

Agilent E1852B Bluetooth™ Test Set



Release Notes

Release B.00.07



Agilent Technologies





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E1852B Release B.00.07

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E1852B Release B.00.07

Overview of New Features and Fixes

- Support of RX and TX on differing channels within testmode
 - DUT automatically forced to transmit at maximum power level when entering into Test Mode
 - Added commands/buttons to capture the measured packet's raw demod or power sample data then download it to file(s)
 - Added MMI button to freeze current measurement's data/graphical results
 - Added support for testmode PAUSE
 - Link manager stability improvements (better filtering on link manager path, plus improved access code correlation)
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B.00.07 Installation

The E1852B product requires three elements of code:

- Firmware which you must download to the E1852B
- A dynamic link library (E1852B.dll) which is automatically installed on your PC
- The E1852B program application (also referred to as the MMI or PC user interface) which is automatically installed on your PC

The complete software package is contained in the file **E1852B_B0007.zip**. To install it proceed as follows:

1. Unzip the file (the directory "E1852B Install" is created).
2. From the "E1852B Install" directory locate and execute the "setup.exe" file. This installs the new E1852B (MMI) application and DLL on your PC.
3. When complete, restart your PC.
4. Launch the 'E1852B debug' program (**Start Menu -> Programs -> Agilent Technologies -> E1852B Debug**).
5. From the **System page** of the E1852B application download the B.00.07 firmware (E1852B0007.bsff) to the E1852B. Please ensure that a serial cable has been connected from your PC to the E1852B.

Changes since B.00.06

Firmware + DLL (changes since B.00.06)

- Support of RX and TX on differing channels within testmode
- DUT automatically forced to transmit at maximum power level when entering into Test Mode
- Added SCPI commands to capture the measured packet raw demod and power sample data, and download it to file(s)
- Added support for testmode PAUSE (SCPI parameter CONF:TEST:MODE PAUSE)
- Link manager stability improvements (better filtering on link manager path, plus improved access code correlation)

MMI (changes since B.00.06)

- **Test Mode** page now shows fields for DUT transmit and receive channels
- Added **Freeze/Run** button to the Measurement Results window. This freezes all measurement data fields and graphical windows (Modulation, Power, and Average Power versus Channel)
- Added **Capture** button to the **Modulation** graphical window. This captures the currently measured packet's raw demodulated data (8x oversampled) and downloads it to a file.
- Added **Capture** button to the **Power** graphical window. This captures the currently measured packet's raw power envelope data (8x oversampled) and downloads it to a file
- The text associated with Firmware download error messages has been improved to give the user better troubleshooting information

Known bugs in B.00.07

- Small offset errors in the ICFT measurements are possible when DUT power levels are below -10dBm. This will be addressed in rev B.00.08
- MMI does not support minimum poll period within Transmitter Test mode. This will be addressed in rev B.00.08

- When entering the MMI **Test Mode** page the poll period setting always return to the default value - irrespective of its previous setting. This will be addressed in rev B.00.08
- When using the MMI, inquiring onto a DUT whose BD Address is 00 00 00 00 00 00 does not update the DUT BDAD

TX and RX on differing channels

Related Commands

`CONF:FREQ <TX value> <optional RX value>`

The E1852B now has the ability to specify differing channels for DUT transmit and receive. The MMI implements this as shown in Figure 1.

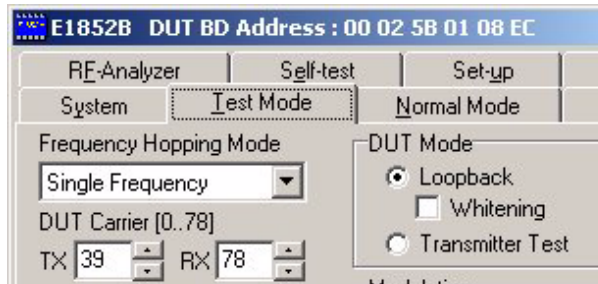


Figure 1 Transmit and Receive Channels

SCPI The following are examples of SCPI implementation.

`CONF:FREQ 39` sets DUT TX and DUT RX to channel 39

`CONF:FREQ 0 78` sets DUT TX to channel 0, and DUT RX to channel 78

DUT automatically forced to Max Power within Test Mode

Related Command None

The Bluetooth RF Test Specification states that during testing the DUT should transmit at its maximum power level. The E1852B now forces the DUT to transmit at its maximum power level by repeatedly sending **LMP_incr_power** shortly after **LMP_test_activate** has been completed.

Capturing Raw Demod and Power Data

Related Commands

```
READ:PWR:BLK? <value>
READ:RX:BLK? <value>
```

The sampling method used by the E1852B results in a block of data that is 27,000 elements in length. Each element is a single sample (the E1852B uses 8x oversampling). Both demod and power measurements use this format of data block. Each new measurement trigger results in a new block of demod or power data to be generated. It is now possible to capture these data blocks and save them to a pre-defined or user defined file.

If you do not specify a filename (or when using the MMI), the following naming convention is used:

nnn_PwrValueBlock.txt	capturing the power data
nnn_RxValueBlock.txt	capturing the demod data

where nnn is an integer with the initial value of 000, incrementing towards 255, then resetting/recycling to 000 and so on.

You can capture these data blocks by using the following methods:

Windows Interface

By clicking on the capture button in any **Modulation** graphical window the current measured packet demod data is downloaded to a file.

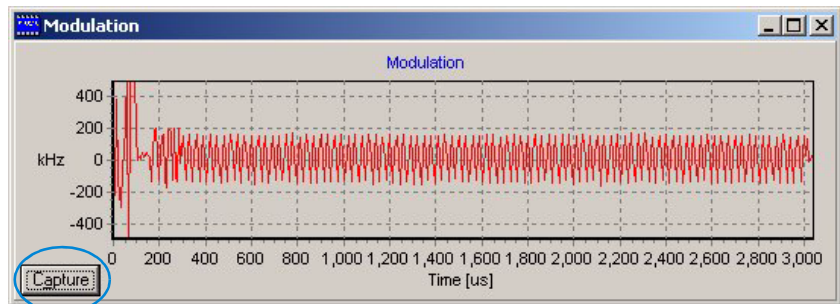


Figure 2 Modulation Capture

By clicking on the capture button in any **Power** graphical window the current measured packet's power data is downloaded to a file.

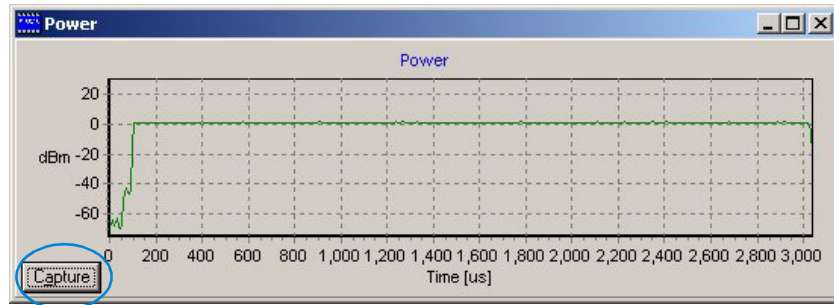


Figure 3 Power Capture

SCPI The following are examples of SCPI implementation.

```
READ:PWR:BLK? <optional value>
```

```
READ:RX:BLK? <optional value>
```

where the <optional values> are:

- RES - resets the nnn value associated with default filename.
- FILE - <filename> to define the filename to be used.

Examples:

<pre>READ:RX:BLK? RES</pre>	<p>saves demod data to file '000_RxValueBlock.txt'</p>
<pre>READ:PWR:BLK?</pre>	<p>if previous block was saved to default file '002_PwrValueBlock.txt', then this block will be saved to '003_PwrValueBlock.txt'</p>
<pre>READ:RX:BLK? FILE C:/my_demod_file.txt</pre>	<p>saves the demod data block to 'C:/my_demod_file.txt'</p>

The format of the resulting file is 14 lines of header information and up to 27,000 lines of data (packet length dependant - unwanted post-packet data is truncated).

NOTE Each line of data represents a single sample.

Example State = TCONN

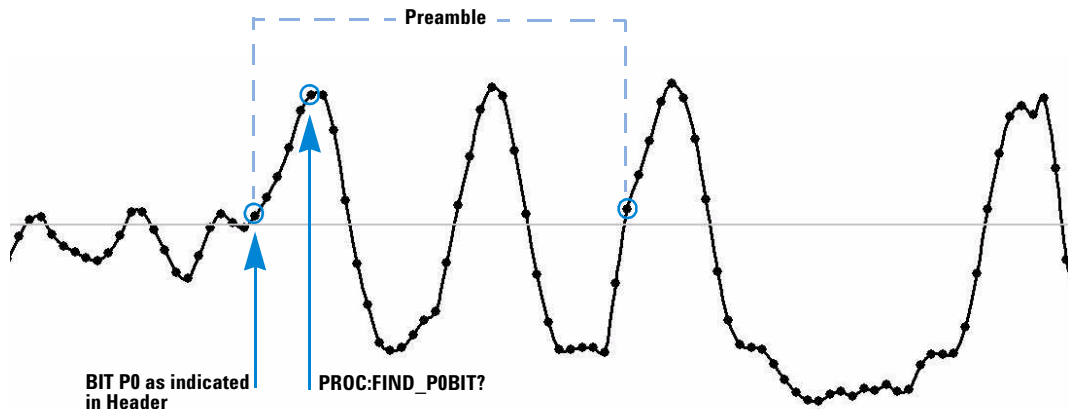
DUT Mode = LOOP
Whitening = OFF
Modulation = BS55
Hopping = EUROPE
Carrier = 67
Poll Period = 8
Packet Type = DH5
Packet Length= 339

P0Bit = 1221 ***See Note 1**
RX Samples (0-24565):
1121
1360
1504
1550
1513
1417
1284
1133
979
825
671
518
362
193
25
-117
-197
-183
-55
202
592
1111
1714
...etc...

In this example a DH5 packet's demod data has been captured. 24566 samples have been included in the file (sample 24565 is the last valid sample relating to the packet - all samples after this position are not included in the file).

Demod data units are in 100Hz (for example, a value of -1256 represents -125.6kHz).

Power data units are in 0.1dBm (for example, a value of -28 represents -2.8dBm).



NOTE 1 This is changing in release B.00.08 to match the value returned by PROC:FIND_POBIT?. That is, it will indicate the center of Bit P0.

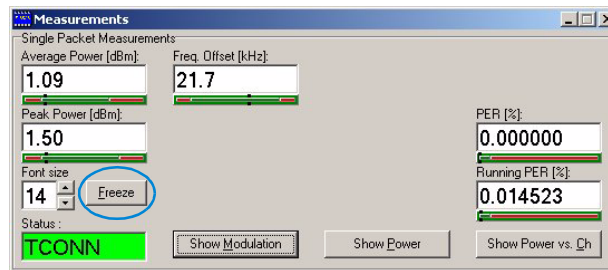
Freezing Results Displayed on the Windows Interface

Related Command

None

It is now possible to freeze the results (numeric and graphical) displayed on the Windows Interface. A **Freeze/Run** button has been added to the Measurement Results window.

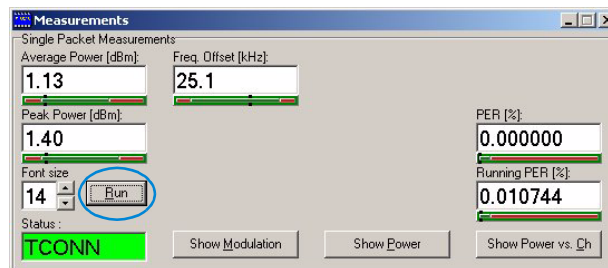
Pressing **Freeze** freezes all current measurement data and graphical displays.



NOTE It is possible to open/close graphical results windows when in the frozen state.

NOTE Pressing the **Freeze** button toggles to **Run**.

Pressing **Run** returns the Measurement Results window to normal operation (continuously updating).



Test Mode PAUSE

**Related
Commands** `CONF:TEST:MODE PAUSE`
 `CONF:TEST:MODE LOOP`
 `CONF:TEST:MODE TRAN`

The E1852B now supports PAUSE TEST (not available directly from the Windows Interface).

To enter pause test send the SCPI command:

```
CONF:TEST:MODE PAUSE
```

To exit from pause test send the command:

```
CONF:TEST:MODE LOOP or CONF:TEST:MODE TRAN
```

Pause Test is used when you want the device under test to stop the current loopback or transmitter test and enter a standby mode.

When in Pause Test, the device under test stops its current test. In the case of a transmitter test, this means that no more packets are transmitted. While in Pause Test mode the DUT responds normally to POLL packets, that is, it responds with a NULL packet. It also responds normally to all the LMP packets that are allowed in Test Mode.

When in Pause Test all the other fields in the LMP_test_control are ignored. There is no change in hopping scheme or whitening as a result of a request to pause test.

Automatic Payload Detection (errata to B.00.06 release notes)

Errata

Although automatic payload detection verifies for the presence of correct payload, STAT:DEV? should be sent immediately after any CONF: subsystem command to ensure that TCONN has been established.

NOTE This STAT:DEV? requirement shall be eliminated in B.00.08 (in B.00.08 the STAT:DEV? step will be incorporated within the payload detection process).

Related Commands

```
CONF:PAYLOAD_CHECK ON
CONF:PAYLOAD_CHECK OFF
```

When a Bluetooth test set issues a change request (by transmitting an LMP_PDU) the DUT responds with an acknowledge and LMP_accept. This indicates that the DUT has understood the LMP_PDU and is in the process of changing to the newly requested state. However, some Bluetooth devices typically require 180ms to establish the correct payload after they send their LMP_accept response. If a measurement is initiated before the payload has been correctly established the measurement result could be invalid.

B.00.06 now has the capability to automatically detect when the DUT has started to transmit correct payload. To enable/disable this feature, use the following command:

```
CONF:PAYLOAD_CHECK ON (payload checking on - default)
CONF:PAYLOAD_CHECK OFF
```

The purpose of the payload detection is to delay the E1852B measurement trigger until the correct payload is being transmitted by the DUT (i.e. avoid making measurements on incorrect or NULL payload causing false results). The payload check is only performed on the first measurement request after each E1852B LMP_PDU. All subsequent measurement requests do not cause a payload check to be performed (it is assumed that the DUT payload has established correctly and continues to be transmitted correctly).

NOTE In previous releases of E1852B code it was recommended that you characterize the length of time your DUT requires to establish the correct payload, then insert a suitable delay in your programming code before making each measurement. That method is not required with release B.00.07

Link Manager Stability Improvements

**Related
Commands** None

The following changes have been made to the link manger:

- A post-demod low pass filter has been placed in the link manger path (the filter has similar characteristics to that of a pre-demod 1.3MHz bandpass IF filter. Note: This filter is always present (i.e. not user selectable).
- Improvements have been made to the access code correlation.

These improvements help resolve problems created by unwanted in-channel spurious signals, and/or unwanted in-channel leakage tones, and/or images associated with those signal.

In previous releases of code, and under extreme circumstances, those signals could cause the E1852B to incorrectly report high levels of PER.

