GCF™

Global Certification Forum

GCF Certification

Essential certification for device manufacturers targeting the global mobile market.

The mark of devices that conform to international standards for mobile technologies and interoperate correctly with networks worldwide.

Test Once, Use Anywhere

What is GCF Certification?

Opens markets worldwide

GCF Certification demonstrates that a device conforms to international standards for mobile technologies.

Devices that conform to these global standards can enjoy success in multiple markets.

The scheme has increased the choice of trusted devices; the availability of such a wide variety of certified devices has expanded the global market and improved the lives of billions of people by providing reliable access to mobile services.

The standardised, rigorous and trusted testing framework maintained by GCF Certification cuts total testing costs for device manufacturers and network operators.

With its coverage of NB-IoT and LTE Cat-M1, GCF Certification will also repeat its success and help device manufacturers target the global opportunities presented by the 'Internet of Things'.

Protects the world's critical communications infrastructure

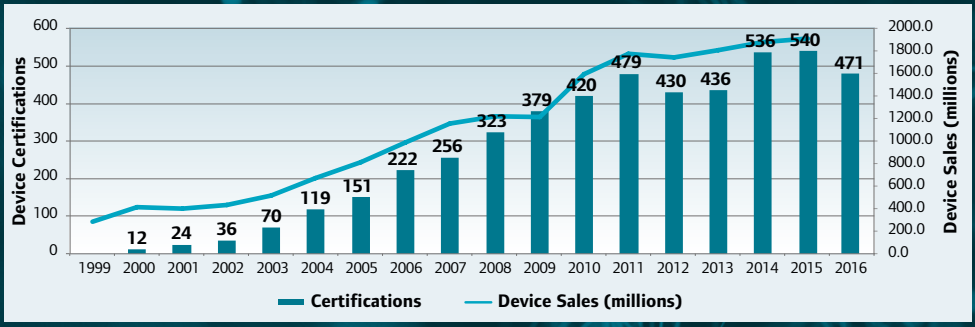
Mobile networks have become an essential component of the communications infrastructure worldwide.

Standards-compliant devices are less likely to disrupt operators' networks. Conformance will become even more important when millions, or even billions, of IoT devices are connected over mobile networks.

Identifies devices that will deliver services that meet users' expectations

Certification demonstrates a device's quality of interoperability. A conformant device delivers services that better meet the expectations of end users – whether consumers or enterprises. The inherent interoperability of a certified device will deliver seamless roaming services.

Growth in availability of certified devices has driven global device sales

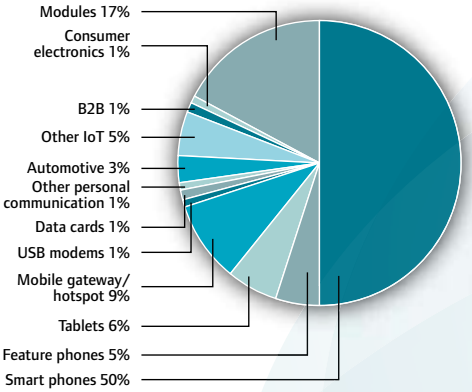


GCF certification is recognised and accepted by the world's leading operator groups. The scheme:

- **Generates efficiencies and economies of scale that reduce manufacturers' testing costs**
- **Shortens time-to-market for new handsets and devices**
- **Improves product quality**
- **Raises the overall quality of device interoperability**
- **Benefits the whole mobile industry and end-users**

All types of devices incorporating mobile connectivity can be certified, from feature phones, smartphones, tablets, USB modems, portable Wi-Fi hotspots and connected consumer products to M2M/IoT devices.

2016 certified devices by type



Covers Modules and Platforms

Wireless modules that can be used to add mobile connectivity to other devices can also be certified through GCF. A streamlined certification process is available for devices that incorporate a GCF-certified module.

Platform Certification enables designers and manufacturers to develop new products around previously certified functionality. By promoting the reuse of test results and existing GCF certifications, product development can be accelerated and the end-device manufacturer's testing costs are significantly reduced.

Evolves with the industry

GCF evolves and expands to accommodate new mobile technologies and functionalities.

The choice of sophisticated multi-mode, multi-band smartphones available today would not have been possible without a trusted certification scheme to provide a robust benchmark of interoperability quality while keeping testing overheads low.

GCF is the only scheme that supports the certification of all 3GPP & 3GPP2 mobile technologies: GSM, GPRS, EDGE, CDMA2000, WCDMA, HSPA, LTE, LTE-Advanced, LTE Advanced Pro.

This practical experience in the testing of devices incorporating multiple technologies across multiple frequency bands will be invaluable to the commercialisation of 5G devices.

Functionalities such as Carrier Aggregation, VoLTE, VoWi-Fi, RCS and NFC-enabled services for payment and transport ticketing are also covered by GCF's testing & certification framework. GCF has decided on certification requirements for GSMA's Remote SIM Provisioning (RSP).

What is the Global Certification Forum?

The Global Certification Forum (GCF) maintains the world's largest database of prioritised and validated test cases for mobile devices. GCF's Device Certification Criteria (DCC) database is a unique knowledge centre that provides detailed information on:

- **The test cases selected to demonstrate GCF compliance**
- **The test platforms used for GCF certification testing**

Founded in 1999, the Forum brings together technical experts from leading manufacturers, operators and the test industry. Together, they define certification requirements that really work for the industry - because they have been developed by the industry.

Membership of GCF is open to any company in the mobile eco-system. Today, GCF's focus is mainly on the 3GPP family of standards - the current technologies-of-choice for its members - but standards from other standards organisations such as GSMA, NFC Forum and OMA are also referenced.

GCF's strategy, priorities and work plan are agreed, and driven forward, by its members: the Forum's governance is designed to promote consensus between manufacturers and operators thereby ensuring GCF stays relevant and meaningful to its entire membership.

GCF is a 3GPP Market Representation Partner, offering the standards organisation consensus views of market requirements in areas such as mobile functionality, features and services.

GCF offers four main membership classes:

Manufacturer

Any company that develops, manufactures or supplies:

- **Products that incorporate technologies within the scope of GCF - which include 3GPP and 3GPP2 connectivity - or**
- **Components, sub-system or platforms that provide defined functionality within the scope of GCF certification**

Operator

Any operator of a network based on any 3GPP or 3GPP2 technology.

Observer

Any company with a business interest in 3GPP- and 3GPP2-capable products. Test labs and test equipment providers contribute significant technical insight to GCF as Observer members.

Client Vendor

Any company that produces client application software for 3GPP- and/or 3GPP2-capable devices.

Associate Operator and Associate Manufacturer membership categories are also available, to ensure that GCF's membership is accessible to the broadest cross section of the industry

As of 31 July 2017, GCF had 308 members, including 107 Manufacturers and 128 Operators.

Internet of Things

Reliable connectivity will be critical to the success of the Internet of Things. To promote quality of interoperability in wireless IoT devices, GCF is extending its certification scheme to cover the three 3GPP Low Power Wide Area standards LTE Cat-M1, NB-IoT and EC-GSM-IoT.

Recognising the very different characteristics and needs of the IoT ecosystem, in July 2017, GCF established an IoT Agreement Group (IAG) as a dedicated forum of experts to develop and maintain certification criteria and tests for IoT device features, services and applications outside the existing Agreement Groups.

The initial focus of IAG will be to:

- **Update GCF's existing permanent reference documents with a set of definitions relevant to the IoT ecosystem**
- **Define any new processes required for the validation of test cases and for IoT device certification**
- **Establish formal relationships with oneM2M, OMA, IoT-related groups within GSMA and other relevant standards organisations working on IoT**

IAG will investigate how IoT device certification needs to integrate with application-layer standards such as LWM2M and oneM2M. As current test methods used in GCF may not be applicable to IoT devices, IAG will also explore what form testing environments need to take and how they can be made cost effective.

As well as working closely with standards organisations, IAG will also seek to engage with industry organisations dedicated to promoting IoT in vertical markets.

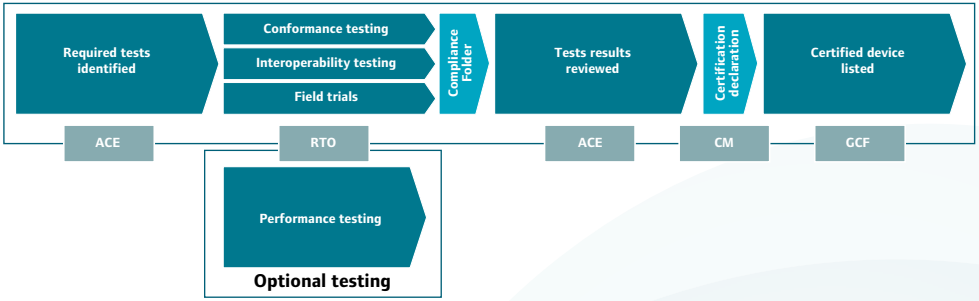
Organisations wishing to engage with GCF's IoT Agreement Group can contact **gcf@globalcertificationforum.org**

The GCF Certification Process

Certification testing combines conformance, field trial and interoperability testing and is managed by the manufacturer's named Certification Manager (CM). All testing must be undertaken by a GCF Recognised Test Organisation (RTO). An RTO is a GCF Member that has demonstrated it has the experience, qualifications and systems to test mobile devices against GCF's certification criteria.

An ACE - Assessment Capable Entity – is a named individual from a GCF Member with the demonstrable ability and experience to determine the testing required, and then assess the results of those tests to ensure all certification criteria applicable to the product have been satisfied.

Manufacturer Members will have demonstrated they have the required ACE skills in-house during the membership application process. Associate Manufacturer Members must engage a third-party ACE to perform this function.



Performance Metrics

In parallel with Certification, GCF also maintains a Key Performance Metrics programme. This programme is designed to allow manufacturers to quantify and report, in a harmonised way, on agreed aspects of the performance of a wireless product.

Performance Metrics testing is an optional but invaluable complement to GCF Certification.

Current Performance Metrics in the scheme include:

- **Battery life**
- **Acoustics**
- **OTA antenna performance**
- **Data throughput**

Module and Platform Certification

Mobile connectivity is being added to an increasingly diverse range of consumer, enterprise and industrial products. This trend will accelerate further as more and more everyday objects are connected to the Internet of Things.

Certified modules

GCF offers a streamlined certification process for products that are based on a GCF-certified embedded wireless module.

The number and scope of tests required to certify a product is significantly reduced when the certification of its embedded wireless module can be referenced. Certification testing for the product is focused on functionality that is not part of the module such as antenna, SIM- and user-interfaces.

Platform Certification

Platform Certification extends this principle by enabling manufacturers to design innovative new wireless products around a wider variety of pre-certified mobile communications functionality.

This scheme has been developed to simplify and cut the cost of obtaining GCF certification by permitting and encouraging the re-use of test results.

What is a platform?

A platform is any hardware or software subsystem that provides defined functionality within the scope of the GCF certification scheme.

Examples of platforms include:

- **Chipsets**
- **Core radio components**
- **Protocol stacks**
- **Applications such as MMS or SUPL**
- **Downloadable clients**
- **White label devices that are not marketed directly to end-users but produced to be customised as an operator- or retailer-branded product**

How does GCF Platform Certification work?

Platform Certification follows the same key principles as all certifications undertaken through GCF.

- **The platform supplier specifies the functionality the platform is intended to deliver**
- **The supplier certifies that functionality against all applicable GCF certification criteria**
- **The supplier identifies test results that will not be impacted by the platform's integration into an end-product**
- **During the certification of the end-product, the manufacturer references and re-uses the platform certification. The manufacturer also undertakes the necessary testing to certify any other functionality and must re-assess any of the platform's certification criteria that may be affected by integration into the end-product**

Multiple independent platforms may be integrated into a single end-product provided an Assessment Capable Entity (ACE) has assessed the integrations to ensure there are no co-existence issues.

Who can use GCF Platform Certification?

Any Manufacturer or Associate Manufacturer Member can use GCF-certified platforms to optimise their own product development and certification testing.

Associate Manufacturer Members are required to select an Assessment Capable Entity to provide support and guidance.

Technology Providers wishing to supply GCF-certified platforms must join GCF as a Manufacturer Member.

Benefits of GCF Platform Certification

Manufacturers

- **Opens-up new sources of mobile functionality**
- **Makes product certification accessible to more manufacturers and for a wider range of products**
- **Cuts the cost of certifying products that incorporate certified platforms.**
- **Further streamlines the testing and certification phase of product development, reducing time-to-market**

Technology Providers

- **Creates new opportunities to provide GCF-certified functional blocks to manufacturers developing devices incorporating mobile connectivity**

Operators

- **Increases the penetration of GCF-certified products connecting to mobile networks**
- **Increases confidence in the quality of mobile-connected products**
- **Reduces the risk of disruption to operators' networks and other mobile users from poorly performing, non-certified, devices**

Users

- **Increases the overall quality, reliability and choice of mobile-connected products available to consumers and business users**

Manufacturer Membership

Mobile connectivity is a feature of increasingly diverse products. Such wirelessly-connected products will enjoy greater success if they can be shown to connect efficiently over multiple mobile networks.

Manufacturers that certify can expand their addressable market by demonstrating that their products will work correctly on up to 800 mobile networks that serve every country in the world.

For sophisticated multi-mode, multi-band devices incorporating advanced functionalities, pre-launch testing becomes even more critical to commercial success.

GCF Certification demonstrates that a manufacturer's device conforms with international standards and will be interoperable with, and can be sold for use on, multiple mobile networks worldwide.

GCF Certification is the most widely recognised and cost-effective way of demonstrating quality of interoperability and conformance with standards.

Incorporating GCF Certification into its quality management system helps a manufacturer differentiate the quality of its products from those of its competitors.

Certification protects a manufacturer's brand from being damaged by products that do not connect correctly.

Benefits of Certification for Manufacturers

- **Recognised by operators with interests in markets worldwide who collectively invest billions of dollars in marketing devices**
- **Helps manufacturers expand their addressable market by identifying that their device is relevant to multiple operators (or distributors) in multiple export markets**
- **Provides confidence in, and comparability of, test results through the harmonisation of testing**
- **Creates economies of scale and a competitive market in the supply of test tools and services**
- **Reduces cumulative testing costs when supplying a device to multiple operator partners**
- **Defines the boundary between the testing responsibilities of manufacturers and operators**
- **GCF's entire operator membership automatically alerted about newly certified products**
- **Certified devices included in GCF's public listing**
- **Supports the rapid commercialisation of important new technologies by achieving industry consensus on the most appropriate, effective testing**

Manufacturer Members enjoy the right to propose new Work Items or Performance Items.

To become a GCF Manufacturer Member, a company must have a Quality Assurance Programme that meets the requirements of the ISO 9000 series of standards (or a recognized equivalent).

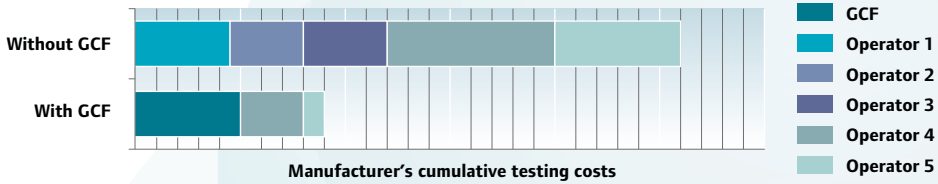
Associate Manufacturer Membership is open to companies that have put in place a quality system that meets the requirements of the ISO 9000 series of standards but have not pursued accreditation. An Associate Manufacturer can certify any wireless product except platforms and modules and must work with a Third Party Assessment Capable Entity to assist in certification. Associate Manufacturers do not have voting rights or the ability to nominate candidates for election to the GCF Board or for Chair/Vice Chair positions within the Steering or Agreement Groups.

Both Manufacturer and Associate Manufacturer Members enjoy access to the GCF Device Certification Criteria database (DCC) that includes information on:

- **The criteria currently needed for GCF Certification**
- **Available test platforms**
- **Latest test validations on test platforms**
- **Test case issues, should they arise**

Membership fees are dependent Manufacturer Membership class and on the types of product the manufacturer wishes to certify.

GCF Certification reduces the cumulative testing costs when manufacturers are supplying multiple operators



Operator Membership

GCF Certification gives network operators an assurance that a mobile phone or wireless device will perform correctly on their network infrastructure. High penetration of GCF certified devices will associate operators' brands with high quality service delivery.

Certification helps protect operators' networks from poorly performing devices.

When mobile users expect to remain connected everywhere, certified devices facilitate successful international roaming services.

In the past year, operators from India have joined leading operators from Brazil, China, Europe, Japan, Korea, MENA and North America as full Operator Members of GCF.

Associate Operator Membership is open to operators interested in becoming full members in future, subsidiaries of full Operator Members and operators with limited or no in-house testing resources. Associate Operator Members also enjoy full access to information on certified devices.

Benefits of Certification for Operators

- **Identifies mobile devices that conform to international standards and will meet operators' needs**
- **Operators do not need to duplicate GCF tests. This allows operators to focus their own test resources in areas that add value to their own customers and provide differentiation in their own market(s)**
- **Internal testing costs for operators who actively test can be reduced by as much as 80%**
- **Greatly simplifies selection and acceptance testing for devices to be sold directly by operators**
- **Helps operators identify devices to recommend for sale through indirect sales channels**
- **Offers a level of assurance about the performance of Open Market devices**

Operator Members directly influence the evolution of GCF Certification by proposing new Work Items or Performance Items that meet the needs of their own businesses and the wider industry. They also enjoy access to the GCF Device Certification Criteria database, DCC, which gives detailed insight to GCF's certification criteria.

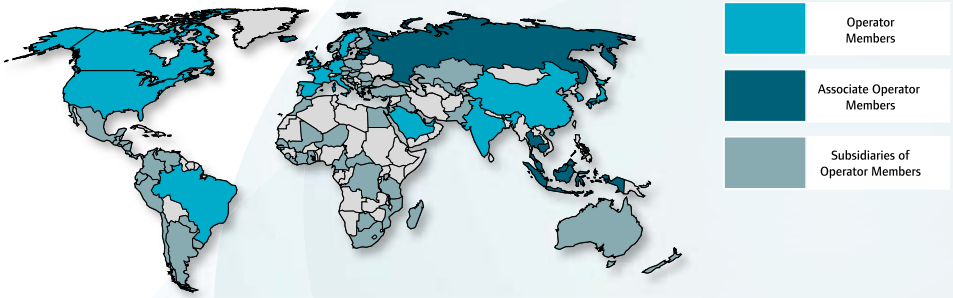
All Operators receive notifications of new GCF certifications, and can access detailed information on certified products through the GCF Members' Portal.

Both Operator and Associate Operator Members can gain greater insight, and support the certification process, by becoming a GCF Field Trial Qualified (FTQ) Network and making their networks available for field trials. Field testing is an important aspect of GCF certification, complementing lab-based conformance testing with real world interoperability testing of a device.

FTQ Operators benefit hugely by supporting manufacturers and test houses that undertake the field trials. As well as first-hand knowledge of new products, FTQ Operators also gain valuable insights into potential interoperability issues within their own networks.

Associate Operators do not have voting rights or the ability to nominate candidates for election to the GCF Board or for Chair/Vice Chair positions within the Steering or Agreement Groups.

GCF Certification is supported by operators with interests in markets worldwide



Test once, use anywhere

Observer Membership

By demonstrating that a mobile device will interoperate correctly across a variety of mobile networks, GCF Certification delivers confidence throughout the mobile value chain. Any company with a genuine interest in 3GPP and 3GPP2 mobile devices is welcome to contribute to GCF as an Observer Member.

Benefits of membership for Observers

- **Opportunities to influence best practice for conformance, interoperability and field testing by contributing to the open discussion at GCF meetings**
- **Involvement in the selection of new tests that will become certification criteria**
- **Opportunity to present test solutions for GCF endorsement and subsequent test case validation**
- **Inclusion of validated test solutions in the GCF Device Certification Criteria database.**
- **Contribute to the development of the GCF Performance Metrics programme which complements Certification**
- **Take advantage of early visibility of GCF Work Items to guide the development of new test system and service capabilities that will be required to support GCF Certification or the Performance Metrics Programme**
- **Unique opportunity for focused networking with relevant experts from manufacturers and operators**
- **Ability to offer services as a Recognised Test Organisation**
- **Ability to offer services as a Third-Party Assessment Capable Entity**

Client Vendor Membership

GCF Certification covers standards-based client applications such as RCS.

Client Vendor benefits

- **Builds confidence in a client by providing evidence that it is capable of interoperating across a variety of devices and multiple networks**
- **Listing of GCF-Certified clients on the GCF website**
- **Opportunities to work with experts from the world's leading operators, mobile phone and tablet manufacturers**
- **Opportunities to contribute insight and experience to the development of certification criteria for future IP/IMS-based services**

GCF™ Global Certification Forum

Recognised Test Organisation

GCF™ Global Certification Forum

Assessment Capable Entity

How does GCF work?

GCF's work plan and priorities are agreed by its members through the Steering Group. Work Items are executed through Agreement Groups. The elected Board of Directors fulfils the statutory obligations of Global Certification Forum (GCF) Limited.

SG

Steering Group is open to all GCF members and is the forum that conducts the main business of GCF including the approval of membership applications and agreeing the 'Work Items' that lead to the development of new GCF certification criteria.

CAG

Conformance Agreement Group is responsible for developing and maintaining the certification criteria that demonstrate devices conform to international standards. Conformance tests are typically run on commercial system simulators and test harnesses.

FTAG

Field Trial & Interoperability Agreement Group is responsible for developing and maintaining the certification criteria for Field Trial and interoperability test scenarios.

IAG

The IoT Agreement Group develops and maintains certification criteria for IoT (Internet of Things) products.

CAG2

Conformance Agreement Group 2 is responsible for defining the conformance certification criteria for devices that incorporate 3GPP2 technologies (CDMA2000).

TCAG2

Test Case Development Agreement Group is responsible for the development and maintenance of GCF Test Specifications for 3GPP2 devices. TCAG2 collaborates closely with CAG2 to ensure seamless integration of new test items into 3GPP2 certification criteria.

PAG

The Performance Agreement Group defines standardised methods for reporting on product attributes that do not relate to interoperability.

To Join GCF visit www.globalcertificationforum.org
For further information, please contact gcf@globalcertificationforum.org

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September 2017