RF Exposure Evaluation declaration

Product Name : Wireless Motherboard

Model No. : TH80GA

FCC ID : WL6-TH8AG20GA4

Applicant : ELITEGROUP COMPUTER SYSTEMS CO., LTD

Address : No.239, Sec. 2, Ti Ding Blvd., Taipei, Taiwan

Date of Receipt : Feb. 05, 2016

Date of Declaration : Mar. 24, 2016

Report No. : 1620222R-RF-US-RFEXP

Testing Laboratory
3023

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Motherboard
Model No.	TH80GA
Trade Name	ECS ELITEGROUP
IMEI No.	004999010640000
FCC ID	WL6-TH8AG20GA4
2G/ 3GTX Frequency	GSM850: 824.2 ~ 848.8 MHz
	GSM1900: 1850.2~ 1909.8MHz
	WCDMA Band 2: 1852.4 ~ 1907.6 MHz
	WCDMA Band 5: 826.4~ 846.6 MHz
2G/3G Rx Frequency	GSM850: 869.2 ~ 893.8 MHz
	GSM1900: 1930.2 ~ 1989.8 MHz
	WCDMA Band 2: 1932.4 ~ 1987.6 MHz
	WCDMA Band 5: 871.4 ~ 891.6 MHz
WIFI Frequency	2412-2462MHz for 802.11b/g/n-20BW
Bluetooth Frequency	

1.2. Antenna List :

No.	Manufacturer	Part No.	Peak Gain
1	SOUTH STAR	13H130-JJ5451	0.46 dBi for 850MHz 1.32 dBi for 1900MHz

2. RF Exposure Evaluation

2.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	30
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $\mathbf{Pd = (Pout*G)/(4*Pi*R^2)}$

Where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm^2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0

2.2. Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

The temperature and related humidity: 21℃and 60％ RH.

2.3. Test Result of RF Exposure Evaluation

Product : Wireless Motherboard
Test Item : RF Exposure Evaluation
Test Site : N/A

GPRS 850
Peak Gain: 0.46dBi

Frequency (MHz)	Conducted Peak Power (dBm)	Maximum ERP (W)	Maximum ERP Limit(W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
836.4	31.37	0.9290	7	12.5	22.3	171.4	0.04	0.56	Pass
824.2	28.02	0.4295	7	25	22.0	158.5	0.04	0.55	Pass
824.2	25.94	0.2661	7	37.5	21.7	147.2	0.03	0.55	Pass
824.2	24.52	0.1919	7	50	21.5	141.6	0.03	0.55	Pass

EGPRS 850
Peak Gain: 0.46dBi

Frequency	Conducted Peak Power (dBm)	Maximum ERP (W)	Maximum ERP Limit(W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
836.4	25.1	0.2193	7	12.5	16.1	40.4	0.01	0.56	Pass
848.8	25.08	0.2183	7	25	19.1	80.5	0.02	0.57	Pass
836.4	25.03	0.2158	7	37.5	20.8	119.4	0.03	0.56	Pass
836.4	21.26	0.0906	7	50	18.2	66.8	0.01	0.56	Pass

GPRS 1900

Peak Gain: 1.32dBi

Frequency	Conducted Peak Power (dBm)	Maximum EIRP (W)	Maximum EIRP Limit(W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
1850.2	28.78	1.0233	2	12.5	19.7	94.4	0.03	1	Pass
1850.2	26.14	0.5572	2	25	20.1	102.8	0.03	1	Pass
1850.2	24.33	0.3673	2	37.5	20.1	101.6	0.03	1	Pass
1850.2	23.07	0.2748	2	50	20.1	101.4	0.03	1	Pass

EGPRS 1900

Peak Gain: 1.32dBi

Frequency	Conducted Peak Power (dBm)	Maximum EIRP (W)	Maximum EIRP Limit(W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
1880	24.6	0.3908	2	12.5	15.6	36.1	0.01	1	Pass
1880	24.55	0.3864	2	25	18.5	71.3	0.02	1	Pass
1880	24.16	0.3532	2	37.5	19.9	97.7	0.03	1	Pass
1880	22.93	0.2661	2	50	19.9	98.2	0.03	1	Pass

WCDMA

Peak Gain: Band II : 1.32dBi / Band V : 0.46dBi

Band	Frequency	Conducted Peak Power (dBm)	Maximum ERP/EIRP (W)	Maximum ERP/EIRP Limit (W)	Duty Cycle (%)	Conducted Average Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
II	1880	23.14	0.2793	2	100	23.1	206.1	0.06	1	Pass
V	846.6	22.73	0.2084	7	100	22.7	187.5	0.04	0.56	Pass

WLAN

Peak Gain: 2.71dBi

Band	Frequency	Conducted Peak Power (dBm)	Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
2.4	2437	18.39	100	69.0	0.026	1	Pass

Bluetooth
Peak Gain: 2.71dBi

Band	Frequency	Conducted Peak Power (dBm)	Duty Cycle (%)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Pass/Fail
2.4	2480	6.76	75	3.6	0.001	1	Pass

2.4. calculations for Multi-Transsmitter

Mode	Exposure Calculations	result	Limit	Pass/Fail
WLAN	0.026	0.1	1	Pass
BT	0.001			
WWAN	0.073			

Note: The conducted output power is refer to report No.: 1620222R-HPUSP08V00, 1620222R-RFUSP23V00, 1620222R-RFUSP26V00 from the QuieTek.