

APPLICANT: SPEEDCOM WIRELESS CORP.

FCC ID: NCBSLTMA

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6 April 2001

Federal Communications Commission  
Authorization and Evaluation Division  
7435 Oakland Mills Road  
Columbia, MD 21046

SUBJECT: SPEEDCOM WIRELESS Corporation Wave Wireless Networking

FCCID: NCBSLTMA

To Whom It May Concern:

The attached application is for a direct sequence spread spectrum assembly, made up of the Bridge/Radio (FCC ID: IMRWLPCE24H), 50 foot of coax, an amplifier, 10 foot of coax, a lightning arres-tor, and a parabolic antenna.

This system has only one type of antenna, a parabolic dish that has a gain of 24dBi.

SPEEDCOM WIRELESS CORP. purchases standard antennas from the manufacturers with unique connectors on them.

The antenna is intended to be used outside.

Should you have any questions or require any further information with regards to this, please feel free to contact me.

Sincerely,

Mario R. de Aranzeta C.E.T.

MRD/sh  
Encl.

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## TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/ preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter HP 85650A, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02, S/N 3008A00372
2. Biconnical Antenna: Eaton Model 94455-1, S/N 1057
3. Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632
4. Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180, 1-18 GHz, S/N 2319
5. Line Impedance Stabilization Network: Electro-Metrics Model ANS-25/2, S/N 2604
6. AC Voltmeter: HP Model 400FL, S/N 2213A14499
7. Peak Power Meter HP 8900C With Peak Power Sensor HP 84811A

## TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC. Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal data transmission on a network.

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 76°F with a humidity of 55%.

BANDWIDTH 6.0dB: The measurements were made with the spectrum analyzer's resolution bandwidth(RBW)=1.0MHz and the video bandwidth(VBW) =3.0MHz and the span set as shown on plot.

POWER OUTPUT: The RF power output was measured at the antenna feed point using a peak power meter.

ANTENNA CONDUCTED EMISSIONS: The RBW=100KHz, VBW=300KHz and the span set to 10.0MHz and the spectrum was scanned from 30MHz to the 10th Harmonic of the fundamental. Above 1.0GHz the resolution bandwidth was 1.0MHz and the VBW = 3.0MHz and the span to 50MHz.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth(RBW) of the spectrum analyzer was 100kHz up to 1GHz and 1.0MHz above 1GHz with an appropriate sweep speed. The VBW above 1.0GHz was = 3.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 53°F with a humidity of 17%.

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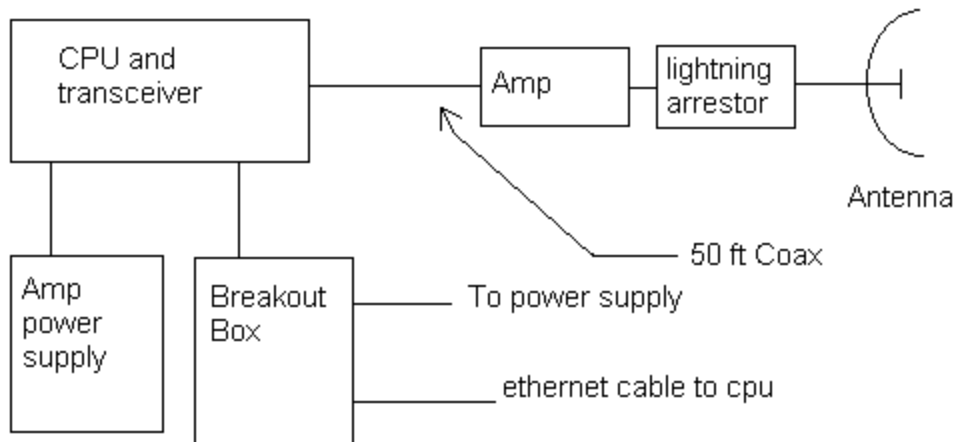
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PRODUCT DESCRIPTION:

The NCBSLTMA is a direct sequence spread spectrum radio that operates in the 2433 MHz frequency.

## EUT



APPLICANT: SPEEDCOM WIRELESS CORP.  
FCC ID: NCBSLTMA  
NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE  
RULES PART NUMBER: 15.107(a)  
REQUIREMENTS: .45 - 30 MHz 250 uV OR 47.96 dBuV  
TEST PROCEDURE: ANSI STANDARD C63.4-1992. The spectrum  
was scanned from .45 to 30 MHz.  
TEST DATA:

THE HIGHEST EMISSION READ FOR LINE 1 WAS 104 uV @ 22.61 MHz.

THE HIGHEST EMISSION READ FOR LINE 2 WAS 97.70 uV @ 20.54 MHz.

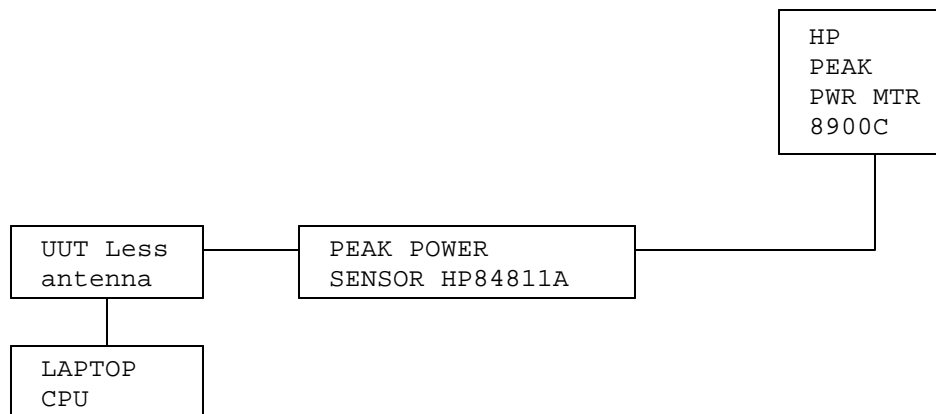
THE PLOTS IN EXHIBITS 6A-6B REPRESENT THE EMISSIONS TAKEN FOR THIS  
DEVICE.

TEST RESULTS: Both lines were observed. The measurements indicate  
that the unit DOES appear to meet the FCC requirements for this class  
of equipment.

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APPLICANT: SPEEDCOM WIRELESS CORP.  
FCC ID: NCBSLTMA  
NAME OF TEST: 6.0dB BANDWIDTH  
RULES PART NUMBER: 15.247(a)(2)  
REQUIREMENTS: The 6.0dB bandwidth must be greater than 500KHz.  
MEASUREMENT: The 6.0dB bandwidth measured @ 2433.00MHz was  
10.85 MHz.  
MEASUREMENT DATA: See plot, Exhibit #7.

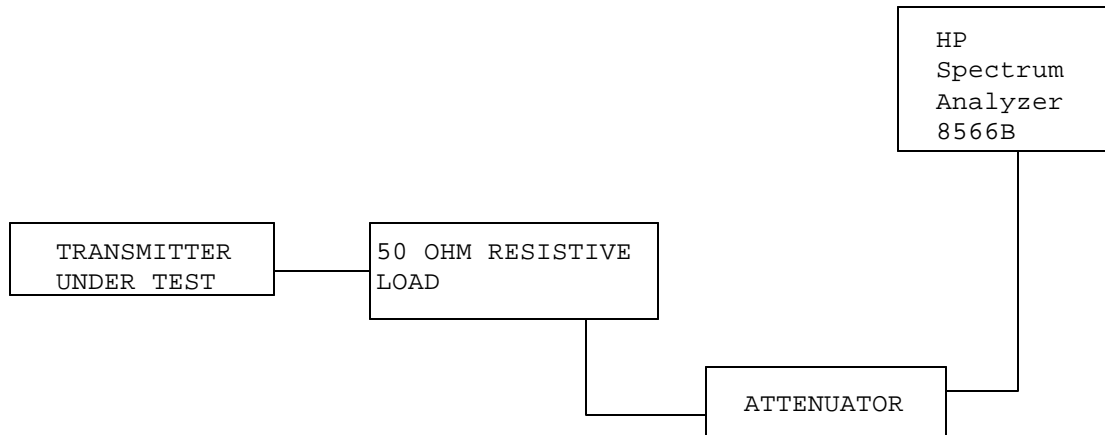
NAME OF TEST: POWER OUTPUT  
RULES PART NUMBER: 15.247(b) 1.0Watt or +30dBm  
250mW Watts or 24dBm for 24dBi Gain Ant  
MEASUREMENT: 158.0 mWATTS or 22.0 dBm @ 2433.0MHz  
15.247(c) Method of Measuring RF Power output:  
The Peak power Sensor was connected in place of the  
antenna.



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15.247(c)

Method of Measuring RF Conducted Spurious Emissions



NAME OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

REQUIREMENTS: Emissions must be at least 20dB down from the highest emission level within the authorized band as measured with a 100KHz RBW.

EMISSION FREQUENCY ____MHz____	dB BELOW CARRIER _____
2430.0	00.0
4860.0	- 53.3
7290.0	- 70.4
9720.0	- 87.6
12150.0	- 95.4
14580.0	-100.3
21870.0	- 79.6

NOTE: THE SPECTRUM WAS SCANNED TO THE TENTH HARMONIC.

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15.247(c),15.205 &15.209(b) Field strength of spurious emissions:

REQUIREMENTS:

FIELD STRENGTH	FIELD STRENGTH	S15.209	
of Fundamental:	of Harmonics	30 - 88 MHz	40 dBuV/m @3M
902-928MHz		88 -216 MHz	43.5
2.4-2.4835GHz		216 -960 MHz	46
127.38dBuV/m @3m	54 dBuV/m @3m	ABOVE 960 MHz	54dBuV/m

EMISSIONS RADIATED OUTSIDE OF THE SPECIFIED FREQUENCY BANDS, EXCEPT FOR HARMONICS, SHALL BE ATTENUATED BY AT LEAST 50 dB BELOW THE LEVEL OF THE FUNDAMENTAL OR TO THE GENERAL RADIATED EMISSION LIMITS IN 15.209, WHICHEVER IS THE LESSER ATTENUATION.

REQUIREMENTS: Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

TEST DATA:

Emission Frequency MHz	Meter Reading dBuV	Ant. Polarity	Coax Loss dB	Correction Factor dB	Field Strength dBuV/m	Margin dB
<b>DIGITAL</b>	<b>EMISSIONS</b>					
48.90	28.2	H	0.80	11.00	40.00	0.00
58.50	23.0	H	0.90	7.75	31.65	8.35
68.30	26.4	H	1.00	6.75	34.15	5.85
132.70	24.4	H	1.40	16.90	42.70	0.80
165.90	22.8	H	1.60	16.67	41.07	2.43
199.00	15.1	H	1.80	12.60	29.50	14.00
220.00	20.0	H	2.00	12.40	34.40	11.60
232.30	27.4	H	2.00	14.40	43.80	2.20
249.00	25.6	H	2.00	14.40	42.00	4.00
265.60	27.0	H	2.20	15.30	44.50	1.50
275.60	22.4	H	2.20	16.20	40.80	5.20
298.70	25.0	H	2.20	16.20	43.40	2.60
331.60	22.6	H	2.50	16.90	42.00	4.00
620.00	12.1	H	3.70	21.80	37.60	8.40
660.00	14.6	H	3.70	23.70	42.00	4.00
680.00	12.4	H	3.70	23.30	39.40	6.60
620.00	12.1	H	3.70	21.80	37.60	8.40
700.00	10.6	V	3.70	23.30	37.60	8.40
740.00	10.6	V	4.00	23.10	37.70	8.30
<b>INTENTIONAL</b>	<b>RADIATOR</b>	<b>EMISSIONS</b>				
2,430.00	94.2	H	3.70	29.25	127.15	00.00
4,862.00	14.0	H	5.70	34.13	53.83	0.17

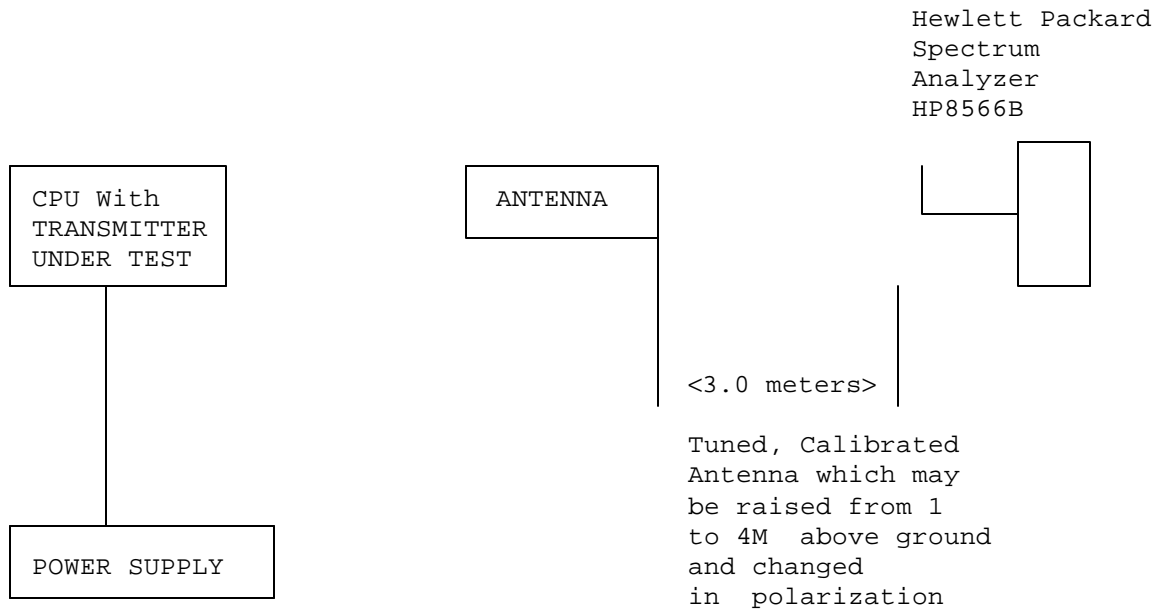


METHOD OF MEASUREMENT: The procedure used was ANSI STANDARD C63.4-1992 & the Guidance on Measurements for Direct Sequence Spread Spectrum Systems. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. State Road, Newberry, FL 32669.

2.993(a)(b)

2.993(a)(b) Continued Field strength of spurious emissions:

#### Method of Measuring Radiated Spurious Emissions



Equipment placed 4' above ground  
on a rotatable platform.

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NAME OF TEST: RADIATED SPURIOUS EMISSIONS INTO ADJACENT RESTRICTED BAND

REQUIREMENTS: Emissions that fall in the restricted bands (15.205). These emissions must be less than or equal to 500 uV/m (54 dBuV/m).

TEST PROCEDURE: An in band field strength measurement of the fundamental Emission using the RBW and detector function required by C63.4-2000 and FCC Rules. The procedure was repeated with an average detector and a plot made. The calculated field strength in the adjacent restricted band is presented below.

-107.30dBm	from plot
+ 29.21 dB	ACF
+ 1.1 dB	Coax loss
<hr/>	
- 76.99 dBm	
+107.00	
<hr/>	
30.01 dBuV	

APPLICANT: SPEEDCOM WIRELESS CORP.  
FCC ID: NCBSLTMA  
NAME OF TEST: POWER SPECTRAL DENSITY  
RULES PART NUMBER: 15.247(d)  
REQUIREMENTS: The peak level measured must be no greater than  
+8.0dBm.  
DATA: THE PLOT IS SHOWN IN EXHIBITS #8.  
The level at 2432.94 MHz was -71.90 dBm.

+20 dB Attn.  
+35 dB Correction Factor  

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+55 dB  
-71.9 dBm  

---

-16.9 dBm

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APPLICANT: SPEEDCOM WIRELESS CORP.

FCC ID: NCBSLTMA

NAME OF TEST: PROCESSING GAIN

RULES PART NUMBER: 15.247(e)

REQUIREMENTS:

DATA: The processing gain information supplied by the manufacturer  
is 10.0dB.

APPLICANT: SPEEDCOM WIRELESS CORP.

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