                              Megaco Errata

1. Abstract

   This document records the errors found in the Megaco/H.248 protocol
   document [2], along with the changes proposed in the text of that
   document to resolve them.

2. Conventions used in this document

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
   document are to be interpreted as described in RFC-2119 [1].

3. Errata

   All section numbers are those of the relevant text of [2].

   Section: 2 "References"

   Editorial: Add missing references to I.363.5 (AAL5) and RFC 1661
   (PPP).

   Editorial: delete unused reference to Q.724.

   Editorial: Leave Recommendations referred to in Annex C undated,
   implying latest issue.

   Editorial: add reference to RFC 2805, the Megaco requirements
   document.

Section: 4 "Abbreviations"

Editorial: delete unused abbreviation BRI.

Editorial: add explanations for GSM and IVR.

Section: 6.2.2 "TerminationIDs"

Issue: Not clear what wildcard union responses look like.

Resolution: Add the following text:
 "ie. Given termination Ta with properties p1=a, p2=b, and
termination Tb with properties p2=c, p3=d a UNION
response would be T* p1=a, p2=b,c, p3=d."

Section: 6.2.4 "Termination Properties and descriptors"

Issue: Says that property values set in Null context are remembered
and reinstated when termination returns to Null. Contradicts latest
text in 7.2.3.

Resolution: Rewrite the first paragraph from the third sentence
onward, to read: "Most properties have default values, which are
explicitly defined in this standard or in a package (see Section 12)
or set by provisioning. If not provisioned otherwise, all
descriptors except for TerminationState and LocalControl default to
empty/"no value" when a termination is first created or is returned
to the null context. The default contents of the two exceptions are
described in sections 7.1.5 and 7.1.7."

Issue: DigitMap entry in table makes explicit reference to DTMF
tones, but is also intended to apply to other in-band signalling
systems.

Resolution: Change existing text to new one as follows: "Defines
patterns against which sequences of a specified set of events are to
be matched so they can be reported as a group rather than singly."

Section: 6.2.5 "Root Termination"

Issue: Root can have statistics as well as properties and events.

Resolution: add "statistics" to the fourth sentence of the first
paragraph, listing what is valid for Root. Add "statistics" to what
AuditValue can return for Root.

Section: 7.1 "Descriptors"

Issue: it is unclear how to express empty descriptors in responses to
the MGC.

Proposed resolution: In section 7.1, add the following text after the
sentence: "Descriptors may be returned as output from a command.":
"In any such return of descriptor contents, an empty descriptor is
represented by its name unaccompanied by any list."

In the ASN.1, add the following choice to the AuditReturnParameter
production:

   "emptyDescriptors   AuditDescriptor,"

In the ABNF, add the choice auditItem to the production
auditReturnParameter.

Section: 7.1.1 "Specifying Parameters"

Issue: Third paragraph (discussing unspecified parameters): not clear
which parameters are mandatory.

Resolution: Replace the first two sentences (each beginning with the
word "unspecified") with the following text: "If a required
descriptor other than the Audit descriptor is unspecified (i.e.
entirely absent) from a command, the previous values set in that
descriptor for that termination, if any, are retained. A missing
Audit descriptor is equivalent to an empty Audit descriptor. The
behaviour of the MG with respect to unspecified parameters within a
descriptor varies with the descriptor concerned, as indicated in
succeeding sections."

Section: 7.1.6 "Stream Descriptor", ABNF (Annex B.2)

Issue: Text indicates use of "true" and "false" values while ABNF
uses "on" and "off"

Resolution: Add comment in B.2 that "true" in text corresponds to
"on" in ABNF, and "false" corresponds to "off".

Section: 7.1.8 "Local and Remote Descriptors"

Issue: case where reserveGroup or reserveValue is true, last bulleted
item beginning: "If the Mode property of the LocalControl descriptor
is RecvOnly or SendRecv,...", could also have DSP involvement in the
case of loopback mode.

Resolution: Add "loopback".

Section: 7.1.9 "Events Descriptor"

Issue: EventDM is part of syntax but not mentioned in section.

Resolution: Add text: "If a digit map completion event is present or
implied in the EventsDescriptor, EventDM is used to carry either the
name or the value of the associated digit map. See section 7.1.14."

Issue: Not clear whether events trigger side effects (e.g. signal
termination) at time of detection, at time of processing (whether or
not in active Events Descriptor) or at time of notification. Also,
the third paragraph of the section fails to mention these side
effects and limits MG action to notification.

Resolution: Modify the third paragraph of the section, so that it
reads: "When an event (either newly detected or buffered) is
processed against the contents of an active Events descriptor and
found to be present in that descriptor ("recognized"), the default
action of the MG is to send a Notify command to the MG. Notification
may be deferred if the event is absorbed into the current dial string
of an active digit map (see section 7.1.14). Any other action is for
further study. Moreover, event recognition may cause currently
active signals to stop, or may cause the current Events and/or
Signals descriptor to be replaced, as described at the end of this
section."

Replace "detection" with "recognition" in the fourth paragraph from
the end, so that it reads: "Normally, recognition of an event shall
cause any active signals to stop. When KeepActive is specified in
the event, the MG shall not interrupt any signals active on the
Termination on which the event is detected."

In the third-last paragraph, replace all three instances of
"detected" with "recognized".

Leave the word "detected" as is in the final paragraph.

Issue: Case 1, step 2(a) is incorrectly formulated. Existing logic
may result in an infinite loop. Also, the step excludes side effect
actions such as signal termination.

Resolution: Modify step 2(a) to read: "If the event in the queue is
in the events listed in the new EventsDescriptor, the MG acts on the
event and removes it from the EventBuffer. The time stamp of the
Notify shall be the time the event was actually detected. The MG
then waits for a new EventsDescriptor. While waiting for a new
EventsDescriptor, any events detected which appear in the current
EventsBufferDescriptor will be placed in the EventBuffer. When a new
EventDescriptor is received, event processing repeats from step 1."

Section: 7.1.11 "Signals Descriptor"

Issue: There is a need for the MGC to be aware of signalling
failures. It is not possible to use the signal completion event to
monitor for signalling failures only, without also having to process
successes.

Proposed Resolution: In section 7.1.11, replace the current text on
completion notification, beginning: "Finally, the optional parameter
"notifyCompletion" ..." and continuing to the end of the paragraph
with the following text:

"Finally, the optional parameter "notifyCompletion" allows a MGC to
indicate the circumstances under which it wishes to be notified when
the signal finishes playout. The possible cases are that the signal
timed out, that it was interrupted by an event, that it was halted
when a Signals descriptor was replaced, or that it stopped or never
started for other reasons. If "notifyCompletion" is absent,
notification is generated in the "other reasons" case only. For
reporting to occur the signal completion event (see section E.1.2)
must be enabled in the currently active Events descriptor."

In Annex A.2, make notifyCompletion a BIT STRING with the four cases.
In B.2, make it a parameter consisting of a name and a list of values
representing the possible completion methods.

Section: 7.1.13 "ServiceChange Descriptor"

Issue: Missing "extension" component in the API.

Resolution: Add missing component.

   Section: 7.1.14 "DigitMap Descriptor"

   Editorial: add the following subsections.

   7.1.14.1 DigitMap definition, creation, modification and termination
   (before first paragraph)

   7.1.14.2 DigitMap Timers (after the first bullet list)

   7.1.14.3 DigitMap syntax (before the long paragraph starting "The
   formal syntax of the digit map [...]")

   7.1.14.4 DigitMap completion event (before the paragraph starting "A
   digit map is active while the events descriptor [...]")

   7.1.14.5 DigitMap procedures (before the sentence "Pending
   completion, successive events shall be processed [...]", preceding
   the numbered list)

   7.1.14.6 DigitMap activation (after the numbered list)

   7.1.14.7 Interaction of DigitMap and event processing (before the
   next paragraph, starting "While the digit map is activated, [...]")

   7.1.14.8 Wildcards (before the the next paragraph, starting "Note
   that if a package contains [...]")

   7.1.14.9 Example (before the example)

   Issue: incorrect statements regarding the interaction of the dot
   symbol with default timing rules.

   Resolution: last sentence of the paragraph beginning "The letter "x"
   is used as a wildcard, ..." should be modified to read: "As a
   consequence of the third timing rule above, inter-event timing while
   matching a terminal dot symbol uses the short timer by default." In
   the next paragraph, the third sentence, which begins: "A timer
   specifier following a dot ...", should be deleted.

   Issue: Step 5 in second numbered list understates conditions for
   digit map completion when single candidate remains.

   Resolution: Add the words "and it has been fully matched" to the
   existing sentence. Also remove the parenthetical remark: "...
   (because the candidate set still contains more than one alternative
   event sequence)" from step 6.

Issue: Not clear when unmatched events are recognized and trigger
side effects (e.g. signal termination).

Resolution: Modify the final sentence of the paragraph following
procedural step 6 to read as follows: "Normal event behaviour (e.g.
stopping of signals unless the digit completion event has the
KeepActive flag enabled) continues to apply for each such event
detected, except that

    . the events in the package containing the specified digit map
      completion event other than the completion event itself are not
      individually notified, and
    . an event which triggers a "partial match" completion is not
      recognized and therefore has no side effects until reprocessed
      following the recognition of the digit map completion event."

Issue: the last paragraph before the example is misleading if the
package containing the digit map completion event is different from
the package containing the actual digits.

Resolution: qualify the second sentence of the paragraph as follows:
"Regardless of whether a digit map is activated, if the package also
contains the digit events themselves, this form of event
specification ...".

Section: 7.1.18 "Topology Descriptor"

Issue: Third bullet attached to third para: says loopback achieved by
manipulating TerminationMode, which no longer has that name.

Resolution: Delete the clause "; loopbacks are created by setting the
TerminationMode"

Section: 7.2

Issue: The order in which descriptors are processed within a command
matters, but is not clear. Moreover, it is fixed in the ASN.1 but
variable in the ABNF.

Resolution: Add text stating that descriptors are processed in the
order in which they are provided. Change ASN.1 in Annex A.2 to allow
the MGC to specify ordering:

```
AmmRequest ::= SEQUENCE
{
        terminationID           TerminationIDList,
        descriptors             SEQUENCE OF AmmDescriptor,
        -- At most one descriptor of each type (see AmmDescriptor)
        -- allowed in the sequence
        ...
}

AmmDescriptor ::= CHOICE
{
        mediaDescriptor         MediaDescriptor,
        modemDescriptor         ModemDescriptor,
        muxDescriptor           MuxDescriptor,
        eventsDescriptor        EventsDescriptor,
        eventBufferDescriptor   EventBufferDescriptor,
        signalsDescriptor       SignalsDescriptor,
        digitMapDescriptor      DigitMapDescriptor,
        auditDescriptor         AuditDescriptor,
        ...
}
```

Section: 7.2.3 "Subtract"

Issue: cannot use the CHOOSE wildcard for terminationId of a Subtract
command.

Resolution: add this qualification to the second sentence, which
indicates that terminationId may be wildcarded.

Section: 7.2.4 "Move"

Issue: cannot use the CHOOSE wildcard for terminationId of a Move
command.

Resolution: add this qualification to the second sentence, which
indicates that terminationId may be wildcarded.

Section: 7.2.5 "AuditValue"

Issue: Not clear whether AuditValue of ObservedEventsDescriptor
reports events captured in current dial string of active digit map.

Resolution: Add text to indicate that if a digit map is active and
ObservedEventsDescriptor is specified the response to an AuditValue
includes a digit map completion event which shows the current dial
string but does not show a termination method.

Issue: Fails to indicate what AuditValue for EventBufferDescriptor
returns

Resolution: Add the following text: "EventBuffer returns the set of
events and associated parameter values currently enabled in the
EventBufferDescriptor."

Issue: not clear whether wildcarded context includes the null
context.

Resolution: add statement that ALL as a contextID does not include
the null context.

Issue: the text of 7.2.5 allows retrieval of multiple digit maps with
one AuditValue command if the terminationId is ALL. Moreover,
earlier text in the Annex anticipates that multiple instances of a
descriptor may be returned. The comment in front of production
auditReturnParameter in Annex B.2 contradicts this text. Note that
Annex A has no restriction on the number of instances of any
descriptor in either a command or a response.

Proposed Resolution: delete the"at-most-once" comment preceding ABNF
production auditReturnParameter.

Issue: Does not indicate how an audit of digit maps returns unnamed
digit maps.

Resolution: Change syntax of DigitMapDescriptor to allow return of
unnamed digit maps as follows:

digitMapDescriptor = DigitMapToken EQUAL
                    ((LBRKT digitMapValue RBRKT)
                    / (digitMapname [LBRKT digitMapValue RBRKT])
) and

DigitMapDescriptor ::= SEQUENCE {
        digitMapName   DigitMapName OPTIONAL,
        digitMapValue   DigitMapValue OPTIONAL }

Issue: the text in section 7.2.5 mentions that using an empty Audit
descriptor with a wildcarded terminationId is a way to get a list of
the terminations in the context. Annex A provides the possibility
that the auditReply may be a contextAuditResult of type
terminationIdList, and Annex B allows for an auditReply containing a
contextTerminationAudit which in turn presents a terminationIdList.
The connection between the text in 7.2.5 and these special forms of
audit result is not clear. Moreover, a note at the beginning of
Annex A section A.2 limits terminationIdList to one terminationId.

Proposed Resolution: add the following text in section 7.2.5 after
the sentence "This may be useful to get a list of TerminationIDs when
used with wildcard.": "Annexes A and B provide a special syntax for
presenting such a list in condensed form, such that the AuditValue
command tag does not have to be repeated for each terminationId."
Also, in the Note at the beginning of section A.2 of Annex A, provide
an exception on the length of type TerminationIdList when used in
contextAuditResult.

Section: 7.2.6 "AuditCapabilities"

Issue: Fails to indicate what AuditCapabilities for
EventBufferDescriptor returns

Resolution: Add the following text: "EventBuffer returns the same
information as Events."

Issue: Inconsistency regarding permissibility of DigitMap or Packages
as capability audit items.

Resolution: Add comment to B.2 "auditItem" production indicating that
DigitMap and Packages are not allowed in the AuditCapabilities
command.

Section: 7.2.8 "ServiceChange"

Issue: In point 1) describing the Graceful ServiceChange method, the
scope of the recommendation against new connections is unclear.

Resolution: at the end of the first sentence, add the phrase "on the
termination(s) affected by the ServiceChange command".

Issue: the explanatory string associated with ServiceChangeReason is
optional in the syntax, but not in the text.

Resolution: add "optional" before "explanatory string" in the
explanation of the ServiceChangeReason" parameter.

Issue: Paragraph beginning "A ServiceChange Command specifying the
Root..." immediately following the description of ServiceChange
Descriptor parameters erroneously states that the response to the
ServiceChange command terminates the registration process. This is
so only if the response does not specify an alternate MGC.

Resolution: Add text to the offending sentence, so that it reads:
"Acknowledgement of the ServiceChange Command completes the
registration process, except when the MGC has returned an alternative
ServiceChangeMgcId as described in the next paragraph."

Section: 7.3 "Command Error Codes"

Issue: Text for error code 403 should be consistent with that for 404
and 405.

Resolution: Change text to "Syntax error in TransactionRequest"

Issue: There should be no error responses to TransactionReply or
TransactionPending, lest they create response loops.

Resolution: Delete codes 404, 405, 461-467

Section: 8 "Transactions", A.2

Issue: state is unclear if a command fails.

Resolution: add the following text: "If a command fails, the MG
shall as far as possible restore the state which prevailed prior to
the attempted execution of the command before continuing with
transaction processing."

Section: 8.1.1 "Transaction Identifiers"

Issue: need a transaction identifier to use when reporting a syntax
error such that the identifier is unavailable.

Resolution: add text reserving transionId = 0 for this purpose.

Section: 8.1.2 "Context Identifiers"

Issue: ALL as a context identifier does not include the null context.

Resolution: add text to indicate that exclusion in the final sentence
of the section.

Section: 8.2.2 "TransactionReply"

Issue: Final para has wrong text for error code 442.

Resolution: Change to "Syntax Error in Command"

Section: 10.2 "Interim AH Scheme", B.2

Issue: The interim AH header can actually be as short as 24 hex
digits (per RFCs 2403, 2404 which are indirectly referenced). It is
also unclear whether it is the source or destination UDP port which
is prepended in the calculation.

Resolution: Change 10.2 second para, second-last sentence to specify
the destination port, in consistency with IPSEC. In Annex B.2,
change lower count for production AuthData to 24 from 32.

Section: 11.2 "Cold Start"

Issue: First paragraph last sentence inadvertently modified --
duplicates material in 11.3.

Resolution: Restore original sentence: "If the MG is unable to
establish a control relationship with any MGC, it shall wait a random
amount of time as described in Section 9.2 and then start contacting
its primary, and if necessary, its secondary MGCs again."

Section: 11.4 "Failure Of an MG"

Issue: Second para: wrong MG is specified as the one to be used after
failover.

Resolution: Change fourth sentence to refer to "secondary MG" rather
than "primary MG".

Section: 12.1.2 "Properties"

Issue: As indicated in 6.2.4, Properties occur in other descriptors
besides LocalControl and TerminationState.

Resolution: after the sentence mentioning TerminationState, add
another sentence: "Although these are the most common cases, it is
also possible for a property to be defined for other descriptors."

Section: 12.1.4 "Signals"

Issue: Note says that default duration should be specified for BR
signals. This also applies to TO signals.

Resolution: Add TO signals to note.

Section: 12.2 "Guidelines to defining Properties, Statistics and
Parameters to Events and Signals", B.2

Issue: Text indicates that statistics can have the sub-list data
type, but ABNF does not support that.

Resolution: qualify the sublist type by adding the note: "(not
supported for statistics)".

Section: Annex A.1, ASN.1 Syntax

Issue: the ASN.1 uses the values 0x0, 0xFFFFFFFE, and 0xFFFFFFFF for
the NULL context, a wildcard CHOOSE of context, and a wildcard ALL of
context respectively. Because of the possibility of a switch between
binary and text encoding for messages relating to the same context,
these values should be reserved in the text encoded syntax.

Resolution: Add a comment preceding the ContextID production in Annex
B.2 indicating that these values are reserved.

Section: Annex A.2, ASN.1 Syntax

Issue: sloppy ASN.1 -- in production EventBufferControl the values
"off" and "lockstep" should not be capitalized, and IA5STRING in
production NonStandardIdentifier should be IA5String. Both
TransactionID and TransactionId are used. A number of productions
need ellipses to express extensibility.

Resolution: fix them.

Issue: syntax for PropertyParm does not support sub-lists (i.e.
parameters supporting multiple values simultaneously)

Resolution: add a third choice to extrainfo in PropertyParm as
follows:

```
        extraInfo    CHOICE
     {
             relation          Relation,
             range             BOOLEAN,
             sublist           BOOLEAN
     } OPTIONAL
```

and add an appropriate note to the preceding comments.

Issue: LocalControlDescriptor still contains reserve rather than
reserveValue and reserveGroup.

Resolution: Replace reserve with separate reserveValue and
reserveGroup Booleans.

Issue: EventBufferDescriptor is incorrectly portrayed as a SEQUENCE
OF ObservedEvent.

Resolution: replace with the following productions:

```
EventBufferDescriptor ::= SEQUENCE OF EventSpec

EventSpec ::= SEQUENCE {
    pkgdName                PkgdName,
    streamID                StreamID OPTIONAL,
    evParList               SEQUENCE OF EventParameter }
```

Issue: Assigned object identifier missing. It is usually present as
a matter of convention.

Resolution: Add object identifier line in the message header with
content:
    "itu-t recommendation h 248 media-gateway-control(0)" Delete the
version field, which this makes redundant.

Issue: the T.35 country code in the H221NonStandard production does
not have the right structure.

Resolution: fix it.

Section: Annex B.2, ABNF Syntax

Issue: Syntax for parmValue and VALUE together make parsing of range
ambiguous. Furthermore, sub-lists and sets of alternative values
have the same syntax, introducing possible ambiguity

Resolution: Replace production alternativeValue by the following:
  "alternativeValue = (VALUE
        / LSBRKT VALUE *(COMMA VALUE) RSBRKT   ; sub-list
        / LBRKT VALUE *(COMMA VALUE) RBRKT   ; alternatives
        / LSBRKT VALUE COLON VALUE RSBRKT)   ; range"

Issue: EventBufferDescriptor content mistakenly shown as a sequence
of observedEvent.

Resolution: replace the production for eventBufferDescriptor with the
following productions:

eventBufferDescriptor = EventBufferToken LBRKT [eventSpec
   *(COMMA eventSpec)] RBRKT

eventSpec = pkgdName [LBRKT   eventSpecParameter
                      *(COMMA eventSpecParameter) RBRKT]

eventSpecParameter = (eventStream / eventOther)

Issue: Error in syntax for digitMapDescriptor: value meant to be
optional.

   Resolution: Change production:
   digitMapDescriptor = DigitMapToken EQUAL digitMapName
                 [LBRKT digitMapValue RBRKT]

   Issue: VersionToken not defined.

   Resolution: Add ABNF: VersionToken = ("Version" / "V")

   Issue: DiscardToken not used.

   Resolution: Delete production.

   Section: Annex C

   Issue: alignment of sub-octet fields within the octet is not
   indicated.

   Resolution: add note that fields of sub-octet length are placed in
   the low-order bits of the octet.

   Section: Annex C, ATM-related sections C.4, C.7, C.8, C.10

   Issue: direction of flow is segregated by outgoing (Remote
   descriptor) and incoming (Local descriptor). Since forward and
   backward properties will not both reside in the same descriptor, need
   only the one set of properties applicable to both directions.

   Resolution: replace with a single set of properties.

   Issue: miscellaneous problems of parameter specifications
   inconsistent with the relevant standards, unused parameters,
   distinction between ATM Forum and ITU-T usages, missing references.

   Resolution: fix them.

   Section: Annex C.8 "ATM AAL1"

   Issue: Length of GIT is wrong.

   Resolution: ITU-T procedural problem, to be resolved by SG 16.
   Probable solution is to allow 29 octets, event though the relevant
   form requires only four octets.

   Section: Annex C.9 "Bearer Capabilities"

   Issue: ITC has reference to missing note 2

   Resolution: Delete reference.

   Issue: Not clear that Q.931 Bearer Capability IE rather than Low
   Layer Compatibility IE is being used.

   Resolution: Specify that values are those valid for Bearer Capability
   IE

   Section: Annex D.1 "Transport over IP/UDP using Application Level
   Framing"

   Issue: Even in the case of handoff or failover, the originating MGC
   needs confirmation that its command was received.

   Resolution: In the last sentence of the first paragraph, delete the
   excepting clause, so that the sentence reads: "Responses must be sent
   to the address and port from which the corresponding commands were
   sent."

   Section: Annex D.1.1 "Providing At-Most-Once Functionality"

   Issue: Second para last sentence provides a procedural reference to
   8.2.3. Should refer to UDP-specific procedures.

   Resolution: Add reference to D.1.4.

   Section: Annex D.1.3 "Repeating Requests, Responses and
   Acknowledgements"

   Issue: Make exponential backoff in the face of congestion mandatory.

   Resolution: To the paragraph just before the note, which begins "The
   specification purposely avoids specifying any value for the
   retransmission timers...", add the following sentence:

   "Implementations SHALL ensure that the algorithm used to calculate
   retransmission timing performs an exponentially increasing backoff of
   the retransmission timeout for each retransmission or repetition
   after the first one."

   In the paragraph in the middle of the note beginning "After any
   retransmission ...", capitalize the word SHOULD to emphasize the
   importance of the steps which follow.

   Issue: Last paragraph is equivocal about what ServiceChangeReason to
   use when recovering from loss of contact; it must always be
   "Disconnected".

Resolution: Change the two sentences following the phrase "_ and it begins its recovery process" to read as follows: "The MG shall use a ServiceChange with ServiceChangeMethod set to disconnected so that the new MGC will be aware that the MG lost one or more transactions."

Section: Annex D.1.4 "Provisional responses"

Issue: First paragraph, last sentence talks about when to send the Transaction Pending response. When UDP/ALF is in use, the originator of a transaction may repeat it because it has not received an acknowledgement that the transaction was received. An appropriate response to a duplicate transaction which is still being processed is to return Transaction Pending.

Resolution: Add the sentence: "They SHOULD send this response if they receive a repetition of a transaction that is still being executed."

Issue: Second para: transaction originator may not have received TransactionPending response(s) because they were lost, and may therefore not know that responder is expecting immediate acknowledgement of the TransactionReply.

Resolution: add an optional field to TransactionReply allowing the responder to indicate if an immediate ACK is required. Add text in the section indicating that when the responder has sent a provisional response, it shall also set the indicator in the final transaction reply to indicate that an immediate acknowledgement is required.

Section: Annex E "Basic Packages"

Issue: package numbering does not follow order of presentation.

Resolution: renumber packages to follow order of numbering.

Section: Annex E.2.1 "Base Root Package -- Properties"

Issue: the descriptor in which these properties occur is not specified.

Resolution: in each case, indicate that the property is defined in the TerminationState descriptor.

Section: Annex E.6.2 "DTMF detection Package -- Events"

Issue: "Long duration event modifier" is shown as "L" in parameter DigitString -- should be "Z".

Resolution: Replace with "Z".

Section: Annex E.9.2 "Analog Line Supervision Package -- Events"

Issue: Stated hook state reporting behaviour has race condition where
same transition could be reported twice.

Resolution: add an optional EventsDescriptor parameter and an
optional ObservedEvents parameter to each of the on-hook and off-hook
events. Delete the second sentence of the existing event description
(which indicates that the event is always reported if the hook state
has already been achieved).

The EventsDescriptor parameter is described as follows:

Strict Transition
      ParameterID: strict (0x0001)
      Type: enumeration
      Possible values:
          "exact" means that only an actual hook state transition
          to on-hook (off-hook) is to be recognized

          "state" means that the event is to be recognized
          either if the hook state transition is detected or if the
          hook state is already on-hook (off-hook). This is the
          default value if "strict" is unspecified.

          "failWrong" means that if the hook state is already what
          the transition would imply, the command fails and an error
          is reported [error code to be defined in the package].

   The ObservedEvents parameter is described as follows:

   Initial State
      ParameterID: init (0x0002)
      Type: Boolean
      Possible values:
          true/"ON" means that the event was reported because the
          line was already on-hook (off-hook) when the events
          descriptor containing this event was activated

          false/"OFF" means that the event represents an actual
          state transition to on-hook (off-hook)

   Section: Annex E.10.3 "Basic Continuity Package -- Signals"

   Issue: The rsp signal should continue until the MGC tells the MG to
   stop applying it.

   Resolution: change the type of signal from Timeout to ON/OFF.

Section: Annex E.10.5 "Basic Continuity Package -- Procedures"

Issue: Wording of condition for generating cmp event with "success"
does not cover case where test also requires successful removal of
tone.

Resolution: In the second paragraph of E.10.5 (dealing with test
initiation), add the words "and any other required conditions are
satisfied" in the second sentence, as part of the condition upon
which success is reported. Replace the third paragraph (dealing with
test response) with the following text:

"When a MGC wants the MG to respond to a continuity test, it sends a
command to the MG containing a signals descriptor with the rsp
signal. Upon reception of a command with the rsp signal, the MG
either applies a loop-back or (for 2-wire circuits) awaits reception
of a continuity test tone. In the loop-back case, any incoming
information shall be reflected back as outgoing information. In the
2-wire case, any time the appropriate test tone is received, the
appropriate response tone should be sent. The MGC will determine
when to remove the rsp signal."

Section: Appendix A.1.2 "Example -- Collecting Originator Digits and
Initiating Termination"

Issue: Step 3 uses a now-obsolete package DS0 for echo cancellation.

Resolution: replace with echo cancellation via package TDM.

Issue: Step 20 fails to show a returned TerminationStateDescriptor.
It also contains the erroneous statement that an RTP termination does
not support events and signals and fails to show a number of other
descriptors.

Resolution:
Delete the sentence containing the erroneous statement.
Add the following to the Media Descriptor preceding the line "Stream
= 1_":
"TerminationState { ServiceStates = InService, EventBufferControl =
OFF },"

Add lines showing Events, Signals, and DigitMap descriptors
following the Media descriptor.

"Events, Signals, DigitMap,"

4. Security Considerations

   This memo is a supplement to [2], which contains the required
   security section.

5. References

   [1] Bradner, S., "The Internet Standards Process -- Revision 3", BCP
       9, RFC 2026, October 1996.

   [2] Cuervo, F., Greene, N., Huitema, C., Rayhan, A., Rosen, B. and J.
       Segeret, "Megaco Protocol", RFC 2885, August 2000.

   [3] Bradner, S., "Key Words For Use In RFCs To Indicate Requirement
       Levels", BCP 14, RFC 2119, March 1997.

6. Acknowledgments

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8. Full Copyright Statement

Acknowledgement