Digivance®

Street-Level Coverage Solution (SCS)

ADC's Digivance Street-Level Coverage Solution (SCS) helps wireless service providers improve capacity in dense urban areas where restrictive zoning requirements prohibit deployment of necessary network equipment. This digital distributed antenna system (D-DAS) utilizes patented RF transport-over-fiber technology to distribute wireless service between existing cell sites and SCS remote antenna units. The low power, small-form-factor remote units offer an unobtrusive design and multiple mounting options that easily blend into the environment. The maintenance-free design of the remote antenna units makes the SCS ideal for improving capacity in hard-to-access areas such as tunnels, subways, and urban canyons.

Features:

- Supports 800 cellular, 800 SMR, 900 SMR, and 1900 PCS
- Single-band and dual-band solutions in a compact remote unit
- Maintenance-free operation with sealed unit – no fans or filters
- Industry's highest available optical loss budget – 25 dB
- Digital transport is transparent to air modulation standards; e.g., iDEN®, GSM, CDMA, W-CDMA, IxEV-DO
- All-digital transport enables transition to optional capabilities such as free space optics links and coarse wavelength division multiplexing (CWDM)
- Noiseless (no fans) remote is sealed NEMA 6/IP-67 rated enclosure with passive cooling
- Remote units mount vertically or horizontally – inside pole, pole wrap, wall mount, and strand mount
- Remote alarm monitoring and SNMP support
- Local alarm networking of multiple systems for monitoring and control
- Remote unit features integrated WDM to minimize fiber connections

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Overview

With the increasing popularity of wireless devices, subscribers expect to have coverage at any time in any place. This requires service providers to increase capacity, which is typically done by adding new cell sites. However, with city centers becoming more congested and local government zoning regulations increasingly more stringent, obtaining permits for new wireless cell sites is becoming nearly impossible. Extending service to these hard-to-reach areas often requires overcoming major challenges. The Digivance Street-Level Coverage Solution (SCS) is a cost-effective solution for extending or distributing capacity from base stations to other areas that require coverage.

Application

Digivance is the only all-digital distributed antenna system (D-DAS) available today. By using patented technology, the Digivance SCS digitizes the entire designated RF band, digitally transports it over fiber, and reconstructs the signal at full bandwidth, regardless of modulation technology. Digital RF transport allows the signals to be replicated at full dynamic range, independent of the fiber length, which improves data throughput. As advanced, high data-rate broadband services become available, networks with Digivance SCS technology will be ready.

ADC's digital RF transport technology is also conducive to enhancements such as free space optical laser links instead of physical fiber connections for even faster deployment and CWDM capabilities. The CWDM option allows multiple transmit and receive paths over a single fiber cable, potentially reducing annual fiber lease costs. Free space optical laser links overcome fiber availability issues, as well as enable service providers to deploy wireless capacity in specific dense urban areas in days.

Digivance SCS offers all the benefits of digital technology in a maintenance-free, compact remote unit. Its versatility and small size allow service providers to quickly deploy networks in areas where zoning restrictions often hinder installation of base stations. Centralization of base station capacity can also be realized using Digivance SCS. This allows service providers to further benefit by reducing capital expenditures and annual operating costs.

System Description

The Digivance SCS is an all-digital distributed antenna system (D-DAS) that optically transports RF signals to difficult coverage areas such as congested city center locations, tunnels, and canyons. One point-to-point RF transport link consists of a host unit and corresponding remote unit. Base station radio capacity may be simulcast to multiple remotes by using RF splitting and combining capabilities.

The Digivance SCS host unit is typically rack-mounted at the base transceiver station (BTS) site or co-located with other host units at a centralized base station radio (BR) suite. The RF signal is transported digitally over fiber optic cable connecting the host to a remote SCS unit. The Digivance SCS remote unit is positioned at the area requiring coverage and interfaces with an antenna to distribute the RF signal. The distance between the Digivance SCS host unit and remote unit is typically limited by time delay requirements of system modulation standards (iDEN®, GSM, CDMA, etc.), and can be as far as 40 miles or more. With the product's 25 dB optical budget, the SCS can be deployed in the most challenging fiber plants.

Element Management System (EMS)

The Digivance EMS provides operational and maintenance capabilities for the SCS product. This EMS can simultaneously monitor a network of Digivance SCS links by daisy-chaining the alarm interfaces of up to 24 Digivance SCS host units. Each host unit is connected through a controller area network bus, and the PC can be connected to any of the host units. The Digivance EMS has the ability to download software, change parameters, and monitor alarms. It also provides three levels of alarms: software reporting, LEDs, and external contacts.

In addition, off-site functionality is accomplished through a terminal at the NOC utilizing Digivance EMS or Digivance - supported SNMP. Through StarGazer®, ADC's SNMP manager, enhanced GUI, alarm management and interfaces are provided.

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Host Unit

The rack-mountable Digivance SCS host unit is typically located at a BTS or a facility housing a suite of BTSes. On the forward path, the host unit digitizes the designated RF band and digitally transports it over single mode fiber to the remote SCS unit. On the reverse path, the host unit receives the digitized signal and converts it to RF. The host unit also collects alarm information from the remote unit.

For system deployments, multiple links can be networked together at the same BTS site. Host units can be daisy-chained together to allow monitoring and control of multiple links from a single user interface.

Remote alarm monitoring and control of the Digivance SCS system can also be managed from an off-site location or NOC. Using a PC with a standard physical layer protocol, communications can be delivered to the NOC. In addition to sending alarm notifications to the Digivance EMS through software, the Digivance SCS host unit also features front panel alarm reporting. LEDs on the front panel of the host unit will change color depending on the status of the unit. LED displays provide information regarding the following items:

- Power
- System mode (active/standby)
- Indication of faulty unit
- RF conditions

Furthermore, alarm contact closures provide major and minor alarms. The host unit has two alarm contacts that either report system operation is seriously affected (major alarm) or system operation is degraded (minor alarm). The host unit operates on DC power.

Remote Unit

The low power, small-form-factor Digivance SCS remote unit offers an unobtrusive design and multiple mounting options that easily blend into the environment. Mounting options for the single-band and dual-band remotes include inside pole mount, pole wrap, wall mount, and strand mount. The units, which can be mounted in a vertical or horizontal position in less than five minutes, are sealed NEMA 6/IP-67 rated enclosures that can be deployed in the harshest environments. Fiber, antenna, and power input/output connectors are all sealed for maximum protection.

On the forward path, the remote unit receives the digitized signals from the host unit and converts the signal back into RF to be distributed via an externally mounted antenna. On the reverse path, the remote unit digitizes the designated RF band and digitally transports it over single mode fiber to the host unit.

In addition to sending alarm notifications to the Digivance EMS software, the Digivance SCS remote unit also features LED alarm reporting. An LED on the bottom of the remote unit will illuminate upon a fault condition. The LED will display information about the following:

- System mode (active/standby)
- Indication of faulty unit
- RF conditions
- Power amplifier fault
- Antenna fault system (VSWR)

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SPECIFICATIONS

FORWARD PATH	
Bandwidth Capacity:	Single-band and dual-band solutions available
Frequency Bands	
Cellular A Band:	869 to 891.5 MHz
Cellular B Band:	880 to 894 MHz
SMR 800/900 Band:	851 to 869 MHz and 935 to 940 MHz
PCS AD Band:	1930 to 1950 MHz
PCS DBE Band:	1945 to 1970 MHz
PCS BEF Band:	1950 to 1975 MHz
PCS EFC Band:	1965 to 1990 MHz
Intermodulation:	≤ -53 dBc at remote output (two tone)
Spurious:	≤ -20 dBm (in-band)
Peak to Average Ratio:	>10 dB
Propagation Delay	
Cellular/PCS:	<3 µsec (excluding fiber)
SMR:	<6 µsec (excluding fiber)
Adjustable Delay Setting:	0 - 63 microseconds, software adjustable
Delay Setting Adjustments:	0.1 µsec
RF Input Level:	-40 to -10 dBm
Output Power:	6.5 Watts (+38 dBm) Composite at Antenna Port
PERFORMANCE MERIT FUNCTIONS	
TDMA/EDGE:	4% EVM
GSM:	4° RMS
iDEN®:	SQE decrease < 1 dB
CDMA:	0.97 rho factor

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REVERSE PATH

Frequency Bands	
Cellular A Band:	824 to 846.5 MHz
Cellular B Band:	835 to 849 MHz
SMR 800/900 Band:	806 to 824 MHz and 896 to 901 MHZ
PCS AB Band:	1850 to 1870 MHz
PCS DBE Band:	1865 to 1890 MHz
PCS BEF Band:	1870 to 1895 MHz
PCS EFC Band:	1885 to 1910 MHz
Gain Range:	0 to 30 dB, 1 dB steps
Blocking Dynamic:	≥ 70 dB
Propagation Delay	
Cellular/PCS:	<3 µsec (excluding fiber)
SMR:	<8 µsec (excluding fiber)
Adjustable Delay Setting:	0 - 63 microseconds, software adjustable
Delay Setting Adjustments:	0.1µsec
Input IP3:	-8.5 dBm
Noise Figure	
Cellular/PCS:	5 dB
SMR:	6 dB
Maximum RF Output Level:	-10 dBm composite
Automatic Gain Limiting (AGC) Range:	30 dB
Maximum Input for AGC:	-10 dBm peak
Reverse Path VSWR:	3.0:1

OPTICAL SPECIFICATIONS

Fiber Type:	Single-mode, 9/125 µm
Fibers Required:	1 per single band, 2 per dual band
WDM:	Integrated in remote separate module required at host
Transmit Device:	SFP optical transceiver
Fiber Connectors:	OptiTap LC
Return Loss Requirement:	>12 dB
Forward Wavelength:	1550 nm
Reverse Path Wavelength:	1310 nm
Optical Budget:	25 dB Standard
CWDM Wavelength Option:	8 Wavelength ITU-T G.694.2 grid CWDM

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GENERAL SPECIFICATIONS

Operating Temperature	
Remote Unit:	-30 to 50° C (-22 to 122° F)
Host Unit:	0 to 50° C (32 to 122° F)
Storage Temperature:	-40 to 50° C (-40 to 122° F)
Humidity:	10% to 90% non-condensing
Lightning Protection Surge:	20kA IEC 1000-45 8/20 µs Waveform
Alarm Contacts - Host:	Major/Minor contact closures
Alarm Indicators - Host:	LEDs; red, green, and yellow
Alarm Indicator - Remote:	LED; red
Element Management System:	SNMP V2

REMOTE UNIT

Enclosure:	NEMA 6/ IP-67
Mounting:	Inside Pole, Pole Wrap, Wall or Strand
Dimensions (HxWxD)	
Single:	28.3" x 9.5" x 6.20" (719mm x 241mm x 157mm)
Dual:	37.3" x 10.0" x 7.54" (947mm x 254mm x 192mm)
Weight	
Single:	<40 lbs. (18.1 kg)
Dual:	<80 lbs. (36.3 kg)
Optical connectors:	Sealed OptiTap with pigtail
RF connector:	N-Type Female

HOST UNIT

Mounting:	19 and 23 inch rack
Dimensions (HxWxD) (max):	2 Rack Units (3.5" x 19.0" x 12.0") (89mm x 483mm x 305mm)
Weight: (max):	18 lbs.
RF connector:	N-Type Female

POWER SOURCE

Remote Unit Power Source:	Wired to 90 – 265 VAC, 47 to 63 Hz Optional 60 – 89 VAC, 47 to 63 Hz (single-band only)
Remote Unit Power Requirement (at rated Power Output)	
Single:	<200 W
Dual:	<400 W
Host Unit Power Source:	21 to 60 VDC floating
Host Unit Input Current:	< 2A at 27.5VDC

Unless noted otherwise specifications are typical and subject to change

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Ordering Information

Please contact your sales representative or customer service at 1.800.366.3891 ext. 73022 for ordering information.

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