WIFI RF Output Power Control_ver01

WISOL

February 28, 2018

Contents

Revision history

Revision	Date	Description
ver01	2018.02.28	Initial release

Overview

- **If it have WIFI version 3 or higher, you can modify the Tx power table.**
  - WIFI firmware : development/sigfox_cfg2/tools/wifitools
    https://github.com/wisol-SFM/WSSFM20Rx_12x
  - It can get the WIFI version by using cWifi_get_version_info() function.

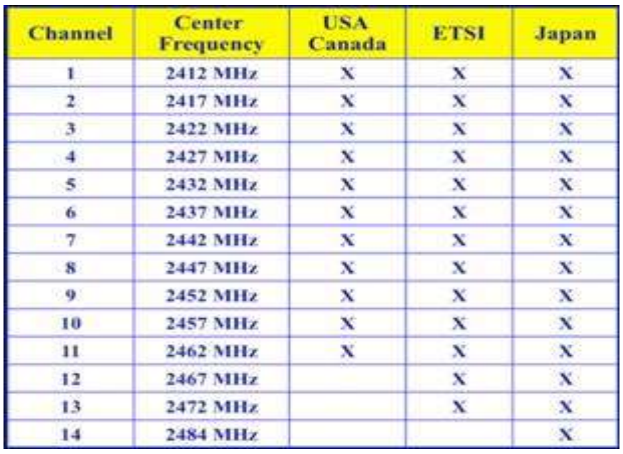
- **The following AT commands are used.**
  - AT+TXPWRITE="3B3B3B3B3838"
    A total of six values can be controlled. : NV1,NV2,NV3, NV4,NV5,NV6
    It is recommended to correct only three values "NV1 ~ 3".

AT+TXPWRITE	47	47	47	3B	38	38
Index	**NV1**	**NV2**	**NV3**	N DO	NOT NV4 CHANGE	N
WiFi Modulation	11b (1 ~11Mbps) 11g (6 ~ 12Mbps) 11n (MCS0 ~ MCS1)	11g (18 ~ 24Mbps) 11n (MCS2 ~MCS3)	11g (36Mbps) 11n (MCS4)	11g (48 ~ 54Mbps) 11n (MCS5 ~ MCS7)	WIFI Channel Number "1"	Channel High Group CE : 11 ~13 CH FCC/IC : 11CH TELEC : 11 ~ 14CH
Current WiFi RF power (CE)	0x3B	0x3B	0x3B	0x3B	0x38	0x38
Ex) If you want to raise 3dB (CE)	0x47	0x47	0x47	0x3B	0x38	0x38

*** Only NV1, NV2, and NV3 values should be changed. NV4, NV5, and NV6 should not be changed to fixed values. If you change this value, EVM performance of 11n, MCS7 decreases.**

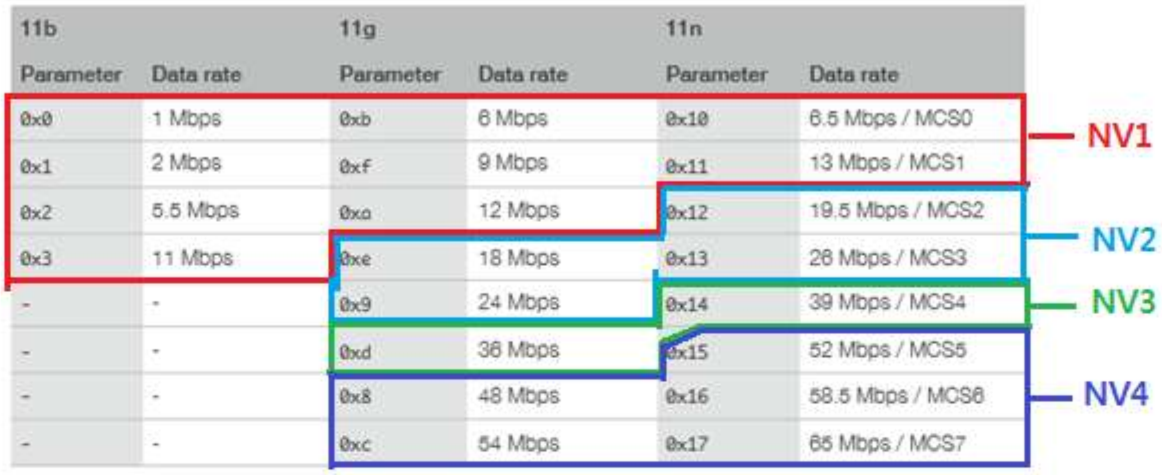
  - See WIFI_TX_POWER_TABLES_UPDATE_ENABLE in cfg_board.c.

- **Available WIFI Channels**
  CE (R1) : 1~13 (ETSI)
  FCC (R2, R4) : 1~11 (USA Canada)
  TELEC (R3) : 1~14 (Japan)



Channel	Center Frequency	USA Canada	ETSI	Japan
1	2412 MHz	X	X	X
2	2417 MHz	X	X	X
3	2422 MHz	X	X	X
4	2427 MHz	X	X	X
5	2432 MHz	X	X	X
6	2437 MHz	X	X	X
7	2442 MHz	X	X	X
8	2447 MHz	X	X	X
9	2452 MHz	X	X	X
10	2457 MHz	X	X	X
11	2462 MHz	X	X	X
12	2467 MHz		X	X
13	2472 MHz		X	X
14	2484 MHz			X

Control Rule


NV1
NV2
NV3
NV4

11b		11g		11n	
Parameter	Data rate	Parameter	Data rate	Parameter	Data rate
0x0	1 Mbps	0xb	6 Mbps	0x10	6.5 Mbps / MCS0
0x1	2 Mbps	0xf	9 Mbps	0x11	13 Mbps / MCS1
0x2	5.5 Mbps	0xa	12 Mbps	0x12	19.5 Mbps / MCS2
0x3	11 Mbps	0xe	18 Mbps	0x13	26 Mbps / MCS3
-	-	0x9	24 Mbps	0x14	39 Mbps / MCS4
-	-	0xd	36 Mbps	0x15	52 Mbps / MCS5
-	-	0x8	48 Mbps	0x16	58.5 Mbps / MCS6
-	-	0xc	54 Mbps	0x17	65 Mbps / MCS7

NV5 : WIFI Channel No 1

NV6 : WIFI Channel No 11~ (eg. ch 11, ch 12, ch 13, ch 14)

- 0x52(20.5) is the maximum value.
  Decreasing 1 will reduce 0.25DBm
- The following formula must be satisfied to ensure normal operation.
  NV1 >= NV2 >= NV3 >= NV4 >= NV5 >= NV6
- It is recommended to modify only NV1 ~ 3.

Example Source for Update

```
const uint8_t wifi_tx_power_table_CE[6] = {0x45, 0x3F, 0x4D, 0x3b, 0x38, 0x38};   //default 0x3b, 0x3b, 0x3b, 0x3b, 0x38, 0x38
const uint8_t wifi_tx_power_table_FCC[6] = {0x44, 0x3E, 0x3C, 0x3a, 0x32, 0x2e };   //default 0x3a, 0x3a, 0x3a, 0x3a, 0x32, 0x2e
const uint8_t wifi_tx_power_table_TELECT[6] = {0x46, 0x40, 0x3E, 0x3c, 0x3c, 0x3c };   //default 0x3c, 0x3c, 0x3c, 0x3c, 0x3c, 0x3c
int main(void)
{
   uint8_t wifiAppVer, check_tx_power_buf[6];;
   uint16_t wifiInitDataVer;
   APP_TIMER_INIT(APP_TIMER_PRESCALER, APP_TIMER_OP_QUEUE_SIZE, false);
   ble_stack_init();
   //wifi init
   cWifi_resource_init();
   cWifi_prepare_start();

   if(cWifi_get_version_info(&wifiAppVer, &wifiInitDataVer) && (wifiAppVer >= 3) && cWifi_get_tx_power_tables(check_tx_power_buf))
   {
      const uint8_t *p_pwr_tables;
      bool check_tx_power = false;
      if(wifiInitDataVer == 0x0302)   //ce
      {
         p_pwr_tables = wifi_tx_power_table_CE;
         check_tx_power = true;
      }
      else if((wifiInitDataVer == 0x0402) || (wifiInitDataVer == 0x0602))   //fcc (R2, R4)
      {
         p_pwr_tables = wifi_tx_power_table_FCC;
         check_tx_power = true;
      }
      else if(wifiInitDataVer == 0x0502) //telect
      {
         p_pwr_tables = wifi_tx_power_table_TELECT;
         check_tx_power = true;
      }
      if(check_tx_power)
      {
         if(memcmp(check_tx_power_buf, p_pwr_tables, 6) != 0)
         {
            if(cWifi_bypass_req(NULL, NULL) == CWIFI_Result_OK)
            {
               char sendAtCmd[32];
               int sendATCmdSize;
               int timeout;
               timeout = 5000;
               while(!cWifiState_is_bypass_mode())
               {
                  if(--timeout==0)break;   //wait bypassmode
                  nrf_delay_ms(1);
               }
               if(timeout > 0)
               {
                  sendATCmdSize = sprintf((char *)sendAtCmd, "AT+TXPWRITE=₩"%02X%02X%02X%02X%02X%02X₩"₩r₩n",
                                                    p_pwr_tables[0], p_pwr_tables[1], p_pwr_tables[2], p_pwr_tables[3], p_pwr_tables[4], p_pwr_tables[5]);
                  cWifiState_bypass_write_request(sendAtCmd, sendATCmdSize);
                  nrf_delay_ms(500);
                  cWifi_abort_req();   //power off wifi module
                  nrf_delay_ms(2000);
                  NVIC_SystemReset();
               }
            }
         }
      }
   }
}
```