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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: SMR-650P-110 and SMR-650P-111

UPN: FCC ID:	2404A-650P KL7-650MR-V1
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:	December 16, 2003
FINAL TEST DATE:	December 8, December 9 and

December 8, December 9 and December 11, 2003

AUTHORIZED SIGNATORY:

Mark Briggs Vice President of Engineering



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Equipment Name and Model:

Transceiver, SMR-650P-110 and SMR-650P-111

Manufacturer:

Savi Technology, Inc.

Tested to applicable standard: RSS210, Issue 5, February 1996 Low Power License-Exempt Radio Communication Devices FCC Part 15 Subpart C

Test Report Prepared For: Eugene Schlindwein Savi Technology, Inc. 615 Tasman Drive Sunnyvale, CA. 94089-1707 USA

Measurement Facility Description Filed With Department of Industry:

Departmental Acknowledgement Number: IC2845 SV1, Dated July 3, 1997

Declaration of Compliance

I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above mentioned departmental standards (through the use of ANSI C63.4 as detailed in section 5.3 of RSS-210, Issue 5); and that the equipment performed in accordance with the data submitted in this report.

Signature Name Title Address

Mark Briggs Vice President of Engineering Elliott Laboratories Inc. 684 W. Maude Ave Sunnyvale, CA 94086 USA

Date: December 16, 2003

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SCOPE

An electromagnetic emissions test has been performed on the Savi Technology, Inc. model SMR-650P-110 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 a single type test of the Savi Technology, Inc. model SMR-650P-110 and therefore apply only to the tested sample. The sample was selected and prepared by Eugene Schlindwein of Savi Technology, Inc..

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 the Savi Technology's SMR-650P-110 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 layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY 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	-5.6dB @ 1.169MHz	Pass
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz	-3.7dB @ 1.169MHz	Pass
15.231 (a) (1)	6.1.1(a) (1)	Duration of manually activated transmission	N/A	
15.231 (a) (2)	6.1.1(a) (2)	Duration of automatically activated transmission	5 seconds or less for control signals (Wake-Up and Control signals) Refer to the operational description for detailed description and timing diagrams.	
15.231 (a) (3)	6.1.1(a) (3)	Transmissions at predetermined / regular intervals are not permitted	All transmissions are triggered via the Personal Data Terminal by the end-user. Refer to the operational description for detailed description and timing diagrams.	
15.231 (a) (4)	6.1.1(a)(4)	Pendency of transmissions used during emergencies involving fire, security, and safety of life	Not applicable	
15.231 (b)	6.1.1(b) / Table 1	Transmitter Radiated Emissions, 433.92 MHz	92.2dBuV/m Peak; 80.2dBuV/m Average. Highest fundamental level was in pulsed control mode.	Pass (-0.6dB)
15.231 (b)	6.1.1(b) / Table 1	Transmitter Radiated Spurious Emissions, 30-4339.2 MHz	40.1dBuV/m Average @ 1735.7 MHz (-13.9dB) Highest spurious level was in Wake-Up mode.	Pass (-13.9dB)
15.231 (c)	6.1.1 (c)	Bandwidth	Measured bandwidth was 448 kHz. The maximum permitted is 0.25% of the fundamental frequency (1MHz)	
15.231 (d)	6.1.1 (d)	Frequency Stability	N/A for devices operating at 433.926 MHz	
15.231 (e)	6.1.1 (e)	Duration of transmission	1 second or less - Refer to the operational description for detailed description and timing diagrams.	
15.231 (e)	6.1.1 (e)	Transmitter Radiated Emissions, 433.92 MHz	92.2dBuV/m Peak; 72.2dBuV/m Average	Pass (-0.7dB)
15.231 (e)	6.1.1 (e)	Transmitter Radiated Spurious Emissions, 30-4339.2 MHz	28.1dBuV/m Average @ 867.8 MHz (-24.8dB)	Pass (-24.8dB)
15.109	7.3	Receiver Spurious Emissions	-12.0dB @ 423.200	Pass (-12dB)

Note 2 - As the device is intended for hand-held operation it was tested in all three orthogonal orientations.

Note 3 – There are two different peak signal levels from the device. The lower level is for the Wake-Up signal which is a single transmission of 5 seconds duration. The higher level is for pulsed transmission signals. Data signal transmissions have a total duration of 1 second and a duty cycle of 10%. Pulsed control signals have duration of 5 seconds and a duty cycle of 25%.

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz	-5.7dB @ 1.169MHz	Pass
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz	-3.6dB @ 1.169MHz	Pass
15.209	6.2.1	Transmitter Fundamental Signal Emissions, 0.123 MHz	-7.9 dBuV/m @ 123 kHz	Complies (note 1)
15.231 (b)	6.2.1	Transmitter Radiated Spurious Emissions, 0.123 – 1.3 MHz	All spurious emissions from the 123kHz transmitter were more than 20dB below the limit.	Complies (note 1)
	RSP 100	Bandwidth	14 kHz	N/A

15.209 / RSS 210 Table 3 – Operation at 123 kHz

Note 1 - As the device is intended for hand-held operation it was tested in all three orthogonal orientations.

15.209 / RSS 210 Table 3 – Operation at 433.92 MHz)

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz	-5.6dB @ 1.169MHz	Pass
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz	-3.7dB @ 1.169MHz	Pass
15.209	6.2.1	Transmitter Radiated Emissions, 433.92 MHz	45.1 dBuV/m @ 433.92 (-0.9 dB)	Complies (Note 2)
15.231 (b)	6.2.1	Transmitter Radiated Spurious Emissions, (Other than control) 30-4340 MHz	26.5 dBuV/m @ 867.853 MHz (-19.5 dB)	Complies (Note 3)
	RSP 100	Bandwidth	448 kHz	N/A

Note 1 - As the device is intended for hand-held operation it was tested in all three orthogonal orientations.

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. models SMR-650P-110 and SMR-650P-111 are transceivers that are designed connect to a hand-held personal data terminal (PDT) to communicate with Savi's RFID tags. The devices transmit at 123 kHz and at 433.92 MHz to initiate responses from tags within its vicinity. The tag's transmit at 433.92 MHz, so the devices also contains a receiver operating at 433.92 MHz with an LO at 423.2 MHz.

The only difference between the -110 and the -111 models is in the type of connector attached to the end of the integral serial cable. The -110 uses a DB9 connector and the -111 uses a proprietary connector for the Symbol series of hand-held PDTs. As the only software available to control the SMR-650P-11x devices for the purposes of FCC and Industry Canada compliance testing (i.e. continuously transmit modes) is a laptop PC, the -110 variant was tested.

The SMR-650P-110 and -111 both have a serial (RS-232) interface and operate from internal, rechargeable batteries. The device has an external DC input used to recharge the batteries via adapter. Although it is intended to be used as a hand held device operating fom the internal batteries it is capable of operation while connected to the external AC-DC adapter. For this reason all tests were performed with the AC-DC adapter connected.

The 123 kHz transmitter operates under part 15.209 of the FCC's rules and RSS 210 Table 3 of Industry Canada's rules.

The 433.92 MHz transceiver operates under sections 15.209 and 15.231 of the FCC rules and Table 3 and section 6.1.1 of RSS 210. The 433.92 MHz transmissions consist of both data and control signals. When operating under 15.231 rules, the data signals are 10 mS long and have a duty cycle of no more than 10% measured in a 100 mS period. There are two types of control signals, one that has a 24% duty cycle and another, the Wake-Up signal that is a 2.5 second transmission. When operated under 15.209 rules, 433.92 MHz transmissions may be continuous.

Normally, the EUT would be used in conjunction with a hand-held device. The EUT was, therefore, treated as table-top equipment and tested in all three orthogonal orientations during testing to simulate the end-user environment. The electrical rating of the EUT adapter is 100-240VAC, 50-60Hz, 0.2A.

The sample was received on December 8, 2003 and tested on December 8, December 9 and December 11, 2003. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Savi Technology, Inc. SMR-650P-110 Transceiver	443503120001

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 6.5 cm wide by 2.5 cm deep by 9 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 local support equipment for emissions testing:

Manufacturer/Model/Description	Serial Number	FCC ID Number
Winbook/WinBook XL/Laptop	H1106589	DoC
PowDec/WP05050I/Charger	WP05050I-1.3	N/A
IBM/ThinkPad/Laptop	78-48-24897/11	AN09611TBOON

Note: Note the WinBook was used for digital device emissions tests. The IBM Thinkpad laptop was used for all other tests. The laptop was used to terminate the serial port. The actual serial peripheral would be a hand-held Personal Data Terminal and not a PC (the EUT is not considered to be a PC peripheral). The PDT's do not have the operating software to control the EUT as required for the tests (continuously transmitting).

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)			
For Connected IG		Description	Shielded / Unshielded	Length (m)	
EUT RS232	LaptopRS232	Integral cable	unshielded	0.15	
EUT DC in	AC-DC adapter	Adapter's integral cable	unshielded	.5	
AC-DC Adapter AC	AC outlet	3-wire	unshielded	1.2	

EUT OPERATION

During testing the EUT was configured to continuously transmit a modulated signal at either 123kHz or 433.92 MHz for transmit-mode tests and was configured in receiver mode for receive mode tests.

ANTENNA SYSTEM

The antenna system used with the Savi Technology, Inc. model SMR-650P-110 and SMR-650P-111 is permanently attached.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on December 8, December 9 and December 11, 2003 at the Elliott Laboratories Open Area Test Site 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 logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis 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

1 Page

Radiated Emissions, 30 - 4339.25MHz, 08-Dec-03 **Engineer: Marissa Faustino** Manufacturer Description Model # Assett # Cal Due EMCO Horn Antenna, D. Ridge 1-18GHz 3115 487 24-Apr-04 Hewlett Packard Microwave Preamplifier, 1-26.5GHz 8449B 785 24-Jan-04 High Pass Filter, 1GHz HP12/1000-5BA Filtek 956 11-Mar-04 EMC Spectrum Analyzer, Opt. 026 9 KHz -Hewlett Packard 8593EM 1141 19-Mar-04 26 5GHz FMCO Log Periodic Antenna, 0.2-1 GHz 3146 1294 17-Apr-04 Rohde & Schwarz Test Receiver, 9kHz-2750MHz ESCS 30 1337 27-Dec-03 Radiated Emissions, 30 - 2,000 MHz, 09-Dec-03 Engineer: Joseph Cadigal Manufacturer Description Model # Assett # Cal Due Hewlett Packard Microwave Preamplifier, 1-26.5GHz 8449B 870 10-Jan-04 Filtek High Pass Filter, 1GHz HP12/1000-5BA 955 03-Apr-04 EMCO Horn Antenna, D. Ridge 1-18GHz 1242 09-Oct-04 3115 Hewlett Packard EMC Spectrum Analyzer, 9KHz - 22GHz 8593EM 1319 20-Nov-04 FMCO Log Periodic Antenna, 0.2-2 GHz 3148 1321 31-Mar-04 Rohde & Schwarz Test Receiver, 0.009-2000 MHz ESN 1332 24-Jul-04 Radiated Emissions, 30 - 2,000 MHz, 11-Dec-03 **Engineer: Yu Chien Ho** Manufacturer Description Model # Assett # Cal Due Hewlett Packard Microwave Preamplifier, 1-26.5GHz 8449B 870 10-Jan-04 High Pass Filter, 1GHz HP12/1000-5BA 956 11-Mar-04 Filtek EMCO Horn Antenna, D. Ridge 1-18GHz 3115 1242 09-Oct-04 Hewlett Packard EMC Spectrum Analyzer, 9KHz - 22GHz 8593EM 1319 20-Nov-04 EMCO Log Periodic Antenna, 0.2-2 GHz 3148 31-Mar-04 1321 ESN Rohde & Schwarz Test Receiver, 0.009-2000 MHz 1332 24-Jul-04 Conducted Emissions - AC Power Ports, 11-Dec-03 **Engineer: Yu Chien Ho** Manufacturer Description Model # Assett # Cal Due Elliott Laboratories FCC / CISPR LISN LISN-3. OATS 304 01-Jul-04 Fischer Custom Comm. LISN, Freq. 0.9 -30 MHz,16 Amp FCC-LISN-50/250-16-2 1079 01-Jul-04 Rohde & Schwarz Test Receiver, 0.009-2000 MHz ESN 1332 24-Jul-04 ESH3 Z2 Rohde& Schwarz Pulse Limiter 1398 10-Jan-04 Radiated Emissions, 30 - 1000 MHz, 18-Dec-03 Engineer: jmartinez Manufacturer Description Model # Assett # Cal interval EMCO Biconical Antenna, 30-300 MHz 3110B 801 12 EMCO Log Periodic Antenna, 0.2-1 GHz 3146 1294 12 12 Rohde & Schwarz Test Receiver, 9kHz-2750MHz ESCS 30 1337

EXHIBIT 2: Test Measurement Data

The following data includes conducted emission measurements of the Savi Technology, Inc. model SMR-650P-110 and SMR-650P-111 and maximized radiated emissions measurements of the complete system.

T 53670_Radio 26 Pages T 53670_Digital 14 Pages

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EMC Test Data

-			
Client:	Savi	Job Number:	J53657
Model:	SMR-650P-110	T-Log Number:	T53670
		Account Manager:	Robert Holt
Contact:	Eugene Schlindwein		
Emissions Spec:	EN55022,FCC 15.231, 15.209	Class:	A/B
Immunity Spec:	EN 301 489-3, EN60601-1-2	Environment:	

EMC Test Data

For The

Savi

Model

SMR-650P-110

Date of Last Test: 12/23/2003

Elliot	t
Client:	Savi
Model	SMD_650D_110

EMC Test Data

Client:	Savi	Job Number:	J53657
Model:	SMR-650P-110	T-Log Number:	T53670
		Account Manager:	Robert Holt
Contact:	Eugene Schlindwein		
	EN55022,FCC 15.231, 15.209	Class:	A/B
Immunity Spec:	EN 301 489-3, EN60601-1-2	Environment:	

EUT INFORMATION

General Description

The EUT is a transceiver which is designed to communicate with Savi's RFID tags. The device transmits at 123 kHz and at 433.92 MHz to initiate responses from tags within its vicinity. The tag's transmit at 433.92 MHz, so the EUT also contains a receiver operating at 433.92 MHz. The device has a serial (RS-232) interface to connect directly to a hand held PC or similar device and operates from internal, rechargable batteries. The device has an external DC input used to recharge the batteries via adapter. It is intended to be used as a hand held device although it can operate while connected to the external AC-DC adapter. The 123 kHz transmitter operates under part 15.209 of the FCC's rules. The 433.92 MHz transceiver operates under sections 15.209 and 15.231 of the FCC rules. The 433.92 MHz transmissions consist of both data and control signals. When operating under 15.231 rules, the data signals are 10 mS long and have a duty cycle of no more than 10% measured in a 100 mS period. There are two types of control signals, one that has a 24% duty cycle and another, the Wake-Up signal, that is a 2.5 second transmission. When operated under 15.209 rules. 433.92 MHz transmissions may be continuous. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment

Normally, the EOT would be placed on a table top during operation. The EOT was, therefore, treated as table-top ec	uipineni
during testing to simulate the end-user environment. The electrical rating of the EUT adapter is 100-240VAC, 50-60	łz, 0.2A.

Equipment Under Test				
Manufacturer	Model	Description	Serial Number	FCC ID
Savi Technology, Inc.	SMR-650P-110	Transceiver	443503120001	KL7-650MR-V1

EUT Enclosure

The EUT enclosure is primarily constructed of plastic. It measures approximately 6.5 cm wide by 2.5 cm deep by 9 cm high.

Modification History

······································			
Mod. #	Test	Date	Modification
1	-	-	None

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

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EMC Test Data

Client:	Savi	Job Number:	J53657
Model:	SMR-650P-110	T-Log Number:	T53670
		Account Manager:	Robert Holt
Contact:	Eugene Schlindwein		
Emissions Spec:	EN55022,FCC 15.231, 15.209	Class:	A/B
Immunity Spec:	EN 301 489-3, EN60601-1-2	Environment:	

Test Configuration #2

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Winbook	Winbook XL	Laptop Computer	H1106587	DoC
IBM	ThinkPad	Laptop Computer	78-48-24897/11	ANO9611TBOON
PowDec	WP05050I	Charger	WP05050I-1.3	none

Note the WinBook was used for digital device emissions tests. The IBM Thinkpad laptop was used for all other tests. The laptop was used to terminate the serial port. The actual serial peripheral would be a hand-held Personal Data Terminal and not a PC (the EUT is not considered to be a PC peripheral). The PDT's do not have the operating software to control the EUT as required for the tests (continuously transmitting).

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
none				

Interface Cabling and Ports

			Cable(s)	
Port	Connected To	Description	Shielded or Unshielded	Length(m)
Serial	Laptop	DB9	Shielded	0.2
DC	Charger	Multiwire	Shielded	2

EUT Operation During Emissions

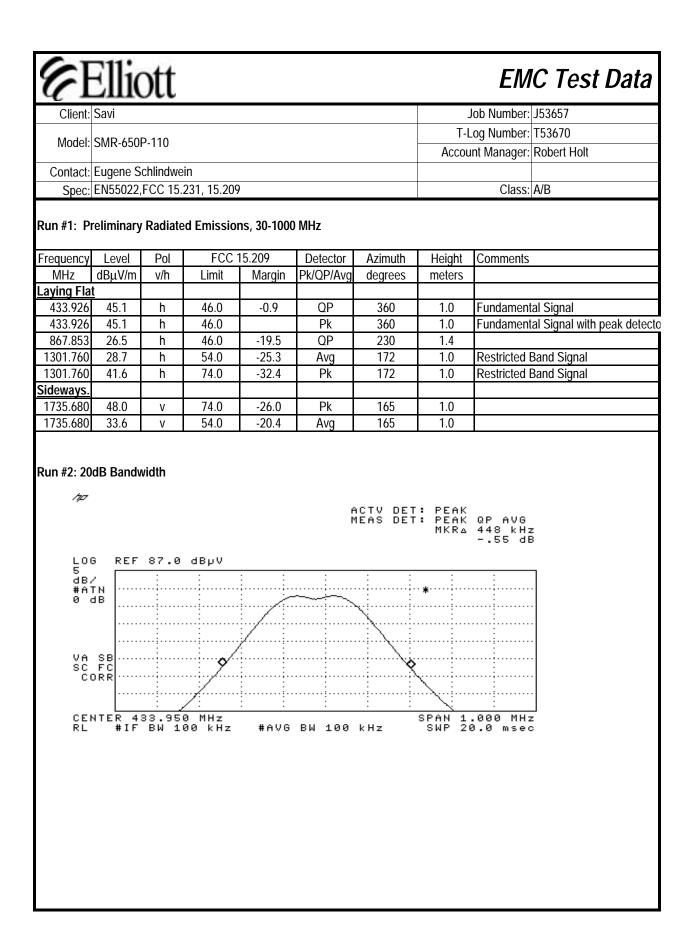
The EUT was set to continuously transmit at either 123kHz or 433.92 MHz with no modulation.

Ellio	ott			EM	C Test Data
Client: Savi			Job N	umber:	J53657
Model: SMR-650	P-110		T-Log N Account Ma		T53670 Robert Holt
Contact: Eugene S					
Spec: EN55022,	FCC 15.231, 15.209			Class:	A/B
	Radi	ated Emissio	ons		
Test Specifics					
Objective:	The objective of this test session specification listed above.	is to perform final qua	lification testing of	the EU	T with respect to the
Date of Test:		Config. Use			
Test Engineer: Test Location:	Joseph Cadigal	Config Change			
Test Location:	SVUATS #2	EUT Vollage	e: 120V/60Hz		
measurement anter	Rel. Humidity: 6	I that the emissions we e EUT's interface cabl 19°C 59%	ere maximized by o	orientati	ion of the EUT, elevation
	Test Performed	Limit	Result		argin
1	RE, 0.123 - 1.23 MHz	FCC 15.209	Pass	see	below
Modifications are d	ade During Testing: etailed under each run descriptior The Standard made from the requirements of th				

Æ	Ellio	ott						EM	IC Test Data
Client:							-	Job Number:	J53657
		D 110					T-L	og Number:	T53670
Model:	SMR-650	P-110					Ассоц	int Manager:	Robert Holt
Contact:	Eugene S	chlindwe	in						
Spec:	EN55022,	FCC 15.	231, 15.209					Class:	A/B
Run #1: Ra	diated E	missions	s, 0.009 - 10	000 MHz: 1	Fransmit Mo	de (132kHz)			
sn: 0443503								140	
	nts of the	fundame	ental signal v	were made	on the OATS	at test dista	nces of 3m	and 10m an	d are recorded in the table
below. Frequency	Level	AF	Level	Pol	Detector	Azimuth	Height	Comments	
kHz	dBµV	dBm ⁻¹	dBµV/m	(0 / I)	Pk/QP/Avg	degrees	meters	Comments	
flat	υυμν	UDIII	սերտու	(071)	TNUTHVY	ucyices	11101013		
123.000	91.5	10.4	101.9	0	Pk	269	1.0	Tested at 3	Sm - Note 1
123.000	82.5	10.4	92.9		Pk	256	1.0	Tested at 3	
side									
123.000	87.8	10.4	98.2	0	Pk	200	1.0	Tested at 3	
123.000	88.2	10.4	98.6		Pk	159	1.0	Tested at 3	sm - Note 1
standing	00.0	10.4	00.7	0	DL	00	1.0	T	No. No. La d
123.000	80.3 81.6	10.4 10.4	90.7 92.0	0	Pk Pk	<u>89</u> 155	1.0 1.0	Tested at 3	
123.000	01.0	10.4	92.0	I	PK	100	1.0	Tested at 3	in - Note T
flat									
123.000	62.8	10.4	73.2	0	Pk	49	1.0	Tested at 1	0m - Note 2
123.000	58.9	10.4	69.3		Pk	152	1.0		0m - Note 2
side									
123.000	62.3	10.4	72.7	0	Pk	264	1.0	Tested at 1	0m - Note 2
123.000	58.5	10.4	68.9		Pk	174	1.0	Tested at 1	0m - Note 2
standing									
123.000	59.1	10.4	69.5	0	Pk	225	1.0		Om - Note 2
123.000	52.7	10.4	63.1	I	Pk	135	1.0	Tested at 1	0m - Note 2
Note 1:	The mavir	mum siar		with the d	evice oriented	d 101 0 dBu	V/m FLIT I	aving flat	
					evice oriented				
									endicular to the EUT.

Client: Savi Job Number: J53657 Model: SMR-650P-110 T-Log Number: T53670 Account Manager: Robert Holt Robert Holt Robert Holt Contact: Eugene Schlindwein Robert Holt Robert Holt Spec: EN55022, FCC 15.231, 15.209 Class: A/B Extrapolation Factor Calculation: Level at 3m: 101.9 dBµV/m Extrapolation from 3m to 10m: 54.9 dB Extrapolation from 10m to 300m: B1.1 (This factor used to calculate the level in the table below) Frequency Level FCC 15.209 Detector Azimuth Height Comments KHz dBµV/m Limit Margin Pk/OP/Avg degrees meters 123 -7.9 25.8 -33.7 Pk 89 1.0 Note 1 246 19.8 >20dB Pk - Note 2 2492 -33.8 >20dB Pk - Note 3 - 615 31.8 >20dB Pk	Æ	Ellio	ott					EM	C Test Data
T-Log Number: T53670 Account Manager: Robert Holt Contact: Eugene Schlindwein Class: A/B Spec: EN55022,FCC 15.231, 15.209 Class: A/B Extrapolation Factor Calculation: Level at 3m: 101.9 dBµV/m Level at 10m: 73.2 dBµV/m Level at 10m: 73.2 dBµV/m Extrapolation from 3m to 10m: 54.9 dB Frequency Level FCC 15.209 Detector Azimuth Height Comments KHz dBµV/m Limit Margin Pk/OP/Avg degrees meters 123 -7.9 25.8 -33.7 Pk - Note 2 492 Note 2 <								Job Number:	J53657
Model: SMR-650P-110 Account Manager: Robert Holt Contact: Eugene Schlindwein									
Spec: EN55022,FCC 15.231, 15.209 Class: A/B Extrapolation Factor Calculation: Level at 3m: 101.9 dBµV/m Level at 10m: 73.2 dBµV/m Extrapolation from 3m to 10m: 54.9 dB Extrapolation from 10m to 300m: 81.1 (This factor used to calculate the level in the table below) Frequency Level FCC 15.209 Detector Azimuth Height Comments KHz dBµV/m Limit Margin Pk/QP/Avg degrees meters 123 -7.9 25.8 -33.7 Pk 89 1.0 Note 1 246 - 19.8 >20dB Pk - - Note 2 369 - 16.3 >20dB Pk - - Note 3 615 - 31.8 >20dB Pk - - Note 3 738 - 30.2 >20dB Pk - - Note 3 984 - 26.7 >20dB Pk - - Note 3 1007 - 26.7 >20dB	Model:	SMR-650	P-110					0	
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246 19.8 >20dB Pk - - Note 2 369 16.3 >20dB Pk - - Note 2 492 33.8 >20dB Pk - - Note 3 615 - 31.8 >20dB Pk - - Note 3 738 - 30.2 >20dB Pk - - Note 3 738 - 30.2 >20dB Pk - - Note 3 861 - 28.9 >20dB Pk - - Note 3 984 - 27.7 >20dB Pk - - Note 3 1107 - 26.7 >20dB Pk - - Note 3 1230 - 25.8 >20dB Pk - - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. - Note 3 Note 2: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental			Limit	Margin	Pk/QP/Avg				
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492 - 33.8 >20dB Pk - - Note 3 615 - 31.8 >20dB Pk - - Note 3 738 - 30.2 >20dB Pk - - Note 3 861 - 28.9 >20dB Pk - - Note 3 984 - 27.7 >20dB Pk - - Note 3 1107 - 26.7 >20dB Pk - - Note 3 1230 - 25.8 >20dB Pk - - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT or fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distar if using the suggested extrapolation factor of 40log(measurement distance/specification distance).		-	19.8			-	-		
615 - 31.8 >20dB Pk - - Note 3 738 - 30.2 >20dB Pk - - Note 3 861 - 28.9 >20dB Pk - - Note 3 984 - 27.7 >20dB Pk - - Note 3 1107 - 26.7 >20dB Pk - - Note 3 1230 - 25.8 >20dB Pk - - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Note 2: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distar if using the suggested extrapolation factor of 40log(measurement distance/specification distance).		-				-	-		
738 - 30.2 >20dB Pk - - Note 3 861 - 28.9 >20dB Pk - - Note 3 984 - 27.7 >20dB Pk - - Note 3 1107 - 26.7 >20dB Pk - - Note 3 1230 - 25.8 >20dB Pk - - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Note 1: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distar if using the suggested extrapolation factor of 40log(measurement distance/specification distance).						-	-		
861 28.9 >20dB Pk - Note 3 984 - 27.7 >20dB Pk - Note 3 1107 - 26.7 >20dB Pk - Note 3 1107 - 26.7 >20dB Pk - Note 3 1230 - 25.8 >20dB Pk - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distarre if using the suggested extrapolation factor of 40log(measurement distance/specification distance).						-	-		
984 - 27.7 >20dB Pk - Note 3 1107 - 26.7 >20dB Pk - Note 3 1230 - 25.8 >20dB Pk - Note 3 1230 - 25.8 >20dB Pk - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distarrei f using the suggested extrapolation factor of 40log(measurement distance/specification distance).		-				-	-		
1107 26.7 >20dB Pk - Note 3 1230 - 25.8 >20dB Pk - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distarre if using the suggested extrapolation factor of 40log(measurement distance/specification distance).		-				-	-		
1230 - 25.8 >20dB Pk - Note 3 Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Note 2: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distarce).		-				-	-		
Note 1: Level calculated by applying the extrapolation factor calculated from the measurements at 3m and 10m measurement recorded at 10m. Note 1: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distance).		-				-	-		
Note 1: measurement recorded at 10m. Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distance).	1230	-	20.0	>200D	ГК	-	-		
Note 2: Preliminary measurements showed there to be no significant signals at a distance of 3m from the EUT of fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distance).	Note 1 [.]		-			tion factor c	alculated from	m the measurements at	3m and 10m to the
Note 2: fundamental signal. Apart from the fundamental transmission, all signals below 490kHz were less than (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distance if using the suggested extrapolation factor of 40log(measurement distance/specification distance).									
Note 2: (1.85dBuA/m) at a distance of 3m, which is equivalent to a level of -28dBuV/m at the specification distance if using the suggested extrapolation factor of 40log(measurement distance/specification distance).			-			-	-		
if using the suggested extrapolation factor of 40log(measurement distance/specification distance).	Note 2:		•	•				0	
		•							
דבו בווחוחמו א וחפמסטובווובנווס סוטשבע וחבוב זע אב חע סוטוווונמחו סוטומוס מדמ עוסומונב ערסוו וועווו וחב דע דע									
fundamental signal. All signals above 490kHz were less than 43.4dBuV/m (-8.2dBuA/m) at a distance of			5						
Note 3: Is equivalent to a level of 3.4dBuV/m at the specification distance of 30m if using the suggested extrapo	Note 3:		•	•					
of 40log(measurement distance/specification distance).								of John II doing the bugge	

Cliant Cavi	ott		1	ob Number:	150/57	
Client: Savi				og Number:		
Model: SMR-650F	°-110			•	Robert Holt	
Contact: Eugene So	chlindwein			5		
Spec: EN55022,	FCC 15.231, 15.209			Class:	A/B	
	Radi	ated Emissio	ns			
est Specifics						
UNIACTIVA	The objective of this test session specification listed above.	ı is to perform final qualif	fication testi	ng of the EL	JT with respect to	
Date of Test:		Config. Used:				
Test Engineer: Yu-Chien HoConfig Change: NoneTest Location: SVOATS #2EUT Voltage: 120V/60Hz						
	510413 #2	EUT Voltage.	1200/00112			
General Test Con The EUT and all loc	nfiguration al support equipment were locate	ed on the turntable for ra	adiated emis	sions testin	g.	
Unless otherwise sp	pecified, the measurement anten	na was located 3 meters	s from the El	JT.		
measurement anten	esting indicates that the emission nna. Maximized testing indicated t antenna, <u>and</u> manipulation of th	d that the emissions wer	e maximized			
•	ove 1 GHz, the FCC specifies the emission above 1 GHz, can not	5			the FCC states	
mbient Conditio	DNS: Temperature:	13.3 °C				
	Rel. Humidity:	46 %				
	ulte					
Summary of Resi	uita		Decult	N/A		
5		Limit			orgin	
Run #	Test Performed	Limit	Result		argin 9dB @	
5		Limit FCC 15.209	Pass	-0.9		
Run # 1 Nodifications Ma	Test Performed	FCC 15.209		-0.9	dB@	



Elli	ott						EMC Test Data
Client: Savi							Job Number: J53657
Model: SMR-65	1D 110					T-	Log Number: T53670
						Αссоι	unt Manager: Robert Holt
Contact: Eugene							
Spec: EN55022							Class: A/B
Data to demonstrat							
433.926 45.1 433.926 46.2	h h	46.0	-0.9	QP Pk	360 360	1.0 1.0	Fundamental Signal Fundamental Signal - peak detector
1735.680 48.0	V N	- 74.0	-26.0	Pk Pk	165	1.0	Peak detector with 1MHz - note 1
1735.680 37.1	V	-	-20.0	Pk	165	1.0	Peak detector with 100kHz - note 2
1735.680 33.6	V	54.0	-20.4	Avg	165	1.0	
LOG 5 db/ [48.01 REF 57	600 GHz dBµV/m .5 dBµV	'/m :	: :		KR 1.7	ΑΚ QP ΑVG 358600 GHz .01 dBµV/m
#ATN Ø db VA VB	har marine	Calleral Constraints		un Mary and and	www.www. Www.wyww.		an a
SC FC ACORR		57375 6	Hz +A		Peak i		ZRBW 500.0 kHz 20.0 msec
740 1 1	IVERAG LØ kHz	E BANDW	ІОТН		ACTV D Meas d	ET: PE ET: PE KR 1.7	
5 г	(EF 57	.5 dBµV	/m				· ·
dB∕ #ATN ØdB			: measurer	•	e floor)	* ~~~	g _{enge} ntenterte a ggentententeggen
VA WB SC FS Acorr	19 A			¢ Ac	tual signal	-narrowb	and signal
CENTER Rt #		57375 G 10 kHz	Hz #A∖	/G BW 10	0 kHz	SPAN SWP	
Note I: (peak) w	as of the s	system nois	e floor.	U			d harmonic in a 1MHz bandwidth
Note 2: When m	easured ir	1MHz the	peak and av	erage meas	surements are	e of the ins	n is below the fundamental signal level. trumentation noise floor and ement bandwidth.

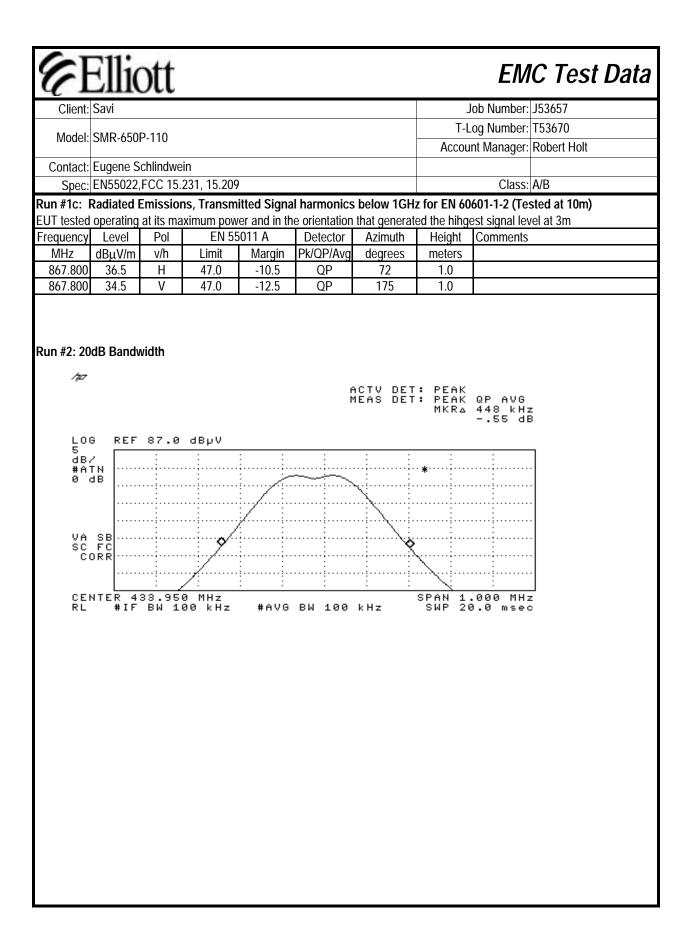
	Ellio	JU			EIV	IC Test
Client:	Savi			J	lob Number:	J53657
Model:	SMR-650	P-110			.og Number: nt Manager:	T53670 Robert Holt
Contact:	Eugene S	chlindwein				
Spec:	EN55022	FCC 15.231, 15.209			Class:	A/B
		Rad	iated Emissio	ns		
Test Spe	cifics					
I	Objective:	The objective of this test sessio specification listed above.	n is to perform final qualif	fication testi	ng of the EL	JT with respect to
		12/8/2003	Config. Used:			
		Marissa Faustino	Config Change:			
Test	Location:	SVOATS #1	EUT Voltage:	120V/60Hz	<u>/</u>	
		nfiguration cal support equipment were loca	ited on the turntable for ra	adiated emis	ssions testing	g.
		pecified, the measurement anter from the EUT for the frequency		from the E	UT for the m	easurement ran
measure	ment antei	testing indicates that the emission nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t	ed that the emissions were	e maximize		
Ambient	Conditio	ons: Temperature:	13 °C			
	oonanti	Rel. Humidity:				
	v of Doc	ults				
ummar	y ui ingo		1 !!#	Result	Ма	argin
Summar Rur		Test Performed	Limit			
	n #	RE, 30 - 4339.25MHz, Pulsed				433.926 MHz
Rur 1a	a	RE, 30 - 4339.25MHz, Pulsed Data Signals	FCC 15.231(a)	Pass	-0.6dB @ 4	
Rur	a	RE, 30 - 4339.25MHz, Pulsed Data Signals RE, 30 - 4339.25MHz, Pulsed			-0.6dB @ 4	433.926 MHz 433.926 MHz
Rur 1a 1b)))	RE, 30 - 4339.25MHz, Pulsed Data Signals	FCC 15.231(a) FCC 15.231(e)	Pass Pass	-0.6dB @ 4 -0.7dB @ 4	433.926 MHz
Rur 1a) #)) C	RE, 30 - 4339.25MHz, Pulsed Data Signals RE, 30 - 4339.25MHz, Pulsed Control Signals	FCC 15.231(a)	Pass	-0.6dB @ 4 -0.7dB @ 4 -10.5dB @	
1a 1b)))	RE, 30 - 4339.25MHz, Pulsed Data Signals RE, 30 - 4339.25MHz, Pulsed Control Signals RE, 30 - 1000MHz: Tx	FCC 15.231(a) FCC 15.231(e)	Pass Pass	-0.6dB @ 4 -0.7dB @ 4	433.926 MHz

	Ellic								
Client:	Savi						~	lob Number:	J53657
Model	SMR-650F	0 110					T-l	og Number:	T53670
mouer.	31011-030F	-110					Accou	nt Manager:	Robert Holt
Contact:	Eugene So	chlindwe	in						
Spec:	EN55022,	FCC 15.	231, 15.209)				Class:	A/B
un #1a:	Radiated E	mission			Control Signa	als with 25%	duty cycl	e (12dB ACI	F)
requency	Level	Pol		5.231(a)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
aying Fla			00.0	<i></i>		0.01			
433.926	80.2	h	80.8	-0.6	Avg	331	1.0	Fundament	
433.926	92.2	h	100.8	-8.6	Pk	331	1.0	Fundament	
<u>1301.760</u> 1301.760	33.7 31.5	h	54.0 54.0	-20.3 -22.5	Avg	139 165	1.0 1.0		Band Signal Band Signal
867.800	31.5 36.1	v h	54.0 60.8	-22.5 -24.7	Avg Avg	165	1.0	RESUICIED	dahu Siyfial
1301.760	45.7	h	74.0	-24.7	Pk	135	1.0	Restricted	Band Signal
1301.760	43.7	V	74.0	-30.5	Pk	165	1.0		Band Signal
867.800	30.0	V	60.8	-30.8	Avg	336	1.0	Restricted	Dana Signai
867.800	48.1	ĥ	80.8	-32.7	Pk	153	1.6		
867.800	42.0	V	80.8	-38.8	Pk	336	1.0		
ideways.									
1301.760	33.5	h	54.0	-20.5	Avg	204	1.0	Restricted	Band Signal
1301.760	30.3	V	54.0	-23.7	Avg	59	1.0	Restricted	Band Signal
867.800	34.5	V	60.8	-26.3	Avg	336	1.0		
867.800	33.0	h	60.8	-27.8	Avg	225	1.5		
1301.760	45.5	h	74.0	-28.5	Pk	204	1.0	Restricted	Band Signal
1735.680	31.0	V	60.8	-29.8	Avg	6	1.0	Desta 1	
1301.760	42.3	V	74.0	-31.7	Pk	59	1.0	Restricted	Band Signal
867.800	46.5	V b	80.8	-34.3	Pk Dk	336	1.0 1.5		
867.800 1735.680	45.0 43.0	h	80.8 80.8	-35.8 -37.8	Pk Pk	225 6	1.5		
tanding	43.0	V	00.0	-31.0	ГК	U	1.0		
1301.760	27.0	V	54.0	-27.0	Avg	40	1.0	Restricted	Band Signal
867.800	32.6	h	60.8	-28.2	Avg	226	1.0	i to Surioto u	
867.800	31.5	V	60.8	-29.3	Avg	0	1.0		
1735.680	28.8	v	60.8	-32.0	Avg	222	1.0		
1301.760	39.0	V	74.0	-35.0	Pk	40	1.0	Restricted	Band Signal
867.800	44.6	h	80.8	-36.2	Pk	226	1.0		<u>×</u>
867.800	43.5	V	80.8	-37.3	Pk	0	1.0		
1735.680	40.8	V	80.8	-40.0	Pk	222	1.0		

Note - Average values are caluclated form the peak measurement by applying a -12dB correction factor assuming a duty cycle of no more than 25% in any 100ms period. The orientation of the device that produced the highest signal level at the fundamental frequency (433.9 MHz) had been previously determined during preliminary testing. All other signals were measured with the device in all three orientations to determine the worst case.

Æ	1110	ott						EM	IC Test Da
Client:	Savi							Job Number:	J53657
								og Number:	
Model:	SMR-650F	P-110						•	Robert Holt
Combook		مامانيم					ACCOU	int manayer.	Robert Holt
	Eugene So							01	
			231, 15.209					Class:	A/B
Run #1b: R	adiated E	mission	is, 30-4339.	250MHz D	ata Signals	with 10% du	ty cycle (2	OdB ACF)	
Frequency	Level	Pol	FCC 15	5.231(e)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
aying Flat									
433.926	92.2	h	92.9	-0.7	Pk	331	1.0	Fundamen	tal Signal
433.926	72.2	h	72.9	-0.7	Avg	331	1.0	Fundamen	tal Signal
867.800	48.1	h	72.9	-24.8	Pk	153	1.6		
867.800	28.1	h	52.9	-24.8	Avg	153	1.6		
1301.760	25.7	h	54.0	-28.3	Avg	139	1.0		
1301.760	45.7	h	74.0	-28.3	Pk	139	1.0		
1301.760	43.5	V	74.0	-30.5	Pk	165	1.0		
1301.760	23.5	V	54.0	-30.5	Avg	165	1.0		
867.800	42.0	V	72.9	-30.9	Pk	336	1.0		
867.800	22.0	V	52.9	-30.9	Avg	336	1.0		
Sideways.									
867.800	26.5	V	52.9	-26.4	Avg	336	1.0		
867.800	46.5	V	72.9	-26.4	Pk	336	1.0		
867.800	25.0	h	52.9	-27.9	Avg	225	1.5		
867.800	45.0	h	72.9	-27.9	Pk	225	1.5		
1301.760	45.5	h	74.0	-28.5	Pk	204	1.0		
1301.760	25.5	h	54.0	-28.5	Avg	204	1.0		
1735.680	43.0	V	74.0	-31.0	Pk	6	1.0		
1735.680	23.0	V	54.0	-31.0	Avg	6	1.0		
1301.760	22.3	V	54.0	-31.7	Avg	59	1.0		
1301.760	42.3	V	74.0	-31.7	Pk	59	1.0		
Standing									
867.800	24.6	h	52.9	-28.3	Avg	226	1.0		
867.800	44.6	h	72.9	-28.3	Pk	226	1.0		
867.800	23.5	V	52.9	-29.4	Avg	0	1.0		
867.800	43.5	V	72.9	-29.4	Pk	0	1.0		
1735.680	40.8	V	74.0	-33.2	Pk	222	1.0		
1735.680	20.8	V	54.0	-33.2	Avg	222	1.0		
1301.760	39.0	V	74.0	-35.0	Pk	40	1.0		
1301.760	19.0	V	54.0	-35.0	Avg	40	1.0		

Note - Average values are caluclated form the peak measurement by applying a -20B correction factor assuming a duty cycle of no more than 10% in any 100ms period. The orientation of the device that produced the highest signal level at the fundamental frequency (433.9 MHz) had been previously determined during preliminary testing. All other signals were measured with the device in all three orientations to determine the worst case.



Client: Savi Model: SMR-650				<i>EIVI</i>	C Tes
Model: SMR-650				lob Number:	J53657
	P-110		T-L	og Number:	T53670
			Accou	nt Manager:	Robert Holt
Contact: Eugene S				Class	A /D
Spec: ENSSU22	,FCC 15.231, 15.209			Class:	A/B
	Rad	iated Emissio	ns		
Test Specifics					
Objective:	The objective of this test sessio specification listed above.	n is to perform final qualifi	ication testi	ing of the EU	IT with respec
Date of Test:		Config. Used:			
Test Engineer: Test Location:	Joseph Cadigal	Config Change: EUT Voltage		7	
			120 9/00112	<u>-</u>	
General Test Co The EUT and all lo	nfiguration cal support equipment were loca	ted on the turntable for ra	diated emis	ssions testing	g.
	pecified, the measurement anter from the EUT for the frequency i		from the E	UT for the m	easurement i
measurement ante	testing indicates that the emissic nna. Maximized testing indicate It antenna, <u>and</u> manipulation of t	ed that the emissions were	e maximize		
Ambient Conditi	ons: Temperature:	19°C			
	Rel. Humidity:				
	alts	1 : : 4	Devel	N.	
Summary of Res			Result	IVIč	argin
Summary of Res Run #	Test Performed	Limit			
4		FCC 15.231(a)	Pass	-1.3dB @ 4	433.926 MHz
Run #	Test Performed RE, 30 - 4339.25MHz, Wake-		Pass Pass		433.926 MHz @ 423.200

	EW	IC Test Data
Savi	Job Number:	J53657
SMD 450D 110	T-Log Number:	T53670
SMR-030F-110	Account Manager:	Robert Holt
Eugene Schlindwein		
EN55022,FCC 15.231, 15.209	Class:	A/B
3120001		
	3120001	Savi Job Number: SMR-650P-110 T-Log Number: Eugene Schlindwein EN55022,FCC 15.231, 15.209 Class: adiated Emissions, 30-4339.250MHz Wake-Up Control Signal 3120001

511. 044300	3120001							
Frequency	Level	Pol	FCC 15	5.231(a)	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Laying Fla	t							
433.926	79.5	h	80.8	-1.3	Avg	360	1.0	Fundamental Signal
433.926	79.8	h	100.8	-21.0	Pk	360	1.0	Fundamental Signal
1301.760	43.7	h	74.0	-30.3	Pk	172	1.0	Restricted Band Signal
1301.760	33.6	h	54.0	-20.4	Avg	172	1.0	Restricted Band Signal
867.800	48.0	h	80.8	-32.8	Pk	176	1.4	
867.800	45.8	h	60.8	-15.0	Avg	176	1.4	
Sideways.								
1735.680	48.7	V	74.0	-25.3	Pk	165	1.0	
1735.680	40.1	V	54.0	-13.9	Avg	165	1.0	
					· · · · · ·			•

Note - Testing was performed with the EUT in all three orientations during the measurements for the control signal. As the control signal and wake-up signals use the same curcuitry, measurements of the Wake-Up signal were made with the device in the orinetations that produced the highest signal levels during the pulsed control signal measurements.

	Ellio	ott			EM	IC Test D
Client:	Savi				ob Number:	J53657
Modal	SMR-650	D 110		T-L	og Number:	T53670
				Accou	nt Manager:	Robert Holt
	-	chlindwein			01	A/D
Spec:	EN55022,	FCC 15.231, 15.209			Class:	A/B
		Rad	iated Emissio	ns		
est Spe	cifics					
	Objective:	The objective of this test sessio specification listed above.	n is to perform final qualifi	ication testi	ng of the EU	JT with respect to th
	te of Test:		Config. Used:			
Test Engineer: Joseph Cadigal Test Location: SVOATS #2			Config Change: EUT Voltage		,	
105	Location.	5101115 #2	Lot vollage	120 1/00112	-	
		nfiguration al support equipment were loca	ted on the turntable for ra	diated emis	ssions testing	g.
	-	becified, the measurement anter from the EUT for the frequency i		from the E	UT for the m	neasurement range
	liminary	esting indicates that the emission	ons were maximized by or	ientation of	the EUT and	d elevation of the
measure	ment anter	nna. Maximized testing indicates that the emissic tantenna, <u>and</u> manipulation of t	ed that the emissions were		d by orientat	tion of the EUT, elev
measure of the me	ment anter easuremen	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t	ed that the emissions were he EUT's interface cables		d by orientat	tion of the EUT, elev
measure of the me	ment anter	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature:	ed that the emissions were he EUT's interface cables 19°C		d by orientat	tion of the EUT, elev
measure of the me	ment anter easuremen Conditio	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t DNS: Temperature: Rel. Humidity:	ed that the emissions were he EUT's interface cables 19°C		d by orientat	tion of the EUT, elev
measure of the me mbient	ment anter easuremen Condition y of Res	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature: Rel. Humidity: ults	ed that the emissions were he EUT's interface cables 19°C 69%	5.	-	
measure of the me mbient ummar Ru	ment anter easuremen Condition y of Res	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature: Rel. Humidity: ults Test Performed	ed that the emissions were he EUT's interface cables 19°C 69% Limit	Result	Ma	argin
measure of the me mbient	ment anter easuremen Condition y of Res	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature: Rel. Humidity: ults	ed that the emissions were he EUT's interface cables 19°C 69%	5.	Ma 3.0	
measure of the me mbient Summar Ru	ment anter easuremen Condition y of Res	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature: Rel. Humidity: <u>ults</u> <u>Test Performed</u> RE, 30 - 4339.25MHz, Wake-	ed that the emissions were he EUT's interface cables 19°C 69% Limit	Result	Ma -3.0 433.9261	argin IdB @
measure of the mo mbient Summar Ru 1	ment anter easuremen Condition y of Res	nna. Maximized testing indicate t antenna, <u>and</u> manipulation of t ons: Temperature: Rel. Humidity: ults Test Performed RE, 30 - 4339.25MHz, Wake- Up Signal	ed that the emissions were he EUT's interface cables 19°C 69% Limit FCC 15.231(a)	Result Pass	Ma -3.0 433.9261 -12.0dB	argin IdB @ Laying Flat

Client:	Savi							lob Number:	J53657
Marial		2 1 1 0					T-L	og Number:	T53670
Model:	SMR-650F	J-110					Accou	nt Manager:	Robert Holt
Contact:	Eugene So	chlindwe	in						
	•		231, 15.209)				Class:	A/B
					ive-Mode (F	CC 15.109/R	SS 210)		
tun " tur i			10,00 1000		ire mede (i				
Frequency	Level	Pol	15.109/	RSS 210	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
aying Flat	<u>t</u>								
423.200	34.0	h	46.0	-12.0	QP	0	1.1	LO	
846.400	24.0	h	46.0	-22.0	QP	99	1.1	LO x 2	
1269.600	42.2	h	74.0	-31.8	Pk	205	1.7	LO x 3	
1269.600	29.6	h	54.0	-24.4	Avg	205	1.7	LO x 3	
423.200	31.3	V	46.0	-14.7	QP	190	1.0	LO	
846.400	24.1	V	46.0	-21.9	QP	190	1.0	LO x 2	
1269.600	43.8	V	74.0	-30.2	Pk	0	1.0	LO x 3	
1269.600	31.6	V	54.0	-22.4	Avg	0	1.0	LO x 3	
Side									
423.200	30.8	h	46.0	-15.2	QP	54	2.1	LO	
846.400	24.7	h	46.0	-21.3	QP	185	1.4	LO x 2	
1269.600	42.7	h	74.0	-31.3	Pk	310	1.7	LO x 3	
1269.600	29.5	h	54.0	-24.5	Avg	310	1.7	LO x 3	
423.200	29.0	V	46.0	-17.0	QP	160	1.3	LO	
846.400	23.2	V	46.0	-22.8	QP	329	1.0	LO x 2	
1269.600	43.2	V	74.0	-30.8	Pk	0	1.0	LO x 3	
1269.600	32.4	V	54.0	-21.6	Avg	0	1.0	LO x 3	
<u>Jp</u>	20.1	h	1/ 0	1/ 0		4	1.0		
423.200	29.1	h	46.0	-16.9	QP OD	45	1.9	LOva	
846.400 1269.600	20.9 42.1	h h	46.0 74.0	-25.1 -31.9	QP Pk	0 154	2.0 1.5	LO x 2 LO x 3	
1269.600	42.1 30.2	h	74.0 54.0	-31.9	Avg	154	1.5	LOX3	
423.200	30.2 31.0	V	46.0	-23.0	QP	134	1.0	LOXS	
423.200 846.400	23.4	V V	46.0	-13.0	QP QP	332	1.0	LO x 2	
1269.600	43.0	V	74.0	-31.0	Pk	319	1.0	LOX2	
			54.0						
			ns, Receive ximum pow	er and in th		319 501-1-2 (Tes that generate			vel at 3m
Frequency	Level	Pol		5011 A	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
423.200	27.9	h	47.0	-19.1	QP	11	2.1	LO, flat	
846.400	21.9	h	47.0	-25.1	QP	253	2.0	LO x 2, side	•

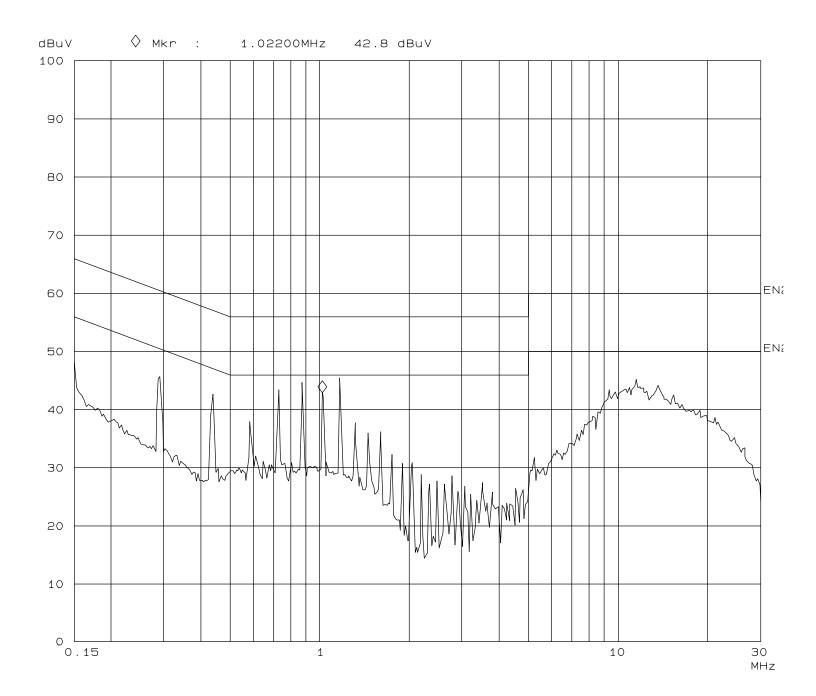
Client: Savi Model: SMR-650 Contact: Eugene S			EMC Test Da			
Contact: Eugene S	P-110		J	ob Number: J536	57	
Contact: Eugene S			T-L	og Number: T536	70	
-			Accou	nt Manager: Robe	ert Holt	
Spec: EN55022	P,FCC 15.231, 15.209			Class: A/B		
	Conducted E	missions - P	ower P	orts		
est Specifics						
Objective:	The objective of this test session specification listed above.	is to perform final qua	lification testi	ng of the EUT with	n respect to the	
Date of Test:	12/11/2003	Config. Used	d: 2			
Test Engineer:		Config Change				
Test Location:	SVOATS #2	EUT Voltage	• Refer to inc	lividual run		
second LISN was ι	nfiguration ent, the EUT was located on a woo used for all local support equipmer	oden table, 40 cm from nt.			30cm from the	
or tabletop equipme	nfiguration ent, the EUT was located on a woo used for all local support equipmer ons: Temperature: Rel. Humidity:	oden table, 40 cm from			30cm from the	
or tabletop equipme second LISN was u Ambient Conditi Summary of Res	nfiguration ent, the EUT was located on a woo used for all local support equipmer ons: Temperature: Rel. Humidity: Sults	oden table, 40 cm from nt. 13.3 °C 46 %	a vertical cou	ipling plane and 8	30cm from the	
or tabletop equipme second LISN was t Ambient Conditi	nfiguration ent, the EUT was located on a woo used for all local support equipmer ons: Temperature: Rel. Humidity:	oden table, 40 cm from nt. 13.3 °C				
or tabletop equipme second LISN was u Ambient Conditi Summary of Res Run #	nfiguration ent, the EUT was located on a woo used for all local support equipmer ons: Temperature: Rel. Humidity: sults Test Performed	oden table, 40 cm from nt. 13.3 °C 46 % Limit	a vertical cou	ipling plane and 8	9MHz 9MHz	

6	Ellio	ott					EM	IC Test Data
Client:							Job Number:	J53657
Model:	SMR-650	P-110				_	T-Log Number: Account Manager:	
Contact:	Eugene S	chlindwe	in				5	
			231, 15.209)			Class:	A/B
Run #1: A0	C Power F	ort Cond	lucted Em	issions, 0.1	5 - 30MHz,	120V/60Hz		
UHF					-			
Frequency	Level	AC		022 B	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
1.169	40.4	Neutral	46.0	-5.6	Average			
1.023	40.2	Line	46.0	-5.8	Average			
1.169	39.3	Line	46.0	-6.7	Average			
0.877	38.4	Neutral	46.0	-7.6	Average			
1.169	44.3	Neutral	56.0	-11.7	QP			
1.169	44.1	Line	56.0	-11.9	QP			
1.023	43.5	Line	56.0	-12.5	QP			
0.877	42.3	Neutral	56.0	-13.7	QP			
0.150	39.7	Neutral	56.0	-16.3	Average			
0.150	39.2	Line	56.0	-16.8	Average			
0.150	43.8	Neutral	66.0	-22.2	QP			
0.150	43.5	Line	66.0	-22.5	QP			
Frequency	Level	AC	RSG	5 210	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave	Comments		
1.169	44.3	Neutral	48.0	-3.7	QP			
	44.1	Line	48.0	-3.9	QP			
1 169			48.0	-4.5	QP			
1.169	43 5	line			Q2.1			
1.169 1.023 0.877	43.5 42.3	Line Neutral	48.0	-5.7	QP			
1.023 0.877 Run #2: AC	42.3 C Power F	Neutral Port Conc	48.0 lucted Em	-5.7 issions, 0.1	5 - 30MHz,			
1.023 0.877 Run #2: A0 LHF Frequency	42.3 C Power F Level	Neutral Port Conc AC	48.0 Iucted Em EN55	-5.7 issions, 0.1	5 - 30MHz, Detector	120V/60Hz Comments		
1.023 0.877 Run #2: AG LHF Frequency MHz	42.3 C Power F Level dBµV	Neutral Port Conc AC Line	48.0 Jucted Em EN55 Limit	-5.7 i ssions, 0.1 i022 B Margin	5 - 30MHz, Detector QP/Ave			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169	42.3 C Power F Level dBμV 40.3	Neutral Port Conc AC Line Line	48.0 Jucted Em EN55 Limit 46.0	-5.7 issions, 0.1 i022 B Margin -5.7	5 - 30MHz, Detector QP/Ave Average			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023	42.3 C Power F Level dBμV 40.3 40.2	Neutral Port Conc AC Line Line Line	48.0 Jucted Em EN55 Limit 46.0 46.0	-5.7 issions, 0.1 022 B Margin -5.7 -5.8	5 - 30MHz, Detector QP/Ave Average Average			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170	42.3 C Power F Level dBμV 40.3 40.2 39.8	Neutral Port Conc AC Line Line Line Neutral	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2	5 - 30MHz, Detector QP/Ave Average Average Average			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3	AC Line Line Line Neutral Neutral	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 46.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7	5 - 30MHz, Detector QP/Ave Average Average Average Average			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4	AC Line Line Neutral Neutral Line	48.0 ducted Em EN55 Limit 46.0 46.0 46.0 46.0 56.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6	5 - 30MHz, Detector QP/Ave Average Average Average QP			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3	Neutral Ort Conc AC Line Line Neutral Neutral Line Neutral Neutral Line	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7	5 - 30MHz, Detector QP/Ave Average Average Average QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5	Neutral Port Cond AC Line Line Neutral Neutral Line Neutral Line Line	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0	-5.7 issions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5	5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.023 0.877	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3	AC Line Line Line Neutral Neutral Line Neutral Line Neutral Line Neutral	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7	5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8	Neutral Port Conc Line Line Line Neutral Neutral Line Neutral Line Neutral Neutral Neutral	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2	5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150 0.150	42.3 C Power F ΔBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8 39.8 39.4	NeutralOrt CondACLineLineNeutralNeutralLineNeutralLineNeutralLineNeutralLineNeutralLineNeutralLineNeutralLineNeutralLineNeutralLine	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0	-5.7 issions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2 -16.6	5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP QP Average Average			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8	Neutral Port Conc Line Line Line Neutral Neutral Line Neutral Line Neutral Neutral Neutral	48.0 Jucted Em EN55 Limit 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2	5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP			

Spec: EN un #3: AC Pe	avi MR-650F						EM	IC Test Dat
Contact: Eu Spec: EN un #3: AC Pe		-					Job Number:	J53657
Contact: Eu Spec: EN un #3: AC Pe							T-Log Number:	T53670
Spec: EN un #3: AC Pe	iaono S	·-110					Account Manager:	
un #3: AC P	t: Eugene Schlindwein :: EN55022,FCC 15.231, 15.209							
	V 55022,	FCC 15.2	31, 15.209)			Class:	A/B
HF	ower P	ort Cond	ucted Emi	ssions, 0.1	5 - 30MHz,	230V/50Hz		
requency L	Level	AC	EN55	022 B	Detector	Comments		
MHz d	dBµV	Line	Limit	Margin	QP/Ave			
0.742	41.5	Line	46.0	-4.5	Average			
1.040	40.2	Line	46.0	-5.8	Average			
1.188	40.0	Line	46.0	-6.0	Average			
0.444	40.1	Neutral	47.0	-6.9	Average			
0.891	37.0	Line	46.0	-9.0	Average			
0.889	36.0	Neutral	46.0	-10.0	Average			
1.188	44.9	Line	56.0	-11.1	QP			
1.040	43.6	Line	56.0	-12.4	QP			
0.150	43.3	Line	56.0	-12.7	Average			
0.150	42.4	Neutral	56.0	-13.6	Average			
0.742	42.0	Line	56.0	-14.0	QP			
0.891	41.4	Line	56.0	-14.6	QP			
0.444	40.6	Neutral	57.0	-16.4	QP			
0.889	39.4	Neutral	56.0	-16.6	QP			
	49.3	Neutral	66.0	-16.7	QP			
0.150	48.7	Line	66.0	-17.3	QP			

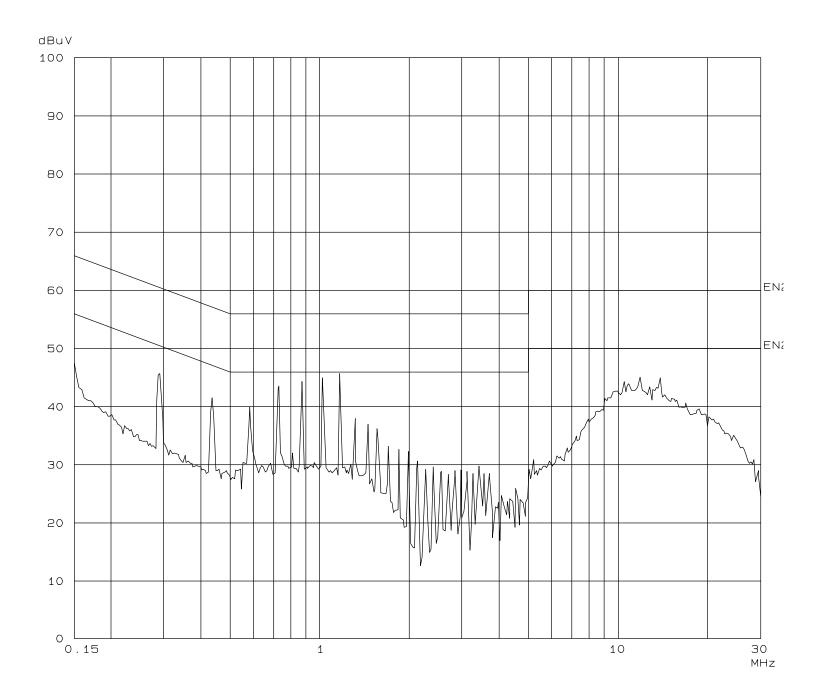
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 120V / 60Hz Run No.1 120V Neutral



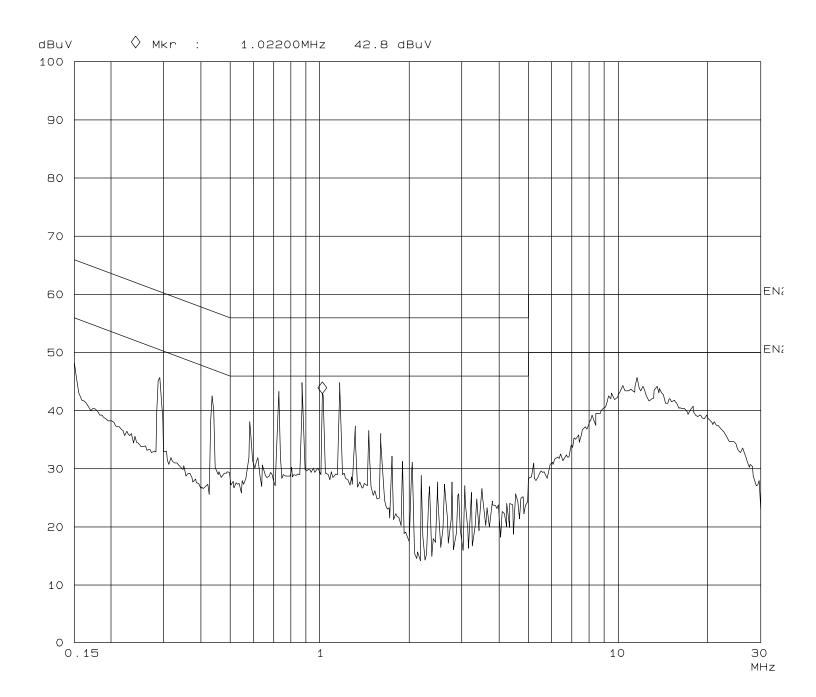
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 120V / 60Hz Run No.1 120V Line



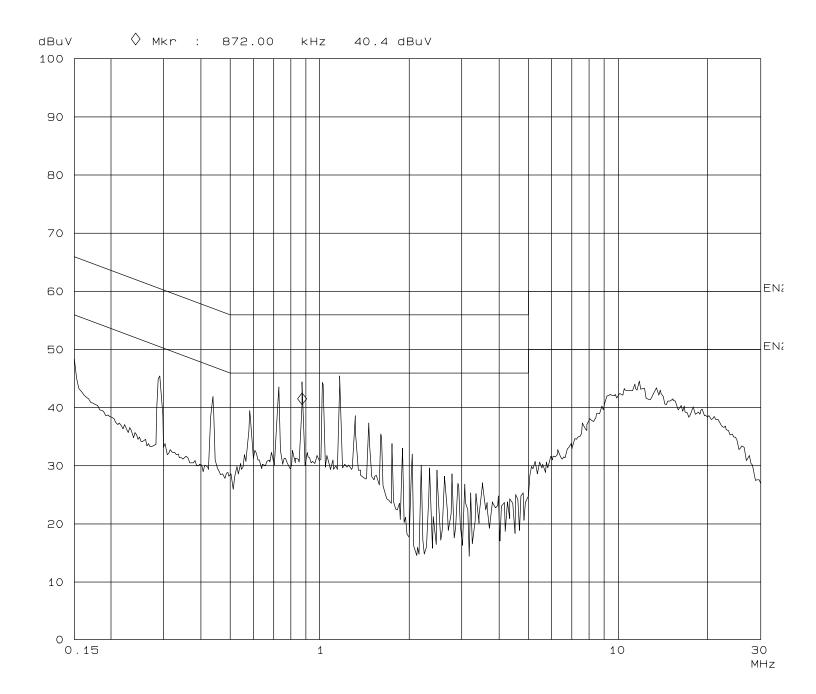
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

LHF Test, 120V / 60Hz Run No.2 120V Neutral



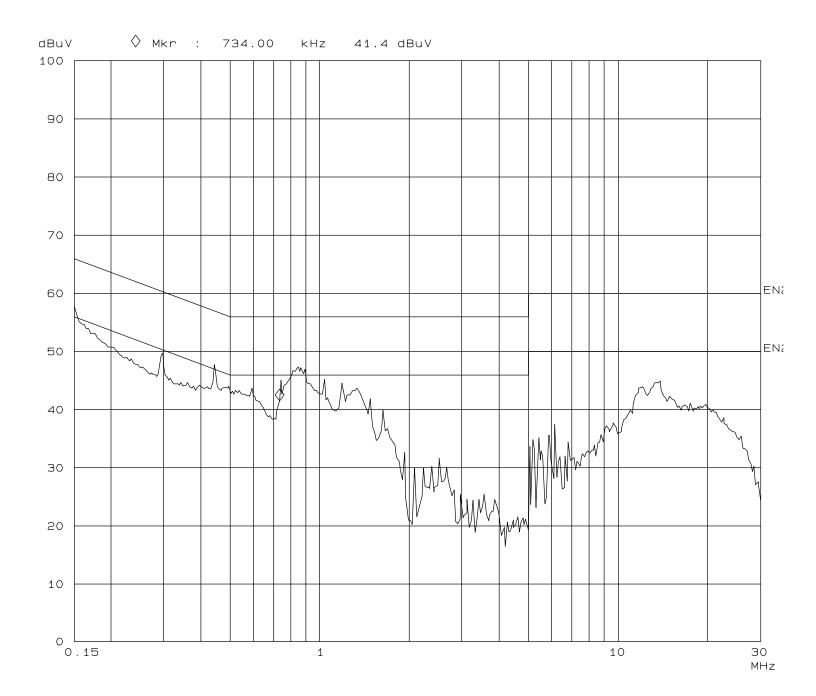
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

LHF Test, 120V / 60Hz Run No.2 120V Line



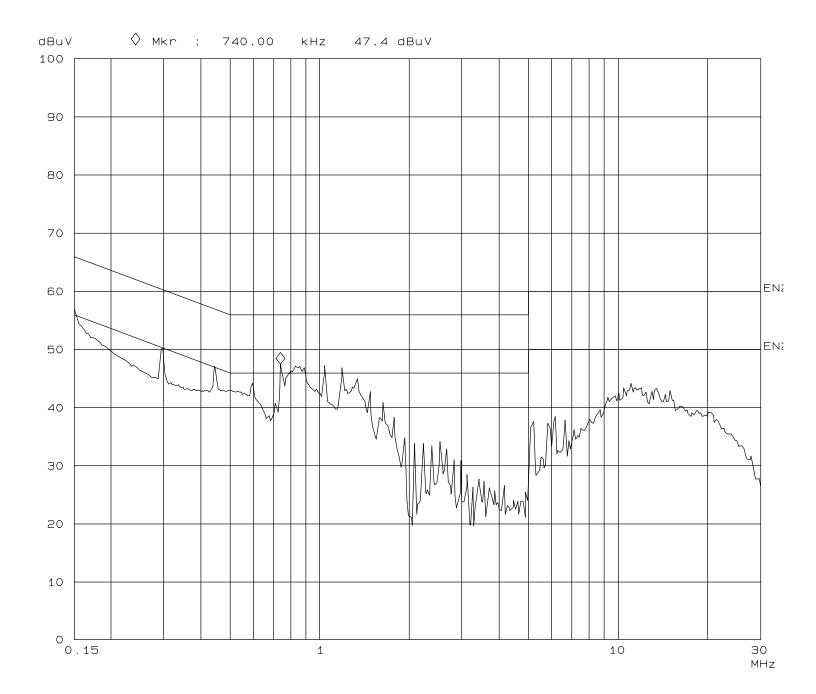
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 230V / 50Hz Run No.3 230V Neutral



Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 230V / 50Hz Run No.3 230V Line



Elliott		C Test
Client: Savi Model: SMR-650P-110	Job Number:	
	T-Log Number: Account Manager:	
Contact: Eugene Schlindwein		
missions Spec: EN55022,FCC 15.231, 15.209	Class:	A/B
mmunity Spec:	Environment:	
EMC Tes	t Data	
For Th		
Sav	i	
Mode	I	
SMR-6501	P-110	
	: 12/17/2003	
Date of Last Test		

				IC Test Data
	t: Savi		Job Number	
Mode	el: SMR-650P-110		T-Log Number	
Conta	t: Eugene Schlindwe	oin	Account Manager	
	c: EN55022,FCC 15		Class	: A/B
	c: Enter immunity sp		Environment	
433.92 MHz to initiate	e responses from tag	s within its vicinity. The tag	's RFID tags. The device transr s transmit at 433.92 MHz, so the sterface to connect directly to a	e EUT also contains a
device and operates via adapter. It is inter adapter. The 123 kH sections 15.209 and operating under 15.2 mS period. There are second transmission Normally, the EUT w	rom internal, recharg ded to be used as a transmitter operates 15.231 of the FCC ru 31 rules, the data sig two types of control When operated und buld be placed on a t	gable batteries. The device hand held device although s under part 15.209 of the F ules. The 433.92 MHz transminals are 10 mS long and has signals, one that has a 24% ler 15.209 rules. 433.92 MH able top during operation.	has an external DC input used t t can operate while connected t CC's rules. The 433.92 MHz tra hissions consist of both data an ve a duty cycle of no more thar o duty cycle and another, the Wa z transmissions may be continu he EUT was, therefore, treated ting of the EUT adapter is 100-	o recharge the batteries o the external AC-DC nsceiver operates under d control signals. When 10% measured in a 100 ake-Up signal, that is a 2. ous. as table-top equipment
device and operates via adapter. It is inter adapter. The 123 kH sections 15.209 and operating under 15.2 mS period. There are second transmission Normally, the EUT w	rom internal, recharg ded to be used as a transmitter operates 15.231 of the FCC ru 31 rules, the data sig two types of control When operated und buld be placed on a t	gable batteries. The device hand held device although s under part 15.209 of the F iles. The 433.92 MHz transr inals are 10 mS long and ha signals, one that has a 24% ler 15.209 rules. 433.92 MH able top during operation. vironment. The electrical ra	has an external DC input used to t can operate while connected to CC's rules. The 433.92 MHz transisions consist of both data an we a duty cycle of no more than of duty cycle and another, the Wa z transmissions may be continue the EUT was, therefore, treated ting of the EUT adapter is 100-2	o recharge the batteries o the external AC-DC nsceiver operates under d control signals. When 10% measured in a 100 ake-Up signal, that is a 2. ous. as table-top equipment
device and operates via adapter. It is inter adapter. The 123 kH sections 15.209 and operating under 15.2 mS period. There are second transmission Normally, the EUT w	rom internal, recharg ded to be used as a transmitter operates 15.231 of the FCC ru 31 rules, the data sig two types of control When operated und buld be placed on a t	gable batteries. The device hand held device although s under part 15.209 of the F ules. The 433.92 MHz transminals are 10 mS long and has signals, one that has a 24% ler 15.209 rules. 433.92 MH able top during operation.	has an external DC input used to t can operate while connected to CC's rules. The 433.92 MHz transisions consist of both data an we a duty cycle of no more than of duty cycle and another, the Wa z transmissions may be continue the EUT was, therefore, treated ting of the EUT adapter is 100-2	o recharge the batteries o the external AC-DC nsceiver operates under d control signals. When 10% measured in a 100 ake-Up signal, that is a 2. ous. as table-top equipment
device and operates via adapter. It is inter adapter. The 123 kH sections 15.209 and operating under 15.2 mS period. There are second transmission Normally, the EUT w during testing to simu	rom internal, recharg ded to be used as a transmitter operates 15.231 of the FCC ru 31 rules, the data sig two types of control When operated und buld be placed on a t late the end-user en	gable batteries. The device hand held device although s under part 15.209 of the F ules. The 433.92 MHz transr nals are 10 mS long and ha signals, one that has a 24% ler 15.209 rules. 433.92 MH able top during operation. vironment. The electrical ra Equipment Unde Description	has an external DC input used to t can operate while connected to CC's rules. The 433.92 MHz transisions consist of both data an we a duty cycle of no more than o duty cycle and another, the Wa z transmissions may be continue the EUT was, therefore, treated ting of the EUT adapter is 100-2 r Test	o recharge the batteries o the external AC-DC nsceiver operates under d control signals. When 10% measured in a 100 ake-Up signal, that is a 2. ous. as table-top equipment 240VAC, 50-60Hz, 0.2A.

6		1
6	EI	11011

EMC Test Data

Client:	Savi	Job Number:	J53657
Model:	SMR-650P-110	T-Log Number:	T53670
		Account Manager:	Robert Holt
Contact:	Eugene Schlindwein		
Emissions Spec:	EN55022,FCC 15.231, 15.209	Class:	A/B
Immunity Spec:	Enter immunity spec on cover	Environment:	

Test Configuration #2

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Winbook	Winbook XL	Laptop Computer	H1106587	DoC
IBM	ThinkPad	Laptop Computer	78-48-24897/11	ANO9611TBOON
PowDec	WP05050I	Charger	WP05050I-1.3	none

Note the WinBook was used for digital device emissions tests. The IBM Thinkpad laptop was used for all other tests. The laptop was used to terminate the serial port. The actual serial peripheral would be a hand-held Personal Data Terminal and not a PC (the EUT is not considered to be a PC peripheral). The PDT's do not have the operating software to control the EUT as required for the tests (continuously transmitting).

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID		
none						

Interface Cabling and Ports

			Cable(s)	
Port	Connected To	Description	Shielded or Unshielded	Length(m)
Serial	Laptop	DB9	Shielded	0.2
DC	Charger	Multiwire	Shielded	2

EUT Operation During Emissions

The EUT was set to continuously transmit at either 123kHz or 433.92 MHz with no modulation.

$\boldsymbol{\varphi}$	Ellic	ott			EM	C Test Da
Client					Job Number:	J53657
Model	SMR-650P	110		T-L	og Number:	T53670
Model	SIVIR-030P	-110		Accou	int Manager:	Robert Holt
	Eugene So					
Spec:	EN55022,F	FCC 15.231, 15.209			Class:	A/B
		Radi	ated Emissio	ons		
lest Spe	ecifics					
		The objective of this test session specification listed above.	n is to perform final qua	lification test	ing of the EL	IT with respect to the
Da	ite of Test: 7	12/8/2003	Config. Used	d: 2		
		Juan Martinez	Config Change			
les	t Location: S	SVOATS #1	EUT Voltage	e: 120V/60Hz	Z	
Unless o 1000 MH Note, pr e	otherwise sp 1z and 3m fr eliminary te	al support equipment were local ecified, the measurement anter rom the EUT for the frequency r esting indicates that the emissio	na was located 10 met ange 1 - 10 GHz. ns were maximized by	ers from the orientation of	EUT for the i	measurement range d elevation of the
		na. Maximized testing indicate antenna, <u>and</u> manipulation of the second s			d by oriental	ion of the EUT, elev
	Conditio	ns: Temperature:	13 °C			
Ambient		Rel. Humidity:	59 %			
Ambient						
	y of Resu	llts				
	n #	Test Performed	Limit	Result	Ma	argin
Summar	n #		Limit EN55022 A	Result Pass		argin 200.453MHz

61	Ellic)[[EIV	IC Test D
Client:	nt: Savi							lob Number:	J53657
							T-Log Number:		T53670
Model:	SMR-650	P-110				-	Robert Holt		
Contact	Eugene S	chlindwe	in						
	-		231, 15.209)			Class:	۵/R	
Run #1: P		Radiate		ns, 30-1000) MHz				
Frequency		Pol	EN55	6022 A	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
_aying Fla								ļ	
40.080		V	40.0	-9.7	QP	174	1.0		
40.080	15.5	h	40.0	-24.5	QP	205	2.0		
160.360	28.4	V	40.0	-11.6	QP	360	1.0	ļ	
160.360	20.6	h	40.0	-19.4	QP	269	2.8		
200.453 200.453	33.0 20.4	v h	40.0 40.0	-7.0 -19.6	QP QP	0 136	1.0 2.8		
400.917	20.4 28.0	n h	40.0	-19.6	QP	360	2.8		
400.917	28.0		47.0	-19.0	QP	360	1.0		
641.467	35.0	v h	47.0	-19.9	QP	302	1.0		
641.467	26.4	V	47.0	-20.6	QP	277	1.2		
Sideways.	20.4	v	0.17	-20.0		211	1.0		
40.080	29.5	V	40.0	-10.5	QP	174	1.0		
160.360	30.0	v	40.0	-10.0	QP	360	1.0		
200.453	26.7	V	40.0	-13.3	QP	0	1.0		
standing						-			
200.453	25.9	V	40.0	-14.1	QP	0	1.0		
40.080	29.0	V	40.0	-11.0	QP	160	1.0		
160.360	27.1	V	40.0	-12.9	QP	360	1.0		
		-	IS From Ru	n #1 5022 A	Datastas	Animath	110:244	Commonte	
Frequency		Pol			Detector	Azimuth	Height	Comments	
MHz 200.453	dBµV/m 33.0	v/h	Limit 40.0	Margin -7.0	Pk/QP/Avg QP	degrees 0	meters 1.0	EUT flat	
40.080		V V	40.0	-7.0	QP QP	174	1.0	EUT flat	
40.080		V V	40.0	-9.7	QP	360	1.0	EUT nat EUT on its	sido
160.360		V V	40.0	-10.0	QP	360	1.0	EUT OIT ILS	SIUC
641.467	35.0	h	40.0	-11.0	QP	302	1.0	EUT flat	
		h	47.0	-12.0	QP	360	1.2	EUT flat	
400.917	28.0						I.U		

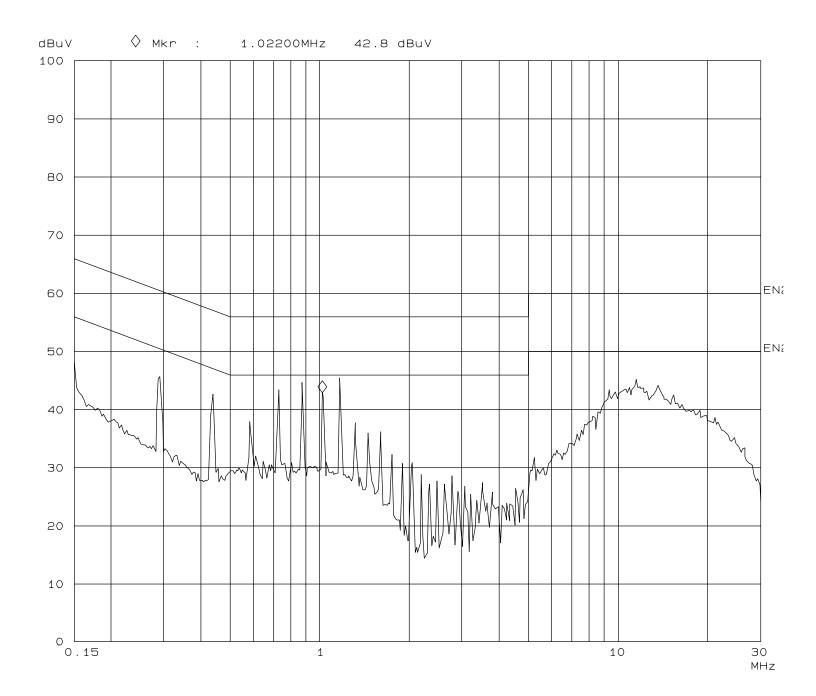
Client: Savi Job Number: J53657 Model: SMR-650P-110 Contact: Eugene Schlindwein Spec: EN55022, FCC 15.231, 15.209 Client: Class: AKB Conducted Emissions - Power Ports The objective of this test session is to perform final qualification testing of the EUT with resp specification listed above. Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run
Model: SMR-650P-110 Account Manager: Robert Hol Contact: Eugene Schlindwein Image: Robert Hol Image: Robert Hol Spec: EN55022,FCC 15.231, 15.209 Class: A/B Conducted Emissions - Power Ports est Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with resp specification listed above. Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run Seneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from tabletop equipment.
Contact: Eugene Schlindwein Spec: EN55022,FCC 15.231, 15.209 Class: A/B Conducted Emissions - Power Ports Conducted Emissions - Power Ports est Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with resp specification listed above. Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run eneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
Spec: EN55022,FCC 15.231, 15.209 Class: A/B Class: Display: Colspan="2">Class: Display: Class: A/B The objective of this test session is to perform final qualification testing of the EUT with resp Date of Test: 12/11/2003 Config. Used: 2 Config Change: None Test Engineer: Yu-Chien Ho Config Change: None EUT Voltage: Refer to individual run
est Specifics Objective: The objective of this test session is to perform final qualification testing of the EUT with responsible specification listed above. Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Test Location: SVOATS #2 EUT Voltage: Refer to individual run eneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
Objective: The objective of this test session is to perform final qualification testing of the EUT with resp Objective: The objective of this test session is to perform final qualification testing of the EUT with resp Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run eneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
Objective: The objective of this test session is to perform final qualification testing of the EUT with resp Date of Test: 12/11/2003 Config. Used: 2 Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run Peneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
Test Engineer: Yu-Chien Ho Config Change: None Test Location: SVOATS #2 EUT Voltage: Refer to individual run eneral Test Configuration or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
or tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane and 80cm f
Ambient Conditions:Temperature:13.3 °CRel. Humidity:46 %
Summary of Results
Run # Test Performed Limit Result Margin
1 CE, AC Power, 120V/60Hz EN 55022 B Pass -5.6dB @ 1.169MHz
2 CE, AC Power,120V/60Hz EN 55022 B Pass -5.7dB @ 1.169MHz 3 CE, AC Power, 230V/50Hz EN 55022 B Pass -4.5dB @ 0.742MHz

6	Ellio	ott					EM	IC Test Data
Client:							Job Number	J53657
Model:	SMR-650	P-110				_	T-Log Number Account Manager	
Contact:	Eugene S	chlindwe	in					
	-		231, 15.209)			Class	A/B
Run #1: A(C Power F	ort Cond	lucted Em	issions, 0.1	5 - 30MHz,	120V/60Hz		
UHF	-				-			
Frequency	Level	AC		022 B	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave			
1.169	40.4	Neutral	46.0	-5.6	Average			
1.023	40.2	Line	46.0	-5.8	Average			
1.169	39.3	Line	46.0	-6.7	Average			
0.877	38.4	Neutral	46.0	-7.6	Average			
1.169	44.3	Neutral	56.0	-11.7	QP			
1.169	44.1	Line	56.0	-11.9	QP			
1.023	43.5	Line	56.0	-12.5	QP			
0.877	42.3	Neutral	56.0	-13.7	QP			
0.150	39.7	Neutral	56.0	-16.3	Average			
0.150	39.2	Line	56.0	-16.8	Average			
0.150	43.8	Neutral	66.0	-22.2	QP QP			
0.150	43.5	Line	66.0	-22.5	QP			
Frequency	Level	AC	RSS	5 210	Detector	Comments		
MHz	dBµV	Line	Limit	Margin	QP/Ave	Comments		
1.169	44.3	Neutral	48.0	-3.7	QP			
1.169	44.1	Line	48.0	-3.9	QP			
				-4.5	QP			
	43.5	Line	48.0					
1.023 0.877	43.5 42.3	Line Neutral	48.0 48.0	-5.7	QP			
1.023 0.877 Run #2: A0 LHF	42.3 C Power F	Neutral Port Conc	48.0 Iucted Emi	-5.7 issions, 0.1	QP 5 - 30MHz,			
1.023 0.877 Run #2: A0 LHF Frequency	42.3 C Power F Level	Neutral Port Conc AC	48.0 Iucted Em EN55	-5.7 issions, 0.1	QP 5 - 30MHz, Detector	120V/60Hz Comments		
1.023 0.877 Run #2: A0 LHF Frequency MHz	42.3 C Power F Level dBμV	Neutral Port Conc AC Line	48.0 Jucted Emi EN55 Limit	-5.7 i ssions, 0.1 i022 B Margin	QP 5 - 30MHz, Detector QP/Ave			
1.023 0.877 Run #2: AG LHF Frequency MHz 1.169	42.3 C Power F Level dBµV 40.3	Neutral Port Conc AC Line Line	48.0 Jucted Emi EN55 Limit 46.0	-5.7 issions, 0.1 i022 B Margin -5.7	QP 5 - 30MHz, Detector QP/Ave Average			
1.023 0.877 Run #2: AG LHF Frequency MHz 1.169 1.023	42.3 C Power F Level dBμV 40.3 40.2	Neutral Port Conc AC Line Line Line	48.0 Jucted Emi EN55 Limit 46.0 46.0	-5.7 issions, 0.1 022 B Margin -5.7 -5.8	QP 5 - 30MHz, Detector QP/Ave Average Average			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170	42.3 C Power F Level dBμV 40.3 40.2 39.8	Neutral Port Conc AC Line Line Line Neutral	48.0 ducted Emi EN55 Limit 46.0 46.0 46.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2	QP 5 - 30MHz, Detector QP/Ave Average Average Average			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3	AC Line Line Line Neutral Neutral	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 46.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7	QP 5 - 30MHz, Detector QP/Ave Average Average Average Average			
1.023 0.877 Run #2: AG LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169	42.3 C Power F ΔBμV 40.3 40.2 39.8 38.3 44.4	AC Line Line Neutral Neutral Line	48.0 ducted Emi EN55 Limit 46.0 46.0 46.0 46.0 56.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3	Neutral Ort Conc AC Line Line Neutral Neutral Line Neutral Neutral Line	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023	42.3 C Power F Level dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5	Neutral Port Cond AC Line Line Neutral Neutral Line Neutral Line Line	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0 56.0	-5.7 issions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.023 0.877	42.3 C Power F ΔBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3	AC Line Line Line Neutral Neutral Line Neutral Line Neutral Line Neutral	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0	-5.7 issions, 0.1 i022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150	42.3 C Power F dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8	Neutral Port Conc Line Line Line Neutral Neutral Line Neutral Line Neutral Neutral Neutral	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP			
1.023 0.877 Run #2: A0 LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150 0.150	42.3 C Power F ΔBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8 39.8 39.4	Neutral Ort Conc AC Line Line Neutral Neutral Line Neutral Line	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0 5	-5.7 issions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2 -16.6	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP Average Average			
1.023 0.877 Run #2: AC LHF Frequency MHz 1.169 1.023 1.170 0.877 1.169 1.170 1.023 0.877 0.150	42.3 C Power F dBμV 40.3 40.2 39.8 38.3 44.4 44.3 43.5 42.3 39.8	Neutral Port Conc Line Line Line Neutral Neutral Line Neutral Line Neutral Neutral Neutral	48.0 Jucted Emi EN55 Limit 46.0 46.0 46.0 56.0 56.0 56.0 56.0 56.0 56.0 56.0	-5.7 ssions, 0.1 022 B Margin -5.7 -5.8 -6.2 -7.7 -11.6 -11.7 -12.5 -13.7 -16.2	QP 5 - 30MHz, Detector QP/Ave Average Average Average QP QP QP QP QP QP			

	avi							ΕΜС Τέ	est Da
Contact: Eu Spec: El	MR-650						Job N	umber: J53657	
Contact: Eu Spec: El	MR-650							umber: T53670	
Spec: El		P-110					•	anager: Robert H	lolt
	tact: Eugene Schlindwein								
2un #3: AC F	N55022	FCC 15.2	231, 15.209)				Class: A/B	
HF	Power P	ort Cond	ucted Emi	ssions, 0.1	5 - 30MHz,	230V/50Hz			
requency	Level	AC	EN55	022 B	Detector	Comments			
MHz	dBµV	Line	Limit	Margin	QP/Ave				
0.742	41.5	Line	46.0	-4.5	Average				
1.040	40.2	Line	46.0	-5.8	Average				
1.188	40.0	Line	46.0	-6.0	Average				
0.444	40.1	Neutral	47.0	-6.9	Average				
0.891	37.0	Line	46.0	-9.0	Average				
0.889	36.0	Neutral	46.0	-10.0	Average				
1.188	44.9	Line	56.0	-11.1	QP				
1.040	43.6	Line	56.0	-12.4	QP				
0.150	43.3	Line	56.0	-12.7	Average				
0.150	42.4	Neutral	56.0	-13.6	Average				
0.742	42.0	Line	56.0	-14.0	QP				
0.891	41.4	Line	56.0	-14.6	QP				
0.444	40.6	Neutral	57.0	-16.4	QP				
0.889	39.4	Neutral	56.0	-16.6	QP				
0.150	49.3	Neutral	66.0	-16.7	QP				
0.150	48.7	Line	66.0	-17.3	QP				

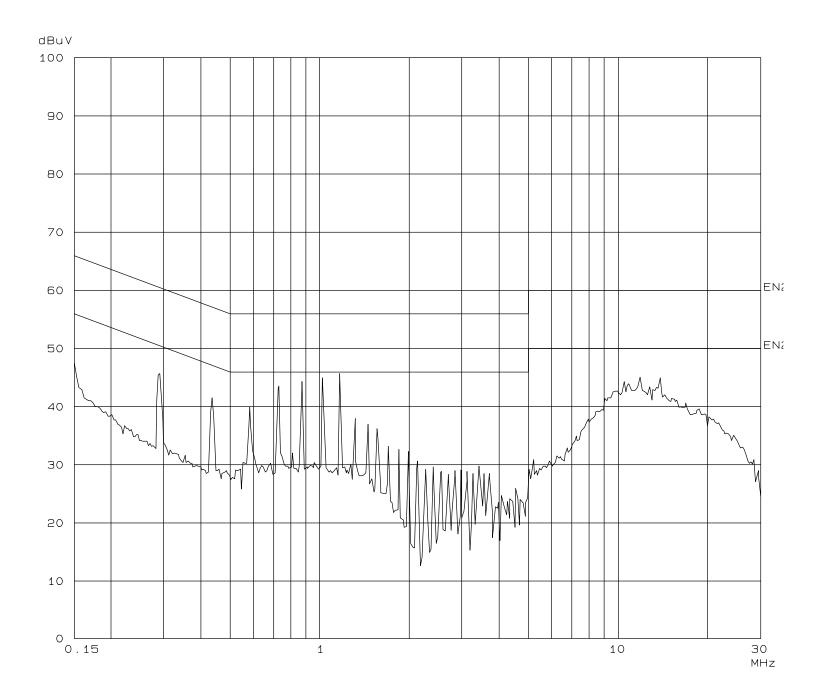
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 120V / 60Hz Run No.1 120V Neutral



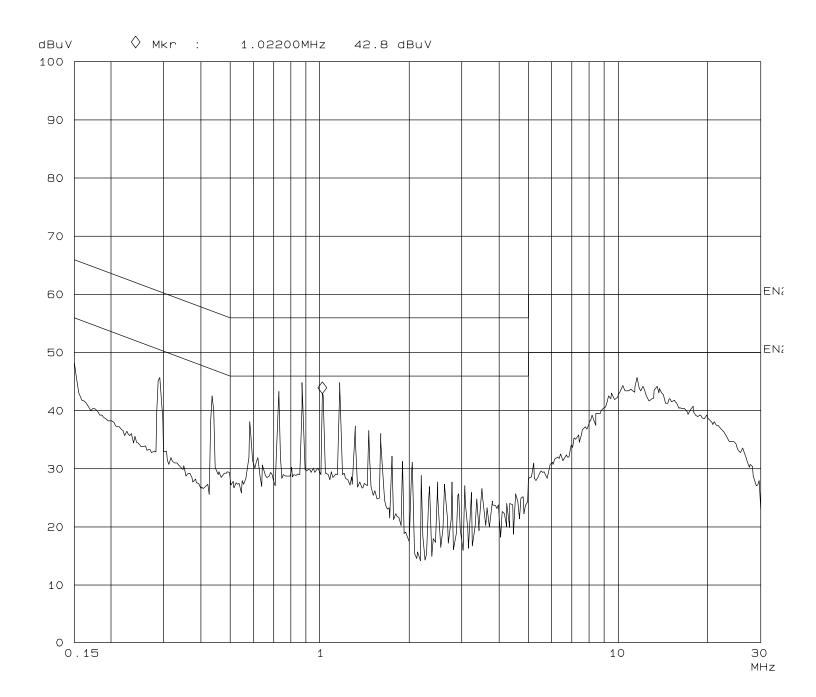
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 120V / 60Hz Run No.1 120V Line



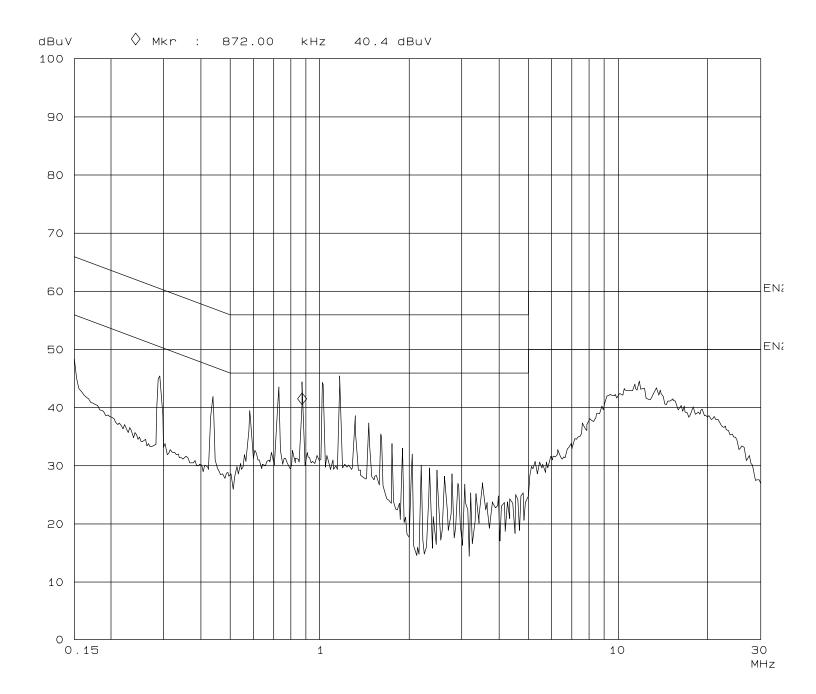
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

LHF Test, 120V / 60Hz Run No.2 120V Neutral



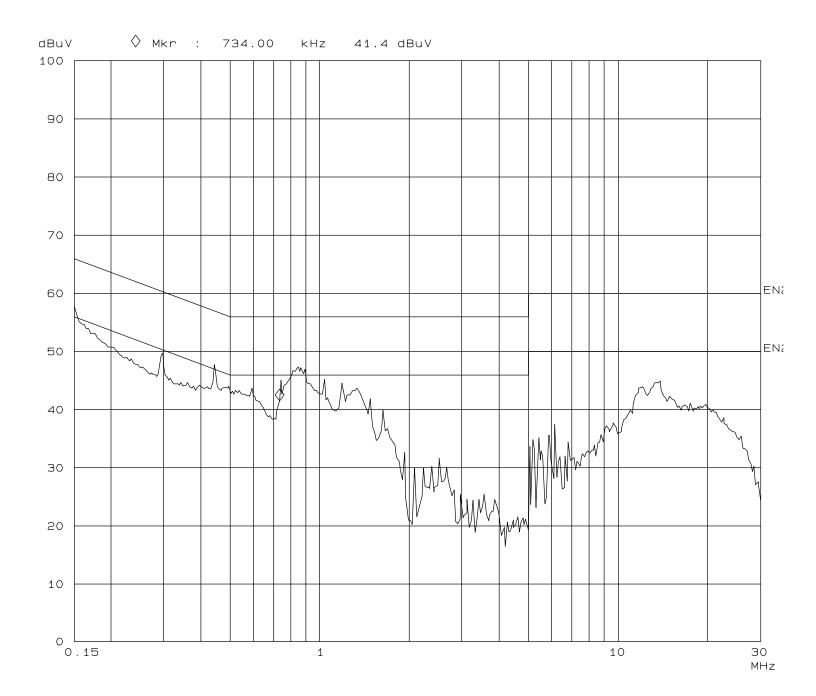
Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

LHF Test, 120V / 60Hz Run No.2 120V Line



Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 230V / 50Hz Run No.3 230V Neutral



Operator:	Yu-Chien Ho
Comment:	Savi
	SMR-650-110-111
	J53657 / T53670

UHF Test, 230V / 50Hz Run No.3 230V Line

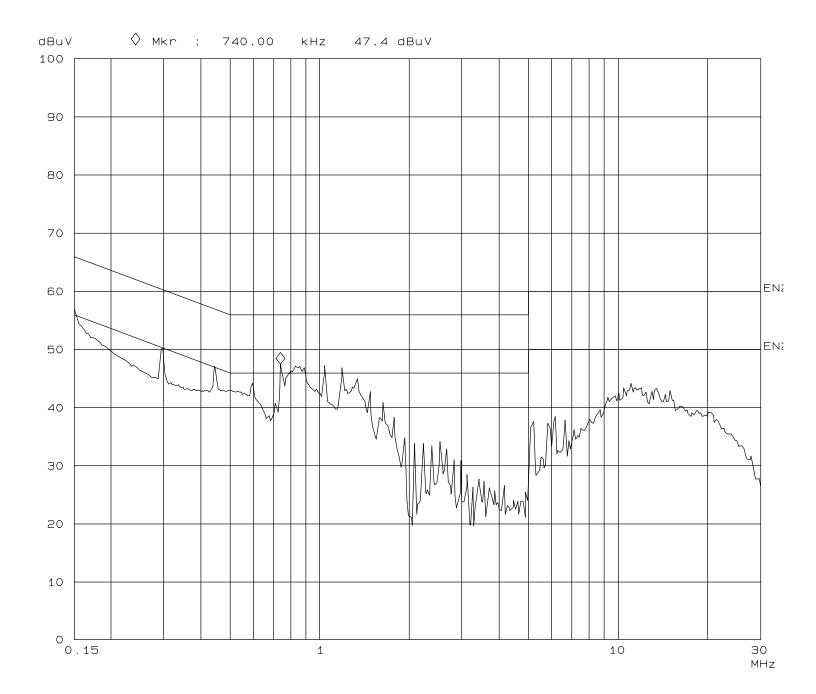


EXHIBIT 3: Test Configuration Photographs

EXHIBIT 4: Label and Label Locattion

EXHIBIT 5: Detailed Photographs of Savi Technology, Inc. Model SMR-650P-110 and SMR-650P-111 Construction

EXHIBIT 6: Block Diagram of Savi Technology, Inc. Model SMR-650P-110 and SMR-650P-111

EXHIBIT 7: Schematic Diagrams of Savi Technology, Inc. Model SMR-650P-110 and SMR-650P-111

EXHIBIT 8: Theory of Operation for Savi Technology, Inc. Model SMR-650P-110 and SMR-650P-111

EXHIBIT 9: Advertising Literature

EXHIBIT 10: Operator's Manual