



Wideband Analog Transport Interface
& Performance Specifications for
Microcell Access Service

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WIDEBAND ANALOG TRANSPORT INTERFACE AND PERFORMANCE SPECIFICATIONS FOR MICROCELL ACCESS SERVICE

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WIDEBAND ANALOG TRANSPORT INTERFACE AND PERFORMANCE SPECIFICATIONS FOR MICROCELL ACCESS SERVICE

1. INTRODUCTION

1.1 General

This document describes the physical and electrical aspects of Wideband Analog Transport for Microcell Access Service. This service is intended to provide for the transport of radio frequency traffic between cellular locations.

This document is complete and accurate to the extent of the information disclosed to BellSouth by the manufacturers. It is offered in good faith, but errors of both content and omission may exist. BellSouth will do everything possible to correct such errors, and to resolve any confusion or uncertainty associated with the document. Any liability on the part of BellSouth is limited to such corrective action.

1.2 Revisions

When revisions to this document are released, this paragraph will give a summary of the causes for revision.

2. SERVICE DESCRIPTION

This service provides for the bi-directional transport of signals within the spectrum employed for cellular telephone service within the United States – 824 to 894 MHz. An optional uni-directional channel may also be available.

Figure 1 portrays the interfaces to this service. Note that this service involves three interfaces, denoted 'A', 'B', and 'C' in Figure 1.

The transport distance is limited to 10 km (6.2 miles).

This service assumes that power for operation of the network equipment will be furnished by the customer.

Alarms, indicating a degradation or potential loss of transport capability, will be provided to the customer. These alarms are not monitored from within the network, therefore it is the responsibility of the customer to notify BellSouth when maintenance action is required.

3. SPECIFICATIONS OF INTERFACE ‘A’

3.1 General

As indicated in Figure 1, Interface ‘A’ provides for connection to a duplex channel, an optional simplex receive-only channel, and associated powering and alarm circuitry.

3.2 Physical

This interface employs one connector. It is comprised of multiple coaxial contacts and individual pins housed in a ‘D’ type shell. The network connector is female. See Table 1 for more details.

**TABLE 1
INTERFACE ‘A’
PHYSICAL SPECIFICATIONS**

Connector type	Female ‘D’ connector with 10 pins and 3 coaxial receptacle contacts. (Palco 13W3 connector equipped with 3 Palco PDM 24-1080-0670 coaxial contacts, or equivalent.)	
Wiring Configuration		
Coaxial		
Transmit	Position A1	
Receive	Position A2	
Optional 2nd Receive	Position A3	
Pins		
1	+15 VDC	
2	+5 VDC	
3	+5 VDC	
4	-5 VDC	
5	Ground	
6	Transmitter Laser Output Power	
7	Transmitter Laser Temperature	
8	Primary Receiver Optical Input Power	
9	Optional Receiver Optical Input Power	
10	Ground	

3.3 Electrical

3.3.1 Payload

The fundamental spectral components of signals at the interface shall be between 824 and 894 MHz. The transmission of components outside these limits, or their impact on components within the band, is not specified. The user is advised to limit the transmitted signal spectrum to this range of frequencies.

The network presents a nominal impedance of $50\ \Omega$ to both loads and sources.

The maximum signal power delivered to the network is limited to $-3\ \text{dBm}$. A $50\ \Omega \pm 5\%$, resistive termination shall be used for the evaluation of signal power.

3.3.2 Power

Voltages necessary to power the network equipment must be furnished by the customer. These voltages, and associated maximum current requirements, are specified in Table 2.

3.3.3 Alarms

Alarm indications are provided to allow the customer to monitor the status of:

- Transmitter Laser Output Power,
- Transmitter Laser Temperature,
- Primary Receiver Optical Input Power, and
- Optional Received Optical Input Power (if the optional channel is used).

Under normal operating conditions, each of these leads will present a high impedance to ground. Alarms are indicated via a low impedance path to ground. Further details are contained in Table 2.

TABLE 2
INTERFACE 'A'
ELECTRICAL SPECIFICATIONS

Payload

Impedance	50 Ω nominal
Bandwidth	824 to 894 MHz
Maximum Signal Level	-3.0 dBm

Supply Voltage Requirements

Circuit	Voltage	Maximum Current
+5	+5 VDC \pm 5%	1.2 A
-5	-5 VDC \pm 5%	1.0 A
+15	+15 VDC \pm 5%	0.9 A

The A.C. component present on any D.C. supply may not exceed 0.3% RMS or 1.0% peak-to-peak of the supply voltage.

Alarm Circuits

Alarms are indicated by providing a low resistance to ground. Customer supplied voltages used to sense alarms must be biased positive with respect to ground.

Maximum Voltage (Supplied by Customer)	15 VDC
Maximum Current	20 mA

4. SPECIFICATIONS OF INTERFACE 'B'

4.1 General

As indicated in Figure 1, Interface 'B' provides for connection to a simplex receive-only channel, and associated powering and alarm circuitry.

The transmission channel is terminated in one connector, denoted the payload connector. The powering and alarm circuitry is terminated in another multi-circuit connector, denoted the power and alarm connector. Both are explained in further detail below.

4.2 Payload Connector

4.2.1 Physical

The payload connector is a female SMA coaxial connector.

4.2.2 Electrical

The network will present a source impedance of 50 Ω nominal.

4.3 Power and Alarm Connector

4.3.1 Physical

Both power and alarm circuits are interconnected via one 9 pin 'D' type connector. The network connector is male. Table 3, below, portrays the pinouts of this connector.

**TABLE 3
INTERFACE 'B'
POWER AND ALARM CONNECTOR
WIRING CONFIGURATION**

Connector – Male 9 pin 'D' connector

Pin	Use
1	+15 VDC
2	Ground
3	No connection
4&5	Ground
6	No connection
7	Receiver Optical Input Power
8&9	No connection

4.3.2 Electrical

4.3.2.1 Power

Voltages necessary to power the network equipment must be furnished by the customer. These voltages, and associated maximum current requirements, are specified in Table 4, below.

4.3.2.2 Alarms

One alarm indication – Receiver Optical Input Power – is provided to the customer. Under normal conditions, this lead will present a high impedance to ground. An alarm condition is indicated via a low impedance path to ground. Further details are contained in Table 4, below.

TABLE 4 INTERFACE 'B' POWER AND ALARM CONNECTOR ELECTRICAL SPECIFICATIONS		
Supply Voltage Requirements		
Circuit	Voltage	Maximum Current
+15	+15 VDC \pm 5%	0.3 A
<p>The A.C. component may not exceed 0.3% RMS or 1.0% peak-to-peak of the supply voltage.</p>		
Alarm Circuits		
<p>An alarm is indicated by providing a low resistance to ground. Customer supplied voltage used to sense the alarm must be biased positive with respect to ground.</p>		
Maximum Voltage (Supplied by Customer)		15 VDC
Maximum Current		20 mA

5. SPECIFICATIONS OF INTERFACE(S) 'C'

5.1 General

As indicated in Figure 1, Interface 'C' provides for the connection to a simplex transmit-only channel, and associated powering and alarm circuitry.

This interface terminates only one channel. When the optional channel is employed, two identical interfaces shall be used.

The transmission channel is terminated in one connector, denoted the payload connector. The powering and alarm circuitry is terminated in another multi-circuit connector, denoted the power and alarm connector. Both of these interfaces are explained in further detail below.

5.2 Payload Connector

5.2.1 Physical

The payload connector is one female SMA coaxial connector.

5.2.2 Electrical

The fundamental spectral components of signals at the interface shall be between 824 and 894 MHz. The transmission of components outside these limits, or their impact on components within the band, is not specified. The user is advised to limit the transmitted signal spectrum to this range of frequencies.

The network presents a load impedance of 50Ω , nominal, towards connected signal sources.

The maximum signal power delivered to the network is limited to -3 dBm. A $50 \Omega \pm 5\%$, resistive termination shall be used for evaluation of signal power.

5.3 Power and Alarm Connector

5.3.1 Physical

Both power and alarm circuits are interconnected via one 9 pin 'D' type connector. The network connector is male. Table 5, below, portrays the pinouts of this connector.

TABLE 5
INTERFACE 'C'
POWER AND ALARM CONNECTOR
WIRING CONFIGURATION

Connector – Male 9 pin 'D' connector

Pin	Use
1	+15 VDC
2	+5 VDC
3	-5 VDC
4&5	Ground
6	No connection
7	Transmitter Laser Output Power
8	No connection
9	Transmitter Laser Temperature

5.3.2 Electrical

5.3.2.1 Power

Voltages necessary to power the network equipment must be furnished by the customer. These voltages, and associated maximum current requirements, are specified in Table 6, below.

5.3.2.2 Alarms

Two alarm indications are provided to the customer. They provide for monitoring the status of the transmitter laser output power and the transmitter laser temperature.

Under normal operating conditions, each of these leads will present a high impedance to ground. Alarms are indicated via a low impedance path to ground. Further details are contained in Table 6, below.

TABLE 6 INTERFACE 'C' POWER AND ALARM CONNECTOR ELECTRICAL SPECIFICATIONS		
Supply Voltage Requirements		
Circuit	Voltage	Maximum Current
+5	+5 VDC \pm 5%	1.2 A
-5	-5 VDC \pm 5%	1.0 A
+15	+15 VDC \pm 5%	0.3 A
<p>The A.C. component present on any D.C. supply may not exceed 0.3% RMS or 1.0% peak-to-peak of the supply voltage.</p>		
Alarm Circuits		
<p>Alarms are indicated by providing a low resistance to ground. Customer supplied voltages used to sense alarms must be biased positive with respect to ground.</p>		
Maximum Voltage (Supplied by Customer)	15 VDC	
Maximum Current	20 mA	

6. ENVIRONMENTAL REQUIREMENTS

6.1 Space

Space must be provided to house the network equipment used to provide this service

One piece of network equipment provides both interfaces 'B' and 'C'. It is likely that this equipment will be mounted in an outside housing. For that reason, space requirements are specified in Table 7, below.

Height	0.868 inches
Width	15.22 inches
Depth	18.00 inches

It is anticipated that equipment associated with interface 'A' will be mounted indoors.

6.2 Temperature

The temperature of network equipment associated with this service must be maintained between -30° C and $+60^{\circ}$ C.

7. PERFORMANCE SPECIFICATIONS

7.1 General

A $50 \Omega \pm 5\%$ resistive termination shall be used for the evaluation of all performance characteristics.

7.2 Attenuation

Attenuation shall be at least 6.0 dB, and no more than 30.0 dB.

7.3 Noise Contribution

Noise contributed by the network may be represented as a noise source, having a Power Spectral Density (PSD) of -115 dBm/Hz, injected at the transmitter.

7.4 Attenuation Distortion

Attenuation distortion shall not exceed ± 0.5 dB between 824 and 894 MHz.

7.5 Intermodulation Distortion

The intermodulation distortion (IMD) associated with this service will be largely impacted by discontinuities in the transmission media. These discontinuities will be limited in order to control IMD. The following are service objectives:

- Third-order IMD products should be at least 55 dB below the composite signal, and
- The third-order IMD intercept point should be at least +22 dBm.

FIGURE 1

