PRINTRONIX ADDENDUM TEST REPORT TO FC04-036A

FOR THE

PRINTER, T5204E

FCC PART 15 SUBPART C SECTION 15.247 AND SUBPART B SECTION 15.107 CLASS B

COMPLIANCE

DATE OF ISSUE: JULY 28, 2004

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Date of test: April 29 – June 16, 2004

Report No.: FC04-036B

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TABLE OF CONTENTS

Administrative Information....4
Summary of Results....5
Conditions for Compliance....5
Approvals....5
Equipment Under Test (EUT) Description....6
FCC 15.31(e) Voltage Variation....6
FCC 15.31(m) Number of Channels....6
FCC 15.33(a) Frequency Ranges Tested....6
FCC 15.35 Analyzer Bandwidth Settings....6
FCC 15.203 Antenna Requirements....6
EUT Operating Frequency....6
Equipment Under Test (EUT) Description....7
Equipment Under Test....7
Peripheral Devices....7
Report of Measurements....8
- FCC 15.107 Six Highest Conducted Emission Levels....8
- FCC 15.247(a)(1) Number Of Hopping Frequencies....9
- FCC 15.247(a)(1) Frequency Separation....10
- FCC 15.247(a)(1)(i) Average Time Of Occupancy....11
- FCC 15.247(a)(1) 20 dB Bandwidth....17
- FCC 15.247(b)(2) RF Power Output....18
- FCC 15.247(c) Six Highest Radiated Emission Levels – Antenna Conducted ...19
- Table 1: FCC 15.247(c) Six Highest Radiated Emission Levels 19
- Antenna Conducted Bandedge - Low....20
- Antenna Conducted Bandedge - High....21
- Antenna Conducted Bandedge - Low Hopping....22
- Antenna Conducted Bandedge - High Hopping....23
- Radiated Bandedge - Low....24
- Radiated Bandedge - High....25
- Radiated Bandedge - Low Hopping....26
- Radiated Bandedge - High Hopping....27
- RSS 210 99% Bandwidth....28

Temperature And Humidity During Testing....29
EUT Setup....29
Correction Factors....29
- Table A: Sample Calculations....29

Test Instrumentation and Analyzer Settings....30
- Spectrum Analyzer Detector Functions....30
  - Peak....30
  - Quasi-Peak....30
  - Average....30

EUT Testing....31

Mains Conducted Emissions 31
Antenna Conducted Emissions.....31
Radiated Emissions 31
Appendix A: Test Setup Photographs 32
Photograph Showing Direct Connect Test Setup 33
Photograph Showing Mains Conducted Emissions 34
Photograph Showing Mains Conducted Emissions 35
Photograph Showing Radiated Emissions.....36
Photograph Showing Radiated Emissions.....37
Photograph Showing Radiated Emissions.....38
Appendix B: Test Equipment List.....39
Appendix C: Measurement Data Sheets.....40

ADMINISTRATIVE INFORMATION

DATE OF TEST:	April 29 – June 16, 2004
DATE OF RECEIPT:	April 29, 2004
PURPOSE OF TEST:	To demonstrate the compliance of the Printer, T5204e, with the requirements for FCC Part 15 Subpart C Section 15.247 and Subpart B Section 15.107 Class B devices. **Addendum A** is verification testing of the Printer, T5204e after the manufacturer changed the PCB and the window in the printer was changed to transparent conductive oxide. Only partial testing was performed to FCC Part 15 Subpart C Section 15.247(c) for OATS and antenna conducted spurious emissions. Includes new bandedge plots. Models SL5204 C1 and SL5304 C1 were also added. **Addendum B** is to revise the bandedge plot on page 27.
TEST METHOD:	ANSI C63.4 (2001)
MANUFACTURER:	Printronix P.O. Box 19559 Irvine, CA 92623-9559
REPRESENTATIVE:	Josh Wiseman
TEST LOCATION:	CKC Laboratories, Inc. 110 Olinda Place Brea, CA 92621

SUMMARY OF RESULTS

As received, the Printronix Printer, T5204e was found to be fully compliant with the following standards and specifications:

Canadian Standard	Canadian Section	FCC Standard	FCC Section	Test Description
RSS 210	5.5	47CFR	15.203	Antenna Connector Requirements
RSS 210	6.5	47CFR	15.35(c)	Pulsed Operation
RSS 210	6.6	47CFR	15.207	AC Mains Conducted Emissions Requirement
RSS 210	6.2.2(o)(a1)	47CFR	15.247(a)(1)	Minimum Channel Bandwidth
RSS 210	6.2.2(o)(a1)	47CFR	15.247(g)	Hopping Sequence
RSS 210	6.2.2(o)(a1)	47CFR	15.247(h)	Incorporation of Intelligence
RSS 210	6.2.2(o)(a2)	47CFR	15.247(a)(1)(i)	Average Time of Occupancy
RSS 210	6.2.2(o)(a2)	47CFR	15.247(b)(2)	RF Power Output
RSS 210	6.2.2(o)(e1)	47CFR	15.247(c)	Spurious Emissions
	IC 3172-A		90473	Site File No.

Notes: Rule Sections for RSS 210 are in accordance with RSS 210 Issue 5 Amendment 1

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

TEST PERSONNEL:

Eddie Wong, EMC Engineer

Stuart Yamamoto, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION
The EUT tested by CKC Laboratories was representative of a production unit.

FCC 15.31(e) Voltage Variations
No variation in power level was observed when the AC power was varied from 93 VAC – 126 VAC, hence meeting the requirement of 15.31(e)

FCC 15.31(m) Number of Channels
This device was tested on three channels.

FCC 15.33(a) Frequency Ranges Tested
15.107 Conducted Emissions: 150 kHz – 30 MHz
15.247(c) Radiated Emissions: 9 kHz – 9.28 GHz

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
RADIATED EMISSIONS	1000 MHz	9.28 GHz	1 MHz

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.

EUT Operating Frequency
The EUT was operating at 902 MHz, 915.25 MHz and 928 MHz. The EUT is a frequency hopping device operating in the 902 – 928 MHz band.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was a production unit.

The following model has been tested by CKC Laboratories: **T5204e**

The following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they comply to the level of testing equivalent to the tested models.

T5304e
4400-004 (The 4400-004 will show IBM for the Trademark/Company name.)
SL5204e C1
SL5304e C1

Addendum A changes: The transmitter PCB layout was revised and the window in the printer was changed to transparent conductive oxide. Models SL5204 C1 and SL5304 C1 were also added.

EQUIPMENT UNDER TEST

Printer

Manuf:	Printronix
Model:	T5204e
Serial:	480329082260
FCC ID:	E5A-AN2RFID

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Lap Top Computer

Manuf:	Dell
Model:	66902 (Latitude)
Serial:	00066902-12800-82P-3038
FCC ID:	Doc

REPORT OF MEASUREMENTS

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

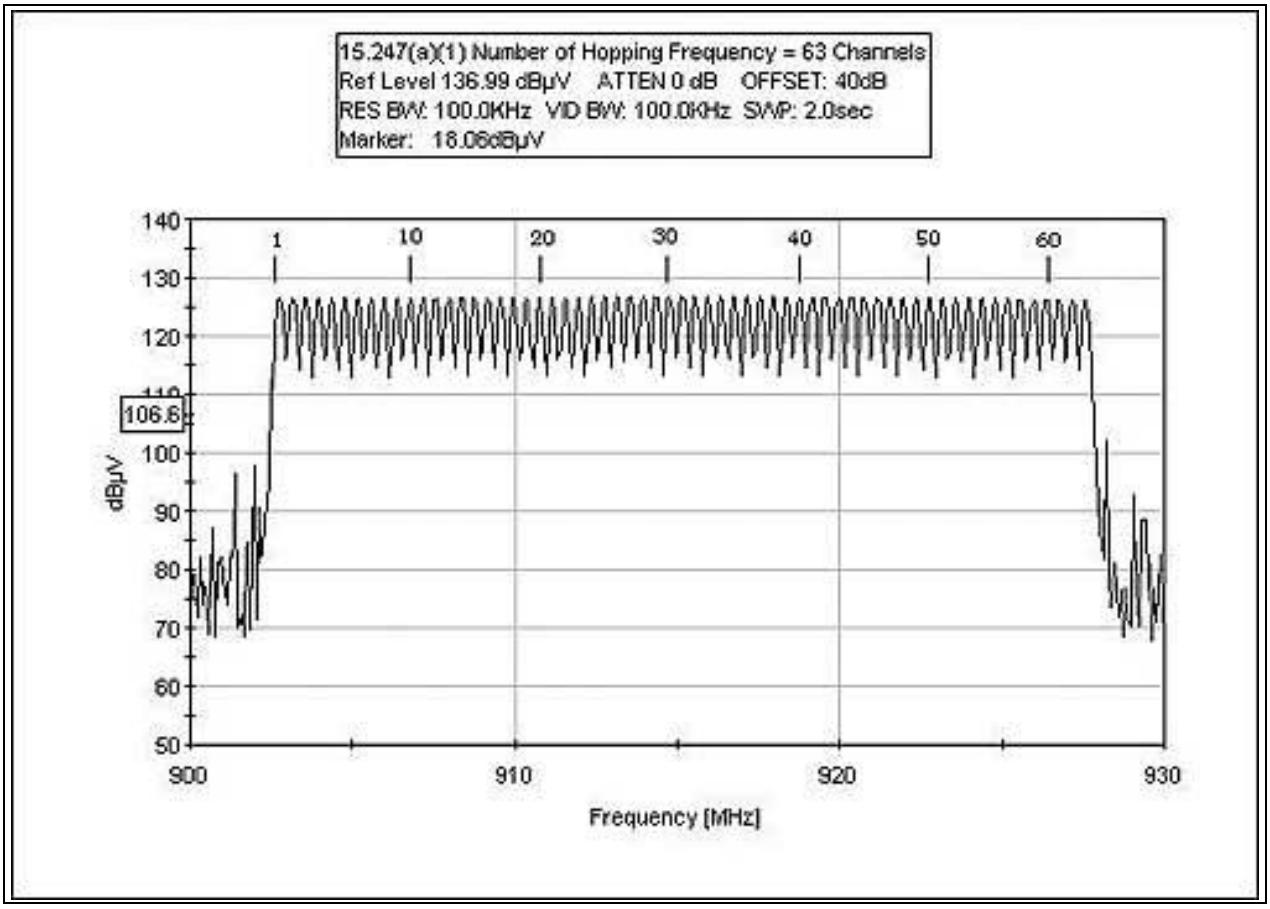
FCC 15.107 Six Highest Conducted Emission Levels									
	METER	CORRECTION FACTORS				CORRECTED	SPEC		
FREQUENCY MHz	READING dBµV	Lisn dB	dB	dB	dB	READING dBµV	LIMIT dBµV	MARGIN dB	NOTES
0.851748	40.5	0.2				40.7	46.0	-5.3	W
1.340577	41.9	0.2				42.1	46.0	-3.9	W
1.400119	41.2	0.2				41.4	46.0	-4.6	B
1.446902	42.6	0.1				42.7	46.0	-3.3	B
1.493685	41.1	0.1				41.2	46.0	-4.8	B
1.557480	41.2	0.1				41.3	46.0	-4.7	B

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart B Section 15.107 Class B

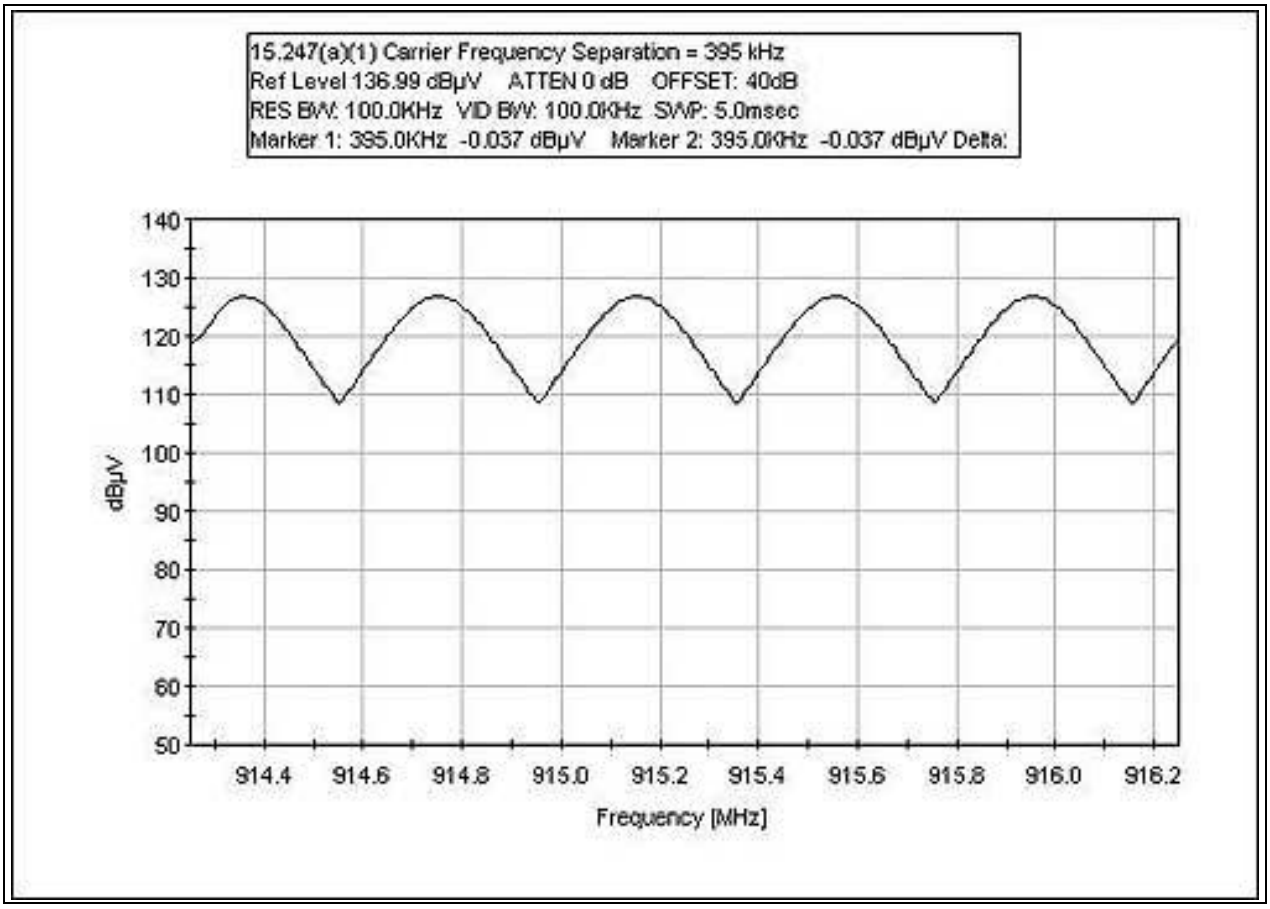
NOTES: B = Black Lead
W = White Lead

COMMENTS: Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all “H’s Pattern" to the printer via Centronics interface cable. EUT is in operating mode. Freq: Hopping. RFID card: Alien Technology SX2000. 110 VAC, 60 Hz, 22°C, 31% relative humidity.

FCC 15.247(a)(1) NUMBER OF HOPPING FREQUENCIES

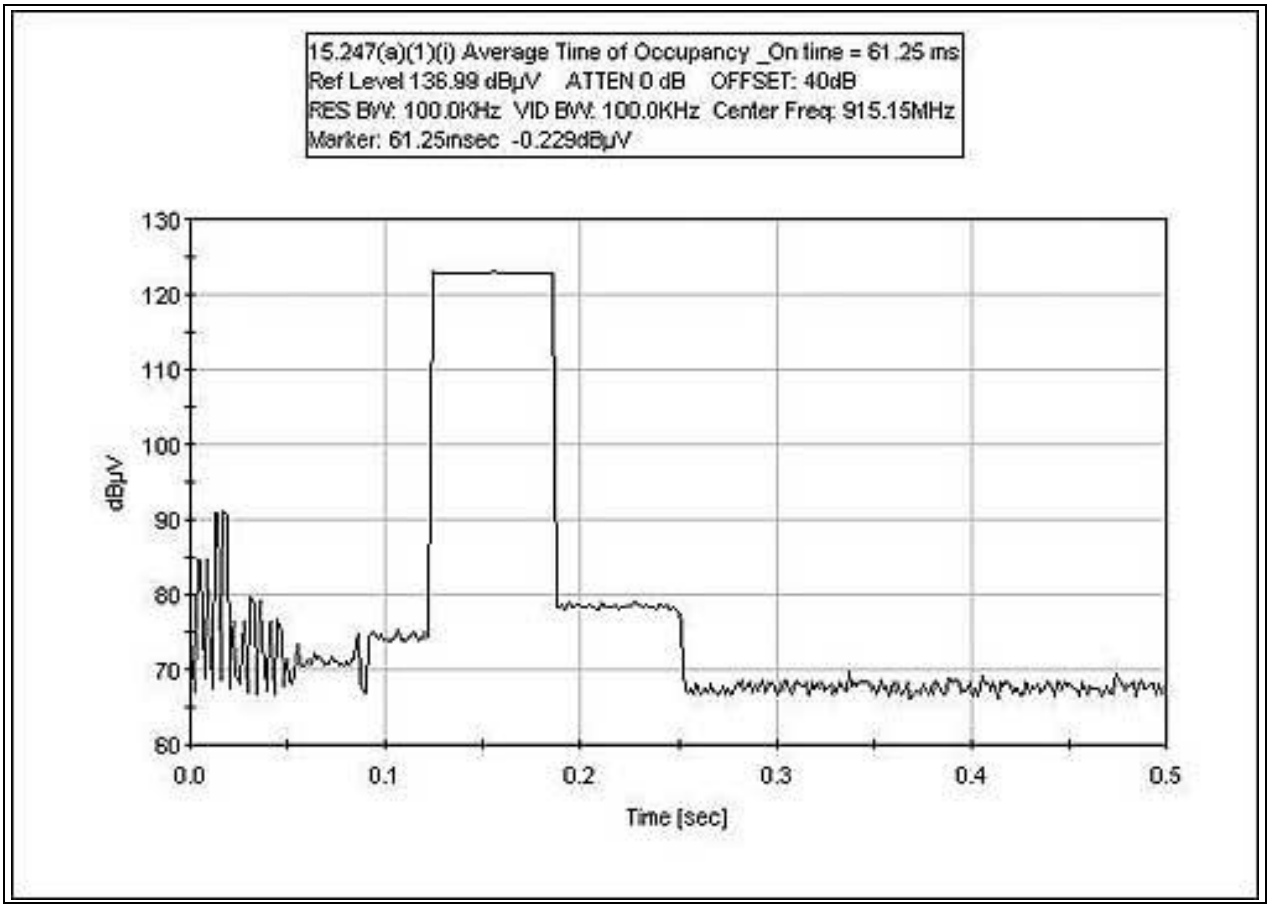


FCC 15.247(a)(1) FREQUENCY SEPARATION



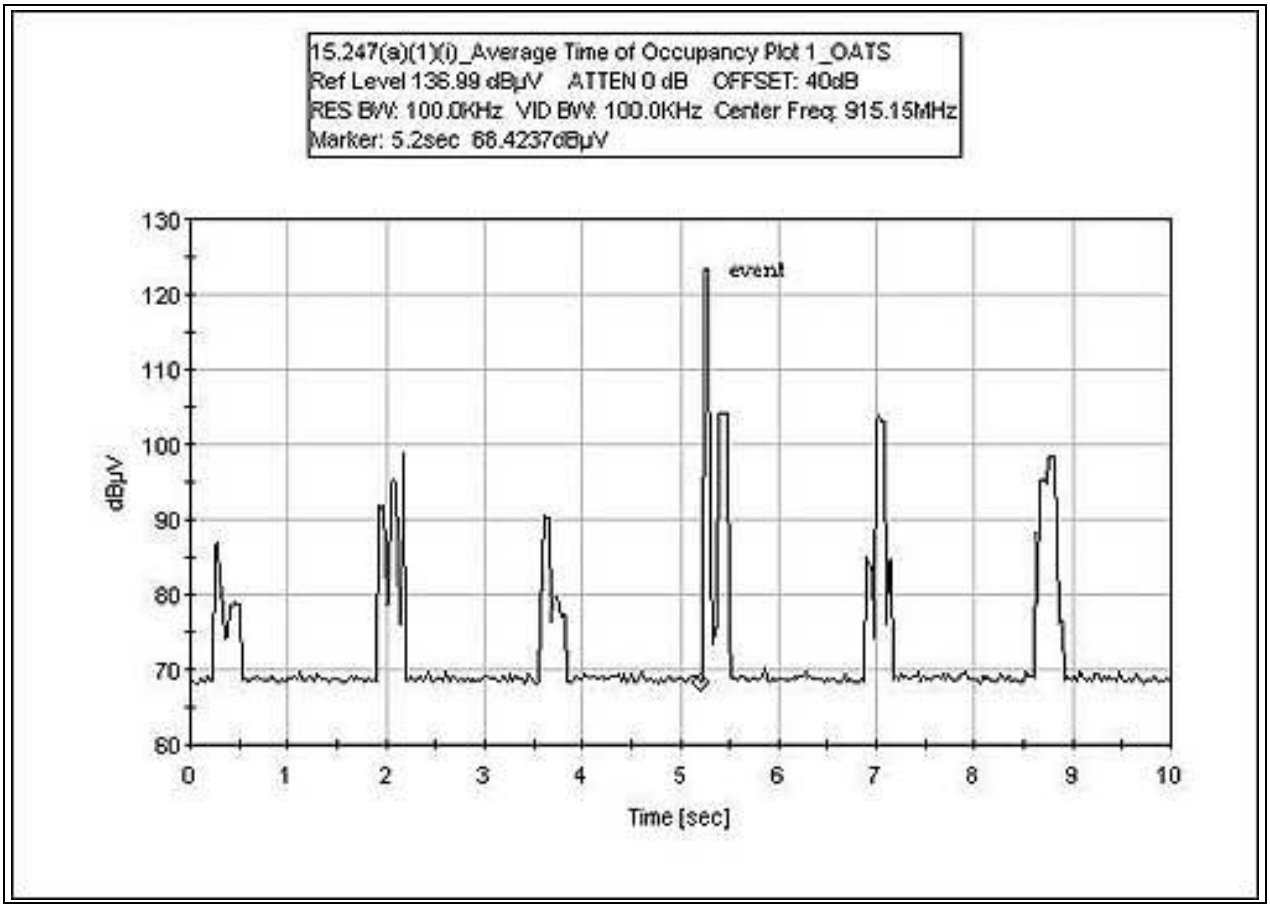
FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY ON TIME

Test Conditions : The average time of occupancy is captured with the EUT in operational mode, printing labels. With the center frequency set on 915.25 MHz, a fast sweep time was set to capture the Channel on time. Captured channel on time = 61.25 mSec

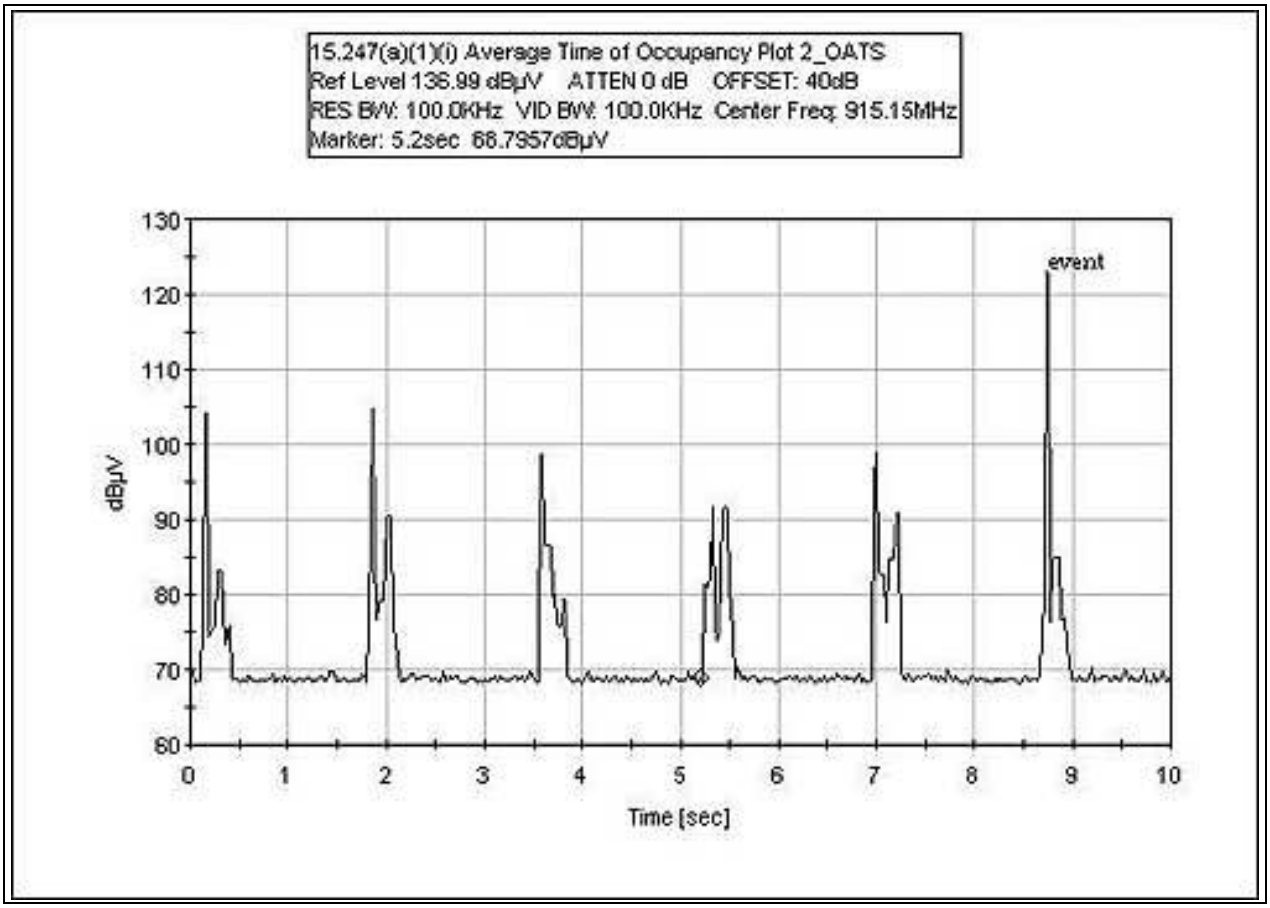


With the center frequency set on 915.25 MHz and a sweep time of 10 sec to capture the average events captured in 10 sec, average 1 event every 10 sec. (average over 5 captures).

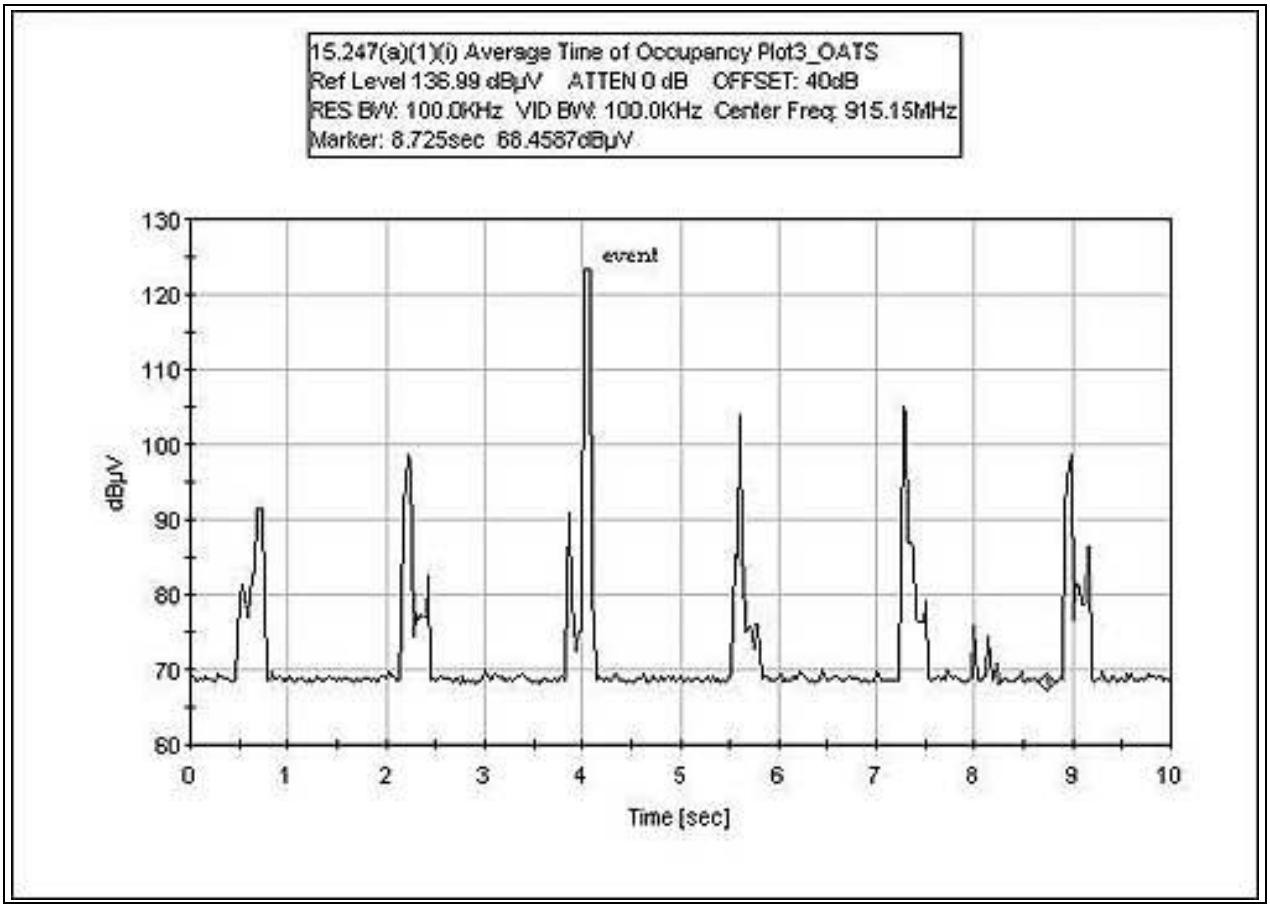
FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY PLOT 1



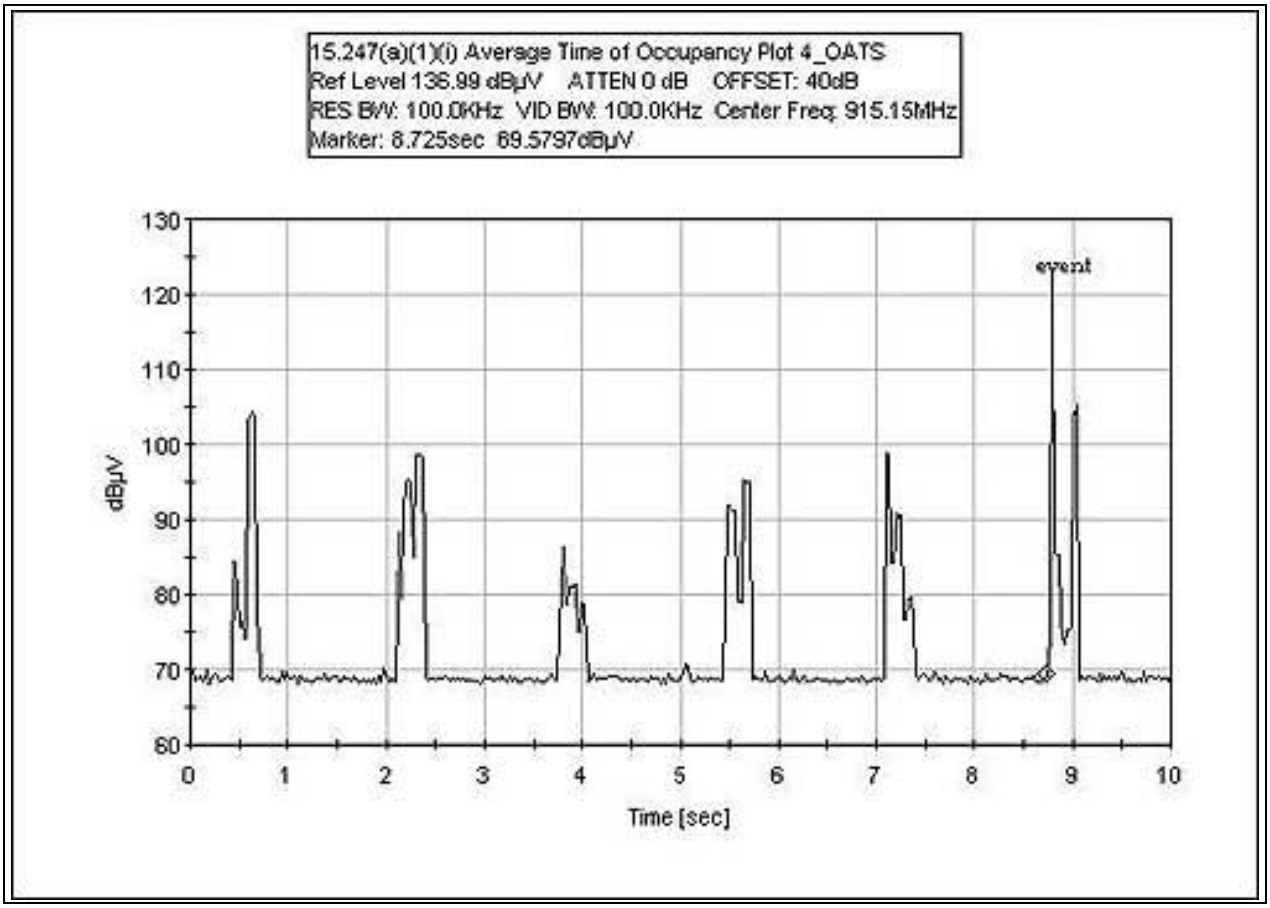
FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY PLOT 2



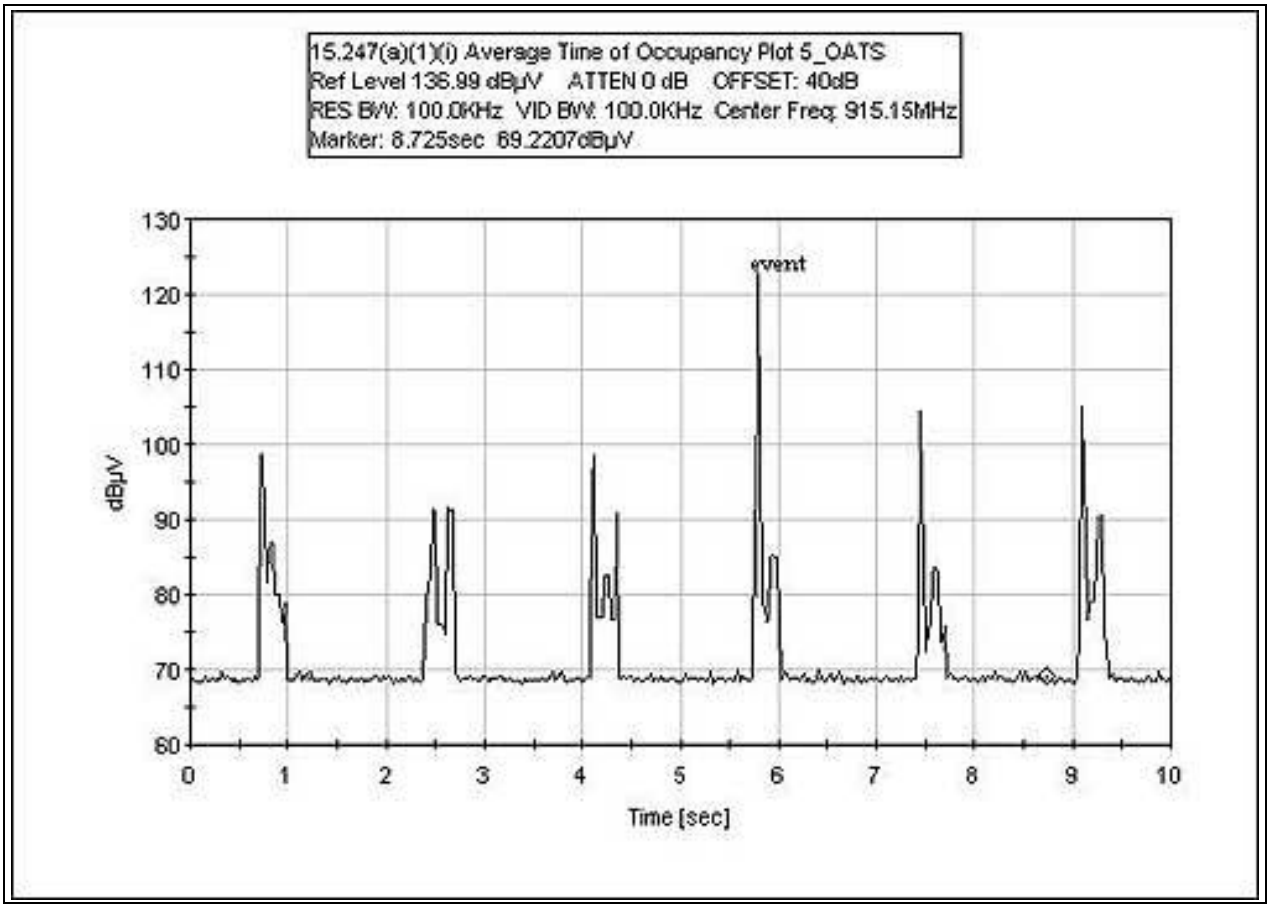
FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY PLOT 3



FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY PLOT 4



FCC 15.247(a)(1)(i) AVERAGE TIME OF OCCUPANCY PLOT 5

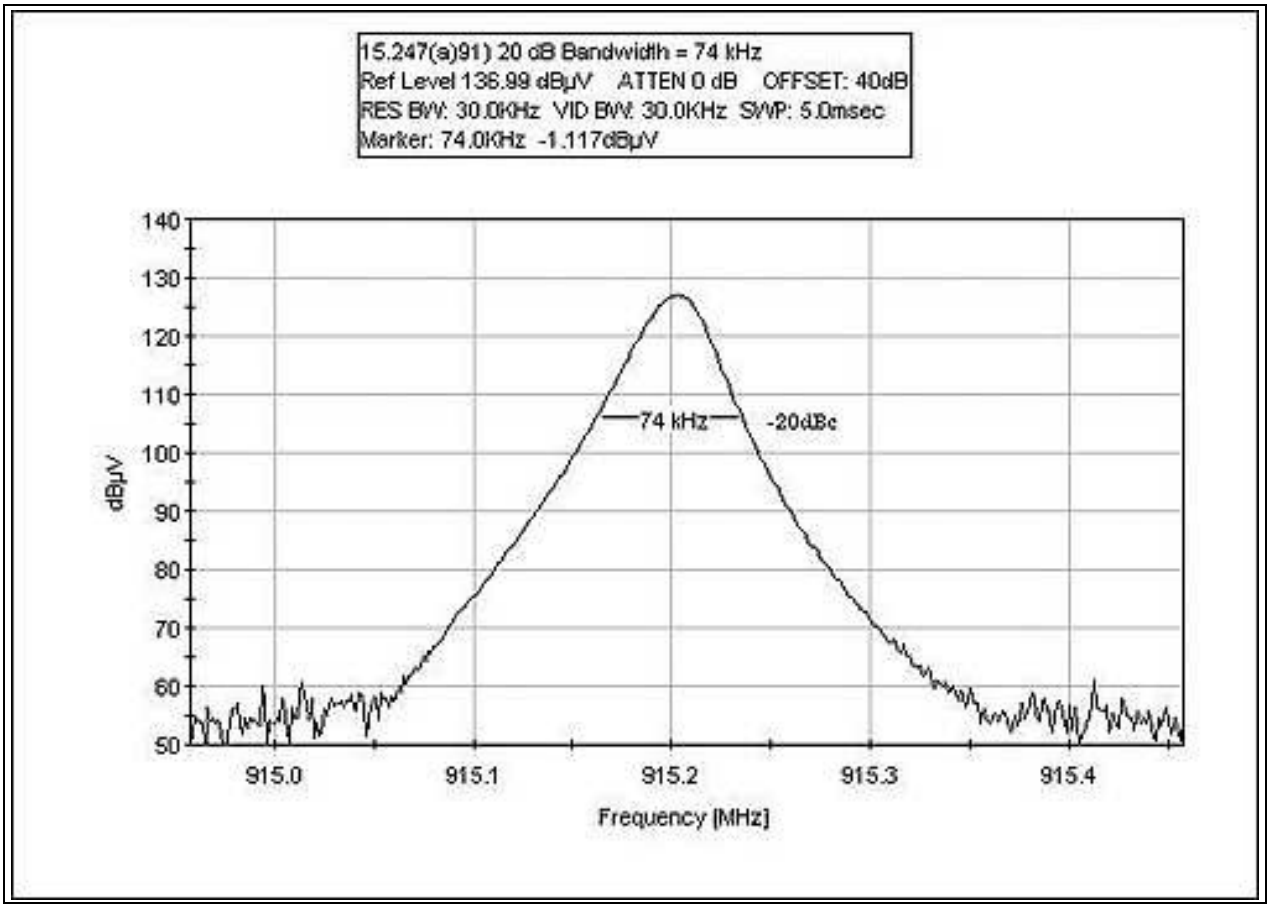


Calculation: The average time of occupancy in 10 secs is equal to Events captured in 10 sec times the channel on time, in this case each measured "channel on time" = 61.25 msec and 1 event /10 sec average over 5 captured.

Result: Average time of occupancy = 61.25 mSec

FCC 15.247(a)(1) 20 dB BANDWIDTH

20 dB bandwidth was captured and measured.



Measured 20 dB bandwidth =74 kHz meets *"The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz"* requirement.

FCC 15.247(b)(2) RF POWER OUTPUT

Conducted RF Output Power
Setup: RF Power measured at antenna terminal with a spectrum analyzer.rbw=vbw=5 MHz

Result

Freq		Power (watt)
902.00 MHz	129.6dBuV	0.182W
915.25 MHz	130.1 dBuV	0.205W
928.0 MHz	129.6 dBuV	0.182W

Radiated RF Output Power
Reported RF power is a power density conversion from radiated field measured at 3 meter.

Result

Freq	Radiated field	Power (watt)
902.00MHz	93.6 dBuV/3m	0.0007
915.25MHz	92.9 dBuV/3m	0.0006
928.00MHz	88.6 dBuV/3m	0.0002

Conclusion:
The output power meets the requirement.

FCC 15.247(c) Six Highest Radiated Emission Levels – Antenna Conducted

TEST CONDITIONS: Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all "H Patterns" to the printer via Centronics interface cable. EUT is in operating mode. Frequencies test: 902, 915 & 928MHz. RFID card: Alien Technology SX2000. Frequency range of measurement = 9kHz- 9.28GHz. Modification: Alien Rev. B, Grill Style. 110VAC, 60 Hz, 21ºC, 46% relative humidity, 100kPa. **No emissions found within 30dB of the limit.**

Table 1: FCC 15.247(c) Six Highest Radiated Emission Levels

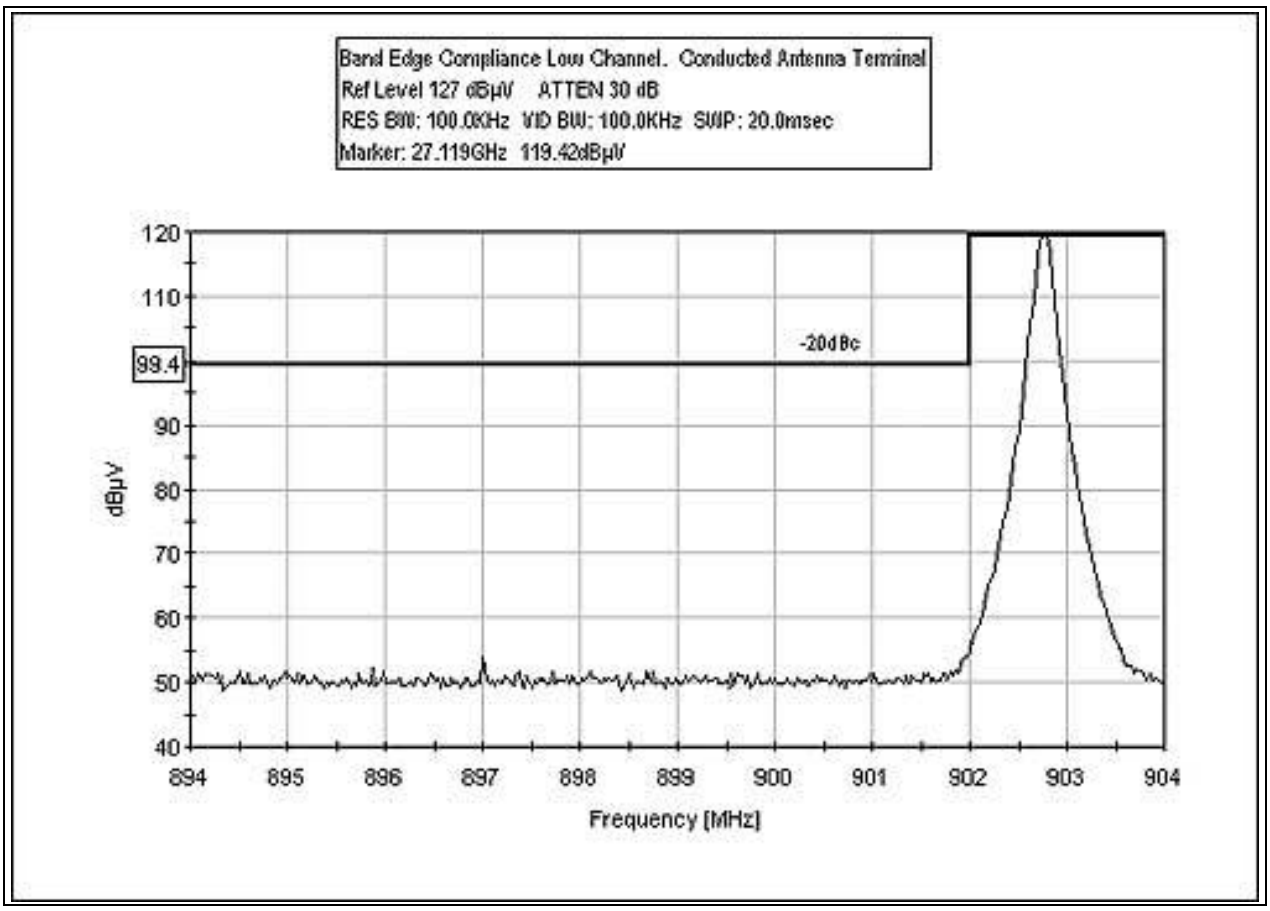
FREQUENCY MHz	METER READING dBµV	CORRECTION FACTORS Ant dB	Amp dB	Cable dB	Dist dB	CORRECTED READING dBµV/m	SPEC LIMIT dBµV/m	MARGIN dB	NOTES
98.033	56.9	10.7	-28.4	1.9		41.1	43.5	-2.4	VQ
100.200	57.1	10.9	-28.4	1.9		41.5	43.5	-2.0	H
100.332	58.2	10.9	-28.4	1.9		42.6	43.5	-0.9	VQ
101.632	58.5	11.0	-28.4	1.9		43.0	43.5	-0.5	VQ
200.430	58.1	9.8	-28.4	3.0		42.5	43.5	-1.0	HQ
4638.100	51.2	34.5	-39.3	5.2		51.6	54.0	-2.4	V

Test Method: ANSI C63.4 (1992)
Spec Limit: FCC Part 15 Subpart C Sections 15.247(c)
Test Distance: 3 Meters

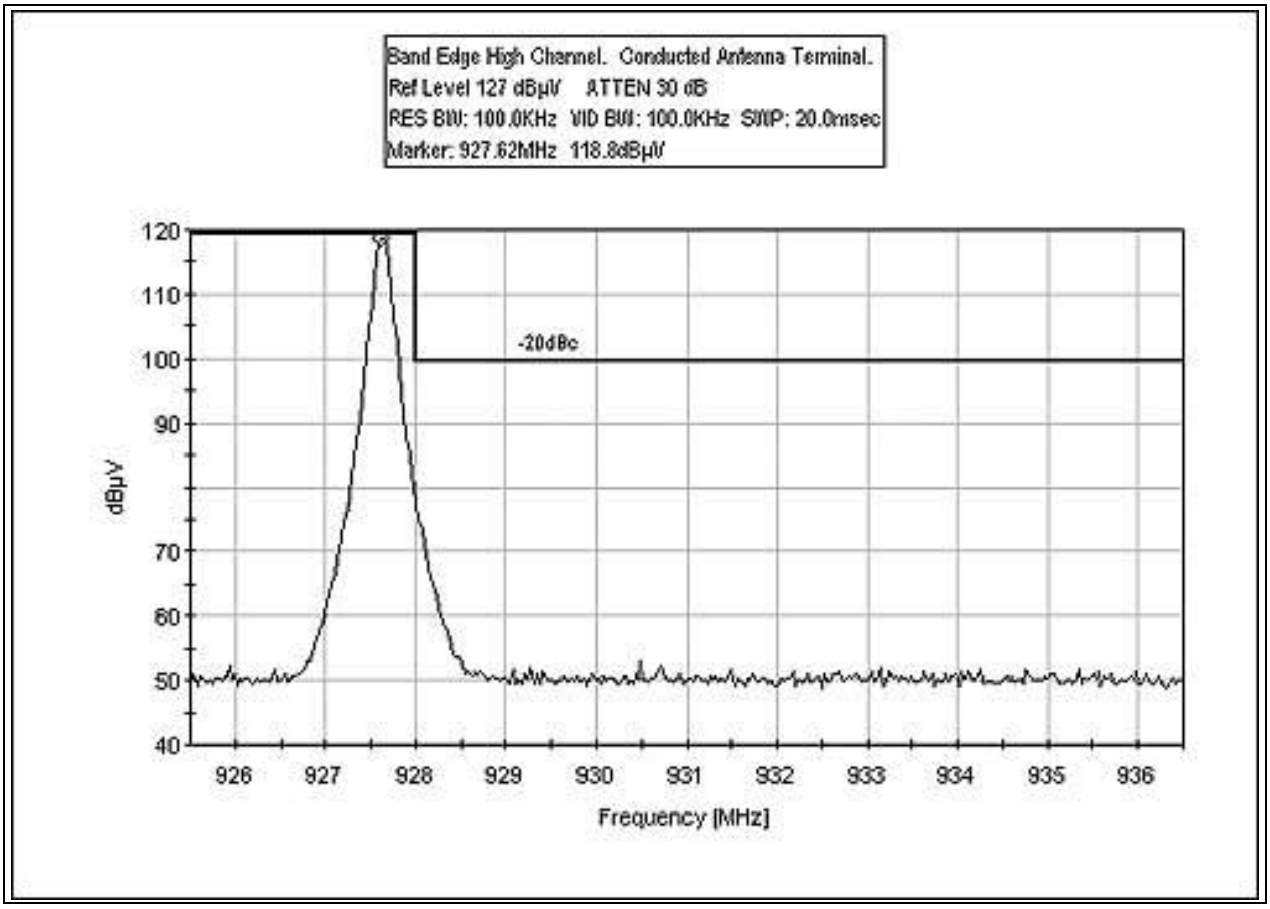
NOTES: H = Horizontal Polarization
V = Vertical Polarization
Q = Quasi Peak Reading

COMMENTS: Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all "H-Patterns" to the printer via Centronics interface cable. EUT is in operating mode. Operating frequencies: 902MHz, 915 MHz, & 928 MHz. RFID card: Alien Technology SX2000. Frequency range of measurement = 9 kHz - 9.28 GHz. Modification: Alien Rev.B, ITO 60 Mil. 110VAC, 60 Hz, 22ºC, 31% relative humidity.

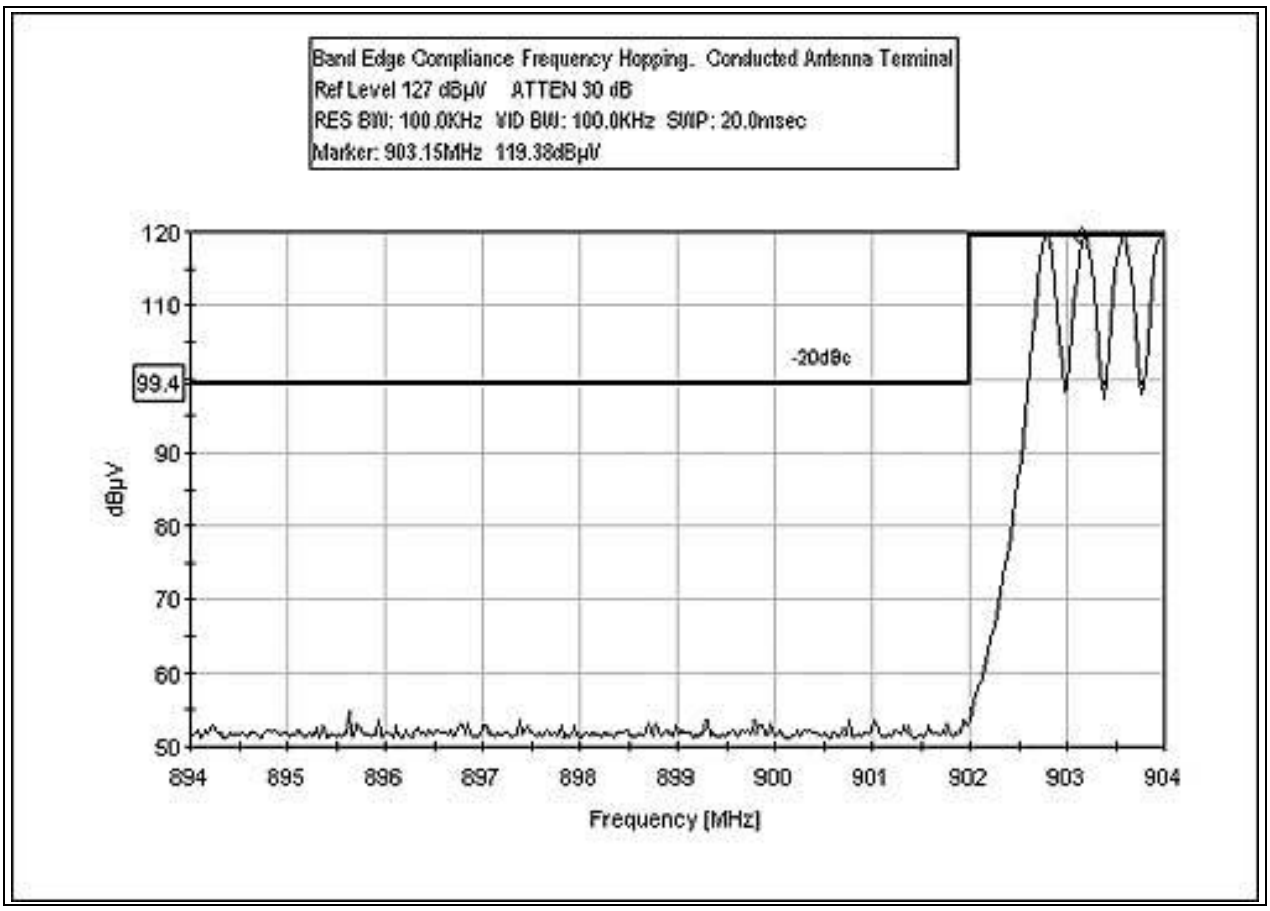
ANTENNA CONDUCTED BANDEDGE - LOW



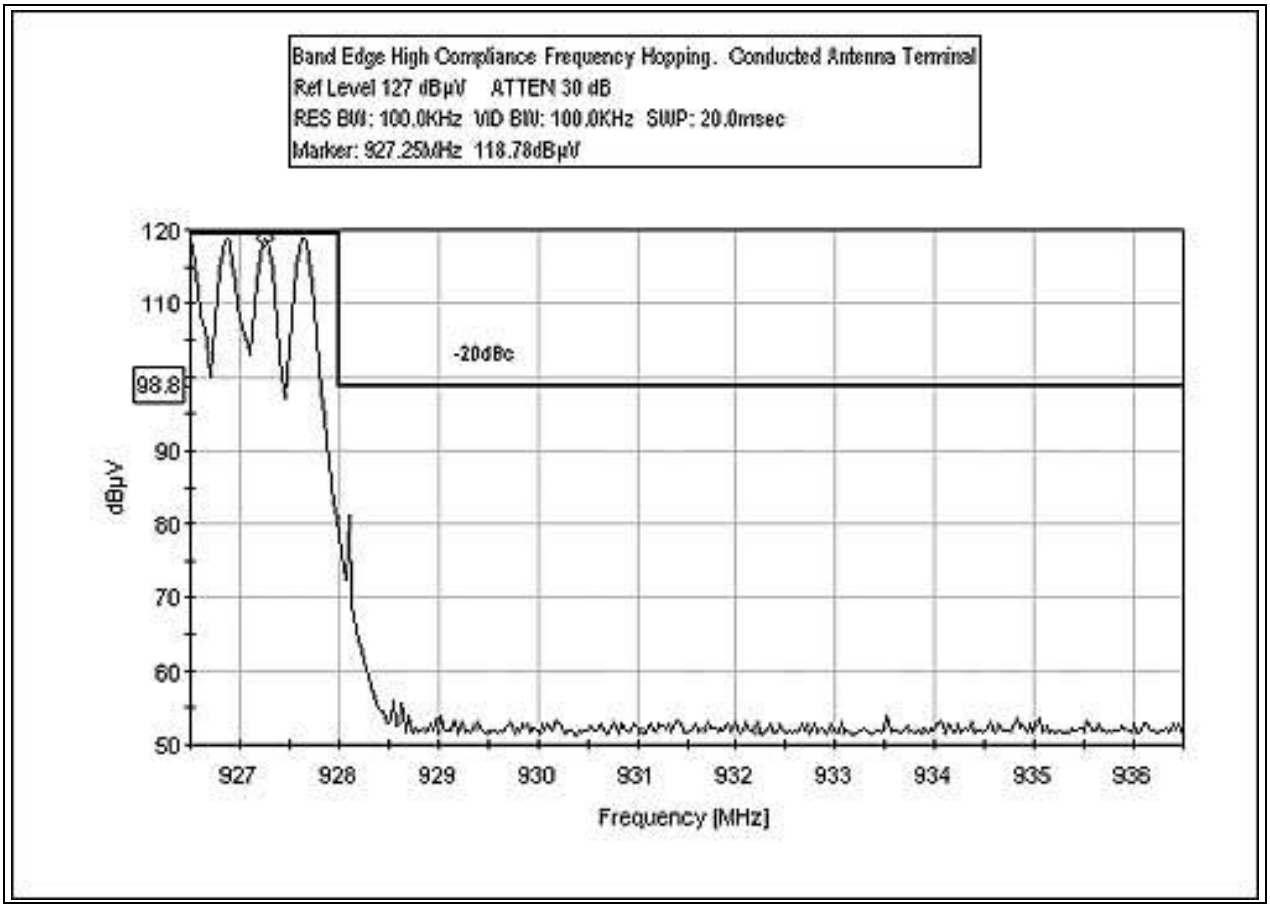
ANTENNA CONDUCTED BANDEDGE - HIGH



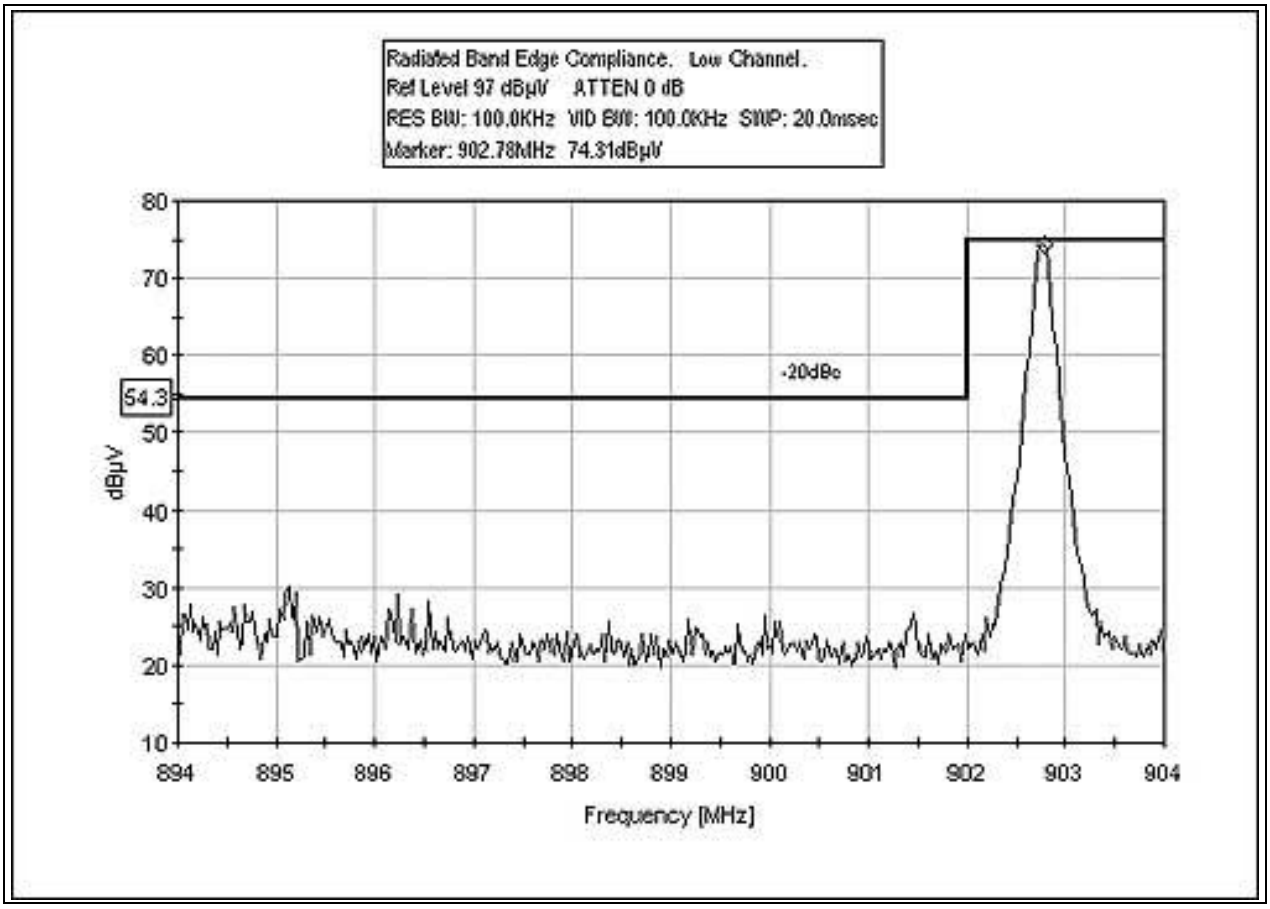
ANTENNA CONDUCTED BANDEDGE - LOW HOPPING



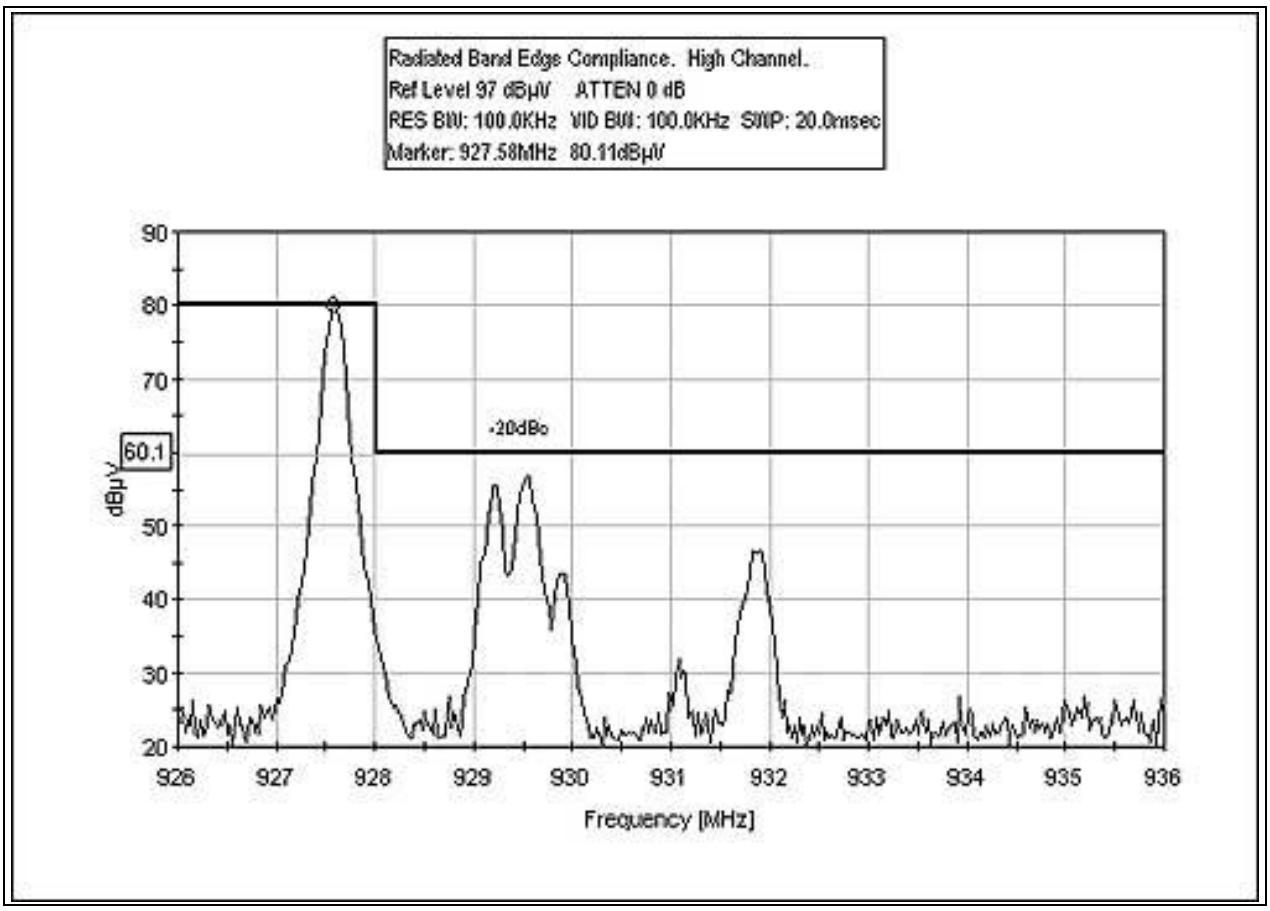
ANTENNA CONDUCTED BANDEDGE - HIGH HOPPING



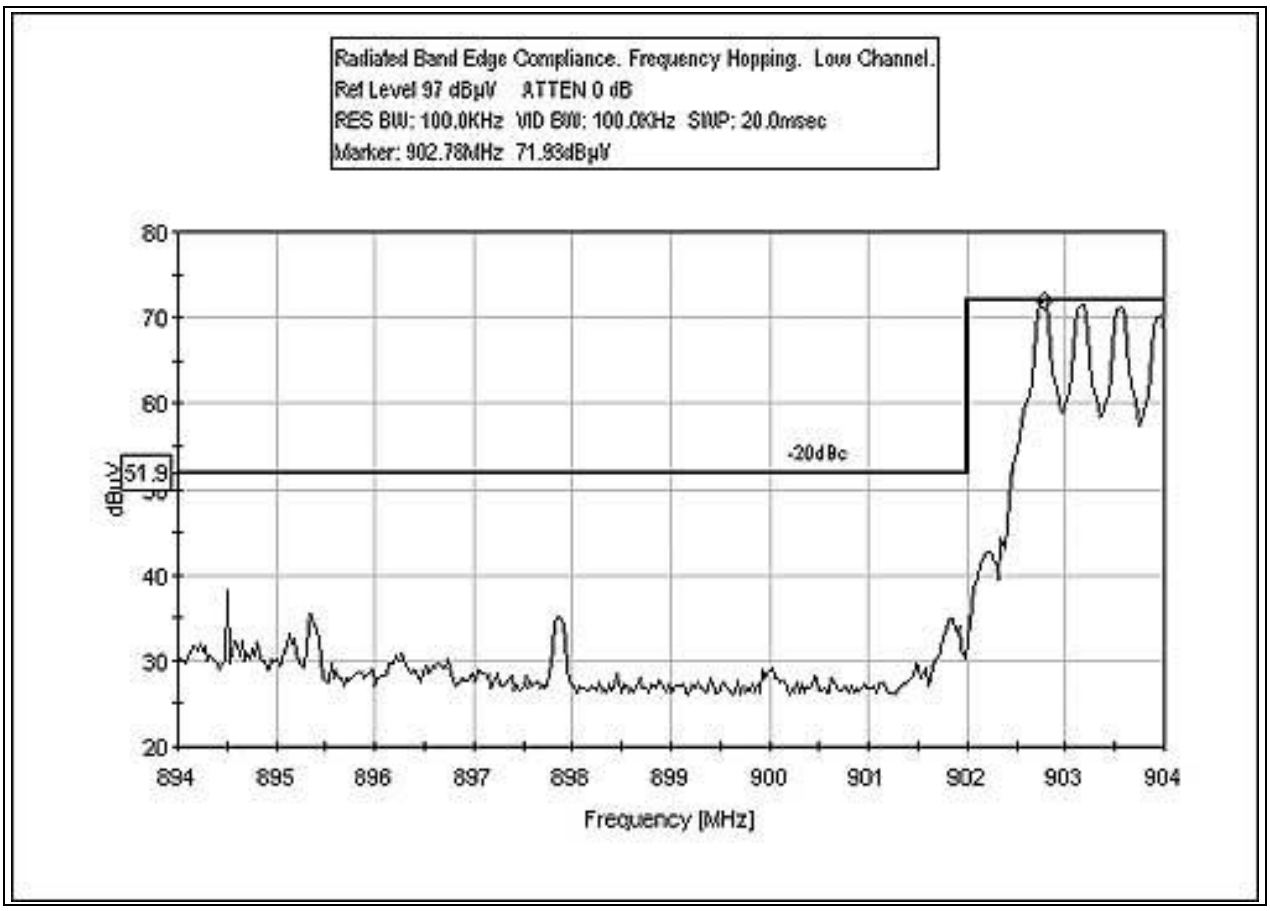
RADIATED BANDEDGE - LOW



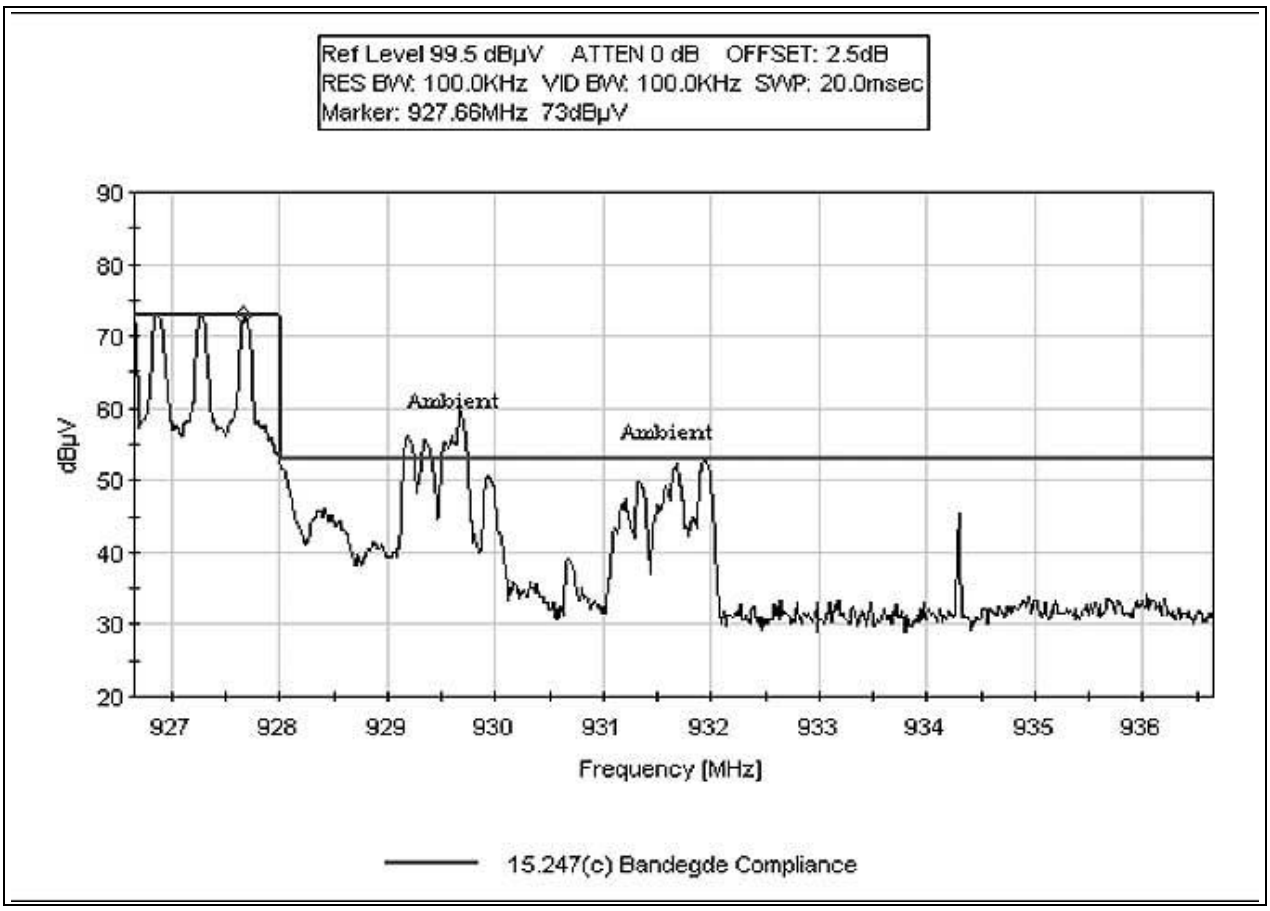
RADIATED BANDEDGE - HIGH



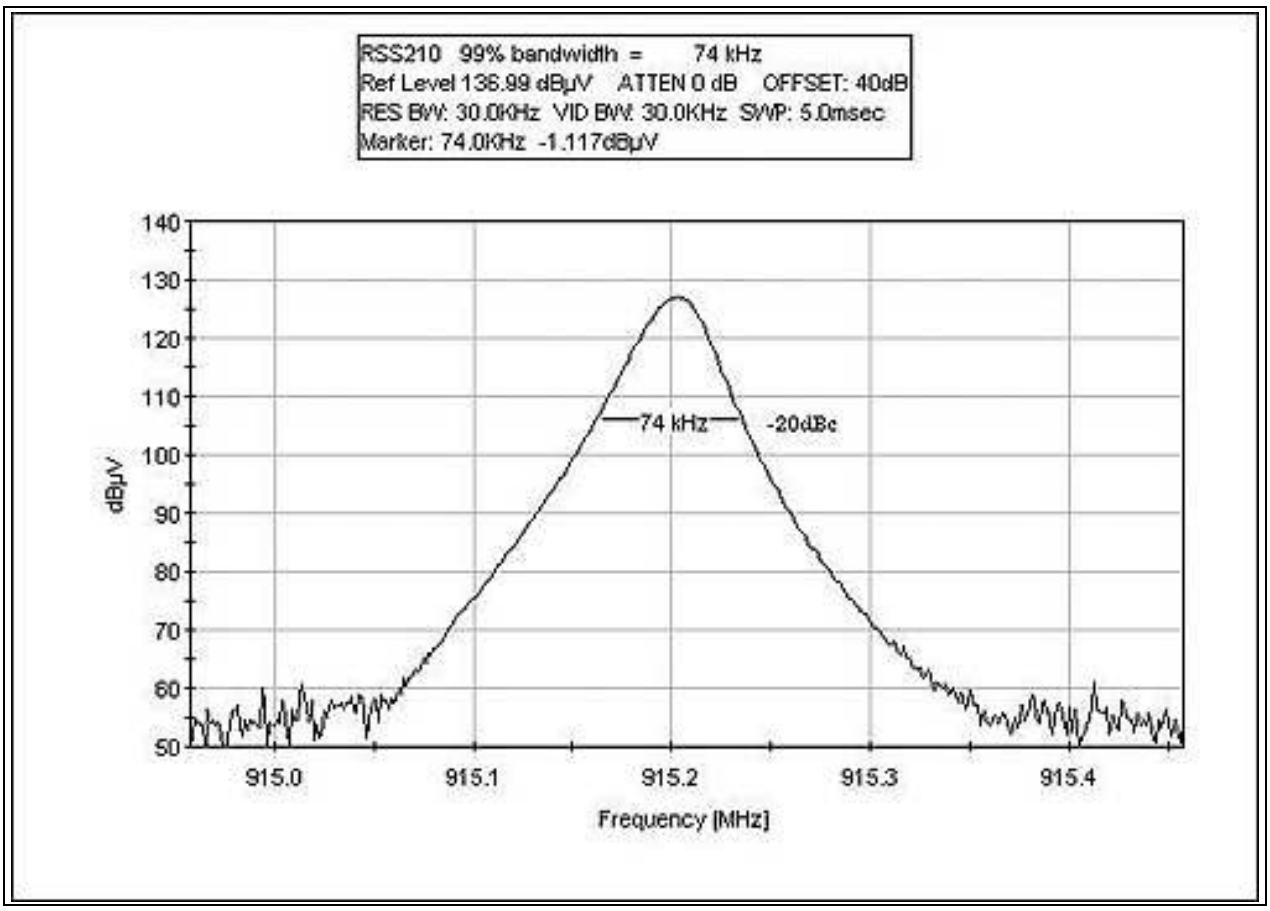
RADIATED BANDEDGE - LOW HOPPING



RADIATED BANDEDGE - HIGH HOPPING



RSS 210 99% BANDWIDTH



TEMPERATURE AND HUMIDITY DURING TESTING
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

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 dBµV/m, the spectrum analyzer reading in dBµV 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	(dBµV)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed in Table A were used to collect both the radiated and conducted emissions data for the EUT. For radiated measurements from 9 kHz to 30 MHz, the magnetic loop antenna was used. For radiated measurements from 30 to 1000 MHz, the biconilog antenna was used. The horn antenna was used for frequencies above 1000 MHz. 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 dBµV, 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 µH-/+50 ohms. Above 150 kHz, a 0.15 µF 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.

Antenna Conducted Emissions

For measuring the signal strength on the RF output port of the EUT, the spectrum analyzer was connected directly to the EUT. The sweep time of the analyzer was adjusted so that the spectrum analyzer readings were always in a calibrated range. All readings within 20 dB of the limit were recorded.

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. For frequencies exceeding 1000 MHz, the horn antenna was used. 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 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 DIRECT CONNECT TEST SETUP

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 - Front View - Loop Antenna

PHOTOGRAPH SHOWING RADIATED EMISSIONS

Radiated Emissions - Back View

APPENDIX B

TEST EQUIPMENT LIST

Conducted Emissions
15.207

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	02462	HP	8568B	2928A04874	031103	031105
Spectrum Analyzer Display Section	02472	HP	85662A	3001A18430	031103	031105
QP Adapter	01437	HP	85650A	3303A01884	092702	092704
Conducted Cable	NA	Harbour Ind	RG142	Cable # 21	072302	072304
LISN	00847	EMCO	3816/2NM	1104	010403	010405
LISN	00276, 00277, 00278	Solar	8028-50-TS-24BNC	B2	101403	101405
150kHZ HPF	02610	TTE	HB9615-150k-50-720	07766	041604	041605

FCC15.247(a)(1), (a)(1)(I), (b)(2), (c), 15.31(e), bandedge plot

Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105

Radiated Emissions
FCC15.247

Equipment	Asset #	Manufacturer	Model #	Serial #	Cal Date	Cal Due
Spectrum Analyzer RF Section	02462	HP	8568B	2928A04874	031103	031105
Spectrum Analyzer Display Section	02472	HP	85662A	3001A18430	031103	031105
QP Adapter	01437	HP	85650A	3303A01884	092702	092704
Spectrum Analyzer	02111	HP	8593EM	3624A000159	51203	51205
Spectrum Analyzer	02467	Agilent	E7405A	US40240225	033103	033105
FCC 15.247 (c) Spurious Emission 30 – 1000MHz, bandedge plots						
Biconilog Antenna	01995	Chase	CBL6111C	2451	040804	040806
Pre-amp	00309	HP	8447D	1937A02548	082303	082304
Antenna cable	NA	NA	RG214	Cable#15	123003	123004
Pre-amp to SA cable	NA	Harbour	RG223/U	Cable#10	070802	070804
FCC 15.247 (c) Spurious Emission 1000 – 9280MHz						
Horn Antenna	0849	EMCO	3115	6246	091002	091004
Microwave Pre-amp	00786	HP	83017A	3123A00281	091102	091104
¼" Heliax Coaxial Cable	NA	Andrew	FSJ-50A-4	Cable#7 (6 ft)	073103	073104
Heliax Antenna cable	NA	Andrew	LDF1-50	Cable#20	101303	101304
24" SMA Cable	2604	Argosy	UFA147A	0-0360-200200	012304	012305
150kHz-30MHz						
Loop Antenna	00314	EMCO	6502	2014	072302	072304

APPENDIX C
MEASUREMENT DATA SHEETS

Test Location: CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer:	**Printronix**		
Specification:	**FCC 15.107 Class B COND [AVE]**		
Work Order #:	**81380**	Date:	04/29/2004
Test Type:	**Conducted Emissions**	Time:	09:12:51
Equipment:	**Printer**	Sequence#:	2
Manufacturer:	Printronix	Tested By:	Eddie Wong
Model:	T5204e		110V 60Hz
S/N:	480329082260		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Printer*	Printronix	T5204e	480329082260

Support Devices:

Function	Manufacturer	Model #	S/N
Lap Top Computer	Dell	66902 (Latitude)	00066902-12800-82P-3038

Test Conditions / Notes:

Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all “H’s Pattern" to the printer via Centronics interface cable. EUT is in operating mode. Freq: Hopping. RFID card: Alien Technology SX2000. 110 VAC, 60 Hz, 22°C, 31% relative humidity.

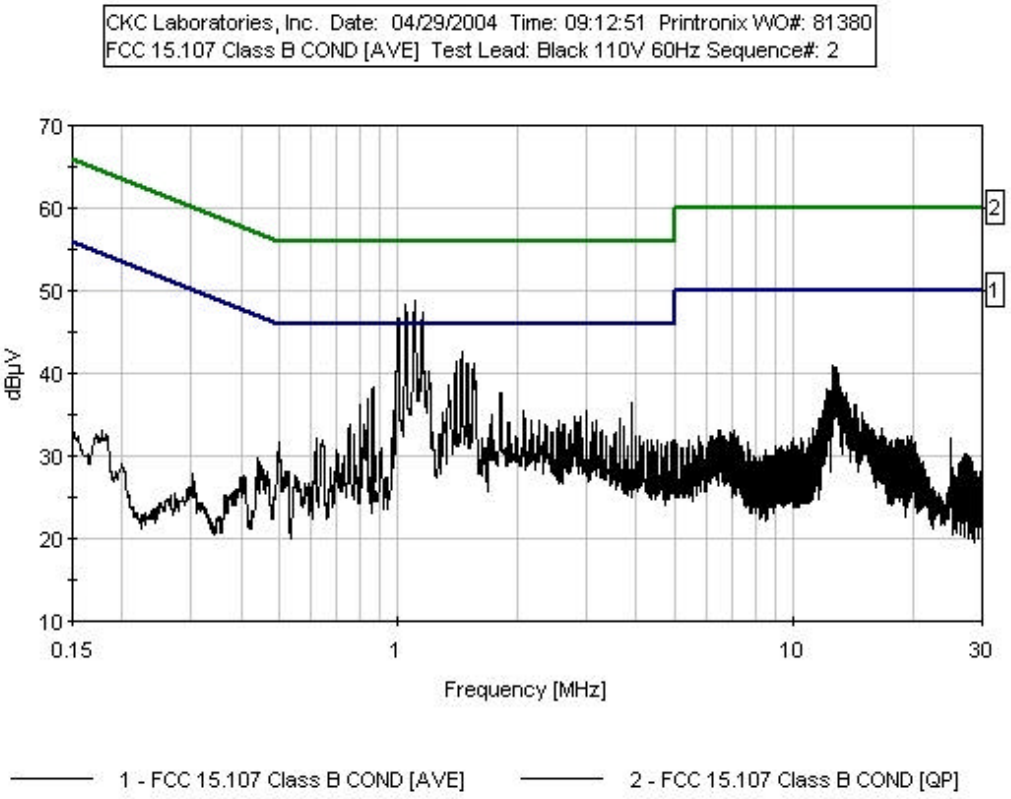
Transducer Legend:

T1=150kHz HPF 041605

Measurement Data: Reading listed by margin. Test Lead: Black

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1.447M	42.6	+0.1				+0.0	42.7	46.0	-3.3	Black
2	1.400M	41.2	+0.2				+0.0	41.4	46.0	-4.6	Black
3	1.557M	41.2	+0.1				+0.0	41.3	46.0	-4.7	Black
4	1.494M	41.1	+0.1				+0.0	41.2	46.0	-4.8	Black
5	1.200M	40.1	+0.2				+0.0	40.3	46.0	-5.7	Black
6	1.175M	40.0	+0.2				+0.0	40.2	46.0	-5.8	Black
7	1.574M	38.9	+0.1				+0.0	39.0	46.0	-7.0	Black
8	1.345M	38.4	+0.2				+0.0	38.6	46.0	-7.4	Black
9	862.656k	38.2	+0.2				+0.0	38.4	46.0	-7.6	Black
10	1.817M	37.6	+0.1				+0.0	37.7	46.0	-8.3	Black
11	12.526M	40.7	+0.2				+0.0	40.9	50.0	-9.1	Black

12 Ave	1.000M	32.7	+0.2		+0.0	32.9	46.0	-13.1	Black
^	1.000M	46.4	+0.2		+0.0	46.6	46.0	+0.6	Black
14 Ave	1.098M	32.7	+0.2		+0.0	32.9	46.0	-13.1	Black
^	1.098M	48.6	+0.2		+0.0	48.8	46.0	+2.8	Black



Test Location: CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer:	**Printronix**		
Specification:	**FCC 15.107 Class B COND [AVE]**		
Work Order #:	**81380**	Date:	04/29/2004
Test Type:	**Conducted Emissions**	Time:	09:02:37
Equipment:	**Printer**	Sequence#:	1
Manufacturer:	Printronix	Tested By:	Eddie Wong
Model:	T5204e		110V 60Hz
S/N:	480329082260		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Printer*	Printronix	T5204e	480329082260

Support Devices:

Function	Manufacturer	Model #	S/N
Lap Top Computer	Dell	66902 (Latitude)	00066902-12800-82P-3038

Test Conditions / Notes:

Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all “H’s Pattern" to the printer via Centronics interface cable. EUT is in operating mode. Freq: Hopping. RFID card: Alien Technology SX2000. 110 VAC, 60 Hz, 22°C, 31% relative humidity.

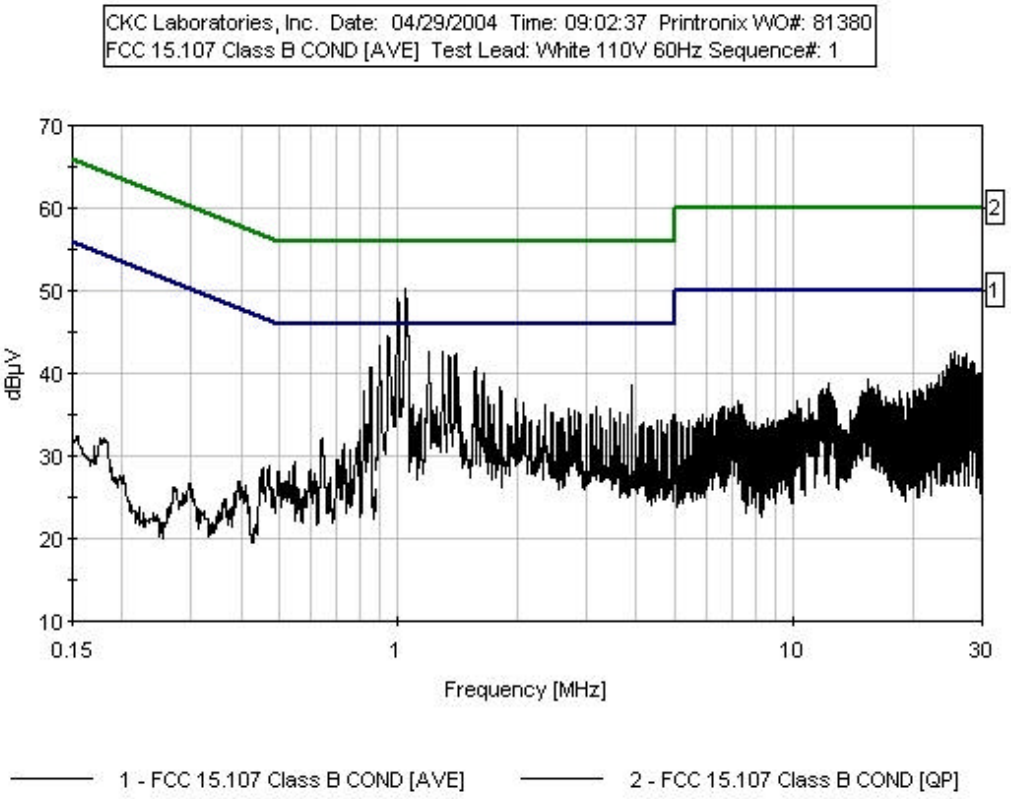
Transducer Legend:

T1=150kHz HPF 041605

Measurement Data: Reading listed by margin. Test Lead: White

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1.341M	41.9	+0.2				+0.0	42.1	46.0	-3.9	White
2	851.748k	40.5	+0.2				+0.0	40.7	46.0	-5.3	White
3	1.566M	40.5	+0.1				+0.0	40.6	46.0	-5.4	White
4	1.643M	39.8	+0.1				+0.0	39.9	46.0	-6.1	White
5	1.421M	39.4	+0.1				+0.0	39.5	46.0	-6.5	White
6	25.553M	42.4	+0.2				+0.0	42.6	50.0	-7.4	White
7	3.888M	38.4	+0.1				+0.0	38.5	46.0	-7.5	White
8	27.369M	42.2	+0.2				+0.0	42.4	50.0	-7.6	White
9	1.047M Ave	35.3	+0.2				+0.0	35.5	46.0	-10.5	White
^	1.047M	50.1	+0.2				+0.0	50.3	46.0	+4.3	White

11 Ave	996.000k	34.7	+0.2		+0.0	34.9	46.0	-11.1	White
^	996.084k	48.8	+0.2		+0.0	49.0	46.0	+3.0	White
13 Ave	1.200M	29.2	+0.2		+0.0	29.4	46.0	-16.6	White
^	1.200M	42.5	+0.2		+0.0	42.7	46.0	-3.3	White



Test Location: CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **Printronix**
Specification: **FCC 15.247(c)**
Work Order #: **82001** Date: 6/16/04
Test Type: **Maximized emission** Time: 13:20:55
Equipment: **Printer** Sequence#: 33
Manufacturer: Printronix Tested By: Eddie Wong
Model: T5204e
S/N: 480329082260

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Printer*	Printronix	T5204e	480329082260

Support Devices:

Function	Manufacturer	Model #	S/N
Lap Top Computer	Dell	66902 (Latitude)	00066902-12800-82P-3038

Test Conditions / Notes:

Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all "H-Patterns" to the printer via Centronics interface cable. EUT is in operating mode. Operating frequency: 902 MHz. RFID card: Alien Technology SX2000. Frequency range of measurement = 9 kHz - 9.28 GHz. Modification: Alien Rev. B, ITO 60 Mil. 110VAC, 60 Hz, 22ºC, 31% relative humidity.

Transducer Legend:

T1=Horn 6246_091004	T2=SMA Cable 1-40GHz AN2604_012305
T3=HP83017A Preamp 091104	T4=Cable#20 Heliax 48ft 101304
T5=HPF_AN02116_1.5GHz_060605	T6=Biconalog, SN 2451 040806
T7=Cable #10 070804	T8=Cable# 15 123004
T9=Preamp 8447D 082304	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	902.829M	82.8	+0.0 +0.0 -27.4	+0.0 +24.0	+0.0 +0.7	+0.0 +6.2	+0.0	86.3	46.0 Fundamental	+40.3	Vert
2	902.823M	79.1	+0.0 +0.0 -27.4	+0.0 +24.0	+0.0 +0.7	+0.0 +6.2	+0.0	82.6	46.0 Fundamental	+36.6	Horiz
3	200.430M QP	58.1	+0.0 +0.0 -28.4	+0.0 +9.8	+0.0 +0.2	+0.0 +2.8	+0.0	42.5	43.5	-1.0	Horiz
^	200.430M	60.4	+0.0 +0.0 -28.4	+0.0 +9.8	+0.0 +0.2	+0.0 +2.8	+0.0	44.8	43.5	+1.3	Horiz
5	100.200M	57.1	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	41.5	43.5	-2.0	Horiz

6	98.000M QP	56.1	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +1.7	+0.0	40.3	43.5	-3.2	Vert
^	98.000M	57.0	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +1.7	+0.0	41.2	43.5	-2.3	Vert
8	84.900M QP	54.3	+0.0 +0.0 -28.5	+0.0 +8.8	+0.0 +0.2	+0.0 +1.8	+0.0	36.6	40.0	-3.4	Vert
^	84.900M	57.9	+0.0 +0.0 -28.5	+0.0 +8.8	+0.0 +0.2	+0.0 +1.8	+0.0	40.2	40.0	+0.2	Vert
10	2708.440M Ave	55.0	+29.5 +0.3 +0.0	+0.5 +0.0	-38.5 +0.0	+3.7 +0.0	+0.0	50.5	54.0	-3.5	Vert
^	2708.460M	57.2	+29.5 +0.3 +0.0	+0.5 +0.0	-38.5 +0.0	+3.7 +0.0	+0.0	52.7	54.0	-1.3	Vert
12	101.570M QP	54.7	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	39.2	43.5	-4.3	Vert
^	101.570M	56.6	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	41.1	43.5	-2.4	Vert
14	100.081M QP	53.9	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	38.3	43.5	-5.2	Vert
^	100.081M	55.6	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	40.0	43.5	-3.5	Vert
16	734.607M	40.5	+0.0 +0.0 -27.5	+0.0 +21.6	+0.0 +0.6	+0.0 +5.4	+0.0	40.6	46.0	-5.4	Horiz
17	169.354M	53.1	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +2.5	+0.0	38.1	43.5	-5.4	Horiz
18	100.200M QP	53.6	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	38.0	43.5	-5.5	Vert
^	100.200M	57.8	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	42.2	43.5	-1.3	Vert
20	99.700M QP	53.5	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	37.9	43.5	-5.6	Horiz
21	102.481M	53.2	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	37.7	43.5	-5.8	Vert
22	321.787M	50.1	+0.0 +0.0 -28.3	+0.0 +14.6	+0.0 +0.3	+0.0 +3.4	+0.0	40.1	46.0	-5.9	Horiz

23	95.700M	53.6	+0.0 +0.0 -28.4	+0.0 +10.4	+0.0 +0.2	+0.0 +1.8	+0.0	37.6	43.5	-5.9	Vert
24	4513.930M	48.6	+33.2 +0.4 +0.0	+0.7 +0.0	-39.8 +0.0	+4.9 +0.0	+0.0	48.0	54.0	-6.0	Horiz
25	4514.030M	48.2	+33.2 +0.4 +0.0	+0.7 +0.0	-39.7 +0.0	+4.9 +0.0	+0.0	47.7	54.0	-6.3	Vert
26	423.417M	45.7	+0.0 +0.0 -28.2	+0.0 +17.3	+0.0 +0.4	+0.0 +3.9	+0.0	39.1	46.0	-6.9	Horiz
27	2708.500M	51.5	+29.5 +0.3 +0.0	+0.5 +0.0	-38.5 +0.0	+3.7 +0.0	+0.0	47.0	54.0	-7.0	Horiz
28	93.700M	51.9	+0.0 +0.0 -28.5	+0.0 +10.2	+0.0 +0.2	+0.0 +1.8	+0.0	35.6	43.5	-7.9	Vert
29	6317.930M	40.6	+33.2 +0.4 +0.0	+0.9 +0.0	-35.3 +0.0	+6.0 +0.0	+0.0	45.8	54.0	-8.2	Horiz
30	104.700M	50.3	+0.0 +0.0 -28.4	+0.0 +11.2	+0.0 +0.2	+0.0 +1.8	+0.0	35.1	43.5	-8.4	Vert
31	95.700M	51.0	+0.0 +0.0 -28.4	+0.0 +10.4	+0.0 +0.2	+0.0 +1.8	+0.0	35.0	43.5	-8.5	Horiz
32	355.642M	45.8	+0.0 +0.0 -28.3	+0.0 +15.5	+0.0 +0.4	+0.0 +3.5	+0.0	36.9	46.0	-9.1	Horiz
33	6318.030M	39.7	+33.2 +0.4 +0.0	+0.9 +0.0	-35.3 +0.0	+6.0 +0.0	+0.0	44.9	54.0	-9.1	Vert
34	5415.930M	40.6	+33.9 +0.6 +0.0	+0.8 +0.0	-36.9 +0.0	+5.5 +0.0	+0.0	44.5	54.0	-9.5	Horiz
35	136.440M	47.7	+0.0 +0.0 -28.3	+0.0 +12.2	+0.0 +0.2	+0.0 +2.1	+0.0	33.9	43.5	-9.6	Horiz
36	1805.680M	51.6	+27.0 +0.8 +0.0	+0.5 +0.0	-38.3 +0.0	+2.5 +0.0	+0.0	44.1	54.0	-9.9	Vert
37	5416.030M	40.2	+33.9 +0.6 +0.0	+0.8 +0.0	-36.9 +0.0	+5.5 +0.0	+0.0	44.1	54.0	-9.9	Vert
38	90.900M	50.0	+0.0 +0.0 -28.5	+0.0 +9.8	+0.0 +0.2	+0.0 +1.9	+0.0	33.4	43.5	-10.1	Vert
39	389.551M	42.8	+0.0 +0.0 -28.2	+0.0 +16.2	+0.0 +0.4	+0.0 +3.8	+0.0	35.0	46.0	-11.0	Horiz

40	1805.600M	49.1	+27.0 +0.8 +0.0	+0.5 +0.0	-38.3 +0.0	+2.5 +0.0	+0.0	41.6	54.0	-12.4	Horiz
41	3611.380M	43.9	+32.4 +0.3 +0.0	+0.6 +0.0	-39.9 +0.0	+4.3 +0.0	+0.0	41.6	54.0	-12.4	Vert
42	3610.500M	41.2	+32.4 +0.3 +0.0	+0.6 +0.0	-39.9 +0.0	+4.3 +0.0	+0.0	38.9	54.0	-15.1	Horiz

Test Location: CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer:	**Printronix**		
Specification:	**FCC 15.247(c)**		
Work Order #:	**82001**	Date:	6/16/04
Test Type:	**Maximized emission**	Time:	11:30:42
Equipment:	**Printer**	Sequence#:	33
Manufacturer:	Printronix	Tested By:	Eddie Wong
Model:	T5204e		
S/N:	480329082260		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Printer*	Printronix	T5204e	480329082260

Support Devices:

Function	Manufacturer	Model #	S/N
Lap Top Computer	Dell	66902 (Latitude)	00066902-12800-82P-3038

Test Conditions / Notes:

Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all "H-Patterns" to the printer via Centronics interface cable. EUT is in operating mode. Operating frequency: 915 MHz. RFID card: Alien Technology SX2000. Frequency range of measurement = 9 kHz - 9.28 GHz. Modification: Alien Rev. B, ITO 60 Mil. 110VAC, 60 Hz, 22ºC, 31% relative humidity.

Transducer Legend:

T1=Horn 6246_091004	T2=SMA Cable 1-40GHz AN2604_012305
T3=HP83017A Preamp 091104	T4=Cable#20 Heliax 48ft 101304
T5=HPF_AN02116_1.5GHz_060605	T6=Biconalog, SN 2451 040806
T7=Cable #10 070804	T8=Cable# 15 123004
T9=Preamp 8447D 082304	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	915.209M	83.4	+0.0 +0.0 -27.4	+0.0 +24.6	+0.0 +0.7	+0.0 +6.2	+0.0	87.5	46.0 Fundamental	+41.5	Vert
2	915.219M	81.6	+0.0 +0.0 -27.4	+0.0 +24.6	+0.0 +0.7	+0.0 +6.2	+0.0	85.7	46.0 Fundamental	+39.7	Horiz
3	101.632M QP	58.5	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	43.0	43.5	-0.5	Vert
^	101.632M	61.3	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	45.8	43.5	+2.3	Vert
5	100.332M QP	58.2	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	42.6	43.5	-0.9	Vert

^	100.332M	60.7	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	45.1	43.5	+1.6	Vert
7	98.033M QP	56.9	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +1.7	+0.0	41.1	43.5	-2.4	Vert
^	98.033M	59.1	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +1.7	+0.0	43.3	43.5	-0.2	Vert
9	99.528M QP	56.6	+0.0 +0.0 -28.4	+0.0 +10.8	+0.0 +0.2	+0.0 +1.7	+0.0	40.9	43.5	-2.6	Vert
^	99.528M	58.8	+0.0 +0.0 -28.4	+0.0 +10.8	+0.0 +0.2	+0.0 +1.7	+0.0	43.1	43.5	-0.4	Vert
11	102.478M QP	54.8	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	39.3	43.5	-4.2	Vert
^	102.478M	56.9	+0.0 +0.0 -28.4	+0.0 +11.0	+0.0 +0.2	+0.0 +1.7	+0.0	41.4	43.5	-2.1	Vert
13	4576.030M	49.4	+33.2 +0.5 +0.0	+0.7 +0.0	-39.5 +0.0	+5.1 +0.0	+0.0	49.4	54.0	-4.6	Horiz
14	86.624M	52.2	+0.0 +0.0 -28.5	+0.0 +9.1	+0.0 +0.2	+0.0 +1.8	+0.0	34.8	40.0	-5.2	Vert
15	104.700M	53.2	+0.0 +0.0 -28.4	+0.0 +11.2	+0.0 +0.2	+0.0 +1.8	+0.0	38.0	43.5	-5.5	Vert
16	321.817M	50.5	+0.0 +0.0 -28.3	+0.0 +14.6	+0.0 +0.3	+0.0 +3.4	+0.0	40.5	46.0	-5.5	Horiz
17	2745.630M Ave	52.9	+29.7 +0.3 +0.0	+0.6 +0.0	-38.7 +0.0	+3.5 +0.0	+0.0	48.3	54.0	-5.7	Vert
^	2745.630M	55.6	+29.7 +0.3 +0.0	+0.6 +0.0	-38.7 +0.0	+3.5 +0.0	+0.0	51.0	54.0	-3.0	Vert
19	73.200M	53.6	+0.0 +0.0 -28.5	+0.0 +7.1	+0.0 +0.2	+0.0 +1.6	+0.0	34.0	40.0	-6.0	Vert
20	4576.000M	47.7	+33.2 +0.5 +0.0	+0.7 +0.0	-39.5 +0.0	+5.1 +0.0	+0.0	47.7	54.0	-6.3	Vert
21	96.383M QP	52.9	+0.0 +0.0 -28.4	+0.0 +10.5	+0.0 +0.2	+0.0 +1.8	+0.0	37.0	43.5	-6.5	Vert
^	96.383M	56.3	+0.0 +0.0 -28.4	+0.0 +10.5	+0.0 +0.2	+0.0 +1.8	+0.0	40.4	43.5	-3.1	Vert

23	372.609M	46.7	+0.0 +0.0 -28.3	+0.0 +15.9	+0.0 +0.4	+0.0 +3.7	+0.0	38.4	46.0	-7.6	Horiz
24	98.000M	51.6	+0.0 +0.0 -28.4	+0.0 +10.7	+0.0 +0.2	+0.0 +1.7	+0.0	35.8	43.5	-7.7	Horiz
25	141.773M	49.2	+0.0 +0.0 -28.4	+0.0 +12.2	+0.0 +0.2	+0.0 +2.1	+0.0	35.3	43.5	-8.2	Horiz
26	89.455M	50.8	+0.0 +0.0 -28.5	+0.0 +9.6	+0.0 +0.2	+0.0 +1.9	+0.0	34.0	43.5	-9.5	Vert
27	75.686M	49.5	+0.0 +0.0 -28.5	+0.0 +7.4	+0.0 +0.2	+0.0 +1.7	+0.0	30.3	40.0	-9.7	Horiz
28	1830.330M	51.5	+27.1 +0.7 +0.0	+0.5 +0.0	-38.4 +0.0	+2.6 +0.0	+0.0	44.0	54.0	-10.0	Vert
29	2745.700M	48.4	+29.7 +0.3 +0.0	+0.6 +0.0	-38.7 +0.0	+3.5 +0.0	+0.0	43.8	54.0	-10.2	Horiz
30	734.564M	34.4	+0.0 +0.0 -27.5	+0.0 +21.6	+0.0 +0.6	+0.0 +5.4	+0.0	34.5	46.0	-11.5	Horiz
31	3660.700M	43.1	+32.6 +0.3 +0.0	+0.6 +0.0	-39.8 +0.0	+4.3 +0.0	+0.0	41.1	54.0	-12.9	Horiz
32	1830.300M	48.1	+27.1 +0.7 +0.0	+0.5 +0.0	-38.4 +0.0	+2.6 +0.0	+0.0	40.6	54.0	-13.4	Horiz

Test Location: CKC Laboratories, Inc. •110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer:	**Printronix**		
Specification:	**FCC 15.247(c)**		
Work Order #:	**82001**	Date:	6/16/04
Test Type:	**Maximized emission**	Time:	10:48:18
Equipment:	**Printer**	Sequence#:	33
Manufacturer:	Printronix	Tested By:	Eddie Wong
Model:	T5204e		
S/N:	480329082260		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Printer*	Printronix	T5204e	480329082260

Support Devices:

Function	Manufacturer	Model #	S/N
Lap Top Computer	Dell	66902 (Latitude)	00066902-12800-82P-3038

Test Conditions / Notes:

Transmitter is installed in the printer and transmitting info to the tag. The Laptop is sending all "H-Patterns" to the printer via Centronics interface cable. EUT is in operating mode. Operating frequency: 928 MHz. RFID card: Alien Technology SX2000. Frequency range of measurement = 9 kHz - 9.28 GHz. Modification: Alien Rev. B, ITO 60 Mil. 110VAC, 60 Hz, 22ºC, 31% relative humidity.

Transducer Legend:

T1=Horn 6246_091004	T2=SMA Cable 1-40GHz AN2604_012305
T3=HP83017A Preamp 091104	T4=Cable#20 Heliax 48ft 101304
T5=HPF_AN02116_1.5GHz_060605	T6=Biconalog, SN 2451 040806
T7=Cable #10 070804	T8=Cable# 15 123004
T9=Preamp 8447D 082304	

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6	T3 T7	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	927.618M	91.0	+0.0 +0.0 -27.5	+0.0 +25.1	+0.0 +0.7	+0.0 +6.3	+0.0	95.6	46.0 Fundamental	+49.6	Vert
2	927.625M	85.3	+0.0 +0.0 -27.5	+0.0 +25.1	+0.0 +0.7	+0.0 +6.3	+0.0	89.9	46.0 Fundamental	+43.9	Horiz
3	4638.100M	51.2	+33.3 +0.5 +0.0	+0.7 +0.0	-39.3 +0.0	+5.2 +0.0	+0.0	51.6	54.0	-2.4	Vert
4	100.600M QP	55.2	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	39.6	43.5	-3.9	Vert
^	100.600M	57.0	+0.0 +0.0 -28.4	+0.0 +10.9	+0.0 +0.2	+0.0 +1.7	+0.0	41.4	43.5	-2.1	Vert

6	906.015M	38.2	+0.0 +0.0 -27.4	+0.0 +24.2	+0.0 +0.7	+0.0 +6.2	+0.0	41.9	46.0	-4.1	Horiz
7	80.350M QP	53.9	+0.0 +0.0 -28.5	+0.0 +7.9	+0.0 +0.2	+0.0 +1.7	+0.0	35.2	40.0	-4.8	Vert
^	80.350M	56.6	+0.0 +0.0 -28.5	+0.0 +7.9	+0.0 +0.2	+0.0 +1.7	+0.0	37.9	40.0	-2.1	Vert
9	2782.850M	53.5	+29.9 +0.2 +0.0	+0.6 +0.0	-38.8 +0.0	+3.4 +0.0	+0.0	48.8	54.0	-5.2	Vert
10	200.014M QP	53.5	+0.0 +0.0 -28.4	+0.0 +9.8	+0.0 +0.2	+0.0 +2.8	+0.0	37.9	43.5	-5.6	Horiz
^	199.995M	55.5	+0.0 +0.0 -28.4	+0.0 +9.8	+0.0 +0.2	+0.0 +2.8	+0.0	39.9	43.5	-3.6	Horiz
12	96.170M	53.8	+0.0 +0.0 -28.4	+0.0 +10.5	+0.0 +0.2	+0.0 +1.8	+0.0	37.9	43.5	-5.6	Vert
13	4638.100M	47.7	+33.3 +0.5 +0.0	+0.7 +0.0	-39.3 +0.0	+5.2 +0.0	+0.0	48.1	54.0	-5.9	Vert
14	133.662M	51.0	+0.0 +0.0 -28.3	+0.0 +12.1	+0.0 +0.2	+0.0 +2.1	+0.0	37.1	43.5	-6.4	Horiz
15	63.032M	52.3	+0.0 +0.0 -28.4	+0.0 +7.3	+0.0 +0.2	+0.0 +1.5	+0.0	32.9	40.0	-7.1	Vert
16	4637.950M	46.4	+33.3 +0.5 +0.0	+0.7 +0.0	-39.3 +0.0	+5.2 +0.0	+0.0	46.8	54.0	-7.2	Horiz
17	45.107M	48.5	+0.0 +0.0 -28.4	+0.0 +11.1	+0.0 +0.2	+0.0 +1.2	+0.0	32.6	40.0	-7.4	Vert
18	135.330M	49.7	+0.0 +0.0 -28.3	+0.0 +12.2	+0.0 +0.2	+0.0 +2.1	+0.0	35.9	43.5	-7.6	Horiz
19	2782.900M	49.1	+29.9 +0.2 +0.0	+0.6 +0.0	-38.8 +0.0	+3.4 +0.0	+0.0	44.4	54.0	-9.6	Horiz
20	1855.400M	49.5	+27.2 +0.7 +0.0	+0.5 +0.0	-38.4 +0.0	+2.7 +0.0	+0.0	42.2	54.0	-11.8	Vert
21	1855.150M	46.3	+27.2 +0.7 +0.0	+0.5 +0.0	-38.4 +0.0	+2.7 +0.0	+0.0	39.0	54.0	-15.0	Horiz