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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

Rolling Bot

Model: LG-RB200

Trade Name: LG

Issued to

LG Electronics MobileComm USA, Inc.
1000 Sylvan Avenue, Englewood Cliffs, NJ 07632 U.S.A.

Issued by

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Testing Laboratory
1309

Revision History

Rev.		Issue Date		Revisions	Effect Page	Revised By
00		June 2, 2016		Initial Issue	ALL	Becca Chen

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1. 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.

2. EUT SPECIFICATION

Product	Rolling Bot
Model Number	LG-RB200
Model Discrepancy	N/A
Trade Name	LG
Frequency band (Operating)	☒ Bluetooth 4.0: 2402 ~ 2480 MHz 802.11b/g/n HT 20: 2.412GHz ~ 2.462GHz 802.11n HT 40: 2.422GHz ~ 2.452GHz 802.11a/n HT 20: 5.180GHz ~ 5.320GHz / 5.500 ~ 5.825GHz 802.11n HT 40: 5.190GHz ~ 5.310GHz / 5.510 ~ 5.795GHz 802.11ac VHT 80: 5.210GHz ~ 5.290GHz / 5.530 ~ 5.775GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna Specification	**BT** MAG LAYERS / FPA-5220-2G4C2-A1-AH FPC Antenna / Gain: 0.34dBi **2.4G** MAG LAYERS / FPA-5321-25GC2-A1-AH FPC Antenna / Gain: 1.72dBi **5G** MAG LAYERS / FPA-5321-25GC2-A1-AH FPC Antenna / Gain: 4.45dBi BT: Antenna Gain : 0.34 dBi (Numeric gain: 1.08) Worst 2.4GHz: Antenna Gain : 1.72 dBi (Numeric gain: 1.49) Worst 5GHz: Antenna Gain : 4.45 dBi (Numeric gain: 2.79) Worst
Maximum Average output power	Bluetooth 4.0 Mode : -2.30 dBm (0.589 mW) IEEE 802.11b Mode: 16.21 dBm (41.783 mW) IEEE 802.11g Mode: 13.50 dBm (22.387 mW) IEEE 802.11n HT 20 Mode: 12.49 dBm (17.742 mW) IEEE 802.11n HT 40 Mode: 12.44 dBm (17.539 mW) IEEE 802.11a Mode: 12.33 dBm (17.100 mW) IEEE 802.11n HT 20 Mode: 12.33 dBm (17.100 mW) IEEE 802.11n HT 40 Mode: 10.42 dBm (11.015 mW) IEEE 802.11ac VHT 80 Mode: 7.78 dBm (5.998 mW)

Maximum Tune up Power	Bluetooth 4.0 Mode : -1.00 dBm (0.794 mW) IEEE 802.11b Mode: 17.00 dBm (50.119 mW) IEEE 802.11g Mode: 14.00 dBm (25.119 mW) IEEE 802.11n HT 20 Mode: 13.00 dBm (19.953 mW) IEEE 802.11n HT 40 Mode: 13.00 dBm (19.953 mW) IEEE 802.11a Mode: 13.00 dBm (19.953 mW) IEEE 802.11n HT 20 Mode: 13.00 dBm (19.953 mW) IEEE 802.11n HT 40 Mode: 11.00 dBm (12.589 mW) IEEE 802.11ac VHT 80 Mode: 9.00 dBm (7.943 mW)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Notes: *This device does not support simultaneous transmissions between Bluetooth and WiFi transmitters and will only operate in one of the WiFi bands at a time.*

3. 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 (mW) = P (W) / 1000 and

d (cm) = d(m) / 100

Yields

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

Where d = Distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

4. 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

Bluetooth 4.0 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
0	2402	0.794	1.08	20	0.0002	1

IEEE 802.11b mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
1	2412	50.119	1.49	20	0.0149	1

IEEE 802.11g mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	25.119	1.49	20	0.0074	1

IEEE 802.11n HT 20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
6	2437	19.953	1.49	20	0.0059	1

IEEE 802.11n HT 40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
3	2422	19.953	1.49	20	0.0059	1

IEEE 802.11a mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
44	5220	19.953	2.79	20	0.0111	1

IEEE 802.11n HT 20 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
44	5220	19.953	2.79	20	0.0111	1

IEEE 802.11n HT 40 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
151	5755	12.589	2.79	20	0.0070	1

IEEE 802.11ac VHT 80 mode:

Ch.	Frq.(MHz)	P (mW)	Gain (num.)	D (cm)	Power density in mW / cm²	Limit (mW/cm2)
155	5775	7.943	2.79	20	0.0044	1