

# FCC Part 15B

## Measurement and Test Report

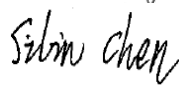
For

**Honeywell Integrated Technology(China) Co.,LTD**

**430 Li Bing Road, Shanghai ,P.R. China**

**FCC ID: 2AJAWVCU-057015EN**

|                                      |                                 |
|--------------------------------------|---------------------------------|
| <b>FCC Rule(s):</b>                  | <u>FCC Part 15 Subpart B</u>    |
| <b>Product Description:</b>          | <u>Tema-Voyager TM Compact</u>  |
| <b>Tested Model:</b>                 | <u>VCU-057015EN1N01</u>         |
| <b>Report No.:</b>                   | <u>STR16078134I-2</u>           |
| <b>Tested Date:</b>                  | <u>2016-07-15 to 2016-08-10</u> |
| <b>Issued Date:</b>                  | <u>2016-08-10</u>               |
| <b>Tested By:</b>                    | <u>Tink Zeng / Engineer</u>     |
| <b>Reviewed By:</b>                  | <u>Silin Chen / EMC Manager</u> |
| <b>Approved &amp; Authorized By:</b> | <u>Jandy So / PSQ Manager</u>   |
| <b>Prepared By:</b>                  |                                 |



**Shenzhen SEM.Test Technology Co., Ltd.**

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,  
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

## **TABLE OF CONTENTS**

|                                                             |           |
|-------------------------------------------------------------|-----------|
| <b>1. GENERAL INFORMATION .....</b>                         | <b>3</b>  |
| 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)..... | 3         |
| 1.2 TEST STANDARDS.....                                     | 4         |
| 1.3 TEST METHODOLOGY .....                                  | 4         |
| 1.4 TEST FACILITY .....                                     | 4         |
| 1.5 EUT SETUP AND OPERATION MODE .....                      | 5         |
| 1.6 MEASUREMENT UNCERTAINTY .....                           | 5         |
| 1.7 TEST EQUIPMENT LIST AND DETAILS .....                   | 6         |
| <b>2. SUMMARY OF TEST RESULTS .....</b>                     | <b>7</b>  |
| <b>3. CONDUCTED EMISSIONS .....</b>                         | <b>8</b>  |
| 3.1 TEST PROCEDURE.....                                     | 8         |
| 3.2 BASIC TEST SETUP BLOCK DIAGRAM.....                     | 8         |
| 3.3 ENVIRONMENTAL CONDITIONS .....                          | 8         |
| 3.4 SUMMARY OF TEST RESULTS/PLOTS .....                     | 8         |
| 3.5 CONDUCTED EMISSIONS TEST DATA.....                      | 9         |
| <b>4. RADIATED EMISSION .....</b>                           | <b>11</b> |
| 4.1 TEST PROCEDURE.....                                     | 11        |
| 4.2 TEST RECEIVER SETUP .....                               | 11        |
| 4.3 CORRECTED AMPLITUDE & MARGIN CALCULATION.....           | 12        |
| 4.4 ENVIRONMENTAL CONDITIONS .....                          | 12        |
| 4.5 SUMMARY OF TEST RESULTS/PLOTS .....                     | 12        |

## 1. GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: Honeywell Integrated Technology(China) Co.,LTD  
Address of applicant: 430 Li Bing Road, Shanghai ,P.R. China

Manufacturer: Honeywell S.r.l.  
Address of manufacturer: Via PHILIPS 12, 20052, MONZA- ITALY

| General Description of EUT                                                              |                         |
|-----------------------------------------------------------------------------------------|-------------------------|
| Product Name:                                                                           | Tema-Voyager TM Compact |
| Trade Name:                                                                             | Honeywell               |
| Model No.:                                                                              | VCU-057015EN1N01        |
| Adding Model(s):                                                                        | /                       |
| Rated Voltage:                                                                          | DC12V From Power Supply |
| Note: The test data is gathered from a production sample, provided by the manufacturer. |                         |

| Technical Characteristics of EUT |                                           |
|----------------------------------|-------------------------------------------|
| Rated Voltage:                   | DC12V From Power Supply                   |
| Power Adapter Model:             | RTU Q03<br>I/P: AC 120V/60Hz; O/P: DC 12V |
| Rated Power:                     | /                                         |
| Lowest Internal Frequency:       | 32.768kHz                                 |
| Highest Internal Frequency:      | 27.12MHz                                  |
| Classification of ITE:           | CLASS B                                   |

## 1.2 Test Standards

The following report is prepared on behalf of the Honeywell Integrated Technology(China) Co.,LTD in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

## 1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

## 1.4 Test Facility

### **FCC – Registration No.: 934118**

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

### **Industry Canada (IC) Registration No.: 11464A**

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

### **CNAS Registration No.: L4062**

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2<sup>nd</sup> Road, Bao'an District, Shenzhen, P.R.C (518101).

## 1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

| Test Mode | Description | Remark                      |
|-----------|-------------|-----------------------------|
| TM1       | Operating   | Connect to Notebook by RJ45 |
| TM2       |             |                             |

EUT Cable List and Details

| Cable Description | Length (M) | Shielded/Unshielded | With Core/Without Core |
|-------------------|------------|---------------------|------------------------|
| /                 | /          | /                   | /                      |

### Special Cable List and Details

| Cable Description | Length (m) | Shielded/Unshielded | With / Without Ferrite |
|-------------------|------------|---------------------|------------------------|
| RJ45 Cable*2      | 3.0        | Shielded            | Without Ferrite        |
| AC Cable          | 1.3        | Unshielded          | Without Ferrite        |
| Signal Cable      | 1.8        | Unshielded          | Without Ferrite        |

### Auxiliary Equipment List and Details

| Description  | Manufacturer | Model   | Serial Number |
|--------------|--------------|---------|---------------|
| Notebook     | Lenovo       | E23     | /             |
| Power Supply | Honeywell    | RTU Q03 | /             |

## 1.6 Measurement Uncertainty

| Measurement uncertainty        |            |                     |
|--------------------------------|------------|---------------------|
| Parameter                      | Conditions | Uncertainty         |
| Conducted Emissions            | Conducted  | $\pm 2.88\text{dB}$ |
| Transmitter Spurious Emissions | Radiated   | $\pm 5.1\text{dB}$  |

## 1.7 Test Equipment List and Details

| No.       | Description       | Manufacturer    | Model     | Serial No. | Cal Date   | Due Date   |
|-----------|-------------------|-----------------|-----------|------------|------------|------------|
| SEMT-1072 | Spectrum Analyzer | Agilent         | E4407B    | MY41440400 | 2016-06-04 | 2017-06-03 |
| SEMT-1031 | Spectrum Analyzer | Rohde & Schwarz | FSP30     | 836079/035 | 2016-06-04 | 2017-06-03 |
| SEMT-1007 | EMI Test Receiver | Rohde & Schwarz | ESVB      | 825471/005 | 2016-06-04 | 2017-06-03 |
| SEMT-1008 | Amplifier         | Agilent         | 8447F     | 3113A06717 | 2016-06-04 | 2017-06-03 |
| SEMT-1043 | Amplifier         | C&D             | PAP-1G18  | 2002       | 2016-06-04 | 2017-06-03 |
| SEMT-1011 | Broadband Antenna | Schwarz beck    | VULB9163  | 9163-333   | 2016-06-04 | 2017-06-03 |
| SEMT-1042 | Horn Antenna      | ETS             | 3117      | 00086197   | 2016-06-04 | 2017-06-03 |
| SEMT-1121 | Horn Antenna      | ETS             | 3116B     | 00088203   | 2016-06-04 | 2017-06-03 |
| SEMT-1069 | Loop Antenna      | Schwarz beck    | FMZB 1516 | 9773       | 2016-06-04 | 2017-06-03 |
| SEMT-1001 | EMI Test Receiver | Rohde & Schwarz | ESPI      | 101611     | 2016-06-04 | 2017-06-03 |
| SEMT-1003 | L.I.S.N           | Schwarz beck    | NSLK8126  | 8126-224   | 2016-06-04 | 2017-06-03 |
| SEMT-1002 | Pulse Limiter     | Rohde & Schwarz | ESH3-Z2   | 100911     | 2016-06-04 | 2017-06-03 |

## 2. SUMMARY OF TEST RESULTS

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| Description of Test            | Result    |
|--------------------------------|-----------|
| §15.107 (a) Conducted Emission | Compliant |
| §15.109(a) Radiated Emission   | Compliant |

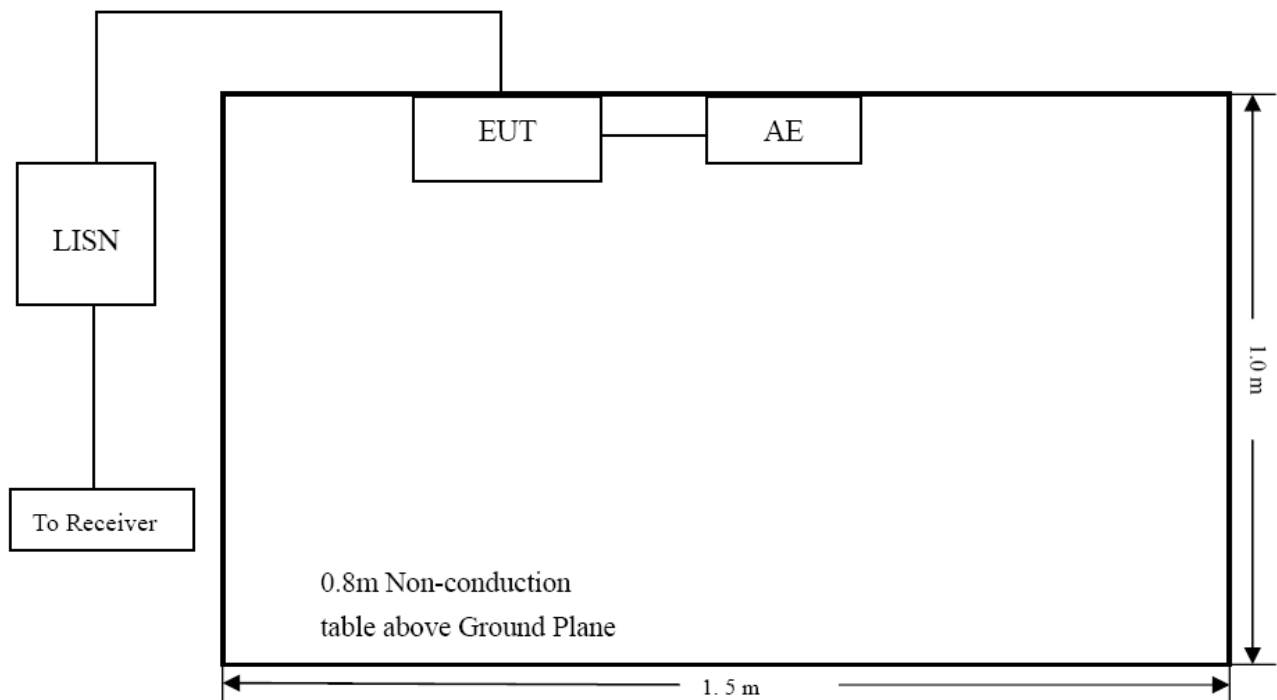
N/A: not applicable

### 3. Conducted Emissions

#### 3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

#### 3.2 Basic Test Setup Block Diagram



#### 3.3 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 52%       |
| ATM Pressure:      | 1011 mbar |

#### 3.4 Summary of Test Results/Plots

According to the data in section 3.5, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

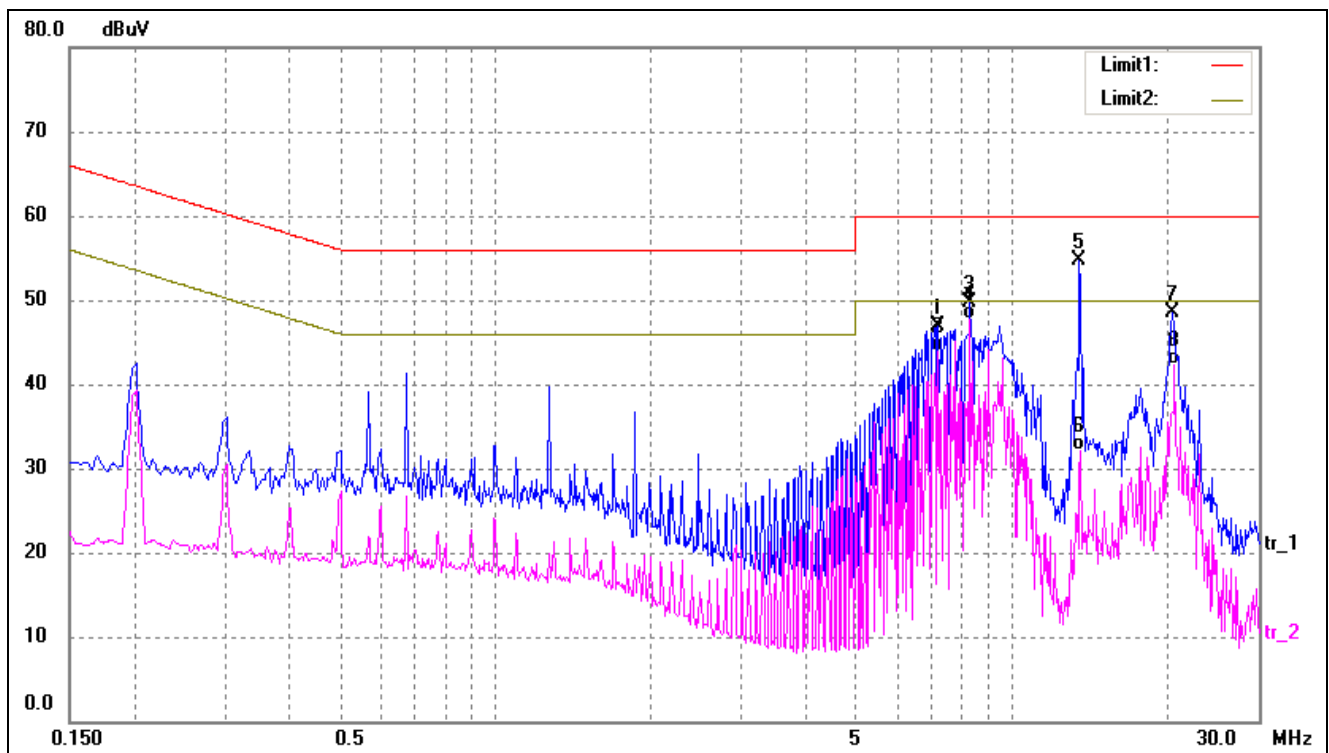
**-1.34 dB at 8.3018 MHz in the Line, Average detector, 0.15-30MHz**

### 3.5 Conducted Emissions Test Data

#### Plot of Conducted Emissions Test Data

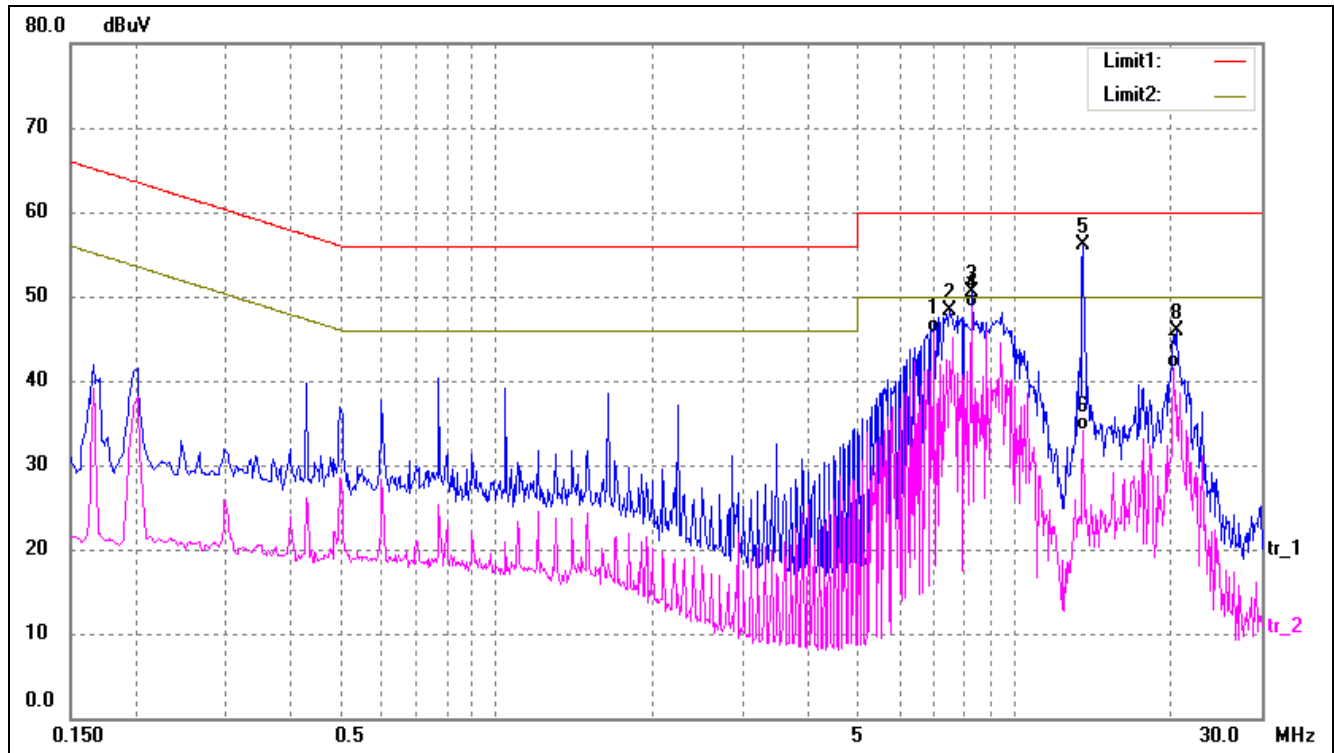
EUT: Tema-Voyager TM Compact  
Tested Model: VCU-057015EN1N01  
Operating Condition: TM1  
Comment: AC 120V/60Hz; Power Supply DC 12V

Test Specification: Neutral



| No. | Frequency<br>(MHz) | Reading<br>(dBuV) | Correct<br>(dB/m) | Result<br>(dBuV) | Limit<br>(dBuV) | Margin<br>(dB) | Detector    |
|-----|--------------------|-------------------|-------------------|------------------|-----------------|----------------|-------------|
| 1   | 7.2059             | 36.56             | 10.29             | 46.85            | 60.00           | -13.15         | QP          |
| 2   | 7.2059             | 33.62             | 10.29             | 43.91            | 50.00           | -6.09          | AVG         |
| 3   | 8.2979             | 39.37             | 10.32             | 49.69            | 60.00           | -10.31         | QP          |
| 4*  | 8.2979             | 37.39             | 10.32             | 47.71            | 50.00           | -2.29          | AVG         |
| 5   | 13.5339            | 44.24             | 10.40             | 54.64            | /               | /              | Fundamental |
| 6   | 13.6019            | 21.79             | 10.40             | 32.19            | /               | /              | Fundamental |
| 7   | 20.4060            | 37.95             | 10.47             | 48.42            | 60.00           | -11.58         | QP          |
| 8   | 20.5980            | 31.82             | 10.47             | 42.29            | 50.00           | -7.71          | AVG         |

Test Specification: Line



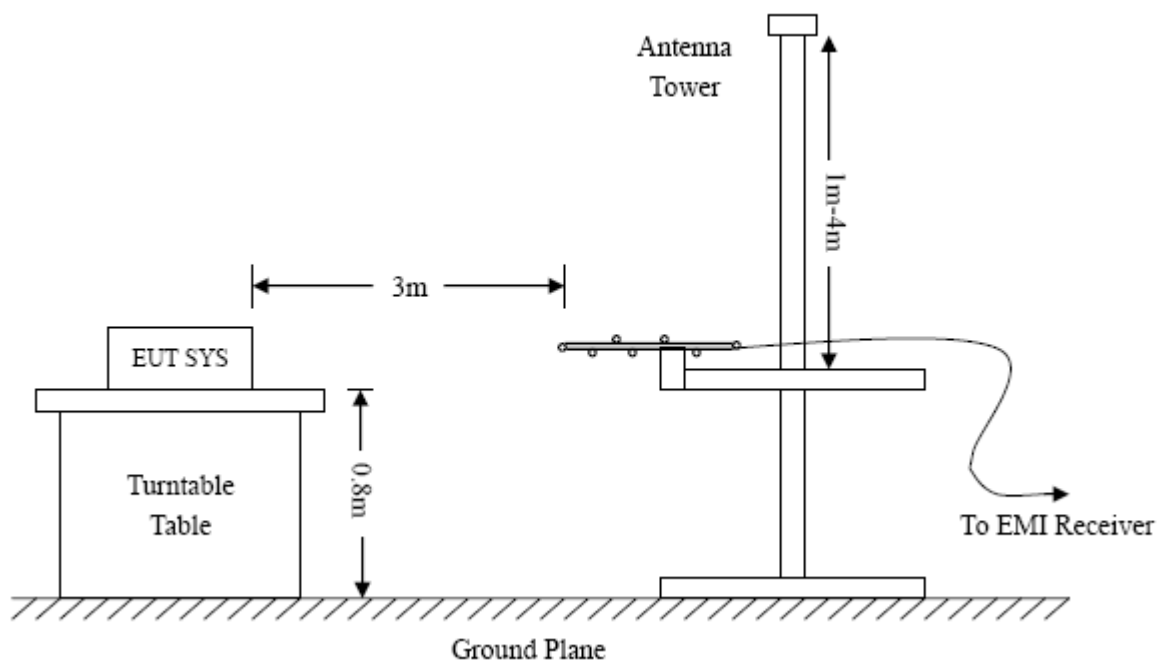
| No. | Frequency | Reading | Correct | Result | Limit  | Margin | Detector    |
|-----|-----------|---------|---------|--------|--------|--------|-------------|
|     | (MHz)     | (dBuV)  | (dB/m)  | (dBuV) | (dBuV) | (dB)   |             |
| 1   | 7.0058    | 35.48   | 10.29   | 45.77  | 50.00  | -4.23  | AVG         |
| 2   | 7.4939    | 38.06   | 10.30   | 48.36  | 60.00  | -11.64 | QP          |
| 3   | 8.3018    | 40.25   | 10.32   | 50.57  | 60.00  | -9.43  | QP          |
| 4*  | 8.3018    | 38.34   | 10.32   | 48.66  | 50.00  | -1.34  | AVG         |
| 5   | 13.5818   | 45.63   | 10.40   | 56.03  | 60.00  | /      | Fundamental |
| 6   | 13.5818   | 23.80   | 10.40   | 34.20  | 50.00  | /      | Fundamental |
| 7   | 20.2979   | 31.07   | 10.46   | 41.53  | 50.00  | -8.47  | AVG         |
| 8   | 20.5259   | 35.50   | 10.47   | 45.97  | 60.00  | -14.03 | QP          |

## 4. RADIATED EMISSION

### 4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.



### 4.2 Test Receiver Setup

Frequency :9kHz-30MHz  
RBW=10KHz,  
VBW =30KHz  
Sweep time= Auto  
Trace = max hold  
Detector function = peak

Frequency :30MHz-1GHz  
RBW=120KHz,  
VBW=300KHz  
Sweep time= Auto  
Trace = max hold  
Detector function = peak, QP

### 4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB $\mu$ V means the emission is 6dB $\mu$ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

### 4.4 Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 23 °C     |
| Relative Humidity: | 55 %      |
| ATM Pressure:      | 1011 mbar |

### 4.5 Summary of Test Results/Plots

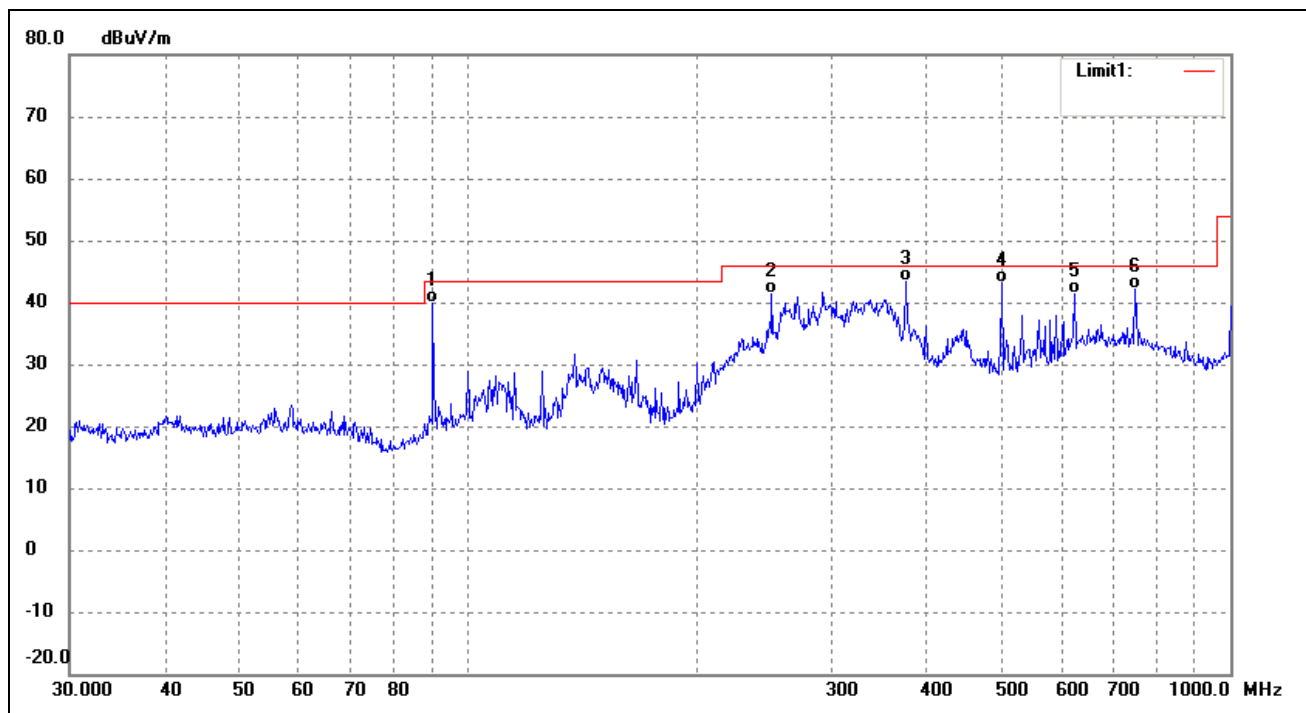
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

**-2.57 dB at 375.9385 MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters**

### Plot of Radiated Emissions Test Data

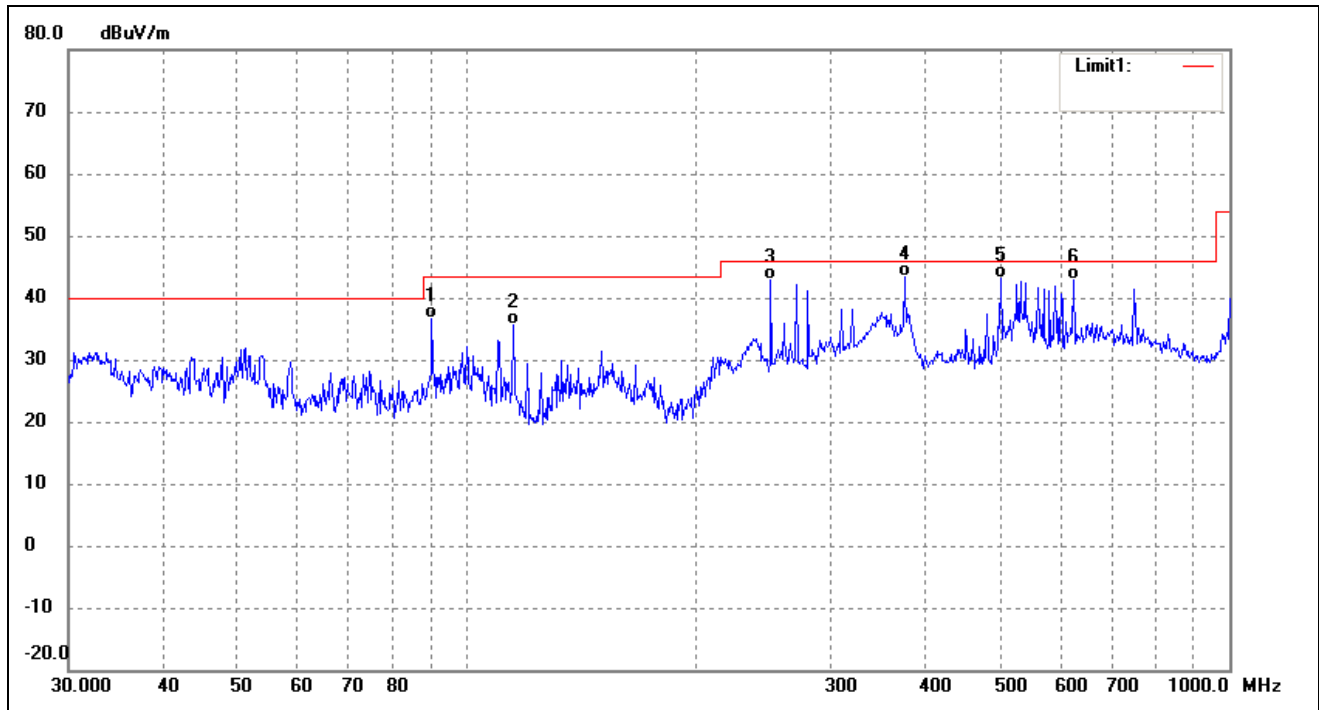
EUT: Tema-Voyager TM Compact  
Tested Model: VCU-057015EN1N01  
Operating Condition: TM1  
Comment: AC 120V/60Hz; Power Supply DC 12V

Test Specification: Horizontal



| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Degree<br>( ° ) | Height<br>(cm) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|-----------------|----------------|--------|
| 1   | 89.9047            | 36.47               | 3.38                  | 39.85              | 43.50             | -3.65          | 258             | 100            | QP     |
| 2   | 250.3012           | 32.02               | 9.32                  | 41.34              | 46.00             | -4.66          | 326             | 200            | QP     |
| 3   | 375.9385           | 31.62               | 11.81                 | 43.43              | 46.00             | -2.57          | 29              | 200            | QP     |
| 4   | 501.1790           | 29.81               | 13.37                 | 43.18              | 46.00             | -2.82          | 209             | 100            | QP     |
| 5   | 625.0780           | 23.86               | 17.55                 | 41.41              | 46.00             | -4.59          | 234             | 100            | QP     |
| 6   | 750.1083           | 23.49               | 18.58                 | 42.07              | 46.00             | -3.93          | 109             | 100            | QP     |

Test Specification: Vertical



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