

Caution! The maximum safe RF input power is 3 dBm.

In CATM mode, the sensitivity is measured over a 6 RB (Resource Block) channel (1.2 MHz). In NB-IoT mode, the sensitivity is measured over a single RB (200 kHz).

RF Output Power

The GM02S maximum output power within the recommended operating range (from 2.5 to 5.5 V) is given in Table 29.

Table 29. RF Max Output Power

Bands	Output Power
All Bands	23 dBm $\pm$ 1 dB

RF performance at 2.2 V

While it is not recommended to operate the GM02S in the range 2.2 to 2.5 V, the RF section will continue to work normally, albeit with reduced TX output power as shown in Table 30 below.

Table 30. RF Performance at 2.2 V compared to 2.5 V

Temperature	Sensitivity Loss	Output Power Loss
-30 °C	No loss	1.1 dB
25 °C	No loss	1.1 dB
85 °C	No loss	1.7 dB

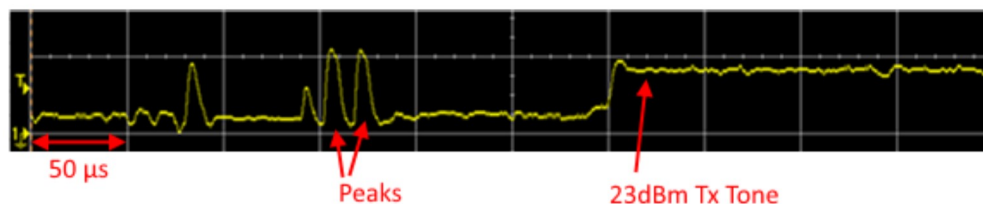
3.4. Power Supply Dimensioning

This section provides guidance to designers working on the power supply or selecting a suitable battery to power the GM02S.

Overview

The current consumption of the GM02S peaks before every TX sub-frame as shown in Figure 8. In this figure, the time division is 50 μ s. Around 150 μ s from the start, two current pulses peaking 34% higher than the average current consumption during the 23 dBm TX tone which follows can be observed.

Figure 8. Current Consumption in TX Sub-Frame



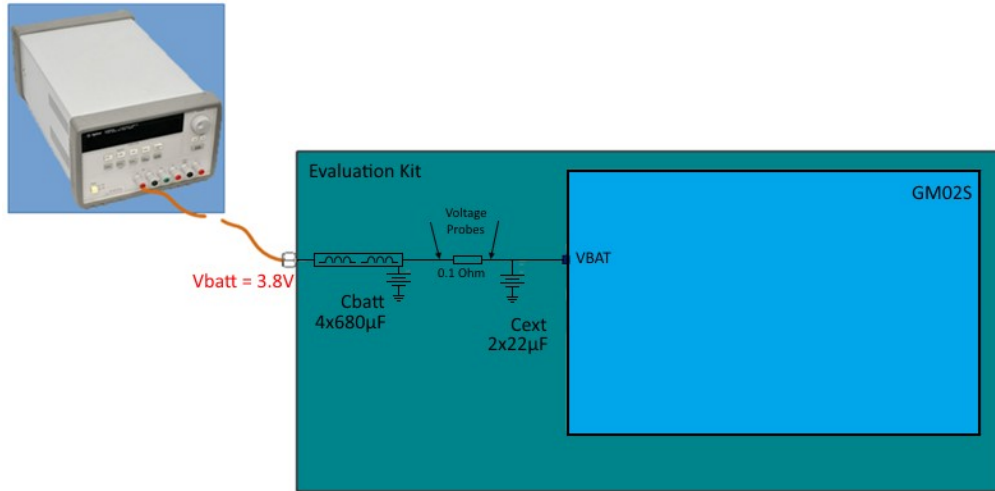
Peak Current Measurement Method

Sequans recommends to use the setup represented in Figure 9 for peak current measuring. This setup was used to record the measurements presented in Table 31. Pay attention that:

1. Voltage probes are placed close to module V_{BAT} input.
2. Voltage probes accuracy is calibrated using a current probe.

3. A large capacitance C_{batt} is placed close to the V_{BAT} pin to simulate a battery and screen the device from the parasitic inductances of the cables and tracks.
4. $2 \times 22 \mu F$ capacitors (C_{ext}) are placed between the voltage probes and the module V_{BAT} input to soften the current peaks.

Figure 9. Setup for Current Peak Measurement



Peak Current Measurement

Table 31 gives the peak current values measured on the setup shown on Figure 9 for different voltages and temperatures.

Table 31. Peak Current Measurements (in mA)

Input Voltage	T = -40°C	T = -30°C	T = +25°C	T = +85°C
5.5 V	328	305	263	268
3.8 V	475	438	444	479
2.5 V	705	667	679	741
2.2 V	676	640	652	717

Margin



Important: It is recommended that designs potentially sensitive to the current peaks described in this section use the recommended $C_{ext} 2 \times 22 \mu F$ and dimension the power supply with an extra 20% margin w/r to the values provided in this section.

Module's Total Capacitance and Inductance

The module's sum of internal capacitance (positive side tolerance) is 115 μF .

The module's sum of internal inductance (positive side tolerance) is 5.3 μH .

3.5. Maximum Electrical Ratings

Table 32. Maximum Electrical Ratings

Parameter	Minimum	Maximum
Supply Voltage V_{BAT}	-0.2 V	5.5 V
I/Os in Power Group PVDD_1V8	-0.2 V	4.125 V
I/Os in Power Group PMU_5V	-0.2 V	6.0 V

3.6. Thermal Considerations

Special attention needs to be given to thermal dissipation.

The outer layers of the host board must be covered in as many wide copper areas as possible, and those must be stitched with evenly spaced ground vias. Care must be taken that no air gap exists along the thermal path from the GM02S to the dissipating copper area(s). Gaps can be filled with heat conducting materials such as GapPad™.

The Gxx pads should be tied to a large ground plane on the customer's PCB layer 1. It is also recommended to have the Gxx pads area on the PCB stitched with through ground vias to improve thermal dissipation.

If the host board is piggybacked over a larger board, the aforementioned heat dissipation considerations should be applied to both the main and the daughter board.

Use the AT command `AT+SQNTMON` to monitor the current temperature of the modem and implement alert thresholds. The accuracy of the reported temperature is within $\pm 3^{\circ}\text{C}$.

4. MECHANICAL CHARACTERISTICS

4.1. Package Description

The module footprint is $(16.3 \pm 0.15) \text{ mm} \times (17.0 \pm 0.15) \text{ mm} \times 2.30 \text{ mm (max.)}$.

Maximum 'warpage' is 0.13 mm (as per JEITA ED7306).

See below for the other dimensions.

The GM02S weighs 1.42 g.

Hardware Module Dimensions

Figure 10. Module Top and Side Views

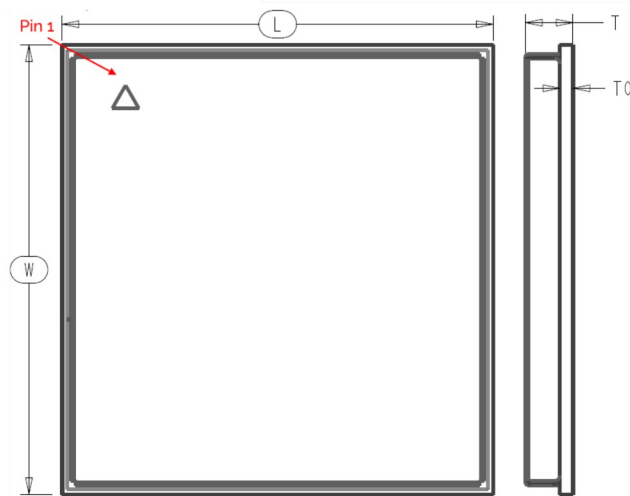


Figure 11. Module PCB Views

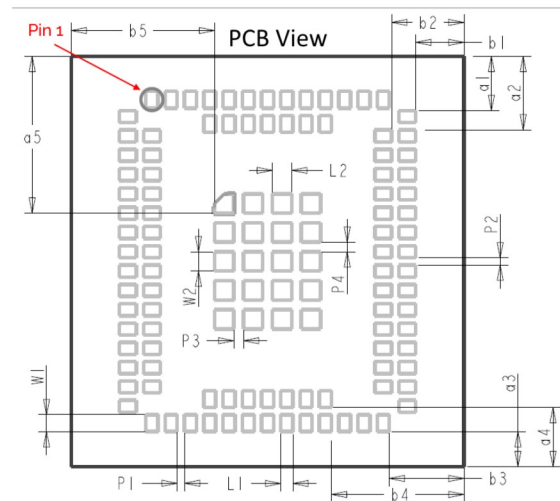


Figure 12. Details of chamfered central ground pad G1

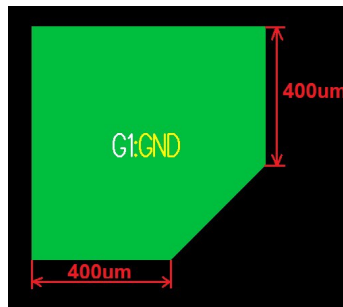
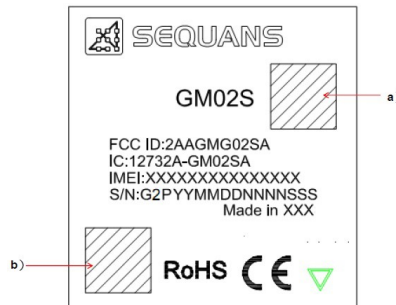


Table 33. Module Dimensions (mm)

Dimension	Value (mm)
L	16.3 ± 0.15
W	17.0 ± 0.15
T	2.3 max (2.2 typical)
T0	0.8 max
L1	0.5 ± 0.1
W1	0.7 ± 0.1
L2	0.8 ± 0.1
W2	0.8 ± 0.1
a1	2.25 ± 0.1
a2	3.05 ± 0.1
a3	1.45 ± 0.1
a4	2.45 ± 0.1
a5	6.5 ± 0.1
b1	2.0 ± 0.1
b2	3.0 ± 0.1
b3	3.1 ± 0.1
b4	5.5 ± 0.1
b5	5.95 ± 0.1
P1	0.3 ± 0.1
P2	0.3 ± 0.1
P3	0.4 ± 0.1
P4	0.4 ± 0.1

Laser Marking

Figure 13. GM02S Laser Marking



Notes on Figure 13:

1. The triangle in the bottom-right corner provides pin #1 location.
2. FCC ID: 2AAGMG02SA
3. IC: 12732A-GM02SA
4. IMEI: XXXXXXXXXXXXXXXX
5. S/N: G2PYMMDDNNNNSSS (16 digits)
 - G2P: reserved, value subject to change at Sequans' discretion (3 digits);
 - YYMMDD: Manufacturing Date (YY:Year;MM:Month,DD:Day);
 - NNNN: Panel counter (from 0001~9999);
 - SSS: Piece location on panel (from 001 to 065).
6. 2D marked "a" refer to IMEI Barcode
7. 2D marked "b" refer to S/N Barcode
8. XXX represents the country of origin, and can be either PRC for China or VN for Vietnam.

4.2. Environmental Conditions

Table 34. GM02S Operating Conditions

Parameter	Range	Description
Normal Operating Temperature ⁱ	-30 to +85°C	3GPP Compliant Operating Temperature.
Extended Operating Temperature ⁱⁱ	-40 to +85°C	Operation with Possible Penalty in RF Performances.
Relative Humidity	10 - 85%	Non condensing.

i. PCB temperature as measured by on-board thermistor. The correlation between oven temperature and the module on-board thermistor reading can be influenced by the specific thermal design of the customer's device.

ii. -40°C is the lowest temperature that the module can boot and start operation at.

4.3. Packing

The GM02S is delivered in Tape-and-Reel. Details are provided in the figures below.

Figure 14. Packing Modules in Reels

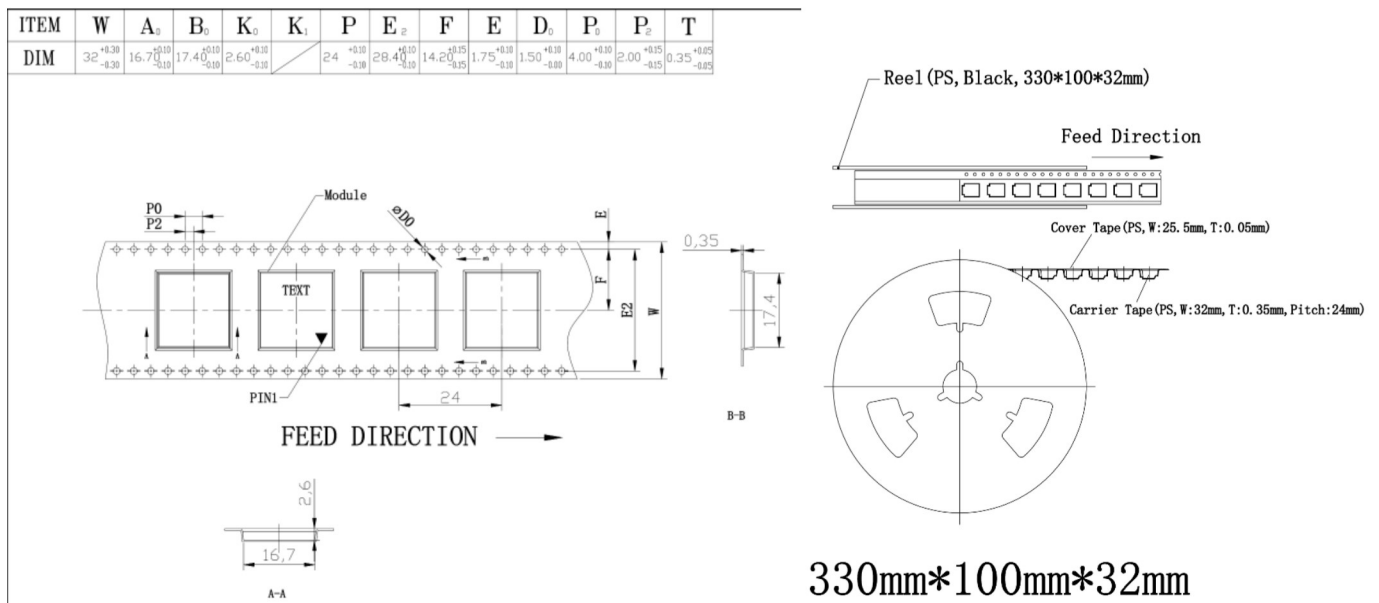
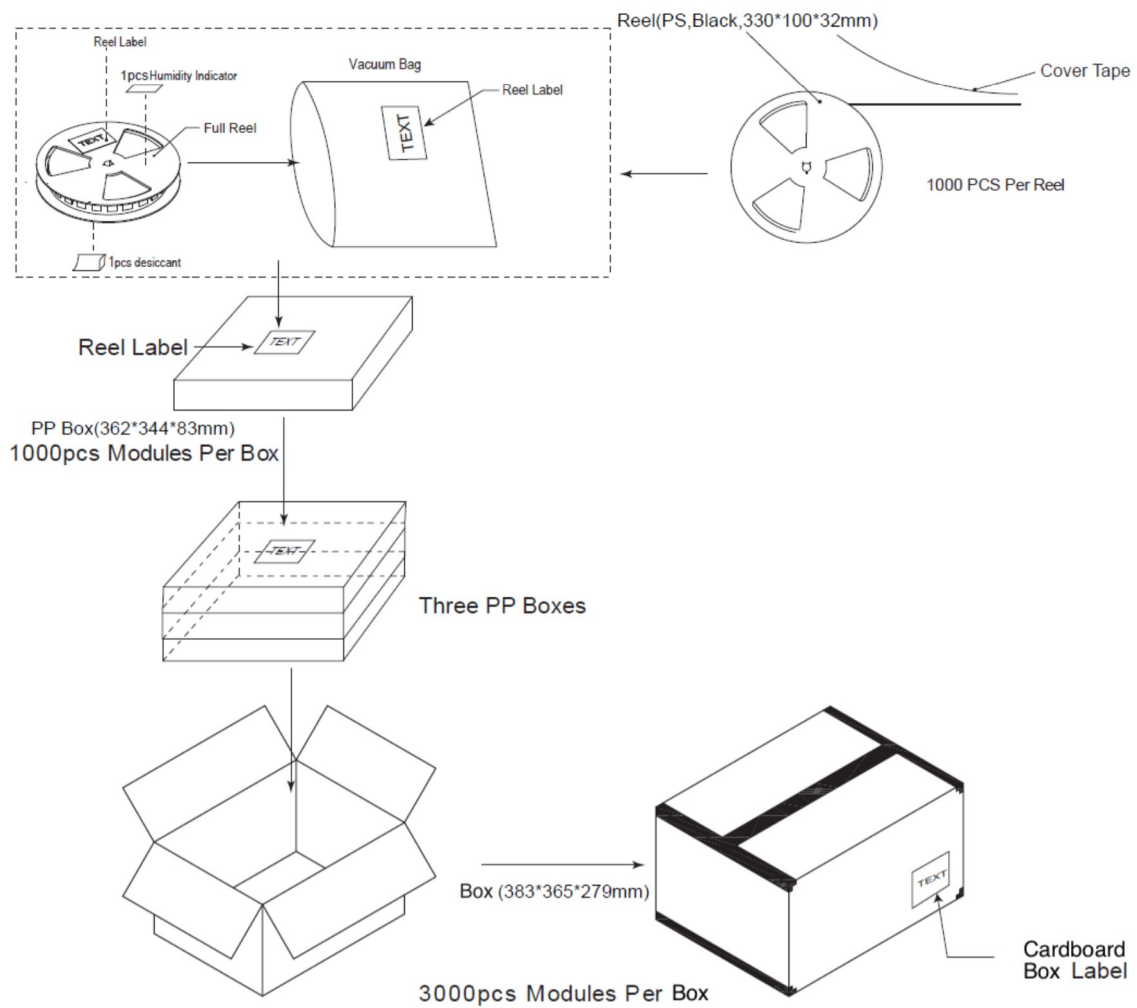


Figure 15. Packing Reels in Boxes



The full box set weights about 5.95 kg.

The label attached to reels, vacuum bags, and the PP boxes is shown in Figure 16. The label attached to the cardboard box (which contains 3 PP boxes) is shown in Figure 17. On both label, xxx in the COO (Country Of Origin) field stands either for CHINA or VIETNAM.

Figure 16. Reel, Vacuum Bag and PP Box Label



Figure 17. Cardboard Box Label



4.4. Storage and Mounting



Attention! This information is valid for hardware Rev. 3 only. (See the corresponding P/N here).

The GM02S module is Moisture Level 3 rated as per JEDEC industrial standard.

The GM02S is JEDEC J-STD-033D compliant and can be stored at $T < 40^{\circ}\text{C}$ and relative humidity $< 90\%$.

The GM02S can withstand up to three reflows at a maximum of 245°C .

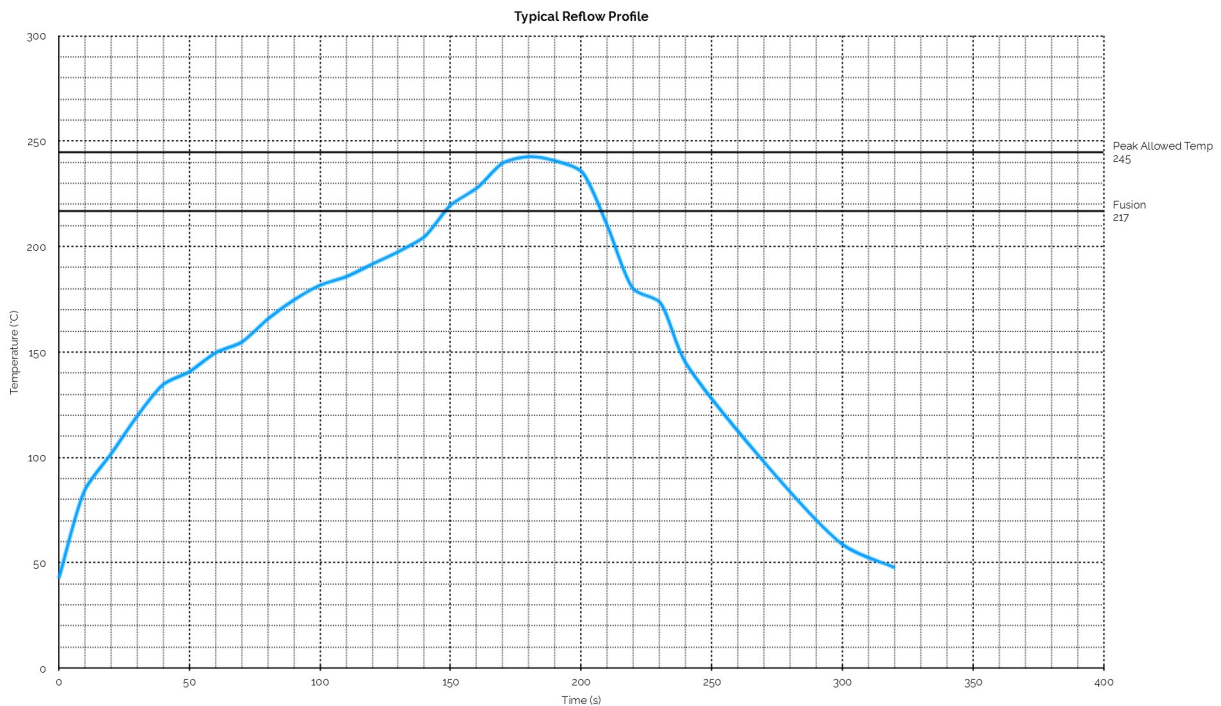
Table 35. Reflow Profile

Profile Feature	
Solder Paste Alloy	Sn 96.5/Ag 3.0/Cu 0.5 (Lead Free solder paste)

Table 35. Reflow Profile (continued)

Profile Feature	
Peak Package Body Temperature	235 °C to 245 °C
Fusion Time	Temp: 217 to 245 °C Duration: 60 to 90 s
Pre-heat / Soak	Temp: 150 to 217 °C Time: 90 to 120 s
Ramp-up Rate	< 3 °C/s
Ramp-down Rate	-3 to 0 °C/s
Air composition	N ₂ , O ₂ contents less than 1,500 ppm

Figure 18. Reflow Profile Parameters



Recommended stencil thickness: 0.1 to 0.13 mm (prefer 0.1 mm). More detail on the PCB land pattern will be provided in a future edition of the document.

Following reflow soldering, the GM02S can be washed with deionised RO water to remove any remaining flux. The module then needs a single backing at 125 °C during 16 hours. The module's package may be slightly discoloured during baking.

4.5. Reliability Specifications for Hardware Rev. 3

The hardware version 3 of the GM02S has been tested against Sequans's industrial reliability specification as described in Table 36.

Table 36. Reliability Test Plan

Item	Test conditions	Standard	#Sam- ples	Re- sult
Preconditioning	(a) Bake: 125°C / 24 hours (b) MSL3: 30°C/60% RH, 192 hrs (c) SAT (CSAM & TSCAN) (d) X-ray (e) Reflow 3 cycles at T_p : 250 $\pm$ 2°C (f) SAT (CSAM & TSCAN)	JESD22-A113	225	PASS
TC	Temperature Shock Cycling (TC): -40°C to +85°C air to air, 20 minutes, ramp rate 20°C/minute, 1000 cycles	JESD22-A104	25	PASS
THB	Temperature Humidity Bias Test +85°C, 85 % RH, V_{CC} Max, Read Point at 168/500/1,000 hrs	JESD22-A101	25	PASS
HAST	1. 130/100 °C, 85% RH, Vcc max 2. Electrical test	JESD22-A110	25	PASS
Environmental Testing - A Cold	Environmental Testing Test A Cold. -40°C, 500 hrs	IEC60068-2-1 JESD22-A119	25	PASS
Environmental Testing - B Dry Heat	Environmental Testing Test B Dry Heat. +85°C, 500 hrs	IEC60068-2-2 JESD22-A103	25	PASS
HTOL	High Temperature Operating Test 85 °C, V_{CC} max, Tx: 50% / Rx: 50%. Read Point at 283/500/1,000 hrs	N/A	50	PASS
LTOL	Low Temperature Operating Test <50 °C, V_{CC} max, Tx: 50% / Rx: 50%. Read Point at 283 hrs	JESD22-A108	25	PASS
High Temperature Storage Test (HST)	150 °C/1,000 hours	JESD22-A103	25	PASS

Table 36. Reliability Test Plan (continued)

Item	Test conditions	Standard	#Samples	Result
Intermittent Operating Life (IOL)	- Power on/off 75 °C 5,000 cycles	N/A	25	PASS
Power and Temperature Cycling	Test Condition A – -40 to +85 °C	JESD22-A105	25	PASS
Shock	Mechanical Shock (MS) (Half Sine, 500G, 1.0 ms, 1 shock for each $\pm$ axis)	DIN IEC 68-2-27	15	PASS
Drop	Drop Test: - Height: 80 cm; - Concrete or steel; - All surfaces and edges; 1,500 g / 0.5 ms	DIN IEC 68-2-31 ETS 300019-2-7	15	PASS
Vibration	Vibration Test (Vib) Sweep-Sine Vibration. Sinusoidal, 10 ~ 500 Hz, 1.0 octave/min, 10 sweep cycles for 2 hr for each axis.	DIN IEC 68-2-6 EIA/TIA 571 §4.1.1.2	15	PASS
ESD	HBM Start: $\pm 1000V$, Stop: $\pm 1500V$	JS-001JESD22-A114	12	PASS
	CDM Start: $\pm 250V$, Stop: $\pm 500V$	JS-002STM5.3.1	12	PASS
TCT	Temperature Change Test 10 cycles; 1 cycle has the following steps (roughly 7+ hrs): - Ramp from ambient (23°C) to -40°C at 3°C/min. 3 hrs at - 40°C - Ramp to 85°C at 3°C/min 3 hrs at 85°C - Ramp from 85°C to 23°C at 3°C/min	IEC60068-2-14	25	PASS

Mean Time To Failure (MTTF)

The MTTF at 60% confidence level is based on the following results/assumptions derived from the 'HTOL' test as described in the table above:

- There was no failure recorded on a cumulative $D_h=50,000$ hour run (50 devices tested for 1000 hours), which, at a confidence level of 60%, results in a failure rate F_r equal to 0.93.
- Stress test temperature T_s is 75 °C.
- The thermal activation energy E_v is assumed to be 0.7 eV.

The MTTF is given by the following formula:

where:

k being the Boltzmann constant and T_u the usage temperature.

Considering the figures given above, the resulting MTTF for the GM02S at 60% confidence level and a usage temperature T_u of 25°C is 313 years. At a usage temperature T_u of 55°C, this figure drops to 25.9 years.

5. REGULATORY APPROVAL

5.1. FCC Regulatory Approval

FCC-ID: 2AAGMG02SA (single modular approval)

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

This device complies with parts 22/24/27/90 of the FCC Rules.

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.

Installation/Integration

This above identified radio module is not intended to be provided to end-users but is for installation by OEM integrators only.

Sequans's module integration guidelines must be closely followed.

Compliance of host integrations of the module is limited to hosts adaptation designs which are identical to Sequans' reference design.

Host integrations with adaptation designs deviating from Sequans' reference design require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own FCC ID.

Host integrations with co-located (simultaneously operating) radio transmitters must be evaluated in accordance with FCC multi-transmitter rules and may require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own FCC ID. Dependent on the result of the evaluation.

An inquiry to the FCC or a TCB is urgently recommended.

Antennas

This radio transmitter has been tested and approved by the FCC to operate with the antennae listed below:

- Aaronia AG OmniLOG® 90200 – max. antenna gain = 2 dBi.
- Fractus Antennas TRIO mXTEND™ (FR01-S4-210) – max. antenna gain = 2.4 dBi.

To comply with both the FCC maximum EIRP limits and with RF Exposure rules, the maximum antenna gain for the operation bands are:

Band	Frequency range (MHz)	Maximum Antenna Gain (dBi)
B2	1850 – 1910	8.0
B4	1710 – 1755	5.0
B5	824 – 849	9.4
B8	897.5 - 900.5	9.77

Band	Frequency range (MHz)	Maximum Antenna Gain (dBi)
B12	699 – 716	8.6
B13	777 – 787	9.1
B17	704 – 716	8.7
B25	1850 – 1915	8.0
B26	814 – 849	9.4
B66	1710 – 1780	5.0
B85	698 – 716	8.6

The use of an antenna having a gain greater than the above indicated in any of those specified bands is strictly prohibited.

RF Exposure Safety

This module complies with the FCC RF exposure limits and has been evaluated in compliance with mobile exposure conditions.

The equipment must be installed and operated with minimum distance of 20 cm of the human body.

End-Product RF Exposure Safety

Integrations of this module into end-products which are intended for portable use, i.e. less than 20 cm distance between its radiating structures (antenna) and the body of nearby persons, or which otherwise put additional technical requirements, like Hearing Aid compatibility, require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own FCC ID.

Compliance with FCC Rule Part 15B

Note: 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.

End-product Compliance with FCC Rule Part 15B (Unwanted Emission Limits for Digital Device)

If the OEM of the end-product fully complies with the above described reference design, they can inherit and rest on the existing modular approval for RF compliance.

The OEM of the end-product remains still responsible to show compliance of the overall end-product with the FCC limits for unwanted conducted and radiated emissions from the digital device (unintentional radio) portion of such end-product (commonly addressed as part 15B compliance or similar).

End-Product Labelling

The module's FCC ID must either be visible from the exterior of the end-product (e.g. per window) or per electronic display, or shall be displayed on an additional exterior label per the following or similar string:

Contains FCC ID: 2AAGMG02SA

Further labelling requirements may apply depending on the FCC rule parts relevant to the end-product.

End-product User manual

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 user manual of the end-product shall include all the applicable regulatory information/warnings.

5.2. ISED Regulatory Approval (English)

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

This device complies with ISED Radio Standards Specifications RSS-130, RSS-132, RSS-133, RSS-139.

Installation/Integration

This above identified radio module is not intended to be provided to end-users but is for installation by OEM integrators only. The integration guidelines must be closely followed.

Compliance of host integrations of the module is limited to hosts adaptation designs which are identical to the reference design.

Host integrations with adaptation designs deviating from the reference design require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own IC.

Host integrations with co-located (simultaneously operating) radio transmitters must be evaluated in accordance with ISED multi-transmitter rules and may require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own IC. Dependent on the result of the evaluation.

An inquiry to the ISED or an FCB is urgently recommended.

Antennas

This radio transmitter has been tested and approved by the ISED to operate with the antennae listed below:

- Aaronia AG OmniLOG® 90200 – max. antenna gain = 2 dBi.
- Fractus Antennas TRIO mXTEND™ (FR01-S4-210) – max antenna gain = 2.4 dBi.

To comply with both the ISED maximum EIRP limits and with RF Exposure rules, the maximum antenna gain for the operation bands are:

Band	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
B25	1850 – 1915	8.0

B2	1850 – 1910	8.0
B66	1710 – 1780	5.0
B4	1710 – 1755	5.0
B5	824 – 849	6.1
B85	698 – 716	5.6
B12	699 – 716	5.6
B17	704 – 716	5.6
B13	777 – 787	5.9

The use of an antenna having a gain greater than the above indicated in any of those specified bands is strictly prohibited.

RF exposure safety

This module complies with the ISED RF exposure limits and has been evaluated in compliance with mobile exposure conditions.

The equipment must be installed and operated with minimum distance of twenty centimetres of the human body.

End-product RF exposure safety

Integrations of this module into end-products which are intended for portable use, i.e. less than 20 cm distance between its radiating structures (antenna) and the body of nearby persons, or which otherwise put additional technical requirements, like Hearing Aid compatibility, require either filing a Class 2 Permissive Change to this modular approval or separate approval for the end-Product under its own IC.

Compliance with Interference-Causing Equipment Standard

This Class B digital apparatus complies with ISED's Interference-Causing Equipment Standard ICES-003.

End-product compliance with Interference-Causing Equipment Standard

If the OEM of the end-product fully complies with the above described reference design, they can inherit and rest on the existing modular approval for RF compliance.

The OEM of the end-product remains still responsible to show compliance of the overall end-product with the applicable Interference-Causing Equipment Standards issued by the ISED.

End-product Labelling

The module's IC must either be visible from the exterior of the end-product (e.g. per window) or per electronic display, or shall be displayed on an additional exterior label per the following or similar string:

Contains IC: 12732A-GM02SA

Further labelling requirements may apply depending on the applicability of other Radio Standard Specifications relevant to the end-product.

End-product User manual

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 user manual of the end-product shall include all the applicable regulatory information/warnings.

5.3. Autorisation Réglementaire de l'ISDE (Français)

Les changements ou modifications non expressément approuvés par la partie responsable de la conformité peuvent annuler l'autorisation de l'utilisateur à utiliser l'équipement.

Cet appareil est conforme aux spécifications des normes radio ISDE RSS-130, RSS-132, RSS-133, RSS-139.

Installation/Intégration

Le module radio identifié ci-dessus n'est pas destiné à être fourni aux utilisateurs finaux, mais est destiné à être installé uniquement par des intégrateurs OEM. Les directives d'intégration doivent être suivies à la lettre.

La conformité des intégrations hôtes du module est limitée aux conceptions d'adaptation des hôtes qui sont identiques à la conception de référence.

Les intégrations hôtes avec des conceptions d'adaptation s'écartant de la conception de référence nécessitent soit le dépôt d'une modification permissive de classe 2 à cette approbation modulaire, soit une approbation distincte pour le produit final sous son propre CI.

Les intégrations hôtes avec des émetteurs radio colocalisés (fonctionnant simultanément) doivent être évaluées conformément aux règles multi-émetteurs ISDE et peuvent nécessiter soit le dépôt d'une modification permissive de classe 2 à cette approbation modulaire, soit une approbation distincte pour le produit final sous son propre CI. Cela dépend du résultat de l'évaluation.

Une demande de renseignements auprès de l'ISDE ou d'un FCB est recommandé de toute urgence.

Antennes

Cet émetteur radio a été testé et approuvé par l'ISDE pour fonctionner avec les antennes énumérées ci-dessous :

- Aaronia AG OmniLOG® 90200 – gain d'antenne maximal = 2 dBi
- Fractus Antennas TRIO mXTEND™ (FR01-S4-210) – gain d'antenne maximal = 2,4 dBi

Pour se conformer aux limites EIRP maximales de l'ISDE et aux règles d'exposition aux fréquences radio, le gain d'antenne maximal pour les bandes de fonctionnement est :

Bande	Limites de bande (MHz)	Gain maximal d'antenne (dBi)
B25	1850 – 1915	8.0
B2	1850 – 1910	8.0
B66	1710 – 1780	5.0
B4	1710 – 1755	5.0
B5	824 – 849	6.1
B85	698 – 716	5.6
B12	699 – 716	5.6
B17	704 – 716	5.6
B13	777 – 787	5.9

L'utilisation d'une antenne ayant un gain supérieur à celui indiqué ci-dessus dans l'une des bandes spécifiées est strictement interdite.

Sécurité d'exposition aux RF

Ce module est conforme aux limites d'exposition aux RF de l'ISDE et a été évalué conformément aux conditions d'exposition mobile.

L'équipement doit être installé et utilisé à une distance minimale de 20 cm du corps humain.

Sécurité d'exposition aux RF du produit final

L'intégration de ce module dans des produits finaux destinés à une utilisation portable, c'est-à-dire à une distance inférieure à 20 cm entre ses structures rayonnantes (antenne) et le corps des personnes à proximité, ou qui imposent des exigences techniques supplémentaires, comme la compatibilité avec les prothèses auditives, nécessite soit le dépôt d'une modification permissive de classe 2 à cette approbation modulaire, soit une approbation distincte pour le produit final sous son propre CI.

Conformité aux normes sur le matériel brouilleur

Cet appareil numérique de classe B est conforme à la norme NMB-003 de l'ISDE sur les équipements brouilleurs.

Conformité du produit final à la norme sur les équipements brouilleurs

Si le fabricant d'équipement d'origine du produit final est entièrement conforme à la conception de référence décrite ci-dessus, il peut hériter et s'appuyer sur l'approbation modulaire existante pour la conformité RF.

Le fabricant d'équipement d'origine du produit final reste toujours responsable de démontrer la conformité du produit final global aux normes applicables sur les équipements brouilleurs émises par l'ISDE.

Étiquetage du produit final

Le circuit intégré du module doit être visible de l'extérieur du produit final (par exemple, par fenêtre) ou par affichage électronique, ou doit être affiché sur une étiquette extérieure supplémentaire conformément à la chaîne suivante ou similaire :

Contient le circuit intégré : 12732A-GM02SA

D'autres exigences d'étiquetage peuvent s'appliquer en fonction de l'applicabilité d'autres spécifications de normes radio pertinentes pour le produit final.

Manuel d'utilisation du produit final

L'intégrateur OEM doit veiller à ne pas fournir d'informations à l'utilisateur final concernant la manière d'installer ou de retirer ce module RF dans le manuel d'utilisation du produit final qui intègre ce module.

Le manuel d'utilisation du produit final doit inclure toutes les informations/avertissements réglementaires applicables.

5.4. Japan Regulatory Marking



R003-210088



5.5. ACMA Regulatory Marking



5.6. RE-D Regulatory Safety Notice



Caution! Equipment must be supplied by ES1, PS1 circuits according to the standard EN 62368-1.

5.7. UKCA Regulatory Marking



A. ACRONYMS

Acronym	Definition
ADC	Analogue to Digital Converter
CPU	Central Processing Unit
DL	Downlink
ESD	Electro-static discharge
GND	Ground
GPIO	General Purpose Input Output
I/O	Input/Output
I ² C	Inter-Integrated Circuit interface
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
JTAG	Joint Test Action Group
LGA	Large Grid Array
LNA	Low-Noise Amplifier
LTE	Long Term Evolution, or 4G. Standard is developed by the 3GPP.
MIMO	Multiple In Multiple Out
NAS	Network Access Server
PCM	Pulse-Code Modulation
PHY	Physical Layer
RED	European Radio Equipment Directive
SAW	Surface Acoustic Wave (filter)
RF	Radio Frequency
RoHS	Restriction of Hazardous Substances
Rx	Reception
S/N	or SN: Serial Number
SIM	Subscriber Identification Module
SMS	Short Message Service
SPI	Serial Peripheral Interface
Tx	Transmission
UART	Universal Asynchronous Receiver Transmitter
UE	User Equipment
UL	Uplink
USB	Universal Serial Bus