RF Exposure Evaluation Report

APPLICANT	:	Gemalto M2M GMbH
EQUIPMENT	:	CDMA 1XRTT Module
BRAND NAME	:	Cinterion
MODEL NAME	:	PCS3
FCC ID	:	QIPPCS3
STANDARD	:	47 CFR Part 2.1091

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA382628	Rev. 01	Initial issue of report	Nov. 01, 2013

1. Administration Data

1.1. Testing Laboratory

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

1.2. Applicant

Company Name	Gemalto M2M GMbH
Address	Siemensdamm 50 Berlin 13629 Germany

1.3. Manufacturer

Company Name	HON HAI PRECISION IND. CO., LTD
Address	5F-1,5 Hsin-An road, Hsinchu, Science-Bases Industrial Park 300, Taiwan, R.O.C

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	CDMA 1XRTT Module
Brand Name	Cinterion
Model Name	PCS3
FCC ID	QIPPCS3
IMEI Code	A100003B90013D1
Wireless Technology and Frequency Range	CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz
Mode	・CDMA2000 : 1xRTT
Antenna Type	Dipole Antenna
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.

3. Maximum RF average output power among production units

Band	CDMA BC0	CDMA BC1	CDMA BC10
	average power(dBm)		
1xRTT RC1 SO55	25	25	25
1xRTT RC3 SO55	25	25	25
1xRTT RC3 SO32	25	25	25

4. RF Exposure Limit Introduction

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:
S = Power Density
P = Output Power at Antenna Terminals
G = Gain of Transmit Antenna (linear gain)
R = Distance from Transmitting Antenna

5. Radio Frequency Radiation Exposure Evaluation

5.1. Standalone Power Density Calculations

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP/EIRP (W)	Maximum ERP/EIRP Limit (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm2)	Limit (mW/cm2)
CDMA2000 BC10	817.9	9.0	25.0	1.53	7.0	2511.89	0.50	0.55
CDMA2000 BC0	824.7	9.0	25.0	1.53	7.0	2511.89	0.50	0.55
CDMA2000 BC1	1851.3	7.5	25.0	1.78	2.0	1778.28	0.35	1.00

Note: For conservativeness, the lowest uplink frequency of each band is used to determine the MPE limit of that band

5.2. Collocated Power Density Calculations

Note:

1. This MPE analysis is applicable to any collocated transmitters with transmit power for WLAN/WiMax is less than or equal to 29dBm and for Bluetooth is less than or equal to 15dBm.
2. A maximum antenna gain of 5 dBi for WLAN/WiMAX/BT has been assumed for all collocated antennas.

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum ERP/EIRP (W)	Average EIRP (mW)	Power Density at 20cm (mW/cm2)	Limit (mW/cm2)	Power Density / Limit
CDMA2000 BC10	817.9	6.0	25.0	0.77	1258.93	0.25	0.55	0.46
CDMA2000 BC0	824.7	6.0	25.0	0.77	1258.93	0.25	0.55	0.46
CDMA2000 BC1	1851.3	7.5	25.0	1.78	1778.28	0.35	1.00	0.35
WLNA2.4GHz Band	2412.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
WLNA5GHz Band	5180.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
WiMax2.3GHz	2300.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
WiMax2.6GHz	2500.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
WiMax3.5GHz	3400.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
WiMax3.7GHz	3600.0	5.0	29.0	0.79	2511.89	0.50	1.00	0.50
Bluetooth	2402.0	5.0	15.0	0.03	100.00	0.02	1.00	0.02

Wireless Interface	Maximum Power Density / Limit	Σ(Power Density / Limit) of WWAN+WLAN/WiMax+Bluetooth
CDMA	0.46	0.962
WLAN2.4GHz	0.50	
WLAN5GHz	0.50	
WiMax	0.50	
Bluetooth	0.02	

Note:

1. For colocation analysis, CDMA BC10 is chosen for summation due to the highest (power density/limit) among all WWAN wireless modes.
2. Σ(Power Density / Limit): This is a summation of [(power density for each transmitter/antenna included in the simultaneous transmission)/ (corresponding MPE limit)], for WWAN + WLAN/WiMax + Bluetooth.
3. Considering the WWAN module collocation with the WLAN and Bluetooth transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1.

Conclusion:

Based on 47 CFR §2.1091, the analysis concludes that this product when transmitting in standalone within a host device, is complant with the FCC RF exposure requirements in mobile exposure condition, provided the conducted power and antenna gain do not exceed the limits for each given frequency band per wireless technology as follow table:

Technology	Band	Maximum Conducted Power (dBm)	Stanalone Maximum Antenna Gain (dBi)	Collocated Maximum Antenna Gain (dBi)
CDMA	BC10	25.0	9.0	6.0
	BC0	25.0	9.0	6.0
	BC1	25.0	7.5	7.5