

TEST REPORT



Testing Certification # 1367-01

Laboratory ID

PRODUCT SAFETY ENGINEERING, INC.
Inc.

12955 Bellamy Brothers Boulevard
Dade City, Florida 33525 USA
PH (352) 588-2209 FX (352) 588-2544

Submitter ID

UTC Fire & Security Americas Corporation,

8995 Town Center Parkway

Bradenton, FL 34202

Report Issue Date: 03 Oct 2014

Sample S/N: NA

Sample Receipt Date: 04 Sep 2014

Test Report Number: 14F171E

Model Designation: 562NSTT-ATT01

Product Description: Wireless Smoke
Detector

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

Name David Foerstner

Title Engineering Group Leader

Date 03 Oct 2014

Reviewed by:

Approved Signatory: Steve Hoke Date 03 Oct 2014

Steve Hoke (EMC Site Manager)

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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

☐ - ICES-003

☐ - Class A

☐ - Class B

☐ - CNS 13438

☐ - Class A

☐ - Class B

☐ - VCCI V-3/2010.4

☐ - Class A

☐ - Class B

■ - FCC Part 15 (per ANSI C63.4) 15.249

☐ - 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 : _____ Volts _____ Hz SINGLE phase
*** Internal (3) VDC batteries

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:

- ☒ - 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	2043A00209
☒ - 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	2403A07352
☒ - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
☐ - 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	2403A06604
☐ - 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

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The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz -10 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
- ☒ - Stand-Alone Operation

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 dB at MHz
MU: 5.3 dB

Radiated emissions (electric field) 902 - 928 MHz (per 15.249)

The requirements are ☐ - MET ☐ - NOT MET
Minimum limit margin 0.1 dB at 918.8 MHz
MU: NA

Radiated emissions (electric field) 30 - 1,000 MHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 6.5 dB at 35.0 MHz
MU: 5.2 dB

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin >10 dB at MHz
MU: NA

Radiated emissions 1 GHz - 10 GHz

The requirements are ☒ - MET ☐ - NOT MET
Minimum limit margin 10.3 dB at 3.675 GHz
MU: 4.9 dB

Emissions Test Conditions): CONDUCTED EMISSIONS - TELECOMMUNICATIONS PORT 0.15 to 30 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 17 Sep 2014

Testing End Date: 02 Oct 2014

- PRODUCT SAFETY ENGINEERING INC -

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Test-setup photo(s):
Conducted emission 150 kHz - 30 MHz

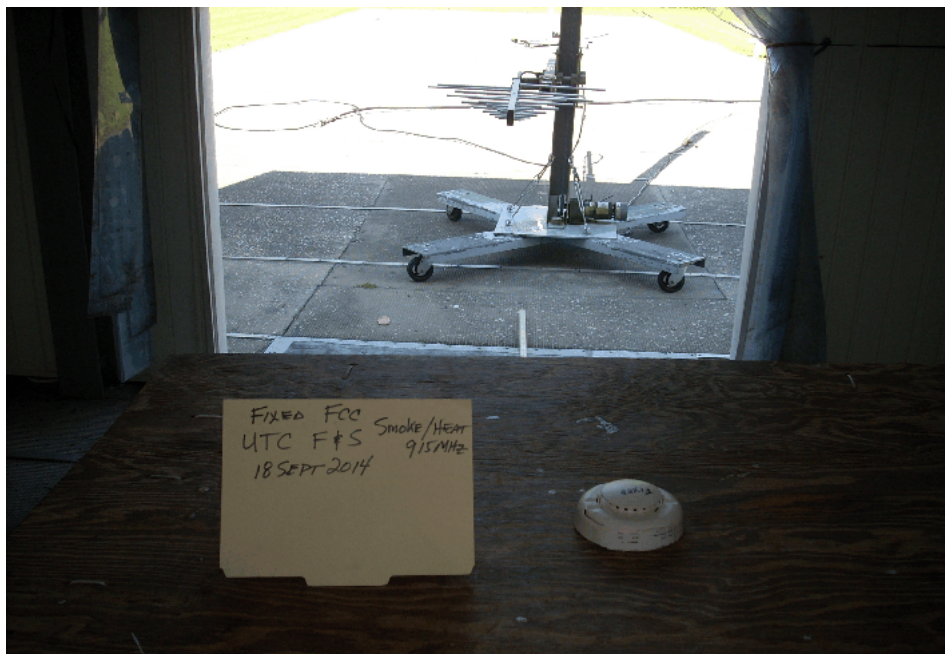
NA

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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

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	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	11/5/2014
Hewlett Packard	8566B	Spectrum Analyzer	2532A02418	11/5/2014
Hewlett Packard	85662A	Display	2403A07352	11/5/2014
Hewlett Packard	85650A	Quasi-peak Adapter	2043A00358	
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	6/6/2015
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	
Electro-Metrics	EMC-30	EMI Receiver	191	
Electro-Metrics	3115	Double Ridge Guide Antenna	3810	** 7/16/2015
Solar	8028	LISN	829012/809022	
Com-Power	LI-125	LISN	191180/191181	
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				

			UTC F&S 915 Transmitter Fixed									
			3 Meter Distance									
18-Sep-14			One Low Freq 911.78 and One High Freq 918.78 are Measured									
			FUNDAMENTAL EMISSIONS									
Freq.	Quasi peak Measured @ 3 m		ACF	CL	PA Gain	Adj QP	QP Limit	Delta	Polarity	Detector		Comments
MHz	dBuV		dB/M	dB	dB	dBuV/M	dBuV/M	dB				
911.78	65.3		23.6	4.9	0	93.8	94	-0.2	H	QP		No PA used
918.78	65.4		23.6	4.9	0	93.9	94	-0.1	H	QP		No PA used
			Harmonics of 911.78 MHz									
Freq.	AVERAGE DET LEVEL Measured @ 3 m		ACF	System Gain PA - CL	Adj AVG	Average Limit	Delta	Polarity	Detector		Comments	
MHz	dBuV			dB	dBuV/M	dBuV/M	dB				PA = HP 87449B	
1823.5	29.4		27.5	23	33.9	54	-20.1	H	Average			
2735.3	27		29.2	21.7	34.5	54	-19.5	H	Average			
3647.1	31.5		32.1	20.5	43.1	54	-10.9	H	Average			
4558.9	27.5		32.5	18.4	41.6	54	-12.4	V	Average			
5470.7	*											> 10 dB Below
6382.5	*											> 10 dB Below
7294.2	*											> 10 dB Below
8206	*											> 10 dB Below
9117.8	*											> 10 dB Below
			* All Harmonic Emissions above 5 GHz are greater than 10 dB below the Limit									
			Harmonics of 918.78 MHz									
Freq.	AVERAGE DET LEVEL Measured @ 3 m		ACF	System Gain PA - CL	Adj AVG	Average Limit	Delta	Polarity	Detector		Comments	
MHz	dBuV			dB	dBuV/M	dBuV/M	dB				PA = HP 87449B	
1837.5	29.7		27.5	23	34.2	54	-19.8	H	Average			
2756.4	28.8		29.2	21.7	36.3	54	-17.7	H	Average			
3675.1	32.1		32.1	20.5	43.7	54	-10.3	H	Average			
4593.9	26.2		32.5	18.4	40.3	54	-13.7	V	Average			
5512.7	*											> 10 dB Below
6431.5	*											> 10 dB Below
7350.2	*											> 10 dB Below
8269	*											> 10 dB Below
9187.8	*											> 10 dB Below
			* All Harmonic Emissions above 5 GHz are greater than 10 dB below the Limit									

Radiated Fields (900) MHz to (10) GHz

PRODUCT EMISSIONS

HP 85870A Rev. A.02.00 Data File: UTC F&S SMOKE FCC-B@10M 02OCT14

No	EMISSION	SPEC	MEASUREMENTS			SITE			CORR	COMMENTS
	FREQUENCY MHz	LIMIT dBuV/m	ABS	dLIM dB	MODE	POL	HGT cm	AZM deg	FACTOR dB	
1	34.997	30.0	23.5	-6.5	PK	V	100	225	-17.9	
2	50.003	30.0	17.6	-12.4	PK	V	100	270	-16.9	
3	75.000	30.0	22.3	-7.7	PK	V	100	135	-21.7	
4	100.001	30.0	22.3	-7.7	PK	V	100	90	-16.6	
5	110.011	30.0	19.8	-10.2	PK	V	125	135	-15.6	
6	148.500	30.0	18.7	-11.3	PK	V	125	135	-15.	
7	225.002	30.0	18.3	-11.8	PK	H	300	180	-15.5	
8	352.556	37.0	22.6	-14.4	PK	V	150	270	-12.3	
9	500.002	37.0	26.0	-11.0	PK	H	200	225	-9.3	
10	999.995	37.0	26.4	-10.6	PK	V	100	135	1.2	

APPENDIX

B

System Under Test Description

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APPENDIX

C

Measurement Protocol

ANSCI C63.4 2003 was the guiding document for test procedures as required by 47 CFR Part 15 Subpart A Section 15.31(a)(3).

The data is compared to the FCC Part.249 limits.

The stated limit is (50) mV/m @ (3) meter. $20 \log (50,000) = (94)$ dBuV/m

The "EMI" instrumentation is capable of calculating the final emission level based on the following formula:

Level at the receiver (dBuV) + Antenna Correction Factor (dB/M) + Cable Loss (dB) - Preamp Gain (dB) = Actual Level in dBuV/M.

The sample calculation below is based on the actual test data collected:

Observed Level		65.4	dBuV	
ACF	+	23.6	dB/M	
Cable Loss	+	4.9	dB	
Preamp Gain	-	0.0	dB	
Actual Level		93.9	dBuV/M	@ 918.78 MHz

Please have a company official review this report and sign.
