

Partial FCC Test Report

Report No.: RF190813C30-5 FCC ID: B32E2853GDB Test Model: e285 3G/BT/WiFi/DS/DB Received Date: Aug. 13, 2019 Test Date: Sep. 12, 2019 Issued Date: Sep. 19, 2019 Applicant: Verifone, Inc. Address: 1400 West Stanford Ranch Road Suite 200 Rocklin CA 95765 USA Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan FCC Registration / 788550 / TW0003 **Designation Number:**



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Release Control Record Issue No. Description Date Issued Original Release Sep. 19, 2019 RF190813C30-5



Certificate of Conformity 1

Product:	Point of Sale Terminal
Brand:	Verifone
Test Model:	e285 3G/BT/WiFi/DS/DB
Sample Status:	Identical Prototype
Applicant:	Verifone, Inc.
Test Date:	Sep. 12, 2019
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.225)
	47 CFR FCC Part 15, Subpart C (Section 15.215)
	ANSI C63.10:2013

The above equipment has been tested by Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

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Prepared by :

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Sep. 19, 2019 Date:

Approved by :

Dylan Chiou / Project Engineer

Date: Sep. 19, 2019



2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)					
FCC Clause	Test Item	Result	Remarks		
15.207	Conducted emission test	N/A	Refer to Note		
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -46.78 dB at 13.56 MHz.		
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	s Iz N/A Refer to Note			
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	N/A	Refer to Note		
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass	Meet the requirement of limit. Minimum passing margin is -9.61 dB at 43.58 MHz.		
15.225 (e)	The frequency tolerance	N/A	Refer to Note		
15.215 (c)	20 dB Bandwidth	N/A	Refer to Note		
15.203	Antenna Requirement	Pass	No antenna connector is used.		

Note:

1. Only Radiated emission test was performed for this addendum. Refer to original report for other test data.

2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.94 dB
	9 kHz ~ 30 MHz	3.04 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB

2.2 Modification Record

There were no modifications required for compliance.



3 General Information

3.1 General Description of EUT

Product	Point of Sale Terminal
Brand	Verifone
Test Model	e285 3G/BT/WiFi/DS/DB
Status of EUT	Identical Prototype
Dower Supply Doting	5.0 Vdc (adapter or host equipment)
Power Supply Rating	3.8 Vdc (Li-ion battery)
Modulation Type	ASK
Operating Frequency	13.56 MHz
Field Strength	77.22 dPu/(m/2m)
(Maximum)	77.22 dBuv/m (Sm)
Antenna Type	Loop Antenna
Accessory Device	Refer to Note
Data Cable Supplied	Refer to Note

Note:

1. This report is issued as a supplementary report to BV CPS report no.: RF170804C11-5. The difference compared with original report is changing BT/WLAN module and FCC ID for new application with new model. Therefore, only Radiated emission test was verified and recorded in this report.

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
	Verifone		I/P: 100-240 Vac, 50/60 Hz, 0.2 A
Adapter		PSAA05A-050QL6V	O/P: 5 Vdc, 1.0 A
			Manufacturer: Phihong
Battery	Verifone	BPK087-600	3.8 Vdc, 1800mAh
BT/WLAN	Maria I.	LBEH5HY1LC-981	
Module	Murata		
WWAN Module	Gemalto	EHS6	
USB Cable	Verifone	CBL087-500-01	1m shielded cable w/o core

3. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.



3.2 Description of Test Modes

One channel was provided to this EUT:

Channel	Frequency (MHz)
1	13.56

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure	Applicable To	Description
Mode	RE	Description
_	1	-

Where **RE:** Radiated Emission

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

Radiated Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type	Axis
-	1	1	ASK	Z

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE	25 deg. C, 65 % RH	120 Vac, 60 Hz	Tim Chen



3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.225) FCC Part 15, Subpart C (15.215) KDB 414788 D01 Radiated Test Site v01r01 ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.



4 Test Types and Results

4.1 Radiated Emission Measurement

- 4.1.1 Limits of Radiated Emission Measurement
- a. The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
- b. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
- c. Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
- d. The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209 as below table:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)	
0.009 ~ 0.490	2400/F (kHz)	300	
0.490 ~ 1.705	24000/F (kHz)	30	
1.705 ~ 30.0	30	30	
30 ~ 88	100	3	
88 ~ 216	150	3	
216 ~ 960	200	3	
Above 960	500	3	

NOTE:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.



4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
Loop Antenna	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier EMCI	EMC001340	980201	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower &Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 10.



4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Both Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
- 2. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
- 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
- 4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

No deviation.



4.1.5 Test Set Up

<Radiated Emission below 30 MHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

KDB 414788 OFS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Set the EUT under transmission condition continuously at specific channel frequency.



4.1.7 Test Results

EUT Test Condition		Measurement Detail			
Channel	Channel 1	Frequency Range	13.553 ~ 13.567 MHz		
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak		
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen		



Antenna Polarity & Test Distance: Loop Antenna Parallel at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
13.56	77.22	55.4	21.82	124	-46.78	100	312	QP

Remarks:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Factor (dB/m)

2. The other emission levels were very low against the limit.

- 3. Margin value = Emission level Limit value.
- 4. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance) Example:

13.56 MHz =	15848 uV/m	30m
		20m

=		3011
=	84+20log(30/3) ²	3m
_	124 dBu\//m	

= 124 dBuV/m



EUT Test Condition		Measurement Detail		
Channel	Channel 1	Frequency Range	Below 1000 MHz	
Input Power	120 Vac, 60 Hz	Detector Function	Quasi-Peak	
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen	

Horizontal



Vertical 80 Level (dBuV/m) Date: 2019-09-12 70.0 60.0 FCC CLASS-B 50.0 40.0 4 2 6 30.0 20.0 10.0 0<mark>11</mark> 30 100. 200. 300. 700. 1000 400. 500. 600. 800. 900. Frequency (MHz)



Antonno Polority & Toot Distance: Herizontal at 2 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
43.58	30.39	47.34	-16.95	40	-9.61	200	0	QP
135.73	26.59	44.95	-18.36	43.5	-16.91	200	0	QP
190.05	26.47	45.81	-19.34	43.5	-17.03	200	0	QP
430.61	23.2	35.49	-12.29	46	-22.8	200	0	QP
773.99	29.02	33.49	-4.47	46	-16.98	200	0	QP
933.07	30.47	33.29	-2.82	46	-15.53	200	0	QP
		Antenna	a Polarity &	Test Dista	nce: Vertica	l at 3 m		
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
42.61	29.96	46.91	-16.95	40	-10.04	120	340	QP
162.89	31.19	48.35	-17.16	43.5	-12.31	120	340	QP
347.19	29.3	44.18	-14.88	46	-16.7	120	340	QP
519.85	34.09	44.01	-9.92	46	-11.91	120	340	QP
786.6	29.48	34.19	-4.71	46	-16.52	120	340	QP
923.37	31.38	34.62	-3.24	46	-14.62	120	340	QP

Remarks:

1. Emission Level = Read Level + Factor

2. Margin value = Emission level – Limit value.

3. The other emission levels were very low against the limit.

4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)

– Pre-Amplifier Factor (dB)



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).



Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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The address and road map of all our labs can be found in our web site also.

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