



GCF Antenna Testing

Workshop: Receiver performance of mobile telephones
Brussels April 10, 2014

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Objective of Presentation

- GCF is addressing OTA performance in depth already for global markets including Europe, wants to offer knowledge of our work to the meeting.
- GCF would welcome broader engagement in current GCF strategy review for future needs on this topic, and to make it potentially useful to a wider 'customer' / 'user' base
- GCF wants to avoid parallel industry activities and build efficiency and consistency.



QUICK INTRODUCTION

What is GCF?

- Founded in 1999
- Originally established to define a common benchmark of interoperability for GSM devices
 - Complementing the R&TTE Directive for the European Single Market
- Incorporated as not-for-profit company since 2008
 - Global Certification Forum (GCF) Ltd
 - UK Company Registration Number 6594830
 - Owned by members
- Membership from all key regions
 - Operators, Associate Operators
 - Manufacturers, Associate Manufacturers (M2M), Client Vendors (RCS)
 - Observers (test industry & other mobile industry stakeholders)
- Consensus oriented work
 - If needed: Dual Majority Voting - Operators & Manufacturers

GCF Current Objectives

- To maintain and strengthen the current scope of GCF and its robust and respected GCF Certification regime.
- To provide framework and associated processes for the harmonization of test requirements with the aim of avoiding duplication of testing
- To enable the certification of all devices that include 3GPP & 3GPP2 Radio Technologies
- To promote the certification of all devices irrespective of the distribution channel
- To ensure GCF Certification is open to other areas of mutual benefit to GCF Members and the industry
- GCF is undertaking a strategic review focussed on its members' needs in a rapidly evolving industry, which may modify and add to its objectives for 2015+

“Test once, use anywhere”

Current Work Focus

- Strategic Review
- New regions – India & Latin Americas
- Increase footprint in China (Workshop June 5)
- Addressing the M2M market
- RCS clients and UICC based NFC services
- LTE Advanced & new LTE bands
- Review of OTA requirements due to device evolution



Membership

GCF Membership

Operators

- 20+

Associate Operators

- 98

Manufacturers

- 59+

Associate Manufacturers

- 10+

Client Vendors

- 1+

Observers

- 77+

Total Membership

(April 11, 2014)

- 265

- All major EU operators
- Top 15 manufacturers



GCF Board Members

- Sprint - Chair
- Vodafone
- Telecom Italia
- Verizon
- China Mobile
- Orange
- Telefonica
- BlackBerry (2x)
- Samsung
- Qualcomm
- Ericsson
- Sierra Wireless
- Panasonic
- GSMA (non-executive)
- CCF (non-executive)

<http://www.globalcertificationforum.org/members.html>

OPEN MARKET COVERAGE EU

Analysis of Carphone Warehouse (UK)

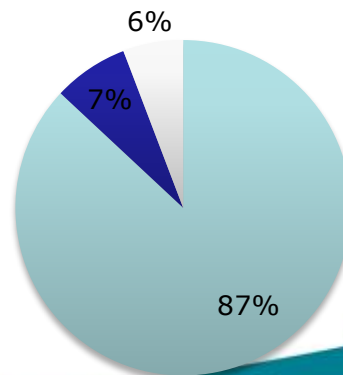
- **Aim:** To give a snapshot of the proportion of devices on-sale at a major independent phone retailer that are GCF-certified. Test hypothesis that most devices will be GCF-Certified or Apple.

Results:

- 69 devices for online sale on 28th August 2013.
- 87% (i.e. 60 devices) are GCF certified, 7% (5 devices) are Apple iPhones.
- Uncertified devices (excluding Apple) tend to be low-priced GSM only handsets. These account for 6% (4 devices) of devices on sale.

Proportion of devices on sale by Carphone Warehouse (UK) that are GCF certified

■ GCF Certified ■ Apple iPhone ■ Other non-GCF certified devices



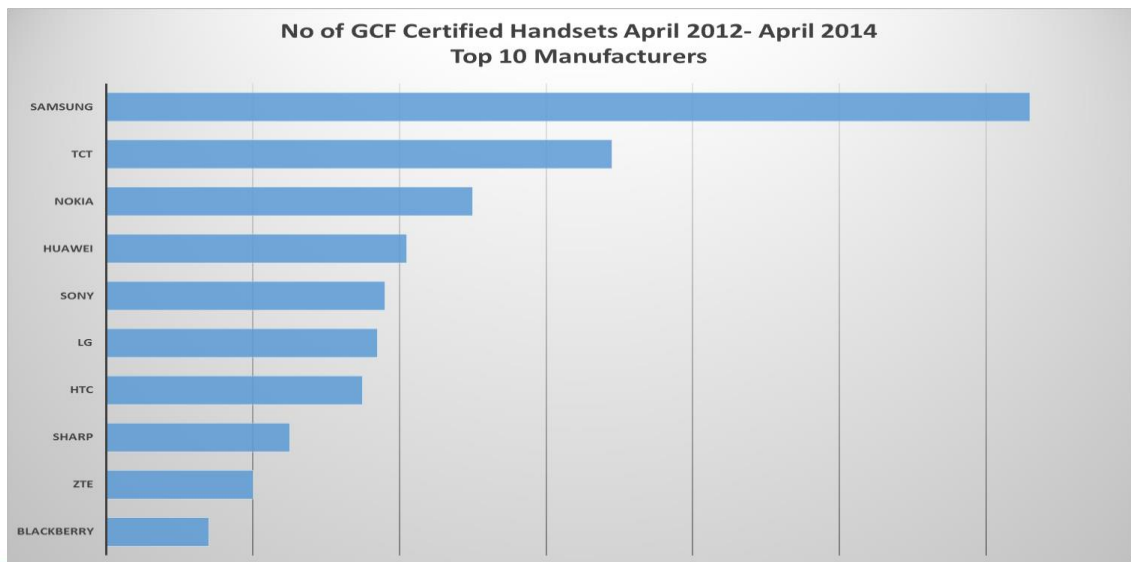
Danish Market

- Investigations based on products listed for online sale in April 2014
- TDC, Telenor, Telia, 3 (Largest DK operator)
 - Apple, Samsung, LG, Nokia, HTC, Sony, Huawei, Doro
 - Models GCF certified except
 - Apple, Doro
- Elgiganten (Largest DK electronics retail chain)
 - Apple, Samsung, LG, Nokia, HTC, Sony, Huawei, Doro, NGM, Alcatel, Emporia
 - Models GCF certified except
 - Apple, Doro, NGM
- Note:
 - Doro (easy to use phones) is in the process of becoming GCF member
 - Apple is GCF member
 - NGM models is low cost GSM Android products manufactured by Gionee Communication Equipment Co. Ltd, Shenzhen



Conclusion on open market coverage (EU)

- Based on UK/DK data
 - Assumes same situation in other EU markets
- All high volume models are covered by GCF certification
 - “Apple does do all the testing (including Antenna) and provide the data on a 1-2-1 basis with each operator Apple is engaged with”
 - Few open market products not certified
 - Less than 5% of the market
 - Low cost GSM products
 - Assumption that chipset/stack has been verified against by the chipset supplier
 - Successful open market manufacturers will join GCF to ensure growth



ANTENNA PERFORMANCE IN GCF

GCF Antenna Testing - Conformance

- Conformance Testing TRP/TRS
 - Covers all EU bands for GSM and WCDMA (3GPP 34.114)
 - Result from CTIA OTA testing may be used
 - Speech position
 - Normative limit must be met
 - May also indicate if recommended limits of 25.144 are met
 - Data transfer position
 - 3GPP limit is TBD - CTIA limits to be used
- Reporting: Compliance with Normative respective Recommended Limits
- Purpose: To ensure device meets minimum requirements

GCF Antenna Testing - Performance

- Optional Performance Testing TRP/TRS
 - Multiple positions:
 - Free Space, Head+hand Left side, Head+hand Right side, Left Hand only
 - Coverage GSM & WCDMA:
 - GSM bands: 850, 900, 1800, 1900
 - FDD bands: I, II, III, IV, V, VIII
 - Coverage LTE
 - LTE FDD 1,2,3,4,5,7,8,12,13,14,17,20,25,26,27
 - LTE TDD 38,39,40,41
- Reporting: Values for bilateral sharing between manufacturers and operators
- Purpose: Agreed common configurations across operators



GCF Antenna Testing - Issues

- Lack of limits in the 3GPP specifications
 - data transfer position
 - LTE
 - laptop mounted equipment (LME) plug-in UEs & laptop embedded equipment (LEE) UE
- Use of CTIA OTA test plan has restrictions for use by GCF
 - Proprietary test plan, fee to use test plan
 - Testing to take place in CTIA Authorized Test Laboratories
 - Test method to allow operators own limits
- GCF planned future work
 - Overall review of antenna testing requirements
 - Proposals for how to address areas w/o limits
 - Limits for modules with integrated antenna vs final products

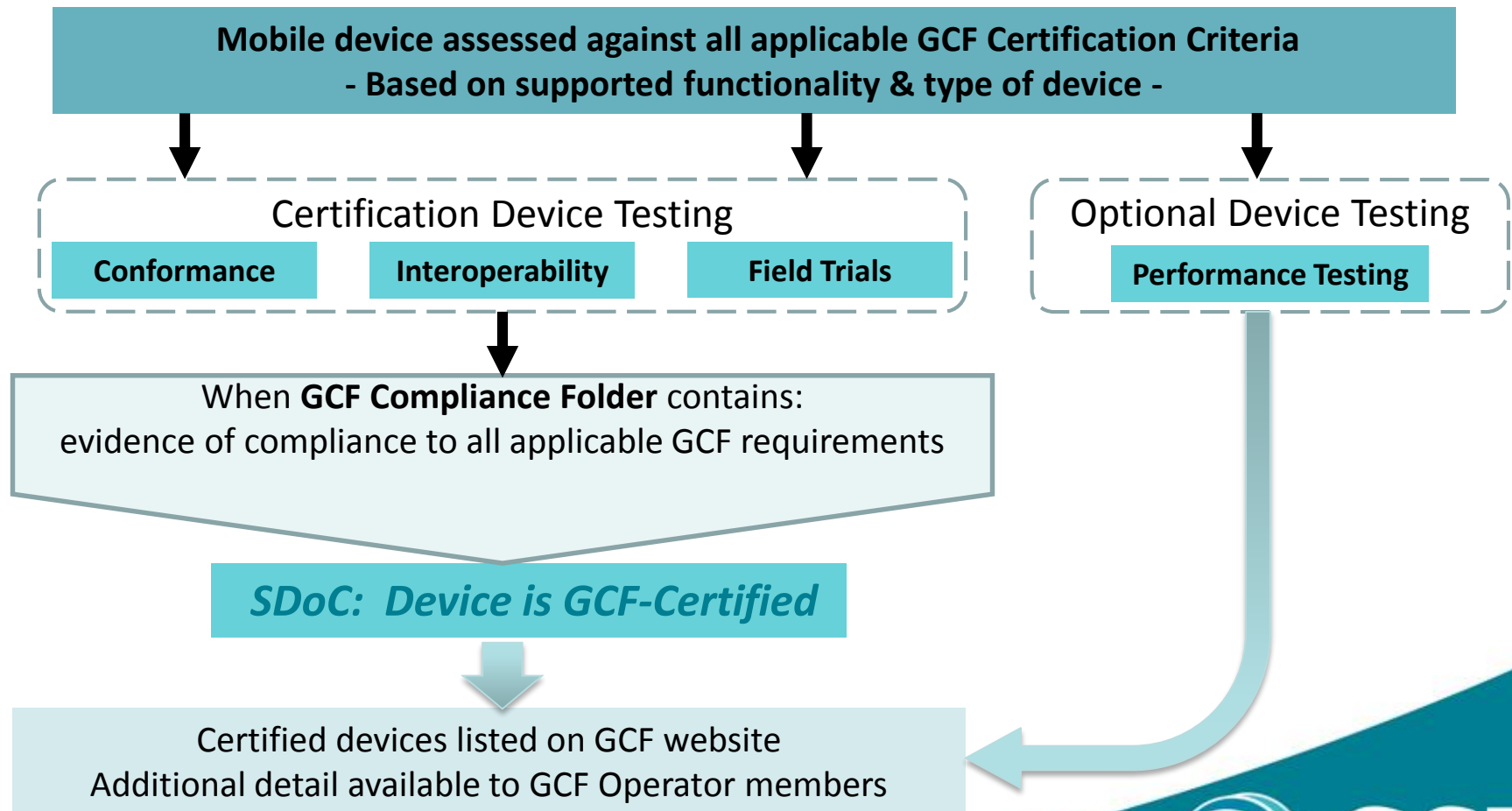
BACKUP INFORMATION GCF

GCF Certification

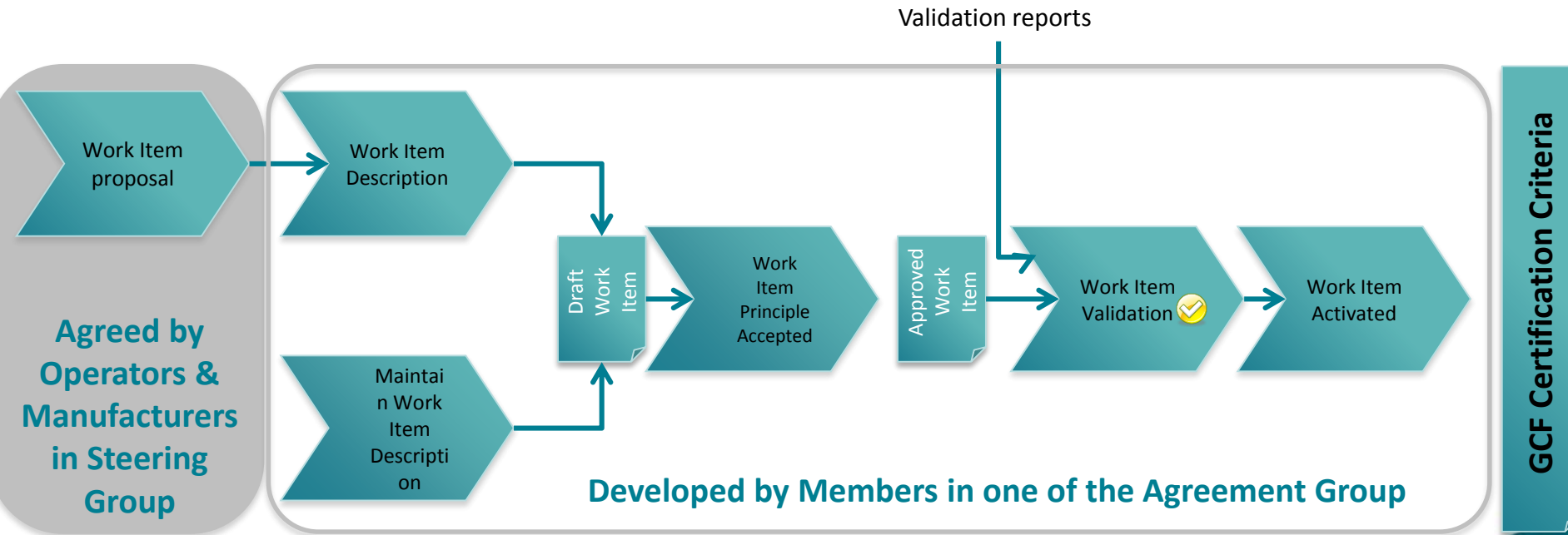
- Complements regulatory schemes (which focus on spectrum utilisation, EMC, user safety)
- Certification Criteria based on core standards from SDOs
- Scheme has expanded to encompass all 3GPP/3GPP2 technologies – from GSM to 3G (UMTS/WCDMA/CDMA2000) & LTE (FDD & TDD) as well as application enablers, RCS clients and UICC based NFC
- Test cases agreed by the industry for the industry
 - Relevant to the real needs of operators and device manufacturers
- Focused on:
 - Providing a platform for harmonisation of testing
 - Avoidance of duplication of testing
 - Reducing testing overheads for manufacturers and operators

“Test once, use anywhere”

The GCF Certification Process

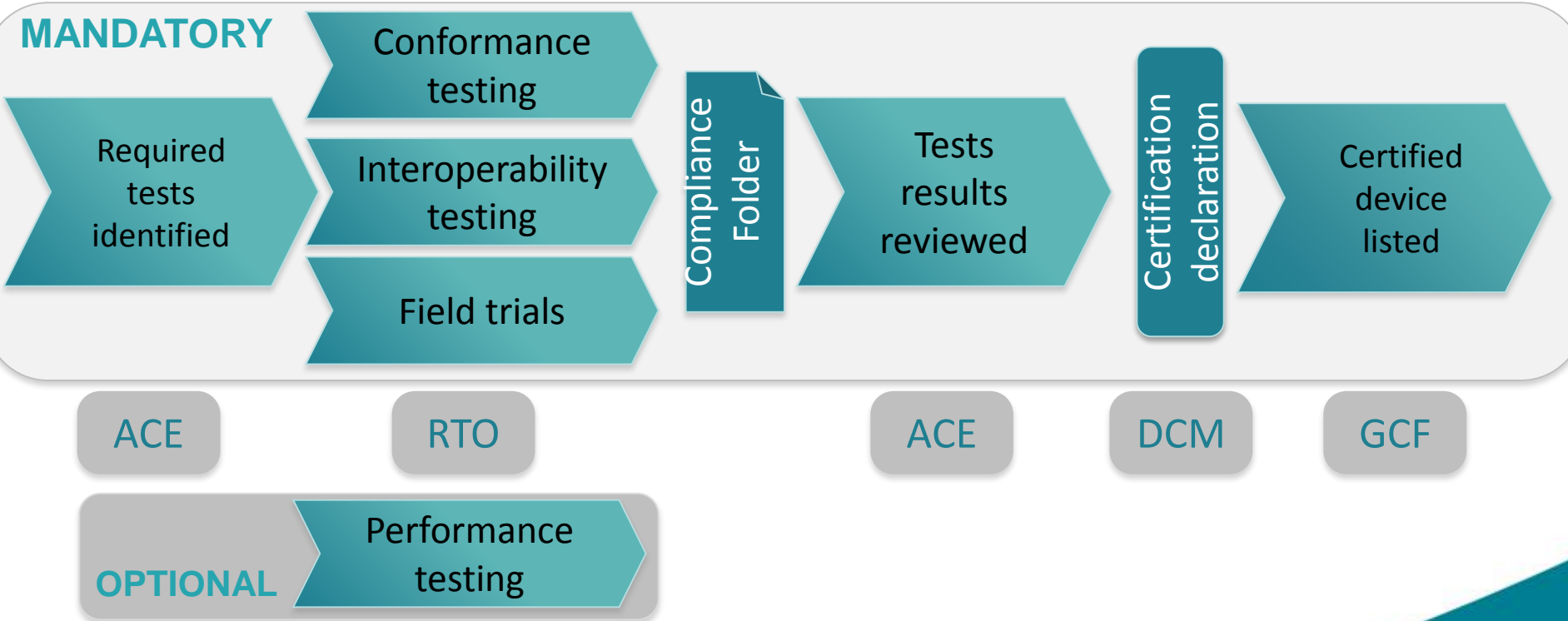


Defining new certification criteria

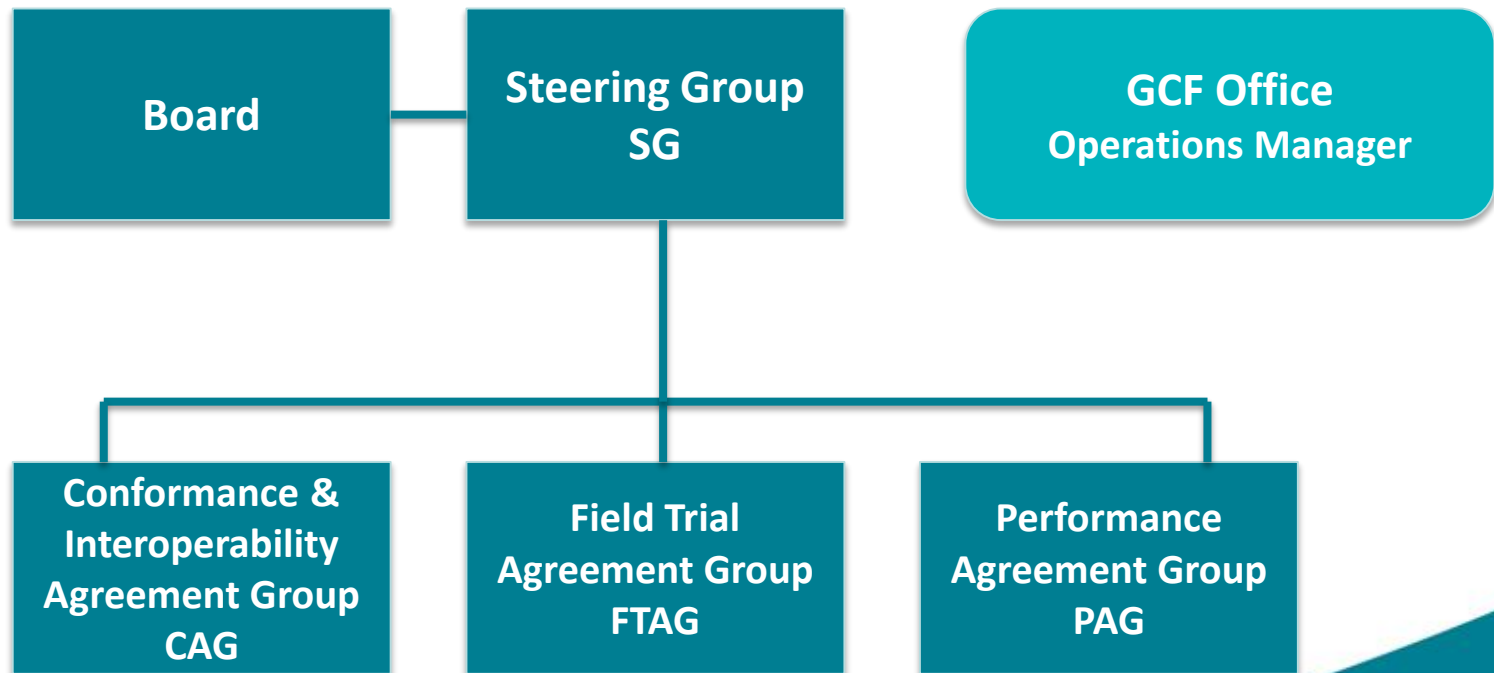


GCF Certification Criteria

The GCF Certification Process



GCF Structure



What types of device can be certified?

| Any wireless device | Incorporating | Any 3GPP/3GPP2 technology |
|--------------------------|---------------|---------------------------|
| Mobile/smartphone | | GSM |
| USB modem | | GPRS |
| Embedded module | | EDGE |
| Data card | | 3G (UMTS/WCDMA/C2K) |
| Laptops & Notebooks | | HSPA |
| Tablet | | LTE (FDD, TDD) |
| M2M device | | |
| Mobile gateway / hotspot | | |

GCF Certification evolves in step with 3GPP technologies

Find out more

www.globalcertificationforum.org

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