

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Report No.: RFBWIN-WTW-P23020421M-1

FCC ID: J9C-QCNCM825

Product: Qualcomm WiFi 7/BT Combo module

Brand: Qualcomm

Model No.: QCNCM825

Received Date: 2024/7/30

Test Date: 2024/12/11

Issued Date: 2024/12/30

Applicant: Qualcomm Technologies, Inc.

Address: 5775 Morehouse Drive, San Diego, CA 92121-1714

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

FCC Registration / 723255 / TW2022

Designation Number:

Approved by:



Wen Yu / Assistant Manager

, Date:

2024/12/30

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Prepared by : Phoenix Huang / Specialist

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Table of Contents

Release Control Record	3
1 Certificate.....	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Supplementary Information	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Antenna Description of EUT	7
3.3 Channel List.....	8
3.4 Test Mode Applicability and Tested Channel Detail.....	10
4 Test Instruments	11
4.1 Transmit power control (TPC) mechanism.....	11
5 Limits of Test Items.....	12
5.1 Transmit power control (TPC) mechanism.....	12
6 Test Arrangements.....	13
6.1 Transmit power control (TPC) mechanism.....	13
6.1.1 Test Setup	13
6.1.2 Test Procedure	13
7 Test Results of Test Item	14
7.1 Transmit power control (TPC) mechanism.....	14
8 Pictures of Test Arrangements	15
9 Information of the Testing Laboratories	16

Release Control Record

Issue No.	Description	Date Issued
RFBWIN-WTW-P23020421M-1	Original release.	2024/12/30

1 Certificate

Product: Qualcomm WiFi 7/BT Combo module

Brand: Qualcomm

Test Model: QCNCM825

Sample Status: Engineering sample

Applicant: Qualcomm Technologies, Inc.

Test Date: 2024/12/11

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Measurement procedure: ANSI C63.10-2013
KDB 987594 D02 U-NII 6 GHz EMC Measurement v03
KDB 789033 D02 General UNII Test Procedure New Rules v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(d)(10)	Transmit power control (TPC) mechanism	Pass	Meet the requirement of limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=w) (±)
Power Spectral Density	-	1.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Qualcomm WiFi 7/BT Combo module
Brand	Qualcomm
Test Model	QCNCM825
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 4096QAM for OFDMA in 11ax mode 4096QAM for OFDMA in 11be mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54 Mbps 802.11ax: up to 2969.7 Mbps 802.11be: up to 5764.7 Mbps
Operating Frequency	5.935 GHz ~ 6.415 GHz 6.535 GHz ~ 6.855 GHz
Equipment Class	6VL: 15E 6 GHz Very low power devices

Note:

1. This is a supplementary report of FCC ID: J9C-QCNCM825. The differences between them are as below information:
 ◆ Add 6VL equipment class.
2. According to above conditions, all of test items need to be performed. This report only recodes the Transmit power control (TPC) mechanism test item. For other test items refer to Report No.: RFBWIN-WTW-P23020421M. And all data was verified to meet the requirements.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain0/1	Hong-Bo	260-25094	3.53	2.4~2.4835	0.74	PIFA	MHF 4L	300
				3.06	5.15~5.25	1.16			
				3.07	5.25~5.35	1.18			
				4.81	5.47~5.725	1.26			
				4.2	5.725~5.850	1.28			
2	Chain0/1	Hong-Bo	260-25083	5.09	5.850~5.895	1.29	PIFA	MHF 4L	300
				5.14	5.925~6.425	1.35			
				5.09	6.425~6.525	1.38			
				5.16	6.525~6.875	1.45			
				5.12	6.875~7.125	1.50			
3	Chain0/1	Hong-Bo	260-25084	3.22	2.4~2.4835	0.49	Monopole	MHF 4L	200
				3.35	5.150~5.250	0.76			
				3.42	5.250~5.350	0.77			
				4.77	5.470~5.725	0.80			
				4.72	5.725~5.850	0.84			
				4.71	5.850~5.895	0.84			
				4.75	5.925~6.425	0.86			
				4.29	6.425~6.525	0.91			
				4.81	6.525~6.875	0.96			
				4.74	6.875~7.125	0.98			

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

6 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	2TX / 1TX	2RX
802.11ax (HE20)	2TX / 1TX	2RX
802.11ax (HE40)	2TX / 1TX	2RX
802.11ax (HE80)	2TX / 1TX	2RX
802.11ax (HE160)	2TX / 1TX	2RX
802.11be (EHT20)	2TX / 1TX	2RX
802.11be (EHT40)	2TX / 1TX	2RX
802.11be (EHT80)	2TX / 1TX	2RX
802.11be (EHT160)	2TX / 1TX	2RX
802.11be (EHT320)	2TX / 1TX	2RX
802.11ax (RU26/52/106/242/484/996/2*996)	2TX / 1TX	2RX
802.11be (RU26/52/106/242/484/996/2*996/4*996/ MRU52+26/106+26/484+242/996+484/ 996+484+242/ 2*996+484/3*996/3*996+484)	2TX / 1TX	2RX

Note: Note: The modulation and bandwidth are similar for 802.11ax/be mode for 20 MHz (40 MHz, 80 MHz, 160 MHz).

3.3 Channel List

U-NII-5:

25 channels are provided for 802.11a, 802.11ax (HE20), 802.11be (EHT20):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
2	5935 MHz	1	5955 MHz	5	5975 MHz	9	5995 MHz
13	6015 MHz	17	6035 MHz	21	6055 MHz	25	6075 MHz
29	6095 MHz	33	6115 MHz	37	6135 MHz	41	6155 MHz
45	6175 MHz	49	6195 MHz	53	6215 MHz	57	6235 MHz
61	6255 MHz	65	6275 MHz	69	6295 MHz	73	6315 MHz
77	6335 MHz	81	6355 MHz	85	6375 MHz	89	6395 MHz
93	6415 MHz						

12 channels are provided for 802.11ax (HE40), 802.11be (EHT40):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
3	5965 MHz	11	6005 MHz	19	6045 MHz	27	6085 MHz
35	6125 MHz	43	6165 MHz	51	6205 MHz	59	6245 MHz
67	6285 MHz	75	6325 MHz	83	6365 MHz	91	6405 MHz

6 channels are provided for 802.11ax (HE80), 802.11be (EHT80):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
7	5985 MHz	23	6065 MHz	39	6145 MHz	55	6225 MHz
71	6305 MHz	87	6385 MHz				

3 channels are provided for 802.11ax (HE160), 802.11be (EHT160):

Channel	Frequency	Channel	Frequency	Channel	Frequency
15	6025 MHz	47	6185 MHz	79	6345 MHz

2 channels are provided for 802.11be (EHT320):

Channel	Frequency	Channel	Frequency
31	6105 MHz	63	6265 MHz

U-NII-7:

17 channels are provided for 802.11a, 802.11ax (HE20), 802.11be (EHT20):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
117	6535 MHz	121	6555 MHz	125	6575 MHz	129	6595 MHz
133	6615 MHz	137	6635 MHz	141	6655 MHz	145	6675 MHz
149	6695 MHz	153	6715 MHz	157	6735 MHz	161	6755 MHz
165	6775 MHz	169	6795 MHz	173	6815 MHz	177	6835 MHz
181	6855 MHz						

8 channels are provided for 802.11ax (HE40), 802.11be (EHT40):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
123	6565 MHz	131	6605 MHz	139	6645 MHz	147	6685 MHz
155	6725 MHz	163	6765 MHz	171	6805 MHz	179	6845 MHz

3 channels are provided for 802.11ax (HE80), 802.11be (EHT80):

Channel	Frequency	Channel	Frequency	Channel	Frequency
135	6625 MHz	151	6705 MHz	167	6785 MHz

1 channel is provided for 802.11ax (HE160), 802.11be (EHT160):

Channel	Frequency
143	6665 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Test Item	Mode	Category	Tested Channel
Transmit power control (TPC) mechanism	802.11be (EHT160)	VLP	15

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Transmit power control (TPC) mechanism

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
PXA Signal Analyzer Keysight	N9030A	MY54490679	2024/11/20	2025/11/19
Power Splitter/Combiner Mini-Circuits	ZN2PD-9G-S+	SF620001639-1	2024/3/19	2025/3/18
Programmable Step Attenuator SHX	GKTS1-9-110-8Y- HLU	GKTS1-9-110-8Y- HLU-02	2024/5/29	2025/5/28

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2024/12/11

5 Limits of Test Items

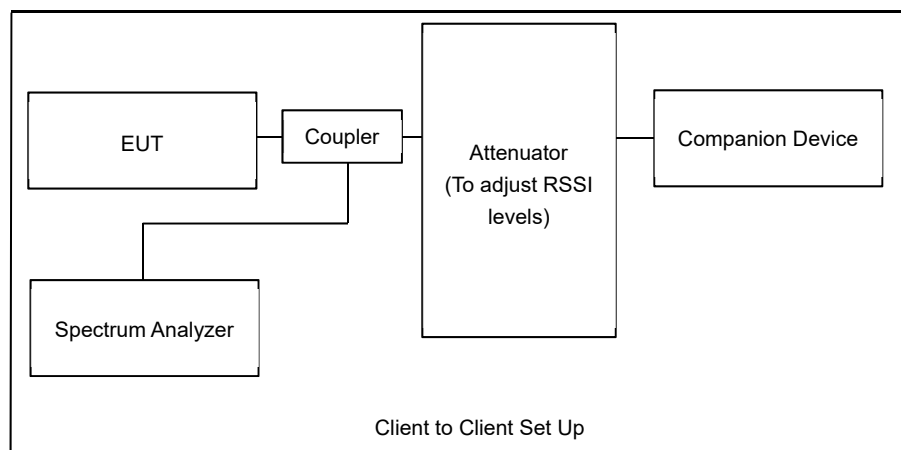
5.1 Transmit power control (TPC) mechanism

Very low power devices operating in the 5.925-6.425 and 6.525-6.875 GHz bands shall employ a transmit power control (TPC) mechanism. A very low power device is required to have the capability to operate at least 6 dB below the maximum EIRP power spectral density (PSD) value of -5 dBm/MHz.

6 Test Arrangements

6.1 Transmit power control (TPC) mechanism

6.1.1 Test Setup



6.1.2 Test Procedure

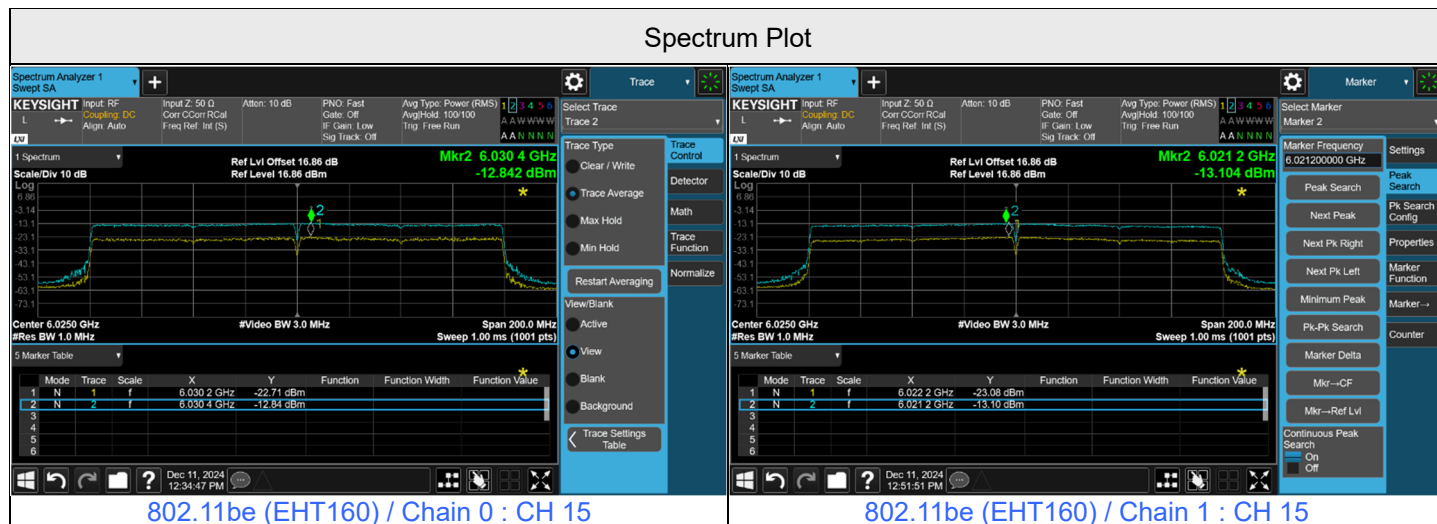
- Establish a connection between the EUT and the companion device and enable peer-to-peer communication.
- Spectrum set span to encompass the entire emission bandwidth (EBW) of the signal. RBW = 1 MHz, Set VBW \geq 3 MHz, Detector = RMS, Sweep time = auto. Trace average at least 100 traces in power averaging mode. Record the max value.
- Set the variable attenuator to 0 dB (simulate a noise-free spectral environment and high RSSI).
- Capture the PSD values (A) from the Spectrum analyzer.
- Increase the attenuation of the variable attenuator step to step (simulate a noisy spectral environment and low RSSI)
- Capture the PSD values (B) from the Spectrum analyzer.
- Compare the highest PSD from value (A) to the highest PSD on value (B) and determine the delta. For MIMO operations use the sum of the highest PSD from each individual antenna.

7 Test Results of Test Item

7.1 Transmit power control (TPC) mechanism

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko
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BW (MHz)	Frequency (MHz)	Chain	High RSSI PSD (dBm/MHz)	Low RSSI PSD (dBm/MHz)	High RSSI Total PSD (dBm/MHz)	Low RSSI Total PSD (dBm/MHz)	Limit (dB)	Test Result
160	6025	0	-22.71	-12.84	-19.88	-9.96	> 6	Pass
		1	-23.08	-13.10				



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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