

EMISSIONS TEST REPORT

Report Number: 3136180BOX-001

Project Number: 3136180

Testing performed on the

VCA100 Radio

Model: BAEVCA100-V1FCGX-LF

To

FCC Part 15 Subpart B "Unintentional Radiators"

FCC Part 15 Subpart C "Intentional Radiators"

FCC Part 22 Subpart E "Public Mobile Radio – Paging and Radiotelephone Service"

FCC Part 74 Subpart H "Experimental Radio, Auxiliary, Special Broadcast And Other
Program Distributional Services – Low Power Auxiliary Stations"

FCC Part 90 Subpart I

"Private Land Mobile Radio Services – General Technical Requirements"

For

BAE Systems – Homeland Security Solutions

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
BAE Systems – Homeland Security Solutions
2 Forbes Road
Lexington, MA 02420

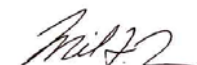
Prepared by:



Nicholas Abbondante

Date: 11/14/2007

Reviewed by:



Michael F. Murphy

Date: 11/19/2007

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1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: BAE Systems – Homeland Security Solutions
2 Forbes Road
Lexington, MA 02420
Contact: Mr. Ralph Lombardo
Telephone: 603-885-7172
Fax: N/A
Email: Ralph.lombardo@baesystems.com

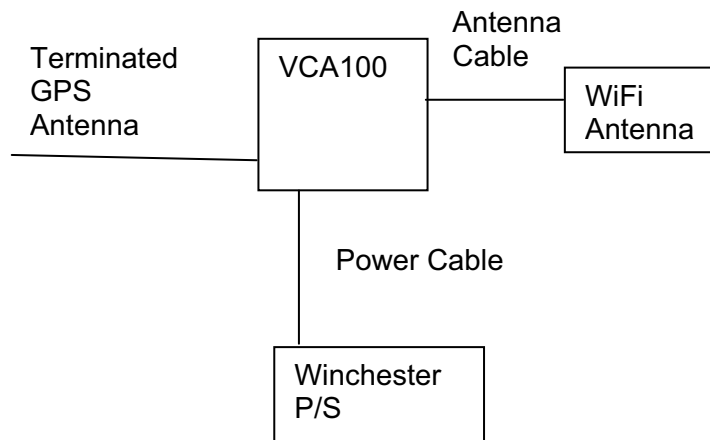
1.2 Equipment Under Test

Equipment Type: VCA100 Radio
Model Number(s): BAEVCA100-V1FCGX-LF
Serial number(s): 0716HNH000091
Manufacturer: BAE Systems – Homeland Security Solutions
EUT receive date: 10/26/2007
EUT received condition: Prototype in Good Condition
Test start date: 10/26/2007
Test end date: 11/06/2007

1.3 Test Plan Reference: Tested according to the standards listed, ANSI C63.4:2003, and ANSI/TIA-603-C-2004.

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
WiFi Antenna Cable	Braid	SMA	4.2	1
GPS Antenna Cable	Braid	SMA	5.5	1
Power Cable	None	Plastic/Wire	3.25	1

1.4.3. Support Equipment:

Name: Antenex WiFi Antenna 2.4-2.5 GHz
 Model No.: A10245
 Serial No.: N/L

Name: All-Start Winchester Portable Power Generator
 Model No.: WPG103
 Serial No.: N/L

1.5 Mode(s) of Operation:

During testing, the EUT was powered from a nominal 12V DC power supply. During the FCC Part 15 Subpart B testing, the EUT was fully powered but no transmissions were occurring. During the FCC Part 15 Subpart C testing, the EUT was fully powered but only the WiFi transmitter was transmitting at maximum duty cycle. For the FCC Part 90 testing, the EUT was fully powered and was transmitting an unmodulated one second burst with one second intervals.

1.6 Floor Standing Equipment: Applicable: _____ Not Applicable: X

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart B FCC Part 15 Subpart C FCC Part 22 Subpart E FCC Part 74 Subpart H FCC Part 90 Subpart I		
SUB-TEST	TEST PARAMETER	COMMENT
FCC Part 15 Subpart B		
Radiated Emissions Receiver Verification FCC §15.109	Spurious emissions must not exceed the FCC Part 15 Subpart B Class B limits.	Pass
FCC Part 22 Subpart E, FCC Part 74 Subpart H, FCC Part 90 Subpart I		
RF Output Power FCC §22.565(a), FCC §74.861(d)(1), FCC §90.205(d)	Power must not exceed the following: FCC Part 22: 152-153 MHz – 1400 Watts ERP, 157-159 MHz – 150 Watts ERP FCC Part 74: Licensees may not operate at higher than 1 Watt ERP. FCC Part 90: Power limitation is dependant on the device antenna’s height above average terrain (HAAT) and on the required service area, and will be authorized according to the HAAT table found in FCC §90.205(d) Table 1.	Pass
Radiated Emissions FCC §22.359(a), FCC §74.861(d)(3), FCC §90.210	Spurious emissions must not exceed -13 dBm ERP.	Pass
FCC Part 15 Subpart C		
RF Output Power FCC §15.247(b)(3)	Conducted RF Output Power must not exceed 1 Watt (30 dBm). EIRP must not exceed 4 Watts (36 dBm).	Pass
Radiated Emissions FCC §15.205, §15.209, §15.247(d)	Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209.	Pass

Notes: In order to comply with the results in this test report, Wurth Elektronik #74271132 and Fair-Rite #0443167251 must be installed in single loop configuration on the power cable right at the connection to the EUT.

3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$\begin{aligned} RA &= 52.0 \text{ dB}\mu\text{V} \\ AF &= 7.4 \text{ dB/m} \\ CF &= 1.6 \text{ dB} \\ AG &= 29.0 \text{ dB} \\ FS &= 32 \text{ dB}\mu\text{V/m} \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where NF = Net Reading in dB μ V

- RF = Reading from receiver in dB μ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where UF = Net Reading in } \mu\text{V}$$

Example:

$$\begin{aligned} NF &= RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V} \\ UF &= 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m} \end{aligned}$$

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:

± 3.5 dB at 10m, ± 3.8 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 2.6 dB

The expanded uncertainty ($k = 2$) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 3.2 for ISN and voltage probe measurements

± 3.1 for current probe measurements

3.2 Site Description

Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Test Results: Pass

Test Standard: FCC Part 15 Subpart B

Test: Radiated Emissions Receiver Verification, FCC §15.109

Performance Criterion: Spurious emissions must not exceed the FCC Part 15 Subpart B Class B limits.

Test Environment:

Environmental Conditions During Testing:	Ambient (°C):	21	Humidity (%):	38	Pressure (hPa):	1050
Pretest Verification Performed	Yes		Equipment under Test:	BAEVCA100-V1FCGX-LF		
Test Engineer(s):	Nicholas Abbondante		EUT Serial Number:	0716HNNH000091		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
2	ANTENNA	EMCO	3142	9711-1223	02/06/2008
3	10 Meter in floor cable for site 2	ITS	RG214B/U	S2 10M FLR	09/17/2008
4	EMI Receiver with 85420E RF Filter Section S/N 3705A00230 On Loan from Littleton	Hewlett Packard	8542E	3906A00273	02/16/2008

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

Radiated Emissions

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineers: Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 15 Subpart B Class B
 Receiver: HP 8542E (145-092)
 PreAmp: PRE9 3-25-08.txt
 PreAmp Used? (Y or N): N
 Antenna & Cables: N Bands: N, LF, HF, SHF
 Antenna: LOG2 02-06-08 V10.txt LOG2 02-06-08 H10.txt
 Cable(s): S2 10M FLR 9-17-08.txt NONE.
 Barometer: BAR2
 Location: Site 2
 Date(s): 10/26/07
 Temp/Humidity/Pressure: 21c 38% 1050mB
 Limit Distance (m): 3
 Test Distance (m): 10
 Voltage/Frequency: 12VDC
 Frequency Range: 30-1000 MHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: Car lighter cable, Wurth Elektronik #74271132 and Fair-Rite #0443167251 in single loop on power cable right at connector												
QP	V	113.900	8.6	7.3	1.7	0.0	-10.5	28.0	43.5	-15.5	120/300 kHz	FCC
QP	V	127.100	18.6	6.7	1.8	0.0	-10.5	37.5	43.5	-6.0	120/300 kHz	RB
QP	V	146.100	18.5	8.0	1.9	0.0	-10.5	38.9	43.5	-4.6	120/300 kHz	RB
QP	V	265.600	-2.8	12.8	2.7	0.0	-10.5	23.1	46.0	-22.9	120/300 kHz	RB
QP	V	294.400	6.7	13.6	2.8	0.0	-10.5	33.6	46.0	-12.4	120/300 kHz	
QP	V	300.000	6.6	13.7	2.9	0.0	-10.5	33.6	46.0	-12.4	120/300 kHz	
QP	V	399.700	2.3	16.5	3.3	0.0	-10.5	32.6	46.0	-13.4	120/300 kHz	
QP	V	400.400	3.9	16.5	3.3	0.0	-10.5	34.2	46.0	-11.8	120/300 kHz	RB

Setup Photos



Setup Photos



Test Results: Pass

Test Standard: FCC Part 22, FCC Part 74, FCC Part 90

Test: RF Output Power, FCC §22.565(a), FCC §74.861(d)(1), FCC §90.205(d)

Performance Criterion: Power must not exceed the following values:

FCC Part 22: 152-153 MHz – 1400 Watts ERP, 157-159 MHz – 150 Watts ERP

FCC Part 74: Licensees may not operate at higher than 1 Watt ERP.

FCC Part 90: Power limitation is dependant on the device antenna's height above average terrain (HAAT) and on the required service area, and will be authorized according to the HAAT table found in FCC §90.205(d) Table 1.

Test Environment:

Environmental Conditions During Testing:	Ambient (°C):	20	Humidity (%):	35	Pressure (hPa):	1050
Pretest Verification Performed	Yes		Equipment under Test:	BAEVCA100-V1FCGX-LF		
Test Engineer(s):	Nicholas Abbondante		EUT Serial Number:	0716HNNH000091		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
2	10W, 30dB Attenuator	Weinschel Corp	47-30-34	BD43291	07/06/2008
3	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL027	12/04/2007
4	EMI Receiver with 85420E RF Filter Section S/N 3705A00230 On Loan from Littleton	Hewlett Packard	8542E	3906A00273	02/16/2008

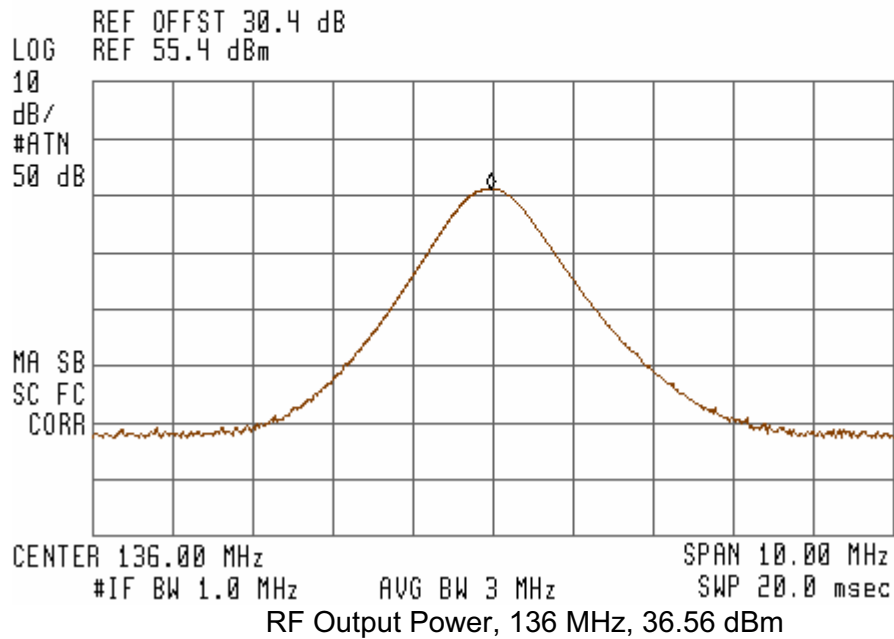
Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

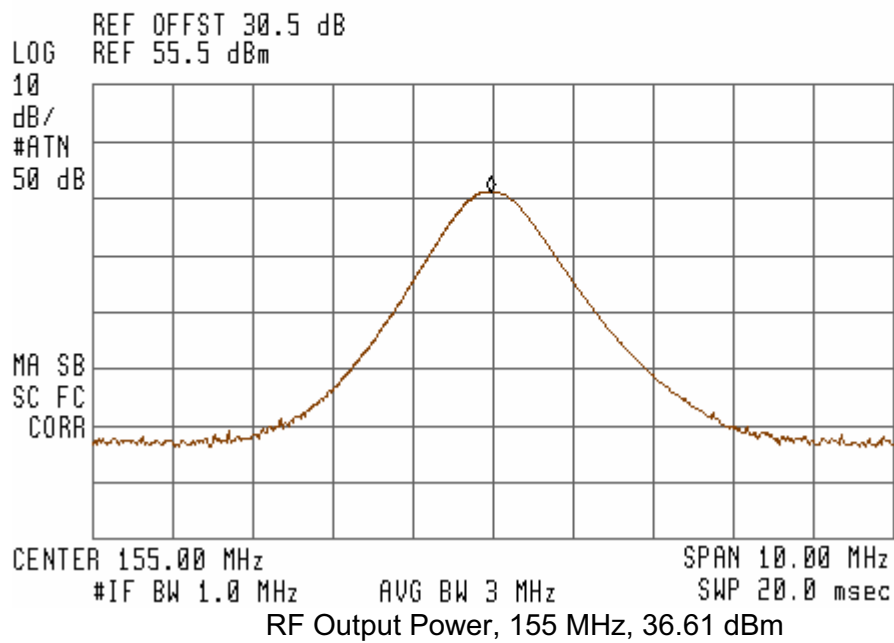
12:00:58 OCT 31, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 135.98 MHz
36.56 dBm



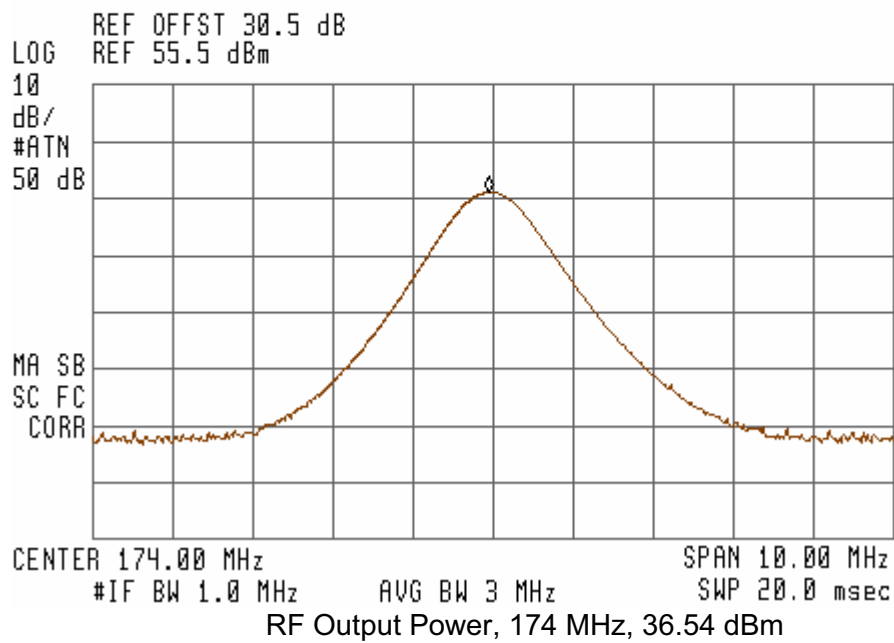
12:12:20 OCT 31, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 154.98 MHz
36.61 dBm



12:19:26 OCT 31, 2007

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 173.95 MHz
36.54 dBm



Test Results: Pass

Test Standard: FCC Part 22, FCC Part 74, FCC Part 90

Test: Radiated Emissions, FCC §22.359(a), FCC §74.861(d)(3), FCC §90.210

Performance Criterion: Spurious emissions must not exceed -13 dBm ERP.

Test Environment:

Environmental Conditions During Testing:	Ambient (°C):	21	Humidity (%):	50	Pressure (hPa):	1050
Pretest Verification Performed	Yes		Equipment under Test:	BAEVCA100-V1FCGX-LF		
Test Engineer(s):	Nicholas Abbondante		EUT Serial Number:	0716HNNH000091		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
2	ANTENNA	EMCO	3142	9711-1223	02/06/2008
3	HORN ANTENNA	EMCO	3115	9602-4675	09/24/2008
4	10 Meter in floor cable for site 2	ITS	RG214B/U	S2 10M FLR	09/17/2008
5	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL027	12/04/2007
6	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL028	12/04/2007
7	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
8	EMI Receiver with 85420E RF Filter Section S/N 3705A00230 On Loan from Littleton	Hewlett Packard	8542E	3906A00273	02/16/2008
9	BROADBAND ANTENNA	Compliance Design	B100	1852	09/13/2008
10	BROADBAND ANTENNA	Compliance Design	B200	1850	09/13/2008
11	BROADBAND ANTENNA	Compliance Design	B300	00674	09/13/2008
12	HORN ANTENNA	EMCO	3115	9610-4980	06/18/2008
13	Synthesized Sweep Generator	Hewlett Packard	83620A	3213A01244	02/06/2009

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

Radiated Emissions, Substitution

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineer(s): Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 90
 Barometer: BAR2 Temp/Humidity/Pressure: 21c 50% 1050mB
 Test Distance (m): 10 Voltage/Frequency: Fresh 12V Battery Frequency Range: 30-1000 MHz
 Net = Generator Level (0.00 dBm) + (EUT reading - Generator reading) - Cable Loss + Antenna Gain (dBi or dBd)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor RB = Restricted Band; Bandwidth denoted as RBW/VBW
 Rx Antenna: LOG2 HORN2
 Rx Cable(s): S2 10M FLR CBL027 CBL028
 Rx Preamp: NONE Receiver: 145-092
 Tx Antenna: ANT2A ANT2B ANT2C
 Tx Cable(s): CBL029 HORN3
 Tx Signal Generator: HEW62
 ERP or EIRP?: ERP

Detector Type	Ant. Pol. (V/H)	Frequency MHz	EUT Reading dB(uV)	Generator Reading dB(uV)	Transmit Cable Loss dB	Transmit Antenna dBi	Generator Level dBm	Net dBm	Limit dBm	Margin dB	Bandwidth
PK	V	136.000	21.9	62.1	0.3	1.2	-20.0	-61.4	-13.0	-48.4	120/300 kHz
PK	V	272.000	1.5	51.0	0.4	-1.1	-20.0	-73.2	-13.0	-60.2	120/300 kHz
PK	V	408.000	3.4	47.0	0.5	0.6	-20.0	-65.6	-13.0	-52.6	120/300 kHz
PK	V	544.000	1.7	46.1	0.6	1.0	-20.0	-66.1	-13.0	-53.1	120/300 kHz
PK	V	680.000	1.8	42.5	0.6	2.7	-20.0	-60.8	-13.0	-47.8	120/300 kHz
PK	V	816.000	2.1	41.8	0.7	-0.6	-20.0	-63.1	-13.0	-50.1	120/300 kHz
PK	V	952.000	1.5	40.0	0.8	1.0	-20.0	-60.4	-13.0	-47.4	120/300 kHz
PK	V	61.500	12.1	59.8	0.2	-3.3	-20.0	-73.4	-13.0	-60.4	120/300 kHz
PK	V	73.860	14.2	63.7	0.2	1.1	-20.0	-70.7	-13.0	-57.7	120/300 kHz
PK	V	110.840	11.3	56.8	0.2	-1.8	-20.0	-69.7	-13.0	-56.7	120/300 kHz
PK	V	123.540	15.5	62.0	0.3	0.3	-20.0	-68.6	-13.0	-55.6	120/300 kHz
PK	V	146.490	19.5	62.1	0.3	1.7	-20.0	-63.3	-13.0	-50.3	120/300 kHz
PK	H	392.500	9.8	49.2	0.5	0.1	-20.0	-61.8	-13.0	-48.8	120/300 kHz
PK	H	778.000	14.6	44.1	0.7	1.1	-20.0	-51.2	-13.0	-38.2	120/300 kHz
PK	H	790.750	13.3	45.5	0.7	1.5	-20.0	-53.5	-13.0	-40.5	120/300 kHz
PK	V	155.000	25.6	58.0	0.3	1.2	-20.0	-53.6	-13.0	-40.6	120/300 kHz
PK	V	310.000	5.3	49.3	0.4	-1.1	-20.0	-67.7	-13.0	-54.7	120/300 kHz
PK	V	465.000	1.9	47.9	0.5	-0.4	-20.0	-69.0	-13.0	-56.0	120/300 kHz
PK	H	775.000	13.3	43.9	0.7	1.2	-20.0	-52.2	-13.0	-39.2	120/300 kHz
PK	V	61.240	13.8	59.8	0.2	-3.5	-20.0	-71.8	-13.0	-58.8	120/300 kHz
PK	V	86.560	8.5	60.0	0.2	-0.2	-20.0	-74.0	-13.0	-61.0	120/300 kHz
PK	V	115.250	10.2	59.5	0.2	-1.3	-20.0	-73.0	-13.0	-60.0	120/300 kHz
PK	V	128.200	6.9	62.9	0.3	0.5	-20.0	-77.9	-13.0	-64.9	120/300 kHz
PK	V	145.490	12.4	62.1	0.3	1.7	-20.0	-70.5	-13.0	-57.5	120/300 kHz
PK	H	392.500	10.4	49.2	0.5	0.1	-20.0	-61.2	-13.0	-48.2	120/300 kHz
PK	H	777.475	16.4	44.1	0.7	1.1	-20.0	-49.4	-13.0	-36.4	120/300 kHz
PK	H	781.950	16.2	44.8	0.7	1.0	-20.0	-50.4	-13.0	-37.4	120/300 kHz
PK	H	790.750	14.5	45.5	0.7	1.5	-20.0	-52.3	-13.0	-39.3	120/300 kHz
PK	V	174.000	12.0	53.2	0.3	-2.6	-20.0	-66.3	-13.0	-53.3	120/300 kHz
PK	V	348.000	9.5	48.8	0.4	-1.5	-20.0	-63.3	-13.0	-50.3	120/300 kHz
PK	V	522.000	1.4	45.2	0.5	1.9	-20.0	-64.5	-13.0	-51.5	120/300 kHz
PK	V	61.360	7.4	59.8	0.2	-3.4	-20.0	-78.1	-13.0	-65.1	120/300 kHz
PK	V	122.600	19.1	61.9	0.3	0.1	-20.0	-65.0	-13.0	-52.0	120/300 kHz
PK	V	145.400	20.8	62.1	0.3	1.7	-20.0	-62.1	-13.0	-49.1	120/300 kHz
PK	V	299.719	8.3	51.0	0.4	-0.5	-20.0	-65.8	-13.0	-52.8	120/300 kHz
PK	H	393.000	13.0	49.2	0.5	0.1	-20.0	-58.7	-13.0	-45.7	120/300 kHz
PK	H	793.000	16.6	45.3	0.7	1.8	-20.0	-49.7	-13.0	-36.7	120/300 kHz
PK	H	1088.000	6.7	47.7	0.8	6.2	-20.0	-57.7	-13.0	-44.7	1/3 MHz
PK	H	1224.000	8.2	49.2	0.9	6.7	-20.0	-57.3	-13.0	-44.3	1/3 MHz
PK	H	1360.000	8.8	50.5	0.9	7.1	-20.0	-57.6	-13.0	-44.6	1/3 MHz
PK	H	1085.000	7.5	47.4	0.8	6.2	-20.0	-56.7	-13.0	-43.7	1/3 MHz
PK	H	1240.000	8.6	48.9	0.9	6.7	-20.0	-56.7	-13.0	-43.7	1/3 MHz
PK	H	1395.000	9.1	50.2	0.9	7.2	-20.0	-57.0	-13.0	-44.0	1/3 MHz
PK	H	1550.000	11.3	51.0	1.0	7.8	-20.0	-55.1	-13.0	-42.1	1/3 MHz
PK	H	1044.000	10.4	47.7	0.8	6.1	-20.0	-54.2	-13.0	-41.2	1/3 MHz
PK	H	1185.200	18.7	48.0	0.9	6.5	-20.0	-45.8	-13.0	-32.8	1/3 MHz
PK	H	1218.000	11.2	49.1	0.9	6.6	-20.0	-54.3	-13.0	-41.3	1/3 MHz
PK	H	1392.000	11.5	50.1	0.9	7.2	-20.0	-54.4	-13.0	-41.4	1/3 MHz
PK	H	1566.000	11.4	51.3	1.0	7.8	-20.0	-55.3	-13.0	-42.3	1/3 MHz
PK	H	1740.000	11.8	50.3	1.1	8.4	-20.0	-53.2	-13.0	-40.2	1/3 MHz

Setup Photos



Setup Photos



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Test Results: Pass

Test Standard: FCC Part 15 Subpart C

Test: RF Output Power, FCC §15.247(b)(3)

Performance Criterion: Conducted RF Output Power must not exceed 1 Watt (30 dBm). EIRP must not exceed 4 Watts (36 dBm).

Test Environment:

Environmental Conditions During Testing:	Ambient (°C):	N/A	Humidity (%):	N/A	Pressure (hPa):	N/A
Pretest Verification Performed	Yes		Equipment under Test:	BAEVCA100-V1FCGX-LF		
Test Engineer(s):	Nicholas Abbondante		EUT Serial Number:	0716HNNH000091		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
2	20 dB, Attenuator DC-18GHz	Weinschel Corp	47-20-34	BP0570	07/06/2008
3	Peak Power Meter	Rohde & Schwarz	857.8008.02	147-291	03/20/2008
4	Peak Power Sensor	Rohde & Schwarz	857.9604.02	147-193	03/20/2008

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

Channel 1 (2412 MHz): 27.62 dBm
Channel 6 (2437 MHz): 27.81 dBm
Channel 11 (2462 MHz): 27.93 dBm

Test Results: Pass

Test Standard: FCC Part 15 Subpart C

Test: Radiated Emissions, FCC §15.205, §15.209, §15.247(d)

Performance Criterion: Spurious emissions must be at least 20 dB lower than the fundamental field strength when measured with a 100 kHz bandwidth. Emissions which fall in the restricted bands of 15.205 must meet the general limits of 15.209.

Test Environment:

Environmental Conditions During Testing:	Ambient (°C):	See Tables	Humidity (%):	See Tables	Pressure (hPa):	See Tables
Pretest Verification Performed	Yes		Equipment under Test:		BAEVCA100-V1FCGX-LF	
Test Engineer(s):	Nicholas Abbondante		EUT Serial Number:		0716HNNH000091	

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	05/20/2008
2	EMI Receiver with 85420E RF Filter S/N3705A00230	Hewlett Packard	8542E	3906A00273	02/16/2008
3	ANTENNA	EMCO	3142	9711-1223	02/06/2008
4	10 Meter in floor cable for site 2	ITS	RG214B/U	S2 10M FLR	09/17/2008
5	HORN ANTENNA	EMCO	3115	9602-4675	09/24/2008
6	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL027	12/04/2007
7	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 197	CBL028	12/04/2007
8	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
9	Preamplifier	Miteq	NSP4000-NFG	1260417	03/25/2008
10	Spectrum Analyzer	Agilent	E7405A	US40240205	08/09/2008
11	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
12	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	12/13/2007
13	1GHz High Pass Filter	Reactel, Inc	7HS-1G/10G-S11	06-1	09/18/2008
14	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	09/18/2008

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	3/07/07 Revision

Test Details:

Special Radiated Emissions

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineers: Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: HP 8542E (145-092)
 PreAmp: PRE9 3-25-08.txt
 PreAmp Used? (Y or N): N
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Antenna & Cables: N Bands: N, LF, HF, SHF
 Antenna: LOG2 02-06-08 V10.txt LOG2 02-06-08 H10.txt
 Cable(s): S2 10M FLR 9-17-08.txt NONE.
 Barometer: BAR2

Location: Site 2
 Date(s): 11/06/07
 Temp/Humidity/Pressure: 21c 48% 1050mB

Limit Distance (m): 3
 Test Distance (m): 10
 Voltage/Frequency: Fresh 12V Battery Frequency Range: 30-1000 MHz

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: WiFi Channel 1 (2412 MHz)												
PK	V	86.250	15.9	7.1	1.5	0.0	-10.5	35.0	90.3	-55.3	120/300 kHz	FCC
QP	V	109.100	14.2	7.6	1.6	0.0	-10.5	33.9	43.5	-9.6	120/300 kHz	RB
QP	V	123.100	15.6	6.7	1.8	0.0	-10.5	34.6	43.5	-8.9	120/300 kHz	RB
PK	V	144.600	22.3	7.8	1.9	0.0	-10.5	42.5	90.3	-47.8	120/300 kHz	
PK	V	300.000	6.2	13.7	2.9	0.0	-10.5	33.3	90.3	-57.0	120/300 kHz	
PK	V	399.600	9.0	16.5	3.3	0.0	-10.5	39.3	90.3	-51.0	120/300 kHz	
PK	V	419.500	7.3	16.8	3.5	0.0	-10.5	38.0	90.3	-52.3	120/300 kHz	
PK	H	778.000	16.3	22.8	5.0	0.0	-10.5	54.6	90.3	-35.7	120/300 kHz	
Note: WiFi Channel 6 (2437 MHz)												
PK	V	85.650	14.2	7.1	1.5	0.0	-10.5	33.1	90.3	-57.2	120/300 kHz	RB
QP	V	109.100	12.9	7.6	1.6	0.0	-10.5	32.6	43.5	-10.9	120/300 kHz	RB
QP	V	117.800	16.7	7.0	1.7	0.0	-10.5	35.9	43.5	-7.6	120/300 kHz	
PK	V	147.385	24.5	8.2	1.9	0.0	-10.5	45.0	90.3	-45.3	120/300 kHz	
PK	V	300.000	4.0	13.7	2.9	0.0	-10.5	31.0	90.3	-59.3	120/300 kHz	
PK	H	399.750	6.8	16.4	3.3	0.0	-10.5	37.0	90.3	-53.3	120/300 kHz	
PK	H	768.000	8.0	22.8	5.0	0.0	-10.5	46.2	90.3	-44.1	120/300 kHz	
PK	H	807.000	16.4	22.5	5.2	0.0	-10.5	54.5	90.3	-35.8	120/300 kHz	
Note: WiFi Channel 11 (2462 MHz)												
PK	V	86.250	15.5	7.1	1.5	0.0	-10.5	34.5	90.3	-55.8	120/300 kHz	RB
QP	V	109.300	12.7	7.6	1.6	0.0	-10.5	32.4	43.5	-11.1	120/300 kHz	
QP	V	122.500	13.5	6.8	1.8	0.0	-10.5	32.5	90.3	-57.8	120/300 kHz	
PK	V	148.000	21.0	8.2	1.9	0.0	-10.5	41.6	90.3	-48.7	120/300 kHz	
PK	V	300.500	6.3	13.7	2.9	0.0	-10.5	33.3	90.3	-57.0	120/300 kHz	
PK	V	392.850	9.3	16.4	3.3	0.0	-10.5	39.4	90.3	-50.9	120/300 kHz	
PK	V	419.500	7.7	16.8	3.5	0.0	-10.5	38.4	90.3	-51.9	120/300 kHz	
PK	H	766.800	13.9	22.8	5.0	0.0	-10.5	52.0	90.3	-38.3	120/300 kHz	
PK	H	791.300	12.0	22.6	5.2	0.0	-10.5	50.2	90.3	-40.1	120/300 kHz	

Special Radiated Emissions

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineers: Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: Agilent E7405A (AGL001)
 PreAmp: PRE9 3-25-08.txt
 PreAmp Used? (Y or N): N
 Antenna & Cables: HF Bands: N, LF, HF, SHF
 Antenna: Horn2 V1m 9-24-2008.txt Horn2 H1m 9-24-2008.txt
 Cable(s): CBL027 12-04-2007.txt CBL028 12-04-2007.txt
 Barometer: BAR2
 Location: Site 2
 Date(s): 11/02/07
 Temp/Humidity/Pressure: 23c 30% 1050mB
 Limit Distance (m): 3
 Test Distance (m): 3
 Voltage/Frequency: Fresh 12V Battery Frequency Range: 1-4 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: Fundamental Power Reference												
PK	V	2412.000	75.3	28.7	6.3	0.0	0.0	110.3	-	-	100/300 kHz	FCC
PK	V	2437.000	75.0	28.7	6.3	0.0	0.0	110.0	-	-	100/300 kHz	
PK	V	2462.000	75.1	28.7	6.3	0.0	0.0	110.2	-	-	100/300 kHz	
Note: WiFi Channel 1 (2412 MHz)												
PK	V	2122.500	18.0	28.2	5.8	0.0	0.0	52.1	90.3	-38.2	100/300 kHz	RB
PK	V	2247.500	23.2	28.4	6.0	0.0	0.0	57.6	74.0	-16.4	1/3 MHz	RB
AVG	V	2247.500	0.1	28.4	6.0	0.0	0.0	34.5	54.0	-19.5	1/3 MHz	RB
PK	V	2692.500	25.8	29.5	6.7	0.0	0.0	61.9	74.0	-12.1	1/3 MHz	RB
AVG	V	2692.500	2.4	29.5	6.7	0.0	0.0	38.6	54.0	-15.4	1/3 MHz	RB
Note: WiFi Channel 6 (2437 MHz)												
PK	V	2135.000	19.4	28.2	5.9	0.0	0.0	53.4	90.3	-36.9	100/300 kHz	RB
PK	V	2256.000	24.3	28.4	6.0	0.0	0.0	58.7	74.0	-15.3	1/3 MHz	RB
AVG	V	2256.000	1.0	28.4	6.0	0.0	0.0	35.5	54.0	-18.5	1/3 MHz	RB
PK	V	2690.000	25.2	29.5	6.7	0.0	0.0	61.4	74.0	-12.6	1/3 MHz	RB
AVG	V	2690.000	1.5	29.5	6.7	0.0	0.0	37.6	54.0	-16.4	1/3 MHz	RB
Note: WiFi Channel 11 (2462 MHz)												
PK	V	2157.500	19.4	28.3	5.9	0.0	0.0	53.5	90.3	-36.8	100/300 kHz	RB
PK	V	2256.000	24.7	28.4	6.0	0.0	0.0	59.1	74.0	-14.9	1/3 MHz	RB
AVG	V	2256.000	0.6	28.4	6.0	0.0	0.0	35.0	54.0	-19.0	1/3 MHz	RB
PK	V	2690.000	25.2	29.5	6.7	0.0	0.0	61.4	74.0	-12.7	1/3 MHz	RB
AVG	V	2690.000	2.3	29.5	6.7	0.0	0.0	38.4	54.0	-15.6	1/3 MHz	RB

Special Radiated Emissions

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineers: Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: Agilent E7405A (AGL001)
 PreAmp: PRE9 3-25-08.txt
 PreAmp Used? (Y or N): Y
 Antenna & Cables: LF Bands: N, LF, HF, SHF
 Antenna: Horn2 V1m 9-24-2008.txt Horn2 H1m 9-24-2008.txt
 Cable(s): CBL027 12-04-2007.txt CBL029 12-04-2007.txt
 Barometer: BAR2
 Location: Site 2
 Date(s): 11/05/07
 Temp/Humidity/Pressure: 20c 32% 1050mB
 Limit Distance (m): 3
 Test Distance (m): 3
 Voltage/Frequency: Fresh 12V Battery Frequency Range: 4-18 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	
Note: WiFi Channel 1 (2412 MHz)												
PK	V	4824.000	38.2	33.6	6.4	28.4	0.0	49.8	74.0	-24.2	1/3 MHz	RB
AVG	V	4824.000	24.8	33.6	6.4	28.4	0.0	36.4	54.0	-17.6	1/3 MHz	RB
PK	V	7236.000	27.0	36.7	8.1	28.1	0.0	43.6	90.3	-46.7	100/300 kHz	
PK	H	9648.000	28.9	38.2	9.7	27.8	0.0	49.0	90.3	-41.3	100/300 kHz	
PK	V	12060.000	35.2	39.1	11.3	27.7	0.0	57.8	74.0	-16.2	1/3 MHz	RB
AVG	V	12060.000	21.7	39.1	11.3	27.7	0.0	44.3	54.0	-9.7	1/3 MHz	RB
PK	V	14472.000	37.4	40.7	12.7	27.6	0.0	63.2	74.0	-10.8	1/3 MHz	RB
AVG	V	14472.000	23.8	40.7	12.7	27.6	0.0	49.6	54.0	-4.4	1/3 MHz	RB
PK	V	16884.000	26.4	40.6	15.1	28.4	0.0	53.8	90.3	-36.5	100/300 kHz	
Note: WiFi Channel 6 (2437 MHz)												
PK	V	4874.000	37.8	33.7	6.5	28.4	0.0	49.5	74.0	-24.5	1/3 MHz	RB
AVG	V	4874.000	24.9	33.7	6.5	28.4	0.0	36.6	54.0	-17.4	1/3 MHz	RB
PK	V	7311.000	38.2	36.8	8.2	28.1	0.0	55.1	74.0	-18.9	1/3 MHz	RB
AVG	V	7311.000	24.4	36.8	8.2	28.1	0.0	41.3	54.0	-12.7	1/3 MHz	RB
PK	V	9748.000	27.7	38.4	9.7	27.8	0.0	48.0	90.3	-42.3	100/300 kHz	
PK	V	12185.000	35.6	39.1	11.3	27.7	0.0	58.4	74.0	-15.6	1/3 MHz	RB
AVG	V	12185.000	21.8	39.1	11.3	27.7	0.0	44.5	54.0	-9.5	1/3 MHz	RB
PK	V	14622.000	28.7	40.2	12.8	27.6	0.0	54.1	90.3	-36.2	100/300 kHz	
PK	V	17059.000	26.3	41.5	15.4	28.4	0.0	54.8	90.3	-35.5	100/300 kHz	
Note: WiFi Channel 11 (2462 MHz)												
PK	V	4924.000	37.8	33.8	6.5	28.4	0.0	49.7	74.0	-24.3	1/3 MHz	RB
AVG	V	4924.000	24.5	33.8	6.5	28.4	0.0	36.4	54.0	-17.6	1/3 MHz	RB
PK	V	7386.000	37.2	37.0	8.2	28.1	0.0	54.3	74.0	-19.7	1/3 MHz	RB
AVG	V	7386.000	24.1	37.0	8.2	28.1	0.0	41.2	54.0	-12.8	1/3 MHz	RB
PK	V	9848.000	27.0	38.5	9.8	27.8	0.0	47.5	90.3	-42.8	100/300 kHz	
PK	V	12310.000	35.2	39.2	11.4	27.7	0.0	58.1	74.0	-15.9	1/3 MHz	RB
AVG	V	12310.000	21.7	39.2	11.4	27.7	0.0	44.5	54.0	-9.5	1/3 MHz	RB
PK	V	14772.000	27.4	39.7	12.9	27.6	0.0	52.4	90.3	-37.9	100/300 kHz	
PK	V	17234.000	27.2	42.5	15.7	28.5	0.0	56.9	90.3	-33.4	100/300 kHz	

Special Radiated Emissions

Company: BAE Systems
 Model #: BAEVCA100-V1FCGX-LF
 Serial #: 0716HNNH000091
 Engineers: Nicholas Abbondante
 Project #: 3136180
 Standard: FCC Part 15 Subpart C 15.247
 Receiver: Agilent E7405A (AGL001)
 PreAmp: PRE9 3-25-08.txt
 PreAmp Used? (Y or N): Y
 Voltage/Frequency: Fresh 12V Battery
 Frequency Range: 18-26 GHz
 Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC
Note: WiFi Channel 1 (2412 MHz)												
PK	V	19296.000	36.0	45.1	10.3	29.3	0.0	62.1	74.0	-11.9	1/3 MHz	RB
AVG	V	19296.000	23.2	45.1	10.3	29.3	0.0	49.3	54.0	-4.7	1/3 MHz	RB
PK	V	21708.000	25.1	45.3	9.9	29.8	0.0	50.5	90.3	-39.8	100/300 kHz	
PK	V	24120.000	25.4	45.6	10.4	30.1	0.0	51.3	90.3	-39.0	100/300 kHz	
Note: WiFi Channel 6 (2437 MHz)												
PK	V	19496.000	36.7	45.2	10.1	29.4	0.0	62.6	74.0	-11.4	1/3 MHz	RB
AVG	V	19496.000	23.4	45.2	10.1	29.4	0.0	49.3	54.0	-4.7	1/3 MHz	RB
PK	V	21933.000	25.1	45.2	10.0	29.8	0.0	50.5	90.3	-39.8	100/300 kHz	
PK	V	24370.000	25.5	45.7	10.4	30.1	0.0	51.5	90.3	-38.8	100/300 kHz	
Note: WiFi Channel 11 (2462 MHz)												
PK	V	19696.000	36.0	45.2	10.0	29.5	0.0	61.7	74.0	-12.3	1/3 MHz	RB
AVG	V	19696.000	23.0	45.2	10.0	29.5	0.0	48.7	54.0	-5.3	1/3 MHz	RB
PK	V	22158.000	37.3	45.2	10.1	29.9	0.0	62.7	74.0	-11.3	1/3 MHz	RB
AVG	V	22158.000	25.3	45.2	10.1	29.9	0.0	50.7	54.0	-3.3	1/3 MHz	RB
PK	V	24620.000	27.3	45.9	10.5	30.1	0.0	53.5	90.3	-36.8	100/300 kHz	

Setup Photos



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