

G3x Series

Fixed Wireless Terminals for GSM/EDGE Mobile Networks

Technical Product Description



The product description for the Fixed Wireless Access Terminals G3x Series offers a complete description of the product from a hardware and software perspective. Applications such as fixed line replacement and PBX Least Cost Routing for businesses are also briefly described.

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1 G3x Series Overview

The Fixed Wireless Access is a cost efficient solution for providing fixed voice, data and fax services to areas with no fixed infrastructure in a cost efficient way utilizing an existing GSM infrastructure.

Data connectivity is provided either through circuit switched or packet switched GPRS/EDGE technology, offering an ideal solution for Internet access.

Additionally the terminal can be connected to a PBX for LCR of outgoing mobile calls enabling increased traffic for the operator and cost savings for businesses.

The G3x fixed wireless terminal series has the following main characteristics:

- Four GSM bands available in two different models 850/1900 & 900/1800
- EDGE Multislot class 10 (4+1) alt (3+2) or GPRS Multislot class 10 (4+1) alt (3+2) packet switched data transmission, comparable to PSTN modem connections with “always-on” connectivity??
- Circuit switched data 9600 bps
- GSM V.42bis data compression
- Integrated V.90 analog modem
- Single Telephony line interface with standard connection for voice, fax and modem that can facilitate up to 3 devices in parallel, though only 1 device can be used at a time.
- Fax and data transmission using USB connection
- The terminal can be powered from AC mains, DC power source or an internal battery
- Integrated design for high quality and performance
- PBX connectivity via analog trunk
- Remote Management capability

The G3x fixed wireless terminal series consist of the following models:

- G30 – For voice only
- G31 – For data only
- G32 – Voice, data and fax
- G35 – For PBXs and least cost routing
- G35 – For PBXs, least cost routing, data and fax

2 Features

	G30	G31	G32	G35	G36
Voice	Yes	-	Yes	Yes	Yes
Data	-	Yes	Yes	-	Yes
SMS	-	Yes	Yes	-	Yes
Fax	-	PC fax	Yes	-	Yes
PBX	-	-	-	Yes	Yes
GSM suppl. services	Yes	-	Yes	Yes	Yes
Voice mail alert	Yes	-	Yes	Yes	Yes
Phone Book	Yes	-	Yes	Yes	Yes
Pre-paid services	Yes	Yes	Yes	Yes	Yes
Operator Name	Yes	-	Yes	Yes	Yes
Terminal administration	DTMF	-	DTMF	DTMF	DTMF
	AT comm.	AT comm.	AT comm.	AT comm.	AT comm.
	-	Web I/F	Web I/F	-	Web I/F
Remote Management	Yes	Yes	Yes	Yes	Yes

The table above is a summary of what features are available in each terminal. The features are described below.

2.1 Voice

Standard voice service is provided by the RJ-11 connector by using a standard analogue phone.

2.2 Data

Data connectivity is provided via the RJ-11 connector or the USB connector.

Please note that the maximum transmission speed using the 2 wire line RJ-11 connector is limited by the V.90 analog modem in the PC, normally 56 kbps.

2.3 SMS

The Terminal can send SMS:s by connecting a PC to the USB port. The PC needs to have a 3rd party application.

2.4 Fax

The data capable models of the Terminal can send faxes either through the 2-wire interface or by connecting a PC to the USB port. The PC needs to have a 3rd party application.

2.5 PBX

This feature allows connection to a PBX. It supports polarity reversal (only on G35 and G36) and loop-break.

2.6 GSM Supplementary Services

The Terminal supports GSM supplementary services, in order to use the services; the operator network must support them. Offered supplementary services can only be used with a DTMF telephone connected to the Terminal.

- Call Waiting
- Call Divert (Forward)
- Call Barring
- Call Hold
- Call Transfer
- Multiparty call
- Dual numbering

The Terminal can handle alternate line service handle (2 voice lines) with a dual number SIM card. Alternative service handling can be managed from the telephone connected to the Terminal. You will receive all the incoming calls addressed to any of your numbers independently of the selected line but your outgoing calls will be charged to the line that you have selected (1 or 2)

2.7 Voice Mail alert

The answering service of the GSM network (operator dependant) allows callers to leave a voice message when you cannot answer your calls. The Terminal gives a special acoustic indication to indicate the presence of voice mail.

2.8 Phone Book

Telephone numbers can be stored for abbreviated dialing in either the SIM card memory or the Terminal memory (up to 99 numbers in each).

2.9 Pre-paid services

The operator can offer the Terminal together with a pre-paid GSM service, which is usually not supported by fixed networks.

2.10 Operator Name

An operator's name can be stored in the Terminal so that it is visualized on the external display instead of the current GSM network operator name.

2.11 Terminal Administration

Configuration parameters in the terminal can be changed, e.g. ring tones and volume. This can be done with DTMF signaling via the RJ-11 connector, AT commands via the USB connector or by using the built in web GUI.

2.12 Remote Management

The terminal can be remotely managed by sending and receiving SMS:s with the Over-The-Air (OTA) interface.

3 Technical Specifications

3.1 GSM Air Interface

Frequency Bands	GSM 850 EGSM 900 GSM 1800 GSM 1900
Speech Codecs	FR EFR HR AMR
Data transmission	EDGE Multislot class 10 (4+1) or (3+2) GPRS Multislot class 10 (4+1) or (3+2) V.42bis data compression

3.1.1 Frequency bands

The Terminal model shall be selected depending on which GSM band is available at the location of use. This is an advantage for operators that offer a multiple GSM band service. Support of EGSM is beneficial for operators that have optimized their networks for EGSM, which requires the use of EGSM compatible terminals.

Frequency ranges	<u>GSM 850:</u> TX 824 – 849 MHz RX 869 – 915 MHz <u>EGSM 900:</u> TX 890 – 915 MHz RX 935 – 960 MHz <u>GSM 1800:</u> TX 1710 – 1785 MHz RX 1805 – 1880 MHz <u>GSM 1900:</u> TX 1850 – 1910 MHz RX 1930 – 1990 MHz
Maximum RF Power Output Sensitivity	GSM 850 – 2 Watts (33 dBm), Power class 4 EGSM 900 – 2 Watts (33 dBm), Power class 4 GSM 1800 – 1 Watt (30 dBm), Power class 1 GSM 1900 – 1 Watt (30 dBm), Power class 1
Channel Spacing	200 KHz
Modulation	8-PSK/GMSK

3.1.2 Speech Codecs

The Terminal supports the common speech codecs available in GSM networks. FR, EFR, HR and AMR capabilities must be provided both by the network and the terminal in order to work.

- FR – Standard voice codec used in GSM.
- EFR – Offers improved speech quality utilizing the same bandwidth as FR.
- HR – Offers lower speech quality than FR but has the advantage of only using half the bandwidth, thus enabling twice the capacity in the network.
- AMR – Offers an adaptable rate for optimal speech quality, bandwidth utilization and power consumption.

3.1.3 Data Transmission on the GSM Air Interface

The Terminal offers both circuit switched and packet switched means of data transmission. CSD and GPRS/EDGE capabilities must be provided both by the network and the terminal in order to work

Additionally data transmission rates can be increased with the use of data compression. With use of V.42bis data compression, data transmission rates can be multiplied by a factor up to 4. This factor varies due to the compression of the data to be transmitted, e.g. data on Internet www pages are often already compressed.

3.1.3.1 EDGE

General	<p><u>Class B:</u> The Terminal can use GSM and EDGE/GPRS services; only one at a time. The user can receive or make calls/SMS while in the middle of a data session; the data session is simply paused and then automatically resumed after the call/SMS session has ended.</p> <p><u>Multislot class 10:</u> 4+1: 4 downlink (236.8 kbps) 1 uplink (59.2 kbps)</p> <p>or</p> <p>3+2: 3 downlink (177.6 kbps) 2 uplink (118.4 kbps)</p>
Coding Schemes	<p>MCS-1: 8.4 kbps MCS-2: 11.2 kbps MCS-3: 14.8 kbps MCS-4: 17.6 kbps MCS-5: 22.4 kbps MCS-6: 29.6 kbps MCS-7: 44.8 kbps MCS-8: 54.4 kbps MCS-9: 59.2 kbps</p>
PDP Contexts	5 Analog and 5 digital PDP contexts can be defined
Access	Analog RJ11 telephone line

methods	Digital USB connector
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3.1.3.2 GPRS

General	<p><u>Class B:</u> The Terminal can use GSM and GPRS services; only one at a time. The user can receive or make calls/SMS while in the middle of a data session; the data session is simply paused and then automatically resumed after the call/SMS session has ended.</p> <p><u>Multislot class 10:</u> 4+1: 4 downlink (maximum 86.20 kbps) 1 uplink (maximum 21.55 kbps) or 3+2: 3 downlink (maximum 64.65 kbps) 2 uplink (maximum 43.10 kbps)</p>
Coding Schemes	<p>CS-1: 9.05 kbps CS-2: 13.55 kbps CS-3: 15.75 kbps CS-4: 21.55 kbps</p>
PDP Context	5 Analog and 5 digital PDP contexts can be defined
Access Methods	<p>Analog RJ11 telephone line Digital USB connector</p>

3.1.3.3 CSD

Channel Coding	9.6 kbps
Access Methods	<p>Analog RJ11 telephone line Digital USB connector</p>

3.1.3.4 V.24bis

Data Compression	4 times compression, depending on the application
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3.2 Telephone Interface

Maximum cable length	600m for a line characteristics of 600 ohm and 50nF/km. 200m for the worst transmission line characteristics considered as 450 ohm and 50nF/km.
Analog telephone	Pulse and tone (DTMF) dialing are supported
CLI display	ETSI DTMF, ETSI V.23 FSK and Bellcore FSK
Line Impedance	600 ohm (default) or 900 ohm

Loop current	25 mA (off-hook)
Open loop voltage	48 V (off-hook)
Loop resistance	< 900 ohm (off-hook)
Ringing voltage	50 Vms
Ring load	3 REN; up to 3 telephone devices in parallel
Analog fax	G3 Fax transmission 2.4, 4.8, 7.2 and 9.6 kbps
Analog modem	V.90, V.34, V.32bis, V.32, V.22bis, V.22, V.23, V.21, Bell 212A & 103 Automatic fallback supported
PBX	<u>Analog Trunk:</u> Call control Tip-Ring signaling Polarity reversal and loop-break (<i>Polarity reversal for Voice only!</i>)

3.3 USB Interface

When the Terminal is connected with the USB interface it can provide SMS, fax and data services. The Terminal acts as a standard modem for data transmission using a Windows PC, and will be handled as any other dial-up connection by Windows. To send/receive SMS or fax via the Terminal a 3rd party application is required.

USB version	USB 1.1
USB connector	Mini USB
Pin configuration	1 VBus 2 D- 3 D+ 4 GND - Shield
Maximum cable length	Maximum cable length is 5 m
Modem support	AT modem V.25ter command set supported
SMS	All applicable GSM 7.05 AT commands
Data services	All applicable GSM 7.07 AT commands
PC Fax	G3 Class 1 and Class 2 Fax transmission 9.6, 7.2, 4.8 and 2.4 kbps

3.4 Power Input

Power Connector	Input: 7.5 Vdc ± 0.4V; 0.8 A
Battery Connector	Pin configuration: - type 1 0 + GROUND

3.5 Connectors

GSM Antenna	SMA plug female Nominal impedance: 50 ohm
Telephone Interface (a/b 2- wire line)	RJ11 connector, 6/4 (4C6P) modular socket
USB Interface	4 pin mini-USB connector.
SIM card	Small plug-in card, 1.8V or 3V type
Power Connector	Type: EIAJ RC-5320A class 4 male
Battery Connector	3 pin connector located in the battery compartment. JST - JST- BM05B-XASS-TF
System interface connector	Ericsson proprietary

For technical specifications on each connector interface, please see specifications below.



Bottom view of a voice and data capable model showing the various connectors

3.6 LED indicators

Power LED	A dual color LED indicates source of power. Green: Power feeding via the power connector Red: Running on the internal battery
Radio LED	Green LED indicates the GSM radio signal strength

3.7 Physical Data

Dimensions	148 x 165 x 45 mm (H x W x D)
Weight	310 g
Temperature Range	Operation: -10 °C to +55 °C Storage: -40 °C to +85 °C
Humidity Range	Operation: 20 to 75 % Storage: 5 to 95 %

4 Product Approvals

4.1 EMC Emission & Immunity

R&TTE Directive 1999/5/EC: EN 301 489-1 V1.4.1 (2002-08) according to the specific conditions detailed in EN 301 489-7 V1.2.1 (2002-08)

FCC CFR47: Part 22 Public Mobile Services and Part 24 Personal Communications Services

FCC CFR47: Part 15 subpart B Clause 15.107 Conducted Emissions and 15.109 Radiated Emissions

Industry Canada Regulations RSS-Gen, RSS-132, RSS-133

PTCRB: 3GPP TS 51.010, Test Cases 12.2.1 and 12.2.2

4.2 Safety

IEC 60950-1:2001

EN 60950-1:2001

CB/CCA scheme

UL 60950-1

CAN/CSA-C22.2 No 6095-1-03

4.3 Transmission and Signaling

PTCRB – NAPRD.03 v3.6.1

3GPP TS51.010-1 V7.2.0 (GCF-CC 3.21.1)

ETSI EN 301 511


5 Standard Product Kit

A Standard Product Kit includes:

- G3x terminal
- Antenna, 168 mm
- AC/DC power supply and power cable
- Telephone cable, 5 meters (not in G31)
- USB cable, 5 meters (not in G30, G35)
- Battery cable
- USB driver (not in G30, G35)
- Wall Bracket and mounting kit
- User guide (EN)
- Quick guide (multilingual, EN, FR,SP)
- Basic Technical Support

6 Accessories


6.1 DC/DC Power Converter (optional)

Converter Type	DC/DC converter useful when the Terminal needs to be powered from a DC source, such as a solar panel or a car/truck battery. 
Input Characteristics	10 – 32 VDC (usually 12 – 24 VDC)
Output Characteristics	7.5 Vdc ± 0.4V; 0.8 A
Input connector	Car lighter type

6.2 Battery (optional)

The Fixed Wireless Terminals G3x series can be fitted with batteries to provide redundancy in case of an AC Mains power failure. This is facilitated within the Terminal unit. Additionally there is an internal battery charger that can recharge a Lead-Acid battery.

Battery Type	Lead-Acid battery
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<p>Battery Characteristics</p>	<p>6 V, 1.2 Ah Autonomy: 13.5 h standby and 2.5 h talk-time (at 25 °C) Rechargeable by Terminal. Includes a battery cable.</p>

6.3 USB cable (model dependant)

The USB cable is delivered as a standard for G31, G32 and G36. It is used to connect a PC to the terminal. The USB cable is needed to achieve the maximum EDGE speed the network can support.

6.4 Anti-Theft Lock (optional)

An anti-theft lock is available as an accessory. This secures the Terminal unit against the wall bracket, thus preventing physical removing of the Terminal without using the Anti-theft key.

6.5 Anti-Theft Key

The anti-theft key is used to unlock the terminal from the wall bracket when the anti-theft lock has been used. All locks can be unlocked with the same key, i.e. one key fits all anti-theft locks.

6.6 Remote Management Interface, RMI (optional)


The terminal can be configured to accept remote configuration via OTA. In a standard unit this feature is not activated.

7 Spare Parts

7.1 Standard Antenna

Standard Antenna	168 mm antenna with 2 dBi gain attached directly on top of the terminal. Two models available, 850/1900 MHz or 900/1800 MHz
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7.2 AC/DC Power Supply

Type	AC/DC adapter for normal terminal mains power feed. 
Input Characteristics	100-240 VAC, 40-70 Hz 2 pole AC inlet connector (IEC 320-C8 power inlet)
Output Characteristics	7.5 Vdc \pm 0.4V; 1,4 A
Available plugs	EU, UK, US, and AU

7.3 Power Cables

Power cables for EU, US, UK and Australia are available as spare parts

7.4 Battery Cable

For connection between the main unit and the lead-acid battery.

7.5 Wall Bracket

All units are delivered with a wall bracket for mounting on walls.

8 Security

The basic security feature of the Terminal is the same as any GSM phone, using a four-digit PIN code that comes with the subscription SIM card. The PIN code is simply entered via a telephone or PC that is connected to the terminal. To simplify usage, the Terminal has an auto PIN feature that requires the PIN code only to be entered the first time the Terminal is powered on or upon changing the SIM card. Auto PIN will be in operation even in the event of a power failure.

Additionally the Terminal provides security features that prevent unauthorized use of the SIM card and the Terminal, which can be customized if required.

8.1 SIM-Lock

This feature controls the Terminal's network access, based on whether the Terminal matches the SIM card and fulfills one or more of the following criteria:

- Mobile Country Code (MCC)
- Mobile Network Code (MNC)
- Additional Mobile Network Code (MNC+)
- Mobile Sub-net Code (IMSI digits 6 and 7)

8.2 PIN-Lock

This feature locks the SIM card to the Terminal by changing the PIN code to a random value. As a result, the SIM card cannot be used in another terminal unless the PUK code is known.

This is especially useful with the fixed line replacement application, where the tariff that applies may not be that of the GSM network but rather the fixed network.

8.3 FWT-Lock

This feature locks the Terminal completely, preventing the establishment of calls and data connections. Emergency calls can however be placed.

8.4 Cell-Lock

This feature will lock the terminal to a cell or a group of surrounding cells, so that no calls can be made or received if the terminal is outside the group of allowed cells.

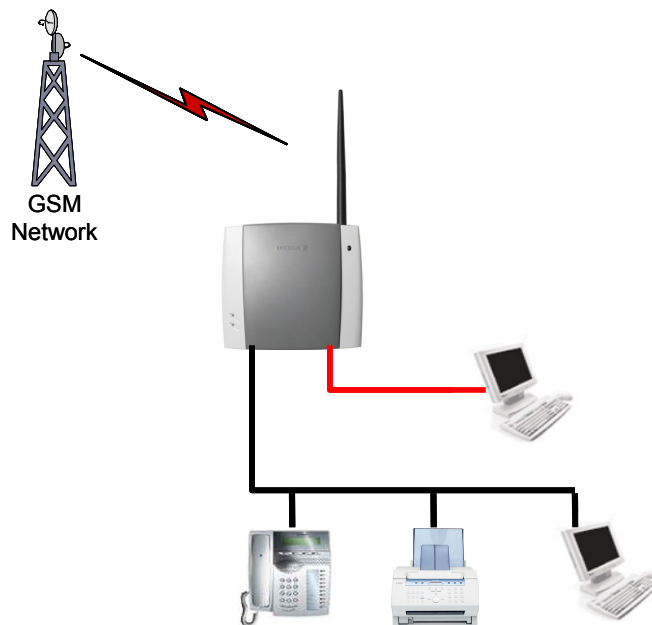
9 Applications

9.1 Fixed Line Alternative or Replacement

With the Terminal an operator can deliver fixed voice, fax, and data service to areas with limited or no fixed infrastructure utilizing existing GSM infrastructure. This fast and economical way in providing fixed services has a clear advantage over using traditional fixed cabling which is expensive and very time-consuming to deploy.

Other benefits are a new range of services that can be offered, which does not exist in traditional fixed networks such as SMS and Pre-paid services.

The whole solution opens up a vast range of possibilities for an operator to bundle services, offering a complete voice and data service to the end user without the need of any additional equipment.



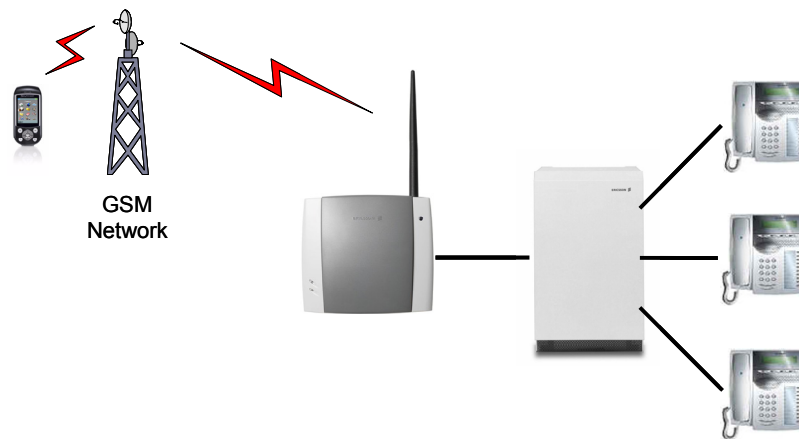
9.2 PBX Least Cost Routing

The Terminal is the ideal solution to deliver substantial cost savings for businesses with high mobile traffic originating from a PBX. The mobile operator will also benefit by increased traffic in the network.

Connecting the Terminal to the PBX, programming LCR in the PBX enables all outgoing calls to mobile phones to be routed through the Terminal. The outgoing calls from the PBX to mobile phones will then be mobile-to-mobile rather than fixed-to-mobile, which is how the cost saving is made.

An additional benefit is redundancy in case of a network failure emergency calls can be routed either through the mobile or fixed network.

The Terminal connection to the PBX is made via an analog trunk.



Terminal connected to a PBX with analog trunk

9.3 Mobile Broadband

Mobile Broadband provides broadband services to stationary and moving users, indoor or outdoor, nationwide with roaming across borders. The terminal has a central role in such an offering when mobility is needed on a workplace level. Examples are temporary offices in both public and private sectors such as small home offices, construction sites, trade shows, sporting events, emergency sites etc.

The mobile office will get access to broadband services by connecting the local infrastructure to the data port on the terminal.

10 Acronyms

3GPP	3 rd Generation Partnership Project
8-PSK	8-Phase Shift Keying
AMR	Adaptive Multi Rate
CLI	Calling Line Identification
DL	Downlink
DTMF	Dual Tone Multi Frequency
EDGE	Enhanced Data Rates for Global Evolution
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
ETSI	European Telecommunications Standards Institute
FR	Full Rate
FSK	Frequency Shift Keying data Transmit
G3	Group 3 (Fax protocol)
GMSK	Gaussian Minimum Shift Keying data Transmit
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
HR	Half Rate
HSCSD	High Speed Circuit Switched Data
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Data Network
ITU	International Telecommunication Union
LED	Light Emitting Diode
LCR	Least Cost Routing
OTA	Over The Air
PBX	Private Branch Exchange
PDP	Packet Data Protocol
PIN	Personal Identity Number
PS	Packet Switched
PSTN	Public Switched Telephony Network
PUK	Personal Unblocking Key
SIM	Subscriber Identity Module
SMS	Short Messaging Service
UL	Uplink
USB	Universal Serial Bus