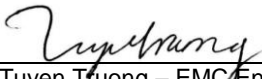
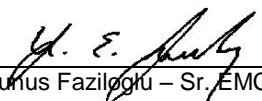


Test Report



**BUREAU
VERITAS**

Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Report No	EQ3095-1
Client	Mobile Aspects Inc.
Address	3700 S Water St Ste 310 Pittsburgh, PA 15203
Phone	412-325-1690
Items tested	RFID Printer Module (M/N: IDIFC.M02)
FCC ID	R4FIRISPRINT10
FRN	0010877447
Equipment Type	Part 15 Low Power Communication Device Transmitter
Equipment Code	DXX
Emission Designator	83K6A1D
FCC Rule Parts	CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6
Test Dates	Nov 14 to 17 and Dec 3 to 9, 2016
Results	As detailed within this report
Prepared by	 Tuyen Tfuong – EMC Engineer
Authorized by	 Yunus Faziloglu – Sr. EMC Engineer
Issue Date	3/6/2017
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 16 of this report

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



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Form Final Report REV 7-20-07 (DW)



Summary

This test report supports an application for certification of a transmitter operating pursuant to CFR Title 47 FCC Part 15.225, ISED Canada RSS-210 Issue 9 Annex B.6

The device under test is RFID Printer Module (M/N: IDIFC.M02) operating at 13.56MHz.

We found that the product met the above requirements with modifications as detail below:

- Ferrite was added on Serial cable (Fair-Rite VO sleeve, PN 0431164181, 1 loop).
- Ferrite was added on antenna cable (Fair-Rite VO sleeve, PN 0431164951, 1 loop).

The modification was required during spurious Radiated Emissions testing.

The test sample was received in good condition.

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	March 6, 2017



Test Methodology

All testing was performed according to the following rules/procedures/documents;

- CFR Title 47 FCC Part 15.225,
- ISED Canada RSS-210 Issue 9 Annex B.6,
- ISED Canada RSS-Gen Issue 4,
- ANSI C63.10-2013

Device was tested in 3 different orientations (X, Y and Z) of possible installation. Emissions were maximized by rotating the turntable as well as varying the test antenna’s height and polarity.

Operating voltage of the device is 5Vdc; therefore AC line conducted emissions testing was performed on the AC side of a representative power supply with a 50Ω/50μH LISN.

The following bandwidths were used during radiated spurious and line conducted emissions.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	1MHz

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	March 6, 2017



Compliance Statement

RSS-GEN	RSP-100	RSS 210	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the users that vary the output power.
	3.1		15.19	The label is shown in the label exhibit.
	3.2		15.21	Information to the user is shown in the instruction manual exhibit.
6			15.27	No special accessories are required for compliance.
3			15.31	The EUT was tested in accordance with the measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
8.1			15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
8.3			15.203	The antenna for this device is a detachable PCB trace loop antenna
8.10			15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable
8.8			15.207	AC side of EUT Power Supply meets the limits in 15.207
		B.6(a)	15.225	The fundamental and harmonics meet the limits in 15.225(a)
		B.6(b) B.6(c) B.6(d)	15.225(d)	Spurious emissions meet the limits in 15.209.
		B.6	15.225(e)	Transmitter frequency stability meets the applicable limits
6.6				99% emissions bandwidth plot is provided.

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	March 6, 2017



Product Tested - Configuration Documentation

EUT Configuration											
Work Order:	Q3095										
Company:	Mobile Aspects										
Company Address:	24 S. 18th St Ste 300										
	Pittsburgh, PA, 15203										
Contact:	Khang Le										
	MN			PN			SN				
EUT:	IDIFC.M02			--			Sample 1				
EUT Description:	RFID Printer Module										
EUT Max Frequency:	13.56 MHz										
EUT Min Frequency:	8 MHz										
	MN			SN							
Support Equipment	Dell Laptop			Vostro 1400				--			
	HP Agilent Power Supply			Curtis Straus Test Instrument				--			
	Printer Console PCB			--				--			
Port Label	Port Type	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment	
Antenna	other	1	1	Coaxial	Yes	No	0.5	in	yes		
Communication	other	1	1	other	No	No	0.1	in	yes		
USB to RS232	RS-232	1	1	RS-232	Yes	No	0.3	5	in		
Power	other	1	1	other	No	No	3	in	in		
Software Operating Mode Description:											
EUT is set to transmit continuously at 13.56 MHz.											



Test Results

Fundamental Emission

LIMIT

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters, (124dBuV/m at 3m.)
[15.225 (a)]

MEASUREMENTS / RESULTS

Radiated Emissions Table												
Date: 03-Dec-16			Company: Mobile Aspects				Work Order: Q3095					
Engineer: Ahmed Ahmed			EUT Desc: RFID printer module				EUT Operating Voltage/Frequency: 5Vdc					
Temp: 23C			Humidity: 30%				Pressure: 1001mbar					
Frequency Range: 13.56MHz Fundamental							Measurement Distance: 3 m					
Notes: IDIFC.M02											13.56MHz	
Worst case orientation: Y												
Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading dBuA/m	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	FCC 15.225			---		
							Limit dBuA/m	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
90	13.56	44.1	25.4	39.0	0.3	58.0	124.0	-66.0	Pass	---	---	---
0	13.56	40.5	25.4	39.0	0.3	54.4	124.0	-69.6	Pass	---	---	---
Table Result: Pass by -66.0 dB							Worst Freq: 13.56 MHz					
Test Site: EMI Chamber 1			Cable 1: Asset #2051				Cable 2: Asset #2054			Cable 3: ---		
Analyzer: Gold			Preamp: Blue-Blk				Antenna: Sm Loop (high)			Preselector: ---		
CSsoft Radiated Emissions Calculator v 1.017.178										Copyright Curtis-Straus LLC 2000		
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												

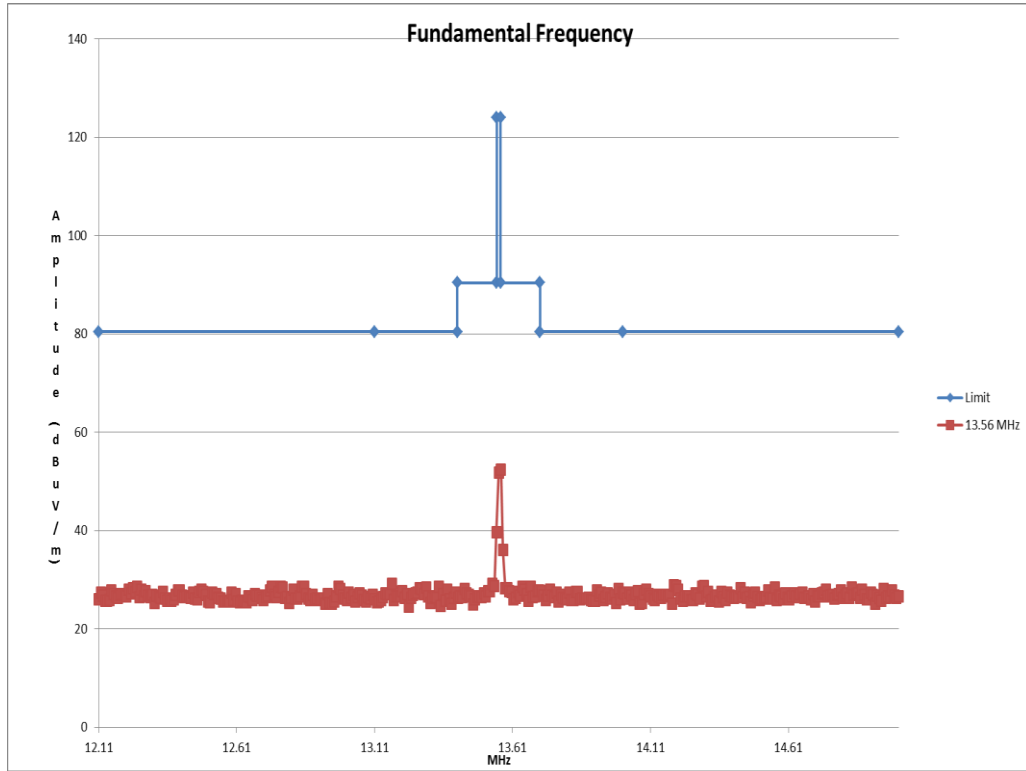
Rev. 1/21/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/13/2017	1/13/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/26/2017	12/26/2016
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2051	9kHz - 18GHz	Florida RF			II	3/2/2017	3/2/2016	
Asset #2054	9kHz - 18GHz	Florida RF			II	10/1/3017	10/30/2016	
Meteorological Meters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	II	3/22/2017	3/22/2015	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



PLOT(S)



Radiated Spurious Emissions

LIMITS

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. [15.225(d)]

MEASUREMENTS / RESULTS

Radiated Emissions Table												
Date: 03-Dec-16			Company: Mobile Aspects				Work Order: Q3095					
Engineer: Ahmed Ahmed			EUT Desc: RFID printer module				EUT Operating Voltage/Frequency: 5Vdc					
Temp: 23C			Humidity: 30%				Pressure: 1001mbar					
Frequency Range: 9kHz-30MHz						Measurement Distance: 3 m						
Notes: IDIFC.M02						13.56MHz						
Worst case orientation: Y												
Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading dBuA/m	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	---			---		
							Limit dBuA/m	Margin (dB)	Result (Pass/Fail)	Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
90	27.12	35.3	25.3	37.2	0.4	47.6	69.5	-21.9	Pass	---	---	---
0	27.12	28.3	25.3	37.2	0.4	40.6	69.5	-28.9	Pass	---	---	---
Table Result: Pass by -21.9 dB						Worst Freq: 27.12 MHz						
Test Site: EMI Chamber 1			Cable 1: Asset #2051				Cable 2: Asset #2054					
Analyzer: Gold			Preamp: Blue-Bik				Antenna: Sm Loop (high)					
CSsoft Radiated Emissions Calculator v 1.017.178												
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor												

Rev. 1/21/2017

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	2/13/2017	1/13/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
Large Loop	20Hz-5MHz	6511	EMCO	9704-1154	67	I	6/14/2018	6/14/2016
Preamps / Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/26/2017	12/26/2016
Cables	Range	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Asset #2051	9kHz - 18GHz	Florida RF			II	3/2/2017	3/2/2016	
Asset #2054	9kHz - 18GHz	Florida RF			II	10/1/3017	10/30/2016	
Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on	
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016	
TH A#2081	HTC-1	HDE		2081	II	4/5/2017	4/5/2016	
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due	Calibrated on	
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz	II	3/22/2017	3/22/2015	

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Radiated Emissions Table

Date: 09-Dec-16		Company: Mobile Aspects				Work Order: Q3095			
Engineer: Chris Bramley		EUT Desc: RFID Printer Module				EUT Operating Voltage/Frequency: 5Vdc			
Temp: 23.9°C		Humidity: 24%		Pressure: 1010mBar					
Frequency Range: 30-1000MHz						Measurement Distance: 3 m			
Notes: IDIFC.M02 Worst case orientation: Y						EUT Max Freq: 13.56MHz			
Antenna Polarization (H/V)	Frequency (MHz)	Reading (dBuV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBuV/m)	FCC 15.209		
							Limit (dBuV/m)	Margin (dB)	Result (Pass/Fail)
v	32.0	33.7	25.2	20.0	0.4	28.9	40.0	-11.1	Pass
v	48.02	49.0	25.2	9.2	0.4	33.4	40.0	-6.6	Pass
v	67.8	49.9	25.3	8.6	0.5	33.7	40.0	-6.3	Pass
v	72.02	53.4	25.3	8.9	0.5	37.5	40.0	-2.5	Pass
v	108.5	51.6	25.2	12.5	0.6	39.5	43.5	-4.0	Pass
v	135.6	52.6	25.2	13.8	0.8	42.0	43.5	-1.5	Pass
h	162.7	46.9	25.0	12.2	0.8	34.9	43.5	-8.6	Pass
h	288.1	50.6	25.2	13.4	1.0	39.8	46.0	-6.2	Pass
h	366.1	47.5	25.0	15.1	1.2	38.8	46.0	-7.2	Pass
v	379.7	50.6	25.0	15.2	1.3	42.1	46.0	-3.9	Pass
v	384.1	44.4	25.0	15.2	1.4	36.0	46.0	-10.0	Pass
h	393.2	48.7	25.1	15.3	1.5	40.4	46.0	-5.6	Pass
v	406.8	51.9	25.4	16.0	1.4	43.9	46.0	-2.1	Pass
v	420.4	51.9	25.5	16.5	1.4	44.3	46.0	-1.7	Pass
v	433.9	47.2	25.4	16.6	1.5	39.9	46.0	-6.1	Pass
v	447.5	51.4	25.4	16.9	1.4	44.3	46.0	-1.7	Pass
v	461.1	45.2	25.4	17.1	1.4	38.3	46.0	-7.7	Pass
v	474.6	46.6	25.5	17.6	1.5	40.2	46.0	-5.8	Pass
v	501.7	45.2	25.3	17.8	1.2	38.9	46.0	-7.1	Pass
v	528.9	43.7	25.0	18.0	1.6	38.3	46.0	-7.7	Pass
h	637.3	42.4	24.8	19.7	1.7	39.0	46.0	-7.0	Pass
h	718.7	40.7	24.8	20.5	1.8	38.2	46.0	-7.8	Pass
h	745.8	42.7	24.8	20.7	1.8	40.4	46.0	-5.6	Pass
h	772.9	44.5	24.8	21.2	1.9	42.8	46.0	-3.2	Pass
h	786.5	44.2	24.8	21.4	1.9	42.7	46.0	-3.3	Pass
h	800.1	44.4	24.9	21.3	1.9	42.7	46.0	-3.3	Pass
h	813.6	41.9	24.9	21.6	1.8	40.4	46.0	-5.6	Pass
h	867.9	40.5	25.1	22.0	2.0	39.4	46.0	-6.6	Pass
v	976.3	43.6	24.4	23.0	2.1	44.3	54.0	-9.7	Pass
Table Result: Pass by -1.5 dB							Worst Freq: 135.6 MHz		
Test Site: EMI Chamber 1		Cable 1: Asset #2051			Cable 2: Asset #2054				
Analyzer: Rental SA#2		Preamp: Blue-Blk			Antenna: Red-Black				
CSsoft Radiated Emissions Calculator v 1.017.178						Copyright Curtis-Straus LLC 2000			
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor									

Rev. 12/8/2016

Spectrum Analyzers / Receivers / Preselectors SA #2 (1860)	Range 9kHz-26.5 GHz	MN E7405A	Mfr Agilent	SN MY45104916	Asset 1860	Cat I	Calibration Due 12/23/2016	Calibrated on 12/23/2015
Radiated Emissions Sites EMI Chamber 1	FCC Code 719150	IC Code 2762A-6	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/21/2017	Calibrated on 3/21/2015
Preamps / Couplers / Attenuators / Filters Blue-Black	Range 0.009-2000MHz	MN ZFL-1000-LN	Mfr CS	SN N/A	Asset 800	Cat II	Calibration Due 12/27/2016	Calibrated on 12/27/2015
Antennas Red-Black Bilog	Range 30-2000MHz	MN JB1	Mfr Sunol	SN A091604-2	Asset 1106	Cat I	Calibration Due 2/9/2017	Calibrated on 2/9/2015
Meteorological Meters Weather Clock (Pressure Only) TH A#2080		MN BA928 HTC-1	Mfr Oregon Scientific HDE	SN C3166-1	Asset 831 2080	Cat I II	Calibration Due 4/28/2018 4/5/2017	Calibrated on 4/28/2016 4/5/2016
Cables Asset #2051 Asset #2054	Range 9kHz - 18GHz 9kHz - 18GHz		Mfr Florida RF Florida RF			Cat II II	Calibration Due 3/2/2017 10/1/3017	Calibrated on 3/2/2016 10/30/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



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Frequency Tolerance

LIMITS

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+ 50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

[15.225(e)]

MEASUREMENTS / RESULTS

Frequency Stability Under Extreme Conditions					
Date: 17-Nov-16		Company: Mobile Aspects		Work Order: Q3095	
Engineer: Zac Johnson		EUT: RFID printer module		Voltage: 5.0VDC	
Notes: EUT operating voltage range is from 4.75 to 5.25 Vdc per client.					
Temperature	Voltage	Carrier Frequency	Frequency Delta	Limit	Result
°C	VDC	MHz	(MHz)	(MHz)	(Pass/Fail)
20	5.00	13.560290	n/a	n/a	n/a
20	4.75	13.560284	0.0000060	± 0.001356	Pass
20	5.25	13.560314	0.0000240	± 0.001356	Pass
30	5.00	13.560272	0.0000180	± 0.001356	Pass
40	5.00	13.560242	0.0000480	± 0.001356	Pass
50	5.00	13.560206	0.0000840	± 0.001356	Pass
10	5.00	13.560332	0.0000420	± 0.001356	Pass
0	5.00	13.560338	0.0000480	± 0.001356	Pass
-10	5.00	13.560338	0.0000480	± 0.001356	Pass
-20	5.00	13.560320	0.0000300	± 0.001356	Pass
Test Site: ENV Chamber (20C and 70C)			Spectrum Analyzer: Brown SA		
Cable 1: Asset #1785					

Rev. 11/2/2016

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Brown	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	1/21/2017	1/21/2016
RMS Voltmeters/Current Clamp		MN	Mnfr	SN	Asset	Cat	Calibration Due	Calibrated on
DMM		114	Fluke	25660081	1864	I	2/2/2017	2/2/2016
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2080		HTC-1	HDE		2080	II	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1785	9kHz - 18GHz		Florida RF			II	1/5/2017	1/5/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



99% Occupied Bandwidth

REQUIREMENT

When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is its 99% emission bandwidth, as calculated or measured. [RSS-GEN 6.6]

MEASUREMENTS/RESULTS

99% OCCUPIED BANDWIDTH			
Date: 14-Nov-16		Company: Mobile Aspects	
Engineer: Tuyen Truong		EUT Desc: RFID printer module	
Temp: 22.4°C		Humidity: 28%	
		Pressure: 1006mbar	
Frequency Range: 13.56 MHz		Measurement Distance: 3 m	
Notes: IDIFC.M02		EUT Max Freq: 13.56 MHz	
Antenna Polarization (0° - 90°)	Frequency (MHz)	OCCUPIED BANDWIDTH (kHz)	
0	13.56	83.6011	
Table Result: by dB Worst Freq: 13.56 MHz			
Test Site: EMI Chamber 2		Cable 1: Asset #2052	
Analyzer: Gold		Cable 2: Asset #2053	
CSsoft Radiated Emissions Calculator v 1.017.178		Cable 3: ---	
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor		Antenna: Sm Loop (high)	
		Preselector: ---	
<small>Copyright Curtis-Straus LLC 2000</small>			

Note: Since the signal is narrowband, reduction in RBW causes the 99% Occupied Bandwidth to get smaller and smaller at each iteration. Therefore to have a meaningful reading, an RBW value that is higher than 5% of the emission bandwidth is selected.

Rev. 11/2/2016

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue	0.009-2000MHz	ZFL-1000-LN	CS	N/A	759	II	5/13/2017	5/13/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Small Loop	10kHz-30MHz	PLA-130/A	ARA	1024	755	I	6/14/2018	6/14/2016
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016
Asset #2053	9kHz - 18GHz		Florida RF			II	10/1/3017	10/30/2016

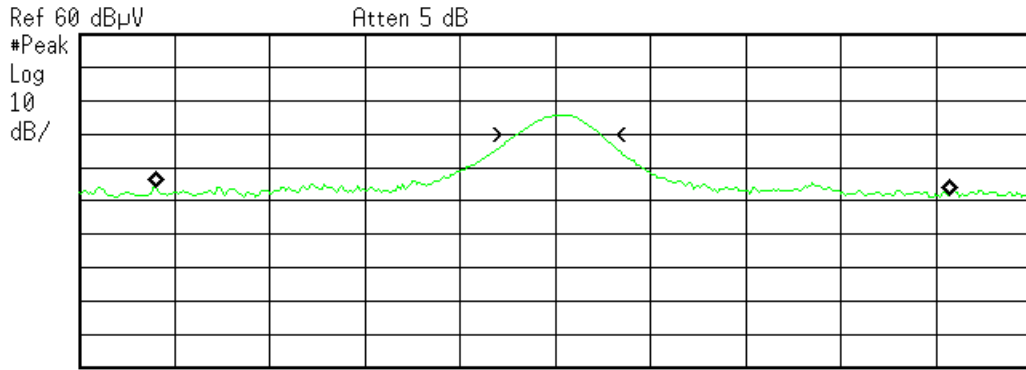
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



PLOT(S)

Agilent 14:36:20 Nov 14, 2016

R T



Center 13.56 MHz Span 100 kHz
 #Res BW 9 kHz #VBW 30 kHz Sweep 12.03 ms (401 pts)

Occupied Bandwidth
83.6011 kHz

Occ BW % Pwr 99.00 %
x dB -6.00 dB

Transmit Freq Error -225.466 Hz
x dB Bandwidth 8.855 kHz



AC Line Conducted Emissions

LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency. 47 CFR 15.207(a)

MEASUREMENTS / RESULTS

AC Conducted Emissions Data Table														
Date: 03-Dec-16 Engineer: Ahmed ahmed Temp: 21.8 °C Notes: EUT is set to transmit at 13.56 MHz					Company: Mobile Aspects EUT Desc: RFID printer module Humidity: 35%					Work Order: Q3095 Pressure: 1001 mBar				
Frequency Range: 0.15-30MHz										EUT Input Voltage/Frequency: 5Vdc				
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC 15.207			FCC 15.207		
	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)			QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
4.18	19.0	19.0	19.0	19.0	0.0	-0.1	-0.1	-20.0	56.0	-16.9	Pass	46.0	-6.9	Pass
15.45	20.9	20.9	20.9	20.9	-0.1	-0.1	-0.2	-20.0	60.0	-18.9	Pass	50.0	-8.9	Pass
21.20	14.7	14.0	14.7	14.0	-0.1	-0.1	-0.2	-20.0	60.0	-25.0	Pass	50.0	-15.0	Pass
22.40	18.5	18.5	18.5	18.5	-0.1	-0.1	-0.2	-20.0	60.0	-21.2	Pass	50.0	-11.2	Pass
24.00	14.5	16.4	14.5	16.4	-0.1	-0.1	-0.2	-20.0	60.0	-23.3	Pass	50.0	-13.3	Pass
27.16	23.7	24.0	23.7	24.0	-0.1	-0.1	-0.2	-20.0	60.0	-15.7	Pass	50.0	-5.7	Pass
Result: Pass					Worst Margin: -5.7 dB					Frequency: 27.160 MHz				
Measurement Device: LISN ASSET 1728(Line 1) LISN ASSET 1729(Line 2)					Cable: CEMI-13					Spectrum Analyzer: SA EMI Chamber (1327)				
Attenuator: 20dB ATTEN-03					Site: CEMI 1									
C-S CEMI Calculator Version 3.0.14 Adjusted Reading = Raw Reading + LISN Insertion Loss + Cable Loss + Attenuation Equipment Factor Sheet rev: 11/6/2016														

AC Conducted Emissions Data Table														
Date: 03-Dec-16 Engineer: Ahmed ahmed Temp: 21.8 °C Notes: Antenna replaced by 50ohm load.					Company: Mobile Aspects EUT Desc: RFID printer module Humidity: 35%					Work Order: Q3095 Pressure: 1001 mBar				
Frequency Range: 0.15-30MHz										EUT Input Voltage/Frequency: 5Vdc				
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC 15.207			FCC 15.207		
	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)			QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
13.56	22.2	22.7	22.2	22.2	-0.1	-0.1	-0.1	-20.0	60.0	-17.1	Pass	50.0	-7.1	Pass
Result: Pass					Worst Margin: -7.1 dB					Frequency: 13.560 MHz				
Measurement Device: LISN ASSET 1728(Line 1) LISN ASSET 1729(Line 2)					Cable: CEMI-13					Spectrum Analyzer: SA EMI Chamber (1327)				
Attenuator: 20dB ATTEN-03					Site: CEMI 1									
C-S CEMI Calculator Version 3.0.14 Adjusted Reading = Raw Reading + LISN Insertion Loss + Cable Loss + Attenuation Equipment Factor Sheet rev: 11/6/2016														

Rev. 11/27/2016									
Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
SA EMI Chamber (1327)		9kHz-13.2 GHz	E 4405B	Agilent	MY45103416	1327	I	8/4/2017	8/4/2016
LISNs/Measurement Probes		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
LISN Asset 1728		150kHz-30M Hz	LI-150A	Com-Power	201084	1728	I	4/20/2017	4/20/2016
LISN Asset 1729		150kHz-30M Hz	LI-150A	Com-Power	201085	1729	I	4/20/2017	4/20/2016
Conducted Test Sites (Mains / Telco)		FCC Code		VCCI Code			Cat	Calibration Due	Calibrated on
CEMI 1		719150		A-0015			III	NA	N/A
Meteorological Meters			MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)			BA928	gon Scient	C3166-1	831	I	4/28/2018	4/28/2016
TH A#2085			HTC-1	HDE		2085	II	4/5/2017	4/5/2016
Cables		Range		Mfr			Cat	Calibration Due	Calibrated on
CEMI-13		9kHz - 2GHz		C-S			II	10/2/2017	1/2/2016
Attenuators		Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
20dB Attenuator-03		9kHz-2GHz			N/A		II	10/2/2017	10/2/2016

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.



Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz)		
NIST	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucisp)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucisp)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "BUREAU VERITAS," "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS," "MTL," "ACTS," "MTL-ACTS" and "CURTIS-STRAUS" (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only where such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.



13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.

14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.

15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

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