

How to do LoRaWAN[®] test with 64 channels using RWC5020B-64

Background

The US915/AU915 region is defined to use 64+7 UL channels, while the CN470 region is defined to use a maximum of 96 UL channels. Hardware supporting 64 channels is very complex and expensive, so in most cases, only 8 channels are used to test RF performance and protocol certification. However, to accurately measure the performance of the end device, testing must be done with equipment supporting 64 channels.

Test Environment

The RWC5020B-64 fulfills the specified requirements as a protocol and performance measurement equipment for LoRaWAN[®], supporting either 64 channels or 96 channels. If using an RWC5020B that does not support 64 channels, hardware should be upgraded to RWC5020B-64.

To connect the RWC5020B-64 with a PC installed with the PC application, either connect both devices to the same network via LAN or directly connect them using a LAN cable. Create an environment where a LoRaWAN[®] end device using 64 channels can communicate by connecting RF cables from the end device to the RWC5020B-64 or utilizing antennas.

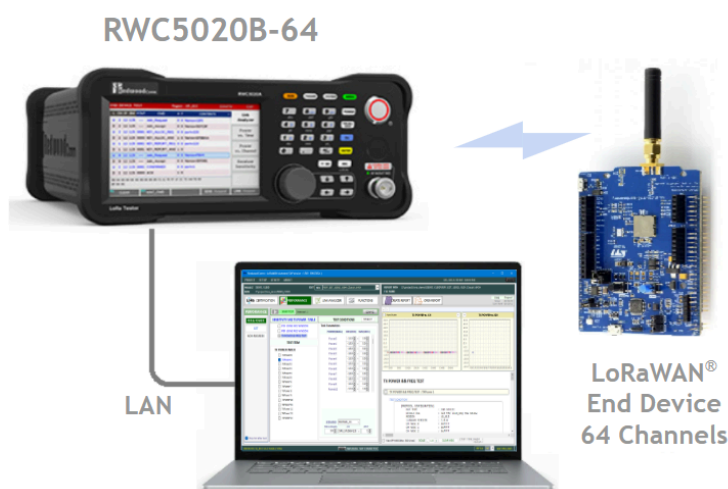


Fig. Test connection among the PC application, the RWC5020B-64, and an end device.

Once the testing environment is set up, run RWC502x_App.exe and press [CONNECT] to establish a connection between the RWC5020B-64 and the software. The application will then read whether the 64-channel option is available from the RWC5020B-64, which can be confirmed through the Licenses tab.

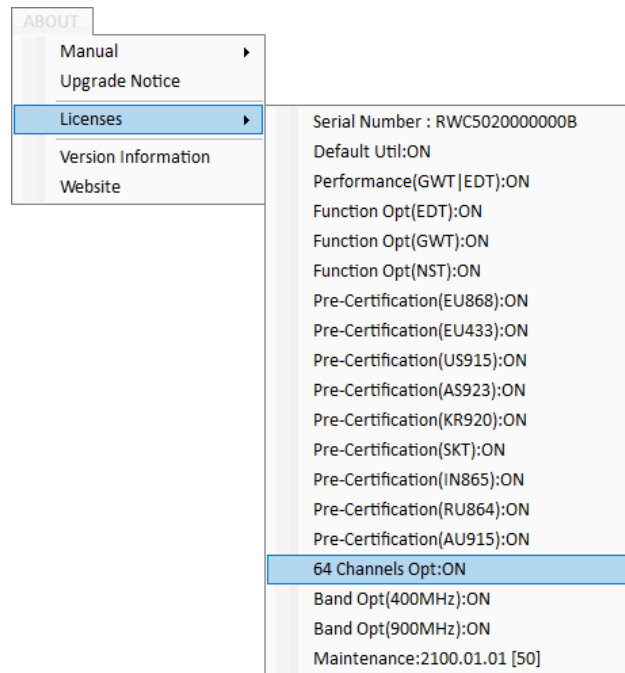


Fig. Licenses check menu

Read an existing Project file or create one, and create a new DUT. Press the [NEW] DUT button to open the new DUT creation window, select the region, and check the 64-channel option.

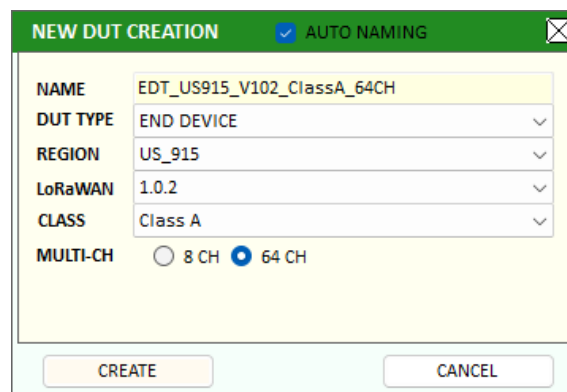
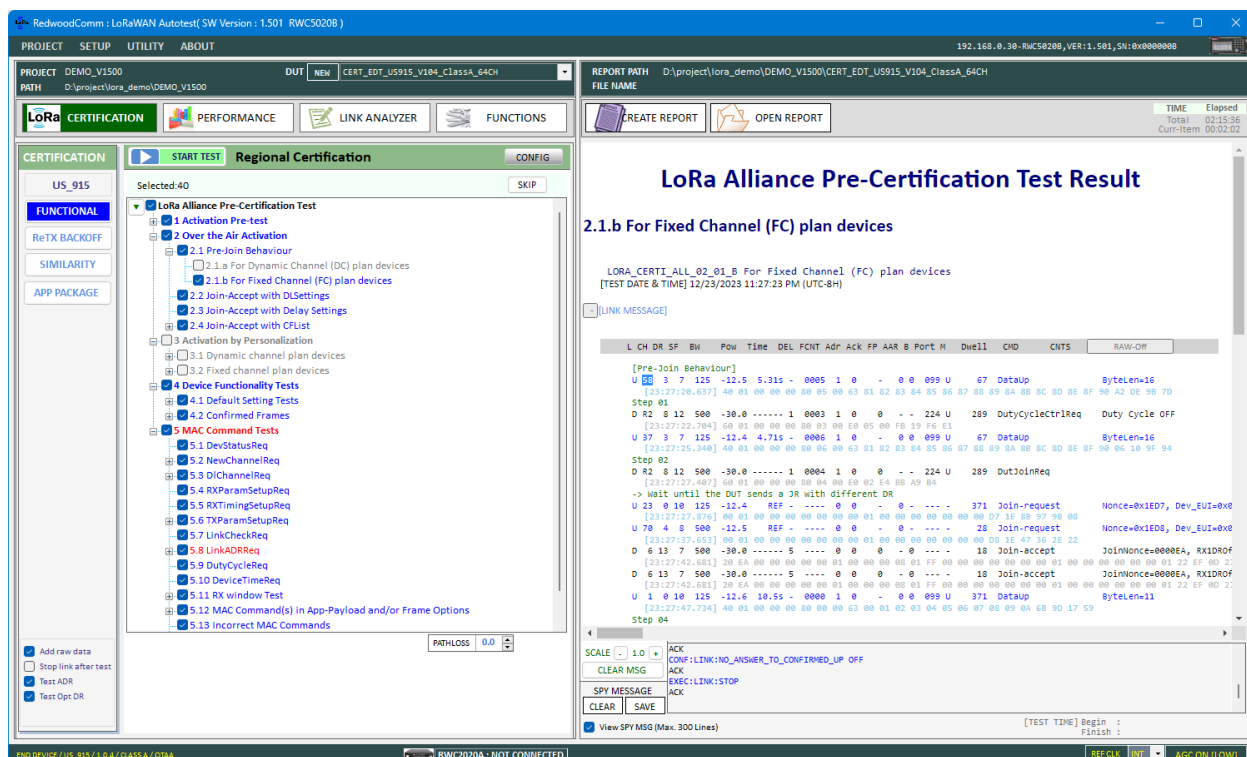


Fig. New DUT creation window

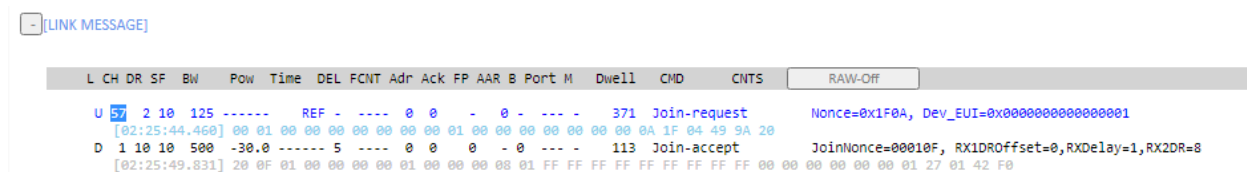
Pre-Certification Test with 64 channels

Select the Pre-Certification function, choose the desired test items, and perform the test. Through the Link message, you can confirm that the test is conducted using 64 channels. The operation of the 64 channels is automatically performed based on the communication protocol and test procedures between the RWC5020B-64 and the end device.



The screenshot shows the RedwoodComm LoRaWAN Autotest (SW Version: 1.501 RWC5020B) interface. The main window displays the 'LoRa Alliance Pre-Certification Test Result' for '2.1.b For Fixed Channel (FC) plan devices'. The test was conducted on 12/23/2023 at 11:27:23 PM (UTC-8h). The test results show a successful completion of the test, with a 'PASS' status. The test results are displayed in a table with columns: L, CH, DR, SF, BW, Pow, Time, DEL, FCNT, ADR, ACK, FP, AAR, B, Port, M, Dwell, CMD, CNTS, and RAW-Off. The test results show a successful completion of the test, with a 'PASS' status. The test results are displayed in a table with columns: L, CH, DR, SF, BW, Pow, Time, DEL, FCNT, ADR, ACK, FP, AAR, B, Port, M, Dwell, CMD, CNTS, and RAW-Off.

Fig. Result window of Pre-Certification test



The screenshot shows the RedwoodComm LoRaWAN Autotest (SW Version: 1.501 RWC5020B) interface. The main window displays the 'Link Message' window. The test results show a successful completion of the test, with a 'PASS' status. The test results are displayed in a table with columns: L, CH, DR, SF, BW, Pow, Time, DEL, FCNT, ADR, ACK, FP, AAR, B, Port, M, Dwell, CMD, CNTS, and RAW-Off. The test results show a successful completion of the test, with a 'PASS' status. The test results are displayed in a table with columns: L, CH, DR, SF, BW, Pow, Time, DEL, FCNT, ADR, ACK, FP, AAR, B, Port, M, Dwell, CMD, CNTS, and RAW-Off.

Fig. Link messages of Pre-Certification test

Performance Test with 64 channels

Select the Performance function, choose the desired test item (PER/TX POWER), and proceed with the test. During the PER test, confirmation of the test being conducted using 64 channels can be made through the Link message. In the TXPOWER test, confirmation of the test being conducted using 64 channels can be made through the Link message and test procedures. The operation of the 64 channels on the RWC5020B is automatically performed based on the communication protocol and test procedures with the End Device.

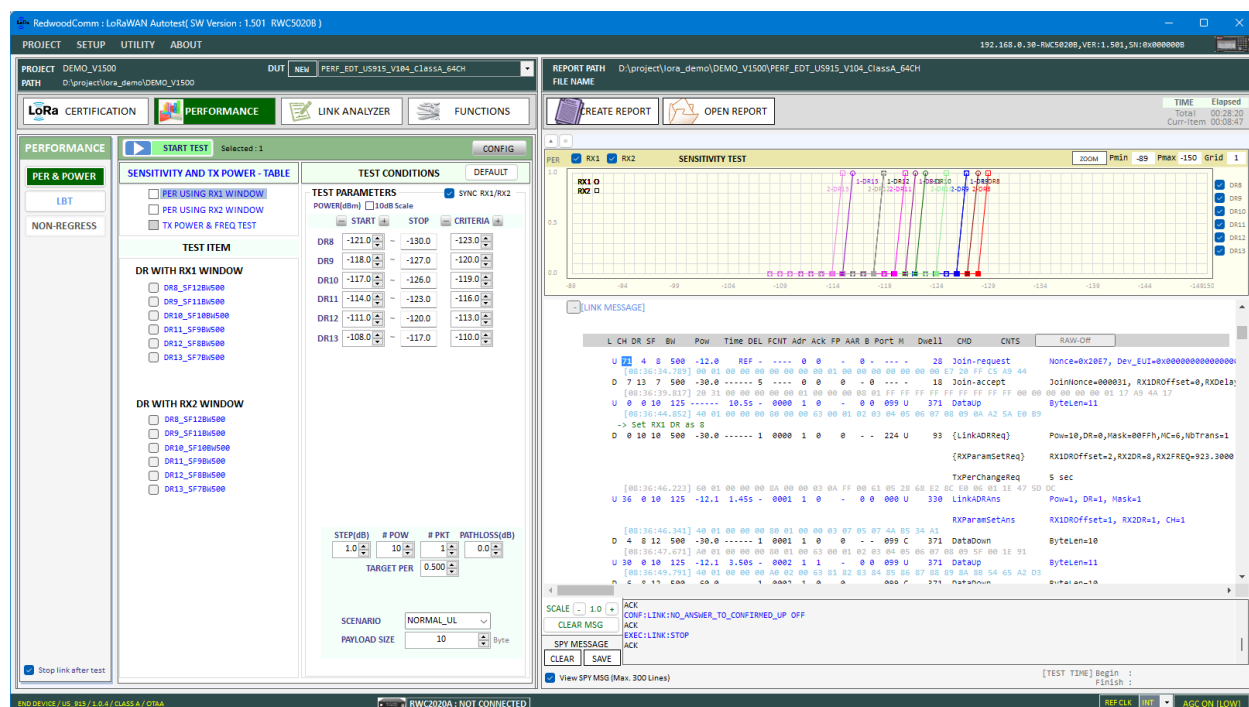


Fig. Test result window PER test

 [LINK MESSAGE]

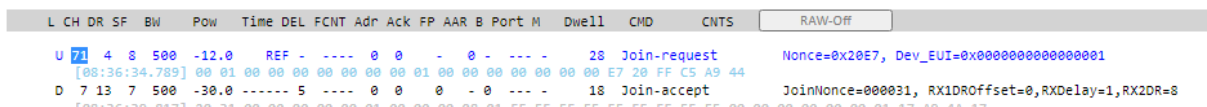


Fig. Link messages of PER test

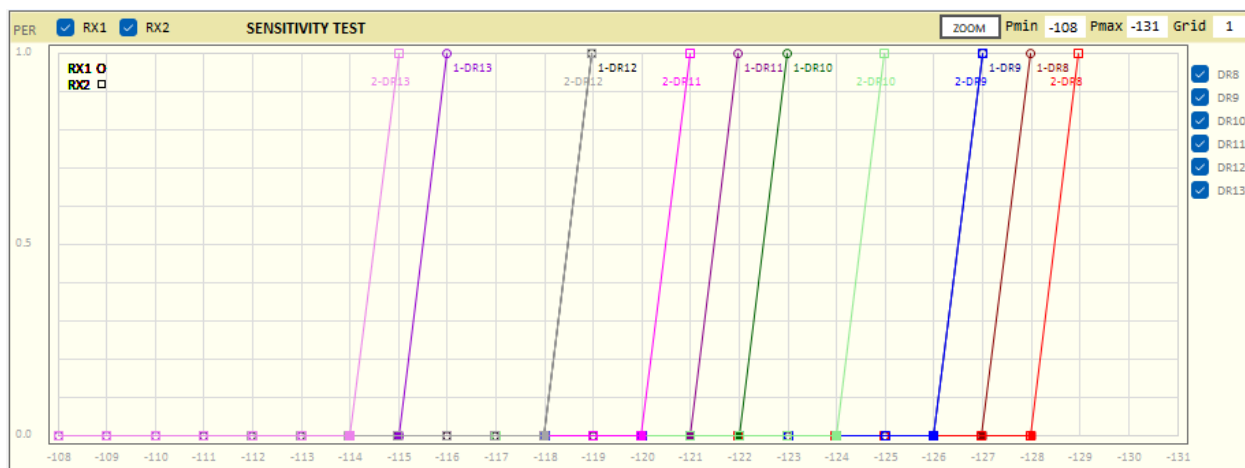


Fig. Result graph of PER test

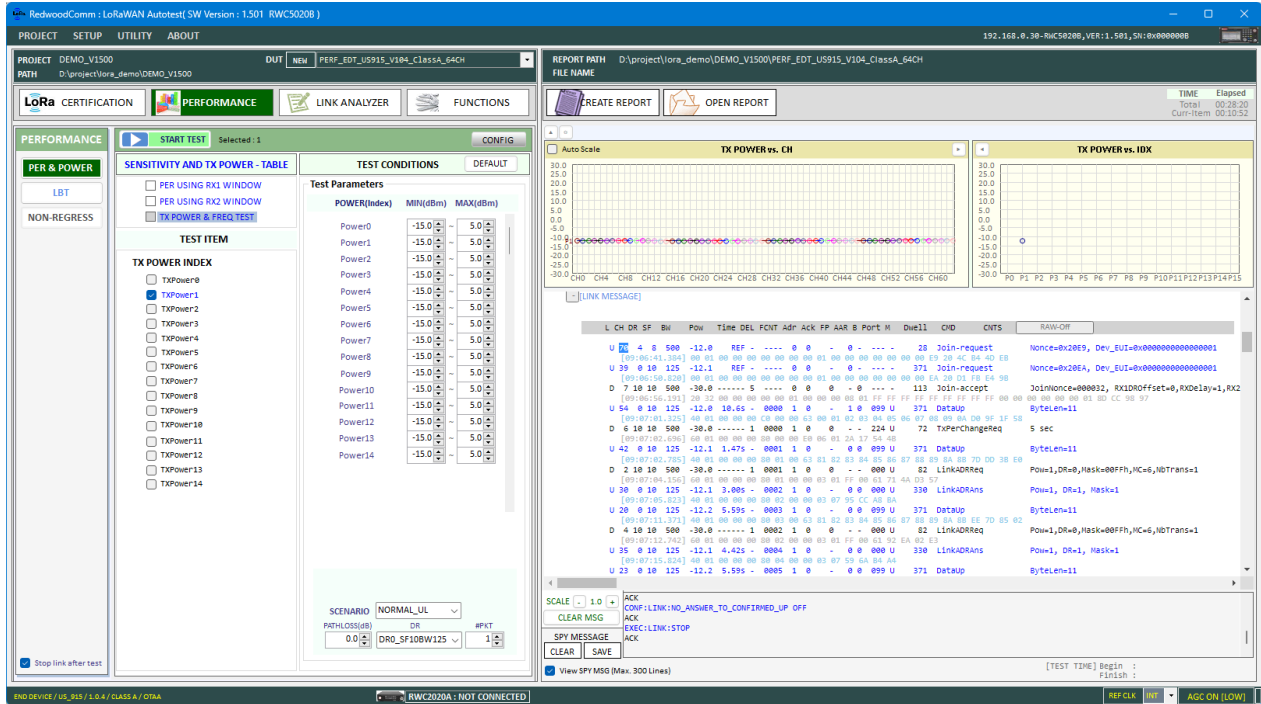


Fig. Test result window of Power test

[LINK MESSAGE]

L	CH	DR	SF	BW	Pow	Time	DEL	FCNT	Adr	Ack	FP	AAR	B	Port	M	Dwell	CMD	CNTS	RAW-Off
U	7	0	4	8	500	-12.0	REF	-	----	0	0	-	0	-	----	28	Join-request	Nonce=0x20E9, Dev_EUI=0x0000000000000001	
[09:06:41.384] 00 01 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 E9 20 4C B4 4D EB																			
U	39	0	10	125	-12.1	REF	-	----	0	0	-	0	-	----	371	Join-request	Nonce=0x20EA, Dev_EUI=0x0000000000000001		
[09:06:50.820] 00 01 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 EA 20 D1 FB E4 9B																			
D	7	10	10	500	-30.0	-----	5	----	0	0	0	-	0	----	113	Join-accept	JoinNonce=000032, RX1DROffset=0, RXDelay=1, RX2DR=8		
[09:06:56.191] 20 32 00 00 00 00 00 01 00 00 00 00 08 01 FF FF FF FF FF FF FF FF 00 00 00 01 8D CC 9B 97																			

Fig. Link messages of Power test

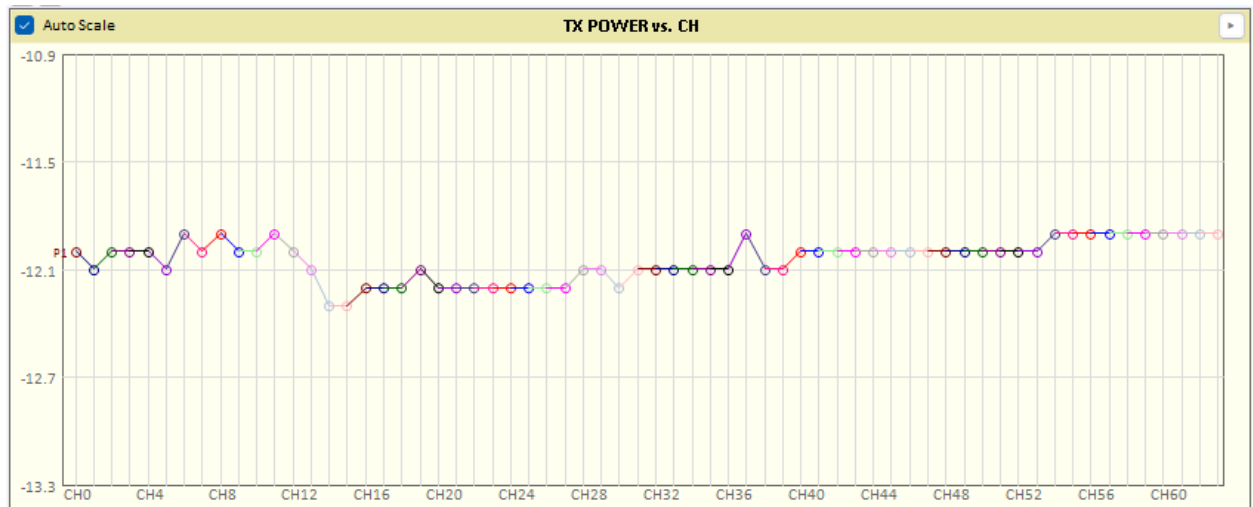


Fig. Result graph of Power test

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