Introducing EtherHaul™-1200

Siklu's EtherHaul-1200 products are carrier-class, high-capacity E-band radios that dramatically lowers the cost of wireless and Ethernet backhaul. The systems are uniquely based on an all-silicon design that results in fewer components, greater reliability and pricing that is up to 80% less than comparable radio systems. Operating in the uncongested and inexpensive licensed 71-76 GHz E-band, TCO (total cost of ownership) is reduced even further – to the lowest in the industry. Designed with strenuous carrier wireless backhaul demands in mind, the EtherHaul-1200 solutions are equally at home in the mobile backhaul, in the enterprise or in Ethernet service provider networks.

Release History

Date	Version	Version Description
March 22, 2011	1.1.0.x	Software version 1.1.0.x is the first commercial software release for the EtherHaul-1200 products. The software version 1.1.0.x provides the core features of the EH-1200 products including Adaptive Bandwidth, Coding and Modulation, Bridging, classification and Quality of Service, OAM and performance monitoring and management interfaces.
August 31, 2011	2.0.0.x	Software version 2.0.0.x is the second commercial software release for the EtherHaul-1200 products. The software version 2.0.0.x provides performance improvements and additional features for the EH-1200 products including 1 Gbps aggregated capacity, Synchronous Ethernet and Ethernet Ring Protection.
September 27, 2011	2.0.1.x	Software version 2.0.1.x is a bug fix release for the EtherHaul-1200 products. This version fixes the following limitations: 1. 1200L.v2: maximum data-rate should be 400Mbps instead of 200Mbps. 2. SyncE Wander Transfer performance.

December 6, 2011	2.0.2.x	Software version 2.0.2.x includes the following fixes, changes and features: Fixed limitations: 1. Link malfunction in low, sub-zero temperatures 2. RSSI readings accuracy Changes (applicable for the EH-1200L.v2 only): 1. Operating mode QPSK 4, 1, 2/3 is replaced with operating mode QAM16 4, 1, 0.5 making it in line with the operating modes of the EH-1200. There is no impact on performance. Features: 1. Transmit Power Control (TPC) Upgrading to software version 2.0.2.x is mandatory for all EH-1200 and EH-1200L.v2. For the upgrade procedure details please see Technical Note - TN0014.

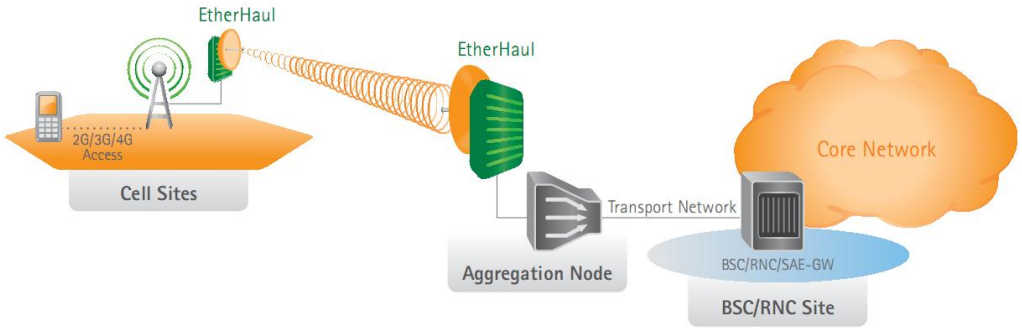
Product Compatibility

Version	Version Description
1.1.0.x	EtherHaul-1200L
2.0.0.x	EtherHaul-1200 EtherHaul-1200L.v2 Software version 2.0.0.x is not compatible with the EtherHaul-1200L
2.0.1.x	EtherHaul-1200 EtherHaul-1200L.v2 Software version 2.0.2.x is not compatible with the EtherHaul-1200L
2.0.2.x	EtherHaul-1200 EtherHaul-1200L.v2 Software version 2.0.2.x is not compatible with the EtherHaul-1200L

Typical Applications

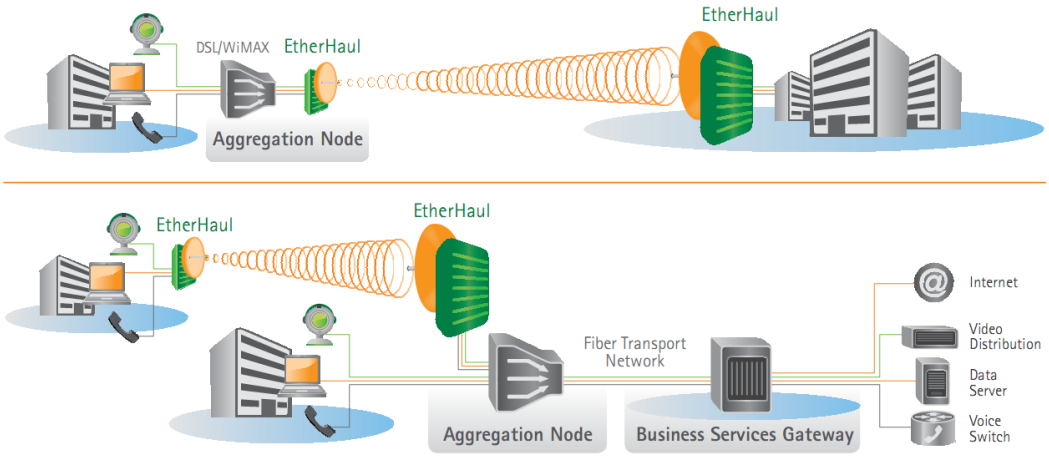
Wireless Backhaul for 2G, 3G, 4G, LTE and WiMAX Networks

High-capacity Gigabit Ethernet backhaul at the lowest TCO in the industry enables mobile operators to profitably and reliably provide data intensive services.



Ethernet Wireless Backhaul for Business Services and Enterprise Connectivity

A low cost, high capacity Ethernet wireless solution allows you to rapidly extend your fiber reach beyond existing fiber footprint or expand your enterprise network.



New Features - Highlights

#	Topic	Description	Compatibility
1	Transmit power control (TPC)	The nominal transmit power may be controlled to allow deployment of short distance links. The transmit power may be set to be in the range between +5 dBm (default) to -5 dBm. When commissioning a link the maximum RSSI should not exceed -35 dBm. If the maximum RSSI is exceeded the transmit power needs to be reduced until reaching the maximum RSSI.	EH-1200 EH-1200L.v2

Existing Features - Highlights

Available from previous software versions

#	Topic	Description	Compatibility
1	Adaptive Bandwidth, Coding & Modulation (ABC&M)	The EH-1200 products utilize hitless/errorless Adaptive Bandwidth, Coding & Modulation automatically making the necessary adjustments to the wireless system, optimizing the over-the-air transmission and preventing weather-related losses from causing traffic link disruption. Traffic is dropped according to the Quality of Service priority.	EH-1200, EH-1200L EH-1200L.v2
2	Symmetric / Asymmetric Traffic Configuration	Traffic may be configured to be either symmetric (50%-50% downstream-upstream ratio) or asymmetric. The asymmetric traffic may be configured up to a ratio of 75%-25% downstream-upstream division ratio.	EH-1200 EH-1200L EH-1200L.v2
3	Provider Bridge (IEEE 802.1ad)	The EH-1200 products incorporate a fully functional integrated Provider Bridge (IEEE 802.1ad).	EH-1200

#	Topic	Description	Compatibility
4	QoS Aware Transparent Bridging (IEEE 802.1d)	The EH-1200 products provide a QoS aware Transparent Bridging (IEEE 802.1d) mode. In this mode minimal user configuration is required to achieve a point-to-point connection while still utilizing the Quality of Service and adaptive bandwidth, coding and modulation capabilities. In this mode Undef-VLAN (undefined VLAN) is set between all ports, allowing all tagged and untagged traffic. No VLAN configuration is available to the user (for VLAN configuration L2 networking software license is required – relevant for the EH-1200 only).	EH-1200 EH-1200L.v2
5	Classification	The EH-1200 products' QoS Engine classifies the incoming packets by VID, PCP and/or DSCP (as defined by the IEEE 802.1 Q/p and RFC-2475 standards) and maps them onto {EVC, CoS} pairs. The EH-1200 has 8 queues per port.	EH-1200 EH-1200L EH-1200L.v2
6	QoS Scheduling	The EH-1200 products' QoS scheduling mechanism may be configured to operate according to a strict priority or hybrid Weighted Fair Queuing and strict priority.	EH-1200 EH-1200L.v2
7	QoS Scheduling	The EH-1200 products' QoS mechanism operates according to a Strict Priority scheduling mechanisms.	EH-1200L
8	Shaping	The EH-1200 products implement shaping to optimize and guarantee performance	EH-1200, EH-1200L.v2
9	Connectivity Fault Management (IEEE 802.1ag)	The EH-1200 products provide the following IEEE 802.1ag CFM capabilities: 1. CFM Connectivity Check 2. CFM Link Trace 3. CFM Loopback	EH-1200
10	Performance Monitoring (ITU-T Y.1731)	The EH-1200 products provide the following ITU-T Y.1731 Performance Management capabilities: 1. Frame delay 2. Frame loss	EH-1200
11	Synchronous Ethernet	The EH-1200 products provides Synchronous Ethernet capabilities receiving a synchronized Ethernet link and providing a synchronized Ethernet link on the other end of the wireless link within the required masks as defined by the ITU-T G.8261 standard.	EH-1200
12	Ethernet Ring Protection (ITU-T G.8032)	The EH-1200 products provide non-proprietary ring protection based on the ITU-T G.8032 Ethernet Ring Protection standard.	EH-1200
13	Alarm Propagation	The EH-1200 products provide alarm propagation capabilities for both radio and line faults, propagating the alarms when losing connection on the radio or Ethernet port.	EH-1200 EH-1200L EH-1200L.v2
14	Management	The EH-1200 products may be managed in the following methods: 1. CLI for full configuration and maintenance 2. SNMP 3. Web-based EMS 4. SikluView for high level administration and monitoring	EH-1200 EH-1200L EH-1200L.v2
15	NTP	The EH-1200 supports Network Time Protocol (NTP) to synchronize its internal system time	EH-1200, EH-1200L.v2

#	Topic	Description	Compatibility
16	AES	The EH-1200 products provide AES encryption with static key	EH-1200 EH-1200L EH-1200L.v2

Limitations and Known Issues

#	Topic	Limitation / Known Issue	Work Around / Notes
1	RF & Modem	Supported channel bandwidth is only 500 MHz	
2	RF & Modem	Supported operational frequencies are: 73.875 GHz, 74.375 GHz, 74.875 GHz, 75.375 GHz	
3	RF & Modem	Minimal link distance is 170m	
5	RF & Modem	Transmit power is +5 dBm at all modes of operation except at QPSK 1, 4, 0.5 where the transmit power is +3 dBm	In the default mode of operation without using TPC.
6	RF & Modem	Capacity provided at QAM 64, 500 MHz (channel size), 0.5 (FEC rate), 1 (repetitions) 1028 Mbps aggregated has a residual BER of 10^{-11} [Relevant for: EH-1200]	To operate with zero residual BER the user may limit the highest mode of operation to QAM16 4 1 0.5, limiting the throughput to 700 Mbps (aggregated).
7	RF & Modem	Auto role setting (master / slave) is not supported	Use the CLI or Web-GUI to configure one end of the links to Role=Master and second end to Role=Slave (sec. 2.9 in the user manual)
8	RF & Modem	All RF related settings (via CLI or Web) should be followed by the following operations: 1. Copy running to startup config 2. Reset system	
9	RF & Modem	In asymmetric traffic configuration the unit set for RF role “Master” must be configured to 75% of the capacity and the slave to 25%	
10	RF & Modem	Transmit Power Control (TPC) allows all values -128 ÷ 127 while actual allowed values are in the range of -35 ÷ 5.	Set TPC values -35 ÷ 5.
11	RF & Modem	Setting Tx power should be followed by ‘reset rf’ (using CLI) or by the following operations (via CLI or Web): 1. Copy running to startup config 2. Reset system	
12	Performance Monitoring	Undefined VLAN packets statistics counted per port only	
13	Performance Monitoring	VLAN statistics are not supported in external Loopback mode	

#	Topic	Limitation / Known Issue	Work Around / Notes
14	Synchronization	Synchronous Ethernet holdover is only supported when using the optical interfaces [Relevant for: EH-1200]	
15	Synchronization	SSM based SyncE must not be used with network loops	
16	Management and Configuration	At startup some events may be missed and not shown (link down/up), this may occur if large numbers of CFM MEPS are configured [Relevant for: EH-1200]	
17	AES	Only AES 128 bit key may be set	

Fixed Limitations and Issues

#	Topic	Fixed Limitation / Issue	Notes
1	RF & Modem	A limitation causing the links to malfunction at sub-zero temperatures (Celsius) was identified. The limitation was identified in the ODU's automatic gain control (AGC) causing Rx gain to increase dramatically, overloading the Rx channel when operating at sub-zero temperatures. This software release fixes this limitation allowing the deployment of the links at the temperature range of -45°C ÷ +55°C.	
2	RF & Modem	A limitation with the accuracy of the RSSI reading was identified resulting in the display of inaccurate readings in the CLI and web EMS. The accuracy of the RSSI readings from the radio is improved to ±3 dBm	

About Siklu

Siklu has been committed to reducing the cost of high capacity wireless backhaul solutions since 2008. The company's success centers on an innovative silicon-based design of the E-band radio system and components that has resulted in systems priced as low as 20% of competition. The EtherHaul delivers Gigabit speeds and is ideal for a wide range of urban and metropolitan Ethernet wireless backhaul applications. Serving providers around the world, Siklu Communication is based near Tel Aviv, Israel.

Siklu Communication Ltd.
7, Shoham St.
Petach Tikva 49517, Israel
Tel: +972 3 921 4015
Fax: +972 3 921 4162
info@siklu.com

www.siklu.com