TEST REPORT

KCTL Inc.
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KCTL
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1. Applicant

Name:	LG Household&Health Care Co., Ltd.
Address:	LG GwangHwaMoon Building, 58, Saemunan-ro Jongno-gu Seoul 110-782, Korea

2. Sample Description:

FCC ID:	2AIYULTE007
Type of equipment:	Dual Spin Spa
Basic Model:	LTE-007
Variant Model:	LTE-007A

3. Date of Test: July 15 ~ July 20, 2016

4. Test method used: FCC Part 15 Subpart C
Section 15.209

5. Test Results

Test Item:	Refer to page 6
Result:	Refer to page 7 ~ page 14
Measurement Uncertainty:	Refer to page 6

This result shown in this report refers only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name: KWANG HEE, KIM	Technical Manager Name: MIN GI, SON

2016. 07. 21

KCTL Inc.

[Contents]

1. Client information

Applicant:	LG Household&Health Care Co., Ltd.
Address:	LG GwangHwaMoon Building, 58, Saemunan-ro Jongno-gu Seoul 110-782, Korea
Telephone number:	+82-43-860-8019
Facsimile number:	+82-43-860-2072
Contact person:	Jung Yong, Lee / jungyonglee@lgcare.com

Manufacturer:	LG Household&Health Care Co., Ltd.
Address:	LG GwangHwaMoon Building, 58, Saemunan-ro Jongno-gu Seoul 110-782, Korea

2. Laboratory information

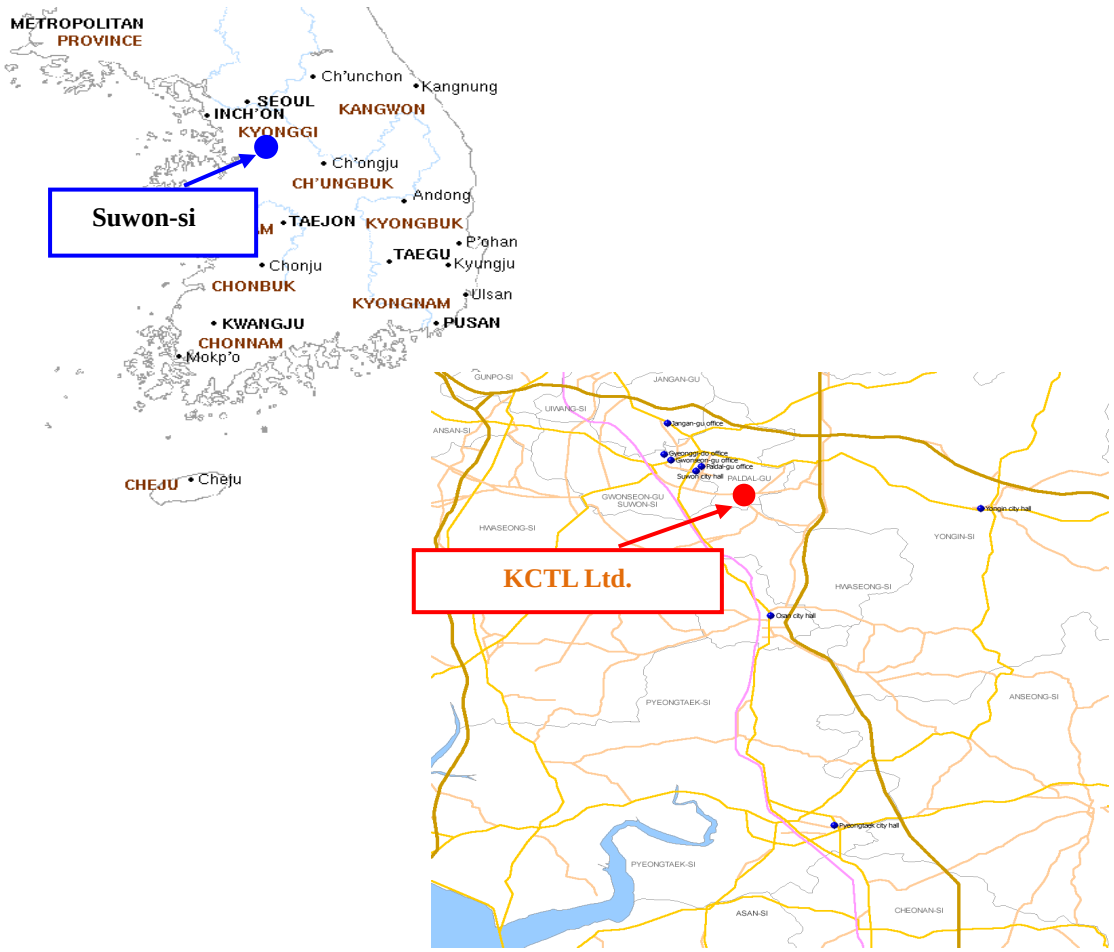
Address

KCTL Inc.
65 Sinwon-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, Korea
Telephone Number: 82-70-5008-1016 Facsimile Number: 82-505-299-8311

Certificate

KOLAS No.: KT231
FCC Site Registration No.: 687132
VCCI Site Registration No.: R-3327, G-198, C-3706, T-1849
IC Site Registration No.:8035A-2

SITE MAP



3. Description of E.U.T.

3.1 Basic description

Applicant	LG Household&Health Care Co., Ltd.
Address of Applicant	LG GwangHwaMoon Building, 58, Saemunan-ro Jongno-gu Seoul 110-782, Korea
Manufacturer	LG Household&Health Care Co., Ltd.
Address of Manufacturer	LG GwangHwaMoon Building, 58, Saemunan-ro Jongno-gu Seoul 110-782, Korea
Type of equipment	Dual Spin Spa
Basic Model	LTE-007
Variant Model [1)]	LTE-007A
Serial number	N/A

[1)] : Variant Model is different only color.

3.2 General description

Frequency Range	115 ㎑
Type of Modulation	AM
Number of Channels	1 ch
Type of Antenna	Coil Antenna
Power supply	DC 5.0 Ⅴ
Product SW/HW version	1.0 / 1.0
Radio HW version	1.0
Test SW Version	N/A

3.3 Test frequency

	Frequency
Low frequency	-
Middle frequency	115 ㎑
High frequency	-

4. Summary of test results

4.1 Standards & results

FCC Rule	Parameter	Report Section	Test Result
15.203	Antenna Requirement	5.1	C
15.209	Field Strength of Fundamental	5.2	C
15.209	Radiated Emissions	5.3	C

Note 1: C=complies
NC= Not complies
NT=Not tested
NA=Not Applicable
Note 2: The worst case is Y scheme(Please refer to the "Test setup photos" to check X, Y, Z configuration).

- The general test methods used to test on this device are ANSI C63.10-2013

4.2 Uncertainty

Measurement Item	Expanded Uncertainty U = *k*Uc (*k* = 2)	
Radiated Spurious Emissions	30 ㎒ ~ 300 ㎒:	+4.94 ㏈, -5.06 ㏈
		+4.93 ㏈, -5.05 ㏈
	300 ㎒ ~ 1 000 ㎒:	+4.97 ㏈, -5.08 ㏈
		+4.84 ㏈, -4.96 ㏈
Conducted Emissions	9 ㎑ ~ 150 ㎑:	3.75 ㏈
	150 ㎑ ~ 30 ㎒:	3.36 ㏈

5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.1.2 Result

-Complied

Using permenant attached antenna and has no general access to end user after it has been installed.

5.2 Field Strength of Fundamental Emissions

5.2.1 Regulation

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (㎒)	Field strength (㎶/m)	Distance(m)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	30
1.705-30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

**Except as provided in paragraph(g).fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72 ㎒. 76-88 ㎒. 174-216 ㎒ or 470-806 ㎒. However, Operation within these frequency bands is permitted under other sections of this part. e.g.,
Section 15.231 and 15.241.

**Limit : 2 400/115=20.87 ㎶/m @ 300m
Distance Correction Factor = 40log(test distance /specific distance)

5.2.2 Measurement Procedure

Test Procedure the Radiated Electric Field Strength intensity has been measured on semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9 ㎑ to 30 ㎒ at distance 3m The EUT was rotated a full revolution in order to obtain the maximumvalue of the electric field intensity.

The method of measurement used to test this is ANSI C63.10-2013.

Exploratory radiated emission tests

The tests shall be performed in the frequency range specified in 5.5 and 5.6, using the procedures in Clause 5, applying the appropriate modulating signal to the EUT, to determine cable or wire positions of the EUT system that produce the emission with the highest amplitude relative to the limit.
Exploratory measurements below 30 ㎒ are useful in determining the maximum level of emissions while manipulating and rotating the EUT; however, exploratory and final measurements may be made concurrently, provided care is taken to determine the maximum level of emissions for all configurations and orientations.

The test arrangement, measuring antenna guidelines and operational configurations in 6.3.1 and 6.3.2, shall be followed. The measurement antenna shall be positioned with its plane perpendicular to the ground at the specified distance. When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT.50 When the EUT contains a loop antenna that can only be placed in a vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, and then orthogonal to the axis. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. When the EUT contains a loop antenna that can be placed in a horizontal or vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. The report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 ㏈, then the following statement shall be made: “all emissions were greater than 20 ㏈ below the limit.”

Final radiated emission tests

Using the orientation and equipment arrangement of the EUT determined in 6.4.6, and applying the appropriate modulating signal to the EUT, perform final radiated emission measurements on the fundamental and highest spurious emissions.
Unless otherwise specified by the regulatory authority, the instrumentation, detector functions, and bandwidths specified in 4.1.4.2.1 shall be used. For pulsed emissions, the procedure in 4.1.4.2.4 shall be used.

5.2.3 Test Result

-Complied

Measurement Distance: 3 m

Frequency [㎒]	Pol. [V/H]	Reading [dB㎶]	Factor [dB]	Result [dB㎶/m] at 3m	Result [dB㎶/m] at 300m	Limit [dB㎶/m]	Margin [dB]
PK DATA.							
0.114	H	71.1	-13.0	58.1	-21.9	106.5	48.4

Margin (dB) = Limit – Actual
[Result = Reading – Amp Gain + Attenuator + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. ATT = Attenuation (10 dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

Note: This test was performed by using peak detector mode
If peak result meets the limit, QP measurement is skipped.

5.3 Radiated Emissions

5.3.1 Regulation

According to §15.209(a), Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (㎒)	Field strength (㎶/m)	Distance(m)
0.009-0.490	2400/F(㎑)	300
0.490-1.705	24000/F(㎑)	30
1.705-30.0	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

**Except as provided in paragraph(g). fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72 ㎒. 76-88 ㎒. 174-216 ㎒ or 470-806 ㎒. However, Operation within these frequency bands is permitted under other sections of this part. e.g.,
Section 15.231 and 15.241.

**Limit : 2 400/115=20.87 ㎶/m @ 300m
Distance Correction Factor = 40log(test distance /specific distance)

5.3.2 Measurement Procedure

Test Procedure the Radiated Electric Field Strength intensity has been measured on semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9 ㎑ to 30 ㎒ at distance 3m The EUT was rotated a full revolution in order to obtain the maximumvalue of the electric field intensity.

The method of measurement used to test this is ANSI C63.10-2013.

Exploratory radiated emission tests

The tests shall be performed in the frequency range specified in 5.5 and 5.6, using the procedures in Clause 5, applying the appropriate modulating signal to the EUT, to determine cable or wire positions of the EUT system that produce the emission with the highest amplitude relative to the limit.
Exploratory measurements below 30 ㎒ are useful in determining the maximum level of emissions while manipulating and rotating the EUT; however, exploratory and final measurements may be made concurrently, provided care is taken to determine the maximum level of emissions for all configurations and orientations.

The test arrangement, measuring antenna guidelines and operational configurations in 6.3.1 and 6.3.2, shall be followed. The measurement antenna shall be positioned with its plane perpendicular to the ground at the specified distance. When perpendicular to the ground plane, the lowest height of the magnetic antenna shall be 1 m above the ground and shall be positioned at the specified distance from the EUT.50 When the EUT contains a loop antenna that can only be placed in a vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, and then orthogonal to the axis. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. When the EUT contains a loop antenna that can be placed in a horizontal or vertical axis, normal measurements shall be made aligning the measurement antenna along the site axis, orthogonal to the axis, and then with the measurement antenna horizontal. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable. The report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB, then the following statement shall be made: "all emissions were greater than 20 dB below the limit."

Final radiated emission tests

Using the orientation and equipment arrangement of the EUT determined in 6.4.6, and applying the appropriate modulating signal to the EUT, perform final radiated emission measurements on the fundamental and highest spurious emissions.

Unless otherwise specified by the regulatory authority, the instrumentation, detector functions, and bandwidths specified in 4.1.4.2.1 shall be used. For pulsed emissions, the procedure in 4.1.4.2.4 shall be used.

Frequency : From 30 MHz to 1 GHz at distance 3m The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

The method of measurement used to test this is ANSI C63.10-2013.

Exploratory radiated emission tests

Exploratory measurements are used to identify the frequencies and amplitudes of the emissions while manipulating and rotating the EUT.

Exploratory radiated measurements shall be performed at the measurement distance or at a closer distance than that specified for compliance to determine the emission characteristics of the EUT. At near distances, for EUTs of comparably small size, it is relatively easy to determine the spectrum signature of the EUT and, if applicable, the EUT configuration that produces the maximum level of emissions. Exploratory measurements shall be made on a test site per 5.2. Shielded rooms, not treated with RF absorption material, shall not be used for exploratory measurements.

For each mode of operation required to be tested, the frequency spectrum shall be monitored. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

Final radiated emission tests

Using the orientation and equipment arrangement of the EUT, and based on the measurement results found during the exploratory measurement in 6.5.3, the EUT arrangement, appropriate modulation, and modes of operation that produce the emissions that have the highest amplitude relative to the limit shall be selected for the final measurement. The final measurement shall follow all the procedures in 6.3 with the EUT operating on frequencies per 5.6. For each mode selected, record the frequency and amplitude of the highest fundamental emission (if applicable) and the frequency and amplitude of the six highest spurious emissions relative to the limit; emissions more than 20 ㏈ below the limit do not need to be reported.
Measurements are performed with the EUT rotated from 0° to 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Variations in cable or wire placement shall be explored to maximize the measured emissions.
Unless specified otherwise by the regulatory authority, the instrumentation, detector functions, and bandwidths specified in 4.1.4.2.1 and 4.1.4.2.2 shall be used. For pulsed emissions, the procedure in 4.1.4.2.4 shall be used.

On any frequency or frequencies below or equal to 1 000 ㎒, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.(15.35(a))

below 1 ㎓ : quasi-peak

- Part 15 Section 15.31 (f)(2) (9 ㎑-30 ㎒)
[Limit at 3 m]=[Limit at 300 m]-40 x log(3[m]/300[m])
[Limit at 3 m]=[Limit at 30 m]-40 x log (3[m]/30[m])

The final measurement will be performed with an EMI Receiver set to Quasi Peak detector except for the Frequency bands 9 ㎑ to 90 ㎑ and 110 to 490 ㎑ where an average detector will be used according to Section 15.209 (d) [2].
The final level, expressed in ㏈㎶/m, is arrived at by taking the reading from the EMI receiver (Level ㏈㎶) and adding the antenna correction factor and cable loss factor (Factor ㏈) to it. This result then has to be compared with the relevant FCC limit. The resolution bandwidth during the measurement is as follows:
9 ㎑ – 150 ㎑: ResBW: 200 ㎐
150 ㎑ – 30 ㎒: ResBW: 9 ㎑

5.3.3 Test Result

-Complied

Measurement Distance: 3 m
-Below 30㎒

Frequency [㎒]	Pol. [V/H]	Reading [dB㎶]	Factor [dB]	Result [dB㎶/m]	Limit [dB㎶/m]	Margin [dB]
PK DATA.						
-	**Not Detected**	-	-	-	-	-

-Above 30㎒

Frequency [㎒]	Pol. [V/H]	Reading [dB㎶]	Factor [dB]	Result [dB㎶/m]	Limit [dB㎶/m]	Margin [dB]
PK DATA.						
60.43	V	41.2	-14.0	27.2	40.0	12.8
110.27	V	41.4	-17.1	24.3	43.5	19.2
235.28	V	40.6	-15.2	25.4	46.0	20.6
939.01	H	26.4	2.9	29.3	46.0	16.7
Above 1 000.00	**Not Detected**	-	-	-	-	-

Margin (dB) = Limit – Actual
[Resultl = Reading – Amp Gain + Attenuator + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. ATT = Attenuation (10dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

- The spurious emission at the frequency does not fall in the restricted bands.
- The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

Note 1: All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

6. Test equipment used for test

	Equipment Name	Manufacturer	Model No.	Serial No.	Next Cal. Date
■	Test Receiver	R&S	ESCI7	100732	17.02.26
■	Bi-Log Antenna	SCHWARZBECK	VULB 9168	440	17.10.23
■	Amplifier	SONOMA INSTRUMENT	310N	344922	16.09.02
■	3 ㏈ Attenuator	HP	8491B	22981	16.09.01
■	Antenna Mast	Innco Systems	MA4000-EP	303	-
■	Turn Table	Innco Systems	DT2000S-1t	079	-
■	DC POWER SUPPLY	Agilent	E3632A	KR94907353	17.01.21
■	LOOP Antenna	R&S	HFH2-Z2	100355	18.03.03
■	TEMP & HUMID CHAMBER	ESPEC CORP.	SH-261	92002980	16.07.17
■	TEMP & HUMID CHAMBER	ESPEC CORP.	SH-641	92004785	17.07.07
■	SIGNAL GENERATOR	R & S	SMB100A	176206	17.03.14