



Recommendation ITU-R F.2113-0
(01/2018)

**Error performance and availability
objectives and requirements for real
point-to-point packet-based radio links**

F Series
Fixed service



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SA	Space applications and meteorology
SF	Frequency sharing and coordination between fixed-satellite and fixed service systems
SM	Spectrum management
SNG	Satellite news gathering
TF	Time signals and frequency standards emissions
V	Vocabulary and related subjects

Note: This ITU-R Recommendation was approved in English under the procedure detailed in Resolution ITU-R 1.

Electronic Publication
Geneva, 2018

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RECOMMENDATION ITU-R F.2113-0

Error performance and availability objectives and requirements for real point-to-point packet-based radio links

(Question ITU-R 255/5)

(2018)

Summary

This Recommendation describes error performance and availability events and parameters for packet based fixed wireless service equipment and links, provides a formula for link objectives, includes relations between packet and non-packet based systems, and shows examples of applications to real cases.

Scope

This Recommendation provides a method to assign the error performance and availability objectives for proper design of real point to point packet-based radio links, with specific reference to Ethernet based radio links.

Keywords

Fixed service, point-to-point, availability, error performance, packet based, Ethernet

Abbreviations/Glossary

BER	Bit error rate
FWS	Fixed wireless service
FER	Ethernet frame error ratio
FLR	Ethernet frame loss ratio
PEU	Percent Ethernet service unavailability
PEA	Percent Ethernet service availability
SESETH	Severe errored second

Related ITU Recommendations

Recommendation ITU-R F.1668 – Error performance objectives for real digital fixed wireless links used in 27 500 km hypothetical reference paths and connections

Recommendation ITU-R F.1703 – Availability objectives for real digital fixed wireless links used in 27 500 km hypothetical reference paths and connections

Recommendation ITU-T Y.1563 – Ethernet frame transfer and availability performance

The ITU Radiocommunication Assembly,

considering

- a) that the demand for bandwidth need is increasing significantly, the microwave technology has also evolved from supporting low capacity to high capacity which can provide much higher speed data transmission;
- b) that packet-based applications constitute major part of existing transport and access networks, and are expected to be strongly increased in near future;

- c) that there is a need to establish error performance and availability objectives to assist in link design and development of packet based networks;
- d) that no specific reference length is given for end-to-end Ethernet network, and no country based model is available,

recognizing

- a) that Recommendation ITU-T Y.1563 defines parameters that may be used in specifying and assessing the performance of speed, accuracy, dependability and availability of Ethernet frame transfer of an Ethernet communication service;
- b) that Recommendation ITU-T Y.1563 defines an end-to-end Ethernet network as the set of EL (exchange link) and NS (Network section) that provide the transport of Ethernet frames transmitted from SRC (Source) to DST (Destination). The MPs that bind the end-to-end Ethernet network are the MPs at the SRC and the DST;
- c) that the calculation criteria methodology adopted in Recommendations ITU-R F.1668 and ITU-R F.1703 to establish the error performance and availability for real fixed wireless links (SDH and PDH traffic) based on Recommendations ITU-T G.826 and ITU-T G.827,

recommends

- 1 that the events and parameters to be used for Error performance and availability needs, including design of real links, should be selected within the set described in Annex 1;
- 2 that error performance and availability objectives for real digital fixed wireless links carrying packet based traffic should be established according to the procedures described in Annex 2.

Annex 1

Events and parameters

This Annex only deals with Ethernet-based packet applications.

1 Events

Following error performance and availability definition are in accordance with Recommendation ITU-T Y.1563.

Severe errored second (SESETH)

A severe errored second (SESETH) outcome occurs for a block of frames observed during a one-second interval at ingress MP₀ when the corresponding FLR (i.e. the ratio of lost frames to total frames in the block) at egress MP_i exceeds s_1 . A provisional value s_1 of 0.5 is proposed by ITU-T, and different values may also be chosen depending on the class of service (CoS).

Availability

Availability of Ethernet-based network is described by available state and unavailable state.