# Liberator V1000



# High capacity 60GHz band radio powers macro and small cell backhaul and enterprise connectivity

The Liberator V1000 is an easy to deploy, cost-effective, wireless Ethernet pointto-point bridge operating in the 60 GHz millimeter wave V band, delivering full duplex capacity of up to 1 Gbit/s over distances of up to 800 meters. With a minimal 18 x 18 cm form factor, this all-outdoor platform is optimized for invisible street level deployments in challenging high density networks. A high gain antenna with low sidelobes, combined with the option to use multiple channels, ensures excellent interference immunity for colocated radios on a single pole. The antenna beam-width is sufficiently wide to allow for the pole sway, twist and tilt encountered with small cell backhaul links. Combining carrier class performance with advanced features such as adaptive modulation, multi-channel operation, low latency, softwareactivated flexible link throughput and AES 256 bit encryption, the V1000 supports a variety of short haul connectivity and backhaul applications.

#### **Backhaul and Short Haul Applications**

The Liberator V1000 is optimal anywhere that high capacity, short haul point-topoint connectivity is needed, including dense urban networks. Applications include:

- Small cell 3G and LTE backhaul
- Campus connectivity and building to building private links
- Backbone / fiber extension and wired network bridging

### Novel & Innovative Technology

A combination of leading-edge technology and superior attention to detail in every element of design and manufacture means that the V1000 radio packs huge performance and resilience into a small form factor platform. All housed in a lightweight robust aluminum housing to withstand even harsh weather conditions. The use of frequency division duplexing (FDD) means that the full capacity of the radio is available in both directions simultaneously, rather than being shared.

### About V Band

The V band, between 57 and 64 GHz, is available on a licence-exempt basis, enabling backhaul and connectivity links to be rapidly and cost-effectively deployed. In this band, radios can operate without interference issues, even when deployed in close proximity in highly dense networks, due to the oxygen absorption characteristics of this millimeter wave band. Large networks can be deployed and operate at extremely high densities with tens of links on a single rooftop or street.

## Form and function combined in powerful, feature-packed device

- Interference-free operation, 60 GHz millimeter wave V band
- Up to 800 meter range
- Up to 1 Gbit/s full duplex capacity with FDD
- Flexible capacity licence keys, from 500 Mbit/s to 1 Gbit/s
- All outdoor unit
- Minimal form factor & integrated antenna
- Robust aluminum housing withstands weather conditions
- 256 bit AES encryption option available for added security
- SyncE and IEEE 1588 compliant synchronization



*Liberator V1000 millimeter wave V band radio* 

### **Specifications**

Frequency bands57-64 GHz bandModulationP5/K/QP5KRangeUp 0800 metrsEthent HroughputFile GBU (File SF)K/700 Mbit/s (QP5K/500 Mbit/s)Maximum Tx power46 dBmMaximum Tx power40 dBmChannel width500 MHzAntona gain300 MELink adaptation40 dBm consultation, APPCUtra-fast boot time10 seconds from power-up to full data transmissionAutalabilityUp 09 999% (use Link Availability Calculator)Marding Bebruenci (MTBF)52 yearsVand loadSinciforecondsSynchronatogen90.11/1 SecondsVark from anagement60.20,12Vark for anagement60.20,12Vark for anagement50.20,12Vark for anagement50.20,12Vark for anagement50.20,12Statistic11.11 Sinz, 24 hour statistics coar 30 days, downloadableFirmware control12.52 kBt availabiles as hardware optionAlarpost15.25 kBt availabiles as hardware optionStatistic10.11 Sinz, 24 hour statistics coar 30 days, downloadableFirmware control12.52 kBt available as a hardware optionData ports12.52 kBt available as a hardware optionStatistic12.52 kBt available as a hardware optionCharpost ports12.52 kBt available as a hardware optionStatistic12.52 kBt available as a hardware optionStatistic12.52 kBt available as a hardware optionStatistic12.52 kB mmStatistic12.52 kB mmStatistic		
Rage     Up to 800 metrs       Ethernet throughput     Full duplex: 1 Ebit/s (8-PSK)/700 Mbit/s (QPSK)/500 Mbit/s       Maximum Tx power     4 dBm       Maximum EIRP     4 dBm       Ethernet throughput     500 MHz       Antenna gain     30 dBit       Link adaptation     Adaptive coding and modulation, ATPC       Ultra-fast boot time     10 seconds from power-up to full data transmission       Availability     Up to 99.999% (use Link Availability Calculator)       Mart time between failures (MTBF)     5 years       Vind load     16 km/h (operating) and 200 km/h (survival)       Latency     50m icroseconds       Synchronization     SyncE with patent-pending "Snapback" technology, and IEEE 1588v2       Vind for amangement     SUMP v1, v2, v3       Graphical user interface (GUI)     HTP web browser       Alarns     User-fieled alarms and thresholds on GUI, Syslog, SNMP       Firmware control     Later port, orign available       Firmware control     Later port, orign available       Alarps     Lings port, expload available       Alarps     Lings port, expload available as a hardware option       Alaring     Lings port, compact alignment	Frequency bands	57-64 GHz band
Etheme throughput     Full duples: 1 Gbit/s (8-PSK)/700 Mbit/s (QPSK)/500 Mbit/s       Maximum Tx power     46 dBm       Maximum EIRP     44 dBm       Channel width     500 MHz       Antenna gain     38 dBi       Link adaptation     Adaptive coding and modulation, ATPC       Ultra-fast boot time     10 seconds from power-up to full data transmission       Availability     Up to 99.999% (use Link Availability Calculator)       Mean time between failures (MTBF)     25 years       Vind load     100 km/h (operating) and 200 km/h (survival)       Latercy     250 microseconds       Synchronization     SyncE with patent-pending "Snapback" technology, and IEEE 1580+2       ViAN for management     SULP, Diffserv, 8 queues       Network management     SULP, Diffserv, 8 queues       Adams     User-defined atarms and thresholds on GU, Syslog, SNMP       Statsics     1min, 15 min, 24 hour statistics over 30 days, downloadable       Firmware control     Bal firmware banks with safety rollback feature       Adapmet     Geg, with 2 port version available       Adapted     Statsics     Geg, with 2 port version available       Adapront Contot     Geg, with 2 port version availabl	Modulation	8-PSK/QPSK
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Maximum EIRP44 dBmChannel width500 MHzAntenna gain38 dBiLink adaptationAdaptive coding and modulation, ATPCUltra-fast boot time10 seconds from power-up to full data transmissionAvailabilityUp to 99.99% (use Link Availability Calculator)Mean time between failures (MTBF)5 yearsVind load160 km/h (operating) and 200 km/h (survival)Latency<250 microseconds	Ethernet throughput	Full duplex: 1 Gbit/s (8-PSK)/700 Mbit/s (QPSK)/500 Mbit/s
Channel widthS00 MHzAntenna gain84 BiLink adaptationAdaptive coding and modulation, ATPCUltra-fast boot time10 seconds from power-up to full data transmissionAvailabilityUp to 99.999% (use Link Availability Calculator)Mean time between failures (MTBF)25 yearsVind load160 km/h (pareting) and 200 km/h (survival)Latency<250 microseconds	Maximum Tx power	+6 dBm
Artena gain38 dBiLink adaptationAdaptive coding and modulation, ATPCUltra-fast boot time0 seconds from power-up to full data transmissionAvailabilityUp 099.99% (use Link Availability Calculator)Mean time between failures (MTBF)25 yearsVind load160 km/h (perating) and 200 km/h (survival)Latency<250 microseconds	Maximum EIRP	44 dBm
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Mean time between failures (MTBF)25 yearsWind load160 km/h (operating) and 200 km/h (survival)Latency<250 microseconds	Ultra-fast boot time	10 seconds from power-up to full data transmission
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Latency<250 microsecondsSynchronizationSyncE with patent-pending "Snapback" technology, and IEEE 1588v2VLAN for managementIEEE 802.IQQuality of service (QoS)802.1p, DiffServ, 8 queuesNetwork managementSNMP v1, v2C, v3Graphical user interface (GUI)HTTP web browserAlarmsUser-defined alarms and thresholds on GUI, Syslog, SNMPStatistics1 min, 15 min, 24 hour statistics over 30 days, downloadableFirmware controlDual firmware banks with safety rollback featureData portsGig, with 2 port version availableAlignmentVoltmeter port, compact alignment scopeOutdoor unit (ODU) terminal size152 x 182 x 68 mmWeight2.5 kg (ODU only)WeightSover Over Ertenet ("Ultra-PoE"/PoE++), consumption 35W	Mean time between failures (MTBF)	25 years
SynchronizationSyncE with patent-pending "Snapback" technology, and IEEE 1588v2VLAN for managementIEEE 802.IQQuality of service (QoS)802.1 p. DiffServ, 8 queuesNetwork managementSNMP v1, v2C, v3Graphical user interface (GUI)HTTP web browserAlarmsUser-defined alarms and thresholds on GUI, Syslog, SNMPStatistics1 min, 15 min, 24 hour statistics over 30 days, downloadableFirmware controlDual firmware banks with safety rollback featureData portsGigE, with 2 port version availableAlignmentVoltmeter port, compact alignment scopeOutdoor unit (ODU) terminal size182 x 182 x 68 mmWeight2.5 kg (ODU only)Port Over Quer Lifter ("Ultra-PDE"/PDE++), consumption 355W	Wind load	160 km/h (operating) and 200 km/h (survival)
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Quality of service (QoS)     802.1p, DiffServ, 8 queues       Network management     SNMP v1, v2C, v3       Graphical user interface (GUI)     HTTP web browser       Alarms     User-defined alarms and thresholds on GUI, Syslog, SNMP       Statistics     1 min, 15 min, 24 hour statistics over 30 days, downloadable       Firmware control     Dual firmware banks with safety rollback feature       Data ports     GigE, with 2 port version available       Alignment     Voltmeter port, compact alignment scope       Weight     2.5k g(DU only)       Power supply     Power Over Ethernet ("Ultra-PoE"/POE++), consumption 35W	Synchronization	SyncE with patent-pending "Snapback" technology, and IEEE 1588v2
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Graphical user interface (GUI)HTTP web browserAlarmsUser-defined alarms and thresholds on GUI, Syslog, SNMPStatistics1 min, 15 min, 24 hour statistics over 30 days, downloadableFirmware controlDual firmware banks with safety rollback featureEncryptionAES 256 bit available as a hardware optionData portsGigE, with 2 port version availableAlignmentVoltmeter port, compact alignment scopeOutdoor unit (ODU) terminal size182 x 182 x 68 mmWeight2.5 kg (ODU only)Power SupplyPower Over Ethernet ("Ultra-PoE"/PoE++), consumption 35W	Quality of service (QoS)	802.1p, DiffServ, 8 queues
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	Weight	2.5 kg (ODU only)
Operating temperature -40°C to +55°C	Power supply	Power Over Ethernet ("Ultra-PoE"/PoE++), consumption 35W
	Operating temperature	-40°C to +55°C

#### **About Fastback Networks**

Fastback Networks was founded with a vision to deliver innovative technology for the mobile infrastructure of the future. Fastback solutions enable network operators to expand and enhance services, and private networks to secure, monitor and manage operations via high capacity data connectivity. With insights derived from the collective team's experience building leading edge radio and data networking solutions, Fastback Networks looks at the challenges of 4G/5GLTE deployment with fresh eyes and better ideas, and develops transformational mobile backhaul solutions that enable the acceleration of the mobile future. Fastback Networks is a privately held company funded by Business Growth Fund, Foundation Capital, Granite Ventures, Harmony Partners, Juniper Networks Junos Innovation Fund, and Matrix Partners. More information is available at www.fastbacknetworks.com.

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