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GWM300

Hardware Interface Overview

Version: 01
DocId: GWM300_HIO_v01
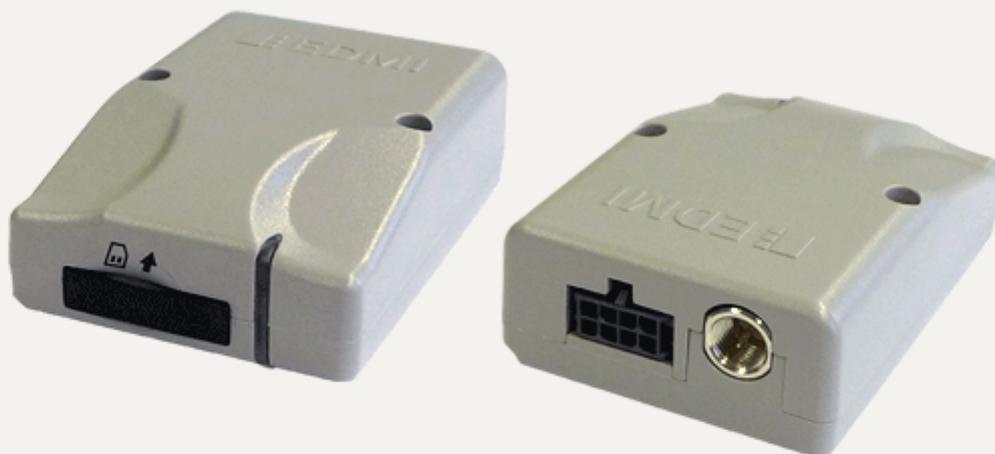
Document Name:	**GWM300 Hardware Interface Overview**
Version:	**01**
Date:	**2016-01-26**
DocId:	**GWM300_HIO_v01**
Status	**Confidential / Released**

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0 Document History

New document: "Cinterion® GWM300 Hardware Interface Overview" Version 01

Chapter	What is new
--	Initial document setup.

1   Introduction

This document[1] describes the hardware of the GWM300. The GWM300 contains a Cinterion®
EHS6 module, and has an RS-232 compatible interface with an 8-pin Molex Microfit connector,
including power supply, and an RF antenna connector.

The scope of this document includes interface specifications, electrical as well as mechanical
characteristics of the GWM300. It specifies standards pertaining to wireless applications and
outlines requirements that must be adhered to for successful product design.

The GWM300 is a compact GSM/UMTS modem to transfer data to/from other devices, such
as smart meter, to the mobile network. It is easy to use the GWM300 as a GSM/GPRS/UMTS
terminal. The GWM300 has an industrial standard serial interface that can be used to transfer
data to/from the connected device. The connected device can also send AT commands via this
serial interface, to control GWM300. The GWM300 supports quad band GSM and five band
UMTS. It has an integrated SIM card reader supporting 1.8V and 3V SIM cards.

GWM300 is not intended for use in vehicular environments.

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1. The document is effective only if listed in the appropriate Release Notes as part of the technical docu-
    mentation delivered with your Gemalto M2M product.

1.1 Related Documents

[1] AT Command Set for the Cinterion® EHS6 module
[2] Release Notes for the Cinterion® EHS6 module

To visit the Gemalto M2M GmbH Website please use the following link:
http://m2m.gemalto.com

1.2 Terms and Abbreviations

Table 1: Terms and abbreviations

Abbreviation	Description
ACMA	Australian Communications and Media Authority
ARP	Antenna Reference Point
ATC	AT Command
BTS	Base Transceiver Station
CB	Cell Broadcast
CE	Communauté Européenne (originally)
CODEC	Coder-Decoder
DAI	Digital Audio Interface
DCE	Data Circuit terminating Equipment
DSR	Data Set Ready
DTR	Data Terminal Ready
EFR	Enhanced Full Rate
EGSM	Enhanced GSM
EMC	Electromagnetic Compatibility
ESD	Electrostatic Discharge
ETS	European Telecommunication Standard
FDMA	Frequency Division Multiple Access
G.C.F.	GSM Conformity Forum
GSM	Global Standard for Mobile Communication
HW	Hardware
IC	Integrated Circuit
IF	Intermediate Frequency
IMEI	International Mobile Equipment Identifier
I/O	Input/ Output
IGT	Ignition
ISO	International Standards Organization

Table 1: Terms and abbreviations

Abbreviation	Description
ITU	International Telecommunications Union
kbps	kbits per second
LVD	Low voltage Directive
Mbps	Mbits per second
MMI	Machine Machine Interface
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NC	Not Connected
PA	Power Amplifier
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PCS	Personal Communication System
PD	Power Down
PDU	Protocol Data Unit
R&TTE	Radio and Telecommunication Terminal Equipment
RF	Radio frequency
RI	Ring Indication
RX	Receive direction
SIM	Subscriber Identification Module
SMS	Short Message Service
SW	Software
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TX	Transmit direction
UART	Universal Asynchronous Receiver and Transmitter

1.3 Regulatory and Type Approval Information

1.3.1 Directives and Standards

EHS6 has been designed to comply with the directives and standards listed below.

Table 2: Directives

99/05/EC	Directive of the European Parliament and of the council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (in short referred to as R&TTE Directive 1999/5/EC). The product is labeled with the CE conformity mark - see Section 5.3.
2002/95/EC (RoHS 1) 2011/65/EC (RoHS 2)	Directive of the European Parliament and of the Council of 27 January 2003 (and revised on 8 June 2011) on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
2002/96/EC	Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE)
2003/108/EC	Directive of the European Parliament and of the Council of 8 December 2003 amending directive 2002/96/ec on waste electrical and electronic equipment (WEEE)

Table 3: Standards of North American type approval

CFR Title 47	"Code of Federal Regulations, Part 15 B, Part 22 and Part 24 (Telecommunications, PCS)"; US Equipment Authorization FCC
OET Bulletin 65 (Edition 97-01)	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
UL 60 950-1	Product Safety Certification (Safety requirements)
NAPRD.03 V5.15	"Overview of PCS Type certification review board Mobile Equipment Type Certification and IMEI control" PCS Type Certification Review board (PTCRB)
RSS102 (Issue 4) RSS132 (Issue 3) RSS133 (Issue 6)	Canadian Standard
IEEE Std. C95.1-1999	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz

Table 4: Standards of European type approval

3GPP TS 51.010-1	"Digital cellular telecommunications system (Phase 2); Mobile Station (MS) conformance specification"
ETSI EN 301 511 V9.0.2	Candidate Harmonized European Standard (Telecommunications series) Global System for Mobile communications (GSM); Harmonized standard for mobile stations in the GSM 900 and DCS 1800 bands covering essential requirements under article 3.2 of the R&TTE directive (1999/5/EC) (GSM 13.11 version 7.0.1 Release 1998)
GCF-CC V3.49	Global Certification Forum - Certification Criteria

Table 4: Standards of European type approval

ETSI EN 301 489-1 V1.9.2	Candidate Harmonized European Standard (Telecommunications series) Electro Magnetic Compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common Technical Requirements
ETSI EN 301 489-7 V1.3.1	Candidate Harmonized European Standard (Telecommunications series) Electro Magnetic Compatibility and Radio spectrum Matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services; Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)
ETSI EN 301 489-24 V1.5.1	Electromagnetic Compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 24: Specific conditions for IMT-2000 CDMA Direct Spread (UTRA) for Mobile and portable (UE) radio and ancillary equipment
ETSI EN 301 908-01 V5.2.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third Generation cellular networks; Part 1: Harmonized EN for IMT-2000, introduction and common requirements of article 3.2 of the R&TTE Directive
ETSI EN 301 908-02 V5.2.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS) and User Equipment (UE) for IMT-2000 Third Generation cellular networks; Part 2: Harmonized EN for IMT-2000, CDMA Direct Spread (UTRA FDD) (UE) covering essential requirements of article 3.2 of the R&TTE Directive
EN 62311-2008	Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)
EN 60950-1 (2006)+ A11:2009+A1:2010+ AC:2011+A12:2011	Safety of information technology equipment

Table 5: Requirements of quality

IEC 60068	Environmental testing
DIN EN 60529	IP codes

Table 6: Standards of the Ministry of Information Industry of the People's Republic of China

SJ/T 11363-2006	"Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products" (2006-06).
SJ/T 11364-2006	"Marking for Control of Pollution Caused by Electronic Information Products" (2006-06). According to the "Chinese Administration on the Control of Pollution caused by Electronic Information Products" (ACPEIP) the EPUP, i.e., Environmental Protection Use Period, of this product is 20 years as per the symbol shown here, unless otherwise marked. The EPUP is valid only as long as the product is operated within the operating limits described in the Hardware Interface Description. Please see Table 1.3.2 for an overview of toxic or hazardous substances or elements that might be contained in product parts in concentrations above the limits defined by SJ/T 11363-2006.

Table 7: Toxic or hazardous substances or elements with defined concentration limits

部件名称 Name of the part	有毒有害物质或元素 Hazardous substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
金属部件 (Metal Parts)	O	O	O	O	O	O
电路模块 (Circuit Modules)	X	O	O	O	O	O
电缆及电缆组件 (Cables and Cable Assemblies)	O	O	O	O	O	O
塑料和聚合物部件 (Plastic and Polymeric parts)	O	O	O	O	O	O

O:

表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。

Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X:

表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006标准规定的限量要求。

Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part *might exceed* the limit requirement in SJ/T11363-2006.

1.3.2 Safety Precautions

The following safety precautions must be observed during all phases of the operation, usage, service or repair of any cellular terminal or mobile incorporating GWM300. Manufacturers of the cellular terminal are advised to convey the following safety information to users and operating personnel and incorporate these guidelines into all manuals supplied with the product. Failure to comply with these precautions violates safety standards of design, manufacture and intended use of the product. Gemalto M2M GmbH assumes no liability for customer's failure to comply with these precautions.

	When in hospitals or other health care facilities, observe the restrictions on the use of mobiles. Switch off the cellular terminal or mobile if to be instructed to do so by the guidelines posted in sensitive areas. Medical equipment may be sensitive to RF energy. The operation of cardiac pacemakers, other implanted medical equipment and hearing aids can be affected by interference from cellular terminals or mobiles placed close to the device. If in doubt about potential danger, contact the physician or the manufacturer of the device to verify that the equipment is properly shielded. Pacemaker patients are advised to keep their hand-held mobile away from the pacemaker, while it is on. This personal subgroup always should check the distance to the mobile.
	Switch off the cellular terminal or mobile before boarding an aircraft. Make sure it cannot be switched on inadvertently. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communications systems. Failure to observe these instructions may lead to the suspension or denial of cellular services to the offender, legal action, or both. Check the local and actual laws about these themes.
	Do not operate the cellular terminal or mobile in the presence of flammable gases or fumes. Switch off the cellular terminal when you are near petrol stations, fuel depots, chemical plants or where blasting operations are in progress. Operation of any electrical equipment in potentially explosive atmospheres can constitute a safety hazard.
	Your cellular terminal or mobile receives and transmits radio frequency energy while switched on. Remember that interference can occur if it is used close to TV sets, radios, computers or inadequately shielded equipment. Follow any special regulations and always switch off the cellular terminal or mobile wherever forbidden, or when you suspect that it may cause interference or danger.
	Road safety comes first! Do not use a hand-held cellular terminal or mobile while driving a vehicle unless it is securely mounted in a holder for speakerphone operation. Before making a call with a hand-held terminal or mobile park the vehicle. Speakerphones must be installed by qualified personnel. Faulty installation or operation can constitute a safety hazard. Check the actual and local laws about these themes.

SOS	IMPORTANT! Cellular terminals or mobiles operate using radio signals and cellular networks. In that case connections cannot be guaranteed at all times under all conditions. Therefore, you should never rely solely upon any wireless device for essential communications, for example emergency calls. Remember, in order to make calls or receive calls the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength. Some networks do not allow for emergency calls if certain network services or phone features are in use (e.g. lock functions, fixed dialing etc.). You may need to deactivate those features before you can make an emergency call. Some networks require a valid SIM card to be properly inserted in the cellular terminal or mobile.
	If a power supply unit is used to supply the device it must meet the demands placed on SELV circuits in accordance with EN60950. The maximum permissible connection length between the device and the supply source should not exceed 3m.
	According to the guidelines for human exposure to radio frequency energy, an antenna connected to the FME jack of the device should be placed at least 20cm away from human bodies.

1.4   Product Label

The labels fixed to the bottom of a GWM300 comprise the following information.
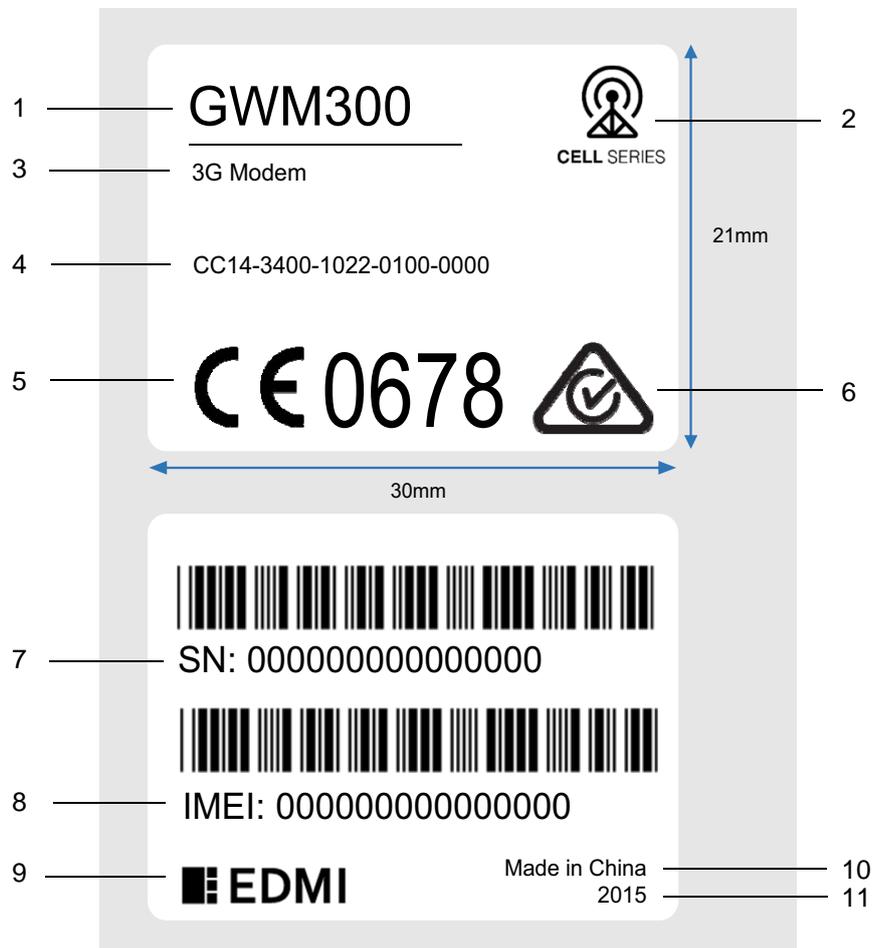
Figure 1: Sample GWM300 labels

Table 8: GWM300 label information

No.	Information
1	Product name
2	Product series/family
3	Product group
4	Manufacturing code
5	CE logo (including notified body number)
6	RCM logo (ACMA Regulatory Compliance Mark)
7	Product's serial number (also as Barcode 128 type C)
8	Product's IMEI (also as Barcode 128 type C)
9	Company logo
10	Marking "Made in China"
11	Year of manufacture

2   Product Concept

2.1   Key Features at a Glance

Feature	Implementation
General	
Incorporates Cinterion® Java module	The Java module handles all signal and data processing within the GWM300. Internal software runs the application interface and the complete GSM/UMTS protocol stack.

Frequency bands	GWM300 (with EHS6 module):
	    GSM/GPRS/EDGE: Quad band 850/900/1800/1900MHz
	    UMTS/HSPA+: Five band 800/850/900/1900/2100MHz

GSM class	Small MS
Output power (according to Release 99, V5) depending on frequency band supported by module	Class 4 (+33dBm ±2dB) for EGSM850 Class 4 (+33dBm ±2dB) for EGSM900 Class 1 (+30dBm ±2dB) for GSM1800 Class 1 (+30dBm ±2dB) for GSM1900 Class E2 (+27dBm ± 3dB) for GSM 850 8-PSK Class E2 (+27dBm ± 3dB) for GSM 900 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1800 8-PSK Class E2 (+26dBm +3 /-4dB) for GSM 1900 8-PSK Class 3 (+24dBm +1/-3dB) for UMTS 2100, WCDMA FDD BdI Class 3 (+24dBm +1/-3dB) for UMTS 1900, WCDMA FDD BdII Class 3 (+24dBm +1/-3dB) for UMTS 900, WCDMA FDD BdVIII Class 3 (+24dBm +1/-3dB) for UMTS 850, WCDMA FDD BdV Class 3 (+24dBm +1/-3dB) for UMTS 800, WCDMA FDD BdVI The values stated above are maximum limits. According to Release 99, the maximum output power in a multislot configuration may be lower. The nominal reduction of maximum output power varies with the number of uplink timeslots used and amounts to 3.0dB for 2Tx.
Power supply	Single supply voltage 5V to 26V
Operating temperature (ambient temperature)	Normal operation: -25°C to +70°C
Physical	Dimensions: 71mm x 51.5mm x 23.5mm (excluding antenna and serial interface connectors) Weight: 60g (approx.)
HSPA features	
3GPP Release 6,7	DL 7.2Mbps, UL 5.7Mbps HSDPA Cat.8 / HSUPA Cat.6 data rates Compressed mode (CM) supported according to 3GPP TS25.212
UMTS features	
3GPP Release 4	PS data rate – 384 kbps DL / 384 kbps UL CS data rate – 64 kbps DL / 64 kbps UL

Feature	Implementation
GSM / GPRS / EDGE features	
Data transfer	GPRS: • Multislot Class 12 • Full PBCCH support • Mobile Station Class B • Coding Scheme 1 – 4 EGPRS: • Multislot Class 12 • EDGE E2 power class for 8 PSK • Downlink coding schemes – CS 1-4, MCS 1-9 • Uplink coding schemes – CS 1-4, MCS 1-9 • SRB loopback and test mode B • 8-bit, 11-bit RACH • PBCCH support • 1 phase/2 phase access procedures • Link adaptation and IR • NACC, extended UL TBF • Mobile Station Class B CSD: • V.110, RLP, non-transparent • 2.4, 4.8, 9.6, 14.4kbps • USSD
SMS	• Point-to-point MT and MO • Cell broadcast • Text and PDU mode
Software	
AT commands	Hayes 3GPP TS 27.007, TS 27.005, Gemalto M2M
Java™ Open Platform	Java™ Open Platform with • Java™ profile IMP-NG & CLDC 1.1 HI • Secure data transmission via HTTPS/SSL • Multi-threading programming and multi-application execution Major benefits: seamless integration into Java applications, ease of programming, no need for application microcontroller, extremely cost-efficient hardware and software design – ideal platform for industrial GSM applications. The memory space available for Java programs is around 10MB in the flash file system and around 10MB RAM. Application code and data share the space in the flash file system and in RAM.
SIM Application Toolkit	SAT Release 99
TCP/IP stack	Protocols: TCP server/client, UDP, HTTP, FTP, SMTP, POP3 Access by AT commands
Firmware update	Upgradeable via serial RS-232 interface or FOTA

Feature	Implementation
Interfaces	
RS232	RS-232 interface as part of 8-pin Molex Microfit for AT commands and data: • Supports RTS/CTS hardware handshake • Supports software XON/XOFF flow control • Multiplex ability according to GSM 07.10 Multiplexer protocol • Baud rates from 1200bps to 921,600bps • Autobauding supported
Power supply	Power supply (BATT+) as part of 8-pin Molex Microfit
SIM card reader	Supported SIM cards: 3V, 1.8V
Antenna	Antenna connected via female SMA connector
Power on/off, Reset	
Power on	Power supply line at power connector
Power off	Normal switch-off by AT^SMSO
Reset	Orderly shutdown and reset by AT command
Special features	
Status indication	LED to indicate operating status.
Real time clock	Timer functions via AT commands
Phonebook	SIM card and terminal

3 Interface Description

3.1 Overview

GWM300 provide the following interfaces for power supply, operating status indication, antenna, SIM card and data transfer:

Table 9: GWM300' interfaces

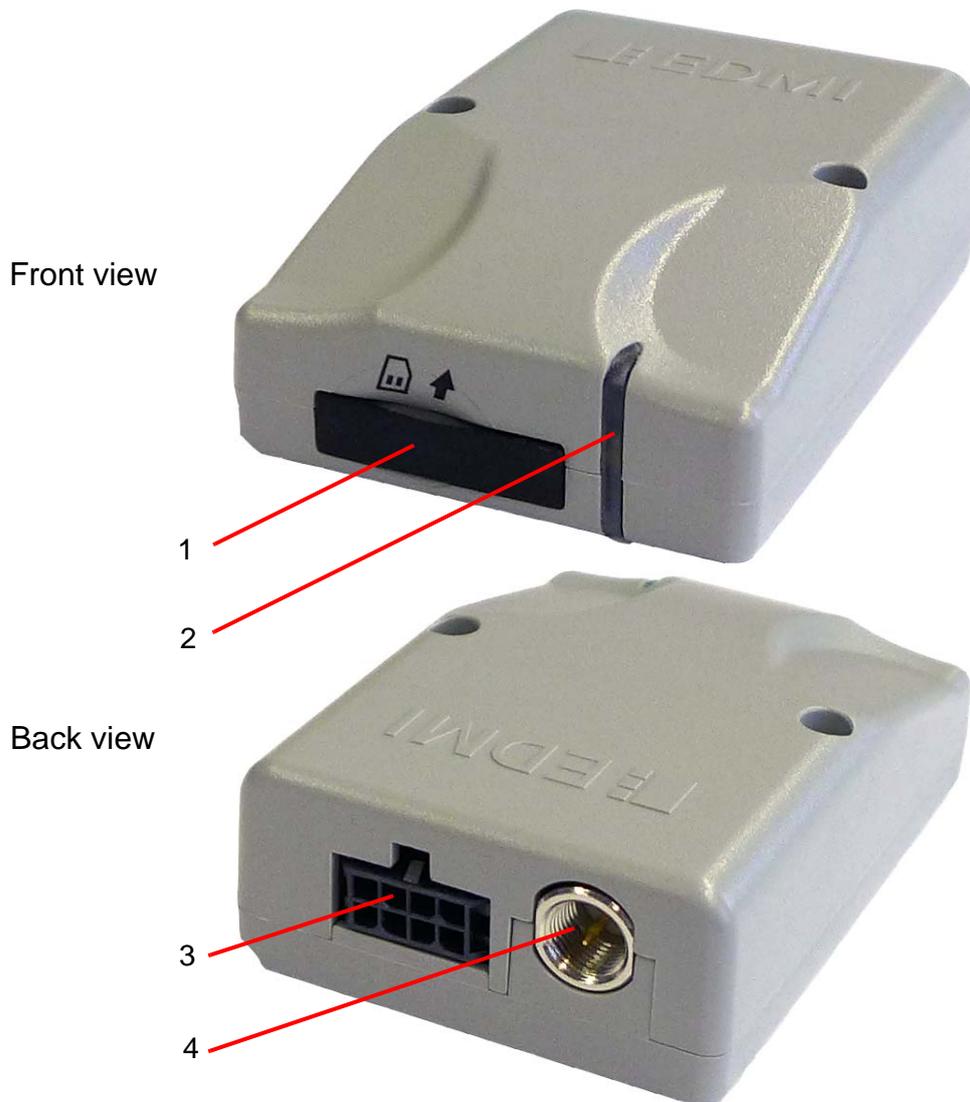| No.	Description
1	SIM card reader (FF2, rubber cover, no hot plug)
2	LED (green) showing operating status LED
3	8-pin Molex Microfit connector (female) for data transfer (RS-232 interface) and power supply
4	FME connector (female) for RF antenna

Front view

Back view

Figure 2: GWM300 interfaces

3.2   Block Diagram

Figure 3 shows a block diagram of a sample configuration that incorporates a GWM300 and typical accessories.
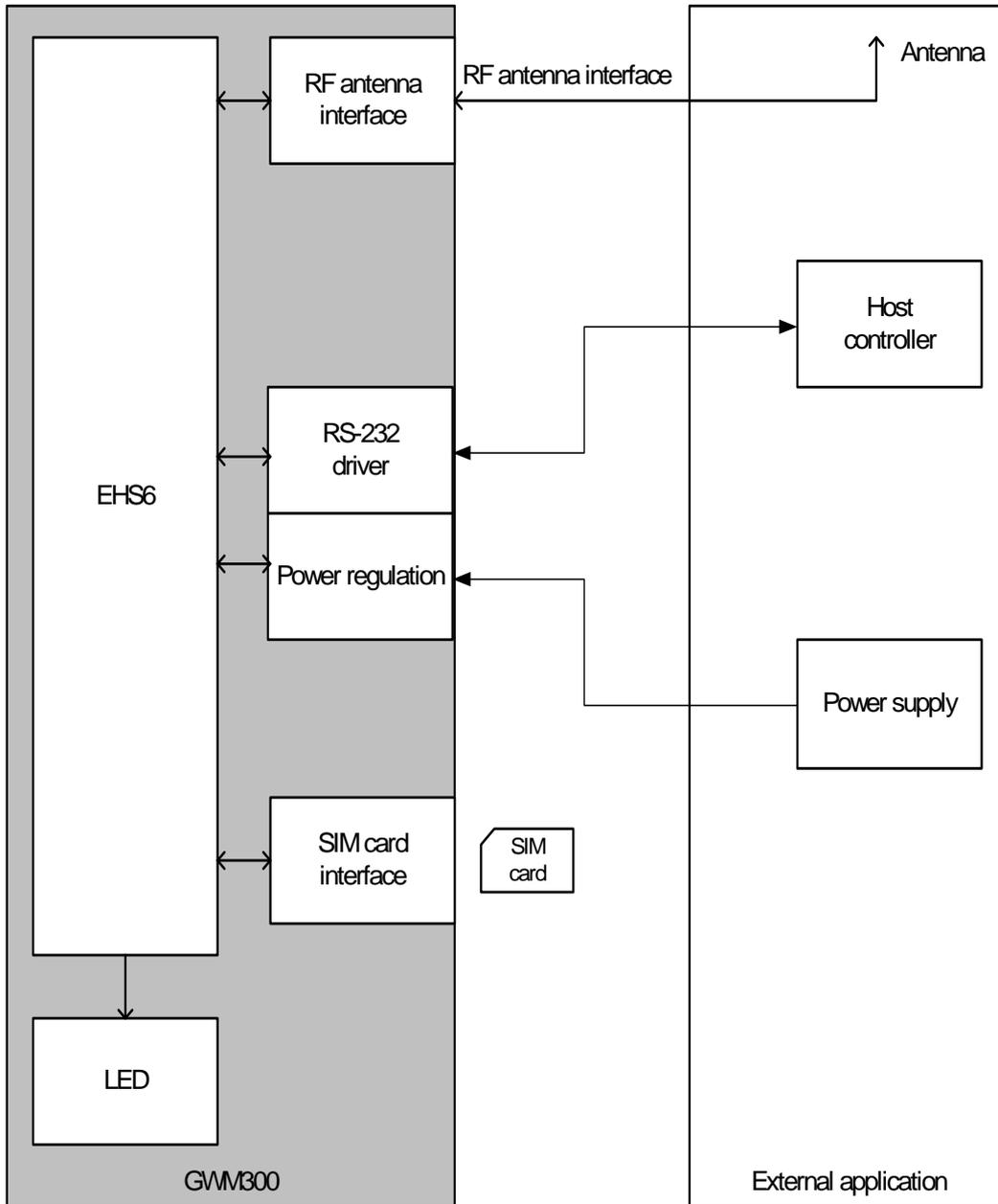

Figure 3: Block diagram

3.3 Operating Modes

The table below briefly summarizes the various operating modes referred to in the following chapters.

Table 10: Overview of operating modes

Normal operation	GSM IDLE	Software is active. Once registered to the GSM network paging with BTS is carried out. The Terminal is ready to send and receive. Watchdog active.
	GSM TALK GSM DATA	Connection between two subscribers is in progress. Power consumption depends on network coverage individual settings, such as DTX off/on, FR/EFR/HR, hopping sequences, antenna. Watchdog active.
	GPRS / UMTS / HSPA IDLE	Terminal is ready for GPRS data transfer, but no data is currently sent or received. Power consumption depends on network settings and GPRS configuration (e.g. multislot settings). Watchdog active.
	GPRS DATA	GPRS data transfer in progress. Power consumption depends on network settings (e.g. power control level), uplink / downlink data rates, GPRS configuration (e.g. used multislot settings) and reduction of maximum output power. Watchdog active.
	EGPRS DATA	EGPRS data transfer in progress. Power consumption depends on network settings (e.g. power control level), uplink / downlink data rates, EGPRS configuration (e.g. used multislot settings) and reduction of maximum output power. Watchdog active.
	UMTS TALK UMTS DATA	UMTS data transfer in progress. Power consumption depends on network settings (e.g. TPC Pattern) and data transfer rate. Watchdog active.
	HSPA DATA	HSPA data transfer in progress. Power consumption depends on network settings (e.g. TPC Pattern) and data transfer rate. Watchdog active.
Power Down		Normal shutdown after sending the AT^SMSO command. The RTC works continuously, but the software is not active. Interfaces are not accessible. To restart GWM300 the power supply has to be turned off and on again.

3.4   Molex Microfit Connector

Via the 8-pin Molex Microfit connector, the host application controller controls the GWM300 (including power supply), and transports data.
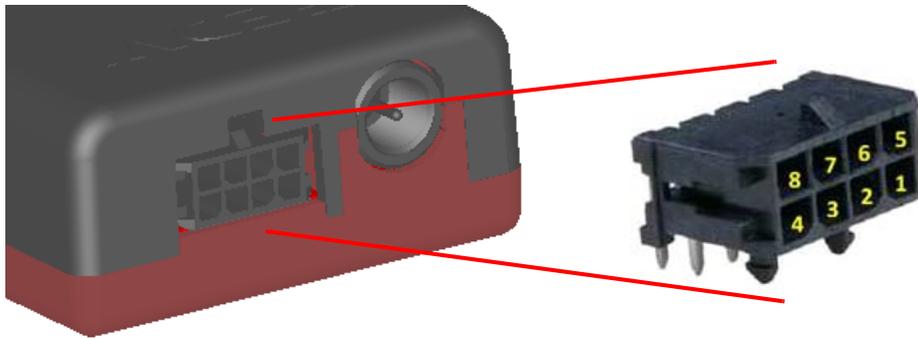
Figure 4: Pin assignment Molex Microfit

Table 11: 8-pin Molex Microfit connector

Pin no.	Signal name	I/O	Function
1	BATT+	I	Power Supply (5-26V DC; 3W maximum including peaks)
2	DTR0	I	Data Terminal Ready
3	RXD0	O	Receive Data
4	CTS0	O	Clear To Send
5	DCD0	O	Data Carrier Detected
6	GND	-	Ground
7	TXD0	I	Transmit Data
8	RTS0	I	Request To Send

The Molex Microfit connector implements an RS-232 interface (see Section 3.4.1) as well as the power supply line (see Section 3.4.2).

The GWM300's Molex Microfit (3.0) connector, i.e., the header (series number: 430450822) mates with the Molex Microfit (3.0) receptacle (series number: 430250800).

3.4.1   RS-232 Interface

The RS-232 interface is implemented as a serial asynchronous transmitter and receiver conforming to ITU-T V.24 Interchange Circuits DCE. Based on the conventions for DCE-DTE connections it communicates with the host application (DTE) using the following signals:
- Port TxD @ application sends data to TXD0 of the GWM300
- Port RxD @ application receives data from RXD0 of the GWM300

The serial interface (also called ASC0) is configured for 8 data bits, no parity and 1 stop bit, and is by default operated at a fixed baud rate of 9600bps, but can be configured for bit rates from 1200bps to 921kbps. Autobauding supports bit rates from 1.2kbps to 230kbps. Hardware handshake using the RTS0 and CTS0 signals and XON/XOFF software flow control are supported. In addition, the modem control signals DTR0 and DCD0 are available. There are different modes of operation that can be set with AT commands.

3.4.2   Power Supply

The power supply of the GWM300 has to be a single voltage source of V_{PLUS}=5V…26V capable of providing a peak current of about 2.5A at 15V during an active transmission. The uplink burst causes strong ripple (drop) on the power lines. The absolute minimum voltage during drops must be >5V.

3.5   Power Up/Power Down Scenarios

In general, be sure not to turn on the GWM300 while it is beyond the safety limits of voltage stated in Section 4.1. GWM300 immediately switches off after having started and detected these inappropriate conditions. In extreme cases this can cause permanent damage to the GWM300.

3.5.1   Turn GWM300 on

GWM300 is automatically turned on and started into normal mode by plugging or by re-plugging an appropriate power supply unit at the power supply line BATT+.

3.5.2   Reset/Restart GWM300

GWM300 can be reset/restarted by entering the command AT+CFUN=x,1. For details on AT+CFUN please see [1].

3.5.3   Turn GWM300 off

Normal shutdown:
* To turn off the GWM300 use the AT^SMSO command, rather than disconnecting the mains adapter.
  This switch off procedure lets the GWM300 log off from the network and allows the software to enter a secure state and save data before disconnecting the power supply. After AT^SMSO has been entered the GWM300 returns the following result codes:

        ^SMSO: MS OFF
        OK
        ^SHUTDOWN

  The "^SHUTDOWN" result code indicates that the GWM300 turns off in less than 1 second. After the shutdown procedure is complete the GWM300 enters the Power Down mode. The RTC is still fed from the voltage regulator in the power supply ASIC.

Only after power off and power on again, i.e., turning off and on the power supply line, can the terminal be switches on again. Apart from teh normal shutdown

3.5.4   Disconnecting Power Supply

Before disconnecting the power supply from the BATT+ pin, make sure that the GWM300 is in a safe condition. The best way is to wait 1s after the "^SHUTDOWN" result code has been indicated.

3.6   SIM Interface

The SIM interface is intended for 1.8V and 3V SIM cards in accordance with GSM 11.12 Phase 2. The card holder is a five wire interface according to GSM 11.11. The SIM card holder is protected by a rubber cover that has to be opened before a SIM can be inserted.
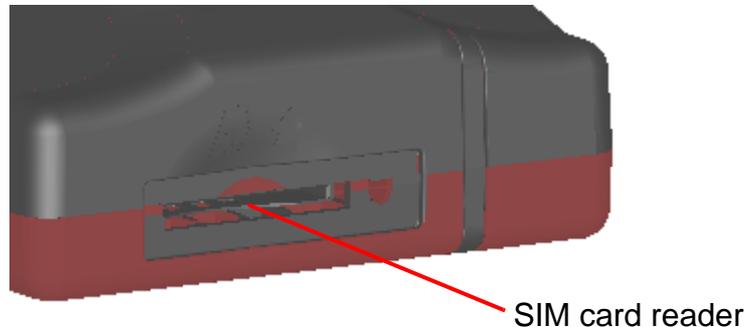

SIM card reader

Figure 5: SIM interface

The SIM - with the circuit side facing upwards - is inserted by gently pushing it into the SIM card holder until it snaps hold. It is now protected from accidental removal. The SIM can be removed from the card holder by using a flat object such as a screwdriver to carefully press the inserted SIM until it snaps out again.

All signals of the SIM interface are protected from electrostatic discharge.

Removing and inserting the SIM card during operation requires is not supported by GWM300.

Note: No guarantee can be given, nor any liability accepted, if loss of data is encountered after removing the SIM card during operation. Also, no guarantee can be given for properly initializing any SIM card that the user inserts after having removed a SIM card during operation. In this case, the application must restart the GWM300.

3.7   Status LED

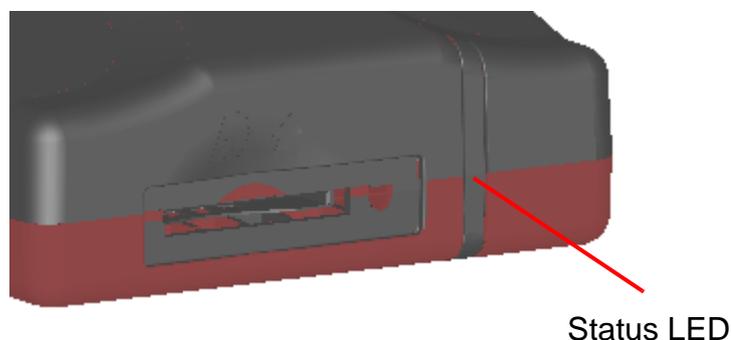GWM300 has a green LED to indicate its operating status.

Status LED

Figure 6: Status LED

The LED is enabled by default, but can be configured by AT command AT^SLED. For more information on the AT^SLED command please refer to [1].

3.8   RF Antenna Interface

An external RF antenna is connected via the GWM300's female FME connector that is also the antenna reference point (ARP).
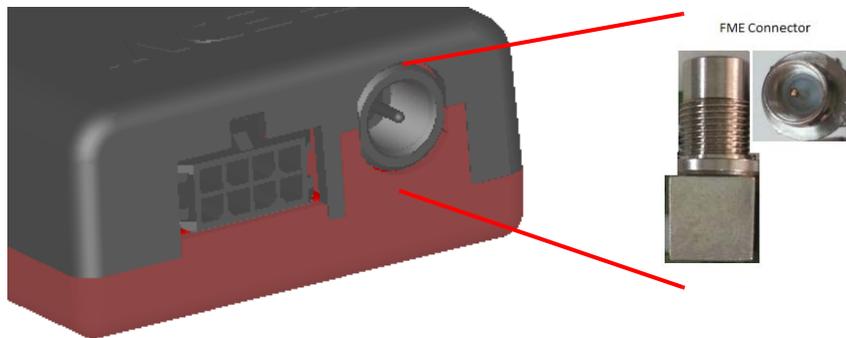

Figure 7: Antenna connector

The system impedance is 50Ω. In any case, for good RF performance, the return loss of the customer application's antenna should be better than 10dB (VSWR < 2). GWM300 withstand a total mismatch at this connector when transmitting with maximum RF power.

Additional ESD protection to the antenna connector is provided. No DC voltage must be applied to the antenna circuit to protect it from damage.

Please note that the terminal should be installed and operated with a minimum distance of 20cm between the antenna connected to the terminal and any human bodies. Also, the transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antenna's character impedance should be 50Ω. It it recommended that the antenna should have VSWR <=2:1, within the working band frequency range.

4 Mechanics, Mounting and Packaging

4.1 Mechanical Dimensions

Figure 8 shows a 3D view of the GWM300 and provides an overview of the mechanical dimensions of the terminal. For further details and an exploded view see Figure 9.

Length: 71mm (excluding antenna and connector interfaces)
Width: 51.5mm
Height: 23.5mm

Weight: 60g
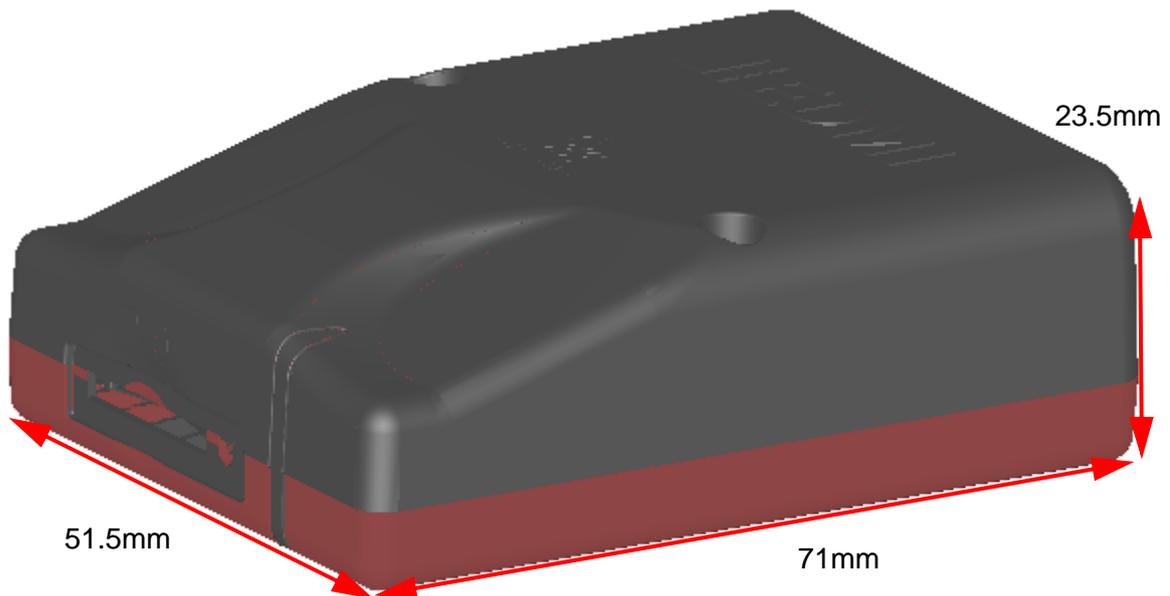
Figure 8: GWM300 3D overview

Figure 9: GWM300 exploded view

Item	Qty	Part Name
8	1	Cosmos PCBA
7	2	Terminal Label
6	4	Screw (Self Tapping)
5	1	FME Cushion
4	1	Light Pipe
3	1	SIM Cover
2	1	Rear Housing
1	1	Front Housing

4.2　　Packaging

GWM300 terminal units come in bubble bags stashed into VP boxes made out of corrugated fiberboard:

- VP box size: 370mm x 350mm x 155mm

A VP box contains up to 80 terminal units, stashed into two layers of up to 40 units. Terminal layers are separated by foam layers for protective purposes.
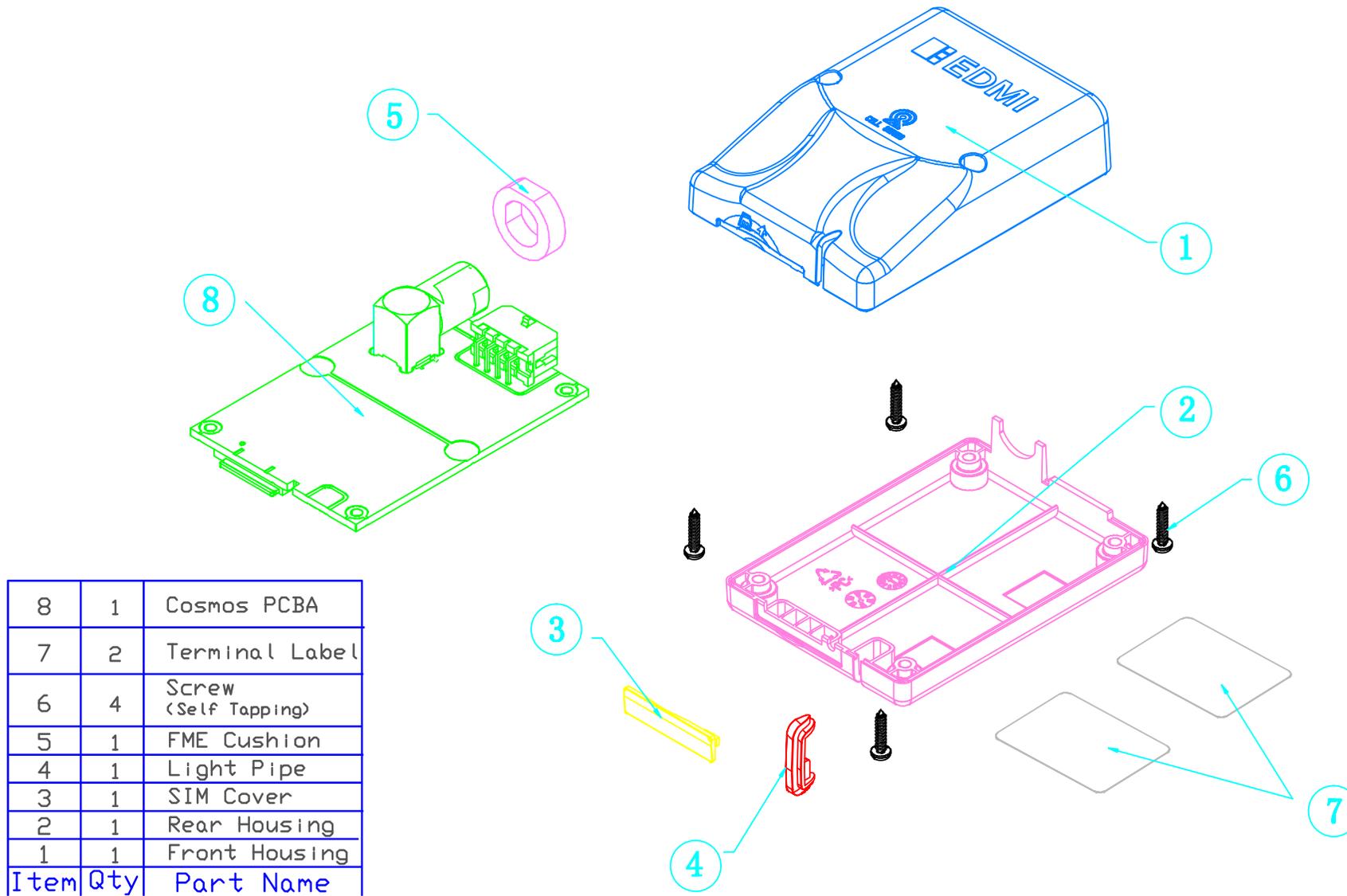
5 Full Type Approval

5.1 Gemalto M2M Reference Setup

The Gemalto M2M reference setup submitted to type approve GWM300 consists of the following components:

- GWM300 with approved Java module
- PC as MMI
- Power Supply
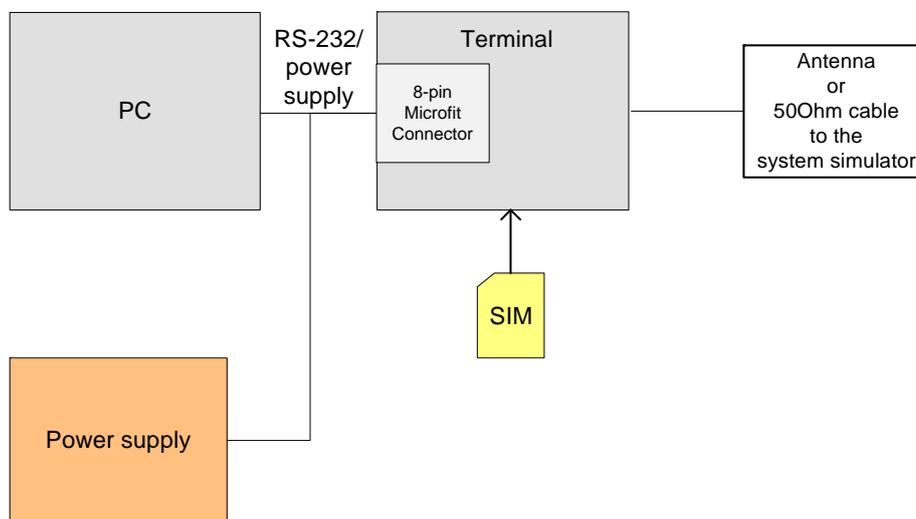- RS-232/power supply cable (modified from DB9-RJ45 connector adapter)

Figure 10: Reference equipment for approval

For ordering information please refer to Chapter 6.

5.2   Restrictions

Later enhancements and modifications beyond the certified configuration require extra approvals. Each supplementary approval process includes submittal of the technical documentation as well as testing of the changes made.

• No further approvals are required for customer applications that comply with the approved GWM300 configuration.

• Extra approval must be obtained for applications using other accessories than those included in the approved GWM300 configuration (power supply, MMI implementation supported by AT commands).

5.3   CE Conformity

GWM300 meets the requirements of the EU directives listed below:

• R&TTE Directive 1999/5/EC

GWM300 is marked with the CE conformity mark (including notified body number):

GWM300
CE 0682

5.4   EMC

GWM300 complies with the equipment requirements specified in EN 301489-1, -7 and -24 are covered by the R&TTE Directive. For details see Section 1.3.

5.5   Compliance with FCC and IC Rules and Regulations

As an integrated product, GWM300 is fully compliant with the grant of the FCC Equipment Authorization and the Industry Canada Certificates issued for the built-in Java modules, and therefore, bears the labels "Contains FCC ID: QIPEHS6".

The Equipment Authorization Certification for the included Cinterion® module is listed under the following identifiers:

FCC Idenitifier: QIPEHS6
Industry Canada Certification Number: 7830A-EHS6
Granted to Gemalto M2M GmbH

Notes (FCC):
Radiofrequency radiation exposure Information:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This terminal equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
•   Reorient or relocate the receiving antenna.
•   Increase the separation between the equipment and receiver.
•   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
•   Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications made to this equipment not expressly approved by Gemalto M2M may void the FCC authorization to operate this equipment.

This device contains UMTS, GSM and GPRS class functions in the 900, 1800 and 2100MHz bands that are not operational in U.S. Territories. This device is to be used only for mobile and fixed applications.

Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance: For more information on the RF antenna interface please refer to Section 3.8 and Section 4.4.

Notes (IC):

(EN) This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Operation is subject to the following two conditions: (1) this devive may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

(FR) Cet appareil numérique de classe B est conforme aux normes canadiennes ICES-003 et RSS-210. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne doit pas causer d'interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

(EN) Radio frequency (RF) Exposure Information

The radiated output power of the Wireless Device is below the Industry Canada (IC) radio frequency exposure limits. The Wireless Device should be used in such a manner such that the potential for human contact during normal operation is minimized.

This device has also been evaluated and shown compliant with the IC RF Exposure limits under mobile exposure conditions. (antennas are greater than 20cm from a person's body).

(FR) Informations concernant l'exposltion aux fréquences radio (RF)

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d'Industry Canada (IC). Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal.

Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d'IC dans des conditions d'exposition à des appareils mobiles (les antennes se situent à moins de 20cm du corps d'une personne).

6   List of Parts and Accessories

Table 12: List of parts and accessories

Description	Supplier	Ordering information
GWM300	Gemalto	Ordering number L30960-N4300-A100
8-pin receptacle Molex Microfit (3.0)	Molex	Ordering number 43025-0800

About Gemalto

Gemalto (Euronext NL0000400653 GTO) is the world leader in digital security with 2014 annual revenues of €2.5 billion and blue-chip customers in over 180 countries. Our 14,000 employees operate out of 99 offices, 34 personalization and data centers, and 24 research and software development centers located in 46 countries.

We are at the heart of the rapidly evolving digital society. Billions of people worldwide increasingly want the freedom to communicate, travel, shop, bank, entertain and work - anytime, everywhere - in ways that are enjoyable and safe. Gemalto delivers on their expanding needs for personal mobile services, payment security, authenticated cloud access, identity and privacy protection, eHealthcare and eGovernment efficiency, convenient ticketing and dependable machine-to-machine (M2M) applications.

Gemalto develops secure embedded software and secure products which we design and personalize. Our platforms and services manage these secure products, the confidential data they contain and the trusted end-user services they enable. Our innovations enable our clients to offer trusted and convenient digital services to billions of individuals.

Gemalto thrives with the growing number of people using its solutions to interact with the digital and wireless world.

For more information please visit
m2m.gemalto.com, www.facebook.com/gemalto, or Follow@gemaltom2m on twitter.

Gemalto M2M GmbH
St.-Martin-Str. 60
81541 Munich
Germany

gemalto
security to be free