



FCC LISTED, REGISTRATION
NUMBER: 2764.01

ISED LISTED REGISTRATION
NUMBER: 23595-1

Test report No:
2676ERM.004A1

Test report

**FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition)
&
ICES-003 ISSUE 6 – Update April (2017)**

Identification of item tested	Wireless Module
Trademark	Telit
Model and /or type reference	WL865E4-P
Other identification of the product	FCC: RI7WL865E4 IC ID: 5131A-WL865E4
Features	BT LE +Wi-Fi 802.11 a/b/g/n @ 2.4 GHz and @ 5GHz
Manufacturer	Telit Communications S.p.A. Via Stazione di Prosecco 5/B 34010 Sgonico, Trieste-Italy
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition) ICES-003 ISSUE 6 – Update April (2017)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	12-03-2019
Report template No	FDT08_21

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Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Certification internal document PODT000.

	Frequency (MHz)	U(k=2)	Units
Conducted emission	0,009 - 30	2.69	dB
Radiated emission	30-180	3.82	dB
	180-1000	2.61	dB
	1000-18000	2.92	dB
	18000-40000	2.15	dB

Data provided by the client

WiFi / BLE Module

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
2262.003	WL865E-P on debug board	WL865E-P	00217E249E74	05/07/2019

Following accessories were for enable EUT to stay operation during testing

Control N°	Description	Model	Serial N°	Date of reception
2262.005	USB cable (A to micro) 6ft	-	-	05/07/2019
2323.03	Antenna	T-AT9552	1RR0100174TLB	05/07/2019
2323.04	Antenna	T-AT9552	1RR0100174TLB	05/07/2019

Sample S/01 was used in following testing: Radiated Emission

Test sample description

Ports..... :	Port name and description		Cable					
			Specified length [m]	Attached during test	Shielded			
	USB		0.5	☒	☒			
				☐	☐			
				☐	☐			
				☐	☐			
Supplementary information to the ports..... :	No Data Provided							
Rated power supply	Voltage and Frequency		Reference poles					
			L1	L2	L3	PE		
	☐	AC: 230Vac / 50Hz.	☐	☐	☐	☐		
	☐	AC:	☐	☐	☐	☐		
	☒	DC:3.3 V						
Rated Power	No Data Provided							
Clock frequencies	40 MHz							
Other parameters..... :	No Data Provided							
Software version	M0G.000002							
Hardware version..... :	HW 0.0							
Dimensions in cm (L x W x D)	2.44 x 0.29 x 2.44							
Mounting position..... :	☐	Table top equipment						
	☐	Wall/Ceiling mounted equipment						
	☐	Floor standing equipment						
	☐	Hand-held equipment						
	☒	Other: all the above depending on the host application system						
Modules/parts	Module/parts of test item		Type		Manufacturer			
Accessories (not part of the test item)	Description		Type		Manufacturer			
	WL865E4-P EVB IF		Interface board		Telit			
	Micro USB cable		Cable					
	T-AT9552 external antenna		Antenna		ATEL-ANTENNAS			

Documents as provided by the applicant.....:	Description	File name	Issue date
	Equipment declaration data	FDT30_14_FCC_TELIT_W L865E4-P_rev0	2019-02-04
Copy of marking plate:			
			

Identification of the client

Telit Communication S.p.A.
Via Stazione di Prosecco 5/b
34010 SGONICO TRIESTE - ITALY

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	10-29-2019
Date (finish)	10-31-2019

Document history

Report number	Date	Description
2676ERM.004	11-04-2019	First release
2676ERM.004A1	12-03-2019	Second release

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 2676ERM.001 related with the same samples, in the next clauses and sub-clauses:

Clauses/ Sub-Clauses	Modification	Justification
Page14 &15/Radiated Emission Results	Results corrected	Number of values adjusted acc.to standard

This modification test report cancels and replaces the test report 2676ERM.004

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semi anechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto & Poojita Bhattu

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test			
Report Section	Requirement – Test case	Verdict	Remark
A.1.	Radiated emission electromagnetic field test (30 MHz – 1000 MHz)	P	N/A
A.1.	Radiated emission electromagnetic field test (1 GHz – 18 GHz)	P	Refer 1
A.1.	Radiated emission electromagnetic field test (18 GHz – 40 GHz)	P	Refer 1
-	Conducted emission test (150 kHz to 30 MHz)	N/A	Refer 2
Supplementary information and remarks:			
1) As per standard 47 CFR §15.33 due to the highest frequency generated or used in the device is above 1000MHz the upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower. 2) DUT is a module and not the final product.			

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
0981	Preamplifier	BONN ELEKTRONIK	BLMA 0118-2A	2018/10	2020/10
0982	Preamplifier	BONN ELEKTRONIK	BLMA1840-1M	2018/10	2020/10
1017	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---
1039	Signal Analyser	ROHDE & SCHWARZ	FSV40	2018/10	2020/10
1055	Horn Antenna	ETS LINDGREN	3116C	2016/12	2019/12
1058	Horn Antenna	ETS LINDGREN	3115	2017/03	2020/03
1065	Biconilog Antenna	ETS LINDGREN	3142E	2017/03	2020/03

Appendix A: Test results

Appendix A Content

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01*	EUT ON. Power supply 3.3 Vdc • Idle mode • No TX/RX Blue tooth • No TX/RX Wifi 2.4GHz • No TX/RX Wifi 5GHz • No TX/RX Wifi 5.8GHz

*Worst configurations detected

A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD TEST

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017); ANSI C63.4 (2014)

Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017) in the frequency range 30 MHz to 40 GHz for class B equipment.

Frequency range (MHz)	QP Limit for 3 m	
	(μ V/m)	(dB μ V/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46
Above 960	500	54

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μ V/m)	(dB μ V/m)	(dB μ V/m)
Above 1000	500	54	74

Frequencies above 1 GHz, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test, as per §15.35(b)

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18GHz (Double ridge horn antennas). A distance of 1m is used for the frequency range 18-40 GHz (Double ridge horn antennas).

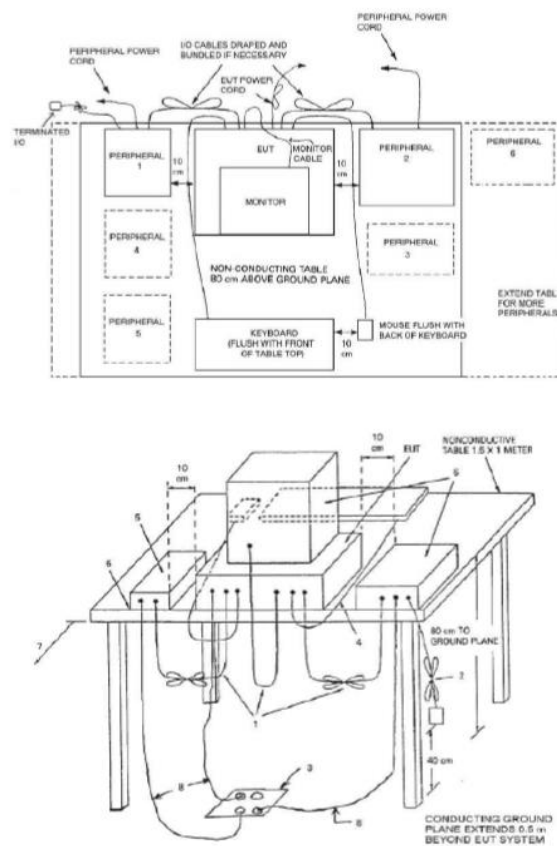
For radiated emissions in the range 18-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (Cont.)



TESTED SAMPLES:

S/01

TESTED OPERATION MODES:

OM#01

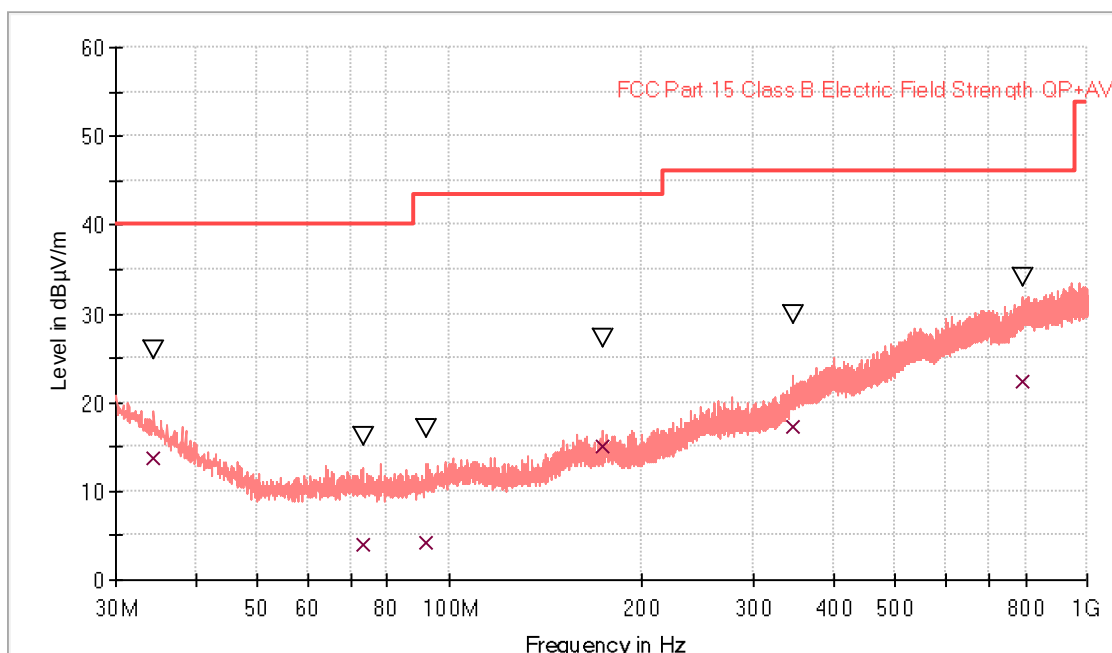
TEST RESULTS:

CRmmnnxx: CR, Radiation Condition; mm: Sample number; nn: Operation mode.,xx:Range,

CRmmnnxx	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0101LR	Range: 30 MHz - 1000 MHz Vertical Polarization	P
CR0101HR1	Range: 1-18 GHz Horizontal Polarization	P
CR0101HR1	Range: 1-18 GHz Vertical Polarization	P
CR0101HR2	Range: 18-40 GHz Horizontal Polarization	P
CR0101HR2	Range: 18-40 GHz Vertical Polarization	P

Radiated Emission. CR0101LR

Project: 02276ERM004A1
Company: Telit
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Standalone basis (Wi-Fi 5.8 GHz in Idle Mode. Power supply: 3.3Vdc. Both polarizations



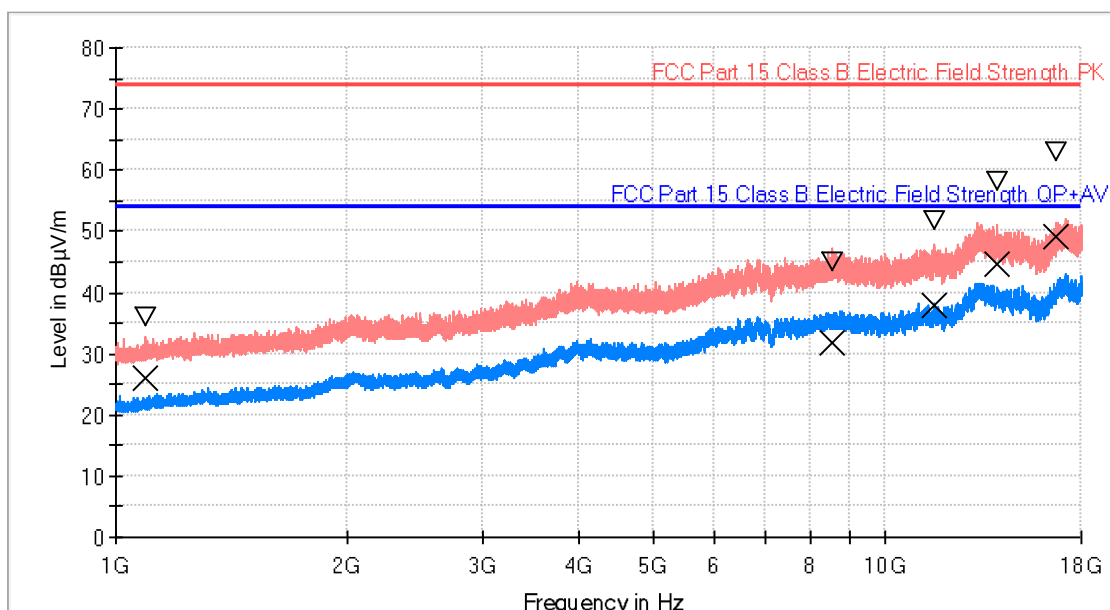
PK+ _MAXH
FCC Part 15 Class B Electric Field Strength QP+AV
v MaxPeak-PK+ (Single)
x QuasiPeak-QPK (Single)

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	QuasiPeak (dBμV/m)	Pol	Azimuth (deg)
34.413500	25.84	13.65	V	-94.0
73.407500	16.26	3.96	V	-65.0
92.031500	17.14	4.31	H	-180.0
173.608500	27.20	15.04	H	100.0
345.298500	29.93	17.26	V	98.0
791.013500	34.09	22.31	H	35.0

Radiated Emission. CR0101HR1

Project: 02276ERM004A1
Company: Telit
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Standalone basis (Wi-Fi 5.8 GHz in Idle Mode. Power supply: 3.3Vdc. Both polarizations



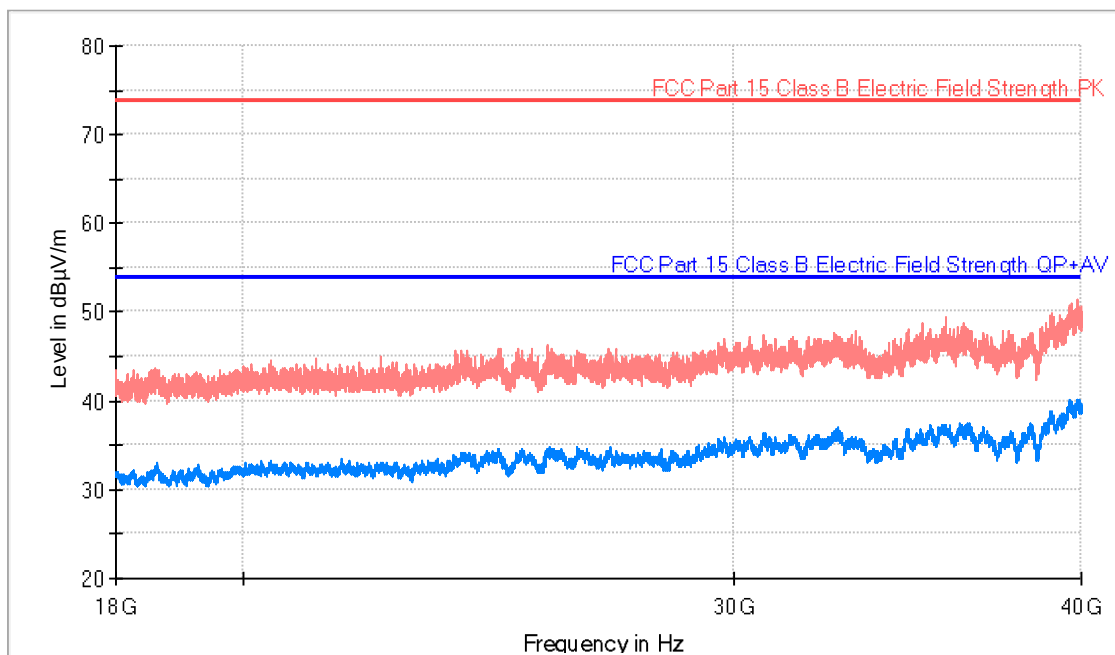
— AVG_MAXH
— PK+_MAXH
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV
▽ MaxPeak-PK+ (Single)
× Average-AVG (Single)

Final_Result

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Pol	Azimuth (deg)
1092.042857	35.9	25.9	H	25.0
8528.571429	45.1	31.7	V	90.0
11595.128571	51.9	37.8	V	-34.0
13955.214286	58.2	44.8	H	-167.0
16718.442857	63.1	49.2	V	87.0

Radiated Emission. CR0101HR2

Project: 02276ERM004A1
Company: Telit
Sample: S/01
Operation mode: OM#01
Description: EUT ON. Standalone basis (Wi-Fi 5.8 GHz in Idle Mode. Power supply: 3.3Vdc. Both polarizations



— AVG_MAXH
— PK+_MAXH
— FCC Part 15 Class B Electric Field Strength PK
— FCC Part 15 Class B Electric Field Strength QP+AV

No spurious observed in 18-40GHz