

# MT8852B

Bluetooth Test Set



## Introduction

This document provides specifications for the Bluetooth® Test Set MT8852B and lists ordering information and option and accessory codes. The MT8852B brochure is also available. The brochure provides in-depth descriptions of MT8852B applications, features, and benefits when testing a wide range of Bluetooth products.

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## Specifications

All measurements made in compliance with Bluetooth Core Specification v1.2, 2.0, 2.1, 3.0 + HS, 4.0, 4.1 and 4.2.

### Basic Rate Measurements

Characteristic/Parameter	Specification
<b>Output Power (TRM/CA/BV-01-C)</b>	
Measurement Configuration	Hopping: Off or On – measure at defined, all, or any frequencies Loopback, Tx mode Payload: PRBS9 Packet type: DH1, DH3, DH5
Displayed Results	Average power Peak power
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	–50 to +22 dBm (average power), +23 dBm (peak power)
Resolution	0.1 dB
Accuracy	±1.0 dB (–35 to +20 dBm) ±1.5 dB (+20 to +22 dBm)
<b>Power Control (TRM/CA/BV-03-C)</b>	
Measurement Configuration	Hopping: Off Loopback, Tx mode Payload: PRBS9 Packet type: DH1, DH3, DH5
Displayed Result	Maximum power, Minimum power, Maximum step size, Minimum step size, Power at each power step
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	–35 to +22 dBm (average power), +23 dBm (peak power)
Resolution	0.1 dB
Accuracy	±1.0 dB (–35 to +20 dBm) ±1.5 dB (+20 to +22 dBm)
<b>Enhanced Power Control (TRM/CA/BV-14-C)</b>	
Measurement Configuration	Hopping: Off Loopback, Tx mode Payload: PRBS9 Packet type: DH1, 3, 5, 2-DH1, 3, 5 and 3-DH1, 3, 5
Displayed Result	Maximum power for each packet type Minimum power for each packet type Maximum power step for each packet type Minimum power step for each packet type Maximum power difference at any step between DHn and 2DHn or 3DHn packets
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	–35 to +22 dBm (average power), +23 dBm (peak power)
Resolution	0.1 dB
Accuracy	±1.0 dB (–35 to +20 dBm) ±1.5 dB (+20 to +22 dBm)
<b>Initial Carrier Frequency Tolerance (TRM/CA/BV-08-C)</b>	
Measurement Configuration	Hopping: Off or On – measure at defined, all, or any frequencies Loopback, Tx mode Payload: PRBS9 Packet type: DH1
Displayed Results	Average initial frequency error Maximum positive frequency error Maximum negative frequency error
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
RF Input Measurement Range	–35 to +20 dBm
Initial Frequency Error Measurement Range	0 to ±150 kHz
Frequency Resolution	1 kHz
Accuracy	500 Hz ±frequency standard

Characteristic/Parameter	Specification
<b>Carrier Frequency Drift (TRM/CA/BV-09-C)</b>	
Measurement Configuration	Hopping: Off or On – measure at defined, all, or any frequencies Loopback, Tx mode Payload: 10101010 Packet type: DH1, DH3, DH5
Displayed Results	Carrier frequency drift Drift rate
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
RF Input Measurement Range	–35 to +20 dBm
Frequency Drift Measurement Range	0 to 200 kHz, and >2000 $\mu$ s/50 $\mu$ s
Frequency Resolution	1 kHz
<b>Sensitivity – single slot packets (RCV/CA/BV-01-C)</b>	
Measurement Configuration	Hopping: Off or On, user selectable Loopback only Payload: PRBS9 Packet type: DH1 Dirty transmitter (as defined in the RF test spec): On or Off, user defined
Displayed Results	BER (percentage) Total number of bit errors and FER
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Number of Measured Bits	1 to 10000 packets (216 bits to 2160000 bits)
Output Power Range	–90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (–80 to 0 dBm)
BER/FER Measurement Range	0 to 100%
BER/FER Resolution	0.001%
<b>Sensitivity – multi-slot packets (RCV/CA/BV-02-C)</b>	
Measurement Configuration	Hopping: Off or On, user selectable Loopback only Payload: PRBS9 Packet type: DH3, DH5 Dirty transmitter (as defined in RF test spec): On or Off, user defined
Displayed Results	BER (percentage) Total number of bit errors and FER
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Number of Measured Bits	1 to 10000 packets (for DH3, 1464 bits to 14640000 bits), (for DH5, 2712 bits to 27120000 bits)
Output Power Range	–90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (–80 to 0 dBm)
BER/FER Measurement Range	0 to 100%
BER/FER Resolution	0.001%
<b>Modulation Characteristics (TRM/CA/BV-07-C)</b>	
Measurement Configuration	Hopping: Off Loopback, Tx mode Payload: 11110000 and 10101010 Packet type: DH1, DH3, DH5
Displayed Results	Frequency deviation: $\Delta f_{1max}$ , $\Delta f_{2max}$ , $\Delta f_{1avg}$ , $\Delta f_{2avg}$ , $\Delta f_{2avg}/\Delta f_{1avg}$ plus % of $\Delta f_{2max}$ <115 kHz
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
RF Input Measurement Range	–35 to +20 dBm
Deviation Measurement Range	0 to 350 kHz (peak power)
Deviation Resolution	1 kHz
Accuracy	1% for modulation index 0.32
<b>Maximum Input Level (RCV/CA/BV-06-C)</b>	
Measurement Configuration	Hopping: Off Loopback only Payload: PRBS9 Packet type: DH1
Displayed Results	BER (percentage) Total number of bit errors and FER
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Number of Measured Bits	1 to 10000 packets (216 bits to 2160000 bits)
Output Power Range	–90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (–80 to 0 dBm)

**Enhanced Data Rate (EDR) Measurements**

Characteristic/Parameter	Specification
<b>EDR Relative Transmit Power (TRM/CA/BV-10-C)</b>	
Measurement Configuration	Hopping: Off and On – measure at defined, all, or any frequencies Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5 Loopback, Tx mode EUT power level: Max. and Min.
Displayed Results	Max. differential power (from all packets) Min. differential power (from all packets) Average differential power (over all packets)
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	-35 to +20 dBm (average power), +23 dBm (peak power)
Relative Power Resolution	0.01 dB, GFSK to $\pi/4$ DQPSK and 8DPSK
Relative Power Accuracy	Relative power measurement accuracy between GFSK and $\pi/4$ DQPSK or 8DPSK, 0.2 dB typical for a power difference of <6 dB
Relative Power Measurement Range	Relative power measurement range between GFSK and $\pi/4$ DQPSK or 8DPSK, ( $P_{GFSK} - 8 \text{ dB}$ ) < $P_{DPSK}$ < ( $P_{GFSK} + 4 \text{ dB}$ )
<b>EDR Carrier Frequency Stability and Modulation Accuracy (TRM/CA/BV-11-C)</b>	
Measurement Configuration	Hopping: Off and On – measure at defined, all, or any frequencies Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5 Loopback, Tx mode EUT power level: Max. and Min.
Displayed Results	Initial frequency error $\omega_i$ Frequency error $\omega_o$ 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)
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Carrier Frequency Stability Measurement Range	0 to $\pm 100$ kHz
Carrier Frequency Stability Accuracy	500 Hz $\pm$ frequency standard
Carrier Frequency Stability Resolution	1 kHz
RMS DEVM Range	30% $\pi/4$ DQPSK, 20% 8DPSK
RMS DEVM Resolution	0.1% $\pi/4$ DQPSK and 8DPSK
Peak DEVM Range	0 to 50% $\pi/4$ DQPSK, 0 to 30% 8DPSK
Peak DEVM Resolution	0.1% $\pi/4$ DQPSK and 8DPSK
<b>EDR Differential Phase Encoding (TRM/CA/BV-12-C)</b>	
Measurement Configuration	Hopping: Off and On, user selectable Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5. Number of test packets: default 100 Tx mode only
Displayed Results	Number of packets received Number of packets with payload data errors Percentage of errored packets
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
<b>EDR Sensitivity (RCV/CA/BV-07-C)</b>	
Measurement Configuration	Hopping: Off and On, user selectable Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5. Bit threshold control: Threshold 1, 1.6 million bits, Threshold 2, 16 million bits (user editable) Loopback only 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
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)
<b>EDR BER Floor Performance (RCV/CA/BV-08-C)</b>	
Measurement Configuration	Hopping: Off and On, user selectable Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5 Bit threshold control: Threshold 1, 8 million bits, Threshold 2, 160 million bits (user editable) Loopback only
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
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)

Characteristic/Parameter	Specification
<b>EDR Maximum Input Level (RCV/CA/BV-10-C)</b>	
Measurement Configuration	Hopping: Off and On, user selectable Modulations: $\pi/4$ DQPSK and 8DPSK Packet type: 2-DH1, 3, 5 and 3-DH1, 3, 5 Number of bits: default 1.6 million (user editable) Loopback only
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
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)

## Bluetooth low energy Measurements

Bluetooth low energy measurements made in compliance with Bluetooth RF Test Specification RF\_PHY.TS/4.0, 4.1 and 4.2

Characteristic/Parameter	Specification
<b>Output power (TRM-LE/CA/BV-01-C and TRM-LE/CA/BV-02-C)</b>	
Measurement Configuration	EUT configured to transmit test reference packets Packet payload: PRBS9
Displayed Results	Average power Peak to average power
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	-50 to +22 dBm (average power), +23 dBm (peak power)
Resolution	0.1 dB
Accuracy	$\pm 1.0$ dB (-35 to +20 dBm) $\pm 1.5$ dB (+20 to +22 dBm)
<b>Modulation Characteristics (TRM-LE/CA/BV-05-C)</b>	
Measurement Configuration	EUT configured to transmit test reference packets Packet payload: 11110000 and 10101010
Displayed Results	Frequency deviation: $\Delta f_{1max}$ , $\Delta f_{2max}$ , $\Delta f_{1avg}$ , $\Delta f_{2avg}$ , $\Delta f_{2avg}/\Delta f_{1avg}$ comparison, >185 kHz $\Delta f_{2max}$ ratio (%)
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	RF input: -35 to +20 dBm Deviation: 0 to 500 kHz (peak power)
Resolution	Deviation: 1 kHz
Accuracy	1% for modulation index 0.5
<b>Carrier frequency offset and drift (TRM-LE/CA/BV-06-C and TRM-LE/CA/BV-07-C)</b>	
Measurement Configuration	EUT configured to transmit test reference packets Packet payload: 10101010
Displayed Results	Carrier frequency error Frequency drift Drift rate
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Measurement Range	RF input: -35 to +20 dBm Frequency: 500 kHz
Frequency Resolution	1 kHz
Accuracy	500 Hz $\pm$ frequency standard
<b>Receiver sensitivity (RCV-LE/CA/BV-01-C and RCV-LE/CA/BV-02-C)</b>	
Measurement Configuration	EUT configured to receive test reference packets Packet payload: PRBS9 Full support of dirty transmitter as defined in test specification
Displayed Results	Receiver PER. Requires EUT to support HCI or 2-Wire interface for automated PER results
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)
<b>Maximum input signal level (RCV-LE/CA/BV-06-C)</b>	
Measurement Configuration	EUT configured to receive test reference packets Packet payload: PRBS9
Displayed Results	Receiver PER. Requires EUT to support HCI or 2-Wire interface for automated PER results
Number of Measurement Frequencies	Three, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)
<b>PER Report Integrity (RCV-LE/CA/BV-07-C)</b>	
Measurement Configuration	EUT configured to receive test reference packets Packet payload: PRBS9 CRC corruption: Alternate packets Number of test packets: Random [100 $\leq$ RND $\leq$ 1500]
Displayed Results	Receiver PER. Requires EUT to support HCI or 2-Wire interface for automated PER results
Number of Measurement Frequencies	One, default to RF Test Specification or user defined
Output Power Range	-90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy	$\pm 1$ dB (-80 to 0 dBm)

## MT8852B Signal Generator

Characteristic/Parameter	Specification
<b>Frequency</b>	
Frequency Range	2.40 GHz to 2.5 GHz
Frequency Resolution	1 kHz
Frequency Accuracy	As frequency standard $\pm 500$ Hz
<b>Level</b>	
Amplitude Range	-90 to 0 dBm
Amplitude Accuracy	$\pm 1$ dB (-80 to 0 dBm)
Amplitude Resolution	$\pm 0.1$ dB
Output Impedance	50 $\Omega$ (nominal)
Output VSWR	1.5:1 1.3:1 (typical) Adjacent channels 3 or higher -40 dBc
<b>GFSK Modulation</b>	
Modulation Index	Variable, 0.25 to 0.50 (125 kHz to 250 kHz)
Modulation Index Resolution	0.01
Modulation Index Accuracy	1% for modulation index = 0.32
Baseband Filter	BT = 0.5
<b><math>\pi/4</math>DQPSK Modulation</b>	
Modulation Index Accuracy	<5% RMS DEVM
Baseband Filter	BT = 0.4
<b>8DPSK Modulation</b>	
Modulation Index Accuracy	<5% RMS DEVM
Baseband Filter	BT = 0.4

## MT8852B Measuring Receiver

Characteristic/Parameter	Specification
<b>Frequency</b>	
Frequency Range	2.40 GHz to 2.5 GHz
Frequency Resolution	1 kHz
Frequency Accuracy	As frequency standard $\pm 500$ Hz
<b>Level</b>	
Range	-55 to +22 dBm (average power)
Power Measurement Accuracy	$\pm 1$ dB (-35 to +20 dBm)
Input VSWR	1.5:1
Damage Level	+25 dBm
Resolution	0.1 dB
<b>GFSK Modulation</b>	
Deviation Measurement Range	0 to 350 kHz (peak power)
Accuracy	1% for modulation index 0.32

## EUT Control Interface

Characteristic/Parameter	Specification
RS232 HCI Commands	The EUT control interface provides RS232 HCI commands to the EUT through a standard RS232 interface. The interface meets the requirements of the <i>Bluetooth</i> specification for HCI UART transport layer. An 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 <i>Bluetooth</i> specification section H:2. A USB cable is supplied.
2-Wire Control	For test control of <i>Bluetooth</i> low energy devices the EUT control interface supports the 2-Wire specification
USB to RS232 HCI Command	For use with EUTs fitted with USB to RS232 FTDI chips

## Audio Specifications

Characteristic/Parameter	Specification
Number of SCO Channels Supported	3
Codec Air Interfaces Supported	CVSD, A-Law, $\mu$ -Law
Frequency Response	(-3 dB) measured CODEC in to CODEC out: 160 Hz to 3.5 kHz. Measured with 50 $\Omega$ source impedance and 10M $\Omega$ load impedance
Maximum Input/Output Signal Level	3.4 V <sub>pk-pk</sub> = 1.2 V RMS
Distortion/Noise	A law: -37 dB (typical) (1 kHz, 1 V RMS) $\mu$ law: -37 dB (typical) (1 kHz, 1 V RMS) CVSD: -30 dB (typical) (300 Hz, 1 V RMS)
Input/Output Connectors	3.5 mm audio jack plugs (one for each SCO channel)
Input Impedance	20k $\Omega$
Minimum Output Load	600 $\Omega$
Internal Audio Source	1 kHz fixed frequency

## Adaptive Frequency Hopping (MT8852B-015)

Supported in ACL and SCO connections

Characteristic/Parameter	Specification
Displays	Active channel vs. time, FER vs. time
Other Features	ACL connection timer, resolution: 1 ms

## Electrical Characteristics

Characteristic/Parameter	Specification
<b>Frequency Standard</b>	
Frequency	10 MHz
Temperature Stability	±0.5 ppm (−10° to +85°C)
Aging (1st year)	±1.0 ppm
Aging (over 10 years)	±2.5 ppm (including year 1)
<b>Rear Panel Connectors</b>	
External Frequency Standard Input	Rear panel, BNC connector, 50Ω, 1 V
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
<b>GPIB</b>	
IEE 488.2	Offers full instrument control as standard
<b>RS232</b>	
RS232	Offers full instrument control as standard

## General

Characteristic/Parameter	Specification
<b>Power Supply</b>	
Power Voltage	85 Vac to 264 Vac
Frequency	47 Hz to 63 Hz
Power Consumption	150 VA Max.
<b>Environmental</b>	
Operating Temperature	+5° to +40°C
Operating Humidity	20 to 75%
Safety	Complies with IEC 61010-1
EMC	Conforms to the protection requirements of EEC Council Directive 89/336/EEC
<b>Dimensions and Mass</b>	
Dimensions	216.5 (W) × 88 (H) × 380 (D) mm
Mass	≤3.45 kg

# Ordering Information

Please specify the model/order number, name and quantity when ordering.  
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Description
<b>Main frame</b>	
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
MT8852B-043	Bluetooth Test Set with low energy measurements only
<b>Included accessories</b>	
	BlueSuite (Software, Standard Version)
	RS232 HCI Control Interface Lead
	USB HCI Control Interface Lead
	RS232 Cable for Firmware Updates
	Power Cord for Destination Country
	Certificate of Calibration
	3.5 mm Jack Plugs (Qty. 3, Audio Versions Only)
	BlueTest2 (Software)

Model/Order No.	Description
<b>Options and accessories</b>	
MT8852B-001	Rack Mount Kit, Single Unit
MT8852B-003	Rack Mount Kit, Side by Side
MT8852B-015	Adaptive Frequency Hopping
MT8852B-017	IQ Data Output
MT8852B-027	Bluetooth low energy Measurements
MT8852B-034*	BLE Data Length Extension
MT8852B-319	Retrofit Audio to MT8852B
MT8852B-325	Retrofit EDR to MT8852B
MT8852B-327	Retrofit Bluetooth low energy Measurements
MT8852B-330	Retrofit Basic Rate Measurements to MT8852B-043
MT8852B-334*	Retrofit BLE Data Length Extension
MT8852B-098	Standard Calibration to ANSI/NCSL Z540
MT8852B-099	Premium Calibration to ANSI/NCSL Z540 (Test report and uncertainty data included)
MX885201B	BlueSuite Pro3 (Software Application)
2000-1613-R	Bluetooth Antenna and Adaptor
D41310	Soft Carry Bag

\*: MT8852B-034 (334) requires MT8852B-027 (327) or MT8852B-043.



Specifications are subject to change without notice.

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