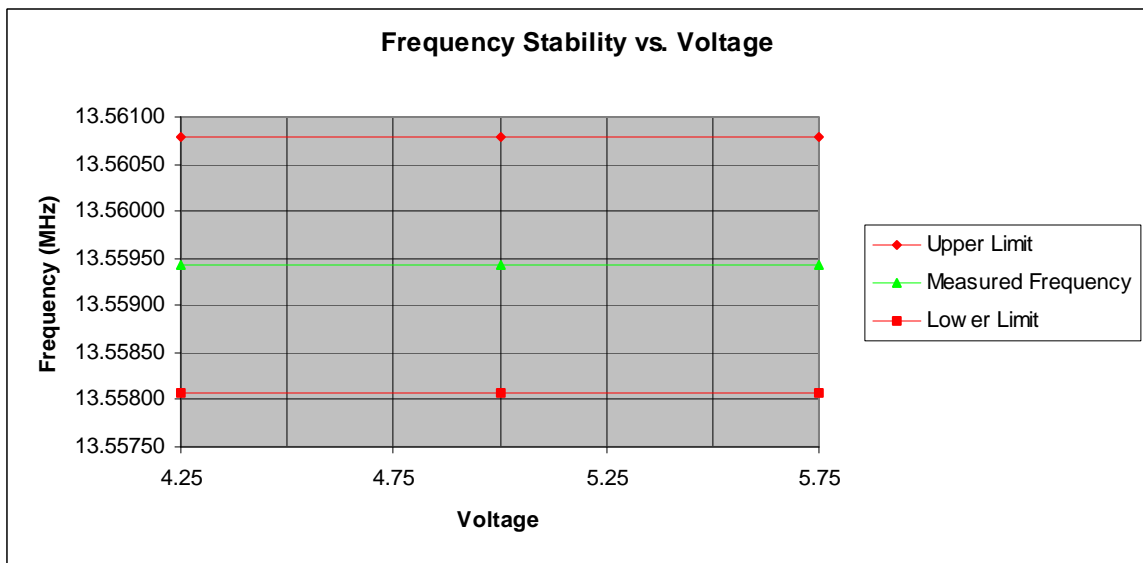
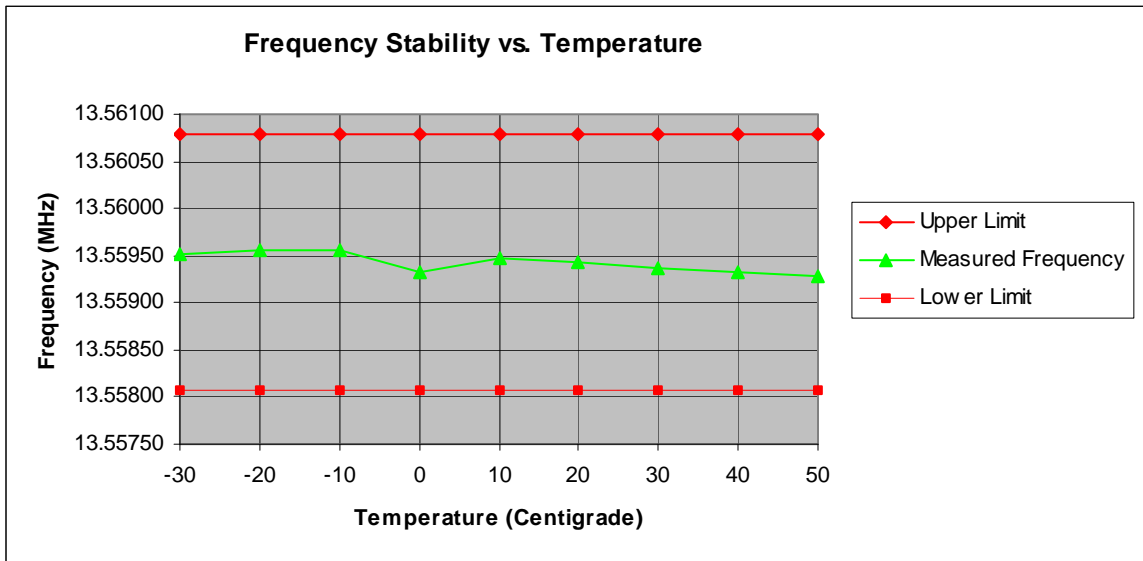
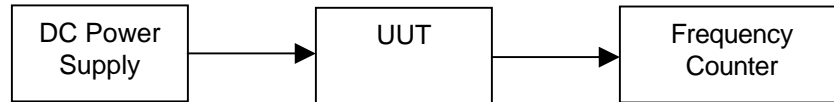
Name of Test: Frequency Stability
Specification: 15.225(e)
Test Equipment Utilized i00019, i00027, i00054

Engineer: J. Erhard
Test Date: 10/27/2009

Test Procedure

The UUT was placed in an environmental test chamber and a frequency counter was utilized to verify that the frequency stability met the requirement for frequency stability across the temperature range from -20°C to +50°C. A variable DC power supply was used to vary the voltage from 85% to 115% of the rated voltage.

Test Setup





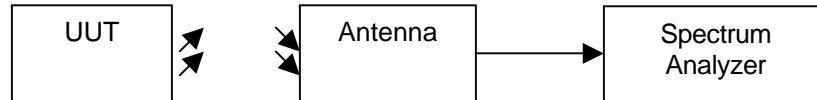
Name of Test: Radiated Emissions
Specification: 15.209
Test Equipment Utilized: i00049, i00267

Engineer: J. Erhard
Test Date: 10/28/2009

Test Procedure

The UUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Radiated Emissions. The spectrum for each tuned frequency was examined beyond the 10th harmonic.

Test Setup



Radiated Emissions

Emission Freq (MHz)	Measured Value (dBuV/m)	Correction Factor (dB)	Corrected Value (dBuV/m)	Limit (dBuV/m)	Margin dB
52.026	14.5	9.1	23.6	40.0	-16.4
165.407	13.9	12.2	26.1	43.0	-16.9
328.842	13.9	16.7	30.6	46.0	-15.4
496.816	13.8	20.6	34.4	46.0	-11.6
564.364	13.8	22.3	36.1	46.0	-9.9
760.000	13.8	25.3	39.1	46.0	-6.9

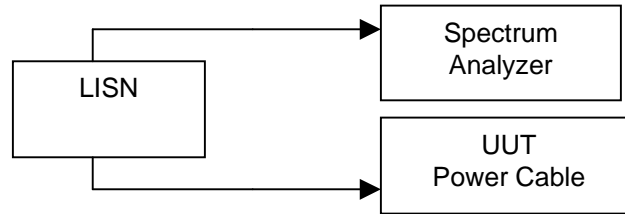
Name of Test: Powerline Conducted Emissions
 Specification: 15.207
 Test Equipment Utilized: i00033, i00270

Engineer: J. Erhard
 Test Date: 10/28/2009

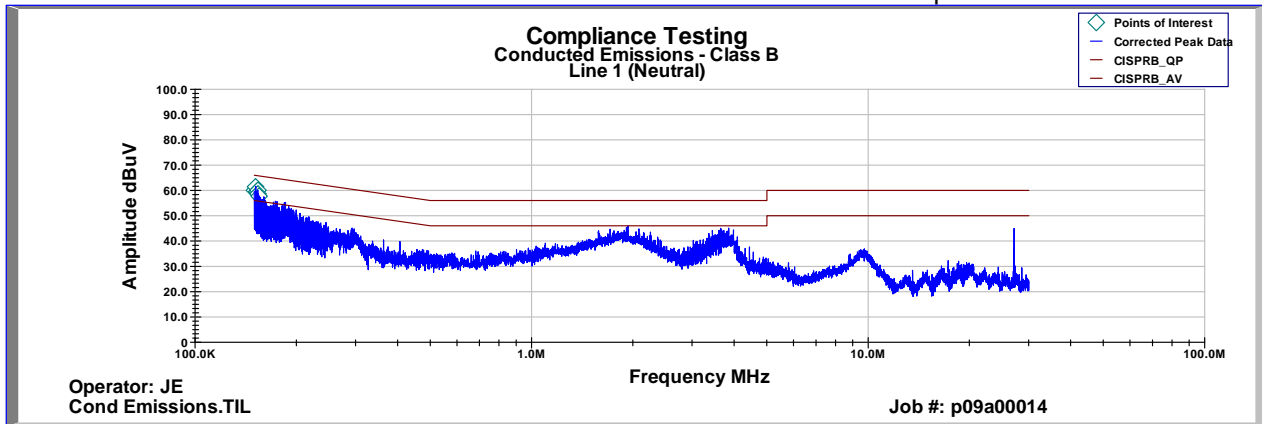
Test Procedure

The UUT power cable connected to a LISN and the monitored output of the LISN was connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits. The average measurements were the worst-case and are recorded in the tables below.

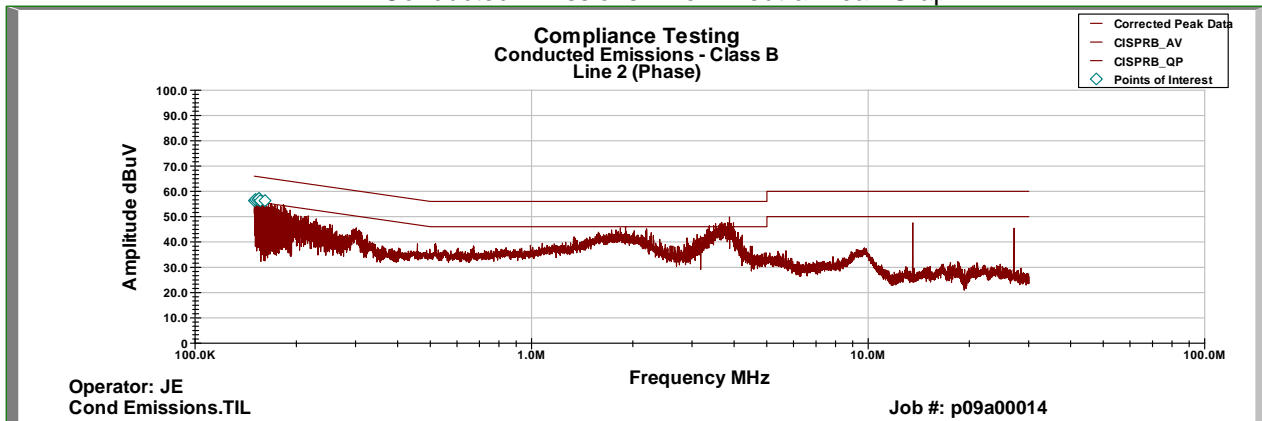
Test Setup



Conducted Emissions Line 1 Neutral Peak Graph



Conducted Emissions Line 2 Neutral Peak Graph



Line 1 Neutral AVG Detector

Frequency (MHz)	Uncorrected Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	Final L1	Limit	AVG Margin (dB)
151.22 KHz	28.89	0.29	0.043	10.000	39.217	55.965	-16.748
151.13 KHz	28.36	0.29	0.042	10.000	38.690	55.968	-17.277
151.03 KHz	28.56	0.29	0.039	10.000	38.892	55.971	-17.079
150.54 KHz	28.88	0.29	0.042	10.000	39.213	55.985	-16.772
150.37 KHz	28.58	0.30	0.039	10.000	38.918	55.990	-17.071
150.27 KHz	28.73	0.30	0.038	10.000	39.068	55.992	-16.924

Line 2 Phase AVG Detector

Frequency (MHz)	Uncorrected Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	Final L1	Limit	AVG Margin (dB)
155.91 KHz	26.67	0.24	0.037	10.000	36.948	55.831	-18.883
152.0 KHz	26.75	0.28	0.045	10.000	37.075	55.943	-18.868
151.83 KHz	27.20	0.28	0.041	10.000	37.523	55.948	-18.425
151.15 KHz	27.11	0.29	0.042	10.000	37.441	55.967	-18.526
150.25 KHz	27.13	0.30	0.038	10.000	37.462	55.993	-18.530
150.0 KHz	26.33	0.30	0.043	10.000	36.677	56.000	-19.323

Line 1 Neutral QP Detector

Frequency (MHz)	Uncorrected Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	Final L1	Limit	QP Margin (dB)
151.22 KHz	42.850	0.288	0.043	10.000	53.181	65.965	-12.784
151.13 KHz	42.590	0.289	0.042	10.000	52.920	65.968	-13.047
151.03 KHz	42.580	0.290	0.039	10.000	52.908	65.971	-13.062
150.54 KHz	42.690	0.295	0.042	10.000	53.026	65.985	-12.958
150.37 KHz	42.710	0.296	0.039	10.000	53.045	65.990	-12.945
150.27 KHz	42.440	0.297	0.038	10.000	52.775	65.992	-13.217

Line 2 Phase QP Detector

Frequency (MHz)	Uncorrected Data (dBuV)	LISN Corr Fact (dB)	Cable Loss (dB)	Attenuator (dB)	Final L1	Limit	QP Margin (dB)
155.91 KHz	45.96	0.24	0.037	10.000	56.238	65.831	-9.593
152.0 KHz	41.00	0.28	0.045	10.000	51.325	65.943	-14.618
151.83 KHz	41.28	0.28	0.041	10.000	51.603	65.948	-14.345
151.15 KHz	41.32	0.29	0.042	10.000	51.651	65.967	-14.316
150.25 KHz	41.59	0.30	0.038	10.000	51.926	65.993	-14.067
150.0 KHz	41.28	0.30	0.043	10.000	51.623	66.000	-14.377

All other results were greater than 20 dB below the limit.



Name of Test:
Specification:
Test Equipment Utilized

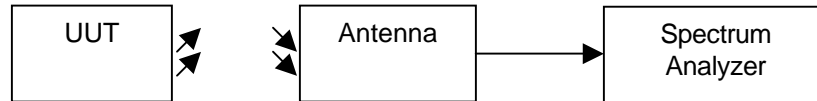
99% Occupied Bandwidth
RSS 210 Industry Canada Only
i00326, i00033

Engineer: J. Erhard
Test Date: 10/28/2009

Test Procedure

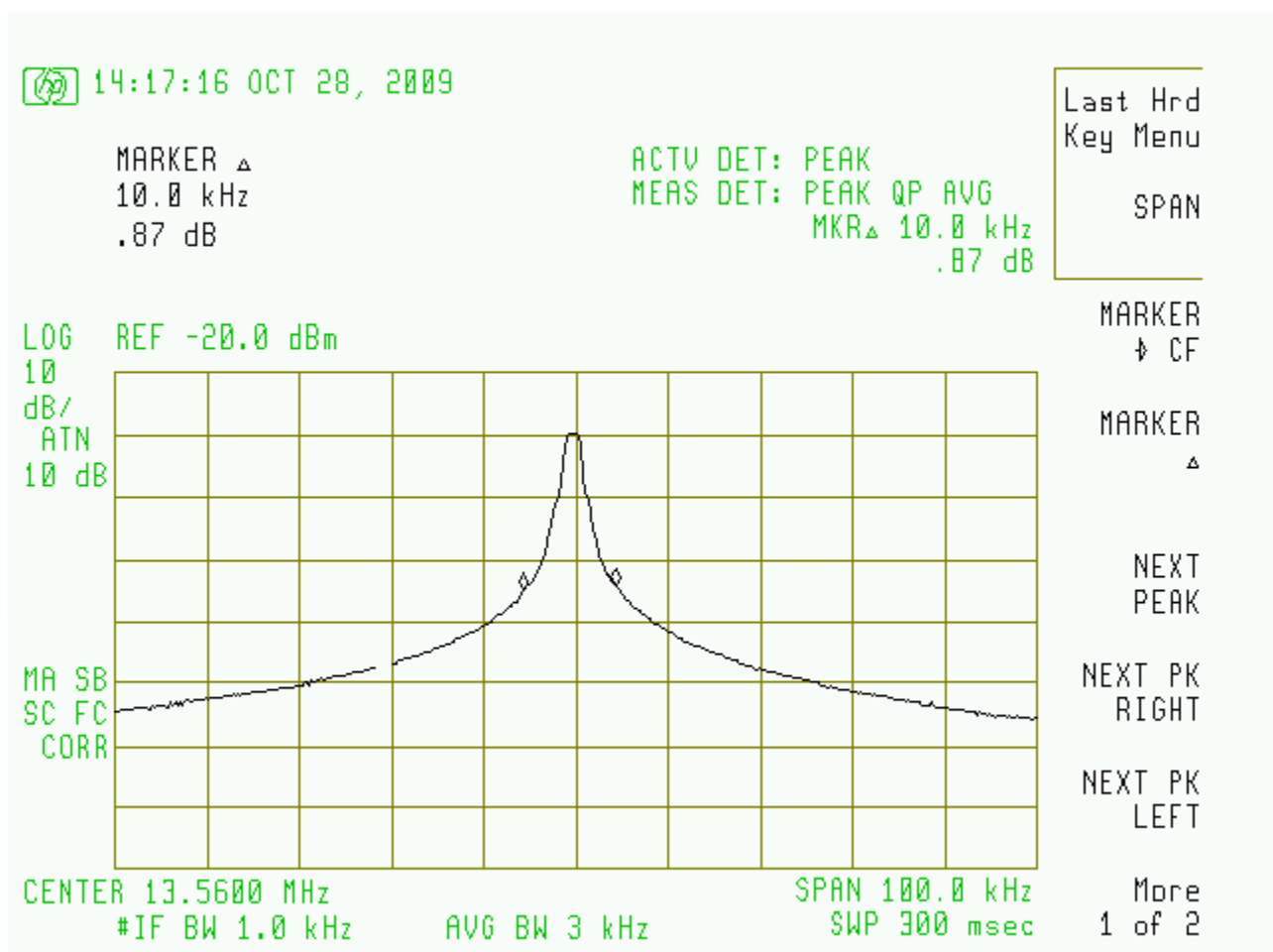
The UUT was tested on an anechoic chamber at a distance of 1 meter from the receiving loop antenna. A spectrum analyzer was used to measure the 99% occupied bandwidth.

Test Setup



99% Bandwidth Summary

Frequency MHz	Recorded Measurement	Result
13.56	10.0 kHz	Pass



**Test Equipment Utilized**

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
Frequency Counter	HP	5334B	i00019	1/26/09	1/26/11
Temperature Chamber	Tenney	Tenney Jr	i00027	12/8/08	12/8/09
Spectrum Analyzer	HP	85462A	i00033	10/14/08	10/14/09*
Spectrum Analyzer	HP	8566B	i00049	12/3/08	12/3/08
Power Supply	HP	6286A	i00054	NCR	NCR
Bi-Log Antenna	Schaffner	CBL6111C	i00267	11/6/07	11/6/09
LISN	FCC	FCC-LISN-50-32-2-01	i00270	9/17/08	9/17/10
DMM	Fluke	87 III	i00319	12/5/08	12/5/09
Active Loop Antenna	EMCO	6507	i00326	4/1/09	4/1/11

* 30 Day calibration extension.

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT