

## Fifth Generation Fixed Network (F5G)

### RELEASE 2 DESCRIPTION

Release 2 exhibits extensions and improvements of Release 1. And it adds novel features as new documents in Release 2. There are certain areas, where more focus and specification work is going on. The novel topics include Telemetry for Access Networks, the residential service quality, and Industrial PON. In addition extension of the F5G architecture is specified including the management architecture and the security framework.

The logic of Release 2 is based on various aspects including the 5th generation network characteristics, a set of Release 2 use cases a F5G network shall be able to implement, based on that functional and performance characteristics of those use cases. All of those aspects are driving the F5G system architecture.

### OVERVIEW OF RELEASE 2

The focus of the 5th generation fixed networks (F5G) specifications is on networks, which consist fully of optical fibre elements up to the connection serving locations (user, home, office, base station, etc.). That being said, the connection to some terminals can still be assisted with wireless technologies (for instance, Wi-Fi®). The F5G Release 2 contains the following documents:

[ETSI GS F5G 006](#) Fifth Generation Fixed Network (F5G); End to End Management and Control

[ETSI GS F5G 007](#) Fifth Generation Fixed Network (F5G); Industrial PON

[ETSI GR F5G 008](#) Fifth Generation Fixed Network (F5G); F5G Use Cases Release 2

[ETSI GS F5G 011](#) Fifth Generation Fixed Network (F5G); Telemetry Framework and Requirements for Access Network

[ETSI GS F5G 012](#) Fifth Generation Fixed Network (F5G); Security Countermeasure framework specification

[ETSI GS F5G 013](#) Fifth Generation Fixed Network (F5G); Technology Landscape Release 2

[ETSI GS F5G 014](#) Fifth Generation Fixed Network (F5G); F5G Network Architecture Release 2

[ETSI GS F5G 015](#) 5th Generation Fixed Network (F5G); F5G Residential Services Quality Evaluation and Classification

[ETSI GS F5G 016](#) 5th Generation Fixed Network (F5G); Data Models of Telemetry for Access Network

### SUMMARY OF FEATURES

The Release 2 of F5G has in addition to the features already present in Release 1 a set of distinct features, which are listed in the following:

- Fibre-to-the-Room (FTTR): The concept and architecture for fibre to the room is adding fibre-based technology to connect end devices, customer premises network (CPN) nodes including Wi-Fi access points via edge ONUs and one primary ONU. The primary ONU is connected to the access network segment. This is a future prove feature, which is important for premium services in residential and SME scenarios.
- Industrial PON: An extension of the F5G into industrial networks with industrial application and scenario specific features.
- Network abstraction and model-driven design: the network controllers are abstracting the F5G network segments and expose the abstract model to the orchestrator for a programmable end-to-end management and control.
- Telemetry for the Access Network Segment: The telemetry framework and interfaces for telemetry in the access network are defined. Telemetry shows benefits for managing the network in real-time and for getting real-time data into the digital twin of the MCA plane in order to run a set of analytics on that data to improve the user experience of the services.
- Security: Release 2 defines the security framework of the F5G network.
- Residential Service Quality Evaluation: Specifies a framework for assessing residential service quality.

## HIGHLIGHT OF EACH STANDARD DOCUMENT

### ETSI GR F5G 008: Use Cases

Additional use cases (ETSI GR F5G 008 V1.1.1) are described and classified along the dimensions of technical characteristics, network/service/operations topics, and the application categories. The use cases cover a wide range of applications and dimensions as defined in the F5G generation definition.

**Use cases with key dimensions, segments and focus**

USE CASES	Key F5G Dimensions	Key Segment					Key Focus			Clause
		Residential	Business	Mobile	Vertical - Industry	Network features	Service	Network	Management	
Use case #1: Cloud Virtual Reality	GRE	x	x		x		x			6.1
Use case #2: High Quality Private Line	GRE		x				x			6.2
Use case #3: High quality low cost private line for small and medium enterprises	eFBB		x				x			6.3
Use case #4: Fibre on-premises networking: Fibre-to-The-Room (FTTR)	eFBB, FFC	x	x					x		6.4
Use case #5: Passive optical LAN	eFBB, FFC		x					x		6.5
Use case #6: PON for Industrial Manufacturing	GRE, eFBB, FFC				x			x		6.6
Use case #7: Using PON for City Public Service	FFC				x			x		6.7
Use case #8: Multiple Access Aggregation over PON	eFBB, FFC			x		x		x		6.8
Use case #9: Extend PON to legacy Ethernet Uplink	eFBB, FFC					x		x		6.9
Use case #10: Scenario based broadband	eFBB, FFC					x		x		6.10
Use case #11: Enhanced traffic monitoring and network control in Intelligent Access Network	GRE, FFC					x		x		6.11
Use case #12: On Demand High Quality Transport for Real time applications	GRE					x			x	6.12
Use case #13: Remote Attestation for Secured Network Elements	GRE					x			x	6.13
Use case #14: Digitalized ODN/FTTX	eFBB					x			x	6.14
Use case #15: XR-based Virtual Presence	eFBB, GRE	x	x				x			7.1
Use case #16: Enterprise private line connectivity to multiple clouds	GRE		x				x			7.2
Use case #17: Premium home broadband connectivity to multiple clouds	GRE, FFC	x					x			7.3
Use case #18: Virtual Music	eFBB, GRE	x	x				x			7.4
Use case #19: Next Generation Digital Twins	eFBB, GRE				x		x			7.5
Use case #20: Media Transport	eFBB, GRE	x	x		x	x	x			7.6
Use case #21: Edge/Cloud-based visual inspection for automatic quality assessment in production	GRE, FFC				x		x			7.7
Use case #22: Edge/Cloud-based control of automated guided vehicles (AGV)	GRE				x		x			7.8
Use case #23: Cloudification of Medical Imaging	eFBB, GRE		x				x			7.9
Use case #24: F5G for Intelligent Mine	GRE, FFC				x		x			7.10
Use case #25: Enhanced optical transport network for Data Centre Interconnections	eFBB, GRE					x		x		7.11
Use case #26: Enhanced point to point optical access	FFC			x		x		x		7.12
Use case #27: Rural Scenarios	FFC, eFBB					x		x		7.13
Use case #28: High-speed Passive P2MP Network Traffic Aggregation	eFBB, FFC			x		x		x		7.14
Use case #29: Orchestration of B2B services in xPON networks	GRE, eFBB					x			x	7.15
Use case #30: Bandwidth on Demand	GRE	x	x		x				x	7.16
Use case #31: Intelligent Optical Cable Management	GRE, FFC					x			x	7.17
Use case #32: AI-based PON optical path diagnosis	GRE					x			x	7.18

## ETSI GS F5G 003: Technology Landscape and Gap Analyses, Release 2

Based on those use cases of Release 2, the requirements for each use case are described and the technologies available to implement those use cases are shown. The gaps against the current technology landscape is showing missing pieces and recommendations of action to be taken to fill those gaps. ETSI GS F5G 003 V2.1.1 lists recommendation for further standardization work inside or outside of ETSI ISG F5G.

## ETSI GS F5G 004: Network Architecture, Release 2

The end-to-end F5G network architecture is specified taking all the use cases and technologies into account and combines them to an overall F5G architecture (ETSI GS F5G 004 V2.1.1). The main additional features compared to Release 1 of the architecture are listed below.

### **ETSI GR F5G 007: Industrial PON**

The industrial PON document studies various aspects on how to use the optical network/PON technologies in various industrial settings. Specifically, it shows various options to achieve industrial scenario specific performance and functionality requirements.

### **ETSI GS F5G 011: Access Network Telemetry Framework**

F5G 011 specifies the overall access network telemetry framework with interfaces for the configuration of telemetry tasks and the telemetry data exporting functions.

### **ETSI GS F5G 016: Access Network Telemetry Data Models**

F5G 016 specifies the detailed data models of those interfaces and is published as a combination of a document and the open source repository in <https://forge.etsi.org/rep/f5g/f5g-access-telemetry>.

### **ETSI GS F5G 012: Security Countermeasure framework specification**

The security countermeasure specification described a framework for security countermeasures in F5G networks including the Underlay and MCA plane. It specifies countermeasures in terms of threads identified in ETSI GR F5G 010 V1.1.1.

### **ETSI GS F5G 015: Residential Services Quality Evaluation and Classification**

As follow-up of the Release 1 Quality of Experience document, F5G 015 is specifying the key quality indicators for F5G applications and services and for F5G networks. It also defines the calculation of mean opinion scores (MOS) for a variety of services usually subscribed in F5G networks, which overall is defining a numeric quality indicator for broadband networks in the residential market. Finally, the document describes a methodology to classify the F5G network quality in order to match the requirements of the services.

## **SPECIFICATIONS**

A full list of related standards in the public domain is accessible via the [ETSI F5G committee page](#).