

Test Report

Prepared for: ED2 Corporation

Model: Roadrunner

Description: Band n261 5G mmWave Repeater

FCC ID: 2AYVPRR001ODR

To

FCC Part 1.1310

Date of Issue: February 16, 2021

On the behalf of the applicant:

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	February 16, 2021	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: Roadrunner

Description: Band n261 5G mmWave Repeater

Additional Information:

The EUT is a 5G mmWave Repeater.

The frequency range for both the Donor and Server ports is 27.50 – 28.35 GHz.

The EUT has separate horizontal and vertical inputs and outputs.

For Output Power and Conducted Spurious Emissions, the horizontal and vertical outputs for each signal path are summed together per KDB 662911 D01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

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).

EUT Operation during Tests

EUT was set up for normal operating conditions.

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

The antennas were removed to provide access to the antenna ports.

Test signals were injected into the antenna ports.

The EUT Antenna ports and signal paths are listed below.

From	To
Donor Vertical RX Input	Server Vertical TX Output
Donor Horizontal RX Input	Server Horizontal TX output
Server Vertical RX Output	Donor Vertical TX Input
Server Horizontal RX output	Donor Horizontal TX Input

Antenna Gain

Antenna	Frequency (GHz)	Gain (dBi)
TX	27.50 – 28.35	18
RX	27.50 – 28.35	18

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

The output power used for the MPE calculation is the is the maximum rated output power per the manufacturer datasheet.

Port	Manufacturer rated power	Tune up procedure	Maximum Antenna Gain	Conducted Output Power for RF Exposure calculation	
	EIRP (dBm)	(dB)	dBi	(dBm)	(mw)
Donor TX Output	51	None Specified	18	33	1995.26
Server TX Output	51	None Specified	18	33	1995.26

MPE Calculation

Test Frequency, MHz	27925
Power, Conducted, mW (P)	1995.26
Antenna Gain Isotropic (dBi)	18
Antenna Gain Numeric (G)	63.10
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 is over the 1.0 mw/cm² limit so the Minimum Safe Distance is calculated on the next page.

Minimum Safe Distance Evaluation

Test Data

Test Frequency, MHz	27925
Power, Conducted, mW (P)	1995.26
Antenna Gain Isotropic	18 dBi
Antenna Gain Numeric (G)	63.10
Antenna Type	Linear
Limit (L)	1.0 mw/cm ²

R= $\sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
100.1 cm	1995.26	63.10	1.0 mw/cm ²

The EUT Minimum Safe Distance is 100.1 cm.

END OF TEST REPORT