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Hybrid FSS satellite/terrestrial network architecture
for high speed broadband access

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ETSI

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

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

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

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Satellite Earth Stations and Systems (SES).

Modal verbs terminology

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Executive summary

The present document proposes and analyses an hybrid access network combining one or several terrestrial access technologies (Fixed or Mobile Service) together with a satellite broadband access network (Fixed Satellite Service) in order to enhance end users' Quality of Experience of broadband service delivery primarily in under-served areas where Internet service is available over terrestrial access technologies but delivering rates below that expected of Next Generation Access.

This hybrid access network will support all the telecommunications services typically offered on Next generation access technologies, including high bandwidth applications such as video conferencing, live streaming and video on demand via the satellite link along with the latency sensitive applications such as highly interactive online game play via the relatively slow terrestrial link.

Intelligent Gateways route the traffic between terrestrial and satellite access technologies according to the Quality of Service requirements associated to the various service components with the objective to maximize the overall Quality of Experience for the users (large bandwidth and low latency). In addition, the hybrid network ensures a higher resiliency towards potential interruption of service on the terrestrial access link.

The present document aims at:

- Providing an overall description of the hybrid access network architecture with special emphasis on integration aspects with a public packet switched core network on one hand and the home network environment on the other hand;
- Proposing suitable metrics to compare the Quality of Experience (QoE) over such hybrid access network with respect to single access network technology;
- Identifying existing standards that have to be modified and additional standards that have to be created for enabling this kind of scheme.

1 Scope

The present document details the benefit of an intelligent combination of satellite and terrestrial broadband access technologies for the benefits of users mainly in underserved areas.

2 References

2.1 Normative 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.

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

Not applicable.

2.2 Informative 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.

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

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 EN 302 307 (V1.3.1) (2013-03): "Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite applications (DVB-S2)".

[i.2] ETSI TS 101 545-1: "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 1: Overview and System Level specification".

[i.3] ETSI EN 301 545-2 (V1.1.1): "Digital Video Broadcasting (DVB); Second Generation DVB Interactive Satellite System (DVB-RCS2); Part 2: Lower Layers for Satellite standard".

[i.4] Recommendation ITU-T E.800: "Quality of Telecommunication Services: Concepts, Models, Objectives and Dependability Planning. Terms and Definitions Related to the Quality of Telecommunication Services".

[i.5] IETF RFC 3697: "IPv6 Flow Label Specification".

[i.6] IETF RFC 3917: "Requirements for IP Flow Information Export (IPFIX)".

[i.7] Recommendation ITU-T M.3400.

[i.8] IETF RFC 2722: "Traffic Flow Measurement: Architecture".

[i.9] IEEE 802.1Q: "IEEE Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks".

[i.10] ETSI TR 102 274: "Human Factors (HF); Guidelines for real-time person-to-person communication services".