



CERTIFICATION TEST REPORT **CLASS II PERMISSIVE CHANGE**

Report Number. : 12234189-E4V2

Applicant : SATELLITE TRACKING OF PEOPLE LLC
1212 NORTH POST OAK RD, SUITE 100,
HOUSTON, TX 77055, U.S.A.

Model : PLS8-US R4

FCC ID : S5EBHV4PLS8

IC : 9086A-BHV4PLS8

EUT Description : GSM, WCDMA, LTE MODULE

Test Standard(s) : FCC CFR47 PART 24E
IC RSS-133 ISSUE 6

Date Of Issue:
AUGUST 28, 2018

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NVLAP LAB CODE 200065-0 (FREMONT)

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	7/9/2018	Initial Review	--
V2	8/28/2018	Updated model number	Tina Chu

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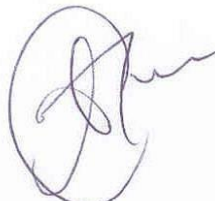
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1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	SATELLITE TRACKING OF PEOPLE LLC 1212 NORTH POST OAK RD, SUITE 100, HOUSTON, TX 77055, U.S.A.
Model	PLS8-US R4
FCC ID	S5EBHV4PLS8
IC	9086A-BHV4PLS8
EUT Description	GSM, WCDMA, LTE MODULE
Serial Number	13-800003
Date Tested	MAY 25, 2018 TO JUNE 4, 2018
Applicable Standards	FCC CFR 47 Part 24E IC RSS-133 ISSUE 6
Test Results	COMPLIES

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government (NIST Handbook 150, Annex A). This report is written to support regulatory compliance of the applicable standards stated above.

Approved & Released By:	Prepared By:
	
Francisco de Anda Operations Leader UL Verification Services Inc.	Tina Chu Senior Project Engineer UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, Part 24, FCC KDB 971168 D01 v03r01/ D02 v02r01. ANSI C63.26:2015, IC RSS-133.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☒ Chamber A (IC:2324B-1)	☐ Chamber D (IC:22541-1)
☐ Chamber B (IC:2324B-2)	☐ Chamber E (IC:22541-2)
☐ Chamber C (IC:2324B-3)	☐ Chamber F (IC:22541-3)
	☐ Chamber G (IC:22541-4)
	☐ Chamber H (IC:22541-5)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) –
Preamp Gain (dB)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Radiated Disturbance, 26000 to 40000 MHz	5.24 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM 850/1900, WCDMA 850/1900/1700, LTE 700/850/1900/1700MHz module.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

This Class II Permissive Change is to add a host and a new antenna.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted and EIRP output powers as follows:

GSM MODES

Part 24 / RSS 133 1900MHz Band

Frequency range (MHz)	Modulation	Conducted (Peak)		EIRP (Peak)	
		dBm	mW	dBm	mW
1850 - 1910	GPRS	29.85	966.1	30.72	1180.3
	EGPRS	28.94	783.4	28.33	680.8

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was BluHome V4 UL Test Code V2_3.

5.5. MAXIMUM ANTENNA GAIN

Frequency Range (MHz)	Antenna Peak Gain(dBi)
1850 - 1910	3.8

5.6. WORST-CASE CONFIGURATION AND MODE

Only GSM 1900MHz output power and EIRP was measured. The host is a tabletop device, all testing was performed at X-orientation (Flat-Bed).

Worst-case modes:

- GSM GPRS
- GSM EGPRS

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

N/A

I/O CABLES (CONDUCTED TEST)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	EUT	Unshielded	0.15	EUT to Directional coupler
2	DC	1	Barrel	Unshielded	1.5	Attached cable
3	RF In/Out	1	SMA	Un-shielded	1	Directional coupler to callbox
4	RF In/Out	1	Barrel	N/A	N/A	N/A

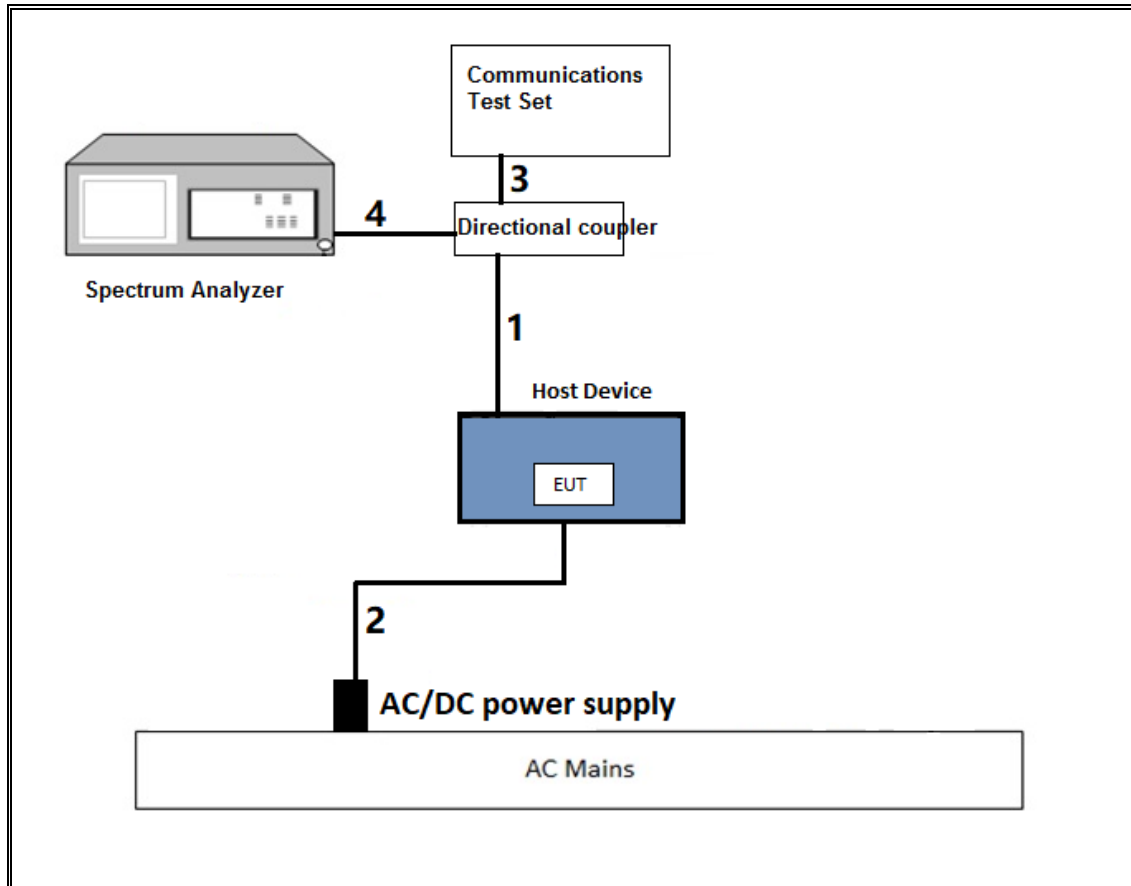
I/O CABLES (RADIATED TEST)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length m	Remarks
1	DC	1	Barrel	Unshielded	1.5	Attached cable

TEST SETUP-CONDUCTED TEST

EUT powered by AC/DC power supply. Test software exercised the EUT.

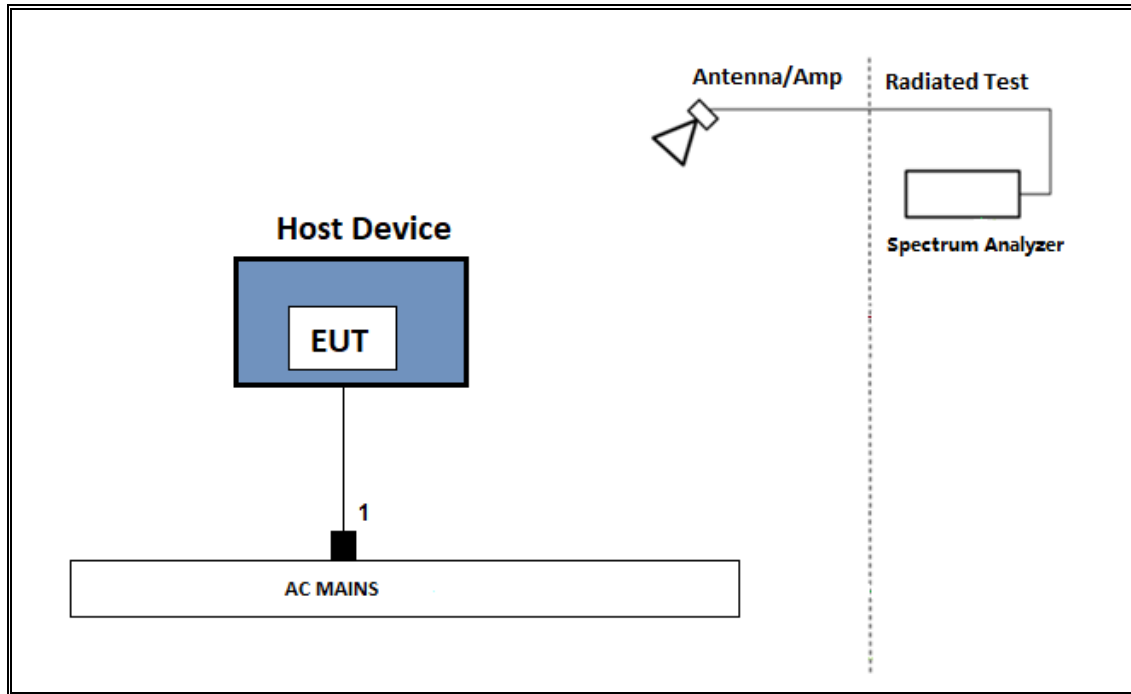
SETUP DIAGRAM



TEST SETUP-RADIATED TEST

EUT powered by AC/DC power supply. Test software exercised the EUT.

SETUP DIAGRAM



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight	E4446A	T146	7/18/2018
Wideband Communication Test Set, Call Box	R&S GmbH & Co. KG	CMW500	T919	3/28/2019
Directional Coupler	Mini-Circuits	ZUDC10-183+	T1136	6/14/2018
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1466	4/16/2019
RF Amplifier, 1-18GHz	MITEQ	AFS42-00101800-25-S-42	T1165	4/3/2019
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T136	6/26/2018
Antenna, Horn 1-18GHz	EMCO	3115	T73	1/4/2019

NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

7. RF OUTPUT POWER VERIFICATION

7.1. GSM

Using CMW500 Communication Test Set

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900

Press **Connection control** to choose the different menus

Press **RESET** > choose all to reset all settings

Connection	Press Signal Off to turn off the signal and change settings Network Support > GSM+GPRS or GSM+EGPRS Main Service > Packet Data Service selection > Test Mode A – Auto Slot Config. off
MS Signal	Press Slot Config bottom on the right twice to select and change the number of time slots and power setting > Slot configuration > Uplink/Gamma > 33 dBm for GPRS 850/900 > 27 dBm for EGPRS 850/900 > 30 dBm for GPRS1800/1900 > 26 dBm for EGPRS1800/1900
BS Signal	Enter the same channel number for TCH channel (test channel) and BCCH channel Frequency Offset > + 0 Hz Mode > BCCH and TCH BCCH Level > -85 dBm (May need to adjust if link is not stable) BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel] Channel Type > Off P0> 4 dB Slot Config > Unchanged (if already set under MS Signal) TCH > choose desired test channel Hopping > Off Main Timeslot > 3 (Default)
Network	Coding Scheme > CS 4 (GPRS) and MCS5 (EGPRS) Bit Stream > 2E9-1PSR Bit Pattern
AF/RF	Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection	Press Signal On to turn on the signal and change settings

RESULT

GSM 1900MHz

ID:	37290	Date:	6/4/18
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GPRS (GMSK) - Coding Scheme: CS1

Band	Ch No.	Freq. (MHz)	Peak Output power (dBm)	Average Output Power (dBm)	Peak to Average Ratio
1900.0	512	1850.2	29.82	29.32	0.50
	661	1880.0	29.85	29.45	0.40
	810	1909.8	29.65	29.17	0.48

EGPRS (8PSK) - Coding Scheme: MCS5

Band	Ch No.	Freq. (MHz)	Peak Output power (dBm)	Average Output Power (dBm)	Peak to Average Ratio
1900.0	512	1850.2	28.94	25.03	3.91
	661	1880.0	28.77	25.37	3.40
	810	1909.8	28.72	25.12	3.60

8. RADIATED POWER (EIRP)

RULE PART(S)

FCC: §2.1046, §24.232

IC: RSS133§6.4

LIMITS

§24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

RSS 133-- The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.

TEST PROCEDURE

ANSI C63.26:2015

KDB 971168 D01 v03r01, Section 5.8

RESULTS

8.1. GSM

Part 24 / RSS 133 1900MHz Band

Band	Mode	Channel	f (MHz)	EIRP (Peak)	
				dBm	mW
PCS	GPRS	512	1850.2	30.72	1180.32
		661	1880.0	29.43	877.00
		810	1909.8	30.15	1035.14
	EGPRS	512	1850.2	27.22	527.23
		661	1880.0	27.37	545.76
		810	1909.8	28.33	680.77

GPRS, 1900MHz

UL Verification Services, Inc. High Frequency Substitution Measurement								
Company:		Satellite Tracking						
Project #:		12234189						
Date:		5/25/2018						
Test Engineer:		10629 RL						
Configuration:		EUT+ Support Equipment						
Location:		Chamber A						
Mode:		GPRS 1900 MHz Fundamentals						
Test Equipment:								
Receiving: Horn T136, and Chamber A SMA Cables								
Substitution: Horn T73, 6ft N-type Cable T1096								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	18.02	V	0.6	8.5	26.00	33.0	-7.0	
1850.20	22.74	H	0.6	8.5	30.72	33.0	-2.3	
Mid Ch								
1880.00	18.73	V	0.5	8.5	26.70	33.0	-6.3	
1880.00	21.47	H	0.5	8.5	29.43	33.0	-3.6	
High Ch								
1909.80	21.16	V	0.6	8.5	29.07	33.0	-3.9	
1909.80	22.25	H	0.6	8.5	30.15	33.0	-2.8	

EGPRS, 1900MHz

UL Verification Services, Inc. High Frequency Substitution Measurement								
Company:		Satellite Tracking						
Project #:		12234189						
Date:		5/25/2018						
Test Engineer:		10629 RL						
Configuration:		EUT+ Support Equipment						
Location:		Chamber A						
Mode:		EGPRS 1900 MHz Fundamentals						
Test Equipment:								
Receiving: Horn T136, and Chamber A SMA Cables								
Substitution: Horn T73, 6ft N-type Cable T1096								
f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch								
1850.20	16.45	V	0.6	8.5	24.43	33.0	-8.6	
1850.20	19.24	H	0.6	8.5	27.22	33.0	-5.8	
Mid Ch								
1880.00	15.10	V	0.5	8.5	23.07	33.0	-9.9	
1880.00	19.41	H	0.5	8.5	27.37	33.0	-5.6	
High Ch								
1909.80	16.97	V	0.6	8.5	24.88	33.0	-8.1	
1909.80	20.43	H	0.6	8.5	28.33	33.0	-4.7	