

# G3-PLC/RF Hybrid Technology

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# G3-PLC embeds all modern features for a long-term network operation and is designed for harsh network conditions

Robust communication	<ul style="list-style-type: none"><li>• Operates at very low SNR and at different modulations</li><li>• Self healing</li><li>• High indoor penetration( high rise buildings, in home applications)</li></ul>
Long distance	<ul style="list-style-type: none"><li>• Easily covers several hundreds of meters</li></ul>
High data rate	<ul style="list-style-type: none"><li>• Complies with future needs for energy demand management and demand response policies</li></ul>
Strong security	<ul style="list-style-type: none"><li>• State-of-the-art Security with MAC security combined with data integrity mechanisms in higher layers</li></ul>
Future proof	<ul style="list-style-type: none"><li>• End to end IPV6 communication</li><li>• Designed to accept diverse application layers (EV, lighting, ...)</li></ul>
International Standard	<ul style="list-style-type: none"><li>• International open ITU standard</li><li>• Strong certification program</li></ul>



# Backed by international group of nearly 100 DSO's and industrial players



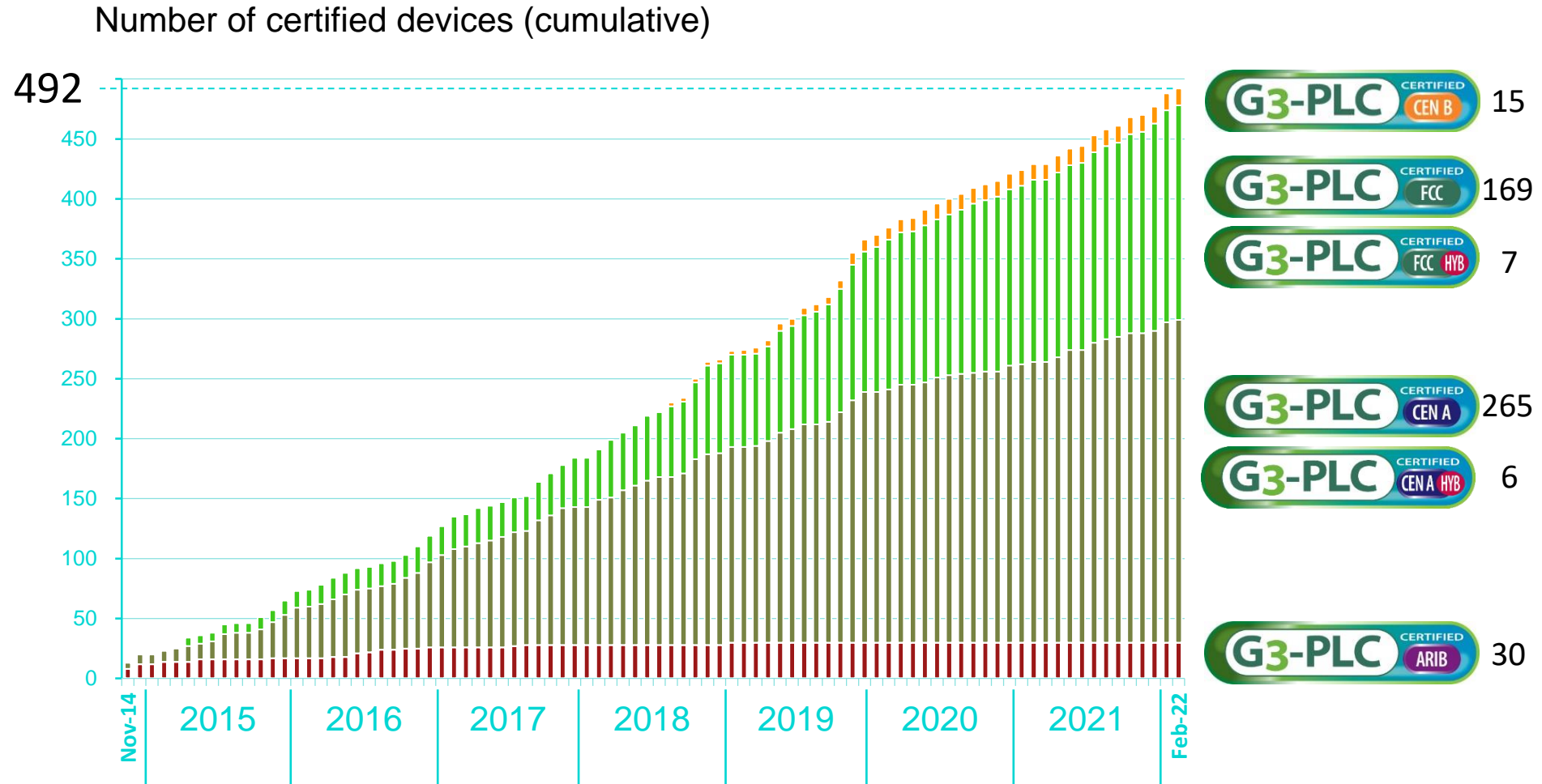
... in a wide range of applications



- ➡ Mature technology with >80 million products in >30 countries worldwide
- ➡ Main tasks are to maintain the spec, promote G3-PLC worldwide and to operate a certification program.

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The total number of issued certificates is approaching 500 including 13 hybrid PLC&RF platforms and the first hybrid products!



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

# Hybride G3-PLC/RF and KEY FEATURES

- It is designed based both RF and PLC Technologies where system selects best available network (RF or PLC) **automatically**.
- Total data rate of 230 Kbps. 180 Kbps PLC plus 50 Kbps RF.
- It is a standard based solution adapted with both ITU and IEEE.



## Lower Cost of Ownership

Reduce the need to construct pole for RF canopy and repeaters with Higher KPI and no OPEX for using the network.



## Flexibility

RF and PLC network works hand in hand to penetrate the white area where other technologies struggling.

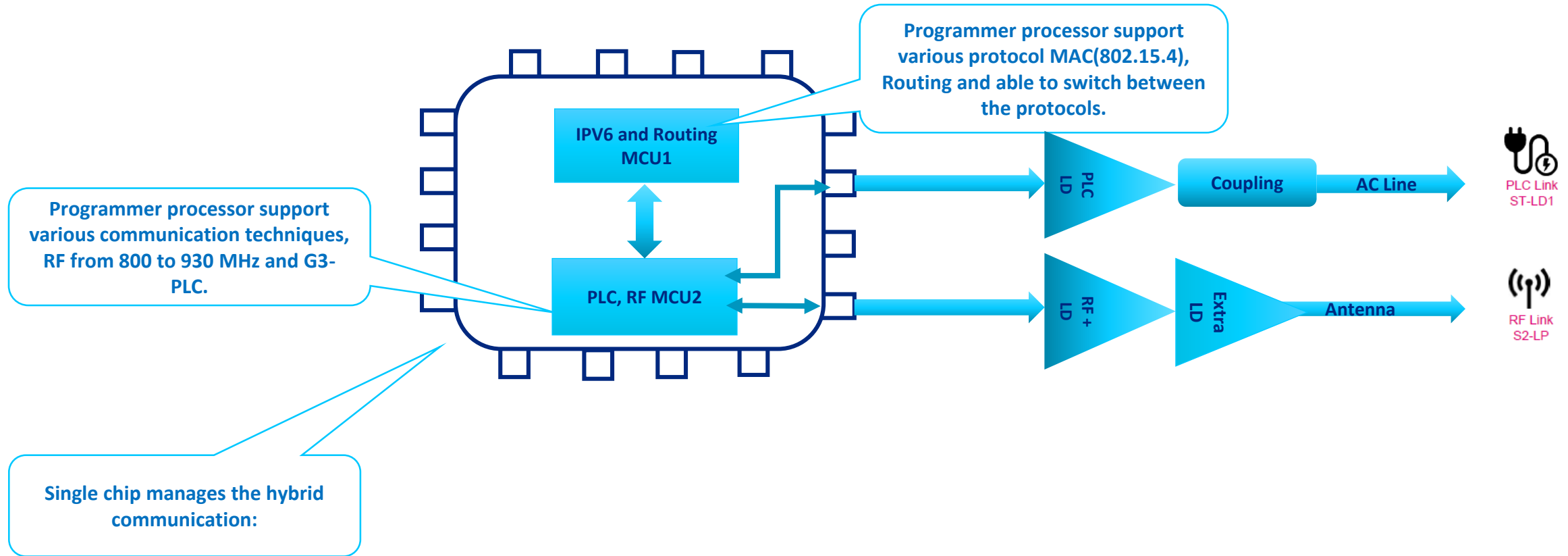


## Performance

Higher data rate with larger number of nodes can communicate within a network. It Opens to other IoT applications such as SmartGrid, Gas and water meters.

Key Features

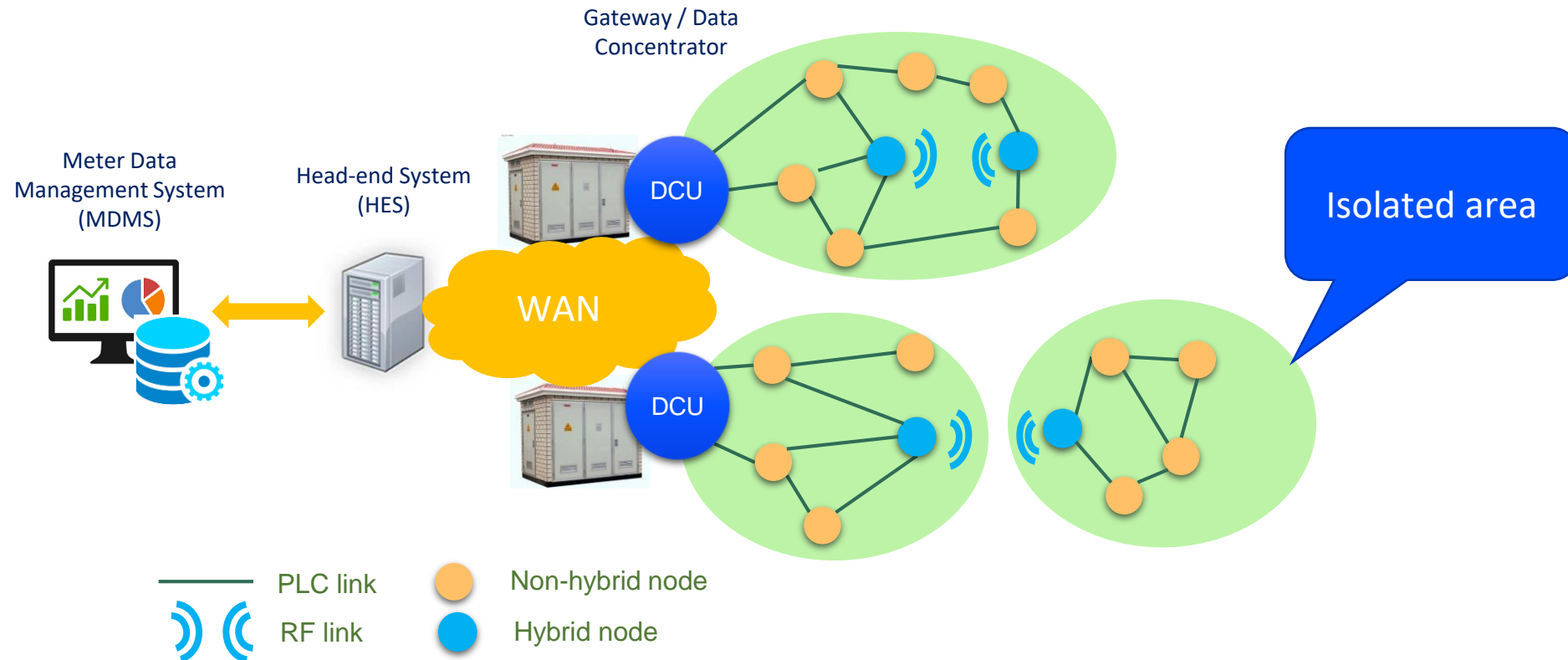
# Hybrid PLC/RF Meter Architecture



A single chip managing both technologies

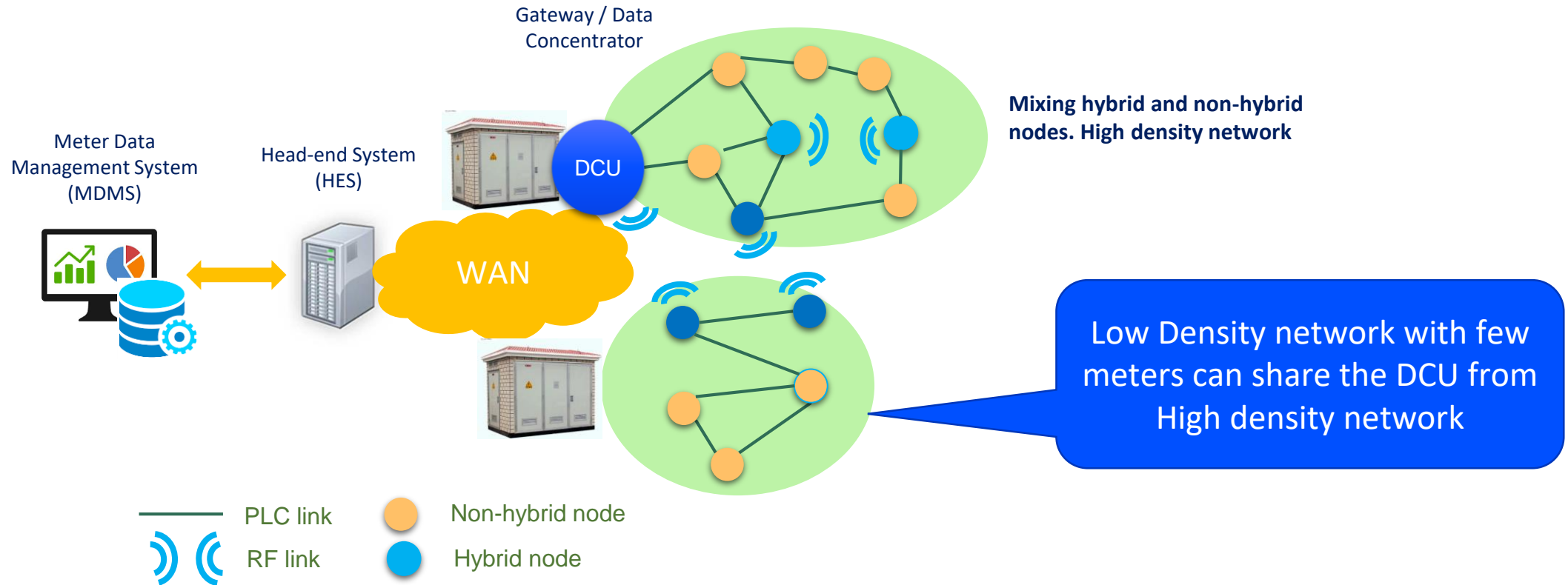
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# Hybrid Use Cases connecting the isolated network



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# Hybrid Use Cases for sharing DCU for two adjacent substation. High density and low density network.



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# PoC in India in cooperation with Sagemcom G3-PLC Alliance, ISGF, ST Micro and local DSO

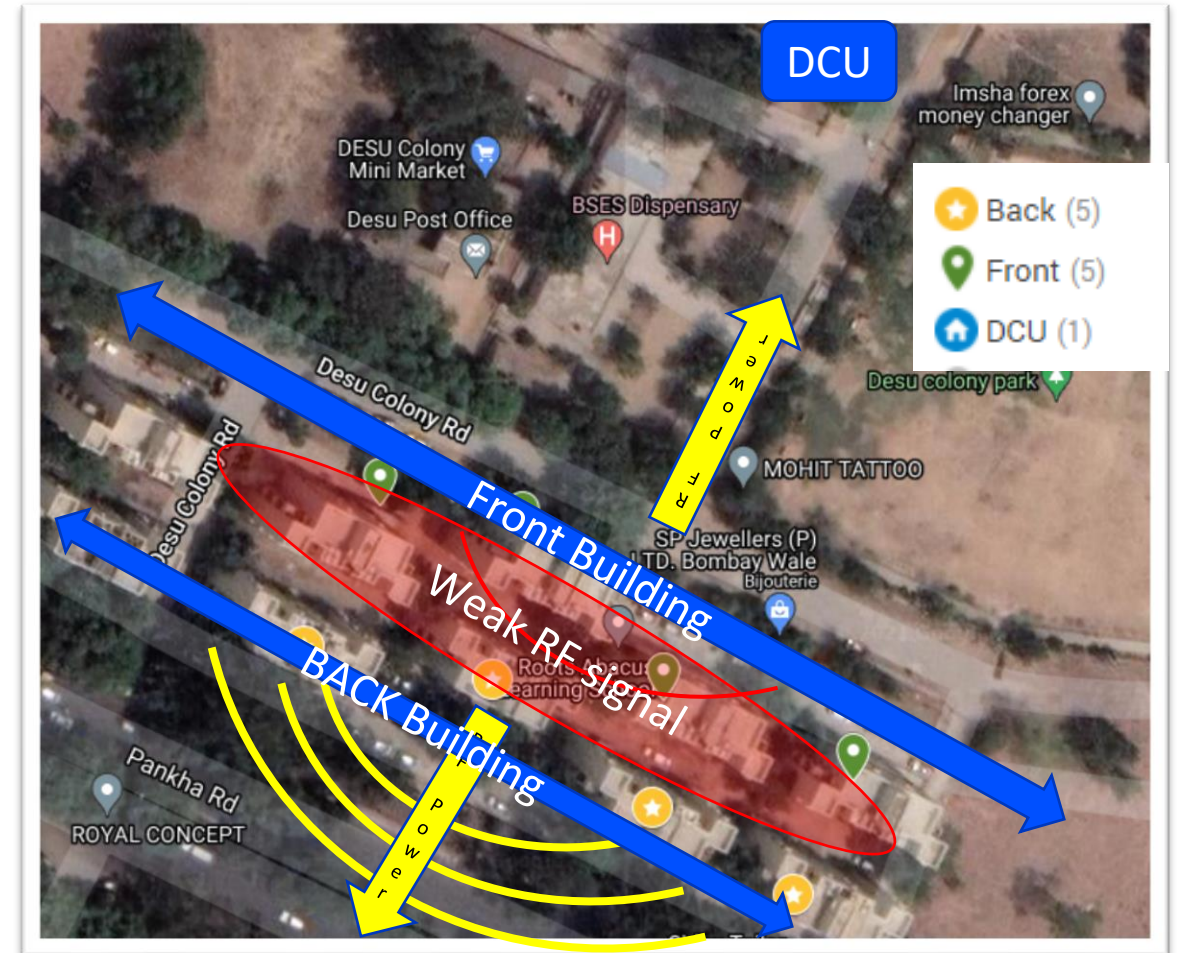
- Proposed POC location represents a challenging environment for both RF & PLC communications
  - High level of PLC noise, compared to other countries, is measured during Site Survey.



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# An Overview on Field Composition

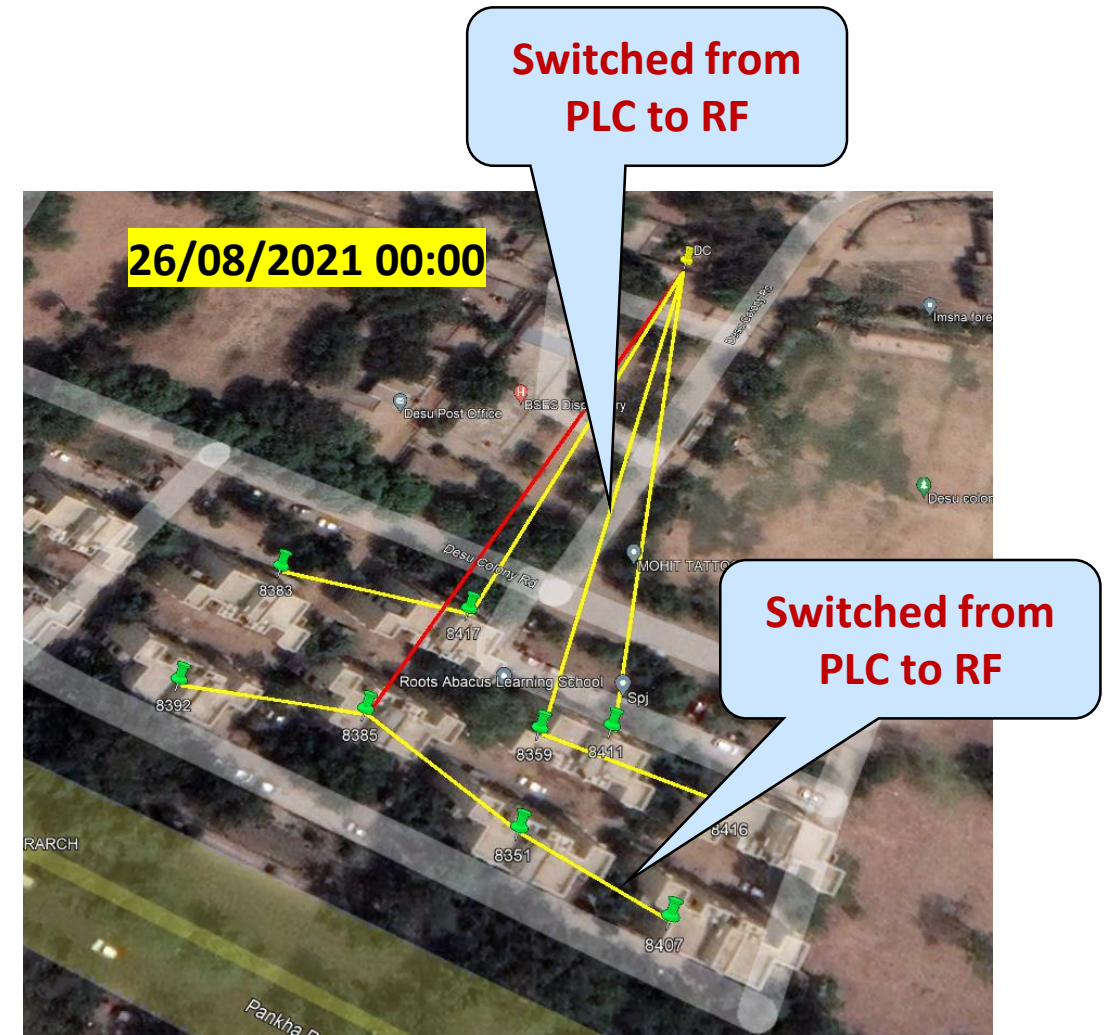
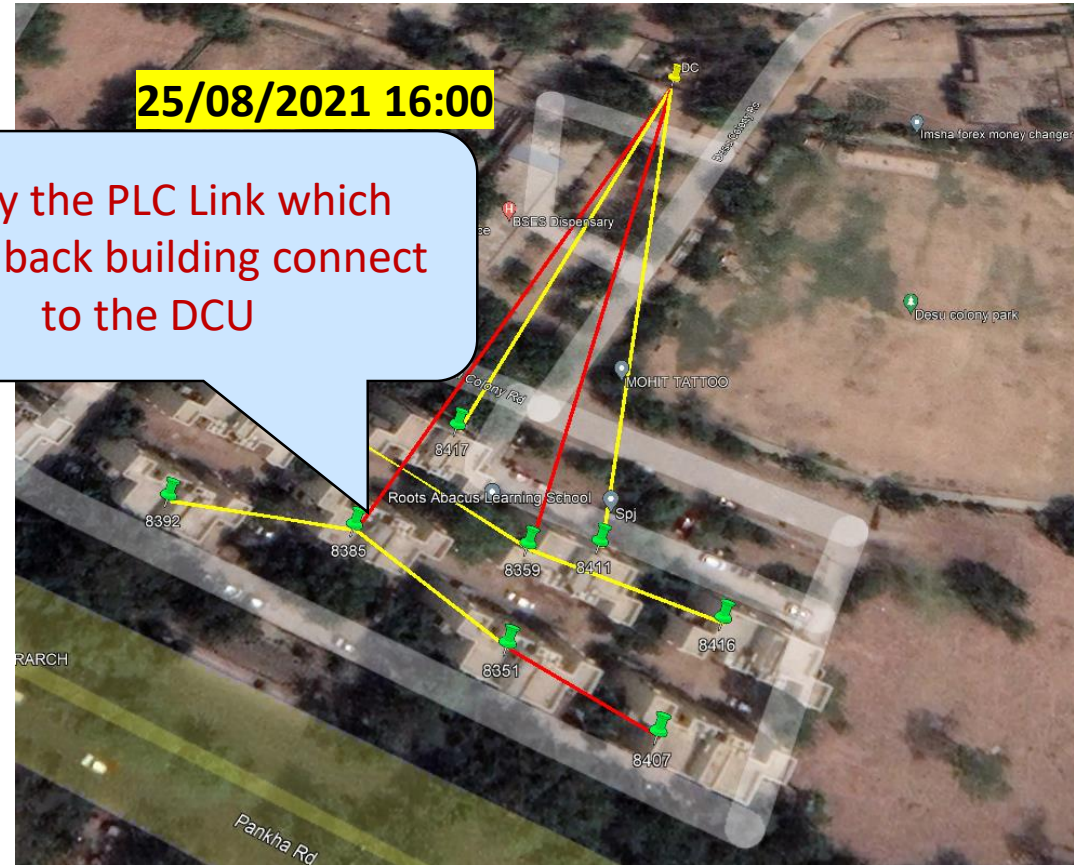
- Proposed POC location represents a challenging environment for both RF & PLC communications .
  - Front Meters have a good RF communication with DCU.
  - Obstacles create a very harsh environment for back meters to communicate in RF with the front Meters.



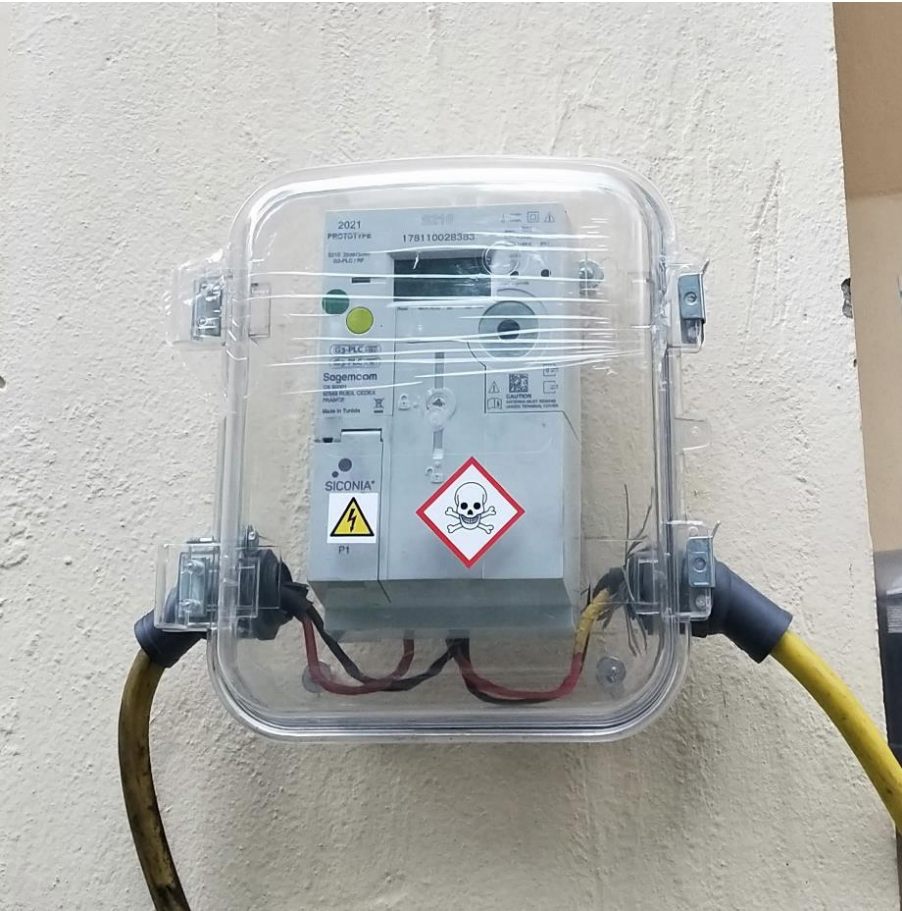
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# Hybrid Topology at different time frame



# Site Pictures: Meters



1 H collect with Retry and recovery	30-sept	01-oct	02-oct	03-oct	Today AVG
LP1(2690 Bytes)- Daily KPI %	100	98	97	100	98.5
Billing (76 Bytes) Daily KPI %	100	98	99	100	99



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# Conclusion

1

G3-PLC Hybrid offers both PLC and RF technology on single solution.  
➤ G3-PLC routing automatically makes the decision to use RF or PLC.

2

Sagemcom is the active member of G3-PLC technical task force initiating the development of G3-PLC Hybrid (PLC and RF) within the alliance in 2019.

3

Fully backwards compatible with existing G3-PLC implementations.  
➤ It is a standard based and interoperable solution.  
➤ Sagemcom providing smart tools for field intervention.

4

➤ Offer new services such as establishing a multi energy network (Gas and Water), Smart Grid and Last Gasp..

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# Thank You

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