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TEST REPORT

FCC /IC SAR Exclusion Report for certification of MR20PJTR

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-SR-2006-FI001-R1

DATE OF ISSUE
June 25, 2020

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TEST REPORT

(If needed)
FCC SAR Test for certification

REPORT NO.
HCT-SR-2006-FI001-R1

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Other ID

Applicant	**LG Electronics Inc.** 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do
Product Name	Magic Lighting Remote
Model Name	MR20PJTR
FCC ID	BEJMR20PJTR
ISED ID	2703H-MR20PJTR
Date of Test	Jun 19, 2019
FCC Test Standard Used	**47CFR §2.1093**
ISED Test Standard Used	**RSS-102 Issue 5; Health Canada Safety Code 6**
Test Results	PASS **This device has been excluded from SAR based on FCC and ISED Standard**
Bluetooth 4.2 LE.	2 402 – 2 480 MHz

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	Jun 19 2019	Initial Release
R1	Jun 25 2019	Revised page 8

CONTENTS

1. Test Regulations 5
2. Test Location 5
3. EUT DESCRIPTION 6
4 FCC 7
5. ISED 8

1. Test Regulations

The results in this report apply only to sample tested.
The tests were performed according to the following regulations:

Test Standard	FCC: 47CFR §2.1093 ISED : RSS102 Issue 5
Phenomena	Calculation
Application Port	SAR
Test Method	FCC KDB 447498 D01 v06 Per RSS102 Issue 5

2. Test Location

2.1 Test Laboratory

Company Name	HCT Co., Ltd.
Address	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
Telephone	031-645-6300
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3. EUT DESCRIPTION

Model	MR20PJTR
Additional Model	-
EUT Type	Magic Lighting Remote
Power Supply	DC 3.0 V
Frequency Range	2 402 MHz – 2 480 MHz
Max. Output Power	5 dBm (3.16mW)
Modulation Type	GFSK
Bluetooth Version	4.2
Number of Channels	40 Channels
Antenna Specification	Antenna type: PCB Antenna Peak Gain : 2.85 dBi
Date(s) of Tests	May 26, 2020 ~ June 11, 2020
PMN (Product Marketing Number)	Magic Lighting Remote
HVIN	MR20PJTR
FVIN (Firmware Version Identification Number)	1.0.329.13
HMN (Host Marketing Name)	N/A
EUT serial numbers (Radiated)	20041300229A Ver 19.82.01
EUT serial numbers (Conducted)	20041300233A Ver 19.82.01

4 FCC

4.1 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

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

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: 5 dBm (3.162278) 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	5	10	0.5

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	5	5	10.9

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.

5. ISED

5.1 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

Calculation Result:

Tx frequency range: 2 402 MHz ~ 2 480 MHz
Limb SAR Consideration Min. test separation distance: 5 mm
Maximum Output Power: 5 dBm (3.162278 mW)
The Highest RF channel frequency: 2 480 MHz
Linearly interpolated RF Exposure SAR exemption limit of the highest frequency(2 480 MHz) is 3.347mW
For Limb-worn SAR Exclusion: 3.347mW * 2.5 = 8.3675 mW

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