ETSI TS 102 361-2 V2.2.1 (2013-07)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4458-80b3-157600a6d5e3/etsi-ts-102-361-2-v2.2.1-2013-07

Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Mobile Radio (DMR) Systems; Part 2: DMR voice and generic services and facilities

Reference

RTS/ERM-TGDMR-314-2

Keywords

air interface, digital, PMR, protocol, radio

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0707f74-ad1d-4458-80b3-157600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

Important notice

Individual copies of the present document can be downloaded from:
http://www.etsi.org

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
http://portal.etsi.org/tb/status/status.asp

If you find errors in the present document, please send your comment to one of the following services:
http://portal.etsi.org/chaircor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2013.
All rights reserved.

DECT™, **PLUGTESTS**™, **UMTS**™ and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE**™ are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights 7
Foreword 7
1 Scope 8
2 References 8
2.1 Normative references 8
2.2 Informative references 8
3 Definitions and abbreviations 9
3.1 Definitions 9
3.2 Abbreviations 11
4 Overview 12
4.1 Protocol architecture 13
4.1.1 Air Interface Physical Layer (layer 1) 14
4.1.2 Air Interface Data Link Layer (layer 2) 14
4.1.3 Air Interface layer 3 (CCL) 15
4.2 Overview of voice and generic services and facilities 15
4.3 Feature interoperability 16
5 DMR services 16
5.1 Generic services 16
5.1.1 Generic BS services 16
5.1.1.1 BS outbound activation 18
5.1.1.1.1 BS Outbound Activation SDL 19
5.1.1.1.2 BS MSCs 19
5.1.1.1.3 BS_Outbound_Activation 20
5.1.1.2 Voice call repeating 21
5.1.1.3 Voice call hangtime 22
5.1.1.4 CSBK repeating 23
5.1.1.5 BS outbound deactivation 24
5.1.2 Feature Not Supported (FNS) signalling 24
5.1.2.1 FNS Data Bursts/Fields 25
5.1.2.2 MS FNS MSC 25
5.2 Primary voice services 26
5.2.1 Group call service 26
5.2.1.1 Service description 27
5.2.1.2 Group call data bursts/fields 27
5.2.1.2.1 Direct mode 27
5.2.1.2.2 Repeater mode 27
5.2.1.3 MS group call control 28
5.2.1.3.1 MS group call SDL 28
5.2.1.3.2 MS group call HMSC 29
5.2.1.3.3 MS group call MSCs 30
5.2.2 Individual call service 40
5.2.2.1 Service description 40
5.2.2.2 Individual call data bursts/fields 40
5.2.2.2.1 Direct mode 40
5.2.2.2.2 Repeater mode 41
5.2.2.3 MS Individual call channel access 41
5.2.2.3.1 UU_V_Req channel access SDL 41
5.2.2.3.2 UU_Ans_Rsp channel access SDL 42
5.2.2.4 MS Individual call control 43
5.2.2.4.1 MS OACSU Individual call source CCL SDL 44
5.2.2.4.2 MS OACSU Individual call setup MSCs 45
5.3 Supplementary voice services 47
5.3.1 Unaddressed voice call service 47

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4456-80b3-157600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

5.3.1.1 Unaddressed voice call data burst/fields 47
5.3.1.2 MS Unaddressed voice call control 47
5.3.2 All call voice service 47
5.3.2.1 All call data bursts/fields 47
5.3.2.2 MS All call control 47
5.3.2.3 BS All call control 48
5.3.2.3.1 All call voice repeating 48
5.3.2.3.2 All call end of transmission 48
5.3.3 Broadcast call voice service 49
5.3.3.1 Broadcast call data bursts/fields 49
5.3.3.2 MS Broadcast call control 49
5.3.3.3 BS Broadcast call control 49
5.3.3.3.1 Broadcast call voice repeating 49
5.3.3.3.2 Broadcast call end of transmission 49
5.3.4 Open voice channel mode service 49
5.3.4.1 OVCM service description 50

6 DMR facilities 50
6.1 Transmit timeout 50
6.2 TDMA direct mode wide area timing 51
6.2.1 Facility description 51
6.2.1.1 Leader_and_Timing_Unknown 51
6.2.1.2 Leader_Unknown 51
6.2.1.3 Leader_and_Timing_Known 51
6.2.1.4 Leader 51
6.2.2 TDMA direct mode data bursts/fields 51
6.2.2.1 Synchronization 51
6.2.2.2 Colour Code 52
6.2.2.3 Channel Timing CSBK 52
6.2.2.3.1 CT_CSBK_Beacon 52
6.2.2.3.2 CT_CSBK_Prop 52
6.2.2.3.3 CT_CSBK_Term 53
6.2.2.3.4 CT_CSBK_Req 53
6.2.2.3.5 CT_CSBK_Resp 53
6.2.3 TDMA direct mode SDL 54
6.2.3.1 Power up and channel change SDL 54
6.2.3.2 Leader and timing unknown SDL 54
6.2.3.3 Leader unknown SDL 56
6.2.3.4 Leader and timing known SDL 57
6.2.3.5 Leader SDL 59
6.2.3.6 Leader identifier conflict SDL 60
6.2.3.7 CT_CSBK evaluation SDL 61
6.2.3.8 Send correction SDL 63
6.2.3.9 Accept leader SDL 64
6.2.3.10 Appoint new leader SDL 65
6.2.3.11 Timing push SDL 66
6.2.3.12 Transmit procedure SDL 67

7 PDU description 68
7.1 Layer 3 PDUs 68
7.1.1 Full Link Control PDUs 69
7.1.1.1 Group Voice Channel User LC PDU 69
7.1.1.2 Unit to Unit Voice Channel User LC PDU 69
7.1.2 Control Signalling BlocK (CSBK) PDUs 69
7.1.2.1 BS Outbound Activation CSBK PDU 69
7.1.2.2 Unit to Unit Voice Service Request CSBK PDU 70
7.1.2.3 Unit to Unit Voice Service Answer Response CSBK PDU 70
7.1.2.4 Negative Acknowledge Response CSBK PDU 71
7.1.2.5 Preamble CSBK PDU 71
7.1.2.6 Channel Timing CSBK PDU 71
7.1.3 Short Link Control PDUs 72
7.1.3.1 Null Message 72

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed9f-445f-8bb3-157600a6daa3/etsi-ts-102-361-2-v2.2.1-2013-07

7.1.3.2 Activity Update 73
7.2 Layer 3 information element coding 74
7.2.1 Service Options 74
7.2.2 Answer Response 74
7.2.3 Reason Code 75
7.2.4 Service Type 75
7.2.5 Source Type 75
7.2.6 Additional Information Field 75
7.2.7 CSBK Blocks to Follow (CBF) 75
7.2.8 Identifier (ID) 75
7.2.9 Dynamic Identifier (DI) 76
7.2.10 Wide Area Timing Identifier (WATID) 76
7.2.11 Channel Timing Opcode (CTO) 76
7.2.12 New Leader (NL) 77
7.2.13 Generation (Gen) 77
7.2.14 Sync Age (SA) 77

Annex A (normative): Timers and constants in DMR 78

A.1 Layer 3 timers 78

A.2 Layer 3 constants 79

Annex B (normative): Opcode Reference Lists 80

B.1 Full Link Control Opcode List 80

B.2 CSBK Opcode List 80

B.3 Short Link Control Opcode List 80

Annex C (informative): Numbering and dialling plan 81

C.1 Introduction to the numbering and dialling plan 81

C.2 Subscriber mapping 82
C.2.1 User Interface - Air Interface 82
C.2.1.1 Mapping for MS individual address space 83
C.2.1.1.1 Mapping for diallable addresses (prefix 0 to 9) 84
C.2.1.1.2 Mapping for non-diallable individual addresses (prefix 10 to 14) 84
C.2.1.1.3 Examples of individual address mapping 85
C.2.1.2 Mapping for MS talkgroup address space 85
C.2.1.2.1 The concept of the wildcard character 85
C.2.1.2.2 The concept of stored parameters 85
C.2.1.2.3 The concept of ad-hoc arrangement 86
C.2.1.2.4 The rules for the sender 86
C.2.1.2.5 The rules for the recipient 86
C.2.1.2.6 Mapping of dialled strings to the AI talkgroup address space 87
C.2.1.2.6.1 Mapping of numeric dialled strings to the AI talkgroup address space 87
C.2.1.2.6.2 Mapping for non-diallable talkgroup addresses (prefix 10 to14) 89
C.2.1.2.6.3 Examples of talkgroup non-diallable address mapping 89
C.2.1.2.7 The concept of the prefix 89
C.2.2 Addresses 91
C.2.3 Conversion rules 91
C.2.3.1 MS addresses 91
C.2.3.2 Limiting the length of the destination address 91
C.2.3.3 All talkgroup address 91
C.2.3.4 Gateways 92

C.3 User dialling plan 92
C.3.1 User numbering 92
C.3.1.1 Dialling method 92
C.3.1.2 Call Type determination 92
C.3.1.3 Call modifier strings 92
C.3.2 Dialled digits to address mapping 93

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-e82b-442e-a0f3-157e00a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

C.3.3 Storage requirements 93
C.3.3.1 MS individual address 93
C.3.3.2 Talkgroups 93
C.3.3.3 All MSs 93
C.3.3.4 Non-diallable numbers 93
C.3.3.5 Talkgroup recognition 94
C.3.3.5.1 All numeric talkgroups 94
C.3.3.5.2 Talkgroups defined by wildcards 94
C.3.3.5.3 MS receives a talkgroup call 94
C.3.4 Dialling procedures 95
C.3.4.1 MS calls 95
C.3.4.1.1 Seven digit dialling 95
C.3.4.1.2 Abbreviated dialling 95
C.3.4.1.3 Individual call 96
C.3.4.1.4 Talkgroup Call 96
C.3.4.1.5 All Call 96
C.3.4.2 Gateway calls 96
C.3.4.2.1 Telephone call 96
C.3.4.2.1.1 Telephone numeric padding format 96
C.3.4.2.1.2 Telephone star modifier format 97
C.3.4.2.2 PABX call 97
C.3.4.2.2.1 PABX numeric padding format 97
C.3.4.2.2.2 PABX star modifier format 97
C.3.4.2.3 IP call 97
C.3.4.3 Call modifiers 98
C.3.4.3.1 Broadcast call 98
C.3.4.3.2 Priority call 98
C.3.4.3.3 Emergency call 98
C.3.4.3.4 Status call 98
C.3.4.3.5 Divert own call 99
C.3.4.3.6 Open channel voice mode call 99
C.3.4.3.7 Force talkgroup service 99
C.3.4.3.8 Multiple call modifiers 99
C.3.4.4 MS behaviour commands 99
C.3.4.4.1 Edit the talkgroup table 99
C.3.4.4.2 Queue Incoming call 100
C.3.4.4.3 Display own identity 100
C.3.4.4.4 Display Own talkgroup table 100
C.3.4.5 Call set-up abandon or call complete 100

Annex D (informative): Change requests 101

Annex E (informative): Bibliography 102

History 103

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4458-80b3-157600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://ipr.etsi.org).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document is part 2 of a multi-part deliverable covering the Technical Requirements for Digital Mobile Radio (DMR), as identified below:

Part 1: "DMR Air Interface (AI) protocol";

Part 2: "DMR voice and generic services and facilities";

Part 3: "DMR data protocol";

Part 4: "DMR trunking protocol".

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4458-80b3-157600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

1 Scope

The present document contains technical requirements for Digital Mobile Radio (DMR) operating in the existing licensed land mobile service frequency bands, as identified in CEPT/ERC/T/R 25-08 [i.1].

The present document describes the voice and generic services and facilities of a scalable Digital Mobile Radio system which covers three tiers of possible products:

Tier I: DMR equipment having an integral antenna and working in direct mode (communication without infrastructure) under a general authorization with no individual rights operation.

Tier II: DMR systems operating under individual licences working in direct mode (unit-to-unit) or using a Base Station (BS) for repeating.

Tier III: DMR trunking systems under individual licences operating with a controller function that automatically regulates the communications.

NOTE 1: Tier II and Tier III products encompass both simulcast and non-simulcast systems.

NOTE 2: The three tiers of possible products will work only independently and not interoperable.

The present document specifies the voice and generic services and facilities of DMR that has been specifically developed with the intention of being suitable for all identified product tiers. The DMR protocol is intended to be applicable to the land mobile frequency bands, physical channel offset, duplex spacing, range assumptions and all other spectrum parameters without need for any change.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/0f7f1f04-ed7d-4458-80b1-157605...-2013-2-2-2-1-

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI TS 102 361-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Mobile Radio (DMR) Systems; Part 1: DMR Air Interface (AI) protocol".

[2] ETSI TS 102 361-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Digital Mobile Radio (DMR) Systems; Part 3: DMR data protocol".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] CEPT/ERC/T/R 25-08: "Planning criteria and co-ordination of frequencies in the Land Mobile Service in the range 29,7-921 MHz".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

1:1-mode: 1 traffic channel mode

NOTE: 1:1-mode supports one "MS to fixed end" duplex call or one simplex call with an optional inbound Reverse Channel using a two frequency BS.

2:1-mode: 2 traffic channel mode

NOTE: 2:1-mode supports two independent calls which may be either "MS to fixed end" duplex calls, simplex calls using a two frequency BS or simplex calls between MS units on a single frequency.

Base Station (BS): fixed end equipment that is used to obtain DMR services

bearer service: telecommunication service providing the capability for information transfer between access points

burst: elementary amount of bits within the physical channel

NOTE 1: Three different bursts exist with different number of bits. The Traffic burst contains 264 bits, the CACH burst contains 24 bits and the RC burst contains 96 bits.

NOTE 2: The burst may include a guard time at the beginning and end of the burst used for power ramp-up and ramp-down.

NOTE 3: For detailed burst definition see clause 4.2.1.

call: complete sequence of related transactions between MSs

NOTE: Transactions may be one or more bursts containing specific call related information.

channel slot timing: time slot 1 and time slot 2 timing boundaries established by a TDMA direct mode leader

Control plane (C-plane): part of the DMR protocol stack dedicated to control and data services

Digital Mobile Radio (DMR): physical grouping that contains all of the mobile and/or fixed end equipment that is used to obtain DMR services

direct mode: mode of operation where MSs may communicate outside the control of a network

NOTE 1: This is communication technique where any radio unit (MS) may communicate with one or more other radio units (MSs) without the need for any additional equipment (e.g. BS).

NOTE 2: Supports one transmission per 12,5 kHz frequency; 12,5 kHz equivalent (12,5e) spectral efficiency.

duplex: a mode of operation by which information can be transferred in both directions and where the two directions are independent

NOTE: Duplex is also known as full duplex.

frame: two contiguous time slots labelled 1 and 2

NOTE: A frame has a length of 60 ms.

inbound: MS to BS transmission

logical channel: distinct data path between logical endpoints

NOTE: The logical channels are labelled 1 and 2. The logical channel may consist of sub-channels, e.g. SYNC, embedded signalling, etc.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4458-90b3-557600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

Mobile Station (MS): physical grouping that contains all of the mobile equipment that is used to obtain DMR mobile services

octet: 8 bits grouped together, also called a byte

outbound: BS to MS transmission

payload: bits in the information field

personalization: address and configuration information that characterizes a particular DMR MS

NOTE: This information may be programmed by the installer before putting an MS into service.

physical channel: RF carrier that is modulated with information bits of the bursts

NOTE: The RF carrier may be a single frequency or a duplex pair of frequencies. The physical channel of a DMR subsystem is required to support the logical channels.

polite protocol: "Listen Before Transmit" (LBT) protocol

NOTE: This is a medium access protocol that implements a LBT function in order to ensure that the channel is free before transmitting.

prefix: most significant digit of a MS address in the user domain

privacy: secret transformation

NOTE: Any transformation of transmitted information that is derived from a shared secret between the sender and receiver.

Protocol Data Unit (PDU): unit of information consisting of protocol control information (signalling) and possibly user data exchanged between peer protocol layer entities

Radio Frequency channel: Radio Frequency carrier (RF carrier)

NOTE: This is a specified portion of the RF spectrum. In DMR, the RF carrier separation is 12,5 kHz. The physical channel may be a single frequency or a duplex spaced pair of frequencies.

repeater mode: mode of operation where MSs may communicate through a BS

NOTE: This is a communication technique where any radio unit (MS) may communicate with one or more other radio units (MSs) with the need for an intermediate BS.

signalling: exchange of information specifically concerned with the establishment and control of connections, and with management, in a telecommunication network

simplex: mode of working by which information can be transferred in both directions but not at the same time

superframe: 6 continues traffic bursts on a logical channel labelled "A" to "F"

NOTE: A superframe has a length of 360 ms and is used for voice traffic only.

TDMA direct mode: direct mode operation that supports two transmissions per 12,5 kHz frequency

NOTE: Supports 6,25 kHz equivalent (6,25e) spectral efficiency.

time slot (or slot): elementary timing of the physical channel

NOTE: A timeslot has a length of 30 ms and will be numbered "1" or "2".

transmission: transfer period of bursts containing information or signalling

NOTE: The transmission may be continuous, i.e. multiple bursts transmission without ramp-up, ramp-down, or discontinuous, i.e. single burst transmission with ramp-up and ramp-down period.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed70-4458-80b3-15760a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

trunking: network controlled communication

NOTE: This is a communication technique where any radio unit (MS) may communicate with one or more other radio units (MSs) using a trunking protocol and all MSs will be under control of a network.

user numbering: decimal representation of DMR air interface addresses

NOTE: The user numbering is that visible to a user or seen by the user.

User plane (U-plane): part of the DMR protocol stack dedicated to user voice services

wildcard: character in the user domain that represents all digits 0 to 9

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ACK	(positive) ACKnowledgement
AI	Air Interface
AL	Accept Leader
ANL	Announce New Leader
AT	Access Type
BOC	Beginning Of Call
BOR	Beginning Of Repeat
BOT	Beginning Of Transmission
BS	Base Station
CACH	Common Announcement Channel
CBF	CSBK Blocks to Follow
CC	Colour Code
CCE	CT_CSBK Evaluation
CCITT	Consultative Committee on International Telegraphy and Telephony
CCL	Call Control Layer
CCL_1	Call Control Layer: Slot 1 process
CCL_2	Call Control Layer: Slot 2 process
CCL_BS	Call Control Layer: Both Slot process
C-plane	Control-plane
CRC	Cyclic Redundancy Checksum for data error detection
CSBK	Control Signalling BlocK
CSBKO	CSBK Opcode
CT_CSBK	Channel Timing CSBK
CTO	Channel Timing Opcode
DI	Dynamic Identifier
DLL	Data Link Layer
DMR	Digital Mobile Radio
EOC	End Of Call
EOR	End Of Repeat
EOT	End Of Transmission
FEC	Forward Error Correction
FID	Feature set ID
FLCO	Full Link Control Opcode
FNS	Feature Not Supported
Gen	Generation
Grp_V_Ch_Usr	Group Voice Channel User
HMSC	High level Message Sequence Chart
ID	Identifier
IO	Input Output
IP	Internet Protocol
LB	Last Block
LBT	Listen Before Transmit
LC	Link Control
LDI	Leader Dynamic Identifier
LDR	LeaDeR CT_CSBK evaluation

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-d7d1-458a-80b3-157600a6da83/etsi-ts-102-361-2-v2.2.1-2013-07

LID	Leader Identifier
LLC	Logical Link Control
LSB	Least Significant Bit
LWATID	Leader Wide Area Timing IDentifier
MAC	Medium Access Control
MFID	Manufacturer's FID
MMI	Man Machine Interface
MS	Mobile Station (either portable or mobile unit)
MSB	Most Significant Bit
MSC	Message Sequence Chart
MS_DI	Mobile Station Dynamic Identifier
N_xxxx	Layer 3 constant

NOTE: As defined in clause A.2.

NA	Not Applicable
NL	New Leader
OACSU	Off Air Call SetUp
OVCM	Open Voice Channel Mode service
PABX	Private Automatic Branch eXchange
PATCS	Press And Talk Call Setup
PDU	Protocol Data Unit
PF	Protect Flag
PL	Physical Layer
PSTN	Public Switched Telephone Network
PTT	Push-To-Talk
RC	Reason Code
RC	Reverse Channel
RF	Radio Frequency
RX	Receive
SA	Sync Age
SC	Send Correction
SDI	SourceDynamic Identifier
SDL	Specification and Description Language
SFID	Standards FID
SID	Source Identifier
SLCO	Short Link Control Opcode
SMS	Short Message Service
SO	Service Options
SWATID	Source Wide Area Timing IDentifier
SYNC	Synchronization
T_xxxx	Layer 3 Timer

NOTE: As defined in clause A.1.

TD_LC	Terminator Data Link Control
TDMA	Time Division Multiple Access
TO	Time Out
TP	Timing Push
TS	Technical Specification
TX	Transmit
U-plane	User-plane

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-d7d-4458-80b3-1556600a6dac3/etsi-ts-102-361-2-v2.2.1-2013-07

4 Overview

The present document describes a Digital Mobile Radio (DMR) system for Tier II and Tier III products which employ a Time Division Multiple Access (TDMA) technology with a 2-slot TDMA solution and RF carrier bandwidth of 12,5 kHz (see note 1).

NOTE 1: DMR system for Tier I products employ a continuous transmission variation of the previously mentioned technology.

The present document describes the Call Control Layer (CCL) of the DMR Air Interface (AI). Radio equipments (fixed, mobile or portable) which conform to the present document shall be interoperable at the Air Interface with equipment from other manufacturers. Radio equipment of the present document shall also comply with TS 102 361-1 [1].

The present document will not provide the specification or operational detail for system implementations which include but are not limited to trunking, roaming, network management, vocoder, security, data, subsystems interfaces and data between private and public switched telephone networks. It describes only the appropriate access requirements compatible with the Air Interface.

NOTE 2: The DMR standard consists of a multi-part deliverable, which will be referred to in the present document if needed.

4.1 Protocol architecture

The purpose of this clause is to provide a model where the different functions and processes are identified and allocated to different layers in the DMR protocol stack.

The protocol stack in this clause and all other related clauses describe and specify the interfaces, but these stacks do not imply or restrict any implementation.

The DMR protocol architecture which is defined herein follows the generic layered structure, which is accepted for reference description and specification of layered communication architectures.

The DMR standard defines the protocols for the following 3 layered model as shown in figure 4.1.

The base of the protocol stack is the Physical Layer (PL) which is the layer 1.

The Data Link Layer (DLL), which is the layer 2, shall handle sharing of the medium by a number of users. At the DLL, the protocol stack shall be divided vertically into two parts, the User plane (U-plane), for transporting information without addressing capability (e.g. voice), and the Control plane (C-plane) for signalling information, both control and data, with addressing capability, as illustrated by figure 4.1.

NOTE 1: It is appropriate to bear in mind the different requirements of C-plane and U-plane information. C-plane information needs only a discrete (or non-continuous) physical link to pass information although it needs a continuous virtual link to support the service. This may also be called signalling or packet mode service. Acknowledgements may or may not be requested. U-plane information, on the other hand, requires a regular physical link to be available so that a constant delay service can be supported. This may also be called circuit mode service.

NOTE 2: The DLL identified in figure 4.1 may be further sub-divided in the air interface protocol to separate the functionality of Medium Access Control (MAC) and Logical Link Control (LLC), which is often performed in radio air interface protocols due to the specialized nature of these two tasks. Such separation is not presented in the present document and is implementation specific. It is further implementation specific if layer 2 at U-plane offers only MAC for the service.

The Call Control Layer (CCL), which is layer 3, lies in the C-plane and is responsible for control of the call (addressing, features, and etc.), provides the services supported by DMR, and supports Short Data and Packet Data service. U-plane access at layer 2 (DLL) supports voice service which is available in DMR. The Control Layer and the features and services offered by DMR are described in the present document. The Short Data and Packet Data Protocol offered by DMR are described in TS 102 361-3 [2].

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
https://standards.iteh.ai/catalog/standards/sist/c0797f74-ed7d-4458-80b3-157a0046dac3/etsi-ts-102-361-2-v2.2.1-2013-07