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 v5.2.

Basic Rate Measurements

Basic Rate measurements made in compliance with Bluetooth RF Test Specification RF. TS. p30.

Output Power (RF/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 (RF/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 (RF/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 (RF/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 (RF/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 (RF/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 (RF/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 (RF/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: $\Delta f_{1\text{max}}, \Delta f_{2\text{max}}, \Delta f_{1\text{avg}}, \Delta f_{2\text{avg}}, \Delta f_{2\text{avg}}/\Delta f_{1\text{avg}}$, % of $\Delta f_{2\text{max}} < 115$ 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 (RF/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. p30.

**EDR Relative Transmit Power (RF/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, (P_{GFSK} – 8 dB) < P_{DPSK} < (P_{GFSK} + 4 dB)

**EDR Carrier Frequency Stability and Modulation Accuracy (RF/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 $\omega_i$, Frequency error $\omega_o$, Frequency error $\omega_i + \omega_o$, RMS DEV (block with greatest DEV value displayed), Peak DEV, 99% DEV, Average RMS DEV (average DEV 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 DEV Range: 30% π/4DQPSK, 20% 8DPSK
- RMS DEV Resolution: 0.1% π/4DQPSK and 8DPSK
- Peak DEV Range: 0 to 50% π/4DQPSK, 0 to 30% 8DPSK
- Peak DEV Resolution: 0.1% π/4DQPSK and 8DPSK

**EDR Differential Phase Encoding (RF/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
- 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

**EDR Sensitivity (RF/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 (RF/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

Output Power Range: –90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy: ± 1 dB (∆B = 80 to 0 dBm)

EDR Maximum Input Level (RF/RCV/CA/BV-10-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 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

Output Power Range: –90 to 0 dBm, resolution: 0.1 dB
Output Power Accuracy: ± 1 dB (∆B = 80 to 0 dBm)

Bluetooth low energy Measurements
Bluetooth low energy measurements made in compliance with Bluetooth RF Test Specification RF-PHY. TS. p15.

Output power (RF-PHY/TRM/BV-01-C, RF-PHY/TRM/BV-15-C)

Measurement Configuration
- EUT configured to transmit test reference packets
- Packet payload: PRBS9
- AoA Constant Tone Extensions

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 (∆B = 35 to +20 dBm), ± 1.5 dB (+20 to +22 dBm)

Modulation characteristics
[RF-PHY/TRM/BV-05-C (BLE), RF-PHY/TRM/BV-10-C (2LE), RF-PHY/TRM/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: Δf1 max, Δf2 max, Δf1 avg, Δf2 avg, Δf2 avg/Δf1 avg comparison, % of Δf2 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
[RF-PHY/TRM/BV-06-C (BLE), RF-PHY/TRM/BV-12-C (2LE), RF-PHY/TRM/BV-14-C (BLR S = 8), RF-PHY/TRM/BV-16-C (BLE CTE), RF-PHY/TRM/BV-17-C (2LE CTE)]

Measurement Configuration
- EUT configured to transmit test reference packets
- BLE/2LE CTE Packet payload: 11110000
- BLR Packet payload: 11111111
- AoA Constant Tone Extensions

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
[RF-PHY/RCV/BV-01-C (BLE), RF-PHY/RCV/BV-08-C (2 LE), RF-PHY/RCV/BV-26-C (BLR S = 2),
RF-PHY/RCV/BV-27-C (BLR S = 8)]
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
[RF-PHY/RCV/BV-06-C (BLE), RF-PHY/RCV/BV-12-C (2 LE)]
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
[RF-PHY/RCV/BV-07-C (BLE), RF-PHY/RCV/BV-13-C (2 LE), RF-PHY/RCV/BV-30-C (BLR S = 2),
RF-PHY/RCV/BV-31-C (BLR S = 8)]
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 dB (–80 to 0 dBm)

BLE Tx Power Stability
Measurement Configuration
  EUT configured to transmit Test Reference Packets
  No payload
  AoD Constant Tone Extensions
Displayed results
  Maximum deviation to average power during reference period
  Maximum deviation to average power for each transmit slot
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: 0.01 dB
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% (nominal) for modulation index = 0.32
- Baseband Filter: BT = 0.5
  
*: Supports low energy signal generator compliant with Bluetooth Core Specification v5.2

**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 10 MΩ 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 (MT8852 B-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%

EU Standards (CE Marking)
  EMC: EN61326-1, EN61000-3-2
  LVD: EN61010-1
  RoHS: EN50581

Dimensions and Mass
  Dimensions: 216.5 (W) × 88 (H) × 380 (D) mm
  Mass: <3.8 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.

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<th>Name</th>
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<tr>
<td>MT8852B-040</td>
<td>Bluetooth Test Set</td>
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<td><strong>Standard Accessories</strong></td>
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<td>J1783A</td>
<td>MT8852B Bluetooth Test Set Operation Manual</td>
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<td>J1784A</td>
<td>MT8852B Bluetooth Test Set Operation Manual</td>
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<td>J1785A</td>
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<tr>
<td></td>
<td>USB HCI control interface lead</td>
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<tr>
<td></td>
<td>RS232 HCI Control Interface Lead</td>
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<td>RS232 Cable for Firmware Updates</td>
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<td>BlueSuite Software</td>
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<td></td>
<td>Bluetooth Low Energy Measurement Software application</td>
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<td>MT8852B Bootloader</td>
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<tr>
<td>J1786A</td>
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<th>Model/Order No</th>
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<td>Platform Enhancement Option</td>
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<tr>
<td>MT8852B-070</td>
<td>Platform Enhancement Option</td>
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*1: MT8852B-034 (334) requires MT8852B-027 (327) or MT8852B-043.

*2: MT8852B-035 (335), MT8852B-036 (336) and MT8852B-037 (337) requires MT8852B-034 (334).

*3: MT8852B-036 (336) and MT8852B-037 (337) requires MT8852B-070 (270, 370).

*4: When installing MT8852B-315/317/319/325 to MT8852B-043, MT8852B-330 is necessary.