

Emissions Test Report

EUT Name: DLO Transcast

EUT Model: 009-2007

FCC Title 47, Part 15.239, Subpart C

Prepared for:

Garey De Angelis
Digital Lifestyle Outfitters
3871 S. Aliston
Durham, NC 27713
Tel: 843 577-7067
Fax: 928 447-4937

Prepared by:

TUV Rheinland of North America
762 Park Avenue
Youngsville, NC 27596
Tel: (919) 554-3668
Fax: (919) 554-3542
<http://www.tuv.com/>

Report/Issue Date: 29 September 2006

Report Number: 30662452.001

Statement of Compliance

Manufacturer: Digital Lifestyle Outfitters
3871 S. Aliston
Durham, NC 27713
843 577-7067
Requester / Applicant: Garey De Angelis
Name of Equipment: DLO Transcast
Model No. 009-2007
Type of Equipment: Information Technology Equipment (ITE)
Class of Equipment: Intentional Radiator
Application of Regulations: FCC Title 47, Part 15.239, Subpart C
Test Dates: 15 August 2006 to 14 September 2006

Guidance Documents:

Emissions: FCC 47 CFR Part 15

Test Methods:

Emissions: FCC 47CFR Part 15.239 and ANSI C63.4:2005

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland of North America, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.

	29 September 2006		29 September 2006
_____ Test Engineer	Date	_____ NVLAP Signatory	Date

Table of Contents

1	EXECUTIVE SUMMARY.....	4
1.1	SCOPE.....	4
1.2	PURPOSE.....	4
1.3	SUMMARY OF TEST RESULTS.....	4
2	LABORATORY INFORMATION	4
2.1	ACCREDITATIONS & ENDORSEMENTS	4
2.2	TEST FACILITIES.....	5
2.3	MEASUREMENT UNCERTAINTY.....	6
2.4	CALIBRATION TRACEABILITY	6
3	PRODUCT INFORMATION	6
3.1	TYPE OF ANTENNA.....	6
3.2	TUNABLE FREQUENCY RANGE.....	6
3.3	ACCESSORIES USED IN TESTING	6
4	EMISSIONS	7
4.1	RADIATED EMISSIONS	7
4.2	BANDWIDTH	13
5	TEST EQUIPMENT USE LIST	15

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15.239, Subpart C based on the results of testing performed on *15 August 2006* through *14 September 2006* on the *DLO Transcast* Model No. *009-2007* manufactured by Digital Lifestyle Outfitters. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Emission	Test Method(s)	Test Parameters	Result
Radiated Emissions	47 CFR Part 15.239, ANSI C63.4:2005	Fundamental >250 micro volts/meter Spurious Emissions per 15.209	compliant
Bandwidth	47 CFR Part 15, ANSI C63.4:2005	> 200 kHz	Compliant

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No 90552 and 100881). The laboratory scope of accreditation includes: Title 47 CFR Part 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology.

The laboratory has been assessed and accredited in accordance with ISO Guide 17025:1999 and ISO 9002 (Lab code 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Japan - VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174, R-1679, C-1790 and C-1791).

2.1.4 Acceptance By Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland of North America at the 762 Park Ave. Youngsville, N.C 27596 address test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 762 Park Ave., Youngsville, North Carolina 27596, USA.

2.2.1 Emission Test Facility

The Open Area Test Site and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 and 10 meters. This site has been described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The site is listed with the FCC and accredited by NVLAP (code 200094-0). The 5m semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:2005, at a test distance of 3 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 k Ω resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 k Ω resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

The test system for conducted emissions is defined as the LISN, spectrum analyzer, coaxial cables, and pads. The test system for radiated emissions is defined as the antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads. The conducted test system has a combined standard uncertainty of ± 1.2 dB. The radiated test system has a combined standard uncertainty of ± 1.6 dB. The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 17025:1999.

3 Product Information

3.1 Type of Antenna

The product uses a monopole antenna permanently affixed to the circuit board.

3.2 Tunable Frequency Range

The controls on the Transcast were manually adjusted to verify maximum tuning range from 88.1 MHz to 107.9 MHz.

3.3 Accessories used in testing

An ipod s/nYM53707UTJU was used as the audio input device. All tests were performed with the audio output level at maximum volume.

4 Emissions

4.1 Radiated Emissions

Testing was performed in accordance with 47 CFR Part 15.239, ANSI C63.4:2005. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.1 Test Methodology

4.1.1.1 Final Test

Measurements were made on 3 transmit frequencies across the frequency band and on the spurious emissions generated by the transmitter. The transmitter was placed on a table 80 cm high, inside an anechoic chamber and the emissions were maximized by raising and lowering the antenna from 1 to 4 meters and rotating the turntable 360 degrees. The six highest spurious emissions relative to the limit were recorded.

Final testing was performed on an NSA compliant test site.

4.1.1.2 Deviations

There were no deviations from this test methodology.

4.1.2 Test Results

Section 4.1.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.1.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions

Tracking # 30662452.001 Page 1 of 5

EUT Name	DLO Transcast	Date	September 7, 2006
EUT Model	009-2007	Temp / Hum in	72 deg F / 57% rh
EUT Serial	None	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq.	DC +15V
Deg/sweep	12 degrees	RBW / VBW	120kHz/300kHz
Dist/Ant Used	3 Meters/3142-1007	Performed by	Randy Masline
Configuration	Average Measurements		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
88.50	V	3.5	200	25.80	0.00	4.01	7.36	37.17	47.95	-10.78
98.10	V	1	0	21.10	0.00	4.07	9.05	34.23	47.95	-13.72
107.50	V	1	310	31.60	0.00	4.13	8.35	44.08	47.95	-3.87
107.50	H	1.8	96	34.40	0.00	4.13	8.65	47.18	47.95	-0.77
98.10	H	2.5	80	26.80	0.00	4.07	8.72	39.60	47.95	-8.32
88.50	H	1.7	100	36.20	0.00	4.01	7.62	47.83	47.95	-0.12

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = k u_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

Tracking # 30662452.001 Page 2 of 5

EUT Name	DLO Transcast	Date	September 7, 2006
EUT Model	009-2007	Temp / Hum in	72 deg F / 57% rh
EUT Serial	None	Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq.	DC +15V
Deg/sweep	12 degrees	RBW / VBW	120kHz/300kHz
Dist/Ant Used	3 Meters/3142-1007	Performed by	Randy Masline
Configuration	Peak Measurements		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
88.50	V	3.5	200	30.00	0.00	4.01	7.36	41.37	67.96	-26.59
98.10	V	1	0	28.50	0.00	4.07	9.05	41.63	67.96	-26.33
107.50	V	1	310	35.00	0.00	4.13	8.35	47.48	67.96	-20.48
107.50	H	1.8	96	33.20	0.00	4.13	8.65	45.98	67.96	-21.98
98.10	H	2.5	80	32.90	0.00	4.07	8.72	45.70	67.96	-22.26
88.50	H	1.7	100	38.10	0.00	4.01	7.62	49.73	67.96	-18.23

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

Tracking # 30662452.001 Page 3 of 5

EUT Name	DLO Transcast	Date	September 7, 2006
EUT Model	009-2007	Temp / Hum in	75 deg F/ 45 %rh
EUT Serial		Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq.	12 VDC
Deg/sweep	12 degrees	RBW / VBW	120 kHz / 300 kHz
Dist/Ant Used	3 Meters/3142-1007	Performed by	Randy Masline
Configuration	Spurious Emissions for 107.5 MHz		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
215.00	V	1	0	22.00	0.00	4.62	11.20	37.82	43.50	-5.68
322.50	V	1	0	21.60	0.00	4.99	14.80	41.39	46.00	-4.61
430.00	V	1	0	21.00	0.00	5.30	16.00	42.30	46.00	-3.70
215.00	H	1	0	20.60	0.00	4.62	11.20	36.42	43.50	-7.08
322.50	H	1	0	23.00	0.00	4.99	14.90	42.89	46.00	-3.11
430.00	H	1	0	21.10	0.00	5.30	17.00	43.40	46.00	-2.60

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

Tracking # 30662452.001 Page 4 of 5

EUT Name	DLO Transcast	Date	September 7, 2006
EUT Model	009-2007	Temp / Hum in	75 deg F/ 45 %rh
EUT Serial		Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq.	12 VDC
Deg/sweep	12 degrees	RBW / VBW	120 kHz / 300 kHz
Dist/Ant Used	3 Meters/3142-1007	Performed by	Randy Masline
Configuration	Spurious Emissions for 98.1		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
196.20	H	1	0	24.10	0.00	4.53	10.83	39.46	43.50	-4.04
294.30	H	1	0	24.80	0.00	4.90	13.64	43.35	46.00	-2.65
392.40	H	1	0	22.60	0.00	5.20	16.64	44.44	46.00	-1.56
196.20	V	1	0	23.40	0.00	4.53	10.55	38.48	43.50	-5.02
294.30	V	1	0	20.20	0.00	4.90	13.47	38.57	46.00	-7.43
392.40	V	1	0	21.00	0.00	5.20	15.80	42.00	46.00	-4.00

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

SOP 1 Radiated Emissions

Tracking # 30662452.001 Page 5 of 5

EUT Name	DLO Transcast	Date	September 7, 2006
EUT Model	009-2007	Temp / Hum in	75 deg F/ 45 %rh
EUT Serial		Temp / Hum out	N/A
Standard	FCC 47 CFR Part 15	Line AC / Freq.	12 VDC
Deg/sweep	12 degrees	RBW / VBW	120 kHz / 300 kHz
Dist/Ant Used	3 Meters/3142-1007	Performed by	Randy Masline
Configuration	Spurious Emissions for 88.5 MHz		

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	Spec Limit (dBuV/m)	Spec Margin (dB)
177.00	V	1	0	23.70	0.00	4.44	10.38	38.52	43.50	-4.98
265.50	V	1	0	21.20	0.00	4.81	12.79	38.80	46.00	-7.20
354.00	V	1	0	21.00	0.00	5.09	15.56	41.65	46.00	-4.35
177.00	H	1	0	25.10	0.00	4.44	10.00	39.54	43.50	-3.96
265.50	H	1	0	27.60	0.00	4.81	12.92	45.33	46.00	-0.67
354.00	H	1	0	22.20	0.00	5.09	15.98	43.27	46.00	-2.73

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor \pm Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 1.6\text{dB}$ Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes:

4.1.3 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{FIM} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: FIM = Field Intensity Meter (dB μ V)
AMP = Amplifier Gain (dB)
CBL = Cable Loss (dB)
ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

4.2 Bandwidth

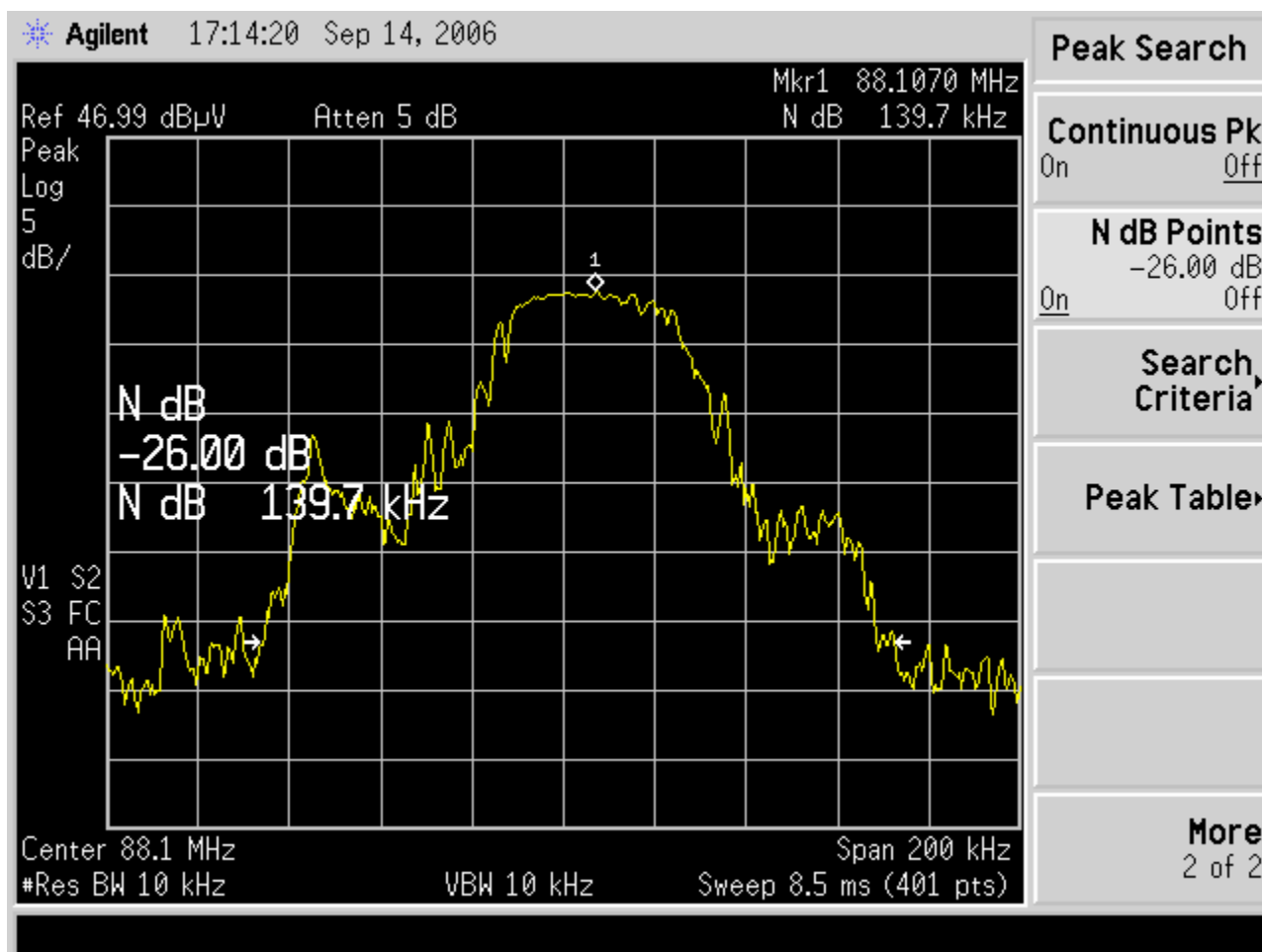


Figure 1 - 88.1 MHz

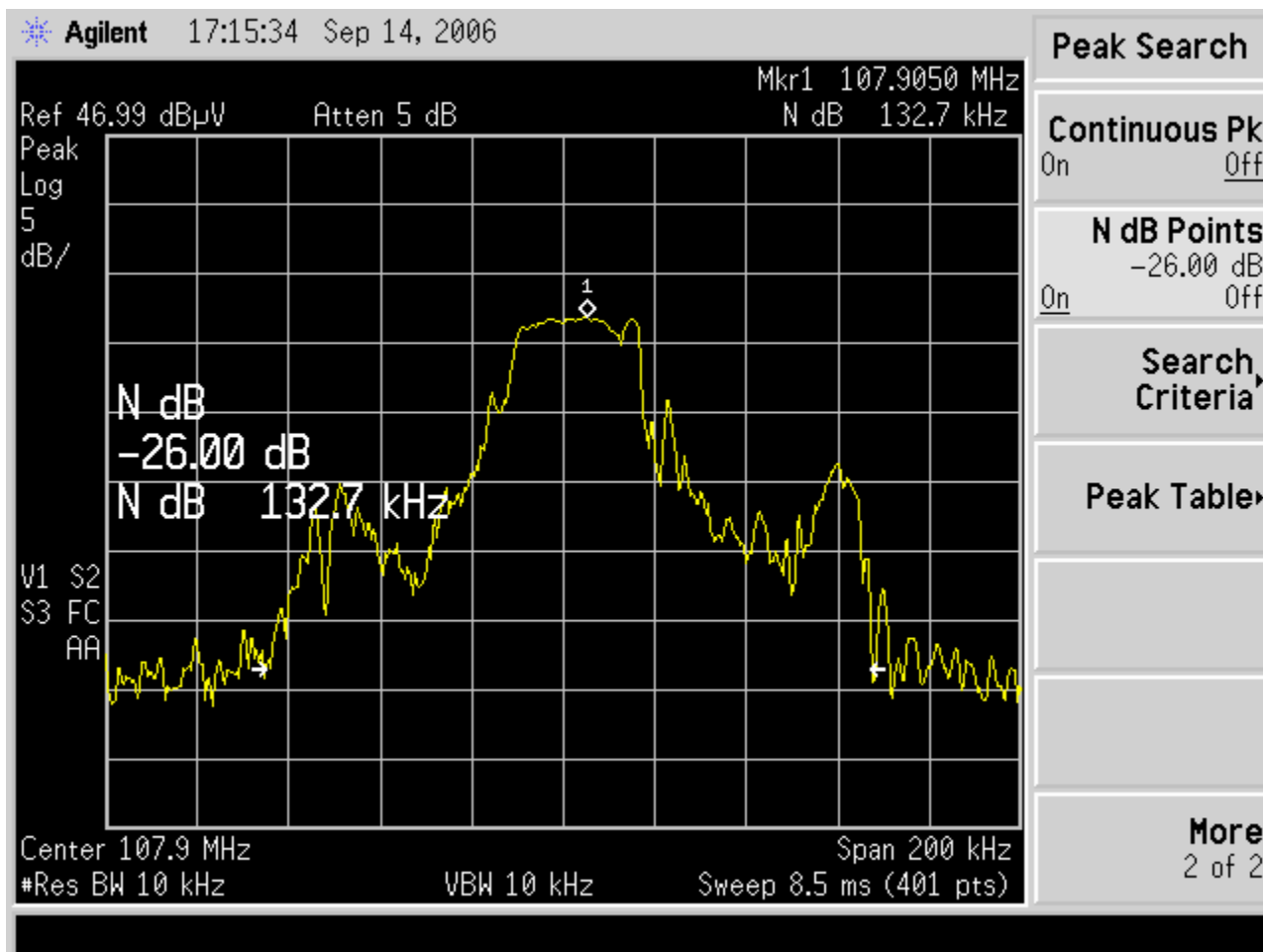


Figure 2 - 107.9 MHz

5 Test Equipment Use List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (OATS)					
Ant. BiconiLog	EMCO	3142	1007	09-Feb-06	09-Feb-07
Cable, Coax	Andrew	FSJ1-50A	030	16-Jan-06	16-Jan-07
Cable, Coax	Andrew	FSJ1-50A	045	16-Jan-06	16-Jan-07
Spectrum Analyzer	Rohde & Schwarz	ESI 40	1088.7490	22-Dec-05	22-Dec-06
Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	27-Feb-06	27-Feb-07

General Laboratory Equipment					
Meter, Temp/Humid/Barom	Fisher	02-400	01	24-Oct-05	24-Oct-06

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.