

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

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.



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AirView Specifications

Netro Corporation is a leading provider of intelligent broadband wireless point-to-multipoint systems to competitive service providers worldwide. Netro's AirStar™ system allows service providers to rapidly and cost effectively offer integrated voice and high-speed packet data services with bandwidth on-demand. Netro's AirStar is engineered to support broadband service rollouts and to operate at a number of different licensed frequencies worldwide.

Wireless Management

AirView is a wireless ATM network management system based on a Graphical User Interface (GUI). It is designed based on the SNMP protocol for network provisioning, fault management and performance monitoring. It is used to commission and manage Netro's wireless ATM product AirStar. AirView permits unsurpassed network scalability and flexibility, and can be easily migrated to other network management system.

AirView Components

The AirView Network Management System consists of the following components:

- Element Manager System (EMS): The EMS provides access and control to all manageable objects of both BSC and SAS.
- BSC Agent: Facilitates management of BSC and BRU.
- SAS Agent: Facilitates management of SAS and SRU.

FCAPS

Fault Management

AirView is programmed with multiple types of alarms along with different severity values. The user can observe the system health continuously to detect any kind of potential, latent or "active" problem. Alarms are reported in real time.

Configuration Management

AirView is based on an Inventory Database, which contains the "Managed Objects" of the system. The Database is updated with the information recollected from the SNMP agents.

AirView provides operators with an intuitive graphical interface to simplify the network management. In addition provides CES and connection provisioning, and software download capabilities to all network elements.

Accounting

SNMP agents' collect billing Statistics that AirView grooms to deliverer to the operator billing system.

Performance Monitoring

AirView collects G.821 and G.826 statistics on the Air Interface, egress and ingress of T1/E1 performance statistics.

Security Management

AirView provides function partitioning and restricted access capabilities. The system allows user security managers to define and modify user classes, assign each user to a class, and provide each user with an access level.

Element Management System Specifications

Management Protocol:	SNMP	
Host Platform:	AirView Link Explorer (Now)	Windows NT
	AirView Link Explorer, Carrier Class (Rel. 2.2)	Windows NT or Solaris
Host Requirements:	TCP/IP Connectivity	
	P5/P6 based PC with at least 32MB RAM (64MB recommended) and a 100MB free disk	
Nodes	AirView Link Explorer (Now)	1000
	AirView Link Explorer, Carrier Class (Rel. 2.2)	100K, 1 M connections.
Client/Server Architecture:	Java and HTTP (Link Explorer, Carrier Class) 50 Clients	
Software Download:	Local and Remote	
North Bound Interfaces:	AirView Link Provisioner (Rel. 3)	CORBA-based for Service Provisioning
	AirView Link Monitor (Future)	Service Level Agreements
	AirView Link Inspector (Future)	Fault Correlation
	AirView Link Collector (Future)	Billing Statistics
Status and Alarms:	NMS Interface	Ethernet 10BaseT & RS-232C/V.24
	Internal Loopbacks	Modem, Remote, Line
	RSL Indication	-20 to -80 dBm,
	Performance Monitoring	ITU-T G.821/G.826 standard

**NOTE:**

The content and availability of any released features is subject to change at any time without express notification. The features are dependent upon developmental and field experience, as well as customer requirements and market demands.

Release 2 features are implemented plans that are in subject to the verification process at this time. Release 3 features represent our current plans based on customer and partner input. They are currently in an early definition phase and may be changed. Final content and availability will be determined in accordance with Netro's New Product Development Process.



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AirStar System Specifications

3.5 GHz (ERC 14-03)

Radio Performance Specifications

Netro's radios are based on a highly integrated design including antenna, millimeter wave, and channelization subsystems in a single low cost, compact outdoor unit.

Antenna Specifications

Integral Base Radio Unit Sectorization Options	90°, 30°
Subscriber Terminal Options	305 mm Planar
Polarization Options	Vertical and Horizontal

Radio Performance Specifications

Frequency Range:	3.4 to 3.6 GHz
T/R Spacing:	100 MHz
Tuning Range:	50 MHz
Tuning Step Size:	250 KHz
Channel Bandwidth:	3.5 MHz 16QAM 7 MHz 4QAM
Transmit Power Control	50 dB SRU
Dynamic Range:	20 dB BRU

Air Interface

Netro's Industry-Leading CellMAC Air Interface is based on a TDM/TDMA multiple access system providing native ATM transport to support multiservice applications. Netro's Virtual Frammer provides QoS based traffic scheduling for CBR services, while Netro's Virtual Shaper provides QoS based scheduling for VBR services.

Modulation Format	4/16QAM
Forward Error Correction	BCH
System Gain	133 dB 16QAM 138 dB 4QAM
Capacity per Channel	8.192 Mbps
Range and Availability, 10 ⁻⁶ CLR	10 km, ITU-R Region K, 99.997% Availability

Base Station Specifications

Capacity per Shelf	155 Mbps
Network Interface Options	E3, OC-3c/STM-1 ATM UNI
Common Equipment Redundancy	1:1
Modem and Radio Redundancy	1:N

Subscriber Terminal Specifications

Service	Interworking Function	Physical Interface
T1/E1	ATM AAL1 UDT	G.703
Fractional T1/E1	ATM AAL1 SDT with CAS Activity Detection	G.703, X.21, V.35
ISDN PRI	AAL1 SDT with Bearer Channel Activity Detection	I.431
Frame Relay	FRF.5, FRF.8	G.703, X.21, V.35
Internet Access	RFC 1483: Routed & Bridged	10BaseT / 100BaseT

Network Management

Element Management

Embedded Management Interface	SNMP
Element Management Systems	Link Explorer, PC-based Link Navigator, CORBA/Java Client-Server

North Bound Interfaces

Management Interface	CORBA
Service Activation	Link Provisioner
Fault Management	Link Inspector
Performance Monitoring	Link Monitor
Billing Statistics	Link Collector

Environmental and Mechanical

Operating Environment

Operating Temperature	
Indoor Equipment	0°C to +40°C
Outdoor Equipment	-35°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

Mechanical

Subscriber Terminal	H x W x D	Weight
- Indoor unit (SAS)	4.4 cm x 21.5 cm x 28.0 cm	2.5 kg
- Outdoor unit (SRU)	30.5 cm x 30.5 cm x 11 cm	13 kg
Base Station:	H x W x D	Weight
- Indoor unit	44.4 cm x 48.3 cm x 50.8 cm	21.5 kg
- Outdoor unit (BRU)	80 cm x 30.5 cm x 18 cm	15 kg

Standards and Regulatory Compliance

System:	ERC 14-03, ETSI EN 301 021, EN 302 085, RegTP 321 ZV 042
EMC:	CE Mark; CISPR 22; ETSI EN 55022, EN 50082-1 and -2, ETS 300 385
Traffic Interface:	ITU-T G.703, G.704, G.775, G.823, I.431
Mechanical and Safety:	UL1950, ETSI EN 60950
Environmental	ETSI ETS 300 019



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