

FCC Part 15.247 Test Report for Symbol Technologies on the Model: LA4121 FCC ID: Not Labeled

Test Report #: J20008658d Date of Report: April 11, 2000

Job #: J20008658-C Date of Test: April 3 & 7, 2000

Total No. of Pages Contained in this Report: <u>25</u> + data pages

NVLAG

Other My 2 for	Barry E. Smith, Test Engineer
David Chemomondik	David Chernomordik, Ph.D., EMC Site Manager

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FCC Part 15 DSSS Cert, Rev 9/99







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Summary of Tests 1.0

MODEL: LA4121

TEST	REFERENCE	RESULTS			
Max. Output power	15.247(b)	Pass			
6 dB Bandwidth	15.247(a)(2)	Pass			
Max. Power Density	15.247(d)	Pass			
Out of Band Antenna Conducted Emission	15.247(c)	Pass			
Out of Band Radiated Emission	15.247(c)	N/A			
Radiated Emission in Restricted Bands	15.247(c)	Pass			
AC Conducted Emission	15.207	Pass spe Doc report			
Radiated Emission from Digital Part	15.109	Pass			
Radiated Emission from Receiver L.O.	15.109	Not Applicable			
Processing Gain Measurements	15.247(e)	Provided by applicant			
Antenna Requirement	15.203	Pass			

Test Engineer: CE. M. G.C. Date: 5/5/02 Barry E. Smith ()

EMC Site Manager: David Chernomodic Date: 5/5/00 David Chernomordik, Ph.D.

EMC Site Manager



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2.0 General Description

2.1 Product Description

The Symbol Technologies model LA4121 is 2.4 GHz Spread Spectrum radio in the form of a PCMCIA card that is used for wireless communication from a computer to a LAN.

A pre-production version of the sample was received on January 31, 2000 in good condition.

Applicant	Symbol Technologies
Trade Name & Model No.	Symbol Technologies / LA4121
FCC Identifier	Not Labeled
Use of Product	
Manufacturer & Model of	Symbol Technologies
Spread Spectrum Module	
Type of Transmission	Direct Sequence
Rated RF Output (mW)	22 dBm
Frequency Range (MHz)	2412 – 2462 MHz
Number of Channel(s)	11
Antenna(s) & Gain, dBi	9
Processing Gain Measurements	[] Will be provided to ITS for submission with the application
	[] Will be provided directly to the FCC reviewing engineer by the client or
	manufacturer of the spread spectrum module
Antenna Requirement	[] The EUT uses a permanently connected antenna.
	[X] The antenna is affixed to the EUT using a unique connector which
	allows for replacement of a broken antenna, but DOES NOT use a standard
	antenna jack or electrical connector.
	[] The EUT requires professional installation (attach supporting
	documentation if using this option).
Manufacturer name & address	Symbol Technologies
	2145 Hamilton Avenue
	San Jose CA 95125

Overview of LA4121

2.2 Related Submittal(s) Grants

None



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2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is site 2. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.



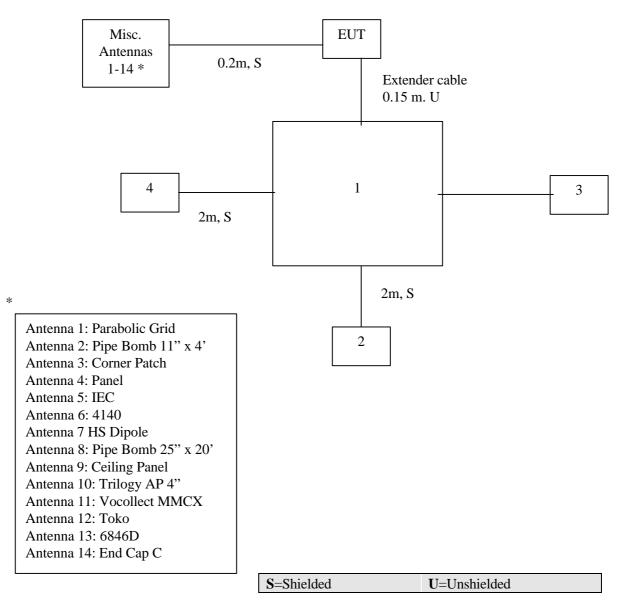
Date of Test: April 3 & 7, 2000

3.0 System Test Configuration

3.1 Support Equipment and description

Item #	Description	Model No.	Serial No.
1	Dell PC	Latitude M233ST	Z8T5U
2	Dell Monitor	D1428-HS	2922CV22495
3	Datatronics Modem	1200CK	07-305041
4	HP Printer	2225C+	2921\$45711

4.2 Block Diagram of Test Setup





1365 Adams Ct. Menlo Park, CA 94025

Symbol Technologies, Model No. LA4121 FCC ID:

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3.3 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

Detector functions are in peak and average modes for frequencies above 1 GHz.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

3.5 Mode of Operation During Test

EUT was set to continuously transmit.

3.6 Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by Symbol Technologies prior to compliance testing):

No modifications were installed by Intertek Testing Services.

3.7 Additions, deviations and exclusions from standards

No additions, deviations, or exclusions were made to the standard.



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4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)

Requirement

For antennas with gains of 6 dBi or less, maximum allowed transmitter output power is 1 watt (+30 dBm).

For antennas with gain greater than 6 dBi, transmitter output power must be decreased by an amount equal to (GAIN - 6) dB.

Procedure **Procedure**

- [X] The antenna port of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals.
- [] The antenna port of the EUT was connected to the input of a spectrum analyzer. The analyzer was set for maximun RES BW and power was read directly in dBm. External attenuation and cable loss were compensated for using the OFFSET function of the analyzer.

Max. antenna gain = 9 dBi									
Frequency (MHz)	Output in dBm	Output in mWatt							
2412	21.8								
2437	20.5								
2462	19.4								

Cable loss: <u>0</u> dB

External Attenuation: 0 dB

Cable loss, external attenuation:

[x] included in OFFSET function []added to SA raw reading

Test Result

EUT Transmit Antenna Gain(dBi) + dBm max. output power = 31.8 dBm (less than 36 dBm)

The EUT passed the test



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4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

Requirement

For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

Test Result

Frequency (MHz)	Min. 6 dB Bandwidth (kHz)				
2437	9760				

Refer to the following plots for 6 dB bandwidth sharp:

Plot 2a: Low Channel 6 dB RF Bandwidth Plot 2b: Middle Channel 6 dB RF Bandwidth Plot 2c: High Channel 6 dB RF Bandwidth

The EUT passed the test.



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4.3 Maximum Power Density Reading, FCC Rule 15.247(d):

Requirement

The peak power spectral density shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Procedure

The spectrum analyzer RES BW was set to 3 kHz. The START and STOP frequencies were set to the band edges of the maximum output passband. If there is no clear maximum amplitude in any given portion of the band, it may be necessary to make measurements at a number of bands defined by several START and STOP frequency pairs. Total SWEEP TIME is calculated as follows:

SWEEP TIME (SEC) = (Fstop, kHz - Fstart, kHz)/3 kHz

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Frequency (MHz)	Power Density (dBm)				
2412	1.9dBm				

Frequency Span = 2100 kHz

Sweep Time = Frequency Span/3 kHz = 700 seconds

Test Result

Refer to the following plots for power density data:

Plot 3a: Low Channel Power Density Plot 3b: Middle Channel Power Density Plot 3c: High Channel Power Density



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4.4 Out of Band Conducted Emissions, FCC Rule 15.247(c):

Requirement

In any 100 kHz bandwidth outside the frequency band, the RF power shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Test Procedure

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. Several plots were made to show Out of Band Conducted Emissions in the frequency range from 1 MHz to 25 GHz.

Test Result

Refer to the following plots for out of band conducted emissions data:

Plot 4a.1 - 4a.6: Low Channel Emissions Plot 4b.1 - 4b.6: Middle Channel Emissions Plot 4c.1 - 4c.6 : High Channel Emissions

The EUT passed the test



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4.5 Out of Band Radiated Emissions (except Radiated emissions in Restricted Bands), FCC Rule 15.247(c).

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the radiated emission requirement. (20 dB below in- band emissions)

[x] Not required. All out-of-band conducted emissions at least 20 dB below in-band conducted emissions.
 [] See attached data sheet



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4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.247 (c), 15.209, 15.35(b), (c):

Radiated emission measurements were performed according ANSI C63.4 Requirements. Radiated emission measurements were performed from 30 MHz to 25 GHz. Analyzer resolution bandwidth (Res BW) was 100 kHz or greater for frequencies from 30 MHz to ! GHz, and 1 MHz for frequencies above 1GHz.

All measurements below 1 GHz were performed with peak detection unless otherwise specified, all measurements above 1 GHz were performed with peak and average detection.

In addition for antenna with highest antenna gain (antenna 15), radiated emissions on the band-edge frequencies were performed using a "delta method". The field strength at the fundamental frequencies (E_0) was measured and recorded (peak and average level) at lowest and highest channels. The conducted emission plots were made to show attenuation (delta) at the 2483.5 MHz and up to 2500 MHz (for high channel), and attenuation at 2390 MHz and down to 2310 MHz (for low channel). Radiated emission at the band-edge frequencies were calculated by subtracting "delta" from field strength at the fundamental frequencies.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

For band-edge frequency 2483.5 MHz:

at 2462 MHz $E_0 = 102.1 \text{ dBuV}$ (average), $E_0 = 106.0 \text{ dBuV}$ (peak) "delta" = 54.7 dB (from plot 6.1)

Field Strength at band-edge frequency $E_f = 47.4 \text{ dBuV}$ (average), $E_f = 51.3 \text{ dBuV}$ (peak)

For 2390 MHz at 2412 MHz $E_0 = 104.0 \text{ dBuV}$ (average), $E_0 = 108.0 \text{ dBuV}$ (peak) "delta" = 58.2 dB (from plot 6.3) Field Strength at 2390 MHz, $E_f = 45.8 \text{ dBuV}$ (average), $E_f = 49.8 \text{ dBuV}$ (peak)

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Radiated Emissions

Test Data

Company:	Symbol		ſ			Model #:	LA4121		Standa		FCC & 15 (RB1	247
EUT:	Trilogy 2					Ant #:	ML-2499-P	GA1-00	Linde		11	
Project #:	J2000865	8P				Test Date:	April 3, 200	00	(C) (1)		3	
Test Mode:	Transmitti		nna 1			Engineer:	Barry S				0	dB:
Frecuency			9 Y S	4100			(Pro-Arco)	Insert	0.0			11 P 21 P
						Fector		Loes	F. I			
CHW .	58(pV)	PATO	6 2 6		N.Y.	(8(1 m))	80	68	Strail_		::::::::::::::::::::::::::::::::::::::	
2412.00E+0	76.1	Peak	8		V	29.6	0.0	2.3	0.0	108.0		ļ
2412.00E+0	1	Ave.	8		V	29.6	0.0	2.3	0.0	104.0		
2390.00E+0												1
4824.00E+0		Peak	8	8	V	33.5	28.1	3.2	0.0	37.3	74.0	-36.7
4824.00E+0		Ave.	8	8	V	33.5	28.1	3.2	0.0	30.5	54.0	-23.5
7236.00E+0		Peak	8	8	V	38.0	28.0	4.3	0.0	47.6	74.0	-26.4
7236.00E+0		Ave.	8	8	V	38.0	28.0	4.3	0.0	40.2	54.0	-13.8
1.21E+4	34.8	Peak	8	10	V	42.5	39.1	5.9	0.0	44.1	74.0	-30.0
1.21E+4	26.5	Ave.	8	10	V	42.5	39.1	5.9	0.0	35.8	54.0	-18.3
1.45E+4	39.2	Peak	8	10	V	41.5	37.8	6.5	0.0	49.4	74.0	-24.6
1.45E+4	31.9	Ave.	8	10	V	41.5	37.8	6.5	0.0	42.1	54.0	-11.9
1.93E+4	41.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.7	74.0	-17.3
1.93E+4	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
2.17E+4	41.5	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.0	74.0	-25.0
2.17E+4	24.1	Ave.	21	13	V	40.3	23.3	0.0	-9.5	31.6	54.0	-22.4
2437.00E+0)											-
4874.00E+0		Peak	В	8	V	33.5	28.1	3.2	0.0	37.5	74.0	-36.6
4874.00E+0		Ave.	8	8	V	33.5	28.1	3.2	0.0	30.1	54.0	-23.9
7311.00E+0		Peak	8	8	V	38.0	28.0	4.3	0.0	47.8	74.0	-26.2
7311.00E+0		Ave.	8	8	V	<u>38.0</u>	28.0	4.3	0.0	40.5	54.0	-13.6
1 22E+4	34.3	Peak	8	10	V	42.5	39.1	5.9	0.0	43.6	74.0	-30.5
1.22E+4	26.2	Ave.	8	10	V	42.5	39.1	5.9	0.0	35.5	54.0	-18.6
1.95E+4	33.0	Peak	21	13	V	40.2	23.3	7.7	-9.5	48.1	74.0	-25.9
1.95E+4	22.1	Ave.	21	13	V	40.2	23.3	7.7	-9.5	37.2	54.0	-16.8
2462,00E+0	73.3	Peak	8		V	29.6	0.0	3.1	0.0	106.0	<u></u> -	
2462.00E+0		Peak	8		V	29.6	0.0	3.1	0.0	102.1		<u> </u>
2483.50E+0									1			
4924.00E+0	0 29.0	Peak	8	8	V	33.5	28.1	4.9	0.0	39.3	74.0	-34.7
4924.00E+0		Ave.	8	8	· V	33.5	28.1	4.9	0.0	32.0	54.0	-22.0
7386.00E+0		Peak	8	8	V	38.0	28.0	6.3	0.0	50.0	74.0	-24.0
7386.00E+0		Ave.	8	8	V	38.0	28.0	6.3	0.0	42.5	54.0	-11.5
1.23E+4	34.2	Peak	8	10	V	42.5	39.1	8.8	0.0	46.4	74.0	-27.6
1.23E+4	26.7	Ave.	8	10	V	42.5	39.1	8.8	0.0	38.9	54.0	-15.1
1.23E+4	34.2	Peak	8	10	<u>v</u>	42.5	<u>39.1</u>	8.8	-9.5	36.9	74.0	-37.1
1.23E+4	26.7	Ave.	8	10	V	42.5	39.1	8.8	-9.5	29.4	54.0	-24.6

a) D.C.F.:Distance Correction Factor
h) Insert Loss (dB) = Cable A + Cable B + Cable C.
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the timus.
f) Readings with -9.5 DCF were taken at 1 meter with RBW=300kHz

Radiated Emissions

Company:	Symbol					Model #:	LA4121		Standa	я. Така 1		
C (1 T .	Trilogy 2					Ant #: 50-1	1901-048P		Limite		11	
EUT:	J20008654	00				Test Date:				* * * * * * * * * *	3	
Project #: Test Mode:	Transmitti		<u>. 1</u> ภกล 2	2		Engineer:					0	
		-						10.27 10 20 4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5.5 A			
Frequency		en en cri	Aat	Amp.	Ant P.C.	And. Factor	Pre Amp					
Mic	dBegr∕	PA.0	÷.		W/	diii am	58					
2412			0000000									
4824	30.6	Peak	8	8	V	33.5	28.1	3.2	0.0	39.2	74.0	-34.8
4824	23.4	Ave.	8	8	V	33.5	28.1	3.2	D.0	32.0	54 .0	-22.0
7236	33.2	Peak	8	8	V	38.0	28.0	4.3	0.0	47.5	74.0	-26.5
7236	26.0	Ave.	8	8	v	38.0	28.0	4.3	0.0	40.3	54.0	-13.7
12060	34.5	Peak	8	10	v	42.5	39.1	5.9	0.0	43.8	74.0	-30.3
12060	27.3	Ave.	8	10	V V	42.5	39.1	5.9	0.0	36.6	54.0	-17.5
14472	39.7	Peak	8	10	v	41.5	37.8	6.5	0.0	49.9	74.0	-24.1
14472	31.8	Ave.	8	10	Ť V	41.5	37.8	6.5	0.0	42.0	54.0	-12.0
19296	41.6	Peak	21	13	v	40.2	23.3	7.7	-9.5	56.7	74.0	-17.:
19296	24.6	Ave.	21	13	T V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.
	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.5	74.0	-24.
21708	23.6	Ave.	21	13	v	40.3	23.3	0.0	-9.5	31.1	54.0	-22.
21708 2437	23.0	AVC.				-+	+		1	1		
	28.5	Peak	8	8	V	33.9	28.1	3.2	0.0	37.5	74.0	-36.
4874			8	8	t v	33.9	28.1	3.2	0.0	29.5	54.0	-24
4874	20.5	Ave.		8	V	38.0	28.0	4.3	0.0	47.6	74.0	-26
7311	33.3	Peak	8	8	v	38.0	28.0	4.3	0.0	40.3	54.0	13.
7311	26.0	Ave.	8	10	V V	42.3	39.1	5.9	0.0	43.5	74.0	-30.
12185	34.4	Peak	-	10	Ť	42.3	39.1	5.9	0.0	36.0	54.0	-18.
12185	26.9	Ave.	8	13	- V	42.3	23.3	7.7	-9.5	47.9	74.0	-26.
19496	32.8	Peak	21		V	40.2	23.3	7.7	-9.5	36.6	54.0	-17.
19496	21.5	Ave.	21	13		40.2	23.3	(.)				+
2462			-	-	+	33.5	28.1	4.9	0.0	44.8	74.0	-29.
4924	34.5	Peak	8	8	V	33.5	28.1	<u>4.9</u> 4.9	0.0	36.1	54.0	-17.
4924	25.8	Ave.	8	8		33.5	28.0	6.3	0.0	50.4	74.0	-23.
7386	34.1	Peak	8	8				6.3	0.0	42.3	54.0	•11.
7386	26.0	Ave.	8	8	<u>v</u>	38.0	28.0	8.8	0.0	47.1	74.0	-26.
12310	34.9	Peak	8	10	<u>v</u>	42.5	39.1		0.0	38.7	54.0	-15.
12310	26.5	Ave.	8	10	V	42.5	39.1	8.8	-9.5	53.5	74.0	-20
22158	46.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	45.3	54.0	-8.
22158	37.8	Ave.	21	13	V	40.3	23.3	0.0	-9.5	45.5	04.0	-0./

Notes: a) D.C.	F.:Distance Correction Factor
h) Inse	f(A) = Cable A + Cable B + Cable C.
c) Net ((dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
onty)	
d) Neg	ative signs (-) in Margin column signify levels below the limits.
e) All o	ther emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
f) Rea	dings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121		Standa	rd.	FCC 6 15. (R.8.)	247
						A	ML-2499-P	TA1-01	Links		11	
EUT:	Trilogy 2					Ant #:	MIC-2435-F					
Project #:	J2000865	8B	- 1			Test Date:	April 3, 200	0			3	<u>hin ha</u>
Test Mode:		ng on ante	nna	3		Engineer:	Barry S.				0	
Freclutionsy				Amo.	Anl 23	Ant -	Rentes and		10. C-1			
						M. Carling St.		LOEP				
NF2		PAR			1997			48	æ	5.8 G.A.		
2412										<u> </u>		
4824	38.4	Peak	8	8	V	33.5	28.1	3.2	0.0	47.0	74.0	-27.0
4824	29.3	Ave.	8	8	V	33.5	28.1	3.2	0.0	37.9	54.0	-16.1
7236	31.7	Peak	8	8	V	38.0	28.0	4.3	0.0	46.1	74.0	-28.0
7236	25.7	Ave.	8	8	V	38.0	28.0	4.3	0.0	40.0	54.0	-14.0
12060	34.5	Peak	8	10	V	42.5	39.1	5.9	D.0	43.8	74.0	-30.3
12060	26.8	Ave.	8	10	V	42.5	39.1	5.9	0.0	36.1	54.0	-18.0
14472	39.1	Peak	8	10	V	41.5	37.8	6.5	0.0	49.3	74.0	-24.7
14472	32.3	Ave.	8	10	V	41.5	37.8	6.5	0.0	42.5	54.0	-11.5
19296	40.9	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.0	74.0	-18.0
19296	24.1	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.2	54.0	-1 <u>4.8</u>
21708	39.9	Peak	21	13	V	40.3	23.3	0.0	-9.5	47.4	74.0	-26.6
21708	21.1	Ave.	21	13	V	40.3	23.3	0.0	-9.5	28.6	54.0	-25.4
2437		,	† <u> </u>		<u>+</u>							
4874	35.2	Peak	В	8	V	33.5	28.1	3.2	0.0	43.8	74.0	-30.2
4874	28.4	Ave.	8	8	$\frac{1}{v}$	33.5	28.1	3.2	0.0	37.0	54.0	-17.0
7311	33.7	Peak	8	8	V V	38.0	28.0	4.3	0.0	48.0	74.0	-26.0
7311	26.1	Ave.	8	8	v	38.0	28.0	4.3	0.0	40.4	54.0	-13.6
12185	33.5	Peak	8	10		42.5	39.1	5.9	0.0	42.8	74.0	-31.3
12185	24.0	Ave.	8	10	÷.	42.5	39.1	5.9	0.0	33.3	54.0	-20.8
19496	31.8	Peak	21	13	i V	40.2	23.3	7.7	-9.5	46.9	74.0	-27.1
19496	21.1	Ave.	21	13	t v	40.2	23.3	7.7	-9.5	36.2	54.0	-17.8
		AVC.	-		+	1		1				
2462 4924	30.5	Peak	8	8	V	33.5	28.1	4.9	0.0	40.8	74.0	-33.2
	24.9	Ave.	8	8	V	33.5	28.1	4.9	0.0	35.2	54.0	-18.8
4924	32.5	Peak	8	8	V V	38.0	28.0	6.3	0.0	48.8	74.0	-25.2
7386	25.9	Ave.	8	8	- v	38.0	28.0	6.3	0.0	42.2	54.0	-11.9
7386	36.2	Peak	8	10	- v	42.5	39.1	8.8	0.0	48.4	74.0	-25.6
12310	27.1		8	10	V	42.5	39.1	8.8	0.0	39.3	54.0	-14.7
12310		Ave.	21	13	V	40.3	23.3	0.0	-9.5	53.6	74.0	-20.4
22158	46.1	Peak	21	13	v	40.3	23.3	0.0	-9.5	45.5	54.0	-8.5
22158	38.0	Ave.	2	13	V	40.3						

A) D.C.F.: Distance Correction Factor
b) Insert Loss (dB) = Cable A + Cable B + Cable C.
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert, Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
1) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Radiated Emissions

Test Data

Company:	Symbol	· · · · · · · · · · · · · · · · · · ·				Model #:	LA4121		Standa	8 .	2000 - 19. 2000 - 19.	247
EUT:	Trilogy 2	;			1	Ant #:	ML-2499-P	NA1-01			11	
Project #:	J2000865	8B	[Test Date:	April 3, 200	20	TOE O			
Test Mode:	Transmitti		nna	ί ι · · · ·		Engineer:	Barry S.				0	
Proctions's		Participants		Amp	Ant, Pol.	Ant	Pression					
		1. C. P. & &				Sec. Sugar				090,7402	6340 681/4/m	1.38
MHZ		7.04			NWY .	CC (Cap)	ыB			Secret and the sec	Sec. A chiefe the	Million to all state
2412										10.0	74.0	27.0
4824	37.6	Peak	8	8	V	33.5	28.1	3.2	0.0	46.2	74.0	-27.8
4824	28.3	Ave.	8	8	V	33.5	28.1	3.2	D.0	36.9	54.0	-17.1 -25.5
7236	34.2	Peak	8	8	V	38.0	28.0	4.3	0.0	48.5	74.0	
7236	26.1	Ave.	8	8	V	38.0	28.0	4.3	0.0	40.4	54.0	-13.6
12060	33.7	Peak	8	10	V	42.5	39.1	5.9	0.0	43.0	74.0	-31.1
12060	26.0	Ave.	8	10	V	42.5	39.1	5.9	0.0	35.3	54.0	-18.8
14472	39.D	Peak	8	10	V	41.5	37.8	6.5	0.0	49.2	74.0	-24.8
14472	31.5	Ave.	8	: 10	V	41.5	37.8	6.5	0.0	41.7	54.0	-12.3
19296	41.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.7	74.0	-17.3
19296	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
21708	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.5	74.0	-24.5
21708	23.6	Ave.	21	13	V	40.3	23.3	0.0	-9.5	31.1	54.0	-22.9
2437			1				İ					<u> </u>
4874	35.2	Peak	8	B	V	33.5	28.1	3.2	0.0	43.8	74.0	-30.2
4874	26.0	Ave.	8	8	V	33.5	28.1	3.2	0.0	34.6	54.0	-19.4
7311	33.9	Peak	B	8	V	38.0	28.0	4.3	0.0	48.2	74.0	-25.8
7311	25.8	Ave.	8	8	V	38.0	28.0	4.3	0.0	40 .1	54.0	-13.9
12185	33.1	Peak	8	10	V	42.5	39.1	5.9	0.0	42.4	74.0	-31.7
12185	25.9	Ave.	8	10	V	42.5	39.1	5.9	0.0	35.2	54.0	-18.9
19496	32.8	Peak	21	13	V	40.2	23.3	7.7	0.0	57.4	74.0	-16.6
19496	21.5	Ave.	21	13	V	40.2	23.3	7.7	0.0	46.1	54.0	-7.9
2462			<u> -</u> .			-				-	1	
4924	43.4	Peak	8	8	V	33.5	28.1	4.9	0.0	53.7	74.0	-20.4
4924	39.0	Ave.	8	8	V	33.5	28.1	4.9	0.0	49.3	54.0	-4.7
7386	30.9	Peak	8	8	† v	38.0	28.0	6.3	0.0	47.2	74.0	-26.8
7386	24.3	Ave.	8	8	V V	38.0	28.0	6.3	0.0	40.6	54.0	-13.4
12310	36.3	Peak	8	10	V	42.5	39.1	8.8	0.0	48.5	74.0	-25.5
12310	26.4	Ave.	8	10	V	42.5	39.1	8.8	0.0	38.6	54.0	-15.4
22158	46.0	Peak	21	13	v	40.3	23.3	0.0	-9.5	53.5	74.0	-20.5
22158	37.8	Ave.	21		v	40.3	23.3	0.0	-9.5	45.3	54.0	-8.7

a) D.C.F.: Distance Correction Factor
b) Insert Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
f) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Radiated Emissions

Test Data

Company:	Symbol			·		Mode #:	LA4121		Standar		°CC § 15.2 R.B.)	* /
UT:	Antenna	5		·		S/N #:			Limite		11	
						Test Date:	April 7 2000)	Test Die	tance		meter
roject #: est Mode:	Tx @ 241	2MH7				Engineer:	Xi-Ming Y.		Duty		0	¢B
est Mode.									Relaxat	ion i		
	Antenr	a Used			Pre-A	np LAsed		Cable			Transduce 0	ir Usac
umber	2	21	8		8	10	13	0	0 None	3 S#e 2	V Nome	
lodel:	ENCO 3143	3480-9		ACO 115	CD)_P100 0	AFT18655	ACO/400	None	NOR	Sae 2 IGm	Techer	
Frequency		Datactor	Ant	Amp	Ant Pol.	Ant,	Pre-Amp	lasert,	D. C.	Net		Marg
riequeilog	i ve au nig							Loss	F.		@3m	dB
MHz	(Vype6	PIARO			H∕V	dB(1/m)	C8	dB	æ	dBigiV/m	dB(µ₩m)	100
	24.0	Peak	8	8	H	34.0	28.1	0.0	0.0	39.9	74.0	-34
4825.40 4825.40	34.0 24.0	Ave.	<u> </u>	8	- н	34.0	28.1	0.0	0.0	29.9	54.0	-24
7237.30	34.0	Peak	8	8	V	38.0	28.0	0.0	0.0	44.0	74.0	-30
7237.30	27.0	Ave.	8	8	V	38.0	28.0	0.0	0.0	37.0	54.0	+-17
19296.00	45.0	Peak	21	13	V	40.2	23.3	2.3	-9.5	54.7	74.0	-19
19296.00	35.0	Ave.	21	13	V	40.2	23.3	2.3	-9.5	44.7	54.0	<u>-9.</u>
21708.00	47.0	Peak	21	13	H	40.3	23.3	2.4	-9.5	56.9	74.0	-17
21708.00	38.0	Ave.	21	13	н	40.3	23.3	2.4	-9.5	47.9	54.0	<u>-6</u> ,
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					<u> </u>		_i			*		
		.:Distance	Corre	ection 9	actor							
Nofes:		Lang/dD	- 0-	black	+ Cable B	+ Cable C						
	c) Net (c	iB) = Read	ina +	Anten	na Factor	Pre-amp +	nsert. Loss.	- Transdu	cer Loss	- Duty Re	laxation (tra	insmitt
	Sector 10	tive signs (

d) Negative signs (-) in Margin column signify levels below the limits. e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.

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na 5 2437MHz				S/N #:	April 7, 2000 Xi-Ming Y)	Standar Limita Teat Die Duty	- 1	CC § 15.2 R B) 11 3 0	47 meteos d8
na 5 2437MHz				S/N #: Test Date:	April 7, 2000)	Test Die Duty		11 3	· · · · · · · · · · · · · · · · · · ·
2437MHz				Test Date:	April 7, 2000 Xi-Ming Y)	Test Die Duty	tance	3	· · · · · · · · · · · · · · · · · · ·
				Test Date: Engineer:	April 7, 2000 Xi-Ming Y.)	Duty	tance_		· · · · · · · · · · · · · · · · · · ·
		l		Engineer:	Xi-Ming Y.				D	C C C C C C C C C C
				1			Relaxat	A		
tenna Used				·			IN ALL AND		*****	
222 2 222 PM 2 2 2 2 2 2 2 2 2 2 2 2 2 2			Pre-A	mp Used		Catie	And the second second second		Transduc	ir Used
21	8	in an	8	10	13	0	0 Nome	3 Sie 2	0 None	
;O 3160-9	E			AFTIBESS	ACC:400	Norte	TNCOPHE .	10m		
			n an							Marg
ling Delecto	r Ant	Amp.	Ant. Pol.	Ant.	Pre-Amp		P.C.	Met	@3m	
		ø	HN	48(1/m)	¢8	dB	dB	œ(µV/m	dB(yV/m)	dB
				240	28.1	0.0	0.0	40.4	74.0	-33
						0.0	0.0	30.1	54.0	-23
			V	38.0	28.0	0.0	0.0		· · —	-28
	8	+	V	38.0	28.0				· · · · · · · · · · · · · · · · · · ·	- <u>16</u> -19.
		13	1							-8.9
4 Ave.	21	<u> 13</u>	<u>v</u>	40.2	23.3					•
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	II Detecto Ing Detecto Division Pikiq 5 Peak 2 Ave. 5 Peak 9 Ave. 6 1 Peak	Ing Detector Arit Ing Detector Arit V) P/A/Q # .5 Peak 8 .2 Ave. 8 .5 Peak 8 .9 Ave. 8 .1 Peak 21	Bits Bits Ing Detector Art Amp. Amp. Ing Detector Art Amp. Imp. Imp. PAR Imp. Imp. Imp. Imp. PAR Imp. Imp. Imp. Imp. PAR Imp. Imp. PIAR Imp.	iaStris9Ing Detector Ant Amp.Ant. Pol.Iv)P/Arg.###Hiv5Peak888H2Ave.85Peak89Ave.89Ave.81Peak2113V	Str5 9 Ing Detector Ant Amp. Ant. Pot. Ant. Factor W) P/A/Q # # HAV dB(trin). 5 Peak 8 H 34.0 .2 Ave. 8 8 H 34.0 .5 Peak 8 8 H 34.0 .5 Peak 8 8 V 38.0 .5 Peak 8 8 V 38.0 .5 Peak 8 2 38.0 38.0 .5 Peak 2 1 1 40.2	Sits O Sits O Sits O Sits O Sits O Sits O Factor Pre-Amp Factor Factor P/A/Q S Ant. Pol. Ant. Pol. Sits S H/V doi:1/m) CB S Peak 8 H 34.0 28.1 .2 Ave. 8 8 V 38.0 28.0 .5 Peak 8 V 38.0 28.0 .2 Ave. 8 8 V 38.0 28.0 .9 Ave. 8 8 V 38.0 28.0 .9 Ave. 8 V 38.0 28.0 .1 Peak 21 13 V 40.2 23.3	So Step Exact of the step Step	O Stats O Count of the state of the	O SiteS O Iou Iou Iou SiteS O Ant Pre-Amp Issert: D. C: Net Ing Delector Amt Pre-Amp Issert: D. C: Net I/0 PLAQ B 4 HAV deg(m) cP dB dB dB deg(p/m) S Peak 8 8 H 34.0 28.1 0.0 0.0 40.4 Z Ave. 8 8 H 34.0 28.1 0.0 0.0 40.4 Z Ave. 8 8 V 38.0 28.0 0.0 0.0 45.5 S Peak 8 V 38.0 28.0 0.0 0.0 37.9 S Ave. 8 V 38.0 28.0 0.0 0.0 37.9 S Ave. 21 13 V 40.2 23.3 2.3 -9.5 54.8 A Ave. 21 13 V 40.2 23.3 <	CO STRES COL COL COL COL Town STRES STRES 9 Intervalue Insert. D. C. Net Limit (2)3m MU Pia.iq # HV de(1/m) SP dB dB dB dB dB(1/m) dD(1/m) dD(1/m)

Radiated Emissions

	t Data				N	lodel #: I	A4121		tandatd.	<u> </u>	C § 15.247 B.j 11	
ompany: S	ymbol		_			#N #:			imits .			neters
UT: A	intenna 5					Leet Date:	April 7, 2000		et. i Flat	ance		19 19
roject #:						Engineer:	XI-Ming Y.)uty Relpcath	'n		
est Mode:	TX @ 2462	MHZ								a an	[ransdix a	Used
			11 100		Pre-Ar	np Used		Cable U	0	12	0	
	Antehn 2	21	8	2000-000 2000-000-000-000-000-000-000-00	8	10 AFT (8656	13 ACD/400	Norie	None	Sm_M•	None	
iumber: Aodel:	EMCO	3160-9	E 14 31		0.0				0.0000000000000000000000000000000000000		Limit	Margin
24 () () () () () () () () () (3149		han an a		ni Pal	Ant	Pre-Amp	linsert.	D.C. F.	Net	@3m	38
Frequency	Reading	Detector	AR	Hendy.		Factor dB(1/m)	dB		.68	dB(uV/m	dB(µVim)	
W G	dE(µ√)	.p/A/C		•	11.		28.1	3.2	0.0	45.0	74.0 54.0	-29.0 -19.9
4923.90	35.9	Peak	8	8	<u>H</u>	34.0	28.1	3.2	0.0	34.1 49.9	74.0	-24.1
4923.90	25.0	Ave.	8	8		38.0	28.0	4.3	0.0	41.8	54.0	-12.2 -26 B
7385.90	35.6	Peak Ave.	8	8	٧	38.0 42.5	28.0 39.1	5.9	0.0	47.3	74.0 54.0	-14.5
7385.90		Peak	8	10	V	42.5	39.1	5.9 2.4	0.0 -9.5	55.0	74.0	-19.0
12310.00	30.3	Ave. Peak	8 21		V	40.3	23.3	2.4	-9.5	45.2	54.0	-8.8
22158.00 22158.00	45.1	Ave.	21		V	40.3						····
22100.00									· ·			
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Notes:	a) D	C.F.:Dista	nce C	Cable	A + Cab	le B + Cable ctor - Pre-ar	C	oss - Tran	sducer L	css - Duly	Relaxation	n (transmitt
	b) ln c) N	et(dB) = F	Readin	g + Ant	enna Fa	ctor - Pre-ar						
	only).	ans (-)	in Mar	gin colur	nn signify le	vels below the e equipment r	e imits	which is a	t least 20	dB below I	the limits
	(e) A	li other en	hission	s not re	eported a	re below th	e equipirent.					
	É											

					Model #:	LA4121		Stander		FCC 4 15 (R 5 1	
Trilogy 2					Ant#:	50-11900-0	001			11	
120008658	B			·····	Test Date:	April 5, 200)0			3	
		nna 4	5			Barry S.				-	
			(The second	21,12,2 2 ,2		Pre-Amp					
							1.048				66
- 430 M P	PAO			-44V	d8(1/m)	66	68	03			
											1
30.6	Peak	8	8	V		28.1					-34.8
23.6	Ave.	8	8	V	A CONTRACTOR OF						-21.8
33.4	Peak	8	8	V							-26.3
26.3	Ave.	8	8	V	38.0						-13.4
	Peak	8	10	V							-31.3
	Ave.	8	10	V	42.5						-18.4
		8	10	V	41.5						-24.2
		8	10	V	41.5	37.8					-11.6
		21	13	V	40.2	23.3				the second se	-17.4
				V	40.2	23.3					-14.4
				V	40.3	23.3	0.0				-24.6
			13	V	40.3	23.3	0.0	-9.5		54.0	-23.5
										<u> </u>	1
29.4	Peak	8	8	V	33.5	28.1					-36.0
				V	33.5	28.1					-24.1
			8	V	38.0	28.0					-26.1
			8	V	38.0	28.0					-13.7
			10	V	42.5	39.1					-30.4
		8		V	42.5	39.1					-18.4
		21		V	40.2	23.3					-26.9
			13	V	40.2	23.3	7.7	-9.5	36.1	54.0	-17.9
		+.=		1							
29.2	Peak	8	8	V	33.5	28.1	4.9				-34.5
		8		V	33.5	28.1	4.9				-22.2
		8	8	V	38.0	28.0	6.3	0.0			-24.0
		8	8	V	38.0	28.0	6.3	0.0			-11.8
		8	10	V	42.5	39.1		0.0			-27.2
	Ave.	8	10	V	42.5	39.1	8.8				-14.5
				V	40.3	23.3	0.0				-20.0
			13	V	40.3	23.3	0.0	-9.5	35.7	54.0	-18.3
	Transmittir Reading db(µ)) 30.6 23.6 33.4	Reading Delector 30.6 Peak 23.6 Ave. 33.4 Peak 23.5 Peak 26.3 Ave. 33.5 Peak 26.4 Ave. 39.6 Peak 32.2 Ave. 41.5 Peak 23.0 Ave. 29.4 Peak 23.0 Ave. 29.4 Peak 23.0 Ave. 29.4 Peak 23.0 Ave. 33.6 Peak 26.0 Ave. 32.0 Ave. 32.0 Peak 21.3 Ave. 32.0 Peak 21.3 Ave. 32.0 Peak 21.1 Ave. 22.0 Peak 21.5 Ave. 33.7 Peak 25.9 Ave. 34.6 Peak	Transmitting on antenna (Roding Delector Artility 30.6 Peak 8 30.6 Peak 8 23.6 Ave. 8 33.4 Peak 8 23.6 Ave. 8 33.4 Peak 8 26.3 Ave. 8 33.5 Peak 8 26.4 Ave. 8 39.6 Peak 8 32.2 Ave. 8 34.5 Peak 21 24.5 Ave. 21 24.5 Ave. 21 29.4 Peak 8 21.3 Ave. 8 33.6 Peak 8 26.0 Ave. 8 33.6 Peak 8 26.0 Ave. 8 32.0 Peak 8 26.4 Ave. 8 32.0 Peak 8 26.4 Ave. 8 32.0 Peak <td< td=""><td>Transmitting on antenna 6 Paxing Defactor Ant Amp 30.6 Peak 8 8 30.6 Peak 8 8 23.6 Ave. 8 8 33.4 Peak 8 8 33.5 Peak 8 10 26.4 Ave. 8 10 39.6 Peak 8 10 39.6 Peak 8 10 32.2 Ave. 8 10 32.1 Ave. 21 13 24.5 Ave. 21 13 23.0 Ave. 21 13 23.0 Ave. 8 8 33.6 Peak 8 8 26.0 Ave. 8 10 32.0 Peak 8 10 3</td><td>Transmitting on antenna 6 Pactor Defector Ant Ant Pea 30.6 Peak 8 8 V 23.6 Ave. 8 8 V 33.4 Peak 8 8 V 33.5 Peak 8 10 V 26.3 Ave. 8 10 V 33.5 Peak 8 10 V 39.6 Peak 21 13 V 24.5 Ave. 21 13 V 23.0 Ave. 21 13 V 29.4 Peak 21 13 V 29.4 Peak 8 8 V 21.3 Ave. 8 8 V 26.0 Ave. 8 10 V 26.1 Ave. 8 10 V 21.3 Ave. 8 8 V</td><td>Transmitting on antenna 6 Engineer: Paxeling Defector Art Arty April Post Art 30.6 Peak 8 8 V 33.5 23.6 Ave. 8 8 V 33.5 23.3 Peak 8 10 V 42.5 33.5 Peak 8 10 V 42.5 39.6 Peak 8 10 V 41.5 32.2 Ave. 8 10 V 41.5 41.5 Peak 21 13 V 40.2 24.5 Ave. 21 13 V 40.3 23.0 Ave. 21 13 V 40.3 21.3 Ave.</td><td>Transmitting on antenna 6 Engineer: Barry S. Reaching Defector Ant Ang. Ant. Pol. Ant. Pre-Amp. 30.6 Peak 8 8 V 33.5 28.1 30.6 Peak 8 8 V 33.5 28.1 33.4 Peak 8 8 V 33.5 28.1 33.4 Peak 8 8 V 33.5 28.1 33.5 Peak 8 8 V 33.5 28.1 33.5 Peak 8 8 V 33.5 28.1 33.5 Peak 8 10 V 42.5 39.1 39.6 Peak 8 10 V 41.5 37.8 32.2 Ave. 8 10 V 40.2 23.3 24.5 Ave. 21 13 V 40.2 23.3 32.2 Ave. 21 13 V 40.3 23.3 23.0 Ave. 21 13 V 40.3 23.3 23.0 Ave. 8<td>Transmitting on antenna 6 Engineer: Barry S. Pactor Provided Street Ant Provided Street <th< td=""><td>Journal Sector Journal /td><td>Transmitting on antenna G. Engineer: Barry S. Decy Feeded or Loading <thdecy fe<="" td=""><td>Jobbessing Engineer: Barry S. Diff. Partial Control O Presching Defactor Ant Ant. Port Presching Ant. Port Presching Presching<!--</td--></td></thdecy></td></th<></td></td></td<>	Transmitting on antenna 6 Paxing Defactor Ant Amp 30.6 Peak 8 8 30.6 Peak 8 8 23.6 Ave. 8 8 33.4 Peak 8 8 33.5 Peak 8 10 26.4 Ave. 8 10 39.6 Peak 8 10 39.6 Peak 8 10 32.2 Ave. 8 10 32.1 Ave. 21 13 24.5 Ave. 21 13 23.0 Ave. 21 13 23.0 Ave. 8 8 33.6 Peak 8 8 26.0 Ave. 8 10 32.0 Peak 8 10 3	Transmitting on antenna 6 Pactor Defector Ant Ant Pea 30.6 Peak 8 8 V 23.6 Ave. 8 8 V 33.4 Peak 8 8 V 33.5 Peak 8 10 V 26.3 Ave. 8 10 V 33.5 Peak 8 10 V 39.6 Peak 21 13 V 24.5 Ave. 21 13 V 23.0 Ave. 21 13 V 29.4 Peak 21 13 V 29.4 Peak 8 8 V 21.3 Ave. 8 8 V 26.0 Ave. 8 10 V 26.1 Ave. 8 10 V 21.3 Ave. 8 8 V	Transmitting on antenna 6 Engineer: Paxeling Defector Art Arty April Post Art 30.6 Peak 8 8 V 33.5 23.6 Ave. 8 8 V 33.5 23.3 Peak 8 10 V 42.5 33.5 Peak 8 10 V 42.5 39.6 Peak 8 10 V 41.5 32.2 Ave. 8 10 V 41.5 41.5 Peak 21 13 V 40.2 24.5 Ave. 21 13 V 40.3 23.0 Ave. 21 13 V 40.3 21.3 Ave.	Transmitting on antenna 6 Engineer: Barry S. Reaching Defector Ant Ang. Ant. Pol. Ant. Pre-Amp. 30.6 Peak 8 8 V 33.5 28.1 30.6 Peak 8 8 V 33.5 28.1 33.4 Peak 8 8 V 33.5 28.1 33.4 Peak 8 8 V 33.5 28.1 33.5 Peak 8 8 V 33.5 28.1 33.5 Peak 8 8 V 33.5 28.1 33.5 Peak 8 10 V 42.5 39.1 39.6 Peak 8 10 V 41.5 37.8 32.2 Ave. 8 10 V 40.2 23.3 24.5 Ave. 21 13 V 40.2 23.3 32.2 Ave. 21 13 V 40.3 23.3 23.0 Ave. 21 13 V 40.3 23.3 23.0 Ave. 8 <td>Transmitting on antenna 6 Engineer: Barry S. Pactor Provided Street Ant Provided Street <th< td=""><td>Journal Sector Journal /td><td>Transmitting on antenna G. Engineer: Barry S. Decy Feeded or Loading <thdecy fe<="" td=""><td>Jobbessing Engineer: Barry S. Diff. Partial Control O Presching Defactor Ant Ant. Port Presching Ant. Port Presching Presching<!--</td--></td></thdecy></td></th<></td>	Transmitting on antenna 6 Engineer: Barry S. Pactor Provided Street Ant Provided Street Provided Street <th< td=""><td>Journal Sector Journal /td><td>Transmitting on antenna G. Engineer: Barry S. Decy Feeded or Loading <thdecy fe<="" td=""><td>Jobbessing Engineer: Barry S. Diff. Partial Control O Presching Defactor Ant Ant. Port Presching Ant. Port Presching Presching<!--</td--></td></thdecy></td></th<>	Journal Sector Journal	Transmitting on antenna G. Engineer: Barry S. Decy Feeded or Loading Decy Feeded or Loading <thdecy fe<="" td=""><td>Jobbessing Engineer: Barry S. Diff. Partial Control O Presching Defactor Ant Ant. Port Presching Ant. Port Presching Presching<!--</td--></td></thdecy>	Jobbessing Engineer: Barry S. Diff. Partial Control O Presching Defactor Ant Ant. Port Presching Ant. Port Presching Presching </td

a) D.C.F. Distance Correction Factor
b) Insert Loss (dB) = Cable A + Cable B + Cable C
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
anly).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
1) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121		Standa	d,	FCC 6 15. IR 9.	47
EUT:	Trilogy 2					Ant #:	9090.16.00	001	Min Carlo		11	
Project #:	J2000865	8B				Test Date:	April 5, 200	10			3	and the second sec
Test Mode:	Transmitti		nna ^r	7+		Engineer:	Barry S.			a a sur	D	
Frequency					1.6.2.20.2.61	A.mt	ALC: NO		1. S.			
	a a chini s					Factor						
Maiz	10 JUN	P/A/C	8.8		1992 - S	CE (Pro)				SERIE ANTI	(dEig)(/di)	96
2412	1											
4824	31.0	Peak	8	8	V	33.5	28.1	3.2	0.0	39.6	74.0	-34.4
4824	24.6	Ave.	8	8	V	33.5	28.1	3.2	0.0	33.2	54.0	-20.8
7236	34.4	Peak	8	8	V	38.0	28.0	4.3	0.0	48.7	74.0	-25.3
7236	26.4	Ave.	8	8	V	38.0	28.0	4.3	0.0	40.7	54.0	-13.3
12060	32.1	Peak	8	10	· V	42.5	39.1	5.9	0.0	41.4	74.0	-32.7
12060	25.0	Ave	8	10	V	42.5	39.1	5.9	0.0	34.3	54.0	-19.8
14472	36.9	Peak	8	10	V	41.5	37.8	6.5	0.0	47.1	74.0	-26.9
14472	30.0	Ave.	8	10	V	41.5	37.8	6.5	0.0	40.2	54.0	-13.8
19296	41.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.7	74.0	-17.3
19296	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
21708	42.0	Peak	21	13	v	40.3	23.3	0.0	-9.5	49.5	74.0	-24.5
21708	23.6	Ave.	21	13	V V	40.3	23.3	0.0	-9.5	31.1	54.0	-22.9
									—			
2437	30.6	Peak	8	8	V	33.9	28.1	3.2	0.0	39.6	74.0	-34.4
4874	23.2	Ave.	8	8	V	33.9	28.1	3.2	0.0	32.2	54.0	-21.8
4874	34.1	Peak	8	8	1 V	38.0	28.0	4,3	0.0	48.4	74.0	-25.6
7311	25.7	Ave.	8	8	1 V	38.0	28.0	4.3	0.0	40.0	54.0	-14.0
7311	33.1	Peak	8	10	Ť V	42.3	39.1	5.9	0.0	42.2	74.0	-31.9
12185		Ave.	8	10	T V	42.3	39.1	5.9	0.0	34.7	54.0	-19.4
12185	25.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	47.9	74.0	-26.1
19496	32.8	Ave.	21	13	t v	40.2	23.3	7.7	-9.5	36.6	54.0	-17.4
19496	<u> </u>	AVC.	121	1.3	+			· · · · · · · · · · · · · · · · · · ·			,	
2462	30.7	Peak	8	8	V	33.5	28.1	4.9	0.0	41.0	74.0	-33.0
4924			8	8	÷ v	33.5	28.1	4.9	0.0	33.1	54.0	-20.9
4924	22.8	Ave.	8	8	v	38.0	28.0	6.3	0.0	49.7	74.0	-24.3
7386	33.4	Peak	8	8	V	38.0	28.0	6.3	0.0	42.2	54.0	-11.8
7386	25.9	Ave.	8	10	V V	42.5	39.1	8.8	0.0	44.4	74.0	-29.6
12310	32.2	Peak	8	10	V V	42.5	39.1	8.8	0.0	37.2	54.0	-16.8
12310	25.0	Ave.	21	13	V	40.3	23.3	0.0	-9.5	53.5	74.0	-20.5
22158	46.0	Peak	21		+ v	40.3	23.3	0.0	-9.5	45.3	54.0	-8.7
22158	37.8	Ave.	121	13	¥		20.0					

a) D.C.F.:Distance Correction Factor
(A + Cable B + Cable C)
b) insert Loss (db) - Cable A + Cable B + Oddie B + Insert. Loss Transducer Loss - Duty Relaxation (transmitter c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
f) Readings with -9.5 DCF were taken at 1 meter with RBW 300kHz

Radiated Emissions

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Test Data

Company:	Symbol					Model #:	LA4121		Standa		F60 8 15. (P.B.)	47
EUT:	Trilogy 2					Ant #:	50-11902-	240S	N. 1923		11	
Project #:	J2000865	RR				Test Date:	April 3, 200	ю	<u> </u>		3	
Test Mode:		ng on ante	nna	8		Engineer:	Barry S.			and the second		
Frequency	31	Detector	Ant	A	And Post	And.	S. S. Martine		len ett			
						SSS &						
WHIL	dB(c)/}	ELV-21				C(5/(189)	8	CE:		39997fm	dB(g)/ms	
2412										40.0	71.0	-24.2
4824	41.2	Peak	8	8	<u> </u>	33.5	28.1	3.2	0.0	49.8	74.0 54.0	-12.5
4824	32.9	Ave.	8	8	V	33.5	28.1	3.2	0.0	41.5		-12.5
7236	33.9	Peak	8	8	V	38.0	28.0	4.3	0.0	48.2	74.0	-25.0
7236	25.3	Ave.	8	8	V	38.0	28.0	4.3	0.0	39.6	54.0	
12060	32.1	Peak	8	10	V	42.5	39.1	5.9	0.0	41.4	74.0	-32.7
12060	24.8	Ave.	8	10	V	42.5	39.1	5.9	0.0	34.1	54.0	-20.0
14472	37.3	Peak	8	10	V	41.5	37.8	6.5	0.0	47.5	74.0	-26.5
14472	29.7	Ave.	8	10	V	41.5	37.8	6.5	0.0	39.9	54.0	-14.1
19296	41.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.7	74.0	-17.3
19296	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
21708	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.5	74.0	-24.5
21708	23.6	Ave.	21	13	V	40.3	23.3	0.0	-9.5	31 .1	54.0	-22.9
2437		+	1									
4874	37.6	Peak	14	8	V	33.9	28.1	3.2	0.0	46.6	74.0	-27.4
4874	31.3	Ave.	14	i B	V	33.9	28.1	3.2	0.0	40.3	54.0	-13.7
7311	33.B	Peak	14		V	38.0	28.0	4.3	0.0	48.1	74.0	-25.9
7311	26.4	Ave.	14	1	V	38.0	28.0	4.3	0.0	40.7	54.0	-13.3
12185	32.3	Peak	14		V	42.3	39.1	5.9	0.0	41.4	74.0	-32.7
12185	25.1	Ave.	14		V	42.3	39.1	5.9	0.0	34.2	54.0	-19.9
19496	32.8	Peak	21	13	V	40.2	23.3	7.7	-9.5	47.9	74.0	-26.1
19496	21.5	Ave.	21		V	40.2	23.3	7.7	-9.5	36.6	54.0	-17.4
2462			+=-									
4924	34.3	Peak	8	8	V	33.5	28.1	4.9	0.0	44.6	74.0	-29.4
4924	24.5	Ave.	8	8	V	33.5	28.1	4.9	0.0	34.8	54.0	-19.2
7386	33.7	Peak	8	8	V	38.0	28.0	6.3	0.0	50.0	74.0	-24.0
7386	27.2	Ave.	8		† v	38.0	28.0	6.3	0.0	43.5	54.0	-10.5
12310	32.3	Peak	8		· v	42.5	39.1	8.8	0.0	44.5	74.0	-29.5
12310	24.9	Ave.	8		v	42.5	39.1	8.8	0.0	37.1	54.0	-16.9
22158	46.0	Peak	21	_	v	40.3	23.3	0.0	-9.5	53.5	74.0	-20.5
22158	36.4	Ave.	21		v	40.3	23.3	0.0	-9.5	43.9	54.0	-10.1
22150	30.4	<u></u>					····					

A D.C.F. Distance Correction Factor
A + Cable B + Cable A + Cable B + Cable C
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert Loss Transducer Loss - Duty Relaxation (transmitter
only).
A Megative signs (-) in Margin column signify levels below the limits.
a) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
f) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121		Stepdat	•	FCC & I.S. RCB J	
EUT:	Trilogy 2					Ant #:	ML-2499-S	D24-06			11	
	10000005	00				Test Date:	April 3, 200	0		: ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰	3	and market
Project #:	J2000865		000	o -		Engineer:					0	
Test Mode:	Reading	ng on ante	3 5 2 6 7 6	No. of Concession			Pra-Amp				10 B	200.00
Frequency								Lore				
ianta	C UM	PAG			E HAV	SIR! AT	œ		a and the second		$\mathbf{x} = (\mathbf{y}^{\prime}, \mathbf{y}^{\prime})$	
	S Steed rite		1					i				!
2412	37.4	Peak	8	8	V	33.5	28.1	3.2	0.0	46.0	74.0	-28.(
4824	28.4	Ave.	8	8	v	33.5	28.1	3.2	0.0	37.0	54.0	<u>i</u> -17.(
4824	33.4	Peak	8	8	v	38.0	28.0	4.3	0.0	47.7	74.0	-26.3
7236	26.4	Ave.	8	8	- v	38.0	28.0	4.3	0.0	40.7	54.0	-13.
7236	34.2	Peak	8	10	-v	42.5	39.1	5.9	0.0	43.5	74.0	-30.
12060	27.1	Ave.	8	10	V V	42.5	39.1	5.9	0.0	36.4	54.0	-17.
12060	41 1	Peak	8	10	v	41.5	37.8	6.5	0.0	51.3	74.0	-22.
14472		Ave.	8	10	v	41.5	37.8	6.5	0.0	45.2	54.0	-8.8
14472	35.0	Peak	21	13	V	40.2	23.3	7.7	-9.5	56.3	74.0	-17.
19296	41.2	1	21	13		40.2	23.3	7.7	-9.5	40.1	54.0	-13.
19296	25.0	Ave.	<u>: 21</u> 21	13	V	40.3	23.3	0.0	-9.5	48.5	74.0	-25.
21708	41.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	31.9	54.0	-22.
21708	24.4	Ave.	21	13	¥	40.0				<u> </u>		T
2437		Deale	1		+	33.9	28.1	3.2	0.0	44.6	74.0	-29.
4874	35.6	Peak	14		v	33.9	28.1	3.2	0.0	34.4	54.0	-19.
4874	25.4	Ave.	14	_	V	38.0	28.0	4.3	0.0	48.3	74.0	-25.
7311	34.0	Peak	14		V V	38.0	28.0	4.3	0.0	40.7	54.0	-13.
7311	26.4	Ave.	14		t v	42.3	39.1	5.9	0.0	44.2	74.0	-29.
12185	35.1	Peak	14				39.1	5.9	0.0	37.0	54.0	.17
12185	27.9	Ave.	14		V V	42.3	23.3	7.7	-9.5	48.0	74.0	-26.
19496	32.9	Peak	21			40.2	23.3	7.7	-9.5	38.5	54.0	-15.
19496	23.4	Ave.	21	13		40.2	20.0					1
2462		1	<u> </u>	+	V	33.5	28.1	4.9	0.0	40.8	74.0	-33
4924	30.5	Peak	8	8		33.5	28.1	4.9	0.0	33.6	54.0	-20
4924	23.3	Ave.	8	B		33.5	28.0	6.3	0.0	50.3	74.0	-23
7386	34.0	Peak	8	8			28.0	6.3	0.0	42.8	54.0	-11
7386	26.5	Ave.	8		V	38.0	39.1	8.8	0.0	47.3	74.0	-26
12310	35.1	Peak	8	10	V	42.5	39.1	i 8.6	0.0	41.7	54.0	-12
12310	29.5	Ave.	8		V	42.5		0.0	-9.5	52.5	74.0	-21
22158	45.0	Peak	21		V	40.3	23.3	0.0	-9.5	43.0	54.0	-11
22158	35.5	Ave.	2	1 13	V	40.3	23.3	0.0		40.0	01.0	

a) D.C.F. Distance Correction Factor
b) insert. Loss (uB) - Cable A + Cable D + Outro C + Cost - Transducer Loss - Duty Relaxation (transmitter c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
 a) Negative signs (-) in Wagn cold in signify the equipment noise floor which is at least 20 dB below the limits. b) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
1) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121			d.,	FCC § 15. R.B.	(41
EUT:	Trilogy 2					Ant #:	21-20667-	01			11	
EUT.	t nogy z			-							3	
Project #:	J2000865			Ĺ			April 3, 200				0	ana ana ana ang ang ang ang ang ang ang
Test Mode:	Transmitti	ng on ante	nna	0		Engineer:	Barry S.				Link	2000 30000 20 2 4 - 100000 20 2 4 - 10000 20
Frequency					Ant Pol	Arr.	Pre-Amp					
		P/A/0		•	GN/		10 30				s	
IAH2	dBgpM	al familie and a state		S.S. Milli								
2412			-			00 F		3.2	0.0	30.3	74.0	-43.7
4824	21.7	Peak	8	8	<u> </u>	33.5	28.1	3.2	0.0	24.5	54.0	-29.5
4824	15.9	Ave.	8	8	V	33.5	28.1	4.3	0.0	45.4	74.0	-28.6
7236	31.1	Peak	8	8	V	38.0	28.0	4.3	0.0	39.8	54.0	-14.2
7236	25.5	Ave	8	8	V	38.0	28.0	<u>4.3</u> 5.9	0.0	43.2	74.0	-30.9
12060	33.9	Peak	8	10	V	42.5	39.1		0.0	36.1	54.0	-18.0
12060	26.8	Ave.	8	10	V	42.5	39.1	5.9	0.0	49.5	74.0	-24.5
14472	39.3	Peak	8	10	<u>v</u>	41.5	37.8	6.5		49.5	54.0	-11.6
14472	32.2	Ave.	8	10	Ň.	41.5	37.8	6.5	0.0		74.0	-19.1
19296	39.8	Peak	21	13	V	40.2	23.3	7.7	-9.5	54.9	54.0	-14.8
19296	24.1	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.2	74.0	-36.6
21708	29.9	Peak	121	13	<u> </u>	40.3	23.3	0.0	-9.5	37.4		-23.2
21708	23.3	Ave.	21	13	V	40.3	23.3	0.0	-9.5	30.8	54 <u>.0</u>	-23.2
2437		1								1- <u></u> -	740	-34.6
4874	30.8	Peak	8	8	V	33.5	28.1	3.2	0.0	39.4	74.0	
4874	23.9	Ave.	8	8	V	33.5	28.1	3.2	0.0	32.5	54.0	-21.5
7311	33.7	Peak	8	8	V	38.0	28.0	4.3	0.0	48.0	74.0	-26.0
7311	25.8	Ave.	8	8	V	38.0	28.0	4.3	0.0	40.1	54.0	-13.9
12185	34.6	Peak	8	110	V	42.5	39.1	5.9	0.0	43.9	74.0	-30.2
12185	27.5	Ave.	8	10	V	42.5	39.1	5.9	0.0	36.8	54.0	-17.3
19496	29.0	Peak	21	13	V	40.2	23.3	7.7	-9.5	44.1	74.0	-29.9
19496	21.5	Ave.	21	13	V	40.2	23.3	7.7	9.5	36.6	54.0	-17.4
2462			+	1								
4924	39.6	Peak	8	8	V	33.5	28.1	4.9	0.0	49.9	74.0	-24.1
4924	32.2	Ave.	8		V	33.5	28.1	4.9	0.0	42.5	54.0	-11.
7386	31.1	Peak	8		V	38.0	28.0	6.3	0.0	47.4	74.0	-26.6
7386	26.0	Ave.	8	8	V	38.0	28.0	6.3	0.0	42.3	54.0	-11.
12310	34.8	Peak	8		V V	42.5	39.1	8.8	0.0	47.0	74.0	-27.0
12310	27.5	Ave.	8	_	- v	42.5	39.1	8.8	0.0	39.7	54.0	-14.
22158	45.1	Peak	21		+ ·	40.3	23.3	0.0	-9.5	52.6	74.0	-21.
22150	32.0	Ave.	21		+ v	40.3	23.3	0.0	-9.5	39.5	54.0	-14.

a) D.C.F.: Distance Correction Factor
h b) locart Loss (dB) = Cable A + Cable B + Cable C.
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert, Loss, - Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the amits.
Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits. f) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol	_	i			Model #:	LA4121		Siece and		100 0 15.	
				!		Ant #:	Vocollect		F. S.			
EUT:	Trilogy 2			1								
Project #:	J2000865						April 3, 200	0			3	
Test Mode:	Transmitti	ng on ante	nna			Engineer:	Barry S.		COLLEGE COLLEGE			
	17020n i	Distantian a			903.20	Ant				- Carte		
						838 x 1 2 2 8	66	-568 38		000000	(17) JA	
Milita	S. 1948	P.A.O			n Cuin					inita atan	State and the second	<u></u>
2412									0.0	37.5	74.0	-36.5
4824	28.9	Peak	8	8	V	33.5	28.1	3.2	0.0	31.0	54.0	-23.0
4824	22.4	j Ave.	8	8	V	33.5	28.1		0.0	45.3	74.0	-28.7
7236	31.0	Peak	8	8	V	38.0	28.0	4.3	0.0	40.2	54.0	-13.8
7236	25.9	Ave.	8	8	V	38.0	28.0	4.3	0.0	43.7	74.0	i -30.4
12060	34.4	Peak	8	10	V	42.5	39.1	5.9	<u>0.0</u> 0.0	43.7 35.9	54.0	-18.2
12060	26.6	Ave.	8	10		42.5	39. 1	5.9		50.7	74.0	-23.
14472	40.5	Peak	8	10	V V	41.5	37.8	6.5	0.0	42.4	54.0	-11.0
14472	32.2	Ave.	8	10	V	41.5	37.8	6.5		51.1	74.0	-22.
19296	36.0	Peak	21	13	<u> </u>	40.2	23.3	7.7	-9.5	39.1	54.0	-14.
19296	24.0	Ave.	21	13	V	40.2	23.3	7.7	-9.5	49.5	74.0	-24
21708	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	30.4	54.0	-23
21708	22.9	Ave.	21	13	V	40.3	23.3	0.0	-9.5	30.4	04.0	-20.
2437										37.2	74.0	-36.
4874	28.6	Peak	8	8	V	33.5	28.1	3.2	0.0	29.8	54.0	-24
4874	21.2	Ave.	8	8	ν	33.5	28.1	3.2	0.0		74.0	-26.
7311	33.5	Peak	8	8	V		28.0	4.3	0.0	47.8	54.0	-13.
7311	26.0	Ave.	B	8	V	38.0	28.0	4.3	0.0	40.3	74.0	-30.
12185	33.9	Peak	8	10	V	42.5	39.1	5.9	0.0	43.2		-30.
12185	26.7	Ave.	8	10	V	42.5	39.1	5.9	0.0	36.0	<u>54.0</u> 74.0	-27.
19496	31.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	46.7		-19.
19496	19.8	Ave.	21	13	V	40.2	23.3	7.7	-9.5	34.9	54.0	-13.
2462											74.0	-34
4924	29.4	Peak	8	8	V	33.5	28.1	4.9	0.0	39.7	54.0	-34
4924	21.4	Ave.	8	8	V	33.5	28.1	4.9	0.0	31.7	74.0	-24
7386	33.0	Peak	8	8	V	38.0	28.0	6.3	0.0	49.3	54.0	-11
7386	26.0	Ave.	8	8	V	38.0	28.0	6.3	0.0	42.3	74.0	-11
12310	34.5	Peak	8	10	V	42.5	39.1	8.8	0.0		54.0	-14
12310	27.7	Ave.	8	10	V	42.5	39.1	8.8	0.0	39.9	74.0	-21
22158	45.5	Peak	21		V	40.3	23.3	0.0	-9.5	53.0	54.0	-21
22158	36.0	Ave.	21	13	V	40.3	23.3	0.0	-9.5	43.5		

Actes: a) D.C.F.:Distance Correction Factor
b) Insert Loss (db) - Cable A + Cable D + Cable C + c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert, Loss, - Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
 (a) Negative signs (-) in Margin conditioning by the equipment noise floor which is at least 20 dB below the limits. (c) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
f) Readings with DCF –9.5 were taken at 1 meter with RBW 300kHz
·/····································

Company:	Symbol		i			Model #:	LA4121		Sin P		CC (15.2 R:B.)	H.
	-						50-21900-(122	Linita		11	
EUT:	Trilogy 2					Ant #:						
Project #:	J2000865	8B				Test Date:		0			3	
Test Mode:		ng on antei	nnal	2 1		Engineer:	Barry S.	_			0	
						AIL			FICE		Land	
		Sec. Sec.			an-wi	Factor						
19 142	6 5.040	P/8/Q			1. IAN	(1)(1/m)		dB		n (Calor	2000 K.OL	
41) SA												
2412								3.2	0.0	48.1	74.0	-25.9
4824	39.5	Peak	8	8	<u> </u>	33.5	28.1	3.2	0.0	37.8	54.0	-16.2
4824	29.2	Ave.	8	8	V	33.5	28.1	4.3	0.0	48.8	74.0	-25.2
7236	34.5	Peak	8	8	<u>V</u>	38.0	28.0	4.3	0.0	41.1	54.0	-12.9
7236	26.8	Ave.	8	8	V	38.0	28.0	4.3	0.0	43.2	74.0	-30.9
12060	33.9	Peak	8	10	<u>v</u>	42.5	39.1	5.9	0.0	35.9	54.0	-18.2
12060	26.6	Ave.	8	10	V	42.5	39.1	6.5	0.0	49.2	74.0	-24.8
14472	39.0	Peak	8	10_	V	41.5	37.8	6.5	D.0	41.6	54.0	-12.4
14472	31.4	Ave.	8	10	<u>v</u>	41.5	37.8	7.7	-9.5	57.2	74.0	-16.8
19296	42.1	Peak	21	13	V	40.2	23.3	7.7	-9.5	40.1	54.0	-13.9
19296	25.0	Ave.	21	13	V	40.2	23.3	0.0	-9.5	49.9	74.0	-24.1
2170B	42.4	Peak	21	13	V	40.3	23.3	0.0	-9.5	31.5	54.0	-22.5
21708	24.0	Ave.	21	13_	V	40.3	23.3	0.0	-5.5	01.0		
2437					L			3.2	0.0	43.6	74.0	-30.4
4874	35.0	Peak	8	8	<u>v</u>	33.5	28.1	3.2	0.0	35.8	54.0	-18.2
4874	27.2	Ave.	8	8	V	33.5	28.1	4.3	0.0	48.8	74.0	-25.2
7311	34.5	Peak	8	8	V	38.0	28.0	4.3	0.0	41.7	54.0	-12.3
7311	27.4	Ave.	8	8	V	38.0	28.0	5.9	0.0	42.7	74.0	-31.4
12185	33.4	Peak	8	10	V	42.5	39.1	<u> </u>	0.0	35.8	54.0	-18.3
12185	26.5	Ave.	8	10	V	42.5	39.1	7.7	-9.5	46.1	74.0	-27.9
19496	31.0	Peak	21	13	V	40.2	23.3	7.7	-9.5	34.8	54.0	-19.2
19496	19.7	Ave.	21	13	V	40.2	23.3	1.1	-9.9	04.0		
2462					ļ			4.9	0.0	44.8	74.0	-29.2
4924	34.5	Peak	8	8	V	33.5	28.1 28.1	4.9	0.0	36.2	54.0	-17.8
4924	25.9	Ave.	8	8	<u>v</u>	33.5	28.1	6.3	0.0	50.3	74.0	-23.7
7386	34.0	Peak	8	8	V	38.0	28.0	6.3	0.0	43.3	54.0	-10.7
7386	27.0	Ave.	8	8	V	38.0	39.1	8.8	0.0	44.8	74.0	-29.2
12310	32.6	Peak	8	10	V	42.5	39.1	8,8	0.0	39.2	54.0	-14.8
12310	27.0	Ave.	8	10	V	42.5	23.3	0.0	-9.5	52.8	74.0	-21.2
22158	45.3	Peak	21		V	40.3	23.3	0.0	-9.5	38.6	54.0	-15.4
22158	31.1	Ave.	21	13	V	40.3	23.3	0,0	0.0		<u> </u>	

a) D.C.F.:Distance Correction Factor
b) Insert Loss (dB) = Cable X + Cable B + Cabl
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment hoise hoof which is at least 20 db below the times
f) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121	r	Standar		FCC 8115. (R 8)	(4)
							10-41003-				11	
EUT:	Trilogy 2					Ant #:		,				
Project #:	J2000865	8B	-				April 5, 200	ю		Contraction of the second	<u>з</u> 0	
Test Mode:	Transmitti	ng on ante	nna (3		Engineer:	Barry S.		a state of the second stat		-	
Frequency		1.	p. 197. g	Amb	Age Pol	Am			(OC)		E E C	
						Self range of the						- 68
M-tz	1.0000	PAO				1. (194 (*m))		e ië	().		and an inclusion	
2412												
4824	31.2	Peak	8	8	V	33.5	28.1	3.2	0.0	39.8	74.0	-34.2
4824	22.8	Ave.	8	8	V	33.5	28.1	3.2	0.0	31.4	54.0	-22.6
7236	33.7	Peak	8	8	V	38.0	28.0	4.3	0.0	48.0	74.0	-26.0
7236	25.9	Ave.	8	8	V	38.0	28.0	4.3	0.0	40.2	54.0	-13.8
12060	34.2	Peak	8	10	V	42.5	39.1	5.9	0.0	43.5	74.0	-30.6
12060	26.5	Ave.	8	10	- v -	42.5	39.1	5.9	0.0	35.8	54.0	-18.3
14472	39.4	Peak	8	10	· V	41.5	37.8	6.5	0.0	49.6	74.0	-24.4
14472	32.0	Ave.	8	10	V	41.5	37.8	6.5	0.0	42.2	54.0	-11.8
19296	41.6	Peak	.21	13	V	40.2	23.3	7.7	-9.5	56.7	74.0	-17.3
19296	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
21708	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.5	74.0	-24.5
21708	23.6	Ave.	21	13	V	40.3	23.3	0.0	-9.5	31.1	54.0	-22.9
2437	20.0	- F(VG.			 i							
4874	30.2	Peak	8	8	V	33.5	28.1	3.2	0.0	38.8	74.0	-35.2
4874	23.5	Ave.	8	8	Ť V	33.5	28.1	3.2	0.0	32.1	54.0	-21.9
7311	33.2	Peak	18	8	V	38.0	28.0	4.3	0.0	47.5	74.0	-26.5
	25.6	Ave.	8	8	+ v	38.0	28.0	4.3	0.0	39.9	54.0	-14.1
7311	34.7	Peak	8	1 10	TV V	42.5	39.1	5.9	0.0	44.0	74.0	-30.1
12185	26.6	Ave.	8	10	v	42.5	39.1	5.9	0.0	35.9	54.0	-18.2
12185	<u>26.6</u> 32.8	Peak	21	13	V V	40.2	23.3	7.7	-9.5	47.9	74.0	-26.1
19496	21.5	Ave.	21		V	40.2	23.3	7.7	-9.5	36.6	54.0	-17.4
19496	21.3	Ave.	<u></u>	- 13	+ v							
2462	29.6	Peak	8	8	-v	33.5	28.1	4.9	0.0	39.9	74.0	-34.1
4924	29.6	Ave.	8	8	V	33.5	28.1	4.9	0.0	31.9	54.0	-22.1
4924	33.5	Peak	8	8	V	38.0	28.0	6.3	0.0	49.8	74.0	-24.2
7386	25.9	Ave.	8	8	Ť V	38.0	28.0	6.3	0.0	42.2	54.0	-11.6
7386	34.2	Peak	8	. 10	T V	42.5	39.1	8.8	0.0	46.4	74.0	-27.6
12310	27.2		8	10	V	42.5	39.1	8.8	0.0	39.4	54.0	-14.6
12310		Ave.	21		V	40.3	23.3	0.0	-9.5	53.5	74.0	-20.
22158	46.0	Peak	21		v	40.3	23.3	0.0	-9.5	45.3	54.0	-8.7
22158	37.8	Ave.	2	113	¥							

Actes: a) D.C.F.: Distance Correction Factor
b) Insert Loss (ub) - Cable A + Coble D + Cable C + Insert Loss Transducer Loss - Duty Relaxation (transmitter c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
 a) Negative signs (-) in Margin column ognity forecoupling of the equipment noise floor which is at least 20 dB below the limits. b) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
1) Readings with DCF -9.5 were taken at 1 meter with RBW 300kHz

Company:	Symbol					Model #:	LA4121		Standa		FCC § 15. (R.B.)	247
EUT:	Trilogy 2]]			Ant #: ML-3	3099-PCEC-	02	Limits		11	
Project #:	J2000865	8B					April 3, 200		Test Di			meters
Test Mode:	Transmitti					Engineer:	Barry S.		Duty Re	elaxation		de
Frequency			Ant	Amp.	Ant. Pol.	Ant.	Pre-Amp	insert.	0. C.	Net		Margin
			l			Factor		Loss	<u> </u>		@3m	dB
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	de	dB(µV/m)	d8(µV/m)	00
2412			1									
4824	33.4	Peak	8	8	V	33.5	28.1	3.2	0.0	42.0	74.0	-32.0
4824	19.8	Ave.	8	8	V	33.5	28.1	3.2	0.0	28.4	54.0	-25.6
7236	32.6	Peak	8	8	V	38.0	28.0	4.3	0.0	46.9	74.0	-27.1
7236	24.7	Ave.	8	8	V	38.0	28.0	4.3	0.0	39.0	54.0	-15.0
12060	33.5	Peak	8	10	V	42.5	39.1	5.9	0.0	42.8	74.0	-31.3
12060	25.4	Ave.	8	10	V	42.5	39.1	5.9	0.0	34.7	54.0	-19.4
14472	39.0	Peak	8	10	V	41.5	37.8	6.5	0.0	49.2	74.0	-24.8
14472	31.5	Ave.	8	10	V	41.5	37.8	6.5	0.0	41.7	54.0	-12.3
19296	39.6	Peak	21	13	V	40.2	23.3	7.7	-9.5	54.7	74.0	-19.3
19296	24.6	Ave.	21	13	V	40.2	23.3	7.7	-9.5	39.7	54.0	-14.3
21708	42.0	Peak	21	13	V	40.3	23.3	0.0	-9.5	49.5	74.0	-24.5
21708	23.6	Ave.	21	13	V	40.3	23.3	0.0	-9.5	31.1	54.0	-22.9
2437												
4874	25.7	Peak	14	8	V	33.9	28.1	3.2	0.0	34.7	74.0	-39.3
4874	16.2	Ave.	14	8	V	33.9	28.1	3.2	0.0	25.2	54.0	-28.8
7311	32.8	Peak	14	8	V	38.0	28.0	4.3	0.0	47.1	74.0	-26.9
7311	24.8	Ave.	14	8	V	38.0	28.0	4.3	0.0	39.1	54.0	-14.9
12185	33.5	Peak	14	10	V	42.3	39.1	5.9	0.0	42.6	74.0	-31.5
12185	25.8	Ave.	14	10	V	42.3	39.1	5.9	0.0	34.9	54.0	-19.2
19496	32.8	Peak	21	13	V	40.2	23.3	7.7	-9.5	47.9	74.0	-26.1
19496	22.4	Ave.	21	13	V	40.2	23.3	7.7	-9.5	37.5	54.0	-16.5
2462			-		1							<u></u>
4924	27.4	Peak	8	8	Н	34.0	28.1	4.9	0.0	38.2	74.0	-35.8
4924	16.9	Ave.	8	8	Н	34.0	28.1	4.9	0.0	27.7	54.0	-26.3
7386	32.3	Peak	8	8	Н	36.8	28.0	6.3	0.0	47.4	74.0	-26.6
7386	25.6	Ave.	8	8	Н	36.8	28.0	6.3	0.0	40.7	54.0	-13.3
12310	34.1	Peak	8	10	H	44.1	39.1	8.8	0.0	47.9	74.0	-26.1
12310	26.5	Ave.	8	10	Н	44.1	39.1	8.8	0.0	40.3	54.0	-13.7
22158	43.0	Peak	21	13	Н	40.3	23.3	0.0	-9.5	50.5	74.0	-23.5
22158	34.6	Ave.	21	13	H	40.3	23.3	0.0	-9.5	42.1	54.0	-11.9

Notes: a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss Transducer Loss - Duty Relaxation (transmitter
only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 20 dB below the limits.
 Readings with –9.5 DCF were taken at 1 meter with RBW 300kHz



Date of Test: April 3 & 7, 2000

4.7 AC Line Conducted Emission, FCC Rule 15.207:

Test was performed according the ANSI C63.4 requirements.

- [] Not required; battery operation only
- [x] Test data in DoC report



Date of Test: April 3 & 7, 2000

- 4.8 Radiated Emissions from Digital Section of Transceiver (Transmitter), FCC Ref: 15.109
- [] Not required No digital part
- [] Test results are attached
- [x] Included in the separate DOC report.



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- 4.9 Radiated Emissions from Receiver Section of Transceiver (L.O. Radiation), FCC Ref: 15.109, 15.111
- [x] Not required EUT operation above 960 MHz only
- [] Not required EUT is transmitter only
- [] Test results are attached



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Symbol Technologies, Model No. LA4121 FCC ID: Date of Test: April 3 & 7, 2000

4.10 Processing Gain Measurements, FCC Rule 15.247(e)

The processing gain shall be determined from the ratio in dB of the signal to noise ratio with the system spreading code turned OFF, to the signal to noise ratio with the system spreading code turned ON, as measured at the demodulated output of the receiver. The processing gain shall be at least 10 dB for a direct sequence spread spectrum system.

	Refer to attached test procedure and data sheets.
Х	Refer to circuit analysis and processing gain calculations provided by manufacturer.



Date of Test: April 3 & 7, 2000

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

Duty cycle = Maximum ON time in 100 msec/100

Duty cycle correction, $dB = 20 * \log(DC)$

	See attached spectrum analyzer chart(s) for transmitter timing				
	See transmitter timing diagram provided by manufacturer				
Х	No Duty cycle correction was used				



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Symbol Technologies, Model No. LA4121 FCC ID:

5.0 Appendix A : Plots

Processing Gain Calculation Symbol Technologies LA-4121 WLAN PC Card

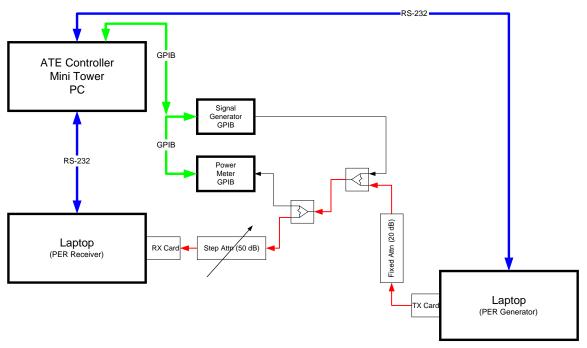
Norman H. Nelson, Sr. EMC Engineer May 8, 2000

Symbol calculated the processing gain from the jamming margin of the LA-4121 transceiver as specified in 15.247 (e)(2).

Test Setup

The purpose of the jamming test is to determine how effective the modulation, coding and decoding is at rejecting the corrupting influence of a CW jammer signal. Where as most setups us a BER to generate data and count errors because the modulator chip architecture prevents injecting data after chipping, Symbol chose to use another LA-4121 as the transmitter and data generator. A link between the transmitter and receiver is made and path loss adjusted so that the BER is 10E-5. The path loss is then reduced by 10 dB so that the BER approaches zero. Finally a jamming signal is combined with the transmitted signal to degrade the system performance. The jamming signal amplitude is then adjusted to the point that the BER is degraded to 10E-5.

The relationship between PER and BER is as follows. In order to get a good packet we need 8 x 1024 good bits. Stated mathematically. $1-\text{PER} = (1-\text{BER})^{(8^{*}24)}$. Or BER=1-(1-PER)^{(1/(8^{*}1024))}.



Jamming Margin Test Setup

The major blocks of the jamming margin test are a transmitter, a receiver, and a jammer. The TX card formats and transmits packets of data consisting of 1024 bytes LA-4121 Processing Gain Calculations Page 1 of 1

each. The RX card then attempts to read each packet. The Signal Generator provides the jamming signal. The splitters combine the TX and jammer signals and provide a port to measure the power levels within the RF link. The PER Generator Laptop controls the transmit card and the PER receiver laptop controls the receiver. The ATE PC automates the test by controlling the two laptops, the Signal Generator, and the power meter.

Software blocks

The key to this test is three software programs Packet Generator (PG), Packet Counter (PC), and Jam Margin Controller (JMC). The first to work together to form the PER measurement system and the last to control the jammer, the power meter, and the other two software blocks.

Packet Generator runs on the PG Laptop and controls the transmit card. A trigger on the serial port line commands the TX card to generate and transmit 1000 packets of 1024 bytes at a specified data rate.

Packet Counter runs on the PER receiver laptop and queries the RX card for the number of packets it has received. A trigger on the serial port causes the Packet Counter to report the number of packets to the ATE Controller and reset the Packet Counter to zero. The Packet counter automatically detects the data rate of the incoming packet stream.

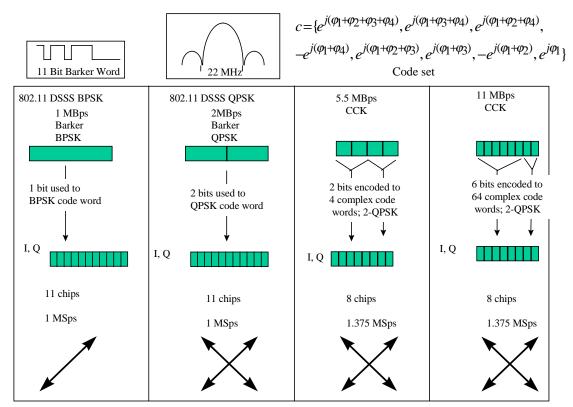
The other Jamming Margin Controller (JMC) runs on the ATE PC and controls the Signal Generator, the Power Meter, and PGAC running on the Dual Slot laptop.

PG commands the TX card to transmit a set of 1000 packets of 1024 bytes of data. The RX card receives the packets and PC sends the number of good packets received to the serial port. The functional purpose is the same as a BER meter. A new set is run every time a new trigger is received on the serial port from JMC.

JMC controls the jammer, the power meter, and the Dual Slot program. JMC sets the frequency and level of the signal generator that acts as a jammer. JMC then sends a trigger to PG. The trigger causes PG to run another set of packets and PC reports the number of good packets back to JMC. The packet error rate is then converted to BER and JMC adjusts the Jammer level appropriately. A search algorithm is built into JMC to have the jammer converge to the right level for a 10E-5 BER. The jammer resolution is .1 dB.

When the jammer level causes a BER of 10E-5, the JMC program turns off the TX card and commands the power meter to read the jammer power level. JMC then turns off the jammer, turns on the TX card, and measures its power. Then S is offset for duty cycle and J/S is calculated from the two power measurements and recorded to disk. In this way as the test progresses and the TX card warms up power fluctuations due to temperature are referenced out.

The test is then repeated at the next jammer frequency. In this instance the test is conducted across the band of a single channel at 50KHz steps.



Modulation Technique and Data rates

Mode	Chip/Symbol
1 MBps	11/1
2 MBps	11/2
5.5 MBps	8/2
11 MBps	8/8

Gp Calculation from J/S data

 $Gp = E_b/N_0 + J/S + L_{sys}$ Where $L_{sys} <= 2 \text{ dB}$

Mbps	E _b / N ₀ (dB)	Gp = J/S +
1	10.6	12.6
2	10.6	12.6
5.5	15.6	17.6
11	16.6	18.6

Test Results

Attached are two plots of J/S and Gp vs F in MHz for 11 Mbps and 2 Mbps. The two plots are the worst case modes for each chipping rate. Theoretical calculations are given for the 1 and 5.5 Mbps modes.

The lower line shows the J/S as taken from the power ratios measured with the power meter. The upper line shows the processing gain G_p as calculated from the Jamming Margin data. Note that the lowest 20% of the data points were discarded as specified in 15.247 (e)(2).

Theoretical calculations

1 Mbps mode using BPSK 5.5 Mbps mode using CCK The processing gain is defined by: The processing gain is defined by: PG = Wss/Rb1PG = BW reduction + Coding Gain BW reduction = Chip Rate / Symbol Wss is the bandwidth (11.2 MHz min). Rb is the data rate (1 Mbps) Rate PG = 11.2 MHz/1 Mbps= 10Log10(11 MCps/1.375 = 11.2MSps) = 10Log10(11.2) $= 9.03 \, dB$ $= 10.49 \, \text{dB}$ Coding Gain = 1.7 @ 11 Mbps 2.0 @ 5.5 Mbps PG = 9.03 + 2.0= 11.03 dB

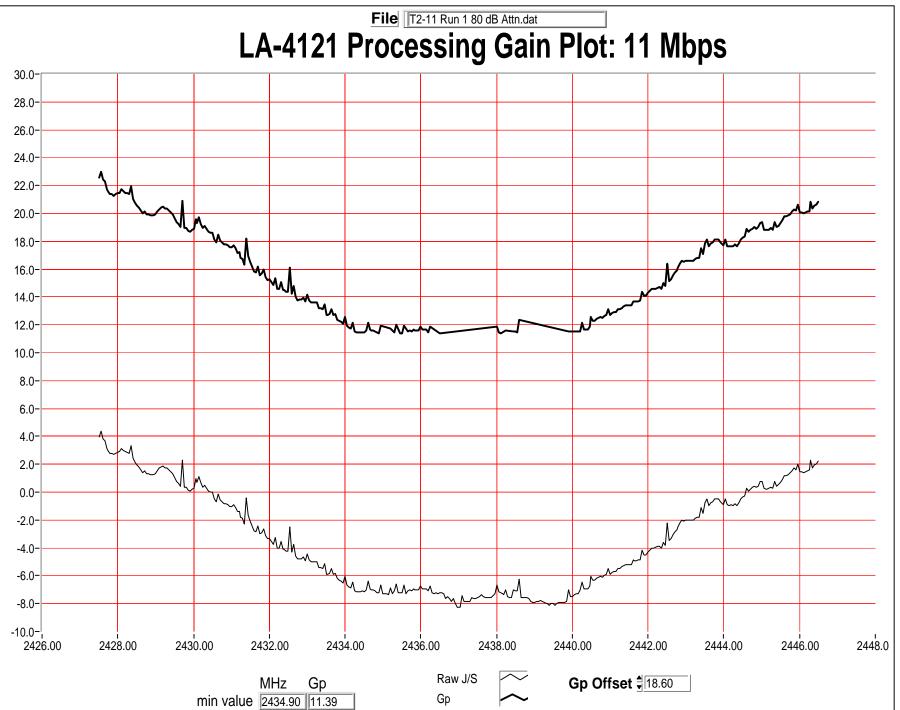
¹ Simon Omura, Scholtz, and Levitt *Spread Spectrum Communications Handbook* (New York: McGraw Hill, 1994), p. 138 LA-4121 Processing Gain Calculations

Results Table

Mode (Mbps)	Gp (dB)
1	10.49
2	10.13
5.5	11.03
11	11.39

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