Regulatory Testing

45NBT Modules

Application Note *v1.2*

INTRODUCTION

The goal of this document is to explain the process for regulatory testing with the Laird's 45NBT modules using the Atheros test tool. Before proceeding, please contact Laird support at cs-support@lairdtech.com to obtain the necessary regulatory tools software package. You must have this package to complete the steps laid out in this document.

SET UP PROCESS

Regulatory testing can be completed with the Atheros test tool, *athtestcmd*. In order to use the tool, the driver must be loaded in test mode and additional firmware must be loaded by the regular firmware.

If you are manually loading the driver, it must be loaded with the parameter *testmode=1* as seen below.

```
insmod ath6kl_core.ko testmode=1
insmod ath6kl_sdio.ko
```

Alternatively, you can use the script **tcmd.sh** to properly set up your driver and wireless interface.

Enable test mode:

```
tcmd.sh
```

Disable test mode:

```
tcmd.sh off
```

Note For the Laird MSD45NBT: The kernel .config must include the nl option for test mode:

```
CONFIG_NL80211_TESTMODE=y
```

Once your device is in test mode, you can issue commands from the command line.

ATHTESTCMD USAGE

The following are examples of *athtestcmd*.

Transmit test, ch1, mcs0

```
# athtestcmd -i wlan0 --tx tx99 --txfreq 1 --txrate 12 --txpwr 30 txantenna 1
```


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Receive sensitivity test, ch1, 1Mbps

```
# athtestcmd -i wlan0 --rx promis --rxfreq 1 rxantenna 1
# athtestcmd -i wlan0 --rx report
```

The *athtestcmd* program includes the following options:

athtestcmd Usage:

```
athtestcmd [-i device] commands
```

Commands:

```
--tx <sine/frame/tx99/tx100/off>
--txfreq <Tx channel or freq(default 2412)>
--txrate <rate index>
--txpwr <frame/tx99/tx100: 0-30dBm,0.5dBm resolution; sine: 0-60, PCDAC
  vaule>
--txantenna <1/2/0 (auto)>
--txpktsz <pkt size, [32-1500](default 1500)>
--txpattern <tx data pattern, 0: all zeros; 1: all ones; 2: repeating 10; 3:
  PN7; 4: PN9; 5: PN15
--ani (Enable ANI. The ANI is disabled if this option is not specified)
--scrambleroff (Disable scrambler. The scrambler is enabled by default)
--aifsn <AIFS slots num,[0-252](Used only under '--tx frame' mode)>
--shortguard (use short guard)
--mode <ht40plus/ht40minus/ht20>
--setlongpreamble <1/0>
--numpackets <number of packets to send 0-65535>
--tx sine --txfreq <Tx channel or freq(default 2412)>
--rx <promis/filter/report>
--rxfreq <Rx channel or freq(default 2412)>
--rxantenna <1/2/0 (auto)>
--mode <ht40plus/ht40minus>
--pm <wakeup/sleep/deepsleep>
--setmac <mac addr like 00:03:7f:be:ef:11>
--getmac
--SetAntSwitchTable <table1 in decimal value> <table2 in decimal value>
  (Set table1=0 and table2=0 will restore the default AntSwitchTable)
--efusedump --start <start address> --end <end address>
```

```
--efusewrite --start <start address> --data <data> (could be one or multiple
  data in quotation marks)
--otpwrite --data (could be one or multiple data in quotation marks)
--otpdump
```

Rates:

```
<rate> 0    1 Mb
<rate> 1    2 Mb
<rate> 2    5.5 Mb
<rate> 3    11 Mb
<rate> 4    6 Mb
<rate> 5    9 Mb
<rate> 6    12 Mb
<rate> 7    18 Mb
<rate> 8    24 Mb
<rate> 9    36 Mb
<rate> 10    48 Mb
<rate> 11    54 Mb
<rate> 12    HT20 MCS0 6.5 Mb
<rate> 13    HT20 MCS1 13 Mb
<rate> 14    HT20 MCS2 19.5 Mb
<rate> 15    HT20 MCS3 26 Mb
<rate> 16    HT20 MCS4 39 Mb
<rate> 17    HT20 MCS5 52 Mb
<rate> 18    HT20 MCS6 58.5 Mb
<rate> 19    HT20 MCS7 65 Mb
<rate> 20    HT40 MCS0 13.5 Mb
<rate> 21    HT40 MCS1 27.0 Mb
<rate> 22    HT40 MCS2 40.5 Mb
<rate> 23    HT40 MCS3 54 Mb
<rate> 24    HT40 MCS4 81 Mb
<rate> 25    HT40 MCS5 108 Mb
<rate> 26    HT40 MCS6 121.5 Mb
<rate> 27    HT40 MCS7 135 Mb
```

Revision History

Version	Date	Notes	Approver
1.0	13 April 2015	Initial Version	Andy Dobbing
1.1	30 April 2015	Added Rev History table	Sue White
1.2	8 March 2018	Callout for installing regulatory software package	John Imboden

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