

TEST REPORT

Reference No..... : WTD24X01019435W010
FCC ID..... : 2AQRM-Q5
Applicant : Foxx Development Inc.
Address : 3480 Preston Ridge Road, Suite500, Alpharetta, GA 30005, USA
Manufacturer : The same as Applicant
Address : The same as Applicant
Product Name : 5G MiFi
Model No..... : Q5
Standards : FCC Part 96
Date of Receipt sample : 2024-01-24
Date of Test..... : 2024-05-08 to 2024-05-30
Date of Issue : 2024-05-30
Test Report Form No. : WTX_Part 96W
Test Result..... : **Pass**

Remarks:

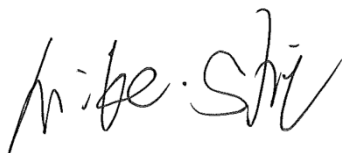
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

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Report version

Version No.	Date of issue	Description
Rev.00	2024-05-30	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	5G MiFi
Trade Name:	/
Model No.:	Q5
Adding Model(s):	/
Rated Voltage:	Adapter DC5V; Battery DC3.85V
Battery:	/
Adapter Model:	GQ15-050300-ZU Input: AC100-240v~50/60Hz 0.5A Output:DC5V3.0A
<i>Note: The test data is gathered from a production sample provided by the manufacturer.</i>	

Technical Characteristics of EUT:	
5G NR	
Support Networks:	5G NR
Support Band:	N48
Uplink Frequency:	5G NR n48: 3550-3700MHz
Downlink Frequency:	5G NR n48: 3550-3700MHz
RF Output Power:	5G NR n48: 22.38dBm
Type of Emission:	5G NR n48:35M7G7D, 35M8W7D
Type of Modulation:	DFT-s-OFDM: PI/2 BPSK QPSK / 16QAM / 64QAM / 256QAM CP-OFDM: QPSK / 16QAM / 64QAM / 256QAM
Antenna Type:	FPC Antenna
Antenna Gain:	n48: 3.2dBi
<i>Note The Antenna Gain is provided by the customer and can affect the validity of results.</i>	

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.

FCC Rules Part 96: Citizens Broadband Radio Service.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

KDB 971168 D01 Power Meas License Digital Systems v03r01: Measurement Guidance for Certification of Licensed Digital Transmitters.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A and the CAB identifier is CN0057.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	5G NR n48	Low, Middle, High Channels

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
Type-C Cable	1.0	Shielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	±0.42dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041 A1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2024-02-24	2025-02-23
WTXE1104 A1001	MXG Vector Signal Generator	Agilent	N5182A	MY47420108	2024-02-24	2025-02-23
WTXE1104 A1002	DC Power Supply	Agilent	E3634A	MY40009294	2024-02-24	2025-02-23
WTXE1104 A1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2024-02-24	2025-02-23
WTXE1104 A1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2024-02-24	2025-02-23
WTXE1104 A1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0658	2024-02-24	2025-02-23
<input type="checkbox"/> Chamber A: Below 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-02-24	2025-02-23
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1007 A1001	Amplifier	HP	8447F	2805A03475	2024-02-24	2025-02-23
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
WTXE1010 A1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2024-02-24	2025-02-23
<input type="checkbox"/> Chamber A: Above 1GHz						
WTXE1005 A1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2024-02-24	2025-02-23
WTXE1001 A1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2024-03-19	2025-03-18
WTXE1065 A1001	Amplifier	C&D	PAP-1G18	2002	2024-02-27	2025-02-26
WTXE1010 A1005	Horn Antenna	ETS	3117	00086197	2024-02-26	2025-02-25
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28
WTXE1004	Spectrum	Rohde &	FSP40	100612	2024-02-27	2025-02-26

A1-001	Analyzer	Schwarz				
<input type="checkbox"/> Chamber B:Below 1GHz						
WTXE1010 A1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2024-03-17	2027-03-16
WTXE1038 A1001	Amplifier	Agilent	8447D	2944A104 57	2024-02-24	2025-02-23
WTXE1001 A1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2024-02-24	2025-02-23
<input checked="" type="checkbox"/> Chamber C:Below 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
WTXE1010 A1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2024-04-18	2027-04-17
WTXE1007 A1002	Amplifier	HP	8447F	2944A038 69	2024-02-24	2025-02-23
WTXE1010 A1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2024-02-26	2025-02-25
<input checked="" type="checkbox"/> Chamber C: Above 1GHz						
WTXE1093 A1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2024-02-27	2025-02-26
WTXE1103 A1005	Horn Antenna	POAM	RTF-118A	1820	2023-03-10	2026-03-09
WTXE1103 A1006	Amplifier	Tonscend	TAP01018050	AP22E806 235	2024-02-27	2025-02-26
WTXE1010 A1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2024-03-17	2025-03-16
WTXE1003 A1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2024-02-29	2025-02-28

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
LTE Test System*	Tonscend	JS1120-1	V2.5
5G NR Test Ssystem	Tonscend	TS-1120	V2.4.0

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§96.41(b)	RF Output Power	Compliant
§96.41	Peak-to-average Ratio (PAR) of Transmitter*	N/A
§96.41	Emission Bandwidth*	N/A
§96.41	Spurious Emissions at Antenna Terminal*	N/A
§96.41	Spurious Radiation Emissions	Compliant
§2.917(a), §96.41	Out of Band Emissions*	N/A
-	Frequency Stability*	N/A

**Remark: Due to updated antennas of NR, Updated test data include radiated Power, Spurious Radiation Emissions, the RF conducted test data refer to the module (FCC ID: XMR2022RG520NNA), the granted date: 10/27/2022.*

N/A: Not applicable.

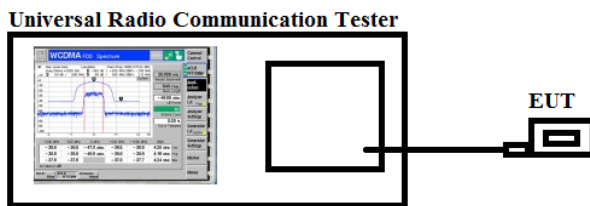
3. RF Output Power

3.1 Standard Applicable

According to §96.41(b), Limitations on power and antenna height.

3.2 Test Procedure

- Conducted output power test method:



- Radiated power test method:

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

3.3 Summary of Test Results/Plots

Max. Radiated Power:
5G NR n48

Channel Bandwidth: 5 MHz			
Modulation	Channel	E.i.r.p [dBm/10MHz]	Verdict
DFT-QPSK	LCH	21.27	PASS
	MCH	21.45	PASS
	HCH	21.26	PASS
CP-QPSK	LCH	21.34	PASS
	MCH	21.25	PASS
	HCH	21.46	PASS
Channel Bandwidth: 10 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
DFT-QPSK	LCH	21.56	PASS
	MCH	21.26	PASS
	HCH	21.22	PASS
CP-QPSK	LCH	21.12	PASS
	MCH	21.49	PASS
	HCH	21.59	PASS
Channel Bandwidth: 15 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
DFT-QPSK	LCH	21.24	PASS
	MCH	21.53	PASS
	HCH	21.23	PASS
CP-QPSK	LCH	21.21	PASS
	MCH	21.34	PASS
	HCH	21.49	PASS
Channel Bandwidth: 20 MHz			
Modulation	Channel	E.i.r.p [dBm]	Verdict
DFT-QPSK	LCH	21.31	PASS
	MCH	21.28	PASS
	HCH	21.42	PASS
CP-QPSK	LCH	21.26	PASS
	MCH	21.35	PASS
	HCH	21.54	PASS

Max. Conducted Output Power

The test data refer to the module (FCC ID: XMR2022RG520NNA), the granted date: 10/27/2022.

Test result: Pass

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4. Spurious Radiated Emissions

4.1 Standard Applicable

According to §96.41, Emission mask requirements for EA-based systems.

4.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA-603-E and ANSI C63.4-2014 measurement procedure.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

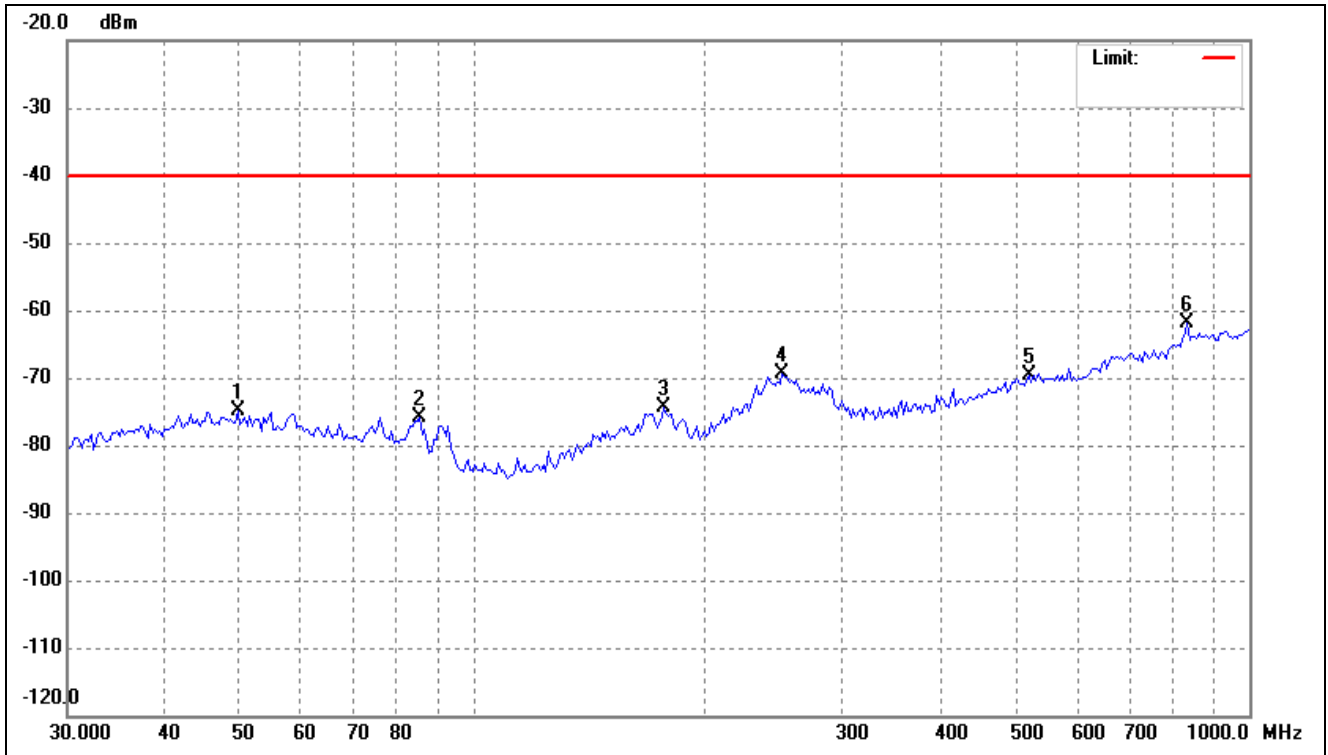
4.3 Summary of Test Results/Plots

Note: 1. this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

2. All test modes (different bandwidth and different modulation) are performed, but only the worst case is recorded in this report.

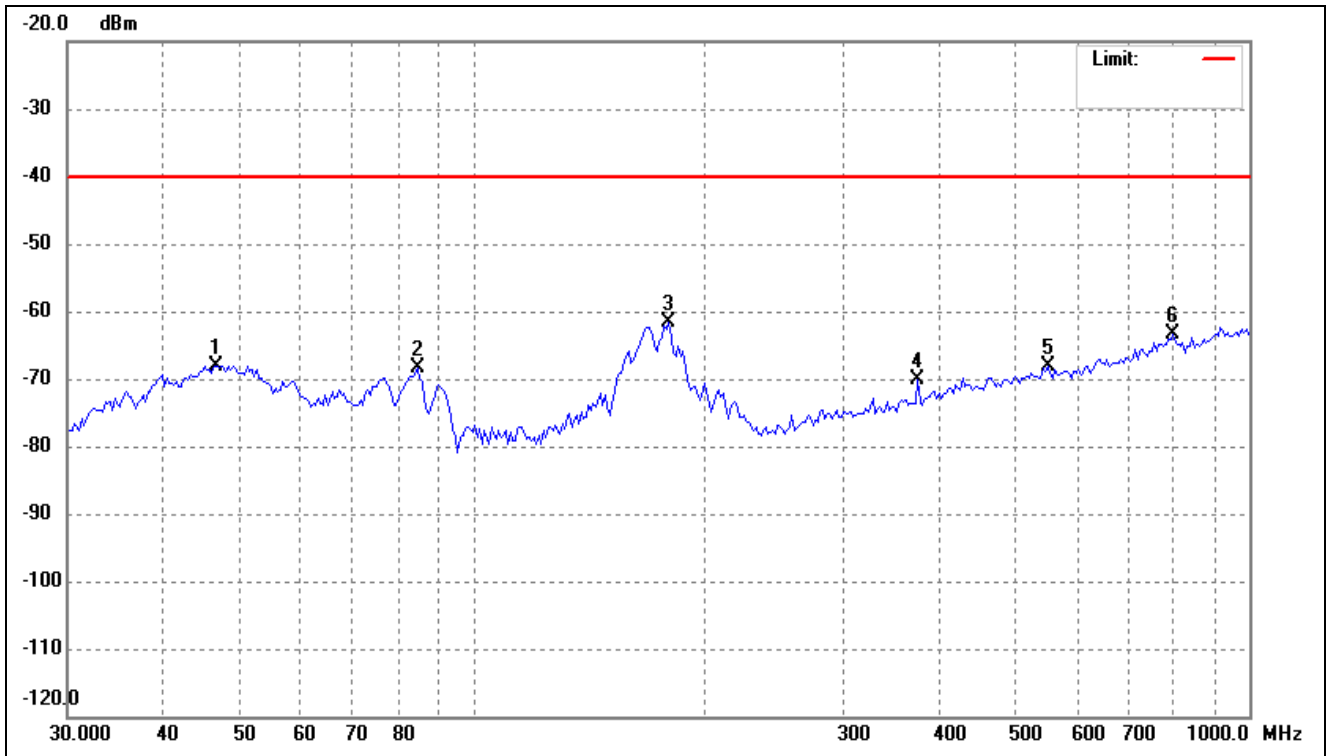
➤ Spurious Emissions Below 1GHz

Test Mode	5G NR n48	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	49.7571	-78.45	3.48	-74.97	-40.00	-34.97	ERP
2	85.4769	-74.31	-1.65	-75.96	-40.00	-35.96	ERP
3	176.2748	-75.36	0.98	-74.38	-40.00	-34.38	ERP
4	250.4859	-78.00	8.51	-69.49	-40.00	-29.49	ERP
5	520.2079	-77.07	7.47	-69.60	-40.00	-29.60	ERP
6	833.0127	-75.15	13.37	-61.78	-40.00	-21.78	ERP

Test Mode	5G NR n48	Polarity:	Vertical
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No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark
1	46.7077	-71.20	3.19	-68.01	-40.00	-28.01	ERP
2	84.8783	-67.51	-0.90	-68.41	-40.00	-28.41	ERP
3	178.7697	-66.21	4.64	-61.57	-40.00	-21.57	ERP
4	373.8862	-74.88	4.83	-70.05	-40.00	-30.05	ERP
5	550.2902	-76.11	8.00	-68.11	-40.00	-28.11	ERP
6	798.6205	-76.05	12.62	-63.43	-40.00	-23.43	ERP

Note: Margin= (Reading+ Correct)- Limit

➤ Spurious Emissions Above 1GHz

For TDD_N48 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (3560.0MHz)						
6910.00	-63.68	15.67	-48.01	-40	-8.01	H
10365.00	-62.99	19.81	-43.18	-40	-3.18	H
6910.00	-62.68	15.67	-47.01	-40	-7.01	V
10365.00	-62.19	19.81	-42.38	-40	-2.38	V
Middle Channel (3625.0MHz)						
7000.00	-62.54	16.74	-45.8	-40	-5.8	H
10500.00	-62.9	20.26	-42.64	-40	-2.64	H
7000.00	-62.29	16.74	-45.55	-40	-5.55	V
10500.00	-63.31	20.26	-43.05	-40	-3.05	V
High Channel (3690MHz)						
7080.00	-63.35	17.74	-45.61	-40	-5.61	H
10620.00	-62.76	21.31	-41.45	-40	-1.45	H
7080.00	-63.11	17.74	-45.37	-40	-5.37	V
10620.00	-62.9	21.31	-41.59	-40	-1.59	V

Note: $Result = Reading + Correct$, $Margin = Result - Limit$

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

**** END OF REPORT ****