

Nokia Siemens Networks TCSM3i High-Capacity Transcoder Submultiplexer Better Speech Quality at Lower Cost

Nokia Siemens
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The Nokia Siemens Networks TCSM3i, the state-of-the-art Transcoder Submultiplexer offers ever increasing capacity. Highly reliable and with a wide range of functions, it helps minimize transmission costs, as well as offering latest enhancements in voice quality with Wideband Adaptive Multirate Codec (WB AMR).

Nokia Siemens Networks Transcoder Submultiplexer (TCSM3i) converts the 64 kbit/s traffic channels arriving from the Mobile Switching Centre (MSC) into channels of 16 kbit/s sub time slots. It then multiplexes these channels in a ratio of 4:1 to fit into the sub time slots of the transmission line connected to the Base Station Controller (BSC), reducing terrestrial transmission costs.

The TCSM3i offers 44% more capacity than the previous product variant, while maintaining the same compact size. It can also be easily configured from small start-up capacity expandable to meet future capacity needs. This capacity has been arranged to provide over 16,000 channels per cabinet and has been achieved using the latest DSP (Digital Signal Processor) technology.

Cut costs dramatically

More capacity with fewer transcoder cabinets gives you a great opportunity to cut your O&M costs to the bare minimum. Cost savings can be made across your operation, in technical staff, spare part kits, energy consumption and site rentals.

Enhancements have been done also on pool management side to minimize configuration work over time. Known as all-in-one circuit pool, the new method allows one pool to support all the different codecs saving the time and cost of having to reconfigure for different codecs as the traffic pattern changes with time.

Implementation costs can also be cut through the unit's reduced need for physical site space, low power consumption and the lower amount of installation, commissioning and integration work needed.



Cost-effective transmission

Maximum transmission efficiency can be achieved by using submultiplexing between the BSC and the transcoders on the Ater interface link.

Our TCSM3i can be located near the MSC so that fewer transmission links are needed. Locating the BSC as close to the base stations as possible can also save terrestrial transmission costs by concentrating traffic as near as possible to where it is generated. In high-capacity networks there is also the opposite trend of concentrating high-capacity BSC resources to or near core sites. The Transcoder Submultiplexer TCSM3i for combined installation with the Nokia Siemens Networks Flexi Base Station Controller addresses these needs.

Whatever the network architecture and topology is, the TCSM3i and Flexi BSC offer flexible support to different needs and help the operator to minimize the number of BSC sites and BSC/TCSM network elements on their part.

Support for IP transmission

The very latest in transmission efficiency can be reached with native IP; A over IP. Additional options to take full benefit of IP/Ethernet transmission efficiency are enabled by IP/PWE (PCM over IP). Whatever the customer need is, TCSM3i can offer the most cost-efficient transmission solution. These new transmission options can also be introduced to the installed base of the TCSM3i.

Support for optical SDH/SONET transmission

TCSM3i for combined BSC/TCSM installation provides optical A-interface connectivity towards the core network. While in this configuration the maintenance of optical connections is done by BSC, the base TCSM3i product is the same. Optical connectivity is achieved by optional SDH/SONET Exchange Terminals. The TCSM3i can be shared with several BSCs to further enhance the operational efficiency of these products.

Future-proof support

A new concept in codec support means that the TCSM3i has the power to support new codecs, making it future-proof. The TCSM3i also uses same platform as the Flexi BSC, giving proven reliability in the field and cutting the need for spares and training. TCSM3i is thus highly reliable and is also easily expanded and upgraded by simply adding plug-in modules. Software can be downloaded remotely, minimizing operating costs by reducing the need for site visits.

Improved speech quality – the very heart of TCSM3i

Wideband Adaptive Multi Rate (WB AMR) is the latest in speech coding development. It is designed to achieve improvements in speech quality by extending the speech bandwidth. It uses a twice as high sampling rate compared to current voice services in mobile and fixed line telephony. Together with higher sampling frequency, with WB-AMR the transcoding algorithms are also improved.

Furthermore, audio capabilities of handsets e.g. with integrated MP3 players, are well ahead of AMR quality, thus motivating to improve voice transfer capabilities as well. WB-AMR enhances both the low and high end of the audio frequency band providing a clearly warmer and more intimate sound. With clear audible enhancements, MS-to-MS conversations will become more transparent and callers will feel like being closer to each other.

Additionally, the transmission of the finer nuances of the human voice will make communicating more complete. As soon as the end-user has once experienced this quality, he will most likely not be willing to change back to non-WB-AMR anymore if a choice is being offered. With WB-AMR mobile voice calls will be used more frequently and continue longer. WB-AMR will boost wire-line to mobile substitution and provide advantages towards the competition from emerging voice technologies, e.g. VoIP over xDSL.

For dual-mode operators WB-AMR provides also service continuity between WCDMA and GSM and enhances the probability to establish a WB-AMR call. Thus WB-AMR will support the “2G network to complement 3G” strategy of the operator.

A further advance is provided through Acoustic Echo Cancellation (AEC). Nokia Siemens Networks AEC removes acoustic echo in the uplink from the mobile to the base station, solving acoustic echo problems both in mobile station (MS)-to-PSTN and MS-to-MS calls.

Also incorporated is Noise Suppression (NS), to improve the intelligibility of speech in noisy urban environments by improving the signal-to-noise ratio of calls. Nokia Siemens Networks' NS is a state-of-the-art quality solution that provides excellent voice quality by removing background noise, improving users' satisfaction and helping to reduce churn.

Another speech-enhancing feature offered by the TCSM3i is Tandem Free Operation (TFO) of Speech Codecs. TFO aims to improve speech quality in mobile-to-mobile calls by avoiding double transcoding. By using TFO, speech is transported in its compressed form across the network(s), which minimizes the number of transcodings needed.

Support for latest capacity features

The latest in radio network performance software is the unique Nokia Siemens Networks innovation called Orthogonal Sub Channel (OSC). OSC introduces a doubling of the channel capacity; that is, four users sharing the same radio slot via a Double Half Rate (DHR) channel, made possible through unique innovation by Nokia Siemens Networks. This unique radio network capacity booster is supported by TCSM3i.

Main benefits

- High capacity with over 16,000 traffic channels per cabinet
- All-in-one circuit pool concept eliminates reconfiguration
- A over IP option for ultimate transmission efficiency
- Optional support for E1/T1 over IP and SDH/Sonet optical transmission
- Easy and fast capacity extension possibilities
- No need for cabling cabinet
- TCSM3i can serve tens of BSCs
- Compact one-cabinet design
- Very low site space need and power consumption per channel
- Latest technology to support future transcoding requirements
- All enhanced Nokia Siemens Networks voice quality functionalities (AEC, NS, TFO, WB AMR) available
- Built on reliable and field-proven platform
- Cost-effective and fast roll-out with minimal site requirements
- Easy software maintenance with automatic downloading via BSC
- Central supervision and management via BSC3i to Nokia Siemens Networks NetAct™

Technical specification of TCSM3i

Capacity	<p>Maximum capacity: 14,400 ch ETSI / 11,400 ch ANSI</p> <p>Capacity increase in steps of 960 ETSI (760 ANSI) traffic channels</p> <p>TCSM3i connects up to 30 BSCs</p> <p>Maximum capacity of TCSM3i for combined BSC/TCSM installation is 33,600 ch ETSI and 33,320 ANSI</p> <p>Capacity increase in steps of 960 traffic channels</p> <p>TCSM3i combined connects up to 280 BSCs ETSI and up to 70 BSCs ANSI</p> <p>Max. number of PCMs: for A interface 480, for Ater interface 120</p> <p>Submultiplexing 4:1, 2:1, 1:1</p> <p>Submultiplexing of 16 kbit/s TRAU frame channels into 64 kbit/s time slots</p>
Transmission	<p>E1/T1 PCMs</p> <p>E1/T1 over IP (IP/PWE), Gigabit Ethernet</p> <p>IP (A over IP), Gigabit Ethernet</p> <p>TCSM3i for combined BSC3i/TCSM3i installation provides optical SDH/Sonet transmission option for A interfaces</p>
Weights	<p>TCSM3i rack fully loaded approx. 350 kg</p> <p>Floor loading below 500 kg/m²</p> <p>No need for raised floor</p>
Cabinet dimensions Height x width x depth (mm)	2000 x 900 x 600 mm
Power supply	<p>Inputs -48 or -60 V dc</p> <p>Direct floating batteries can be used in both cases</p>
Power consumption	<p>Typical operating power consumption of the TCSM3i in maximum channel configuration is 1.6-2.0 kW depending on the number and type of the external interface units</p>
Environment: Safety Fire resistance Earthquake resistance Environmental requirements EMC specifications Acoustic noise Restriction of Hazardous Substances Product collection and disposal	<p>EN 60950 and UL 60950</p> <p>GR63CORE & TP76200MP</p> <p>ETS 300 019 & GR63CORE</p> <p>ETS 300019-1-3</p> <p>EN 300386-2 & FCC part 15</p> <p>ETS 300 753 & GR63CORE</p> <p>EU 2002/95/EC (RoHS)</p> <p>EU 2002/96/EC (WEEE)</p>

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