CE EMC Test Report

Test Standard(s):	EN 301489-1 V1.9.2 (2011-09) EN 301489-17 V2.2.1 (2012-09)
Applicant:	
Product Name:	Activity Tracker
Model:	WB102
Report No.:	ZKS161100228E-2
Tested Date:	2016-11-29 to 2016-12-08
Issued Date:	2016-12-10
Tested By :	William Liu (Engineer)
Approved By:	Lahm Peng (Manager)
Prepared By:	

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1. General Information

1.1 Product Information

Applicant and Manufacturer	
Applicant:	
Address of Applicant:	
Manufacturer:	
Address of Manufacturer:	

General Description of EUT	
Product Name:	Activity Tracker
Model No.:	WB102
Trade Name:	EHOME
Adding Model(s):	--
Class of Equipment:	Class B
Rated Voltage:	DC 3.7V, Battery
Note 1: The test data is gathered from a production sample, provided by the manufacturer.	

1.2 Compliance Standards

Compliance Standards	
EN 301489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
EN 301489-17	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment.
The objective of the manufacturer or applicant is to demonstrate compliance with the above standards.	
According to standards for test methodology	
EN 55022	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
EN 55024	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 61000-3-2	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)
EN 61000-3-3	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
IEC 61000-4-2	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
IEC 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
IEC 61000-4-5	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
IEC 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests
All measurements contained in this report were conducted with all above standards	
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.3 Test Facilities

Shenzhen Academy of Metrology and Quality Inspection (CNAS Registration No.: L0579)
Shenzhen Academy of Metrology and Quality Inspection is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L0579. All measurement facilities used to collect the measurement data are located at Metrology and Quality Inspection Building, Central Section of LongZhu Road, Nanshan District, Shenzhen (518055)

1.4 Test Setup Information

List of Test Modes			
Test Mode	Description	Remark	
TM1	Operating	Bluetooth	
TM2	Charging	--	
List and Details of Auxiliary Cable			
Description	Length (M)	Shielded/Unshielded	With/Without Ferrite
--	--	--	--
List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	G405S	--
The equipment under test (EUT) was configured to measure its highest possible emission and immunity level. The test modes were adapted according to the operation manual for use.			

1.5 Measurement Uncertainty

Parameter	Conditions	Uncertainty
Conducted Disturbance	9kHz ~30MHz	±2.75 dB
Radiated Disturbance	30MHz ~ 1GHz	±4.89 dB
Radiated Disturbance	1Hz ~ 6GHz	±4.93 dB

1.6 Performance Criteria for EMS

All the test data has been collected and analyzed within this report in accordance with Immunity requires the following as specific performance criteria:	
A	The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacturer as a permissible loss of performance.
B	The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.
C	Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

1.7 List of Test and Measurement Instruments

Description	Manufacturer	Model	Serial Number	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2017-08-30
AMN	Rohde & Schwarz	ESH2-Z5	100002	2017-08-30
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	2017-08-30
Pre-amplifier	CD	PAP-0118	24004	2017-08-30
Bilog Antenna	Chase	CBL6112B	2591	2017-08-30
Horn Antenna	Rohde & Schwarz	HF906	100014	2017-08-30
Digital Power Analyzer	California Instrument	5001ix-CTS-400	X71730	2017-08-30
ESD Generator	SCHNAFFNER	NSG 435	2103	2017-08-30
Signal Generator	Rohde & Schwarz	SMT03	100059	2017-08-30
Voltage Probe	Rohde & Schwarz	URV5-Z2	100013	2017-08-30
Power Amplifier	AR	150W1000	300999	2017-08-30
Power Amplifier	AR	25S1G4AM1	305993	2017-08-30
Immunity Simulator	EMTEST	UCS500M4	0800-44	2017-08-30
CS Immunity Tester	EMTEST	CWS500	0900-12	2017-08-30
EMCPRO	KEYTEK	EMCPRO	9909302	2017-08-30
Coil	KEYTEK	F-1000-4-8	9935	2017-08-30

2. Summary of Test Results

Standards	Description of Test Items	Result
EN 301489-1	Conducted Emission	Passed
	Radiated Emission	Passed
	Harmonic Current Emission	Passed
	Voltage Fluctuation and Flicker	Passed
	Immunity - Radio Frequency Electromagnetic Field	Passed
	Immunity - Electrostatic Discharge	Passed
	Immunity - Fast Transient, Common Mode	Passed
	Immunity - Radio Frequency, Common Mode	Passed
	Immunity - Voltage Dips and Interruptions	Passed
	Immunity - Surges	Passed
	Immunity - Transients and Surges in the Vehicular Environment	N/A
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

3. Conducted Emission

3.1 Standard and Limit

According to the standard EN 55022, clause 5 - Limits for conducted emission at mains terminals and telecommunication ports, the limit of conducted disturbance for a class B device as below:

Frequency range MHz	Limits dB(μV)	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies. NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.		

Main Terminals

3.2 Test Procedure

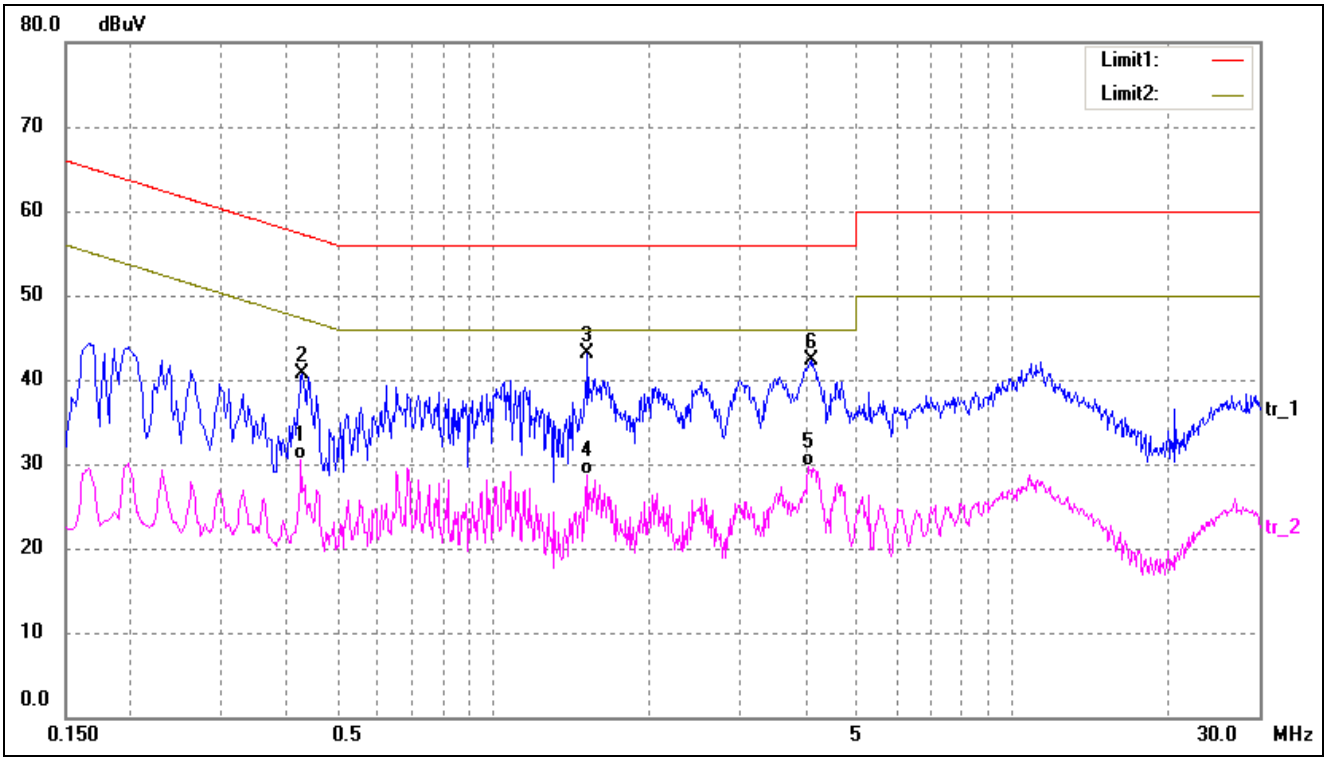
Test is conducting under the description of EN 55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

Test Setup Block Diagram

3.3 Test Data and Results

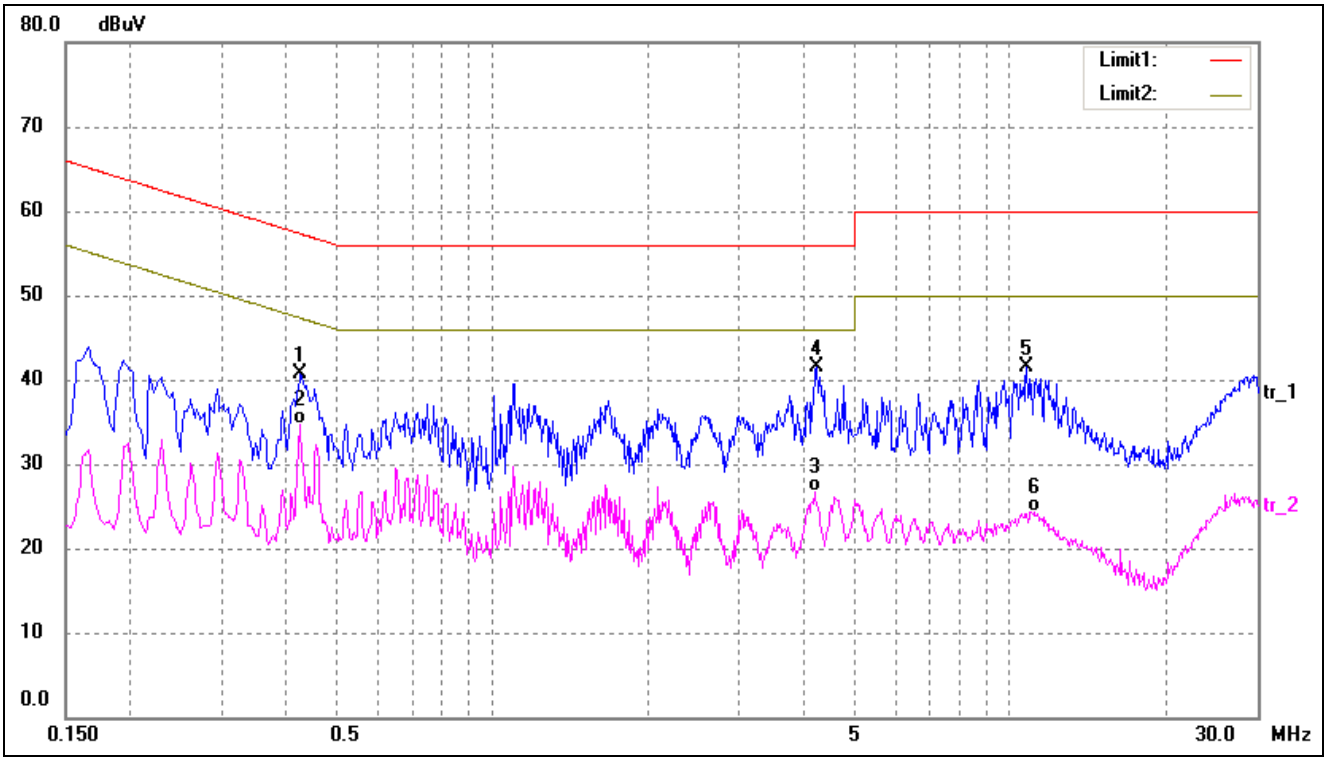
Based on all tested data, the EUT complied with the EN 55022 standard limit for a Class B device, and with the worst case as below:

Test Plots and Data of Conducted Emissions	
Tested Model:	WB102
Tested Mode:	TM1&TM2
Test Power Specification:	AC 230V/50Hz
Test Power Line:	Live
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.4260	20.99	9.50	30.49	47.33	-16.84	AVG
2	0.4300	31.16	9.50	40.66	57.25	-16.59	peak
3*	1.5220	33.14	10.00	43.14	56.00	-12.86	peak
4	1.5220	18.61	10.00	28.61	46.00	-17.39	AVG
5	4.0580	19.74	10.00	29.74	46.00	-16.26	AVG
6	4.1260	32.29	10.00	42.29	56.00	-13.71	peak

Test Plots and Data of Conducted Emissions	
Tested Model:	WB102
Tested Mode:	TM1&TM2
Test Power Specification:	AC 230V/50Hz
Test Power Line:	Neutral
Remark:	



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.4260	31.27	9.50	40.77	57.33	-16.56	peak
2*	0.4260	25.13	9.50	34.63	47.33	-12.70	AVG
3	4.1860	16.66	10.00	26.66	46.00	-19.34	AVG
4	4.2260	31.49	10.00	41.49	56.00	-14.51	peak
5	10.7500	31.29	10.15	41.44	60.00	-18.56	peak
6	11.1020	14.10	10.22	24.32	50.00	-25.68	AVG

4. Radiated Emission

4.1 Standard and Limit

According to the standard EN 55022, clause 6 - Limits for radiated emission, the limit of radiated disturbance for a class B device as below:

Frequency range MHz	Quasi-peak limits dB(μV/m)
30 to 230	30
230 to 1 000	37
NOTE 1 The lower limit shall apply at the transition frequency. NOTE 2 Additional provisions may be required for cases where interference occurs.	

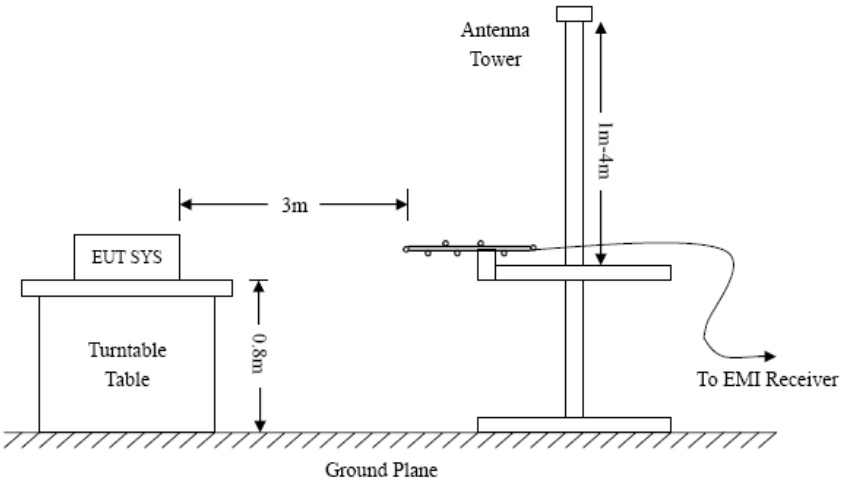
Limits below 1GHz at a measurement distance of 10 m
(Limit at 3m = limit at 10 m + 10dB)

Frequency range GHz	Average limit dB(μV/m)	Peak limit dB(μV/m)
1 to 3	50	70
3 to 6	54	74
NOTE The lower limit applies at the transition frequency.		

Limits above 1GHz at a measurement distance of 3 m

4.2 Test Procedure

Test is conducting under the description of EN 55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

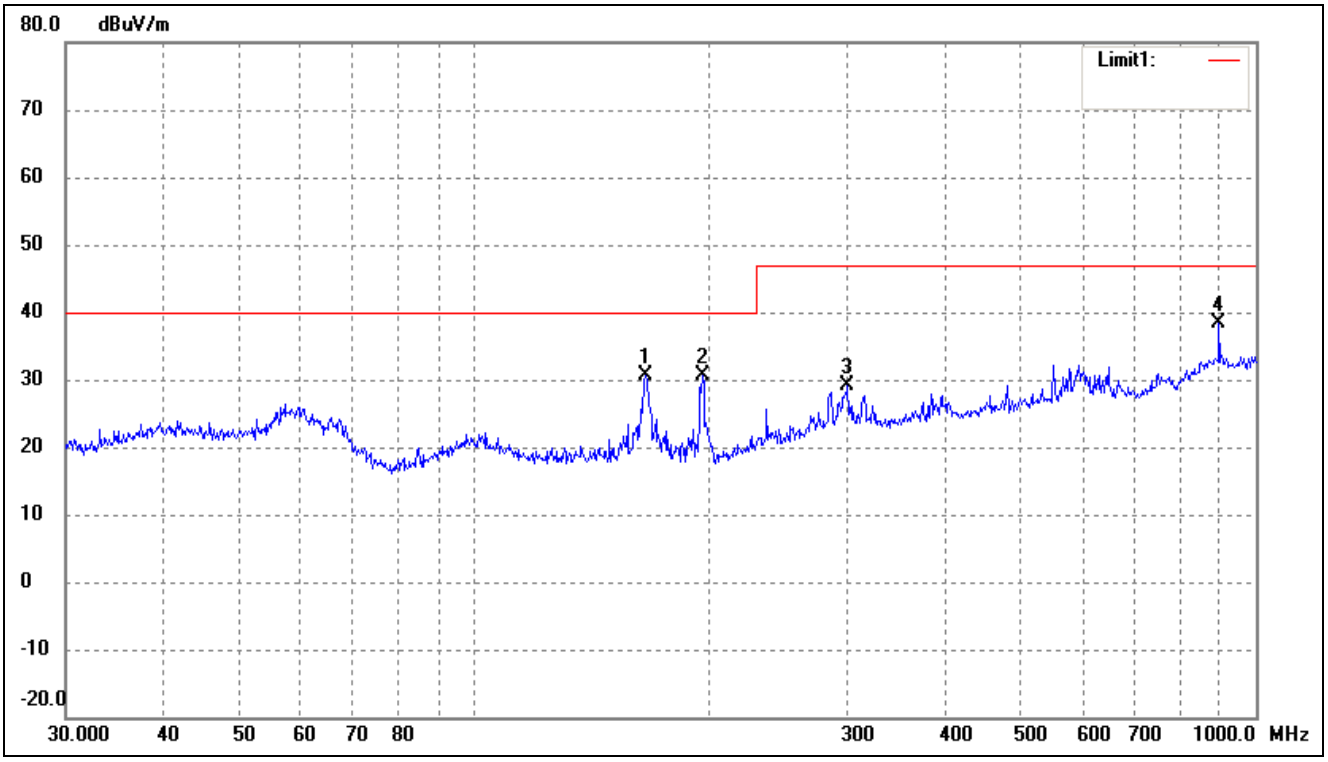


Test Setup Block Diagram

4.3 Test Data and Results

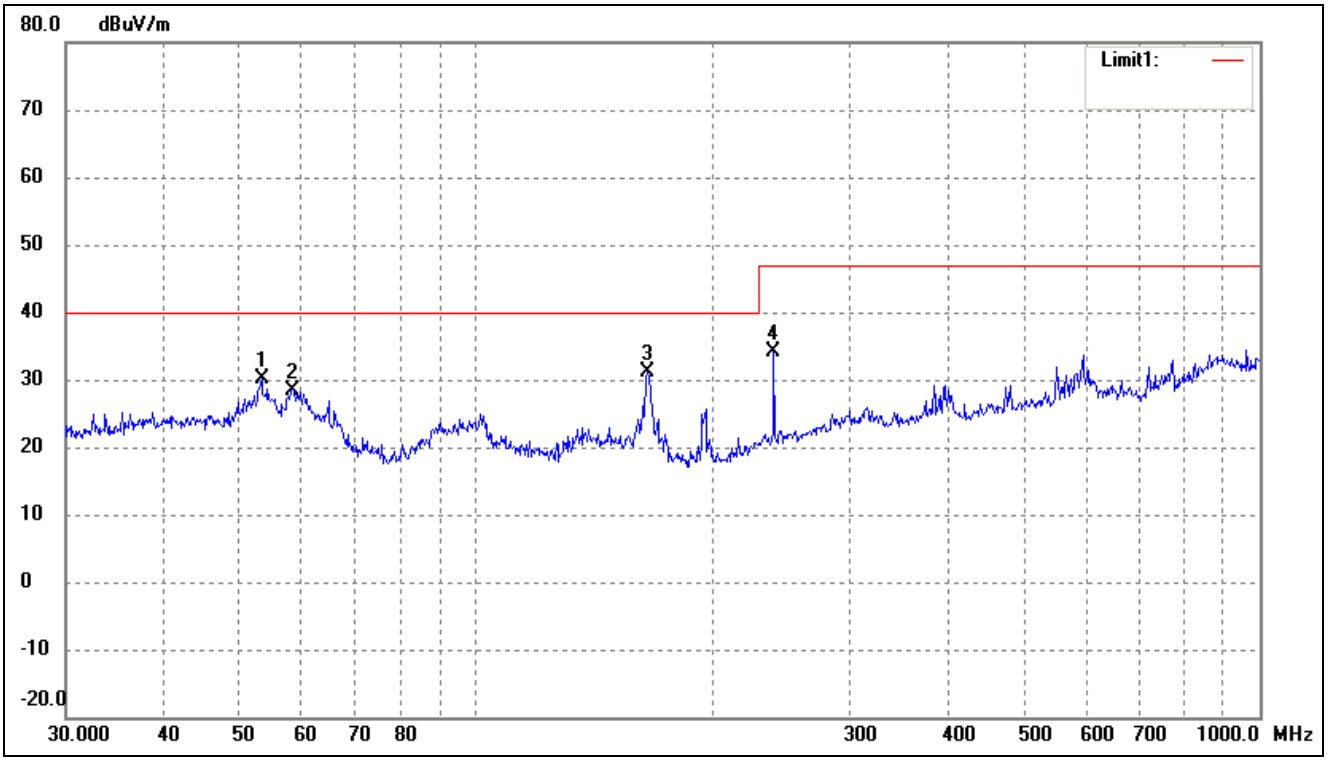
Based on all tested data, the EUT complied with the EN 55022 standard limit for a Class B device, and with the worst case as below:

Test Plots and Data of Radiated Emissions	
Tested Model:	WB102
Tested Mode:	TM2
Test Power Specification:	DC 3.7V
Test Antenna Polarization:	Horizontal
Remark:	



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	165.4866	27.87	2.65	30.52	40.00	-9.48	360	100	peak
2	195.8220	27.04	3.47	30.51	40.00	-9.49	360	100	peak
3	300.3672	19.89	9.18	29.07	47.00	-17.93	360	100	peak
4	896.9965	21.52	16.85	38.37	47.00	-8.63	360	100	peak

Test Plots and Data of Radiated Emissions	
Tested Model:	WB102
Tested Mode:	TM2
Test Power Specification:	AC 230V/50Hz
Test Antenna Polarization:	Vertical
Remark:	



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	53.3179	22.75	7.30	30.05	40.00	-9.95	360	100	peak
2	58.4074	21.15	7.35	28.50	40.00	-11.50	360	100	peak
3	165.4866	28.55	2.65	31.20	40.00	-8.80	360	100	peak
4	239.9874	27.68	6.33	34.01	47.00	-12.99	360	100	peak

5. Harmonic Current Emissions

5.1 Standard and Limit

According to the standard EN 61000-3-2 Clause 7.1, limits for class A equipment.

5.2 Test Procedure

Test is conducting under the description of EN 61000-3-2.

5.3 Test Data and Results

According to Clause 7 of EN61000-3-2, the rated power of the EUT is less than 75W, belong to ‘equipment with a rated power of 75W or less’, therefore ‘limits are not specified in this edition of the standards’. It is deem to full fit the requirements of the standards.

Result: The EUT is compliance with the requirements of this section.

6. Voltage Fluctuation and Flicker

6.1 Standard and Limit

According to the standard EN 61000-3-3 Clause 5.

6.2 Test Procedure

Test is conducting under the description of EN 61000-3-3.

6.3 Test Data and Results

According to clause 6.1 of EN 61000-3-3:2008, “Tests need not be made on equipment which is unlikely to produce significant voltage fluctuations or flicker.”

The maximum rated input power of the EUTs is about 75W only, which unlikely to produce significant voltage fluctuation. Therefore no test was applied.

Result: The EUT is compliance with the requirements of this section.

7. Electrostatic Discharges (ESD)

7.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.3, Limit as below:

Test Specifications	Test Levels	Performance Criterion
Air Discharge	8kV	B
Contact Discharge	4kV	B

7.2 Test Procedure

Test is conducting under the description of IEC 61000-4-2.

7.3 Test Results

Air Discharge	**Test Levels (kV)**							
Test Points	-2	+2	-4	+4	-8	+8	-15	+15
Buttons	A	A	A	A	A	A	--	--
Slots	A	A	A	A	A	A	--	--
LCD Screen	A	A	A	A	A	A	--	--

Contact Discharge	**Test Levels (kV)**							
Test Points	-2	+2	-4	+4	-6	+6	-8	+8
Metal Part	A	A	A	A	--	--	--	--
--	--	--	--	--	--	--	--	--

8. Radio Frequency, Common Mode (R/S)

8.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.2, Limit as below:

Test Specifications	Test Levels	Performance Criterion
80MHz-1000MHz	3V/m	A
1.4GHz-2.7GHz	3V/m	A

8.2 Test Procedure

Test is conducting under the description of IEC 61000-4-3.

8.3 Test Results

Frequency step: 1% of fundamental
Dwell time: 1 second
Modulation: AM by 1kHz sine wave with 80% modulation depth

Frequency Range	**EM Field**	**Polarization**	**Front**	**Rear**	**Left**	**Right**
80MHz-1GHz	3V/m	Horizontal	A	A	A	A
80MHz-1GHz	3V/m	Vertical	A	A	A	A
1.4GHz-2.7GHz	3V/m	Horizontal	A	A	A	A
1.4GHz-2.7GHz	3V/m	Vertical	A	A	A	A

9. Fast Transient, Common Mode (EFT)

9.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.4, Limit as below:

Test Specifications	Test Levels (5/50ns)	Performance Criterion
AC Power Ports	1kV	B
DC Power Ports	0.5kV	B
Signal Ports	0.5kV	B

9.2 Test Procedure

Test is conducting under the description of IEC 61000-4-4.

9.3 Test Results

EFT Test Ports		**Test Levels (kV)**					
		+0.5	**-0.5**	**+1.0**	**-1.0**	**+2.0**	**-2.0**
Power Port (AC Power Supply)	L (Live)	A	A	B	B	--	--
	N (Neutral)	A	A	B	B	--	--
	G (Ground)	A	A	B	B	--	--
	L + N	A	A	B	B	--	--
	L + G	A	A	B	B	--	--
	N + G	A	A	B	B	--	--
	L + N + G	A	A	B	B	--	--
Power Port (DC Power Supply)	P (Positive)	--	--	--	--	--	--
	N (Negative)	--	--	--	--	--	--
	P + N	--	--	--	--	--	--
Signal Ports	--	--	--	--	--	--	--
	--	--	--	--	--	--	--

10. Surges

10.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.8, Limit as below:

Test Specifications	Test Levels (1.2/50us)	Performance Criterion
Line to Line	2kV	B
Line to Ground	1kV	B
DC Power Ports	0.5kV	B
Signal Ports	1kV(10/700us)	B

10.2 Test Procedure

Test is conducting under the description of IEC 61000-4-5.

10.3 Test Results

Surges Test Ports		**Test Levels (kV)**					
		+0.5	**-0.5**	**+1.0**	**-1.0**	**+2.0**	**-2.0**
AC Power Port	L – N	A	A	A	A	--	--
	L – G	A	A	A	A	A	A
	N – G	A	A	A	A	A	A
DC Power Port	P – N	--	--	--	--	--	--
Signal Ports	--	--	--	--	--	--	--
	--	--	--	--	--	--	--

11. Radio Frequency, Common Mode (C/S)

11.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.5, Limit as below:

Test Specifications	Test Levels	Performance Criterion
0.15MHz-80MHz	3V	A

11.2 Test Procedure

Test is conducting under the description of IEC 61000-4-6.

11.3 Test Results

Sweep frequency range: 150 kHz ~ 80 MHz
Frequency step: 1% of fundamental
Dwell time: 1 second

C/S Test Ports	Test Levels	Modulation	Result
AC Power Port	3V	AM 80%, 1kHz sinewave	A
DC Power Port	3V	AM 80%, 1kHz sinewave	--
Signal Port	3V	AM 80%, 1kHz sinewave	--

12. Voltage Dips and Interruptions

12.1 Standard and Limit

According to the standard EN 301489-1 Clause 9.7, Limit as below:

Test Specifications	Test Periods	Performance Criterion
100% reduction	0.5 periods	B
100% reduction	1 periods	B
30% reduction	25 periods	C
100% reduction	250 periods	C

12.2 Test Procedure

Test is conducting under the description of IEC 61000-4-11.

12.3 Test Results

U: Voltage dips in % U_T (U_T is rated voltage for the EUT)
T: Test duration

Dips Test Levels	**U**	**T**	**Phase Angle**	**Result**
1	100%	10ms	0/90/180/270	A
2	100%	20ms	0/90/180/270	A
3	30%	500ms	0/90/180/270	B
4	100%	20ms	0/90/180/270	B

Annex A. EUT Photos

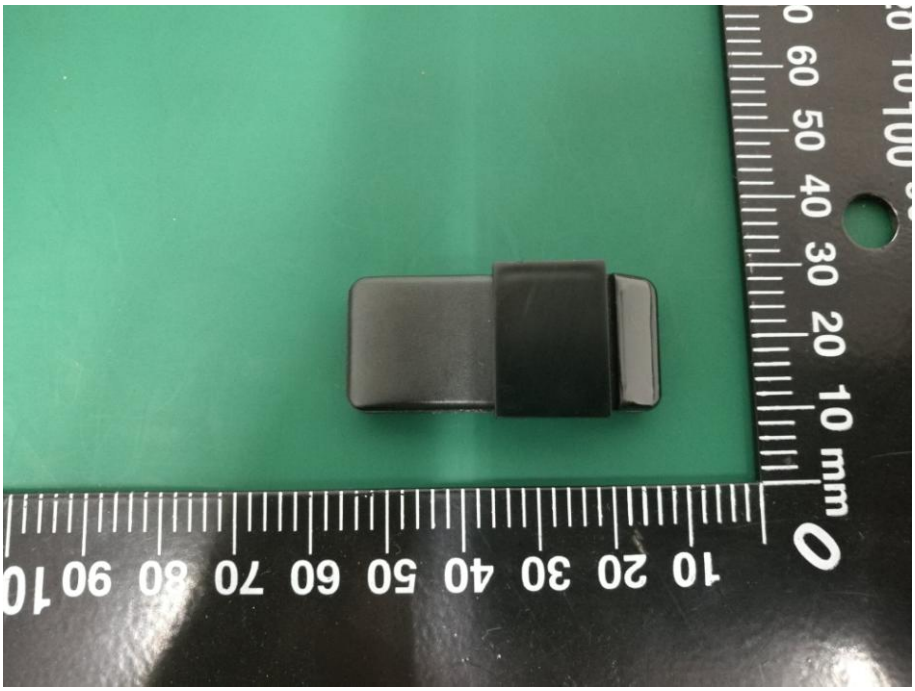
EUT View 1

EUT View 2

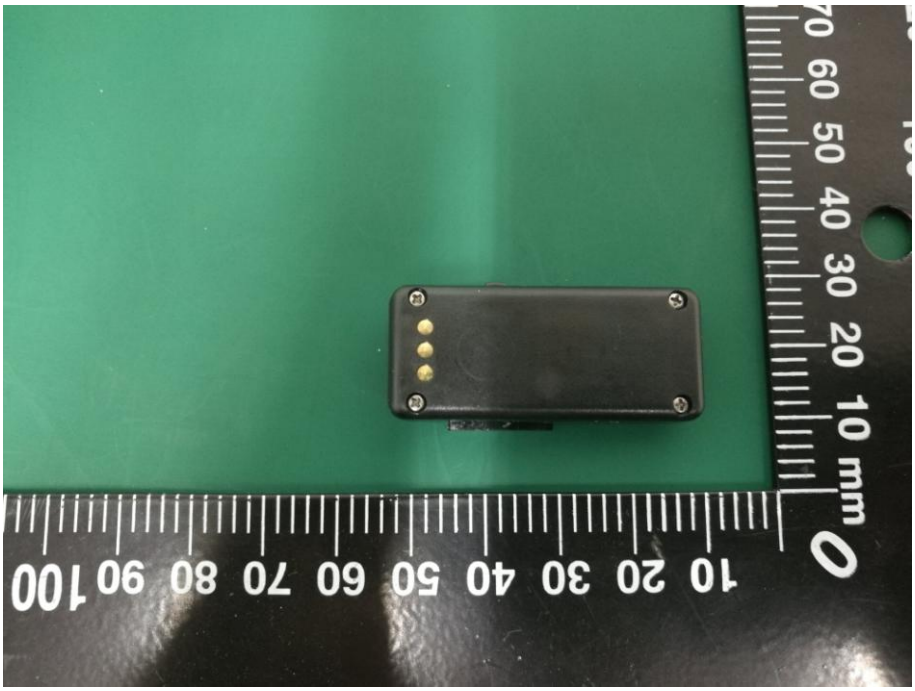
EUT View 3

EUT View 4

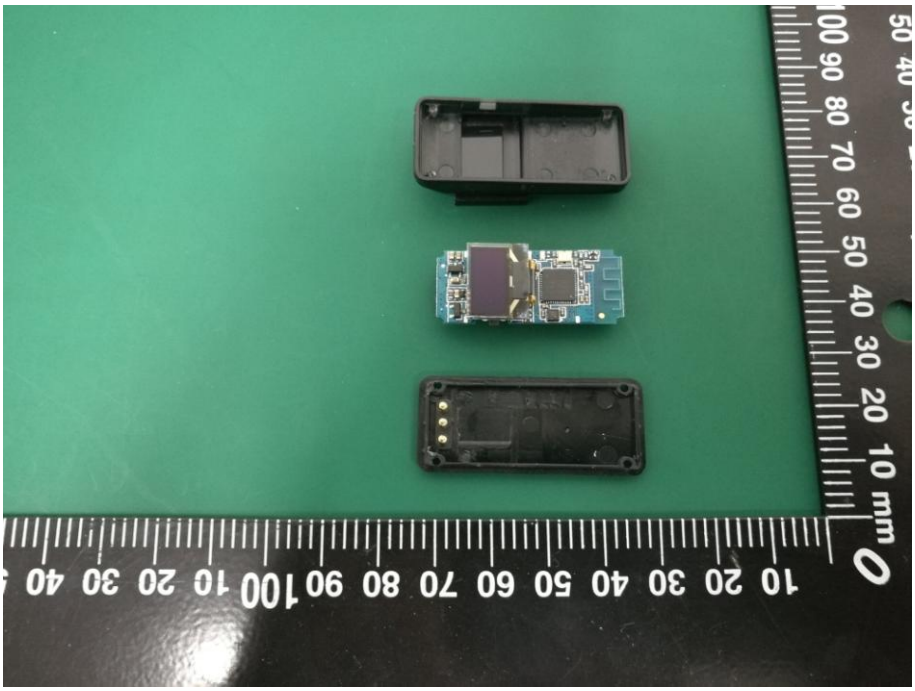
EUT View 5



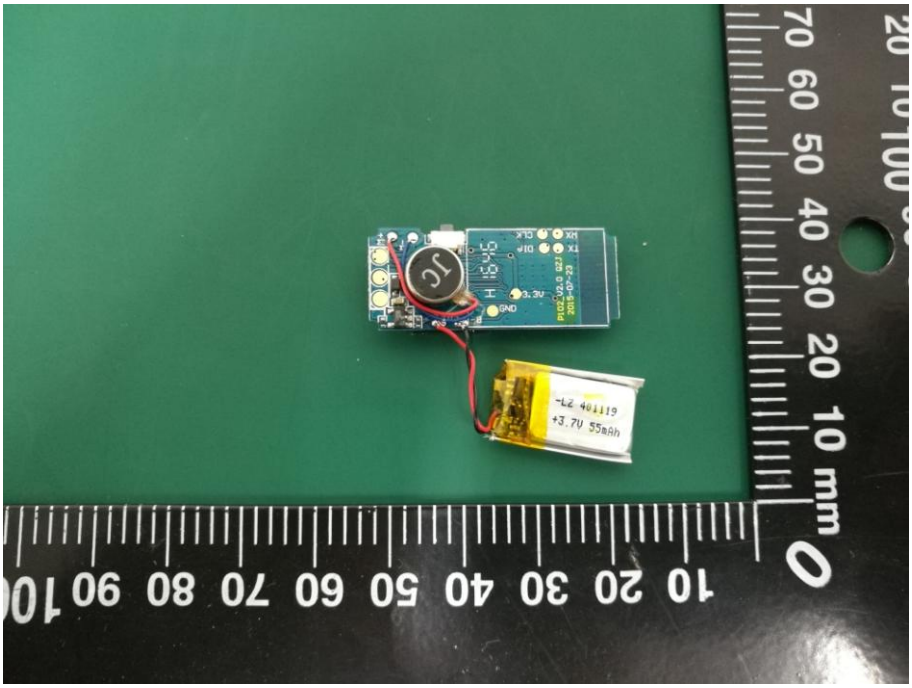
EUT View 6



EUT View 7



EUT View 8



Annex B. Label and Information

CE Mark Sample

CE Mark Specifications

Text is Black in color and is justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT. The ‘CE’ marking must be affixed to the EUT or to its data plate. Where this is not possible or not warranted on account of the nature of the apparatus, it must be affixed to the packaging, if any, and to the accompanying documents. The ‘CE’ marking must have a height of at least 5 mm. If the ‘CE’ marking is reduced or enlarged the proportions given in the above graduated drawing must be respected.

******* END OF REPORT *******