

Test Report

Prepared for: RF Industries Pty Ltd

Model: DSPbR Edge

Description: Channelized Bidirectional Repeater

FCC ID: YK7040004901CXXXM

To

FCC Part 1.1310

Date of Issue: October 27, 2023

On the behalf of the applicant:

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Project Test Engineer

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	10/27/2023	Greg Corbin	Original Document
2.0	11/27/23	Greg Corbin	Corrected applicants address on page 1 and numeric gain on page 5.

ANAB

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

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FCC Site Reg. #349717

IC Site Reg. #2044A-2

EUT Description

Model: DSPbR Edge

Description: Channelized Bidirectional Repeater

Serial Number: ESY23089108, ESY23079202

Software:4.9.4

HVIN: DEDGE400490

PMN: DSPbR EDGE

UPN: DEDGE400490

Additional Information:

The EUT is a channelized bidirectional industrial signal booster / repeater.

The EUT is controlled by a webserver GUI.

The EUT can provide up to 8 channels with the output power limited to +36 dBm composite output power. The output power is limited in software per the number of channels selected as shown in Table 1.

Table 1 - # of Channels and Maximum Output Power

# of channels	Maximum Power dBm
1	+36
2	+33
4	+30
8	+27

Table 2 - EUT frequency range and emission designators

Regulation	Frequency Range MHz	Modulation	Emission Designators
FCC Part 90	450 – 490	FM, C4FM, TDMA H-CPM, TDMA H-DQPSK	F1D, F1E, F3E, FXE, F1W, G1E, G1D, D7E, D7W, D7D, D1E, D1W, F9W
FCC Part 22	454.025 – 459.975	FM, C4FM, TDMA H-CPM, TDMA H-DQPSK	
ISED	450 – 470	FM, C4FM, TDMA H-CPM, TDMA H-DQPSK	

The manufacturer does not supply the antennas. The antennas are site specific and determined at the time of installation.

The manufacturer limits the output power to + 36 dBm composite output power via software and has provided the following statement:

“The DSPbR Edge has a configurable output power level, which allows the user to lower the power level per channel in 1dB increments.

Even though the DSPbR Edge is capable of 36dBm composite power, based on the antenna gain and feeder loss and the FCC ERP limit of 37dBm, the power levels per channel must be set appropriately by the end user to ensure the ERP limit of 37dBm is not exceeded.”

Since the ERP limit is +37 dBm, this RF exposure exhibit calculates the MPE based on maximum manufacturer output power of +36 dBm with 1 dBi antenna gain.

Any antenna used with a gain higher than 1 dBi, will require the output power to be reduced accordingly to stay within the 37 dBm ERP limit.

MPE Evaluation

This is a mobile device used in Uncontrolled Exposure environment.

Limits Controlled Exposure 47 CFR 1.1310 Table 1, (A)

0.3-3.0 MHz:	Limit [mW/cm ²] = 100
3.0-30 MHz:	Limit [mW/cm ²] = (900/f ²)
30-300 MHz:	Limit [mW/cm ²] = 1.0
300-1500 MHz:	Limit [mW/cm ²] = f/300
1500-100,000 MHz	Limit [mW/cm ²] = 5

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

Test Frequency, MHz	450
Power, Conducted, mW (P)	4000
Antenna Gain Isotropic	1 dBi
Antenna Gain Numeric (G)	1.26
Antenna Type	N/A
Distance (R)	20 cm

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

Power Density (S) = 1.00 mw/cm ²
Limit = (from above table) = 0.300 mw/cm ²

At 450 MHz, with an antenna gain of 1 dBi, the transmitter at 1.0 mw/cm² is over the RF exposure limit of 0.300 mw/cm² when calculated at 20 cm.

The minimum safe distance is calculated on the next page.

Minimum Safe Distance Evaluation

This is a mobile device used in Uncontrolled Exposure environment.

Limits Controlled Exposure 47 CFR 1.1310 Table 1, (A)

0.3-3.0 MHz:	Limit [mW/cm ²] = 100
3.0-30 MHz:	Limit [mW/cm ²] = (900/f ²)
30-300 MHz:	Limit [mW/cm ²] = 1.0
300-1500 MHz:	Limit [mW/cm ²] = f/300
1500-100,000 MHz	Limit [mW/cm ²] = 5

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

Test Frequency, MHz	450
Power, Conducted, mW (P)	4000
Antenna Gain Isotropic	1 dBi
Antenna Gain Numeric (G)	1.26
Antenna Type	N/A
Limit (L)	0.300

$R = \sqrt{(PG/4\pi L)}$			
Distance (R) cm	Power mW (P)	Numeric Gain (G)	Limit (L)
36.6	4000	1.26	0.300

At 450 MHz, the minimum safe distance is 36.6 cm when using an antenna with 1 dBi gain.

If an antenna is used with a gain of > 1 dBi, the minimum safe distance will change and will need to be re-evaluated.

END OF TEST REPORT