Application Note
Labtool User Guide for 88W8897

Documentation No. AN12101
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Revision History

Date	Author	Revision	Description
09/11/13	Stephen Sobejana	0.1	Initial Draft
11/08/13	Stephen Sobejana	0.3	Included CMD35 Usage

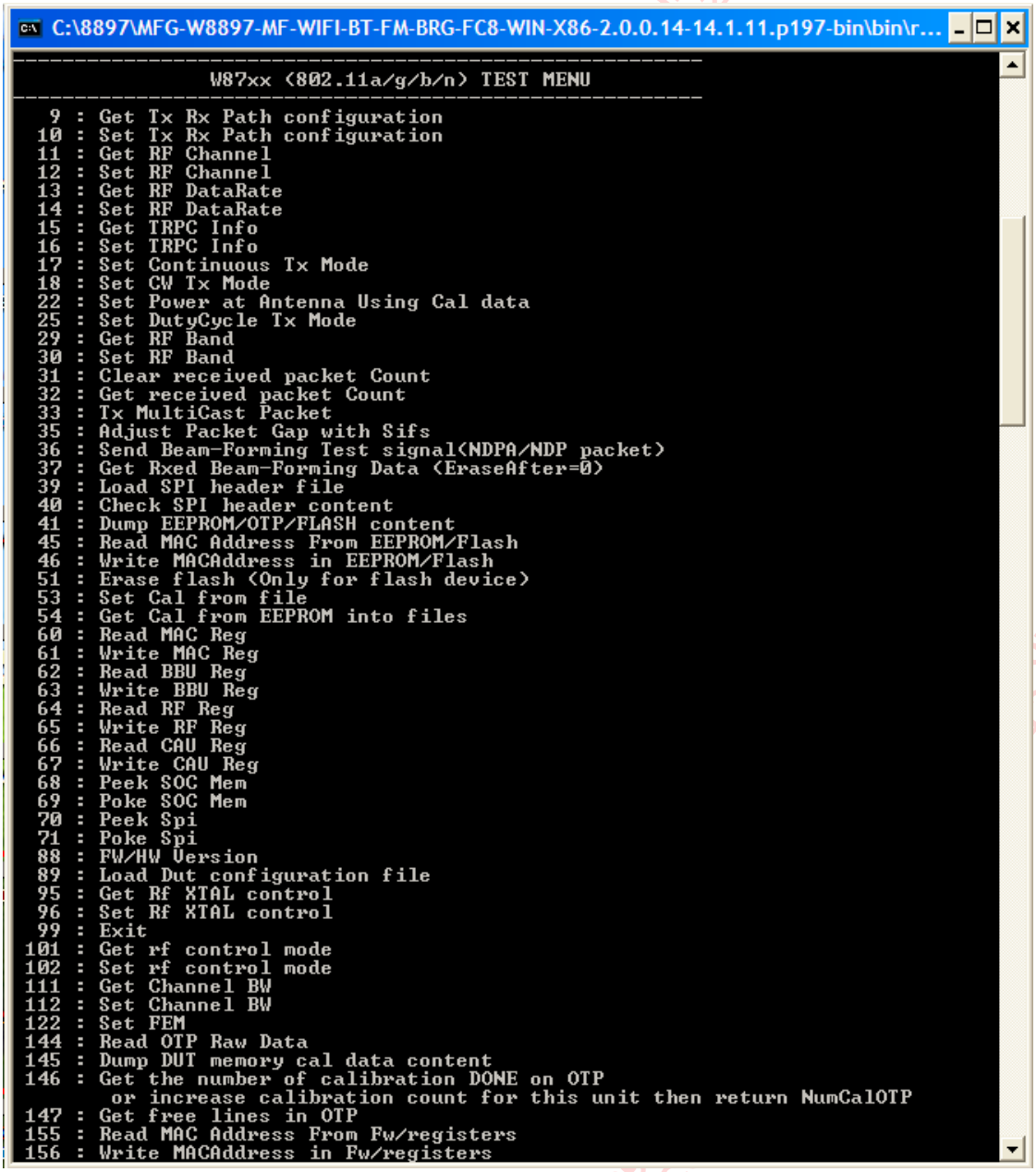
The Marvell 8897 Labtool User Guide

The following application note gives a brief overview of the Marvell Labtool for the 88W8897 SOC. The tool allows a user to do certain low-level functional tests on the device to determine radio performance, perform certain tests that may be required for Homologation /Certification, and optimize other functions.

The tools are available for download from the Extranet. Since there are multiple versions, it is important to determine which release should be used.

I. Marvell Labtool Usage

WLAN



Listed below are the WLAN commands shown in the CLI menu. Commands in **BOLD** are fully supported and those without are pending support.
SD8897 (802.11a/c/g/b/n) TEST MENU .
For any command, enter with "?" to bring up help menu to list out the supported options.
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9. Get Tx Rx Path Configuration

Get Tx Rx Path configuration

Tx/Rx path: Hot bit definition. bit=0, path disabled, bit=1, path enabled.
bit0=PathA, bit1=PathB

10. Get Tx Rx Path Configuration

Tx/Rx path: Hot bit definition. bit=0, path disabled, bit=1, path enabled.
bit0=PathA, bit1=PathB.
Ex. ***"10 3 3"***
The first ***"3"*** is to enable both Path A and B for TX.
The second ***"3"*** is to enable both Path A and B for RX.

11. Get RF Channel

Ex. ***"11"***
"11" returns the channel in use.

Channel [offset 1-lower boundary, 3-upper boundary
(valid for none 20Mhz bandwidth only)]
(2.4GHz Channels:1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14(JP))
(5GHz Channels: 36, 40, 44, 48, 52, 56, 60, 64,
100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140,
149, 153, 157, 161, 165,
8(JP 20MHz), 12(JP 20MHz), 16(JP 20MHz),
34(JP 20MHz), 38(JP 20MHz), 42(JP 20MHz),
46(JP 20MHz), 184(JP 20MHz), 188(JP 20MHz),
192(JP 20MHz), 196(JP 20MHz))

12. Set RF Channel (decimal)

To place the device on a specific channel, perform the listed command below in Labtool.

Ex. ***"12 7"***
The ***"7"*** specifies the desired channel for testing.

13. Get RF Data Rate

(1 for 1M; 2 for 2M; 3 for 5.5M; 4 for 11M; 5 for 22M;
6 for 6M; 7 for 9M; 8 for 12M; 9 for 18M; 10 for 24M;
11 for 36M; 12 for 48M; 13 for 54M; 14 for 72M;
15 for MCS0; 16 for MCS1; 17 for MCS2;
18 for MCS3; 19 for MCS4; 20 for MCS5;
21 for MCS6; 22 for MCS7; 23 for MCS8;

24 for MCS9; 25 for MCS10; 26 for MCS11;
27 for MCS12; 28 for MCS13; 29 for MCS14;
30 for MCS15;
101 for VHT_SS1_MCS0; 102 for VHT_SS1_MCS1;
103 for VHT_SS1_MCS2; 104 for VHT_SS1_MCS3;
105 for VHT_SS1_MCS4; 106 for VHT_SS1_MCS5;
107 for VHT_SS1_MCS6; 108 for VHT_SS1_MCS7;
109 for VHT_SS1_MCS8; 110 for VHT_SS1_MCS9;
111 for VHT_SS2_MCS0; 112 for VHT_SS2_MCS1;
113 for VHT_SS2_MCS2; 114 for VHT_SS2_MCS3;
115 for VHT_SS2_MCS4; 116 for VHT_SS2_MCS5;
117 for VHT_SS2_MCS6; 118 for VHT_SS2_MCS7;
119 for VHT_SS2_MCS8; 120 for VHT_SS2_MCS9)

14. Set RF Data Rate

Ex. ***"14 1"*** //1 for 1M
(See CMD13 Information for various Data Rates)

15. Get TRPC Info

Path – 0 for A, 1 for B
TRPCID – This ID is different for different data rates and bandwidths. The ID's are subject to change. Therefore, it is best to occasionally read it back from CMD 25. E.g. When setting CMD 25, it will tell the user what ID is being used for that data rate. For example, when issuing 25 1 22, it will say for that data rate (MCS7 20), it is on ID 0x5. For MCS7 40 MHz, the ID is 0xb.

PathID TRPC_ID(0x)
PathID: 0 - path A, 1 - path B
2(default):display TRPC info for both Path
TRPC_ID: 0 - 0x1f for TRPC ID 0 to 31,
0x20(default):display all TRPC ID info for the path

Ex. ***"15 1 5"***
// Query TRPC Info on path B for TRPC ID 5. TRPC ID 5 corresponds to MCS7 20 MHz
15 <path> <TRPCID>

16. Set TRPC Info

16 <path> <TRPCID> <Gain Code>

PathID TRPC_ID(0x) InitP(0x) ThreshHi(0x) ThreshLow(0x)
PA1(0x) PA2(0x) PA3(0x)
Ex. ***"16 0 1 60"***

Example Use Case of Command 15/16

Enter option: **10 1 1**

DutIf_SetTxRxPath to 1 1 : status 0x0
Enter option: **30 0**

DutIf_SetModeAG: 0x0
Enter option: **112 0**

DutIf_SetChannelBw: 0x00000000
Enter option: **12 7**

DutIf_SetRfChannel: 0x00000000
RF Channel: 7 (2442.0 MHz)
Enter option: **15 0 2**

Path Id: 0

TRPC	InitP	ThreshHi	ThreshLow	PA1	PA2	PA3
0x02	0x56	0x001	0x0fd	0x25	0xb3	0x6e

Enter option: **16 0 2 4c**

DutIf_SetTRPCInfo: 0x00000000
PathId=0 TRPC ID=0x2
InitP=0x4c ThreshHi=0x1 ThreshLow=0xfd
PA1=0x25 PA2=0xb3 PA3=0x6e
Enter option: **25 1 4**

DutIf_SetTxDutyCycle: 0x00000000
TRPC ID: 2

17. Set Continuous Tx Mode

Placing the device in continuous transmit mode can be performed with command ***"17"*** after the power is manually set.

Ex. ***"17 1 4"***
The first parameter (***"1"***) enables the command and the (***"4"***) specifies the data rate, which in this case is 11M.

Ex. ***"17 0"***
Using a ***"0"*** disables the command and should be performed before executing another command.
(enable) (datarate) (pattern) (CSMode) (ActSubCh)
Enable: 0(default): off; 1: on
DataRate: TxDataRate(default - 4), see cmd 14
Pattern: anyvalue between 0(default) - 0xffffffff
CSMode: 0(default) - disable, 1 - enable
ActSubCh: default -1, which will follow current BW setting.
0=Primary_20, 1=Primary_40, 2=Primary_80, 5=Dup_40, 6=Dup_80
if -1 and LG rate, ActSubCh=0/5/6 based on ChanBW=20/40/80
if -1 and HT/VHT rate, ActSubCh=0/1/2 based on ChanBW=20/40/80)

18. Set CW Tx Mode

(Enable)
Enable: 0: off; 1: on
Ex. **"18 1"**

19. Set Carrier Suppression Tx Mode(enable)

Ex. ***"19 1"***
The first parameter (***"1"***) enables the command.

22. Set Tx Output Power

Command 22 in the labtool can be used to specify output power as well as identifying whether 11B or 11G rate is being used for the test.

Ex. ***"22 1 6 13 1"***
Set Power at Antenna Using Cal data
(TxPath) (channel) (power_level) ([modulation=0:0=b, 1=g])
TxPath: Tx Path, 0=PathA, 1=PathB
channel to set to. See cmd11 for valid channels
power_level: Tx Power level to be set to, in dBm
modulation: CCK or OFDM modulation, only for 2.4GHz band.0=b(CCK), 1=g(OFDM)

Example: 22 1 6 13 1

This above command will set the output power to path B at "***13dBm"*** on channel "***6"*** and perform an 11G rate transmit.

Notes:
1 – If there is no valid calibration data in eeprom or OTP, the return for this command will be -1.
2- The Last parameter is used to specify ***11B (with a "0") or 11G(with a "1").***

25. Set DutyCycle Tx Mode

(enable=0(0|1)) (dataRate=4) [(payloadweight =50)(pattern=0)(shortPreamble=0(0|1))] (ShortGI=0(0|1)), (AdvCoding=0(0|1))
(TxBfOn=0(0|1)) (GFMode=0(0|1)) (STBC=0 (2bits))
(PowerID=-1)
(SignalBw=-1 (-1=Follwing deviceBw as in cmd112/111; 0=20MHz; 1=40MHz; 4=80Mhz))

Placing the device in burst mode can be performed with command ***"25"*** after the power is manually set.
Ex. ***"25 1 4"***
The first parameter (***"1")*** enables the command and the (***"4")*** specifies the data rate, which in this case is 11M.

Ex. ***"25 0"***
Using a ***"0"*** disables the command and should be performed before executing another command.

Complete Test Sequence w/ Labtool CMD25:

Tx on CH 6 at 10 dBm with a CCK-11Mbps data rate in 20 MHz BW mode on path A only

```
25              // Stop Tx
10 1 1          // Set Path A Only
30 0            // Set to 2.4 GHz Band
112 0           // Set to 20 MHz BW
12 6            // Set to CH 6
22 0 6 10 0     // Set to CH 6 at 10 dBm Output Power with CCK/BPSK Data Rate on Path A
25 1 4          // Tx at 11 Mbps
25              // Stop Tx
```

29. Get RF Band

Ex. **"29" 0 for 2.4GHz, 1 for 5GHz**

30. Set Band

Ex. ***"30 1 "***

Sets the band to 5G.

31. Clear received packet Count (Start Rx FER test)

Ex. ***"31 "***

Using a ***"31"*** enables the command and should clear the receive packet count.

32. Get received packet Count (Stop Rx FER test)

Ex. ***"32 "***

Using a ***"32"*** enables the command and should get the receive packet count.

33. Tx MultiCast Packet (0x)(len=400) (0x)(Count=64) (rate=4) (pattern=0xAA) (shortPreamble=1) (bssid-xx.xx.xx.xx.xx.xx)

Ex. ***"33 400 64 4"***

"33" enables the command and should get the receive packet count.

"400" enables the command with len of 1024

"64" enables the command with packet count of 64

"4" enables the command with data rate of 11M

35. Adjust Packet Gap with SIFS

Ex. **"**35 1 4 1 150 100 AA 1 3 0 0 0 0 0 0 -1 -1 11.22.33.44.55.66**"**

"1" enables the command

"4" sets the data rate to 11M

"1" adjusts the Tx burst gap

"150" adjusts the burst SIFs in us

"100" adjusts the length

"AA" adjusts the pattern

"1" short Preamble enable

"3" sets the Active sub Channels

"0" disabled Short GI

"0" Advanced Coding disabled

"0" TX beamforming disabled

"0" Green Field Mode disabled

"0"STBC Disabled

"0" DPD disabled

"-1" PowerID

"-1" SignalBW

"11.22.33.44.55.66" to specify BSSID

(enable=0(0|1)) (rate=4)
(AdjustTxBurstGap=0(0|1)) (BurstSifsInUs=(0)(0-255))
(len=400(0x)) (pattern=AA) (shortPreamble=1)
(ActSubCh=3(lower=0, upper=1, Both path 2 or 3)
(ShortGI=0(0|1)) (AdvCoding=0(0|1))
(TxBfOn=0(0|1)) (GFMode=0(0|1)) (STBC=0 (2bits))

(DPD=0 (1 for Enable, 0 for Disable)) (PowerID=-1)
(SignalBw=-1 (-1=Follwing deviceBw as in cmd112/111; 0=20MHz; 1=40MHz))
(bssid-xx.xx.xx.xx.xx.xx)

36. Send Beam-Forming Test signal(NDPA/NDP packet)
(Count=1) (csi_steering=0) (mcsfeedback=0)
(mode=0) (interval=0) (slp=1)
Count:numberof packaet to tx. Default to 1
CSI steering: 0 csi steering no feedback
1: csi steering fb csi
2: csi steering fb no compress bf
3: csi steering fb compress bf
Mcsfeedback : 0 MCS feedback off, 1 MCS feedback on
Mode: 0: NDPA
1: Control Wrapper
Interval: in ~20msec
slp: 1: ON 0: OFF
Ex. **"36 1 3 0 0 1 0"**

37. Get Rxed Beam-Forming Data (EraseAfter=0)
Get Rxed Beam-Forming Data into a file.
Erase After: 1=Erase SQ buffer after dumping.
: 0= Don't Erase SQ buffer after dumping.
Ex. **"37 1"**

45. Read MACAddress
Using a "***45"*** returns the MAC address.

46. Write MACAddress (xx.xx.xx.xx.xx.xx)
Using a "***46 00.50.43.20.ee.ff"*** enables the user to set the MAC address.

60. Read MAC Reg (0x)(addr)
CMD ***"60"*** enables the user to read back the specified MAC register.
Ex.
"60 1b8" will read back MAC register 0x1b8

61. Write MAC Reg (0x 0x)(addr data)
CMD ***"61"*** enables the user to write to the specified MAC register.
Ex.
"61 1b8 11" will write 0x11 to MAC register 0x1b8

62. Read BBP Reg (0x)(addr)

CMD ***"62"*** enables the user to read back the specified BBP register.

Ex.
"62 1b8" will read back BBP register 0x1b8

63. Write BBP Reg (0x 0x)(addr data)

CMD ***"63"*** enables the user to write to the specified BBP register.
Ex.
"63 1b8 0x11" will write 0x11 to BBP register 0x1b8

64. Read RF Reg (0x)(addr)

CMD ***"64"*** enables the user to read back the specified RF register.
Ex.
"64 1b8" will read back BBP register 0x1b8

65. Write RF Reg (0x 0x)(addr data)

CMD ***"65"*** enables the user to write to the specified RF register.
Ex.
"65 1b8 11" will write 0x11 to RF register 0x1b8

66. Read CAU Reg (0x)(addr)

CMD ***"66"*** enables the user to read back the specified CAU register.
Ex.
"66 800001b8" will read back BBP register 0x1b8

67. Write CAU Reg (0x 0x)(addr data)

CMD ***"67"*** enables the user to write to the specified RF register.
Ex.
"67 800001b8 1111" will write 0x1111to CAU register 0x80001b8

68. Peek SOC Mem (0x)(addr)

CMD ***"68"*** enables the user to read back the specified location in the SOC mem.
Ex.
"68 800001b8" will read back SOC mem location 0x800001b8

69. Poke SOC Mem (0x 0x)(addr data)

CMD ***"69"*** enables the user to write to the specified SOC mem location.
Ex.
"69 800001b8 1111" will write 0x1111 to SOC register 0x800001b8

88. Get FW and HW Versions

111. Get Channel BW (0: 20MHz, 1: 40MHz, 4: 10MHz, 5: 5MHz.
2 and 3 are invalid for this chip)

112. Set Channel BW

122. Set FEM

FEM file is specified in "setup.ini"
section[HW_CONFIG], field "FEM_FILENAME"

144. Read OTP Raw Data

145. Dump Memory Cal Data Content

CMD ***"145"*** enables the user to read specific locations in OTP.
Ex.
"145 0" will read location 0x0 in OTP

146. Get the number of calibration DONE on OTP

or increase calibration count for this unit then return NumCalOTP
Ex. 146 will return the number of calibration done.
146 1 will increament the number by 1 147. Get free lines in OTP

147. Get free lines in OTP

155. Read MAC Address From Fw/registers

156. Write MACAddress in Fw/registers
Write MACAddress in Fw/registers
MACAddress (xx.xx.xx.xx.xx.xx)

157 Read BF CSI Peer MAC Address From registers

158. Write BF CSI Peer MAC Address into registers
MACAddress (xx.xx.xx.xx.xx.xx)

159. Enter-Exit BF CSI Test Mode
((enter=1/exit=0)=0)

Ex. “159 0”

160. IBFCal
debugFlag (0 - off, 1 - on)

99. Exit

Example Labtool Test Sequences for Controlling the 8897 DUT.

1. Tx on CH6 at 10dBm with a CCK-11Mbps data rate in 20 MHz BW mode on path A only

```
25              // Stop Tx
10 1 1          // Set Path A Only
30 0            // Set to 2.4 GHz Band
112 0           // Set to 20 MHz BW
12 6            // Set to CH 6
22 0 6 10 0     // Set to CH 6 at 10 dBm Output Power with CCK/BPSK Data Rate on Path A
25 1 4          // Tx at 11 Mbps
25              // Stop Tx
```

2. Tx on CH6 at 10dBm with a CCK-11Mbps data rate in 20 MHz BW mode on path B only

```
25              // Stop Tx
10 2 2          // Set Path B Only
30 0            // Set to 2.4 GHz Band
112 0           // Set to 20 MHz BW
12 6            // Set to CH 6
22 1 6 10 0     // Set to CH 6 at 10 dBm Output Power with CCK/BPSK Data Rate on Path B
25 1 4          // Tx at 11 Mbps
25              // Stop Tx
```

3. Tx on CH36 at 8dBm with a MCS7 Data rate in 20 MHz BW Mode on Path A and B

```
25              // Stop Tx
10 3 3          // Set Path A and B
30 1            // Set to 5 GHz Band
112 0           // Set to 20 MHz BW
12 36           // Set to CH 36
22 2 36 8 1     // Set to CH 36 at 8 dBm Output Power with OFDM Data Rate on Path A + B
25 1 22         // Tx at MCS 7
25              // Stop Tx
```

4. Tx on CH 3640 (CH 36 + CH 40 Bonded Pair) at 12 dBm with a MCS7 Data rate in 40 MHz BW Mode on Path A and B

```
25                  // Stop Tx
10 3 3              // Set Path A and B
30 1                // Set to 5 GHz Band
112 1               // Set to 40 MHz BW
12 36               // Set to CH 36. CH 36 is the lower bonded pair. CH 40 is the higher
                    //bonded pair. Set the lower channel in 40 MHz mode.
22 2 36 12 1        // Set to CH 36 + CH 40 Bonded Pair at 12 dBm Output Power with OFDM
                    //Data Rate on path A + B
25 1 22             // Tx at MCS 7
25                  // Stop Tx
```

5. Rx on CH 157 in 20 MHz BW Mode on both Path A and Path B

```
25          // Stop Tx
10 3 3      // Set to Path A and B
30 1        // Set to 5 GHz Band
112 0       // Set to 20 MHz BW
12 157      // Set to CH 157
32          // Get Rx Packet Count and then clear the Rx packet counter
```

6. Cont. Tx on CH 36 at 8 dBm with a MCS7 Data rate in 20 MHz BW Mode on Path A and B

```
17          // Stop Cont. Tx
25          // Stop Tx
10 3 3      // Set Path A and B
30 1        // Set to 5 GHz Band
112 0       // Set to 20 MHz BW
12 36       // Set to CH 36
22 2 36 8 1 // Set to CH 36 at 8 dBm Output Power with OFDM Data Rate on Path A + B
25 1 22     // Tx at MCS 7
25          // Stop Tx
17 1 22     // Cont. Tx at MCS7
17          // Stop Cont. Tx
```

11AC Manual Testing with Labtool Commands

7. Tx on CH 36/40/44/48 (CH 36 + CH 40 + CH 44 + CH48 Bonded Channels) at 8 dBm with a VHT SS1 MCS9 Data rate in 80 MHz BW Mode on Path A only

```
25          // Stop Tx
102 0       // Set RF Control Mode to 0x0
10 1 1      // Set Path A only
30 1        // Set to 5 GHz Band
112 4       // Set to 80 MHz BW
12 36       // Set to CH 36 (80 MHz Center Frequency is at 5210 MHz)
```

22 0 36 8 1 // Set to CH 36 at 8 dBm Output Power with OFDM Data Rate on Path A only
25 1 110 // Tx at VHT SS1 MCS9
25 // Stop Tx

8. Tx on CH 149/153/157/161 (CH 149 + CH 153 + CH 157 + CH167 Bonded Channels) at 8 dBm with a VHT SS2 MCS9 Data rate in 80 MHz BW Mode on Path A and B
25 // Stop Tx
102 0 // Set RF Control Mode to 0x0
10 3 3 // Set Path A and B
30 1 // Set to 5 GHz Band
112 4 // Set to 80 MHz BW
12 149 // Set to CH 149 (80 MHz Center Frequency is at 5775 MHz)
22 2 149 8 1 // Set to CH 149 at 8 dBm Output Power with OFDM Data Rate on Path A + B
25 1 120 // Tx at VHT SS2 MCS9
25 // Stop Tx

9. Rx on CH 100/104/108/112 (CH 100 + CH 104 + CH 108 + CH 112) in 80 MHz BW Mode on both Path A and Path B
25 // Stop Tx
102 0 // Set RF Control Mode to 0x0
10 3 3 // Set to Path A and B
30 1 // Set to 5 GHz Band
112 4 // Set to 80 MHz BW
12 100 // Set to CH 100 (80 MHz Center Frequency is at 5530 MHz)
32 // Get Rx Packet Count and then clear the Rx packet counter

10. Cont. Tx on CH 116/120/124/128 (CH 116 + CH 120 + CH 124 + CH 128) at 8 dBm with a VHT SS2 MCS9 Data rate in 80 MHz BW Mode on Path A and B
17 // Stop Cont. Tx
25 // Stop Tx
102 0 // Set RF Control Mode to 0x0
10 3 3 // Set Path A and B
30 1 // Set to 5 GHz Band
112 4 // Set to 80 MHz BW
12 116 // Set to CH 116 (80 MHz Center Frequency is at 5610 MHz)
22 2 116 8 1 // Set to CH 36 at 8 dBm Output Power with OFDM Data Rate on Path A + B
25 1 120 // Tx at VHT SS2 MCS 9
25 // Stop Tx
17 1 120 // Cont. Tx at VHT SS2 MCS9
17 // Stop Cont. Tx

// VHT Data Rates
101 for VHT_SS1_MCS0

102 for VHT_SS1_MCS1
103 for VHT_SS1_MCS2
104 for VHT_SS1_MCS3
105 for VHT_SS1_MCS4
106 for VHT_SS1_MCS5
107 for VHT_SS1_MCS6
108 for VHT_SS1_MCS7
109 for VHT_SS1_MCS8
110 for VHT_SS1_MCS9
111 for VHT_SS2_MCS0
112 for VHT_SS2_MCS1
113 for VHT_SS2_MCS2
114 for VHT_SS2_MCS3
115 for VHT_SS2_MCS4
116 for VHT_SS2_MCS5
117 for VHT_SS2_MCS6
118 for VHT_SS2_MCS7
119 for VHT_SS2_MCS8

II. Bluetooth

87xx (BT) TEST MENU

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11 : Get BT Channel

Ex. ***"11"***

"11" returns the channel in use.

12 : Set BT Channel

To place the device on a specific channel, perform the listed command below in Labtool.

Ex. ***"12 7"*** //Channels 0-78 are available

The ***"7"*** specifies the desired channel for testing.

15 : Get Power Level Value

Returns Power Level Value in 0.5dB steps.

Example: "**15"**

16 : Set Power Level Value

(pwr) (IsEDR=0)

Power Level in 0.5dB steps

IsEDR: Flag to spcify Data Rate. 0(BDR) 1(EDR)

Example: "**16 2.5 0"**

21 : Step Power Level

(step)

Step Power Level in 0.5dB steps

step: Step Value, (double).

Example: "**21 -2.5"**

31 : Rx RSSI Test

Ex. ***"31"***

"31" returns the following fields.

PER 0 %

BER2 0 %

32 : Rx RSSI Test (Used with CMD 31)

Enter *"80"* for Reset
Example Use Case for HW setup(Litepoint):
-Connect the system to the Litepoint Environment
SW setup:
-Open IQ Signal 1.4.0.t
-Tools -> VSG
-File -> Open Generator File -> select file -> 3-DH5…000088c0ffee.mod
-Make sure Rf Bt channel is set to 10
-Signal Level at -60dBm
1) Enter 32 10 10 -1 35 2 00-00-88-c0-ff-ee
10 – channel
10 – packets
-1 = payloadlength
35 = packetType
2 = PayLoadPattern
00-…ee= BD-Address
2) Send Packets from Litepoint (in this case 10)
3) Enter "31" in Labtools
-Receive Packets
4) Repeat test for 100, 1000, and 10000 packets.

62 : Read BTU Reg
CMD ***"62"*** enables the user to read back the specified BTU Reg.
Ex.
"62 800001b8" will read back SPI location 0x800001b8

63 : Write BTU Reg
CMD ***"63"*** enables the user to write to the specified BTU Reg.
Ex.
"63 0b8 11" will write 0x11to the BTU 0x0b8

64 : Read BRF Reg
CMD ***"64"*** enables the user to read back the specified BRF Reg.
Ex.
"64 1b8" will read back BRF register 0x1b8

65 : Write BRF Reg
CMD ***"65"*** enables the user to write to the specified BRF Reg.
Ex.
"65 0b8 11" will write 0x11 to the BRF 0x0b8 register

68 : Peek SOC Mem

CMD ***"68"*** enables the user to read back the specified location in the SOC mem.
Ex.
"68 800001b8" will read back SOC mem location 0x800001b8

69 : Poke SOC Mem

CMD ***"69"*** enables the user to write to the specified SOC mem location.
Ex.
"69 800001b8 1111" will write 0x1111 to SOC register 0x800001b8

78 : Enable Device Under Test Mode

"78 1" enables the device under Test Mode.

80 : Reset BT RF Block

"80" resets the BT RF Block

88 : FW/HW Version

"88" returns the Firmware and Hardware Version.

89 : Load Dut configuration file

99 : Exit

"***99"*** exits the labtool.

100 : PCM Loopback Test

Connect PCM_DIN to function generator and PCM_DOUT to Scope
Function Generator configuration is frequency 4kHz, 3.3Vpp, Square Waveform
"100 1" enables the PCM Loopback Test.

113 : Get Power Control Class

mode: 0:MRVL_Class2, 1:MRVL_Class1.5

114 : Set Power Control Class

(mode)
mode: 0:MRVL_Class2, 1:MRVL_Class1.5. Default=0.
Example: ***"114 0"*** sets the Mode to Class2 only

115 : Get Disable Btu Pwr Ctl

116 : Set Disable Btu Pwr Ctl

(mode)
mode : 0=enable, 1=disable. Default=0.

121 : Read LE Mem

122 : Write LE Mem

123 : Read LE Radio Register

124 : Write LE Radio Register

125/126/129/130 : BT LE Tx Test

Example Procedure:

1) Enter **"130 x"**
x = Power Range from -30 to 20 dBm

2) Set the parameters in the CBT(BT Tester) to follow the same settings as CMD 125 below for Frequency, Length and Pattern.

3) Enter ***"125 39 37 2"***
(FreqIndex=0) (Len=37) (pattern=0)
FreqIndex: Frequency Index, range 0 - 39,matching with Frequency 2402 - 2480 MHz
Len: Payload data length (Range: 0 - 37)
pattern: Payload data pattern.
0: PN9, 1: 0xF0, 2: 0xAA, 3: PN15, 4: all 1, 5: all 0, 6: 0x0F, 7: 0x55.

4) Check Tx Results on CBT

5) Enter "**129"** to stop Tx test

6) Enter **"126"** to review Tx packets count

127/128/129 : BT LE Rx Test

Example Procedure:

1) Enter **"127 39" .**
This will start the BT LE Rx tests on channel 39..
LE Rx Test (FreqIndex=0x0)
FreqIndex: Freq Index, range 0 - 39, matching with Frequency 2402 - 2480MHz

2) Configure CBT to send x number of packets

3) Enter **"129"** to Rx packets
Cmd 129 will stop the Rx test and return total Rxed Packets count

4) Enter **"128"**
CMD128 checks Rx Test Error Report

225 : Dutycycle Tx

Enter **CMD "80"**
Enter **12 78 – 78=channel**

1) Enter **"225 1"**
2) Read meter
Meter shows fluctuating signal
3) Enter 225
4) <u>Repeat test for other combination</u>:
"225 p0 p1 p2 p3 p4"

p0 – Enable: 0=off; 1=on
p1 – PacketType (Rate.Slot):
Testing pattern and ACL:
DM1=0x01; DM3=0x03; DM5=0x05 (GFSK, 1M FEC)
DH1=0x11; DH3=0x13; DH5=0x15 (GFSK, 1M)
2-DH1=0x21; 2-DH2=0x23; 2-DH5=0x25; (DQPSK, 2M)3-DH1=0x31;
3-DH2=0x33;
3-DH5=0x35; (8PSK, 3M)
Sco: HV1=0x11; HV2=0x12; HV3=0x13; (GFSK, 1M)
eSco: EV3=0x13; EV4=0x14; EV5=0x15; (GFSK, 1M); 2-EV3=0x23; 2-EV5=0x25 (DQPSK,2M); 3-EV3=0x33; 3-EV5=0x35 (8PSK, 3M)
p2 – PayloadPattern: 0: all 0, 1: all 1, 2: PN9, 3: 0xAA, 4: 0xF0 5:PRBS ACL, 6: PRBS SCO, 7: PRBS ESCO
p3 – PayloadLenInByte: PacketType dependent, -1 for max possible
p4 – Hopmode: Hopemode (on=1, random hopping, off=0 fixed channel)

234 : Reload Bt CalData

<u>Test Procedure:</u>

1. **Make Sure "WlanCalData_ext.conf" is in the Labtool Application Directory**

Configure SetUp.ini file -

2. **Set "No_EEPROM = 1"**
3. **Enter 54**

Generate 2 cal data files

4. **Remove "_Upload" from cal data files**
5. **Launch Labtool**
6. **Enter BT Labtool**
7. **Enter 80**
8. **Enter 116 1**
9. **Enter 114 1**
10. **Enter 16 4 0**

Set Power to 4dBm at BDR rate

11. **Enter 12 39**

Set BT channel

12. **Enter 225 1 11**

Measure for BDR

13. **Measure with LP tester; BT VSA**

Check “Avg. Power (no gap)” field for power measurement. Ideally power offset should be +/-1.5dB from target power. Remember the measurement.

14. **Enter 225**
    Disable Tx
15. **Modify “FELoss” flag in CalBtDataFile.txt and save**
    Remember the Default, 1 code change is 0.5dB step. E.g if default is 0x0 and you want 1dB increments; you changed it to 0x2.
16. **Rename existing “WlanCalData_ext.conf” from Step 1**
17. **Enter 53**
    A new “WlanCalData_ext.conf” file will be generated
18. **Compare *.conf from Step1/16 with *.conf from Step17**
    See FELoss value updated
19. **Power Recycle DUT <optional step>**
20. **Enter BT Labtool**
21. **Enter 234**
    Reload BT CalData
22. **Repeat Step 7-14**
    Output power changes according to FELoss setting

NFC

To be updated in next revision of the Application Note.

Advanced Information

This document provides advanced information about the products described. All specifications described herein are based on design goals only. Do not use for final design. Visit the Marvell® web site at www.marvell.com or call 1-866-674-7253 for the latest information on Marvell products.

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