Advanced Compliance Laboratory

210 Cougar Court
Hillsborough, NJ 08844
Tel: (908) 927 9288
Fax: (908) 927 0728

Electromagnetic Emission Compliance Test Report

Equipment Under Test	Smart ConnectDER
(EUT)	CELL CARRIER V3.1
Applicant	Infinite Invention, Inc. DBA ConnectDER
In Accordance With	FCC Part 27 & Part 2
Tested by	Advanced Compliance Laboratory, Inc. 210 Cougar Court Hillsborough, New Jersey 08844
Authorized by	Wei Li Lab Manager
Signature	
Date	October 16, 2020
AC Lab Report Number	0048-200824-01

Lab Code:200101-0

The test result in this report is supported and covered by the NVLAP accreditation.

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Infinite Invention, Inc. DBA ConnectDER

Product Name: Smart ConnectDER

Model/Parts No. : CELL CARRIER V3.1

S/N: S193709988

General: **All measurements are traceable to national standards**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 2 & Part 27.

☒New Submission ☐Production Unit

☐Class I Permissive Change ☐Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

None. See Summary of Test Data.

NVLAP LAB CODE: 200101-0

Advance Compliance Laboratory, Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Advance Compliance Laboratory, Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This report applies only to the items tested.

Summary of Test Data

Testing Items	FCC Rule	Limit	Result
Maximum Output Power	2.1046 27.50(c)	<3 W	Complies
Occupied Bandwidth (Digital)*	2.1049(i) 27.53(i)(6)	N/A	Complies
Peak to Average Ratio*	27.50	<13dB	Complies
Frequency Stability*	2.1055(a)(i)	<2.5ppm	Complies
Spurious Emission at Antenna* Terminals	27.53	<-13dBm	Complies
Spurious Emission	2.1051 27.53(i)(4)(6)	<-13dBm	Complies

***** Per Agreement Letter dated on July 14, 2020 between Telit and ConnectDER, the testing results for these testing items shall be found in Dekra Report # 1840048R-HPUSP40V00 which was used for Telit Module ME910C1-NA's FCC Certification under FCC ID: RI7ME910C1NA since there is no modification on Telit RF module in ConnectDER Cell Carrier V3.1 design The antenna requirements in original Telit RF modular letter (6.18dBi for 700MHz frequency band) is also met.

The estimated uncertainty of the test result is given as following. The method of uncertainty calculation is provided in Advanced Compliance Lab. Doc. No. 0048-01-01.

	Prob. Dist.	Uncertainty(dB)	Uncertainty(dB)	Uncertainty(dB)
		30-1000MHz	1-6.5GHz	Conducted
Combined Std. Uncertainty u_c	norm.	±2.36	±2.99	±1.83

Wei Li
Lab Manager
Advanced Compliance Lab

Date: October 16, 2020

Section 2. General Equipment Specification

Supply Voltage	5V				
Frequency Range	700MHz Band 13	**TX/ 777MHz-787MHz**			
		RX/ 746 MHz- 756MHz			
Modulation	☒ LTE Cat-M1	☐ CDMA	☐ GSM	☐ EDGE	☐ TDMA
Type of Emissions	G7D/ W7D	F9W	GXW	G7W	DXW
Rated Power	0.226W				
Output Impedance /Nominal OCBW	50ohm / 1.11MHz & 966KHz				
Antenna Gain	1.2dBi @700MHz Band (Flexible Antenna with Cable)				

DC voltages and DC currents per 2.1033(c)(8)

The input supply to the transmitter was set at 5 Volts DC. The RF power output was measured with the indicated voltage and current applied into the final RF amplifying device(s): **CELL CARRIER V3.1**
Measured max. RF output at Tx port: 23.30dBm (0.214W)
DC voltage: 5.0V & Current : 1A

Tune-up procedure per 2.1033(c) (9)

There are no user accessible adjustments or tuning in this EUT. All necessary adjustments and tuning are performed during manufacture of the product. Any adjustments or tuning after service or repair are done as part of that process as special equipment is required to perform such adjustments.

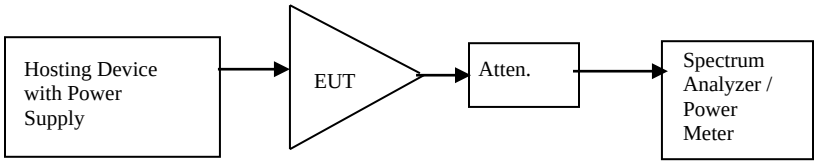
Description of Operation

The EUT operated in FCC 700MHz band with max. rated power setting during the test. All measurements shall be made at room temperature and at nominal DC input voltage.

System Diagram

See Attachment.

General EUT Setup



Operational Frequency channel(s) for testing:

- Operation Mode: LTE Cat-M1 with Band 13
- Low CH: 777MHz; Middle CH: 782MHz; High CH: 787MHz
- Channel BW: 1.11MHz & 966KHz.

Section 3. RF Output Power

Name of Test:	*RF Output Power*	Test Standard:	*27.50 (c)*
Tested By:	WEI LI	Test Date:	08/24-10/16/2020

Minimum Standard: Para. No. 27.50(c) (10)
Limit: <3Wattas

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 4.2 &4.3
ANSI C63.26-2015 Sub-clause 5.4.3& 5.4.4

Test Result: **Complies**

Test Data: Date Sheet

Rated Output Power – Normal Condition

Complete Test Data:
Referred to Dekra Report # 1840048R-HPUSP40V00 Sec. 3.4, Page 16.

Verification Test Result: LTE Band 13 (Max. Power Setting)

Frequency (MHz)	Average Power				Limit (W) ERP
	Reading Level (dBm)	Antenna Gain (dBi)	Measured Level (dBm) ERP	Measured Level (W) ERP	
779.5	23.12	1.2	22.17	0.165	3
782.0	23.30	1.2	22.35	0.172	3
784.5	22.80	1.2	21.85	0.153	3

Section 4. Occupied Bandwidth

Name of Test:	*Occupied Bandwidth*	Test Standard:	*2.1049(i)* *27.53(i)(6)*
Tested By:	Dekra	Test Date:	04/09/2019

Minimum Standard: Not defined by FCC. Input vs. Output.
Or defined Mask

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 4.2 &4.3
ANSI C63.26-2015 Sub-clause 5.4.3& 5.4.4

Spectrum Analyzer Settings:
RBW: WCDMA (100KHz), CDMA(30KHz), GSM (3 kHz), EDGE (3KHz), NADC (1 kHz) and CDPD (1 kHz), LTE(100KHz)
VBW: ≥RBW
Span: As required
Sweep: Auto
Input Signal Characteristics: Generated from Signal Generator or digital input design specification
RF level: Rated, recommended by manufacturer

Test Result: **Complies**

Test Data: Referred to Dekra Report # 1840048R-HPUSP40V00 Sec. 4.4, Page 18-23

Section 5. Peak to Average Ratio

Name of Test:	***Peak to Average Ratio***	**Test Standard:**	***27.50***
Tested By:	Dekra	**Test Date:**	04/09/2019

Minimum Standard: Per FCC Part 27.50

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 5.7.2
ANSI C63.26-2015 Sub-clause 5.2.3.4

Test Result: **Complies**

Test Data: Referred to Dekra Report # 1840048R-HPUSP40V00 Sec. 5.4, Page 25-30

Section 6. Frequency Stability

Name of Test:	*Frequency Stability*	Test Standard:	*2.1055(a)(i)*
Tested By:	Dekra	Test Date:	04/09/2019

Minimum Standard: Per FCC Part 2.1055(a)(i)

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 9
ANSI C63.26-2015 Sub-clause 5.6

Test Result: **Complies**

Test Data: Referred to Dekra Report # 1840048R-HPUSP40V00 Sec. 8.4, Page 51-58

Section 7. Spurious Emissions at Antenna Terminals

Name of Test:	*Spurious Emissions at Antenna Terminals*	Test Standard:	*27.53*
Tested By:	Dekra	Test Date:	04/09/2019

Minimum Standard: Per FCC Part 27.53

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 6.1
ANSI C63.26-2015 Sub-clause 5.7

Test Result: **Complies**

Test Data: Referred to Dekra Report # 1840048R-HPUSP40V00
Sec. 6.4, Page 34-41 & Sec. 7.4, Page 45-48

Section 8. Field Strength of Spurious

Name of Test:	***Field Strength of Spurious***	**Test Standard:**	***2.1051 27.53(i)(4)(6)***
Tested By:	Dekra & DAVID TU	**Test Date:**	04/09/2019 &08/24-10/16/2020

Minimum Standard: Per FCC Part 27.53

Method of Measurement: KDB 971168 D01 Power Meas License Digital System v03 Sub-Clause 5.8
ANSI C63.26-2015 Sub-clause 5.5.3.2

Test Result: **Complies**

Test Data:

1. Referred to Dekra Report # 1840048R-HPUSP40V00 Sec. 6.4, Page 42-43 for Telit RF modular only
2. The following data is for Cell Carrier V3.1 with hosting device, Smart ConnectDER

Configuration	CELL CARRIER V3.1 with Hosting Device Smart ConnectDER
Band	LTE Cat-M1 Band 13 Uplink
Channel	TX Mid

Freq. (MHz)	H,V	SA Reading (dBuV)	SG Reading (dBm)	CL (dB)	Gain (dBi)	ERP (dBm)	Limit (dBm)	Margin (dB)
1567.4	H	49.85	-63	0.8	6.0	-59.95	-13	-46.93
2351.3	H	48.10	-60	1.5	8.0	-55.65	-13	-42.65
1567.0	V	42.69	-70	0.8	6.0	-66.95	-13	-53.93
2348.2*	V	35.34	-73	1.5	8.0	-68.65	-13	-55.65

Configuration	CELL CARRIER V3.1 with Hosting Device Smart ConnectDER
Band	LTE Cat-M1 Band 13 Uplink
Channel	TX Low

Freq. (MHz)	H,V	SA Reading (dBuV)	SG Reading (dBm)	CL (dB)	Gain (dBi)	ERP (dBm)	Limit (dBm)	Margin (dB)
1557.3	H	49.61	-63	0.8	6.0	-59.95	-13	-46.93
2338.0	H	47.40	-61	1.5	8.0	-56.65	-13	-43.65

Configuration	CELL CARRIER V3.1 with Hosting Device Smart ConnectDER
Band	LTE Cat-M1 Band 13 Uplink
Channel	TX High

Freq. (MHz)	H,V	SA Reading (dBuV)	SG Reading (dBm)	CL (dB)	Gain (dBi)	ERP (dBm)	Limit (dBm)	Margin (dB)
1577.3	H	48.25	-65	0.8	6.0	-61.95	-13	-48.93
2367.2	H	47.02	-61	1.5	8.0	-56.65	-13	-43.65

NOTE:
*** Measured noise floor**
SA: Spectrum Analyzer
SG: Signal Generator
CL: SMA cable loss (6ft)

Worse case: Horizontal
H=horizontal and V=vertical
ERP = SG reading - CL + Gain (dBi)-2.15
Margin = ERP - Limit

Configuration	CELL CARRIER V3.1 with Hosting Device Smart ConnectDER
Band	LTE Cat-M1 Band 13 Downlink
Channel	Rx/Standby

Freq. (MHz)	H,V	SA Reading (dBuV)	Height (m)	Angle (degree)		Refer to Part 15.109 (Class B) 3m Limit (dBm)	Margin (dB)	
47.4	H	32.7	1.8	110		40.0	-7.3	
142.6	H	36.8	1.8	100		43.5	-6.7	
158.4	H	36.3	1.6	100		43.5	-7.2	
290.1	H	35.8	1.0	220		46.5	-10.7	
336.7	H	34.2	1.0	60		46.5	-12.3	
900.9	H	41.7	1.0	80		46.5	-4.8	
84.8	V	35.2**	1.2	180		40.0	-4.8	
92.1	V	38.7	1.2	190		43.5	-4.8	
119.7	V	37.5	1.2	180		43.5	-6	
716.0	V	39.2	1.1	169		46.5	-7.3	
860.2	V	40.8	1.1	170		46.5	-5.7	
920.1	V	39.5	1.1	200		46.5	-7	
f>1GHz*								

NOTE:
* Measured noise floor above 3GHz range
H=horizontal & V=vertical

SA (Spectrum Analyzer) Reading:
Average Reading for above 1GHz; 1m/3m distance factor applied
**QP reading for under 1GHz; D=3m (as option, peaking reading recorded for lower emissions)

Section 7. ACL Test Equipment List

Manufacture	Model	Serial No.	Description	Cal Due mm/dd/yy
HP	HP8546A	3448A00290	EMI Receiver	09/25/20
EMCO	3104C	9307-4396	20-300MHz Biconical Antenna	01/15/21
EMCO	3146	9008-2860	200-1000MHz Log-Periodic Antenna	01/15/21
EMCO	3115	4945	Double Ridge Guide Horn Antenna	1/22/21
Weinschel	49-30-xx	---	Loads/Attenuators	n/a
Agilent	E4440A	US41421198	1GHz-26GHz Spectrum Analyzer	06/17/21
HP	4419A	US37292112	RF Power Meter w/ Sensor Probe	07/20/21