MEASUREMENT REPORT

FCC PART 15.225 NFC 13.56MHz

FCC ID:	HD5-EDA50211
APPLICANT:	Honeywell International Inc Honeywell Sensing & Productivity Solutions

Application Type:	Class II Permissive Change
Product:	Mobile Computer
Model No.:	EDA50-211
Brand Name:	Honeywell
FCC Classification:	Part 15 Low Power Communication Device Transmitter (DXX)
FCC Rule Part(s):	Part 15.225
Test Procedure(s):	ANSI C63.10-2013
Test Date:	July 21 ~ August 12, 2017

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1707RSU02606	Rev. 01	Initial report	08-12-2017	Valid

Note: This test report was based on MRT original report number: 1704RSU05706. The EUT change the all antennas of BT/Wi-Fi/NFC/GSM/WCDMA/LTE, and we have assessed all test items.

CONTENTS

§2.1033 General Information

Applicant:	Honeywell International Inc Honeywell Sensing & Productivity Solutions
Applicant Address:	9680 Old Bailes Rd. Fort Mill, SC 29707 United States
Manufacturer:	Honeywell International Inc Honeywell Sensing & Productivity Solutions
Manufacturer Address:	9680 Old Bailes Rd. Fort Mill, SC 29707 United States
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT Registration No.:	893164
FCC Rule Part(s):	Part 15.225
Model No.:	EDA50-211
FCC ID:	HD5-EDA50211
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Part 15 Low Power Communication Device Transmitter (DXX)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**


Accredited Laboratory

A2LA has accredited

MRT TECHNOLOGY (SUZHOU) CO., LTD.

Suzhou, Jiangsu, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).

Presented this 6th day of September 2016.

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 3628.01
Valid to August 31, 2018

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

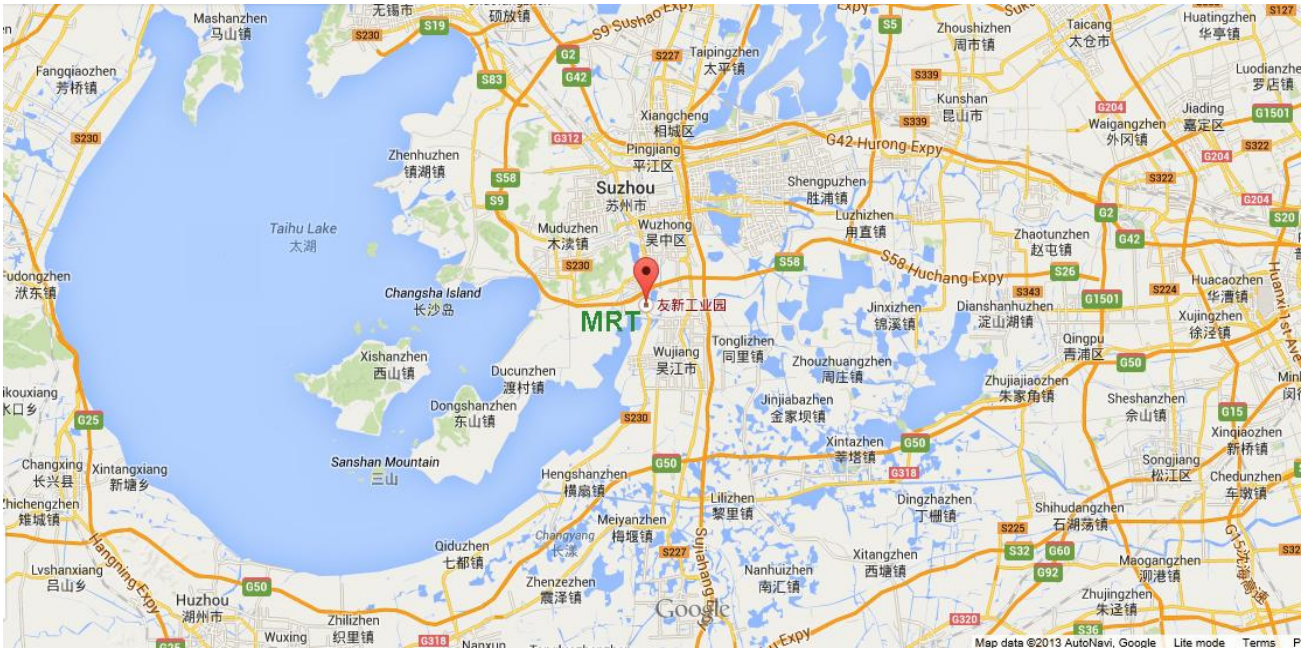
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	Mobile Computer
Model No.:	EDA50-211
Brand Name:	Honeywell
Hardware Version:	V2.0
Software Version:	205.01.00.0006.eng
IMEI:	356074080038511
Wi-Fi Specification:	802.11a/b/g/n
Bluetooth Specification:	v4.0 dual mode
GSM Operation Band (s)	E-GSM 850 / DCS 1900
WCDMA Operation Band (s)	Band II / V
LTE Operation Band (s)	FDD Band 2/4/7
NFC:	13.56MHz
GPS:	1575.42MHz
Components	
Adapter	Model No.: ADS-12B-06 05010E Input Power: 100 - 240V ~ 50/60Hz, Max. 0.3A Output Power: 5VDC 2.0A

2.2. Test Mode

Test Mode
Mode 1: Transmit by NFC

2.3. Device Capabilities

This device contains the following capabilities:

2.4GHz WLAN (DTS), 5GHz WLAN (UNII), Bluetooth (v4.0 dual mode), NFC, GSM 850/1900 WCDMA Band II/IV/V LTE FDD Band 2/4/7

2.4. Test Configuration

The **Mobile Computer FCC ID: HD5-EDA50211** was set to continuous transmission. This was performance using manufacturer software loaded on the terminal to allow for continuous transmission. This device was tested in accordance with the guidance of ANSI C63.10-2013. ANSI C63.4-2014 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.5. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.6. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the **Mobile Computer FCC ID: HD5-EDA50211.**

Deviation from measurement procedure…….....None

3.2. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was

varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the Mobile Computer is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Mobile Computer FCC ID: HD5-EDA50211** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MRTSUE06125	1 year	2017/08/19
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2018/06/20
Loop Antenna	Schwarzbeck	FMZB1519	MRTSUE06025	1 year	2017/11/21
TRILOG Antenna	Schwarzbeck	VULB9168	MRTSUE06172	1 year	2017/11/19
Digital Thermometer & Hygrometer	Minggao	N/A	MRTSUE06170	1 year	2017/12/14
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2018/05/10

Frequency Tolerence - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MRTSUE06125	1 year	2017/08/19
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Software	**Version**	**Function**
e3	V 8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Radiated Emission Measurement - AC2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB

7. TEST RESULT

7.1. Summary

Product Name: **Mobile Computer**
FCC ID: **HD5-EDA50211**
FCC Classification: **Low Power Communication Device Transmitter (DXX)**
Frequency Examined: **13.56MHz**

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.225 (a), (b), (c)	In-Band Emission	15,848uV/m @ 30m 13.553 ~ 13.567 MHz 334uV/m @ 30m 13.410 ~ 13.553 MHz 13.567 ~ 13.710 MHz 106uV/m @ 30m 13.110 ~ 13.410 MHz 13.710 ~ 14.010 MHz	Radiated	Pass	Section 7.2
15.225(d)	Out-Band Emission	Emissions outside of the specified band (13.110~14.010 MHz) must meet the radiated limits detailed in 15.209		Pass	Section 7.3
2.1049	20dB Bandwidth	N/A		Pass	Section 7.4
15.225(e)	Frequency Stability Tolerance	±0.01% of operating frequency		Pass	Section 7.5

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

7.2. In-band Emission

7.2.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.225		
Frequency (MHz)	Distance (m)	Level (uV/m)
13.553 ~13.567	30	15848
13.410 ~13.553 13.567 ~13.710	30	334
13.110 ~13.410 13.710 ~14.010	30	106

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

7.2.2. Test Procedure Used

The EUT was setup according to ANSI C63.4, 2014 and tested according to ANSI C63.10: 2013 for compliance to FCC 47CFR 15.225 requirements.

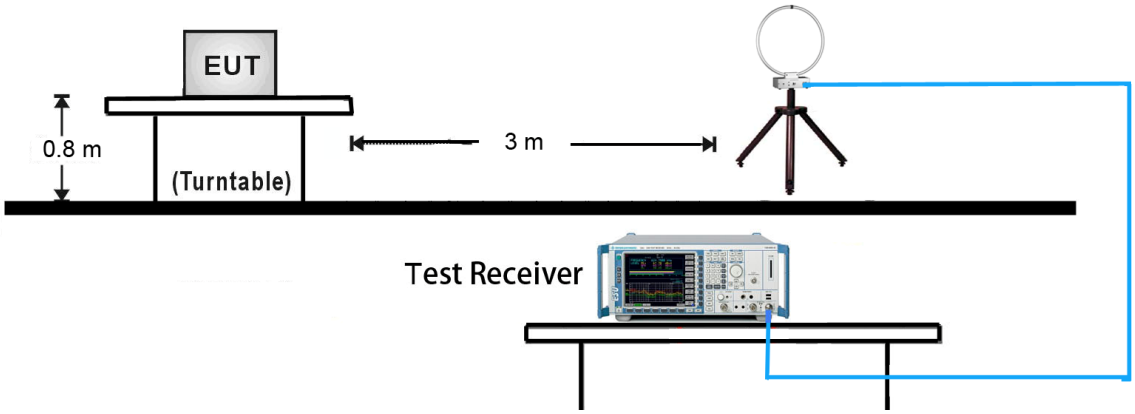
The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2014 on radiated measurement.

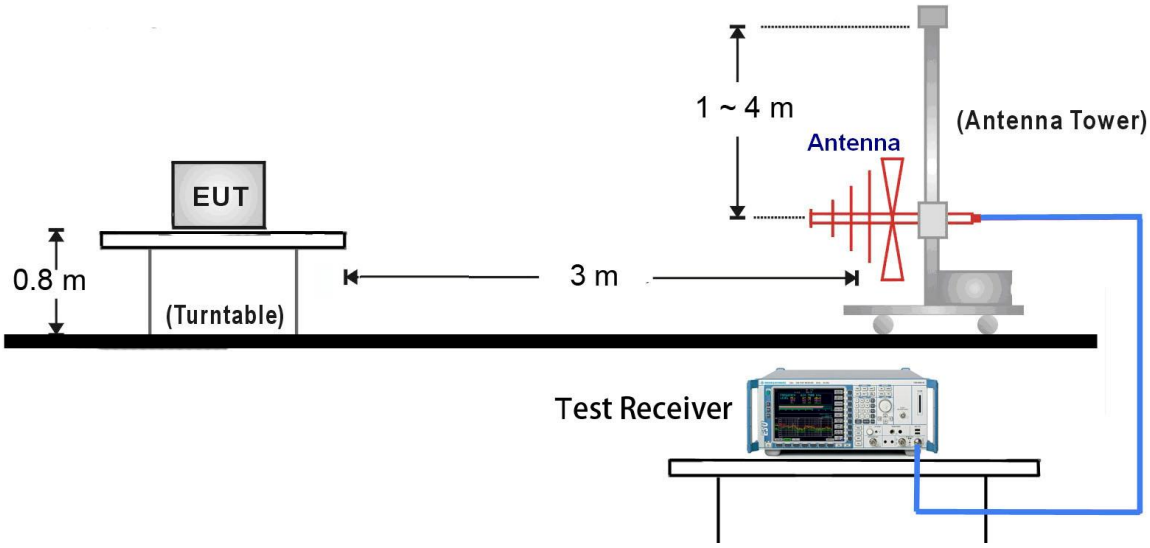
The EUT should be operate in transmission mode.

7.2.3. Test Setup

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



7.2.4. Test Result

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/08/11	Relative Humidity	52%
Test Mode	Mode1	Test Site	AC2

Frequency	Reading Level(dBuV/m)	Factor	Measure Level(dBuV/m)	Limit(3m) [dBuV/m]	Margin [dB]
Face On					
13.35	14.88	19.85	34.73	80.51	-45.78
13.53	19.47	19.86	39.33	90.47	-51.14
13.56	33.35	19.87	53.22	123.99	-70.77
13.58	18.76	19.86	38.62	90.47	-51.85
13.77	13.05	19.88	32.93	80.51	-47.58
Face Off					
13.35	12.89	19.85	32.74	80.51	-47.77
13.53	18.10	19.86	37.96	90.47	-52.51
13.56	31.41	19.87	51.28	123.99	-72.71
13.58	18.19	19.86	38.05	90.47	-52.42
13.77	10.98	19.87	30.85	80.51	-49.66

Note1: All measurements were performed using a loop antenna. The antenna was positioned in two orthogonal (face on and face off) and the position with the highest emission level was recorded.
Note2: Measurements were tested at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear extrapolation factor (40 dB/decade) as specified in &15.31(f)(2).
Extrapolation Factor = 40*Log(30/3) = 40 dB
Note3: All measurements were recorded using a EMI test receiver employing a peak detector.

7.3. Out-band Emission

7.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (uV/m)
0.009 - 0.490	300	2400/F (kHz)
0.490 - 1.705	30	2400/F (kHz)
1.705 - 30	30	30
30 - 88	3	100
88 - 216	3	150
216 - 960	3	200
Above 960	3	500

Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

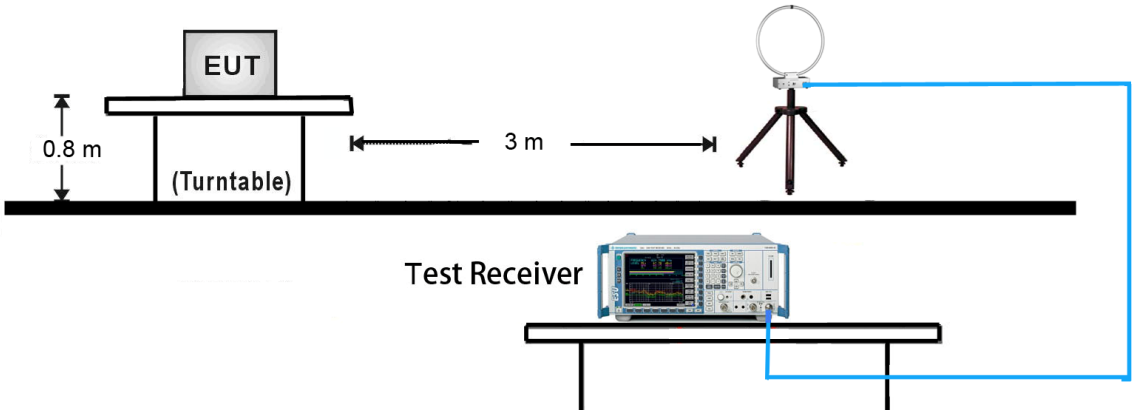
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

7.3.2. Test Procedure Used

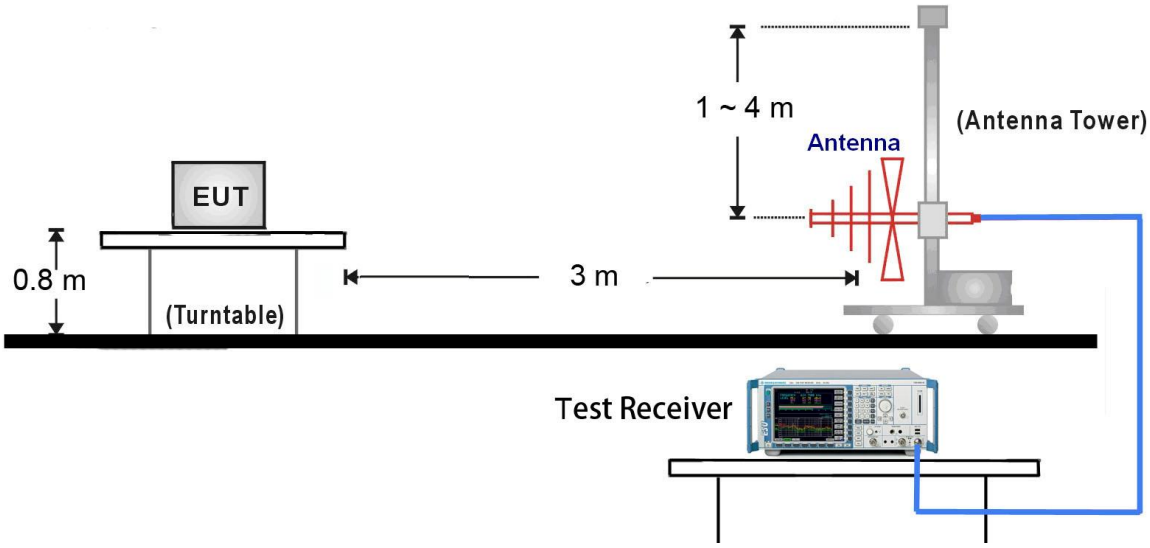
The EUT was tested from 9 kHz up to the 1GHz excluding the band 13.110-14.010MHz. All measurements were recorded with a spectrum analyzer employing an average detector for emissions below 30MHz. Above 30MHz a Quasi-peak detector was used. All out-of-band emissions must not exceed the limits shown as stated per Section 15.209. A loop antenna was used for searching for emissions below 30MHz.

7.3.3. Test Setup

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



7.3.4. Test Result

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/05/25	Relative Humidity	52%
Test Mode	Mode1	Test Site	AC2

Out-Band Emission Below 30MHz						
Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
Face On						
27.12	-0.55	19.51	18.96	69.54	-50.58	AV
Face Off						
27.12	-0.23	19.51	19.28	69.54	-50.26	AV

Out-Band Emission Above 30MHz							
Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	48.92	2.80	14.10	16.90	40.00	-23.10	QP
H	122.64	4.63	13.31	17.94	43.50	-25.56	QP
H	151.25	3.03	15.18	18.21	43.50	-25.29	QP
H	273.96	6.87	13.62	20.49	46.00	-25.51	QP
H	601.82	3.48	20.54	24.02	46.00	-21.98	QP
H	826.86	6.95	23.47	30.42	46.00	-15.58	QP
V	134.76	8.15	14.09	22.24	43.50	-21.26	QP
V	161.92	7.86	15.02	22.88	43.50	-20.62	QP
V	189.08	7.46	11.73	19.19	43.50	-24.31	QP
V	281.23	4.86	13.85	18.71	46.00	-27.29	QP
V	518.40	4.65	18.84	23.49	46.00	-22.51	QP
V	594.06	4.53	20.35	24.88	46.00	-21.12	QP

Note1: All measurements were performed using a loop antenna. The antenna was positioned in two orthogonal (face on and face off) and the position with the highest emission level was recorded.

Note2: Measurements were tested at 3m and the data was extrapolated to the specified measurement distance of 30m using the square of an inverse linear extrapolation factor (40 dB/decade) as specified in &15.31(f)(2).

Extrapolation Factor = 40*Log(30/3) = 40 dB

Note3: All measurements were recorded using a EMI test receiver employing a peak detector.

7.4. 20dB Bandwidth

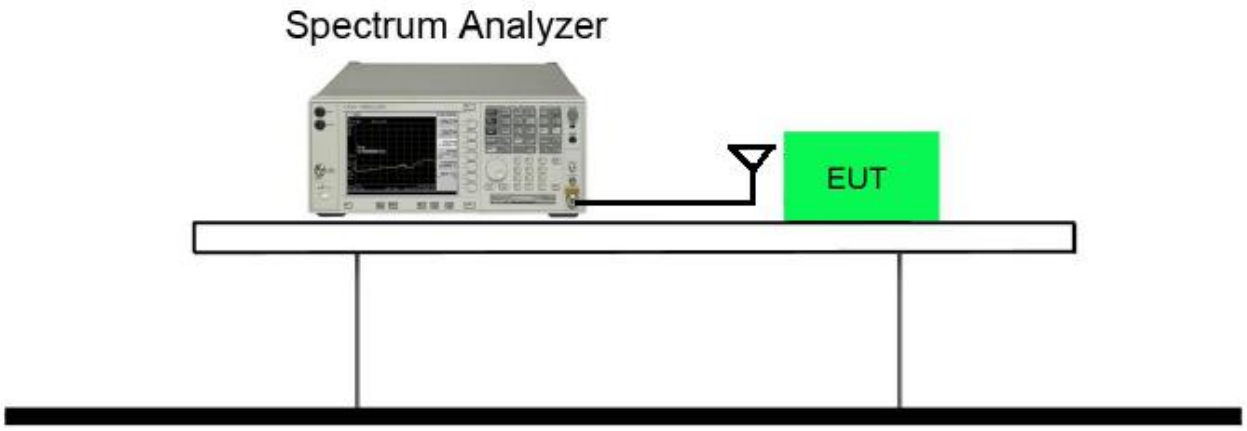
7.4.1. Test Limit

N/A

7.4.2. Test Procedure Used

The 20dB bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

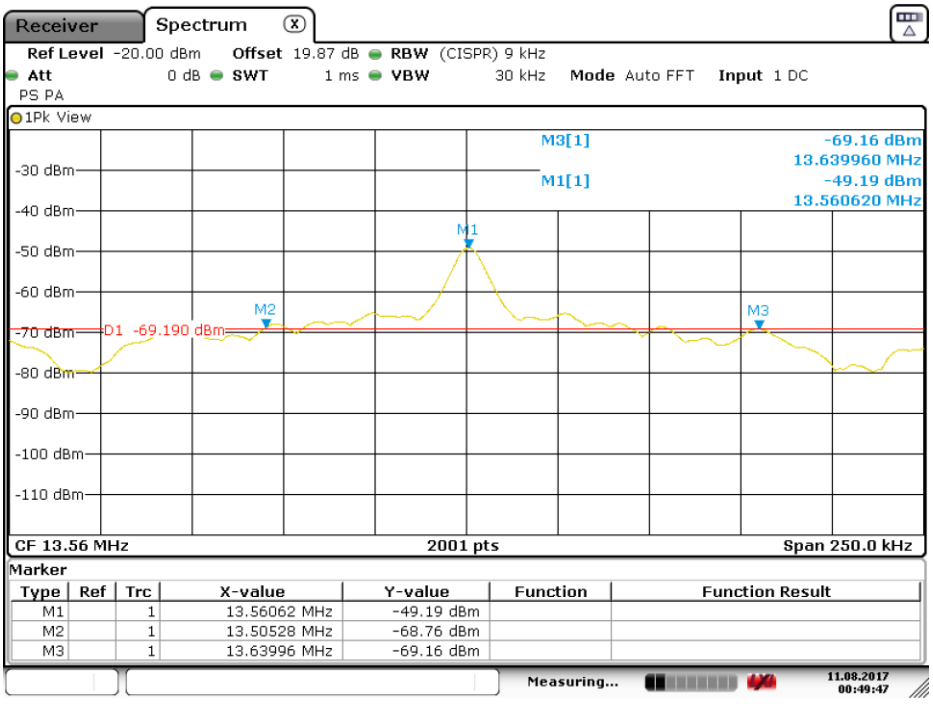
7.4.3. Test Setup



7.4.4. Test Result

Test Engineer	Milo Li	Temperature	25°C
Test Time	2017/08/11	Relative Humidity	52%
Test Mode	Mode1	Test Site	AC2

Frequency (MHz)	Occupied Bandwidth (kHz)
13.56	134.68



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7.5. Frequency Tolerence

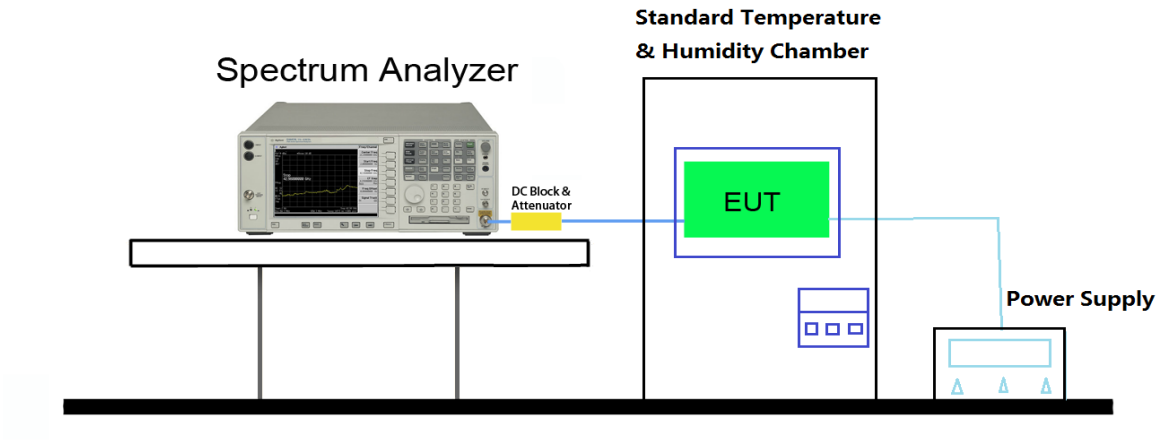
7.5.1. Test Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

7.5.2. Test Procedure Used

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ decreased per stage until the lowest temperature reached.

7.5.3. Test Setup



7.5.4. Test Result

Test Engineer	Vince Yu	Temperature	26°C
Test Time	2017/08/11	Relative Humidity	53%
Test Mode	Mode1	Test Site	TR3

Operating Frequency: 13.56MHz					
Reference Voltage: 3.8Vdc					
Deviation Limit: +/- 0.01% = 1356Hz					
Voltage (%)	Power Battery	TEMP (°C)	FREQ. (Hz)	FREQ. Dev. (Hz)	Deviation (%)
100%	3.80	+20(Ref)	13,560,599	599	0.004417
100%		-30	13,560,585	585	0.004314
100%		-20	13,560,601	601	0.004432
100%		-10	13,560,579	579	0.004270
100%		0	13,560,551	551	0.004063
100%		+10	13,560,580	580	0.004277
100%		+20	13,560,558	558	0.004115
100%		+30	13,560,561	561	0.004137
100%		+40	13,560,547	547	0.004034
100%		+50	13,560,550	550	0.004056
Battery End Point	3.40	+20	13,560,499	499	0.003680
115%	4.37	+20	13,560,510	510	0.003761

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Mobile Computer FCC ID:**

HD5-EDA50211 is in compliance with Part 15C of the FCC Rules.

The End