

**Netro Corporation
Application for FCC Radio Experimental License
(Response to Question 10a)**

10a) Program of Experimentation

Refer to our file 6099-EX-ML-98 , Exhibit No.1 except following:

1. Location is San Jose , (not Santa Clara)
2. Transmitter frequency is 10GHz, (not 24GHz)

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Specific Objective for Experimental Test

A handwritten signature in black ink, appearing to read "J. S. Smith", is written over the signature line.

There are two specific objectives. The first objective is to verify that the radio meets its published specifications without creating interference to other air transmissions. The second objective is to prove the point to multi- point capabilities of broadband technology over microwave radios.

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Contribution to Radio Technology

The demand for wide area networking is mushrooming due to the advent of data communications, which includes wide area private networking, the Internet and intranets networks, and multimedia communications. The demand in bandwidth for data has surpassed that of voice telephony. These new emerging datacom applications rely on Frame Relay and ATM services.

Netro's AirStar point to multi-point wireless product will provide access to these broadband services for small to medium size businesses . It will increase the envelope of capabilities that radio already provides. By allowing a wider use of the wireless technology many business users can take advantage of these services quickly and with utmost reliability for the latest voice, data, and multimedia applications.

Point to Multipoint Wireless Access System

Carrier-Class Broadband Wireless Access—10 GHz

Netro, the wireless ATM Company, introduces **AirStar™**, the industry's most advanced solution for point-to-multipoint wireless voice, data, video, and Internet communications. **AirStar** provides Asynchronous Transfer Mode (ATM) and Frame Relay (FR) wireless access for small or medium sized businesses, cellular/PCS/DECT operators, and corporate campus networks. **AirStar's** dynamic bandwidth allocation and superior system gain offers telcos and service providers outstanding performance and reliability in a compact, easy-to-install solution. **AirStar**, together with Netro's **AirMAN™** point-to-point wireless products, provides a complete portfolio of comprehensive, future-proof, end-to-end wireless communications solutions.

In a point to multipoint topology, one AirStar Base Station serves many subscribers who dynamically share bandwidth in the air. Subscribers are organized into sectors. Each AirStar Base Station has a capacity of up to 12 sectors, with data rates per subscriber from 64 Kb/s up to 8 Mb/s, and optionally up to 16 Mb/s.



Figure 1. AirStar's sectorial network topology provides bandwidth on demand

Netro Wireless Advantages

- **Reliability** of a wired solution
- **Cost-effective**
- **Fast setup** and service availability
- **"Pay-as-you-go"** pricing
- **No right-of-way** easements
- **Uncrowded frequencies**
- **Advanced frequency reuse**

ATM Advantages

- **Multiservice flexibility**
- **Outstanding Quality of Service**
- **Statistical multiplexing**
- **Scalability and upgradability**
- **Burst data capability**

AirStar™ **Netro**

PRODUCT HIGHLIGHTS

- Subscriber shared bandwidth-on-demand – 64 kb/s to 8 Mb/s, optionally to 16 Mb/s
- Dynamic bandwidth allocation – maximizes capacity and frequency reuse
- High performance system gain – outstanding range and availability
- ATM-based statistical multiplexing – higher burst data capability
- Guaranteed BER better than 1×10^{-10}
- Embedded SNMP – extensive diagnostic status and monitoring capabilities
- Element Management – Netro's common sophisticated Network Element System
- Plug and play scalability – easy to add subscribers
- Cost effective connectivity for small to medium-sized businesses

OUTSTANDING PERFORMANCE

- Patented CellMAC™ technology for robust efficient dynamic bandwidth allocation
- Enhanced Forward Error Correction (FEC) provides error detection/correction, lower BER
- Unfaded BER ($< 10^{-10}$) is superior to other point to multipoint wireless services
- Robust modulation – high link margins, resistance to adjacent and co-channel interfaces
- High system gain – optimal combination of small antenna size, high availability, long range



Figure 2. AirStar Point to Multipoint Wireless Access System

ADVANCED NETWORK MANAGEMENT

- Local and remote equipment configuration, status/alarm reporting and diagnostics
- In-band operations channel
- Network Element System with intelligent graphical user interface
- Embedded SNMP agent
- Open platform compatibility

APPLICATIONS FOR AIRSTAR

- ATM and FR access networks
- Internet Access
- Cellular backhaul
- Voice
- Distributed computing
- Digital leased line replacement

A WIDE RANGE OF INTERFACES

- E1 and Fractional E1
- ISDN BRI and PRI
- Frame Relay
- Ethernet 10BaseT

AirStar System Specifications—10 GHz**Release 1.0**

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Range and Availability (typ)	15 kilometer radius 99.995% availability (CCIR climatic Zone E, Northern Europe)																			
Radio Unit and Antennas	Base Station: The Base Station Radio is comprised of a number of sectorized Radio Unit Arrays. Each sector contains one or more Base Station Radio Unite (BRUs), allowing modular capacity build-up and redundant configuration of both radio and antennae. <table><tr><td>Horizontal</td><td>Vertical</td><td></td><td># of Sectors</td></tr><tr><td><u>Beamwidth</u></td><td><u>Beamwidth</u></td><td><u>Gain</u></td><td><u>Per Cell</u></td></tr><tr><td>45°</td><td>7°</td><td>18 dBi</td><td>1 to 8</td></tr><tr><td>90°</td><td>7°</td><td>15 dBi</td><td>1 to 4</td></tr></table> Subscriber Terminal: Transceiver is integrated with a high performance planar antenna: 26 dB gain				Horizontal	Vertical		# of Sectors	<u>Beamwidth</u>	<u>Beamwidth</u>	<u>Gain</u>	<u>Per Cell</u>	45°	7°	18 dBi	1 to 8	90°	7°	15 dBi	1 to 4
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45°	7°	18 dBi	1 to 8																	
90°	7°	15 dBi	1 to 4																	
Frequency Range	Digitally synthesized, software controlled 10.15 to10.65 GHz - T/R Spacing = 350 MHz 3.5 MHz step size																			
Channel Bandwidth	7 MHz																			
Modulation Format	Base Station to Subscriber Terminal: Subscriber Terminal to Base Station:		TDM: 4 QAM TDMA: 4 QAM																	
Transmit Power (typ)	Base Station Subscriber Terminal ATPC (Automatic Transmit Power Control range):		4 QAM +16 dBm +16 dBm 50 dB																	
Receiver	Receiver sensitivity: (BER=1x10 ⁻⁶) Base Station: Subscriber Terminal:		4 QAM -86 dBm at 8 Mb/s -86 dBm at 8 Mb/s																	
Air Interface	Netro's CellIMAC™ protocol for wireless ATM, with centralized traffic scheduling based on Netro's virtual framer for ATM CBR traffic and virtual shaper for ATM VBR traffic.																			
System Capacity	Capacity per subscriber (7 MHz, full duplex, channel): 4 QAM : 64 Kb/s to 8 Mb/s Capacity per Base Station Shelf: 155 Mb/s																			
Networking Specifications & Protocols	Protocols: - RFC 1483 (Multi- protocol encapsulation over ATM, both LLC encapsulation and VC multiplexing for routed PDU's are supported) - IEEE 802.3																			
Interface Specifications	Subscriber Terminals: - E1 and Fractional E1 10BaseT		Base Stations: E3 ATM UNI STM-1 ATM UNI																	
Network Management	SNMP based Software downloadable, local and remote Windows/NT GUI																			

Standards and Regulatory Compliance	System: ETSI prETS 300 431, BAPT 211 ZV, MPT 1420, prETS TM4. ITU-R, RecF.749, x. 731 EMC: CE Mark, CISPR 22, EN55022, EN50082-1 and 2, ETS 300 339 and 385 Traffic interface: ITU-T G.703, G.704, G.775, G.823, I.431, CTR 12, TBR 13, IEEE 802.3 Mechanical and safety: ISO9001, FQAA, CE Mark, EN 60950, EN 41003, IEC 950 Environmental: ETS 300 019		
Environmental	Operating temperature, Base Station - Indoor unit: 0° C to +40° C - Outdoor unit: -33° C to +55° C Operating Temperature, Subscriber Terminal - Indoor unit: 0° C to +40° C - Outdoor unit: -33° C to +55° C Relative humidity (indoor): 5-95%, non-condensing Altitude (system): 0-4500 m Wind loading: Operational: 145 km/hr; Survival: 200 km/hr		
Power	Input voltage: - Subscriber Terminal: -48 VDC or 220 VAC, 50 Hz - Base station: -48 VDC Power consumption (typ): - Base station: 400 W - Subscriber Terminal: 33 W		
Redundancy	1:1		
Mechanical	Dimensions:	<u>HxWxD</u>	<u>Weight</u>
	Subscriber Units:		
	• Indoor unit (SAS):	4 cm x 21.5 cm x 28 cm	2.5 kg
	• Outdoor unit (SRU):	25 cm x 25 cm x 10 cm	6.0 kg
	Base Station Unit:		
	• Indoor unit (BSS, incl. cooling)	44.4 cm x 48.3 cm x 50.8 cm	21.5 kg
	• Outdoor unit (BRU):	25 cm x 25 cm x 10 cm	6.0 kg
	SAS to SRU connection: LMR240, 0-100 m; LMR400, 0-300 m		
Miscellaneous			

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