

Certification Test Report

FCC ID: 2AA9WV500
IC: 11665A-V500

FCC Rule Part: 15.247
IC Radio Standards Specification: RSS-210

ACS Report Number: 14-2094.W06.1A

Manufacturer: VSN Technologies, Inc.
Model(s): V500

Test Begin Date: August 23, 2014
Test End Date: September 3, 2014

Report Issue Date: November 5, 2014



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER AT-1533

This report must not be used by the client to claim product certification, approval, or endorsement by ACCLASS, ANSI, or any agency of the Federal Government.

Reviewed by:

A handwritten signature in blue ink that reads "Thierry Jean-Charles".

Thierry Jean-Charles
EMC Engineer
Advanced Compliance Solutions, Inc.

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This report contains 12 pages

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1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and Industry Canada's Radio Standards Specification RSS-210 for the tests specified in this document.

1.2 Manufacturer Information

VSN Technologies Inc.
1975 E. Sunrise Blvd., Suite 762
Ft. Lauderdale, FL 33304

1.3 Product Description

The V500 is a remote control for the VSN Technologies, Inc. V360 camera. The V500 uses Bluetooth 4.0 low energy technology to communicate with the camera. The remote has three buttons, which are power, photo and recording.

Technical Details

Mode of Operation:	Bluetooth Low Energy (BLE)
Frequency Range:	2402 MHz - 2480 MHz
Number of Channels:	40
Channel Separation:	2 MHz
Transmit Data Rates:	1 Mbps
Modulations:	GFSK
Antenna Type/Gain:	Printed Inverted-F Antenna, -3.05 dBi
Input Power:	3V (AAA Batteries)

Model Number: V500

Test Sample Serial Number(s): ACS#1

Test Sample Condition: The samples were in good conditions with no observable physical damages.

1.4 Test Methodology and Considerations

The EUT was evaluated for radiated emissions. Preliminary measurements were performed for the EUT set in three orthogonal orientations. The final data was collected on the EUT set horizontally on the test table as the worst case configuration.

The evaluation of the unit for compliance with the RF conducted emissions requirements is recorded in a separate test report.

The unit was also evaluated for compliance to the unintentional emissions requirements. The results are documented separately in a verification report.

2 TEST FACILITIES

2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions, Inc.
3998 FAU Blvd, Suite 310
Boca Raton, Florida 33431
Phone: (561) 961-5585
Fax: (561) 961-5587
www.acstestlab.com

FCC Test Firm Registration #: 475089
Industry Canada Lab Code: 4175C

2.2 Laboratory Accreditations/Recognitions/Certifications

ACS is accredited to ISO/IEC 17025 by ANSI-ASQ National Accreditation Board under their ACLASS program and has been issued certificate number AT-1533 in recognition of this accreditation. Unless otherwise specified, all test methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

2.3 Radiated & Conducted Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

The EMC radiated test facility consists of an RF-shielded enclosure. The interior dimensions of the indoor semi-anechoic chamber are approximately 48 feet (14.6 m) long by 36 feet (10.8 m) wide by 24 feet (7.3 m) high and consist of rigid, 1/8 inch (0.32 cm) steel-clad, wood core modular panels with steel framing. In the shielded enclosure, the faces of the panels are galvanized and the chamber is self-supporting. 8-foot RF absorbing cones are installed on 4 walls and the ceiling. The steel-clad ground plane is covered with vinyl floor.

The turntable is driven by pneumatic motor, which is capable of supporting a 2000 lb. load. The turntable is flushed with the chamber floor which it is connected to, around its circumference, with a continuous metallic loaded spring. An EMCO Model 1050 Multi-device Controller controls the turntable position.

A pneumatic motor is used to control antenna polarizations and height relative to the ground. The height information is displayed on the control unit EMCO Model 1050.

The control room is an RF shielded enclosure attached to the semi-anechoic chamber with two bulkhead panels for connecting RF, and control cables. The dimension of the room is 7.3 m x 4.9 m x 3 m high and the entrance doors of both control and conducted rooms are 3 feet (0.91 m) by 7 feet (2.13 m).

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3.1-1 below:

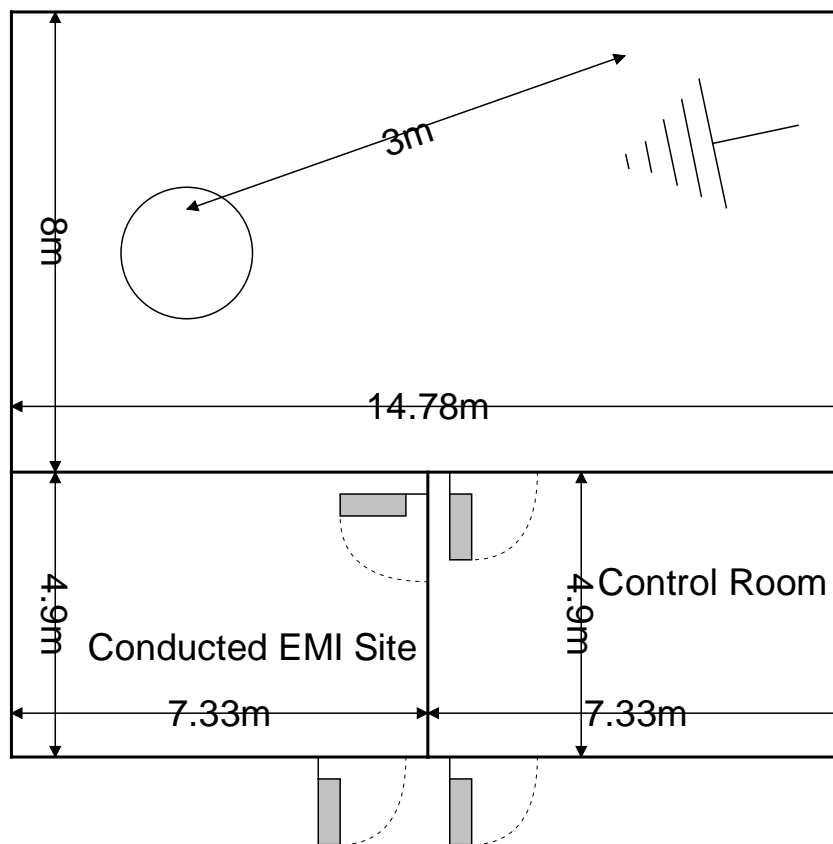


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site

2.3.2 Conducted Emissions Test Site Description

The dimensions of the shielded conducted room are $7.3 \times 4.9 \times 3 \text{ m}^3$. As per ANSI C63.4 2003 requirements, the data were taken using two LISNs; a Solar Model 8028-50 $50 \Omega/50 \mu\text{H}$ and an EMCO Model 3825, which are installed as shown in Photograph 3. For 220 V, 50 Hz, a Polarad LISN (S/N 879341/048) is used in conjunction with a 1 kVA, 50 Hz/220 V EDGAR variable frequency generator, Model 1001B, to filter conducted noise from the generator.

A diagram of the room is shown below in figure 2.3.2-1:

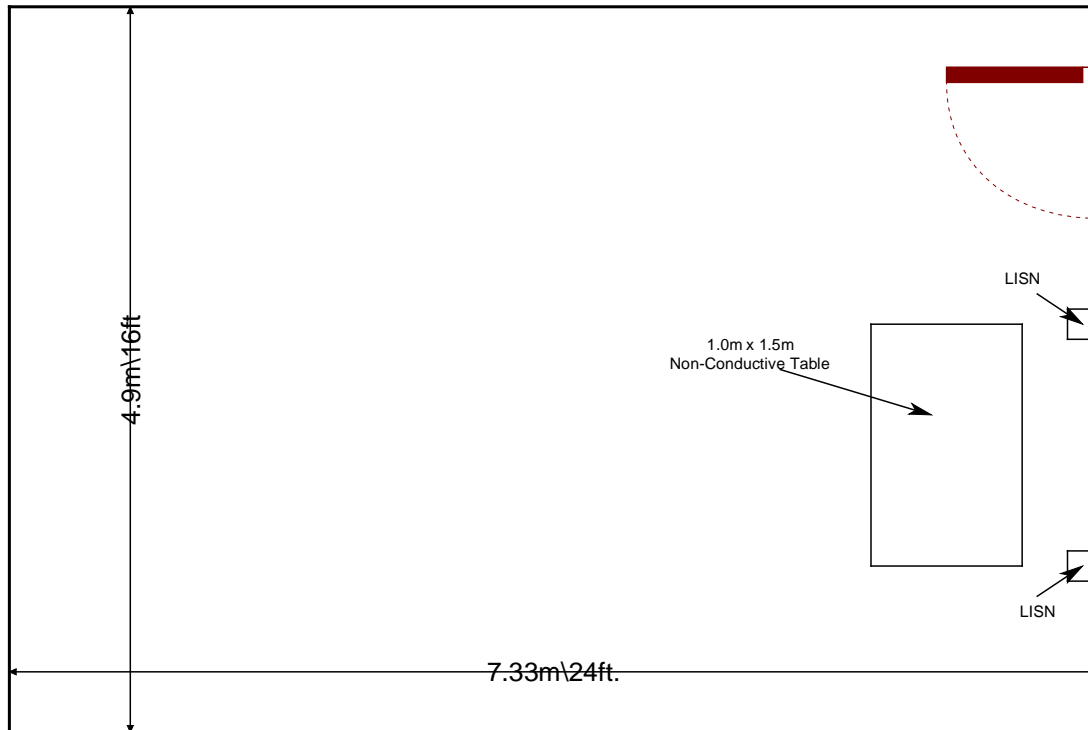


Figure 2.3.2-1: AC Mains Conducted EMI Site

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ❖ ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 kHz to 40 GHz.
- ❖ ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures, 2014.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C: Radio Frequency Devices, Intentional Radiators, 2014
- ❖ KDB Publication No. 558074 D01 DTS Meas Guidance v03r02 – Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247, June 2, 2014.
- ❖ Industry Canada Radio Standards Specification: RSS-210 - Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, Issue 8 December 2010.
- ❖ Industry Canada Radio Standards Specification: RSS-GEN – General Requirements and Information for the Certification of Radiocommunication Equipment, Issue 3, December 2010.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
523	Agilent	E7405	Spectrum Analyzers	MY45103293	1/8/2013	1/8/2015
2002	EMCO	3108	Antennas	2147	11/22/2013	11/22/2015
2004	EMCO	3146	Antennas	1385	11/22/2013	11/22/2015
2006	EMCO	3115	Antennas	2573	4/24/2013	4/24/2015
2008	COM-Power	AH-826	Antennas	81009	NCR	NCR
2011	Hewlett-Packard	HP 8447D	Amplifiers	2443A03952	12/31/2013	12/31/2014
2037	ACS Boca	Chamber EMI Cable Set	Cable Set	2037	2/27/2014	2/27/2015
2044	QMI	N/A	Cables	2044	12/31/2013	12/31/2014
2070	Mini Circuits	VHF-8400+	Filter	2070	1/1/2014	1/1/2015
2072	Mini Circuits	VHF-3100+	Filter	30737	1/1/2014	1/1/2015
2076	Hewlett Packard	HP5061-5458	Cables	2076	12/31/2013	12/31/2014
2086	Merrimac	FAN-6-10K	Attenuators	23148-83-1	12/31/2013	12/31/2014
2089	Agilent Technologies, Inc.	83017A	Amplifiers	3123A00214	12/16/2013	12/16/2014
2095	ETS Lindgren	TILE4! - Version 4.2.A	Software	85242	NCR	NCR

Note: NCR=No Calibration Required

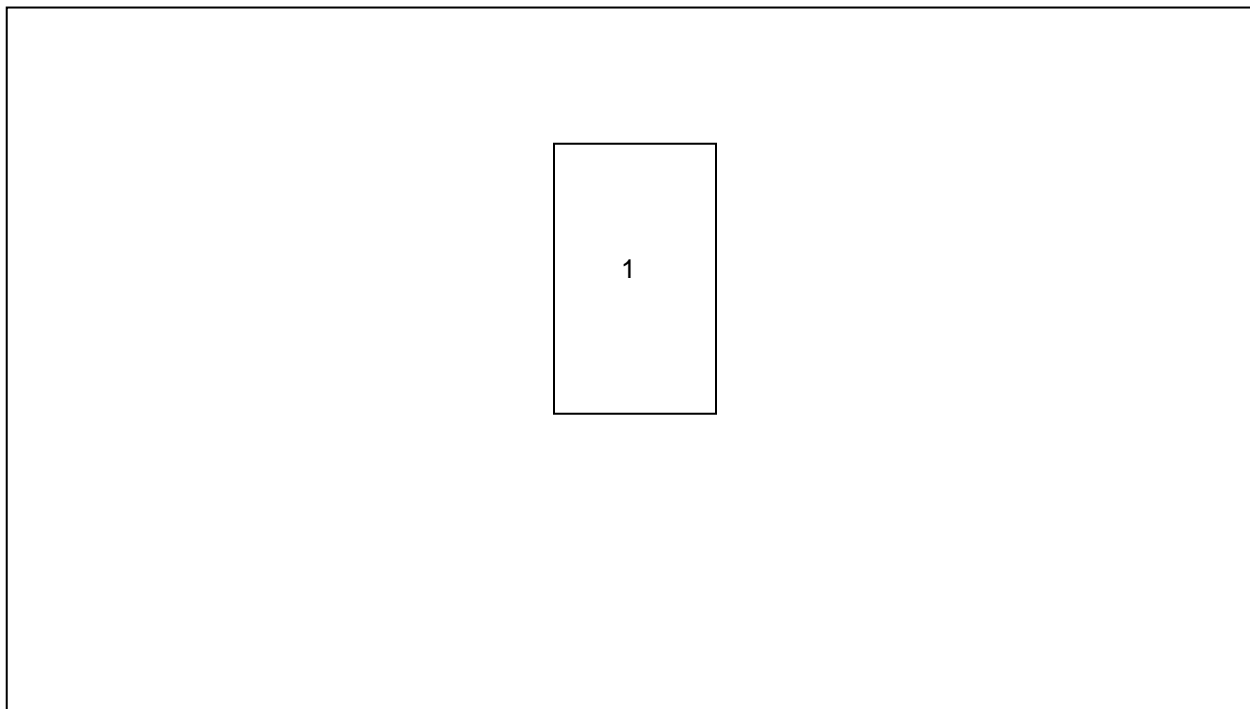
5 SUPPORT EQUIPMENT

Table 5-1: EUT and Support Equipment

Item #	Type Device	Manufacturer or Responsible Party	Model/Part #	Serial #
1	EUT	VSN Technologies, Inc.	V500	ACS#1

Note: The EUT is standalone without provision for connection to accessory equipment.

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM



7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Antenna Requirement – FCC: Section 15.203

The EUT uses a printed inverted-F antenna that is etched on the PCB. The antenna cannot be removed without permanently damaging the product, thus meeting the requirements of FCC Section 15.203.

7.2 Radiated Spurious Emissions into Restricted Frequency Bands - FCC 15.205, 15.209; IC: RSS-210 2.2, RSS-Gen 7.2.2, 7.2.5

7.2.1 Measurement Procedure

Radiated emissions tests were made over the frequency range of 30 MHz to 26 GHz, 10 times the highest fundamental frequency. Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

The EUT was rotated through 360° and the receive antenna height was varied from 1m to 4m so that the maximum radiated emissions level would be detected. For frequencies below 1000MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak measurements are made with RBW of 1 MHz and VBW of 3 MHz. Average measurements are performed in the linear scale using VBW of 30 Hz over a 5 second sweep.

7.2.2 Measurement Results

Radiated band-edge and spurious emissions found in the restricted frequency bands of 30MHz to 26 GHz are reported in the tables below.

Table 7.2.2-1: Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg			pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
Low Channel = 2402 MHz										
2390	59.39	45.33	H	-8.00	51.39	37.33	74.0	54.0	22.6	16.7
4806	48.22	41.20	H	-0.27	47.95	40.93	74.0	54.0	26.0	13.1
4806	49.01	42.54	V	-0.27	48.74	42.27	74.0	54.0	25.3	11.7
Middle Channel = 2442 MHz										
4882	50.47	45.31	H	-0.04	50.43	45.27	74.0	54.0	23.6	8.7
4882	49.35	41.12	V	-0.04	49.31	41.08	74.0	54.0	24.7	12.9
High Channel = 2480 MHz										
2483.5	63.48	55.10	H	-7.61	55.87	47.49	74.0	54.0	18.1	6.5
2483.5	63.62	53.54	V	-7.61	56.01	45.93	74.0	54.0	18.0	8.1
4958	49.82	44.56	H	0.19	50.01	44.75	74.0	54.0	24.0	9.2
4958	49.17	42.35	V	0.19	49.36	42.54	74.0	54.0	24.6	11.5

Note: All emissions above 4958 MHz were attenuated below the limits and the noise floor of the measurement equipment.

7.2.3 Sample Calculation:

$$R_C = R_U + CF_T$$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: PeakCorrected Level: $59.39 + (-8.0) = 51.39 \text{ dB}\mu\text{V/m}$ Margin: $74 \text{ dB}\mu\text{V/m} - 51.39 \text{ dB}\mu\text{V/m} = 22.6 \text{ dB}$ **Example Calculation: Average**Corrected Level: $45.33 + (-8.0) = 37.33 \text{ dB}\mu\text{V/m}$ Margin: $54 \text{ dB}\mu\text{V/m} - 37.33 \text{ dB}\mu\text{V/m} = 16.7 \text{ dB}$

8 CONCLUSION

In the opinion of ACS, Inc., the V500 meets the requirements of FCC Part 15 subpart C and Industry Canada's Radio Standards Specification RSS-210 for the test procedures documented in the test report.

END REPORT