Annex H (Field Strength Measurement)

If fitted with SW option EB200FS (Field Strength) (R&S part no. 4052.9704.02), the EB200 is suitable for field strength measurements.

Note:

A RAM-expansion is prerequisite for this software option for the EB200 (see also TEST on page 3.43, List of modules on page 5.4 and RAM expansion / Li-battery on page 5.7).

Thanks to this option, field strength measurements can be carried out by using calibrated antennae. Beside the level indication in dBµV the field strength is indicated in dBµV/m. To be able to properly take into account the antenna correction factors, the k-factors of the R&S Antenna HE200 and of a half-wave dipole are firmly stored. User-defined k-factor data sets can be loaded into the unit via remote control.

1. Manual operation

Selecting the antenna

The antenna is selected in submenu ANT. This menu is called by pressing the ANT softkey in the RX-CONF menu.

30 KI	HZ	FM	MGC OFF	SQU OFF	TONE OFF	NUMBER
AUTO		TENNA I		4		
AFC		TENNA (HE200 HF		
AVG	HU.	X OUTPL	11:	ANT + CTRL		
0					/	ANT
				ANT PAS	ANT ACT	

Displayed parameters

ANTENNA NUMBER: antenna numbers 0 to 99

With each antenna number there is the possibility of storing two k-factor tables. The associated data set can be selected by using softkey **ANT PAS** or **ANT ACT**, respectively.

If only one of the data sets is filled, this data set will be selected in any case, irrespective of which softkey has been actuated.

To antenna numbers 1 to 5 the following data sets are assigned ex works:

Antenna number	Designation	Data PASSIVE	Data ACTIVE	Frequency range
1	HE200 HF	yes	yes	9 kHz to 30 MHz
2	HE200 20-200M	yes	yes	20 MHz to 200 MHz
3	HE200 .2-0.5G	yes	yes	50 MHz to 500 MHz
4	HE200 .5-3GHZ	yes	yes	500 MHz to 3000 MHz
5	HALFWAVE DIP.	yes	no	9 kHz to 3000 MHz

The k-factors of the half-wave dipoles are calculated as follows:

k-factor = 20* log (2.53 * FREQ / 100 MHz)

ANTENNA CODE: 13-digit antenna name

When the **ANTENNA CODE** parameter is selected, always one letter of the antenna name can be set at a time by using softkey <- or ->, and stepping through the alphabet is possible by turning the spinwheel.

AUX OUTPUT:	FREQ or ANT + CTRL	(switchover by means of spinwheel)

Softkeys

The following two softkeys will only appear if the SW option EB200FS (Field Strength) is fitted.

ANT PAS k-factor table for passive antennae (e.g. HE200 without amplifier)

ANT AKT k-factor table for active antennae (e.g. HE200 with amplifier)

Numerical field strength display

When an antenna number was selected for which a k-factor data set is available, the field strength will be displayed in $dB\mu V/m$ left of the numerical level indication. This implies that the receive frequency is within the range for which the k-factor data set was defined.

Field strength indication in the DISPAY-DEFAULT screen:

30 K	HZ	FM	MGC OFF	SQU OFF	TONE OFF	FRQ
AUTO				27	1010	000
AFC		· · · •			.012	000
AVG				20 40 •: : : :		
0			34.7 dBµ		: dBµV 🧹	MAIN
M-SC	AN	F-SCAN	I D-SCAN	I RX-CONI	DISPLAY	SETUP

Field strength indication in the DISPAY-LEVEL screen:

30 KI	HZ	FM	MGC OFF	SQU OFF	TONE OFF	FRQ
AUTO	AN	ITENNA:	HE200 HF		27	.012 000
AFC		. <u>?</u>	. 20	. 40	60	, 80
AVG						
0		46	3,2 аврул	(m. 17.7	∣dBµV ∕	MAIN
M-SCI	AN	F-SCAN	I D-SCAN	RX-CONI	DISPLAY	SETUP

Field strength display in DSCAN

DSCAN screen with antenna number 02 (HE200 20 MHz to 200 MHz):

₩	10.000	+	250.000	▲ 33	.228 000	F-STOP
-						30 KHZ
	d					FM
		ملعط				SQU OFF
المالم			_		. المتلقي حريقان	
	25 dB⊦				, 1400 - 14 00	D-SCAN

In the DSCAN screen the corrected level values are displayed in dB.

The marker position is set off by a dotted line. Right or left of the marker, the level value measured at the marker position is shown in $dB\mu V$ in a travelling window. When the marker is on a frequency for which a k-factor data set is defined and active, this window will show the field strength in $dB\mu V/m$ instead of the level.

Note:

The squelch threshold and all associated functions such "Marker to Peak" and "Signal > Threshold" still only refer to level values in $dB\mu V$.

In the DSCAN-CONFIG submenu the parameter DISPLAY LIMITS can be set.

DISPLAY LIMITS spectrum display range: eg -20 dB to 60 dB

The upper value of the DISPLAY LIMIT can be configured independent of the reference level. It is adjustable in the range from 0 to 250 dB in increments of 10 dB. Shifting the display range to values near 250 dB is only necessary if the SW option EB200FS (Field Strength Measurement) is fitted and very high antenna k-factors are to be taken into account.

The lower value is calculated from the upper value of the DISPLAY limits minus the current RNG.

2. Remote control

2.1 Sensor functions

In remote control the field strength measurement is configured in just the same way as the level and offset measurements. When the field strength sensor function has been activated by using command <code>FUNCtion "FSTRength"</code>, measured field strength values in dBµV/m can be queried with <code>SENSe:DATA?</code>

2.2 Data output

A single data query is made using command SENSe: DATA?.

As with level output, block data are output via the trace buffers by using command TRACE? MTRACE. The sensor function and the data paths for MTRACE have to be configured beforehand.

MTRACE obtains its data from the SENSe:FUNCtion block. All activated sensor functions signal their respective measured values to MTRACE to be stored.

When the path to the buffer MTRACE is enabled using command TRACE:FEED:CONTrol MTRACE, ALWays, a measured value can be stored in MTRACE via command INITiate:CONM.

The output format can be configured by using command FORMat:DATA ASCii or FORMat:DATA PACKed.

ASCii ->	normal ASCII output:	level in 1/10 dB μ V/m (eg 45.3)
PACKed ->	<definite block="" length="">:</definite>	level in 1/10 dBµV/m (2 bytes)

When no k-factor is defined on the current frequency, ie no antenna with a frequency range covering the current frequency is selected, the NINF value will be output:

ASCii -> -9.9E37 PACKed -> 0x7FFE

(coded in PACKed format)

3. Tool for handling antenna factors

3.1 Starting up the tool

The application for handling of antenna factors was realized by using a Java applet. That means a web browser is needed to run the program. The browser is required to support the Java 2 standard. As this is not the case with conventional products, they must be upgraded accordingly. See chapter 3.3 at the end of this Annex H.

Note:

Prerequisite is that the port number of the receiver is set to the value 5555 (default value). The IP address is optional.

In the URL field of the browser enter the IP-address of the receiver:

eg: http://89.10.11.23/

Alternatively, the name may be entered instead of the 4-part number, provided that an appropriate name service is available in the network which is able to resolve this name.

Also think of proxy settings which may have been made in the browser.

In the browser a welcome screen comes up. Click on the link

Click here to start the Antenna Factor Application

and the antenna factor applet is loaded and started.

Note:

Depending on the Java plugin version (from JRE 1.3.10 up), a safety message appears after the start of the applet. The safety certificate can be granted without objections since it comes from the Rohde & Schwarz receiver.

EB200 Manual

10 10 10 10 10 10 10 10 10 10 10 10 10 1	ESMB Antenna Tool - earbeiten <u>A</u> nsicht <u>F</u> av		Explorer bereitgest	ellt von Rohde & S	Schwarz		
⊹ Zurück		echen Aktualisie	Startseite	in Favoriten V		🎒 🕅 rucken Bearbeit	en T
Adre <u>s</u> se 🛓	http://89.10.31.16/index	1s.html					<u> </u>
		EB200 / E	SMB Antenna	Factor Too	ol		
	USER DATA Antenna Name view		CURRENT DATA Antenna Name	STORE	Antenn	EB200 a Name	
	OPEN		advanced 🗌		Antenna M	Ir. 1 V	
	<u>E</u> DIT					HELP	_
Applet s	tarted.				🛃 Lokales I	Intranet	

Fig. 1: Antenna factor tool within the browser, start window

3.2 Description of functions

General functioning

Right after starting up the tool does not yet have any current antenna set. The current antenna set is the set currently handled by the tool and can be created as follows:

- Create manually with NEW
- Load from device with LOAD
- Load from host with OPEN

This current antenna set can only be displayed / edited (see EDIT) or saved (see SAVE and STORE).

Creating a characteristic data set

By clicking on NEW the submenu for manual creation of characteristic data can be called up. In a table field manually enter the single frequency – k-factor points of the characteristic or insert them with copy and paste from eg an EXCEL table. The interpolation method used can be selected to be either linear

or logarithmic. To save the data the entire characteristic may be saved together with the antenna name in an ASCII file by using the SAVE function. When input has been completed with **OK**, several partial characteristic sections are created by CALC from the overall characteristic, the frequency stepwidth within these sections being constant. From this standardized ASCII format a corresponding binary format is generated before the data are stored in the device with STORE.

Importing and exporting the antenna data - with OPEN and SAVE

With **OPEN** antenna factors can be imported from the host - for instance a PC – and with **SAVE** the current antenna data can be exported. However, this implies that a "certification procedure for signed Java applets" is carried out. A description of how to proceed and the files required for this are contained on the supplied Utility Disk in the "JavaZert" directory. The current version of the Utility Disk is loaded in the R&S EB200 Download Area.

Loading and saving the antenna data – with LOAD and STORE

With **LOAD** the antenna data corresponding to the selected antenna number, if available in the device, are loaded, forming the **current antenna set**.

With **STORE** a current antenna set is written to the device in accordance with the selected antenna number. Please note that the device is delivered with a certain number of fix antenna sets (antenna numbers 1 to 5) which are stored in the ROM. When one of these numbers is selected the associated predefined antenna set will be overwritten, i.e. the new data will be superimposed, and for the time being the original contents can only be restored by a cold start.

Integrated help.

With HELP an extensive help menu with various cross references can be started.

🖉 Help for Antenna Factor Tool
Help for Antenna Factor Tool
Antenna Factor Tool
View Window
Lets start on the left hand side. We have a NEW button. Hitting this will bring up <u>User Data Dialog</u> . You can insert new data there. With OPEN on the other hand you would like to get antenna data stored in your personal computer or workstation (those data have been exported previously with the SAVE button). On both OPEN and SAVE a file dialog box will come up and points you in your home directory at first.
When you already have some data (i.e. generated with a previous NEW or via OPEN) you can go back to those data via EDIT to re-edit them.
The view checkbox brings up the <u>View Window</u> .
With CALC the program is taking those input data (out of the user data area) and generates data in the form internal to the device. It converts a x/y matrix into a list of values bound with a start-frequency(x) and a frequency-increment (delta-x) and also resolves for logarithmic scale
The view checkbox in the current data area brings up the <u>View Window</u> .
The advanced checkbox brings up a combo-box that lists the current modules in a form internal to the device.
SAVE and LOAD initiate a transfer of the current data, that is, the modules as seen in the combo-box, to/from the device. The data will come/go from/to the slot selected in Antenna Nr.
DELETE - you can delete data out of the device. Obviously this only is possible for data that are read/write, i.e. data just written into the device. And not for data that are stored in the device permanently.
HELP button, you already know :-)
HOME BACK EXIT

Fig. 2: Depiction of the help window with explanation of the buttons

Generation of characteristic-lines data in the user-data dialog.

In a field in the form of a table, the individual frequency-K-factor tags of a characteristic line can be entered manually or they can be entered via copy and paste for example from an EXCEL table.

🗟 Help for Antenna Factor Tool
Help for Antenna Factor Tool
Antenna Factor Tool
User Data Dialog
Central to this dalog is a large text area. This is the area where new data needs to be inserted or existing data can be modified. If inserted manually the data should come up like a table, e.g.
🕼 Insert User Data via Cut & Paste
Units Hz O.1dB/m Curve linear P/A Passive
Frequency Factor 10000000 88 USER DATA
3000000 86 5000000 83 7000000 79
7000000 79 8000000 74 9000000 65
view 🗆
<u>Smull</u>
HELP
The other way is to fetch the data from another application like a spreadsheet and use cut&paste to bring in the data. For cutting in the data, see the applications documentation (often 'control-C') and for pasting the data into the text area use 'control-V'. It's important that no other data are in the text area then the frequency
values, the antenna factors and whitespace characters for separating them (a whitspace character is either a blank or a tab-character). If you insert the data as floating point values, use a period '.' to separate leading and trailing digits and prefix a negativ antenna factor with '-' as usual.
On the top of the dialog you can adjust for appropriate units that do match your values and you can specify if the calculations done further use a linear or a logarithmic algorithm.
Note also that there are actually two of these text areas, namely one for the values for the passive part of the antenna and one for the active part if available. You can switch over from one to the other with the selection box on the upper right corner.
You can enter or modify the name of the antenna in the appropriate field on the right side. This is conceptually the same field as in the user data area of the main window.
Also the view from there is duplicated here.
HOME BACK EXIT

Fig. 3: Depiction of the help window with explanation of the input of characteristic lines

Graphical representation in the view Window

👹 Help for Antenna Factor Tool 🛛 🛛 🔀					
Help for Antenna Factor Tool					
Antenna Factor Tool					
View Window					
This window shows graphs of either or both the user antenna data or the current antenna data. Those graphs are colored differently so one can easily figure them out. The agenda on the right bottom side explains this.					
At the bottom side of this window you have the replicated checkboxes that you already know from the main window. You can check and uncheck either to visualize or hide the user antenna graph or the current antenna graph. Unchecking both hides the entire window (which can be brought up again by either of the view checkboxes in the main window). A third checkbox labeled logarithm can be used to change the X-scaling of the current antenna data.					
On the top of the window you see two fields both containing antenna name. They do normally match as you normally correlate user and current antenna data of the same antenna. But in case you, say, loaded an antenna profile out of the device and have totally different antenna data in the user area (those to correlate does not make much sense) you can identify that clash by those two fields.					
Diagram					
The maximum X and Y values are shown at the right-bottom and left-top corner of the diagram.					
Note that some kind of auto-scaling take place over all data that should currently be displayed - so new values on one graph can well affect the whole scaling, thus other graph's scaling.					
Inside the graphics area you can notice the cursor is changing to crosshair style. The values of the X/Y position of the cursor inside the diagram are shown next to it. The adjustment of these labels can be changed with a mouse-click, where each one will 'click' the label clockwise around the cursor So you can easily put it to a more convenient place. After being displayed on every possible place there is one cycle where displaying the labels is set off. This positioning feature can also be changed to behave dynamically by checking dynam . Doing so the repositioning occurs with every movement.					
HOME BACK EXIT					

Fig. 4: Representation of the antenna-factor tool in the browser, help window, graphics area

Graphical representation of the K-factors of the antenna HE200.

Both the ones stored in the EB200 read-only memory, as also the characteristic-line data entered by the operator can be represented with linear or logarithmic scaling.

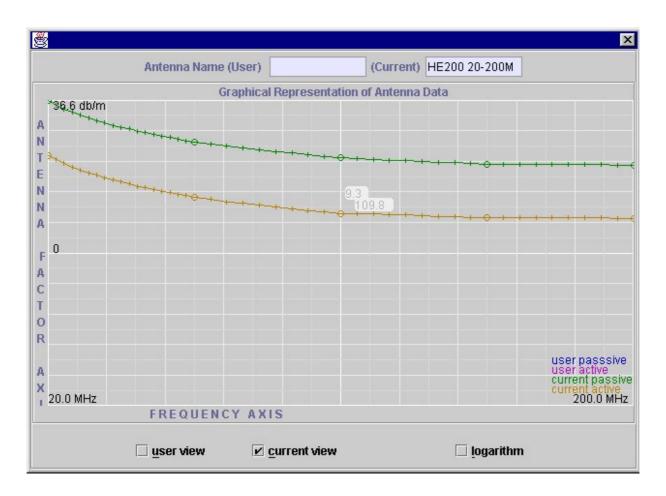


Fig. 5: Graphical representation of the K-factors of the antenna HE200

3.3 Upgrading the browser to Java 2 standard

The Netscape browser from Version 6 onwards already contains Java 2, provided that the entire package has been installed. With other browsers such as Netscape Communicator Version 4 and inferior or Internet Explorer a Java-capable plug-in must be installed. For details on how to proceed and for downloading please visit

http://java.sun.com/products/plugin/.