IEC/TR 62002-3

Edition 1.0   2008-09

TECHNICAL
REPORT

**Mobile and portable DVB-T/H radio access –
Part 3: Measurement Interface**

IEC/TR 62002-3:2008(E)

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

IEC/TR 62002-3

Edition 1.0   2008-09

TECHNICAL
REPORT

**Mobile and portable DVB-T/H radio access –
Part 3: Measurement Interface**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **M**

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

MOBILE AND PORTABLE DVB-T/H RADIO ACCESS –

Part 3: Measurement Interface

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62002-3, which is a technical report, has been prepared by technical area 1: Terminals for audio, video and data services and contents, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
100/1397/DTR	100/1443/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62002 series, under the general title *Mobile and portable DVB-T/H radio access,* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

• reconfirmed,
• withdrawn,
• replaced by a revised edition, or
• amended.

A bilingual version of this publication may be issued at a later date.

MOBILE AND PORTABLE DVB-T/H RADIO ACCESS –

Part 3: Measurement Interface

1 Scope

This Technical Report is defining the minimum requirements for a terminal measurement interface to be used in test systems designed to verify the terminal conformance according IEC 62002-1 and IEC 62002-2. The interface is especially designed to be used with terminal category c), hand-held portable convergence terminals, but can obviously be used with other terminal categories as well (see IEC 62002-1, Clause 4). The measurement interface is used to control the terminal and read the degradation information from the terminal. The test signal interface (terminal input) is specified in the IEC 62002-2 and is not part of this Technical Report.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62002-1, *Mobile and portable DVB-T/H radio access – Part 1: Interface specification*

IEC 62002-2, *Mobile and portable DVB-T/H radio access – Part 2 Interface conformance testing*

3 Abbreviations

For the purposes of this document, the following abbreviations apply.

B	Bandwidth
BER	Bit error ratio
BT	Bluetooth
C	Carrier power [in band carrier power including any echoes]
C/N	Carrier to noise ratio
CR	Code rate
CR	Carriage return, ASCII code 0x0d
dB	Decibel
dB(mW)	Power in dB compared to 1 mW
DVB, DVB-T	Digital video broadcasting, terrestrial digital video broadcasting
DVB-H	Digital video broadcasting to hand-held terminals
ESR_5	Erroneous Second Ratio 5 %
F	Frequency in Hz
FER	Frame error rate
GI	Guard interval
IR	Infrared
LF	Line feed, ASCII code 0x0a
$MFER$	MPE-FEC frame error rate
MHz	Megahertz
MPE-FEC	Multi Protocol Encapsulation Forward Error Correction
PER	Packet error ratio
PSI/SI	Program specific information, service information
QAM16, QAM64	Quadrature amplitude modulation, 16-level and 64-level versions
QEF	Quasi error free
QPSK	Quaternary phase shift keying
SFP	Subjective failure point
TPS	Transmission Parameter Signalling
TS	Transport stream
$TS\text{-}PER$	Transport stream packet error ratio
UART	Universal asynchronous receiver transmitter
UI	User interface
USB	Universal serial bus
WLAN	Wireless local area network

4 Interface description

4.1 General

The purpose of the interface is to allow the test system to

- control the terminal so that it can be set to the different operating modes and frequencies required by the conformance test procedures,
- read degradation information from the terminal.

The terminal can also output additional useful information, e.g. signal strength, modulation parameters etc. This information can be used in other measurements like field tests.

This interface will support the use of degradation criteria a), b), c) and d) as specified in IEC 62002-2.

a) Reference BER, defined as $BER = 2 \times 10^{-4}$ after Viterbi decoding.
b) Picture failure point (PFP). ESR_5 for entire Transport Stream based on the reported $TS\text{-}PER$.
c) Subjective failure point in mobile reception SFP. ESR_5 for entire Transport Stream based on the reported $TS\text{-}PER$.
d) DVB-H error criterion with 5 % $MFER$.

Depending on the specific conformance measurement one of these will be used according to IEC 62002-2.

The terminal should support one of the following measurement methods.

- Manual measurement
- Test system controlled measurement

Although a manual measurement mode is included in the recommendation the main purpose of the recommendation is to describe the interface to be used in an automatic test system, where the test system is controlling the terminal and reading the measured values from the terminal.

4.2 Manual measurement

The terminal should provide interfaces to read out the degradation criteria manually as required by the specific conformance measurement. The measured values should be displayed on the terminal display after the measurement.

4.3 Test system controlled measurement

The terminal should provide an external serial interface to allow control of the terminal by the test system and read back of measured information by the test system. Communication over the interface is done with ASCII character messages. This interface should support for example one of the following physical interfaces.

- USB
- UART (RS-232) Port
- Bluetooth
- WLAN (telnet)
- IR

ASCII messages should be mapped to the physical interface. A possible test setup is presented in the Figure 1.
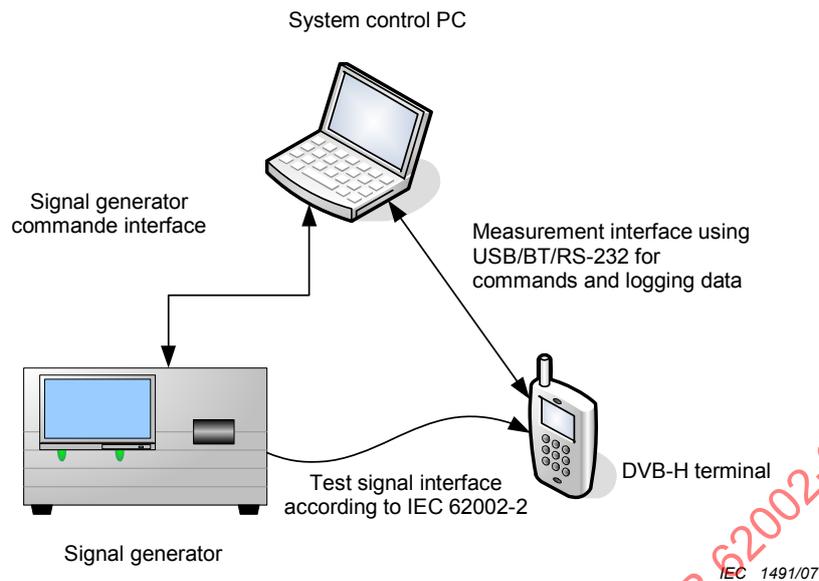
System control PC

Signal generator commande interface

Measurement interface using USB/BT/RS-232 for commands and logging data

Test signal interface according to IEC 62002-2

DVB-H terminal

Signal generator

IEC 1491/07

Figure 1 – Example of a test set up in test system controlled measurement

5 Measurement interface commands

5.1 General

The message consists of a single line starting with TEST command followed by START, RESTART or STOP command and necessary parameters. The parameters are separated with space. The parameter name and value are separated by a character : i.e. colon. The end of line mark is <CR> <LF> Carriage Return Line Feed i.e. ASCII 0x0d 0x0a.

The message can be sent either via terminal UI or via remote link connection.

The parameters for START command are given in Table 1.

Table 1 – Parameters for start command

Abbreviation	Parameter description
FRE	Frequency in Hz, example (498000000)
BDW	Bandwidth in MHz, example (8)
PID	PID value in decimal. If PID or IP is omitted *BER* measurement mode is started.
PRI	Hierarchical modulation, 0 = Low priority, 1 = Hi priority (= No hierarchy)
ROW	MPE-FEC rows , 0 = 256(0,5M), 1 = 512(1M), 2 = 768(1,5M), 3 = 1024(2M)
MBD	Maximum burst duration of burst in tens of milliseconds, example 50 equals 500 ms
IPV	IP version, 6 = Ipv6, 4 = ipv4
IPA	IP address e.g •FF15::0002:0001 for IPv6 •225.6.7.8 for IPv4 If PID or IP is omitted *BER* measurement mode is started

RESTART or STOP commands do not have any parameters.

5.2   Starting BER measurement

5.2.1   General

The terminal is set to *BER* measurement mode by sending the following message:

TEST START *FRE*:**Frequency[Hz]** *BDW*:**Bandwidth[MHz]** *PRI*:**LP/HP[0/1] <CR><LF>**

Above <CR> means Carriage Return, <LF> means Line Feed.

Frequency and the signal bandwidth are given to the receiver. The receiver must discover automatically the rest of the modulation parameters using TPS information etc.

An example for starting a BER measurement at a frequency of 586MHz is given below.

TEST START FRE:586000000 BDW:8 PRI:1

5.2.2   Start *MFER* measurement mode

The terminal is set to *MFER* measurement mode by sending the following message:

TEST START *FRE*:**Frequency[Hz]** *BDW*:**Bandwidth[MHz]** *PRI*:**LP/HP[0/1]** *PID*:**PID[decimal]** *ROW*:**MPE-FEC rows** *MBD*:**Burst duration[10ms]** *IPV*:**IP-version[6/4]** *IPA*:**IP-address <CR><LF>**

Frequency and signal bandwidth are given to the receiver. The receiver must discover automatically the rest of the modulation parameters using TPS information, etc.

If the used test stream has valid PSI/SI and if the terminal supports automatic detection based on PSI/SI information, only parameters frequency, priority and IP address are needed. There should be only one platform available in transport stream used for testing.

An example for *MFER* measurement at a frequency of 586 MHz is given below.

TEST START *FRE*:**586000000** *BDW*:**8** *PRI*:**1** *PID*:**254** *ROW*:**2** *MBD*:**50** *IPV*:**6** *IPA*:**FF15::0001:0300**

An example with automatic detection based on PSI-SI information is given below.

TEST START *FRE*:**586000000** *BDW*:**8** *PRI*:**1** *IPV*:**6** *IPA*:**FF15::0001:0300**

5.3   Stop measuring

The measurement is stopped by the following message:

TEST STOP <CR><LF>

5.4   Restart counters

The measurement counters (*BER*, *FER* etc.) are restarted, i.e. set to zero with the following message:

TEST RESTART <CR><LF>

5.5   Signal quality reporting

The terminal should respond first with Initial Report Header. This header contains the signal parameters and lock information. A parameter name is separated from parameter value with = character. The parameters are separated from each other with a space character. The line ends to Carriage Return <CR>, Line Feed <LF>.

The parameters for the initial report header are described in Table 2.

Table 2 – Initial report header parameters (after start/restart)

Description	Syntax	Example	Mandatory / Optional
Relative time	*TIM*=hh:mm:ss	*TIM*=08:34:05	Mandatory
Frequency	*FRE*=[Hz]	*FRE*=498000000	Mandatory
FFT size	*FFT*=8K, 4K, 2K	*FFT*=8K	Optional
Guard interval	*GI*=1/32, 1/16, 1/8, 1/4	*GI*=1/32	Optional
Inner modulation	*MOD*=QPSK, 16QAM, 64QAM	*MOD*=16QAM	Optional
Coderate	*CR*=1/2, 2/3, 3/4, 5/6, 7/8	*CR*=1/2	Optional
Bandwidth	*BDW*=5, 6,7,8	*BDW*=8	Optional
Hierarchy	*PRI*=0 (LP), 1(HP)	*PRI*=1	Optional
Alpha	*ALP*=0, 1, 2, 4	*ALP*=0	Optional
Interleaving	*INT*=0 (native), 1(in-depth)	*INT*=1	Optional
Lock status	*LOC*=abc (a= Service lock status i.e. receiver knows the delta_T for next burst, b=Transport Stream lock status, c =TPS lock status. Lock=1, No-lock=0, Not implemented = n	*LOC*=111	Mandatory: Transport Stream lock status is mandatory, TPS and service lock status are optional

Example of initial report header is given below.

TIM=08:34:05 FRE=498000000 FFT=8K GI=1/32 MOD=16QAM CR=1/2 BDW=8 PRI=1 ALP=0 LOC=111

In case receiver is not able to acquire the signal at all, only **LOC=000** should be output.