Q.5/13 reviewed the liaison from the IESG and IAB on T-MPLS use of the MPLS Ethertypes (TD235/WP4). The report of the discussion of that liaison and the agreements reached at the Q.12/15 meeting in Stuttgart (TD290/PLEN) was also reviewed.

Q.5/13 endorsed the selection of option 1 as further described in the Stuttgart agreement.

Q.5/13 also supports the establishment of a joint working team.

During the discussion of T-MPLS Q.5/13 identified the following issues that should be further considered by the joint working team:

1. **T-MPLS Section**

   During the discussion between Q5/13 and IETF representatives, it was noted that, according to the IETF architecture, the T-MPLS Section (TMS) layer network instance as defined in G.8110.1, is actually a PHP-ed MPLS LSP between two adjacent nodes where all the traffic between them is tunnelled through.

   Although this is a very specific application of PHP (i.e. single hop LSP where all the traffic between two adjacent nodes is tunnelled through), this contradicts the current text in G.8110.1 regarding the fact that PHP is not used.

   *G.8110.1 needs to be amended to indicate that T-MPLS LSPs use PHP to support T-MPLS section OAM.*

2. **Payload encoding**

   During the discussion between Q5/13 and IETF representatives, it was highlighted that payload encoding for MPLS must conform to RFC 4928.
The requirements for payload encoding in RFC 4928 should be taken into consideration while progressing T-MPLS standardization.

3. Interoperability

The motivation for interoperability of T-MPLS with Ethernet and IETF MPLS technologies is described in item 8 of clause 7:

8) Support the interoperability between T-MPLS OAM and OAMs of different Ethernet transport technologies (e.g. IEEE 802.1ag and ITU-T [ITU-T Y.1731]) and IETF MPLS technologies (e.g. MPLS, PWE3, L2VPN).

Note: Full interoperability has a broader architectural scope than OAM.

The support of this interoperability (whose architectural scope is broader than OAM) has to be defined.

Requirements regarding OAM needs also to be developed.

G.8110.1 needs to be amended in order to clarify that T-MPLS may not be disjoint from an MPLS network.

4. Quantification of degree of confidence

Requirement 20 in clause 8 states that:

20) The T-MPLS OAM should continue to provide the OAM functions with a high degree of confidence under normal packet loss conditions as defined in [ITU-T Rec. Y.1541]. Note: Quantification is for further study.

This quantification needs to be provided.

5. Backward compatibility

The following requirements in clause 8 address the backward compatibility aspects for T-MPLS OAM:

13) A MEP must automatically discard any not recognised or malformed OAM packet.

Note: The need to count the discarded packets to record malfunctions is for further study.

14) OAM packets can only be intercepted at destined MEP/MIPs. Intermediate nodes must not intercept OAM packets not destined for the local MEP/MIP.

15) The OAM packet format must be designed such that equipment that does not support MEPs at the connection endpoint automatically discards OAM at the boundary of the layer network.

Note: The need to count the discarded packets to record malfunctions is for further study.

These requirements need to be reviewed by the joint working team to check if backward compatibility as in RFC 3031 and/or RFC 3032 is applicable.

6. Tandem Connection Monitoring

Supplement 4 to Y-series Recommendations requires T-MPLS to support tandem connection monitoring (TCM).

It is needed to provide to IETF a description of the TCM concept, i.e. different maintenance domains, as well as the allocation of OAM functions to MEPs and MIPs.

7. Counting malfunctions

The following requirements in clause 8 address the behaviour in case of malfunctions:

13) A MEP must automatically discard any not recognised or malformed OAM packet.
Note: The need to count the discarded packets to record malfunctions is for further study.

15) The OAM packet format must be designed such that equipment that does not support MEPs at the connection endpoint automatically discards OAM at the boundary of the layer network.

Note: The need to count the discarded packets to record malfunctions is for further study.

*Whether counting the discarded packets to record malfunctions is or not a requirement needs to be defined. In transport network this usually not required, however in Internet this is usually required.*

8. **MCC**

The requirement for T-MPLS OAM to support a Maintenance Communication Channel (MCC) has been removed because it is outside the scope of Q5/13.

*Q14/15 is requested to provide a set of requirements for an MCC to be reviewed by the joint working team to develop a solution based on the IETF technology. The need to use OAM to support MCC needs to be revisited on the basis of these requirements.*

9. **APS**

The requirement for T-MPLS OAM to support an Automatic Protection Switching (APS) protocol has been removed because it is outside the scope of Q5/13.

*Q9/15 is requested to provide a set of requirements for APS to be reviewed by the joint working team to develop a solution based on the IETF technology. The need to use OAM to support APS needs to be revisited on the basis of these requirements.*

10. **Details on OAM functions**

Clause 10 describes the required OAM functions.

*It is useful to review other documents (e.g. draft-ietf-l2vpn-oam-req-frmk) that may contain more details on these requirements to be added later to Supplement 4 to Y-series Recommendations.*

11. **Tutorial on G.806 and G.7710**

Clause 10 describes the required OAM functions referencing [ITU-T G.806] and [ITU-T G.7710] that provide background material and terminology for the processing of anomalies, defects and faults as described in these OAM requirements.

*A tutorial on the relations between various ITU-T Recommendations that provide foundations of transport networks (e.g. G.805, G.806, and G.7710) needs to be provided.*

12. **Packet Delay measurement**

Supplement 4 to Y-series Recommendations requires the support of one-way and two-way packet delay measurement. Additional detailed requirements (e.g. delay variation, accuracy, precision) are outside the scope of this Recommendation.

*These additional requirements need to be specified consulting Q17/12 (e.g. Y.1561) and IEEE.*

13. **Clause 11 (Security aspects)**

The OAM security requirements in Supplement 4 to Y-series Recommendations are based upon the security requirements of transport networks defined in ITU-T.

*Further analysis (e.g. as required in [IETF BCP61]) is needed before a solution based on IETF technology can be completed.*