

Wifi

BPI-R3 internal wifi

```
root@bpi-r3:~# modprobe mt7915e
[ 1845.929130] mt7986-wmac 18000000.wifi: HW/SW Version: 0x8a108a10, Build
Time: 20220113162701a
[ 1845.929130]
[ 1846.080835] mt7986-wmac 18000000.wifi: WM Firmware Version: ____000000,
Build Time: 20220113162756
[ 1846.151817] mt7986-wmac 18000000.wifi: WA Firmware Version: DEV_000000,
Build Time: 20220113163034
root@bpi-r3:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group
default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1504 qdisc fq_codel state UP
group default qlen 1000
    link/ether a6:10:3b:a5:8c:b2 brd ff:ff:ff:ff:ff:ff
    inet6 fe80::a410:3bff:fea5:8cb2/64 scope link
        valid_lft forever preferred_lft forever
3: eth1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group default
qlen 1000
    link/ether 92:65:f3:ec:b0:19 brd ff:ff:ff:ff:ff:ff
4: sit0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN group default qlen 1000
    link/sit 0.0.0.0 brd 0.0.0.0
5: wan@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether de:d5:1a:b0:11:33 brd ff:ff:ff:ff:ff:ff
6: lan0@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether 5a:de:ab:24:d9:82 brd ff:ff:ff:ff:ff:ff
7: lan1@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether fe:49:16:78:33:39 brd ff:ff:ff:ff:ff:ff
8: lan2@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether 3e:bf:7a:a1:ae:f8 brd ff:ff:ff:ff:ff:ff
9: lan3@eth0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether 82:6c:36:12:39:5e brd ff:ff:ff:ff:ff:ff
10: lan4@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue
state UP group default qlen 1000
    link/ether 36:89:b6:5d:ed:5d brd ff:ff:ff:ff:ff:ff
```

```
inet 192.168.0.19/24 scope global lan4
    valid_lft forever preferred_lft forever
inet6 fe80::3489:b6ff:fe5d:ed5d/64 scope link
    valid_lft forever preferred_lft forever
11: wwan0: <POINTOPOINT,MULTICAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc fq_codel
state UNKNOWN group default qlen 1000
    link/none
    inet6 fe80::68df:ff6d:c2ae:aad4/64 scope link stable-privacy
        valid_lft forever preferred_lft forever
12: wlan0: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether 00:0c:43:26:60:00 brd ff:ff:ff:ff:ff:ff
13: wlan1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN group
default qlen 1000
    link/ether 82:0c:43:26:60:00 brd ff:ff:ff:ff:ff:ff
root@bpi-r3:~# iw dev
phy#1
    Interface wlan1
        ifindex 13
        wdev 0x100000001
        addr 82:0c:43:26:60:00
        type managed
        txpower 6.00 dBm
        multicast TXQ:
            qsz-byt qsz-pkt flows    drops    marks    overlmt
hashcol tx-bytes      tx-packets
0          0          0          0          0          0          0
0          0
phy#0
    Interface wlan0
        ifindex 12
        wdev 0x1
        addr 00:0c:43:26:60:00
        type managed
        txpower 6.00 dBm
        multicast TXQ:
            qsz-byt qsz-pkt flows    drops    marks    overlmt
hashcol tx-bytes      tx-packets
0          0          0          0          0          0          0
0          0
root@bpi-r3:~# iw list
Wiphy phy1
    wiphy index: 1
    max # scan SSIDs: 4
    max scan IEs length: 2190 bytes
    max # sched scan SSIDs: 0
    max # match sets: 0
    Retry short limit: 7
    Retry long limit: 4
    Coverage class: 0 (up to 0m)
    Device supports RSN-IBSS.
```

Device supports AP-side u-APSD.

Device supports T-DLS.

Supported Ciphers:

- * WEP40 (00-0f-ac:1)
- * WEP104 (00-0f-ac:5)
- * TKIP (00-0f-ac:2)
- * CCMP-128 (00-0f-ac:4)
- * CCMP-256 (00-0f-ac:10)
- * GCMP-128 (00-0f-ac:8)
- * GCMP-256 (00-0f-ac:9)
- * CMAC (00-0f-ac:6)
- * CMAC-256 (00-0f-ac:13)
- * GMAC-128 (00-0f-ac:11)
- * GMAC-256 (00-0f-ac:12)

Available Antennas: TX 0xf RX 0xf

Configured Antennas: TX 0xf RX 0xf

Supported interface modes:

- * IBSS
- * managed
- * AP
- * AP/VLAN
- * monitor
- * P2P-client
- * P2P-GO

Band 2:

Capabilities: 0x9ff

RX LDPC

HT20/HT40

SM Power Save disabled

RX Greenfield

RX HT20 SGI

RX HT40 SGI

TX STBC

RX STBC 1-stream

Max AMSDU length: 7935 bytes

No DSSS/CCK HT40

Maximum RX AMPDU length 65535 bytes (exponent: 0x003)

Minimum RX AMPDU time spacing: 4 usec (0x05)

HT TX/RX MCS rate indexes supported: 0-31

VHT Capabilities (0x339b79f6):

Max MPDU length: 11454

Supported Channel Width: 160 MHz

RX LDPC

short GI (80 MHz)

short GI (160/80+80 MHz)

TX STBC

SU Beamformer

SU Beamformee

MU Beamformer

MU Beamformee

RX antenna pattern consistency

```
TX antenna pattern consistency
VHT RX MCS set:
  1 streams: MCS 0-9
  2 streams: MCS 0-9
  3 streams: MCS 0-9
  4 streams: MCS 0-9
  5 streams: not supported
  6 streams: not supported
  7 streams: not supported
  8 streams: not supported
VHT RX highest supported: 0 Mbps
VHT TX MCS set:
  1 streams: MCS 0-9
  2 streams: MCS 0-9
  3 streams: MCS 0-9
  4 streams: MCS 0-9
  5 streams: not supported
  6 streams: not supported
  7 streams: not supported
  8 streams: not supported
VHT TX highest supported: 0 Mbps
HE Iftypes: Station
  HE MAC Capabilities (0x08011a000040):
    +HTC HE Supported
    Trigger Frame MAC Padding Duration: 2
    OM Control
    Maximum A-MPDU Length Exponent: 3
    A-MSDU in A-MPDU
  HE PHY Capabilities: (0x5c70ce126d00f3164e3f00):
    HE40/HE80/5GHz
    HE160/5GHz
    HE160/HE80+80/5GHz
    242 tone RUs/5GHz
    Device Class: 1
    LDPC Coding in Payload
    HE SU PPDU with 1x HE-LTF and 0.8us GI
    NDP with 4x HE-LTF and 3.2us GI
    STBC Tx <= 80MHz
    STBC Rx <= 80MHz
    Full Bandwidth UL MU-MIMO
    Partial Bandwidth UL MU-MIMO
    DCM Max Constellation: 2
    DCM Max Constellation Rx: 2
    SU Beamformee
    Beamformee STS <= 80Mhz: 3
    Beamformee STS > 80Mhz: 3
    Codebook Size SU Feedback
    Codebook Size MU Feedback
    Triggered CQI Feedback
    Partial Bandwidth Extended Range
    Partial Bandwidth DL MU-MIMO
```

PPE Threshold Present
 Power Boost Factor ar
 HE SU PPDU & HE PPDU 4x HE-LTF 0.8us GI
 Max NC: 2
 20MHz in 40MHz HE PPDU 2.4GHz
 20MHz in 160/80+80MHz HE PPDU
 80MHz in 160/80+80MHz HE PPDU
 DCM Max BW: 1
 Longer Than 16HE SIG-B OFDM Symbols
 Non-Triggered CQI Feedback
 TX 1024-QAM
 RX 1024-QAM
 RX Full BW SU Using HE MU PPDU with

Compression SIGB

RX Full BW SU Using HE MU PPDU with Non-

Compression SIGB

HE RX MCS and NSS set <= 80 MHz
 1 streams: MCS 0-11
 2 streams: MCS 0-11
 3 streams: MCS 0-11
 4 streams: MCS 0-11
 5 streams: not supported
 6 streams: not supported
 7 streams: not supported
 8 streams: not supported
 HE TX MCS and NSS set <= 80 MHz
 1 streams: MCS 0-11
 2 streams: MCS 0-11
 3 streams: MCS 0-11
 4 streams: MCS 0-11
 5 streams: not supported
 6 streams: not supported
 7 streams: not supported
 8 streams: not supported
 HE RX MCS and NSS set 160 MHz
 1 streams: MCS 0-11
 2 streams: MCS 0-11
 3 streams: MCS 0-11
 4 streams: MCS 0-11
 5 streams: not supported
 6 streams: not supported
 7 streams: not supported
 8 streams: not supported
 HE TX MCS and NSS set 160 MHz
 1 streams: MCS 0-11
 2 streams: MCS 0-11
 3 streams: MCS 0-11
 4 streams: MCS 0-11
 5 streams: not supported
 6 streams: not supported
 7 streams: not supported

```

                                8 streams: not supported
HE RX MCS and NSS set 80+80 MHz
                                1 streams: MCS 0-11
                                2 streams: MCS 0-11
                                3 streams: MCS 0-11
                                4 streams: MCS 0-11
                                5 streams: not supported
                                6 streams: not supported
                                7 streams: not supported
                                8 streams: not supported
HE TX MCS and NSS set 80+80 MHz
                                1 streams: MCS 0-11
                                2 streams: MCS 0-11
                                3 streams: MCS 0-11
                                4 streams: MCS 0-11
                                5 streams: not supported
                                6 streams: not supported
                                7 streams: not supported
                                8 streams: not supported
PPE Threshold 0x3b 0x1c 0xc7 0x71 0x1c 0xc7 0x71
0x1c 0xc7 0x71
HE Iftypes: AP
HE MAC Capabilities (0x00051a081044):
    +HTC HE Supported
    TWT Responder
    BSR
    OM Control
    Maximum A-MPDU Length Exponent: 3
    BQR
    A-MSDU in A-MPDU
    OM Control UL MU Data Disable RX
HE PHY Capabilities: (0x1c20ce926f1bafd0000c00):
    HE40/HE80/5GHz
    HE160/5GHz
    HE160/HE80+80/5GHz
    LDPC Coding in Payload
    NDP with 4x HE-LTF and 3.2us GI
    STBC Tx <= 80MHz
    STBC Rx <= 80MHz
    Full Bandwidth UL MU-MIMO
    Partial Bandwidth UL MU-MIMO
    DCM Max Constellation: 2
    DCM Max Constellation Rx: 2
    SU Beamformer
    SU Beamformee
    MU Beamformer
    Beamformee STS <= 80Mhz: 3
    Beamformee STS > 80Mhz: 3
    Sounding Dimensions <= 80Mhz: 3
    Sounding Dimensions > 80Mhz: 3
    Codebook Size SU Feedback
```

```
Codebook Size MU Feedback
Triggered SU Beamforming Feedback
Triggered MU Beamforming Feedback
Partial Bandwidth Extended Range
PPE Threshold Present
Max NC: 2
STBC Tx > 80MHz
STBC Rx > 80MHz
TX 1024-QAM
RX 1024-QAM
HE RX MCS and NSS set <= 80 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
HE TX MCS and NSS set <= 80 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
HE RX MCS and NSS set 160 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
HE TX MCS and NSS set 160 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
HE RX MCS and NSS set 80+80 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
```

```
5 streams: not supported
6 streams: not supported
7 streams: not supported
8 streams: not supported
HE TX MCS and NSS set 80+80 MHz
1 streams: MCS 0-11
2 streams: MCS 0-11
3 streams: MCS 0-11
4 streams: MCS 0-11
5 streams: not supported
6 streams: not supported
7 streams: not supported
8 streams: not supported
PPE Threshold 0x3b 0x1c 0xc7 0x71 0x1c 0xc7 0x71
0x1c 0xc7 0x71
```

Bitrates (non-HT):

- * 6.0 Mbps
- * 9.0 Mbps
- * 12.0 Mbps
- * 18.0 Mbps
- * 24.0 Mbps
- * 36.0 Mbps
- * 48.0 Mbps
- * 54.0 Mbps

Frequencies:

- * 5180 MHz [36] (20.0 dBm) (no IR)
- * 5200 MHz [40] (20.0 dBm) (no IR)
- * 5220 MHz [44] (20.0 dBm) (no IR)
- * 5240 MHz [48] (20.0 dBm) (no IR)
- * 5260 MHz [52] (20.0 dBm) (no IR, radar detection)
- * 5280 MHz [56] (20.0 dBm) (no IR, radar detection)
- * 5300 MHz [60] (20.0 dBm) (no IR, radar detection)
- * 5320 MHz [64] (20.0 dBm) (no IR, radar detection)
- * 5500 MHz [100] (20.0 dBm) (no IR, radar detection)
- * 5520 MHz [104] (20.0 dBm) (no IR, radar detection)
- * 5540 MHz [108] (20.0 dBm) (no IR, radar detection)
- * 5560 MHz [112] (20.0 dBm) (no IR, radar detection)
- * 5580 MHz [116] (20.0 dBm) (no IR, radar detection)
- * 5600 MHz [120] (20.0 dBm) (no IR, radar detection)
- * 5620 MHz [124] (20.0 dBm) (no IR, radar detection)
- * 5640 MHz [128] (20.0 dBm) (no IR, radar detection)
- * 5660 MHz [132] (20.0 dBm) (no IR, radar detection)
- * 5680 MHz [136] (20.0 dBm) (no IR, radar detection)
- * 5700 MHz [140] (20.0 dBm) (no IR, radar detection)
- * 5720 MHz [144] (20.0 dBm) (no IR, radar detection)
- * 5745 MHz [149] (20.0 dBm) (no IR)
- * 5765 MHz [153] (20.0 dBm) (no IR)
- * 5785 MHz [157] (20.0 dBm) (no IR)
- * 5805 MHz [161] (20.0 dBm) (no IR)
- * 5825 MHz [165] (20.0 dBm) (no IR)
- * 5845 MHz [169] (disabled)

* 5865 MHz [173] (disabled)

Supported commands:

- * new_interface
- * set_interface
- * new_key
- * start_ap
- * new_station
- * set_bss
- * authenticate
- * associate
- * deauthenticate
- * disassociate
- * join_ibss
- * remain_on_channel
- * set_tx_bitrate_mask
- * frame
- * frame_wait_cancel
- * set_wiphy_netns
- * set_channel
- * tdls_mgmt
- * tdls_oper
- * probe_client
- * set_noack_map
- * register_beacons
- * start_p2p_device
- * set_mcast_rate
- * connect
- * disconnect
- * channel_switch
- * set_qos_map
- * set_multicast_to_unicast
- * Unknown command (140)

software interface modes (can always be added):

- * AP/VLAN
- * monitor

valid interface combinations:

- * #{ IBSS } <= 1, #{ AP } <= 16, #{ managed } <= 19,
total <= 19, #channels <= 1, STA/AP BI must match, radar

detect widths: { 20 MHz (no HT), 20 MHz, 40 MHz, 80
MHz, 80+80 MHz, 160 MHz }

HT Capability overrides:

- * MCS: ff ff ff ff ff ff ff ff ff ff
- * maximum A-MSDU length
- * supported channel width
- * short GI for 40 MHz
- * max A-MPDU length exponent
- * min MPDU start spacing

Device supports TX status socket option.

Device supports HT-IBSS.

Device supports SAE with AUTHENTICATE command

Device supports low priority scan.

Device supports scan flush.

Device supports AP scan.

Device supports per-vif TX power setting

Driver supports full state transitions for AP/GO clients

Driver supports a userspace MPM

Device supports active monitor (which will ACK incoming frames)

Device supports configuring vdev MAC-addr on create.

max # scan plans: 1

max scan plan interval: -1

max scan plan iterations: 0

Supported TX frame types:

- * IBSS: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * managed: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * AP: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * AP/VLAN: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * mesh point: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * P2P-client: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * P2P-GO: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
- * P2P-device: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0

Supported RX frame types:

- * IBSS: 0x40 0xb0 0xc0 0xd0
- * managed: 0x40 0xb0 0xd0
- * AP: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
- * AP/VLAN: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
- * mesh point: 0xb0 0xc0 0xd0
- * P2P-client: 0x40 0xd0
- * P2P-GO: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
- * P2P-device: 0x40 0xd0

Supported extended features:

- * [VHT_IBSS]: VHT-IBSS
- * [RRM]: RRM
- * [BEACON_RATE_LEGACY]: legacy beacon rate setting
- * [BEACON_RATE_HT]: HT beacon rate setting
- * [BEACON_RATE_VHT]: VHT beacon rate setting
- * [FILS_STA]: STA FILS (Fast Initial Link Setup)
- * [CQM_RSSI_LIST]: multiple CQM_RSSI_THRESHOLD records
- * [CONTROL_PORT_OVER_NL80211]: control port over nl80211
- * [TXQS]: FQ-CoDel-enabled intermediate TXQs
- * [AIRTIME_FAIRNESS]: airtime fairness scheduling
- * [AQL]: Airtime Queue Limits (AQL)
- * [SCAN_RANDOM_SN]: use random sequence numbers in scans
- * [SCAN_MIN_PREQ_CONTENT]: use probe request with only

```
rate IEs in scans
    * [ CONTROL_PORT_NO_PREAUTH ]: disable pre-auth over nl80211
control port support
    * [ DEL_IBSS_STA ]: deletion of IBSS station support
    * [ SCAN_FREQ_KHZ ]: scan on kHz frequency support
    * [ CONTROL_PORT_OVER_NL80211_TX_STATUS ]: tx status for
nl80211 control port support
Wiphy phy0
    wiphy index: 0
    max # scan SSIDs: 4
    max scan IEs length: 2200 bytes
    max # sched scan SSIDs: 0
    max # match sets: 0
    Retry short limit: 7
    Retry long limit: 4
    Coverage class: 0 (up to 0m)
    Device supports RSN-IBSS.
    Device supports AP-side u-APSD.
    Device supports T-DLS.
    Supported Ciphers:
        * WEP40 (00-0f-ac:1)
        * WEP104 (00-0f-ac:5)
        * TKIP (00-0f-ac:2)
        * CCMP-128 (00-0f-ac:4)
        * CCMP-256 (00-0f-ac:10)
        * GCMP-128 (00-0f-ac:8)
        * GCMP-256 (00-0f-ac:9)
        * CMAC (00-0f-ac:6)
        * CMAC-256 (00-0f-ac:13)
        * GMAC-128 (00-0f-ac:11)
        * GMAC-256 (00-0f-ac:12)
    Available Antennas: TX 0xf RX 0xf
    Configured Antennas: TX 0xf RX 0xf
    Supported interface modes:
        * IBSS
        * managed
        * AP
        * AP/VLAN
        * monitor
        * P2P-client
        * P2P-GO
    Band 1:
        Capabilities: 0x9ff
            RX LDPC
            HT20/HT40
            SM Power Save disabled
            RX Greenfield
            RX HT20 SGI
            RX HT40 SGI
            TX STBC
            RX STBC 1-stream
```

```
Max AMSDU length: 7935 bytes
No DSSS/CCK HT40
Maximum RX AMPDU length 65535 bytes (exponent: 0x003)
Minimum RX AMPDU time spacing: 4 usec (0x05)
HT TX/RX MCS rate indexes supported: 0-31
HE Iftypes: Station
  HE MAC Capabilities (0x08011a000040):
    +HTC HE Supported
    Trigger Frame MAC Padding Duration: 2
    OM Control
    Maximum A-MPDU Length Exponent: 3
    A-MSDU in A-MPDU
  HE PHY Capabilities: (0x2270ce126d00f3164e3f00):
    HE40/2.4GHz
    242 tone RUs/2.4GHz
    Device Class: 1
    LDPC Coding in Payload
    HE SU PPDU with 1x HE-LTF and 0.8us GI
    NDP with 4x HE-LTF and 3.2us GI
    STBC Tx <= 80MHz
    STBC Rx <= 80MHz
    Full Bandwidth UL MU-MIMO
    Partial Bandwidth UL MU-MIMO
    DCM Max Constellation: 2
    DCM Max Constellation Rx: 2
    SU Beamformee
    Beamformee STS <= 80Mhz: 3
    Beamformee STS > 80Mhz: 3
    Codebook Size SU Feedback
    Codebook Size MU Feedback
    Triggered CQI Feedback
    Partial Bandwidth Extended Range
    Partial Bandwidth DL MU-MIMO
    PPE Threshold Present
    Power Boost Factor ar
    HE SU PPDU & HE PPDU 4x HE-LTF 0.8us GI
    Max NC: 2
    20MHz in 40MHz HE PPDU 2.4GHz
    20MHz in 160/80+80MHz HE PPDU
    80MHz in 160/80+80MHz HE PPDU
    DCM Max BW: 1
    Longer Than 16HE SIG-B OFDM Symbols
    Non-Triggered CQI Feedback
    TX 1024-QAM
    RX 1024-QAM
    RX Full BW SU Using HE MU PPDU with
    RX Full BW SU Using HE MU PPDU with Non-
    HE RX MCS and NSS set <= 80 MHz
    1 streams: MCS 0-11
```

Compression SIGB

Compression SIGB

```
2 streams: MCS 0-11
3 streams: MCS 0-11
4 streams: MCS 0-11
5 streams: not supported
6 streams: not supported
7 streams: not supported
8 streams: not supported
HE TX MCS and NSS set <= 80 MHz
1 streams: MCS 0-11
2 streams: MCS 0-11
3 streams: MCS 0-11
4 streams: MCS 0-11
5 streams: not supported
6 streams: not supported
7 streams: not supported
8 streams: not supported
PPE Threshold 0x3b 0x1c 0xc7 0x71 0x1c 0xc7 0x71
0x1c 0xc7 0x71
HE Iftypes: AP
HE MAC Capabilities (0x00051a081044):
+HTC HE Supported
TWT Responder
BSR
OM Control
Maximum A-MPDU Length Exponent: 3
BQR
A-MSDU in A-MPDU
OM Control UL MU Data Disable RX
HE PHY Capabilities: (0x0220ce926f1bafd0000c00):
HE40/2.4GHz
LDPC Coding in Payload
NDP with 4x HE-LTF and 3.2us GI
STBC Tx <= 80MHz
STBC Rx <= 80MHz
Full Bandwidth UL MU-MIMO
Partial Bandwidth UL MU-MIMO
DCM Max Constellation: 2
DCM Max Constellation Rx: 2
SU Beamformer
SU Beamformee
MU Beamformer
Beamformee STS <= 80Mhz: 3
Beamformee STS > 80Mhz: 3
Sounding Dimensions <= 80Mhz: 3
Sounding Dimensions > 80Mhz: 3
Codebook Size SU Feedback
Codebook Size MU Feedback
Triggered SU Beamforming Feedback
Triggered MU Beamforming Feedback
Partial Bandwidth Extended Range
PPE Threshold Present
```

```
Max NC: 2
STBC Tx > 80MHz
STBC Rx > 80MHz
TX 1024-QAM
RX 1024-QAM
HE RX MCS and NSS set <= 80 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
HE TX MCS and NSS set <= 80 MHz
    1 streams: MCS 0-11
    2 streams: MCS 0-11
    3 streams: MCS 0-11
    4 streams: MCS 0-11
    5 streams: not supported
    6 streams: not supported
    7 streams: not supported
    8 streams: not supported
PPE Threshold 0x3b 0x1c 0xc7 0x71 0x1c 0xc7 0x71
0x1c 0xc7 0x71
Bitrates (non-HT):
* 1.0 Mbps (short preamble supported)
* 2.0 Mbps (short preamble supported)
* 5.5 Mbps (short preamble supported)
* 11.0 Mbps (short preamble supported)
* 6.0 Mbps
* 9.0 Mbps
* 12.0 Mbps
* 18.0 Mbps
* 24.0 Mbps
* 36.0 Mbps
* 48.0 Mbps
* 54.0 Mbps
Frequencies:
* 2412 MHz [1] (20.0 dBm)
* 2417 MHz [2] (20.0 dBm)
* 2422 MHz [3] (20.0 dBm)
* 2427 MHz [4] (20.0 dBm)
* 2432 MHz [5] (20.0 dBm)
* 2437 MHz [6] (20.0 dBm)
* 2442 MHz [7] (20.0 dBm)
* 2447 MHz [8] (20.0 dBm)
* 2452 MHz [9] (20.0 dBm)
* 2457 MHz [10] (20.0 dBm)
* 2462 MHz [11] (20.0 dBm)
* 2467 MHz [12] (20.0 dBm) (no IR)
```

- * 2472 MHz [13] (20.0 dBm) (no IR)

- * 2484 MHz [14] (20.0 dBm) (no IR)

Supported commands:

- * new_interface
- * set_interface
- * new_key
- * start_ap
- * new_station
- * set_bss
- * authenticate
- * associate
- * deauthenticate
- * disassociate
- * join_ibss
- * remain_on_channel
- * set_tx_bitrate_mask
- * frame
- * frame_wait_cancel
- * set_wiphy_netns
- * set_channel
- * tdls_mgmt
- * tdls_oper
- * probe_client
- * set_noack_map
- * register_beacons
- * start_p2p_device
- * set_mcast_rate
- * connect
- * disconnect
- * channel_switch
- * set_qos_map
- * set_multicast_to_unicast
- * Unknown command (140)

software interface modes (can always be added):

- * AP/VLAN
- * monitor

valid interface combinations:

- * #{ IBSS } <= 1, #{ AP } <= 16, #{ managed } <= 19,
total <= 19, #channels <= 1, STA/AP BI must match, radar

detect widths: { 20 MHz (no HT), 20 MHz, 40 MHz, 80
MHz, 80+80 MHz, 160 MHz }

HT Capability overrides:

- * MCS: ff ff ff ff ff ff ff ff ff
- * maximum A-MSDU length
- * supported channel width
- * short GI for 40 MHz
- * max A-MPDU length exponent
- * min MPDU start spacing

Device supports TX status socket option.

Device supports HT-IBSS.

```
Device supports SAE with AUTHENTICATE command
Device supports low priority scan.
Device supports scan flush.
Device supports AP scan.
Device supports per-vif TX power setting
Driver supports full state transitions for AP/GO clients
Driver supports a userspace MPM
Device supports active monitor (which will ACK incoming frames)
Device supports configuring vdev MAC-addr on create.
max # scan plans: 1
max scan plan interval: -1
max scan plan iterations: 0
Supported TX frame types:
    * IBSS: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90
0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * managed: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80
0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * AP: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90
0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * AP/VLAN: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80
0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * mesh point: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80
0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * P2P-client: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80
0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * P2P-GO: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80 0x90
0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
    * P2P-device: 0x00 0x10 0x20 0x30 0x40 0x50 0x60 0x70 0x80
0x90 0xa0 0xb0 0xc0 0xd0 0xe0 0xf0
Supported RX frame types:
    * IBSS: 0x40 0xb0 0xc0 0xd0
    * managed: 0x40 0xb0 0xd0
    * AP: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
    * AP/VLAN: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
    * mesh point: 0xb0 0xc0 0xd0
    * P2P-client: 0x40 0xd0
    * P2P-GO: 0x00 0x20 0x40 0xa0 0xb0 0xc0 0xd0
    * P2P-device: 0x40 0xd0
Supported extended features:
    * [ VHT_IBSS ]: VHT-IBSS
    * [ RRM ]: RRM
    * [ BEACON_RATE_LEGACY ]: legacy beacon rate setting
    * [ BEACON_RATE_HT ]: HT beacon rate setting
    * [ BEACON_RATE_VHT ]: VHT beacon rate setting
    * [ FILS_STA ]: STA FILS (Fast Initial Link Setup)
    * [ CQM_RSSI_LIST ]: multiple CQM_RSSI_THOLD records
    * [ CONTROL_PORT_OVER_NL80211 ]: control port over nl80211
    * [ TXQS ]: FQ-CoDel-enabled intermediate TXQs
    * [ AIRTIME_FAIRNESS ]: airtime fairness scheduling
    * [ AQL ]: Airtime Queue Limits (AQL)
    * [ SCAN_RANDOM_SN ]: use random sequence numbers in scans
```

```
* [ SCAN_MIN_PREQ_CONTENT ]: use probe request with only
rate IEs in scans
* [ CONTROL_PORT_NO_PREAUTH ]: disable pre-auth over nl80211
control port support
* [ DEL_IBSS_STA ]: deletion of IBSS station support
* [ SCAN_FREQ_KHZ ]: scan on kHz frequency support
* [ CONTROL_PORT_OVER_NL80211_TX_STATUS ]: tx status for
nl80211 control port support
```

From:

<https://fw-web.de/dokuwiki/> - **FW-WEB Wiki**

Permanent link:

<https://fw-web.de/dokuwiki/doku.php?id=en:bpi-r3:wlan&rev=1664710611>

Last update: **2023/06/08 17:06**

