WL127x TX Testing

Introduction

This section will review the calibrator commands that may be useful when performing transmission (TX) testing on the WL127x.

Tune Command

Purpose

The purpose of the tune_channel command is to configure the WL127x chip to operate in a specific Wifi band and channel.

Method

The tune_channel command can be called using the following format:

```
calibrator wlan0 plt tune_channel <band> <channel>
```

> **Where:**
> - <band> is the wifi band. Ex: 0 means we are in **g** band equal to 1 means we are in **a** band
> - <channel> is the channel within the wifi band. See the picture below for details:

Example

The following tune_channel example configures the chip to opera in the 2.4 GHz band at channel 1.

```
calibrator wlan0 plt tune_channel 0 1
```

Tx Continuous Test

Purpose

The purpose of the Tx Continuous test to perform continuous transmission to evaluate the WLAN transmission quality.

Method

Tx Continuous test sends packets of data to the air, where the data packets parameters are controlled by the PLT command and include parameters such as transmitted rate, transmitted power, destination MAC address, etc...

```
calibrator wlan0 plt tx_cont <delay> <rate> <size>
<amount> <power> <seed> <pkt mode> <DC
on/off> <gi> <preamble> <type> <scramble>
<clpc> <seq nbr mode> <dest mac>
```

> **Where**
> - <delay> - Delay between packets measured in microseconds
> - <rate> - Parameter assumes the input is hexidecimal, e.g., 20 for 11Mbps (you do not need to use 0x prefix). The preamble (another parameter) has to match the modulation type for the command to be successful.

Rate (Mbps)	Value (hex)
1	0x1
2	0x2
5.5	0x4
6	0x8
9	0x10
11	0x20
12	0x40
18	0x80
24	0x200
36	0x400
48	0x800
54	0x1000
MCS0	0x2000
MSC1	0x4000
MSC2	0x8000
MSC3	0x10000
MSC4	0x20000
MSC5	0x40000
MCS6	0x80000
MSC7	0x100000

- size - Size of data field in MPDU (in bytes, 0 - 2284)

- amount - number of packets in case of using series mode

- power - output power in dBm*1000

- seed - value for the scrambler

- pkt mode - 0-single, 1-multiple, 3-continuous, 4-FCC

- DC on/off - activate DCF

- gi - guard interval on/off for 11n rates

- preamble - Packet preamble

Preamble	Value	Available Rates (Mbps)
LONG_PREAMBLE_MODE	0	1, 2, 5.5, 11
SHORT_PREAMBLE_MODE	1	2, 5.5, 11
OFDM_PREAMBLE_MODE	4	6, 9, 12, 18, 24, 36, 48, 54
N_MIXED_MODE_PREAMBLE_MODE	6	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7
GREENFIELD_PREAMBLE_MODE	7	MCS0, MCS1, MCS2, MCS3, MCS4, MCS5, MCS6, MCS7

- type - 0-data packet, 1-ack, 2-probe req, 3-random data, 4-user data
- scrambler - on/off
- CLPC - range 0-100, 0 is disable calibration
- Sequence - number mode (incremented or fixed)
- Destination Mac address

Example

Following is a typical example of common used parameters:

First step is to get in to PLT (Production Line Testing) mode, and configure the transmitted packets parameters.

```
ifconfig wlan0 down
calibrator wlan0 plt power_mode on
calibrator wlan0 plt tune_channel 0 7
calibrator wlan0 plt tx_cont 2000 1 100 0 5000 0 3 0 0 0 0 0 1 0 11:22:11:22:11:22
```

at this point the transmission had started, and should be seen with WLAN sniffer or any other testing tool.

In order to complete the PLT test, we should stop the transmission and exit from PLT mode, that is done by the following commands:

```
calibrator wlan0 plt tx_stop
calibrator wlan0 plt power_mode off
```

Sniffer

Source	Destination	BSSID	Channel	Frequency	Signal dBm	Data Rate	Size	Relative Time	Protocol
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-29	1.0	128	0.000000000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.006348000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.009594000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.012839000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.016085000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.019207000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.022458000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.025707000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.028957000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-31	1.0	128	0.032081000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.035341000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.038578000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.041827000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.045077000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-33	1.0	128	0.048240000	01
DE:AD:BE:EF:00:00	11:22:11:22:11:22	11:22:11:22:11:22	7	2442 MHz	-35	1.0	128	0.051466000	01

If you take a look at the second column you can see that the destination MAC address (11:22:11:22:11:22) matches the one we entered in calibrator command line. The same applies for the channel number (4th column) which is 7, and data rate (7th column) which is 1 bps.

Let's have another example, where we change the data rate and the packet size as follows:

```
ifconfig wlan0 down
calibrator wlan0 plt power_mode on
calibrator wlan0 plt tune_channel 0 7
calibrator wlan0 plt tx_cont 2000 4096 400 0 5000 0 3 0 0 4 0 0 1 0 11:22:11:22:11:22
```

The data rate is set to 4096 (0x1000) corresponding to 54 Mbps and the packet size is set to 400 bytes. The sniffer log of such command is:

Source	Destination	BSSID	Flags	Channel	Signal	Data Rate	Size	Relative Time	Protocol
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.000000000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.002125000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.004239000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.006261000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.008370000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.010524000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.012626000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.014634000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.016747000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.018876000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.020994000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.025120000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.027270000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.029381000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.031376000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.033495000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.035628000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.037747000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.041870000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.043999000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.046120000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.048257000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.050244000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.052394000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.054496000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.056624000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.060753000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.062864000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.064999000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.066995000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	73%	54.0	428	0.069171000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.071243000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.073376000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.075371000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.077498000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.079611000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.081750000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.083745000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.085873000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.087989000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.090134000	01
CamilleBau:56:78:90	11:22:11:22:11:22	11:22:11:22:11:22		7	78%	54.0	428	0.094260000	01

Here we can see that the data rate (7th column) changed to 54Mbps.

The packet size (8th column) has also changed to 428 bytes (there is a constant addition of 28 bytes).

TX Tone Test

Purpose

The purpose of the tx_tone command is to create and transmit a carrier wave that can be modulated with a fixed audio tone.

Method

The tx_tone command can be called using the following format:

```
calibrator wlan0 plt tx_tone <tone type> <power>
```

Where:

- <tone type> [1 or 2] 1 will give a carrier feed through. 2 will give a single tone.
- <power> [0-10000] is the output power range scaled to 0-10 dBm.

Example

The following example set shows how to send a CW modulated at a single tone at an output power of 10 dBm.

```
calibrator wlan0 plt power_mode on
calibrator wlan0 plt tx_tone 2 10000    // Transmit single tome at 10dBm power
calibrator wlan0 plt tx_stop
calibrator wlan0 plt power_mode off
```

External Links

For detailed information you can visit the following link: <Wl12xx Calibration> [1]

References

[1] http://linuxwireless.org/en/users/Drivers/wl12xx/calibrator#wl12xx_Calibration

Article Sources and Contributors

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