RPU Driver  
procfs API usage guide

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Document History

| Issue | Date | Changes/Comments |
| --- | --- | --- |
| 1.0.2 | 20 Apr 2017 | Rename UCCP to RPU and update to match with MAIN. Remove PER and EVM measurements they will be part of SIG. |

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# Introduction

This document describes the RPU Host driver procfs API information.

# Proc Parameters

The procfs interface params section of the host driver provides control to the RPU Driver and firmware. These params can be set and queried from Linux shell.

1. Command to query params: cat /proc/rpu/params
2. Command to set params: echo dot11a\_support=1 > /proc/rpu/params

## Parameters Description

|  |  |  |
| --- | --- | --- |
| Name | Values allowed | Description |
| dot11a\_support | 0 – disable  1 – enable | 802.11a support (5 GHz band operation) |
| dot11g\_support | 0 – disable  1 – enable | 802.11g support (2.4 GHz band operation) |
| production\_test | 0 – disable  1 – enable | For performing production tests like continuous Tx at particular rate, channel, power etc |
| num\_vifs | 1 to 2 | Number of virtual interfaces supported |
| rf\_params | Hex value string | 369 byte hex value string for RF related parameters |
| get\_stats | 0 – disable  1 – enable | To obtain MAC and PHY layer statistics |
| max\_tx\_cmds | 1 to 24 | Maximum number of TX frames per TX CMD sent to RPU firmware |
| disable\_power\_save | 0 – enable  1 – disable | To disable hardware power save |
| disable\_sm\_power\_save | 0 – enable  1 – disable | To disable spatial multiplexing power save in hardware |
| rpu\_max\_nss | 1, 2 | To control number of spatial streams supported at system level (will re-initialize the system) |
| rate\_protection\_type | 0 – disable  1 – enable | To enable RTS/CTS protection |
| reset\_hal\_params | 0/1 | To reset HAL parameters |
| vht\_beamformer\_enable | 0 – disable  1 – enable | To enable VHT beam former functionality (sending NDPA and NDP to peer) |
| vht\_beamformer\_period | Between 100 and 10000 | Beam former period in ms, used to send NDPA and NDP |
| bg\_scan\_enable | 0 – disable  1 – enable | To enable background scan |
| bg\_scan\_channel\_list | String of hex values | Background scan channel list |
| bg\_scan\_channel\_flags | String of “010101” | To specify each BG channel active or passive |
| bg\_scan\_intval | Between 1000 and 60000 | BG scan interval |
| bg\_scan\_num\_channels | 1 to 5 | Number of background channels |
| scan\_type | 0 – disable  1 – enable | 0 means passive scan  1 means active scan |
| radar | 0 – disable  1 – enable | To enable radar detection for DFS support (debug only) |
| enable\_early\_agg\_checks | 0 – disable  1 - enable | To enable / disable check for aggregation to be done or not. |
| antenna\_sel | 1 or 2 | To select a particular antenna to be used for Transceiver. |
| max\_data\_size | Between 2K to 12K | To set the maximum data size |
| bypass\_vpd | 0 or 1 | To set RF parameters |
| pdout\_val | Set to some value | Related to Aux ADC. (Used only in FTM mode) |
| rate\_protection\_type | 0: None  1: RTS/CTS  2: CTS2SELF | Used for rate protection |
| aux\_adc\_chain\_id | 1 or 2 | used to set the Aux chain id(used in FTM mode) |
| continuous\_tx | 0 – To stop continuous transmission  1 - To start continuous transmission | Used only in production mode for continuous transmission. |
| start\_prod\_mode | Channel number | Starts production mode in the given channel number. Used only in production mode testing. |
| stop\_prod\_mode | 1 | Stops production mode if it has been started. Used only in production mode testing. |
| start\_packet\_gen | -1 – infinite  <1, 2…Any other value> | Starts packet generation in production mode. Transmits configured number of packets. Used only in production mode testing. |
| stop\_packet\_gen |  | Stops packet generation. Used only in production mode testing. |
| payload\_length | Default 4000 bytes. | Used only to set data content length in production mode packet generation. |
| set\_tx\_power | Value in db | Used to set transmit power in production/FTM mode frame transmission. |
| fw\_loading | 0: disables firmware loading from driver  1: enables firmware loading from driver | Used for loading firmware from driver. Default it is enabled. To load firmware by other means(viz. Codescape) disable loading from driver. |
| bt\_state | 0: disables Bluetooth  1: enables Bluetooth | Used for enabling/disabling Bluetooth. |
| rpu\_debug | Val for enable for various debug (Add the values beside each module for which debug prints will be enabled) | Used for printing debug messages |
| sleep | Sleep timer value (Trigger the LPW to enter in to Sleep for the specified duration). | Used to control the RPU sleep duration. |
| wakeup | Wakeup timer value (Trigger the LPW to wake up after the specified duration). | Used to control the RPU wakeup duration. |
| rpu\_sleep\_type | 0 : Sleep  1 : Awake | Used to keep RPU in sleep or awake. |

## Fixed Rate Parameters for System Mode Unicast Data Packets

Applicable only when either *mgd\_mode\_tx\_fixed\_mcs\_indx* or *mgd\_mode\_tx\_fixed\_rate* are not equal to -1. If both are equal to -1 then the rate config will be picked up from automatic rate control algorithm.

First configure all other parameters and then enable fixed rate using either *mgd\_mode\_tx\_fixed\_mcs\_indx* or *mgd\_mode\_tx\_fixed\_rate.*

|  |  |  |
| --- | --- | --- |
| Name | Values allowed | Description |
| fixed\_rate\_flags | Bit 0 to Bit 5 in a byte | Rate flag represented in bitfield:  80MHz-VHT-11N-SGI-40MHz-GF  MSb-----------------------------------LSb |
| num\_spatial\_streams | 1, 2 | Number of spatial streams per packet. |
| fixed\_rate\_preamble\_type | 0 – disable  1 – enable | 0 means short preamble,  1 means long preamble |
| fixed\_rate\_stbc\_enabled | 0 – disable  1 – enable | To enable STBC |
| fixed\_rate\_bcc\_or\_ldpc | 0 – disable  1 – enable | To enable LDPC |
| *mgd\_mode\_tx\_fixed\_mcs\_indx* | *Any MCS value as per 1x1, 2x2* | *MCS index at which Tx pkt will be transmitted* |
| *mgd\_mode\_tx\_fixed\_rate* | *1,2,55,11*  *6,9,12,18,24,36,48,54* | *Legacy rate at which Tx pkt will be transmitted* |

## 

## Fixed Rate Parameters for System Mode Multicast Data Packets

Applicable only when *mgd\_mode\_mcast\_fixed\_data\_rate* is not equal to -1. Else the rate config will be picked up from automatic rate control algorithm.

First configure all other parameters and then enable fixed rate using *mgd\_mode\_mcast\_fixed\_data\_rate.*

|  |  |  |
| --- | --- | --- |
| Name | Values allowed | Description |
| mgd\_mode\_mcast\_fixed\_rate\_flags | Bit 0 to Bit 5 in a byte | Rate flag represented in bitfield:  80MHz-VHT-11N-SGI-40MHz-GF  MSb---------------------------------LSb |
| mgd\_mode\_mcast\_fixed\_nss | 1, 2 | Number of spatial streams per packet. |
| mgd\_mode\_mcast\_fixed\_preamble | 0, 1 | 0 means short preamble,  1 means long preamble |
| mgd\_mode\_mcast\_fixed\_stbc\_enabled | 0 – disable  1 – enable | To enable STBC |
| mgd\_mode\_mcast\_fixed\_bcc\_or\_ldpc | 0 – disable  1 – enable | To enable LDPC |
| *mgd\_mode\_mcast\_fixed\_data\_rate*  *(Single Variable which encodes both MCS and Legacy Data Rates).* | *MSb 1 - MCS*  *MSb 0 - Legacy rates* | *Eg: 143 - MCS 15*  *0x8c - MCS 12*  *48 - 48 Mbps*  *55 - 5.5 Mbps* |

## Fixed Rate Parameters for Production Mode

Either *tx\_fixed\_mcs\_indx* or *tx\_fixed\_rate* must be set, else the TX will not be started.

First configure all other parameters and then enable fixed rate using either *tx\_fixed\_mcs\_indx* or *tx\_fixed\_rate.*

|  |  |  |
| --- | --- | --- |
| Name | Values allowed | Description |
| fixed\_rate\_flags | Bit 0 to Bit 5 in a byte | Rate flag represented in bitfield:  80MHz-VHT-11N-SGI-40MHz-GF  MSb-----------------------------------LSb |
| num\_spatial\_streams | 1, 2 | Number of spatial streams per packet. |
| fixed\_rate\_preamble\_type | 0 – disable  1 – enable | 0 means short preamble,  1 means long preamble |
| fixed\_rate\_stbc\_enabled | 0 – disable  1 – enable | To enable STBC |
| fixed\_rate\_bcc\_or\_ldpc | 0 – disable  1 – enable | To enable LDPC |
| *tx\_fixed\_mcs\_indx* | *Any MCS value as per 1x1, 2x2* | *MCS index at which Tx pkt will be transmitted in production mode* |
| *tx\_fixed\_rate* | *1,2,55,11*  *6,9,12,18,24,36,48,54* | *Legacy rate at which Tx pkt will be transmitted in production mode* |
| chnl\_40\_offset | 0 – 40MHz Disabled  1 – Secondary 20 is right/above the primary 20  -1 – Secondary 20 is left/below the primary 20 | 40 MHz channel bandwidth in production mode |
| chnl\_80\_offset | 0 – 80MHz Disabled  1 – Secondary 40 is right/above the Secondary 20  -1 – Secondary 40 is left/below the Secondary 20 | 80 MHz channel bandwidth in production mode |