



5G Air Channel Basic

2 Hr. 9 Min.



LEARNING OBJECTIVE:

Upon completing the course, the participant will be able to:

- Understand 5G NR Channel Structure
- Understand the basic functionality of Downlink and uplink Channels.
- Discuss the associated reference signals with the respective Downlink and uplink channels
- Understand the Physical channel Processing
- Understand the Cell search procedure
- Understand the Initial Access Procedure in 5G

COURSE OBJECTIVE:

This course provides a basic understanding of 5G New Radio Channels as defined by 3GPP standards and specification. The content and flow are structured to introduce NR air interface channels along with a basic cell search and random access procedure with a focus on technical design principles and their impacts on performance and deployments.

WHO SHOULD ATTEND:

This course is designed to provide a general overview for Network Engineers, technical managers, consultants, communications professionals, network professionals and others who plan on using, evaluating or working with 5G wireless technology.

TARGET AUDIENCE:

Network Engineers, Planning and Optimization Experts, Technical Consultants, Drive test engineers and any one who wants to learn about 5G.

INSTRUCTIONAL METHODS:

Lectures in Classroom, Virtual Classroom trainings, discussion, Questions & Answers. All participants will also receive comprehensive course materials.

COURSE OUTLINE:

1. Introduction

Understand the Downlink Channels

1.1 List of Logical Channels for NR

1.2 List of Transport Channels for NR

1.3 List of Physical Channels for NR

1.4 Logical, Transport and Physical Channel Mapping





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2. 5G Downlink Channels

- 2.1 Synchronization Channels – PSS/ SSS
- 2.2 Discuss the functionality of PBCH Radio spectrum and millimeter wave
- 2.3 Discuss the physical Shared data channel (PDSCH)
- 2.4 Understand the Physical downlink control channel (PDCCH)

3. Uplink Channels

Understand the uplink Channels

- 3.1 List of Logical Channels for NR
- 3.2 List of Transport Channels for NR
- 3.3 List of Physical Channels for NR
- 3.4 Logical, Transport and Physical Channel Mapping
- 3.5 Discuss the physical Shared data channel (PUSCH)
- 3.6 Understand the Physical uplink control channel (PUCCH)
- 3.7 Sub frame Structure - Control Channel and Reference Signal
- 3.8 Discuss PRACH | Physical random access channel
 - 3.8 a) PRACH structure

4. Reference Signals

Understand the Different type reference signals used in 5G, their functionality and mapping on the Physical resources

- 4.1 Discuss PDSCH DMRS
- 4.2 Discuss PDCCH DMRS
- 4.3 Understand the DMRS Associated with PUSCH and PUCCH
- 4.4 Discuss PT-RS
- 4.5 Understand CSI-RS

5. Channel Processing

- 5.1 Physical channel processing gain
- 5.2 LDPC codes
- 5.2 Polar codes
- 5.3 NR Modulation schemes
- 5.4 Multi Antenna systems in NR
- 5.5 Antenna Ports

6. Cell Search

Understanding Cell Search Procedure

- 6.1 Frequency domain SSB resource allocation
- 6.2 Time domain SSB resource allocation
- 6.3 SSB burst set
- 6.4 Obtaining Min SI and Other SI
- 6.5 System Information Acquisition Procedure





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7. Random Access Procedure

7.1 Initial Access/RACH

7.2 Two types of RACH :

7.2 a) Contention Based and

7.2 b) Non Contention Based

**7.3 Two Types of Sequence : Short Sequence
and Long Sequence**

7.4 Preamble Format

**Evaluation and feedback
of the participants**

Maximum number of participants: 15

Duration: 2 Hr. 9 Min.



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