TEST REPORT

Report Number: 3156507ATL-004

July 30, 2008

Product Designation: DLO HDHD Remote

Standard: 47 CFR Part 15, Subpart C (15.231 - Periodic operation in the band 40.66-40.70 MHz and above 70 MHz)
RSS-210 Issue 7, June 2007

Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
Netalog Inc
3871 South Alston Avenue
Durham, NC 27713
Contact: Garey De Angelis
Phone: 815.577.7067
Fax: 928.447.4973

Tests performed by:

Shawn K. McGuinness
Senior Associate Engineer

Report reviewed by:

Jeremy O. Pickens
EMC Department Manager

1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatum text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)	07/29/2008	
5.0	Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)	07/29/2008	PASS
6.0	Restrictions (FCC 15C - 15.231(a))	07/29/2008	PASS
7.0	Duty Cycle Determination (FCC 15A - 15.35(c))	07/29/2008	PASS
8.0	Radiated Emissions (FCC 15C - 15.231(b))	07/29/2008	PASS
9.0	Bandwidth Requirements (FCC 15C - 15.231(c))	07/29/2008	PASS

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
IPod Docking Station Remote Control	Netalog	DLO HDHD	Not Labeled

EUT receive date:	7-29-2008
EUT receive condition:	Good

Description of EUT provided by Client:
The DLO HDHD is an RF Remote controller for use with a Netalog HDHD IPod Docking Station. The DLO HDHD operates at 433.935 MHz.

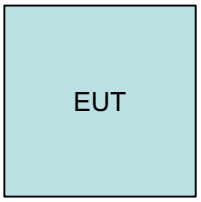
Description of EUT exercising:

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Drawing:



System Block Diagram

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Data:

EUT Cabling						
					Connection	
ID	Description	Length	Shielding	Ferrites	From	To
None required						

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None required			

5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

Method:

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

Results: The sample tested was found to Comply.

Data:

Applicant	Netalog Inc.
	3871 South Alston Avenue
	Durham, NC 27713
Trade Name & Model No.	DLO HDHD Remote
FCC Identifier	
Use of product	Remote Control for Ipod dock
Transmitter activation	☑ Manual and automatically deactivate within 5 seconds of being released
	☐ Periodic transmissions
Frequency Range (MHz)	434
Antenna Type (15.203)	Permanently Connected
Manufacturer name & address	Netalog Inc.
	3871 South Alston Avenue
	Durham, NC 27713

Related Submittals and Grants:	This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.
Additions, deviations and exclusions from standards	None

6.0 Restrictions (FCC 15C - 15.231(a))

Method:

15.231(a) The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition

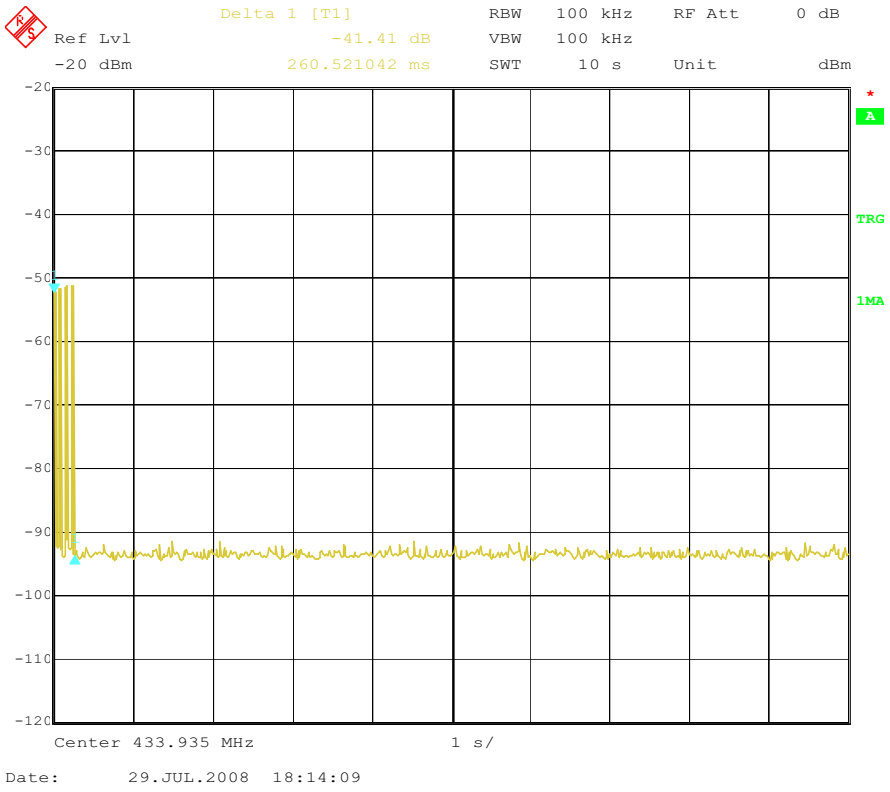
(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/05/2008	05/05/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	03/19/2008	03/19/2009

Results: The sample tested was found to Comply.

Plot:



5 second shutoff after activation

6.0 Restrictions (FCC 15C - 15.231(a))

Data:

15.231(a)	Response	Requirement
Frequency Range (Mhz, max)	434	40.66-40.70 MHz and > 70MHz
Frequency Range (MHz, min)	434	40.66-40.70 MHz and > 70MHz
Transmit only control signal?	Yes	Only control signal allowed
Continuous transmission?	No	No
Voice transmission?	No	No
Video transmission?	No	No
Radio control of toy?	No	No

15.231(a)(1)		
Manually operated?	Yes	
Deactivates within 5 seconds?	Yes	Yes
Show plot (10 second sweep)	Yes	

15.231(a)(2)		
Automatically operated?	No	
Deactivates within 5 seconds?	NA	
Show plot (10 second sweep)	NA	

15.231(a)(3)		
Periodically transmits at predetermined intervals?	No	No

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Method:

(c) Unless otherwise specified, e.g. §15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

Determine the period of the pulse train, T, in mSec and record the results. T is defined as the time from the beginning of one pulse train to the beginning of the next pulse train.

Count the number of different types of pulses, N and record the results.

For each of the different types of pulses, count the number of occurrences within one pulse train.

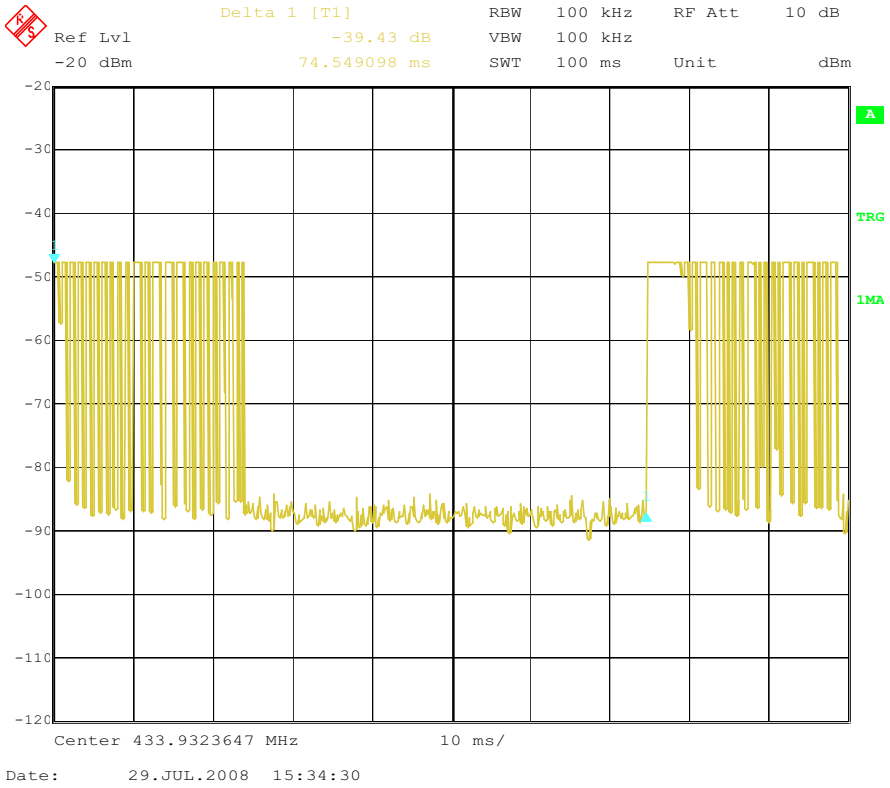
Use the Duty Cycle Correction Factor, DCCF, from the results table and use it to adjust the field strength measurements recorded for radiated emissions.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/05/2008	05/05/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	03/19/2008	03/19/2009

Results: The sample tested was found to Comply.

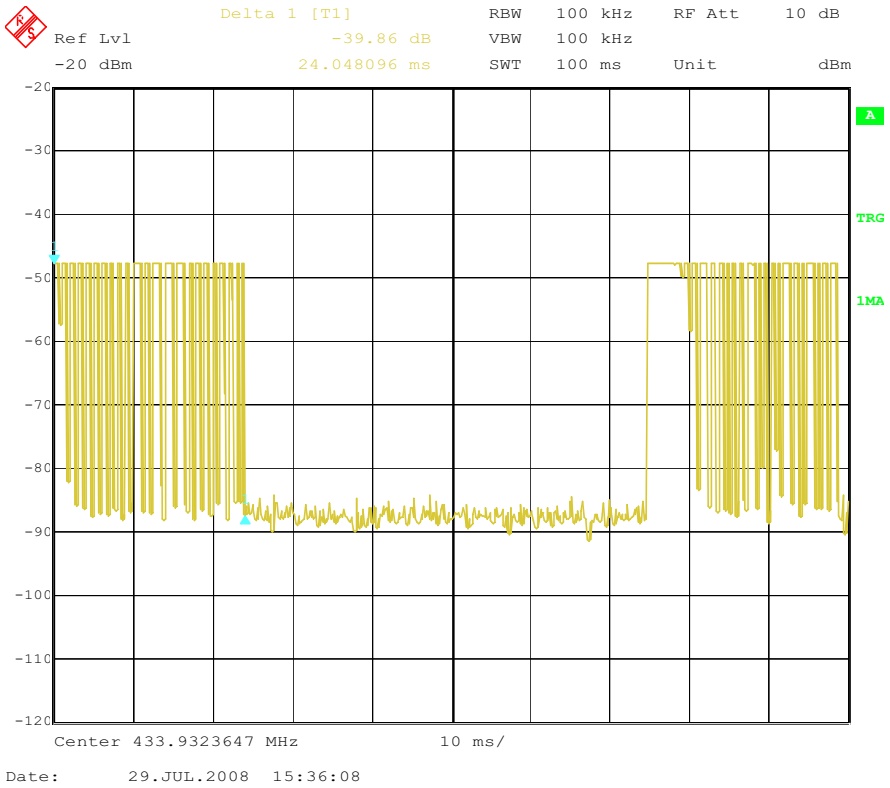
Plot:



100ms Measurement

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

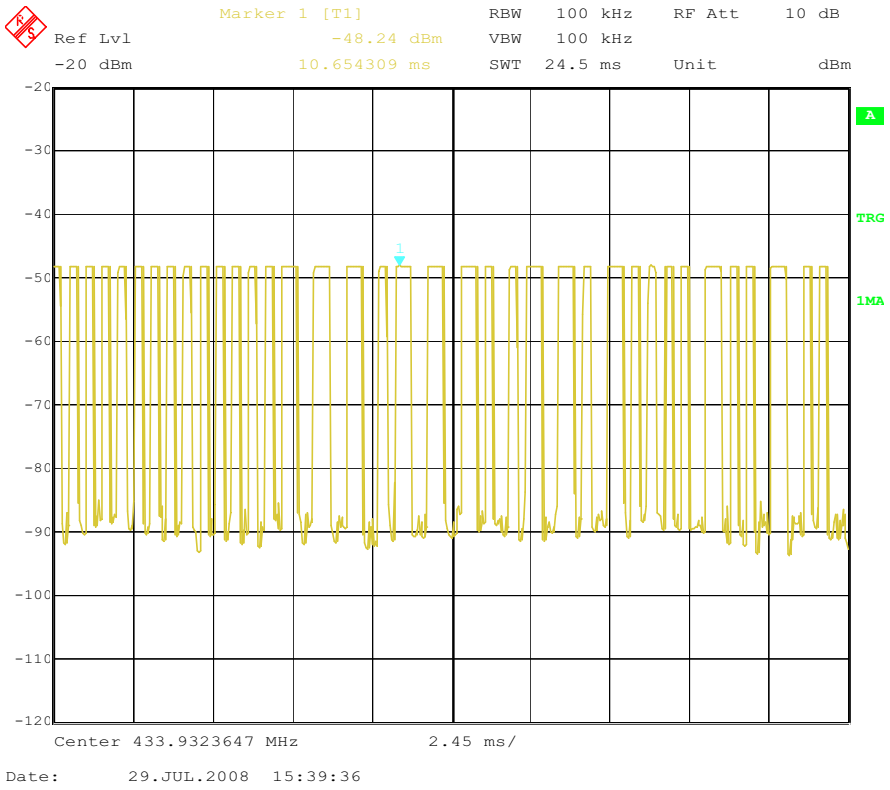
Plot:



100ms On-Time Measurement

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

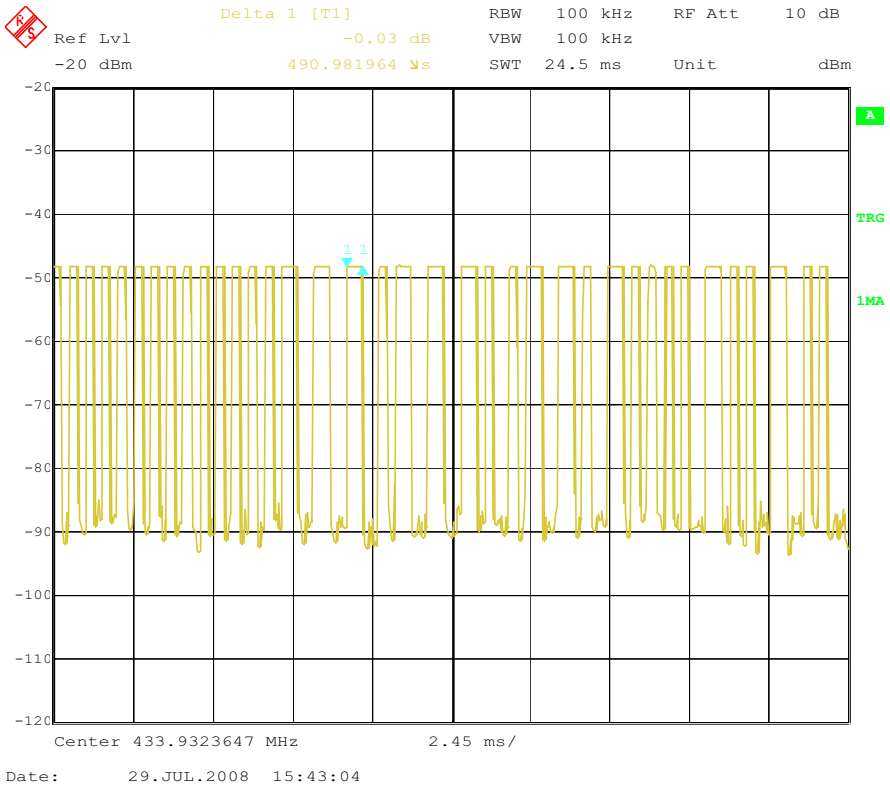
Plot:



24.5ms Pulse Measurement

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

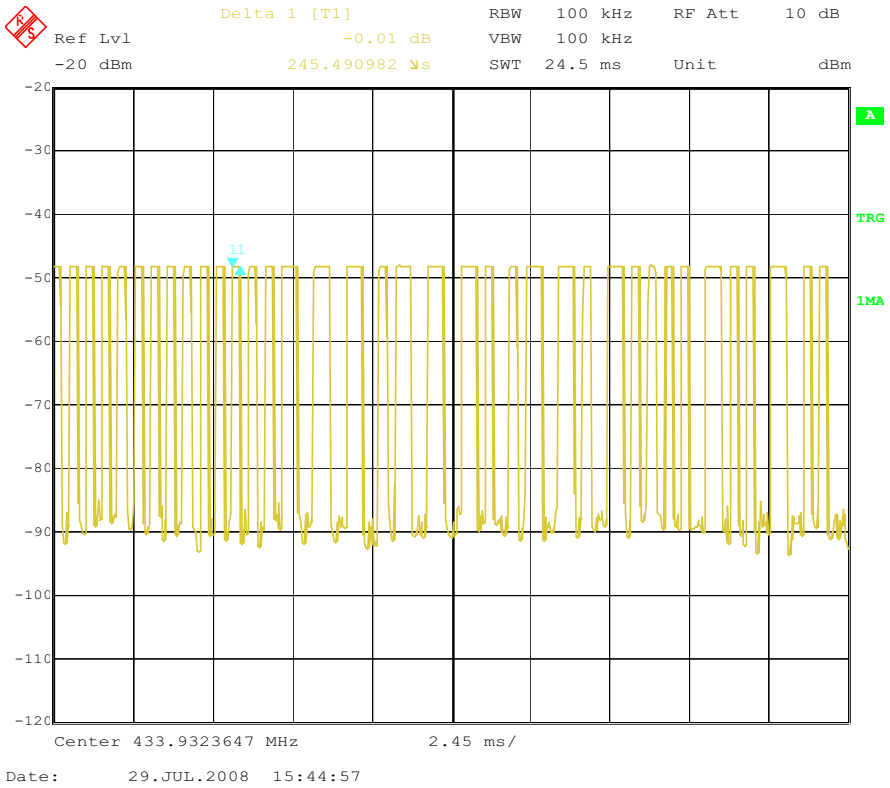
Plot:



24.5ms Large Pulse Measurement

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Plot:



24.5ms Small Pulse Measurement

7.0 Duty Cycle Determination (FCC 15A - 15.35(c))

Data:

Duration of Pulse Train, T (mSec):	74.549
Averaging Interval, A_I (mSec):	74.549
Number of different Pulses, N:	2

	Number ($\#P_x$)	Pulse Width, mSec (PW_x)	Product ($\#P_x$)*(PW_x)
Pulse Width 1	26	0.24549	6.38274
Pulse Width 2	11	0.490981	5.400791
Pulse Width 3			
Pulse Width 4			
Pulse Width 5			
Pulse Width 6			
Pulse Width 7			
Pulse Width 8			
Pulse Width 9			
Pulse Width 10			

Duty Cycle:	0.15806424
Duty Cycle Correction Factor, dB:	-16.0

$$T_{on} = (PW_1 * \#P)_1 + (PW_{2*} * \#P_2) + \cdots + (PW_n * \#P_n)$$

$$DutyCycle = T_{on} \div A_I$$

$$DCCF = 20 * Log_{10}(DutyCycle)$$

8.0 Radiated Emissions (FCC 15C - 15.231(b))

Method:

(b) In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the limits specified in FCC Part 15.231(b).

Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

For radiated emission measurements, the EUT is attached to a styro-foam block and placed on a non-conductive table whose top is 80cm above the ground plane. If the EUT is handheld, the signal shall be aximized through rotation and placement in the three orthogonal axes.

During the test the EUT is rotated and the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at 3 meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent 3-meter reading using inverse scaling with distance.

Radiated emission measurements were performed from 30 MHz to 10 times the highest frequency generated in the EUT.

Analyzer resolution is:
100 kHz or greater for frequencies 1000 MHz and below,
1 MHz for frequencies above 1000 MHz.

The Peak value of the Field Strength was measured. The Average value was obtained from the Peak by subtracting the Duty Cycle Correction Factor.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	211386	09/07/2007	09/07/2008
Antenna, Horn, <18 GHz	EMCO	3115	213061	04/18/2008	04/18/2009
Cable E01, <18GHz	Pasternack	RG214/U	E01	05/05/2008	05/05/2009
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/05/2008	05/05/2009
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/16/2008	01/16/2009
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/05/2008	05/05/2009
Cable ST1, 7m, N-N, 18 GHz	Storm Products Co.	PR90-206-7MTR	ST1	01/16/2008	01/16/2009
EMI Receiver	Hewlett Packard	8546A	213109	09/10/2007	09/10/2008
EMI Receiver, Preselector section	Hewlett Packard	85460A	213108	09/10/2007	09/10/2008
Excel spreadsheet for radiated emissions	Software	Excel - RE Worksh	SW004	11/21/2007	11/21/2008
Preamplifier, 10 MHz to 2000 MHz, 30 dB gain	Mini-Circuits	ZKL-2	200069	09/18/2007	09/18/2008
Preamplifier, 20 MHz to 18 GHz, 40 dB	A.H. Systems	PAM-0118	200108	03/27/2008	03/27/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	03/19/2008	03/19/2009
Tile - software profile for radiated and conducted emissions testing.	Software	Tile - Emissions	SW006	11/21/2007	11/21/2008

Results: The sample tested was found to Comply.

8.0 Radiated Emissions (FCC 15C - 15.231(b))

Photo:

Front View

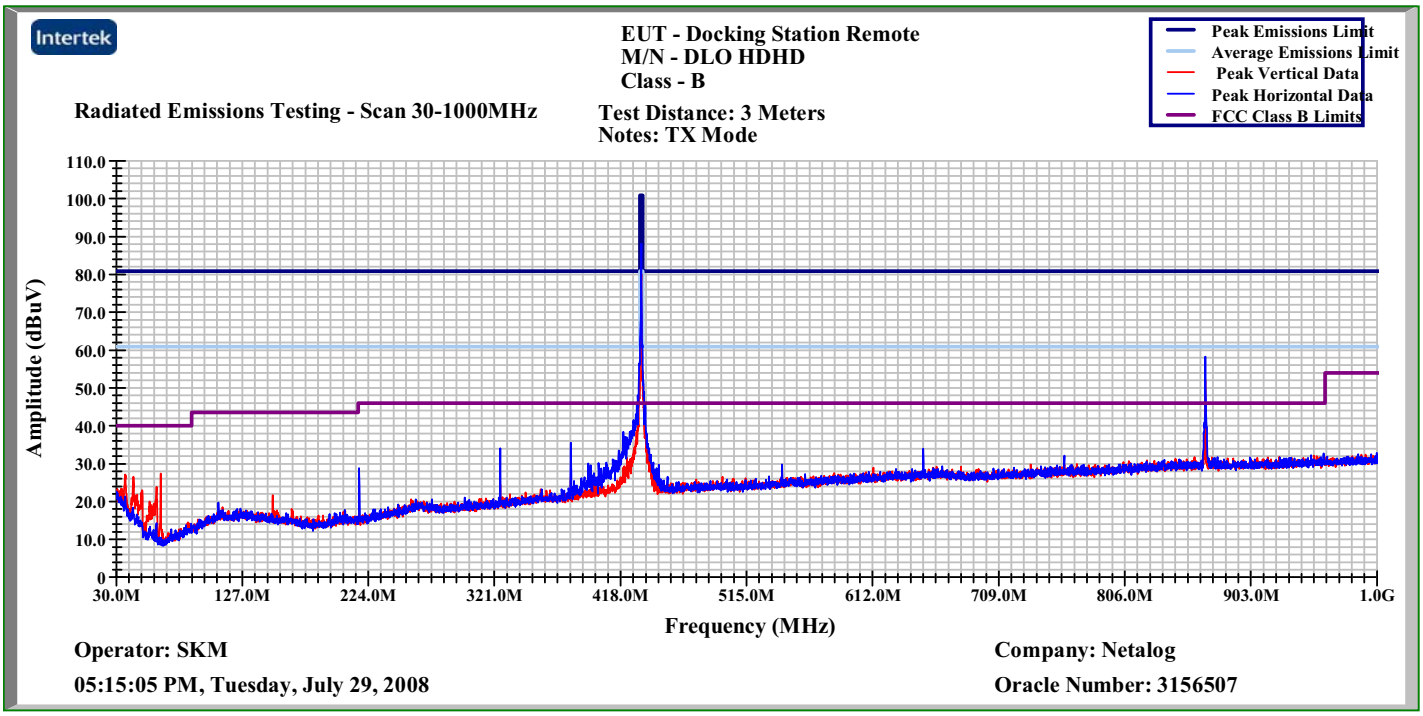
8.0 Radiated Emissions (FCC 15C - 15.231(b))

Photo:

Rear View

8.0 Radiated Emissions (FCC 15C - 15.231(b))

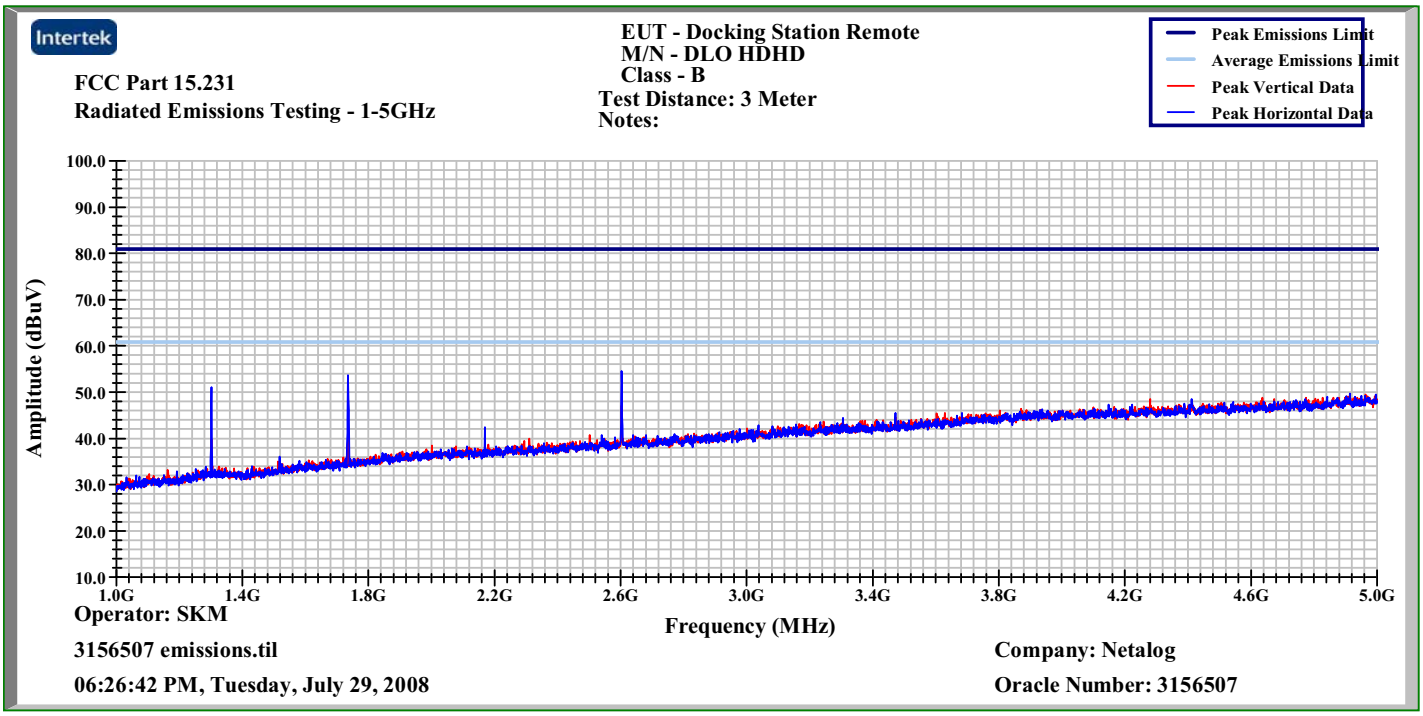
Plot:



Scan 30-1000MHz

8.0 Radiated Emissions (FCC 15C - 15.231(b))

Plot:



Scan 1000-5000MHz

8.0 Radiated Emissions (FCC 15C - 15.231(b))

Data:

Frequency Range (MHz): 30-1000 **Test Distance (m):** 3

Input power: Battery **Modifications for compliance (y/n):** n

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**Limit dB(uV/m)**	**Margin dB**	**Axis / Detector**
V	433.935	88.6	16.9	4.2	27.7	0.0	81.9	100.8	-18.9	XP
V	433.935	88.6	16.9	4.2	27.7	16.0	65.9	80.8	-14.9	XA
H	433.935	97.4	17.7	4.2	27.7	0.0	91.6	100.8	-9.3	XP
H	433.935	97.4	17.7	4.2	27.7	16.0	75.6	80.8	-5.3	XA
V	433.935	83.6	16.9	4.2	27.7	0.0	77.0	100.8	-23.9	YP
V	433.935	83.6	16.9	4.2	27.7	16.0	61.0	80.8	-19.9	YA
H	433.935	96.0	17.7	4.2	27.7	0.0	90.2	100.8	-10.7	YP
H	433.935	96.0	17.7	4.2	27.7	16.0	74.2	80.8	-6.7	YA
V	433.935	98.4	16.9	4.2	27.7	0.0	91.8	100.8	-9.1	ZP
V	433.935	98.4	16.9	4.2	27.7	16.0	75.8	80.8	-5.1	ZA
H	433.935	79.0	17.7	4.2	27.7	0.0	73.1	100.8	-27.7	ZP
H	433.935	79.0	17.7	4.2	27.7	16.0	57.1	80.8	-23.7	ZA
V	867.870	52.0	20.7	6.0	27.5	0.0	51.1	80.8	-29.7	XP
V	867.870	52.0	20.7	6.0	27.5	16.0	35.1	60.8	-25.7	XA
H	867.870	59.7	21.9	6.0	27.5	0.0	60.0	80.8	-20.8	XP
H	867.870	59.7	21.9	6.0	27.5	16.0	44.0	60.8	-16.8	XA
V	867.870	49.4	20.7	6.0	27.5	0.0	48.5	80.8	-32.3	YP
V	867.870	49.4	20.7	6.0	27.5	16.0	32.5	60.8	-28.3	YA
H	867.870	62.4	21.9	6.0	27.5	0.0	62.8	80.8	-18.1	YP
H	867.870	62.4	21.9	6.0	27.5	16.0	46.8	60.8	-14.1	YA
V	867.870	61.3	20.7	6.0	27.5	0.0	60.4	80.8	-20.4	ZP
V	867.870	61.3	20.7	6.0	27.5	16.0	44.4	60.8	-16.4	ZA
H	867.870	49.5	21.9	6.0	27.5	0.0	49.9	80.8	-31.0	ZP
H	867.870	49.5	21.9	6.0	27.5	16.0	33.9	60.8	-27.0	ZA
Calculations		G=C+D+E-F		I=G-H						

30-1000MHz

8.0 Radiated Emissions (FCC 15C - 15.231(b))

Data:

Frequency Range (MHz): 1000-5000 **Test Distance (m):** 3

Input power: Battery **Modifications for compliance (y/n):** n

Notes:

A	B	C	D	E	F	G	H	I	J	K
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Duty Cycle Factor dB**	**Net dB(uV/m)**	**Limit dB(uV/m)**	**Margin dB**	**Axis / Detector**
V	1735.725	48.9	25.8	7.6	27.2	0.0	55.1	80.8	-25.7	XP
V	1735.725	48.9	25.8	7.6	27.2	16.0	39.1	60.8	-21.7	XA
H	1735.725	57.5	27.4	7.6	27.2	0.0	65.3	80.8	-15.6	XP
H	1735.725	57.5	27.4	7.6	27.2	16.0	49.3	60.8	-11.6	XA
V	1735.725	55.1	25.8	7.6	27.2	0.0	61.3	80.8	-19.5	YP
V	1735.725	55.1	25.8	7.6	27.2	16.0	45.3	60.8	-15.5	YA
H	1735.725	53.1	27.4	7.6	27.2	0.0	60.9	80.8	-19.9	YP
H	1735.725	53.1	27.4	7.6	27.2	16.0	44.9	60.8	-15.9	YA
V	1735.725	54.4	25.8	7.6	27.2	0.0	60.5	80.8	-20.3	ZP
V	1735.725	54.4	25.8	7.6	27.2	16.0	44.5	60.8	-16.3	ZA
H	1735.725	52.7	27.4	7.6	27.2	0.0	60.5	80.8	-20.3	ZP
H	1735.725	52.7	27.4	7.6	27.2	16.0	44.5	60.8	-16.3	ZA
V	2603.513	51.0	26.7	8.0	27.4	0.0	58.2	80.8	-22.6	XP
V	2603.513	51.0	26.7	8.0	27.4	16.0	42.2	60.8	-18.6	XA
H	2603.513	57.4	28.2	8.0	27.4	0.0	66.1	80.8	-14.7	XP
H	2603.513	57.4	28.2	8.0	27.4	16.0	50.1	60.8	-10.7	XA
V	2603.513	55.7	26.7	8.0	27.4	0.0	62.9	80.8	-17.9	YP
V	2603.513	55.7	26.7	8.0	27.4	16.0	46.9	60.8	-13.9	YA
H	2603.513	57.7	28.2	8.0	27.4	0.0	66.5	80.8	-14.4	YP
H	2603.513	57.7	28.2	8.0	27.4	16.0	50.5	60.8	-10.4	YA
V	2603.513	52.9	26.7	8.0	27.4	0.0	60.1	80.8	-20.7	ZP
V	2603.513	52.9	26.7	8.0	27.4	16.0	44.1	60.8	-16.7	ZA
H	2603.513	51.5	28.2	8.0	27.4	0.0	60.2	80.8	-20.6	ZP
H	2603.513	51.5	28.2	8.0	27.4	16.0	44.2	60.8	-16.6	ZA
Calculations		G=C+D+E-F		I=G-H						

1000-5000MHz

9.0 Bandwidth Requirements (FCC 15C - 15.231(c))

Method:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

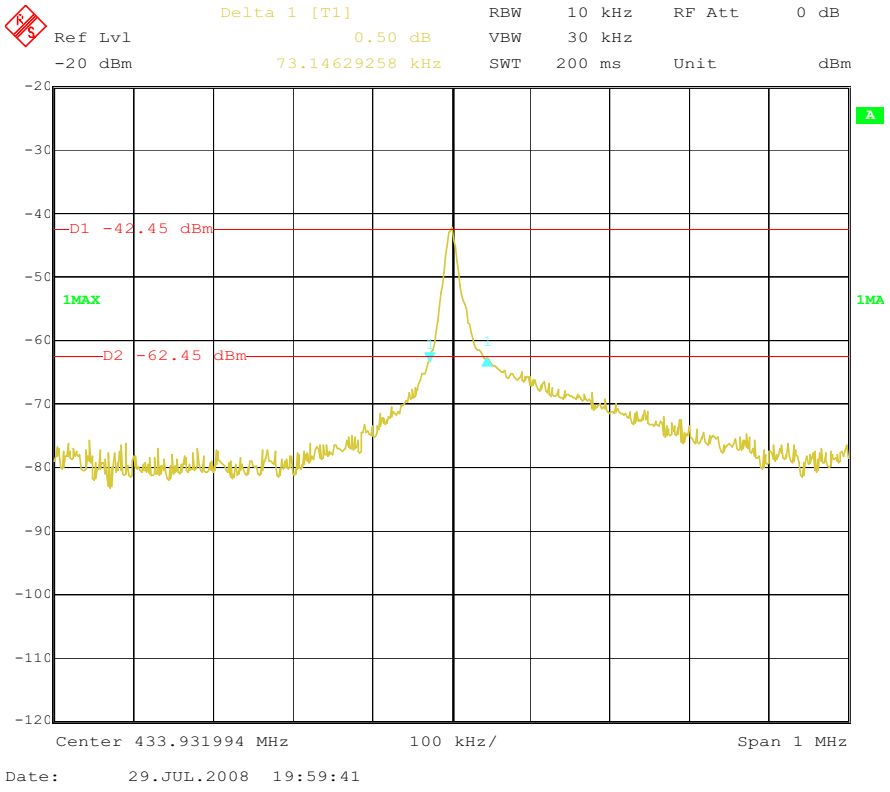
- Center Frequency is set to the fundamental of transmitter.
- Resolution Bandwidth is set to approximately 1% of the emission bandwidth.
- Video Bandwidth is set greater than or equal to the Resolution Bandwidth.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable E05, <18GHz	Huber-Suhner	Sucoflex 104PEA	E05	05/05/2008	05/05/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	03/19/2008	03/19/2009

Results: The sample tested was found to Comply.

Plot:



-20dB Bandwidth Measurement

9.0 Bandwidth Requirements (FCC 15C - 15.231(c))

Data:

Fundamental Frequency MHz	Measured Bandwidth MHz	Bandwidth Limit MHz
434	0.075	1.085

Suggested Instrument Settings	
RBW (kHz):	11
VBW (kHz):	33
Span (MHz):	1.085
Sweep time (s):	>1