

RF EXPOSURE EVALUATION REPORT FROM UL

For: Eseye Design Ltd

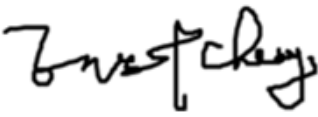
Product: Hera604v6

FCC ID: 2AASBHERAQ4029

Contains FCC ID: N7NEM75T

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This RF Exposure Evaluation Report Is Issued Under The Authority
Of Andrew Hoare, Head of Certification:


pp

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Checked By: Ernest Cheung



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For: Eseye Design Ltd

Product: Hera604v6

1. Client Information

Company Name:	Eseye Design Ltd
Address:	20 Nugent Road Surrey Research Park Guildford GU2 7AF United Kingdom
Contact Name:	Jon Darley

2. Description Of The Apparatus And Its Operational Environment

Model / Type Reference:	Hera604v6
Basic Direct Function:	Cellular Router with WiFi
Intended Operating Environment:	Indoors

The Hera604v6 operates in the 2.4 GHz frequency band (WLAN 802.11b/g/n), 5 GHz frequency band (WLAN 802.11a/n/ac) using cellular WCDMA/LTE technologies.

The Hera604v6 uses integrated certified modules:

- Cellular FCC ID: N7NEM75T

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3. Equipment Specifications

Equipment Category:	2.4 GHz WLAN / 5 GHz WLAN / Cellular WCDMA/LTE
Type of Unit:	Router
Operating Frequency Range:	
2.4GHz WLAN	2412 – 2462 MHz
5GHz WLAN	5180 – 5700 MHz
WCDMA 2	1850 – 1910 MHz
WCDMA 4	1710 – 1755 MHz
WCDMA 5	824 – 849 MHz
LTE B2	1850 – 1910 MHz
LTE B4	1710 – 1755 MHz
LTE B5	824 – 849 MHz
LTE B7	2500 – 2570 MHz
LTE B12	699 – 716 MHz
LTE B13	777 – 787 MHz
LTE B14	788 – 798 MHz
LTE B25	1850 – 1915 MHz
LTE B26	814 – 849 MHz
LTE B41	2496 – 2690 MHz
LTE B48	3550 – 3700 MHz
LTE B66	1710 – 1780 MHz
LTE B71	663 – 698 MHz
*RF Output Power (max. dBm):	
WLAN 2.4GHz	12.5 (per chain)
WLAN 5GHz	18.0 (per chain)
WCDMA/LTE	24.0
*Antenna Gain (max. peak values dBi):	
WLAN 2.4GHz	4.0
WLAN 5GHz	4.0
LTE	4.0
EIRP (max. dBm):	
WLAN 2.4GHz	16.5 (SISO) / 19.51 (2x2 MIMO)
WLAN 5GHz	22.0 (SISO) / 25.01 (2x2 MIMO)
WCDMA/LTE	28.0

* Specification values have been supplied by the manufacturer. The maximum power and maximum antenna gain will be used in the calculations, as these will show worst case.

2.4GHz WLAN + 5GHz WLAN + Cellular WCDMA/LTE can operate simultaneously

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4. Methods and Procedures

Reference:	KDB 447498 D01 v06
Title:	RF Exposure Procedures and Equipment Authorisation Policies for Mobile and Portable Devices
Reference:	FCC §1.1310
Title:	Radiofrequency radiation exposure limits

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5. Calculations

5.1 MPE

The MPE calculation to calculate the safe operating distance for the user is.

$$S = \text{EIRP} / (4 * \pi * R^2)$$

Where S = Power density
EIRP = Effective Isotropic Radiated Power
R = distance to the centre of radiation of the antenna (safe operating distance)

Power Density Requirement

From table 1 (ii) - Limits for General Population/ Uncontrolled Exposure of FCC §1.1310 (1)(e) for $f > 1500\text{MHz}$, $S_{\text{req}} = 1.0 \text{ mW/cm}^2$

From table 1 (ii) - Limits for General Population/ Uncontrolled Exposure of FCC §1.1310 (1)(e) for $f = 300 - 1500\text{MHz}$, $S_{\text{req}} = f/1500 \text{ mW/cm}^2$

(f = operating frequency in MHz)

Note: the worst-case limit has been used for all Cellular bands

VALUES

Frequency Range (MHz)	Operating Band	EIRP (dBm)	EIRP (mW)	Power Density $S \text{ mW/cm}^2$		
				Limit S_{req}	Calculated $S_n @ 20\text{cm}$	S_n/S_{req}
2412 – 2462	WLAN	19.51	89.3	1.00	0.018	0.018
5180 – 5700	WLAN	25.01	317.0	1.00	0.063	0.063
824 – 849	3G ¹	28.0	631.0	0.55	0.126	0.229
663 – 698	4G ¹	28.0	631.0	0.44	0.126	0.286

NOTE 1: Lowest frequency used as this gives the worst-case limit value.

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5.2 KDB447498 D01 v06 Section 7.2 SIMULTANEOUS TRANSMISSION CONSIDERATIONS

For simultaneous transmission:

As per KDB, summation of calculated MPE ratios (worst case):

$$\begin{aligned}\Sigma \text{MPE}_{\text{ratios}} &= (S_1/S_{\text{req1}}) + (S_2/S_{\text{req2}}) + (S_4/S_{\text{req4}}) \\ &= 0.018 + 0.063 + 0.286 \\ &= \mathbf{0.367}\end{aligned}$$

Σ of MPE ratios < 1.0, so in accordance with KDB447498 D01 V06 Section 7.2, simultaneous transmission test exclusion applies for the transmitters.

6. Conclusion

The required 20cm RF exposure limits for General Population/Uncontrolled Exposure will not be exceeded for the Hera604v6.
