



**EN 301 489-17 v3.1.1**

**TEST REPORT**

**FOR**

**Bluetooth Serial Port Module**

**MODEL NUMBER: LMX9838**

**REPORT NUMBER: 14U17620-E1V3**

**ISSUE DATE: AUGUST 31, 2017**

*Prepared for*  
**Texas Instrument**  
**2900 Semiconductor Drive**  
**Santa Clara**  
**CA, 95051 USA**

*Prepared by*  
**UL VERIFICATION SERVICES INC.**  
**47173 BENICIA STREET**  
**FREMONT, CA 94538, U.S.A.**  
**TEL: (510) 771-1000**  
**FAX: (510) 661-0888**



**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	5/28/14	Initial Issue	F. de Anda
V2	8/29/2017	Updated report reference from v2.2.1 to v3.1.1 and updated section 7.3	Edgard Rincand
V3	8/31/2017	Updated section 2	Edgard Rincand

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Texas Instrument  
2900 Semiconductor Drive  
Santa Clara, CA, 95051, US

**EUT DESCRIPTION:** Bluetooth Serial Port Module

**MODEL:** LMX9838

**SERIAL NUMBER:** 014-36  
3593900012 (Tested on 8/25/2017)

**DATE TESTED:** May 23 to 27, 2014  
August 25, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
*EN 301 489-17 v3.1.1	Pass

\*This report contains data that are not covered by the NVLAP accreditation

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.

Approved & Released For  
UL Verification Services Inc. By:

Tested By:



Francisco De Anda  
PROJECT LEAD  
UL Verification Services Inc.

Nancy B. Garcia  
EMC ENGINEER  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

All tests were performed in accordance with the procedures documented in EN 301 489-1 v2.1.1 as referenced by EN 301 489-17 v3.1.1. Basic standards referenced by EN 301 489-1 include the following:

BASIC STANDARD	VERSION	SUBJECT	APPLICABLE IN THIS REPORT (Yes/No)
EN 55022 Amendment 1	2006 2007	Emissions	No
EN 61000-3-2 Amendment 1 Amendment 2	2006 2009 2009	Harmonic Current	No
EN 61000-3-3	2008	Flicker	No
EN 61000-4-2	2009	ESD	Yes
EN 61000-4-3 Amendment 1 Amendment 2	2006 2008 2010	Radiated Immunity	Yes
EN 61000-4-4 Amendment 1	2004 2010	EFT	No
EN 61000-4-5	2006	Surge	No
EN 61000-4-6	2009	Conducted Immunity	No
EN 61000-4-11	2004	Voltage Dips and Interrupts	No

## 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.

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:

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

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is a Bluetooth serial port module.

The radio module is manufactured by National Semiconductor.

### **5.2. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an integral antenna with a maximum gain of -1.48 dBi.

### **5.3. SOFTWARE AND FIRMWARE**

The EUT driver software installed in the host support equipment during testing was Simply Blue commander version 1.6.0.1.

### **5.4. WORST-CASE MODE FOR IMMUNITY TESTS**

For radiated immunity tests requiring a wireless link, tests are performed at one channel and mode in the 2.4 GHz band.

The worst-case data rate for this channel is assumed to be the maximum data rate, since it will have the highest probability of intercept by an RF interference signal.

## 6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number
Horn antenna	EMCO	3115	9001-3245
Horn antenna	ETS	3115	6739
Bluetooth tester	Rhode and Scharz	CBT	10-300282760
Laptop	DELL	D620	00045-668-830-779
USB to serial cable Adapter	Gigaware	3312	2603487
9 pin f to f adaptor	I dot connect	3589	833250003589
AC/DC adapter #1	SMP technology, Inc	SBU205	0702-0000684
AC/DC adapter #2	Dell	LA65NS0-00	CN0DF263-71615-6AC-38D4

Tested on August 2017

SUPPORT EQUIPMENT & PERIPHERALS LIST			
Description	Manufacturer	Model	Serial Number
Horn Antenna	EMCO	3115	9001-3245
Horn Antenna	ATM	PNR250-441 EM	Q208604-02
Wide Band Radio Communication Tester	Rhode&Schwarz	CMW500	1201-0002K50
Laptop	Dell	Latitude D820	C01087
AC Adapter# 2	Dell	LA65NS0-00	CNODF263
AC Adapter # 1	CUI	EMSA05200	N/A

**I/O CABLES**

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2 prong	UN-shielded	1	None
2	DC	1	Barrel	UN-shielded	2	None
3	DC	1	Barrel	UN-shielded	0.8	None
4	AC	1	3 prong	UN-shielded	2	None
5	Serial	1	DB9	Shielded	2	None
6	RF	1	SMA	Coax	0.6	None
7	RF	1	SMA	Coax	7.5	None
8	RF	1	SMA	Coax	1.25	None

Tested on August 2017

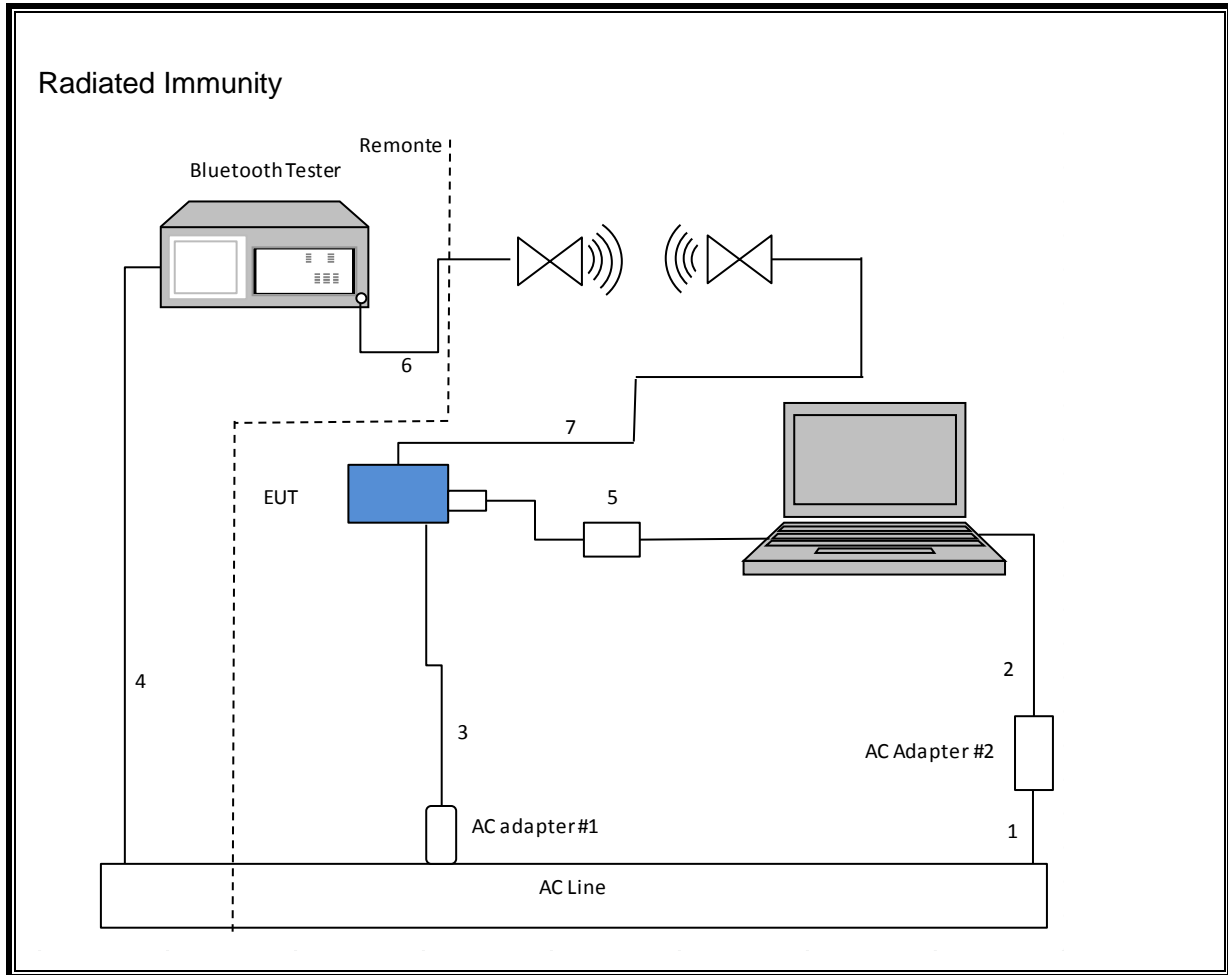
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length m	Remarks
1	AC	1	3 Prong	Unshielded	1.2	None
2	DC	1	Barrel	Unshielded	1.8	None
3	DC	1	Barrel	Unshielded	1	None
4	AC	1	3 Prong	Unshielded	1.8	None
5	Serial	1	DB9	Shielded	2	None
6	RF	1	SMA	Coax	0.6	None
7	RF	1	SMA	Coax	1	None
8	RF	1	SMA	Coax	1	None

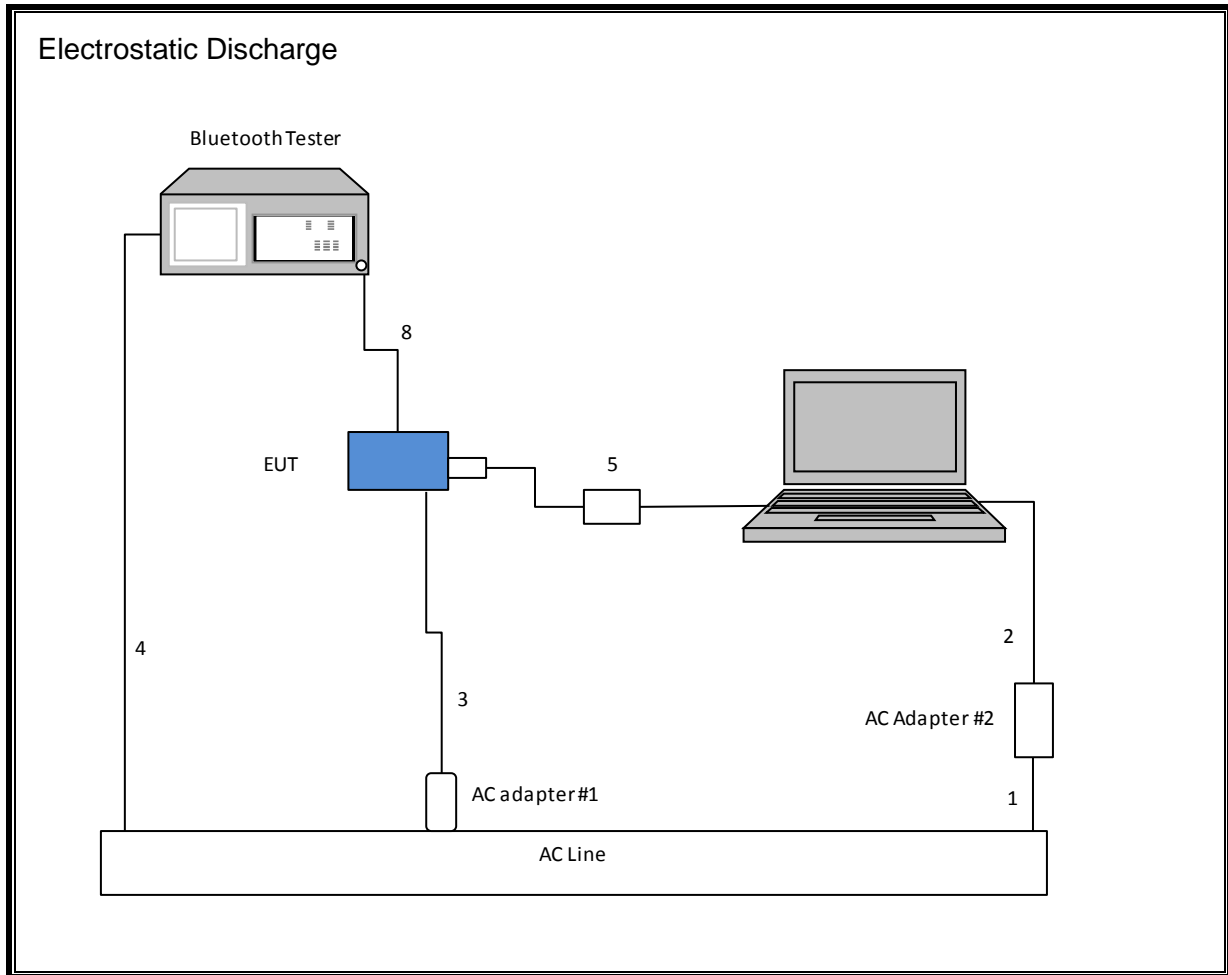
**TEST SETUP**

The EUT was connected to a host laptop computer via a USB to Serial cable adapter and to a Bluetooth tester. Bluetooth tester exercised the radio card. Traffic is sent forward across RF link, acknowledgements are sent back, and the performance of the link is monitored.



**SETUP DIAGRAM**





## 7. IMMUNITY LIMITS AND RESULTS

### 7.1. IMMUNITY PERFORMANCE CRITERIA

<b>CRITERION A</b>	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below performance level specified by the manufacture when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacture, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
<b>CRITERION B</b>	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed after the application of the phenomena below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. However, no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer then either of these may be derived from the product description and documentation and what the user may reasonably expect from the product when used as intended.
<b>CRITERION C</b>	Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls by the user in accordance with the manufacture's instruction. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

## 7.2. ELECTROSTATIC DISCHARGE

### TEST LEVEL

EN 301 489-1 Clause 9.3.2

Contact Discharge: +/- 2 kV to +/- 4 kV

### TEST PROCEDURE

EN 61000-4-2

### PERFORMANCE CRITERIA

EN 301 489-1 Clause 6.2

Performance criteria for transient phenomena applied to transmitters and receivers

### TEST AND MEASUREMENT EQUIPMENT

Test Equipment List				
Description	Manufacturer	Model	Serial Number	Calibration Due
<input checked="" type="checkbox"/> ESD Simulator	Schaffner	NSG 435	CCS-0226	11/08/2014
<input checked="" type="checkbox"/> Static Charge Monitor	Wescorp	W210A	CCS 01658	C.N.R.

### ENVIRONMENTAL CONDITIONS

Parameter	Value	Limits
Temperature	22°C	15 °C to 35 °C
Humidity	32 %	30 % to 60 %
Pressure	1014 mbar	860 mbar to 1060 mbar

### TEST INFORMATION

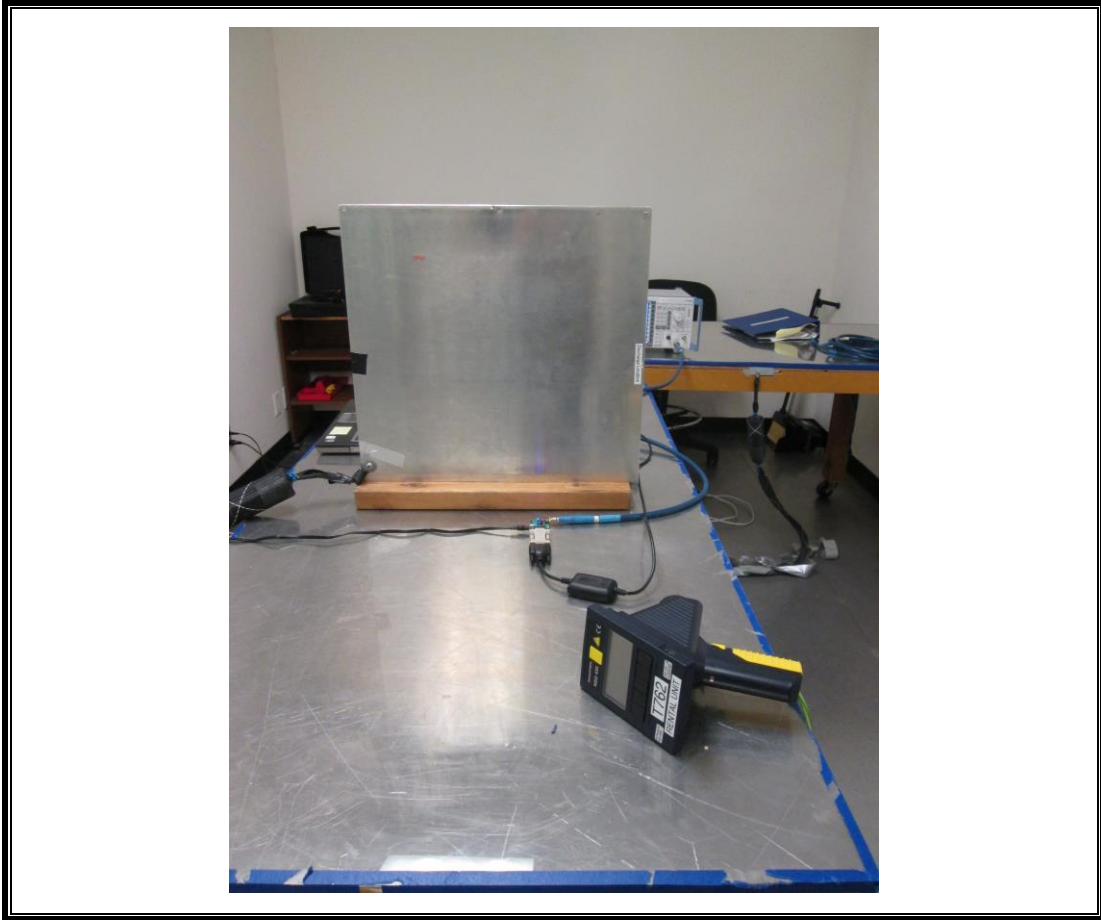
**Date:** 5/27/2014

**Project No:** 14U17620

**Tester:** Nancy Garcia

**EUT Mode of Operation:** The EUT was connected to a host laptop computer via a USB to Serial cable adapter and to a Bluetooth tester. Bluetooth tester exercised the radio card. Traffic is sent forward across RF link, acknowledgements are sent back, and the performance of the link is monitored.

**PHOTOGRAPH OF HCP AND VCP FOR INDIRECT CONTACT DISCHARGE TESTS**



**RESULTS**

Indirect Contact Discharge To Horizontal Coupling Plane				
Side of EUT	Test Levels		Results	
	± 2 kV	± 4 kV	Pass	Fail
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Indirect Contact Discharge To Vertical Coupling Plane				
Side of EUT	Test Levels		Results	
	± 2 kV	± 4 kV	Pass	Fail
Front	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Back	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Left	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Right	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Required Passing Criterion:**

A

B

C

**Actual Performance:**

A

B

C

**Notes:** No anomalies observed. The EUT functioned as expected according to manufacturer's instructions.

### 7.3. RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY

#### TEST LEVEL

EN 301 489-1 Clause 9.2.2

3 V/m with 1000 Hz Sinusoidal AM at 80 % depth  
80 to 6000 MHz in 1 % increments

#### TEST PROCEDURE

EN 301 489-1 Clause 9.2.2

EN 61000-4-3

#### PERFORMANCE CRITERIA

EN 301 489-1 Clause 6.2  
Performance criteria for continuous phenomena applied to transmitters and receivers

#### TEST AND MEASUREMENT EQUIPMENT

Test Equipment List				
Description	Manufacturer	Model	Serial Number	Calibration Due
<input checked="" type="checkbox"/> Signal Generator	Agilent	N5183A	MY50140493	4/29/15
<input checked="" type="checkbox"/> RF Amplifier	Amplifier Research	150W1000M2	303370	C.N.R.
<input checked="" type="checkbox"/> RF Amplifier	Amplifier Research	30S1G3	303877	C.N.R.
<input checked="" type="checkbox"/> Directional Coupler	Werlatone	C6021	8576	C.N.R.
<input checked="" type="checkbox"/> Directional Coupler	Amplifier Research	DC7144A	305089	C.N.R.
<input checked="" type="checkbox"/> Power Meter	Agilent	N1914A	MY50000606	5/28/2014
<input checked="" type="checkbox"/> E-Series Power Sensor 9 kHg~18 GHz	Agilent / HP	E9304A	MY51160016	5/28/2014
<input checked="" type="checkbox"/> E-Series Power Sensor 9 kHg~18 GHz	Agilent / HP	E9304A	MY51160017	5/28/2014
<input checked="" type="checkbox"/> Log Periodic Antenna	Rohde & Schwarz	HL 046	358714/003	C.N.R.
<input checked="" type="checkbox"/> Horn Antenna	EMCO	3115	9702-5118	C.N.R.
<input checked="" type="checkbox"/> Field Probe	Holaday	HI 6122	00126142	4/20/2015

**ENVIRONMENTAL CONDITIONS**

Parameter	Value	Limits
Humidity	32 %	< 95 %

**Date:** 5/27/2014

**Project No:** 14U17620

**Tester:** Nancy Garcia

**EUT Mode of Operation:** The EUT was connected to a host laptop computer via a USB to Serial cable adapter and to a Bluetooth tester. Bluetooth tester exercised the radio card. Traffic is sent forward across RF link, acknowledgements are sent back, and the performance of the link is monitored.

Tested on August 2017

Test Equipment List					
Description	Manufacturer	Model	Local ID (T No.)	Cal Date	Cal Due
<input checked="" type="checkbox"/> Signal Generator	Agilent	MXG, N5183A	454	5/15/2017	5/15/2018
<input checked="" type="checkbox"/> RF Amplifier	Amplifier Research	150W1000M2	N/A	C.N.R	C.N.R
<input type="checkbox"/> RF Amplifier	Amplifier Research	30S1G3	519	C.N.R	C.N.R
<input checked="" type="checkbox"/> Directional Coupler	Werlatone	C6021	67	C.N.R	C.N.R
<input type="checkbox"/> Directional Coupler	Amplifier Research	DC7144A	524	C.N.R	C.N.R
<input checked="" type="checkbox"/> Power Meter	HP/Agilent	N1914A	254	7/12/2017	7/12/2018
<input checked="" type="checkbox"/> Power Sensor	HP/Agilent	E9304A	255	7/12/2017	7/12/2018
<input checked="" type="checkbox"/> Power Sensor	HP/Agilent	E9304A	256	7/12/2017	7/12/2018
<input checked="" type="checkbox"/> Log Periodic Antenna	Rohde & Schwarz	HL 046	620	C.N.R	C.N.R
<input type="checkbox"/> Horn Antenna	EMCO	3115	59	C.N.R	C.N.R
Radiated immunity s/w	UL	UL EMS	ver. 9.5, dated April 1, 2014		



Tested on August 2017

Parameter	Value	Limits
Humidity	40%	< 95 %

**Date:** 8/25/2017

**Project No:** 11910253

**Tester:** 29427 TN

**EUT Mode of Operation:** The EUT was connected to a host laptop computer via a USB to Serial cable adapter and to a CMW 500 Wideband Radio Communication tester. Radio Communication tester exercised the radio card. Traffic is sent forward across RF link, acknowledgements are sent back and BER was less than 100%.

**RESULTS**

Enclosure Port							
Frequency Range (MHz)	Antenna Polarization	Vertical Front		Vertical Back		Horizontal	
		Pass	Fail	Pass	Fail	Pass	Fail
80 to 1000	Horizontal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
80 to 1000	Vertical	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1400 to 2700	Horizontal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1400 to 2700	Vertical	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Tested on August 2017

Enclosure Port					
Frequency Range (MHz)	Antenna Polarization	Top		Bottom	
		Pass	Fail	Pass	Fail
1000 to 6000	Horizontal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1000 to 6000	Vertical	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Required Passing Criterion:**

A

B

C

**Actual Performance:**

A

B

C

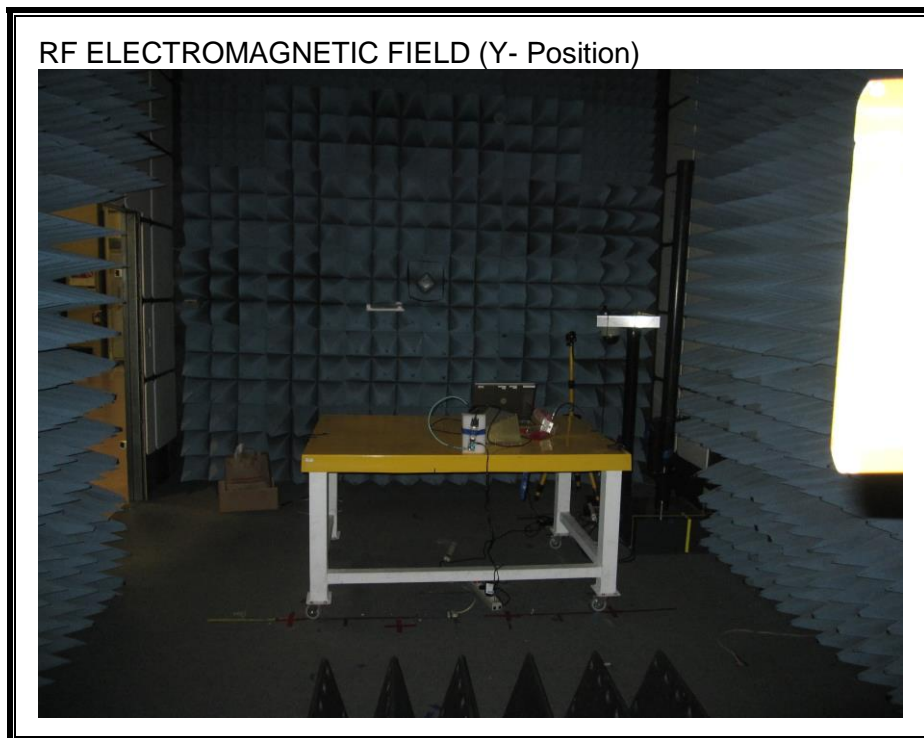
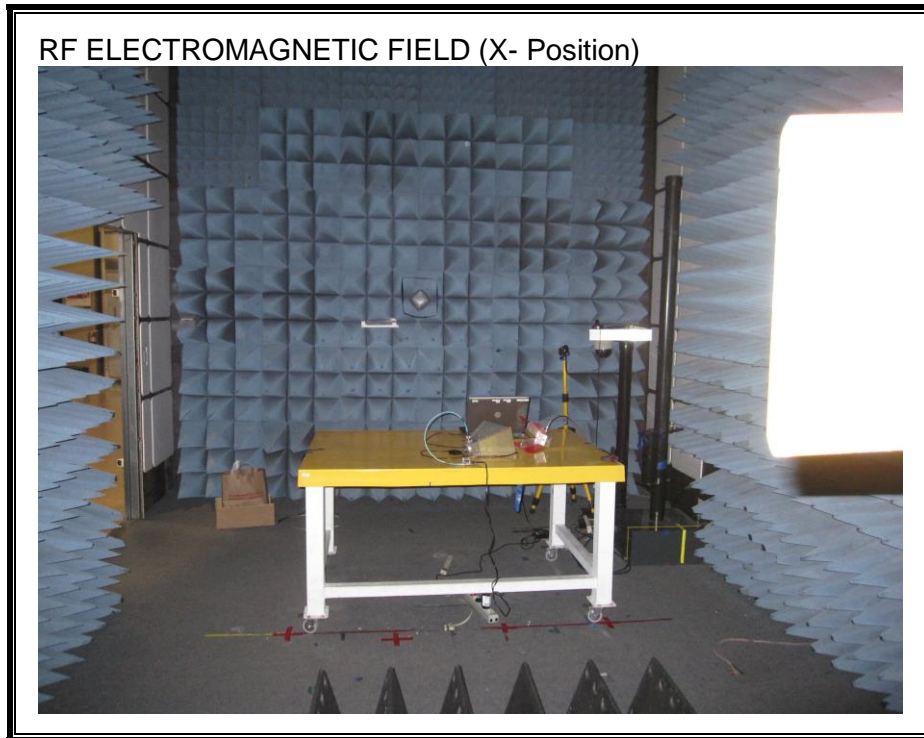
**Notes:** No anomalies observed. The EUT functioned as expected according to manufacturer's instructions.

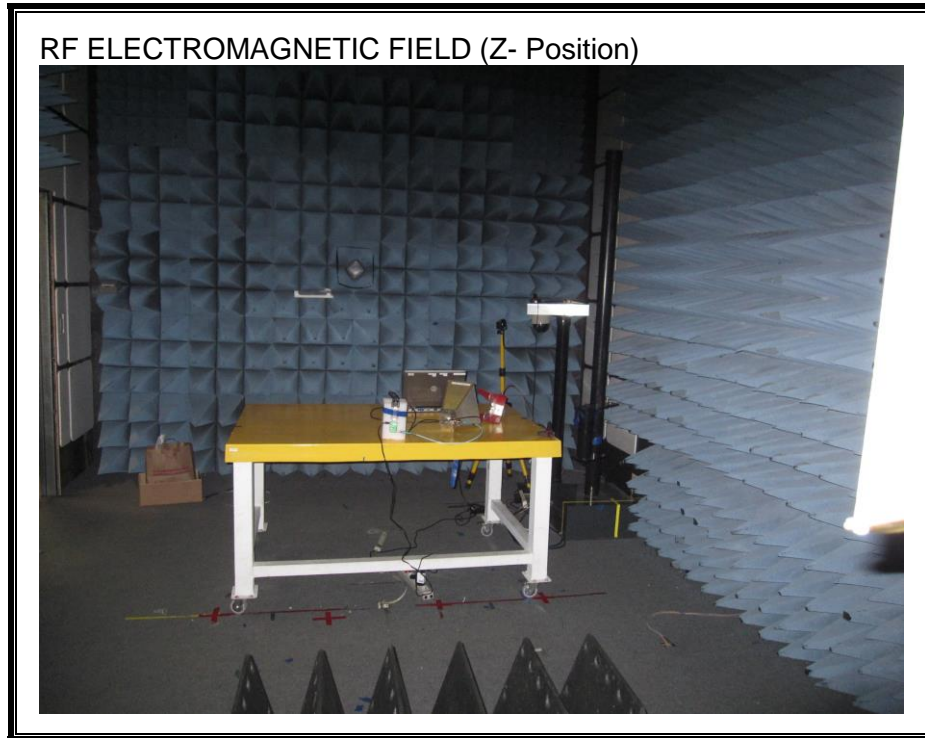
## 8. SETUP PHOTOS

### ELECTROSTATIC DISCHARGE

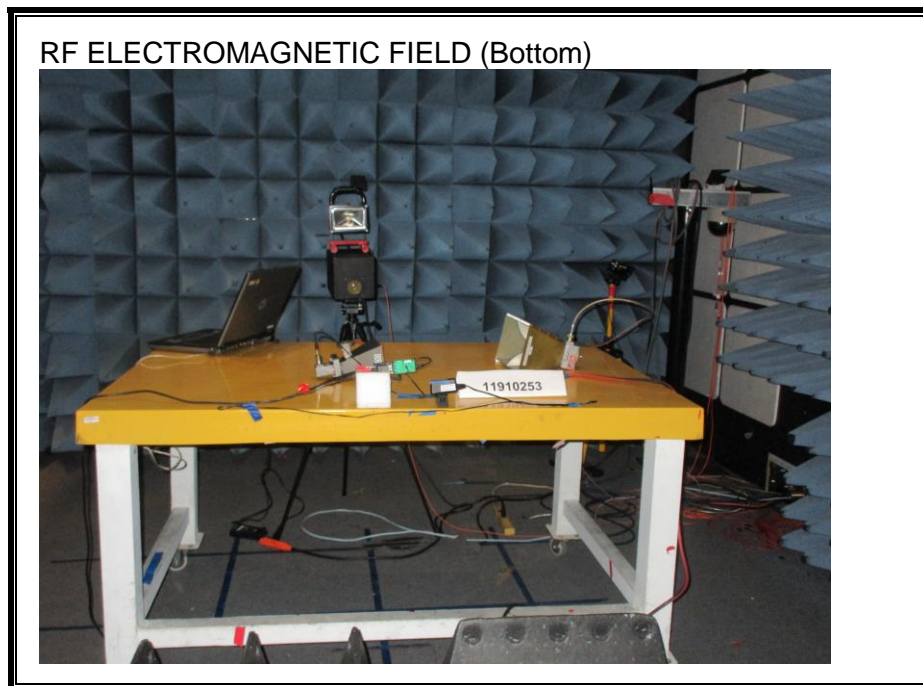
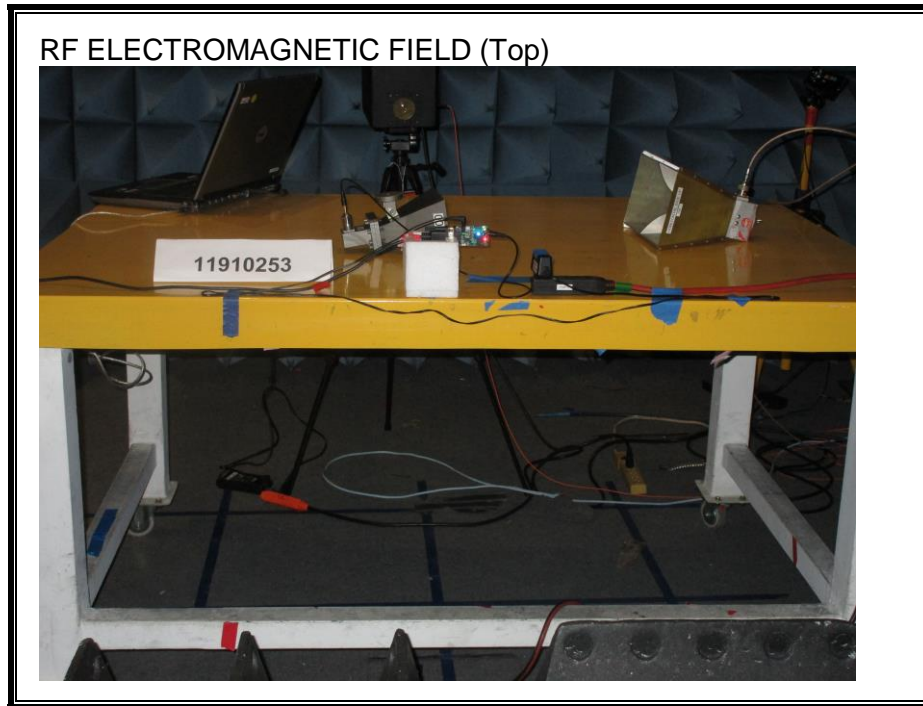


**RADIATED IMMUNITY**





**RADIATED IMMUNITY – Tested on August 2017**



**END OF REPORT**