

EN 62311:2008
ASSESSMENT REPORT

For

Shenzhen MingZhan Information Technology Co., Ltd

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Shenzhen, China

Tested Model: M5Stack-CORE

Report Type: Original Report	Product Type: WIFI & Bluetooth Development Board
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Report Number: RSHA170928002-00E	
Report Date: 2017-10-20	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shenzhen MingZhan Information Technology Co., Ltd
Tested Model	M5Stack-CORE
Product Type	WIFI & Bluetooth Development Board
Dimension	54 mm(L)× 54 mm(W)× 12.6 mm(H)
Power Supply	DC 3.7V by battery and DC 5V from USB port

**All measurement and test data in this report was gathered from production sample serial number: 20170928001.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2017-09-28)*

Objective

This report is prepared on behalf of Shenzhen MingZhan Information Technology Co., Ltd in accordance with EN 62311:2008, Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.

The objective is to determine the compliance of EUT with EN 62311:2008.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All measurements contained in this report were conducted with EN 62311:2008.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Technical Requirements Specification in EN 62311

General Description of Applied Standards

EN 62311 Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.

RF Exposure Evaluation

Limit:

According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.

Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	$4\,000/f$	$5\,000/f$	—
0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—
0,8-3 kHz	$250/f$	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	$0,73/f$	$0,92/f$	—
1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$
2-300 GHz	61	0,16	0,20	10

Notes:

1. f as indicated in the frequency range column.

Test method

The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement of the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.

Far Field Calculation Formula

$$E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$$

G = antenna gain relative to an isotropic antenna
 θ, ϕ = elevation and azimuth angles to point of investigation
 r = distance from observation point to the antenna

Test Data**Environmental Conditions**

Temperature:	24.1 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Ada Yu on 2017-10-16.

Wi-Fi:

Function	Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	E-Field Strength (V/m)	E-Field Limit (V/m)	Result
Wi-Fi	2412-2472	17.82	60.53	6.74	61	Pass

Note 1: Antenna Gain (numeric): 2dBi (1.58) for Wi-Fi.

BT:

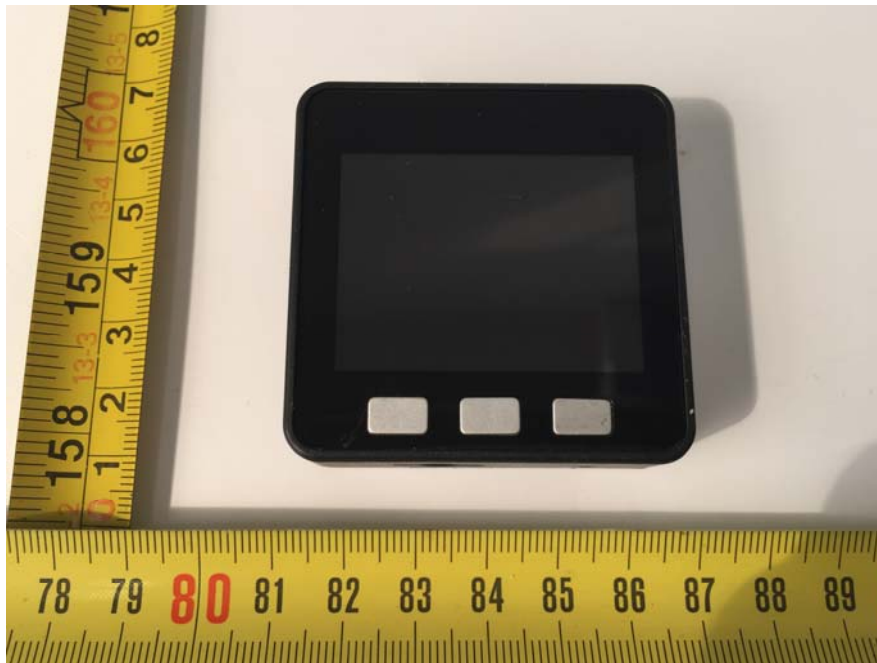
Function	Frequency Range (MHz)	EIRP (dBm)	EIRP (mW)	E-Field Strength (V/m)	E-Field Limit (V/m)	Result
BT3.0	2402-2480	7.72	5.92	2.11	61	Pass
BLE	2402-2480	7.62	5.78	2.08	61	Pass

Note 2: Antenna Gain (numeric): 2dBi (1.58) for BT.

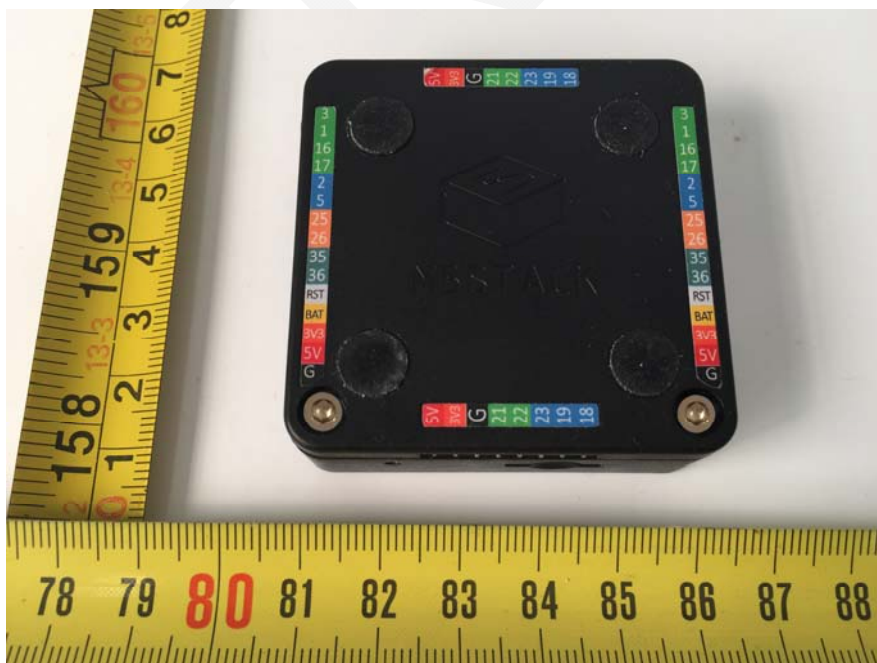
The distance from observation point to the antenna is 20cm.

EXHIBIT B - EUT PHOTOGRAPHS

EUT – Top View



EUT – Bottom View



EUT – Front View



EUT – Rear View



EUT – Left View



EUT – Right View



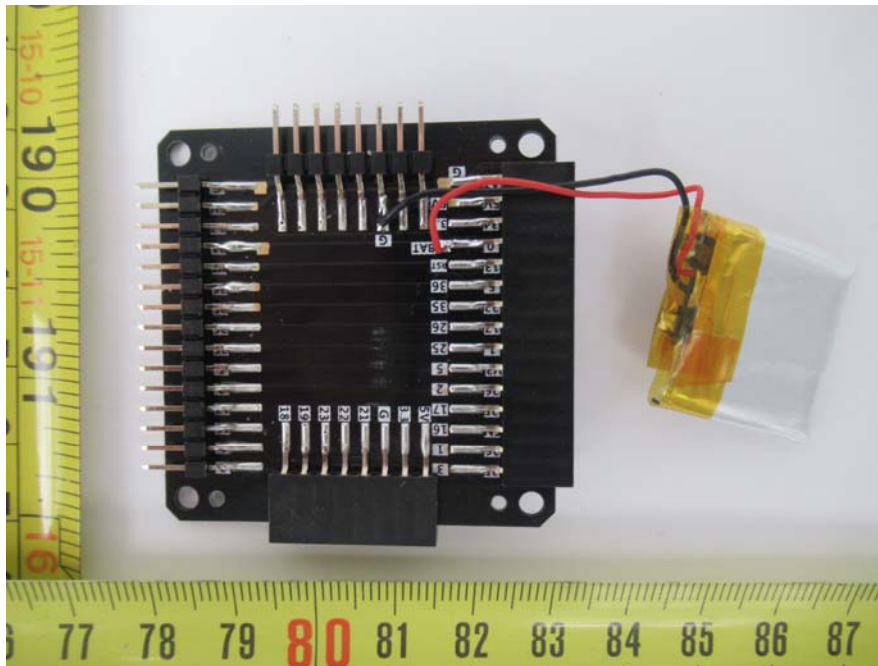
EUT – Cover off View-1



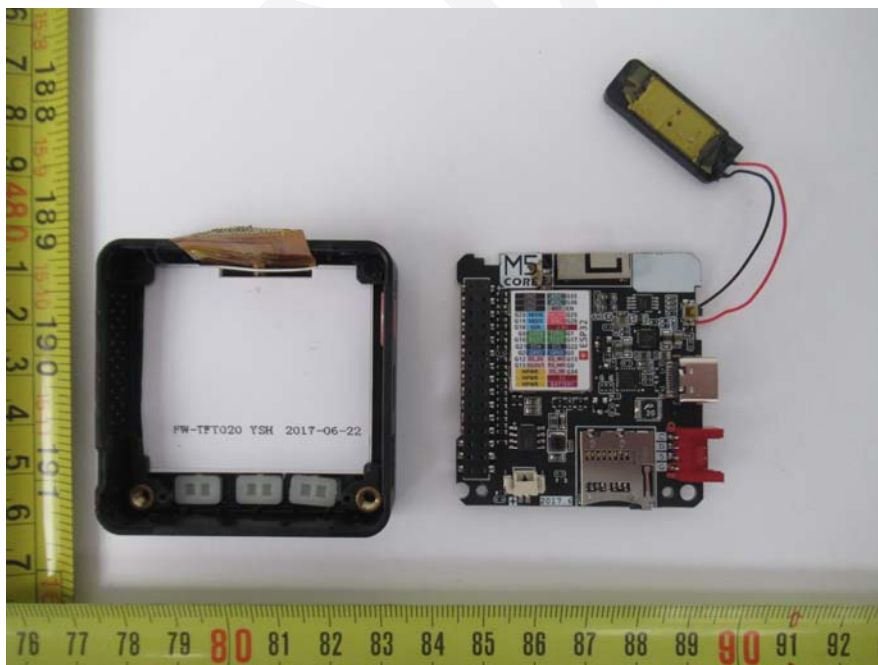
EUT – Cover off View-2



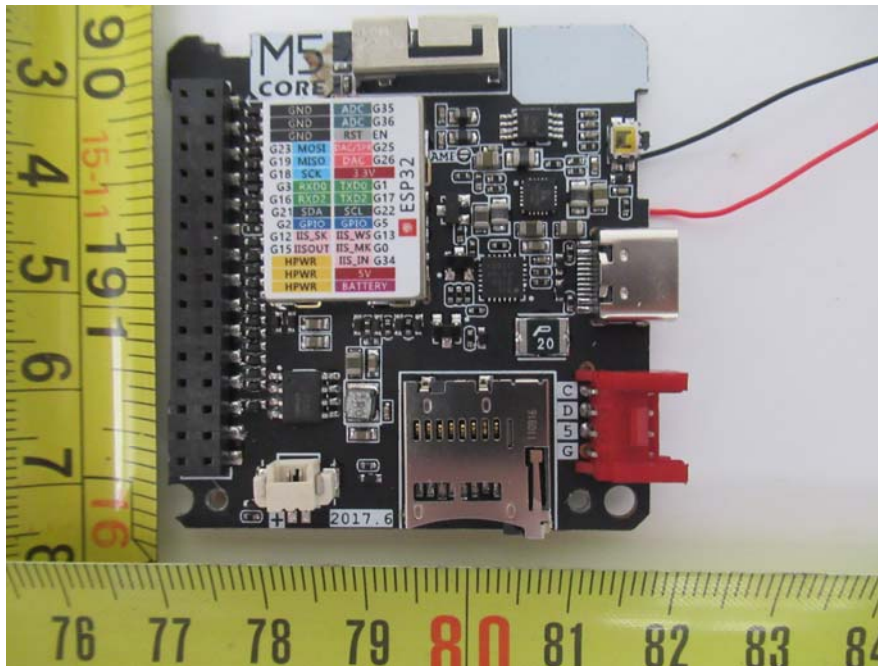
EUT – Cover off View-3



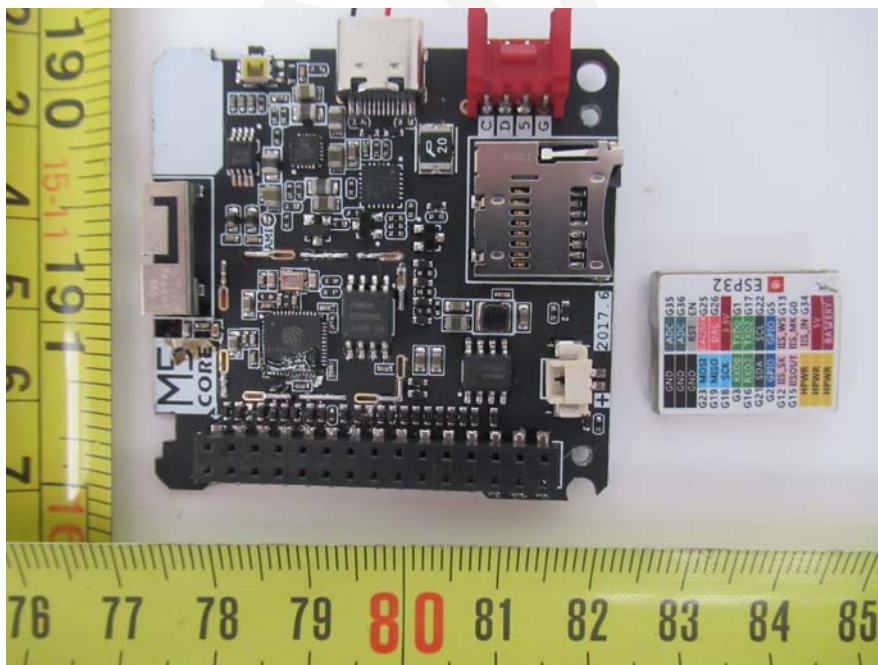
EUT – Cover off View-4



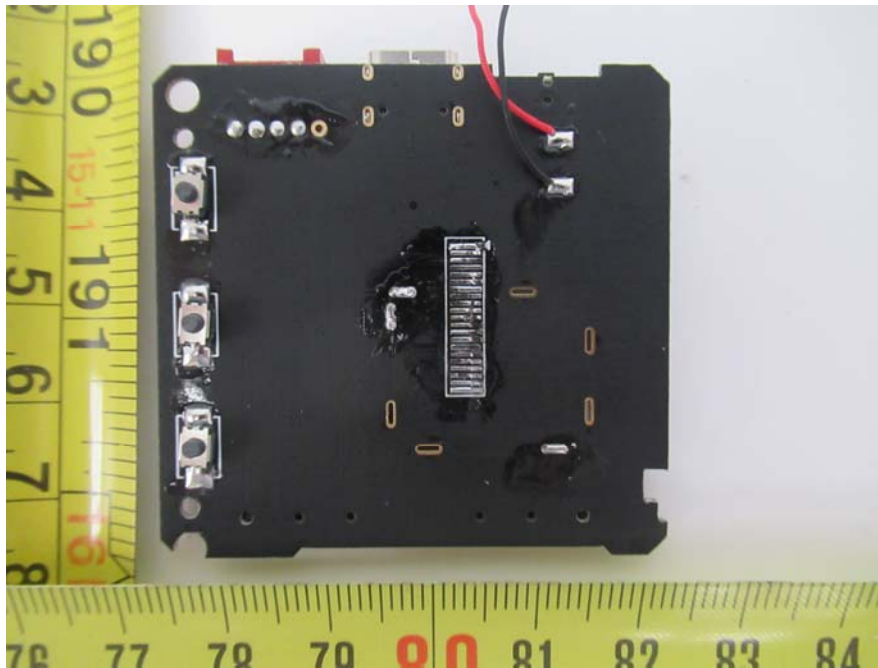
EUT – Main Board Top View



EUT – Main Board Top Shielding off View



EUT – Main Board Bottom View



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