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Satellite Earth Stations and Systems (SES);
SC-FDMA based radio waveform technology
for Ku/Ka band satellite service

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Contents

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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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1 Scope

The present document aims at assessing the performance of a SC-FDMA-based radio waveform over geostationary satellites in Ku/Ka band. Moreover, it aims at defining an evaluation framework for performance comparison with existing waveform technologies (e.g. DVB-S2, DVB-S2X and DVB-RCS2), focusing on the radio and physical layers.

The present document deals with satellite return link only. The forward link is for further study. For the return link, two use cases have been identified and treated so far, Satellite News Gathering (DSNG) and Broadband Access.

The present document provides a description of the waveforms to be compared; it identifies their key characteristics, defines the system model used for comparison and presents comparative performance results in terms of spectral efficiency. A complexity analysis is also performed.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

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 referenced document (including any amendments) applies.

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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: "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] DVB Document A83-2: "Digital video broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for broadcasting, interactive services, news gathering and other broad-band satellite applications, Part II: S2-Extensions (DVB-S2X)-(Optional)", March 2014.

[i.3] ETSI TS 136 211 (V8.3.0): "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); Physical channels and modulation (3GPP TS 36.211 version 8.3.0 Release 8)".

[i.4] DVB BlueBook A160: "Digital Video Broadcasting (DVB); Next Generation broadcasting system to Handheld, physical layer specification (DVB-NGH)".

[i.5] Ciochina-Duchesne C., Castelain D., Bouttier A.: "Satellite profile in DVB-NGH," Advanced Satellite Multimedia Systems Conference (ASMS) and 12th Signal Processing for Space Communications Workshop (SPSC), Baiona, Spain, 5-7 September 2012.

[i.6] DVB Document A162: "Guidelines for Implementation and Use of LLS: ETSI EN 301 545-2", February 2013.

[i.7] Recommendation ITU-R M.2047-0 (12-2013): "Detailed specifications of the satellite radio interfaces of International Mobile Telecommunications-Advanced (IMT Advanced)".

[i.8] C. Ciochina: "Physical layer design for the uplink of mobile cellular radiocommunications systems", PhD defence, July 2009.