A Test Lab Techno Corp.

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MPE Report

Test Report No.	：	1402FS11-01
Applicant	：	Telit Communications S.p.A.
Manufacturer	：	Telit Communications S.p.A.
Product Type	：	Wireless module
Trade Name	：	Telit
Model Number	：	GE866-QUAD
Date of Received		Jan. 24, 2014
Test Period	：	Feb. 25, 2014
Date of Issued		Apr. 02, 2014
Test Specification	：	47 CFR § 2.1091
		47 CFR §1.1310
		ANSI / IEEE Std.C95.1-1992
		H46-2/99-237E
Location of Test Lab.	：	Chang-an Lab.

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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Approved By ： Bill Hu (Bill Hu)　　Tested By ： Sky Chou (Sky Chou)

Contents

1. Description of Equipment under Test (EUT)

Applicant	Telit Communications S.p.A.
Applicant Address	Viale Stazione di Prosecco 5/b, 34010, Trieste, Italy
Manufacturer	Telit Communications S.p.A.
Manufacturer Address	Viale Stazione di Prosecco 5/b, 34010, Trieste, Italy
Product Type	Wireless module
Trade Name	Telit
Model Number	GE866-QUAD
FCC ID	RI7GE866
IC	5131A-GE866
Frequency Range	824.2 - 848.8 MHz GSM/GPRS 850 1850.2 - 1909.8 MHz PCS/GPRS 1900 *GPRS Multi Class: 10
Transmit Power (conducted power)	GSM/GPRS 850: 2.037 W / 33.09 dBm PCS/GPRS 1900: 0.989 W / 29.95 dBm
Antenna Specification	GSM/GPRS 850: 6.42 dBi GSM/GPRS 1900: 1.99 dBi
Antenna Designation	1/4 λ Mobile Antenna
Temperature Range	-30 ~ +70°C
RF Evaluation	5.48 W/m^2

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 & 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties

2. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR §1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. ” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation
Equation from page 18 of OET Bulletin 65, Edition 97-01 $$S = \frac{PG}{4\pi R^2}$$ $$G_{max} = \frac{4\pi R^2}{P_{av}} S_{limit}$$ Where S: power density P: power input to the antenna G: power gain of the antenna in the direction of interest relative to an isotropic radiator. R: distance to the center of radiation of the antenna.

3. RF Output Power

Band	Data Rate	CH	Frequency (MHz)	Avg.-burst Conducted power (dBm)
GSM 850	---	128	824.2	**33.09**
		190	836.6	33.07
		251	848.8	32.96
GPRS 850	4Down1Up	128	824.2	33.06
		190	836.6	33.01
		251	848.8	32.91
	3Down2Up	128	824.2	33.02
		190	836.6	32.97
		251	848.8	32.87

Band	Data Rate	CH	Frequency (MHz)	Avg.-burst Conducted power (dBm)
GSM 1900	---	512	1850.2	**29.95**
		661	1880.0	29.79
		810	1909.8	29.67
GPRS 1900	4Down1Up	512	1850.2	29.88
		661	1909.8	29.78
		810	1909.8	29.64
	3Down2Up	512	1850.2	29.85
		661	1909.8	29.75
		810	1909.8	29.62

4. Max. Gain Evaluation

Band	Data Rate	Frequency (MHz)	Limit (mw)/cm^2	Distance (cm) [R]	Duty Cycle	Calculations to meet ERP limits				Calculations to meet MPE limits		
						Peak power (dBm)	ERP limits (W)	Antenna gain to meet ERP limits [G1]		max tune-up power (upper limit) (dBm) [P]	Antenna gain to meet MPE limits [G2]	
								Numeric	[dBi]		Numeric	[dBi]
GSM 850	1D1U	824.2	0.549	20	0.125	34.00	7.00	4.57	6.60	34	8.78	9.43
		836.6	0.558	20	0.125	34.00	7.00	4.57	6.60	34	8.93	9.50
		848.8	0.566	20	0.125	34.00	7.00	4.57	6.60	34	9.06	9.57
GPRS 850	4D1U	824.2	0.549	20	0.125	34.00	7.00	4.57	6.60	34	8.78	9.43
		836.6	0.558	20	0.125	34.00	7.00	4.57	6.60	34	8.93	9.50
		848.8	0.566	20	0.125	34.00	7.00	4.57	6.60	34	9.06	9.57
	3D2U	824.2	0.549	20	0.250	34.00	7.00	4.57	6.60	34	4.39	6.42
		836.6	0.558	20	0.250	34.00	7.00	4.57	6.60	34	4.46	6.49
		848.8	0.566	20	0.250	34.00	7.00	4.57	6.60	34	4.53	6.56

Min G1 : 6.60 dBi

Min G2 : 6.42 dBi

Min G(G1,G2) : 6.42 dBi

G1 : Antenna gain(dBi) to comply with ERP limits

G2 : Antenna gain(dBi) to comply with MPE limits

Note: In order to comply with MPE and ERP limits therefore the max antenna gain should not exceed 6.42 dBi in GSM850 MHz.

Band	Data Rate	Frequency (MHz)	Limit (mw)/cm2	Distance (cm) [R]	Duty Cycle	Calculations to meet EIRP limits				Calculations to meet MPE limits		
						Peak power (dBm)	EIRP limits (w)	Antenna gain to meet ERP limits [G1]		max tune-up power (upper limit) (dBm) [P]	Antenna gain to meet MPE limits [G2]	
								Numeric	[dBi]		Numeric	[dBi]
PCS 1900	1D1U	1850.2	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
		1880.0	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
		1909.8	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
GPRS 1900	4D1U	1850.2	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
		1909.8	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
		1909.8	1.000	20	0.125	31.00	2.00	1.58	1.99	31	31.94	15.04
	3D2U	1850.2	1.000	20	0.250	31.00	2.00	1.58	1.99	31	15.97	12.03
		1909.8	1.000	20	0.250	31.00	2.00	1.58	1.99	31	15.97	12.03
		1909.8	1.000	20	0.250	31.00	2.00	1.58	1.99	31	15.97	12.03

Min G1 : 1.99 dBi

Min G2 : 12.03 dBi

Min G(G1,G2) : 1.99 dBi

G1 : Antenna gain(dBi) to comply with EIRP limits

G2 : Antenna gain(dBi) to comply with MPE limits

Note: In order to comply with MPE and EIRP limits therefore the max antenna gain should not exceed 1.99 dBi in PCS.

Summary Gain	
Band	Antenna Gain Evaluation(dBi)
GSM/GPRS 850	6.42
GSM/GPRS 1900	1.99

Note: Except meet limit of EIRP and MPE, the evaluation gain also meets other test with RSE and CSE. Therefore it chose available evaluation gain on the report.

Please see the summary gain that actual gain should be not more than evaluation gain.

5. Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw/cm^2)	Distance (cm) [R]	Max Tune-up Power (upper limit) (dBm) [P]	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	[P] x [G] with Duty cycle (mW) [TP]	Power Density (mw/cm^2) [S]
GSM 850	1D1U	824.2	0.549	20	34	6.42	4.39	0.125	1378.40	0.274
		836.6	0.558	20	34	6.42	4.39	0.125	1378.40	0.274
		848.8	0.566	20	34	6.42	4.39	0.125	1378.40	0.274
GPRS 850	4D1U	824.2	0.549	20	34	6.42	4.39	0.125	1378.40	0.274
		836.6	0.558	20	34	6.42	4.39	0.125	1378.40	0.274
		848.8	0.566	20	34	6.42	4.39	0.125	1378.40	0.274
	3D2U	824.2	0.549	20	34	6.42	4.39	0.250	2756.80	0.548
		836.6	0.558	20	34	6.42	4.39	0.250	2756.80	0.548
		848.8	0.566	20	34	6.42	4.39	0.250	2756.80	0.548
GSM 1900	1D1U	1850.2	1.000	20	31	1.99	1.58	0.125	248.64	0.049
		1880.0	1.000	20	31	1.99	1.58	0.125	248.64	0.049
		1909.8	1.000	20	31	1.99	1.58	0.125	248.64	0.049
GPRS 1900	4D1U	1850.2	1.000	20	31	1.99	1.58	0.125	248.64	0.049
		1880.0	1.000	20	31	1.99	1.58	0.125	248.64	0.049
		1909.8	1.000	20	31	1.99	1.58	0.125	248.64	0.049
	3D2U	1850.2	1.000	20	31	1.99	1.58	0.250	497.28	0.099
		1880.0	1.000	20	31	1.99	1.58	0.250	497.28	0.099
		1909.8	1.000	20	31	1.99	1.58	0.250	497.28	0.099

Note: The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).