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Industrial networks - 5G communication technology - General considerations

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CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 8
2 Normative references 8
3 Terms, definitions, abbreviated terms and conventions 8
3.1 Terms and definitions 8
3.2 Abbreviated terms 13
3.3 Conventions 16
4 Considerations on 5th Generation mobile networking 16
4.1 Overview 16
4.2 Radio access technology and spectrum 18
5 Considerations of 5G in industrial automation applications 19
5.1 General 19
5.2 5G background and challenges 19
5.3 Use cases and requirements 19
5.3.1 Key 5G use cases and requirements 19
5.3.2 A 5G traffic model for industrial use cases 19
5.3.3 5G for automation in industry 20
5.4 5G system network architecture and capabilities 20
5.4.1 Security aspects of 5G for industrial networks 20
5.4.2 5G non-public networks for industrial scenarios 21
5.4.3 Exposure of 5G capabilities for connected industries and automation applications 21
5.5 5G system integration with other technologies 21
5.5.1 Integration of 5G with Time-Sensitive Networking for industrial communications 21
5.5.2 Integration of industrial Ethernet networks with 5G networks 21
5.6 5G system integration with devices 22
5.6.1 5G QoS for industrial automation 22
5.6.2 Industrial 5G devices – architecture and capabilities 22
5.7 Performance agreement and monitoring 22
5.7.1 Selected testing and validation considerations for industrial communication with 5G technologies 22
5.7.2 Performance testing of 5G systems for industrial automation 23
5.7.3 Service-level specifications for 5G technology-enabled connected industries 23
6 Use cases overview 23
6.1 Typical Industrial deployment scenarios 23
6.2 General 5G functional requirements 24
6.3 Performance indicators 26
7 General system architecture 26
7.1 The industrial production system 26
7.2 Technical plant system 27
7.3 Distributed automation system 27
7.3.1 Architecture 27
7.3.2 Device types and data endpoint types 28
7.3.3 Typical data connections and data traffic types 29

7.4 Communication system 32
7.5 Environmental conditions 33
8 Conceptual model for 5G systems in industrial automation 33
8.1 Conceptual model 33
8.2 Reference interface 36
8.3 Parameter concept 37
8.3.1 General 37
8.3.2 Parameter statements 37
8.3.3 Parameter values 38
8.4 Performance parameters 39
8.4.1 General 39
8.4.2 Performance parameters related to the application 39
8.4.3 Performance parameters related to the wireless communication solution 40
8.4.4 Performance parameters related to the radio environment 40
8.5 Influencing quantity 41
8.6 Quality of communication services 42
9 Industrial communication infrastructure to be considered 42
9.1 General 42
9.2 Distributed automation system and industrial communication system 42
9.3 Structure of a communication-enabled industrial automation device 42
9.4 Interfaces of industrial communication systems 43
9.5 Security requirements and measures 44
9.6 Functional safety requirements and measures 45
10 Key capabilities of 5G technologies for industrial automation 46
10.1 General 46
10.2 Network deployment scenarios 46
10.3 Structure of 5G devices 50
10.4 Interfaces of 5G systems 52
10.4.1 General 52
10.4.2 User interface to the 5G network terminal 52
10.4.3 User interface to the 5G device management 53
10.4.4 Enhancements in new 3GPP releases 54
10.5 Quality of service 56
10.6 Security 57
11 Integration of 5G technologies into industrial automation 59
11.1 General 59
11.2 Industrial 5G network functions 60
11.3 Industrial 5G device functions 61
11.4 Interfaces for industrial 5G systems 63
11.5 Integration of quality of service 63
11.6 Integration of Security measures 66
11.7 5G communication in functionally safe applications 66
11.8 The deployment process of industrial 5G system 66
Annex A (informative) 5G-ACIA White Papers of interest 68
Bibliography 70

Figure 1 – 5G in the context of industrial communication 7
Figure 2 – 5G system network architecture 17

Figure 3 – Typical industrial deployment scenarios 24
Figure 4 – The position of the communication system in the context of the industrial production system 27
Figure 5 – Architecture of an automation system with spatially distributed automation functions 28
Figure 6 – Transfer interval in context of a cyclic production process 31
Figure 7 – Access through 5G network 32
Figure 8 – Conceptual model of a distributed automation system using a wireless communication system 34
Figure 9 – Conceptual model of a distributed automation system using an industrial 5G system 35
Figure 10 – Reference interface with gap to the wireless communication functions 37
Figure 11 – Basic structure of a communication-enabled industrial automation device 43
Figure 12 – Security of the configuration of devices 45
Figure 13 – Deployment as isolated NPN 47
Figure 14 – Deployment with shared RAN 48
Figure 15 – Deployment with shared RAN and control plane 49
Figure 16 – NPN deployed in public network 50
Figure 17 – Top-level logical architecture of a 5G device 51
Figure 18 – 5G network termination of a 5G device 52
Figure 19 – 5G support for TSN synchronization 55
Figure 20 – 5G QoS model 56
Figure 21 – The transfer of AF information to 5G system QoS Parameters 56
Figure 22 – Key elements of a distributed automation system interconnected by an industrial 5G system 60
Figure 23 – Basic structure of an industrial 5G device 62

Table 1 – Possible reference interface hardware 36
Table 2 – Possible reference interface software 36
Table 3 – Examples of the three statements of influencing quantities and characteristic parameters 38
Table 4 – Industrial automation traffic types 44
Table 5 – Network slicing scenarios 58
Table A.1 – References to the 5G-ACIA White Papers 69

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Industrial networks - 5G communication technology - General considerations

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Draft	Report on voting
65C/1354/DPAS	65C/1362/RVDPAS

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Publicly Available Specification is English.

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INTRODUCTION

The overall market for wireless communication solutions spans a range of diverse applications, with differing performance and functional requirements. Within this overall market, the industrial automation domain can include:

– process automation, covering for example the following industry branches:
  - oil and gas, refining,
  - chemical,
  - pharmaceutical,
  - mining,
  - pulp & paper,
  - water & wastewater,
  - steel,
– electric power such as:
  - power generation (for example wind turbine),
  - power transmission and distribution (grid),
– factory automation, covering for example the following industry branches:
  - food and beverage,
  - automotive,
  - machinery,
  - semiconductor.

Application communication requirements for industrial wireless communication systems are different from those of, for example, the telecommunications, and commercial and consumer markets. These industrial application requirements are identified and provided in 5G-ACIA white papers that are referenced by this document.

This document provides general requirements for industrial automation and spectrum considerations that are the basis for industrial communication solutions.

Industrial premises can contain a variety of wireless communication technologies and other sources of radio emissions.

In industrial automation, many different wireless communication solutions can operate in the same premises. Different to wired fieldbuses, the wireless communication devices can interfere with others on the same premises or environment, disturbing each other.

This document is intended to provide considerations on cellular wireless communication systems according to the specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020) for being applicable in wireless communication system of industrial automation plants (see ITU-R M.2150-1:02/2022).

In Figure 1, a UML class diagram is used to categorize the term Industrial 5G, along with other examples of standards for industrial wireless communications. Accordingly, Industrial 5G refers to a set of functions for wireless data transmission using 5G in industrial automation applications. In this context, only the 3rd Generation Partnership Project (3GPP) 5G radio interface technologies (RIT) according to the detailed specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020) are considered 3GPP TR22.832.

The 3GPP is a collaborative project that brings together standardization organizations from around the world to create globally acceptable specifications for mobile networks. As its name implies, it was first created to establish such specifications for the third generation (3G) of mobile systems. It has continued its work for subsequent generations, including the one considered here, the fifth generation (5G).

As an application of cellular networks in industrial automation, the class "Industrial 5G" inherits from both class "3GPP 5G – RIT" and class "wireless industrial communication".

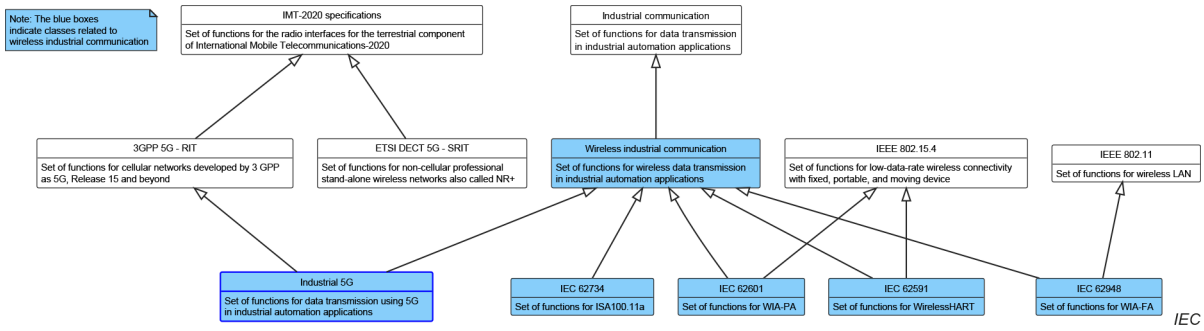


Figure 1 – 5G in the context of industrial communication

1 Scope

This document defines wireless communication systems based on 5G and beyond technologies applicable for industrial process measurement and control applications. Based on common terminology, generic descriptions, and use cases, this document provides requirements for related users, designers, and device manufacturers.

This document considers cellular wireless communication systems according to the specifications of the terrestrial radio interfaces of International Mobile Telecommunications-2020 (IMT-2020) developed by 3GPP as 5G Release 15 and beyond (see ITU-R M.2150-1:02/2022).

NOTE 1 Non-cellular professional stand-alone wireless communication systems, also called NR+, are not considered.

NOTE 2 The PAS is a pre-standard and can be converted into a series of documents for users, designers, and device manufacturers.

2 Normative references

There are no normative references in this document.