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EMI TEST REPORT
FCC CERTIFICATION

Applicant: **LG Electronics MobileComm U.S.A., Inc.** **1000 Sylvan Avenue, Englewood Cliffs NJ 07632**	**Date of Receipt: September 27, 2016** **Date of Issue: November 09, 2016** **Test Report No. HCT-E-1609-F009-1** **HCT FRN: 0005866421**

FCC ID : **ZNFW281**

Rule Part(s) / Standard(s):	FCC CFR 47 PART 15 Subpart B Class B
FCC Classification:	JBP (Part 15 B – Class B Computing Device Peripheral)
EUT Type:	Portable Wrist Device
Model Name:	LG-W281
Date of Test:	September 27, 2016 - September 29, 2016

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2014. (See Test Report if any modifications were made for compliance)
I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.
HCT certifies that no party to application has been denial the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

Jea-Woong Lee
Test Engineer
EMC Team
Certification Division

Reviewed By

Jin-Pyo Hong
Technical Manager
EMC Team
Certification Division

DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1609-F009	September 29, 2016	Initial Release
HCT-E-1609-F009-1	November 09, 2016	Revision of the Frequency Rages

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Description of EUT

Its basic purpose is used for communications.

FCC ID	ZNFW281
Model	LG-W281
EUT Type	Portable Wrist Device
Frequency Range	TX: 824 MHz to 849 MHz (LTE B5)
	RX: 869 MHz to 894 MHz (LTE B5)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.

Measurement Facilities	Registration Number
Radiated Field strength measurement facility (3 m)	90661 (July 07, 2015)
Radiated Field strength measurement facility (10 m)	90661 (July 07, 2015)

1.4 Calibration of Measuring Instrument

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipments, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

1.5 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LG-W281	LG Electronics	ZNFW281	Wireless PAD
USB cable	EAD63849201	Ningbo Broad	-	Wireless PAD, Notebook PC
Wireless PAD	WCD-H100	LGIT	-	Notebook PC
Notebook PC	ProBook6560b	HP	DoC	Gateway , Wireless PAD, Notebook PC adaptor, RJ45 cable, Serial mouse
Notebook PC adaptor	Series PPP009L-E	LITE-ON TECHNOLOGY	-	Notebook PC
Gateway	TL-WR747N	TP-LINK	-	RJ45 cable, Gateway adaptor
Gateway adaptor	T120150-2H1	TP-LINK	-	Gateway
Serial mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
RJ45 cable	-	-	-	Notebook PC, Gateway

1.6 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	-	-	-	-
Wireless PAD	USB type C	Y	Y	(P)1.0
Notebook PC	RJ 45	N/A	N	(D)2.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC in	N	N/A	(P)1.8
Gateway	DC in	N	N/A	(P)1.8

* The marked “(D)” means the data cable and “(P)” means the power cable.

1.7 Noise Suppression Parts on Cable. (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	-	-	-	-	Both End
Wireless PAD	USB type C	N	N/A	Y	Both End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	Y	Notebook PC End

2. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014.
All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Emission (0.15 MHz to 30 MHz)	±1.82 dB (k = 2)
Radiated Emissions (30 MHz to 1 GHz)	±5.06 dB (k = 2)
Radiated Emissions (1 GHz to 6 GHz)	±5.0 dB (k = 2)
Radiated Emissions (6 GHz to 18 GHz)	±5.4 dB (k = 2)

3. DESCRIPTION OF TEST

3.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
c. The frequency range from 150 kHz to 30 MHz was searched.

[Conducted Emission Limits]

Frequency (MHz)	Resolution Bandwidth (kHz)	Quasi-Peak (dB(μV))	Average (dB(μV))
0.15 to 0.5	9	66 to 56*	56 to 46*
0.5 to 5	9	56	46
5 to 30	9	60	50

**Decreases with the logarithm of the frequency.*

3.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.(1 GHz to 40 GHz)

[Radiated Emission Limits]

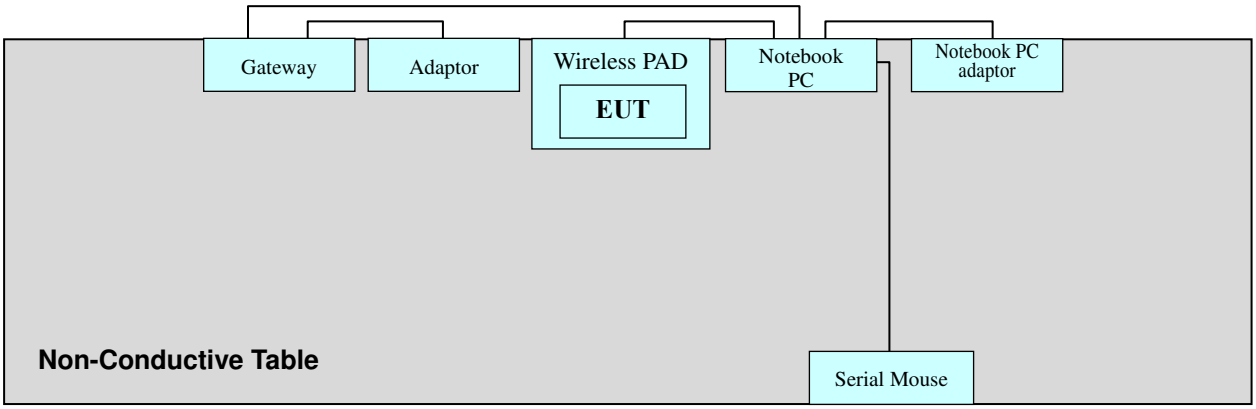
Frequency (MHz)	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dB(μV)/m)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	**Antenna Distance (m)**	**Peak (dB(μV)/m)**	**Average (dB(μV)/m)**
Above 1 000	3	74	54

3.2.1 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 ㎓, whichever is lower

3.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz

4. PRELIMINARY TEST

4.1 Conducted Emission Test

It was tested Charging mode, after connecting all peripheral devices.

Operation Mode: ☒ Charging mode

4. 2 Radiated Emission Test

It was tested Charging mode, after connecting all peripheral devices.

Operation Mode: ☒ Charging mode

5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

5.1 Conducted Emission Test

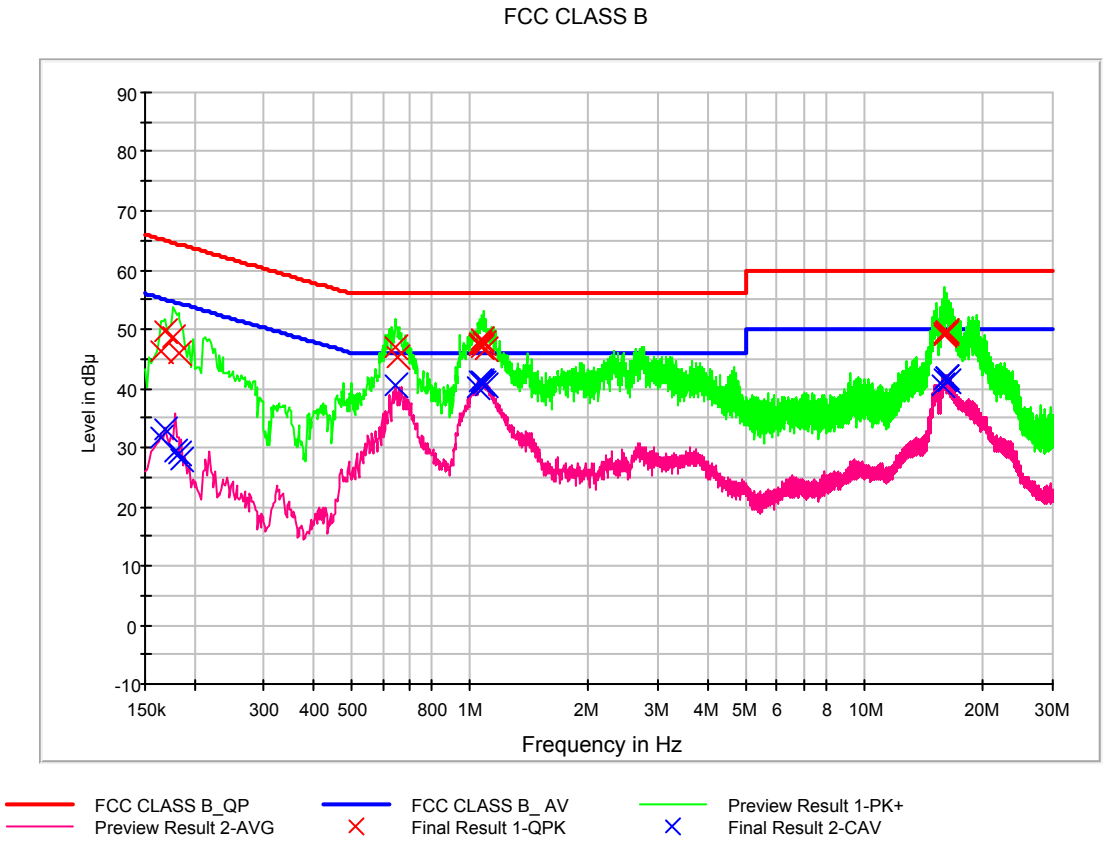
The test results of conducted emission at mains ports provide the following information:

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Charging mode
Kind of Test Site	Shielded Room
Temperature	24.9 °C
Relative Humidity	47.7 %
Test Date	September 28, 2016

- Calculation Formula:

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

Figure 1: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)



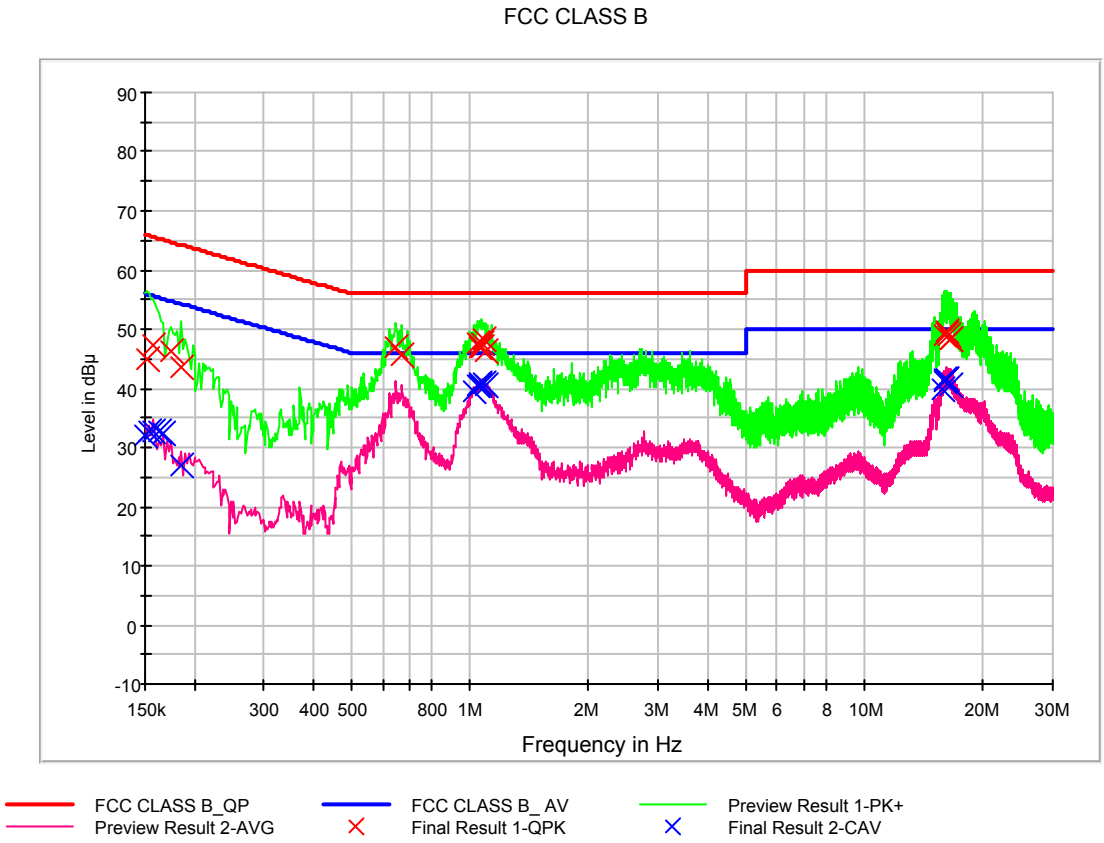
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.164000	46.3	9.000	L1	9.7	18.9	65.3
0.168000	49.8	9.000	L1	9.7	15.2	65.1
0.176000	48.6	9.000	L1	9.7	16.1	64.7
0.182000	46.0	9.000	L1	9.7	18.4	64.4
0.648000	47.0	9.000	L1	9.7	9.0	56.0
0.652000	45.1	9.000	L1	9.7	10.9	56.0
1.058000	47.4	9.000	L1	9.8	8.6	56.0
1.062000	47.7	9.000	L1	9.8	8.3	56.0
1.070000	46.9	9.000	L1	9.8	9.1	56.0
1.076000	48.2	9.000	L1	9.8	7.8	56.0
1.080000	47.6	9.000	L1	9.8	8.4	56.0
1.098000	46.6	9.000	L1	9.8	9.4	56.0
15.956000	49.3	9.000	L1	10.2	10.7	60.0
15.962000	49.1	9.000	L1	10.2	10.9	60.0
16.006000	49.5	9.000	L1	10.2	10.5	60.0
16.124000	49.6	9.000	L1	10.2	10.4	60.0
16.190000	49.7	9.000	L1	10.2	10.3	60.0
16.202000	49.5	9.000	L1	10.2	10.5	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.164000	31.8	9.000	L1	9.7	23.4	55.3
0.168000	33.1	9.000	L1	9.7	21.9	55.1
0.178000	29.3	9.000	L1	9.7	25.3	54.6
0.182000	28.9	9.000	L1	9.7	25.5	54.4
0.186000	27.8	9.000	L1	9.7	26.4	54.2
0.648000	40.4	9.000	L1	9.7	5.6	46.0
1.050000	40.2	9.000	L1	9.8	5.8	46.0
1.058000	41.2	9.000	L1	9.8	4.8	46.0
1.068000	41.0	9.000	L1	9.8	5.0	46.0
1.076000	41.2	9.000	L1	9.8	4.8	46.0
1.088000	40.9	9.000	L1	9.8	5.1	46.0
1.096000	40.6	9.000	L1	9.8	5.4	46.0
15.764000	40.7	9.000	L1	10.2	9.3	50.0
15.956000	41.5	9.000	L1	10.2	8.5	50.0
16.114000	41.7	9.000	L1	10.2	8.3	50.0
16.124000	41.9	9.000	L1	10.2	8.1	50.0
16.202000	41.8	9.000	L1	10.2	8.2	50.0
16.340000	41.3	9.000	L1	10.2	8.7	50.0

Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	44.9	9.000	N	9.7	21.0	65.9
0.158000	47.1	9.000	N	9.7	18.4	65.6
0.174000	46.2	9.000	N	9.7	18.6	64.8
0.186000	43.4	9.000	N	9.7	20.8	64.2
0.648000	47.0	9.000	N	9.7	9.0	56.0
0.672000	45.5	9.000	N	9.7	10.5	56.0
1.048000	47.7	9.000	N	9.7	8.3	56.0
1.056000	47.0	9.000	N	9.7	9.0	56.0
1.064000	46.9	9.000	N	9.7	9.1	56.0
1.072000	47.5	9.000	N	9.7	8.5	56.0
1.080000	48.3	9.000	N	9.7	7.7	56.0
1.090000	46.3	9.000	N	9.7	9.7	56.0
15.908000	49.1	9.000	N	10.2	10.9	60.0
16.078000	49.5	9.000	N	10.2	10.5	60.0
16.184000	49.4	9.000	N	10.2	10.6	60.0
16.358000	49.0	9.000	N	10.2	11.0	60.0
16.532000	48.2	9.000	N	10.2	11.8	60.0
16.572000	48.3	9.000	N	10.2	11.7	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	32.0	9.000	N	9.7	24.0	56.0
0.154000	32.9	9.000	N	9.7	22.9	55.8
0.158000	32.8	9.000	N	9.7	22.8	55.6
0.162000	32.7	9.000	N	9.7	22.7	55.4
0.166000	32.3	9.000	N	9.7	22.9	55.2
0.186000	26.9	9.000	N	9.7	27.3	54.2
1.024000	39.5	9.000	N	9.7	6.5	46.0
1.048000	40.5	9.000	N	9.7	5.5	46.0
1.056000	40.9	9.000	N	9.7	5.1	46.0
1.062000	40.7	9.000	N	9.7	5.3	46.0
1.080000	41.0	9.000	N	9.7	5.0	46.0
1.090000	40.4	9.000	N	9.7	5.6	46.0
15.724000	39.8	9.000	N	10.2	10.2	50.0
15.908000	41.4	9.000	N	10.2	8.6	50.0
15.972000	41.6	9.000	N	10.2	8.4	50.0
16.164000	41.4	9.000	N	10.2	8.6	50.0
16.220000	41.4	9.000	N	10.2	8.6	50.0
16.532000	40.6	9.000	N	10.2	9.4	50.0

5.2 Radiated Emission Test

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operation Mode	Charging mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.3 °C
Relative Humidity	57.7 %
Test Date	September 28, 2016

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
32.463888	22.9	100.0	V	5.0	21.5	17.1	40.0
44.327214	24.8	100.0	V	190.0	22.6	15.2	40.0
63.486092	29.5	100.0	V	90.0	22.0	10.5	40.0
66.453868	28.6	165.0	H	17.0	21.6	11.4	40.0
240.299880	33.2	150.0	H	0.0	21.7	12.8	46.0
265.570421	33.0	100.0	H	315.0	22.6	13.0	46.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak

-For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Operating Frequency	1.094 GHz
Upper Frequency of Measurement Range	1 GHz to 6 GHz
Operation Mode	Charging mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.1 °C
Relative Humidity	55.5 %
Test Date	September 27, 2016

Frequency (MHz)	Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1331.212425	43.2	310.6	V	212.0	-9.1	30.8	74.0
1399.949900	48.0	149.5	V	13.0	-8.9	26.0	74.0
1999.749499	50.4	99.8	V	212.0	-8.4	23.6	74.0
2592.434870	49.4	292.5	V	211.0	-5.4	24.6	74.0
4031.813627	45.5	188.6	H	-1.0	-2.5	28.5	74.0
4897.745491	49.7	308.5	V	165.0	0.7	24.3	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1331.212425	27.9	310.6	V	212.0	-9.1	26.1	54.0
1399.949900	44.8	149.5	V	13.0	-8.9	9.2	54.0
1999.749499	32.7	99.8	V	212.0	-8.4	21.3	54.0
2592.434870	32.7	292.5	V	211.0	-5.4	21.3	54.0
4031.813627	33.0	188.6	H	-1.0	-2.5	21.0	54.0
4897.745491	37.2	308.5	V	165.0	0.7	16.8	54.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. Peak or CAverage = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor+ Cable Loss –Amplifier Gain
4. Margin = Limit - Peak or CAverage

6. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	CAL Date
Conducted Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.09.2016
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
Radiated Emission					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☐ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☒ Trilog Antenna	Schwarzbeck	VULB9168	255	2 year	04.15.2015
☒ 6dB Attenuator	HP	8491A	24257	2 year	04.15.2015
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Antenna master	INNCO Systems	MA4000-XP-ET	48709515	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.04.2016
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.07.2016
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-

7. CONCLUSION

The data collected shows that the **EUT Type: Portable Wrist Device, Model: LG-W281, FCC ID: ZNFW281** complies with §15.107 and §15.109 of the FCC rules.