TEST REPORT

No. I17D00197-EMC01

For

Client : Gemalto M2M GmbH

Production: LTE Data-Only SMT World-Module

Model Name : ELS81-US

Hardware Version: B2.1

Software Version: 02.000

FCC ID: QIPELS81-US

Issued date: 2017-09-27

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
I17D00197-EMC01	00	2017-09-27	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7F, G Area,No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	86-21-63843300
Fax:	86-21-63843301
FCC registration No:	489729

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	30-60%RH

1.3. Project data

Project Leader:	Zhou Yan
Testing Start Date:	08-28,2017
Testing End Date:	08-29,2017

1.4. Signature

Qin Yabin
(Prepared this test report)

You Jinjun
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

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

2.2. Manufacturer Information

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

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

3.1. About EUT

EUT Description	LTE Data-Only SMT World-Module
Model name	ELS81-US
WCDMA Frequency Band	WCDMA BAND Ⅱ/Ⅳ/Ⅴ
LTE Frequency Band	LTE FDD Band 2/4/5/8/12

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N02	/	B2.1	02.00	2017-08-27

*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
CA02	Adapter	HW-120200U6W	/
S03	PCB	/	/
EA03	Antenna	/	/
EC02	Antenna	/	/
EB02	RF Cable	/	/

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

4. Reference Documents

4.3. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	10-1-10 Edition
ANSI C63.4	Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

5. Test Results

5.3. Summary of Test Results

Items	Test List	Clause in FCC rules	Verdict
1	Radiated Emission	15.109(a)	Pass
2	AC Conducted Emission	15.107(a)	Pass

5.4. Statements

The ELS81-US, manufactured by Gemalto M2M GmbH is a variant product for testing. ECIT performed test cases which identified with Pass/Fail/Inc result in section 5.1.

ECIT has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. Test Equipments Utilized

6.1 Radiated Emission Equipments list

No.	Name	Type	Series Number	Producer	Cal. Date	Cal. interval
1	Universal Radio Communication	CMU200	123126	R&S	2017-05-11	1 Year
2	Test Receiver	ESU40	100307	R&S	2017-05-11	1 Year
3	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double Ridged Guide	ETS-3117	00135890	ETS	2017-01-11	3 Year
5	EMI Test Software	EMC32 V9.15	NA	R&S	NA	NA

6.1 AC Conducted Emission Equipments list

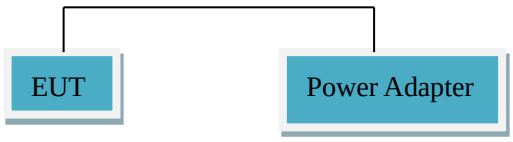
No.	Name	Type	Series Number	Producer	Cal. Date	Cal. interval
1	Universal Radio	CMU200	123123	R&S	2017-05-11	1 Year
2	Test Receiver	ESCI	101235	R&S	2017-05-11	1 Year
3	2-Line V-Network	ENV216	101380	R&S	2017-05-11	1 Year
4	EMI Test Software	EMC32 V9.12	NA	R&S	NA	NA

7. System Configuration during Test

7.1 Test Mode

Test Item	Function Type
AC Conducted Emission	Mode 1: Adapter charging <Figure 1>
Radiated Emission	Mode 1: Adapter charging <Figure 1>
Remark: 1. All test modes are performed, only the worst cases test data are recorded in this report.	

7.2 Connection Diagram of Test System



<Figure 1>

8. Measurement Results

Only the worst test result was shown in this report.

8.1 Radiated Emission 30MHz-12.75GHz

Method of Measurement

For 30-1000MHz, the EUT was placed on the top of a rotating 0.8-m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement .Tested in accordance with the procedures of ANSI C63.4-2014, section 8.3.

For 1000-12750MHz,The maximal emission value was acquired by adjusting the antenna height, The table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.

Limits for Radiated Emission at a measuring distance of 3m

Frequency Range (MHz)	Quasi-Peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Frequency Range (MHz)	Peak (dBuV/m)	Average (dBuV/m)
Above 1000	74	54

Test conditions

Frequency Range (MHz)	RBW/VBW	Sweep Time (s)
30-1000	120KHz/300KHz	Auto
1000-12750	1MHz/3MHz	Auto

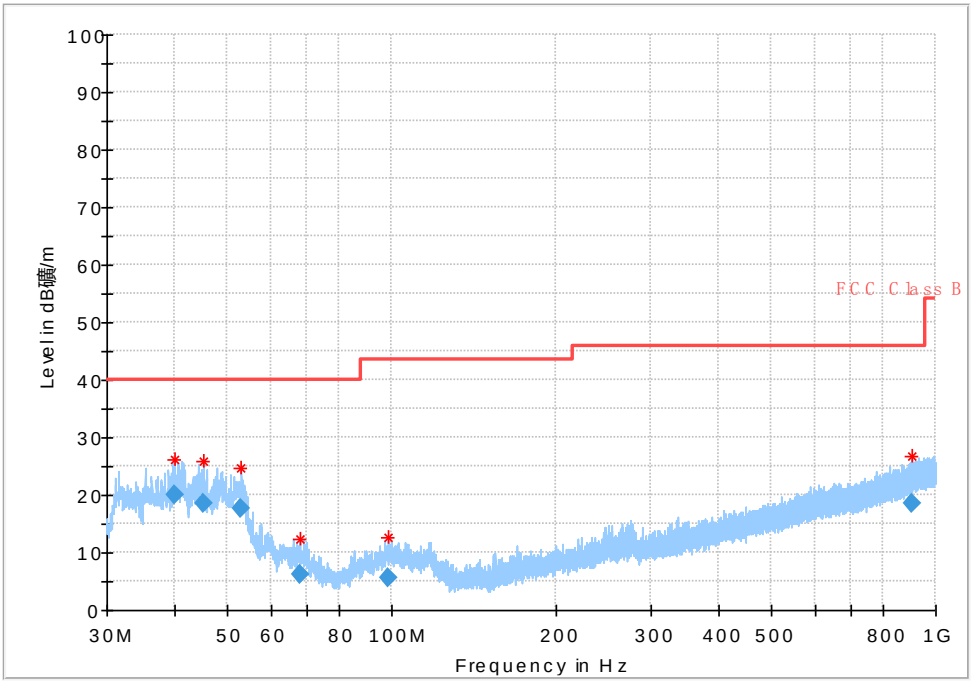
Uncertainty Measurement

The measurement uncertainty is 5.82dB (k=2).

Test Results

Mode 1: Adapter charging

Frequency Range:	30MHz – 1GHz



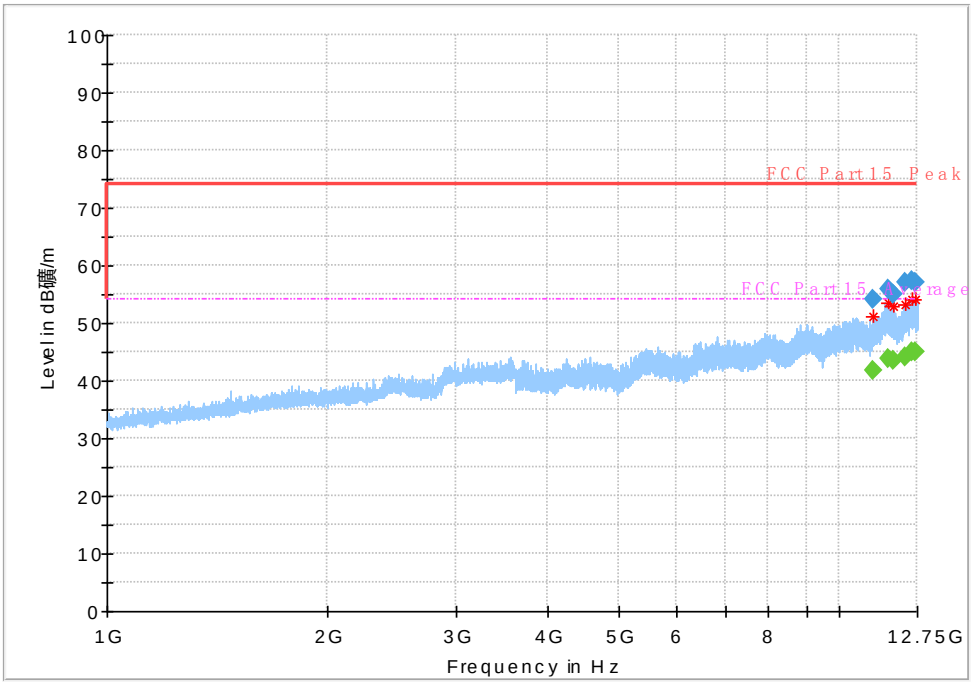
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
39.944357	19.93	40.00	20.07	1000.0	120.000	100.0	V	278.0	-23.9
45.104173	18.48	40.00	21.52	1000.0	120.000	175.0	V	112.0	-23.7
52.907533	17.75	40.00	22.25	1000.0	120.000	106.0	V	80.0	-23.8
67.815957	6.19	40.00	33.81	1000.0	120.000	100.0	V	354.0	-27.0
98.936485	5.56	43.50	37.94	1000.0	120.000	175.0	V	-29.0	-24.1
905.271115	18.53	46.00	27.47	1000.0	120.000	181.0	V	30.0	-9.4

Note:

1. Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Mode 1: Adapter charging

Frequency Range:	1GHz –12.75GHz, Vertical



Final Result

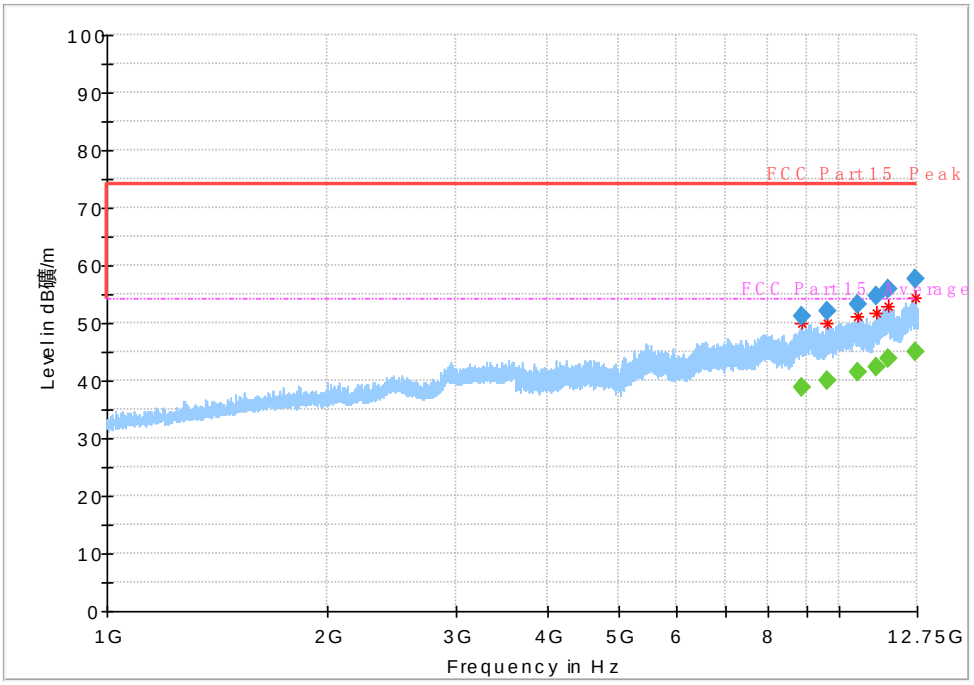
Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
11105.148667	---	41.68	54.00	12.32	50.0	1000.000	200.0	V	105.0	11105.1
11105.148667	53.99	---	74.00	20.01	50.0	1000.000	200.0	V	105.0	11105.1
11623.457600	55.74	---	74.00	18.26	50.0	1000.000	100.0	V	-20.0	11623.4
11623.457600	---	43.69	54.00	10.31	50.0	1000.000	100.0	V	-20.0	11623.4
11832.785067	54.95	---	74.00	19.05	50.0	1000.000	200.0	V	181.0	11832.7
11832.785067	---	43.46	54.00	10.54	50.0	1000.000	200.0	V	181.0	11832.7
12281.886400	56.93	---	74.00	17.07	50.0	1000.000	100.0	V	-4.0	12281.8
12281.886400	---	44.20	54.00	9.80	50.0	1000.000	100.0	V	-4.0	12281.8
12543.065000	---	44.91	54.00	9.09	50.0	1000.000	100.0	V	164.0	12543.0
12543.065000	57.44	---	74.00	16.56	50.0	1000.000	100.0	V	164.0	12543.0
12714.319000	57.17	---	74.00	16.83	50.0	1000.000	100.0	V	-22.0	12714.3
12714.319000	---	45.02	54.00	8.98	50.0	1000.000	100.0	V	-22.0	12714.3

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Mode 1: Adapter charging

Frequency Range:	1GHz –12.75GHz, Horizontal



Final Result

Frequency (MHz)	MaxPeak (dBuV/m	Average (dBuV/m	Limit (dBuV/m	Margin (dB)	Meas. Time	Bandwidth	Height	Pol	Azimuth	Corr. (dB)
8882.718067	---	38.92	54.00	15.08	50.0	1000.000	200.0	H	340.0	8882.71
8882.718067	51.19	---	74.00	22.81	50.0	1000.000	200.0	H	340.0	8882.71
9607.551867	---	39.86	54.00	14.14	50.0	1000.000	100.0	H	347.0	9607.55
9607.551867	51.98	---	74.00	22.02	50.0	1000.000	100.0	H	347.0	9607.55
10594.350200	---	41.54	54.00	12.46	50.0	1000.000	200.0	H	145.0	10594.3
10594.350200	53.19	---	74.00	20.81	50.0	1000.000	200.0	H	145.0	10594.3
11244.830000	---	42.30	54.00	11.70	50.0	1000.000	100.0	H	57.0	11244.8
11244.830000	54.74	---	74.00	19.26	50.0	1000.000	100.0	H	57.0	11244.8
11646.376600	55.94	---	74.00	18.06	50.0	1000.000	100.0	H	63.0	11646.3
11646.376600	---	43.69	54.00	10.31	50.0	1000.000	100.0	H	63.0	11646.3
12693.423334	57.54	---	74.00	16.46	50.0	1000.000	100.0	H	223.0	12693.4
12693.423334	---	44.98	54.00	9.02	50.0	1000.000	100.0	H	223.0	12693.4

Note:

1. Emission level(peak or average)=Raw value by receiver + Corr(Antenna factor+ cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

8.2 AC Conducted Emission

Method of Measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.3

Limit of AC Conducted Emission

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

Test Condition in Charging Mode

Voltage (V)	Frequency (Hz)	RBW	Sweep Time (s)
120	60	9 KHz	Auto

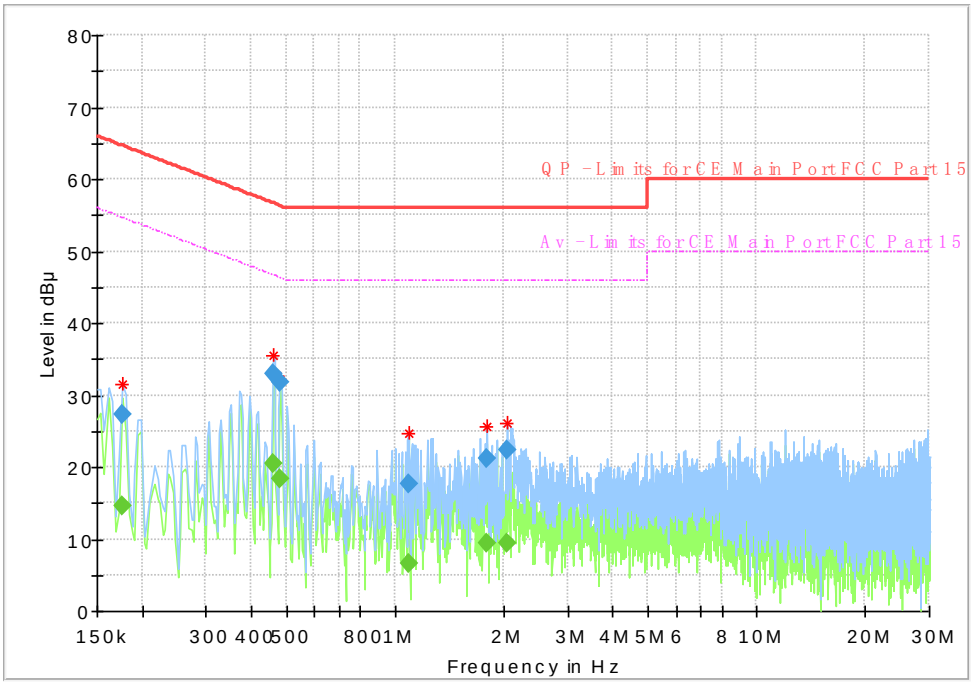
Uncertainty Measurement

The measurement uncertainty is 3.47dB (k=2).

Test Results

Mode 1: Adapter charging

Frequency Range:	150kHz – 30MHz



Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.176119	---	14.62	54.67	40.05	1000.0	9.000	L1	ON	9.6
0.176119	27.39	---	64.67	37.28	1000.0	9.000	L1	ON	9.6
0.459694	---	20.58	46.70	26.12	1000.0	9.000	N	ON	9.7
0.459694	32.87	---	56.70	23.83	1000.0	9.000	N	ON	9.7
0.482081	---	18.38	46.30	27.92	1000.0	9.000	N	ON	9.7
0.482081	31.74	---	56.30	24.56	1000.0	9.000	N	ON	9.7
1.090275	---	6.68	46.00	39.32	1000.0	9.000	N	ON	9.7
1.090275	17.56	---	56.00	38.44	1000.0	9.000	N	ON	9.7
1.799212	---	9.34	46.00	36.66	1000.0	9.000	N	ON	9.7
1.799212	21.10	---	56.00	34.90	1000.0	9.000	N	ON	9.7
2.045475	---	9.34	46.00	36.66	1000.0	9.000	N	ON	9.7
2.045475	22.39	---	56.00	33.61	1000.0	9.000	N	ON	9.7

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested , the result of them is synthesized in the above data diagram.

**********END OF REPORT**********