



TEST REPORT

No. I17D00184-MPE01

For

Client : Gemalto M2M GmbH

Production : LTE Data-Only SMT World-Module

Model Name : PLS62-W

FCC ID: QIPPLS62-W

IC: 7830A-PLS62W

Hardware Version: B2.1

Software Version: 01.000

Issued date: 2017-10-10

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I17D00184-MPE01	00	2017-9-15	Initial creation of test report
I17D00184-MPE01	01	2017-10-10	second creation of test report

CONTENTS

1. TEST LABORATORY	5
1.1. TESTING LOCATION	5
1.2. PROJECT DATA	5
1.3. SIGNATURE	5
2. CLIENT INFORMATION.....	6
2.1. APPLICANT INFORMATION.....	6
2.2. MANUFACTURER INFORMATION.....	6
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	7
3.1. ABOUT EUT	7
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	7
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	7
4. REFERENCE DOCUMENTS.....	8
4.1. APPLICABLE STANDARDS.....	8
4.2. TEST LIMITS.....	8
5. TEST RESULTS	9
5.1. RF POWER OUTPUT.....	9
5.2. DUTY CYCLE	9
5.3. CALCULATION INFORMATION	9
5.4. RESULT OF LTE BAND2.....	10
5.5. RESULT OF LTE BAND4.....	10
5.6. RESULT OF LTE BAND5.....	10
5.7. RESULT OF LTE BAND7.....	11
5.8. RESULT OF LTE BAND12.....	11
5.9. RESULT OF LTE BAND18.....	12
5.10. RESULT OF LTE BAND19.....	12
5.11. RESULT OF GSM850	12

5.12. RESULT OF GSM1900	13
5.13. RESULT OF WCDMA BAND2	13
5.14. RESULT OF WCDMA BAND4	13
5.15. RESULT OF WCDMA BAND5	14
6. REFERENCE DOCUMENTS FOR IC	15
6.1. APPLICABLE STANDARDS.....	15
6.2. TEST LIMITS	15
6.3. RF POWER OUTPUT.....	15
6.4. CALCULATION INFORMATION	16
6.5. RESULT OF LTE	16

1. Test Laboratory

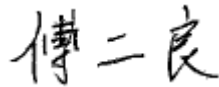
1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

1.2. Project Data

Project Leader:	Yu Anlu
-----------------	---------

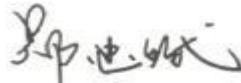
1.3. Signature



Fu Erliang
(Prepared this test report)



Song Kaihua
(Reviewed this test report)



Zheng Zhongbin
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: Gemalto M2M GmbH
Address /Post: Gemalto M2M GmbH, Siemensdamm 50, 13629 Berlin, Germany
Telephone: +861059378342

2.2. Manufacturer Information

Company Name: Gemalto M2M GmbH
Address /Post: Gemalto M2M GmbH, Siemensdamm 50, 13629 Berlin, Germany
Telephone: +861059378342

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	LTE Data-Only SMT World-Module
Model name	PLS62-W
GSM Frequency Band	GSM850/1900
LTE Frequency Band	LTE Band2/4/5/7/12/18/19
Antenna Type	External Antenna
FCC ID:	QIPPLS62-W
IC:	7830A-PLS62W

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version:
N01	N/A	B2.1	01.000

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
N/A	N/A	N/A	N/A	N/A

*AE ID: is used to identify the test sample in the lab internally.

4. Reference Documents

4.1. Applicable Standards

The MPE report was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2.1091.

FCC CFR 47, Part 2, FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS, Oct 1,2011

Section 2.1091 Radiofrequency radiation exposure evaluation: mobile devices, June 23, 2015

4.2. Test Limits

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

Limits for Occupational / Controlled Exposure

Frequency Range [MHz]	Electric Field Strength [V/m]	Magnetic Field Strength (E) [A/m]	Magnetic Field Strength (H)	Power Density (S) [mW/cm ²]	Averaging Times E ² , H ² or S [minutes]
0.3 – 3.0	614	1.63		(100)*	6
3.0 – 30	1824/f	4.89/f		(900/f)*	6
30 – 300	61.4	0.163		1.0	6
300 – 1500	--	--		F/300	6
1500 - 100000	--	--		5	6

Limits for General Population / Uncontrolled Exposure

Frequency Range [MHz]	Electric Field Strength [V/m]	Magnetic Field Strength (E) [A/m]	Magnetic Field Strength (H)	Power Density (S) [mW/cm ²]	Averaging Times E ² , H ² or S [minutes]
0.3 – 1.34	614	1.63		(100)*	30
1.34 – 30	824/f	2.19/f		(180/f)*	30
30 – 300	27.5	0.073		0.2	30
300 – 1500	--	--		F/1500	30
1500 - 100000	--	--		1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

For the DUT, the limits for General Population / Uncontrolled Exposure are applicable.

5. Test Results

5.1. RF Power Output

Frequency Band	Highest Power Output(dBm)	Antenna Gain(dBi)
LTE Band2	25	2.15
LTE Band4	25	2.15
LTE Band5	25	5.15
LTE Band7	25	4.2
LTE Band12	25	2
LTE Band18	25	5.15
LTE Band19	25	5.15
GSM850	25.97	5.15
GSM1900	22.97	2.15
UMTS Band 2	25	2.15
UMTS Band 4	25	2.15
UMTS Band 5	25	5.15

5.2. Duty cycle

Mode	Duty Cycle
GSM	1:8.3
WCDMA	1:1
LTE	1:1

5.3. Calculation Information

For conservative evaluation consideration, only maximum power of each frequency band based on the tighter limits respectively are used to calculate the boundary power density.

Based on the FCC KDB 447498 D01 and 47 CFR §2.1091, the DUT is evaluated as a mobile device.

$$\text{Given } S = \frac{P \times G}{4\pi d^2} \quad \text{Equation 1}$$

Where

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

5.4. Result of LTE Band2

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850 – 1910 MHz; as per the original test report the highest power is 316.23mW,. The maximum gain is 2.15dBi(numeric gain 1.64).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.103 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.5. Result of LTE Band4

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1710 – 1755 MHz; as per the original test report the highest power is 316.23 mW,. The maximum gain is 2.15 dBi(numeric gain 1.64).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.103 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.6. Result of LTE Band5

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824 – 849 MHz; as per the original test report the highest power is 316.23 mW,. The maximum gain is 5.15 dBi(numeric gain 3.27).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.206 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498

D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 0.549 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.7. Result of LTE Band7

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 2500 – 2570MHz; as per the original test report the highest power is 316.23 mW,. The maximum gain is 4.2 dBi(numeric gain 2.63).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.165 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.8. Result of LTE Band12

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 869 – 716 MHz; as per the original test report the highest power is 316.23mW,. The maximum gain is 2dBi(numeric gain 1.585).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.10 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = F / 1500 = 716 / 1500 = 0.477 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.9. Result of LTE Band18

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 815 – 830 MHz; as per the original test report the highest power is 361.23mW,. The maximum gain is 5.15 dBi(numeric gain 3.27).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.206 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = F/1500 = 815/1500 = 0.543 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.10. Result of LTE Band19

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 830 – 845 MHz; as per the original test report the highest power is 361.23mW,. The maximum gain is 5.15 dBi(numeric gain 3.27).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.206 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = F/1500 = 815/1500 = 0.553 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

Note: $\pi=3.1416$

So the product is under the MPE limits. All is pass.

5.11. Result of GSM850

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824 – 849 MHz; as per the original test report the highest power is 395.367 mW,. The maximum gain is 5.15 dBi(numeric gain 3.27).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.257 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 0.549 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.12. Result of GSM1900

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850 – 1910 MHz; as per the original test report the highest power is 198.15 mW,. The maximum gain is 2.15 dBi(numeric gain 1.64).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.065 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.13. Result of WCDMA Band2

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1850 – 1910 MHz; as per the original test report the highest power is 316.23mW,. The maximum gain is 2.15dBi(numeric gain 1.64).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.103 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.14. Result of WCDMA Band4

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 1710 – 1755 MHz; as per the original test report the highest power is 316.23 mW,. The maximum gain is

2.15dBi(numeric gain 1.64).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.103 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 1 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

5.15. Result of WCDMA Band5

Test Results: MPE Limit Calculation: the EUT's operating frequencies @ 824 – 849 MHz; as per the original test report the highest power is 316.23 mW,. The maximum gain is 5.15 dBi(numeric gain 3.27).The resulted power density at a distance of 20cm can be deducted as follows:

$$\text{Power Density} = P * G * \text{Duty Cycle} / (4 \pi R^2) = 0.206 \text{ mW/cm}^2$$

The MPE limit for Occupational/Controlled Exposure is shown in the FCC KDB 447498 D01 and 47 CFR §2.1091, can be calculated as follows:

$$\text{MPE limit} = 0.549 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, therefore the DUT in this band is compliant with the FCC rules on RF exposure.

6. Reference Documents for IC

6.1. Applicable Standards

RSS 102 Issue 5 :Radio Frequency (RF) Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

6.2. Test Limits

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $22.48/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

6.3. RF Power Output

Frequency Band	Highest Output Power (dBm)	Antenna Gain(dBi)
LTE Band2	25	2.15
LTE Band4	25	2.15
LTE Band5	25	5.15
LTE Band7	25	4.2
LTE Band12	25	2
LTE Band18	25	5.15
LTE Band19	25	5.15
GSM850	25.97	5.15
GSM1900	22.97	2.15
UMTS Band 2	25	2.15
UMTS Band 4	25	2.15
UMTS Band 5	25	5.15

6.4. Calculation Information

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ (adjusted for tune-up tolerance), where f is in MHz;

6.5. Result of LTE

The MPE limit for Occupational/Controlled Exposure is shown in the RSS 102 issue 5 section 2.5.2, can be calculated as follows:

Frequency Band	Highest Output Power (dBm)	Antenna Gain(dBi)	EIRP (mW)	MPE limit (W)
LTE Band2	25	2.15	316.23	2.24
LTE Band4	25	2.15	316.23	2.12
LTE Band5	25	5.15	630.96	1.29
LTE Band7	25	4.2	831.76	2.75
LTE Band12	25	2	501.19	1.15
LTE Band18	25	5.15	630.96	1.28
LTE Band19	25	5.15	630.96	1.29
GSM850	25.97	5.15	788.86	1.29
GSM1900	22.97	2.15	198.15	2.24
UMTS Band 2	25	2.15	316.23	2.24
UMTS Band 4	25	2.15	316.23	2.12
UMTS Band 5	25	5.15	630.96	1.29

As we can see the resulted EIRP is below the MPE limit, therefore the DUT in this band is compliant with the IC rules on RF exposure.

*******End The Report*******