

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Peer-to-Peer Digital Private Mobile Radio;  
Part 2: Conformance testing; Test Suite Structure and  
Test Purposes (TSS&TP) specification**

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Reference

RTS/ERM-TGDMR-297-2

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Keywords

digital, mobile, radio, testing, TSS&TP

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## 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 Electromagnetic compatibility and Radio spectrum Matters (ERM); Peer-to-Peer Digital Private Mobile Radio, as identified below:

- Part 1: "Conformance testing; Protocol Implementation Conformance Statement (PICS) proforma";
- Part 2: "Conformance testing; Test Suite Structure and Test Purposes (TSS&TP) specification";**
- Part 3: "Requirements catalogue";
- Part 4: "Conformance testing; Abstract Test Suite (ATS)";
- Part 5: "Interoperability testing; Interoperability Test Suite Structure and Test Purposes (TSS&TP) specification";
- Part 6: "Interoperability testing; Test Descriptions (TD)".

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# 1 Scope

The present document specifies the conformance Test Purposes (TPs) for the Peer-to-Peer digital Private Mobile Radio (dPMR) standard, TS 102 490 [1]. TPs are defined using the TPLan notation described in ES 202 553 [i.1]. Test purposes have been written based on the test specification framework described in TS 102 351 [2] and based on the methodology defined in ISO/IEC 9646-2 [3].

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## 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.

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### 2.1 Normative references

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

- [1] ETSI TS 102 490 (V1.6.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Peer-to-Peer Digital Private Mobile Radio using FDMA with a channel spacing of 6,25 kHz with e.r.p. of up to 500 mW".
- [2] ETSI TS 102 351 (V2.1.1): "Methods for Testing and Specification (MTS); Internet Protocol Testing (IPT); IPv6 Testing: Methodology and Framework".
- [3] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [4] ETSI TS 102 587-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Peer-to-Peer Digital Private Mobile Radio; Part 3: Requirements catalogue".

### 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] ETSI ES 202 553: "Methods for testing and Specification (MTS); TPLan: A notation for expressing test Purposes".

## 3 Abbreviations

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

CF	(Test) ConFIGuration
CSF	Configured Services and Facilities
dPMR	digital Private Mobile Radio
ISDM	Individual Short Data Message
ISF	Initial Services and Facilities
IUT	Implementation Under Test
MS	Mobile Station
OACSU	Off Air Call Set-Up
PTT	Push To Talk
RC	Requirements Catalogue
RQ	ReQUIREment
TP	Test Purpose
TSS	Test Suite Structure

## 4 Test Suite Structure (TSS)

The Test Suite Structure is based on the dPMR Requirements Catalogue (TS 102 587-3 [4]). It is defined by the groups within the following TPLan specification of test purposes. The numbering is not contiguous so that new TPs can be added at a later date without the need to completely renumber the TSS groups.

The test purposes have been divided into three groups:

Group 1: Common requirements.

Group 2: CSF requirements.

Group 3: ISF requirements.

The sub-grouping of these three group follows the structure of the RC. Some of the sub-groups of the RC contained no testable requirement. Headings for those sub-groups are in this test purpose document in the node group to give a full view on the relation between RQ and TSS&TP.

```

Group 1 "ISF CSF Common"
Group 1.1 "All Call"
Group 1.2 "Channel Access"
Group 1.3 "Framing"
Group 1.3.1 "End frame"
Group 1.3.2 "Header frames"
Group 1.3.2.1 "Call information field"
Group 1.3.3 "Packet data frame"
Group 1.3.4 "Superframe"
Group 1.3.4.1 "Type 1 data"
Group 1.3.4.2 "Type 2 data"
Group 1.3.4.3 "Voice"
Group 1.4 "Late Entry"
Group 1.5 "Powersave"
Group 1.6 "Talking Party ID"
Group 2 "CSF"
Group 2.1 "Broadcast Call"
Group 2.2 "Dialling Plan"
Group 2.3 "Individual Short Data Message"
Group 2.3.1 "ISDM Free Text Message"
Group 2.3.2 "ISDM Precoded Message"
Group 2.3.3 "ISDM Short File Transfer"
Group 2.3.4 "ISDM Status Message"
Group 2.4 "OACSU"
Group 2.5 "Short Appended Data"
Group 2.6 "Slow User Data"
Group 2.7 "Type 3 data"
Group 3 "ISF"

```

























```

ensure that {
  when { IUT is requested to send a Voice_Transmission }
  then { IUT sends a Voice_Transmission with colour_code set to 'F7 7D 57h' }
}

-- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TP id      : TP_PMR_0811_03
summary    : 'CSF Colour Codes'
RQ ref     : RQ_001_0811
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0811_03
with {     : IUT in standby and 'using channel 446,115625 MHz'
}
ensure that {
  when { IUT is requested to send a Voice_Transmission }
  then { IUT sends a Voice_Transmission with colour_code set to 'F7 D5 55h' }
}

-- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TP id      : TP_PMR_0811_04
summary    : 'CSF Colour Codes'
RQ ref     : RQ_001_0811
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0811_04
with {     : IUT in standby and 'using channel 446,121875 MHz'
}
ensure that {
  when { IUT is requested to send a Voice_Transmission }
  then { IUT sends a Voice_Transmission with colour_code set to 'F7 FF 55h' }
}

-- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TP id      : TP_PMR_0811_05
summary    : 'CSF Colour Codes'
RQ ref     : RQ_001_0811
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0811_05
with {     : IUT in standby and 'using channel 446,128125 MHz'
}
ensure that {
  when { IUT is requested to send a Voice_Transmission }
  then { IUT sends a Voice_Transmission with colour_code set to 'F5 5F 5Dh' }
}

-- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

TP id      : TP_PMR_0811_06
summary    : 'CSF Colour Codes'
RQ ref     : RQ_001_0811
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0811_06
with {     : IUT in standby and 'using channel 446,134375 MHz'
}
ensure that {
  when { IUT is requested to send a Voice_Transmission }
  then { IUT sends a Voice_Transmission with colour_code set to 'F5 75 5Dh' }
}

-- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

```











































```

TP id      : TP_PMR_1418_01
summary    : 'Masked dialling works for individual calls'
RQ ref     : RQ_001_1418
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_1418_01
with {     : IUT configured_for_Standard_User_Interface
            : and in standby
            : and 'a dialling string input mask enabled'
        }
ensure that {
  when {   : IUT has a valid masked_dialling_string entered or selected -- valid means the exact number
of digits as in mask
            : before IUT hash_key or dedicated_send_key is pressed }
  then {   : IUT sends a Voice_Transmission
            : with Header_Frame
            : containing Called_Station_ID set to the Tx_B2_conversion of the
            : 'address resulting from substituting the masked_dialling_string for
those digits of the IUT individual address that fall within the input mask' }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

TP id      : TP_PMR_1418_02
summary    : 'Masked dialling for group'
RQ ref     : RQ_001_1418
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_1418_02
with {     : IUT configured_for_Standard_User_Interface
            : and in standby
            : and configured_for_wildcards
            : and 'a dialling string input mask enabled'
        }
ensure that {
  when {   : IUT has a valid masked_dialling_string containing a wildcard entered or selected --
valid means the exact number of digits as in mask
            : before IUT hash_key or dedicated_send_key is pressed }
  then {   : IUT sends a Voice_Transmission
            : with Header_Frame
            : containing Called_Station_ID set to the Tx_B2_conversion of the
            : 'address resulting from substituting the masked_dialling_string for
those digits of the IUT individual address that fall within the input mask' }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

TP id      : TP_PMR_1418_03
summary    : 'Abbreviated masked dialling works for individual calls'
RQ ref     : RQ_001_1418
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_1418_03
with {     : IUT configured_for_Standard_User_Interface
            : and in standby
            : and 'a dialling string input mask enabled'
            : and configured_for_abbreviated_dialling
        }
ensure that {
  when {   : IUT has a valid abbreviated_masked_dialling_string entered or selected
            : before IUT hash_key or dedicated_send_key is pressed }
  then {   : IUT sends a Voice_Transmission
            : with Header_Frame
            : containing Called_Station_ID set to the Tx_B2_conversion of the
            : 'address resulting from substituting the
abbreviated_masked_dialling_string for those digits of the IUT individual address that fall within
the least significant digits of the input mask' }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

```



















```

TP id      : TP_PMR_0844_01
summary    : 'CSF Appended Data individual calls'
RQ ref     : RQ_001_0844
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0844_01
with {     : IUT is preset_with_AD_test_data
}
ensure that {
  when {   : IUT is requested to send a Individual_AD_Call }
  then {   : IUT sends Voice_Transmission
            containing Header_Frame
            containing Communications_Mode set to '101b'}
  when {   : IUT is requested to terminate the Individual_AD_Call during the first Payload_Frame of a
Superframe}
  then {   : IUT sends 'AD_test_data in penultimate and last Payload_Frames'}
}

```

```
-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

End group 2.5

## 5.2.6 slow user data

Group 2.6 'Slow User Data'

```
-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

```

TP id      : TP_PMR_0843_01
summary    : 'CSF Slow User Data individual calls'
RQ ref     : RQ_001_0843
TP type    : conformance
Role       : CSF
config     : CF_dPMR_01
TC ref     : TC_PMR_0843_01
with {     : IUT in standby and preset_with_SLD_test_data
}
ensure that {
  when {   : IUT is requested to make a Individual_SLD_Call }
  then {   : IUT sends Voice_Transmission
            containing a Header_Frame
            containing Communications_Mode set to '001b' and
            containing first Payload_Frame
            containing CCH_data
            set to first 2 bytes of SLD_test_data and
            containing second Payload_Frame
            containing CCH_data
            set to second 2 bytes of SLD_test_data }
}

```

```
-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

End group 2.6



```

Role      : CSF
config    : CF_dPMR_01
TC ref    : TC_PMR_0820_01
with {    : IUT is 'sending a T3_Transmission'
}
ensure that {
  when {  : IUT receives a Ack_Frame containing Ack_type set to '010b' and CI_information set to a
packet_data_frame number }
  then {  : IUT sends 'the previous T3_Transmission starting with the packet_data_frame following that
packet_data_frame number' }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

TP id     : TP_PMR_0821_01
summary   : 'Type 3 Data unused bytes'
RQ ref    : RQ_001_0821
TP type   : conformance
Role      : CSF
config    : CF_dPMR_01
TC ref    : TC_PMR_0821_01
with {    : IUT in standby
}
ensure that {
  when {  : IUT is requested to send a T3_Transmission 'with a payload of 1400 bytes' }
  then {  : IUT sends T3_Transmission
           with the eighth packet_data_frame
           containing data_length set to 140 and
           last 40 data_bytes set to '00h' }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

TP id     : TP_PMR_0822_01
summary   : 'Type 3 Data CRC'
RQ ref    : RQ_001_0822
TP type   : conformance
Role      : CSF
config    : CF_dPMR_01
TC ref    : TC_PMR_0822_01
with {    : IUT in standby
}
ensure that {
  when {  : IUT is requested to send a T3_Transmission }
  then {  : IUT sends a T3_Transmission
           with every packet_data_frame
           containing data_checksum set to the valid CRC_D value }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

End group 2.7
End group 2

```

## 5.3 ISF

```

Group 3 'ISF'

TP id     : TP_PMR_0804_01
summary   : 'Selectable Common_IDs'
RQ ref    : RQ_001_0804
TP type   : conformance
Role      : ISF
config    : CF_dPMR_01
TC ref    : TC_PMR_0804_01
with {    : IUT in standby
}
ensure that {
  when {  : IUT is requested to send a Voice_Transmission using a Common_ID between 1 and 255 }
  then {  : IUT sends a Voice_Transmission
           containing a Header_Frame
           containing Own_Station_ID and Called_Station_ID
           set to the Common_ID in their upper 8 bits }
}

-- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

```





## Annex A (normative): dPMR conformance test configurations

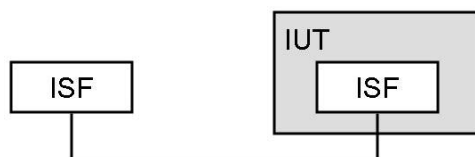


Figure A.1: Configuration CF\_dPMR\_ISF\_01\_C

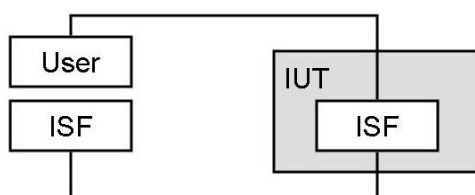


Figure A.2: Configuration CF\_dPMR\_ISF\_02\_C

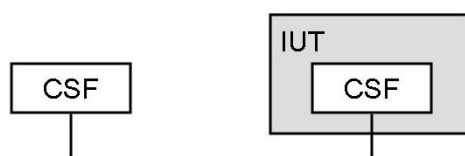


Figure A.3: Configuration CF\_dPMR\_CSF\_01\_C

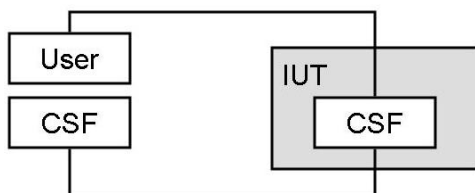


Figure A.4: Configuration CF\_dPMR\_CSF\_02\_C

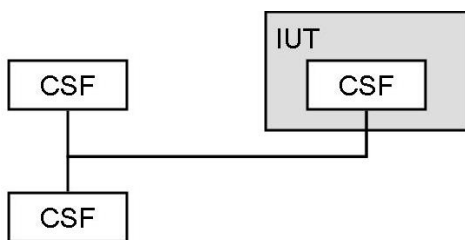
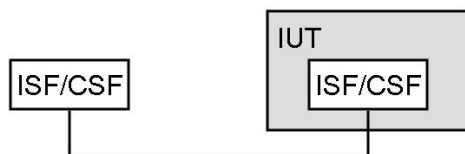
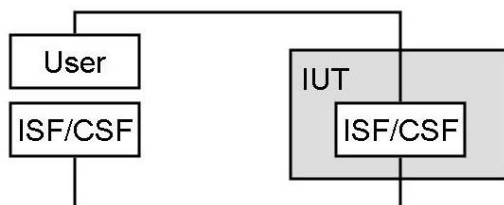


Figure A.5: Configuration CF\_dPMR\_CSF\_03\_C



**Figure A.6: Configuration CF\_dPMR\_ISF/CSF\_01\_C**



**Figure A.7: Configuration CF\_dPMR\_ISF/CSF\_02\_C**

In the configuration CF\_dPMR\_ISF/CSF\_01\_C and CF\_dPMR\_ISF/CSF\_01\_C either all entities are ISF or all are CSF.

## Annex B (normative): dPMR TPLan conformance testing user definitions

```

---**Cross references**

xref PICS_doc          {DTS/ERM-TGDMR-066-1}

-- Configurations
xref CF_dPMR_01       {DTS-ERM-TGDMR-066-3}

---**Definitions**

def header type      -- as in "TP type"

-- Entities

-- Messages or signals
def event PTT_Call   -- voice transmission directly initiated by the PTT switch
def event Header_Frame {header_type, format_coding } -- alias HF
def event End_Frame  {Ack_Request, ARQ, End_Type} -- alias EF
def event Ack_Frame  {Ack_type}
def event Ack_Frames -- Up to 4 Ack frames repeated with 300-500ms intervals
def event Payload_Frame { CCH_data, ID0, ID1, ID2, ID3 }
def event Payload_Frames
def event Superframe { Payload_Frames }
def event Superframes { Payload_Frames }
def event Voice_Transmission -- directly following sequence of HF, SFs, EF with audible tone as
payload
def event T1_Transmission -- directly following sequence of HF, SFs, EF with Type 1 data in
payload
def event T2_Transmission -- directly following sequence of HF, SFs, EF with Type 2 data in
payload
def event T3_Transmission -- directly following sequence of HF, 8 PDFs, EF with Type 3 data in
payload
def event Connection_Request { HeaderFrame, EndFrame } -- Manually initiated, e.g., PTT double
click,
-- Status request, etc
def event Disconnection_Request { HeaderFrame1, EndFrame1, HeaderFrame2, EndFrame2 }
def event Status_Response { HeaderFrame, EndFrame }
def event T2_Status_Message
def event T2_Precoded_Data_Message
def event T2_Freetext_Data_Message
def event T2_Short_File_Transfer
def event T1_Status_Message
def event T1_Precoded_Data_Message
def event T1_Freetext_Data_Message
def event T1_Short_File_Transfer
def event Individual_SLD_Call
def event Group_SLD_Call
def event Broadcast_Call
def event Individual_AD_Call
def event Group_AD_Call
def event OACSU_Call
def event Status_Call { HeaderFrame, EndFrame}
def event Call_Fail -- non-specified kind of user notification in case of a call failure
def event hash_key
def event dedicated_send_key
def event broadcast_command
def event talkgroup_command

-- Values
def value bit
def value integral_number
def value individual_address
def value Call_Data -- Comms Mode, Comms Format, Caller, Callee IDs, Common ID
-- ... appearing in header well as payload frames of CCH
def value Header_Type { Status_Request }
def value Own_Station_ID
def value Called_Station_ID
def value Communications_Mode
def value Communications_Format
def value format_coding
def value Common_ID

```

```

def value CRC_D
def value colour_code
def value ISF_colour_code
def value CSF_colour_code
def value Frame_Sync
def value Status_Request
def value status_code          -- a value from 0 to 31
def value Ack_Request
def value error
def value packet_data_frame { data_bytes, data_length, data_checksum }
def value CI_type
def value CI_information        -- only the information part of CI (=call information)
def value wildcard_group_address -- a 7 digit group address containing a wildcard in the last four
digits
def value numeric_group_address -- a 7 digit talkgroup address
def value SLD_test_data        -- 4 bytes of data to be buffered in the IUT
def value AD_test_data         -- 40 bytes of data to be buffered in the IUT
def value wildcards
def value STAT
def value preamble
def value Tx_WAIT
def value T_Ack
def value all_call_address      -- ***** (7 wildcard symbols)
def value all_call_within_a_prefix_address -- n***** (6 wildcard symbols)
def value seven_digit_address
def value abbreviated_dialling_string
def value number
def value wildcard
def value masked_dialling_string
def value dialling_string
def value abbreviated_masked_dialling_string

def unit bits
def unit bytes
def unit MHz
def unit seconds

-- Conditions
def condition standby
def condition transmit
def condition OACSU_enabled -- radio configured for Off Air Call Set-up
def condition has_received_an_End_Frame_with_Acknowledge_Request
def condition TPID_is_enabled
def condition has_sent_OACSU_Connection_Request
def condition configured_for_abbreviated_dialling
def condition masked_dialling
def condition configured_for_Standard_User_Interface
def condition preset_with_SLD_test_data
def condition preset_with_AD_test_data
def condition invalid_CRC
def condition configured_for_impolite_channel_access
def condition configured_for_polite_to_own_CC
def condition configured_for_polite_to_own_group
def condition configured_for_multiple_acks
def condition configured_to_use_Tack
def condition powersave_enabled
def condition programmed_with_a_numeric_group_address
def condition not_programmed_with_a_numeric_group_address

-- Keywords - (Pre)conditions

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def word configured
def word entered
def word selected
def word Tx_B2_conversion -- B2 Algorhythm forward conversion
def word Rx_B2_conversion -- B2 Algorhythm reverse conversion

-- Keywords - Stimuli
def word start
def word make
def word requested
def context {is ~requested to}
def word completes
def word cancel
def word terminate
def word terminates
def word pressed

```

```
-- Keywords - Responses
def word outputs
def word output
def word notifies
def word returns
def word send

-- Keywords - other
def word set
def context {~set to}
def word up
def context {~up to}
def word same
def word their
def word upper
def word lower
def word each
def word every
def word first
def word second
def word third
def word fourth
def word eighth
def word last
def word except
def word for
def word followed
def word by
def context {~followed by}
def word using
def word part
def word between
def word twice
def word does
def word has
def word non_zero
def word time
def word during
def word continuous
def word valid
def word invalid
def word different
```

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## History

<b>Document history</b>		
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