# MEASUREMENT REPORT

## FCC PART 15.247 Bluetooth v3.0 + HS

| | |
|---|---|
| **FCC ID:** | HD5-EDA50211 |
| **APPLICANT:** | Honeywell International Inc<br>Honeywell Sensing & Productivity Solutions |

| | |
|---|---|
| **Application Type:** | Class II Permissive Change |
| **Product:** | Mobile Computer |
| **Model No.:** | EDA50-211 |
| **Brand Name:** | Honeywell |
| **FCC Classification:** | FCC Part 15 Spread Spectrum Transmitter(DSS) |
| **FCC Rule Part(s):** | Part 15.247 |
| **Test Procedure(s):** | ANSI C63.10-2013, DA 00-705 |
| **Test Date:** | July 24 ~ August 08, 2017 |

Reviewed By : Jame Yuan
( Jame Yuan )

Approved By : Marlin Chen
( Marlin Chen )

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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 C63.10-2013 and DA 00-705. Test results reported herein relate only to the item(s) tested.

# Revision History

| Report No. | Version | Description | Issue Date | Note |
|---|---|---|---|---|
| 1707RSU02602 | Rev. 01 | Initial report | 08-10-2017 | Valid |
| | | | | |

Note: This test report was based on MRT original report number: 1704RSU05702. The EUT change the all antennas of BT/Wi-Fi/NFC/GSM/WCDMA/LTE, and we have assessed the part of radiation emission testing.

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## §2.1033 General Information

| | |
|---|---|
| **Applicant:** | Honeywell International Inc<br>Honeywell Sensing & Productivity Solutions |
| **Applicant Address:** | 9680 Old Bailes Rd. Fort Mill, SC 29707 United States |
| **Manufacturer:** | Honeywell International Inc<br>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 15.247 |
| **Model No.** | EDA50-211 |
| **FCC ID:** | HD5-EDA50211 |
| **Test Device Serial No.:** | N/A ☐ Production ☒ Pre-Production ☐ Engineering |
| **FCC Classification:** | FCC Part 15 Spread Spectrum Transmitter (DSS) |
| **Method/System:** | Frequency Hopping Spread Spectrum (FHSS) |

### 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.

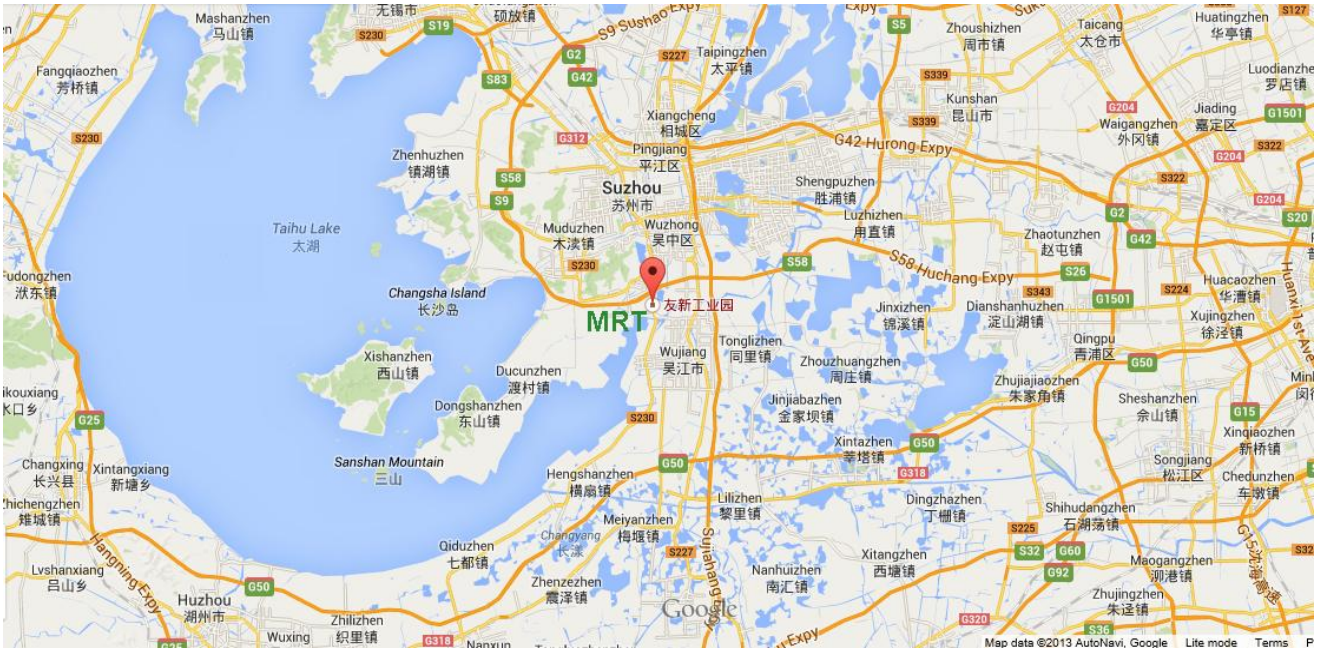
# 1. INTRODUCTION

## 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. Feature of Equipment under Test

| | |
|---|---|
| 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<br>Input Power: 100 - 240V ~ 50/60Hz, Max. 0.3A<br>Output Power: 5VDC 2.0A |

## 2.2. Product Specification Subjective to this Report

| | |
|---|---|
| Bluetooth Frequency | 2402~2480MHz |
| Bluetooth Version | v3.0 + HS |
| Type of modulation | FHSS |
| Data Rate | 1Mbps(GFSK), 2Mbps(Pi/4 DQPSK), 3Mbps (8DPSK) |
| Antenna Type / Antenna Gain: | FPC Antenna / 2.1dBi |

The equipment under test (EUT) is the **Mobile Computer FCC ID: HD5-EDA50211**. The test data contained in this report pertains only to the emissions due to the EUT's Bluetooth transmitter.

- 15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.

- 15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate its channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

- 15.247(h): The EUT employs Adaptive Frequency Hopping (AFH) which identifies sources of interference namely devices operating in 802.11 WLAN and excludes them from the list of available channels. The process of re-mapping reduces the number of test channels from 79 channels to a minimum number of 20 channels.

## 2.3. Working Frequencies for this Report

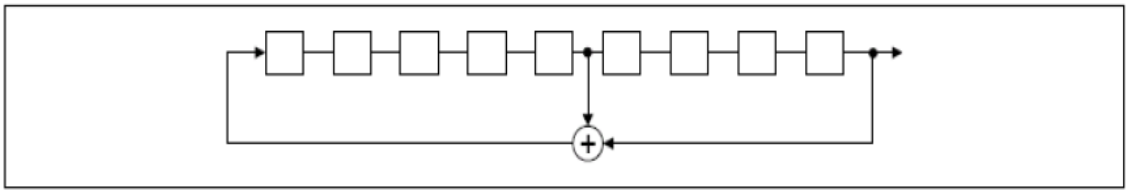
Channel List for Bluetooth v3.0 + HS

| Channel | Frequency | Channel | Frequency | Channel | Frequency |
|---|---|---|---|---|---|
| 00 | 2402 MHz | 01 | 2403 MHz | 02 | 2404 MHz |
| 03 | 2405 MHz | 04 | 2406 MHz | 05 | 2407 MHz |
| 06 | 2408 MHz | 07 | 2409 MHz | 08 | 2410 MHz |
| 09 | 2411 MHz | 10 | 2412 MHz | 11 | 2413 MHz |
| 12 | 2414 MHz | 13 | 2415 MHz | 14 | 2416 MHz |
| 15 | 2417 MHz | 16 | 2418 MHz | 17 | 2419 MHz |
| 18 | 2420 MHz | 19 | 2421 MHz | 20 | 2422 MHz |
| 21 | 2423 MHz | 22 | 2424 MHz | 23 | 2425 MHz |
| 24 | 2426 MHz | 25 | 2427 MHz | 26 | 2428 MHz |
| 27 | 2429 MHz | 28 | 2430 MHz | 29 | 2431 MHz |
| 30 | 2432 MHz | 31 | 2433 MHz | 32 | 2434 MHz |
| 33 | 2435 MHz | 34 | 2436 MHz | 35 | 2437 MHz |
| 36 | 2438 MHz | 37 | 2439 MHz | 38 | 2440 MHz |
| 39 | 2441 MHz | 40 | 2442 MHz | 41 | 2443 MHz |
| 42 | 2444 MHz | 43 | 2445 MHz | 44 | 2446 MHz |
| 45 | 2447 MHz | 46 | 2448 MHz | 47 | 2449 MHz |
| 48 | 2450 MHz | 49 | 2451 MHz | 50 | 2452 MHz |
| 51 | 2453 MHz | 52 | 2454 MHz | 53 | 2455 MHz |
| 54 | 2456 MHz | 55 | 2457 MHz | 56 | 2458 MHz |
| 57 | 2459 MHz | 58 | 2460 MHz | 59 | 2461 MHz |
| 60 | 2462 MHz | 61 | 2463 MHz | 62 | 2464 MHz |
| 63 | 2465 MHz | 64 | 2466 MHz | 65 | 2467 MHz |
| 66 | 2468 MHz | 67 | 2469 MHz | 68 | 2470 MHz |
| 69 | 2471 MHz | 70 | 2472 MHz | 71 | 2473 MHz |
| 72 | 2474 MHz | 73 | 2475 MHz | 74 | 2476 MHz |
| 75 | 2477 MHz | 76 | 2478 MHz | 77 | 2479 MHz |
| 78 | 2480 MHz | -- | -- | -- | -- |

## 2.4. Pseudorandom Frequency Hopping Sequence

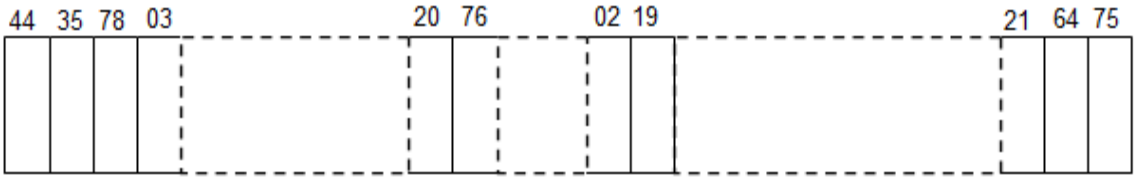
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: $2^9$ - 1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:




Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

## 2.5. Device Capabilities

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

## 2.6. Test Configuration

The **Mobile Computer FCC ID: HD5-EDA50211** was tested per the guidance of ANSI C63.10-2013 and DA 00-705. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

## 2.7. Test Software

The test utility software used during testing was “QRCT Version3.0.105.0”.

## 2.8. EMI Suppression Device(s)/Modifications

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

## 2.9. 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), and the “Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems” (DA 00-705) were 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 for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 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 | 2018/06/21 |
| Preamplifier | Schwarzbeck | BBV 9721 | MRTSUE06121 | 1 year | 2018/04/15 |
| Loop Antenna | Schwarzbeck | FMZB1519 | MRTSUE06025 | 1 year | 2017/11/21 |
| TRILOG Antenna | Schwarzbeck | VULB9168 | MRTSUE06172 | 1 year | 2017/11/19 |
| Broad-Band Horn Antenna | Schwarzbeck | BBHA9120D | MRTSUE06171 | 1 year | 2017/11/19 |
| Broadband Horn Antenna | Schwarzbeck | BBHA9170 | MRTSUE06024 | 1 year | 2017/12/30 |
| Digital Thermometer & Hygrometer | Minggao | N/A | MRTSUE06170 | 1 year | 2017/12/14 |
| Anechoic Chamber | RIKEN | Chamber-AC2 | MRTSUE06213 | 1 year | 2018/05/10 |

| 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)):<br>9kHz ~ 1GHz: 4.18dB<br>1GHz ~ 25GHz: 4.76dB |

# 7. TEST RESULT

## 7.1. Summary

**Product Name:** **Mobile Computer**
**FCC ID:** **HD5-EDA50211**
**Method/System:** **Frequency Hopping Spread Spectrum (FHSS)**
**Number of Channels:** **79**

| FCC Part Section(s) | Test Description | Test Limit | Test Condition | Test Result | Reference |
|---|---|---|---|---|---|
| 15.205<br>15.209 | General Field Strength Limits (Restricted Bands and Radiated Emission Limits) | Emissions in restricted bands must meet the radiated limits detailed in 15.209 | Radiated | PASS | Section 7.2, Section 7.3 |

**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.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
4) For the “Radiated Restricted Band Edge Measurement”, only the worst test channel has been shown.

## 7.2. Radiated Spurious Emission Measurement

### 7.2.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

| FCC Part 15 Subpart C Paragraph 15.209 | | |
|---|---|---|
| Frequency [MHz] | Field Strength [V/m] | Measured Distance [Meters] |
| 0.009 - 0.490 | 2400/F (kHz) | 300 |
| 0.490 - 1.705 | 24000/F (kHz) | 30 |
| 1.705 - 30 | 30 | 30 |
| 30 - 88 | 100 | 3 |
| 88 - 216 | 150 | 3 |
| 216 - 960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 7.2.2. Test Procedure Used

ANSI C63.10-2013 - Section 6.10.5

### 7.2.3. Test Setting

**Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3 * RBW
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

**Table 1 - RBW as a function of frequency**

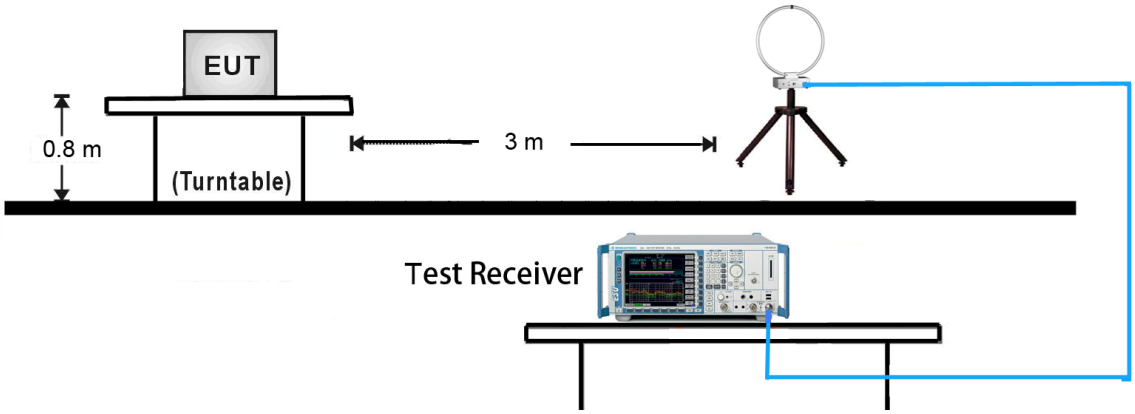
| Frequency | RBW |
|---|---|
| 9 ~ 150 kHz | 200 ~ 300 Hz |
| 0.15 ~ 30 MHz | 9 ~ 10 kHz |
| 30 ~ 1000 MHz | 100 ~ 120 kHz |
| > 1000 MHz | 1 MHz |

**Average Field Strength Measurements**

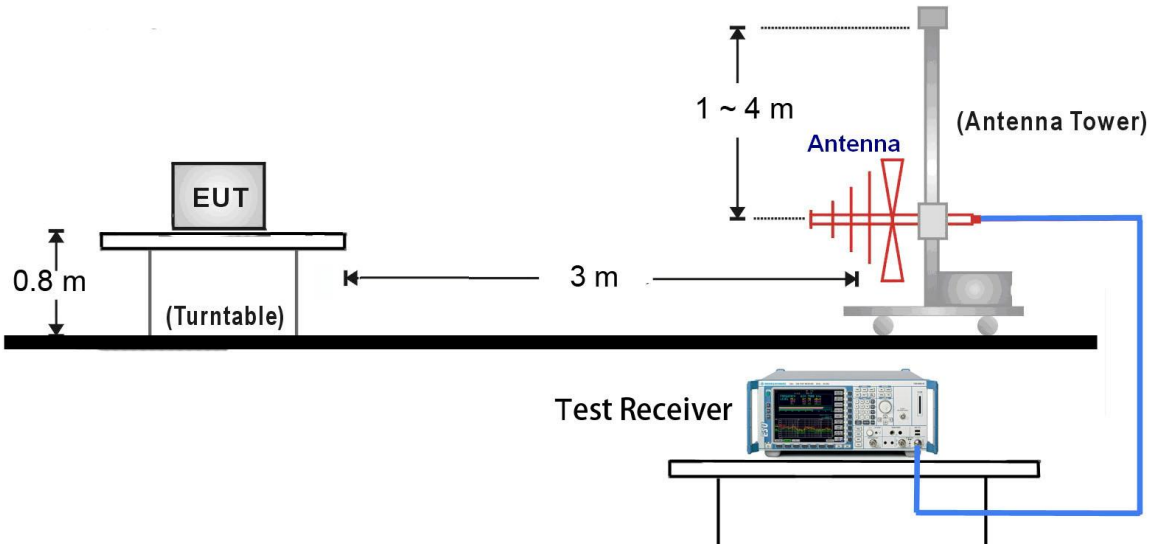
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

### 7.2.4. Test Setup

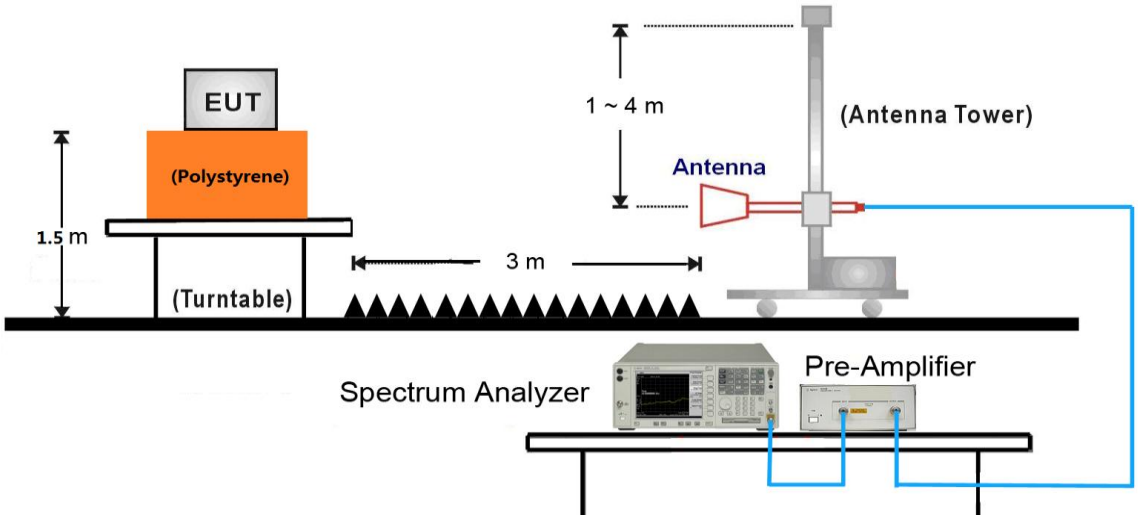
9kHz ~ 30MHz Test Setup:




30MHz ~ 1GHz Test Setup:



1GHz ~ 25GHz Test Setup:



### 7.2.5. Test Result

| Product: | Mobile Computer | Temperature: | 25°C |
|---|---|---|---|
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | DH5 | Test Channel: | 00 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 3975.0 | 37.4 | -0.5 | 36.9 | 74.0 | -37.1 | Peak | Horizontal |
| | 6499.5 | 33.1 | 7.2 | 40.3 | 74.0 | -33.7 | Peak | Horizontal |
| | 7502.5 | 32.5 | 11.0 | 43.5 | 74.0 | -30.5 | Peak | Horizontal |
| | 9925.0 | 31.8 | 13.3 | 45.1 | 74.0 | -28.9 | Peak | Horizontal |
| | 4723.0 | 34.9 | 2.8 | 37.7 | 74.0 | -36.3 | Peak | Vertical |
| | 6661.0 | 33.2 | 7.6 | 40.8 | 74.0 | -33.2 | Peak | Vertical |
| | 7545.0 | 32.5 | 10.9 | 43.4 | 74.0 | -30.6 | Peak | Vertical |
| | 10205.5 | 32.5 | 14.0 | 46.5 | 74.0 | -27.5 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| | | | |
|---|---|---|---|
| Product: | Mobile Computer | Temperature: | 25°C |
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | DH5 | Test Channel: | 39 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 3890.0 | 36.3 | -0.6 | 35.7 | 74.0 | -38.3 | Peak | Horizontal |
| | 6431.5 | 33.9 | 6.7 | 40.6 | 74.0 | -33.4 | Peak | Horizontal |
| | 7468.5 | 32.6 | 11.0 | 43.6 | 74.0 | -30.4 | Peak | Horizontal |
| | 13044.5 | 32.3 | 17.5 | 49.8 | 74.0 | -24.2 | Peak | Horizontal |
| | 4884.5 | 36.1 | 2.7 | 38.8 | 74.0 | -35.2 | Peak | Vertical |
| | 6295.5 | 32.6 | 6.0 | 38.6 | 74.0 | -35.4 | Peak | Vertical |
| | 11523.0 | 32.1 | 17.2 | 49.3 | 74.0 | -24.7 | Peak | Vertical |
| | 14217.5 | 32.0 | 21.5 | 53.5 | 74.0 | -20.5 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| Product: | Mobile Computer | Temperature: | 25°C |
|---|---|---|---|
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | DH5 | Test Channel: | 79 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 4187.5 | 36.4 | 0.5 | 36.9 | 74.0 | -37.1 | Peak | Horizontal |
| | 6550.5 | 33.1 | 7.4 | 40.5 | 74.0 | -33.5 | Peak | Horizontal |
| | 7460.0 | 32.9 | 11.1 | 44.0 | 74.0 | -30.0 | Peak | Horizontal |
| | 10146.0 | 32.5 | 13.8 | 46.3 | 74.0 | -27.7 | Peak | Horizontal |
| | 4323.5 | 35.9 | 1.0 | 36.9 | 74.0 | -37.1 | Peak | Vertical |
| | 5598.5 | 35.4 | 3.7 | 39.1 | 74.0 | -34.9 | Peak | Vertical |
| | 7545.0 | 32.9 | 10.9 | 43.8 | 74.0 | -30.2 | Peak | Vertical |
| | 7876.5 | 34.1 | 10.5 | 44.6 | 74.0 | -29.4 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| | | | |
|---|---|---|---|
| Product: | Mobile Computer | Temperature: | 25°C |
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 2DH5 | Test Channel: | 00 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 6618.5 | 33.3 | 7.6 | 40.9 | 74.0 | -33.1 | Peak | Horizontal |
| | 10537.0 | 32.7 | 15.3 | 48.0 | 74.0 | -26.0 | Peak | Horizontal |
| | 11098.0 | 31.2 | 16.9 | 48.1 | 74.0 | -25.9 | Peak | Horizontal |
| | 14769.2 | 18.4 | 20.5 | 38.9 | 74.0 | -35.1 | Peak | Horizontal |
| | 5054.5 | 36.1 | 2.9 | 39.0 | 74.0 | -35.0 | Peak | Vertical |
| | 6635.5 | 33.5 | 7.6 | 41.1 | 74.0 | -32.9 | Peak | Vertical |
| | 11523.0 | 31.4 | 17.2 | 48.6 | 74.0 | -25.4 | Peak | Vertical |
| | 14991.0 | 18.5 | 19.1 | 37.6 | 74.0 | -36.4 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| | | | |
|---|---|---|---|
| Product: | Mobile Computer | Temperature: | 25°C |
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 2DH5 | Test Channel: | 39 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 5377.5 | 34.6 | 3.0 | 37.6 | 74.0 | -36.4 | Peak | Horizontal |
| * | 6550.5 | 33.8 | 7.4 | 41.2 | 74.0 | -32.8 | Peak | Horizontal |
| | 11557.0 | 31.6 | 17.7 | 49.3 | 74.0 | -24.7 | Peak | Horizontal |
| * | 13172.0 | 31.9 | 17.8 | 49.7 | 74.0 | -24.3 | Peak | Horizontal |
| | 4706.0 | 34.7 | 2.7 | 37.4 | 74.0 | -36.6 | Peak | Vertical |
| * | 6499.5 | 33.7 | 7.2 | 40.9 | 74.0 | -33.1 | Peak | Vertical |
| | 9126.0 | 31.7 | 12.5 | 44.2 | 74.0 | -29.8 | Peak | Vertical |
| * | 13002.0 | 32.2 | 17.3 | 49.5 | 74.0 | -24.5 | Peak | Vertical |

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

| Product: | Mobile Computer | Temperature: | 25°C |
|---|---|---|---|
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 2DH5 | Test Channel: | 79 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 4638.0 | 34.8 | 2.4 | 37.2 | 74.0 | -36.8 | Peak | Horizontal |
| * | 6720.5 | 33.5 | 7.6 | 41.1 | 74.0 | -32.9 | Peak | Horizontal |
| | 7604.5 | 33.1 | 10.8 | 43.9 | 74.0 | -30.1 | Peak | Horizontal |
| * | 10307.5 | 32.1 | 14.7 | 46.8 | 74.0 | -27.2 | Peak | Horizontal |
| | 5080.0 | 35.5 | 3.1 | 38.6 | 74.0 | -35.4 | Peak | Vertical |
| * | 6601.5 | 33.0 | 7.5 | 40.5 | 74.0 | -33.5 | Peak | Vertical |
| | 7426.0 | 34.5 | 10.7 | 45.2 | 74.0 | -28.8 | Peak | Vertical |
| * | 9627.5 | 32.6 | 12.7 | 45.3 | 74.0 | -28.7 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| Product: | Mobile Computer | Temperature: | 25°C |
|---|---|---|---|
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 3DH5 | Test Channel: | 00 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 4808.0 | 35.6 | 2.7 | 38.3 | 74.0 | -35.7 | Peak | Horizontal |
| * | 5683.5 | 35.5 | 4.0 | 39.5 | 74.0 | -34.5 | Peak | Horizontal |
| | 7264.5 | 33.1 | 10.7 | 43.8 | 74.0 | -30.2 | Peak | Horizontal |
| * | 9916.5 | 32.1 | 13.4 | 45.5 | 74.0 | -28.5 | Peak | Horizontal |
| | 4629.5 | 35.1 | 2.3 | 37.4 | 74.0 | -36.6 | Peak | Vertical |
| * | 6678.0 | 31.9 | 7.7 | 39.6 | 74.0 | -34.4 | Peak | Vertical |
| | 7630.0 | 33.5 | 10.5 | 44.0 | 74.0 | -30.0 | Peak | Vertical |
| * | 9729.5 | 33.2 | 12.4 | 45.6 | 74.0 | -28.4 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| Product: | Mobile Computer | Temperature: | 25°C |
|---|---|---|---|
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 3DH5 | Test Channel: | 39 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

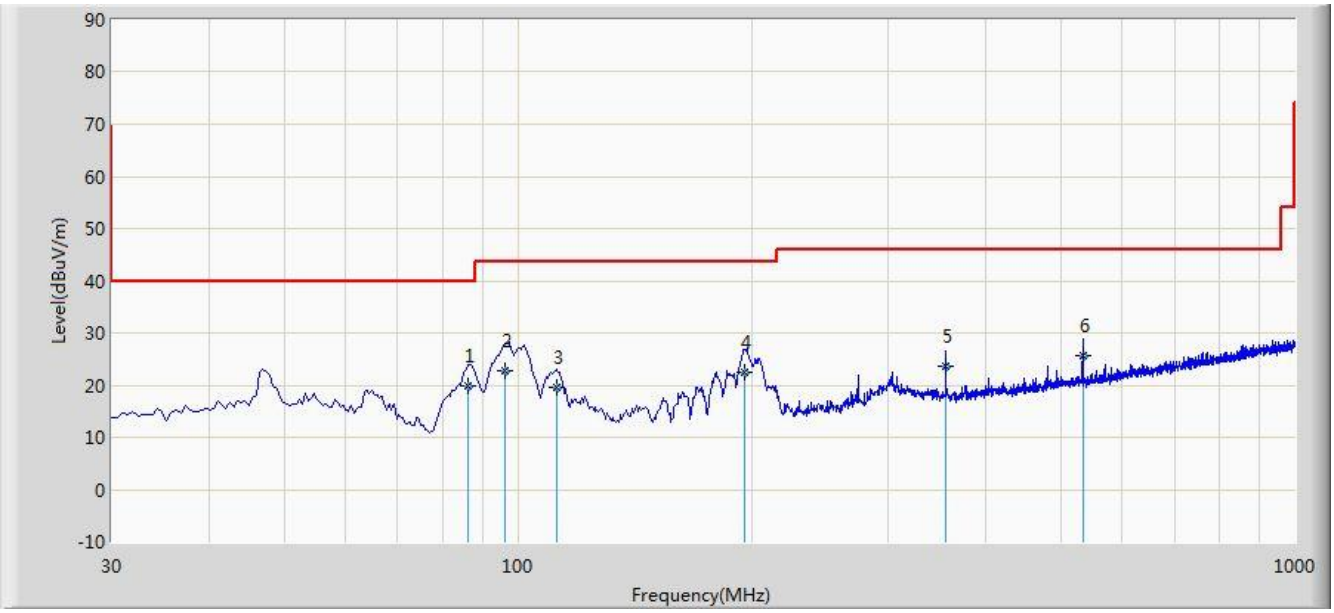
| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 5080.0 | 35.7 | 3.1 | 38.8 | 74.0 | -35.2 | Peak | Horizontal |
| * | 6499.5 | 33.3 | 7.2 | 40.5 | 74.0 | -33.5 | Peak | Horizontal |
| | 7460.0 | 33.1 | 11.1 | 44.2 | 74.0 | -29.8 | Peak | Horizontal |
| * | 9916.5 | 33.0 | 13.4 | 46.4 | 74.0 | -27.6 | Peak | Horizontal |
| | 5445.5 | 35.9 | 3.1 | 39.0 | 74.0 | -35.0 | Peak | Vertical |
| * | 6610.0 | 33.6 | 7.6 | 41.2 | 74.0 | -32.8 | Peak | Vertical |
| | 11557.0 | 31.4 | 17.7 | 49.1 | 74.0 | -24.9 | Peak | Vertical |
| * | 14659.5 | 18.7 | 20.5 | 39.2 | 74.0 | -34.8 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

| | | | |
|---|---|---|---|
| Product: | Mobile Computer | Temperature: | 25°C |
| Test Engineer: | Snake Ni | Relative Humidity: | 51 ~ 56% |
| Test Site: | AC2 | Test data: | 2017/07/28 |
| Test Mode: | 3DH5 | Test Channel: | 79 |
| Remark: | 1. Average measurement was not performed if peak level lower than average limit.<br>2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. | | |

| Mark | Frequency (MHz) | Reading Level (dBμV) | Factor (dB) | Measure Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector | Polarization |
|---|---|---|---|---|---|---|---|---|
| | 4655.0 | 34.9 | 2.6 | 37.5 | 74.0 | -36.5 | Peak | Horizontal |
| | 6491.0 | 34.2 | 7.3 | 41.5 | 74.0 | -32.5 | Peak | Horizontal |
| | 8429.0 | 33.0 | 10.6 | 43.6 | 74.0 | -30.4 | Peak | Horizontal |
| | 15280.0 | 34.0 | 18.7 | 52.7 | 74.0 | -21.3 | Peak | Horizontal |
| | 5131.0 | 35.5 | 3.2 | 38.7 | 74.0 | -35.3 | Peak | Vertical |
| | 6227.5 | 35.4 | 6.1 | 41.5 | 74.0 | -32.5 | Peak | Vertical |
| | 7494.0 | 33.4 | 11.0 | 44.4 | 74.0 | -29.6 | Peak | Vertical |
| | 9942.0 | 31.2 | 13.3 | 44.5 | 74.0 | -29.5 | Peak | Vertical |
| Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)<br>Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB) | | | | | | | | |

**The worst case of Radiated Emission 9KHz ~ 1GHz and 18GHz ~ 25GHz:**

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 02:40 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: VULB9162_0.03-8GHz | Polarity: Horizontal |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| **Worse Case Mode:** Transmit by DH5 at Channel 2480MHz | |



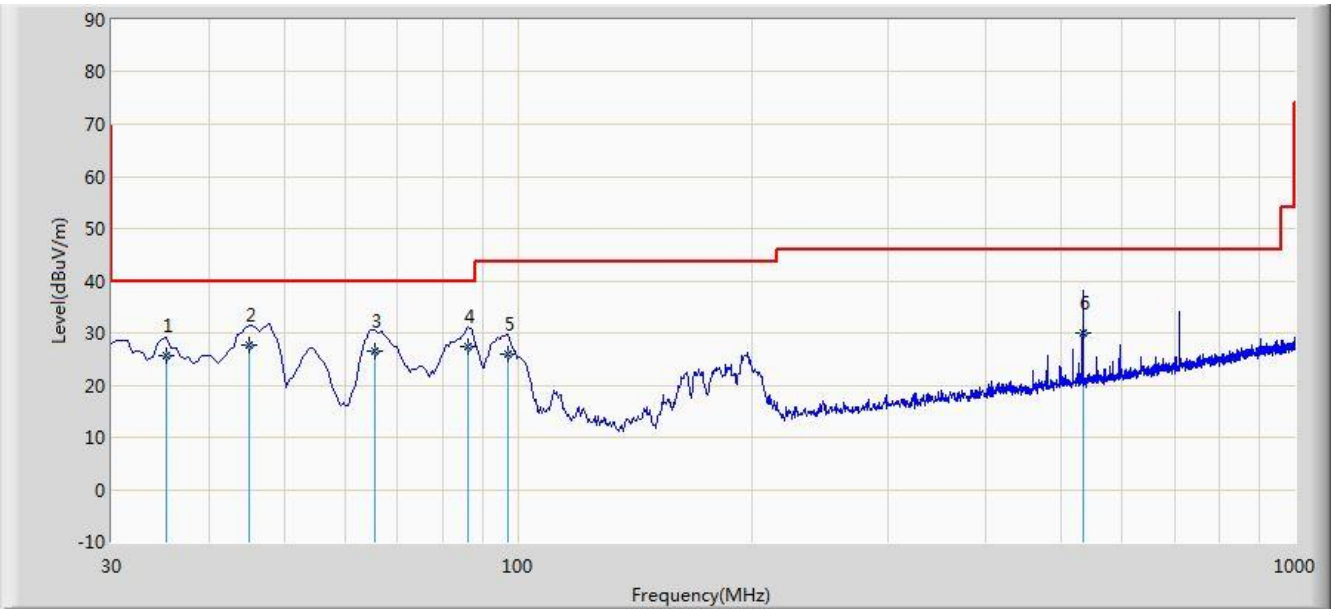

| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | * | 86.260 | 19.867 | 9.551 | -20.133 | 40.000 | 10.316 | QP |
| 2 | | | 96.445 | 22.775 | 10.251 | -20.725 | 43.500 | 12.524 | QP |
| 3 | | | 112.450 | 19.472 | 6.958 | -24.028 | 43.500 | 12.514 | QP |
| 4 | | | 195.870 | 22.348 | 10.205 | -21.152 | 43.500 | 12.143 | QP |
| 5 | | | 355.435 | 23.525 | 7.585 | -22.475 | 46.000 | 15.940 | QP |
| 6 | | | 533.430 | 25.701 | 6.870 | -20.299 | 46.000 | 18.832 | QP |

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 02:54 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: VULB9162_0.03-8GHz | Polarity: Vertical |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| **Worse Case Mode:** Transmit by DH5 at Channel 2480MHz | |




| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | | 35.335 | 25.520 | 12.518 | -14.480 | 40.000 | 13.001 | QP |
| 2 | | * | 45.035 | 27.796 | 12.950 | -12.204 | 40.000 | 14.846 | QP |
| 3 | | | 65.405 | 26.637 | 14.215 | -13.363 | 40.000 | 12.422 | QP |
| 4 | | | 86.260 | 27.517 | 17.201 | -12.483 | 40.000 | 10.316 | QP |
| 5 | | | 96.930 | 25.866 | 13.280 | -17.634 | 43.500 | 12.585 | QP |
| 6 | | | 533.430 | 30.041 | 11.210 | -15.959 | 46.000 | 18.832 | QP |

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

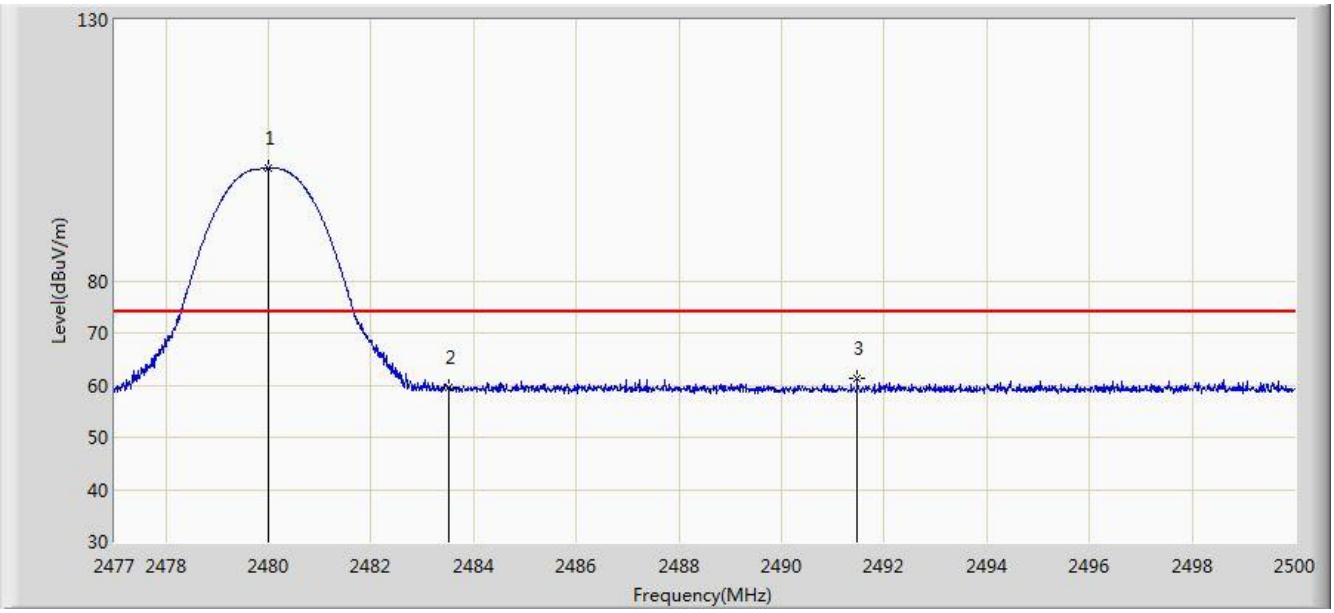
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

## 7.3. Radiated Restricted Band Edge Measurement

### 7.3.1. Test Result

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 05:46 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: BBHA9120D_1-18GHz | Polarity: Horizontal |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| Test Mode: Transmit by DH5 at Channel 2480MHz | |

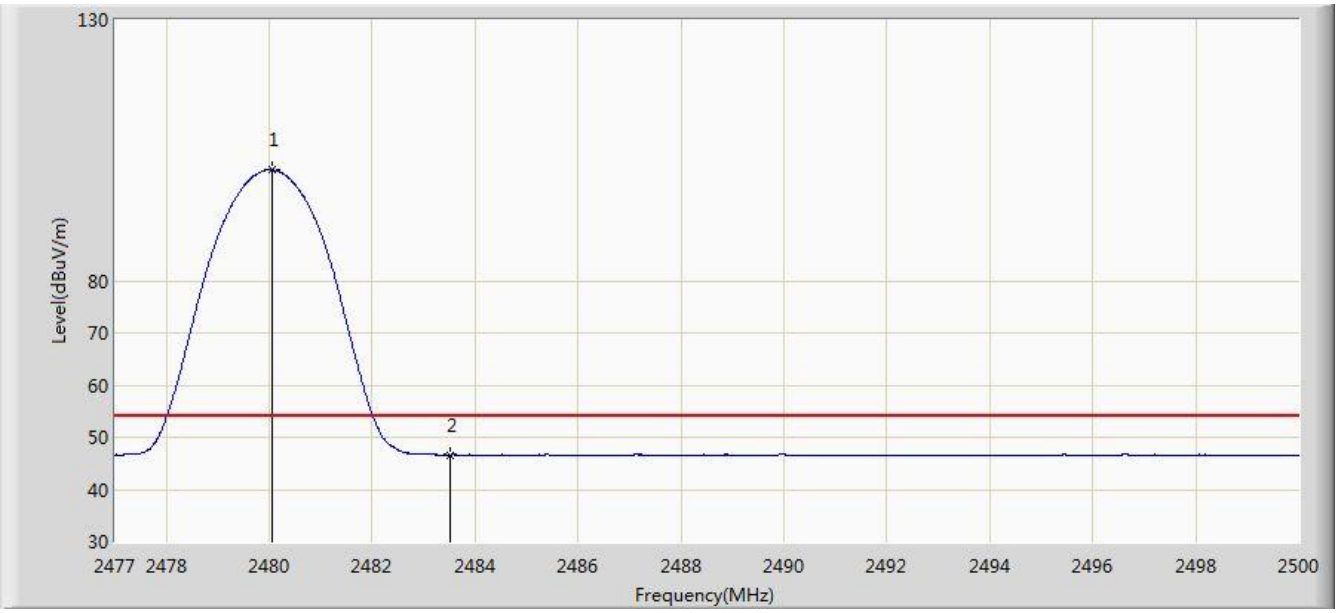



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | * | 2479.990 | 101.486 | 69.217 | N/A | N/A | 32.269 | PK |
| 2 | | | 2483.500 | 59.500 | 27.219 | -14.500 | 74.000 | 32.282 | PK |
| 3 | | | 2491.467 | 61.292 | 28.983 | -12.708 | 74.000 | 32.309 | PK |

Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 05:54 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: BBHA9120D_1-18GHz | Polarity: Horizontal |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| Test Mode: Transmit by DH5 at Channel 2480MHz | |

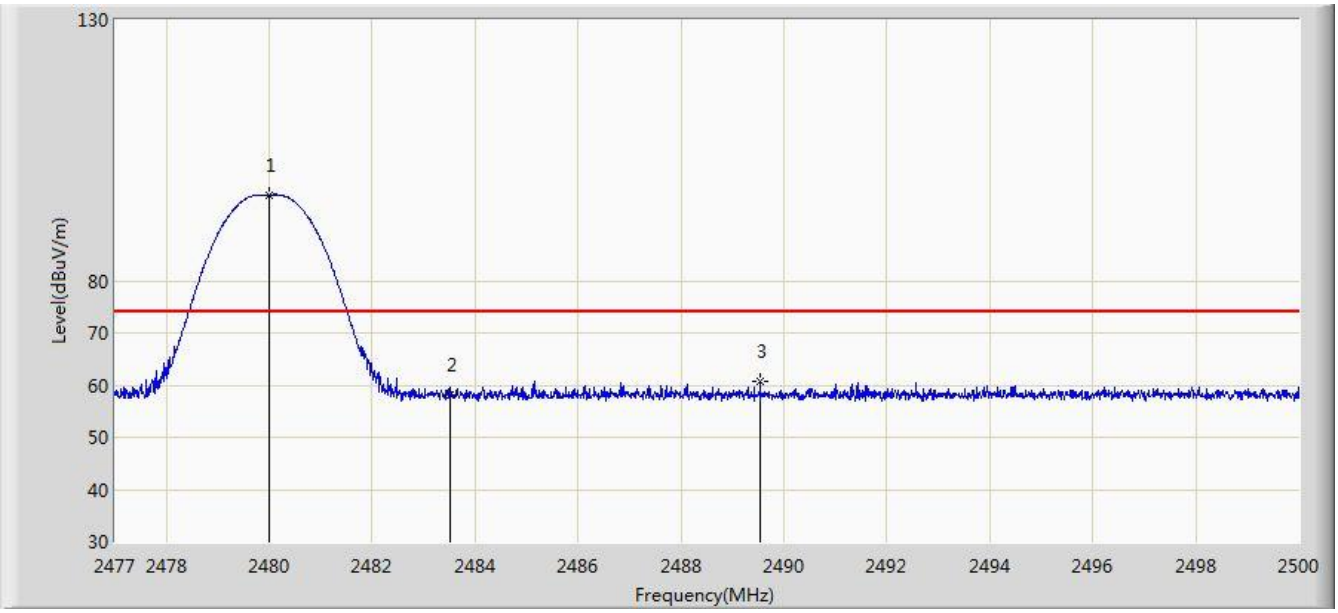



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | * | 2480.059 | 101.228 | 68.959 | N/A | N/A | 32.269 | AV |
| 2 | | | 2483.500 | 46.589 | 14.308 | -7.411 | 54.000 | 32.282 | AV |

Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 05:57 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: BBHA9120D_1-18GHz | Polarity: Vertical |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| Test Mode: Transmit by DH5 at Channel 2480MHz | |

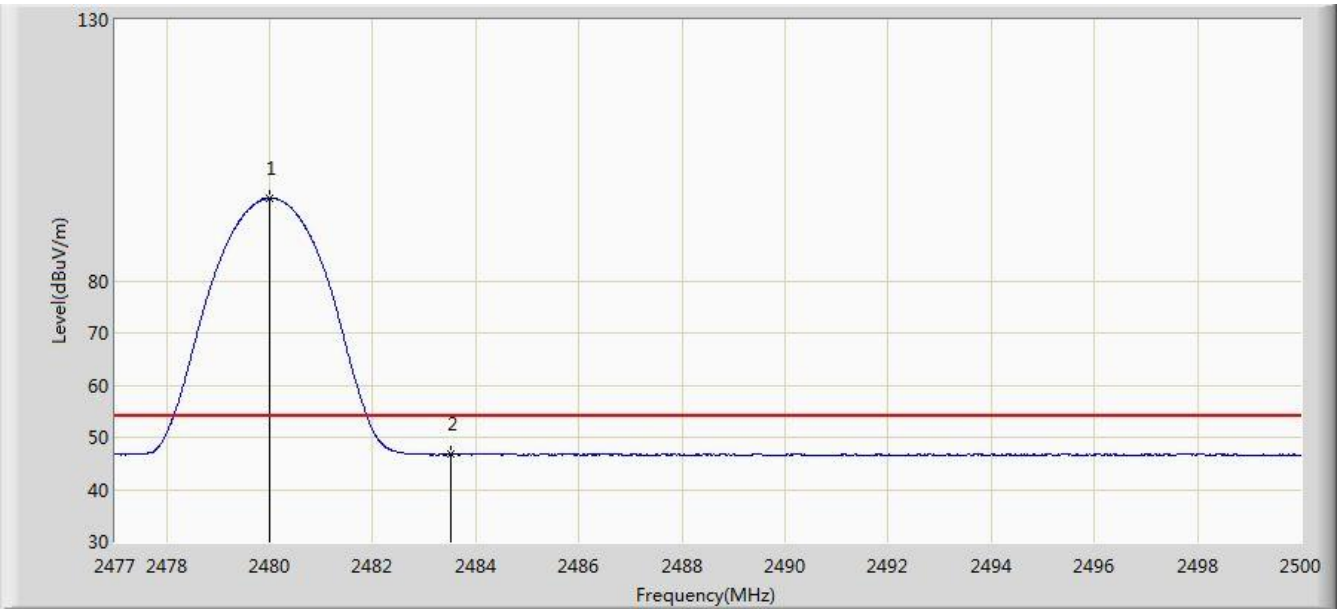



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | * | 2479.990 | 96.497 | 64.228 | N/A | N/A | 32.269 | PK |
| 2 | | | 2483.500 | 58.178 | 25.897 | -15.822 | 74.000 | 32.282 | PK |
| 3 | | | 2489.535 | 60.592 | 28.290 | -13.408 | 74.000 | 32.303 | PK |

Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

| | |
|---|---|
| Site: AC2 | Time: 2017/08/06 - 06:01 |
| Limit: FCC_Part15.209_RE(3m) | Engineer: Snake Ni |
| Probe: BBHA9120D_1-18GHz | Polarity: Vertical |
| EUT: Mobile Computer | Power: AC 120V/60Hz |
| Test Mode: Transmit by DH5 at Channel 2480MHz | |




| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | * | 2479.990 | 95.793 | 63.524 | N/A | N/A | 32.269 | AV |
| 2 | | | 2483.500 | 46.725 | 14.444 | -7.275 | 54.000 | 32.282 | AV |

Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

# 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