

Honeywell

OneWireless Adapter for wired HART Devices Model: OWA 100

Report No. HONE0057

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Last Date of Test: September 23, 2010
Honeywell
Model: OWA 100

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Peak Output Power	FCC 15.247:2010	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2010	ANSI C63.10:2009	Pass

Modifications made to the product

See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
41 Tesla Ave.
Irvine, CA 92618

Phone: (503) 844-4066 Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834B-1).

Approved By:

Don Fecteau, IS Manager



NVLAP Lab Code: 200676-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



NVLAP

Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0
NVLAP LAB CODE 200881-0

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)



CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.



NEMKO

Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).



BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017). License No.SL2-IN-E-1017.



GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157)



VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.



SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



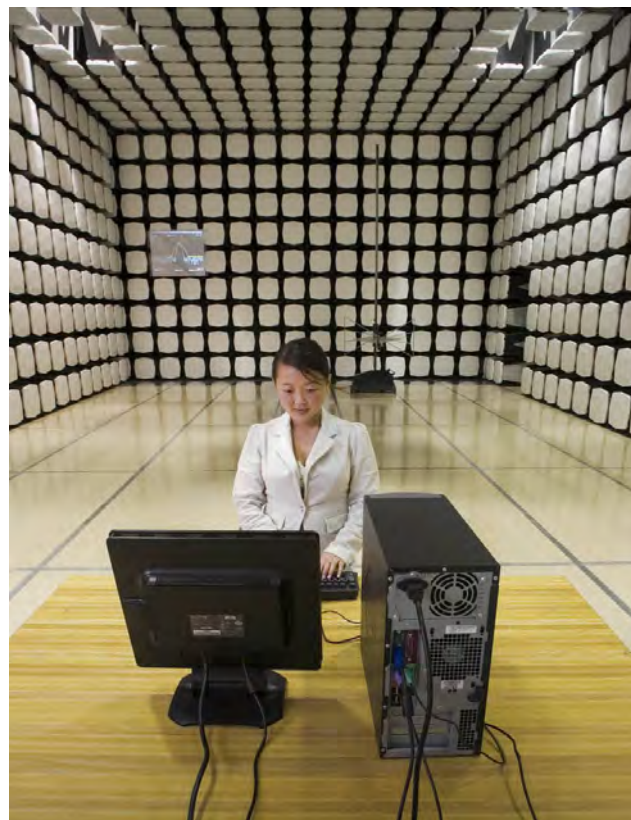
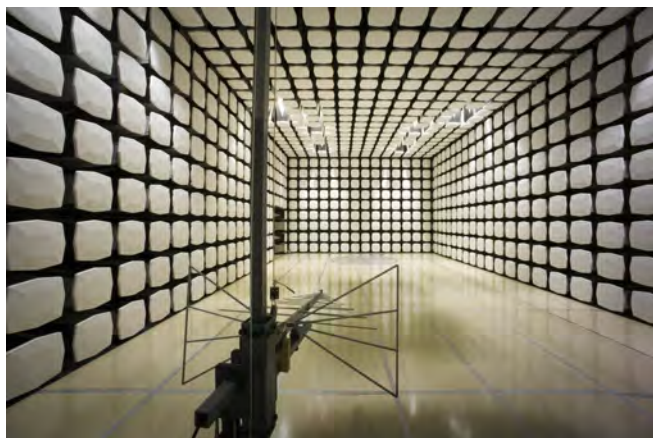
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Honeywell
Address:	1860 W. Rose Garden Lane
City, State, Zip:	Phoenix, AZ 85027
Test Requested By:	David Shipley
Model:	OWA 100
First Date of Test:	September 21, 2010
Last Date of Test:	September 23, 2010
Receipt Date of Samples:	September 16, 2010
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

2.4 GHz radio (OneWireless Adapter) for wired HART Devices

Testing Objective:

To demonstrate compliance of the radio to spurious radiated emissions requirements of FCC 15.247.

CONFIGURATION 1 HONE0057**EUT**

Description	Manufacturer	Model/Part Number	Serial Number
OneWireless Adapter for wired HART Devices	Honeywell	Model: OWA 100	None

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Ground Strap	Yes	3m	No	OneWireless Adapter for wired HART Devices	Ground
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	9/21/2010	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	9/23/2010	Peak Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Power Meter	Hewlett Packard	E4418A	SPA	4/21/2010	13
Spectrum Analyzer	Agilent	E4440A	AFA	2/9/2010	12
Signal Generator	Agilent	E8257D	TGU	12/20/2008	24

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

EMC

Peak Output Power

EUT:	OWA 100	Work Order:	HONE0057
Serial Number:	None	Date:	09/23/10
Customer:	Honeywell	Temperature:	22.42 °C
Attendees:	David Shipley	Humidity:	44%
Project:	None	Barometric Pres.:	1011.2
Tested by:	Jaemi Suh	Power:	24VDC
		Job Site:	OC10

TEST SPECIFICATIONS	Test Method
FCC 15.247:2010	ANSI C63.10:2009

COMMENTS

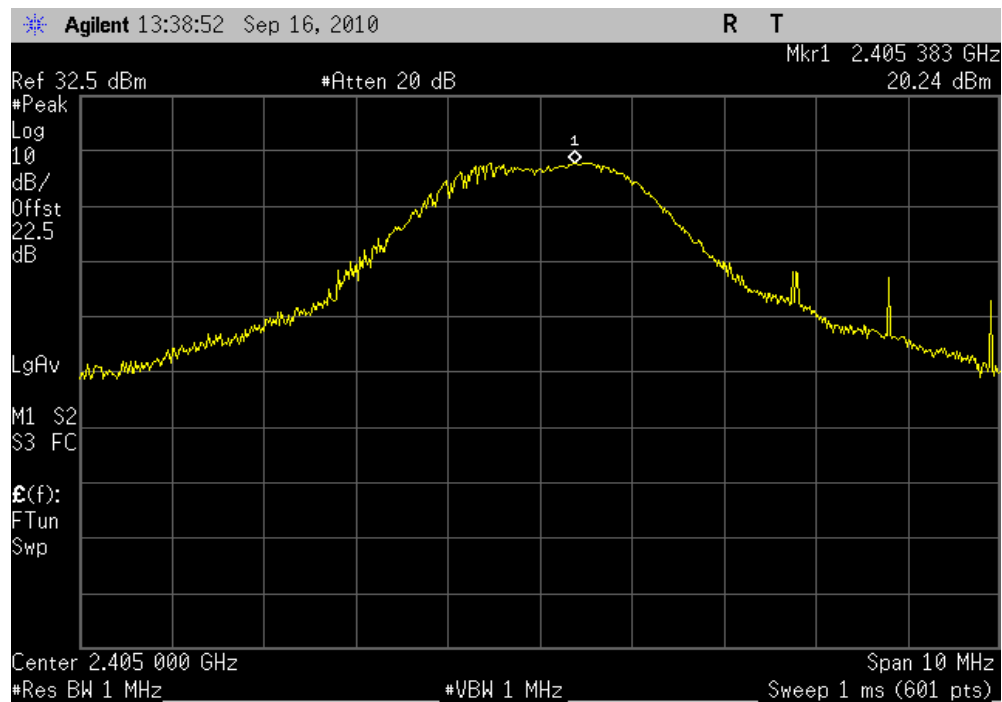
Power level at 255.

DEVIATIONS FROM TEST STANDARD

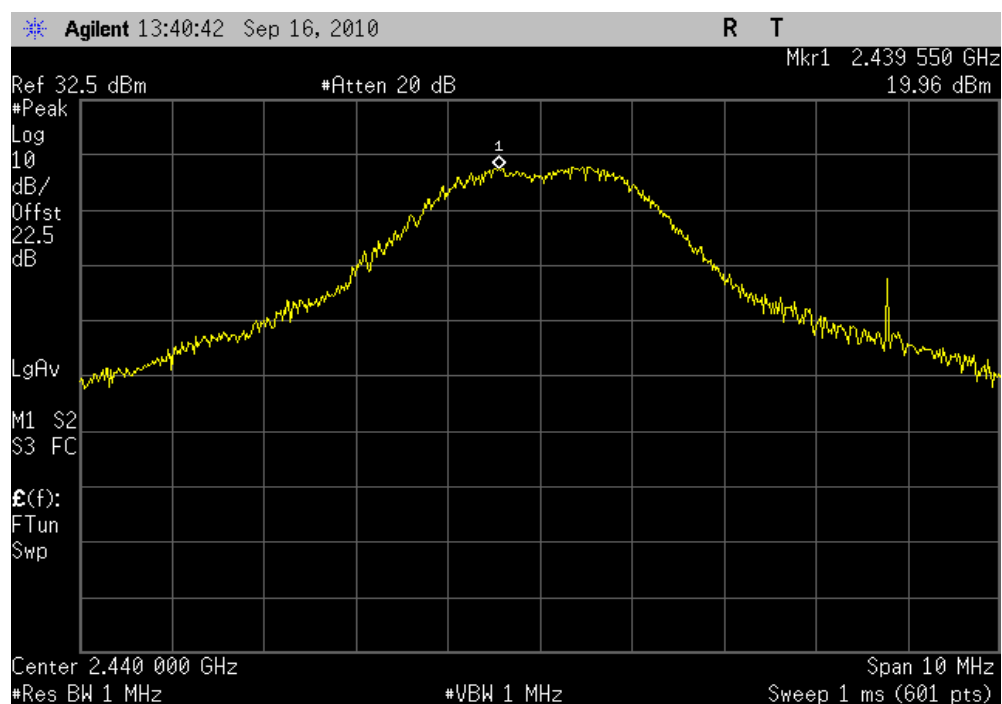
Configuration #	1	Signature 
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	Value	Limit	Results
Low Channel, 2405 MHz	20.24 dBm	30 dBm	Pass
Low Channel, 2440 MHz	19.96 dBm	30 dBm	Pass
Low Channel, 2475 MHz	19.36 dBm	30 dBm	Pass

Low Channel, 2405 MHz		
Result: Pass	Value: 20.24 dBm	Limit: 30 dBm



Low Channel, 2440 MHz		
Result: Pass	Value: 19.96 dBm	Limit: 30 dBm

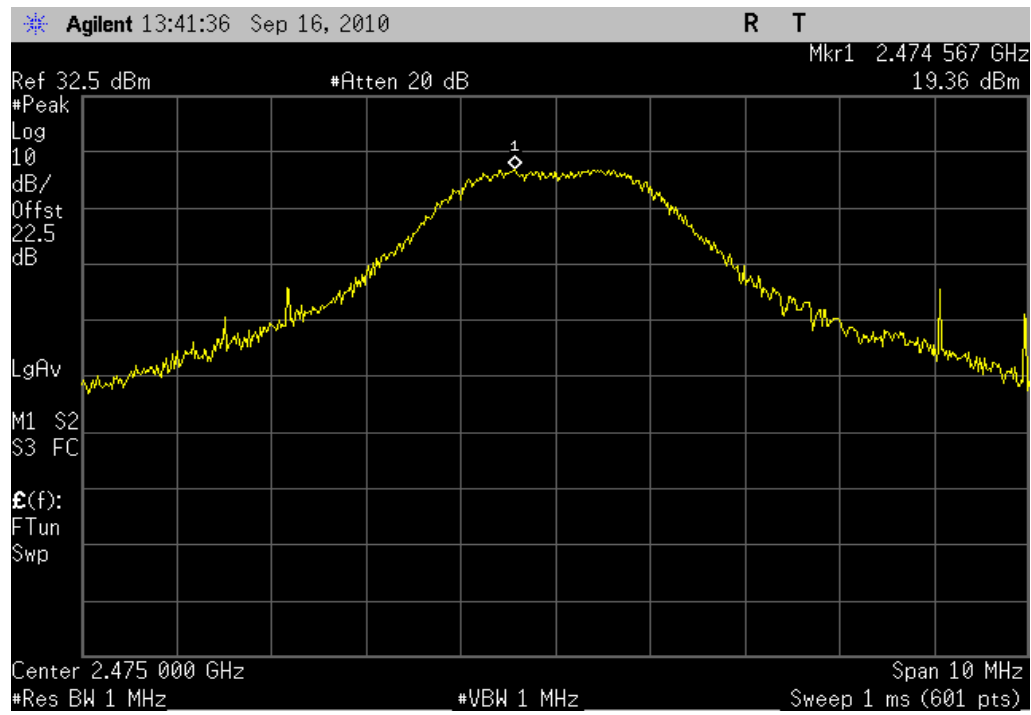


Low Channel, 2475 MHz

Result: Pass

Value: 19.36 dBm

Limit: 30 dBm



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Transmitting High Channel 2475.

Transmitting Mid Channel 2440.

Transmitting Low Channel 2405.

POWER SETTINGS INVESTIGATED

24 VDC

FREQUENCY RANGE INVESTIGATED

Start Frequency	1000	Stop Frequency	26000
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CLOCKS AND OSCILLATORS

2405 MHz, 2440 MHz, 2475 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOI	5/3/2010	13
Antenna, Horn	EMCO	3160-09	AHN	NCR	0
OC floating Cable	N/A	18-26GHz RE Cables	OCK	5/3/2010	13
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVP	12/21/2009	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	4/11/2010	13
Antenna, Horn	EMCO	3160-08	AHK	NCR	0
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVL	4/11/2010	13
Antenna, Horn	ETS	3160-07	AHX	NCR	0
OC11 Cables	N/A	12-18GHz RE Cables	OCS	4/11/2010	13
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVJ	9/10/2009	13
Antenna, Horn	EMCO	3115	AHB	9/11/2009	24
OC11 Cables	N/A	1-8GHz RE Cables	OCR	3/19/2010	13
Spectrum Analyzer	Agilent	E4440A	AFA	2/9/2010	12

MEASUREMENT BANDWIDTHS

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

EUT:	OWA 100	Work Order:	HONE0057
Serial Number:	None	Date:	09/21/10
Customer:	Honeywell	Temperature:	22.42
Attendees:	David Shipley	Humidity:	44%
Project:	None	Barometric Pres.:	1011.2
Tested by:	Jaemi Suh	Power:	Battery
		Job Site:	OC08

TEST SPECIFICATIONS

Test Method

FCC 15.247:2010

ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

Power level at 255. 25% Duty Cycle. Duty Cycle Correction = $20\log(41\text{msec}/100\text{msec}) = 7.7\text{dB}$

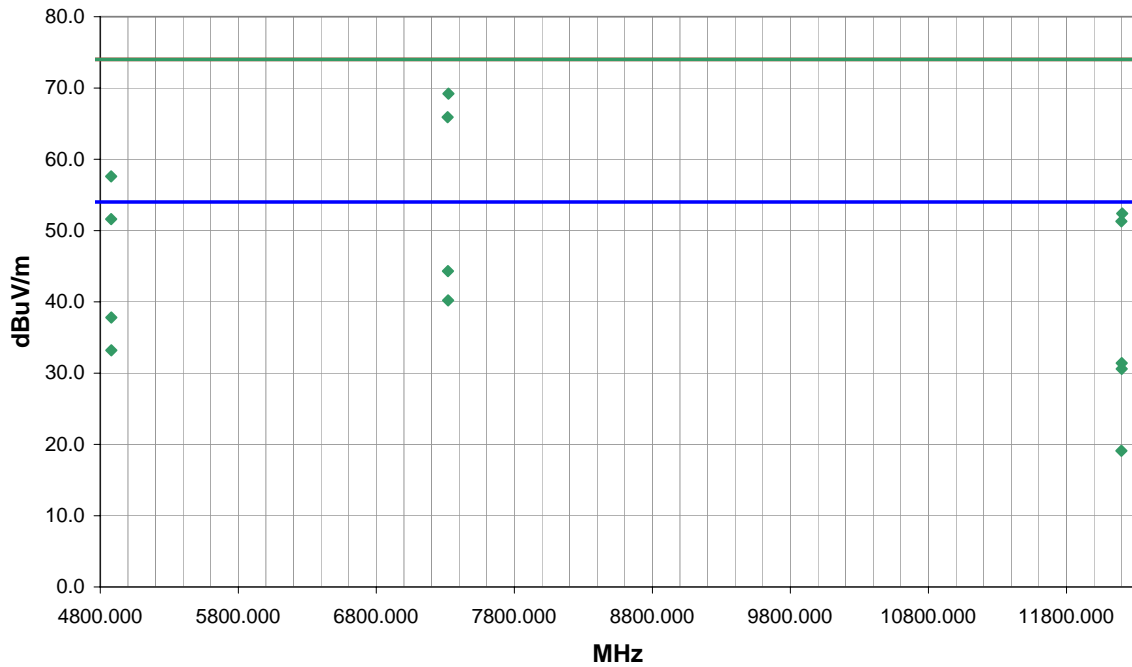
EUT OPERATING MODES

Transmitting Mid Channel 2440.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	9	Signature 
Configuration #	1	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7321.983	59.2	10.0	338.0	1.0	0.0	0.0	V-Horn	PK	0.0	69.2	74.0	-4.8
7316.950	55.9	10.0	228.0	1.0	0.0	0.0	H-Horn	PK	0.0	65.9	74.0	-8.1
7319.350	42.0	10.0	338.0	1.0	7.7	0.0	V-Horn	AV	0.0	44.3	54.0	-9.7
7319.767	37.9	10.0	228.0	1.0	7.7	0.0	H-Horn	AV	0.0	40.2	54.0	-13.8
4879.933	41.2	4.3	233.0	1.0	7.7	0.0	V-Horn	AV	0.0	37.8	54.0	-16.2
4879.067	53.3	4.3	233.0	1.0	0.0	0.0	V-Horn	PK	0.0	57.6	74.0	-16.4
4879.783	36.6	4.3	153.0	1.0	7.7	0.0	H-Horn	AV	0.0	33.2	54.0	-20.8
12203.380	60.8	-8.4	167.0	1.0	0.0	0.0	H-Horn	PK	0.0	52.4	74.0	-21.6
4879.233	47.3	4.3	153.0	1.0	0.0	0.0	H-Horn	PK	0.0	51.6	74.0	-22.4
12200.000	47.5	-8.4	165.0	1.0	7.7	0.0	H-Horn	AV	0.0	31.4	54.0	-22.6
12197.620	59.7	-8.4	72.0	1.4	0.0	0.0	V-Horn	PK	0.0	51.3	74.0	-22.7
12200.000	46.7	-8.4	74.0	1.4	7.7	0.0	V-Horn	AV	0.0	30.6	54.0	-23.4
12198.120	35.2	-8.4	167.0	1.0	7.7	0.0	H-Horn	AV	0.0	19.1	54.0	-34.9

EUT:	OWA 100	Work Order:	HONE0057
Serial Number:	None	Date:	09/21/10
Customer:	Honeywell	Temperature:	22.42
Attendees:	David Shipley	Humidity:	44%
Project:	None	Barometric Pres.:	1011.2
Tested by:	Jaemi Suh	Power:	Battery
		Job Site:	OC08

TEST SPECIFICATIONS

Test Method

FCC 15.247:2010

ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

Power level at 255. 25% Duty Cycle. Duty Cycle Correction = $20\log(41\text{msec}/100\text{msec}) = 7.7\text{dB}$

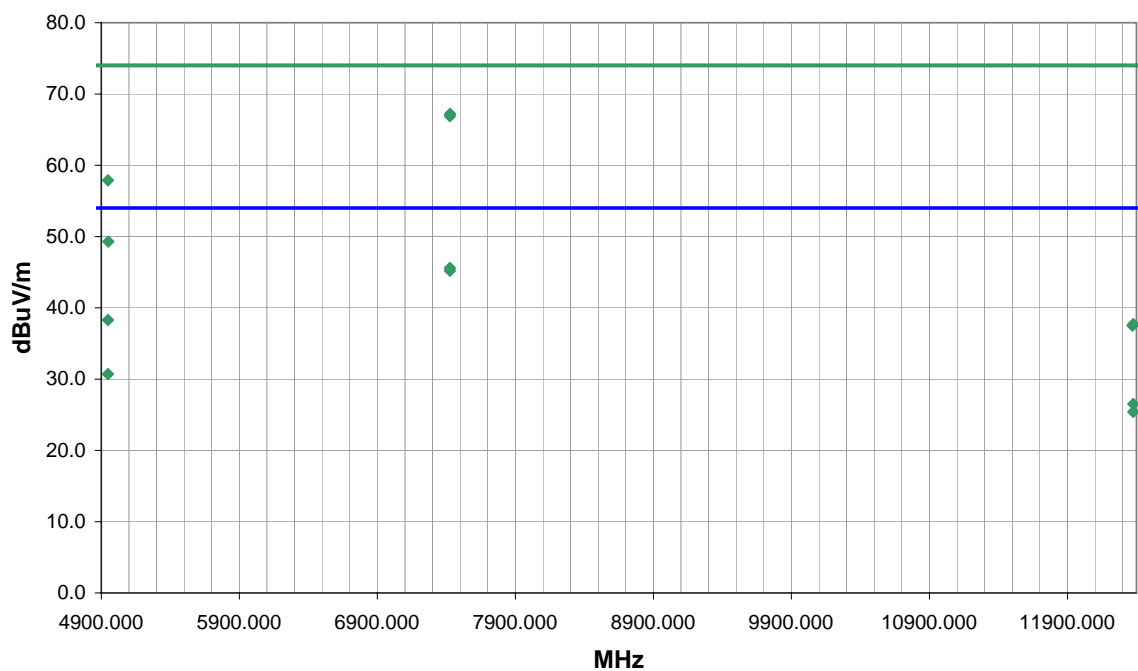
EUT OPERATING MODES

Transmitting Hq Channel 2475.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	11	Signature 
Configuration #	1	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
7427.550	57.0	10.2	86.0	1.0	0.0	0.0	V-Horn	PK	0.0	67.2	74.0	-6.8
7426.300	56.7	10.2	200.0	1.0	0.0	0.0	H-Horn	PK	0.0	66.9	74.0	-7.1
7426.117	43.1	10.2	200.0	1.0	7.7	0.0	H-Horn	AV	0.0	45.6	54.0	-8.4
7425.950	42.7	10.2	86.0	1.0	7.7	0.0	V-Horn	AV	0.0	45.2	54.0	-8.8
4949.033	41.5	4.5	17.0	1.0	7.7	0.0	V-Horn	AV	0.0	38.3	54.0	-15.7
4948.500	53.4	4.5	17.0	1.0	0.0	0.0	V-Horn	PK	0.0	57.9	74.0	-16.1
4948.917	33.9	4.5	188.0	1.0	7.7	0.0	H-Horn	AV	0.0	30.7	54.0	-23.3
4951.033	44.8	4.5	188.0	1.0	0.0	0.0	H-Horn	PK	0.0	49.3	74.0	-24.7
12377.170	42.1	-7.9	170.0	1.0	7.7	0.0	H-Horn	AV	0.0	26.5	54.0	-27.5
12376.900	41.0	-7.9	306.0	1.0	7.7	0.0	V-Horn	AV	0.0	25.4	54.0	-28.6
12377.170	45.6	-7.9	170.0	1.0	0.0	0.0	H-Horn	PK	0.0	37.7	74.0	-36.3
12371.180	45.4	-7.9	306.0	1.0	0.0	0.0	V-Horn	PK	0.0	37.5	74.0	-36.5

EUT:	OWA 100	Work Order:	HONE0057
Serial Number:	None	Date:	09/22/10
Customer:	Honeywell	Temperature:	22.42
Attendees:	David Shipley	Humidity:	44%
Project:	None	Barometric Pres.:	1011.2
Tested by:	Jaemi Suh	Power:	Battery
		Job Site:	OC08

TEST SPECIFICATIONS

Test Method

FCC 15.247:2010

ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

Power level at 255. 25% Duty Cycle. Duty Cycle Correction = $20\log(41\text{msec}/100\text{msec}) = 7.7\text{dB}$

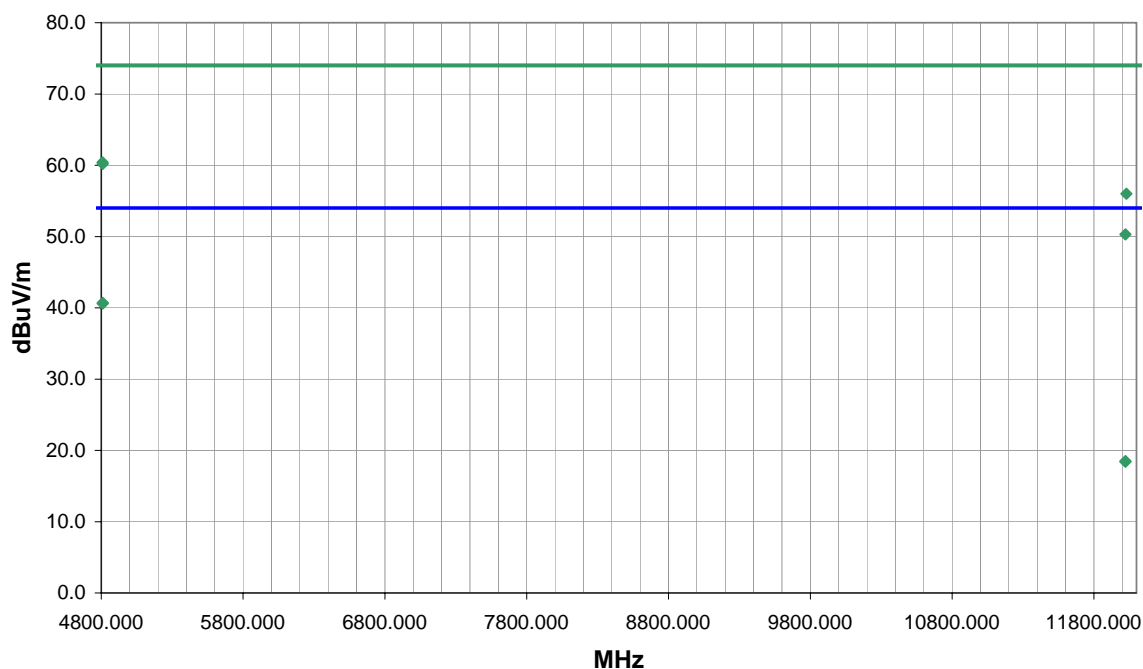
EUT OPERATING MODES

Transmitting Low Channel 2405.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	13	Signature 
Configuration #	1	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
4809.750	44.2	4.2	66.0	1.0	7.7	0.0	V-Horn	AV	0.0	40.7	54.0	-13.3
4810.150	44.1	4.2	197.0	1.0	7.7	0.0	H-Horn	AV	0.0	40.6	54.0	-13.4
4809.450	56.2	4.2	66.0	1.0	0.0	0.0	V-Horn	PK	0.0	60.4	74.0	-13.6
4809.850	56.0	4.2	197.0	1.0	0.0	0.0	H-Horn	PK	0.0	60.2	74.0	-13.8
12028.420	64.9	-8.9	165.0	1.0	0.0	0.0	H-Horn	PK	0.0	56.0	74.0	-18.0
12022.220	59.2	-8.9	125.0	1.0	0.0	0.0	V-Horn	PK	0.0	50.3	74.0	-23.7
12022.470	35.1	-8.9	165.0	1.0	7.7	0.0	H-Horn	AV	0.0	18.5	54.0	-35.5
12022.470	35.0	-8.9	125.0	1.0	7.7	0.0	V-Horn	AV	0.0	18.4	54.0	-35.6

EUT:	OWA 100	Work Order:	HONE0057
Serial Number:	None	Date:	09/22/10
Customer:	Honeywell	Temperature:	22.42
Attendees:	David Shipley	Humidity:	44%
Project:	None	Barometric Pres.:	1011.2
Tested by:	Jaemi Suh	Power:	Battery
		Job Site:	OC08

TEST SPECIFICATIONS

Test Method

FCC 15.247:2010

ANSI C63.10:2009

TEST PARAMETERS

Antenna Height(s) (m)	1 - 4	Test Distance (m)	3
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COMMENTS

Power level at 255. 25% Duty Cycle. Duty Cycle Correction = $20\log(41\text{msec}/100\text{msec}) = 7.7\text{dB}$

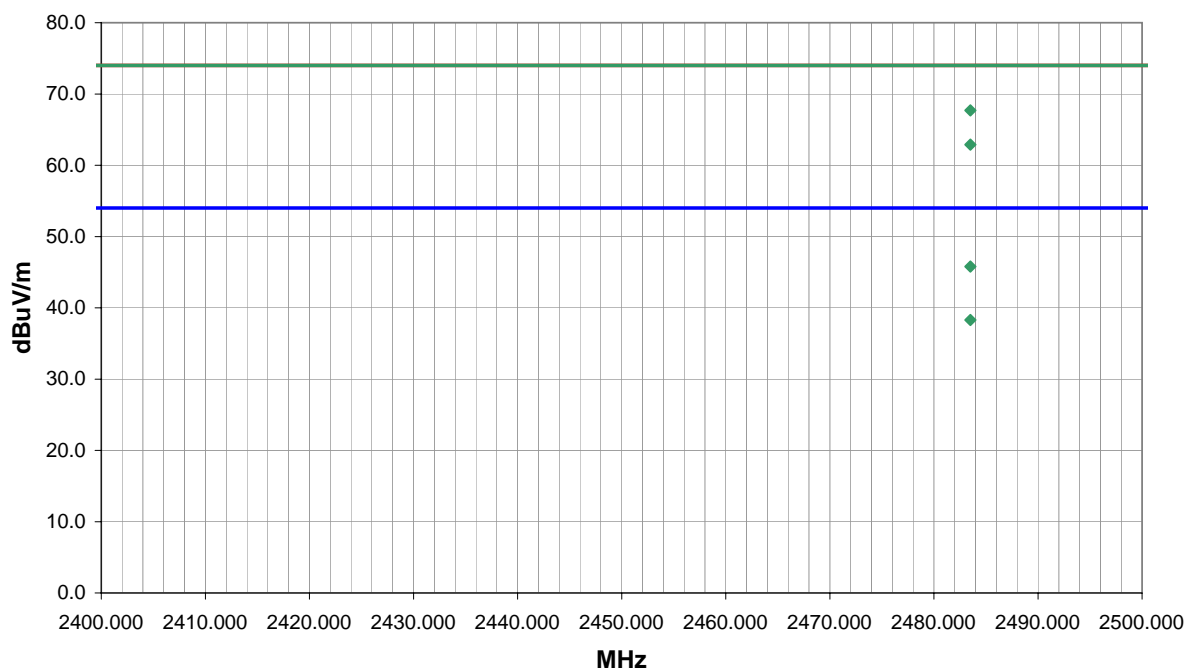
EUT OPERATING MODES

Transmitting High Channel 2475.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	14	Signature 
Configuration #	1	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)
2483.500	51.8	-4.1	154.0	1.0	0.0	20.0	V-Horn	PK	0.0	67.7	74.0	-6.3
2483.499	37.6	-4.1	154.0	1.0	7.7	20.0	V-Horn	AV	0.0	45.8	54.0	-8.2
2483.500	47.0	-4.1	129.0	1.0	0.0	20.0	H-Horn	PK	0.0	62.9	74.0	-11.1
2483.500	30.1	-4.1	129.0	1.0	7.7	20.0	H-Horn	AV	0.0	38.3	54.0	-15.7