

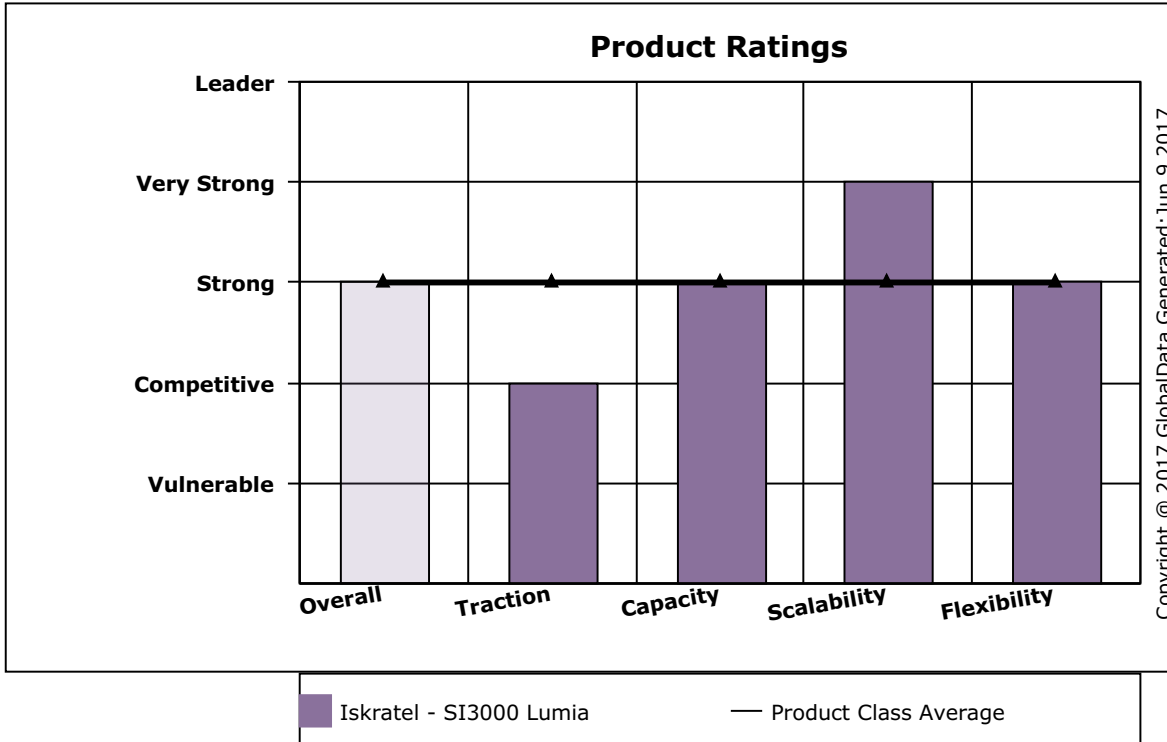
Iskratel - SI3000 Lumia

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April 24, 2017

PRODUCT ASSESSMENT - GPON

SUMMARY



Competitive Strengths

- Iskratel’s SI3000 Lumia supports a solid array of FTTx access technologies, including GPON, Active/P2P Ethernet and VDSL2 (with vectoring), as well as ADSLx and POTS for MSAN configurations.
- The SI3000 Lumia (MEC 20 chassis), when configured as a GPON OLT, supports very competitive port density and subscriber scalability metrics (4,096 subscribers/chassis w/redundant uplinks via 1:32 split ratio).
- Iskratel’s SI3000 Lumia also provides operators with compelling SDN and NFV service support capabilities; in fact, Iskratel asserts first-to-market status with SDN/NFV functionality (Q1 2010).
- The SI3000 Lumia GPON OLT has been deployed by Telekom Slovenije, TCI (telecom operators), Scancom (partner/integrator) and others, highlighting the appeal of the Lumia platform in delivering GPON services to sizeable subscriber bases.
- While Iskratel’s SI3000 Lumia does not support EPON/10G EPON, the company has demonstrated a GPON/DOCSIS proof of concept with Finnish partner Teleste, which debuted in February 2017.

Competitive Weaknesses

- Iskratel's SI3000 Lumia does not support EPON or 10G EPON, and Iskratel has not disclosed its plans for supporting or delivering the next generation of GPON, i.e., XGS-PON or NG-PON2.
- While Iskratel's customer traction is solid in Eastern Europe, compared to many of its rivals in the GPON market, Iskratel lacks a broad and globally diverse customer base.
- Since Iskratel does not report GPON unit or port shipments, there is limited tangible proof of the company's global (or even European) market presence.
- The Iskratel/Teleste GPON/DOCSIS solution is currently a proof of concept, and neither Iskratel nor Teleste has announced when this hybrid solution will be ready for customer deployment.

Current Perspective

STRONG

Iskratel's SI3000 Lumia solution set is strong in the GPON market, thanks to very competitive density and scalability metrics supported by the platform. Specifically, the SI3000 MEC 20 chassis – the largest form factor in the portfolio with 20 subscriber card slots – supports up to 4,096 GPON subscribers in a redundant (dual network uplink) configuration and up to 4,608 GPON subscribers in a non-redundant (single network uplink) configuration. These metrics are achieved via 128 and 144 GPON OLT ports/chassis, respectively, leveraging a 1:32 split ratio. The slightly smaller MEC 18 chassis (18 subscriber slots) also supports solid GPON subscriber port density and scalability metrics, i.e., 4,416 in a non-redundant configuration and 3,584 in a redundant set-up, again via 1:32 split ratio. The SI3000 Lumia also supports a strong array of complementary fixed access networking technologies, including active/point-to-point Ethernet fiber cards, as well as VDSL2 with vectoring and more traditional, legacy MSAN interfaces (ADSLx and POTS). Wrapping up the product and solution set capabilities, Iskratel asserts being first-to-market with SDN and NFV functionality for a fixed access platform, which the company announced in 2010.

In terms of competitive challenges, while the SI3000 Lumia platform provides operators with a strong MSAN foundation that is capable of supporting competitive GPON density and scalability, Iskratel's comparatively limited customer and market traction in the GPON and overall fixed access market means the company must generate more customer momentum to drive further market success. Specifically, Iskratel needs to leverage its core customer base in Eastern Europe to entice operators in other markets to trial and deploy its SI3000 platform. Other proof points of its success can be evidenced by reporting unit and port shipments so Iskratel's market presence can be quantified against rival vendors. Finally, in terms of its product technology, while the SI3000 supports a reasonable array of telco fixed access interfaces, it lacks EPON and 10G EPON support, and Iskratel has not provided guidance on when/if the platform will support the next generations of GPON, specifically, XGS-PON and NG-PON2.

STRENGTHS AND WEAKNESSES

Strengths

- Iskratel's SI3000 Lumia supports a solid array of FTTx access technologies, including GPON, Active/P2P Ethernet and VDSL2 (with vectoring), as well as ADSLx and POTS for MSAN configurations. As such, Iskratel offers operators a very competitive MSAN+GPON OLT proposition, enabling them to support everything from basic POTS and ADSLx services to ultra-broadband services, i.e., via VDSL2 vectoring, which enables

Weaknesses

- Iskratel's SI3000 Lumia does not support EPON or 10G EPON, and Iskratel has not disclosed its plans for supporting or delivering the next generation of GPON, i.e., XGS-PON or NG-PON2. While Iskratel has ventured into the cable market via its GPON/DOCSIS proof of concept with Teleste, addressing the larger cable market opportunity with EPON/10G EPON or CCAP functionality would dramatically broaden Iskratel's potential customer

100 Mbps, and GPON, which can support even higher connectivity speeds (up to 1 Gbps).

- The SI3000 Lumia (MEC 20 chassis), when configured as a GPON OLT, supports very competitive port density and subscriber scalability metrics (4,096 subscribers/chassis w/redundant uplinks via 1:32 split ratio). These metrics are achieved via 128 and 144 GPON OLT ports/chassis, respectively, leveraging a 1:32 split ratio. The slightly smaller MEC 18 chassis (18 subscriber slots) also supports solid GPON subscriber port density and scalability metrics, i.e., 4,416 in a non-redundant configuration and 3,584 in a redundant set-up, again via 1:32 split ratio.

- Iskratel's SI3000 Lumia also provides operators with compelling SDN and NFV service support capabilities; in fact, Iskratel asserts first-to-market status with SDN/NFV functionality (2010). While vendors such as ADTRAN and Calix are now leveraging SDN and NFV as their primary foci for fixed access sales and marketing, Iskratel can point to the fact that it offered SDN and NFV solutions for the fixed networking market as far back as 2010.

- The SI3000 Lumia GPON OLT has been deployed by Telekom Slovenije, TCI (telecom operators), Scancom (partner/integrator) and others, highlighting the appeal of the Lumia platform in delivering GPON services to sizeable subscriber bases. With the latest OLT generation platform (shipping from Q3 2016) alone, these three customers collectively support around 80,000 customers connected to SI3000 Lumia GPON OLT (the number to increase to around 300,000 in a few months), showcasing Iskratel's ability to support true mass-market broadband connectivity.

- While Iskratel's SI3000 Lumia does not support EPON/10G EPON, the company has demonstrated a GPON/DOCSIS proof of concept with Finnish partner Teleste, which debuted in February 2017. The solution combines Iskratel's SI3000 GPON OLT in conjunction with Teleste's DOCSIS-based mini Access Hub (DAH). This solution highlights Iskratel's ability to support ultra-broadband services over a cable (HFC) network, which represents a high-potential new market opportunity for Iskratel.

and market penetration.

- While Iskratel's customer traction is solid in Eastern Europe, compared to many of its rivals in the GPON market, Iskratel lacks a broad and globally diverse customer base. With the solid range of fixed broadband service support capabilities enabled by the SI3000 Lumia platform, Iskratel has 'the goods' to appeal to operators in virtually every geographic region worldwide, but the company's current comparative lack of customer presence means Iskratel must still prove its mettle against rival vendors.

- Since Iskratel does not report GPON unit or port shipments, there is limited tangible proof of the company's global (or even European) market presence. While the top three vendors in the global fixed access market (Huawei, Nokia and ZTE) account for the vast majority of revenues and unit/port shipments (for both GPON and DSL), vendors such as ADTRAN, Calix and FiberHome have been able to win solid, tangible market share, as evidenced by market share proof points (e.g., ADTRAN's ~10% share of global DSL port shipments).

- The Iskratel/Teleste GPON/DOCSIS solution is currently a proof-of-concept, and neither Iskratel nor Teleste has announced when this hybrid solution will be ready for customer deployment. Certainly, this proof of concept shows promise, and can enable cable operators to leverage deeper fiber implementations in combination with their existing HFC 'last mile/last kilometer' installed bases, similar to what telcos are doing with advanced copper access technologies such as G.fast.

Point

- Rivals can point out that Iskratel lacks substantial, tangible market presence and its customer base is limited to Eastern Europe and the former Commonwealth of Independent States (CIS). As such, competitors can assert that Iskratel does not pose a compelling, immediate threat in other global market regions, including Western Europe.

Counterpoint

- Iskratel can counter this claim by highlighting its key customer deployments in markets outside of Eastern Europe, i.e., the Middle East, Central Asia and Latin America, such as telecom operator TCI and end customers of partner/integrator Scancom. Iskratel can also point out that many of its customers in Eastern Europe are leveraging its SI3000 Lumia GPON OLT to deliver mass-market ultra-broadband services (over 100 Mbps per user), to hundreds of thousands of subscribers.

Point

- Rival vendors can also assert that while the SI3000 Lumia platform supports solid telco access technologies including GPON, it lacks support for cable access technologies ranging from EPON/10G EPON to DOCSIS provisioning of EPON (DPoE), as well as the ability to support a converged cable access platform (CCAP) configuration.

Counterpoint

- Iskratel can counter claims about the SI3000's lack of ability to support cable access technologies by citing the partnership with Teleste, where the Lumia GPON OLT is deployed in conjunction with Teleste's DOCSIS Access Hub (DAH) solution, to enable cable operators to deliver fiber-based ultra-broadband services that leverage both FTTH/GPON technology and the operator's existing hybrid fiber-coax (HFC) network.

Buying/Selecting Criteria

CUSTOMER AND MARKET TRACTION

COMPETITIVE

- Iskratel's core customer base consists primarily of telco operators in Eastern Europe, with some limited traction in other global regions (Western Europe, Asia). In total, Iskratel has more than a thousand customers in more than 50 countries worldwide.
- Iskratel's key GPON customers include the following telecom operators and partners/integrators: Telekom Slovenije, Akhali Kselebi, Scancom (partner/integrator), TCI, Rostelecom, Telemach, Interdnestrcom, Telrad Net, Teleserv Argentina (partner/integrator), FibroLAN (partner/integrator), Azernet, ClearTec (partner/integrator), Telefony Podlaskie, Akhteli, Kuuskaista Cooperative, Kazakhtelecom, Vahta and others. These operators provide their residential and business users with services ranging from basic triple-play services to business VPNs and managed apps from the cloud, employing different business models and/or levels of functional separation.

BACKPLANE/SYSTEM THROUGHPUT CAPACITY

STRONG

- The maximum backplane capacity for service blades is 16 slots for 10G service blades x 2 slots for 10G central blades x 4 lanes x 10G = 1.28 Tbps.
- In addition, the two central slots are connected with 8 x 10G = 80 Gbps. In total, maximum backplane capacity is

therefore 1.36 Tbps of bidirectional traffic (i.e., full duplex).

DENSITY/SCALABILITY

VERY STRONG

- The 20-slot SI3000 Lumia chassis (MEC 20) can support 4,096 GPON subscribers when configured with eight-port GPON OLT subscriber cards and a 1:32 split ratio (i.e., 32 subscribers per PON port). These metrics are achieved via 128 and 144 GPON OLT ports/chassis, respectively, leveraging a 1:32 split ratio.
- The 18-slot SI3000 Lumia chassis (MEC 18) supports 4,416 GPON ONTs in a non-redundant configuration (1 network uplink card) and 3,584 in a redundant configuration (dual network uplink cards), again via a 1:32 split ratio.
- The SI3000 Lumia MEC 20 chassis, when configured with Active/P2P Ethernet FTTP interfaces (either Gigabit Ethernet or Fast Ethernet), can support 456 ports in a non-redundant configuration and 432 ports in a redundant configuration.
- The SI3000 Lumia MEC 18 chassis, when configured with Active/P2P Ethernet FTTP interfaces (either Gigabit Ethernet or Fast Ethernet), can support 408 ports in a non-redundant configuration and 384 ports in a redundant configuration.

DEPLOYMENT FLEXIBILITY

STRONG

- Iskratel's SI3000 Lumia solutions can be deployed to support a range of subscriber interfaces, ranging from POTS and ADSLx (MSAN ports) to Active/P2P Ethernet FTTP (Gigabit Ethernet or Fast Ethernet), as well as GPON.
- The SI3000 Lumia is available in three variants of high-capacity chassis (shelves), which are designed for different deployment scenarios/locations in a FTTP network. Specifically, the larger form factor chassis are designed to anchor the GPON network in the telco central office and connect to the smaller, subtended SI3000 Lumia 'building blocks.' The complete range of SI3000 Lumia chassis is composed of the following: the 20-slot shelf (MEC 20); the 18-slot shelf (MEC 18); the 10-slot shelf (MEC 10); the six-slot shelf (MEC 6); and the two-slot shelf (MEC 2U).
- All of Iskratel's SI3000 Lumia (MEC) chassis fit into 2.2 meter-high ETSI racks; all Lumia shelves, with the exception of the MEC 20, also fit into 19-inch racks.
- All of Iskratel's SI3000 Lumia chassis can be mounted into a cabinet of 300mm depth. All of the cabling (copper, fiber) is connected to the front of the chassis (per ETSI standards).
- The SI3000 Lumia platform lacks support for cable access technologies ranging from EPON/10G EPON to DPoE, as well as the ability to support a CCAP configuration.
- Iskratel has not revealed plans to support XGS-PON or NG-PON2, which are the expected next steps forward from the current G.984 GPON specification (based on the ITU-T GPON standards evolution).

ONT RANGE

- Iskratel's Innbox series of ONTs is strong and includes more than two dozen unique CPE, IAD, ONT and home gateway solutions that support not only GPON connectivity, but also an array of complementary access technologies that enable operators to deliver ultra-broadband at the customer premises or business location. Supported technologies include LAN Ethernet (FE and/or GigE), WiFi, 3G/LTE, powerline pass through, VDSL2, ADSLx, FXS, FXO, SIP, USB and PLC-connected WiFi access points.

- Iskratel's Innbox series also features some modular units which can be combined – specifically, snapped together – to deliver GPON ONT plus home gateway functionality, enabling faster installation and lower TCO and OpEx, as well as the ability to upgrade modules as necessary.
- Several Iskratel Innbox FTTH home gateway platforms also support RF modules, enabling support for cable TV services.

Metrics

METRICS	
PON Interface Support	GPON, with XGS-PON and NG-PON2 on roadmap
PON Ports per Chassis	MEC 20: 144/128 (redundant); MEC 18: 138/112 (redundant)
PON Price per Port	Not disclosed
PON Chipset	Not disclosed (except the assertion that the same PON chipset already includes support for XGS-PON and NG-PON2 as well)
Active Ethernet Support	Yes
Network Interfaces	4 x 10 GigE SFP+, 2 x GigE RJ (per network uplink card)
Transport Protocol	Ethernet/IP
Throughput per Slot	Backplane supports 80 Gbps per slot (prepared for next PON generations). Line cards for current GPON generation support 20 Gbps per slot.
Switching/Throughput Capacity	1.36 Tbps (MEC 20)
Chassis Dimensions	MEC 20 (14U): 622 mm H x 500 mm W x 240 mm D (ETSI rack); MEC 18 (14U): 622 mm H x 450 mm W x 270 mm D
Form Factor	Packet OLT (P-OLT) CO chassis with OLTs, ONUs and ONTs in the field
Line Powered	Yes
RF Overlay	Yes
Customers	Telekom Slovenije, Akhali Kselebi, Scancom (partner/integrator), TCI, Rostelecom, Telemach, Interdnestrcom, Telrad Net, Teleserv Argentina (partner/integrator), FibroLAN (partner/integrator), Azernet, ClearTec (partner/integrator), Telcel, Bell

(partner/integrator), Telerony Podlaskie,
Akhteli, Kuuskaista Cooperative, Kazakhtelecom,
Vahta and others

Standards Compliance

ANSI, ETSI

General Availability/FCS

Current-generation SI3000 Lumia GPON OLT
ships from Q3 2016. Earlier OLT generations
were available since 2012.

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