

**Application for Certification  
For a GPS Positioning System**

**Leica Geosystems, Inc.  
23868 Hawthorne Blvd.  
Torrance, CA 90505**

**GPS Positioning System:**

**Model #s: WORCS**

**FCC ID: QOHWORCS**

**REPORT # RV38025C**

This report was prepared in accordance with the requirements of the FCC Rules and Regulations Part 2, Subpart J, 2.1033, and Part 15.247 and other applicable sections of the rules as indicated herein.

Prepared By:

Dana Grove

**DNB Engineering, Inc.  
5969 Robinson Avenue  
Riverside, CA 92503**

15 Nov 2002

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## 1.0 ADMINISTRATIVE DATA

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### 1.1 Certifications and Qualifications

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I certify that DNB Engineering, Inc conducted the tests performed in order to obtain the technical data presented in this application. Also, based on the results of the enclosed data, I have concluded that the equipment tested meets or exceeds the requirements of the Rules and Regulations governing this application.

### 1.2 Measurement Repeatability Information

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The test data presented in this report has been acquired using the guidelines set forth in FCC Part 2.1031 through 2.1057, Part 15. The test results presented in this document are valid only for the equipment identified herein under the test conditions described. Repeatability of these test results will only be achieved with identical measurement conditions. These conditions include: The same test distance, EUT Height, Measurement Site Characteristics, and the same EUT System Components. The system must have the same Interconnecting Cables arranged in identical placement to that in the test set-up, with the system and/or EUT functioning in the identical mode of operation (i.e. software and so on) as on the date of the test. Any deviation from the test conditions and the environment on the date of the test may result in measurement repeatability difficulties.

All changes made to the EUT during the course of testing as identified in this test report must be incorporated into the EUT or identical models to ensure compliance with the FCC regulations.



C. L. Payne III (Para. 1.1)  
Manager, Riverside Facility.  
DNB Engineering, Inc.  
Tel. (909) 637-2630 FAX (909) 637-2704

## 2.1033 (b) (1) Application for Certification

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Name of Applicant:		Leica Geosystems Inc. 23868 Hawthorne Blvd. Torrance, CA 90505
Applicant is:	X	Manufacturer Vendor Licensee Prospective Licensee Other
Name of Manufacturer		Leica Geosystems Inc.
Description:		GPS Positioning System
Part Number:		WORCS
Anticipated Production Quantity:		Multiple Units
Frequency Band:		2400 – 2483.5 GHz
Rated Power:		0.63 mW (-2dBm )
Type of Signal:		FHSS
Hopping Channels:		75 minimum
Max Data Rate:		115.2 kbps

2.1033 (b) (2) FCC Identifier

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FCC ID: QOHWORCS (for model number WORCS)



Figure 1 - Label Position - WORCS

**2.1033 (b) (3) Installation and Operating Instructions**

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Please reference attached .pdf file: [GS20\\_fieldguide.pdf](#)

**2.1033 (b) (4) Brief Description of Circuit Function**

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2.1033 (b) (5) Block Diagram

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## 2.1033 (b) (6) Report of Measurements

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### 15.247 (a) 20 dB Emission Bandwidth

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The EUT was placed in a temperature controlled environment and the worst case signal was transmitted and recorded on a spectrum analyzer. The EUT was tested at temperatures of -22, +25, and +55 degrees C. The EUT power was also varied from minus 15% to plus 30%. The spectrum was allowed enough time to satisfy the requirements of stability. The leading edge of the signal was recorded as was the trailing edge during the testing.


NOTE 1: This device was only tested to 0 degree C per manufacturer's technical documentation

NOTE 2: This device was only tested to 3.13 Vdc or minus 5.4% per manufacturer's technical documentation.

### 15.247 (c) Band Edge

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The EUT was set-up and tested in accordance with the 20dB Emission Bandwidth as referenced above. Emission edges were recorded on the same data sheet.

		5969 Robinson Avenue Riverside, CA 92503 (909) 637-2630 FAX (909) 637-2704				<b>20 dB Emission Bandwidth</b>			
		DNB Job Number: 38025		Date: 2 Oct 2002		<b>Conformance Standard</b>  FCC Part 15			
Customer: Leica Geosystems Inc		Model Number: GS20 and WORCS		Serial Number: Proto					
Description: GPS Positioning Device									
Environmental Conditions									
Ambient Temperature			Relative Humidity			Barometric Pressure			
26 °C			35 %			99.8 kPa			
TEST CONDITIONS		Measured Frequency Bandwidth (FHSS)							
				Channel 1		Channel 2		Channel 3	
Temperature	Voltage	Fl	Fh	Fl	Fh	Fl	Fh	Fl	Fh
- 0 °C	3.15 Vdc	2.4004	2.4799	N/a	N/a	N/a	N/a	N/a	N/a
	4.29 Vdc	2.4002	2.4800	N/a	N/a	N/a	N/a	N/a	N/a
+ 25 °C	3.30 Vdc	2.4002	2.4800	N/a	N/a	N/a	N/a	N/a	N/a
+ 55 °C	3.15 Vdc	2.4003	2.4798	N/a	N/a	N/a	N/a	N/a	N/a
	4.29 Vdc	2.4004	2.4800	N/a	N/a	N/a	N/a	N/a	N/a
Maximum Frequency Error (Hz)		100,000 Hz							
Measurement Uncertainty		+/- 10,000 Hz							
Frequency Range Limit		Fl equal or greater than 2.4 Ghz / Fh less than or equal to 2.485 GHz							
Notes	100kHz bandwidth used.								
	Fl = Lower frequency edge (-30dB down)								
	Fh = Upper frequency edge (-30dB down)								
	3.15Vdc is the minimum Vdc required per customer documentation								
	- 0 °C is the minimum per customer documentation								
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>C L Payne III</i>									

## 15.247 (b) Peak RF Output Power

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The EUT was measured on an open area test site (OATS) using the reference antenna substitution method.

A measuring distance of at least 3 m shall be used for measurements at frequencies up to 1 GHz. For frequencies above 1 GHz, any suitable measuring distance may be used. The equipment size (excluding the antenna) shall be less than 20 % of the measuring distance. The height of the equipment or of the substitution antenna shall be 1,5 m; the height of the test antenna (transmit or receive) shall vary between 1 m and 4 m.

Sufficient precautions shall be taken to ensure that reflections from extraneous objects adjacent to the site do not degrade the measurement results, in particular:

- no extraneous conducting objects having any dimension in excess of a quarter wavelength of the highest frequency tested shall be in the immediate vicinity of the site;
- all cables shall be as short as possible; as much of the cables as possible shall be on the ground plane or preferably below; and the low impedance cables shall be screened.


The EUT shall be placed upon a non-conductive table 1.5 meters above the ground plane and shall be placed in the “worst case” transmitting mode. The EUT shall be rotated 360 degrees to find the azimuth maxima. The receive antenna shall then be raised and lowered between 1 to 4 meters to find the maximum signal emanating from the EUT. Once the maximum has been identified and recorded the EUT is replaced with a tuned dipole at the appropriate frequency and a signal generator is input into the dipole. The level is raised until the same signal strength is achieved. This signal strength is then recorded on the data sheets.

	5969 Robinson Avenue Riverside, CA 92503 (909) 637-2630 FAX (909) 637-2704		<b>Peak Power Output</b>			
	DNB Job Number:	38025	Date:	9 Aug 2002	<b>Conformance Standard</b>  FCC Part 15	
Customer:	Leica Geosystems Inc					
Model Number:	GS20 and WORCS	Serial Number:	Proto			
Description:	GPS Positioning Device				<b>Clause</b>  15.247 (b)	
Environmental Conditions						
Ambient Temperature		Relative Humidity		Barometric Pressure		
29 °C		35 %		100.8 kPa		
Rated Radiated Power in W		0.63 mW	Rated Radiated Power in dBm		-2 dBm	
Polarization of the measurement for the largest power level (Horizontal or Vertical)					Vertical	
TESTS	Measured Power (W/dBm) and Variation (W/dB)					
	Channel 1		Channel 2		Channel 3	
	W	dBm	W	dBm	W	dBm
Measured Radiated Power	0.00029	- 5.4	N/a	N/a	N/a	N/a
Variation	N/o *	N/o *	N/a	N/a	N/a	N/a
Measurement Uncertainty	+/- 0.5dB					
Limit per 15.247 (b)	1W					
Notes	N/o * = No Variation observed during test					
	Test performed under normal operating conditions					
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    C L Payne III						

**15.247 (c) Field Strength of Harmonics and Spurious Out of Band Emissions**

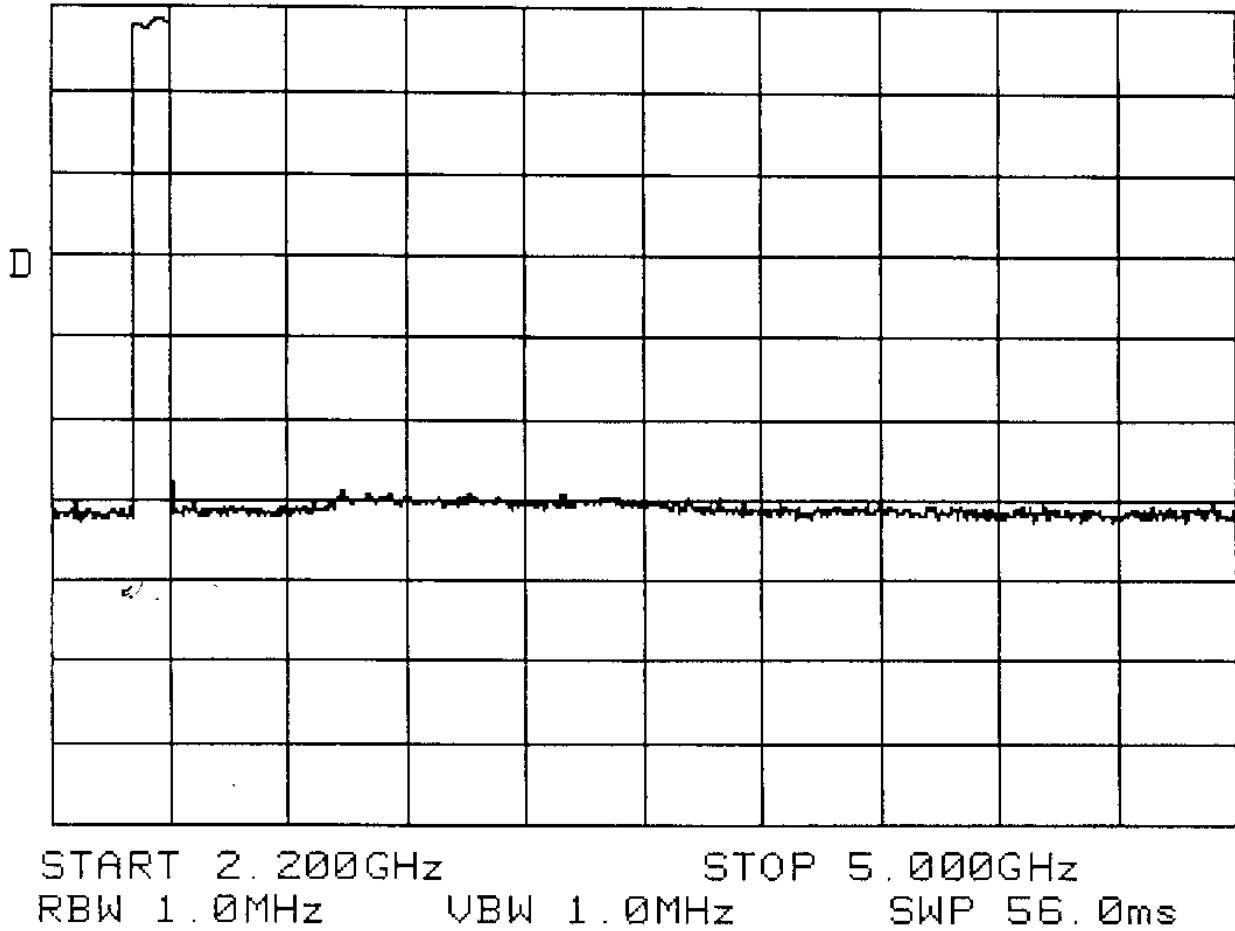
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The EUT was placed upon the Open Area Test Site (OATS) and the radiated spurious emissions were recorded from the EUT. Harmonics of the transmitter frequency were evaluated for their maximum emissions. The substitution method was used as in the peak power output test except for frequencies above 1GHz a Double Ridge Guide (Horn) antenna was used.

		5969 Robinson Avenue Riverside, CA 92503 (909) 637-2630 FAX (909) 637-2704		<b>XMTR Spurious Emissions</b>							
DNB Job Number:		38025		Date:		2 Oct 2002		<b>Conformance Standard</b>  FCC Part 15  Clause 15.247 (c)			
Customer:		Leica Geosystems Inc									
Model Number:		GS20 and WORCS		Serial Number:		Proto					
Description:		GPS Positioning Device									
Environmental Conditions											
Ambient Temperature				Relative Humidity				Barometric Pressure			
32 °C				36 %				100.8 kPa			
Spurious Emissions Level (dBm)											
Channel 1				Channel 2				Channel 3			
f (GHz)	BW (kHz)	Level (dBuV)	Limit (dBuV)	f (GHz)	BW (kHz)	Level (dBuV)	Limit (dBuV)	f (GHz)	BW (kHz)	Level (dBuV)	Limit (dBuV)
4.84	100	< 37	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
7.24	100	< 37	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
9.64	100	< 37	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
12.04	100	< 37	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
14.44	100	< 38	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
16.84	100	< 38	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
19.24	100	< 42	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
21.64	100	< 42	54	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
Measurement Uncertainty						+/- 0.5 dBm					
Notes	Antenna polarization for maximum reading was vertical										
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No    C L Payne III											

15.247 (c) RF Antenna Conducted of Harmonics and Spurious Emissions

This EUT incorporates an integral antenna. The antenna was disconnected and a fifty ohm load was installed. The signal was then directly coupled into a spectrum analyzer. The output signal from 2.400 to 2.480 Ghz was transmitted so that the fundamental frequency could be observed. No signal above the ambient were observed during this test.



**15.207 Power Line Conducted Emissions**

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Not Applicable – EUT is battery operated only. No connect to the mains supply.




**15.209 Radiated Emissions – Class B**

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Radiated emissions generated by the EUT were measured in the applicable frequency range on a 10 meter open area test site. All radiated data was recorded.

To measure radiated emissions, the EUT was set up on the 10 meter open air test site. The EUT is placed on a wooden Table which rests on a wooden turntable. The top of the table is one meter above the ground, and the turntable can be rotated 360 degrees. For each frequency measured, the antenna is raised and lowered for both horizontal and vertical polarities to obtain the maximum reading on the analyzer. The turntable is also rotated throughout the 360 degrees in azimuth to determine the position of the maximum emissions. The applicable frequency range is searched using the antennas listed below. The respective antenna and preamplifier were connected to an HP 8568B Spectrum Analyzer or equivalent. Preamplifiers were used for all ranges to achieve the needed dynamic range.



5969 Robinson Avenue  
 Riverside, CA 92503  
 (909) 637-2630  
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**EMI Datasheet**

DNB Job	38025	Date:	1 Oct 2002	Specification <input checked="" type="checkbox"/> EN55022 Class B <input checked="" type="checkbox"/> CISPR Class B <input checked="" type="checkbox"/> FCC Part 15 Class B
Customer:	Leica Geosystems Inc			
Model	GS20 and WORCS	S/N:	Proto	
Description:	GPS positioning system			

EUT performed within the requirements of the applicable Standard(s)	<input checked="" type="checkbox"/> X	<input type="checkbox"/> YES	<input type="checkbox"/> NO	Signed	Date Signed
Bcn = A.H. Systems SAS-200/540 Biconical Antenna S/N 138 (30-200 MHz) Log = EMCO 3146 Log-Periodic Antenna S/N 1284 (200-1000 MHz) Dcf = Distance Correction Factor = $20 \cdot \text{LOG}_{10}(\text{Test Distance} / \text{Specification Distance})$ Typ = Type of reading PK = Peak reading QP = Quasi-peak reading	Cbl = Cable Loss Amp = Preamplifier Gain Pl = Antenna polarity V = Vertical H = Horizontal Hgt = Antenna height in meters x.xx = 1.00 to 4.00 meters Tbl = Table Position in degrees xxx = 000 to 360 degrees "*" = Readings taken with a res bandwidth of 10KHz do to nearby ambient signal				

NOTES: Limits for EN55022 Class B were used for compliance testing. No significant readings above 1 Ghz were observed.

FREQ.	Meter	Bcn	Log	Cbl	Amp	Def	Corr	Lim	Delta	Typ	Tbl	Pl	Hgt
120.272	28.2	14.6	0	1.5	-24.0	0	20.3	30	-9.7	PK	147	H	1.16
240.010	38.7	0	13.8	2.1	-24.1	0	30.5	37	-6.5	PK	292	H	3.73
279.979	37.3	0	15.4	2.3	-24.2	0	30.8	37	-6.2	PK	111	H	3.97
280.019	38.3	0	15.4	2.3	-24.2	0	31.8	37	-5.2	PK	285	H	2.68
360.034	31.5	0	17.4	2.7	-24.4	0	27.2	37	-9.8	PK	125	H	2.99
439.994	24.5	0	20.1	3.0	-24.6	0	23	37	-14	PK	104	H	1.73
600.033	32.2	0	22.7	3.4	-24.9	0	33.4	37	-3.6	QP	103	H	1.26
840.052	29.6	0	24.2	4.3	-24.9	0	33.2	37	-3.8	PK	294	H	1.26
120.021	31.4	14.6	0	1.5	-24.0	0	23.5	30	-6.5	PK	353	V	1.16
240.004	30.8	0	13.8	2.1	-24.1	0	22.6	37	-14.4	PK	199	V	2.08
280.003	28.5	0	15.4	2.3	-24.2	0	22	37	-15	PK	161	V	2.08
360.003	28.3	0	17.4	2.7	-24.4	0	24	37	-13	PK	63	V	2.08
480.003	26.4	0	21.7	3.1	-24.7	0	26.5	37	-10.5	PK	360	V	2.08
600.014	31.0	0	22.7	3.4	-24.9	0	32.2	37	-4.8	PK	144	V	2.48
840.014	26.0	0	24.2	4.3	-24.9	0	29.6	37	-7.4	PK	46	V	2.48

**2.1033 (b) (7) Equipment Photographs**

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- Photo 1      Top Cover off – WORCS
- Photo 2      Detail View – Bluetooth module – Top
- Photo 3      Detail View – Bluetooth module – Bottom
- Photo 4      Detail View – WORCS – External View

Photo 1 Top Cover off - WORCS

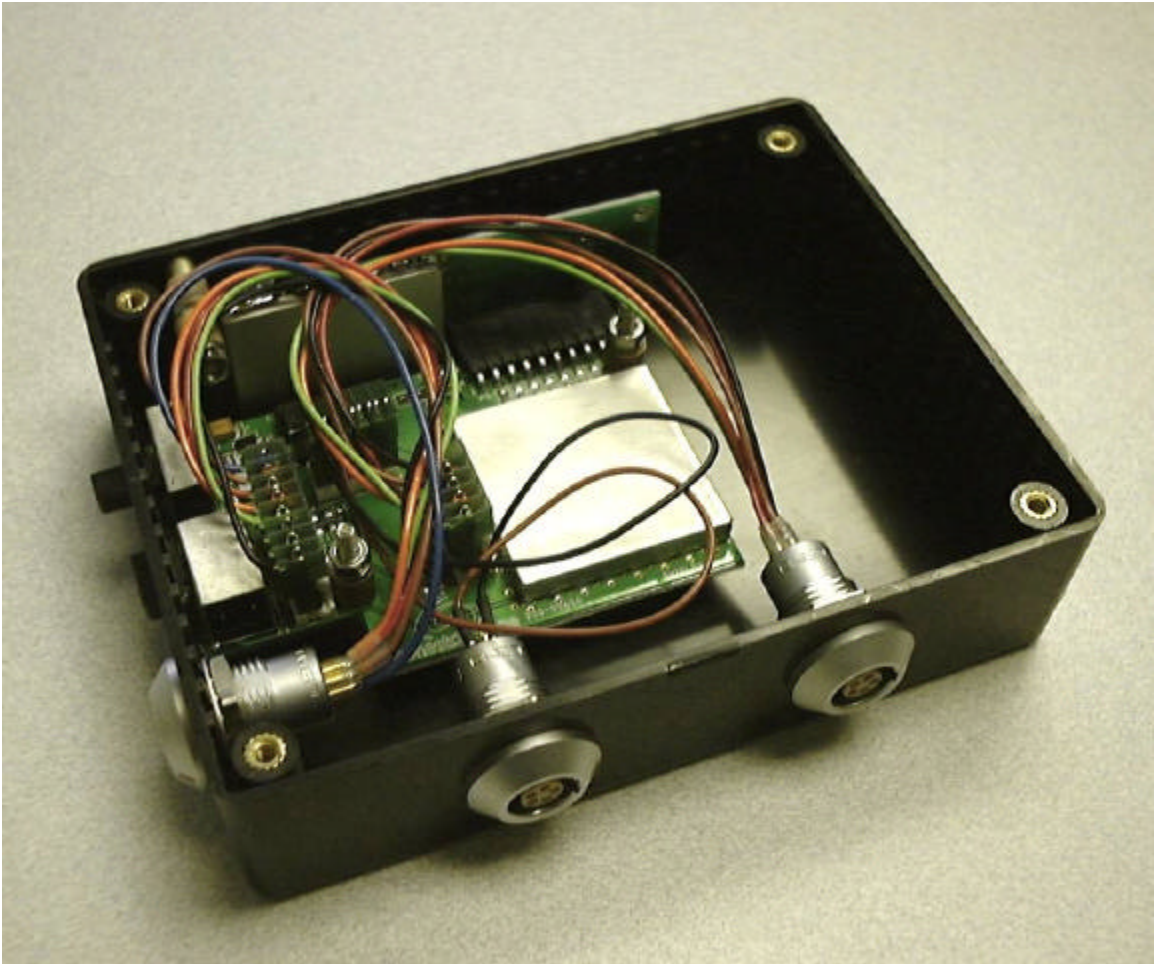


Photo 2 Detail View – Bluetooth module – Top



Photo 3 Detail View – Bluetooth module – Bottom

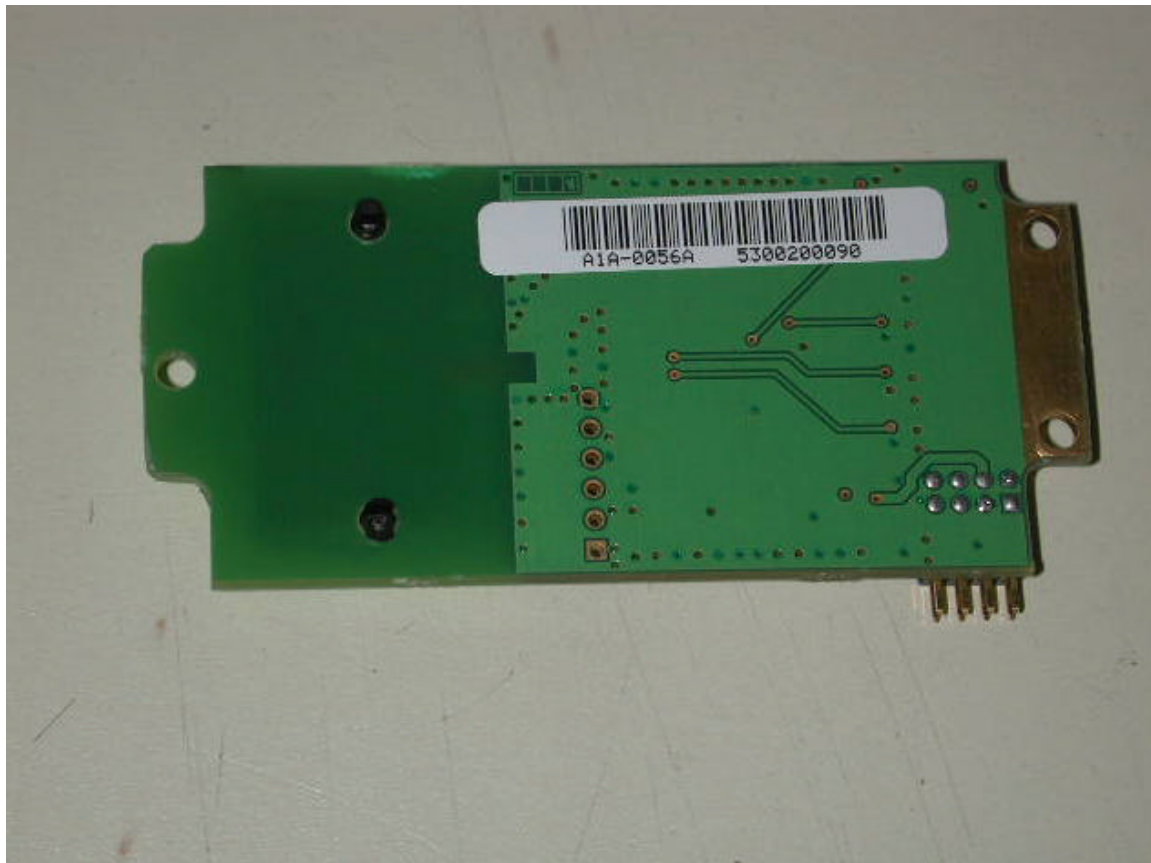




Photo 4 Detail View – GS20 – External View



**2.1033 (b) (10) Spread Spectrum Transmitters - FHSS**

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The receiver for this device was tested at the same time as the transmitter. The transmitter / receiver are located in the GS20 and the WORCS and both were tested concurrently. The data within this report shows compliance of the FHSS receiver with the FCC Technical requirements.



Test Equipment Log						
Item No:	Description	Manufacturer	M/N	S/N	DNB Asset	Cal Due
68	Antenna, Log Periodic	Emco	3146	1284	31	1/2/2004
69	Temperature Chamber	Sigma Systems	170	487	77	NCR
29	QP Adapter	Hewlett Packard	85650A	2043A00184	101	6/14/2003
71	Integratred Stereo Amplifier	Realistic	sa-10;31-1982a	356	167	NCR
39	Oscilloscope	LeCroy	9400	85584	209	2/26/2002
73	Pre-Amplifier 4-8G	Miteq	AFD304008040	121391	364	5/10/2003
65	Pre-Amplifier	Hewlett Packard	10855A	1250-0212	387	2/15/2003
43	Artificial Mains Network	Schwarzbeck	NNLA 8120	8120288	498	6/12/2003
22	Safety Analyzer	Dynatech Nevada	431A	431A-1230	506	4/12/2003
74	Attenuator VHF	TenuLine	8341-200	902	604	5/10/2003
75	Pre-Amplifier 6Khz-500MHz	DNB	TF10010	7003	703	Out of Serv
54	Spectrum Analyzer 22 GHZ	Hewlett Packard	8565A	2232A02476	705	1/28/2003
76	Multimeter	Hewlett Packard	34740A	1213A05726	751	NCR
77	Power Supply 0-60VDC	Hewlett Packard	6024A	219A00964	769	NCR
26	QP Adapter	Hewlett Packard	85650A	2811A01240	844	8/27/2003
27	SA - RF Section	Hewlett Packard	85680B	2049A01403	845	6/14/2003
12	Oscilloscope	Tektronix	464	B133241	855	9/16/2003
30	ESD Power Supply/Gun	Haefely	PSD 25 B	083 427-05	858	3/29/2003
78	Field Monitor	Amplifier Research	FM 1000	60520	859	NCR
79	Field Probe	Amplifier Research	FP1000	60620	861	8/14/2004
44	A.C. Leakage Current Tester	Simpson	229-2	948	948	10/28/2003
15	AC/DC Current Probe	Amprobe	CT600	30301828	949	4/9/2003
4	Digital MultiMeter	Amprobe	AM-1250	330224	952	10/24/2003
5	LCR Meter	B & K Precision	878	23702237	956	10/24/2003
6	Digital MultiMeter	Amprobe	AM-1250	330139	957	8/6/2003
7	Dial Caliper	General MG	ULTRATEST	CD56903	958	12/18/2002
8	Micrometer	General MG	0-1"	N o S N #	959	12/17/2002
35	Precision Torque Gauge	SeeKonik	SL-12	967	967	7/9/2003
1	Push/Pull Scale	Imada	MF	70403	969	6/3/2003
9	Impact Hammer	E.D. & D.	F22-50	9606235-3	972	11/6/2002
51	L I S N	ComPower Corporation	L1-300	1373	997	5/13/2003
50	L I S N	ComPower Corporation	L1-300	1331	998	5/13/2003
80	Power Analyzer	Voltech	PM3000A	1273	1027	5/7/2003
32	Signal Source 9Khz-2Ghz	Marconi	2024	112231/034	1034	2/2/2003
55	WeatherLink	Davis Instruments	7400	PC70804A04	1056	2/19/2003
21	Weather Link	Davis Instruments	7400	PC70804A01	1057	1/29/2003
45	Leakage Current tester	Simpson	228	709721	1058	Out of Serv
81	Antenna Clpsbl Bicon	Antenna Research	CB1071	1063	1063	9/30/2004
37	Step Attenuator 120dB	Hewlett Packard	355D	2522A43896	1079	11/9/2002
38	Step Attenuator 12dB	Hewlett Packard	355C	2524A42578	1080	11/9/2002
3	Digital MultiMeter	Chief Engineer	104	31220125	1092	8/26/2003
2	Power Analyzer	Combinova	300	102	1093	Out of Serv
82	Spectrum Analyzer	Hewlett Packard	3585A	2718A05908	1102	8/26/2003
53	Function Generator	Hewlett Packard	3312A	1432A05880	1108	12/20/2002
24	SA - Display Section	Hewlett Packard	85662A	2318A05282	1109	8/27/2003

Test Equipment Log						
Item No:	Description	Manufacturer	M/N	S/N	DNB Asset	Cal Due
23	SA - RF Section	Hewlett Packard	85680B	2330A02791	1110	8/27/2003
63	Control Center	Key tek	ECAT SERIES 100	9603276	1117	NCR
10	Process Meter	Newport	INFCP-210	4381880	1119	4/5/2003
11	Process Meter	Newport	INFCP-210	6150730	1120	4/5/2003
83	Oscilloscope	Tektronix	7603	B341735	1124	Out of Serv
84	LISN	Solar	8028-50-TS-24-BNC	852331	1148	4/24/2003
85	LISN	Solar	8028-50-TS-24-BNC	852332	1149	4/24/2003
61	Attenuator	JFW	PE7010-20	1196	1196	5/16/2003
62	Attenuator	JFW	PE7010-20	1197	1197	5/16/2003
60	Current Probe	Solar	6741-1	922626	1209	5/16/2003
56	Digital Multi Meter	DI-LOG	DL-297T	637652	1210	2/4/2003
17	Data Aquisition Unit	Hewlett Packard	34970A	US37016877	1214	5/21/2003
13	Line Leakage Tester	Associated Research	510L	A130511	1215	4/19/2003
14	Safety Compliance Analyzer	Associated Research	7564SA	A100601	1216	4/19/2003
16	Data Aquisition Unit	Hewlett Packard	34970A	US37017024	1217	4/29/2003
86	Surge Withstand Tester	Beckwith Electronics	M-0180B	85	1239	6/21/2003
18	Input Multiplexer	Hewlett Packard	34901A	US37017773	1399	5/21/2003
19	Input Multiplexer	Hewlett Packard	34901A	US37017729	1400	5/21/2003
34	Scale 25lb Capacity	Hanson	40	1402	1402	4/26/2003
33	Scale 300lb Capacity	Hanson	8930	1403	1403	6/3/2003
25	RF Preselector	Hewlett Packard	85685A	2724A00659	1430	8/26/2003
49	Probe	Omega	HX94V		1442	04/05/03
40	Pressure Gauge	Ashcroft	0-30 PSI	1500	1500	9/13/2003
41	Pressure Gauge	Ashcroft	0-30 PSI	1501	1501	9/13/2003
42	Pressure Gauge	Ashcroft	0-30 PSI	1502	1502	9/13/2003
87	Input Multiplexer	Hewlett Packard	34901A	US41010235	1504	4/29/2003
46	Insulation Tester	Amprobe	AMB-1A	340055	1510	10/28/2003
47	Ground Continuity Tester	Rod-L	M25	12485	1511	10/29/2003
31	ESD Contact Finger	Haefely	093 579-1	083 071-11	1671	Out of Serv
36	Precision Torque Wrench	Husky	39104	4980656019	1672	7/18/2003
28	SA - Display Section	Hewlett Packard	85662A	2112A02234	1695	6/14/2003
88	Pre-Amplifier	Miteq	AFS4-08001800-35-LN	378064	1698	5/10/2003
89	Power Amplifier	Kalmus	757LCB/1-60-485-003	7902-1	1722	NCR
90	Control Box	Kalmus	757LCB/1-60-485-003	7902-1	1723	NCR
52	Near Field Probe Kit	Credence Technologies	CTK015	None	1724	NCR
57	Amplifier	Miteq	AFS4-08001800-30-ULN	834258	1725	Out of Serv
59	EFT Generator	Haefely	P90.1	083-315-19	1726	6/14/2003
91	Plotter	Hewlett Packard	7470A	2644V00406	1727	NCR
93	Emission Loop	Fischer Custom Comm.	F-55103-2-0.13m	9951	1729	4/30/2004
94	Chassis Bay	Key tek	ECAT SERIES 100	9603277	1730	NCR
95	Surge Network	Key tek	E501A	9603278	1731	4/30/2003
96	Mains Coupler/Dec	Key tek	E551	9603279	1732	4/30/2003
97	TWTA	Hughes	8020H10F000	113	1733	NCR
64	Xwing Bilog Antenna	Chase	CBL6140	1048	1734	6/10/2003

Test Equipment Log						
Item No:	Description	Manufacturer	M/N	S/N	DNB Asset	Cal Due
58	Bicon Antenna	A.H. Systems Inc.	SAS-200/540	524	1758	1/2/2004
98	Pre-Amplifier 10-2000MHz	Mini-Circuits	ZFL-2000	8350	1760	5/10/2003
99	Pre-Amplifier	Miteq	JS2-0200400	664011	1761	5/10/2003
100	Ref Dipole Antenna	Comp Design	Antenna Kit	NSN	1762	NCR
101	Ref Dipole Antenna	Comp Design	Antenna Kit	NSN	1763	NCR
102	Biconical Antenna	AH Systems	SAS-200/540	138	1764	2/14/2004
103	Amplifier	Hughes	8020H10F000	113	1765	NCR
104	Power Supply	Hewlett Packard	8268B	1436A01139	1766	NCR
105	Random Noise Generator	General Radio	1390-B	3285	1767	NCR
107	Injection Probe	Fischer Custom Comm.	F-120-9B	33	1769	NCR
108	Attenuator	Emco	A8230M30db	NSN	1770	5/10/2003
109	Attenuator Kit	Alan	Attenuator Kit	117018	1771	5/10/2003
110	Attenuator Kit	Alan	Attenuator Kit	117019	1772	5/10/2003
111	Signal Generator	Hewlett Packard	200CD	229-45278	1773	NCR
112	Telecom Pairs Kit	Fischer Custom Comm.	FCC-TLISN-T4	20068	1774	NCR
113	Power Source	California Instruments	4500iL	51859	1775	NCR
114	Variac	Staco	3PN2210	NSN	1776	NCR
115	Variac	Staco	3PN1010V	NSN	1777	NCR
116	High Voltage Pulse	DNB	NMN	NSN	1778	NCR
117	Power Supply	California Instruments	351TC	L32208	1779	NCR
118	Attenuator	Mini-Circuits	CAT-10	931812	1786	5/10/2003
66	Power Line CDN	Fischer Custom Comm.	FCC-801-M3-16A	110	1791	6/13/2003
119	ESD Simulator	Haefely	PESD3000	H002033	1841	6/13/2003
120	RS-Bhead-Antenna Cable	DNB	RG214	11858	1858	7/26/2003
121	RSTemcell Load-9'	DNB	RG214	11859	1859	7/26/2003
122	RS-SigGen-Amp4'	DNB	RG214	11860	1860	7/26/2003
123	RS-AmpBulkhead 5'	DNB	RG214	11861	1861	7/26/2003
124	RS-Bhead Injection Probe	DNB	RG214	11862	1862	7/26/2003
125	RS-Cprobe-Bhead	DNB	RG223	11863	1863	7/26/2003
126	RS-Amplifier-Bhead 5'	DNB	RG214	11864	1864	7/26/2003
127	RS-BheadSpAntenna	DNB	RG58	11865	1865	7/26/2003
129	Riv Cable - A-3'	DNB	NMN	11871	1871	7/26/2003
130	Riv Cable - B-4'	DNB	NMN	11872	1872	7/26/2003
131	Riv Cable - C-6'	DNB	NMN	11873	1873	7/26/2003
132	Riv Cable - D-range	DNB	NMN	11874	1874	7/26/2003
133	Ric Cable - E-27'	DNB	NMN	11875	1875	7/26/2002
134	Voltage Probe	Emco	3701	9703-1156	1879	12/12/2001
135	Range Cable	DNB	NMN	11880	1880	8/14/2003
138	80' RG214 Cable	DNB	NMN	11883	1883	8/14/2003
139	60' RG214 Cable	DNB	NMN	11884	1884	8/14/2003
140	10' RG214 Cable	DNB	NMN	11885	1885	8/14/2003
67	Antenna, DRG	Emco	3115	2281		1/2/2004