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Electromagnetic Emissions Test Report and Application for Grant of Equipment Authorization pursuant to FCC Part 15, Subpart C Specifications for an Intentional Radiator and FCC Part 15, Subpart B Specifications for a Receiver on the Savi Technology, Inc. Models: 644 and 645 Tags

> FCC ID: KL7-640T-V1 GRANTEE: Savi Technology, Inc. 615 Tasman Drive Sunnyvale, CA. 94089-1707 TEST SITE: Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086

REPORT DATE: September 26, 2002

FINAL TEST DATE: June 18 - June 20, September 4, 2002

Mark Brig

AUTHORIZED SIGNATORY:

Mark Briggs Director of Engineering

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SCOPE

An electromagnetic emissions test has been performed on the Savi Technology, Inc. models 645 and 646 Tags pursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and Subpart B of Part 15 of FCC Rules for receivers. 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 transceiver above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

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

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

The test results recorded herein are based on single type tests of the Savi Technology, Inc. models 645 and 646 Tags and therefore apply only to the tested samples. The samples were selected and prepared by Eugene Schlindwein of Savi Technology, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subparts B and C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators and receivers. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

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.

STATEMENT OF COMPLIANCE

The tested samples of Savi Technology, Inc. models 645 and 646 Tags complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators and the requirements of Subpart B of Part 15 of the FCC Rules for receivers operating between 30 MHz and 960 MHz.

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.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Savi Technology, Inc. models ST-644 and ST-645 Tags. The actual test results are contained in an exhibit of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The limits detailed in FCC Rules Part 15 Section 15.207 for the conducted interference voltage on AC power leads do not apply to the 640 series of tags as they are powered from internal batteries and cannot be powered, directly or indirectly, from the AC mains.

LIMITS OF RADIATED FIELD STRENGTH - RECEIVER

The EUT tested complied with the limits detailed in FCC Rules Part 15 FCC Rules Part 15 Section 15.109(a) for a receiver.

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

50 - 500 WHZ, RECEIVE WIDDE LO @ $+55.72$ WHZ, $51-0++$														
Frequency	Level	Pol	Class B		Class B		Class B		Class B		Class B Detector		Height	Comments
MHz	dBuV/m	v/h	Limit Margin		Pk/QP/Avg	Degrees	Meters							
867.618	44.1	h	46.0	-1.9	QP	60	1.0	EUT Upright						

30 - 900 MHz, Receive Mode LO @433.72 MHz, ST-644

30 – 900 MHz, Receive Mode LO @433.72 MHz, ST-645										
Frequency	Level	Pol			Class B Detector		Detector	Azimuth	Height	Comments
MHz	dBuV/m	v/h			Pk/QP/Avg	Degrees	Meters			
867.560	41.8	h	46.0	-4.2	QP	75	1.0	EUT on its side		

BANDWIDTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.231(c). The 20dB bandwidth was 455kHz.

DUTY CYCLE CALCULATION

The maximum duty cycle permitted for all signals is 10% (refer to the Theory of Operations for details) when measured over any 100mS period. This corresponds to a minimum average duty cycle correction factor of -20 dB to be applied to peak readings to calculate the average level of the signal.

PERIOD OF OPERATION

All transmissions consist of a pulse train of 10ms pulses, 1 pulse every 100ms (duty cycle = 10%). The pulse train transmission lasts for less than 1 second and there is a silent period of the longer of 30 times the transmission period or 10 seconds between successive transmissions, thereby meeting the timing requirements of 15.231(e). Refer to the Theory of Operations for more details. Timing plots are attached to the test data.

LIMITS OF RADIATED FIELD STRENGTH -INTENTIONAL RADIATOR

The EUT tested complied with the radiated field strength limits detailed in FCC Rules Part 15 Section 15.231(e) and 15.209 in the case of emissions falling within the frequency bands specified in Section 15.205.

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an exhibit of this report.

30–4500 MHz, ST-644										
Frequency	Level	Pol	15.2	31(e)	Detector	Azimuth	Height			
MHz	dBuV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	Comments		
433.878	91.6	V	92.9	-1.3	Pk	130	1.3	EUT upright		

92.9

	30 – 4500 MHz, ST-645								
Frequency	Level	Pol	15.2	231(e)	Detector	Azimuth	Height		
MHz	dBuV/m	v/h	I imit	Margin	Pk/OP/Avo	degrees	meters	Comments	

Pk

79

1.1

-1.2

433.878

91.7

V

EUT upright

MEASUREMENT UNCERTAINTIES

ISO Guide 25 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	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Savi Technology, Inc.640 series of RFID Tagging devices are designed to identify the container to which they are attached when used as a part of the Savi Control System. There are three models that make up the 640 series – ST- 644, ST-645 and ST-646.

All three use the same rf circuitry on PCB CCA 810-02900-00, but they use different stuffing options to enable auxiliary functions. These stuffing options do not affect the rf circuitry. The ST-644 does not use any options. The ST-645 and ST-646 use stuffing options to connect to a small daughter card that connects to a sensor. The magnetic coil sensor for the ST-645 detects if a bolt has been removed to trigger an alarm transmission. The ST-646 uses an optical sensor is used to detect if a cable is cut.

All of the 640 series use Lithium cell batteries for power (the ST-645 uses two cells, the others only one).

Only models ST-644 and ST-645 were submitted for testing. The model ST-646 sensor is not yet available. It is anticipated that data for the ST-646 would be submitted at a later data to file for a Permissive Change to the FCC ID KL7-640T-V1.

Normally, the EUT would be mounted to a container or similar piece of equipment. The EUT was treated as tabletop equipment during testing to simulate the end user environment.

The ST-644 sample was received on June 18, 2002 and tested on June 18, June 19 and June 20, 2002. This sample had the components for the ST-644 and ST-645 installed in all of the stuffing options but did not have the sensor attached. The ST-645 sample was received and tested on September 4, 2002.

The EUTs tested consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Savi Technology, Inc. 644 Tag	644005
Savi Technology, Inc. 645 Tag	none

ENCLOSURE

The EUT enclosure is primarily constructed of Injection molded ABS plastic. It measures approximately 15.7cm long by 4.3cm wide by 3cm high.

SUPPORT EQUIPMENT

No support equipment was used during emissions testing.

EXTERNAL I/O CABLING

The 640 series of tags do not have interface ports that would connect to external cables.

EUT OPERATION

The EUT was either set to transmit continuously or to receive-only during testing.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on June 18, June 19 and June 20, 2002 at the Elliott Laboratories Open Area Test Site #2 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC 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 FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through 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 Range (MHz)	Limit (uV)	Limit (dBuV)
0.450 to 30.000	250	48

FUNDAMENTAL AND HARMONIC LIMITS 15.231 (b)

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)

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

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands.

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

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RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.109(a) (RECEIVER)

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

$$R_r - B = C$$

and

$$\mathbf{C} - \mathbf{S} = \mathbf{M}$$

where:

 $R_r =$ Receiver Reading in dBuV

- B = Broadband Correction Factor*
- C = Corrected Reading in dBuV
- S = Specification Limit in dBuV
- M = Margin to Specification in +/- dB
- * Broadband Level Per ANSI C63.4, 13 dB may be subtracted from the quasi-peak level if it is determined that the emission is broadband in nature. If the signal level in the average mode is six dB or more below the signal level in the peak mode, the emission is classified as broadband.

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, 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

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:

EXHIBIT 1: Test Equipment Calibration Data

Radiated Emissions, 30 - 4000 MHz, 18-Jun-02 Engineer: Marissa

Engineer: Marissa						
Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	12	5/13/2002	5/13/2003
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	12	8/28/2001	8/28/2002
Rohde & Schwarz	Test Receiver, 0.009-2000 MHz	ESN	1332	12	4/16/2002	4/16/2003
	s, 30MHz - 6.5 GHz, 21-Jun-02					
Engineer: Vishal		•• • • •	•			
Manufacturer	Description	Model #	Assett #		Last Calibrated	Cal Due
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	12	1/4/2002	1/4/2003
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	1242	12	10/9/2001	10/9/2002
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1347	12	10/16/2001	10/16/2002
Filtek	High Pass Filter, 1GHz	HP12/1000-5BA	955	12	3/12/2002	3/12/2003
Hewlett Packard	EMC Spectrum Analyzer, Opt. 026 9 KHz -26.5GHz	8593EM	1141	12	3/11/2002	3/11/2003
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12	1/15/2002	1/15/2003
Rohde & Schwarz	Test Receiver, 9kHz-2750MHz	ESCS 30 EMI	1337	12	12/26/2001	12/26/2002
	s, 30 - 4400MHz, 04-Sep-02					
Engineer: Chris <u>Manufacturer</u>	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	773	12	3/5/2002	3/5/2003
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	786	12	3/2/2002	3/2/2003
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1321	12	4/23/2002	4/23/2003
Rohde & Schwarz	Test Receiver, 20-1300 MHz	ESVP	1317	12	5/3/2002	5/3/2003
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	12	2/11/2002	2/11/2003
Filtek	High Pass Filter, 1GHz	HP12/1000-5BA	956	12	3/12/2002	3/12/2003
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12	1/15/2002	1/15/2003

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T4762212 PagesTiming Verification1 PageBandwidth and timing plots4 Pages

Elliott EMC Test Data Job Number: J47363 Client: Savi Technology, Inc. Model: 644, 645 and 646 Tags T-Log Number: T47622 Proj Eng: Mark Briggs Contact: Eugene Schlindwein Emissions Spec: FCC 15.231(e) Class: -Immunity Spec: -Environment: -**EMC Test Data** For The Savi Technology, Inc. Model 644, 645 and 646 Tags

Elliott EMC Test Data Client: Savi Technology, Inc. Job Number: J47363 Model: 644, 645 and 646 Tags T-Log Number: T47622 Proj Eng: Mark Briggs Contact: Eugene Schlindwein Emissions Spec: FCC 15.231(e) Class: Immunity Spec: -Environment: -EUT INFORMATION **General Description** The 640 series of devices are RF Tagging devices designed to identify the container to which it is attached. Normally, the EUT would be mounted to a container or similar piece of equipment. The EUT was treated as table-top equipment during testing to simulate the end user environment. Equipment Under Test Model Description Serial Number FCC ID Manufacturer Savi Technology, Inc. ST-645-02 See individual tests KL7-640T-V1 Tag **Other EUT Details** The 640 series of Tags consists of the following models: **EUT Enclosure** The EUT enclosure is primarily constructed of Injection molded ABS plastic. It measures approximately 15.7cm long by 4.3cm wide by 3cm high. Modification History Mod. # Test Date Modification 1

Elliot	t		EM	C Test Data		
Client:	Savi Technology, Inc.		Job Number:	J47363		
Model:	644, 645 and 646 Tags		T-Log Number:	T47622		
	-		Proj Eng: Mark Briggs			
Contact:	Eugene Schlindwein					
Emissions Spec:	FCC 15.231(e)		Class:	-		
Immunity Spec:	-		Environment:	-		
Manufacturer		cal Support Equipme		FCC ID		
None	IVIOUEI	Description	Senai Number	FUUID		
		note Support Equipn				
Manufacturer	Model	Description	Serial Number	FCC ID		
None						
		Interface Ports				
			Cable(s)			
Port	Connected To	Description	Shielded or Unshield	ded Length(m)		
None						

EUT Operation During Emissions

The EUT was either set to transmit or standby mode during testing. In transmit mode the device was operating continuously. Correction factors were applied to all peak readings signals related to the transmit signal to calculate the average value of the signal based on a 10% duty cycle as detailed in the Theory of Operations. The Theory of Operations also includes plots showing the duty cycle of the system.

Client: Savi Teo	ott			lob Number:	1/17363	
Model: 644, 645				.og Number:		
				0	Mark Briggs	
Contact: Eugene	Schlindwein			, , ,		
Spec: FCC 15.	231(e)			Class:	-	
	Padi	ated Emissio	ne			
est Specifics	Naun		/15			
Objective	: The objective of this test session specification listed above.	is to perform final qual	ification testi	ng of the 645	5 Tag with resp	pect to t
Date of Test		Config. Used				
•	Chris Byleckie	Config Change		Horias		
Test Location	: SVOATS #2	EUT Voltage	e: internal ba	tteries		
General Test Co	onfiguration					
	ited on the turntable for radiated er	missions testing				
	measurement antenna was locate		IT			
		s were maximized by a	nientation of	the FLIT and	d elevation of t	h⊖
Note, preliminary	testing indicates that the emission	-				
Note, preliminary measurement ante	r testing indicates that the emission enna. Maximized testing indicated	that the emissions we	re maximize			
Note, preliminary measurement ante of the measurement	r testing indicates that the emission enna. Maximized testing indicated int antenna, <u>and</u> manipulation of th	that the emissions we e EUT's interface cable	ere maximize es.	d by orientat	ion of the EUT	, elevat
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433.878		V	72.9	-1.2	Avg	79	1.1	EUT upright
433.878		H	92.9	-1.2	Pk	272	1.1	EUT upright
433.878	59.2	H	72.9	-13.7	Avg	272	1.0	EUT upright
433.878	83.4	V	92.9	-9.5	Pk	122	1.0	EUT on its side
433.878	63.4	V	72.9	-9.5	Avg	122	1.0	EUT on its side
433.878	87.4	H	92.9	-5.5	Pk	251	1.0	EUT on its side
433.878		H	72.9	-5.5	Avg	251	1.0	EUT on its side
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433.878 433.878 433.878 433.878 Note 1: un #2: Ra purious Si requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	66.0 88.9 68.9 All average correction adiated En ignals, teste Level dBμV/m 59.9 39.9 49.6 29.6 53.6 33.6 55.2 35.2 35.2 62.1	V H H e measu factor is ed at 3m Pol V/h V V H H V V V H H V V V H H V V	72.9 92.9 72.9 rements cal based on a 5, 30 - 4400 15.2: Limit 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9	-6.9 -4.0 -4.0 culated fro duty cycle MHz: Tran 31(e) Margin -13.0 -23.3 -23.3 -23.3 -19.3 -19.3 -19.3 -17.7 -17.7 -10.8	Avg Pk Avg m the peak m of less than msmit Mode Detector Pk/QP/Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk	92 85 85 neasurements 10% in any 1 (433.92 MHz (433.92 MHz (433.92 MHz Azimuth degrees 0 0 128 128 303 303 41 41 41 71	1.1 1.0 1.0 5 using an a 00mS perio 0 - 10mS Si Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat EUT flat average correction factor of 20dB. The d. ignal Comments EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT on its side
433.878 433.878 433.878 433.878 Note 1: un #2: Ra purious Si requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	66.0 88.9 68.9 All average correction adiated En ignals, teste Level dBμV/m 59.9 39.9 49.6 29.6 53.6 33.6 55.2 35.2 62.1 32.1	V H H factor is nissions ed at 3m Pol V/h V V H H H V V V H H H V V V V H H V V V V V V V V V V V V V V V	72.9 92.9 72.9 rements cal based on a 5, 30 - 4400 15.2: Limit 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9	-6.9 -4.0 -4.0 culated fro duty cycle MHz: Trai 31(e) Margin -13.0 -13.0 -23.3 -23.3 -23.3 -19.3 -19.3 -17.7 -17.7 -10.8 -20.8	Avg Pk Avg m the peak m of less than nsmit Mode Detector Pk/QP/Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	92 85 85 heasurements 10% in any 1 (433.92 MHz (433.92 MHz Azimuth degrees 0 0 128 128 303 303 41 41 71 71 71	1.1 1.0 1.0 5 using an a 00mS perio) - 10mS Si Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat EUT flat EUT flat average correction factor of 20dB. The d. ignal Comments EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT flat EUT flat
433.878 433.878 433.878 433.878 Note 1: 2un #2: R purious Si requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	66.0 88.9 68.9 68.9 All average correction 68.9 adiated Englishing tester 1000000000000000000000000000000000000	V H H e measu factor is nissions ed at 3m Pol V/h V V V H H H V V V H H V V V H H H V V V H H	72.9 92.9 72.9 rements cal based on a 5, 30 - 4400 15.2 Limit 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9	-6.9 -4.0 -4.0 culated froi duty cycle MHz: Trai 31(e) Margin -13.0 -13.0 -23.3 -23.3 -19.3 -19.3 -19.3 -19.3 -17.7 -17.7 -10.8 -20.8 -13.9	Avg Pk Avg m the peak m of less than memory fless than Detector Pk/QP/Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk	92 85 85 heasurements 10% in any 1 (433.92 MHz (433.92 MHz Azimuth degrees 0 0 128 128 303 303 41 41 71 71 63	1.1 1.0 1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat EUT flat EUT flat average correction factor of 20dB. The d. ignal Comments EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT flat EUT flat
433.878 433.878 433.878 433.878 433.878 Note 1: un #2: R purious Si requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	66.0 88.9 68.9 All average correction adiated En ignals, testo Level dBμV/m 59.9 39.9 49.6 29.6 53.6 33.6 55.2 35.2 62.1 32.1 59.0 39.0	V H H e measu factor is nissions ed at 3m Pol V/h V V V H H H V V V H H H V V V H H H H	72.9 92.9 72.9 rements cal based on a 5, 30 - 4400 15.2 Limit 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9	-6.9 -4.0 -4.0 culated froi duty cycle MHz: Tran 31(e) Margin -13.0 -13.0 -23.3 -23.3 -19.3 -19.3 -19.3 -19.3 -17.7 -17.7 -10.8 -20.8 -13.9 -13.9	Avg Pk Avg m the peak m of less than memory fless than nesmit Mode Detector Pk/QP/Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	92 85 85 heasurements 10% in any 1 (433.92 MHz (433.92 MHz Azimuth degrees 0 0 128 128 128 303 303 41 41 71 63 63	1.1 1.0 1.0 1.0 5 using an a 00mS perio 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat EUT flat EUT flat average correction factor of 20dB. The d. ignal Comments EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT flat EUT flat EUT flat
433.878 433.878 433.878 433.878 Note 1: 2un #2: R purious Si requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	66.0 88.9 68.9 68.9 All average correction 68.9 adiated Englishing tester 1000000000000000000000000000000000000	V H H e measu factor is nissions ed at 3m Pol V/h V V V H H H V V V H H V V V H H H V V V H H	72.9 92.9 72.9 rements cal based on a 5, 30 - 4400 15.2 Limit 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9	-6.9 -4.0 -4.0 culated froi duty cycle MHz: Trai 31(e) Margin -13.0 -13.0 -23.3 -23.3 -19.3 -19.3 -19.3 -19.3 -17.7 -17.7 -10.8 -20.8 -13.9	Avg Pk Avg m the peak m of less than memory fless than Detector Pk/QP/Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk	92 85 85 heasurements 10% in any 1 (433.92 MHz (433.92 MHz Azimuth degrees 0 0 128 128 303 303 41 41 71 71 63	1.1 1.0 1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat EUT flat EUT flat average correction factor of 20dB. Th d. ignal Comments EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT flat EUT flat

6	Ellic	ott						EMC Test Data
	Savi Tech		nc.					Job Number: J47363
Model:	644, 645 a	and 646	Tags				T-l	₋og Number: T47622
	·		5					Proj Eng: Mark Briggs
Contact:	Eugene S	chlindwe	in					
Spec:	FCC 15.23	31(e)						Class: -
continue	ed from pr	evious p	bage					
requency	Level	Pol	15.2	31(e)	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1735.600	31.2	V	54.0	-22.8	Avg	0	1.0	EUT flat
2169.500	48.9	V	74.0	-25.1	Pk	181	1.0	EUT flat
2169.500	28.9	V	54.0	-25.1	Avg	181	1.0	EUT flat
2603.400	44.3	V	74.0	-29.7	Pk	0	1.0	EUT flat
2603.400	24.3	V	54.0	-29.7	Avg	0	1.0	EUT flat
3037.300	47.0	V	74.0	-27.0	Pk	0	1.0	EUT flat
3037.300	27.0	V	54.0	-27.0	Avg	0	1.0	EUT flat
3471.200	46.2	V	74.0	-27.8	Pk	0	1.0	EUT flat
3471.200	26.2	V	54.0	-27.8	Avg	0	1.0	EUT flat
3905.100	48.1	V	74.0	-25.9	Pk	0	1.0	EUT flat
3905.100	28.1	V	54.0	-25.9	Avg	0	1.0	EUT flat
4339.000	48.8	V	74.0	-25.2	Pk	0	1.0	EUT flat
4339.000	28.8	V	54.0	-25.2	Avg	0	1.0	EUT flat
1301.700	43.1	Н	74.0	-30.9	Pk	51	1.6	EUT flat
1301.700	23.1	Н	54.0	-30.9	Avg	51	1.6	EUT flat
1735.600	48.2	Н	74.0	-25.8	Pk	174	1.4	EUT flat
1735.600	28.2	Н	54.0	-25.8	Avg	174	1.4	EUT flat
2169.500	46.4	Н	74.0	-27.6	Pk	134	1.0	EUT flat
2169.500	26.4	Н	54.0	-27.6	Avg	134	1.0	EUT flat
2603.400	44.4	Н	74.0	-29.6	Pk	0	1.0	EUT flat
2603.400	24.4	Н	54.0	-29.6	Avg	0	1.0	EUT flat
3037.300	45.8	Н	74.0	-28.2	Pk	0	1.0	EUT flat
3037.300	25.8	Н	54.0	-28.2	Avg	0	1.0	EUT flat
3471.200	46.3	Н	74.0	-27.7	Pk	0	1.0	EUT flat
3471.200	26.3	Н	54.0	-27.7	Avg	0	1.0	EUT flat
3905.100	47.5	Н	74.0	-26.5	Pk	0	1.0	EUT flat
3905.100	27.5	H	54.0	-26.5	Avg	0	1.0	EUT flat
4339.000	48.0	H	74.0	-26.0	Pk	0	1.0	EUT flat
4339.000	28.0	H	54.0	-26.0	Avg	0	1.0	EUT flat
1301.700	45.8	<u>V</u>	74.0	-28.2	Pk	271	1.0	EUT Upright
1301.700	25.8	V	54.0	-28.2	Avg	271	1.0	EUT Upright
1735.600	52.5	V	74.0	-21.6	Pk	290	1.0	EUT Upright
1735.600	32.5	V	54.0	-21.6	Avg	290	1.0	EUT Upright
2169.500	48.9	V	74.0	-25.1	Pk	80	1.5	EUT Upright
2169.500	28.9	V	54.0	-25.1	Avg	80	1.5	EUT Upright
2603.400	47.7	V	74.0	-26.3	Pk	0	1.0	EUT Upright
2603.400	27.7	V	54.0	-26.3	Avg	0	1.0	EUT Upright
3037.300	44.7	V	74.0	-29.3	Pk	0	1.0	EUT Upright
3037.300	24.7	V	54.0	-29.3	Avg	0	1.0	EUT Upright continued on following page

	Ellic							EMC Test Dat
Client:	Savi Tech	nology, l	nc.					Job Number: J47363
Model:	644, 645 a	and 646	Tags				T-l	₋og Number: T47622
			-					Proj Eng: Mark Briggs
Contact:	Eugene S	chlindwe	ein					
Spec:	FCC 15.23	31(e)						Class: -
continue	ed from pr	evious p	oage					
requency	Level	Pol	15.2	31(e)	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3471.200	47.0	V	74.0	-27.0	Pk	0	1.0	EUT Upright
3471.200	27.0	۷	54.0	-27.0	Avg	0	1.0	EUT Upright
3905.100	48.1	V	74.0	-25.9	Pk	0	1.0	EUT Upright
3905.100	28.1	V	54.0	-25.9	Avg	0	1.0	EUT Upright
4339.000	48.6	V	74.0	-25.4	Pk	0	1.0	EUT Upright
4339.000	28.6	V	54.0	-25.4	Avg	0	1.0	EUT Upright
1301.700	44.0	Н	74.0	-30.0	Pk	237	1.4	EUT Upright
1301.700	24.0	Н	54.0	-30.0	Avg	237	1.4	EUT Upright
1735.600	51.4	Н	74.0	-22.6	Pk	287	1.0	EUT Upright
1735.600	31.4	Н	54.0	-22.6	Avg	287	1.0	EUT Upright
2169.500	51.6	Н	74.0	-22.4	Pk	317	1.7	EUT Upright
2169.500	31.6	Н	54.0	-22.4	Avg	317	1.7	EUT Upright
2603.400	48.7	Н	74.0	-25.3	Pk	0	1.0	EUT Upright
2603.400	25.7	Н	54.0	-28.3	Avg	0	1.0	EUT Upright
3037.300	45.2	Н	74.0	-28.8	Pk	0	1.0	EUT Upright
3037.300	25.2	Н	54.0	-28.8	Avg	0	1.0	EUT Upright
3471.200	47.6	Н	74.0	-26.4	Pk	0	1.0	EUT Upright
3471.200	27.6	Н	54.0	-26.4	Avg	0	1.0	EUT Upright
3905.100	47.7	Н	74.0	-26.3	Pk	0	1.0	EUT Upright
3905.100	27.7	Н	54.0	-26.3	Avg	0	1.0	EUT Upright
4339.000	48.8	Η	74.0	-25.2	Pk	0	1.0	EUT Upright
4339.000	28.8	Н	54.0	-25.2	Avg	0	1.0	EUT Upright
1301.700	45.5	V	74.0	-28.5	Pk	334	1.0	EUT on its side
1301.700	25.5	V	54.0	-28.5	Avg	334	1.0	EUT on its side
1735.600	51.6	V	74.0	-22.4	Pk	255	1.0	EUT on its side
1735.600	31.6	V	54.0	-22.4	Avg	255	1.0	EUT on its side
2169.500	50.9	<u>V</u>	74.0	-23.1	Pk	338	1.0	EUT on its side
2169.500	30.9	V	54.0	-23.1	Avg	338	1.0	EUT on its side
2603.400	43.4	<u>V</u>	74.0	-30.6	Pk	0	1.0	EUT on its side
2603.400	23.4	<u>V</u>	54.0	-30.6	Avg	0	1.0	EUT on its side
3037.300	45.8	<u>V</u>	74.0	-28.2	Pk	0	1.0	EUT on its side
3037.300	25.8	<u>V</u>	54.0	-28.2	Avg	0	1.0	EUT on its side
3471.200	47.6	<u>V</u>	74.0	-26.4	Pk	0	1.0	EUT on its side
3471.200	27.6	<u>V</u>	54.0	-26.4	Avg	0	1.0	EUT on its side
3905.100	48.8	V	74.0	-25.2	Pk	0	1.0	EUT on its side
3905.100	28.4	<u>V</u>	54.0	-25.6	Avg	0	1.0	EUT on its side
4339.000	49.1	<u>V</u>	74.0	-24.9	Pk	0	1.0	EUT on its side
4339.000	29.1	<u>V</u>	54.0	-24.9	Avg	0	1.0	EUT on its side
1301.700	43.3	Н	74.0	-30.8	Pk	81	1.0	EUT on its side continued on following page

Y I	Ellic	ott						EMC Test Data
	Savi Tech		nc.				~	Job Number: J47363
Model:	644, 645 a	and 646	Tags				T-L	og Number: T47622
			U U					Proj Eng: Mark Briggs
Contact:	Eugene S	chlindwe	in					
	FCC 15.23							Class: -
	ed from pr	. /	aae					
Frequency	Level	Pol		31(e)	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1301.700	23.3	Н	54.0	-30.7	Avg	81	1.0	EUT on its side
1735.600	48.2	Н	74.0	-25.8	Pk	192	1.0	EUT on its side
1735.600	28.2	Н	54.0	-25.8	Avg	192	1.0	EUT on its side
2169.500	47.4	Н	74.0	-26.6	Pk	117	1.0	EUT on its side
2169.500	27.4	Н	54.0	-26.6	Avg	117	1.0	EUT on its side
2603.400	45.8	Н	74.0	-28.2	Pk	0	1.0	EUT on its side
2603.400	25.8	Н	54.0	-28.2	Avg	0	1.0	EUT on its side
3037.300	45.2	Н	74.0	-28.8	Pk	0	1.0	EUT on its side
3037.300	25.2	Н	54.0	-28.8	Avg	0	1.0	EUT on its side
3471.200	46.5	Н	74.0	-27.5	Pk	0	1.0	EUT on its side
3471.200	26.5	Н	54.0	-27.5	Avg	0	1.0	EUT on its side
3905.100	47.4	Н	74.0	-26.6	Pk	0	1.0	EUT on its side
3905.100	27.4	Н	54.0	-26.6	Avg	0	1.0	EUT on its side
4339.000	50.1	Н	74.0	-23.9	Pk	0	1.0	EUT on its side
4339.000	30.1	Η	54.0	-23.9	Avg	0	1.0	EUT on its side
Note 1:	All averag correction	e measu factor is	rements cal based on a	culated fror duty cycle	n the peak m of less than	-	s using an a 00mS perio	average correction factor of 20dB. The
Note 1: Run #3: Ra Tested at 3	All averag correction adiated Er m	e measu factor is nissions	rements cal based on a s, 30 - 900 N	Iculated from duty cycle MHz: Rece	n the peak m of less than ive Mode (L	neasurements 10% in any 1 0 @ 433.78	s using an a 00mS perio MHz)	average correction factor of 20dB. The
Note 1: Run #3: Ra Tested at 3 Frequency	All averag correction adiated Er m Level	e measu factor is nissions Pol	rements cal based on a s, 30 - 900 M 15.2	Iculated fror duty cycle MHz: Rece 09(a)	n the peak m of less than ive Mode (L Detector	neasurements 10% in any 1 0 @ 433.78 Azimuth	s using an a 00mS perio MHz) Height	average correction factor of 20dB. The
Note 1: Run #3: Ra Tested at 3 Frequency MHz	All averag correction adiated Er m Level dBµV/m	e measu factor is nissions Pol v/h	rements cal based on a s, 30 - 900 N 15.2 Limit	iculated fror duty cycle MHz: Rece 09(a) Margin	n the peak m of less than ive Mode (L Detector Pk/QP/Avg	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees	s using an a 00mS perio MHz) Height meters	average correction factor of 20dB. The d. Comments
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560	All averag correction adiated Er m Level dBµV/m 41.8	e measu factor is nissions Pol v/h h	rements cal based on a s, 30 - 900 N 15.2 Limit 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75	s using an a 00mS perio MHz) Height meters 1.0	everage correction factor of 20dB. The d. Comments EUT on its side
Note 1: Run #3: R : Tested at 3 Frequency MHz 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5	e measu factor is nissions Pol v/h h h	rements cal based on a s, 30 - 900 N <u>15.2</u> Limit 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237	s using an a 00mS perio MHz) Height meters 1.0 1.0	Comments EUT on its side EUT on its side
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0	e measu factor is nissions Pol v/h h h v	rements cal based on a s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0	Comments EUT on its side EUT on its side EUT on its side
Note 1: Run #3: R : Tested at 3 Frequency MHz 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5	e measu factor is nissions Pol v/h h h	rements cal based on a s, 30 - 900 N <u>15.2</u> Limit 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237	s using an a 00mS perio MHz) Height meters 1.0 1.0	Comments EUT on its side EUT on its side
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4	e measu factor is nissions Pol v/h h h v v	rements cal based on a s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0	Culated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0	Average correction factor of 20dB. The d. Comments EUT on its side EUT on its side EUT on its side EUT on its side EUT on its side
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 867.560	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 38.9	e measu factor is nissions Pol V/h h h v v v v	rements cal based on a s, 30 - 900 N <u>15.2</u> Limit 46.0 46.0 46.0 46.0 46.0	Culated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0 1.0	Comments EUT on its side EUT on its side
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 38.9 37.8	e measu factor is nissions Pol v/h h h v v v v	rements cal based on a s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247	s using an a 00mS perio MHz) Height neters 1.0 1.0 1.0 1.0 1.0 1.0 1.0	Comments EUT on its side EUT flat
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 867.560 867.560	All averag correction adiated Er m Level dBμV/m 41.8 37.5 32.0 30.4 38.9 37.8 34.7	e measu factor is nissions Pol v/h h h v v v v h h	rements cal based on a s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2 -11.3	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247 139	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	Comments EUT on its side EUT flat EUT flat EUT flat
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 38.9 37.8	e measu factor is nissions Pol v/h h h v v v v	rements cal based on a s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247	s using an a 00mS perio MHz) Height neters 1.0 1.0 1.0 1.0 1.0 1.0 1.0	Comments EUT on its side EUT flat
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 433.780 867.560 433.780 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 33.9 33.4 33.7 31.3	e measu factor is nissions Pol v/h h h v v v h h h v v	rements cal based on a s, 30 - 900 N <u>15.2</u> Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Culated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2 -11.3 -14.7	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247 139 286	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1	Comments EUT on its side EUT flat EUT flat EUT flat EUT flat
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 433.780 867.560 433.780 867.560 433.780 867.560	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 38.9 37.8 34.7 31.3 38.5	e measu factor is nissions Pol v/h h v v v v v h h v v	rements cal based on a 5, 30 - 900 N <u>15.20</u> Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Culated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2 -11.3 -14.7 -7.5	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247 139 286 305	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.0	Comments EUT on its side EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat
Note 1: Run #3: R Tested at 3 Frequency MHz 867.560 433.780 867.560 433.780 867.560 433.780 867.560 433.780	All averag correction adiated Er m Level dBµV/m 41.8 37.5 32.0 30.4 38.9 37.8 34.7 31.3 38.5 38.5 38.1	e measu factor is nissions Pol v/h h h v v v h h h v v	rements cal based on a s, 30 - 900 N <u>15.2</u> Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Culated fror duty cycle MHz: Rece 09(a) Margin -4.2 -8.5 -14.0 -15.6 -7.1 -8.2 -11.3 -14.7	n the peak m of less than ive Mode (L Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	neasurements 10% in any 1 0 @ 433.78 Azimuth degrees 75 237 110 317 53 247 139 286	s using an a 00mS perio MHz) Height meters 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1	Comments EUT on its side EUT flat EUT flat EUT flat EUT flat

Model: 644, 645	nnology, Inc.		J	ob Number:	J47363
	and 646 Tags		T-L	og Number:	T47622
				Proj Eng:	Mark Briggs
Contact: Eugene S					
Spec: FCC 15.2	.31(e)			Class:	-
	Radi	ated Emissio	ns		
est Specifics					
Objective:	The objective of this test session with respect to the specification I		fication testi	ng of the 644	l (with all option
Date of Test:		Config. Used:			
Test Engineer: Test Location:	Vishal Narayan	Config Change: EUT Voltage:		ttorios	
General Test Co		EUT vollage.		lienes	
Note, preliminary measurement ante of the measuremen Note, for testing ab peak reading of an	ove 1 GHz, the FCC specifies the y emission above 1 GHz, can not	ns were maximized by or d that the emissions wer e limit as an average me	rientation of re maximized asurement.	d by orientati In addition,	ion of the EUT,
mbient Conditi	ons:				
	Temperature: Rel. Humidity:	13°C 69%			
Summary of Res	sults				
ummary of Res Run #	Test Performed	Limit	Result	Ма	argin
		Limit FCC 15.231(e)	Result Pass		argin 433.878MHz
Run #	Test Performed			-1.3dB @ /	ě –
Run # 2	Test Performed RE, 433.92MHz fundamental RE, 433.92MHz Tx Mode,	FCC 15.231(e)	Pass	-1.3dB @ 4 -13.1dB @ -1.9	433.878MHz

	Ellic							EMC Test	
	Savi Tech							ob Number: J47363	
Model:	644, 645 a	and 646	Tags				T-L	og Number: T47622	
								Proj Eng: Mark Briggs	
Contact:	Eugene So	chlindwe	ein						
	FCC 15.23							Class: -	
			s. 30 - 4000	MHz: Tra	nsmit Mode ((433.92 MHz) - 10mS Si		
			sted, test di			(,	5	
	el =17Hex								
requency	Level	Pol	15.2	31(e)	Detector	Azimuth	Height	Comments	
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters		
433.878	91.6	V	92.9	-1.3	Pk	130	1.3	EUT upright	
433.878	71.6	V	72.9	-1.3	Avg	130	1.3	EUT upright	
433.878	85.7	Н	92.9	-7.2	Pk	90	1.0	EUT upright	
433.878	65.7	Н	72.9	-7.2	Avg	90	1.0	EUT upright	
433.878	81.0	٧	92.9	-11.9	Pk	90	1.3	EUT on its side	
433.878	61.0	٧	72.9	-11.9	Avg	90	1.3	EUT on its side	
433.878	90.0	Η	92.9	-2.9	Pk	60	1.0	EUT on its side	
433.878	70.0	Н	72.9	-2.9	Avg	60	1.0	EUT on its side	
433.878	81.9	V	92.9	-11.0	Pk	330	1.1	EUT flat	
122 070	(10	14	70.0						
433.878	61.9	V	72.9	-11.0	Avg	330	1.1	EUT flat	
433.878	61.9 90.5	V H	72.9 92.9	-11.0 -2.4	Avg Pk	330 180	1.1 1.0	EUT flat EUT flat	
433.878 433.878	90.5 70.5 All average	H H e measu	92.9 72.9 rements ca	-2.4 -2.4 culated from	Pk Avg	180 180 easurements	1.0 1.0 s using an a	EUT flat EUT flat verage correction factor of 2	20dB. T
433.878 433.878 Note 1:	90.5 70.5 All averag correction	H H e measu factor is	92.9 72.9 Irements ca based on a	-2.4 -2.4 Iculated froi duty cycle	Pk Avg m the peak m	180 180 heasurements 10% in any 19	1.0 1.0 s using an a 00mS perio	EUT flat EUT flat verage correction factor of 2 d.	20dB. 1
433.878 433.878 Note 1: un #2: Ra purious S	90.5 70.5 All averag correction adiated Er signals, te	H H factor is nissions	92.9 72.9 rrements ca based on a s, 30 - 4400 3m	-2.4 -2.4 Iculated from duty cycle MHz: Tran	Pk Avg m the peak m of less than 1 nsmit Mode (180 180 leasurements 10% in any 1 (433.92 MHz)	1.0 1.0 s using an a 00mS perio) - 10mS Si	EUT flat EUT flat verage correction factor of 2 d. gnal	20dB. T
433.878 433.878 Note 1: un #2: Ra purious S requency	90.5 70.5 All averag correction adiated Er Signals, te: Level	H H e measu factor is nissions sted at 3 Pol	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2	-2.4 -2.4 Iculated froi duty cycle MHz: Trai 31(e)	Pk Avg m the peak m of less than 1 nsmit Mode (Detector	180 180 heasurements 10% in any 1 (433.92 MHz Azimuth	1.0 1.0 s using an <i>a</i> 00mS perio) - 10mS Si Height	EUT flat EUT flat verage correction factor of 2 d.	20dB. 1
433.878 433.878 Note 1: un #2: Rapurious S requency MHz	90.5 70.5 All averag correction adiated Er signals, te Level dBµV/m	H H e measu factor is nissions sted at 3 Pol v/h	92.9 72.9 rrements ca based on a s, 30 - 4400 3m 15.2 Limit	-2.4 -2.4 Iculated froi duty cycle MHz: Trai 31(e) Margin	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg	180 180 heasurements 10% in any 1 (433.92 MHz Azimuth degrees	1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters	EUT flat EUT flat verage correction factor of 2 d. gnal Comments	20dB. T
433.878 433.878 Note 1: un #2: Rapurious S requency MHz 867.840	90.5 70.5 All averag correction adiated Er Signals, te: Level dBµV/m 39.8	H H e measu factor is nissions sted at 3 Pol v/h V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9	-2.4 -2.4 Iculated froi duty cycle MHz: Tran 31(e) Margin -13.1	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg	180 180 heasurements 10% in any 1 (433.92 MHz) Azimuth degrees 130	1.0 1.0 s using an <i>a</i> 00mS perio) - 10mS Si Height meters 1.3	EUT flat EUT flat werage correction factor of 2 d. gnal Comments EUT upright	20dB. 1
433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840	90.5 70.5 All averag correction adiated Er signals, te: Level dBµV/m 39.8 59.8	H H e measu factor is nissions sted at 3 Pol v/h V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9	-2.4 -2.4 Iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk	180 180 easurements 10% in any 1 (433.92 MHz (433.92 MHz) Azimuth degrees 130 130	1.0 1.0 5 using an <i>a</i> 00mS perio) - 10mS Si Height meters 1.3 1.3	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright	20dB. 1
433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er Signals, tes Level dBµV/m 39.8 59.8 39.4	H H e measu factor is sted at 3 Pol V/h V V V H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9	-2.4 -2.4 Iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.5	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg	180 180 easurements 10% in any 1 (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (130 130 110	1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT upright EUT flat	20dB. 1
433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840	90.570.5All averagcorrectionadiated Ersignals, tesLeveldBμV/m39.859.839.459.4	H H e measu factor is sted at 3 Pol v/h V V V H H H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 72.9	-2.4 -2.4 Iculated from duty cycle MHz: Trai 31(e) Margin -13.1 -13.1 -13.5 -13.5	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk	180 180 Ieasurements 10% in any 1 (433.92 MHz) (433.92 MHz) Azimuth degrees 130 130 110 110	1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat	20dB. 1
433.878 433.878 Note 1: un #2: Rapurious S requency MHz 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All average correction adiated Er Signals, tee Level dBµV/m 39.8 59.8 39.4 59.4 37.9	H H e measu factor is nissions sted at 3 Pol v/h V V V H H H H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9	-2.4 -2.4 lculated froi duty cycle MHz: Trai 31(e) Margin -13.1 -13.5 -13.5 -13.5 -15.0	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg	180 180 heasurements 10% in any 1 (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (100 130 110 110 170	1.0 1.0 5 using an <i>a</i> 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side	20dB. 1
433.878 433.878 433.878 Note 1: un #2: R purious S requency MHz 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er signals, ter ignals, ter dBμV/m 39.8 59.8 39.4 59.4 37.9 59.0	H H e measu factor is nissions sted at 3 Pol v/h V V V H H H H V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0	-2.4 -2.4 culated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -15.0 -15.0	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk	180 180 heasurements 10% in any 1 (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (10%) 130 130 110 110 170 0	1.0 1.0 1.0 s using an <i>a</i> 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.0 1.2	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840 867.840 1339.000	90.5 70.5 All averag correction adiated Er signals, tes Level dBμV/m 39.8 59.8 39.4 59.8 39.4 59.4 37.9 59.0 39.0	H H e measu factor is sted at 3 Pol v/h V V V H H H H H V V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0 54.0	-2.4 -2.4 culated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) (1.0 1.0 5 using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.0 1.2 1.2	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT Upright	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er signals, tes Level dBμV/m 39.8 59.8 39.4 59.4 37.9 59.0 39.0 59.0 39.0 57.9	H H e measu factor is sted at 3 Pol V/h V V H H H H V V H H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9	-2.4 -2.4 iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk	180 180 180 180 10% in any 1 (433.92 MHz) (433.92 MHz) (4	1.0 1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.0 1.2 1.2 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT on its side	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er signals, tes Level dBμV/m 39.8 59.8 39.4 59.8 39.4 59.4 37.9 59.0 39.0 57.9 36.5	H H e measu factor is sted at 3 Pol V/h V V H H H H V V V H H H H H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9	-2.4 -2.4 iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	180 180 180 180 10% in any 1 (433.92 MHz) (433.92 MHz) (433.92 MHz) 10% 110 110 110 170 0 0 170 110	1.0 1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.2 1.2 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT on its side EUT upright	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S equency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er signals, te Level dBμV/m 39.8 59.8 39.4 59.8 39.4 59.4 37.9 59.0 39.0 57.9 36.5 56.5	H H e measu factor is sted at 3 Pol v/h V V H H H H V V V H H H H H H H	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9 52.9 72.9	-2.4 -2.4 iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4 -16.4	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) 100 130 130 110 170 0 0 170 110 110 110	1.0 1.0 1.0 5 using an <i>a</i> 00mS perio) - 10mS Si Height meters 1.3 1.0 1.0 1.0 1.0 1.2 1.2 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat werage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT On its side EUT Upright EUT Upright EUT upright EUT upright EUT upright EUT upright EUT upright	20dB. 1
433.878 433.878 433.878 Note 1: un #2: R burious S equency MHz 867.840 867.840 867.840 867.840 1339.000 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All averag correction adiated Er Signals, ter Level dBμV/m 39.8 59.8 39.4 59.4 37.9 59.0 37.9 59.0 39.0 57.9 36.5 56.5 57.2	H H e measu factor is nissions sted at 3 Pol V/h V V V H H H H H H H H V V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9 74.0 52.9 72.9 72.9 72.9	-2.4 -2.4 iculated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4 -16.4 -16.8	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) Azimuth degrees 130 130 110 110 170 0 0 170 110 110 1	1.0 1.0 1.0 5 using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.2 1.2 1.2 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT Upright EUT upright	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All average correction adiated Er signals, tes Level dBµV/m 39.8 59.8 39.4 59.4 37.9 59.0 39.0 57.9 36.5 56.5 57.2 37.2	H H e measu factor is sted at 3 Pol v/h V V V H H H H H H V V V V V V V V V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9	-2.4 -2.4 culated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4 -16.8 -16.8	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) 100 100 100 100	1.0 1.0 1.0 5 using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.2 1.2 1.2 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT upright EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT upright EUT on its side	20dB. 1
433.878 433.878 433.878 433.878 Note 1: 2007 2007 2007 2007 2007 2007 2007 200	90.5 70.5 All averag correction adiated Er signals, tes Level dBμV/m 39.8 59.8 39.4 59.8 39.4 59.4 37.9 59.0 39.0 59.0 39.0 57.9 36.5 56.5 57.2 37.2 56.6	H H e measu factor is sted at 3 Pol V/h V V V H H H H V V V H H H H V V V V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9 74.0 54.0 74.0	-2.4 -2.4 culated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4 -16.4 -16.8 -16.8 -17.4	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Pk Avg Pk Pk Avg Pk Pk Avg Pk Pk Pk Pk Pk Pk Pk Pk Pk Pk Pk Pk Pk	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) (433.92 MHz) 100 100 100 100 100	1.0 1.0 1.0 s using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.2 1.2 1.2 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT upright EUT on its side EUT upright EUT on its side EUT upright EUT on its side	20dB. 1
433.878 433.878 433.878 Note 1: un #2: Ra purious S requency MHz 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840 867.840	90.5 70.5 All average correction adiated Er signals, tes Level dBµV/m 39.8 59.8 39.4 59.4 37.9 59.0 39.0 57.9 36.5 56.5 57.2 37.2	H H e measu factor is sted at 3 Pol v/h V V V H H H H H H V V V V V V V V V V	92.9 72.9 rements ca based on a s, 30 - 4400 3m 15.2 Limit 52.9 72.9 52.9 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9 52.9 74.0 54.0 72.9	-2.4 -2.4 culated from duty cycle MHz: Tran 31(e) Margin -13.1 -13.1 -13.5 -13.5 -13.5 -15.0 -15.0 -15.0 -15.0 -15.0 -16.4 -16.8 -16.8	Pk Avg m the peak m of less than 1 nsmit Mode (Detector Pk/QP/Avg Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg Pk Avg	180 180 180 180 10% in any 10 (433.92 MHz) (433.92 MHz) 100 100 100 100	1.0 1.0 1.0 5 using an a 00mS perio) - 10mS Si Height meters 1.3 1.3 1.0 1.0 1.0 1.2 1.2 1.2 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	EUT flat EUT flat verage correction factor of 2 d. gnal Comments EUT upright EUT upright EUT flat EUT flat EUT flat EUT on its side EUT Upright EUT Upright EUT upright EUT upright EUT upright EUT upright EUT upright EUT upright EUT on its side EUT upright EUT on its side	20dB. 1

6 I	Ellic	ott						EMC Test Data
Client:	Savi Tech	nology, I	Inc.					Job Number: J47363
Model:	644, 645 a	and 646	Tags				T-l	_og Number: T47622
			5					Proj Eng: Mark Briggs
Contact:	Eugene S	chlindwe	ein					
Spec:	FCC 15.23	31(e)						Class: -
	d from pr		page					
requency	Level	Pol		31(e)	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
3905.100	55.1	V	74.0	-18.9	Pk	360	1.3	EUT Upright
3905.100	35.1	V	54.0	-18.9	Avg	360	1.3	EUT Upright
3905.100	55.1	Н	74.0	-18.9	Pk	180	1.0	EUT Upright
3905.100	35.1	Н	54.0	-18.9	Avg	180	1.0	EUT Upright
4339.000	54.9	Н	74.0	-19.1	Pk	180	1.0	EUT Upright
4339.000	34.9	Н	54.0	-19.1	Avg	180	1.0	EUT Upright
2169.500	54.6	V	74.0	-19.4	Pk	100	1.0	EUT Upright
2169.500	34.6	V	54.0	-19.4	Avg	100	1.0	EUT Upright
2169.500	54.5	V	74.0	-19.5	Pk	100	1.0	EUT on its side
2169.500	34.5	V	54.0	-19.5	Avg	100	1.0	EUT on its side
1735.600	54.4	V	74.0	-19.6	Pk	300	1.3	EUT Upright
1735.600	34.4	V	54.0	-19.6	Avg	300	1.3	EUT Upright
3471.200	53.2	V	74.0	-20.8	Pk	0	1.2	EUT Upright
3471.200	33.2	V	54.0	-20.8	Avg	0	1.2	EUT Upright
2169.500	53.2	Н	74.0	-20.8	Pk	160	1.4	EUT Upright
2169.500	33.2	Н	54.0	-20.8	Avg	160	1.4	EUT Upright
3471.200	53.0	Н	74.0	-21.0	Pk	360	1.0	EUT Upright
3471.200	33.0	Н	54.0	-21.0	Avg	360	1.0	EUT Upright
3037.300	51.5	Н	74.0	-22.5	Pk	360	1.0	EUT Upright
3037.300	31.5	Н	54.0	-22.5	Avg	360	1.0	EUT Upright
867.840	30.2	V	52.9	-22.7	Avg	70	1.0	EUT on its side
3037.300	31.3	V	54.0	-22.7	Avg	360	1.1	EUT Upright
867.840	50.2	V	72.9	-22.7	Pk	70	1.0	EUT on its side
3037.300	51.3	V	74.0	-22.7	Pk	360	1.1	EUT Upright
2603.400	51.1	Н	74.0	-22.9	Pk	0	1.4	EUT Upright
2603.400	31.1	Η	54.0	-22.9	Avg	0	1.4	EUT Upright
2169.500	51.0	Н	74.0	-23.0	Pk	140	1.6	EUT flat
2169.500	31.0	Н	54.0	-23.0	Avg	140	1.6	EUT flat
2603.400	50.9	V	74.0	-23.1	Pk	0	1.3	EUT Upright
2603.400	30.9	٧	54.0	-23.1	Avg	0	1.3	EUT Upright
2603.400	30.8	Н	54.0	-23.2	Avg	150	1.5	EUT flat
2603.400	50.8	Н	74.0	-23.2	Pk	150	1.5	EUT flat
1735.600	29.8	Η	54.0	-24.2	Avg	170	1.0	EUT on its side
1735.600	49.8	Н	74.0	-24.2	Pk	170	1.0	EUT on its side
1301.700	48.5	V	74.0	-25.5	Pk	110	1.0	EUT flat
1301.700	28.5	V	54.0	-25.5	Avg	110	1.0	EUT flat
1301.700	47.9	V	74.0	-26.1	Pk	270	1.0	EUT Upright
1301.700	27.9	V	54.0	-26.1	Avg	270	1.0	EUT Upright
1301.700	27.3	Н	54.0	-26.7	Avg	130	1.0	EUT on its side

	Ellic Savi Tech		nc.					lob Number: J47363
	644, 645 a						T-L	.og Number: T47622
	,		-9-					Proj Eng: Mark Briggs
Contact	Eugene S	chlindwa						Troj Eng. Mark Driggs
	•							
	FCC 15.23							Class: -
	ed from pro			21(2)	Detector	A -incusta	Lloight	Commonto
Frequency		Pol		31(e) Morgin	Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h H	Limit	Margin -26.7	Pk/QP/Avg Pk	degrees	meters	FLIT on its side
1301.700		H V	74.0		Pk Pk	130 340	1.0	EUT on its side
1301.700		V	74.0	-27.4			1.0	EUT on its side
1301.700	26.6		54.0	-27.4	Avg	340	1.0	EUT on its side
1735.600	25.8	H	54.0	-28.2	Avg	140	1.0	EUT flat
1301.700	25.8	H	54.0	-28.2	Avg	120	1.4	EUT Upright
1735.600	45.8	H	74.0	-28.2	Pk	140	1.0	EUT flat
1301.700	45.8	H	74.0 74.0	-28.2	Pk Pk	120	1.4	EUT Upright EUT Upright
1735.600	45.5 25.5	H H	74.0 54.0	-28.5		160	1.0	
1735.600 1301.700	45.0	H	54.0 74.0	-28.5	Avg Pk	160 130	1.0 1.0	EUT Upright EUT flat
				-29.0		130	1.0	
1301.700 Note 1:	All averag				•	130 neasurements 10% in any 1	•	EUT flat average correction factor of 20dB. d.
Run #4: R	All averag correction	e measu factor is missions	rements cal based on a	lculated fror duty cycle	n the peak m of less than ?	neasurements	s using an a 00mS perio	average correction factor of 20dB.
Note 1: Run #4: R Fested at 3	All averag correction adiated Er Bm, 6/19/02	e measu factor is missions 2	irements cal based on a s, 30 - 900 M	Iculated fror duty cycle MHz: Rece	n the peak m of less than f	neasurement: 10% in any 1 0 @ 433.72	s using an a 00mS perio MHz)	average correction factor of 20dB. d.
Note 1: Run #4: R Fested at 3	All averag correction adiated Er Bm, 6/19/02 Level	e measu factor is missions 2 Pol	s, 30 - 900 N	Iculated fror duty cycle MHz: Rece 09(a)	n the peak m of less than 7 ive Mode (Lo	neasurement: 10% in any 1 0 @ 433.72	s using an a 00mS perio MHz) Height	average correction factor of 20dB.
Note 1: Run #4: R Fested at 3 Frequency MHz	All averag correction adiated Er 3m, 6/19/02 Level dBµV/m	e measu factor is nissions 2 Pol v/h	rements cal based on a s, 30 - 900 N 15.2 Limit	Iculated fror duty cycle MHz: Rece 09(a) Margin	n the peak m of less than f ive Mode (Lu Detector Pk/QP/Avg	neasurements 10% in any 1 0 @ 433.72 Azimuth degrees	s using an a 00mS perio MHz) Height meters	average correction factor of 20dB. d. Comments
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2	e measu factor is nissions 2 Pol v/h h	irements cal based on a s, 30 - 900 N 15.2 Limit 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8	n the peak m of less than ive Mode (Lu Detector Pk/QP/Avg QP	neasurements 10% in any 1 0 @ 433.72 Azimuth degrees 350	s using an a 00mS perio MHz) Height meters 1.0	Comments
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 867.618	All averag correction adiated Er 3m, 6/19/02 Level dBµV/m 43.2 38.7	e measu factor is nissions 2 Pol v/h h v	irements cal based on a s, 30 - 900 N 15.2 Limit 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3	n the peak m of less than ive Mode (Lu Detector Pk/QP/Avg QP QP	Azimuth degrees 290 0 290	s using an a 00mS perio MHz) Height meters 1.0 1.6	Comments EUT on its side Signal Sub EUT on its side Signal Sub
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 867.618 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2 38.7 37.2	e measu factor is nissions 2 Pol v/h h v h	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -8.8	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP	neasurements 10% in any 1 0 @ 433.72 Azimuth degrees 350 290 0	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0	Comments EUT on its side Signal Sub EUT on its side
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 867.618	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2 38.7 37.2	e measu factor is nissions 2 Pol v/h h v	s, 30 - 900 N 15.20 Limit 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3	n the peak m of less than ive Mode (Lu Detector Pk/QP/Avg QP QP	Azimuth degrees 290 0 290	s using an a 00mS perio MHz) Height meters 1.0 1.6	Comments EUT on its side Signal Sub EUT on its side Signal Sub
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 867.618 433.819 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2 38.7 37.2 34.8	e measu factor is nissions 2 Pol v/h h v h v	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2	n the peak m of less than ' ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP	Azimuth degrees 350 290 250	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 867.618 433.819 433.819 867.618	All averag correction adiated Er Bm, 6/19/02 Level dBμV/m 43.2 38.7 37.2 34.8 41.3	e measu factor is nissions 2 Pol v/h h v h v h	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -4.7	n the peak m of less than f ive Mode (Lo Detector Pk/QP/Avg QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT on its side EUT on its side EUT flat Signal Sub
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 433.819 433.819 867.618 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2 38.7 37.2 38.7 37.2 34.8 41.3 39.6	e measu factor is nissions 2 Pol v/h h v h v h v h	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180 20	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.0	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT on its side EUT on its side EUT flat Signal Sub EUT flat
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 433.819 433.819 867.618 433.819 867.618	All averag correction adiated Er Bm, 6/19/02 Level dBμV/m 43.2 38.7 37.2 34.8 41.3 39.6 39.5	e measu factor is missions 2 Pol v/h h v h v h v h v	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4 -6.5 -6.5	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180 20 230	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.0 1.2	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT on its side EUT on its side EUT flat Signal Sub EUT flat EUT flat Signal Sub
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 433.819 433.819 867.618 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBμV/m 43.2 38.7 37.2 34.8 41.3 39.6 39.5	e measu factor is nissions 2 Pol v/h h v h v h v h	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180 20	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.0	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT on its side EUT on its side EUT flat Signal Sub EUT flat
Note 1: Run #4: R Tested at 3 Trequency MHz 867.618 433.819 433.819 867.618 433.819 867.618 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBμV/m 43.2 38.7 37.2 34.8 41.3 39.6 39.5 33.0	e measu factor is nissions 2 Pol v/h h v h v h v h v v h v v v	s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4 -6.5 -13.0	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	Azimuth 0 @ 433.72 Azimuth degrees 350 290 0 250 180 20 230 310	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.2 1.0	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT flat Signal Sub EUT flat EUT flat EUT flat
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 433.819 433.819 867.618 433.819 867.618 433.819 867.618 433.819 867.618	All averag correction adiated Er Bm, 6/19/02 Level dBμV/m 43.2 38.7 37.2 34.8 41.3 39.6 39.5 33.0 44.1	e measu factor is nissions 2 Pol v/h h v h v h v h v v h v v	s, 30 - 900 N 15.20 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4 -6.5 -13.0 -1.9	n the peak m of less than ' ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180 20 230 310 60	s using an a 00mS perio WHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.2 1.0 1.0 1.2	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT flat Signal Sub EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat EUT flat
Note 1: Run #4: R Fested at 3 Frequency MHz 867.618 433.819 433.819 867.618 433.819 867.618 433.819	All averag correction adiated Er Bm, 6/19/02 Level dBµV/m 43.2 38.7 37.2 34.8 41.3 39.6 39.5 33.0 44.1 42.5	e measu factor is nissions 2 Pol v/h h v h v h v h v v h v v v	s, 30 - 900 N 15.2 Limit 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0 46.0	Iculated fror duty cycle MHz: Rece 09(a) Margin -2.8 -7.3 -8.8 -11.2 -4.7 -6.4 -6.5 -13.0	n the peak m of less than 7 ive Mode (Lu Detector Pk/QP/Avg QP QP QP QP QP QP QP QP QP QP	Azimuth degrees 350 290 0 250 180 20 230 310	s using an a 00mS perio MHz) Height meters 1.0 1.6 1.0 1.5 1.0 1.0 1.2 1.0	Comments EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side Signal Sub EUT on its side EUT on its side EUT flat Signal Sub EUT flat EUT flat EUT flat

Timing Verification

The following plots were made to demonstrate the timing of the transmissions from the Savi ST-60X and ST-64X series of tags. The actual tag used during testing was an ST-602, but both tag series use the same firmware. These plots are representative of the transmission timing for both the 640 and 604 series.

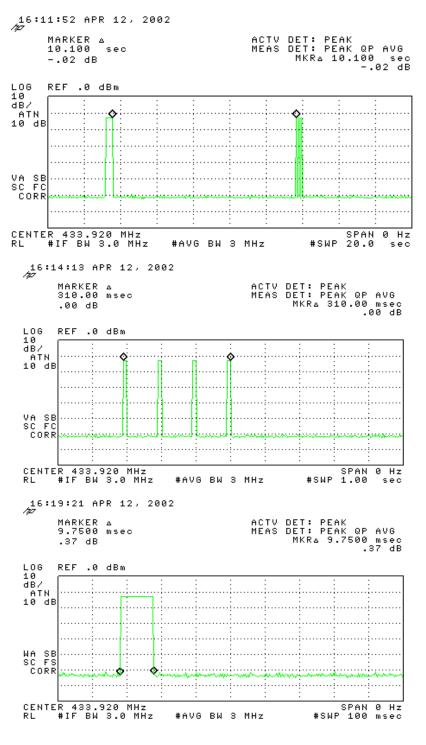
The graphs show:

A 10.1 second interval between successive transmissions;

A total of four pulses per transmission, each pulse separated by a 90mS period, giving a total transmission time of 310mS;

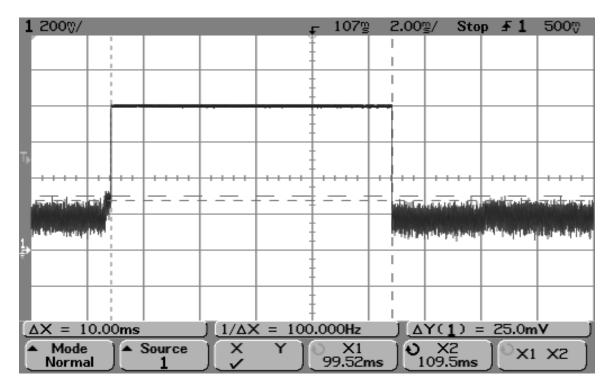
An individual pulse width of 10mS.

The timing of the pulses meets the requirements of FCC 15.231(e) as the transmission time is less than 1 second and the silent period is greater than 30 times the duration of each transmission and greater than 10 seconds.

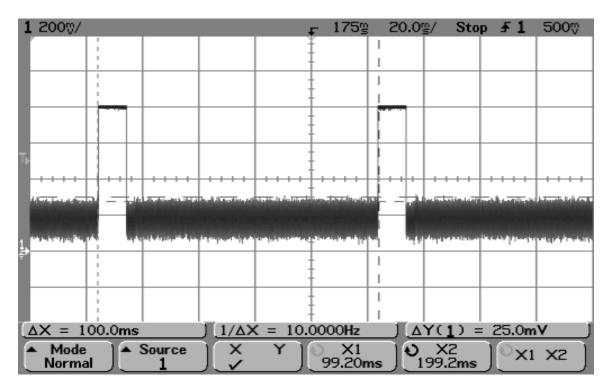


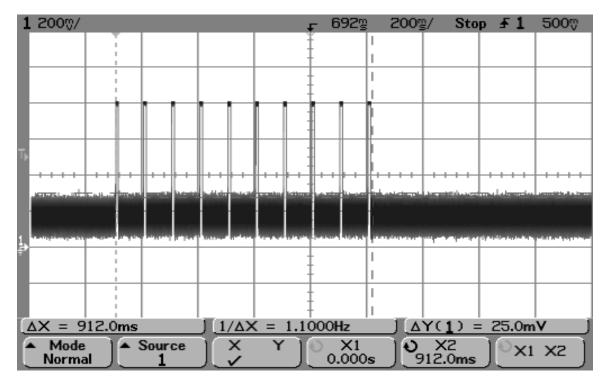
ST-64X-XX Duty Cycle/Bandwidth Plots

ST-64X-XX Single Data Pulse (10 msec)



ST-64X-XX Data Pulse within 100 msec period





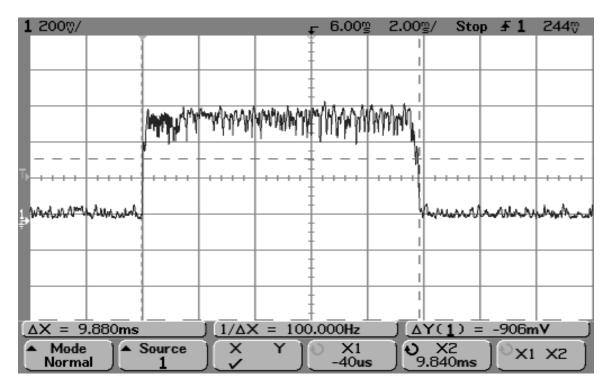
ST-64X-XX Data Pulses within 1 second period

ST-64X-XX Data Pulses with 30 second silent period between transmissions

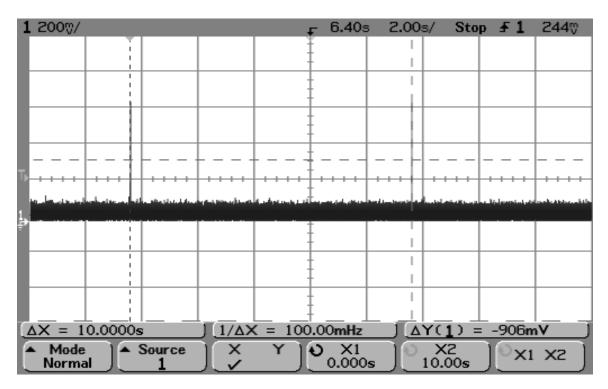
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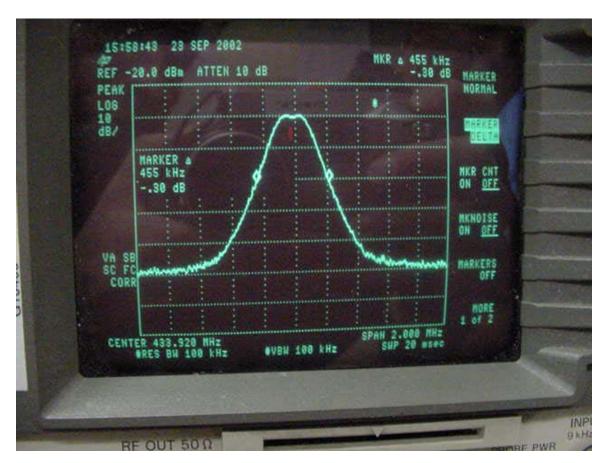
ST-64X-XX Beacon Duty Cycle Plots

ST-64X-XX Single Beacon Pulse (10 msec)



ST-64X-XX Beacon Pulses with 10 second silent period between transmissions





ST-64X-XX: 20 dB Bandwidth Measurement