



Engineering and Testing for EMC and Safety Compliance

**CERTIFICATION APPLICATION REPORT
FCC PART 15.249 & INDUSTRY CANADA RSS-210**

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FCC ID	S2G-SC100	TEST REPORT DATE	April 20, 2005
PLATFORM	N/A	RTL WORK ORDER NUMBER	2005036
MODEL	SC100-100	RTL QUOTE NUMBER	QRTL05-051
FCC Classification	FDS		
FCC Rule Part(s)	Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz, and 24.0-24.25 GHz		
Industry Canada Standard	RSS-210: Low Power License-Exempt Radio Communication Devices (All Frequency Bands)		
Digital Interface Information	Digital Interface was found to be compliant		
Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
5730 – 5825	N/A	N/A	N/A

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. Modifications made to the equipment during testing, in order to achieve compliance with these standards, are listed in the report.

Furthermore, there was no deviation from, additions to, or exclusions from the applicable parts of FCC Part 2, FCC Part 15, Industry Canada RSS-210, and ANSI C63.4

Signature: 

Date: April 20, 2005

Typed/Printed Name: Desmond A. Fraser

Position: President

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1 GENERAL INFORMATION

1.1 SCOPE

FCC Rules Part 15.249: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz, and 24.0-24.25 GHz.

IC RSS-210 Section 6.2.2(m2): 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

1.2 MODIFICATIONS

No modifications were required to meet the testing requirements.

1.3 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.4 2003).

1.4 RELATED SUBMITTAL(S)/GRANT(S)

This is an original certification application for the Sweco SentryScan, Model Number: SC100-100, FCC ID: S2G-SC100. The EUT consists of a control box, a transmitter, and a receiver.

2 TEST INFORMATION

2.1 TEST JUSTIFICATION

The low channel at 5730 MHz, mid channel at 5780 MHz, and high channel at 5825 MHz, were tested and investigated from 9 kHz to 40 GHz. Data for all three channels are presented in this report. The test results relate only to the item(s) that was tested. The EUT contains an antenna; in order to complete the configuration required for approval. Separate antennas were used to transmit, receive, and were connected, to the control box which controlled access to continually transmit on a single channel using an external serial port.

2.2 EXERCISING THE EUT

The EUT was provided with the software to continuously transmit during testing. The carrier was also checked to verify that the information was being transmitted. There were no deviations from the test standard(s) and/or methods.

2.3 TEST RESULT SUMMARY

TABLE 2-1: TEST RESULT SUMMARY WITH FCC RULES AND REGULATIONS

STANDARD	TEST	PASS/FAIL OR N/A
FCC 15.207	Conducted Emissions	Pass
FCC 15.249(a)	Radiated Emissions	Pass

2.4 TEST SYSTEM DETAILS

The test sample was received by Rhein Tech Labs on April 14, 2005. The FCC ID S2G-SC100 applies to the EUT as a whole, which consists of the control box, the transmitter, and the receiver listed in the table below.

TABLE 2-2: EQUIPMENT UNDER TEST (EUT)

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
Control Box	Sweco	SC100C-100	SCC050001	S2G-SC100	1.7m Unshielded Power; 2.6m Unshielded I/O	16721
Transmitter	Sweco	SC100T-100	SCT050001	S2G-SC100	6.2m Unshielded I/O	16623
Receiver	Sweco	SC100R-100	SCR050001	S2G-SC100	6.2m Unshielded I/O	16624
Separator	Sweco	NA	NA	NA	N/A	16625

TABLE 2-3: EXTERNAL COMPONENTS IN TEST CONFIGURATION

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
USB Mobile Port Replicator	Targus	PA070	430-0019-001B	N/A	0.9m unshielded I/O	16622
Laptop	Toshiba	Satellite 1905-S301	92043315C	N/A	3m unshielded power	16621

2.5 CONFIGURATION OF TESTED SYSTEM

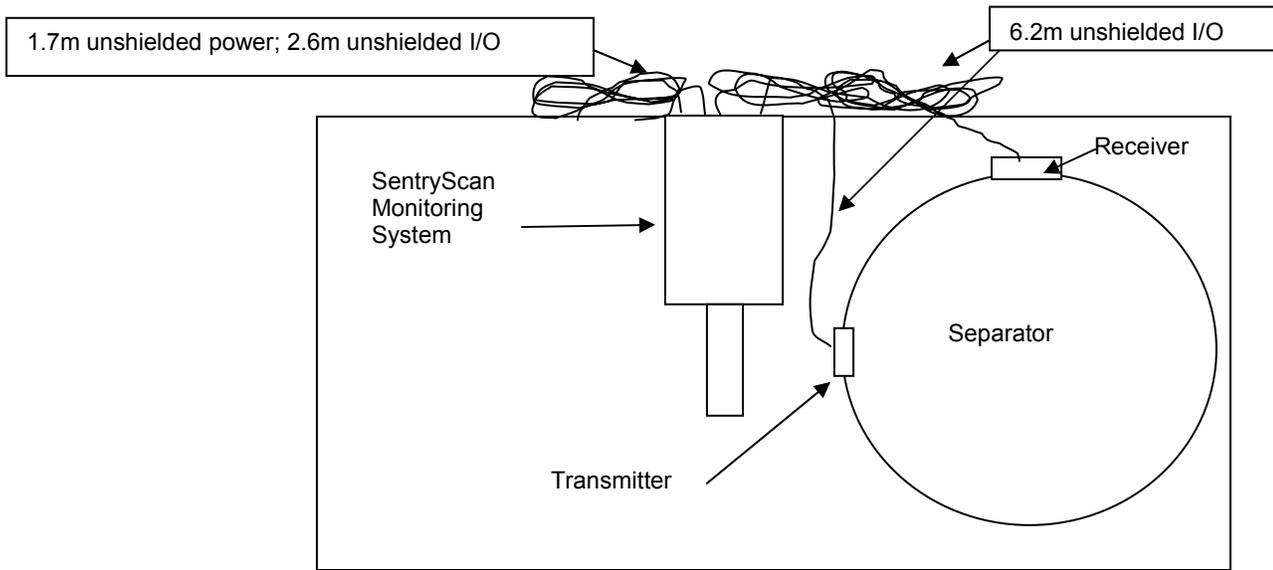


FIGURE 2-1: WORST CASE CONFIGURATION OF SYSTEM UNDER TEST

3 CONDUCTED LIMITS - §15.207 - RSS-210 §9.0

3.1 TEST METHODOLOGY FOR CONDUCTED EMISSIONS MEASUREMENTS

The power line conducted emission measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 80 centimeters high. Power was fed to the EUT through a 50 ohm / 50 microHenry Line Impedance Stabilization Network (EUT LISN). The EUT LISN was fed power through an A.C. filter box on the outside of the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT test peripherals. This peripheral LISN was also fed A.C. power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

The spectrum analyzer was connected to the A.C. line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 150 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by decreasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech Quality Manual, Section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

3.2 CONDUCTED EMISSION TEST

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. If the conducted emissions exceed the limit with the instrument set to the quasi-peak mode, then measurements are made in the average mode. The conducted test was performed with the EUT exercise program loaded, and the emissions were scanned between 150 kHz to 30 MHz on the NEUTRAL SIDE and PHASE SIDE.

TABLE 3-1: CONDUCTED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
901083	AFJ International	LS16	16A LISN	16010020080	3/24/06

3.3 CONDUCTED EMISSION TEST DATA

TABLE 3-2: CONDUCTED EMISSIONS (NEUTRAL SIDE) TRANSMIT

Temperature: 74°F Humidity: 33%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)	Pass/Fail	Comments
0.157	Pk	52.5	0.4	52.9	65.6	-12.7	55.6	-2.7	Pass	
0.449	Pk	40.4	0.5	40.9	56.9	-16.0	46.9	-6.0	Pass	
4.720	Pk	41.1	1.1	42.2	56.0	-13.8	46.0	-3.8	Pass	
4.810	Pk	41.4	1.2	42.6	56.0	-13.4	46.0	-3.4	Pass	
7.460	Pk	45.0	1.2	46.2	60.0	-13.8	50.0	-3.8	Pass	
7.580	Pk	46.6	1.2	47.8	60.0	-12.2	50.0	-2.2	Pass	
14.450	Pk	42.7	1.5	44.2	60.0	-15.8	50.0	-5.8	Pass	
20.530	Pk	44.3	1.5	45.8	60.0	-14.2	50.0	-4.2	Pass	

TABLE 3-3: CONDUCTED EMISSIONS (PHASE SIDE) TRANSMIT

Temperature: 74°F Humidity: 33%										
Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB)	Emission Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)	Pass/Fail	Comments
0.198	Pk	51.8	0.4	52.2	63.7	-11.5	53.7	-1.5	Pass	
0.450	Pk	44.0	0.5	44.5	56.9	-12.4	46.9	-2.4	Pass	
1.650	Pk	42.7	0.7	43.4	56.0	-12.6	46.0	-2.6	Pass	
2.270	Pk	43.3	0.8	44.1	56.0	-11.9	46.0	-1.9	Pass	
4.720	Pk	42.4	1.1	43.5	56.0	-12.5	46.0	-2.5	Pass	
6.580	Pk	43.1	1.2	44.3	60.0	-15.7	50.0	-5.7	Pass	
12.300	Pk	44.5	1.4	45.9	60.0	-14.1	50.0	-4.1	Pass	
21.090	Pk	44.2	1.5	45.7	60.0	-14.3	50.0	-4.3	Pass	

TEST PERSONNEL:

Daniel Baltzell
 Test Engineer



Signature

April 19, 2005
 Date Of Test

4 RADIATED EMISSION LIMITS FUNDAMENTAL EMISSIONS - RSS-210 §6.2.2 (M2)

4.1 RADIATED EMISSION LIMITS TEST PROCEDURE

Radiated Emissions of the Fundamentals were tested at three meters, and meet the requirements of 50 millivolts/meter in average mode, and 20 dB higher in peak mode, per 15.249(e).

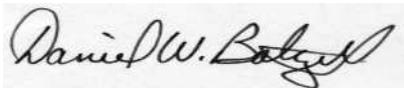
4.2 RADIATED EMISSION LIMITS TEST DATA

TABLE 4-1: RADIATED EMISSIONS FUNDAMENTAL EMISSIONS

Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dBm)	Corrected Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
5730.227	Pk	H	30	1	72.8	14.2	87.0	114.0	-27.0
5730.227	Av	H	30	1	72.6	14.2	86.8	94.0	-7.2
5780.227	Pk	H	30	1	75.5	14.2	89.7	114.0	-24.3
5780.227	Av	H	30	1	75.3	14.2	89.5	94.0	-4.5
5825.229	Pk	H	30	1	70.0	14.1	84.1	114.0	-29.9
5825.229	Av	H	30	1	69.7	14.1	83.8	94.0	-10.2

TEST PERSONNEL:

Daniel Baltzell
 Test Engineer



Signature

April 20, 2005
 Date Of Test

5 RADIATED EMISSION LIMITS RADIATED HARMONICS - §15.249 - RSS-210 §6.2.2 (M2)

5.1 RADIATED EMISSION LIMITS TEST PROCEDURE

Radiated Emissions of the harmonics were tested at three meters, and meet the requirements of 500 microvolts/meter in average mode, and 20 dB higher in peak mode, per 15.249(e).

5.2 RADIATED EMISSIONS HARMONICS/SPURIOUS TEST DATA

TABLE 5-1: RADIATED EMISSIONS HARMONICS/SPURIOUS (LOW CHANNEL, 5730 MHZ)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11460.356	Pk	42.7	18.9	61.6	74.0	-12.4
11460.356	Av	30.0	18.9	48.9	54.0	-5.1
17190.534	Pk	33.5	24.7	58.2	74.0	-15.8
17190.534	Av	19.5	24.7	44.2	54.0	-9.8
22920.712	Pk	26.4	21.5	47.9	74.0	-26.1
22920.712	Av	26.2	21.5	47.7	54.0	-6.3
28650.890	Pk	23.4	25.6	49.0	74.0	-25.0
28650.890	Av	13.7	25.6	39.3	54.0	-14.7
34381.068	Pk	25.0	25.8	50.8	74.0	-23.2
34381.068	Av	13.7	25.8	39.5	54.0	-14.5
40111.246	Pk	22.7	21.4	44.1	74.0	-29.9
40111.246	Av	11.6	21.4	33.0	54.0	-21.0

PEAK RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/3 MHz; AVERAGE RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/10 Hz

TABLE 5-2: RADIATED EMISSIONS HARMONICS/SPURIOUS (MID CHANNEL, 5780 MHZ)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11560.416	Pk	42.2	18.9	61.1	74.0	-12.9
11560.416	Av	30.8	18.9	49.7	54.0	-4.3
17340.624	Pk	29.7	24.0	53.7	74.0	-20.3
17340.624	Av	18.8	24.0	42.8	54.0	-11.2
23120.893	Pk	34.8	21.3	56.1	74.0	-17.9
23120.893	Av	23.2	21.3	44.5	54.0	-9.5
28901.148	Pk	20.8	25.6	46.4	74.0	-27.6
28901.148	Av	19.7	25.6	45.3	54.0	-8.7
34681.334	Pk	20.9	25.6	46.5	74.0	-27.5
34681.334	Av	8.6	25.6	34.2	54.0	-19.8
40461.542	Pk	31.3	21.4	52.7	74.0	-21.3
40461.542	Av	20.0	21.4	41.4	54.0	-12.6

PEAK RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/3 MHz; AVERAGE RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/10 Hz

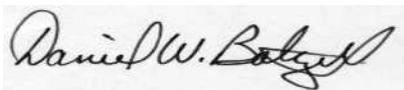
TABLE 5-3: RADIATED EMISSIONS HARMONICS/SPURIOUS (HIGH CHANNEL, 5825 MHZ)

Emission Frequency (MHz)	Test Detector	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
11650.37	Pk	41.7	18.9	60.6	74.0	-13.4
11650.37	Av	30.3	18.9	49.2	54.0	-4.8
17475.666	Pk	33.5	23.9	57.4	74.0	-16.6
17475.666	Av	21.0	23.9	44.9	54.0	-9.1
23300.907	Pk	34.1	21.1	55.2	74.0	-18.8
23300.907	Av	23.2	21.1	44.3	54.0	-9.7
29126.18	Pk	26.5	25.6	52.1	74.0	-21.9
29126.18	Av	13.6	25.6	39.2	54.0	-14.8
34951.36	Pk	23.4	25.7	49.1	74.0	-24.9
34951.36	Av	13.6	25.7	39.3	54.0	-14.7
40776.36	Pk	33.2	21.5	54.7	74.0	-19.3
40776.36	Av	19.8	21.5	41.3	54.0	-12.7

PEAK RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/3 MHz; AVERAGE RESOLUTION/VIDEO BANDWIDTH IS 1 MHz/10 Hz

TEST PERSONNEL:

Daniel Baltzell
 Test Engineer



Signature

April 20, 2004
 Date Of Test

TABLE 5-4: RADIATED SPURIOUS EMISSIONS TEST EQUIPMENT

RTL Asset	Manufacturer	Model	Part Type	Serial Number	Calibration Date
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	6/23/05
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	6/23/05
901053	Schaffner & Chase	CBL6112B	Bilog antenna (20 MHz - 2 GHz)	2648	9/20/05
900905	Rhein Tech Laboratories, Inc.	PR-1040	Pre Amplifier 40dB (10 MHz - 2 GHz)	1006	9/1/05
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/12/05
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	5/05/05
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	5/20/07
900323	EMCO	3160-07	Horn Antenna (8.2 - 12.4 GHz)	9605-1054	5/20/07
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	5/20/07
900356	EMCO	3160-08	Horn Antenna (12.4-18 GHz)	9607-1044	5/20/07
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 - 26 GHz)	3525A00159	11/27/07
900126	Hewlett Packard	11970A	Harmonic Mixer (26 - 40 GHz)	2332A01199	10/29/09
900717	Hewlett Packard	11970U	Harmonic Mixer (40 - 60 GHz)	2332A01110	10/28/09
901256	ATM	19-443-6R	Horn antenna. (40 - 60 GHz)	8041704-01	5/20/07
901303	EMCO	3160-10	Horn Antenna 26-40.0 GHz	960452-007	5/20/07
901218	EMCO	3301B	Horn Antenna (18 - 26.5 GHz)	960281-003	5/20/07
901020	Hewlett Packard	8564E	Portable Spectrum Analyzer (9 kHz - 40 GHz)	3943A01719	8/11/05
901231	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/05
901232	IW Microwave Products	KPS-1503-2400-KPS	High frequency RF cables	240"	9/1/05
901235	IW Microwave Products	KPS-1503-360-KPS	High frequency RF cables	36"	9/1/05
900878	Rhein Tech Labs	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901242	Rhein Tech Labs	WRT-000-0003	Wood rotating table	N/A	Not Required

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Report #: 2005036
FCC: Part 15.249
IC: RSS-210
FCC ID: S2G-SC100
M/N: SC100-100

6 CONCLUSION

The data in this measurement report shows that the Sweco Model: SC100C-100; FCC ID: S2G-SC100, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules, and Industry Canada RSS-210.