

TEST REPORT



Testing Certification # 2955.16

Laboratory ID

TUV SUD America Inc.
12955 Bellamy Brothers Boulevard
Dade City, Florida 33525 USA
PH (352) 588-2209 FX (352) 588-2544

Submitter ID

UTC Climate Controls Secuity CCS
4820 Centennial Blvd.
Suite 145
Colorado Springs, CO 80919

Report Issue Date: 19 Sep 2016

Test Report Number: TP72117966.301 EM

Sample S/N: None

Model Designation: 263A-CO-OEM-

Sample Receipt Date: 27 July 2016

ATT01

Sample Test Date: see data sheets

Product Description: Wireless CO Detector

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 TUV SUD America, 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 19 Sep 2016 _____

Reviewed by:

Approved Signatory _____

Date 19 Sep 2016 _____

Steve Hoke (EMC Site Manager)

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Test Report Number TP72117966.301 EM

TUV SUD America, Inc 12955 Bellamy Brothers Blvd. Dade City, FL 33525
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DIRECTORY - EMISSIONS

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Radiated emissions	30 MHz - 1000 MHz
Disturbance power	30 MHz - 300 MHz
Equivalent Radiated emissions	1 GHz - 18 GHz
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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

<input type="checkbox"/> - EN 61000-6-3:2007/A1:2011		
<input type="checkbox"/> - EN 61000-6-4:2007/A1:2011		
<input type="checkbox"/> - EN 60601-1-2:2007		
<input type="checkbox"/> - EN 60601-1-2:2014		
<input type="checkbox"/> - EN 55011 : 2009/A1:2010	<input type="checkbox"/> - Group 1	<input type="checkbox"/> - Group 2
	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55014 -1: 2006/A2:2011	<input type="checkbox"/> - Household appliances and similar	<input type="checkbox"/> - Portable tools
	<input type="checkbox"/> - Semiconductor devices	
<input type="checkbox"/> - EN 55022:2010/AC:2011	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - EN 55032	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - CISPR 22:2008	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - AS/NZS CISPR 22:2009	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - ICES-003-Issue 5:2012	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - CNS 13438	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - VCCI V-3/2014.4	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - FCC Part 15	<input type="checkbox"/> - Class A	<input type="checkbox"/> - Class B
<input type="checkbox"/> - (per ANSI C63.4:2014)	<input type="checkbox"/> - Certification <input type="checkbox"/> - Verification <input type="checkbox"/> - Declaration of Conformity	
<input type="checkbox"/> - FCC Part 15 (per ANSI C63.10:2013)		
<input type="checkbox"/> - RSS-210 Issue 8 12/2010		

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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 indicated 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 Battery

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 :

- - 10 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
□ - ALR-25M	Electro-Metrics	Loop Antenna	722

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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
<input type="checkbox"/> - HLP 3003C	EMC Automation	Hybrid Periodic Antenna	017501
<input checked="" type="checkbox"/> - 8447D	Hewlett-Packard	Preamplifier (26dB)	2944A06901
<input checked="" type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
<input checked="" type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input checked="" type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input type="checkbox"/> - BIA 25	Electro-Metrics	Biconical Antenna	4283
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191
<input type="checkbox"/> - 8566B	Hewlett Packard	Spectrum Analyzer	2421A00526
<input type="checkbox"/> - 85650A	Hewlett Packard	Quasi-Peak Adapter	2043A00358
<input type="checkbox"/> - 85662A	Hewlett Packard	Analyzer Display	2151A03667
<input type="checkbox"/> - LPA30	Electro-Metrics	Log Periodic	2280
<input checked="" type="checkbox"/> - BIA-25	Electro-Metrics	Biconical Antenna	1045
<input checked="" type="checkbox"/> - 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
<input type="checkbox"/> - MDS-21	Rhode&Schwarz	Absorbing Clamp	8608447020
<input type="checkbox"/> - 8566B	Hewlett-Packard	Spectrum Analyzer	2532A02418
<input type="checkbox"/> - 85662A	Hewlett-Packard	Analyzer Display	2403A07352
<input type="checkbox"/> - 85650A	Hewlett-Packard	Quasi-Peak Adapter	2043A00209
<input type="checkbox"/> - 8447D	Hewlett-Packard	Amplifier (26 dB)	2944A06901
<input type="checkbox"/> - EMC-30	Electro-Metrics	EMI Receiver	191

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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:

- Stand alone device

Rationale for EUT setup / configuration:

ANSI C63.10 - 2013

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Emission Test Results:

Conducted emissions 150 kHz - 30 MHz

The requirements are - NA - MET - NOT MET

Minimum limit margin dB at MHz
MU: 5.3 dB

Radiated emissions (magnetic field) 10 kHz - 30 MHz

The requirements are - NA - MET - NOT MET

Minimum limit margin >20 dB at MHz
MU: NA

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are - NA - MET - NOT MET

Minimum limit margin 0.3 dB at 911.78 MHz
MU: 5.2 dB

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

The requirements are - NA - MET - NOT MET

Minimum limit margin dB at MHz
MU: NA

Radiated emissions 1 GHz - 10 GHz

The requirements are - NA - MET - NOT MET

Minimum limit margin 0.4 dB at 3.679 GHz
MU: 4.9 dB

Emissions Test Conditions): CONDUCTED EMISSIONS - TELECOMMUNICATIONS PORT 0.15 to 30 MHz

The requirements are - NA - 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 08 Aug 2016

Testing End Date: 09 Aug 2016

- TUV SUD America INC -

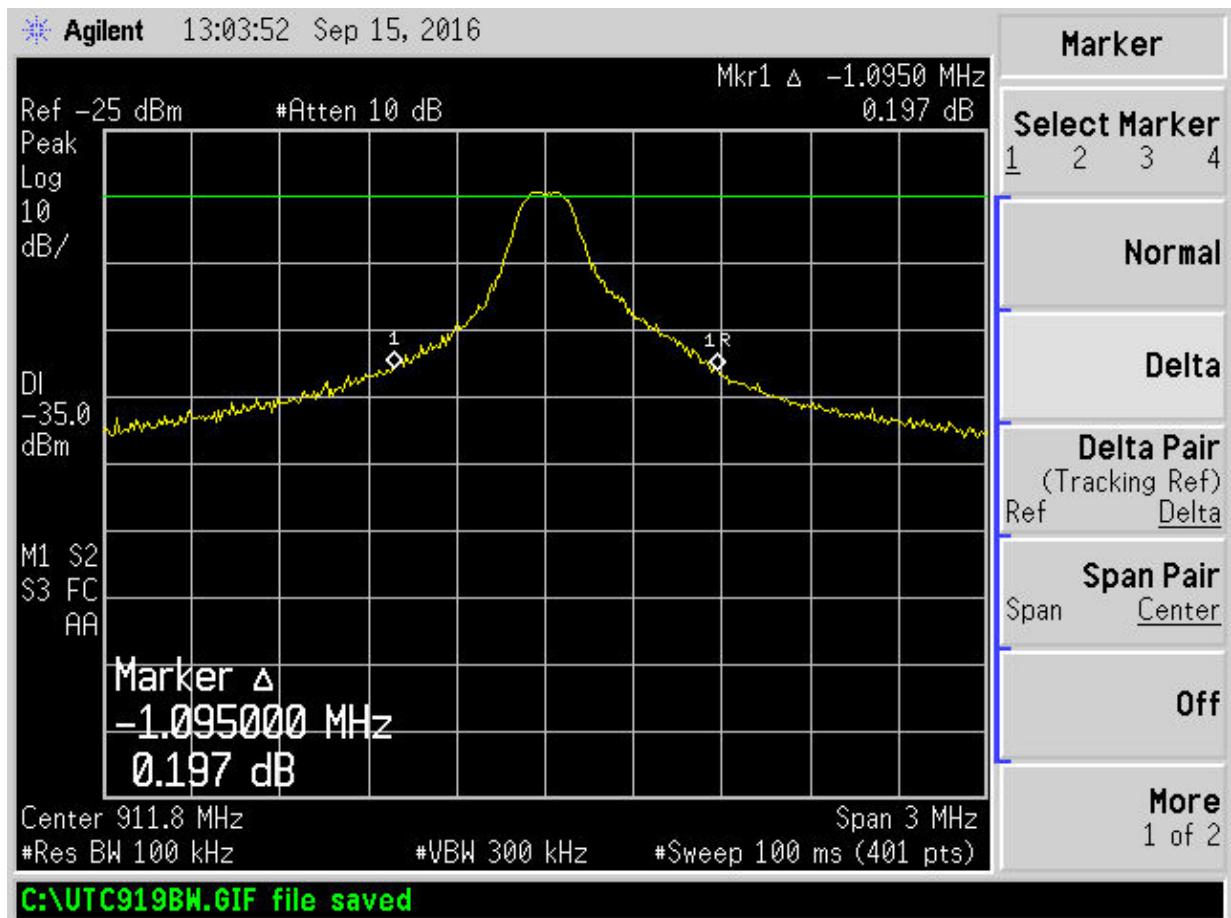
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Test-setup photo(s):

Conducted emission 150 kHz - 30 MHz



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Test-setup photo(s):

Radiated emission 30 MHz - 9000 MHz



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APPENDIX

A

Test Equipment Calibration Information

&

Test Data Sheets

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Manufacturer	Asset	Model	Description	Serial Number	Cal Due *			
TEST EQUIPMENT CALIBRATION INFORMATION								
Hewlett Packard	57	8566B	Spectrum Analyzer	2421A00526				
Hewlett Packard	57	85662A	Display	2151A03667				
Hewlett Packard	2	85650A	Quasi-peak Adapter	2043A00209	11/24/2016			
Hewlett Packard	152	8566B	Spectrum Analyzer	2532A02418	11/24/2016			
Hewlett Packard	152	85662A	Display	2403A07352	11/24/2016			
Hewlett Packard	7	85650A	Quasi-peak Adapter	2043A00358				
Hewlett Packard	3	8447D	Preamp 0.1 - 1,000 MHz	2944A06832				
Hewlett Packard	8	8447D	Preamp 0.1 - 1,000 MHz	2944A06901	12/4/2016			
Hewlett Packard	23	8449B	Preamp 1 - 26.5 GHz	3008A00320	6/7/2017			
Hewlett Packard	119	E7402A	Portable Spectrum Analyzer	US39150137				
ETS Lindgren	132	3148	Log Periodic Antenna	44783				
ETS Lindgren	137	3148	Log Periodic Antenna	75741	** 2/4/2018			
ElectroMetrics	9	LPA-30	Log Periodic Antenna	2280				
Electro-Metrics	10	BIA-30	Biconical Antenna	3852				
Electro-Metrics	148	BIA-25	Biconical Antenna	1045	** 7/14/2017			
Electro-Metrics	12	ALR30M	Magnetic Loop Antenna	824	** 4/27/2017			
Electro-Metrics	146	ALR-25M	Magnetic Loop Antenna	722				
Electro-Metrics	13	EMC-30	EMI Receiver	191				
Electro-Metrics	11	3115	Double Ridge Guide Antenna	3810	** 7/16/2017			
Electro-Metrics	153	3117	Double Ridge Guide Antenna	109296				
Solar	17	8028	LISN	829012/809022				
Com-Power	150/151	LI-125	LISN	191080/191081				
Schwartzbeck	29	MDS-21	Absorbing Clamp	2581				
Fisher Custom	145	FCC-TLISN-T4-02	T LISN	20454				
Fisher Custom	144	FCC-TLISN-T8-02	Fisher Custom	20452				
ATM		42-441-6	Stanard Gain Horn Antenna	E531612-01				
Solar	124	7334-1	Loop Sensor	32317				
Sun Systems		EC127	Enviromental Chamber	EC0154				
Fluke		52	Digital Thermometer	4475388				
Hewlett Packard	123	3585A	Spectrum Analyzer	1750A01006				
			* 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								

PRODUCT EMISSIONS

HP 85870A Rev. A.02.00 Data File: UTC CO DETECTOR FCC-B BIC 8-3-16

No	EMISSION	SPEC	MEASUREMENTS			SITE			CORR	COMMENTS
	FREQUENCY	LIMIT	ABS	dLIM	MODE	POL	HGT	AZM	FACTOR	
	MHz					cm	deg			
1	72.180	40.0	15.9	-24.1	PK	V	100	180	-20.7	
2	81.100	40.0	12.4	-27.6	PK	H	200	45	-21.8	
3	137.320	43.5	22.9	-20.6	PK	H	200	135	-14.8	
4	187.660	43.5	23.5	-20.0	PK	V	100	1	-10.1	
5	244.209	46.0	21.8	-24.3	PK	H	200	1	-12.	
6	452.300	46.0	25.8	-20.2	PK	V	100	225	-8.	
7	453.010	46.0	27.4	-18.6	PK	V	100	225	-8.	

UTC F&S CO Detector Transmitter													
3 Meter Distance up to 5 GHz, 1 Meter setup after 5 GHz(*)													
08/08/2016 and 8/09/2016			One Low Freq 911.78 and One High Freq 919.78 are Measured										
FUNDAMENTAL EMISSIONS													
Freq.	Quasi peak Measured @ 3 m	ACF dB/M	PA Gain dB	Adj QP dBuV/M	QP Limit dBuV/M	Delta	Polarity	Detector	Comments				
MHz	Measured @ 3 m	dB/M	dB	dBuV/M	dBuV/M	dB							
911.78	65	23.6	5.1	0	93.7	94	-0.3	H	QP	No PA used, EUT Vert stand			
919.78	64.7	23.6	5.1	0	93.4	94	-0.6	H	QP	No PA used, EUT Vert stand			
Harmonics of 911.78 MHz													
Freq.	AVERAGE DET LEVEL Measured @ 3 m	ACF	System Gain PA - CL dB	Adj AVG dBuV/M	Pk/Avg Limit dBuV/M	Delta	Polarity	Detector Pk/Avg	Comments				
MHz	Measured @ 3 m	dBuV	dB	dBuV/M	dBuV/M	dB			PA = HP 87449B				
1824	40	27.5		22.8	44.7	74	-29.3	V	Peak				
1824	36.5	27.5		22.8	41.2	54	-12.8	V	Average				
2735	34.1	28.9		21.7	41.3	74	-32.7	H	Peak				
2735	31.1	28.9		21.7	38.3	54	-15.7	H	Average				
3647	43.1	32		17.9	57.2	74	-16.8	H	Peak	EUT Vert Stand Up			
3647	39.4	32		17.9	53.5	54	-0.5	H	Average	EUT Vert Stand Up			
4559	29.7	32.2		13	48.9	74	-25.1	H	Peak				
4559	26	32.2		13	45.2	54	-8.8	H	Average				
5471 *	49.2	34.1		28	55.3	83.5	-28.2	H	Peak				
5471 *	45.6	34.1		28	51.7	63.5	-11.8	H	Average				
6382 *	44	34.4		25.2	53.2	83.5	-30.3	H	Peak				
6382 *	40.1	34.4		25.2	49.3	63.5	-14.2	H	Average				
7294 *	48.9	36.4		25.1	60.2	83.5	-23.3	H	Peak				
7294 *	45	36.4		25.1	56.3	63.5	-7.2	H	Average				
8206 *	44.4	37		25.3	56.1	83.5	-27.4	H	Peak				
8206 *	40.2	37		25.3	51.9	63.5	-11.6	H	Average				
9118 *	45.4	37.8		25.2	58	83.5	-25.5	H	Peak				
9118 *	41.1	37.8		25.2	53.7	63.5	-9.8	H	Average				
Harmonics of 919.78 MHz													
Freq.	AVERAGE DET LEVEL Measured @ 3 m	ACF	System Gain PA - CL dB	Adj AVG dBuV/M	Average Limit dBuV/M	Delta	Polarity	Detector Pk/Avg	Comments				
MHz	Measured @ 3 m	dBuV	dB	dBuV/M	dBuV/M	dB			PA = HP 87449B				
1839.6	41.2	27.5		22.8	45.9	74	-28.1	V	Peak				
1839.6	37.4	27.5		22.8	42.1	54	-11.9	V	Average				
2759.3	34.6	28.9		21.7	41.8	74	-32.2	H	Peak				
2759.3	31.1	28.9		21.7	38.3	54	-15.7	H	Average				
3679.1	43.8	32		18	57.8	74	-16.2	H	Peak	EUT Vert Stand Up			
3679.1	39.6	32		18	53.6	54	-0.4	H	Average	EUT Vert Stand Up			
4598.9	30	32.2		13.1	49.1	74	-24.9	H	Peak				
4598.9	25.9	32.2		13.1	45	54	-9	H	Average				
5518.7*	50	34.1		28	56.1	83.5	-27.4	H	Peak				
5518.7*	46.2	34.1		28	52.3	63.5	-11.2	H	Average				
6438.4*	43.9	34.3		25.2	53	83.5	-30.5	H	Peak				
6838.4*	40	34.3		25.2	49.1	63.5	-14.4	H	Average				
7358.2*	49.2	36.5		25.1	60.6	83.5	-22.9	H	Peak				
7358.2*	45.9	36.5		25.1	57.3	63.5	-6.2	H	Average				
8278*	44.2	37		25.3	55.9	83.5	-27.6	H	Peak				
8278*	40	37		25.3	51.7	63.5	-11.8	H	Average				
9197.8*	46	37.8		25.2	58.6	83.5	-24.9	H	Peak				
9197.8*	41.5	37.8		25.2	54.1	63.5	-9.4	H	Average				

APPENDIX

B

System Under Test Description

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APPENDIX

C

Measurement Protocol

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Test Report Number TP72117966.300 EM

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ANSI C63.4 2014 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 15 Class B limits.

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

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

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

Observed Level	33.6	dB μ V
ACF	+	18.2 dB/M
Cable Loss	+	1.6 dB
Preamp Gain	-	26.0 dB
Actual Level		27.4 dB μ V/M @ 453 MHz

Please have a company official review this report and sign.
