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TEST REPORT

Report No.: 19100002HKG-002

Lidl US, LLC

Application For Certification
(Original Grant)

FCC ID: 2AJ9O-HG04735RX

Superheterodyne Receiver

Prepared and Checked by:	**Approved by:**
Signed On File	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Ltd.
Wong Cheuk Ho, Herbert	Wong Kwok Yeung, Kenneth
Lead Engineer	Senior Lead Engineer
	Date: October 10, 2019

TEST REPORT

GENERAL INFORMATION

Grantee:	LIDL US LLC
Grantee Address:	3500 S. Clark Street, Arlington, Virginia 22202 USA
Contact Person:	Maxwell Hand
Tel:	+1 (703) 819 3936
Fax:	N/A
e-mail:	N/A
Brand Name:	Not Applicable
Model:	HG04735-US-RX
Type of EUT:	Superheterodyne Receiver
Description of EUT:	Battery-Free Wireless DoorBell
FCC ID:	2AJ9O-HG04735RX
Date of Sample Submitted:	October 02, 2019
Date of Test:	October 02, 2019 to October 08, 2019
Report No.:	19100002HKG-002
Report Date:	October 10, 2019
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

TEST REPORT

SUMMARY OF TEST RESULT

Test Specification	Reference	Results
AC Power Line Conducted Emissions	15.107	Pass
Receiver Radiated Emissions	15.109	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2018 Edition

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions of this section.

2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.

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TEST REPORT

1.0 GENERAL DESCRIPTION

1.1 Product Description

The Equipment Under Test (EUT) is a Battery-Free Wireless DoorBell (433.92MHz Receiver). When the button of corresponding 433.92MHz transmitter is activated, the EUT will sound. The EUT is powered by 120VAC.

Antenna Type: Internal, Integral

1.2 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). All radiated measurements were performed in an 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Justification Section"** of this Application.

1.3 Test Facility

The 3m Chamber used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

TEST REPORT

2.0 SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.10 (2013).

The EUT was powered by 120VAC 60Hz during test.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it receives the RF signal continuously.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Equipment Modification

No modifications were installed by Intertek Testing Services Hong Kong Ltd.

2.5 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

2.6 Support Equipment List and Description

N/A.

TEST REPORT

3.0 EMISSION RESULTS

Data is included of the worst-case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG - AV

where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

FS = RR + LF

where FS = Field Strength in dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

TEST REPORT

3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission at 42.550 MHz

The worst case radiated emission configuration photographs are shown on Appendix B1 of this test report.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 6.0 dB

3.4 Conducted Emission Configuration Photograph

Worst Case Line Conducted Configuration at 0.150 MHz

The worst case line conducted configuration photographs are shown in Appendix B2 of this test report.

3.5 Conducted Emission Data

The graph and data table of conducted emission is shown on following pages.

Judgment: Pass by 23.0 dB

TEST REPORT

Worst Case Mode: Receiving + sound + light

Date of Test: October 08, 2019

Table 1

Radiated Emissions
Pursuant to FCC Part 15 Section 15.109 Requirement

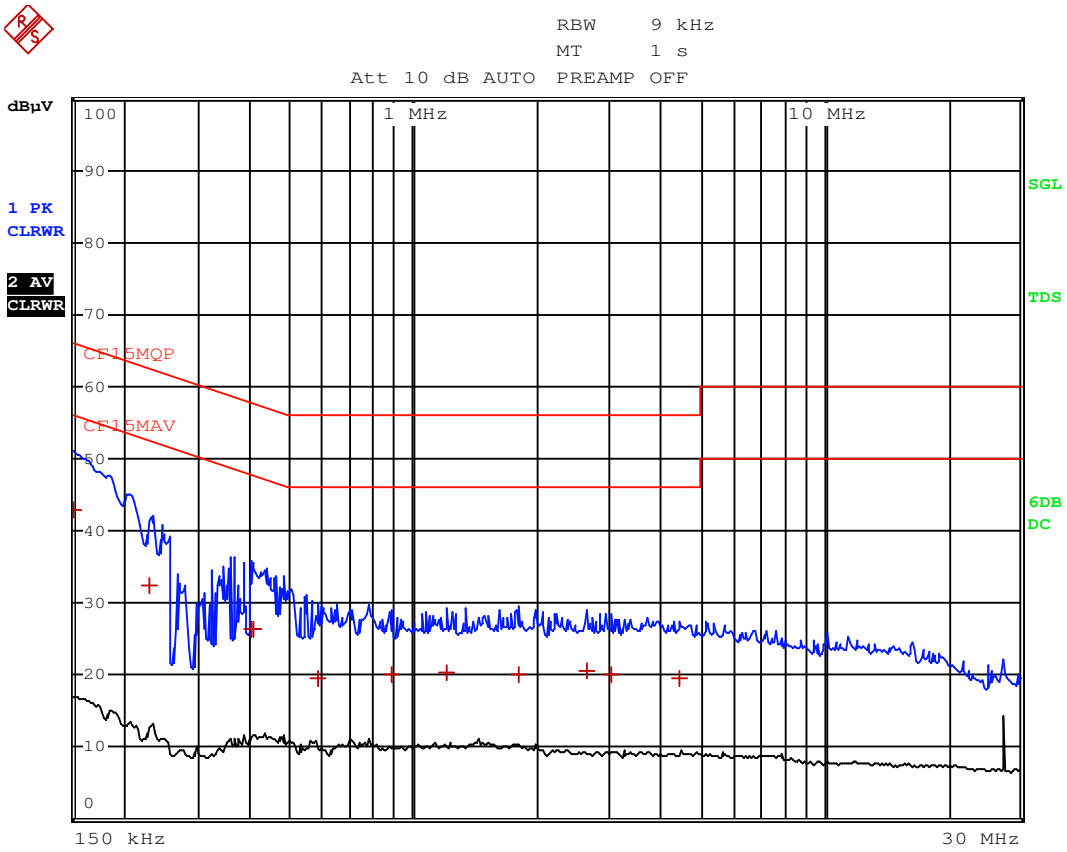
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	42.550	40.0	16	10.0	34.0	40.0	-6.0
V	50.594	29.4	16	11.0	24.4	40.0	-15.6
H	150.654	23.5	16	14.0	21.5	43.5	-22.0
H	433.920	11.5	16	25.0	20.5	46.0	-25.5
H	867.840	9.0	16	31.0	24.0	46.0	-22.0
H	***1301.760***	***39.1***	***33***	***26.1***	***32.2***	***54.0***	***-21.8***
H	1735.680	48.4	33	27.2	42.6	54.0	-11.4

NOTES:
1. Peak Detector Data unless otherwise stated.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative sign in the column shows value below limit.
4. Horn antenna is used for the emissions over 1000MHz.

TEST REPORT

Worst Case Mode: Receiving + sound + light

Date of Test: October 08, 2019



Date: 8.OCT.2019 13:58:19

TEST REPORT

Worst Case Mode: Receiving + sound + light

Date of Test: October 08, 2019

EDIT PEAK LIST (Final Measurement Results)

Trace1:	CF15MQP
Trace2:	CF15MAV
Trace3:	---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	150 kHz	42.95	L1	-23.04
1	Quasi Peak	231 kHz	32.30	L1	-30.11
1	Quasi Peak	402 kHz	26.48	N	-31.32
1	Quasi Peak	406.5 kHz	26.25	L1	-31.46
1	Quasi Peak	586.5 kHz	19.65	N	-36.34
1	Quasi Peak	888 kHz	20.00	L1	-35.99
1	Quasi Peak	1.203 MHz	20.27	L1	-35.73
1	Quasi Peak	1.8105 MHz	20.08	L1	-35.91
1	Quasi Peak	2.6475 MHz	20.50	L1	-35.49
1	Quasi Peak	3.0255 MHz	20.11	N	-35.88
1	Quasi Peak	4.434 MHz	19.55	N	-36.44

Date: 8.OCT.2019 13:57:50

TEST REPORT

4.0 MISCELLANEOUS INFORMATION

This miscellaneous information includes details of the stabilizing process (including a plot of the stabilized waveform), the test procedure and calculation of the factors such as pulse desensitization and averaging factor.

4.1 Measured Bandwidth

N/A

4.1 Stabilization Waveform

N/A

TEST REPORT

4.2 Discussion of Pulse Desensitization

This device is a Superheterodyne receiver. No desensitization of the measurement equipment is required as the received signals are continuously.

4.3 Calculation of Average Factor

This device is a Superheterodyne receiver. It is not necessary to apply average factor to the measurement result.

TEST REPORT

4.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of Superregenerative receivers operating under FCC Part 15.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 (2013).

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2014. Superregenerative receivers are stabilized prior to measurement by generating a signal well above the receiver threshold whose frequency is tuned until the emissions stabilize into a line spectrum. The signal is usually generated as CW with a Marconi 2022D signal generator and a short whip antenna and is at a level of several hundred to several thousand mV/m. Plots of the stabilized signal will be shown. If a modulated signal is used, it will be noted.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.

For line conducted emissions, the range scanned is 150kHz to 30MHz.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).
The IF bandwidth used for measurement of radiated signal strength was 10kHz for emission below 30MHz and 120kHz for emission from 30MHz to 1000MHz. Above 1000MHz, a resolution bandwidth of 1MHz is used.
Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

TEST REPORT

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of Superheterodyne receivers operating under FCC Part 15.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 (2013).

The equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings.
The frequency range scanned is from 30 MHz to 1000 MHz.

For line conducted emissions, the range scanned is 150kHz to 30MHz.

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.10 (2013).

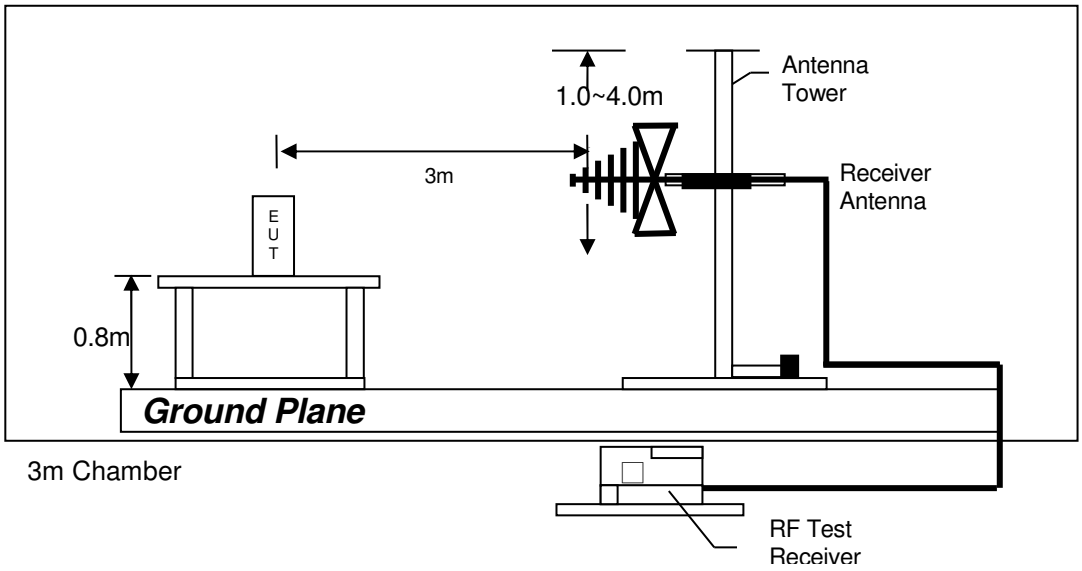
The IF bandwidth used for measurement of radiated signal strength was 10kHz for emission below 30MHz and 120kHz for emission from 30MHz to 1000MHz. Above 1000MHz, a resolution bandwidth of 1MHz is used.

Measurements are normally conducted at a measurement distance of three meters. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.

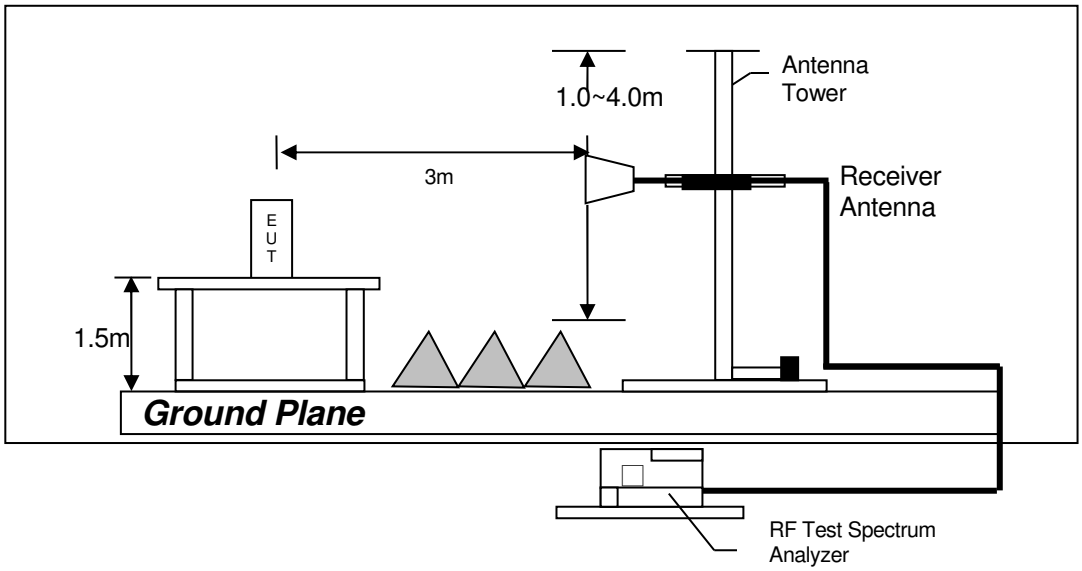
TEST REPORT

4.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

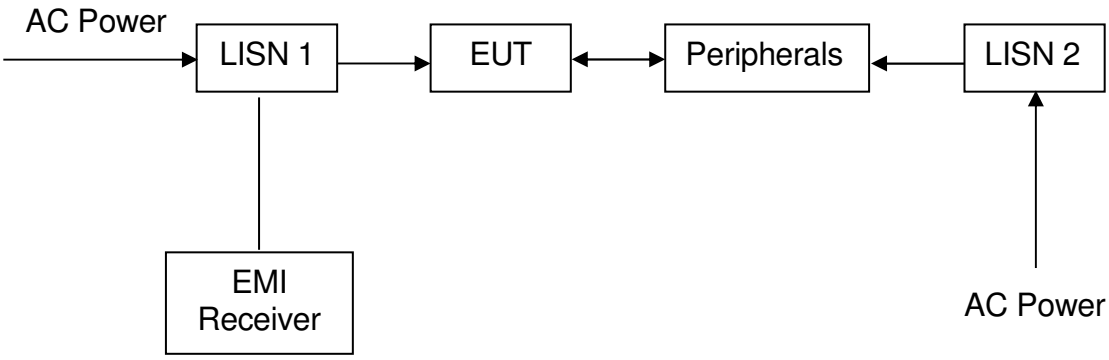
TEST REPORT

4.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. The EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

4.4.3 Conducted Emission Test Setup



TEST REPORT

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-3156	EW-2253	EW-0571
Manufacturer	R&S	R&S	EMCO
Model No.	ESR26	FSP40	3104C
Calibration Date	November 19, 2018	November 27, 2018	July 23, 2019
Calibration Due Date	November 19, 2019	November 27, 2019	July 23, 2021

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	14m Double Shield RF Cable (20MHz to 6GHz)
Registration No.	EW-1042	EW-1133	EW-2505
Manufacturer	EMCO	EMCO	RADIALL
Model No.	3148	3115	nm / br5d / sma 14m
Calibration Date	May 23, 2019	November 29, 2018	October 27, 2018
Calibration Due Date	November 23, 2020	May 29, 2020	October 27, 2019

Equipment	Active Loop H-field (9kHz to 30MHz)	Pyramidal Horn Antenna	Solid State Low Noise Preamplifier Assembly (1 - 18)GHz
Registration No.	EW-3326	EW-0905	EW-3229
Manufacturer	EMCO	EMCO	BONN ELEKTRO
Model No.	6502	3160-09	BLMA 0118-5G
Calibration Date	March 21, 2019	July 23, 2019	June 28, 2019
Calibration Due Date	September 21, 2020	January 23, 2021	June 28, 2020

2) Conducted Emissions Test

Equipment	RF Cable 80cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver
Registration No.	EW-2451	EW-2501	EW-2500
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	bnc m st / 142 / bnc m st 80cm	ENV-216	ESCI
Calibration Date	November 03, 2018	May 10, 2019	November 28, 2018
Calibration Due Date	November 03, 2019	May 10, 2020	November 28, 2019

END OF TEST REPORT