

*Electromagnetic Emissions Test Report  
Application for Grant of Equipment Authorization  
pursuant to  
Industry Canada RSS-Gen Issue 2 / RSS 210 Issue 7  
FCC Part 15 Subpart C  
on the  
Hewlett Packard Company  
Transmitter  
Model: SDGOB-0891*

UPN: 466D-SDGOB891  
FCC ID: B94SDGOB0891

GRANTEE: Hewlett Packard Company  
3000 Hanover Street  
Palo Alto, CA 94304

TEST SITE: Elliott Laboratories  
684 W. Maude Ave  
Sunnyvale, CA 94086  
IC Site Registration #: IC 2845-2

REPORT DATE: October 24, 2008  
REISSUE DATE: November 21, 2008

FINAL TEST DATE: October 14 – 20, and November 19 - 21 , 2008

AUTHORIZED SIGNATORY:



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Staff Engineer



Testing Cert #2016-01

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### ***REVISION HISTORY***

Rev #	Date	Comments	Modified By
1	11/7/2008	First Release	David Guidotti
2	11/19/08	Revision to add results from testing module in a host device, Clarified results for channel dwell time and channel utilization	Mark Hill
3	11/21/08	Clarification of results in a printer vs standalone. Additional test data for outside printer included.	Mark Hil

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## SCOPE

An electromagnetic emissions test has been performed on the Hewlett Packard Company model SDGOB-0891 pursuant to the following rules:

Industry Canada RSS-Gen Issue 2  
RSS 210 Issue 7 "Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment"  
FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in Elliott Laboratories test procedures:

ANSI C63.4:2003  
FHSS test procedure DA 00-0705A1, March 2000

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

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

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Hewlett Packard Company model SDGOB-0891 and therefore apply only to the tested sample. The sample was selected and prepared by Juan Martinez of Broadcom Corporation.

## OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

#### *STATEMENT OF COMPLIANCE*

The tested sample of Hewlett Packard Company model SDGOB-0891 complied with the requirements of the following regulations:

- Industry Canada RSS-Gen Issue 2
- RSS 210 Issue 7 “Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment”
- FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

## TEST RESULTS SUMMARY

### FREQUENCY HOPPING SPREAD SPECTRUM (2400 – 2483.5 MHz, 15 channels or more) – Testing outside the host

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	RSS 210 A8.1 (1)	20dB Bandwidth	GFSK: 930 kHz 8PSK: 1330 kHz	Channel spacing > 20dB bandwidth or Channel spacing > 2/3 of 20dB bandwidth for devices less than 125mW	Complies
		Channel Separation	1000 kHz		Complies
15.247 (a) (1) (iii)	RSS 210 A8.1 (4)	Channel Dwell Time (average time of occupancy)	<0.4s dwell time, The system uses the Bluetooth algorithm and, therefore, meets all requirements for channel dwell time	<0.4 second within a period of 0.4 x number of channels	Complies
15.247 (a) (1) (iii)	RSS 210 A8.1 (4)	Number of Channels	Minimum 20, with a maximum of 79	15 or more	Complies
15.247 (a) (1)	RSS 210 A8.1 (1)	Channel Utilization	The system uses the Bluetooth algorithm and, therefore, meets all requirements for channel utilization.	All channels shall, on average, be used equally	Complies
15.247 (b) (3)	RSS 210 A8.4 (2)	Output Power (multipoint systems)	GFSK: -0.5 dBm (0.0009 Watts) EIRP = 0.001 W <sup>Note 1</sup>  Basic: -2.2 dBm (0.0006 Watts) EIRP = 0.0007 W <sup>Note 1</sup>	125mW	Complies
15.247(c)	RSS 210 A8.5	Spurious Emissions – 30MHz – 25GHz	All spurious emissions < -20dBc	< -20dBc	Complies
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 25GHz	50.4dBμV/m @ 7440.1MHz (-3.6dB)	15.207 in restricted bands, all others < -20dBc	Complies
15.247 (a) (1)	RSS 210 A8.1(2)	Receiver bandwidth	Refer to operational description	Shall match the channel bandwidth	Complies

Note 1: EIRP calculated using antenna gain of 0.48 dBi for the highest EIRP multi-point system.

### FREQUENCY HOPPING SPREAD SPECTRUM (2400 – 2483.5 MHz, 15 channels or more) – Testing In Printer

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 25GHz	51.9dBμV/m @ 7206.0MHz (-2.1dB)	15.207 in restricted bands, all others < -20dBc	Complies

Bandedge measurements were repeated in 8PSK mode, since it resulted in the highest levels observed when tested outside the host. Spurious emissions measurements were repeated in GFSK mode, since it resulted in the highest emission values when tested outside the host.

**GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS**

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Antenna is integral to device		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	44.2dB $\mu$ V/m @ 3000.3MHz (-9.8dB)	Refer to Standard	Complies
15.207	RSS GEN Table 2	AC Conducted Emissions	38.1dB $\mu$ V @ 20.369MHz (-11.9dB)	Refer to standard	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
	RSP 100 RSS GEN 7.1.5	User Manual		Statement required regarding non-interference	Complies – Note 2

Note 2: The manufacture will use the module in host devices of their own design. Therefore, they have provided a user's manual showing typical instructions for the end-use device.

**MEASUREMENT UNCERTAINTIES**

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	$\pm 2.4$
Radiated Emissions	0.015 to 30	$\pm 3.0$
Radiated Emissions	30 to 1000	$\pm 3.6$
Radiated Emissions	1000 to 40000	$\pm 6.0$

## EQUIPMENT UNDER TEST (EUT) DETAILS

### GENERAL

The Hewlett Packard Company model SDGOB-0891 is a bluetooth module that is designed to be installed only inside HP final product designs. Since the Bluetooth module would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3 Volts.

The sample was received on October 9, 2008 and tested on October 14, October 15, October 16, October 20, and November 19, and November 21, 2008. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	SDGOB-0891	Bluetooth module	01	B94SDGOB0891

Note: The testing in October 14 – 20 was performed with the module mounted on a test fixture located outside of a host system. The testing in November was performed with the module and test fixture mounted in a printer, as it would be mounted in the printer during end use. The test fixture was connected via USB to a laptop, in order to control and power the radio.

### OTHER EUT INFORMATION

The EUT was tested while connected to a PCB that allowed for connection to a PC via a USB interface. This was to allow for control of the radio and to test in accordance with the FCC's modular requirements. During normal use, the EUT would be installed within the enclosure of the end-use product.

### ANTENNA SYSTEM

The EUT antenna is printed on the PCB. Gain is 0.48dBi.

### ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed into final product designs.

### MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

### SUPPORT EQUIPMENT

The following equipment was used as local support equipment for emissions testing:

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	Pavilion	Laptop	CNF6511956	DoC

No remote support equipment was used during emissions testing.

**EUT INTERFACE PORTS**

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop USB	Multiwire	Shielded	2.0
Laptop AC Power	AC Mains	Three Wire	Unshielded	1.2
Laptop DC Power	Laptop PS	Two wire	Unshielded	2.0

**EUT OPERATION**

For transmit power, bandwidth, and spurious emissions, the EUT was configured to continuously transmit on a selected channel. For hopping timing and number of channels, the EUT was configured to transmit using a pseudo-random hopping sequence.

**TEST SITE****GENERAL INFORMATION**

Final test measurements were taken on October 14, October 15, October 16 and October 20, 2008 at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Registration Numbers		Location
	FCC	Canada	
SVOATS #2	90593	IC 2845-2	684 West Maude Ave, Sunnyvale CA 94085-3518

ANSI C63.4:2003 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception, on OATS sites, of predictable local TV, radio, and mobile communications traffic. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4:2003.

**CONDUCTED EMISSIONS CONSIDERATIONS**

Conducted emissions testing is performed in conformance with ANSI C63.4:2003. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

**RADIATED EMISSIONS CONSIDERATIONS**

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4:2003 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4:2003.

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**MEASUREMENT INSTRUMENTATION****RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

**INSTRUMENT CONTROL COMPUTER**

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

**LINE IMPEDANCE STABILIZATION NETWORK (LISN)**

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

**FILTERS/ATTENUATORS**

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

### *ANTENNAS*

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

### *ANTENNA MAST AND EQUIPMENT TURNTABLE*

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.4:2003 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

### *INSTRUMENT CALIBRATION*

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

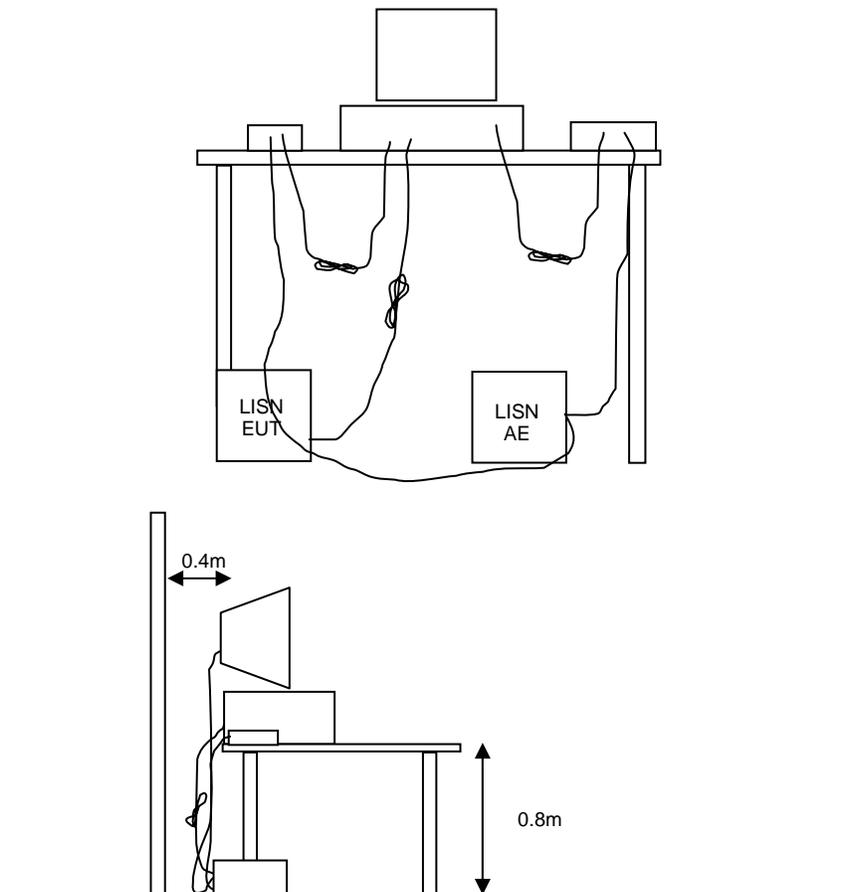
## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4:2003, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.



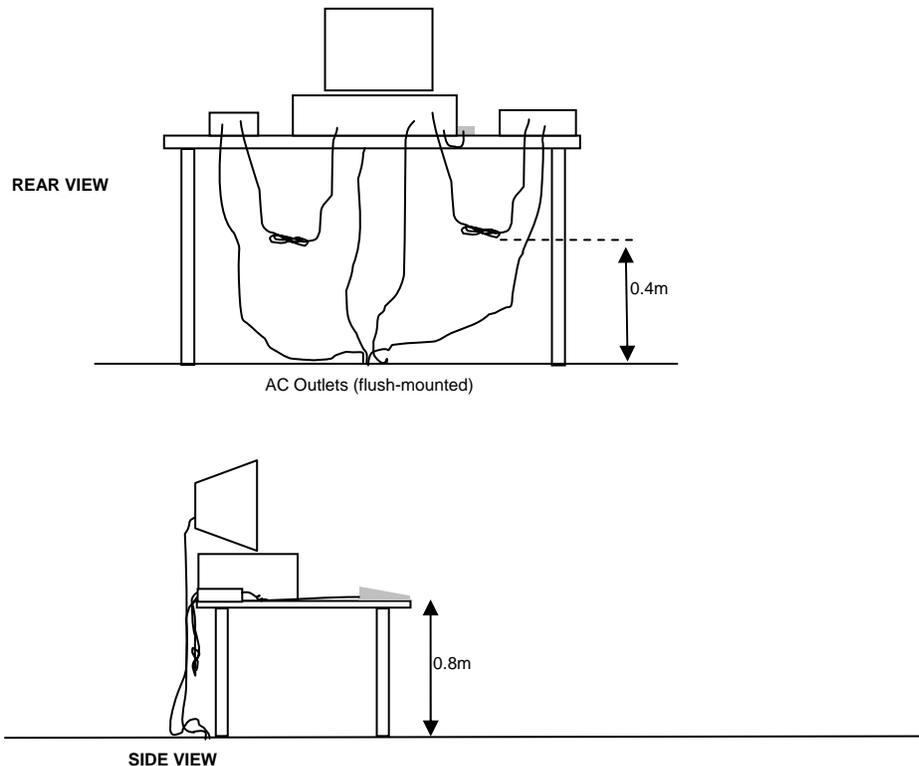
**RADIATED EMISSIONS**

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

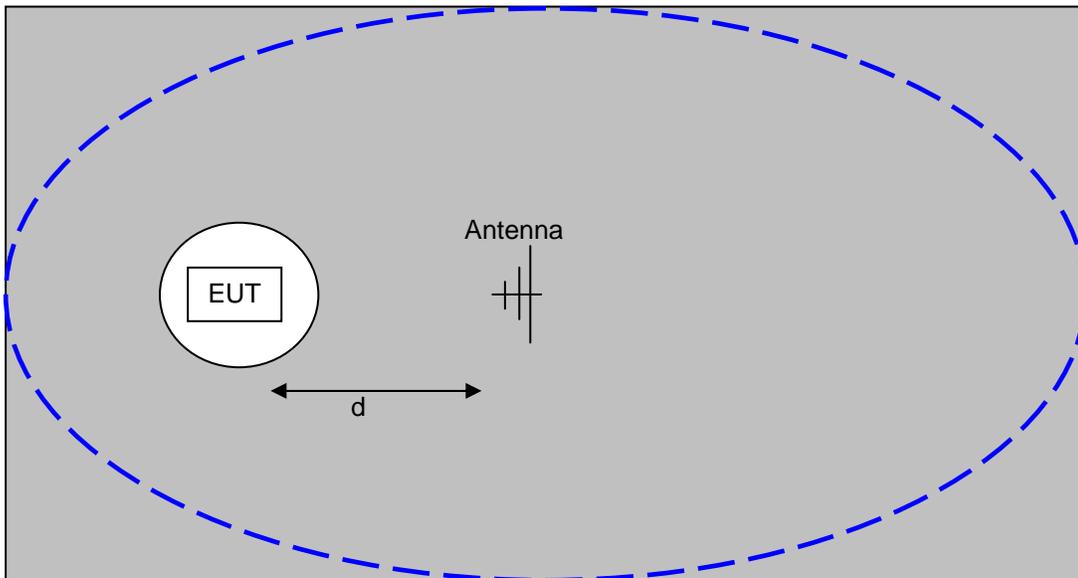
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

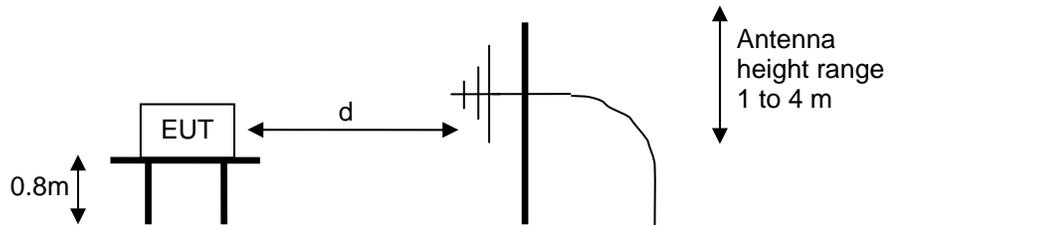
When testing above 18 GHz, the receive antenna is located at 1 meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



Typical Test Configuration for Radiated Field Strength Measurements



The ground plane extends beyond the ellipse defined in CISPR 16 / CISPR 22 / ANSI C63.4 and is large enough to accommodate test distances (d) of 3m and 10m. Refer to the test data tables for the actual measurement distance.



Test Configuration for Radiated Field Strength Measurements  
OATS- Plan and Side Views

**BANDWIDTH MEASUREMENTS**

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS GEN.

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**SPECIFICATION LIMITS AND SAMPLE CALCULATIONS**

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

**GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands<sup>1</sup> (with the exception of transmitters operating under FCC Part 15 Subpart D and RSS 210 Annex 9), the limits for all emissions from a low power device operating under the general rules of RSS 310 (tables 3 and 4), RSS 210 (table 2) and FCC Part 15 Subpart C section 15.209.

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	2400/F <sub>KHz</sub> @ 300m	67.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 300m
0.490-1.705	24000/F <sub>KHz</sub> @ 30m	87.6-20*log <sub>10</sub> (F <sub>KHz</sub> ) @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

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<sup>1</sup> The restricted bands are detailed in FCC 15.203, RSS 210 Table 1 and RSS 310 Table 2

**RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS**

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS 210 Table 2, RSS GEN Table 1 and RSS 310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

**OUTPUT POWER LIMITS – FHSS SYSTEMS**

The table below shows the limits for output power based on the number of channels available for the hopping system.

Operating Frequency (MHz)	Number of Channels	Output Power
902 – 928	≥ 50	1 Watt (30 dBm)
902 – 928	25 to 49	0.25 Watts (24 dBm)
2400 – 2483.5	≥ 75	1 Watt (30 dBm)
2400 – 2483.5	< 75	0.125 Watts (21 dBm)
5725 – 5850	75	1 Watt (30 dBm)

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

**TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS**

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

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**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_T - S = M$$

where:

$R_T$  = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

**SAMPLE CALCULATIONS - RADIATED EMISSIONS**

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20 * \text{LOG}_{10} (D_m/D_s)$$

where:

$F_d$  = Distance Factor in dB

$D_m$  = Measurement Distance in meters

$D_s$  = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40 * \text{LOG}_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

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The margin of a given emission peak relative to the limit is calculated as follows:

$$R_C = R_R + F_d$$

and

$$M = R_C - L_S$$

where:

$R_R$  = Receiver Reading in dBuV/m

$F_d$  = Distance Factor in dB

$R_C$  = Corrected Reading in dBuV/m

$L_S$  = Specification Limit in dBuV/m

$M$  = Margin in dB Relative to Spec

#### *SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION*

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of 3m from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{3} \text{ microvolts per meter}$$

where P is the eirp (Watts)

***EXHIBIT 1: Test Equipment Calibration Data***

3 Pages

**Conducted Emissions - AC Power Ports, 10-Oct-08****Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	31-Jul-09
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	780	09-Oct-09
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	29-Jan-09
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	372	01-Nov-08

**Radiated Emissions, 30 - 1,000 MHz, 10-Oct-08****Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	26-Mar-09
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	13-Dec-08
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	787	19-Feb-09
Hewlett Packard	Preamplifier, 100 kHz - 1.3 GHz	8447D OPT 010	1826	29-May-09

**Radiated Emissions, 30 - 1,000 MHz, 16-Oct-08****Engineer: Rafael Varelas**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Log Periodic Antenna, 0.3-1 GHz	3146A	364	13-Dec-08
EMCO	Biconical Antenna, 30-300 MHz	3110B	801	19-Sep-09
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	29-Jan-09

**Radiated Emissions, 1,000 - 25,000 MHz, 14-Oct-08****Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Oct-08
Hewlett Packard	High Pass filter, 3.5 GHz (Red System)	P/N 84300-80038 (84125C)	1403	28-Aug-09
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-Jun-10

**Radiated Emissions, 1000 - 8000 MHz, 15-Oct-08****Engineer: Rafael Varelas**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	09-Oct-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Oct-08

**Radio Antenna Port (Power and Spurious Emissions), 16-Oct-08****Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Oct-08

**Antenna Port Conducted, 17-Oct-08****Engineer: Mark Hill**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	787	19-Feb-09
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1071	01-Jul-09
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts	NRV-Z32	1423	07-Nov-08

**Radio Spurious Emissions, 20-Oct-08****Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Oct-08
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	10-Jun-10

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**Radio Spurious Emissions, 19-Nov-08****Engineer: Peter Sales**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	06-Jun-09
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

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**Radiated Emissions, 1000 - 18,000 MHz, 20-Nov-08****Engineer: Rafael Varelas**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

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**Radiated Emissions, 1000 - 18,000 MHz, 21-Nov-08****Engineer: Joseph Cadigal**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Horn, 1-18 GHz	3115	487	15-Jul-10
Hewlett Packard	SpecAn 30 Hz -40 GHz, SV (SA40) Red	8564E (84125C)	1148	24-Nov-08

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***EXHIBIT 2: Test Measurement Data***

T73333 37 Pages  
T73332 10 Pages  
T73826 Addendum 15 Pages



# EMC Test Data

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	FCC 15.247, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EMC Test Data

For The

### Hewlett Packard (Broadcom)

Model

SDGOB-0891

Date of Last Test: 11/21/2008

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manger:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	FCC 15.247, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

## EUT INFORMATION

### General Description

The EUT is a bluetooth module that is designed to be installed only inside HP final product designs. Since the Bluetooth module would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3 Volts.

### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	SDGOB-0891	Bluetooth module	01	B94SDGOB0891

### Other EUT Details

The EUT was tested while connected to a PCB that allowed for connection to a PC via a USB interface. This was to allow for control of the radio and to test in accordance with the FCC's modular requirements. During normal use, the EUT would be installed within the enclosure of the end-use product.

The module was installed in a host printer and the worst case spurious emissions were remeasured.

### EUT Antenna (Intentional Radiators Only)

The EUT antenna is printed on the PCB. Gain is 0.48dBi.

### EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed into final product designs.

### Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manger: Dean Eriksen
Emissions Standard(s): FCC 15.247, RSS-210	Class: -
Immunity Standard(s): -	Environment: -

### Test Configuration #1

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	Pavilion	Laptop	CNF6511956	DoC

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

#### Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop USB	Multiwire	Shielded	2.0
Laptop AC Power	AC Mains	Three Wire	Unshielded	1.2
Laptop DC Power	Laptop PS	Two wire	Unshielded	2.0

#### EUT Operation During Emissions Tests

For transmit power, bandwidth, and spurious emissions, the EUT was configured to continuously transmit on a selected channel. For hopping timing and number of channels, the EUT was configured to transmit using a pseudo-random hopping sequence.

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	-

## Radiated Emissions - Rx Mode

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/15/2008 18:10	Config. Used: 1
Test Engineer: Rafael Varelas	Config Change: None
Test Location: Chamber #2/OATS #2	EUT Voltage: 120V/60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated emissions testing.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, **preliminary** testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. **Maximized** testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

**Ambient Conditions:**

Temperature:	21.8 °C
Rel. Humidity:	41 %

### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 - 8000 MHz, Maximized Emissions	RSS-GEN	Pass	44.2dBµV/m @ 3000.3MHz (-9.8dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

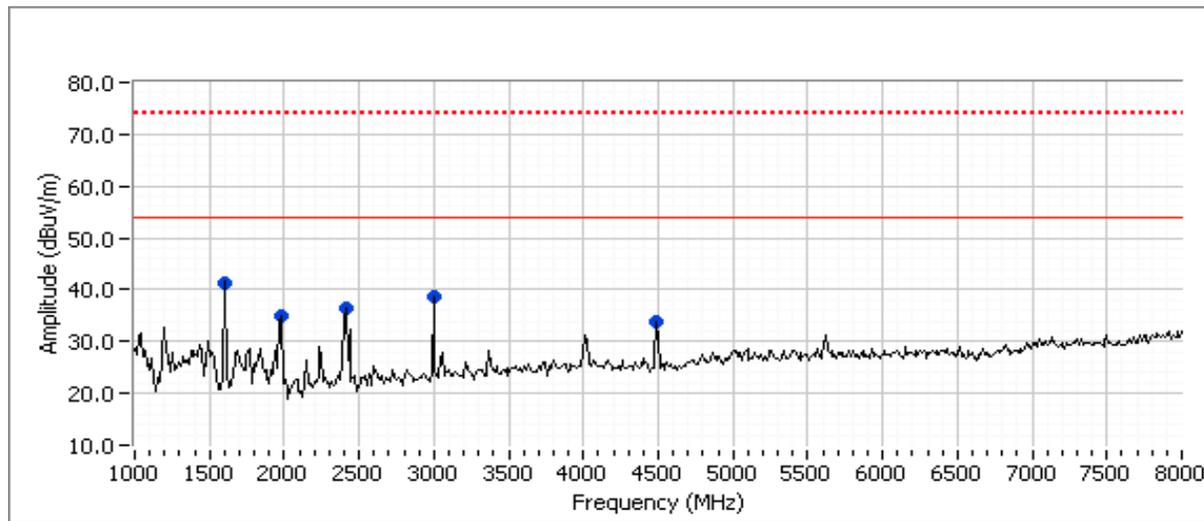
No deviations were made from the requirements of the standard.

Note: Preliminary testing showed no receive mode emissions below 1 GHz.

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: -

Run #1: Maximized readings, 1000 - 8000 MHz, Rx Mode  
EUT at 2441 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 - 8000 MHz	3	3	0.0



Frequency MHz	Level dB $\mu$ V/m	Pol v/h	RSS Gen		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
3000.330	44.2	V	54.0	-9.8	AVG	211	1.1	RB 1 MHz; VB: 10 Hz
3000.300	40.0	H	54.0	-14.0	AVG	340	1.5	RB 1 MHz; VB: 10 Hz
1606.840	39.0	V	54.0	-15.0	AVG	327	1.0	RB 1 MHz; VB: 10 Hz
2413.850	37.3	V	54.0	-16.7	AVG	121	1.0	RB 1 MHz; VB: 10 Hz
1988.700	34.9	V	54.0	-19.1	Peak	324	1.7	
4500.330	33.7	V	54.0	-20.3	Peak	50	1.7	
1607.030	53.4	V	74.0	-20.6	PK	327	1.0	RB 1 MHz; VB: 1 MHz
2413.370	52.4	V	74.0	-21.6	PK	121	1.0	RB 1 MHz; VB: 1 MHz
3000.070	49.0	V	74.0	-25.0	PK	211	1.1	RB 1 MHz; VB: 1 MHz
3000.440	46.5	H	74.0	-27.5	PK	340	1.5	RB 1 MHz; VB: 1 MHz

Note 1: Above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1: Radiated Spurious Emissions, 30 - 25000 MHz. Operating Mode: EDR**

**Run #1a: Low Channel @ 2402 MHz**

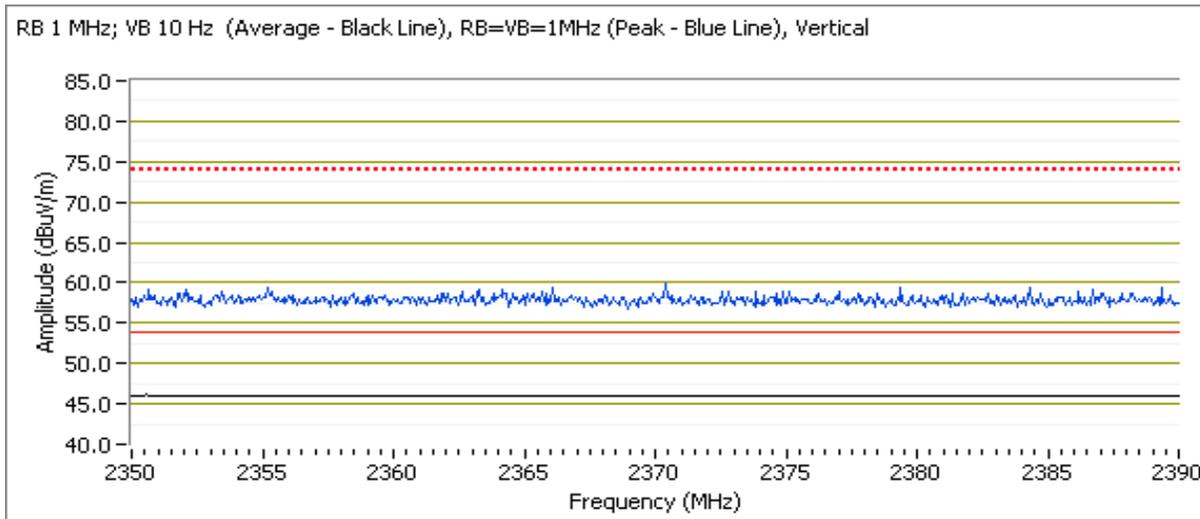
**Fundamental Signal Field Strength:** Peak values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2401.790	95.9	V	Fundamental		PK	66	1.4	RB 1 MHz; VB: 1 MHz
2401.750	93.6	H	Fundamental		PK	144	1.9	RB 1 MHz; VB: 1 MHz
2401.860	92.7	V	-	-	-	66	1.4	RB=VB=100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	92.7 dB $\mu$ V/m	
Limit for emissions outside of restricted bands:	62.7 dB $\mu$ V/m	Limit is -30dBc (UNII power measurement)

**Band Edge Signal Field Strength**

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2350.000	47.4	V	54.0	-6.6	AVG	65	1.4	RB 1 MHz; VB: 10 Hz
2382.330	58.5	V	74.0	-15.5	PK	65	1.4	RB 1 MHz; VB: 1 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4804.000	46.2	H	54.0	-7.8	AVG	194	1.2	Note 2, RB 1 MHz; VB: 10 Hz
<b>4804.020</b>	<b>49.5</b>	<b>V</b>	<b>54.0</b>	<b>-4.5</b>	AVG	259	1.0	Note 2, RB 1 MHz; VB: 10 Hz
7205.980	49.1	H	54.0	-4.9	AVG	352	1.2	RB 1 MHz; VB: 10 Hz
7206.040	45.1	V	54.0	-8.9	AVG	240	1.1	RB 1 MHz; VB: 10 Hz
4803.720	55.1	V	74.0	-18.9	PK	259	1.0	Note 2, RB 1 MHz; VB: 1 MHz
4804.350	52.7	H	74.0	-21.3	PK	194	1.2	Note 2, RB 1 MHz; VB: 1 MHz
7205.910	60.0	H	74.0	-14.0	PK	352	1.2	RB 1 MHz; VB: 1 MHz
7205.960	56.9	V	74.0	-17.1	PK	240	1.1	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	All harmonics beside the 2nd and 3rd harmonics were more than 20dB below the limit.

**Run #1b: Center Channel @ 2441 MHz**

Fundamental emission level @ 3m in 100kHz RBW:	94.3 dB $\mu$ V/m	Limit is -30dBc (UNII power measurement)
Limit for emissions outside of restricted bands:	64.3 dB $\mu$ V/m	

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4881.990	43.9	V	54.0	-10.1	AVG	273	1.0	MHz; VB: 10 Hz
4882.000	42.3	H	54.0	-11.7	AVG	189	1.0	MHz; VB: 10 Hz
<b>7322.950</b>	<b>47.2</b>	<b>H</b>	<b>54.0</b>	<b>-6.8</b>	AVG	147	1.2	MHz; VB: 10 Hz
7323.000	45.3	V	54.0	-8.7	AVG	239	1.0	MHz; VB: 10 Hz
4882.100	50.9	H	74.0	-23.1	PK	189	1.0	MHz; VB: 1 MHz
4882.210	51.4	V	74.0	-22.6	PK	273	1.0	MHz; VB: 1 MHz
7322.870	56.2	V	74.0	-17.8	PK	239	1.0	MHz; VB: 1 MHz
7322.960	57.9	H	74.0	-16.1	PK	147	1.2	MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	All harmonics beside the 2nd and 3rd harmonics were more than 20dB below the limit.

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1c: High Channel @ 2480 MHz**

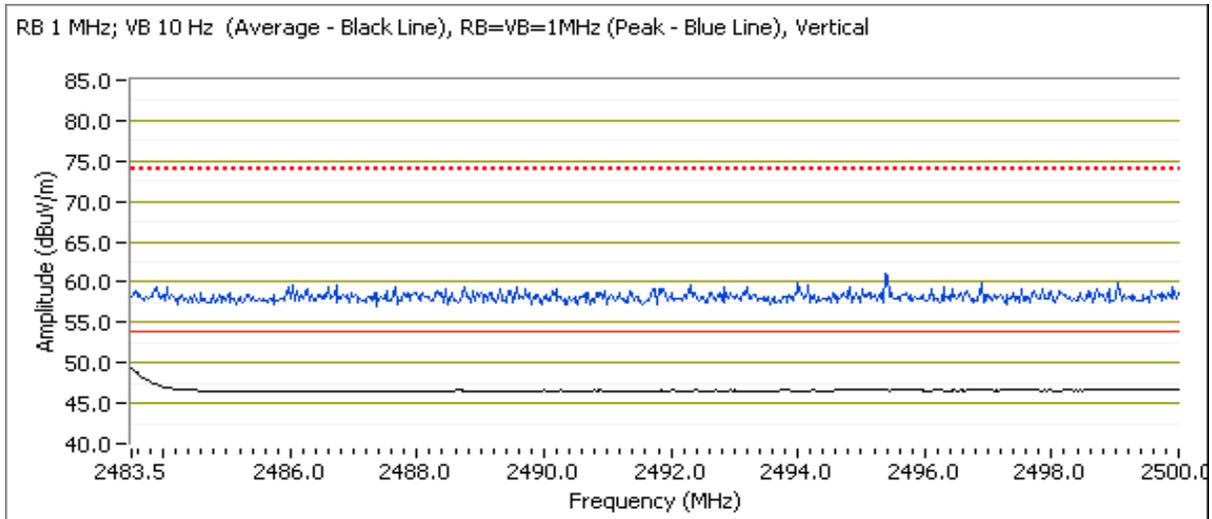
**Fundamental Signal Field Strength:** Peak values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2479.980	97.6	V	Fundamental		PK	28	1.1	RB 1 MHz; VB: 1 MHz
2480.000	92.2	H	Fundamental		PK	162	1.9	RB 1 MHz; VB: 1 MHz
2479.860	94.2	V	-	-	-	28	1.1	RB = VB = 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	92.2 dB $\mu$ V/m	
Limit for emissions outside of restricted bands:	62.2 dB $\mu$ V/m	Limit is -30dBc (UNII power measurement)

**Band Edge Signal Field Strength**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	49.9	V	54.0	-4.1	AVG	28	1.1	RB 1 MHz; VB: 10 Hz
2487.730	59.2	V	74.0	-14.8	PK	28	1.1	RB 1 MHz; VB: 1 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol V/H	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4960.010	39.1	H	54.0	-14.9	AVG	171	1.0	RB 1 MHz; VB: 10 Hz
4960.030	37.5	V	54.0	-16.5	AVG	226	1.2	RB 1 MHz; VB: 10 Hz
<b>7439.960</b>	<b>46.5</b>	H	<b>54.0</b>	<b>-7.5</b>	AVG	356	1.2	RB 1 MHz; VB: 10 Hz
7439.970	45.4	V	54.0	-8.6	AVG	252	1.0	RB 1 MHz; VB: 10 Hz
4959.870	48.3	H	74.0	-25.7	PK	171	1.0	RB 1 MHz; VB: 1 MHz
4960.080	48.2	V	74.0	-25.8	PK	226	1.2	RB 1 MHz; VB: 1 MHz
7439.730	56.3	V	74.0	-17.7	PK	252	1.0	RB 1 MHz; VB: 1 MHz
7440.130	57.3	H	74.0	-16.7	PK	356	1.2	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.
Note 3:	All harmonics beside the 2nd and 3rd harmonics were more than 20dB below the limit.



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: Basic**

**Run #1a: Low Channel @ 2402 MHz**

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2402.270	92.6	V	-	-	AVG	182	1.0	RB 1.000 MHz; VB: 10 Hz
2402.080	92.9	V	-	-	PK	182	1.0	RB 1.000 MHz; VB: 1.000 MHz
2402.270	88.0	H	-	-	AVG	308	1.3	RB 1.000 MHz; VB: 10 Hz
2402.380	88.5	H	-	-	PK	308	1.3	RB 1.000 MHz; VB: 1.000 MHz
2402.080	87.6	H	-	-	PK	308	1.3	RB 100 kHz; VB: 100 kHz
2402.220	90.8	V	-	-	PK	182	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW: 90.8 dB $\mu$ V/m

Limit for emissions outside of restricted bands: 60.8 dB $\mu$ V/m

Limit is -30dBc (UNII power measurement)

**Band Edge Signal Field Strength**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2350.070	46.2	V	54.0	-7.8	AVG	182	1.0	RB 1.000 MHz; VB: 10 Hz
2369.930	57.2	V	74.0	-16.8	PK	182	1.0	RB 1.000 MHz; VB: 1.000 MHz
2350.000	46.2	H	54.0	-7.8	AVG	308	1.3	RB 1.000 MHz; VB: 10 Hz
2381.600	57.7	H	74.0	-16.3	PK	308	1.3	RB 1.000 MHz; VB: 1.000 MHz

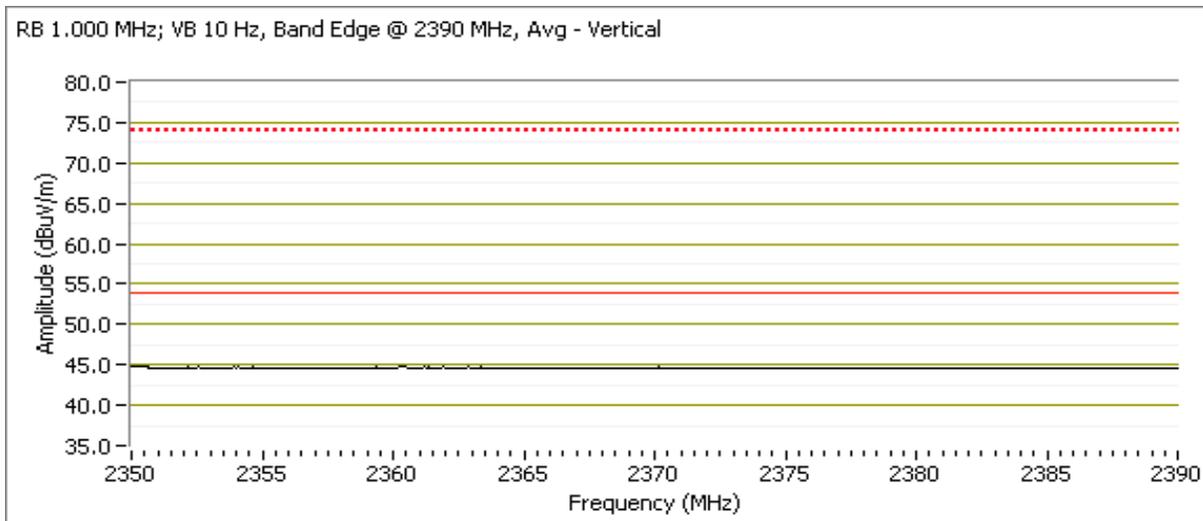
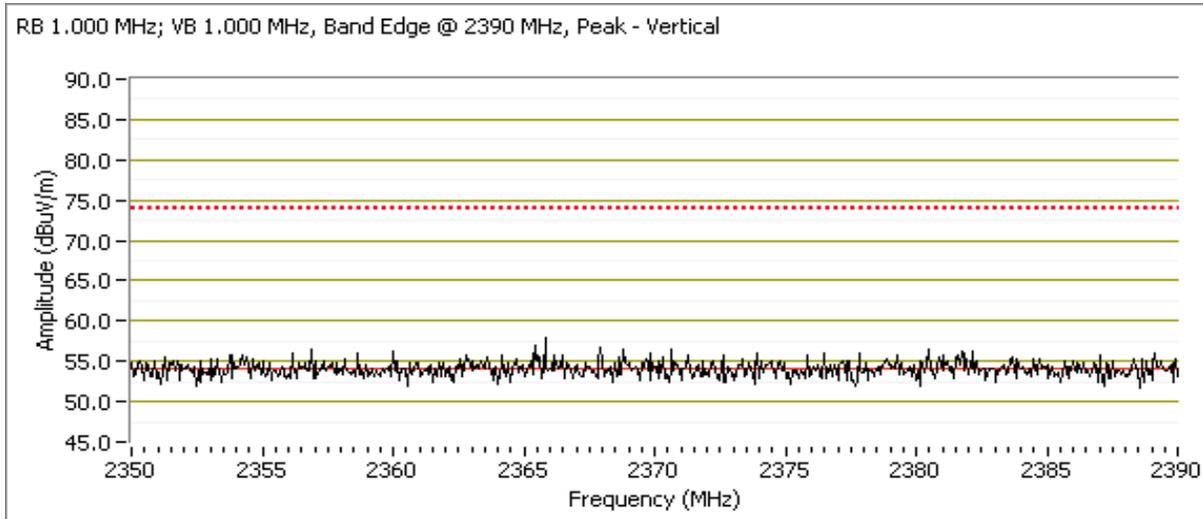
**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4804.100	48.8	V	54.0	-5.2	AVG	0	1.0	RB 1.000 MHz; VB: 10 Hz
4804.120	47.8	H	54.0	-6.2	AVG	19	1.3	RB 1.000 MHz; VB: 10 Hz
7206.030	47.4	V	54.0	-6.6	AVG	74	1.0	RB 1.000 MHz; VB: 10 Hz
9608.010	40.3	V	54.0	-13.7	AVG	318	1.0	RB 1.000 MHz; VB: 10 Hz
7205.830	53.6	V	74.0	-20.4	PK	74	1.0	RB 1.000 MHz; VB: 1.000 MHz
4803.950	53.1	V	74.0	-20.9	PK	0	1.0	RB 1.000 MHz; VB: 1.000 MHz
4804.410	52.2	H	74.0	-21.8	PK	19	1.3	RB 1.000 MHz; VB: 1.000 MHz
9614.720	49.8	V	74.0	-24.2	PK	318	1.0	RB 1.000 MHz; VB: 1.000 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

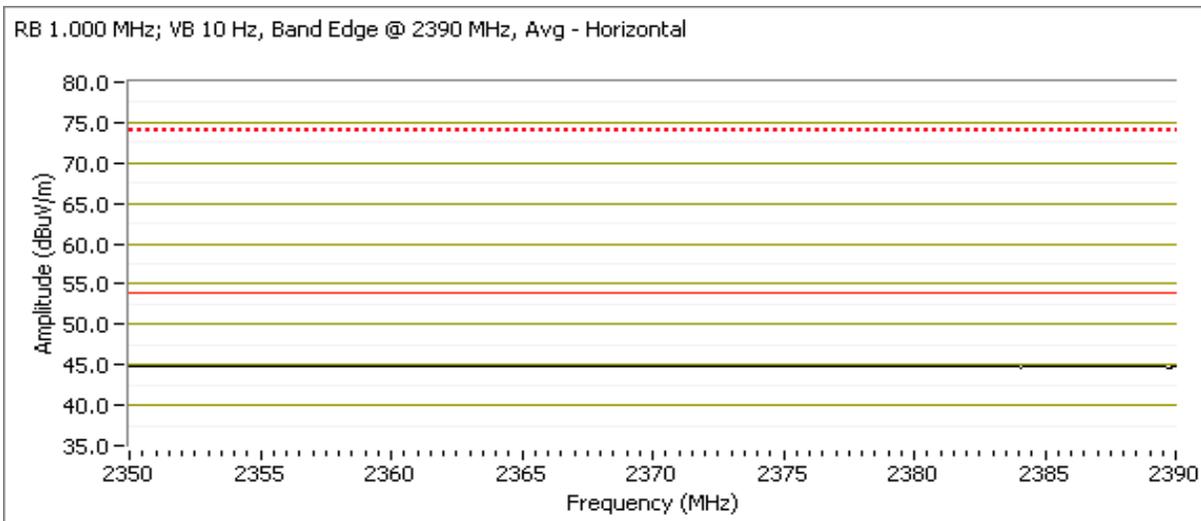
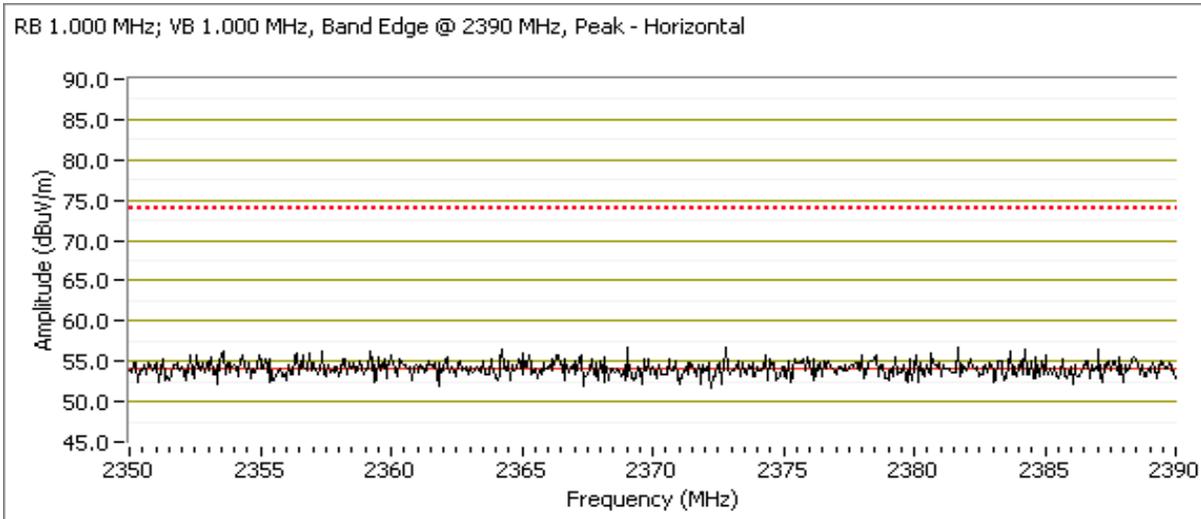
Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

Run #1a: Low Channel @ 2402 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

Run #1a: Low Channel @ 2402 MHz



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

**Run #1b: Center Channel @ 2441 MHz**

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2441.220	87.9	H	-	-	AVG	255	1.0	RB 1.000 MHz; VB: 10 Hz
2441.050	88.4	H	-	-	PK	255	1.0	RB 1.000 MHz; VB: 1.000 MHz
2441.220	93.6	V	-	-	AVG	125	1.3	RB 1.000 MHz; VB: 10 Hz
2441.030	94.0	V	-	-	PK	125	1.3	RB 1.000 MHz; VB: 1.000 MHz
2441.030	92.7	V	-	-	PK	125	1.3	RB 100 kHz; VB: 100 kHz
2441.160	87.5	H	-	-	PK	255	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	92.7 dB $\mu$ V/m	Limit is -30dBc (UNII power measurement)
Limit for emissions outside of restricted bands:	62.7 dB $\mu$ V/m	

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
4882.090	44.9	V	54.0	-9.1	AVG	81	1.4	RB 1.000 MHz; VB: 10 Hz
4882.090	44.7	H	54.0	-9.3	AVG	31	1.3	RB 1.000 MHz; VB: 10 Hz
7227.870	34.8	V	54.0	-19.2	AVG	44	1.0	RB 1.000 MHz; VB: 10 Hz
4882.060	50.2	V	74.0	-23.8	PK	81	1.4	RB 1.000 MHz; VB: 1.000 MHz
4882.630	49.6	H	74.0	-24.4	PK	31	1.3	RB 1.000 MHz; VB: 1.000 MHz
7225.980	46.1	V	74.0	-27.9	PK	44	1.0	RB 1.000 MHz; VB: 1.000 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

### Run #1c: High Channel @ 2480 MHz

**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2480.090	93.7	V	-	-	AVG	183	1.6	RB 1.000 MHz; VB: 10 Hz
2479.880	94.3	V	-	-	PK	183	1.6	RB 1.000 MHz; VB: 1.000 MHz
2480.070	90.6	H	-	-	AVG	288	1.9	RB 1.000 MHz; VB: 10 Hz
2479.980	91.3	H	-	-	PK	288	1.9	RB 1.000 MHz; VB: 1.000 MHz
2480.050	90.7	H	-	-	PK	288	1.9	RB 100 kHz; VB: 100 kHz
2480.070	79.5	V	-	-	Pk	183	2.5	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	90.7	
Limit for emissions outside of restricted bands:	70.7 dB $\mu$ V/m	Limit is -20dBc (Peak power measurement)
Limit for emissions outside of restricted bands:	60.7 dB $\mu$ V/m	Limit is -30dBc (UNII power measurement)

### Band Edge Signal Field Strength

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	48.3	H	54.0	-5.7	AVG	288	1.9	RB 1.000 MHz; VB: 10 Hz
2492.440	46.8	V	54.0	-7.2	Avg	183	2.5	RB 1.000 MHz; VB: 10 Hz
2483.860	60.0	H	74.0	-14.0	PK	288	1.9	RB 1.000 MHz; VB: 1.000 MHz
2495.490	59.1	V	74.0	-14.9	Pk	183	2.5	RB 1.000 MHz; VB: 1.000 MHz

### Other Spurious Emissions

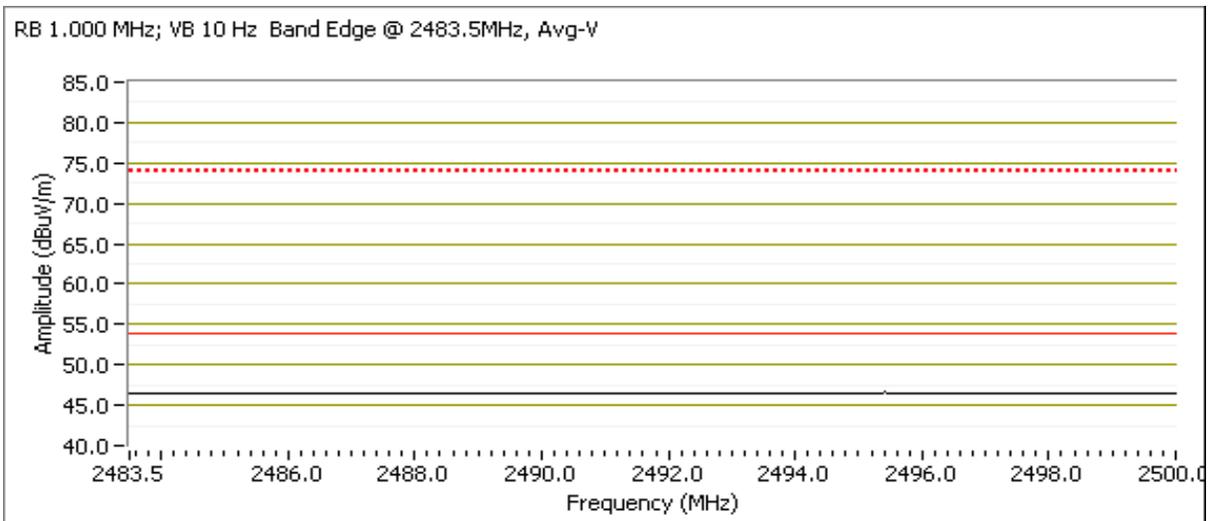
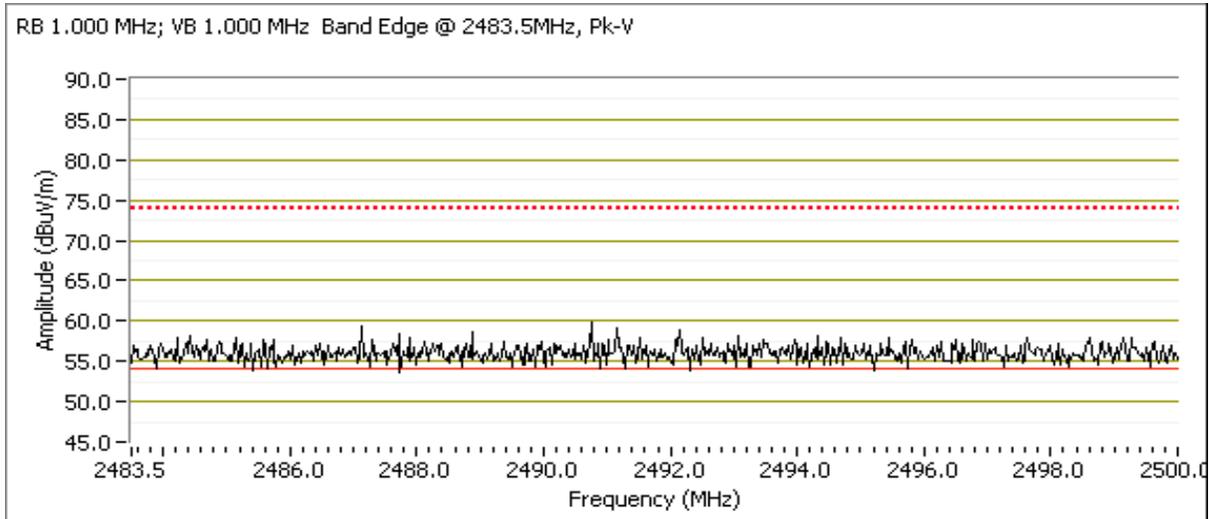
Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7440.050	50.4	H	54.0	-3.6	AVG	167	1.1	RB 1.000 MHz; VB: 10 Hz
7440.020	47.9	V	54.0	-6.1	AVG	71	1.0	RB 1.000 MHz; VB: 10 Hz
4960.050	39.3	H	54.0	-14.7	AVG	7	1.3	RB 1.000 MHz; VB: 10 Hz
4960.050	38.4	V	54.0	-15.6	AVG	56	1.0	RB 1.000 MHz; VB: 10 Hz
7440.360	56.0	H	74.0	-18.0	PK	167	1.1	RB 1.000 MHz; VB: 1.000 MHz
7440.580	54.0	V	74.0	-20.0	PK	71	1.0	RB 1.000 MHz; VB: 1.000 MHz
4960.350	46.9	H	74.0	-27.1	PK	7	1.3	RB 1.000 MHz; VB: 1.000 MHz
4960.050	46.8	V	74.0	-27.2	PK	56	1.0	RB 1.000 MHz; VB: 1.000 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

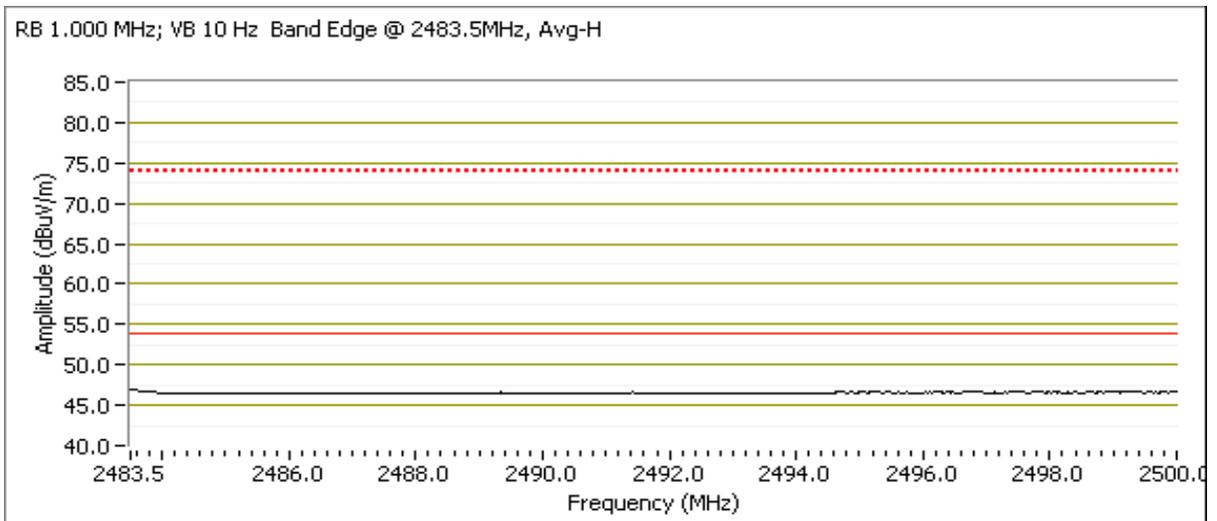
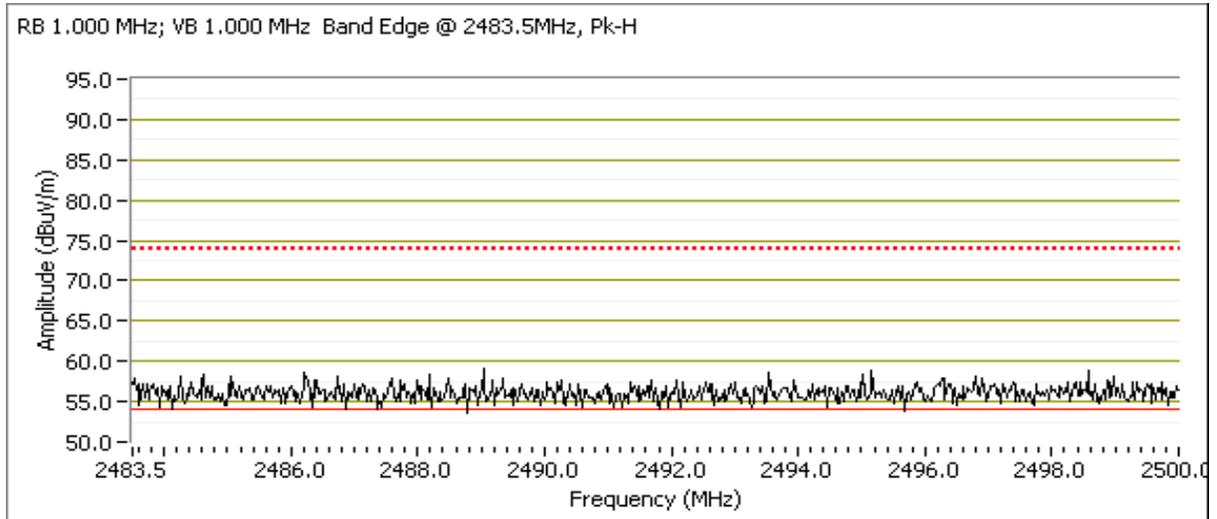
Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

**Run #1c: High Channel @ 2480 MHz**



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

Run #1c: High Channel @ 2480 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

## FCC 15.247 FHSS - Power, Bandwidth and Spurious Emissions

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/16/08	Config. Used: 1
Test Engineer: Mehran Birgani	Config Change: -
Test Location: SV OATS #2	Host Unit Voltage 120V/ 60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Unless stated otherwise the EUT was operating such that it constantly hopped on either the low, center or high channels.

**Ambient Conditions:**

Temperature:	19 °C
Rel. Humidity:	33 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	30 - 25000 MHz - Conducted Spurious Emissions	FCC Part 15.247( c)	Pass	> 20dB below the limit
2	Output Power	15.247(b)	Pass	-0.5 dBm (0.9mW)
3	20dB Bandwidth	15.247(a)	-	993 kHz
3	99% bandwidth	15.247(a)	-	998 kHz
3	Channel Spacing	15.247(a)	Pass	1 MHz
3	Channel Occupancy	15.247(a)	-	3.7 mS
3	Number of Channels	15.247(a)	-	79 Channels

### Modifications Made During Testing:

No modifications were made to the EUT during testing

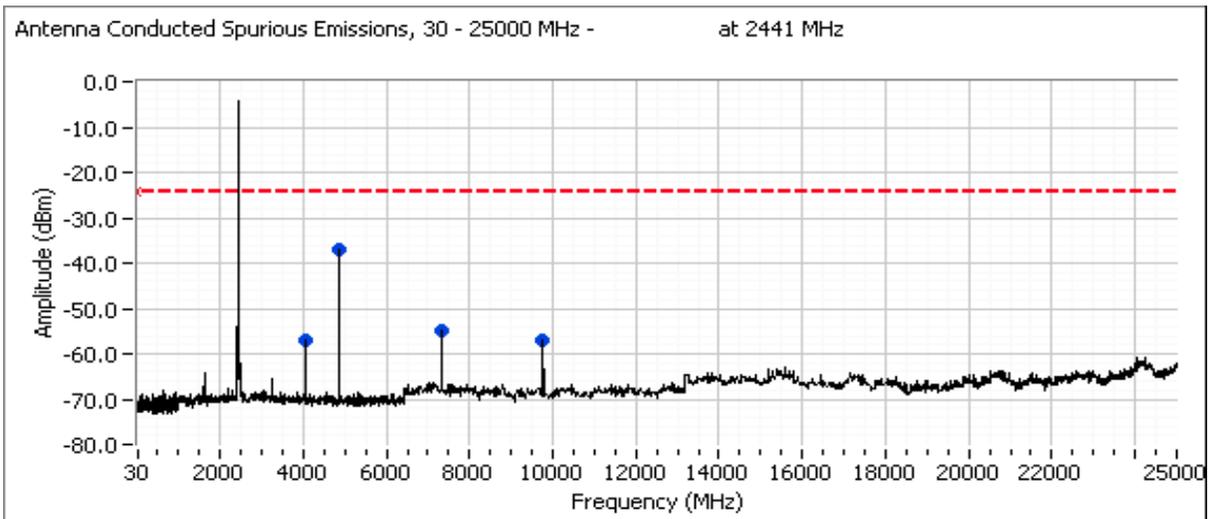
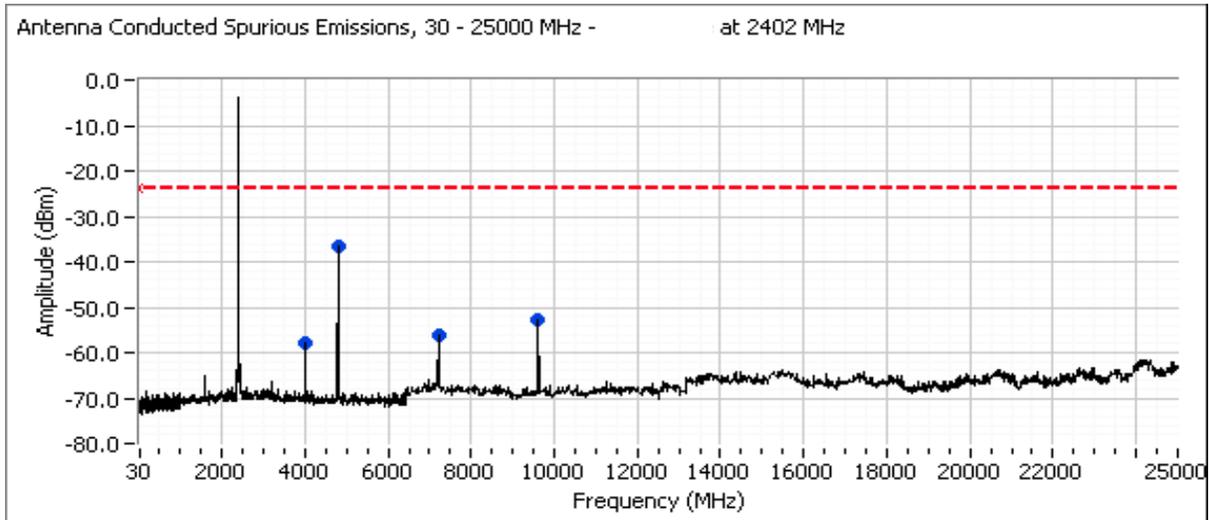
### Deviations From The Standard

No deviations were made from the requirements of the standard.

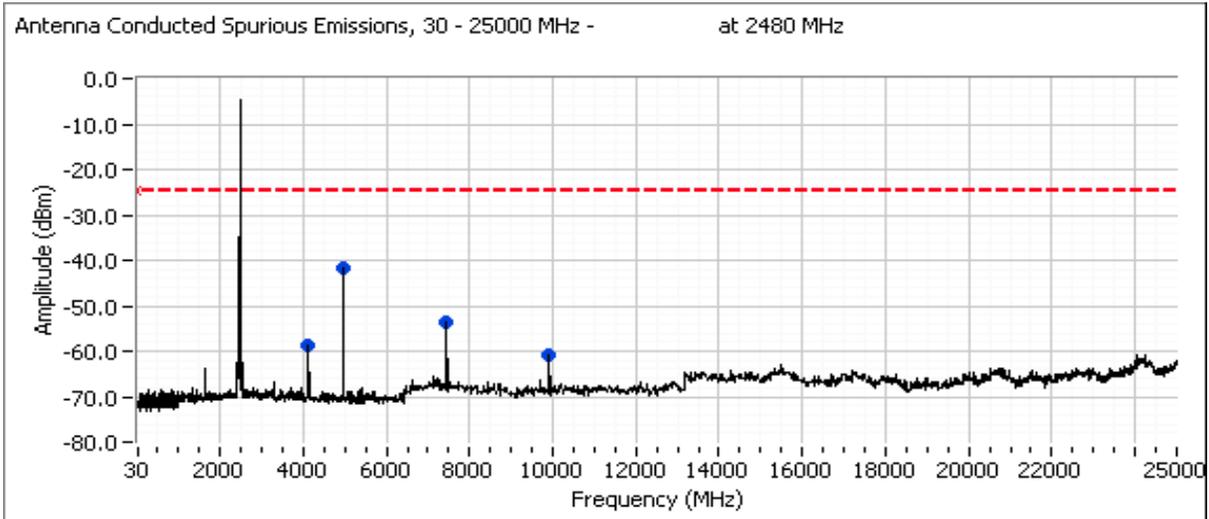
Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

**Run #1: Antenna Conducted Spurious Emissions, 30 - 25000 MHz.**

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A



**Run #2: Output Power**

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.  
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Maximum antenna gain: 0.48 dBi

Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	-	-0.6	0.000870964	0.0009727
Mid	2441	-	-0.5	0.000891251	0.0009954
High	2480	-	-0.8	0.000831764	0.000929

Note 1: Measurements taken with a peak power meter.

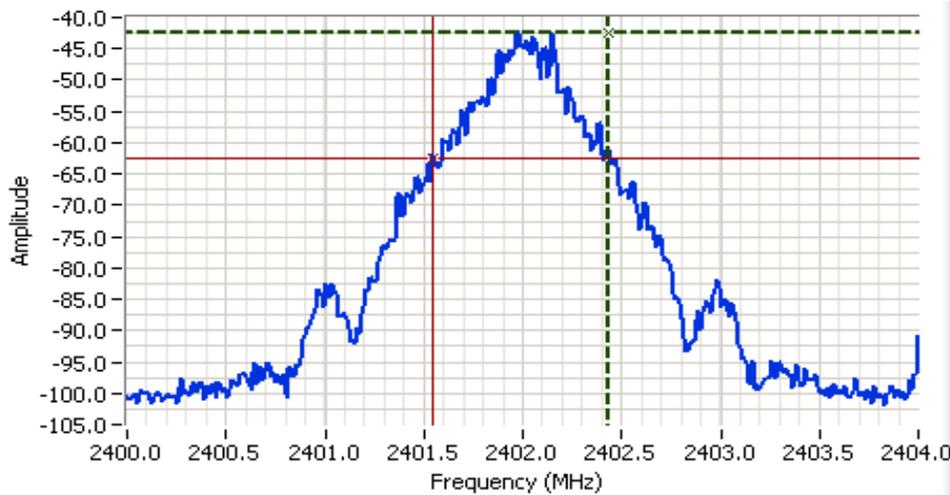
**Run #3: Bandwidth, Channel Occupancy, Spacing and Number of Channels**

Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (MHz)	Resolution Bandwidth	99% Bandwidth (MHz)
Low	2402	10 kHz	0.890	100 kHz	0.998
Mid	2441	10 kHz	0.930	100 kHz	0.988
High	2480	10 kHz	0.920	100 kHz	0.998

Note 1: 20dB bandwidth measured using RB = 10 kHz, VB = 10 kHz

Note 2: 99% bandwidth measured using RB = 100 kHz, VB = 300 kHz (VB >=3RB)

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



**Analyzer Settings**  
HP8595EM

CF: 2402.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

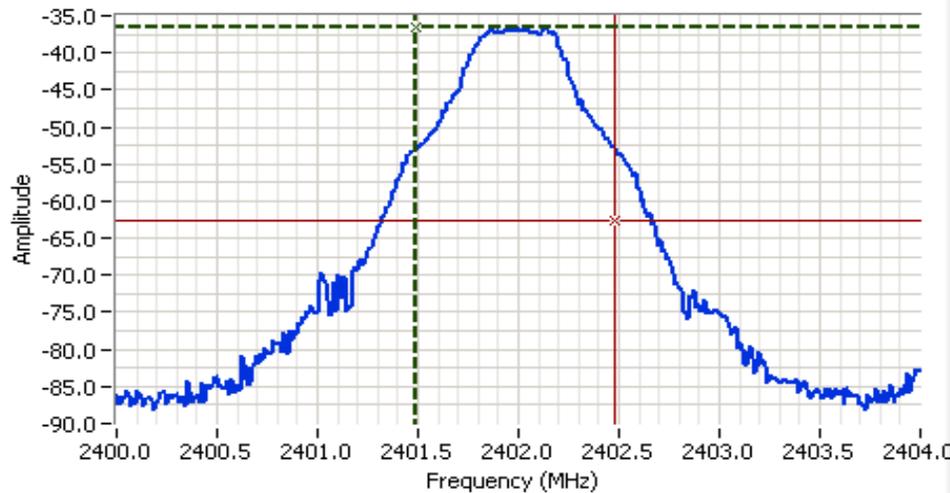
**Comments**  
20dB BW: 890 kHz

Cursor 1 2402.4300 -42.37 

Cursor 2 2401.5400 -62.37 

Delta Freq. 890 kHz

Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2402.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

**Comments**  
99% power BW: 998 kHz

Cursor 1 2401.4863 -36.61 

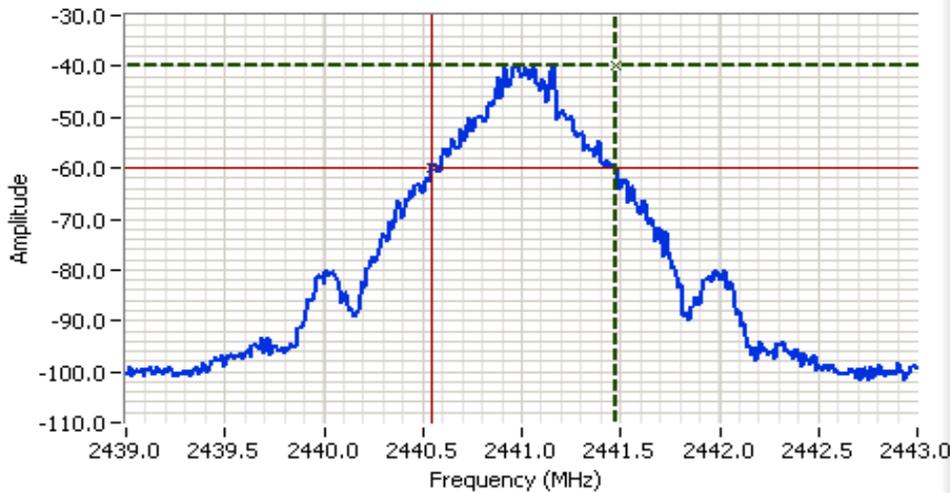
Cursor 2 2402.4838 -62.61 

Delta Freq. 998 kHz

Delta Amplitude 26.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



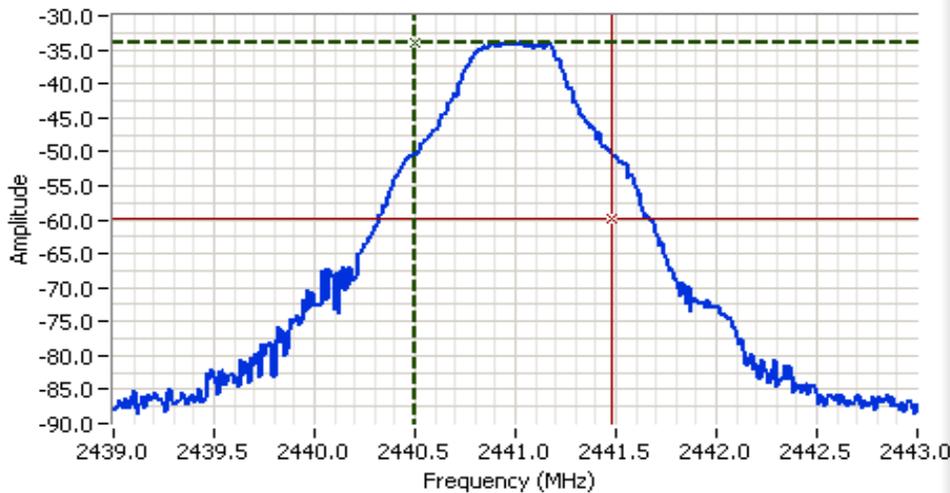
**Analyzer Settings**  
HP8595EM

CF: 2441.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

**Comments**  
20dB BW: 930 kHz

Cursor 1 2441.4800 -39.79  Delta Freq. 930 kHz

Cursor 2 2440.5500 -59.79  Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2441.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

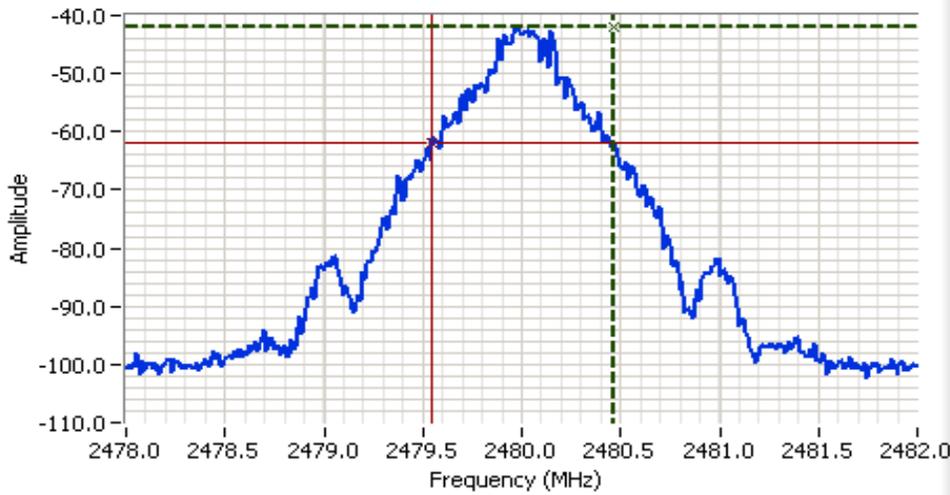
**Comments**  
99% power BW: 988 kHz

Cursor 1 2440.4963 -33.99  Delta Freq. 988 kHz

Cursor 2 2441.4838 -59.99  Delta Amplitude 26.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



**Analyzer Settings**  
HP8595EM

CF: 2480.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

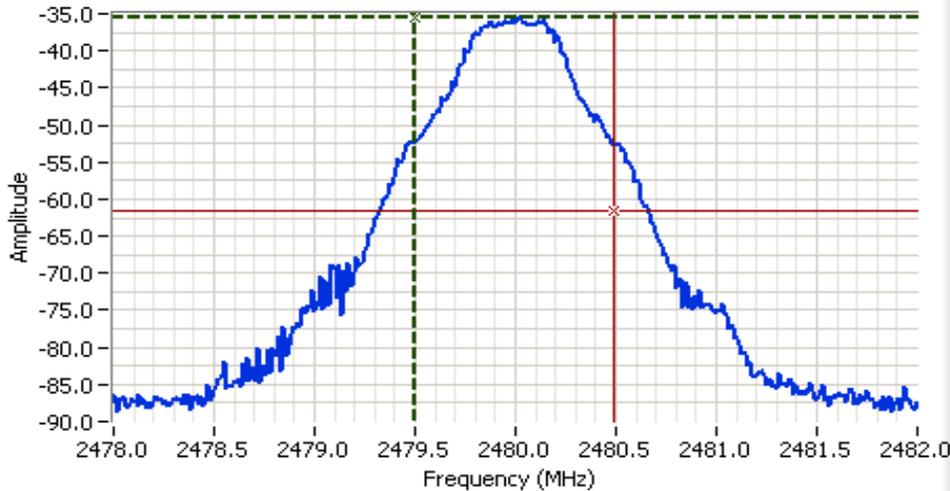
**Comments**  
20dB BW: 920 kHz

Cursor 1 2480.4700 -41.95 

Cursor 2 2479.5500 -61.95 

Delta Freq. 920 kHz

Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2480.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

**Comments**  
99% power BW: 998 kHz

Cursor 1 2479.4963 -35.63 

Cursor 2 2480.4938 -61.63 

Delta Freq. 998 kHz

Delta Amplitude 26.00



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

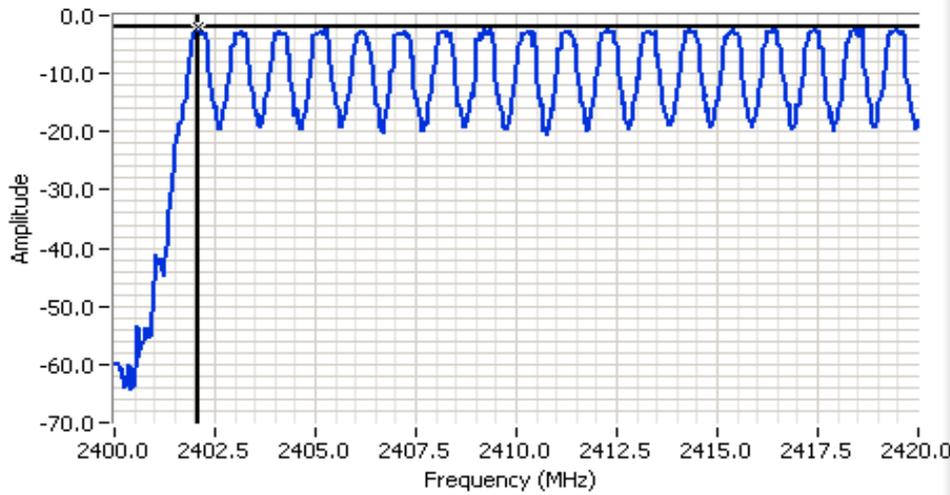
Frequency hopping systems in the **2400-2483.5 MHz** band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. (Frequency hopping systems may avoid or suppress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

The channel dwell time is calculated from the transmit time on a channel multiplied by the number of times a channel could be used in a period of 0.4 times the number of channels, N (i.e. 0.4N divided by the time between successive hops, rounded up to the closest integer), unless the time between successive hops exceeds 0.4N, in which case the channel dwell time is the transmit time on a channel.

Maximum 20dB bandwidth:	<u>930</u> kHz			
Channel spacing:	<u>1000</u> kHz	Pass	Limit (kHz):	620
Transmission time per hop:	<u>3.0</u> ms			
The time between successive hops on a channel:	- <u>      </u> ms			
Number of channels (N):	<u>79</u>	Pass		
Channel dwell time in 31.6 seconds:	<u>400</u> ms	Pass - See Note		

Note: Since the dwell time per hop is less than 0.4 seconds and the operation description details that all channels are used equally, then compliance with the 0.4 s per 0.4 \* # of channels is automatic, independent of the time between hops on the same channel.

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A

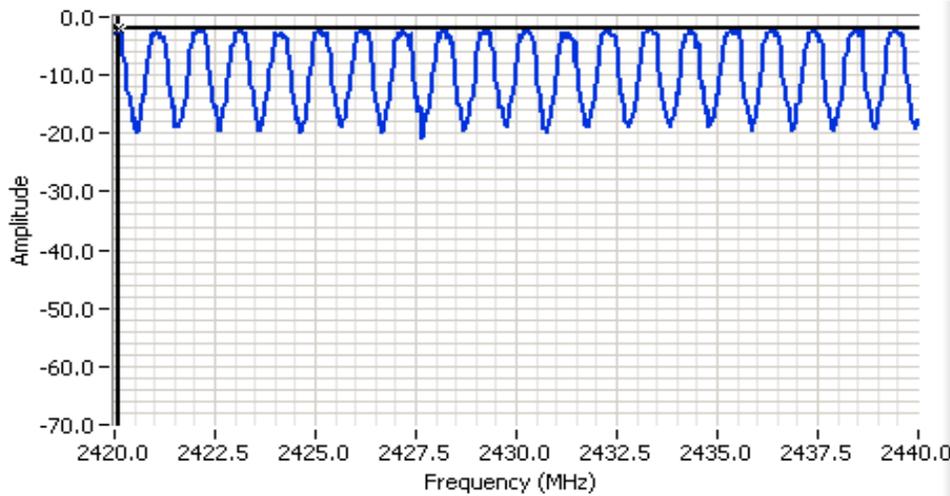
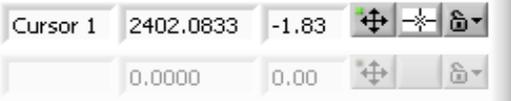


Analyzer Settings

HP8564E  
CF: 2410.000 MHz  
SPAN:20.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 7.00  
Sweep Time 50.0ms  
Ref Lvl:6.50DBM

Comments

Basic Mode  
Number of Channels  
18 channels

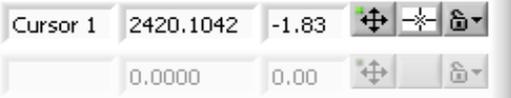


Analyzer Settings

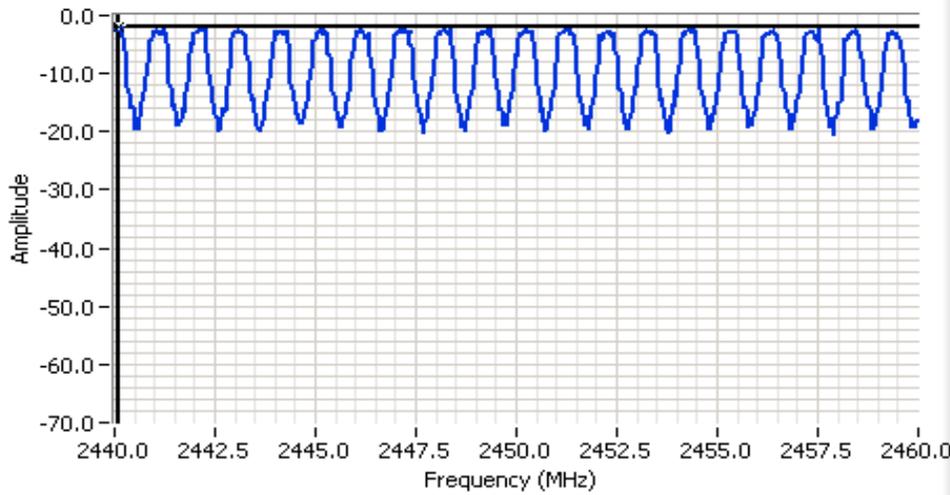
HP8564E  
CF: 2430.000 MHz  
SPAN:20.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 7.00  
Sweep Time 50.0ms  
Ref Lvl:6.50DBM

Comments

Basic Mode  
Number of Channels  
20 channels



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



**Analyzer Settings**

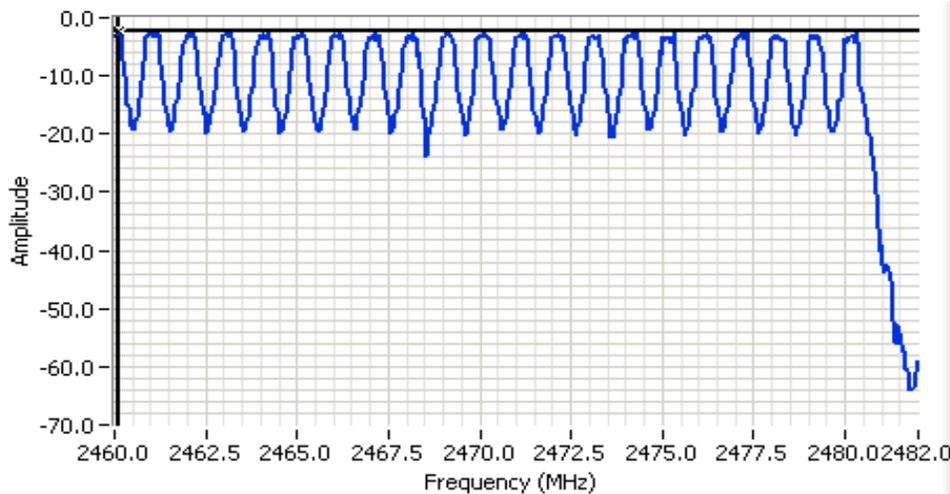
HP8564E  
CF: 2450.000 MHz  
SPAN: 20.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 7.00  
Sweep Time 50.0ms  
Ref Lvl: 6.50DBM

**Comments**

Basic Mode  
Number of Channels  
20 channels

Cursor 1 2440.1042 -1.83

0.0000 0.00



**Analyzer Settings**

HP8564E  
CF: 2471.000 MHz  
SPAN: 22.000 MHz  
RB 100 kHz  
VB 100 kHz  
Detector POS  
Att 10  
RL Offset 7.00  
Sweep Time 50.0ms  
Ref Lvl: 6.50DBM

**Comments**

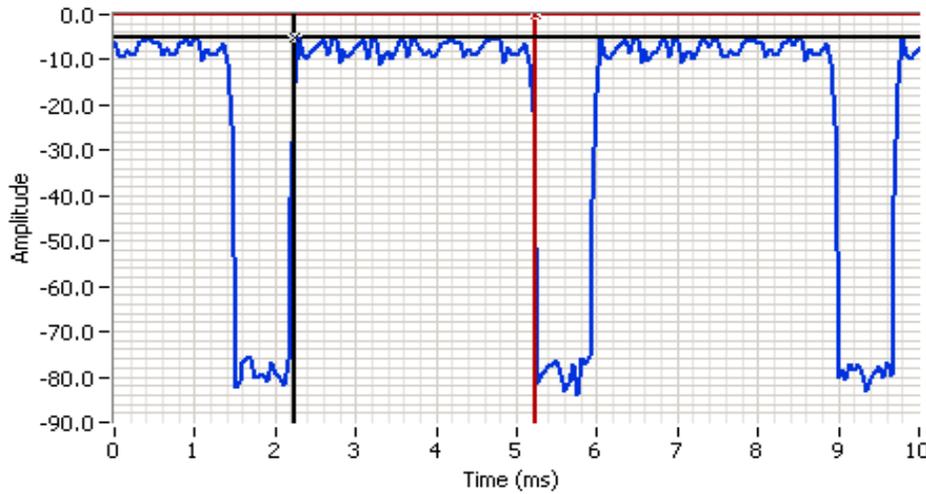
Basic Mode  
Number of Channels  
21 channels

Cursor 1 2460.1146 -2.33

0.0000 0.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



**Analyzer Settings**

HP8564E  
 CF: 2441.000 MHz  
 SPAN: 0.000 MHz  
 RB 30.0 kHz  
 VB 100 kHz  
 Detector POS  
 Att 10  
 RL Offset 7.00  
 Sweep Time 30.0ms  
 Ref Lvl: 6.50DBM

**Comments**

Basic Mode  
 Transmission Time per Hop

Cursor 1	2.2396	-5.00		Delta Time (ms)	2.99
Cursor 1	5.2344	0.00		Delta Amplitude	5.00



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

## FCC 15.247 FHSS - Power, Bandwidth and Spurious Emissions

### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/16/08	Config. Used: 1
Test Engineer: Mehran Birgani	Config Change: -
Test Location: SV OATS #2	Host Unit Voltage 120V/ 60Hz

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

When measuring the conducted emissions from the EUT's antenna port, the antenna port of the EUT was connected to the spectrum analyzer or power meter via a suitable attenuator to prevent overloading the measurement system. All measurements are corrected to allow for the external attenuators used.

Unless stated otherwise the EUT was operating such that it constantly hopped on either the low, center or high channels.

**Ambient Conditions:**

Temperature:	19 °C
Rel. Humidity:	33 %

### Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	30 - 25000 MHz - Conducted Spurious Emissions	FCC Part 15.247( c)	Pass	> 20dB below the limit
2	Output Power	15.247(b)	Pass	-2.2 dBm (0.6mW)
3	20dB Bandwidth	15.247(a)		1330 kHz
3	99% bandwidth	15.247(a)	-	1.29 MHz
3	Channel Spacing	15.247(a)	Pass	1 MHz
3	Channel Occupancy	15.247(a)	-	3.8 mS
3	Number of Channels	15.247(a)	-	79 Channels

### Modifications Made During Testing:

No modifications were made to the EUT during testing

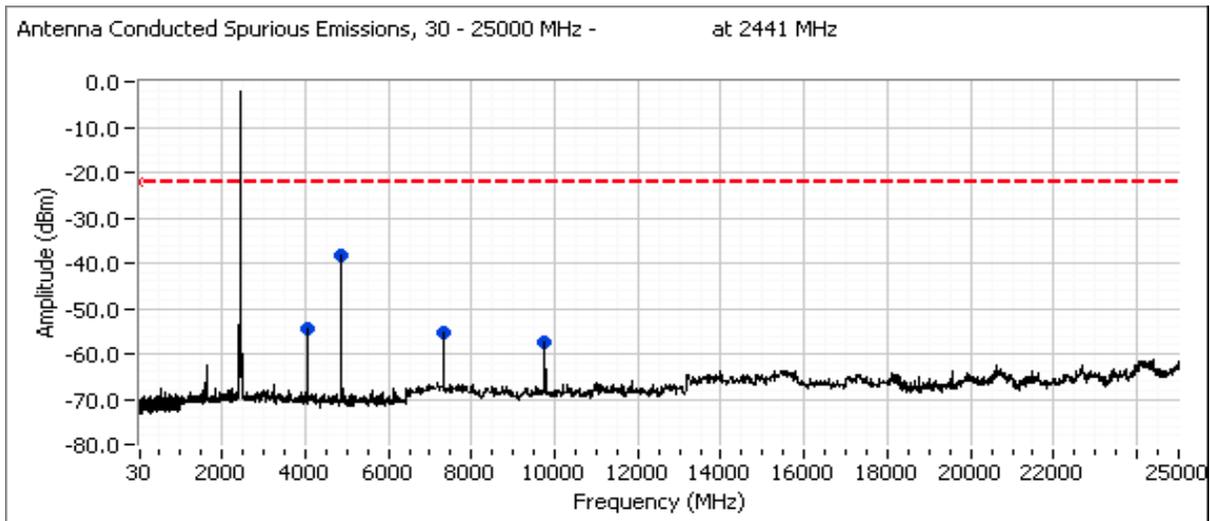
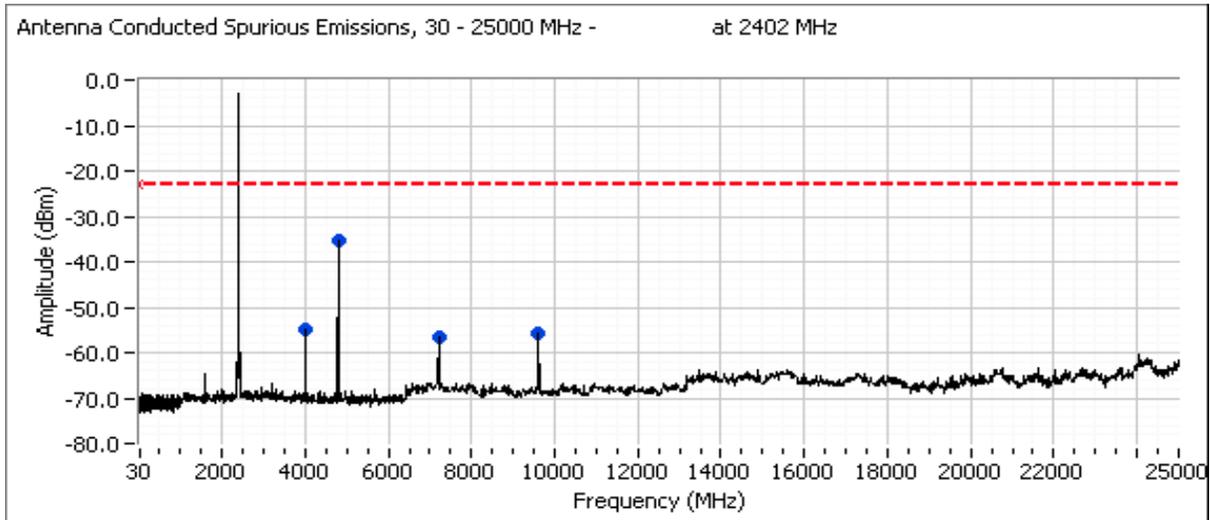
### Deviations From The Standard

No deviations were made from the requirements of the standard.

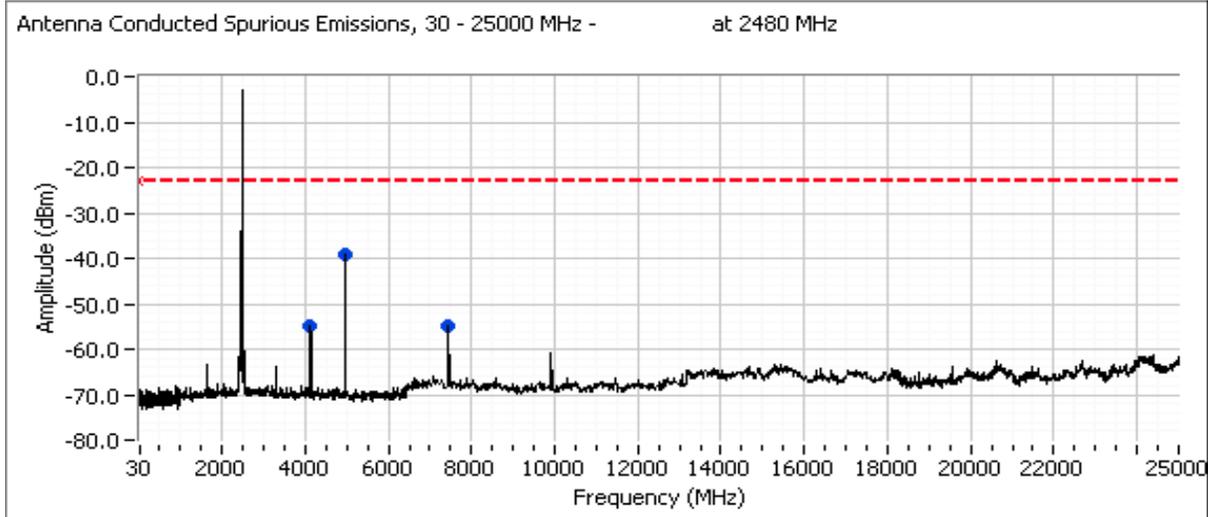
Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1: Antenna Conducted Spurious Emissions, 30 - 25000 MHz.**

Refer to plots below. Scans made using RBW=VB=100 KHz with the limit line set at 20dB below the highest in-band signal level.



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A



**Run #2: Output Power**

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.  
For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Maximum antenna gain: 0.48 dBi

Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	-	-2.2	0.00060256	0.000673
Mid	2441	-	-2.2	0.000602560	0.000673
High	2480	-	-2.5	0.000562341	0.0006281

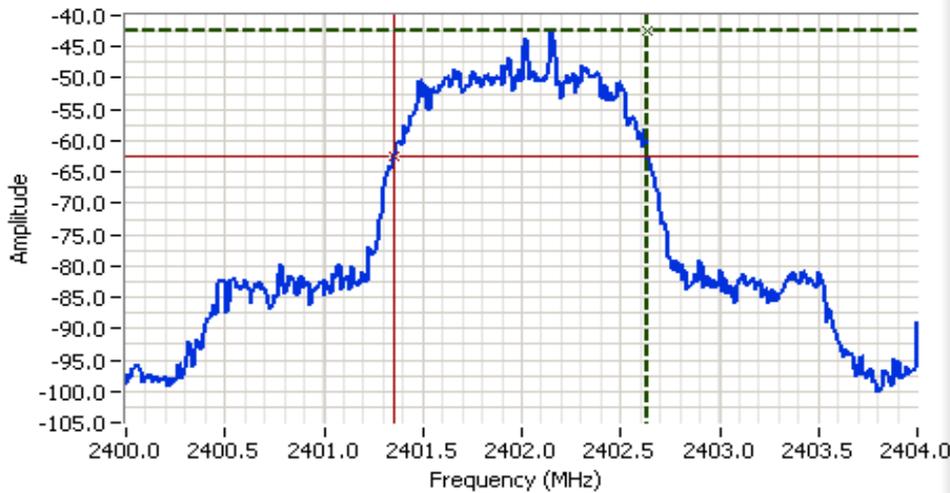
Note 1: Measurements taken with a peak power meter.

Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (MHz)	Resolution Bandwidth	99% Bandwidth (MHz)
Low	2402	10 kHz	1.290	100 kHz	1.287
Mid	2441	10 kHz	1.330	100 kHz	1.287
High	2480	10 kHz	1.290	100 kHz	1.277

Note 1: 20dB bandwidth measured using RB = 10 kHz, VB = 10 kHz

Note 2: 99% bandwidth measured using RB = 100 kHz, VB = 300 kHz (VB >=3RB)

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



**Analyzer Settings**  
HP8595EM

CF: 2402.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

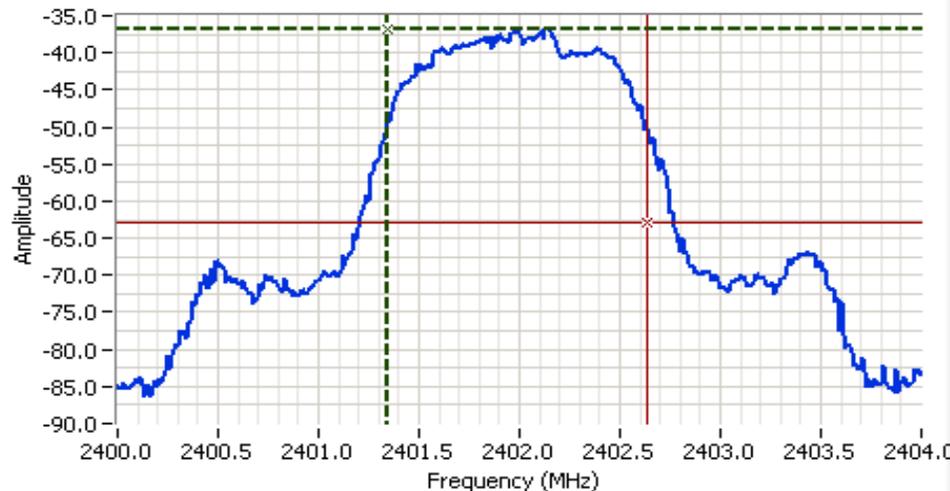
**Comments**  
20dB BW: 1.290 MHz

Cursor 1 2402.6400 -42.55 

Cursor 2 2401.3500 -62.55 

Delta Freq. 1.290

Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2402.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

**Comments**  
99% power BW: 1.287 MHz

Cursor 1 2401.3466 -36.91 

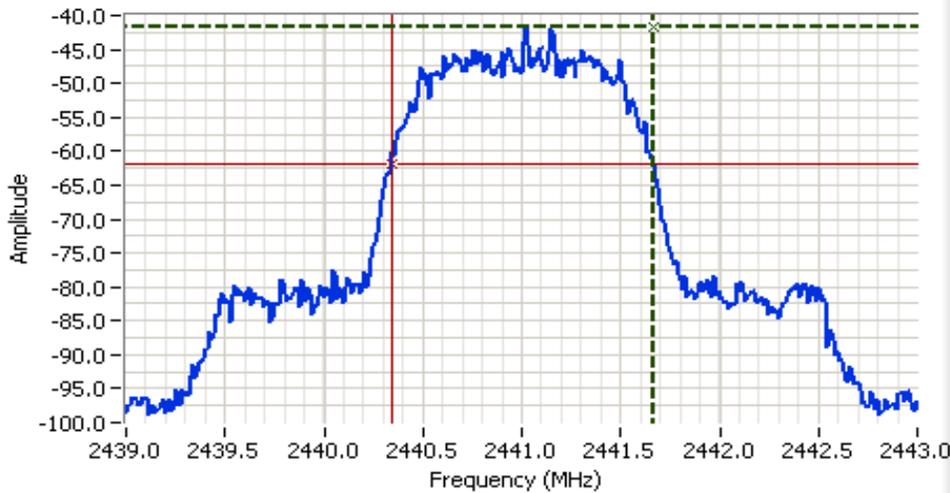
Cursor 2 2402.6334 -62.91 

Delta Freq. 1.287

Delta Amplitude 26.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A



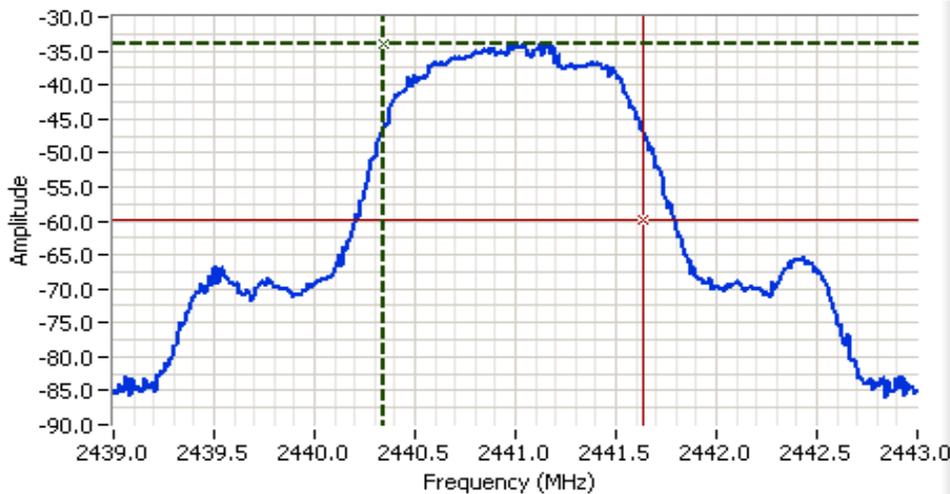
**Analyzer Settings**  
HP8595EM

CF: 2441.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

**Comments**  
20dB BW: 1.330 MHz

Cursor 1 2441.6700 -41.82  Delta Freq. 1.330

Cursor 2 2440.3400 -61.82  Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2441.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

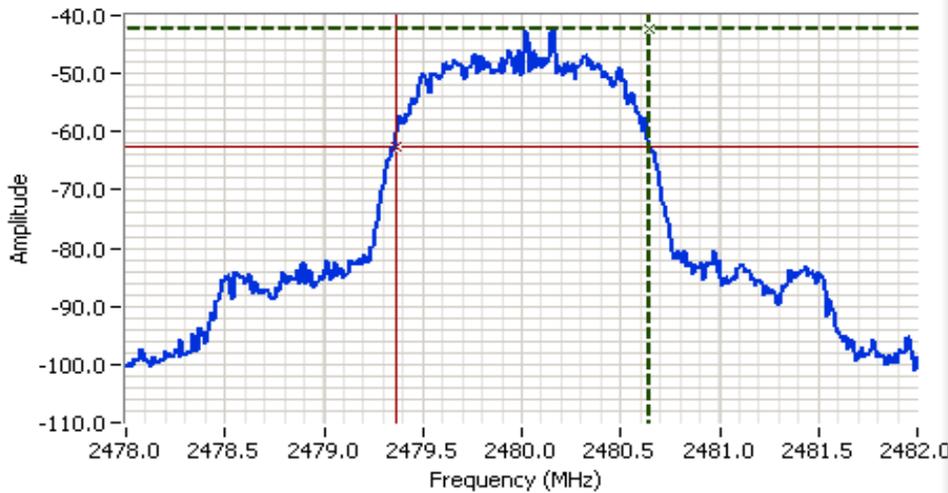
**Comments**  
99% power BW: 1.287 MHz

Cursor 1 2440.3466 -33.92  Delta Freq. 1.287

Cursor 2 2441.6334 -59.92  Delta Amplitude 26.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A

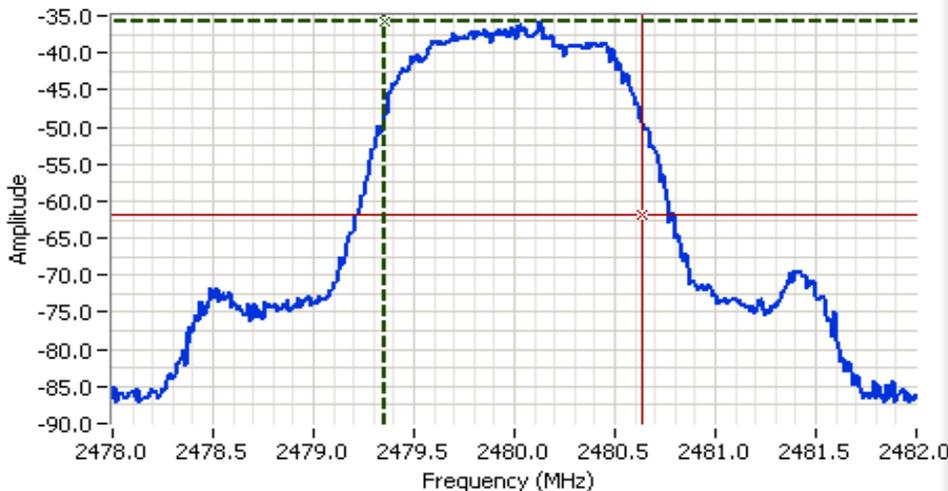


**Analyzer Settings**  
HP8595EM

CF: 2480.000 MHz  
SPAN: 4.000 MHz  
RB 10.00 kHz  
VB 10.00 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 120.0ms  
Ref Lvl: -36.00DBM

**Comments**  
20dB BW: 1.290 MHz

Cursor 1 2480.6500 -42.48 [icons]  
Cursor 2 2479.3600 -62.48 [icons]  
Delta Freq. 1.290  
Delta Amplitude 20.00



**Analyzer Settings**  
HP8595EM

CF: 2480.000 MHz  
SPAN: 4.000 MHz  
RB 100 kHz  
VB 300 kHz  
Detector POS  
Att 0  
RL Offset 0.00  
Sweep Time 20.0ms  
Ref Lvl: -32.00DBM

**Comments**  
99% power BW: 1.277 MHz

Cursor 1 2479.3566 -35.77 [icons]  
Cursor 2 2480.6334 -61.77 [icons]  
Delta Freq. 1.277  
Delta Amplitude 26.00



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73333
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

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.)

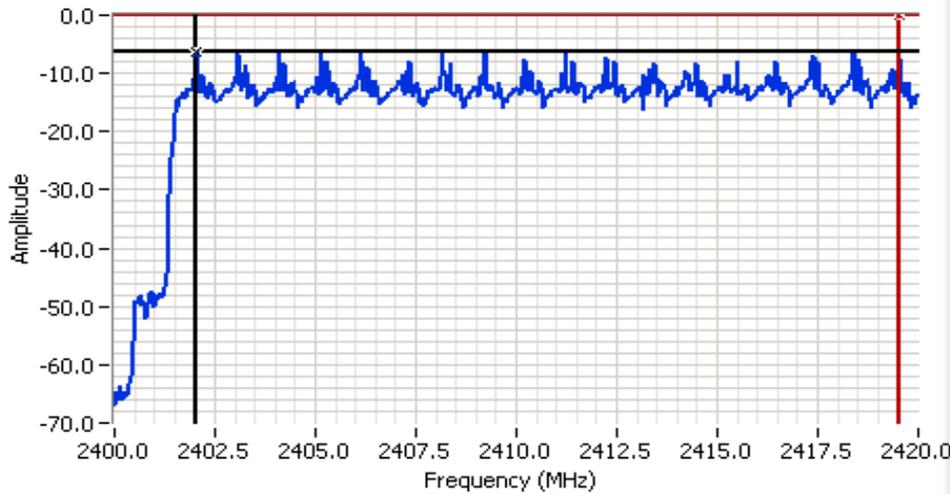
The channel dwell time is calculated from the transmit time on a channel multiplied by the number of times a channel could be used in a period of 0.4 times the number of channels, N (i.e. 0.4N divided by the time between successive hops, rounded up to the closest integer), unless the time between successive hops exceeds 0.4N, in which case the channel dwell time is the transmit time on a channel.

Maximum 20dB bandwidth:	<u>1330</u> kHz			
Channel spacing:	<u>1000</u> kHz	Pass	Limit (kHz):	887
Transmission time per hop:	<u>3.0</u> ms			
The time between successive hops on a channel:	- <u>        </u> ms			
Number of channels (N):	<u>79</u>	Pass		
Channel dwell time in 31.6 seconds:	<u>400</u> ms	Pass - See Note		

Note: Since the dwell time per hop is less than 0.4 seconds and the operation description details that all channels are used equally, then compliance with the 0.4 s per 0.4 \* # of channels is automatic, independent of the time between hops on the same channel.

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A

Number of Channels

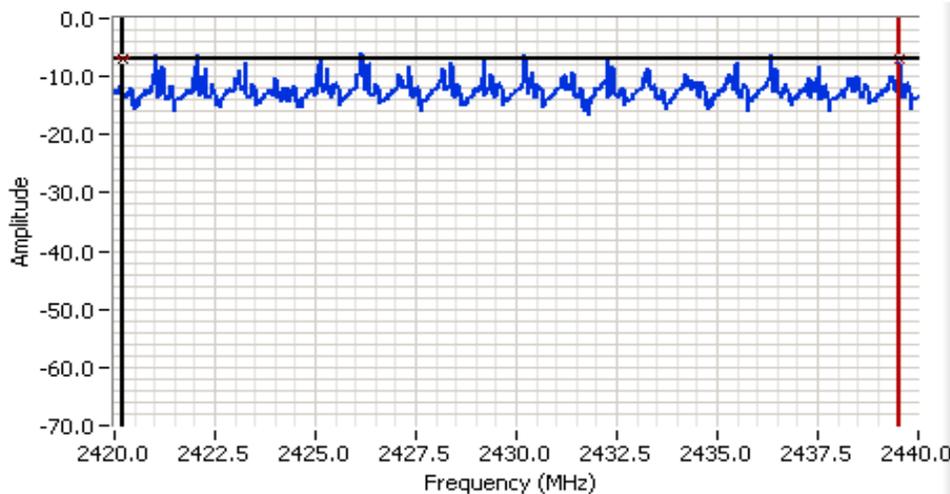


**Analyzer Settings**  
 HP8564E  
 CF: 2410.000 MHz  
 SPAN: 20.000 MHz  
 RB 30.0 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 10  
 RL Offset 7.00  
 Sweep Time 200.0ms  
 Ref Lvl: 6.50DBM

**Comments**  
 Number of Channels  
 2402 - 2420 MHz  
 18 Channels

Cursor 1 2402.0312 -6.17  Delta Freq. 17.500

Cursor 2 2419.5312 0.00  Delta Amplitude 6.17



**Analyzer Settings**  
 HP8564E  
 CF: 2430.000 MHz  
 SPAN: 20.000 MHz  
 RB 30.0 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 10  
 RL Offset 7.00  
 Sweep Time 200.0ms  
 Ref Lvl: 6.50DBM

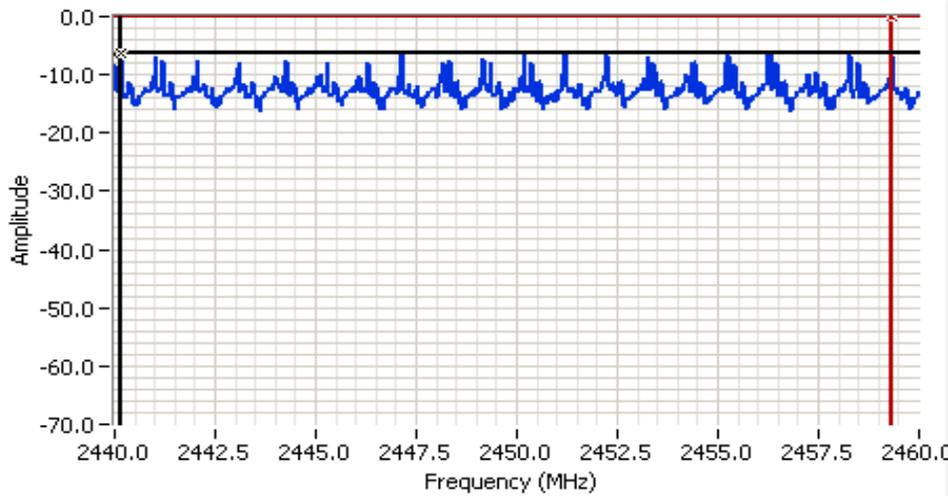
**Comments**  
 Number of Channels  
 2420 - 2440 MHz  
 20 Channels

Cursor 1 2420.2083 -6.97  Delta Freq. 19.323

Cursor 1 2439.5312 -6.97  Delta Amplitude 0.00



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73333
Contact: Juan Martinez	Account Manager: Dean Eriksen
Standard: FCC 15.247, RSS-210	Class: N/A

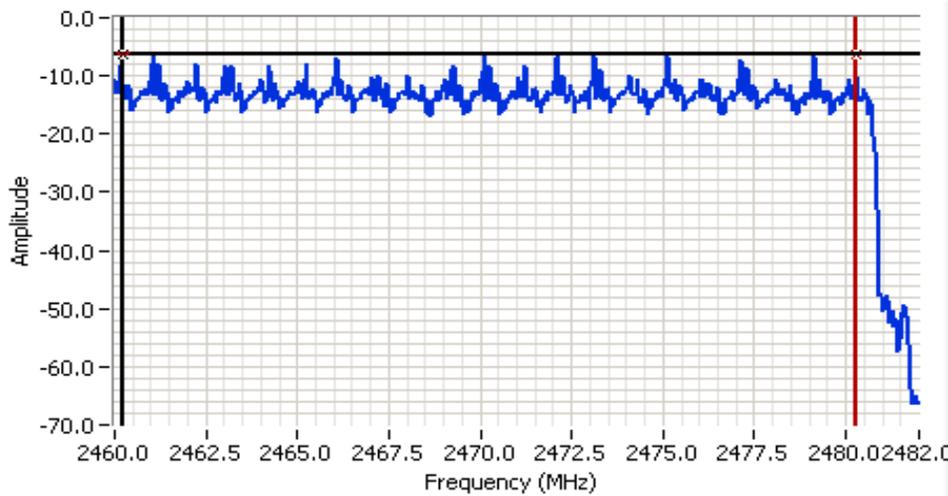


**Analyzer Settings**  
 HP8564E  
 CF: 2450.000 MHz  
 SPAN:20.000 MHz  
 RB 30.0 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 10  
 RL Offset 7.00  
 Sweep Time 200.0ms  
 Ref Lvl:6.50DBM

**Comments**  
 Number of Channels  
 2440 - 2460 MHz  
 20 Channels

Cursor 1	2440.1562	-6.17	
Cursor 1	2459.3229	0.00	

Delta Freq. 19.167  
 Delta Amplitude 6.17



**Analyzer Settings**  
 HP8564E  
 CF: 2471.000 MHz  
 SPAN:22.000 MHz  
 RB 30.0 kHz  
 VB 10.00 kHz  
 Detector POS  
 Att 10  
 RL Offset 7.00  
 Sweep Time 200.0ms  
 Ref Lvl:6.50DBM

**Comments**  
 Number of Channels  
 2460 - 2480 MHz  
 21 Channels

Cursor 1	2460.2292	-6.33	
Cursor 2	2480.2812	-6.33	

Delta Freq. 20.052  
 Delta Amplitude 0.00



Client:	Broadcom	Job Number:	J73297
Model:	SDGOB-0891	T-Log Number:	T73332
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	FCC Part 15	Class:	B
Immunity Standard(s):	EN 301 489-1/-17	Environment:	-

## EMC Test Data

For The

### Broadcom

Model

SDGOB-0891

Date of Last Test: 10/16/2008

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manger: Dean Eriksen
Contact: Juan Martinez	
Emissions Standard(s): FCC Part 15	Class: B
Immunity Standard(s): EN 301 489-1/-17	Environment: -

## EUT INFORMATION

### General Description

The EUT is a bluetooth module that is designed to be installed only inside HP final product designs. Since the Bluetooth module would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3 Volts.

### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	SDGOB-0891	Bluetooth module	01	

### Other EUT Details

None

### EUT Antenna (Intentional Radiators Only)

The EUT antenna is printed on the PCB. Gain is 2dBi.

### EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed into final product designs.

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manger: Dean Eriksen
Contact: Juan Martinez	
Emissions Standard(s): FCC Part 15	Class: B
Immunity Standard(s): EN 301 489-1/-17	Environment: -

## Test Configuration #2

### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	Pavilion	Laptop	CNF6511956	DoC

### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
NetGear	RP114	Router	-	-

### Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop USB	Multiwire	Shielded	2.0
Laptop AC Power	AC Mains	Three Wire	Unshielded	1.2
Laptop DC Power	Laptop PS	Two wire	Unshielded	2.0
Ethernet	Router	CAT-5	Unshielded	7.0

### EUT Operation During Emission Tests

During testing in Stand-by/Receive Mode: The EUT continued to remain in stand-by/receive mode during and after the test. There were no data errors reported by the monitoring software.

During testing in transceiver mode: The EUT continued hopping data during and after the test. There were no data errors reported by the monitoring software.

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

### Conducted Emissions - Power Ports

#### Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 10/10/2008 14:07	Config. Used: 2
Test Engineer: Suhaila Khushzad	Config Change: None
Test Location: SVOATS #2	EUT Voltage: 230V/50Hz & 120V/60Hz

#### General Test Configuration

The EUT host system was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN.

**Ambient Conditions:**

Temperature:	22 °C
Rel. Humidity:	40 %

#### Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 230V/50Hz	EN 55022 Class B	Pass	44.6dBµV @ 0.208MHz (-8.7dB)
2	CE, AC Power, 120V/60Hz	EN 55022 Class B	Pass	38.1dBµV @ 20.369MHz (-11.9dB)
3	CE, AC Power, 120V/60Hz	EN 55022 Class B	Pass	36.3dBµV @ 0.415MHz (-11.3dB)

#### Modifications Made During Testing

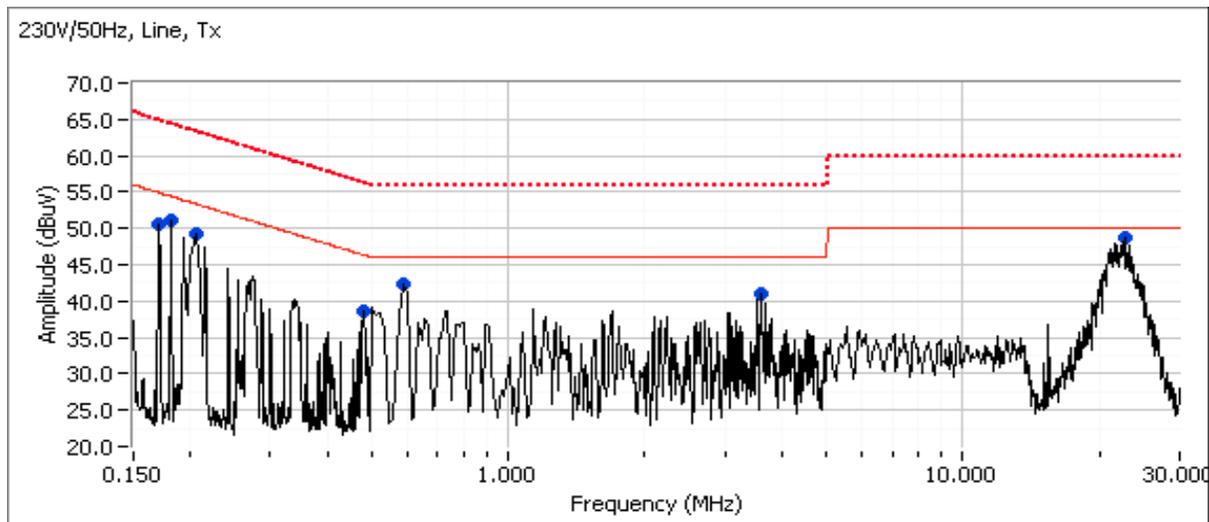
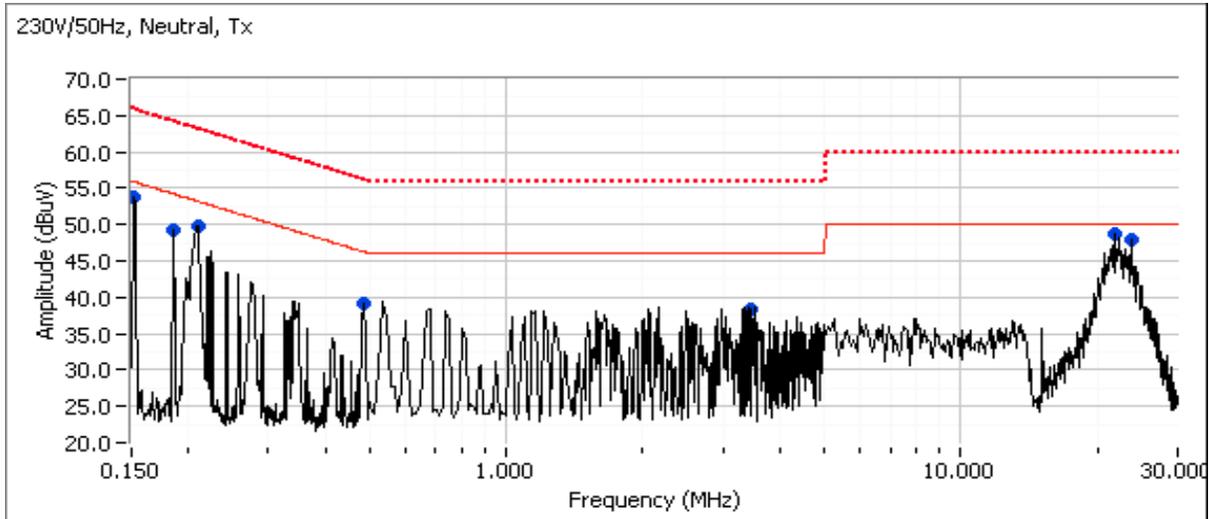
No modifications were made to the EUT during testing

#### Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz  
Tx mode (hopping)



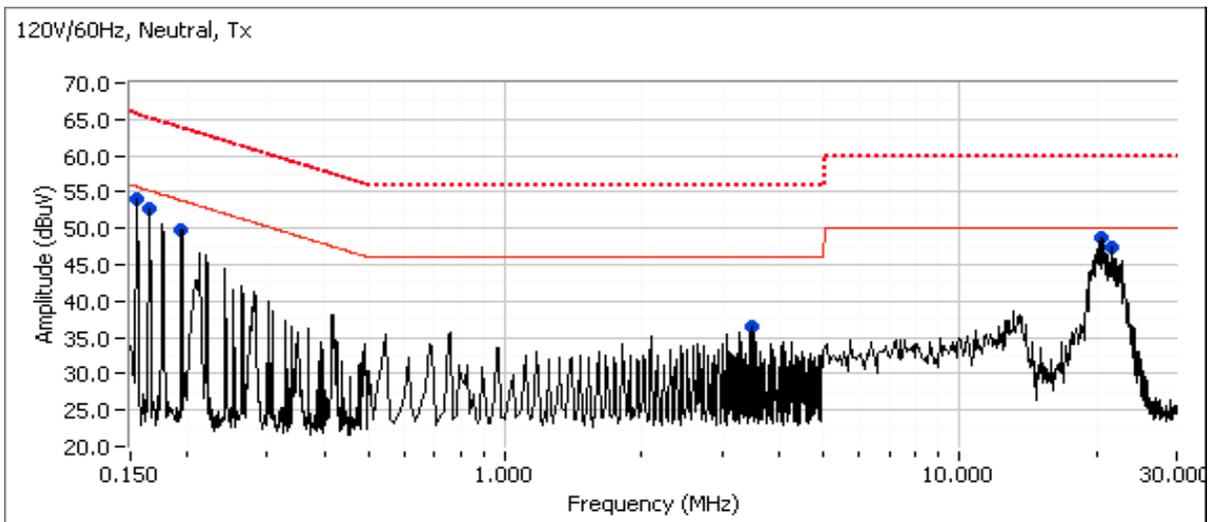
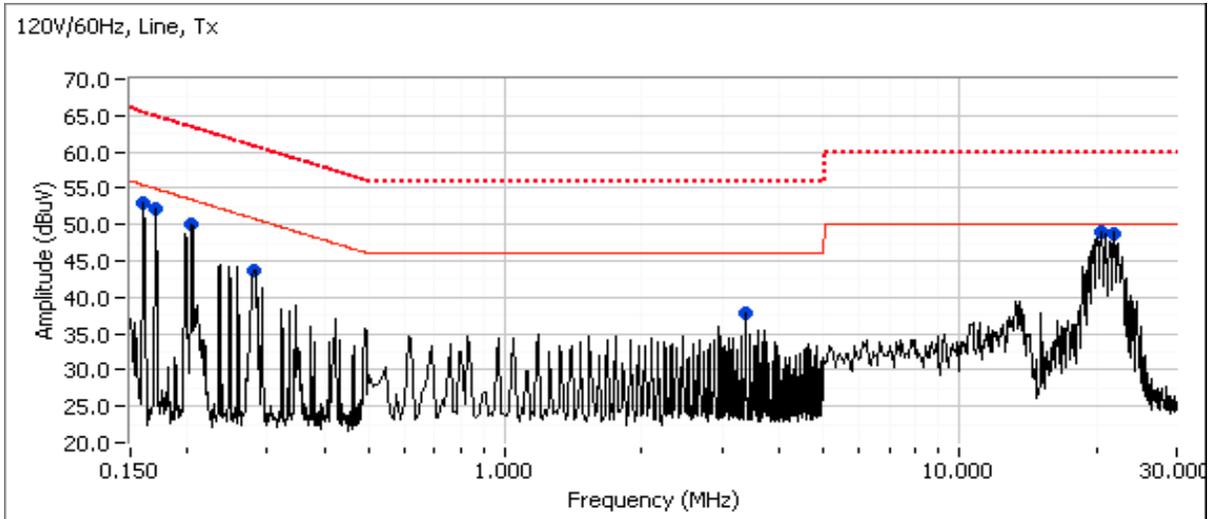
Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

**Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz**  
Tx mode (hopping)

Frequency MHz	Level dB $\mu$ V	AC Line	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
0.208	44.6	Neutral	53.3	-8.7	AVG	AVG (0.10s)
0.204	43.6	Line	53.5	-9.9	AVG	AVG (0.10s)
0.608	35.5	Line	46.0	-10.5	AVG	AVG (0.10s)
22.570	35.4	Line	50.0	-14.6	AVG	AVG (0.10s)
0.199	38.8	Neutral	53.7	-14.9	AVG	AVG (0.10s)
0.208	47.6	Neutral	63.3	-15.7	QP	QP (1.00s)
3.568	30.3	Line	46.0	-15.7	AVG	AVG (0.10s)
21.825	43.9	Neutral	60.0	-16.1	QP	QP (1.00s)
21.825	33.7	Neutral	50.0	-16.3	AVG	AVG (0.10s)
0.204	47.0	Line	63.5	-16.5	QP	QP (1.00s)
22.570	43.5	Line	60.0	-16.5	QP	QP (1.00s)
0.608	39.0	Line	56.0	-17.0	QP	QP (1.00s)
0.199	46.5	Neutral	63.7	-17.2	QP	QP (1.00s)
0.484	28.8	Neutral	46.3	-17.5	AVG	AVG (0.10s)
23.880	41.8	Neutral	60.0	-18.2	QP	QP (1.00s)
23.880	31.7	Neutral	50.0	-18.3	AVG	AVG (0.10s)
0.151	47.5	Neutral	66.0	-18.5	QP	QP (1.00s)
3.568	37.4	Line	56.0	-18.6	QP	QP (1.00s)
0.150	47.1	Line	66.0	-18.9	QP	QP (1.00s)
0.194	45.0	Line	63.9	-18.9	QP	QP (1.00s)
0.194	33.7	Line	53.9	-20.2	AVG	AVG (0.10s)
0.484	34.9	Neutral	56.3	-21.4	QP	QP (1.00s)
3.508	32.4	Neutral	56.0	-23.6	QP	QP (1.00s)
3.508	20.6	Neutral	46.0	-25.4	AVG	AVG (0.10s)
0.481	25.5	Line	56.3	-30.8	QP	QP (1.00s)
0.481	10.7	Line	46.3	-35.6	AVG	AVG (0.10s)
0.151	19.0	Neutral	56.0	-37.0	AVG	AVG (0.10s)
0.150	17.9	Line	56.0	-38.1	AVG	AVG (0.10s)

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz  
Tx mode (hopping)



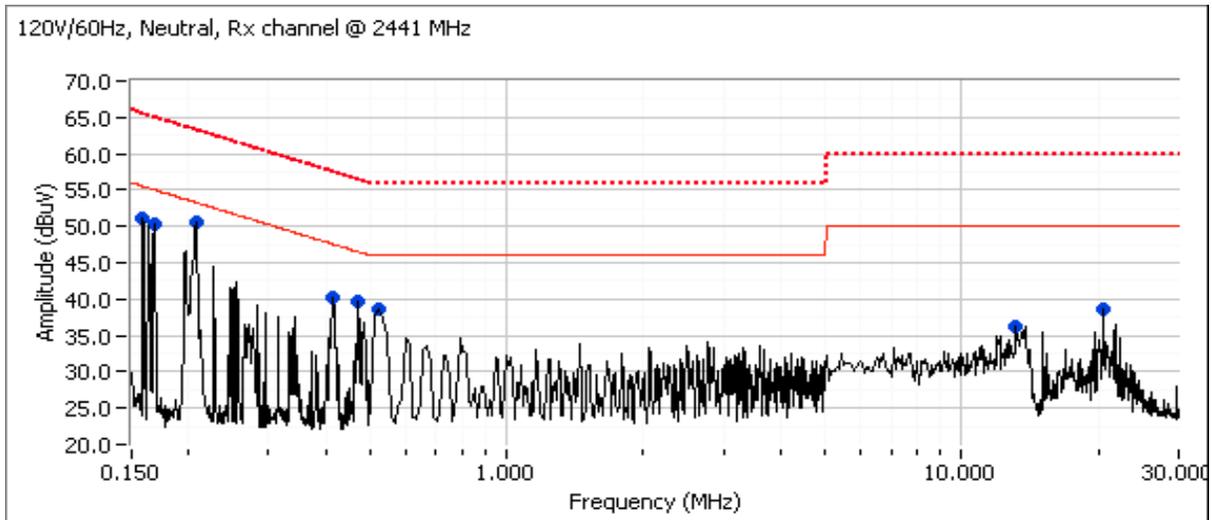
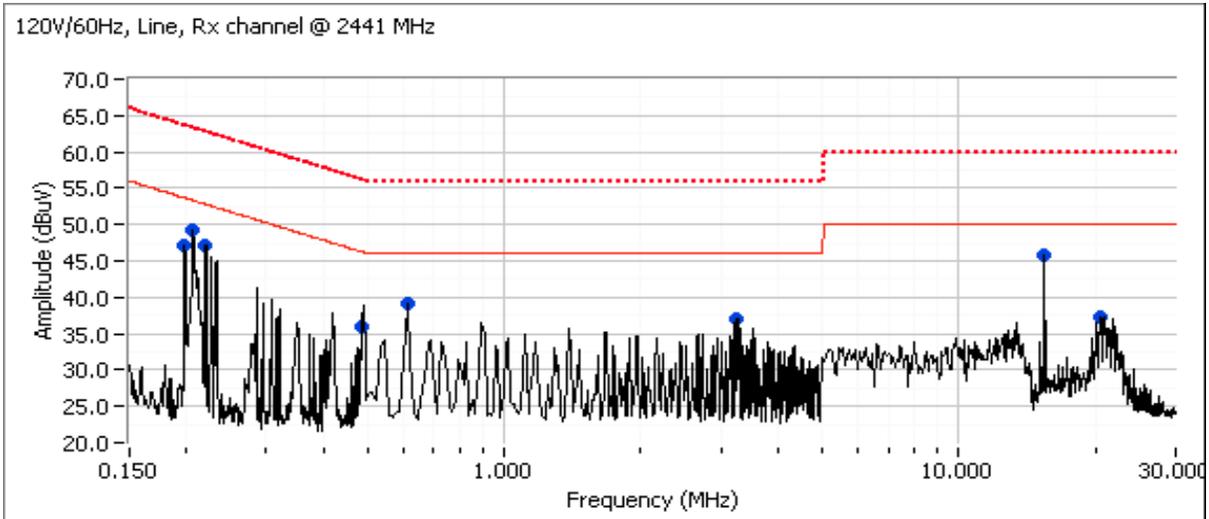
Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

**Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz**  
Tx mode (hopping)

Frequency MHz	Level dB $\mu$ V	AC Line	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
20.369	38.1	Line	50.0	-11.9	AVG	AVG (0.10s)
0.280	38.0	Line	50.8	-12.8	AVG	AVG (0.10s)
20.369	45.7	Line	60.0	-14.3	QP	QP (1.00s)
20.436	35.4	Neutral	50.0	-14.6	AVG	AVG (0.10s)
21.474	35.3	Neutral	50.0	-14.7	AVG	AVG (0.10s)
0.207	36.9	Neutral	53.3	-16.4	AVG	AVG (0.10s)
0.207	36.6	Line	53.3	-16.7	AVG	AVG (0.10s)
20.436	43.2	Neutral	60.0	-16.8	QP	QP (1.00s)
0.151	49.0	Line	65.9	-16.9	QP	QP (1.00s)
21.647	33.1	Line	50.0	-16.9	AVG	AVG (0.10s)
21.474	43.0	Neutral	60.0	-17.0	QP	QP (1.00s)
3.488	28.9	Neutral	46.0	-17.1	AVG	AVG (0.10s)
0.151	48.5	Neutral	66.0	-17.5	QP	QP (1.00s)
0.160	47.9	Line	65.5	-17.6	QP	QP (1.00s)
21.647	41.4	Line	60.0	-18.6	QP	QP (1.00s)
3.355	27.3	Line	46.0	-18.7	AVG	AVG (0.10s)
0.162	46.6	Neutral	65.3	-18.7	QP	QP (1.00s)
0.280	41.3	Line	60.8	-19.5	QP	QP (1.00s)
3.488	36.0	Neutral	56.0	-20.0	QP	QP (1.00s)
0.207	43.2	Neutral	63.3	-20.1	QP	QP (1.00s)
0.207	43.0	Line	63.3	-20.3	QP	QP (1.00s)
3.355	34.7	Line	56.0	-21.3	QP	QP (1.00s)
0.151	21.5	Line	55.9	-34.4	AVG	AVG (0.10s)
0.151	20.5	Neutral	56.0	-35.5	AVG	AVG (0.10s)
0.160	19.1	Line	55.5	-36.4	AVG	AVG (0.10s)
0.162	18.1	Neutral	55.3	-37.2	AVG	AVG (0.10s)

Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

Run # 3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz  
Rx mode



Client: Broadcom	Job Number: J73297
Model: SDGOB-0891	T-Log Number: T73332
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC Part 15	Class: B

**Run # 3: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz**

Rx mode

Frequency MHz	Level dB $\mu$ V	AC Line	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
0.415	36.3	Neutral	47.6	-11.3	AVG	AVG (0.10s)
0.553	33.3	Neutral	46.0	-12.7	AVG	AVG (0.10s)
0.480	32.7	Neutral	46.3	-13.6	AVG	AVG (0.10s)
15.440	36.3	Line	50.0	-13.7	AVG	AVG (0.10s)
0.207	39.5	Line	53.3	-13.8	AVG	AVG (0.10s)
0.207	38.8	Neutral	53.3	-14.5	AVG	AVG (0.10s)
0.622	30.4	Line	46.0	-15.6	AVG	AVG (0.10s)
0.486	30.1	Line	46.2	-16.1	AVG	AVG (0.10s)
0.201	35.3	Line	53.6	-18.3	AVG	AVG (0.10s)
0.207	44.4	Line	63.3	-18.9	QP	QP (1.00s)
0.150	47.1	Neutral	66.0	-18.9	QP	QP (1.00s)
0.207	44.4	Neutral	63.3	-18.9	QP	QP (1.00s)
0.415	38.1	Neutral	57.6	-19.5	QP	QP (1.00s)
0.553	35.8	Neutral	56.0	-20.2	QP	QP (1.00s)
0.165	44.8	Neutral	65.2	-20.4	QP	QP (1.00s)
0.201	43.0	Line	63.6	-20.6	QP	QP (1.00s)
0.486	34.6	Line	56.2	-21.6	QP	QP (1.00s)
0.622	34.3	Line	56.0	-21.7	QP	QP (1.00s)
0.480	34.3	Neutral	56.3	-22.0	QP	QP (1.00s)
0.218	39.4	Line	62.9	-23.5	QP	QP (1.00s)
15.440	36.3	Line	60.0	-23.7	QP	QP (1.00s)
13.346	22.5	Neutral	50.0	-27.5	AVG	AVG (0.10s)
3.210	27.5	Line	56.0	-28.5	QP	QP (1.00s)
13.346	30.6	Neutral	60.0	-29.4	QP	QP (1.00s)
20.566	29.9	Line	60.0	-30.1	QP	QP (1.00s)
20.529	29.9	Neutral	60.0	-30.1	QP	QP (1.00s)
20.529	19.2	Neutral	50.0	-30.8	AVG	AVG (0.10s)
20.566	17.7	Line	50.0	-32.3	AVG	AVG (0.10s)
3.210	10.4	Line	46.0	-35.6	AVG	AVG (0.10s)
0.150	18.8	Neutral	56.0	-37.2	AVG	AVG (0.10s)
0.165	16.2	Neutral	55.2	-39.0	AVG	AVG (0.10s)
0.218	13.2	Line	52.9	-39.7	AVG	AVG (0.10s)



## EMC Test Data

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Emissions Standard(s):	FCC 15.247, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

# EMC Test Data

For The

## Hewlett Packard (Broadcom)

Model

SDGOB-0891 (Installed in Printer)

Date of Last Test: 11/21/2008



## EMC Test Data

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
Contact:	Juan Martinez	Account Manger:	Dean Eriksen
Emissions Standard(s):	FCC 15.247, RSS-210	Class:	-
Immunity Standard(s):	-	Environment:	-

### EUT INFORMATION

#### General Description

The EUT is a bluetooth module that is designed to be installed only inside HP final product designs. Since the Bluetooth module would be placed on a table top during operation, the EUT was treated as table-top equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.3 Volts.

#### Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	SDGOB-0891	Bluetooth module	01	B94SDGOB0891

#### Other EUT Details

The module was mounted in a host printer in a manner representative of the final installation. Due to the need to control the radio for test purposes, a test fixture was used. The module and fixture were powered via a USB connection from a laptop computer.

#### EUT Antenna (Intentional Radiators Only)

The EUT antenna is printed on the PCB. Gain is 0.48dBi.

#### EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed into final product designs.

#### Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



## EMC Test Data

Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891 (Installed in Printer)	T-Log Number: T73826
Contact: Juan Martinez	Account Manger: Dean Eriksen
Emissions Standard(s): FCC 15.247, RSS-210	Class: -
Immunity Standard(s): -	Environment: -

### Test Configuration #2

#### Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Hewlett Packard	Pavilion	Laptop	CNF6511956	DoC
Hewlett Packard	HP Photosmart Premium	Printer (host)		DoC

#### Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None	-	-	-	-

#### Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
USB	Laptop USB	Multewire	Shielded	2.0
Laptop AC Power	AC Mains	Three Wire	Unshielded	1.2
Laptop DC Power	Laptop PS	Two wire	Unshielded	2.0

#### EUT Operation During Emissions Tests

For transmit power, bandwidth, and spurious emissions, the EUT was configured to continuously transmit on a selected channel. For hopping timing and number of channels, the EUT was configured to transmit using a pseudo-random hopping sequence.

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

## RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

### Test Specific Details

Objective: The objective of this test session is to perform engineering evaluation testing of the EUT with respect to the specification listed above.

Date of Test: 11/21/2008	Config. Used: 2
Test Engineer: Joseph Cadigal	Config Change: None
Test Location: SVOATS #2	EUT Voltage: 120V/60Hz (Powered From Host System)

### General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

**Ambient Conditions:**

Temperature:	20 °C
Rel. Humidity:	40 %

### Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Power Setting	Test Performed	Limit	Result / Margin
1a	8PSK	low	0dB	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247( c)	46.6dBµV/m @ 2388.5MHz (-7.4dB)
1c	8PSK	high	0dB	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247( c)	49.1dBµV/m @ 2483.5MHz (-4.9dB)

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

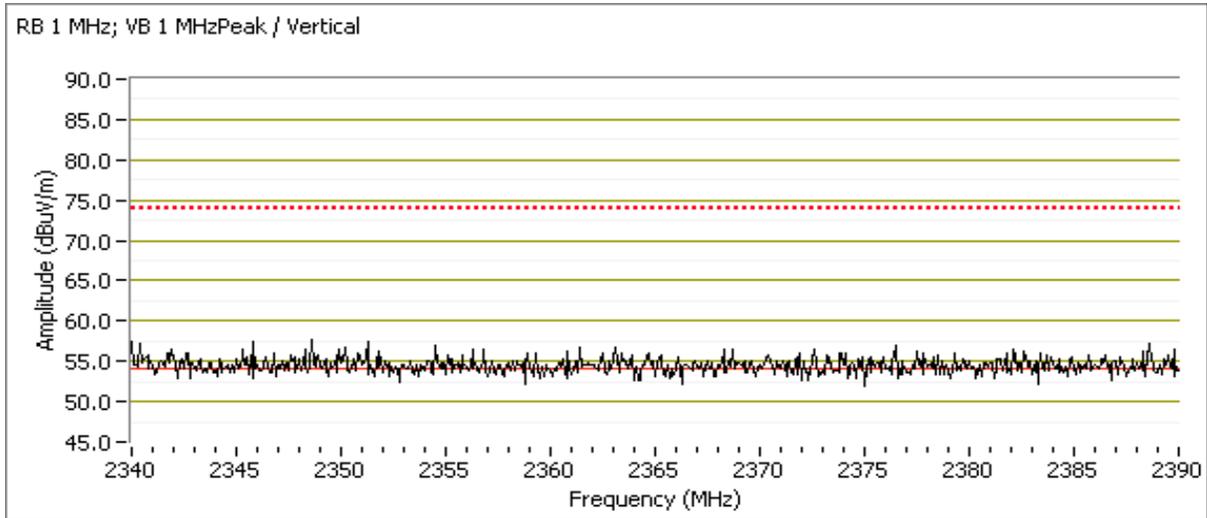
Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891 (Installed in Printer)	T-Log Number: T73826
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: 8PSK

Run #1a: Low Channel @ 2402 MHz

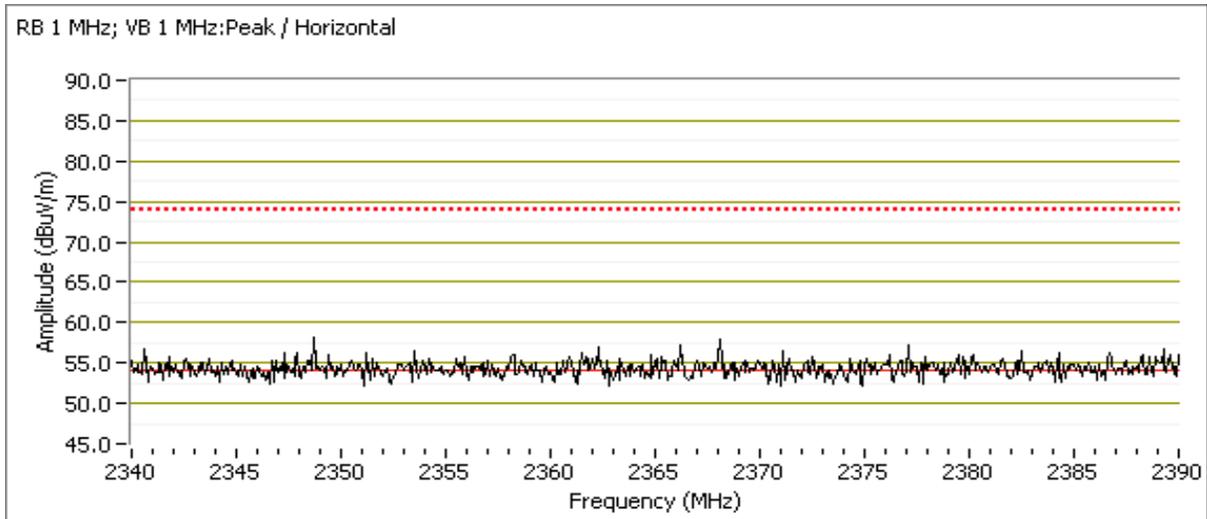
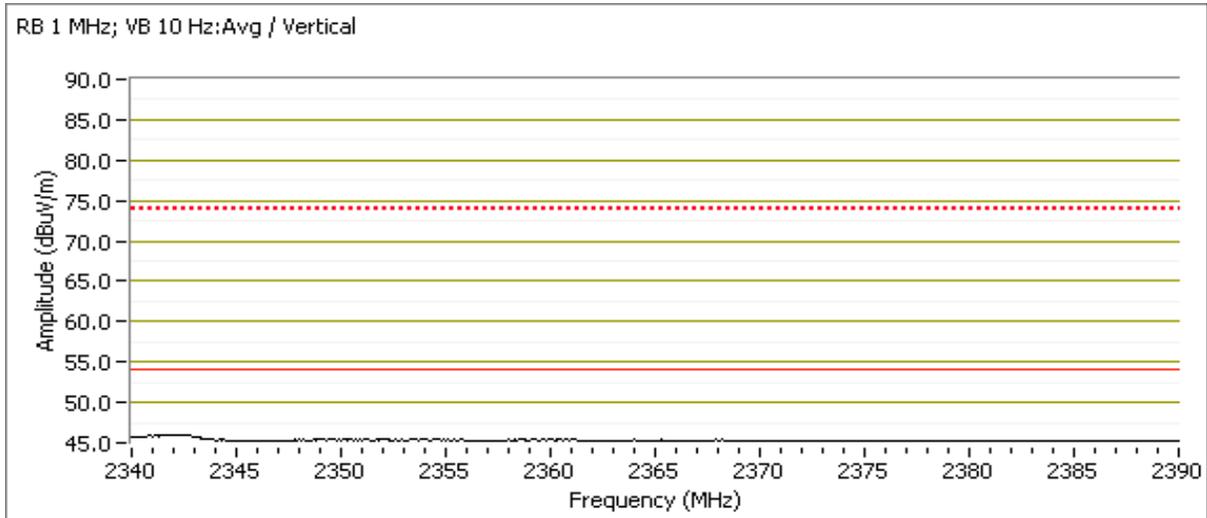
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2402.070	95.1	V	-	-	AVG	270	1.4	RB 1 MHz; VB: 10 Hz
2401.890	97.7	V	-	-	PK	270	1.4	RB 1 MHz; VB: 1 MHz
2401.880	94.2	V	-	-	PK	270	1.4	RB 100 kHz; VB: 100 kHz
2402.060	93.8	H	-	-	AVG	274	1.9	RB 1 MHz; VB: 10 Hz
2402.020	96.5	H	-	-	PK	274	1.9	RB 1 MHz; VB: 1 MHz
2401.870	93.0	H	-	-	PK	273	1.9	RB 100 kHz; VB: 100 kHz



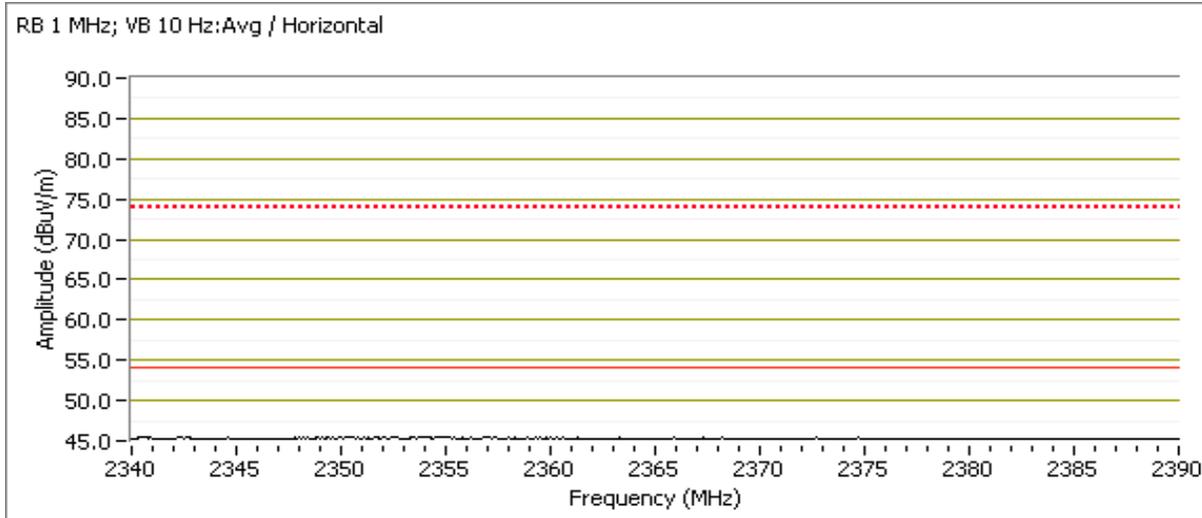
Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891 (Installed in Printer)	T-Log Number: T73826
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

Run #1a: Low Channel @ 2402 MHz



Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891 (Installed in Printer)	T-Log Number: T73826
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

**Run #1a: Low Channel @ 2402 MHz**



**Band Edge Signal Field Strength**

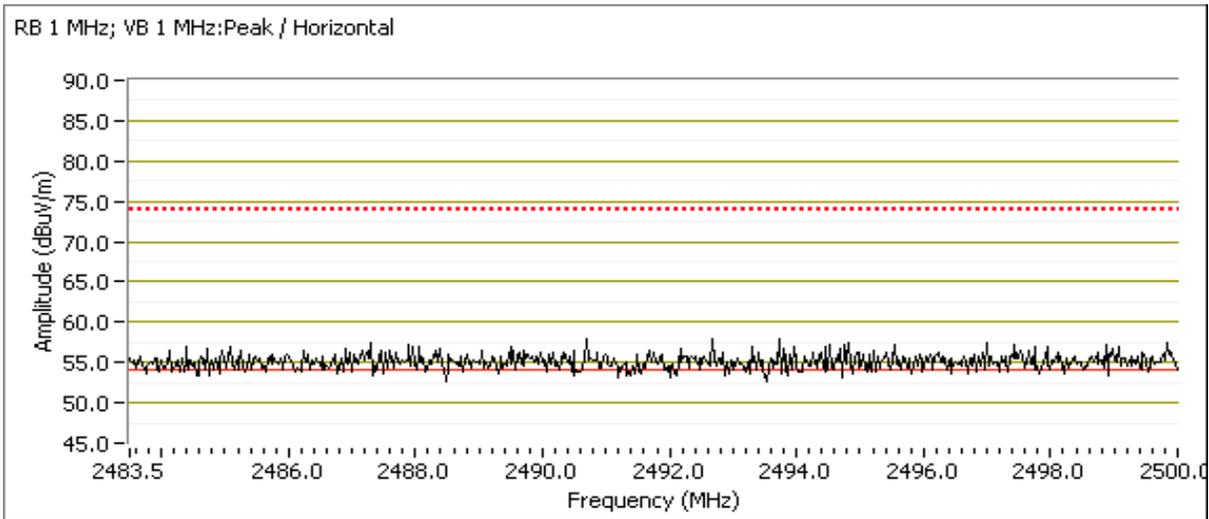
Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2388.500	46.6	V	54.0	-7.4	AVG	270	1.4	RB 1 MHz; VB: 10 Hz
2388.500	46.5	H	54.0	-7.5	AVG	274	1.9	RB 1 MHz; VB: 10 Hz
2388.680	57.8	V	74.0	-16.2	PK	270	1.4	RB 1 MHz; VB: 1 MHz
2389.760	57.6	H	74.0	-16.4	PK	274	1.9	RB 1 MHz; VB: 1 MHz

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1c: High Channel @ 2480 MHz**

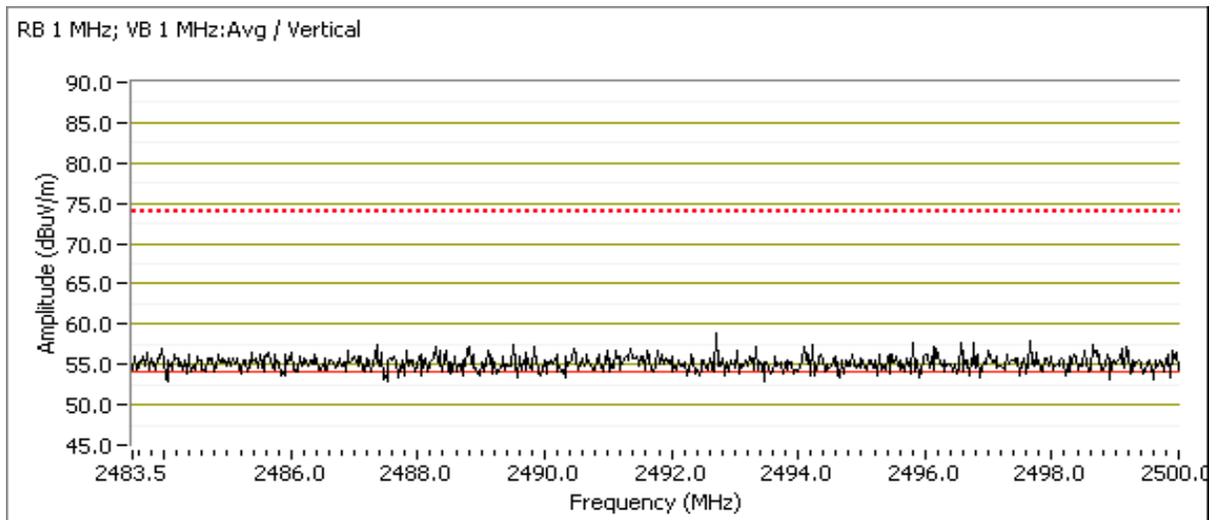
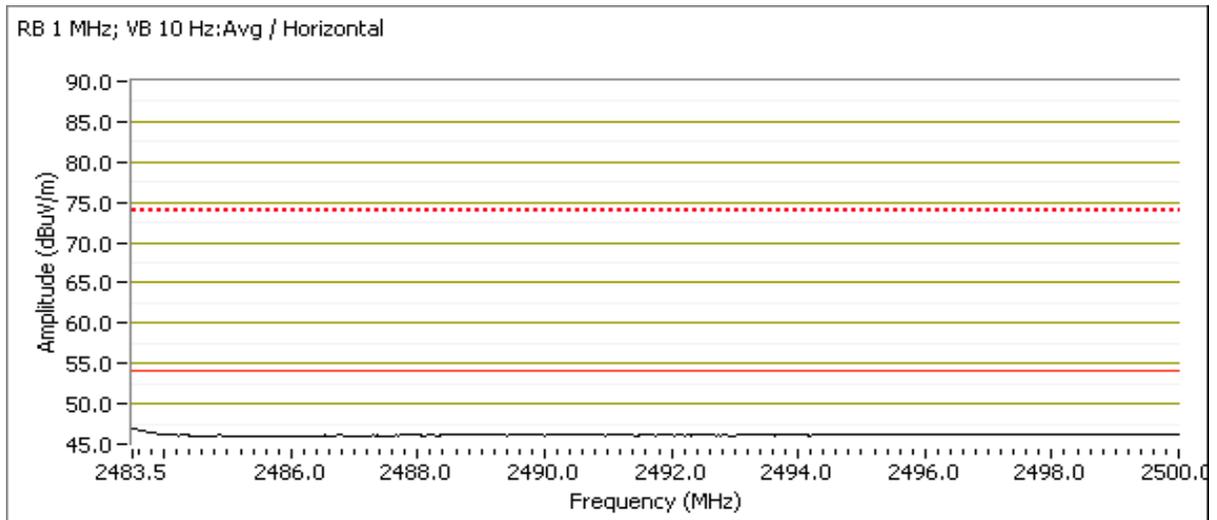
**Fundamental Signal Field Strength:** Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2480.030	90.9	H	-	-	AVG	286	1.4	RB 1 MHz; VB: 10 Hz
2479.950	93.7	H	-	-	PK	286	1.4	RB 1 MHz; VB: 1 MHz
2479.970	90.5	H	-	-	PK	286	1.4	RB 100 kHz; VB: 100 kHz
2480.050	92.6	V	-	-	AVG	271	1.3	RB 1 MHz; VB: 10 Hz
2479.970	95.5	V	-	-	PK	271	1.3	RB 1 MHz; VB: 1 MHz
2479.830	91.8	V	-	-	PK	274	1.3	RB 100 kHz; VB: 100 kHz



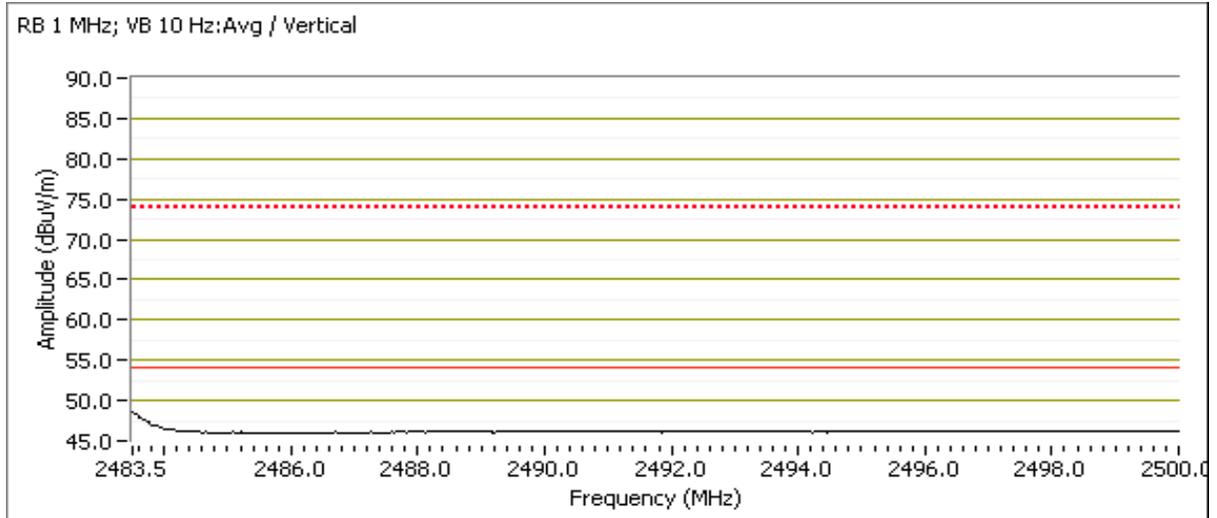
Client: Hewlett Packard (Broadcom)	Job Number: J73297
Model: SDGOB-0891 (Installed in Printer)	T-Log Number: T73826
	Account Manager: Dean Eriksen
Contact: Juan Martinez	
Standard: FCC 15.247, RSS-210	Class: N/A

**Run #1c: High Channel @ 2480 MHz**



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1c: High Channel @ 2480 MHz**



**Band Edge Signal Field Strength**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
2483.500	49.1	V	54.0	-4.9	AVG	273	1.3	RB 1 MHz; VB: 10 Hz
2483.500	47.9	H	54.0	-6.1	AVG	286	1.4	RB 1 MHz; VB: 10 Hz
2483.750	58.3	V	74.0	-15.7	PK	273	1.3	RB 1 MHz; VB: 1 MHz
2489.520	58.1	H	74.0	-15.9	PK	286	1.4	RB 1 MHz; VB: 1 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1: Radiated Emissions, Field Strength at the Fundamental. Operating Mode: Basic**

**Run #1a: Low Channel @ 2402 MHz**

**Fundamental Signal Field Strength:** Peak values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.100	94.5	V	-	-	AVG	298	1.5	RB 1 MHz; VB: 10 Hz
2401.930	94.9	V	-	-	PK	298	1.5	RB 1 MHz; VB: 1 MHz
2402.090	93.0	H	-	-	AVG	307	1.6	RB 1 MHz; VB: 10 Hz
2401.910	93.3	H	-	-	PK	307	1.6	RB 1 MHz; VB: 1 MHz

**Run #1b: Center Channel @ 2441 MHz**

**Fundamental Signal Field Strength:** Peak values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2441.100	88.3	H	-	-	AVG	35	1.0	RB 1 MHz; VB: 10 Hz
2440.920	88.8	H	-	-	PK	35	1.0	RB 1 MHz; VB: 1 MHz
2441.090	92.6	V	-	-	AVG	352	1.8	RB 1 MHz; VB: 10 Hz
2440.920	93.1	V	-	-	PK	352	1.8	RB 1 MHz; VB: 1 MHz

**Run #1c: High Channel @ 2480 MHz**

**Fundamental Signal Field Strength:** Peak values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB $\mu$ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2480.060	94.6	V	-	-	AVG	304	1.4	RB 1 MHz; VB: 10 Hz
2480.120	95.2	V	-	-	PK	304	1.4	RB 1 MHz; VB: 1 MHz
2480.060	96.2	H	-	-	AVG	273	1.9	RB 1 MHz; VB: 10 Hz
2480.160	96.8	H	-	-	PK	273	1.9	RB 1 MHz; VB: 1 MHz



Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
Contact:	Juan Martinez	Account Manager:	Dean Eriksen
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: Basic**

**Run #1a: Low Channel @ 2402 MHz**

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7206.020	51.9	H	54.0	-2.1	AVG	56	1.2	RB 1 MHz; VB: 10 Hz
7206.020	51.7	V	54.0	-2.3	AVG	33	1.6	RB 1 MHz; VB: 10 Hz
4804.060	49.4	H	54.0	-4.6	AVG	89	1.0	RB 1 MHz; VB: 10 Hz
4804.090	42.7	V	54.0	-11.3	AVG	196	1.0	RB 1 MHz; VB: 10 Hz
7206.250	56.9	H	74.0	-17.1	PK	56	1.2	RB 1 MHz; VB: 1 MHz
7205.840	56.6	V	74.0	-17.4	PK	33	1.6	RB 1 MHz; VB: 1 MHz
4803.900	53.0	H	74.0	-21.0	PK	89	1.0	RB 1 MHz; VB: 1 MHz
4803.730	48.3	V	74.0	-25.7	PK	196	1.0	RB 1 MHz; VB: 1 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

**Run #1b: Center Channel @ 2441 MHz**

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7323.040	51.4	H	54.0	-2.6	AVG	42	1.3	RB 1 MHz; VB: 10 Hz
7323.100	50.2	V	54.0	-3.8	AVG	145	1.1	RB 1 MHz; VB: 10 Hz
4882.020	45.0	H	54.0	-9.0	AVG	86	1.5	RB 1 MHz; VB: 10 Hz
4882.040	42.3	V	54.0	-11.7	AVG	89	1.0	RB 1 MHz; VB: 10 Hz
7322.810	56.4	H	74.0	-17.6	PK	42	1.3	RB 1 MHz; VB: 1 MHz
7323.220	55.6	V	74.0	-18.4	PK	145	1.1	RB 1 MHz; VB: 1 MHz
4882.240	49.9	H	74.0	-24.1	PK	86	1.5	RB 1 MHz; VB: 1 MHz
4882.230	47.9	V	74.0	-26.1	PK	89	1.0	RB 1 MHz; VB: 1 MHz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.

Note 2: Signal is not in a restricted band but the more stringent restricted band limit was used.

Client:	Hewlett Packard (Broadcom)	Job Number:	J73297
Model:	SDGOB-0891 (Installed in Printer)	T-Log Number:	T73826
		Account Manager:	Dean Eriksen
Contact:	Juan Martinez		
Standard:	FCC 15.247, RSS-210	Class:	N/A

**Run #1c: High Channel @ 2480 MHz**

**Other Spurious Emissions**

Frequency MHz	Level dB $\mu$ V/m	Pol v/h	15.209 / 15.247		Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
			Limit	Margin				
7440.050	51.6	V	54.0	-2.4	AVG	11	1.6	RB 1 MHz; VB: 10 Hz
7440.020	47.5	H	54.0	-6.5	AVG	67	1.2	RB 1 MHz; VB: 10 Hz
4960.000	40.3	V	54.0	-13.7	AVG	54	1.0	RB 1 MHz; VB: 10 Hz
4960.030	37.4	H	54.0	-16.6	AVG	76	1.2	RB 1 MHz; VB: 10 Hz
7439.540	57.0	V	74.0	-17.0	PK	11	1.6	RB 1 MHz; VB: 1 MHz
7439.970	53.3	H	74.0	-20.7	PK	67	1.2	RB 1 MHz; VB: 1 MHz
4959.770	47.6	V	74.0	-26.4	PK	54	1.0	RB 1 MHz; VB: 1 MHz
4959.430	45.1	H	74.0	-28.9	PK	76	1.2	RB 1 MHz; VB: 1 MHz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Signal is not in a restricted band but the more stringent restricted band limit was used.