

Bluetooth Test Set

MT8852B





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, 4.2 and 5.0.

Basic Rate Measurements

Basic Rate measurements made in compliance with Bluetooth RF Test Specification RF. TS. 5.0.0.

Output Power (TP/TRM/CA/BV-01-C)

Measurement Configuration

Hopping: Off or On – measure at defined, all, or any frequencies

Loopback or 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)

Power Control (TP/TRM/CA/BV-03-C)

Measurement Configuration

Hopping: Off Loopback or 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)

Enhanced Power Control (TP/TRM/CA/BV-14-C)

Measurement Configuration

Hopping: Off Loopback or Tx mode Payload: PRBS9

Packet type: DH1, DH3, DH5, 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

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)

Initial Carrier Frequency Tolerance (TP/TRM/CA/BV-08-C)

Measurement Configuration

Hopping: Off or On - measure at defined, all, or any frequencies

Loopback or 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

Carrier Frequency Drift (TP/TRM/CA/BV-09-C)

Measurement Configuration

Hopping: Off or On – measure at defined, all, or any frequencies

Loopback or 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 μs/50 μs

Frequency Resolution: 1 kHz

Sensitivity - single slot packets (TP/RCV/CA/BV-01-C)

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 10,000 packets (216 bits to 2,160,000 bits)

Output Power Range: –90 to 0 dBm, resolution: 0.1 dB Output Power Accuracy: ±1 dB (–80 to 0 dBm) BER/FER Measurement Range: 0 to 100%

BER/FER Resolution: 0.001%

Sensitivity - multi-slot packets (TP/RCV/CA/BV-02-C)

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 10,000 packets (for DH3, 1,464 bits to 14,640,000 bits), (for DH5, 2,712 bits to 27,120,000 bits)

Output Power Range: –90 to 0 dBm, resolution: 0.1 dB Output Power Accuracy: ±1 dB (–80 to 0 dBm) BER/FER Measurement Range: 0 to 100%

BER/FER Resolution: 0.001%

Modulation Characteristics (TP/TRM/CA/BV-07-C)

Measurement Configuration

Hopping: Off Loopback, Tx mode

Payload: 11110000 and 10101010 Packet type: DH1, DH3, DH5

Displayed Results

Frequency deviation: Δf1max, Δf2max, Δf1avg, Δf2avg, Δf2avg/Δf1avg, % of Δf2max <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

Maximum Input Level (TP/RCV/CA/BV-06-C)

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 10,000 packets (216 bits to 2,160,000 bits)

Output Power Range: –90 to 0 dBm, resolution: 0.1 dB

Output Power Accuracy: ±1 dB (-80 to 0 dBm)

Enhanced Data Rate (EDR) Measurements

Enhanced Data Rate measurements made in compliance with Bluetooth RF Test Specification RF. TS. 5.0.0.

EDR Relative Transmit Power (TP/TRM/CA/BV-10-C)

Measurement Configuration

Hopping: Off and On – measure at defined, all, or any frequencies

Modulations: π/4DQPSK and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

Loopback or Tx mode

EUT power level: Max. and Min.

Displayed Results:

Max. differential power (2-DH1, 2-DH3, 2-DH5 and 3-DH1, 3-DH3 and 3-DH5), Min. differential power (2-DH1, 2-DH3, 2-DH5 and 3-DH1, 3-DH3 and 3-DH5), average differential power (2-DH1, 2-DH3, 2-DH5 and 3-DH1, 3-DH3 and 3-DH5)

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 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, (Pgfsk - 8 dB) < Pdpsk < (Pgfsk + 4 dB)

EDR Carrier Frequency Stability and Modulation Accuracy (TP/TRM/CA/BV-11-C)

Measurement Configuration

Hopping: Off and On - measure at defined, all, or any frequencies

Modulations: π/4DQPSK and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

Loopback or Tx mode

EUT power level: Max. and Min.

Displayed Results: Initial frequency error ω₁, Frequency error ω₂, Frequency error ω₁ + ω₂, 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 ±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% $\pi/4DQPSK$, 0 to 30% 8DPSK Peak DEVM Resolution: 0.1% π/4DQPSK and 8DPSK

EDR Differential Phase Encoding (TP/TRM/CA/BV-12-C)

Measurement Configuration

Hopping: Off and On, user selectable Modulations: π/4DQPSK and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

Number of test packets: default 100

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

EDR Sensitivity (TP/RCV/CA/BV-07-C)

Measurement Configuration

Hopping: Off and On, user selectable Modulations: π/4DQPSK and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

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: ±1 dB (-80 to 0 dBm)

EDR BER Floor Performance (TP/RCV/CA/BV-08-C)

Measurement Configuration

Hopping: Off and On, user selectable Modulations: π/4DQPSK and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

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: ±1 dB (-80 to 0 dBm)

EDR Maximum Input Level (TP/RCV/CA/BV-10-C)

Measurement Configuration

Hopping: Off and On, user selectable Modulations: $\pi/4DQPSK$ and 8DPSK

Packet type: 2-DH1, 2-DH3, 2-DH5, 3-DH1, 3-DH3 and 3-DH5

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 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: ±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. 5.0.0.

Output power (TP/TRM-LE/CA/BV-01-C)

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: ±1.0 dB (-35 to +20 dBm), ±1.5 dB (+20 to +22 dBm)

Modulation characteristics

[TP/TRM-LE/CA/BV-05-C (BLE), TP/TRM-LE/CA/BV-09-C (BLE Stable), TP/TRM-LE/CA/BV-10-C (2LE), TP/TRM-LE/CA/BV-11-C (2LE Stable), TP/TRM-LE/CA/BV-13-C (BLR S = 8)]

Measurement Configuration

EUT configured to transmit test reference packets BLE/2LE Packet payload: 11110000 and 10101010

BLE Packet payload: 11111111

Displayed Results

Frequency deviation: $\Delta f1$ max, $\Delta f2$ max, $\Delta f2$ avg, $\Delta f2$ avg, $\Delta f2$ avg/ $\Delta f1$ avg comparison, % of $\Delta f2$ max < frequency deviation limit 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

Carrier frequency offset and drift

[TP/TRM-LE/CA/BV-06-C (BLE), TP/TRM-LE/CA/BV-12-C (2LE), TP/TRM-LE/CA/BV-14-C (BLR S = 8)]

Measurement Configuration

EUT configured to transmit test reference packets

BLE/2LE Packet payload: 10101010 BLR Packet payload: 11111111

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 ±frequency standard

Receiver sensitivity

[TP/RCV-LE/CA/BV-01-C (BLE), TP/RCV-LE/CA/BV-14-C (BLE Stable), TP/RCV-LE/CA/BV-08-C (2LE), TP/RCV-LE/CA/BV-21-C (2LE Stable), TP/RCV-LE/CA/BV-26-C (BLR S = 2), TP/RCV-LE/CA/BV-27-C (BLR S = 8), TP/RCV-LE/CA/BV-32-C (BLR S = 2 Stable), TP/RCV-LE/CA/BV-33-C (BLR S = 8 Stable)]

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: ±1 dB (-80 to 0 dBm)

Maximum input signal level

[TP/RCV-LE/CA/BV-06-C (BLE), TP/RCV-LE/CA/BV-18-C (BLE Stable), TP/RCV-LE/CA/BV-12-C (2LE), TP/RCV-LE/CA/BV-24-C (2LE Stable)]

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: ±1 dB (-80 to 0 dBm)

PER report integrity

[TP/RCV-LE/CA/BV-07-C (BLE), TP/RCV-LE/CA/BV-19-C (BLE Stable), TP/RCV-LE/CA/BV-13-C (2LE), TP/RCV-LE/CA/BV-25-C (2LE Stable), TP/RCV-LE/CA/BV-30-C (BLR S = 2), TP/RCV-LE/CA/BV-31 (BLR S = 8), TP/RCV-LE/CA/BV-32-C (BLR S = 2 Stable), TP/RCV-LE/CA/BV-33-C (BLR S = 8 Stable)]

Measurement Configuration

EUT configured to receive test reference packets

Packet payload: PRBS9

CRC corruption: Alternate packets

Number of test packets: Random [100 ≤ RND ≤ 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: ±1 dBm (-80 to 0 dBm)

MT8852B Signal Generator

Frequency

Frequency Range: 2.4 GHz to 2.5 GHz

Frequency Resolution: 1 kHz

Frequency Accuracy: As frequency standard ±500 Hz

Level

Amplitude Range: -90 to 0 dBm

Amplitude Accuracy: ±1 dB (-80 to 0 dBm)

Amplitude Resolution: ± 0.1 dB Output Impedance: 50Ω (nominal)

Output VSWR: 1.5:1, 1.3:1 (typical), Adjacent channels 3 or higher -40 dBc

GFSK Modulation

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

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: 2.4 GHz to 2.5 GHz

Frequency Resolution: 1 kHz

Frequency Accuracy: As frequency standard ±500 Hz

Level

Range: -55 to +22 dBm (average power)

Power Measurement Accuracy: ±1 dB (-35 to +20 dBm)

Input VSWR: 1.5:1 Damage Level: +25 dBm Resolution: 0.1 dB

GFSK Modulation

Deviation Measurement Range: 0 to 350 kHz (peak power)

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 RS232 interface.

The interface meets the requirements of the Bluetooth 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 Bluetooth specification section H:2.

A USB cable is supplied.

2-Wire Control: For test control of Bluetooth 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

USB to 2-Wire Command: For use with EUTs fitted with USB to RS232 FTDI chips that support 2-Wire control

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: 160 Hz to 3.5 kHz.

Measured with 50Ω source impedance and $10M\Omega$ load impedance

Maximum Input/Output Signal Level: 3.4 Vpk-pk = 1.2 V RMS

Distortion/Noise

A law: -37 dB (typical) (1 kHz, 1 V RMS)

μ 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: 20kΩ

Minimum Output Load: 600Ω

Internal Audio Source: 1 kHz fixed frequency

Adaptive Frequency Hopping (MT8852B-015)

Supported in ACL and SCO connections

Displays: Active channel vs. time, FER vs. time

Other Features: ACL connection timer, resolution: 1 ms

Electrical Characteristics

Frequency Standard

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)

Rear Panel Connectors

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

GPIB

IEEE 488.2: Offers full instrument control as standard

RS232

RS232: Offers full instrument control as standard

General

Power Supply

Rated Voltage: 100 Vac to 120 Vac/200 Vac to 240 Vac

Rated Frequency: 50 Hz/60 Hz Power Consumption: 150 VA max.

Environmental

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 2014/30/EU

Dimensions and Mass

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.	Name
MT8852B MT8852B-040 MT8852B-041 MT8852B-042 MT8852B-043	Main frame Bluetooth Test Set with EDR and Audio Bluetooth Test Set with no EDR and no Audio Bluetooth Test Set with no EDR and with Audio Bluetooth Test Set with EDR and no Audio Bluetooth Test Set with EDR and no Audio Bluetooth Test Set with low energy Measurements only
	Standard accessories BlueSuite (Software, Standard version) BLE Measurement Software MT8852B Bootloader 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)
MT8852B-001 MT8852B-015 MT8852B-017 MT8852B-027 MT8852B-034* ¹ MT8852B-035* ¹ , * ² MT8852B-036* ¹ , * ² , * ³ MT8852B-070	Options and accessories Rack Mount Kit, Single Unit Adaptive Frequency Hopping IQ Data Output Bluetooth low energy Measurements BLE Data Length Extension BLE 2LE (2 Mbps Low Energy) BLE BLR (Bluetooth Long Range) Platform Enhancement

Model/Order No.	Name
MT8852B-315 MT8852B-317	Retrofit Adaptive Frequency Hopping Retrofit IQ Data Output
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*1	Retrofit BLE Data Length Extension
MT8852B-335*1, *2	Retrofit BLE 2LE (2 Mbps Low Energy)
MT8852B-336*1, *2, *3	Retrofit BLE BLR (Bluetooth Long Range)
MT8852B-270	Retrofit Platform Enhancement
MT8852B-370	(For units where the first three characters of the serial number are not "6A6") Retrofit Platform Enhancement (For units where the first three characters of the serial number are "6A6")
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 (Application)
2000-1613-R	Bluetooth Antenna and Adapter
D41310	Soft Carry Bag

- **★**1: MT8852B-034 (334) requires MT8852B-027 (327) or MT8852B-043.
- *2: MT8852B-035 (335) and MT8852B-036 (336) requires MT8852B-034 (334).
- *3: MT8852B-036 (336) requires MT8852B-070 (270, 370).



Specifications are subject to change without notice.

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