

TEST REPORT



Testing Certification # 1367-01

Laboratory ID
PRODUCT SAFETY ENGINEERING, INC.
12955 Bellamy Brothers Boulevard
Dade City, Florida 33525 USA
PH (352) 588-2209 FX (352) 588-2544

Submitter ID
Cross Match Technologies Inc.
3960 RCA Blvd.
Suite 6001
Palm Beach, FL 33410

Report Issue Date: 14 Nov 2014
Sample S/N: _____
Sample Receipt Date: 16 Sep 2014

Test Report Number: 14F360B
Model Designation: Sentry
Product Description: Biometric Identity
Management Technology

Sample Test Date: see data sheets

Description of non-standard test method or test practice: *None*

Estimated Measurement Uncertainty: *See page 9. This uncertainty represents and expanded uncertainty expressed at approximately 95% confidence level using a coverage factor of k=2.*

Special limitations of use: *None*

Traceability: *reference standards of measurement have been calibrated by a competent body using standards traceable to the NIST.*

According to testing performed at Product Safety Engineering, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in regulations indicated on page (3) of the test report. The test results contained herein relate only to the item identified above. It is the manufacturer's responsibility to assure that additional production units are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Project Engineer, I hereby declare that the equipment tested as specified above conforms to the requirements indicated on page (3) of the test report.

Signature David Foerstner Name David Foerstner
SN

Title Engineering Group Leader Date 14 Nov 2014

Reviewed by: Steve Hoke
Approved Signatory Steve Hoke Date 14 Nov 2014
Steve Hoke (EMC Site Manager)

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Test Report Number 14F360B

Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 61000-6-3:2007

☐ - EN 61000-6-4:2007

☐ - EN 55011 : 2009/A1:2010

☐ - Group 1

☐ - Group 2

☐ - Class A

☐ - Class B

☐ - EN 55013 : 2001 /A1:2003 /A2:2006

☐ - EN 55014 -1: 2006/A2:2011

☐ - Household appliances and similar

☐ - Portable tools

☐ - Semiconductor devices

☐ - EN 55022:2010/AC:2011

■ - Class A

☐ - Class B

☐ - CISPR 22:2008

☐ - Class A

☐ - Class B

☐ -AS/NZS CISPR 22:2009

☐ - Class A

☐ - Class B

■ - RSS-210 Issue 7

■ - Class A

☐ - Class B

☐ - CNS 13438

☐ - Class A

☐ - Class B

☐ - VCCI V-3/2010.4

■ - Class A

☐ - Class B

■ - FCC Part 15.225 (per ANSI C63.4)

☐ - Class A

☐ - Class B

■ - Certification

☐ - Verification

☐ - Declaration of Conformity

☐ - FCC Part 18

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Environmental conditions during testing:

	LAB	OATS
Temperature: *	_____	: _____
Relative Humidity: **	_____	: _____

* The ambient temperature during the testing was within the range of (50° - 104° F) unless indicted above.
** The humidity levels during the testing was within the range of (10% - 90%) relative humidity unless indicated above.

Power supply system : 120 Volts 60 Hz SINGLE phase

Sign Explanations:

- ☐ - not applicable
- ☒ - applicable

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Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - Test not applicable

- ☐ - Darby Test Site (Open Area Test Site)
☒ - Darby Laboratory

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number
☐	8028-50	Solar	50 Ω LISN	829012, 829022
☐	8012	Solar	50 Ω LISN	924840
☒	EMC-30	Electro-Metrics	EMI Receiver	191
☐	8566B	Hewlett-Packard	Spectrum Analyzer	2421A00526
☐	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
☐	85662A	Hewlett Packard	Analyzer Display	2403A07352
☐	8028-50	Solar	50 Ω LISN	903725, 903726
☐	FCC-TLISN-T4-02	Fisher Custom Com.	Telecom ISN	20454
☐	FCC-TLISN-T8-02	Fisher Custom Com.	Telecom ISN	20452
☒	LI-125	Com-Power	50 Ω LISN	191080/191081

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

* AC power applied to host computer - Darby Test Site (Open Area Test Site)

- ☐ -
☐ -

at a test distance of :

- ☐ - 3 meters
☒ - 30 meters

☐ - Test not applicable

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number
☐	3148	EMCO	Log Periodic Antenna	00044783
☐	BIA-25	Electro-Metrics	Biconical Antenna	4283
☒	8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
☒	85662A	Hewlett-Packard	Analyzer Display	2403A07352
☒	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00358
☒	ALR-30M	Electro-Metrics	Loop Antenna	824
☒	8447D	Hewlett Packard	Preamplifier	2944A06901
☐	EMC-30	Electro-Metrics	EMI Receiver	191
☐	ALA-130/A	Antenna Research	Loop Antenna	106

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

☐ - Test not applicable

- ☒ - Darby Site (Open Area Test Site)
- ☐ - Darby Lab
- ☐ -

at a test distance of :

- ☐ - 3 meters
- ☒ - 10 meters
- ☐ - 30 meters

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number
☐ -	HLP 3003C	EMC Automation	Hybrid Periodic Antenna	017501
☒ -	8447D	Hewlett-Packard	Preamplifier (26dB)	2944A06901
☒ -	8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
☐ -	85662A	Hewlett-Packard	Analyzer Display	2403A06604
☒ -	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00358
☐ -	BIA 25	Electro-Metrics	Biconical Antenna	4283
☐ -	EMC-30	Electro-Metrics	EMI Receiver	191
☐ -	8566B	Hewlett Packard	Spectrum Analyzer	2532A02418
☐ -	85650A	Hewlett Packard	Quasi-Peak Adapter	2043A00358
☒ -	85662A	Hewlett Packard	Analyzer Display	2403A07352
☐ -	LPA30	Electro-Metrics	Log Periodic	2280
☒ -	3104C	Emco	Biconical Antenna	00075927
☒ -	3148	ETS Lindgren	Log Periodic Antenna	75741

Emissions Test Conditions): DISTURBANCE POWER

The *DISTURBANCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

☒ - Test not applicable

- ☐ - Darby Lab
- ☐ -

Test equipment used :

	Model Number	Manufacturer	Description	Serial Number
☐ -	MDS-21	Rhode&Schwarz	Absorbing Clamp	8608447020
☐ -	8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
☐ -	85662A	Hewlett-Packard	Analyzer Display	2403A07352
☐ -	85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00358
☐ -	8447D	Hewlett-Packard	Amplifier (26 dB)	2944A06901
☐ -	EMC-30	Electro-Metrics	EMI Receiver	191

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The **EQUIVALENT RADIATED EMISSIONS** measurements in the frequency range 1 GHz -2 GHz were performed in a horizontal and vertical polarization at the following test location :

- ☐ - Darby Test Site (Open Area Test Site)
- ☐ -
- ☐ -
- ☐ -

at a test distance of:

- ☐ - 1 meters
- ☐ - 3 meters
- ☐ - 10 meters

■ - Test not applicable

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
☐ - 8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
☐ - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
☐ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
☐ - 8449B	Hewlett-Packard	Preamplifier	3008A00320
☐ - 3115	Electro-Mechanics	Double Ridge Guide Horn	3810

Emissions Test Conditions): CONDUCTED EMISSIONS - TELECOMMUNICATIONS PORT measurements were performed in the frequency range 0.15 MHz - 30 MHz at the following test location :

■ - Test not applicable

- ☐ - Darby Lab
- ☐ -

Test equipment used :

Model Number	Manufacturer	Description	Serial Number
☐ - EMC-30	Electro-Metrics	EMI Receiver	191
☐ - FCC-TLISN-T8-02	Fischer Custom Com	T-LISN	20452
☐ - FCC-TLISN-T4-02	Fischer Custom Com	T_LISN	20454
☐ -			
☐ -			

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Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☒ - Practice operation
- ☐ - Normal Operating Mode
- ☐ -

Configuration of the device under test:

- ☒ - See System Under Test Information in Appendix B

Rationale for EUT setup / configuration:

ANSI C63.4:2003

Emission Test Results:

Conducted emissions 150 kHz - 30 MHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 21.5 dB at 0.89 MHz
MU: 5.3 dB

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 21.5 dB at 13.1 MHz
MU: NA

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 7.1 dB at 61.8 MHz
MU: 5.2 dB

Interference Power at the mains and interface cables 30 MHz - 300 MHz

The requirements are ☐ - MET ☐ - NOT MET
Minimum limit margin dB at MHz
MU: NA

Radiated emissions 1 GHz - 2 GHz

The requirements are ☐ - MET ☐ - NOT MET
Minimum limit margin dB at GHz
MU: 4.9 dB

Antenna Terminal Disturbance Voltage 30 MHz - 1,000 MHz

The requirements are ☐ - MET ☐ - NOT MET
Minimum limit margin dB at MHz
MU: NA

MU = Measurement Uncertainty

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GENERAL REMARKS:

Conducted emissions - Exploratory measurements are used to identify the frequency of the emission that has the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable positions, and with a typical system equipment configuration and arrangement. For each mode of operation and for each ac power current-carrying conductor, cable manipulation is performed within the range of likely configurations. For this measurement or series of measurements, the frequency spectrum of interest is monitored looking for the emission that has the highest amplitude relative to the limit. Once that emission is found for each current-carrying conductor of each power cord associated with the EUT (but not the cords associated with non-EUT equipment in the overall system), the one and arrangement and mode of operation that produces the emission closest to the limit across all the measured conductors is recorded. Software used is Electro metrics OS-30-CAT ver 1.10

Radiated emissions - The equipment under test is oriented at (0) degrees azimuth with respect to the measuring antenna. The antenna is placed in the vertical polarity and the software performs an automated set of measurements across the frequency range of interest. When complete, a database of all signals labeled "suspects" is displayed and the test engineer manually investigates any signal that is within (15) dB of the limit. Those determined to be from the EUT are placed on a separate database labeled "finals" and those not from the EUT are placed in the ambient database. The EUT is then rotated (90) degrees and the process is repeated. Upon completion of (4) scans, the antenna polarity is changed to horizontal, the EUT orientation is set to (45) degrees and the process is repeated (4) additional times. After every scan, the final list is completed re-measured and updated for amplitude and polarity if higher in amplitude.

Once all (8) scans are complete, the highest (6) signals are re-measured by maximizing the amplitude with cable manipulation, antenna height and EUT azimuth. The final (6) six signals are included in the test report. Software used is HP 85870A Opt655/Rev A.02.01.

SUMMARY:

The requirements according to the technical regulations are

■ - met

□ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

□ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date 29 Sep 2014

Testing End Date: 01 Oct 2014

- PRODUCT SAFETY ENGINEERING INC -

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Product Safety Engineering, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
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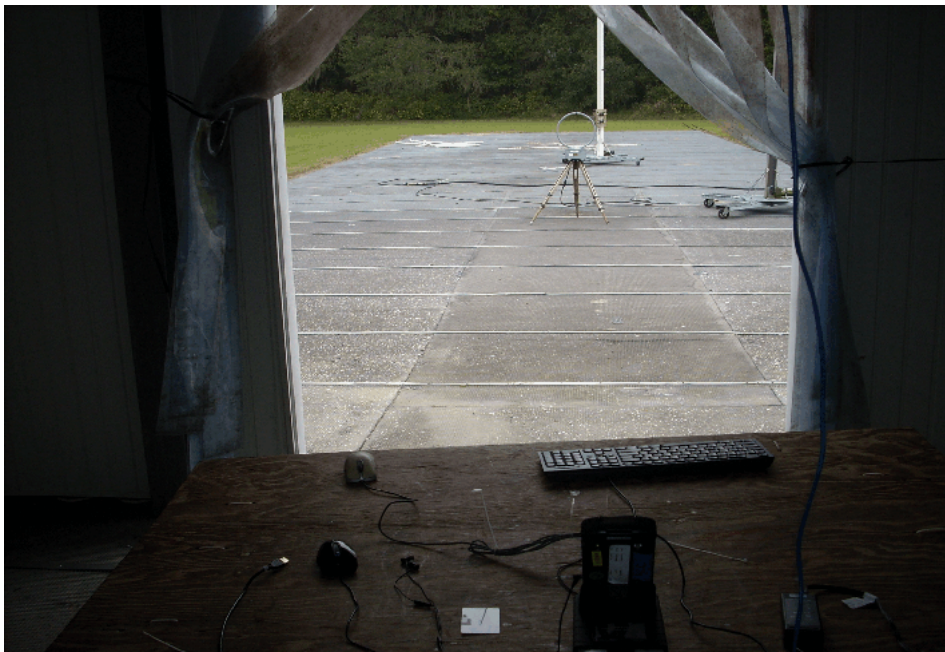
Test-setup photo(s):
Conducted emission 150 kHz - 30 MHz



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Test-setup photo(s):
Radiated emission 30 MHz - 1000 MHz



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APPENDIX

A

Test Equipment Calibration Information & Test Data Sheets

	TEST EQUIPMENT CALIBRATION INFORMATION			
Manufacturer	Model	Description	Serial Number	Cal Due *
Hewlett Packard	8566B	Spectrum Analyzer	2421A00526	
Hewlett Packard	85662A	Display	2151A03667	
Hewlett Packard	85650A	Quasi-peak Adapter	2043A00209	
Hewlett Packard	8566B	Spectrum Analyzer	2532A02418	11/5/2015
Hewlett Packard	85662A	Display	2403A07352	11/5/2015
Hewlett Packard	85650A	Quasi-peak Adapter	2043A00358	11/5/2015
Hewlett Packard	8447D	Preamplifier 0.1 - 1,000 MHz	2944A06832	
Hewlett Packard	8447D	Preamplifier 0.1 - 1,000 MHz	2944A06901	12/10/2014
Hewlett Packard	8449B	Preamplifier 1 - 26.5 GHz	3008A00320	
Hewlett Packard	E7402A	Portable Spectrum Analyzer	US40240204	
ETS Lindgren	3148	Log Periodic Antenna	75741	** 2/7/2016
Electro-Metrics	BIA-30	Biconical Antenna	3852	
EMCO	3104C	Biconical Antenna	75927	** 5/14/2016
Electro-Metrics	ALR30M	Magnetic Loop Antenna	824	** 7/15/2015
Electro-Metrics	EMC-30	EMI Receiver	191	7/11/2015
Electro-Metrics	3115	Double Ridge Guide Antenna	3810	
Solar	8028	LISN	829012/809022	
Com-Power	LI-125	LISN	191180/191181	9/22/2015
Schwartzbeck	MDS-21	Absorbing Clamp	2581	
Fisher Custom	FCC-TLISN-T4-02	T LISN	20454	
Fisher Custom	FCC-TLISN-T8-02	Fisher Custom	20452	
ATM	42-441-6	Standard Gain Horn Antenna	E531612-01	
Electro-Metrics	3117	Double Ridge Guide Antenna	109296	
Solar	7334-1	Loop Sensor	32317	
Sun Systems	EC127	Environmental Chamber	EC0154	NA
Fluke	52	Digital Thermometer	447553	
		* Cal Due Date Format = MM/DD/YYYY		
All equipment was calibrated one year prior to the cal due date listed unless otherwise indicated				
** These devices are on a (2) year calibration cycle				

RADIATED DATA SHEET

FCC Rule Part	Frequency Range MHz	Limit dBuV/M	Limit Dist meters	Measured Freq. (MHz)	Level dBuV/M	Margin dB
15.225 (a)	13.553 - 13.567	84	30	13.557	30.9	53.1
15.225 (b)	13.410 - 13.553	50.5	30	13.543	18.0	32.5
15.225 (b)	13.567 - 13.710	50.5	30	13.567	18.0	32.5
15.225 (c)	13.110 - 13.410	40.5	30	13.2	8.0	32.5
15.225 (c)	13.710 - 14.010	40.5	30	13.8	8.0	32.5
15.225 (d)	1.705 - 13.110	29.5	30	13.1	8.0	21.5
15.225 (d)	14.010 - 30.0	29.5	30	27.12	7.0	22.5
15.225 (d)	>30	29.5	10	40.68	20.3	9.2
15.225 (d)	>30	29.5	10	54.24	19.7	9.8
15.225 (d)	>30	29.5	10	67.80	22.4	7.1
15.225 (d)	>30	29.5	10	81.36	21.7	7.8
15.225 (d)	>30	33.0	10	94.92	23.5	9.5
15.225 (d)	>30	33.0	10	108.48	17.9	15.1
15.225 (d)	>30	33.0	10	122.04	18.3	14.7
15.225 (d)	>30	33.0	10	135.6	17.1	15.9

Note: The same limits are stated in the RSS-210 (A2.6) for Canada.

FCC DATA SHEET

Frequency tolerance

§15.225

(e) The frequency tolerance of the carrier signal shall be maintained within +/-0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Temperature	Frequency (Hz)	Tolerance
-20 C	13,557,790	$13,557,740 - 13,557,790 = -50$
+ 50 C	13,558,150	$13,557,740 - 13,558,150 = -410$
+ 20 C	13,557,740	$0.0001 \times 13,557,740 = 1,356$

The supply voltage to the host computer was varied from (102) to (138) VAC while we monitored the frequency. The frequency did not change during this voltage variation.

PASS

(f) In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

NOT APPLICABLE

Product Safety Engineering

CROSSMATCH

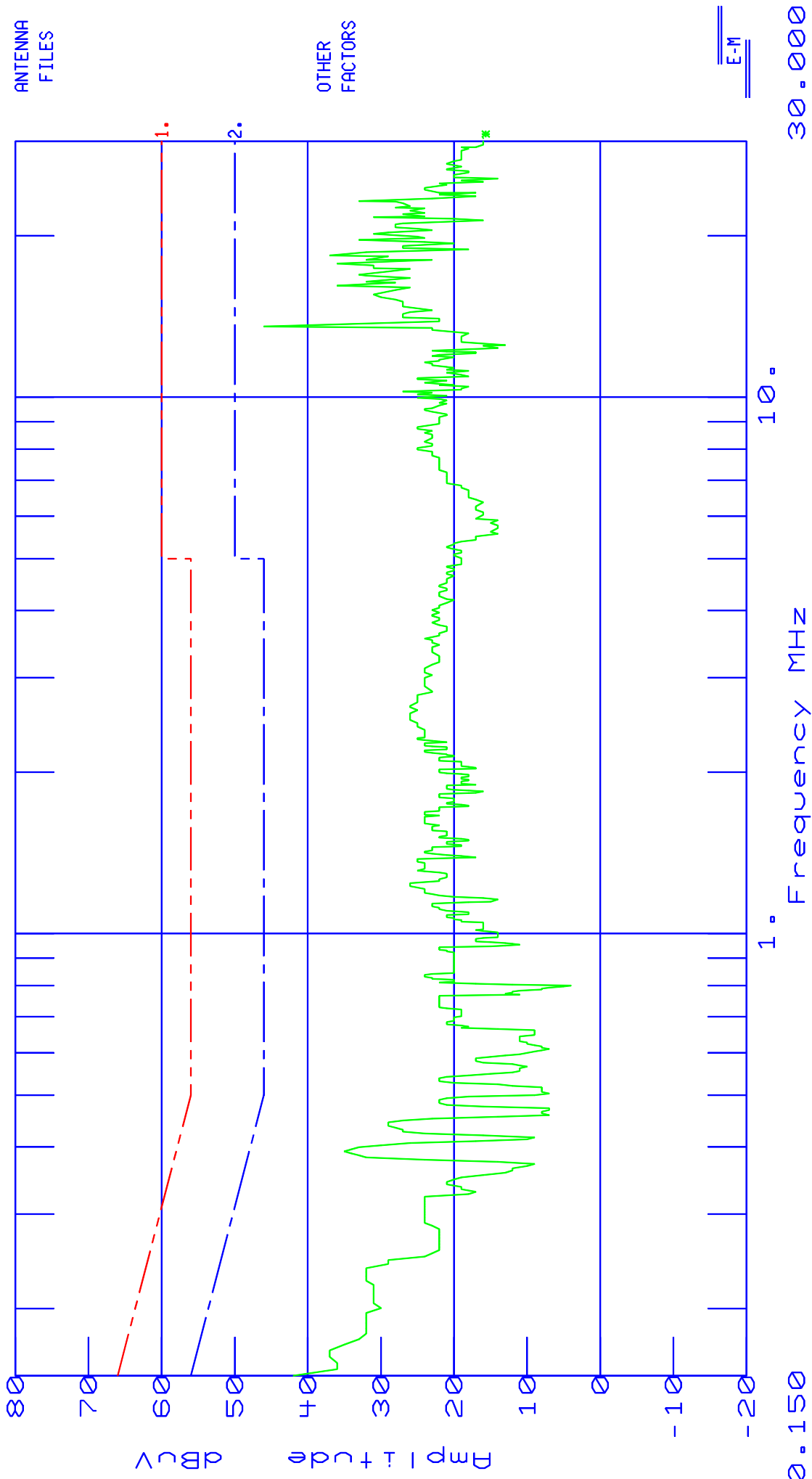
Date : 08/28/14
Technician : CHIP FOERSTNER
Test Method : EN55022 CLASS B
Equipment : VERIFIER SENTRY
Mode of Op. : NORMAL
Serial No. : NONE

Time : 13:24:29.84
Test Equip. : EMC-30
Test Number : 1
Sensor Loc. : LINE
Sensor Pol. :
Ext. Atten. : 0 dB

EMC-30 SETTINGS
Detector QuasiPeak
Bandwidth CISPR
Dump/Dwell IN/A
RF Atten. 10 dB
IF Atten. 10 dB

SPECS
1) CISPR 22 Quasi Peak
2) CISPR 22 AVG
3)
4)

Comment : 120 VAC / 60 HZ



0.150

1.

10.

Frequency MHz

30.000

TEST TITLE: CROSSMATCH				PAGE 1	
DATA FILE : 14335_L.D30				Freq. (MHz)	
Amplitude Units : dBuV				0.1500	
Threshold -8 dB					
	C22BQP. S30		C22BAVG. S30		
	Freq(MHz)	Amp	vs Spec(dB)	vs Spec(dB)	
	13.5390	46.0		-4.000 *	

Product Safety Engineering

CROSSMATCH

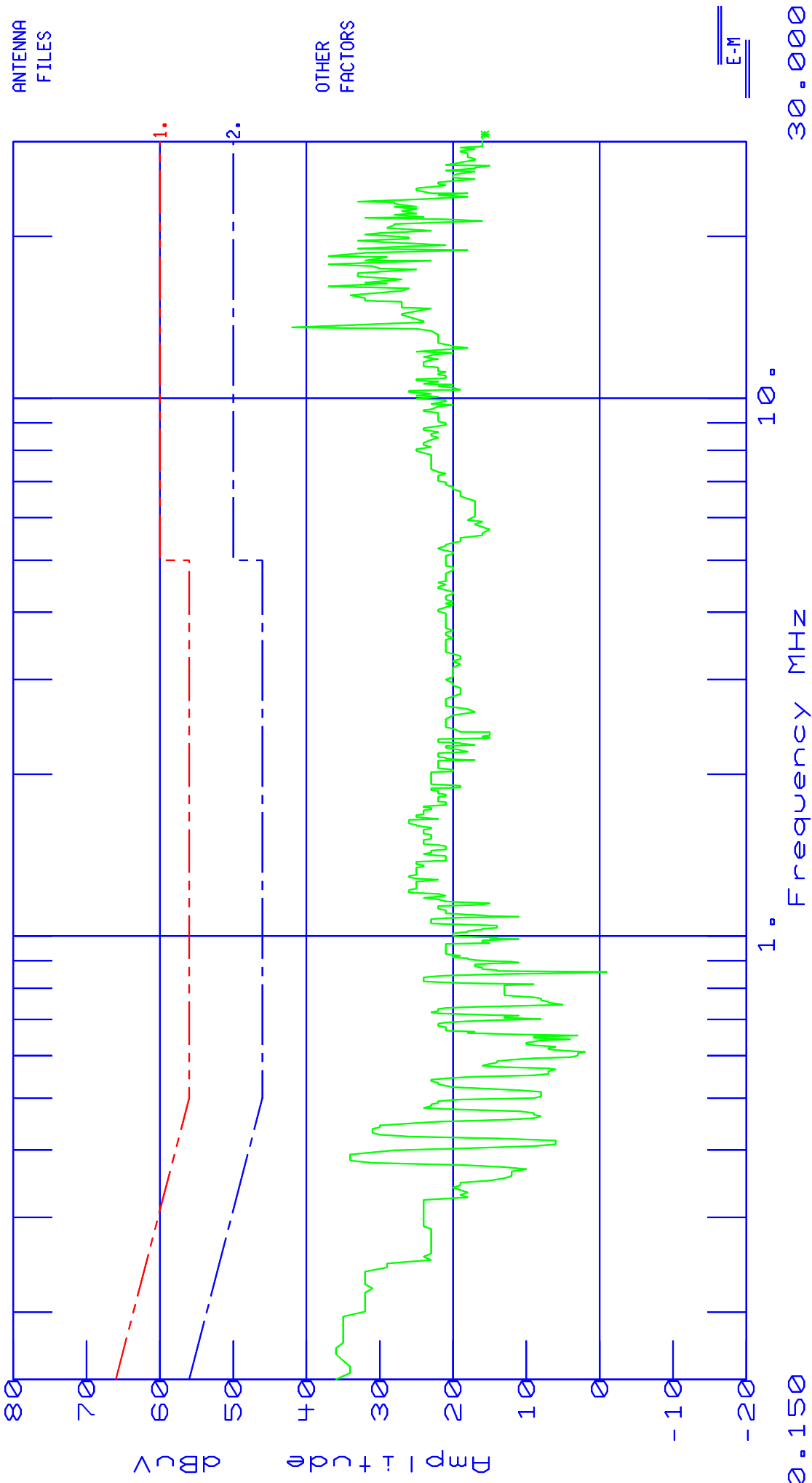
Date : 08/28/14
Technician : CHIP FOERSTNER
Test Method : EN55022 CLASS B
Equipment : VERIFIER SENTRY
Mode of Op. : NORMAL
Serial No. : NONE

Time : 13:06:28.52
Test Equip. : EMC-30
Test Number : 1
Sensor Loc. : NEUTRAL
Sensor Pol. :
Ext. Atten. : 0 dB

EMC-30 SETTINGS
Detector QuasiPeak
Bandwidth CISPR
Dump/Dwell IN/A
RF Atten. 10 dB
IF Atten. 10 dB

SPECS
1) CISPR 22 Quasi Peak
2) CISPR 22 AVG
3)
4)

Comment : 120 VAC / 60 HZ



TEST TITLE: CROSSMATCH	PAGE 1
DATA FILE : 14335_N.D30	Freq. (MHz)
Amplitude Units : dBuV	Threshold -12 dB
	0.1500

		C22BQP. S30	C22BAVG. S30
Freq(MHz)	Amp	vs Spec(dB)	vs Spec(dB)
13.5423	42.0		-8.000 *

APPENDIX

B

System Under Test Description

SYSTEM COMPONENTS

DEVICE TYPE: EUT, Cross Match Model# Verifier - Sentry

DEVICE TYPE: EUT, Cross Match "Docking Station" for Verifier - Sentry

DEVICE TYPE: EUT, Power Supply, FSP 090-D2CA1

DEVICE TYPE: Support for EUT, USB Mouse X2

DEVICE TYPE: Support for EUT USB Keyboard

DEVICE TYPE: Support for EUT Audio Headset

DEVICE TYPE: Support for EUT Ethernet Router , Remotely Located

INTERFACE CABLES

DEVICE TYPE: EUT , Cross Match

SHIELD: Yes

LENGTH: 1 Meter Bundled

CONNECTOR TYPE: #1, USB-A to Mouse #2 USB-A to Mouse, #3 USB-A to Keyboard

PORT: USB 3X, USB Host "A" Ports on Docking Station

DEVICE TYPE: EUT , Cross Match

SHIELD: Yes

LENGTH: 1 Meter Bundled

CONNECTOR TYPE: USB-B to Unterminated USB Cable

PORT: USB Slave "B" Ports

DEVICE TYPE: EUT , Cross Match

SHIELD: NO

LENGTH: 150 Feet

CONNECTOR TYPE: RJ45, UnShielded Ethernet cables to Remote Router

PORT: LAN Port, Ethernet

DEVICE TYPE: EUT , Cross Match

SHIELD: NO

LENGTH: 1 Meter Bundled

CONNECTOR TYPE: Audio Mini Jack

PORT: Audio

POWER CORDS

DEVICE TYPE: EUT, Power Supply, FSP 090-D2CA1

SHIELD: NO

LENGTH: 1 METER AC Cord

CONNECTOR TYPE: IEC to AC Plug

DEVICE TYPE: EUT, Power Supply, FSP 090-D2CA1

SHIELD: NO

LENGTH: 1 METER Bundled DC Cord (Ferrite Loaded at both ends)

CONNECTOR TYPE: Dedicated to DC Plug
