



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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Test Report

Prepared for: FRTek

Model: FRM-DU39D / FRM-MRU39D

Description: 5G 39 GHz Optical DAS

FCC ID: 2AFEG-FRM-39

To

FCC Part 1.1310

Date of Issue: September 23, 2020

On the behalf of the applicant:

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Attention of:

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	July 9, 2020	Greg Corbin	Original Document

ANAB

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

EUT Description

Model: FRM-DU39D / FRM-MRU39D

Description: 5G 39 GHz Optical DAS

Additional Information:

The EUT is a 5G 39 GHz Optical DAS (Distributed Amplifier System).

The frequency range for both the uplink and downlink is 38.6 – 40.0 GHz.

The EUT has separate SISO and MIMO input / outputs.

Modulation used is according to the 5G NR (New Radio Standard) 3GPP 38 (Downlink: CP-OFDM, Uplink: CP-OFDM or DFT-S-OFDM – up to 256QAM).

Channel Capacity is:

100MHz X 8FA (Continuous & Non-Continuous) or 200MHz X 4FA (Continuous & Non-Continuous) or 400MHz X 2FA (Continuous & Non-Continuous)

EUT Operation during Tests

EUT was set up for normal operating conditions.

The EUT was controlled by a GUI, Control: *i-storm*, version:40.01

5G test signals with either 100 MHz or 400 MHz bandwidths were used as required.

The DU and mHU antennas were removed to provide access to the antenna ports.

Test signals were injected into the antenna ports.

The 5G 39 GHz Optical DAS contains the following individual units.

Product Name	Model Name
39 GHz 5G mRU	FRM-mRU39D
39 GHz 5G DU	FRM-DU39D
39 GHz 5G DRU	FRM-DRU39
39 GHz 5G MDU	FRM-MDU39
39 GHz 5G MHU	FRM-MHU39
39 GHz 5G MPSU	FRM-MSPU

The EUT Antenna ports are listed below.

DU	mRU
SISO Downlink Input	SISO Downlink Output
SISO Uplink Output	SISO Uplink Input
MIMO Downlink Input	MIMO Downlink Output
MIMO Uplink Output	MIMO Uplink Input

Antenna Gain

Antenna	Frequency (GHz)	Bandwidth (GHz)	Gain (dBi)
DU (uplink)	38.6 – 40	1.4	10 ±1 dB
mRU (downlink)	38.6 – 40	1.4	8 ±1 dB

MPE Evaluation

This is a mobile device used in Uncontrolled Exposure environment.

Limits Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)

0.3-1.234 MHz:	Limit [mW/cm ²] = 100
1.34-30 MHz:	Limit [mW/cm ²] = (180/f ²)
30-300 MHz:	Limit [mW/cm ²] = 0.2
300-1500 MHz:	Limit [mW/cm ²] = f/1500
1500-100,000 MHz	Limit [mW/cm ²] = 1.0

Test Data

Output Power

	Manufacturer rated power	Tune up procedure	Output Power for RF Exposure calculation	
	(dBm)	(dB)	(dBm)	(mw)
Downlink	20	None Specified	20	100
Uplink	20	None Specified	20	100

SISO Downlink

Test Frequency, MHz	27925
Power, Conducted, mW (P)	100
Antenna Gain Isotropic (dBi)	9
Antenna Gain Numeric (G)	7.94
Antenna Type	Linear
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$
Power Density (S) mw/cm ²

Power Density (S) = 0.158 mw/cm ²
Limit = (from above table) = 1.0 mw/cm ²

SISO Uplink

Test Frequency, MHz	27925
Power, Conducted, mW (P)	100
Antenna Gain Isotropic	11 dBi
Antenna Gain Numeric (G)	12.59
Antenna Type	Linear
Distance (R)	20 cm

$S = \frac{P * G}{4\pi r^2}$
Power Density (S) mw/cm ²

Power Density (S) = 0.250 mw/cm ²
Limit = (from above table) = 1.0 mw/cm ²

The EUT complies with the MPE limit at 20 cm.

END OF TEST REPORT