



INDALA CORPORATION TEST REPORT

FOR THE

PROXIMITY READER, CX-8525

FCC PART 15 SUBPART C SECTIONS 15.207 & 15.209

COMPLIANCE

DATE OF ISSUE: MAY 9, 2003

PREPARED FOR:

Indala Corporation
6850 B Santa Teresa Blvd.
San Jose, CA 95119-1295

P.O. No.: 10001163
W.O. No.: 80545

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: May 2-8, 2003

Report No.: FC03-031

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ADMINISTRATIVE INFORMATION

DATE OF TEST: May 2-8, 2003

DATE OF RECEIPT: May 2, 2003

PURPOSE OF TEST: To demonstrate the compliance of the Proximity Reader, CX-8525 with the requirements for FCC Part 15 Subpart C Sections 15.207 & 15.209 devices.

TEST METHOD: ANSI C63.4 (1992)

MANUFACTURER: Indala Corporation
6850 B Santa Teresa Blvd.
San Jose, CA 95119-1295

REPRESENTATIVE: Steve Rose

TEST LOCATION: CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the Indala Corporation Proximity Reader, CX-8525 was found to be fully compliant with the following standards and specifications:

United States

- FCC 15.209
- FCC 15.205
- FCC 15.207
- NA
- ANSI C63.4 (1992) method

Canada

- RSS 210 6.2.1
- RSS 210 6.3
- RSS 210 6.6
- RSS 210 5.9.1
- ANSI C63.4 (1992) method

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

QUALITY ASSURANCE:



Steve Behm, Director of Engineering Services
and Quality Assurance



Joyce Walker, Quality Assurance Administrative
Manager


Mike Wilkinson

Lab Manager

TEST PERSONNEL:



Randy Clark, EMC Engineer

FCC 15.31(e) Voltage Variations

FREQUENCY MHz	CORRECTED READING dB μ V/m 85%	CORRECTED READING dB μ V/m 100%	CORRECTED READING dB μ V/m 115%	SPEC LIMIT dB μ V/m 25.3
0.129	2.8	2.9	2.9	

FCC 15.31(m) Number Of Channels

This device operates on a single channel.

FCC 15.33(a) Frequency Ranges Tested

15.207 Conducted: 150 kHz – 30 MHz

15.209 Radiated: 9 kHz – 1000 MHz

FCC SECTION 15.35: ANALYZER BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz

FCC 15.203 Antenna Requirements

The antenna is an integral part of the EUT and is non-removable; therefore the EUT complies with Section 15.203 of the FCC rules.

FCC 15.205 Restricted Bands

The fundamental operating frequency lies outside the restricted bands and therefore complies with the requirements of Section 15.205 of the FCC rules. Any spurious emission coming from the EUT was investigated to determine if any portion lies inside the restricted band. If any portion of a spurious emissions signal was found to be within a restricted band, investigation was performed to ensure compliance with Section 15.209.

Eut Operating Frequency

The EUT was operating at 130 kHz.

Temperature And Humidity During Testing

The temperature during testing was within +15°C and + 35°C.

The relative humidity was between 20% and 75%.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit.

EQUIPMENT UNDER TEST

Proximity Reader

Manuf: Indala Corporation
Model: CX-8525
Serial: 39403
FCC ID: E9UCX-8525 (pending)

PERIPHERAL DEVICES

The EUT was tested with the following peripheral devices:

Power Supply

Manuf: Topward Electric Instruments
Model: TPS-2000
Serial: 920035
FCC ID: NA

REPORT OF MEASUREMENTS

The following tables report the worst case emissions levels recorded during the tests performed on the EUT. All readings taken were peak readings unless otherwise stated. The data sheets from which the emissions tables were compiled are contained in Appendix C.

Table 1: FCC 15.207 Six Highest Conducted Emission Levels

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS				CORRECTED READING dB μ V	SPEC LIMIT dB μ V	MARGIN dB	NOTES
		Lisn dB	Cable dB	Cable dB	dB				
0.323872	43.7	0.1		0.1		43.9	49.6	-5.7	BA
10.354220	43.6	0.7		0.2		44.5	50.0	-5.5	W
10.606470	44.2	0.7		0.2		45.1	50.0	-4.9	W
10.876740	44.8	0.7		0.2		45.7	50.0	-4.3	W
11.138000	44.9	0.7		0.2		45.8	50.0	-4.2	W
11.399260	44.4	0.6		0.2		45.2	50.0	-4.8	W

Test Method: ANSI C63.4 (1992)
 Spec Limit: FCC Part 15 Subpart C Section 15.207

NOTES:
 A = Average Reading
 B = Black Lead
 W = White Lead

COMMENTS: EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. A proximity card is in the field of the card reader, which is reading continuously.

Table 2: FCC 15.209 Fundamental Emission Levels

FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS			CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES
		Ant dB	dB	dB				
0.130	52.2	10.7			-60.0	2.9	25.3	-22.4 H
0.130	47.2	10.7			-60.0	-2.1	25.3	-27.4 V

Test Method: ANSI C63.4 (1992)
 Spec Limit: FCC Part 15 Subpart C Sections 15.209
 Test Distance: 10 Meters

NOTES: H = Horizontal Polarization
 V = Vertical Polarization

COMMENTS: EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located on the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. Test data is corrected to 300 meters in accordance with 15.31 40dB per decade fall off.

Table 3: FCC 15.209 Six Highest Radiated Emission Levels

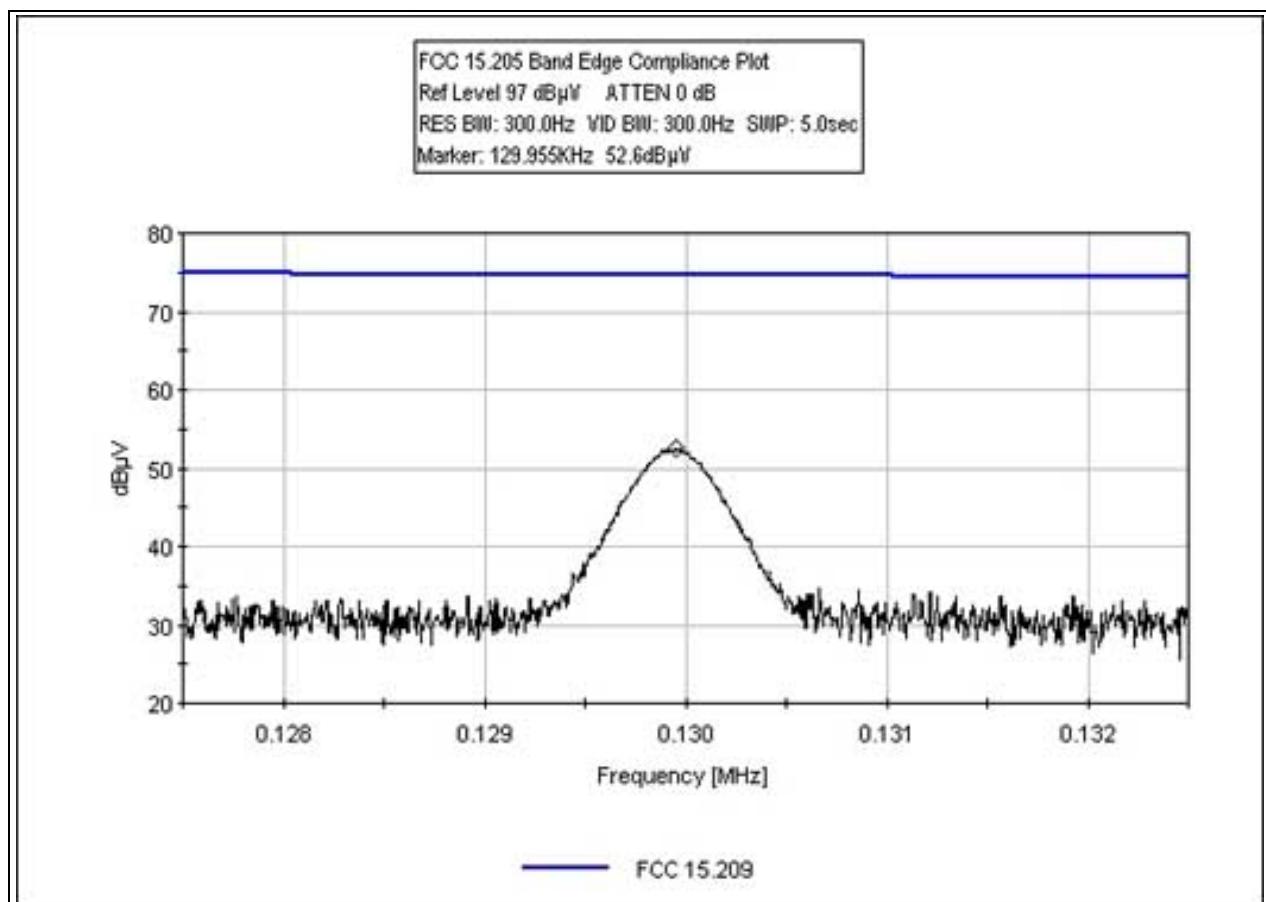
FREQUENCY MHz	METER READING dB μ V	CORRECTION FACTORS			CORRECTED READING dB μ V/m	SPEC LIMIT dB μ V/m	MARGIN dB	NOTES
		Ant dB	Amp dB	Cable dB				
42.150	45.4	12.9	-27.3	0.9	31.9	40.0	-8.1	V
43.450	47.6	12.4	-27.3	0.9	33.6	40.0	-6.4	V
44.100	47.5	12.1	-27.3	0.9	33.2	40.0	-6.8	V
45.950	44.2	11.2	-27.3	1.0	29.1	40.0	-10.9	V
47.350	45.8	10.3	-27.3	1.0	29.8	40.0	-10.2	V
48.200	46.4	9.7	-27.3	1.0	29.8	40.0	-10.2	V

Test Method: ANSI C63.4 (1992)
 Spec Limit: FCC Part 15 Subpart C Section 15.209
 Test Distance: 3 Meters

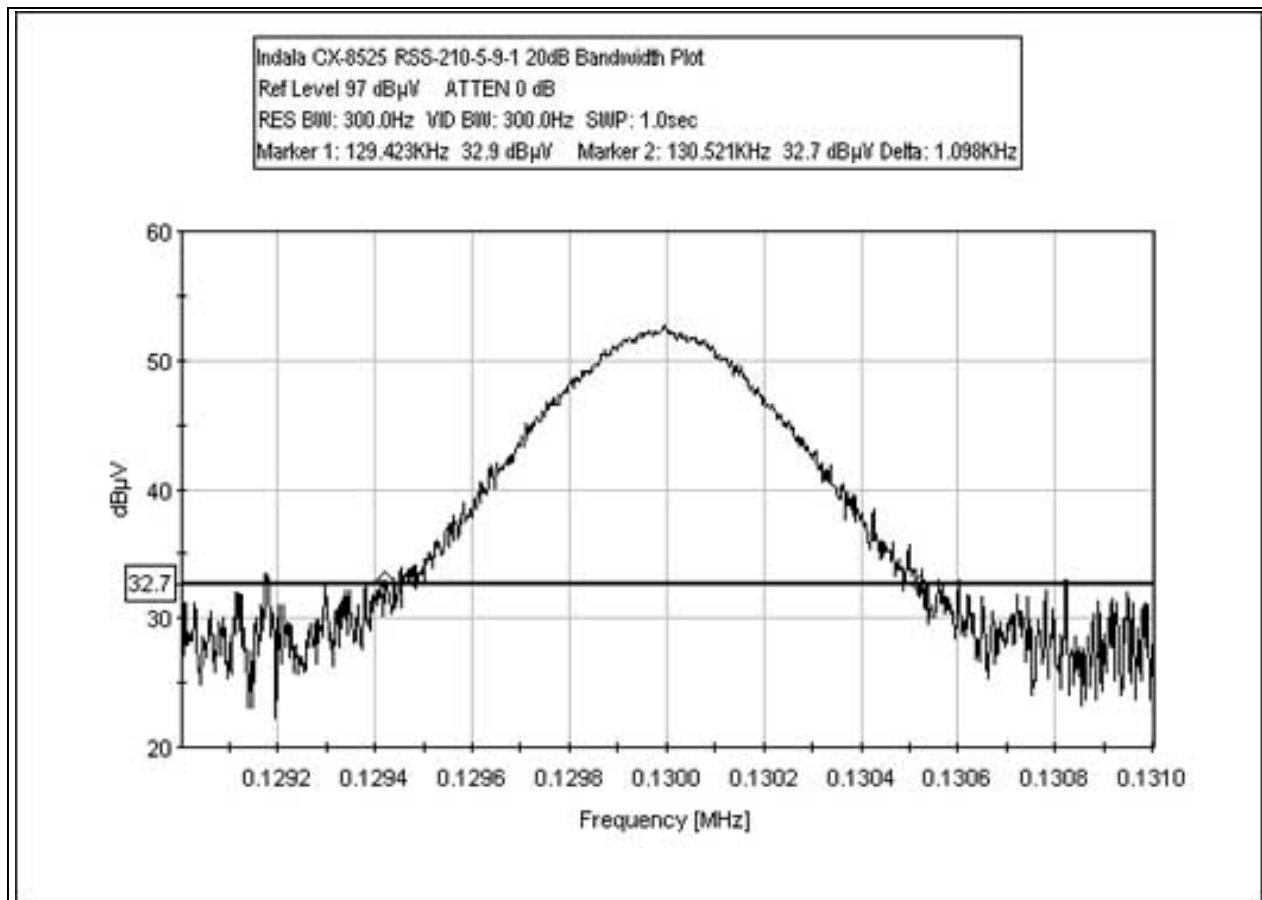
NOTES: V = Vertical Polarization

COMMENTS: EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. Frequency range tested: 9 kHz – 1000 MHz.

FCC 15.215 BANDEDGE COMPLIANCE



RSS 210 SECTION 5.9.1 20dB BANDWIDTH PLOT



MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB
Conducted Emissions	+/- 1.56 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Statements of compliance are based on the nominal values only.

EUT SETUP

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the photographs in Appendix A. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables. The corrected data was then compared to the applicable emission limits to determine compliance.

The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available I/O ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. I/O cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The radiated and conducted emissions data of the EUT was taken with the HP Spectrum Analyzer. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in Table A.

Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula in Table A. This reading was then compared to the applicable specification limit to determine compliance.

TABLE A: SAMPLE CALCULATIONS	
Meter reading	($\text{dB}\mu\text{V}$)
+ Antenna Factor	(dB)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Appendix B were used to collect both the radiated and conducted emissions data. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For frequencies from 30 to 1000 MHz, the biconilog antenna was used. Conducted emissions tests required the use of the FCC type LISNs.

The HP spectrum analyzer was used for all measurements. Table B shows the analyzer bandwidth settings that were used in designated frequency bands. For conducted emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. A 10 dB external attenuator was also used during conducted tests, with internal offset correction in the analyzer. During radiated testing, the measurements were made with 0 dB of attenuation, a reference level of 97 dB μ V, and a vertical scale of 10 dB per division.

SPECTRUM ANALYZER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the Tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the six highest readings, this is indicated as a "Q" or an "A" in the appropriate table. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the Spectrum Analyzer or test engineer recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the analyzer called "peak hold," the analyzer had the ability to measure transients or low duty cycle transient emission peak levels. In this mode the analyzer made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the HP Quasi-Peak Adapter for the HP Spectrum Analyzer. The detailed procedure for making quasi peak measurements contained in the HP Quasi-Peak Adapter manual were followed.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer. To make these measurements, the test engineer reduces the video bandwidth on the analyzer until the modulation of the signal is filtered out. At this point the analyzer is set into the linear mode and the scan time is reduced.

EUT TESTING

Mains Conducted Emissions

During conducted emissions testing, the EUT was located on a wooden table measuring approximately 80 cm high, 1 meter deep, and 1.5 meters in length. One wall of the room where the EUT was located has a minimum 2 meter by 2 meter conductive plane. The EUT was mounted on the wooden table 40 cm away from the conductive plane, and 80 cm from any other conductive surface.

The vertical metal plane used for conducted emissions was grounded to the earth. Power to the EUT was provided through a LISN. The LISN was grounded to the ground plane. All other objects were kept a minimum of 80 cm away from the EUT during the conducted test.

The LISNs used were 50 μ H/-+50 ohms. Above 150 kHz, a 0.15 μ F series capacitor was added in-line prior to connecting the analyzer to restore the proper impedance for the range. A 30 to 50 second sweep time was used for automated measurements in the frequency bands of 150 kHz to 500 kHz, and 500 kHz to 30 MHz. All readings within 20 dB of the limit were recorded, and those within 6 dB of the limit were examined with additional measurements using a slower sweep time.

Radiated Emissions

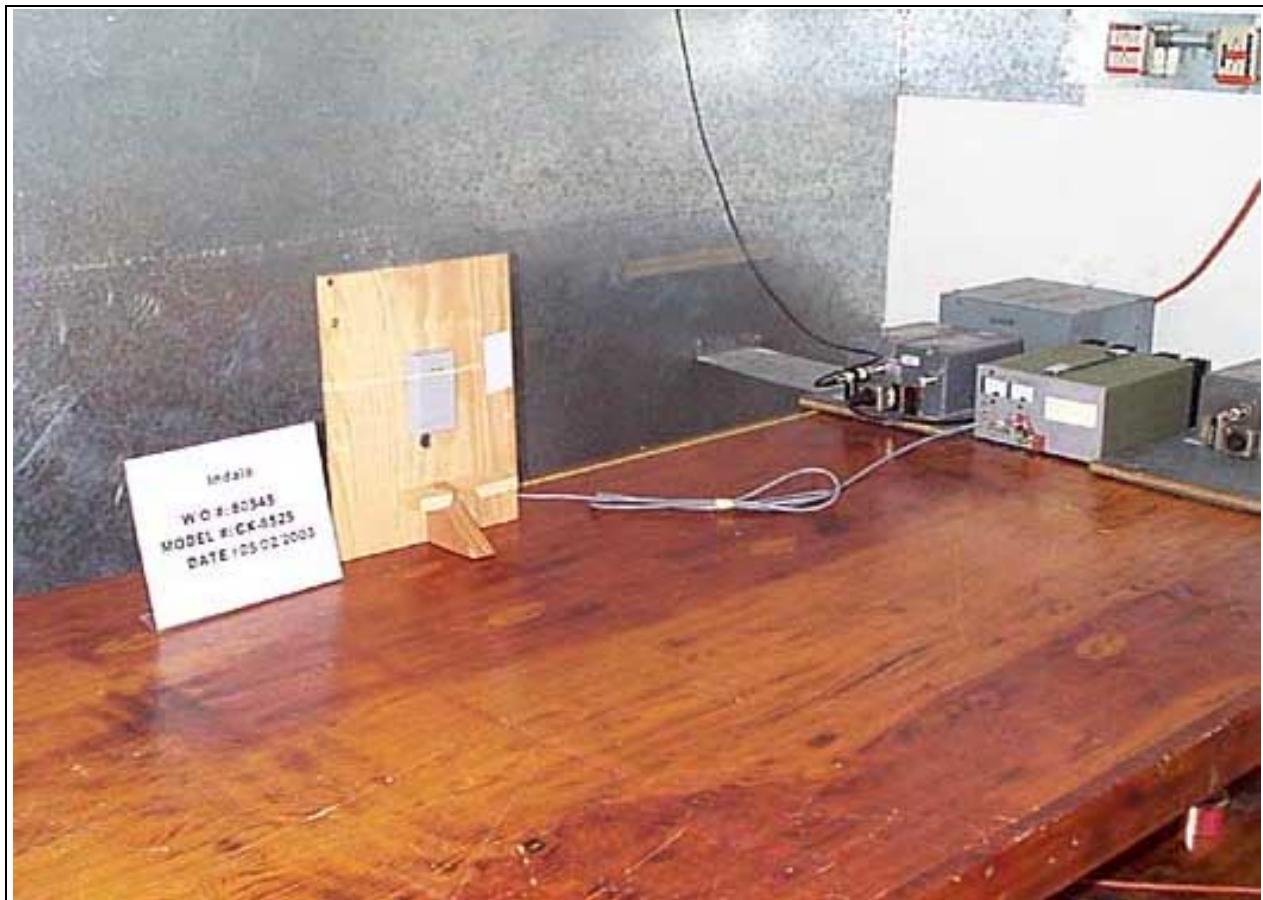
The EUT was mounted on a nonconductive, rotating table 80 cm above the conductive grid. The nonconductive table dimensions were 1 meter by 1.5 meters.

During the preliminary radiated scan, the EUT was powered up and operating in its defined FCC test mode. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. The frequency range of 30 MHz to 1000 MHz was scanned with the biconilog antenna located about 1.5 meter above the ground plane in the vertical polarity. During this scan, the turntable was rotated and all peaks at or near the limit were recorded. A scan of the FM band from 88 to 110 MHz was then made using a reduced resolution bandwidth and frequency span. The biconilog antenna was changed to the horizontal polarity and the above steps were repeated. Care was taken to ensure that no frequencies were missed within the FM and TV bands. An analysis was performed to determine if the signals that were at or near the limit were caused by an ambient transmission. If unable to determine by analysis, the equipment was powered down to make the final determination if the EUT was the source of the emission.

A thorough scan of all frequencies was made manually using a small frequency span, rotating the turntable as needed. The test engineer maximized the readings with respect to the table rotation, antenna height, and configuration of EUT. Maximizing of the EUT was achieved by monitoring the spectrum analyzer on a closed circuit television monitor.

APPENDIX A
TEST SETUP PHOTOGRAPHS

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS



Mains Conducted Emissions – Front View

PHOTOGRAPH SHOWING MAINS CONDUCTED EMISSIONS



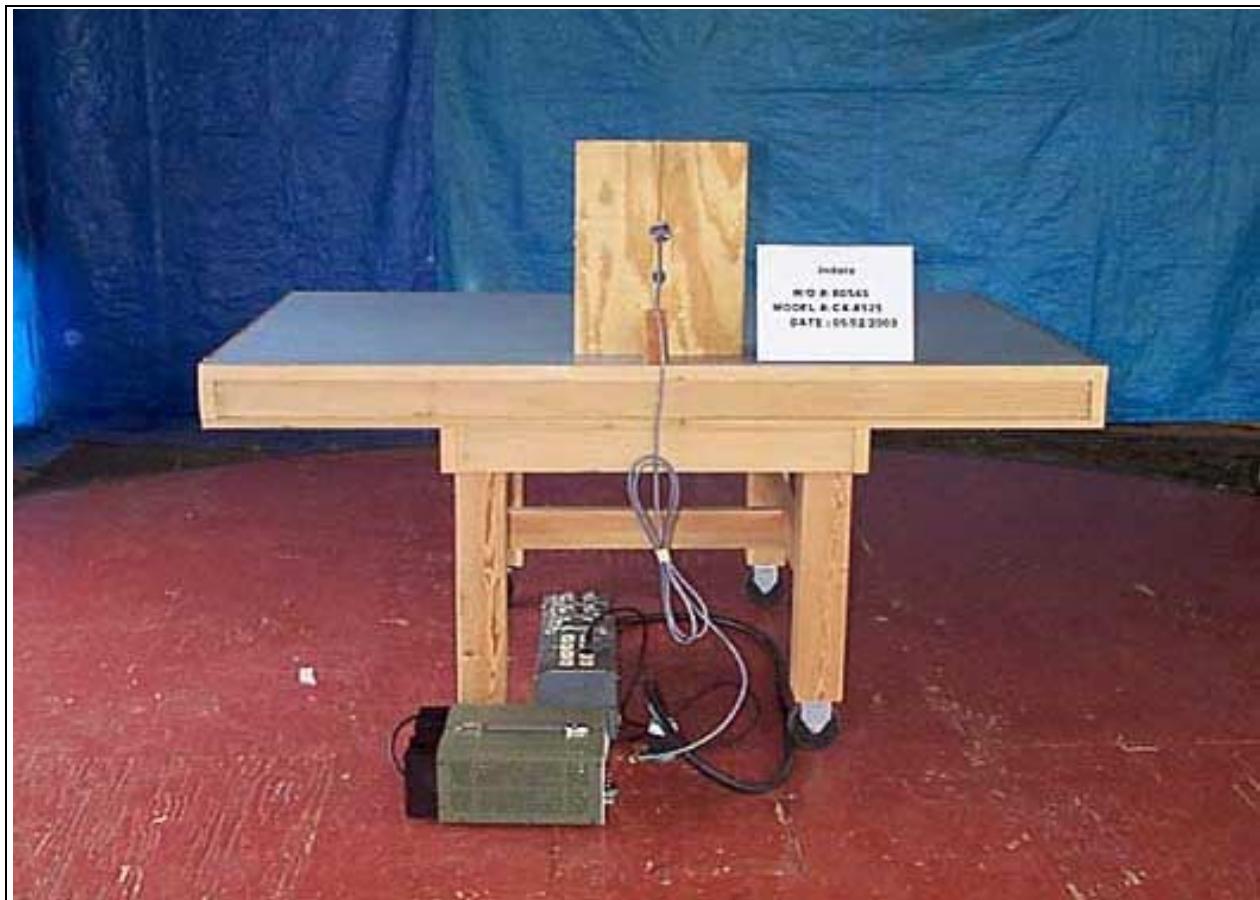
Mains Conducted Emissions – Side View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions – Front View

PHOTOGRAPH SHOWING RADIATED EMISSIONS



Radiated Emissions – Back View

APPENDIX B

TEST EQUIPMENT LIST

15.207

Description	Manufacturer	Model #	Serial #	Asset #	Cal Date	Cal Due
LISN Set	Solar	8028-50-TS-24-BNC	814493, 474	02056	11/20/02	11/20/03
Spectrum Analyzer 100Hz – 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

FCC 15.31(e), 15.209 Fundamental, 15.215 & RSS 210-5.9.1

Description	Manufacturer	Model #	Serial #	Asset #	Cal Date	Cal Due
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/03
Cable, 3/10m	Andrews	Hardline	N/A	N/A	11/18/02	11/18/03
Digital Multimeter	Radio Shack	22-183	NA	01241	9/3/02	9/3/03
Power Supply, DC	HP	6205C	2228A01775	00762	6/5/02	6/5/03
Spectrum Analyzer 100Hz – 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

15.209 9kHz-1000MHz

Description	Manufacturer	Model #	Serial #	Asset #	Cal Date	Cal Due
Antenna, Loop	EMCO	6502	1074	00226	6/5/02	6/5/03
Cable, 3/10m	Andrews	Hardline	N/A	N/A	11/18/02	11/18/03
Digital Multimeter	Radio Shack	22-183	NA	01241	9/3/02	9/3/03
Power Supply, DC	HP	6205C	2228A01775	00762	6/5/02	6/5/03
Antenna, Biconilog	Chase	CBL6111C	2456	01991	12/13/02	12/12/04
Preamp	HP	8447D	1937A02604	00099	3/7/03	3/6/04
Spectrum Analyzer 100Hz – 22.5GHz	HP	8566B	2209A01404	00490	2/26/03	2/26/04
Spectrum Analyzer Display	HP	8566B	2403A08241	00489	2/26/03	2/26/04
Spectrum Analyzer QP Adapter	HP	85650A	2811A01267	00478	2/26/03	2/26/04

APPENDIX C:
MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, Ca 95338 • (209) 966-5240

Customer: **Indala**
 Specification: **FCC 15.207 – AVE**
 Work Order #: **80545** Date: 05/08/2003
 Test Type: **Conducted Emissions** Time: 13:58:28
 Equipment: **RF Proximity Card Reader** Sequence #: 6
 Manufacturer: Indala Tested By: Randal Clark
 Model: CX-8525 120V 60Hz
 S/N: 39403

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF Proximity Card Reader*	Indala	CX-8525	39403

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	TopwardElectric Instrument	TPS-2000	920035

Test Conditions / Notes:

EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. A proximity card is in the field of the card reader, which is reading continuously.

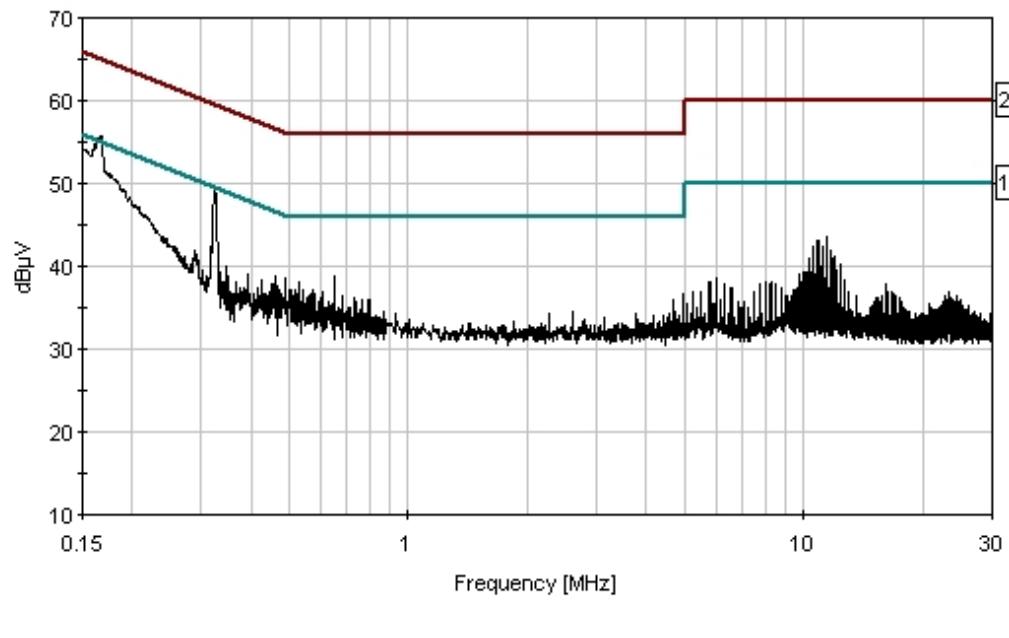
Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n474
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Measurement Data:			Reading listed by margin.						Test Lead: Black		
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant	
1	323.872k Ave	43.7	+0.1	+0.1		+0.0	43.9	49.6	-5.7	Black	
^	323.873k	49.4	+0.1	+0.1		+0.0	49.6	49.6	+0.0	Black	
3	11.399M	42.7	+0.2	+0.7		+0.0	43.6	50.0	-6.4	Black	
4	166.732k Ave	48.5	+0.1	+0.0		+0.0	48.6	55.1	-6.5	Black	
^	166.733k	55.5	+0.1	+0.0		+0.0	55.6	55.1	+0.5	Black	
6	10.868M	42.2	+0.2	+0.8		+0.0	43.2	50.0	-6.8	Black	
7	653.430k	38.7	+0.1	+0.1		+0.0	38.9	46.0	-7.1	Black	
8	11.129M	41.5	+0.2	+0.8		+0.0	42.5	50.0	-7.5	Black	
9	487.560k	38.5	+0.1	+0.0		+0.0	38.6	46.2	-7.6	Black	
10	10.606M	41.4	+0.2	+0.8		+0.0	42.4	50.0	-7.6	Black	
11	527.573k	38.0	+0.1	+0.0		+0.0	38.1	46.0	-7.9	Black	

12	11.661M	41.1	+0.2	+0.7	+0.0	42.0	50.0	-8.0	Black
13	11.922M	40.3	+0.2	+0.7	+0.0	41.2	50.0	-8.8	Black
14	468.645k	37.5	+0.1	+0.0	+0.0	37.6	46.5	-8.9	Black
15	502.838k	37.0	+0.1	+0.0	+0.0	37.1	46.0	-8.9	Black
16	516.660k	37.0	+0.1	+0.0	+0.0	37.1	46.0	-8.9	Black
17	541.395k	37.0	+0.1	+0.0	+0.0	37.1	46.0	-8.9	Black
18	571.950k	36.9	+0.1	+0.1	+0.0	37.1	46.0	-8.9	Black
19	392.258k	38.9	+0.1	+0.0	+0.0	39.0	48.0	-9.0	Black
20	10.345M	39.9	+0.2	+0.9	+0.0	41.0	50.0	-9.0	Black
21	605.415k	36.7	+0.1	+0.1	+0.0	36.9	46.0	-9.1	Black
22	344.970k	39.7	+0.1	+0.1	+0.0	39.9	49.1	-9.2	Black

CKC Laboratories Date: 05/08/2003 Time: 13:58:28 Indala WO#: 80545
 FCC 15.207 - AVE Test Lead: Black 120V 60Hz Sequence#: 6



Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, Ca 95338 • (209) 966-5240

Customer: **Indala**
 Specification: **FCC 15.207 – AVE**
 Work Order #: **80545** Date: 05/08/2003
 Test Type: **Conducted Emissions** Time: 2:04:30 PM
 Equipment: **RF Proximity Card Reader** Sequence#: 7
 Manufacturer: Indala Tested By: Randal Clark
 Model: CX-8525 120V 60Hz
 S/N: 39403

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF Proximity Card Reader*	Indala	CX-8525	39403

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	TopwardElectric Instrument	TPS-2000	920035

Test Conditions / Notes:

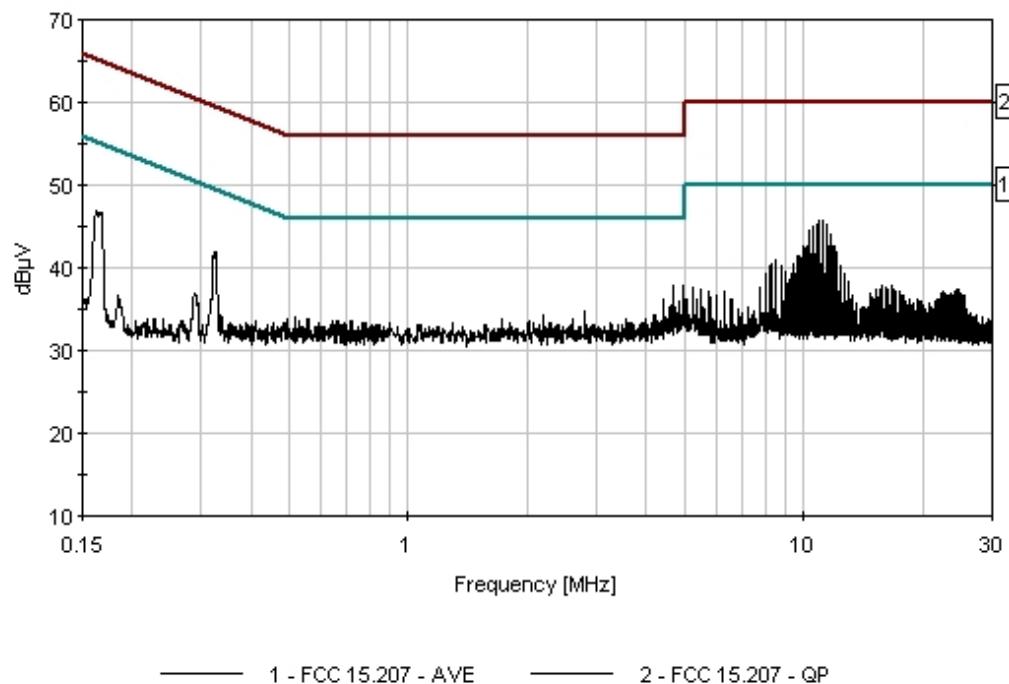
EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. A proximity card is in the field of the card reader, which is reading continuously.

Transducer Legend:

T1=Cable & Cap (Bench)	T2=LISN Insertion Loss s/n493
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Measurement Data:			Reading listed by margin.			Test Lead: White				
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	11.138M	44.9	+0.2	+0.7		+0.0	45.8	50.0	-4.2	White
2	10.877M	44.8	+0.2	+0.7		+0.0	45.7	50.0	-4.3	White
3	11.399M	44.4	+0.2	+0.6		+0.0	45.2	50.0	-4.8	White
4	10.606M	44.2	+0.2	+0.7		+0.0	45.1	50.0	-4.9	White
5	10.354M	43.6	+0.2	+0.7		+0.0	44.5	50.0	-5.5	White
6	11.652M	43.3	+0.2	+0.6		+0.0	44.1	50.0	-5.9	White
7	9.958M	41.7	+0.2	+0.7		+0.0	42.6	50.0	-7.4	White
8	10.219M	41.7	+0.2	+0.7		+0.0	42.6	50.0	-7.4	White
9	11.913M	41.8	+0.2	+0.6		+0.0	42.6	50.0	-7.4	White
10	10.093M	41.4	+0.2	+0.7		+0.0	42.3	50.0	-7.7	White
11	323.074k	41.5	+0.1	+0.2		+0.0	41.8	49.6	-7.8	White

12	12.174M	41.2	+0.2	+0.6	+0.0	42.0	50.0	-8.0	White
13	4.700M	36.4	+0.1	+1.4	+0.0	37.9	46.0	-8.1	White
14	4.960M	36.1	+0.1	+1.7	+0.0	37.9	46.0	-8.1	White
15	163.090k	46.6	+0.1	+0.2	+0.0	46.9	55.3	-8.4	White
16	10.480M	40.7	+0.2	+0.7	+0.0	41.6	50.0	-8.4	White
17	10.742M	40.7	+0.2	+0.7	+0.0	41.6	50.0	-8.4	White
18	9.697M	40.6	+0.2	+0.7	+0.0	41.5	50.0	-8.5	White
19	9.823M	40.2	+0.2	+0.7	+0.0	41.1	50.0	-8.9	White
20	8.525M	39.6	+0.2	+1.1	+0.0	40.9	50.0	-9.1	White

CKC Laboratories Date: 05/08/2003 Time: 2:04:30 PM Indala WO#: 80545
FCC 15.207 - AVE Test Lead: White 120V 60Hz Sequence#: 7


Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, Ca 95338 • (209) 966-5240

Customer: **Indala**
 Specification: **FCC 15.209**
 Work Order #: **80545** Date: 05/02/2003
 Test Type: **Maximized Emissions** Time: 11:13:24
 Equipment: **RF Proximity Card Reader** Sequence#: 1
 Manufacturer: Indala Tested By: Randal Clark
 Model: CX-8525
 S/N: 39403

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF Proximity Card Reader*	Indala	CX-8525	39403

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	TopwardElectric Instrument	TPS-2000	920035

Test Conditions / Notes:

EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. Test data is corrected to 300 meters in accordance with 15.31 40dB per decade fall off.

Transducer Legend:

T1=Loop 1074	T2=15.31 10m 40dB/Dec Correction
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#	Freq MHz	Rdng dB μ V	Reading listed by margin.			Test Distance: 10 Meters				
			T1 dB	T2 dB	dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	129.930k	52.2	+10.7	-60.0		+0.0	2.9	25.3	-22.4	Horiz
2	129.946k	47.2	+10.7	-60.0		+0.0	-2.1	25.3	-27.4	Vert

Test Location: CKC Laboratories • 5473A Clouds Rest • Mariposa, Ca 95338 • (209) 966-5240

Customer: **Indala**
 Specification: **FCC 15.209**
 Work Order #: **80545** Date: 05/02/2003
 Test Type: **Maximized Emissions** Time: 16:08:24
 Equipment: **RF Proximity Card Reader** Sequence#: 3
 Manufacturer: Indala Tested By: Randal Clark
 Model: CX-8525
 S/N: 39403

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
RF Proximity Card Reader*	Indala	CX-8525	39403

Support Devices:

Function	Manufacturer	Model #	S/N
Power Supply	TopwardElectric Instrument	TPS-2000	920035

Test Conditions / Notes:

EUT is a proximity card reader operating on a frequency of 130kHz. The EUT is powered by 12VDC through a DC power supply. The power supply is located near the ground plane. To simulate normal installation, the EUT is mounted on a wooden stand. Frequency range tested: 9 kHz – 1000 MHz.

Transducer Legend:

T1=Amp - S/N 604	T2=Bilog B
T3=Cable - 10 Meter	

#	Freq MHz	Reading listed by margin.					Test Distance: 3 Meters				
		Rdng dB μ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	43.450M	47.6	-27.3	+12.4	+0.9		+0.0	33.6	40.0	-6.4	Vert
2	44.100M	47.5	-27.3	+12.1	+0.9		+0.0	33.2	40.0	-6.8	Vert
3	42.150M	45.4	-27.3	+12.9	+0.9		+0.0	31.9	40.0	-8.1	Vert
4	48.200M	46.4	-27.3	+9.7	+1.0		+0.0	29.8	40.0	-10.2	Vert
5	47.350M	45.8	-27.3	+10.3	+1.0		+0.0	29.8	40.0	-10.2	Vert
6	45.950M	44.2	-27.3	+11.2	+1.0		+0.0	29.1	40.0	-10.9	Vert
7	36.800M	40.3	-27.3	+15.2	+0.8		+0.0	29.0	40.0	-11.0	Vert
8	48.950M	45.4	-27.3	+9.2	+1.0		+0.0	28.3	40.0	-11.7	Vert
9	50.000M	44.2	-27.3	+8.6	+1.0		+0.0	26.5	40.0	-13.5	Vert
10	51.300M	44.0	-27.3	+8.1	+1.0		+0.0	25.8	40.0	-14.2	Vert
11	45.280M	37.8	-27.3	+11.6	+1.0		+0.0	23.1	40.0	-16.9	Horiz

12	44.790M	37.3	-27.3	+11.9	+1.0	+0.0	22.9	40.0	-17.1	Horiz
13	45.580M	37.6	-27.3	+11.4	+1.0	+0.0	22.7	40.0	-17.3	Horiz
14	45.060M	36.7	-27.3	+11.8	+1.0	+0.0	22.2	40.0	-17.8	Horiz
15	53.900M	41.0	-27.3	+7.3	+1.0	+0.0	22.0	40.0	-18.0	Vert
16	44.010M	36.2	-27.3	+12.2	+0.9	+0.0	22.0	40.0	-18.0	Horiz
17	44.500M	36.2	-27.3	+12.0	+0.9	+0.0	21.8	40.0	-18.2	Horiz
18	44.280M	35.4	-27.3	+12.1	+0.9	+0.0	21.1	40.0	-18.9	Horiz
19	66.550M	40.5	-27.2	+5.8	+1.2	+0.0	20.3	40.0	-19.7	Vert
20	64.700M	40.6	-27.3	+5.7	+1.2	+0.0	20.2	40.0	-19.8	Vert
21	68.750M	38.3	-27.2	+5.9	+1.3	+0.0	18.3	40.0	-21.7	Vert
22	140.020M	32.2	-27.1	+11.5	+1.8	+0.0	18.4	43.5	-25.1	Horiz
23	138.420M	31.9	-27.1	+11.5	+1.8	+0.0	18.1	43.5	-25.4	Horiz
24	132.010M	31.5	-27.1	+11.5	+1.8	+0.0	17.7	43.5	-25.8	Horiz
25	130.960M	30.9	-27.1	+11.5	+1.8	+0.0	17.1	43.5	-26.4	Horiz