
Modem G2 Specifications



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1.Introduction

1.1.Objective of the document

This document specifies the second generation of Wavecom's GSM modem. The Modem product is referenced as: WMO2-GXXXX according to standards (WMO2-G900 : GSM ; WMO2-G1800 : DCS ; WMO2-G1900 : PCS). All these modem products are based on WISMO concept. That means that each modem include a WISMO1B-Gxxxx module .

This document describes both the basic Modem offer, and its accessories.

1.2.Related documents

ETS 300 019	Environmental conditions and environmental tests for telecommunications equipment
WAVE 1.1	Wavecom Internal Qualification Plan Version 1.1
SAE J1113	Transients Voltage Suppression in Automotive Vehicle

2. Basic offer and accessories

2.1. Basic offer

2.1.1. Contained

Basic offer include the following elements:

- Modem
- Mechanical fixation (holding bridle)
- Power supply cable + fuse
- User manual

2.1.2. Packaging

The Basic offer set is presented in an unique conditioning. External dimensions close to the following values

70mm (width) x 60mm (height) x135mm (length).

This is a carton box. It is build in small waves which are covered with a thin film of white ice-cold paper.

2.1.3. User manual

The 22 pages user manual is realised in a size close to the following values:

105mm (width) x 148,5 mm (height) (1/2 A5).

2.2. Accessories

2.2.1. Cables

Two cables are proposed:

- serial link and audio cable (Y cordon) for a low power audio solution (for example : head set, phone receiver, ...).
- serial link and audio cable (Y cordon) for Car Kit option.

2.2.2. Headset

Headset allows an audio hand free function. It integrates a weak power speaker phone and a microphone.

2.2.3. Antenna

Two options are proposed:

- a standard deported cellular phone antenna
- a Wavecom designed short antenna

2.2.4. Power supply

An AC(220V~)/DC(12V/2A) converter allows a power network connection

2.3. Options

2.3.1. Car Kit

Thanks to an audio power amplifier, a microphone fixed on vehicle sun visor and a loud speaker fixed on the vehicle dashboard, anybody can obtain a hand free embarked solution.

Speaker (8 Ω) and directional microphone are supplied with this option.

3. Product management

3.1. Wavecom reference

WMO2-GXXXX (WMO2-G900, WMO2-G1800 , WMO2-G1900).

3.2. Markings by labels

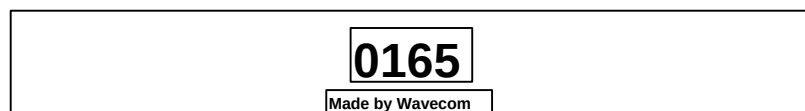
3.2.1. Product label

This label is built with anodise aluminium. It has a blue silk screen treatment (marking : aluminium colour) and is located on the upper convex mechanical part. It supports the WAVECOM logo. Dimension: 96 x10 mm.



3.2.2. Production sticker

This label is located on the back of the product and contains CE marking (in order to improve the productivity on assembly line, this marking will be printed matter or silk screened in the laser). Dimension : 60 x 9.5 mm.



3.2.3. CE and IMEI sticker

This label is placed in the back of the product. It contains the following information : REF PROD (WMO-GXXX), REF WISMO WM1B-GXXX, PN (WMXXXXX) in clear and IMEI number in barre code that includes the product serial number. Dimensions : 60 x 9.5 mm.



4. Context specifications

4.1. Normative specifications

Product is compliant with specification ETSI Phase II.

4.2. Environment specifications

4.2.1. Climatic and mechanics environment

The following figure shows environment standard constraints:

WMO2_Gxxxx		ENVIRONNEMENTAL CLASSES		
TYPE OF TEST	STANDARDS	STORAGE Class 1.2	TRANSPORTATION Class 2.3	OPERATING (PORT USE) Class 7.3
Cold	IEC 68-2.1 Ab test	-25° C 72 h	-40° C 72 h	-20° C 16 h
Dry heat	IEC 68-2.2 Bb test	+70° C 72 h	+70° C 72 h	+55° C 16 h
Change of temperature	IEC 68-2.14 Na/Nb test		-40° / +30° C 5 cycles t1 = 3 h	-20° / +30° C 3 cycles t1 = 3 h
Damp heat cyclic	IEC 68-2.30 Db test	+30° C 2 cycles 90% - 100% RH variant 1	+40° C 2 cycles 90% - 100% RH variant 1	+40° C 2 cycles 90% - 100% RH variant 1
Damp heat	IEC 68-2.56 Cb test	+30° C 4 days	+40° C 4 days	+40° C 4 days
Sinusoidal vibration	IEC 68-2.6 Fc test	5 - 62 Hz : 5 mm/ s 62 - 200Hz : 2 m/ s2 3 x 5 sweep cycles		
Random vibration wide band	IEC 68-3.36 Fdb test		5 - 20 Hz : 0.96 m2 / s3 20 - 500Hz : - 3 dB / oct 3 x 10 min	10 - 12 Hz : 0.96 m2 / s3 12 - 150Hz : - 3 dB / oct 3 x 30 min

4.2.1.1. Electric environment

The following figure sum up electrical constraints in an automotive environment:

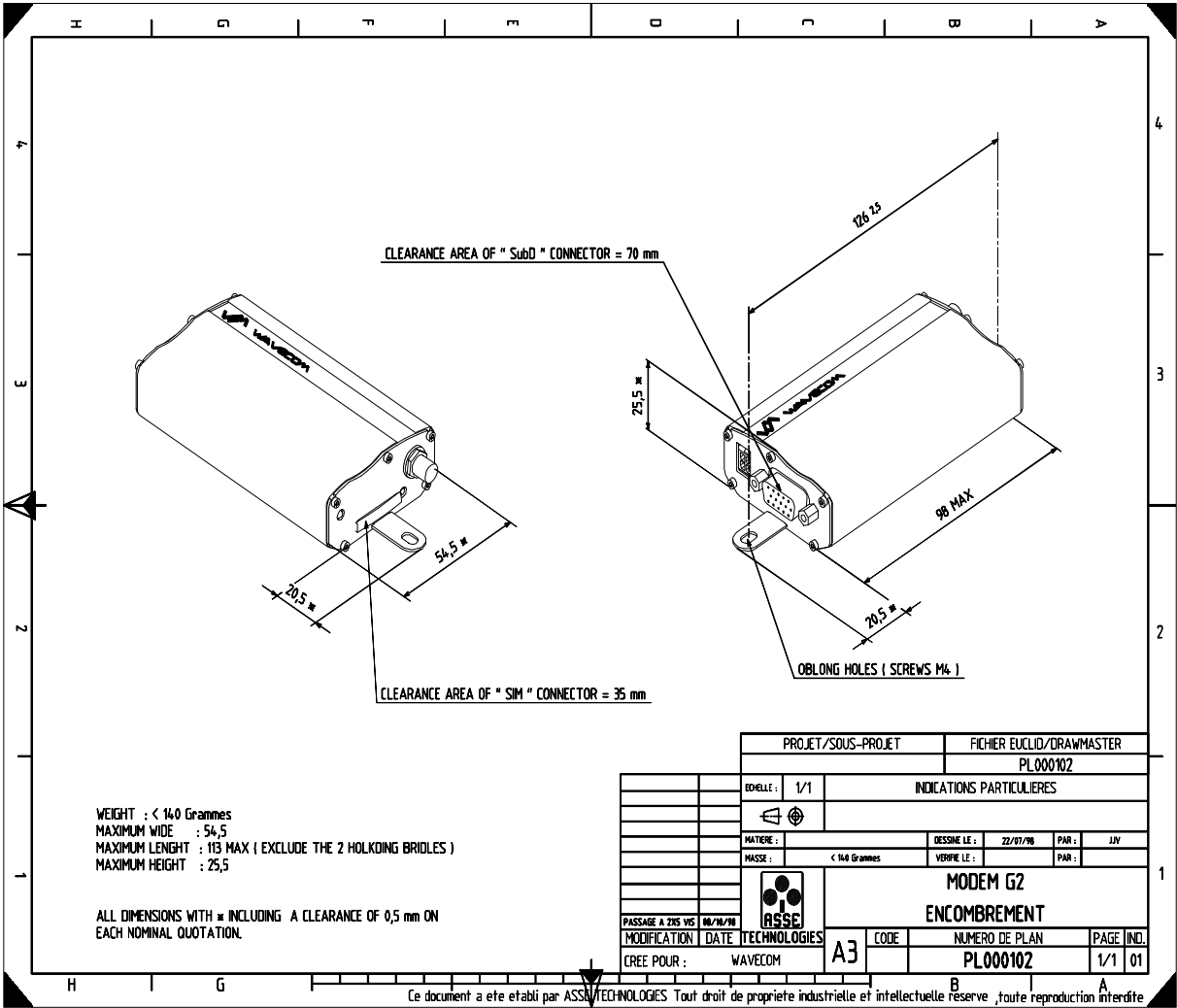
Length of transient	Cause	Energy capability Voltage Amplitude	Possible frequency of application
Steady state	Failed Voltage Regulator	∞ + 18 V	Infrequent
3 - 5 minutes	Jump start with 24 V battery	∞ +/- 24 V	Infrequent
200ms to 400ms	Load dump - i.e., disconnection of battery while at high charging rates	≥10 J ≤125V	Infrequent
< 0.32 s	Inductive Load Switching Transient	<1 J -300V to +80V	Often
< 0.20 s	Alternator Field Decay	<1 J -100V to -40V	Each Turn-Off
90ms	Ignition Pulse, Battery Disconnected	<0.5 J ≤75V	<500Hz Several Times in vehicle Life
1ms	Mutual Coupling in Harness (Note)	<1 J <200V	Often
15μs	Ignition Pulse, Normal	<0.001 J <3V	<500Hz Continuous
	Accessory Noise	<1.5V	50 Hz to 10 KHz
	Transceiver Feedback	20mV	R.F.

Note : These transients may be present on any wire in the vehicle.

4.3. Physical characteristics

The physical characteristics are the following ones:

Physical characteristic	Qualification	Comments
Dimension Absolute dimension	98x54x25 mm maximum 110x54x25 mm	Without the connectors quotations .
Weight	< 140 g	
Volume	13.23 cm3	
Case		Aluminium profile



4.4. Basic services

The functions of this modem are the following ones:

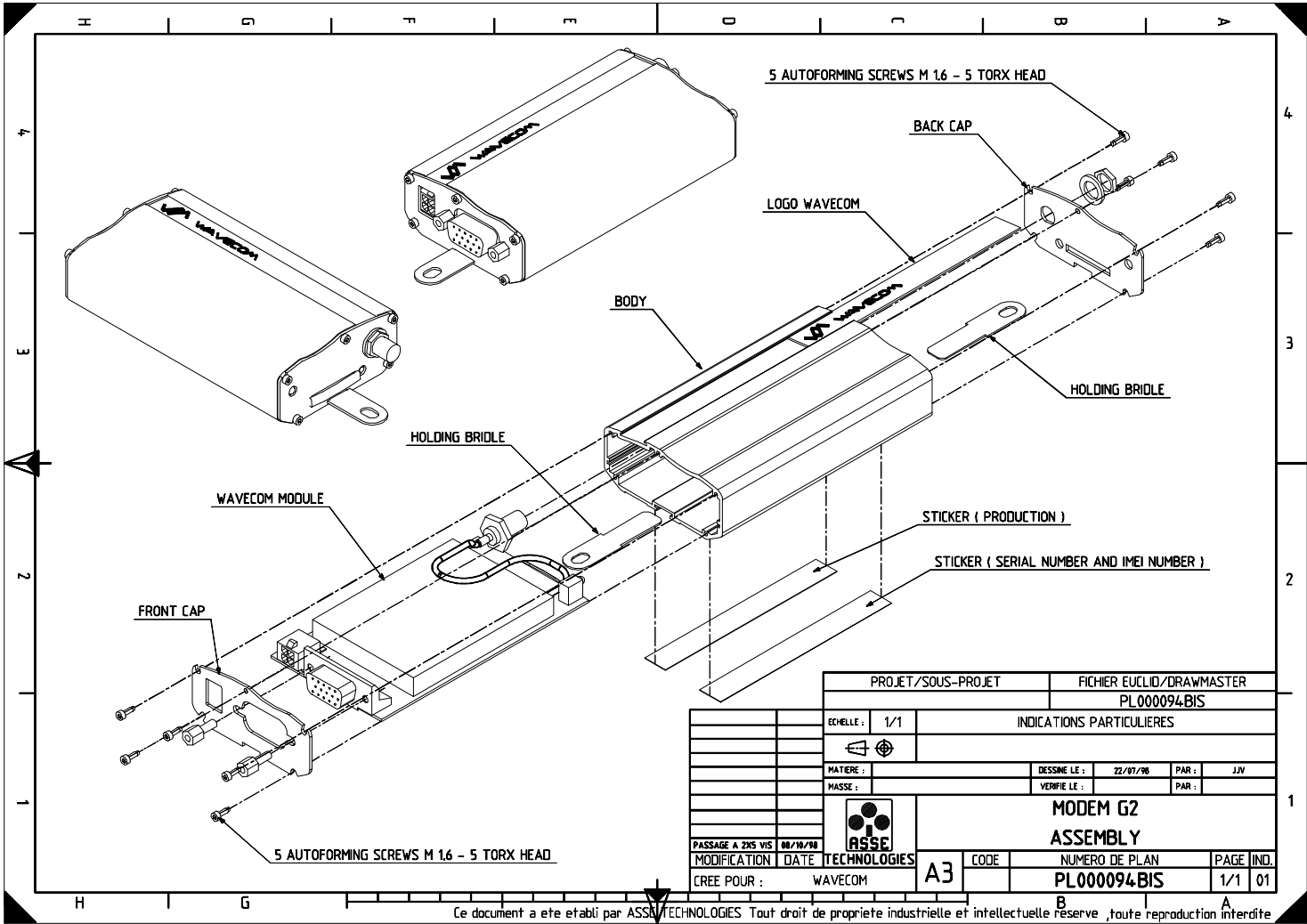
	GSM	DCS/PCS
Standard	900 MHz. Class 4 (2W). GSM phase 2.	1800 MHz or 1900 MHz Class 5 (1W) GSM phase 2.
Interface	Serial interface RS232 V.24/V.28 AT command set based on V.25ter and GSM 07.05 & 07.07. Auto-bauding function between 2400 bits/s and 19200 bits/s No auto-framing available	Serial interface RS232 V.24/V.28 AT command set based on V.25ter and GSM 07.05 & 07.07. Auto-bauding function between 2400 bits/s and 19200 bits/s No auto-framing available
SMS	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broad cast. In accordance with GSM 07.05	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broad cast. In accordance with GSM 07.05
Data	Asynchronous 2400, 4800, 9600 bits/s. Transparent and Non Transparent mode In Non Transparent Mode: 300, 1200, 1200/75 bauds.	Asynchronous 2400, 4800, 9600 bits/s. Transparent and Non Transparent mode In Non Transparent Mode: 300, 1200, 1200/75 bauds.
Fax	Mode 3.1 KHz (PSTN) and V110 (ISDN) 2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode. Class 1.	Mode 3.1 KHz (PSTN) and V110 (ISDN) 2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode. Class 1.
Audio	Group 3 compatible. FR et EFR operation 1 : Head Set 2 : Car Kit (in option)	Group 3 compatible. FR et EFR operation 1 : Head Set 2 : Car Kit (in option)

5. General description

5.1. Presentation

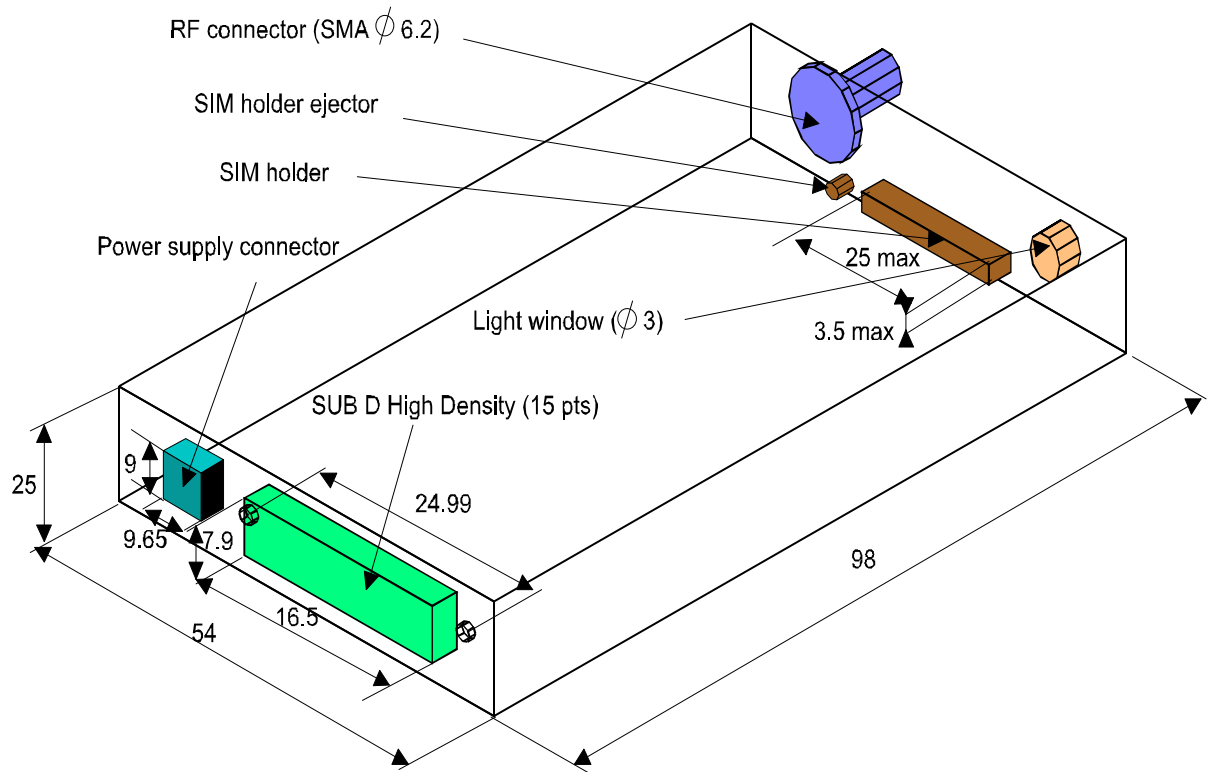
Modem mechanical case is built from an aluminium profile ended by two stoppers at these extremities. All input/output links are established by three connector placed at the two extremities of the profile. No cordon is fixed to the case. The SIM card (micro-SIM) is put on an extract drawer. A red indicator specifies the functioning mode of the product.

5.2. Mechanical philosophy retained



5.3. Connectors definition

5.3.1. Connector location



5.3.2. Connectors description

We apply the following constraints in the connector choice:

- size
- mechanical
- electrical performances
- Industrialisation (surface assembly choice)

In order to extract or insert the Micro SIM card, each user has to press with a sharp element (a pen for example) the SIM holder ejector. If this procedure is not respected, the SIM holder can be damaged.

Function connector	Type	Pining	Drawing	Ref. supplier	opposite connector examples
RF connector	SMA			<u>RADIAL</u> : R284310085	<u>RADIAL</u> : R125073
Serial link	SUB D High Density (15 pts)	1 DCD (CT109) 2 TX (CT103) 6 RX (CT104) 7 DSR (CT107) 8 DTR (CT108/2) 9 GND		<u>JST</u> : KSEY-15S-3B6L18-13	<u>ITT CANNON</u> : ZDEA-15P-SB or <u>JST</u> : KEC-15P with contact JK-SP2143
AUDIO link		11 CTS (CT106) 12 RTS (CT105) 13 RI (CT125) 4 MICROPHONE (+) 5 MICROPHONE (-) 10 SPEAKER (+) 15 SPEAKER (-)			
BOOT RESET		3 BOOT 14 RESET			
Power Supply connector		1 V+BATTERY 2 GROUND 3-4 AUXI			
SIM holder				<u>MOLEX</u> : 52828-0611	MICRO SIM

5.4. Electrical characteristics

The following figure summarises electrical characteristics defined in input/output for all external connections.

Parameters	MIN	TYP	MAX	UNIT	Comments
<u>Power supply</u> :					
Input supply voltage	5*/6*	13,5	32	V	GSM or DCS/PCS
Input supply voltage with Car Kit option	*	13,5	18	V	
Input peak supply current @5V*/6V**			2,5*/0,9**	A	GSM or DCS/PCS
Input average supply current @5V*/6V** in communication mode			450*/200**	mA	GSM or DCS/PCS
Input average supply current @5V*/6V** in idle mode (paging period 480ms)			35	mA	
Input average supply current @5V* in idle mode with auto-shutdown function***			10	mA	
<u>Serial link</u> :					
RS232					standard
<u>Audio (head set)</u> :					
Microphone input current @2V/2K Ω		0,5		mA	
absolute microphone input voltage			100	mVpp	
speaker output current 150 Ω //1nF		16		mA	
absolute speaker impedance			32	Ω	
SIM	3		5	V	

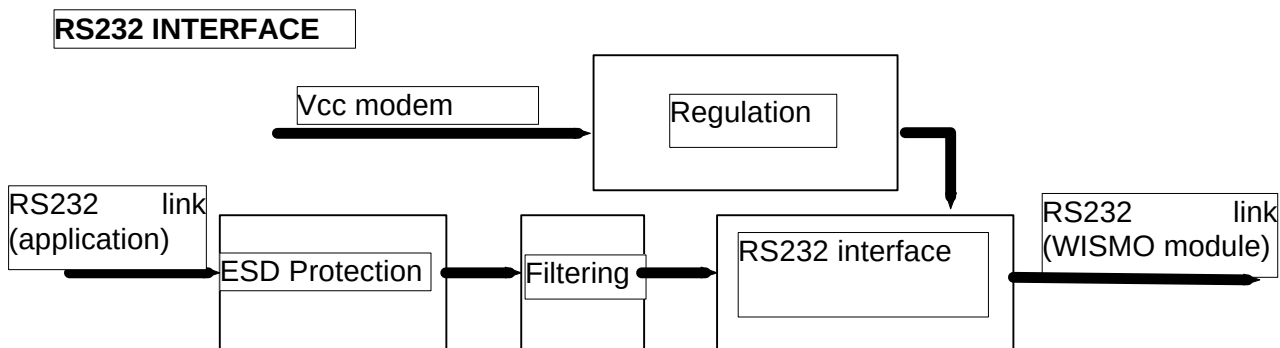
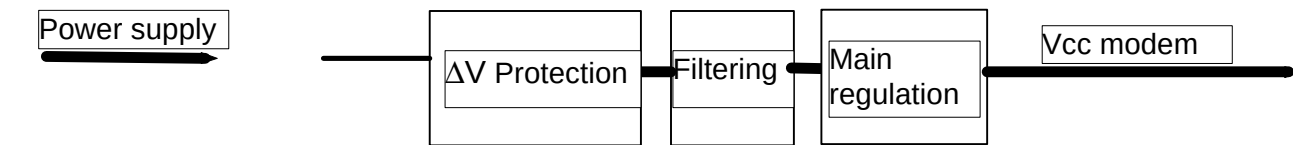
* only GSM

** only DCS/PCS

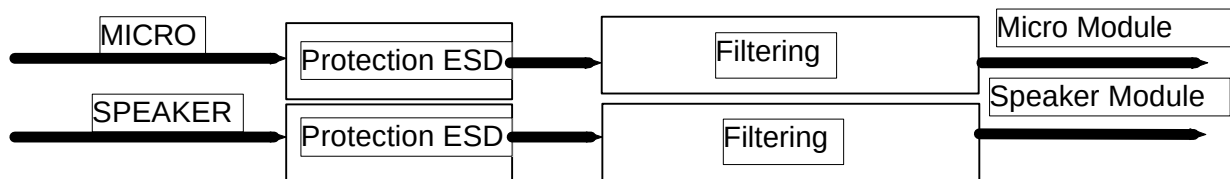
*** auto shutdown function could be activate if the serial link leads a non hardware flux (CTS/RTS non used). This hardware function will not be available with the first products.

5.5. Electrical functions

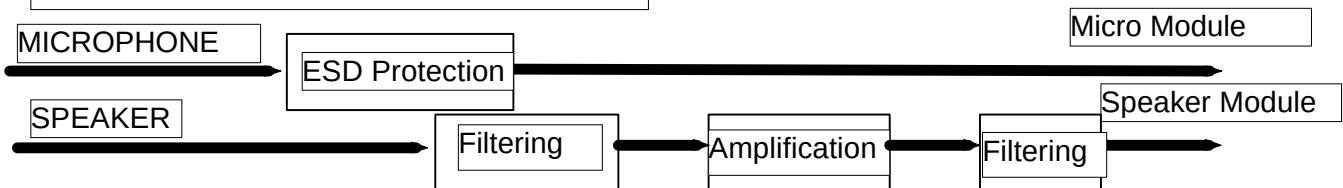
5.5.1. Functionnal schematic



AUDIO INTERFACE : Head Set



AUDIO INTERFACE : Car Kit (in option)



5.5.2. Filtering

Filtering guarantees:

- EMI/RFI protection in input and output,
- signal smoothing.

Components retained are on the one hand Low Pass Filter (LC filter architecture) and other one power inductor.

5.5.3. ESD protection

This function protects all input/output against the electrostatic surges.

Components which compose this function will be sized according to, the power of the electrostatic surges apply on the connectors and the normal functioning voltage scale. Components retained are TRANZIL diodes (TVS diode : Transient Voltage Suppression diode).

5.5.4. Voltage surge protection

This function allows a protection against, the voltage surges, the reverse polarity and electrostatics surges on the power supply line.

5.5.5. Regulation

Main regulation is made with a DC/DC converter in order to supply power at all functions (STEP-DOWN CONVERTER is the name of montage).

5.5.6. RS232 Interface

This function adapts voltage levels between the WISMO module and external world .

5.5.7. Amplification

This function is obtains with an audio power amplifier.

5.5.8.Other function

Red indicator. This function shows three operating modes:

- the red indicator blinks quickly in transmission mode
- the red indicator blinks slowly in idle mode
- the red indicator is continuously lightened while in network search

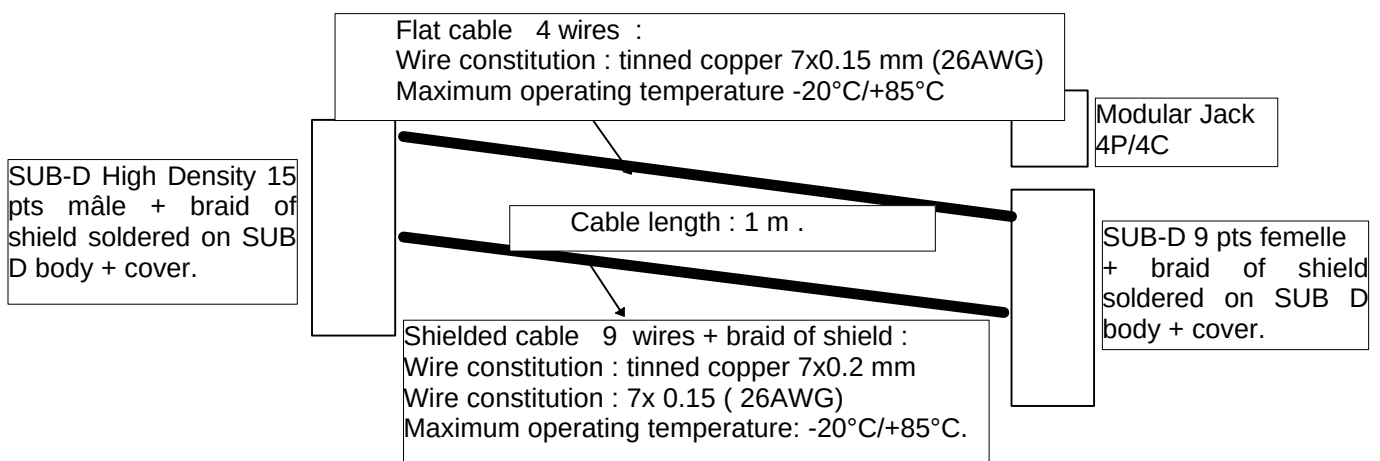
6. Accessories description

6.1. Headset

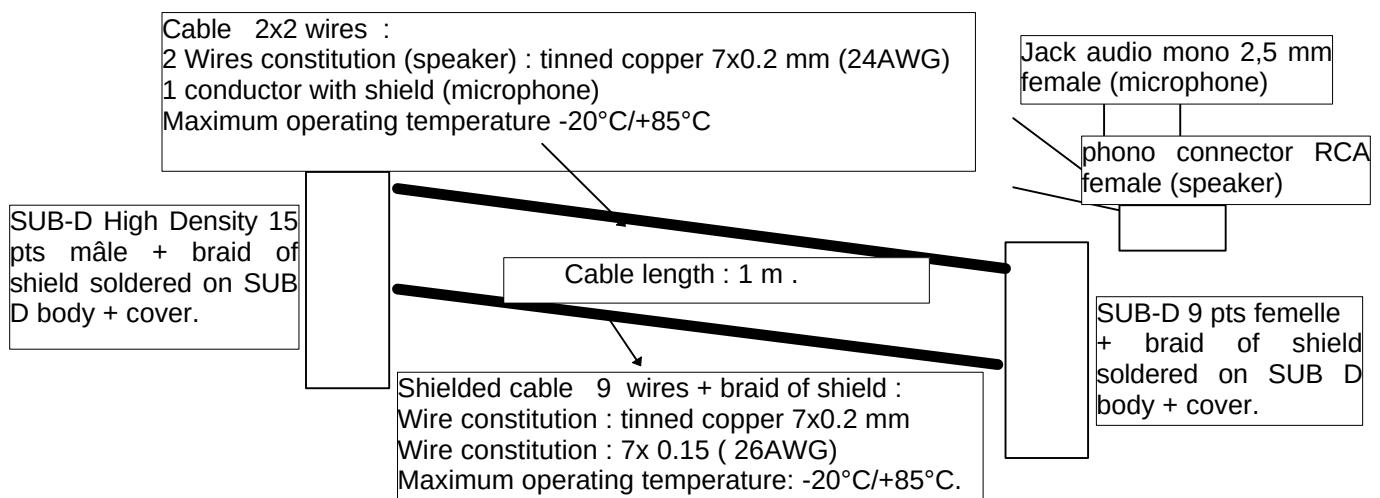
References of this kit have to be specified.

6.2. Cordon examples

6.2.1. Cordon RS232/AUDIO(head set) :



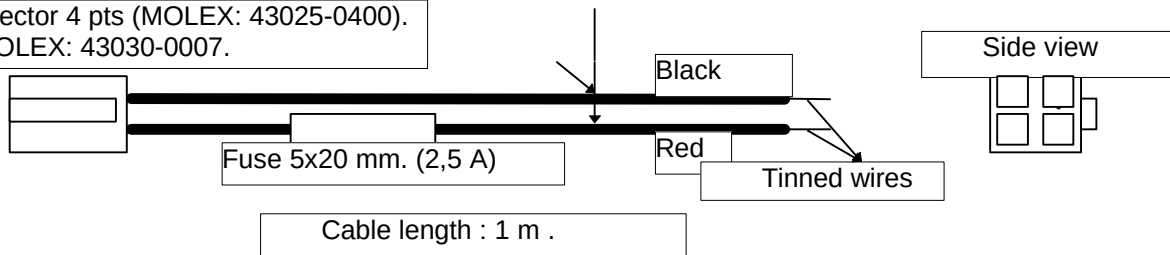
6.2.2. Cordon RS232/AUDIO(Car Kit) :



6.2.3. Power supply cordon

Cable : 1 wire.
 Ame : tinned copper 24x0.2 mm
 Section : 0.75 mm²
 Maximum operating temperature: -20°C/+85°C.

MICRO FIT connector 4 pts (MOLEX: 43025-0400).
 Contacts (x2) (MOLEX: 43030-0007).



6.2.4. Cordons construction (RS232/Audio head set):

Assembly example

SUB-D 9CTS	Connection	SUB D 15CTS (RS232)	Signal name
1 (White)	↻	1 (White)	DCD (CT109)
2 (Grey)	↻	6 (Grey)	RX (CT104)
3 (Violet)	↻	2 (Violet)	TX (CT103)
4 (Bleu)	↻	8 (Bleu)	DTR (CT108/2)
5 (Black)	↻	9 (Black)	GND
6 (Orange)	↻	7 (Orange)	DSR (CT107)
7 (Yellow)	↻	12 (Yellow)	RTS (CT105)
8 (Brown)	↻	11 (Brown)	CTS (CT106)
9 (Green)	↻	13 (Green)	RI (CT125)
Modular Jack 4P/4C	Connection	SUB D 15CTS (AUDIO)	
1 (Yellow/White)	↻	4 (Yellow/White)	microphone(+)
2 (Red/White)	↻	10 (Red/ White)	speaker(+)
3 (Green/White)	↻	15 (Green/White)	speaker(-)
4 (Black/White)	↻	5 (Black/White)	microphone(-)
Flying wires	Connection	SUB D 15CTS (Boot/Reset/GND)	
(Pink)	↻	3 (Pink)	BOOT
(Bleu/White)	↻	14 (Bleu/White)	RESET
(Black)	↻	9 (Black)	GND

Top view

1
2
3
4