Telit Cinterion

ME310G1

Hardware Design Guide

1VV0301588 Rev.27
2025-11-26
Released
Public

Technical Documentation

Contents

1 Applicability Table

Table 1: Applicability Table

Products
ME310G1-W1
ME310G1-WW
ME310G1-WWV
ME310G1-W2
ME310G1-W3

2 Introduction

2.1 Scope

This document describes the electrical specifications, mechanical information, interface application, and manufacturing information of the Telit ME310G1 module. With the help of this document and other application notes or user guides, users can understand the Telit ME310G1 module well and quickly develop various products.

2.2 Audience

This document is intended for system integrators who use the Telit ME310G1 module in their products.

2.3 Contact Information, Support

For technical support and general questions, e-mail:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com
- TS-ONEEDGE@telit.com

Alternatively, use: https://www.telit.com/contact-us/

For Product information and technical documents, visit: https://www.telit.com

2.4 Conventions

Note:	Provides advice and suggestions that may be useful when integrating the module.
Danger:	This information MUST be followed, or catastrophic equipment failure or personal injury may occur.
Warning:	Alerts the user on important steps about the module integration.

All dates are in ISO 8601 format, that is YYYY-MM-DD.

2.5 Terms and Conditions

Refer to https://www.telit.com/hardware-terms-conditions/.

2.6 Disclaimer

THE MATERIAL IN THIS DOCUMENT IS FOR INFORMATIONAL PURPOSES ONLY. TELIT CINTERION RESERVES THE RIGHT TO MAKE CHANGES TO THE PRODUCTS DESCRIBED HEREIN. THE SPECIFICATIONS IN THIS DOCUMENT ARE SUBJECT TO CHANGE AT THE DISCRETION OF TELIT CINTERION WITHOUT PRIOR NOTICE. THIS DOCUMENT IS PROVIDED ON “AS IS” BASIS ONLY AND MAY CONTAIN DEFICIENCIES OR INADEQUACIES. TELIT CINTERION DOES NOT ASSUME ANY LIABILITY FOR INFORMATION PROVIDED IN THE DOCUMENT OR ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT DESCRIBED HEREIN.

TELIT CINTERION GRANTS A NON-EXCLUSIVE RIGHT TO USE THE DOCUMENT. THE RECIPIENT SHALL NOT COPY, MODIFY, DISCLOSE, OR REPRODUCE THE DOCUMENT EXCEPT AS SPECIFICALLY AUTHORIZED BY TELIT CINTERION.

TELIT CINTERION AND THE TELIT CINTERION LOGO, ARE TRADEMARKS OF TELIT CINTERION AND ARE REGISTERED IN CERTAIN COUNTRIES. ALL OTHER REGISTERED TRADEMARKS OR TRADEMARKS MENTIONED IN THIS DOCUMENT ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS AND ARE EXPRESSLY RESERVED BY TELIT CINTERION (AND ITS LICENSORS).

3 General Product Description

3.1 Overview

The Telit ME310G1 module is a CATM / NBIoT communication module that allows integrators to plan availability for lifecycle applications.

The Telit ME310G1-WWV module is fully voice capable with a Digital Voice Interface (DVI). It is suitable for applications such as voice-enabled alarm panels, mHealth patient monitors, and special devices used by elderly or disabled. The Telit ME310G1 module operates with 1.8 V GPIOs, minimizing power consumption. This makes it suitable for battery-powered and wearable devices.

3.2 Product Variants and Frequency Bands

Table 2: Product Variants and their Frequency Bands

Product	Hw rev	2G Band (MHz)	LTE CATM1	NBIoT	CS Voice VoLTE	Region
ME310G1-W1	0.0	-	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85, B8_39d*	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85, B86*, B8_39d*	N	Worldwide
ME310G1-WW	0.0 1.0	850, 900, 1800, 1900	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85, B8_39d*	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85, B8_39d*	N	Worldwide
ME310G1-WWV	1.0	850, 900, 1800, 1900	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85	Y	Worldwide
ME310G1-W2	0.0	-	B1, B3, B5, B8, B20, B28, B31, B72, B87***, B88***	B1, B3, B5, B8, B20, B28, B31, B72, B87***, B88***	N	Worldwide
ME310G1-W3	0.0	-	B1, B2, B3**, B4, B5**, B8, B12, B13, B14, B18, B19, B20, B25, B26**, B27, B28, B66, B85, B8_39d*		N	Worldwide

Refer to “RF Section” for detailed information about frequencies and bands.

Note: Cellular technologies and frequency bands that are enabled may vary based on firmware version and firmware configuration used.

Note: *"B86" is not a 3GPP band, but a private band; it means the following: .

UL range: 787-788 MHz (channels 132672-132681), DL range: 757-758 MHz (channels 67536-67545) it is supported only in module where AT#BNDOPTIONS command response contains the string 86.

E.g. AT#BNDOPTIONS?

#BNDOPTIONS: 1,2,3,4,5,8,12,13,18,19,20,25,26,27,28,66,71,85,86.

Note: * "B8_39d" is not a 3GPP band, it means the following:

U.S. FCC 900MHz that employs 39MHz duplexing

UL range: 897.5-900.5MHz, DL range: 936.5-939.5

It is supported only in the module where AT#BNDOPTIONS command response contains the string B8_39d.

E.g. AT#BNDOPTIONS?

#BNDOPTIONS: 1,2,3,4,5,8,12,13,18,19,20,25,26,27,28,66,71,85, B8_39d.

Note: ** indicates SKT bands.

Note: *** B87 and B88 are available only in SW based on TX2.0 Qualcomm baseline (from 37.00.xx5 - M0C.xxxx04)

3.3 Target Market

The Telit ME310G1 can be used for telematics applications where tamper-resistance, confidentiality, integrity, and authenticity of end-user information are required, for example:

- Telematics services
- Road pricing
- Pay-as-you-drive insurance
- Vehicles tracking
- Internet connectivity

3.4 Main Features

Table 3: Functional Features

Function*	Features
Modem	• CATM and NBIoT technologies • SMS support (text and PDU) • Alarm management • Real-Time Clock
Interfaces	• USB 2.0 HS (AT command* and FW upgrade) • USIF0 Main UART (AT command* and FW upgrade) • USIF1 Secondary UART (Not currently supported: pins reserved for future use) • AUX UART (AT Command*) • SPI • 6 GPIOs • Antenna port

Note: * Functionality depending on ports configurations

3.5 Tx Output Power

3.5.1 ME310G1-W1

Table 4: Transmission Output Power ME310G1W1

Band	Mode	Class	RF power (dBm) Nominal*
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85, B8_39d	(LTE) CAT-M1	5	21
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85, B86, B8_39d	(LTE) CAT-NB2	5	21

Note: * Max output power tolerance range according to 3GPP TS 36.521-1 and 3GPP TS 51.010-1 or higher.

3.5.2 ME310G1-WW

Table 5: Transmission Output Power ME310G1-WW

Band	Mode	Class	RF power (dBm) Nominal*
850/ 900MHz	GPRS	4	32.5
	EGPRS	E2	27
1800/ 1900MHz	GPRS	1	29.5
	EGPRS	E2	26
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85, B8_39d	(LTE) CAT-M1	3	23

Band	Mode	Class	RF power (dBm) Nominal*
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B85, B86, B8_39d	(LTE) CAT-NB2	3	23
B71	(LTE) CAT-NB2	5	20

Note: * Max output power tolerance range according to 3GPP TS 36.521-1 and 3GPP TS 51.010-1 or higher.

3.5.3 ME310G1-WWV

Table 6: Transmission Output Power ME310G1-WWV

Band	Mode	Class	RF power (dBm) Nominal*
850/900MHz	GPRS	4	32.5
	EGPRS	E2	27
1800/1900MHz	GPRS	1	29.5
	EGPRS	E2	26
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B27, B28, B66, B85	(LTE) CAT-M1	3	23
B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B85	(LTE) CAT-NB2	3	23
B71	(LTE) CAT-NB2	5	20

Note: * Max output power tolerance range according to 3GPP TS 36.521-1 and 3GPP TS 51.010-1 or higher.

3.5.4 ME310G1-W2

Table 7: Transmission Output Power ME310G1-W2

Band	Mode	Class	RF power (dBm) Nominal*
B1, B3, B5, B8, B20, B28	(LTE) CAT-M1	5	21
B1, B3, B5, B8, B20, B28	(LTE) CAT-NB2	5	21
B31, B72	(LTE) CAT-M1	2	26
B31, B72	(LTE) CAT-NB2	3	23
B87, B88	(LTE) CAT-M1	3	23
B87, B88	(LTE) CAT-NB2	3	23

Note: * Max output power tolerance range according to 3GPP TS 36.521-1 and 3GPP TS 51.010-1 or higher.

3.5.5 ME310G1-W3

Table 8: Transmission Output Power ME310G1-W3

Band	Mode	Class	RF power (dBm) Nominal*
B1, B2, B3**, B4, B5**, B8, B12, B13, B14, B18, B19, B20, B25, B26**, B27, B28, B66, B85, B8_39d	(LTE) CAT-M1	3	23

Note: * Max output power tolerance range according to 3GPP TS 36.521-1 and 3GPP TS 51.010-1 or higher.

Note: ** indicates SKT bands.

3.6 RX Sensitivity

3.6.1 ME310G1-W1

Table 9: RX Sensitivity ME310G1-W1

Band	Class	REFsens(dBm) * 3GPP Limit
CATM1 / Band1	-107.1	-102.7
CAT M1 / Band2	-107.5	-100.3
CAT M1 / Band3	-106.4	-99.3
CAT M1 / Band4	-107.3	-102.3
CAT M1 / Band5	-106.0	-100.8
CAT M1 / Band8	-107.3	-99.8
CAT M1 / Band12	-103.2	-99.3
CAT M1 / Band13	-104.3	-99.3
CAT M1 / Band18	-107.2	-102.3
CAT M1 / Band19	-106.5	-102.3
CAT M1 / Band20	-105.4	-99.8
CAT M1 / Band25	-107.5	None
CAT M1 / Band26	-107.1	-100.3
CAT M1 / Band27	-107.1	-100.8
CAT M1 / Band28	-105.5	-100.8
CAT M1 / Band66	-107.5	None

Band	Class	REFsens(dBm) * 3GPP Limit
CAT M1 / Band85	-102.2	None
CAT NB2 / Band1	-115.5	-108.2
CAT NB2 / Band2	-115.6	-108.2
CAT NB2 / Band3	-114.0	-108.2
CAT NB2 / Band4	-115.8	None
CAT NB2 / Band5	-115.1	-108.2
CAT NB2 / Band8	-114.1	-108.2
CAT NB2 / Band12	-115.5	-108.2
CAT NB2 / Band13	-115.8	-108.2
CAT NB2 / Band18	-115.1	-108.2
CAT NB2 / Band19	-115.4	-108.2
CAT NB2 / Band20	-114.0	-108.2
CAT NB2 / Band25	-115.7	None
CAT NB2 / Band26	-115.4	-108.2
CAT NB2 / Band28	-115.7	-108.2
CAT NB2 / Band66	-115.3	-108.2
CAT NB2 / Band71	-111.3	None
CAT NB2 / Band85	-115.7	None

Note: * 3GPP TS 36.521-1 release 15 minimum performance requirements.

3.6.2 ME310G1-WW and ME310G1-WWV

Table 10: RX Sensitivity ME310G1-WW and ME310G1-WWV (* 2G)

Band	REFsens (dBm) Typical HW 0.0	REFsens (dBm) Typical HW1.0	REFsens (dBm)* 3GPP Limit
CATM1 / Band1	-105.6	-107.6	-102.7
CAT M1 / Band2	-106.7	-107.8	-100.3
CAT M1 / Band3	-104.3	-107.6	-99.3
CAT M1 / Band4	-106.2	-107.8	-102.3
CAT M1 / Band5	-105.8	-106.7	-100.8
CAT M1 / Band8	-106.2	-106.7	-99.8
CAT M1 / Band12	-104.8	-107.2	-99.3
CAT M1 / Band13	-106.7	-107.8	-99.3
CAT M1 / Band18	-106.6	-106.8	-102.3
CAT M1 / Band19	-105.7	-106.5	-102.3

Band	REFsens (dBm) Typical HW 0.0	REFsens (dBm) Typical HW1.0	REFsens (dBm)* 3GPP Limit
CAT M1 / Band20	-105.7	-106.8	-99.8
CAT M1 / Band25	-106.7	-107.8	None
CAT M1 / Band26	-106.4	-106.7	-100.3
CAT M1 / Band27	-106.9	-107.0	-100.8
CAT M1 / Band28	-106.4	-107.3	-100.8
CAT M1 / Band66	-105.8	-107.8	None
CAT M1 / Band85	-104.0	-107.1	None
CAT NB2 / Band1	-115.7	-116.8	-108.2
CAT NB2 / Band2	-115.9	-116.7	-108.2
CAT NB2 / Band3	-115.5	-116.5	-108.2
CAT NB2 / Band4	-115.1	-116.7	None
CAT NB2 / Band5	-115.8	-115.8	-108.2
CAT NB2 / Band8	-115.3	-115.8	-108.2
CAT NB2 / Band12	-115.5	-116.2	-108.2
CAT NB2 / Band13	-115.5	-116.5	-108.2
CAT NB2 / Band18	-115.8	-115.7	-108.2
CAT NB2 / Band19	-115.6	-115.7	-108.2
CAT NB2 / Band20	-114.7	-115.8	-108.2
CAT NB2 / Band25	-115.9	-116.6	None
CAT NB2 / Band26	-115.7	-115.8	-108.2
CAT NB2 / Band28	-115.5	-116.4	-108.2
CAT NB2 / Band66	-115.2	-116.6	-108.2
CAT NB2 / Band71	-107.5	-115.2	None
CAT NB2 / Band85	-115.5	-116.2	None
GPRS/GSM850**	-110.0	-110.0	-104
GPRS/GSM900**	-109.8	-109.8	-104
GPRS/DCS1800**	-109.6	-109.6	-104
GPRS/PCS1900**	-108.6	-108.6	-104
GSM850**	-109.0	-109.0	-104
GSM900**	-108.5	-108.5	-104
DCS1800**	-108.2	-108.2	-104
PCS1900**	-107.5	-107.5	-104

Note: * 3GPP TS 36.521-1 release 15 minimum performance requirements.

Note: **GPRS sensitivity table using CS2 GMSK BLER<10%, CS2 According to 3GPP 51.010-1; GSM voice BER <2.44%.

3.6.3 ME310G1-W2

Table 11: RX Sensitivity ME310G1-W2

Band	REFsens (dBm) Typical	REFsens (dBm)* 3GPP Limit
CATM1 / Band1	-106.6	-102.7
CAT M1 / Band3	-107.0	-99.3
CAT M1 / Band5	-106.5	-100.8
CAT M1 / Band8	-106.9	-99.8
CAT M1 / Band20	-106.8	-99.8
CAT M1 / Band28	-107.4	-100.8
CAT M1 / Band31	-104.7	-96.6
CAT M1 / Band72	-104.8	-96.6
CAT M1 / Band87	-105.3	-96.6
CAT M1 / Band 88	-105.4	-96.6
CAT NB2 / Band1	-116.2	-108.0
CAT NB2 / Band3	-116.5	-108.0
CAT NB2 / Band5	-115.9	-108.0
CAT NB2 / Band8	-116.2	-108.0
CAT NB2 / Band20	-115.8	-108.0
CAT NB2 / Band28	-116.2	-108.0
CAT NB2 / Band31	-114.4	-108.0
CAT NB2 / Band72	-114.6	-108.0
CAT NB2 / Band87	-114.3	-108.0
CAT NB2 / Band88	-114.7	-108.0

Note: * 3GPP TS 36.521-1 release 15 minimum performance requirements.

3.6.4 ME310G1-W3

Table 12: RX Sensitivity ME310G1-W3

Band	REFsens (dBm) Typical	REFsens (dBm)* 3GPP Limit
CATM1 / Band1	-107.2	-102.3
CAT M1 / Band2	-107.3	-100.3
CAT M1 / Band3**	-106.8	-99.3

Band	REFsens (dBm) Typical	REFsens (dBm)* 3GPP Limit
CAT M1 / Band4	-106.7	-102.3
CAT M1 / Band5**	-107.2	-100.8
CAT M1 / Band8	-107.1	-99.8
CAT M1 / Band12	-107.3	-99.3
CAT M1 / Band13	-107.7	-99.3
CAT M1 / Band14	-107.7	-99.3
CAT M1 / Band18	-107.5	-102.3
CAT M1 / Band19	-107.2	-102.3
CAT M1 / Band20	-106.9	-99.8
CAT M1 / Band25	-107.3	-100.3
CAT M1 / Band26**	-107.3	-100.3
CAT M1 / Band27	-107.2	-100.8
CAT M1 / Band28	-107.9	-100.8
CAT M1 / Band66	-107.2	-102.3
CAT M1 / Band85	-107.4	-99.3
CAT M1 / Band8_39d	-108.1	-99.8

Note: * 3GPP TS 36.521-1 release 15 minimum performance requirements.

Note: ** indicates SKT bands.

3.7 Mechanical Specifications

3.7.1 Dimensions

The overall dimensions of the ME310G1-W1 are:

- Length: 14.3 mm
- Width: 13.1 mm
- Thickness: 2.6 mm

The dimensions of the ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3 without label applied are:

- Length: 18.0 mm
- Width: 15.0 mm
- Thickness: 2.6 mm

3.7.2 Weight

The nominal weight of the ME310G1-W1 is 1g.

The nominal weight of the ME310G1-WW, ME310G1-WWV, and ME310G1-W2 is 1.5g.

3.8 Temperature Range

Table 13: Temperature Range

Temperature range	Range	Note
Operating Temperature Range	–40°C to +85°C	The module is fully functional (*) and compliant according to regulatory standards.
Storage Temperature Range	–40°C to +105°C	The module is not powered and not connected to power supply

Note: (*) If applicable, the module can make and receive voice calls, data calls, send and receive SMS, and data traffic.

4 Pins Allocation

4.1 LGA Pads Layout Top View (HW 1.0)

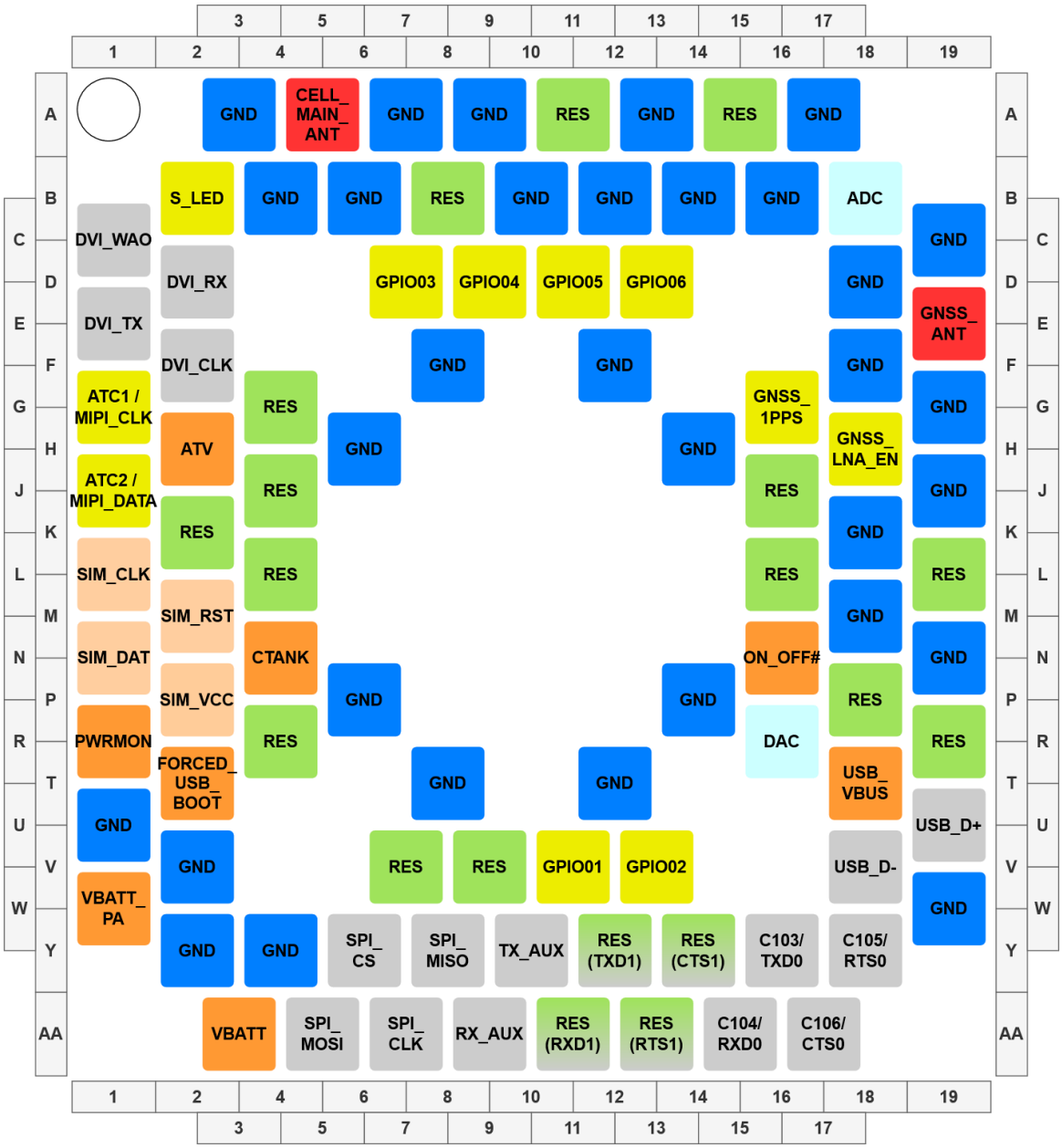


Figure 1: LGA Pads Layout

- SUPPLY AND CONTROL
- SIM CARD
- ANALOG FUNCTIONALITY
- GROUND
- DIGITAL FUNCTIONALITY
- DIGITAL COMMUNICATION
- HIGH SPEED DIGITAL COMMUNICATION
- EXT. MEMORY INTERFACE
- RF SIGNALS
- NO CONNECT / RESERVED FOR FUTURE USE

4.2 Pin-out

Table 14: PIN Out Information

Pin	Signal	I/O	Function	Type	Comment
USB HS 2.0 Communication Port					
U19	USB_D+	I/O	USB differential Data (+)		
V18	USB_D-	I/O	USB differential Data (-)		
T18	USB_VBUS	AI	USB Power Sense		
Asynchronous Serial Port (USIF0) – Prog. / Data + HW Flow Control					
Y16	TXD0	I	Serial data input (TXD) from DTE	CMOS 1.8V	Internal PU (100K)
AA15	RXD0	O	Serial data output (RXD) to DTE	CMOS 1.8V	
Y18	RTS0	I	Input for Request to send signal (RTS) from DTE	CMOS 1.8V	Internal PU (100K)
AA17	CTS0	O	Output for Clear to send signal (CTS) to DTE	CMOS 1.8V	
Asynchronous Serial Port (USIF1 - Not managed by software)					
Y12	RFU (TXD1)	(I)	Serial data input (TXD) from DTE	CMOS 1.8V	Internal PU (100K)
AA11	RFU(RXD1)	(O)	Serial data output (RXD) to DTE	CMOS 1.8V	MUST NOT BE “HIGH” at boot
AA13	RFU(RTS1)	(I)	Input for Request to send signal (RTS) from DTE	CMOS 1.8V	Internal PU (100K)
Y14	RFU(CTS1)	(O)	Output for Clear to send signal (CTS) to DTE	CMOS 1.8V	
Auxiliary Serial Port					
Y10	TX_AUX	O	Auxiliary UART (TX Data to DTE)	CMOS 1.8V	
AA9	RX_AUX	I	Auxiliary UART (RX Data to DTE)	CMOS 1.8V	Internal PU (100K)
Sim Card Interface					
L1	SIM_CLK	O	External SIM signal – Clock	CMOS 1.8V	
M2	SIM_RST	O	External SIM signal – Reset	CMOS 1.8V	
N1	SIM_DAT	I/O	External SIM signal – Data I/O	CMOS 1.8V	
P2	SIM_VCC	-	Power supply for the SIM	1.8V	Only 1.8V simcard are supported
-	SIMIN	I	Presence SIM input	CMOS 1.8V	See External SIM holder

Pin	Signal	I/O	Function	Type	Comment
SPI					
AA5	SPI_MOSI	I/O	SPI MOSI	CMOS 1.8V	
Y8	SPI_MISO	I/O	SPI MISO	CMOS 1.8V	
AA7	SPI_CLK	I/O	SPI Clock	CMOS 1.8V	
Y6	SPI_CS	I/O	SPI Chip Select	CMOS 1.8V	
Digital IO					
V11	GPIO01	I/O	Configurable GPIO01/ DTR is alternate function	CMOS 1.8V	Internal PD (100K) *
V13	GPIO02	I/O	Configurable GPIO02/ RING is alternate function	CMOS 1.8V	Internal PD (100K)
D7	GPIO03	I/O	Configurable GPIO03	CMOS 1.8V	Internal PD (100K)
D9	GPIO04	I/O	Configurable GPIO04	CMOS 1.8V	Internal PD (100K)
D11	GPIO05	I/O	Configurable GPIO05 DTR is alternate function	CMOS 1.8V	Internal PD (100K) *
D13	GPIO06	I/O	Configurable GPIO06	CMOS 1.8V	Internal PD (100K)
ADC and DAC					
B18	ADC	I	Analog To Digital Converter Input	A/D	
R16	DAC	O	Digital To Analog Converter Output	D/A	PWM signal
RF Section					
A5	CELL_MAIN ANTENNA	I/O	Main Antenna (50 ohm)	RF	
E19	GNSS ANTENNA	I	GNSS Antenna	RF	
GNSS_PPS					
H18	GNSS_LNA_EN	O	GNSS external LNA enable	CMOS 1.8V	
G16	GNSS_1PPS	O	1 Pulse per Second	CMOS 1.8V	
Miscellaneous Functions					
B2	S_LED	O	Status LED	CMOS 1.8V	
N16	ON_OFF#/WAKE#	I	Input Command for Power ON/OFF and to wake from deep sleep mode	CMOS 1.8V	Active Low
R1	PWRMON	O	Power ON Monitor	CMOS 1.8V	
T2	FORCED_USB_BOOT	I	Optional pin, connect to test point	CMOS 1.8V	Active high, Internal PD (100K)

Pin	Signal	I/O	Function	Type	Comment
Audio Section					
C1	DVI_WA0	I/O	Digital Audio Interface (WA0)	CMOS 1.8V	
D2	DVI_RX	O	Digital Audio Interface (RX)	CMOS 1.8V	
E1	DVI_TX	I	Digital Audio Interface (TX)	CMOS 1.8V	
F2	DVI_CLK	I/O	Digital Audio Interface (CLK)	CMOS 1.8V	
Power Supply					
W1	VBATT_PA	-	Main power supply (Radio PA)	Power	
AA3	VBATT	-	Main power supply (Baseband)	Power	
N4	CTANK	-	Internal supply domain pin for external tank capacitor	1.8V	
Antenna Tuner Section (refer to the Antenna tuner chapter)					
G1	ATC1/MIPI_CLK	O	Antenna Tuner Ctrl		
J1	ATC2/MIPI_DATA	O	Antenna Tuner Ctrl		
H2	ATV	O	Antenna Tuner Voltage		
GND					
A3	GND	-	RF Ground	Power	
A7	GND	-	RF Ground	Power	
A9	GND	-	RF Ground	Power	
A13	GND	-	RF Ground	Power	
A17	GND	-	RF Ground	Power	
B4	GND	-	RF Ground	Power	
B6	GND	-	RF Ground	Power	
B10	GND	-	RF Ground	Power	
B12	GND	-	RF Ground	Power	
B14	GND	-	RF Ground	Power	
B16	GND	-	RF Ground	Power	
C19	GND	-	RF Ground	Power	
D18	GND	-	RF Ground	Power	
F8	GND	-	Thermal Ground	Power	
F12	GND	-	Thermal Ground	Power	
F18	GND	-	Thermal Ground	Power	
G19	GND	-	Thermal Ground	Power	
H6	GND	-	Thermal Ground	Power	
H14	GND	-	Thermal Ground	Power	
J19	GND	-	Thermal Ground	Power	
K18	GND	-	Thermal Ground	Power	
M18	GND	-	Thermal Ground	Power	

Pin	Signal	I/O	Function	Type	Comment
N19	GND	-	Thermal Ground	Power	
P6	GND	-	Thermal Ground	Power	
P14	GND	-	Thermal Ground	Power	
T8	GND	-	Thermal Ground	Power	
T12	GND	-	Thermal Ground	Power	
U1	GND	-	Power Ground	Power	
V2	GND	-	Power Ground	Power	
W19	GND	-	Power Ground	Power	
Y2	GND	-	Power Ground	Power	
Y4	GND	-	Power Ground	Power	
RESERVED					
K2	RESERVED	-	RESERVED		
J4	RESERVED	-	RESERVED		
G4	RESERVED	-	RESERVED		
L19	RESERVED	-	RESERVED		
A11	RESERVED	-	RESERVED		
R4	RESERVED	-	RESERVED		
L4	RESERVED	-	RESERVED		
V7	RESERVED	-	RESERVED		
V9	RESERVED	-	RESERVED		
L16	RESERVED	-	RESERVED		
P18	RESERVED	-	RESERVED		
J16	RESERVED	-	RESERVED		
R19	RESERVED	-	RESERVED		
B8	RESERVED	-	RESERVED		
A15	RESERVED	-	RESERVED		

Warning: Reserved pins must not be connected.

Warning: All pull-up (PU) and pull-down (PD) are about 100K.

Warning: Pin AA11 RFU(RXD1) cannot have any PU or HIGH state during the BOOT UP phase.

Note: (*) Refer to Table 32: ME310G1 available GPIO for pull value when using alternate functions

Note: (**) Refer to Antenna tuner chapter.

5 Power Supply

The power supply circuit and board layout are an important part of the product design. Make sure to follow the guidelines and requirements for optimal performance.

5.1 Power Supply Requirements

The external power supply must be connected to the VBATT & VBATT_PA signals. The following are the power supply requirements:

Table 15: Power Supply Requirements

Power Supply	Value
Nominal Supply Voltage	3.8V
Operating Voltage Range	3.4 V - 4.2 V
Extended Voltage Range	2.6 V - 4.5 V
$VBATT_{min}$	2.7V

Warning: The range 2.6V - 3.2V can be used only if both USB and 2G are disabled.

Warning: The modem supply voltage must never exceed the Extended Voltage Range. Inaccurate implementation of power supply guidelines can cause a modem failure.

Note: For PTCRB approval on the final products the power supply is required to be within the “Operating Voltage Range”.

Note: The power supply section of the application must be carefully designed to avoid excessive voltage drop during peak transmission current absorptions. If the voltage drops beyond the limits of the Extended Operating Voltage range, an unintentional module power off can occur.

Note: At power on, the supply voltage must be at least VBATTmin.

Note: The Hardware User Guide specifications must be recognized and carefully implemented when using the module in its Extended Voltage Range.

5.2 Power Consumption

5.2.1 Idle Mode

Table 16: Idle and PSM Mode

Mode	Measure (Typical)			Mode Description
OFF mode				
Switched Off	3uA			VBATT applied but module has not been turned on yet.
Off after On	13uA†			Module off without activating PSM modes. Additional consumption depends on RTC calibration logic†. Use PSM modes for lower consumption if RTC calibration is not needed.
IDLE mode	CATM(mA)	NBIoT(mA)	2G(mA)	
AT+CFUN=1	8.1	8.0	8.0	Normal mode: full functionality of the module
AT+CFUN=4	7.5			Disabled TX and RX; the module is not registered on the network
AT+CFUN=5	1.20	0.95	-	Paging cycle #256 frames (2.56s DRx cycle)
	0.60	0.60	-	81.92s eDRx cycle length (PTW=2.56s, DRX=1.28s)
	0.18[1]	0.18*	-	327.68s eDRx cycle length (PTW=2.56s, DRX=1.28s)
	0.10[1]	0.10*	-	655.36s eDRx cycle length (PTW=2.56s, DRX=1.28s)
	0.05[1]	0.05*	-	1310.72s eDRx cycle length (PTW=2.56s, DRX=1.28s)
	0.03[1]	0.03*	-	2621.44s eDRx cycle length (PTW=2.56s, DRX=1.28s)
	-	-	0.90	Paging Multiframe 9
PSM mode	Typical (mA)			
AT+CPSMS=1	3uA			No current source or sink by any connected pin

Note: * PSM in between eDRX. * PSM in between eDRX.

Table 17: GPS Mode

Mode		Measure* (Typical)	Mode Description
GPS		(mA)	
Active State (GNSS ON, CFUN=4)	Acquisition	69.3	GPS+GLO, DPO off
	Navigation	22	GPS+GLO, DPO on DWELL=280ms
		55.9	GPS+GLO, DPO off
Active State (GNSS ON, CFUN=5 eDRX)	Acquisition	68.5	GPS+GLO, DPO off
	Navigation	15.7	GPS+GLO, DPO on DWELL=280ms
		54	GPS+GLO, DPO off

Note: *reference signal @-130dBm with static scenario.

5.2.2 ME310G1-W1 Connected Mode

Table 18: ME310G1-W1 Connected Mode

Mode	Measure (Typical)		Mode Description
Connected mode	Average (mA)	Peak (mA)	
CATM	180	400	1 RB, RMC, TBS=5, QPSK, 21dBm, all bands
NBIoT	245	340	3.75KHz, 1 SC, RU 32ms, TBS=0, BPSK, 20dBm, all bands
	65	290	15KHz, 12 SC, RU 1ms, TBS=5, QPSK, 21dBm, all bands

5.2.3 ME310G1-WW and ME310G1-WWV Connected Mode

Table 19: ME310G1-WW and ME310G1-WWV Connected Mode

Mode	Measure (Typical)		Mode Description
Connected mode	Average (mA)	Peak (mA)	
CATM	380	1100	1 RB, RMC, TBS=5, QPSK, 23dBm, Band 85, 28, 12
	320	900	1 RB, RMC, TBS=5, QPSK,23dBm, Band 13, 26, 5, 18, 19, 20, 8
	305	800	1 RB, RMC, TBS=5, QPSK, 23dBm, Band 3, 2, 25, 4, 1, 66
NBIoT	240	335	3.75KHz, 1 SC, RU 32ms, TBS=0, BPSK, 20dBm, Band 71
	600	1000	3.75KHz, 1 SC, RU 32ms, TBS=0, BPSK, 23dBm, Band 85, 28, 12
	500	850	3.75KHz, 1 SC, RU 32ms, TBS=0, BPSK, 23dBm, Band 13, 26, 5, 18, 19, 20, 8
	430	750	3.75KHz, 1 SC, RU 32ms, TBS=0, BPSK, 23dBm, Band 3, 2, 25, 4, 1, 66
	68	300	15KHz, 12 SC, RU 1ms, TBS=5, QPSK, 21dBm, Band 71
	88	950	15KHz, 12 SC, RU 1ms, TBS=5, QPSK, 23dBm, Band 85, 28, 12
	78	800	15KHz, 12 SC, RU 1ms, TBS=5, QPSK, 23dBm, Band 13, 26, 5, 18, 19, 20, 8
	77	730	15KHz, 12 SC, RU 1ms, TBS=5, QPSK, 23dBm, Band 3, 2, 25, 4, 1, 66
GPRS	300	2000	1TX + 1RX, CS1, GMSK, Band 850, 900
	170	1000	1TX + 1RX, CS1, GMSK, Band 1800, 1900

5.2.4 ME310G1-W2 Connected Mode

Table 20: ME310G1-W2 Connected Mode

Mode	Measure (Typical)		Mode Description
Connected mode	Average (mA)	Peak (mA)	
CATM	180	400	1 RB, RMC, TBS=5, QPSK, 21dBm, B1, B3, B5, B8, B20, B28
	275	690	1 RB, RMC, TBS=5, QPSK 26dBm, B31, B72

Mode	Measure (Typical)		Mode Description
	210	470	1 RB, RMC, TBS=5, QPSK 23dBm, B87, B88
NBIoT	245	340	3.75KHz subcarrier spacing, 1 SC, RU 32ms, TBS=0, BPSK, 21dBm, B1, B3, B5, B8, B20, B28
	430	550	3.75KHz subcarrier spacing, 1 SC, RU 32ms, TBS=0, BPSK, 23dBm, B31, B72
	430	500	3.75KHz subcarrier spacing, 1 SC, RU 32ms, TBS=0, BPSK, 23dBm, B87, B88
	65	290	15KHz subcarrier spacing, 12 SC, RU 1ms, TBS=5, QPSK, 21dBm, B1, B3, B5, B8, B20, B28
	80	500	15KHz subcarrier spacing, 12 SC, RU 1ms, TBS=5, QPSK, 23dBm, B31, B72
	80	500	15KHz subcarrier spacing, 12 SC, RU 1ms, TBS=5, QPSK, 23dBm, B87, B88

5.2.5 ME310G1-W3 Connected Mode

Table 21: ME310G1-W3 Connected Mode

Mode	Measure (Typical)		Mode Description
Connected mode	Average (mA)	Peak (mA)	
CATM	185	390	1 RB, RMC, TBS=5, QPSK,23dBm, Band 12, 13, 14, 28, 85
	200	440	1 RB, RMC, TBS=5, QPSK,23dBm, Band 5**, 8, 8_38d, 18, 19, 20, 26**, 27
	205	450	1 RB, RMC, TBS=5, QPSK, 23dBm, Band 1, 2, 3**, 4, 25, 66

**** indicates SKT bands**

Note: The reported LTE CAT M1 and LTE CAT NB1 values are an average among all the product variants and bands for each network wireless technology. The support of specific network wireless technology depends on the product variant configuration.

5.3 General Design Rule

The Power Supply Design guidelines include three different design steps:

- Electrical design
- Thermal design
- the PCB layout

5.3.1 Electrical Design Guidelines

The design of the module input power supply stage strongly depends on the power rail available on the host board. The following paragraphs will describe some typical design applications relying on:

- +5V input (typically PC internal regulator output)
- +12V input (typically automotive)
- Battery

5.3.1.1 +5V Source Power Supply Design Guidelines

The nominal power supply voltage of the module is 3.8V. The difference between the input source and the desired output voltage level is moderately low, hence a linear regulator may be used. A switching power supply could anyway be used for applications requiring higher conversion efficiency.

If using a linear regulator, include a heat sink to dissipate excess generated power.

- A low ESR bypass capacitor must be included to supply the transient current absorption peaks near the module.
- Make sure that the low ESR capacitor on the power supply output rail has voltage rating equal or greater than 10V nominal.

An example of a linear regulator with 5V input is:

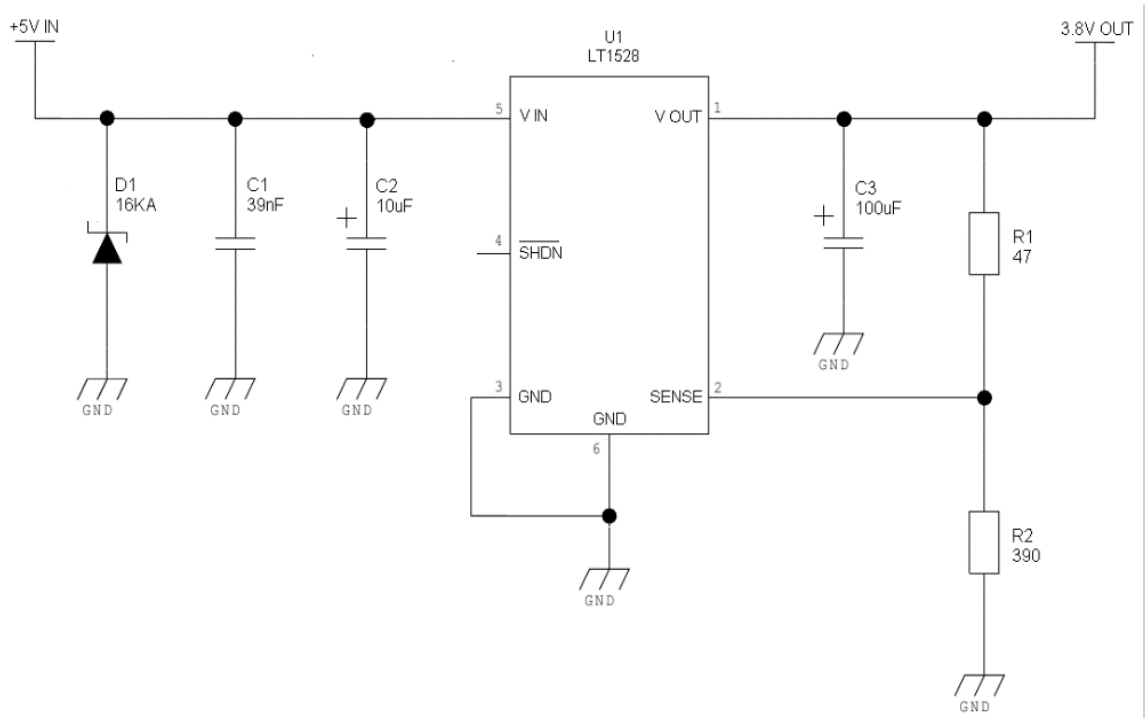


Figure 2: Example of Linear Regulator with 5V Input

5.3.1.2 +12V Source Power Supply Design Guidelines

The desired output for the power supply is 3.8V, so due to the difference between the input source and the desired output voltage level, a linear regulator is not suitable and shall not be used. A switching power supply is recommended due to its higher efficiency.

- The frequency and selection of switching design are related to the application. The designer should consider the tradeoffs between switching frequency, transient response, power stage design area on PCB and EMC of components.
- For a Pb car battery, the input voltage may rise to 15.8V and this must be considered when selecting components. All components in the power supply must support this voltage.
- A low ESR bypass capacitor must be included to stop the current absorption peaks near the module. The recommended capacitor is 100µF.
- Make sure that the low ESR capacitor on the output of the power supply is rated at least 10V.
- For Car applications a spike protection diode should be inserted close to the power input, to protect the supply from the spikes.
- An example of a switching regulator with 12V input is in the below schematic:

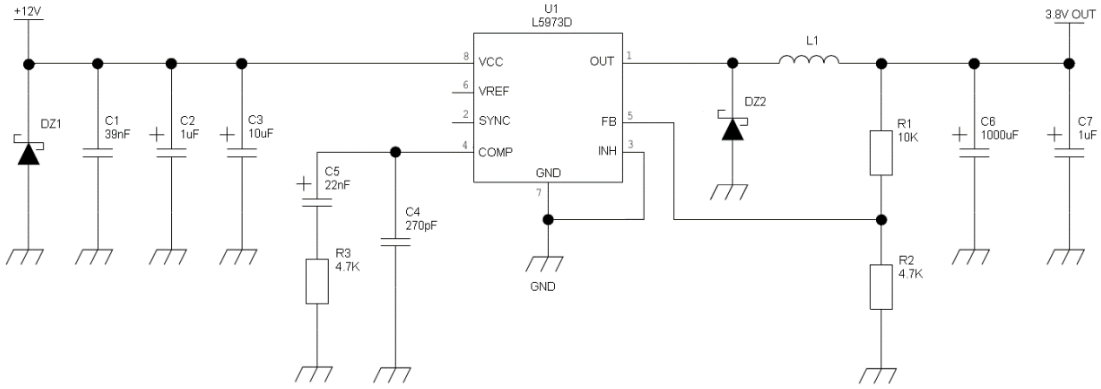


Figure 3: Switching Regulator with 12V Input

5.3.1.3 Battery Source Power Supply Design Guidelines

The nominal output of the desired power supply is 3.8V and the maximum voltage is 4.5V. So a single 3.7V Li-Ion battery type is sufficient to power the Telit ME310G1 module.

- A Bypass low ESR capacitor of adequate capacity must be provided in order to cut the current absorption peaks, a 100µF tantalum capacitor is usually suitable.
- Make sure the low ESR capacitor on the power supply output is rated at least 10V.
- A protection diode must be placed near the power input. This protects the ME310G1 from power polarity inversion. Otherwise, the battery connector must be specifically designed to avoid polarity inversions when connecting the battery.

- The battery must be rated to supply current peaks up to 2A.

Note: DON'T USE any Ni-Cd, Ni-MH, and Pb battery types directly connected with ME310G1. Their use can lead to overvoltage on the ME310G1 and damage it. USE ONLY Li-Ion battery types.

5.3.2 Thermal Design Guidelines

Worst case as reference values for thermal design of ME310G1 are:

- Average current consumption (LTE CAT M1 and NB1 modes): 700 mA
- Average current consumption (GPRS and EDGE modes): 700 mA
- Supply voltage: 4.50V

Note: Host PCB shall provide a reliable connection between its reference GND and all the module GND pads. The GND plane on the host and the connections to the module GND shall provide adequate thermal dissipation and minimize GND bounce effects that could affect RF performances.

5.3.3 Power Supply PCB Layout Guidelines

As seen on the guidelines for electrical design guidelines, the power supply shall have a low ESR capacitor on the output to reduce the current absorption peaks at input and to protect the supply from spikes. The positioning of this component is essential for the correct functioning of the circuitry. A misplaced component can be useless or can even decrease the power supply performance.

- The low ESR Bypass capacitor must be placed near the Telit ME310G1 power input pads or, if the power supply is of the switching type, it can be placed near the inductor to cut the ripple, provided that the PCB trace from the capacitor to the ME310G1 is wide enough to limit voltage drops during 2A current peak. Try to keep supply rail traces as short and as wide as possible.
- The protection diode must be placed close to the input connector where the power source is drained.
- To reduce EMI due to switching, it is important to keep the mesh involved very small; then the input capacitor, the output diode (if not incorporated into the IC) and the regulator will form a very small loop. This is done to reduce the radiated field (noise) at the switching frequency and its harmonics (usually 100-500 kHz).
- The placement of the power supply on the board must be done in such a way as to guarantee that the high current return paths in the ground plane do not overlap with noise-sensitive circuitry such as the microphone amplifier/buffer or the earphone amplifier.
- Power supply input cables should be kept separate from noise-sensitive lines such as microphone/earphone cables.

- The insertion of the EMI filter on the VBATT pins is recommended in those designs where the antenna is placed near batteries or power supply lines. For this purpose, a Murata BLM18EG101TN1 or Taiyo Yuden P/N FBMH1608HM101 ferrite bead can be used.

The below figure shows the recommended circuit:

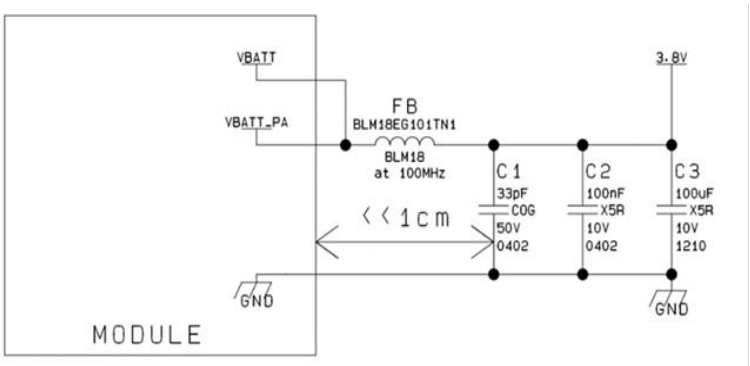


Figure 4: Recommended Circuit

5.4 RTC Supply

RTC is functional when ME310G1 is in PSM or OFF state and VBATT pin is supplied.

RTC settings are lost when the VBATT supply is disconnected.

5.5 PWRMON Power-on Monitor

PWRMON is always active (output high) when the module is powered ON (module powered ON indication) and cannot be set to a LOW level with AT commands.

This signal is present on pin R1.

The following are the operating range characteristics of the PWRMON signal:

Table 22: Operating Range Characteristics of PWRMON signal

Item	Min	Typical	Max
Output voltage	1.35V	1.8V	1.8V
Output current	-	1mA	3mA

Note: The Output Current MUST never be exceeded. To avoid excessive current consumption, be sure to carefully design the application section.

If the current exceeds the limit, the module may shutdown.

Note: PWRMON during the PSM period is LOW.

(PSM must be previously enabled by AT+CPSMS command.

Warning: This signal is NOT provided to supply small devices from the module.

PWRMON is only a module power-on indicator.

6 Digital Section

ME310G1has four main operation states:

- OFF state: VBATT is applied and only RTC is running. Baseband is switched OFF and the only change possible is the ON state.
- ON state: The baseband is fully switched on and the module is ready to accept AT commands. ME310G1 can be idle or connected.
- Sleep mode state: The main baseband processor is intermittently switched ON and AT commands can be processed with some latency. The module is idle with low current consumption.
- Deep sleep mode state: PSM defined in 3GPP Release 12. Baseband is switched OFF most of the time.

6.1 Logic Levels

Table 23: Logic Levels Minimum and Maximum

Parameter	Min	Max
Absolute Maximum Ratings – Not Functional		
Input level on any digital pin (CMOS 1.8) with respect to ground	-0.3V	2.1V
Operating Range - Interface levels (1.8V CMOS)		
Input high level	1.5V	1.9V
Input low level	0V	0.35V
Output high level	1.6V	1.9V
Output low level	0V	0.2V

Table 24: Logic Levels Average

Parameter	AVG
Current Characteristics	
Output Current	1mA
Input Current	1uA

6.2 Power On

The following flow chart shows the proper “Modem Turn ON” procedure.

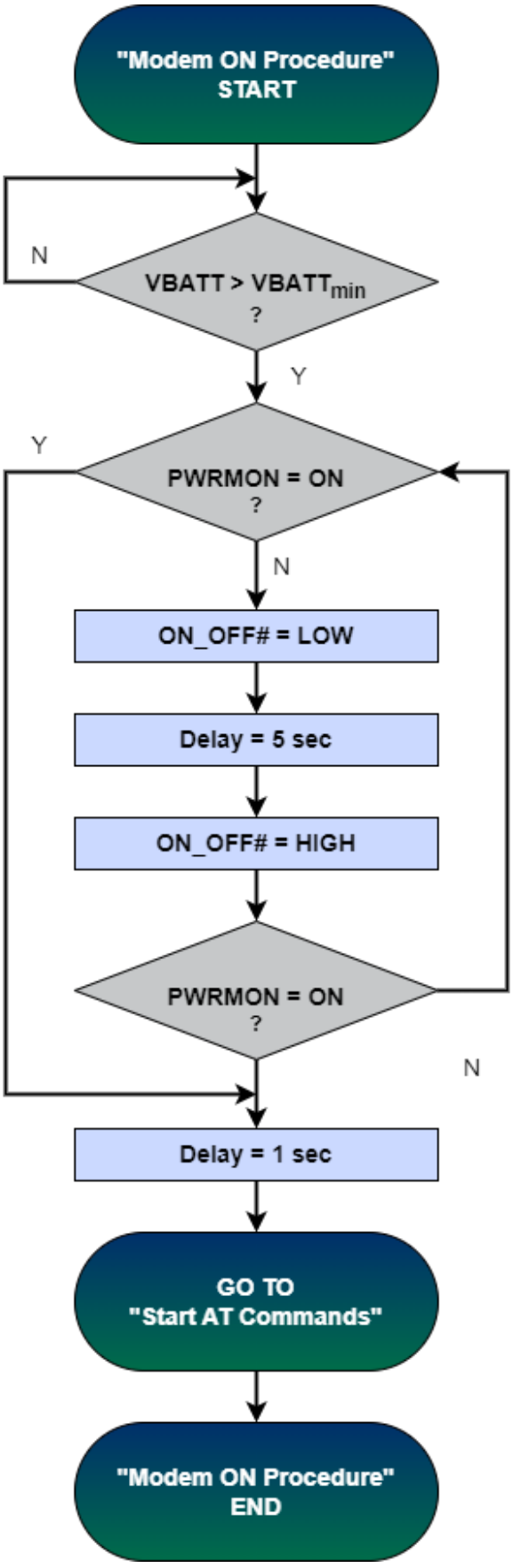


Figure 5: Modem on Process flow chart

A flow chart showing the AT commands managing procedure is displayed below:

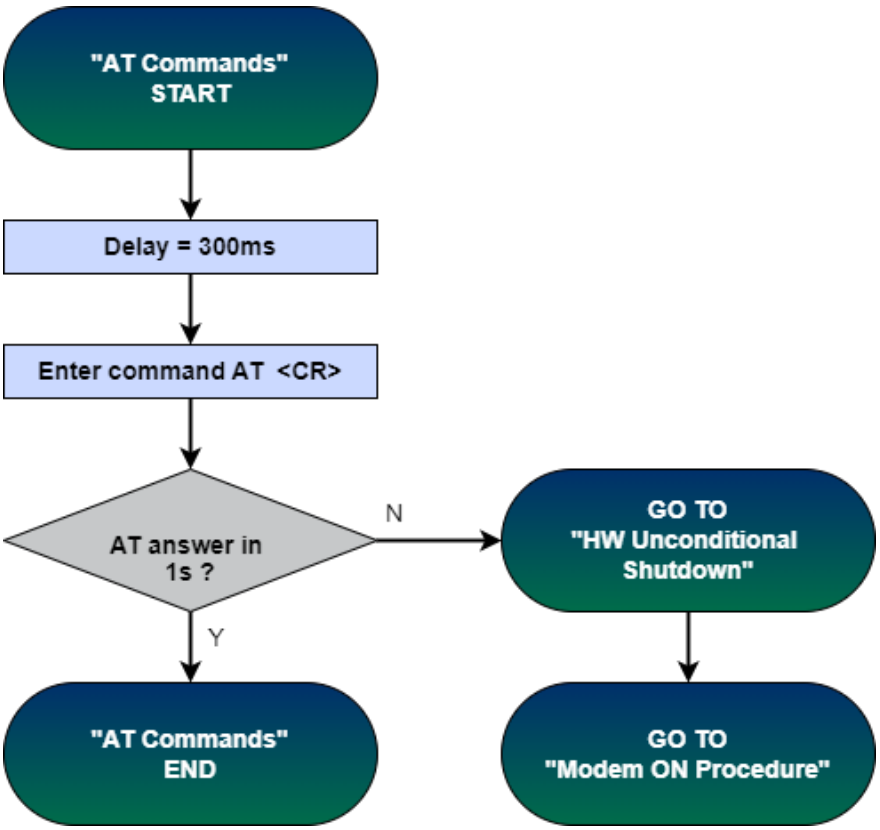


Figure 6: AT commands managing procedure flow chart

Note: To avoid back-powering it is recommended to prevent any signal with level higher than 0.4V from being applied to the digital pins of the ME310G1 when the module is powered off or during an ON-OFF transition.

In some use cases ON_OFF* can be tied fix LOW considering two limitations:

1. PSM wake-up asynchronous capability will be lost.
2. To perform an unconditional shutdown, it is necessary to send AT#SHDN command and then remove VBATT.
3. Emergency recovery procedure requires ON_OFF* not to be held LOW at all times. Host board is required to have a 0 ohm resistor to GND, instead of a direct connection, to allow for emergency procedure if required.

6.3 Power Off

The proper procedure to power off the module is to use the AT#SHDN command.

An alternative procedure is to use the ON_OFF* pin as described in the following procedure:

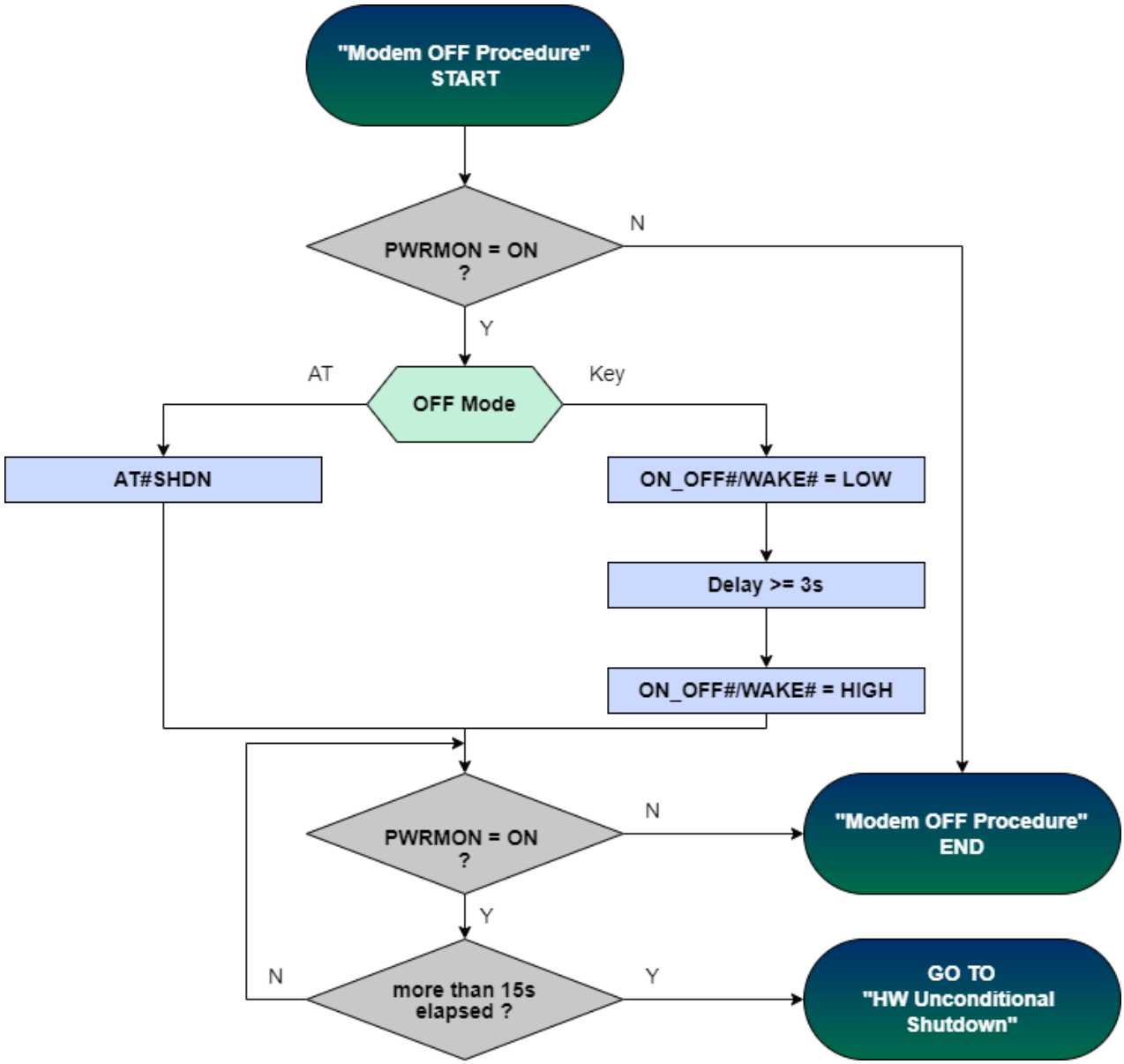


Figure 7: Modem OFF Process flow chart

6.4 Unconditional Shutdown

The following flow chart shows the proper procedure for an unconditional shutdown of the Telit ME310G1 module, except in PSM mode. When the procedure is completed, the module is reset and stops all operations. After the release of the line, the module is unconditionally shut down, without performing any disconnection from the network in which it is registered.

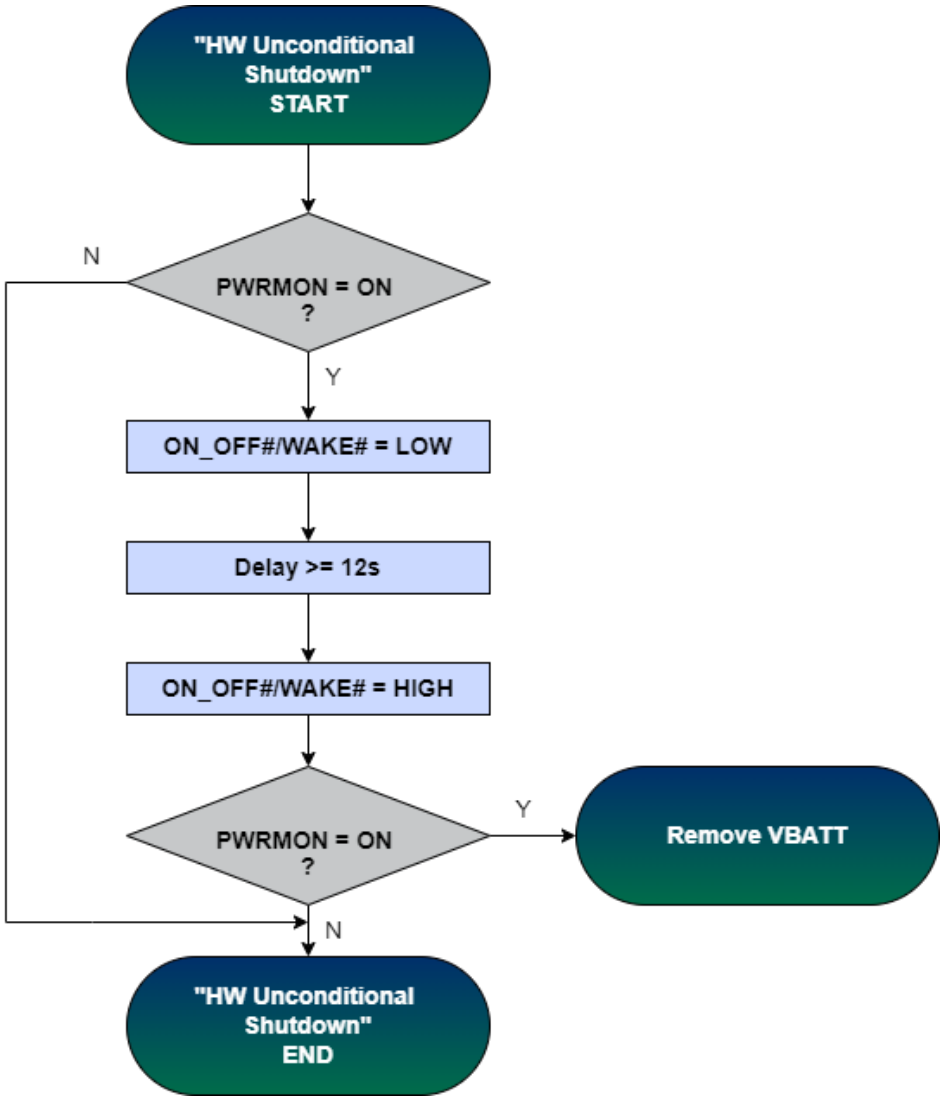


Figure 8: Unconditional shutdown of ME310G1

Warning: The Unconditional Hardware SHUTDOWN performed by removing VBATT shall not be used during the normal shutdown operation of the device. It does not disconnect the device from the network and may damage the memory content or result in inconsistent data. It must be performed only as an emergency exit procedure.

INCORRECT SHUTDOWN Procedure may void the warranty.

6.5 Wake up From Deep Sleep Mode

The ME310G1 module supports Power Saving Mode (PSM) functionality defined in 3GPP release 12. When the Periodic Update Timer expires, the module shuts down until the next scheduled wake-up. Host-controlled asynchronous events can wake up the module from deep sleep mode by asserting the ON_OFF*/WAKE* pin LOW for at least 5 seconds. The host can detect deep sleep mode by checking the PWRMON pin sate if PSM has been previously configured.

6.6 Fast Shut Down

The procedure to power off the Telit ME310G1 module is explained in the Power Off section. It normally takes more than a second to disconnect from the network and properly close the internal filesystem. Fast Shut Down feature enables proper system shutdown without any filesystem corruption. You can use this feature during an unexpected supply voltage loss. Fast Shut Down feature enables you to reduce current consumption and minimize the time-to-power off values.

Note: For more information Refer to ME310G1/ME910G1/ML865G1 AT Commands Reference Guide (Fast shut down - #FASTSHDN) to set up a detailed AT command.

6.6.1 Fast Shut Down by Hardware

The Fast Shut Down by hardware may be triggered by configuring a GPIO. HI level to the LOW level transition of a GPIO triggers the Fast Shut Down by hardware procedure.

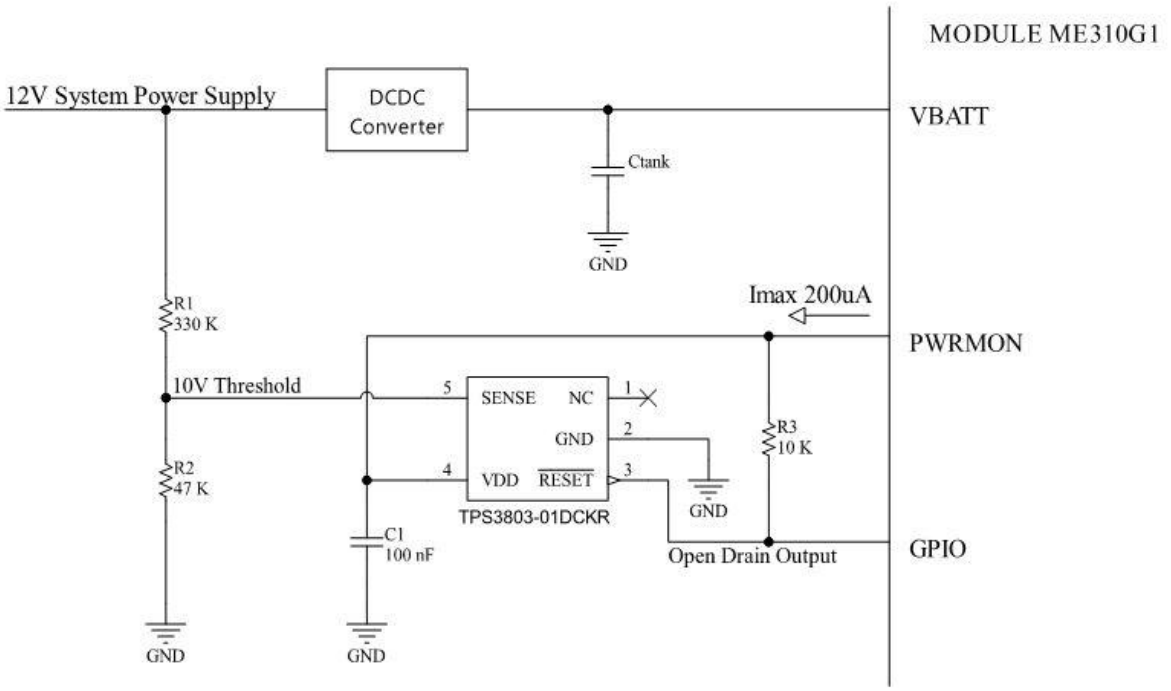


Figure 9: Example Circuit

Note: Consider the voltage drop under max current conditions when defining the voltage detector threshold to avoid unwanted shutdown.

6.6.2 Fast Shut Down by Software

The Fast Shut Down can be triggered by AT command.

6.6.3 Module Reboot

A Reboot of the module can be triggered by AT command.

Specific AT commands do include an implicit reboot to apply the changes.

Please refer to the "AT Commands Reference Guide" to identify commands that implicitly execute a reboot of the module.

Warning: The boot-up time of the module, after issuing any of the AT commands that implicitly trigger a Reboot procedure, could be considerably longer compared to what is defined in the previous flow charts. Please allow up to 20 seconds for boot up before executing a HW SHUTDOWN.

6.7 Communication Ports

6.7.1 USB 2.0 HS

The Telit ME310G1 module includes an integrated universal serial bus (USB 2.0 HS) transceiver.

The following table lists the available signals:

Table 25: USB 2.0HS available signals

PAD	Signal	I/O	Function	NOTE
U19	USB_D+	I/O	USB differential Data (+)	
V18	USB_D-	I/O	USB differential Data (-)	
T18	VUSB	AI	Power sense for the internal USB transceiver.	

The following are the USB_VBUS input voltage range and input current:

Table 26: Voltage Range

Parameter	Min	Max
ABSOLUTE MAXIMUM RATINGS – NOT FUNCTIONAL		
USB_VBUS Input level	-0.3V	6.0V
Operating Range		
USB_VBUS Input high level	1.0V	5.25V
USB_VBUS Input low level	0V	0.4V

Table 27: Input Current

Parameter	TYP
Current characteristics:	
USB_VBUS Input Current	6uA

6.7.2 SPI

The Telit ME310G1Module is provided by a standard 3-wire master SPI interface or slave interface with chip select control.

The following table lists the available signals:

Table 28: Available Signals

PAD	Signal	I/O	Function	Type	NOTE
AA5	SPI_MOSI	I/O	SPI MOSI	CMOS 1.8V	
Y8	SPI_MISO	I/O	SPI MISO	CMOS 1.8V	
AA7	SPI_CLK	I/O	SPI Clock	CMOS 1.8V	
Y6	SPI_CS	I/O	SPI Chip Select	CMOS 1.8V	

Note: The SPI interface is supported by the Telit AppZone API's.

6.7.3 Serial Ports

The Telit ME310G1 module includes 3 Asynchronous serial ports:

- Asynchronous Serial Port (USIF0)
- Asynchronous Serial Port (USIF1) *
- Auxiliary Serial Port

You may design various serial port configurations on the OEM hardware.

The common are designs are:

- RS232 PC com port
- Microcontroller UART @ 1.8V (Universal Asynchronous Receive Transmit)
- Microcontroller UART @ 5V or other voltages different from 1.8V

Depending on the serial port type on the OEM hardware, a level translator circuit may be required to operate the system. The serial port on the module is CMOS 1.8.

Note: (*) The USIF1 is currently NOT supported by ME310G1 firmware.

6.7.3.1 Asynchronous Serial Port (USIF0)

The serial port 0 on the Telit ME310G1 module is a +1.8V UART with 5 RS232 signals.

It differs from the PC-RS232 in signal polarity (RS232 is reversed) and levels.

The following are the available signals:

Table 29: Available Signals

RS232 Pin	Signal	PAD	Name	Usage
2	RXD0	AA15	Transmit line	Output transmit line of ME310G1 UART
3	TXD0	Y16	Receive line	Input receive of the ME310G1 UART Pull-up default during ON state
4	DTR	(*)	Data Terminal Ready	Input to the ME310G1 that controls the DTE READY condition
5	GND	A3, A7, A9, A13, A17, B4, B6, B10, B12, B14, B16, C19, D18, F8, F12, F18, G19, H6, H14, J19, K18, M18, N19, P6, P14, T8, T12, U1, V2, W19, Y2, Y4	Ground	Ground
8	CTS0	AA17	Clear to Send	Output from the ME310G1 that controls the Hardware flow control
7	RTS0	Y18	Request to Send	Input to the ME310G1 that controls the Hardware flow control Pull-up default during ON state
9	RING	(*)	Ring Indicator	Output from the ME310G1 that indicates the incoming call condition

*** For alternate GPIO functions, refer to General Purpose I/O**

Note: According to V.24, some signal names refer to the application side, so on the ME310G1 side these signals are in the opposite direction:

TXD on the application side is connected to the receiving line (here named TXD0)

RXD on the application side is connected to the transmit line (here named RXD0)

For reduced implementation, only the TXD, RXD lines can be connected, the other lines can be left open.

To avoid back-powering it is recommended to prevent any signal with level higher than 0.4V from being applied to the digital pins of the ME310G1 when the module is powered off or during an ON-OFF transition.

6.7.3.2 Asynchronous Serial Port (USIF1)

Current Software does not support UART1: all pins must be considered as Reserved for Future Use.

Warning: RXD1 cannot have any PU or HIGH state during BOOTING UP phase.

The following are the signals routed to external pad:

Table 30: ME310G1 Serial Port Signals

RS232 Pin	Signal	PAD	Name	Usage
2	RXD1	AA11	Transmit line	RFU - Output transmit line of ME310G1 UART
3	TXD1	Y12	Receive line	RFU - Input receive of the ME310G1 UART Pull-up default during ON state
8	CTS1	Y14	Clear to Send	RFU - Output from the ME310G1 that controls the Hardware flow control
7	RTS1	AA13	Request to Send	RFU - Input to the ME310G1 that controls the Hardware flow control Pull-up default during ON state

6.7.3.3 Auxiliary Serial Port

The auxiliary serial port on the Telit ME310G1 module is a CMOS 1.8V with only the RX and TX signals.

Table 31: ME310G1 serial port signals

Pad	Signal	I/O	Function	type	Note
Y10	TX_AUX	O	Auxiliary UART (TX Data to DTE)	CMOS 1.8V	
AA9	RX_AUX	I	Auxiliary UART (RX Data from DTE)	CMOS 1.8V	

6.8 General Purpose I/O

The Telit ME310G1 module includes a set of configurable digital input and output pins (CMOS 1.8V). The Input pads can only be read. They report the digital value (high or low) present on the pad at the time of reading. The Output pads can only be written or queried and set the value of the pad output.

An alternate function pad is controlled internally by the module firmware and depends on the function implemented.

The following are the available GPIO:

Table 32: ME310G1 available GPIO

Pad	Signal	I/O	Device Strength	Default State	Note
V11	GPIO_01	I/O	1 mA	INPUT - PD (100K)	Alternate function DTR INPUT - PU (100K)
V13	GPIO_02	I/O	1 mA	INPUT - PD (100K)	Alternate function RING
D7	GPIO_03	I/O	1 mA	INPUT - PD (100K)	
D9	GPIO_04	I/O	1 mA	INPUT - PD (100K)	
D11	GPIO_05	I/O	1 mA	INPUT - PD (100K)	Alternate function DTR INPUT - PU (100K)
D13	GPIO_06	I/O	1 mA	INPUT - PD (100K)	

6.8.1.1 Using a GPIO as INPUT

GPIO pads, when used as inputs, can be connected to the digital output of another device to report its status. Make sure the external device is compatible at interface levels with the 1.8V CMOS levels of the GPIO.

Note: To avoid back power, it is recommended to avoid applying any HIGH logic level signal to the digital pins of the ME310G1 when the module is powered off or during an ON/OFF transition.

6.8.1.2 Using a GPIO as OUTPUT

GPIO pads, when used as outputs, may drive the 1.8V CMOS digital devices or compatible hardware. When set as outputs, the pads have a push-pull output and therefore the pull-up resistor may be omitted.

6.9 External SIM Holder

Refer to the SIM Holder Design Guide, 80000NT10001A.

Note: There is no dedicated signal (SIMIN) for "Presence SIM" in the Telit ME310G1 module pinout.

This feature may be performed by connecting the GPIO_01 (Pad V11) or GPIO_02 (Pad V13) or GPIO_03 (Pad D7) or GPIO_04 (Pad D9) to the switch embedded into the sim-holder.

SIM detection may be configured by a specific AT Command.

Refer to the SW User Guide or AT Commands Reference Guide for a complete description of this function.

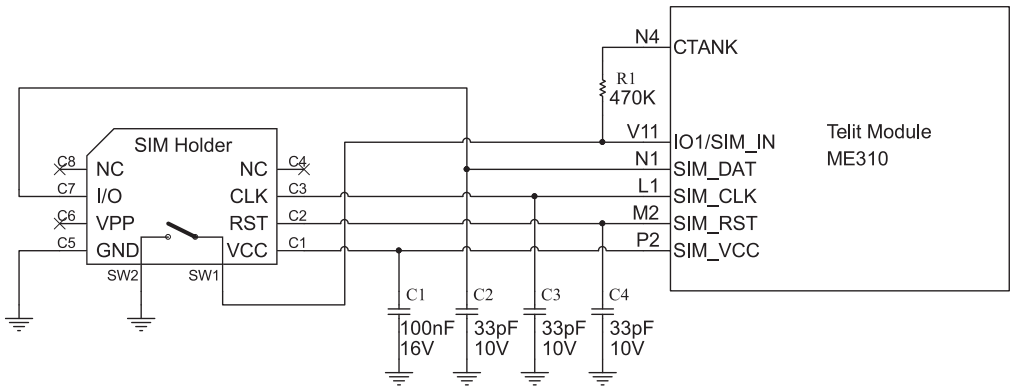


Figure 10 IM Holder schematic

Warning: Pull-up 470K is required across CTANK (ball N4) and switch embedded in the sim-holder

6.10 ADC Converter

The Telit ME310G1 module includes an AD converter. It can read a voltage level in the range of 0÷1.8V applied on the ADC pin input, store it and convert it to 10-bit words.

The input lines are called ADC (available on Pad B18).

Table 33: ADC Characteristics

Item	Min	Typical	Function	Unit
Input Voltage range	0	-	1.8	Volt
AD conversion	-	-	10	bits

6.10.1 Using ADC Converter

The ADC could be controlled using an AT command.

The read value is expressed in mV by AT#ADC command

Refer to SW User Guide or AT Commands Reference Guide for the full description of this function.

6.11 CTANK

The Telit ME310G1 module includes an internal supply domain pin for additional capacitance or pull up reference. It supports only the specific use cases described in the Telit ME310G1 module documentation. The internal supply domain (named CTANK) is available on pin N4 of the ME310G1.

The user's application circuit should add a place-holder capacitor of 100uF 4V connected to pin N4 of the ME310G1.

6.12 Forced USB Boot

If standard firmware upgrade procedures are not possible, the FORCED_USB_BOOT pin must be set to 1.8V when power-on of the module.

The input current is very low, so 10K resistor to CTANK (pin N4) may be used to keep this pin in the HI state.

FORCED_USB_BOOT pin must be connected only during the firmware upgrade operation. It must be left open during normal operation.

FORCED_USB_BOOT and CTANK pins must be available in the user application circuit at all test points for easy connection of the 10K resistor.

6.13 Antenna Tuner

The Telit ME310G1 module includes a feature to enable an external antenna tuning solution. This enables to dynamically tune the antenna on multiple frequencies.

Refer to AT command AT#ATUNERSEL (AT Commands Reference Guide-Telit code 80617ST10991A) to select GPIO or MIPI interfaces on ATC1/ATC2 pins.

Warning: The feature is available from PNs with M0C.x00004 (SW package xx5) on all W1 variants and on WW variants with HW 1.0. The feature depends on HW, SW and production setup: upgrading only the SW does not ensure the feature functionality. In PN with private band B86 support, there is no antenna tuner configuration for this private band.

6.13.1 GPIO

Table 34: Antenna Tuner GPIO table

ATC1 Pin	ATC2 Pin	Band (Uplink)	Freq. Range [MHz]
0	0	B1, B2, B3, B4, B25, B66, GSM1800, GSM1900	1710-2200
0	1	B8, EGSM900	880-960
1	0	B5, B18, B19, B20, B26, B27 GSM850	791-894
1	1	B12, B13, B28, B85	698-803

6.13.2 MIPI

The MIPI interface is intended to be used in bundle with Qualcomm QAT3516 Adaptive Aperture Tuner.

7 RF Section

7.1 Antenna Requirements

The antenna connection and the board layout design are the most important aspect of the complete product design. It strongly affects the performance of the product. Be sure to follow the requirements and guidelines for a proper design.

The following are the antenna and antenna transmission line requirements:

Table 35: ME310G1 Antenna and Antenna Transmission Line on PCB

Item	Value
Frequency range	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s)
Bandwidth	250 MHz in LTE Band 1 140 MHz in LTE Band 2, PCS1900 170 MHz in LTE Band 3, DCS1800 445 MHz in LTE Band 4 70 MHz in LTE Band 5, GSM850 80 MHz in LTE Band 8, GSM900 47 MHz in LTE Band 12 41 MHz in LTE Band 13 60 MHz in LTE Band 18 60 MHz in LTE Band 19 71 MHz in LTE Band 20 145 MHz in LTE Band 25 80 MHz in LTE Band 26 62 MHz in LTE Band 27 100 MHz in LTE Band 28 490 MHz in LTE Band 66 81 MHz in LTE Band 71 48 MHz in LTE Band 85
Impedance	50 ohm
Input power	ME310G1-W1: > 24dBm Average power ME310G1-WW: > 33dBm Average power ME310G1-W2: > 26dBm Average power
VSWR absolute max	≤ 10:1 (limit to avoid permanent damage)
VSWR recommended	≤ 2:1 (limit to fulfill all regulatory requirements)

7.1.1 PCB Design Guidelines

As there is no antenna connector on the ME310G1 module, you must use a transmission line to connect the antenna to the antenna pad on the PCB.

The following are the transmission line requirements:

Table 36: ME310G1 Antenna Pad Requirements

Item	Value
Characteristic Impedance	50 ohm (+-10%)
Max Attenuation	0.3 dB
Coupling	Coupling with other signals shall be avoided
Ground Plane	The Cold End (Ground Plane) of the antenna shall be equipotential to the ME310G1 ground pins

The transmission line should be designed according to the following guidelines:

- Make sure that the transmission line's characteristic impedance is 50 ohm.
- Keep the on the PCB as short as possible since the antenna line loss shall be less than about 0,3 dB.
- The Line geometry should have uniform characteristics, constant cross-section, avoid meanders and sharp curves.
- Any type of suitable geometry/structure (Microstrip, Strip line, Coplanar, Grounded Coplanar Waveguide...) can be used to implement the printed transmission line afferent to the antenna.
- If a Ground plane is required in line geometry, that plane shall be continuous and sufficiently extended so that the geometry can be as similar as possible to the related canonical model.
- Keep, if possible, at least one layer of the PCB used only for the Ground plane; If possible, use this layer as a reference Ground plane for the transmission line.
- It is advisable to surround (on both sides) the transmission line of the PCB with Ground, avoiding that other signal tracks face directly the antenna line track.
- Avoid crossing any un-shielded transmission line footprint with other signal tracks on different layers.
- The ground surrounding the antenna line on PCB shall be strictly connected to the main Ground Plane using via holes (at least once per 2mm), positioned near the ground edges facing the line track.
- Place the noisy EM devices as far as possible away from the ME310G1 antenna line.
- Keep the antenna line far away from the ME310G1 power supply lines.

- If there are noisy EM devices (such as fast switching ICs, LCD, and so on) on the PCB hosting the ME310G1, shield the antenna line by burying it in an inner layer of the PCB and surrounding it with the Ground planes, or shield it with a metal frame cover.
- If noisy EM devices are not present around the line, it is preferable to use geometries such as Microstrip or Grounded Coplanar Waveguide as they typically ensure less attenuation than a strip line of the same length.

The following image shows the suggested layout for the Antenna pad connection:

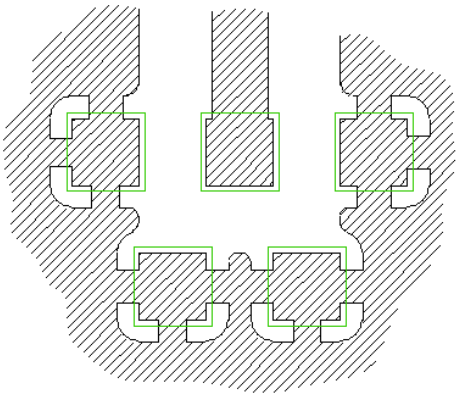


Figure 11: Layout for the Antenna Pad Connection

7.1.2 PCB Guidelines in Case of FCC Certification

In case FCC certification is required for an application using ME310G1, according to FCC KDB 996369 for modular approval requirements, the transmission line must be similar to the one implemented on the ME310G1 interface board and described in the following chapter.

7.1.2.1 Transmission Line Design

When designing the ME310G1 interface board, the placement of components was chosen properly, in order to keep the line length as short as possible, thus leading to the lowest possible power losses. A Grounded Coplanar Waveguide (G-CPW) line was chosen, since this kind of transmission line ensures good impedance control and can be implemented in an outer PCB layer as needed in this case. A SMA female connector has been used to feed the line.

The interface board is made on a FR4, 4-layers PCB. The substrate material is characterized by relative permittivity εr = 4.6 ± 0.4 @ 1 GHz, TanD= 0.019 ÷ 0.026 @ 1 GHz.

A characteristic impedance of nearly 50 Ω is obtained using the trace width = 1.1 mm, clearance from a coplanar ground plane = 0.3 mm each side. The line uses the reference ground plane on layer 3, while copper is removed from layer 2 below the line. The height of the trace from the ground floor is 1.335 mm. The calculated characteristic impedance is 51.6 Ω, the estimated line loss is less than 0.1 dB.

The line geometry is shown below:

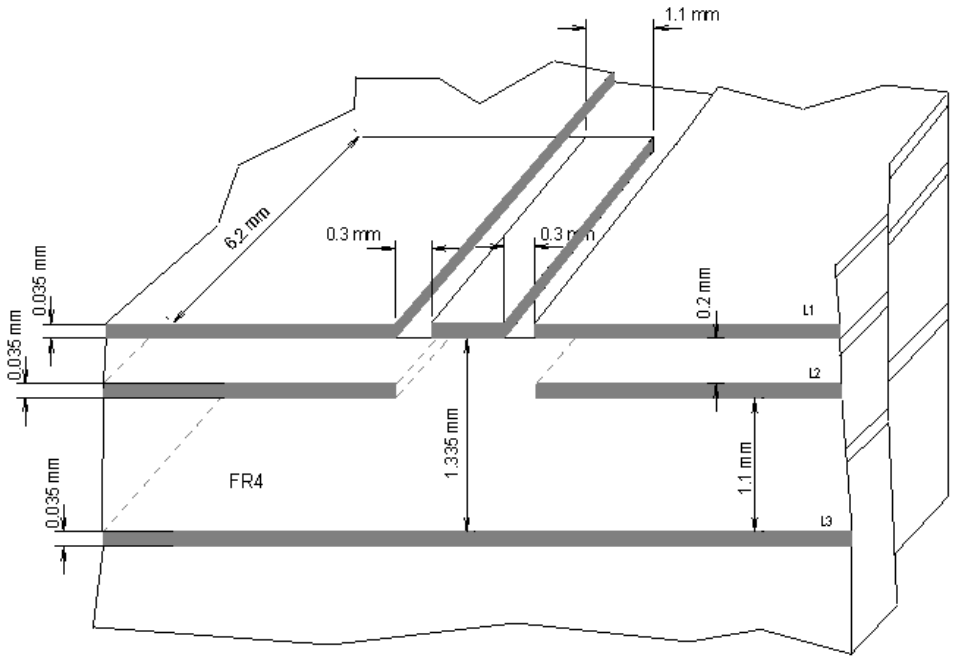


Figure 12: Line Geometry

7.1.2.2 Transmission Line Measurements

An HP8753E VNA (Full-2-port calibration) was used in this measurement session.

A calibrated coaxial cable was soldered to the pad corresponding to RF output; a SMA connector was soldered to the board in order to characterize the losses of the transmission line including the connector itself. During Return Loss / impedance measurements, the transmission line has been terminated to 50 Ω load.

Return Loss plot of line under test is shown below:

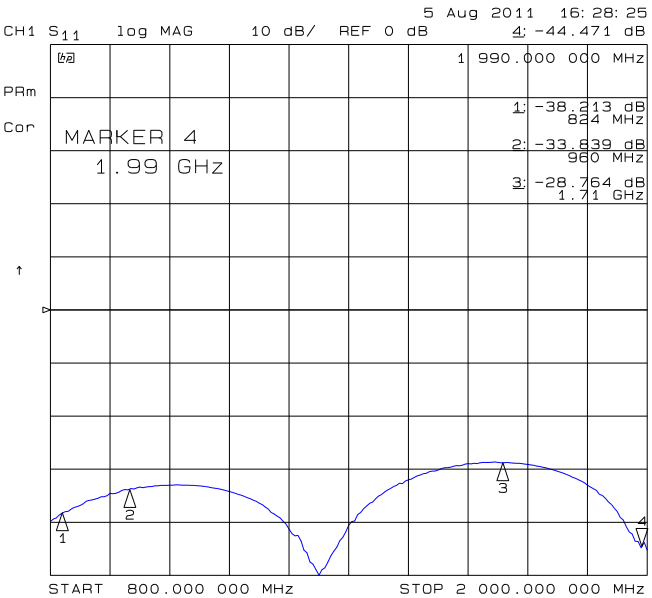


Figure 13: Return Loss plot of line under test

The line input impedance of the line (in Smith Chart format, once the line has been terminated to 50 Ω load) is shown in the following figure:

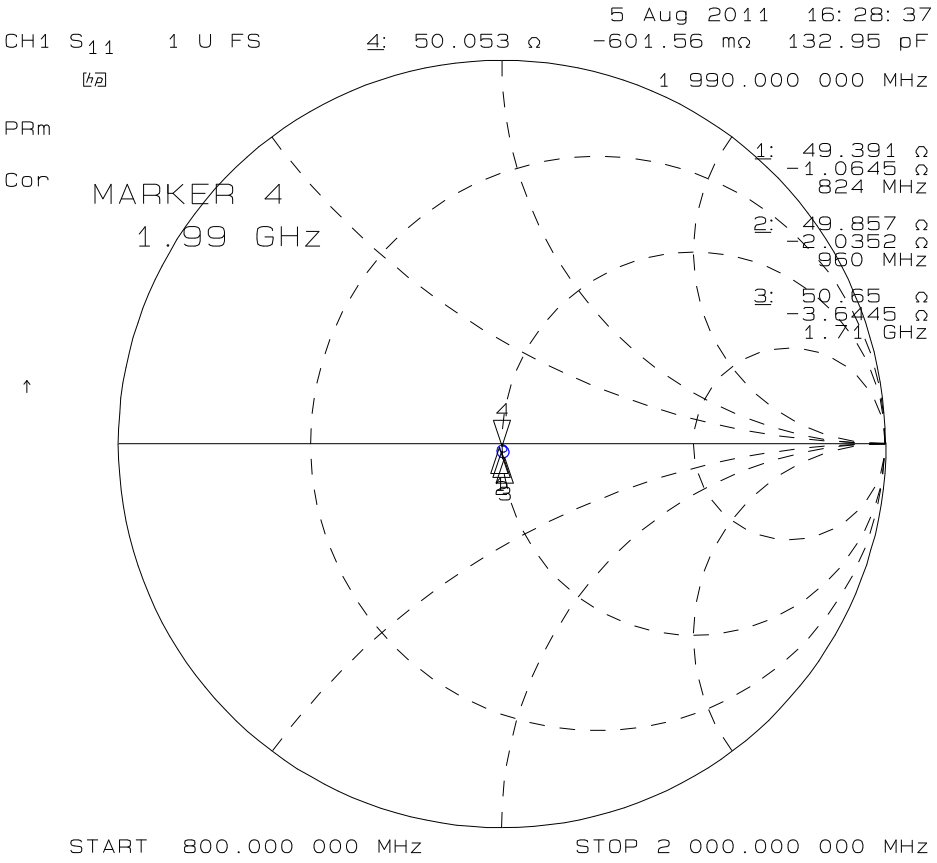


Figure 14: Line input impedance

Insertion Loss of G-CPW line plus SMA connector is shown below:

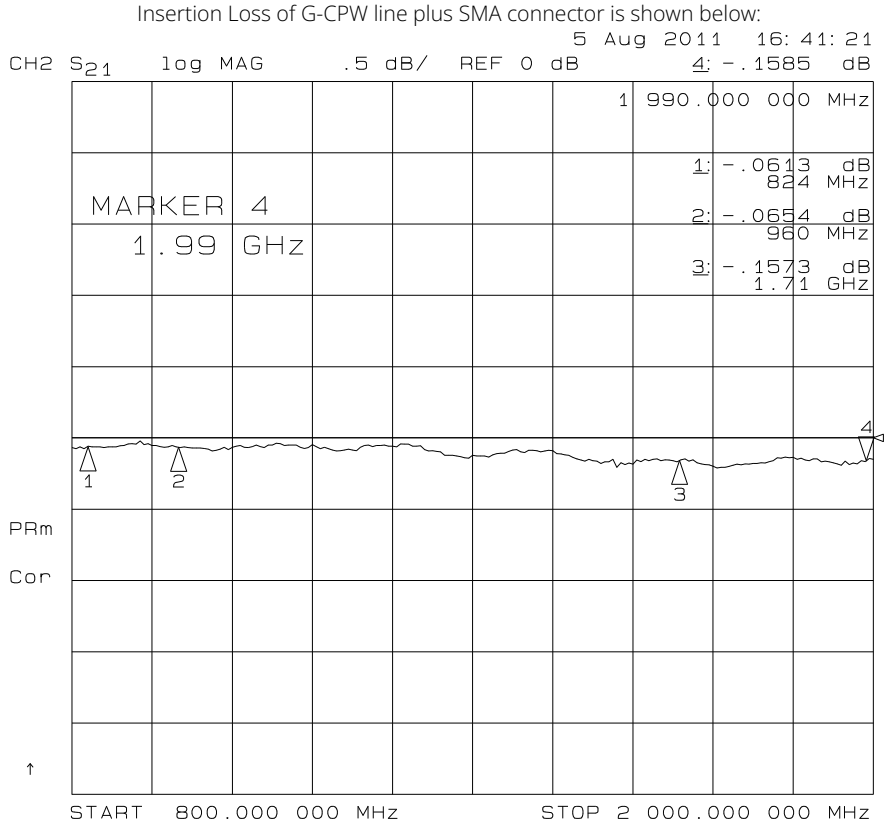


Figure 15: Insertion Loss of G-CPW line plus SMA connector

7.1.2.3 Antenna Installation Guidelines

- Install the antenna in a place covered by the LTE signal with CAT-M1 and NB-IoT support.
- The Antenna must not be installed inside metal cases.
- The Antenna must be installed according to Antenna manufacturer instructions.
- The Antenna integration should optimize the Radiation Efficiency. Efficiency values > 50% are recommended on all frequency bands.
- The Antenna integration should not perturb the radiation pattern described in the documentation of the Antenna manufacturer.
- It is preferable to get an omnidirectional radiation pattern.
- The Antenna Gain must not exceed the values indicated in regulatory requirements, where applicable, to meet the related EIRP limitations. The Typical antenna Gain in most M2M applications does not exceed 2dBi.
- If the device antenna is located farther than 20cm from the human body and there are no co-located transmitters, then the Telit FCC/IC approvals can be re-used by the product.
- If the device antenna is located closer than 20cm from the human body or there are co-located transmitters, then the additional FCC/IC testing may be required for the product (Telit FCC/IC approvals cannot be reused).

8 Audio Section

The Telit ME310G1 Module's digital voice interface is based on the I2S serial bus interface. The audio port can be connected to the digital interface which uses multiple compliant codecs (in case analog audio is needed). The audio port is available only in ME310G1-WWV that has CS Voice/VoLTE support.

8.1 Electrical Characteristics

The Telit ME310G1 module provides digital voice interface on the following PINs:

Table 37: Electrical characteristics

Pin	Signal	I/O	Function	Internal Pull Up	Type
C1	DVI_WA0	I/O	Digital Audio Interface (Word Alignment / LRCLK)		CMOS 1.8V
D2	DVI_RX	I	Digital Audio Interface (RX)		CMOS 1.8V
E1	DVI_TX	O	Digital Audio Interface (TX)		CMOS 1.8V
F2	DVI_CLK	I/O	Digital Audio Interface (BCLK)		CMOS 1.8V

9 GNSS Section

The ME310G1 module includes a state-of-the-art receiver capable of simultaneously searching and tracking satellite signals from multiple satellite constellations. This multi-GNSS receiver uses the entire spectrum of available GNSS systems, such as GPS, GLONASS, BeiDou, Galileo, and QZSS.

9.1 GNSS Signals Pin-out

Table 38: GNSS Signals Pin-out

Pin	Signal	I/O	Function	Type
E19	ANT_GNSS	I	GNSS Antenna (50 ohm)	
H18	GNSS_LNA_EN	O	GNSS External LNA Enable	CMOS 1.8V
G16	GNSS_1PPS	O	1 pulse per second	CMOS 1.8V

Warning: GNSS_1PPS is supported from M0C.x00006 (37.00.xx7) SW release. The fearture is not supported on ME310G1-W3 variant (HW limitation).

9.2 RF Front End Design

The ME310G1 module does not contain the LNA required to achieve maximum sensitivity. The active antenna (antenna with a built-in low noise amplifier) must be supplied with a proper bias-tee circuit.

9.2.1 PCB Guidelines for GNSS Antenna

- Make sure that the antenna line impedance is 50 ohm.
- The antenna line on the PCB should be as short as possible to reduce the loss.
- The antenna line must have uniform characteristics, constant cross-section without meanders, or sharp curves.
- If possible, keep one layer of the PCB used only for the Ground plane.
- Wind (on both sides, above and below) the antenna line on the PCB with the Ground plane, make sure the other signal tracks are not directly facing the antenna line.
- The ground around the antenna line on the PCB must be firmly connected to the Ground plane by placing vias at a minimal of each 2mm.
- Place EM noisy devices as far as possible away from the antenna line.
- Keep the antenna line away from GSM RF lines and power supply lines.

- If there are noisy EM devices around the PCB hosting the module, such as fast switching ICs, take care of the antenna line shielding by burying it inside the PCB layers and surrounding it with Ground planes, or shielding it with a metal frame cover.
- For an EM noise environment, make sure to shield the antenna line with a metal frame cover or PCB layers and wind it with the Ground plane.
- For an EM noise free environment, shield the antenna line with a strip-line on the superficial copper layer. The line attenuation will be lower than the buried one.

9.2.2 Hardware-Based Solution for GNSS and LTE Coexistence

If the decoupling between the LTE and GNSS antennas is low in a stand-alone GNSS receiver, the LTE transmission may desensitize the GNSS receiver. To protect the GNSS receiver from LTE out-of-band emissions, include a SAW filter on the LTE side as described in the diagram below.

There is no condition to degrade the GNSS receiver embedded in the ME310G1 module while it is in use. So, filtering on the LTE is not mandatory as the LTE and GNSS cannot be active at the same time.

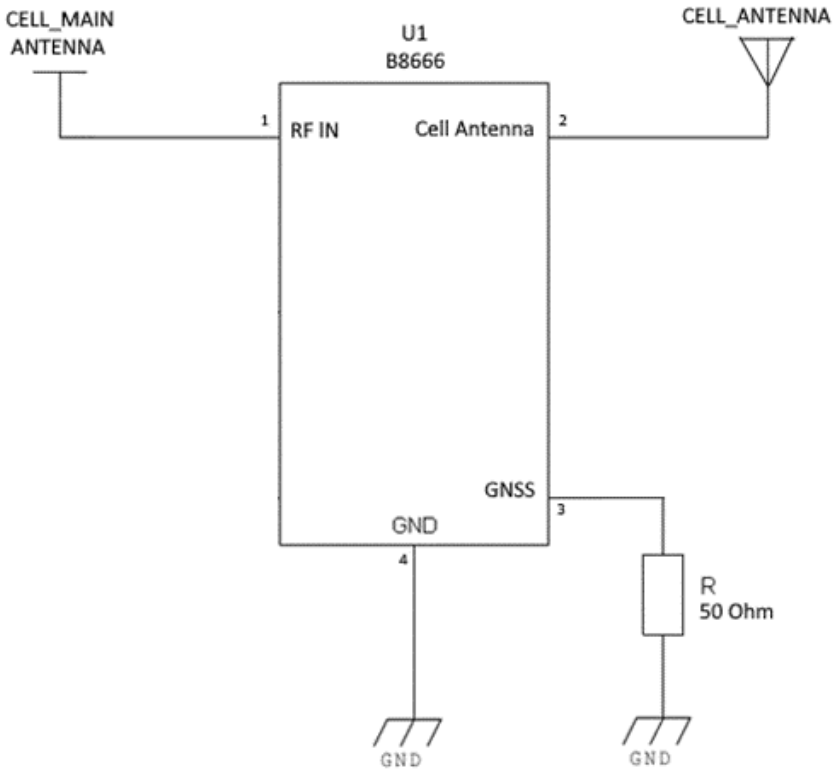


Figure 16: SAW filter on LTE side

9.3 GNSS Antenna Requirements

GNSS active antenna must be used or integrated in the application.

9.3.1 GNSS Antenna Specification

Table 39: GNSS Antenna Specification

Item	Value
Frequency range	1559.0 ~ 1610.0 MHz
Gain	15 ~ 30dB
Impedance	50 hm
Noise Figure of LNA	< 1.5 (recommended)
DC supply voltage	DC 1.8 ~ 3.3V
VSWR	≤ 3:1 (recommended)

Note: For a short antenna cable the minimal gain must be 15dB. For a long antenna cable the minimal gain must be 30dB.

9.3.2 GNSS Antenna – Installation Guidelines

- For best performance of the GNSS receiver, the antenna must be installed according to the antenna manufacturer's instructions.
- The performance may degrade if the antenna is installed inside metal cases or near obstacles.
- Evaluate the antenna location if it is coupled to other antennas or transmitters.

9.3.3 Powering the External LNA (Active Antenna)

Generally the active antenna requires either 1.8V or 3V DC power supply. To meet this requirement, an external power source with the ME310G1 module must be included in the user's application circuit.

The electrical characteristics of the GPS_LNA_EN signal are:

Table 40: GPS_LNA_EN Signal Characteristics

Level	Min	Max
Output High Level	1.6V	1.9V
Output Low Level	0V	0.3V

Example of external antenna bias circuitry:

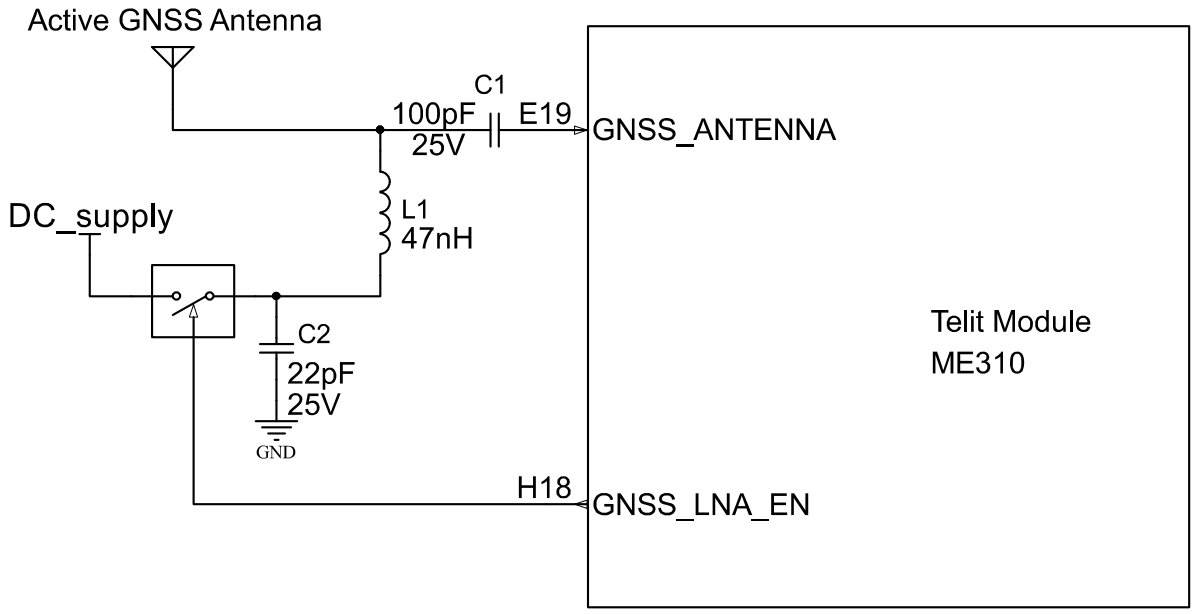


Figure 17: Antenna Bias Circuitry Example

Warning: Ensure to limit the maximum bias current. A short circuit on the antenna cable may damage the decoupling inductor.

9.4 GNSS Characteristics

The following table specifies the GNSS characteristics and the expected performance.

Table 41: GNSS Characteristics

Parameters	Performance	Typical Measurement	Notes
Sensitivity	Tracking Sensitivity	-159 dBm	
	Navigation	-155 dBm	
	Cold Start	-144 dBm	
TTFF	Hot	N/A	It will be available in next revision
	Warm	<30s	GNSS Simulator test @-130dBm
	Cold	<30s	GNSS Simulator test @-130dBm
Min Navigation update rate		1Hz	
CEP		<2m	

10 Mechanical Design

10.1 Drawing

10.1.1 ME310G1-W1

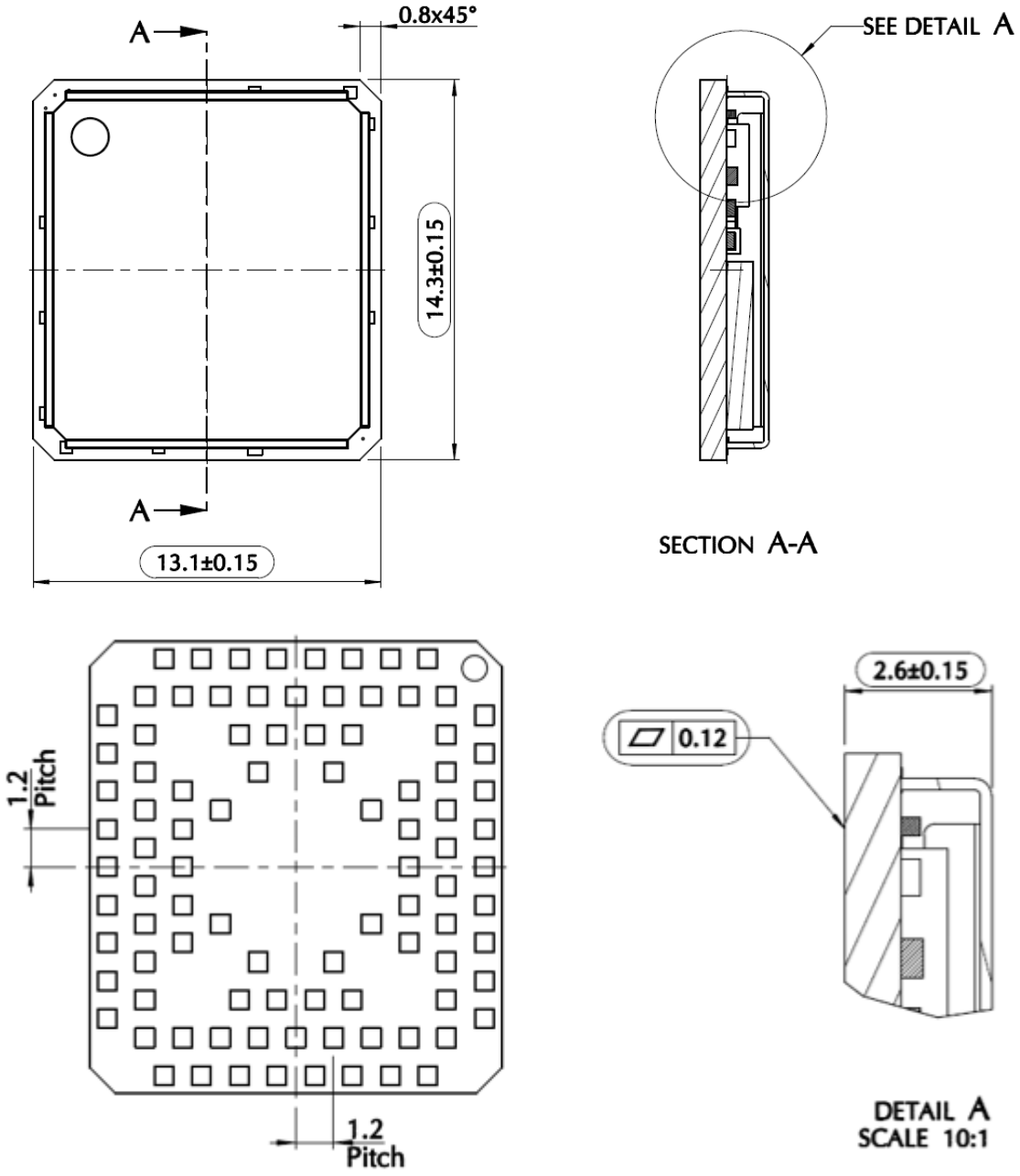


Figure 18: Mechanical Drawing of ME310G1-W1 (without label applied)

Note: Dimensions are in mm. General Tolerance ±0.1, Angular Tolerance ±1°, The tolerance is not cumulative.

10.1.2 ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3

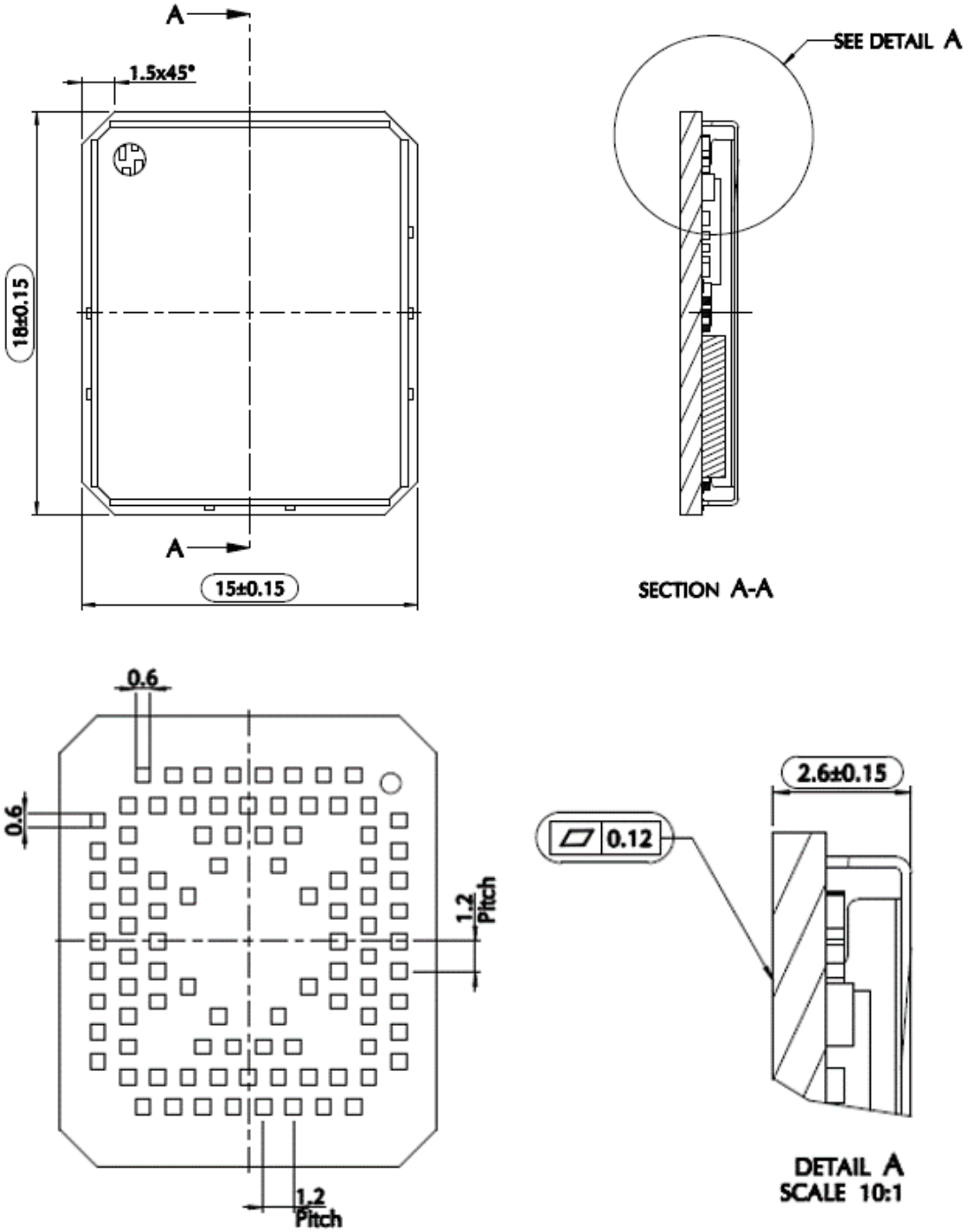


Figure 19: Mechanical Drawing of ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3 (without label applied)

ME310G1 modules are compliant with a standard lead-free SMT process.

11 Application PCB Design

ME310G1 modules have been designed to be compliant with a standard lead-free SMT process.

11.1 Footprint

11.1.1 ME310G1-W1

COPPER PATTERN (top view)

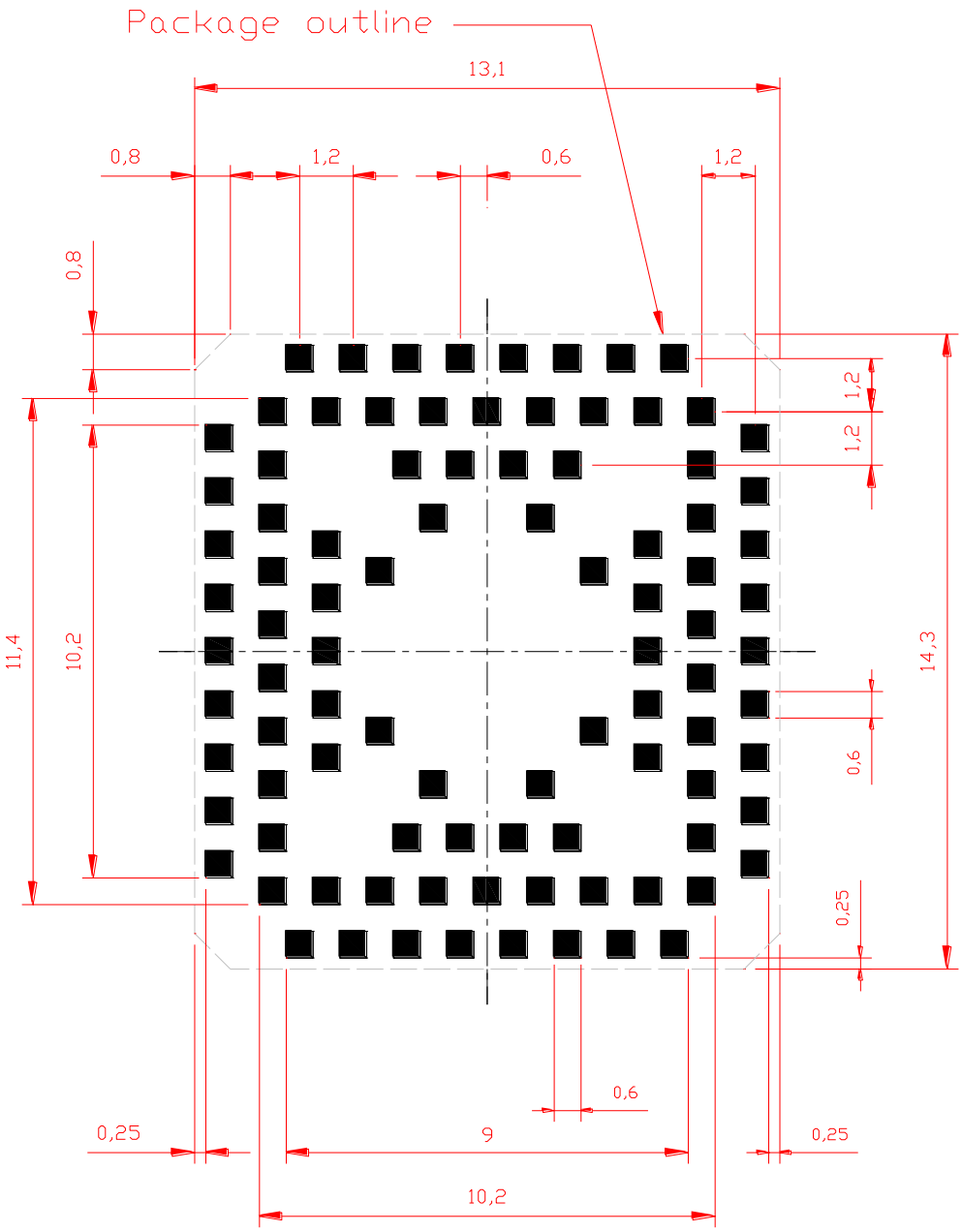


Figure 20: Copper Pattern (top view)

SOLDER RESIST PATTERN (top view)

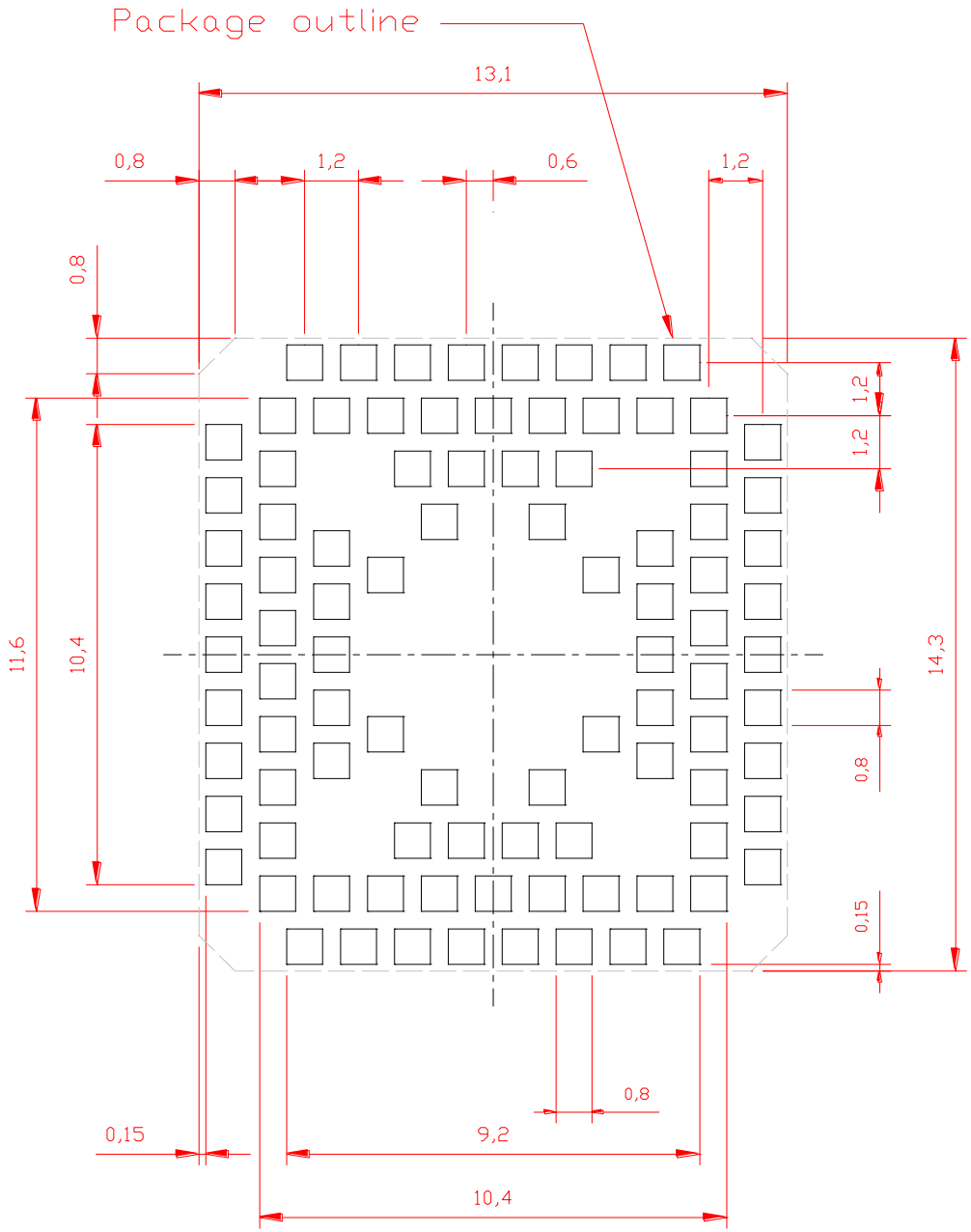


Figure 21: Solder Resist Pattern (top view)

11.1.2 ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3

COPPER PATTERN (top view)

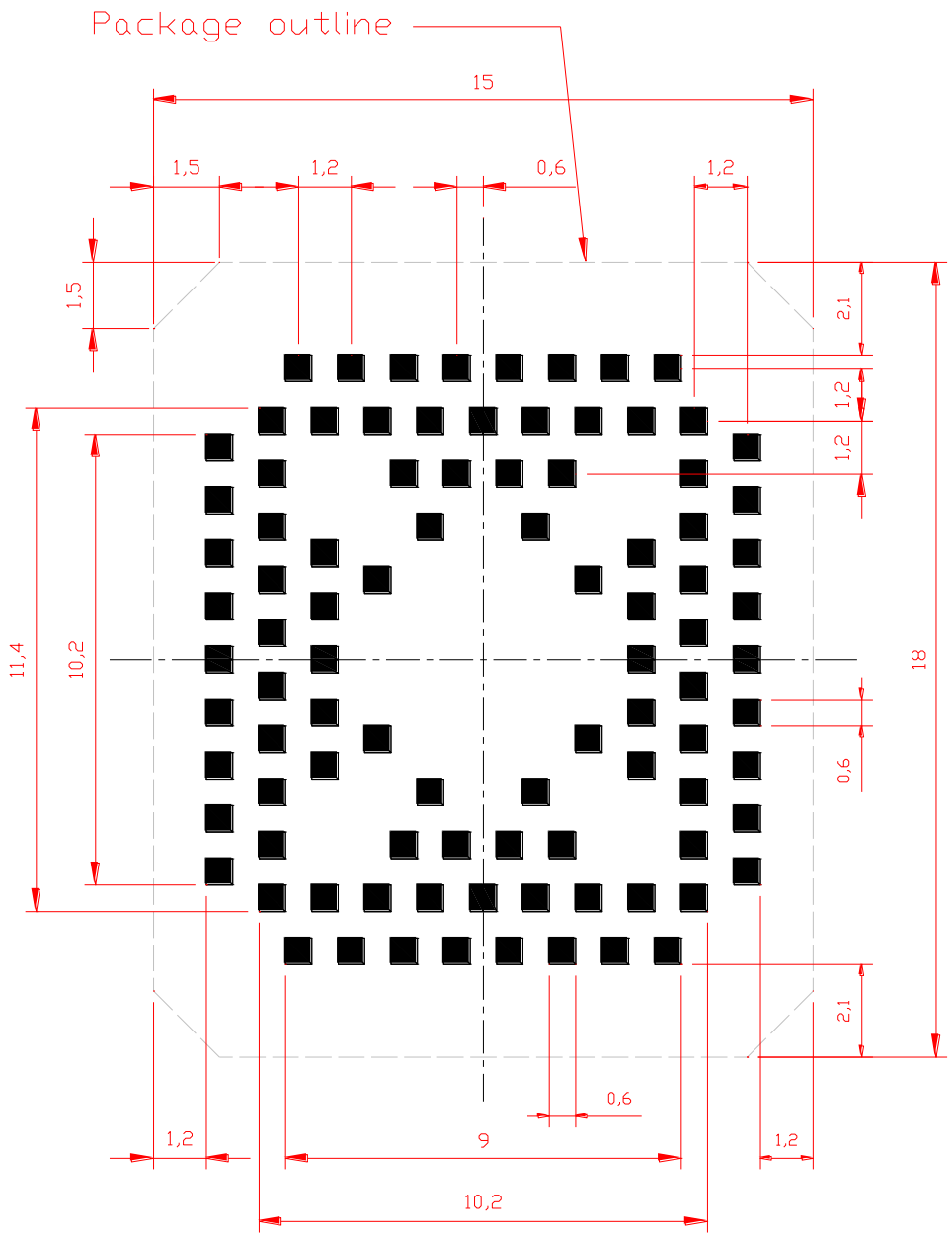


Figure 22: Example Figure

SOLDER RESIST PATTERN (top view)

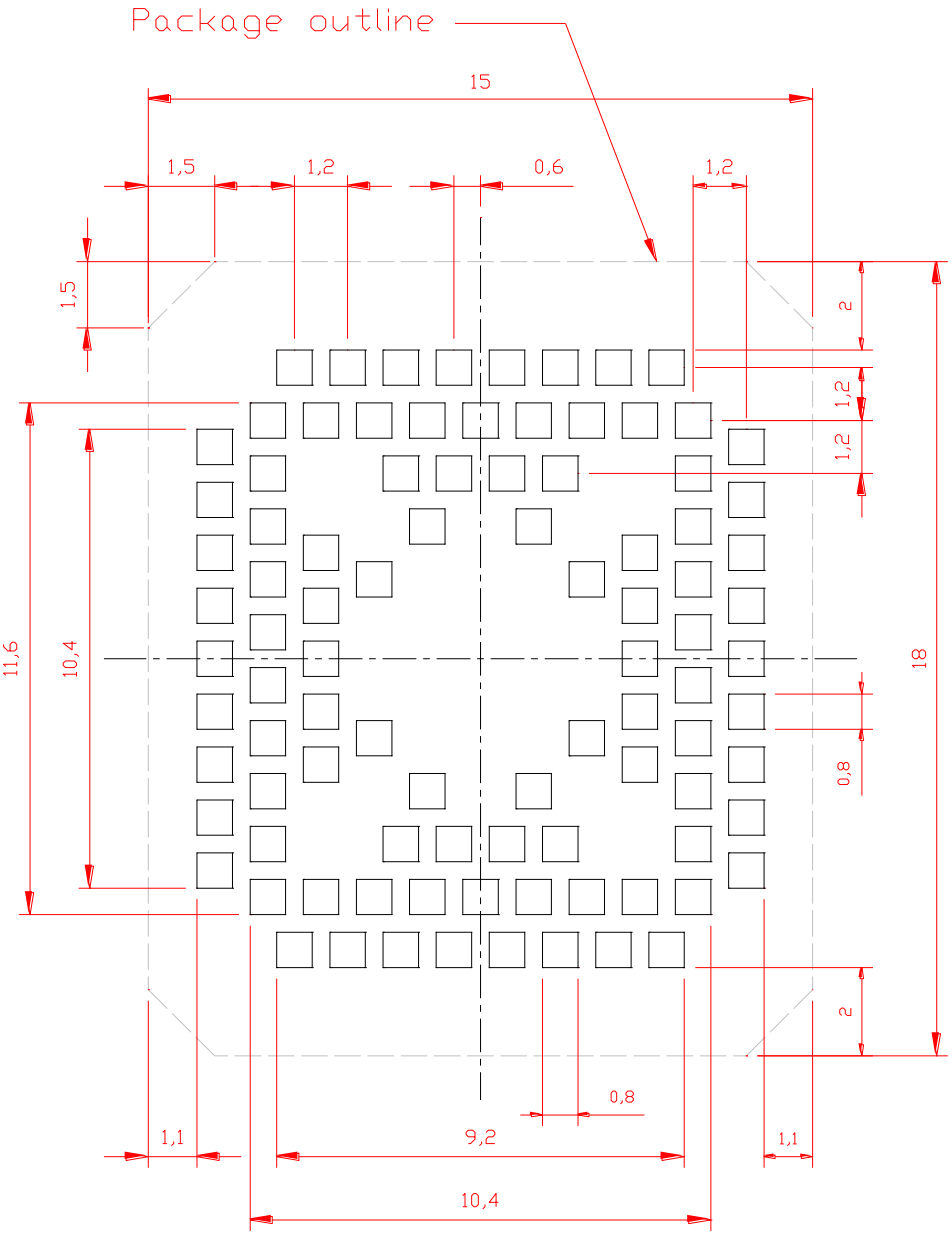


Figure 23: Example Figure

11.1.3 Recommendations for ME310G1-W1

This section illustrates the application positioning inhibit area for ME310G1 models W1. To facilitate reworking, the recommended placement is shown in figure below.

It is recommended to avoid contact of mechanical parts with an SMT component of the module.

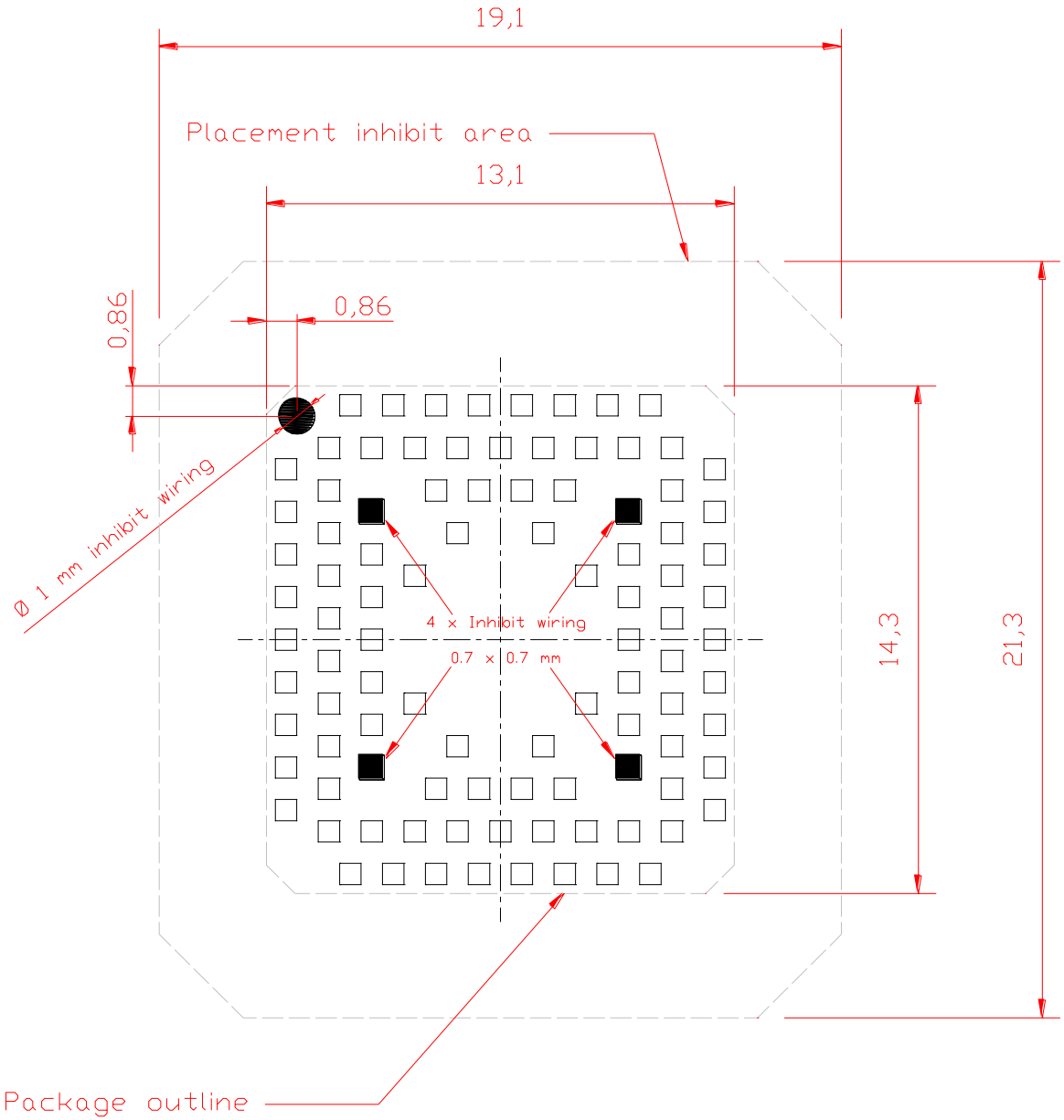


Figure 24: ME310G1-W1 Recommendations

Note: The region under INHIBIT WIRING must be clear from signal or ground paths.

11.1.4 Recommendations for ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3

This section illustrates the application placement inhibit area for the ME310G1 models WW, WWV, W2, and W3. To facilitate reworking, the recommended placement is shown in the figure below.

It is recommended to avoid contact of mechanical parts with a SMT component of the module.

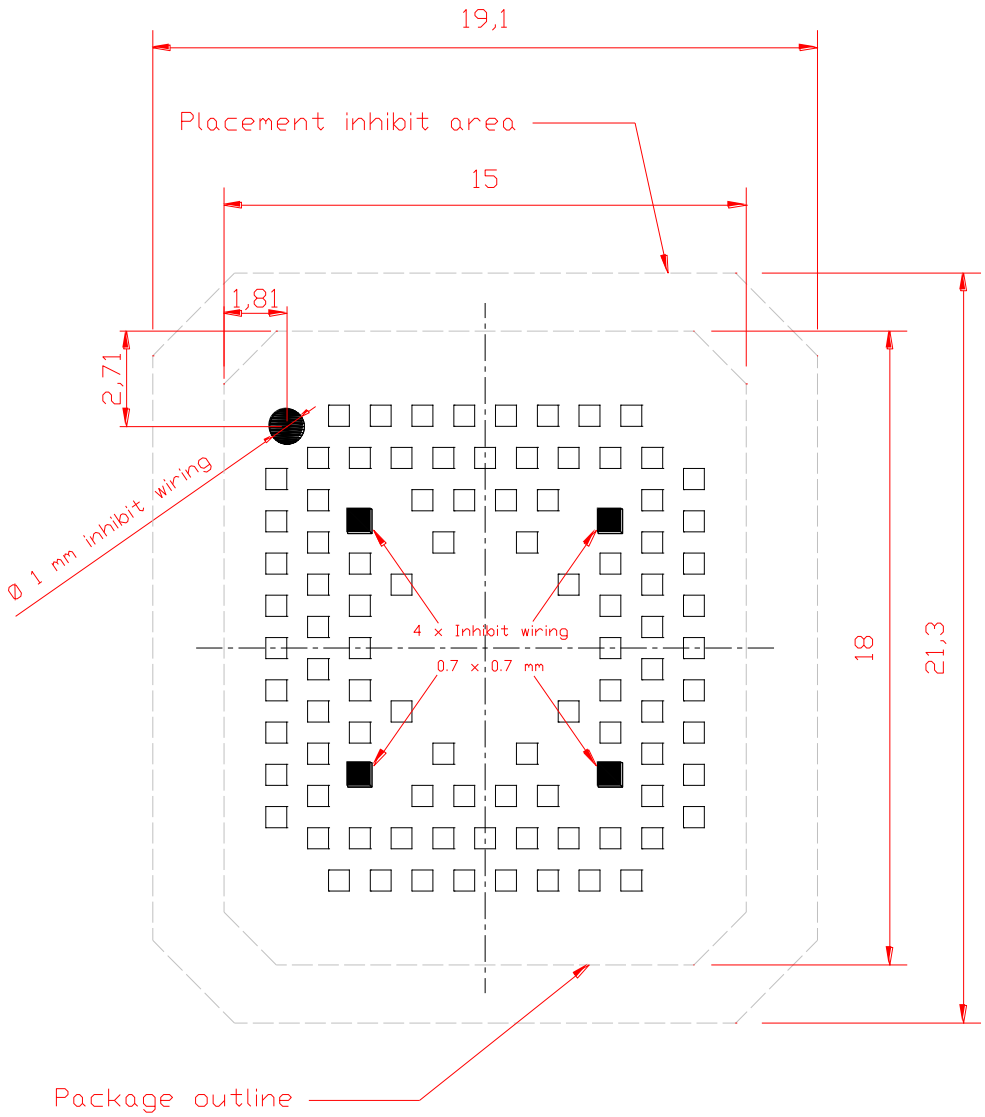


Figure 25: ME310G1-WW, ME310G1-WWV, ME310G1-W2, and ME310G1-W3 Recommendations

Note: The region under INHIBIT WIRING must be clear from signal or ground paths.

11.2 PCB Pad Design

The recommended PCB solder type is Non-solder mask defined (NSMD).

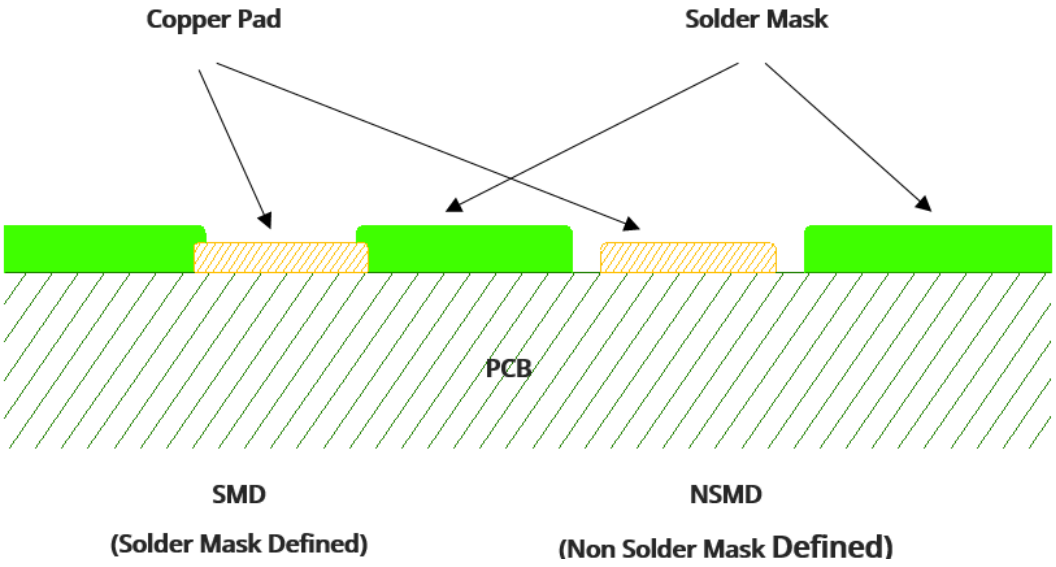


Figure 26: PCB Solder Pad Recommendations

Recommended dimensions for PCB pads are 1:1, including the module pads.

It is not recommended to place via or micro-vias not covered by the solder resist in an area of 0.3 mm around the pads unless they are transmitting the same signal as the pad itself

Through holes in the pad are not allowed, only blind holes are allowed.

Recommended PCB pad surface:

Table 42: Recommendations for PCB Pad Surfaces

Finish	Layer Thickness (um)	Properties
Electro-less Ni / Immersion Au	3 –7 / 0.05 – 0.15	good solder ability protection, high shear force values

The PCB must be able to resist the high temperatures that occur during the lead-free process. This issue should be discussed with the PCB supplier. For best surface plating wettability, tin-lead solder paste must be used in place of lead-free solder paste.

It is not mandatory to panel the PCB of the application. If required, it is recommended to use milled contours and pre-drilled board breakouts. It is not recommended to use scoring or v-cut solutions.

11.3 Stencil

The layout of the stencil apertures can be the same as the recommended footprint (1:1). The recommended stencil foil thickness must be ≥ 120 µm.

11.4 Solder Paste

Table 43: Solder Paste

Item	Lead free
Solder Paste	Sn/Ag/Cu

We recommend using only “no-clean” solder paste to avoid cleaning of the modules after assembly.

11.5 Solder Reflow

Recommended solder reflow profile:

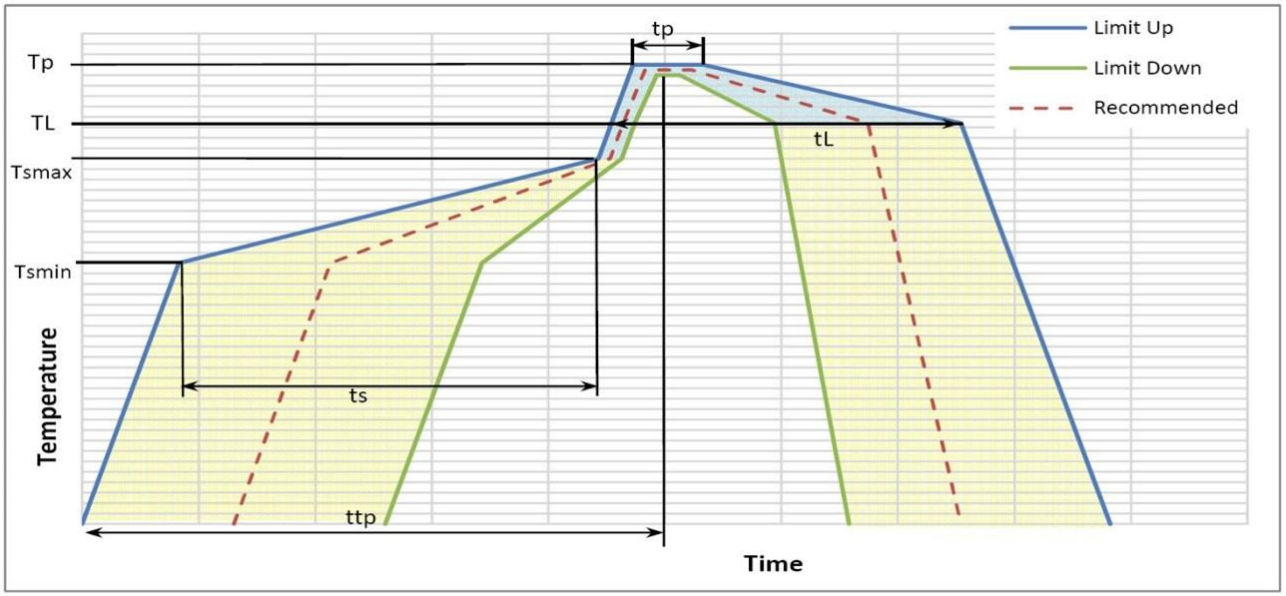


Figure 27: Recommended Solder Reflow Profile

Warning: The solder reflow profile represents the typical SAC reflow limits. It does not guarantee the proper adherence of the module to the customer’s application throughout the temperature range. The customer must optimize the reflow profile based on the factors such as thermal mass and warpage.

Table 44: Profile Feature Recommendations

Profile Feature	Pb-Free Assembly Free
Average ramp-up rate (T_L to T_P)	3°C/second max
Preheat – Temperature Min (T_{smin}) – Temperature Max (T_{smax}) – Time (min to max) (ts)	 150°C 200°C 60-180 seconds
T_{smax} to TL – Ramp-up Rate	 3°C/second max
Time maintained above: – Temperature (TL)	 217°C

Profile Feature	Pb-Free Assembly Free
– Time (tL)	60-150 seconds
Peak Temperature (T_p)	245 +0/-5°C
Time within 5°C of actual Peak Temperature (tp)	10-30 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.

Note: All temperatures refer to topside of the package, measured on the package body surface.

Warning: The ME310G1 modules withstand one reflow process only.

Warning: The solder reflow profile represents the typical SAC reflow limits. It does not guarantee the proper adherence of the module to the customer's application throughout the temperature range. The customer must optimize the reflow profile based on the factors such as thermal mass and warpage.

12 Packaging

12.1 Tray

12.1.1 ME310G1-W1

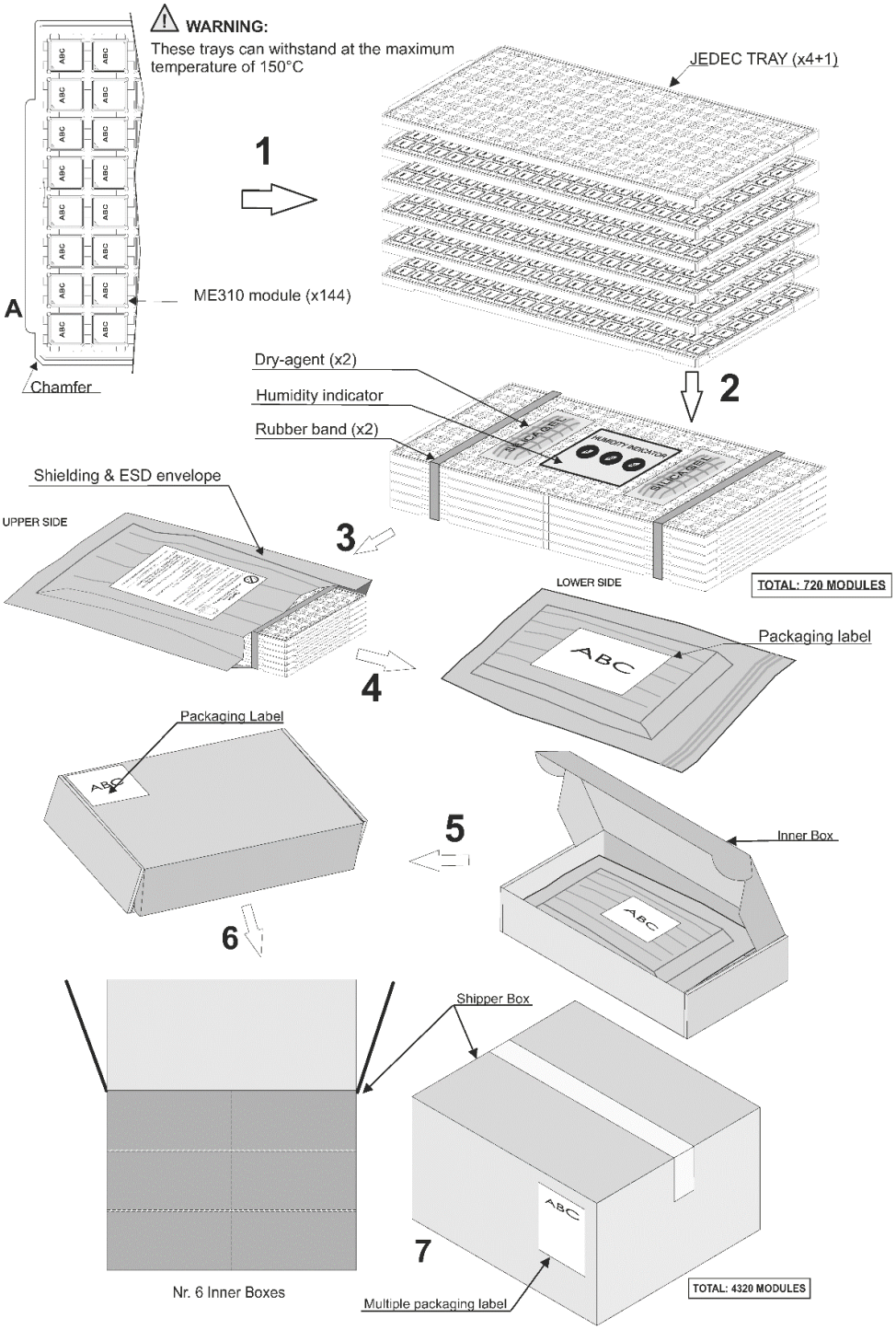


Figure 28: ME310G1-W1 tray packaging

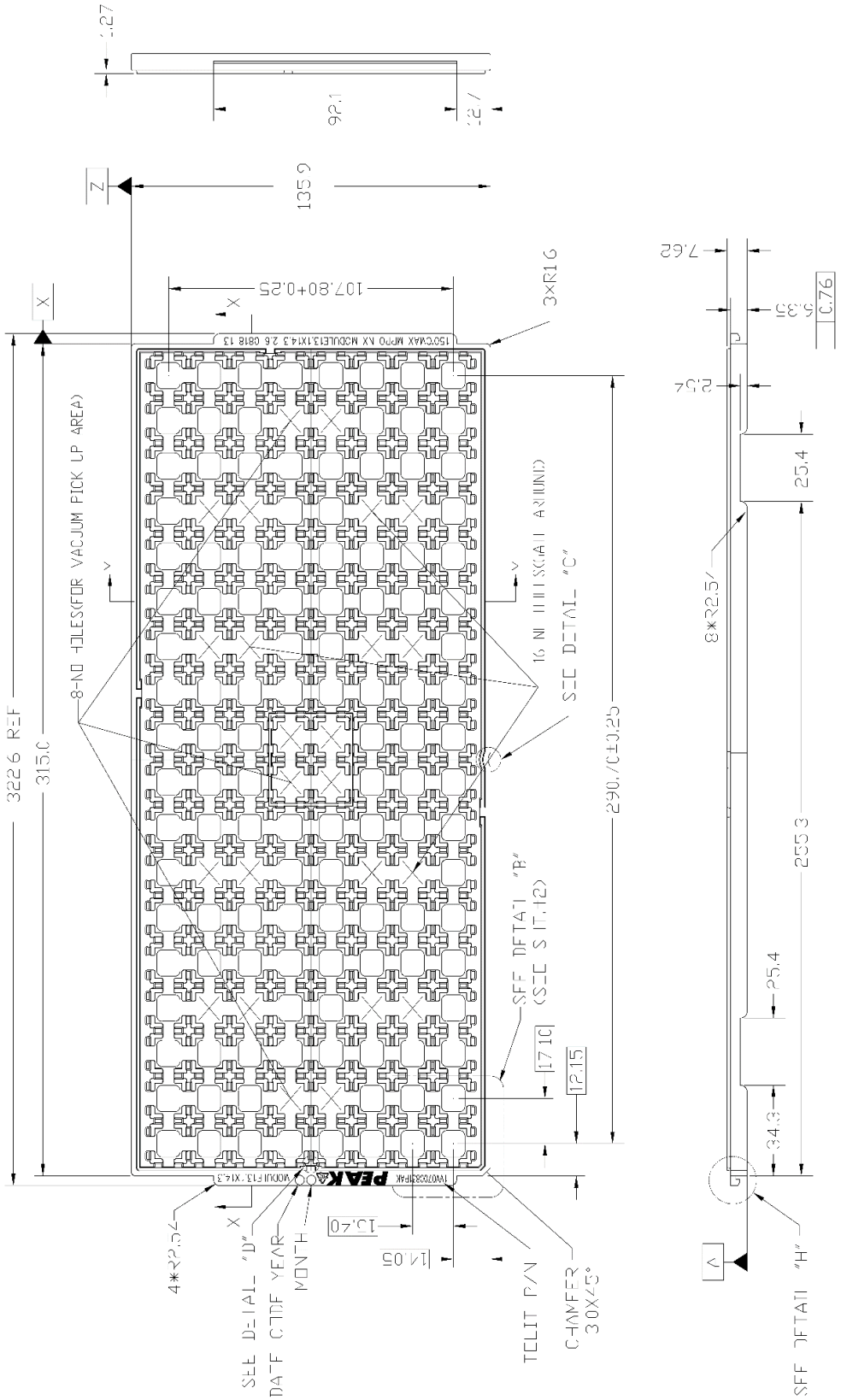


Figure 29: ME310G1-W1 tray

12.1.2 ME310G1-WW, ME310G1-W2, and ME310G1-W3

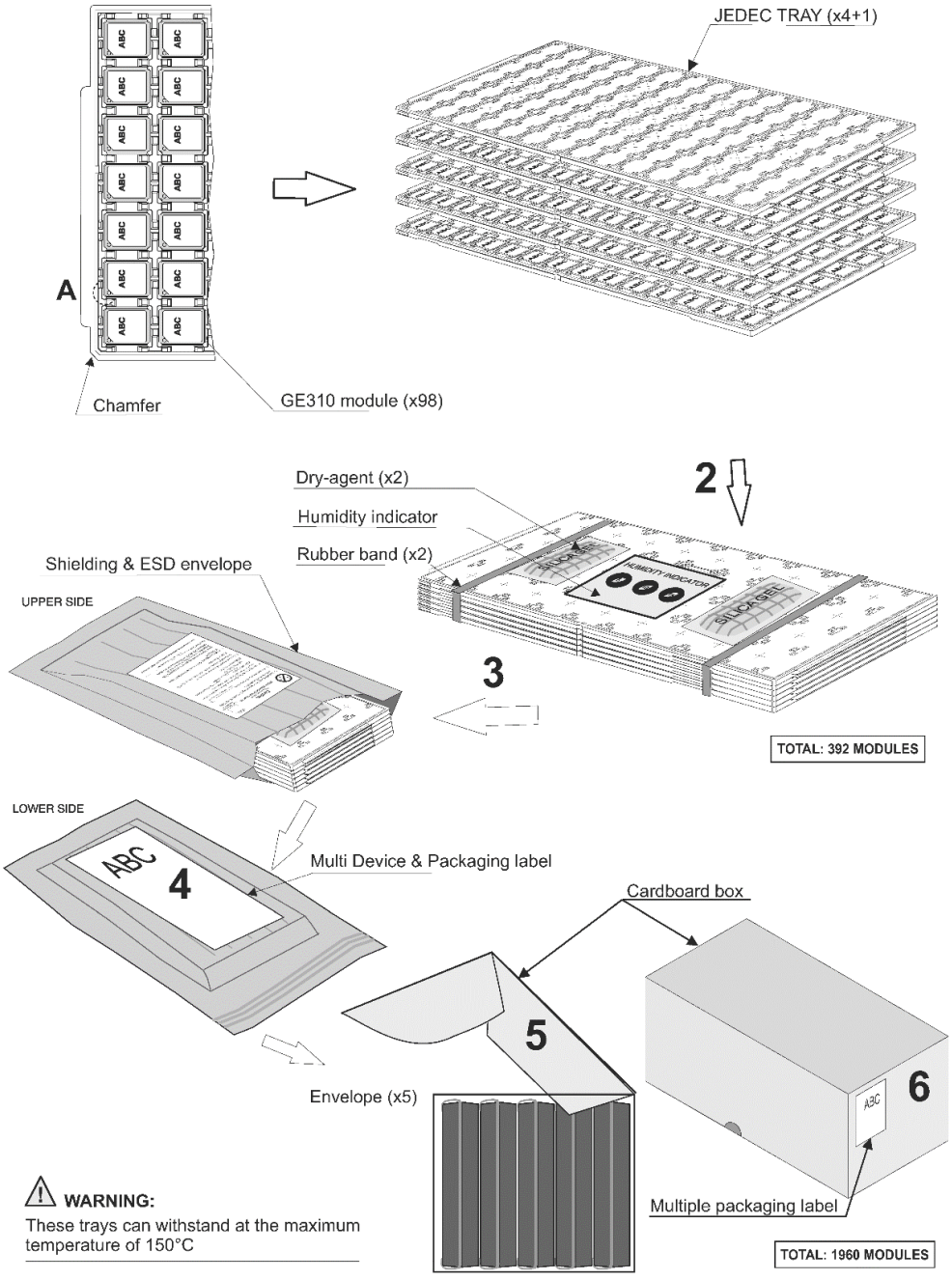


Figure 30: ME310G1-WW tray packaging

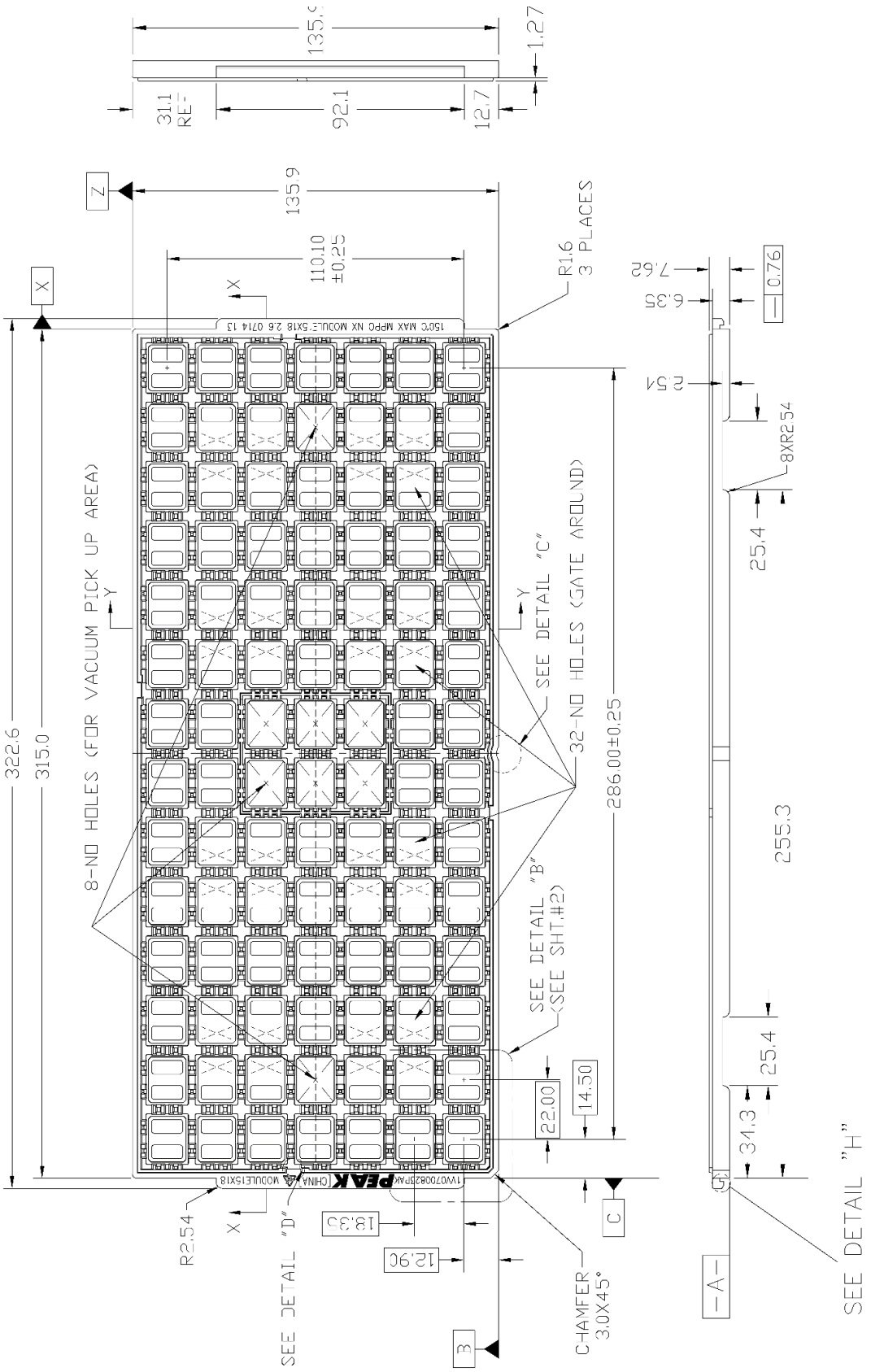


Figure 31: ME310G1-WW tray

12.2 Reel

12.2.1 ME310G1-W1

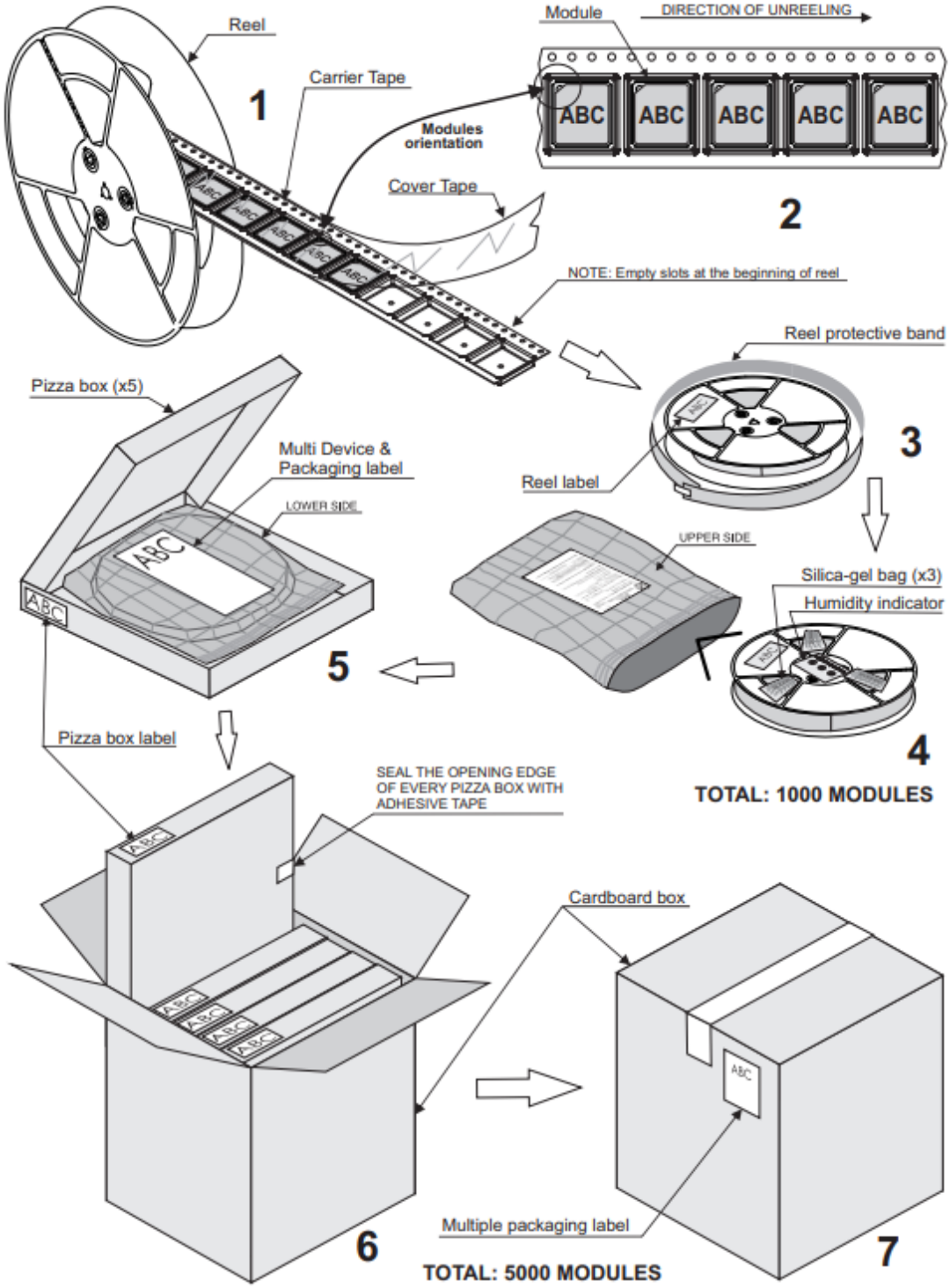


Figure 32: ME310G1-WW Tray

12.2.2 ME310G1-WW, ME310G1-W2, and ME310G1-W3

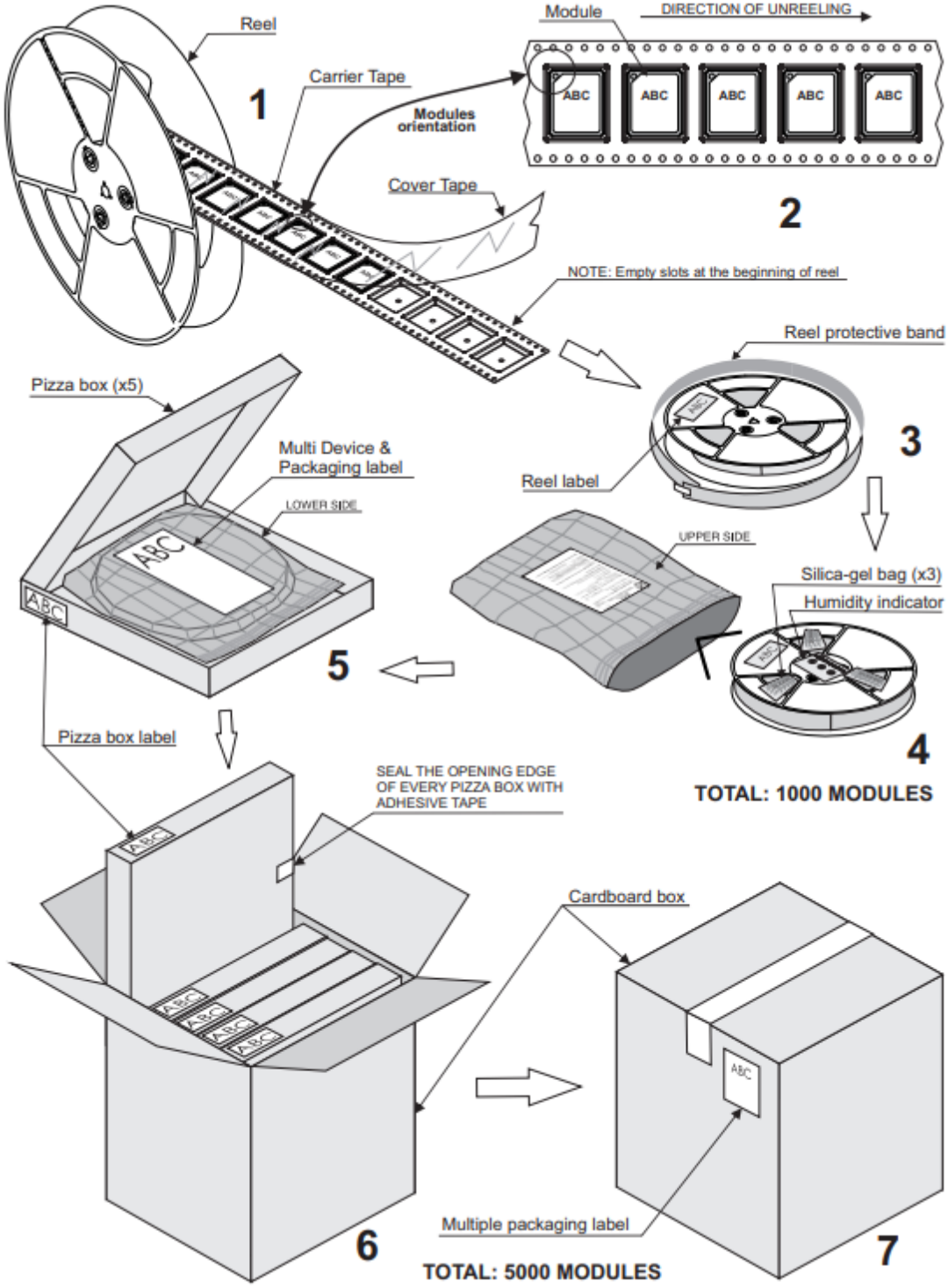


Figure 33: ME310G1-WW tray

12.3 Moisture Sensitivity

The ME310G1 is a level 3 Moisture Sensitive Device, in accordance with the standard IPC/JEDEC J-STD-020, it takes care of all related requirements for using this kind of components.

Moreover, the customer must take care of the following conditions:

- **a** Calculated shelf life in sealed bag: 12 months at <40°C and <90% relative humidity (RH).
- **b** Environmental condition during the production: 30°C / 60% RH according to IPC/JEDEC J STD-033A paragraph 5.
- **c** The maximum time between the opening of the sealed bag and the reflow process must be 168 hours if condition b) “IPC/JEDEC J-STD-033D paragraph 5.2” is respected
- **d** Baking is required if conditions b) or c) are not respected
- **e** Baking is required if the humidity indicator inside the bag indicates 10% RH or more.

13 Conformity Assessment Issues

13.1 Approvals Compliance Summary

Table 45: Americas Approvals Compliance Summary

Region	Americas			
Country &Type Approval	BR Anatel	CA ISED	MX IFETEL	US FCC
ME310G1-W1		●	●	●
ME310G1-WW		●	●	●
ME310G1-WWV	●	●		●
ME310G1-W3		●		●
ME310G1-W2	●			

Table 46: APAC Approvals Compliance Summary

Region	APAC					
Country &Type Approval	AU RCM	CH CCC	JP JRL / JTBL	KR KCC	SG IMDA	TW NCC
ME310G1-W1					●	
ME310G1-WW	●	●	●	●	●	●
ME310G1-W3	●			●		

Table 47: EMEA Approvals Compliance Summary

Region	EMEA	
Country &Type Approval	EU RED	UK UKCA
ME310G1-W1	●	●
ME310G1-WW	●	●
ME310G1-WWV	●	●
ME310G1-W2	●	●
ME310G1-W3	●	●

Table 48: Legend Description

Legend	Description
●	The equipment is compliant
●	Type approval is in progress
	The equipment is not compliant

13.2 Americas Approvals

13.2.1 USA FCC

13.2.1.1 FCC Certificates

The FCC Grants can be found here: https://www.fcc.gov/oet/ea/fccid

13.2.1.2 Applicable FCC Rules

Table 49: Applicable FCC Rules

Model	Applicable FCC rules
ME310G1-W1	Title 47 CFR Part 2, 22, 24, 27, 90
ME310G1-WW	
ME310G1-WWV	
ME310G1-W3	

13.2.1.3 FCC Regulatory Notices

Modification Statement

Telit has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

Interference Statement

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

Wireless Notice

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This transmitter must not be co-located or operate in conjunction with any other antenna or transmitter. The antenna should be installed and operated with a minimum distance of 20 cm between the radiator and your body

FCC Class B digital device notice

This equipment has been tested and found to comply with the limits for a Class B digital device, according 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 per 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 taking one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the 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.

Information for the OEMs and Integrators

The following statement must be included with all versions of this document supplied to an OEM or integrator but should not be distributed to the end user.

1 This device is intended for OEM integrators only.

2 See the full Grant of Equipment document for other restrictions

Manual Information to the End User

The OEM integrator should be aware not to provide information to the end user on how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warming as shown in this manual

Information on test modes and additional testing requirement

The module has been evaluated in mobile stand-alone conditions. For operational conditions other than a stand-alone modular transmitter in a host (multiple, simultaneously transmitting modules or other transmitters in a host), additional testing may be required (collocation, retesting...). If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements of FCC Part 2.1093.

Additional testing, Part 15 Subpart B disclaimer

The modular transmitter is only authorized by the FCC for the specific rule parts (for example, FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The end product with an embedded module may also need to pass the FCC Part 15 unintentional emission testing requirements and be properly authorized per FCC Part 15.

13.2.1.4 FCC Antenna Info

This radio transmitter has been approved by FCC to operate with the antenna types listed below with the maximum allowable gain indicated. Antenna types not included in this list, with a gain greater than the maximum gain indicated for that type, are strictly prohibited from use with this device.

Table 50: FCC Antenna Type

Model	Applicable FCC rules
ME310G1-W1	Omnidirectional Antenna Gain 2.14 dBi
ME310G1-WW	
ME310G1-WWV	
ME310G1-W3	

Table 51: Max Gain for FCC (dBi)

Max Gain for FCC (dBi)				
Band	ME310G1-W1	ME310G1-WW	ME310G1-WWV	ME310G1-W3
GSM 850	---	---	6.6	---
GSM 1900	---	---	2.0	---
GPRS/EGPRS 850	---	6.9	6.9	---
GPRS/EGPRS 1900	---	2.5	2.5	---
FDD 2	11.0	8.0	8.0	8.0
FDD 4	8.0	5.0	5.0	5.0
FDD 5	12.4	9.4	9.4	9.4
FDD 12	11.6	8.7	8.7	8.6
FDD 13	12.1	9.1	9.1	9.2
FDD 14	---	---	---	9.3
FDD 25	11.0	8.0	8.0	8.0
FDD 26	12.3	9.3	9.3	9.4
FDD 66	8.0	5.0	5.0	5.0
FDD 71	11.4	11.4	11.4	---
FDD 85	11.6	8.6	8.6	8.6
FDD 86	12.1	9.1	---	---
FDD8_39d	11.9	8.9	---	9.8

13.2.1.5 FCC Labelling Requirements for the Host Device

The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the FCC ID of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as in the below table.

Table 52: Host Device FCC Label

Model	FCC ID
ME310G1-W1	Contains FCC ID: RI7ME310G1W1
ME310G1-WW	Contains FCC ID: RI7ME310G1WW
ME310G1-WWV	
ME310G1-W3	Contains FCC ID: RI7ME310G1W3

13.2.2 Canada ISED

13.2.2.1 ISED Database

The products ISED certified can be found here:

Les produits certifiés ISED peuvent être trouvés ici:
https://sms-sgs.ic.gc.ca/equipmentSearch/searchRadioEquipments?execution=e1s1&lang=en

13.2.2.2 Applicable ISED Rules */ Liste des Règles ISDE Applicables*

Table 53: Applicable FCC and ISED rules

Model	Applicable ISED rules */Règles ISDE applicables 2*
ME310G1-W1	RSS: 132 Issue3, 133 Issue 6, 130 Issue 2, 139 Issue 3; RSS-Gen Issue 5
ME310G1-WW	
ME310G1-WWV ME310G1-W3	

13.2.2.3 ISED Regulatory Notices */ Avis réglementaires d'ISDE*

Modification Statement / *Déclaration de modification*

Telit has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authority to operate the equipment.

Telit n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.

Interference Statement */ Déclaration d'interférence*

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux applicables RSS standards d'Industrie Canada. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Radio Exposure Notice */ Avis d'exposition radio*

This device complies with ISED radiation exposure limits set forth for an uncontrolled environment and meets the RSS-102 of the ISED radio frequency (RF) Exposure rules. Antenna gain must be less than the values reported in the table below:

Le présent appareil est conforme à l'exposition aux radiations FCC / ISED définies pour un environnement non contrôlé et répond aux directives d'exposition de la fréquence de la FCC radiofréquence (RF) et RSS-102 de la fréquence radio (RF) ISED règles d'exposition. Gain de l'antenne doit être ci-dessous :

Table 54: ISED Antenna Type */ ISDE Type d'antenne*

Model Modèle	Antenna Type Type d'Antenne
ME310G1-W1	Omnidirectional Antenna Gain 2.14 dBi Omnidirectionelle Gain de l'antenne 2.14 dBi
ME310G1-WW	
ME310G1-WWV	
ME310G1-W3	

Table 55: Gain maximum for ISED (dBi) */ Gain d'antenne max pour ISED en dBi*

Gain maximum for ISED (dBi) / Gain maximum pour ISDE (dBi)				
Band	ME310G1-W1	ME310G1-WW	ME310G1-WWV	ME310G1-W3
GSM 850	---	---	6.1	---
GSM 1900	---	---	2.0	---
GPRS/EGPRS 850	---	3.6	3.6	---
GPRS/EGPRS 1900	---	2.5	2.5	---
FDD 2	11.0	8.0	8.0	8.0
FDD 4	8.0	5.0	5.0	5.0
FDD 5	9.1	6.1	6.1	6.1
FDD 12	8.6	5.6	5.6	5.6
FDD 13	8.9	5.9	5.9	6.0
FDD 14	---	---	---	6.0
FDD 25	11.0	8.0	8.0	8.0
FDD 26	9.0	6.0	6.0	6.2
FDD 66	8.0	5.0	5.0	5.0
FDD 71	8.4	8.4	8.4	---
FDD 85	8.6	5.6	5.6	5.6

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and consider removing the no-collocation statement.

Cet équipement doit être installé et utilisé conformément aux instructions fournies et la ou les antennes utilisées pour cet émetteur doivent être installées pour fournir une distance de séparation d'au moins 20 cm de toutes les personnes et ne doivent pas être co-localisées ou fonctionner en conjonction avec toute autre antenne ou émetteur. Les utilisateurs finaux et les installateurs doivent recevoir les instructions d'installation de l'antenne et envisager de supprimer la déclaration de non-collocation.

Information on test modes and additional testing requirement / Informations sur les modes de test et exigences de test supplémentaires

The module has been evaluated in mobile stand-alone conditions. For operational conditions other than a stand-alone modular transmitter in a host (multiple, simultaneously transmitting modules or other transmitters in a host), additional testing may be required (collocation, retesting...) If this module is intended for use in a portable device, you are responsible for separate approval to satisfy the SAR requirements IC RSS-102.

Le module a été évalué dans des conditions mobiles autonomes. Pour des conditions de fonctionnement autres qu'un émetteur modulaire autonome dans un hôte (plusieurs modules transmettant simultanément ou d'autres émetteurs dans un hôte), des tests supplémentaires peuvent être nécessaires (colocalisation, retest...) Si ce module est destiné à être utilisé dans un appareil portable, vous êtes responsable de l'approbation séparée pour satisfaire aux exigences SAR IC RSS-102.

Trace antenna designs

See 7.2 GSM/WCDMA/TD-SCDMA/LTE Antenna - PCB Line Guidelines

Summary of the specific operational use conditions

See apart 7.1 GSM/WCDMA/TD-SCDMA/LTE Antenna - Antenna requirements

13.2.2.4 Labelling requirements for the host device / Exigences d'étiquetage pour le périphérique hôte

The host device shall be properly labelled to identify the modules within the host device. The certification label of the module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the IC of the module, preceded by the words "Contains transmitter module", or the word "Contains", or similar wording expressing the same meaning, as in the following table.

L'appareil hôte doit être étiqueté comme il faut pour permettre l'identification des modules qui s'y trouvent. L'étiquette de certification du module donné doit être posée sur l'appareil hôte à un endroit bien en vue en tout temps. En l'absence d'étiquette, l'appareil hôte doit porter une étiquette donnant le IC du module, précédé des mots « Contient un module d'émission », du mot « Contient » ou d'une formulation similaire exprimant le même sens, comme en tableau suivant.

Table 56: ISED Certification Number / Ètiquette IC du dispositif hôte

Model Modèle	ISED Certification Number Num. de certification ISDE
ME310G1-W1	Contains IC: 5131A-ME310G1W1
ME310G1-WW	Contains IC: 5131A-ME310G1WW
ME310G1-WWV	
ME310G1-W3	Contains IC: 5131A-ME310G1W3

CAN ICES-3 (B) / NMB-3 (B)

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.

13.2.3 Brazil ANATEL

13.2.3.1 ANATEL Regulatory Notices

Agência Nacional de Telecomunicações (ANATEL) of Brazil

ME310G1-WW Homologation #: 08566-20-02618

ME310G1-W1 Homologation # 01333-23-02618

ME310G1-W2 Homologation # 11093-23-02618

13.3 APAC Approvals

13.3.1 Australia RCM

In accordance with the above Approval Compliance Summary table, where applicable (green ball), hereby, Telit Communications S.p.A declares that the equipment is in compliance with Regulatory Compliance Mark (RCM) of Australia.

Note: The equipment listed may not work when main power fails.

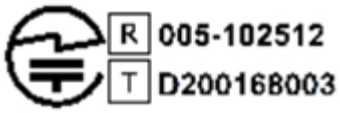
13.3.2 Japan JRL/JTBL

13.3.2.1 JRL/JTBL Regulatory Notices

Antenna info

According to Japan regulatory rule, module certification is valid only with the specific antennas registered to and approved by Japan Radio Law (JRL) certified body in relation to module certification. Customers who are going to use modules under JRL are

According to Japanese JRL/JTBL requirements, the module and the packaging shall display the conformity mark, showing that the terminal equipment has received the certification. Due to the very small size of the ME310G1-WW and the difficulties to affix the mark, the conformity mark is displayed only in the packaging and in the picture below:



13.3.3 Taiwan NCC

13.3.3.1 NCC Regulatory Notices

According to National Communication Commission (NCC) Taiwan requirements, the module and the packaging shall be identified as described in the following lines. Shall be added also the specified safety warning statement.

Brand name: Telit

Model name: ME310G1-WW

Product name: WWAN module

NCC logo: 

NCC ID: CCAF21Y00040

NCC safety warning statement: “**減少電磁波影響，請妥適使用**”NCC Note:
注意：行動電話業務(2G)**於**106**年**6**月停止提供服務後，本設備**2G**功能在國內將無法使用。**

13.4 EMEA Approvals

13.4.1 EU RED

13.4.1.1 EU Declaration of Conformity

In accordance with the above Approval Compliance Summary table, where applicable (green ball), hereby, Telit Communications S.p.A declares that the equipment is in compliance with the Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: https://www.telit.com/red

Text of 2014/53/EU Directive (RED) requirements can be found here:

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0053

13.4.1.2 RED Antennas

This radio transmitter has been approved under RED to operate with the antenna types listed below with the maximum permissible gain indicated. The usage of a different antenna in the final hosting device may need a new assessment of host conformity to RED.

Table 57: RED Antenna Type

Model	Antenna Type
ME310G1-W1	Omnidirectional Antenna Gain 2.14 dBi
ME310G1-WW	
ME310G1-WWV	
ME310G1-W2	
ME310G1-W3	

Table 58: Max gain for RED

Max Gain for RED (dBi)					
Band	ME310G1-W1	ME310G1-WW	ME310G1-WWV	ME310G1-W2	ME310G1-W3
GSM 900	---	---	8.48	---	---
DCS 1800	---	---	14.36	---	---
GPRS/EGPRS 1800	---	10.34	9.34	---	---
FDD 1	14.84	11.84	11.84	14.3	11.84
FDD 3	14.33	11.33	11.33	13.8	11.33
FDD 8	11.45	8.45	8.45	10.7	8.45
FDD 20	11.20	8.20	8.20	11.2	8.20
FDD 28	10.47	7.47	7.47	10.7	7.47
FDD 31	---	---	---	2.5	---
FDD 72	---	---	---	2.5	---
FDD 87	---	---	---	5.1	---

Max Gain for RED (dBi)					
FDD 88	---	---	---	5.1	---

13.4.2 UK UKCA

13.4.2.1 UKCA Declaration of Conformity

In accordance with the above Approval Compliance Summary table, where applicable (green ball), hereby, Telit Communications S.p.A declares that the equipment is in compliance with the Radio Equipment Regulations 2017 for UKCA.

The full text of the UKCA declaration of conformity is available at the following internet address: https://www.telit.com/ukca

The UKCA requirements can be found here:

https://www.gov.uk/guidance/using-the-ukca-marking

13.5 RED/UKCA Antennas

This radio transmitter has been approved under UKCA to operate with the antenna types listed below with the maximum permissible gain indicated. The usage of a different antenna in the final hosting device may need a new assessment of host conformity to UKCA.

Table 59: UKCA Antenna Type

Model	Antenna Type
ME310G1-W1	Omnidirectional Antenna Gain 2.14 dBi
ME310G1-WW	
ME310G1-WWV	
ME310G1-W2	
ME310G1-W3	

Table 60: Max gain for UKCA

Max Gain for UKCA (dBi)					
Band	ME310G1-W1	ME310G1-WW	ME310G1-WWV	ME310G1-W2	ME310G1-W3
GSM 900	---	---	8.48	---	---
DCS 1800	---	---	14.36	---	---
GPRS/EGPRS 1800	---	10.34	9.34	---	---
FDD 1	14.84	11.84	11.84	14.3	11.84
FDD 3	14.33	11.33	11.33	13.8	11.33
FDD 8	11.45	8.45	8.45	10.7	8.45
FDD 20	11.20	8.20	8.20	11.2	8.20
FDD 28	10.47	7.47	7.47	10.7	7.47
FDD 31	---	---	---	2.5	---
FDD 72	---	---	---	2.5	---
FDD 87	---	---	---	5.1	---

Max Gain for UKCA (dBi)					
FDD 88	---	---	---	5.1	---

14 Acronyms and Abbreviations

Table 61: Acronyms and Abbreviations

Acronym	Definition
ADC	Analog – Digital Converter
CLK	Clock
CMOS	Complementary Metal – Oxide Semiconductor
CS	Chip Select
DAC	Digital – Analog Converter
DTE	Data Terminal Equipment
ESR	Equivalent Series Resistance
GPIO	General Purpose Input Output
HS	High Speed
HSDPA	High-Speed Downlink Packet Access
HSIC	High-Speed Inter Chip
HSUPA	High-Speed Uplink Packet Access
I/O	Input Output
MISO	Master Input – Slave Output
MOSI	Master Output – Slave Input
PCB	Printed Circuit Board
RTC	Real-Time Clock
SIM	Subscriber Identification Module
SPI	Serial Peripheral Interface
TTSC	Telit Technical Support Centre
UART	Universal Asynchronous Receiver Transmitter
UMTS	Universal Mobile Telecommunication System
USB	Universal Serial Bus
VNA	Vector Network Analyzer
VSWR	Voltage Standing Wave Radio
WCDMA	Wideband Code Division Multiple Access

15 Related Documents

Refer to https://dz.telit.com/ for current documentation and downloads.

Table 62: Related Documents

S.no	Book Code	Document Title
1	80617ST10991A	ME310G1/ME910G1/ML865G1 AT Commands Reference Guide
2	80529NT11661A	Cat M/NB-IoT Quick Start Guide
3	1VV0300989	SSL/TLS User Guide
4	80000NT10001A	SIM Integration Design Guide
5	80000NT10060A	xE910 Global Form Factor Application Note
6	80000NT10002A	Antenna Detection Application Note
7	80000NT10003A	Rework procedure for BGA modules
8	80000NT10028A	Event Monitor Application Note

16 Document History

Table 63: Document History

Revision	Date	Changes
27	2025-11-26	Table 56 updated: ME310G1-W3 code modified
26	2024-12-16	Migration to latest TC template Adding RCM certification for W3
25	2024-07-17	GNSS Signals Pin-out: updated the warning note 1PPS not supported on W3 variant
24	2023-10-18	CAT M1/Band 31 and Band72 sensitivity changed Table 45 and Brazil Anatel updated for ME310G1-W2
23	2023-08-18	Template Update
22	2023-05-11	Table 2 updated: NB bands for WWV variant Table 4: CAT-NB2 typo corrected Added B5 for ME310G1-W2 in all tables "B86" is not 3GPP B103 band Chapter 5.6.3 Module Reboot added Chapter 5.14: note added for antenna tuner ME310G1-W2 B31 and B72 sensitivity updated ME310G1-W1 Anatel approval
21	2022-07-27	"B86" has been 3GPP standardized as B103 Antenna aperture Tuning Application note not yet available
20	2022-05-05	Updated Chapter 12
19	2022-04-05	"Start AT CMD" flowchart added 5.3 Power Off flowchart changed B14 removed in chapter 2.5.1 for ME310G1-W1 variant Fast shutdown by HW figure changed ME310G1-W2 B87 and B88 sensitivity ME310G1-W2 power consumption USIF1: not managed by SW. All pins set as RFU UKCA for W3 variant Anatel restricted radiation statement removed 2.7.1 thickness without label 9.1 drawing: without label
18	2022-01-21	ME310G1-W3 power consumption update ME310G1-WW sensitivity update Table 32 and Table 3.1 pin: DTR alternate function ME310G1-W2 NB2 sensitivity measurements
17	2021-11-17	Added ME310G1-W3 for worldwide market
16	2021-10-27	UKCA reference for ME310G1-WW added
15	2021-09-24	Chap 6.1.2 added Chap 11.6 added UCKA reference only for ME310G1-W1, ME310G1-W2 Language reviewed

Revision	Date	Changes
14	2021-08-19	Revision released for certification purpose. Not distributed. UKCA certification added
13	2021-08-05	Added B86 for WW Chapter 12, updated
12	2021-06-08	Added ME310G1-W3 for Korea market Added Section 5.14 for Antenna Tuner solution
11	2021-04-28	Section12.5, added NCC Regulatory Notices Section 8.4, measurements update Section 2.2 and 2.5 added B86 Section 12.3 added B86 FCC antenna info Added B8_39d (US 900Mhz band) to W1 and WW products
10	2021-01-12	Reviewed template design and styles Section 12.2 updated with ME310G1-W2 information Section 11.2 updated with Reel information Section 7.2 removed Chapter 4 update
9	2020-09-14	Added ME310G1-W2 variant Section 2.5, TX Power update Section 2.8, Temperature ranges update Section 5.2, Power-on timing change back to 5sec
8	2020-07-22	Conformity assessment update with ANATEL
7	2020-05-19	Power consumption update (GPS) Conformity assessment update Added ME310G1-WWV variant
6	2020-05-19	Power consumption update (GPS) Conformity assessment update Added ME310G1-WWV variant
5	2020-04-29	Power consumption figures update FORCED_USB_BOOT renamed ROM_BOOT Added USB signals in PIN ALLOCATION Added “WARNING” RXD1 in PIN ALLOCATION and in section 5.6.3.2 Footprint update in section 10.1 Added Packaging Tray information Added GNSS and LTE coexistence suggestion VBATmin update in section 4.1
4	2020-01-31	Power consumption figures update RX Sensitivity figures update HW Shutdown update Conformity assessment update
3	2019-10-02	Power consumption figures update Added DTR and RING Removed B14 Update ME310G1-WW inhibit area recommendation Extended Voltage Range lower limit change

Revision	Date	Changes
2	2019-08-13	Added ME310G1-WW Update of Temperature range table N16 pin update (ON_OFF*/WAKE*) ON/OFF procedure updated
1	2019-06-13	Band list update, pinout update Added SIMIN, USB_VBUS, CTANK, PWRMON, ROM_BOOT pins description Added power on procedure
0	2019-03-11	First Issue

From Mod.0818 Rev.16

Technical Documentation