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IEEE C95.1 2005
KDB 447498 D03
47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091

RF EXPOSURE REPORT

For

GUARDIAN SYSTEM LTE

Model: G2-SY-CON2

Trade Name: GUARDIAN

Issued to

Seeing Machines Pty Ltd
80 Mildura Street, Fyshwick, ACT , Canberra 2609 Australia

Issued by

Compliance Certification Services Inc.
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Issue Date: May 29, 2020

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 22, 2020	Initial Issue	ALL	Doris Chu
01	April 28, 2020	See the following Note Rev. (01)	ALL	Doris Chu
02	May 29, 2020	See the following Note Rev. (02)	P.6, P.10-12	May Lin

Rev (01):

1. Added section 6 and 2G function.

Rev (02):

1. Revised the section 3 ~ 5.



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1. TEST RESULT CERTIFICATION

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
IEEE C95.1 2005 KDB 447498 D03 47 C.F.R. Part 1, Subpart I, Section 1.1310 47 C.F.R. Part 2, Subpart J, Section 2.1091	No non-compliance noted
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

Approved by:



Kevin Tsai
Deputy Manager
Compliance Certification Services Inc.

2. LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.



3. EUT SPECIFICATION

EUT	GUARDIAN SYSTEM LTE
Model	G2-SY-CON2
Model Discrepancy	N/A
Frequency band (Operating)	☒ Bluetooth: 2402MHz-2480MHz ☒ GPRS: 850: 824.2 ~ 848.8 MHz ☒ GPRS: 1900: 1850.2 ~ 1909.8 MHz ☒ WCDMA Band II: 1852.4 ~ 1907.6 MHz ☒ WCDMA Band IV: 1712.4-1752.6 MHz ☒ WCDMA Band V: 826.4 ~ 846.6MHz ☒ LTE Band 2: 1850MHz ~ 1910MHz ☒ LTE Band 4: 1710MHz ~ 1755MHz ☒ LTE Band 5: 824MHz ~ 849MHz ☒ LTE Band 12: 699 MHz ~ 716 MHz ☒ LTE Band 13: 777 MHz ~ 787 MHz ☒ LTE Band 25: 1850 MHz ~ 1915MHz ☒ LTE Band 26: 814 MHz ~ 824 MHz ☒ LTE Band 26: 824 MHz ~ 849 MHz ☒ LTE Band 41: 2496MHz ~ 2690MHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure ($S = 5\text{mW}/\text{cm}^2$) ☒ General Population/Uncontrolled exposure ($S=1\text{mW}/\text{cm}^2$) Frequency Range 300MHz~1500MHz = $f/1500$ (mW/cm²) Frequency Range 1500MHz~100000MHz = 1 (mW/cm²)



Antenna Specification	WLAN
	FPC Antenna
	BT: Directional Gain : 2.56 dBi (Numeric gain: 1.80)
	WWAN
	Dipole Antenna
	GPRS: 850: Directional Gain : -0.10 dBi (Numeric gain: 0.98) Worst
	GPRS: 1900: Directional Gain : 1.20 dBi (Numeric gain: 1.32) Worst
	WCDMA Band II: Directional Gain : 1.20 dBi (Numeric gain: 1.32) Worst
	WCDMA Band IV: Directional Gain : 1.80 dBi (Numeric gain: 1.51) Worst
	WCDMA Band V: Directional Gain : -0.10 dBi (Numeric gain: 0.98) Worst
	LTE Band 2: Directional Gain : 1.20 dBi (Numeric gain: 1.32) Worst
	LTE Band 4: Directional Gain : 1.80 dBi (Numeric gain: 1.51) Worst
	LTE Band 5: Directional Gain : -0.10 dBi (Numeric gain: 0.98) Worst
	LTE Band 12: Directional Gain : 1.00 dBi (Numeric gain: 1.26) Worst
	LTE Band 13: Directional Gain : 1.00 dBi (Numeric gain: 1.26) Worst
	LTE Band 25: Directional Gain : 1.20 dBi (Numeric gain: 1.32) Worst
	LTE Band 26: Directional Gain : -0.10 dBi (Numeric gain: 0.98) Worst
	LTE Band 26: Directional Gain : -0.10 dBi (Numeric gain: 0.98) Worst
	LTE Band 41: Directional Gain : 0.10 dBi (Numeric gain: 1.02) Worst

Maximum Measurement Average Power	WLAN		
	BT:	11.13 dBm	(12.972 mW)
	WWAN		
	GPRS: 850:	29.80 dBm	(954.993 mW)
	GPRS: 1900:	27.00 dBm	(501.187 mW)
	WCDMA Band II:	23.42 dBm	(219.786 mW)
	WCDMA Band IV:	23.37 dBm	(217.270 mW)
	WCDMA Band V:	24.23 dBm	(264.850 mW)
	LTE Band 2:	21.00 dBm	(125.893 mW)
	LTE Band 4:	21.49 dBm	(140.929 mW)
	LTE Band 5:	22.67 dBm	(184.927 mW)
	LTE Band 12:	21.96 dBm	(157.036 mW)
	LTE Band 13:	21.11 dBm	(129.122 mW)
	LTE Band 25:	21.43 dBm	(138.995 mW)
	LTE Band 26:	22.44 dBm	(175.388 mW)
LTE Band 26:	22.35 dBm	(171.791 mW)	
LTE Band 41:	22.40 dBm	(173.780 mW)	
Maximum tune up power	WLAN		
	BT:	11.50 dBm	(14.125 mW)
	WWAN		
	GPRS: 850:	30.00 dBm	(1000.000 mW)
	GPRS: 1900:	27.50 dBm	(562.341 mW)
	WCDMA Band II:	24.00 dBm	(251.189 mW)
	WCDMA Band IV:	24.00 dBm	(251.189 mW)
	WCDMA Band V:	25.00 dBm	(316.228 mW)
	LTE Band 2:	21.00 dBm	(125.893 mW)
	LTE Band 4:	22.00 dBm	(158.489 mW)
	LTE Band 5:	23.00 dBm	(199.526 mW)
	LTE Band 12:	22.00 dBm	(158.489 mW)
	LTE Band 13:	22.50 dBm	(177.828 mW)
	LTE Band 25:	21.50 dBm	(141.254 mW)
	LTE Band 26:	22.50 dBm	(177.828 mW)
LTE Band 26:	23.00 dBm	(199.526 mW)	
LTE Band 41:	22.50 dBm	(177.828 mW)	
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A		

4. TEST RESULTS

No non-compliance noted.

Calculation

Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{ Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

5. MAXIMUM PERMISSIBLE EXPOSURE

Substituting the MPE safe distance using $d = 20$ cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm²

BT:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
0	2402	14.125	1.80	20	0.0051	1

GPRS 850 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
128	824.2	1000.000	0.98	20	0.1950	0.549

GPRS 1900 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
810	1909.8	562.341	1.32	20	0.1477	1

WCDMA Band II mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
9400	1880	251.189	1.32	20	0.0660	1

WCDMA Band IV mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
1312	1712.4	251.189	1.51	20	0.0755	1

WCDMA Band V mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
4132	826.4	316.228	0.98	20	0.0617	0.551

LTE Band 2 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
18900	1880	125.893	1.32	20	0.0331	1

LTE Band 4 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
20300	1745	158.489	1.51	20	0.0476	1

LTE Band 5 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
20600	844	199.526	0.98	20	0.0389	0.563

LTE Band 12 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
23130	711	158.489	1.26	20	0.0397	0.474

LTE Band 13 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
23230	782	177.828	1.26	20	0.0446	0.521

LTE Band 25 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
26365	1882.5	141.254	1.32	20	0.0371	1

LTE Band 26 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
26740	819	177.828	0.98	20	0.0347	0.546

LTE Band 26 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
26865	831.5	199.526	0.98	20	0.0389	0.554

LTE Band 41 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm ²	Limit (mW/cm ²)
41490	2680	177.828	1.02	20	0.0361	1



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6. SIMULTANEOUS TRANSMISSION SAR ANALYSIS

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

WLAN+WWAN

Therefore, the worst-case situation is $0.0051 / 1 + 0.1950 / 0.549 = 0.3602$, which is less than "1".

--End of Report--