



FCC Certification Test Report
for
Kalan LP
FCC ID: SWG-PP55

April 30, 2005

Prepared for:

Kalan LP
97 South Union Avenue
Lansdowne, PA 19050

Prepared By:

Washington Laboratories, Ltd.
7560 Lindbergh Drive
Gaithersburg, Maryland 20879



FCC Certification Test Program

FCC Certification Test Report for the Kalan LP Hound Bytes Remote Control Dog Collar FCC ID: SWG-PP55

April 30, 2005

WLL JOB# 8581

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Abstract

This report has been prepared on behalf of Kalan LP to support the application for Equipment Authorization. The test report is submitted for an Intentional Radiator under Part 15.227 of the FCC Rules and Regulations. This Federal Communication Commission (FCC) Certification Test Report documents the test configuration and test results for a Kalan LP Hound Bytes Remote Control Dog Collar.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The Kalan LP Hound Bytes Remote Control Dog Collar complies with the limits for an Intentional Radiator device under Part 15.227 of the FCC Rules and Regulations.

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1 Introduction

1.1 Compliance Statement

The Kalan LP Hound Bytes Remote Control Dog Collar complies with the limits for an Intentional Radiator device under Part 15.227 of the FCC Rules and Regulations.

1.2 Test Scope

Tests for radiated emissions were performed. All measurements were performed according to the 2003 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer: Kalan LP
97 South Union Avenue
Lansdowne, PA 19050

Quotation Number: 62187

1.4 Test Dates

Testing was performed on February 16, 2005 and April 4, 2005.

1.5 Test and Support Personnel

Washington Laboratories, LTD

James Ritter

1.6 Abbreviations

A	Ampere
Ac	alternating current
AM	Amplitude Modulation
Amps	Amperes
b/s	bits per second
BW	Bandwidth
CE	Conducted Emission
Cm	centimeter
CW	Continuous Wave
DB	decibel
Dc	direct current
EMI	Electromagnetic Interference
EUT	Equipment Under Test
FM	Frequency Modulation
G	giga - prefix for 10^9 multiplier
Hz	Hertz
IF	Intermediate Frequency
K	kilo - prefix for 10^3 multiplier
M	Mega - prefix for 10^6 multiplier
M	Meter
μ	micro - prefix for 10^{-6} multiplier
NB	Narrowband
LISN	Line Impedance Stabilization Network
RE	Radiated Emissions
RF	Radio Frequency
Rms	root-mean-square
SN	Serial Number
S/A	Spectrum Analyzer
V	Volt

2 Equipment Under Test

2.1 EUT Identification & Description

The Kalan LP Hound Bytes Remote Control Dog Collar is a hand-held remote control transmitter paired with a receiving dog collar attachment. The transmitter is battery powered from two L1131 button cell batteries located in rear of unit. Six buttons on front of the transmitter send a 27.144MHz signal to the receiver unit that initiates a corresponding voice message from the receiver unit. The EUT transmitter has a 5 inch extending monopole antenna.

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	Kalan LP
FCC ID Number	SWG-PP55
EUT Name:	Remote Control Dog Collar
Model:	Hound Bytes
FCC Rule Parts:	§15.227
Frequency Range:	27.144MHz
Maximum Output Power:	N/A
Occupied Bandwidth:	8.6 kHz
Keying:	Manual
Type of Information:	Control
Number of Channels:	Single Channel
Antenna Type	Permanently attached monopole
Interface Cables:	None
Power Source & Voltage:	3.10Vdc from batteries

2.2 Test Configuration

The Hound Bytes was tested as a standalone device.

2.3 Testing Algorithm

The Hound Bytes was operated by configuring the transmitter for continuous operation.

Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ± 2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5 (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.

3 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

Table 2. Test Equipment List

Equipment	WLL Asset #	Calibration Due
Hewlett-Packard 8568B Spectrum Analyzer	0073	7/08/05
Hewlett-Packard 85650A Quasi-Peak Adapter	0069	7/08/05
Hewlett-Packard 8593A Spectrum Analyzer	0074	8/17/05
Hewlett-Packard 8449B Microwave Preamp	0312	9/29/05
ARA LPB-2520 BiconiLog Antenna	0007	9/14/05
ARA DRG118/A Microwave Horn Antenna	0425	4/17/05
EMCO 6502 Active Loop Antenna	0031	1/10/06
Hewlett-Packard 85685A RF Preselector	0071	7/08/05
EMCO 3110B Biconical Antenna	0026	6/22/05
EMCO 3146A Log Periodic Antenna	0029	6/24/05

4 Test Results

4.1 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer. A receive antenna was placed near the transmit antenna for detecting the signal.

The 20 dB bandwidth of the modulated carrier was measured.

At full modulation, the occupied bandwidth measured 8.6 kHz at 27.144MHz as shown in the following plot.

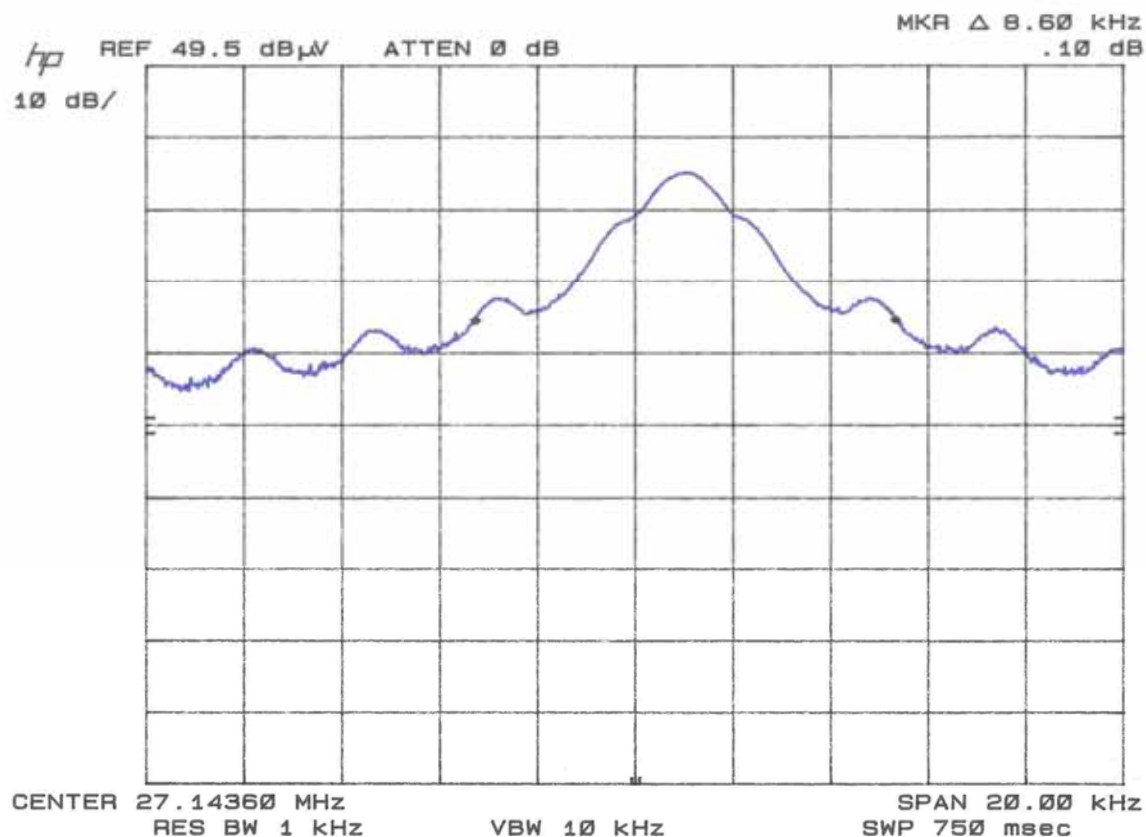


Figure 1. Occupied Bandwidth

4.2 Radiated Spurious Emissions: (FCC Part §15.227)

The requirements of §15.227 state that the spurious emissions within the band 26.96 – 27.28 MHz shall not exceed 10,000μV/m at 3 meters when measured with an average detector. Emissions occurring outside this band shall comply with the general emission limits of §15.209.

4.2.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. Emissions below 30MHz were measured with a loop antenna while emissions above 30MHz were measured using a broadband E-field antenna. Both the horizontal and vertical field components were measured above 30MHz while below 30 MHz the antenna was rotated in 3 axes.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
26.96 – 30 MHz	10k	10Hz
30 - 1000 MHz	100kHz	>100kHz
>1000 MHz	1 MHz	1MHz (peak)

Emissions were measured to the 10th harmonic of the transmit frequency. The controller was tested in three orthogonal planes. Worst case emission levels are reported.

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level): V dBμV (Peak)

Antenna Factor (Ant Corr): AFdB/m

Cable Loss Correction (Cable Corr): CCdB

Duty Cycle Correction (If applicable): DCCdB

Amplifier Gain (If applicable): GdB

Electric Field (Corr Level): $EdB_{\mu V/m} = VdB_{\mu V} + AFdB/m + CCdB + DCCdB - GdB$

Table 3. Radiated Emissions Test Data, <30Mhz

CLIENT:	Kalan LP	DATE:	4/4/2005
TESTER:	James Ritter	JOB #:	8581
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Dog Collar	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Constant TX @27.14MHz	DISTANCE:	3m
CLASS:	B		
<u>Test Equipment/Limit:</u>			
ANTENNA:	A_00031	LIMIT:	LFCC_3m_Class_B
CABLE:	CSITE2_3m	AMPLIFIER (dB)	None

Frequency	Polarity	Az	Ant. Hght	SA Level Avg.	Ant. Corr.	Cable Corr.	Corr. Level	Corr. Level	Limit	Margin	Notes
(MHz)	H/V	Deg	(m)	(dBµV)	(dB/m)	(dB)	(dBµV/m)	(µV/m)	(µV/m)	dB	
Upright											
27.14	X	100.0	1.0	17.2	9.2	1.1	27.6	23.9	10000.0	-52.4	
27.14	Y	180.0	1.0	30.2	9.2	1.1	40.6	106.8	10000.0	-39.4	
27.14	Z	190.0	1.0	16.9	9.2	1.1	27.3	23.1	10000.0	-52.7	
27.28	X	170.0	1.0	11.4	9.2	1.1	21.8	12.2	30.0	-7.8	Band edge
26.96	X	180.0	1.0	9.4	9.3	1.1	19.8	9.8	30.0	-9.8	Band edge
27.28	Y	100.0	1.0	8.1	9.2	1.1	18.5	8.4	30.0	-11.1	Band edge
26.96	Y	100.0	1.0	8.9	9.3	1.1	19.3	9.2	30.0	-10.3	Band edge
27.28	Z	180.0	1.0	8.8	9.2	1.1	19.2	9.1	30.0	-10.4	Band edge
26.96	Z	180.0	1.0	8.6	9.3	1.1	19.0	8.9	30.0	-10.6	Band edge
Flat											
27.14	X	180.0	1.0	15.8	9.2	1.1	26.2	20.3	10000.0	-53.8	
27.14	Y	90.0	1.0	18.9	9.2	1.1	29.3	29.1	10000.0	-50.7	
27.14	Z	190.0	1.0	17.6	9.2	1.1	28.0	25.0	10000.0	-52.0	
27.28	X	180.0	1.0	11.3	9.2	1.1	21.7	12.1	30.0	-7.9	Band edge
26.96	X	180.0	1.0	10.1	9.3	1.1	20.5	10.6	30.0	-9.1	Band edge
27.28	Y	190.0	1.0	7.0	9.2	1.1	17.4	7.4	30.0	-12.2	Band edge
26.96	Y	180.0	1.0	9.1	9.3	1.1	19.5	9.4	30.0	-10.1	Band edge
27.28	Z	100.0	1.0	9.2	9.2	1.1	19.6	9.5	30.0	-10.0	Band edge
26.96	Z	125.0	1.0	8.1	9.3	1.1	18.5	8.4	30.0	-11.1	Band edge
Side											
27.14	X	90.0	1.0	15.9	9.2	1.1	26.3	20.6	10000.0	-53.7	
27.14	Y	170.0	1.0	25.3	9.2	1.1	35.7	60.7	10000.0	-44.3	
27.14	Z	90.0	1.0	19.9	9.2	1.1	30.3	32.6	10000.0	-49.7	
27.28	X	90.0	1.0	8.0	9.2	1.1	18.4	8.3	30.0	-11.2	Band edge
26.96	X	90.0	1.0	12.9	9.3	1.1	23.3	14.6	30.0	-6.3	Band edge
27.28	Y	90.0	1.0	6.6	9.2	1.1	17.0	7.0	30.0	-12.6	Band edge
26.96	Y	90.0	1.0	10.8	9.3	1.1	21.2	11.5	30.0	-8.4	Band edge
27.28	Z	180.0	1.0	7.2	9.2	1.1	17.6	7.5	30.0	-12.0	Band edge
26.96	Z	180.0	1.0	9.3	9.3	1.1	19.7	9.6	30.0	-9.9	Band edge

Note: All testing below 30 MHz was performed at 3 meters. The 15.209 limit specified at 30 meter was not adjusted as the unit complies with the limits at 3 meters.

Table 4: Radiated Emission Test Data, >30MHz

CLIENT:	Kalan LP	DATE:	4/4/2005
TESTER:	James Ritter	JOB #:	8581
<u>EUT Information:</u>		<u>Test Requirements:</u>	
EUT:	Dog Collar	TEST STANDARD:	FCC Part 15
CONFIGURATION:	Constant TX @27.14MHz	DISTANCE:	3m
CLASS:	B		
<u>Test Equipment/Limit:</u>			
ANTENNA:	A_00007	LIMIT:	LFCC_3m_Class_B
CABLE:	CSITE2_3m	AMPLIFIER (dB)	None

Frequency (MHz)	Polarity H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Upright											
54.285	V	190.0	1.0	13.1	12.3	1.3	26.7	21.7	100.0	-13.3	
81.433	V	270.0	1.0	10.0	6.6	1.6	18.2	8.1	100.0	-21.8	
108.577	V	90.0	1.2	7.3	9.9	1.7	18.9	8.8	150.0	-24.7	
135.722	V	0.0	1.0	3.1	9.1	1.9	14.1	5.1	150.0	-29.4	
162.866	V	150.0	1.0	2.1	9.3	2.0	13.3	4.6	150.0	-30.2	
190.011	V	270.0	1.2	7.2	9.5	2.1	18.8	8.7	150.0	-24.7	
217.155	V	250.0	1.0	4.1	11.0	2.3	17.4	7.4	200.0	-28.6	
244.300	V	270.0	3.0	2.7	11.7	2.4	16.8	6.9	200.0	-29.2	
271.444	V	100.0	1.4	3.6	13.2	2.5	19.3	9.2	200.0	-26.7	
54.285	H	220.0	3.5	6.5	12.3	1.3	20.1	10.2	100.0	-19.9	
81.433	H	270.0	1.5	6.8	6.6	1.6	15.0	5.6	100.0	-25.0	
108.577	H	300.0	2.1	1.6	9.9	1.7	13.2	4.5	150.0	-30.4	
135.722	H	90.0	1.3	2.1	9.1	1.9	13.1	4.5	150.0	-30.4	
162.866	H	0.0	3.0	1.0	9.3	2.0	12.2	4.1	150.0	-31.3	
190.011	H	0.0	3.0	7.3	9.5	2.1	18.9	8.8	150.0	-24.6	amb
217.155	H	180.0	3.0	4.4	11.0	2.3	17.7	7.7	200.0	-28.3	
244.300	H	190.0	2.5	1.3	11.7	2.4	15.4	5.9	200.0	-30.6	
271.444	H	180.0	1.7	2.8	13.2	2.5	18.5	8.4	200.0	-27.5	
Flat											
54.285	V	1.0	45.0	10.9	12.3	1.3	24.5	16.9	100.0	-15.5	
81.433	V	0.0	1.3	6.9	6.6	1.6	15.1	5.7	100.0	-24.9	
108.577	V	125.0	1.5	2.1	9.9	1.7	13.7	4.8	150.0	-29.9	
135.722	V	45.0	1.8	3.0	9.1	1.9	14.0	5.0	150.0	-29.5	
162.866	V	0.0	1.5	5.1	9.3	2.0	16.3	6.6	150.0	-27.2	
190.011	V	90.0	1.4	3.6	9.5	2.1	15.2	5.8	150.0	-28.3	
217.155	V	0.0	1.0	1.6	11.0	2.3	14.9	5.6	200.0	-31.1	
244.300	V	180.0	1.3	0.6	11.7	2.4	14.7	5.4	200.0	-31.3	
271.444	V	0.0	1.0	1.6	13.2	2.5	17.3	7.3	200.0	-28.7	
54.285	H	180.0	1.4	8.5	12.3	1.3	22.1	12.8	100.0	-17.9	
81.433	H	90.0	2.0	7.2	6.6	1.6	15.4	5.9	100.0	-24.6	

108.577	H	270.0	1.9	4.6	9.9	1.7	16.2	6.4	150.0	-27.4
135.722	H	180.0	1.6	3.8	9.1	1.9	14.8	5.5	150.0	-28.7
162.866	H	180.0	1.7	2.9	9.3	2.0	14.1	5.1	150.0	-29.4
190.011	H	180.0	1.7	8.2	9.5	2.1	19.8	9.8	150.0	-23.7
217.155	H	0.0	1.7	7.1	11.0	2.3	20.4	10.5	200.0	-25.6
244.300	H	350.0	1.4	5.3	11.7	2.4	19.4	9.3	200.0	-26.6
271.444	H	0.0	1.4	5.8	13.2	2.5	21.5	11.9	200.0	-24.5
Side										
54.285	V	90.0	1.0	3.9	12.3	1.3	17.5	7.5	100.0	-22.5
81.433	V	125.0	1.0	4.2	6.6	1.6	12.4	4.2	100.0	-27.6
108.577	V	90.0	1.2	5.6	9.9	1.7	17.2	7.2	150.0	-26.4
135.722	V	125.0	1.0	4.1	9.1	1.9	15.1	5.7	150.0	-28.4
162.866	V	25.0	1.0	5.7	9.3	2.0	16.9	7.0	150.0	-26.6
190.011	V	180.0	1.4	4.1	9.5	2.1	15.7	6.1	150.0	-27.8
217.155	V	0.0	1.5	5.7	11.0	2.3	19.0	9.0	200.0	-27.0
244.300	V	270.0	2.0	0.5	11.7	2.4	14.6	5.4	200.0	-31.4
271.444	V	90.0	1.0	0.1	13.2	2.5	15.8	6.2	200.0	-30.2
54.285	H	90.0	3.0	8.4	12.3	1.3	22.0	12.6	100.0	-18.0
81.433	H	0.0	1.6	6.8	6.6	1.6	15.0	5.6	100.0	-25.0
108.577	H	180.0	3.0	2.9	9.9	1.7	14.5	5.3	150.0	-29.1
135.722	H	250.0	2.2	4.4	9.1	1.9	15.4	5.9	150.0	-28.1
162.866	H	270.0	2.4	5.5	9.3	2.0	16.7	6.9	150.0	-26.8
190.011	H	280.0	2.0	2.8	9.5	2.1	14.4	5.3	150.0	-29.1
217.155	H	190.0	1.2	5.6	11.0	2.3	18.9	8.9	200.0	-27.1
244.300	H	280.0	1.2	2.3	11.7	2.4	16.4	6.6	200.0	-29.6
271.444	H	90.0	1.4	4.4	13.2	2.5	20.1	10.1	200.0	-25.9