

Visteon

MACH Voice Link Bluetooth Subsystem Version 2.1a (VMVL2.1a)

May 23, 2005

Report No. 7LAY0038

Report Prepared By:



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

Test Report



22975 NW Evergreen Parkway
 Suite 400
 Hillsboro, Oregon 97124

Certificate of Test
 Issue Date: May 23, 2005
 Visteon

MACH Voice Link Bluetooth Subsystem version 2.1a (VMVL2.1a)

| Specification | Emissions | | |
|---|-----------------|-------------------------------------|--------------------------|
| | Test Method | Pass | Fail |
| FCC 15.247(a) Occupied Bandwidth:2004 | ANSI C63.4:2003 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC 15.247(b) Output Power:2004 | ANSI C63.4:2003 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC 15.247(d) Band Edge Compliance:2004 | ANSI C63.4:2003 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC 15.247(d) Spurious Conducted Emissions:2004 | ANSI C63.4:2003 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| FCC 15.247(d) Spurious Radiated Emissions:2004 | ANSI C63.4:2003 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |


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
 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.

Approved By:

 Dean Ghizzone, President

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 | | |

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 recognized 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 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. 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.



200629-0
200630-0
200676-0

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 212, Issue 1 (Provisional) 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.



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.



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C.



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



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).



Technology International: Assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LACO196. Based upon that assessment, Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.



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 and R-1025, Irvine: C-2094 and R-1943, Newberg: C-1877 and R-1760, Sultan: R-871, C-1784 and R-1761.*)



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. 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



SCOPE

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

<http://www.nwemc.com/scope.asp>

What is measurement uncertainty?

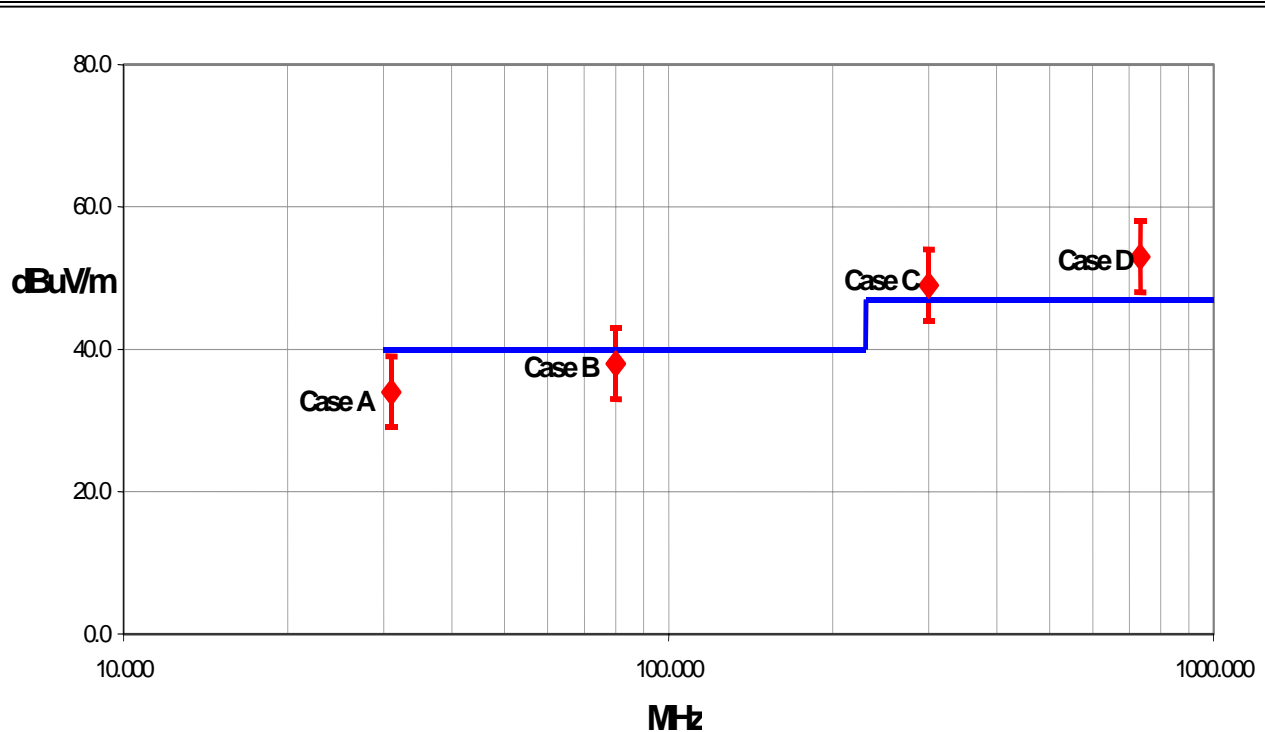
When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value. In the case of transient tests (ESD, EFT, Surge, Voltage Dips and Interruptions), the test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements.

The following documents were the basis for determining the uncertainty levels of our measurements:

- "ISO Guide to the Expression of Uncertainty in Measurements", October 1993
- "NIS81: The Treatment of Uncertainty in EMC Measurements", May 1994
- "IEC CISPR 16-3 A1 f1 Ed.1: Radio-interference measurements and statistical techniques", December 2000

How might measurement uncertainty be applied to test results?

If the diamond marks the measured value for the test and the vertical bars bracket the range of + and - measurement uncertainty, then test results can be interpreted from the diagram below.



Test Result Scenarios:

Case A: Product complies.

Case B: Product conditionally complies. It is not possible to say with 95% confidence that the product complies.

Case C: Product conditionally does not comply. It is not possible to say with 95% confidence that the product does not comply.

Case D: Product does not comply.

Radiated Emissions ≤ 1 GHz

Value (dB)

| Test Distance | Probability Distribution | Biconical Antenna | | Log Periodic Antenna | | Dipole Antenna | |
|---|--------------------------|-------------------|--------|----------------------|--------|----------------|--------|
| | | 3m | 10m | 3m | 10m | 3m | 10m |
| Combined standard uncertainty $u_c(y)$ | normal | + 1.86 | + 1.82 | + 2.23 | + 1.29 | + 1.31 | + 1.25 |
| | | - 1.88 | - 1.87 | - 1.41 | - 1.26 | - 1.27 | - 1.25 |
| Expanded uncertainty U (level of confidence ≈ 95%) | normal (k=2) | + 3.72 | + 3.64 | + 4.46 | + 2.59 | + 2.61 | + 2.49 |
| | | - 3.77 | - 3.73 | - 2.81 | - 2.52 | - 2.55 | - 2.49 |

Radiated Emissions > 1 GHz

Value (dB)

| Test Distance | Probability Distribution | Without High Pass Filter | | With High Pass Filter | |
|---|--------------------------|--------------------------|--------|-----------------------|--------|
| | | 3m | 10m | 3m | 10m |
| Combined standard uncertainty $u_c(y)$ | normal | + 1.29 | + 1.38 | - 1.25 | - 1.35 |
| | | - 1.25 | - 1.35 | - 1.25 | - 1.35 |
| Expanded uncertainty U (level of confidence ≈ 95%) | normal (k=2) | + 2.57 | + 2.76 | - 2.51 | - 2.70 |
| | | - 2.51 | - 2.70 | - 2.51 | - 2.70 |

Conducted Emissions

| | Probability Distribution | Value (+/- dB) |
|--|--------------------------|----------------|
| Combined standard uncertainty $u_c(y)$ | normal | 1.48 |
| Expanded uncertainty U (level of confidence ≈ 95 %) | normal (k = 2) | 2.97 |

Radiated Immunity

| | Probability Distribution | Value (+/- dB) |
|--|--------------------------|----------------|
| Combined standard uncertainty $u_c(y)$ | normal | 1.05 |
| Expanded uncertainty U (level of confidence ≈ 95 %) | normal (k = 2) | 2.11 |

Conducted Immunity

| | Probability Distribution | Value (+/- dB) |
|--|--------------------------|----------------|
| Combined standard uncertainty $u_c(y)$ | normal | 1.05 |
| Expanded uncertainty U (level of confidence ≈ 95 %) | normal (k = 2) | 2.10 |

Legend

$u_c(y)$ = square root of the sum of squares of the individual standard uncertainties

U = combined standard uncertainty multiplied by the coverage factor: k . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then $k=3$ (CL of 99.7%) can be used. Please note that with a coverage factor of one, $u_c(y)$ yields a confidence level of only 68%.



California

Orange County Facility

Labs OC01 – OC13

41 Tesla Ave.
Irvine, CA 92618
(888) 364-2378
FAX (503) 844-3826

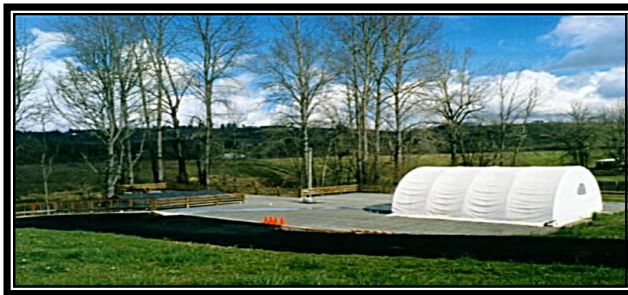


Oregon

Evergreen Facility

Labs EV01 – EV10

22975 NW Evergreen Pkwy.
Suite 400
Hillsboro, OR 97124
(503) 844-4066
FAX (503) 844-3826



Oregon

Trails End Facility

Labs TE01 – TE03

30475 NE Trails End Lane
Newberg, OR 97132
(503) 844-4066
FAX (503) 537-0735



Washington

Sultan Facility

Labs SU01 – SU07

14128 339th Ave. SE
Sultan, WA 98294
(888) 364-2378
FAX (360) 793-2536

Party Requesting the Test

| | |
|---------------------------------|---|
| Company Name: | 7 Layers US |
| Address: | 9361 Irvine Blvd |
| City, State, Zip: | Irvine, CA 92618 |
| Test Requested By: | Dave Couchman |
| Model: | Visteon MACH Voice Link Bluetooth Subsystem version 2.1a (VMVL2.1a) |
| First Date of Test: | 03-18-2005 |
| Last Date of Test: | 03-25-2005 |
| Receipt Date of Samples: | 03-16-2005 |
| Equipment Design Stage: | Production |
| Equipment Condition: | No visual damage. |

Information Provided by the Party Requesting the Test

| | |
|----------------------------|---|
| Clocks/Oscillators: | Not provided. |
| I/O Ports: | Bluetooth Antenna Input, J1850 Bus A, J1850 Bus B |

Functional Description of the EUT (Equipment Under Test):

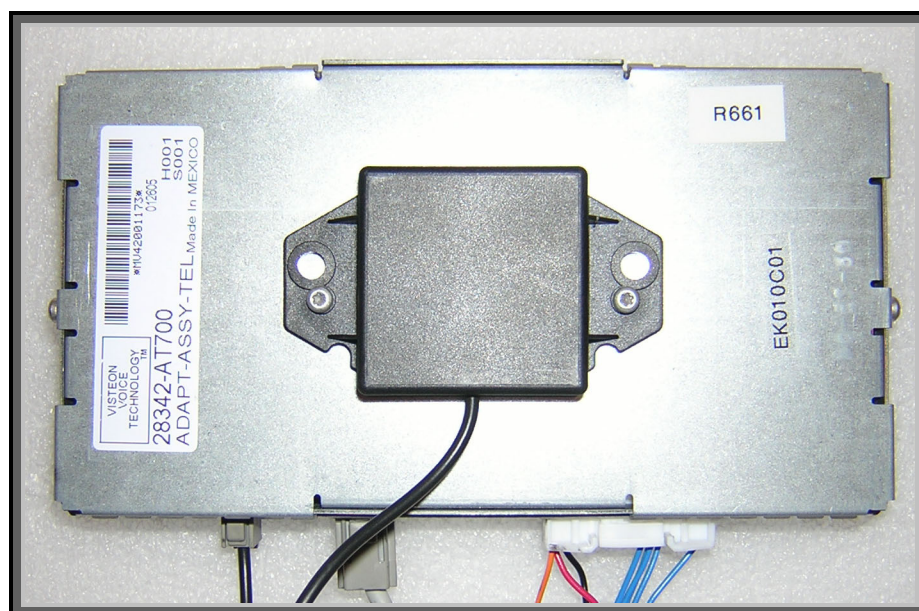
Bluetooth Hands-Free System - Voice Link Bluetooth Subsystem version 2.1a (VMVL2.1a)

Client Justification for EUT Selection:

Not Provided

Client Justification for Test Selection:

The equipment is intended only for vehicle mounting, there are no provisions for connection to the AC mains either directly or indirectly.

EUT Photo

Equipment modifications

| Item | Test | Date | Modification | Note | Disposition of EUT |
|------|------------------------------|------------|---|----------------------------------|--------------------------------|
| 1 | Band Edge Compliance | 03/18/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| 2 | Occupied Bandwidth | 03/18/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| 3 | Output Power | 03/18/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| 4 | Power Spectral Density | 03/21/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| 5 | Spurious Conducted Emissions | 03/25/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| 6 | Spurious Radiated Emissions | 03/25/2005 | No EMI suppression devices were added or modified during this test. | Same configuration as delivered. | EUT remained at Northwest EMC. |
| | | | | | |

Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

| |
|------|
| Low |
| Mid |
| High |

Operating Modes Investigated:

| |
|--------|
| No Hop |
|--------|

Data Rates Investigated:

| |
|---------|
| Maximum |
|---------|

Output Power Setting(s) Investigated:

| |
|---------|
| Maximum |
|---------|

Power Input Settings Investigated:

| |
|---------|
| 12 VDC. |
|---------|

Software\Firmware Applied During Test

| | | | |
|--------------------------|-----------------------|----------------|---------|
| Operating system | Unknown | Version | Unknown |
| Exercise software | VACM Utility Software | Version | 3.0.8 |

Description

The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.

EUT and Peripherals in Test Setup Boundary

| Description | Manufacturer | Model/Part Number | Serial Number |
|----------------------------|-----------------|-------------------|---------------|
| SCP Network Analysis Tool | Ford | N/A | 015674 |
| Bluetooth Hands Free Unit | Visteon | VMVL2.1a | MV42001173 |
| Bluetooth Hands Free Unit | Visteon | VMVL2.1a | MV42001005 |
| Control Box w/harness | Nissan | MVL 2005 | N/A |
| 10Amp/13.8VDC Power Supply | RadioShack TM | CAT. No. 22-506 | 806977 |
| DC Power Supply | Hewlett Packard | 6574A | US36340150 |

| Cables | | | | | |
|------------------|--------|------------|---------|----------------------------|----------------------------|
| Cable Type | Shield | Length (m) | Ferrite | Connection 1 | Connection 2 |
| DC Leads | No | 3.2 | No | SCP Network Analysis Tool | DC Power Supply |
| DC Leads | No | 0.6 | No | Control Box w/harness | 10Amp/13.8VDC Power Supply |
| AC Power | No | 1.8 | No | 10Amp/13.8VDC Power Supply | AC Mains |
| AC Power | No | 2.0 | No | DC Power Supply | AC Mains |
| Serial | No | 1.4 | No | SCP Network Analysis Tool | Control Box w/harness |
| DC Leads | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| Control | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| SMA | No | 1.2 | No | Spectrum Analyzer | RF adapter cable |
| RF adapter cable | No | 0.2 | No | SMA cable | Bluetooth Hands Free Unit |

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

| Measurement Equipment | | | | | |
|-----------------------|-----------------|-------|------------|------------|----------|
| Description | Manufacturer | Model | Identifier | Last Cal | Interval |
| Spectrum Analyzer | Hewlett Packard | 8593E | AAA | 12/06/2004 | 13 mo |

Test Description

Requirement: Per an FCC Interpretation # 20021209-001, "Bluetooth devices may apply under the rules in 15.247 as either a Digital Transmission System (DTS), a Frequency Hopping System (FHSS), or a Hybrid System whichever provides an advantage to the grantee as long as all the requirements are met... The hopping function (*of a hybrid*) must be a true hopping system, as described in Section 15.247(a)(1)."

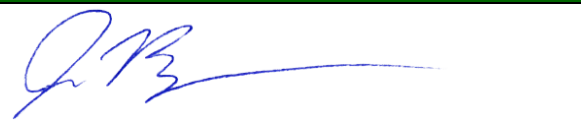
As a DTS system, the minimum 6 dB bandwidth is 500 kHz.

As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation (see 47 CFR 15.247(a)(1)). For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.

As a Hybrid, it must meet the FHSS requirement as described above.

Configuration: The occupied bandwidth 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 the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

Completed by:



EMISSIONS DATA SHEET

| | |
|-------------------------|--------------------------|
| EUT: Visteon BT Unit | Work Order: 7LAY0030 |
| Serial Number: VMVL2.1a | Date: 03/18/05 |
| Customer: Visteon | Temperature: 70 °F |
| Attendees: None | Tested by: Jonathan Peng |
| Customer Ref. No.: N/A | Power: 12VDC |
| | Humidity: 41% RH |
| | Job Site: OC11 |

| | | | |
|---------------------------------|------------|-------------------------------|------------|
| TEST SPECIFICATIONS | | | |
| Specification: 47 CFR 15.247(a) | Year: 2004 | Method: DA 00-705, ANSI C63.4 | Year: 2003 |

| |
|---------------------|
| SAMPLE CALCULATIONS |
| |

COMMENTS
Measured with a direct connection between the RF output and a spectrum analyzer.

EUT OPERATING MODES
Modulated at maximum data rate

DEVIATIONS FROM TEST STANDARD
None

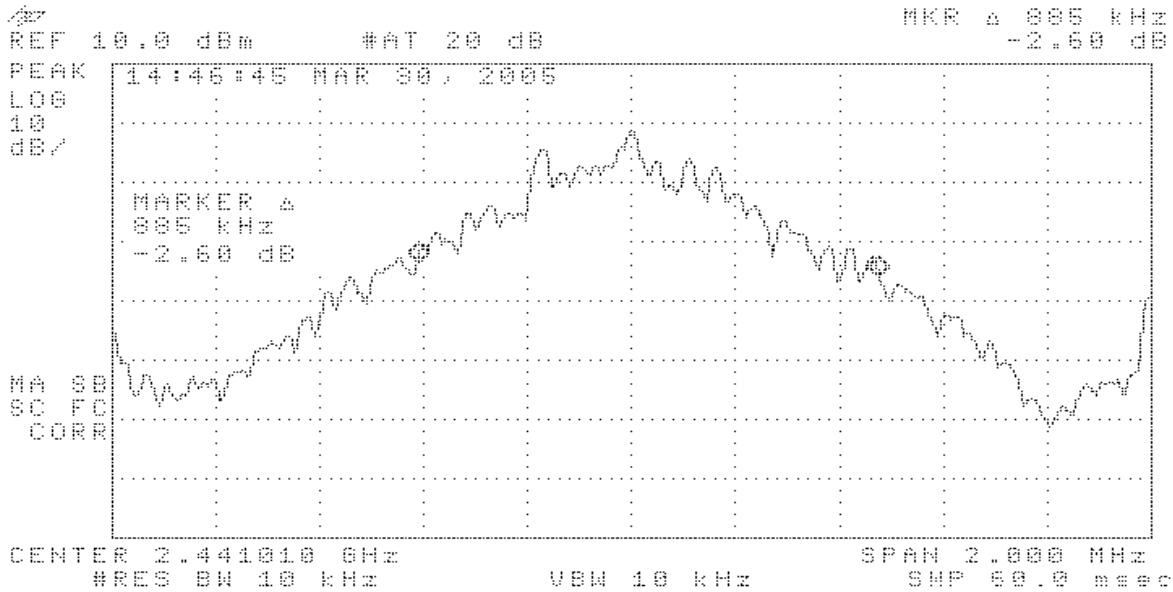
REQUIREMENTS
Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

| | |
|----------------|------------------|
| RESULTS | BANDWIDTH |
| Pass | 0.685 MHz |

SIGNATURE

Tested By: 

DESCRIPTION OF TEST
20dB Bandwidth - Mid Channel



NORTHWEST
EMC

EMISSIONS DATA SHEET

Rev BETA
01/30/01

| | |
|-------------------------|--------------------------|
| EUT: Visteon BT Unit | Work Order: 7LAY0030 |
| Serial Number: VMVL2.1a | Date: 03/18/05 |
| Customer: Visteon | Temperature: 70 °F |
| Attendees: None | Tested by: Jonathan Peng |
| Customer Ref. No.: N/A | Power: 12VDC |
| | Humidity: 41% RH |
| | Job Site: OC11 |

| | | | |
|---------------------------------|------------|-------------------------------|------------|
| TEST SPECIFICATIONS | | | |
| Specification: 47 CFR 15.247(a) | Year: 2004 | Method: DA 00-705, ANSI C63.4 | Year: 2003 |

| | | | |
|---------------------|--|--|--|
| SAMPLE CALCULATIONS | | | |
| | | | |

COMMENTS
Measured with a direct connection between the RF output and a spectrum analyzer.

EUT OPERATING MODES
Modulated at maximum data rate

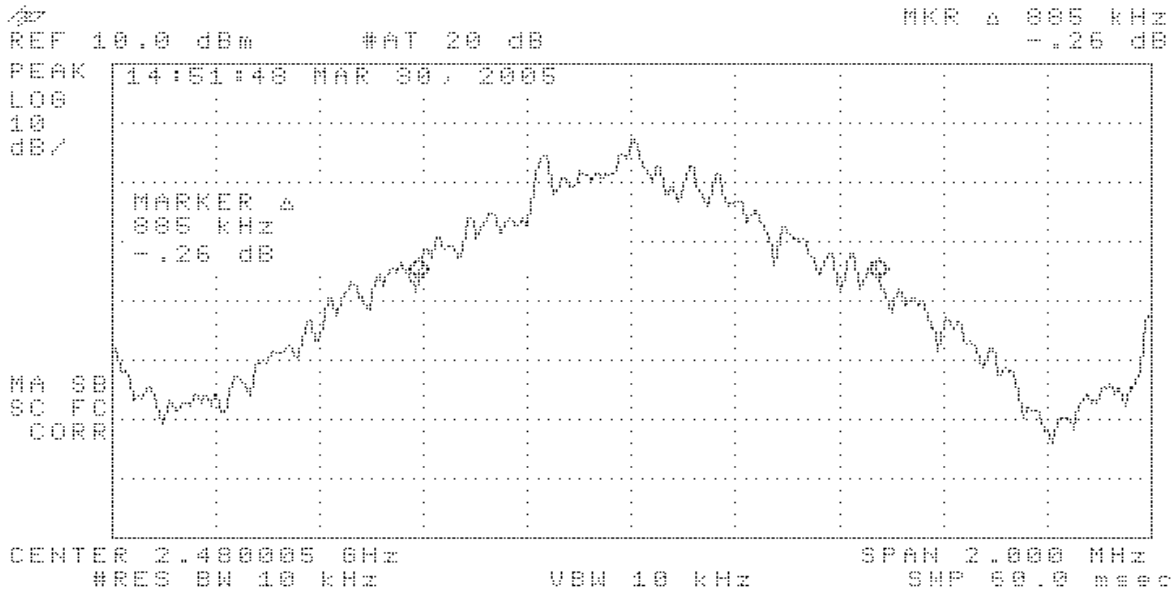
DEVIATIONS FROM TEST STANDARD
None

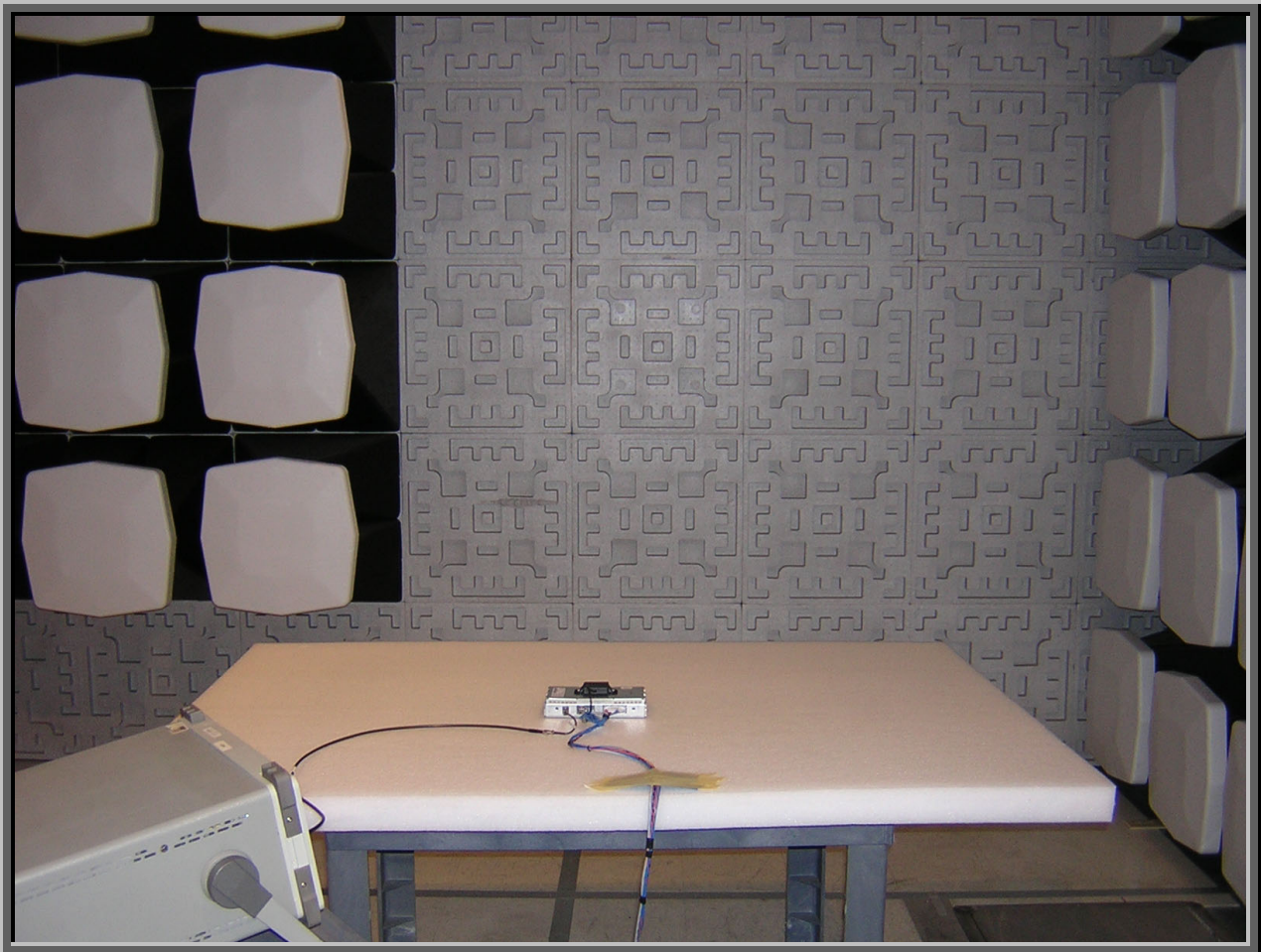
REQUIREMENTS
Bluetooth can be authorized as either a Frequency Hopping System (FHSS), a Digital Transmission System (DTS), or a Hybrid System.
As a FHSS, the maximum 20dB bandwidth of the hopping channel is equal to 1.5 times the channel separation. For example, channel separation for Bluetooth is 1 MHz, therefore the maximum 20 dB bandwidth is 1.5 MHz.
As a DTS system, the minimum 6 dB bandwidth is 500 kHz. As a Hybrid, it must meet the FHSS requirement as described above.

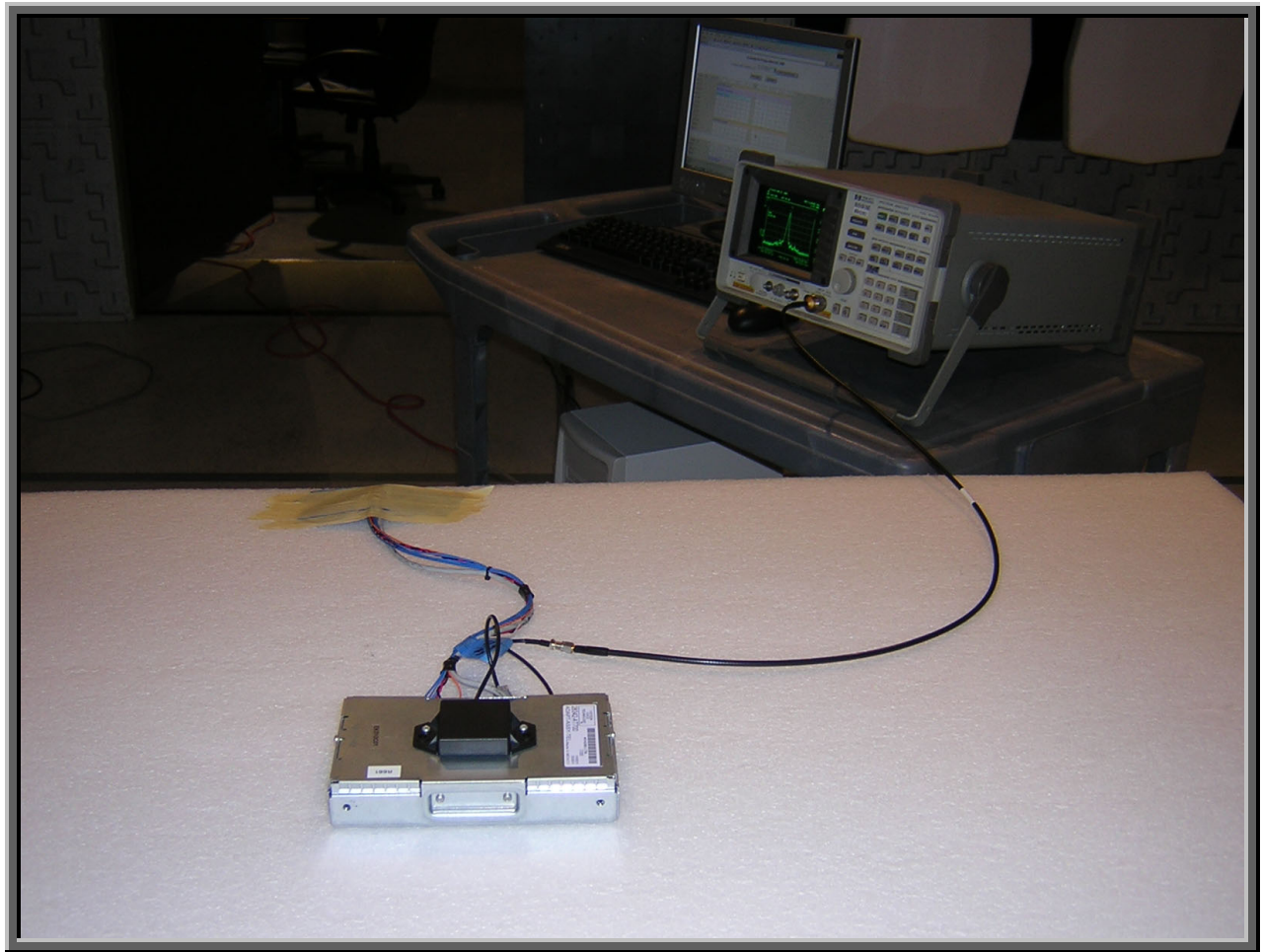
| | |
|----------------|------------------|
| RESULTS | BANDWIDTH |
| Pass | 0.685 MHz |

SIGNATURE
Tested By: 

DESCRIPTION OF TEST
20dB Bandwidth - High Channel







Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

| |
|------|
| Low |
| Mid |
| High |

Operating Modes Investigated:

| |
|--------|
| No Hop |
|--------|

Data Rates Investigated:

| |
|---------|
| Maximum |
|---------|

Power Input Settings Investigated:

| |
|---------|
| 12 VDC. |
|---------|

Software\Firmware Applied During Test

| | | | |
|--------------------------|-----------------------|----------------|---------|
| Operating system | Unknown | Version | Unknown |
| Exercise software | VACM Utility Software | Version | 3.0.8 |

Description

The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest, a middle, and the highest channels in the operating band.

EUT and Peripherals in Test Setup Boundary

| Description | Manufacturer | Model/Part Number | Serial Number |
|----------------------------|-----------------|-------------------|---------------|
| SCP Network Analysis Tool | Ford | N/A | 015674 |
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| 10Amp/13.8VDC Power Supply | RadioShack TM | CAT. No. 22-506 | 806977 |
| DC Power Supply | Hewlett Packard | 6574A | US36340150 |

| Cables | | | | | |
|------------------|--------|------------|---------|----------------------------|----------------------------|
| Cable Type | Shield | Length (m) | Ferrite | Connection 1 | Connection 2 |
| DC Leads | No | 3.2 | No | SCP Network Analysis Tool | DC Power Supply |
| DC Leads | No | 0.6 | No | Control Box w/harness | 10Amp/13.8VDC Power Supply |
| AC Power | No | 1.8 | No | 10Amp/13.8VDC Power Supply | AC Mains |
| AC Power | No | 2.0 | No | DC Power Supply | AC Mains |
| Serial | No | 1.4 | No | SCP Network Analysis Tool | Control Box w/harness |
| DC Leads | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| Control | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| SMA | No | 1.2 | No | Spectrum Analyzer | RF adapter cable |
| RF adapter cable | No | 0.2 | No | SMA cable | Bluetooth Hands Free Unit |

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

| Measurement Equipment | | | | | |
|-----------------------|-----------------|-------|------------|------------|----------|
| Description | Manufacturer | Model | Identifier | Last Cal | Interval |
| Spectrum Analyzer | Hewlett Packard | 8593E | AAA | 12/06/2004 | 13 mo |

Test Description

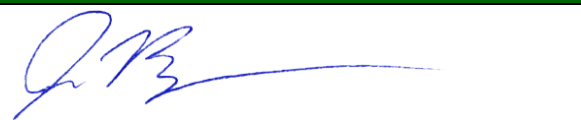
Requirement: Per 47 CFR 15.247(b)(1), the maximum peak output power must not exceed 1 Watt. The measurement is made using a spectrum analyzer using the following settings:

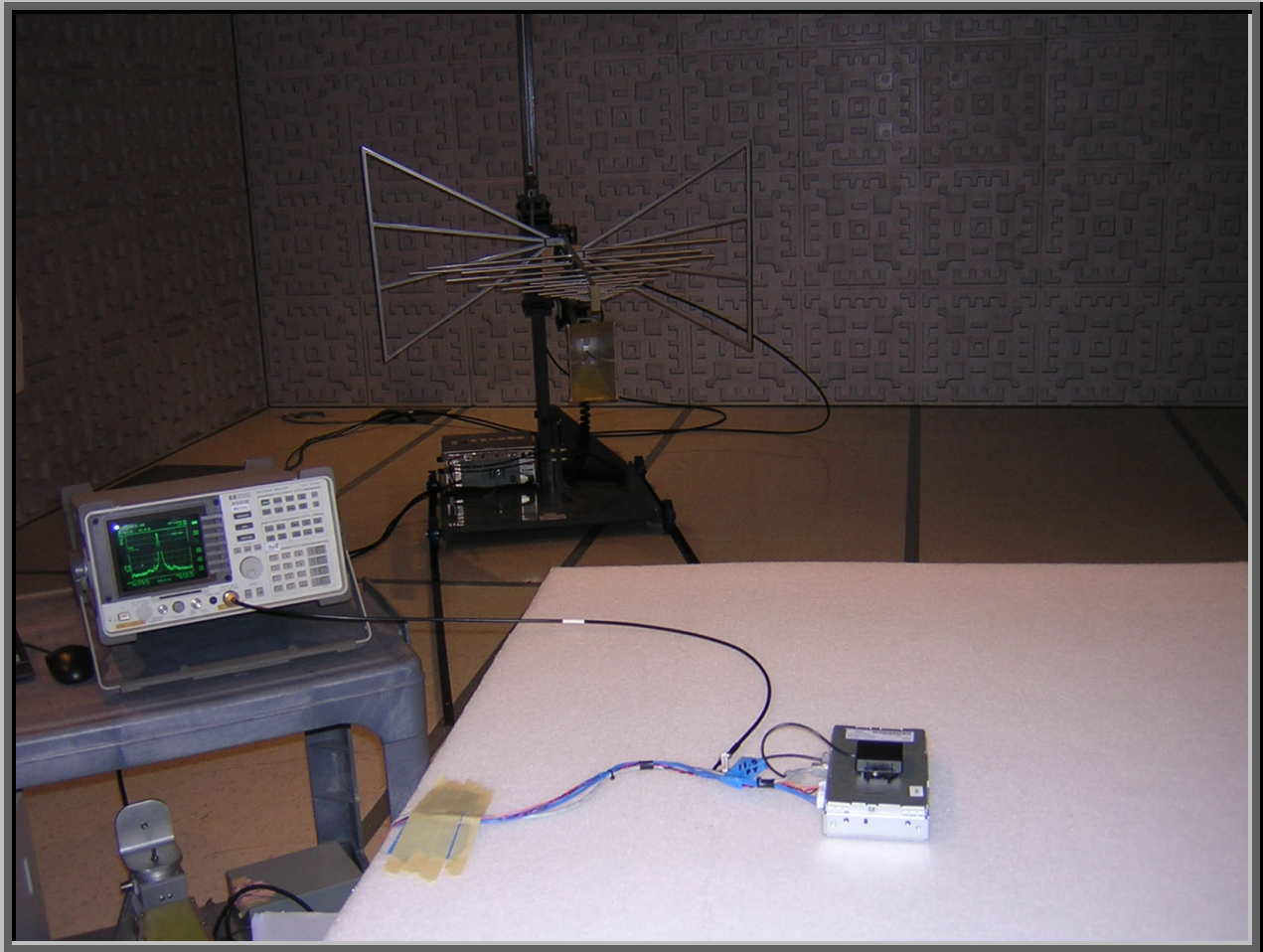
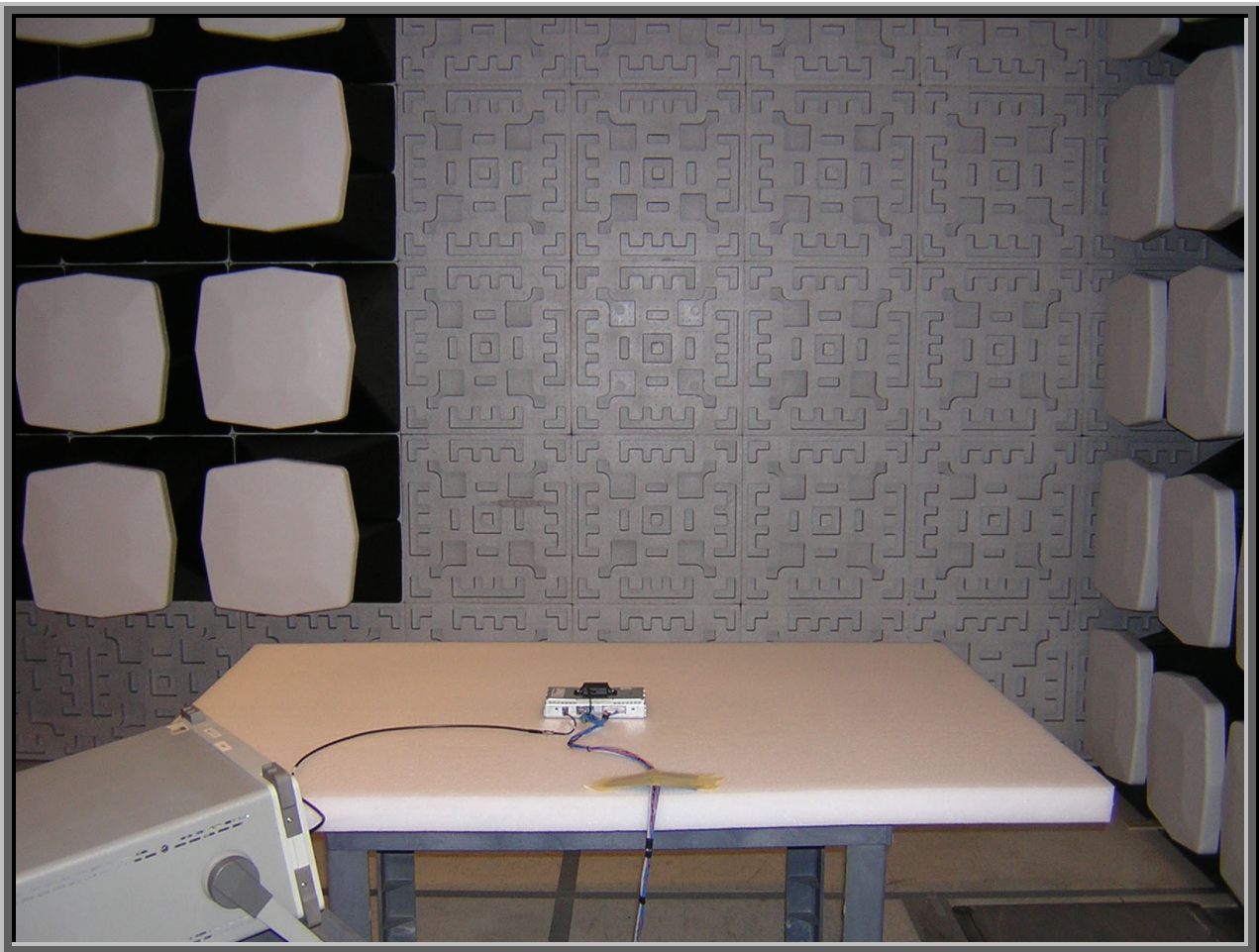
- Resolution bandwidth set to greater than the 6 dB bandwidth of the modulated carrier, and
- The video bandwidth set to greater than or equal to the resolution bandwidth.

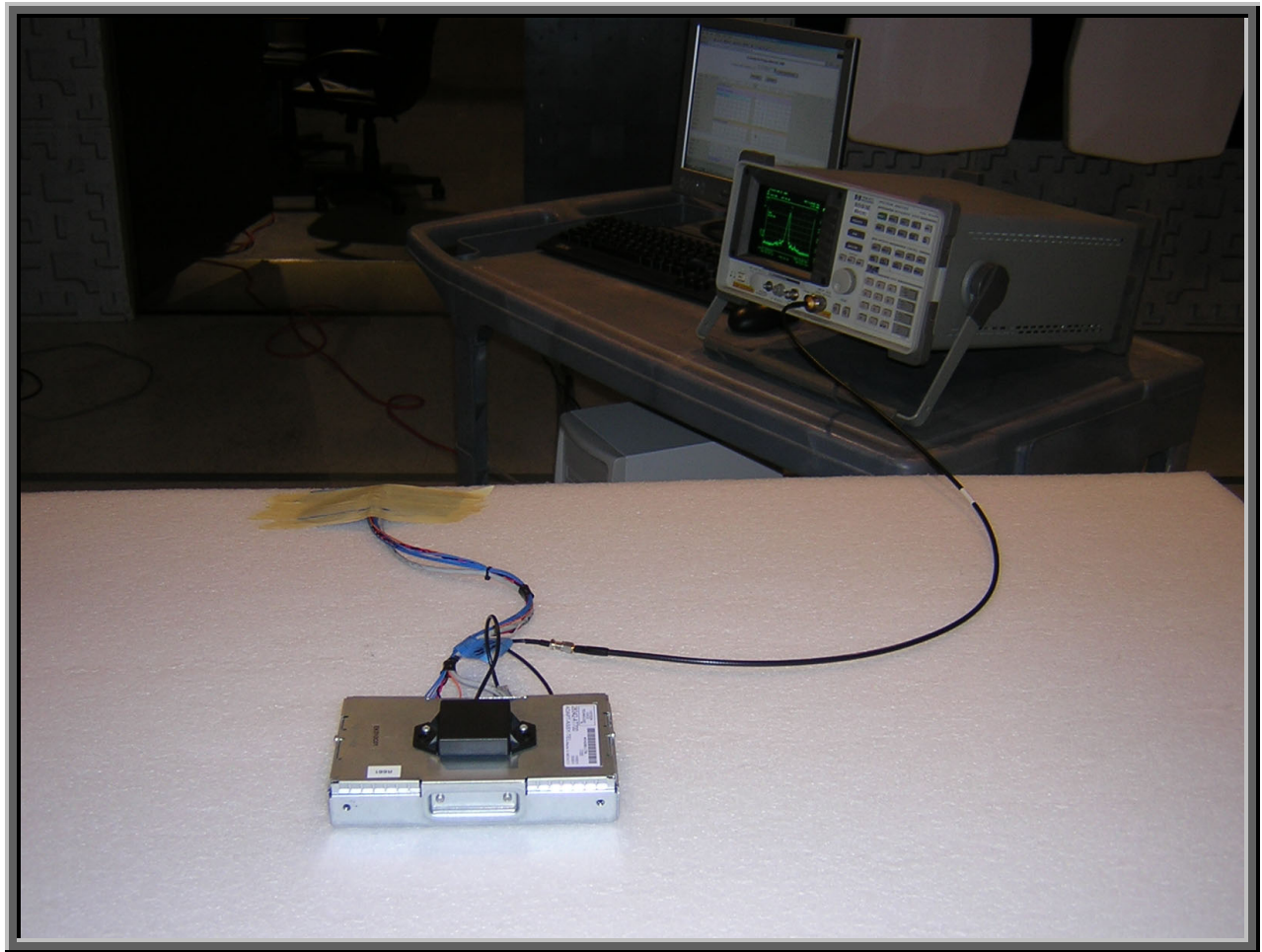
Configuration: The peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

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

Completed by:







Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

Channels in Specified Band Investigated:

Low

High

Operating Modes Investigated:

No Hop

Data Rates Investigated:

Maximum

Output Power Setting(s) Investigated:

Maximum

Power Input Settings Investigated:

12 VDC.

Software\Firmware Applied During Test

| | | | |
|--------------------------|-----------------------|----------------|---------|
| Operating system | Unknown | Version | Unknown |
| Exercise software | VACM Utility Software | Version | 3.0.8 |

Description

The system was tested using special firmware developed to test all functions of the device during the test. The firmware put the radio into a no-hop mode with a modulated carrier. Transmit channels were selectable between the lowest and the highest channels in the operating band.

EUT and Peripherals in Test Setup Boundary

| Description | Manufacturer | Model/Part Number | Serial Number |
|----------------------------|---------------------|--------------------------|----------------------|
| SCP Network Analysis Tool | Ford | N/A | 015674 |
| Bluetooth Hands Free Unit | Visteon | VMVL2.1a | MV42001173 |
| Bluetooth Hands Free Unit | Visteon | VMVL2.1a | MV42001005 |
| Control Box w/harness | Nissan | MVL 2005 | N/A |
| 10Amp/13.8VDC Power Supply | RadioShack TM | CAT. No. 22-506 | 806977 |
| DC Power Supply | Hewlett Packard | 6574A | US36340150 |

| Cables | | | | | |
|------------------|--------|------------|---------|----------------------------|----------------------------|
| Cable Type | Shield | Length (m) | Ferrite | Connection 1 | Connection 2 |
| DC Leads | No | 3.2 | No | SCP Network Analysis Tool | DC Power Supply |
| DC Leads | No | 0.6 | No | Control Box w/harness | 10Amp/13.8VDC Power Supply |
| AC Power | No | 1.8 | No | 10Amp/13.8VDC Power Supply | AC Mains |
| AC Power | No | 2.0 | No | DC Power Supply | AC Mains |
| Serial | No | 1.4 | No | SCP Network Analysis Tool | Control Box w/harness |
| DC Leads | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| Control | No | 3.6 | No | Control Box w/harness | Bluetooth Hands Free Unit |
| SMA | No | 1.2 | No | Spectrum Analyzer | RF adapter cable |
| RF adapter cable | No | 0.2 | No | SMA cable | Bluetooth Hands Free Unit |

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

| Measurement Equipment | | | | | |
|-----------------------|-----------------|-------|------------|------------|----------|
| Description | Manufacturer | Model | Identifier | Last Cal | Interval |
| Spectrum Analyzer | Hewlett Packard | 8593E | AAA | 12/06/2004 | 13 mo |

Test Description

Requirement: Per 47 CFR 15.247(d), in any 100 kHz bandwidth outside the authorized band, the maximum level of radio frequency power must be at least 20dB down from the highest emission level within the authorized band. The measurement is made with the spectrum analyzer's resolution bandwidth set to 100 kHz, and the video bandwidth set to greater than or equal to the resolution bandwidth.

Configuration: The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

Completed by:

