Test of Brace Audio Wireless Audio Equipment

To: FCC 47 CFR Part15.247 & IC RSS-210

Test Report Serial No.: BRCE03-A2 Rev A

TEST REPORT

FROM

Test of Brace Audio Wireless Audio Equipment

To FCC 47 CFR Part15.247 & IC RSS-210

Test Report Serial No.: BRCE03-A2 Rev A

This report supersedes: None

Manufacturer: Brace Audio Corporation
29732 130th Way SE
Auburn, Washington 98092
USA

Product Function: Wireless Audio Equipment

Copy No: pdf **Issue Date:** 7th July '08

This Test Report is Issued Under the Authority of;

MiCOM Labs, Inc.
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Pleasanton, CA 94566 USA
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ACCREDITED
CERTIFICATE #2381.01

MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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ACCREDITATION, LISTINGS & RECOGNITION

MiCOM Labs, Inc. an accredited laboratory complies with the international standard BS EN ISO/IEC 17025. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

ilac-MRA

THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

MICOM LABS
Pleasanton, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005*).

Presented this 26th day of February 2008.

President
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2009

AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION CORPORATE SEAL 1978 DISTRICT OF COLUMBIA A2LA

For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

LISTINGS

MiCOM Labs test facilities are listed by the following organizations;

North America

United States of America
Federal Communications Commission (FCC) Listing #: 102167

Canada
Industry Canada (IC) Listing #: 4143A

RECOGNITION

APEC MRA (Asia-Pacific Economic Community Mutual Recognition Agreement)

Conformity Assessment Body (CAB) – MiCOM Labs

Test data generated by MiCOM Labs is accepted in the following countries under the APEC MRA.

Country	Recognition Body	Phase	CAB Identification No.
Australia	Australian Communications and Media Authority (ACMA)	I	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)	I	
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)	I	
Singapore	Infocomm Development Authority (IDA)	I	
Taiwan	Directorate General of Telecommunications (DGT) Bureau of Standards, Metrology and Inspection (BSMI)	I I	

DOCUMENT HISTORY

Document History		
Revision	**Date**	**Comments**
Draft		
Rev A	7th July '08	Initial Release

1. TEST RESULT CERTIFICATE

Manufacturer:	Brace Audio 29732 130th Way SE Auburn, Washington 98092 USA	Tested By:	MiCOM Labs, Inc. 440 Boulder Court Suite 200 Pleasanton California, 94566, USA
EUT:	Wireless Audio Equipment	Telephone:	+1 925 462 0304
Model:	DWG-1000	Fax:	+1 925 462 0306
S/N:	N/A		
Test Date(s):	20th - 21st June '08	Website:	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC 47 CFR Part15.247 & IC RSS-210	EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

ACCREDITED
CERTIFICATE #2381.01

Approved & Released for MiCOM Labs, Inc. by:

Graeme Grieve
Quality Manager MiCOM Labs,

Gordon Hurst
President & CEO MiCOM Labs, Inc.

2. REFERENCES AND MEASUREMENT UNCERTAINTY

2.1. Normative References

Ref.	Publication	Year	Title
(i)	FCC 47 CFR Part 15.247	2007	Code of Federal Regulations
(ii)	Industry Canada RSS-210	Issue 7 June 2007	Low Power License-Exempt Radiocommunication Devices (All Frequency Bands)
(iii)	Industry Canada RSS-Gen	Issue 2 June 2007	General Requirements and Information for the Certification of Radiocommunication Equipment.
(iv)	ANSI C63.4	2003	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
(v)	CISPR 22/ EN 55022	1997 1998	Limits and Methods of Measurements of Radio Disturbance Characteristics of Information Technology Equipment
(vi)	M 3003	Edition 1 Dec. 1997	Expression of Uncertainty and Confidence in Measurements
(vii)	LAB34	Edition 1 Aug 2002	The expression of uncertainty in EMC Testing
(viii)	ETSI TR 100 028	2001	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
(ix)	A2LA	14th September 2005	Reference to A2LA Accreditation Status – A2LA Advertising Policy

2.2. Test and Uncertainty Procedures

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

3. PRODUCT DETAILS AND TEST CONFIGURATIONS

3.1. Technical Details

Details	Description
Purpose:	Test of the Wireless Audio Equipment to FCC Part 15.247 and Industry Canada RSS-210 regulations
Applicant:	Brace Audio 29732 130th Way SE Auburn, Washington 98092 USA
Manufacturer:	Dallas Electronics, Inc. 2151-A Delaware Ave. Santa Cruz, California 95060 USA
Laboratory performing the tests:	MiCOM Labs, Inc. 440 Boulder Court, Suite 200 Pleasanton, California 94566 USA
Test report reference number:	BRCE03-A2 Rev A
Date EUT received:	20th June 2008
Standard(s) applied:	FCC 47 CFR Part15.247 & IC RSS-210
Dates of test (from - to):	20th - 21st June '08
No of Units Tested:	Two; 1).. integral antenna 2).. modified with RF connector for conducted testing
Type of Equipment:	2.4 GHz Wireless Audio Equipment
Manufacturers Trade Name:	Wireless Audio Equipment
Model:	DWG-1000
Location for use:	Indoor
Antenna:	Internal only
Declared Frequency Range(s):	2400 – 2483.5 MHz
Type of Modulation:	FHSS
Declared Nominal Output Power:	+16 dBm
Software Version:	3.01
EUT Modes of Operation:	FHSS
Transmit/Receive Operation:	Transceiver, Simplex
ITU Emission Designator:	1M79F1W
Rated Input Voltage and Current:	3 Vdc Battery Operated, Current 600mA
Operating Temperature Range:	Client declared range : 0ºC to +40ºC
Clock/Oscillator(s):	49.152 MHz, 24.576 MHz, 12.288 MHz
EUT Dimensions:	Transmitter & Receiver 1.25” (H) X 2.25” (W) X 3.5” (D)
EUT Weight :	6 oz
Primary function of equipment:	Wireless Audio Equipment that permits wireless connection of musical equipment to sound equipment

3.2. Scope of Test Program

The scope of the test program was to test the Wireless Audio Equipment in the frequency ranges 2,400 – 2,483.5 MHz against FCC 47 CFR Part 15.247 and Industry Canada RSS-210 specifications for radiated and conducted emissions for intentional radiators. The intentional radiator was tested in a simulated typical installation to demonstrate compliance with the stated standards i.e. for radiated emissions both the transmitter and receiver tested simultaneously.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of the EUT, orientation of the power and I/O cabling, antenna search height and antenna polarization.

Every effort was made to perform an impartial test using appropriate test equipment of known calibration.

The Wireless Audio Equipment (EUT) reader is a 2,400 MHz Frequency Hoping Spread Spectrum (FHSS) transceiver. The EUT required no modification to bring it into compliance, see Section 3.7 “Equipment Modifications”.

Brace Audio 2.4 GHz Wireless Audio Equipment

Receiver on left, Transmitter on right of photograph

Brace Audio 2.4 GHz Wireless Audio Equipment

Receiver on left, Transmitter on right of photograph

Brace Audio 2.4 GHz ac/dc Convertor

Brace Audio 2.4 GHz ac/dc Convertor

3.3. Equipment Model(s) and Serial Number(s)

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr	Model No.	Serial No.
EUT	Audio Amplifier - Transmitter	Brace Audio Corporation		N/A
EUT	Audio Amplifier - Receiver	Brace Audio Corporation		N/A
EUT	100-240Vac 50/60Hz ac/dc convertor 3 Vdc 500 mA Note: ac/dc convertor will not be marketed as part of the system	Radio Shack/ITE	273-024	N/A

3.4. Antenna Details

1. Integral surface mount hemispherical radiator 4 dBi, Tyco

3.5. Cabling and I/O Ports

Number and type of I/O ports

1. +3 Vdc Jack (receiver only)
2. 1/4” to 1/8” Shielded Audio Male Cable (3’ length)

3.6. Test Configurations

Test configurations

Operating Channel	Frequencies (MHz)
0	2403.33
10	2442.22
19	2479.10

Results for the above configurations are provided in this report.

3.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

3.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

4. TEST SUMMARY

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247**, **Industry Canada RSS-210** and **Industry Canada RSS-Gen.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.247(a)(1) **A8.1**	20 dB BW	20 dB BW	Conducted	Complies	5.1.1
15.247(a)(1) **A8.1**	Transmitter Channels	Channel Spacing	Conducted	Complies	5.1.2
15.247(a)(1) **A8.1**	Transmitter Channels	Number of Channels	Conducted	Complies	5.1.3.1
		Channel Occupancy	Conducted	Complies	5.1.3.2
15.247(b)(2) **A8.4**	Output Power	Transmit Power	Conducted	Complies	5.1.4
15.247(i) **5.5**	Maximum Permissible Exposure	Exposure to radio frequency energy levels	Conducted	Complies	5.1.5
15.247(d) **A8.5**	Conducted Spurious Emissions	Band Edge	Conducted	Complies	5.1.6
		Spurious Emissions Transmitter (1 to 10 GHz)	Conducted	Complies	

List of Measurements

The following table represents the list of measurements required under the **FCC CFR47 Part 15.247**, **Industry Canada RSS-210** and **Industry Canada RSS-Gen.**

Section(s)	Test Items	Description	Condition	Result	Test Report Section
15.247(d) **15.205** **15.209** **A8.5** **2.2** **2.6** **4.9**	Transmitter Radiated Spurious Emissions (above 1GHz)	Transmitter	Radiated	Complies	5.1.7
4.10 **§7.2.3**		Standby	Radiated	Complies	5.1.8
15.247(d) **15.205** **15.209** **A8.5** **2.2** **2.6**	Radiated Emissions below 1 GHz	Battery operated + ac/dc converter operated	Radiated	Complies (Class B)	5.1.9
15.207 **7.2.2**	Conducted	AC Wireline Conducted Emissions	Conducted	Complies	5.1.10

Note 1: *Test results reported in this document relate only to the items tested*
Note 2: *The required tests demonstrated compliance as per client declaration of test configuration, monitoring methodology and associated pass/fail criteria*
Note 3: *Section 3.7 - Equipment Modifications highlights the equipment modifications that were required to bring the product into compliance with the above test matrix*

5. TEST RESULTS

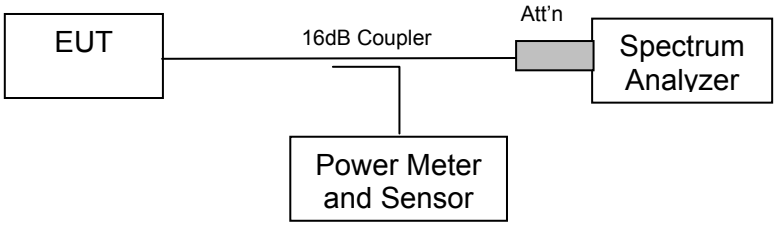
5.1. Device Characteristics

5.1.1. 20 dB Bandwidth

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-210 §A8.1

Test Procedure
The 20 dB bandwidth is measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate center frequency and modulation.

Test Measurement Set up



Measurement set up for 20 dB bandwidth test

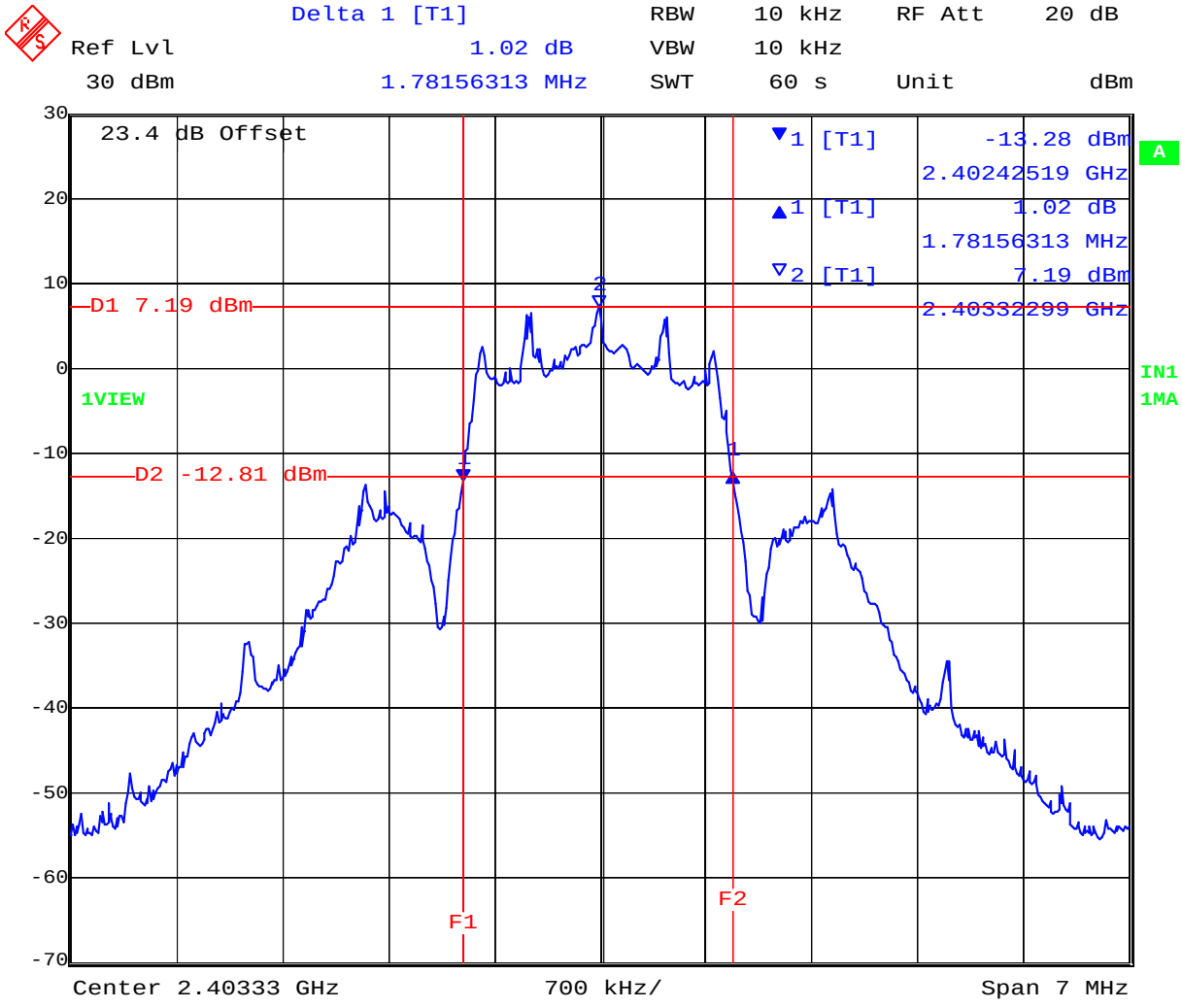
Test Results for 20 dB Bandwidth

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

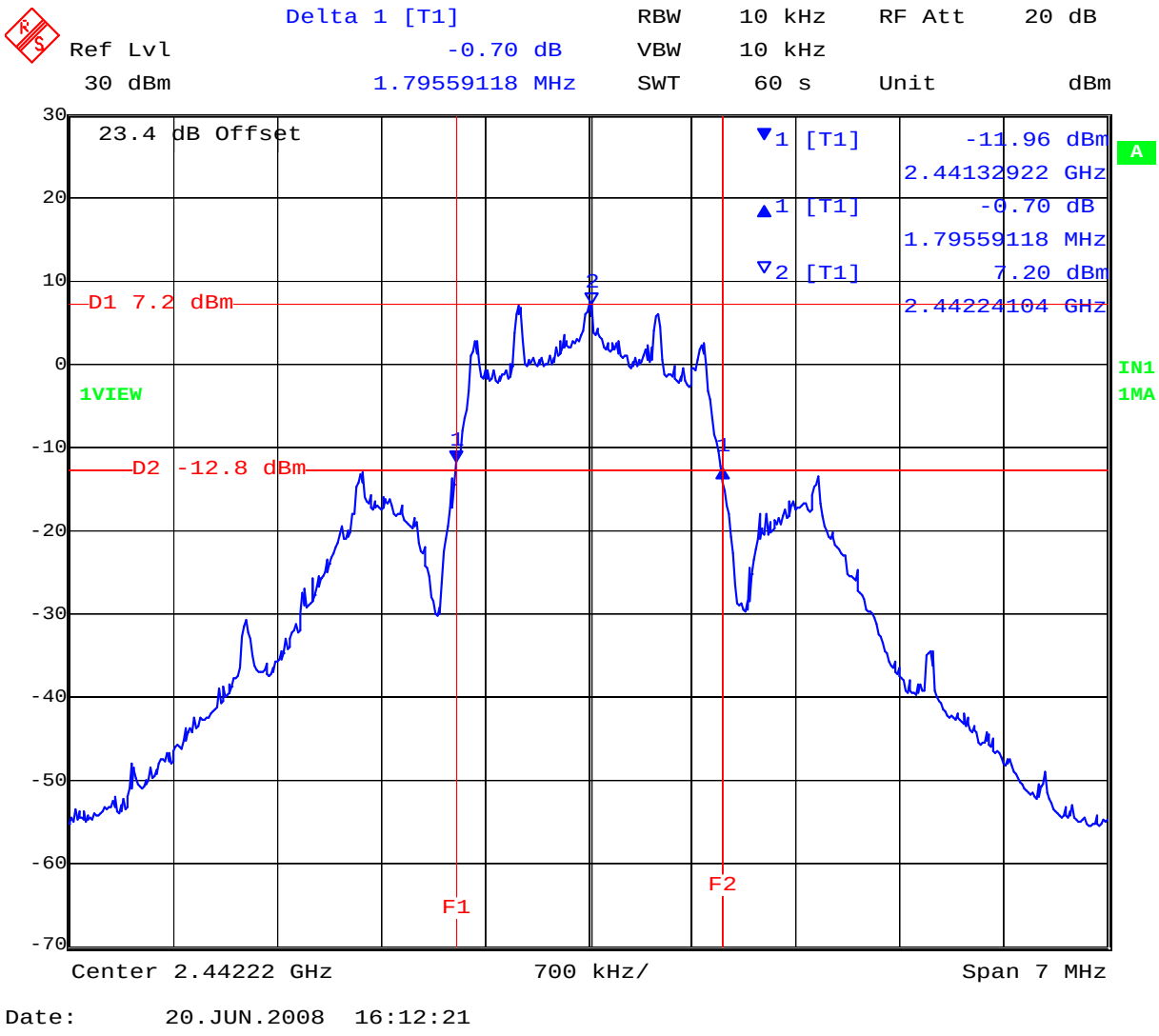
TABLE OF RESULTS

Channel #	Center Frequency (MHz)	20 dB Bandwidth (MHz)	Specification
0	2403.33	1.7816	Greater than 15 channels used
10	2442.22	1.7956	
19	2479.10	1.7816	

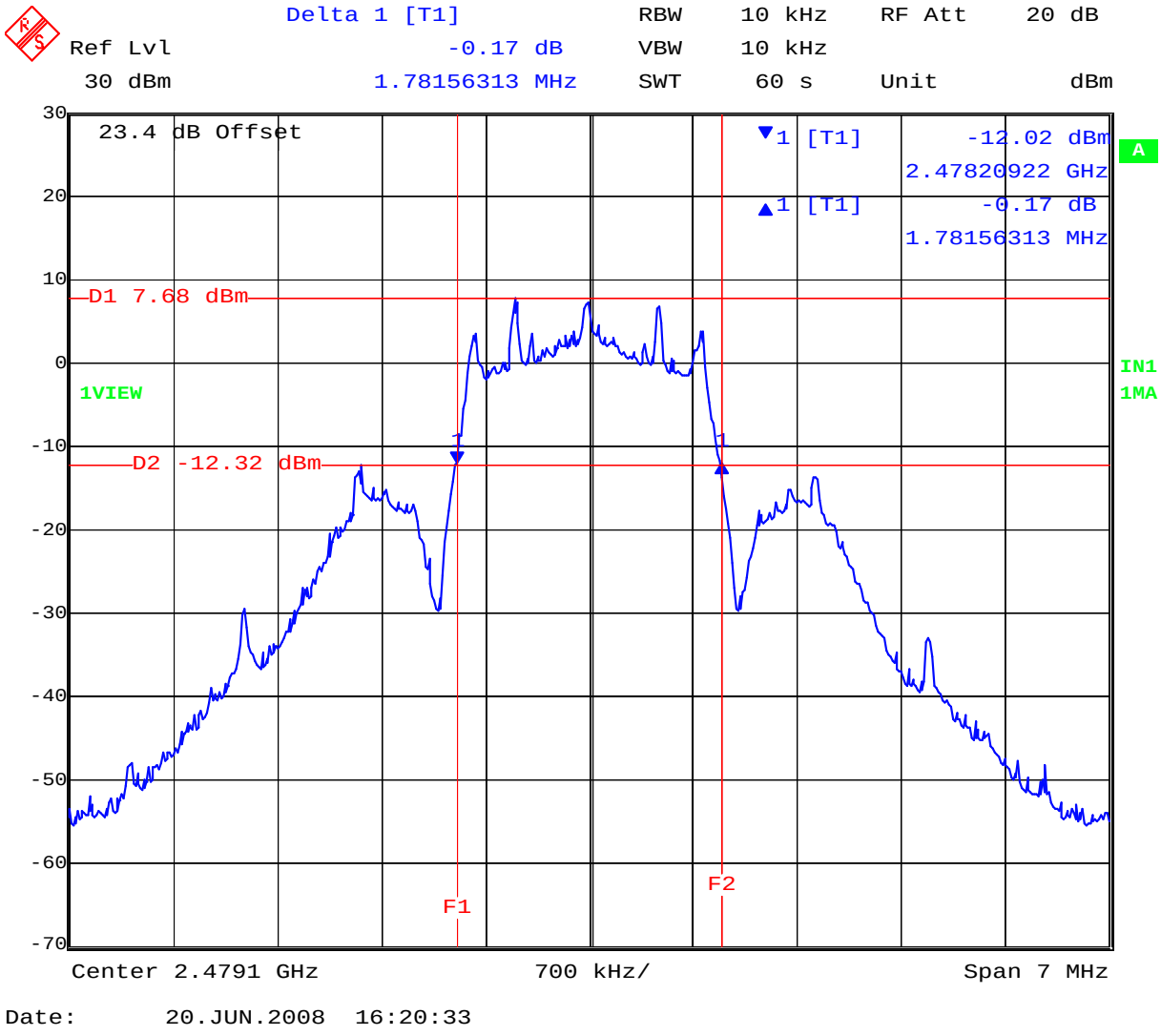
CH 0 2403.33 MHz 20 dB Bandwidth



CH 10 2442.22 MHz 20 dB Bandwidth



CH 19 2479.10 MHz 20 dB Bandwidth



Specification

Limits

FCC §15.247 (a)(1)
Industry Canada RSS-210 §8.1

(i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(ii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

(iii) Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	±2.81 dB

Traceability

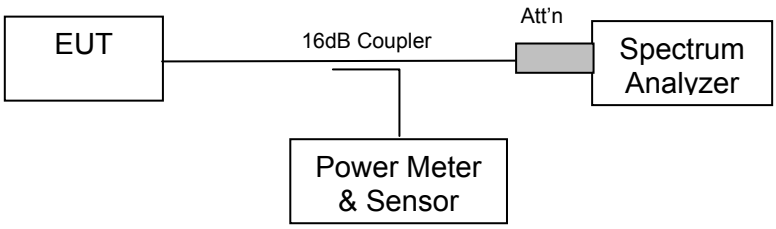
Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

5.1.2. Transmitter Channels - Channel Spacing

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-210 §8.1(2)

Test Procedure
The channel spacing is measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate center frequency and modulation.

Test Measurement Set up



Measurement set up for Channel Spacing Test

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

TABLE OF RESULTS

Channel(s)	Channel Spacing (MHz)	Specification
9-10	4.1088	Greater than maximum 20 dB Bandwidth

Channel Spacing

Specification for Channel Spacing

Limits

FCC §15.247 (a)(1)
Industry Canada RSS-210 §A8.1(2)

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Laboratory Uncertainty for Frequency Measurements

Measurement uncertainty	±0.86ppm

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-02 ‘Frequency Measurement”	0078, 0134, 0158, 0184, 0193, 0250,0252 0310, 0312.

5.1.3. Transmitter Channels

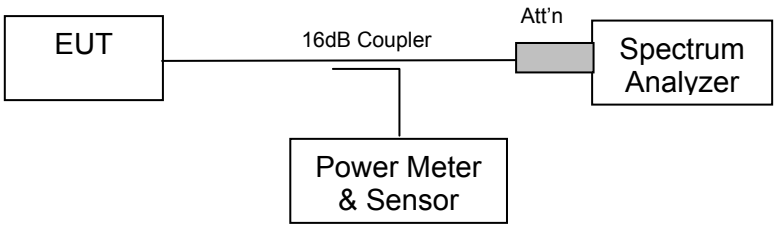
5.1.3.1. Number of Channels

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-210 §A8.1

Test Procedure

The number of channels and channel occupancy is measured with a spectrum analyzer connected to the antenna terminal, while the EUT is operating in transmission mode at the appropriate center frequency and modulation.

Test Measurement Set up



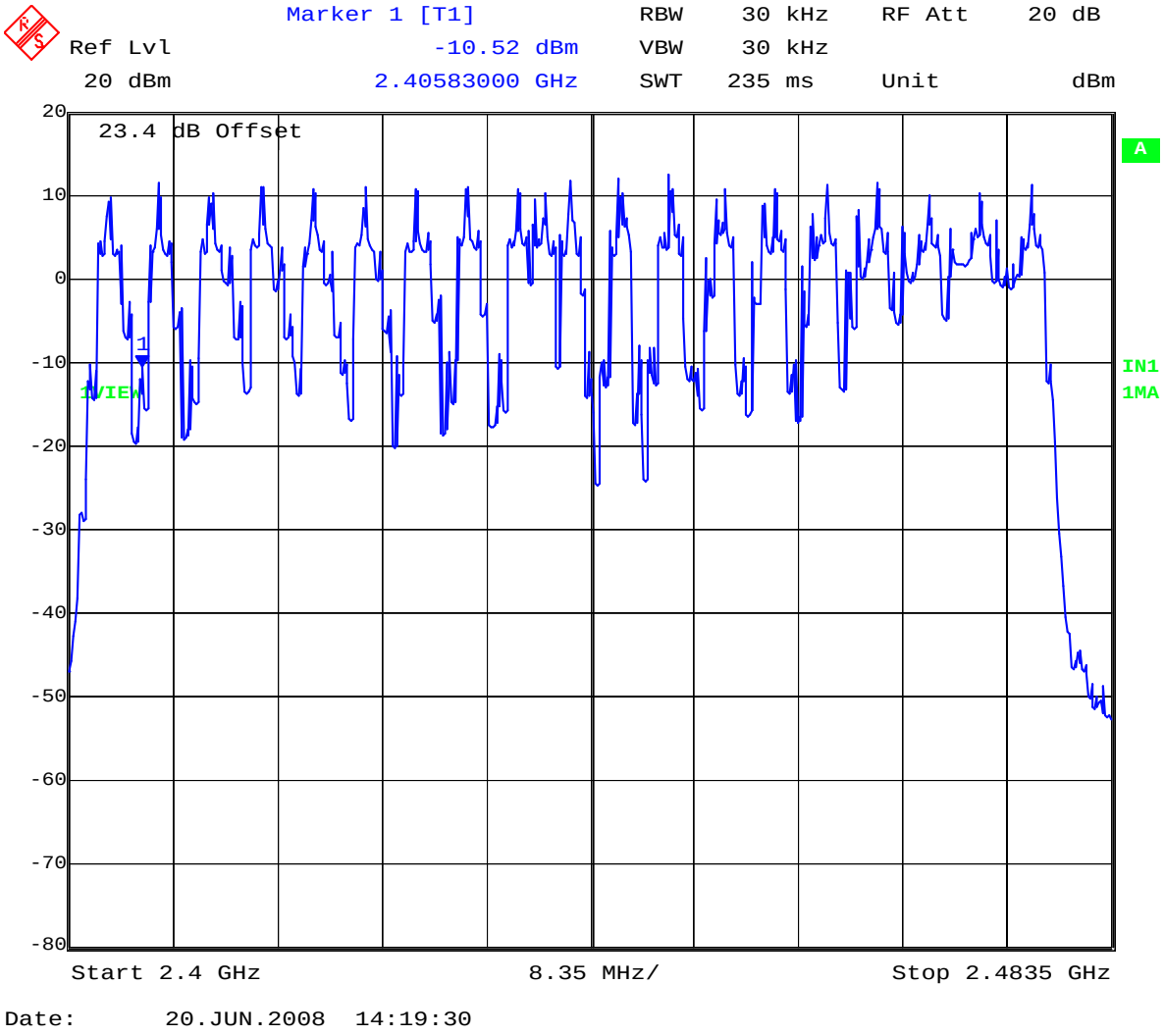
Test set up to measure the number of channels and channel occupancy

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

TABLE OF RESULTS

Number of Channels	Specification
20	Minimum 15 hopping channels

Number of Transmission Channels



5.1.3.2. Channel Occupancy

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-210 §A8.1

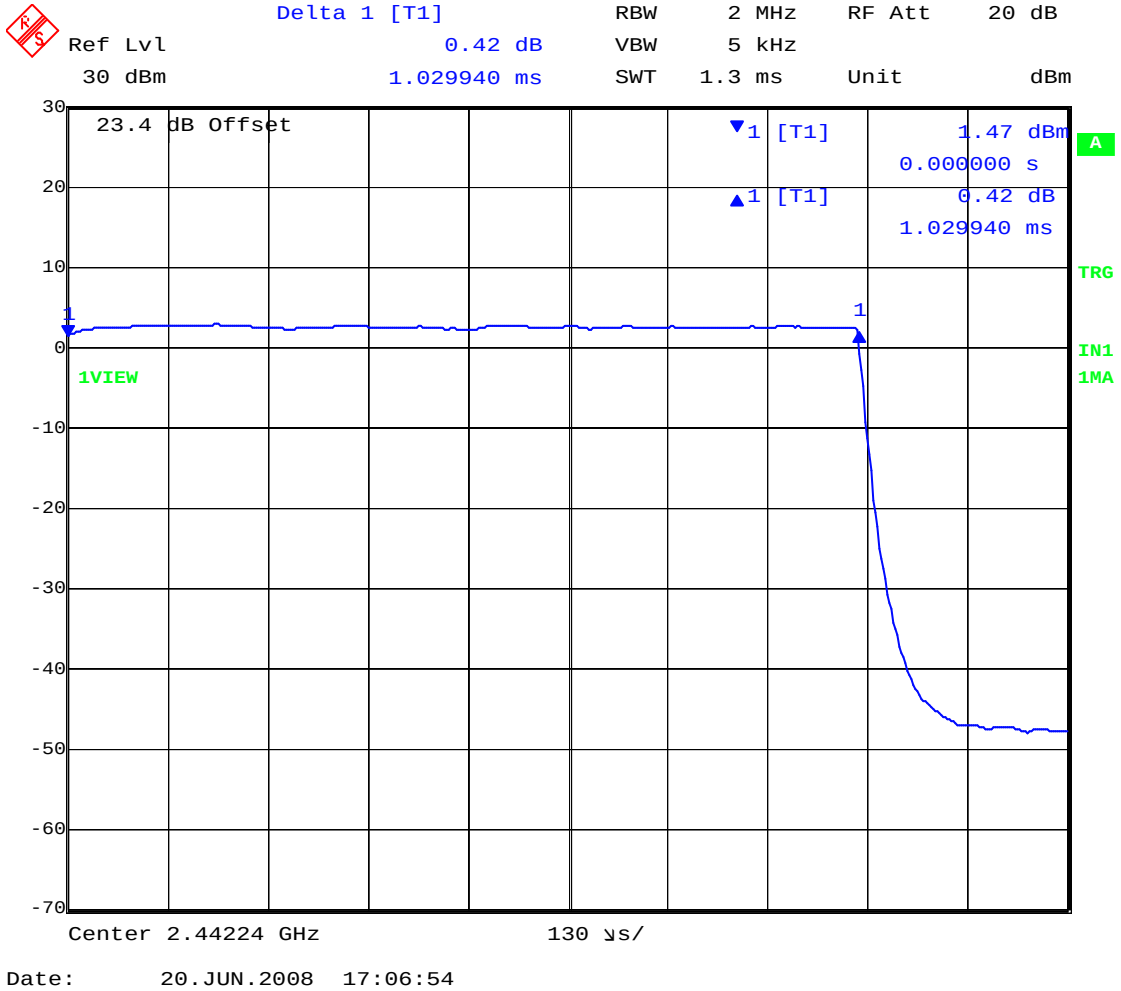
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Channel Dwell Time

TABLE OF RESULTS

Channel #	Center Frequency (MHz)	Channel Dwell Time (single channel) (mSecs)
10	2442.22	1.02994

Channel dwell time Ch 10 2442.22 MHz

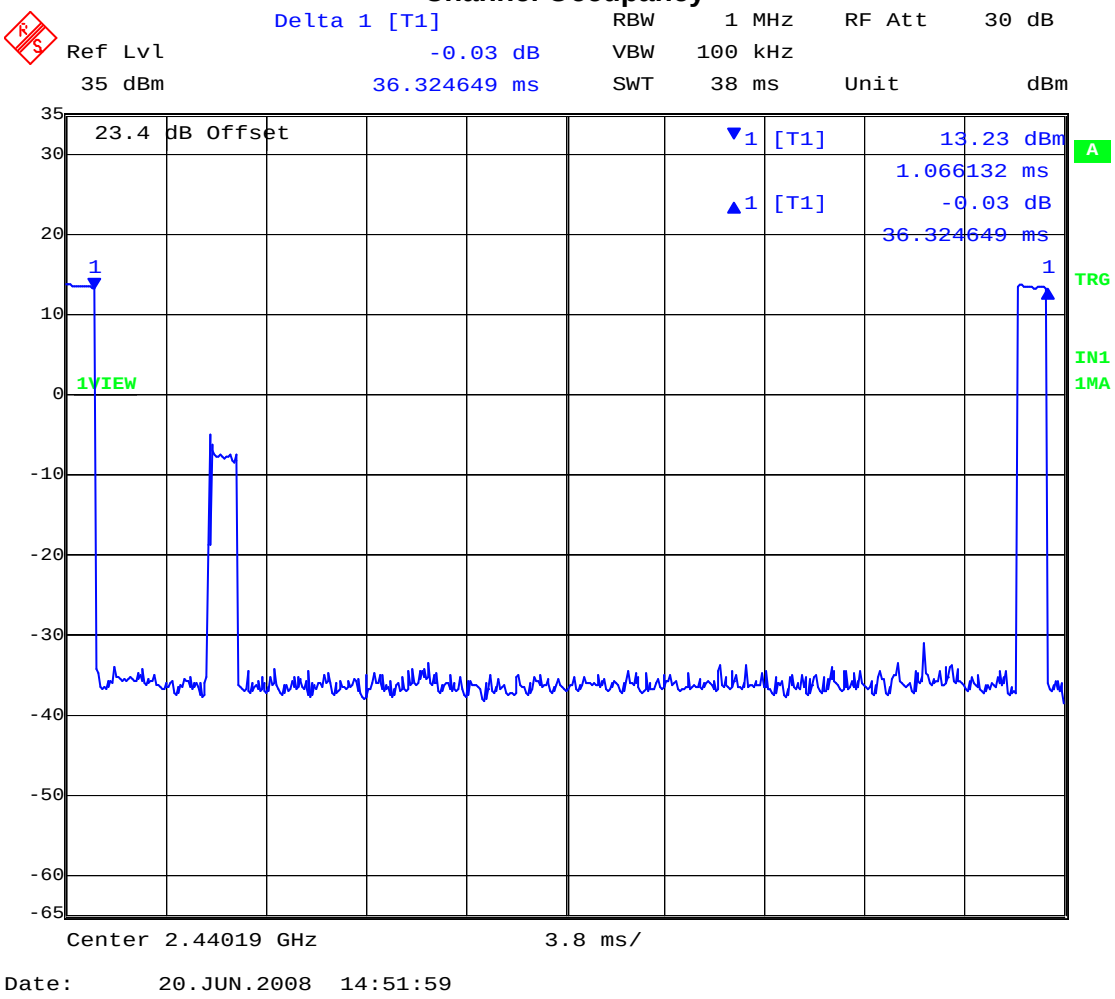


Channel Occupancy

TABLE OF RESULTS

Channel #	Center Frequency (MHz)	Channel Occupancy (mSeconds)
10	2442.22	36.325

Channel Occupancy



Average Time of Occupancy = dwell time * number of channels
= 1.02994 mS * 20 = 20.6mS

Specification for Number of Channels and Channel Occupancy

Limits

FCC, Part 15 Subpart C §15.247(a)(1)
Industry Canada RSS-210 §A8.1

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(ii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

(iii) Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

Laboratory Uncertainty for Frequency Measurements

Measurement uncertainty	±0.86ppm

Traceability

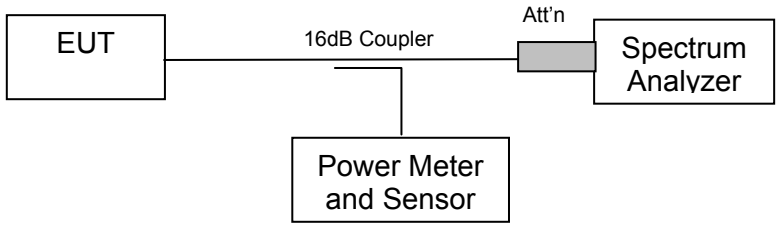
Method	Test Equipment Used
Measurements were made per work instruction WI-02 ‘Frequency Measurement”	0078, 0134, 0158, 0184, 0193, 0250, 0252 0310, 0312.

5.1.4. Output Power

FCC, Part 15 Subpart C §15.247(b)(2)
Industry Canada RSS-210 §A8.4

Test Procedure
The transmitter terminal of EUT was set for CW (continuous wave) operation and connected to the input of the power meter which was calibrated to measure power. The value of measured power including antenna cable loss was reported.

Test Measurement Set up



Measurement set up for Transmitter Output Power

Measurement Results for Output Power

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

TABLE OF RESULTS

Channel #	Center Frequency (MHz)	Power (dBm)	Power (mW)
0	2403.33	+13.7	+23.4
10	2442.22	+14.4	+27.5
19	2479.10	+14.7	+29.5

Specification

Limits

FCC, Part 15 Subpart C §15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

Industry Canada RSS-210 §A8.4 Transmitter Output Power & EIRP Requirements
(1) For frequency hopping systems operating in the band 902-928 MHz, the maximum peak conducted output power shall not exceed 1.0 W, and the e.i.r.p. shall not exceed 4 W, if the hopset uses 50 or more hopping channels; the maximum peak conducted output power shall not exceed 0.25 W, and the e.i.r.p. shall not exceed 1 W, if the hopset uses less than 50 hopping channels.

(2) For frequency hopping systems operating in the band 2400-2483.5 MHz employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4W.

(3) For frequency hopping systems operating in the band 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-01 'Measuring RF Output Power'	0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117

5.1.5. Maximum Permissible Exposure

FCC, Part 15 Subpart C §15.247(i)
Industry Canada RSS-Gen §5.5

SAR report exists for the Wireless Audio Product, see Celltech Labs SAR report #: 061608WD2-T913-S15S

Antenna Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated Safe Distance @ 1mW/cm^2 Limit(cm)	Minimum Separation Distance (cm)

Specification

Maximum Permissible Exposure Limits

§15.247(i) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency levels in excess of the Commission's guidelines.

FCC §1.1310 Limit = 1mW / cm^2 from 1.310 Table 1

RSS-Gen §5.5 Before equipment certification is granted, the applicable requirements of RSS-102 shall be met.

Laboratory Measurement Uncertainty for Power Measurements

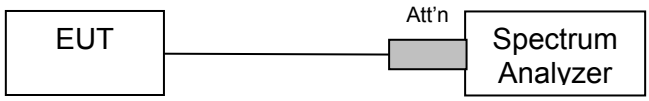
Measurement uncertainty	±1.33 dB

5.1.6. Conducted Spurious Emissions Transmitter

FCC, Part 15 Subpart C §15.247(d)
Industry Canada RSS-210 §A8.5

Test Procedure
Conducted emissions were measured at a limit of 20 dB below the highest in-band spectral density measured with a spectrum analyzer connected to the antenna terminal. Emissions at the band edge were measured and recorded. Measurements were made while EUT was operating in transmit mode of operation at the appropriate center frequency.

Test Measurement Set up



Band-edge measurement test configuration

Measurement Results of Conducted Spurious Emissions

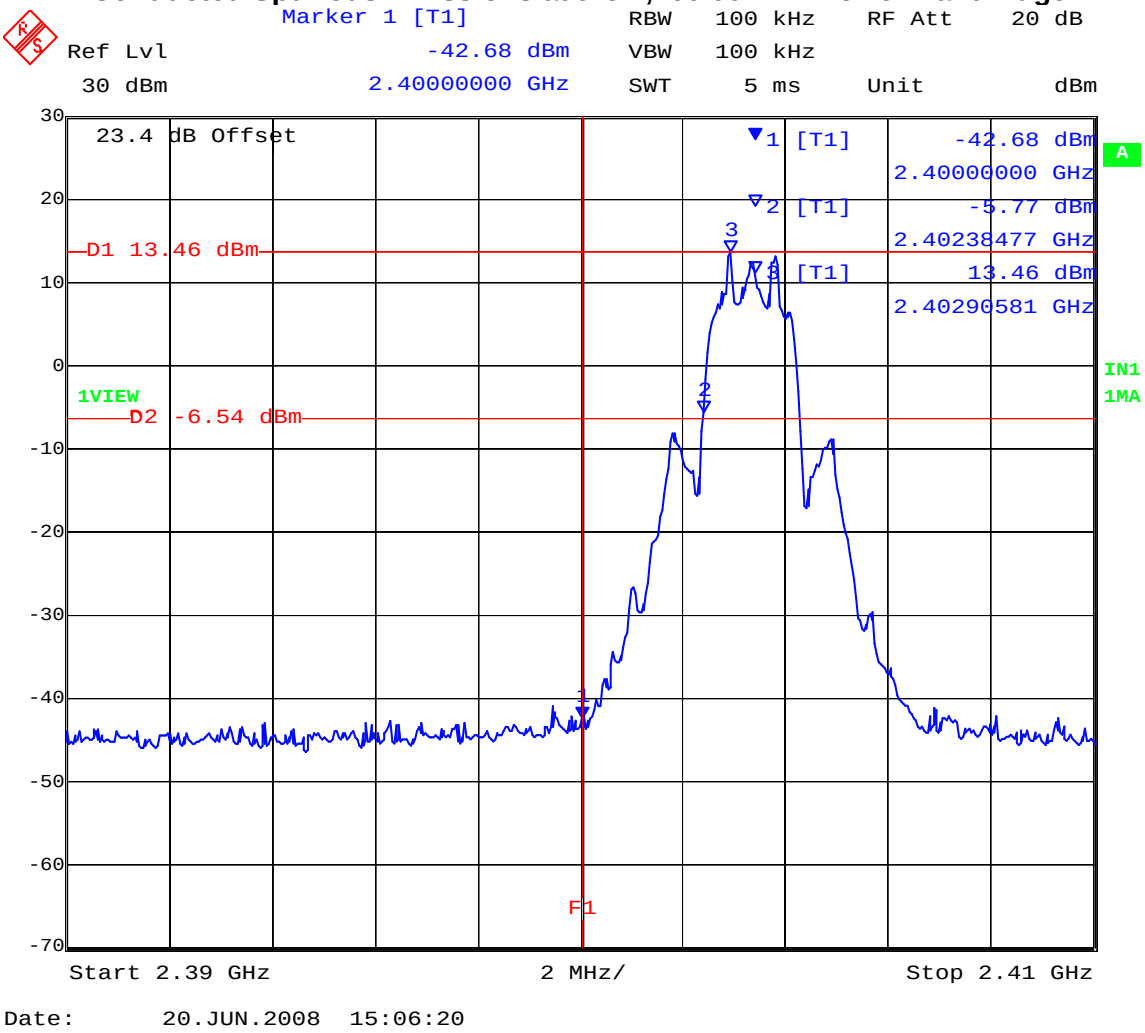
Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Conducted Band-Edge Results

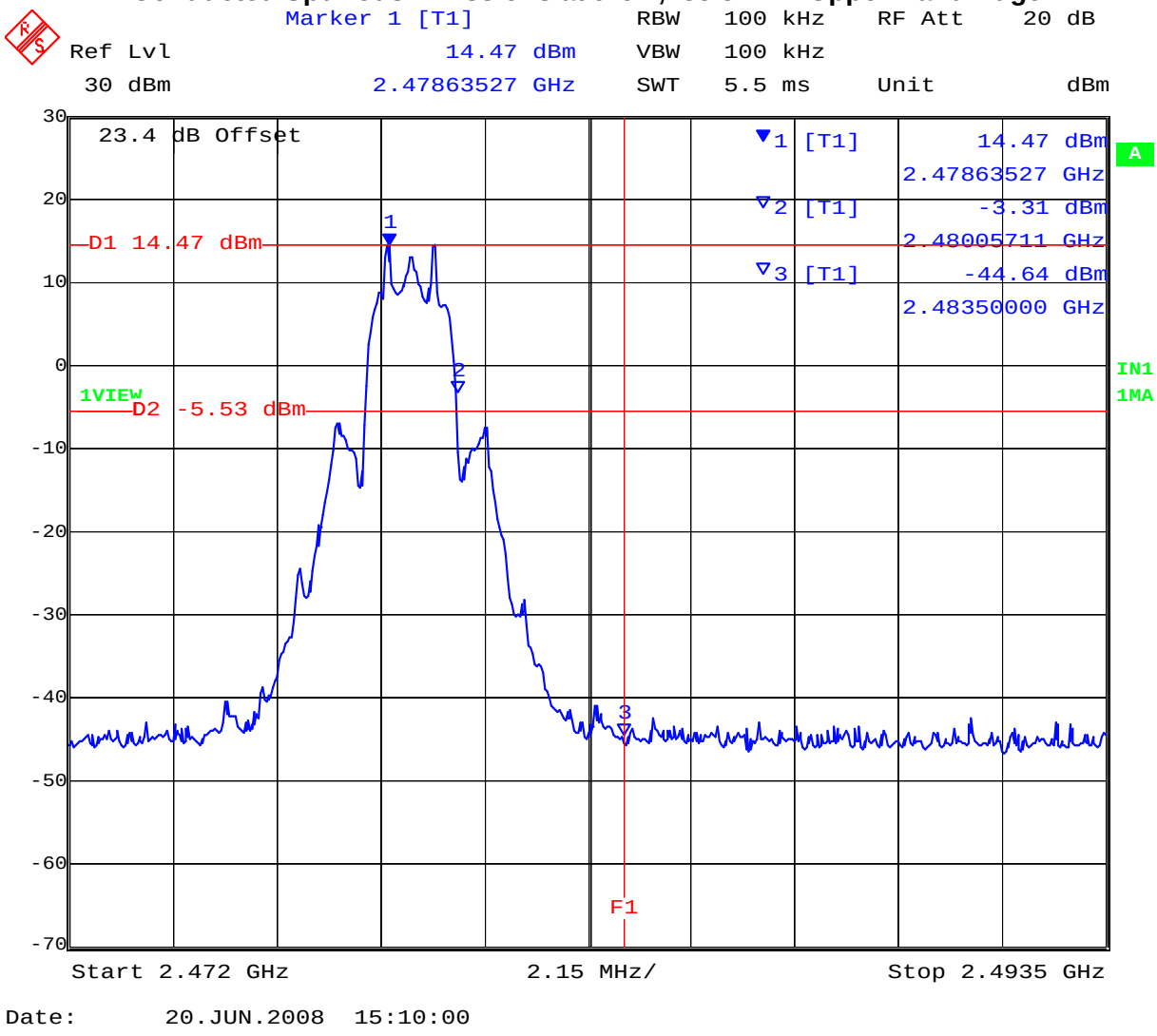
TABLE OF RESULTS

Channel #	Center Frequency (MHz)	Band-edge Frequency (MHz)	Limit (dBm)	Amplitude @ Band-edge (dBm)	Margin (dB)
0	2403.33	902.0	-6.54	-42.68	-36.14
19	2479.10	928.0	-5.53	-44.64	-39.11

Conducted Spurious Emissions at the 2,400.00 MHz Lower Band Edge



Conducted Spurious Emissions at the 2,483.5 MHz Upper Band Edge



Spurious Emissions (0.03 - 26.5 GHz)

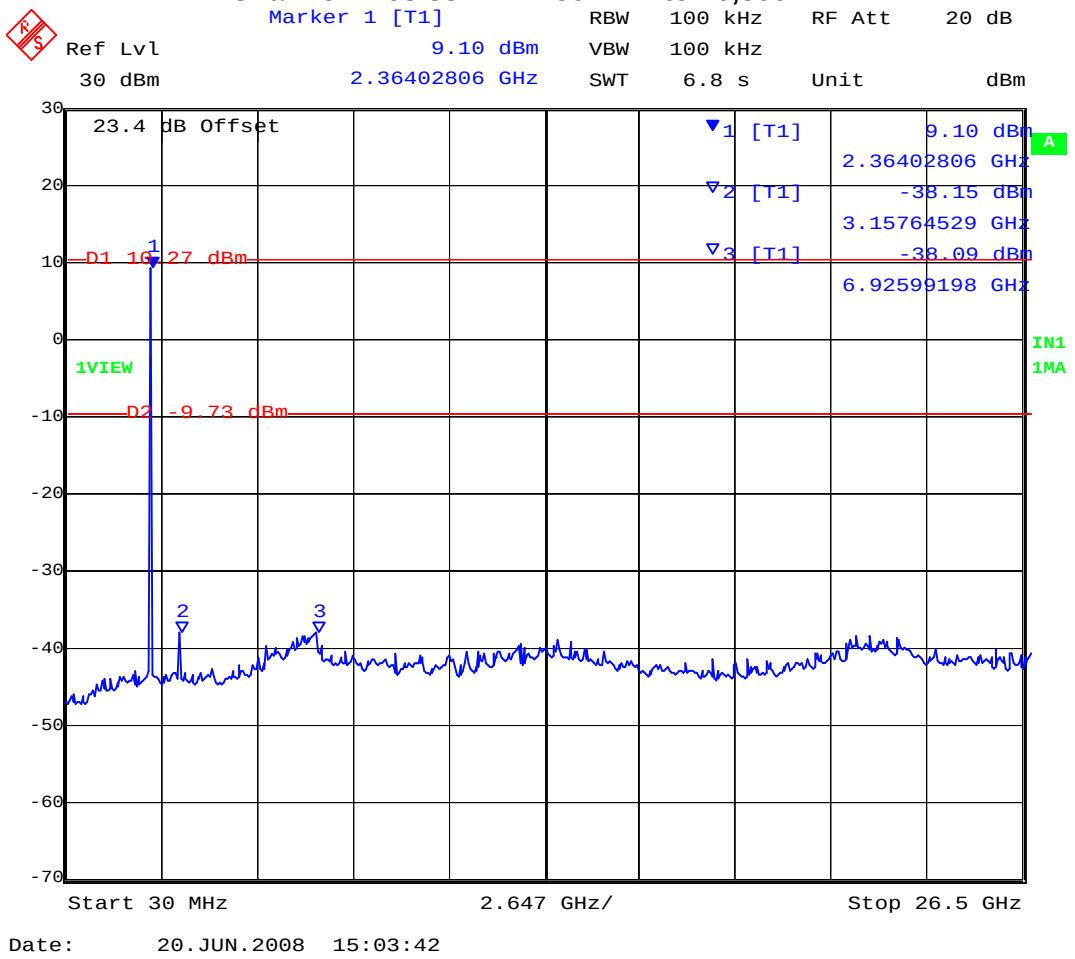
Conducted spurious emissions (0.03-26.5 GHz) are provided indicated by the following matrix. Measurements were performed with the transmitter tuned to the channel closest to the band-edge being measured. All emissions were maximized during measurement. Limits which were derived from the band-edge measurements provided below are drawn on each plot.

TABLE OF RESULTS

Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm)	Limit (dBm)	Margin (dB)
2403.33	30	26,500	-38.09	-9.73	-28.36

The emission breaking the limit line is the carrier.

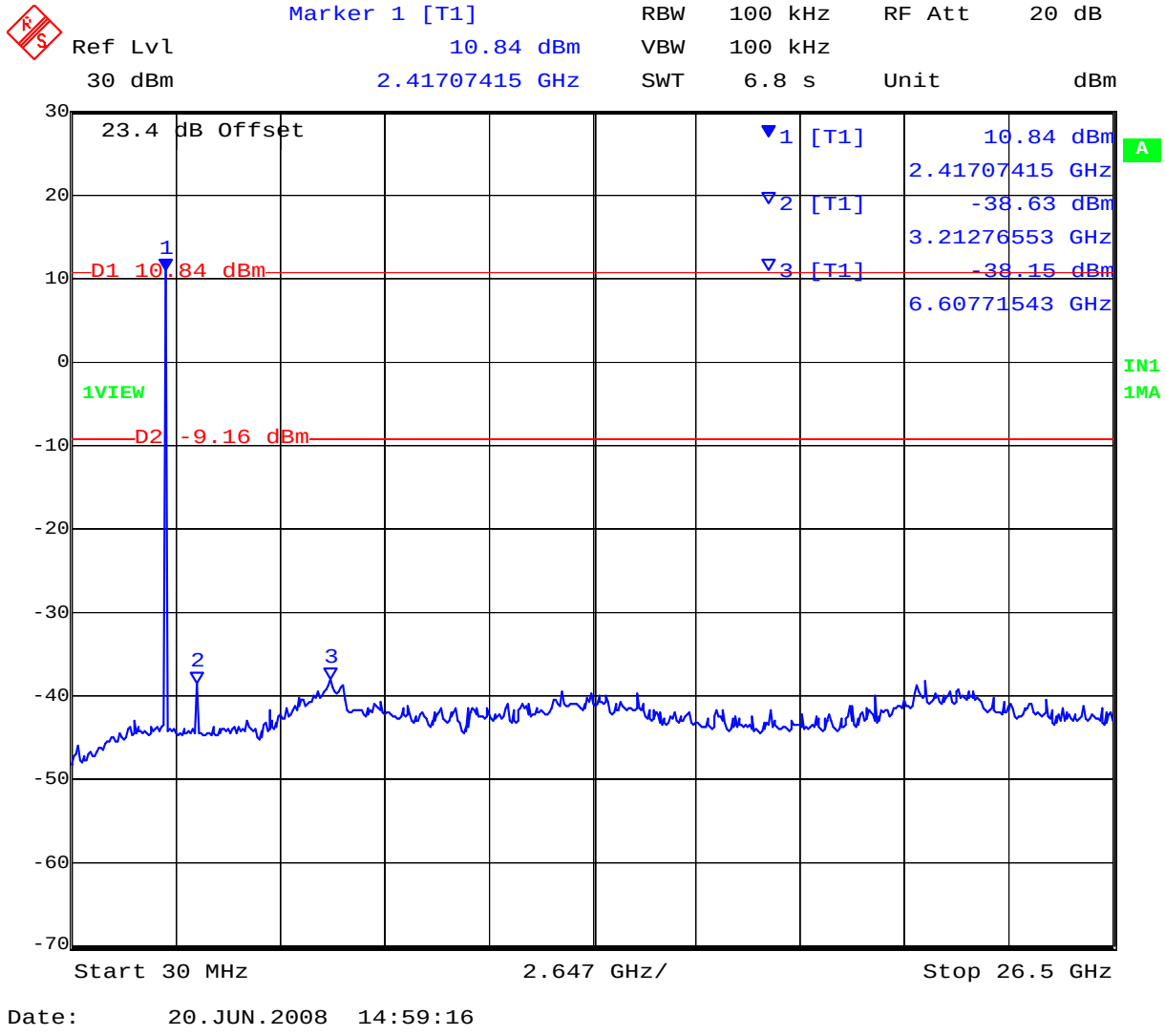
Conducted Transmitter Spurious Emissions
Channel 2403.33 MHz - 30 MHz to 26,500 MHz



Mid Channel

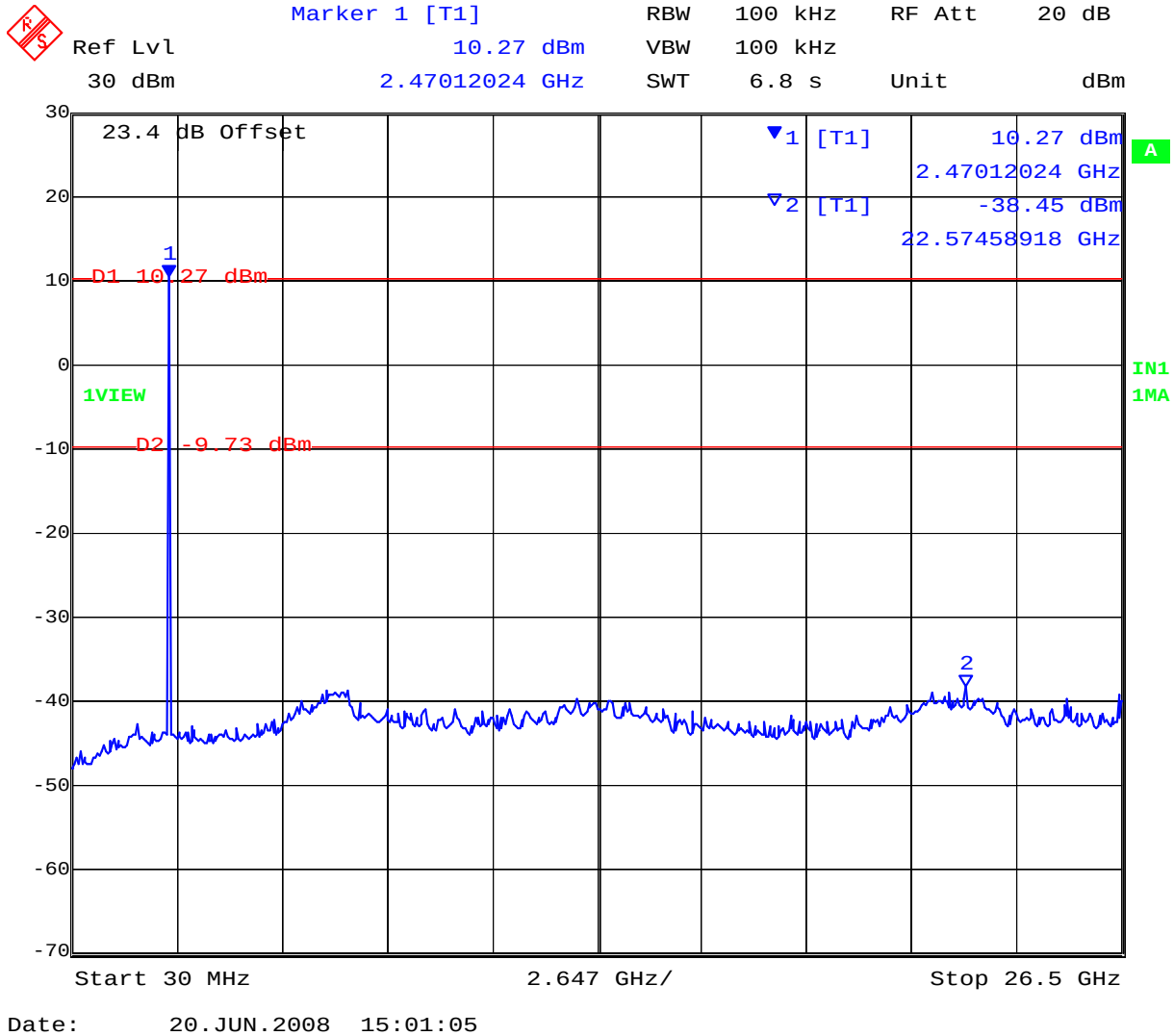
Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm)	Limit (dBm)	Margin (dB)
2442.22	30	26,500	-38.15	-9.16	-28.99

Conducted Transmitter Spurious Emissions
Channel 2442.22 MHz - 30 MHz to 26,500 MHz



Channel Centre Frequency (MHz)	Start Frequency (MHz)	Stop Frequency (MHz)	Maximum Emission Observed (dBm)	Limit (dBm)	Margin (dB)
2479.10	30	26,500	-38.45	-9.73	-28.72

Conducted Transmitter Spurious Emissions
Channel 2479.10 MHz - 30 MHz to 26,500 MHz



Specification

Limits Band-Edge

Lower Limit Band-edge	Upper Limit Band-edge	Limit below highest level of desired power
2400 MHz	2483.5 MHz	≥ 20 dB

FCC, Part 15 Subpart C §15.247(d)

Industry Canada RSS-210 §A.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Laboratory Measurement Uncertainty for Conducted Spurious Emissions

Measurement uncertainty	±2.37 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0088, 0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117.

5.1.7. Transmitter Radiated Spurious Emissions (above 1 GHz)

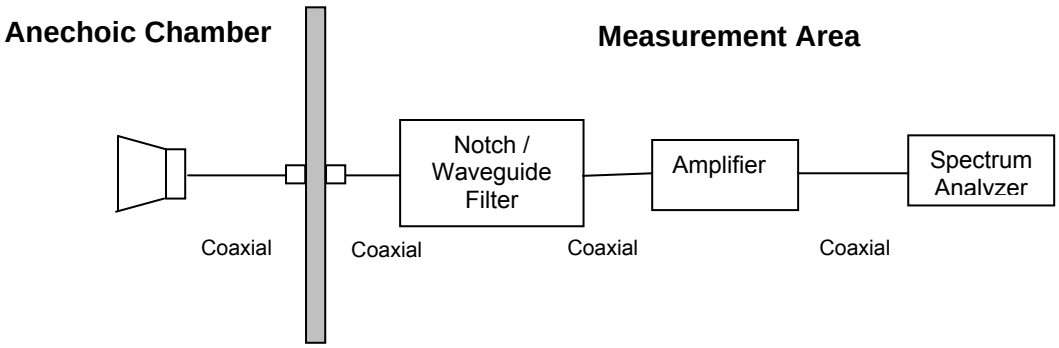
FCC, Part 15 Subpart C §15.247(d)
Industry Canada RSS-210 §A8.5

Test Procedure

Radiated emissions above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 MHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz.

Test Measurement Set up



Measurement set up for Radiated Emission Test

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR - FO

where: FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

For example:
Given receiver input reading of 51.5 dBμV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

Radiated Spurious Emissions above 1 GHz

Ambient conditions.
Temperature: 17 to 23°C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Integral Antenna
Channel 0 – 2403.33 MHz

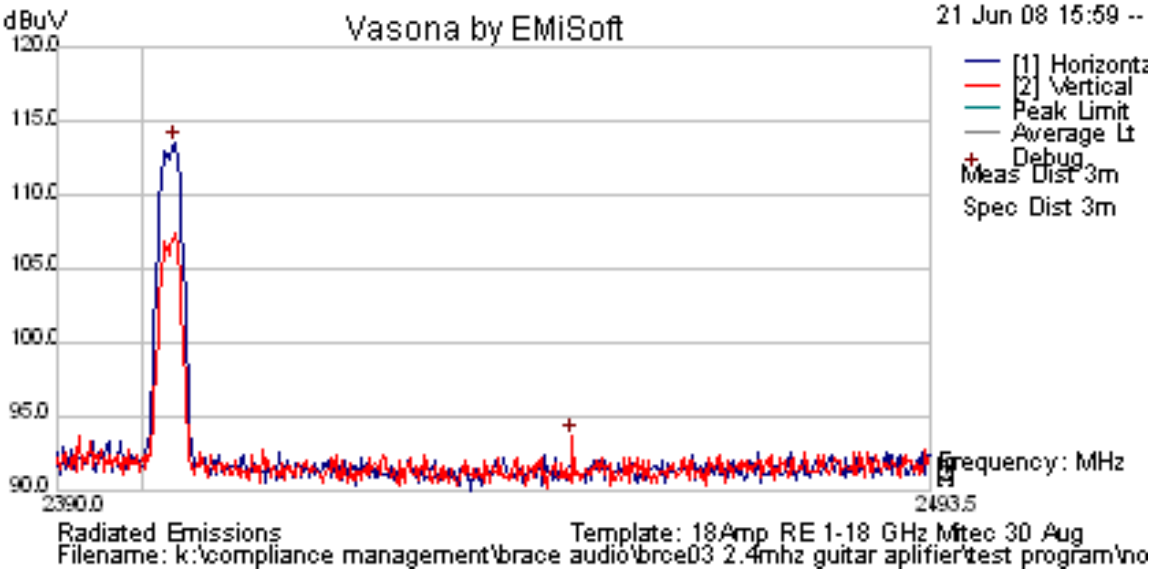
TABLE OF RESULTS

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2403.330	68.16	12.96	32.35	113.46	Peak [Scan]	H						Fundamental
2369.780				50.22	Peak Max	H			74	-23.78	Pass	Band-edge
2390.000				37.88	Average Max	H			54	-16.12	Pass	Band-edge
4004.459	59.04	3.9	-9.79	53.16	Peak Max	H	98	61	74	-20.84	Pass	
4807.335	54.22	4.45	-8.72	49.95	Peak Max	H	98	81	74	-24.05	Pass	
4004.459	50.68	3.9	-9.79	44.79	Average Max	H	98	61	54	-9.21	Pass	
4807.335	46.14	4.45	-8.72	41.87	Average Max	H	98	81	54	-12.13	Pass	
7210.401	55.3	5.4	-2.4	58.39	Peak [Scan]	H	100	0	93.46	-35.07	Pass	NRB
3205.361	64.8	3.5	-11	57.21	Peak [Scan]	H	100	0	93.46	-36.25	Pass	NRB
8010.036	49.5	5.6	-0.6	54.49	Peak [Scan]	H	100	0	93.46	-38.97	Pass	NRB

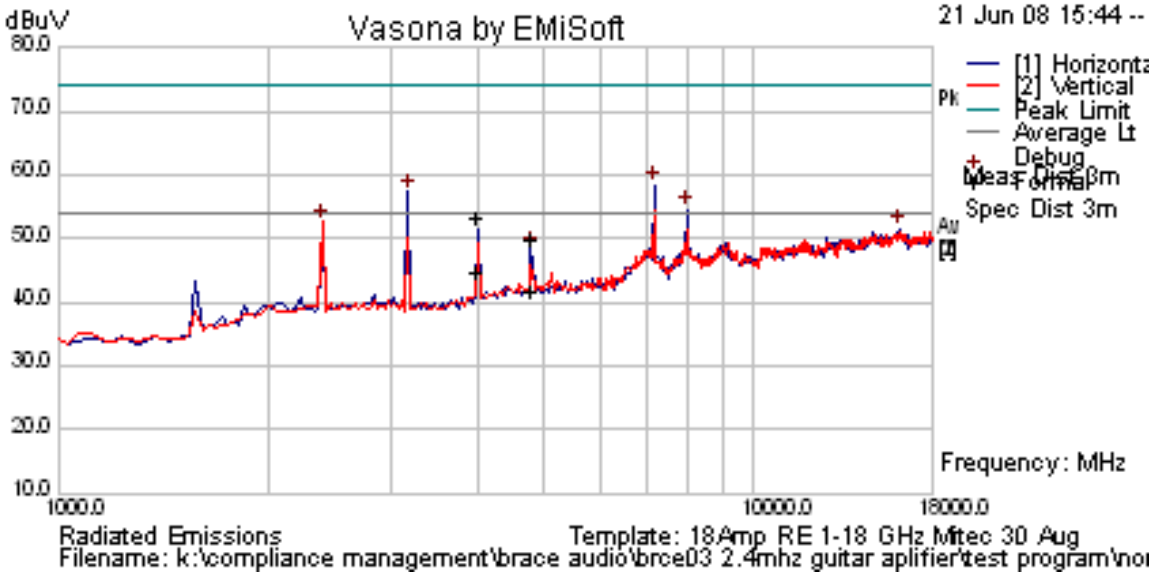
Peak – Peak Emission
NRB – Non-restricted band emission

NRB Limit = Peak Fundamental Emission – 20 dB = 113.46 – 20 = 93.46 dBµV/m

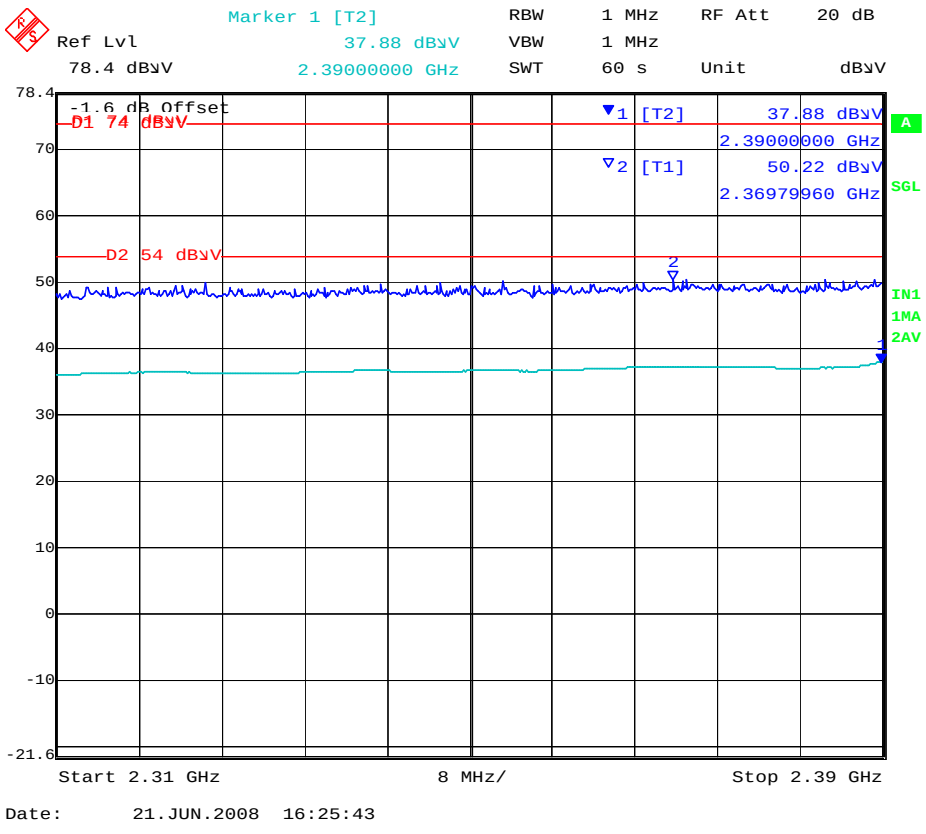
Ch 0 Peak Fundamental Emission



Ch 0 Radiated Emissions Above 1 GHz



Ch 0 Band-edge @ 2310 - 2390 MHz



Integral Antenna

Channel 10 – 2442.22 MHz

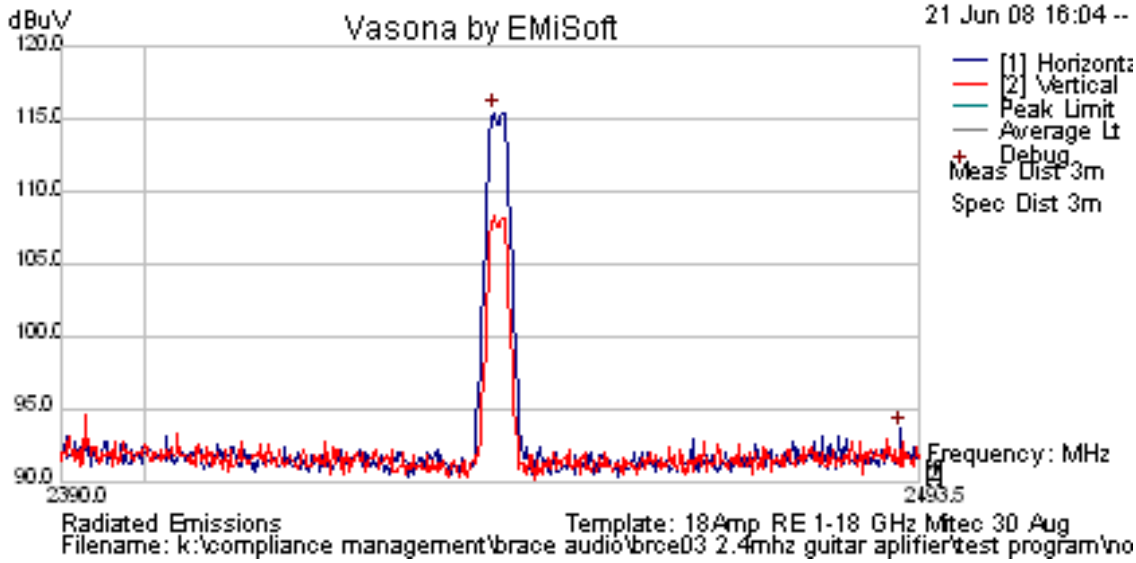
TABLE OF RESULTS

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2442.220	70.09	12.97	32.37	115.43	Peak [Scan]	H						Fundamental
7324.859	54.76	5.45	-2.9	57.3	Peak Max	H	151	76	74	-16.7	Pass	
8138.747	53.55	5.68	-0.91	58.32	Peak Max	H	123	300	74	-15.68	Pass	
4069.353	59.18	3.94	-9.7	53.42	Peak Max	H	98	80	74	-20.58	Pass	
4885.321	57.09	4.52	-8.74	52.88	Peak Max	H	102	127	74	-21.12	Pass	
7324.809	44.72	5.45	-2.9	47.26	Average Max	H	151	76	54	-6.74	Pass	
8138.747	43.16	5.68	-0.91	47.93	Average Max	H	123	300	54	-6.07	Pass	
4069.353	51.24	3.94	-9.7	45.48	Average Max	H	98	80	54	-8.52	Pass	
4885.321	49	4.52	-8.74	44.79	Average Max	H	102	127	54	-9.21	Pass	
3255.556	67.9	3.5	-11.1	60.24	Peak [Scan]	H	100	0	95.43	-35.19	Pass	NRB
15172.35	44.09	8.14	-1.1	51.12	Peak [Scan]	V	100	0	95.43	-44.31	Pass	NRB

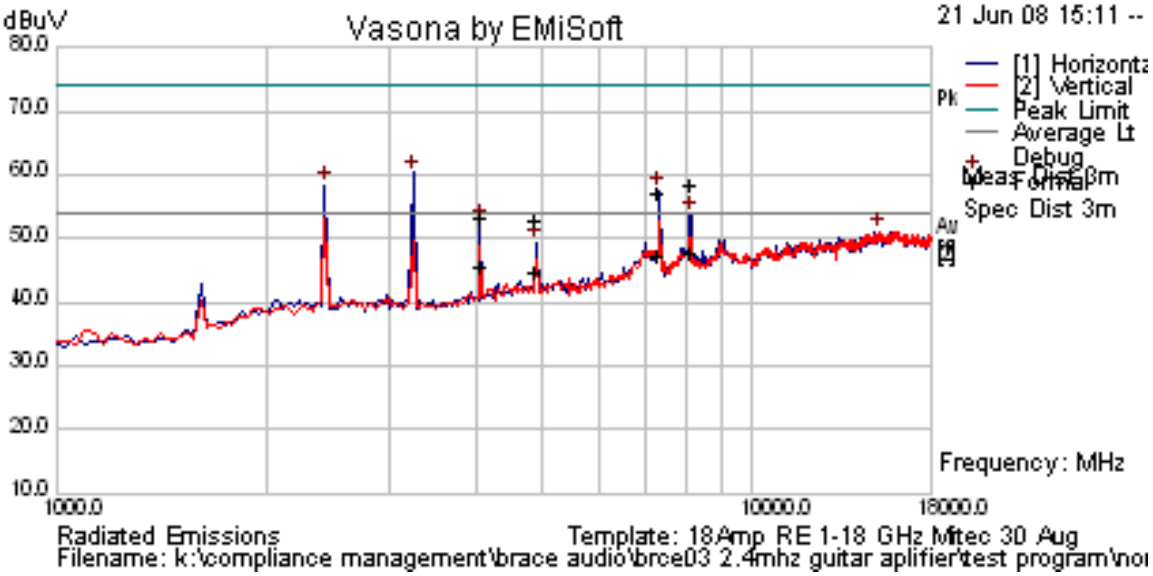
Peak – Peak Emission
NRB – Non-restricted band emission

NRB Limit = Peak Fundamental Emission – 20 dB = 115.43 – 20 = 95.43 dBµV/m

Ch 10 Peak Fundamental Emission



Ch 10 Radiated Emissions Above 1 GHz



Channel 19 – 2479.10 MHz

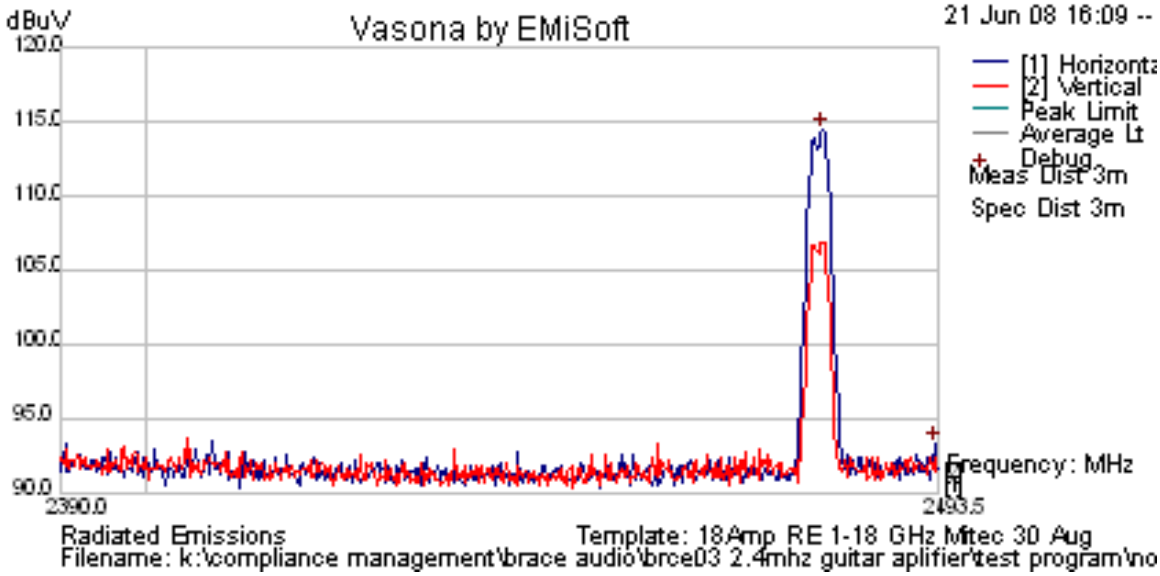
TABLE OF RESULTS

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
2479.100	69.02	12.99	32.39	114.4	Peak [Scan]	H						Fundamental
2483.533				61.40	Peak Max	H			74	-12.60	Pass	Band-edge
2483.500				51.41	Average Max	H			54	-2.59	Pass	Band-edge
7435.546	55.41	5.47	-3.53	57.35	Peak Max	H	98	111	74	-16.65	Pass	
8261.586	50	5.75	-1.21	54.55	Peak Max	H	139	246	74	-19.45	Pass	
4130.875	58.12	3.97	-9.45	52.65	Peak Max	H	98	78	74	-21.35	Pass	
7435.546	46.19	5.47	-3.53	48.13	Average Max	H	98	111	54	-5.87	Pass	
8261.586	38.42	5.75	-1.21	42.96	Average Max	H	139	246	54	-11.04	Pass	
4130.875	50.37	3.97	-9.45	44.9	Average Max	H	98	78	54	-9.1	Pass	
3282.565	67.26	3.51	-11.08	59.68	Peak [Scan]	H	100	0	94.4	-34.72	Pass	NRB

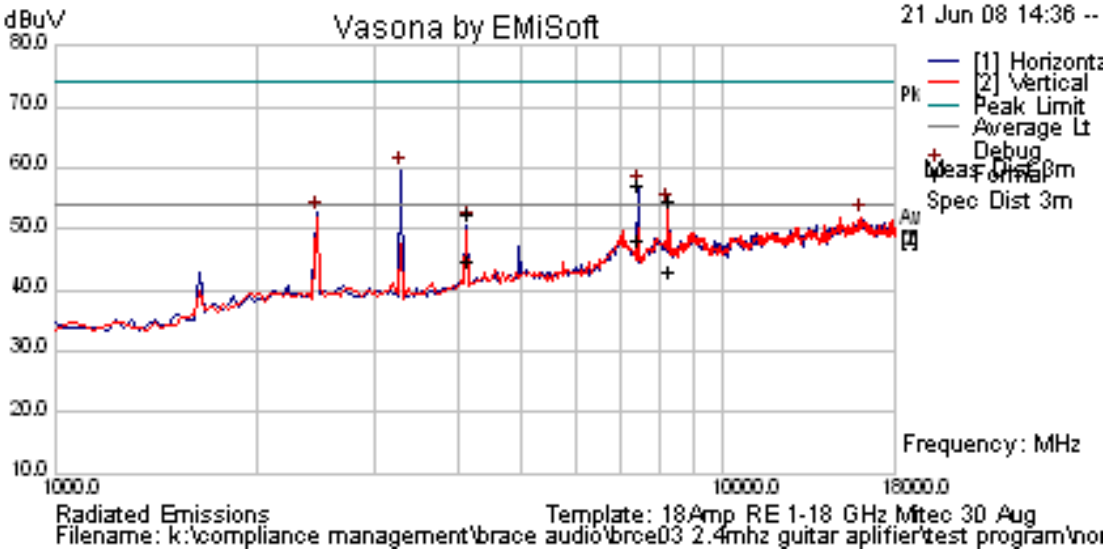
Peak – Peak Emission
NRB – Non-restricted band emission

NRB Limit = Peak Fundamental Emission – 20 dB = 114.4 – 20 = 94.4 dBµV/m

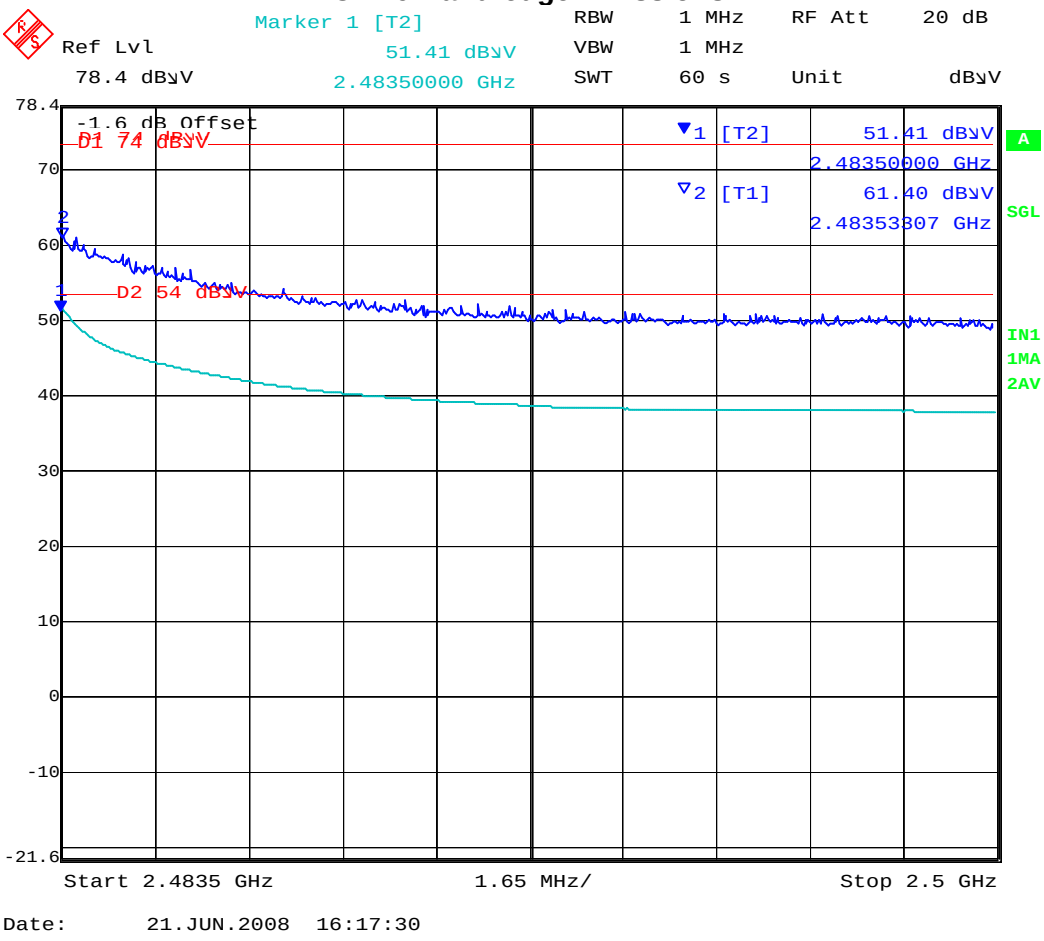
Ch 19 Peak Fundamental Emission



Ch 19 Radiated Emissions Above 1 GHz



Ch 19 Band-edge Emissions



Specification

FCC Part 15 Subpart C §15.247(d)

Industry Canada §A8.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

5.1.8. Receiver Radiated Spurious Emissions

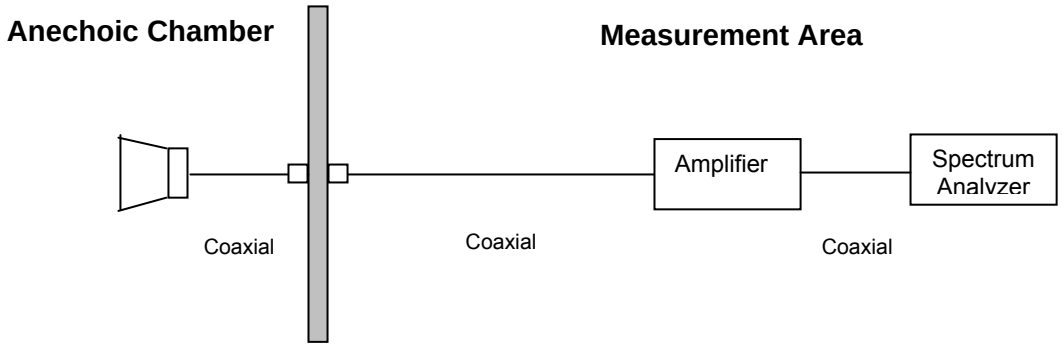
Industry Canada RSS-Gen §7.2.3

Test Procedure

Radiated receiver emissions were measured on the device on the low and high channel. The EUT was placed in receive mode and emissions measured. Emissions above 1 GHz were measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. The highest emissions relative to the limit are listed for each frequency spanned.

All measurements on any frequency or frequencies over 1 GHz are based on the use of measurement instrumentation employing an average detector function. All measurements above 1 GHz were performed using a minimum resolution bandwidth of 1 MHz, measurements below 1 GHz use a resolution bandwidth of 100 kHz.

Test Measurement Set up



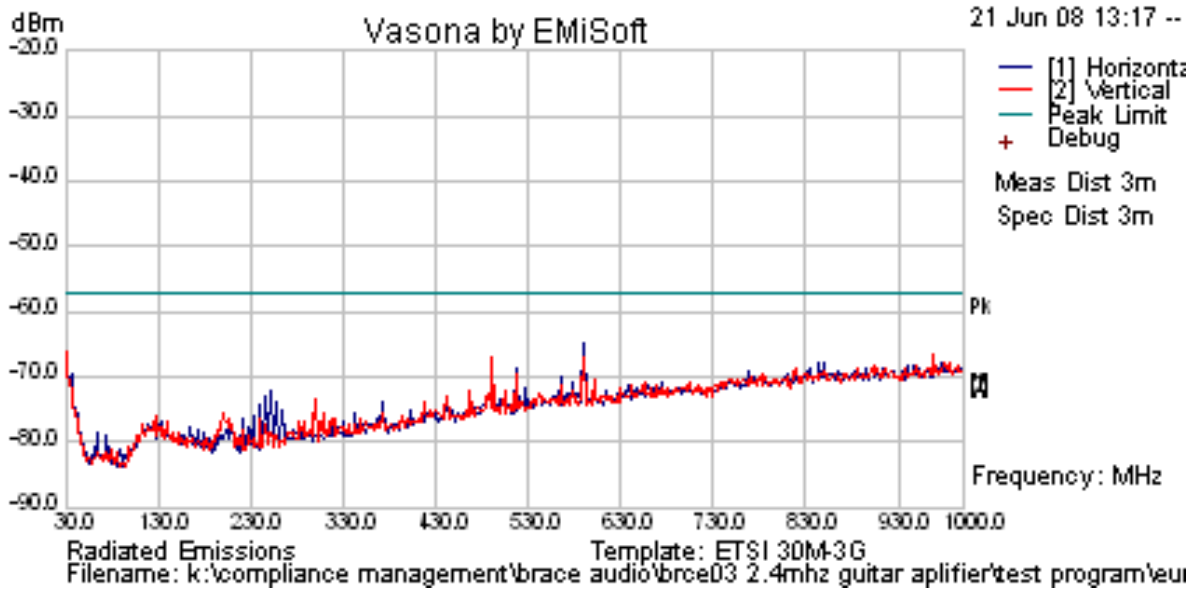
Receiver spurious emissions test configuration

Measurement Results

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Spurious Emissions 0.03 - 1 GHz Channel 2403.33 MHz

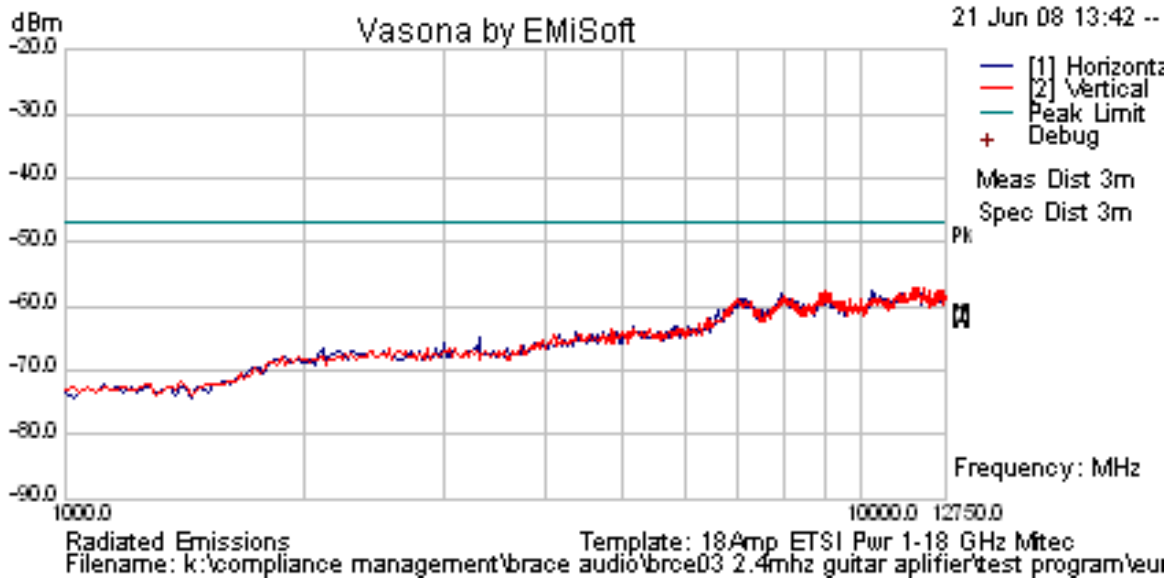
Spurious Emissions Stand-By Mode 0.03 - 1 GHz



No emissions were observed breaking the limit. Maximum emission observed is -67.9 dBm (0.162 µW)

Spurious Emissions 1 – 12.75 GHz Channel 2403.33 MHz

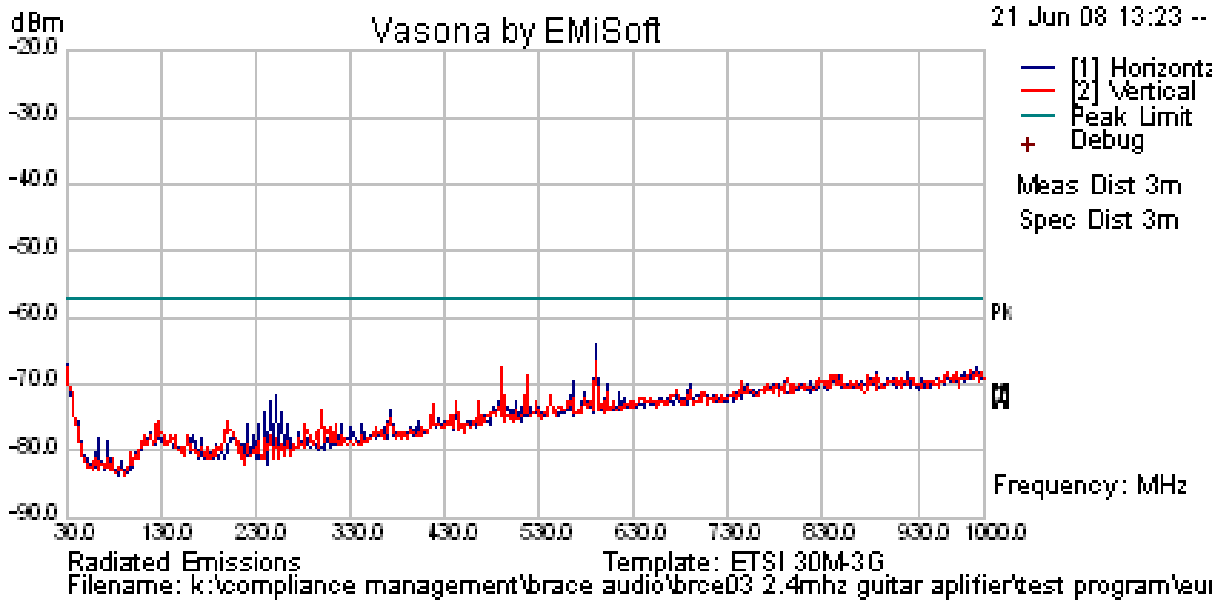
Spurious Emissions Stand-By Mode 1 – 12.75 GHz



No emissions were observed breaking the limit. Maximum emission observed is -58.1 dBm (1.55 µW)

Spurious Emissions 0.03 - 1 GHz Channel 2479.10 MHz

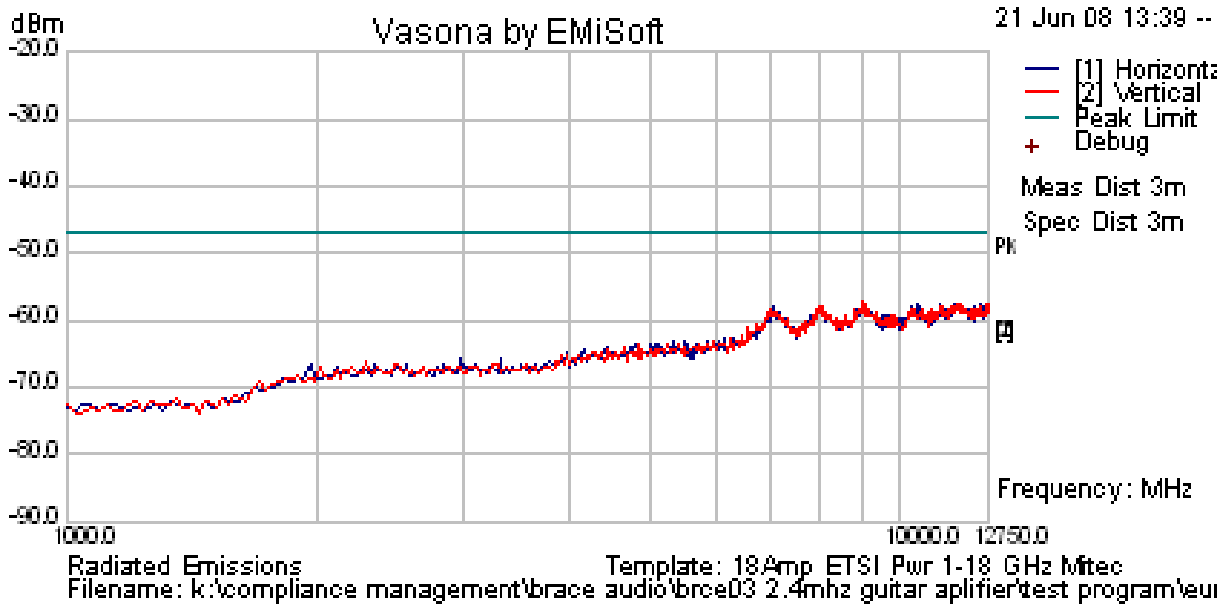
Spurious Emissions Stand-By Mode 0.03 - 1 GHz



No emissions were observed breaking the limit. Maximum emission observed is -64.2 dBm (0.38 µW)

Spurious Emissions 1 – 12.75 GHz Channel 2479.10 MHz

Spurious Emissions Stand-By Mode 1 – 12.75 GHz



No emissions were observed breaking the limit. Maximum emission observed is -59.6 dBm (1.1 µW)

Specification
Antenna Conducted Measurement
Industry Canada RSS-Gen §7.2.3

If the device has a detachable antenna of known antenna impedance, then the antenna conducted method is permitted in lieu of a radiated measurement.
Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, or 5 nanowatts (-53 dBm) above 1 GHz.

Laboratory Measurement Uncertainty for Conducted Spurious Emissions

Measurement uncertainty	±2.37 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-05 'Measurement of Spurious Emissions'	0088, 0158, 0193, 0252, 0313, 0314, 0070, 0116, 0117.

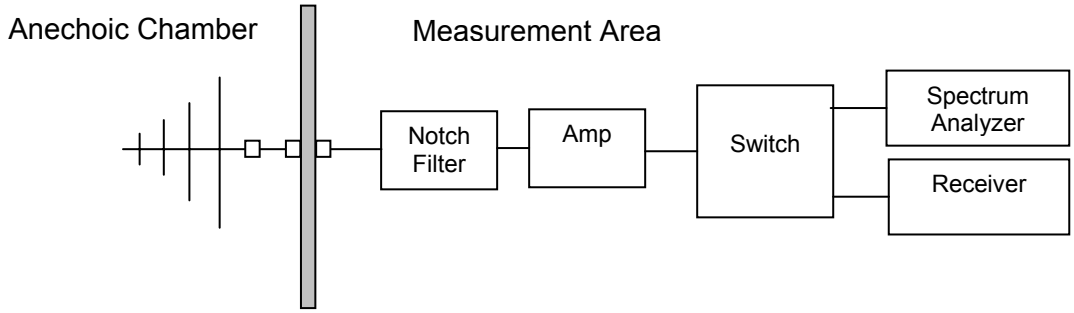
5.1.9. Radiated Spurious Emissions (30M-1 GHz)

FCC, Part 15 Subpart C §15.247(d), §15.205, 15.209
Industry Canada RSS-210 §A8.5, 2.2, 2.6.

Test Procedure
Preliminary radiated emissions were measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarity. The emissions are recorded with a CISPR compliant spectrum analyzer in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

A notch filter with approximately 70 dB of rejection was used to remove the fundamental frequency.

Test Measurement Set up



Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100μV/m
48 dBμV/m = 250μV/m

Measurement Results for Radiated Emissions (30 MHz – 1 GHz)

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

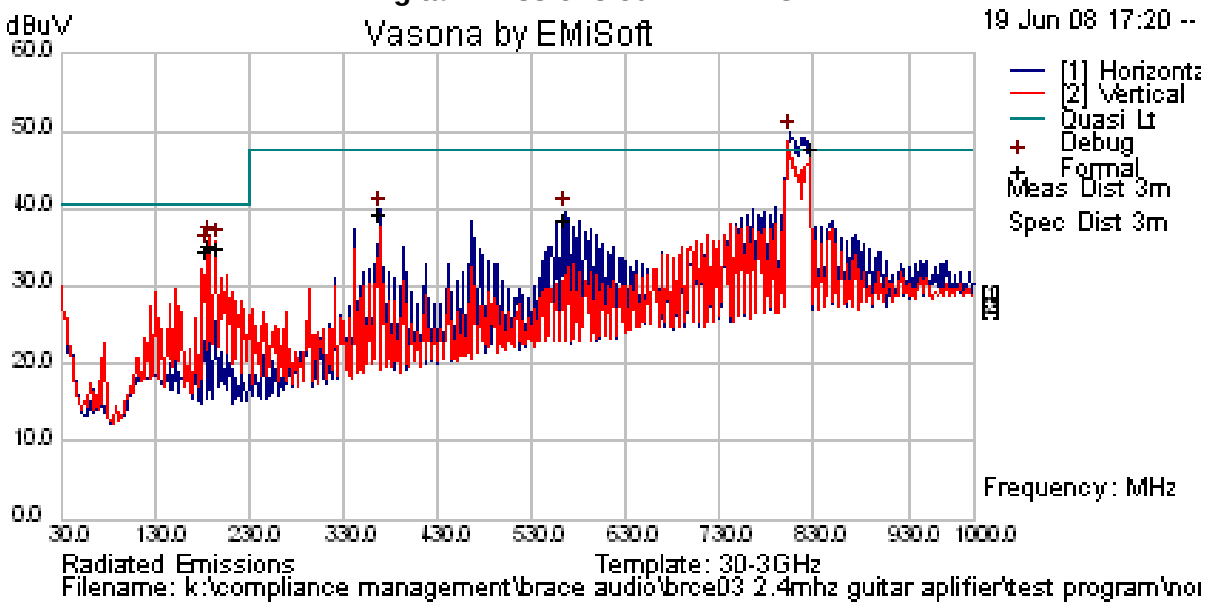
Radiated Emissions Below 1 GHz (Class B)

TABLE OF RESULTS – DIGITAL EMISSIONS 30M – 1 GHz

EUT Transmitting Maximum Output Power

Battery Operation

Digital Emissions 30 MHz – 1 GHz

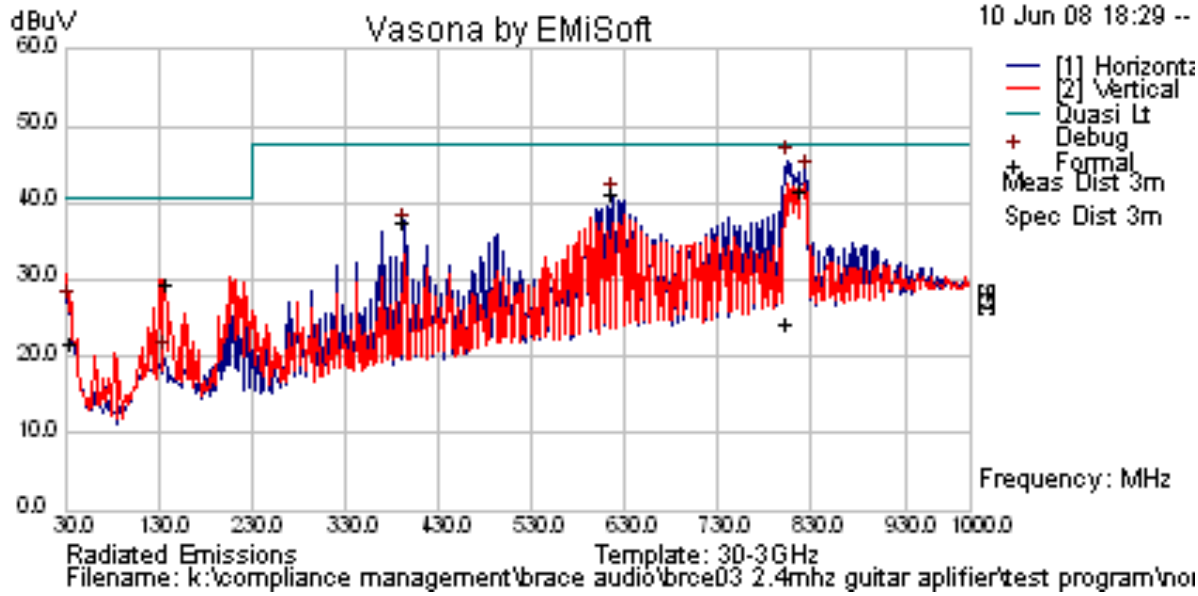


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
826.387	60.86	7.17	-20.83	47.2	Quasi Max	H	200	6	47.5	-0.6	Pass
187.371	61.66	4.69	-30.9	35.44	Quasi Max	V	98	183	40.5	-5.06	Pass
196.587	59.84	4.73	-29.74	34.83	Quasi Max	V	98	11	40.5	-5.67	Pass
184.309	61.03	4.67	-31.04	34.66	Quasi Max	V	98	177	40.5	-5.84	Pass
368.634	61.15	5.53	-27.46	39.22	Quasi Max	H	98	167	47.5	-8.28	Pass
565.244	56.46	6.3	-24.19	38.57	Quasi Max	H	103	167	47.5	-8.93	Pass

EUT Transmitting Maximum Output Power

ac/dc Converter Operation

Digital Emissions 30 MHz – 1 GHz



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail
804.089	38.24	7.18	-21.15	24.26	Quasi Max	H	354	300	47.5	-23.24	Pass
820.209	55.42	7.18	-20.92	41.68	Quasi Max	H	173	272	47.5	-5.82	Pass
617.445	58.39	6.45	-23.6	41.24	Quasi Max	H	132	298	47.5	-6.26	Pass
393.204	59.2	5.65	-27.21	37.64	Quasi Max	H	104	6	47.5	-9.86	Pass
36.826	38.72	3.51	-20.43	21.81	Quasi Max	V	161	34	40.5	-18.69	Pass
138.212	53.79	4.41	-28.72	29.48	Quasi Max	V	98	251	40.5	-11.02	Pass

Specification

Limits

§15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

§15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

§15.209 (a) and **RSS-Gen §2.2** Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312, 0341

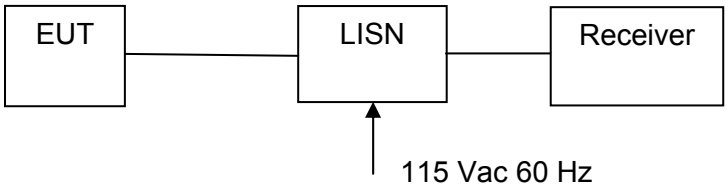
5.1.10. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

FCC, Part 15 Subpart C §15.207
Industry Canada RSS-Gen §7.2.2

Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test Measurement Set up



Measurement set up for AC Wireline Conducted Emissions Test

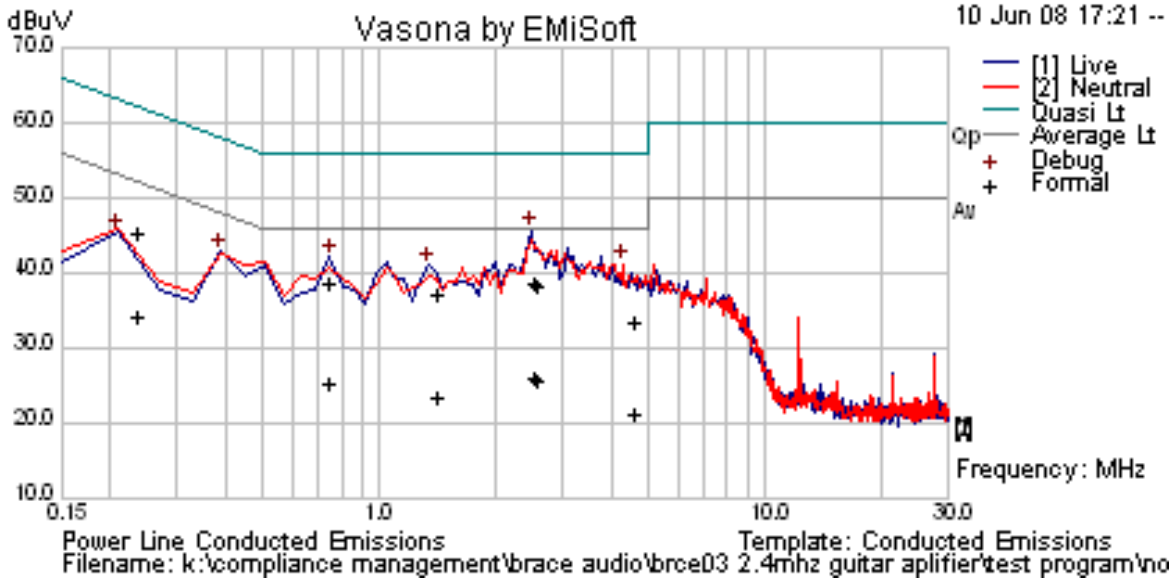
Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Radio Parameters:
Transmitter and receiver communicating – normal transmit mode
Full output power

TABLE OF RESULTS

Conducted Emissions (150 kHz – 30 MHz)



Freq (MHz)	Line	Peak (dBµV)	QP (dBµV)	QP Limit (dBµV)	QP Margin (dB)	Ave. (dBµV)	Ave. Limit (dBµV)	Ave. Margin (dB)
2.553	Live	45.79	36.79	56	-19.21	24.17	46	-21.83
0.755	Live	42.01	36.91	56	-19.09	23.47	46	-22.53
2.586	Live	45.68	36.42	56	-19.58	23.9	46	-22.1
1.422	Live	40.94	35.4	56	-20.6	21.66	46	-24.34
0.239	Neutr	45.46	43.44	62.13	-18.69	32.49	52.13	-19.64
4.635	Neutr	41.28	31.74	56	-24.26	19.58	46	-26.42

Specification

Limit

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μΩ line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

RSS-Gen §7.2.2
The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

§15.207 (a) and **RSS-Gen §7.2.2** Limit Matrix
The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

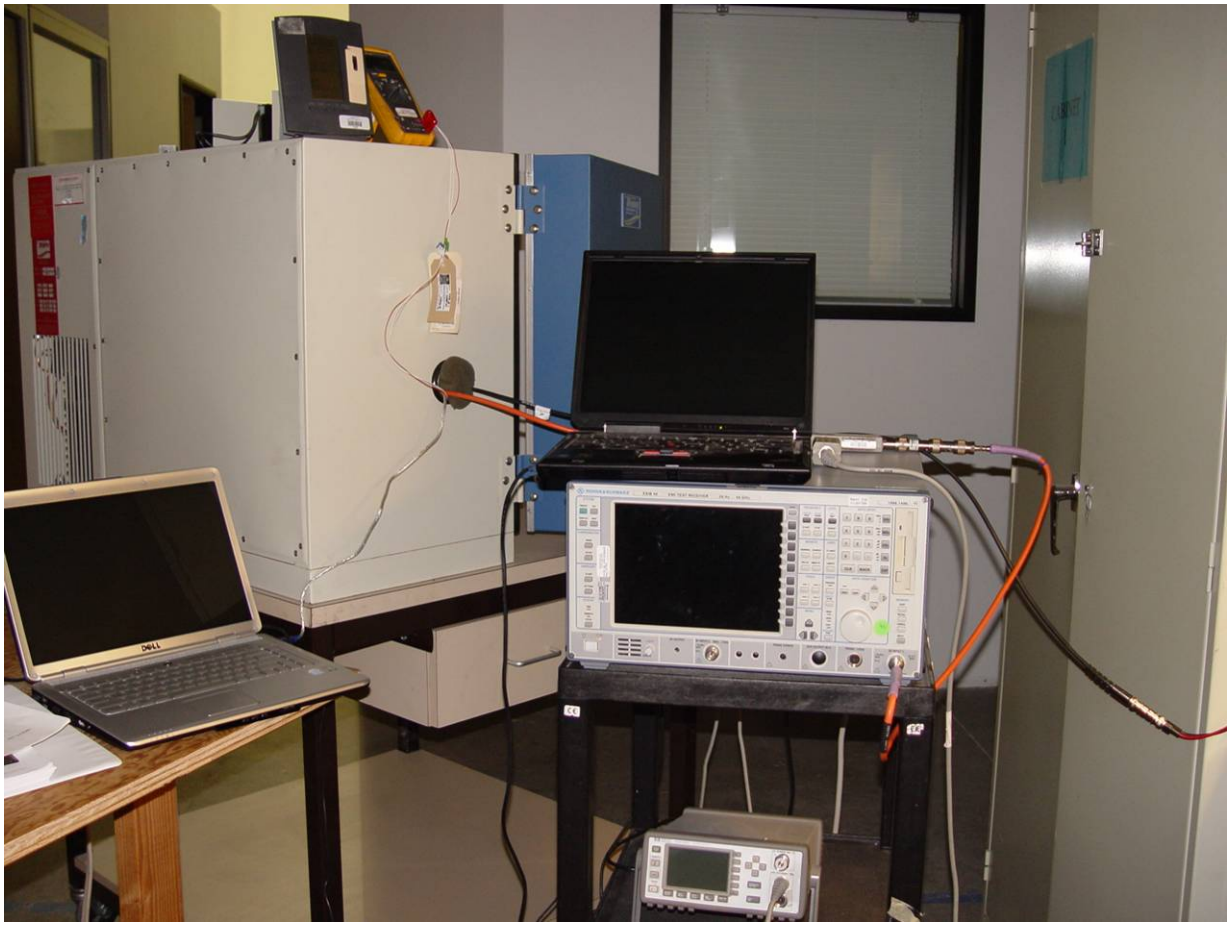
Measurement uncertainty	±2.64 dB

Traceability

Method	Test Equipment Used
Measurements were made per Sanmina work instruction	0190, 0193

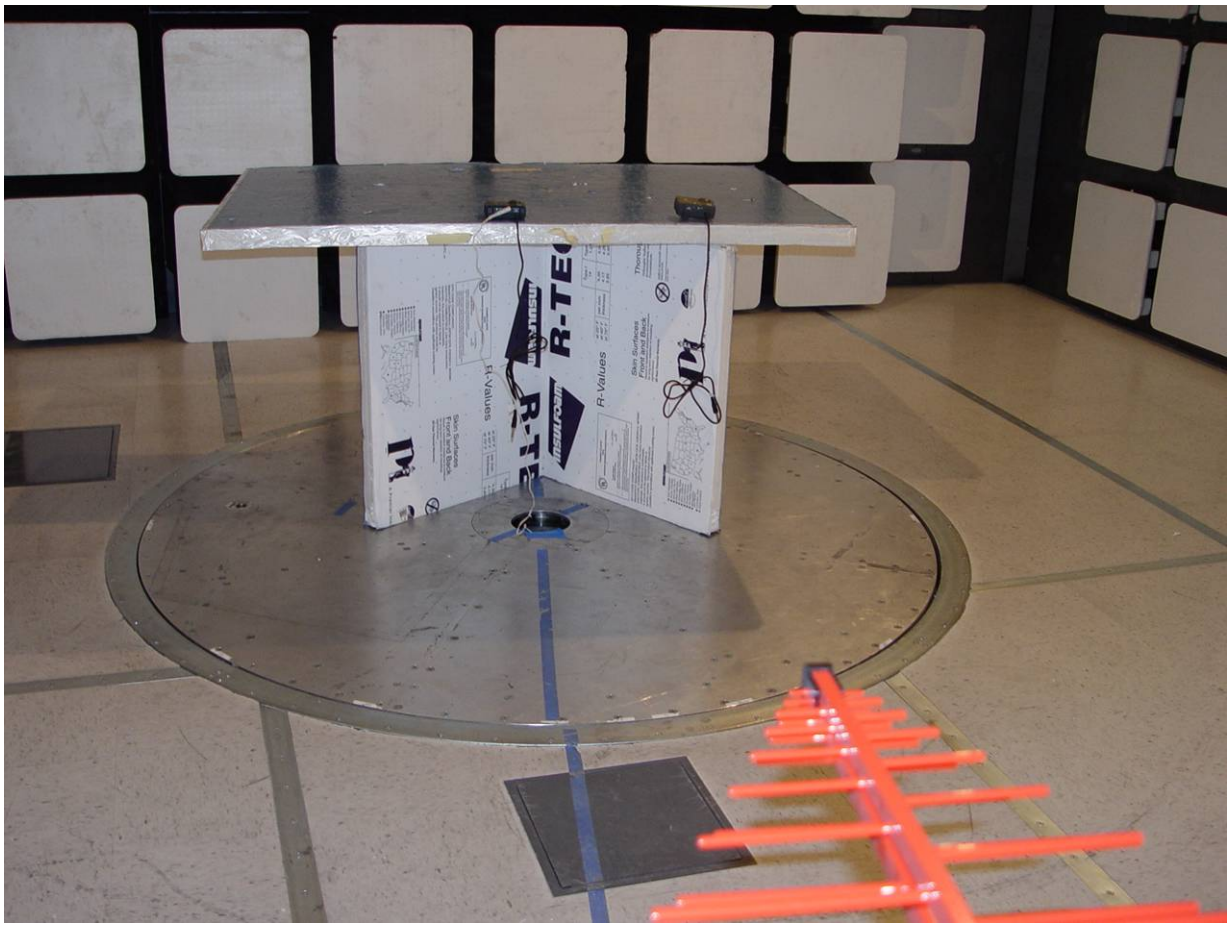
6. PHOTOGRAPHS

6.1. General Measurement Test Set-up

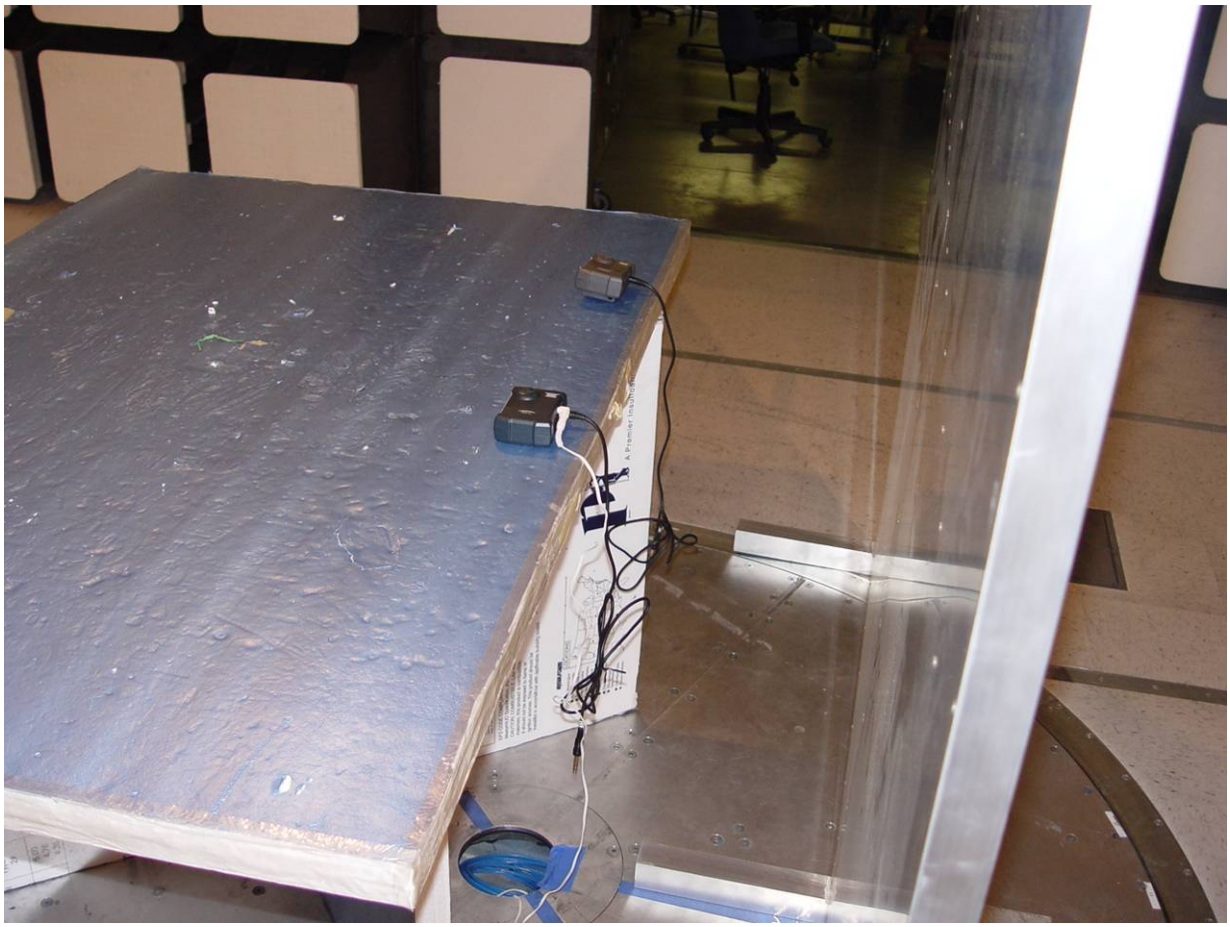


6.2. Radiated Emissions <1GHz – Battery Operation

6.3. Radiated Emissions <1GHz – ac/dc Convertor



6.4. AC Wireline Conducted Emissions



7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0104	1-18GHz Horn Antenna	The Electro-Mechanics Company	3115	9205-3882
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0193	EMI Receiver	Rhode & Schwartz	ESI 7	838496/007
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002

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