Compliance Testing, LLC
Previously Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.ComplianceTesting.com
info@ComplianceTesting.com

Test Report

Prepared for: FRTek

Model: FRM-DU28D / FRM-MRU28D

Description: 5G 28 GHz Optical DAS

FCC ID: 2AFEG-FRM-28

To

FCC Part 1.1310

Date of Issue: July 9, 2020

On the behalf of the applicant:	**FRTek** **181 Metro Drive** **San Jose, CA 95110**
Attention of:	**Milla Woo, CEO** **Ph: (510)390-1939** **Email: milla.woo@frtek.com**

Prepared By
Compliance Testing, LLC
1724 S. Nevada Way
Mesa, AZ 85204
(480) 926-3100 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p19c0009

Greg Corbin
Project Test Engineer

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	July 9, 2020	Greg Corbin	Original Document
2.0	August 4, 2020	Greg Corbin	Revised calculations based on tune up power
3.0	August 6, 2020	Greg Corbin	Added output power table to page 5 Corrected typo in SISO UL calculation

FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

EUT Description:
Model: FRM-DU28D / FRM-MRU28D

Description: 5G 28 GHz Optical DAS

Additional Information:

The EUT is a 5G 28 GHz Optical DAS (Distributed Amplifier System).
The frequency range for both the uplink and downlink is 27.5 – 28.35 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)

DU Antenna Gain = 10 dBi
mRU Antenna Gain = 8 dBi

EUT Operation during Tests

EUT was set up for normal operating conditions.
The EUT was controlled by a GUI titled “FRTek 5G DAS GUI – version 0.22”
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 28 GHz Optical DAS contains the following individual units.

Product Name	Model Name	Serial Number	Version
28 GHz 5G mRU	FR-R5G17AFU	FRC14-198-0007	10.30
28 GHz 5G DU	FR-R5G17AFU	FRC10-198-0004	10.30
28 GHz 5G DRU	FR-R5G17AFU	FRC13-198-0004	10.30
28 GHz 5G MDU	FR-R5G17AFU	FRC11-198-0004	10.30
28 GHz 5G MHU	FR-R5G17AFU	FRC12-198-0004	10.21
28 GHz 5G MPSU	FR-R5G17AFU	FRC15-198-0007	N/A

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

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/cm²] = 100
	1.34-30 MHz:	Limit [mW/cm²] = (180/f²)
	30-300 MHz:	Limit [mW/cm²] = 0.2
	300-1500 MHz:	Limit [mW/cm²] = f/1500
	1500-100,000 MHz	Limit [mW/cm²] = 1.0

Test Data

Output Power

	Manufacturer rated power	**Tune up procedure**	**Output Power for RF Exposure calculation**	
	(dBm)	**(dB)**	**(dBm)**	**(mw)**
Downlink	**20**	**± 2dB**	**22**	**158.5**
Uplink	**17**	**± 2dB**	**19**	**79.4**

SISO Downlink

Test Frequency, MHz	27925
Power, Conducted, mW (P)	158.5
Antenna Gain Isotropic	8 dBi
Antenna Gain Numeric (G)	6.31
Antenna Type	Linear
Distance (R)	20 cm

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

Power Density (S) = 0.199 mw/cm^2
Limit = (from above table) = 1.0 mw/cm^2

SISO Uplink

Test Frequency, MHz	27925
Power, Conducted, mW (P)	79.4
Antenna Gain Isotropic	10 dBi
Antenna Gain Numeric (G)	10
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

The EUT complies with the MPE limit at 20 cm.

END OF TEST REPORT