

EMC TEST REPORT



NVLAP Lab Code 200033-0

Standard(s):

47 CFR FCC Part 15.225
FCC Parts 15.107 and 15.109
RSS 210, Issue 9, 2016
ICES 003, Issue 6, 2016

FCC ID: MES-PR01517
IC: 22832-PR01517

Product: Full Page Passport Reader
Models: PV60

Company Name:
Gemalto Canada

Address:
1545 Carling Ave., Suite 700
Ottawa, Ontario, Canada K1Z 8P9

Report Number: RE1607001-3
Report Issue Date: September 28, 2017

Report Prepared by:

Signature: 
Yuriy Litvinov
Lead EMC Engineer

Tested by:
3M EMC Laboratory
410 E. Fillmore Avenue, Building 76-01-1
St. Paul, Minnesota 55107-1000, USA

This report is the confidential property for the exclusive internal use of Gemalto Inc. and applies only to the specific item tested under the stated test conditions. This test report shall not be reproduced except in full, without written approval of the 3M EMC laboratory. Any changes impacting the attributes, functionality or operational characteristics documented in this report shall be communicated to the body responsible for approving (certifying) the subject equipment.

**TABLE OF CONTENTS**

Item		Description	Page
1.0		Test Summary	3
	1.1	Measurement Uncertainty	3
2.0		Equipment Description	4
	2.1	Equipment Under Test	4
3.0		EUT Configuration	5
	3.1	System Configuration	5
	3.2	Input/Output Ports of EUT	5
	3.3	Cables	5
	3.4	Measurement Arrangements of EUT	5
	3.5	Primary functions(s) of EUT	5
	3.6	Exercising of EUT and Interfaces	5
4.0		Test Conditions and Results	6
	4.1	Conducted Emissions	6
	4.2	Radiated Emissions outside of the specified band	7
	4.3	20dB Bandwidth	15
	4.4	Field Strength of Fundamental	16
		Frequency Stability	18
5.0		Test Equipment	21
6.0		Revision History	21
		Certificate of Conformity	22



1.0 Test Summary

Based on the results of our investigation, we have concluded the product tested **comply** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

	Standard	Requirement – Test	Result	Comments
4.1	15.107/15.207/ RSS-Gen	Conducted Emissions	pass	
4.2	15.225(d)/ RSS210 A2.6(d)	Radiated Emissions outside of the specified band	pass	
4.3	2.1049/RSS Gen	20dB Bandwidth	pass	
4.4	15.225(a)(b)(c)/ RSS210 A2.6	Field Strength of Fundamental	pass	
4.5	15.225(e)/RSS210	Frequency Stability	pass	
			N/A	
			N/A	
			N/A	
			N/A	

Note:

Non-channelized Equipment

1.1 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements. The measurement uncertainty figures were calculated and correspond to a coverage factor of k=2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Radiated emissions 30MHz to 1000MHz	4.9 dB
Radiated emissions 1GHz to 18GHz	4.6 dB
Conducted emissions 150KHz to 30MHz (AMN)	2.7 dB
Conducted emissions 150KHz to 30MHz (AAN)	1.92 dB

**2.0 Equipment Description**

2.1	Equipment Under Test		
Description:	The Gemalto Full page Passport Reader optically scans passports, ID cards and other travel documents. It also reads Contactless Integrated Circuit chips integrated into travel documents.		
Model(s):	PV60-02-00-00-03		
Serial number:	PV60-G-5422		
Client Contact:	Stephen Bernard		
Phone:	(613) 221-4988		
3M Division:	N/A		
Modifications and Special Measures:	N/A		
Frequency Range:	13.56MHz		
Channel No.:	1		
Modulation Type:	ASK		
Maximum Output Power:	N/A		
Antenna Type:	Internal PCB Loop Antenna		
EUT Highest Internal Frequency (F_x):	≤ 30MHz		
Test Deviations or Exclusions	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Rated Power:	Voltage:	<input checked="" type="checkbox"/> 120VAC	<input type="checkbox"/> 230VAC <input type="checkbox"/> VDC
	Phase:	<input checked="" type="checkbox"/> 1ph	<input type="checkbox"/> 3ph <input type="checkbox"/> Battery
	Frequency:	<input checked="" type="checkbox"/> 50Hz	<input checked="" type="checkbox"/> 60Hz
	Current:	0.4 Amps	
Test Dates:	06/02-06/28/2017		
Received Date:	04/01/2017		
Received Conditions:	<input type="checkbox"/> Poor		<input checked="" type="checkbox"/> Good
	<input checked="" type="checkbox"/> Prototype		<input type="checkbox"/> Production



3.0 EUT Configuration

3.1 System Configuration

No.	Product Type	Manufacturer	Model	Comments
1	AC/DC Power Supply	Sino-American	SA115K-05K	100-240VAC, 50-60Hz, 0.4A
2	Laptop Computer	HP	Elitebook 840	Support Equipment
3	Spectrum Analyzer	HP	8591A	Support Equipment

3.2 Input/Output Ports of EUT

No.	Description	Type	Comments
1	Data Port	USB	
2			

3.3 Cables

No.	Description	Type	Length	Shielding	Comments
1	Data Cable	USB	2m	Yes	with a molded ferrite on each end of the cable
2	Power supply to EUT	2 wire	2m	No	

3.4 Measurement Arrangements of EUT

	Intended Operational Arrangement(s)	Comments
<input checked="" type="checkbox"/>	Table-top only	
<input type="checkbox"/>	Floor-standing only	
<input type="checkbox"/>	Floor-standing or table-top	
<input type="checkbox"/>	Other	

3.5 Primary function(s) of EUT

No.	List of Essential Functions
1	Capture the image data
2	

3.6 Exercising of EUT and Interfaces

No.	Mode of Operation
1	Full Page Reader was connected to the PC over USB cable to read the plastic card image using AutoCal SW00355 software
2	Continues transmission of modulated signal at 13.56MHz



4.0 Test Conditions and Results

4.1	Conducted Emissions Data			
Method:	The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.			
	All power was connected to the system through Artificial Mains Network (AMN). All tested telecommunications lines were connected to an Asymmetric Artificial Network (AAN) and conducted voltage measurements on telecommunications lines were made at the output of the ISN. Where an AAN was not appropriate or available measurements were made using a Capacitive Voltage Probe.			
Test Verification: <input checked="" type="checkbox"/>	Laboratory Ambient Temperature:		21°C	
	Relative Humidity:		55%	
	Atmospheric Pressure:		836.8 mbars	
Reference Standard:	<input checked="" type="checkbox"/> RSS GEN/FCC 15.207 <input checked="" type="checkbox"/> ANSI C63.4:2014 <input checked="" type="checkbox"/> ANSI C63.10:2013		Measurement Point <input checked="" type="checkbox"/> Mains <input type="checkbox"/> Telecommunication ports <input type="checkbox"/> 	
	Nominal Voltage: <input checked="" type="checkbox"/> 120VAC <input checked="" type="checkbox"/> 230VAC <input type="checkbox"/> 			
Test Personnel:	Clay Huff C. H		Date: 06/20//2017	
Limits - Class A – AC Mains				
Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Average	Result	Comments
0.15 to 0.50	79	66	N/A	AMN
0.50 to 30	73	60	N/A	AMN
Limits - Class B – AC Mains				
0.15 to 0.50	66 to 56	56 to 46	pass	AMN
0.50 to 5	56	46	pass	AMN
5 to 30	60	50	pass	AMN

Modifications:	
Note:	Devices has a permanent attached antenna operating at 13.56 MHz The measurements was performed with a suitable dummy load to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band and with the antenna connected to determine compliance with Section 15.207 limits outside the transmitter's fundamental emission band.

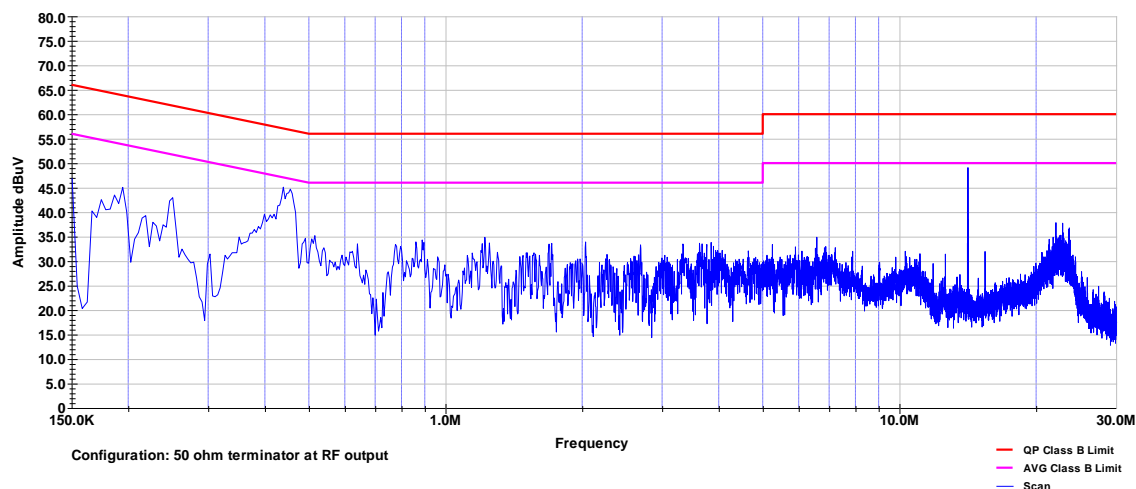


Frequency (MHz)	QP Line 1 dB μ V	AVG Line 1 dB μ V	QP Limit dB μ V	AVG Limit dB μ V	QP Margin dB	AVG Margin dB
0.176	45.82	31.18	64.65	54.65	-18.83	-23.47
0.216	42.37	33.27	62.99	52.99	-20.62	-19.71
0.442	44.73	39.41	57.03	47.03	-12.3	-7.62
1.308	30.93	23.43	56	46	-25.07	-22.57
13.426	35.39	16.87	60	50	-24.61	-33.13
22.559	31.89	25.47	60	50	-28.11	-24.53
22.563	31.76	25.54	60	50	-28.24	-24.46
22.898	30.84	24.7	60	50	-29.16	-25.3
Frequency (MHz)	QP Line 2 dB μ V	AVG Line 2 dB μ V	QP Limit dB μ V	AVG Limit dB μ V	QP Margin dB	AVG Margin dB
0.15	48.92	33.15	66	56	-17.08	-22.85
0.183	44.7	30.44	64.35	54.35	-19.65	-23.91
0.265	36.23	26.59	61.28	51.28	-25.05	-24.69
0.446	44.72	39.6	56.95	46.95	-12.22	-7.35
14.552	21.86	14.86	60	50	-38.14	-35.14
22.931	31.43	25.11	60	50	-28.57	-24.89
22.944	31.21	25.01	60	50	-28.79	-24.99
22.963	31.34	25.07	60	50	-28.66	-24.93
Voltage		<input checked="" type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/>				
Notes		Net Reading (dB μ V) = Reading (dB μ V)+AMN CF(dB)+Cable CF(dB) RBW 9KHz				



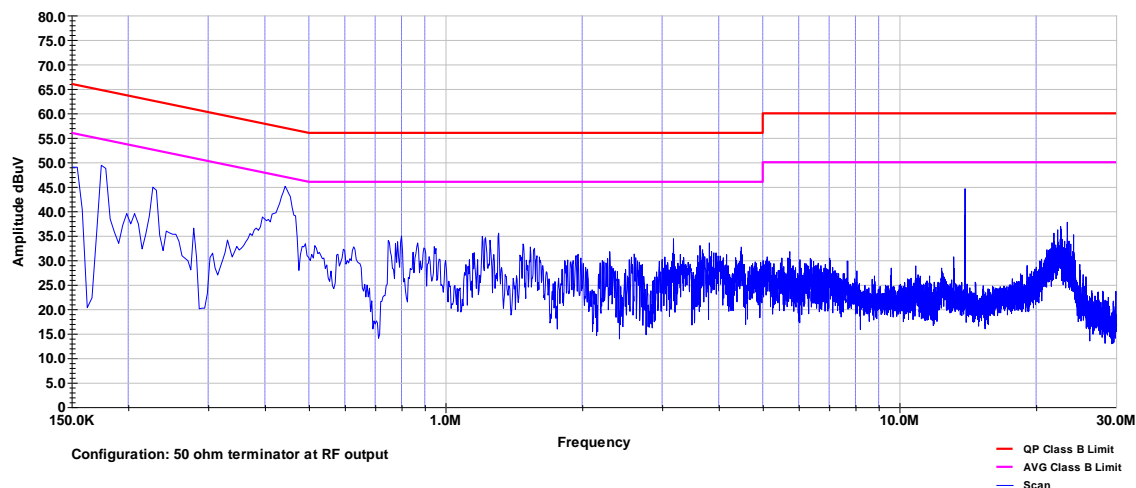
3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 2

RE Project # - RE1607001
Model # - PV60
Serial # - N/A
EUT Power - 120VAC/60Hz



3M Company
Conducted Emissions
CISPR 32_FCC Part 15, Class B, Line 1

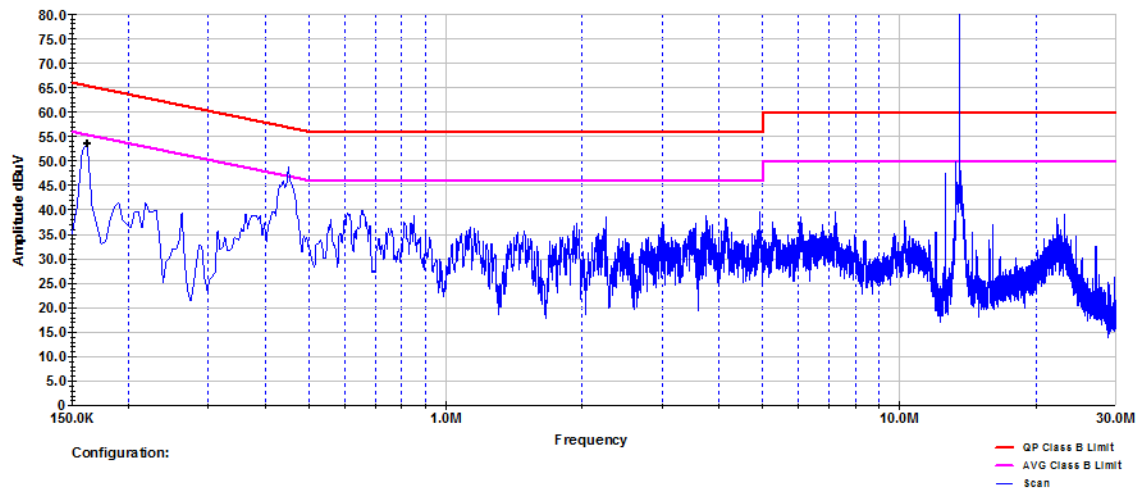
RE Project # - RE1607001
Model # - PV60
Serial # - N/A
EUT Power - 120VAC/60Hz





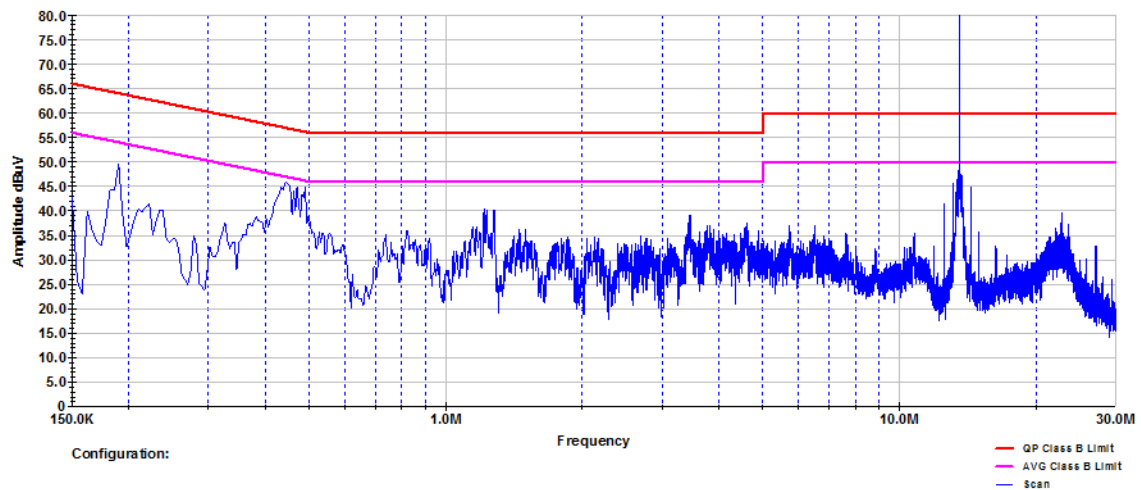
3M Company
Conducted Emissions
 CISPR 32_FCC Part 15, Class B, Line 2

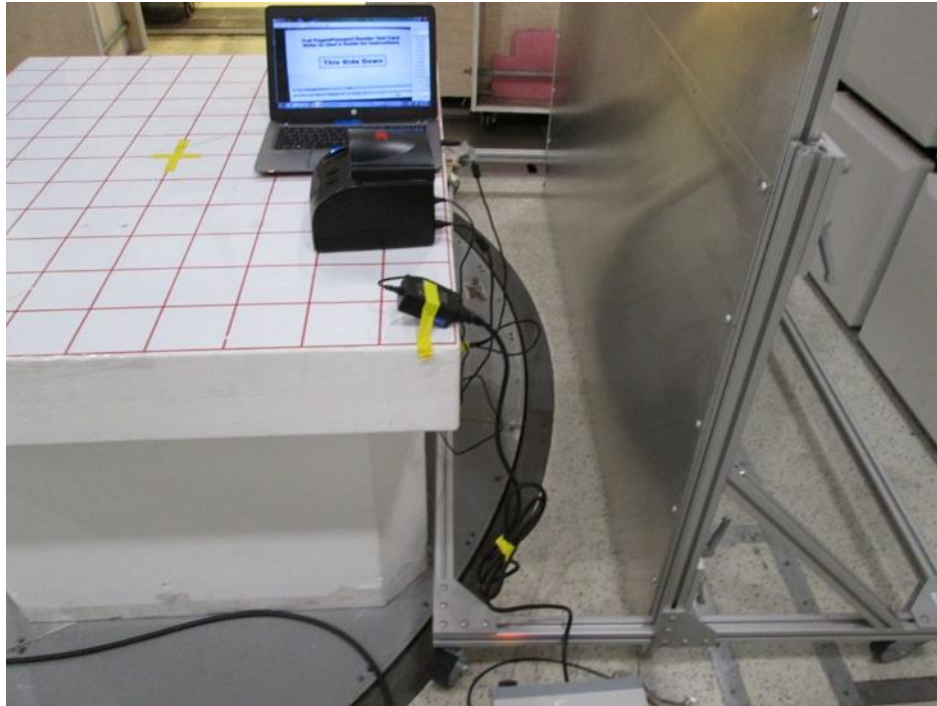
RE Project# - RE1607001
 Model # - PV60
 Serial # - PV60-G-5422
 EUT Power - 120VAC/60Hz



3M Company
Conducted Emissions
 CISPR 32_FCC Part 15, Class B, Line 1

RE Project# - RE1607001
 Model # - PV60
 Serial # - PV60-G-5422
 EUT Power - 120VAC/60Hz



**Test Set Up Photo**

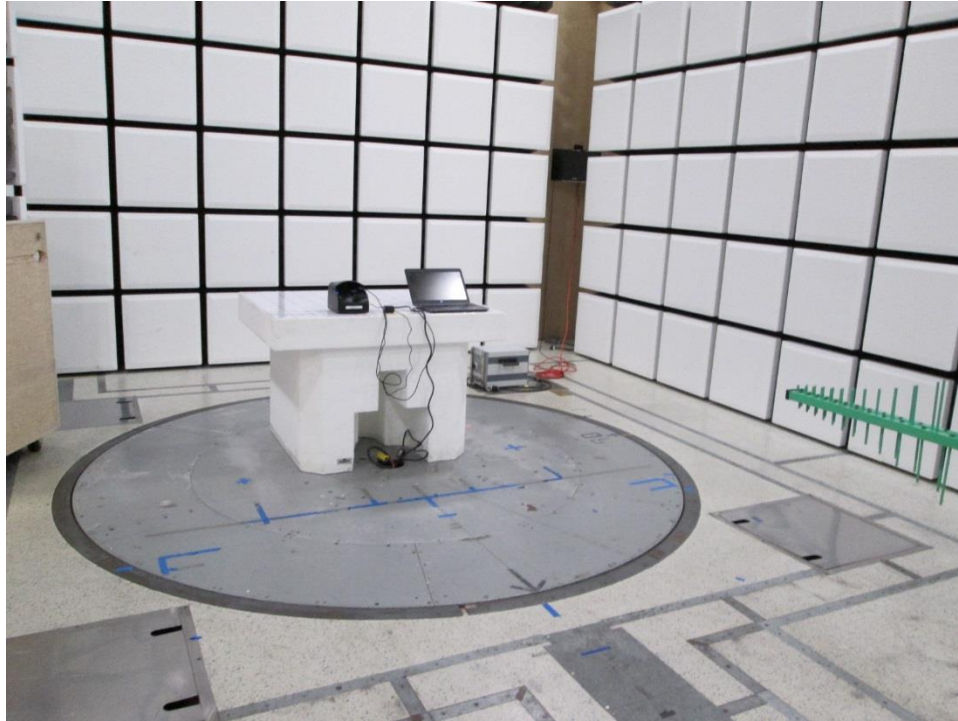
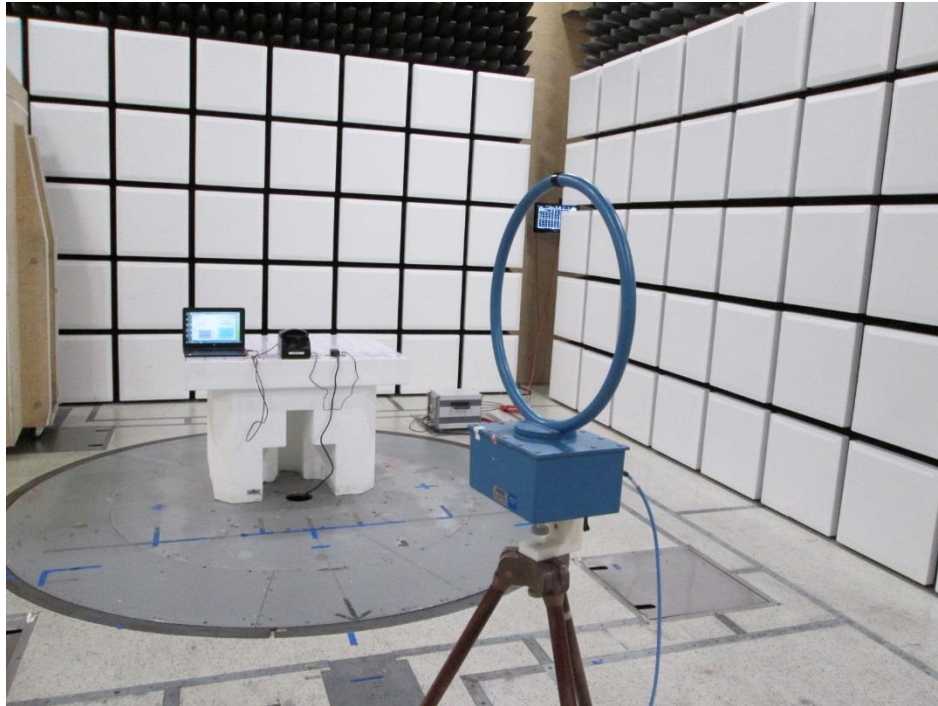


4.2	Radiated Emissions Data				
Method:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.				
Test Verification: <input checked="" type="checkbox"/>	Laboratory Ambient Temperature		23°C		
	Relative Humidity		35%		
Reference Standard:	<input type="checkbox"/> ANSI C63.4:2014 <input checked="" type="checkbox"/> ANSI C63.10:2013 <input checked="" type="checkbox"/> FCC Part 15.225(d) <input checked="" type="checkbox"/> FCC Part 15.247/RSS 210		Measurement Distance		
			<input checked="" type="checkbox"/> 3 Meters <input type="checkbox"/>		
Frequency Range:	<input checked="" type="checkbox"/> 30 MHz to 1Ghz <input checked="" type="checkbox"/> 30 MHz to 1Ghz				
Nominal Voltage:	<input checked="" type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/>				
Tested By:	Clay Huff <i>C. H</i>		Date: 06/20//2017		
Limits – 15.109, Class A					
Frequency (MHz)	Limit dB (µV/m)				
	Quasi-Peak	Average	Peak	Distance	Results
30 to 88	39			10	pass
88 to 216	43.5			10	pass
216 to 960	46.4			10	pass
Above 960	49.5			10	N/A
Limits – 15.109, Class B and 15.209					
0.009-0.490		2400/F(KHz)	300	300	pass
0.490-1.705	24000/F(KHz)		30	30	pass
1.705-30	30		30	30	pass
30 to 88	40			3	N/A
88 to 216	43.5			3	N/A
216 to 960	46			3	N/A
Above 960		54		3	N/A

Modifications:	
Note:	<p>For emission in the restricted bands, the limit of 15.209 was used.</p> <p>The level of unwanted emissions from an intentional radiator above 30MHz has not exceed 15.209 limit. All radiated emissions above 30MHz listed in the table is associated with unintentional radiation form the device.</p> <p>The lower limit applies at the transition frequency. An inverse proportionality factor of 20 dB per decade has been used to normalize the measured data to the specified distance for determining compliance.</p>



Frequency (MHz)	Pol.	QP Reading dB μ V/m	Total CF dB	Net at 3 m dB μ V/m	Limit (dB μ V/m)	Margin dB
5.86*		-0.2	40.2	40	70	-30
27.12*		-5.1	32.4	27.3	70	-42.7
41.11	V	8.2	17	25.3	49.5	-24.2
94.91	V	36	14.8	50.8	54	-3.2
120.9	V	14.4	17	31.4	54	-22.6
228.54	V	24	15.2	39.1	57	-17.9
240	V	38.2	16.4	54.7	57	-2.3
479.98	H	30.4	23.2	53.6	57	-3.4
Notes:	Net Reading (dBμV) = Reading (dBμV)+Antenna CF(dB)+Cable CF(dB) – Amp Gain(dB) Measurements <30MHz includes Loop Antenna correction factor *Field strength of emissions measurements outside 13.110-14.010MHz band of operation. It is found to be attenuated below Part 15.209 limits (70dB μ V/m at 3meters). *The level of unwanted emissions from an intentional radiator above 30MHz has not exceed 15.209 limit. All radiated emissions above 30MHz listed in the table is associated with unintentional radiation from the device.					

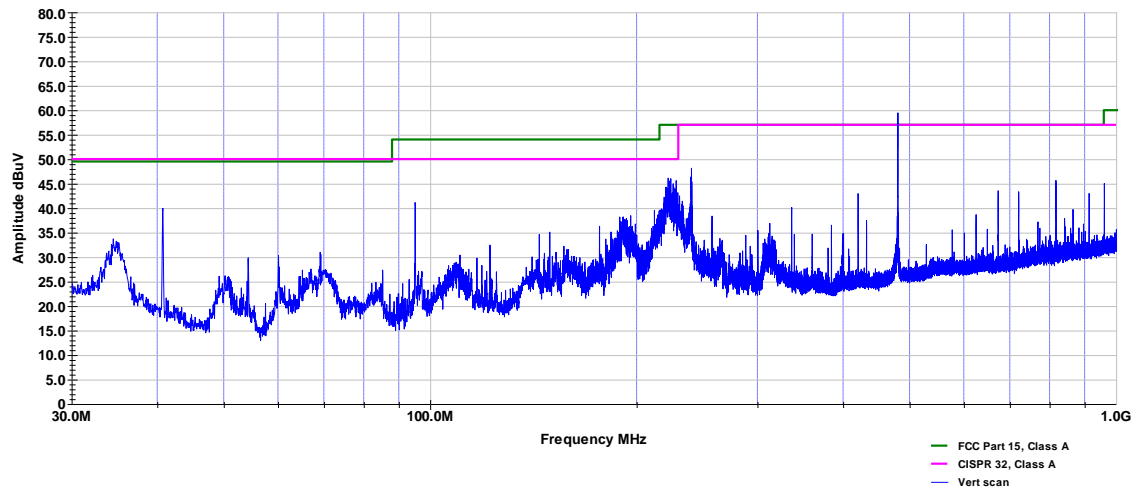


Test Set Up Photo



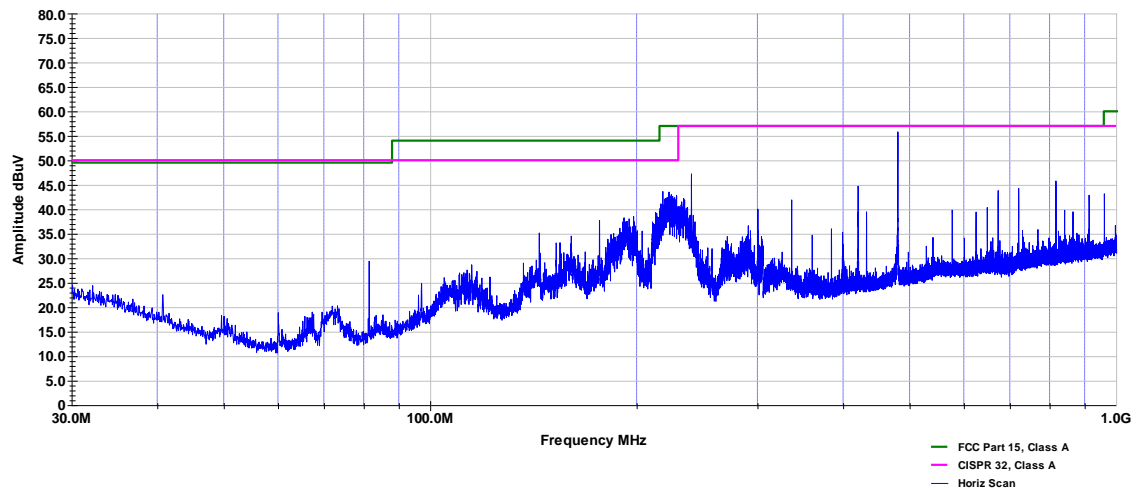
3M Company
Radiated Emissions Prescan
 CISPR 32_FCC Part 15, Class A, Vertical

RE Project # - RE1607001
 Model # - PV60
 Serial # -
 EUT Power - 230VAC/50Hz



3M Company
Radiated Emissions Prescan
 CISPR 32_FCC Part 15, Class A, Horizontal

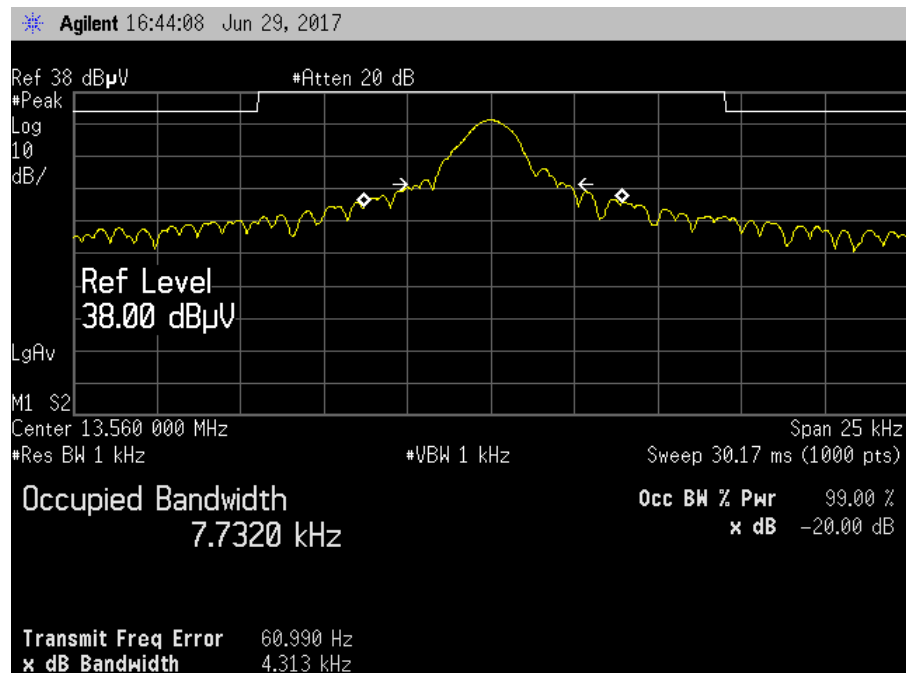
RE Project # - RE1607001
 Model # - PV60
 Serial # -
 EUT Power - 230VAC/50Hz





4.3	20dB Bandwidth		
Method:		The 20dB bandwidth was measured with a spectrum analyzer connected via Loop antenna placed near the EUT while the EUT is operating in transmissions mode	
	Laboratory Ambient Temperature	23°C	
	Relative Humidity	35%	
Reference Standard:	<input checked="" type="checkbox"/> ANSI C63.10:2013 <input type="checkbox"/> FCC Part 15.109/ICES 003 <input type="checkbox"/> FCC Part 15.247/RSS 210	Measurement Point <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> Radiated	
Frequency Range:	<input checked="" type="checkbox"/> 13.553 MHz -13.567 MHz	RBW ≥ 1% of the 20 dB bandwidth VBW ≥ RBW	
Nominal Voltage:	<input checked="" type="checkbox"/> 120VAC <input type="checkbox"/> VDC		
Tested By:	Clay Huff <div>C. H</div>	Date: 06/30/2017	

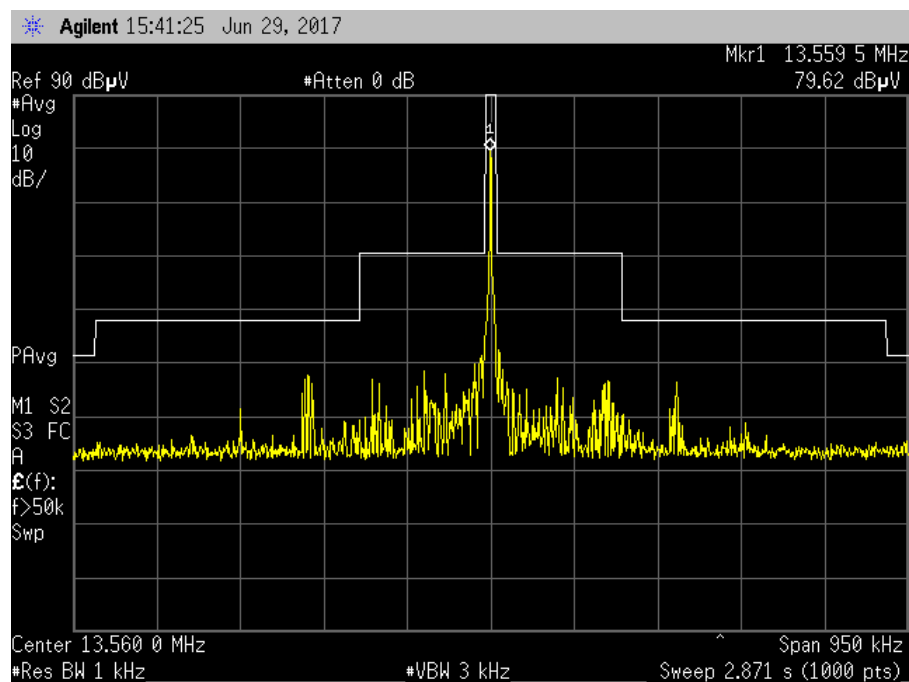
Frequency (MHz) (PR-ASK)	20 dB Bandwidth (KHz)	99% Bandwidth (KHz)	Results
13.553 -13.567	4.313	7.732	pass





4.4	Field Strength of Fundamental		
Method:	Measurements was performed with modulated carrier at the highest power level at which the transmitter is intended to operate. The analyzer offset was adjusted to compensate for the attenuator and other losses.		
	Laboratory Ambient Temperature		21°C
	Relative Humidity		45%
Reference Standard:	<input checked="" type="checkbox"/> ANSI C63.10:2013 <input checked="" type="checkbox"/> FCC Part 15.255/RSS210 <input type="checkbox"/> FCC Part 15.109/ICES 003 <input type="checkbox"/> FCC Part 15.209		Measurement Point <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> Radiated at 3 meters
Frequency Range:	<input checked="" type="checkbox"/> 13.553 MHz -13.567 MHz		
	Frequency (MHz)	Field Strength uV/m at 30m	Field Strength dBuV/m at 3m
Limit	1.705-13.110	30	69.5
	13.110-13.410	106	80.5
	13.410-13.553	334	90.5
	13.553-13.567	15848	124.0
	13.567-13.710	334	90.5
	13.710-14.010	106	80.5
	14.010-30.0	30	69.5
Nominal Voltage:	<input type="checkbox"/> 230VAC <input checked="" type="checkbox"/> 120VAC		
Tested By:	Clay Huff <i>C. H</i>		Date: 06/26/2017

Frequency (MHz)	Pol (XYZ)	QP Reading dBµV/m	Limit (3m) (dBµV/m)	Margin dB	Antenna Height (m)
13.56	Y	79.6	124	-44.4	1.0
13.61	Y	55.5	90.5	-35.0	1.0
13.72	Y	45.8	80.5	-34.7	1.0
13.82	Y	42.3	80.5	-38.2	1.0
14.0145	Y	36.2	69.5	-33.3	1.0
13.404	Y	41.31	90.5	-49.2	1.0
13.29	Y	34.45	80.5	-46.1	1.0
13.19	Y	33.31	80.5	-47.2	1.0
13.08	Y	31.5	69.5	-38.0	1.0





4.5	Frequency Stability		
Method:	Measurements was performed with modulated carrier at the highest power level at which the transmitter is intended to operate. The frequency was measured under normal and extreme test conditions test conditions. The analyzer offset was adjusted to compensate for the attenuator and other losses. During extreme test conditions, both extreme temperature and voltage apply simultaneously.		
	Laboratory Ambient Temperature	21°C	
	Relative Humidity	35%	
Reference Standard:	<input checked="" type="checkbox"/> Part 15.225 <input checked="" type="checkbox"/> ANSI C63.10:2013	Measurement Point <input type="checkbox"/> Conducted <input checked="" type="checkbox"/> Radiated	
Frequency Range:	<input checked="" type="checkbox"/> 13.553 MHz -13.567MHz	Maximum Deviation	
Limit:	<input checked="" type="checkbox"/> ± 100 ppm	7.5 ppm	
Nominal Voltage:	<input type="checkbox"/> 230VAC <input checked="" type="checkbox"/> 120VAC		
Extreme Temperature Ranges (C°)	<input checked="" type="checkbox"/> General	<input checked="" type="checkbox"/> - 20.0 to +50.0	
	<input type="checkbox"/> Portable	<input type="checkbox"/>	
	<input type="checkbox"/> Indoor Use	<input type="checkbox"/>	
Extreme Test Voltages:	<input checked="" type="checkbox"/> Mains Voltage	<input checked="" type="checkbox"/> $\pm 15\%$	
	<input type="checkbox"/> Battery	<input type="checkbox"/> 0.85 <input type="checkbox"/> 1.15	
Tested By:	Clay Huff <i>C. H</i>		Date: 06/27/2017



Channel Frequency (MHz)	Temperature C°	Voltage (VAC/60Hz)	Measured Frequency (MHz)	Frequency Deviation (MHz)	Result
13.56MHz	50	102	13.5599	0.0001	pass
		120	13.5599	0.0001	pass
		138	13.5599	0.0001	pass
	40	102	13.5599	0.0001	pass
		20	13.5599	0.0001	pass
		138	13.5599	0.0001	pass
	30	102	13.5599	0.0001	pass
		120	13.5599	0.0001	pass
		138	13.5599	0.0001	pass
	20	102	13.5599	0.0001	pass
		120	13.5599	0.0001	pass
		138	13.5599	0.0001	pass
	10	102	13.5599	0.0001	pass
		120	13.5599	0.0001	pass
		138	13.5599	0.0001	pass
	0	102	13.56	0	pass
		120	13.56	0	pass
		138	13.56	0	pass
	-10	102	13.56	0	pass
		120	13.56	0	pass
		138	13.56	0	pass
	-20	102	13.5599	0.0001	pass
		120	13.5599	0.0001	pass
		138	13.5599	0.0001	pass

**Test Set Up Photo**

5.0	Test Equipment				
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Last Cal. Date	Check
Biconilog Antenna	Schaffner	CBL6112B	27491	10/212017	<input checked="" type="checkbox"/>
Horn Antenna	AH Systems	SAS 571	1010	10/212017	<input type="checkbox"/>
Loop Antenna	EMCO	ALR25M	1011	10/212017	<input checked="" type="checkbox"/>
EMI Receiver	Rohde & Schwarz	ESIB 40	100235	10/212017	<input checked="" type="checkbox"/>
EMI Receiver	Agilent	E4448A	1530975	10/212017	<input checked="" type="checkbox"/>
LISN	TESEQ	NNB51	1130	10/212017	<input type="checkbox"/>
Harmonic/Flicker Source	Cal. Instruments	C4-5001iX	57162	10/212017	<input type="checkbox"/>
Amplifier	AR	250W1000AM	14354	10/212017	<input type="checkbox"/>
Amplifier	AR	25S1G4A	4003	10/212017	<input type="checkbox"/>
Signal Generator	HP	8656A	2326A05125	10/212017	<input type="checkbox"/>
Signal Generator	Agilent	E8257D	MY45140566	10/212017	<input type="checkbox"/>
Field Probe	AR	FL7006	25019	10/212017	<input type="checkbox"/>
Field Monitor	AR	FM2000	14292	10/212017	<input type="checkbox"/>
AC CDN	Schaffner	M316,	21937	10/212017	<input type="checkbox"/>
AC CDN	TESEQ	M016,	26131	10/212017	<input type="checkbox"/>
Current Injection Coil	A.H. Systems	ICP-200/521	149	10/212017	<input type="checkbox"/>
RF Conducted System	TESEQ	NSG 4070-75	1141	10/212017	<input type="checkbox"/>
ESD Generator	TESEQ	NSG 438	1355	10/212017	<input type="checkbox"/>
EFT/Surge Generator	TESEQ	NSG 3060		10/212017	<input type="checkbox"/>
EMF Meter	NARDA	ELT400	1139	10/212017	<input type="checkbox"/>
EMF E-field Antenna	NARDA	Type 33.0 300M-50G	K-0014	10/212017	<input type="checkbox"/>
EMF H-field Antenna	NARDA	Type 10.2 27M-1G	AP-0004	10/212017	<input type="checkbox"/>
EMC Software	ETS-Lindgren	TILE 7		10/212017	<input checked="" type="checkbox"/>
Equipment Calibration Interval		<input checked="" type="checkbox"/> 12 months <input type="checkbox"/> 24 months			

6.0	Report revision history		
Revision Level	Date	Report Number	Notes
0	07/20/2017	RE1607001-3	Original Issue



Certificate of Conformity

3M EMC Laboratory

Hardgoods Regulatory Engineering

Building 76-01-01

St. Paul, MN 55144-1000, USA

MANUFACTURER'S NAME:	Gemalto Canada
NAME OF EQUIPMENT:	Full Page Passport Reader
MODEL NUMBER(S):	PV60
TEST REPORT NUMBER:	RE 1607001-3
DATE OF ISSUE:	September 28, 2017

Referring to the performance criteria and operating mode during the tests specified in this report the equipment complies with the essential requirements herein specified:

47 CFR Part 15 – Subpart C – Intentional Radiator

FCC Part 15.225

License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

RSS 210, issue 9, 2016

FCC Parts 15.107 and 15.109, Class A
ICES-003, Issue 6, 2016, Class A

Comments:

Yuriy Litvinov
Lead EMC Engineer



NVLAP Lab Code 200033-0