HCT CO.,LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
TEL: +82-31-645-6300 FAX: +82-31-645-6401

EMI TEST REPORT
FCC CERTIFICATION

Applicant: **LG Electronics MobileComm U.S.A., Inc.** **1000 Sylvan Avenue, Englewood Cliffs NJ 07632** **United States**	**Date of Receipt: March 28, 2018** **Date of Issue: April 18, 2018** **Test Report No. HCT-EM-1804-FC021**

FCC ID : **ZNFW315**

Rule Part(s) / Standard(s)	: FCC CFR 47 PART 15 Subpart B Class B
FCC Classification	: JAB (Part 15B – Class B Digital Device)
EUT Type	: Portable Wrist Device
Model Name	: LM-W315
Additional Model Name	: LMW315, W315
TA Information:	: Model Name: MCS-V01WD, Manufacturer: DONGDO
Date of Test	: April 07, 2018 – April 13, 2018

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

Dong-Hwan Seo
Test Engineer
EMC Team
Certification Division

Reviewed By

Jin-Pyo Hong
Technical Manager
EMC Team
Certification Division

REVISION HISTORY

The revision history for this document is shown in table.

Report No.	Issue Date	Information About Changes
HCT-EM-1804-FC021	April 18, 2018	Initial Release

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1. GENERAL INFORMATION

1.1 Description of EUT

Its basic purpose is used for communications.

FCC ID	ZNFW315
Model	LM-W315
Additional Model	LMW315, W315
EUT Type	Portable Wrist Device
TX Frequency	2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz)
RX Frequency	2 402 MHz to 2 480 MHz (Bluetooth) 2 412 MHz to 2 462 MHz (WiFi 2.4 GHz)

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. The Normalized site attenuations (30 MHz to 1 GHz) and Site validation (1 GHz to 18 GHz) were performed in accordance with the standard in ANSI C63.4-2014

Measurement Facilities	Registration Number
Radiated Field strength measurement facility 3 m Semi Anechoic chamber	90661
Radiated Field strength measurement facility 10 m Semi Anechoic chamber	

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	Serial Number	Manufacturer	FCC ID
EUT	LM-W315	-	LG	ZNFW315
Data cable	EAD64746111	-	LUXSHARE	-
Cradle	SDT-370	EAY65128901	SUNLIN	-
Bluetooth headset	HBS-760	-	LG	-
Travel adaptor	MCS-V01WD	-	DONGDO	-

1.6 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
Cradle	USB type C	Y	Y	(P)1.0

* 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
Cradle	USB type C	N	N/A	Y	Both 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)	5.20 dB ($k = 2$)
Radiated Emissions (1 GHz to 18 GHz)	5.24 dB ($k = 2$)
Radiated Emissions (18 GHz to 40 GHz)	5.40 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]

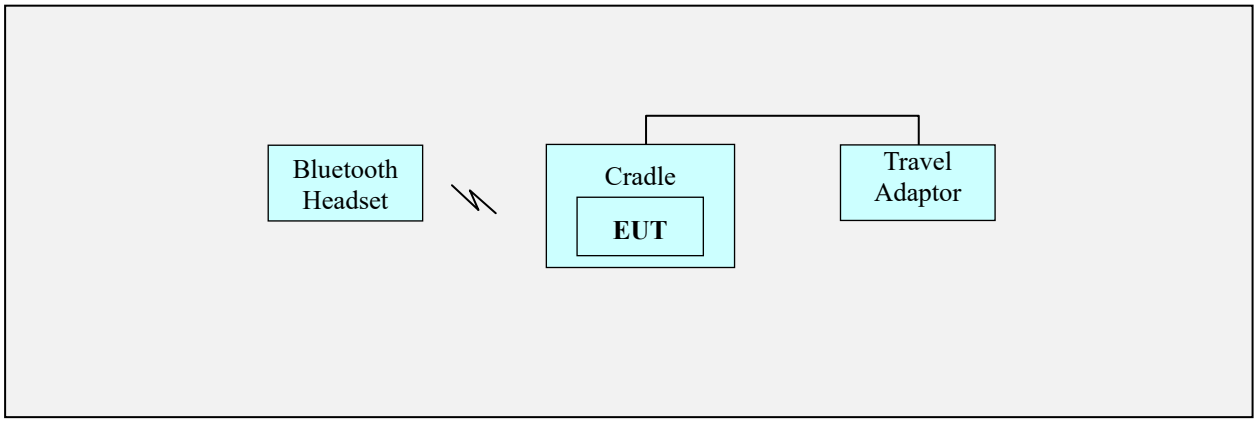
Frequency (MHz)	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dB(μV)/m)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	Antenna Distance (m)	Peak (dB(μV)/m)	Average (dB(μV)/m)
Above 1 000	3	74	54

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



Non-Conductive Table
Power Line: 120 VAC

4. PRELIMINARY TEST

4.1 Conducted Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Charging & MP3 play mode

4. 2 Radiated Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: Charging & MP3 play mode

5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

5.1 Conducted Emission Test

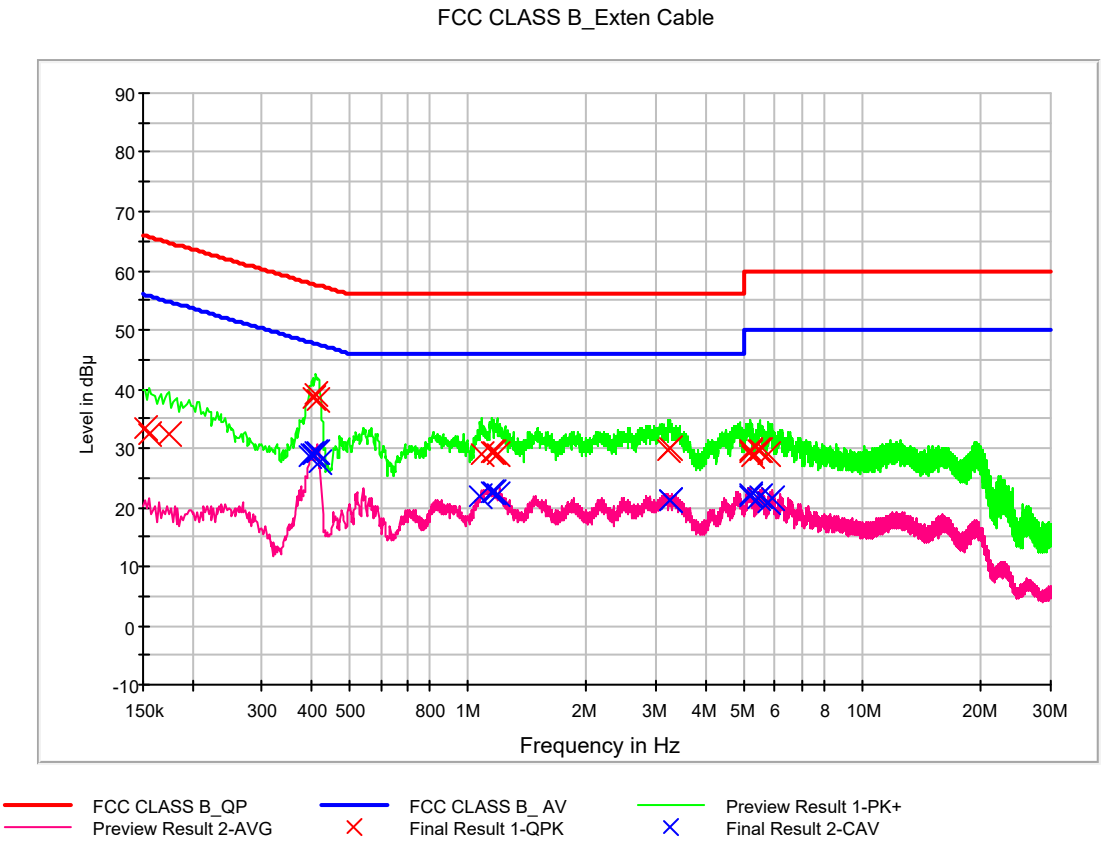
The test results of conducted emission at mains ports provide the following information:

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Kind of Test Site	Shielded Room
Temperature	23.0 °C
Relative Humidity	45.3 %
Test Date	April 07, 2018

- 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: Conducted Emission, AC Main Port, Line (L1)



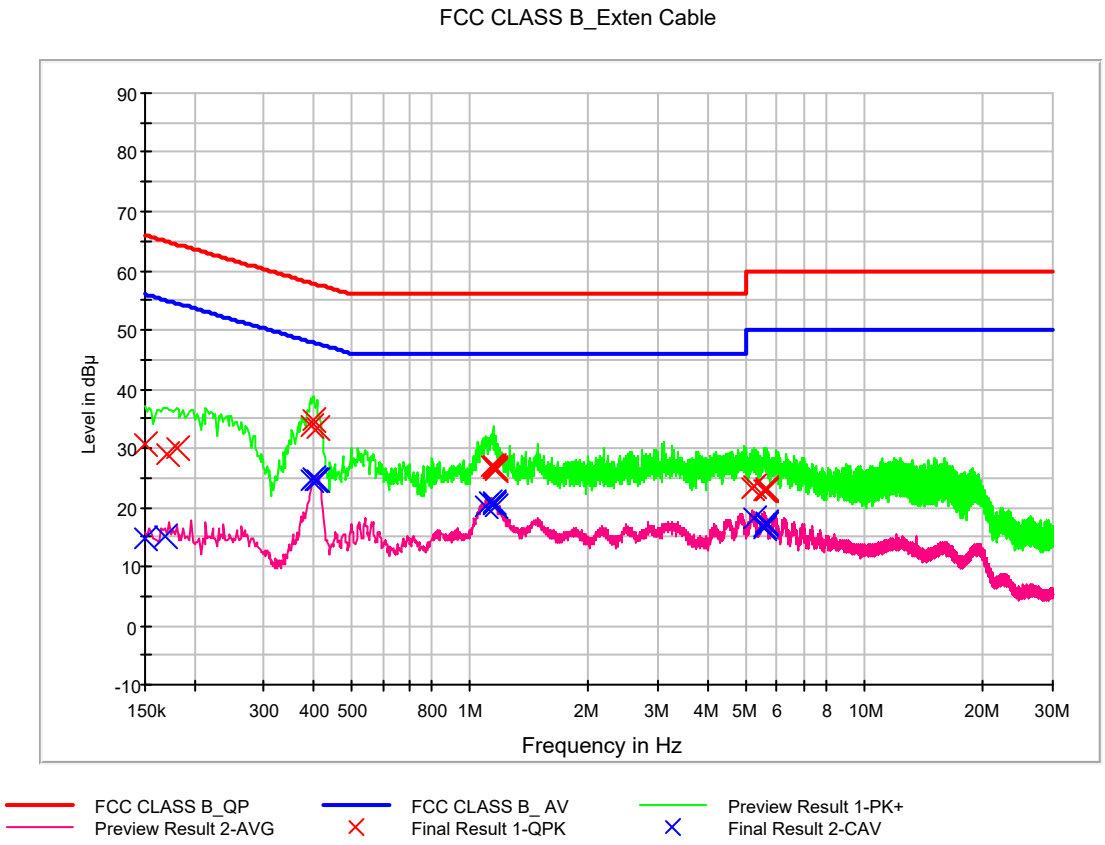
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	33.5	9.000	L1	9.7	32.4	65.9
0.156000	32.3	9.000	L1	9.7	33.3	65.7
0.174000	32.2	9.000	L1	9.7	32.5	64.8
0.404000	38.4	9.000	L1	9.7	19.3	57.8
0.412000	39.1	9.000	L1	9.7	18.5	57.6
0.416000	38.1	9.000	L1	9.7	19.4	57.5
1.084000	29.0	9.000	L1	9.8	27.0	56.0
1.152000	29.4	9.000	L1	9.8	26.6	56.0
1.158000	29.5	9.000	L1	9.8	26.5	56.0
1.184000	29.0	9.000	L1	9.8	27.0	56.0
3.228000	29.7	9.000	L1	9.9	26.3	56.0
3.234000	30.0	9.000	L1	9.9	26.0	56.0
5.190000	29.6	9.000	L1	10.0	30.4	60.0
5.198000	29.3	9.000	L1	10.0	30.7	60.0
5.246000	28.6	9.000	L1	10.0	31.4	60.0
5.466000	29.7	9.000	L1	10.0	30.3	60.0
5.472000	29.8	9.000	L1	10.0	30.2	60.0
5.792000	29.1	9.000	L1	10.0	30.9	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.398000	28.8	9.000	L1	9.7	19.1	47.9
0.402000	29.1	9.000	L1	9.7	18.7	47.8
0.406000	28.9	9.000	L1	9.7	18.9	47.7
0.410000	29.4	9.000	L1	9.7	18.3	47.6
0.414000	29.3	9.000	L1	9.7	18.3	47.6
0.418000	27.7	9.000	L1	9.7	19.8	47.5
1.074000	21.7	9.000	L1	9.8	24.3	46.0
1.154000	22.6	9.000	L1	9.8	23.4	46.0
1.158000	22.5	9.000	L1	9.8	23.5	46.0
1.184000	22.0	9.000	L1	9.8	24.0	46.0
3.234000	21.2	9.000	L1	9.9	24.8	46.0
3.246000	21.1	9.000	L1	9.9	24.9	46.0
5.190000	22.0	9.000	L1	10.0	28.0	50.0
5.198000	22.1	9.000	L1	10.0	27.9	50.0
5.466000	21.7	9.000	L1	10.0	28.3	50.0
5.494000	21.9	9.000	L1	10.0	28.1	50.0
5.792000	20.8	9.000	L1	10.0	29.2	50.0
5.904000	21.5	9.000	L1	10.0	28.5	50.0

Figure 2: 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)
0.150000	30.6	9.000	N	9.7	35.4	66.0
0.170000	29.1	9.000	N	9.7	35.8	65.0
0.180000	30.1	9.000	N	9.7	34.4	64.5
0.394000	33.7	9.000	N	9.7	24.3	58.0
0.402000	34.8	9.000	N	9.7	23.0	57.8
0.410000	33.4	9.000	N	9.7	24.2	57.6
1.130000	27.0	9.000	N	9.8	29.0	56.0
1.142000	27.0	9.000	N	9.8	29.0	56.0
1.146000	26.6	9.000	N	9.8	29.4	56.0
1.154000	26.7	9.000	N	9.8	29.3	56.0
1.160000	26.5	9.000	N	9.8	29.5	56.0
1.164000	26.3	9.000	N	9.8	29.7	56.0
5.206000	23.3	9.000	N	10.0	36.7	60.0
5.256000	23.7	9.000	N	10.0	36.3	60.0
5.598000	22.9	9.000	N	10.0	37.1	60.0
5.604000	23.0	9.000	N	10.0	37.0	60.0
5.632000	23.0	9.000	N	10.0	37.0	60.0
5.658000	23.3	9.000	N	10.0	36.7	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	14.8	9.000	N	9.7	41.2	56.0
0.168000	15.0	9.000	N	9.7	40.1	55.1
0.398000	24.7	9.000	N	9.7	23.2	47.9
0.402000	24.9	9.000	N	9.7	23.0	47.8
0.406000	24.6	9.000	N	9.7	23.1	47.7
0.410000	24.6	9.000	N	9.7	23.0	47.6
1.096000	20.2	9.000	N	9.8	25.8	46.0
1.124000	20.8	9.000	N	9.8	25.2	46.0
1.142000	20.8	9.000	N	9.8	25.2	46.0
1.146000	20.5	9.000	N	9.8	25.5	46.0
1.154000	20.4	9.000	N	9.8	25.6	46.0
1.164000	20.0	9.000	N	9.8	26.0	46.0
5.270000	18.2	9.000	N	10.0	31.8	50.0
5.582000	16.6	9.000	N	10.0	33.4	50.0
5.594000	16.8	9.000	N	10.0	33.2	50.0
5.604000	17.0	9.000	N	10.0	33.0	50.0
5.632000	17.2	9.000	N	10.0	32.8	50.0
5.640000	17.4	9.000	N	10.0	32.6	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)
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.7 °C
Relative Humidity	39.5 %
Test Date	April 12, 2018

Frequency (MHz)	Quasi Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
34.239200	17.2	275.0	V	17.0	19.1	22.8	40.0
47.329600	18.0	174.8	V	98.0	20.1	22.0	40.0
54.867200	19.0	99.8	V	55.0	20.0	21.0	40.0
114.568000	21.2	175.0	V	331.0	17.2	22.3	43.5
250.008800	24.4	191.7	V	116.0	18.8	21.6	46.0
639.337600	27.8	208.7	V	192.0	27.9	18.2	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	2 480 MHz
Upper Frequency	1 GHz to 12.4 GHz
Kind of Test Site	3 m semi anechoic chamber
Temperature	24.1 °C
Relative Humidity	38.9 %
Test Date	April 13, 2018

Frequency (MHz)	Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2332.835000	36.8	99.7	H	266.0	-25.2	37.2	74.0
2507.810000	43.9	250.2	H	290.0	-24.3	30.1	74.0
2570.405000	40.2	99.8	H	353.0	-24.1	33.8	74.0
4574.365000	35.6	350.2	V	101.0	-19.4	38.4	74.0
7037.830000	40.9	134.0	H	153.0	-13.6	33.1	74.0
9601.320000	43.8	249.8	H	50.0	-10.7	30.2	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
2332.835000	19.3	99.7	H	266.0	-25.2	34.7	54.0
2507.810000	19.8	250.2	H	290.0	-24.3	34.2	54.0
2570.405000	19.7	99.8	H	353.0	-24.1	34.3	54.0
4574.365000	22.7	350.2	V	101.0	-19.4	31.3	54.0
7037.830000	27.6	134.0	H	153.0	-13.6	26.4	54.0
9601.320000	30.7	249.8	H	50.0	-10.7	23.3	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	06.20.2017
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	06.27.2017
☒ LISN	Rohde & Schwarz	ENV216	102245	1 year	12.20.2017
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	05.22.2017
☐ LISN	Rohde & Schwarz	ENV216	100073	1 year	07.18.2017
☒ Software	Rohde & Schwarz	EMC32 VER8.54.0	-	-	-
Radiated Emission					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	08.16.2017
☒ Trilog Antenna	Schwarzbeck	VULB 9168	760	2 year	04.06.2017
☒ Antenna master	INNCO Systems	MA4000-XP-ET	-	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515/L	N/A	-
☒ Turn Table	INNCO Systems	-	-	N/A	-
☒ Turn Table controller	INNCO Systems	CO2000	-	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	08.16.2017
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-
-For measurement above 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESU40	100524	1 year	08.16.2017
☒ Antenna master	INNCO Systems	MA4000-XP-ET	-	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515/L	N/A	-
☒ Turn Table	INNCO Systems	-	-	N/A	-
☒ Turn Table controller	INNCO Systems	CO2000	-	N/A	-
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.12.2016
☒ Low Noise Amplifier	TESTEK	TK-PA18H	170034-L	1 year	03.06.2018
☐ Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170#786	2 year	12.05.2017
☐ Power Amplifier	TESTEK	TK-PA1840H	170030-L	1 year	12.20.2017
☐ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☐ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	06.28.2017
☐ Antenna master	HD GmbH	MA240	240/520	N/A	-
☐ Horn Antenna	Schwarzbeck	BBHA 9120D	1300	2 year	06.30.2017
☐ EMI Test Receiver	Rohde & Schwarz	ESU26	100241	1 year	08.16.2017
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32 VER8.40.0	-	-	-

7. CONCLUSION

The data collected shows that the **EUT Type: Portable Wrist Device, Model: LM-W315, FCC ID: ZNFW315** complies with §15.107 and §15.109 of the FCC rules.

8. APPENDIX A. TEST SETUP PHOTOGRAPHS

Please refer to Appendix A