

Variant FCC/IC RF Test Report

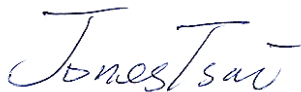
APPLICANT : Gemalto M2M GmbH
EQUIPMENT : CDMA 1XRTT Module
BRAND NAME : Cinterion
MODEL NAME : PCS3
FCC ID : QIPPCS3
IC : 7830A-PCS3
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
IC RSS-132 issue 3
IC RSS-133 issue 6
CLASSIFICATION : PCS Licensed Transmitter (PCB)

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 test procedures given in ANSI / TIA / EIA-603-D-2010 and has been in 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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FCC ID : QIPPCS3

IC : 7830A-PCS3

Page Number : 1 of 15

Report Issued Date : Jun. 03, 2016

Report Version : Rev. 01

Report Template No.: BU5-FG22/24/27/90 Version 1.1

Report Template No.: BU5-CG132/133/139 Version 1.1



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG382628-01	Rev. 01	This is a variant report. Detail changes list as below: 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 All the test cases were performed on original report which can be referred to Sporton Report Number FG382628. Based on the original report, only worst case was verified.	Jun. 03, 2016



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.4	§2.1046	RSS-132 (5.4) RSS-133 (6.4)	Conducted Output Power	Reporting Only	PASS	-
4.4	§2.1053 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Field Strength of Spurious Radiation	$< 43 + 10 \log_{10}(P[\text{Watts}])$	PASS	Under limit 18.17 dB at 3763.000 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 Product Feature of Equipment Under Test

Product Feature	
Equipment	CDMA 1XRTT Module
Brand Name	Cinterion
Model Name	PCS3
FCC ID	QIPPCS3
IC	7830A-PCS3
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

Standards-related Product Specification	
Tx Frequency	CDMA2000: BC0: 824.70 MHz ~ 848.31 MHz BC1: 1851.25 MHz ~ 1908.75 MHz
Rx Frequency	CDMA2000: BC0: 869.70 MHz ~ 893.31 MHz BC1: 1931.25 MHz ~ 1988.75 MHz
Maximum Output Power to Antenna	CDMA2000: BC0: 23.31 dBm BC1: 22.73 dBm
Antenna Type	Dipole Antenna
Antenna Gain	1.50 dBi
Type of Modulation	CDMA2000 1xRTT: QPSK

1.5 Modification of EUT

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

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation
Part 22	CDMA2000 BC0 1xRTT	QPSK
Part 24	CDMA2000 BC1 1xRTT	QPSK

1.7 Testing Location

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.	IC Registration No.
	03CH12-HY	4086H-3



1.8 Applicable Standards

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

- ♦ 47 CFR Part 2, 22(H), 24(E)
- ♦ ANSI / TIA / EIA-603-D-2010
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02
- ♦ IC RSS-132 Issue 3
- ♦ IC RSS-133 Issue 6
- ♦ IC RSS-Gen Issue 4

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.

Radiated emissions were investigated as following frequency range:

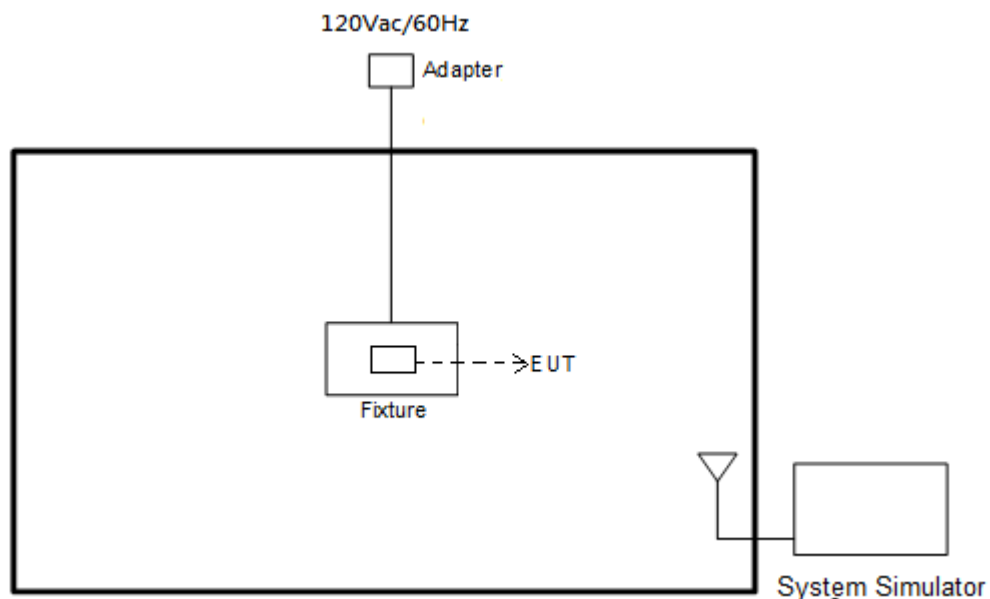
1. 30 MHz to 19000 MHz for CDMA BC1.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes	
Band	Radiated TCs
CDMA BC1	■ 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

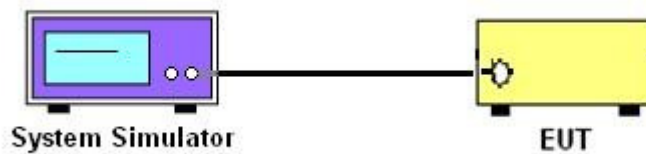
3 Conducted Test Result

3.1 Measuring Instruments

See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 Conducted Output Power





3.3 Conducted Output Power

3.3.1 Description of the Conducted Output Power

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.

3.3.2 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.
4. Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

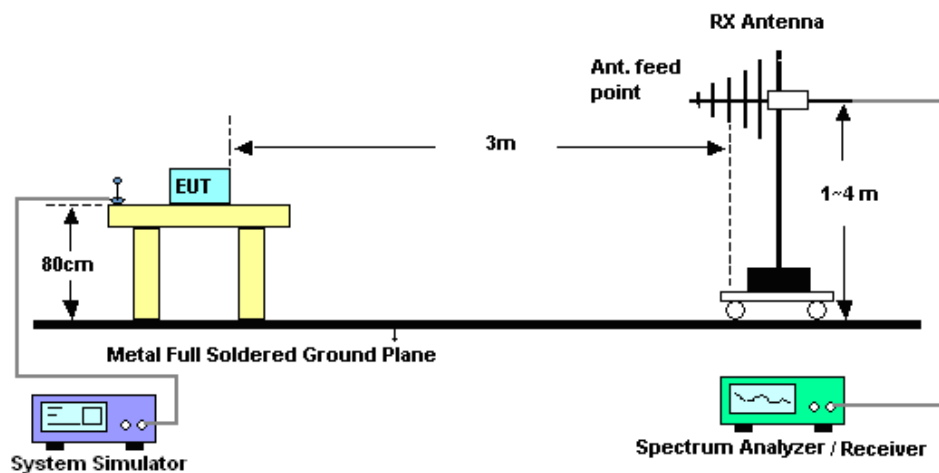
4 Radiated Test Items

4.1 Measuring Instruments

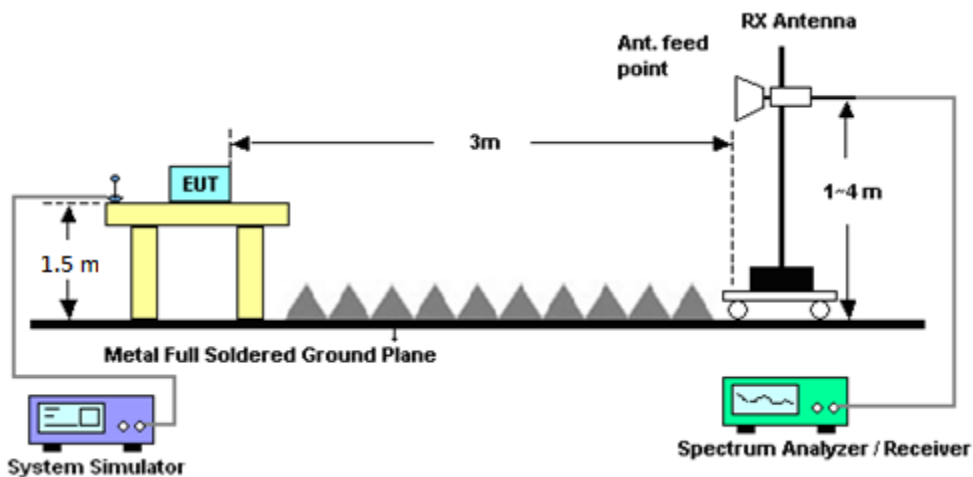
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Field Strength of Spurious Radiation Measurement

4.4.1 Description of Field Strength of Spurious Radiated Measurement

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 $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 D01 v02r02 Section 5.8 and ANSI / TIA-603-D-2010 Section 2.2.12.
2. The EUT was placed on a non-conductive rotating platform (0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz) in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Wireless Communication	Agilent	E5515C	MY48360820	GSM/GPRS/WCDMA	Jan. 11, 2016	Mar. 29, 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-00 101800-30-1	1815698	1GHz~18GHz	Dec. 14, 2015	Apr. 09, 2016	Dec. 13, 2016	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA917058 4	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-450 0-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	JS44-18004 000-33-8P	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)



6 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	CDMA 2000 BC0		
Channel	1013	384	777
Frequency	824.7	836.52	848.31
1xRTT RC1 SO55	23.14	23.22	23.31
1xRTT RC3 SO55	23.15	23.20	23.28
1xRTT RC3 SO32 (+ F-SCH)	23.18	23.24	23.30
1xRTT RC3 SO32 (+SCH)	23.17	23.25	23.24

Conducted Power (*Unit: dBm)			
Band	CDMA 2000 BC1		
Channel	25	600	1175
Frequency	1851.25	1880	1908.75
1xRTT RC1 SO55	22.62	22.46	22.25
1xRTT RC3 SO55	22.65	22.56	22.34
1xRTT RC3 SO32 (+ F-SCH)	22.69	22.54	22.25
1xRTT RC3 SO32 (+SCH)	22.73	22.53	22.33



Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

CDMA BC1 (1xRTT)									
Channel	Frequency (MHz)	EIRP (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	3700	-45.09	-13	-32.09	-38.9	-51.66	1.67	8.24	H
	5555	-64.14	-13	-51.14	-64.72	-71.21	2.66	9.72	H
	7403	-57.30	-13	-44.30	-63.29	-66.45	2.46	11.61	H
	3700	-47.43	-13	-34.43	-40.99	-54	1.67	8.24	V
	5555	-62.81	-13	-49.81	-63.34	-69.88	2.66	9.72	V
	7403	-52.68	-13	-39.68	-58.94	-61.83	2.46	11.61	V
Middle	3763	-31.17	-13	-18.17	-25.06	-37.8	1.69	8.32	H
	5639	-64.40	-13	-51.40	-65.22	-71.45	2.71	9.76	H
	7522	-56.23	-13	-43.23	-62.49	-65.62	2.42	11.81	H
	3763	-32.41	-13	-19.41	-26.09	-39.04	1.69	8.32	V
	5639	-63.90	-13	-50.90	-64.66	-70.95	2.71	9.76	V
	7522	-50.46	-13	-37.46	-57.01	-59.85	2.42	11.81	V
Highest	3819	-35.38	-13	-22.38	-29.35	-42.06	1.70	8.38	H
	5723	-64.36	-13	-51.36	-65.38	-71.4	2.75	9.79	H
	7634	-54.23	-13	-41.23	-60.67	-63.72	2.39	11.88	H
	3819	-38.98	-13	-25.98	-33.75	-45.66	1.70	8.38	V
	5723	-60.31	-13	-47.31	-61.3	-67.35	2.75	9.79	V
	7634	-48.27	-13	-35.27	-54.96	-57.76	2.39	11.88	V

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



Appendix B. Test Setup Photographs