Testing Tomorrow's Technology

Application for
Class 2 Permissive Change per Part 2.932, Modification of Equipment

US Code Title 47, Part 2, Subpart J, Section 907, Certification
And
Part 15, Subpart C, for Intentional Radiators Section 15.249 Intentional Radiator Operating within the Band 2400 MHz to 2483.5 MHz

For the

Ventriloscope ARX Unit

Manufactured by

Lecat's Ventriloscope, LLC

UST Project: 09-0064
Issue Date: May 12, 2009

3505 Francis Circle Alpharetta, GA 30004
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Testing Tomorrow's Technology

I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: _____

Name: Stephen A. Sawyer

Title: Chief Compliance Engineer

Date: May 12, 2009

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MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: Lecat's Ventriloscope, LLC

MODEL: Ventriloscope ARX Unit

FCC ID: WNT-VENT - R

DATE: May 12, 2009

This report concerns (check one): Original grant ___
Class II permissive change__✓___

Equipment type: **Intentional Radiator Operating within the bands 2400-2483.5 MHz**

Deferred grant requested per 47 CFR 0.457(d) (1) (ii)? yes_____ No_X

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

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1 General Information

1.1 Purpose for this Application (Class 2 Permissive Change)

The ATX and ARX were physically changed to allow the transmitter microcontroller to communicate directly with the receiver microcontroller. Upon powering up a transceiver pair (Transmitter and Receiver) they connect with each other with a preprogrammed address. The transmitter microcontroller then calculates a random address and transmits it to the receiver and they connect again at this new address and remain at that address until powered down. Circuitry around of resistors R26 – R28 was changed to allow this communication to occur. Also the battery for the Receiver, a LPP 402934 was changed. Plus a new battery for the transmitter was changed LPP 383450.

The new information compared with the originally reported data will be used to asses the EUT eligibility for Permissive change status.

2 Tests and Measurements

2.1 Configuration of Tested System

The sample was setup and tested per ANSI C63.4, *Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Frequency Range of 9 kHz to 40 GHz (2003).* Conducted and radiated emissions data were taken with the EMC test receiver (or spectrum analyzer's) resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. A Block diagram of the tested system is shown in Figure 3. Test configuration photographs for spurious and fundamental emissions are shown in Figures 6 - 9.

2.2 EUT Characterization

The sample used for testing was received by US Tech on April 30, 2009 in good condition.

2.3 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and registered with the FCC under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

2.4 Test Equipment

Table 3 describes test equipment used to evaluate this product.

2.5 Modifications to EUT

No modifications were made by US Tech to bring the modified EUT into compliance with FCC Part 15 Requirements

2.6 Measurement Standards (CFR 15.31)

Intentional and unintentional radiators are to use the methods of ANSI C63.4 – 2003. Measurements were made on an Open Area Test Site (OATS) wherever possible. For battery powered equipment, new (or fully charged) batteries were used.

Section 15.31(m) indicates that because the EUT System operates over the 2.4 GHz to 2.4835 GHz ISM band, measurements must be made near the bottom of the band (around 2.405 GHz for example) and in the middle of the band (2.441 GHz) as well as near the top of the band (2.480 GHz).

2.6.1 Intentional Radiators

The spectrum was investigated from the lowest RF signal generated without going below 9 kHz to the 10^{th} harmonic of the highest fundamental transmitter frequency (24.835 GHz maximum).

2.6.2 Unintentional Radiators

The spectrum was investigated from the lowest RF signal generated without going below the lowest frequency for which an emissions limit is specified (30 MHz) to the 5^{th} harmonic of the highest fundamental frequency of the digital device (5 GHz maximum). Actually, the value of the unintentional radiator has no direct effect on FCC Certification.

2.7 Measurement Detector Function and Bandwidth (CFR 15.35)

On any frequency below 1000 MHz, the limits shown are based upon measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths. On frequencies above 1000 MHz, the radiation limits are based upon the use of measuring instrumentation employing an average detector function.

When average detector measurements are specified for use, including emission measurements below 1000 MHz, there is also a corresponding limit for Peak

detector measurements having a limit of 20 dB above the corresponding average limit unless a different peak emission limit is specified. Measurements above 1000 MHz utilize a minimum resolution bandwidth of 1 MHz.

When radiated emissions limits are expressed in terms of the average value of the emission and pulsed operation is employed, the measurement field strength is determined by averaging over one complete pulse train (Duty Cycle) including blanking intervals for pulse trains up to 0.1 second in duration.

2.8 Antenna Requirement (CFR 15.203)

No changes were made to the originally submitted antenna information.

2.9 ARX Duty Cycle Correction Factor

Because the EUT is not transmitting continuously, a duty cycle factor can be derived from measured peak data and applied for recording average data and comparing it to the average limits.

From Figures 1 and 2 below:

There are two pulses of 220 uS each and 32 pulses of 40 uS each, therefore the Duty Cycle correction factor is:

(2 x 220) uS + (32 x 40) uS = 440 uS + 1280 uS = 1720 uS = 1.72 mSec = 1.72%. Then, 20 log(0 .0172) =

= - 35.3 dB

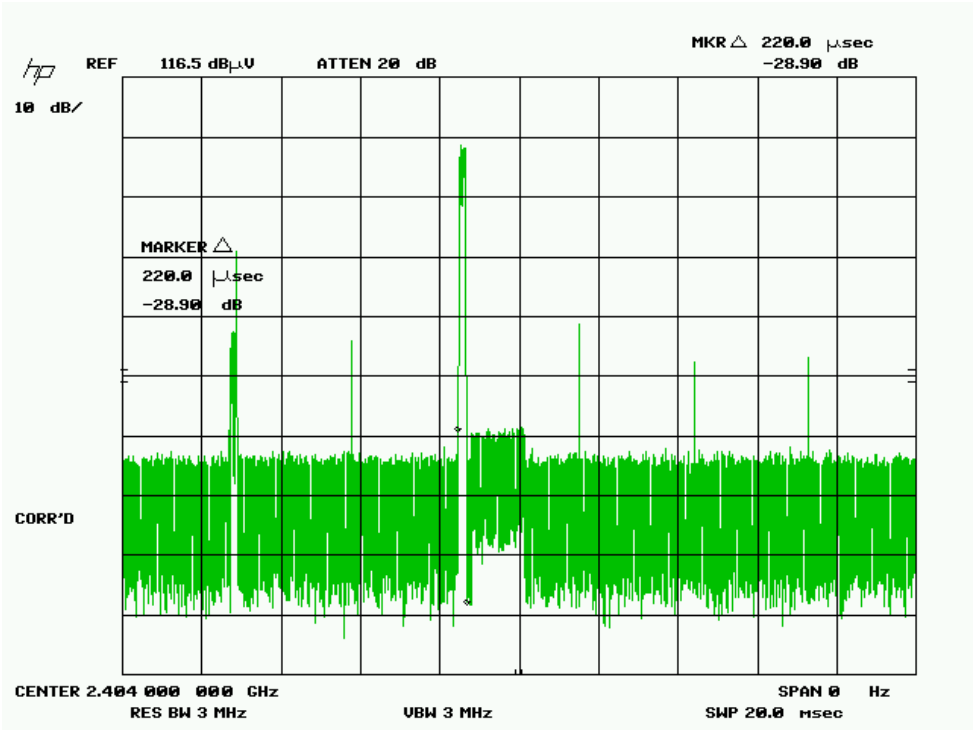

Figure 1(a). ARX Transmitter Pulse Width (Longer Pulses 220 uSec).

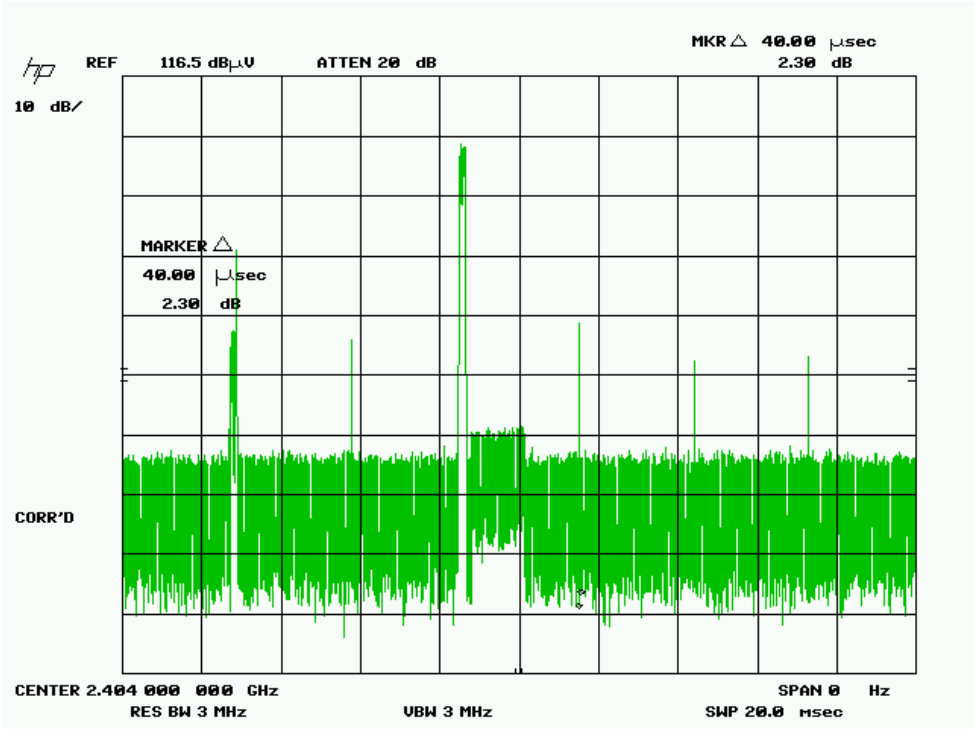

Figure 1(b). ARX Transmitter Pulse Width (Shorter Pulses 40 uSec).

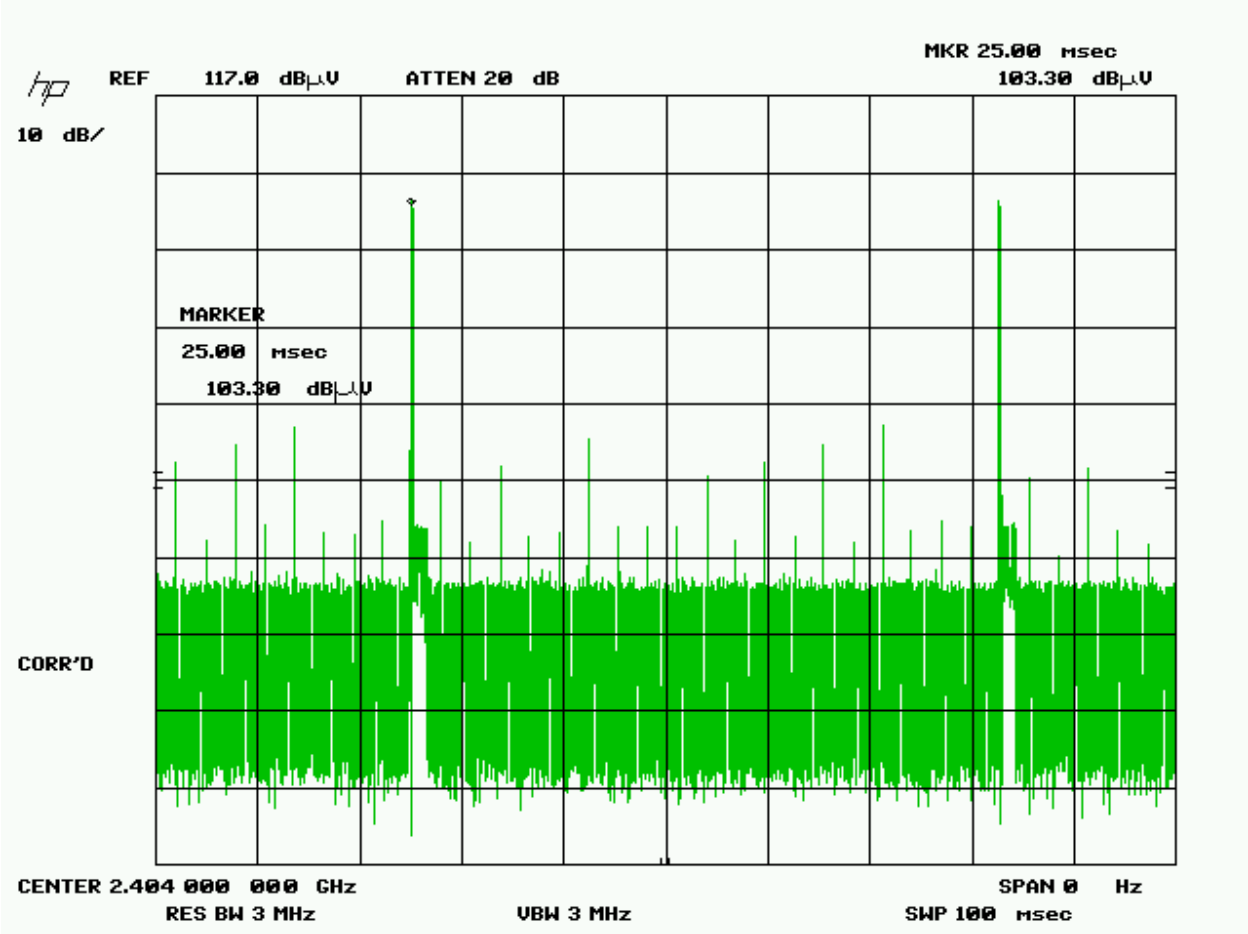

Figure 2. ARX Pulses in 100 mSec period.

2.10 Unintentional Radiator Power Line Conducted Emissions (CFR 15.107)

For the permissive change investigation, this test was not performed because the changes to the unintentional radiator do not affect FCC Certification.

2.11 Intentional Radiator Power Line Conducted Emissions (CFR 15.207)

For the permissive change investigation, this test was not performed because the equipment modifications did not affect the originally submitted data.

2.12 Unintentional Radiator Radiated Emissions (CFR 15.109)

For the permissive change investigation, this test was not performed because the changes to the unintentional radiator do not affect FCC Certification.

2.13 Intentional Radiator Radiated Emissions (CFR 15.249(a), (e))

The EUT frequency hopping characteristic was stopped and the EUT was placed into a continuous transmit mode of operation.

For the permissive change investigation, the fundamental and harmonic signals were re-measured under the same exact test conditions as the original measurements. The re-measured signals were then corrected so that they could be compared to the FCC Limits. In comparing to the limits, the data was scrutinized to ascertain whether it was degraded from the original measurements but still meeting the limits. The test data is found in Tables 1 and 2.

Table 1. Peak Fundamental and Harmonics, ARX (CFR15.249 (a)) for permissive change study, 05/09.

ARX Radiated Fundamental and Harmonics Emissions							
Test By: K.M.	**Test:** Fundamental and Harmonics- above 1 GHz CFR 15.249 (a)			**Client:** Lecat's Ventriloscope LLC			
	Project: 09-0064	**Class:**		**Model:** Ventriloscope ARX Unit			
Frequency (MHz)	**Test Data (dBuV)**	**AF+CL-PA (dB/m)**	**Corrected Results (dBuV/m)**	**Peak Limits (dBuV/m)**	**Distance / Polarity (Meters)**	**Margin (dB)**	**PK / QP /AVG**
LOW BAND							
2403.95	66.54	32.51	99.05	114.0	3m./VERT	15.0	**PK**
4806.73	62.34	2.33	64.67	74.0	3m./HORZ	9.3	**PK**
7210.08*	41.61	8.35	49.96	74.0	1m./HORZ	24.0	**PK**
9613.57*	39.43	11.24	50.67	74.0	1m./VERT	23.3	**PK**
MID BAND							
2440.48	67.27	32.65	99.92	114.0	3m./VERT	14.1	**PK**
4880.90	61.44	3.27	64.71	74.0	1m./HORZ	9.3	**PK**
7321.60*	40.18	8.64	48.82	74.0	1m./HORZ	25.2	**PK**
9761.87*	41.49	11.52	53.01	74.0	1m./HORZ	21.0	**PK**
HIGH BAND							
2477.48	65.95	32.80	98.75	114.0	3m./VERT	15.3	**PK**
4954.80	58.69	2.74	61.43	74.0	3m./HORZ	12.6	**PK**
7432.05*	43.66	8.93	52.59	74.0	1m./HORZ	21.4	**PK**
9909.67*	41.44	11.69	53.13	74.0	1m./HORZ	20.9	**PK**

*Corrected for distance = 1.0 m 20 log(1/3) = -9.54 dB
Data corrected by 1.0 dB for loss of high pass filter, except for fundamental

Duty Cycle, DC = -47.1dB

SAMPLE CALCULATION: at 4806.73 MHz, = (62.34) dBuV+ 2.33 dB/m = 64.67 dBuV/m @ 3m

Date: May 29, 2009

Tester Signature: Keyvan Muvahhid **Name: Keyvan Muvahhid**

Table 1. Average Fundamental and Harmonics, ARX (CFR15.249 (a)) for permissive change study, 05/09

ARX Radiated Fundamental and Harmonics Emissions							
Test By: K.M.	**Test:** Fundamental and Harmonics- above 1 GHz CFR 15.249 (a)			**Client:** Lecat's Ventriloscope LLC			
	Project: 09-0064	**Class:**		**Model:** Ventriloscope ARX Unit			
Frequency (MHz)	**Test Data (dBuV)**	**AF+CL-PA (dB/m)**	**Corrected Results (dBuV/m)**	**Peak Limits (dBuV/m)**	**Distance / Polarity (Meters)**	**Margin (dB)**	**PK / QP /AVG**
LOW BAND							
2403.95	66.54	-2.79	63.75	94.0	3m./VERT	30.3	**PK**
4806.73	62.34	-32.97	29.37	54.0	3m./HORZ	24.6	**PK**
7210.08*	41.61	-26.95	14.66	54.0	1m./HORZ	39.3	**PK**
9613.57*	39.43	-24.06	15.37	54.0	1m./VERT	38.6	**PK**
MID BAND							
2440.48	67.27	-2.65	64.62	94.0	3m./VERT	29.4	**PK**
4880.90	61.44	-32.03	29.41	54.0	1m./HORZ	24.6	**PK**
7321.60*	40.18	-26.66	13.52	54.0	1m./HORZ	40.5	**PK**
9761.87*	41.49	-23.78	17.71	54.0	1m./HORZ	36.3	**PK**
HIGH BAND							
2477.48	65.95	-2.50	63.45	94.0	3m./VERT	30.6	**PK**
4954.80	58.69	-32.56	26.13	54.0	3m./HORZ	27.9	**PK**
7432.05*	43.66	-26.37	17.29	54.0	1m./HORZ	36.7	**PK**
9909.67*	41.44	-23.61	17.83	54.0	1m./HORZ	36.2	**PK**

*Corrected for distance = 1.0 m 20 log(1/3) = - 9.54 dB
Data corrected by 1.0 dB for loss of high pass filter, except for fundamental

Duty Cycle, DC = -35.3 dB

SAMPLE CALCULATION: at 4806.73 MHz, = (62.34) dBuV+ (-32.97) dB/m = 29.37 dBuV/m @ 3m

Date: May 29, 2009

Tester Signature: Keyvan Muvahhid **Name: Keyvan Muvahhid**

2.14 Band Edge Measurements (CFR15.249 (d))

This test was not re-measured for permissive change investigations because the fundamental signals were not affected by the hardware changes.

Table 3. EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
ATX Transmitter Lecat's Ventriloscope LLC	Ventriloscope ATX Unit (Source)	None	WNT-VENTRILOSCOPE	None
ARX Receiver Lecat's Ventriloscope LLC	Ventriloscope ARX Unit (EUT)	None	WNT-VENT-R	None
AC Adapter ALTEC Lansing	AL664	None	None	2m U P 120 VAC/ 60 Hz Direct Plug-in
Speaker ALTEC Lansing	None	None	None	1m bundled U
IPod Apple	A1199	YU7063WUVQ5	None	1m bundled U
AC Power Supply Motorola	FMP5202A	None	None	1 m U P 120 VAC, 60 Hz

U = Unshielded; P = Power Leads

Table 4 Test Instruments

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	9/9/08
HORN ANTENNA	3115	EMCO	9107-3723	11/04/08
MICROWAVE PREAMP	8449B	HEWLETT PACKARD	3008A00480	9/2/08
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise, and all calibrations are traceable to NIST/USA.