

Modular Integration Instructions

Product: **LTE CAT 1 Cellular Module**

Modulation Type: **QPSK, 16QAM**

Model: **A7672G** | **FCC ID: KKG8BAE005**

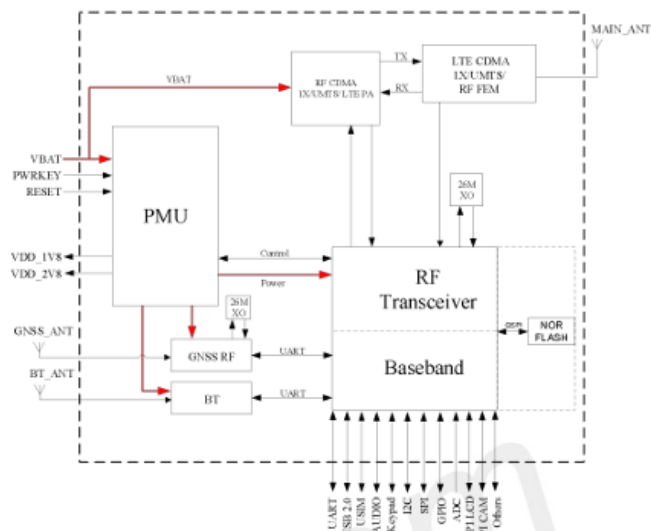
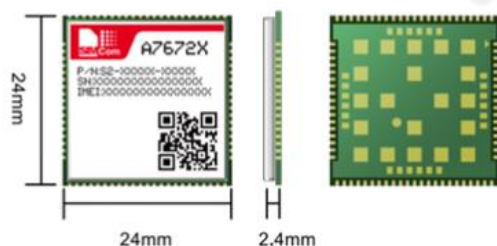


Figure above shows the A7672G Functional Block Diagram

2.1 Introduction/ General

The following instructions are provided as a guide on how to properly install and integrated this FCC certified module (model A7672G) into host devices/end products. Failure to follow these instructions may void the module's FCC certification and/or the host product's authorization to operate under FCC rules.

2.2 List of Applicable FCC Rules

REGULATORY BODY	SPECIFICATION	ID (IF APPLICABLE)	HVIN/MODEL
FCC (USA)	22H, 24E, 27, 90	KKG8BAE005	A7672G
ISED (Canada)	RSS-132, 133, 139, 199, 130, 195	2213A-8BAE005	A7672G

2.3 Specific Operational Use Conditions

The A7672G has been granted a single modular FCC grant. It is authorized for use only by the Grantee (Digital Control Incorporated/DCI) and not intended for sale to third parties. This module may only be used under following conditions:

- Must be factory installed in DCI devices exclusively.
- Must remain enclosed by its original shielding method.
- The antenna(s) used for this device must be installed to provide a separation distance of at least 20cm from all persons and must not be collocated or operating in conjuncture with any other antenna or transmitter within a host device except in accordance with FCC multi-transmitter product procedures. To be used in any other configuration, such as portable and/or collocated with other transmitters simultaneously, additional evaluation, testing and C2PC on the module grant are required.
- Any notification to the end user about how to install or remove the integrated radio module is NOT allowed.

Any changes to hardware, hosts or co-location configuration may require new radiated emission and SAR evaluation and/or testing. The approval of the module does not exempt the end product from being evaluated against any applicable regulatory demands. The evaluation of the end product shall be performed with A7672G module installed and operating in a way that reflects the intended use case of the end product.

2.2 Limited Module Procedures

Not applicable.

2.3 Trace Antenna Designs

Not applicable.

2.4 RF Exposure Considerations

The A7672G complies with FCC and ICED radiation exposure limits set forth for mobile devices in an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & operator's body. Colocation of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures.

CAUTION: FCC RF Radiation Exposure Statement

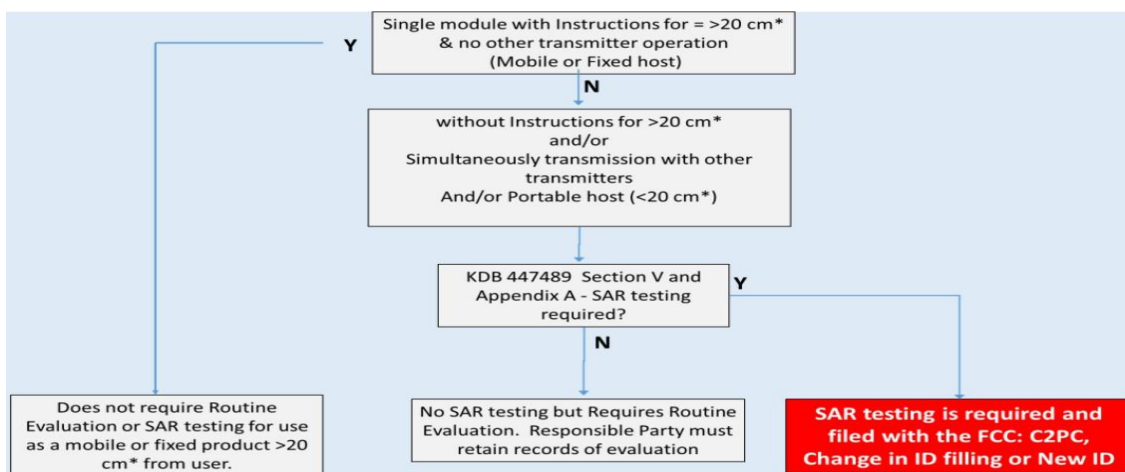
This equipment complies with FCC radiation exposure limits set forth for a mobile device in an uncontrolled environment and should be installed and operated with a minimum distance of 20cm between radiator and operator.

CAUTION: IC RF Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for a mobile device in an uncontrolled environment and should be installed and operated with a minimum distance of 20cm between radiator and operator.

Cet équipement respecte les limites d'exposition aux radiations IC fixées pour un appareil mobile dans un environnement non contrôlé et doit être installé et utilisé avec une distance minimale de 20 cm entre le radiateur et l'opérateur.

If the enduser operating case requires the WL18MODGI to be installed and operated in a host with a distance less than 20cm between the radiator and user, the host device must comply with the requirements in KDB 996369 D03 and KDB 996369 D04. Please follow the general RF exposure guidance flow chart below. Additional host specific details can be found in Annex A of this document.



2.7. Antennas

This module has been tested and approved for use with the antennas featured in the Approved Antennas List below. This module is intended only for integrators under the following conditions:

- Module may only operate using an antenna of a type and max (or lesser) gain as approved by DCI in the table below.
- Antenna requires professional installation by DCI.
- The module may be integrated with other antennas. In this case, the integrator must certify the design with respective regulatory agencies, see Module Integration Instructions.

Approved Antennas List

Antenna Type	Brand	Model
PCB	Taoglas	FXUB68.17.0420C*

Electrical								
Frequency (MHz)	LTE 700	GSM 850	GSM 900	DCS	PCS	UMTS1	Wi-Fi	LTE 2600
	698~ 803	824~ 894	880~ 960	1710 ~1880	1850 ~1990	1920 ~2170	2400 ~2480	2490 ~2690
Max Return Loss (dB)	-9	-8	-7	-9	-17	-13	-13	-12
Max VSWR	2.5	2.5	3	2.5	1.5	1.5	1.5	2
Efficiency (%)	45	45	45	60	65	65	65	55
Peak Gain (dBi)	2	2	2	2	2.5	2.5	3	2
Average Gain (dB)	-3.5	-3.5	-3.5	-2.2	-2	-2	-2	-2.6
Radiation Properties	Omni-directional							
Max Input Power (Watts)	5							
Polarization	Linear							
Impedance (Ohms)	50 Ohms							

*A customized version of the base part number Taoglas FXUB68.07.0180C where the coax cable length is increased from 180mm to 420mm and the U.FL connection is swapped for a MMCX connector.

2.8. Label and Compliance Information

Module Label: The module must clearly show the following information on its label:

- Model/HVIN No.
- FCC ID
- IC ID

Host Labeling Requirement: A host integrating this module must display a visible label (e.g., on the product enclosure) stating: "Contains FCC ID: KKG8BAE005; Contains IC ID: 2213A-8BAE005"

Étiquette du module : Le module doit clairement afficher les informations suivantes sur son étiquette :

- Modèle/HVIN
- Identification FCC
- IC ID

Exigence d'étiquetage de l'hôte : Un hôte intégrant ce module doit afficher une étiquette visible (par exemple, sur l'enceinte du produit) indiquant: « Contient l'ID FCC: KKG8BAE005 ; Contient l'ID du CI : 2213A-8BAE005

2.9 Test Modes and Additional Testing Requirements

Testing of the host product with all transmitters installed (composite investigation test) is recommended to ensure the host product complies with all applicable FCC rules. This testing is performed with the host product configured in typical operational modes to check the fundamental-frequency and should evaluate any emissions that may arise from the interaction of multiple transmitters, digital circuitry, or the physical properties of the host product (e.g., its enclosure) to verify that no emissions exceed the highest permissible limits for any individual transmitter, in accordance with Section 2.947(f).

For implementation into DCI host devices, an AT command, SimCom's "A76XX Series_CTBURST_Application Note_V1.04" ("A76XX Series_AT Command Manual_V2.03") is used to setup the A7672G module to ensure output power is limited to meet regulatory requirements. The data in the table below is populated as the power settings for each band.

	A	B	C	D	E
1	LTE Band	Power (apc)		GSM	Power (afcdac)
2	B2	1844		850	910
3	B4	1848		1900	1000
4	B5	1875			
5	B7	1846			
6	B12	1869			
7	B13	1865			
8	B25	1846			
9	B26	1867			
10	B38	1821			
11	B40	1861			
12	B41	1821			
13	B66	1839			

2.10 Additional Testing & Part 15 Subpart B Disclaimer

The A7672G is only FCC approved for the specific rule parts listed on the grant. Host product manufacturers are responsible for equipment authorization for the host's unintentional radiator portions (digital circuitry etc) under Part 15 Subpart B.

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.

2.11 EMI Considerations

The host manufacture is recommended to use D04 Module Integration Guide recommending as "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

Simultaneous transmission conditions must be evaluated by the integrator. Evaluating compliance for a host using certified modules and/or a stand-alone product requires: addressing EMC requirements specified in Section 2.947(f) for composite system testing and for simultaneous transmission.

2.12 How to Make Changes

1. Permissive Change Filings:
 - o Any host modifications that affect RF characteristics (e.g., enclosure changes, additional transmitters, new antennas) may require a Class II or Class III Permissive Change filing with the FCC.
2. Full vs. Limited Verification:
 - o If integration instructions herein are followed exactly, the module's existing grant remains valid.
 - o If the integrator's implementation deviates, the integrator must contact the module grantee to determine if further testing or a new FCC filing is required.

Important: These instructions must be followed to maintain FCC modular approval. Failure to comply may result in the module's FCC certification being voided, requiring the host integrator to pursue a separate FCC equipment authorization. For questions or clarifications, please contact: productcompliance@digital-control.com

ANNEX A : Host Specific RF Guidance and Information

The A7672G is approved for use under the existing grant conditions. To be used in host device configurations that affect RF characteristics (i.e additional transmitters, new antennas), the grantee must obtain a C2PC for the A7672G as installed into the specific host device.

DigiTrak Ares Locator

The DigiTrak Ares Locator host device (model AEO2) contains multiple simultaneously transmitting modules (see table below) and is therefore subject to additional requirements to show compliance to FCC and IC Rules.

Model/HVIN	FCC ID	IC ID
A7672G	KKG8BAE005	2213A-8BAE005
WL18MODG1	KKG-WL18DBMOD	2213A- WL18DBMOD
DR2	KKGB2DIG1	2213A- B2DIG1

Class II Permissive Change

DCI (the module grantee) must obtain a C2PC under § 2.1043 in order to be integrated into the AEO2.

Host Testing

Refer to sections 2.9, 2.10 and 2.11 of this document for specific host testing requirements to maintain compliance. The AEO2 was tested to FCC 15.109 and 15.19(g) for radiated emissions using the testing configurations listed in section 2.9 of this document.

RF Exposure

FCC: The AEO2 has been tested and complies with FCC radiation exposure limits for mobile and portable devices in an uncontrolled environment operated with a minimum separation distance of 0mm from the body.

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

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation of the device.

ISED: The AEO2 has been tested and complies with IC radiation exposure limits for mobile and portable devices in an uncontrolled environment operated with a minimum separation distance of 0mm from the body.

This device complies with Industry Canada license exempt RSS standards. Operation is subject to the following conditions:

- This device may not cause harmful interference
- This device must accept any interference received, including interference that may cause undesired operation of the device.

The AEO2's user manual will include the above RF information to users as required.

Host Labeling

The AEO2 displays a label indicating the following text: "Contains FCC ID KKG8BAE005, FCC ID KKG-WL18DBMOD, FCC ID KKGB2DIG1. Contains IC ID 2213A-8BAE005, IC ID 2213A- WL18DBMOD, IC ID 2213A- B2DIG1."

ANNEXE A : Directives et informations RF spécifiques à l'hôte

Le A7672G est approuvé pour une utilisation dans les conditions de subvention existantes. Pour être utilisé dans des configurations d'appareils hôtes qui affectent les caractéristiques RF (c'est-à-dire des émetteurs supplémentaires, de nouvelles antennes), le bénéficiaire doit obtenir un C2PC pour le A7672G tel qu'installé dans l'appareil hôte spécifique.

DigiTrak Ares Locator

Le dispositif hôte DigiTrak Ares Locator (modèle AEO2) contient plusieurs modules émetteurs simultanément (voir tableau ci-dessous) et est donc soumis à des exigences supplémentaires pour démontrer la conformité aux règles FCC et IC.

Modèle/HVIN	Identification FCC	IC ID
A7672G	KKG8BAE005	2213A-8BAE005
WL18MODG1	KKG-WL18DBMOD	2213A- WL18DBMOD
DR2	KKGB2DIG1	2213A - B2DIG1

Changement permissif de classe II

Le DCI (le bénéficiaire du module) doit obtenir un C2PC en vertu du § 2.1043 afin d'être intégré à l'AEO2.

Tests d'hôte

Veuillez consulter les sections 2.9, 2.10 et 2.11 de ce document pour connaître les exigences spécifiques de tests hôtes afin de maintenir la conformité.

L'AEO2 a été testé selon les FCC 15.109 et 15.19(g) pour les émissions rayonnées en utilisant les configurations d'essai listées à la section 2.9 de ce document.

Exposition RF

FCC : L'AEO2 a été testé et respecte les limites d'exposition aux radiations de la FCC pour les appareils mobiles et portables dans un environnement non contrôlé avec une distance de séparation minimale de 0 mm du corps.

Cet appareil est conforme à la Partie 15 des règles de la FCC. L'exploitation est soumise aux conditions suivantes :

1. Cet appareil ne peut pas causer d'interférences nuisibles
2. Cet appareil doit accepter toute interférence reçue, y compris celles pouvant provoquer un fonctionnement indésirable de l'appareil.

ISED : L'AEO2 a été testé et respecte les limites d'exposition aux radiations IC pour les appareils mobiles et portables dans un environnement non contrôlé, opérant avec une distance minimale de séparation de 0 mm du corps.

Cet appareil est conforme aux normes RSS exemptées de licence d'Industrie Canada. L'exploitation est soumise aux conditions suivantes :

3. Cet appareil ne peut pas causer d'interférences nuisibles
4. Cet appareil doit accepter toute interférence reçue, y compris celles pouvant provoquer un fonctionnement indésirable de l'appareil.

Le manuel utilisateur de l'AEO2 inclura les informations RF ci-dessus aux utilisateurs selon les besoins.

Étiquetage des hôtes

L'AEO2 affiche une étiquette indiquant le texte suivant : « Contient l'identifiant FCC KKG8BAE005, l'identifiant FCC KKG-WL18DBMOD, l'identifiant FCC KKGB2DIG1. Contient IC ID 2213A-8BAE005, IC ID 2213A- WL18DBMOD, IC ID 2213A- B2DIG1. »