

RF Exposure Evaluation Declaration

Product Name : ELS61-US
Model No. : ELS61-US
FCC ID: QIPELS61-US
IC ID: 7830A-ELS61US

Applicant : Gemalto M2M GmbH
Address : Siemensdamm 50, 13629 Berlin, Germany

Date of Receipt : 11-02-2015
Test Date : 11-17-2015~11-28-2015
Issued Date : 01-21-2016
Report No. : UL05420151102FCC/IC042-4

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
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Report No. : UL05420151102FCC/IC042-4

Product Name : ELS61-US
Applicant : Gemalto M2M GmbH
Address : Siemensdamm 50, 13629 Berlin, Germany
Manufacturer : Gemalto M2M GmbH
Address : Siemensdamm 50, 13629 Berlin, Germany
Model No. : ELS61-US
EUT Voltage : MIN: 3.0V, NOR: 3.8V, MAX: 4.5V
Brand Name : GEMALTO
FCC ID: QIPELS61-US
IC ID: 7830A-ELS61US
Applicable Standard : FCC's Rules (47 C.F.R. §1.1310 and 2.1091)
Industry Canada RSS-102, Issue 5
Test Result : Complied
Performed Location : Unilab (Shanghai) Co.,Ltd.
FCC 2.948 register number is 714465
IC register number is 11025A-1
No.1350, Lianxi Road, Pudong New District, Shangha, China
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Approved by :

Eva Wang

(Supervisor Engineer: Eva Wang)

1. EUT Description

Product Name:	ELS61-US
Model Name:	ELS61-US
Hardware Version:	00.301
Software Version:	B2
RF Exposure Environment:	Uncontrolled
LTE	
Support Band:	LTE Band II
Tx Frequency Range:	LTE Band II :1850MHz ~1910MHz
Rx Frequency Range:	LTE Band II :1930MHz ~1990MHz
Type of modulation:	LTE: QPSK,16-QAM
Antenna Type:	Connector
Antenna Peak Gain:	LTE Band II : 2.15dBi
Support Band:	LTE Band IV
Tx Frequency Range:	LTE Band IV:1710MHz ~1755MHz
Rx Frequency Range:	LTE Band IV:2110MHz ~2155MHz
Type of modulation:	LTE: QPSK,16-QAM
Antenna Type:	Connector
Antenna Peak Gain:	LTE Band IV: 2.15dBi
Support Band:	LTE Band V
Tx Frequency Range:	LTE Band V: 824MHz ~849MHz
Rx Frequency Range:	LTE Band V: 869MHz ~894MHz
Type of modulation:	LTE: QPSK,16-QAM
Antenna Type:	Connector
Antenna Peak Gain:	LTE Band V:2.15dBi
Support Band:	LTE Band XII
Tx Frequency Range:	LTE Band XII: 698MHz ~716MHz
Rx Frequency Range:	LTE Band XII: 728MHz ~746MHz
Type of modulation:	LTE: QPSK,16-QAM
Antenna Type:	Connector
Antenna Peak Gain:	LTE Band XII: 2.15dBi
WCDMA	
Support Band:	WCDMA Band II
Tx FrequencyRange:	WCDMA Band II: 1850MHz ~1910MHz

Rx FrequencyRange:	WCDMA Band II: 1930MHz ~1990MHz
Type of modulation:	WCDMA(UMTS): QPSK
Antenna Type:	Connector
AntennaPeak Gain:	WCDMA Band II: 2.15dBi
Support Band:	WCDMA Band V
Tx FrequencyRange:	WCDMA Band V: 824MHz ~849MHz
Rx FrequencyRange:	WCDMA Band V: 869MHz ~894MHz
Type of modulation:	WCDMA(UMTS): QPSK
Antenna Type:	Connector
AntennaPeak Gain:	WCDMA Band V: 2.15dBi
Support Band:	WCDMA Band IV
Tx Frequency Range:	WCDMA Band IV: 1710MHz~1755MHz
Rx Frequency Range:	WCDMA Band IV: 2110MHz~2155MHz
Type of modulation:	WCDMA(UMTS): QPSK
Antenna Type:	Connector
Antenna Peak Gain:	WCDMA Band IV: 2.15dBi

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 Occupation/Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B)Limits for General Occupation/UnControlled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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.

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: 22 °C and 53 %RH.

2.3.Test Result of RF Exposure Evaluation

This device is evaluated by mobile device with general population/uncontrolled exposure condition
For this device, the calculation is using the most conservative values, and the results are as follows:

Test Mode	Antenna Gain (dBd)	Antenna Gain (dBi)	Maximum Output Power (dBm)	Maximum Output Power (mW)	Calculated RF Exposure at d = 20cm (mW/cm ²)	MPE Limit (mW/cm ²)
WCDMA Band II	----	2.15	25	518.8	0.10	1.00
WCDMA Band IV	----	2.15	25	518.8	0.10	1.00
WCDMA Band V	0	----	25	518.8	0.10	0.55
Duty cycle =100%						

Test Mode	Band Width (MHz)	Antenna Gain (dBd)	Antenna Gain (dBi)	Maximum Output Power (dBm)	Maximum Output Power (mW)	Calculated RF Exposure at d = 20cm (mW/cm ²)	MPE Limit (mW/cm ²)
LTE Band 2	1.4	----	2.15	25	518.8	0.10	1.00
	3	----	2.15	25	518.8	0.10	
	5	----	2.15	25	518.8	0.10	
	10	----	2.15	25	518.8	0.10	
	15	----	2.15	25	518.8	0.10	
	20	----	2.15	25	518.8	0.10	
LTE Band 4	1.4	----	2.15	25	518.8	0.10	1.00
	3	----	2.15	25	518.8	0.10	
	5	----	2.15	25	518.8	0.10	
	10	----	2.15	25	518.8	0.10	
	15	----	2.15	25	518.8	0.10	
	20	----	2.15	25	518.8	0.10	
LTE Band 5	1.4	0	----	25	518.8	0.10	0.55
	3	0	----	25	518.8	0.10	
	5	0	----	25	518.8	0.10	
	10	0	----	25	518.8	0.10	
LTE Band 12	1.4	0	----	25	518.8	0.10	0.47
	3	0	----	25	518.8	0.10	
	5	0	----	25	518.8	0.10	
	10	0	----	25	518.8	0.10	
Duty cycle =100%							

Test Mode	ERP (dBm)	EIRP (dBm)	Peak EIRP (mW)	Calculated RF Exposure at d = 20cm (mW/cm ²)	MPE Limit (mW/cm ²)
WCDMA Band II	----	23.68	233.35	0.05	1.00
WCDMA Band IV	----	23.63	230.67	0.05	1.00
WCDMA Band V	23.93	26.08	405.51	0.08	0.55
Duty cycle =100%					

Test Mode	Band Width (MHz)	ERP (dBm)	EIRP (dBm)	Maximum Output Power (mW)	Calculated RF Exposure at d = 20cm (mW/cm ²)	MPE Limit (mW/cm ²)
LTE Band 2	1.4	---	23.00	199.53	0.04	1.00
	3	---	23.10	204.17	0.04	
	5	---	23.07	202.77	0.04	
	10	---	23.09	203.70	0.04	
	15	---	23.00	199.53	0.04	
	20	---	22.99	199.07	0.04	
LTE Band 4	1.4	---	22.93	196.34	0.04	1.00
	3	---	23.07	202.77	0.04	
	5	---	23.00	199.53	0.04	
	10	---	22.95	197.24	0.04	
	15	---	23.11	204.64	0.04	
	20	---	23.01	199.99	0.04	
LTE Band 5	1.4	23.03	25.18	329.61	0.07	0.55
	3	23.04	25.19	330.37	0.07	
	5	23.12	25.27	336.51	0.07	
	10	22.98	25.13	325.84	0.06	
LTE Band 12	1.4	23.10	25.25	334.97	0.07	0.47
	3	23.17	25.32	340.41	0.07	
	5	23.26	25.41	347.54	0.07	
	10	23.07	25.22	332.66	0.07	
Duty cycle =100%						

This device can pass RF exposure limit.