



EXM-G1A Module User Manual



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1. Foreword

1.1 Introduction

This document describes the hardware of the COMPAL® 4G EXM-G1A Module products. It helps you quickly retrieve interface specifications, electrical and mechanical details, and information on the requirements to be considered for integrating further components.

1.2 Safety Information

The following safety precautions must be observed during all phases of operation, such as usage, service or repair of any cellular terminal or mobile incorporating with 4G EXM-G1A module. Manufacturers of the cellular terminal should send the following safety information to users and operating personnel, and incorporate these guidelines into all manuals supplied with the product. If not so, Compal assumes no liability for customers' failure to comply with these precautions.



Full attention must be given to driving at all times in order to reduce the risk of an accident. Using a mobile while driving (even with a hands free kit) causes distraction and can lead to an accident. Please comply with laws and regulations restricting the use of wireless devices while driving.



Switch off the cellular terminal or mobile before boarding an aircraft. The operation of wireless appliances in an aircraft is forbidden to prevent interference with communication systems. If the device offers an Airplane Mode, then it should be enabled prior to boarding an aircraft. Please consult the airline staff for more restrictions on the use of wireless devices on boarding the aircraft.



Wireless devices may cause interference on sensitive medical equipment, so please be aware of the restrictions on the use of wireless devices when in hospitals, clinics or other healthcare facilities.



Cellular terminals or mobiles operating over radio signals and cellular network cannot be guaranteed to connect in all possible conditions (for example, with unpaid bills or with an invalid (U) SIM card). When emergent help is needed in such conditions, please remember using emergency call. In order to make or receive a call, the cellular terminal or mobile must be switched on in a service area with adequate cellular signal strength.



The cellular terminal or mobile contains a transmitter and receiver. When it is ON, it receives and transmits radio frequency signals. RF interference can occur if it is used close to TV set, radio, computer or other electric equipment.



In locations with potentially explosive atmospheres, obey all posted signs to turn off wireless devices such as your phone or other cellular terminals. Areas with potentially explosive atmospheres include fueling areas, below decks on boats, fuel or chemical transfer or storage facilities, areas where the air contains chemicals or particles such as grain, dust or metal powders, etc.



2. Overview

2.1 Introduction

The EXM-G1A devices are WWAN module in size 30x42mm. The module and device software combination deliver multiband, multimode WWAN connectivity in a single hardware configuration. EXM-G1A supports LTE Band 1/ 2/ 3/ 4/ 5/ 7/ 8/ 12/ 13/ 14/ 18/ 19/ 20/ 25/ 26/ 28/ 29/ 32/ 38/ 39/ 40/ 41/ 42/ 43/ 48/ 66/ 71, WCDMA Band 1/ 2/ 4/ 5/ 6/ 8/ 9/ 19. The EXM-G1A devices also have an internal GPS receiver that can operate standalone or in simultaneous operation with its WWAN radios.

The EXM-G1A device is a highly-integrated 4G wireless communication module that adopts standard USB 3.0 Gen 1 interface and backward supports with LTE/WCDMA system. It is applicable to most broadband communication networks of the mobile operator across the world.

EXM-G1A and supported features for the Duplex mode: FDD (Frequency Division Duplex) and TDD ((Time Division Duplex)). MIMO (Multi-input Multi-output) capability: up to 2x2 DL MIMO; CA (Carrier Aggregation) capability: DLCA: inter-band, intra-band contiguous and intra-band non-contiguous DLCA; ULCA: inter-band. Modulation: UL: 64QAM; DL: 256QAM. Waveform: UL: CS-FDMA; DL: CP-OFDM.



2.2 Transmitting Power

The transmitting power for each band of the EXM-G1A Module as shown in the following table:

Table 2-1 WCDMA

Mode	Band	Typical Value (dBm)	Note
WCDMA	Band 1	24.5	+0.5/-0.2
	Band 2	24.5	+0.5/-0.2
	Band 3	24.5	+0.5/-0.2
	Band 4	24.5	+0.5/-0.2
	Band 5	24.5	+0.5/-0.2
	Band 6	24.5	+0.5/-0.2
	Band 8	24.5	+0.5/-0.2
	Band 9	24.5	+0.5/-0.2
	Band 19	24.5	+0.5/-0.2

Table 2-2 LTE FDD

Mode	Band	Typical Value (dBm)	Note
LTE FDD	Band 1	24	+0.5/-0.2
	Band 2	24	+0.5/-0.2
	Band 3	24	+0.5/-0.2
	Band 4	24	+0.5/-0.2
	Band 5	25	+0.5/-0.2
	Band 7	24	+0.5/-0.2
	Band 8	25	+0.5/-0.2
	Band 12	25	+0.5/-0.2
	Band 13	25	+0.5/-0.2
	Band 14	25	+0.5/-0.2
	Band 18	25	+0.5/-0.2
	Band 19	25	+0.5/-0.2
	Band 20	25	+0.5/-0.2



	Band 25	24	+0.5/-0.2
	Band 26	25	+0.5/-0.2
	Band 28	25	+0.5/-0.2
	Band 29	NA	NA
	Band 32	NA	NA
	Band 66	24	+0.5/-0.2
	Band 71	25	+0.5/-0.2

Table 2-3 LTE TDD

Mode	Band	Typical Value (dBm)	Note
LTE TDD	Band 38	24	+0.5/-0.2
	Band 39	24	+0.5/-0.2
	Band 40	NA	NA
	Band 41	24	+0.5/-0.2
	Band 42	NA	NA
	Band 43	NA	NA
	Band 48	22	+0/-0.2



2.3 Antennas (Maximum allowable gain)

Table 2-4 Maximum allowable gain

Modulation	Frequency (MHz)	Max. Allowable Antenna Gain (dBi)
WCDMA B2/ LTE Band 2	1850 ~ 1910	8.0
WCDMA B4/ LTE Band 4	1710 ~ 1755	5.0
WCDMA B5/ LTE Band 5	824 ~ 849	5.5
LTE Band 7	2500 ~ 2570	8.5
LTE Band 12	699 ~ 716	5.0
LTE Band 13	777 ~ 787	5.0
LTE Band 14	788 ~ 798	5.0
LTE Band 25	1850 ~ 1915	8.0
LTE Band 26	814 ~ 849	5.5
LTE Band 38	2570 ~ 2620	8.5
LTE Band 41	2496 ~ 2690	8.5
LTE Band 48	3550 ~ 3700	1.0
LTE Band 66	1710~ 1780	5.0
LTE Band 71	663 ~ 698	4.5



Table 2-5: Antenna port mapping table



Band	Frequency	Ant_1	Ant_3
LB	617-960MHz	Tx/PRx	DRx
MHB	1427-2690MHz	Tx/PRx	DRx
UHB	3300-4200MHz	Tx/PRx	DRx
GPS L1	1559-1607MHz		Rx



3. FCC/IC Notice

Model: EXM-G1A

Important Notice to OEM integrators

1. This module is limited to OEM installation ONLY.
2. This module is limited to installation in mobile or fixed applications, according to Part 2.1091(b). 3. The separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations 4. For FCC Part 15.31 (h) and (k): The host manufacturer is responsible for additional testing to verify compliance as a composite system. When testing the host device for compliance with Part 15 Subpart B, the host manufacturer is required to show compliance with Part 15 Subpart B while the transmitter module(s) are installed and operating. The modules should be transmitting and the evaluation should confirm that the module's intentional emissions are compliant (i.e. fundamental and out of band emissions). The host manufacturer must verify that there are no additional unintentional emissions other than what is permitted in Part 15 Subpart B or emissions are complaint with the transmitter(s) rule(s).

Antenna Installation

- (1) The antenna must be installed such that 20 cm is maintained between the antenna and users.
- (2) The transmitter module may not be co-located with any other transmitter or antenna.
- (3) To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile exposure condition must not exceed:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.



Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding 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/warning as show in this manual.

Module Warning statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF Exposure

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure. The antenna(s) used for this transmitter should be installed and operated with minimum distance 20 cm between the radiator & your body.

Label requirements

Any device incorporating this module must include an external, visible, permanent marking or label which states:

“Contains FCC ID: GKREXMG1A”



Industry Canada Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- (1) L'appareil ne doit pas produire de brouillage;
- (2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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

Radiation Exposure Statement

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC/IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et votre corps.

End Product Labeling

When the module is installed in the host device, the IC ID label must be visible through a window on the final device or it must be visible when an access panel, door or cover is easily re-moved. If not, a second label must be placed on the outside of the final device that contains the following text:

"Contains IC: 2533B-EXMG1A"