Anritsu

MT8852B
Bluetooth Test Solutions

From Product Design, through Qualification and into Manufacturing

The World's Leading Short Range Wireless Technology

By eliminating wires and simplifying connections between everyday appliances, *Bluetooth* wireless technology has become the dominant standard for short-range wireless connectivity. Mobile phones, PCs, and PDAs can be connected quickly and easily whenever we want. But *Bluetooth* is not confined to the office– home applications include, portable music players, digital cameras and environmental control. Even cars are now offered with *Bluetooth* interfaces.

The future success of the *Bluetooth* standard will depend on users of the technology enjoying reliable, high-quality connections. We will expect to use products "out of the box" to provide immediate connectivity.

Anritsu recognizes the importance of *Bluetooth* link quality to the success of the technology and to the reputation of the products in which it is embedded. We have developed a series of test solutions to help in development and production test of *Bluetooth* modules and *Bluetooth* products – quickly and at low cost.

Anritsu is the leading supplier of instruments to test the quality of products manufactured with *Bluetooth* technology embedded. As members of the *Bluetooth* Special Interest Group (SIG) since 1999, Anritsu has actively participated in the development of the standard from the first 1.0 core specification release through to the current 2.0 core specification with EDR. The MT8852B *Bluetooth* Test Set builds on this experience to offer an optimized radio layer test instrument.

MT8852B Bluetooth Test Set with EDR

- Compliant with *Bluetooth* 1.1, 1.2 and 2.0 core specification RF test suite.
- Measurements performed in *Bluetooth* test mode – Loopback or TX mode supported.
- Signal generator and transmitter analyzer modes for protocol free applications.
- Single script runs eight standard rate and six EDR test cases.
- For design proving and production test.
- Full implementation of standard rate and EDR dirty transmitter for SIG RF test specification compliant measurements.
- Audio test capability, 3 SCO channels with CVSD, µ-Law and A-Law air interface.
- Adaptive Frequency Hopping (AFH) measurements with Option 15.

- BlueSuite Pro3 PC software displays; FSK modulation, power burst profile, PSK constellation diagrams and sensitivity searches graphically.
- BlueTest2 program automates production test software with test script generator and results data base.
- Headset and Hands-free profile support for design verification of integrated *Bluetooth* headsets.
- Easy operation – one-touch testing with RUN key.
- GPIB and RS-232 remote programming interfaces.
- Backward compatible with MT8850A and MT8852A test sets.
- Small size (half rack) and low weight (3.3 kg).

Why Test?

Bluetooth wireless interfaces present a new challenge to many manufacturers. The combination of leading-edge RF and protocol technologies, coupled with the requirement to get implementation costs down to a few dollars, puts particularly high demands on the test department. The challenge is to develop test procedures that are comprehensive in terms of both RF and functional test, but which are fast and initiated through a simple user interface. RF at 2.4 GHz is not easy to test, and the introduction of EDR introduces more complexity as a result of the digital modulation techniques used in its implementation. The integration of a module into an OEM product will not necessarily produce predictable results, and the performance of every item will be different, this makes it essential to test to a known set of parameters using an instrument traceable to International Standards. Anritsu knows the importance of test for RF products. We know that in an OEM production environment, the key requirement is to validate performance in the shortest time. Production engineers will need to decide on a subset of the *Bluetooth* RF test specification that is appropriate to their product's requirements.


Your Solution

As a manufacturer of *Bluetooth* products, you need above all else to maintain your reputation for quality and reliability. The complex demands of new technologies such as *Bluetooth* will require the adoption of new testing techniques. By bringing our experience to bear on these demanding test requirements, Anritsu can offer you the test capability you need. The MT8852B *Bluetooth* Test Set gives you a one-button test to fully characterize your *Bluetooth* implementation and ensure that your reputation for quality is maintained. Working with RF, especially RF at over 2 GHz, is not easy, but with Anritsu as your test partner you can be certain of having the most up-to-date and relevant testing capabilities for your *Bluetooth* products.

Anritsu understand the need to quickly and accurately verify the performance of products in a high volume manufacturing environment, thereby ensuring excellent and reliable performance from new *Bluetooth* products. When tested on the Anritsu MT8852B, you can ship products to your customers with confidence that they will work perfectly first time, every time.

MT8852B Applications

Module Testing

Anritsu understands the requirements of the manufacturers of *Bluetooth* modules. Test times must be minimized yet performance must be assured. The MT8852B can establish a link with the module under test and performs a comprehensive set of transceiver measurements in under 10 seconds. If the module address is unknown, MT8852B can read it through the module HCI (RS 232 or USB), or perform an Inquiry. An integrated CW frequency counter can be used for crystal trimming. Module testing requires a test fixture, ideally in a shielded box, to interface the *Bluetooth* module to the MT8852B. The test fixture should provide a direct RF connection plus, if required, connection to the modules HCI interface.
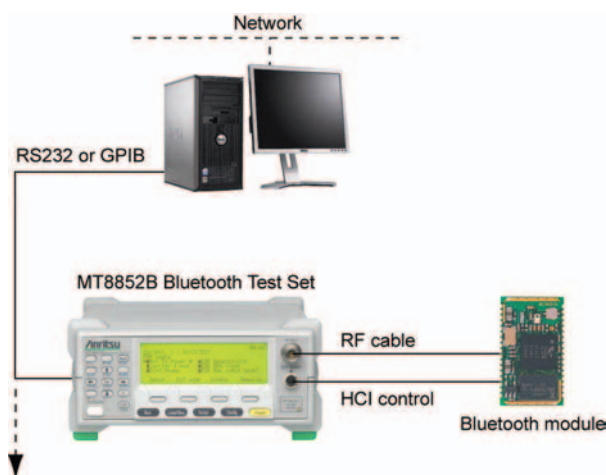
Consumer Product Testing

Bluetooth interfaces are now standard on many office and consumer products including; digital music players (MP3), Notebook PCs, personal organizers, printers, digital cameras and headsets. For many manufacturers, it will be the first time that RF measurements have been made in their production environment.

The MT8852B is a highly targeted instrument that has been designed to offer *Bluetooth* test capability in a compact, economical and easy to operate package. The pre-programmed test scripts provide a fast solution that can quickly be integrated into existing production facilities. By using the BlueTest2 production test software, the MT8852B can be quickly integrated in to the production flow.

MT8852B Applications

Design Proving

Each new revision of a *Bluetooth* chip requires full verification for RF performance. The MT8852B forms the heart of a design and verification test system. With the addition of other Anritsu test instruments including a MS2681A spectrum analyzer and a second MT8852B, all 15 standard rate and eight EDR test cases can be executed.

For fault finding and analysis, BlueSuite Pro3 software is a PC based tool kit that tests EUTs systematically on all channels. BlueSuite Pro3 also graphically displays the essential waveforms of power burst profile, modulation deviation and IQ diagrams.

In the early stages of development, the signal generator and transmitter analyzer can be used to test the device without forming any protocol connection to the test set.

Mobile Phones Testing

Mobile phones are the highest volume product to benefit from *Bluetooth* technology. Manufacturers need to prove the performance of both the *Bluetooth* and mobile phone radios. Test is typically a bottleneck in any mobile phone production line and so testing the *Bluetooth* interface must be performed with no increment to total test time. It is also vital to confirm that both radios can be active simultaneously without any interference between them. These demands result in the need for parallel testing of the *Bluetooth* and mobile phone radios. MT8852B is the ideal instrument used alongside a radio communications analyzer to perform parallel testing.

Should the phone also include an 802.11b/g WLAN radio, the AFH feature of the MT8852B is ideal for validating that both radios can be used simultaneously without mutual interference.

For mobile phones without an RF test connector, MT8852B can make all its measurements over the air interface. You simply use your test fixture to position the EUT accurately with respect to the test antenna. Correction values for the path loss at each frequency can be entered into MT8852B path loss table and all results are corrected accordingly.
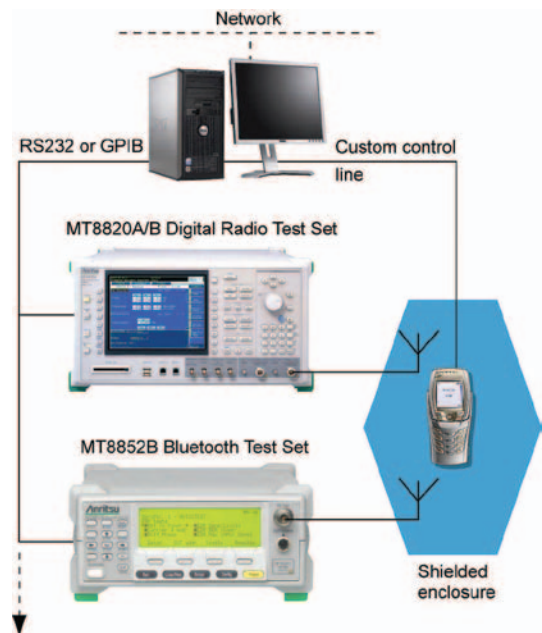
# Add BlueSuite Pro3 Software for Greater Insight into the Device's Performance

BlueSuite Pro3 is a comprehensive software tool that enables a greater understanding of all aspects of a devices RF characteristics. Running on a standard PC, BlueSuite Pro3 interfaces to the MT8852B through a GPIB interface. With BlueSuite Pro3 you can;

- Monitor the real-time state of the EUT through the display of frequency deviation, power burst, IQ constellation and vector graphs.

- Configure and run sensitivity sweeps and display the results graphically.

- Configure and run measurement sweeps for seven different tests and display the results graphically for each of the 79 *Bluetooth* channels.

- Configure and run audio tests and display the results graphically.

- Configure and run a power control test and display the results graphically.

- Read and write script and limit settings to and from the MT8852B.

- Edit and run a complete test script and generate a detailed report of the results.

- Step through individual connection and test mode controls to determine the cause of problems otherwise difficult to isolate.
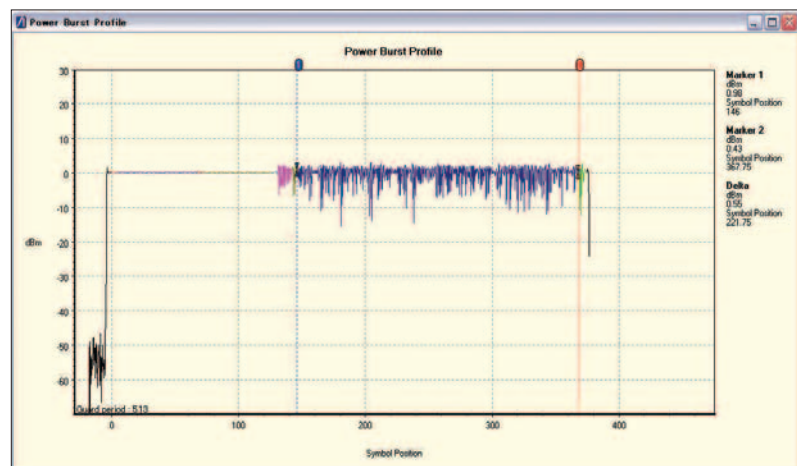
Power Burst profile display of 3-DH1 packet. Color coding highlights each element of the packet; for example, red - preamble, light blue - access code and dark blue - PSK payload.

Analyze EDR Performance with Waveform Analysis and Sensitivity Searches
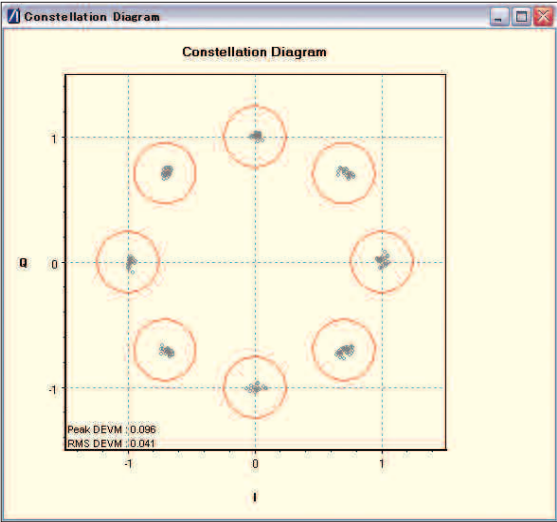
BlueSuite Pro3 displays the IQ constellation pattern for all payload symbols, or any user defined 50 µs block. Limit circles are preset to the core specification requirement for π/4DQPSK or 8DPSK modulation standards.
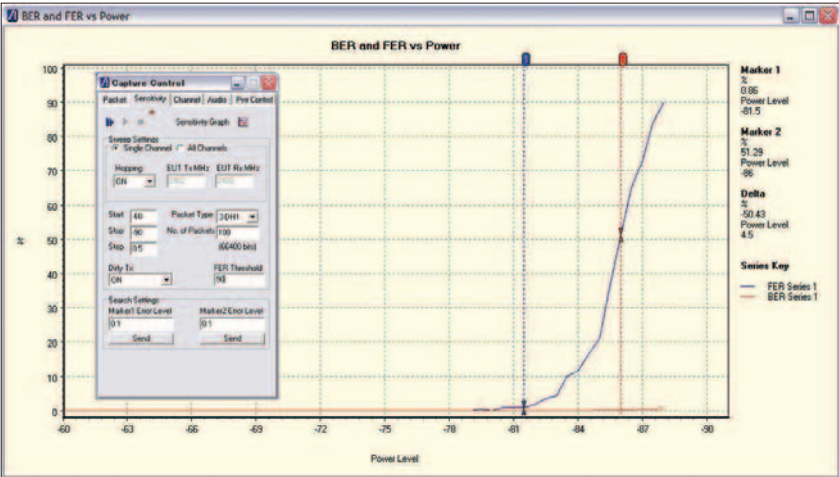
Automatic sensitivity search measurements display the FER/BER performance of an EUT with decreasing power into the receiver. Tests can be performed on all supported standard rate and EDR packet types.

Start Testing Immediately with BlueTest2 Production Line Software


Anritsu has developed the BlueTest2 software to increase the efficiency of *Bluetooth* testing on the production line. The software provides a remote means to control and run *Bluetooth* tests on up to 16 MT8852B units simultaneously. This simultaneous connection not only means that tests can be performed quickly and easily, but also that script and configuration settings can be copied between the test sets in the line.

BlueTest2 software is supplied as standard with MT8852B in both executable and source code formats (Visual Basic.NET). Users may edit the BlueTest2 source code in order to add functionality to customize it for specific requirements. With BlueTest2 you can;

- Run *Bluetooth* tests remotely using up to 16 MT8852B test sets.
- Copy settings from any of the test sets to BlueTest2.
- Apply settings from BlueTest2 to all of the test sets in the line.
- View and print detailed reports of the tests conducted.
- Write test results to a database on the local drive or to a separate server computer.
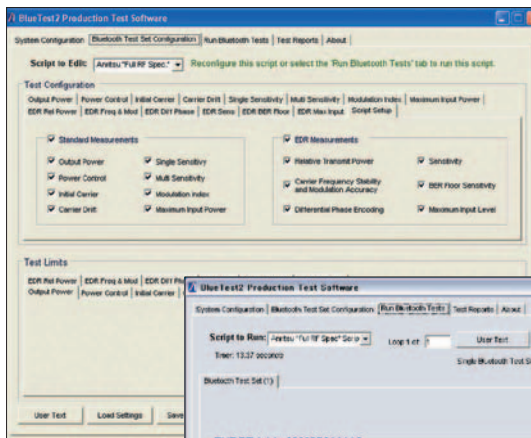
Test scripts are easily defined and written to the MT8852B using the BlueTest2 PC interface.
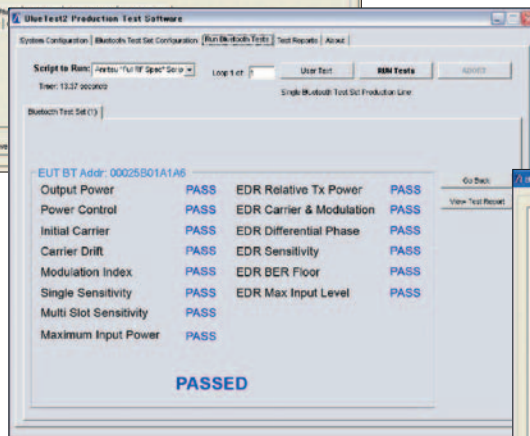
The results of the completed test are read back into the PC and the status of each test clearly displayed.

A detailed test report is automatically archived and can be printed in report format with user comments.

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Test the Interference Rejection Capability of your *Bluetooth* Devices with the AFH Option

When two *Bluetooth* devices connect under normal circumstances, they establish a basic frequency hopping scheme across 79 frequency channels in the 2.4 GHz ISM band, hopping at a rate of 1600 times per second. However, as is becoming increasingly common, interference may be encountered in environments where other wireless technologies, such as 802.11 WLAN or DECT are also active. Blocked channels, caused by interference, result in a deterioration in the performance of the connection, and this in turn results in poor voice quality or reduced data transfer rates. To limit the impact of this interference, an adaptation of frequency hopping, known as Adaptive Frequency Hopping (AFH) was introduced by the *Bluetooth* Special Interest Group in the 1.2 *Bluetooth* specification. AFH aims to restore the performance of a *Bluetooth* connection by identifying channels with high error rates and excluding the use of these channels thereafter.

## MT8852B implementation of AFH

When *Bluetooth* devices that implement the 1.2 specification are connected, each device can create its own Local Assessment Scheme. This is a channel map that defines which channels the device assesses to be clear and which are experiencing interference. The MT8852B is designed to respond to the EUT assessment of which channels are experiencing interference. The MT8852B, being the Master device, creates an Active Channel Map that is the combination of the EUT's local assessment scheme and any channels that the user has manually masked from the MT8852B user interface.

With the MT8852B/15 AFH option you can:

- Connect to an EUT using the *Bluetooth* 1.2 specification Faster Connection and display the connection time in milliseconds.
- Display the EUT *Bluetooth* 1.2 Supported Features map, including AFH capabilities.
- Create an AFH connection to the EUT.
- Read the EUT Local Assessment Scheme in the presence of an external interfering signal (e.g. WLAN).
- Manually define additional channels to mask in the MT8852B Pseudo Local Assessment Map.
- Display a graph of channel utilization against time to measure the speed with which an EUT masks channels when an interfering source is activated.
- Display a graph of Frame Error Rate (FER) against time to validate that an EUT identifies all "Bad" channels and maintains a zero or low FER.
- Establish an audio SCO link so that the audio quality can be monitored in the presence of interfering signals, and ensure that the AFH functionality maintains a high quality audio path.

Channel Utilization Against Time

This screen presents a graph with 1 second resolution of the number of channels masked by the EUT. It can be used to measure the time that the EUT takes to respond to the introduction of an interfering signal source. When the interfering source is removed, the same display shows the time that the EUT takes to re-introduce the now clear channels into the hopping scheme.
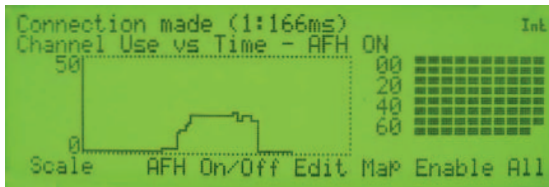
Frame Error Rate against time

This screen presents a graph with one second resolution of the FER of the *Bluetooth* link with AFH enabled. When an interfering source such as a 802.11 WLAN access point is activated, the FER can be seen to increase immediately. As the EUT's local assessment scheme identifies the "bad" channels and reports its assessment to the MT8852B, the FER will decrease as the channels are removed from the hopping plan.
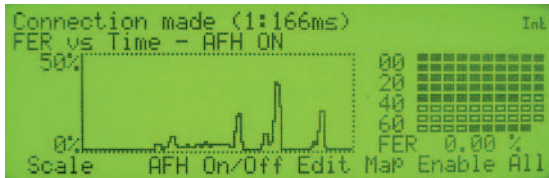
Audio measurements with AFH

The MT8852B also supports SCO connections with AFH active. This facilitates analysis of the impact of an interfering source on the quality of an audio signal.

Headset and Hands-Free Profile Emulation Software

The *Bluetooth* Headset and Hands-Free Profile Emulator is a software package developed in partnership with Centro De Tecnología de las Comunicaciones S.A. (CETECOM), and designed for use with the MT8852B Bluetooth Test Set. This PC software package runs the higher layers (above HCI) on the PC including the Headset and Hands-free profiles.

The emulator has been developed to facilitate the testing of integrated headsets in the integration and design proving stages. Typically a fully integrated *Bluetooth* headset requires connections at the profile layer to maintain a connection to another *Bluetooth* device. Use of the emulator enables connection to a headset or audio gateway with the MT8852B and routing of audio signals directly to the microphone and speakers in the headset.

The Emulator allows the user to:

*   Perform an EUT inquiry and name discovery.
*   Manually enter an EUT address.
*   Pair with the selected headset.
*   Alert the headset.
*   Initiate the MT8852B 1 kHz tone.
*   Create and release an ACL or SCO connection between the MT8852B and the headset.
*   Perform audio measurements on the headset by establishing an audio path to the headset microphone and speaker.
*   View and save activity and host controller interface logs.
*   Configure the MT8852B as the headset or audio gateway.
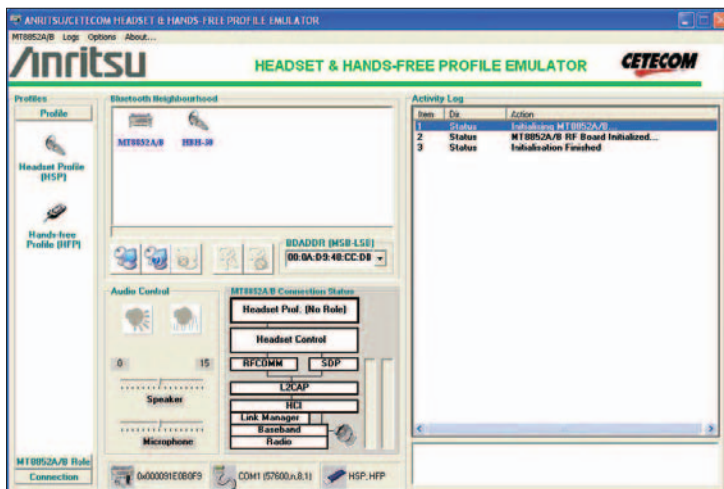
The main control window shows the profile selected for the MT8852B, the discovered devices and the connection status of the protocol stack. An activity log shows messaging, including AT commands, between the test set and the headset in real time. Detailed protocol logs including L2CAP, SDP and RFCOMM are also provided for protocol analysis and debugging.

MT8852B Specifications

Characteristic/Parameter	Specification
Bluetooth **RF Measurements**	**As defined in *Bluetooth* specification Radio Frequency Test Suite Structure, revision 2.0.E.3 dated 21st March 2005**
Output Power	**TRM/CA/01/C**
Measurement configuration	Hopping: OFF or ON – measure at Defined, All, or Any frequencies Test mode: ON Loopback or TX mode Payload: PRBS 9 Packet type: DH1, DH3, DH5
Displayed results	Average power Peak power
Number of measurement channels	User selectable, Defined (3), All, or Any
Measurement range	+22 dBm to –50 dBm average power (+23 dBm peak power)
Resolution	0.1 dB
Accuracy	+20 dBm to –35 dBm, ±1 dB +22 dBm to +20 dBm, ±1.5 dB
Power Control	**TRM/CA/03/C**
Measurement configuration	Hopping: OFF Test mode: ON Loopback or TX mode Payload: PRBS 9 Packet type: DH1, DH3, DH5
Displayed results	Maximum power Minimum power Maximum step size Minimum step size Power at each power step
Number of measurement frequencies	Three, default to qualification specification or user defined
Measurement range	+22 dBm to –35 dBm average power (+23 dBm peak power)
Resolution	0.1 dB
Accuracy	+20 dBm to –35 dBm, ±1 dB +22 dBm to +20 dBm, ±1.5 dB
Initial Carrier Frequency Tolerance	**TRM/CA/08/C**
Measurement configuration	Hopping: OFF or ON – measure at Defined, All, or Any frequencies Test mode: ON Loopback or TX mode Payload: PRBS 9 Packet type: DH1
Displayed results	Initial carrier frequency error
Number of measurement channels	User selectable, Defined (3), All, or Any
RF input measurement range	+20 dBm to –35 dBm
Initial frequency error measurement range	0 Hz to ±150 kHz
Frequency resolution	1 kHz
Accuracy	500 Hz ± Frequency Standard
Carrier Frequency Drift	**TRM/CA/09/C**
Measurement configuration	Hopping: OFF or ON – measure at Defined, All, or Any frequencies Test mode: ON Loopback or TX mode Payload: 10101010 Packet type: DH1, DH3, DH5
Displayed results	Carrier frequency drift Drift rate
Number of measurement channels	User selectable, Defined (3), All, or Any
RF input measurement range	+20 dBm to –35 dBm
Frequency drift measurement range	0 Hz to 200 kHz, and >2000/50 µs
Frequency resolution	1 kHz

MT8852B Specifications

Characteristic/Parameter	Specification
Sensitivity - Single Slot Packets	**RCV/CA/01/C**
Measurement configuration	Hopping: OFF or ON, user selectable Test mode: ON Loopback: ON Payload: PRBS9 Packet type: DH1 Dirty transmitter (as defined in the RF test spec): ON or OFF, user selectable
Displayed results	BER (percentage) Total number of bit errors and FER
Number of measurement frequencies	Three with hopping off, or hopping on
Number of measured bits	1 to 10,000 packets (216 to 2,160,000 bits)
MT8852B transmitter output range	0 dBm to –80 dBm, resolution 0.1 dB
BER/FER measurement range	0.000% to 100%
BER/FER resolution	0.001%
Sensitivity - Multi Slot Packets	**RCV/CA/02/C**
Measurement configuration	Hopping: OFF or ON, user selectable Test mode: ON Loopback: ON Payload: PRBS 9 Packet type: DH3, DH5 Dirty transmitter (as defined in RF test spec): ON or OFF, user selectable
Displayed results	BER (percentage) Total number of bit errors and FER
Number of measurement frequencies	Three with hopping off, or hopping on
Number of measured bits	1 to 10,000 packets (for DH3, 1,464 to 14,640,000 bits), (for DH5, 2,712 to 27,120,000 bits)
MT8852B transmitter output range	0 dBm to –80 dBm, 0.1 dB resolution
BER/FER measurement range	0.000% to 100%
BER/FER resolution	0.001%
Modulation Index	**TRM/CA/07/C**
Measurement configuration	Hopping: OFF Test mode: ON Loopback or TX mode Payload: 11110000 and 10101010 Packet type: DH1, DH3, DH5
Displayed results	Frequency deviation $\Delta f1max$ $\Delta f2max$ $\Delta f1avg$ $\Delta f2avg$ and $\Delta f2avg/\Delta f1avg$ plus % of $\Delta f2max$ <115 kHz
Number of measurement frequencies	Three, default to qualification specification or user defined
RF input measurement range	+20 dBm to –35 dBm
Deviation measurement range	0 Hz to 350 kHz peak
Deviation resolution	1 kHz
Accuracy	1% for modulation index = 0.32
Maximum Input Power	**RCV/CA/06/C**
Measurement configuration	Hopping: OFF Test mode: ON Loopback: ON Payload: PRBS 9 Packet type: DH1
Displayed results	BER and FER for –20 dBm at receiver input
Number of measurement frequencies	Three, default to qualification specification or user defined
Number of measured bits	1 to 10,000 packets (216 – 2,160,000 bits)
Transmitter power settable range	0 dBm to –80 dBm
Resolution	0.1 dB

MT8852B Specifications

Characteristic/Parameter	Specification
EDR Specific Measurements	**As defined in *Bluetooth* specification Radio Frequency Test Suite Structure, revision 2.0.E.3 dated 21st March 2005**
EDR Relative Transmit Power	**TRM/CA/10/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5 Number of test packets: default 10 Test control: Loopback or Tx mode EUT power level: Max and Min Hopping mode: Off and On Test channels: Defined, All, Any (default defined, Low, Med, High)
Displayed results	Max differential power (from all packets) Min differential power (from all packets) Average differential power (over all packets)
Measurement range (nominal)	+20 to –35 dBm average power, +23 dBm peak power
Relative power resolution	0.01db, GFSK to π/4DQPSK and 8DPSK
Relative power accuracy	Relative power measurement accuracy between GFSK and π/4DQPSK or 8DPSK, 0.2 dB typical for a power difference of <6 dB
Relative power measurement range	Relative power measurement range between GFSK and π/4DQPSK or 8DPSK, $(P_{GFSK} - 8\ dB) < P_{DPSK} < (P_{GFSK} + 4\ dB)$
EDR Carrier Frequency Stability and Modulation Accuracy	**TRM/CA/11/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5 Number of test blocks: default 200 Test control: Loopback or Tx mode EUT power level: Max and Min Hopping mode: Off and On Test channels: Defined, All, Any (default defined, Low, Med, High)
Displayed results	Initial frequency error ω_i Frequency error ω_o Frequency error $\omega_i + \omega_o$ RMS DEVM (block with greatest DEVM value displayed) Peak DEVM 99% DEVM Average RMS DEVM (average DEVM for all blocks measured)
Carrier frequency stability measurement range	0 Hz to ±100 kHz
Carrier frequency stability accuracy	500 Hz ± Frequency Standard
Carrier frequency stability resolution	1 kHz
RMS DEVM range	30% π/4DQPSK, 20% 8DPSK
RMS DEVM resolution	0.1% π/4DQPSK and 8DPSK
Peak DEVM range	0 to 50% π/4DQPSK, 0 to 30% 8DPSK
Peak DEVM resolution	0.1% π/4DQPSK and 8DPSK
EDR Differential Phase Encoding	**TRM/CA/12/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5. Number of test packets: default 100 Test control: Tx mode Hopping mode: Off and On Test channels: Defined
Displayed results	Number of packets received Number of packets with payload data errors Percentage of errored packets

MT8852B Specifications

Characteristic/Parameter	Specification
EDR Sensitivity	**RCV/CA/07/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5. Dirty transmitter control: On and Off Payload bit count: transmitted or received Bit threshold control: default threshold 1, 1.6 million, threshold 2, 16 million (user editable) Test control: Loopback Hopping mode: Off and On Test channels: Defined Dirty transmitter (as defined in RF test spec): ON or OFF, user selectable
Displayed results	Overall BER (displayed in exponential format) Number of bits in error Number of packets sent by test set Number of packets received in error by EUT
Output power range	0 to –90 dBm
Output power accuracy	±1 dB, 0 dBm to –80 dBm
EDR BER Floor Performance	**RCV/CA/08/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5 Payload bit count: transmitted or received Bit threshold control: default threshold 1, 8 million, threshold 2, 160 million (user editable) Test control: Loopback Hopping mode: Off and On Test channels: Defined
Displayed results	Overall BER (displayed in exponential format) Number of bits in error Number of packets sent by test set Number of packets received in error by EUT
Output power range	0 to –90 dBm
Output power accuracy	±1 dB, 0 dBm to –80 dBm
EDR maximum Input Level	**RCV/CA/10/C**
Measurement configuration	Modulations: π/4DQPSK and 8DPSK Packets: 2-DH1, 3, 5 and 3-DH1, 3, 5 Payload bit count: transmitted or received Number of bits: default 1.6 million (user editable) Test control: Loopback Hopping mode: Off and On Test channels: Defined
Displayed results	Overall BER (displayed in exponential format) Number of bits in error Number of packets sent by test set Number of packets received in error by EUT
Output power range	0 to –90 dBm
Output power accuracy	±1 dB, 0 dBm to –80 dBm

MT8852B Specifications

Characteristic/Parameter	Specification
MT8852B Signal Generator	
Frequency	
Frequency range	2.40 to 2.5 GHz
Frequency resolution	1 kHz
Frequency accuracy	As frequency standard ±500 Hz
Level	
Amplitude range	0 dBm to –90 dBm
Amplitude accuracy	±1 dB (0 dBm to –80 dBm)
Amplitude resolution	±0.1 dB
Output impedance	50Ω (nominal)
Output VSWR	1.5:1 (typically 1.3) Adjacent channels 3 or higher –40 dBc
GFSK modulation	
Modulation index	Variable, 0.25 to 0.38 (125 kHz to 190 kHz)
Modulation index resolution	0.01
Modulation index accuracy	1% for Modulation Index = 0.32
Baseband filter	BT=0.5
π/4DQPSK modulation	
Modulation index accuracy	<5% RMS DEVM
Baseband filter	BT=0.4
8DPSK modulation	
Modulation index accuracy	<5% RMS DEVM
Baseband filter	BT=0.4
MT8852B Measuring Receiver	
Frequency	
Frequency range	2.40 to 2.5 GHz
Frequency resolution	1 kHz
Frequency accuracy	As frequency standard ±500 Hz
Level	
Range	+22 dBm to –55 dBm average power
Power measurement accuracy	±1 dB (+20 dBm to –35 dBm)
Input VSWR	1.5:1
Damage level	+25 dBm
Resolution	0.1 dB
GFSK modulation	
Deviation measurement range	0 to 350 kHz peak
Accuracy	1% for Modulation Index = 0.32
EUT Control Interface	
RS232 HCI commands	The EUT control interface provides RS232 HCI commands to the EUT through a standard RS-232 interface. The interface meets the requirements of the *Bluetooth* specification for HCI UART transport layer. A RS232 cable is supplied.
USB HCI commands	The EUT control interface provides USB HCI commands to the EUT through a standard USB interface. The interface meets the requirements of the *Bluetooth* specification section H:2. A USB cable is supplied.

MT8852B Specifications

Characteristic/Parameter	Specification
Audio Specifications	
Number of SCO channels supported	3
Codec air interfaces supported	CVSD, A-Law, µ-Law
Frequency response	(–3 dB) measured CODEC in to CODEC out: 160Hz –3.5kHz. Measured with 50Ω source impedance and 10 MΩ load impedance
Maximum input / output signal level	$3.4V_{pk-pk}$ = 1.2V RMS
Distortion/noise	A law: typical –37dB at 1 kHz, 1V RMS µ law: typical –37dB at 1 kHz, 1V RMS CVSD: typical –30dB at 300 Hz, 1V RMS
Input/Output connectors	3.5 mm audio jack plugs (one for each SCO channel)
Input impedance	20 kΩ
Minimum output load	600Ω
Internal audio source	1kHz fixed frequency
AFH (Option 15)	Supported in ACL and SCO connections
Displays	Active channel vs. time, FER vs. time
Other features	ACL connection timer, resolution 1 ms
Frequency Standard	
Frequency	10 MHz
Temperature Stability	±0.5 ppm, –10ºC to +85ºC
Aging (1st year)	±1.0 ppm
Aging (over 10 years)	±2.5 ppm, including year 1
Rear Panel Connectors	
External frequency standard input	Rear panel BNC socket, 50Ω 1 volt
Output 1	TTL output for TX ON, TX DATA, RX DATA, and correlator
Output 2	TTL output for RX ON, TX DATA, RX DATA, and correlator
Input 1	For service use only
GPIB	
IEE 488.2	Offers full instrument control as standard
RS232	
RS232	Offers full instrument control as standard

MT8852B Ordering Information

Characteristic/Parameter	Specifications
General	
Power supply	85 to 264 Volts AC
Frequency	47 to 63 Hz
Power	150 VA Max
Environmental	
Operating temperature	5 to +40ºC
Operating humidity	20% to 75%
Safety	Complies with IEC 61010-1
EMC	Conforms to the protection requirements of EEC Council Directive 89/336/EEC
Size and Weight	
Dimensions	216.5 mm x 88 mm x 380 mm
Weight	<3.45 kg
Order Information	
MT8852B	*Bluetooth* test set with EDR and Audio
MT8852B-040	*Bluetooth* test set with no EDR and no Audio
MT8852B-041	*Bluetooth* test set with no EDR and with Audio
MT8852B-042	*Bluetooth* test set with EDR and no Audio
Included Accessories	
MT8852B Operation Manual	
MT8852B Remote Programming Manual	
BlueSuite software (standard version)	
RS232 HCI control interface lead	
RS232 cable for firmware updates	
Power cord for destination country	
Certificate of calibration	
USB HCI control interface lead	
3.5 mm jack plugs (3)	
BlueTest2 software	
Options	
MT8850A-01	Rack Mount, single instrument
MT8850A-03	Rack Mount, side-by-side
MT8850A-10	*Bluetooth* antenna and adapter
MT8852A-14P/U	Headset and Handsfree profile emulator software
MT8852A-15	Adaptive Frequency Hopping (AFH)
MT8852A-16	Headset and Handsfree support
MT8850A-17	IQ data output
MT8850A-20	Spare EUT/RS232 cable
MT8850A-21	Spare EUT/USB cable
MT8850A-30	Extra Operation and Programming Manual
MT885xA-98	Z540, ISO 25 calibration certificate
MT885xA-99	Premium Z540, ISO 25 calibration certificate + test data
MT8852B-319	Retrofit Audio to MT8852B
MT8852B-325	Retrofit EDR to MT8852B
D41310	Soft carry case with shoulder strap
MX885201B	BlueSuite Pro3 (standard rate and EDR)
MX885201B-301	Upgrade from BlueSuite Pro2 to BlueSuite Pro3

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