Network Systems Organization

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Federal Communications Commission
Equipment Approval Services
P.O. Box 358315
Pittsburgh, PA 15251-5315

Re: FCC ID H9PLA4111 Ref # 11167

Date: January 23, 2000

Dear Reviewer,

In response to the following Email:

To: Norman Nelson, Symbol Technologies, Inc.
From: Joe Dichoso
jdichoso@fcc.gov
FCC Application Processing Branch

Re: FCC ID H9PLA4111
Applicant: Symbol Technologies Inc
Correspondence Reference Number: 11167
731 Confirmation Number: EA95624
Date of Original E-Mail: 12/23/1999

1) The output power measured at 60 mW does not agree with the 100 mW and 500 mW listed in the manual. Please explain. You may have to correct the manual or retest the device at the higher output power.

The operator's manual was changed to:

TX Max.Radiated EIRP	**US:**	**FCC part 15.247**
	Europe :	**ETS 300 320**
	Japan:	**RCR STD-33**

2) It appears that you are trying to obtain DOC for the peripheral portion of this device. If so, provide a corrected label with the DOC label requirements. Also, Provide the official DOC Certificate because the Certificate in the report was blank with no name, address etc... and was not signed.

A new corrected label was uploaded to the OET web site.

An error occurred when converting the DOC report to electronic format. The completed and signed DOC Certificate page was incorporated into the DOC report and uploaded to the OET web site.

3) Provide a list of antennas. For each antenna, indicate the model number, antenna gain, the output power and the total EIRP. Provide a photo for each antenna or antenna specification sheet for each antenna. Also, indicate which antennas were tested.

Antenna Summary Table

Non Hand Held Antennas

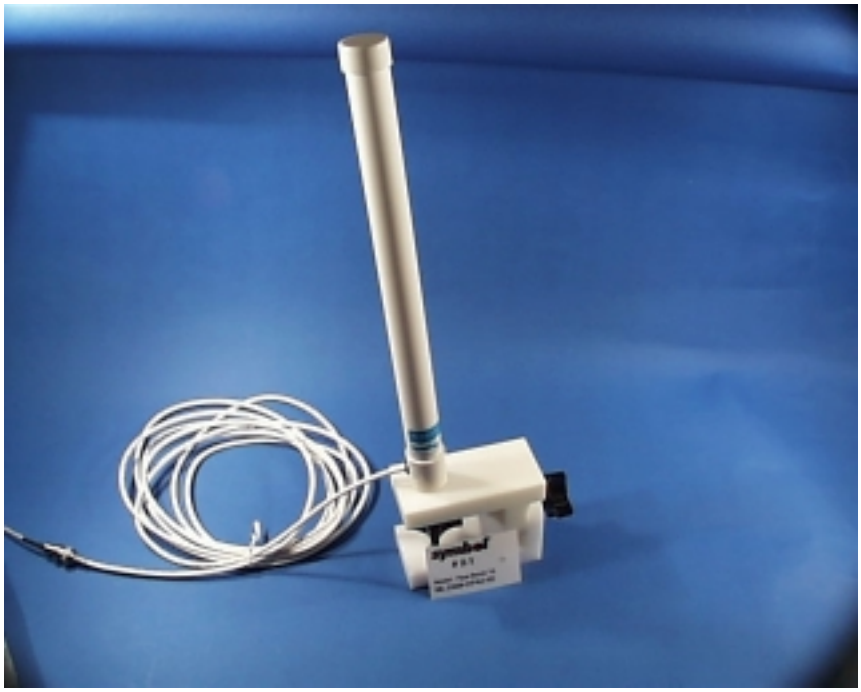
Ant #	Model	Symbol P/N	Gain[1](dBi)	Cable Loss (dB)	Output Power[2] (dBm)	EIRP (mW)	Tested[3]
1	Plane Antenna	ML-2499-PSA1-00	0 dBi	.5	17.2	52	Yes
2	Dipole Antenna (4' Cable),	ML-2499-HPA1-00 (4 ft)	3.8 dBi	0.8	16.9	117	Yes
2.1	Dipole Antenna (15" cable)	ML-2499-HPA2-00 (15 ft)	3.8 dBi	3.8	13.9	59	Yes
3	Rubber Duck	ML-2499-APA1-00	1 dBi	0	17.7	74	Yes
4	Yagi	ML-2499-YGA1-01	13 dB	4	13.7	468	Yes
5	Patch	ML-2499-PTA1-01	6 dBi	2	15.7	148	Yes
6	Panel	ML-2499-PNA1-01	11dBi	3.4	14.3	339	Yes
15	Parabolic Grid	ML-2499-PGA1-00	23 dBi	14	3.7	468	Yes
16	S2406	ML-2499-WHA1-20/30	7	5.6 / 8.4	12.1 / 9.3	81 / 43	Yes
18	Corner Patch	ML-2499-DLA1-06	7.5 dBi	2.5	15.2	186	Yes
19	Ceiling Mount Panel	ML-2499-SD24-06	3.3 dBi	1.5	16.2	89	**Yes**
X	Access Point	21-20667-01	2.2 dBi	.2	17.5	93	Yes
Z	End Cap	ML-3099-PCEC-01	0 dBi	0	17.7	60	Yes

Hand Held Antennas

Ant #	*Model*	*Symbol P/N*	*Gain*	Cable Loss (dB)	Output Power	EIRP (mW)	Tested
9	4640	21-17486-02	< 0 dBi	0	17.7	60	Yes
10	2140	10-17577-01	< 0 dBi	0	17.7	60	Yes
11	6140	10-35305-01	< 0 dBi	0	17.7	60	Yes
12	6840	10-32290-01	< 0 dBi	0	17.7	60	Yes
17	Criticare		0 dBi	0	17.7	60	Yes
20	2040	10-17577-02	< 0 dBi	0	17.7	60	Yes

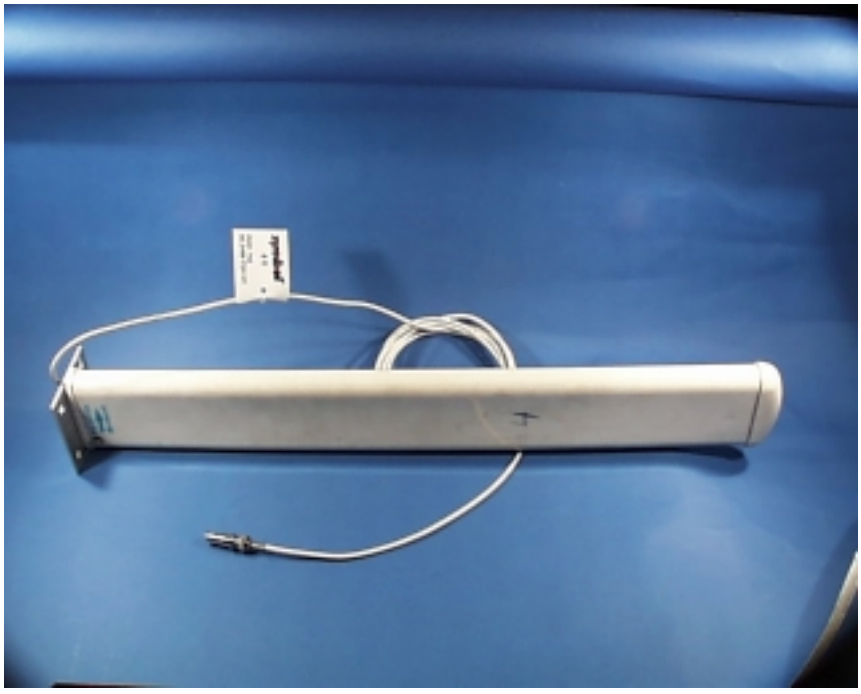
[1] Antenna gain is without cable loss
[2] Includes cable loss
[3] Data included in test report

Antenna #1



Antenna #2

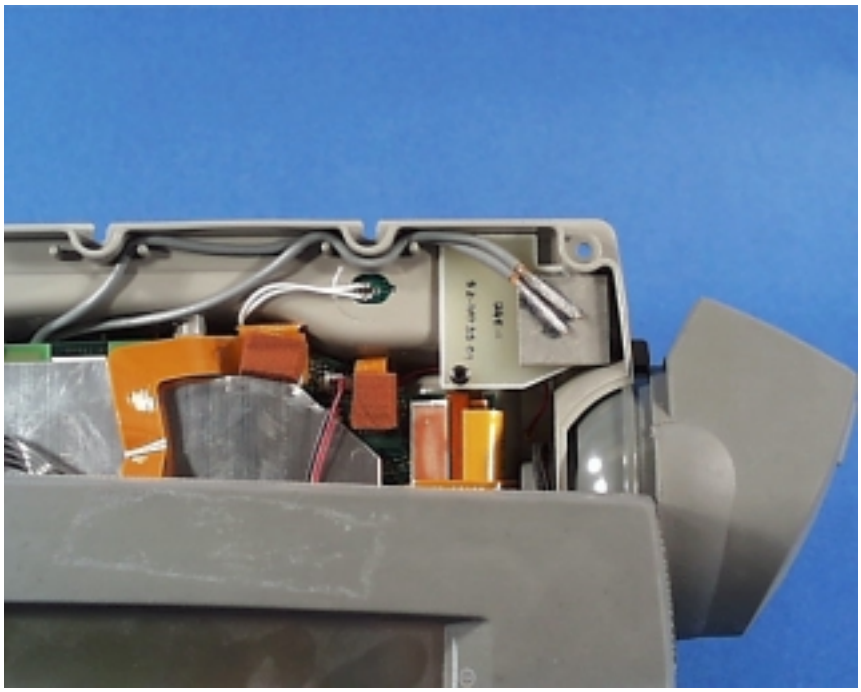
Antenna #3



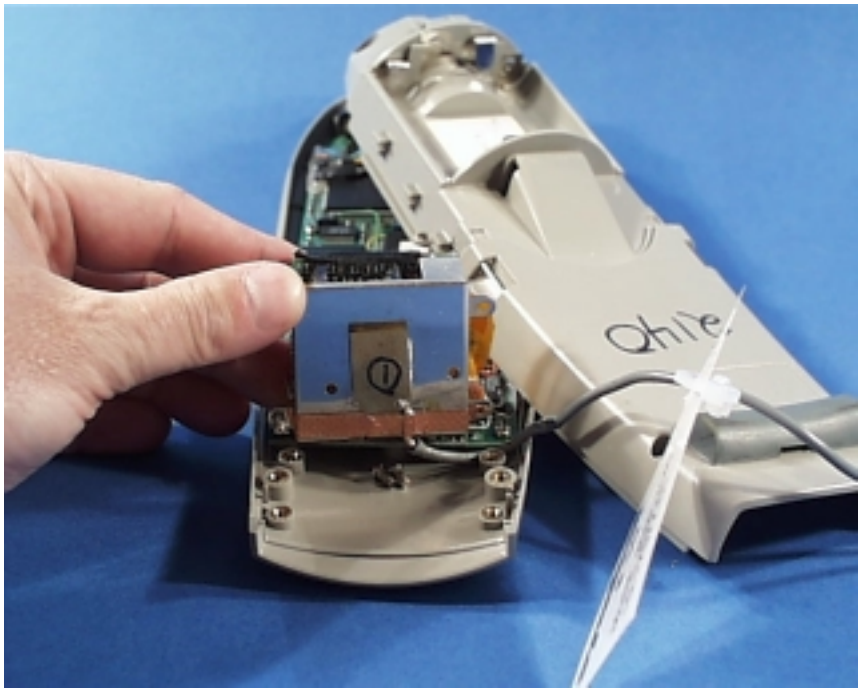
Antenna # 4

Antenna #5

Antenna #6



Antenna # 9

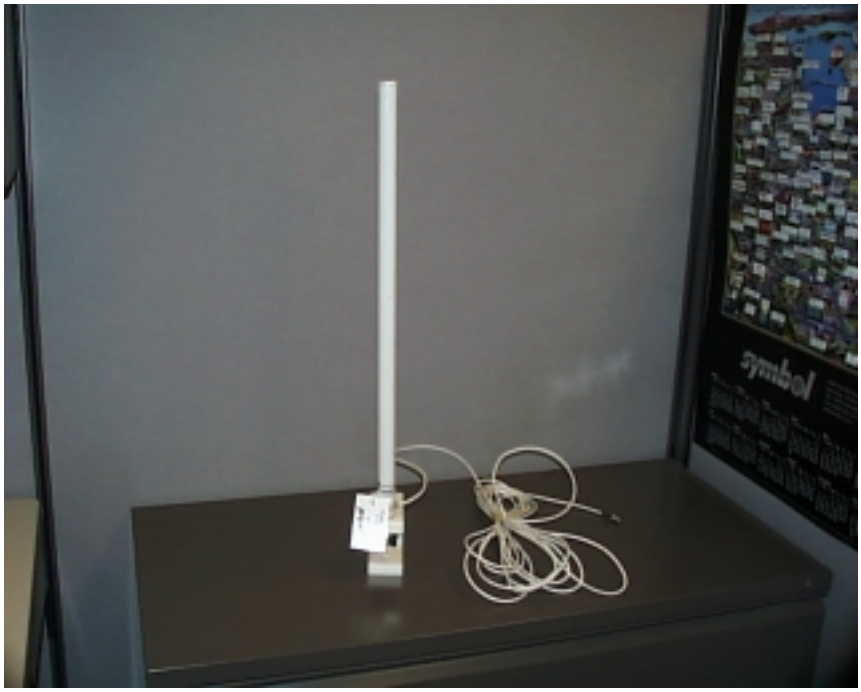


Antenna # 10

Antenna # 11

Antenna # 12

Antenna # 15



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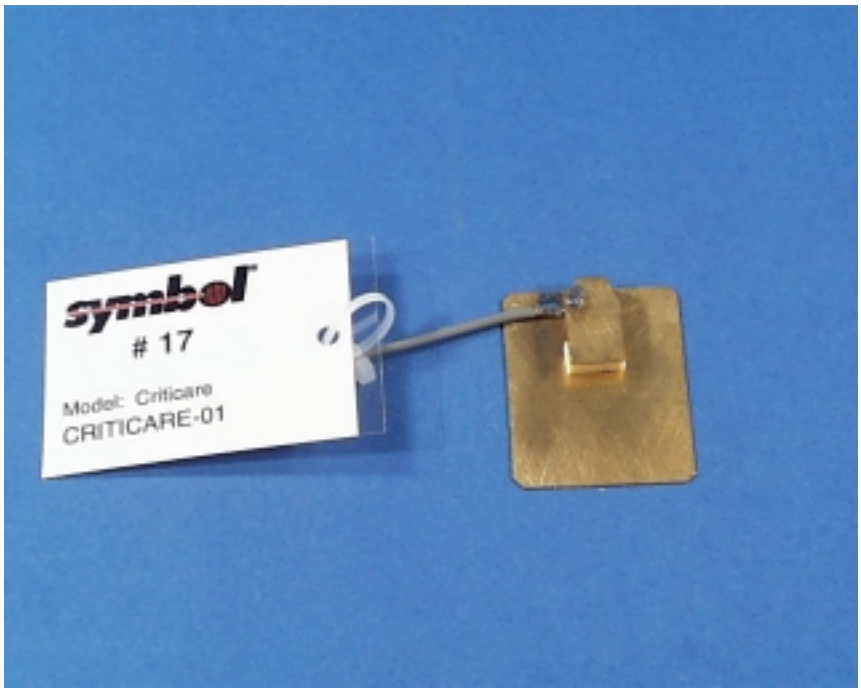
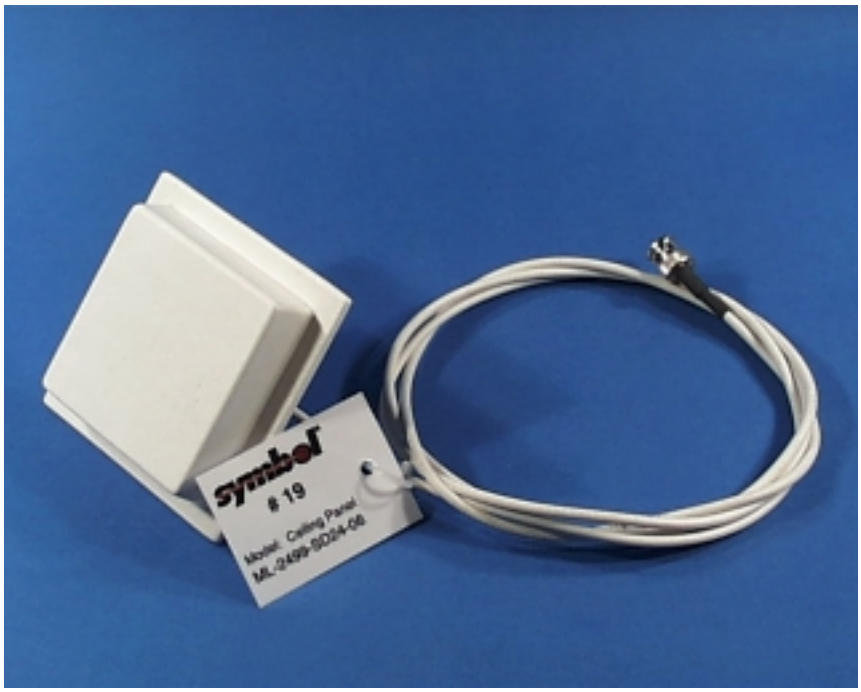
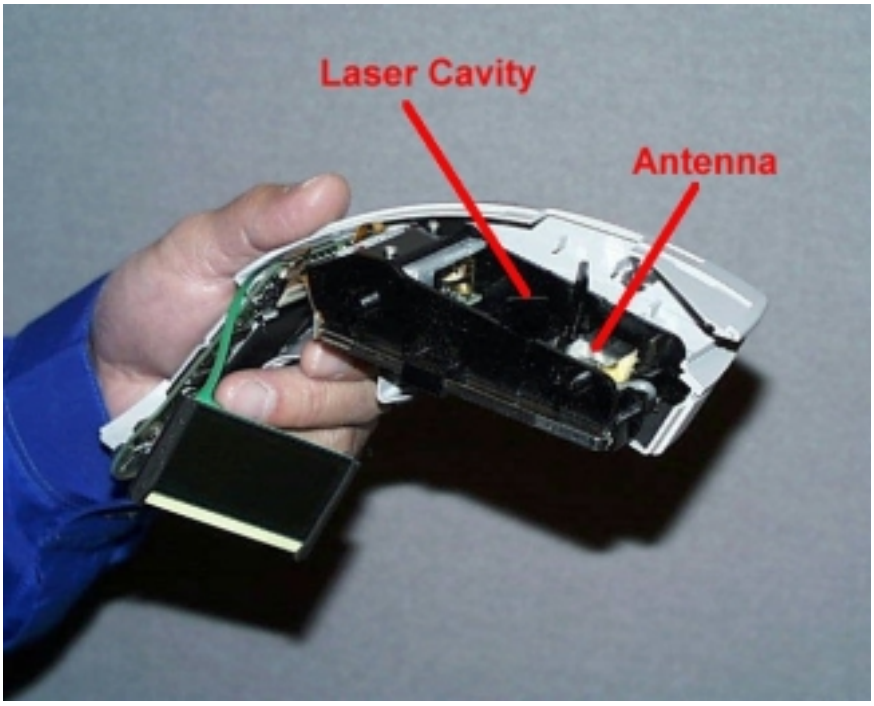


Antenna # 17

Antenna # 18



Antenna # 19



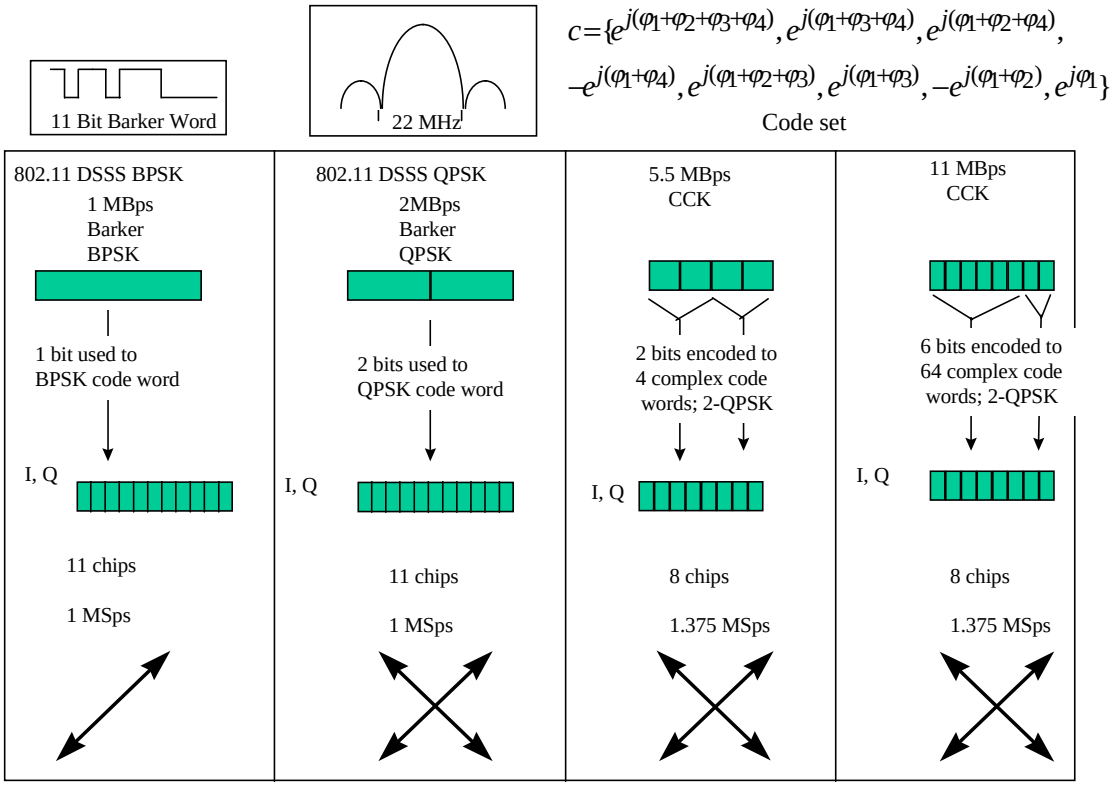
Antenna # 20

Antenna # X

Antenna # Z

3) Provide the Process gain test measurement description and test data. Indicate the theoretical process gain (spread rate/data rate) for all modes. The process gain test must be performed at the highest data rate for each different chip/symbol ratio. Indicate the chip/symbol rate for all modes.

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**

The test measurement description is contained in the Test Report Addendum along with the antenna and RF Safety information. Although the tabular data is not shown, a graph of the data is.

Per our email conversation of the Harris chip set the jamming margin test data for the 2 Mbps and 11 Mbps modes with the theoretical PG of the 1 Mbps and 5.5 Mbps modes are included in this response.

Theoretical calculations:

1 Mbps mode using BPSK

The processing gain is defined by:

PG = Wss/Rb[4]

Wss is the bandwidth (11.2 MHz min).
Rb is the data rate (1 Mbps)

PG = 11.2 MHz/1 Mbps = 11.2
= $10Log_{10}(11.2)$ = 10.49 dB

5.5 Mbps mode using CCK modulation

PG = BW reduction + Coding Gain

BW reduction = Chip Rate / Symbol Rate
= $10Log_{10}$(11 MCps/1.375 MSps)
= 9.03 dB

Coding Gain = 1.7 @ 11 Mbps
2.0 @ 5.5 Mbps

PG = 9.03 + 2.0
= 11.03 dB

[4] Simon Omura, Scholtz, and Levitt *Spread Spectrum Communications Handbook* (New York: McGraw Hill, 1994), p. 138

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ast modified on 1/19/00 at 8:20 PM
rinted on 1/20/00 at 10:17 AM

I hope these answers are satisfactory.

Respectfully,

Norman H. Nelson