

Report No.: SEWM2205000047RG05
 Rev.: 01
 Page: 1 of 8


TEST REPORT

Application No.: SEWM2205000047RG
Applicant: Heimgard Technologies AS
Address of Applicant: Postbox 1618 VIKA, 0119 Oslo, Norway
Manufacturer: Heimgard Technologies AS
Address of Manufacturer: Postbox 1618 VIKA, 0119 Oslo, Norway
EUT Description: Hybrid Router 4G
Model No.: C4DM-ADAE-C0S0CCLEH-HCv1
Trade Mark: Heimgard, Heimgard Technologies
FCC ID: 2A62BHYBRIDROUTER4G
Standards: 47 CFR Part 2.1091
 FCC KDB 447498 D01 v06
Date of Receipt: 2022/05/27
Date of Issue: 2022/07/01

Test Result:	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Panta Sun
 Wireless Laboratory Manager




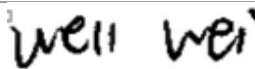
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1 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2022/07/01		Original

Prepared By		 <hr/> (Weller Liu) / Test Engineer
Checked By		 <hr/> (Well Wei) / Reviewer



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2 General Information

2.1 Client Information

Applicant:	Heimgard Technologies AS
Address of Applicant:	Postbox 1618 VIKA, 0119 Oslo, Norway
Manufacturer:	Heimgard Technologies AS
Address of Manufacturer:	Postbox 1618 VIKA, 0119 Oslo, Norway

2.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

- **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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2.3 General Description of EUT

EUT Description:	Hybrid Router 4G		
Model No.:	C4DM-ADAE-C0S0CCLEH-HCv1		
Trade Mark:	Heimgard, Heimgard Technologies		
Hardware Version:	C0S0CCLEH-HCv1		
Software Version:	Version V23		
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated		
Antenna Gain*:	<input checked="" type="checkbox"/> Provided by client		
	GSM850:	1.58dBi	GSM1900: 3.32dBi
	WCDMA Band II:	3.32dBi	WCDMA Band IV: 3.32dBi
	WCDMA Band V:	1.58dBi	
	LTE Band 2:	3.32dBi	LTE Band 4: 3.32dBi
	LTE Band 5:	1.58dBi	LTE Band 7: 1.77dBi
	LTE Band 66:	3.25dBi	
	Zigbee	1.0dBi(ANT4)	
	2.4GWIFI:	3.33dBi(ANT2); 5.05dBi(ANT3)	5GWIFI: 4.42dBi(Ant2); 5.29dBi(Ant3);
<p>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, SGS is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.</p> <p>Remark: As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.</p>			



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3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(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
1500-100,000	/	/	5	6
(B) Limits for General Population/Uncontrolled Exposure				
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
1500-100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

RF exposure compliance will need to be determined with respect to 1.1307(c) and (d) of the FCC rules. The emissions should be within the limits at 300kHz in Table 1 of 1.1310(use the 300kHz limits for 150kHz:614V/m,1.63A/m).

Friis Formula

Friis transmission formula: $Pd = (Pout * G) / (4 * \pi * R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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3.1.2 Test Procedure

Software provided by client enabled the EUT to transmit data at lowest, middle and highest channel individually

3.1.3 EUT RF Exposure Evaluation

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0 / 2.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

This confirmed that the device comply with MPE limit.

Remark: Frame-average power=Burst power+ Division Factors(-9.19)

Operating Band	Frequency (MHz)	Antenna Gain (dBi)	Max Conducted Average Output Power (dBm)	Output Power to Antenna (dBm)	EIRP(ERP) Limit (dBm)	Output Power to Antenna (mw)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)	Gain according to EIRP (dBi)	Gain according to Pd (dBi)	Max Gain Allowed (dBi)	conclusion
GSM850	824.2	1.58	24.50	26.08	38.45	281.8383	0.0807	0.5495	16.10	9.91	9.91	Pass
GSM1900	1850.2	3.32	22.50	25.82	33.00	177.8279	0.0760	1.0000	10.50	14.51	10.50	Pass
WCDMA B2	1852.4	3.32	24.50	27.82	33.00	281.8383	0.1204	1.0000	8.50	12.51	8.50	Pass
WCDMA B4	1712.4	3.32	24.50	27.82	30.00	281.8383	0.1204	1.0000	5.50	12.51	5.50	Pass
WCDMA B5	826.4	1.58	24.50	26.08	38.45	281.8383	0.0807	0.5509	16.10	9.92	9.92	Pass
LTE B2	1850.7	3.32	24.50	27.82	33.00	281.8383	0.1204	1.0000	8.50	12.51	8.50	Pass
LTE B4	1710.7	3.32	24.50	27.82	30.00	281.8383	0.1204	1.0000	5.50	12.51	5.50	Pass
LTE B5	824.70	1.58	24.50	26.08	38.45	281.8383	0.0807	0.5498	16.10	9.91	9.91	Pass
LTE B7	2502.50	1.77	24.50	26.27	33.00	281.8383	0.0843	1.0000	8.50	12.51	8.50	Pass
LTE B66	1710.7	3.25	24.50	27.75	30.00	281.8383	0.1185	1.0000	5.50	12.51	5.50	Pass
Zigbee	2405	1.00	14.00	15.00	30.00	25.1189	0.0063	1.0000	NA			Pass
2.4GWIFI	2412	4.27	20.50	24.77	30.00	112.2018	0.0597	1.0000				Pass
5GWIFI	5180	4.88	20.50	25.38	30.00	112.2018	0.0687	1.0000				Pass



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3.1.4 Exposure calculations for multiple sources

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE in accordance with the provisions of Table(A) and Table(B). To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity.

In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	WCDMA Band V + Zigbee+ WiFi 2.4G+ WiFi 5G

No.	Mode	Power Density (W/cm2)	MPE Limit (W/cm2)	Result Ratio	Total Ratio	Limit	Result
1	WCDMA Band V	0.0807	0.5509	0.1465	0.2812	1.00	Pass
	Zigbee	0.0063	1.0000	0.0063			
	WiFi 2.4G	0.0597	1.0000	0.0597			
	WiFi 5G	0.0687	1.0000	0.0687			

---End of Report---

