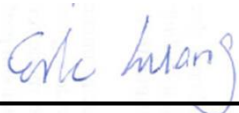


RF Exposure Evaluation Report

APPLICANT : Super Micro Computer, Inc.
EQUIPMENT : IoT Gateway System
BRAND NAME : Super Micro Computer, Inc
MODEL NAME : SYS-E100-8Q-THE3/SYS-E100-8QE-THE3
IC ID : 20273-E100THE3
STANDARD : IC RSS-102 Issue 5

We, SPORTON INTERNATIONAL INC., would like to declare that the device has been evaluated in accordance with IC RSS-102 Issue 5, 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



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
CA560818-01	Rev. 01	Initial issue of report	Aug. 31, 2015

1. Administration Data

1.1. Testing Laboratory

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Super Micro Computer, Inc.
Address	980 Rock Ave., San Jose, CA, 95131, USA

Manufacturer	
Company Name	Super Micro Computer, Inc.
Address	980 Rock Ave., San Jose, CA, 95131, USA

2. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	IoT Gateway System
Brand Name	Super Micro Computer, Inc
Model Name	SYS-E100-8Q-THE3/SYS-E100-8QE-THE3
IC ID	20273-E100THE3
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz Zigbee: 2405 MHz ~ 2480 MHz
Mode	<ul style="list-style-type: none"> • GSM/GPRS/EGPRS • RMC/AMR • HSDPA Rel • HSUPA Rel • Zigbee: O-QPSK
HW Version	Module: HE910-D: 0, A1SQN-E/A1SQN MB V1.02
SW Version	Module: firmware 12.00.026, system:RCPL23
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

Mode	Burst Average Power (dBm)	
	GSM 850	GSM 1900
GPRS/EDGE (GMSK, 1 Tx slot)	32.5	30.0
GPRS/EDGE (GMSK, 2 Tx slots)	32.5	30.0
EDGE (8PSK, 1 Tx slot)	27.0	26.0
EDGE (8PSK, 2 Tx slots)	27.0	26.0

Mode	Average Power (dBm)		
	WCDMA Band V	WCDMA Band II	WCDMA Band IV
RMC 12.2Kbps	22.5	22.5	22.5
HSDPA Subtest-1	22.5	22.5	22.5
HSUPA Subtest-5	22.5	22.5	22.5

Frequency (MHz)	Average Power (dBm)
	Zigbee 2.4GHz Band
2405	17
2440	19
2475	10

4. RF Exposure Limit Introduction

IC has adopted the RF field strength limits established in Health Canada's RF exposure guideline. The limits are shown in Table 4 below per RSS-102.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m²)	Reference Period (minutes)
0.003-10 ⁻²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ $f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ $f^{0.25}$	0.1540/ $f^{0.25}$	8.944/ $f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 $f^{0.3417}$	0.008335 $f^{0.3417}$	0.02619 $f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ $f^{1.2}$
150000-300000	0.158 $f^{0.5}$	4.21 x 10 ⁻⁴ $f^{0.5}$	6.67 x 10 ⁻⁵ f	616000/ $f^{1.2}$
Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).				

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 Calculation

Band	Frequency (MHz)	Antenna Gain (dBi)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (W)	Average EIRP (mW)	Power Density at 20cm (W/m ²)	Limit (W/m ²)	Power Density / Limit
GPRS 850 (1 Tx slot)	824.2	2.10	32.50	34.600	2.884	363.078	0.723	2.576	0.281
GPRS 850 (2 Tx slots)	824.2	2.10	32.50	34.600	2.884	724.436	1.442	2.576	0.560
EGPRS 850 (1 Tx slot)	824.2	2.10	27.00	29.100	0.813	102.329	0.204	2.576	0.079
EGPRS 850 (2 Tx slots)	824.2	2.10	27.00	29.100	0.813	204.174	0.406	2.576	0.158
GPRS 1900 (1 Tx slot)	1850.2	2.80	30.00	32.800	1.905	239.883	0.477	4.477	0.107
GPRS 1900 (2 Tx slots)	1850.2	2.80	30.00	32.800	1.905	478.630	0.953	4.477	0.213
EGPRS 1900 (1 Tx slot)	1850.2	2.80	26.00	28.800	0.759	95.499	0.190	4.477	0.042
EGPRS 1900 (2 Tx slots)	1850.2	2.80	26.00	28.800	0.759	190.546	0.379	4.477	0.085
WCDMA Band 5	826.4	2.10	22.50	24.600	0.288	288.403	0.574	2.581	0.222
WCDMA Band 4	1712.4	2.00	22.50	24.500	0.282	281.838	0.561	4.246	0.132
WCDMA Band 2	1852.4	2.80	22.50	25.300	0.339	338.844	0.674	4.480	0.151
Zigbee	2405.0	2.10	19.00	21.100	0.129	128.825	0.256	5.355	0.048

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 Calculation

Maximum Zigbee Power Density / Limit	Maximum WWAN Power Density / Limit	Σ (Power Density / Limit) of WWAN+Zigbee
0.048	0.560	0.608

Note:

1. For collocation analysis, GPRS850 (2TX slot) 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 + Zigbee
3. Considering the WWAN collocation with the Zigbee transmitter of the EIRP performance listed in the table above, the aggregated (power density /limit) is smaller than 1, and MPE of 2 collocated transmitters is compliant

Conclusion:

According to IC RSS-102 Issue 5, the RF exposure analysis concludes that the RF Exposure is IC compliant.