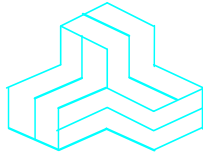


# ENGINEERING TEST REPORT



**HSDPA Point of Sale Terminal**

**Model: NOIRE510H1**

**FCC ID: COL-NOIRE510H1**

*Applicant:*

**NBS Payment Solutions Inc.**

703 Evans Ave., Suite 400

Toronto, Ontario

Canada M9C 5E9

***In Accordance With***

**Federal Communications Commission (FCC)**

**Part 15, Subpart C**

**Unlicensed Low Power Transmitter Operating in the Band 13.110-14.010 MHz**

**UltraTech's File No.: 16MIS115\_FCC15C225**

This Test report is Issued under the Authority of  
Tri M. Luu  
Vice President of Engineering  
UltraTech Group of Labs

Date: April 15, 2016

Report Prepared by: Dan Huynh

Tested by: Wei Wu

Issued Date: April 15, 2016

Test Date(s): November 13, 2015

- *The results in this Test Report apply only to the sample(s) tested, and the sample tested is randomly selected.*
- *This report must not be used by the client to claim product endorsement by NVLAP or any agency of the US Government.*

## UltraTech

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NVLAP LAB  
CODE 200093-0



AT-1945



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CA2049



TL363\_B



TPTDP  
DA1300

## TABLE OF CONTENTS

<b>EXHIBIT 1.</b>	<b>INTRODUCTION.....</b>	<b>1</b>
1.1.	SCOPE .....	1
1.2.	RELATED SUBMITTAL(S)/GRANT(S) .....	1
1.3.	NORMATIVE REFERENCES .....	1
<b>EXHIBIT 2.</b>	<b>PERFORMANCE ASSESSMENT.....</b>	<b>2</b>
2.1.	CLIENT INFORMATION .....	2
2.2.	EQUIPMENT UNDER TEST (EUT) INFORMATION .....	2
2.3.	EUT'S TECHNICAL SPECIFICATIONS.....	3
2.4.	LIST OF EUT'S PORTS.....	3
2.5.	ANCILLARY EQUIPMENT .....	3
2.6.	TEST SETUP.....	4
<b>EXHIBIT 3.</b>	<b>EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS.....</b>	<b>5</b>
3.1.	CLIMATE TEST CONDITIONS.....	5
3.2.	OPEPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS.....	5
<b>EXHIBIT 4.</b>	<b>SUMMARY OF TEST RESULTS.....</b>	<b>6</b>
4.1.	LOCATION OF TESTS .....	6
4.2.	APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS .....	6
4.3.	MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES.....	6
<b>EXHIBIT 5.</b>	<b>TEST DATA .....</b>	<b>7</b>
5.1.	FIELD STRENGTH OF EMISSIONS WITHIN & OUTSIDE THE PERMITTED BAND 13.110-14.010 MHz [47 CFR 15.225 (a) to (d)] .....	7
<b>EXHIBIT 6.</b>	<b>TEST EQUIPMENT LIST .....</b>	<b>10</b>
<b>EXHIBIT 7.</b>	<b>MEASUREMENT UNCERTAINTY.....</b>	<b>11</b>
7.1.	LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY .....	11
7.2.	RADIATED EMISSION MEASUREMENT UNCERTAINTY .....	11

## EXHIBIT 1. INTRODUCTION

### 1.1. SCOPE

<b>Reference:</b>	FCC Part 15, Subpart C, Section 15.225 - Operation within the band 13.110 - 14.010 MHz.
<b>Title:</b>	Code of Federal Regulations (CFR), Title 47 Telecommunication, Part 15, Subpart C - Intentional Radiators
<b>Purpose of Test:</b>	Equipment Certification for Devices in Section 15.225 - Operation within the Band 13.110 - 14.010 MHz.
<b>Test Procedures:</b>	American National Standards Institute ANSI C63.4 - American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
<b>Environmental Classification:</b>	Commercial, industrial or business environment

### 1.2. RELATED SUBMITTAL(S)/GRANT(S)

None.

### 1.3. NORMATIVE REFERENCES

Publication	Year	Title
47 CFR Parts 0-19	2015	Code of Federal Regulations (CFR), Title 47 – Telecommunication
ANSI C63.4	2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
CISPR 22 & EN 55022	2008-09, Edition 6.0 2006	Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement
CISPR 16-1-1 +A1 +A2	2006 2006 2007	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-1: Measuring Apparatus
CISPR 16-1-2 +A1 +A2	2003 2004 2006	Specification for radio disturbance and immunity measuring apparatus and methods. Part 1-2: Conducted disturbances

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#### ULTRATECH GROUP OF LABS

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File #: 16MIS115\_FCC15C225  
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## EXHIBIT 2. PERFORMANCE ASSESSMENT

### 2.1. CLIENT INFORMATION

APPLICANT	
<b>Name:</b>	NBS Payment Solutions Inc.
<b>Address:</b>	703 Evans Ave., Suite 400 Toronto, ON Canada M9C 5E9
<b>Contact Person:</b>	Mr. Eric Babbitt Phone #: 416-621-7410 x567 Fax #: 416-621-2450 Email Address: ebabbitt@nbsps.com

MANUFACTURER	
<b>Name:</b>	NBS Payment Solutions Inc.
<b>Address:</b>	703 Evans Ave., Suite 400 Toronto, ON Canada M9C 5E9
<b>Contact Person:</b>	Mr. Eric Babbitt Phone #: 416-621-7410 x567 Fax #: 416-621-2450 Email Address: ebabbitt@nbsps.com

### 2.2. EQUIPMENT UNDER TEST (EUT) INFORMATION

The following information (with the exception of the Date of Receipt) has been supplied by the applicant.

<b>Brand Name:</b>	NBS Payment Solutions Inc.
<b>Product Name:</b>	HSDPA Point of Sale Terminal
<b>Model Name or Number:</b>	NOIRE510H1
<b>Serial Number:</b>	Test sample
<b>Type of Equipment:</b>	Low Power Communication Device Transmitter
<b>Input Power Supply Type:</b>	Lithium Battery 3.7V/2600mAh or AC adapter 9 VDC/3.33A
<b>Primary User Functions of EUT:</b>	Point of Sale credit/debit financial transactions

## 2.3. EUT'S TECHNICAL SPECIFICATIONS

Transmitter	
Equipment Type:	Portable
Intended Operating Environment:	Commercial, light industry & heavy industry
Power Supply Requirement:	Lithium Battery 3.7V/2600mAh or AC adapter 9 VDC/3.33A
Field Strength:	48.90 dB $\mu$ V/m at 10 m
Operating Frequency Range:	13.56 MHz
RF Output Impedance:	50 $\Omega$
20 dB Bandwidth:	12.6 kHz
Modulation Type:	ASK
Oscillator Frequencies:	13.56 MHz
Antenna Connector Type:	Integral

## 2.4. LIST OF EUT'S PORTS

Port Number	EUT's Port Description	Number of Identical Ports	Connector Type	Cable Type (Shielded/Non-shielded)
1	*USB Port	1	Mini USB Type B	Shielded
2	*Serial RS232 Port	1	Hirose MQ172-3PA	Shielded
3	Power Input	1	Hirose: MQ172X-4PA	1m, Non-shielded

\* Not used in normal operation.

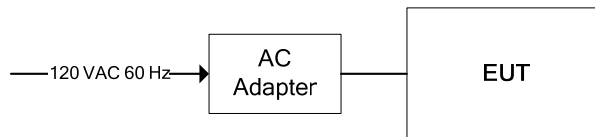
## 2.5. ANCILLARY EQUIPMENT

The EUT was tested while connected to the following representative configuration of ancillary equipment necessary to exercise the ports during tests:

Ancillary Equipment # 1	
Description:	AC/DC Power Adapter
Brand name:	FSP Group Inc.
Model Name or Number:	FSP040-DGAA2
Connected to EUT's Port:	Power Port

## 2.6. TEST SETUP

### RADIATED EMISSION



## EXHIBIT 3. EUT OPERATING CONDITIONS AND CONFIGURATIONS DURING TESTS

### 3.1. CLIMATE TEST CONDITIONS

The climate conditions of the test environment are as follows:

Temperature:	21 to 23 °C
Humidity:	45 to 58%
Pressure:	102 kPa
Power Input Source:	AC adapter 9 VDC/3.33A

### 3.2. OPEPERATIONAL TEST CONDITIONS & ARRANGEMENT FOR TESTS

<b>Operating Modes:</b>	The EUT was configured for continuous transmission for the duration of testing.
<b>Special Test Software:</b>	N/A
<b>Special Hardware Used:</b>	N/A
<b>Transmitter Test Antenna:</b>	The EUT was tested with the antenna fitted in a manner typical of normal intended use as integral antenna equipment.

<b>Transmitter Test Signals:</b>	
<b>Frequency:</b>	13.56 MHz
<b>Transmitter Wanted Output Test Signals:</b>	
▪ RF Power Output (measured maximum output power):	48.90 dBµV/m at 10 m
▪ Normal Test Modulation:	ASK
▪ Modulating signal source:	Internal

## EXHIBIT 4. SUMMARY OF TEST RESULTS

### 4.1. LOCATION OF TESTS

All of the measurements described in this report were performed at Ultratech Group of Labs located in the city of Oakville, Province of Ontario, Canada.

- AC Power Line Conducted Emissions were performed in UltraTech's shielded room, 24'(L) by 16'(W) by 8'(H).
- Radiated Emissions were performed at the Ultratech's 3-10 TDK Semi-Anechoic Chamber situated in the Town of Oakville, province of Ontario. This test site been calibrated in accordance with ANSI C63.4, and found to be in compliance with the requirements of Sec. 2.948 of the FCC Rules. The descriptions and site measurement data of the Oakville 3-10 TDK Semi-Anechoic Chamber has been filed with FCC office (FCC File No.: 91038) and Industry Canada office (Industry Canada File No.: 2049A-3). Expiry Date: 2017-04-02.

### 4.2. APPLICABILITY & SUMMARY OF EMC EMISSION TEST RESULTS

FCC Regulations	Test Requirements	Compliance (Yes/No)
15.203 & 15.204	The transmitter shall use a transmitting antenna that is an integral part of the device	Yes
15.215(c)	Emission Bandwidth	Yes, See Note 1
15.225(a) – (d)	Field Strength of Emissions Inside and Outside the Permitted Band 13.110 - 14.010 MHz	Yes
15.225(e)	Frequency Stability	Yes, See Note 1
15.107 & 15.207	Class B - Power Line Conducted Emissions	Yes, See Note 2

Note 1: See UltraTech's File No.: 16MIS095\_FCC15C225 test report

Note 2: See EMC Test Report #: \_EMC\_NBSPS-006-12001\_FCC15B

### 4.3. MODIFICATIONS INCORPORATED IN THE EUT FOR COMPLIANCE PURPOSES

None.



## EXHIBIT 5. TEST DATA

### 5.1. FIELD STRENGTH OF EMISSIONS WITHIN & OUTSIDE THE PERMITTED BAND 13.110-14.010 MHz [47 CFR 15.225 (a) to (d)]

#### 5.1.1. Limits

- (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.

#### 47 CFR 15.209(a) – Radiated Emission Limits; general requirements

Frequency (MHz)	Field Strength Limits (microvolts/m)	Distance (Meters)
0.009 - 0.490	2,400 / F (KHz)	300
0.490 - 1.705	24,000 / 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

#### 5.1.2. Method of Measurements

Refer to Ultratech Test Procedures, File # ULTR P001 and ANSI C63.4 for measurement methods

### 5.1.3. Test Data

#### Remarks:

- Radiated spurious emissions measurements were performed at a measuring distance of 10 m (for frequencies below 30 MHz) and 3 m (for frequencies at or above 30 MHz), from 10 kHz – 10<sup>th</sup> harmonic of the fundamental or the range applicable to the digital device, whichever is the higher frequency range and all spurious emissions that are in excess of 20 dB below the specified limit shall be recorded.
- For frequencies below 30 MHz, the results measured at 10 m distance shall be extrapolated to the specified distance using an extrapolation factor of 40 dB/decade for determining compliance.

#### 5.1.3.1. Field Strength of Emissions Within the Permitted Band at 10 m

Frequency (MHz)	Measured Field Strength @ 10 m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Field Strength Extrapolated Value (dBµV/m)	§ 15.225 Field Strength Limits (dBµV/m)	Margin (dB)
13.56	48.90	Peak	V	29.8	84.0	-54.2
13.56	37.51	Peak	H	18.4	84.0	-65.6

#### 5.1.3.2. Field Strength of Emissions Outside the Permitted Band Below 30 MHz at 10 m

Frequency (MHz)	Measured Field Strength @ 10 m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	Field Strength Extrapolated Value (dBµV/m)	§ 15.209 Field Strength Limits (dBµV/m)	Margin (dB)
All spurious emissions are more than 20 dB below the specified limit.						

#### 5.1.3.3. Field Strength of Emissions Outside the Permitted Band 30 MHz to 6 GHz at 3 m

Frequency (MHz)	Measured Field Strength @ 3 m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits (dBµV/m)	Margin (dB)
40.68	31.90	Peak	V	40.0	-8.1
54.24	22.50	Peak	V	40.0	-17.5
67.80	27.07	Peak	V	40.0	-12.9
81.36	27.05	Peak	V	40.0	-13.0
94.92	30.21	Peak	V	43.5	-13.3
108.48	30.61	Peak	V	43.5	-12.9
122.04	29.68	Peak	V	43.5	-13.8
132.59	35.90	Peak	V	43.5	-7.6
132.59	28.46	Peak	H	43.5	-15.0
135.60	40.50	Peak	V	43.5	-3.0
135.60	40.20	Peak	H	43.5	-3.3
162.13	35.85	Peak	V	43.5	-7.7
162.13	36.68	Peak	H	43.5	-6.8

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Frequency (MHz)	Measured Field Strength @ 3 m (dBµV/m)	Detector Used (Peak/QP)	Antenna Plane (H/V)	§ 15.209 Field Strength Limits (dBµV/m)	Margin (dB)
189.84	39.80	QP	V	43.5	-3.7
189.84	39.44	Peak	H	43.5	-4.1
216.10	36.90	Peak	V	46.0	-9.1
216.10	39.90	Peak	H	46.0	-6.1
325.35	39.88	Peak	V	46.0	-6.1
325.35	43.70	QP	H	46.0	-2.3
379.75	39.75	Peak	V	46.0	-6.3
379.75	41.59	Peak	H	46.0	-4.4
398.41	42.76	Peak	V	46.0	-3.2
398.41	40.66	Peak	H	46.0	-5.3
501.00	39.70	Peak	V	46.0	-6.3
501.00	41.49	Peak	H	46.0	-4.5
515.00	41.81	Peak	V	46.0	-4.2
515.00	42.00	Peak	H	46.0	-4.0
597.38	40.35	Peak	V	46.0	-5.7
597.38	42.45	QP	H	46.0	-3.6
665.02	44.20	QP	V	46.0	-1.8
665.02	41.99	QP	H	46.0	-4.0
718.63	38.73	Peak	V	46.0	-7.3
718.63	42.97	Peak	H	46.0	-3.0
931.60	42.60	Peak	V	46.0	-3.4
931.60	38.00	Peak	H	46.0	-8.0

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## EXHIBIT 6. TEST EQUIPMENT LIST

Test Instruments	Manufacturer	Model No.	Serial No.	Operating Range	Cal. Due Date
Loop Antenna	EMCO	6502	9104-2611	10 kHz – 30 MHz	5 Nov 2016
Spectrum Analyzer	Rohde & Schwarz	ESU40	100037	20 Hz – 40 GHz	8 Mar 2017
Pre-Amplifier	Com-Power	Pam-118A	551016	500 MHz – 18 GHz	6 Jan 2016
Biconi-Log Antenna	EMCO	3142C	00026873	26 – 3000 MHz	14 Apr 2016
Horn Antenna	EMCO	3115	9911-5955	1 – 18 GHz	26 Mar 2016
Spectrum Analyzer	Rohde & Schwarz	FSP	100646	9 kHz – 7 GHz	6 Oct 2016
Biconical Antenna	ETS	3110B	3379	20 - 200MHz	11 Sep 2016
Preamplifier	Com-power	PA-103A	161243	10 – 1000 MHz	21 Jul 2016

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## EXHIBIT 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties stated were calculated in accordance with the requirements of CISPR 16-4-2 @ IEC:2003 and JCGM 100:2008 (GUM 1995) – Guide to the Expression of Uncertainty in Measurement.

### 7.1. LINE CONDUCTED EMISSION MEASUREMENT UNCERTAINTY

	Line Conducted Emission Measurement Uncertainty (9 kHz – 30 MHz):	Measured	Limit
$u_c$	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	$\pm 1.44$	$\pm 1.8$
$U$	Expanded uncertainty U: $U = 2u_c(y)$	$\pm 2.89$	$\pm 3.6$

### 7.2. RADIATED EMISSION MEASUREMENT UNCERTAINTY

	Radiated Emission Measurement Uncertainty @ 3m, Horizontal (30-1000 MHz):	Measured (dB)	Limit (dB)
$u_c$	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	$\pm 2.39$	$\pm 2.6$
$U$	Expanded uncertainty U: $U = 2u_c(y)$	$\pm 4.79$	$\pm 5.2$

	Radiated Emission Measurement Uncertainty @ 3m, Vertical (30-1000 MHz):	Measured (dB)	Limit (dB)
$u_c$	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	$\pm 2.39$	$\pm 2.6$
$U$	Expanded uncertainty U: $U = 2u_c(y)$	$\pm 4.78$	$\pm 5.2$

	Radiated Emission Measurement Uncertainty @ 3 m, Horizontal & Vertical (1 – 18 GHz):	Measured (dB)	Limit (dB)
$u_c$	Combined standard uncertainty: $u_c(y) = \sqrt{\sum_{i=1}^m u_i^2(y)}$	$\pm 1.87$	Under consideration
$U$	Expanded uncertainty U: $U = 2u_c(y)$	$\pm 3.75$	Under consideration