



RF Exposure Evaluation

For

ABELL INDUSTRIES CO.,LTD

DMR Digital Repeater

Test Model: R50

Additional Model No.: R50(10), R50(20)

Prepared for : ABELL INDUSTRIES CO., LTD
Address : 701-702, 7/F, D Bldg, Qianwan Hard Technology Industrial Park,
Nanchang community, Xixiang Rd., Bao An Dist., Shenzhen.

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei,
Shajing Street, Baoan District, Shenzhen, 518000, China
Tel : (+86)755-82591330
Fax : (+86)755-82591332
Web : www.LCS-cert.com
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : July 03, 2025
Number of tested samples : 2
Sample No. : A250701051-1, A250701051-2
Serial number : Prototype
Date of Test : July 03, 2025 ~ July 31, 2025
Date of Report : August 01, 2025



Shenzhen LCS Compliance Testing Laboratory Ltd.

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Tel: (+86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

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**RF Exposure Evaluation****Report Reference No.** : **LCSA07025051EB****Date of Issue** : August 01, 2025**Testing Laboratory Name** : **Shenzhen LCS Compliance Testing Laboratory Ltd.****Address** : 101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, 518000, China**Testing Location/ Procedure** : Full application of Harmonised standards ☒
Partial application of Harmonised standards ☐
Other standard testing method ☐**Applicant's Name** : **ABELL INDUSTRIES CO., LTD****Address** : 701-702, 7/F, D Bldg, Qianwan Hard Technology Industrial Park, Nanchang community, Xixiang Rd., Bao An Dist., Shenzhen.**Test Specification****Standard** : FCC CFR 47 part1 1.1310
FCC CFR 47 part2 2.1091**Test Report Form No.** : TRF-4-E-214 A/0**TRF Originator** : Shenzhen LCS Compliance Testing Laboratory Ltd.**Master TRF** : Dated 2011-03**Shenzhen LCS Compliance Testing Laboratory Ltd. All rights reserved.**

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EUT Description : **DMR Digital Repeater****Trade Mark** : ABELL**Test Model** : R50**Ratings** : Please Refer to Page 6**Result** : **Pass****Compiled by:**

Martin Lee/ Administrator

Supervised by:

Jack Liu / Technique principal

Approved by:

Gavin Liang/ Manager



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RF Exposure Evaluation

Test Report No. :	LCSA07025051EB	<u>August 01, 2025</u> Date of issue
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EUT.....	: DMR Digital Repeater
Test Model.....	: R50
Applicant.....	: ABELL INDUSTRIES CO., LTD
Address.....	: 701-702, 7/F, D Bldg, Qianwan Hard Technology Industrial Park, Nanchang community, Xixiang Rd., Bao An Dist., Shenzhen.
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: ABELL INDUSTRIES CO., LTD
Address.....	: 701-702, 7/F, D Bldg, Qianwan Hard Technology Industrial Park, Nanchang community, Xixiang Rd., Bao An Dist., Shenzhen.
Telephone.....	: /
Fax.....	: /
Factory.....	: ABELL INDUSTRIES CO., LTD
Address.....	: 701-702, 7/F, D Bldg, Qianwan Hard Technology Industrial Park, Nanchang community, Xixiang Rd., Bao An Dist., Shenzhen.
Telephone.....	: /
Fax.....	: /

Test Result:	Pass
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	August 01, 2025	Initial Issue	---





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**1. Product Information**

EUT	:	DMR Digital Repeater
Test Model	:	R50
Additional Model No.	:	R50(10), R50(20)
Model Declaration	:	PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	:	Power: 10/20Watt Input: AC 100-240V, 2.6A, 50-60Hz DC 12V
Hardware Version	:	V1
Software Version	:	V1.06.01
PMR	:	
Operating Frequency	:	400 ~ 470MHz
Channel Separation	:	Analog Voice 12.5KHz Digital Voice/Data 12.5KHz
Modulation Type	:	FM for Analog Voice 4FSK for Digital Voice/Digital Data
Rated Output Power	:	High Power 20W; Lower Power 10W
Antenna Description	:	External Antenna, 5.0dBi (Max.)
Exposure category	:	Controlled Exposure / Occupational Exposure
EUT Type	:	Production Unit
Device Type	:	Mobile Device
Note: For a more detailed antenna description, please refer to the antenna specifications or the antenna report provided by the customer.		



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2. Evaluation Method

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modelled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

3. Limit

3.1 Refer Evaluation Method

[ANSI C95.1-2019](#): IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz

[FCC KDB publication 447498 D01 General 1 RF Exposure Guidance v06](#): Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

[FCC CFR 47 part1 1.1310](#): Radiofrequency radiation exposure limits.

[FCC CFR 47 part2 2.1091](#): Radiofrequency radiation exposure evaluation: mobile devices.

3.2 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	(900/f ²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Uncontrolled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density



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4. MPE Calculation Method

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=PG/4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the center of radiation of the antenna

5. Antenna Information

EUT can only use antennas certificated as follows provided by manufacturer;

Internal/External Identification	Antenna type and antenna number	Operate frequency band	Maximum antenna gain
External	External Antenna	400~470MHz	5.0dBi

6. Conducted Power and Manufacturing Tolerance

<PMR>

Modulation Type	Frequency (MHz)	Max Conducted Peak Power (dBm)	Tune Up Power (dBm)
4FSK	406.1125	44.012	44 ± 1
	430.1125	44.130	44 ± 1
	453.2125	43.640	43 ± 1
	459.625	43.751	43 ± 1
	465.625	43.878	43 ± 1
	469.9875	44.050	44 ± 1
	406.1125	41.002	41 ± 1
	430.1125	41.138	41 ± 1
	453.2125	40.972	40 ± 1
	459.625	40.932	40 ± 1
	465.625	40.938	40 ± 1
FM	469.9875	40.983	40 ± 1
	406.1125	44.022	44 ± 1
	430.1125	44.186	44 ± 1
	453.2125	43.632	43 ± 1
	459.625	43.737	43 ± 1
	465.625	43.895	43 ± 1
	469.9875	43.980	43 ± 1
	406.1125	41.409	41 ± 1
	430.1125	41.158	41 ± 1
	453.2125	40.972	40 ± 1
	459.625	40.923	40 ± 1
	465.625	40.925	40 ± 1
	469.9875	40.954	40 ± 1

7. Measurement Results

7.1 Standalone MPE Evaluation

As declared by the Applicant, the EUT is a wireless device used in a fix application, at least 80 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum separation distance, $r=80\text{cm}$, as well as the gain of the used antenna refer to antenna information, the RF power density can be obtained.



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<PMR>

Modulation Type	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW				
FM/4FSK	45.00	31622.7766	5.0	3.1623	1.244	1.3333*

Remark:

1. Output power including tune-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 80cm from user manual provide by manufacturer.
4. MPE limits lowest is $400/300 = 1.3333$;

7.2 Simultaneous Transmission MPE Evaluation

The EUT equipped with one antenna. So no need consider simultaneous transmission.

8. Conclusion

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the RF Controlled Exposure / Occupational Exposure of mobile device.

9. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

Test Firm Registration Number: 254912.

10. Measurement Uncertainty

Transmitter power conducted	0.62 dB	(1)
Transmitter power Radiated	2.67 dB	(1)

(1). This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

-----THE END OF REPORT-----



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