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54 Haninge (SE). VERRI, Bertil [SE/SE]; Murslevsgränd 1, S-137 38 Västerhaninge (SE). ARKNER, Tommy [SE/SE]; Musserongången 29, S-135 34 Tyresö (SE).

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(74) Agent: SVENSSON, Peder; Telia Research AB, Vitsands- gatan 9, S-123 86 Farsta (SE).

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(71) Applicant (for all designated States except US): TELIA AB (publ) [SE/SE]; Mårbackagatan 11, S-123 86 Farsta (SE).

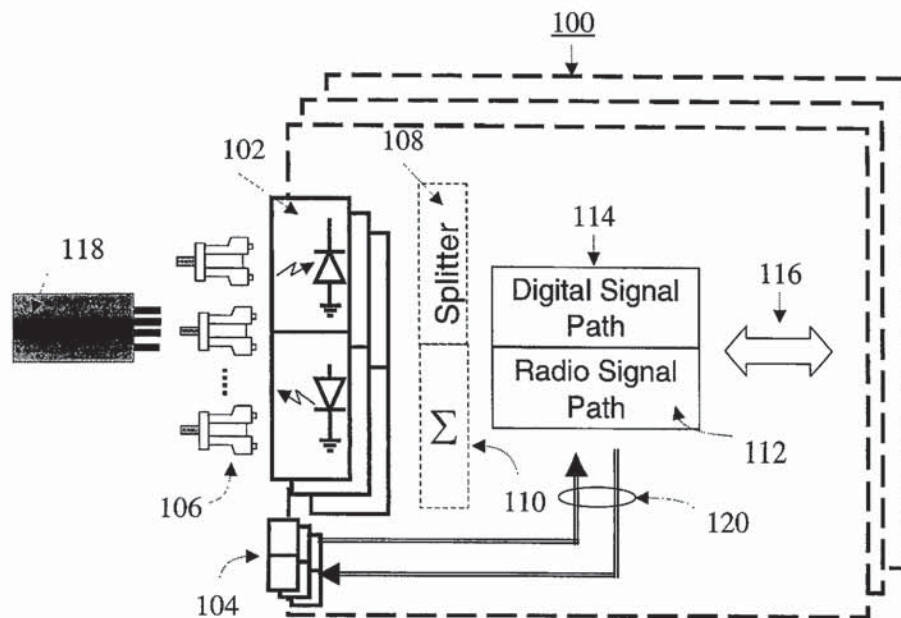
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(72) Inventors; and

(75) Inventors/Applicants (for US only): SCHUH, Ralf [SE/SE]; Stora Råby Byaväg 23, S-224 78 Lund (SE). SUNDBERG, Erland [SE/SE]; Höglundavägen 15, S-136

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(54) Title: AN INTERFACE FOR LOCAL AREA NETWORKS



(57) Abstract: An integrated digital and analogue Radio Frequency (RF) interface (100) for transmitting combined digital and analogue RF signals over fibre based Local Area Networks (LAN). The RF signals are fed/received to/from optical transceiver(s) (102) over a separate electrical RF port (104). The digital and analogue RF signals are distributed over fibre cable (118). The architecture itself is transparent to the transmission of RF signals. The interface is integrated within LAN equipment, e.g. Ethernet or FDDI switch, and allows the distribution of the signals to different buildings or locations within a building.

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AN INTERFACE FOR LOCAL AREA NETWORKS

FIELD OF THE INVENTION

The present invention relates in general to distribution of
5 radio signals between terminals and Base Stations, BSSs, via
Local Area Networks, LAN, more particular to an interface
that can handle combined digital and analogue Radio
Frequency, RF, signals for transmission over fibre based
LANs.

10

BACKGROUND

Passive and active Distributed Antenna Systems (DAS) using
coax or optical fibre are currently often used for Global
System for Mobile communications (GSM) indoor coverage.
15 These DASs are using a separate fibre - coax architecture
to the e.g. digital Local Area Network (LAN) architecture.
Multiple infrastructures are adding up in the price and
increase the operation and maintenance cost.

20 GSM-on-the-Net uses the existing LAN architecture by
connecting pico base stations to the LAN. The radio signal
is distributed digitally in such a radio LAN architecture.
For GSM-on-the-Net a special gateway is needed in order to
ensure security from the intranet to the public network.

25 The number of transceiver units in a pico base station is
currently limited to a maximum of two transceivers.
Moreover, GSM-on-the-Net cannot make use of trunking
efficiency.

30 In buildings there are often many different cabling systems
deployed, for supporting different applications:

- For LANs, Ethernet and Fibre Distributed DATA Interface
(FDDI) the dominant digital transmission standards are
IEEE 803.3 Gigabit Ethernet Standard and ANSI X3T12
35 FDDI Standard which are defined for Category 5 cable,
copper twisted pair, CAT5, fibre and coax cabling.

antennas.

In the European patent application EP 792 048, "Point-
routeur multiprotocoles pour réseaux industriels",

5 inventor J Alexandre, is described a system for
transmitting signals having different protocols on the same
optical fibre. One embodiment can distribute analogue and
digital signals, modulated on different bearer waves on the
same optical fibre.

10

SUMMARY OF THE INVENTION

The present invention relates to a common digital and radio
signals distribution architecture using standard Local Area
Network (LAN) architecture and equipment for distributing
15 the radio signals to remote antennas.

The present invention is using a common interface for the
digital and radio signal distribution. This interface can
solve multiple infrastructure problems by distributing
20 radio signals (e.g. GSM, UMTS) between a Base Transceiver
station (BTS) and its remote antennas over the fibre based
LAN infrastructure. The interface is integrated in the LAN
equipments (e.g. Ethernet switch or Ethernet coax to fibre
media converter). Fibre in general offers a huge bandwidth
25 and can accommodate both the digital and radio signal
transmission.

The present invention uses an integrated digital and
analogue Radio Frequency (RF) interface for transmitting
30 combined digital and analogue RF signals over fibre based
LANs. The RF signals are fed/received to/from optical
transceiver(s) over a separate electrical RF port. The
digital and analogue RF signals are distributed over the
fibre-cable LAN architecture. Radio cell architecture can
35 be built-up by connecting antennas to the electrical RF
ports at the LAN equipment. The architecture itself is

transparent to the transmission of RF signals.

The present invention uses existing LAN architecture (cabling and devices), which enables low cost radio signal
5 distribution e.g. for Distributed Antenna Systems (DASs) in buildings. The digital and radio signals are separated in the frequency domain or can be separated in the space domain by using different transceiver units in the LAN equipment or fibres in the cable. The present invention is
10 a Distribution of Radio Signals using Local Area Network Infrastructure (DoRSuLANI) here called the interface.

One advantage by using this interface is that no gateways to the public network is needed, e.g. if compared with GSM-
15 on-the-Net, because the radio and digital signals can be separated in the frequency domain or in the space domain by using different transceiver units in the LAN equipment. The interface can also make use of trunking efficiency as the Base Station (BS) can be centralized.

20

Multiple infrastructures with separate cabling and access points, e.g. fibre based LAN and passive coax DAS, are not needed. The invention allows a single cabling infrastructure with common access points.

25

The invention allows reduced installation, deployment and operation and maintenance (OAM) costs. The LAN can be public or private.

30 BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in
35 connection with the accompanying drawings, wherein:
Figure 1 shows an overview of the interface,

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