



Variant FCC RF Test Report

APPLICANT : Gemalto M2M GMbH
EQUIPMENT : CDMA 1XRTT Module
BRAND NAME : Cinterion
MODEL NAME : PCS3
FCC ID : QIPPCS3
STANDARD : FCC 47 CFR Part 2, and 90(S)
CLASSIFICATION : PCS Licensed Transmitter (PCB)

This is a variant report which is only valid together with the original test report. The product was received on Mar. 24, 2016 and testing was completed on Apr. 09, 2016. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-D-2010 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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TABLE OF CONTENTS

| | |
|---|----|
| REVISION HISTORY..... | 3 |
| SUMMARY OF TEST RESULT | 4 |
| 1 GENERAL DESCRIPTION..... | 5 |
| 1.1 Applicant..... | 5 |
| 1.2 Manufacturer | 5 |
| 1.3 Feature of Equipment Under Test..... | 5 |
| 1.4 Product Specification of Equipment Under Test | 5 |
| 1.5 Modification of EUT | 5 |
| 1.6 Testing Site..... | 6 |
| 1.7 Applied Standards | 6 |
| 2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST..... | 7 |
| 2.1 Test Mode..... | 7 |
| 2.2 Connection Diagram of Test System | 7 |
| 2.3 Support Unit used in test configuration | 7 |
| 3 TEST RESULT..... | 8 |
| 3.1 Conducted Output Power Measurement..... | 8 |
| 3.2 Field Strength of Spurious Radiation Measurement | 9 |
| 4 LIST OF MEASURING EQUIPMENT | 11 |
| 5 UNCERTAINTY OF EVALUATION..... | 12 |

APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. SETUP PHOTOGRAPHS



REVISION HISTORY



SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|--------------------|--------------------------------------|-------------------------------------|--------|--|
| 3.1 | §90.635 | Conducted Output Power | < 100 Watts | PASS | - |
| 3.2 | §2.1053 §90.691 | Field Strength of Spurious Radiation | < $43+10\log_{10}(P[\text{Watts}])$ | PASS | Under limit 40.90 dB at 1632.000 MHz |



1 General Description

1.1 Applicant

Gemalto M2M GmbH

Siemensdamm 50 Berlin 13629 Germany

1.2 Manufacturer

HON HAI PRECISION IND. CO., LTD

5F-1,5 Hsin-An road, Hsinchu, Science-Bases Industrial Park 300, Taiwan, R.O.C

1.3 Feature of Equipment Under Test

| Product Feature & Specification | |
|--|--------------------|
| Equipment | CDMA 1XRTT Module |
| Brand Name | Cinterion |
| Model Name | PCS3 |
| FCC ID | QIPPCS3 |
| EUT supports Radios application | CDMA |
| HW Version | S2 |
| SW Version | Revision 00.400.04 |
| EUT Stage | Production Unit |

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

| Product Specification subjective to this standard | |
|---|-----------------------|
| Tx Frequency | 817.9 MHz ~ 823.1 MHz |
| Rx Frequency | 862.9 MHz ~ 868.1 MHz |
| Maximum Output Power to Antenna | 24.37 dBm |
| Antenna Type | Dipole Antenna |
| Antenna Gain | 1.50 dBi |
| Type of Modulation | CDMA2000 : QPSK |

Remark: This test report recorded only product characteristics and test results of PCS Licensed Transmitter (PCB).

1.5 Modification of EUT

No modifications are made to the EUT during all test items.



1.6 Testing Site

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

| | |
|---------------------------|--|
| Test Site | SPORTON INTERNATIONAL INC. |
| Test Site Location | No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978 |
| Test Site No. | Sporton Site No. TH04-HY |

| | |
|---------------------------|--|
| Test Site | SPORTON INTERNATIONAL INC. |
| Test Site Location | No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855 |
| Test Site No. | Sporton Site No. 03CH12-HY |

1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR Part 2, 90(S)
- ANSI / TIA / EIA-603-D-2010
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

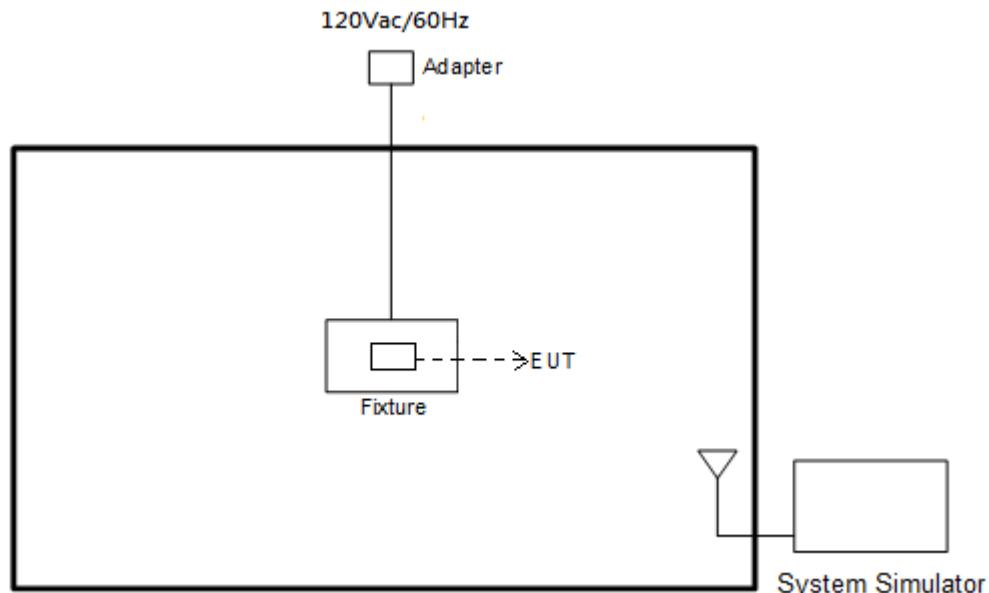
2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

Frequency range investigated for radiated emission is 30 MHz to 9000 MHz for CDMA2000 BC10.

| Test Modes | |
|---------------|--------------|
| Band | Radiated TCs |
| CDMA2000 BC10 | ■ 1xRTT Link |

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration

| Item | Equipment | Trade Name | Model No. | FCC ID | Data Cable | Power Cord |
|------|------------------|------------|-------------|--------|------------|-------------------|
| 1. | System Simulator | R&S | CMU 200 | N/A | N/A | Unshielded, 1.8 m |
| 2. | AC Adapter | CUI INC | EPSA120200U | N/A | N/A | 1.8 m |
| 3. | Fixture | N/A | N/A | N/A | N/A | N/A |

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

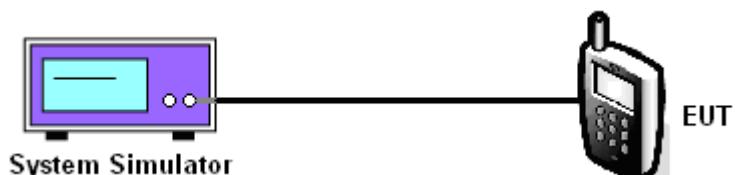
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Please refer to Appendix A.



3.2 Field Strength of Spurious Radiation Measurement

3.2.1 Description of Field Strength of Spurious Radiated Measurement

The radiated spurious emission was measured by substitution method according to ANSI / TIA / EIA-603-D-2010. The power of any emission FCC Part 90.691 on any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth at least $43 + 10 \log(P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log_{10}(P[\text{Watts}])$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.2.2 Measuring Instruments

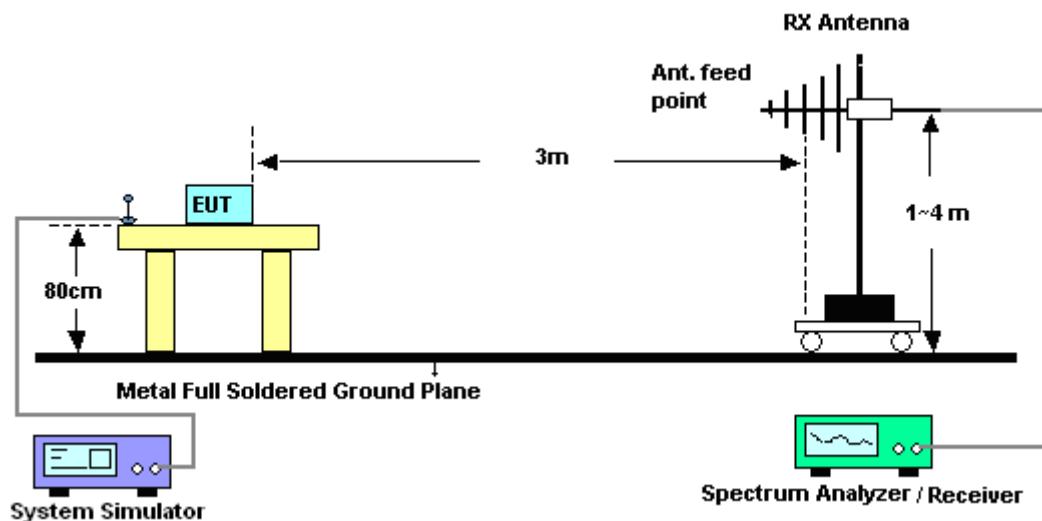
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

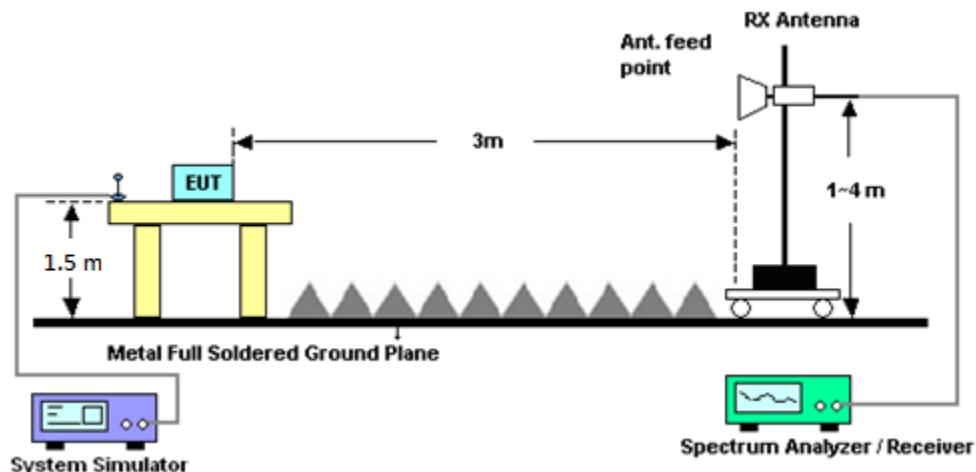
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
13. The limit line is derived from $43 + 10 \log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10 \log(P)]$ (dB)
 $= [30 + 10 \log(P)]$ (dBm) - $[43 + 10 \log(P)]$ (dB)
 $= -13$ dBm.

3.2.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5 Test Result of Field Strength of Spurious Radiated

Please refer to Appendix B.



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|----------------------|-----------------|----------------------------|-------------|-------------------------------|------------------|-------------------------------|---------------|-----------------------|
| System Simulator | Agilent | E5515C | MY48360820 | N/A | Jan. 11, 2016 | Mar. 29, 2016 ~ Mar. 30, 2016 | Jan. 10, 2018 | Conducted (TH04-HY) |
| Bilog Antenna | TESEQ | CBL 6111D | 37059 | 30MHz~1GHz | Dec. 29, 2015 | Apr. 09, 2016 | Dec. 28, 2016 | Radiation (03CH12-HY) |
| EMI Test Receiver | Rohde & Schwarz | ESU26 | 100390 | 20Hz~26.5GHz | Dec. 21, 2015 | Apr. 09, 2016 | Dec. 20, 2016 | Radiation (03CH12-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9120D | 9120D-1328 | 1GHz ~ 18GHz | Nov. 02, 2015 | Apr. 09, 2016 | Nov. 01, 2016 | Radiation (03CH12-HY) |
| Preamplifier | COM-POWER | PA-103 | 161075 | 10MHz~1GHz | Apr. 01, 2016 | Apr. 09, 2016 | Mar. 31, 2017 | Radiation (03CH12-HY) |
| Preamplifier | MITEQ | AMF-7D-0010 1800-30-10P | 1815698 | 1GHz~18GHz | Dec. 14, 2015 | Apr. 09, 2016 | Dec. 13, 2016 | Radiation (03CH12-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK | BBHA 9170 | BBHA9170584 | 18GHz- 40GHz | Nov. 02, 2015 | Apr. 09, 2016 | Nov. 01, 2016 | Radiation (03CH12-HY) |
| Controller | EMEC | EM1000 | N/A | Control Turn table & Ant Mast | N/A | Apr. 09, 2016 | N/A | Radiation (03CH12-HY) |
| Antenna Mast | EMEC | AM-BS-4500-B | N/A | 1m~4m | N/A | Apr. 09, 2016 | N/A | Radiation (03CH12-HY) |
| Turn Table | EMEC | TT2000 | N/A | 0~360 Degree | N/A | Apr. 09, 2016 | N/A | Radiation (03CH12-HY) |
| Horn Antenna | SCHWARZBECK | BBHA 9120 D | 9120D-1241 | 1GHz ~ 18GHz | Apr. 22, 2015 | Apr. 09, 2016 | Apr. 21, 2016 | Radiation (03CH12-HY) |
| Preamplifier | MITEQ | JS44-180040 00-33-8P | 1840917 | 18GHz ~ 40GHz | Jun. 02, 2015 | Apr. 09, 2016 | Jun. 01, 2016 | Radiation (03CH12-HY) |
| Signal Generator | Rohde & Schwarz | SMF100A | 101107 | 100kHz~40GHz | May 22, 2015 | Apr. 09, 2016 | May 21, 2016 | Radiation (03CH12-HY) |



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

| | |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 5.40 |
|---|------|



Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

| Conducted Power (*Unit: dBm) | | | |
|------------------------------|---------------|--------|--------|
| Band | CDMA2000 BC10 | | |
| Channel | 476 | 580 | 684 |
| Frequency | 817.90 | 820.50 | 823.10 |
| 1xRTT RC1 SO55 | 24.19 | 23.97 | 23.92 |
| 1xRTT RC3 SO55 | 24.20 | 24.00 | 23.94 |
| 1xRTT RC3 SO32 (+ F-SCH) | 24.37 | 24.08 | 24.00 |
| 1xRTT RC3 SO32 (+SCH) | 24.31 | 24.08 | 23.99 |



Appendix B. Test Results of Radiated Test

Radiated Spurious Emission

| CDMA BC10(1xRTT) | | | | | | | | | |
|------------------|-----------------|-----------|-------------|-----------------|-------------------|------------------|--------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | ERP (dBm) | Limit (dBm) | Over Limit (dB) | SPA Reading (dBm) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| Lowest | 1632 | -53.90 | -13 | -40.90 | -40.6 | -55.71 | 0.97 | 4.93 | H |
| | 2456 | -61.28 | -13 | -48.28 | -51.9 | -63.12 | 1.28 | 5.27 | H |
| | 3272 | -66.04 | -13 | -53.04 | -59.16 | -69.35 | 1.53 | 7.00 | H |
| | 1632 | -55.34 | -13 | -42.34 | -42.22 | -57.15 | 0.97 | 4.93 | V |
| | 2456 | -59.92 | -13 | -46.92 | -50.56 | -61.76 | 1.28 | 5.27 | V |
| | 3272 | -62.74 | -13 | -49.74 | -55.63 | -66.05 | 1.53 | 7.00 | V |
| Middle | 1640 | -59.00 | -13 | -46.00 | -45.78 | -60.78 | 0.97 | 4.91 | H |
| | 2464 | -60.04 | -13 | -47.04 | -50.66 | -61.9 | 1.28 | 5.29 | H |
| | 3280 | -64.83 | -13 | -51.83 | -57.92 | -68.18 | 1.54 | 7.03 | H |
| | 1640 | -59.80 | -13 | -46.80 | -46.75 | -61.58 | 0.97 | 4.91 | V |
| | 2464 | -58.86 | -13 | -45.86 | -49.49 | -60.72 | 1.28 | 5.29 | V |
| | 3280 | -61.67 | -13 | -48.67 | -54.57 | -65.02 | 1.54 | 7.03 | V |
| Highest | 1648 | -55.22 | -13 | -42.22 | -41.99 | -56.98 | 0.98 | 4.89 | H |
| | 2472 | -58.72 | -13 | -45.72 | -49.42 | -60.6 | 1.28 | 5.32 | H |
| | 3288 | -64.52 | -13 | -51.52 | -57.67 | -67.9 | 1.54 | 7.07 | H |
| | 1648 | -56.26 | -13 | -43.26 | -43.21 | -58.02 | 0.98 | 4.89 | V |
| | 2472 | -58.13 | -13 | -45.13 | -48.85 | -60.01 | 1.28 | 5.32 | V |
| | 3288 | -61.24 | -13 | -48.24 | -54.17 | -64.62 | 1.54 | 7.07 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.