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TEST REPORT

FCC / ISED SAR Exclusion Report for MR23GA

Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-SR-2207-FI001

DATE OF ISSUE
July 07, 2022

Technical Manager
Yun Jeang Heo (signature)

Accredited by KOLAS, Republic of KOREA

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Applicant	**LG Electronics Inc.** 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
EUT Type Model Name	Magic Remote MR23GA
FCC ID ISED ID	BEJMR23GA 2703H-MR23GA
Max. RF Output Power	8 dBm (6 mW)
Modulation type	GFSK
FCC Classification	Digital Transmission System(DTS)
FCC Rule Part(s)	47CFR §2.1093
ISED Rule Part(s)	RSS-102 Issue 5; Health Canada Safety Code 6

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	July 07, 2022	Initial Release

Engineering Statement:
The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC / ISED Rules under normal use and maintenance.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 AND KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.(HCT Accreditation No.: KT197)

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

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1. EUT DESCRIPTION

Model Name	MR23GA
EUT Type	Magic Remote
Power Supply	DC 3.0 V
Frequency Range	2 402 MHz – 2 480 MHz
Max. RF Output Power (EIRP)	8 dBm (6 mW)
Modulation Type	GFSK
Bluetooth Version	4.2
Number of Channels	40 Channels
Antenna Specification	Antenna type: PCB Antenna Peak Gain : 1.88 dBi
PMN (Product Marketing Number)	Magic Remote
HVIN (Hardware Version Identification Number)	MR23GA
FVIN (Firmware Version Identification Number)	1.0.611.1
HMN (Host Marketing Name)	N/A
EUT serial numbers	Radiated: 206OS00002 Conducted: 206OS00001
Manufacturer	1. Hansung Electronics Co., LTD -Headquarters: 49-29, Cheomdangieop 4-ro, Sandong-myeon, Gumi-si, Gyeongsangbuk-do, Korea -Indonesia : Kawasan Industri Batik Lippo Cikarang Jl.Palemn 1Block Ds-6, Cibatu, Cikarang Selatan, Bekasi, Jawa Barat, Indonesia 2. OHSUNG Electronics CO.,LTD. -Headquarters : 335-4, Sanho-daero, Gumi-si, Gyeongsangbuk-do, KOREA -China : No.188 Tunpu South Road, Qiushe Economic Development Zone, Tongli Town, Wujiang City, Jiangsu Province -Indonesia: Jl. Selayar Blok D7 Kawasan Industri MM 2100, Mekarwangi, Cikarang Barat 17845 Jawa Barat, Indonesia -Mexico : CERRADA CENTINELA 1719, PARQUE INDUSTRIAL CACHANILLA, MEXICALI, BAJA CALIFORNIA, MEXICO 21394

2. TEST METHODOLOGY

2.1 FCC

Limb SAR and Face SAR Test Exclusions Applied _Bluetooth 4.2 LE

Since this product is a remote control product, it is used by most users in the hand, so Limb SAR standard is applied. In addition, since this product is capable of voice recognition by the user, an exception evaluation is applied at a distance of 10 mm from the face SAR (head SAR).

According to the FCC KDB 447498 D01 v06 section 4.3.1, for 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

a) For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

$$:\frac{Max\ \ Power\ \ of\ \ Channel(mW)}{Test\ \ \ Separation\ \ Distance\ \ (mm)} * \sqrt{Frequency(GHz)} \leq\ \ 3.0\ \ For\ \ 1g\ \ SAR,\ \ 7.5.for\ \ 10g\ \ SAR$$

where
- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Calculation Result::

Tx frequency range: 2 402 MHz ~ 2 480 MHz
Limb SAR Consideration Min. test separation distance: 5 mm
Face SAR Consideration Min. test separation distance: 10 mm
Maximum Output Power: 3.31 mW
The Highest RF channel frequency: 2 480 MHz

For Face SAR Exclusion

Mode	Frequency [MHz]	Maximum Allowed Power [mW]	Separation Distance [mm]	≤ 3.0 for 1g SAR
Bluetooth 4.2 LE	2 480	6	10	0.94

For Limb SAR exclusion

Mode	Frequency [MHz]	Maximum Allowed Power [mW]	Separation Distance [mm]	≤ 7.5 for 10g SAR
Bluetooth 4.2 LE	2 480	6	5	1.9

Based on the maximum output power of Bluetooth 4.2 LE and antenna to use separation distance, Bluetooth 4.2 LE Limb SAR and Face SAR were not required.

*note : "SAR Exemption threshold was calculated with worst case EIRP which is more conservative than conducted power."

2.2 ISED

SAR Test Exclusions Applied _Bluetooth 4.2 LE
Per RSS102 Issue 5, 2.5.1 Exemption Limits for Routine Evaluation

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance[4,5]

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

For Limb-worn SAR Exclusion: 4mW *2.5 = 10 mW
For Face SAR Exclusion: 7 mW

Calculation Result::

Tx frequency range: 2 402 MHz ~ 2 480 MHz
Limb SAR Consideration Min. test separation distance: 5 mm
Face SAR Consideration Min. test separation distance: 10 mm
Maximum Output Power: 8 dBm (6 mW) (EIRP)
The Highest RF channel frequency: 2 480 MHz

The SAR exemption from RSS102: Issue 5 was also exempted by the above exclusion conditions.

*note : "SAR Exemption threshold was calculated with worst case EIRP which is more conservative than conducted power."