Logic PD

AM3x SOM-M2

EMC Test Report

Report No. LGPD0023.1

Report Prepared By

NORTHWEST EMC

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

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: July 7, 2010
Logic PD
Model: AM3x SOM-M2

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Occupied Bandwidth	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Output Power	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Band Edge Compliance	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Spurious Conducted Emissions	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Power Spectral Density	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Spurious Radiated Emissions	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
AC Powerline Conducted Emissions	FCC 15.207:2010	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.
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).

Accreditations and Authorizations

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

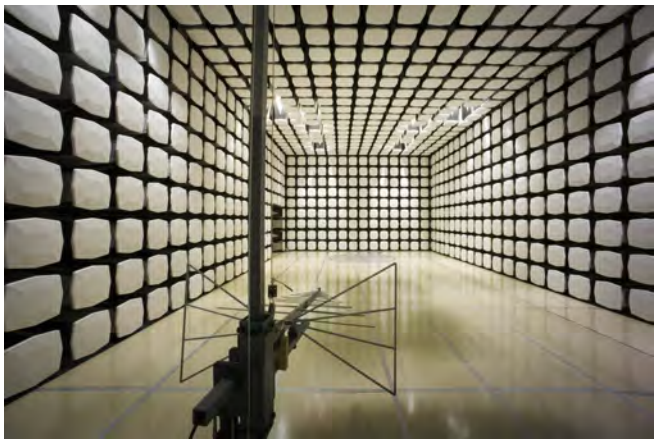
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

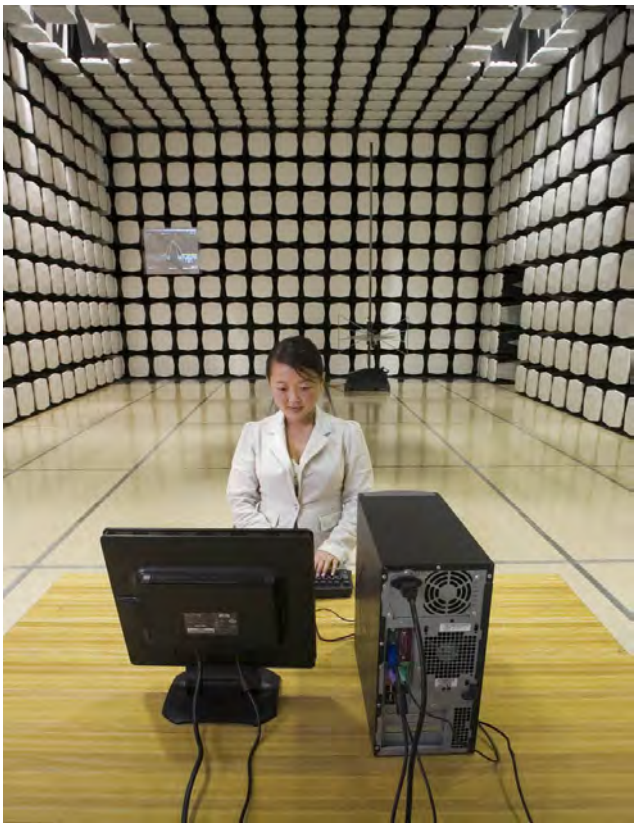
California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

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:	Logic PD
Address:	411 Washington Avenue North, Suite 400
City, State, Zip:	Minneapolis, MN 55401
Test Requested By:	Nathan Kro
Model:	AM3x SOM-M2
First Date of Test:	June 30, 2010
Last Date of Test:	July 7, 2010
Receipt Date of Samples:	June 29, 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):
One combination 802.11b/g/n - Bluetooth radio module

Testing Objective:
Seeking approval for the Bluetooth portion of the radio under FCC 15.247.

CONFIGURATION 1 LGPD0023

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
SOM Module	Logic PD	1015597 Rev A	2010M00186

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Breakout Board	Logic PD	1014472 Rev B	4909M00209
Power Brick	Sceptre	AD2405A	PS2D-5038APL6A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.65m	No	Breakout Board	Power Brick
AC Power	No	1.5m	No	Power Brick	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 LGPD0023

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
SOM Module	Logic PD	1015597 Rev A	2010M00186

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Breakout Board	Logic PD	1014472 Rev B	4909M00209
Power Brick	Sceptre	AD2405A	PS2D-5038APL6A

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	1.5m	No	Power Brick	AC Mains
DC Power	No	1.35m	Yes	Breakout Board	Power Brick
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	6/30/2010	Occupied Bandwidth	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	6/30/2010	Output Power	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.
3	6/30/2010	AC Powerline Conducted 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.
4	7/2/2010	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.
5	7/6/2010	Spurious Conducted 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.
6	7/6/2010	Band Edge Compliance	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.
7	7/7/2010	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

BLUETOOTH APPROVALS

FCC Procedure Received from Joe Dichoso on 2-15-02

The following exhibit indicates the FCC Spread Spectrum requirements in Section 15.247 for devices meeting the Bluetooth Specifications in the 2.4 GHz band as of February 2001 operating in the USA. The purpose of this exhibit is to help expedite the approval process for Bluetooth devices. This exhibit provides items that vary for each device and also provides a list of items that are common to Bluetooth devices that explains the remaining requirements. The list of common items can be submitted for each application for equipment authorization. This exhibit only specifies requirements in Section 15.247, requirements in other rule Sections for intentional radiators such as in Section 15.203 or 15.207 must be also be addressed. A Bluetooth device is a FHSS transmitter in the data mode and applies as a Hybrid spread spectrum device in the acquisition mode.

For each individual device, the following items, 1-7 will vary from one device to another and must be submitted.

1) The occupied bandwidth in Section 15.247(a)(1)(ii).
2) Conducted output power specified in Section 15.247(b)(1).
3) EIRP limit in Section 15.247(b)(3).
4) RF safety requirement in Section 15.247(b)(4)
5) Spurious emission limits in Section 15.247(c).
6) Processing gain and requirements for Hybrids in Section 15.247(f) in the acquisition mode.
7) Power spectral density requirement in Section 15.247(f) in the acquisition mode.

For all devices, the following items, 1-12, are common to all Bluetooth devices and will not vary from one device to another. This list can be copied into the filing.

1 Output power and channel separation of a Bluetooth device in the different operating modes:

The different operating modes (data-mode, acquisition-mode) of a Bluetooth device don't influence the output power and the channel spacing. There is only one transmitter which is driven by identical input parameters concerning these two parameters.
Only a different hopping sequence will be used. For this reason, the RF parameters in one op-mode is sufficient.

2 Frequency range of a Bluetooth device:

The maximum frequency of the device is: **2402 – 2480 M**Hz.
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for devices which will be operated in the USA. Other frequency ranges (e.g. for Spain, France, Japan) which are allowed according the Core Specification must **not be** supported by the device.

3 Co-ordination of the hopping sequence in data mode to avoid simultaneous occupancy by multiple transmitters:

Bluetooth units which want to communicate with other units must be organized in a structure called piconet. This piconet consist of max. 8 Bluetooth units. One unit is the master the other seven are the slaves. The master co-ordinates frequency occupation in this piconet for all units. As the master hop sequence is derived from it's BD address which is unique for every Bluetooth device, additional masters intending to establish new piconets will always use different hop sequences.

4 Example of a hopping sequence in data mode:

Example of a 79 hopping sequence in data mode:
40, 21, 44, 23, 42, 53, 46, 55, 48, 33, 52, 35, 50, 65, 54, 67,
56, 37, 60, 39, 58, 69, 62, 71, 64, 25, 68, 27, 66, 57, 70, 59,
72, 29, 76, 31, 74, 61, 78, 63, 01, 41, 05, 43, 03, 73, 07, 75,
09, 45, 13, 47, 11, 77, 15, 00, 64, 49, 66, 53, 68, 02, 70, 06,
01, 51, 03, 55, 05, 04

5 Equally average use of frequencies in data mode and short transmissions:

The generation of the hopping sequence in connection mode depends essentially on two input values:
1. LAP/UAP of the master of the connection
2. Internal master clock

The LAP (lower address part) are the 24 LSB's of the 48 BD_ADDRESS. The BD_ADDRESS is an unambiguous number of every Bluetooth unit. The UAP (upper address part) are the 24 MSB's of the 48 BD_ADDRESS. The internal clock of a Bluetooth unit is derived from a free running clock which is never adjusted and is never turned off. For synchronization with other units, only the offsets are used. It has no relation to the time of the day. Its resolution is at least half the RX/TX slot length of 312.5 µs. The clock has a cycle of about one day (23h30). In most case it is implemented as 28 bit counter. For the deriving of the hopping sequence the entire LAP (24 bits), 4 LSB's (4 bits) (Input 1) and the 27 MSB's of the clock (Input 2) are used. With this input values different mathematical procedures (permutations, additions, XOR-operations) are performed to generate the sequence. This will be done at the beginning of every new transmission.
Regarding short transmissions, the Bluetooth system has the following behavior:
The first connection between the two devices is established, a hopping sequence is generated. For transmitting the wanted data, the complete hopping sequence is not used and the connection ends. The second connection will be established. A new hopping sequence is generated. Due to the fact that the Bluetooth clock has a different value, because the period between the two transmission is longer (and it cannot be shorter) than the minimum resolution of the clock (312.5 µs). The hopping sequence will always differ from the first one.

6 Receiver input bandwidth, synchronization and repeated single or multiple packets:

The input bandwidth of the receiver is 1 MHz.
In every connection, one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence (see chapter 5). The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master. Additionally the type of connection (e.g. single or multi-slot packet) is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing is according to the packet type of the connection. Also, the slave of the connection uses these settings. Repeating of a packet has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case. That means, a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence

7 Dwell time in data mode

The dwell time of 0.3797s within a 30 second period in data mode is independent from the packet type (packet length). The calculation for a 30 second period is a follows:
Dwell time = time slot length * hop rate / number of hopping channels *30s
Example for a DH1 packet (with a maximum length of one time slot)
Dwell time = 625 µs * 1600 1/s / 79 * 30s = 0.3797s (in a 30s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)
Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 30s = 0.3797s (in a 30s period)
This is according the Bluetooth Core Specification V 1.0B (+ critical errata) for all Bluetooth devices. Therefore, all Bluetooth devices **comply** with the FCC dwell time requirement in the data mode.
This was checked during the Bluetooth Qualification tests.
The Dwell time in hybrid mode is approximately 2.6 mS (in a 12.8s period)

8 Channel Separation in hybrid mode

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.
The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is fcenter = 75 kHz.
This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).

9 Derivation and examples for a hopping sequence in hybrid mode

For the generation of the inquiry and page hop sequences the same procedures as described for the data mode are used (see item 5), but this time with different input vectors:
**For the inquiry hop sequence, a predefined fixed address is always used. This results in the same 32 frequencies used by all devices doing an inquiry but every time with a different start frequency and phase in this sequence.
**For the page hop sequence, the device address of the paged unit is used as the input vector. This results in the use of a subset of 32 frequencies which is specific for that initial state of the connection establishment between the two units. A page to different devices would result in a different subset of 32 frequencies.
So it is ensured that also in hybrid mode, the frequency is used equally on average.
Example of a hopping sequence in inquiry mode:
48, 50, 09, 13, 52, 54,41, 45, 56, 58, 11, 15, 60, 62, 43, 47, 00, 02, 64, 68, 04, 06, 17, 21, 08, 10, 66, 70, 12, 14, 19, 23
Example of a hopping sequence in paging mode:
08, 57, 68, 70, 51, 02, 42, 40, 04, 61, 44, 46, 63, 14, 50, 48, 16, 65, 52, 54, 67, 18, 58, 56, 20, 53, 60, 62, 55, 06, 66, 64

10 Receiver input bandwidth and synchronization in hybrid mode:

The receiver input bandwidth is the same as in the data mode (1 MHz). When two Bluetooth devices establish contact for the first time, one device sends an inquiry access code and the other device is scanning for this inquiry access code. If two devices have been connected previously and want to start a new transmission, a similar procedure takes place. The only difference is, instead of the inquiry access code, a special access code, derived from the BD_ADDRESS of the paged device will be, will be sent by the master of this connection. Due to the fact that both units have been connected before (in the inquiry procedure) the paging unit has timing and frequency information about the page scan of the paged unit. For this reason the time to establish the connection is reduced.

11 Spread rate / data rate of the direct sequence signal

The Spread rate / Data rate in inquiry and paging mode can be defined via the access code. The access code is the only criterion for the system to check if there is a valid transmission or not. If you regard the presence of a valid access code as one bit of information, and compare it with the length of the access code of 68 bits, the Spread rate / Data rate will be 68/1.

12 Spurious emission in hybrid mode

The Dwell in hybrid mode is shorter than in data mode. For this reason the spurious emissions average level in data mode is worst case. The spurious emissions peak level is the same for both modes.

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
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12

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 20 dB 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 in a no hop mode at its maximum data rate for each of the three different modulations available.

NORTHWEST EMC

OCCUPIED BANDWIDTH

XMit 2010.01.14

EUT:	AM3x SOM-M2			**Work Order:**	LGPD0023
Serial Number:	2010M00186			**Date:**	06/30/10
Customer:	Logic PD			**Temperature:**	23.25°C
Attendees:	None			**Humidity:**	43%
Project:	None			**Barometric Pres.:**	1025.1
Tested by:	Trevor Buls	**Power:**	120VAC/60Hz	**Job Site:**	MN05

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

COMMENTS

None

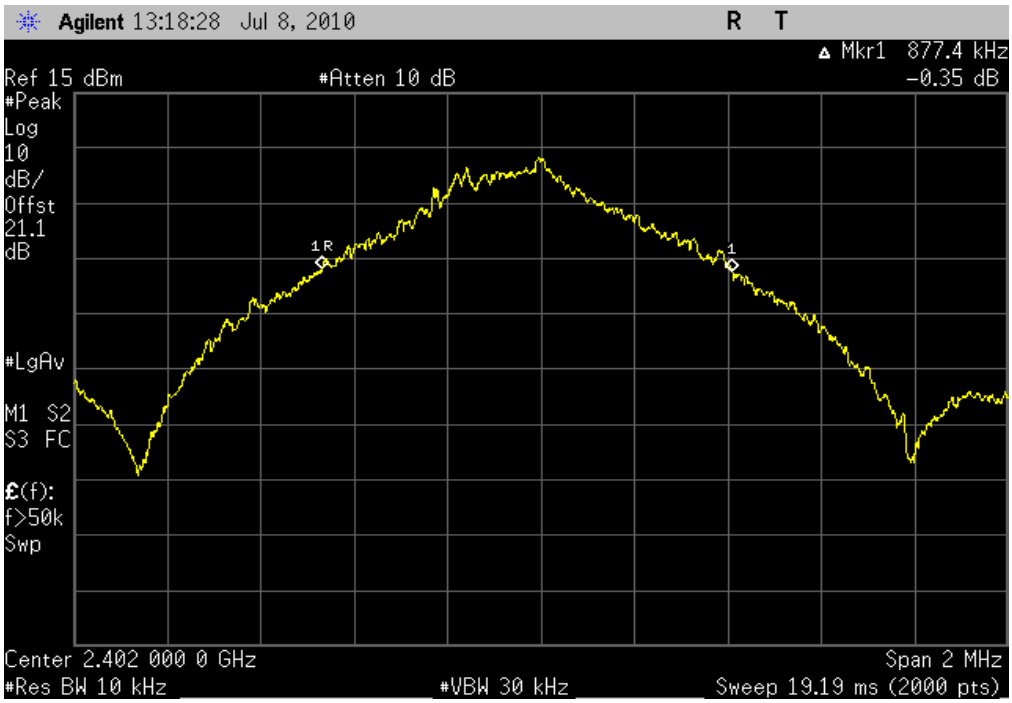
DEVIATIONS FROM TEST STANDARD

No Deviations

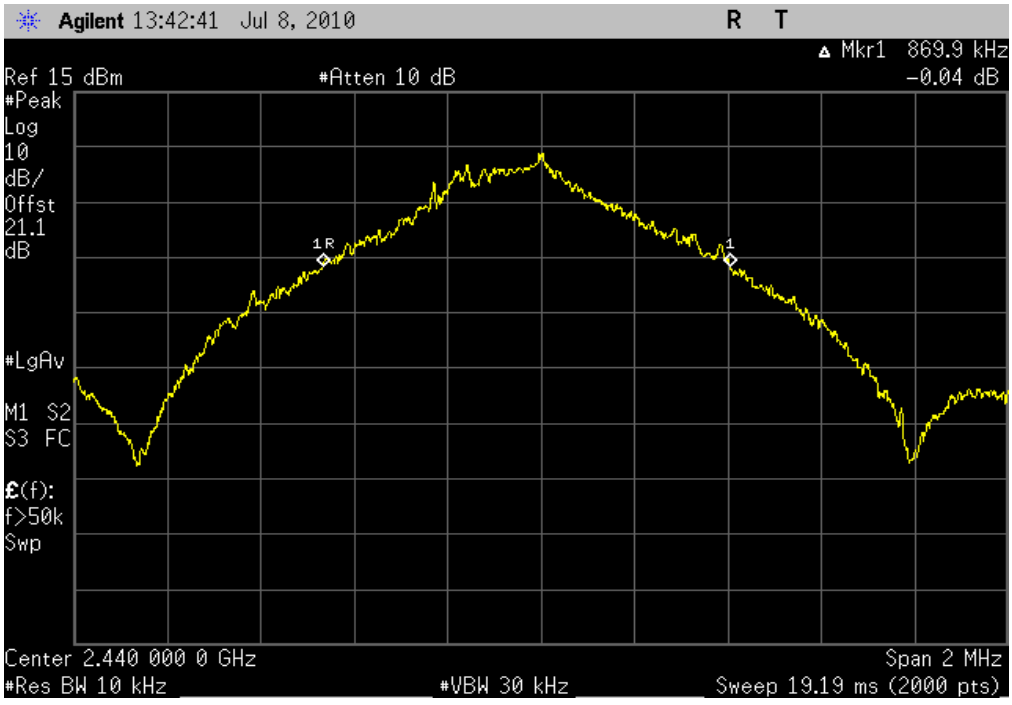
Configuration #	1	Signature	Trevor Buls

		Value	Limit	Results
DH5				
	Low Channel, 2402MHz	877.4 kHz	1.5 MHz	Pass
	Mid Channel, 2440 MHz	869.9 kHz	1.5 MHz	Pass
	High Channel, 2480 MHz	865.9 kHz	1.5 MHz	Pass
2DH5				
	Low Channel, 2402MHz	1.356 MHz	1.5 MHz	Pass
	Mid Channel, 2440 MHz	1.368 MHz	1.5 MHz	Pass
	High Channel, 2480 MHz	1.363 MHz	1.5 MHz	Pass
3DH5				
	Low Channel, 2402MHz	1.368 MHz	1.5 MHz	Pass
	Mid Channel, 2440 MHz	1.363 MHz	1.5 MHz	Pass
	High Channel, 2480 MHz	1.362 MHz	1.5 MHz	Pass

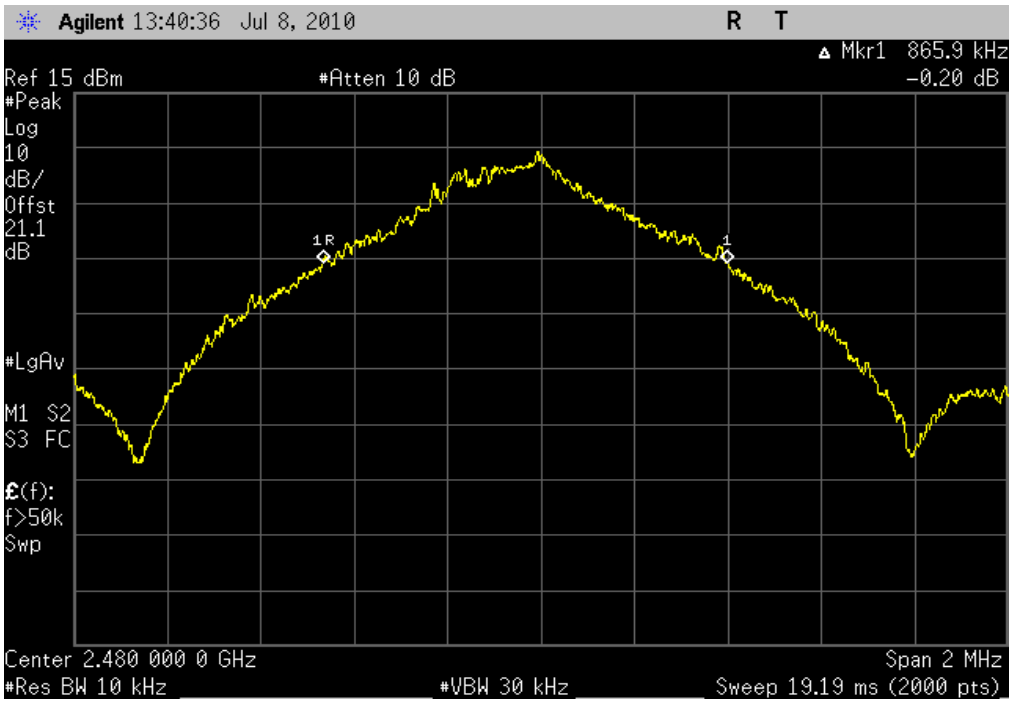
DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	877.4 kHz	**Limit:**	1.5 MHz



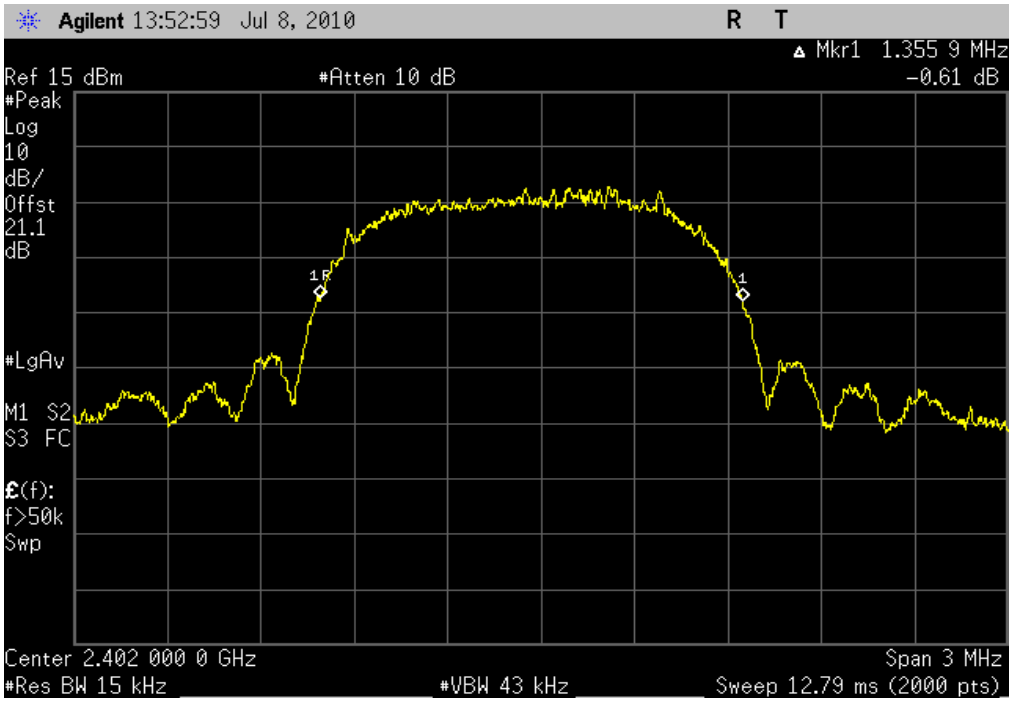
DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	869.9 kHz	**Limit:**	1.5 MHz



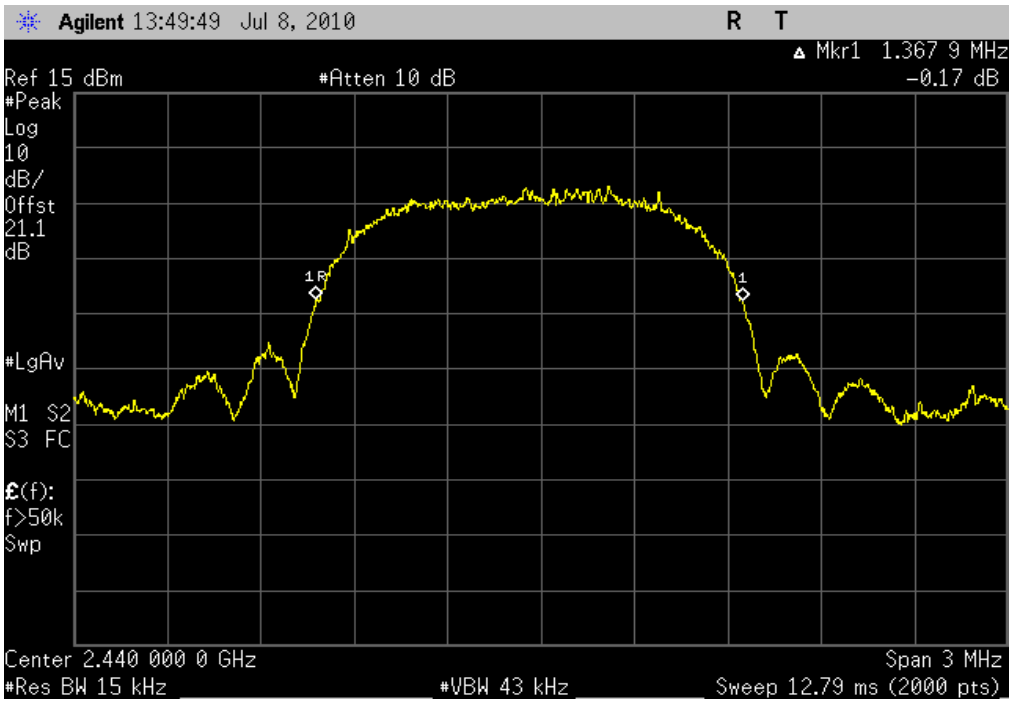
DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	865.9 kHz	**Limit:**	1.5 MHz



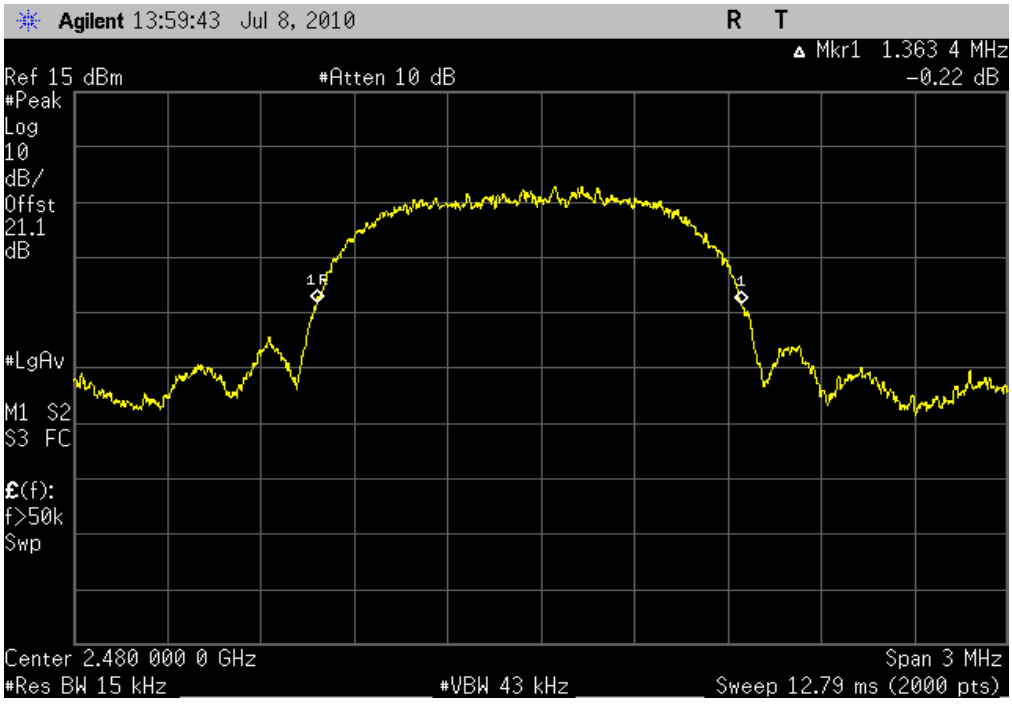
2DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	1.356 MHz	**Limit:**	1.5 MHz



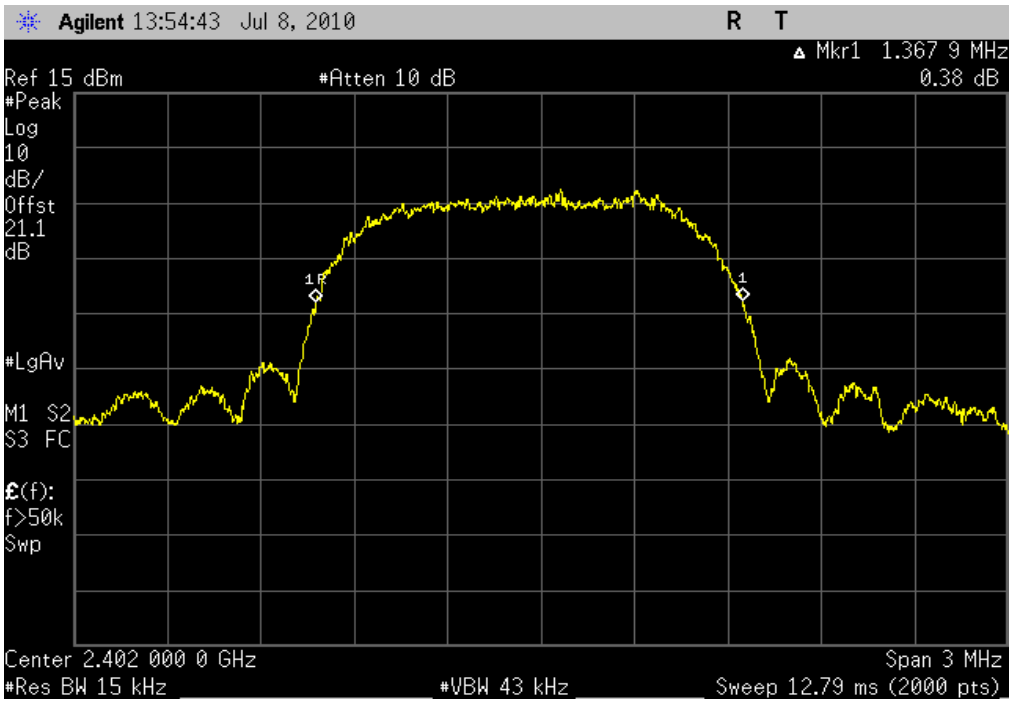
2DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	1.368 MHz	**Limit:**	1.5 MHz



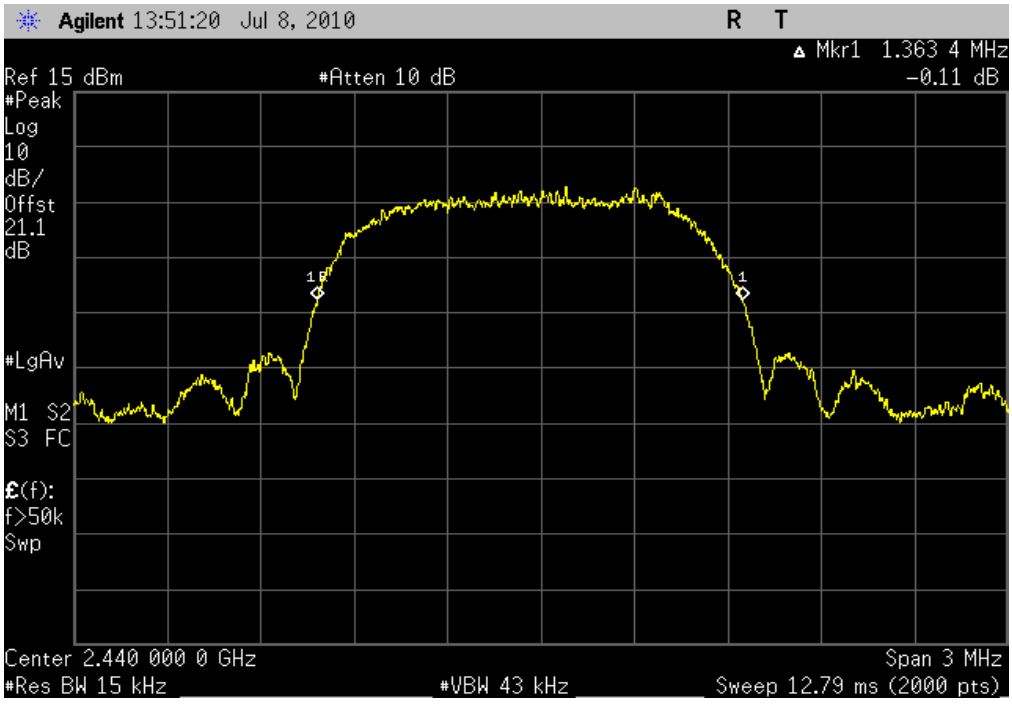
2DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	1.363 MHz	**Limit:**	1.5 MHz



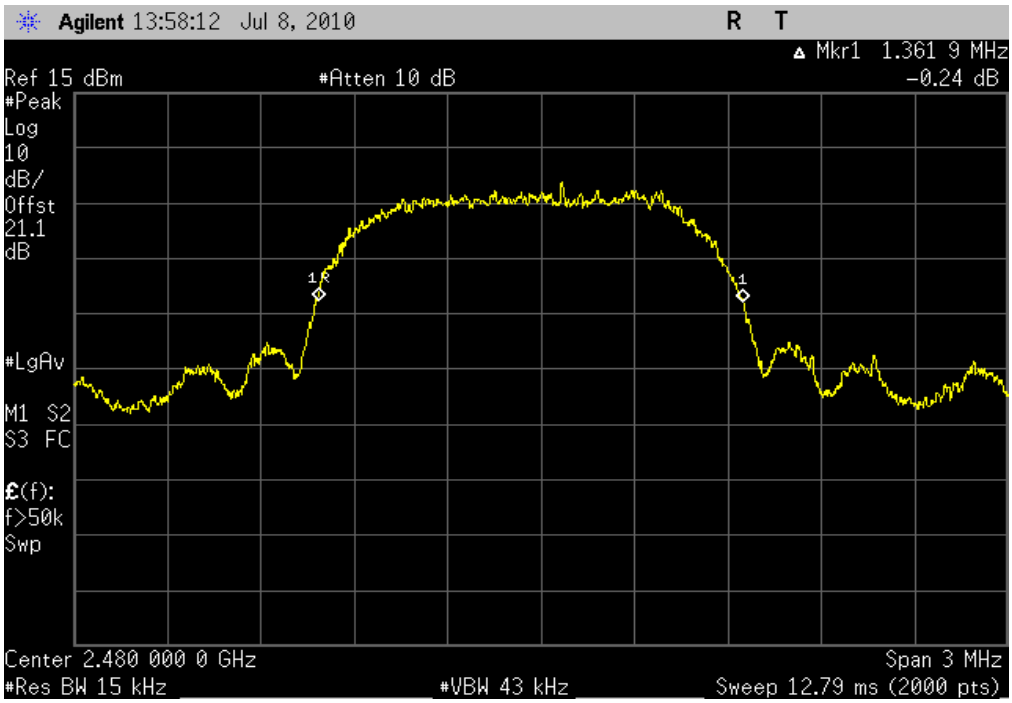
3DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	1.368 MHz	**Limit:**	1.5 MHz



3DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	1.363 MHz	**Limit:**	1.5 MHz



3DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	1.362 MHz	**Limit:**	1.5 MHz



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
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12
Signal Generator	Agilent	N5183A	TIA	11/16/2008	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.

NORTHWEST EMC

OUTPUT POWER

XMit 2010.01.14

EUT:	AM3x SOM-M2			**Work Order:**	LGPD0023
Serial Number:	2010M00186			**Date:**	06/30/10
Customer:	Logic PD			**Temperature:**	23.25°C
Attendees:	None			**Humidity:**	43%
Project:	None			**Barometric Pres.:**	1025.1
Tested by:	Trevor Buls	**Power:**	120VAC/60Hz	**Job Site:**	MN05

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

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

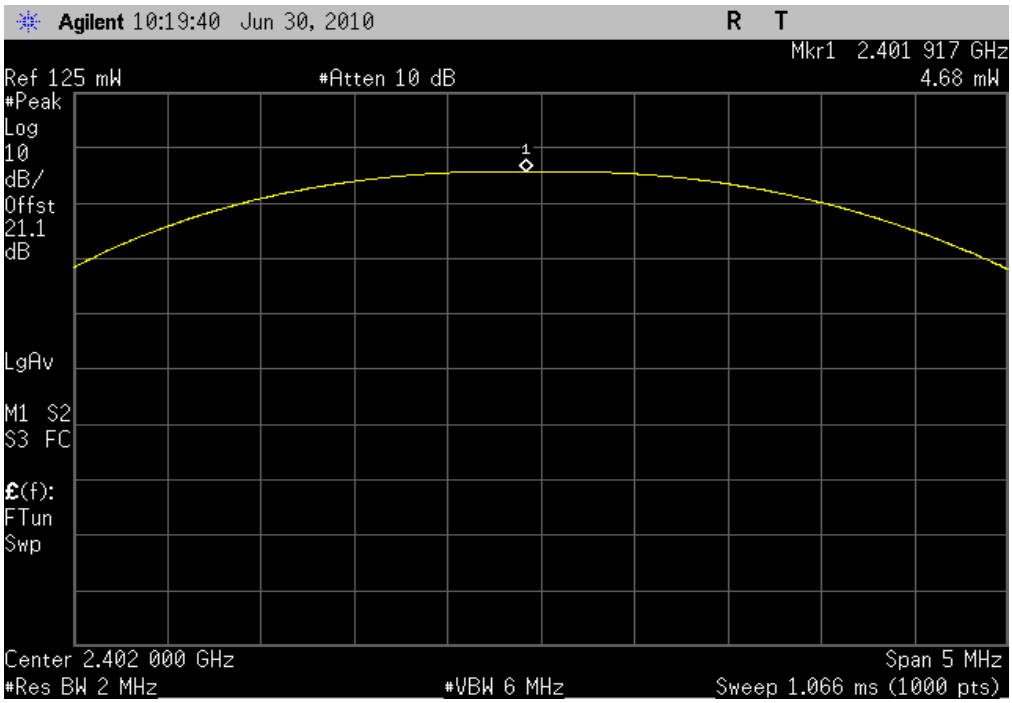
No Deviations

Configuration #	1	Signature Trevor Buls

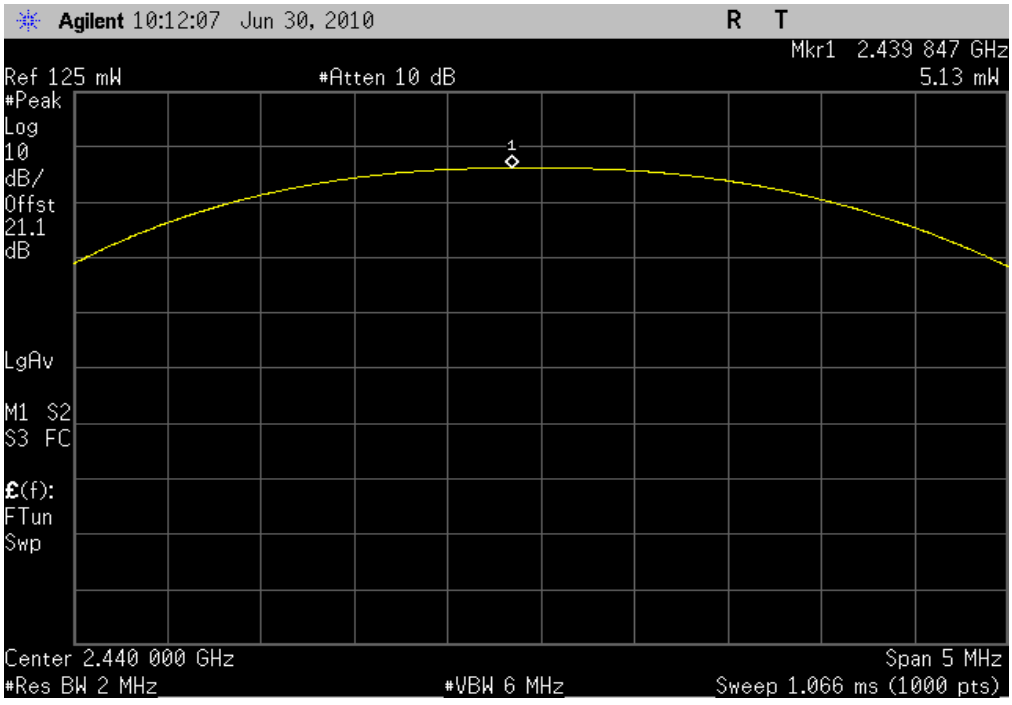
		Value	Limit	Results
DH5				
	Low Channel, 2402MHz	4.68 mW	125 mW	Pass
	Mid Channel, 2440 MHz	5.13 mW	125 mW	Pass
	High Channel, 2480 MHz	5.52 mW	125 mW	Pass
2DH5				
	Low Channel, 2402MHz	4.47 mW	125 mW	Pass
	Mid Channel, 2440 MHz	4.95 mW	125 mW	Pass
	High Channel, 2480 MHz	5.51 mW	125 mW	Pass
3DH5				
	Low Channel, 2402MHz	5.26 mW	125 mW	Pass
	Mid Channel, 2440 MHz	5.91 mW	125 mW	Pass
	High Channel, 2480 MHz	6.63 mW	125 mW	Pass

OUTPUT POWER

DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	4.68 mW	**Limit:**	125 mW

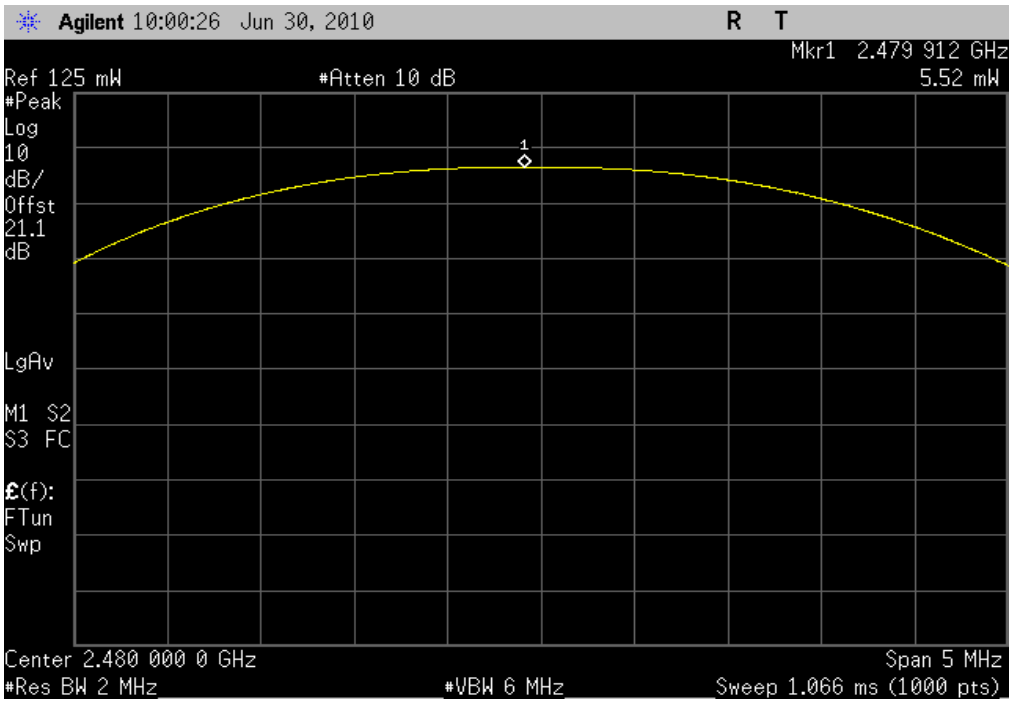


DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	5.13 mW	**Limit:**	125 mW

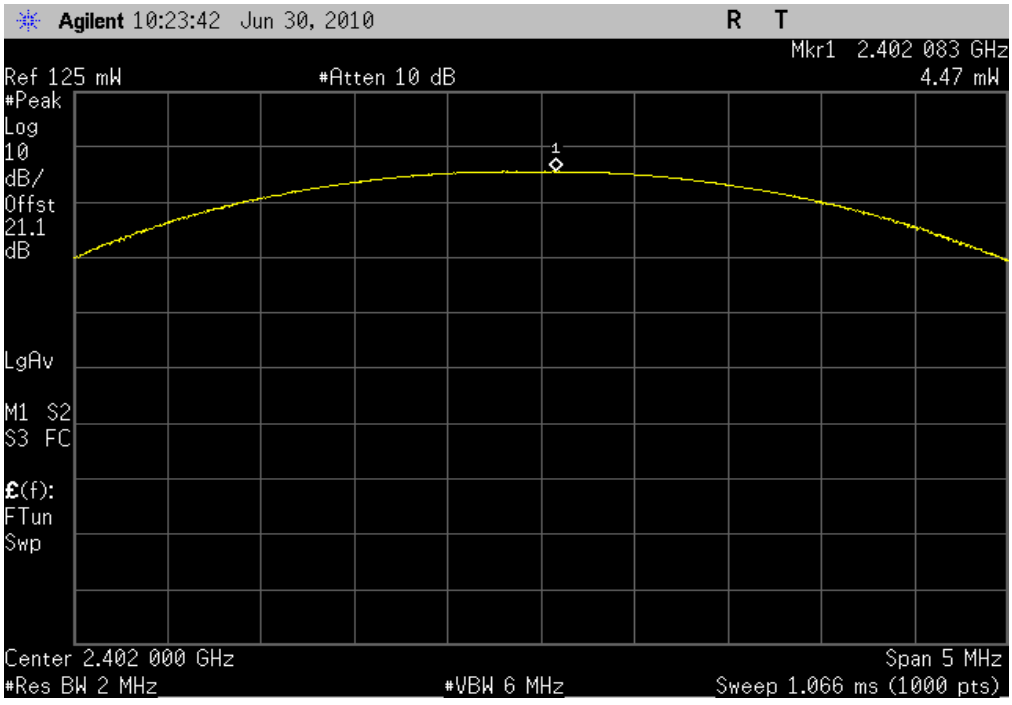


OUTPUT POWER

DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	5.52 mW	**Limit:**	125 mW

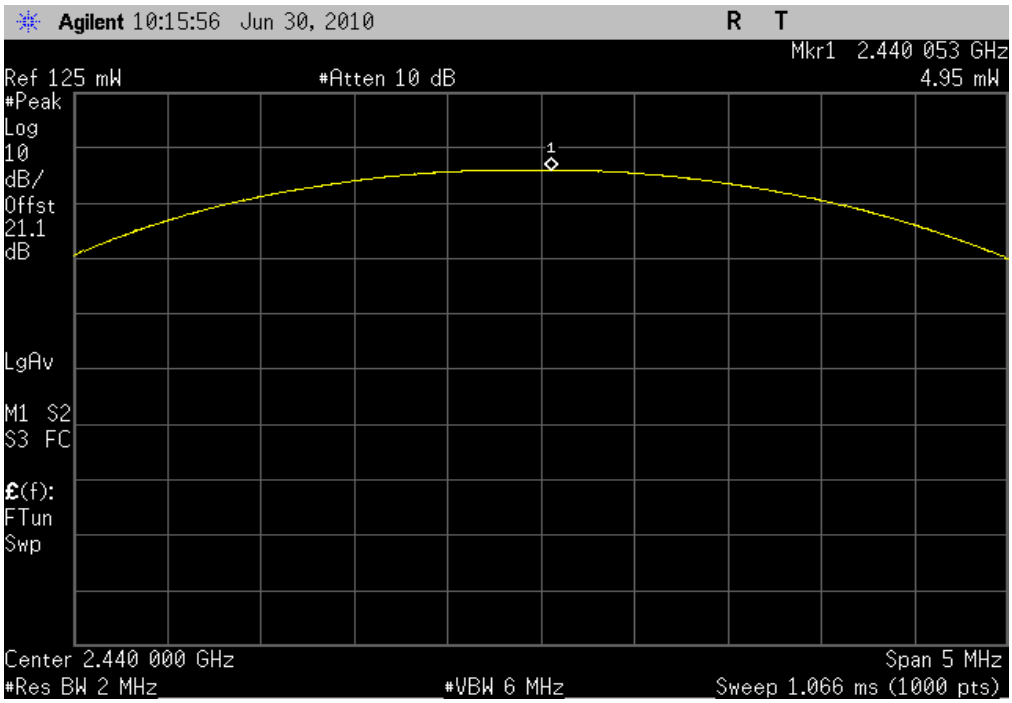


2DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	4.47 mW	**Limit:**	125 mW

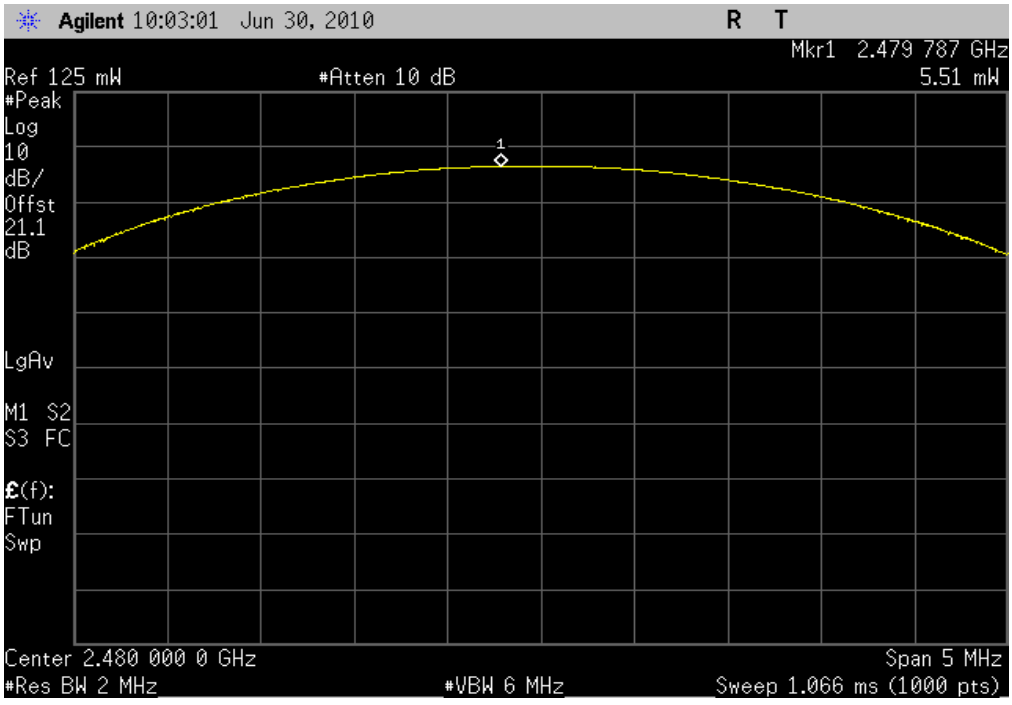


OUTPUT POWER

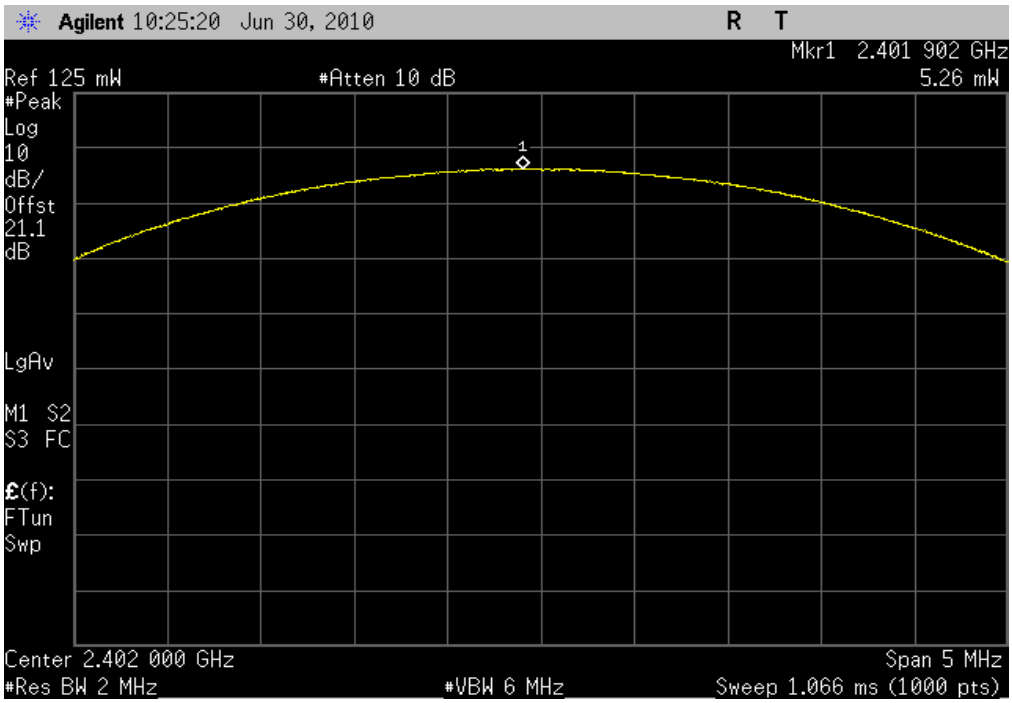
2DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	4.95 mW	**Limit:**	125 mW



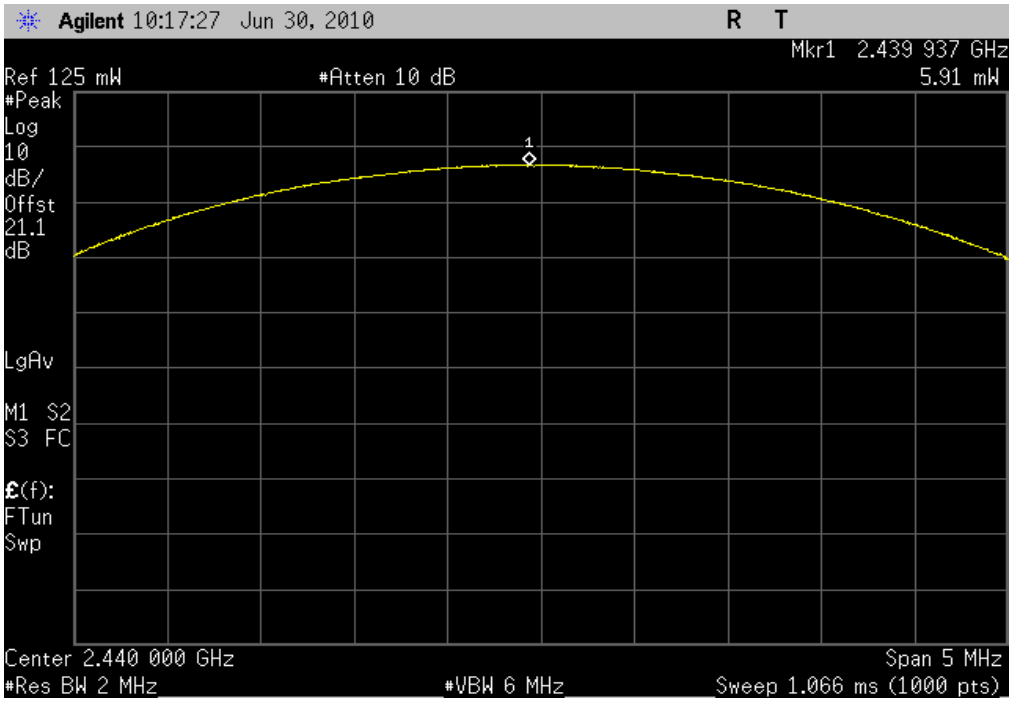
2DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	5.51 mW	**Limit:**	125 mW



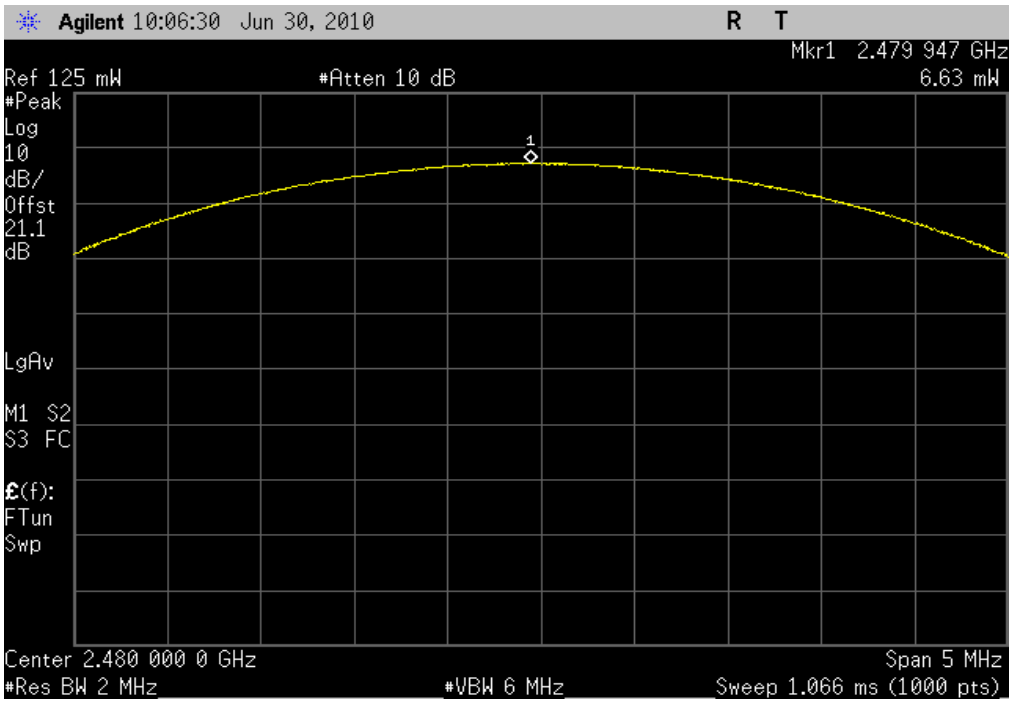
3DH5, Low Channel, 2402MHz					
Result:	Pass	**Value:**	5.26 mW	**Limit:**	125 mW



3DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	5.91 mW	**Limit:**	125 mW



3DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	6.63 mW	**Limit:**	125 mW



BAND EDGE COMPLIANCE

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
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12

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 requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was 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 at least 25 MHz below the band edge to 25 MHz above the band edge.

NORTHWEST EMC

BAND EDGE COMPLIANCE

XMit 2010.01.14

EUT:	AM3x SOM-M2			Work Order:	LGPD0023
Serial Number:	2010M00186			Date:	07/06/10
Customer:	Logic PD			Temperature:	23.06°C
Attendees:	None			Humidity:	62%
Project:	None			Barometric Pres.:	1010.9
Tested by:	Trevor Buls	Power:	120VAC/60Hz	Job Site:	MN05

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

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

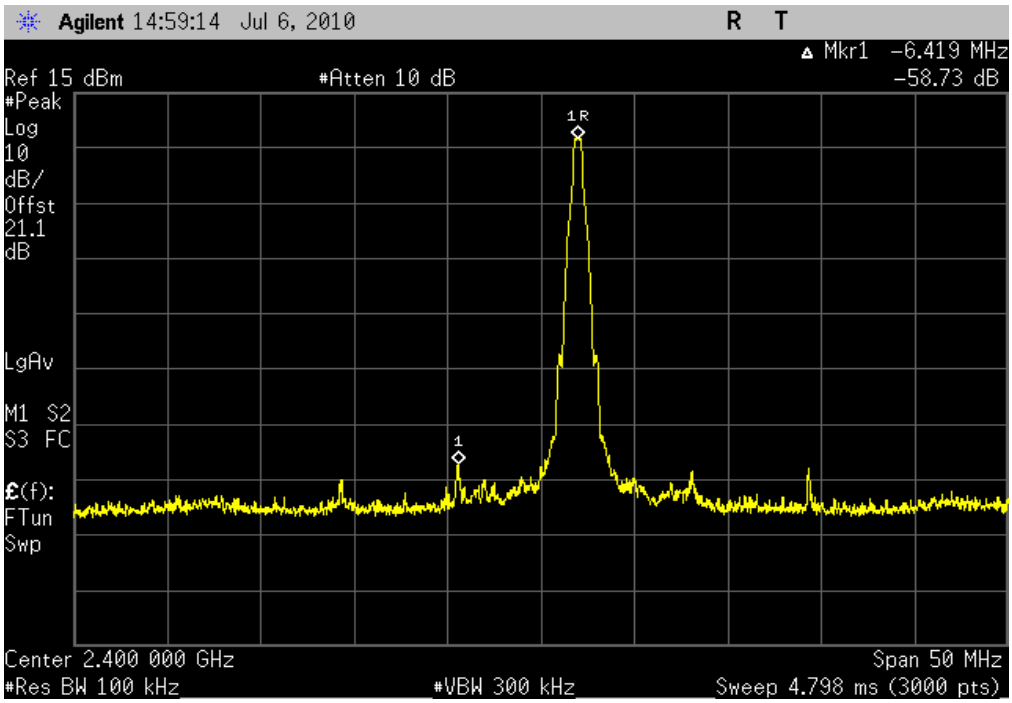
No Deviations

Configuration #	2	Signature	Trevor Buls

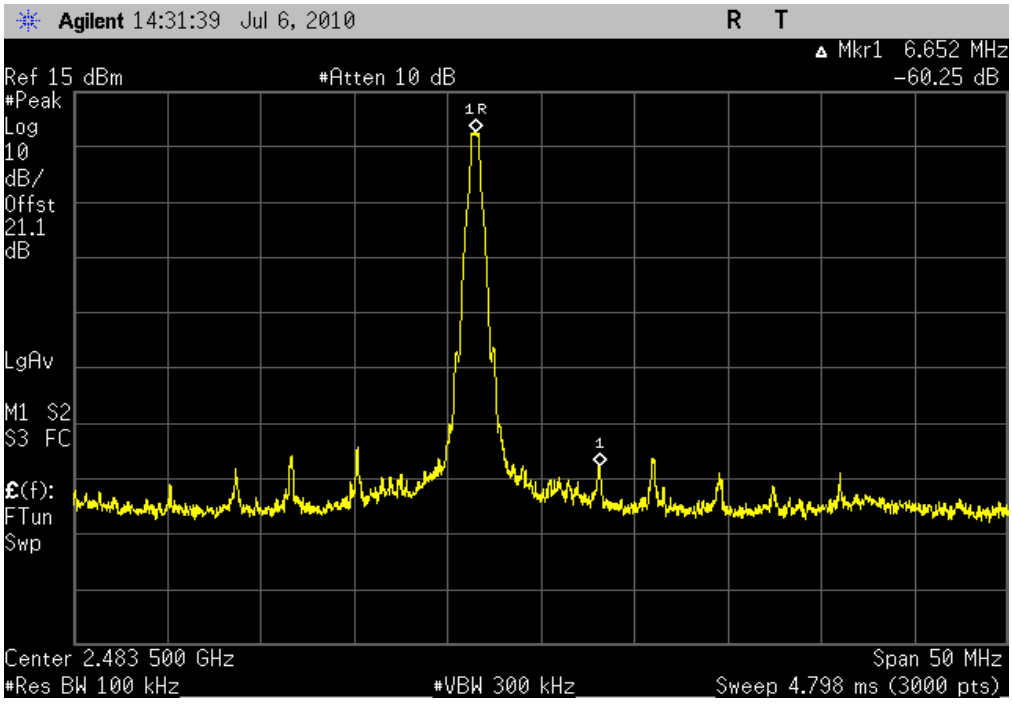
		Value	Limit	Results
DH5				
	Low Channel	-58.73 dBc	≤ -20 dBc	Pass
	High Channel	-60.25 dBc	≤ -20 dBc	Pass
2DH5				
	Low Channel	-46.45 dBc	≤ -20 dBc	Pass
	High Channel	-51.53 dBc	≤ -20 dBc	Pass
3DH5				
	Low Channel	-47.01 dBc	≤ -20 dBc	Pass
	High Channel	-49.21 dBc	≤ -20 dBc	Pass

BAND EDGE COMPLIANCE

DH5, Low Channel					
Result:	Pass	**Value:**	-58.73 dBc	**Limit:**	≤ -20 dBc

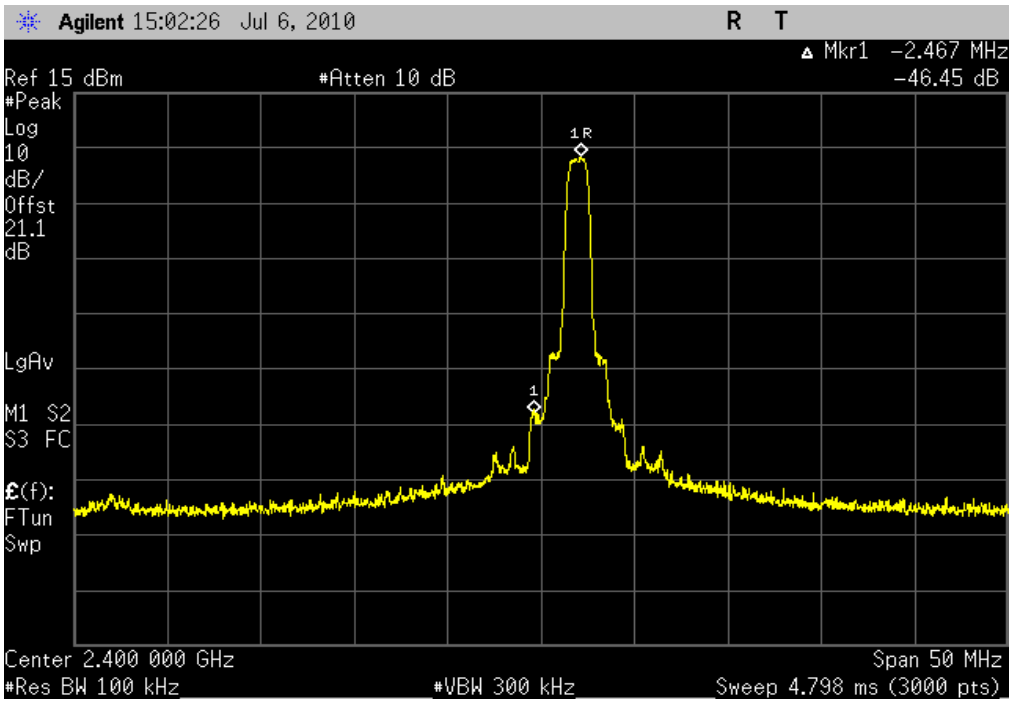


DH5, High Channel					
Result:	Pass	**Value:**	-60.25 dBc	**Limit:**	≤ -20 dBc

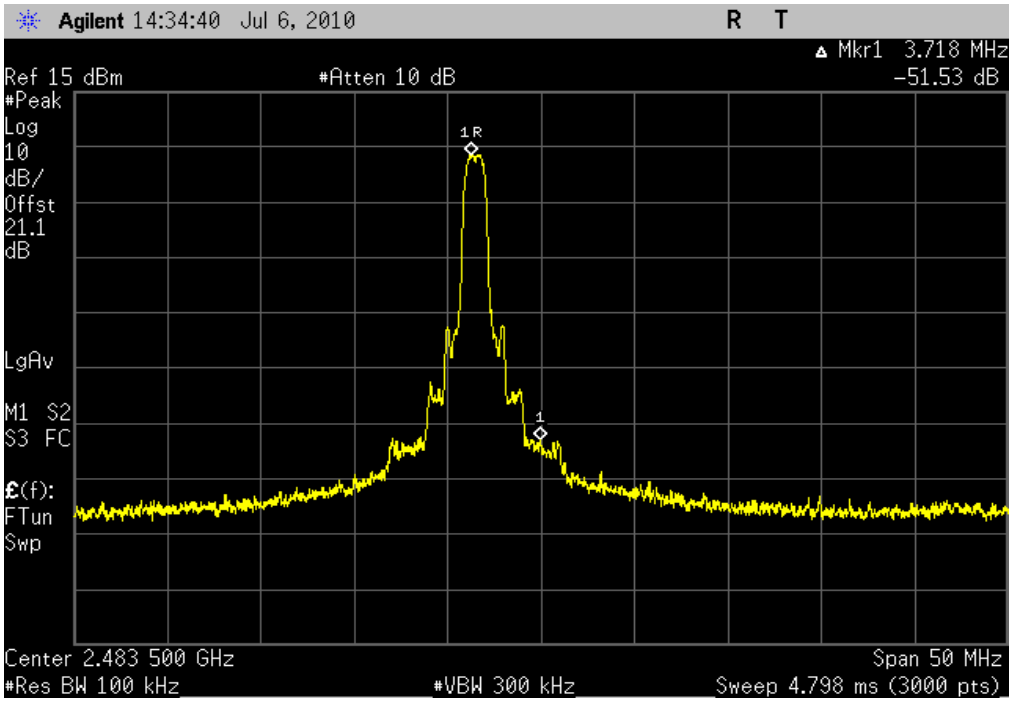


BAND EDGE COMPLIANCE

2DH5, Low Channel					
Result:	Pass	**Value:**	-46.45 dBc	**Limit:**	≤ -20 dBc

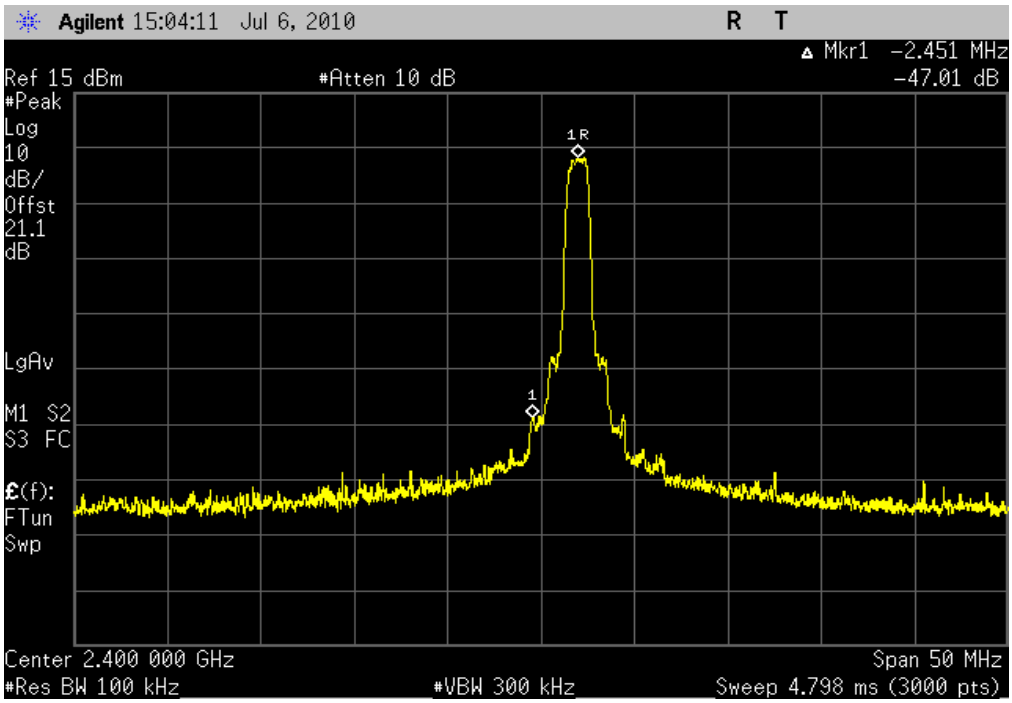


2DH5, High Channel					
Result:	Pass	**Value:**	-51.53 dBc	**Limit:**	≤ -20 dBc

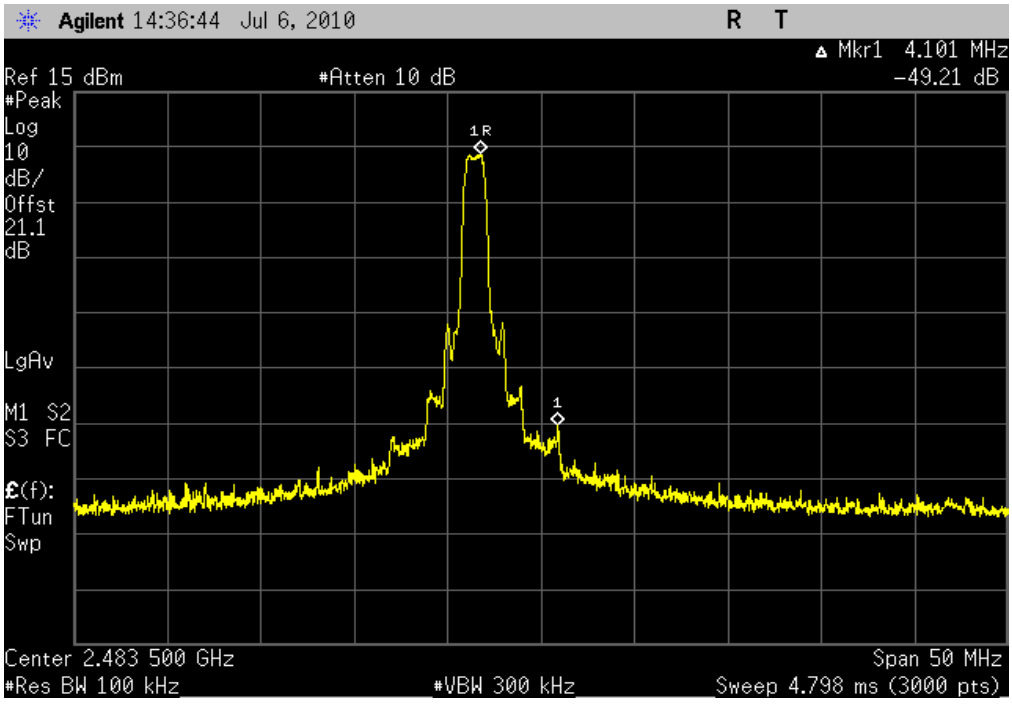


BAND EDGE COMPLIANCE

3DH5, Low Channel					
Result:	Pass	**Value:**	-47.01 dBc	**Limit:**	≤ -20 dBc



3DH5, High Channel					
Result:	Pass	**Value:**	-49.21 dBc	**Limit:**	≤ -20 dBc



SPURIOUS CONDUCTED 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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12

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 spurious RF conducted emissions were measured with the EUT set to low, medium, and high transmit frequencies. The measurements were 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. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

NORTHWEST EMC

SPURIOUS CONDUCTED EMISSIONS

XMit 2010.01.14

EUT:	AM3x SOM-M2			**Work Order:**	LGPD0023
Serial Number:	2010M00186			**Date:**	07/06/10
Customer:	Logic PD			**Temperature:**	23.06°C
Attendees:	None			**Humidity:**	62%
Project:	None			**Barometric Pres.:**	1010.9
Tested by:	Trevor Buls	**Power:**	120VAC/60Hz	**Job Site:**	MN05

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

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

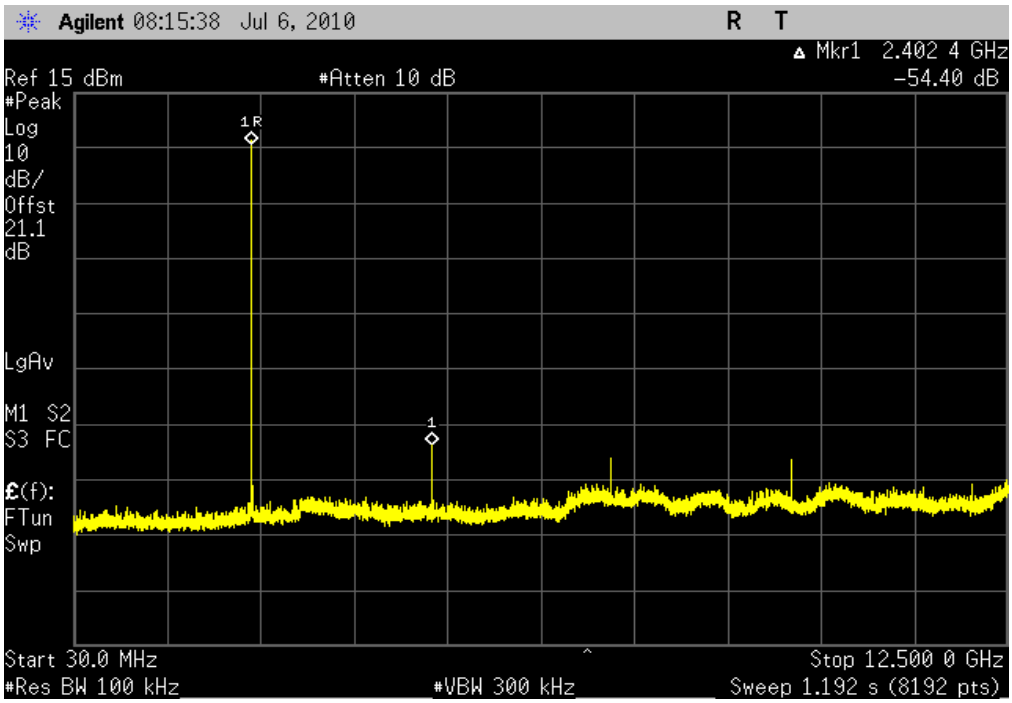
No Deviations

Configuration #	2	Signature	Trevor Buls

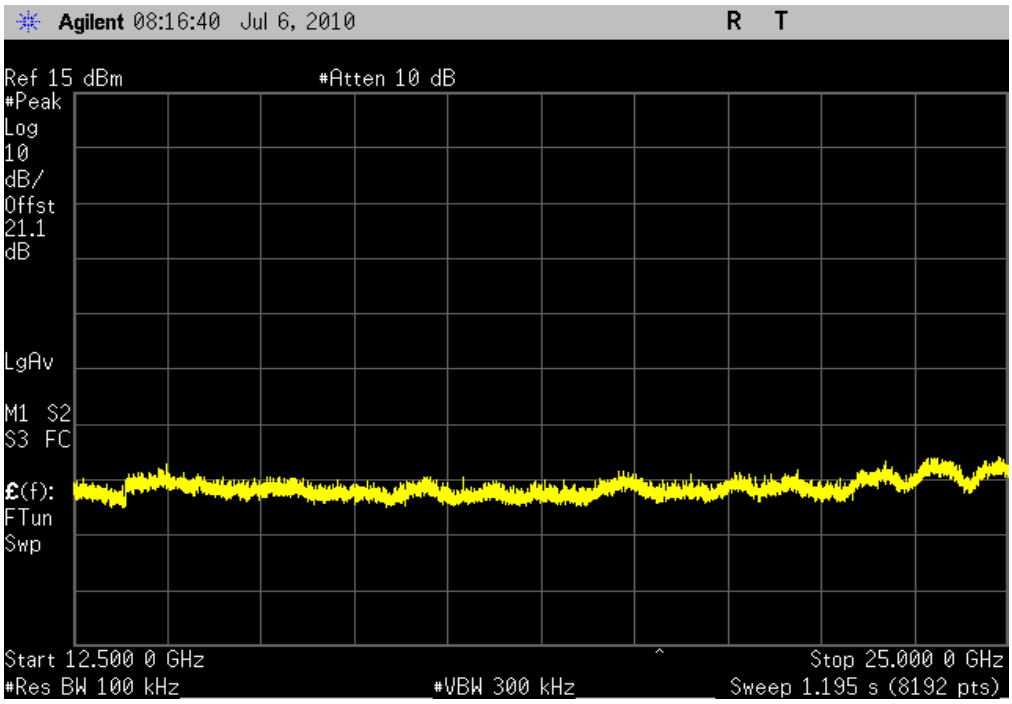
		Value	Limit	Results
DH5				
	Low Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	Mid Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	High Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
2DH5				
	Low Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	Mid Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	High Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
3DH5				
	Low Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	Mid Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass
	High Channel			
	30MHz - 12.5GHz	< -40 dBc	≤ -20 dBc	Pass
	12.5GHz-25GHz	< -40 dBc	≤ -20 dBc	Pass

SPURIOUS CONDUCTED EMISSIONS

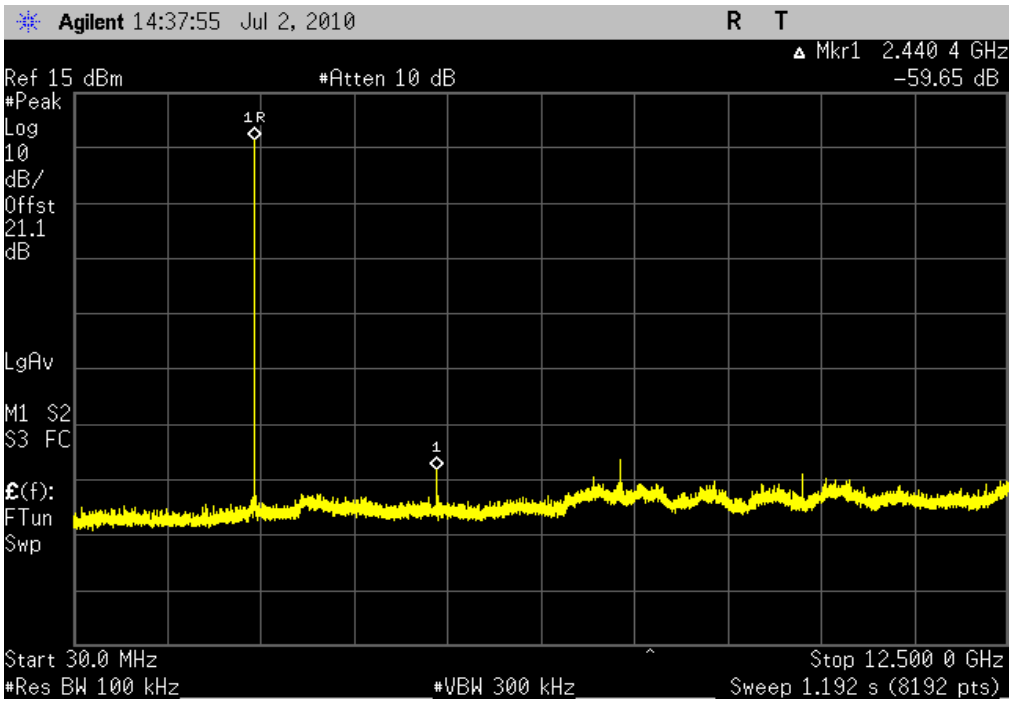
DH5, Low Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



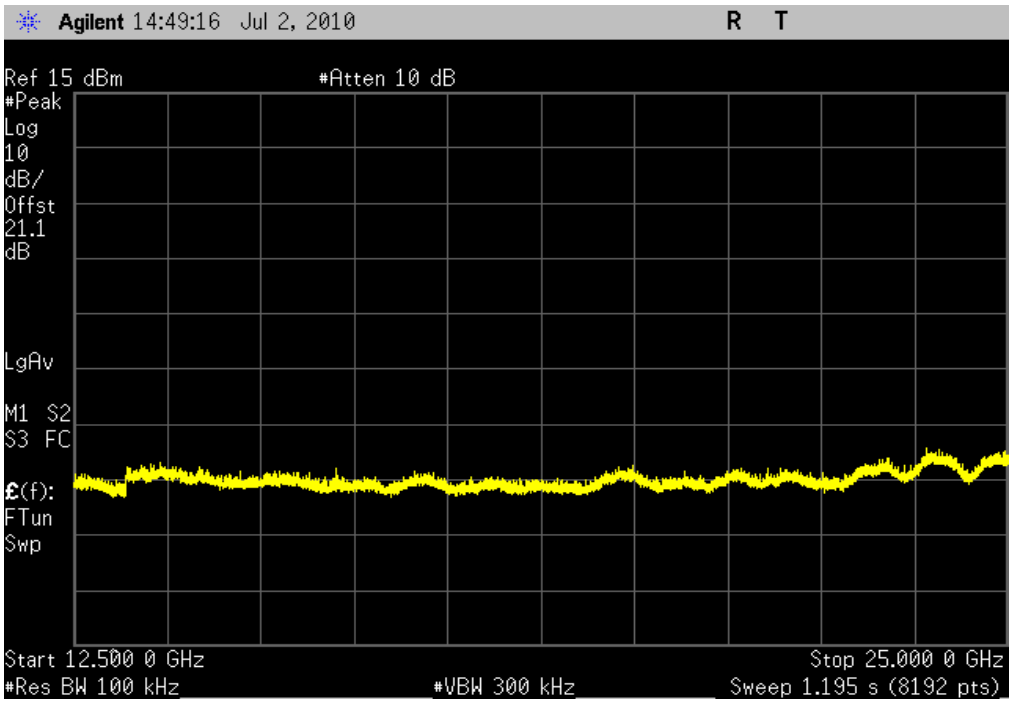
DH5, Low Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



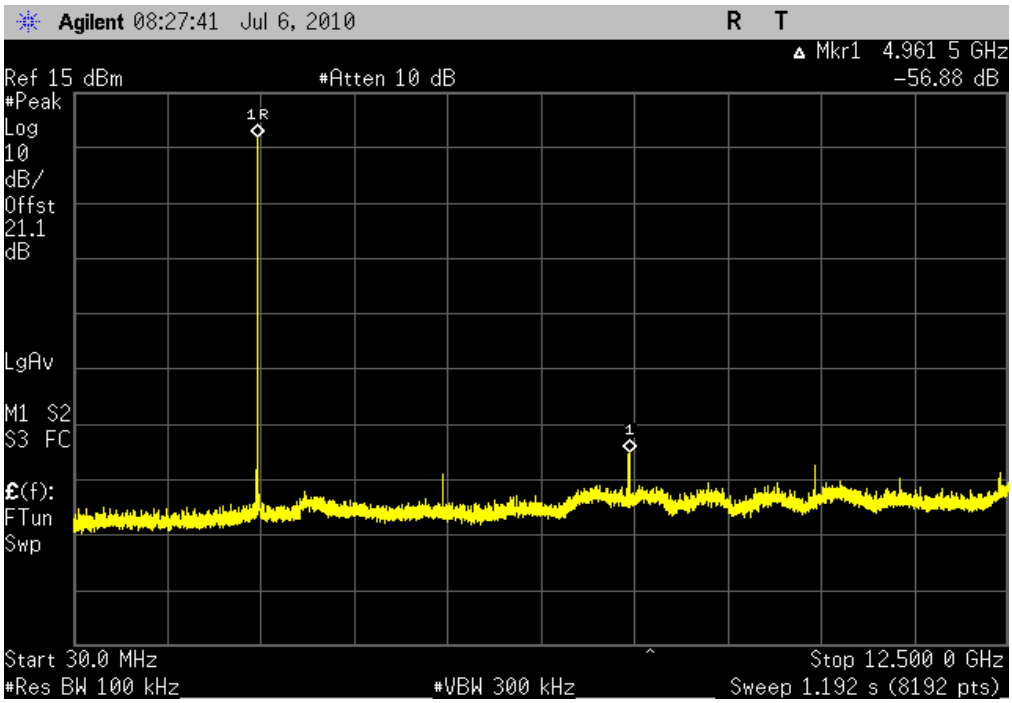
DH5, Mid Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



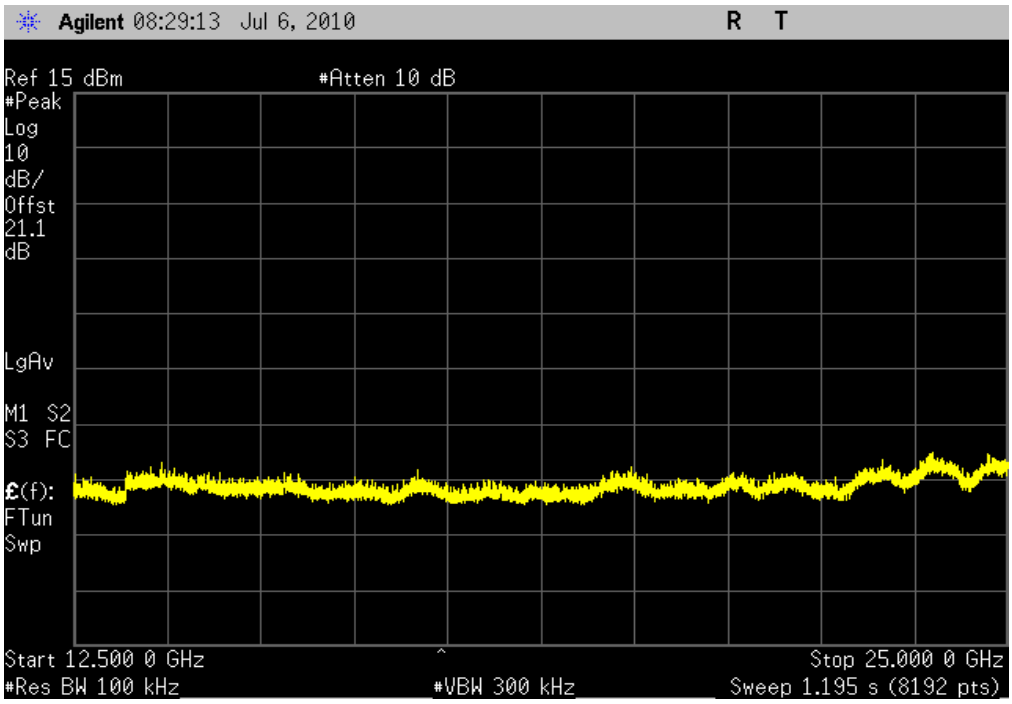
DH5, Mid Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



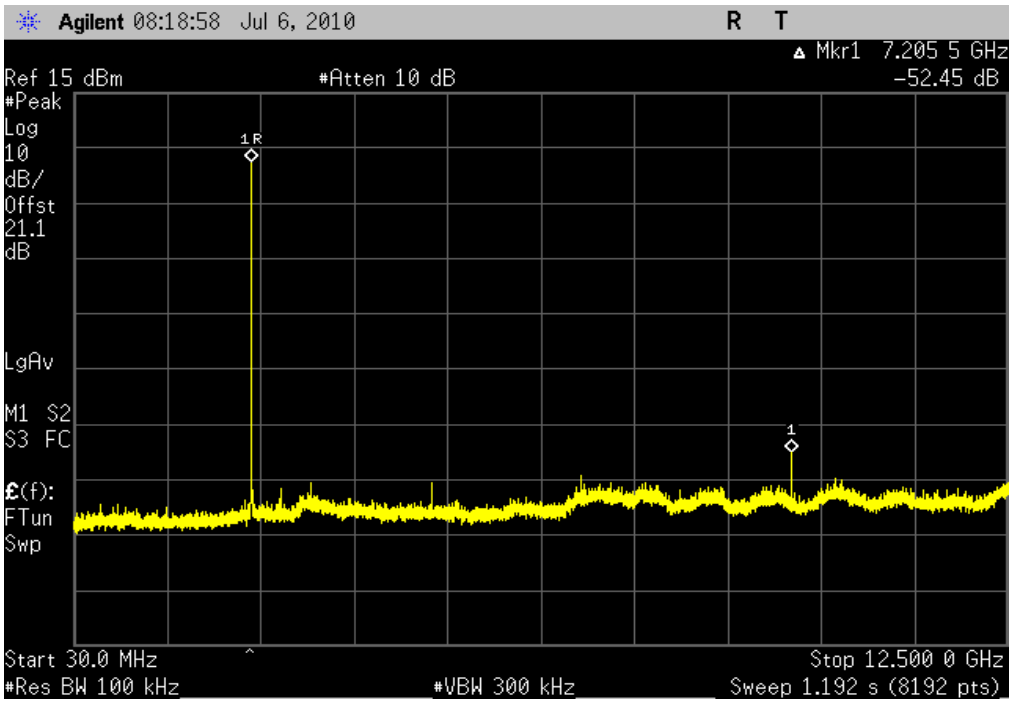
DH5, High Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



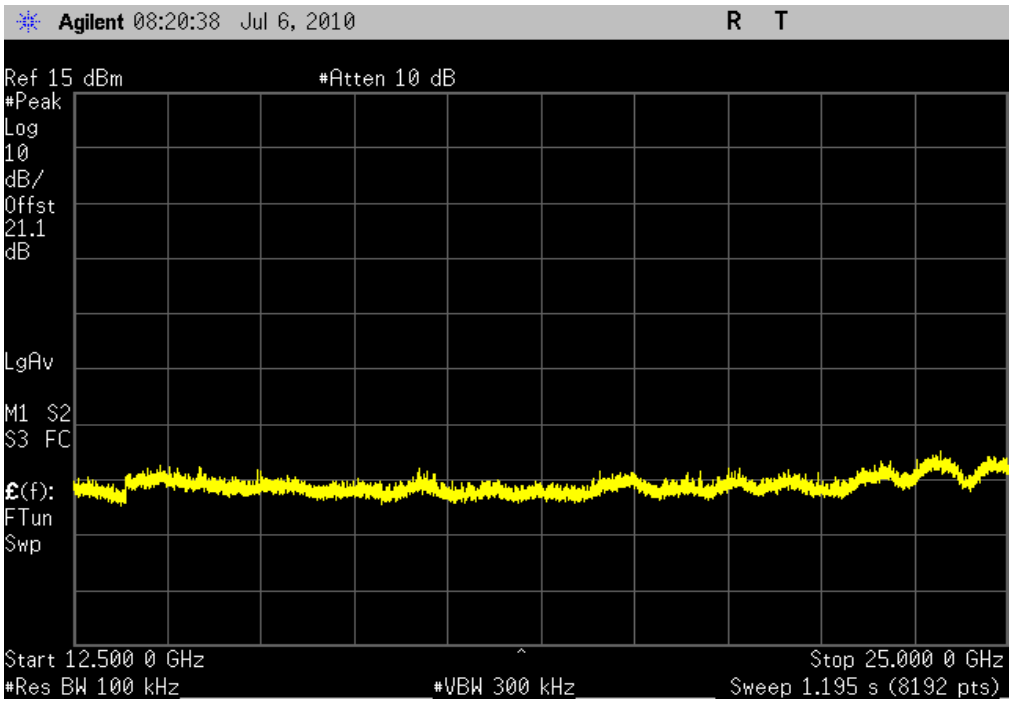
DH5, High Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



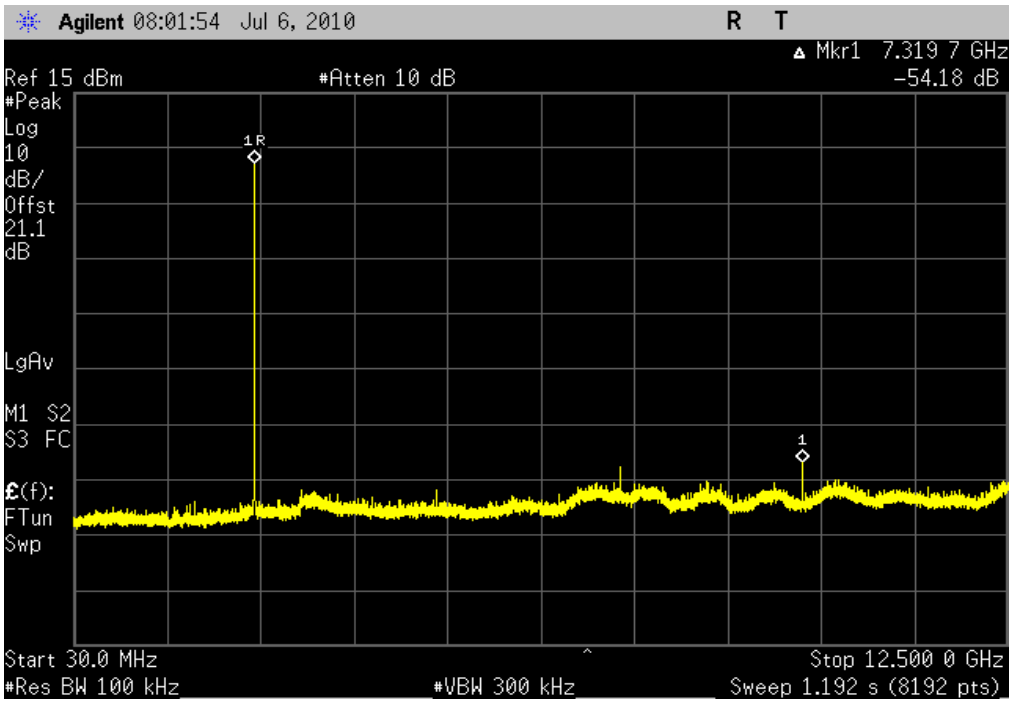
2DH5, Low Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



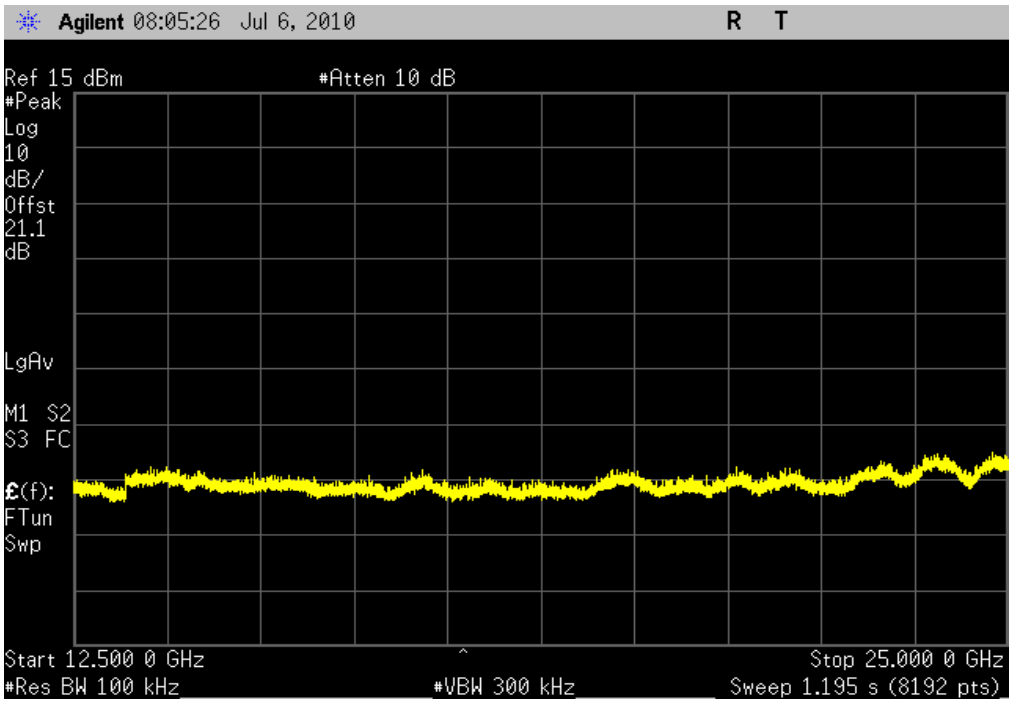
2DH5, Low Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



2DH5, Mid Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc

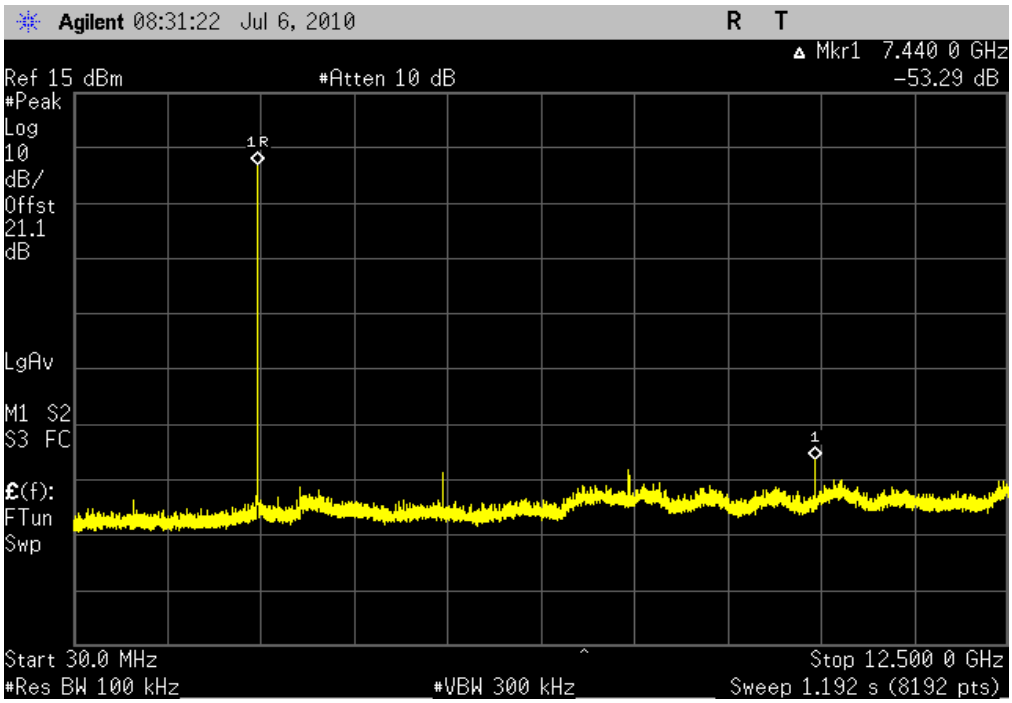


2DH5, Mid Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc

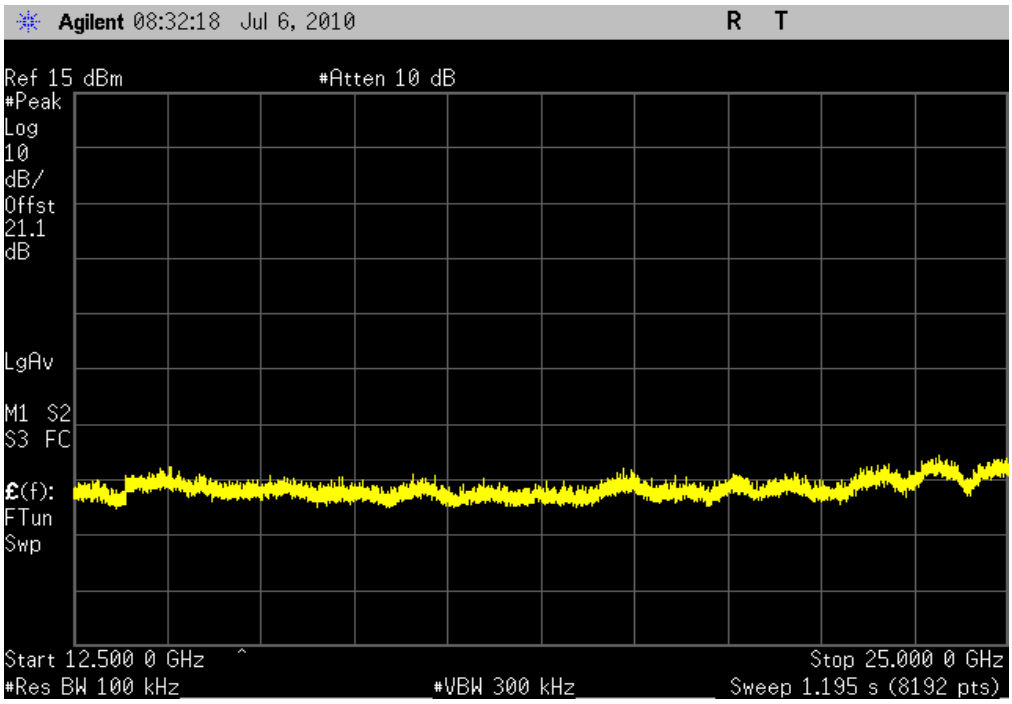


SPURIOUS CONDUCTED EMISSIONS

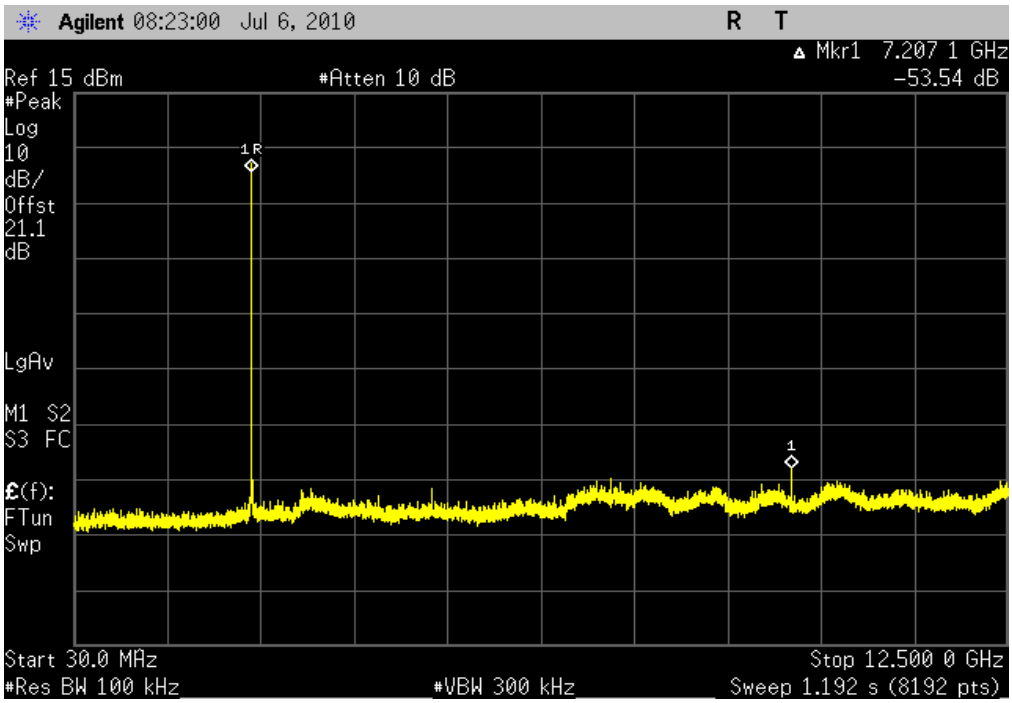
2DH5, High Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



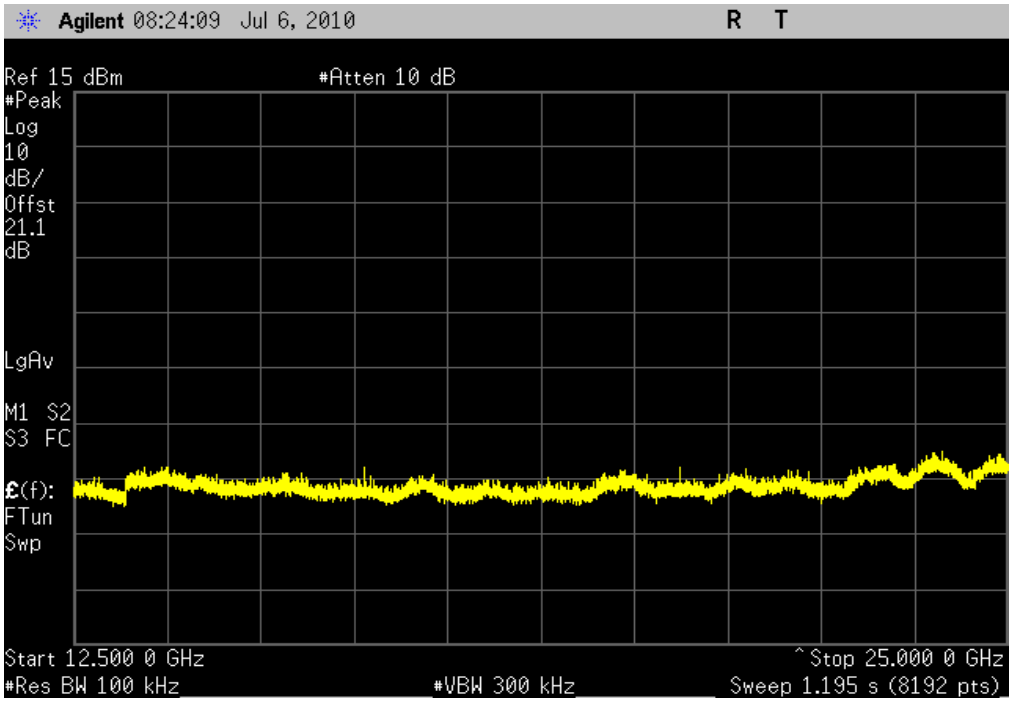
2DH5, High Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



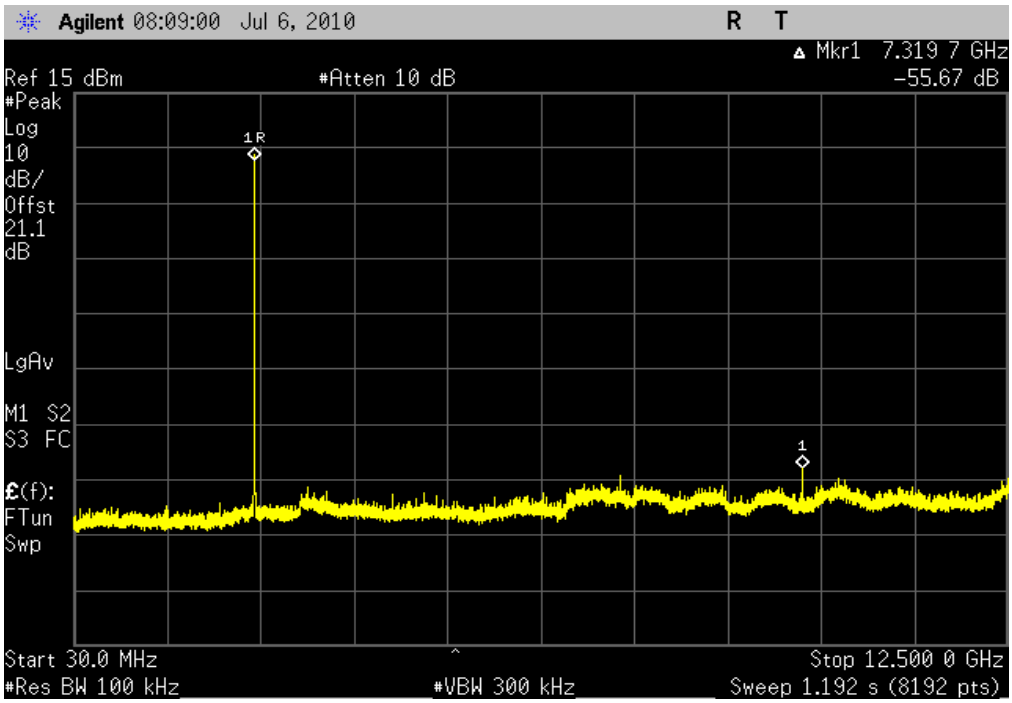
3DH5, Low Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



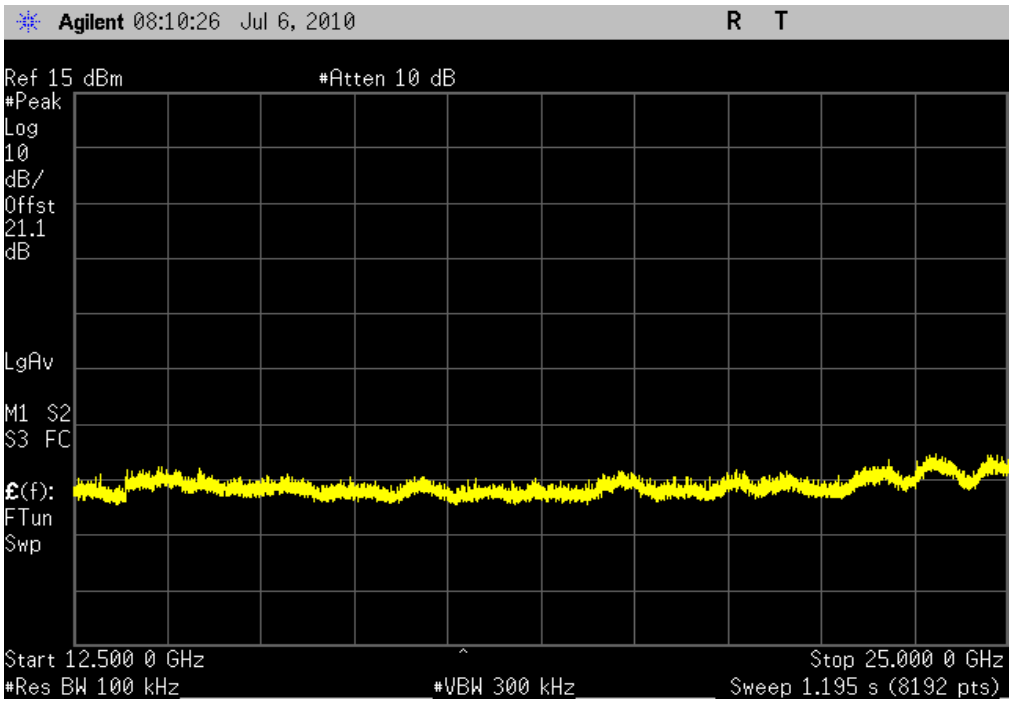
3DH5, Low Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



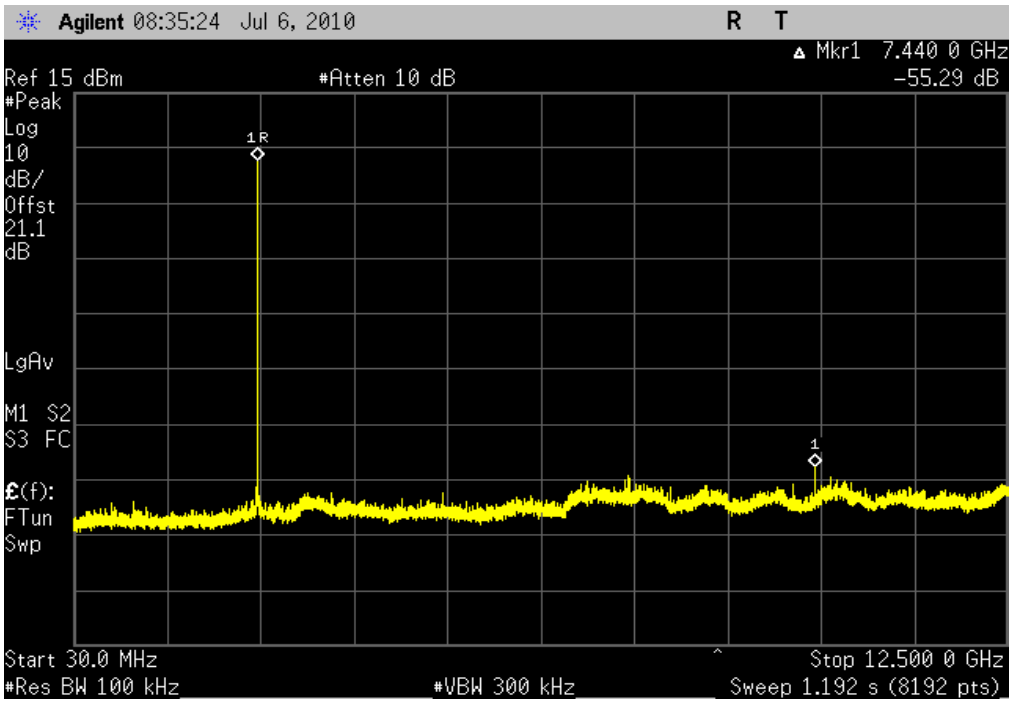
3DH5, Mid Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



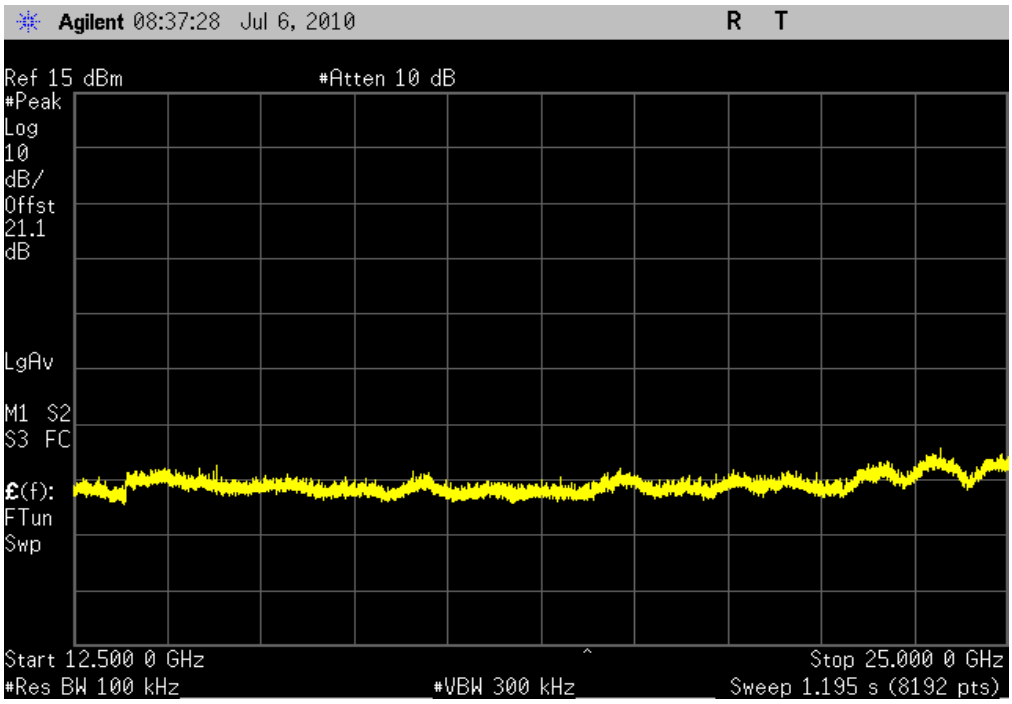
3DH5, Mid Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



3DH5, High Channel, 30MHz - 12.5GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



3DH5, High Channel, 12.5GHz-25GHz					
Result:	Pass	**Value:**	< -40 dBc	**Limit:**	≤ -20 dBc



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
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	12
Signal Generator	Agilent	N5183A	TIA	11/16/2008	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 power spectral density measurements were measured with the EUT set to low, mid, 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 for each modulation type available. Per the procedure outlined in FCC KDB 558074, March 23, 2005, the spectrum analyzer was used as follows:

> The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be 1.5 x 10^6 ÷ 3 x 10^3 = 500 seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 35 dB for correction to 3 kHz."

NORTHWEST EMC

POWER SPECTRAL DENSITY

XMit 2010.01.14

EUT:	AM3x SOM-M2			Work Order:	LGPD0023
Serial Number:	2010M00186			Date:	07/07/10
Customer:	Logic PD			Temperature:	22.45°C
Attendees:	None			Humidity:	59%
Project:	None			Barometric Pres.:	1017.5
Tested by:	Trevor Buls	Power:	120VAC/60Hz	Job Site:	MN05

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

COMMENTS

None

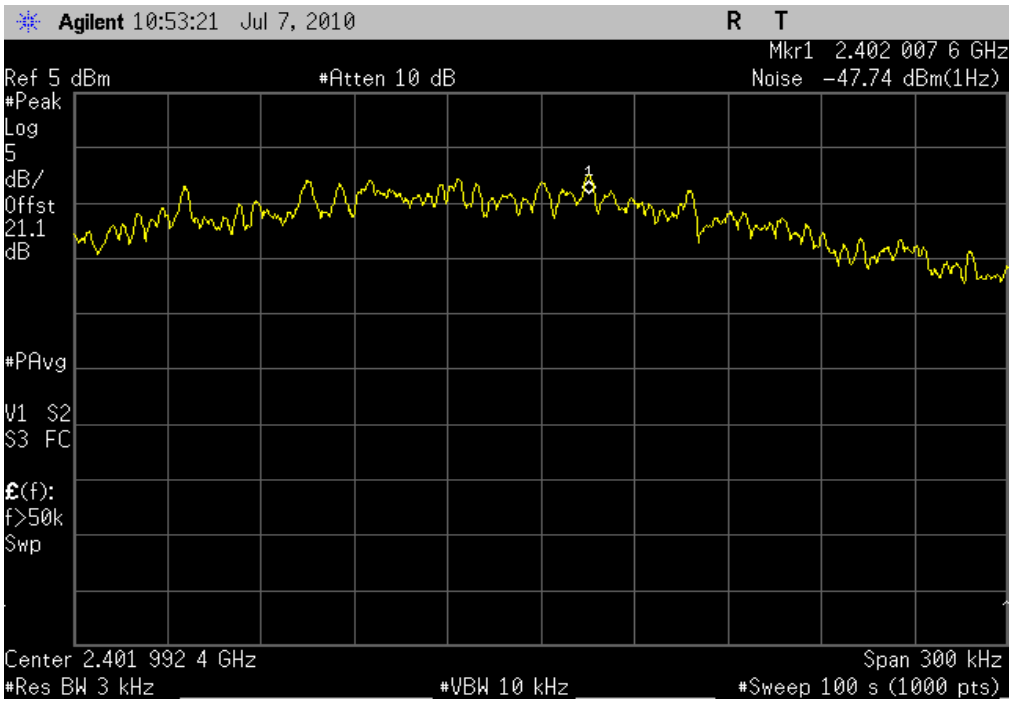
DEVIATIONS FROM TEST STANDARD

No Deviations

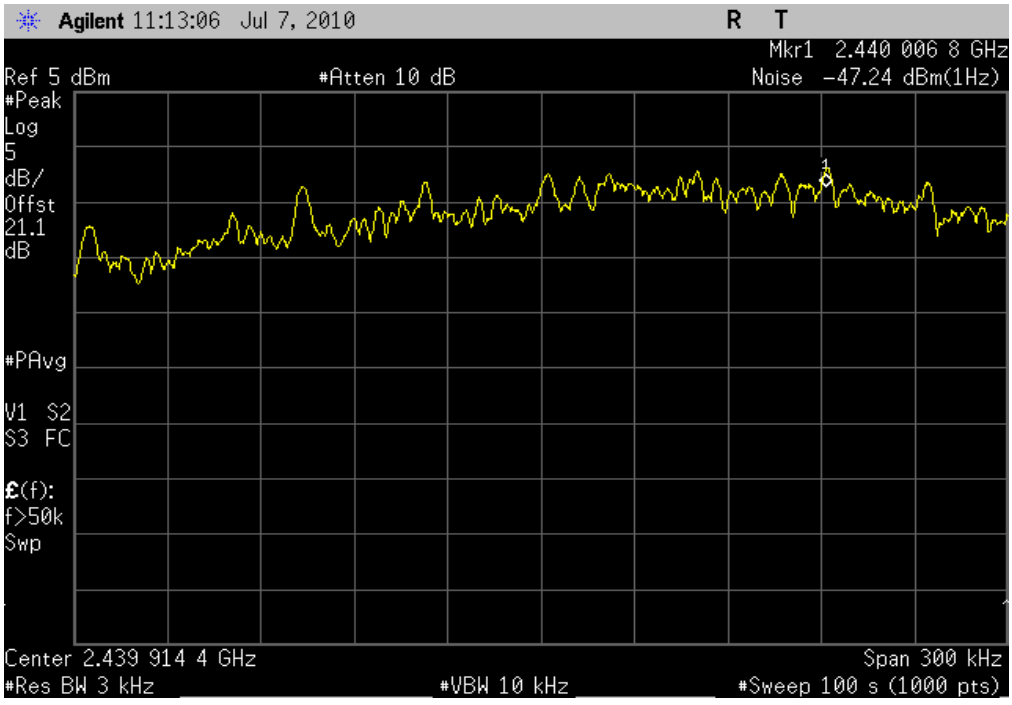
Configuration #	2	Signature	Trevor Buls

		Value	Limit	Results
DH5				
	Low Channel, 2402 MHz	-12.74 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	Mid Channel, 2440 MHz	-12.24 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	High Channel, 2480 MHz	-11.85 dBm / 3 kHz	8 dBm / 3 kHz	Pass
2DH5				
	Low Channel, 2402 MHz	-20.35 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	Mid Channel, 2440 MHz	-20.12 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	High Channel, 2480 MHz	-20.23 dBm / 3 kHz	8 dBm / 3 kHz	Pass
3DH5				
	Low Channel, 2402 MHz	-20.90 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	Mid Channel, 2440 MHz	-20.67 dBm / 3 kHz	8 dBm / 3 kHz	Pass
	High Channel, 2480 MHz	-20.34 dBm / 3 kHz	8 dBm / 3 kHz	Pass

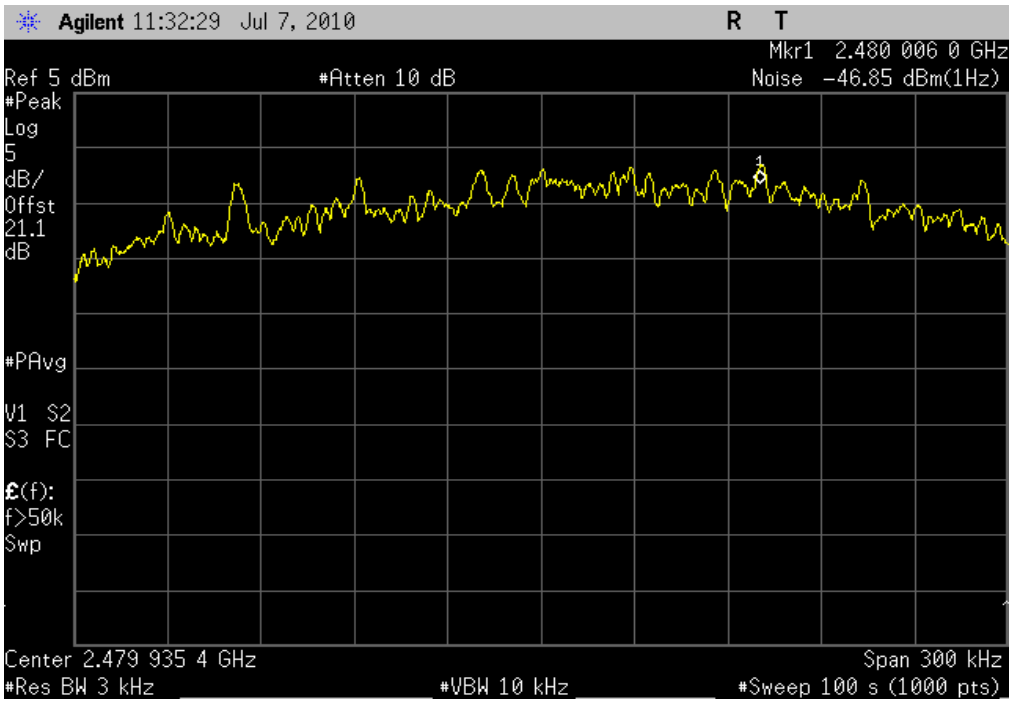
DH5, Low Channel, 2402 MHz					
Result:	Pass	**Value:**	-12.74 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



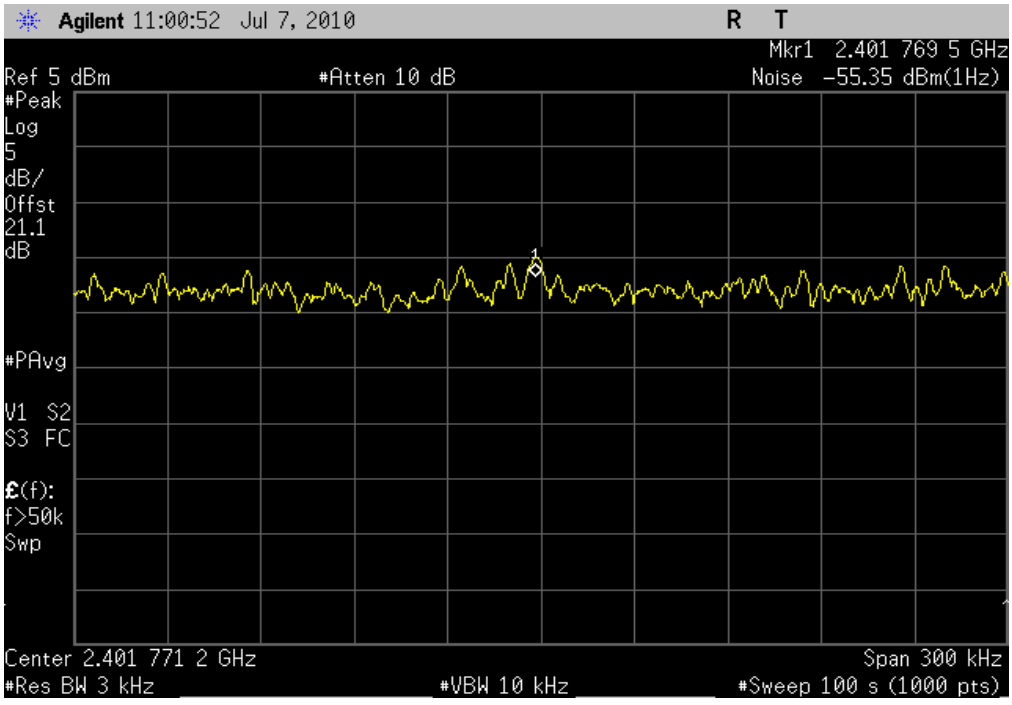
DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	-12.24 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



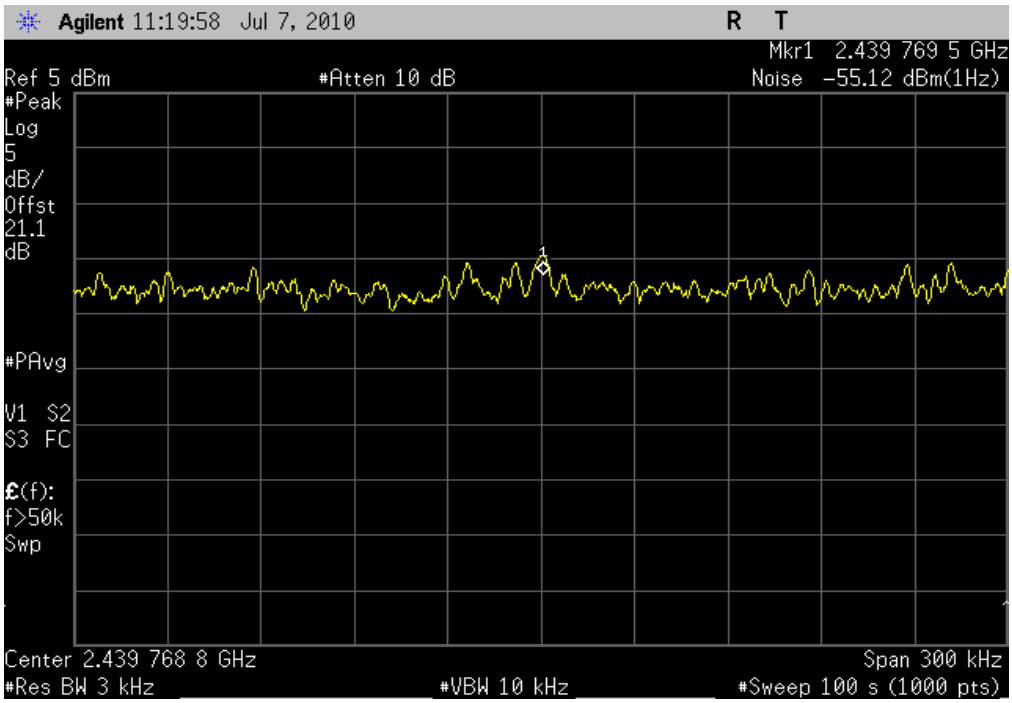
DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	-11.85 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



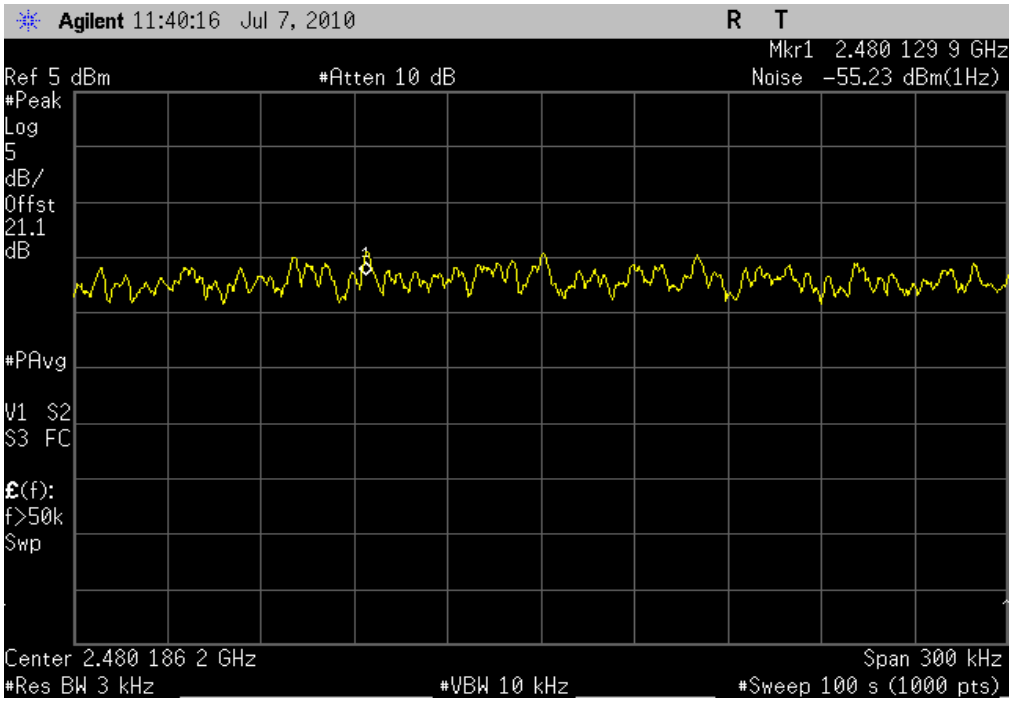
2DH5, Low Channel, 2402 MHz					
Result:	Pass	**Value:**	-20.35 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



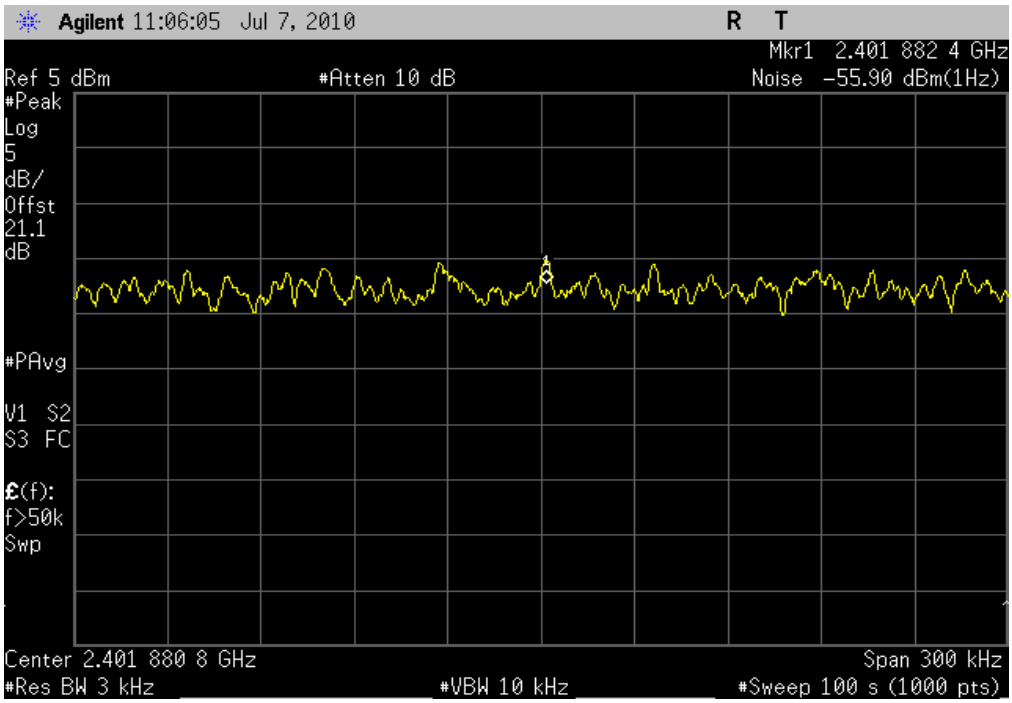
2DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	-20.12 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



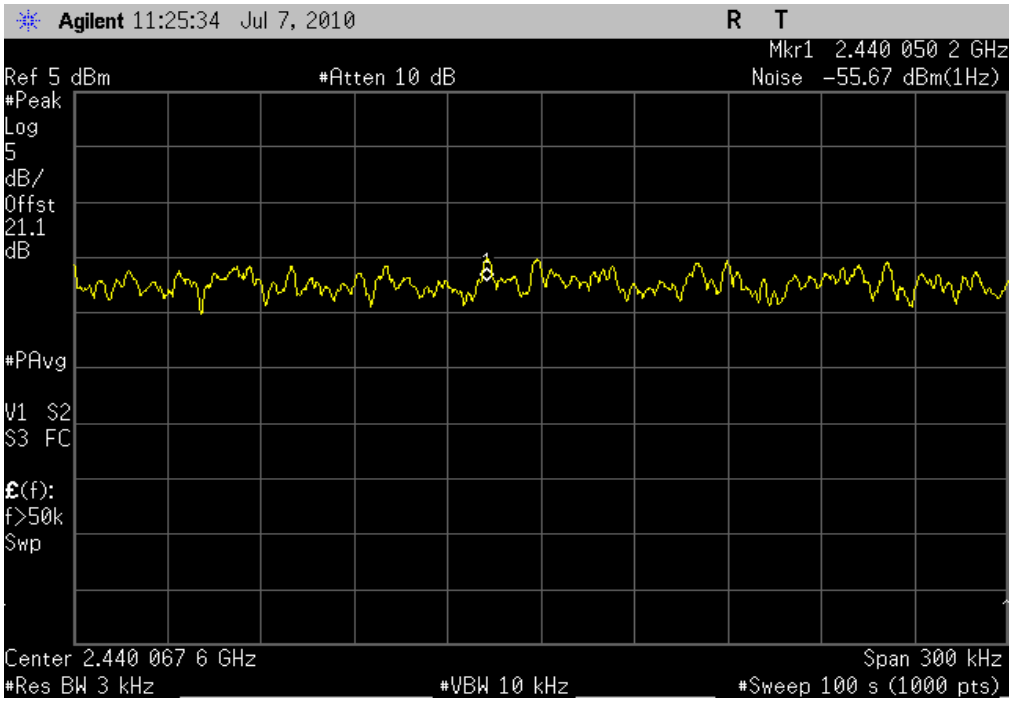
2DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	-20.23 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



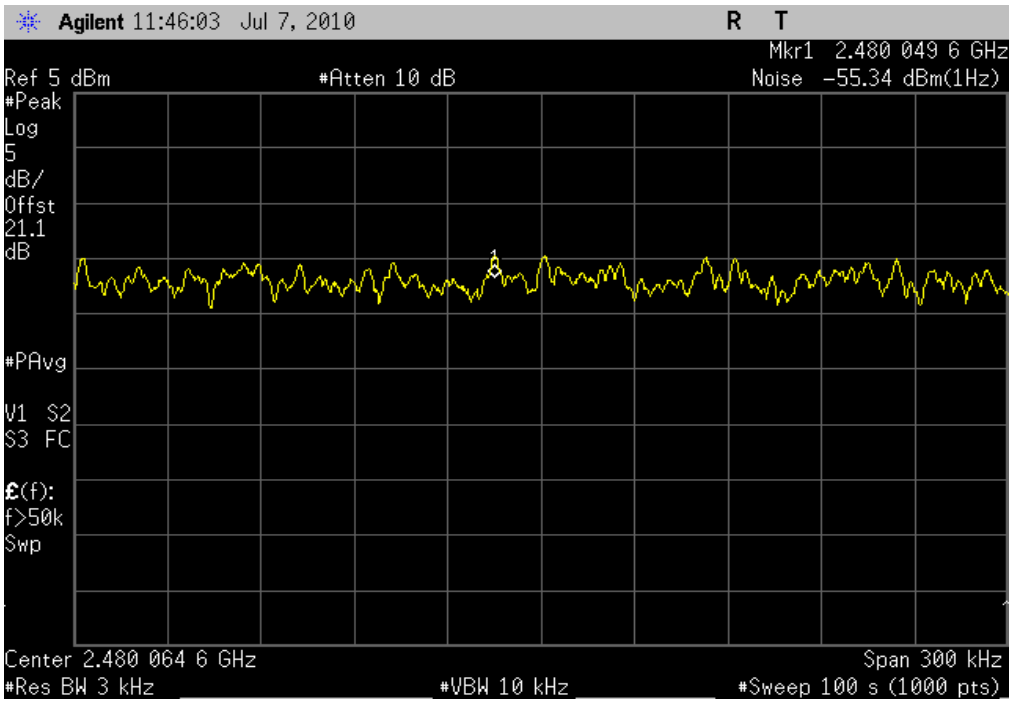
3DH5, Low Channel, 2402 MHz					
Result:	Pass	**Value:**	-20.90 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



3DH5, Mid Channel, 2440 MHz					
Result:	Pass	**Value:**	-20.67 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



3DH5, High Channel, 2480 MHz					
Result:	Pass	**Value:**	-20.34 dBm / 3 kHz	**Limit:**	8 dBm / 3 kHz



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
Bluetooth 3DH5, Mid Channel 2440 MHz
Bluetooth 2DH5, Mid Channel 2440 MHz
Bluetooth DH5, High Channel 2480 MHz
Bluetooth DH5, Mid Channel 2440 MHz
Bluetooth DH5, Low Channel 2402 MHz
Bluetooth Operation in the Restricted Bands

POWER SETTINGS INVESTIGATED
120VAC/60Hz

CONFIGURATIONS INVESTIGATED
2 - AC Power Cable Ferrite

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	25 GHz

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
Low Pass Filter	Micro-Tronics	LPM50004	HGK	7/24/2009	12 mo
High Pass Filter	Micro-Tronics	HPM50111	HGQ	6/24/2009	13 mo
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	6/18/2009	13 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	1/27/2010	13 mo
MN05 Cables	ESM Cable Corp.	6GHz Standard Gain Horn C	EVD	1/27/2010	13 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/1/2009	13 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/1/2009	13 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	7/1/2009	13 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2009	13 mo
MN05 Cables	ESM Cable Corp.	uble Ridge Guide Horn Cabl	MNI	7/1/2009	13 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	12/22/2009	24 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/15/2010	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	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 (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (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, 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.

NORTHWEST

EMC

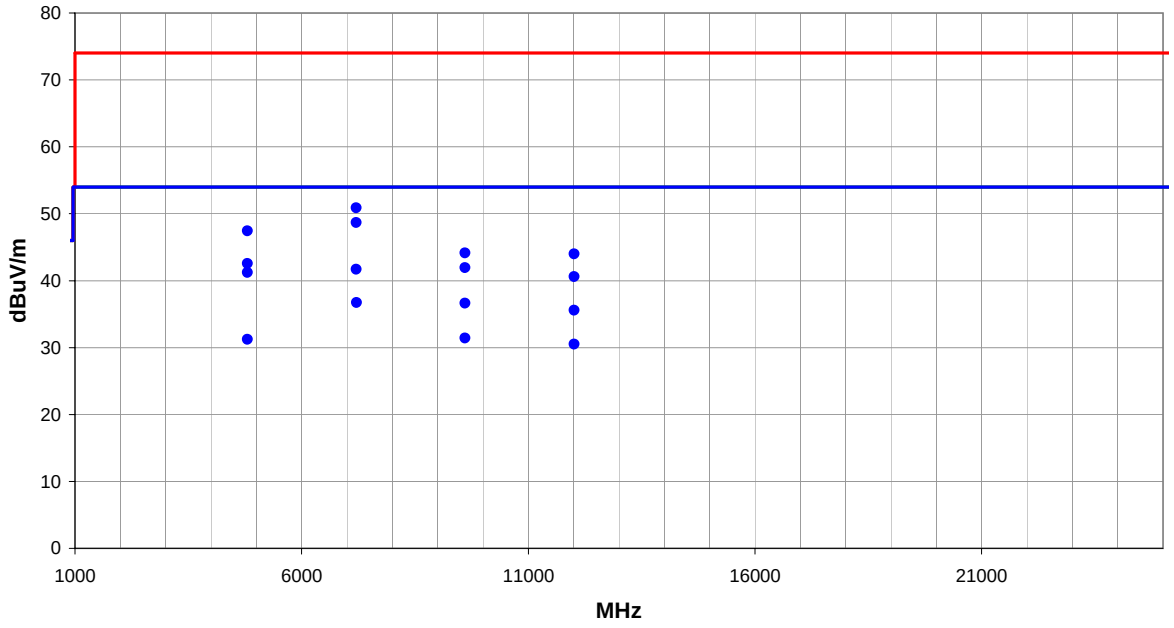
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/02/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls
EUT:	AM3x SOM-M2				
Configuration:	2 - AC Power Cable Ferrite				
Customer:	Logic PD				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Bluetooth DH5, Low Channel 2402 MHz				
Deviations:	None				
Comments:	EUT antenna Vertical.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	47	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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)
7205.900	32.5	9.2	1.6	52.0	3.0	0.0	Vert	AV	0.0	41.7	54.0	-12.3
4803.983	39.5	1.7	1.2	224.0	3.0	0.0	Vert	AV	0.0	41.2	54.0	-12.8
7208.475	27.5	9.2	1.2	11.0	3.0	0.0	Horz	AV	0.0	36.7	54.0	-17.3
9607.868	44.5	-7.9	1.2	19.0	3.0	0.0	Vert	AV	0.0	36.6	54.0	-17.4
12009.830	43.3	-7.7	1.2	187.0	3.0	0.0	Vert	AV	0.0	35.6	54.0	-18.4
9607.793	39.3	-7.9	1.4	96.0	3.0	0.0	Horz	AV	0.0	31.4	54.0	-22.6
4803.958	29.5	1.7	1.6	38.0	3.0	0.0	Horz	AV	0.0	31.2	54.0	-22.8
7205.792	41.7	9.2	1.6	52.0	3.0	0.0	Vert	PK	0.0	50.9	74.0	-23.1
12009.990	38.2	-7.7	1.2	326.0	3.0	0.0	Horz	AV	0.0	30.5	54.0	-23.5
7206.183	39.5	9.2	1.2	11.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3
4803.892	45.7	1.7	1.2	224.0	3.0	0.0	Vert	PK	0.0	47.4	74.0	-26.6
9607.068	52.0	-7.9	1.2	19.0	3.0	0.0	Vert	PK	0.0	44.1	74.0	-29.9
12010.160	51.7	-7.7	1.2	187.0	3.0	0.0	Vert	PK	0.0	44.0	74.0	-30.0
4804.358	40.8	1.7	1.6	38.0	3.0	0.0	Horz	PK	0.0	42.5	74.0	-31.5
9607.518	49.8	-7.9	1.4	96.0	3.0	0.0	Horz	PK	0.0	41.9	74.0	-32.1
12009.330	48.3	-7.7	1.2	326.0	3.0	0.0	Horz	PK	0.0	40.6	74.0	-33.4

NORTHWEST

EMC

Spurious Radiated Emissions

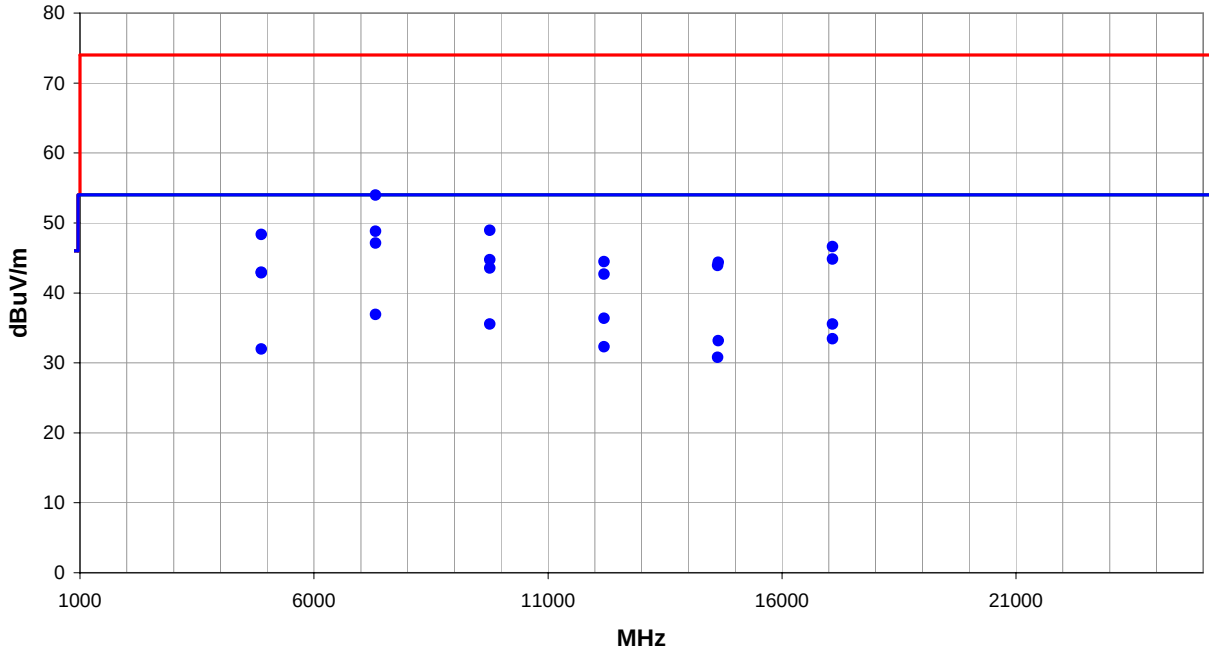
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/02/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls

EUT:	AM3x SOM-M2
Configuration:	2 - AC Power Cable Ferrite
Customer:	Logic PD
Attendees:	None
EUT Power:	120VAC/60Hz
Operating Mode:	Bluetooth DH5, Mid Channel 2440 MHz
Deviations:	None
Comments:	EUT antenna Vertical.

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	52	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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)
7319.932	37.0	10.1	2.2	275.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9
9759.883	51.3	-7.8	1.4	45.0	3.0	0.0	Vert	AV	0.0	43.5	54.0	-10.5
4879.972	40.7	2.2	1.1	212.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1
7319.842	26.8	10.1	2.4	281.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1
12199.870	43.7	-7.3	1.4	348.0	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6
17080.590	35.0	0.5	1.2	240.0	3.0	0.0	Vert	AV	0.0	35.5	54.0	-18.5
9759.917	43.3	-7.8	1.6	83.0	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5
7320.065	43.9	10.1	2.2	275.0	3.0	0.0	Vert	PK	0.0	54.0	74.0	-20.0
17080.610	32.9	0.5	1.2	252.0	3.0	0.0	Horz	AV	0.0	33.4	54.0	-20.6
14639.110	33.3	-0.1	1.2	95.0	3.0	0.0	Vert	AV	0.0	33.2	54.0	-20.8
12199.840	39.6	-7.3	1.2	101.0	3.0	0.0	Horz	AV	0.0	32.3	54.0	-21.7
4879.958	29.8	2.2	1.0	218.0	3.0	0.0	Horz	AV	0.0	32.0	54.0	-22.0
14627.600	30.9	-0.1	1.2	281.0	3.0	0.0	Horz	AV	0.0	30.8	54.0	-23.2
9759.233	56.7	-7.8	1.4	45.0	3.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1
7318.692	38.7	10.1	2.4	281.0	3.0	0.0	Horz	PK	0.0	48.8	74.0	-25.2
4880.072	46.2	2.2	1.1	212.0	3.0	0.0	Vert	PK	0.0	48.4	74.0	-25.6

NORTHWEST

EMC

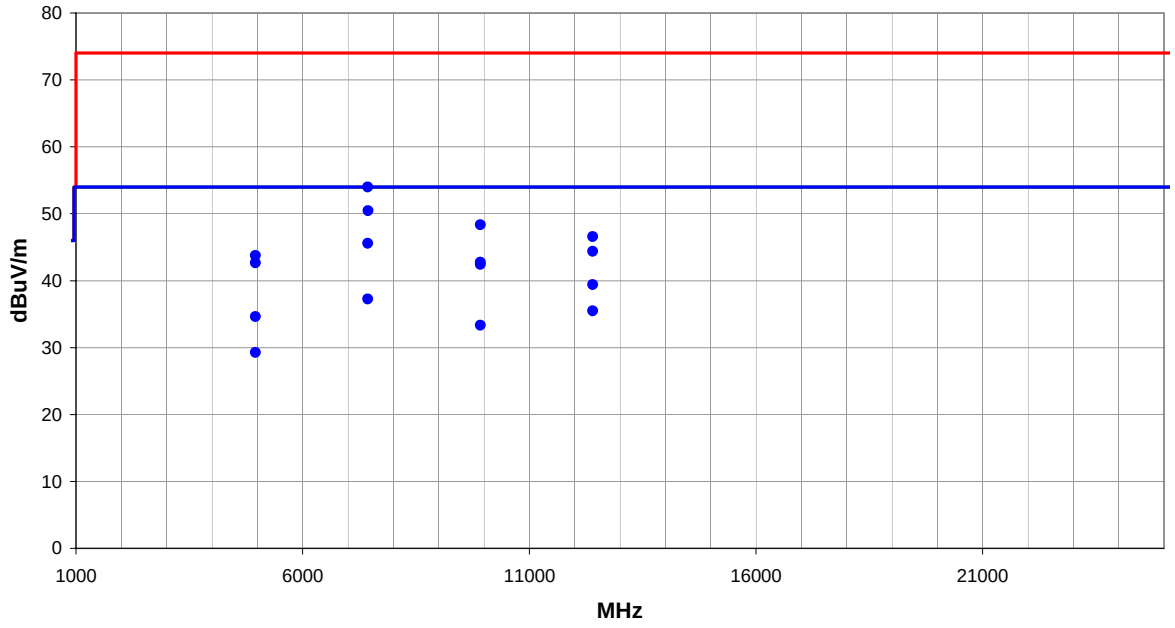
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/02/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls
EUT:	AM3x SOM-M2				
Configuration:	2 - AC Power Cable Ferrite				
Customer:	Logic PD				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Bluetooth DH5, High Channel 2480 MHz				
Deviations:	None				
Comments:	EUT antenna Vertical.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	57	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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)
7439.926	34.8	10.8	1.0	322.0	3.0	0.0	Vert	AV	0.0	45.6	54.0	-8.4
9919.898	50.1	-7.7	1.3	45.0	3.0	0.0	Vert	AV	0.0	42.4	54.0	-11.6
12399.830	46.3	-6.9	1.0	237.0	3.0	0.0	Vert	AV	0.0	39.4	54.0	-14.6
7440.083	26.5	10.8	2.7	124.0	3.0	0.0	Horz	AV	0.0	37.3	54.0	-16.7
12399.850	42.4	-6.9	1.0	106.0	3.0	0.0	Horz	AV	0.0	35.5	54.0	-18.5
4959.942	32.1	2.5	1.0	198.0	3.0	0.0	Horz	AV	0.0	34.6	54.0	-19.4
7440.260	43.2	10.8	1.0	322.0	3.0	0.0	Vert	PK	0.0	54.0	74.0	-20.0
9919.882	41.0	-7.7	1.2	62.0	3.0	0.0	Horz	AV	0.0	33.3	54.0	-20.7
7441.433	39.7	10.8	2.7	124.0	3.0	0.0	Horz	PK	0.0	50.5	74.0	-23.5
4962.086	26.7	2.5	1.0	215.0	3.0	0.0	Vert	AV	0.0	29.2	54.0	-24.8
9919.365	56.0	-7.7	1.3	45.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7
12399.120	53.5	-6.9	1.0	237.0	3.0	0.0	Vert	PK	0.0	46.6	74.0	-27.4
12398.960	51.3	-6.9	1.0	106.0	3.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6
4959.950	41.2	2.5	1.0	198.0	3.0	0.0	Horz	PK	0.0	43.7	74.0	-30.3
9919.448	50.4	-7.7	1.2	62.0	3.0	0.0	Horz	PK	0.0	42.7	74.0	-31.3
4960.469	40.1	2.5	1.0	215.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4

NORTHWEST

EMC

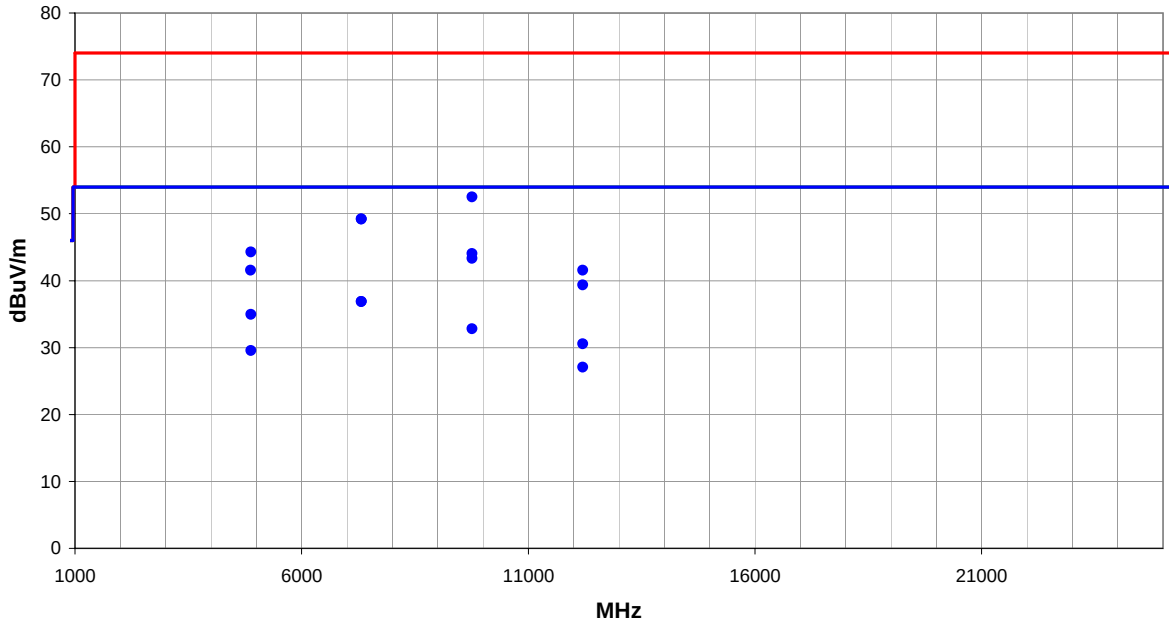
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/02/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls
EUT:	AM3x SOM-M2				
Configuration:	2 - AC Power Cable Ferrite				
Customer:	Logic PD				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Bluetooth 2DH5, Mid Channel 2440 MHz				
Deviations:	None				
Comments:	EUT antenna Vertical.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	61	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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)
9759.958	51.1	-7.8	1.2	45.0	3.0	0.0	Vert	AV	0.0	43.3	54.0	-10.7
7317.675	26.8	10.1	2.7	93.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1
7317.583	26.8	10.1	1.2	350.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1
4879.967	32.8	2.2	1.2	210.0	3.0	0.0	Vert	AV	0.0	35.0	54.0	-19.0
9760.101	40.6	-7.8	1.2	104.0	3.0	0.0	Horz	AV	0.0	32.8	54.0	-21.2
9759.392	60.3	-7.8	1.2	45.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5
12200.300	37.9	-7.3	1.3	348.0	3.0	0.0	Vert	AV	0.0	30.6	54.0	-23.4
4879.983	27.4	2.2	1.2	1.0	3.0	0.0	Horz	AV	0.0	29.6	54.0	-24.4
7320.942	39.1	10.1	2.7	93.0	3.0	0.0	Horz	PK	0.0	49.2	74.0	-24.8
7319.850	39.1	10.1	1.2	350.0	3.0	0.0	Vert	PK	0.0	49.2	74.0	-24.8
12199.270	34.4	-7.3	1.2	98.0	3.0	0.0	Horz	AV	0.0	27.1	54.0	-26.9
4880.258	42.1	2.2	1.2	210.0	3.0	0.0	Vert	PK	0.0	44.3	74.0	-29.7
9759.618	51.8	-7.8	1.2	104.0	3.0	0.0	Horz	PK	0.0	44.0	74.0	-30.0
12198.830	48.9	-7.3	1.3	348.0	3.0	0.0	Vert	PK	0.0	41.6	74.0	-32.4
4878.725	39.4	2.2	1.2	1.0	3.0	0.0	Horz	PK	0.0	41.6	74.0	-32.4
12198.840	46.7	-7.3	1.2	98.0	3.0	0.0	Horz	PK	0.0	39.4	74.0	-34.6

NORTHWEST

EMC

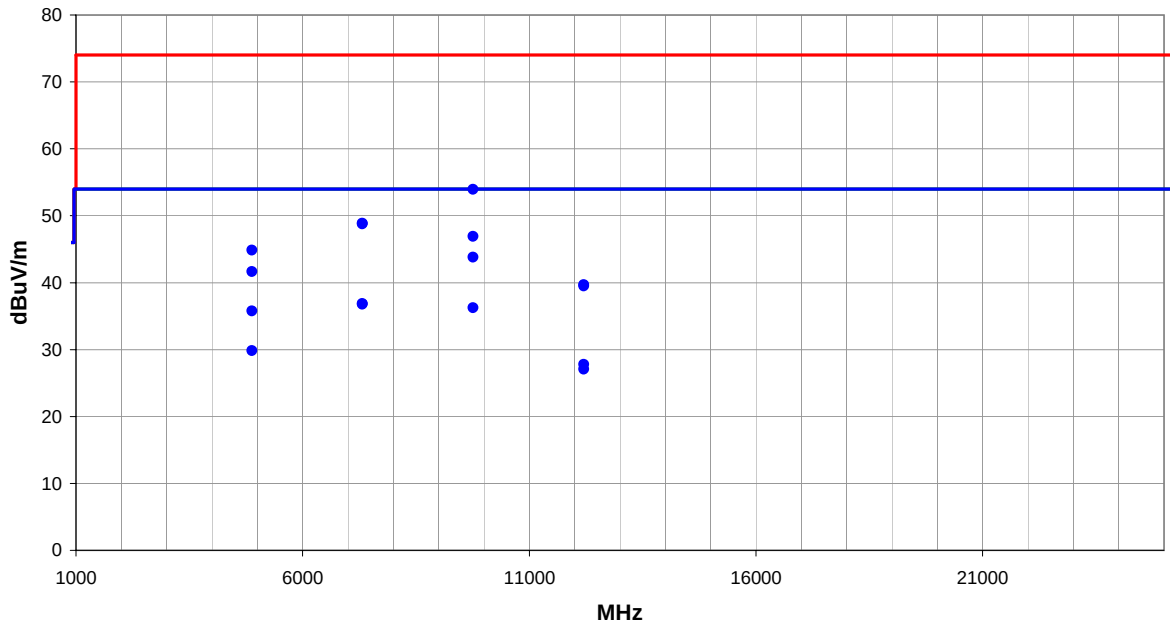
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/02/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls
EUT:	AM3x SOM-M2				
Configuration:	2 - AC Power Cable Ferrite				
Customer:	Logic PD				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Bluetooth 3DH5, Mid Channel 2440 MHz				
Deviations:	None				
Comments:	EUT antenna Vertical.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	64	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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)
9759.950	51.6	-7.8	1.2	45.0	3.0	0.0	Vert	AV	0.0	43.8	54.0	-10.2
7317.508	26.8	10.1	1.2	31.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1
7318.217	26.7	10.1	3.3	55.0	3.0	0.0	Horz	AV	0.0	36.8	54.0	-17.2
9759.925	44.0	-7.8	1.6	81.0	3.0	0.0	Horz	AV	0.0	36.2	54.0	-17.8
4879.992	33.6	2.2	1.3	213.0	3.0	0.0	Vert	AV	0.0	35.8	54.0	-18.2
9759.792	61.7	-7.8	1.2	45.0	3.0	0.0	Vert	PK	0.0	53.9	74.0	-20.1
4880.050	27.7	2.2	1.2	102.0	3.0	0.0	Horz	AV	0.0	29.9	54.0	-24.1
7318.275	38.8	10.1	1.2	31.0	3.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1
7320.617	38.7	10.1	3.3	55.0	3.0	0.0	Horz	PK	0.0	48.8	74.0	-25.2
12199.800	35.1	-7.3	1.2	102.0	3.0	0.0	Horz	AV	0.0	27.8	54.0	-26.2
12199.860	34.4	-7.3	1.2	84.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9
9759.658	54.7	-7.8	1.6	81.0	3.0	0.0	Horz	PK	0.0	46.9	74.0	-27.1
4880.842	42.7	2.2	1.3	213.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1
4881.975	39.5	2.2	1.2	102.0	3.0	0.0	Horz	PK	0.0	41.7	74.0	-32.3
12200.700	47.0	-7.3	1.2	102.0	3.0	0.0	Horz	PK	0.0	39.7	74.0	-34.3
12199.680	46.8	-7.3	1.2	84.0	3.0	0.0	Vert	PK	0.0	39.5	74.0	-34.5

NORTHWEST EMC

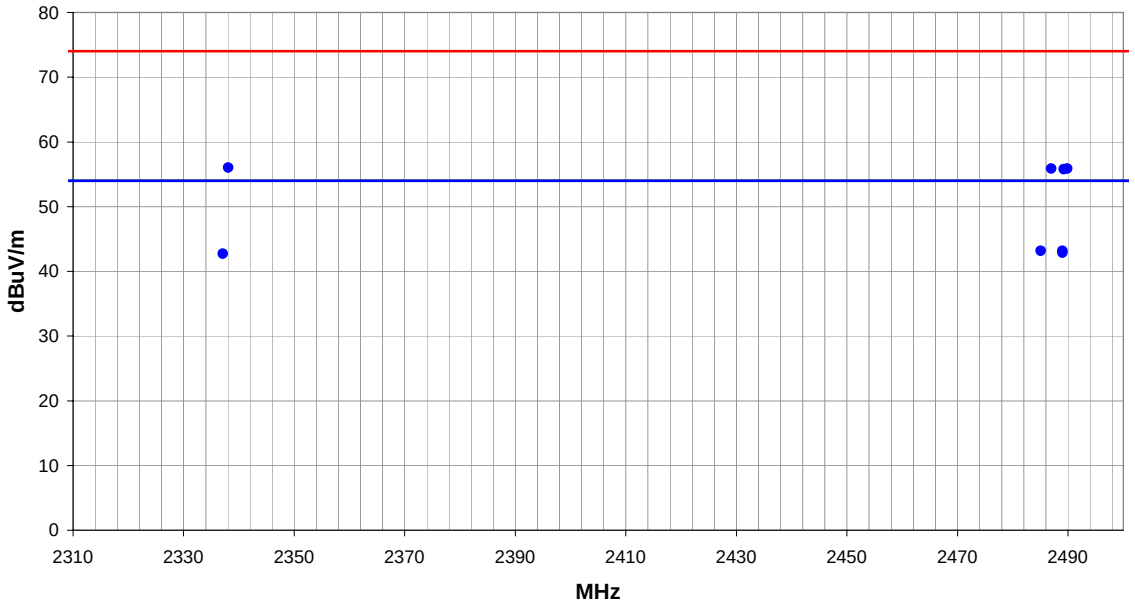
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	07/13/10	Trevor Buls	
Project:	None	**Temperature:**	23.09		
Job Site:	MN05	**Humidity:**	57.65		
Serial Number:	2010M00186	**Barometric Pres.:**	1019.3	**Tested by:**	Trevor Buls
EUT:	AM3x SOM-M2				
Configuration:	2 - AC Power Cable Ferrite				
Customer:	Logic PD				
Attendees:	None				
EUT Power:	120VAC/60Hz				
Operating Mode:	Bluetooth Operation in the Restricted Bands				
Deviations:	None				
Comments:	EUT antenna Vertical.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	69	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



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
2489.013	29.1	-5.9	1.2	354.0	3.0	20.0	Vert	AV	0.0	43.2	54.0	-10.8	2DH5, 2480 MHz
2485.053	29.1	-5.9	1.2	215.0	3.0	20.0	Vert	AV	0.0	43.2	54.0	-10.8	3DH5, 2480 MHz
2489.000	28.8	-5.9	2.1	236.0	3.0	20.0	Vert	AV	0.0	42.9	54.0	-11.1	DH5, 2480 MHz
2337.103	28.5	-5.8	1.2	324.0	3.0	20.0	Vert	AV	0.0	42.7	54.0	-11.3	2DH5, 2402 MHz
2338.060	41.8	-5.8	1.2	324.0	3.0	20.0	Vert	PK	0.0	56.0	74.0	-18.0	2DH5, 2402 MHz
2489.893	41.8	-5.9	2.1	236.0	3.0	20.0	Vert	PK	0.0	55.9	74.0	-18.1	DH5, 2480 MHz
2486.997	41.8	-5.9	1.2	215.0	3.0	20.0	Vert	PK	0.0	55.9	74.0	-18.1	3DH5, 2480 MHz
2489.230	41.7	-5.9	1.2	354.0	3.0	20.0	Vert	PK	0.0	55.8	74.0	-18.2	2DH5, 2480 MHz

AC Powerline Conducted 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.

MODES OF OPERATION

Bluetooth DH5, High Channel 2480 MHz
Bluetooth DH5, Mid Channel 2440 MHz
Bluetooth DH5, Low Channel 2402 MHz

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

LGPD0023 - 1

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	6/8/2010	13 mo
LISN	Solar	9252-50-R-24-BNC	LIO	3/12/2010	12 mo
Attenuator, 20 dB	SM Electronics	SA01B-20	REF	12/11/2009	13 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	6/28/2010	13 mo
Receiver	Rohde & Schwarz	ESCI	ARF	3/30/2010	12 mo

MEASUREMENT BANDWIDTHS

	Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (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. 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 EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

NORTHWEST

EMC

AC Powerline Conducted Emissions

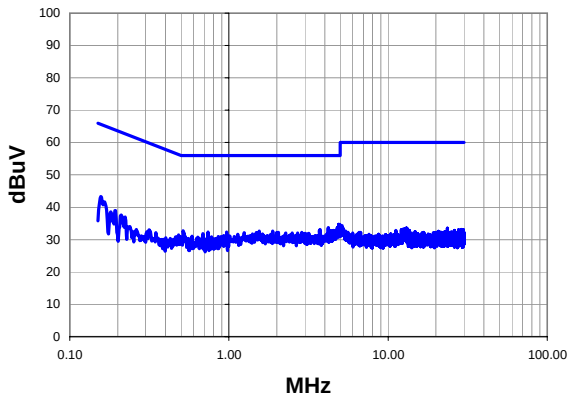
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, Low Channel 2402 MHz			
Deviations:	None			
Comments:	None			

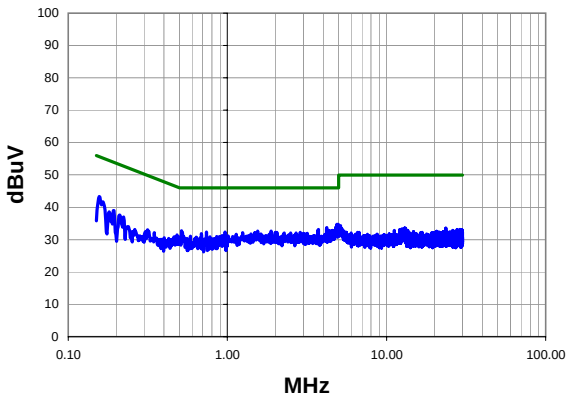
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	1	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.888	14.2	20.5	34.7	56.0	-21.3
4.968	14.2	20.5	34.7	56.0	-21.3
0.157	21.8	21.5	43.3	65.6	-22.3
4.208	13.2	20.5	33.7	56.0	-22.3
3.728	12.6	20.5	33.1	56.0	-22.9
4.344	12.3	20.5	32.8	56.0	-23.2
0.516	12.3	20.4	32.7	56.0	-23.3
1.880	12.2	20.5	32.7	56.0	-23.3
1.552	12.2	20.5	32.7	56.0	-23.3
0.968	12.0	20.4	32.4	56.0	-23.6
0.740	11.9	20.4	32.3	56.0	-23.7
2.000	11.7	20.5	32.2	56.0	-23.8
2.048	11.7	20.5	32.2	56.0	-23.8
2.864	11.7	20.5	32.2	56.0	-23.8
1.248	11.7	20.4	32.1	56.0	-23.9
2.272	11.5	20.5	32.0	56.0	-24.0
3.008	11.4	20.5	31.9	56.0	-24.1
3.184	11.4	20.5	31.9	56.0	-24.1
0.687	11.4	20.4	31.8	56.0	-24.2
3.096	11.3	20.5	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.888	14.2	20.5	34.7	46.0	-11.3
4.968	14.2	20.5	34.7	46.0	-11.3
0.157	21.8	21.5	43.3	55.6	-12.3
4.208	13.2	20.5	33.7	46.0	-12.3
3.728	12.6	20.5	33.1	46.0	-12.9
4.344	12.3	20.5	32.8	46.0	-13.2
0.516	12.3	20.4	32.7	46.0	-13.3
1.880	12.2	20.5	32.7	46.0	-13.3
1.552	12.2	20.5	32.7	46.0	-13.3
0.968	12.0	20.4	32.4	46.0	-13.6
0.740	11.9	20.4	32.3	46.0	-13.7
2.000	11.7	20.5	32.2	46.0	-13.8
2.048	11.7	20.5	32.2	46.0	-13.8
2.864	11.7	20.5	32.2	46.0	-13.8
1.248	11.7	20.4	32.1	46.0	-13.9
2.272	11.5	20.5	32.0	46.0	-14.0
3.008	11.4	20.5	31.9	46.0	-14.1
3.184	11.4	20.5	31.9	46.0	-14.1
0.687	11.4	20.4	31.8	46.0	-14.2
3.096	11.3	20.5	31.8	46.0	-14.2

NORTHWEST

EMC

AC Powerline Conducted Emissions

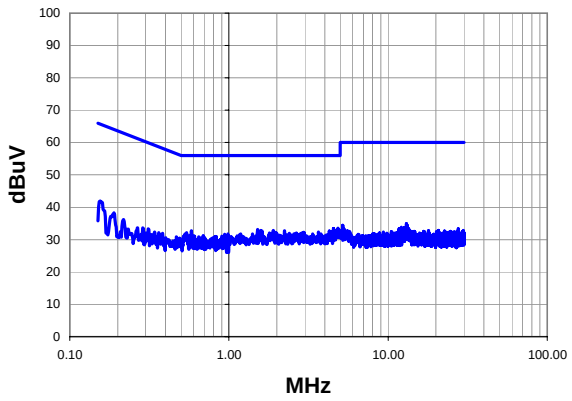
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, Low Channel 2402 MHz			
Deviations:	None			
Comments:	None			

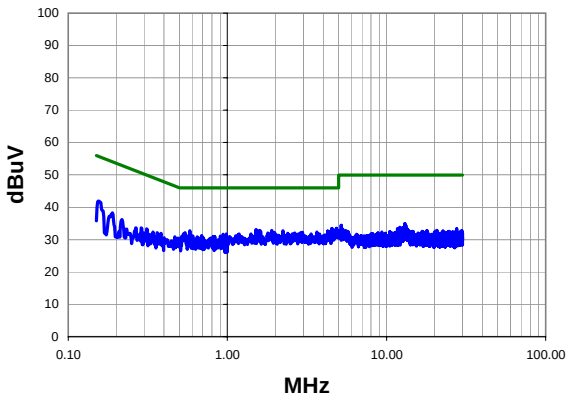
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	2	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.832	13.0	20.5	33.5	56.0	-22.5
4.536	12.9	20.5	33.4	56.0	-22.6
1.512	12.7	20.5	33.2	56.0	-22.8
1.584	12.4	20.5	32.9	56.0	-23.1
1.896	12.3	20.5	32.8	56.0	-23.2
0.582	12.3	20.4	32.7	56.0	-23.3
2.232	12.2	20.5	32.7	56.0	-23.3
1.616	12.2	20.5	32.7	56.0	-23.3
4.272	12.1	20.5	32.6	56.0	-23.4
3.656	11.8	20.5	32.3	56.0	-23.7
0.155	20.4	21.5	41.9	65.7	-23.8
2.936	11.7	20.5	32.2	56.0	-23.8
2.968	11.7	20.5	32.2	56.0	-23.8
1.968	11.7	20.5	32.2	56.0	-23.8
0.541	11.7	20.4	32.1	56.0	-23.9
2.648	11.5	20.5	32.0	56.0	-24.0
2.392	11.4	20.5	31.9	56.0	-24.1
3.792	11.3	20.5	31.8	56.0	-24.2
0.986	11.4	20.4	31.8	56.0	-24.2
1.184	11.3	20.4	31.7	56.0	-24.3

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.832	13.0	20.5	33.5	46.0	-12.5
4.536	12.9	20.5	33.4	46.0	-12.6
1.512	12.7	20.5	33.2	46.0	-12.8
1.584	12.4	20.5	32.9	46.0	-13.1
1.896	12.3	20.5	32.8	46.0	-13.2
0.582	12.3	20.4	32.7	46.0	-13.3
2.232	12.2	20.5	32.7	46.0	-13.3
1.616	12.2	20.5	32.7	46.0	-13.3
4.272	12.1	20.5	32.6	46.0	-13.4
3.656	11.8	20.5	32.3	46.0	-13.7
0.155	20.4	21.5	41.9	55.7	-13.8
2.936	11.7	20.5	32.2	46.0	-13.8
2.968	11.7	20.5	32.2	46.0	-13.8
1.968	11.7	20.5	32.2	46.0	-13.8
0.541	11.7	20.4	32.1	46.0	-13.9
2.648	11.5	20.5	32.0	46.0	-14.0
2.392	11.4	20.5	31.9	46.0	-14.1
3.792	11.3	20.5	31.8	46.0	-14.2
0.986	11.4	20.4	31.8	46.0	-14.2
1.184	11.3	20.4	31.7	46.0	-14.3

NORTHWEST

EMC

AC Powerline Conducted Emissions

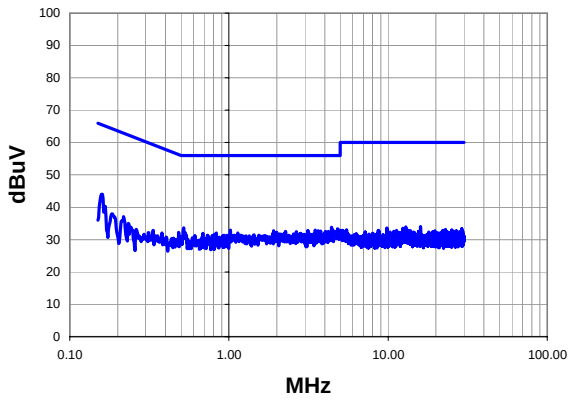
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, Mid Channel 2440 MHz			
Deviations:	None			
Comments:	None			

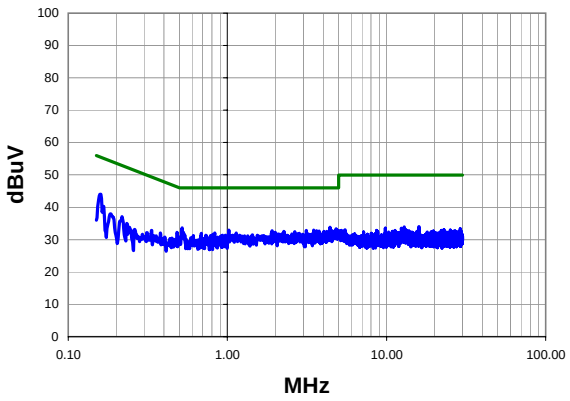
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	3	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.159	22.5	21.5	44.0	65.5	-21.5
4.408	13.3	20.5	33.8	56.0	-22.2
0.521	13.2	20.4	33.6	56.0	-22.4
4.816	12.8	20.5	33.3	56.0	-22.7
4.464	12.6	20.5	33.1	56.0	-22.9
1.024	12.5	20.4	32.9	56.0	-23.1
3.488	12.4	20.5	32.9	56.0	-23.1
3.136	12.3	20.5	32.8	56.0	-23.2
3.640	12.2	20.5	32.7	56.0	-23.3
1.912	12.2	20.5	32.7	56.0	-23.3
3.768	12.1	20.5	32.6	56.0	-23.4
2.264	12.0	20.5	32.5	56.0	-23.5
4.040	12.0	20.5	32.5	56.0	-23.5
2.648	11.9	20.5	32.4	56.0	-23.6
1.888	11.6	20.5	32.1	56.0	-23.9
0.832	11.7	20.4	32.1	56.0	-23.9
0.483	11.8	20.5	32.3	56.3	-24.0
0.686	11.5	20.4	31.9	56.0	-24.1
1.440	11.0	20.4	31.4	56.0	-24.6
0.973	11.0	20.4	31.4	56.0	-24.6

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.159	22.5	21.5	44.0	55.5	-11.5
4.408	13.3	20.5	33.8	46.0	-12.2
0.521	13.2	20.4	33.6	46.0	-12.4
4.816	12.8	20.5	33.3	46.0	-12.7
4.464	12.6	20.5	33.1	46.0	-12.9
1.024	12.5	20.4	32.9	46.0	-13.1
3.488	12.4	20.5	32.9	46.0	-13.1
3.136	12.3	20.5	32.8	46.0	-13.2
3.640	12.2	20.5	32.7	46.0	-13.3
1.912	12.2	20.5	32.7	46.0	-13.3
3.768	12.1	20.5	32.6	46.0	-13.4
2.264	12.0	20.5	32.5	46.0	-13.5
4.040	12.0	20.5	32.5	46.0	-13.5
2.648	11.9	20.5	32.4	46.0	-13.6
1.888	11.6	20.5	32.1	46.0	-13.9
0.832	11.7	20.4	32.1	46.0	-13.9
0.483	11.8	20.5	32.3	46.3	-14.0
0.686	11.5	20.4	31.9	46.0	-14.1
1.440	11.0	20.4	31.4	46.0	-14.6
0.973	11.0	20.4	31.4	46.0	-14.6

NORTHWEST

EMC

AC Powerline Conducted Emissions

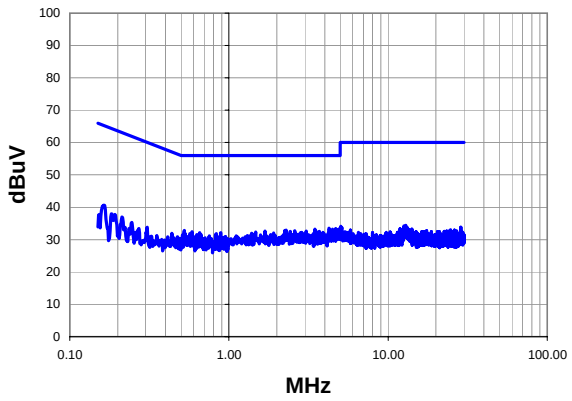
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, Mid Channel 2440 MHz			
Deviations:	None			
Comments:	None			

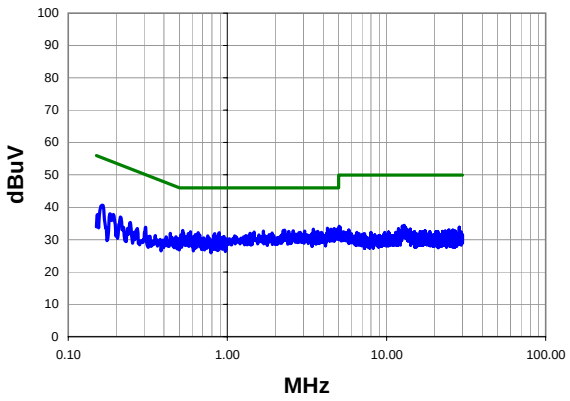
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	4	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.256	13.0	20.5	33.5	56.0	-22.5
4.680	12.9	20.5	33.4	56.0	-22.6
3.472	12.7	20.5	33.2	56.0	-22.8
4.472	12.7	20.5	33.2	56.0	-22.8
2.288	12.4	20.5	32.9	56.0	-23.1
0.524	12.4	20.4	32.8	56.0	-23.2
2.592	12.2	20.5	32.7	56.0	-23.3
1.688	12.2	20.5	32.7	56.0	-23.3
3.056	12.1	20.5	32.6	56.0	-23.4
2.432	12.0	20.5	32.5	56.0	-23.5
3.704	12.0	20.5	32.5	56.0	-23.5
0.585	12.0	20.4	32.4	56.0	-23.6
1.472	11.9	20.4	32.3	56.0	-23.7
3.608	11.8	20.5	32.3	56.0	-23.7
2.872	11.7	20.5	32.2	56.0	-23.8
3.888	11.7	20.5	32.2	56.0	-23.8
0.888	11.8	20.4	32.2	56.0	-23.8
0.655	11.7	20.4	32.1	56.0	-23.9
1.912	11.6	20.5	32.1	56.0	-23.9
1.392	11.5	20.4	31.9	56.0	-24.1

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.256	13.0	20.5	33.5	46.0	-12.5
4.680	12.9	20.5	33.4	46.0	-12.6
3.472	12.7	20.5	33.2	46.0	-12.8
4.472	12.7	20.5	33.2	46.0	-12.8
2.288	12.4	20.5	32.9	46.0	-13.1
0.524	12.4	20.4	32.8	46.0	-13.2
2.592	12.2	20.5	32.7	46.0	-13.3
1.688	12.2	20.5	32.7	46.0	-13.3
3.056	12.1	20.5	32.6	46.0	-13.4
2.432	12.0	20.5	32.5	46.0	-13.5
3.704	12.0	20.5	32.5	46.0	-13.5
0.585	12.0	20.4	32.4	46.0	-13.6
1.472	11.9	20.4	32.3	46.0	-13.7
3.608	11.8	20.5	32.3	46.0	-13.7
2.872	11.7	20.5	32.2	46.0	-13.8
3.888	11.7	20.5	32.2	46.0	-13.8
0.888	11.8	20.4	32.2	46.0	-13.8
0.655	11.7	20.4	32.1	46.0	-13.9
1.912	11.6	20.5	32.1	46.0	-13.9
1.392	11.5	20.4	31.9	46.0	-14.1

NORTHWEST

EMC

AC Powerline Conducted Emissions

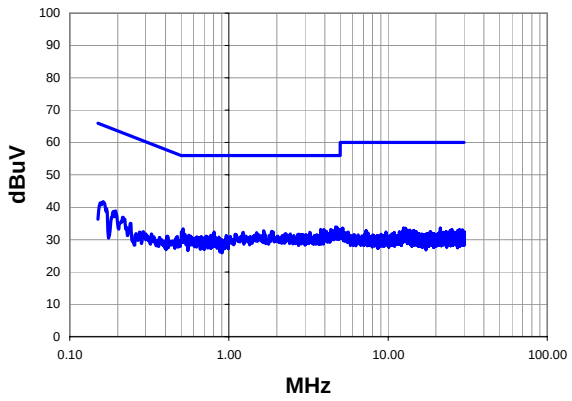
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, High Channel 2480 MHz			
Deviations:	None			
Comments:	None			

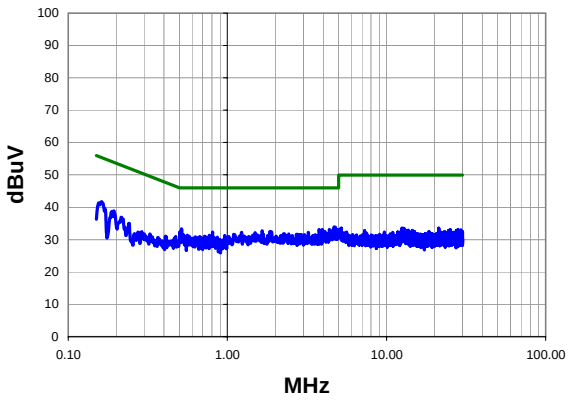
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	5	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.696	13.4	20.5	33.9	56.0	-22.1
0.514	12.9	20.4	33.3	56.0	-22.7
3.776	12.6	20.5	33.1	56.0	-22.9
3.952	12.6	20.5	33.1	56.0	-22.9
4.368	12.6	20.5	33.1	56.0	-22.9
1.656	12.3	20.5	32.8	56.0	-23.2
1.856	12.1	20.5	32.6	56.0	-23.4
4.104	12.0	20.5	32.5	56.0	-23.5
0.162	20.3	21.5	41.8	65.4	-23.6
0.504	12.0	20.4	32.4	56.0	-23.6
0.808	12.0	20.4	32.4	56.0	-23.6
1.232	11.8	20.4	32.2	56.0	-23.8
3.224	11.7	20.5	32.2	56.0	-23.8
1.496	11.7	20.4	32.1	56.0	-23.9
2.768	11.2	20.5	31.7	56.0	-24.3
0.769	10.9	20.4	31.3	56.0	-24.7
0.560	10.9	20.4	31.3	56.0	-24.7
0.963	10.8	20.4	31.2	56.0	-24.8
0.718	10.6	20.4	31.0	56.0	-25.0
0.194	17.7	21.2	38.9	63.9	-25.0

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.696	13.4	20.5	33.9	46.0	-12.1
0.514	12.9	20.4	33.3	46.0	-12.7
3.776	12.6	20.5	33.1	46.0	-12.9
3.952	12.6	20.5	33.1	46.0	-12.9
4.368	12.6	20.5	33.1	46.0	-12.9
1.656	12.3	20.5	32.8	46.0	-13.2
1.856	12.1	20.5	32.6	46.0	-13.4
4.104	12.0	20.5	32.5	46.0	-13.5
0.162	20.3	21.5	41.8	55.4	-13.6
0.504	12.0	20.4	32.4	46.0	-13.6
0.808	12.0	20.4	32.4	46.0	-13.6
1.232	11.8	20.4	32.2	46.0	-13.8
3.224	11.7	20.5	32.2	46.0	-13.8
1.496	11.7	20.4	32.1	46.0	-13.9
2.768	11.2	20.5	31.7	46.0	-14.3
0.769	10.9	20.4	31.3	46.0	-14.7
0.560	10.9	20.4	31.3	46.0	-14.7
0.963	10.8	20.4	31.2	46.0	-14.8
0.718	10.6	20.4	31.0	46.0	-15.0
0.194	17.7	21.2	38.9	53.9	-15.0

NORTHWEST

EMC

AC Powerline Conducted Emissions

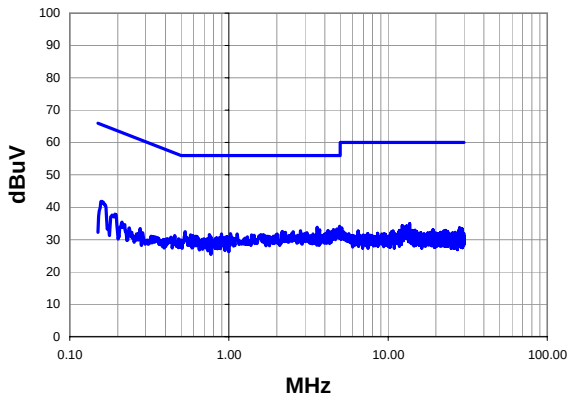
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	LGPD0023	**Date:**	06/30/10	Trevor Buls
Project:	None	**Temperature:**	22.55c°C	
Job Site:	MN03	**Humidity:**	46.63	
Serial Number:	2010M00186	**Barometric Pres.:**	1022.1	**Tested by:** Trevor Buls
EUT:	AM3x SOM-M2			
Configuration:	1 - Basic Configuration			
Customer:	Logic PD			
Attendees:	None			
EUT Power:	120VAC/60Hz			
Operating Mode:	Bluetooth DH5, High Channel 2480 MHz			
Deviations:	None			
Comments:	None			

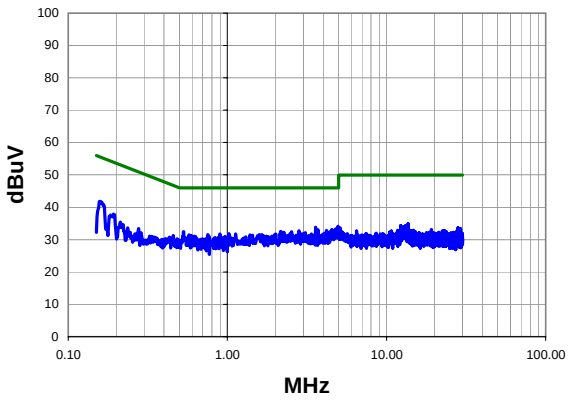
Test Specifications	**Test Method**
FCC 15.207:2010	ANSI C63.10:2009

Run #	6	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.944	13.6	20.5	34.1	56.0	-21.9
3.576	13.3	20.5	33.8	56.0	-22.2
4.528	12.6	20.5	33.1	56.0	-22.9
3.712	12.5	20.5	33.0	56.0	-23.0
4.192	12.3	20.5	32.8	56.0	-23.2
2.816	12.2	20.5	32.7	56.0	-23.3
2.160	12.0	20.5	32.5	56.0	-23.5
0.531	12.0	20.4	32.4	56.0	-23.6
2.536	11.9	20.5	32.4	56.0	-23.6
0.159	20.3	21.5	41.8	65.5	-23.7
3.096	11.6	20.5	32.1	56.0	-23.9
1.024	11.4	20.4	31.8	56.0	-24.2
2.008	11.3	20.5	31.8	56.0	-24.2
3.368	11.3	20.5	31.8	56.0	-24.2
0.898	11.4	20.4	31.8	56.0	-24.2
1.128	11.3	20.4	31.7	56.0	-24.3
1.648	11.1	20.5	31.6	56.0	-24.4
0.753	11.1	20.5	31.6	56.0	-24.4
0.575	11.0	20.4	31.4	56.0	-24.6
0.595	10.8	20.4	31.2	56.0	-24.8

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
4.944	13.6	20.5	34.1	46.0	-11.9
3.576	13.3	20.5	33.8	46.0	-12.2
4.528	12.6	20.5	33.1	46.0	-12.9
3.712	12.5	20.5	33.0	46.0	-13.0
4.192	12.3	20.5	32.8	46.0	-13.2
2.816	12.2	20.5	32.7	46.0	-13.3
2.160	12.0	20.5	32.5	46.0	-13.5
0.531	12.0	20.4	32.4	46.0	-13.6
2.536	11.9	20.5	32.4	46.0	-13.6
0.159	20.3	21.5	41.8	55.5	-13.7
3.096	11.6	20.5	32.1	46.0	-13.9
1.024	11.4	20.4	31.8	46.0	-14.2
2.008	11.3	20.5	31.8	46.0	-14.2
3.368	11.3	20.5	31.8	46.0	-14.2
0.898	11.4	20.4	31.8	46.0	-14.2
1.128	11.3	20.4	31.7	46.0	-14.3
1.648	11.1	20.5	31.6	46.0	-14.4
0.753	11.1	20.5	31.6	46.0	-14.4
0.575	11.0	20.4	31.4	46.0	-14.6
0.595	10.8	20.4	31.2	46.0	-14.8