



**Southwestern Bell  
Technology Resources**

John A. Moore  
512-372-5810

September 19, 1996

Mr. Richard M. Smith  
Chief - Office of Engineering and Technology  
Federal Communications Commission  
2000 M Street, NW  
Room 480  
Washington, DC 20554

Re: Southwestern Bell Technology Resources, Inc.  
Call Sign KM2XBI  
File Number: 4703-EX-ML-95 (expansion/continuation of 3037-EX-PL-92)  
Quarterly Progress Report Number Seventeen

Dear Mr. Smith:

In accordance with the Federal Rules and Regulations Part 5, Section 5.204(b), attached please find quarterly progress report number seventeen for Southwestern Bell Technology Resources, Inc. in connection with our personal/wireless communications testbeds.

The main objective of our St. Louis and Austin testbeds is to verify performance of the emerging wireless communications systems and technologies prior to integration into one of SBC Communications Inc.'s business units.

Please direct any inquiries to me at 512-372-5810.

Sincerely,

*David R. Wotter for*

John A. Moore  
Director, Wireless Communications

Attachment

**FCC Quarterly Progress Report Number Seventeen (17) in  
Connection with Personal/Wireless Communications  
Testbeds**

**Conducted by Southwestern Bell Technology Resources, Inc.**

**September 19, 1996**

**Authorized by FCC Experimental License  
Call Sign KM2XBI, File Number 4703-EX-ML-95  
(expansion/continuation of 3037-EX-PL-92)**

---

## **1.0 Introduction**

This report describes experimentation conducted in Austin, TX for wireless LAN devices, and on rain effects on the propagation of a 38 GHz microwave point-to-point link. Though the 38 GHz testing was conducted under an operating license held by Winstar Wireless, Inc., it is reported here for completeness.

## **2.0 Wireless Local Area Networks**

### **2.1 Introduction**

This report describes the experiments being conducted with Wireless Local Area Network (WLAN) devices operating in the unlicensed ISM band. The purpose of the experiments was to determine the throughput and coverage range of WLAN devices under outdoor radio propagation conditions. The testing began on September 4, 1996 and is currently in progress.

### **2.2 Devices Tested**

The devices tested are:

1. ARLAN 630 Wireless Ethernet Access Point manufactured by Aironet  
Operating Frequency Band : 2.40 - 2.4835 GHz  
Output Power: 100 mW EIRP  
Modulation: Direct Sequence Spread Spectrum
2. ARLAN 690 PCMCIA Wireless LAN Adapter manufactured by Aironet  
Operating Frequency Band : 2.40 - 2.4835 GHz  
Output Power: 100 mW EIRP  
Modulation: Direct Sequence Spread Spectrum
3. RangeLAN2/7500 Wireless LAN Access Point manufactured by Proxim  
Operating Frequency Band : 2.40 - 2.4835 GHz  
Output Power: 100 mW EIRP  
Modulation: Frequency Hopped Spread Spectrum
4. RangeLAN2/7200 PCMCIA Wireless LAN Adapter manufactured by PROXIM  
Operating Frequency Band : 2.40 - 2.4835 GHz  
Output Power: 100 mW EIRP  
Modulation: Frequency Hopped Spread Spectrum

### **2.3 Experiment Description**

The Access Points for both the WLAN devices were collocated on the west side of the seventh floor of the Southwestern Bell Technology Resources building in Austin, Texas. The access points were located near the glass window such that a maximum line of sight range could be obtained. Both the Access points were connected to the wired LAN via the ethernet jack located at a nearby cubicle.

The portables connected with PCMCIA wireless LAN adapters were taken to different locations in the parking lot and along the street in front of the building. All chosen locations had a direct line of sight with the Access Points. Locations with varying distance

from the Access Point were chosen such that data throughput could be measured as a function of range. The maximum achievable range was also determined by finding the nearest location from which reliable data connection with the access point was not possible.

At each of the locations, several tests were conducted to determine the following:

1. Success Rate in connecting to the wired LAN
2. Data transfer rate from wired LAN to wireless portable
3. Data transfer rate from wireless portable to wired LAN
4. Data transfer rate from one wireless portable to another.
5. Data transfer rate under multiple (two) user conditions.

Data collected through these experiments are currently being analyzed, and further data collection is in progress.

### **3.0 Rain Effects on 38 GHz Microwave**

TRI established a 1.7 mile 38 GHz link between the Riverside Central Office and TRI's building at 9505 Arboretum Blvd. in Austin, TX under a license held by Winstar Wireless Inc. The primary use of this link was to test the effects of rain at 38 GHz. This link was designed with one foot antennas to ensure that it would fail during periods of heavy rain. A TBERD test set was used to both generate a signal and to monitor the link. The equipment and it's performance was monitored during different severities of rain to determine it's performance.

Conclusions: For the rain fall that we observed, 0.5 to 3 inches per hour, the 38 GHz equipment was severally limited in range. It is possible to obtain a reliability of 99.999% on a one mile link using two foot antennas. For ranges greater than one mile a lower frequency band would be required.

A copy of the license held by Winstar Wireless, Inc. is attached.

**UNITED STATES OF AMERICA**  
**FEDERAL COMMUNICATIONS COMMISSION**  
**RADIO STATION AUTHORIZATION**

**COMMON CARRIER LICENSE**

**SERVICE:** POINT TO POINT MICROWAVE  
**CLASS:** FIXED  
**DATE OF GRANT:** Jan 15, 1995

**CALL SIGN:** WJMS17  
**FILE NO.:** 4194-CF-7/L-94  
**DATE OF EXPIRATION:** Feb 01, 2001

**LICENSEE:** WINSTAR WIRELESS INC  
 875 FIFTH AVE 48TH FLR  
 NEW YORK, NY 10017

**SUBJECT TO THE PROVISIONS OF THE COMMUNICATIONS ACT OF 1934, SUBSEQUENT ACTS, TREATIES, AND ALL REGULATIONS HERETOFORE OR HEREAFTER MADE THEREUNDER, AND FURTHER SUBJECT TO THE CONDITIONS SET FORTH IN THIS LICENSE, AUTHORITY IS HEREBY GRANTED TO USE AND OPERATE THE RADIO FACILITIES HERINAFTER DESCRIBED:**

**SERVICE AREA:** AUSTIN, TX  
 WITHIN BLOCK 30-30-00N 96-22-30W 29-15-00N 97-22-30W.

**PARTICULARS OF OPERATION**

| FREQUENCIES (MHz) | POLARIZATION | FREQUENCIES (MHz) | POLARIZATION |
|-------------------|--------------|-------------------|--------------|
| 30000.0 - 30850.0 | (V/H)        | 39500.0 - 39550.0 | (V/H)        |

**LICENSEE IS AUTHORIZED TO USE TRANSMITTERS THAT HAVE BEEN TYPE ACCEPTED BY THE COMMISSION AND TO OPERATE WITH A MAXIMUM OUTPUT POWER OF .1 WATTS.**

**AUTHORIZATION CONDITIONS AND REQUIREMENTS**

1. OPERATION OF THIS STATION IS COVERED BY PART 21 OF THE COMMISSION'S RULES.
2. THIS LICENSE IS ISSUED ON THE LICENSEE'S REPRESENTATION THAT THE STATEMENTS CONTAINED IN LICENSEE'S APPLICATION ARE TRUE AND THAT THE UNDERTAKINGS THEREIN CONTAINED, SO FAR AS THEY ARE CONSISTENT HERewith WILL BE CARRIED OUT IN GOOD FAITH. THE LICENSEE SHALL, DURING THE TERM OF THIS LICENSE, RENDER SUCH SERVICE AS WILL SERVE PUBLIC INTEREST, CONVENIENCE, OR NECESSITY TO THE FULL EXTENT OF THE PRIVILEGES HEREIN CONFERRED.
3. THIS LICENSE SHALL NOT VEST IN THE LICENSEE ANY RIGHT TO OPERATE THE STATION FOR ANY MIGHT IN THE USE OF THE FREQUENCIES DESIGNATED IN THE LICENSE BEYOND THE TERM HEREOF, NOR IN ANY OTHER MANNER THAN AUTHORIZED HEREIN. NEITHER THE LICENSE NOR THE RIGHT GRANTED HEREUNDER SHALL BE ASSIGNED OR OTHERWISE TRANSFERRED TO ANY PERSON, FIRM, COMPANY OR CORPORATION WITHOUT THE WRITTEN CONSENT OF THE COMMISSION. THIS LICENSE IS SUBJECT TO THE RIGHT OF USE OR CONTROL BY THE GOVERNMENT OF THE UNITED STATES CONFERRED BY SECTION 706 OF THE COMMUNICATIONS ACT OF 1934.

**THIS AUTHORIZATION IS CONDITIONED ON ANY RULE CHANGES RESULTING FROM FUTURE RULEMAKING PROCEEDINGS AFFECTING THE FREQUENCIES AUTHORIZED HEREIN.**

**DATE PRINTED:** 06/15/1995 **TIME:** 11:22:37