

**Electromagnetic compatibility and
Radio spectrum Matters (ERM);
Peer-to-Peer Digital Private Mobile Radio;
Part 3: Requirements catalogue**



Reference

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Keywords

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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 3 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)".

1 Scope

The present document is to provide a catalogue of requirements extracted from ETSI Specifications. The catalogues has been written based on the test specification framework defined in TS 102 351 [2].

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 102 490 (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".

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 ETS 300 230: "Radio Equipment and Systems (RES); Land mobile service; Binary Interchange of Information and Signalling (BIIS) at 1 200 bit/s (BIIS 1 200)".

3 Definitions and abbreviations

3.1 Definitions

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

conditionally mandatory: requirement that shall be supported by a standard conformant equipment if and only if the condition(s) stated within its requirement text are met

NOTE: If one of these conditions is not met the requirement is considered to be not applicable.

EXAMPLE: Such a condition may be the support of an optional higher level requirement by the equipment.

conditionally optional: requirement that may be supported by a standard conformant equipment if and only if the condition(s) stated within its requirement text are met

NOTE: If one of these conditions is not met the requirement is considered to be not applicable.

mandatory: requirement that shall be supported by a standard conformant equipment

not applicable: requirement that does not have to be met by a standard conformant equipment

optional: requirement that may be supported by a standard conformant equipment

3.2 Abbreviations

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

ACK	ACKnowledgment
AI	Air Interface
ARQ	Automatic Retransmission reQuest
CC	Colour Code
CCH	Control CHannel
CI	Call Information
Cont	Continuation flag
CRC	Cyclic Redundancy Checksum for data error detection
CSF	Configured Services and Facilities
Di-bit	2 bits grouped together to represent a 4-level symbol
DP	Data Position
ET	End Type
FDMA	Frequency Division Multiple Access
FEC	Forward Error Correction
FN	Frame Numbering
HI	Header Information
HT	Header Type
ID	IDentifier
ISF	Initial Services and Facilities
MFID	Manufacturer's FID
MS	Mobile Station
NACK	Negative ACKnowledgment
OACSU	Off Air Call Set Up
PAR	PARAmeter data
PDF	Packet Data Format
RF	Radio Frequency
RSSI	Received Signal Strength Indication
SLD	SLOw Data
SYNC	SYNChronization
TCH	Traffic CHannel

4 Requirements catalogue

4.1 dPMR common requirements

4.1.1 All Call

RQ_001_0824	All Call	
TS 102 490 [1]	Clause: 8.1.1.1 §3	Type: Mandatory
<i>Applies to:</i>	ISF	
<i>Requirement:</i>	A dPMR radio shall support voice group "All call" supplementary service.	
<i>Specification Text:</i>	{{All radios will decode an All call (common ID = 255) irrespective of the common ID selected by the user}}. However, radios that have 255 selected as the common ID will only respond to calls addressed to a common ID of 255.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0824_01 (Interoperability), TP_PMR_0824_02 (Interoperability), TP_PMR_0824_03 (Interoperability), TP_PMR_0824_01 (Conformance), TP_PMR_0824_02 (Conformance), TP_PMR_0824_03 (Conformance)	
RQ_001_0858	All Call	
TS 102 490 [1]	Clause: 8.1.1.1 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF	
<i>Requirement:</i>	IF an ISF radio Common ID is set to 255 THEN the radio shall only respond to call addressed to Common ID of 255.	
<i>Specification Text:</i>	All radios will decode an All call (common ID = 255) irrespective of the common ID selected by the user. {{However, radios that have 255 selected as the common ID will only respond to calls addressed to a common ID of 255}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0858_02 (Interoperability), TP_PMR_0858_01 (Interoperability), TP_PMR_0858_01 (Conformance), TP_PMR_0858_02 (Conformance)	

RQ_001_1317	All Call																												
TS 102 490 [1]	Clause: A.2.3.3 §1	Type: Conditionally Mandatory																											
<i>Applies to:</i>	CSF																												
<i>Requirement:</i>	For a CSF radio complying with the Standard User Interface the All Call dialled strings shall be dialled and encoded as follows:																												
	<p>The All Call dialled string "n*****" (All Call within a prefix)</p> <table border="0"> <thead> <tr> <th>User dialled string</th> <th>Air Interface ID</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>"0*****"</td> <td>18 CC 3E</td> <td>All Talkgroup ID0</td> </tr> <tr> <td>"1*****"</td> <td>2F 23 62</td> <td>All Talkgroup ID1</td> </tr> <tr> <td>etc.</td> <td>etc.</td> <td>etc.</td> </tr> <tr> <td>"9*****"</td> <td>E1 DC 82</td> <td>All Talkgroup ID9</td> </tr> </tbody> </table> <p>The All Call dialled string: "*****" is mapped to the All Talkgroup ID15 and addresses all MSs irrespective of their prefix.</p> <table border="0"> <thead> <tr> <th>User dialled string</th> <th>Air Interface ID</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>"*****"</td> <td>F8 33 A6</td> <td>All Talkgroup ID15</td> </tr> </tbody> </table>		User dialled string	Air Interface ID	Remark	"0*****"	18 CC 3E	All Talkgroup ID0	"1*****"	2F 23 62	All Talkgroup ID1	etc.	etc.	etc.	"9*****"	E1 DC 82	All Talkgroup ID9	User dialled string	Air Interface ID	Remark	"*****"	F8 33 A6	All Talkgroup ID15						
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User dialled string	Air Interface ID	Remark																											
"*****"	F8 33 A6	All Talkgroup ID15																											
<i>Specification Text:</i>	<p>{{The All Call dialled string "n*****" (All Call within a prefix) is mapped as shown in table A.3.</p> <p>Table A.2.3.3.1: Mapping of prefixed All Call to the AI</p> <table border="0"> <thead> <tr> <th>User dialled string</th> <th>Air Interface ID</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>"0*****"</td> <td>18 CC 3E</td> <td>All Talkgroup ID0</td> </tr> <tr> <td>"1*****"</td> <td>2F 23 62</td> <td>All Talkgroup ID1</td> </tr> <tr> <td>etc.</td> <td>etc.</td> <td>etc.</td> </tr> <tr> <td>"9*****"</td> <td>E1 DC 82</td> <td>All Talkgroup ID9</td> </tr> </tbody> </table> <p>The All Call dialled string: "*****" is mapped to the All Talkgroup ID15 and addresses all MSs irrespective of their prefix.</p> <p>Table A.2.3.3.2: Mapping of all prefix call to the AI</p> <table border="0"> <thead> <tr> <th>User dialled string</th> <th>Air Interface ID</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>"*****"</td> <td>F8 33 A6</td> <td>All Talkgroup ID15}} </td> </tr> <tr> <td><i>Family:</i></td> <td colspan="2">RQ_001_1317, RQ_001_1410, RQ_001_1411</td> </tr> <tr> <td><i>Test Purposes:</i></td> <td colspan="2">TP_PMR_1317_01 (Conformance), TP_PMR_1317_02 (Conformance), TP_PMR_1317_03 (Conformance), TP_PMR_1317_04 (Conformance)</td> </tr> </tbody></table>		User dialled string	Air Interface ID	Remark	"0*****"	18 CC 3E	All Talkgroup ID0	"1*****"	2F 23 62	All Talkgroup ID1	etc.	etc.	etc.	"9*****"	E1 DC 82	All Talkgroup ID9	User dialled string	Air Interface ID	Remark	"*****"	F8 33 A6	All Talkgroup ID15}}	<i>Family:</i>	RQ_001_1317 , RQ_001_1410, RQ_001_1411		<i>Test Purposes:</i>	TP_PMR_1317_01 (Conformance), TP_PMR_1317_02 (Conformance), TP_PMR_1317_03 (Conformance), TP_PMR_1317_04 (Conformance)	
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4.1.2 Channel Access

RQ_001_1001	Channel Access	
TS 102 490 [1]	Clause: 10.1 §2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A caller radio shall listen before transmit. When the received signal level has not exceeded -105 dBm for the duration of the T_ch_chk timer then the radio shall assume the channel to be free.	
<i>Specification Text:</i>	<p>When determining whether activity is present on a channel, the radio shall monitor the RSSI level. {{If after a maximum period of time (T_ch_chk) the RSSI level has not exceeded a configurable (within a predefined range) threshold RSSI_LO, then the radio shall assume that activity is not present on the channel.}}</p> <p>RSSI_LO shall be set to -105 dBm ± 3 dB.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_1002	Channel Access	
TS 102 490 [1]	Clause: 10.1 §5	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>A radio shall listen before transmitting.</p> <p>IF the received signal level is equal or above -105 dBm AND the radio can synchronize on the channel. THEN the radio shall assume that there is dPMR activity on the channel.</p>	
<i>Specification Text:</i>	<p>If however the RSSI level does exceed this threshold, then the radio shall assume that activity is present on the channel and it shall attempt to become frame synchronized to the activity.</p> <p>{{If the radio is successful in becoming frame synchronized to the activity, then the radio shall assume that 6,25 kHz FDMA activity is present on the channel. }}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1003	Channel Access	
TS 102 490 [1]	Clause: 10.1 §5	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>A radio shall listen before transmitting.</p> <p>IF the received signal level is above -105 dBm AND the radio can not synchronize to the channel for the duration of the T_ch_free timer THEN it shall assume the activity is not dPMR.</p>	
<i>Specification Text:</i>	<p>If however the RSSI level does exceed this threshold, then the radio shall assume that activity is present on the channel and it shall attempt to become frame synchronized to the activity.</p> <p>{{If however after a maximum period of time (T_ch_free), the radio has not become frame synchronized to the activity, then the radio shall assume that the activity is non-6,25 kHz FDMA activity.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1004	Channel Access	
TS 102 490 [1]	Clause: 10.1 §5	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>A radio shall listen before transmitting. When the received signal level is above -105 dBm and the radio manages to synchronize to the channel but the color code is incorrect then it shall assume the activity is interference.</p>	
<i>Specification Text:</i>	<p>If the radio is successful in becoming frame synchronized to the activity, then the radio shall assume that 6,25 kHz FDMA activity is present on the channel.</p> <p>{{If the Colour Code is different then the radio shall assume that the activity is interference.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1004_01 (Conformance)	

RQ_001_1005	Channel Access	
TS 102 490 [1]	Clause: 10.2.2 §1	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF a transmitting radio announces a non zero Tx WAIT time then other radios shall not commence any PTT activated transmissions during this Tx WAIT period.	
<i>Specification Text:</i>	{{When a transmitting radio announces a non zero Tx WAIT time then PTT activated transmissions shall not be permitted to start during this Tx WAIT time irrespective of any polite or impolite criteria employed.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1005_01 (Conformance)	
RQ_001_1006	Channel Access	
TS 102 490 [1]	Clause: 10.3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A transmission shall be automatically terminated if it exceeds 180 seconds. The transmission may only be resumed by rekeying the transmitter.	
<i>Specification Text:</i>	dPMR HSs shall have a transmit TimeOut timer which limits the time of a single transmission item. This timer shall be set to the value of 180 seconds whenever the PTT key is pressed and counts down to zero. {{If the transmit TimeOut timer expires, then all HSs will stop transmitting immediately and may not re-transmit until PTT has been released and pressed again.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1006_01 (Interoperability), TP_PMR_1006_02 (Interoperability), TP_PMR_1006_03 (Interoperability), TP_PMR_1006_04 (Interoperability)	
RQ_001_1007	Channel Access	
TS 102 490 [1]	Clause: 10.4.1 §1	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	When an acknowledgement is required in response to a received call the callee may transmit this acknowledgement irrespective of whether the RF channel is busy during a defined period after the call has been received.	
<i>Specification Text:</i>	{{Where a radio has been solicited to transmit a response, it may transmit the response within response time [T_ack] irrespective of whether the channel is "Idle" or "Busy". }}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1007_01 (Conformance), TP_PMR_1007_02 (Conformance), TP_PMR_1007_03 (Conformance)	
RQ_001_1008	Channel Access	
TS 102 490 [1]	Clause: 10.4.2, 10.4.3 §1	Type: Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	When a radio is involved in a voice call it may transmit even if another party to the same call is transmitting on the RF channel.	
<i>Specification Text:</i>	Additionally, {{while a radio is partied to a voice call, it may transmit irrespective of whether the channel is "Idle" or "Busy" with 6,25 kHz FDMA activity pertaining to the same voice call}} but may not transmit if a Tx WAIT time has been invoked.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1008_01 (Interoperability), TP_PMR_1008_02 (Interoperability), TP_PMR_1008_01 (Conformance)	

RQ_001_1009	Channel Access	
TS 102 490 [1]	Clause: 10.4.2 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF	
<i>Requirement:</i>	<p>IF a ISF radio has polite to own Colour Code enabled</p> <p>THEN the radio shall not transmit when the RF channel is occupied by a transmission using the same Colour Code.</p>	
<i>Specification Text:</i>	<p>{{Polite to own Colour Code: The radio shall refrain from transmitting on a channel while the channel is "Busy" with other 6,25 kHz FDMA activity from radios using the same Colour Code.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1009_01 (Interoperability), TP_PMR_1009_01 (Conformance)	
RQ_001_1010	Channel Access	
TS 102 490 [1]	Clause: 10.4.2 §3	Type: Conditionally Optional
<i>Applies to:</i>	ISF	
<i>Requirement:</i>	<p>IF an ISF radio has impolite channel access enabled</p> <p>THEN it may transmit if the RF channel is occupied by any other signal.</p>	
<i>Specification Text:</i>	<p>{{Impolite: The radio shall transmit on a channel regardless of any other activity (either 6,25 kHz FDMA or otherwise) already present on the channel.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1010_01 (Interoperability), TP_PMR_1010_01 (Conformance)	
RQ_001_1011	Channel Access	
TS 102 490 [1]	Clause: 10.4.3 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio has polite to own Group or Talkgroup enabled</p> <p>THEN the radio shall not transmit while the RF channel is occupied by transmissions by members of its own group or talkgroup.</p>	
<i>Specification Text:</i>	<p>Polite to own Group or Talkgroup: {{The radio shall refrain from transmitting on a channel while the channel is "Busy" with other 6,25 kHz FDMA activity from radios within its own group or talkgroup. }}For all other types of activity already present on the channel, the radio shall transmit regardless.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1011_01 (Interoperability), TP_PMR_1011_01 (Conformance)	

RQ_001_1012	Channel Access	
TS 102 490 [1]	Clause: 10.5, 10.6.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>Certain received calls require acknowledgement responses. When these acknowledgements are lost because of interference etc they may be repeated.</p> <p>IF these acknowledgements are repeated THEN they shall be limited to a maximum number of 4 times with 300-500 ms time intervals between each repeat.</p>	
<i>Specification Text:</i>	<p>Certain transmissions solicit responses and where these responses are not received (e.g. due to collisions, interference etc.) the transmitting entity may repeat the original transmission a number of times either until the response is received or the transmitting entity gives up. The waiting times for re-transmission and the maximum number of retries are defined in clause 10.6.2.</p> <p>{{Automatic repeats are permitted for acknowledgement (and nack) signalling. A maximum of four such transmissions are permitted. The time between any such repeated signalling shall be in the range 300 ms to 500 ms.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1012_01 (Interoperability), TP_PMR_1012_01 (Conformance), TP_PMR_1012_02 (Conformance), TP_PMR_1012_03 (Conformance)	
RQ_001_1013	Channel Access	
TS 102 490 [1]	Clause: 10.4.3 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio has Polite to own Colour Code enabled THEN the radio shall not transmit while the RF channel is occupied by transmissions using the same Colour Code.</p>	
<i>Specification Text:</i>	<p>Polite to own Colour Code: {{The radio shall refrain from transmitting on a channel while the channel is "Busy" with other 6,25 kHz FDMA activity from radios using the same Colour Code. }}For all other types of activity already present on the channel, the radio shall transmit regardless.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1013_01 (Interoperability)	
RQ_001_1014	Channel Access	
TS 102 490 [1]	Clause: 10.4.3 §4	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio has impolite channel access enabled THEN it may transmit if the RF channel is occupied by any other signal.</p>	
<i>Specification Text:</i>	<p>{{Impolite: The radio shall transmit on a channel regardless of any other activity (either 6,25 kHz FDMA or otherwise) already present on the channel}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1014_01 (Interoperability)	
RQ_001_1017	Channel Access	
TS 102 490 [1]	Clause: 10.6.1	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Before transmitting, radios shall observe certain minimum times in assessing whether an RF channel is busy (T_ch_chk : 100 ms) .</p>	
<i>Specification Text:</i>	<p>{{T_ch_chk: Channel check timer: 100 ms.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_1020	Channel Access	
TS 102 490 [1]	Clause: 10.1 §5	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Before transmitting, radios shall observe certain minimum times for trying to synchronize to any activity found on the channel (T_ch_free : 200 ms).	
<i>Specification Text:</i>	{{T_ch_free: Unsynchronizable activity timer: 200 ms.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1021	Channel Access	
TS 102 490 [1]	Clause: 10.4.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	Where a radio has been solicited to transmit a response, it may transmit the response within the T_ack response time irrespective of whether the channel is "Idle" or "Busy".	
<i>Specification Text:</i>	{{Where a radio has been solicited to transmit a response, it may transmit the response within response time [T_ack] irrespective of whether the channel is "Idle" or "Busy".}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1022	Channel Access	
TS 102 490 [1]	Clause: 10.6.1 §3	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	Where a radio has been solicited to transmit a response it may always disregard any polite channel access enabled for the duration of the T_ack timer of 3 seconds.	
<i>Specification Text:</i>	{{T_ack: Acknowledgement timer : 3 s}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

4.1.3 Framing

RQ_001_0401	Framing	
TS 102 490 [1]	Clause: 4.2.2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	All transmissions are made up from 80 ms (384 bits) frames.	
	Normal frames (not packet data) are the concatenation of: 24 bits of either FrameSync or ColourCode 72 bits of Control Channel data Followed by 4 blocks of 72 bits of payload.	
<i>Specification Text:</i>	<pre> {{The FDMA transmission is made up of 80 ms payload frames, each comprising 384 bits. Payload frame: a b c d e f a: 24 bits FrameSync2 (FS2) or ColourCode (CC) bits b: 72 bits Control Channel (CCH) data c: 72 bits Traffic channel (TCH) d: 72 bits TCH e: 72 bits TCH f: 72 bits TCH }} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0401_01 (Conformance), TP_PMR_0401_02 (Conformance), TP_PMR_0401_03 (Conformance)	
RQ_001_0402	Framing	
TS 102 490 [1]	Clause: 4.2.3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	All normal (non packet data) transmissions are made up from an integral number of superframes.	
<i>Specification Text:</i>	These transmissions are always started with a Header frame containing a preamble (for bit synchronization) and a frame synch (for frame synchronization). The Header is followed by a series of Superframes that contain both the payload (voice or data) and the information about the call such that receiving stations can implement late entry. {{A call always consists of an integral number of superframes}} and is terminated by an End frame.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0403	Framing	
TS 102 490 [1]	Clause: 4.2.2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each superframe is the concatenation of four 80 ms frames.	
<i>Specification Text:</i>	<pre> {{Four 80 ms frames are concatenated to form a superframe of 320 ms.}} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0403_01 (Conformance), TP_PMR_0403_03 (Conformance), TP_PMR_0403_02 (Conformance)	

RQ_001_0404	Framing	
TS 102 490 [1]	Clause: 4.2.3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Normal calls with voice or data continuous transmission generated by the radio will start with a Header frame, an integral number of superframes and then terminated by an End frame.	
<i>Specification Text:</i>	<pre> {{Voice or data payload continuous transmission: These transmissions are always started with a Header frame containing a preamble (for bit synchronization) and a frame synch (for frame synchronization). The Header is followed by a series of Superframes that contain both the payload (voice or data) and the information about the call such that receiving stations can implement late entry. A call always consists of an integral number of superframes and is terminated by an End frame.}} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0404_01 (Conformance), TP_PMR_0404_02 (Conformance), TP_PMR_0404_03 (Conformance)	
RQ_001_0405	Framing	
TS 102 490 [1]	Clause: 4.2.3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Calls generated by the radio for the purposes of call set-up or service request etc will be that of a concatenated Header frame and an End frame.	
<i>Specification Text:</i>	<pre> {{Call set up, service request, etc: These transmissions are simply a concatenation of a Header frame and an End frame. Their purpose is to inform the receiving station of the call, type of call or information required. }} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0405_01 (Conformance), TP_PMR_0405_02 (Conformance)	
RQ_001_0406	Framing	
TS 102 490 [1]	Clause: 4.2.3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	Calls generated by the radio for the purposes of acknowledgements will be simply a Header frame.	
<i>Specification Text:</i>	<pre> {{Acknowledgement: Acknowledgements are a type of Header that contains information such as confirmation of received data, errors in received data etc. Only applicable to CSF radios. }} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0406_01 (Conformance), TP_PMR_0406_02 (Conformance), TP_PMR_0406_03 (Conformance), TP_PMR_0406_04 (Conformance)	

- RQ_001_0407 Framing**
 TS 102 490 [1] *Clause:* 4.2.3 *Type:* Conditionally Mandatory
Applies to: ISF, CSF
Requirement: IF the radio supports disconnection request
 THEN calls generated by the radio for the purposes of confirming the end of the series of exchanges of a call shall be the concatenation of a Header frame and End frame repeated once.
Specification Text: {{Disconnection:
 Sending stations can signal that all exchanges of a call have been completed by transmitting a disconnection request. This is a Header + End frame pair that is repeated.
 }}
Family: No Duplicates
Test Purposes: TP_PMR_0407_01 (Conformance), TP_PMR_0407_02 (Conformance), TP_PMR_0407_03 (Conformance), TP_PMR_0407_04 (Conformance)
- RQ_001_0408 Framing**
 TS 102 490 [1] *Clause:* 4.2.3 *Type:* Conditionally Mandatory
Applies to: CSF
Requirement: Calls generated by the radio for the purposes of status request responses will be a Header frame and End frame.
Specification Text: {{Status request acknowledgements:
 As the status information is contained within the End frame then the response of a receiving station to a status request call will be a Header + End frame pair. Only applicable to CSF radios.}}
Family: No Duplicates
Test Purposes: TP_PMR_0408_01 (Conformance)
- RQ_001_0811 Framing**
 TS 102 490 [1] *Clause:* 8.2.3 §1 *Type:* Mandatory
Applies to: CSF
Requirement: A CSF radio shall use only Group B Colour Codes as defined in the table

Group	Channel	Frequency	Colour Code (Bit)	Colour Code (Hex)
B	446,103125	111101110101011101010111	F75757	
	446,109375	111101110111110101010111	F77D57	
	446,115625	111101111101010101010101	F7D555	
	446,121875	111101111111111101010101	F7FF55	
	446,128125	111101010101111101011101	F55F5D	
	446,134375	111101010111010101011101	F5755D	
	446,140625	111101011101110101011111	F5DD5F	
	446,146875	111101011111011101011111	F5F75F	
	446,153125	111111110101110101111111	FF5D7F	
	446,159375	111111110111011101111111	FF777F	
	446,165625	1111111110111101111101	FFDF7D	
	446,171875	1111111111010101111101	FFF57D	
	446,178125	111111010101010101110101	FD5575	
	446,184375	111111010111111101110101	FD7F75	
	446,190625	111111011101011101110111	FDD777	
	446,196875	111111011111110101110111	FDFD77	

Specification Text: {{Radios shall use only the Group B CC}}.
Family: No Duplicates
Test Purposes: TP_PMR_0811_01 (Conformance), TP_PMR_0811_02 (Conformance), TP_PMR_0811_03 (Conformance), TP_PMR_0811_04 (Conformance), TP_PMR_0811_05 (Conformance), TP_PMR_0811_06 (Conformance), TP_PMR_0811_07 (Conformance), TP_PMR_0811_08 (Conformance), TP_PMR_0811_09 (Conformance), TP_PMR_0811_10 (Conformance), TP_PMR_0811_12 (Conformance), TP_PMR_0811_13 (Conformance), TP_PMR_0811_14 (Conformance), TP_PMR_0811_15 (Conformance), TP_PMR_0811_16 (Conformance), TP_PMR_0811_11 (Conformance)

RQ_001_0812**Framing**

TS 102 490 [1]

Clause: 8.1.2 §1

Type: Mandatory

Applies to:

ISF

Requirement:

A ISF radio shall use only the Group A Colour Codes as defined in the table:

Group	Channel	Frequency	Colour Code (Bit)	Colour Code (Hex)
A	446,103125		010101110111010101110111	577577
	446,109375		010101111101110101110101	57DD75
	446,115625		010101111111011101110101	57F775
	446,121875		01010101010101011101111101	55577D
	446,128125		010101010111110101111101	557D7D
	446,134375		010101011101010101111111	55D57F
	446,140625		010101011111111101111111	55FF7F
	446,146875		010111110101010101011111	5F555F
	446,153125		010111110111111101011111	5F7F5F
	446,159375		010111111101011101011101	5FD75D
	446,165625		010111111111110101011101	5FFD5D
	446,171875		010111010101110101010101	5D5D55
	446,178125		010111010111011101010101	5D7755
	446,184375		010111011101111101010111	5DDF57
	446,190625		010111011111010101010111	5DF557
	446,196875		011101110101110111010111	775DD7

Specification Text: {{Radios shall use only the Group A CC}}.

Family:

No Duplicates

Test Purposes:

TP_PMR_0812_02 (Conformance), TP_PMR_0812_03 (Conformance), TP_PMR_0812_04 (Conformance), TP_PMR_0812_05 (Conformance), TP_PMR_0812_06 (Conformance), TP_PMR_0812_07 (Conformance), TP_PMR_0812_08 (Conformance), TP_PMR_0812_09 (Conformance), TP_PMR_0812_10 (Conformance), TP_PMR_0812_11 (Conformance), TP_PMR_0812_12 (Conformance), TP_PMR_0812_13 (Conformance), TP_PMR_0812_14 (Conformance), TP_PMR_0812_15 (Conformance), TP_PMR_0812_16 (Conformance), TP_PMR_0812_01 (Conformance)

4.1.3.1 End Frame

RQ_001_0984**End frame**

TS 102 490 [1]

Clause: 9.6 §9

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

Each End frame shall start with a Frame synchronization sequence 3, 24 bits long.

Frame synchronization sequence 3 is made by following 3 bytes: 7D DF F5 (all in HEX).

Specification Text: {{Finally the 24 bit FS3 synchronization sequence is prefixed to these end data bits.}}

{{Clause 6.1.3 FS3}}

The Frame sync 3 sequence contained in the End frame is a 24 bit sequence that shall have the following value:

Binary: 011111011101111111110101.

Hex: 7D DF F5.

Family:

No Duplicates

Test Purposes:

None

RQ_001_0985	End frame	
TS 102 490 [1]	Clause: 9.6 §2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each End frame shall have a two bits long End Type (ET) field using the values : 00 Normal end frame 01 End frame with status message 10 Reserved 11 Reserved	
<i>Specification Text:</i>	<pre> {{The end data starts with the End Type (ET) which is either 00 (normal end frame) or 01 (end frame with status message).}} {{Clause 5.12 End type}} Frame used END Frame. Data length 2 bits. Definition: {{Table 5.12}}: End type </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0986	End frame	
TS 102 490 [1]	Clause: 9.6 §3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each End frame shall have a two bits long acknowledgement request (ARQ) field using the values : 00 No ACK request to called station 01 ACK request to called station 10 Reserved 11 Reserved	
<i>Specification Text:</i>	<pre> {{The next 2 bit are the acknowledgement request (ARQ). }}00 signifies that no acknowledgement is requested and 01 requires an acknowledgement. {{Clause 5.13 ARQ}} Frame used END Frame. Data length 2 bits. Definition: Table 5.13: ARQ </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0987	End frame	
TS 102 490 [1]	Clause: 9.6 §4	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each End frame shall have a four bits long Tx wait time (WAIT) field using the values: 0000 No specified time 0001 40 ms (half a frame) 0010 80 ms (one frame) 0011 160 ms (two frames) 0100 320 ms (one superframe) Other Reserved	
<i>Specification Text:</i>	<pre> {{The next 4 bits define any Tx wait time (WAIT) }} using the values given in clause 5.14. {{clause 5.14 Tx Wait}} Frame used END. Data length 4 bits. Definition: The Tx wait time will be implemented by the called station(s) such that other radios who have a break-in request pre-keyed by the user may transmit during the specified time. Table 5.14: Tx wait time </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0988	End frame	
TS 102 490 [1]	Clause: 9.6 §5	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each End frame shall have a five bits long status message field using the values 0 to 31. When End Type (ET) field value has been set to 00 (binary) these bits shall be considered as dummy data.	
<i>Specification Text:</i>	<pre> 5 bit of status message will then follow if ET has been set to 01 (or 5 bits of dummy data if ET = 00). {{Clause 5.15 Status}} Frame used END Frame. Data length 5 bits. Definition: 0 to 31 Status message </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0989	End frame	
TS 102 490 [1]	Clause: 9.6 §6	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each frame shall have a four bits long reserved field and shall always contain a 0.	
<i>Specification Text:</i>	<pre> {{Finally the 4 reserved bits are set to 0000.}} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0992	End frame																																																																																																																																	
TS 102 490 [1]	Clause: 9.6 §7, 8	Type: Mandatory																																																																																																																																
<i>Applies to:</i>	ISF, CSF																																																																																																																																	
<i>Requirement:</i>	In each End frame the End Information (EI1) field shall be used to calculate a 7 bit checksum, generated by the $X^7 + X^3 + 1$ polynomial. The checksum shall be appended, giving a 24 bits field referred as END1 DATA)																																																																																																																																	
<i>Specification Text:</i>	<p>{{The 7 bit CRC checksum is added using the polynomial given in clause 7.2 giving a total of 24 bits.}}</p> <p>See figure 10.</p>																																																																																																																																	
<i>Family:</i>	No Duplicates																																																																																																																																	
<i>Test Purposes:</i>	None																																																																																																																																	
RQ_001_0993	End frame																																																																																																																																	
TS 102 490 [1]	Clause: 9.6 §7, 8	Type: Mandatory																																																																																																																																
<i>Applies to:</i>	ISF, CSF																																																																																																																																	
<i>Requirement:</i>	<p>In each End frame the END1 DATA field shall be separated into 3 bytes. Each of these bytes shall be coded by shortened 12,8 Hamming code, as shown in clause 7.3</p> <p>X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is parity bit (4 bit).</p>																																																																																																																																	
	<p>The Generator matrix is as follows:</p> <table border="0"> <tr> <td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td> </tr> <tr> <td>X7</td><td>X6</td><td>X5</td><td>X4</td><td>X3</td><td>X2</td><td>X1</td><td>1</td><td>C3</td><td>C2</td><td>C1</td><td>C0</td> </tr> <tr> <td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td> </tr> <tr> <td>2</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td> </tr> <tr> <td>3</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>0</td> </tr> <tr> <td>4</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td> </tr> <tr> <td>5</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td> </tr> <tr> <td>6</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td> </tr> <tr> <td>7</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td> </tr> <tr> <td>8</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>1</td><td>1</td> </tr> </table>		12	11	10	9	8	7	6	5	4	3	2	1	X7	X6	X5	X4	X3	X2	X1	1	C3	C2	C1	C0	1	1	0	0	0	0	0	0	0	1	1	1	0	2	0	1	0	0	0	0	0	0	0	1	1	1	3	0	0	1	0	0	0	0	0	1	0	1	0	4	0	0	0	1	0	0	0	0	0	1	0	1	5	0	0	0	0	1	0	0	0	1	0	1	1	6	0	0	0	0	0	1	0	0	1	1	0	0	7	0	0	0	0	0	0	1	0	0	1	1	0	8	0	0	0	0	0	0	0	1	0	0	1	1
12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																							
X7	X6	X5	X4	X3	X2	X1	1	C3	C2	C1	C0																																																																																																																							
1	1	0	0	0	0	0	0	0	1	1	1	0																																																																																																																						
2	0	1	0	0	0	0	0	0	0	1	1	1																																																																																																																						
3	0	0	1	0	0	0	0	0	1	0	1	0																																																																																																																						
4	0	0	0	1	0	0	0	0	0	1	0	1																																																																																																																						
5	0	0	0	0	1	0	0	0	1	0	1	1																																																																																																																						
6	0	0	0	0	0	1	0	0	1	1	0	0																																																																																																																						
7	0	0	0	0	0	0	1	0	0	1	1	0																																																																																																																						
8	0	0	0	0	0	0	0	1	0	0	1	1																																																																																																																						
	<p>The Shortened Hamming code (12,8) Polynomial is $X^4 + X + 1$. This gives the Shortened Hamming END1 DATA.</p>																																																																																																																																	
<i>Specification Text:</i>	<p>These 24 bits are now separated into 3 bytes. {{Each byte is now coded by a shortened 12,8 Hamming Code (clause 7.3) giving 3 x 12 bit blocks.}} These 36 bits are now repeated and the total 72 bits are scrambled using the polynomial given in clause 7.5.</p> <p>Clause 7.3 Hamming code A shortened Hamming code (12,8) is employed and the generator matrix is shown below: X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is Parity bit (4 bit). Table 7.3: Generator matrix</p> <p>Shortened Hamming code (12,8) Polynomial: $X^4 + X + 1$.</p> <p>See Figure 10.</p>																																																																																																																																	
<i>Family:</i>	No Duplicates																																																																																																																																	
<i>Test Purposes:</i>	None																																																																																																																																	

RQ_001_0994	End frame	
TS 102 490 [1]	Clause: 9.6 §8	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	In each End frame the Shortened Hamming END0 DATA and Shortened Hamming END1 DATA shall each be scrambled using the polynomial $X^9 + X^5 + 1$ re-initialised with the value of all "1"s for each block.	
<i>Specification Text:</i>	These 24 bits are now separated into 3 bytes. Each byte is now coded by a shortened 12,8 Hamming Code (clause 7.3) giving 3 x 12 bit blocks. {{These 36 bits are now repeated and each block of 36 bits is scrambled using the polynomial given in clause 7.4.}}	
	Clause 7.4 Scrambling The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s.	
	See Figure 10.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0994_01 (Conformance)	

4.1.3.2 Header Frames

RQ_001_0816	Header frames	
TS 102 490 [1]	Clause: 8.3.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	If the transmission is a type 3 data THEN A CSF radio shall use frame sync 4 (FS4) in the header.	
<i>Specification Text:</i>	{{Packet data uses a different format to the normal communications frame format. The use of frame sync 4 (FS4) indicates that the frames following will be in PDF format}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0816_01 (Conformance)	
RQ_001_0959	Header frames	
TS 102 490 [1]	Clause: 9.5 §14	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header frame shall start with a preamble field, at least 72 bits long, composed by a repetition of a byte containing the value 5F (HEX). If more than 72 bits are sent then the same 5F (HEX) data shall be used.	
<i>Specification Text:</i>	{{The header is completed by prefixing with the 48 bit FS1 synchronization sequence (see note 2) and then prefixing the synchronization sequence with a minimum of 72 bits of preamble}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0960	Header frames	
TS 102 490 [1]	Clause: 9.5 §14	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>If the Header frame is not a Packet data header THEN the Frame synchronization sequence field shall be made by following 6 bytes: 57 FF 5F 75 D5 77 (all in HEX). This is referred as Frame synchronization sequence 1.</p>	
<i>Specification Text:</i>	<p>{{The header is completed by prefixing with the 48 bit FS1 synchronization sequence and then prefixing FS1 with a minimum of 72 bits of preamble}}</p> <p>{{Clause 6.1.1 FS1}}</p> <p>The Frame sync 1 sequence contained in the non packet data Header frame (Header 1) is a 48 bit sequence that shall have the following value: Binary: 0101011111111111010101111101110101110101110101010101110111. Hex: 57 FF 5F 75 D5 77.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0961	Header frames	
TS 102 490 [1]	Clause: 9.5 §14	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>If the Header frame is a Packet data header THEN the Frame synchronization sequence field shall be made by following 6 bytes: FD 55 F5 DF 7F DD (all in HEX). This is referred as Frame synchronization sequence 4.</p>	
<i>Specification Text:</i>	<p>NOTE 2: {{In the case where this is a Packet Data Header, the 48 bit FS4 synchronization sequence shall be used.}}</p> <p>Clause 6.1.4 FS4 The Frame sync 4 sequence contained in the Packet Data Header frame (Header 2) is a 48 bit sequence that shall have the following value: Binary: 1111110101010101011111010111010111110111111101111111011101. Hex: FD 55 F5 DF 7F DD.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0962	Header frames	
TS 102 490 [1]	Clause: 9.5 §2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall be identified by the Header Type (HT) field. This shall have a length of four bits and it's value shall be as follows:	
	<pre> 0000 Communication start Header (a superframe follows) 0001 Connection request Header (an END frame follows) 0010 Unconnect request Header (an END frame follows) 0011 ACK (this a single frame, ACK or NACK is differentiated by the CI bits setting) 0100 System request Header (an END frame follows) 0101 ACK Header reply to a system request (a superframe follows) 0110 System delivery Header (a superframe follows) 0111 Status response Header 1000 Status request Header Other Reserved </pre>	
<i>Specification Text:</i>	<pre> {{First there are 4 bits allocated to Header Type (HT) which is selected according to clause 5.11.}} {{Clause 5.11 Header type}} Frame used Header Frame/Packet Data Header Frame. Data length 4 bits. Table 5.11: Header type </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0963	Header frames	
TS 102 490 [1]	Clause: 9.5 §3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall have a 24 bit long field containing the called station ID.	
<i>Specification Text:</i>	<pre> {{HT is followed by the 24 bits of the called station ID.}} To this the 24 bits of the own ID is added. </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0964	Header frames	
TS 102 490 [1]	Clause: 9.5 §3	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall have a 24 bit long field containing the own ID.	
<i>Specification Text:</i>	<pre> HT is followed by the 24 bits of the called station ID. {{To this the 24 bits of the own ID is added.}} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0965	Header frames	
TS 102 490 [1]	Clause: 9.5 §4	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall state the type of the call through a three bits long communications mode field, as follows: 000 Voice communication (no user data in SLD field) 001 Voice + slow data (user data in SLD field) 010 Data communication type 1 (Payload is user data without FEC) 011 Data communication type 2 (Payload is user data with FEC) 100 Data communication type 3 (Packet data, ARQ method) 101 Voice and appended data (Type 2) Other Reserved	
<i>Specification Text:</i>	{{The communications mode value is added according to the table in clause 5.7.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0966	Header frames	
TS 102 490 [1]	Clause: 9.5 §5	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall have a four bits long Communication format field (F). This shall be as follows: Values shall be as follows: 0000 Call ALL 0001 Peer-to-peer communication Other Reserved	
<i>Specification Text:</i>	{{The communications format bits are now added according to clause 5.8. Generally these will be set to 0001(peer-to-peer call). Occasionally they may be set to 0000 (all call) but this is a special case, similar to a broadcast.}}	
	{{Table 5.8}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0967	Header frames	
TS 102 490 [1]	Clause: 9.5 §6	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each Header shall have a two bits long Reserved field (RES). The two bits shall be always set to 0.	
<i>Specification Text:</i>	{{The next 2 bits are set to 00 (reserved bits).}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0976	Header frames	
TS 102 490 [1]	Clause: 9.5 §11	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	The 12x10 bit blocks shall be interleaved using the following 12x10 interleaving matrix:	
	<pre> 1 2 3 4 5 6 7 8 9 10 1 1 13 25 37 49 61 73 85 97 109 2 2 14 26 38 50 62 74 86 98 110 3 3 15 27 39 51 63 75 87 99 111 4 4 16 28 40 52 64 76 88 100 112 5 5 17 29 41 53 65 77 89 101 113 6 6 18 30 42 54 66 78 90 102 114 7 7 19 31 43 55 67 79 91 103 115 8 8 20 32 44 56 68 80 92 104 116 9 9 21 33 45 57 69 81 93 105 117 10 10 22 34 46 58 70 82 94 106 118 11 11 23 35 47 59 71 83 95 107 119 12 12 24 36 48 60 72 84 96 108 120 </pre>	
	This gives the interleaved HI0 data.	
<i>Specification Text:</i>	<p>{{To protect against burst interference, these 10 x 12 bit blocks are now interleaved using the 12 x 10 HI interleaving matrix given in clause 7.5.}}</p> <p>{{7.5 Interleaving}}</p> <p>There are two interleaving matrices, one for the TCH and one for the HI field.</p> <p>{{Table 7.3}}: HI field Interleaving matrix NOTE: Applied in the Header HI0/HI1.</p> <p>See {{figure 10}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0977	Header frames	
TS 102 490 [1]	Clause: 9.5 §9, 10, 11, 12	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	The interleaved HI0 data shall be scrambled using the polynomial $X^9 + X^5 + 1$ with an initial preset value of all "1"s. This scrambled data shall be referred as HI0 data.	
<i>Specification Text:</i>	<p>{{Then the interleaved HI data is scrambled using the polynomial given in clause 7.4.}}</p> <p>{{Clause 7.4 Scrambling}}</p> <p>The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0980	Header frames	
TS 102 490 [1]	Clause: 9.5 §9, 10, 11, 12	Type: Mandatory
Applies to:	ISF, CSF	
Requirement:	The generated a 12x10 bit blocks, that shall be interleaved using the following 12x10 interleaving matrix:	
	<pre> 1 2 3 4 5 6 7 8 9 10 1 1 13 25 37 49 61 73 85 97 109 2 2 14 26 38 50 62 74 86 98 110 3 3 15 27 39 51 63 75 87 99 111 4 4 16 28 40 52 64 76 88 100 112 5 5 17 29 41 53 65 77 89 101 113 6 6 18 30 42 54 66 78 90 102 114 7 7 19 31 43 55 67 79 91 103 115 8 8 20 32 44 56 68 80 92 104 116 9 9 21 33 45 57 69 81 93 105 117 10 10 22 34 46 58 70 82 94 106 118 11 11 23 35 47 59 71 83 95 107 119 12 12 24 36 48 60 72 84 96 108 120 </pre>	
	This gives the interleaved HI1 data.	
Specification Text:	<p>{{To protect against burst interference, these 10 x 12 bit blocks are now interleaved using the 12 x 10 HI interleaving matrix given in clause 7.5.}}</p> <p>{{7.5 Interleaving}}</p> <p>There are two interleaving matrices, one for the TCH and one for the HI field.</p> <p>Table 7.3: HI field Interleaving matrix NOTE: Applied in the Header HI0/HI1.</p> <p>See figure 10.</p>	
Family:	No Duplicates	
Test Purposes:	None	
RQ_001_0981	Header frames	
TS 102 490 [1]	Clause: 9.5 §9, 10, 11, 12	Type: Mandatory
Applies to:	ISF, CSF	
Requirement:	<p>The interleaved HI1 data shall be scrambled using the polynomial $X^9 + X^5 + 1$ with an initial preset value of all "1"s.</p> <p>This scrambled data shall be referred as HI1 data.</p>	
Specification Text:	<p>{{Then the interleaved HI data is scrambled using the polynomial given in clause 7.4.}}</p> <p>{{Clause 7.4 Scrambling}}</p> <p>The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s.</p> <p>See figure 10.</p>	
Family:	No Duplicates	
Test Purposes:	None	

RQ_001_0982**Header frames**

TS 102 490 [1]

Clause: 9.5 §13

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

The Header shall have a Colour Code (CC) field appended after the HI0 data field.

The Colour Code depend on the operation frequency.

In case of a ISF Radio the CC is

Group	Channel Frequency	Colour Code (Bit)	Colour Code (Hex)
A	446,103125	010101110111010101110111	577577
	446,109375	010101111101110101110101	57DD75
	446,115625	010101111111011101110101	57F775
	446,121875	01010101010101011101111101	55577D
	446,128125	010101010111110101111101	557D7D
	446,134375	010101011101010101111111	55D57F
	446,140625	010101011111111011111111	55FF7F
	446,146875	010111110101010101011111	5F555F
	446,153125	010111110111111101011111	5F7F5F
	446,159375	010111111101011101011101	5FD75D
	446,165625	010111111111110101011101	5FFD5D
	446,171875	010111010101110101010101	5D5D55
	446,178125	010111010111011101010101	5D7755
	446,184375	010111011101111101010111	5DDF57
	446,190625	010111011111010101010111	5DF557
	446,196875	011101110101110111010111	775DD7

In Case of a CSF Radio the CC is

Group	Channel Frequency	Colour Code (Bit)	Colour Code (Hex)
B	446,103125	11110111010101011101010111	F75757
	446,109375	111101110111110101010111	F77D57
	446,115625	111101111101010101010101	F7D555
	446,121875	111101111111111101010101	F7FF55
	446,128125	11110101010101111101011101	F55F5D
	446,134375	111101010111010101011101	F5755D
	446,140625	111101011101110101011111	F5DD5F
	446,146875	111101011111011101011111	F5F75F
	446,153125	111111110101110101111111	FF5D7F
	446,159375	111111110111011101111111	FF777F
	446,165625	1111111111011111011111101	FFDF7D
	446,171875	111111111111010101111101	FFF57D
	446,178125	11111101010101010101110101	FD5575
	446,184375	111111010111111101110101	FD7F75
	446,190625	111111011101011101110111	FDD777
	446,196875	111111011111110101110111	FDFD77

Specification Text: {{The 24 bit Colour Code is appended to the HI data and then the HI data is repeated after the CC.}}

{{6.1.5 Colour code}}

The Colour Code is a 12 bit code that is di-bit encoded into a 24 bit sequence. Colour Code are attributed directly to the RF operating channel and are not freely selectable.

Radios employing Initial Services and Facilities shall use the Group A colour codes.

Radios employing Configured Services and Facilities shall use the Group B colour codes.

{{Table 6.1 Colour code by RF channel}}

Family:

No Duplicates

Test Purposes:

None

RQ_001_0983**Header frames**

TS 102 490 [1]

Clause: 9.5 §13

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

Each Header shall be made up of the concatenation of Preamble, Frame Sync, HI0 data, Colour Code data and HI1 data.

Specification Text:

{{The 24 bit Colour Code is appended to the HI data and then the HI data is repeated after the CC.}}See figure 10.

Family:

No Duplicates

Test Purposes:

None

4.1.3.2.1 Call Information Field

RQ_001_0968 Call information field

TS 102 490 [1]

Clause: 9.5 §7

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

Each Header shall contain the Call Information (CI) field, formed by 3 bits of data type and 8 bits of information fields.

The information contained in this field is depending on the Header type:

Call Information is used to give supplementary data about the call. It has different content and purpose depending on the call type:

Use	Purpose
Powersave	Indicate normal or extended header type
T1 or T2 Data	Indicate the type of data (supplementary service)
T3 Data (Packet)	Indicate data frame size and number of frames
Acknowledgements	Indicate ACK or NACK and reason
System request	CI Type defines the purpose
System response	CI Type defines the purpose
Delivery Header	CI Type defines the purpose

Specification Text: {{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
Powersave	Indicate normal or extended header type	5.10.1
T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2
T3 Data (Packet)	Indicate data frame size and number of frames	5.10.3
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4 }}

NOTE: In the case where this is a Packet Data header, the 48 bit FS4 synchronization sequence is used. Normally receiving stations determine the call type from the Header Information but techniques such as determination by FS type (as used by ETS 300 230 [i.1], MPT1327 and others) can be equally valid.

Family: No Duplicates

Test Purposes: None

RQ_001_0969 Call information field

TS 102 490 [1]

Clause: 9.5 §7

Type: Conditionally Mandatory

Applies to:

ISF, CSF

Requirement:

IF the content of call information type field is 111 (binary)

THEN this is an extended wake-up header

AND the CI information field contains the number of Headers that follow the current one. This value must be at maximum 0000 1111 (binary).

Specification Text: {{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
{{Powersave	Indicate normal or extended header type	5.10.1}}
T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2
T3 Data (Packet)	Indicate data frame size and number of frames	5.10.3
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4

Family: No Duplicates

Test Purposes: None

RQ_001_0970 **Call information field**

TS 102 490 [1]

Clause: 9.5 §7

Type: Conditionally Mandatory

Applies to:

ISF, CSF

Requirement:

IF Header type field is either 0000 or 0001 (binary) - Comm. start or Conn. request -

AND the Header is for a Data communication type 1 or 2 transmission THEN

- the 3 CI type field bits shall set to 001 (binary)
- first 4 bits of the information field shall be set as follows:
 - 0000 Status message
 - 0001 Precoded message
 - 0010 Free text message (radio generated data)
 - 0011 Short file transfer
 - 0100 User defined data 1
 - 0101 User defined data 2
 - 0110 User defined data 3
 - 0111 User defined data 4
 - Other Reserved
- last 4 bits of the information field shall be set to 0

Specification Text:

{{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
Powersave	Indicate normal or extended header type	5.10.1
{{T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2}}
T3 Data (Packet)	Indicate data frame size and number of frames	5.10.3
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4

Family:

No Duplicates

Test Purposes:

None

RQ_001_0971**Call information field**

TS 102 490 [1]

Clause: 9.5 §7

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF Header type field is either 0000 or 0001 (binary) - Comm. start or Conn. request -

AND the Header is for a Packet data communication type 3 transmission

THEN

- the 3 CI type field bits shall set to 011 (binary)

- first 4 bits of the information field shall be the Packet data frame size, set as follows:

pdS	Frame time (ms)	Data size bits
0	80	288
1	160	672
2	240	1 056
3	320	1 440
Other	Reserved	Reserved

- last 4 bits of the information field shall be the Packet data frame number, set as follows:

pdM	Number of Data frames
0	1 frame
1	2 frames
2	3 frames
3	4 frames
4	5 frames
5	6 frames
6	7 frames
7	8 frames
Other	Reserved

Specification Text: {{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
Powersave	Indicate normal or extended header type	5.10.1
T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2
{{T3 Data (Packet) Indicate data frame size and number of frames}}	5.10.3}}	5.10.3}}
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4

Family:

No Duplicates

Test Purposes:

None

RQ_001_0972 **Call information field**

TS 102 490 [1]

Clause: 9.5 §7

Type: Conditionally Mandatory

Applies to:

ISF, CSF

Requirement:

IF Header is a system transaction header -
THEN
 - the 3 data type field bits shall be set as follows:
 000
 001 Dynamic group request/answer/delivery
 010 Reserved
 011 Reserved
 100 ESN request/reply
 101 MFID request/reply
 110 Contact station address (via Interconnect, IP)
 111 Reserved
 - the 8 information bits shall all set to 0

Specification Text: {{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
Powersave	Indicate normal or extended header type	5.10.1
T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2
T3 Data (Packet)	Indicate data frame size and number of frames	5.10.3
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4

Family:

No Duplicates

Test Purposes:

None

RQ_001_0973 **Call information field**

TS 102 490 [1]

Clause: 9.5 §7

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF Header type field is 0101 (bin) - Acknowledgement -
THEN
 - the 3 CI type field bits shall be set as follows:
 000
 001 ACK (Rx OK)
 010 NACK (data error, resend request)
 011 NACK (request denied)
 Other Reserved
 - the 8 information bits shall be set as follows:
 0
 1 to 255 ACK / NACK status (rejection reason defined by user)

Specification Text: {{Finally there are the 11 bits of Call Information (CI) that are made up of 3 CI Type bits and 8 CI information bits as described in clauses 5.10.1 to 5.10.5 (see Table 9.1).}}

Table 9.1: Use of Call Information

Use	Purpose	Clause
Powersave	Indicate normal or extended header type	5.10.1
T1 or T2 Data	Indicate the type of data (supplementary service)	5.10.2
T3 Data (Packet)	Indicate data frame size and number of frames	5.10.3
Acknowledgements	Indicate ACK or NACK and reason	5.10.5
System request	CI Type defines the purpose	5.10.4
System response	CI Type defines the purpose	5.10.4
Delivery Header	CI Type defines the purpose	5.10.4

Family:

No Duplicates

Test Purposes:

None

4.1.3.3 Packet Data Frame

RQ_001_0948 Packet data frame

TS 102 490 [1]

Clause: 9.4 §2

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF the radio offers Packet data
THEN each packet data burst shall consist of up to 8 data frames.

Specification Text:

{{The packet burst can consist of up to 8 data frames.}}

Family:

No Duplicates

Test Purposes:

None

RQ_001_0949 Packet data frame

TS 102 490 [1]

Clause: 9.4 §10

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF the radio offers Packet data
THEN each Type 3 Packet data burst frame shall start with a 24 bits long field, containing the

Colour Code (CC) data which depend on the operation frequency:

B	446,103125	1111011101010111101010111	F75757
	446,109375	1111011101111101010101111	F77D57
	446,115625	11110111110101010101010101	F7D555
	446,121875	111101111111111110101010101	F7FF55
	446,128125	1111010101011111010111101	F55F5D
	446,134375	1111010101110101010111101	F5755D
	446,140625	1111010111011101010111111	F5DD5F
	446,146875	1111010111110111010111111	F5F75F
	446,153125	1111111101011101011111111	FF5D7F
	446,159375	1111111101110111011111111	FF777F
	446,165625	111111111011111011111101	FFDF7D
	446,171875	111111111110101011111101	FFF57D
	446,178125	111111010101010101110101	FD5575
	446,184375	111111010111111101110101	FD7F75
	446,190625	111111011101011101110111	FDD777
	446,196875	111111011111110101110111	FDFD77

Specification Text: The packet burst can consist of up to 8 data frames.

{{The frame is completed by prefixing the 24 bits of Colour Code.}}

{{6.1.5 Colour code}}

The Colour Code is a 12 bit code that is di-bit encoded into a 24 bit sequence. Colour Code are attributed directly to the RF operating channel and are not freely selectable.

Radios employing Initial Services and Facilities shall use the Group A colour codes.

Radios employing Configured Services and Facilities shall use the Group B colour codes.

Table 6.1: Colour code by RF channel

Family:

No Duplicates

Test Purposes:

None

RQ_001_0950	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN each frame is numbered in the three bits long data frame number (N) field. It's value shall be from 000 to 111 (binary).</p>	
<i>Specification Text:</i>	{{The current data frame number (N) is from 000 to 111.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0951	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN each frame shall have an 8 bits long field Data length (LEN), giving the number of data bytes contained in the current burst.</p>	
<i>Specification Text:</i>	<p>{{N is followed by 8 bits that give the total number of data bytes contained in the current burst.}}</p> <p>See {{table 8.5}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0952	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §4	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN the 14 bits long field (DUMMY) shall always set to 0.</p>	
<i>Specification Text:</i>	<p>{{This is followed by 14 dummy bits that are set to zero.}}</p> <p>See {{table 8.5}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0953	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §5	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN the 16 bits long field, CRC for DATA field (CRC-D) of the current frame shall be calculated with the polynomial $X^{16} + X^{12} + X^5 + 1$.</p>	
<i>Specification Text:</i>	<p>{{The next 16 bits are the CRC for the data field contained in this burst.}}</p> <p>See {{table 8.5}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0954	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §6	Type: Conditionally Mandatory
Applies to:	CSF	
Requirement:	<p>IF the radio offers Packet data</p> <p>THEN a 7 bit CRC checksum shall be calculated on the above 41 bits, using the $X^7 + X^3 + 1$ polynomial.</p> <p>The concatenation of above 48 bits shall be defined and referred as the parameter data (PAR)</p>	
Specification Text:	<p>{{The 7 bit CRC checksum is added to these 41 bits using the polynomial given in clause 7.2 giving a total of 48 bits.}}</p> <p>Clause 7.2 CRC addition Use CRC Polynomial Frame (CCH) CRC7 $X^7 + X^3 + 1$</p> <p>See also {{table 8.5 }}and {{figure 9.}}</p>	
Family:	No Duplicates	
Test Purposes:	None	

RQ_001_0955	Packet data frame																																																																																																																																													
TS 102 490 [1]	Clause: 9.4 §7	Type: Conditionally Mandatory																																																																																																																																												
Applies to:	CSF																																																																																																																																													
Requirement:	<p>IF the radio offers Packet data</p> <p>THEN each data burst frame the 48 bits referred as parameter data (PAR) shall be separated into 6 bytes. Each of these bytes shall be coded by shortened 12,8 Hamming code where</p> <p>X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is parity bit (4 bit).</p> <p>The generator matrix is:</p> <table border="0"> <tr> <td></td> <td>12</td> <td>11</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>1</td> <td></td> </tr> <tr> <td></td> <td>X7</td> <td>X6</td> <td>X5</td> <td>X4</td> <td>X3</td> <td>X2</td> <td>X1</td> <td>1</td> <td>C3</td> <td>C2</td> <td>C1</td> <td>C0</td> <td></td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>3</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>4</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td></td> </tr> <tr> <td>5</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>6</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>0</td> <td></td> </tr> <tr> <td>7</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td></td> </tr> <tr> <td>8</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td></td> </tr> </table> <p>The Shortened Hamming code (12,8) Polynomial is $X^4 + X + 1$. This will generate a 6x12 bit Packet data blocks</p>			12	11	10	9	8	7	6	5	4	3	2	1			X7	X6	X5	X4	X3	X2	X1	1	C3	C2	C1	C0		1	1	0	0	0	0	0	0	0	0	1	1	1	0	2	0	1	0	0	0	0	0	0	0	1	1	1		3	0	0	1	0	0	0	0	0	0	1	0	1	0	4	0	0	0	1	0	0	0	0	0	1	0	1		5	0	0	0	0	1	0	0	0	0	1	0	1	1	6	0	0	0	0	0	1	0	0	1	1	0	0		7	0	0	0	0	0	0	1	0	0	1	1	0		8	0	0	0	0	0	0	0	1	0	0	1	1	
	12	11	10	9	8	7	6	5	4	3	2	1																																																																																																																																		
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4	0	0	0	1	0	0	0	0	0	1	0	1																																																																																																																																		
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6	0	0	0	0	0	1	0	0	1	1	0	0																																																																																																																																		
7	0	0	0	0	0	0	1	0	0	1	1	0																																																																																																																																		
8	0	0	0	0	0	0	0	1	0	0	1	1																																																																																																																																		
Specification Text:	<p>{{These 48 data bits are now separated into 6 bytes. Each byte is now coded by a shortened 12,8 Hamming Code (clause 7.3) giving 6 x 12 bit blocks.}}</p> <p>{{Clause 7.3 Hamming code}}</p> <p>A shortened Hamming code (12,8) is employed and the generator matrix is shown below: X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is Parity bit (4 bit). {{Table 7.1}}: Generator matrix</p> <p>Shortened Hamming code (12,8) Polynomial: $X^4 + X + 1$. See also {{figure 9}}.</p>																																																																																																																																													
Family:	No Duplicates																																																																																																																																													
Test Purposes:	None																																																																																																																																													

RQ_001_0956	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §8	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN the 6x12 bit Packet data blocks shall be interleaved using the following 12x6 interleaving matrix:</p> <pre> 1 2 3 4 5 6 1 1 13 25 37 49 61 2 2 14 26 38 50 62 3 3 15 27 39 51 63 4 4 16 28 40 52 64 5 5 17 29 41 53 65 6 6 18 30 42 54 66 7 7 19 31 43 55 67 8 8 20 32 44 56 68 9 9 21 33 45 57 69 10 10 22 34 46 58 70 11 11 23 35 47 59 71 12 12 24 36 48 60 72 </pre> <p>This 72 generated bit shall be referred as the interleaved PAR DATA.</p>	
<i>Specification Text:</i>	<p>{{To protect against burst interference, these 6 x 12 bit blocks are now interleaved using the 12 x 6 TCH interleaving matrix given in clause 7.5.}}</p> <p>Clause 7.5 Interleaving There are two interleaving matrices, one for the TCH and one for the HI field. TCH interleave structure matrix: Table 7.2: TCH Interleaving matrix See{{ figure }}9.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0958	Packet data frame	
TS 102 490 [1]	Clause: 9.4 §9	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF the radio offers Packet data</p> <p>THEN the interleaved PAR DATA and the DATA frames are scrambled using the polynomial $X^9 + X^5 + 1$ with an initial preset value of all "1"s.</p>	
<i>Specification Text:</i>	<p>{{Next the associated data frames are appended to the interleaved PAR data and scrambled using the polynomial given in clause 7.4.}}</p> <p>{{Clause 7.4 Scrambling}}</p> <p>The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s. See {{figure 9}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

4.1.3.4 Superframe

RQ_001_0915	Superframe	
TS 102 490 [1]	Clause: 9.1 §2	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>The Frame Number (FN) field of each Superframe shall be two bits long. It's value shall be from 00 to 11 (binary).</p>	
<i>Specification Text:</i>	<p>{{Frame Numbering (FN) is from 00 to 11 (1 to 4)}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0916	Superframe	
TS 102 490 [1]	Clause: 9.1 §9	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Each frame of the Voice Superframe shall state the type of the call through the communications mode field (M). This shall have a length of three bits and it's value shall be as follows:</p> <p>Values shall be as follows:</p> <p>000 Voice communication (no user data in SLD field) 001 Voice + slow data (user data in SLD field) 101 Voice and appended data (Type 2) Other Reserved</p>	
<i>Specification Text:</i>	<p>{{The communications mode value is added according to the table in clause 5.7}}. For example, if slow data (SLD) is being included within the voice superframe then communications mode value is set to 001.</p> <p>Table 5.7.</p> <p>000 Voice communication (no user data in SLD field) 001 Voice + slow data (user data in SLD field) 010 Data communication type 1 (Payload is user data without FEC) 011 Data communication type 2 (Payload is user data with FEC) 100 Data communication type 3 (Packet data, ARQ method) 101 Voice and appended data (Type 2) Other Reserved</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0917	Superframe	
TS 102 490 [1]	Clause: 9.1 §10	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Each frame of a Superframe shall have a Communication format field (F).</p> <p>This field must be four bits long and must have a value from 0 to 1.</p> <p>Values shall be as follows:</p> <p>0000 Call ALL 0001 Peer-to-peer communication Other Reserved</p>	
<i>Specification Text:</i>	<p>{{The communications format bits are now added according to clause 5.8. Generally these will be set to 0001 (peer-to-peer call). 0}} occasionally they may be set to 0000 (all call) but this is a special case, similar to a broadcast.</p> <p>See also {{Table 5.8}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0918	Superframe	
TS 102 490 [1]	Clause: 9.1 §11	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>After the Communication format field in all Superframe there shall be the two bits long Reserved field (RES).</p> <p>The two bits shall be always set to 0.</p>	
<i>Specification Text:</i>	<p>{{The next 2 bits are set to 00 (reserved bits)}}:</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0919	Superframe	
TS 102 490 [1]	Clause: 9.1 §3, 4	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Each frame in a Superframe shall have a field containing called or own ID.</p> <p>This field shall be 12 bits long and the data it shall contain depends on the Frame Numbering field.</p> <ul style="list-style-type: none">• Frame Numbering 0 will include the upper 12 bits of the called station ID. (ID0)• Frame Numbering 1 will include the lower 12 bits of the called station ID. (ID1)• Frame Numbering 2 will include the upper 12 bits of the own ID. (ID2)• Frame Numbering 3 will include the lower 12 bits of the own ID. (ID3)	
<i>Specification Text:</i>	<p>{{FN is followed by 12 bits of the called station address or own ID}} as follows:</p> <p>The called station ID and own ID make a total of 48 bits. These bits are split into 12 bit blocks and one block is included in each of the 4 frames of the superframe.</p> <ul style="list-style-type: none">• FN 00 will include the upper 12 bits of the called station ID.• FN 01 will include the lower 12 bits of the called station ID.• FN 10 will include the upper 12 bits of the own ID.• FN 11 will include the lower 12 bits of the own ID.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0929**Superframe**

TS 102 490 [1]

Clause: 9.1 §20

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

Each frame of the Superframe shall start with 24 bit field containing:

in frame number 1 and 3 the Frame Sync 2 data, as follows:

Binary: 01011111111011101111101

Hex: 5F F7 7D

in frame number 2 and 4 the Colour Code (CC) data which depends on the operation frequency.

In case of a ISF Radio the CC is

Group Channel Frequency Colour Code (Bit) Colour Code (Hex)

Group	Channel	Frequency	Colour Code (Bit)	Colour Code (Hex)
A	446,103125		010101110111010101110111	577577
	446,109375		010101111101110101110101	57DD75
	446,115625		010101111111011101110101	57F775
	446,121875		01010101010101011101111101	55577D
	446,128125		010101010111110101111101	557D7D
	446,134375		010101011101010101111111	55D57F
	446,140625		010101011111111101111111	55FF7F
	446,146875		010111110101010101011111	5F555F
	446,153125		010111110111111101011111	5F7F5F
	446,159375		010111111101011101011101	5FD75D
	446,165625		010111111111110101011101	5FFD5D
	446,171875		010111010101110101010101	5D5D55
	446,178125		010111010111011101010101	5D7755
	446,184375		010111011101111101010111	5DDF57
	446,190625		010111011111010101010111	5DF557
	446,196875		011011101011101110101111	775DD7

In Case of a CSF Radio the CC is

Group Channel Frequency Colour Code (Bit) Colour Code (Hex)

Group	Channel	Frequency	Colour Code (Bit)	Colour Code (Hex)
B	446,103125		111101110101011101010111	F75757
	446,109375		111101110111110101010111	F77D57
	446,115625		111101111101010101010101	F7D555
	446,121875		111101111111111101010101	F7FF55
	446,128125		111101010101111101011101	F55F5D
	446,134375		111101010111010101011101	F5755D
	446,140625		111101011101110101011111	F5DD5F
	446,146875		111101011111011101011111	F5F75F
	446,153125		111111110101110101111111	FF5D7F
	446,159375		111111110111011101111111	FF777F
	446,165625		111111111101111101111101	FFDF7D
	446,171875		111111111111010101111101	FFF57D
	446,178125		111111010101010101110101	FD5575
	446,184375		111111010111111101110101	FD7F75
	446,190625		111111011101011101110111	FDD777
	446,196875		111111011111110101110111	FDFD77

Specification Text: {{The frame is completed by prefixing with either the 24 bits of FS2 (frame numbers 00 or 10) or the 24 bits of Colour Code (frame numbers 01 or 11)}}.

{{6.1.2}}

The Frame sync 2 sequence contained in the superframe (frames 1 and 3) is a 24 bit sequence that shall have the following value:

Binary: 01011111111011101111101.

Hex: 5F F7 7D.

{{6.1.5 Colour code}}

The Colour Code is a 12 bit code that is di-bit encoded into a 24 bit sequence. Colour Code are attributed directly to the RF operating channel and are not freely selectable.

Radios employing Initial Services and Facilities shall use the Group A colour codes.

Radios employing Configured Services and Facilities shall use the Group B colour codes.

{{Table 6.1: Colour code by RF channel}}

Family:

No Duplicates

Test Purposes:

None

4.1.3.4.1 Type 1 Data

RQ_001_0807	Type 1 data	
TS 102 490 [1]	Clause: 8.1, 8.2 §1	Type: Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A dPMR radio may support Type 1 Group Short Data Message.	
<i>Specification Text:</i>	{{Type 1 data Group Short Message}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0807_01 (Interoperability), TP_PMR_0807_02 (Interoperability), TP_PMR_0807_03 (Interoperability), TP_PMR_0807_04 (Interoperability), TP_PMR_0807_01 (Conformance)	
RQ_001_0810	Type 1 data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may support Type 1 Individual Short Data Message service.	
<i>Specification Text:</i>	{{Type 1 data, Individual Short Data Message}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0810_01 (Interoperability), TP_PMR_0810_02 (Interoperability)	
RQ_001_0831	Type 1 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF a dPMR radio supports type 1 data AND is using Group Short Data Message THEN it may support the supplementary service "Status Message".	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0831_01 (Interoperability), TP_PMR_0831_02 (Interoperability), TP_PMR_0831_03 (Interoperability), TP_PMR_0831_04 (Interoperability), TP_PMR_0831_01 (Conformance), TP_PMR_0831_02 (Conformance)	
RQ_001_0832	Type 1 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF a dPMR radio supports type 1 data AND is using Group Short Data Message THEN it may support the supplementary service "Precoded Message".	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0832_01 (Interoperability), TP_PMR_0832_02 (Interoperability), TP_PMR_0832_03 (Interoperability), TP_PMR_0832_04 (Interoperability), TP_PMR_0832_02 (Conformance), TP_PMR_0832_01 (Conformance)	

RQ_001_0833	Type 1 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF a dPMR radio supports type 1 data AND is using Group Short Data Message THEN it may support the supplementary service "Free Text Message".</p>	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0833_01 (Interoperability), TP_PMR_0833_02 (Interoperability), TP_PMR_0833_03 (Interoperability), TP_PMR_0833_04 (Interoperability), TP_PMR_0833_01 (Conformance), TP_PMR_0833_02 (Conformance)	
RQ_001_0834	Type 1 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF a dPMR radio supports type 1 data AND is using Group Short Data Message THEN it may support the supplementary service "Short file transfer".</p>	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0834_01 (Interoperability), TP_PMR_0834_02 (Interoperability), TP_PMR_0834_03 (Interoperability), TP_PMR_0834_04 (Interoperability), TP_PMR_0834_01 (Conformance), TP_PMR_0834_02 (Conformance)	
RQ_001_0934	Type 1 data	
TS 102 490 [1]	Clause: 9.2 §9	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF the radio offers Type 1 data THEN the communications mode (M) field in the header frame shall be set to 010 (binary).</p>	
<i>Specification Text:</i>	<p>{{The communications mode, 010 is added (clause 5.7).}}. For example, if slow data (SLD) is being included within the voice superframe then communications mode value is set to 001.</p> <pre> {{Table 5.7.}} 000 Voice communication (no user data in SLD field) 001 Voice + slow data (user data in SLD field) 010 Data communication type 1 (Payload is user data without FEC) 011 Data communication type 2 (Payload is user data with FEC) 100 Data communication type 3 (Packet data, ARQ method) 101 Voice and appended data (Type 2) Other Reserved </pre> <p>See also {{figure 7}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0935**Type 1 data**

TS 102 490 [1]

Clause: 9.2 §12

Type: Conditionally Mandatory

Applies to:

ISF, CSF

Requirement:

IF the radio offers Type 1 data
 THEN the Slow data field (SLD) shall be used to convey information
 of data format, position and continuation, etc.
 Data shall be formatted as follows:

Reserved	DP	Format	Cont.	Data length (bytes)
5 bits	2 bits	4 bits	1 bit	6 bits

Data Position (DP):
 00 There is no data in this frame
 01 Reserved
 10 Reserved
 11 This frame is the data frame

Format:
 0000 Status message
 0001 Precoded message
 0010 Free text message (radio generated data)
 0011 Short file transfer
 0100 User defined data 1
 0101 User defined data 2
 0110 User defined data 3
 0111 User defined data 4

Other Reserved

Continuation flag:
 0 Data continues after this frame.
 1 Data finishes at this frame.

Specification Text: {{Then there are the 18 bits of the slow user data field (SLD)}}. These bits are set according to clause 5.9.2 depending on the data to be transmitted.

{{Clause 5.9.2 Slow data field use with Type 1 or 2 data}}.
 When Type 1 or 2 data is transmitted, the SLD field is used to convey information of data format, position and continuation, etc. The SLD field is also used when a voice transmission has data appended to the end of the transmission.

{{Table 5.9.a: }}DP coding

{{Table 5.9.b: }}Format coding

Family:

No Duplicates

Test Purposes:

None

RQ_001_0936**Type 1 data**

TS 102 490 [1]

Clause: 9.2 §15

Type: Conditionally Mandatory

Applies to:

ISF, CSF

Requirement:

IF the radio offers Type 1 data
 THEN the Control CHannel (CCH) field shall be separated into 6 bytes. Each of these bytes shall be coded by shortened 12,8 Hamming code, as shown in clause 7.3
 X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is parity bit (4 bit).
 The Generator matrix is as follows:

	12	11	10	9	8	7	6	5	4	3	2	1
X7	X6	X5	X4	X3	X2	X1	1	C3	C2	C1	C0	
1	1	0	0	0	0	0	0	0	1	1	1	0
2	0	1	0	0	0	0	0	0	0	1	1	1
3	0	0	1	0	0	0	0	0	1	0	1	0
4	0	0	0	1	0	0	0	0	0	1	0	1
5	0	0	0	0	1	0	0	0	1	0	1	1
6	0	0	0	0	0	1	0	0	1	1	0	0
7	0	0	0	0	0	0	1	0	0	1	1	0
8	0	0	0	0	0	0	0	1	0	0	1	1

The Shortened Hamming code (12,8) Polynomial is $X^4 + X + 1$.
 This gives the 6x12 Type 1 data CCH bit blocks.

Specification Text:

{{These 48 bits are now separated into 6 bytes. Each byte is now coded by a shortened 12,8 Hamming Code (clause 7.3) giving 6 x 12 bit blocks.}}

{{Clause 7.3 Hamming code}}

A shortened Hamming code (12,8) is employed and the generator matrix is shown below:

X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is Parity bit (4 bit).

{{Table 7.1: Generator matrix}}

Shortened Hamming code (12,8) Polynomial: $X^4 + X + 1$.

See also {{figure 7}}.

Family:

No Duplicates

Test Purposes:

None

RQ_001_0937	Type 1 data	
TS 102 490 [1]	Clause: 9.2 §16, 17	Type: Conditionally Mandatory
Applies to:	ISF, CSF	
Requirement:	The 6x12 Type 1 data CCH shall be interleaved using the following 12x6 interleaving matrix:	
	<pre> 1 2 3 4 5 6 1 1 13 25 37 49 61 2 2 14 26 38 50 62 3 3 15 27 39 51 63 4 4 16 28 40 52 64 5 5 17 29 41 53 65 6 6 18 30 42 54 66 7 7 19 31 43 55 67 8 8 20 32 44 56 68 9 9 21 33 45 57 69 10 10 22 34 46 58 70 11 11 23 35 47 59 71 12 12 24 36 48 60 72.</pre>	
	This gives the Type 1 interleaved CCH data. Then a 288 bit block of uncorrected user data is added	
Specification Text:	<pre> {{To protect against burst interference, these 6 x 12 bit blocks are now interleaved using the 12 x 6 TCH interleaving matrix given in table 7.2}} {{Next the 288 bit block of uncorrected user data are appended.}} {{Clause 7.5 Interleaving}} There are two interleaving matrices, one for the TCH and one for the HI field. TCH interleave structure matrix: Table 7.2: TCH Interleaving matrix See also {{figure 7}}.</pre>	
Family:	No Duplicates	
Test Purposes:	None	
RQ_001_0938	Type 1 data	
TS 102 490 [1]	Clause: 9.2 §18	Type: Conditionally Mandatory
Applies to:	ISF, CSF	
Requirement:	The Type 1 interleaved CCH data bits and appended data blocks will be scrambled using the polynomial $X^9 + X^5 + 1$ with an initial preset value of all "1"s.	
Specification Text:	<pre> {{Finally the interleaved TCH data and appended data blocks are scrambled using the polynomial given in clause 7.4}} {{Clause 7.4 Scrambling}} The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s. See {{figure 7}}.</pre>	
Family:	No Duplicates	
Test Purposes:	None	

4.1.3.4.2 Type 2 Data

RQ_001_0806	Type 2 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A dPMR radio may support type 2 Group short Data Message	
<i>Specification Text:</i>	{{Type 2 data Group Short Data Message}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0806_01 (Interoperability), TP_PMR_0806_02 (Interoperability), TP_PMR_0806_03 (Interoperability), TP_PMR_0806_04 (Interoperability), TP_PMR_0806_01 (Conformance)	
RQ_001_0809	Type 2 data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may support Type 2 Individual Short data message.	
<i>Specification Text:</i>	{{Type 2 data, Individual Short Data Message}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0809_01 (Interoperability), TP_PMR_0809_02 (Interoperability)	
RQ_001_0825	Type 2 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF a dPMR radio supports type 2 data AND is using Group Short Data Message THEN it may support the supplementary service "Status Message".	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0825_01 (Interoperability), TP_PMR_0825_02 (Interoperability), TP_PMR_0825_03 (Interoperability), TP_PMR_0825_04 (Interoperability), TP_PMR_0825_01 (Conformance), TP_PMR_0825_02 (Conformance)	
RQ_001_0827	Type 2 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF a dPMR radio supports type 2 data AND is using Group Short Data Message THEN it may support the supplementary service "Precoded Message".	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0827_01 (Interoperability), TP_PMR_0827_02 (Interoperability), TP_PMR_0827_03 (Interoperability), TP_PMR_0827_04 (Interoperability), TP_PMR_0827_01 (Conformance), TP_PMR_0827_02 (Conformance)	

RQ_001_0829	Type 2 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF a dPMR radio supports type 2 data AND is using Group Short Data Message THEN it may support the supplementary service "Free Text Message".</p>	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0829_01 (Interoperability), TP_PMR_0829_02 (Interoperability), TP_PMR_0829_03 (Interoperability), TP_PMR_0829_04 (Interoperability), TP_PMR_0829_01 (Conformance), TP_PMR_0829_02 (Conformance)	
RQ_001_0830	Type 2 data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF a dPMR radio supports type 2 data AND is using Group Short Data Message THEN it may support the supplementary service "Short file transfer".</p>	
<i>Specification Text:</i>	{{Table 8.1 and Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0830_01 (Interoperability), TP_PMR_0830_02 (Interoperability), TP_PMR_0830_03 (Interoperability), TP_PMR_0830_04 (Interoperability), TP_PMR_0830_01 (Conformance), TP_PMR_0830_02 (Conformance)	
RQ_001_0839	Late Entry	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>For Voice individual calls a CSF radio shall support supplementary service "Late Entry".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	RQ_001_0802, RQ_001_0839	
<i>Test Purposes:</i>	TP_PMR_0802_01 (Interoperability), TP_PMR_0802_02 (Interoperability), TP_PMR_0802_03 (Interoperability), TP_PMR_0802_04 (Interoperability), TP_PMR_0802_01 (Conformance), TP_PMR_0802_02 (Conformance), TP_PMR_0802_03 (Conformance), TP_PMR_0802_04 (Conformance)	
RQ_001_0840	OACSU	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>For Voice individual calls a CSF radio may support supplementary service "Off Air Call Set Up (OACSU)".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0840_01 (Interoperability), TP_PMR_0840_02 (Interoperability), TP_PMR_0840_01 (Conformance), TP_PMR_0840_02 (Conformance), TP_PMR_0840_03 (Conformance)	

RQ_001_0841	OACSU	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
Applies to:	CSF	
Requirement:	For Voice individual calls a CSF radio may support supplementary service "Cancel call set-up".	
Specification Text:	{{Table 8.3}}	
Family:	RQ_001_1424 , RQ_001_0841, RQ_001_0841	
Test Purposes:	TP_PMR_1424_01 (Interoperability), TP_PMR_1424_01 (Conformance)	
RQ_001_0843	Slow User Data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
Applies to:	CSF	
Requirement:	For Voice individual calls a CSF radio may support supplementary service "Slow user data".	
Specification Text:	{{Table 8.3}}	
Family:	No Duplicates	
Test Purposes:	TP_PMR_0843_01 (Interoperability), TP_PMR_0843_02 (Interoperability), TP_PMR_0843_01 (Conformance)	
RQ_001_0844	Short Appended Data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
Applies to:	CSF	
Requirement:	For Voice individual calls a CSF radio may support supplementary service "Short appended data".	
Specification Text:	{{Table 8.3}}	
Family:	No Duplicates	
Test Purposes:	TP_PMR_0844_01 (Interoperability), TP_PMR_0844_02 (Interoperability), TP_PMR_0844_01 (Conformance)	
RQ_001_0845	Talking Party ID	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
Applies to:	CSF	
Requirement:	For Voice individual calls a CSF radio may support supplementary service "Talking Party Identification".	
Specification Text:	{{Table 8.3}}	
Family:	RQ_001_0803 , RQ_001_0845	
Test Purposes:	TP_PMR_0803_01 (Interoperability), TP_PMR_0803_02 (Interoperability), TP_PMR_0803_01 (Conformance)	
RQ_001_0846	ISDM Status Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
Applies to:	CSF	
Requirement:	IF a CSF radio supports Type 2 data THEN using Individual Short Data Message it may support supplementary service "Status Message".	
Specification Text:	{{Table 8.3}}	
Family:	No Duplicates	
Test Purposes:	TP_PMR_0846_01 (Interoperability), TP_PMR_0846_02 (Interoperability), TP_PMR_0846_01 (Conformance)	

RQ_001_0847	ISDM Status Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Type 1 data THEN using Individual Short Data Message it may support supplementary service "Status Message".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0847_01 (Interoperability), TP_PMR_0847_02 (Interoperability), TP_PMR_0847_01 (Conformance)	

4.1.3.4.3 Voice

RQ_001_0801	Voice	
TS 102 490 [1]	Clause: 8.1 §1	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A dPMR radio shall support PTT calls.	
<i>Specification Text:</i>	See {{tables 8.1 and 8.3 }}in document.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0801_01 (Interoperability), TP_PMR_0801_02 (Interoperability), TP_PMR_0801_01 (Conformance)	
RQ_001_0920	Voice	
TS 102 490 [1]	Clause: 9.1 §12	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Each frame of a Superframe shall contain an eighteen bits long Slow data field (SLD).</p> <p>It is contents depends on the Communication mode field (M) value.</p> <p>IF the Communications mode is set to 000 (binary) THEN the 18 bits of slow user data field are set to zero.</p>	
<i>Specification Text:</i>	{{If the communications mode is set to 000 the 18 bits of slow user data (SLD) field are set to zero}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0921	Voice	
TS 102 490 [1]	Clause: 9.1 §13	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>Each frame of a Superframe shall contain an eighteen bits long Slow data field (SLD).</p> <p>It is contents depends on the Communication mode field (M) value.</p> <p>IF the Communications mode is set to 001 (binary) THEN the Slow user data field shall be assembled as follows:</p> <p>Cont. User data Cont. User data 1 bit 8 bits 1 bit 8 bits</p> <p>Continuation Flag: 0 User data continues after the following byte. 1 User data is terminated by the following byte.</p>	
<i>Specification Text:</i>	<p>{{If the communications mode is set to 001 the 18 bits of slow user data (SLD) field is assembled according to clause 5.9.1}}.</p> <p>{{Clause 5.9.1 Slow data in the voice superframe}}.</p> <p>Each byte of user data is preceded by a continuation flag (Cont.) to inform the receiving party if the subsequent byte is the last.</p> <p>Cont. User data Cont. User data 1 bit 8 bits 1 bit 8 bits</p> <p>Continuation Flag: 0 User data continues after the following byte. 1 User data is terminated by the following byte.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_0922	Voice											
TS 102 490 [1]	Clause: 9.1 §14	Type: Conditionally Mandatory										
<i>Applies to:</i>	ISF, CSF											
<i>Requirement:</i>	<p>Each frame of a Superframe shall contain an eighteen bits long Slow data field (SLD).</p> <p>It is contents depends on the Communication mode field (M) value.</p> <p>IF the Communications mode is set to 101 (binary) THEN the Slow user data field shall be assembled as follows:</p> <table border="0"> <tr> <td>Reserved</td> <td>DP</td> <td>Format</td> <td>Cont.</td> <td>Data length (bytes)</td> </tr> <tr> <td>5 bits</td> <td>2 bits</td> <td>4 bits</td> <td>1 bit</td> <td>6 bits</td> </tr> </table> <p>Data Position (DP): Table 5.9a: DP coding 00 There is no data in this frame 01 Reserved 10 Reserved 11 This frame is the data frame</p> <p>Format: Table 5.9b: Format coding 0000 Status message 0001 Precoded message 0010 Free text message (radio generated data) 0011 Short file transfer 0100 User defined data 1 0101 User defined data 2 0110 User defined data 3 0111 User defined data 4 Other Reserved</p> <p>Continuation flag: 0 Data continues after this frame. 1 Data finishes at this frame.</p>		Reserved	DP	Format	Cont.	Data length (bytes)	5 bits	2 bits	4 bits	1 bit	6 bits
Reserved	DP	Format	Cont.	Data length (bytes)								
5 bits	2 bits	4 bits	1 bit	6 bits								
<i>Specification Text:</i>	<p>{{If the communications mode is set to 101 the slow user data (SLD) field is assembled according to clause 5.9.2}}.</p> <p>Clause 5.9.2 Slow data field use with Type 1 or 2 data When Type 1 or 2 data is transmitted, the SLD field is used to convey information of data format, position and continuation, etc. The SLD field is also used when a voice transmission has data appended to the end of the transmission.</p> <p>See {{Tables 5.9x}}</p>											
<i>Family:</i>	No Duplicates											
<i>Test Purposes:</i>	None											
RQ_001_0923	Voice											
TS 102 490 [1]	Clause: 9.1 §16	Type: Mandatory										
<i>Applies to:</i>	ISF, CSF											
<i>Requirement:</i>	<p>Each frame of a Superframe shall contain a 7 bit CRC field.</p> <p>Involved bits for CRC calculation shall be the ones in fields: Frame Number, Called/Own ID, communication mode, communication format, reserved and Slow data. (CCH data).</p> <p>The polynomial to generate them is $X^7 + X^3 + 1$.</p>											
<i>Specification Text:</i>	<p>{{The 7 bit CRC checksum is added using the polynomial given in clause 7.2}} giving a total of 48 bits</p> <p>{{Clause 7.2 CRC addition}} Use CRC Polynomial Frame (CCH) CRC7 $X^7 + X^3 + 1$</p>											
<i>Family:</i>	No Duplicates											
<i>Test Purposes:</i>	None											

RQ_001_0926**Voice**

TS 102 490 [1]

Clause: 9.1 §17

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

The Control Channel (CCH) field shall be separated into 6 bytes. Each of these bytes shall be coded by shortened 12,8 Hamming code with

X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit)
C3,C2,C1,C0 is parity bit (4 bit)

The Generator matrix is as follows:

	12	11	10	9	8	7	6	5	4	3	2	1	
	X7	X6	X5	X4	X3	X2	X1	1	C3	C2	C1	C0	
1	1	1	0	0	0	0	0	0	0	1	1	1	0
2	0	1	0	0	0	0	0	0	0	0	1	1	1
3	0	0	1	0	0	0	0	0	0	1	0	1	0
4	0	0	0	1	0	0	0	0	0	0	1	0	1
5	0	0	0	0	1	0	0	0	1	0	1	1	
6	0	0	0	0	0	1	0	0	1	1	0	0	
7	0	0	0	0	0	0	1	0	0	1	1	0	
8	0	0	0	0	0	0	0	1	0	0	1	1	

The Shortened Hamming code (12,8) Polynomial is $X^4 + X + 1$. This gives the 6x12 CCH bit blocks.

See figure 6.

Specification Text: {{These 48 bits are now separated into 6 bytes. Each byte is now coded by a shortened 12,8 Hamming Code (clause 7.3) giving 6 x 12 bit blocks.}}

{{Clause 7.3 Hamming code}}

A shortened Hamming code (12,8) is employed and the generator matrix is shown below:

X7,X6,X5,X4,X3,X2,X1,1 is Identity bit (8 bit): C3,C2,C1,C0 is Parity bit (4 bit).

{{Table 7.1: Generator matrix}}

Shortened Hamming code (12,8) Polynomial: $X^4 + X + 1$.

Family:

No Duplicates

Test Purposes:

None

RQ_001_0927**Voice**

TS 102 490 [1]

Clause: 9.1 §18

Type: Mandatory

Applies to:

ISF, CSF

Requirement:

The 6x12 CCH bit blocks shall be interleaved using the following 12x6 interleaving matrix:

	1	2	3	4	5	6
1	1	13	25	37	49	61
2	2	14	26	38	50	62
3	3	15	27	39	51	63
4	4	16	28	40	52	64
5	5	17	29	41	53	65
6	6	18	30	42	54	66
7	7	19	31	43	55	67
8	8	20	32	44	56	68
9	9	21	33	45	57	69
10	10	22	34	46	58	70
11	11	23	35	47	59	71
12	12	24	36	48	60	72

This gives the interleaved CCH data.

Specification Text: {{To protect against burst interference, these 6 x 12 bit blocks are now interleaved using the 12x6 TCH interleaving matrix given in table 7.2}}

{{Table 7.2: TCH Interleaving matrix}}

See also {{Figure 6}}

Family:

No Duplicates

Test Purposes:

None

RQ_001_0928	Voice	
TS 102 490 [1]	Clause: 9.1 §19	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	The interleaved CCH data shall be scrambled using the polynomial $X^9 + X^5 + 1$ with an initial preset value of all "1"s.	
<i>Specification Text:</i>	<p>{{Then the interleaved CCH data is scrambled using the polynomial given in clause 7.4.}}</p> <p>{{Clause 7.4 Scrambling}}</p> <p>The scrambling polynomial is $X^9 + X^5 + 1$ with an initial preset value of all "1"s.</p> <p>See also {{figure 3.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0930	Voice	
TS 102 490 [1]	Clause: 9.1 §21	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	Each frame of the voice Superframe shall end with four 72 bits long Traffic Channel (TCH) fields. Each field shall contain the 72 bit block of Forward Error corrected vocoder data.	
<i>Specification Text:</i>	<p>{{Finally the 4 x 72 bit blocks of Forward Error corrected vocoder data (TCH) are appended}}.</p> <p>See also {{figure 6}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_0931	Voice	
TS 102 490 [1]	Clause: 9.1 §22	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	In a voice transmission, when the PTT is released before the end of the current Superframe the current frame and the subsequent frames until the end of the Superframe shall be completed using silence data for the Traffic Channel field.	
<i>Specification Text:</i>	{{If the PTT is released before the end of the current superframe, then the superframe will be completed using silence data for the TCH ("silence data" is the vocoder output data when no sound is input)}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

4.1.4 Late Entry

RQ_001_0802	Late Entry	
TS 102 490 [1]	Clause: 8.1 §1	Type: Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	A dPMR radio shall support late entry	
<i>Specification Text:</i>	See {{tables 8.1 and 8.3 }}in document.	
<i>Family:</i>	RQ_001_0802 , RQ_001_0839	
<i>Test Purposes:</i>	TP_PMR_0802_01 (Interoperability), TP_PMR_0802_02 (Interoperability), TP_PMR_0802_03 (Interoperability), TP_PMR_0802_04 (Interoperability), TP_PMR_0802_01 (Conformance), TP_PMR_0802_02 (Conformance), TP_PMR_0802_03 (Conformance), TP_PMR_0802_04 (Conformance)	

RQ_001_0839	Late Entry	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For Voice individual calls a CSF radio shall support supplementary service "Late Entry".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	RQ_001_0802 , RQ_001_0839	
<i>Test Purposes:</i>	TP_PMR_0802_01 (Interoperability), TP_PMR_0802_02 (Interoperability), TP_PMR_0802_03 (Interoperability), TP_PMR_0802_04 (Interoperability), TP_PMR_0802_01 (Conformance), TP_PMR_0802_02 (Conformance), TP_PMR_0802_03 (Conformance), TP_PMR_0802_04 (Conformance)	

4.1.5 Powersave

RQ_001_1101	Powersave	
TS 102 490 [1]	Clause: 11.1 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF powersave is supported AND repeated headers are used for powersave THEN the preamble by each header shall be fixed at 72 bits.	
<i>Specification Text:</i>	{{In the case of repeated Headers for powersave use, the preamble used by each Header shall be fixed at 72 bits}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1101_01 (Conformance)	
RQ_001_1102	Powersave	
TS 102 490 [1]	Clause: 11.1 §5	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	IF powersave supported THEN when transmitting extended wake-up headers the first 3 bits (Call Information Type) of the 11 bits of the Call Information (CI) field shall be set to '111' in these headers.	
<i>Specification Text:</i>	These extended wake-up Headers shall be coded according to clauses 5.2 and 5.10. The 11 bits of Call Information (CI) are used as follows: {{CI Type = 111 (extended wake-up Header)}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1102_01 (Conformance)	

RQ_001_1103	Powersave	
TS 102 490 [1]	Clause: 11.1 §6	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>THEN when transmitting extended wake-up headers the last 4 bits of the 11 bits of the Call Information (CI) field shall indicate the number of Header frames to follow.</p>	
<i>Specification Text:</i>	<p>These extended wake-up Headers shall be coded according to clauses 5.2 and 5.10.</p> <p>The 11 bits of Call Information (CI) are used as follows: CI Type = 111 (extended wake-up Header). {{CI Information uses that last 4 bits to show how many Header frames follow the current one}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1103_01 (Conformance)	
RQ_001_1104	Powersave	
TS 102 490 [1]	Clause: 11.1 §7	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave is supported</p> <p>THEN the calling radio can be programmed to use up to 15 extended wake-up headers for extended wake-up purposes.</p>	
<i>Specification Text:</i>	<p>{{Radios can be programmed to use up to 15 extended header frames for wake-up purposes. This will give a maximum response time of 1,2 seconds}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1105	Powersave	
TS 102 490 [1]	Clause: 11.1 §7	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>THEN a caller using the wake-up procedure shall end the sequence of extended wake-up header sending a normal header, indicating the call type in the Call Information (CI) field.</p>	
<i>Specification Text:</i>	See {{Figure 12}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1106	Powersave	
TS 102 490 [1]	Clause: 11.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>THEN the wake-up periods of a radio in standby (sleep mode) shall have a duration of at least T_ch_chk (100 ms).</p>	
<i>Specification Text:</i>	<p>Radio in standby (sleep) will be programmed to wake-up and monitor the channel at regular intervals. {{Each wake-up shall have a minimum duration of T_ch_chk (clause 10.6.1)}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_1107	Powersave	
TS 102 490 [1]	Clause: 11.2 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>THEN the maximum sampling interval between wake-up periods shall be (n-1) x 80ms, where n is the number of extended wake-up headers used.</p>	
<i>Specification Text:</i>	<p>The intervals between successive wake-ups shall be dependant on the number of repeated Header frames used in extended wake-up according to clause 11.1. {{The maximum sampling interval between wake-ups shall be: T_{sam} = (n - 1) x 80 ms}}. Where T_{sam} is the sampling interval and n is the number of extended wake-up Headers used.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1108	Powersave	
TS 102 490 [1]	Clause: 11.2 §4	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>AND the radio is awoken</p> <p>THEN it may return to sleep mode if there is no activity on the channel for the duration of T_{ch_chk}.</p>	
<i>Specification Text:</i>	<p>{{If the radio wakes and there is no activity on the channel for the duration of T_{ch_chk} it may return to sleep}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1109	Powersave	
TS 102 490 [1]	Clause: 11.2 §5	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>AND the radio is awoken by activity on the channel</p> <p>THEN the radio return to sleep mode if the called address in received and decoded traffic does not match it own.</p>	
<i>Specification Text:</i>	<p>{{If the radio wakes and decodes the dPMR activity but the called station ID does not match it may return to sleep}}.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1110	Powersave	
TS 102 490 [1]	Clause: 11.2 §6	Type: Conditionally Optional
<i>Applies to:</i>	ISF, CSF	
<i>Requirement:</i>	<p>IF powersave supported</p> <p>AND has completed payload or signalling reception</p> <p>THEN it may return to sleep.</p>	
<i>Specification Text:</i>	<p>If the radio wakes and decodes the dPMR activity and the called station ID matches, it shall then be able to calculate from the CI information bits when the payload item or signalling will commence. {{Upon completion of the payload item or signalling the radio may return to sleep again.}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

4.1.6 Talking Party Identification

RQ_001_0803 Talking Party ID

TS 102 490 [1]

Clause: 8.1 §1

Type: Optional

Applies to: ISF, CSF

Requirement: A dPMR radio may support Talking Party Identification.

Specification Text: See {{tables 8.1 and 8.3 }}in document.

Family: **RQ_001_0803**, RQ_001_0845

Test Purposes: TP_PMR_0803_01 (Interoperability), TP_PMR_0803_02 (Interoperability),
TP_PMR_0803_01 (Conformance)

RQ_001_0845 Talking Party ID

TS 102 490 [1]

Clause: 8.2 §1

Type: Conditionally Optional

Applies to: CSF

Requirement: For Voice individual calls a CSF radio may support supplementary service "Talking Party Identification".

Specification Text: {{Table 8.3}}

Family: **RQ_001_0803**, RQ_001_0845

Test Purposes: TP_PMR_0803_01 (Interoperability), TP_PMR_0803_02 (Interoperability),
TP_PMR_0803_01 (Conformance)

4.2 Configured Services and Facilities Radios

4.2.1 Broadcast Call

RQ_001_0838 Broadcast Call

TS 102 490 [1]

Clause: 8.2 §1

Type: Conditionally Optional

Applies to: CSF

Requirement: For Voice group calls a CSF radio may support supplementary service "Broadcast Call".

Specification Text: {{Table 8.3}}

Family: No Duplicates

Test Purposes: TP_PMR_0838_01 (Conformance)

4.2.2 Dialling Plan

RQ_001_0814	Dialling Plan	
TS 102 490 [1]	<i>Clause:</i> 8.2.2 §2	<i>Type:</i> Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>A CSF radio complying to the Standard User Interface shall use a 7 digit addressing scheme that is encoded into the 24 bit address field as defined by the algorithm:</p> $\text{SUM}(K1 * 1464100, K2 * 146410, K3 * 14641, K4 * 1331, K5 * 121, K6 * 11, K7)$ <p>where</p> <p>K1,K2,K3 represent decimal symbols in the range 0 to 9. K4,K5,K6,K7 represent symbols to base 11 using the digits 0,1,2,3,4,5,6,7,8,9,*. The "*" is a symbol that has the value of 10.</p>	
<i>Specification Text:</i>	<p>{{For equipment compliant with the Standard User Interface radios shall use a 7 digit addressing scheme that is encoded into the 24 bit address field as detailed in annex A.}}</p>	
<i>Family:</i>	RQ_001_1310 , RQ_001_0814, RQ_001_0814, RQ_001_1301, RQ_001_1306, RQ_001_1309	
<i>Test Purposes:</i>	TP_PMR_1310_01 (Conformance), TP_PMR_1310_02 (Conformance), TP_PMR_1310_03 (Conformance), TP_PMR_1310_04 (Conformance)	
RQ_001_1301	Dialling Plan	
TS 102 490 [1]	<i>Clause:</i> A.2.1 §1	<i>Type:</i> Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>For a CSF radio complying with the Standard User Interface, dialled digits that represent a destination address shall be encoded to give the 24 bit content of the Air Interface address field.</p>	
<i>Specification Text:</i>	<p>Dialled digits are represented in decimal notation and utilize the numbers "0" to "9" and the keys "*" and "#". For an MS fitted with a keypad, the "#" key may initiate a call (although other initiate methods may be implemented by a manufacturer). {{Dialled digits that represent a destination address are translated to a form for the Air Interface by a coding algorithm. This is illustrated in figure A.2. (see document)</p> <p>Address fields in the Air-Interface domain structure has a length of 24 bits.}} The content of a 24-bit AI MS address field may represent:</p> <ul style="list-style-type: none"> • an MS individual address; • an MS group address. <p>The Air Interface provides call services for voice and data. The AI also permits the call services to be modified. The application that converts the User Interface to the Air Interface recognizes the "call modifier" and request the lower layers to set appropriate bits in the PDUs carried between the entities. At the User Interface, the "call modifier" is indicated by preceding the destination address digits with additional "call modifier" digits.</p>	
<i>Family:</i>	RQ_001_1310 , RQ_001_0814, RQ_001_0814, RQ_001_1301, RQ_001_1306, RQ_001_1309	
<i>Test Purposes:</i>	TP_PMR_1310_01 (Conformance), TP_PMR_1310_02 (Conformance), TP_PMR_1310_03 (Conformance), TP_PMR_1310_04 (Conformance)	

RQ_001_1302	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For CSF radios complying with the Standard User Interface, calls shall be addressed to numeric or non-numeric addresses (i.e. addresses containing "wildcards")	
<i>Specification Text:</i>	<p>{{Each call is made to a numeric or non-numeric address (with "wildcards").}}</p> <p>The mapping between the User-Interface domain and the Air Interface uses a reversible coding algorithm.</p> <p>MS will establish the call type from analysis of the decoded Air Interface address. There are a number of methods by which a MS may distinguish between talkgroup and individual calls and these are described in the following clauses.</p>	
<i>Family:</i>	RQ_001_1415, RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	
RQ_001_1303	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.1 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF the "wildcard" feature is enabled	
<i>THEN a CSF radio</i>	complying with the Standard User Interface shall identify group calls by analysing the decoded air interface address for "wildcards"	
<i>Specification Text:</i>	<p>MS will establish the call type from analysis of the decoded Air Interface address. There are a number of methods by which a MS may distinguish between talkgroup and individual calls and these are described in the following clauses.</p> <p>{{The MS may discriminate a talkgroup call from an individual call by the use of the "wildcard".}}</p> <p>In the User Interface domain structure, if the dialled string represents an MS address, and contains a "*" in any of the four least significant characters, then that MS address represents a group of MSs. }}The "*" character is the "wildcard" and represents all numeric values in that digit position, as defined in example 1 to 3.</p> <p>EXAMPLE 1: The user dials "012345*" means that the MS is addressing 10 separate MSs whose individual addresses are "0123450", "0123451", "0123452", "0123453", "0123454", "0123455", "0123456", "0123457", "0123458", and "0123459".</p> <p>EXAMPLE 2: The user dials "01234*6" means the MS is addressing 10 separate MSs whose individual addresses are "0123406", "0123416", "0123426", "0123436", "0123446", "0123456", "0123466", "0123476", "0123486", and "0123496".</p> <p>EXAMPLE 3: Wildcards may be combined. The user dials "01234**" represents 100 MSs in the range "0123400" to "0123499".</p> <p>For operators who have no interest in this method of defining talkgroups, the "wildcard" feature may be disabled by MS programming.</p>	
<i>Family:</i>	RQ_001_1415, RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	

RQ_001_1304	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF a CSF radio complying with the Standard User Interface has one or more numeric talk group address stored in memory	
	THEN the radio shall identify group calls by analysing the decoded AI address and comparing it to the stored talk group address(es).	
<i>Specification Text:</i>	MS will establish the call type from analysis of the decoded Air Interface address. There are a number of methods by which a MS may distinguish between talkgroup and individual calls and these are described in the following clauses. <pre> {{The MS equipment may contain predefined parameters prescribing the MS addresses that will be interpreted as talkgroup addresses. These addresses may be stored as a list programmed during manufacture or before connecting an MS into service.}} </pre>	
<i>Family:</i>	RQ_001_1415 , RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	
RQ_001_1305	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.3 §1	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may use a range of addresses that are all talkgroup addresses.	
<i>Specification Text:</i>	<pre> {{The MS equipment may simply rely on a range of addresses that all equipment is known to be talkgroup addresses.}} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1306	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.4 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF caller radio complying with the Standard User Interface shall encode the dialled user digits to a 24 bit air interface address by using the reversible B2 algorithm.	
<i>Specification Text:</i>	<pre> {{The MS codes the dialled user digits to a 24 bit Air Interface address by using the reversible algorithm B2. }} </pre>	
<i>Family:</i>	RQ_001_1310 , RQ_001_0814, RQ_001_0814, RQ_001_1301, RQ_001_1306, RQ_001_1309	
<i>Test Purposes:</i>	TP_PMR_1310_01 (Conformance), TP_PMR_1310_02 (Conformance), TP_PMR_1310_03 (Conformance), TP_PMR_1310_04 (Conformance)	

RQ_001_1307	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.5 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>A CSF callee radio complying with the Standard User Interface shall decode the 24 bit air interface address of a received call by using the reverse B2 algorithm to a 7 digit string.</p> <p>IF this 7 digit string contains a "*" character in any of the 4 least significant characters, the radio shall compare the received string to its individual address for match and ignore any mismatch if there is a "*" character at that position. If all other digits match then the radio is party to this talk group call.</p>	
<i>Specification Text:</i>	<p>These rules determine whether a call is to a talkgroup or individual address and will be accepted by a MS. (All reference to MS in this clause refer to the recipient.) MS receives a dPMR call. MS uses the reverse of the B2 function specified in clause A.2.1.2.6 to translate the AI talkgroup address to the User Interface domain. {IF digits (User Interface) contains a "*" in any of the least significant four characters THEN each digit received is compared with each corresponding digit of the MS individual address except where the received digit is a "*". If there is a match on all applicable digits then this MS is party to the talkgroup call.}} ELSE (consists of numeric characters only) THEN EITHER The string of digits received is compared with each corresponding string of talkgroup digits that the MS has stored (specifically indicating a talkgroup). If there is a match then this MS is party to the talkgroup call. OR The string of digits received is compared with each corresponding string of individual address digits that the MS has stored. If there is a match then this MS is party to the individual call. ENDIF</p>	
<i>Family:</i>	RQ_001_1415, RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	

RQ_001_1308	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.5 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>A CSF callee radio complying with the Standard User Interface shall decode the 24 bit air interface address of a received call by using the reverse B2 algorithm to a 7 digit string.</p> <p>IF this 7 digit string contains only numerical digits THEN EITHER the radio shall compare the received string to any talk group address programmed in memory and if there is a match then the radio is party to this talk group call.</p> <p>OR the radio shall compare the received string to any individual address programmed in memory and if there is a match then the radio is party to this individual call.</p>	
<i>Specification Text:</i>	<p>These rules determine whether a call is to a talkgroup or individual address and will be accepted by a MS. (All reference to MS in this clause refer to the recipient.) MS receives a dPMR call. MS uses the reverse of the B2 function specified in clause A.2.1.2.6 to translate the AI talkgroup address to the User Interface domain. IF digits (User Interface) contains a "*" in any of the least significant four characters THEN each digit received is compared with each corresponding digit of the MS individual address except where the received digit is a "*". If there is a match on all applicable digits then this MS is party to the talkgroup call. { {ELSE (consists of numeric characters only) THEN EITHER The string of digits received is compared with each corresponding string of talkgroup digits that the MS has stored (specifically indicating a talkgroup). If there is a match then this MS is party to the talkgroup call. OR The string of digits received is compared with each corresponding string of individual address digits that the MS has stored. If there is a match then this MS is party to the individual call. ENDIF}}</p>	
<i>Family:</i>	RQ_001_1415 , RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	
RQ_001_1309	Dialling Plan	
TS 102 490 [1]	Clause: A.2.1.1.6 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>A CSF radio complying with the Standard User Interface shall use the reversible B2 algorithm to convert between 7 digit string and 24 bit air interface addresses and vice-versa.</p>	
<i>Specification Text:</i>	<p>{ {A MS address is a 7-character numeric string in the range "0000001" to "999****", these characters are mapped to the Air Interface domain structure bits by the reversible function B2.}}</p> <p>Addresses may consist of all numeric characters (but the MS must be able to ascertain the address is a talkgroup address rather than an individual address). Alternatively any of the last four characters may contain one or more "*" characters that explicitly signifies the address is a talkgroup address.</p>	
<i>Family:</i>	RQ_001_1310 , RQ_001_0814, RQ_001_0814, RQ_001_1301, RQ_001_1306, RQ_001_1309	
<i>Test Purposes:</i>	TP_PMR_1310_01 (Conformance), TP_PMR_1310_02 (Conformance), TP_PMR_1310_03 (Conformance), TP_PMR_1310_04 (Conformance)	

RQ_001_1310**Dialling Plan**

TS 102 490 [1]

Clause: A.2.1.1.6.1 §1

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

A CSF radio complying with the Standard User Interface shall use the following rules for mapping between 7 digit address field (K1 to K7) at the user level and the 24 bit address field at the Air interface.

K1 is the most significant digit.

K1,K2,K3 represent decimal symbols in the range 0 to 9.

K4,K5,K6,K7 represent symbols to base 11 using the digits 0,1,2,3,4,5,6,7,8,9,*.

The "*" is a symbol that has the value of 10.

The six least significant user dialled digits K2 to K7 in the range "000001" to "999999" are converted to the 20 least significant 20 bits of the AI ID using true decimal to binary conversion. The most significant user dialled digit K1 is converted to the most significant 4 bits of the AI ID using a true decimal to binary conversion.

To following steps are needed to convert the dialled digits to an ID in the AI domain:

c) take the first digit (0 to 9) and multiply by 1 464 100;

d) take the second digit (0 to 9), multiply by 146 410;

e) take the third digit (0 to 9) and multiply by 14 641;

f) take the fourth digit (0 to 9) or * (* has a value of 10) and multiply by 1 331;

g) take the fifth digit (0 to 9) or * (* has a value of 10) and multiply by 121;

h) take the sixth digit (0 to 9) or * (* has a value of 10) and multiply by 11;

i) take the seventh digit (0 to 9) or * (* has a value of 10);

j) add c) to i); and

k) convert the sum to a 24-bit binary number.

Specification Text:

{{K1,K2,K3 represent decimal symbols in the range 0 to 9.

K4,K5,K6,K7 represent symbols to base 11 using the digits

0,1,2,3,4,5,6,7,8,9,*.

The "*" is a symbol that has the value of 10.

The six least significant user dialled digits K2 to K7 in the range "000001" to "999999" are converted to the 20 least significant 20 bits of the AI ID using true decimal to binary conversion. The most significant user dialled digit K1 is converted to the most significant 4 bits of the AI ID using a true decimal to binary conversion.

To following steps are needed to convert the dialled digits to an ID in the AI domain:

c) take the first digit (0 to 9) and multiply by 1 464 100;

d) take the second digit (0 to 9), multiply by 146 410;

e) take the third digit (0 to 9) and multiply by 14 641;

f) take the fourth digit (0 to 9) or * (* has a value of 10) and multiply by 1 331;

g) take the fifth digit (0 to 9) or * (* has a value of 10) and multiply by 121;

h) take the sixth digit (0 to 9) or * (* has a value of 10) and multiply by 11;

i)take the seventh digit (0 to 9) or * (* has a value of 10);

j) add c) to i); and

k) convert the sum to a 24-bit binary number.}}

Examples are shown in table A.2.

Table A.2.1.1.5.1.2: Examples of address translation

User-Interface	Air-Interface (Hex)	Air Interface (Binary)
1234567	1B91FD	0001 1011 1001 0001 1111 1101
468956*	68BF08	0110 1000 1011 1111 0000 1000
012345*	02C00A	0000 0010 1100 0000 0000 1010
0123460	02C00B	0000 0010 C000 0000 0000 1011
999****	DF6767	1101 1111 0110 0111 0110 0111

Family:

RQ_001_1310, RQ_001_0814, RQ_001_0814, RQ_001_1301, RQ_001_1306, RQ_001_1309

Test Purposes:

TP_PMR_1310_01 (Conformance), TP_PMR_1310_02 (Conformance), TP_PMR_1310_03 (Conformance), TP_PMR_1310_04 (Conformance)

RQ_001_1311	Dialling Plan	
TS 102 490 [1]	Clause: A.2.2 §1	Type: Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio shall have at least one individual address.	
<i>Specification Text:</i>	<p>{{An MS is pre-programmed with at least one individual identity.}}</p> <p>An MS is permitted to have multiple individual identities and one or more talkgroup identities.</p> <p>An MS may contain a list of talkgroup identities, which may be pre-programmed or dynamically updated (manually or over the AI).</p> <p>The User Interface domain maps to the AI address space by the B2 algorithm.</p>	
<i>Family:</i>	RQ_001_1408 , RQ_001_1311, RQ_001_1311	
<i>Test Purposes:</i>	None	
RQ_001_1312	Dialling Plan	
TS 102 490 [1]	Clause: A.2.2 §2	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may have multiple individual addresses and one or more talk group addresses.	
<i>Specification Text:</i>	<p>{{An MS is permitted to have multiple individual identities and one or more talkgroup identities.}}</p> <p>Where an MS has more than one individual identity then one of these shall be assigned as the primary individual identity. This primary individual identity is the one that shall be used for all forms of abbreviated or masked dialling (clauses A.3.4.1.2 and A.3.4.1.3)</p> <p>An MS may contain a list of talkgroup identities, which may be pre-programmed or dynamically updated (manually or over the AI).</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1313	Dialling Plan	
TS 102 490 [1]	Clause: A.2.2 §3	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may be programmed with a list of talkgroup identities, which may be pre-programmed or dynamically updated (manually or over the AI).	
<i>Specification Text:</i>	<p>An MS is pre-programmed with at least one individual or one talkgroup identity.</p> <p>An MS is permitted to have multiple individual identities and multiple talkgroup identities.</p> <p>{{An MS may contain a list of talkgroup identities, which may be pre-programmed or dynamically updated (manually or over the AI).}}</p> <p>The User Interface domain maps to the AI address space by the B2 algorithm.</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1314	Dialling Plan	
TS 102 490 [1]	Clause: A.2.3.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For a CSF radio complying with the Standard User Interface the 7 characters used for individual addresses shall contain only the digits "0" to "9".	
<i>Specification Text:</i>	<p>{{An MS address in the User-Interface structure is defined as 7 characters of which for an individual MS address contain the characters "0" to "9". }}For a talkgroup address the three most significant contain the characters "0" to "9" and least significant four characters contain the characters "0" to "9" or "*".</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_1315	Dialling Plan	
TS 102 490 [1]	Clause: A.2.3.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>For a CSF radio complying with the Standard User Interface the 7 characters used for talkgroup addresses shall be as follows:</p> <p>The three most significant contain the characters "0" to "9" and least significant four characters contain the characters "0" to "9" or "*".</p>	
<i>Specification Text:</i>	<p>An MS address in the User-Interface structure is defined as 7 characters of which for an individual MS address contain the characters "0" to "9". {{For a talkgroup address the three most significant contain the characters "0" to "9" and least significant four characters contain the characters "0" to "9" or "*".}}</p>	
<i>Family:</i>	<p>RQ_001_1415, RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409</p>	
<i>Test Purposes:</i>	<p>TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)</p>	
RQ_001_1316	Dialling Plan	
TS 102 490 [1]	Clause: A.2.3.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface THEN the radio may limit the number of digits that can be changed in any dialled address string, thereby limiting the addressable range from that radio.</p>	
<i>Specification Text:</i>	<p>{{The MS equipment may contain predefined parameters prescribing the minimum and maximum length of the user dial string. By limiting the length of the dialled string, the address range that the MS is able to dial is restricted.}}</p>	
<i>Family:</i>	<p>RQ_001_1418, RQ_001_1316, RQ_001_1316</p>	
<i>Test Purposes:</i>	<p>TP_PMR_1418_01 (Interoperability), TP_PMR_1418_02 (Interoperability), TP_PMR_1418_01 (Conformance), TP_PMR_1418_02 (Conformance), TP_PMR_1418_03 (Conformance), TP_PMR_1418_04 (Conformance)</p>	
RQ_001_1401	Dialling Plan	
TS 102 490 [1]	Clause: A.3.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>For a CSF radio complying with the Standard User Interface dialled addresses are always read and dialled in the sense left to right.</p>	
<i>Specification Text:</i>	<p>{{All dialled strings, as defined in the clause A.3 of the present document, are read from left to right and are dialled in the sequence in which they are read. }}Throughout this clause all representations of dialled strings are underlined. MSs may only be required to dial sufficient numbers of characters unambiguously define the destination and service required.</p>	
<i>Family:</i>	<p>No Duplicates</p>	
<i>Test Purposes:</i>	<p>None</p>	

RQ_001_1402	Dialling Plan	
TS 102 490 [1]	Clause: A.3.1 §2	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio complying with the Standard User Interface may support abbreviated dialling.	
<i>Specification Text:</i>	A.3.1 User numbering All dialled strings, as defined in the clause A.3 of the present document, are read from left to right and are dialled in the sequence in which they are read. Throughout this clause all representations of dialled strings are underlined. {{MSs may only be required to dial sufficient numbers of characters unambiguously define the destination and service required.}}	
<i>Family:</i>	RQ_001_1417, RQ_001_1402, RQ_001_1402, RQ_001_1406	
<i>Test Purposes:</i>	TP_PMR_1417_01 (Interoperability), TP_PMR_1417_02 (Interoperability), TP_PMR_1417_03 (Interoperability), TP_PMR_1417_01 (Conformance), TP_PMR_1417_02 (Conformance)	
RQ_001_1403	Dialling Plan	
TS 102 490 [1]	Clause: A3.1.1 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF the user has entered or selected the series of digits as required for the dialled address	
THEN a CSF radio	complying with the Standard User Interface shall also require the pressing of the "#" key or other dedicated send key to initiate the call.	
<i>Specification Text:</i>	{{To maximize channel utilization, the user should enter a string of digits and then press a button to initiate the call. The "#" key or a dedicated "send" key is used to initiate the call. }}The "#" key has an additional purpose of modifying the call type or priority.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_1403_01 (Interoperability), TP_PMR_1403_02 (Interoperability), TP_PMR_1403_01 (Conformance), TP_PMR_1403_02 (Conformance), TP_PMR_1416_01 (Conformance)	
RQ_001_1404	Dialling Plan	
TS 102 490 [1]	Clause: A.3.1.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio complying with the Standard User Interface shall determine the type of call from user dialled string. The user should not have to also select call type.	
<i>Specification Text:</i>	{{Underlying signalling and system functionality is hidden from the user. MSs determine the call type and function from the length and content of the dialled string.}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	

RQ_001_1405	Dialling Plan	
TS 102 490 [1]	Clause: A3.1.3 §3	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	In a CSF radio complying with the Standard User Interface	
	IF the dialled number is preceded by a hash "#"	
	THEN the dialling function or call type may be modified.	
<i>Specification Text:</i>	Dialled strings that commence with a hash "#" provide secondary uses for the keypad.	
	Secondary dialling functions may be as follows:	
	<ul style="list-style-type: none"> • status call; • broadcast call. 	
	<pre> {{Secondary dialling is achieved by the use of call modifier strings in front of the dialled number. These call modifier sequences utilize the "#" and "*" keys.}} </pre>	
<i>Family:</i>	RQ_001_1420, RQ_001_1405, RQ_001_1405	
<i>Test Purposes:</i>	TP_PMR_1420_01 (Interoperability), TP_PMR_1420_02 (Interoperability), TP_PMR_1420_01 (Conformance), TP_PMR_1420_02 (Conformance), TP_PMR_1420_03 (Conformance), TP_PMR_1420_04 (Conformance), TP_PMR_1420_05 (Conformance), TP_PMR_1420_06 (Conformance), TP_PMR_1420_07 (Conformance)	
RQ_001_1406	Dialling Plan	
TS 102 490 [1]	Clause: A.3.2 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF a CSF radio is complying with the Standard User Interface	
	AND abbreviated dialling is available	
	THEN the abbreviated dialling shall operate as follows:	
	An MS shall construct the called address by adding the most	
	significant digits	
	of its own ID to the entered digit string to form a complete	
	destination address.	
	Example	
	An MS whose individual address is "1234567" (in the user domain),	
	dials "43".	
	MS own ID	1234567
	Dialled destination	43
	Full destination address	1234543
<i>Specification Text:</i>	In the User-Interface domain structure, if the string represents an MS address,	
	and contains a "*" in any of the four least significant characters, then that	
	MS address represents a group of MSs.	
	<pre> {{The length of destination MS address dialled digits is in the range from 1 to 7, and is interpreted as the right most digits of the recipient's number. The MSs individual address is used as a base address, and the right-most digits of that number are replaced by the user dialled digits, as shown in example 1 and 2. The resulting number is then converted to the AI ID using the algorithm presented in the annex A.}} </pre>	
	See example 1 in document.	
<i>Family:</i>	RQ_001_1417, RQ_001_1402, RQ_001_1402, RQ_001_1406	
<i>Test Purposes:</i>	TP_PMR_1417_01 (Interoperability), TP_PMR_1417_02 (Interoperability), TP_PMR_1417_03 (Interoperability), TP_PMR_1417_01 (Conformance), TP_PMR_1417_02 (Conformance)	

RQ_001_1407 **Dialling Plan**

TS 102 490 [1]

Clause: A.3.2 §2*Type:* Conditionally Mandatory*Applies to:* CSF*Requirement:*

IF the radio is a CSF radio

AND the radio is complying with the Standard User Interface

AND abbreviated dialling is available

THEN the abbreviated dialling of a group address shall operate as follows:

An MS shall construct the called address by adding the most significant digits of its own ID to the entered digit string to form a complete destination address.

Example

An MS whose individual address is "1234567" (in the user domain), dials "*" to place a group call.

MS own ID	1234567
Dialled destination	*
Full destination address	123456*

Specification Text: {{In the User-Interface domain structure, if the string represents an MS address, and contains a "*" in any of the four least significant characters, then that MS address represents a group of MSs.}}

The length of destination MS address dialled digits is in the range from 1 to 7, and is interpreted as the right most digits of the recipient's number. The MSs individual address is used as a base address, and the right-most digits of that number are replaced by the user dialled digits, as shown in example 1 and 2. The resulting number is then converted to the AI ID using the algorithm presented in the annex A.

See example 2 in document

Family: **RQ_001_1415**, RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409

Test Purposes: TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)

RQ_001_1408 **Dialling Plan**

TS 102 490 [1]

Clause: A3.3.1 §1*Type:* Conditionally Mandatory*Applies to:* CSF*Requirement:*

A CSF radio complying with the Standard User Interface shall have at least one individual numeric address in the range 0000001 to 9999999 with the exception of the following:

"1000000", "2000000", "3000000", "4000000", "5000000", "6000000", "7000000", "8000000", and "9000000".

Specification Text: {{An MS is allocated a numeric address in the range in the range "0000001" to "9999999", see note. MSs may be programmed with more than one individual address.

NOTE: The addresses "1000000", "2000000", "3000000", "4000000", "5000000", "6000000", "7000000", "8000000", and "9000000" are not valid.}}

Family: **RQ_001_1408**, RQ_001_1311, RQ_001_1311

Test Purposes: None

RQ_001_1409	Dialling Plan	
TS 102 490 [1]	Clause: A.3.3.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio complying with the Standard User Interface is programmed with more than one numeric address</p> <p>THEN any additional address may be a talkgroup address in the range 0000001 to 9999999 with the exception of the following: "1000000", "2000000", "3000000", "4000000", "5000000", "6000000", "7000000", "8000000", and "9000000".</p>	
<i>Specification Text:</i>	<pre>{{Talkgroups may be both all numeric numbers}}, or contain a "*" in any of the least significant four digits.</pre>	
<i>Family:</i>	RQ_001_1415 , RQ_001_1302, RQ_001_1302, RQ_001_1303, RQ_001_1304, RQ_001_1307, RQ_001_1308, RQ_001_1315, RQ_001_1407, RQ_001_1409	
<i>Test Purposes:</i>	TP_PMR_1415_01 (Interoperability), TP_PMR_1415_02 (Interoperability)	
RQ_001_1410	Dialling Plan	
TS 102 490 [1]	Clause: A.3.3.3 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>A CSF radio complying with the Standard User Interface shall always respond to call that has an all 'wild card' address, "*****"</p>	
<i>Specification Text:</i>	<pre>{{All units respond to All MSs address "*****#".}}</pre>	
<i>Family:</i>	RQ_001_1317 , RQ_001_1410, RQ_001_1411	
<i>Test Purposes:</i>	TP_PMR_1317_01 (Conformance), TP_PMR_1317_02 (Conformance), TP_PMR_1317_03 (Conformance), TP_PMR_1317_04 (Conformance)	
RQ_001_1411	Dialling Plan	
TS 102 490 [1]	Clause: A.3.3.3 §2	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>Every CSF radio complying with the Standard User Interface with the prefix (most significant digit) n shall respond to call that has an "n" prefix and 6 'wild cards', "n*****". Where n can be 0 to 9.</p> <p>i.e. any radios with an address "2nnnnnn" will respond to a call addressed to "2*****".</p>	
<i>Specification Text:</i>	<pre>{{All units with prefix "n" respond to the prefixed All MS address "n*****# with n=0 to 9.}}</pre>	
<i>Family:</i>	RQ_001_1317 , RQ_001_1410, RQ_001_1411	
<i>Test Purposes:</i>	TP_PMR_1317_01 (Conformance), TP_PMR_1317_02 (Conformance), TP_PMR_1317_03 (Conformance), TP_PMR_1317_04 (Conformance)	

RQ_001_1412	Dialling Plan							
TS 102 490 [1]	Clause: A.3.3.4 §1	Type: Conditionally Mandatory						
<i>Applies to:</i>	CSF							
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface THEN it shall not be possible for the radio to compose or send a non-dialable number. These numbers are: "0000000", "1000000", "200000", "300000", "4000000", "5000000", "6000000", "7000000", "8000000", "9000000".</p> <p>If a user enters any of these addresses the radio shall not send the call and give an appropriate error indication to the user.</p>							
<i>Specification Text:</i>	<pre>{{MS addresses' "0000000", "1000000", "200000", "300000", "4000000", "5000000", "6000000", "7000000", "8000000", "9000000" are not dialable. If the user inputs a dialled string of digits that is not assigned to any of the dialling algorithms, then the MS should not try to establish the call and appropriate feedback given to the user.}}</pre>							
<i>Family:</i>	No Duplicates							
<i>Test Purposes:</i>	TP_PMR_1412_01 (Interoperability)							
RQ_001_1413	Dialling Plan							
TS 102 490 [1]	Clause: A.3.3.5.1 §1	Type: Conditionally Mandatory						
<i>Applies to:</i>	CSF							
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface AND all numeric talk groups are programmed AND a callee address has been entered THEN the MS shall be able to compare this address with its own talkgroup memory table and establish if the call is a talkgroup call.</p>							
<i>Specification Text:</i>	<pre>{{Each MS has storage allocated for numeric talkgroup addresses. The table is populated during MS personalization by the user. The sender (MS) may use entries in this table to establish that the destination address is a talkgroup rather than an individual address.}}</pre> <p>The talkgroup table contains entries consisting of the full talkgroup address consisting of 7 characters as shown in the example. EXAMPLE: The sender (MS) whose individual address is "1234561" has the destination "1234567" stored in its talkgroup table. The user enters a single digit "7" as the destination address. The full destination address is formed from the dialled digit(s) and the MS own individual address.</p> <table border="0"> <tr> <td>MS source address</td> <td>1234561</td> </tr> <tr> <td>Dialled destination</td> <td>7</td> </tr> <tr> <td>Full (Talkgroup), see note</td> <td>1234567</td> </tr> </table> <p>NOTE: Destination address after processing.</p> <p>The talkgroup table is searched for a match. In this example there is a match so the destination address is a talkgroup addresses</p>		MS source address	1234561	Dialled destination	7	Full (Talkgroup), see note	1234567
MS source address	1234561							
Dialled destination	7							
Full (Talkgroup), see note	1234567							
<i>Family:</i>	No Duplicates							
<i>Test Purposes:</i>	None							

RQ_001_1416	Dialling Plan	
TS 102 490 [1]	Clause: A.3.4.1.1 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface</p> <p>The user may enter the full 7 digit address of the radio to be called.</p>	
<i>Specification Text:</i>	<pre> {{A.3.4.1.1 Seven digit dialling The user may enter the whole seven digit address to complete the dialled string prior to transmission. These seven digits may also contain wildcards. }} </pre>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	None	
RQ_001_1417	Dialling Plan	
TS 102 490 [1]	Clause: A.3.4.1.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface</p> <p>AND abbreviated dialling is available</p> <p>THEN User entered digits shall be used as the least significant digits and the radio will use its own ID as the base number for any unentered digits.</p>	
<i>Specification Text:</i>	<pre> {{Where abbreviated keypad dialling is used in the MS, the MS should insert the more significant characters from the MS individual address to complete the dialled string prior to transmission. Those digits entered may also include wildcards. If all digits are not dialled the more significant digits from the MS individual address are copied to the dialled string to build a seven digit address as follows: for the MS individual address "2112345": • if the user dials 6#, the destination address shall be 2112346; • if the user dials 56#, the destination address shall be 2112356; • if the user dials 958#, the destination address shall be 2112958; • if the user dials 1385#, the destination address shall be 2111385; • if the user dials 13*5#, the destination address shall be 21113*5 (talkgroup) . NOTE:}} The double underlined characters represent those that have been copied from the MS individual address. At the Air Interface the calling party address is transferred to the called party. The abbreviated dialling may be applied to display only an abbreviated calling party address on the display of the called party. l) The calling party dials a single digit "2". m) The MS inserts the more significant digits from its individual address to complete the dialled string prior to transmission - i.e. the destination address becomes "1234562". n) The called and calling party addresses are passed across the Air Interface. o) The "B" party decodes the called party address and there is a match and the "B" party receives the call. p) The "B" party decodes the calling party address and may display only an abbreviated digit(s). In this case a single digit "1". The abbreviated display is sufficient for the "B" party to know who has called because the "B" party could call the "A" party by the same abbreviated dialling. By using abbreviated dialling, the dPMR dialling plan is appropriate for the smallest and largest fleets. </pre>	
<i>Family:</i>	RQ_001_1417 , RQ_001_1402, RQ_001_1402, RQ_001_1406	
<i>Test Purposes:</i>	TP_PMR_1417_01 (Interoperability), TP_PMR_1417_02 (Interoperability), TP_PMR_1417_03 (Interoperability), TP_PMR_1417_01 (Conformance), TP_PMR_1417_02 (Conformance)	

RQ_001_1418	Dialling Plan	
TS 102 490 [1]	Clause: A.3.4.1.3 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio is complying with the Standard User Interface</p> <p>The radio may use a mask to limit the number of digits to be entered to be less than 7.</p> <p>Masked dialling may also be used in conjunction with abbreviated dialling.</p>	
<i>Specification Text:</i>	<p>{{The number of digits of a dialling string that can be entered may be restricted by MS programming to restrict the number range accessible from the user interface. For example the user interface could mask the most significant digit of an address to prevent the MS from reaching other MSs outside its own prefix.</p> <p>Where masked dialling is used in the MS, the MS shall insert the characters from its own individual address that correspond to the each of the blocked positions to complete the dialled string prior to transmission.</p> <p>Masked dialling may also be used in conjunction with abbreviated dialling. Those digits entered may also include wildcards.</p> <p>Example:</p> <p>For the MS individual address of 3456789.</p> <p>The dialling string entry mask is [X] [X] [X] [X] [] [] []</p> <p>The user may only enter digits in those positions not marked with an X.</p> <ul style="list-style-type: none"> - If the user enters 888# then the resulting dialling string will be 3456888. - If the user enters 8# then the resulting dialling string will be 3456788 - If the user enters 88*# then the resulting dialling string will be 345688* (Talkgroup call) <p>}}</p>	
<i>Family:</i>	RQ_001_1418 , RQ_001_1316, RQ_001_1316	
<i>Test Purposes:</i>	TP_PMR_1418_01 (Interoperability), TP_PMR_1418_02 (Interoperability), TP_PMR_1418_01 (Conformance), TP_PMR_1418_02 (Conformance), TP_PMR_1418_03 (Conformance), TP_PMR_1418_04 (Conformance)	

RQ_001_1420**Dialling Plan**

TS 102 490 [1]

Clause: A.3.4.2.1 §1

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF a CSF radio is complying with the Standard User Interface
 AND the user keys in a call modifier prefix of #1*.....
 AND the dialled digits after this prefix correspond to a talk group
 address in the radio's memory
 THEN the radio shall set up a broadcast talk group call to that
 address.

Specification Text:

Functions such as the modification of call requests to change to type of service request, and the implementation of other facilities (status, broadcast, etc), are initiated using the syntax in the following clauses. The call modifier is defined by the dialled string by adding extra digits to the dialled destination in the form.

<call modifier code> * destination as defined in clauses A.3.4.3.1 to A.3.4.3.7

Table A.5: Summary of call modifiers

Dialled Digits	Call Modifier
#1*nn..#	Broadcast call, clause A.3.4.2.1
#0ss*nn..#	Status call, clause A.3.4.2.2
#6*nnn..#	Force talkgroup service, clause A.3.4.2.3

{{A.3.4.2.1 Broadcast call

The MS shall set-up a broadcast call to the destination talkgroup nn by dialling "#1*nn#".

The broadcast call shall be a normal group call but with the Communications Format set to 'Call All' (Broadcast).

EXAMPLE 1: "#1*112345*#" should make a broadcast talkgroup call to MS address "112345*".

NOTE: The dialled string "#1*nnn". "#" should generate an error if the address is not a talkgroup address.

EXAMPLE 2: If the MS calling party address is "1234567". "#1**#" should make a broadcast talkgroup call to "123456*" (i.e. to "1234560", "1234561", etc., "1234569*").

Family:

RQ_001_1420, RQ_001_1405, RQ_001_1405

Test Purposes:

TP_PMR_1420_01 (Interoperability), TP_PMR_1420_02 (Interoperability),
 TP_PMR_1420_01 (Conformance), TP_PMR_1420_02 (Conformance), TP_PMR_1420_03
 (Conformance), TP_PMR_1420_04 (Conformance), TP_PMR_1420_05 (Conformance),
 TP_PMR_1420_06 (Conformance), TP_PMR_1420_07 (Conformance)

RQ_001_1421**Dialling Plan**

TS 102 490 [1]

Clause: A.3.4.2.2 §1

Type: Conditionally Mandatory

Applies to:

CSF

Requirement:

IF a CSF radio is complying with the Standard User Interface
 AND the user keys in a call modifier prefix of #0ss*.....
 AND the ss digits have a value of 0 to 31
 THEN the radio shall send a status call to the address specified
 after the call modifier with the status bits set to the value
 entered.

Entering a status value greater than 31 shall generate an error
 warning.

Specification Text:

Functions such as the modification of call requests to change to type of
 service request, and the implementation of other facilities (status, broadcast
 etc.), are initiated using the syntax in the following clauses. The call
 modifier is defined by the dialled string by adding extra digits to the dialled
 destination in the form.

<call modifier code> * destination as defined in clauses A.3.4.3.1 to
 A.3.4.3.7.

Table A.3.4.2: Summary of call modifiers

Dialled Digits	Call Modifier
#1*nn..#	Broadcast call, clause A.3.4.2.1
#0ss*nn..#	Status call, clause A.3.4.2.2
#6*nnn..#	Force talkgroup service, clause A.3.4.2.3

A.3.4.2.2 Status call

{{The string "#0ss*nnn#" causes the MS to set up a status call to the
 destination address nnn. The status digits "ss" are numeric in the range 0 to
 31}}.

The status call shall have the Header frame + End frame format of a status
 response call.

Entry of a status value greater than 31 shall generate an error warning to the
 user.

Family:

No Duplicates

Test Purposes:

TP_PMR_1421_01 (Interoperability), TP_PMR_1421_02 (Interoperability),
 TP_PMR_1421_01 (Conformance)

- RQ_001_1423** **Dialling Plan**
 TS 102 490 [1] *Clause:* A.3.4.2.3 §1 *Type:* Conditionally Mandatory
Applies to: CSF
Requirement: IF a CSF radio is complying with the Standard User Interface
 AND the user enters a call modifier prefix of #6*.....
 AND the dialled digits after this prefix correspond to a talk group
 address in the radio's memory
 THEN the radio shall set up a talk group call to that address.
- Specification Text:* Functions such as the modification of call requests to change to type of
 service request, and the implementation of other facilities (status, broadcast,
 etc.), are initiated using the syntax in the following clauses. The call
 modifier is defined by the dialled string by adding extra digits to the dialled
 destination in the form.
 # <call modifier code> * destination as defined in clauses A.3.4.3.1 to
 A.3.4.3.7.
 Table A.3.4.2: Summary of call modifiers
 Dialled Digits Call Modifier
 #1*nn...# Broadcast call, clause A.3.4.2.1
 #0ss*nn...# Status call, clause A.3.4.2.2
 #6*nnn..# Force talkgroup service, clause A.3.4.2.3
- A.3.4.2.3 Force talkgroup service
 {{The string "#6*nnn..#" causes the MS to set up a talkgroup call to
 destination talkgroup nnn. where nnn. is a numeric string of length from 1 to 7
 digits.
 EXAMPLE: To make a talkgroup call from MS 1122345 to talkgroup MSs 1122356 dial
 "#6*1122356#". In this case dialling "#6*56#" would achieve the same result.}}
- Family:* No Duplicates
Test Purposes: TP_PMR_1423_01 (Interoperability), TP_PMR_1423_02 (Interoperability),
 TP_PMR_1423_01 (Conformance)
- RQ_001_1424** **Dialling Plan**
 TS 102 490 [1] *Clause:* A.3.4.3 §1 *Type:* Conditionally Mandatory
Applies to: CSF
Requirement: IF a CSF radio is complying with the Standard User Interface
 AND the user keys "##" following dialling an address and "#"
 terminator,
 AND the radio has not yet transmitted the call,
 THEN the radio shall not initiate the call.
- Specification Text:* {{ "##" may be dialled after digits and a terminator have been entered on the
 keyboard. If the radio unit has not transmitted a call request, it shall
 abandon the call.}}
- Family:* **RQ_001_1424**, RQ_001_0841, RQ_001_0841
Test Purposes: TP_PMR_1424_01 (Interoperability), TP_PMR_1424_01 (Conformance)

4.2.3 Individual Short Data

4.2.3.1 ISDM Free Text Message

RQ_001_0852	ISDM Free Text Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Type 2 data THEN using Individual Short Data Message it may support supplementary service "Free Text Message".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0852_01 (Interoperability), TP_PMR_0852_02 (Interoperability), TP_PMR_0852_01 (Conformance)	

RQ_001_0853	ISDM Free Text Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Type 1 data THEN using Individual Short Data Message it may support supplementary service "Free Text Message".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0853_01 (Interoperability), TP_PMR_0853_02 (Interoperability), TP_PMR_0853_01 (Conformance)	

4.2.3.2 ISDM Precoded Message

RQ_001_0850	ISDM Precoded Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Type 1 data THEN using Individual Short Data Message it may support supplementary service "Precoded Message".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0850_01 (Interoperability), TP_PMR_0850_02 (Interoperability), TP_PMR_0850_01 (Conformance)	

RQ_001_0851	ISDM Precoded Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Type 2 data THEN using Individual Short Data Message it may support supplementary service "Precoded Message".</p>	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0851_01 (Interoperability), TP_PMR_0851_02 (Interoperability), TP_PMR_0851_01 (Conformance)	

4.2.3.3 ISDM Short File Transfer

RQ_001_0855 ISDM Short File Transfer

TS 102 490 [1] *Clause:* 8.2 §1 *Type:* Conditionally Optional

Applies to: CSF

Requirement: **IF a CSF radio supports Type 3 data (Packet Data)
THEN using Individual Short Data Message it may support
supplementary service "Short File Transfer".**

Specification Text: {{Table 8.3}}

Family: No Duplicates

Test Purposes: TP_PMR_0855_01 (Interoperability), TP_PMR_0855_02 (Interoperability),
TP_PMR_0855_01 (Conformance)

RQ_001_0856 ISDM Short File Transfer

TS 102 490 [1] *Clause:* 8.2 §1 *Type:* Conditionally Optional

Applies to: CSF

Requirement: **IF a CSF radio supports Type 2 data
THEN using Individual Short Data Message it may support
supplementary service "Short File Transfer".**

Specification Text: {{Table 8.3}}

Family: No Duplicates

Test Purposes: TP_PMR_0856_01 (Interoperability), TP_PMR_0856_02 (Interoperability),
TP_PMR_0856_01 (Conformance)

RQ_001_0857 ISDM Short File Transfer

TS 102 490 [1] *Clause:* 8.2 §1 *Type:* Conditionally Optional

Applies to: CSF

Requirement: **IF a CSF radio supports Type 1 data
THEN using Individual Short Data Message it may support
supplementary service "Short File Transfer".**

Specification Text: {{Table 8.3}}

Family: No Duplicates

Test Purposes: TP_PMR_0857_01 (Interoperability), TP_PMR_0857_02 (Interoperability),
TP_PMR_0857_01 (Conformance)

4.2.3.4 ISDM Status Message

RQ_001_0846 ISDM Status Message

TS 102 490 [1] *Clause:* 8.2 §1 *Type:* Conditionally Optional

Applies to: CSF

Requirement: **IF a CSF radio supports Type 2 data
THEN using Individual Short Data Message it may support
supplementary service "Status Message".**

Specification Text: {{Table 8.3}}

Family: No Duplicates

Test Purposes: TP_PMR_0846_01 (Interoperability), TP_PMR_0846_02 (Interoperability),
TP_PMR_0846_01 (Conformance)

RQ_001_0847	ISDM Status Message	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF a CSF radio supports Type 1 data THEN using Individual Short Data Message it may support supplementary service "Status Message".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0847_01 (Interoperability), TP_PMR_0847_02 (Interoperability), TP_PMR_0847_01 (Conformance)	

4.2.4 Off Air Call Set-up

RQ_001_0840	OACSU	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For Voice individual calls a CSF radio may support supplementary service "Off Air Call Set Up (OACSU)".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0840_01 (Interoperability), TP_PMR_0840_02 (Interoperability), TP_PMR_0840_01 (Conformance), TP_PMR_0840_02 (Conformance), TP_PMR_0840_03 (Conformance)	

RQ_001_0841	OACSU	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For Voice individual calls a CSF radio may support supplementary service "Cancel call set-up".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	RQ_001_1424 , RQ_001_0841, RQ_001_0841	
<i>Test Purposes:</i>	TP_PMR_1424_01 (Interoperability), TP_PMR_1424_01 (Conformance)	

4.2.5 Short Appended Data

RQ_001_0837	Short Appended Data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For Voice group calls a CSF radio may support supplementary service "Short appended data".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0837_01 (Interoperability), TP_PMR_0837_02 (Interoperability), TP_PMR_0837_01 (Conformance)	

RQ_001_0844	Short Appended Data									
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional								
<i>Applies to:</i>	CSF									
<i>Requirement:</i>	For voice individual calls a CSF radio may support supplementary service "Short appended data".									
<i>Specification Text:</i>	{{Table 8.3}}									
<i>Family:</i>	No Duplicates									
<i>Test Purposes:</i>	TP_PMR_0844_01 (Interoperability), TP_PMR_0844_02 (Interoperability), TP_PMR_0844_01 (Conformance)									
RQ_001_0932	Short Appended Data									
TS 102 490 [1]	Clause: 9.1 §23	Type: Conditionally Mandatory								
<i>Applies to:</i>	ISF, CSF									
<i>Requirement:</i>	<p>IF radio is an ISF radio and current transmission is voice plus appended data AND the PTT key is released before the end of the current Superframe</p> <p>THEN the current frame shall be completed using silence data for the Traffic Channel field and subsequent frames shall be coded as Type 2 data frames.</p>									
<i>Specification Text:</i>	<p>{{In the case of a voice + data and the voice transmission ends before the end of the current superframe, the current frame will be completed using silence data for the TCH }} ("silence data" is the vocoder output data when no sound is input). After completion of the current frame, subsequent frames in the superframe are available for data and coded according to clause 9.3. DP in the SLD field will indicate if the frame contains voice or data information (clause 5.9.1).</p> <p>{{Clause 5.9.1 Slow data in the voice superframe}}</p> <p>This is the normal use of the slow data field and 2 bytes of user data can be included within each frame of the voice superframe.</p> <p>In this case the communication mode is set to 001 (clause 5.7).</p> <p>Each byte of user data is preceded by a continuation flag (Cont.) to inform the receiving party if the subsequent byte is the last.</p> <table border="0" style="margin-left: 20px;"> <tr> <td>Cont.</td> <td>User data</td> <td>Cont.</td> <td>User data</td> </tr> <tr> <td>1 bit</td> <td>8 bits</td> <td>1 bit</td> <td>8 bits</td> </tr> </table> <p>Continuation Flag: 0 User data continues after the following byte. 1 User data is terminated by the following byte.</p>		Cont.	User data	Cont.	User data	1 bit	8 bits	1 bit	8 bits
Cont.	User data	Cont.	User data							
1 bit	8 bits	1 bit	8 bits							
<i>Family:</i>	No Duplicates									
<i>Test Purposes:</i>	None									

RQ_001_0933	Type 2 data									
TS 102 490 [1]	Clause: 9.1 §23	Type: Conditionally Mandatory								
Applies to:	ISF, CSF									
Requirement:	<p>IF radio is an ISF radio AND current transmission is voice plus appended data AND the PTT key is released before the end of the current Superframe</p> <p>THEN Data Position (DP) in the Slow Data (SLD) field shall indicate if the frame contains voice or data information as follows:</p> <table border="0"> <tr> <td>Cont.</td> <td>User data</td> <td>Cont.</td> <td>User data</td> </tr> <tr> <td>1 bit</td> <td>8 bits</td> <td>1 bit</td> <td>8 bits</td> </tr> </table> <p>Continuation Flag: 0 User data continues after the following byte. 1 User data is terminated by the following byte.</p>		Cont.	User data	Cont.	User data	1 bit	8 bits	1 bit	8 bits
Cont.	User data	Cont.	User data							
1 bit	8 bits	1 bit	8 bits							
Specification Text:	<p>{{In the case of a voice + data and the voice transmission ends before the end of the current superframe, the current frame will be completed using silence data for the TCH }}("silence data" is the vocoder output data when no sound is input). After completion of the current frame, subsequent frames in the superframe are available for data and coded according to clause 9.3. DP in the SLD field will indicate if the frame contains voice or data information (clause 5.9.1).</p> <p>{{Clause 5.9.1 Slow data in the voice superframe}}</p> <p>This is the normal use of the slow data field and 2 bytes of user data can be included within each frame of the voice superframe. In this case the communication mode is set to 001 (clause 5.7). Each byte of user data is preceded by a continuation flag (Cont.) to inform the receiving party if the subsequent byte is the last.</p> <table border="0"> <tr> <td>Cont.</td> <td>User data</td> <td>Cont.</td> <td>User data</td> </tr> <tr> <td>1 bit</td> <td>8 bits</td> <td>1 bit</td> <td>8 bits</td> </tr> </table> <p>Continuation Flag: 0 User data continues after the following byte. 1 User data is terminated by the following byte.</p>		Cont.	User data	Cont.	User data	1 bit	8 bits	1 bit	8 bits
Cont.	User data	Cont.	User data							
1 bit	8 bits	1 bit	8 bits							
Family:	No Duplicates									
Test Purposes:	None									

4.2.6 Slow User Data

RQ_001_0836	Slow User Data	
TS 102 490 [1]	Clause: 8.1 §1	Type: Conditionally Optional
Applies to:	ISF, CSF	
Requirement:	For Voice group calls a radio may support supplementary service "Slow user data".	
Specification Text:	<p>{{Table 8.1}}</p> <p>{{Table 8.3}}</p>	
Family:	No Duplicates	
Test Purposes:	TP_PMR_0836_01 (Interoperability), TP_PMR_0836_02 (Interoperability), TP_PMR_0836_01 (Conformance), TP_PMR_0836_03 (Interoperability), TP_PMR_0836_04 (Interoperability), TP_PMR_0836_02 (Conformance)	

RQ_001_0843	Slow User Data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Conditionally Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	For Voice individual calls a CSF radio may support supplementary service "Slow user data".	
<i>Specification Text:</i>	{{Table 8.3}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0843_01 (Interoperability), TP_PMR_0843_02 (Interoperability), TP_PMR_0843_01 (Conformance)	

4.2.7 Type 3 Data

RQ_001_0808	Type 3 data	
TS 102 490 [1]	Clause: 8.2 §1	Type: Optional
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	A CSF radio may support Individual Short Data Message service (Type 3, Packet data)	
<i>Specification Text:</i>	{{Type 3 data, Individual Short Data Message}}.	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0808_01 (Interoperability), TP_PMR_0808_02 (Interoperability), TP_PMR_0808_01 (Conformance)	
RQ_001_0817	Type 3 data	
TS 102 490 [1]	Clause: 8.3.2 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	IF it supports Packet Data message service (Type 3) THEN in case of successful reception and decoding of a type 3 packet data transmission including a header frame, a sequence of packet data frames, and an end frame, a CSF radio shall send an acknowledge message containing information element Call Information with value "ACK RX(ok)".	
<i>Specification Text:</i>	<p>{{Receiving parties will signal to the transmitting party whether the data has been received without errors.</p> <p>Where there where no errors in any of the received packet frames, the response shall be an ACK frame with the Acknowledgement type (in the CI data) set to 001.</p> <p>}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0817_01 (Conformance)	

RQ_001_0818	Type 3 data	
TS 102 490 [1]	Clause: 8.3.2 §3	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Packet Data message service (Type 3) THEN receiving a packet data message (type 3) it shall send a negative acknowledgement message NACK when there is an error in the decoded data. The NACK message shall indicate the packet data frame number from which to re-transmit the last communication frame.</p>	
<i>Specification Text:</i>	<p>{{Where errors are detected in any of the received packet frames, the response shall be an ACK frame with the Acknowledgement type (in the CI data) set to 010. This is a NACK frame. The information bits in the CI data will denote the number of the last packet frame received without error. The NACK retransmit values are given in Table 8.4}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0818_01 (Conformance)	
RQ_001_0819	Type 3 data	
TS 102 490 [1]	Clause: 8.3.6	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Packet Data message service (Type 3) THEN it shall indicate the completion of a packet data call by sending a disconnect request consisting of two consecutive Header frame, End frame pairs.</p>	
<i>Specification Text:</i>	See {{Figure 4 }}in document	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0819_01 (Conformance)	
RQ_001_0820	Type 3 data	
TS 102 490 [1]	Clause: 8.3.6	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Packet Data message service (Type 3) AND it receives a negative acknowledgement message (NACK) after a packet data message transmission THEN it shall re-transmit the frames from the frame number indicated in the NACK message.</p>	
<i>Specification Text:</i>	{{Figure 5}}	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0820_01 (Conformance)	
RQ_001_0821	Type 3 data	
TS 102 490 [1]	Clause: 8.3.5 §1	Type: Conditionally Mandatory
<i>Applies to:</i>	CSF	
<i>Requirement:</i>	<p>IF a CSF radio supports Packet Data message service (Type 3) THEN it shall set unused bytes in the DATA information element in the last Data Packet Frame to "0" when transmitting Packet data messages. The unused bytes are those bytes (if any) exceeding the specified data length up to the DATA information element length.</p>	
<i>Specification Text:</i>	<p>{{The transmitting party will signal the actual length of the valid data contained in each packet using the LEN parameter. Any unused bytes of each packet shall be completed with null data (all zeroes).}}</p>	
<i>Family:</i>	No Duplicates	
<i>Test Purposes:</i>	TP_PMR_0821_01 (Conformance)	

RQ_001_0822	Type 3 data	
TS 102 490 [1]	Clause: 8.3.6 §1	Type: Conditionally Mandatory
Applies to:	CSF	
Requirement:	<p>IF CSF radio supports Packet Data message service (Type 3) THEN it shall in each packet data frame include a 16 bit CRC field (CRC_D) for the DATA information element using the Generated Polynomial $X^{16} + X^{12} + X^5 + 1$ when transmitting a Packet Data message.</p>	
Specification Text:	<p>{{A 16 bit CRC checksum is calculated from the contents of the data field (including any dummy bits used) in each packet frame, CRC-D. The Generated Polynomial uses $X^{16} + X^{12} + X^5 + 1$. This CRC-D checksum is used in the parameter field (PAR) of the packet data frame.}}</p>	
Family:	No Duplicates	
Test Purposes:	TP_PMR_0822_01 (Conformance)	

4.3 Initial Services and Facilities Radios

RQ_001_0804	ISF											
TS 102 490 [1]	Clause: 8.1.1.1	Type: Mandatory										
Applies to:	ISF											
Requirement:	A ISF radio shall have 255 selectable IDs.											
Specification Text:	<p>Selectable values (decimal) are as follows: Table 8.2: Common ID addressing</p> <table border="0"> <tr> <td>Com ID</td> <td></td> </tr> <tr> <td>0</td> <td>Reserved</td> </tr> <tr> <td>{1 to 254</td> <td>Applicable</td> </tr> <tr> <td>255</td> <td>All call</td> </tr> <tr> <td colspan="2">}}</td> </tr> </table>		Com ID		0	Reserved	{1 to 254	Applicable	255	All call	}}	
Com ID												
0	Reserved											
{1 to 254	Applicable											
255	All call											
}}												
Family:	No Duplicates											
Test Purposes:	TP_PMR_0804_01 (Interoperability), TP_PMR_0804_01 (Conformance)											
RQ_001_0805	ISF											
TS 102 490 [1]	Clause: 8.1.1, 8.1.1.2 §1	Type: Mandatory										
Applies to:	ISF											
Requirement:	A ISF radio shall use the first 8 bits of the address field as a user selectable Common ID and the following 16 bits shall be all set to 1.											
Specification Text:	<p>For the purposes of interoperability "out of the box", radios employing Initial Services and Facilities shall operate with simplified addressing scheme. {{Of the 24 bit address space, 16 bits are fixed and only the 8 bit Common ID is selectable by the user.}} This results in 254 selectable codes which operate indiscriminately as both individual and group addresses.</p> <p>{{The 16 bits following the common ID field shall all be set to 1.}}</p>											
Family:	No Duplicates											
Test Purposes:	TP_PMR_0805_01 (Conformance)											

History

Document history		
V1.1.1	April 2007	Publication
V1.2.1	July 2008	Publication
V1.3.1	September 2010	Publication