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MEASUREMENT REPORT
FCC Part 27 LTE

Applicant Name:
Harris Corporation
150 Apollo Drive
Chelmsford, MA 01824
USA

Date of Testing:
8/12/2013
Test Site/Location:
PCTEST Lab., Columbia, MD, USA
Test Report Serial No.:
0Y1308091569.BV8

FCC ID:	**BV8BBPBM113**
APPLICANT:	**HARRIS CORPORATION**

Application Type:	Class II Permissive Change
FCC Classification:	Licensed Non-Broadcast Transmitter (TNB)
FCC Rule Part(s):	§2; §27
EUT Type:	Wireless Module
Model(s):	PBM-113
Test Device Serial No.:	*identical prototype* [S/N: N/A]
Class II Perm. Change:	The wireless module FCC ID: BV8BBPBM113 is integrated into the portable tablet FCC ID: AQZ-12131-1000.
Original Grant Date:	April 12, 2013

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested. I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

ACCREDITED
TESTING LABORATORY
CERTIFICATE #2041.01

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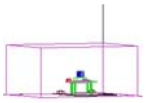
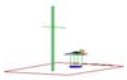


MEASUREMENT REPORT
FCC Part 27



§2.1033 General Information

APPLICANT:	Harris Corporation
APPLICANT ADDRESS:	150 Apollo Drive Chelmsford, MA 01824, USA
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	§2; §27
BASE MODEL:	PBM-113
FCC ID:	BV8BBPBM113
FCC CLASSIFICATION:	Licensed Non-Broadcast Transmitter (TNB)
MODULATIONS:	QPSK / 16-QAM
FREQUENCY TOLERANCE:	Frequency must remain in band
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
DATE(S) OF TEST:	8/12/2013
TEST REPORT S/N:	0Y1308091569.BV8

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab. located in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966)) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451A-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.

- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451A-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

1.2 Testing Facility

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (*See Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39o 10'23" N latitude and 76o 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

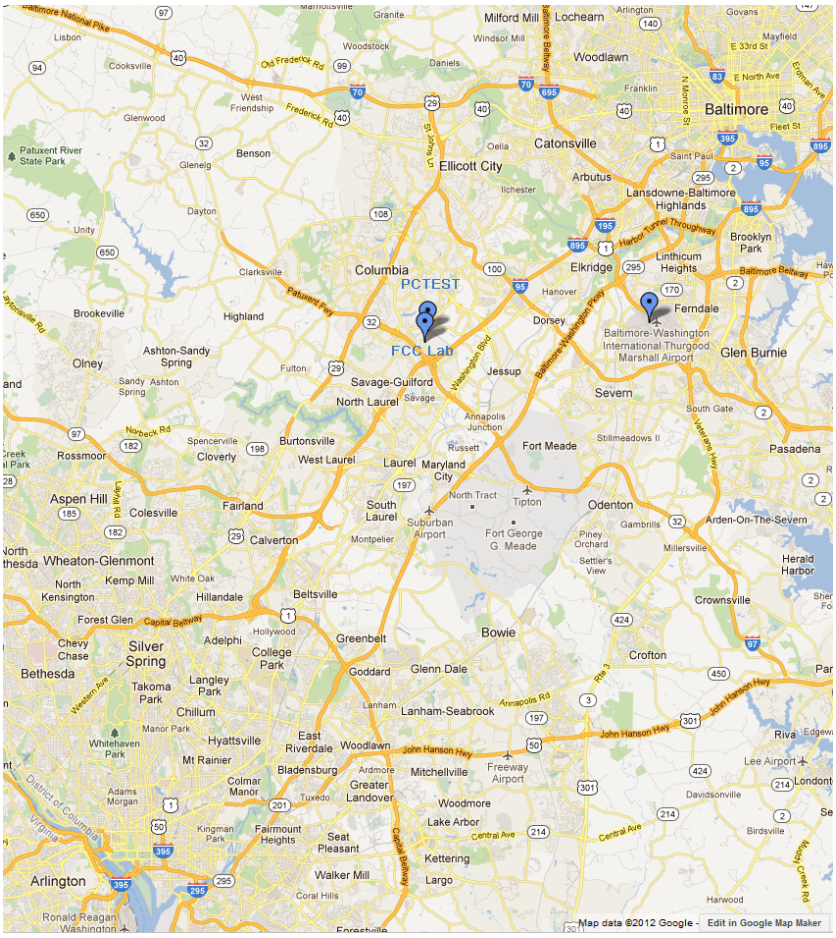


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Harris Wireless Module FCC ID: BV8BBPBM113**. The test data contained in this report pertains only to the emissions due to the EUT's LTE function. The EUT consisted of the following component(s):

Trade Name / Base Model	FCC ID	Description
Harris / Model: PBM-113	BV8BBPBM113	Wireless Module

Table 2-1. EUT Equipment Description

Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000. This tablet was powered by an AC Adapter Model: VEH60US19 by XP Power. Additionally, the standard battery for this tablet Model: 12131-2100-02 by Harris was installed during testing.

The EUT was set to continuous transmission at max power through connection to a CMW500 LTE Call Box. All modulations (QPSK, 16QAM) and RB sizes and RB offsets were investigated. Worst case emissions are reported.

2.2 EUT Capabilities

The EUT has the following capabilities: LTE operating in Band 13

2.3 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and no modifications were made during testing.

3.0 DESCRIPTION OF TESTS

3.1 Measurement Procedure

The radiated spurious measurements were made outdoors at a 3-meter test range (See Figure 3-1). The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This power level was recorded using a broadband average power meter. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This level is recorded with the power meter. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic antenna are taken into consideration.

Deviation from Measurement Procedure……..None

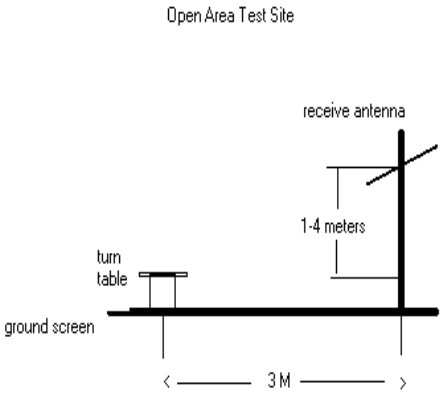


Figure 3-1. Diagram of 3-meter outdoor test range

3.2 Radiated Spurious Emissions

§2.1053, 27.53(c)(f)

Radiated spurious emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. This level is then measured with a broadband average power meter. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10^{th} harmonic. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive average power meter reading. This spurious level is recorded with the power meter. For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. Additionally, all emissions including harmonics in the band 1559-1610MHz shall be limited to -70dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80dBW EIRP for discrete emissions of less than 700Hz bandwidth.

4.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set	1/17/2013	Annual	1/17/2014	N/A
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
Agilent	N9030A	PXA Signal Analyzer (44GHz)	1/11/2013	Annual	1/11/2014	MY52350166
Agilent	E8267C	Vector Signal Generator	10/10/2011	Biennial	10/10/2013	US42340152
Agilent	N9020A	MXA Signal Analyzer	10/9/2012	Annual	10/9/2013	US46470561
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/24/2013	Biennial	7/24/2015	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	11/7/2012	Biennial	11/7/2014	128337
Mini-Circuits	VHF-1300+	High Pass Filter	1/21/2013	Annual	1/21/2014	30716
Mini-Circuits	VHF-1200+	High Pass Filter	1/17/2013	Annual	1/17/2014	30923
Mini-Circuits	VHF-3100+	High Pass Filter	1/17/2013	Annual	1/17/2014	30841
Rohde & Schwarz	CMW500	LTE Radio Communication Tester	10/7/2011	Biennial	10/7/2013	103962
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	2/15/2012	Annual	2/15/2014	100342
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Rx	11/14/2011	Biennial	11/14/2013	9105-2404
Schwarzbeck	UHA 9105	Dipole Antenna (400 - 1GHz) Tx	11/14/2011	Biennial	11/14/2013	9105-2403
Seekonk	NC-100	Torque Wrench (8" lb)	3/5/2012	Triennial	3/5/2015	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

Table 4-1. Test Equipment

5.0 SAMPLE CALCULATIONS

The calculations below are examples only and do not necessarily relate to the EUT.

Spurious Radiated Emission – LTE

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminal is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1402.0 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80) = 50.3 dBc.

6.0 TEST RESULTS

6.1 Summary

Company Name: Harris Corporation

FCC ID: BV8BBPBM113

FCC Classification: Licensed Non-Broadcast Transmitter (TNB)

Mode(s): LTE

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
2.1053, 27.53(c)	Undesirable Emissions	< 43 + 10log$_{10}$ (P[Watts]) for all out-of-band emissions	RADIATED	PASS	Section 6.3
2.1053, 27.53(f)	Undesirable Emissions in the 1559-1610MHz band	< -40dBm/MHz EIRP (wideband) < -50dBm EIRP (narrowband)		PASS	Section 6.4
27.50 (b)(10)	Effective Radiated Power (ERP)	< 3 Watts max. ERP		PASS	Section 6.2

Table 6-1. Summary of Test Results

6.2 Effective Radiated Power (ERP)

§27.50

Frequency [MHz]	Channel Bandwidth [MHz]	Mod.	Battery	RB Size/Offset	Substitute Level [dBm]	Antenna Gain [dBd]	Pol [H/V]	ERP [dBm]	ERP [Watts]	Margin [dB]
779.50	5	QPSK	Standard	1 / 24	17.48	-1.07	V	16.41	0.044	-18.36
782.00	5	QPSK	Standard	1 / 0	18.85	-1.08	V	17.77	0.060	-17.00
784.50	5	QPSK	Standard	1 / 24	17.58	-1.09	V	16.49	0.045	-18.28
779.50	5	16QAM	Standard	1 / 0	19.16	-1.07	V	18.09	0.064	-16.68
782.00	5	16QAM	Standard	1 / 0	18.97	-1.08	V	17.89	0.062	-16.88
784.50	5	16QAM	Standard	1 / 24	17.76	-1.09	V	16.67	0.046	-18.10
782.00	10	QPSK	Standard	1 / 0	18.68	-1.08	V	17.60	0.058	-17.17
782.00	10	16QAM	Standard	1 / 0	18.88	-1.08	V	17.80	0.060	-16.97

Figure 6-1. Band 13 LTE ERP

NOTES:

1. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.

2. Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found with the EUT in the vertical positioning. The data reported in the table above was measured in this test setup.

6.3 Radiated Spurious Emissions

§2.1053, §27.53

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	779.50	MHz		
MEASURED OUTPUT POWER:	18.09	dBm	=	0.064 W
MODULATION SIGNAL:	16-QAM			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	31.09	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
2338.50	-32.11	6.83	-25.28	V	43.37
3118.00	-82.90	7.05	-75.85	V	93.94
3897.50	-80.15	7.07	-73.08	V	91.17
4677.00	-81.63	9.17	-72.46	V	90.55
5456.50	-78.26	8.90	-69.36	V	87.45

Table 6-2. Radiated Spurious Data (5MHz Band 13)

NOTES:

1. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.

2. Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found with the EUT in the vertical positioning. The data reported in the table above was measured in this test setup.

Radiated Spurious Emissions (Cont'd)

§2.1053, §27.53

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	782.00	MHz		
MEASURED OUTPUT POWER:	17.89	dBm	=	0.062 W
MODULATION SIGNAL:	16-QAM			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	30.89	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
2346.00	-38.26	6.82	-31.45	V	49.34
3128.00	-80.90	7.03	-73.87	V	91.76
3910.00	-79.31	7.08	-72.23	V	90.12
4692.00	-80.21	9.18	-71.03	V	88.92
5474.00	-78.39	8.88	-69.52	V	87.41

Table 6-3. Radiated Spurious Data (5MHz Band 13)

NOTES:

1. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.

2. Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found with the EUT in the vertical positioning. The data reported in the table above was measured in this test setup.

Radiated Spurious Emissions (Cont'd)
§2.1053, §27.53

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	784.50	MHz		
MEASURED OUTPUT POWER:	16.67	dBm	=	0.046 W
MODULATION SIGNAL:	16-QAM			
BANDWIDTH:	5 MHz			
DISTANCE:	3	meters		
LIMIT:	43 + 10 $\log_{10}$ (W) =	29.67	dBc	

FREQUENCY (MHz)	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBd)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	(dBc)
2353.50	-24.80	6.81	-17.99	V	34.66
3138.00	-48.98	7.00	-41.98	V	58.65
3922.50	-79.31	7.10	-72.22	V	88.89
4707.00	-80.20	9.20	-71.00	V	87.67
5491.50	-78.35	8.85	-69.49	V	86.16

Table 6-4. Radiated Spurious Data (5MHz Band 13)

NOTES:

1. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.

2. Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found with the EUT in the vertical positioning. The data reported in the table above was measured in this test setup.

6.4 Radiated Spurious Emissions in 1559 – 1610MHz Band

§2.1053, §27.53(f)

All spurious emissions found in the 1559-1610 MHz band were wideband emissions and the limit of -70dBW/MHz (-40dBm/MHz) was applied. Measurements in table below utilized resolution bandwidth of 1MHz.

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY:	784.50	MHz		
MEASURED OUTPUT POWER:	16.670	dBm	=	0.046 W
MODULATION SIGNAL:	16-QAM			
DISTANCE:	3	meters		
NARROWBAND EMISSION LIMIT:	-50	dBm		
WIDEBAND EMISSION LIMIT:	-40	dBm/MHz		

FREQUENCY (MHz)	EMISSION TYPE	LEVEL @ ANTENNA TERMINALS (dBm)	SUBSTITUTE ANTENNA GAIN (dBi)	SPURIOUS EMISSION LEVEL (dBm)	POL (H/V)	MARGIN (dB)
1569.00	WIDEBAND	-63.32	6.55	-56.77	V	-16.77

NOTES:

1. This device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported in the table above.

2. Testing was performed with the EUT integrated into the portable tablet FCC ID: AQZ-12131-1000.

3. The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case test configuration was found with the EUT in the vertical positioning. The data reported in the table above was measured in this test setup.

7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Harris Wireless Module FCC ID: BV8BBPBM113** complies with all the requirements of Parts 2 and 27 of the FCC rules.