FCC CFR47 PART 15 CERTIFICATION
CLASS II PERMISSIVE CHANGE
TEST REPORT

FOR

FHSS WIRELESS LAN SYSTEM

MODEL: LA3021-100

FCC ID: H9PLA3021-100

REPORT NUMBER: 02U1371-2

ISSUE DATE: JUNE 27, 2002

Prepared for
COGNITIVE
720 CORPORATE CIRCLE, UNIT E
GOLDEN, COLORADO, 80401
USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561 F MONTEREY ROAD
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LAB CODE:200065-0

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COMPLIANCE CERTIFICATION SERVICES DOCUMENT NO: CCSUP4031A
561F MONTEREY ROAD, MORGAN HILL, CA 95037 USA
TEL: (408) 463-0885 FAX: (408) 463-0888

1. TEST RESULT CERTIFICATION

COMPANY NAME: **COGNITIVE**
720 CORPORATE CIRCLE, UNIT E
GOLDEN, CO 80401 USA

CONTACT PERSON: **ROGER SHEPHERD/ PROJECT MANAGER**

TELPHONE NO: **303-273-1400 EXT 331**

EUT DESCRIPTION: **FHSS WIRELESS LAN SYSTEM**

MODEL: **LA3021-100**

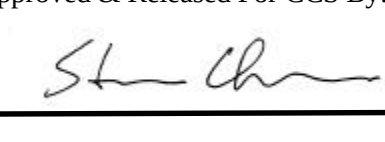
DATE TESTED: **JUNE 24, 2002**

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	2.4GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CERTIFICATION, CLASS II PERMISSIVE CHANGE
FCC RULE	CFR 47 PART 15 SUBPART C

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 15 SUBPART C. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

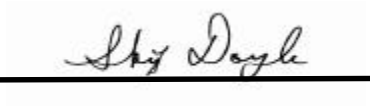
Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:



STEVE CHENG
EMC ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES

Tested By:



SKIP DOYLE
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The Symbol's Technologies Model H9PLA3021-100 is a 2.4GHz Spread Spectrum Radio in the form of a PCMCIA Card that is used for wireless communication from a computer to a LAN.

• Indoor Range approx. 50meters	• Frequency Range: 2.4-2.4835GHz FHSS
• Outdoor Range approx. 350meters	• US and Canada has 75 Channels (USA) 79 Channels (Canada)

EUT Printed Circuit Board Information

Board Name	**CRYSTALS/CLOCKS (MHZ)**
PRINTER BOARD	14.7456MHz
RF BOARD	12.0000MHz

3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This Class II Permissive Change adds on additional Antenna Configuration to the list of previously approved Antennas for the Model LA-3021-100 WLAN PC Card.

-No changes were made on the original RF Circuit.

-The antenna. It is a simple dipole antenna mounted inside the printer.

4. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

5. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

6. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

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7. Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548,IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	NVLAP 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	FC 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	N ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	N ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government

8. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

TEST EQUIPMENTS LIST				
Name of Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Due Date**
Spectrum Analyzer	**HP**	**8568B**	**2841A04227**	**4/15/03**
SA Display	**HP**	**85662A**	**2314A04793**	**4/15/03**
Quasi-Peak Detector	**HP**	**85650A**	**2521A01038**	**4/15/03**
Pre-Amplifier	**HP**	**8447D**	**2944A06550**	**8/10/02**
Antenna, Bicon	**EATON**	**94445-1**	**1214**	**3/30/03**
Antenna, Log	**EMCO**	**3146**	**2120**	**3/30/03**
Spectrum Analyzer	**HP**	**8566B**	**2140A01296**	**5/23/03**
SA Display	**HP**	**85662A**	**3026A19146**	**5/23/03**
Quasi-Peak Detector	**HP**	**85650A**	**2811A01335**	**5/23/03**
Pre-Amplifier	**Miteq**	**NSP2600-44**	**646456**	**4/26/03**
Antenna, Horn	**ETS**	**3115**	**6717**	**1/31/03**

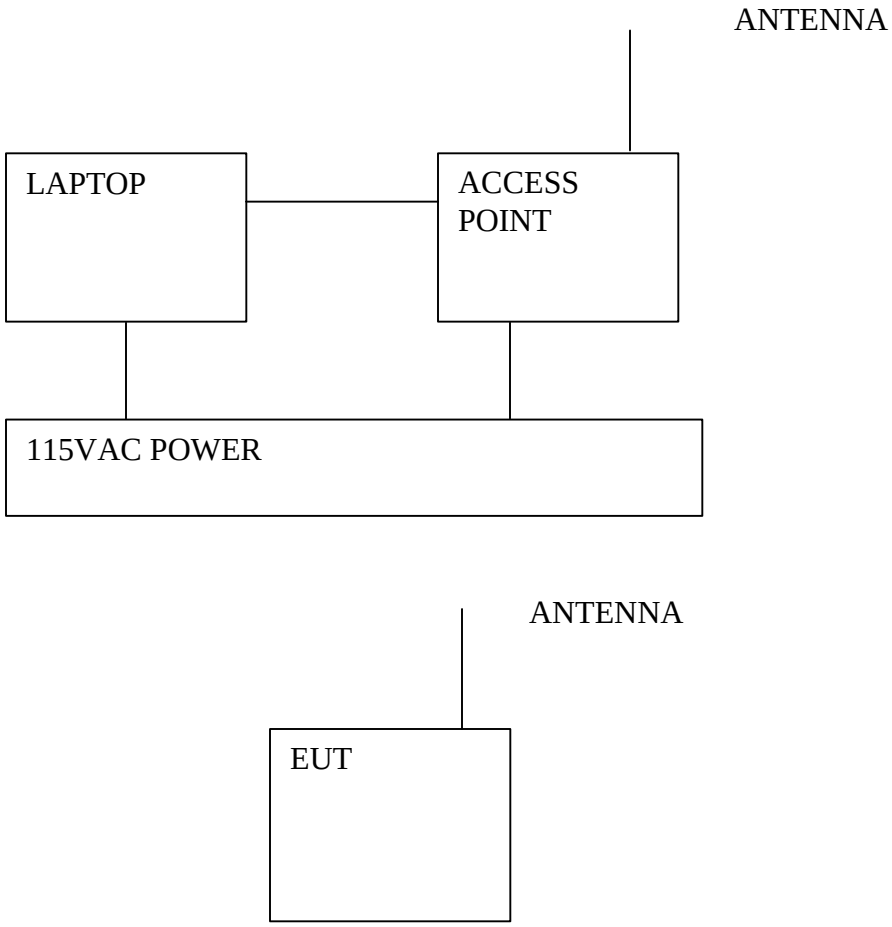
9. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

10. SUPPORT EQUIPMENT / TEST DIAGRAM



11. APPLICABLE RULES AND BRIEF TEST RESULT

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	([2])
13.36 - 13.41	322 - 335.4		

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

Spec limit: As specified above,.
Test result: No non-compliance noted.

§15.209- RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Spec limit: As specified above.
Test result: No non-compliance noted.

12. RADIATED EMISSION

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak ☒ Quasi Peak	☒ 100 KHz ☒ 1 MHz	☒ 100 KHz ☒ 1 MHz
Above 1000	☒ Peak ☒ Average	☒ 1 MHz ☒ 1 MHz	☒ 1 MHz ☒ 10 Hz

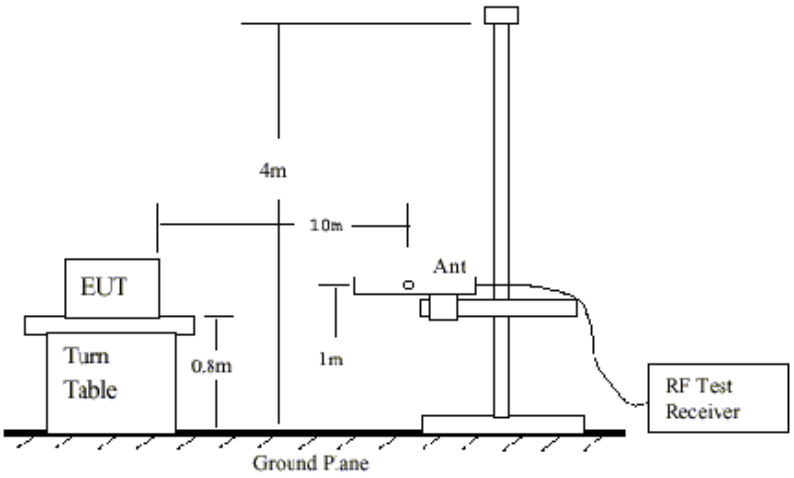


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

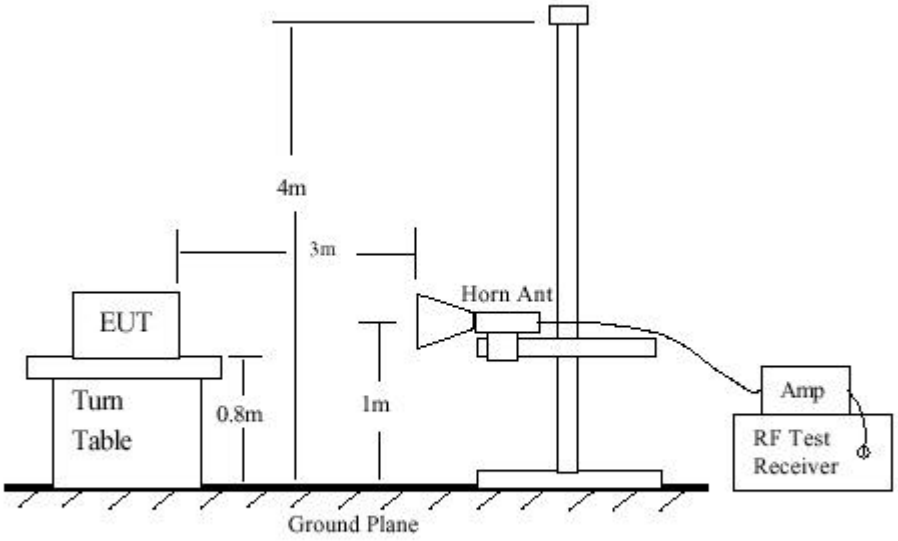


Fig 2: Radiated Emission Above 1000 MHz

TEST SETUP & PROCEDURE

1. The EUT was placed on the turn table 0.8 meter above ground in 3 meter open area test site.
2. Set the resolution bandwidth to 120KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turn table and stop at the angle where the measurement device has maximum reading.
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak.

7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures 3 ~ 7. If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.
8. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures 3 ~ 7 for frequency band from 1 GHz to 10 times carrier frequency.
9. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 300Hz. Repeat procedures 3 ~ 7. If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

RESULT

No non-compliance noted, as shown below.

COMPLIANCE Certification Services
FCC, VCCI, CISPR, CE, AUSTEL,
UL, CSA, TUV, BSMI, DHHS,
561F MONTEREY ROAD, SAN JOSE, CA 95037-
PHONE: (408) 463- FAX: (408) 463-0888

Project #:	
Report #:	02U1371-2
Date& Time:	020624C1
Test Engr:	06/24/02 11:16 AM
	Skip Doyle

Company:	Cognitive
EUT Description:	Code Ranger Model: RD222424-0H4 Printer
Test Configuration :	EUT is setup on the 80cm table and support is inside lab area
Type of Test:	FCC 15.209 30-1000MHz
Mode of Operation:	EUT is in Tx and Rx mode communicating w/Access Point

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
540.00	49.70	18.35	3.62	28.02	43.64	46.00	-2.36	3mV	0.00	2.50	P
67.50	54.00	6.22	0.98	27.44	33.76	40.00	-6.24	3mV	0.00	1.00	P
540.00	44.10	18.35	3.62	28.02	38.05	46.00	-7.95	3mH	0.00	1.50	P
54.00	46.90	9.54	0.89	27.48	29.85	40.00	-10.15	3mV	0.00	1.00	P
240.00	45.60	11.61	2.14	26.70	32.65	46.00	-13.35	3mV	0.00	1.00	P
80.00	43.60	7.48	1.08	27.41	24.75	40.00	-15.25	3mV	0.00	1.00	P
6 Worst Data											

FCC Measurement

Compliance Certification Services, Morgan Hill Open Field Site C

Customer: Cognitive 06/24/02

EUT Model: LA-3021-100

Test Engineer: Skip Doyle

Equipment Used: HP 8566B S/A

Miteq NSP2600-44 Pre Amplifier

ETS Horn Antenna Model 3115

Cable length

16.0 feet

Distance to Antenna

3.3 feet

Average Measurements: Peak Measurements:

1 MHz Resolution Bandwidth 1MHz Resolution Bandwidth

10Hz Video Bandwidth 1MHz Video Bandwidth

f	Peak R.	Avg. R.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Pk Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
1.062	85.2	72.7	23.3	2.6	-42.8	-9.5	1.0	59.9	47.4	74.0	54.0	-14.1	-6.6	V
1.080	79.1	67.4	23.3	2.7	-42.7	-9.5	1.0	53.8	42.1	74.0	54.0	-20.2	-11.9	V
1.000	79.7	65.6	23.1	2.6	-42.8	-9.5	1.0	54.1	40.0	74.0	54.0	-19.9	-14.0	V
1.260	74.9	60.7	32.5	2.9	-42.7	-9.5	1.0	59.1	44.9	74.0	54.0	-14.9	-9.1	V
1.500	70.2	60.5	24.5	3.2	-42.6	-9.5	1.0	46.8	37.1	74.0	54.0	-27.2	-16.9	V
4.900	72.2	61.8	32.5	6.2	-41.8	-9.5	1.0	60.6	50.2	74.0	54.0	-13.4	-3.8	V
7.350	61.3	48.5	36.8	7.8	-41.1	-9.5	1.0	56.3	43.5	74.0	54.0	-17.7	-10.5	V
9.800	62.0	49.1	37.6	9.2	-39.3	-9.5	1.0	60.9	48.0	74.0	54.0	-13.1	-6.0	V
12.250	56.8	38.4	39.2	10.2	-40.2	-9.5	1.0	57.5	39.1	74.0	54.0	-16.5	-14.9	V
1.000	72.4	59.5	23.1	2.6	-42.8	-9.5	1.0	46.8	33.9	74.0	54.0	-27.2	-20.1	H
1.062	56.7	41.5	23.3	2.6	-42.8	-9.5	1.0	31.4	16.2	74.0	54.0	-42.6	-37.8	H
1.080	69.9	57.2	23.3	2.7	-42.7	-9.5	1.0	44.6	31.9	74.0	54.0	-29.4	-22.1	H
1.260	67.9	55.7	23.8	2.9	-42.7	-9.5	1.0	43.4	31.2	74.0	54.0	-30.6	-22.8	H
1.500	65.4	52.7	24.5	3.2	-42.6	-9.5	1.0	42.0	29.3	74.0	54.0	-32.0	-24.7	H
4.900	64.5	51.2	32.7	6.2	-41.8	-9.5	1.0	53.1	39.8	74.0	54.0	-20.9	-14.2	H
7.350	53.8	41.2	36.8	7.8	-41.1	-9.5	1.0	48.8	36.2	74.0	54.0	-25.2	-17.8	H
9.800	53.4	42.7	37.6	9.2	-39.3	-9.5	1.0	52.3	41.6	74.0	54.0	-21.7	-12.4	H
12.250	44.9	32.4	39.2	10.2	-40.2	-9.5	1.0	45.6	33.1	74.0	54.0	-28.4	-20.9	H

Remark: No EUT emission frequencies detected above 12.250 GHz.

f	Measurement Frequency	HPF	High Pass filter
Peak R.	Analyzer Peak Reading	Peak	Calculated peak field Strength
Avg. R.	Analyzer Avg.Reading	Avg	Calculated average field Strength
AF	Antenna Factor	Pk Lim	Peak Field Strength Limit
CL	Cable Loss	Avg Lim	Average Field Strength Limit
Amp	Pre amp gain	Pk Mar	Margin vs. Peak Limit
D Corr	Discorrections to 3 meter	Avg Mar	Margin vs. Average Limit

This is the worst case channel, high frequency RD Measurement.

13. SETUP PHOTOS

Radiated Emission photos:

FCC testing above 1GHz:

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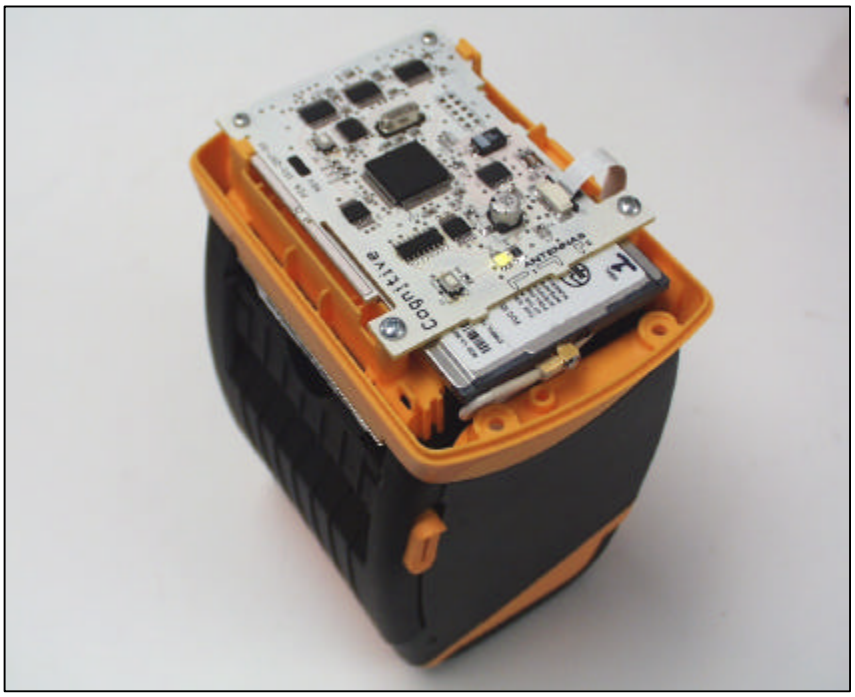
ATTACHMENT

EUT PHOTOGRAPHS



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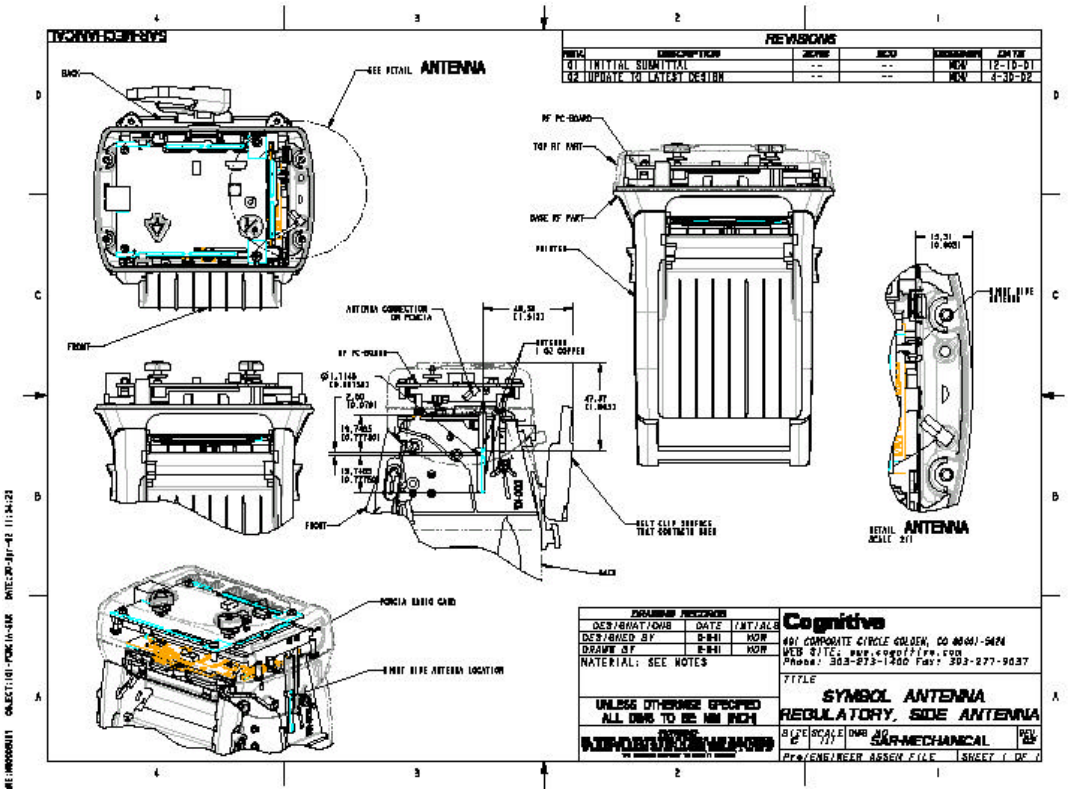

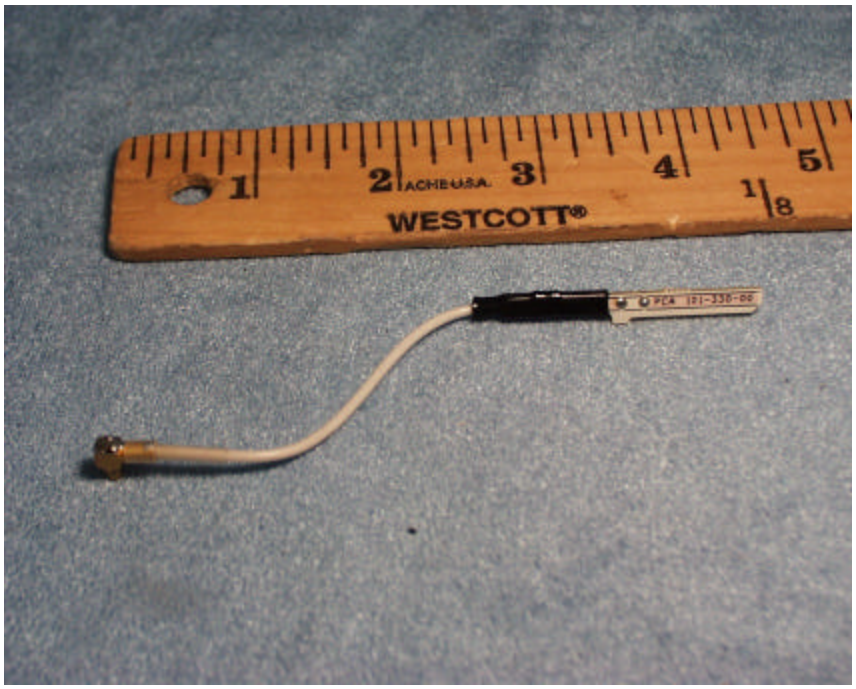

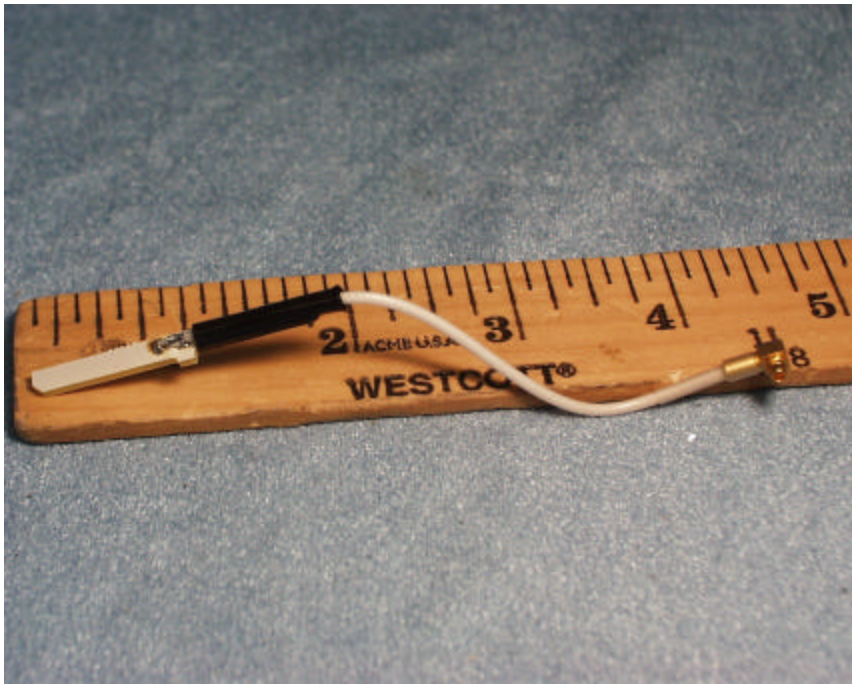

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