[DRAFT] User Manual –
RW61x WLAN Tx Power Setting and Integration

User Manual
COMPANY CONFIDENTIAL

1. Introduction

This document provides guidance on configuring and storing the WLAN Tx power settings for RW61x-based devices. The Tx power settings should be configured after completing regulatory compliance and RF performance testing.

2. Supported Devices

- RW610
- RW612

3. Prerequisite Components

Before getting started, you will need the following:

- Sample_TX_PowerTable_XX.xlsx file (Contact your NXP representative)
- The latest version of MCUXpresso IDE and RW61x SDK

Note: The (XX) in the sample Tx Power Table xls file name is the Alpha-2 country code per ISO 3166-1. For an example, the country code for the United States will be (US).

4. The Tx Power Table Template

The Sample_TX_PowerTable_XX.xlsx file is used to store the target W-Fi Tx power levels during normal operation. This file is commonly referred to as the Tx Power Table. Contact your NXP representative to get access to the spreadsheet (Sample_TX_PowerTable_XX.xlsx) for your device. You need to create additional copies of the Tx Power Table for each country you are seeking certification for.

The Tx Power Table file contains three spreadsheets:

Spreadsheet 1 - Region and country codes

Table 1 shows the content entries of the first spreadsheet.

Table 1. Country & Region Code Spreadsheet 1 Content

Country code	Region code	Environment	Region enforcement	DFS Region
US	16	32	0	1

- Below is an overview for each of the table's parameters:
  - **Country code**: The alpha-2 country code.
  - **Region code**: The applicable region code for the country.
  - **Environment**: The environment code for the product's working environment.
  - **Region enforcement**: Set this parameter to 0.
  - **DFS region**: The DFS region code for the country.

Country code

The country code is the two-letter code for a country in ISO 3166-1 alpha-2 list. The country code input in this table determines the regulatory settings applicable for that country. In Table 1, US is the country code for the United States, so the Tx power level and regulatory settings in the spreadsheet will only apply when the regulatory region is set to US.

Refer to ISO Online Browsing Platform for the list of country codes.

Table 2 shows examples of some country codes.

Table 2. Country code examples

Country	Country code
Canada	CA
China	CN
France	FR
Japan	JP
United States of America	US
World wide	WW

Region code

The region code represents the names of regions abiding by different regulatory agencies. For example, the region code for the United States should be set to 16 to correspond to FCC.

Table 3 shows examples of some region codes.

Table 3. Examples of region codes

Region	Region code
US FCC	16
IC Canada	32
Europe	48
Japan	64
China	80

Environment

The environment value represents the product working environment. The default value is 32, which means the environment is both indoor and outdoor.

For IEEE 802.11 specification, the environment values must be captured as ASCII values where:

- 73 = ASCII value for I character used for indoor environment
- 79 = ASCII value for O character used for outdoor environment
- 32 = ASCII value for space character representing both environments (default)

Region enforcement

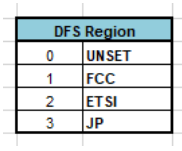
Region enforcement is used to differentiate how the firmware receives the Tx power values and regulatory settings, that is either from a file located in the host OS file system and downloaded from the driver, or from the on-chip OTP.

- If region enforcement is set to 0, the firmware receives Tx power values and regulatory settings from the host settings.
- If Region Enforcement is set to 1, the host cannot overwrite the power table, the device uses the power table programmed in the OTP memory.

The focus of this document is to apply the settings with the region enforcement is set to 0.

DFS region

The DFS region code will enable the firmware to detect the radar patterns specific to the DFS region for the country code configured.
Select a value from 0 to 3 for the country's respective DFS region (Figure 1).



DFS Region	
0	UNSET
1	FCC
2	ETSI
3	JP

Figure 1. DFS region

Spreadsheets 2 and 3 - Tx power tables and regulatory flags

The second and third spreadsheets include the Tx power levels for 2.4 GHz and 5 GHz, respectively.

Figure 2 shows an example of the Tx power levels for the 2.4 GHz band.

Country	Region Code	Environment			Index	0	1	2	3	4	5	6	7	8	9	10
					Channel ID	Center Freq.	11b (11M - 1M)	11g (18M - 6M)	11g (36M - 24M)	11g (54M - 48M)	11n 20 (MCS2 - MCS0, 1x1)	11n 20 (MCS4 - MCS3, 1x1)	11n 20 (MCS7 - MCS5, 1x1)	11n 40 (MCS2 - MCS0, 1x1)	11n 40 (MCS4 - MCS3, 1x1)	11n 40 (MCS7 - MCS5, 1x1)	11ac 20 (MCS9 - MCS8, 1x1)
JP	64	32			1	2412	17	16	16	16	16	16	16	X	X	X	16
					2	2417	17	16	16	16	16	16	16	X	X	X	16
					3	2422	17	17	17	17	17	17	17	14	14	14	17
					4	2427	17	18	18	18	18	18	18	13	19	18	18
					5	2432	15	16	16	16	16	16	16	14	17	17	16
					6	2437	15	16	16	16	16	16	16	17	13	13	13
					7	2442	15	16	16	16	16	16	16	17	13	13	16
					8	2447	15	16	16	16	16	16	16	17	14	14	16
					9	2452	15	17	17	17	16	16	16	13	14	14	16
					10	2457	15	16	16	16	15	15	15	X	X	X	15
					11	2462	15	15	15	15	14	14	14	X	X	X	14
					12	2467	18	16	16	16	15	15	15	12	12	12	X
					13	2472	18	16	16	16	15	15	15	12	12	12	X
					14	2484	18	16	16	16	15	15	15	12	12	12	X

Figure 2. Power table for 2.4 GHz frequency (spreadsheet 2) (partial view)

Figure 3 shows an example of the Tx power levels for the 5 GHz band.

Region Code	Environment			Channel ID	Index	1	2	3	4	5	6	7	8	9	10	11	12	13
					Center Freq.	11g (18M - 6M)	11g (36M - 24M)	11g (54M - 48M)	11n 20 (MCS2 - MCS0, 1x1)	11n 20 (MCS4 - MCS3, 1x1)	11n 20 (MCS7 - MCS5, 1x1)	11n 40 (MCS2 - MCS0, 1x1)	11n 40 (MCS4 - MCS3, 1x1)	11n 40 (MCS7 - MCS5, 1x1)	11ac 20 (MCS9 - MCS8, 1x1)	11ac 40 (MCS9 - MCS8, 1x1)	11ac 80 (MCS2 - MCS0, 1x1)	11ac 80 (MCS4 - MCS3, 1x1)
64	32	42(5210)	38	36	5180	19	19	19	19	19	19	19	19	18	19	18	17	17
				40	5200	19	19	19	19	19	19	19	19	18	19	18	17	17
			46	44	5220	19	19	19	19	19	19	19	19	18	19	18	17	17
				48	5240	19	19	19	19	19	19	19	19	18	19	18	17	17
		58(5290)	54	52	5260	19	19	19	19	19	19	19	19	18	19	18	16	16
				56	5280	19	19	19	19	19	19	19	19	18	19	18	16	16
			62	60	5300	19	19	19	19	19	19	19	19	18	19	18	16	16
				64	5320	19	19	19	19	19	19	19	19	18	19	18	16	16
		106(5530)	102	100	5500	18	18	17	17	17	16	15	15	15	16	15	13	13
				104	5520	18	18	17	17	17	16	15	15	15	16	15	13	13
			110	108	5540	18	18	17	17	17	16	15	15	15	16	15	13	13
				112	5560	18	18	17	17	17	16	15	15	15	16	15	13	13
		122(5610)	118	116	5580	18	18	17	18	18	16	18	18	16	16	15	18	18
				120	5600	18	18	17	18	18	16	18	18	16	16	15	18	18
			126	124	5620	18	18	17	18	18	16	18	18	16	16	15	18	18
				128	5640	18	18	17	18	18	16	18	18	16	16	15	18	18
		138(5690)	134	132	5660	19	19	19	19	19	18	18	19	18	18	17	18	18
				136	5680	19	19	19	19	19	18	18	19	18	18	17	18	18
			142	140	5700	19	19	19	19	19	18	18	19	18	18	17	18	18
				144	5720	19	19	19	19	19	18	18	19	18	18	17	18	18
		155(5775)	151	149	5745	16	16	16	15	15	15	14	14	14	15	14	14	14
				153	5765	16	16	16	15	15	15	14	14	14	15	14	14	14
			159	157	5785	16	16	16	15	15	15	14	14	14	15	14	14	14
				161	5805	16	16	16	15	15	15	14	14	14	15	14	14	14
		171(5855)	167	165	5825	10	10	10	10	10	10	10	10	10	10	10	10	10
				169	5845	10	10	10	10	10	10	10	10	10	10	10	10	10
			175	173	5865	10	10	10	10	10	10	10	10	10	10	10	10	10
				177	5875	10	10	10	10	10	10	10	10	10	10	10	10	10

Figure 3. Power table for 5 GHz frequency (spreadsheet 3) (partial view)

In both spreadsheets, the table includes the following:

- Country code, region code and environment values as set in spreadsheet 1 in the first three columns
- Supported channel values in Channel ID columns
- Data rate groups in the following column headings
- The cells which are used to input the Single User (SU) and RU Tx power level value in dBm for each channel, bandwidth and data rate combination, where:
  - The Tx power level is justified at the antenna connector
  - "X" indicates that the channel is not supported.
- The last two columns are used for DFS and NO_IR regulatory flags for each supported channels.

The 2.4 GHz spreadsheet contains an additional table for `PtBaseVersion` parameter which value represents the device supported operating modes. For example:

- `PTBaseVersion` = 11 1x1 802.11ax + 2G VHT (RW610 and RW612)

***Note: DO NOT** change the pre-set values in the PTBaseVersion table as the values are already defined in the spreadsheet template for a specific device.*

Input for SU Tx Power Level

- Enter the SU Tx power level value of your device in dBm at antenna connector for each channel ID and data rate cell.
  - Ensure your Tx power is within regulatory and hardware specifications
  - To disable a channel for non-supported channel and data rate combinations, enter “X” in each cell for the given channel ID

Note: For the 5 GHz band, bonded channels must have the same TX power and regulatory flag settings. For example:

- For 40 MHz channel at 5190 MHz (channel 38), the channels 36 and 40 must have the same Tx power settings.

- For 80 MHz channel at 5210 MHz (channel 42), the channels 36, 40, 44, and 48 must have the same Tx power settings.

Input for NO_IR regulatory flag

- Cells accept the value of 0 or 1
- For a given channel, when the flag is set to 1, only a passive scan is performed and the transmission does not start until a beacon is received. Once a beacon is received, any Tx transaction like association can start
- When NO_IR and DFS flags are set, NO_IR flag has priority

Input for DFS flag

- Cell accepts the value of 0 or 1
- For a given channel when DFS flag is set to 1:
  - The channel is considered a DFS channel
  - Only passive scan is performed on this channel until a beacon is found. Once a beacon is found, active scan is performed

UL-OFDMA RU TX power for 802.11AX

This section describes how to configure UL-OFDMA Tx power for 802.11ax compatible devices.

UL-OFDMA allows one or more STAs to transmit data packets simultaneously back to the AP. The AP uses a trigger frame to convey the information for the transmission.

The RF channel is split into resource units (RUs). RUs are further broken down into groups of 78.125 kHz subcarriers known as tones. Per IEEE specification, an RU is made of 26, 52, 106, 242, 484, or 996 tones. Each RU is assigned different TX power levels based on its tone size and designated channel. The AP allocates these RUs to the stations based on bandwidth requirements.

Figure 4 shows how an 80 MHz channel is split into groups of tones based on IEEE 802.11ax specification

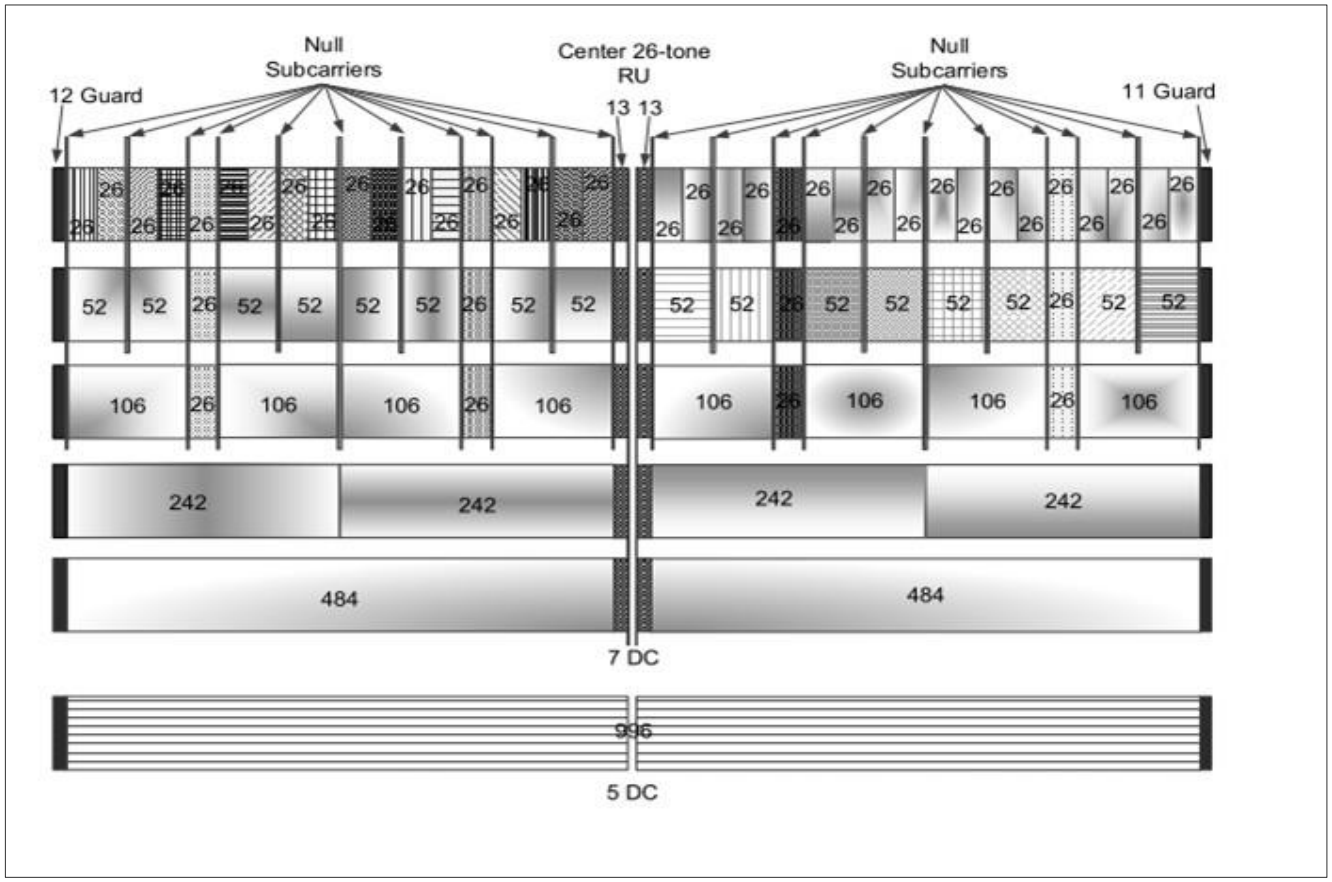


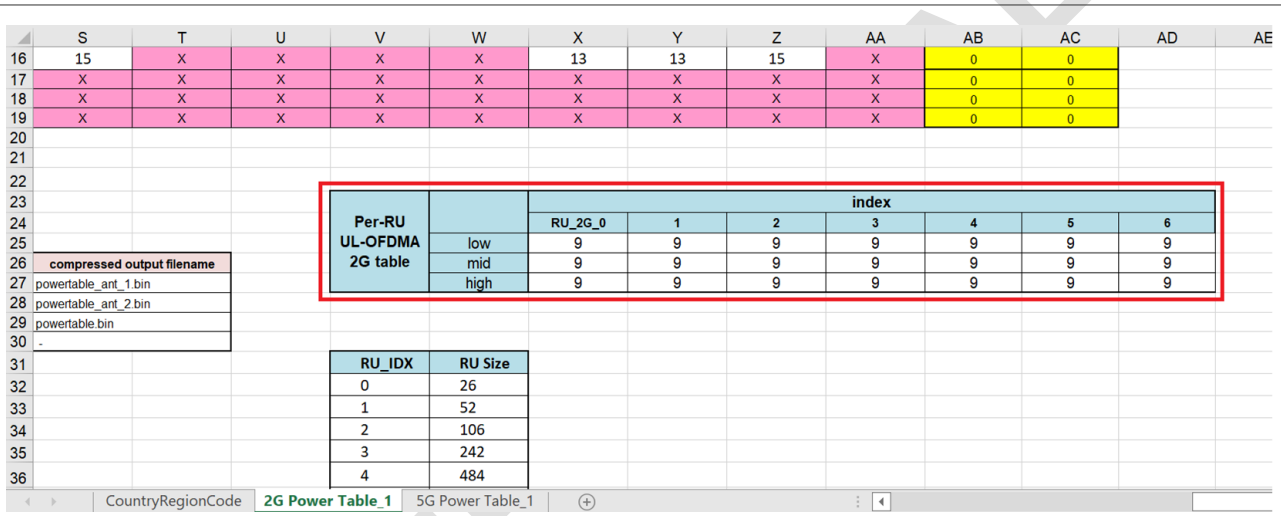
Figure 4. 80MHz Channel UL-OFDMA Tone Mappings

RU Tx power limit

To configure the RU Tx power limit, use the table *Per-RU UL-OFDMA* in 2G Power Table tab for 2.4 GHz band, and 5G Power Table tab for 5 GHz band.

The lowest power value between *Per-RU UL-OFDMA* table and *TX power* table (Section 3.1.2) is used to transmit UL-OFDMA packets.

Figure 5 outlines 2.4 GHz Per-RU UL-OFDMA table.



compressed output filename
powertable_ant_1.bin
powertable_ant_2.bin
powertable.bin
-

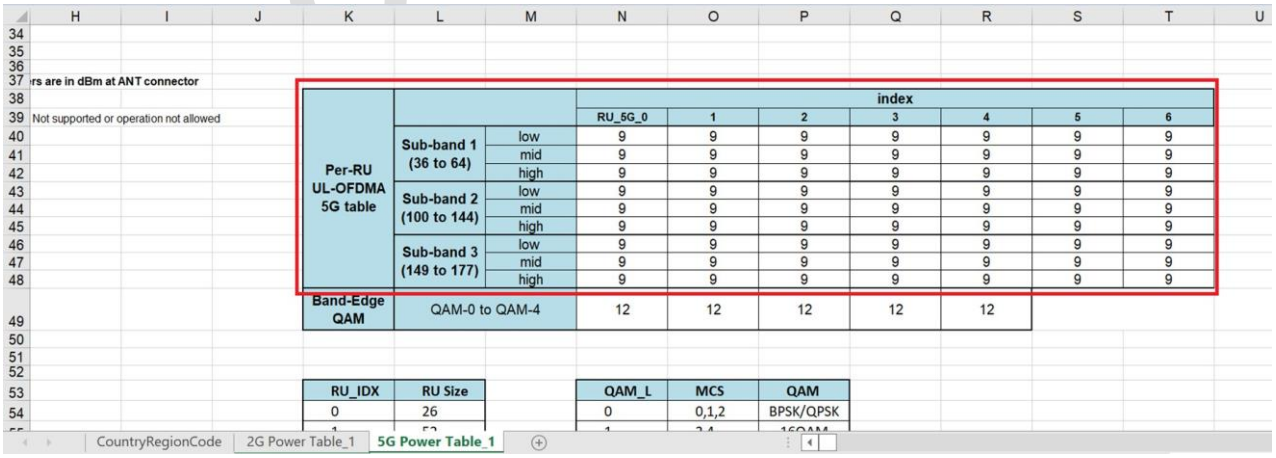
Per-RU UL-OFDMA 2G table		index						
		RU_2G_0	1	2	3	4	5	6
	low	9	9	9	9	9	9	9
	mid	9	9	9	9	9	9	9
	high	9	9	9	9	9	9	9

RU_IDX	RU Size
0	26
1	52
2	106
3	242
4	484

CountryRegionCode | 2G Power Table_1 | 5G Power Table_1

Figure 5. 2.4 GHz band *Per-RU UL-OFDMA* table

Figure 6 outlines 5 GHz Per-RU UL-OFDMA table.



rs are in dBm at ANT connector

Not supported or operation not allowed

Per-RU UL-OFDMA 5G table			index						
			RU_5G_0	1	2	3	4	5	6
	Sub-band 1 (36 to 64)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
	Sub-band 2 (100 to 144)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
	Sub-band 3 (149 to 177)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
Band-Edge QAM	QAM-0 to QAM-4		12	12	12	12	12		

RU_IDX	RU Size
0	26

QAM_L	MCS	QAM
0	0,1,2	BPSK/QPSK

CountryRegionCode | 2G Power Table_1 | 5G Power Table_1

Figure 6. 5 GHz band *Per-RU UL-OFDMA* table

Per-RU UL-OFDMA limit is set in dBm and is based on:

- The channel group (low channel, middle channel, high channel)
- The RU index

The following tables detail the channel maps for 2.4 GHz (Table 3), 5 GHz sub-band 1 (Table 4), 5 GHz Sub- band 2 (Table 5), and 5 GHz Sub-band 3 (Table 6).

Table 3. 2.4 GHz channel map

Channel bandwidth	Low channel	Mid channel	High channel
20 MHz	1	2,3, 4, 5, 6, 7, 8, 9, 10	11
40 MHz	1+5	2+6,3+7, 4+8, 5+9	7+11

Table 4. 5 GHz sub-band 1 channel map

Channel bandwidth	Low channel	Mid channel	High channel
20 MHz	36	40, 44, 48, 52, 56, 60	64
40 MHz	36+40	44+48, 52+56	60+64
80 MHz	36+40+44+48	N/A	52+56+60+64

Table 5. 5 GHz sub-band 2 channel map

Channel band-width	Low channel	Mid channel	High channel
20 MHz	100	104,108, 112, 116, 120, 124, 128, 132, 136, 140	144
40 MHz	100+104	108+112, 116+120, 124+128, 132+136	140+144
80 MHz	100+104+108+112	116+120+124+128	132+136+140+144

Table 6. 5 GHz sub-band 3 channel map

Channel band-width	Low channel	Mid channel	High channel
20 MHz	149	153, 157, 161, 165, 169, 173	177
40 MHz	149+153	157+161, 165+169	173+177
80 MHz	149+153+157+161	N/A	165+169+173+177

RU tone sizes are categorized by an RU index ranging from 0 to 6 (Table 9).

Table 9. RU index and tone size

RU index	RU tone size
0	26
1	52
3	106
4	484
5	996
6	996*2

To configure the 5 GHz **band-edge** UL-OFDMA power limits, use the *Band-Edge QAM* table (Figure 7). The Tx power limits are separated by the MCS Index/modulation scheme. The lowest power value between *band-edge QAM* table and *Per-RU UL-OFDMA* table for 5 GHz is used to transmit RUs on the 5 GHz band-edge channels.

			index						
			RU_5G_0	1	2	3	4	5	6
Per-RU UL-OFDMA 5G table	Sub-band 1 (36 to 64)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
	Sub-band 2 (100 to 144)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
	Sub-band 3 (149 to 177)	low	9	9	9	9	9	9	9
		mid	9	9	9	9	9	9	9
		high	9	9	9	9	9	9	9
Band-Edge QAM	QAM-0 to QAM-4		12	12	12	12	12		

Figure 7. ***Band-edge QAM*** **table for 5 GHz UL-OFDMA**

Table 7 lists the QAM indexes and corresponding modulation types.

Table 7. 5 GHz Band-edge QAM index

QAM index	MCS	Modulation Scheme
0	0, 1, 2	BPSK/QPSK
1	3, 4	16QAM
2	5, 6, 7	64QAM
3	8, 9	256QAM
4	10, 11	1024QAM

5. TX power table .h file

Once you have completed the *Sample_TX_PowerTable_XX.xlsx* template for your device, send this file back to your NXP representative for conversion to a header .h file.

You will receive back a .h file containing array blocks for:

- SU Tx power: [region_power_cfg_raw_file_bin] & [region_power_cfg_raw_file_bin_len]
- RU Tx power: [subband_ru_power_cfg] & [subband_ru_power_cfg_len]

Further modifications will need to be made to the file to use the TX power parameters in the SDK.

1) Open the header .h file shared by NXP
2) Modify the SU Tx power block in the header file
   I. Remove the first 8 bytes in the [region_power_cfg_raw_file_bin] array and reduce 8 bytes from the array length in [region_power_cfg_raw_file_bin_len], as shown in Figure 3 below:

Before:

region_power_cfg_raw_file.h

```
unsigned char region_power_cfg_raw_file_bin[] = {
0x49, 0x02, 0x7f, 0x00, 0x00, 0x00, 0x00, 0x00 0x01, 0x00, 0xee, 0x01, 0x06, 0x00, 0x55, 0x53,
0x20, 0x10, 0x00, 0x01, 0x06, 0x02, 0x67, 0x00, 0x88, 0x88, 0x03, 0x01, 0x0b, 0x00, 0x00, 0x00,
0x00, 0x00, 0x55, 0x53, 0x20, 0x10, 0x53, 0x05, 0x00, 0x02, 0x0c, 0x01, 0x02, 0x00, 0xf0, 0x04,
0x00, 0x0c, 0x14, 0x0b, 0x00, 0x41, 0xa1, 0x10, 0xa8, 0x4c, 0x1e, 0x1b, 0x0b, 0x87, 0x43, 0x00,
0xa0, 0xa0, 0x38, 0x00, 0x0f, 0x14, 0x8b, 0x46, 0x22, 0x70, 0x88, 0x9c, 0x54, 0x7b, 0x11, 0x87,
0x47, 0x40, 0x01, 0x30, 0x00, 0x10, 0x06, 0x0f, 0x00, 0x02, 0x10, 0x00, 0xe0, 0x18, 0x04, 0x00,
0x2a, 0x05, 0x06, 0xc0, 0x00, 0xe0, 0x50, 0x72, 0x67, 0x35, 0x9b, 0xcd, 0xa6, 0x93, 0xa9, 0xc4,
0xee, 0x73, 0x3f, 0x9f, 0x50, 0x67, 0xb4, 0x39, 0xe5, 0x16, 0x81, 0x44, 0x9b, 0x80, 0x40
};
unsigned int region_power_cfg_raw_file_bin_len = 127

unsigned char subband_ru_power_cfg = {
0x6d, 0x02, 0x65, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0x00, 0x18, 0x01, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
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0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x0c, 0x0c, 0x0c, 0x0c, 0x0c
}
unsigned int subband_ru_power_cfg_len = 101;
```

After:

region_power_cfg_raw_file.h

```
unsigned char region_power_cfg_raw_file_bin[] = {
0x01, 0x00, 0xee, 0x01, 0x06, 0x00, 0x55, 0x53,
0x20, 0x10, 0x00, 0x01, 0x06, 0x02, 0x5d, 0x00, 0x88, 0x88, 0x03, 0x01, 0x0b, 0x00, 0x00, 0x00,
0x00, 0x00, 0x55, 0x53, 0x20, 0x10, 0xb3, 0x04, 0x00, 0x02, 0x08, 0x05, 0xa0, 0x00, 0x60, 0xf0,
0x58, 0x00, 0x06, 0x0a, 0x82, 0xc1, 0xe1, 0x30, 0x88, 0x34, 0x32, 0x15, 0x0d, 0x85, 0xc4, 0x62,
0x11, 0x38, 0x78, 0xee, 0x1d, 0x17, 0x82, 0x84, 0x40, 0x00, 0x48, 0x18, 0x00, 0x10, 0x80, 0x07,
0x00, 0xc0, 0x20, 0x01, 0x50, 0x40, 0x02, 0x0a, 0x0d, 0x00, 0x01, 0xc0, 0xa0, 0xe4, 0xaa, 0x59,
0x2e, 0x96, 0xca, 0xe6, 0x32, 0xf9, 0x94, 0xc2, 0x6d, 0x35, 0x9c, 0x4d, 0x27, 0x53, 0x39, 0xe4,
0xde, 0x77, 0x2e, 0x00, 0x80
};
unsigned int region_power_cfg_raw_file_bin_len = 109;

unsigned char subband_ru_power_cfg = {
0x6d, 0x02, 0x65, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0x00, 0x18, 0x01, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
0x0a, 0x0a, 0x0a, 0x0a, 0x0a
}
unsigned int subband_ru_power_cfg_len = 101;
```

Figure 8: Update the *region_power_cfg_raw_file.h* file

6. Integrate the TX power table .h file into the Wi-Fi application

Follow the example instructions below to integrate the TX power into the wifi_cli application. The example below can be used as guidance to update the FCC/US Tx power limits.

1) Import the *wifi_cli* sample application using MCUXpresso IDE

2) Apply the SU and RU Tx power settings to the wifi_cli application
   I. Navigate to the following file:
   …\workspace\rdrw612bga_wifi_cli\component\wifi_bt_module\AzureWave\tx_pwr_limits\wlan_txpwrlimit_cfg_WW_rw610.h

   II. Copy the [region_power_cfg_raw_file_bin] array block from *region_power_cfg_raw_file.h* into the [rg_rw610_XXX] array, where XXX is the region code, as shown in Figure 9. Table 8 shows example region descriptions for some region codes.

Table 8. Region Descriptions

Parameter	Region Description
[rg_rw610_bga]	US FCC/Singapore for BGA packages
[rg_rw610_qfn]	US FCC/Singapore for QFN packages
[rg_rw610_csp]	US FCC/Singapore for CSP packages
[rg_rw610_EU]	Europe
[rg_rw610_JP]	Japan, Australia, Korea
[rg_rw610_CA]	China
[rg_rw610_WW]	World-Wide Safe

Figure 9 below shows an example for configuring US FCC Tx power for BGA packages

```
#ifdef CONFIG_COMPRESS_TX_PWTBL
static const t_u8 rg_rw610_bga[] = {
        0x01, 0x00, 0xee, 0x01, 0x06, 0x00, 0x55, 0x53,
        0x20, 0x10, 0x00, 0x01, 0x06, 0x02, 0x5d, 0x00, 0x88, 0x88, 0x03, 0x01, 0x0b, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x55, 0x53, 0x20, 0x10, 0xb3, 0x04, 0x00, 0x02, 0x08, 0x05, 0xa0, 0x00, 0x60, 0xf0,
        0x58, 0x00, 0x06, 0x0a, 0x82, 0xc1, 0xe1, 0x30, 0x88, 0x34, 0x32, 0x15, 0x0d, 0x85, 0xc4, 0x62,
        0x11, 0x38, 0x78, 0xee, 0x1d, 0x17, 0x82, 0x84, 0x40, 0x00, 0x48, 0x18, 0x00, 0x10, 0x80, 0x07,
        0x00, 0xc0, 0x20, 0x01, 0x50, 0x40, 0x02, 0x0a, 0x0d, 0x00, 0x01, 0xc0, 0xa0, 0xe4, 0xaa, 0x59,
        0x2e, 0x96, 0xca, 0xe6, 0x32, 0xf9, 0x94, 0xc2, 0x6d, 0x35, 0x9c, 0x4d, 0x27, 0x53, 0x39, 0xe4,
        0xde, 0x77, 0x2e, 0x00, 0x80};
static const t_u16 rg_rw610_len_bga = 109;
```

Figure 9 [rg_rw610] array

   III. Copy the [region_power_cfg_raw_file_bin_len] array length from *region_power_cfg_raw_file.h* into [rg_rw610_len_XXX] as shown in Figure 10

```
#ifdef CONFIG_COMPRESS_TX_PWTBL
static const t_u8 rg_rw610_bga[] = {
        0x01, 0x00, 0xee, 0x01, 0x06, 0x00, 0x55, 0x53,
        0x20, 0x10, 0x00, 0x01, 0x06, 0x02, 0x5d, 0x00, 0x88, 0x88, 0x03, 0x01, 0x0b, 0x00, 0x00, 0x00,
        0x00, 0x00, 0x55, 0x53, 0x20, 0x10, 0xb3, 0x04, 0x00, 0x02, 0x08, 0x05, 0xa0, 0x00, 0x60, 0xf0,
        0x58, 0x00, 0x06, 0x0a, 0x82, 0xc1, 0xe1, 0x30, 0x88, 0x34, 0x32, 0x15, 0x0d, 0x85, 0xc4, 0x62,
        0x11, 0x38, 0x78, 0xee, 0x1d, 0x17, 0x82, 0x84, 0x40, 0x00, 0x48, 0x18, 0x00, 0x10, 0x80, 0x07,
        0x00, 0xc0, 0x20, 0x01, 0x50, 0x40, 0x02, 0x0a, 0x0d, 0x00, 0x01, 0xc0, 0xa0, 0xe4, 0xaa, 0x59,
        0x2e, 0x96, 0xca, 0xe6, 0x32, 0xf9, 0x94, 0xc2, 0x6d, 0x35, 0x9c, 0x4d, 0x27, 0x53, 0x39, 0xe4,
        0xde, 0x77, 0x2e, 0x00, 0x80};
static const t_u16 rg_rw610_len_bga = 109;
```

Figure 10: [rg_rw610_len_bga] array

IV. Copy the [subband_ru_power_cfg] array block from *region_power_cfg_raw_file.h* into [rutxpowerlimit_cfg_set] as shown in Figure 11

```
3248 #ifdef CONFIG_11AX
3249 #ifdef CONFIG_COMPRESS_RU_TX_PWTBL
3250 const static uint8_t rutxpowerlimit_cfg_set[] = {
3251     0x6d, 0x02, 0x65, 0x00, 0x00, 0x00, 0x00, 0x00, 0x01, 0x00, 0x18, 0x01, 0x09, 0x09, 0x09, 0x09, 0x09,
3252     0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
3253     0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
3254     0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
3255     0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09,
3256     0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x09, 0x0c, 0x0c, 0x0c, 0x0c, 0x0c};
3257 #else
```

Figure 11: [rutxpowerlimit_cfg_set] array

3) Build the wifi_cli application image and flash the RW61x evaluation board.

7. Enabling Tx Power Limits

Follow the instructions below to enable the Tx power limits with the wifi_cli application

1) Set the regioncode with the following command:
   I. ***wlan-set-regioncode <regioncode>***
   where:

Table 9. Region Codes

Parameter	Description
regioncode	0x00 : World Wide Safe Mode 0x10 : US FCC, Singapore 0x30 : ETSI, Australia, Republic of Korea 0x50 : China 0xFF : Japan

2) Readback the SU Tx power level with the following command:
   I. ***wlan-get-txpwrlimit <subband>***
   where:

Table 10. WLAN-GET-TXPWRLIMIT Parameters

Parameter	Description
subband	0x00 = 2G subband (2.4G: channel 1-14) 0x10 = 5G subband0 (5G: channel 36,40,44,48,52,56,60,64) 0x11 = 5G subband1 (5G: channel 100,104,108,112,116,120,124,128,132,136,140,144) 0x12 = 5G subband2 (5G: channel 149,153,157,161,165,172) 0x13 = 5G subband3 (5G: channel 183,184,185,187,188,189, 192,196; 5G: channel 7,8,11,12,16,34)

Figure 12 shows an example readback of the Tx power limit for the 2.4 GHz

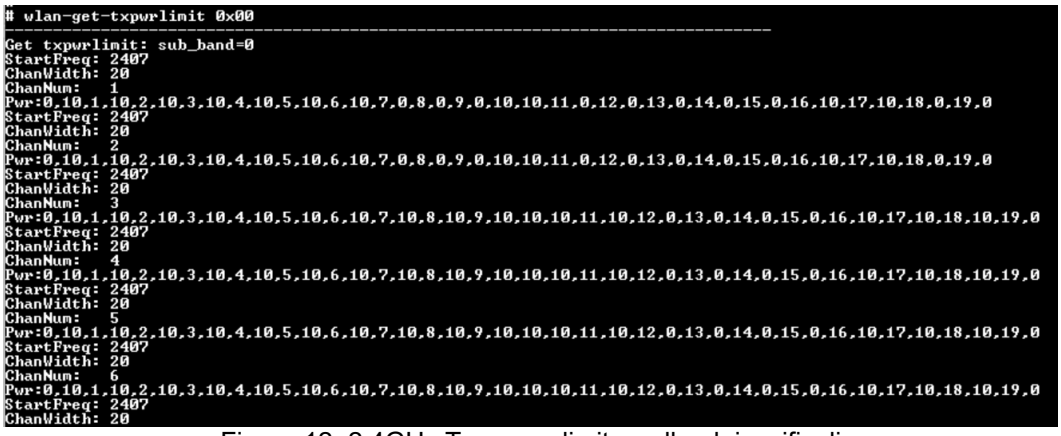

Figure 12: 2.4GHz Tx power limit readback in wifi_cli

3) Enable RU UL-OFDMA Tx power limits with the following command:
   I. ***wlan-set-rutxpwrlimit***

   Note: This command must be executed before connecting to an AP