



FCC Certification Report for the
LA2400 WLAN PC Card
Class II Permissive Change

EXHIBIT 2

TEST REPORT

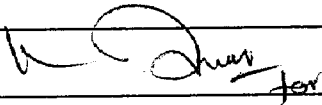
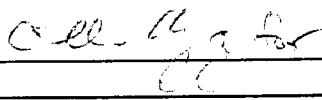
**Radiated Emissions in Restricted Bands
Permissive Change Test Report
FCC Part 15.247 (c)
for
Symbol Technologies
on the
Spread Spectrum Frequency Hopping Radio Model: H9PLA2400
Test Report #: 202567863
Date of Report: September 27, 2000**

Job #: J200256786
Date of Test: September 20, 2000

Total No. of Pages Contained in this Report: 11 + data page



Lab Code: 200201-01

	Barry E. Smith, Test Engineer
	David Chernomordik, Ph.D., EMC Site Manager

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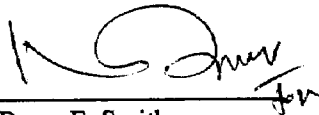
Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

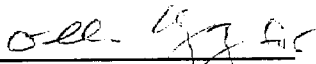
1.0 Summary of Tests

Symbol Technologies Inc. - Model No. H9PLA2400

TEST	REFERENCE	RESULTS
Radiated Emission in Restricted Bands	15.247(c)	Passed

Test Engineer: 
Barry E. Smith

Date: 9/28/00

EMC Site Mgr.: 
David Chernomordik

Date: 9/28/00

Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

2.0 General Description

2.1 Product Description

The Symbol Technologies model H9PLA2400 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.

Overview of the EUT

Trade Name & Model No.	Symbol Technologies, Model No. H9PLA2400
Frequency Range (MHz)	2402 – 2480
Antenna(s)	Moto Monopole 50-21900-041 Zebra Dipole 50-21900-038
Manufacturer name & address	Symbol Technologies 6480 Via Del Oro San Jose CA 95119

Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

2.3 Test Methodology

This report is designed to show that the 2 new antennas added to the previously certified device complies with FCC regulations. Only radiated emissions in restricted bands were tested because the transmitter itself has not been modified.

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.

2.4 Test Facility

The open area test site facility used to collect the radiated data is located at 1365 Adams Court, Menlo Park, CA 94025. This test facility and site measurement data have been fully placed on file with the FCC.

Symbol Technologies,
Model No. H9PLA2400

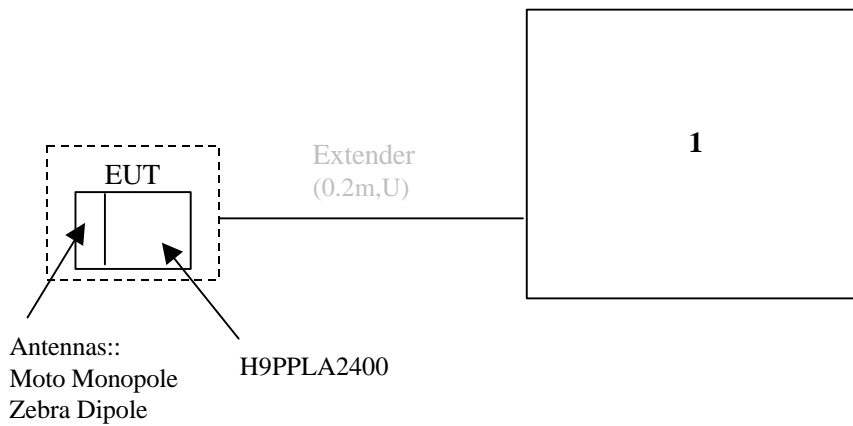
Date of Test: September 20, 2000

3.0 System Test Configuration

3.1 Support Equipment

Item #	Description	Model No.	Serial No.	FCC ID
1	Compaq Notebook Computer	2860A	7448HJJ53R518	CNT75MB2CA

3.2 Block Diagram of Test Setup



m: Length in meters

U: Unshielded

Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

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.

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.

3.5 Mode of Operation During Test

For emissions testing, the unit was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

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 Inc. prior to compliance testing):

No modifications were made to the EUT by Intertek Testing Services.

4.0 Measurement Results

4.1 Transmitter Radiated Emissions in Restricted Bands, *FCC Ref: 15.247(c)*

Radiated emission measurements were performed from 30 MHz to 25000 MHz. Analyzer resolution is 100 kHz or greater for frequencies from 30 MHz to 1000 MHz and 1 MHz for frequencies above 1000 MHz.

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. All measurements were performed with peak detection and average detection (above 1 GHz) unless otherwise specified.

On the following pages, the emissions on the harmonics frequencies, the limits, and the margin of compliance are presented. These tests were made when the transmitter is in full radiated power. Duty cycle correction was not used.

For the test results, refer to the following radiated emission data sheets.

Note : It was verified that radiated emission data from digital portion of the EUT is not worse than the data previously measured and presented in the original report.

Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

4.2 Radiated Emission Test Results

See attachment test data sheets.

**Radiated Emissions
Test Data**

Company:	Symbol				Model #:	50-21900-041	Standard:	FCC § 15.247 (R.B.)
EUT:	LA2400 Frequency Hopper				S/N #:	Moto Monopole	Limits:	11
Project #:	J200256786				Test Date:	Sep 20, 2000	Test Distance:	3 meters
Test Mode:	transmitting antenna 01				Engineer:	Barry S.	Duty Relaxation:	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	8	21	0	8	12	13	21	0	0	0
Model:	EMCO 3115	3160-9	None	CDJ_P100 G	ACO/160	ACO/400	Gm_MrL	None	None	None

Frequency	Reading	Detector	Ant. #	Amp. #	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(f/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
2402	88.2	Peak	8		V	29.1	0.0	2.3	0.0	119.6		
4804	40.6	Peak	8	8	V	34.0	28.1	3.2	0.0	49.7	74.0	-24.3
4804	39.5	Ave.	8	8	V	34.0	28.1	3.2	0.0	48.6	54.0	-5.4
12010	40.3	Peak	8	12	V	41.6	32.4	5.9	-9.5	45.8	74.0	-28.2
12010	36.3	Ave.	8	12	V	41.6	32.4	5.9	-9.5	41.9	54.0	-12.1
19216	37.7	Peak	21	13	V	40.2	23.3	7.7	-9.5	52.8	74.0	-21.2
19216	30.0	Ave.	21	13	V	40.2	23.3	7.7	-9.5	45.1	54.0	-8.9
2440	85.7	Peak	8		V	29.1	0.0	2.3	0.0	117.1		
4880	41.7	Peak	8	8	V	34.0	28.1	3.2	0.0	50.8	74.0	-23.2
4880	40.6	Ave.	8	8	V	34.0	28.1	3.2	0.0	49.7	54.0	-4.3
7320	36.9	Peak	8	8	V	37.0	28.0	4.3	0.0	50.2	74.0	-23.8
7320	32.9	Ave.	8	8	V	37.0	28.0	4.3	0.0	46.2	54.0	-7.8
12220	38.1	Peak	8	12	V	41.6	32.4	5.9	-9.5	43.7	74.0	-30.3
12220	34.1	Ave.	8	12	V	41.6	32.4	5.9	-9.5	39.7	54.0	-14.3
19520	40.6	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.8	74.0	-18.2
19520	30.9	Ave.	21	13	V	40.3	23.3	7.7	-9.5	46.1	54.0	-7.9
2480	89.8	Peak	8		V	29.1	0.0	2.3	0.0	121.2		
4960	43.2	Peak	8	8	V	34.0	28.1	3.2	0.0	52.3	74.0	-21.7
4960	42.2	Ave.	8	8	V	34.0	28.1	3.2	0.0	51.3	54.0	-2.7
7440	38.7	Peak	8	8	V	37.0	28.0	4.3	0.0	52.0	74.0	-22.0
7440	36.2	Ave.	8	8	V	37.0	28.0	4.3	0.0	49.5	54.0	-4.5
12400	38.8	Peak	8	12	V	41.6	32.4	5.9	0.0	53.9	74.0	-20.1
12400	35.0	Ave.	8	12	V	41.6	32.4	5.9	0.0	50.1	54.0	-3.9
19840	40.5	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.7	74.0	-18.3
19840	30.6	Ave.	21	13	V	40.3	23.3	7.7	-9.5	45.8	54.0	-8.2
22320	43.8	Peak	21	13	V	40.3	23.3	7.9	-9.5	59.2	74.0	-14.8
22320	33.7	Ave.	21	13	V	40.3	23.3	7.9	-9.5	49.1	54.0	-4.9

- 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.

**Radiated Emissions
Test Data**

Company:	Symbol				Model #:	50-21900-041	Standard:	FCC § 15.247 (R.E.)
EUT:	LA2400 Frequency Hopper				S/N #:	Moto Monopole	Limits:	11
Project #:	J200256786				Test Date:	Sep 20, 2000	Test Distance:	3 meters
Test Mode:	transmitting antenna 01				Engineer:	Barry S.	Duty Relaxation:	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	8	21	0	8	12	13	21	0	0	0
Model:	EMCO 3115	3160-9	None	CDI_P100 G	ACO/180	ACO/400	Gm_M+L	None	None	None

Frequency	Reading	Detector	Ant	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
2402	88.2	Peak	8		V	29.1	0.0	2.3	0.0	119.6		
4804	40.6	Peak	8	8	V	34.0	28.1	3.2	0.0	49.7	74.0	-24.3
4804	39.5	Ave.	8	8	V	34.0	28.1	3.2	0.0	48.6	54.0	-5.4
12010	40.3	Peak	8	12	V	41.6	32.4	5.9	-9.5	45.8	74.0	-28.2
12010	36.3	Ave.	8	12	V	41.6	32.4	5.9	-9.5	41.9	54.0	-12.1
19216	37.7	Peak	21	13	V	40.2	23.3	7.7	-9.5	52.8	74.0	-21.2
19216	30.0	Ave.	21	13	V	40.2	23.3	7.7	-9.5	45.1	54.0	-8.9
2440	85.7	Peak	8		V	29.1	0.0	2.3	0.0	117.1		
4880	41.7	Peak	8	8	V	34.0	28.1	3.2	0.0	50.8	74.0	-23.2
4880	40.6	Ave.	8	8	V	34.0	28.1	3.2	0.0	49.7	54.0	-4.3
7320	36.9	Peak	8	8	V	37.0	28.0	4.3	0.0	50.2	74.0	-23.8
7320	32.9	Ave.	8	8	V	37.0	28.0	4.3	0.0	46.2	54.0	-7.8
12220	38.1	Peak	8	12	V	41.6	32.4	5.9	-9.5	43.7	74.0	-30.3
12220	34.1	Ave.	8	12	V	41.6	32.4	5.9	-9.5	39.7	54.0	-14.3
19520	40.6	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.8	74.0	-18.2
19520	30.9	Ave.	21	13	V	40.3	23.3	7.7	-9.5	46.1	54.0	-7.9
2480	89.8	Peak	8		V	29.1	0.0	2.3	0.0	121.2		
4960	43.2	Peak	8	8	V	34.0	28.1	3.2	0.0	52.3	74.0	-21.7
4960	42.2	Ave.	8	8	V	34.0	28.1	3.2	0.0	51.3	54.0	-2.7
7440	38.7	Peak	8	8	V	37.0	28.0	4.3	0.0	52.0	74.0	-22.0
7440	36.2	Ave.	8	8	V	37.0	28.0	4.3	0.0	49.5	54.0	-4.5
12400	38.8	Peak	8	12	V	41.6	32.4	5.9	0.0	53.9	74.0	-20.1
12400	35.0	Ave.	8	12	V	41.6	32.4	5.9	0.0	50.1	54.0	-3.9
19840	40.5	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.7	74.0	-18.3
19840	30.6	Ave.	21	13	V	40.3	23.3	7.7	-9.5	45.8	54.0	-8.2
22320	43.8	Peak	21	13	V	40.3	23.3	7.9	-9.5	59.2	74.0	-14.8
22320	33.7	Ave.	21	13	V	40.3	23.3	7.9	-9.5	49.1	54.0	-4.9

- 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.

Radiated Emissions Test Data

Company:	Symbol		Model #:	50-21900-038	Standard	FCC § 15.247 (R.B.)
EUT:	LA2400 Frequency Hopper		S/N #:	Zebra Dipole	Limits	11
Project #:	J200256786		Test Date:	Sep 20, 2000	Test Distance	3 meters
Test Mode:	transmitting antenna 02		Engineer:	Barry S.	Duty Relaxation	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	8	21	0	8	12	13	21	0	0	0
Model:	EMCO 311E	3160-9	None	CDI_P100 G	ACO/180	ACO/400	Gm_M+L	None	None	None

Frequency	Reading	Detector	Ant	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
2402	83.0	Peak	8		V	29.1	0.0	2.3	0.0	114.4		
4804	42.7	Peak	8	8	V	34.0	28.1	3.2	0.0	51.8	74.0	-22.2
4804	40.6	Ave.	8	8	V	34.0	28.1	3.2	0.0	49.7	54.0	-4.3
12010	38.8	Peak	8	12	V	41.6	32.4	5.9	-9.5	44.4	74.0	-29.6
12010	35.4	Ave.	8	12	V	41.6	32.4	5.9	-9.5	41.0	54.0	-13.0
19216	37.7	Peak	21	13	V	40.2	23.3	7.7	-9.5	52.8	74.0	-21.2
19216	30.0	Ave.	21	13	V	40.2	23.3	7.7	-9.5	45.1	54.0	-8.9
2440	81.6	Peak	8		V	29.1	0.0	2.3	0.0	113.0		
4880	44.7	Peak	8	8	V	34.0	28.1	3.2	0.0	53.8	74.0	-20.2
4880	41.7	Ave.	8	8	V	34.0	28.1	3.2	0.0	50.8	54.0	-3.2
7320	32.9	Peak	8	8	V	37.0	28.0	4.3	0.0	46.2	74.0	-27.8
7320	28.1	Ave.	8	8	V	37.0	28.0	4.3	0.0	41.4	54.0	-12.6
12220	39.5	Peak	8	12	V	41.6	32.4	5.9	-9.5	45.1	74.0	-28.9
12220	34.8	Ave.	8	12	V	41.6	32.4	5.9	-9.5	40.4	54.0	-13.6
19520	40.6	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.8	74.0	-18.2
19520	30.9	Ave.	21	13	V	40.3	23.3	7.7	-9.5	46.1	54.0	-7.9
2480	82.4	Peak	8		V	29.1	0.0	2.3	0.0	113.8		
4960	43.0	Peak	8	8	V	34.0	28.1	3.2	0.0	52.1	74.0	-21.9
4960	41.1	Ave.	8	8	V	34.0	28.1	3.2	0.0	50.2	54.0	-3.8
7440	36.2	Peak	8	8	V	37.0	28.0	4.3	0.0	49.5	74.0	-24.5
7440	31.6	Ave.	8	8	V	37.0	28.0	4.3	0.0	44.9	54.0	-9.1
12400	38.6	Peak	8	12	V	41.6	32.4	5.9	0.0	53.7	74.0	-20.3
12400	34.3	Ave.	8	12	V	41.6	32.4	5.9	0.0	49.4	54.0	-4.6
19840	40.5	Peak	21	12	V	40.3	32.2	7.7	-9.5	46.8	74.0	-27.2
19840	30.6	Ave.	21	12	V	40.3	32.2	7.7	-9.5	36.9	54.0	-17.1
22320	41.8	Peak	21	13	V	40.3	23.3	7.9	-9.5	57.2	74.0	-16.8
22320	32.0	Ave.	21	13	V	40.3	23.3	7.9	-9.5	47.4	54.0	-6.6

Subtract 9 dB for all readings to account for duty cycle

DCF of -9.5 were taken at 1 meter with RBW at 300kHz

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.

**Radiated Emissions
Test Data**

Company:	Symbol			Model #:	50-21900-038	Standard	FCC § 15.247 (R.B.)
EUT:	LA2400 Frequency Hopper			S/N #:	Zebra Dipole	Limits	11
Project #:	J200256786			Test Date:	Sep 20, 2000	Test Distance	3 meters
Test Mode:	transmitting antenna 02			Engineer:	Barry S.	Duty Relaxation	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			Transducer Used
Number:	8	21	0	8	12	13	21	0	0	0
Model:	EMCO 3115	3160-9	None	CDI_P100 0	ACO100	ACO400	Gm_M-L	None	None	None

Frequency	Reading	Detector	Ant	Amp	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
2402	83.0	Peak	8		V	29.1	0.0	2.3	0.0	114.4		
4804	42.7	Peak	8	8	V	34.0	28.1	3.2	0.0	51.8	74.0	-22.2
4804	40.6	Ave.	8	8	V	34.0	28.1	3.2	0.0	49.7	54.0	-4.3
12010	38.8	Peak	8	12	V	41.6	32.4	5.9	-9.5	44.4	74.0	-29.6
12010	35.4	Ave.	8	12	V	41.6	32.4	5.9	-9.5	41.0	54.0	-13.0
19216	37.7	Peak	21	13	V	40.2	23.3	7.7	-9.5	52.8	74.0	-21.2
19216	30.0	Ave.	21	13	V	40.2	23.3	7.7	-9.5	45.1	54.0	-8.9
2440	81.6	Peak	8		V	29.1	0.0	2.3	0.0	113.0		
4880	44.7	Peak	8	8	V	34.0	28.1	3.2	0.0	53.8	74.0	-20.2
4880	41.7	Ave.	8	8	V	34.0	28.1	3.2	0.0	50.8	54.0	-3.2
7320	32.9	Peak	8	8	V	37.0	28.0	4.3	0.0	46.2	74.0	-27.8
7320	28.1	Ave.	8	8	V	37.0	28.0	4.3	0.0	41.4	54.0	-12.6
12220	39.5	Peak	8	12	V	41.6	32.4	5.9	-9.5	45.1	74.0	-28.9
12220	34.8	Ave.	8	12	V	41.6	32.4	5.9	-9.5	40.4	54.0	-13.6
19520	40.6	Peak	21	13	V	40.3	23.3	7.7	-9.5	55.8	74.0	-18.2
19520	30.9	Ave.	21	13	V	40.3	23.3	7.7	-9.5	46.1	54.0	-7.9
2480	82.4	Peak	8		V	29.1	0.0	2.3	0.0	113.8		
4960	43.0	Peak	8	8	V	34.0	28.1	3.2	0.0	52.1	74.0	-21.9
4960	41.1	Ave.	8	8	V	34.0	28.1	3.2	0.0	50.2	54.0	-3.8
7440	36.2	Peak	8	8	V	37.0	28.0	4.3	0.0	49.5	74.0	-24.5
7440	31.6	Ave.	8	8	V	37.0	28.0	4.3	0.0	44.9	54.0	-9.1
12400	38.6	Peak	8	12	V	41.6	32.4	5.9	0.0	53.7	74.0	-20.3
12400	34.3	Ave.	8	12	V	41.6	32.4	5.9	0.0	49.4	54.0	-4.6
19840	40.5	Peak	21	12	V	40.3	32.2	7.7	-9.5	46.8	74.0	-27.2
19840	30.6	Ave.	21	12	V	40.3	32.2	7.7	-9.5	36.9	54.0	-17.1
22320	41.8	Peak	21	13	V	40.3	23.3	7.9	-9.5	57.2	74.0	-16.8
22320	32.0	Ave.	21	13	V	40.3	23.3	7.9	-9.5	47.4	54.0	-6.6

Subtract 9 dB for all readings to account for duty cycle

DCF of -9.5 were taken at 1 meter with RBW at 300kHz

- 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.

Symbol Technologies,
Model No. H9PLA2400

Date of Test: September 20, 2000

5.0 Document History

Revision/Job Number	Date	Change
1.0 / J200256786	9/27/00	Original document