# TEST REPORT

## No. I18D00164-EMC01

***For***

**Client : Gemalto M2M GmbH**

**Production: EHS6**

**Model Name : EHS6**

**Hardware Version: B2.1**

**Software Version: 04.000**

**FCC ID: QIPEHS6**

**IC ID: 7830A-EHS6**

**Issued date: 2018-09-14**



**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

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**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| I18D00164-EMC01 | 00 | 2018-09-14 | Initial creation of test report |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications |
| Address: | 7F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code: | 200001 |
| Telephone: | 86-21-63843300 |
| Fax: | 86-21-63843301 |
| FCC registration No: | 489729 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Relative Humidity: | 30-60%RH |

## 1.3. Project data

| | |
|---|---|
| Project Leader: | Zhou Yan |
| Testing Start Date: | 2018-08-10 |
| Testing End Date: | 2018-08-13 |

## 1.4. Signature

**Lu Huifang**
**(Prepared this test report)**

**You Jinjun**
**(Reviewed this test report)**

**Zheng Zhongbin**
**Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Gemalto M2M GmbH |
| Address: | Gemalto M2M GmbH, Siemensdamm 50, 13629 Berlin, Germany |
| Tel: | +86 1059373423 |
| Postcode: | / |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Gemalto M2M GmbH |
| Address: | Gemalto M2M GmbH, St.-Martin-Str.60, 81541 München, Germany |
| Tel: | / |
| Postcode: | / |

# 3. Equipment under Test (EUT) and Ancillary Equipment (AE)

## 3.1. About EUT

| | |
|---|---|
| ProductName | EHS6 |
| Model name | EHS6 |
| GSM Frequency Band | GSM850/GSM1900/GSM900/GSM1800 |
| UMTS Frequency Band | WCDMA Band Ⅰ/Ⅱ/Ⅴ/Ⅷ |

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|
| N01 | NA | B2.1 | 04.000 | 2018-08-10 |

*EUT ID: is used to identify the test sample in the lab internally.

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN |
|---|---|---|---|
| CA01 | Adapter | SO24AMV1200200 | NA |
| EA01 | Antenna | NA | NA |
| S01 | PCB board | / | NA |

*AE ID: is used to identify the test sample in the lab internally.

# 4. Reference Documents

## 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|---|---|---|
| FCC Part 15, Subpart B | Radio frequency devices | 10-1-10 Edition |
| ANSI C63.4 | Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz | 2014 |
| ICE-003 | Information Technology Equipment(Including Digital Apparatus)-Limits and Methods of Measurement | 2016 |

# 5. Test Results

## 5.1. Summary of Test Results

| Items | Test List | Clause in FCC rules | Verdict |
|---|---|---|---|
| 1 | Radiated Emission | 15.109(a) | Pass |
| 2 | Conducted Emission | 15.107(a) | Pass |

## 5.2. Statements

The EHS6, manufactured by Gemalto M2M GmbH Is a new product for testing. ECIT only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

ECIT has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

# 6. Test Equipments Utilized

## 6.1 Radiated Emission Equipments list

| No. | Name | Type | Series Number | Producer | Cal. Date | Cal. interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio Communication | CMU200 | 123126 | R&S | 2018-05-11 | 1 Year |
| 2 | Test Receiver | ESU40 | 100307 | R&S | 2018-05-11 | 1 Year |
| 3 | Trilog Antenna | VULB9163 | VULB9163-515 | Schwarzbeck | 2017-02-25 | 3 Year |
| 4 | Double Ridged Guide | ETS-3117 | 00135885 | ETS | 2017-01-11 | 3 Year |
| 5 | EMI Test Software | EMC32 V9.15 | NA | R&S | NA | NA |

## 6.2 AC Conducted Emission Equipments list

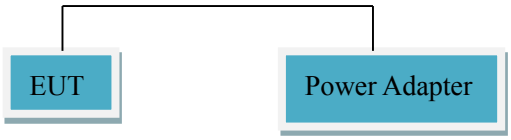
| No. | Name | Type | Series Number | Producer | Cal. Date | Cal. interval |
|---|---|---|---|---|---|---|
| 1 | Universal Radio | CMU200 | 123123 | R&S | 2018-05-11 | 1 Year |
| 2 | Test Receiver | ESCI | 101235 | R&S | 2018-05-11 | 1 Year |
| 3 | 2-Line V-Network | ENV216 | 101380 | R&S | 2018-05-11 | 1 Year |
| 4 | EMI Test Software | EMC32 V9.15 | NA | R&S | NA | NA |

# 7. System Configuration during Test

## 7.1 Test Mode

| Test Item | Function Type |
|---|---|
| Radiated emission | Mode 1:Charge mode+CA01<Figure 1> |
| AC Conducted emission | Mode 1:Charge mode+CA01<Figure 1> |

## 7.2 Connection Diagram of Test System




<Figure 1>

# 8. Measurement Results

Only the worst test result was shown in this report.

## 8.1 Radiated Emission 30MHz-18GHz

**Method of Measurement**

For 30-1000MHz, the EUT was placed on the top of a rotating 0.8-m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement. Tested in accordance with the procedures of ANSI C63.4-2014, section 8.3.

For 1000-18000MHz,The maximal emission value was acquired by adjusting the antenna height, The table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.

**Limits for Radiated Emission at a measuring distance of 3m**

| Frequency Range (MHz) | Quasi-Peak (dBuV/m) |
|---|---|
| 30-88 | 40 |
| 88-216 | 43.5 |
| 216-960 | 46 |
| Above 960 | 54 |

| Frequency Range (MHz) | Peak (dBuV/m) | Average (dBuV/m) |
|---|---|---|
| Above 1000 | 74 | 54 |

**Test conditions**

| Frequency Range (MHz) | RBW/VBW | Sweep Time (s) |
|---|---|---|
| 30-1000 | 120KHz/300KHz | Auto |
| 1000-18000 | 1MHz/3MHz | Auto |

**Uncertainty Measurement**

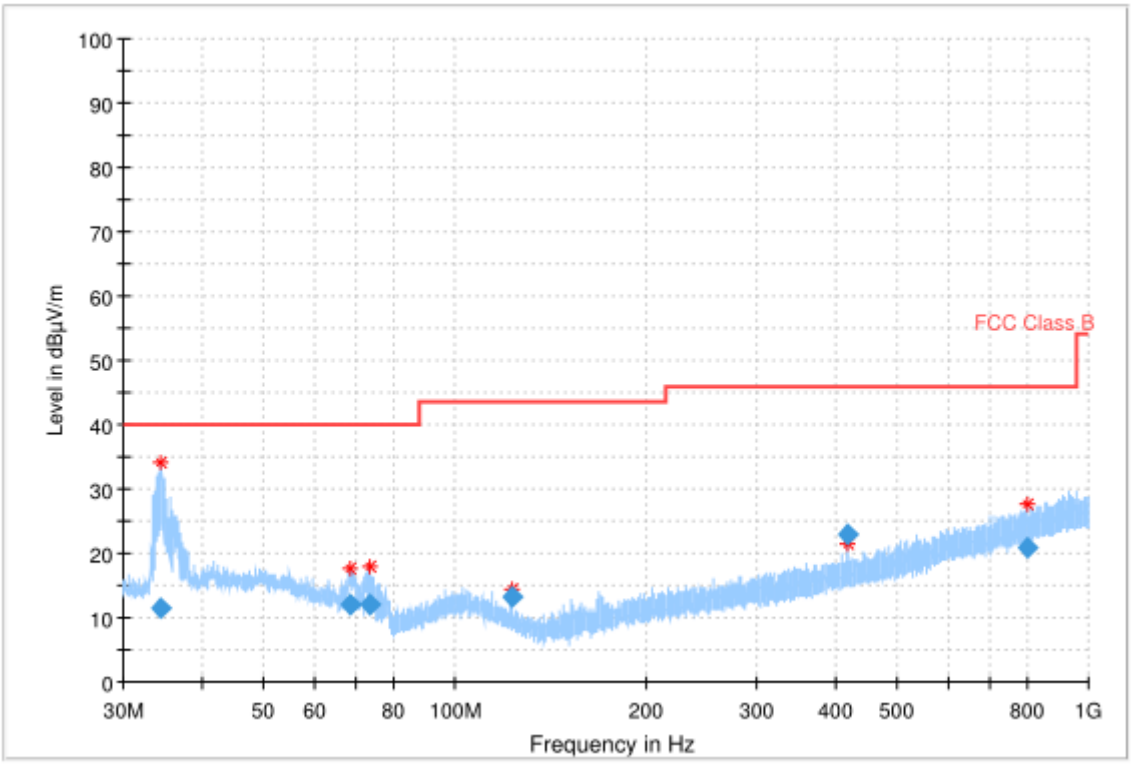
he measurement uncertainty(30MHz-1000MHz) is 4.98 dB (k=2).

The measurement uncertainty(1000MHz-18000MHz) is 5.06 dB (k=2).

**Test Results**

Mode 1: Charge mode+CA01<Figure 1>

| Frequency Range: | 30MHz – 1GHz |
|---|---|



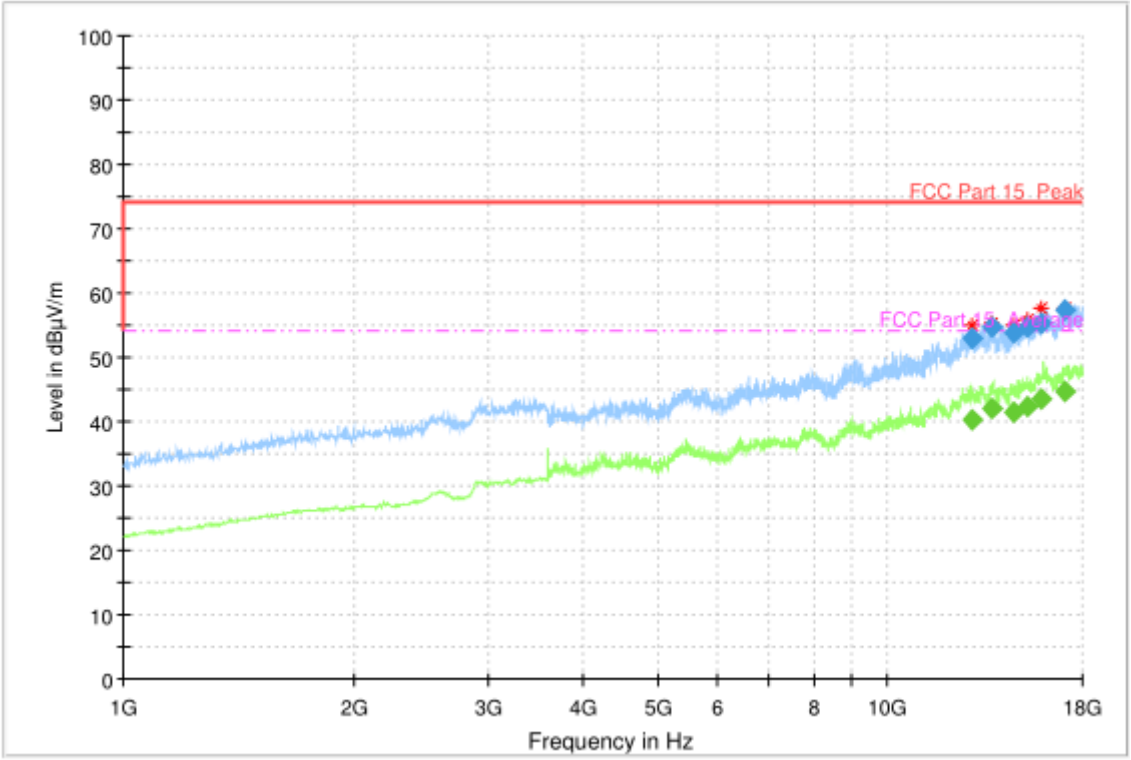

| Frequency (MHz) | QuasiPeak (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 34.298456 | 11.49 | 40.00 | 28.51 | 1000.0 | 120.000 | 100.0 | V | 150.0 | -22.0 |
| 68.384691 | 12.02 | 40.00 | 27.98 | 1000.0 | 120.000 | 125.0 | V | 82.0 | -24.7 |
| 73.393384 | 12.17 | 40.00 | 27.83 | 1000.0 | 120.000 | 199.0 | V | 97.0 | -25.8 |
| 122.882035 | 13.22 | 43.50 | 30.28 | 1000.0 | 120.000 | 198.0 | V | 114.0 | -26.2 |
| 416.011453 | 22.98 | 46.00 | 23.02 | 1000.0 | 120.000 | 222.0 | H | 105.0 | -18.7 |
| 798.714851 | 20.91 | 46.00 | 25.09 | 1000.0 | 120.000 | 222.0 | H | 312.0 | -11.7 |

Note:

1. Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Mode 1: Charge mode+CA04+BA04<Figure1>

| Frequency Range: | 1GHz –18GHz |
|---|---|



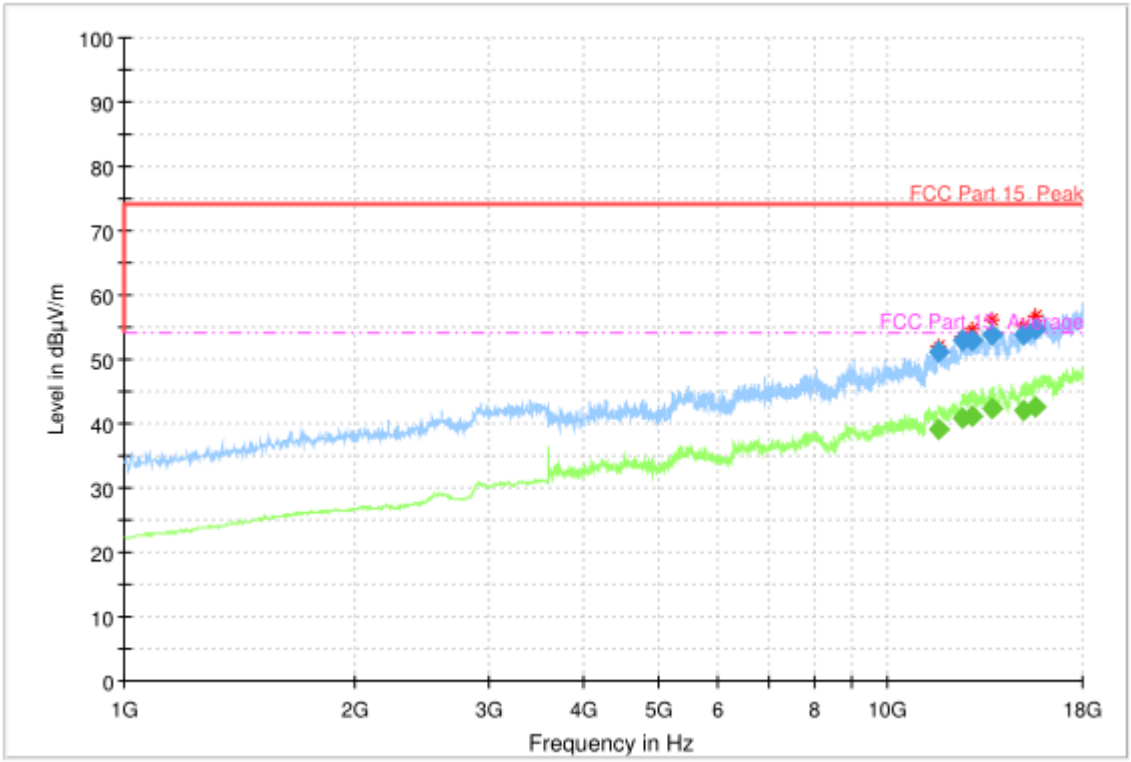

Vertical

## Final Result

| Frequency (MHz) | MaxPeak (dBµV/m) | Average (dBµV/m | Limit (dBµV/m) | Margin | Meas. Time | Bandwidth | Height (cm) | Pol | Azimuth | Corr. (dB) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12895.600000 | --- | 40.39 | 54.00 | 13.61 | 100.0 | 1000.000 | 100.0 | V | 57.0 | 17.5 | |
| 12895.600000 | 52.84 | --- | 74.00 | 21.16 | 100.0 | 1000.000 | 100.0 | V | 57.0 | 17.5 | |
| 13710.000000 | --- | 42.02 | 54.00 | 11.98 | 100.0 | 1000.000 | 100.0 | V | 148.0 | 18.8 | |
| 13710.000000 | 54.57 | --- | 74.00 | 19.43 | 100.0 | 1000.000 | 100.0 | V | 148.0 | 18.8 | |
| 14644.400000 | 53.78 | --- | 74.00 | 20.22 | 100.0 | 1000.000 | 200.0 | V | 316.0 | 19.7 | |
| 14644.400000 | --- | 41.49 | 54.00 | 12.51 | 100.0 | 1000.000 | 200.0 | V | 316.0 | 19.7 | |
| 15211.800000 | 54.78 | --- | 74.00 | 19.22 | 100.0 | 1000.000 | 200.0 | V | 245.0 | 20.7 | |
| 15211.800000 | --- | 42.33 | 54.00 | 11.67 | 100.0 | 1000.000 | 200.0 | V | 245.0 | 20.7 | |
| 15923.000000 | --- | 43.39 | 54.00 | 10.61 | 100.0 | 1000.000 | 200.0 | V | 210.0 | 22.0 | |
| 15923.000000 | 55.36 | --- | 74.00 | 18.64 | 100.0 | 1000.000 | 200.0 | V | 210.0 | 22.0 | |
| 17061.400000 | --- | 44.70 | 54.00 | 9.30 | 100.0 | 1000.000 | 100.0 | V | 230.0 | 23.9 | |
| 17061.400000 | 57.28 | --- | 74.00 | 16.72 | 100.0 | 1000.000 | 100.0 | V | 230.0 | 23.9 | |

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.




Horizontal

## Final Result

| Frequency (MHz) | MaxPeak (dBµV/m | Average (dBµV/m | Limit (dBµV/m | Margin (dB) | Meas. Time | Bandwidth | Height | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 11665.000000 | 51.09 | --- | 74.00 | 22.91 | 100.0 | 1000.000 | 100.0 | H | 168.0 | 15.1 |
| 11665.000000 | --- | 39.25 | 54.00 | 14.75 | 100.0 | 1000.000 | 100.0 | H | 168.0 | 15.1 |
| 12536.600000 | --- | 40.79 | 54.00 | 13.21 | 100.0 | 1000.000 | 200.0 | H | 213.0 | 16.6 |
| 12536.600000 | 52.95 | --- | 74.00 | 21.05 | 100.0 | 1000.000 | 200.0 | H | 213.0 | 16.6 |
| 12896.000000 | 53.04 | --- | 74.00 | 20.96 | 100.0 | 1000.000 | 100.0 | H | 224.0 | 17.5 |
| 12896.000000 | --- | 41.12 | 54.00 | 12.88 | 100.0 | 1000.000 | 100.0 | H | 224.0 | 17.5 |
| 13708.800000 | 53.93 | --- | 74.00 | 20.07 | 100.0 | 1000.000 | 200.0 | H | 154.0 | 18.8 |
| 13708.800000 | --- | 42.26 | 54.00 | 11.74 | 100.0 | 1000.000 | 200.0 | H | 154.0 | 18.8 |
| 15018.800000 | 53.72 | --- | 74.00 | 20.28 | 100.0 | 1000.000 | 100.0 | H | 178.0 | 20.3 |
| 15018.800000 | --- | 42.06 | 54.00 | 11.94 | 100.0 | 1000.000 | 100.0 | H | 178.0 | 20.3 |
| 15605.400000 | --- | 42.56 | 54.00 | 11.44 | 100.0 | 1000.000 | 100.0 | H | 75.0 | 21.3 |
| 15605.400000 | 54.82 | --- | 74.00 | 19.18 | 100.0 | 1000.000 | 100.0 | H | 75.0 | 21.3 |

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

## 8.2 AC Conducted Emission

**Method of Measurement**

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.3

**Limit of Conducted Emission**

| Frequency Range (MHz) | Conducted Limit (dBuV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |
| *Decreases with the logarithm of the frequency | | |

**Test Condition in Charging Mode**

| Voltage (V) | Frequency (Hz) | RBW | Sweep Time (s) |
|---|---|---|---|
| 120 | 60 | 9 kHz | Auto |

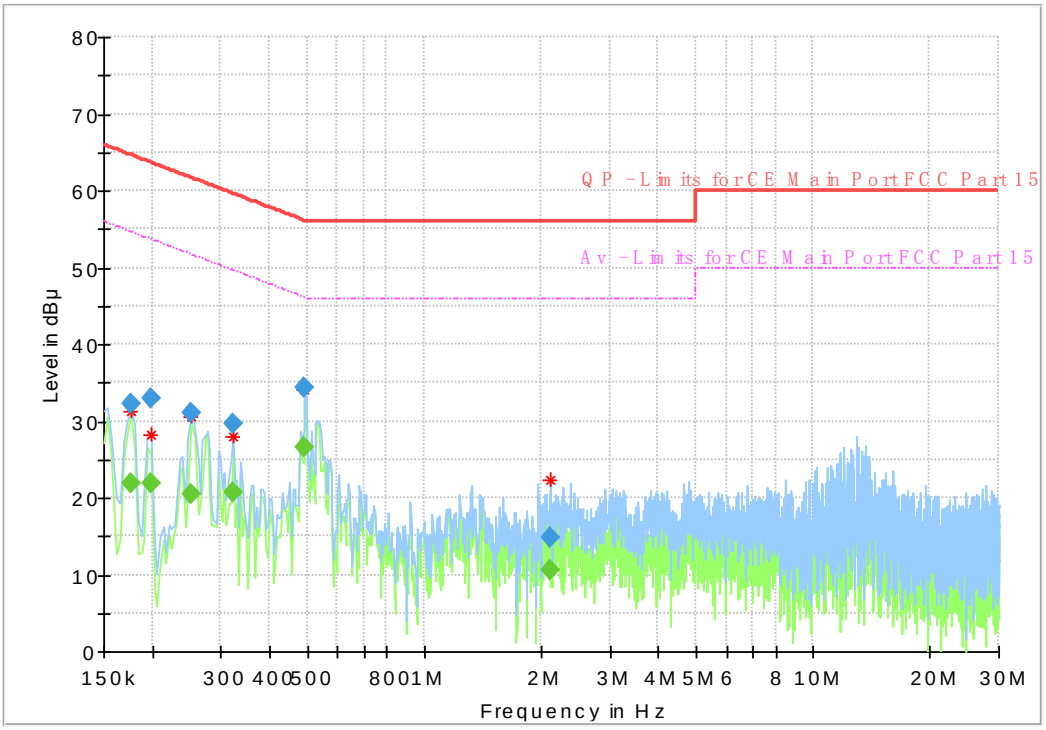
**Uncertainty Measurement**

The measurement uncertainty is 3.66dB (k=2).

**Test Results**

Mode 1: Charge mode+CA01<Figure1>

| Frequency Range: | 150kHz – 30MHz |
|---|---|




| Frequency (MHz) | QuasiPeak (dB µ V) | Average (dB µ V) | Limit (dB µ V) | Margin (dB) | Meas. Time | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 0.176119 | --- | 21.91 | 54.67 | 32.76 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.176119 | 32.19 | --- | 64.67 | 32.48 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.198506 | --- | 21.99 | 53.67 | 31.68 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.198506 | 32.83 | --- | 63.67 | 30.84 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.250744 | --- | 20.56 | 51.73 | 31.17 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.250744 | 31.05 | --- | 61.73 | 30.68 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.321638 | --- | 20.79 | 49.66 | 28.87 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.321638 | 29.55 | --- | 59.66 | 30.11 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.493275 | --- | 26.64 | 46.11 | 19.47 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 0.493275 | 34.36 | --- | 56.11 | 21.75 | 1000.0 | 9.000 | L1 | ON | 9.7 |
| 2.112638 | --- | 10.53 | 46.00 | 35.47 | 1000.0 | 9.000 | N | ON | 9.7 |
| 2.112638 | 14.74 | --- | 56.00 | 41.26 | 1000.0 | 9.000 | N | ON | 9.7 |

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested , the result of them is synthesized in the above data diagram.

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