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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 210 And FCC Part 15 Sections 15.209, 15.231 on the Savi Technology, Inc. Transmitter Model: SP-65Y-ZAB

UPN:	2404A-650SP
FCC ID:	KL7-65XSP-V2
GRANTEE:	Savi Technology, Inc. 615 Tasman Drive Sunnyvale, CA 94089-1707

TEST SITE: Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086

REPORT DATE: Ju

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FINAL TEST DATE: June 25, 2004

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SCOPE

An electromagnetic emissions test has been performed on the Savi Technology, Inc. model SP-65Y-ZAB pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and Industry Canada Radio Standards Specification RSS-210 for Low Power, License-Exempt Radio Communication Devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on single type tests of various models from the Savi Technology, Inc. SP-65Y-ZAB series and therefore apply only to the tested samples. The samples were selected and prepared by Eugene Schlindwein of Savi Technology, Inc.

The sample tested is representative of the following models:

SP-650-011, SP-650-211, SP-650-311, SP-650-111, SP-651-011, SP-651-211, SP-651-311, SP-651-111, SP-650-001, SP-650-201, SP-650-301, SP-650-101, SP-651-001, SP-651-201, SP-651-301, SP-651-101, SP-652-301

For a detailed description of each model please refer to the EUT Details section of this report.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators and Industry Canada RSS-210 for Low Power, License-Exempt Radio Communication Devices. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules and Industry Canada Radio Standards Procedure RSP-100.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Savi Technology, Inc. model SP-65Y-ZAB complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators and Industry Canada specification RSS 210 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands).

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board hyout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY 15.209 / RSS 210 Table 3

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz (Worst-Case with 132kHz Tx)	37.8dBμV @ 0.533MHz (-8.2dB)	Complies
	6.6/7.4	AC Conducted emissions 0.45 – 30 MHz (Worst-Case with 132kHz Tx)	47.5dBµV @ 0.394MHz (-0.5dB)	
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz Large Loop Antenna	22.2dBµV/m (12.8µV/m) @ 122.950kHz (-3.7dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz Small Loop Antenna	Not measured – large loop is worst case for loop antennas (refer to 132kHz data)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz Ferrite Antenna	1.6dBµV/m (1.2µV/m) @ 122.950kHz (-24.2dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz 4-Element Handrail Antenna	2.4dBµV/m (1.3µV/m) @ 122.950KHz (-23.4dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz 2-Element Handrail Antenna	4.3dBμV/m (1.6μV/m) @ 122.950kHz (-21.5dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.132 MHz Large Loop Antenna	22.8dBµV/m (13.8µV/m) @ 131.579kHz (-2.4dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.132 MHz Small Loop Antenna	21.4dBµV/m (11.7µV/m) @ 132kHz (-4.4dB)	Complies (note 1)
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.132 MHz Ferrite Antenna	1.1dBμV/m (1.1μV/m) @ 131.579kHz (-24.2dB)	Complies (note 1)
15.231 (b)	6.2.1	Transmitter Radiated Spurious Emissions, Tx @ 123kHz Worst-case – 4-element handrail	9.5dBµV/m (3.0µV/m) @ 245.900KHz (-10.3dB)	Complies (note 1)
15.231 (b)	6.2.1	Transmitter Radiated Spurious Emissions, Tx @ 132kHz	All spurious more than 20dB below the limit	Complies (note 1)
15.109	7.3	Receiver Spurious Emissions	No receiver	N/A

Note 1 – The ferrite and loop antennas were tested in all three orthogonal axes. The Handrail antennas were tested in two different axes.

15.231 / RSS 210 Section 6.1

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz	37.8dBµV @ 0.533MHz (-8.2dB)	Complies
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz	47.5dBµV @ 0.394MHz (-0.5dB)	Complies
15.231 (a) (1)	6.1.1(a) (1)	Duration of manually activated transmission	N/A – all are software controlled	N/A
15.231 (a) (2)	6.1.1(a) (2)	Duration of automatically activated transmission (control signal)	5 seconds or less – refer to theory of operations	Complies
15.231 (a) (2)	6.1.1(a) (2)	Duration of automatically activated transmission (data signal)	1 second or less – refer to theory of operations	Complies
15.231 (a) (3)	6.1.1(a) (3)	Transmissions at predetermined / regular intervals are not permitted	N/A	N/A
15.231 (a) (4)	6.1.1(a) (4)	Pendency of transmissions used during emergencies involving fire, security, and safety of life	N/A	N/A
15.231 (b)	6.1.1(b) / Table 1	Transmitter Radiated Emissions, 433.9 MHz	80.0dBµV/m (10000.0µV/m) @ 433.920MHz (-0.8dB)	Complies
15.231 (e)	6.1.1(e) / Table 2	Transmitter Radiated Emissions, 433.9 MHz	69.9dBµV/m (3126.1µV/m) @ 433.920MHz (-3.0dB)	Complies
15.231 (b) (e)	6.1.1(b) / Table 1	Transmitter Radiated Spurious Emissions, 30-4180 MHz	57.5dBµV/m (749.9µV/m) @ 867.840MHz (-3.3dB)	Complies
15.231 (c)	6.1.1 (c)	Bandwidth	135 kHz	Complies
15.109	7.3	Receiver Spurious Emissions	34.4dBµV/m (52.5µV/m) @ 423.220MHz (-11.6dB)	Complies

Note 1 - Refer to the operational description included with this application for detailed description and timing diagrams for transmission duration.

Note 2 - As the device can be mounted in different orientations, all three orientations were used during testing.

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Savi Technology, Inc. SP-65Y-ZAB series of rf signposts are designed to transmit at a low frequency (either 123 kHz or 132 kHz, dependant on model) to initiate a response from one of the Savi series of RFID tags. These tags are designed to transmit their ID at a frequency of 433.92 MHz. Some models in the SP-65Y-ZAB series include a 433.92 MHz transceiver to allow retrieval of a tag's ID and provide control signals to switch the tags on and off.

Under FCC Part 15.231 and RSS 210 section 6.1.1 there are different field strength limits for control and data signals. The device's operation at 433.9 MHz operates under these rules, and has a control signal (the Wake-Up signal) and data signals (pulsed transmissions with a 30% duty cycle in any 100ms period).

The signposts can be configured with a variety of antennas for the low frequency transmitter, dependent on model number. The basic model uses an internally mounted ferrite core antenna. External antennas are available, and these connect to the device using a proprietary connector. The external antennas are in two different styles, a rectangular cross-section loop antenna or a "handrail" antenna.

There are two different-sized external loop antennas (large and small). The main unit is mounted to these antennas, which are intended to be installed at exit and entry points to trigger RFID tags to transmit as they pass by.

The handrail antenna is designed to be inserted into a U-section handrail and comes in two different versions, one with two antenna elements and one with four antenna elements. The version with two antennas is designed for the elements to be installed in handrails on either side of a corridor. The four-antenna version is designed for locations where one corridor intersects with another and allows elements to be placed in handrails on both sides of the corridor and both sides of the intersection, thereby ensuring that a tag moving in either direction from the intersection is triggered.

The UHF transceiver uses two identical transceiver modules, each transmitter having its own antenna. This allows for diversity (either spatial or polarization) for communication between the transceiver and the tags. There are two options for antennas for the UHF transceiver, both of which are external and connect via reverse-gender SMA connectors. The options are either a short whip antenna (supplied as standard with the SP-652- ZAB units) that connects directly to the enclosure connectors or a longer, magnetic-mount whip antenna with a cable that can be provided as an accessory (Savi model # SPA-652-001).

The actual model numbers within the SP-65Y-ZAB series are coded as follows:

Y: 0 = base model; 1 = Ethernet adapter; 2 = Ethernet adapter and UHF transceiver with short whip or magnetic mount antenna

Z (LF Antenna): 0 = No antenna (may be used with Handrail, Internal Ferrite or External Loop antenna); 1 = Internal Ferrite antenna; 2 = External loop antenna (12' range); 3 = External loop antenna (8' range)

A (LF frequency): 0 = 132 kHz; 1 = 123 kHz

B (Indoor/Outdoor): 0 = Indoor enclosure; 1 = Outdoor enclosure (note, the enclosures are all plastic, the outdoor version has improved weatherproofing)

Normally the EUT would be installed at access monitoring and control points (entry & leave portals), mounted on a wall, ceiling or pole during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The EUT can be either AC or DC powered. The electrical rating of the EUT is 100-240 VAC, 50-60 Hz, 0.3 A and 12.8-30 VDC, 1.2 A.

The sample was received on June 24, 2004 and tested on June 25, 2004. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Savi	SP-652-011	123kHz Spider ant	0400104070002
Savi	SP-652-211	123kHz Lg loop ant	0400104060007
Savi	SP-652-201	132kHz Lg loop ant	0400104060013
Savi	SP-652-311	123kHz Sm Loop ant	0400104060017
Savi	SP-652-111	123kHz Internal ant	0400104060002
Savi	SP-652-101	132kHz Internal ant	0400104060010
Savi	SPA-652-001	Magnetic-mount UHF Whip Antenna	None
Savi	SPA-652-002	2-HandrailAntenna kit	None
Savi	SPA-652-003	4-HandrailAntenna kit	None

Receive mode radiated spurious emissions were measured with the UHF transceiver connected to the short whip antenna. Preliminary testing demonstrated that this was the worst-case configuration with respect to radiation of the LO and its second and third harmonics. All other radiated emissions were performed on all antennas, with the exception of the small loop antenna at 132kHz. Testing the large and small loops at 123 kHz demonstrated that the emissions were higher with the larger loop antenna.

AC conducted emissions were performed on both a 123kHz (SP-652-211) and 132 kHz (SP-652-201) transmitter.

ENCLOSURE

The EUT enclosure is primarily constructed of molded plastic. It measures approximately 69 cm wide by 13 cm deep by 120 cm high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Manufacturer	Model	Description	Serial Number	FCC ID
IBM	Thinkpad	Laptop	ANO9611TBOON	78-VA248 97/11
IBM	85G6709	AC Adapter	-	-

EUT INTERFACE PORTS

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The I/O cabling	configuration	during e	missions	testing was	as follows.
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		Cable(s)		
Port	Connected To	Description	Shielded or Unshielded	Length(m)
Ethernet	Laptop	CAT 5	Unshielded	30
Sync Out	Unterminated	Multiwire	Shielded	30
Sync IN	Unterminated	Multiwire	Shielded	30
Antenna	Loop antenna	Multiwire	Shielded	0.25
AC in	AC Mains	3 wire	Unshielded	1.5
RS 232	Not cabled			

Note: The Configuration ports were not connected as the manufacturer stated that these are for diagnostic purpose and therefore would not normally be connected.

EUT OPERATION

The EUT was transmitting continuously for transmit mode measurements. For receive mode measurements both transmitters were turned off and the receiver was active.

Conducted emissions measurements were made with the EUT transmitting continuously on both LF transmitter and UHF transceiver.

No measurements were made with the device transmitting a pulsed signal. Average field strength measurements for the pulsed signals were made by subtracting an average correction factor from the peak field strength based on the 30% duty cycle (measured in any 100mS period) for the pulsed data and control signals.

ANTENNA SYSTEM

The LF antenna is either integral to the device (loop and ferrite antennas) or connect via a proprietary connector. The UHF antennas connect via a reverse gender SMA.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on June 25, 2004at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission.

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4-1992.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a nonconductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS, SECTION 15.207 & 15.107(a)

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on	Linear decrease on
	logarithmic frequency axis	logarithmic frequency axis
	between 56.0 and 46.0	between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

CONDUCTED EMISSIONS SPECIFICATION LIMITS, RSS 210

Frequency	Class B	Class B
Range	Limit	Limit
(MHz)	(uV)	(dBuV)
0.450 to 30.000	250	48

FUNDAMENTAL AND HARMONIC LIMITS 15.231 (b) / RSS 210 Table 1

The table below shows the limits for both the Fundamental and Harmonic emissions for each frequency band of operation detailed in Section 15.231 (b) for control signals.

Operating Frequency (MHz)	Field strength (microvolts/m)	Harmonics (microvolts/m)
70 - 130	1250	125
130 - 174	1250 - 3750	125 - 375
174 - 260	3750	375
260 - 470	3750 - 12,500	375 - 1250
Above 470	12,500	1250

FUNDAMENTAL AND HARMONIC LIMITS 15.231 (e)/RSS 210 Table 4

The table below shows the limits for both the Fundamental and Harmonic emissions (that do not fall in restricted bands) for each frequency band of operation detailed in Section 15.231 (e) for data signals.

Operating Frequency (MHz)	Field strength (microvolts/m)	Harmonics (microvolts/m)
70 - 130	500	50
130 - 174	500 - 1500	50 - 150
174 - 260	1500	150
260 - 470	1500 - 5000	150 - 500
Above 470	5000	500

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209 / RSS 210 Table 3

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands and the limits for all emissions for a low power device operating under the general rules of RSS 210 and FCC Part 15 Subpart C.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F _{KHz} @ 300m	67.6-20*log ₁₀ (F _{KHz}) @ 300m
0.490-1.705	24000/F _{KHz} @ 30m	87.6-20*log ₁₀ (F _{KHz}) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.109 / RSS 210 Table 3 (RECEIVER)

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

The table below shows the limits for emissions from the receiver.

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:

 $R_r = Receiver Reading in dBuV$

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

 F_d = Distance Factor in dB D_m = Measurement Distance in meters D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

 $F_d = 40*LOG_{10} (D_m/D_s)$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R _r	=	Receiver Reading in dBuV/m
Fd	=	Distance Factor in dB
R _c	=	Corrected Reading in dBuV/m
Ls	=	Specification Limit in dBuV/m
Μ	=	Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

2 Pages

Conducted Emissions - AC Power Ports, 25-Jun-04			
Engineer: Juan Martinez			
<u>Manufacturer</u>	Description		
Fischer Custom Comm.	LISN, 100A		
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz		
Rohde& Schwarz	Pulse Limiter		

<u>Model #</u>	Asset #	Cal Due
FCC-LISN-50/250-100-2	1205	05-Apr-05
ESN	1332	12-May-05
ESH3 Z2	1398	12-Jan-05

Radiated Emissions, .1 - 2MH Engineer: Chris Byleckie	z, 24-Jun-04 (Low Frequency Transmitters)			
Manufacturer	Description	<u>Model #</u>	Asset #	Cal Due
EMCO	Magnetic Loop Antenna, 10k-30MHz	6502	1299	16-Dec-04
Hewlett Packard	EMC Spectrum Analyzer, 9KHz - 22GHz	8593EM	1319	20-Nov-04

Radiated Emissions, 30 - 4,000 MHz, 25-Jun-04 to 29-Jun-04 (UHF Transceiver, Digital Device)

Engineer: Juan Martinez			
Manufacturer	Description	Model #	<u>Asset # Cal Due</u>
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786 29-Oct-04
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332 12-May-05
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404 17-Nov-04
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498 15-Jan-05
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780 26-Feb-05
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786 29-Oct-04
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	787 10-Dec-04
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870 12-Jan-05

Conducted Emissions - AC Power Ports, 26-Jun-04

Engineer: Juan Martinez				
Manufacturer	Description	Model #	Asset #	<u>Cal Due</u>
Fischer Custom Comm.	LISN, 100A	FCC-LISN-50/250-100-2	1205	05-Apr-05
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	12-May-05
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	1398	12-Jan-05
Radiated Emissions, 30 - 1 Engineer: Juan Martinez Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Log Periodic Antenna, 0.2-1 GHz	3146	1294	08-Apr-05
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	12-May-05
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498	15-Jan-05

EXHIBIT 2: Test Measurement Data

T56150 42 Pages

Elliott

EMC Test Data

Client:	Savi Technology, Inc	Job Number:	J56067
Model:	SP-65Y-ZAB Signpost	T-Log Number:	T56150
		Account Manager:	Christine Vu
Contact:	Gene		
Emissions Spec:	FCC 15.209, 15.231, EN55022	Class:	A / Radio
Immunity Spec:		Environment:	

EMC Test Data

For The

Savi Technology, Inc

Model

SP-65Y-ZAB Signpost

Date of Last Test: 10/1/2004



EMC Test Data

Client:	Savi Technology, Inc	Job Number:	J56067
Model:	SP-65Y-ZAB Signpost	T-Log Number:	T56150
		Account Manager:	Christine Vu
Contact:	Gene		
Emissions Spec:	FCC 15.209, 15.231, EN55022	Class:	A / Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

EUT INFORMATION

General Description

The EUT is a Signpost with either 123 kHz or 132 kHz Transmitter and 433.92 MHz Transceiver which is designed to be used as part of an RFID inventory tracking system. Normally the EUT would be installed at access monitoring and control points (entry & leave portals), mounted on a wall, ceiling or pole during operation. The EUT was, therefore, treated as tabletop equipment during testing to simulate the end-user environment. The EUT can be either AC or DC powered. The electrical rating of the EUT is 100-240 VAC, 50-60 Hz, 0.3 A, 12.8-30 VDC, 1.2 A.

Equipment Under Test

Model	Description	Serial Number	FCC ID
SP-652-011	123kHz Spider ant	0400104070002	TBD
SP-652-211	123kHz Lg loop ant	0400104060007	TBD
SP-652-201	132kHz Lg loop ant	0400104060013	TBD
SP-652-311	123kHz Sm Loop ant	0400104060017	TBD
SP-652-111	123kHz Internal ant	0400104060002	TBD
SP-652-101	132kHz Internal ant	0400104060010	TBD
	SP-652-011 SP-652-211 SP-652-201 SP-652-311 SP-652-111	SP-652-011 123kHz Spider ant SP-652-211 123kHz Lg loop ant SP-652-201 132kHz Lg loop ant SP-652-311 123kHz Sm Loop ant SP-652-111 123kHz Internal ant	SP-652-011 123kHz Spider ant 0400104070002 SP-652-211 123kHz Lg loop ant 0400104060007 SP-652-201 132kHz Lg loop ant 0400104060013 SP-652-311 123kHz Sm Loop ant 0400104060017 SP-652-111 123kHz Internal ant 0400104060002

Other EUT Details

Several tests were performed with different separations between the antenna elements for the handrail antenna. Little difference was observed with separations of between 10" and 1m.

EUT Enclosure

The EUT enclosure is primarily constructed of molded plastic. It measures approximately 69 cm wide by 13 cm deep by 120 cm high.

Modification History

Mod. #	Test	Date	Modification
1			None made during testing

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Elliott

EMC Test Data

Client:	Savi Technology, Inc	Job Number:	J56067
Model:	SP-65Y-ZAB Signpost	T-Log Number:	T56150
		Account Manager:	Christine Vu
Contact:	Gene		
Emissions Spec:	FCC 15.209, 15.231, EN55022	Class:	A / Radio
Immunity Spec:	Enter immunity spec on cover	Environment:	

Test Configuration #1

	Lo	cal Support Equipme	ent	
Manufacturer	Model	Description	Serial Number	FCC ID
None				

Remote Support Equipment

Manufacturer Model Description Serial Number FCC ID					
	Manufacturer	r Model	Description	Serial Number	
IBM Thinkpad Laptop ANO9611TBOON 78-VA248 97/11	IBM	Thinkpad	Laptop	ANO9611TBOON	78-VA248 97/11
IBM 85G6709 AC Adapter	IBM	85G6709	AC Adapter	-	-

Interface Cabling and Ports

Port	Connected To		Cable(s)	
FUIL	Connected 10	Description	Shielded or Unshielded	Length(m)
Ethernet	Laptop	CAT 5	Unshielded	30
Sync Out	Unterminated	Multiwire	Shielded	30
Sync IN	Unterminated	Multiwire	Shielded	30
Antenna	Loop antenna	Multiwire	Shielded	0.25
AC in	AC Mains	3 wire	Unshielded	1.5
RS 232	Not cabled			

Note: The Configuration ports were not connected as the manufacturer stated that these are for diagnostic purpose and therefore would not normally be connected.

EUT Operation During Emissions

Digital device radiated measurements and AC conducted emissions measurements: the EUT was transmitting continuously on both LF transmitter and UHF transceiver.

The EUT was transmitting continuously for transmit mode measurements. For receive mode measurements both transmitters were turned off and the receiver was active.

No measurements were made with the device transmitting a pulsed signal. Average field strength measurements for the pulsed signals were made by subtracting an average correction factor from the peak field strength based on the 10% duty cycle (measured in any 100mS period) for the pulsed data and control signals.

5	y emission above 1 GHz, can not	0		
t Conditie ry of Res	Rel. Humidity:	24 °C 46 %		
ın #	Test Performed	Limit	Result	Margin
1	RE, 30 - 4000MHz, Maximized Emissions	FCC B	Pass	34.4dBµ V/m (52.5µ V/m) @ 423.220MHz (-11.6dE
ifications w ons From	ade During Testing: ere made to the EUT during testin The Standard made from the requirements of t			

General Test Configuration

Date of Test: 6/29/2004

Test Engineer: Juan Martinez

Test Location: SVOATS #2

The EUT and all local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located approximately 30 meters from the test area with all I/O routed overhead.

Unless otherwise specified, the measurement antenna was located 3 meters from the EUT for the measurement range 30 -4000 MHz.

Radiated Emissions - FCC Part 15 Subpart B - Receiver

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the

Config. Used: 1

Config Change: None

EUT Voltage: 120V/60Hz

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak re

Ambient Conditions:	Temperature:	24 °C
	Rel Humidity	46 %

specification listed above.

Summa

Run #	Test Performed	Limit	Result	Margin
1	RE, 30 - 4000MHz, Maximized Emissions	FCC B	Pass	34.4dBµ V/m (52.5µ V/m) @ 423.220MHz (-11.6dB)

Modifica

No mod

Deviatio

No devi



T-Log Number: T56150

Account Manager: Christine Vu

Class: A / Radio

Client: Savi Technology, Inc

Model: SP-65Y-ZAB Signpost

Contact: Gene

Test Specifics

Elliott

Spec: FCC 15.209, 15.231, EN55022

E	Ellio	ott						EM	IC Test Data
Client:	Savi Tech	nology, l	nc				J	ob Number:	J56067
Madal			aact				T-L	og Number:	T56150
woder:	SP-65Y-Z	AB SIGU	DOSI				Accou	nt Manager:	Christine Vu
Contact:	Gene								
Spec:	FCC 15.2	09, 15.23	31, EN5502	2				Class:	A / Radio
			d Emission		-	A - include	lla:abt	0	
Frequency		Pol		Class B	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
423.220	34.4	V	46.0	-11.6	QP	161	1.0	LO	
423 220	32.7	h	46.0	-13.3	OP	0	10	10	

423.220	32.7	n	46.0	-13.3	QP	0	1.0	LO
846.456	21.6	V	46.0	-24.4	QP	0	1.0	x2 LO
846.456	21.5	h	46.0	-24.5	QP	360	1.0	x2 LO

Note that the higher order harmonics were below the noise floor of the instrumentation used (at least 20dB below the limit)

	iott			EMC Tes
Client: Savi Te	chnology, Inc			Job Number: J56067
Model: SP-65)	/-ZAB Signpost			_og Number: T56150 Int Manager: Christine V
Contact: Gene				
Spec: FCC 15	5.209, 15.231, EN55022			Class: A / Radio
	Conducted E	Emissions - Po	ower F	orts
Test Specifics				
Objectiv	The objective of this test session specification listed above.	n is to perform final qualifi	ication test	ing of the EUT with resp
Test Engine	st: 6/25/2004 er: Juan Martinez on: SVOATS #2	Config. Used: Config Change: EUT Voltage:	None	·
second LISN was	Configuration nent, the EUT was located on a wo s used for all local support equipme			
or tabletop equipr	nent, the EUT was located on a wo s used for all local support equipme	ent. Remote support equi 25 °C		
for tabletop equipr a second LISN was ne test area.	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity:	ent. Remote support equi 25 °C		
or tabletop equipr second LISN was ne test area. Ambient Cond	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity:	ent. Remote support equi 25 °C 42 % Limit		located approximately
for tabletop equipr a second LISN was ne test area. Ambient Cond Summary of Re	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults	ent. Remote support equi 25 °C 42 % Limit FCC & CISPR 22 B	pment was	Margin 43.6dBµ V @ 0.318MH
For tabletop equipr A second LISN was ne test area. Ambient Cond Summary of Ro Run #	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults Test Performed	ent. Remote support equi 25 °C 42 % Limit FCC & CISPR 22 B EN 301 489-1 FCC & CISPR 22 B	pment was	Margin 43.6dBµ V @ 0.318MH (-6.2dB) 37.8dBµ V @ 0.533MH
For tabletop equiprovide table	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults Test Performed CE, AC Power, 230V/50Hz	ent. Remote support equi 25 °C 42 % Limit FCC & CISPR 22 B EN 301 489-1	pment was Result Pass	Margin 43.6dBµV @ 0.318MF (-6.2dB)

Clienci	Ellic Savi Tech	nnology, Ir	າດ				Job Nu	imber:	J56067
		0,5					T-Log Nu		
Model:	SP-65Y-Z	AB Signp	ost				0		Christine Vu
Contact:	Gene							3	
Spec:	FCC 15.2	09, 15.23	1, EN5502	2				Class:	A / Radio
Run #1: AC	Power F	ort Cond	lucted Emi	issions, 0.1	5 - 30MHz,	230V/50Hz (1	32kHz & 433MH	z)	
Frequency	Level	AC	EN55	6022 B	Detector	Comments			
MHz	dBµV	Line	Limit	Margin	QP/Ave	Commenta			
0.318	43.6	Line	49.8	-6.2	Average				
0.310	41.8	Line	53.1	-11.3	Average				
0.212	51.0	Line	63.1	-12.1	QP				
0.212	37.0	Neutral	49.8	-12.8	Average				
0.318	46.3	Line	59.8	-13.5	QP				
0.212	39.6	Neutral	53.1	-13.5	Average				
	46.1	Line	60.0	-13.9	QP				
					QP				
6.400		Neutral	631	-149					
6.400 0.212	48.2	Neutral Neutral	63.1 59.8	-14.9 -16.6					
6.400 0.212 0.318	48.2 43.2	Neutral	59.8	-16.6	QP				
6.400 0.212 0.318 6.400	48.2 43.2 33.4	Neutral Line	59.8 50.0	-16.6 -16.6	QP Average				
6.400 0.212 0.318	48.2 43.2	Neutral	59.8	-16.6	QP				
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC	48.2 43.2 33.4 40.0 26.3 C Power F	Neutral Line Neutral Neutral	59.8 50.0 60.0 50.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1	QP Average QP Average 5 - 30MHz,		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC	48.2 43.2 33.4 40.0 26.3 C Power F Level	Neutral Line Neutral Neutral Port Cond	59.8 50.0 60.0 50.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1	QP Average QP Average 5 - 30MHz, Detector	120V/60Hz (1 Comments	32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV	Neutral Line Neutral Neutral Port Cond AC Line	59.8 50.0 60.0 50.0 Iucted Emi EN55 Limit	-16.6 -16.6 -20.0 -23.7 issions, 0.1	QP Average QP Average 5 - 30MHz, Detector QP/Ave		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8	Neutral Line Neutral Neutral Port Cond AC Line Line	59.8 50.0 60.0 50.0 Iucted Emi EN55 Limit 46.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1 io22 B Margin -8.2	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4	Neutral Line Neutral Neutral Oort Cond AC Line Line Line	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1	-16.6 -16.6 -20.0 -23.7 issions, 0.1 i022 B Margin -8.2 -11.7	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3	Neutral Line Neutral Neutral Oort Cond AC Line Line Line Line	59.8 50.0 60.0 50.0 Iucted Emi EN55 Limit 46.0 53.1 49.8	-16.6 -16.6 -20.0 -23.7 issions, 0.1 i022 B Margin -8.2 -11.7 -12.5	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8	Neutral Line Neutral Neutral Port Cond AC Line Line Line Line Line	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1	-16.6 -16.6 -20.0 -23.7 issions, 0.1 io22 B Margin -8.2 -11.7 -12.5 -13.3	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8 36.4	Neutral Line Neutral Neutral Port Cond Cont Cond AC Line Line Line Line Line Neutral	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 io22 B Margin -8.2 -11.7 -12.5 -13.3 -13.6	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3	Neutral Line Neutral Neutral Oort Cond Oort Cond Line Line Line Line Line Line Neutral	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 io22 B Margin -8.2 -11.7 -12.5 -13.3 -13.6 -14.8	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212 0.318	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3 34.7	Neutral Line Neutral Neutral Neutral AC Line Line Line Line Line Neutral Neutral Neutral	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1 49.8	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 issions, 0.1 issions, 1.1 issions, 1.1 issions	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP Average QP		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212 0.318 0.212	48.2 43.2 33.4 40.0 26.3 CPower F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3 34.7 37.9	Neutral Line Neutral Neutral Oort Cond	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1 49.8 53.1	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 io22 B Margin -8.2 -11.7 -12.5 -13.3 -13.6 -14.8 -15.1 -15.2	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP Average QP Average Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212 0.318 0.212 0.318	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3 34.7 37.9 39.8	Neutral Neutral Neutral Neutral Port Cond Cont Cond C	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1 49.8 53.1 53.1 50.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 issions	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP Average QP Average QP		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212 0.318 0.212	48.2 43.2 33.4 40.0 26.3 CPower F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3 34.7 37.9	Neutral Line Neutral Neutral Oort Cond	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1 49.8 53.1	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 io22 B Margin -8.2 -11.7 -12.5 -13.3 -13.6 -14.8 -15.1 -15.2	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP Average QP Average Average		32kHz & 433MH	z)	
6.400 0.212 0.318 6.400 20.650 20.650 Run #2: AC Frequency MHz 0.533 0.212 0.318 0.212 6.400 0.212 0.318 0.212 0.318 0.212 0.318	48.2 43.2 33.4 40.0 26.3 C Power F Level dBμV 37.8 41.4 37.3 49.8 36.4 48.3 34.7 37.9 39.8	Neutral Neutral Neutral Neutral Port Cond Cont Cond C	59.8 50.0 60.0 50.0 lucted Emi EN55 Limit 46.0 53.1 49.8 63.1 50.0 63.1 49.8 53.1 53.1 50.0	-16.6 -16.6 -20.0 -23.7 issions, 0.1 issions, 0.1 issions	QP Average QP Average 5 - 30MHz, Detector QP/Ave Average Average QP Average QP Average QP Average QP		32kHz & 433MH	z)	

-								
E	Ellio	ott					EM	C Test Data
	Savi Tech		nc				Job Number:	J56067
Madal			+				T-Log Number:	T56150
	: SP-65Y-Z	AB Siyiik	JOSI				Account Manager:	Christine Vu
Contact:								
Spec:	FCC 15.2	.09, 15.23	31, EN55022	2			Class:	A / Radio
Run #3: A(C Power F	ort Con	Jucted Emi	issions, 0.1	5 - 30MHz,	120V/60Hz (1	32kHz & 433MHz)	
Frequency	Level	AC	RSS	S-210	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
5.550		Neutral	48.0	-6.9	QP			
6.400		Neutral	48.0	-8.0	QP			
0.533		Line	48.0	-8.2	QP			
6.400	-	Line	48.0	-8.2	QP	ļ		
0.533		Neutral	48.0	-10.6	QP			
5.650	37.3	Line	48.0	-10.7	QP			
Frequency		AC	-	5022 B	Detector	Comments	Hz & 433MHz)	
MHz	dBµV	Line	Limit	Margin	QP/Ave			
0.394		Neutral	48.0	-0.5	Average	l		
0.394	47.5	Line	48.0	-0.5	Average			
0.658		Neutral	46.0	-0.6	Average			
0.658		Line	46.0	-1.3	Average			
0.922		Neutral	46.0	-4.4	Average	ļ		
0.922		Line	46.0	-4.8	Average			
0.394		Neutral	58.0	-5.0	QP	ļ		
0.394		Line Neutral	58.0	-5.0 -5.2	QP QP			
0.658 0.658	1	Line	56.0 56.0	-5.2	QP QP	<u> </u>		
0.058		Neutral	56.0 56.0	-5.9	QP QP	1		
0.922	-	Line	56.0	-9.6	QP	<u>}</u>		
0.722	10.1		00.0			<u> </u>		
I								
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	iott			EM	IC Test	[•] Data
Client: Savi Te	echnology, Inc		J	lob Number:	J56067	
Model: SP-65Y	-ZAB Signpost			og Number:		
			Accou	int Manager:	Christine Vu	
Contact: Gene	5.209, 15.231, EN55022			Class	A / Radio	
Spec. 1 00 10	1207, 10.201, EN00022			01033.	/// Italio	
	Conducted I	Emissions - Po	ower P	orts		
Test Specifics						
Objectiv	e: The objective of this test session specification listed above.	on is to perform final qualif	ication testi	ing of the EU	JT with respec	t to the
Test Enginee	st: 6/25/2004 er: Juan Martinez n: SVOATS #2	Config. Used: Config Change: EUT Voltage:	None			
A second LISN was	nent, the EUT was located on a wo					
For tabletop equipr A second LISN was he test area.	nent, the EUT was located on a wo s used for all local support equipme	ent. Remote support equi				
For tabletop equipr A second LISN was he test area. Ambient Condi	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity:	ent. Remote support equi				
For tabletop equipr A second LISN was he test area. Ambient Condi Summary of Re	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults	ent. Remote support equi	ipment was	located app	roximately 30	
For tabletop equipr A second LISN was he test area. Ambient Condi	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity:	ent. Remote support equi		located app Ma 37.9dBµ V	roximately 30 argin @ 0.305MHz	
For tabletop equipr A second LISN was he test area. Ambient Condi Summary of Re Run #	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults Test Performed	ent. Remote support equi 25 °C 42 % EN 301 489-1 FCC & CISPR 22 B	pment was	located app Ма 37.9dBµV (-12 40.0dBµV	roximately 30 argin	
For tabletop equipr A second LISN was he test area. Ambient Condi Summary of Re Run # 1	nent, the EUT was located on a wo s used for all local support equipme itions: Temperature: Rel. Humidity: esults Test Performed CE, AC Power, 230V/50Hz	ent. Remote support equi	Result Pass	located app Ма 37.9dBµV (-12 40.0dBµV (-10 37.2dBµV	roximately 30 argin @ 0.305MHz 2.2dB) @ 0.305MHz	
For tabletop equipr A second LISN was the test area. Ambient Condi Summary of Re Run # 1 2	nent, the EUT was located on a wo s used for all local support equipment itions: Temperature: Rel. Humidity: esults Test Performed CE, AC Power, 230V/50Hz CE, AC Power, 120V/60Hz	ent. Remote support equi	Result Pass Pass	located app 37.9dBµV (-12 40.0dBµV (-10 37.2dBµV (-10 45.0dBµV	argin @ 0.305MHz 2.2dB) @ 0.305MHz 0.1dB) @ 0.810MHz	
For tabletop equipr A second LISN was he test area. Ambient Condi Summary of Re Run # 1 2 3 4 Modifications I	nent, the EUT was located on a wo s used for all local support equipment itions: Temperature: Rel. Humidity: esults CE, AC Power, 230V/50Hz CE, AC Power, 120V/60Hz CE, AC Power, 120V/60Hz	Limit 25 °C 42 % EN 301 489-1 FCC & CISPR 22 B EN 301 489-1 FCC & CISPR 22 B EN 301 489-1 RSS-210 EN 301 489-1	Result Pass Pass Pass	located app 37.9dBµV (-12 40.0dBµV (-10 37.2dBµV (-10 45.0dBµV	argin @ 0.305MHz 2.2dB) @ 0.305MHz).1dB) @ 0.810MHz).8dB) @ 0.612MHz	

Client:	Elli Savi Tech	nnology, li	nc				Job Number	J56067
Model:	SP-65Y-Z	ZAB Signp	oost				T-Log Number Account Manager	
Contact:	Gene							
		209, 15.23	1, EN5502	2			Class	A / Radio
un #1: AC	C Power F	Port Conc	lucted Emi	ssions, 0.1	5 - 30MHz,	230V/50Hz (1	23kHz & 433MHz)	
requency	Level	AC	EN55	022 B	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
0.305	37.9	Line	50.1	-12.2	Average			
0.301	36.7	Neutral	50.2	-13.5	Average			
0.202	49.4	Line	63.5	-14.1	QP			
0.202	48.5	Neutral	63.5	-15.0	QP			
0.202	36.7	Neutral	53.5	-16.8	Average			
0.202	36.6	Line	53.5	-16.9	Average			
0.305	43.1	Line	60.1	-17.0	QP			
0.305	40.8	Line	60.0	-19.2	QP			
6.800	40.0							
	40.8	Neutral	60.2	-19.4	QP			
6.800		Neutral Neutral	60.2 47.8	-19.4 -20.3	QP Average			
6.800 0.301	40.8				_			
6.800 0.301 0.404 6.800 0.404	40.8 27.5 28.6 34.0	Neutral Line Neutral	47.8 50.0 57.8	-20.3 -21.4 -23.8	Average Average QP			
6.800 0.301 0.404 6.800 0.404	40.8 27.5 28.6 34.0	Neutral Line Neutral	47.8 50.0 57.8	-20.3 -21.4 -23.8	Average Average QP	120V/60Hz (1 Comments	23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2un #2: AC	40.8 27.5 28.6 34.0 Power F Level dBµV	Neutral Line Neutral Port Conc AC Line	47.8 50.0 57.8 Iucted Emi EN55 Limit	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin	Average Average QP 5 - 30MHz, Detector QP/Ave		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2un #2: AC requency MHz 0.305	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0	Neutral Line Neutral Port Conc	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1	Average Average QP 5 - 30MHz, Detector QP/Ave Average		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2un #2: AC requency MHz 0.305 0.202	40.8 27.5 28.6 34.0 Power F Level dBμV 40.0 52.7	Neutral Line Neutral Port Conc AC Line Line Neutral	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2un #2: AC requency MHz 0.305 0.202 4.964	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2	Neutral Line Neutral Oort Conc AC Line Line Neutral Line	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5 46.0	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 200 #2: AC requency MHz 0.305 0.202 4.964 4.961	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0	Neutral Line Neutral Oort Conc AC Line Line Neutral Line Neutral	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5 46.0 46.0	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -11.8 -12.0	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2un #2: AC requency MHz 0.305 0.202 4.964 4.961 0.202	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4	Neutral Line Neutral Ort Conc AC Line Line Neutral Neutral Neutral	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -11.8 -12.0 -13.1	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average Average		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2.un #2: AC requency MHz 0.305 0.202 4.964 4.961 0.202 0.206	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8	Neutral Line Neutral Ort Conc AC Line Line Neutral Line Neutral Neutral Line	47.8 50.0 57.8 lucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -11.8 -12.0 -13.1 -13.6	Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 200 200 200 0.202 0.202 0.206 0.305	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8 46.0	Neutral Line Neutral Oort Conc AC Line Line Neutral Line Neutral Neutral Neutral Line Line Line	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4 60.1	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -12.0 -13.1 -13.6 -14.1	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP QP		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 200 #2: AC requency MHz 0.305 0.202 4.964 4.961 0.202 0.206 0.305 0.206	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8 46.0 39.1	Neutral Line Neutral Oort Conc AC Line Line Neutral Neutral Neutral Neutral Line Line Line	47.8 50.0 57.8 Iucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4 60.1 53.4	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -12.0 -13.1 -13.6 -14.1 -14.3	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP QP QP Average		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 200 7 requency MHz 0.305 0.202 4.964 4.961 0.202 0.206 0.305 0.206 0.305	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8 46.0 39.1 34.6	Neutral Line Neutral Ort Conc AC Line Line Neutral Line Neutral Line Line	47.8 50.0 57.8 lucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4 60.1 53.4 50.1	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -12.0 -13.1 -13.6 -14.1 -14.3 -15.5	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP QP Average QP Average QP		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 2000 2000 2000 0.202 4.964 4.961 0.202 0.206 0.305 0.206 0.305 0.206 0.305 0.305	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8 46.0 39.1 34.6 43.8	Neutral Line Neutral Ort Conc AC Line Line Neutral Line Neutral Line Neutral Neutral Neutral Neutral	47.8 50.0 57.8 lucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4 60.1 53.4 50.1 60.1	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -12.0 -13.1 -13.6 -14.1 -14.3 -15.5 -16.3	Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP Average QP Average QP Average QP		23kHz & 433MHz)	
6.800 0.301 0.404 6.800 0.404 200 7 requency MHz 0.305 0.202 4.964 4.961 0.202 0.206 0.305 0.206 0.305	40.8 27.5 28.6 34.0 C Power F Level dBμV 40.0 52.7 34.2 34.0 40.4 49.8 46.0 39.1 34.6	Neutral Line Neutral Ort Conc AC Line Line Neutral Line Neutral Line Line	47.8 50.0 57.8 lucted Emi EN55 Limit 50.1 63.5 46.0 46.0 53.5 63.4 60.1 53.4 50.1	-20.3 -21.4 -23.8 ssions, 0.1 022 B Margin -10.1 -10.8 -11.8 -12.0 -13.1 -13.6 -14.1 -14.3 -15.5	Average Average QP 5 - 30MHz, Detector QP/Ave Average QP Average Average QP QP Average QP Average QP		23kHz & 433MHz)	

4 -	Ellio	ott					EM	IC Test Data
	Savi Tech		nc				Job Number:	J56067
Madal			1				T-Log Number:	T56150
Niodei:	SP-65Y-Z	AB Signp)OST				Account Manager:	Christine Vu
Contact:								
Spec:	FCC 15.2	09, 15.23	31, EN55022	2			Class:	A / Radio
Run #3: A(C Power P	ort Cond	lucted Emi	ssions, 0.1	5 - 30MHz,	120V/60Hz (1	123kHz & 433MHz)	
Frequency	Level	AC	RSS	5-210	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
0.810	37.2	Line	48.0	-10.8	QP			
4.964	35.6	Line	48.0	-12.4	QP			
0.810	35.4	Neutral	48.0	-12.6	QP	ļ		
0.506	34.1	Neutral	48.0	-13.9	QP			
0.506	31.5	Line	48.0	-16.5	QP			
0.506	30.2	Neutral	48.0	-17.8	QP			
					0 0000012,	24100 (1250	Hz & 433MHz)	
Frequency	Level	AC	EN55	022 B	Detector	Comments		
MHz	dBµV	Line	EN55 Limit	022 B Margin	Detector QP/Ave		112 & 45510112 <i>j</i>	
MHz 0.612	dBμV 45.0	Line Line	EN55 Limit 46.0	022 B Margin -1.0	Detector QP/Ave Average		ΠΖ & 455IWI IZ <i>J</i>	
MHz 0.612 0.612	dBµV 45.0 44.9	Line Line Neutral	EN55 Limit 46.0 46.0	022 B Margin -1.0 -1.1	Detector QP/Ave Average Average			
MHz 0.612 0.612 0.367	dBμV 45.0 44.9 47.0	Line Line Neutral Neutral	EN55 Limit 46.0 46.0 48.6	022 B Margin -1.0 -1.1 -1.6	Detector QP/Ave Average Average Average			
MHz 0.612 0.612 0.367 0.367	dBμV 45.0 44.9 47.0 46.8	Line Line Neutral Neutral Line	EN55 Limit 46.0 46.0 48.6 48.6	022 B Margin -1.0 -1.1 -1.6 -1.8	Detector QP/Ave Average Average Average Average			
MHz 0.612 0.612 0.367 0.367 0.367	dBμV 45.0 44.9 47.0 46.8 50.2	Line Line Neutral Neutral Line Line	EN55 Limit 46.0 46.0 48.6 48.6 56.0	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8	Detector QP/Ave Average Average Average QP			
MHz 0.612 0.612 0.367 0.367 0.367 0.612 0.612	dBμV 45.0 44.9 47.0 46.8 50.2 50.1	Line Line Neutral Neutral Line Line Neutral	EN55 Limit 46.0 48.6 48.6 56.0 56.0	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9	Detector QP/Ave Average Average Average QP QP			
MHz 0.612 0.612 0.367 0.367 0.612 0.612 0.367	dBμV 45.0 44.9 47.0 46.8 50.2 50.1 52.5	Line Line Neutral Neutral Line Line Neutral Line	EN55 Limit 46.0 48.6 48.6 56.0 56.0 58.6	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9 -6.1	Detector QP/Ave Average Average Average QP QP QP			
MHz 0.612 0.367 0.367 0.612 0.612 0.612 0.367 0.367	dBμV 45.0 44.9 47.0 46.8 50.2 50.1 52.5 52.5	Line Line Neutral Neutral Line Neutral Line Neutral	EN55 Limit 46.0 48.6 48.6 56.0 56.0 58.6 58.6	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9 -6.1 -6.1	Detector QP/Ave Average Average Average QP QP QP QP			
MHz 0.612 0.367 0.367 0.612 0.612 0.612 0.367 0.367 1.843	dBμV 45.0 44.9 47.0 46.8 50.2 50.1 52.5 52.5	Line Line Neutral Line Line Neutral Line Neutral Line	EN55 Limit 46.0 48.6 48.6 56.0 56.0 58.6	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9 -6.1 -6.1 -6.1 -13.3	Detector QP/Ave Average Average Average QP QP QP			
MHz 0.612 0.367 0.367 0.612 0.612 0.612 0.367 0.367	dBμV 45.0 44.9 47.0 46.8 50.2 50.1 52.5 52.7 37.5	Line Line Neutral Neutral Line Neutral Line Neutral	EN55 Limit 46.0 48.6 48.6 56.0 56.0 58.6 58.6 46.0	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9 -6.1 -6.1	Detector QP/Ave Average Average Average QP QP QP QP QP QP QP Average			
MHz 0.612 0.612 0.367 0.367 0.612 0.612 0.367 0.367 0.367 1.843 1.843	dBμV 45.0 44.9 47.0 46.8 50.2 50.1 52.5 52.5 32.7 37.5 21.4	Line Line Neutral Line Line Neutral Line Neutral Line Line	EN55 Limit 46.0 48.6 48.6 56.0 56.0 58.6 58.6 46.0 56.0	022 B Margin -1.0 -1.1 -1.6 -1.8 -5.8 -5.9 -6.1 -6.1 -6.1 -13.3 -18.5	Detector QP/Ave Average Average Average QP QP QP QP QP Average QP			

CEIII	ott			EM	C Test
Client: Savi Tec	hnology, Inc			lob Number:	
Model: SP-65Y-	ZAB Signpost			.og Number: nt Manager:	T56150 Christine Vu
Contact: Gene	<u> </u>		710004	in manageri	
Spec: FCC 15.2	209, 15.231, EN55022			Class:	A / Radio
Ra	diated Emissions ((magnetic-mc	ount wi	nip ante	enna)
Test Specifics Objective	The objective of this test session specification listed above.	n is to perform final quali	fication testi	ng of the EU	IT with respec
Date of Test	: 6/25/2004	Config. Used	: 1		
•	: Juan Martinez	Config Change		_	
Test Location	SVUATS #2	EUT Voltage	1200/0002	<u></u>	
	nfiguration ecal support equipment were locat cated approximately 30 meters fro				•
	specified, the measurement anten from the EUT for the frequency ra		s from the E	UT for the m	easurement r
measurement ante	testing indicates that the emission enna. Maximized testing indicated nt antenna, <u>and</u> manipulation of th	d that the emissions we	re maximize		
Ambient Condit	ons: Temperature:	26 °C			
	Rel. Humidity:	40 %			
Summary of Res	sults				
Summary of Ke		Limit	Result		argin
Run #	Test Performed	Ennit			
2	Test Performed RE, 433 MHz Fundamental	FCC 15.231 (a)	Pass	(10000.0	IBμV/m DμV/m) @
Run #			Pass Pass	(10000.0 433.920M 50.7d	•

No deviations were made from the requirements of the standard.

Client:	Savi Tech	nology, l	nc					Job Number: J56067
Model			poct				T-L	og Number: T56150
wouer:	Model: SP-65Y-ZAB Signpost							nt Manager: Christine Vu
Contact:	Gene							
Spec:	FCC 15.20	09, 15.23	81, EN5502	2				Class: A / Radio
Run #1: Ra	diated En	nissions	, Fundame	ntal- Wake	-Up Control	Signal (5 Se	cond)	
Fundamen	tal							
Fundamen Frequency	tal Level	Pol	FCC 1	5.231(a)	Detector	Azimuth	Height	Comments
1	1	Pol v/h	FCC 1	5.231(a) Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
Frequency	Level dBµV/m						¥	Comments Setting 48, Peak reading, Average limit
Frequency MHz	Level dBµV/m 80.0	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Frequency MHz 433.920 433.920	Level dBµV/m 80.0 77.2	v/h v h	Limit 80.8 80.8	Margin -0.8 -3.6	Pk/QP/Avg Pk	degrees 179 317	meters 1.0 1.0	Setting 48, Peak reading, Average limit
Frequency MHz 433.920 433.920	Level dBµV/m 80.0 77.2 s (Note - ha	v/h v h	Limit 80.8 80.8 emissions a	Margin -0.8 -3.6	Pk/QP/Avg Pk Pk	degrees 179 317	meters 1.0 1.0	Setting 48, Peak reading, Average limit
Frequency MHz 433.920 433.920 Harmonics	Level dBµV/m 80.0 77.2 s (Note - ha	v/h v h armonic e	Limit 80.8 80.8 emissions a	Margin -0.8 -3.6 bove 1GHz	Pk/QP/Avg Pk Pk more than 20	degrees 179 317 OdB below lin	meters 1.0 1.0 nit).	Setting 48, Peak reading, Average limit Setting 48, Peak reading, Average limit
Frequency MHz 433.920 433.920 Harmonics Frequency	Level dBµV/m 80.0 77.2 i (Note - ha Level dBµV/m	v/h v h armonic e Pol	Limit 80.8 80.8 emissions a FCC 1!	Margin -0.8 -3.6 bove 1GHz 5.231(a)	Pk/QP/Avg Pk Pk more than 20 Detector	degrees 179 317 OdB below lin Azimuth	meters 1.0 1.0 nit). Height	Setting 48, Peak reading, Average limit Setting 48, Peak reading, Average limit

The EUT transmits four different control commands (Wake-Up, Hello, Sleep and Find) plus data signals. Apart from the wake-up command (measured above in run #1) which is a continuous signal. Due to the 5 second duration of the signal, no duty cycle averaing was made to the peak values. The Theory of Operations details how the different types of transmissions meet the timing requirements for control signals or data signals.

	011				IC Test	
Client: Savi Tec	hnology, Inc			ob Number:		
Model: SP-65Y-2	ZAB Signpost			og Number:		
	0.1		Accou	nt Manager:	Christine Vu	
Contact: Gene	209, 15.231, EN55022			Class	A / Radio	
	Radiated Emiss	sions (short v	vhip ar	itenna))	
est Specifics	T I II II CIII I I		<i>.</i>	(H E)	. 	
Objective	The objective of this test session specification listed above.	n is to perform final quali	fication testi	ng of the EU	JT with respec	t to the
Date of Test: Test Engineer: Test Location:	Juan Martinez	Config. Used: Config Change: EUT Voltage:	None	2		
Seneral Test Co	illigulation					
The EUT and all lo equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante	acal support equipment were locat ated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, <u>and</u> manipulation of the	m the test area with all I ina was located 3 meters ange 1 - 5 GHz. ns were maximized by o id that the emissions we	/O connections from the E rientation of re maximize	ons routed o UT for the m the EUT an	verhead. neasurement r d elevation of	ange 30
The EUT and all lo equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante of the measurement	acal support equipment were locat sated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, <u>and</u> manipulation of the	m the test area with all I ina was located 3 meters ange 1 - 5 GHz. ns were maximized by o d that the emissions wer he EUT's interface cable	/O connections from the E rientation of re maximize	ons routed o UT for the m the EUT an	verhead. neasurement r d elevation of	ange 30
equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante	acal support equipment were locat stated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, and manipulation of the fons: Temperature:	m the test area with all I ina was located 3 meters ange 1 - 5 GHz. ns were maximized by o id that the emissions we	/O connections from the E rientation of re maximize	ons routed o UT for the m the EUT an	verhead. neasurement r d elevation of	ange 30
The EUT and all lo equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante of the measurement Ambient Condition	acal support equipment were locat stated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, <u>and</u> manipulation of the fons: Temperature: Rel. Humidity: Sults	m the test area with all I ana was located 3 meters ange 1 - 5 GHz. ns were maximized by o d that the emissions were he EUT's interface cable 26 °C 40 %	/O connections from the E rientation of re maximized s.	ons routed o UT for the m the EUT and d by orientat	verhead. heasurement r d elevation of tion of the EU	ange 30
The EUT and all lo equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante of the measurement	acal support equipment were locat stated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, <u>and</u> manipulation of the fons: Temperature: Rel. Humidity:	m the test area with all I ana was located 3 meters ange 1 - 5 GHz. ns were maximized by o d that the emissions were he EUT's interface cable 26 °C	/O connections from the E rientation of re maximize	ons routed o UT for the m the EUT and d by orientat	verhead. heasurement r d elevation of tion of the EU argin	ange 30
The EUT and all lo equipment was loc Unless otherwise s 1000 MHz and 3m Note, preliminary measurement ante of the measurement Ambient Condition	acal support equipment were locat stated approximately 30 meters fro specified, the measurement anten from the EUT for the frequency ra- testing indicates that the emission enna. Maximized testing indicate int antenna, <u>and</u> manipulation of the fons: Temperature: Rel. Humidity: Sults	m the test area with all I ana was located 3 meters ange 1 - 5 GHz. ns were maximized by o d that the emissions were he EUT's interface cable 26 °C 40 %	/O connections from the E rientation of re maximized s.	DIT for the m UT for the m the EUT and by orientat d by orientat 77.20 (7244.4	verhead. heasurement r d elevation of tion of the EU	ange 30

Deviations From The Standard

No deviations were made from the requirements of the standard.

(AT	711'	11							
6E	1110	DTT						ЕM	IC Test Data
	Savi Tech		nc				J	ob Number:	J56067
		05						og Number:	
Model:	SP-65Y-Z	AB Sign	post					0	Christine Vu
Contact:	Gene							Ŭ	
Spec:	FCC 15.20	09, 15.23	31, EN55022	2				Class:	A / Radio
					-Up Control	Signal (5 Se	econd)		
						- J ,	,		
Fundament		armonics	s to 4400 M	Hz			-	-	
Laying Flat									
Frequency	Level	Pol	FCC 15	. ,	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
433.920	75.8	V	80.8	-5.0	Pk	140	1.0	<u> </u>	Peak reading, Average limit
433.920	75.5	h	80.8	-5.3	Pk	271	1.0	- V	Peak reading, Average limit
867.840	53.7	V	60.8	-7.1	Pk	256	1.0	Setting 48, F	Peak reading, Average limit
867.840	50.9	h	60.8	-9.9	Pk	0	1.0	Setting 48, F	Peak reading, Average limit
Standing u	р								
Frequency	Level	Pol	FCC 15	5.231(a)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
867.840	57.5	h	60.8	-3.3	Pk	178	1.0	Setting 48, F	Peak reading, Average limit
433.920	76.5	h	80.8	-4.3	Pk	78	1.1	Setting 48, F	Peak reading, Average limit
433.920	73.0	۷	80.8	-7.8	Pk	104	2.7	Setting 48, F	Peak reading, Average limit
867.840	47.3	V	60.8	-13.5	Pk	250	3.0	Setting 48, F	Peak reading, Average limit
On its Side									
Frequency	Level	Pol		5.231(a)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
433.920	77.2	h	80.8	-3.6	Pk	45	2.0	Setting 48, F	Peak reading, Average limit
867.840	57.2	h	60.8	-3.6	Pk	140	2.4	Setting 48, F	Peak reading, Average limit
867.840	53.5	V	60.8	-7.3	Pk	200	1.0	Setting 48, F	Peak reading, Average limit
433.920	73.2	V	80.8	-7.6	Pk	103	1.0	Setting 48, F	Peak reading, Average limit

The EUT transmits four different control commands (Wake-Up, Hello, Sleep and Find) plus data signals. Apart from the wake-up command (measured above in run #1) which is a continuous signal, the remaining signals are pulsed in nature. Due to the 5 second duration of the wake-up signal, no duty cycle averaing was made to the peak values. The Theory of Operations details how the different types of transmissions meet the timing requirements for control signals or data signals.

6 Elli	ott			EMC Te
Client: Savi Tecl	hnology, Inc		J	ob Number: J56067
Madal: SD (EV)	7AD Signact		T-L	og Number: T56150
Model: SP-65Y-2	ZAB Signpost		Accou	nt Manager: Christine
Contact: Gene				
Spec: FCC 15.2	209, 15.231, EN55022			Class: A / Radio
	ated Emissions (Dat	a/Control I	Pulsed 1	Fransmissio
est Specifics				
Objective:	The objective of this test session is the specification listed above.	s to perform enginee	ering evaluatio	n testing of the EUT w
Date of Test:		Config. Use		
0	: Juan Martinez	Config Chang		
Test Location:	: SVOATS #1	EUT Voltag	ge: 120Vac, 60	JHz
eneral Test Co	nfiguration			
The FLIT and all lo	cal support equipment were located	on the turntable for	radiated omic	cions tosting Domot
	support equipment more recutou		Taulateu entis	Siulis lesiliy. Remule
	ated approximately 30 meters from			•
equipment was loc	ated approximately 30 meters from	the test area with a	II I/O connectio	ons routed overhead.
equipment was loc		the test area with a	II I/O connectio	ons routed overhead.
equipment was loc The test distance a Note, preliminary	and extrapolation factor (if used) are testing indicates that the emissions	the test area with al detailed under eacl were maximized by	II I/O connection h run description orientation of	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t	the test area with al detailed under eacl were maximized by hat the emissions w	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante	and extrapolation factor (if used) are testing indicates that the emissions	the test area with al detailed under eacl were maximized by hat the emissions w	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the	the test area with al detailed under eacl were maximized by hat the emissions w	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement mbient Conditi	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the ions: Temperature: Rel. Humidity:	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement mbient Conditi	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the ions: Temperature: Rel. Humidity:	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement ambient Condition Summary of Res	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the ions: Temperature: Rel. Humidity: Sults	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C 61 %	II I/O connection h run descripti r orientation of vere maximized oles.	ons routed overhead. on. the EUT and elevatior d by orientation of the
equipment was loc The test distance a Note, preliminary measurement ante of the measurement	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the ions: Temperature: Rel. Humidity:	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C	II I/O connection h run description orientation of vere maximized	ons routed overhead. on. the EUT and elevatior
equipment was loc The test distance a Note, preliminary measurement ante of the measurement mbient Condition ummary of Res	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, <u>and</u> manipulation of the ions: Temperature: Rel. Humidity: Sults	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C 61 %	II I/O connection h run descripti r orientation of vere maximized oles.	ons routed overhead. on. the EUT and elevatior d by orientation of the Margin
equipment was loc The test distance a Note, preliminary measurement ante of the measurement Ambient Condition Summary of Res Run #	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, and manipulation of the ions: Temperature: Rel. Humidity: sults Test Performed	the test area with al detailed under eact were maximized by hat the emissions w EUT's interface cab 12 °C 61 % Limit	II I/O connection h run description orientation of vere maximized les.	Margin 69.9dBµV/m (3126.1µV/m) @ 433.920MHz (-3.0dF
equipment was loc The test distance a Note, preliminary measurement ante of the measurement ambient Condition Summary of Res Run # 1,2	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, and manipulation of the ions: Temperature: Rel. Humidity: sults Test Performed	the test area with al detailed under eacl were maximized by hat the emissions w EUT's interface cab 12 °C 61 % Limit 15.231(e)	II I/O connection h run description orientation of vere maximized oles.	Margin 69.9dBµ V/m (3126.1µ V/m) @ 433.920MHz (-3.0df 46.1dBµ V/m
equipment was loc The test distance a Note, preliminary measurement ante of the measurement Ambient Condition Summary of Res Run #	and extrapolation factor (if used) are testing indicates that the emissions enna. Maximized testing indicated t nt antenna, and manipulation of the ions: Temperature: Rel. Humidity: sults Test Performed RE, Fundamental	the test area with al detailed under eact were maximized by hat the emissions w EUT's interface cab 12 °C 61 % Limit	II I/O connection h run description orientation of vere maximized oles.	Margin 69.9dBµV/m (3126.1µV/m) @ 433.920MHz (-3.0dF

Deviations From The Standard

No deviations were made from the requirements of the standard.

41	Ellic	ott						EM	IC Test Data	
Client:	Savi Tech	nology, l	nc					Job Number:	J56067	
							T-L	og Number:	T56150	
Model:	Model: SP-65Y-ZAB Signpost Account Manager: C Contact: Gene									
Contact:	Gene							5		
		09, 15.23	31, EN5502	2				Class:	A / Radio	
	l				tic-mount	Whip Ante	enna		l .	
			, Fundame eter distanc	ental (30% E ce. Port A	Duty cycle)					
Frequency	Level	Pol	FCC 1	5.231(e)	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
433.920	69.4	V	72.9	-3.5	Avg	260	1.0			
100.000	62.9	h	72.9	-10.0	Avg	53	1.0			
433.920	0217					2/0	1.0			
433.920 433.920		٧	92.9	-13.0	Pk	260	1.0			
433.920 433.920	79.9 73.4	h	92.9	-19.5	Pk	53	1.0			
433.920 433.920 Run #2: R Measurem Port B (Hig	79.9 73.4 adiated Ei ents taker pher powe	h missions n at 3 me r output	92.9 s, Fundame eter distanc was used	-19.5 ental and 2 ce. to measure	Pk nd harmonic ed 2nd harm	53 c (30% Duty onic)	1.0 cycle)			
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency	79.9 73.4 adiated Ei ents taker her powe Level	h missions n at 3 me r output Pol	92.9 s, Fundame eter distand was used FCC 15	-19.5 ental and 2 ce. to measure 5.231(e)	Pk nd harmonic ed 2nd harm Detector	53 c (30% Duty onic) Azimuth	1.0 cycle) Height	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hig Frequency MHz	79.9 73.4 adiated Ei ents taker her powe Level dBμV/m	h missions n at 3 me r output Pol v/h	92.9 s, Fundame eter distance was used FCC 15 Limit	-19.5 ental and 2 ce. to measure 5.231(e) Margin	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg	53 c (30% Duty onic) Azimuth degrees	1.0 cycle) Height meters	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920	79.9 73.4 adiated En ents taker gher powe Level dBμV/m 69.7	h missions n at 3 me r output Pol V/h V	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg	53 c (30% Duty onic) Azimuth degrees 3	1.0 cycle) Height meters 1.3	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920	79.9 73.4 adiated Et ents taker her powe Level dBμV/m 69.7 64.9	h missions n at 3 me r output Pol V/h v h	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg	53 c (30% Duty onic) Azimuth degrees 3 294	1.0 cycle) Height meters 1.3 1.0	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920 433.920	79.9 73.4 adiated Eu ents taker gher powe Level dBμV/m 69.7 64.9 80.2	h missions n at 3 me r output Pol V/h V h V	92.9 s, Fundame eter distance was used FCC 15 Limit 72.9 72.9 92.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk	53 c (30% Duty onic) Azimuth degrees 3 294 3	1.0 cycle) Height meters 1.3 1.0 1.3	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920	79.9 73.4 adiated Eu ents taker gher powe Level dBμV/m 69.7 64.9 80.2	h missions n at 3 me r output Pol V/h v h	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg	53 c (30% Duty onic) Azimuth degrees 3 294	1.0 cycle) Height meters 1.3 1.0	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hig Frequency MHz 433.920 433.920 433.920	79.9 73.4 adiated Et ents taker her powe Level dBμV/m 69.7 64.9 80.2 75.4	h missions n at 3 me r output Pol v/h v h v h	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9 92.9 92.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk	53 c (30% Duty onic) Azimuth degrees 3 294 3 294	1.0 cycle) Height meters 1.3 1.0 1.3 1.0			
433.920 433.920 Run #2: R Measurem Port B (Hig Frequency MHz 433.920 433.920 433.920	79.9 73.4 adiated Et ents taker Jher powe Level dBμV/m 69.7 64.9 80.2 75.4 Level	h missions n at 3 me r output Pol V/h V h V	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9 92.9 92.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5 5.231(e)	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk Pk Detector	53 c (30% Duty onic) Azimuth degrees 3 294 3 294 3 294 Azimuth	1.0 cycle) Height meters 1.3 1.0 1.3	Comments		
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920 433.920 433.920 Frequency MHz	79.9 73.4 adiated Et ents taker her powe Level dBμV/m 69.7 64.9 80.2 75.4 Level dBμV/m	h missions n at 3 me r output Pol v/h v h v h Pol	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9 92.9 92.9 92.9 FCC 1!	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk Detector Pk/QP/Avg	53 c (30% Duty onic) Azimuth degrees 3 294 3 294	1.0 cycle) Height neters 1.3 1.0 1.3 1.0 Height			
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920 433.920 Frequency	79.9 73.4 adiated Et ents taker gher powe Level dBμV/m 69.7 64.9 80.2 75.4 Level dBμV/m 39.3	h nissions nat 3 mer Pol V/h V h V h Pol V/h	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9 92.9 92.9 92.9 92.9 FCC 1! Limit	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5 5.231(e) Margin	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk Pk Detector	53 c (30% Duty onic) Azimuth degrees 3 294 3 294 3 294 Azimuth degrees	1.0 cycle) Height neters 1.3 1.0 1.3 1.0 Height meters			
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920 433.920 433.920 Frequency MHz 867.840	79.9 73.4 adiated Et ents taker gher powe Level dBμV/m 69.7 64.9 80.2 75.4 Level dBμV/m 39.3	h missions n at 3 mer Pol v/h v h v h Pol v/h v/h v	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 72.9 92.9 92.9 92.9 FCC 1! Limit 52.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5 5.231(e) Margin -13.6	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk Detector Pk/QP/Avg Avg Avg	53 c (30% Duty onic) Azimuth degrees 3 294 3 294 3 294 3 294 3 294 3 294 294 2	1.0cycle)Heightmeters1.31.01.31.0Heightmeters1.0			
433.920 433.920 Run #2: R Measurem Port B (Hic Frequency MHz 433.920 433.920 433.920 433.920 433.920 50 433.920 433.920 433.920 433.920 433.920 433.920 433.920 433.920 433.920	79.9 73.4 adiated El ents taker her powe Level dBμV/m 69.7 64.9 80.2 75.4 Level dBμV/m 39.3 38.5 38.0	h missions n at 3 mer Pol v/h v h v h Pol v/h v v h	92.9 s, Fundame eter distance was used FCC 19 Limit 72.9 72.9 92.9 92.9 92.9 92.9 52.9 52.9	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5 5.231(e) Margin -13.6 -14.4	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Pk Pk Pk Detector Pk/QP/Avg Avg Avg Avg Avg	53 c (30% Duty onic) Azimuth degrees 3 294 3 294 3 294 3 294 3 294 3 294 294 2 4 Zimuth degrees 2 0	1.0 cycle) Height meters 1.3 1.0 1.3 1.0 Height meters 1.0 1.0 1.0			
433.920 433.920 Run #2: R Measurem Port B (Hig Frequency MHz 433.920 433.920 433.920 433.920 433.920 5 Frequency MHz 867.840 867.840 1301.760	79.9 73.4 adiated El ents taker Jher powe Level dBμV/m 69.7 64.9 80.2 75.4 Level dBμV/m 39.3 38.5 38.0 49.8	h missions n at 3 mer r output V/h V h V h V h V h V h V h V V h	92.9 s, Fundame eter distance was used FCC 1! Limit 72.9 92.9 92.9 92.9 92.9 92.9 52.9 52.9 5	-19.5 ental and 2 ce. to measure 5.231(e) Margin -3.2 -8.0 -12.7 -17.5 5.231(e) Margin -13.6 -14.4 -14.9	Pk nd harmonic ed 2nd harm Detector Pk/QP/Avg Avg Avg Pk Pk Detector Pk/QP/Avg Avg Avg Avg Avg Avg Avg	53 c (30% Duty Azimuth degrees 3 294 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 3 2 2 9 4 2 2 3 2 2 3 2 2 3 2 3 2 3 2 3 2 3 2 3	1.0 cycle) Height meters 1.3 1.0 1.3 1.0 Height meters 1.0 1.0 1.0 1.0			

All other transmitter-spurious emissions were more than 20dB below the limit. All average measurements are calculated from the peak measurement by applying a duty cycle correction factor of 20log(0.3) for

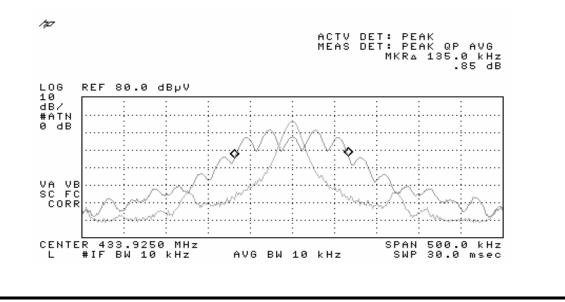
a 30% duty cycle.

C I									C Test Dat
Client:	Savi Tech	nology, I	nc					Job Number:	
Model:	SP-65Y-Z	AB Sianı	oost					og Number:	
		9. 1					Accou	int Manager:	Christine Vu
Contact:									
Spec:	FCC 15.20	09, 15.23	31, EN5502					Class:	A / Radio
Measurem	ents taker	n at 3 me	eter distan	ntal (30% I ce. Port A	hort Whip Duty cycle)				
Frequency		Pol		5.231(e)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
Flat	(0.5		70.0			070	1.0		
433.920		h	72.9	-4.4	Avg	272	1.0		
433.920		V	72.9	-9.4	Avg	52	1.9		
433.920		h	92.9 92.9	-13.9	Pk	272	1.0		
433.920 Side	74.0	V	92.9	-18.9	Pk	52	1.9		
433.920	68.3	h	72.9	-4.6	Avg	94	1.0		
433.920		V	72.9	-4.0	Avg	319	1.5		
433.920		h	92.9	-14.1	Pk	94	1.0		
433.920		V	92.9	-20.7	Pk	319	1.5		
Upright	,	•	, 2. ,	2017	T K	017	110		
433.920	67.7	v	72.9	-5.2	Avg	125	1.0		
433.920		h	72.9	-8.4	Avg	325	1.0		
433.920		V	92.9	-14.7	Pk	125	1.0		
433.920		h	92.9	-17.9	Pk	325	1.0		
Measurem Port B (Hig Frequency	ents taker gher powe	n at 3 me r output Pol	eter distand was used FCC 1	ce. to measure	2nd harmon ed 2nd harm Detector	onic)		Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
433.920		V	72.9	-3.0	Avg	129	1.0	EUT Uprigh	nt
433.920		h	72.9	-3.4	Avg	269	1.0	EUT Flat	1.
433.920		h	72.9	-4.4	Avg	94	1.0	EUT On Sid	ae
433.920 433.920		V	72.9	-7.3	Avg	164	1.0	EUT Flat	.1
/ 1 2 2 10 2 11		h	72.9	-8.4	Avg	361	2.0	EUT Uprigh	
		V	72.9	-10.0	Avg	72	1.5	EUT On Sid	
433.920	80.4	v h	92.9	-12.5	Pk Dk	129	1.0	EUT Uprigh	IL
433.920 433.920	00.0	11	92.9	-12.9	Pk	269 94	1.0 1.0	EUT Flat EUT On Sid	40
433.920 433.920 433.920			0.2.0	10 0	111/		i IU		
433.920 433.920 433.920 433.920	79.0	h	92.9 02.0	-13.9	Pk Pk				Je
433.920 433.920 433.920	79.0 76.1		92.9 92.9 92.9	-13.9 -16.8 -17.9	Pk Pk Pk	94 164 361	1.0 2.0	EUT Flat EUT Uprigh	

E	Ellio	ott						EMC Test Data		
Client:	Savi Tech	nology, l	nc				J	lob Number: J56067		
	00 (5) (7						T-L	.og Number: T56150		
Model:	Model: SP-65Y-ZAB Signpost Account Manager: Christine Vu									
Contact:	Contact: Gene									
Spec:	FCC 15.20	09, 15.23	31, EN5502	2				Class: A / Radio		
Run #2b:	Radiated I	Emissio	ns, 2nd har	monic (30%	6 Duty cycle	e)				
Measurem										
Port B (Po								•		
Frequency	Level	Pol	FCC 15	5.231(e)	Detector	Azimuth	Height	Comments		
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters			
867.840	46.1	h	52.9	-6.8	Avg	116	1.2	EUT Upright		
867.840	43.4	h	52.9	-9.5	Avg	13	1.0	EUT Flat		
867.840	43.3	٧	52.9	-9.6	Avg	5	1.0	EUT Flat		
867.840	41.7	٧	52.9	-11.2	Avg	127	1.0	EUT Upright		
867.840	40.5	V	52.9	-12.4	Avg	232	1.4	EUT On Side		
1301.760	38.7	V	52.9	-14.2	Avg	0	1.3	EUT Flat		
867.840	56.6	h	72.9	-16.3	Pk	116	1.2	EUT Upright		
867.840	36.4	h	52.9	-16.5	Avg	251	1.0	EUT On Side		
867.840	53.9	h	72.9	-19.0	Pk	13	1.0	EUT Flat		
867.840	53.8	V	72.9	-19.1	Pk	5	1.0	EUT Flat		
867.840	52.2	V	72.9	-20.7	Pk	127	1.0	EUT Upright		
867.840	51.0	V	72.9	-21.9	Pk	232	1.4	EUT On Side		
1301.760	49.2	V	72.9	-23.7	Pk	0	1.3	EUT Flat		
867.840	46.9	h	72.9	-26.0	Pk	251	1.0	EUT On Side		

All other transmitter-spurious emissions were more than 20dB below the limit. All average measurements are calculated from the peak measurement by applying a duty cycle correction factor of 20log(0.3) for a 30% duty cycle.

Run #3: 20dB Bandwidth



Elli	ott			EM	IC Test L	Jai
Client: Savi Teo	chnology, Inc		~	lob Number:	J56067	
Model: SP-65Y-	7AB Signnost			og Number:		
			Accou	nt Manager:	Christine Vu	
Contact: Gene	209, 15.231, EN55022			Class	A / Radio	
•		ntornal Earrit	o Antor		I	
	iated Emissions (Ir	iternal Ferrit	e Anter	ina @	132KHZ)	
Test Specifics Objective	The objective of this test sessior specification listed above.	n is to perform final qua	lification testi	ing of the EU	JT with respect to	the
•	t: 6/24/2004 :: Chris Byleckie :: SVOATS #2	Config. Used Config Change EUT Voltage		2		
General Test Co The EUT and all le	onfiguration ocal support equipment were locat	ed on the turntable for	radiated emis	ssions testing	g.	
otherwise noted.	sions testing below 30 MHz the me Radiated magnetic field measuren n the loop of the antenna either pa	nents were made with t	he loop ante			
Ambient Condit	ions: Temperature:	21 °C				
	Rel. Humidity:	59 %				
Summary of Re	sults					
Run #	Test Performed	Limit	Result		argin	
1, 2, 3	RE, Fundamental, Preliminary Scan	FCC 15.209	Pass	@ 131	m (1.1µ V/m) .579kHz I.2dB)	
4	RE, 132 kHz - 1.32 MHz, Harmonic Emissions	FCC 15.209	Pass	-16.40 (0.2µ	dBµ V/m V/m) @ Hz (-32.0dB)	
	lade During Testing: were made to the EUT during testi	ng				
Deviations Fror	-	-				

E	Ellio	ott						EM	IC Test Data
	Savi Tech		nc					lob Number:	J56067
Madal			1				T-L	og Number:	T56150
Model:	SP-65Y-Z	AB SIGN	DOST				Accou	nt Manager:	Christine Vu
Contact:									
Spec:	FCC 15.2	09, 15.23	31, EN55022	2				Class:	A / Radio
	ents of the				nental (Layir on the OATS		nces of 10r	n and 20m a	nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
131.579	82.5	10.4	92.9	0	Pk	72	1.0	-	0m - Note 1
131.579	62.4	10.4	72.8	0	Pk	260	1.0	Tested at 2	20m - Note 2
Note 3:	Polarizatio	on of O ir	ndicates the	loop was f	acing the EU	F, I indicates	that the loo	p was perpe	endicular to the EUT.
<u>Extrapolat</u>	ion Factor	Calcula	<u>ition:</u>						
Ex Run #2: Pi	trapolation reliminary	Le on from 1 ofrom 20 Radiat e			dBμV/m dBμV/m dB nental (On it		nces of 10r	n and 20m a	ind are recorded in the
table below		landame	inter orginar i			at toot diota			
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
131.579	66.0	10.4	76.4	0	Pk	156	1.0	Tested at 1	0m - Note 1
131.579	45.5	10.4	55.9	0	Pk	204	1.0	Tested at 2	20m - Note 2
Note 1				uulth onton		o oonorotoo	hatuaanaa	ah athar	
Note 1: Note 2:	The maxir	num sigi	al lovol was	with antor	nnas 10 inche nnas 10 inche	s seperates	between ea	ich othor	
Note 2:		Ŭ							endicular to the EUT.
Extrapolati					<u>g</u> e <u>_</u> _			<u> </u>	
	•	Le n from 1	evel at 10m: evel at 20m: 0m to 20m: m to 300m:	76.4 55.9 68.2 <u>80.2</u>	dBμV/m dBμV/m dB				

6I	Ellio	ott						EM	C Test Data
Client:	Savi Tech	nology, l	nc				~	lob Number:	J56067
Madal			1				T-L	og Number:	T56150
wodel:	SP-65Y-Z	AB Sign	DOST				Accou	nt Manager:	Christine Vu
Contact:	Gene								
Spec:	FCC 15.2	09, 15.23	31, EN5502	2				Class:	A / Radio
	ents of the			ns, Fundam were made o Pol (O / I) O O		S at test dista Azimuth	Height Height meters 1.0 1.0	Comments Tested at 1	nd are recorded in the 0m - Note 1 0m - Note 2
131.379	03.0	10.4	74.0	0	ΓN	19	1.0	Testeu al 2	
Note 1: Note 2: Note 3: Extrapolati	The maxir Polarizatio	num sigr on of O ir	nal level was indicates the	s with anteni	nas 1 meter	seperates b seperates b T, I indicates	etween eacl	n other.	ndicular to the EUT.
Ex	trapolation	ı from 20	0m to 20m: m to 300m: amental ar	<u>72.9</u>	dB c Radiated	Emissions ((Worst Case	e configurat	ion)
Frequency	Level	FCC	15.209	Detector	Azimuth	Height	Comments		
kHz	dBµV/m	Limit	Margin	Pk/QP/Avg		meters			
131.6	1.1	25.2	-24.2	Pk	79	1.0	Note 1		
		500	15.000						
Frequency kHz	Level dBµV/m	Limit	15.209	Detector Pk/QP/Avg	Azimuth degrees	Height	Comments		
394.7	-16.4	15.7	Margin -32.0	Pk	uegrees 0	meters 1.0	Note 2 ma	asured at 20	Om, extrapolated to 300m
394.7	-16.4	15.7	-32.0	Pk	0	1.0			Om, extrapolated to 300m
263.1	-16.1	19.2	-35.3	Pk	0	1.0			Om, extrapolated to 300m
526.3	-14.5	33.2	-47.7	Pk	0	1.0			m, extrapolated to 30m
	measuren Preliminar	nent reco ry measu	orded at 20r	n from run # owed there I	3. to be no sigr	nificant signa	ils at a dista	nce of 20m f	10m and 20m to the rom the EUT other than
Note 3:	the signal: All signals level of 3.4	<u>s noted ii</u> above 4 4dBuV/m	n <u>the table a</u> 90kHz were at the spee	above. e less than 4	3.4dBuV/m tance of 30n	(-8.2dBuA/m	n) at a distar	•	on distance) was used for hich is equivalent to a n factor of

	ou			EMC Test
Client: Savi Teo	chnology, Inc			Job Number: J56067
Model: SP-65Y-	7AB Signnost		T-I	Log Number: T56150
			Αссоι	unt Manager: Christine Vu
Contact: Gene	000 45 004 ENES000			
Spec: FCC 15.	209, 15.231, EN55022			Class: A / Radio
Ra	diated Emissions (Small Loop	Antenn	ia @ 132kHz)
est Specifics				
Objective	The objective of this test session specification listed above.	is to perform final qua	alification test	ing of the EUT with respect
Date of Test	: 6/24/2004	Config. Use		
2410 01 100		Config Chang		
Test Engineer	5			
Test Engineer	: Chris Byleckie I: SVOATS #2	EUT Voltag	e: 120V/60H	Z
Test Engineer Test Locatior General Test Co	: SVOATS #2	-		
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted.	: SVOATS #2	ed on the turntable for asurement antenna w ents were made with	radiated emi vas located 10 the loop ante	ssions testing.) and 20 meters from the EL
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted. ground plane, with	:: SVOATS #2 configuration pocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement the loop of the antenna either para ions: Temperature:	ed on the turntable for asurement antenna w ents were made with	radiated emi vas located 10 the loop ante	ssions testing.) and 20 meters from the EL
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted. ground plane, with	 SVOATS #2 onfiguration ocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement the loop of the antenna either para 	ed on the turntable for asurement antenna w ents were made with allel or perpendicular	radiated emi vas located 10 the loop ante	ssions testing.) and 20 meters from the EL
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted. ground plane, with	:: SVOATS #2 configuration bocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement in the loop of the antenna either para ions: Temperature: Rel. Humidity:	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C	radiated emi vas located 10 the loop ante	ssions testing.) and 20 meters from the EL
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted.	:: SVOATS #2 configuration bocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement in the loop of the antenna either para ions: Temperature: Rel. Humidity:	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C	radiated emi vas located 10 the loop ante	ssions testing. D and 20 meters from the EL nna located one meter abov Margin
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted. ground plane, with Mbient Condit	e: SVOATS #2 configuration pocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement the loop of the antenna either para ions: Temperature: Rel. Humidity: sults	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 % Limit	radiated emi vas located 10 the loop ante to the EUT.	ssions testing. D and 20 meters from the EL nna located one meter abov Margin 21.4dBµ V/m
Test Engineer Test Location General Test Co The EUT and all lo For radiated emiss otherwise noted. ground plane, with mbient Condit	:: SVOATS #2 onfiguration ocal support equipment were locate sions testing below 30 MHz the mea Radiated magnetic field measurement in the loop of the antenna either para ions: Temperature: Rel. Humidity: sults Test Performed	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 %	radiated emi vas located 10 the loop ante to the EUT.	ssions testing.) and 20 meters from the EL nna located one meter abov Margin 21.4dBμ V/m (11.7μ V/m) @ 132kHz (
Test Engineer Test Location General Test Co The EUT and all lo For radiated emis otherwise noted. ground plane, with Mbient Condit	 SVOATS #2 onfiguration ocal support equipment were locate sions testing below 30 MHz the mean adiated magnetic field measurements the loop of the antenna either para ions: Temperature: Rel. Humidity: sults Test Performed RE, 132 kHz Fundamental 	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 % Limit	radiated emi vas located 10 the loop ante to the EUT.	ssions testing. D and 20 meters from the EL nna located one meter abov Margin 21.4dBµ V/m

6I	Ellio	ott						EM	IC Test Data
Client:	Savi Tech	inology, l	nc					Job Number:	J56067
Model	SP-65Y-Z		aact				T-l	_og Number:	T56150
wouer.	3P-001-2	AD SIYII	0051				Accou	unt Manager:	Christine Vu
Contact:	Gene								
Spec:	FCC 15.2	09, 15.23	31, EN5502	2				Class	A / Radio
EUT set fo	r maximu ents of the	m Pout		were made	nental (On it		ances of 10r	m and 20m a	and are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
132.000	104.3		114.7	0	Pk	0	1.0		10m - Note 1
132.000	85.3	10.4	95.7	0	Pk	360	1.0	Tested at 2	20m - Note 2
Ex Run #2: W	xtrapolatic trapolatior /orst Case	Le Le on from 1 o from 20 e Fundar	evel at 10m: evel at 20m: 0m to 20m: m to 300m: nental (Wo	95.7 63.2 <u>74.3</u> rst Case co	dBμV/m dBμV/m dB onfiguration	-	Comment		
Frequency	Level		15.209	Detector	Azimuth	Height	Comments	8	
kHz 132.0	dBµV/m 21.4	Limit 25.2	Margin -3.8	Pk/QP/Avg Pk	degrees 0	meters 1.0	Note 1		
132.0	Z1.4	Z0.Z	-3.8	PK	0	1.0	NOLE I		
Note 1:	measuren	nent reco	orded at 20r	n from run #	1.				10m and 20m to the
Note 2:	the funda 52dBuV/n distance c	mental si n (1.85dE of 300m i	gnal. Apar BuA/m) at a f using the s	t from the fund distance of suggested e	ndamental tr 20m, which i xtrapolation	ansmission, s equivalent factor of 40k	all signals t to a level o og(measure	pelow 490kH f -28dBuV/m ment distan	from the EUT other than z were less than at the specification ce/specification distance).
Note 3:	Preliminal fundamer is equival	ry measu Ital signa ent to a le	rements sh I. All signal evel of 3.4d	owed there s above 490 BuV/m at the	to be no sigr IkHz were le	nificant signa ss than 43.4 on distance c	lls at a dista dBuV/m (-8	ince of 3m fr .2dBuA/m) a	om the EUT other than the t a distance of 3m, which ested extrapolation factor

Elli 🖉	ott		EMC Test Da			
Client: Savi Tec				Job Number:	J56067	
Model: SP-65Y-	ZAB Signpost			_og Number:	T56150 Christine Vu	
Contact: Gene			ALLUL	ini wanayer.		
	209, 15.231, EN55022			Class:	A / Radio	
Test Specifics Objective Date of Test Test Engineer Test Location General Test Co	: 6/24/2004 : Chris Byleckie : SVOATS #2	s to perform final qua Config. Use Config Chang EUT Voltag	ulification test d: 1 e: None e: 120V/60H:	ing of the EU	JT with respect to th	
otherwise noted.	-	ents were made with Illel or perpendicular 21 °C	the loop ante			
Summary of Rea		59 %				
Run #	Test Performed	Limit	Result		argin IBµ V/m	
1, 2, 3	RE, Fundamental, Preliminary Scan	FCC 15.209	Pass	(13.8µ 131.579k	ı V/m) @ Hz (-2.4dB)	
4	RE, 132 kHz - 1.32 MHz, Harmonic Emissions	FCC 15.209	Pass	(0.3µ	dBμ V/m V/m) @ Hz (-26.5dB)	
	ade During Testing: vere made to the EUT during testing)				
Deviations Fron No deviations wer	n The Standard e made from the requirements of the	e standard.				

61	711;	. ++						EMC Toot D	oto
Æ								EMC Test Da	ala
Client:	Savi Tech	inology, l	nc					ob Number: J56067	
Model:	SP-65Y-Z	AB Sianı	post					og Number: T56150	
							Account Manager: Christine Vu		
Contact:									
Spec:	FCC 15.2	09, 15.23	31, EN55022					Class: A / Radio	
	ents of the				nental (Layin on the OATS		nces of 10n	n and 20m and are recorded in	the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
132.000	85.7	10.4	96.1	0	Pk	Ō	1.0	Tested at 10m - Note 1	
132.000	62.0	10.4	72.4	0	Pk	354	1.0	Tested at 20m - Note 2	
Note 1:	Polarizatio	on of O ir	ndicates the	loop was f	acing the EU	T, I indicates	that the loo	p was perpendicular to the EUT	Г.
					5				
Extrapolati	on Factor	r Calcula	ation:						
	•	Le on from 1	evel at 10m: evel at 20m: 0m to 20m: m to 300m:	96.1 72.4 78.9 <u>92.8</u>	dBµV/m dBµV/m dB				
	ents of the				nental (On it on the OATS		nces of 10n	n and 20m and are recorded in	the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
132.000	103.1	10.4	113.5	0	Pk	0	1.0	Tested at 10m - Note 1	
132.000	84.6	10.4	95.0	0	Pk	360	1.0	Tested at 20m - Note 2	
Note 1:	Polarizatio	on of Ο ir	ndicates the	loon was f	acing the FU	T Lindicates	that the loo	p was perpendicular to the EUT	<u>г – – – – – – – – – – – – – – – – – – –</u>
Extrapolati	ion Factor	r Calcula	ation:						
		Le	evel at 10m:	113.5	dBµV/m				
		Le	evel at 20m:	95.0	dBµV/m				
			0m to 20m:	61.4	dB				
Ex	trapolation	n from 20	m to 300m:	<u>72.2</u>					
1									
1									

Client:	Savi Tech	nology, l	nc				~	lob Number:	J56067
Model	SP-65Y-Z	AR Signr	nost				T-L	og Number:	T56150
wouer.	3F-03T-2	AD SIYII	0031				Account Manager: Christine Vu		
Contact:									
Spec:	FCC 15.20	09, 15.23	81, EN5502	2				Class:	A / Radio
able below requency kHz 132.000 132.000 lote 1:	Level dBμV 103.5 84.5	AF dBm ⁻¹ 10.4 10.4	Level dBµV/m 113.9 94.9	Pol (0 / I) 0 0	Detector Pk/QP/Avg Pk Pk Pk	Azimuth degrees 0 360	Height meters 1.0 1.0	Comments	nd are recorded in the
xtrapolat	ion Factor	Calcula	tion:						
	•	Le n from 1	vel at 10m: vel at 20m: 0m to 20m: m to 300m:	94.9 63.0	dBµV/m dBµV/m dB				
Ex	trapolation	Le n from 1 from 20	vel at 20m: 0m to 20m: m to 300m:	94.9 63.0 <u>74.1</u>	dBµV/m dB	nissions (W	orst Case o	configuratio	n)
Ex Run #4: M	trapolation	Le n from 1 from 20 Fundar	vel at 20m: 0m to 20m: m to 300m:	94.9 63.0 <u>74.1</u>	dBµV/m dB	-	orst Case o	-	n)
Ex run #4: W requency kHz	trapolation /orst Case Level dBµV/m	Le n from 1 from 20 Fundan FCC Limit	vel at 20m: 0m to 20m: m to 300m: nental and	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg	dBµV/m dB Radiated Er Azimuth degrees	nissions (W Height meters	_	-	n)
Ex un #4: M requency	trapolation /orst Case Level dBµV/m	Le n from 1 from 20 Fundar	vel at 20m: 0m to 20m: m to 300m: nental and 15.209	94.9 63.0 <u>74.1</u> Harmonic F	dBµV/m dB Radiated Er	Height	_	-	n)
Ex un #4: M requency kHz 131.6	trapolation /orst Case Level dBμV/m 22.8	Le n from 1 from 20 Fundar FCC Limit 25.2	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk	dBµV/m dB Radiated Er Azimuth degrees 354	Height meters 1.0	Comments Note 1	3	n)
Ex un #4: M requency kHz 131.6 requency	trapolation /orst Case Level dBμV/m 22.8 Level	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth	Height meters 1.0 Height	Comments	3	n)
Ex un #4: M requency kHz 131.6 requency kHz	trapolation forst Case Level dBµV/m 22.8 Level dBµV/m	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC Limit	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209 Margin	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector Pk/QP/Avg	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth	Height meters 1.0 Height meters	Comments Note 1 Comments	3	
Ex requency kHz 131.6 requency	trapolation /orst Case Level dBμV/m 22.8 Level	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth degrees	Height meters 1.0 Height	Comments Note 1 Comments Note 2, me	s seasured at 20	n) Dm, extrapolated to 300 Dm, extrapolated to 300
Ex Run #4: W Frequency kHz 131.6 Frequency kHz 394.7	trapolation /orst Case Level dBµV/m 22.8 Level dBµV/m -10.8	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC Limit 15.7	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209 Margin -26.5	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth degrees 0	Height meters 1.0 Height meters 1.0	Comments Note 1 Comments Note 2, me Note 2, me	easured at 20	Om, extrapolated to 300
Ex Run #4: M requency kHz 131.6 requency kHz 394.7 263.1 526.3	trapolation /orst Case dBµV/m 22.8 Level dBµV/m -10.8 -14.4 -12.5 Level calc measurem	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC Limit 15.7 19.2 33.2 ulated by	vel at 20m: 0m to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209 Margin -26.5 -33.6 -45.7 y applying ti rded at 20r	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk Pk Pk Pk Pk he extrapola n from run #	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth degrees 0 0 0 0 tion factor ca 2.	Height meters 1.0 Height meters 1.0 1.0 1.0 1.0 alculated from	Comments Note 1 Comments Note 2, me Note 2, me Note 3, me m the measu	easured at 20 easured at 20 easured at 3 easured at 3 urements at	Om, extrapolated to 300 Om, extrapolated to 300 n, extrapolated to 30m 10m and 20m to the
Ex Run #4: W requency kHz 131.6 requency kHz 394.7 263.1	trapolation /orst Case Level dBμV/m 22.8 Level dBμV/m -10.8 -14.4 -12.5 Level calc measuren Preliminar the fundar the signals	Le n from 1 from 20 Fundar FCC Limit 25.2 FCC Limit 15.7 19.2 33.2 ulated by nent reco y measu nental si s noted in	vel at 20m: om to 20m: m to 300m: nental and 15.209 Margin -2.4 15.209 Margin -26.5 -33.6 -45.7 y applying ti rded at 20r rements sh gnal. An ex n the table a	94.9 63.0 74.1 Harmonic F Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk Pk Pk Pk Pk he extrapola n from run # owed there to ktrapolation f above.	dBµV/m dB Radiated Er Azimuth degrees 354 Azimuth degrees 0 0 0 0 tion factor ca 2. tio be no sign factor of 40lo	Height meters 1.0 Height meters 1.0 1.0 1.0 alculated from hificant signa	Comments Note 1 Comments Note 2, me Note 2, me Note 3, me m the measure als at a distance	easured at 20 easured at 20 easured at 3r urements at nce of 20m f re/specification	Om, extrapolated to 300 Om, extrapolated to 300 m, extrapolated to 30m

<i>Elli</i>	ou		EMC Test L				
Client: Savi Tec				Job Number:	J56067		
Model: SP-65Y-2	7AB Signpost			og Number:			
			Accou	nt Manager:	Christine Vu		
Contact: Gene	209, 15.231, EN55022			Class	A / Radio		
Spec. 1 CC 13.2	207, 13.231, EN33022			01033.			
Radi	ated Emissions (In	ternal Ferrit	e Anter	nna @ '	123kHz		
est Specifics							
Objective	The objective of this test session specification listed above.	is to perform final qua	lification test	ing of the EL	JT with respe		
Date of Test		Config. Use					
	Chris Byleckie	Config Chang					
	$\sim SV(1\Delta 1 S \#)$	EUT Voltad	e: 120V/60Hz	2			
Test Location							
eneral Test Co The EUT and all Ic	nfiguration cal support equipment were locate	ed on the turntable for	radiated emis				
General Test Co The EUT and all lo For radiated emiss otherwise noted.	nfiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par	ed on the turntable for asurement antenna w ents were made with	radiated emis ras located 10 the loop ante) and 20 met	ters from the		
General Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with	infiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par ions: Temperature: Rel. Humidity:	ed on the turntable for asurement antenna w ients were made with allel or perpendicular 21 °C	radiated emis ras located 10 the loop ante) and 20 met	ters from the		
General Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with mbient Condit	infiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par ions: Temperature: Rel. Humidity:	ed on the turntable for asurement antenna w ients were made with allel or perpendicular 21 °C	radiated emis ras located 10 the loop ante) and 20 met nna located	ters from the		
General Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with mbient Condition ummary of Reso Run #	nfiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par ions: Temperature: Rel. Humidity: Sults	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 % Limit	radiated emi: as located 10 the loop ante to the EUT. Result) and 20 met nna located Ma 1.6dBµ V/i	ters from the lone meter ab argin m (1.2µV/m)		
eneral Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with mbient Condition ummary of Res	nfiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par the loop of the antenna either par tons: Temperature: Rel. Humidity: Sults	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 %	radiated eminates located 10 the loop ante to the EUT.) and 20 met nna located Ma 1.6dBµ V/r @ 122	argin 2.950kHz		
eneral Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with mbient Conditi ummary of Res Run #	Infiguration Incal support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par ions: Temperature: Rel. Humidity: Sults Test Performed RE, Fundamental, Preliminary Scan	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 % Limit	radiated emi: as located 10 the loop ante to the EUT. Result) and 20 met nna located 1.6dBµ V/i @ 122 (-24	argin m (1.2µV/m) 2.950kHz 4.2dB)		
eneral Test Co The EUT and all lo For radiated emiss otherwise noted. I ground plane, with mbient Conditi ummary of Res Run #	nfiguration ical support equipment were locate ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par ions: Temperature: Rel. Humidity: Sults Test Performed RE, Fundamental, Preliminary	ed on the turntable for asurement antenna w ents were made with allel or perpendicular 21 °C 59 % Limit	radiated emi: as located 10 the loop ante to the EUT. Result) and 20 met nna located 1.6dBµ V/i @ 122 (-24 -5.3dBµ V/	argin 2.950kHz		

-	Ellio	ott						EMC Test Dat	
Client:	Savi Tech	nology, l	nc				J	ob Number: J56067	
Model	SP-65Y-Z	AR Signr	nost				T-L	og Number: T56150	
would.	51-051-2	AD SIGII	0031				Account Manager: Christine Vu		
Contact:	Gene								
Spec:	FCC 15.2	09, 15.23	31, EN55022					Class: A / Radio	
leasurem able below	ents of the	fundame	ental signal w	vere made		at test dista		n and 20m and are recorded in the	
requency		AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(0 / 1)	Pk/QP/Avg	degrees	meters		
122.950		10.4	93.7	0	Pk	118	1.0	Tested at 10m - Note 1	
122.950 122.950		10.4 10.4	74.9 72.3	0	Pk Pk	<u>264</u> 0	1.0 1.0	Tested at 20m - Note 2 Tested at 20m - Note 3	
122.700	01.7	10.4	72.5		ΪK	0	1.0		
ote 1:	Polarizatio	on of O ir	dicates the	loop was f	acing the EU	T, I indicates	that the loo	p was perpendicular to the EUT.	
			vel at 20m:	74.9	dBµV/m				
Ex Run #2: P Neasureme	trapolation reliminary ents of the	r from 20 Radiat e			dB nental (On it on the OATS		nces of 10r	n and 20m and are recorded in the	
Ex 2 un #2: P 1easureme able below	trapolation reliminary ents of the	r from 20 Radiat e	m to 300m: e d Emission	<u>73.3</u> s, Fundar	nental (On it		nces of 10r Height	n and 20m and are recorded in the	
Ex Run #2: P	trapolation reliminary ents of the	r from 20 7 Radiate fundame	m to 300m: • d Emission •ntal signal w	73.3 s, Fundar vere made	nental (On it on the OATS	S at test dista			
Ex lun #2: P leasureme ble below requency	trapolation reliminary ents of the Level dBµV	n from 20 7 Radiate fundame AF	m to 300m: e d Emission ental signal w Level	73.3 s, Fundar vere made Pol	nental (On it on the OATS	S at test dista Azimuth	Height		
Ex lun #2: P leasureme bele below requency kHz	trapolation reliminary ents of the Level dBµV 68.6	n from 20 7 Radiate fundame AF dBm ⁻¹	m to 300m: e d Emission ental signal w Level dBμV/m	73.3 s, Fundar vere made Pol (O / I)	nental (On it on the OATS Detector Pk/QP/Avg	at test dista Azimuth degrees	Height meters	Comments	

6I	Ellic	ott						EM	IC Test Data
Client:	Savi Tech	nology, l	nc					ob Number:	
Model	SP-65Y-Z	AR Sianr	nost					og Number:	
			5051				Accou	nt Manager:	Christine Vu
Contact:									
Spec:	FCC 15.20	09, 15.23	31, EN5502	2				Class:	A / Radio
	nts of the			ns, Fundam were made o			inces of 10n	n and 20m a	nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.950	83.0	10.4	93.4	0	Pk	96	1.0		0m - Note 1
122.950	63.9	10.4	74.3	0	Pk	279	1.0	Tested at 2	20m - Note 2
Note 1: Extrapolati		Calcula	ition:	·		I, I indicates	that the loo	p was perpe	endicular to the EUT.
Ex	rapolation	Le n from 1 from 20	vel at 10m: vel at 20m: 0m to 20m: m to 300m: nental and	74.3 63.4 <u>74.6</u>	dBμV/m dBμV/m dB Radiated Er	nissions (W	orst Case o	onfiguratio	n)
Frequency	Level	FCC	15.209	Detector	Azimuth	Height	Comments		
kHz	dBµV/m	Limit	Margin	Pk/QP/Avg	degrees	meters			
123.0	1.6	25.8	-24.2	Pk	264	1.0	Note 1		
F	Laval	FOO	15 200	Detector	A _:	l la indat	C		
Frequency kHz	Level dBµV/m		15.209 Margin	Detector Pk/QP/Avg	Azimuth degrees	Height	Comments		
245.9	-5.3	19.8	-25.1	Pk	uegrees 0	1.0	Note 2 me	asured at 20	Om, extrapolated to 300m
368.7	-20.9	16.3	-37.1	Pk	0	1.0			Om, extrapolated to 300m
491.6	-10.5	33.8	-44.3	Pk	0	1.0			m, extrapolated to 30m
Note 1: Note 2:	measurem Preliminar the fundar the signals	nent reco y measu mental si s noted ii	rements sh gnal. An ex n the table	n from run # owed there t ktrapolation f above.	1. to be no sigr factor of 40lo	nificant signa og(measuren	ls at a dista nent distanc	nce of 20m f e/specificati	10m and 20m to the from the EUT other than on distance) was used for hich is equivalent to a
Note 3:	level of 3.4	4dBuV/m	at the spe		tance of 30n	n if using the			•

Client: Savi Technology Model: SP-65Y-ZAB Sig			EMC Test Da			
Model: SP-65Y-ZAB Sig				lob Number:	J56067	
	gnpost		T-Log Number: T56150 Account Manager: Christine Vu			
Contact: Gene				5		
Spec: FCC 15.209, 15	.231, EN55022			Class:	A / Radio	
Radiat	ed Emissions ((Large Loop A	Antenn	a @ 12	(3kHz)	
Test Specifics				U	,	
Objective: The o	bjective of this test sessior fication listed above.	n is to perform final qualif	ication testi	ing of the EL	JT with respect to th	
Date of Test: 6/24/2 Test Engineer: Juan Test Location: SVOA	Martinez	Config. Used: Config Change: EUT Voltage:	None	2		
General Test Configu The EUT and all local sup	ration pport equipment were locat	ed on the turntable for ra	idiated emis	ssions testin	g.	
otherwise noted. Radiate	sting below 30 MHz the me ed magnetic field measuren op of the antenna either pa	nents were made with the	e loop antei			
Ambient Conditions:	Temperature: Rel. Humidity:	21 °C 59 %				
Summary of Results						
Run #	Test Performed	Limit	Result		argin	
1, 2, 3	Fundamental, Preliminary Scan	FCC 15.209	Pass	(12.8µ	lBμV/m ιV/m) @ Hz (-3.7dB)	
1	122.88 kHz - 1.228 MHz, Harmonic Emissions	FCC 15.209	Pass	-5.8dBµ V/ @ 245.	m (0.5µ V/m) 900kHz (- .6dB)	
Modifications Made D No modifications were ma	During Testing: ade to the EUT during testi	ng				
Deviations From The	Standard					

No deviations were made from the requirements of the standard.

Client:Savi Technology, IncJob Number:J56067Model:SP-65Y-ZAB SignpostT-Log Number:T56150Account Manager:Christine VuContact:GeneIISpec:FCC 15.209, 15.231, EN55022Class:A / Radio

Run #1: Preliminary Radiated Emissions, Fundamental (Laying Flat)

Measurements of the fundamental signal were made on the OATS at test distances of 10m and 20m and are recorded in the table below.

Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters	
122.850	86.9	10.4	97.3	0	Pk	0	1.0	Tested at 10m - Note 1
122.850	63.4	10.4	73.8	0	Pk	0	1.0	Tested at 20m - Note 2

Extrapolation Factor Calculation:

Level at 10m:	97.3	dBµV/m
Level at 20m:	73.8	dBµV/m
Extrapolation from 10m to 20m:	78.1	dB
Extrapolation from 20m to 300m:	<u>91.8</u>	

Run #2: Preliminary Radiated Emissions, Fundamental (On its side)

Measurements of the fundamental signal were made on the OATS at test distances of 10m and 20m and are recorded in the table below.

Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters	
122.850	106.9	10.4	117.3	0	Pk	0	1.0	Tested at 10m - Note 1
122.850	89.0	10.4	99.4	0	Pk	360	1.0	Tested at 20m - Note 2
122.850	87.0	10.4	97.4		Pk	360	1.0	Tested at 20m - Note 2

Extrapolation Factor Calculation:

Level at 10m:	117.3	dBµV/m
Level at 20m:	99.4	dBµV/m
Extrapolation from 10m to 20m:	59.2	dB
Extrapolation from 20m to 300m:	<u>69.6</u>	

	111.								
СE	(11)	ott						EMC Test Data	
	Savi Tech		nc				J	Job Number: J56067	
Model: S	SP-65Y-7	AB Signr	ost					₋og Number: T56150	
			031				Account Manager: Christine Vu		
Contact: G		10 15 22	1, EN55022)				Class: A / Radio	
Run #2 cont		J9, TJ.ZJ	T, EN00022	<u>.</u>				Class. A / Raulu	
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850	104.3	10.4	114.7	0	Pk	J		Tested at 10m - Note 1	
122.850	85.1	10.4	95.5	0	Pk			Tested at 20m - Note 2	
Extrapolatio	n Factor	<u>Calcula</u>	<u>tion:</u>						
		Le	vel at 10m:	114.7	dBµV/m				
			vel at 20m:	95.5	dBµV/m				
	•		Om to 20m:	63.7	dB				
EXT	apolation	110111 201	m to 300m:	<u>74.9</u>					
Final setting	1								
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850	105.3	10.4	115.7	0	Pk			Tested at 10m - Note 1	
122.850	86.2	10.4	96.6	0	Pk			Tested at 20m - Note 2	
Extrapolatio	n Factor	Calcula	tion:						
			vel at 10m:	115.7	dBµV/m				
F -1			vel at 20m:	96.6	dBµV/m				
			Om to 20m: n to 300m:	63.3 74.5	dB				
EXU	apolation	110111 201	11 10 300111.	<u>74.3</u>					

41	Ellio	ott						EMC Test Data
Client:	Savi Tech	nology, I	nc				~	lob Number: J56067
							T-L	og Number: T56150
Model:	SP-65Y-Z	AB Signp	oost					nt Manager: Christine Vu
Contact:	Gene							
Spec:	FCC 15.2	09, 15.23	31, EN5502	2				Class: A / Radio
	ents of the Level dBμV 105.4			ns, Fundam were made (Pol (O / I) O O		S at test dista Azimuth	Height Height Meters 1.0 1.0	n and 20m and are recorded in the Comments Tested at 10m - Note 1 Tested at 20m - Note 2
122.830	80.9	10.4	90.3	0	PK	300	1.0	Tested at 2011 - Note 2
lote 1: lote 2: lote 3:	The maxir	num sigr on of O ir	nal level was indicates the	s with anten	nas 1 meter	seperates be seperates be T, I indicates	etween eacl	
	•	Le on from 1	vel at 10m: vel at 20m: 0m to 20m:	96.3 64.5	dBµV/m dBµV/m dB			
Ex	trapolation	Le on from 10 o from 20	vel at 20m: 0m to 20m: m to 300m:	96.3 64.5	dBµV/m dB			
Ex Run #4: R	trapolation adiated Ei	Le on from 10 o from 200 missions	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca	96.3 64.5 <u>75.9</u> ase configu	dBµV/m dB ration)	Height	Comments	
Ex Run #4: R	trapolation adiated El	Le on from 10 o from 20 missions FCC	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209	96.3 64.5 <u>75.9</u> ase configu	dBµV/m dB ration)	Height	Comments	3
Ex Run #4: R	trapolation adiated Ei Level dBμV/m	Le on from 10 o from 200 missions	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca	96.3 64.5 <u>75.9</u> ase configu	dBµV/m dB ration)	Height meters 0.0		
Ex Run #4: R Trequency kHz	trapolation adiated Ei Level dBμV/m	Le on from 10 from 20 missions FCC Limit	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg	dBµV/m dB ration) Azimuth degrees	meters		s n 2, final setting data
Ex Run #4: R requency kHz 122.95	trapolation adiated Ei Level dBμV/m	Le on from 10 n from 200 missions FCC Limit 25.8	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg	dBµV/m dB ration) Azimuth degrees	meters		n 2, final setting data
Ex cun #4: R requency kHz 122.95 requency kHz	trapolation adiated En dBµV/m 22.2 Level dBµV/m	Le on from 10 from 200 missions FCC Limit 25.8 FCC Limit	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin -3.7 15.209 Margin	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk	dBµV/m dB ration) Azimuth degrees 0	meters 0.0	Note 1 - ru Comments	n 2, final setting data
Ex Run #4: R requency kHz 122.95 requency kHz 245.9	trapolation adiated En Level dBµV/m 22.2 Level dBµV/m -5.8	Le on from 10 from 200 missions FCC Limit 25.8 FCC Limit 19.8	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin -3.7 15.209 Margin -25.5	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk	dBµV/m dB ration) Azimuth degrees 0 Azimuth degrees 0	meters 0.0 Height meters 1.0	Note 1 - ru Comments Note 2, me	n 2, final setting data s easured at 20m, extrapolated to 300r
Ex Run #4: R requency kHz 122.95 requency kHz 245.9 368.7	adiated En Level dBµV/m 22.2 Level dBµV/m -5.8 -10.7	Le on from 10 from 20 missions FCC Limit 25.8 FCC Limit 19.8 16.3	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin -3.7 15.209 Margin -25.5 -26.9	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk Pk	dBµV/m dB ration) Azimuth degrees 0 Azimuth degrees 0 0 0	meters 0.0 Height meters 1.0 1.0	Note 1 - ru Comments Note 2, me Note 2, me	n 2, final setting data s easured at 20m, extrapolated to 300r easured at 20m, extrapolated to 300r
Ex Run #4: R requency kHz 122.95 requency kHz 245.9	trapolation adiated En Level dBµV/m 22.2 Level dBµV/m -5.8	Le on from 10 from 200 missions FCC Limit 25.8 FCC Limit 19.8	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 Margin -3.7 15.209 Margin -25.5	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk	dBµV/m dB ration) Azimuth degrees 0 Azimuth degrees 0	meters 0.0 Height meters 1.0	Note 1 - ru Comments Note 2, me Note 2, me	n 2, final setting data s easured at 20m, extrapolated to 300r
Ex 2 cm #4: R 2 requency kHz 122.95 2 requency kHz 2 45.9 3 68.7 4 91.6	adiated En Level dBµV/m 22.2 Level dBµV/m -5.8 -10.7 -11.2 Level calc measuren	Le on from 10 n from 200 missions FCC Limit 25.8 FCC Limit 19.8 16.3 33.8 sulated by ment reco	vel at 20m: 0m to 20m: m to 300m: s (Worst Ca 15.209 <u>Margin</u> -3.7 15.209 <u>Margin</u> -25.5 -26.9 -45.0 <i>y</i> applying ti rded at 20r	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk Pk Pk Pk Pk he extrapola n from run #	dBµV/m dB ration) Azimuth degrees 0 Azimuth degrees 0 0 0 0 1 0 0 2 (final settin	meters 0.0 Height meters 1.0 1.0 1.0 alculated fror ngs).	Note 1 - ru Comments Note 2, me Note 2, me Note 3, me n the measu	n 2, final setting data easured at 20m, extrapolated to 300r easured at 20m, extrapolated to 300r easured at 20m, extrapolated to 30m easured at 3m, extrapolated to 30m urements at 10m and 20m to the
Ex Run #4: R Frequency kHz 122.95 Frequency kHz 245.9 368.7	trapolation adiated En Level dBµV/m 22.2 Level dBµV/m -5.8 -10.7 -11.2 Level calc measuren Preliminar the fundar the signal	Le on from 10 from 200 missions FCC Limit 25.8 FCC Limit 19.8 16.3 33.8 sulated by nent reco y measu mental sig s noted in	vel at 20m: 0m to 20m: m to 300m: s (Worst C: 15.209 Margin -3.7 15.209 Margin -25.5 -26.9 -45.0 y applying ti rded at 20r rements sh gnal. An ep n the table a	96.3 64.5 75.9 ase configu Detector Pk/QP/Avg Pk Detector Pk/QP/Avg Pk Pk Pk Pk Pk he extrapola n from run # owed there a ktrapolation f above.	dBµV/m dB ration) Azimuth degrees 0 Azimuth degrees 0 0 0 0 tion factor ca 2 (final settin to be no sign factor of 40lo	meters 0.0 Height meters 1.0 1.0 1.0 alculated fror ngs). nificant signa og(measuren	Note 1 - ru Comments Note 2, me Note 2, me Note 3, me n the measu Is at a distance	n 2, final setting data seasured at 20m, extrapolated to 300r easured at 20m, extrapolated to 300r easured at 20m, extrapolated to 30m

Objective The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above the ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 %	СE		ott			EM	C Test D
Model: SP-65Y-ZAB Signpost Account Manager: Christine Vu Contact: Gene Spec: FCC 15.209, 15.231, EN55022 Class; A / Radio Radiated Emissions (2-element handrail antenna) Test Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Re, Fundamental, Preliminary Scan FCC 15.209 Pass General Test Derformed Limit Result Margin A, 2, 3, 4 Result Result Restore frugered above Restore	Client: Sa	avi Tech	nology, Inc		J	lob Number:	J56067
Contact: Gene Account Manager: Christine Vu Spec: FCC 15.209, 15.231, EN55022 Class; A / Radio Radiated Emissions (2-element handrail antenna) Rest Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to th specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Rel. Fundamental, Preliminary FCC 15.209 Pass 4.3dBµV/m (1.6µV/m) (.21.5dB) 5 Rel, 122.88 kHz - 1.228 MHz, Hz C 15.209 Pass 9.0dB µV/m (2.8µV/m) (.21.5dB) 5 Rel, 122.80 Hz, Func	Modal	D_65V 7	AB Signnost		T-L	og Number:	T56150
Spec: FCC 15.209, 15.231, EN55022 Class: A / Radio Radiated Emissions (2-element handrail antenna) Fest Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Maternal RE, Fundamental, Preliminary Scan FCC 15.209 Pass 4.3dBµV/m (2.8µV/m) (2.45.900kHz) <td>would SP</td> <td>-001-Z</td> <td>AD SIYIIPUSI</td> <td></td> <td>Accou</td> <td>nt Manager:</td> <td>Christine Vu</td>	would SP	-001-Z	AD SIYIIPUSI		Accou	nt Manager:	Christine Vu
Radiated Emissions (2-element handrail antenna) Fest Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz Seneral Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results The Ambient Limit Result Margin 1, 2, 3, 4 Rel. Fundamental, Preliminary FCC 15.209 Pass 9.0dBµVm (1.6µVm) 5 RE, 122.88 kHz - 1.228 MHz, Hz -							
The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results 1, 2, 3, 4 RE, Fundamental, Preliminary FCC 15.209 Pass 9.0dBµV/m (1.6µV/m) 245.900kHz 5 RE, 122.88 kHz - 1.228 MHz, HZ FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) 245.900kHz 	Spec: FC	CC 15.2	09, 15.231, EN55022			Class:	A / Radio
The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Re, Fundamental, Preliminary Scan FCC 15.209 Pass 202.950kHz (:21.5dB) 9.0dBµV/m (1.6µV/m) 6 RE, 122.88 kHz - 1.228 MHz, FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) 9.0dBµV/m (2.8µV/m) 			adiated Emissions	s (2-element	handra	il antei	nna)
Dijective: specification listed above. Date of Test: 6/24/2004 Config. Used: 1 Test Engineer: Juan Martinez Config Change: None Test Location: SVOATS #2 EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results 1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass (21.5dB) 9.0dBµV/m (2.8µV/m) 6 RE, 122.88 kHz - 1.228 MHz, FCC 15.209 Pass (21.5dB) (21.5dB) (21.5dB) (21.5dB) (21.5dB) 	est Speci	TICS	The objective of this test session	is to porform final qua	lification tacti	ng of the EU	IT with respect to th
Test Engineer: Juan Martinez Test Location: SVOATS #2 Config Change: None EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Example for the formed Limit Result Margin (-21.5dB) 1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) (-21.5dB) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) (-245.900kHz)	Ob	jective:	-	is to perform final qua		ng of the EU	i mui respect to tr
Test Engineer: Juan Martinez Test Location: SVOATS #2 Config Change: None EUT Voltage: 120V/60Hz General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results <u>Num # Test Performed Limit Result Margin 1, 2, 3, 4 Re, Fundamental, Preliminary Scan FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) (# 245.900kHz </u>	Date of	of Test:	6/24/2004	Config. Used	d: 1		
General Test Configuration The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results <u>Run # Test Performed Limit Result Margin (-21.5dB)</u> <u>3 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions Exclanation (-21.5dB)</u> <u>9.0dBµV/m (2.8µV/m) (2.8µV/m)</u> <u>8 245.900kHz</u> <u>8 245.900kHz <u>8 245.900kHz</u> <u>8 245.900kHz <u>8 245.900kHz <u>8 245.900kHz <u>8 245.900kHz <u>8 245.900kHz </u> <u>8 245.900kHz <u>8 245.900kHz </u> <u>8 245.900kHz </u> <u>8 245.900kHz </u> <u>8 245.900kHz <u>8 245.900kHz </u> <u>8 245.900kHz </u> <u>8 245.900kHz </u> <u>8 245.900kHz </u> </u></u></u></u></u></u></u>	Test En	gineer:	Juan Martinez	Config Change	e: None		
The EUT and all local support equipment were located on the turntable for radiated emissions testing. For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above the ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: Summary of Results Test Performed Limit Result Margin 4.3dBµV/m (1.6µV/m) 1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass 9.0dBµV/m (2.8µV/m) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBµV/m (2.8µV/m)	Test Lo	ocation:	SVOATS #2	EUT Voltage	e: 120V/60Hz	2	
For radiated emissions testing below 30 MHz the measurement antenna was located 10 and 20 meters from the EUT, u otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above the ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C. Rel. Humidity: 59 % Summary of Results 1, 2, 3, 4 Test Performed Limit Result Margin 1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass 9.0dBµ V/m (2.8µ V/m) (2.8µ V/m) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBµ V/m (2.8µ V/m) (2.8µ V/m)	General Te	est Cor	nfiguration				
otherwise noted. Radiated magnetic field measurements were made with the loop antenna located one meter above th ground plane, with the loop of the antenna either parallel or perpendicular to the EUT. Ambient Conditions: Temperature: 21 °C Rel. Humidity: 59 % Summary of Results Run # Test Performed Limit Result Margin 1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass 4.3dBµ V/m (1.6µ V/m) (-21.5dB) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBµ V/m (2.8µ V/m) (@ 245.900kHz	The EUT an	nd all loc	al support equipment were locate	ed on the turntable for	radiated emis	ssions testing	g .
Rel. Humidity:59 %Summary of ResultsRun #Test PerformedLimitResultMargin1, 2, 3, 4RE, Fundamental, Preliminary ScanFCC 15.209Pass4.3dBµ V/m (1.6µ V/m) @ 122.950kHz (-21.5dB)5RE, 122.88 kHz - 1.228 MHz, Harmonic EmissionsFCC 15.209Pass9.0dBµ V/m (2.8µ V/m) @ 245.900kHz	otherwise n	oted. R	adiated magnetic field measurem	ents were made with t	the loop anter		
Summary of ResultsRun #Test PerformedLimitResultMargin1, 2, 3, 4RE, Fundamental, Preliminary ScanFCC 15.209Pass4.3dBµ V/m (1.6µ V/m) @ 122.950kHz (-21.5dB)5RE, 122.88 kHz - 1.228 MHz, Harmonic EmissionsFCC 15.209Pass9.0dBµ V/m (2.8µ V/m) @ 245.900kHz	Ambient Co	onditio	DNS: Temperature:	21 °C			
Run #Test PerformedLimitResultMargin1, 2, 3, 4RE, Fundamental, Preliminary ScanFCC 15.209Pass4.3dBμ V/m (1.6μ V/m)5RE, 122.88 kHz - 1.228 MHz, Harmonic EmissionsFCC 15.209Pass9.0dBμ V/m (2.8μ V/m)			•	59 %			
1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass 4.3dBµ V/m (1.6µ V/m) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBµ V/m (2.8µ V/m)	Summary o	of Res	ults				
1, 2, 3, 4 RE, Fundamental, Preliminary Scan FCC 15.209 Pass @ 122.950kHz (-21.5dB) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBμ V/m (2.8μ V/m)	Run #		Test Performed	Limit	Result		
Scan (-21.5dB) 5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass 9.0dBμ V/m (2.8μ V/m)	1 7 2	4	RE, Fundamental, Preliminary	ECC 15 200	Dece		
5 RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions FCC 15.209 Pass @ 245.900kHz	Ι, Ζ, δ, 4	4	Scan	FCC 13.209	Pass		
5 Harmonic Emissions FCC 15.209 Pass @ 245.900KHZ							
(-10.8dB)	5			FCC 15.209	Pass	@ 245	.900kHz
						(-10	.8dB)
Modifications Made During Testing:			• •	g			
No modifications were made to the EUT during testing			-				
No modifications were made to the EUT during testing							
No modifications were made to the EUT during testing Deviations From The Standard	No deviation	ns were	made from the requirements of the	ne standard.			

Æ	Ellic	ott						EM	C Test Data
	Savi Tech		nc				J	ob Number:	J56067
Madalı			aact				T-L	og Number:	T56150
woder:	SP-65Y-Z	AB SIYII	JUSI				Accou	nt Manager:	Christine Vu
Contact:	Gene								
Spec:	FCC 15.20	09, 15.23	31, EN55022	2				Class:	A / Radio
	ents of the				nental (10 in on the OATS				ntennas nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850		10.4		0	Pk	0	1.0		0m - Note 1
122.850	65.9	10.4	76.3	0	Pk	354	1.0	Tested at 2	0m - Note 2
Noto 1.	Dolorizatio	n of O in	dianton the	loop was f	ooing the FUT	T. Lindiaataa	that the lea		ndigular to the FLIT
Note 1:	Polarizatio		luicales the	loop was ta	acing the EU	r, r muicales	that the iou	p was perpe	ndicular to the EUT.
	xtrapolatio	Le Le n from 1	evel at 10m: evel at 20m: 0m to 20m: m to 300m:		dBµV/m dBµV/m dB	used to calci	ulata tha lay	val in the tab	la halaw)
	ents of the				nental (10 in on the OATS				tennas nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850		10.4	95.3	0	Pk	0	1.0		0m - Note 1
122.850	65.7	10.4	76.1	0	Pk	360	1.0	Tested at 2	0m - Note 2
Note 1:	Dolorizatio	n of O ir	dicatos tha	loop was f	ocina the EU	T Lindicator	that the loo	n was norna	ndicular to the EUT.
NOLE I.	FUIdHZallu			ioup was id	acing the EU	I, I IIIUICALES		p was perpe	
<u>Extrapolat</u>	ion Factor			05.0					
			evel at 10m: evel at 20m:	95.3 76.1	dBµV/m dBµV/m				
F	xtranolatio		0m to 20m:	63.9	dBµ v/m dB				
			m to 300m:	<u>75.1</u>	üD				

E	Ellio	ott						EM	C Test Data
-	Savi Tech		nc					lob Number:	
		0,					T-L	og Number:	T56150
Model:	SP-65Y-Z	AB Signp	oost					•	Christine Vu
Contact:	Gene								
Spec:	FCC 15.2	09, 15.23	31, EN55022	1				Class:	A / Radio
	ents of the				nental (1 me on the OATS				ennas nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850		10.4	94.7	0	Pk	0	1.0		0m - Note 1
122.850	65.9	10.4	76.3	0	Pk	360	1.0	Tested at 2	0m - Note 2
Note 1:	Polarizatio	on of O in	idicates the	loop was f	acing the EU	r, I indicates	that the loo	p was perpe	ndicular to the EUT.
Extrapolat	ion Factor	<u>Calcula</u>	tion:						
	•	Le n from 10	vel at 10m: vel at 20m: 0m to 20m: m to 300m:	94.7 76.3 61.2 <u>72.0</u>	dBμV/m dBμV/m dB				
	ents of the				mental (1 Me on the OATS				nnas nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.850		10.4	95.3	0	Pk	0	1.0		0m - Note 1
122.850	65.9	10.4	76.3	0	Pk	360	1.0	Tested at 2	0m - Note 2
Note 1:	Polarizatio	on of O in	idicates the	loop was f	acing the EUT	r, I indicates	that the loo	p was perpe	ndicular to the EUT.
<u>Extrapolat</u>	ion Factor	Calcula	tion:						
		Le n from 10	vel at 10m: vel at 20m: 0m to 20m: m to 300m:	95.3 76.3 63.2 74.3	dBµV/m dBµV/m dB				
				<u></u>					

(CI	Ellio	ott					EM	IC Test Data
Client:	Savi Tech	nology, l	nc				Job Number:	J56067
Madal							T-Log Number:	T56150
wodel:	SP-65Y-Z	AB SIGU	JOSI				Account Manager:	Christine Vu
Contact:	Gene							
Spec:	FCC 15.2	09, 15.23	81, EN5502	2			Class:	A / Radio
Run #5: H	armoinc F	Radiated	Emissions	6				
requency	Level	FCC	15.209	Detector	Azimuth	Height	Comments	
kHz	dBµV/m	Limit	Margin	Pk/QP/Avg	degrees	meters		
122.95	4.3	25.8	-21.5	Pk	354	1.0	Note 1	
requency	Level	FCC	15.209	Detector	Azimuth	Height	Comments	
kHz	dBµV/m	Limit	Margin	Pk/QP/Avg	degrees	meters		
245.9	•	19.8	-10.8	Pk	-	-	Note 2, measured at 20	Om, extrapolated to 300r
368.7		16.3	-13.3	Pk	-	-		Om, extrapolated to 300r
491.6		33.8	-30.0	Pk	-	-	Note 3, measured at 3r	
ote 3:	level of 3.				3.40DUV/III	(-8.20BUA/N	n) at a distance of 20m, v	which is equivalent to a

6I	Ellio	ott			EMC Test Da
Client:	Savi Tech	nnology, Inc		-	Job Number: J56067
Model	SD-65V-7	AB Signpost		T-L	Log Number: T56150
	3F-031-2			Accou	unt Manager: Christine Vu
Contact:					
Spec:	FCC 15.2	09, 15.231, EN55022			Class: A / Radio
Tact Sna		adiated Emissions	s (4-element	handra	ail antenna)
Fest Spe		The objective of this test session	is to perform final quali	fication test	ing of the FLIT with respect to the
	Objective:	specification listed above.		1000011000	
Dat	te of Test [.]	6/24/2004	Config. Used	: 1	
		Juan Martinez	Config Change		
		SVOATS #2	EUT Voltage	: 120V/60H	Z
		<i>c</i> i			
		nfiguration			la ma da adla n
Ine EUI	and all loo	cal support equipment were locate	ed on the turntable for r	adiated emis	ssions testing.
otherwise	e noted. R	ions testing below 30 MHz the me Radiated magnetic field measurem the loop of the antenna either par	nents were made with th	ne loop ante	
Ambient	Conditi	ons: Temperature:	21 °C		
	Contaiti	Rel. Humidity:	59 %		
Summar	y of Res	ults			
Rur	า #	Test Performed	Limit	Result	Margin
1 0	2.4	RE, Fundamental, Preliminary		Dava	2.4dBμ V/m (1.3μ V/m)
1, 2,	3, 4	Scan	FCC 15.209	Pass	@ 122.950KHz (-23.4dB)
					9.5dBµ V/m (3.0µ V/m)
5		RE, 122.88 kHz - 1.228 MHz, Harmonic Emissions	FCC 15.209	Pass	@ 245.900KHz
		Haimonic Emissions			(-10.3dB)
Modifica	tions Ma	ade During Testing:			
		ere made to the EUT during testir	ng		
	_	-			
		The Standard			
No devia	tions were	made from the requirements of t	ne standard.		

Æ	Ellic	ott						EM	IC Test Data
	Savi Tech		nc				J	ob Number:	J56067
Madal							T-L	og Number:	T56150
wodel:	SP-65Y-Z	AB Signp	ost				Accou	nt Manager:	Christine Vu
Contact:	Gene								
Spec:	FCC 15.20	09, 15.23	31, EN55022	2				Class:	A / Radio
Measureme table below	ents of the	fundame	ental signal v	were made	on the OATS		nces of 10n	n and 20m a	nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(0 / 1)	Pk/QP/Avg	degrees	meters	T	0
122.950		10.4	92.9	0	Pk	0	1.0		Om - Note 1 Om - Note 2
122.950	64.0	10.4	74.4	0	Pk	360	1.0	Tested at 2	com - Note 2
Note 1:	Polarizatio	on of O ir	dicates the	loop was fa	acing the EU	T, I indicates	that the loo	p was perpe	endicular to the EUT.
<u>Extrapolat</u>				-		<u>.</u>		<u> </u>	
	•	Le on from 1	evel at 10m: evel at 20m: 0m to 20m: m to 300m:	74.4	dBµV/m dBµV/m dB (This factor	used to calcu	ulate the lev	el in the tab	le below)
Measureme table below	ents of the	fundame		were made	on the OATS			n and 20m a	nd are recorded in the
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	5	meters		
122.950		10.4	93.3	0	Pk	0	1.0		0m - Note 1
122.950	64.1	10.4	74.50	0	Pk	360	1.0	Tested at 2	20m - Note 2
Note 1:	Dolorizatio	$-$ of \cap in	dicatos tho	loop was f	acing the EU	T Lindicatos	that the lea	n was norno	undicular to the FLIT
Note 1:	Puldiizaut	0000	Idicates the	100p was ia	acing the EU			p was perpe	endicular to the EUT.
<u>Extrapolat</u>	ion Factor			~~ 0					
			vel at 10m:	93.3	dBµV/m				
	vtranalatio		vel at 20m:	74.5 62.6	dBµV/m dB				
	•		0m to 20m: m to 300m:	<u>73.6</u>		used to calcu	ulate the lev	el in the tab	le below)

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6I	Ellio	ott						ЕМ	C Test Data
Client:	Savi Tech	nology, l	nc				J	ob Number:	J56067
Model	SP-65Y-Z	AR Signr	nost					og Number:	
			031				Accou	nt Manager:	Christine Vu
Contact:									
			31, EN55022						A / Radio
						ches sepera			ntennas nd are recorded in the
table below		randame	intal signal i						
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(O / I)	Pk/QP/Avg	degrees	meters		
122.950	83.1	10.4	93.5	0	Pk	0	1.0	Tested at 10	
122.950	64.1	10.4	74.52	0	Pk	360	1.0	Tested at 20	0m - Note 2
Note 1:	Polarizatio	on of O ir	dicates the	loop was fa	acing the EU	T, I indicates	that the loo	p was perpe	ndicular to the EUT.
					<u> </u>	,			
Extrapolati	on Factor	r Calcula	ition:						
		٩١	vel at 10m:	93.5	dBµV/m				
			vel at 20m:	74.5	dBµV/m dBµV/m				
E	xtrapolatic		0m to 20m:	63.0	dB				
	•		m to 300m:	<u>74.1</u>	(This factor	used to calcu	ulate the lev	el in the tabl	e below)
D #4 D									
						ches sepera			tennas nd are recorded in the
table below		Tunuame	intal signal v						
Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(0 / I)	Pk/QP/Avg	degrees	meters		
122.950	83.1	10.4	93.5	0	Pk	0	1.0	Tested at 10	
122.950	64.0	10.4	74.4	0	Pk	360	1.0	Tested at 20	0m - Note 2
Note 1:	Polarizatio	on of Ο ir	dicates the	loon was f	acing the FU	T Lindicates	that the loo	n was nerne	ndicular to the EUT.
Extrapolati	on Factor	r Calcula	tion:						
			vel at 10m:	93.5 74.4	dBµV/m dBµV/m				
E	vtranolatio		vel at 20m: 0m to 20m:	74.4 63.4	dBµV/m dB				
			m to 300m:	<u>74.6</u>		used to calcu	late the lev	el in the tabl	e below)
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	i .	ott						IC Test Data
Client:	Savi Tech	nology, I	nc				Job Number:	
Model:	SP-65Y-Z	AB Sianı	oost				T-Log Number:	
							Account Manager:	Christine Vu
Contact:								
Spec:	FCC 15.20	09, 15.23	31, EN5502	2			Class:	A / Radio
Run #5: H	armonic R	adiated	Emissions	s (Worst cas	se configura	ation 25 inc	hes seperation, laying	down)
Frequency	Level	FCC	15.209	Detector	Azimuth	Height	Comments	
KHz	dBµV/m	Limit	Margin	Pk/QP/Avg	degrees	meters		
122.95	2.4	25.8	-23.4	Pk	360	1.0	Note 1	
Frequency	Level		15.209	Detector	Azimuth	Height	Comments	
KHz	dBµV/m	Limit	Margin	Pk/QP/Avg	degrees	meters		
245.9	9.5	19.8	-10.3	Pk	-	-		Om, extrapolated to 300m
368.8	-5.72	16.3	-22.0	Pk	-	-	Note 2, measured at 20	Om, extrapolated to 300n
Note 2:			•	kii apuiaiiuii i	aciul UI 401	Jullieasulei	ment distance/specificati	
Note 3:	All signals level of 3.4	above 4 4dBuV/m	at the spe	e less than 4	tance of 30r	(-8.2dBuA/m	n) at a distance of 3m, w suggested extrapolation	hich is equivalent to a
Note 3:	All signals level of 3.4	above 4 4dBuV/m	90kHz wer at the spe	e less than 4 cification dist	tance of 30r	(-8.2dBuA/m	n) at a distance of 3m, w	hich is equivalent to a

EXHIBIT 3: Photographs of Test Configurations

EXHIBIT 4: EUT Details

EXHIBIT 5: Detailed Photographs of Savi Technology, Inc. Model SP-65Y-ZAB

EXHIBIT 6: Block Diagram of Savi Technology, Inc. Model SP-65Y-ZAB

EXHIBIT 7: Schematic Diagrams of Savi Technology, Inc. Model SP-65Y-ZAB

EXHIBIT 8: Theory of Operation for Savi Technology, Inc. Model SP-65Y-ZAB

EXHIBIT 9: Advertising Literature

EXHIBIT 10: Operator's Manual