



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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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FW382628-01	Rev. 01	<p>This is a variant report.</p> <p>Detail changes list as below:</p> <ol style="list-style-type: none">1. The new component duplexer only to change the PCS CDMA BC 1, it doesn't effect of RF function.2. Change layout for component size from 2.5 mm * 2.0mm to 2.0 mm * 1.6mm <p>All the test cases were performed on original report which can be referred to Sporton Report Number FW382628. Based on the original report, the field strength of spurious radiation case was verified.</p>	Jun. 03, 2016



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

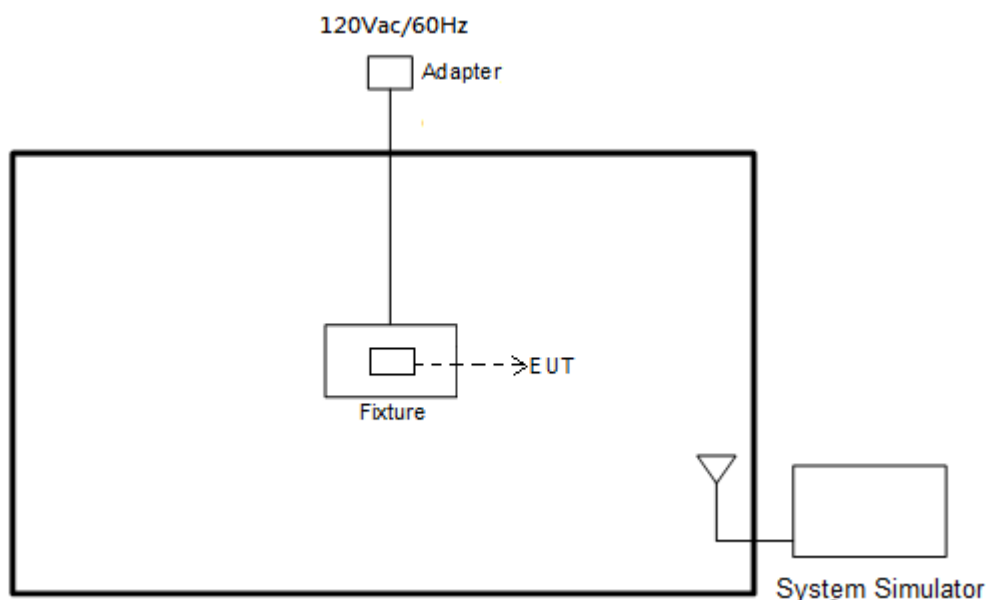
2.1 Test Mode

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.

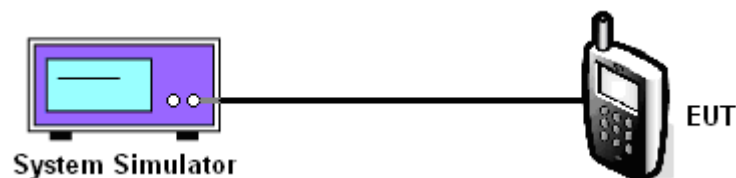
3.1.2 Measuring Instruments

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

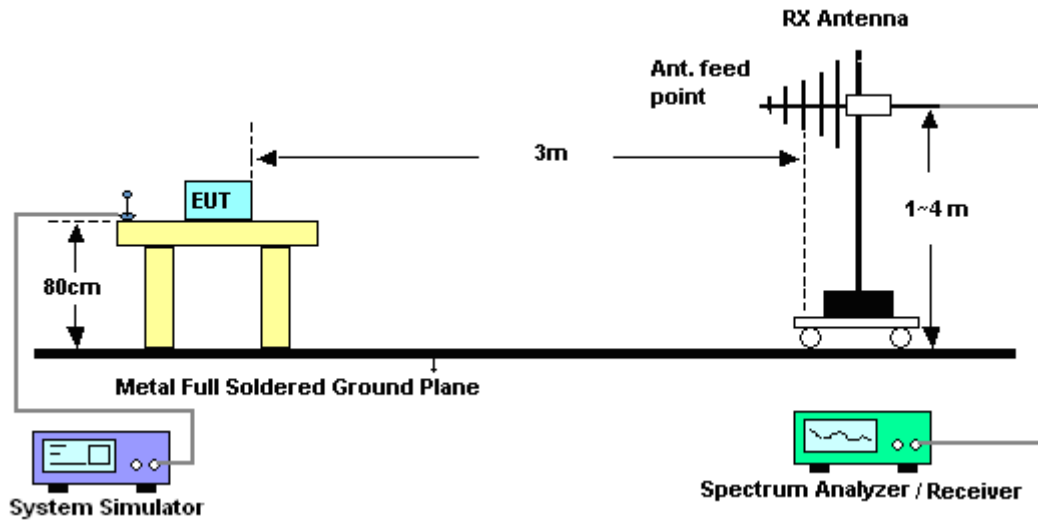
The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

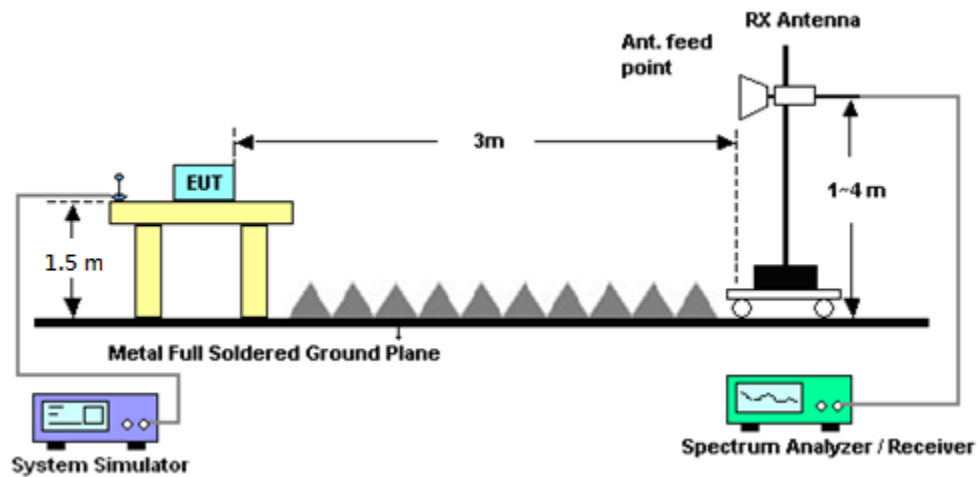
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position 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. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
11. $\text{ERP (dBm)} = \text{EIRP} - 2.15$
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)
 $= P(W) - [43 + 10 \log(P)] \text{ (dB)}$
 $= [30 + 10 \log(P)] \text{ (dBm)} - [43 + 10 \log(P)] \text{ (dB)}$
 $= -13 \text{ dBm}.$

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
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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.