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FCC RF Exposure Test Report

Certificate #6613.01

FCC RF Exposure Test Report

Report No. : PSU-QSU2306260109SA01
Applicant : Cohda Wireless Pty Ltd.
Address : 27 Greenhill Road Wayville SA 5034 Australia
Product : Road-Side (Transceiver) Unit for infrastructure.
FCC ID : 2AEGPMK6RSU
Brand : Cohda Wireless
Model No. : MK6 RSU
Standards : FCC Part 2 (Section 2.1091)
KDB 447498 D01 General RF Exposure Guidance v06
Sample Received Date : Jun. 26, 2023
Date of Testing : Jun. 26, 2023 ~ Nov. 03, 2023

CERTIFICATION: The above equipment have been tested by **HUARUI 7LAYERS HIGH TECHNOLOGY (SUZHOU) CO., Ltd.** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

Prepared By :

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Release Control Record

Report No.	Reason for Change	Date Issued
PSU-QSU2306260109SA01	Initial release	Nov. 03, 2023



1. Description of Equipment Under Test

EUT Type*	Road-Side (Transceiver) Unit for infrastructure.
Brand Name*	Cohda Wireless
Model Name*	MK6 RSU
Tx Frequency Bands (Unit: MHz)	<p>GSM1900 : 1850.2MHz ~ 1909.8MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 17 : 2502.5MHz ~ 2567.5MHz LTE Band 25 : 1850.7MHz ~ 1914.3 MHz LTE Band 29 : 717MHz ~ 728MHz(DL Only) LTE Band 30 : 2307.5MHz ~ 2312.5MHz(DL Only) LTE Band 41 : 2498.5MHz~ 2687.5MHz LTE Band 66 : 1710.7 MHz ~ 1779.3 MHz LTE Band 71 : 665.5 MHz ~ 695.5 MHz NR Band n2: 1852.5MHz ~ 1907.5MHz NR Band n5: 826.5MHz ~ 846.5MHz NR Band n25: 1852.5MHz ~1912.5MHz NR Band n66: 1712.5MHz ~ 1777.5MHz NR Band n71: 665.5MHz ~ 695.5MHz NR Band n77(Part27Q):3460.02MHz ~ 3540MHz NR Band n77(Part27O):3710.01MHz ~ 3969.99MHz NR Band n78 (Part27Q):3460.02 MHz ~ 3540MHz NR Band n78(Part27O):3710.01 MHz ~ 3789.99MHz DC_2A-n77A(Part 27Q) :3460.02MHz ~ 3540MHz DC_2A-n77A(Part 27O) :3710.01MHz ~ 3969.99MHz DC_5A-n77A(Part 27Q) :3460.02MHz ~ 3540MHz DC_5A-n77A(Part 27O) :3710.01MHz ~ 3969.99MHz DC_7A-n77A(Part 27Q) :3460.02MHz ~ 3540MHz DC_7A-n77A(Part 27O) :3710.01MHz ~ 3969.99MHz DC_12A-n77A(Part 27Q) :3460.02MHz ~ 3540MHz DC_12A-n77A(Part 27O) :3710.01MHz ~ 3969.99MHz DC_66A-n77A(Part 27Q) :3460.02MHz ~ 3540MHz DC_66A-n77A(Part 27O) :3710.01MHz ~ 3969.99MHz DC_2A-n78A(Part 27Q) :3460.02MHz ~ 3540MHz DC_2A-n78A(Part 27O) :3710.01MHz ~ 3789.99MHz DC_5A-n78A(Part 27Q) :3460.02MHz ~ 3540MHz DC_5A-n78A(Part 27O) :3710.01MHz ~ 3789.99MHz DC_7A-n78A(Part 27Q) :3460.02MHz ~ 3540MHz DC_7A-n78A(Part 27O) :3710.01MHz ~ 3789.99MHz DC_12A-n78A(Part 27Q) :3460.02MHz ~ 3540MHz DC_12A-n78A(Part 27O) :3710.01MHz ~ 3789.99MHz DC_66A-n78A(Part 27Q) :3460.02MHz ~ 3540MHz DC_66A-n78A(Part 27O) :3710.01MHz ~ 3789.99MHz WLAN : 2412 MHz ~ 2462 MHz, 5180 MHz ~ 5240 MHz, 5260 MHz ~ 5320 MHz, 5500 MHz ~ 5700 MHz, 5745 MHz ~ 5825 MHz Bluetooth : 2402 MHz ~ 2480 MHz DSRC: 5895 MHz – 5925 MHz</p>
Uplink Modulations*	<p>GSM & GPRS : GMSK EDGE : 8PSK WCDMA : BPSK/QPSK LTE : QPSK, 16QAM, 64QAM 5G NR: DFT-s-OFMA($\pi/2$ BPSK,QPSK,16QAM,64QAM,256QAM); CP-OFMA(QPSK,16QAM,64QAM,256QAM)</p>



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	802.11b : DSSS 802.11a/g/n/ac : OFDM Bluetooth : GFSK, $\pi/4$ -DQPSK, 8-DPSK DSRC: BPSK,QPSK,16QAM,64QAM
Antenna Type*	WLAN: Monopole Antenna WWAN: Dipole Antenna DSRC: Dipole Antenna
EUT Stage	Production Unit

Note:

- *Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information , Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
- The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

List of Accessory:

ACCESSORIES	MANUFACTURER	MODEL
2x Antenna for LTE/2G/3G/CDMA	Taoglas	TG.80.4H31
1x Antenna for WLAN/BT	HUBER+SUHNER	1399.17.0224
1x Antenna for WLAN	HUBER+SUHNER	1399.17.0224
2x Antenna for DSRC	Taoglas	TD.80.6H31
1x Antenna for GNSS	Taoglas	TLS.40.1F11
1xM12 field attachable connector	Amphenol	MSXS-08BMMD-SL8001



2. MPE(Maximum Permissible Exposure) Assessment

2.1 Introduction

According to 47 CFR §2.1091, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitting antenna and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 cm separation requirement. The limits to be used for MPE evaluation are specified in §1.1310. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

2.2 RF Radiation Exposure Limits

According to 47 CFR §1.1310, the criteria listed in below table shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093.

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (min)
(A) Limits for Occupational / Controlled Exposures				
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 – 100000	-	-	5	6
(B) Limits for General Population / Uncontrolled Exposures				
0.3 – 1.34	614	1.63	100	30
1.34 – 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 – 100000	-	-	1.0	30

Limits for maximum permissible exposure (MPE)

Notes:

- f = frequency in MHz
- Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided they are made aware of the potential for exposure.



3. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

2.3 MPE Assessment Method

Calculations can be made to predict RF field strength and power density levels around typical RF sources. For example, in the case of a single radiating antenna, a prediction for power density in the far-field of the antenna can be made by use of the general Equations below. This equation is generally accurate in the far-field of an antenna but will over-predict power density in the near field, where they could be used for making a "worst case" or conservative prediction.

$$\text{Power Density (S)} = \frac{PG}{4\pi R^2} = \frac{\text{EIRP}}{4\pi R^2}$$

Where

S = Power Density, unit in mW/cm²

P = Power input to the antenna, unit in mW

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, unit in cm

EIRP = Effective isotropically radiated power

2.4 MPE Calculation for Standalone Operations

The manufacturer expects that the radiated component of this device will not close to the human body during normal usage and the warning statement was also stated in the user instruction. Since the transmitting antenna will be kept at least 20 cm away from the human body, the MPE level is calculated based on this condition and the result is listed in below table.



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CALCULATION FOR MAXIMUM E.I.R.P

Band	Antenna Gain (dBi)	Maximum Power (dBm)	Average EIRP (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Power Density / Limit	Result (PASS / FAIL)
Bluetooth EDR	2.00	10.83	19.187	0.004	1.000	0.004	Pass
Bluetooth LE	2.00	10.80	19.055	0.004	1.000	0.004	Pass
2.4GHz WLAN	2.00	29.41	1383.566	0.275	1.000	0.275	Pass
5.2GHz WLAN	2.00	17.33	85.704	0.017	1.000	0.017	Pass
5.3GHz WLAN	2.00	17.62	91.622	0.018	1.000	0.018	Pass
5.5GHz WLAN	2.00	19.74	149.279	0.030	1.000	0.030	Pass
5.8GHz WLAN	2.00	21.07	202.768	0.040	1.000	0.040	Pass
GSM 1900	2.52	29.50	200.447	0.040	1.000	0.040	Pass
WCDMA Band II	2.52	22.50	317.687	0.063	1.000	0.063	Pass
WCDMA Band IV	1.92	22.50	276.694	0.055	1.000	0.055	Pass
WCDMA Band V	0.27	23.00	212.324	0.042	0.551	0.077	Pass
LTE Band 2	2.52	23.00	356.451	0.071	1.000	0.071	Pass
LTE Band 4	1.92	23.00	310.456	0.062	1.000	0.062	Pass
LTE Band 5	0.27	23.00	212.324	0.042	0.550	0.077	Pass
LTE Band 7	3.03	23.00	400.867	0.080	1.000	0.080	Pass
LTE Band 12	1.03	23.00	252.930	0.050	0.466	0.108	Pass
LTE Band 17	1.03	23.00	252.930	0.050	1.000	0.050	Pass
LTE Band 25	2.52	23.00	356.451	0.071	1.000	0.071	Pass
LTE Band 41	3.03	22.50	357.273	0.071	1.000	0.071	Pass
LTE Band 66	1.92	23.00	310.456	0.062	1.000	0.062	Pass
LTE Band 71	1.03	23.00	252.930	0.050	0.444	0.113	Pass
NR Band n2	2.52	23.00	356.451	0.071	1.000	0.071	Pass
NR Band n5	0.27	23.50	238.232	0.047	0.551	0.086	Pass
NR Band n25	2.52	23.50	399.945	0.080	1.000	0.080	Pass
NR Band n66	1.92	23.00	310.456	0.062	1.000	0.062	Pass
NR Band n71	1.03	23.50	283.792	0.056	0.444	0.127	Pass
NR Band n77 (Part27Q)	1.07	24.00	321.366	0.064	1.000	0.064	Pass
NR Band n77(Part27O)	1.07	24.50	360.579	0.072	1.000	0.072	Pass
NR Band n78 (Part27Q)	1.07	25.50	453.942	0.090	1.000	0.090	Pass
NR Band n78(Part27O)	1.07	24.00	321.366	0.064	1.000	0.064	Pass
DSRC	6.1	19.75	384.592	0.077	1.000	0.077	Pass



2.5 CONCLUSION OF SIMULTANEOUS TRANSMITTER

Both of the WLAN and WWAN can transmit simultaneously, the formula of calculated the MPE is:

$CPD1/LPD1 + CPD2/LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

Band	Antenna Gain (dBi)	Maximum Tune up Power (dBm)	Average EIRP (mW)	Power Density (mW/cm ²)	Power Density / Limit	Σ(Power Density / Limit)	Limit	Result
WWAN	1.07	25.50	453.942	0.090	0.090	0.442	1.000	PASS
WLAN	2	29.41	1383.566	0.275	0.275			
DSRC	6.1	19.75	384.592	0.077	0.077			

Summary:

Since the ERP (effective radiated power) operated at < 1.5 GHz is less than 1.5 watts and > 1.5 GHz is less than 3 watts, the routine environmental evaluation is not required, and the MPE result calculated for this device complies with the MPE limit as specified in 47 CFR §1.1310.



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3. Information on the Testing Laboratories

We, Huarui 7layers High Technology (Suzhou) Co., Ltd. ,were founded in 2020 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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