

OPTIMIZING COMMUNICATIONS FOR CELLULAR BACKHAUL

GROWTH CHALLENGES INFRASTRUCTURE

Cellular subscriber growth continues at astounding rates. The rollout of 2.5G and 3G networks is a reality. The popularity of Short Message Service is soaring. CDMA and GSM deployments continue to increase. All are positive growth indicators, but may be straining your infrastructure.

At Comtech EF Data, we understand that backhauling and trunking cellular traffic from remote sites has become a major challenge. Terrestrial capacity is often unavailable, unreliable, costly and not expandable. And, to be competitive, you need a method of cost-effectively expanding your coverage.

Many cellular operators are taking a fresh look at satellite-based solutions. Cell sites connected via satellite provide instant infrastructure on both temporary and permanent bases, enabling deployment into remote and inaccessible locations.

Satellite is also the fastest method of restoring communications after a disaster. It is the ideal medium to provide additional capacity for one-time events, such as cellular coverage to guests on cruise ships or to attendees of major sporting events.

COST-EFFECTIVE
EXPANSION

INSTANT
INFRASTRUCTURE

SUPERIOR
PERFORMANCE

LINK EFFICIENCY

SCALABILITY



COMTECH EF DATA SOLUTIONS

Cellular services are bandwidth intensive, which can present challenges when back-hauled or trunked via satellite. Additionally, satellite delay has an impact on cellular protocols, particularly TCP/IP-based applications. This problem can be compounded in 2.5G and 3G networks, as a result of constant handoffs.

Specializing in satellite communications, Comtech EF Data has a unique ability to deliver bandwidth-efficient and scalable solutions to cellular operators. With our satellite modems and transceivers, you can achieve bandwidth optimization, resulting in significant operating expense savings.

Comtech EF Data designed cellular backhaul-enabled satellite modems capable of delivering optimal performance and spectral utilization at multiple layers. With the industry's widest range of forward error correction, modulation formats and code rates, our modems can provide the right combination to simultaneously optimize transponder power and bandwidth.

BACKHAUL CONFIGURATIONS

Our robust cellular backhaul solutions can be deployed in point-to-point network configurations. In addition, for multipoint and partial mesh networks providing remote connectivity of lower density areas, the Comtech solutions improve transport efficiency and lower the total cost of ownership.

FORWARD ERROR CORRECTION & MODULATION

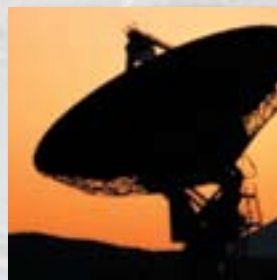
We offer all traditional forward error correction (FEC) plus optional, advanced methods combined with higher order modulation that provide increased coding gain, lower decoding delay and significant bandwidth and power savings. Whether your network utilizes GSM or CDMA, we have forward error correction and modulation ideally suited to meet the performance requirements of cellular backhaul.

Variety of Forward Error Correction

- Low-Density Parity-Check Codes (LDPC)
- 2nd Generation Turbo Product Coding (TPC)
- Viterbi
- Sequential
- Reed-Solomon
- Pragmatic Trellis Coding

Selection of Modulation Techniques

- BPSK
- QPSK
- OQPSK
- 8-PSK
- 8-QAM
- 16-QAM
- 64-QAM



DROP & INSERT (D & I)

For the CDM-600 and CDM-600L modems, we support two variants of Drop & Insert for cellular backhaul, providing flexibility to transmit/receive fractional parts of a T1 or E1 data stream.

Proprietary, Enhanced Mode (D & I ++)

- Supports both T1 and E1 data rates, with a timeslot selection range of N = 1 to 24, any N
- Synchronous and asynchronous EIA-232 Engineering Service Channels
- Satellite overhead is 2.22%
- Supports proprietary overhead channel, Embedded Distant-End Monitor and Control (EDMAC) plus Automatic Uplink Power Control (AUPC)

Open Network Mode

- Provides baseband processing compliant with Intelsat IESS-309 using G.703
- Synchronous and asynchronous EIA-232 Engineering Service Channels
- Satellite overhead is 6.7%
- Supports EDMAC and AUPC for E1 CCS operation

QUAD E1 INTERFACE WITH D&I++

To simplify configuration for sites requiring multiple E1s, the CDM-Qx/L Satellite Modems offer a Quad E1 interface with D&I++ on each E1. Any combination of 1 to 31 time slots can be dropped or inserted per E1, allowing for aggregation of 1 to 128 time slots into a single carrier. This is done with a minimal 0.4% framing overhead, compared to the traditional 6.7%.

DOUBLETALK™ CARRIER-IN-CARRIER®

Our revolutionary DoubleTalk Carrier-in-Carrier is based on Applied Signal Technology's patented "Adaptive Cancellation" technology that allows full duplex satellite links to transmit concurrently in the same segment of transponder bandwidth – doubling your throughput. This powerful technology is available in the CDM-Qx/L modems and the stand-alone IF cancellation product, the CLO-10 Link Optimizer. And, when combined with our advanced forward error correction and modulation techniques, DoubleTalk Carrier-in-Carrier delivers improved satellite transponder utilization and unprecedented operating expense savings.

G.703 CLOCK EXTENSION

Cellular networks require precise synchronization of base stations, which becomes a challenge when using IP backhaul. Most operators are forced to use GPS-based external equipment for site synchronization. The CDM-570/L Satellite Modems offer G.703 clock extension when using IP backhaul, that propagates a high stability reference from hub to the remote. A high stability E1/T1 reference signal is fed to the hub modem. The remote modem generates a T1/E1 signal synchronized to the reference signal that can be used for synchronizing the remote site equipment.





COMTECH EF DATA SOLUTIONS

IP MODULE

Comtech EF Data modems enabled with the optional IP Module take bandwidth optimization to a higher level. Available features such as Payload Compression, Header Compression and Quality of Service (QoS) enable significant bandwidth savings, improve transmission quality and increase control of bandwidth provisioning.

RF PRODUCTS

Comtech EF Data also offers an extensive line of RF products – converters, amplifiers, transceivers and terminals – for a range of configurations, which are deployed globally in commercial and government applications. Rugged platforms, field replaceable power supplies, redundancy and a variety of frequencies are just some of the options available in our extensive RF product line.



MEMOTEC
A SUBSIDIARY OF COMTECH EF DATA

This subsidiary of Comtech EF Data enhances our ability to deliver network optimization and bandwidth efficiencies via a comprehensive range of multiservice platforms. The products feature high quality voice, bandwidth optimization adaptability and reliability, and are deployed in a variety of GSM and VSAT applications.

A combined Memotec and Comtech EF Data solution, called AbisXtender, includes the A.bis over IP optimization platform and the bandwidth efficient IP-enabled modems. The combination provides an efficient and scalable solution that delivers lower cost of ownership to GSM operators.

Deploying satellite-based cellular backhaul solutions by Comtech EF Data provides instant infrastructure, cost-effective expansion, superior performance and link efficiency. Contact us to learn more about our satellite communication products.



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