



Everything you need to know about certification of devices implementing DLMS over G3-PLC/G3-Hybrid

Webinar organised by the G3-Alliance together with DLMS UA
May 30th 2024, 4:00-5:00 pm CET

Today's presenters



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Agenda

1. **Introducing G3 and DLMS**
2. DLMS Generic Companion Profiles over G3-PLC/G3-Hybrid
3. G3 and DLMS certification process
4. Q&A

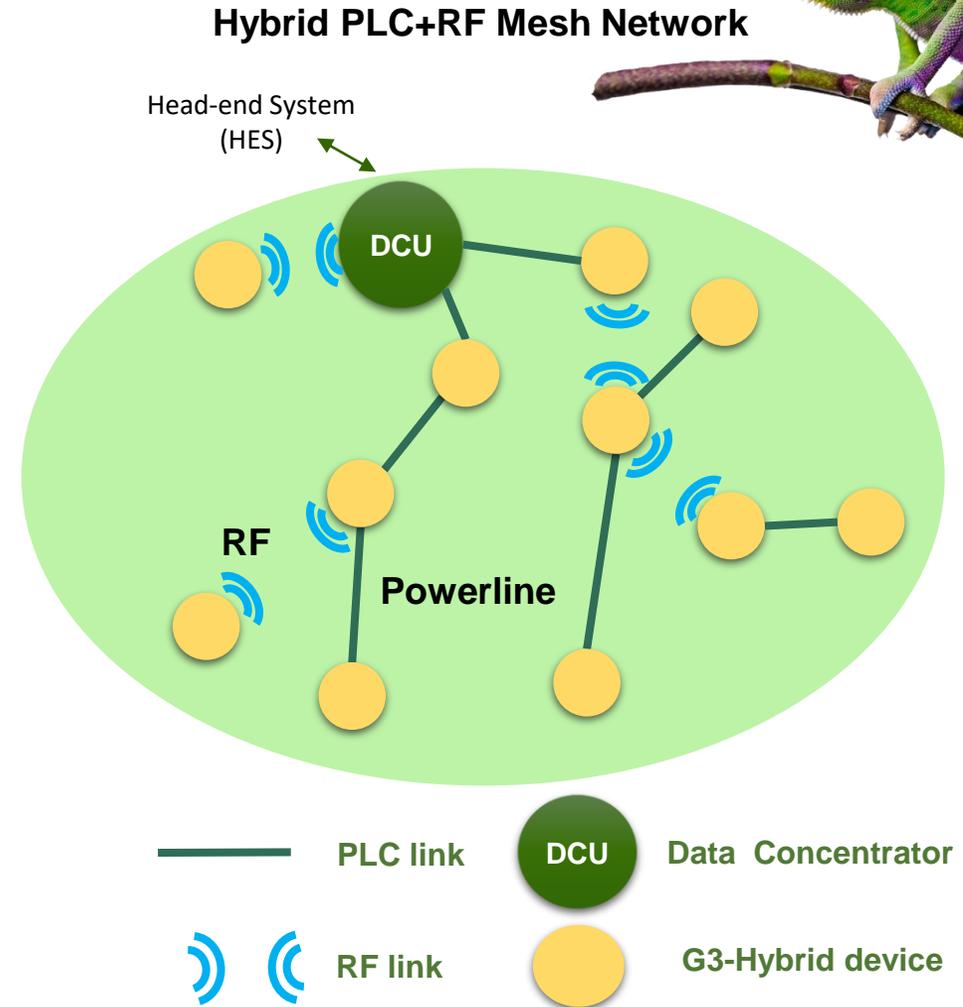
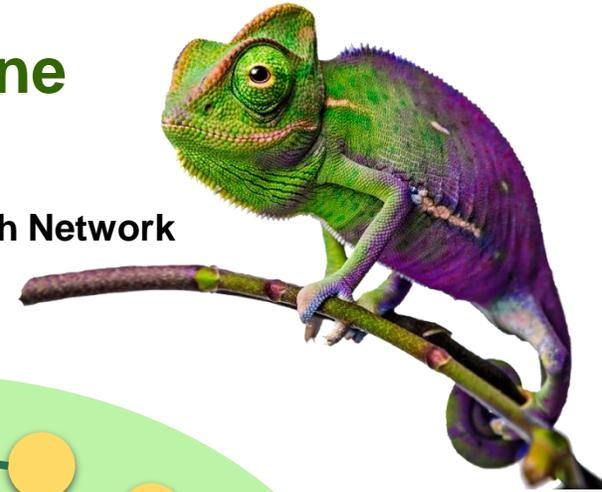
G3-Alliance provides standards-based technologies, designed for harsh network conditions and offering lowest total cost of ownership

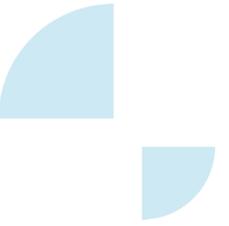
Key features and benefits of G3-PLC

- | | |
|------------------|--|
| 1 Cost effective | <ul style="list-style-type: none">• Uses existing powerlines for communication minimizing infrastructure and maintenance costs |
| 2 Secure | <ul style="list-style-type: none">• Supports MAC-level security using AES-128 cryptographic engine |
| 3 Robust | <ul style="list-style-type: none">• The 'robust' mode improves communication under noisy conditions, operates at very low SNR• Self-healing and high indoor penetration |
| 4 Interoperable | <ul style="list-style-type: none">• International ITU standard• Certification program enabling multi-vendor implementations  |
| 5 Future proof | <ul style="list-style-type: none">• End to end IP communication and IPv6 compliant• Designed to accept diverse application layers  |

G3-Hybrid: Two powerful communication technologies in one single solution!

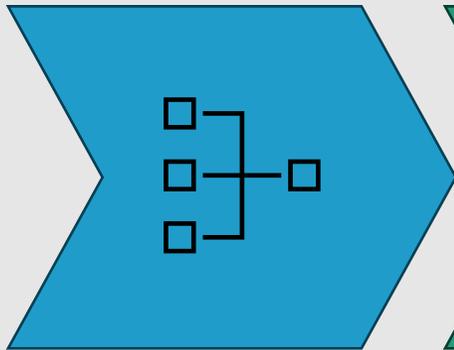
- Each node can use PLC as well as RF for communication
- Maximises coverage and connectivity
- Strongly reduces the complexity of the roll-out and the cost
- Low-power operation
- Fully backwards compatible with G3-PLC



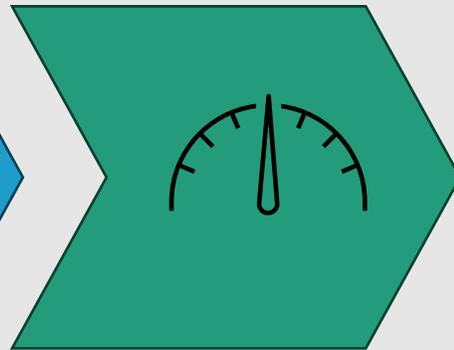


What is DLMS/COSEM

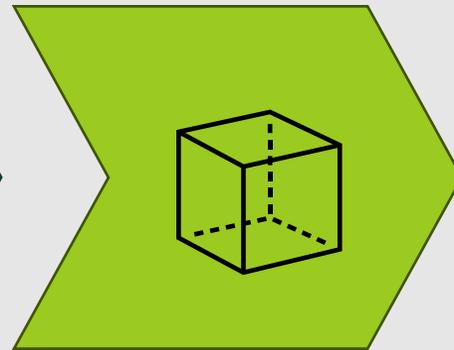
Data Exchange Protocol



Telecommunication
Agnostic



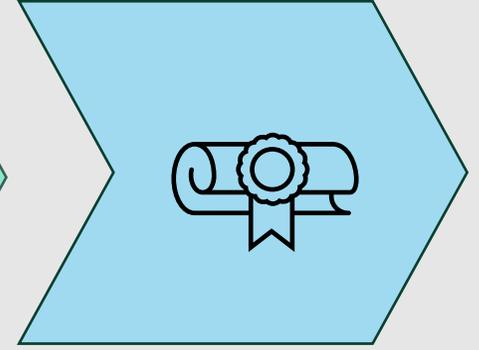
Metrologically
(legally)
Relevant



Object Oriented
Data Model
Based



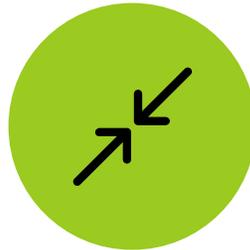
Complying with
Data Privacy
Requirements



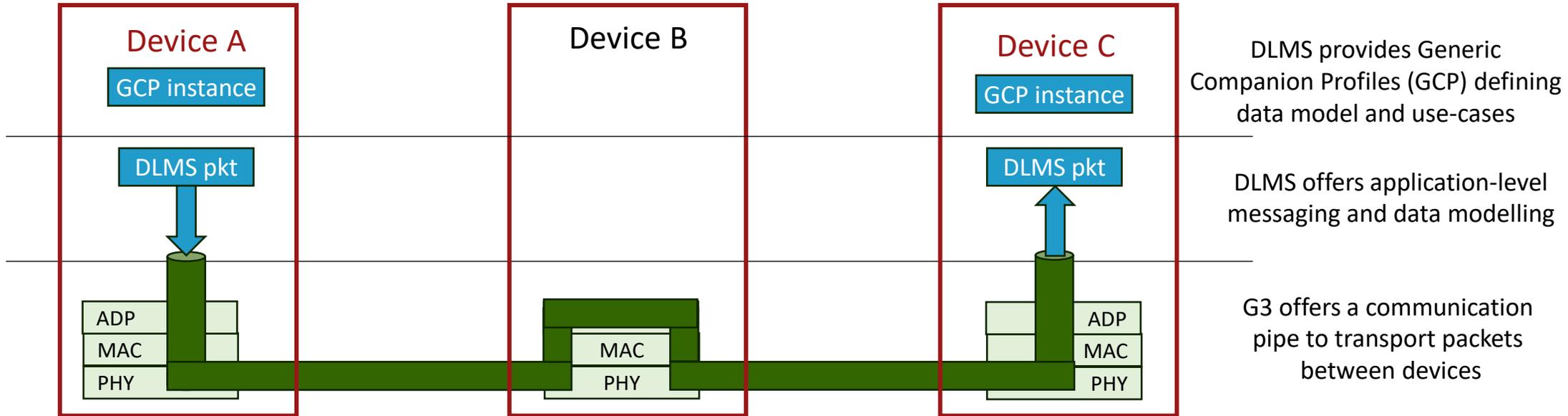
Standardized and
certified by DLMS UA

DLMS/COSEM is a standard

- DLMS/COSEM is available to anyone who wishes to use it.
 - Anybody is free to join the User Association and to participate in the standardization activities
 - It is developed on a consensus basis by the DLMS User Association (UA) members who are industries, public utilities, associations and professionals in this field.
 - It is free of IP and is non-discriminating – it does not create any advantage for any of our members or anyone else.
 - DLMS UA is a non-profit organization
- ▶ All the specifications published by DLMS are brought to IEC through a Type A Liaison with TC13
- ▶ DLMS cooperates via Liaisons with many different standardization organizations (i.e. G3 Alliance)



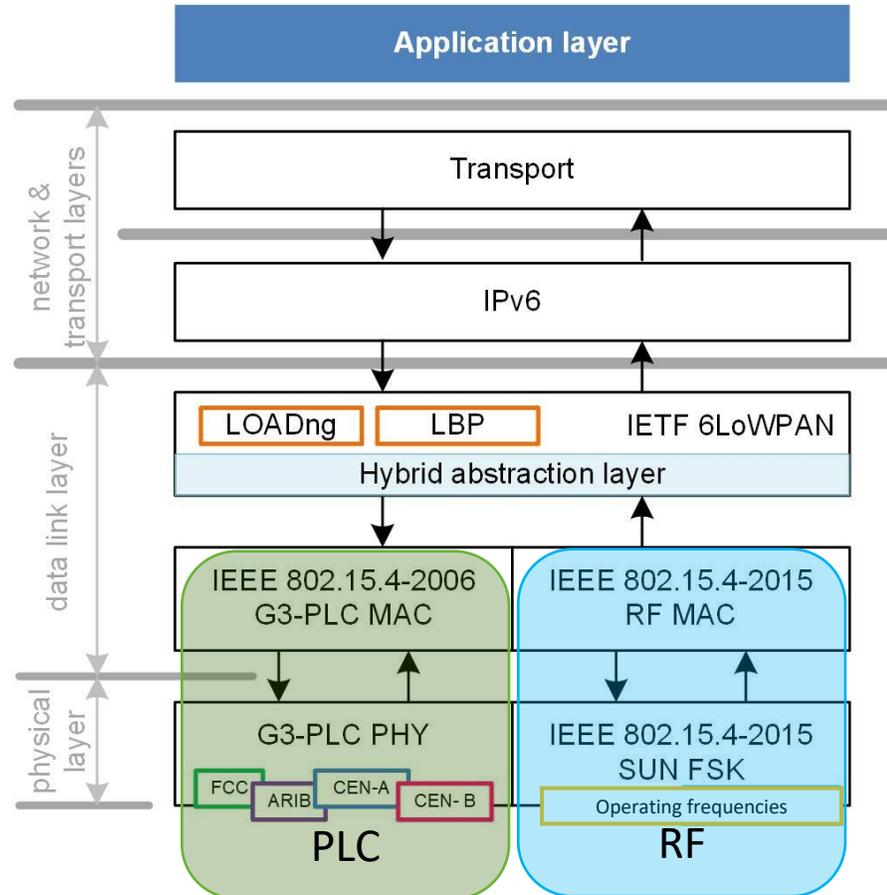
Complementarity between G3 and DLMS



Complementarity between G3 and DLMS certification



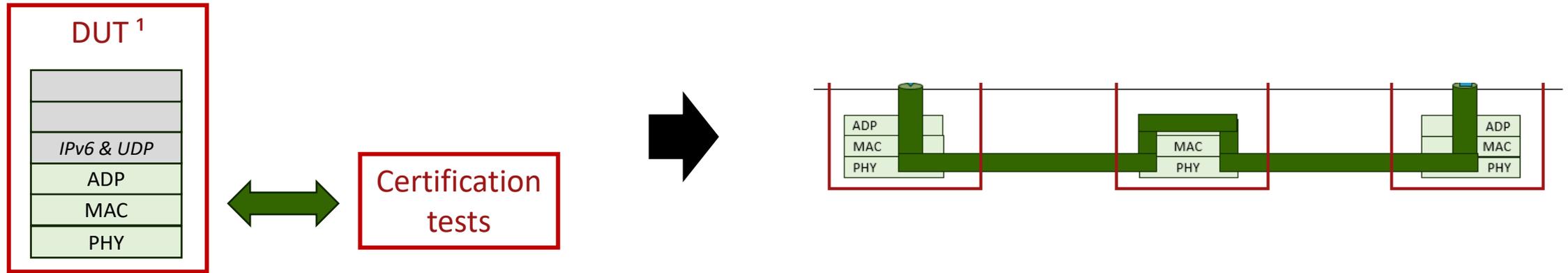
G3-PLC
G3-Hybrid



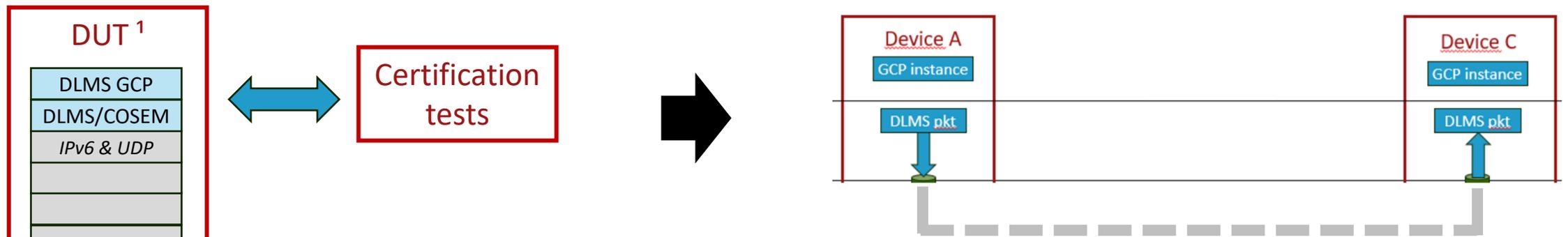
G3 and DLMS in the OSI Model

Complementarity between G3 and DLMS certification

- G3 certification checks G3 protocol



- DLMS certification uses G3 to check DLMS/COSEM and DLMS GCP

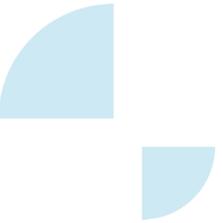


¹ Device Under Test

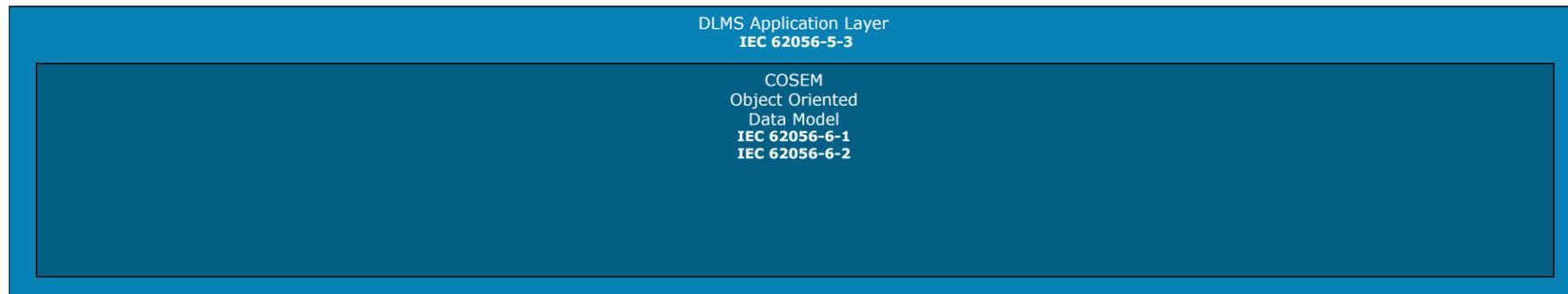
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DLMS/COSEM Protocol Stack



The COSEM Data Model and the DLMS application layer are agnostic of the Telecommunication technology but Objects and ICs are necessary to properly configure the telecommunication devices. For that reason, DLMS UA has published and maintains telecommunication profiles

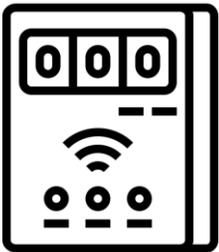


Generic Companion Profiles

It is possible to ensure compliance with the COSEM specification – i.e. verify that the rules are followed and implemented in a proper way.

The COSEM Data Model and the DLMS application are sufficient to guarantee the data interoperability at HES level but not the device exchangeability among manufacturers

In the below example, both instantiations are correct but do not allow interoperability as both devices don't speak exactly the same language.



1234 kWh

0123 kvarh

Objects instance 1

Total Positive Active Energy	1234	kWh
Total Positive Reactive Energy	0123	kvarh



Objects instance 2

Total Positive Active Energy	1234000	Wh
Total Positive Reactive Energy	123000	varh

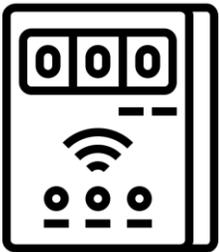


Generic Companion Profiles

Generic Companion Profiles (GCP) provide exact specifications to fulfill market-based Use Cases (UC).

Basic example: UC1: When the total active energy reaches 1500kWh, turn off the disconnect switch, where

- Active energy is in kWh over a period of 1 month
- The disconnect is turned off when the energy is greater than or equal to 1501 kWh
- Information are exchanged over G3-PLC using security suite 1



1234 kWh

0123 kvarh

Objects instance 1

Total Positive Active Energy	1234	kWh
Total Positive Reactive Energy	0123	kvarh

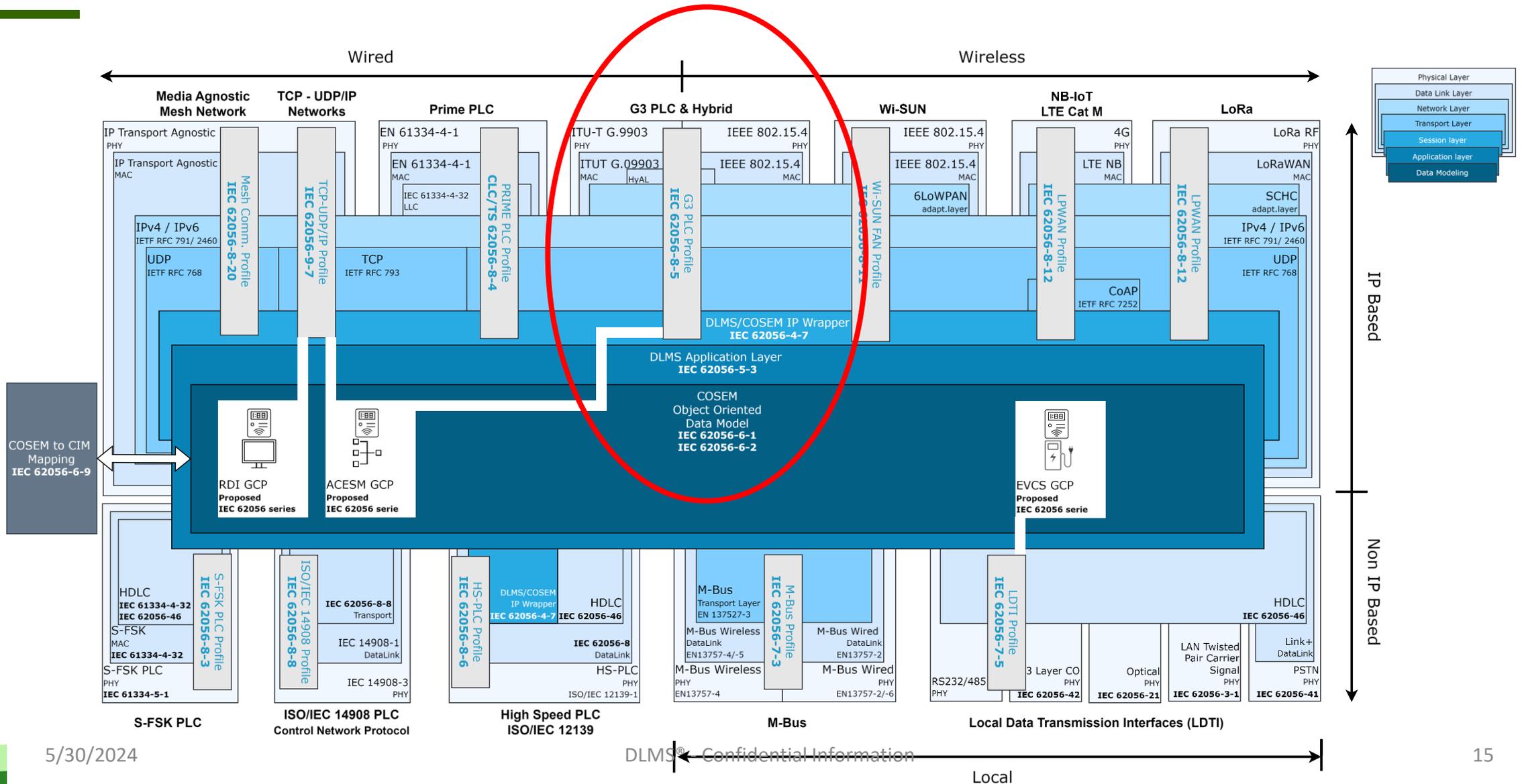


Objects instance 2

Total Positive Active Energy	1234000	Wh
Total Positive Reactive Energy	123000	varh

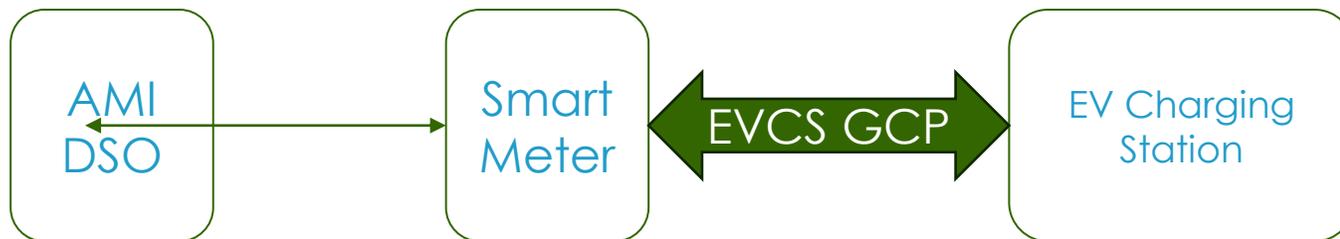
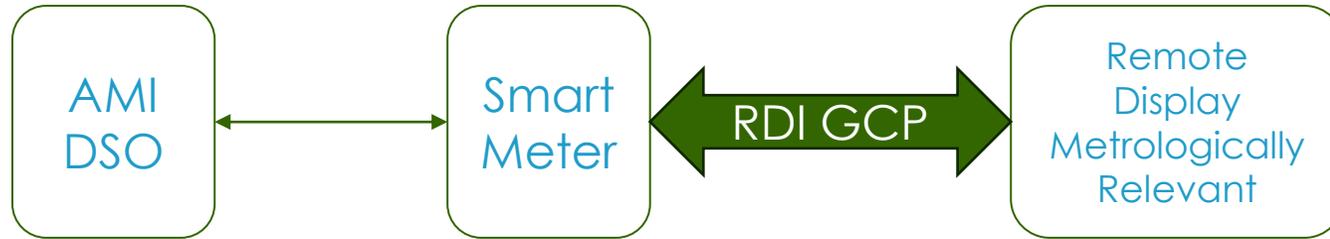


DLMS/COSEM Protocol Stack



DLMS/COSEM - RDI GCP & EVCS GCP (April 2024)

What about the Electricity smart meter GCP?



The RDI GCP focuses on Use Cases around display of legally relevant information on a remote display through IP channels.

Remote display can be a «simple consumer display» or a mobile app on a smartphone

[Metrologically Relevant Remote Display GCP - DLMS UA](#)

The EVCS GCP focuses on Use Cases around load management of an EV Charging Station (EVCS)

The interface used is a Local Data Transmission Interface (LDTI) as per IEC 62056-7-5

[Electric Vehicle Charging Station GCP - DLMS UA](#)

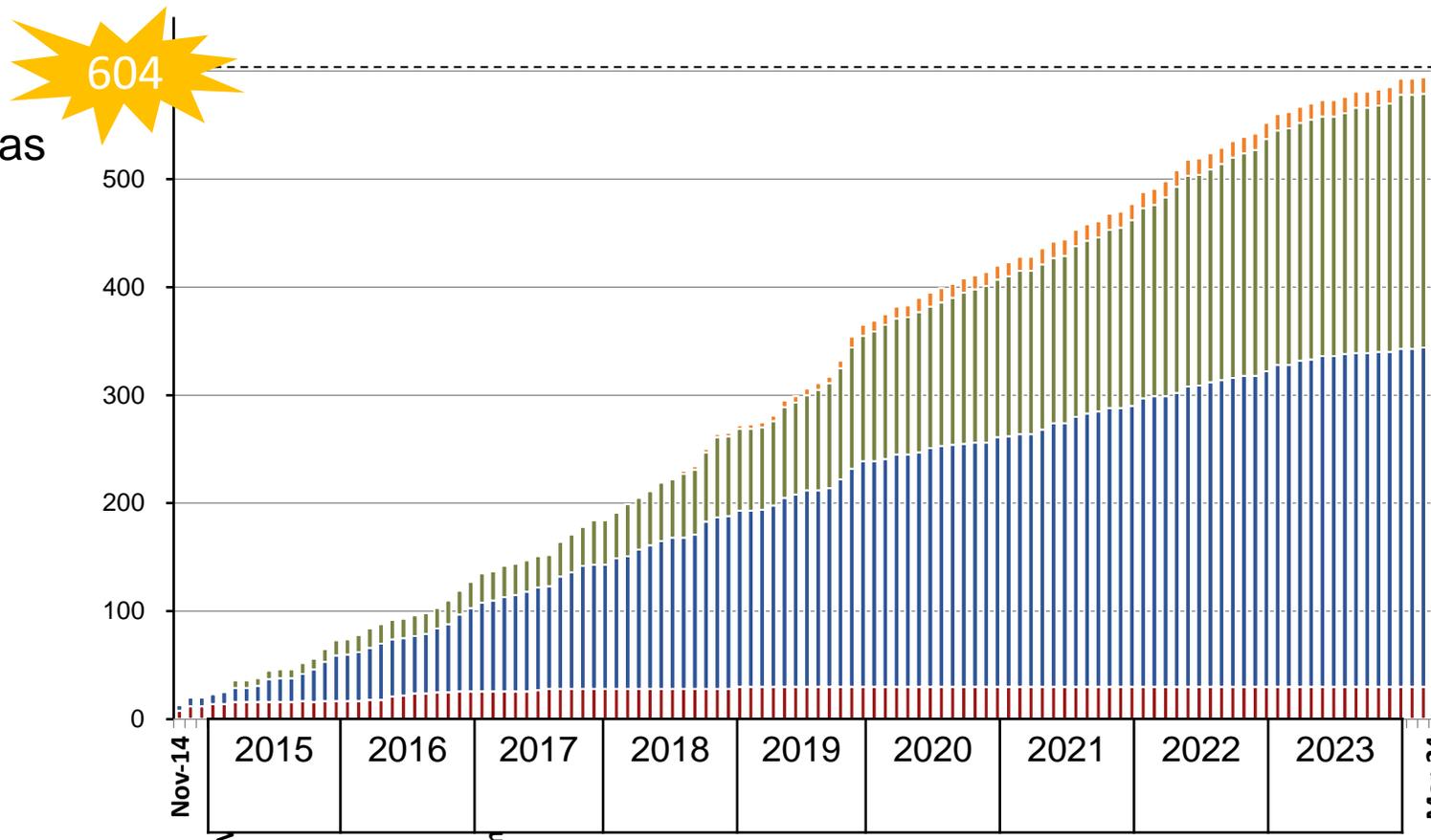
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G3-Alliance operates a successful certification program enabling multi-vendor implementations, since 2014!

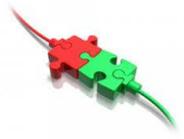
Number of certified devices (cumulative)

- Certification of platforms as well as products
- Over 600 devices have been certified since opening of certification
- Two certification labs: France and Japan



For list of all certified devices: <https://g3-alliance.com/certification/>

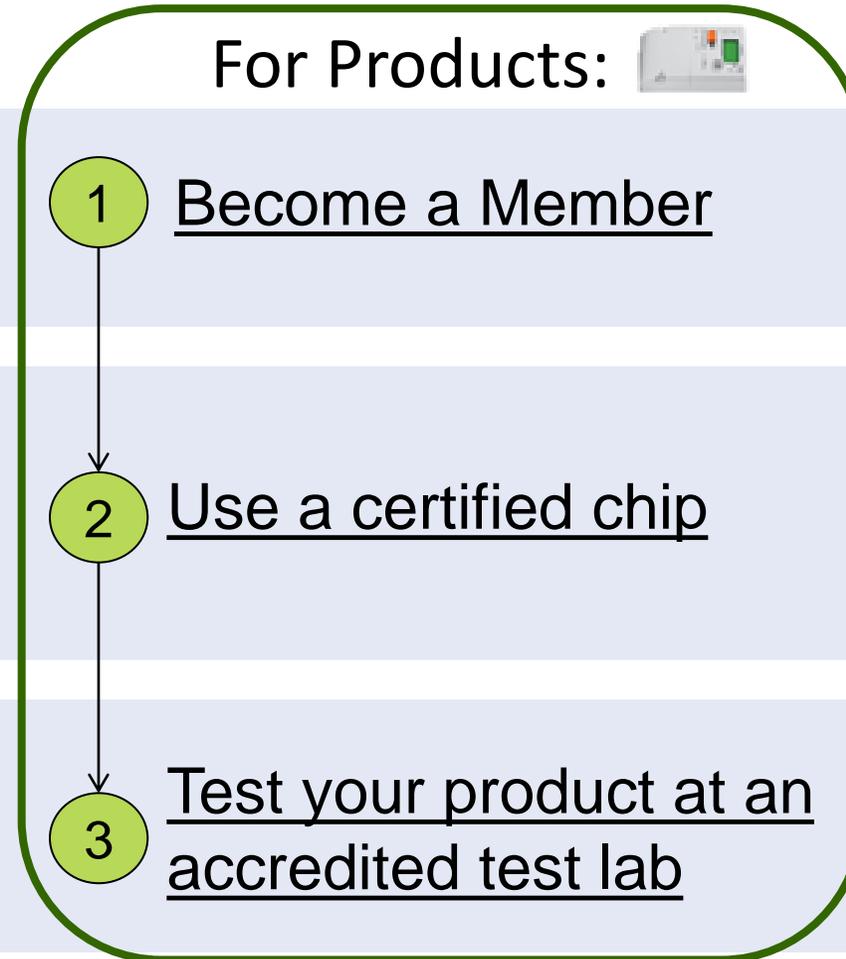
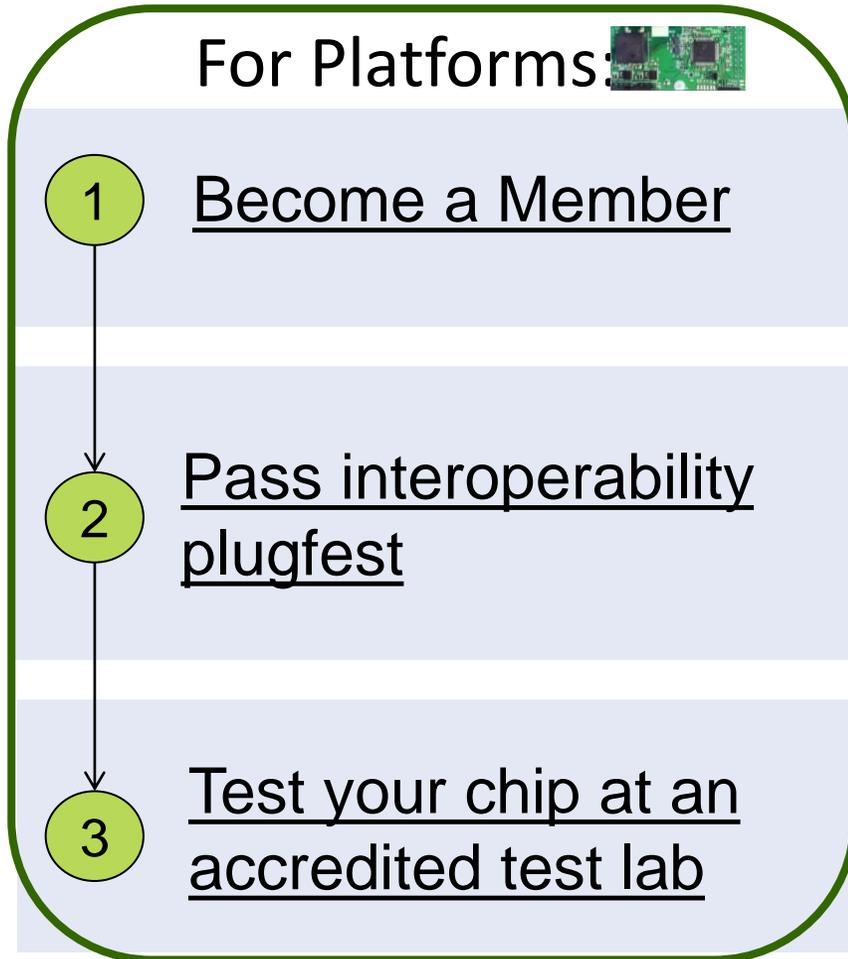
In the G3 Certification, the devices are tested for conformance, interoperability and for performance

	Type of test	Objective	Platforms	Products
	Conformance (245 tests + 186 additional tests for G3-Hybrid)	Validate correct implementation of the G3 protocol at PHY, MAC and 6LoWPAN layers		
	1-to-1 Interoperability (~50 tests)	Validate interoperability with up to six already certified devices		
	Performance (~25 tests)	Validate the performance of the device within a limited set of use cases, for PLC as well as RF	 <i>(subset)</i>	

The latest G3 Certification is Certification Version 7 which was released in October 2023

- This is an important release as it includes key enhancements:
 - Frequency Hopping
 - Last Gasp
 - 915 MHz and 920 MHz RF bands in multiple operating modes (in addition to 860 / 870 MHz bands)
 - RF/PLC Media Switching Improvements
 - Trickle and Clusterhead support for the hybrid solution
 - RF performance testing
 - Certification profile for Arib Hybrid (next to CEN A/B and FCC)
- Six chip manufacturers have already certified hybrid chipsets
- Preparations for Certification V8 will start this year:
 - Will include support battery-powered devices
 - Planning to be decided by certification committee

Three steps towards G3 Certification



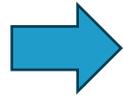
DLMS/COSEM Certification

① Certification for Compliance

Self-Certification
through
DLMS Test Tool Licensing



Blue & Green Books



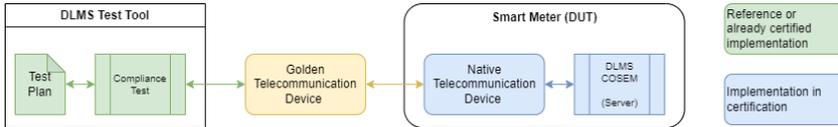
② Certification for Compatibility



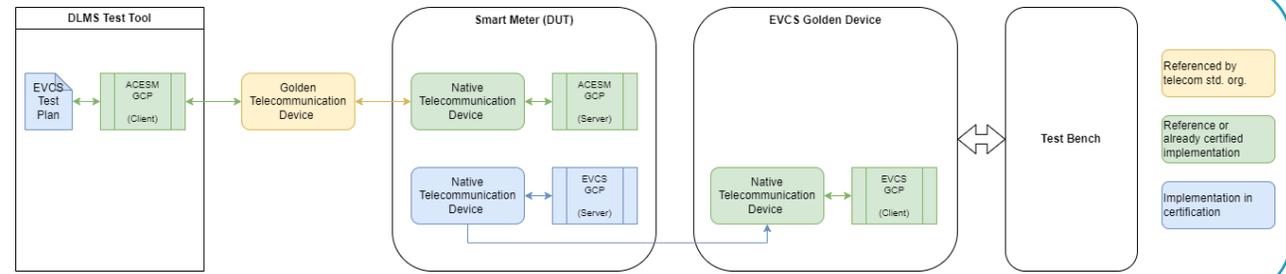
Test Lab Certification
through
DLMS Accredited Test Labs



Generic Companion Profiles



Yellow Book
Test setup and
test bench
definition



DLMS DLMS Certified Device
for Compliance

DLMS DLMS Certified Device for
Compatibility

Takeaway

- To realise interoperability, end-users need to make sure that
 - Devices use international standards
 - Devices are interoperable at communication layer (→ to exchange packets)
 - Devices are interoperable at application layer and implement the same use-cases
- DLMS UA and the G3-Alliance have a liaison agreement to keep their specifications aligned
- DLMS UA and the G3-Alliance both provide a strong, international certification program
- Recommended steps for manufacturers to get the needed certifications:
 1. Make sure hardware meets all local requirements (EMC, CE etc.)
 2. Get certification for G3-PLC/G3-Hybrid
 3. Get certification for DLMS Compliance and DLMS Compatibility



If you have any questions, please visit
www.g3-alliance.com or <https://www.dlms.com/>

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