L.S. Compliance, Inc.
W66 N220 Commerce Court
Cedarburg, WI 53012
Phone: 262.375.4400 Fax: 262.375.4248

COMPLIANCE TESTING OF:

MLTX Series 400 MHz Telemotive-Controller

Prepared For:

Magnetek Power Control Systems
Attention: Mr. Glenn Pederson
N50 W13605 Overview Dr.
Menomonee Falls, WI 53051
U.S.A.

Test Report Number:

305451-Tx-v2

Test Dates:

October 21ST November 2ND, 2005

Table of Contents

1. L.S. Compliance in Review

L.S. Compliance - Accreditations and Listing's

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025 : 1999
with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: **1255.01**

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: **90756**

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: **IC 3088-A**

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: **IC 3088**

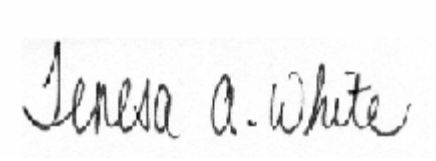
U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a **U. S. Competent Body** operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 2004/108/EC (formerly 89/336/EEC, Article 10.2)
Date of Validation: **January 16, 2001**

Validated by the European Commission as a **U.S. Notified Body** operating under the U.S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: **November 20, 2002**
Notified Body Identification Number: **1243**

2. Signature Page



Prepared By: **March 30, 2006**

Teresa A. White, Document Coordinator **Date**

Tested By: **March 30, 2006**

Abtin Spantman, EMC Engineer **Date**

Approved By: **March 30, 2006**

Brian E. Petted, VP of Engineering **Date**

3. Product and General Information

Manufacturer:	Magnetek					
Date(s) of Test:	October 21ST through November 2ND, 2005					
Test Engineer(s):		Tom Smith	√	Abtin Spantman		Ken Boston
Model #:	MLTX series 400 MHz Telemotive-Controller					
Serial #:	Pre-Production unit					
Voltage:	7.2 VDC					
Operation Mode:	Normal and continuous modulated transmit mode.					

Environmental Conditions in the Test Lab:

Temperature:	20-25° C
Atmospheric Pressure:	86 kPa - 106 kPa
Humidity:	30-60%

4. Introduction

Between October 21ST and November 2ND, 2006, a series of conducted and radiated RF emissions tests were performed on one pre-production sample of the Magnetek MLTX series 400 MHz Telemotive-Controller, here forth referred to as the "Equipment Under Test" or "EUT". These tests were performed using the test procedure outlined in ANSI C63.4, 2003 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.231(b) for a periodic operation of a low power transmitter.

All conducted and radiated RF emission tests were performed to measure the emissions in the frequency bands described later in this report, and to determine whether said emissions are below the limits established by the aforementioned standards.

These tests were performed in accordance with the procedures described in the American National Standard for methods of measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4, 2003).

Also used as a reference for the EMI Receiver specification is the International Special Committee on Radio Interference – CISPR 16-1, 2003.

5. Product Description

The MLTX series 400 MHz Telemotive-Controller is a radio frequency remote controller for industrial machinery. This version of the MLTX transmitter is designed to operate in the frequency range 430 MHz to 440 MHz band, for un-licensed operation, as allowed under 47CFR Part 15.231. The MLTX Telemotive-Controller would be used in applications such as control of over-head cranes.

The MLTX Telemotive-Controller operates on 7.2 VDC internal rechargeable batteries. The battery must be removed from the unit and placed in a separate gang-battery-charger. The MLTX Telemotive-Controller does not have any contingencies for connection to AC mains, and does not contain any other ports or peripheral connections. The system is designed to operate with FSK modulation, with 40 kHz peak deviation at a data rate of 9600 bps.

The MLTX Telemotive-Controller transmits when a control key is activated manually by the user, and stops transmission upon deactivation, as soon as packet transmissions are completed, typically within 10 ms and well within 5 seconds as allowed under the Part 15.231 standard.

Two Views of the MLTX series 400 MHz Telemotive-Controller

6. Test Requirements

The above mentioned tests were performed in order to determine the compliance of the transmitter portion of the *Magnetek "MLTX Series 400MHz Telemotive-Controller"* with limits contained in various provisions of Title 47 CFR, FCC Part 15, including: 15.35, 15.205, 15.207, 15.231(a), 15.231(b) and 15.231(c), for manually operated periodic transmitters, as well as for compliance with Industry Canada RSS-210, for low power license-exempt radio-communication devices.

7. Summary of Test Report

DECLARATION OF CONFORMITY

The **Magnetek Power Control Systems'** ***"MLTX Series 400 MHz Telemotive-Controller"*** was found to **MEET** the requirements as described within the specifications of FCC Title 47 CFR Part 15.231 and Industry Canada RSS-210, Section 6.1 for a low power transmitter.

Some emissions are seen to be within 3dB of their respective limits. As these levels are within the tolerances of the test equipment and site employed, there is a possibility that this unit, or a similar unit selected out of production may not meet the required limit specification if tested by another agency.

The enclosed test results pertain to the sample(s) of the test item listed, and only for the tests performed on the data sheets. Any subsequent modification or changes to the test items could invalidate the data contained herein, and could therefore invalidate the findings of this report.

8. Radiated Emissions Test

Test Setup

The EUT was operated within the 3 Meter FCC listed Semi-Anechoic Chamber, located at L.S. Compliance, Inc., in Cedarburg, Wisconsin. The EUT was placed on an 80cm high, non-conductive pedestal, which was centered on a flush-mounted 2m diameter metal turntable. The EUT was configured to run in a continuous CW transmit mode during the 15.231(a) and 15.231(b) measurements. The EUT was then returned to normal operation for measurements of the data packet length and occupied bandwidth.

Test Procedure

The fundamental and spurious (harmonic) emissions of the transmitter were tested for compliance to FCC Title 47 CFR Part 15.231(b) limits for manually operated periodic devices.

The EUT was tested from the lowest frequency generated by the transmitter (without going below 9 kHz) to the 10^{th} harmonic of the fundamental frequency generated by the device. The appropriate limits were also observed when the fundamental or spurious signals were located within any of the restricted bands as described in FCC Part 15.205(a).

The EUT was placed on an 80cm high non-conductive pedestal, with the Antenna Mast placed 3 m from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz, and a Double Ridged Waveguide Horn Antenna was used to measure emissions above 1 GHz.

The EUT was configured to operate in a continuous c.w. transmit mode. The resultant signals from the fundamental harmonics and spurious signals were maximized by rotating the turntable 360 degrees, and by raising and lowering the Antenna between 1 and 4 meters. The EUT was also given three different orientations to determine the maximum signal levels, using both horizontal and vertical antenna polarities.

The EUT was operated on 3 channels, Low (430.0 MHz), Middle (436.0 MHz) and High (439.8 MHz), programmed via an internal selector switch. The battery voltage was monitored to ensure proper level, and replaced as necessary during the test sequence.

Test Results

The unit was scanned for emissions over the range of 30 MHz to 5000 MHz to establish compliance with FCC Parts 15.231 and 15.205 while in a continuous transmit mode.
A numeric list of measured emissions appears in the Data Chart(s) of this report.

Occupied Bandwidth

In addition to measuring the levels of Radiated Emissions, the Occupied Bandwidth of the transmitter was measured. In accordance with FCC Part 15.231(c), the 20 dB bandwidth of the transmitted signal should be within a window of 0.25% of the center carrier frequency. The resolution bandwidth was set to the closest available filter setting on the HP 8546A EMI Receiver, then corresponded to 5% of the allowable bandwidth determined in the calculation mentioned above, without going below the resolution bandwidth of 10 kHz, as dictated in ANSI C63.4, 2003, Section 13.1.7.

The EUT was activated to transmit in a continuous (normal) mode and was placed on the aforementioned test configuration within the 3 Meter Chamber. The transmitted signal was received on a Log Periodic Antenna and provided to the HP 8546A EMI Receiver, where the fundamental frequency was displayed, and a plot of the Occupied Bandwidth was produced. The maximum measured Occupied Bandwidth of 223.8 kHz is within the calculated minimum limit of 1075 kHz. Results can be seen in the Occupied Bandwidth scans in this report.

Test Equipment Utilized

A list of the test equipment used for the Radiated Emissions tests can be found in the Appendix section of this report. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All antenna calibrations were performed at a N.I.S.T. traceable site, and the resultant correction factors were entered into the HP 8546A EMI Receiver software database.

The connecting cables used were also measured for loss using a calibrated Signal Generator and the HP 8546A EMI Receiver. The resulting loss factors were entered into the HP 8546A EMI Receiver database. This allowed for automatic change in the antenna correction factor. The resulting data taken from the HP 8546A EMI Receiver is an actual reading and can be entered into the database as a corrected meter reading.

When a reading is taken using the Peak Detector, a duty cycle correction factor can be applied for conversion to an average reading. This operation can be used when measuring short-duration bursts of data transmission, under FCC Part 15.231.

The resultant average reading can then be compared to the appropriate limit in order to determine compliance with the limits. The HP 8546A EMI Receiver was operated with a resolution bandwidth of 120 kHz for measurements below 1 GHz (video bandwidth of 300 kHz), and a bandwidth of 1 MHz for measurements above 1 GHz (video bandwidth of 1 MHz).

Measurements of Electromagnetic Radiated Emissions

Test Standard: FCC Parts 15.205, 15.207 and 15.231(b)

Frequency Range Inspected: 30 MHz to 5000 MHz

Manufacturer:	Magnetek							
Date(s) of Test:	October 21ST through November 2ND, 2005							
Test Engineer(s):		Abtin Spantman		Tom Smith		Ken Boston		
Model #:	MLTX series 400 MHz Telemotive-Controller							
Serial #:	Pre-Production unit							
Voltage:	7.2 VDC							
Distance:	3m							
Configuration:	Normal and continuous modulated transmit mode.							
Detectors Used:		√	Peak		Quasi-Peak		Average	

Environmental Conditions in the Lab:
Temperature: 20 – 25°C
Atmospheric Pressure: 86 kPa – 106 kPa
Relative Humidity: 30 – 60 %

Test Equipment Used:
EMI Measurement Instrument: HP8546A
Biconical Antenna: EMCO #93110B
Log Periodic Antenna: EMCO #93146
Horn Antenna: EMCO #3115
Spectrum Analyzer: Agilent E4407B

The table depicts the level of significant radiated emissions found:

Frequency (MHz)	Antenna Sens/EUT	Height (m)	Azimuth (Degree)	Measured EFI (dBμ V/m)	15.231(b) Limit (dBμV/m)	Margin (dB)
110.6	V / H	1.00	0	35.7	43.5	7.8
118.0	V / H	1.00	160	40.9	43.5	2.6
121.6	H / H	1.55	320	42.0	43.5	1.5
125.3	H / H	1.60	320	42.8	43.5	0.7
129.0	H / H	1.60	315	41.2	43.5	2.3
154.8	V / H	1.00	110	37.5	60.9	23.4
205.2	V / H	1.00	0	51.9	60.9	9.0
209.8	V / H	1.00	0	41.9	60.9	19.0
495.2	H / S	1.50	50	33.7	60.7	27.0

Notes:

1) *A Peak Detector was used in measurements below 1 GHz, and an Average Detector was used in measurements above 1 GHz. The Peak detector was also use to ensure that the emission levels do not exceed 20 dB beyond the Average limits. No significant spurious emissions observed. All spurious emissions were better than 20 dB below the limits.*

2) *The limit is expressed as (-20 dBc) under the 15.231 guidelines, with respect to the appropriate center frequency of operation.*

3) *Measurements above 5 GHz were made at 1 meters of separation from the EUT, and at 0.3 m separation for frequencies between 18-25 GHz.*

4) *Measurement at receiver system noise floor.*

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on Low Channel:

Frequency (MHz)	Antenna Sens/EUT	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBμV/m)	Corrected EFI (dBμV/m)	15.231 Limit (dBμV/m)	Margin (dB)
430.0	V / S	1.20	135	90.6	80.6	80.7	0.1
860.0	H / S	1.50	50	43.0	33.0	60.7	27.7
1290	H / H	1.00	245	41.0	31.0	60.7	29.7
1720	H / H	1.05	260	55.5	45.5	54.0	8.5
2150	V / V	1.00	330	43.9	33.9	60.7	26.8
2580	H / H	1.00	0	44.3	34.3	60.7	26.4
3010	H / H	1.00	0	43.7	33.7	60.7	27.0
3440	H / H	1.00	0	36.3	26.3	60.7	34.4
3870	H / H	1.00	0	47.3	37.3	54.0	16.7
4300	H / H	1.00	0	49.3	39.3	54.0	14.7

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on Mid Channel:

Frequency (MHz)	Antenna Sens/EUT	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBμV/m)	Corrected EFI (dBμV/m)	15.231 Limit (dBμV/m)	Margin (dB)
436.0	V / S	1.20	130	89.2	79.2	80.9	1.7
872.0	H / S	1.50	40	42.9	32.9	60.9	28.0
1308	H / H	1.00	280	41.9	31.9	54.0	22.1
1744	H / H	1.05	245	56.2	46.2	60.9	14.7
2180	V / V	1.05	55	44.4	34.4	60.9	26.5
2616	H / H	1.00	0	44.3	34.3	60.9	26.6
3052	H / H	1.00	0	45.3	35.3	60.9	25.6
3488	H / H	1.00	0	46.9	36.9	60.9	24.0
3924	H / H	1.00	0	48.7	38.7	54.0	15.3
4360	H / H	1.00	0	49.1	39.1	54.0	14.9

The following table depicts the level of significant radiated RF fundamental and harmonic emissions seen on High Channel:

Frequency (MHz)	Antenna Sens/EUT	Height (meters)	Azimuth (0° - 360°)	Measured EFI (dBμV/m)	Corrected EFI (dBμV/m)	15.231 Limit (dBμV/m)	Margin (dB)
439.8	V / S	1.20	135	89.1	79.1	81.0	1.9
879.6	H / S	1.50	25	42.0	32.0	61.0	29.0
1319	H / H	1.00	300	41.5	31.5	54.0	22.5
1759	H / H	1.30	130	54.3	44.3	61.0	16.7
2199	V / V	1.00	275	43.4	33.4	61.0	27.6
2639	H / H	1.00	0	44.9	34.9	61.0	26.1
3079	H / H	1.00	0	45.7	35.7	61.0	25.3
3518	H / H	1.00	0	47.2	37.2	61.0	23.8
3958	H / H	1.00	0	48.7	38.7	54.0	15.3
4398	H / H	1.00	0	49.3	39.3	54.0	14.7

Notes continued:

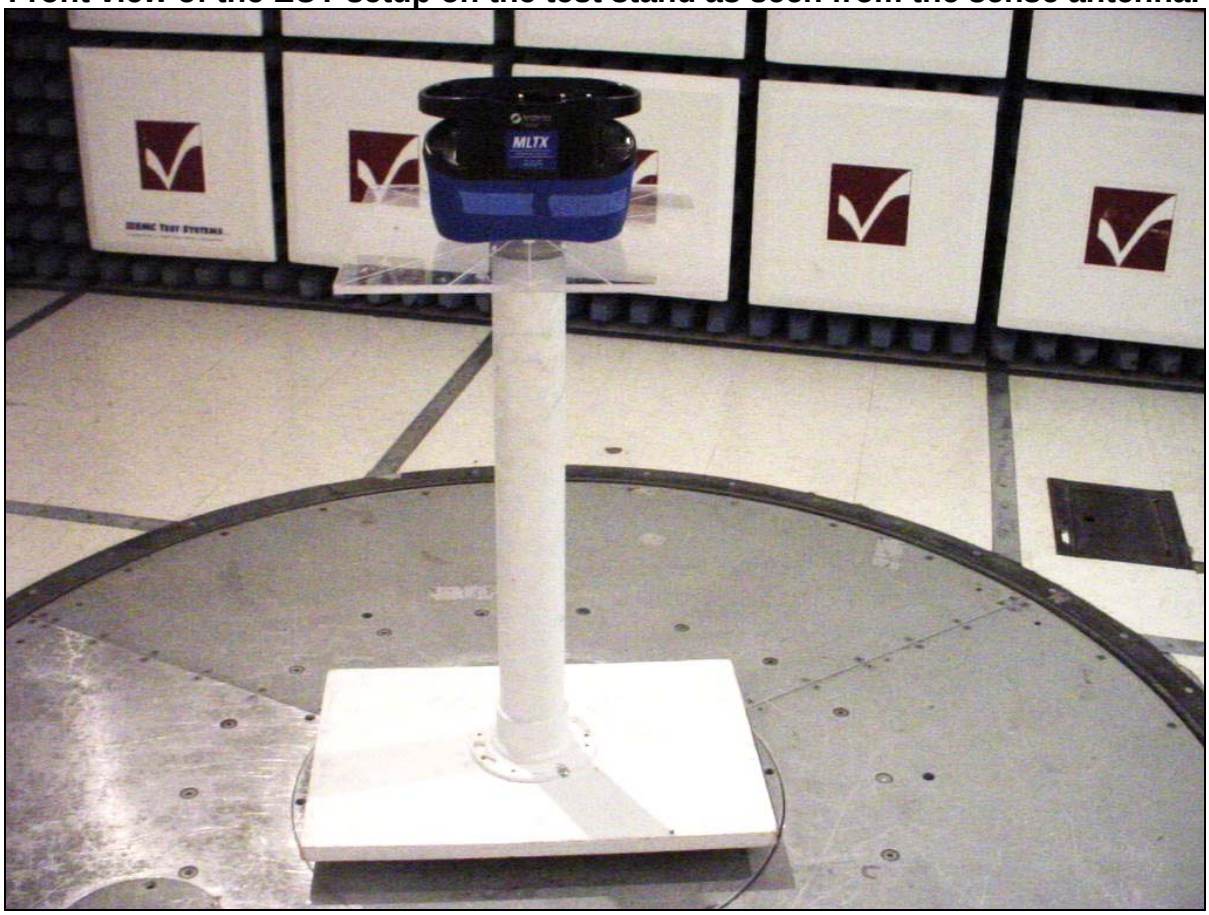
5) *The "Corrected Measurement" column reflects 10.0 dB of relaxation as allowed under Part 15.231, based on the duty factor of the transmitter. The justifications and verifications of the relaxation can be found in later sections of this report.*

View of the EUT setup in vertical orientation

View of the EUT setup in Horizontal orientation

View of the EUT setup in Side orientation

Front view of the EUT setup on the test stand as seen from the sense antenna.

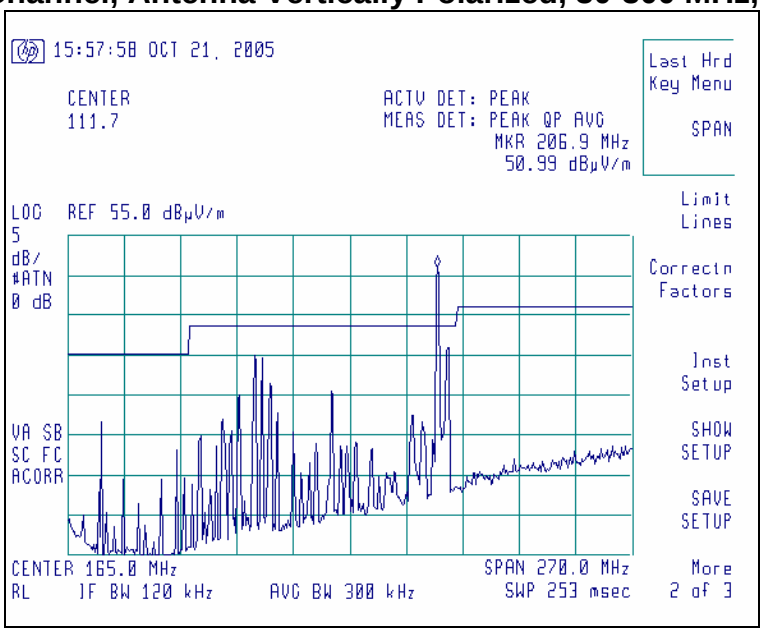


Screen Captures of Radiated RF Emissions:

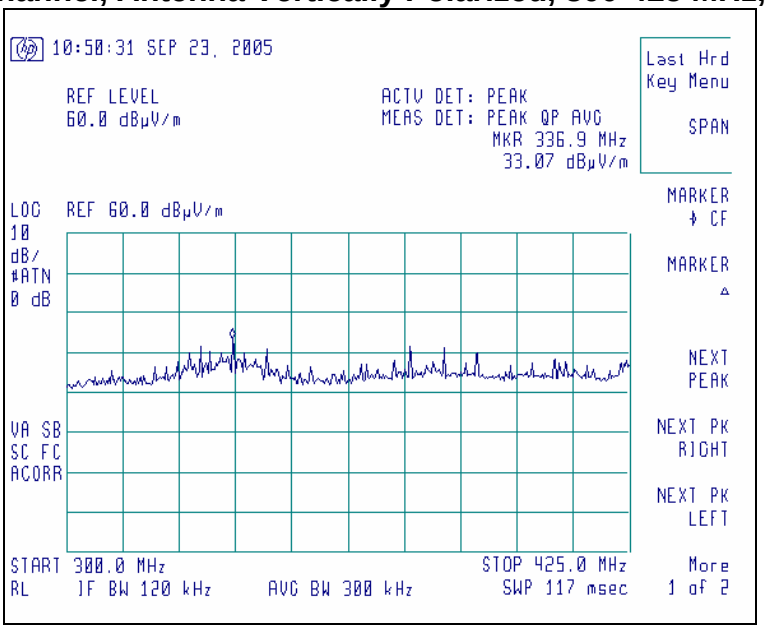
Please note these screen captures represent Peak Emissions. For radiated emission measurements, we utilize a Quasi-Peak detector function when measuring frequencies below 1 GHz, and an Average detector function when measuring frequencies above 1 GHz.

The signature scans shown here are from worst-case emissions among all three antennas tested, as measured on Low, Middle and High channels, and with the sense and EUT antennas both in vertical polarity for worst case presentations.

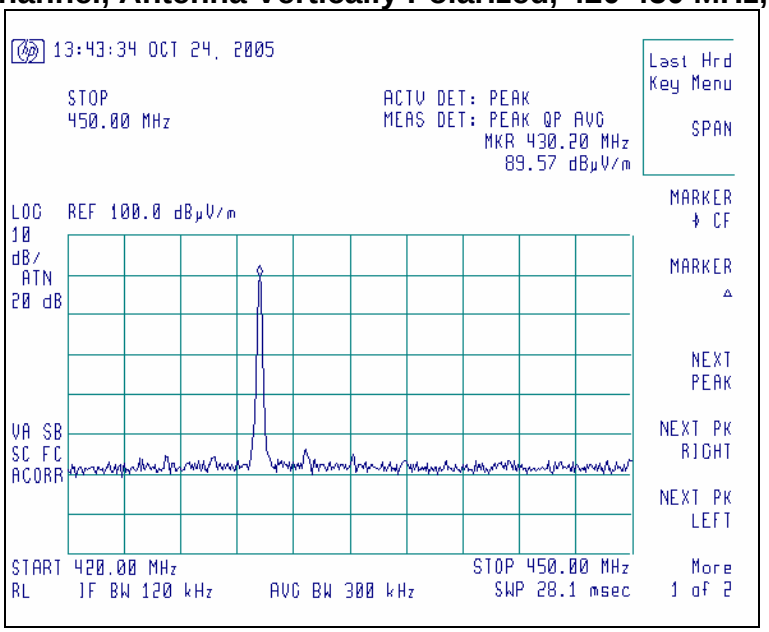
High Channel, Antenna Vertically Polarized, 30-300 MHz, at 3m.



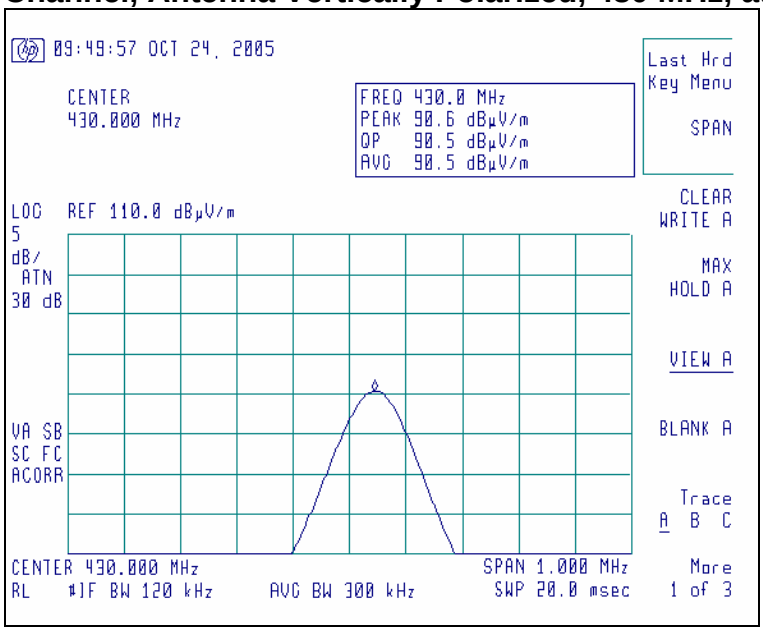
High Channel, Antenna Vertically Polarized, 300-425 MHz, at 3m.



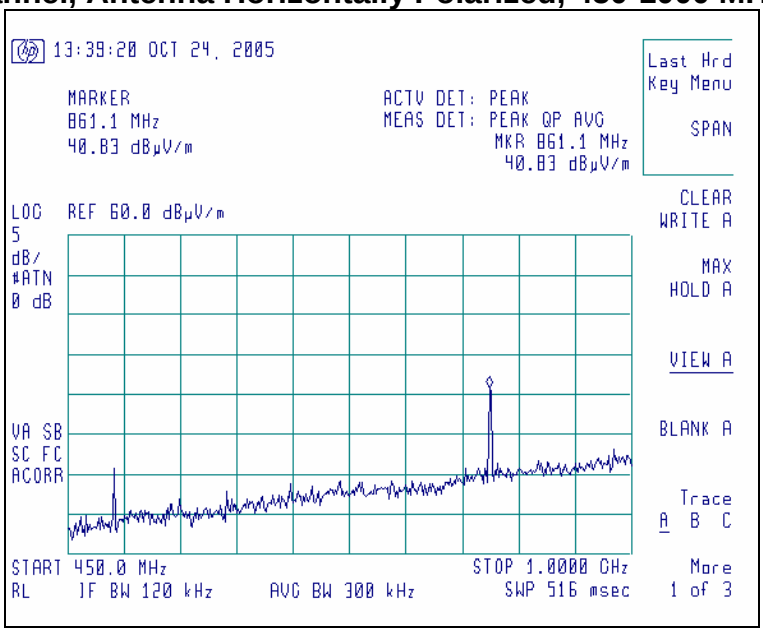
High Channel, Antenna Vertically Polarized, 420-450 MHz, at 3m.



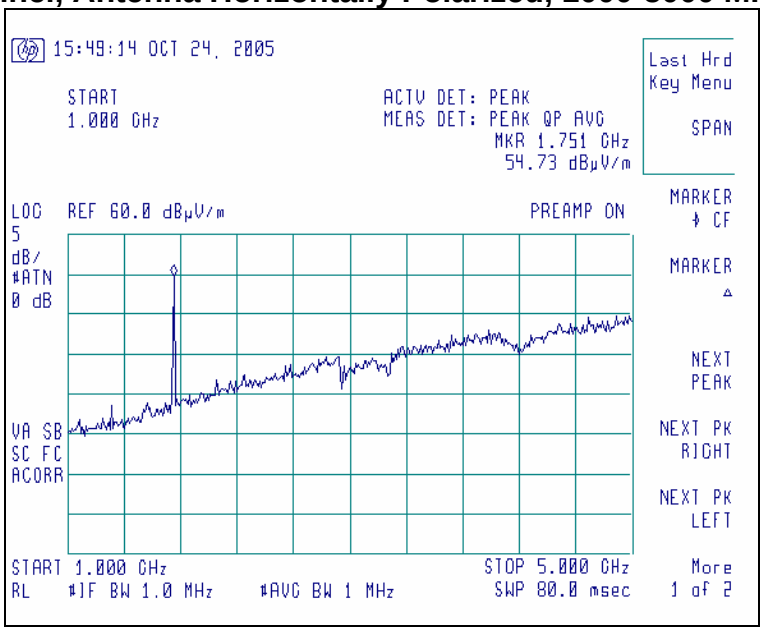
Low Channel, Antenna Vertically Polarized, 430 MHz, at 3m.



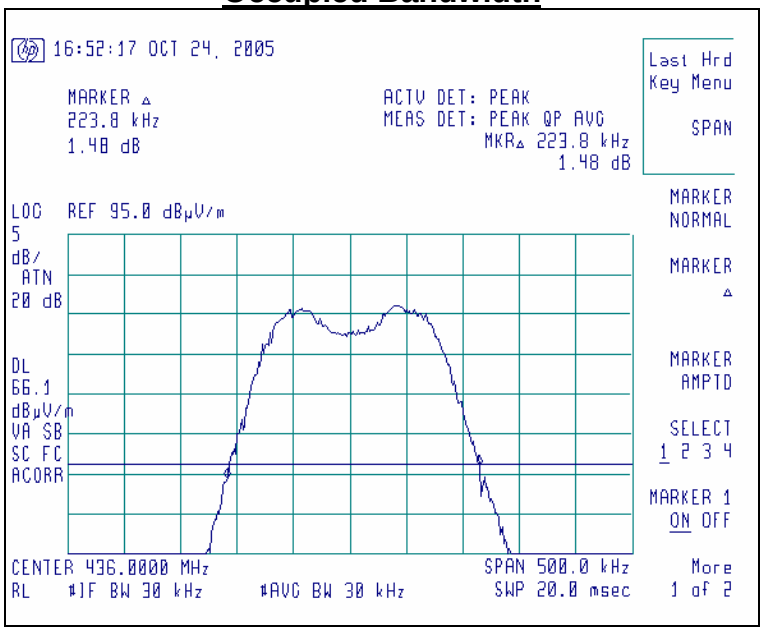
Low Channel, Antenna Horizontally Polarized, 450-1000 MHz, at 3m.



Mid Channel, Antenna Horizontally Polarized, 1000-5000 MHz, at 3m.



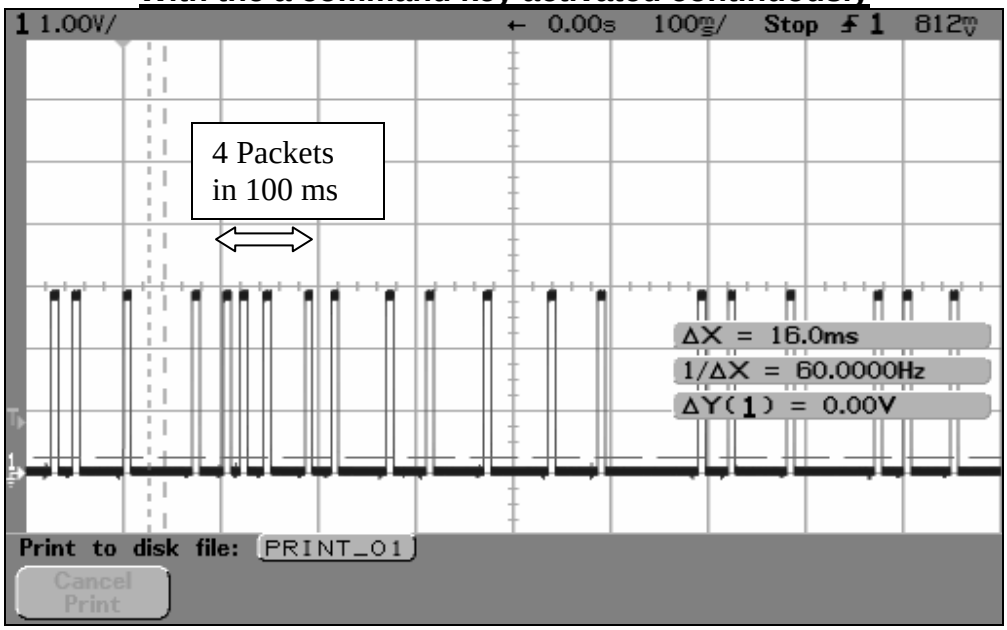
Occupied Bandwidth



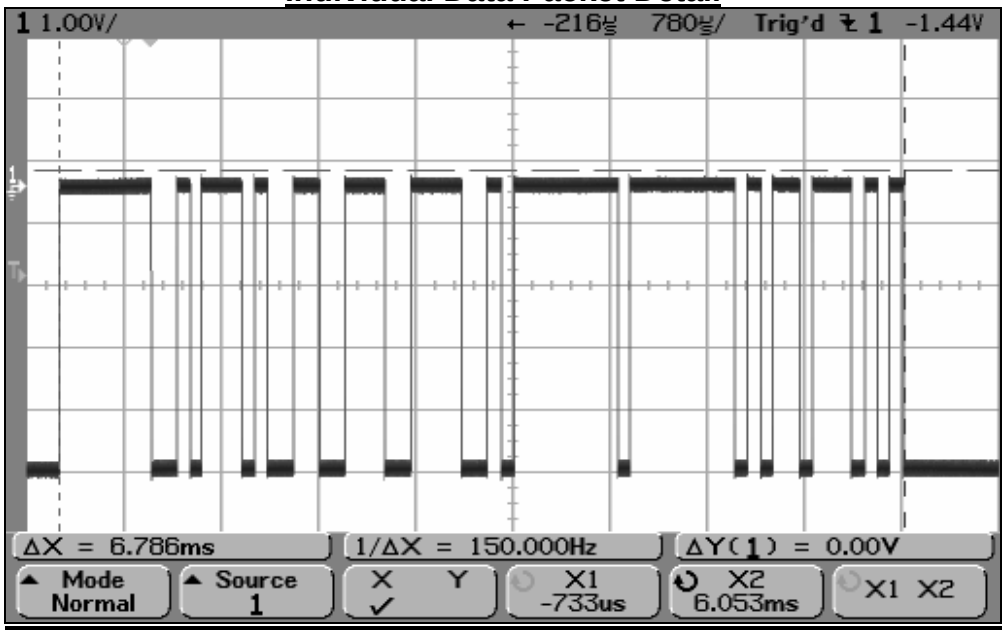
Screen Captures of Transmission Packet Timing:

These screen captures support the request for relaxation based on the average or duty factor of the transmitter. An Oscilloscope was used to measure the parameters at certain locations on the EUT circuit board.

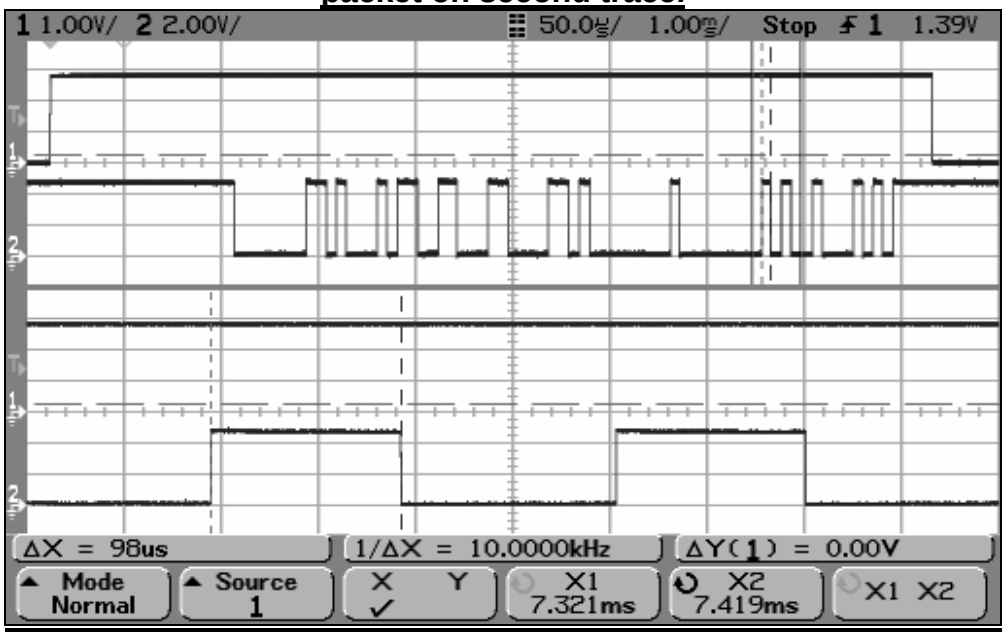
Detail showing up to 4 packets transmitted in 100 ms Window With the a command key activated continuously



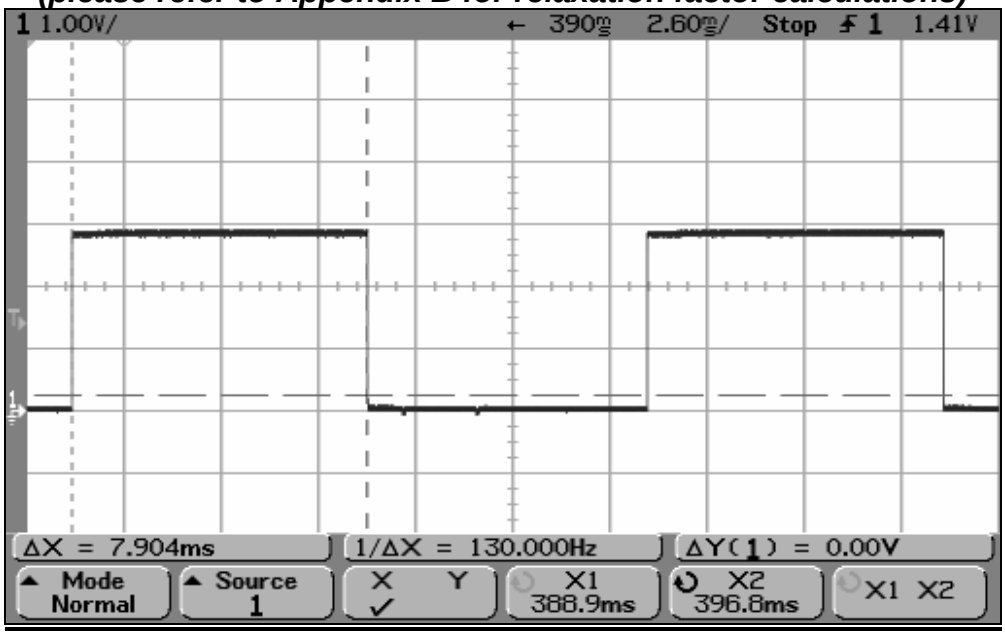
Individual Data Packet Detail



Individual Data Packet Detail Showing RF-on envelope on top trace, and packet on second trace.



Detail confirming relaxation request, based on RF-on envelope at 7.9ms
(please refer to Appendix B for relaxation factor calculations)



9. Conducted RF Emissions on to AC Mains

This device does not have any contingencies for connection to AC Mains.
No testing was performed for Conducted RF Emissions on to AC Mains.

* Note: The device does use a rechargeable battery, but the battery must be removed and placed in a “gang-charger-base” for charging.

10. Frequency and Power Stability

For this portion of the tests, a spectrum analyzer was used to measure the frequency at the appropriate frequency markers, with the EUT placed in continuous transmit CW mode for the measurements. Power was supplied by an external bench-type variable DC power supply, and the frequency of operation was monitored using the spectrum analyzer.

The output power was measured with a receiver resolution bandwidth of 1 MHz, and video bandwidth of 1 MHz.

	DC Voltage Source		
	6.12 V	7.20 V	8.28 V
Low Channel	90.5 (dBµV/m)	90.4 (dBµV/m)	90.5 (dBµV/m)
High Channel	88.2 (dBµV/m)	88.2 (dBµV/m)	88.4 (dBµV/m)

The frequency was measured with a receiver resolution bandwidth of 100 Hz, and video bandwidth of 100 Hz.

	DC Voltage Source		
	6.12 V	7.20 V	8.28 V
Low Channel	430.0413 (MHz)	430.0413 (MHz)	430.0413 (MHz)
High Channel	439.8413 (MHz)	439.8413 (MHz)	439.8413 (MHz)

The power was then cycled On/Off to observe system response. No unusual response was observed, the emission characteristics were well behaved, and the system returned to the proper state of no operation as programmed.

No anomalies were noted in the measured transmit power, varying less than 0.5 dB during the voltage variation tests.

APPENDIX A

CALCULATIONS

Manufacturer: Magnetek
Model: MLTX Series 400 MHz Telemotive-Controller
Serial: Pre-Production Unit

CALCULATION OF RADIATED EMISSIONS LIMITS FOR FCC PARTS 15.209, and 15.231(b) (260-470 MHz)

FIELD STRENGTH OF FUNDAMENTAL FREQUENCIES:
The calculation involves a linear interpolation of 3750 to 12500 µV/m over 260-470 MHz, where field strength of the fundamental frequency (f_0) when $260 \leq f_0 \leq 470$ MHz, can be found by: $3750 + 41.6667 (f_0 - 260)$, where f_0 is in MHz.

FIELD STRENGTH OF SPURIOUS/HARMONIC FREQUENCIES:
The spurious and harmonic emissions are subject to the limits expressed in FCC Parts 15.205 and 15.209, if within the restricted bands and dictated by the following calculation elsewhere.

The calculation involves a linear interpolation of 375 to 1250 µV/m over 260 to 470 MHz, where field strength of the harmonic frequencies ($2f_0$, $3f_0$…) when $260 \leq f_0 \leq 470$ MHz, can be found by: $375 + 4.1667(f_0 - 260)$, where f_0 is in MHz.

At fundamental frequency f_0 = 436.0 MHz

Fundamental Limit: 3750 + 41.6667 (436.0 – 260) = 11083.33 µV/m @ 3m
Harmonic Limit: 375 + 4.1667 (436.0 – 260) = 1108.34 µV/m @ 3m

Frequency (MHz)	Fundamental Limit (µV/m @ 3m)	Fundamental Limit (dBµV/m @ 3m)	Harmonic Limit (µV/m @3m)	Harmonic Limit (dBµV/m @ 3m)
436.0	11083.33	80.89	1108.34	60.89

APPENDIX B

DUTY CYCLE CORRECTION

For a graphical presentation of the data packets from the transmitter, refer to the Data Packet Detail in the Emissions Measurements section of this report. These images were captured on an oscilloscope, while probing the "data" line and the "RF_SW" line feeding into the transmitter. The transmitter was functioning in normal operating mode, and activated by pressing one of the transmit buttons.

Average (Relaxation) Factor

Average Factor = 20 * Log_{10} (Worst Case EUT On-time over 100 ms time window)
In this particular case, the transmit packet envelope can be used to calculate the relaxation factor. The transmit packet occupies 7.9 ms of time, and we may have up to 4 packet transmissions within any 100 ms window. Therefore, the relaxation factor allowance is calculated as:

Average Factor = 20 * Log_{10} (4x7.9ms / 100 ms) = -10.01 dB

A relaxation factor of 10.0 dB would be allowable for this product.

OCCUPIED BANDWIDTH CALCULATIONS

FCC Part 15.231(c) states that the bandwidth of a manually operated device shall be no wider than 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz.

Said bandwidth is determined at the -20 dB reference to peak carrier points.

Refer to the set of screen captures in this report, which show the actual Occupied Bandwidth of the transmitters as measured.

For this device, operating at a center frequency of 436.0 MHz, the allowed Occupied Bandwidth is calculated to be:

436.0 MHz X 0.0025 = 1.09 MHz

Channel	Center Frequency	Occupied Bandwidth Limit
Low	430.0 MHz	1.075 MHz
Mid	436.0 MHz	1.090 MHz
High	439.8 MHz	1.099 MHz

APPENDIX C

Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Date	Due
AA960008	EMCO	3816/2NM	9701-1057	Line Impedance Stabilization Network	9/27/05	9/27/06
AA960031	HP	119474A	3107A01708	Transient Limiter	Note 1	Note 1
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	9/27/05	9/27/06
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	9/27/05	9/27/06
AA960081	EMCO	3115	6907	Double Ridge Horn Antenna	12/07/05	12/07/06
CC00221C	Agilent	E4407B	US39160256	Spectrum Analyzer	12/29/05	12/29/06
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	9/29/05	9/29/06
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	9/29/05	9/29/06
N/A	LSC	Cable	0011	3 Meter ½" Armored Cable	Note 1	Note 1
N/A	LSC	Cable	0050	10 Meter RG 214 Cable	Note 1	Note 1
N/A	Pasternack	Attenuator	N/A	10 dB Attenuator	Note 1	Note 1

Note 1 - Equipment calibrated within a traceable system.

Uncertainty Statement

This uncertainty represents an expanded uncertainty
expressed at approximately the 95% confidence level, using a coverage factor of k=2.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V

APPENDIX D

Antenna Specifications

This device uses a proprietary internal PC-Board antenna.
This device does not use any commercially available antennas.

APPENDIX E

Firmware and Setup Instructions

The channel selection was accomplished by adjusting two rotary channel selection switches inside the EUT, that are not adjustable during normal daily use.

Channel definitions are presented here:

CHANNEL DESIGNATOR	Frequency (MHz)	M	L	Po (dBm), nominal	
AK01	439.800	8	0	0	High
AK02	439.600	8	0	0	
AK03	439.400	8	0	0	
AK04	439.200	8	0	0	
AK05	439.000	8	0	0	
AK06	438.800	8	0	0	
AK07	438.600	8	0	0	
AK08	438.400	8	0	0	
AK09	438.200	8	0	0	
AK10	438.000	8	0	0	
AK11	437.800	8	0	0	
AK12	437.600	8	0	0	
AK13	437.400	8	0	0	
AK14	437.200	8	0	0	
AK15	437.000	8	0	0	
AK16	436.800	8	0	0	
AK17	436.600	8	0	0	
AK18	436.400	8	0	0	
AK19	436.200	8	0	0	
AK20	436.000	8	0	0	Mid
AKA00	433.125	8	0	0	
AKA01	433.325	8	0	0	
AKA02	433.525	8	0	0	
AKA03	433.725	8	0	0	
AKA04	433.925	8	0	0	
AKA05	434.125	8	0	0	
AKA06	434.325	8	0	0	
AKA07	434.525	8	0	0	
AKA08	434.725	8	0	0	
AK38	432.400	5	0	-3	
AK50	430.000	5	0	-3	Low