

### FCC ID: PQS-BM28001

### Exhibit 2d

### **Engineering Report on**

**Spurious Emissions at Antenna Terminal (2.1051)** 



## **Assessment of Compliance**

of

Spurious Emissions at Antenna Terminal in accordance with the FCC Rules & Regulations Part 2.1051 and 90

### Wireless OEM Modem Module Boomer II

Wavenet Technologies Pty Ltd.



August 2002

APREL Project No.:WVTB-Boomer II –Modem-3922-1

51 Spectrum Way Nepean ON K2R 1E6 Tel: (613) 820-2730 Fax: (613) 820-4161 email: info@aprel.com



### Engineering Report

Assessment of Spurious Emissions at Antenna Terminal in accordance with the FCC Rules & Regulations Part 2.1051 and 90
PQS-BM28001
Wireless OEM Modem Module
Boomer II
Wavenet Technologies Pty Ltd. 140 Burswood Rd Burswood, Perth, WA 6100 AUSTRALIA
WVTB-Boomer II-Modem-3922-1
APREL Laboratories Regulatory Compliance Division 51 Spectrum Way Nepean, Ontario K2R 1E6
Jay Sarkar Technical Director, Standards & Certification
Jav Sarkar Date: Sast. 12, 2002
Jay Sarkar Tochnical Director, Standards & Cartilication Date: Date: Dept 12/02. Dr. Jack J. Wojcik, P.Eng. J. WOJCIK

Consulting - Research - Training - Certification Testing Since 1981



FCC ID:	PQS-BM28001
Applicant:	Wavenet Technologies Pty Ltd.
Equipment:	Wireless OEM Modem Module
Model:	BOOMER II
Standard:	FCC Rules and Regulations Part 2.1051 and 90

#### ENGINEERING SUMMARY

This report contains the results of the Spurious Emissions at antenna terminal measurement performed on a **Wavenet OEM Wireless Modem Module.** The measurements were carried out in accordance with the FCC Rules and Regulations Part 2.1051 and 90. The product was evaluated for the Spurious Emissions at the Antenna Terminal when it was set at the maximum power level and appropriately modulated.

The Wireless OEM Modem Module is an 800 MHz OEM product for integration into customer end user equipment as an OEM modem and interfaces to it via the data interface port.

The modem provides two available bands: 806-821 MHz and 821-824 MHz. The bands are software controlled and can not be switched by user.

### This report presents test data for both frequency bands, 806-821 MHz (Mask G) and 821-824 MHz (Mask H).

This modem has two different profiles type with appropriate settings for data rate, deviation, modulation shaping set for 806-821 MHz G Spectral Mask (MDC 48003, RDLAP 9.6 and RDLAP 19.2) and 821-824 MHz H Spectral mask (RDLAP 9.6).

The results presented in this report relate only to the sample tested.

Table 1: Summary	of the Results
------------------	----------------

Test Description	Page	Test Set-up	Results
	No.	Figure No.	Summary
Spurious Emissions at the Antenna Terminal Part 2.1051 and 90	8	1	Pass



#### **INTRODUCTION**

General

This report describes the results of the Spurious Emissions at the Antenna Terminal measurement conducted on a Wavenet Technologies Wireless OEM Modem Module model BOOMER II.

#### Test Facility

The evaluation for compliance was performed for Wavenet Technologies Pty Ltd. by APREL Laboratories at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates an (3m and 10m) Open Area Test Site (OATS). The measurement facility is calibrated in accordance with ANSI C63.4-1992.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria per ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations. *APREL's registration number is: 90416* 

APREL is accredited by Standard Council of Canada. APREL is also accredited by Industry Canada.

#### Standard

The evaluation and analysis were conducted in accordance with FCC Rules and Regulations Parts 2.1051 and the appropriate limits (90).

<u>Personnel</u>: The test was conducted by Roman Kuleba. Methodology developed and report was written by Jay Sarkar.

#### Test Equipment

The test equipment used during the evaluation is listed in Appendix A with calibration due dates.

#### **Environmental Conditions**

- Temperature:	$25 \degree C \pm 2$
- Relative Humidity:	30 - 50 %
- Air Pressure:	101 kPa ± 3
- Air Pressure:	101 kPa ± 3



### FCC SUBMISSION INFORMATION

FCC ID:	PQS-BM28001
Equipment (Type): As marketed	Wireless OEM Modem Module
Model:	BOOMER II
For:	Certification
Applicant:	Wavenet Technologies Pty Ltd. 140 Burswood Rd Burswood, Perth, WA 6100 AUSTRALIA

Manufacturer:	Wavenet Technologies Pty Ltd.
	140 Burswood Rd
	Burswood, Perth, WA 6100
	AUSTRALIA

Evaluated by:

APREL Laboratories 51 Spectrum Way Nepean, Ontario Canada K2R 1E6



### MANUFACTURER'S DATA

FCC ID No:	PQS-BM28001
Equipment Type:	Wireless OEM Modem Module
Model:	BOOMER II
Reference:	FCC Rules and Regulations Parts 2 and Part 90
Manufacturer:	Wavenet Technologies Pty Ltd
Power Source:	3.6 VDC Battery, Lithium-ion
Development Stage of Unit:	Production

#### **GENERAL SPECIFICATIONS**

1.	Frequency Range:	a) 806.00 to 821.00 MHz (Transmitter) b) 821.00 to 824.00 MHz (Transmitter)
2.	Measured ERP	a) 1.828 W (32.62 dBm) at frequency 806 MHz for band 806-821 MHz
		b) 1.496 W (31.61 dBm) at frequency 821 MHz for band
		821-824 MHz
3.	<b>Emission Designators</b>	Per 47 CFR § 2.201 and §2.202
		a) 806.00 to 821.00 MHz: 20K0F1D
		b) 821.00 to 824.00 MHz: 12K6F1D
4.	Antenna Impedance:	50 Ohms



#### Measurements: Spurious Emissions at Antenna Terminal

#### Ref.: FCC Part 2 paragraph 2.1051 and Part 90.210

#### Frequency Band: 806-821 MHz

**Criteria:** *Emission Mask G.* The power of emissions must be attenuated below the power of the unmodulated carrier (P) on any frequency removed from the centre of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least  $43 + 10 \log (P) dB$ . This is calculated to be -13 dBm.

#### Frequency Band: 821-824 MHz

**Criteria:** *Emission Mask H. On* any frequency removed from the centre of the authorized bandwidth by more than 25 KHz: At least  $43 + \log (P) dB$ . This is calculated to be -13 dBm.

Set-up: See Figure No. 1.

#### Methodology:

The DUI was set-up in accordance with the set-up/block diagram Figure no.1. The set –up consisted of the DUI, Spectrum Analyser, Attenuator, and other auxiliary instrumentation necessary to perform the measurements (see Measurement Equipment Lists).

The mobile was configured to operate at maximum power and applicable modulation applied to the transmitter as indicated in the plots.

The Wireless Modem was coupled to the spectrum analyzer through a short test cable and a 20-dB attenuator connected to the spectrum analyser. Instead of the antenna, an MMCX-M to SMA-F test cable was connected and then from the SMA connector the 20-dB attenuator was hooked up. From the other side of the attenuator the Spectrum Analyser was directly connected (see block diagram and set-up photograph).

The spectrum was searched from 9 kHz to the 10<sup>th</sup> harmonic of the operating frequency.



*Measurements required*: Spurious emissions at antenna terminals — The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly terminated with a 50 ohms measurement system.

Spectrum Analyser Set-up - RB: 10kHz, VB: 10kHz, Span: 1MHz.

*Data Required*: Curves or equivalent data showing the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in paragraph 2.1049 as appropriate.

*Not Required*: The amplitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, was not reported.

*Frequency Spectrum to be investigated:* In all of the spurious emissions measurements of spurious emissions at antenna terminals (2.991) the Spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least to the 10<sup>th</sup> harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower if the equipment operates below 10 GHz.

*If operates below 40 GHz*: Since the DUI operated below 10 GHz, the spectrum was searched from nine kHz to the  $10^{\text{th}}$  harmonic of the operating frequency.

*Harmonics and sub-harmonics:* Particular attention was paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency.

*Measurements contain*: Measurements shown contain spectrum analyzer reading, correction factor, and final reading. The final spurious emission levels are derived from the analyzer measurement and the correction factor (3-dB attenuator and cable loss) as shown in the following example:

*Calculation of data*: A sample calculation is provided showing the final data obtained from the measured value.

#### Sample Calculation:

A. Spectrum analyzer reading (Direct measurement)

At 1.6120 MHz a spurious level of –51.61 dBm is measured.

B. Correction factor: 20 dB



C. Spurious Emission Level (Spurious Emissions at Antenna Terminal)

C = A+B = -51.61 dBm + 20 dB = -31.61 dBmC = -31.61 dBm

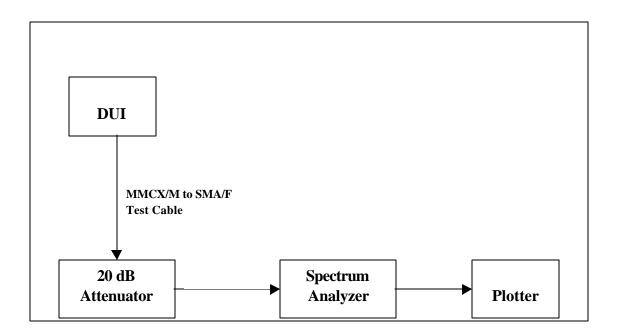
D. The criteria level is derived from this equation:  $P_{TX}$  is the conducted power of the unmodulated carrier: 1.828 Watts (32.62 dBm)

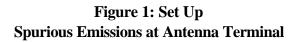
$$\begin{split} D &= P_{TX} - [43 + (10 \cdot \log P_{TX(W)})] \\ D &= 32.62 \text{ dBm} - [43 + (10 \cdot \log 1.932 \text{ W})] \\ D &= \text{Criteria} \text{ (reference) level} = -13.0 \text{ dBm} \end{split}$$

E = Margin (spurious emission below the reference level)

E = D - C E = (-13.0 dBm) - (-31.61 dBm)E = 18.61 dB

*Results:* PASSED. See Tables 2, 3 and 4 and the plots (shown only for configuration 1).







### DATA

### Table 2

WaveNet Boomer-II Wireless OEM Modem Module Spurious Emissions from Transmitter at Antenna Terminal Mask G, Modulation: RD-LAP 19.2 kbps, Channel: LOW

Harmonic No.	Frequency	Measured Level	Correction Factor	Spurious Emission Level	Criteria Level (dBm)	Margin (dB)
	(MHz)	(dBm) A	В	(dBm) C	D	E
1	0.8060	12.61	20.00	32.61	-	-
2	1.6120	-51.61	20.00	-31.61	-13.00	18.61
3	2.4180	-54.38	20.00	-34.38	-13.00	21.38
4	3.2240	-76.14	20.00	-56.14	-13.00	43.14
5	4.0300	-77.03 noise floor	20.00	-57.03	-13.00	44.03
6	4.8360	-75.74	20.00	-55.74	-13.00	42.74
7	5.6420	-77.22 noise floor	20.00	-57.22	-13.00	44.22
8	6.4480	-77.64 noise floor	20.00	-57.64	-13.00	44.64
9	7.2540	-76.04	20.00	-56.04	-13.00	43.04
10	8.0600	-76.60	20.00	-56.60	-13.00	43.60
11	8.8660	-77.09	20.00	-57.09	-13.00	44.09
12	9.6720	-74.74	20.00	-54.74	-13.00	41.74
13	10.4780	-78.07 noise floor	20.00	-58.07	-13.00	45.07
14	11.2840	-76.21 noise floor	20.00	-56.21	-13.00	43.21



# Table 3WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: RD-LAP 19.2 kbps, Channel: MEDIUM

Harmonic No.	Frequency (MHz)	Measured Level (dBm)	Correction Factor	Spurious Emission Level (dBm)	Criteria Level (dBm)	Margin (dB)
	()	A	В	C	D	E
1	0.8150	12.56	20.00	32.56	-	-
2	1.6300	-52.36	20.00	-32.36	-13.00	19.36
3	2.4450	-54.90	20.00	-34.90	-13.00	21.90
4	3.2600	-74.62	20.00	-54.62	-13.00	41.62
5	4.0750	-76.83 noise floor	20.00	-56.83	-13.00	43.83
6	4.8900	-75.20	20.00	-55.20	-13.00	42.20
7	5.7050	-77.20 noise floor	20.00	-57.20	-13.00	44.20
8	6.5200	-77.91 noise floor	20.00	-57.91	-13.00	44.91
9	7.3350	-73.93	20.00	-53.93	-13.00	40.93
10	8.1500	-71.15 noise floor	20.00	-51.15	-13.00	38.15
11	8.9650	-77.01 noise floor	20.00	-57.01	-13.00	44.01
12	9.7800	-76.42	20.00	-56.42	-13.00	43.42
13	10.5950	-77.78 noise floor	20.00	-57.78	-13.00	44.78
14	11.4100	-75.38 noise floor	20.00	-55.38	-13.00	42.38



# Table 4WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: RD-LAP 19.2 kbps, Channel: HIGH

Harmonic No.	Frequency	Measured Level	Correction Factor	Spurious Emission Level	Criteria Level (dBm)	Margin (dB)
	(MHz)	(dBm) A	В	(dBm) C	D	Е
1	0.8210	12.47	20.00	32.47	-	-
2	1.6420	-53.29	20.00	-33.29	-13.00	20.29
3	2.4630	-55.45	20.00	-35.45	-13.00	22.45
4	3.2840	-73.30	20.00	-53.30	-13.00	40.30
5	4.1050	-77.16 noise floor	20.00	-57.16	-13.00	44.16
6	4.9260	-75.38	20.00	-55.38	-13.00	42.38
7	5.7470	-77.46 noise floor	20.00	-57.46	-13.00	44.46
8	6.5680	-78.33 noise floor	20.00	-58.33	-13.00	45.33
9	7.3890	-71.42	20.00	-51.42	-13.00	38.42
10	8.2100	-72.18	20.00	-52.18	-13.00	39.18
11	9.0310	-77.50 noise floor	20.00	-57.50	-13.00	44.50
12	9.8520	-77.65 noise floor	20.00	-57.65	-13.00	44.65
13	10.6730	-77.87 noise floor	20.00	-57.87	-13.00	44.87
14	11.4940	-75.06 noise floor	20.00	-55.06	-13.00	42.06



# Table 5WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: RD-LAP 9.6 kbps, Channel: LOW

Г Г Г		ý		1 7.0 Kops, Chamlei.		
Harmonic	Frequency	Measured	Correction	Spurious Emission	Criteria Level	Margin
No.		Level	Factor	Level	(dBm)	( <b>dB</b> )
	(MHz)	(dBm)		(dBm)		
		Α	В	С	D	E
1	0.8060	12.73	20.00	32.73	-	-
2	1.6120	-51.26	20.00	-31.26	-13.00	18.26
3	2.4180	-54.03	20.00	-34.03	-13.00	21.03
4	3.2240	-75.71	20.00	-55.71	-13.00	42.71
5	4.0300	-77.18	20.00	-57.18	-13.00	44.18
		noise floor				
6	4.8360	-75.30	20.00	-55.30	-13.00	42.30
7	5.6420	-77.10	20.00	-57.10	-13.00	44.10
		noise floor				
8	6.4480	-77.60	20.00	-57.60	-13.00	44.60
		noise floor				
9	7.2540	-75.49	20.00	-55.49	-13.00	42.49
10	8.0600	-76.47	20.00	-56.47	-13.00	43.47
11	8.8660	-76.89	20.00	-56.89	-13.00	43.89
		noise floor				
12	9.6720	-74.54	20.00	-54.54	-13.00	41.54
13	10.4780	-78.00	20.00	-58.00	-13.00	45.00
		noise floor				
14	11.2840	-76.25	20.00	-56.25	-13.00	43.25
		noise floor				



# Table 6WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: RD-LAP 9.6 kbps, Channel: MEDIUM

Harmonic	Frequency	Measured	Correction	Spurious Emission	Criteria Level	Margin	
No.		Level	Factor	Level	(dBm)	( <b>dB</b> )	
	(MHz)	(dBm)	_	(dBm)	_		
		Α	В	С	D	Е	
1	0.8150	12.66	20.00	32.66	-	-	
2	1.6300	-52.10	20.00	-32.10	-13.00	19.10	
3	2.4450	-54.45	20.00	-34.45	-13.00	21.45	
4	3.2600	-74.28	20.00	-54.28	-13.00	41.28	
5	4.0750	-76.61	20.00	-56.61	-13.00	43.61	
		noise floor					
6	4.8900	-74.83	20.00	-54.83	-13.00	41.83	
7	5.7050	-77.15	20.00	-57.15	-13.00	44.15	
		noise floor					
8	6.5200	-77.78	20.00	-57.78	-13.00	44.78	
		noise floor					
9	7.3350	-73.29	20.00	-53.29	-13.00	40.29	
10	8.1500	-70.98	20.00	-50.98	-13.00	37.98	
		noise floor					
11	8.9650	-77.09	20.00	-57.09	-13.00	44.09	
		noise floor					
12	9.7800	-76.77	20.00	-56.77	-13.00	43.77	
13	10.5950	-77.68	20.00	-57.68	-13.00	44.68	
		noise floor					
14	11.4100	-75.29	20.00	-55.29	-13.00	42.29	
		noise floor					



# Table 7WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: RD-LAP 9.6 kbps, Channel: HIGH

		,				
Harmonic	Frequency	Measured	Correction	Spurious Emission	Criteria Level	Margin
No.	/ <b>-</b> \	Level	Factor	Level	(dBm)	( <b>dB</b> )
	(MHz)	(dBm)	_	(dBm)	_	_
		Α	В	С	D	Ε
1	0.8210	12.67	20.00	32.67	-	-
2	1.6420	-53.11	20.00	-33.11	-13.00	20.11
3	2.4630	-54.80	20.00	-34.80	-13.00	21.80
4	3.2840	-72.58	20.00	-52.58	-13.00	39.58
5	4.1050	-76.97	20.00	-56.97	-13.00	43.97
		noise floor				
6	4.9260	-75.40	20.00	-55.40	-13.00	42.40
7	5.7470	-77.85	20.00	-57.85	-13.00	44.85
		noise floor				
8	6.5680	-78.15	20.00	-58.15	-13.00	45.15
		noise floor				
9	7.3890	-72.48	20.00	-52.48	-13.00	39.48
10	8.2100	-72.08	20.00	-52.08	-13.00	39.08
		noise floor				
11	9.0310	-77.55	20.00	-57.55	-13.00	44.55
		noise floor				
12	9.8520	-77.58	20.00	-57.58	-13.00	44.58
13	10.6730	-77.98	20.00	-57.98	-13.00	44.98
		noise floor				
14	11.4940	-75.27	20.00	-55.27	-13.00	42.27
		noise floor				



# Table 8WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: MDC 4.8 kbps, Channel: LOW

Mask G, Modulaton. MDC 4.6 kops, Chamier. LOW							
Harmonic No.	Frequency	Measured Level	Correction Factor	Spurious Emission Level	Criteria Level (dBm)	Margin (dB)	
	(MHz)	(dBm) A	В	(dBm) C	D	Е	
1	0.8060	12.59	20.00	32.59	-	-	
2	1.6120	-52.01	20.00	-32.01	-13.00	19.01	
3	2.4180	-56.67	20.00	-36.67	-13.00	23.67	
4	3.2240	-75.88	20.00	-55.88	-13.00	42.88	
5	4.0300	-77.04 noise floor	20.00	-57.04	-13.00	44.04	
6	4.8360	-74.93	20.00	-54.93	-13.00	41.93	
7	5.6420	-77.05 noise floor	20.00	-57.05	-13.00	44.05	
8	6.4480	-77.56 noise floor	20.00	-57.56	-13.00	44.56	
9	7.2540	-75.63	20.00	-55.63	-13.00	42.63	
10	8.0600	-76.43	20.00	-56.43	-13.00	43.43	
11	8.8660	-76.79 noise floor	20.00	-56.79	-13.00	43.79	
12	9.6720	-74.88	20.00	-54.88	-13.00	41.88	
13	10.4780	-78.12 noise floor	20.00	-58.12	-13.00	45.12	
14	11.2840	-76.21 noise floor	20.00	-56.21	-13.00	43.21	



# Table 9WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: MDC 4.8 kbps, Channel: MEDIUM

Harmonic No.	Frequency (MHz)	Measured Level (dBm) A	Correction Factor B	Spurious Emission Level (dBm) C	Criteria Level (dBm) D	Margin (dB) E
1	0.8150	12.57	20.00	32.57	-	-
2	1.6300	-52.86	20.00	-32.86	-13.00	19.86
3	2.4450	-56.77	20.00	-36.77	-13.00	23.77
4	3.2600	-74.66	20.00	-54.66	-13.00	41.66
5	4.0750	-76.64 noise floor	20.00	-56.64	-13.00	43.64
6	4.8900	-74.88	20.00	-54.88	-13.00	41.88
7	5.7050	-76.88 noise floor	20.00	-56.88	-13.00	43.88
8	6.5200	-77.33 noise floor	20.00	-57.33	-13.00	44.33
9	7.3350	-72.64	20.00	-52.64	-13.00	39.64
10	8.1500	-70.68 noise floor	20.00	-50.68	-13.00	37.68
11	8.9650	-76.99 noise floor	20.00	-56.99	-13.00	43.99
12	9.7800	-75.80	20.00	-55.80	-13.00	42.80
13	10.5950	-77.67 noise floor	20.00	-57.67	-13.00	44.67
14	11.4100	-75.34 noise floor	20.00	-55.34	-13.00	42.34



## Table 10WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask G, Modulation: MDC 4.8 kbps, Channel: HIGH

Harmonic No.	Frequency	Measured Level	Correction Factor	Spurious Emission Level	Criteria Level (dBm)	Margin (dB)
	(MHz)	(dBm) A	В	(dBm) C	D	Е
1	0.8210	12.48	20.00	32.48	-	-
2	1.6420	-54.13	20.00	-34.13	-13.00	21.13
3	2.4630	-57.25	20.00	-37.25	-13.00	24.25
4	3.2840	-73.27	20.00	-53.27	-13.00	40.27
5	4.1050	-76.96	20.00	-56.96	-13.00	43.96
6	4.9260	-74.92	20.00	-54.92	-13.00	41.92
7	5.7470	-77.75	20.00	-57.75	-13.00	44.75
8	6.5680	-78.21 noise floor	20.00	-58.21	-13.00	45.21
9	7.3890	-73.55	20.00	-53.55	-13.00	40.55
10	8.2100	-71.22	20.00	-51.22	-13.00	38.22
11	9.0310	-77.60 noise floor	20.00	-57.60	-13.00	44.60
12	9.8520	-77.42	20.00	-57.42	-13.00	44.42
13	10.6730	-77.97 noise floor	20.00	-57.97	-13.00	44.97
14	11.4940	-75.19 noise floor	20.00	-55.19	-13.00	42.19



## Table 11WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask H, Modulation: RD-LAP 9.6 kbps, Channel: LOW

		,				
Harmonic	Frequency	Measured	Correction	Spurious Emission	Criteria Level	Margin
No.	/ <b>-</b> \	Level	Factor	Level	(dBm)	( <b>dB</b> )
	(MHz)	(dBm)	_	(dBm)	_	_
		Α	В	С	D	Ε
1	0.8210	12.67	20.00	32.67	-	-
2	1.6420	-53.11	20.00	-33.11	-13.00	20.11
3	2.4630	-54.80	20.00	-34.80	-13.00	21.80
4	3.2840	-72.58	20.00	-52.58	-13.00	39.58
5	4.1050	-76.97	20.00	-56.97	-13.00	43.97
		noise floor				
6	4.9260	-75.40	20.00	-55.40	-13.00	42.40
7	5.7470	-77.85	20.00	-57.85	-13.00	44.85
		noise floor				
8	6.5680	-78.15	20.00	-58.15	-13.00	45.15
		noise floor				
9	7.3890	-72.48	20.00	-52.48	-13.00	39.48
10	8.2100	-72.08	20.00	-52.08	-13.00	39.08
		noise floor				
11	9.0310	-77.55	20.00	-57.55	-13.00	44.55
		noise floor				
12	9.8520	-77.58	20.00	-57.58	-13.00	44.58
13	10.6730	-77.48	20.00	-57.48	-13.00	44.48
		noise floor				
14	11.4940	-75.27	20.00	-55.27	-13.00	42.27
		noise floor				



# Table 12WaveNet Boomer-II Wireless OEM Modem ModuleSpurious Emissions from Transmitter at Antenna TerminalMask H, Modulation: RD-LAP 9.6 kbps, Channel: MEDIUM

Harmonic No.	Frequency	Measured Level	Correction Factor	Spurious Emission Level	Criteria Level (dBm)	Margin (dB)
	(MHz)	(dBm) A	В	(dBm) C	D	Е
1	0.8225	12.60	20.00	32.60	-	-
2	1.6450	-52.92	20.00	-32.92	-13.00	19.92
3	2.4675	-55.03	20.00	-35.03	-13.00	22.03
4	3.2900	-71.76	20.00	-51.76	-13.00	38.76
5	4.1125	-76.39 noise floor	20.00	-56.39	-13.00	43.39
6	4.9350	-75.05	20.00	-55.05	-13.00	42.05
7	5.7575	-77.51 noise floor	20.00	-57.51	-13.00	44.51
8	6.5800	-77.81 noise floor	20.00	-57.81	-13.00	44.81
9	7.4025	-72.25	20.00	-52.25	-13.00	39.25
10	8.2250	-71.75 noise floor	20.00	-51.75	-13.00	38.75
11	9.0475	-77.24 noise floor	20.00	-57.24	-13.00	44.24
12	9.8700	-77.33	20.00	-57.33	-13.00	44.33
13	10.6925	-77.62 noise floor	20.00	-57.62	-13.00	44.62
14	11.5150	-74.68 noise floor	20.00	-54.68	-13.00	41.68



Consulting · Research · Training · Certification Testing Since 1981

#### Table 13 WaveNet Boomer-II Wireless OEM Modem Module Spurious Emissions from Transmitter at Antenna Terminal Mask H Modulation, DD I AD06 hbm. Ch

Harmonic No.	Frequency (MHz)	Measured Level (dBm) A	Correction Factor B	Spurious Emission Level (dBm)	Criteria Level (dBm)	Margin (dB)
		A	Б	С	D	E
1	0.8240	12.67	20.00	32.67		·
2	1.6480	-53.33	20.00	-33.33	-13.00	20.33
3	2.4720	-56.10	20.00	-36.10	-13.00	23.10
4	3.2960	-71.66	20.00	-51.66	-13.00	38.66
5	4.1200	-76.85 noise floor	20.00	-56.85	-13.00	43.85
6	4.9440	-75.16	20.00	-55.16	-13.00	42.16
7	5.7680	-77.96 noise floor	20.00	-57.96	-13.00	44.96
8	6.5920	-78.10 noise floor	20.00	-58.10	-13.00	45.10
9	7.4160	-71.43	20.00	-51.43	-13.00	38.43
10	8.2400	-72.35 noise floor	20.00	-52.35	-13.00	39.35
11	9.0640	-77.17 noise floor	20.00	-57.17	-13.00	44.17
12	9.8880	-77.77 noise floor	20.00	-57.77	-13.00	44.77
13	10.7120	-78.01 noise floor	20.00	-58.01	-13.00	45.01
14	11.5360	-74.97 noise floor	20.00	-54.97	-13.00	41.97

No other signals were detected.

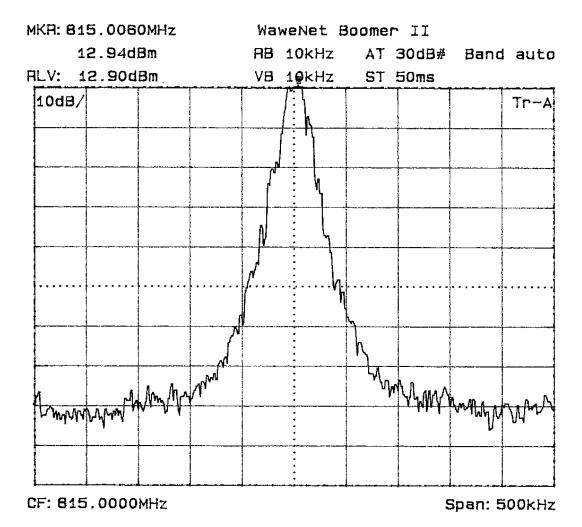
Test performed by: Knleba Roman Date: August, 2002

C August 2002 Page 21 APREL Project No WVTB-Dual Wave M-3861 This report shall not be reproduced, except in full, without the express written approval of APREL Laboratories Spurious Emissions at antenna



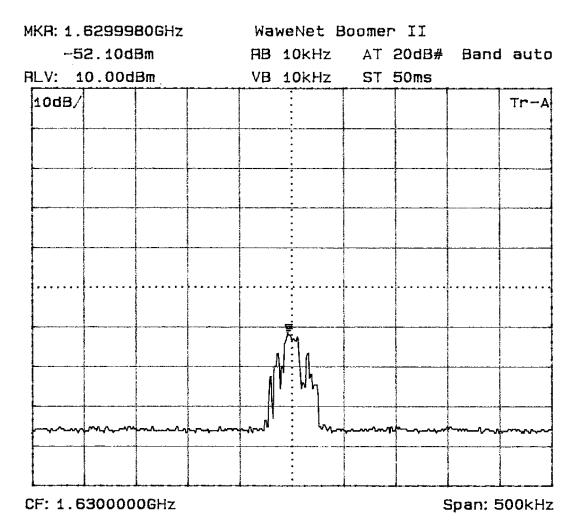
Spurious Emissions at Antenna Terminal - Plots 806-821 MHz Mask G RD-LAP 19.2 kbps

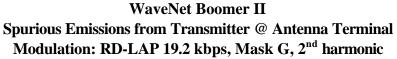




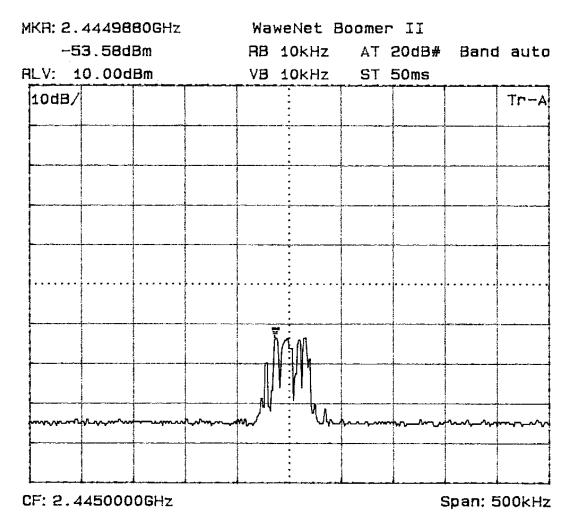
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 1<sup>st</sup> harmonic (fundamental frequency)

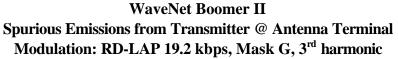














мкя: э.а	2600010G	Hz	Wa	weNet E	Boome	r II		
-72	2.67dBm		RB	10kHz	AT	20dB#	Band	auto
HLV: 10	0.00dBm		VB 10kH		ST	50ms		
10d8/								Tr-A
				- - 	la 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
						14 MAR 1997 1997 1997 1997 1997 1997 1997 199	r • • • • • • • •	
			-					
,	74							
	1,			- - - - -				
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h	mmun			~~~~ <u>~</u> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
				• • •				
CF: 3.20	500000GH	z				9	Span: 5	00kHz

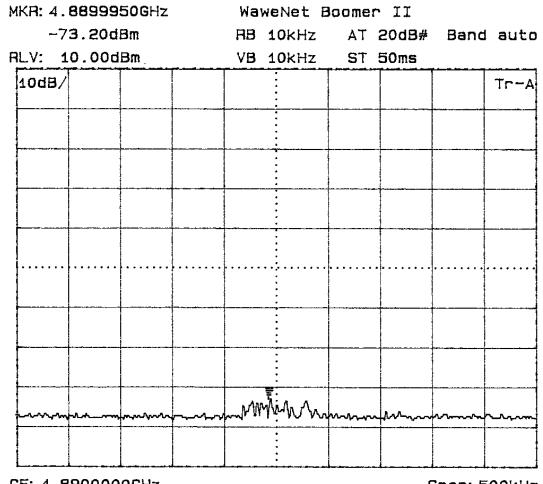
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 4<sup>th</sup> harmonic



MKR: 4.0750050GHz	WaweNet H	Boomer II	
-75.87dBm	RB 10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/			Tr-A
			Frank - Franken - Filler
	• • • •		
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
CF: 4.0750000GHz		5	Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 5<sup>th</sup> harmonic





CF: 4.890000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 6<sup>th</sup> harmonic



MKR: 5.7050100GHz	Wai	WaweNet Boomer II				
-76.32dBm	AB	10kHz	AT 20c	18# Band	i auto	
RLV: 10.00dBm	VB	10kHz	ST 50m	IS		
10dB/					Tr-A	
		* ************************************				
		· · · · · · · · · · · · · · · · · · ·				
		-				
Learn- Johnson		**************************************				
		4 5 				

CF: 5.7050000GHz

Span: 500kHz

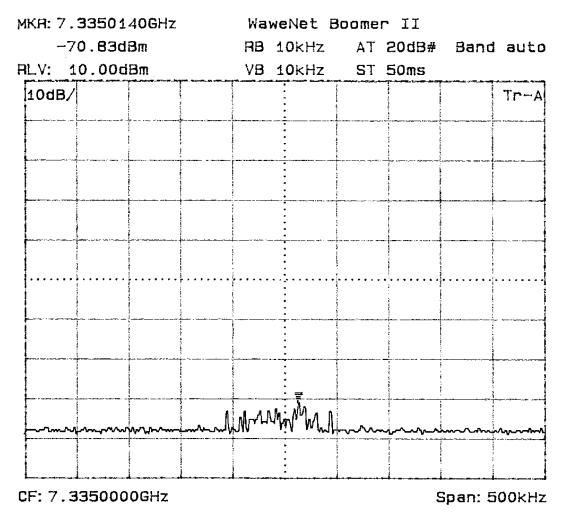
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 7<sup>th</sup> harmonic



MKR:6.5199910GHz -76.53dBm RLV: 10.00dBm			War	weNet E					
			RB	10kHz			Band	auto	
			VB	10kHz					
10dB/									Tr−A
					•				
<b></b>	<u>.</u>								
							-		
			• • • • • • • •				•		
844°4					•				
					:				
᠕᠕᠕ᠰ		4-r-r-r-r-r	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~W	Viernhann :	mm	**	www.	<u></u>
F: 6.5		↓↓ )0GHz				<b>.</b>		ii Span: 5	00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 8<sup>th</sup> harmonic





WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 9<sup>th</sup> harmonic



MKH: 8.1499960GHz	WaweNet Boomer II					
-68.09dBm	RB	10kHz	AT	20dB# 50ms	Band	auto
RL.V: 10.00dBm	VB	10kHz	ST			
10dB/						Tr−A
		- Mattering				
				• • • • • • • • • •	• • • • • • • • •	
				r under (r a for a		
the more to the amount		N-Andra	monto	Mr.	Maria	
		· · ·				
CF: 8.1500000GHz					Span: 5	

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 10<sup>th</sup> harmonic



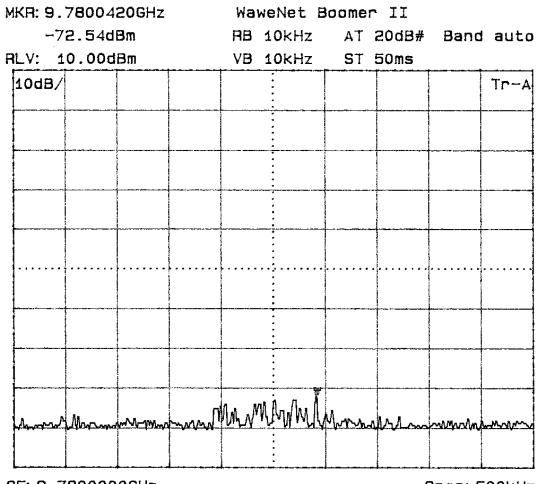
MKA: 8.9650220GHz	Way	weNet B	Boomei	- II		
-74.66dBm	AB	10kHz	AT	20dB#	Band	auto
HLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/		•				Tr-A
	**************************************					
		•				
		:				
		<u>.</u>	<b></b>			
		-				
		•				
	• • • • • • •	•	• • • • • • • •	•		••••••
		* * *				
		:				
		Ţ	<u>+</u>			
mmmmmmhullins	rm	Minhow	rmm	man	Mrn	m
		•				
			1		L	

CF: 8.9650000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 11<sup>th</sup> harmonic





CF: 9.7800000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 12<sup>th</sup> harmonic



MKR: 10.5950160GHz	WaweNet B	Boomer II			
-75.80dBm	RB 10kHz	AT 20 <b>d</b> B#	Band auto		
RLV: 10.00dBm	VB 10kHz	ST 50ms			
10dB/			Tr-A		
	-				
	-				
	· · · · · · · · · · · · · · · · · · ·				
	· · · · · · · · · · · · · · · · · · ·				
	•				
	:				
	-				
	- 				
mmmmmmmmmm	mounder	1-mmann	manning		
	•		and a second sec		
CF: 10.5950000GHz Span: 500kH					

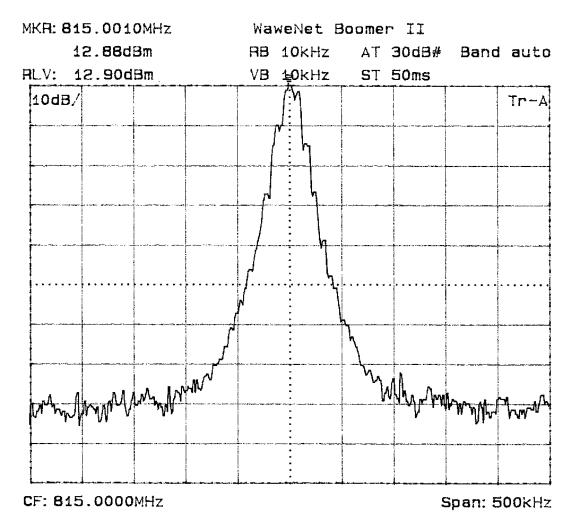
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 19.2 kbps, Mask G, 13<sup>th</sup> harmonic



## **Plots**

Spurious Emissions at Antenna Terminal - Plots Frequency Band: 806-821 MHz Mask G RD-LAP 9.6 kbps





WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 1<sup>st</sup> harmonic (fundamental frequency)



MKH: 1.6300070GHz	WaweNet E	Boomer II	
-51.39dBm	RB 10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/			Tr-A
			9 to 14
mar	mult have		
	-		
CF: 1.6300000GHz	under einer andere der einer einer der einer einer einer einer der einer einer einer einer einer einer einer einer	<u></u>	pan: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 2<sup>nd</sup> harmonic



MKR: 2.4449950GHz	Wa	weNet	Boome	r II		
~53.17dBm	RB	10kHz	AT	20dB#	Band	auto
RLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/						Tr-A
		•				
		•				
		ли.				
					and the second se	
	~~~/		h		m	~~~ <b>~</b> ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
		-				
an a			<u> </u>			

CF: 2.4450000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 3<sup>rd</sup> harmonic



MKR: 3.2599940GHz	WaweNet		
-72.67dBm	HB 10kH	z AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kH	z ST 50ms	
10dB/			Tr-A
man	montim	mmmmm	harring
CF: 3.2600000GHz	L		L Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 4<sup>th</sup> harmonic



MK	MKR: 4.0750020GHz					weNet E				
	-7	5.05d	Bm		RB	10kHz	AT	20dB#	Band	auto
RL	V: 1	0.00d	Bm .		VB	10kHz	ST	50ms		_
1	OdB/									Tr-A
	<b></b>									
						-				
~		h	······	····~	~~~ <b>~</b> ~~~	virm	m		y ny m	m
						•				

CF: 4.0750000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 5<sup>th</sup> harmonic



M	MKR: 4.8900240GHz					weNet				
	-7	2.67d	Bm		RB	10kHz	AT	20dB#	Band	auto
Ħ	LV: 1	0.00d	Bm		VB	10kHz	ST	50ms		
	10dB/									Tr-A
						<u>.</u>				·····
						•				4
						:				
										]
						÷				
							-			
										1
ļ		1								
ļ		<u> </u>				- <u>;</u>				
1						•				
					A.	w.M.				
i			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					mpur Maran		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
						:				
ł		L		ليم حمد من		· · · · · · · · · · · · · · · · · · ·		- <del> </del>	<b></b>	

CF: 4.890000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 6<sup>th</sup> harmonic



MKH: 5.7049960GHz	Wawe	Net B				
-74.21dBm	AB 1	0kHz	AT (	20dB#	Band	auto
RLV: 10.00dBm	VB 1	0kHz	ST !	50ms		
10d8/						Tr-A
			7			
- martine - morthanne	- M	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mvimm	
CF: 5.7050000GHz	·····	<u></u>	1	لــــــــــــــــــــــــــــــــــــ	Span: 5	 00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 7<sup>th</sup> harmonic



MKR: 6.5	200030GHz	2	War	weNet				
-76	.67dBm		<b>BB</b>	10kHz	AT	20dB#	Band	auto
RLV: 10	.OOdBm		VB	10kHz	ST	50ms		
10dB/				:				Tr-A
				;				
	······································							
			• • • • • • •					
					-			
hann	<u>-~~</u>		ر	n.t.	harm	-mara		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
				• • •				
CF: 6.52	00000GHz					5	Span: 5	00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 8<sup>th</sup> harmonic



MKR: 7.	33504	00GHz		Wa	WaweNet Boomer II						
-7	0.11d	Bm		<b>R</b> 8	10kHz	ΓA	50qB <b>#</b>	Band	auto		
RLV: 1	0.00d	Bm .		VB	10kHz	ST	50ms				
10dB/									Tr-A		
					•						
								-			
						•••••••					
							·				
					r MMM 1						
form	m	harrinka	~~~^^		<u>יו א גרון</u>	<u></u>	<u> </u>	-~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>~~~~</u>		
CF: 7.3		0GHz	L	1		_ <u>_</u>	<b></b>	ll Span: 5			

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 9<sup>th</sup> harmonic



MKR: 8.1	MK <b>R: 8.1500310GHz</b>				veNet				
-66	.43dB	m		RB	10kHz	AT	20dB#	Band	auto
RLV: 10	. 00dE	lm .		٧B	10kHz	ST	50ms		
10dB/									Tr-A
						-			
har	Am	^~~~~~	᠂ᡐᡐᡐᡐᡑ᠆ᡎ	~~/ <sup>n</sup> ~	n_mh	hanna	when	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	∽₩∽৵⊷৻
					:				
CF: 8.15	00000	)GHz			•			 Span: 5	00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 10<sup>th</sup> harmonic



MKR: 8.9649940GH	: Wa	weNet E		
-74.35dBm	RB	10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB	10kHz	ST 50ms	
10dB/		, , , ,		Tr-A
		* * *		
		• • • •		
		-		
Maryman	mann	M. mm	Monnoh	mound

CF: 8.9650000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 11<sup>th</sup> harmonic



M	MKR: 9.7799680GHz					weNet	Boome	r II		
	-7	0.62di	Bm		RB	10kHz	AT	20d8#	Band	auto
Ħ	LV: 1	0.00d	Bm		VB	10kHz	ST	50ms		
1	10dB/					:				Tr-A
	••••					; ; ;				
					<u> </u>					
,	mp	mount	mmm	mulu	M hr	Wirly	how	from	mm	~_~

CF: 9.7800000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 12<sup>th</sup> harmonic



MKR: 10.5949650GHz	WaweNet B		
-75.24dBm	<b>AB 10</b> kHz	AT 20dB#	Band auto
HLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/	•		Tr-A
	•		
· · · · · · · · · · · · · · · · · · ·	• • • • • • • • • • • • • • • • • • • •	•••••••	
	-		
	•		
	•		
-			
month march march	Annihrm	montin	Mangan
	:	<u> </u>	

CF: 10.5950000GHz

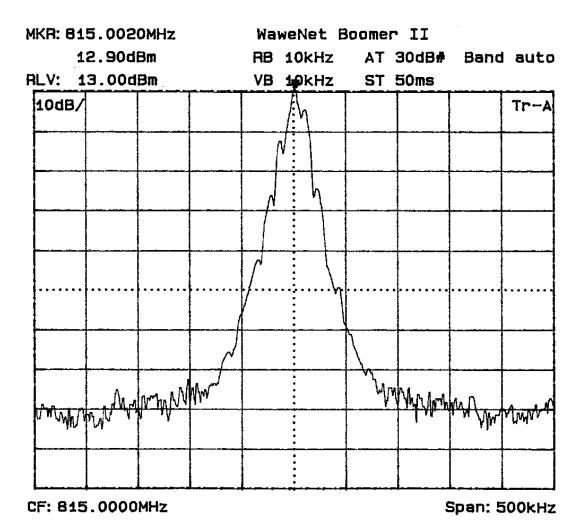
Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask G, 13<sup>th</sup> harmonic



Plots Spurious Emissions at Antenna Terminal - Plots Frequency Band: 806-821 MHz Mask G MDC 4.8 kbps





WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 1<sup>st</sup> harmonic (fundamental frequency)



KR: 1.4	62999	80GHz		WaweNet Boomer II						
-5	1.43di	Bm		RB	10kH	z	AT	20dB#	Band	auto
L.V: 1	0.00d	Bm		VB	10kH	z	ST	50ms		
10dB/										Tr-A
					-					
								• • • • • • • • •	• • • • • • • •	
			- <b>1967</b> .		M					
~~~~~~	m-m3y-r-19	p	ᠾ᠆ᡒᢇᠬᡅᢩ᠕	~~		~~	~~~~~}	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
										<u>,</u> <u>,</u>
		╞_┲╼╍╼┙				<b> </b> _		<b>I</b>	<u> </u>	

CF: 1.6300000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 2<sup>nd</sup> harmonic



IKR: 2.	44500	40GHz		Wa	weNet	Boome	r II		
-5	i3.51d	Bm		AB	10kHz	AT	20dB#	Band	auto
<u> 1</u>	0.00d	Bm _		VB	10kHz	ST	50ms		
10dB/					•				Tr-A
					- - - -				
					:		• • • • • • • • • •		
					AM A				
				A					
+~~~~~	h-m-m	 	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m	- Un		- hanna		~~ <b></b>
					•	1	1		i
	<b>k</b>						<u></u>	·	

CF: 2.4450000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 3<sup>rd</sup> harmonic



MKR: 3.2600130GHz	Wav	veNet i	Boome	r II		
-72.04dBm	RB	10kHz	AT	20dB#	Band	auto
RLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/		•				Tr-A
			+			
		•				
	-					
	^^ 	MAN Jun		+	~~~ <u>~</u>	
CF: 3.2600000GHz		- - 		 S		

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 4<sup>th</sup> harmonic



MKR: 4.0749980GHz	Wa	weNet E				
-74.80dBm	RB	10kHz	AT	20d8#	Band	auto
RLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/						Tr-A
			<u> </u>			
			• • • • • • • •			
			-			
h	4	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		$d \sim 100$		
			<b></b>	··· ·· ··· ···························	·	

CF: 4.0750000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 5<sup>th</sup> harmonic



Μ	IKR: 4.	88994	00GHz		Wa	weNet E	300mei	r II		
	-7	5.31d	Bm		RB	10kHz	AT	20dB#	Band	auto
F	LV: 1	0.00d	Bm		VB	10kHz	ST	50ms		
	10d8/									Tr-A
						•				
							-			[
				man		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
						•				
C	ь Г:4.6	1	OGHz	4+	<b> </b>		- <b>f</b> • •• •	<u>-</u>	Span: 5	i00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 6<sup>th</sup> harmonic



MKR: 5.7049880GHz	WaweNet E		
-74.70dBm	RB 10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/			Tr-A
	• • • • • • • • • • • • •	• • • • • • • • • • • • • • • •	
	him		w
CF: 5.7050000GHz		<del>لـــــبــــاـــــــــــا</del> 9	

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 7<sup>th</sup> harmonic



MKR: 6.5199800GHz	War	weNet E		
-75.17dBm	RB	10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB	10kHz	ST 50ms	
10dB/				Tr-A
		•		
				• • • • • • • • • • • • • • • • • •
		:		
	7	•		
	X	-in-	rm	

CF: 6.5200000GHz

Span: 500kHz

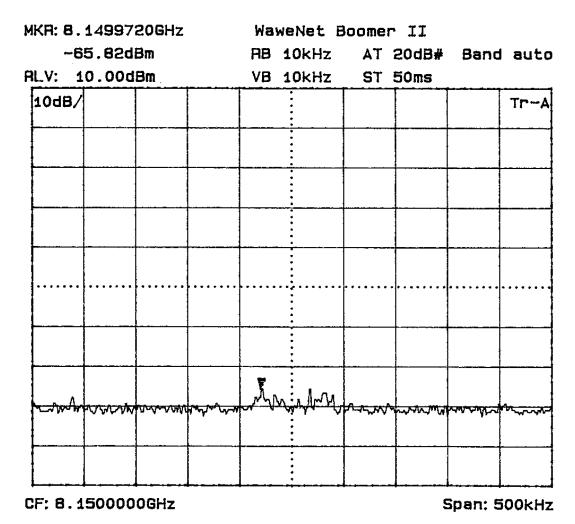
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 8<sup>th</sup> harmonic



M	MKR: 7.3350320GHz					veNet	Boome	r II		
	-7	0.52di	Bm		RB	10kHz	AT	20dB#	Band	auto
R	LV: 1	0.00d	Bm		VB	10kHz	ST	50ms		
	10d8/									Tr-A
						:				
						<b>.</b>				
	m		~~~~~~	nnn	MA	MMM	h		managen	*
		L				•	<u> </u>			
C	F: 7.5	335000	OGHz					5	Span: 5	00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 9<sup>th</sup> harmonic





WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 10<sup>th</sup> harmonic



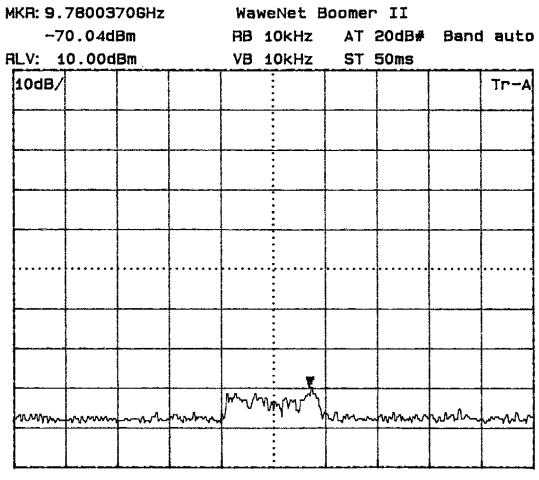
MKR: 8.9649870GHz	Wa	weNet E				
-75.08dBm	RB	10kHz	AT i	20dB#	Band	auto
ALV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/		-				Tr-A
		*				
		•				
		:				
h		•				
		•				
					<b> </b>	
hannon	n.m.	himm	herman	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mm	han
<b>b</b>			L		L	

CF: 8.9650000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 11<sup>th</sup> harmonic





CF: 9.7800000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 12<sup>th</sup> harmonic



MKR: 10.5	950110GH	z	Waw	eNet E	Boomer	II		
-75.	09dBm		RB :	lOkHz	AT	20dB#	Band	auto
RLV: 10.	00dBm		VB :	lOkHz	ST	50ms		
10dB/				:				Tr-A
			······					
				•				Ì
				:				
				*				
				·••••••••••				•••••
				-				
								{
				:				ļ
				÷¥ ,				
monder	wmwww	him	mm	in the west	My Wr-	hn	wh	mon
	the second s							
L				•	L			

CF: 10.5950000GHz

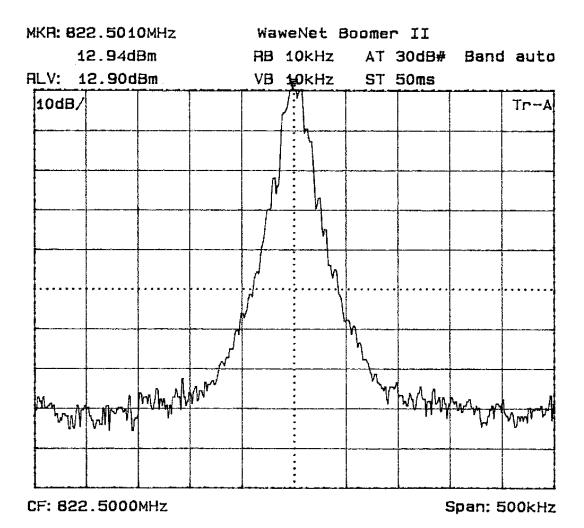
Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: MDC 4.8 kbps, Mask G, 13<sup>th</sup> harmonic



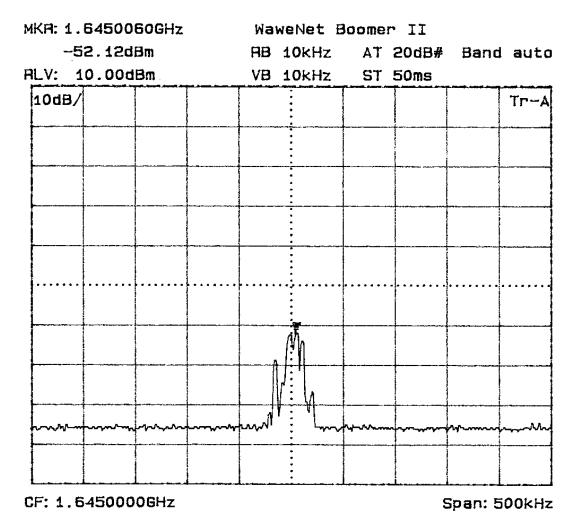
## Plots Spurious Emissions at Antenna Terminal Frequency band: 821-824 MHz Mask H RD-LAP 9.6 kbps





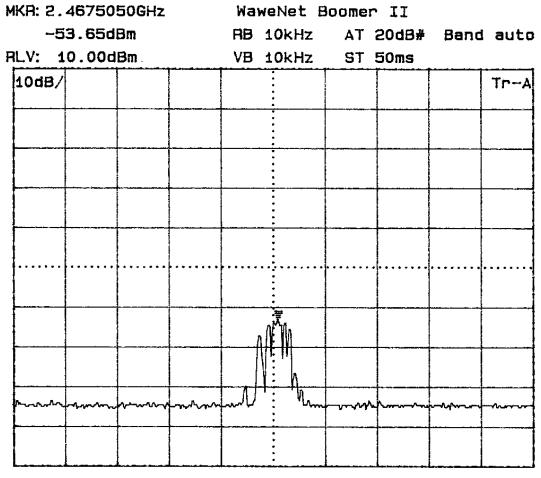
WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 1<sup>st</sup> harmonic (fundamental frequency)





WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 2<sup>nd</sup> harmonic





CF: 2.4675000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 3<sup>rd</sup> harmonic



MKR: 3.2900080GHz	Wav	weNet	Boome	r II		
-70.23dBm	AB	10kHz	AT	20dB#	Band	auto
RLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/						Tr-A
			-			
		•				
		•				
		:				
		:				
		:				
		Λ ĂM				
	- w	Vy Un	h	han	~~~~~	mm
		:				

CF: 3.2900000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 4<sup>th</sup> harmonic



MKH: 4.1125010GHz	Wa	weNet	Boome	r II		
-74.65dBm	RB	10kHz	AT	20dB#	Band	auto
ALV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/		• •				Tr-A
				·		
						ļ
				1		
	• • • • • • • • • • • • • •	••••••••	•••		• • • • • • • • •	
		•				
			1	1		
		· · · · · · · · · · · · · · · · · · ·		_		
have have here here here here here here here he	~~~ <u>_</u> ~_~	1 min			h	
		:				
		•				

CF: 4.1125000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 5<sup>th</sup> harmonic



MKR: 4.9350150GHz	WaweNet Boomer II				
-71.67dBm	RB 10kH	z at	20dB#	Band	auto
RLV: 10.00dBm	VB 10kH	z ST	50ms		
10dB/					Tr-A
					# #
					<b></b>
	Mint				
	man yerry	~~~~~~			~~~~
1	L				

CF: 4.9350000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 6<sup>th</sup> harmonic



MKA: 5.7574800GHz				WaweNet Boomer II					
-7	-76.60dBm				10kHz	AT	20dB#	Band	auto
ILV: 10.00dBm			VB	10kHz	ST	ST 50ms			
10d8/									Tr-A
					:				
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		****		him		
					•				
Correction of states and								المحمد مرا	

CF: 5.7575000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 7<sup>th</sup> harmonic



MKR: 6.5799890GHz			WaweNet Boomer II						
-75.54dBm RLV: 10.00dBm			RB 10kHz		AT	AT 20dB#		auto	
				VB	10kHz	ST	50ms		
10dB/									Tr-A
					•				
							*		
					•••••••••••••••••••••••••••••••••••••••				
<b></b>					• • •				
CF: 6.5	1 180000	1 )0GHz	<u></u> .	<u>l</u>	•	4	لــــــلـ ع	Span: 5	 00kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 8<sup>th</sup> harmonic



MKR: 7.4025080GHz	WaweNet	Boomer II	
-68.47dBm	AB 10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/	-		Tr-A
	•		
		· • • • • • • • • • • • • • • • • • • •	•
	Ţ		
	TAMMANHA	-	
m_mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm	MALAN MAL	Anna mana	mm
	:	· · · · · · · · · · · · · · · · · · ·	

CF: 7.4025000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 9<sup>th</sup> harmonic



MKR: 8.2250200GHz	WaweNet B	WaweNet Boomer II			
-68.00dBm	RB 10kHz	AT 20dB#	Band auto		
RLV: 10.00dBm	VB 10kHz	ST 50ms			
10dB/			Tr-A		
	•				
	•••••		• • • • • • • • • • • • • • • • • •		
montinter	my www.	hand	- Martin - M		

CF: 8.2250000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 10<sup>th</sup> harmonic



MKA: 9.0475260GHz			WaweNet Boomer II						
-75.04dBm			RB	10kHz	AT	20dB#	Band	auto	
RLV: 10.00dBm			VB	10kHz	ST	50ms			
10dB/									Tr-A
						<u></u>			
					-				
					-				
					•		<u> </u>		
					+ + +				
					•				
	•••••	••••			•••••••••••••••••••••••••••••••••••••••		• • • • • • • • •		• • • • • • • • •
								-	
				5 7 8					
					;		+		
				-	-				
hum	n.m.L	mhari	ᠵᡅᢩᠺ᠆᠆᠕	h-m	winter		m. M. M.	lamon A	www.A
			• • • • •						<u>* ***</u>

CF: 9.0475000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 11<sup>th</sup> harmonic



MKH: 9.8700450GHz	WaweNet Boomer II					
-72.05dBm	88	10kHz	AT	20dB#	Band	auto
RLV: 10.00dBm	VB	10kHz	ST	50ms		
10dB/		-				Tr-A
		*				
		•				
		•				
		• •	ļ			
			<u> </u>	·		
						İ
		••••••		• • • • • • • • • •	• • • • • • • •	•••••
		:				
		:				
					<u> </u>	
monument	MWH	WWWW	fm-n-n-	man	mann	m-un
	and have been also	-				
		- - -	1			

CF: 9.870000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 12<sup>th</sup> harmonic



MKR: 10.6924950GHz	WaweNet B		
-74.90dBm	AB 10kHz	AT 20dB#	Band auto
RLV: 10.00dBm	VB 10kHz	ST 50ms	
10dB/	•		Tr-A
	•		
	•		
	•		
	•		
	:		
mm-n-mmmmy-mm	z.	- allow marsh -	manne
		<u><u><u>u</u></u></u>	
	• •	Ll	

CF: 10.6925000GHz

Span: 500kHz

WaveNet Boomer II Spurious Emissions from Transmitter @ Antenna Terminal Modulation: RD-LAP 9.6 kbps, Mask H, 13<sup>th</sup> harmonic Consulting - Research - Training - Certification Testing Since 1981



## APPENDIX A TESTING EQUIPMENT



## List of Equipment used

Description	Manufacturer	Model #	Asset #	Calibration Due Data
Spectrum Analyzer	Anritsu	MS2667C	301386	Dec 10, 2002
Power Meter	HP	HP438A	301417	Nov. 2002
20 dB Attenuator	Narda	4774-20	301533	СВТ

Consulting - Research - Training - Certification Testing Since 1981



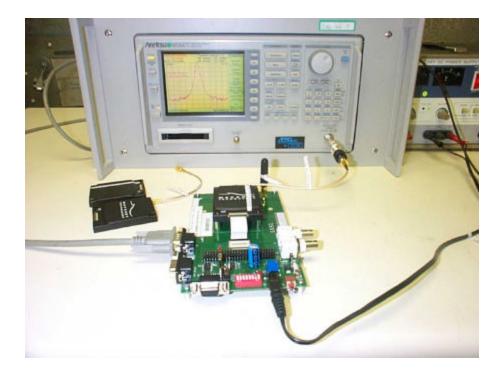
## APPENDIX B PHOTOGRAPHS





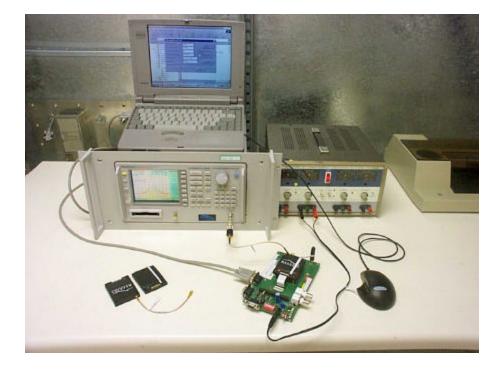
Wireless OEM Modem Module WaveNet BOOMER-II





Testing Spurious Radiation from Transmitter @ Antenna Port on WaveNet BOOMER-II Wireless Modem





Testing Spurious Emissions from Transmitter @ Antenna Port on WaveNet BOOMER-II Wireless Modem