

OEM Worldwide

100

Report No. OEMW0004

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
OEM Worldwide
Model: 100

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.249:2010	ANSI C63.4:2009	Pass
Field Strength of Fundamentals	FCC 15.249:2010	ANSI C63.4:2009	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.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

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

Approved By:

Don Facteau, IS Manager



NVLAP Lab Code: 200881-0

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



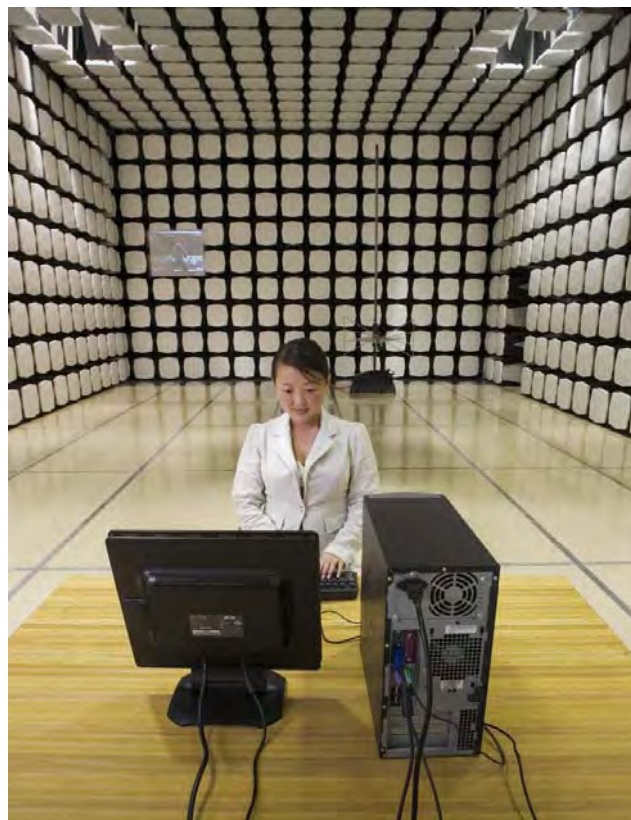
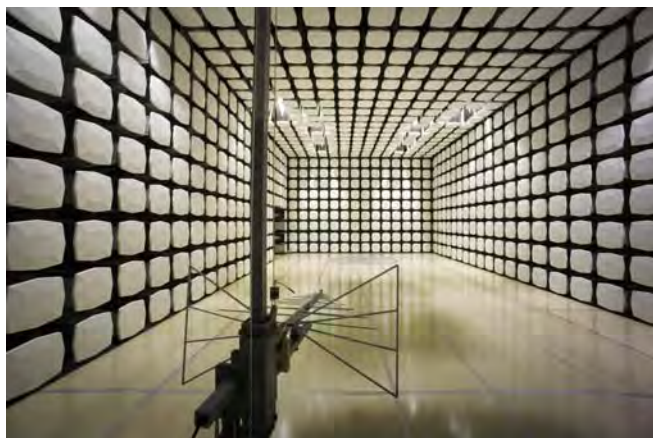
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

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:	OEM Worldwide
Address:	2920 Kelly Avenue, POB 430
City, State, Zip:	Watertown, SD 57201
Manufacturer:	Starkey Laboratories
Address:	6600 Washington Avenue South
City, State, Zip:	Eden Prairie, MN 55344
Test Requested By:	Andy Livingston
Model:	100
First Date of Test:	September 22, 2010
Last Date of Test:	September 23, 2010
Receipt Date of Samples:	September 22, 2010
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

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

The Wireless Remote will broadcast commands that can be received by 900 MHz enabled Starkey hearing aids. It is battery powered with no means of connecting to the AC mains.

Testing Objective:

To demonstrate compliance with FCC 15.249 requirements requirements.

Northwest

EMC

Configurations

Revision 9/21/05

CONFIGURATION 1 OEMW0004

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Remote	Starkey	0A52/100	10865

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	9/23/2010	Field Strength of Fundamental	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	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

EMC**Spurious Radiated Emissions**

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

High Channel 922.07 MHz, CW Transmit Mode -3 dB Output Power

Low Channel 915.7 MHz, CW Transmit Mode -3 dB Output Power

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

OEMW0004 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	10 GHz
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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
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	7/9/2010	13 mo
Attenuator, 6 dB, 'SMA'	SM Electronics	SA18H-06	REM	7/9/2010	13 mo
High Pass Filter 0-425 MHz	Micro-Tronics	LPM50003	HGO	7/9/2010	13 mo
High Pass Filter	Micro-Tronics	HPM50108	HGP	7/9/2010	13 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/19/2010	13 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/19/2010	13 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	7/19/2010	13 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	12/22/2009	24 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/19/2010	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/19/2010	13 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/15/2010	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	13 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12 mo

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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth 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. 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 highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. 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.

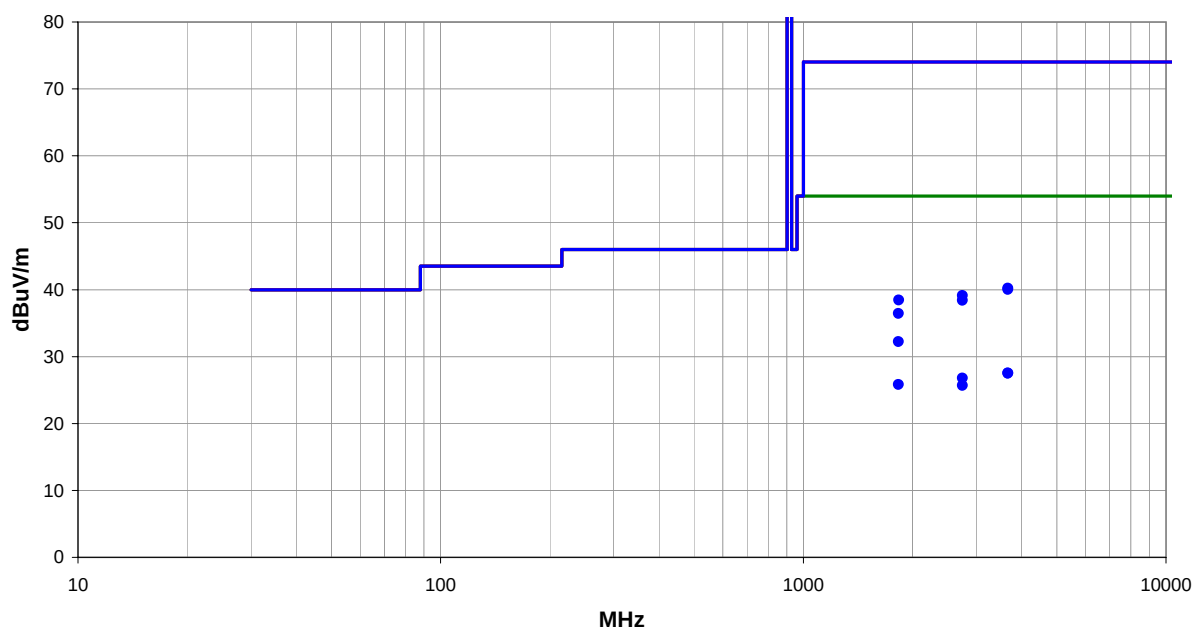
EMC

Spurious Radiated Emissions

Work Order:	OEMW0004	Date:	09/23/10	Trevor Buls Tested by: Trevor Buls
Project:	None	Temperature:	22.53	
Job Site:	MN05	Humidity:	56.99	
Serial Number:	10865	Barometric Pres.:	1007.5	
EUT:	100			
Configuration:	OEMW0004 - 1			
Customer:	OEM Worldwide			
Attendees:	Mike Schneidnes			
EUT Power:	Battery			
Operating Mode:	Low Channel 915.7 MHz, CW Transmit Mode -3 dB Output Power			
Deviations:	None			
Comments:	Worst case position for harmonics is vertical EUT			

Test Specifications	Test Method
FCC 15.249:2010	ANSI C63.4:2009

Run #	16	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
1831.417	38.2	-6.0	1.2	245.0	3.0	0.0	Vert	AV	0.0	32.2	54.0	-21.8
3665.292	28.4	-0.9	1.2	0.0	3.0	0.0	Vert	AV	0.0	27.5	54.0	-26.5
3663.008	28.4	-0.9	1.6	266.0	3.0	0.0	Horz	AV	0.0	27.5	54.0	-26.5
2747.117	30.5	-3.7	1.2	282.0	3.0	0.0	Vert	AV	0.0	26.8	54.0	-27.2
1831.408	31.8	-6.0	1.3	352.0	3.0	0.0	Horz	AV	0.0	25.8	54.0	-28.2
2747.042	29.4	-3.7	1.2	312.0	3.0	0.0	Horz	AV	0.0	25.7	54.0	-28.3
3662.283	41.1	-0.9	1.2	0.0	3.0	0.0	Vert	PK	0.0	40.2	74.0	-33.8
3662.183	40.9	-0.9	1.6	266.0	3.0	0.0	Horz	PK	0.0	40.0	74.0	-34.0
2747.325	42.8	-3.7	1.2	282.0	3.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9
1831.542	44.4	-6.0	1.2	245.0	3.0	0.0	Vert	PK	0.0	38.4	74.0	-35.6
2746.675	42.1	-3.7	1.2	312.0	3.0	0.0	Horz	PK	0.0	38.4	74.0	-35.6
1831.017	42.4	-6.0	1.3	352.0	3.0	0.0	Horz	PK	0.0	36.4	74.0	-37.6

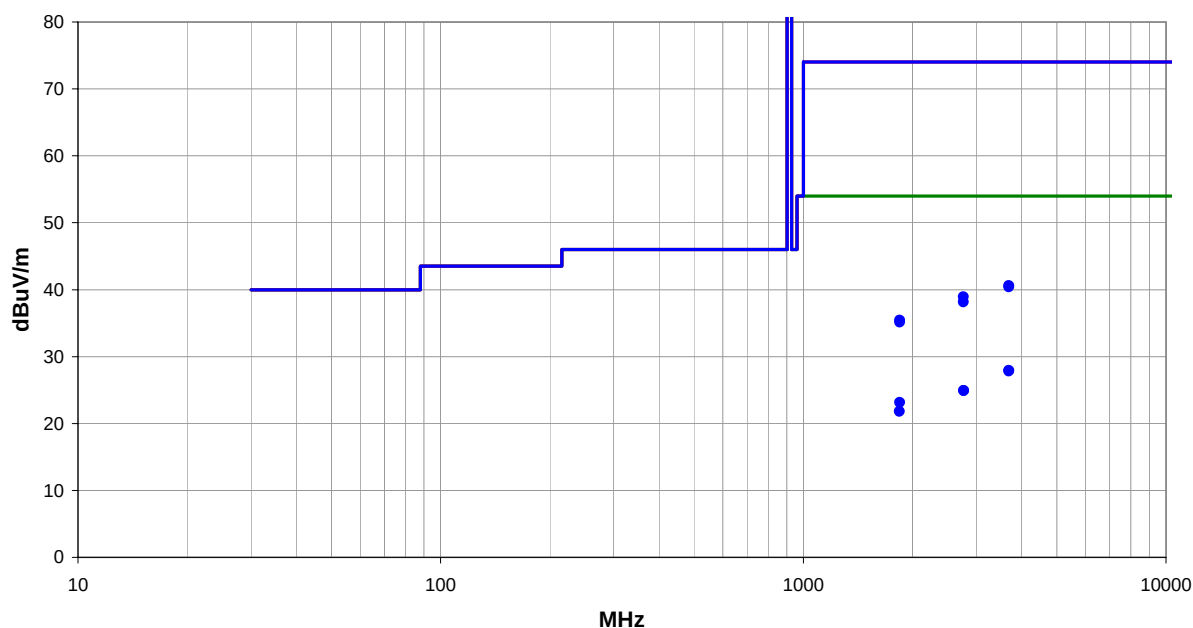
EMC

Spurious Radiated Emissions

Work Order:	OEMW0004	Date:	09/23/10	<i>Trevor Buls</i>
Project:	None	Temperature:	22.53	
Job Site:	MN05	Humidity:	56.99	
Serial Number:	10865	Barometric Pres.:	1007.5	
EUT:	100	Tested by: Trevor Buls		
Configuration:	OEMW0004 - 1			
Customer:	OEM Worldwide			
Attendees:	Mike Schneidnes			
EUT Power:	Battery			
Operating Mode:	High Channel 922.07 MHz, CW Transmit Mode -3 dB Output Power			
Deviations:	None			
Comments:	Worst case position for harmonics is vertical EUT			

Test Specifications	Test Method
FCC 15.249:2010	ANSI C63.4:2009

Run #	21	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
3690.317	28.6	-0.7	1.3	33.0	3.0	0.0	Vert	AV	0.0	27.9	54.0	-26.1
3690.492	28.5	-0.7	1.3	23.0	3.0	0.0	Horz	AV	0.0	27.8	54.0	-26.2
2768.292	28.7	-3.8	1.3	203.0	3.0	0.0	Vert	AV	0.0	24.9	54.0	-29.1
2768.492	28.7	-3.8	1.3	160.0	3.0	0.0	Horz	AV	0.0	24.9	54.0	-29.1
1844.108	29.0	-5.9	1.3	276.0	3.0	0.0	Vert	AV	0.0	23.1	54.0	-30.9
1842.250	27.7	-5.9	1.3	223.0	3.0	0.0	Horz	AV	0.0	21.8	54.0	-32.2
3689.808	41.3	-0.7	1.3	23.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4
3688.692	41.1	-0.7	1.3	33.0	3.0	0.0	Vert	PK	0.0	40.4	74.0	-33.6
2764.175	42.7	-3.8	1.3	160.0	3.0	0.0	Horz	PK	0.0	38.9	74.0	-35.1
2764.742	41.9	-3.8	1.3	203.0	3.0	0.0	Vert	PK	0.0	38.1	74.0	-35.9
1843.925	41.3	-5.9	1.3	276.0	3.0	0.0	Vert	PK	0.0	35.4	74.0	-38.6
1844.783	41.0	-5.9	1.3	223.0	3.0	0.0	Horz	PK	0.0	35.1	74.0	-38.9

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

CW Transmit Mode -3 dB Output Power

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

OEMW0004 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	902 MHz	Stop Frequency	928 MHz
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SAMPLE CALCULATIONS

$$\text{Radiated Emissions: Field Strength} = \text{Measured Level} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain} + \text{Distance Adjustment Factor} + \text{External Attenuation}$$
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/15/2010	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	13 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12 mo

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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

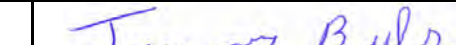
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 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 antennas to be used with the EUT were tested. The EUT was transmitting and while set at the lowest channel and the highest channel available. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT and EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009).

EMC

Field Strength of Fundamental

Work Order:	OEMW0004	Date:	09/23/10	
Project:	None	Temperature:	22.53	
Job Site:	MN05	Humidity:	56.99	
Serial Number:	10865	Barometric Pres.:	1007.5	
		Tested by: Trevor Buls		
EUT:	100			
Configuration:	OEMW0004 - 1			
Customer:	OEM Worldwide			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	CW Transmit Mode -3 dB Output Power			
Deviations:	None			
Comments:				

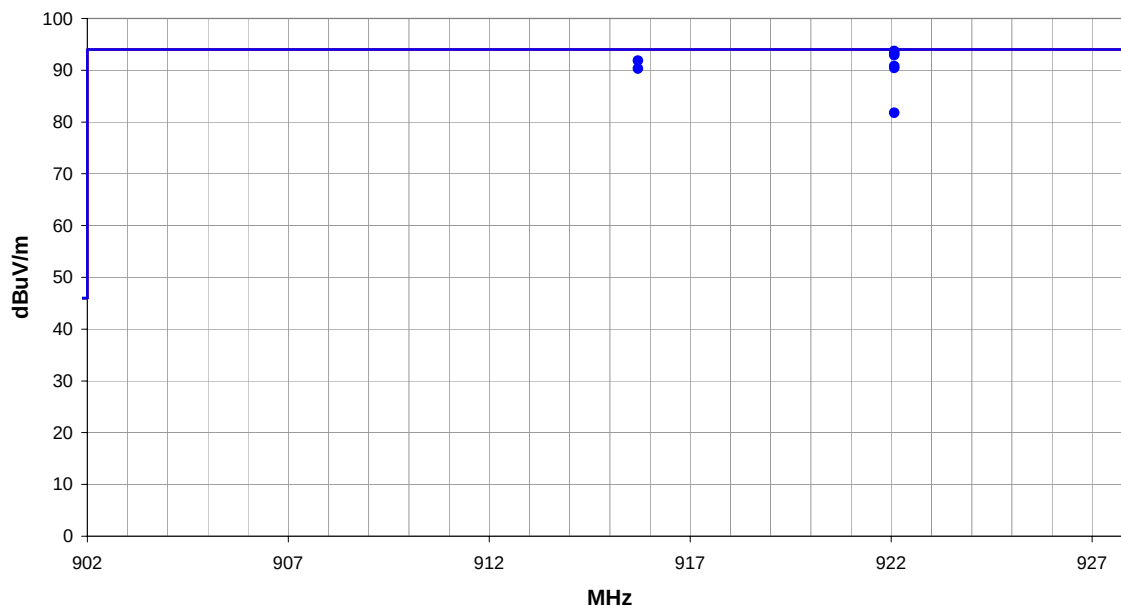
Test Specifications

FCC 15.249:2010

Test Method

ANSI C63.4:2009

Run #	15	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
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Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
922.075	62.4	31.3	1.4	236.0	3.0	0.0	Horz	QP	0.0	93.7	94.0	-0.3	EUT Horizontal
922.074	61.9	31.3	1.2	196.0	3.0	0.0	Vert	QP	0.0	93.2	94.0	-0.8	EUT on Side
922.073	61.6	31.3	1.2	211.0	3.0	0.0	Vert	QP	0.0	92.9	94.0	-1.1	EUT Vertical
915.703	60.5	31.3	1.1	211.0	3.0	0.0	Vert	QP	0.0	91.8	94.0	-2.2	EUT Vertical
922.074	59.5	31.3	1.3	265.0	3.0	0.0	Horz	QP	0.0	90.8	94.0	-3.2	EUT on Side
922.074	59.1	31.3	1.3	94.0	3.0	0.0	Horz	QP	0.0	90.4	94.0	-3.6	EUT Vertical
915.702	59.0	31.3	1.4	53.0	3.0	0.0	Horz	QP	0.0	90.3	94.0	-3.7	EUT Horizontal
922.074	50.5	31.3	1.3	220.0	3.0	0.0	Vert	QP	0.0	81.8	94.0	-12.2	EUT Horizontal