



*EMC 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*

Model: BCM92070MD_REF12

IC CERTIFICATION #: 4324A-BRCM1049
FCC ID: QDS-BRCM1049

APPLICANT: Broadcom Corporation
190 Mathilda Ave.
Sunnyvale, CA 94086

TEST SITE(S): Elliott Laboratories
684 W. Maude Avenue
Sunnyvale, CA 94085

IC SITE REGISTRATION #: 2845A-1; 2845A-2;

REPORT DATE: August 18, 2009

FINAL TEST DATES: July 20, July 21, July 23, July 24, July 27,
August 9, August 10 and August 13, 2009

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Testing Cert #2016-01

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REVISION HISTORY

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SCOPE

An electromagnetic emissions test has been performed on the Broadcom Corporation model BCM92070MD_REF12, 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.

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 Broadcom Corporation model BCM92070MD_REF12 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 modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Broadcom Corporation model BCM92070MD_REF12 and therefore apply only to the tested sample. The sample was selected and prepared by Anne Liang of Broadcom Corporation.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS SUMMARY**FREQUENCY HOPPING SPREAD SPECTRUM (2400 – 2483.5 MHz, 75 channels or more)**

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247 (a) (1)	RSS 210 A8.1 (1)	20dB Bandwidth	8PSK: 1467 kHz GFSK: 1158	Channel spacing > 20dB bandwidth or Channel spacing 2/3 of 20dB bandwidth for devices with less than 125mW	Complies
		Channel Separation	1 MHz		Complies
15.247 (a) (1) (iii)	RSS 210 A8.1 (4)	Channel Dwell Time (<i>average time of occupancy</i>)	<0.4s dwell time, the system uses 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 of 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)	8PSK: 4.2dBm 2.63 mW EIRP = 6.46 mW ^{Note 1} GFSK: 2.3 dBm 1.60 mW EIRP = 4.2 mW ^{Note 1}	1Watt, EIRP limited to 4 Watts.	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 Internal	50.2dB μ V/m @ 2483.5MHz	15.207 in restricted bands, all others < -20dBc	Complies (-3.8dB)
15.247(c) / 15.209	RSS 210 A8.5 Table 2, 3	Radiated Spurious Emissions 30MHz – 25GHz External	50.2dB μ V/m @ 2483.5MHz	15.207 in restricted bands, all others < -20dBc	Complies (-3.8dB)
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 3.9 dBi for the highest EIRP multi-point system.

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	For the optional external antenna, EUT uses a U.FL connector		Complies
15.109	RSS GEN 7.2.3 Table 1	Receiver spurious emissions	38.1dB μ V/m @ 9762.8MHz	Refer to standard	Complies (-15.9 dB)
15.207	RSS GEN Table 2	AC Conducted Emissions	45.3dB μ V @ 0.465MHz	Refer to standard	Complies (-1.3 dB)
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in Exhibit 11, 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
-	RSP 100 RSS GEN 7.1.5	User Manual		Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 4.4.1	99% Bandwidth	8PSK: 1281kHz GFSK: 1007kHz	Information only	N/A

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	± 2.4
Radiated Emissions	0.015 to 30	± 3.0
Radiated Emissions	30 to 1000	± 3.6
Radiated Emissions	1000 to 40000	± 6.0

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Broadcom Corporation model BCM92070MD_REF12 is a Bluetooth module. The EUT receives power from its host. For testing purposes, the EUT was mounted to a test fixture that connected to a computer via USB.

The sample was received on July 20, 2009 and tested on July 20, July 21, July 23, July 24, July 27, August 9, August 10 and August 13, 2009. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Broadcom	BCM92070MD_REF12	Bluetooth Module	-	
Broadcom		Bluetooth Module	-	

OTHER EUT DETAILS

List any items from the test log.

ANTENNA SYSTEM

There are two antennas being evaluated: one internal trace antenna and one external antenna

Internal antenna gain = 1.75 dBi.

External antenna gain = 3.9 dBi

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at Elliott.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	Inspiron	Laptop #2	HEP-E2-C1	-
Broadcom	-	Test Fixture	-	-
Dell	-	Mouse	-	-

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

Company	Model	Description	Serial Number	FCC ID
Linksys	EG005W	Switch	GGB1408 JJ	DoC

Note – the Linksys Ethernet switch was used for AC conducted emissions testing only.

EUT INTERFACE PORTS

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

Port	Connected To	Description	Cable(s) Shielded or Unshielded	Length(m)
Ethernet	Switch	CAT 5	Unshielded	10.0
Test Fixture	Laptop #2 USB	USB	Shielded	1.0
EUT #1	Test Fixture	Multiwire	Unshielded	0.2
AC Power Laptop	AC Mains	3Wire	Unshielded	1.0
Laptop USB	Mouse	USB	Shielded	1.5

EUT OPERATION

Unless otherwise stated, the EUT was configured to continuously hop on a single channel at maximum output power.

TEST SITE**GENERAL INFORMATION**

Final test measurements were taken 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	2845A-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.

MEASUREMENT INSTRUMENTATION**RECEIVER SYSTEM**

An EMI receiver as specified in CISPR 16-1-1 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.

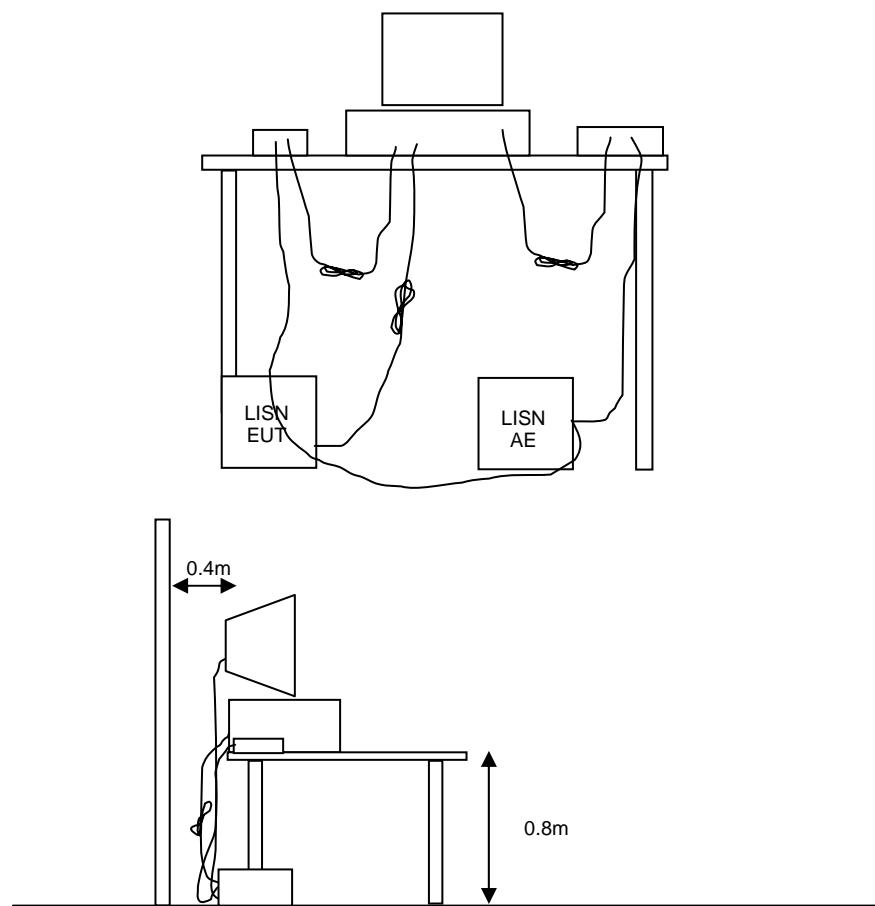
TEST PROCEDURES

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.



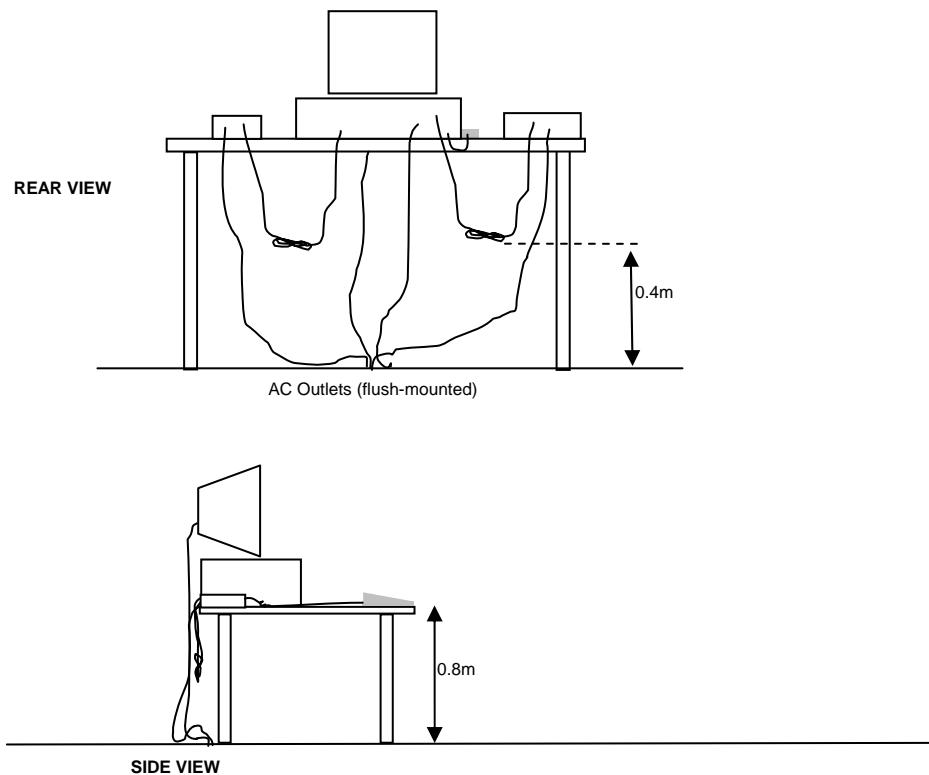
RADIATED EMISSIONS

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.

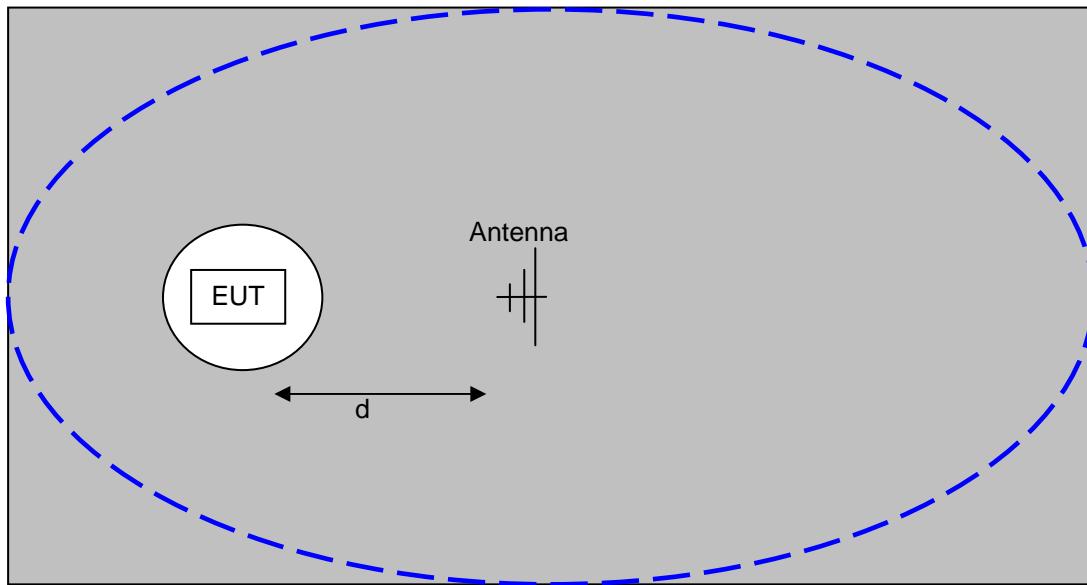
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

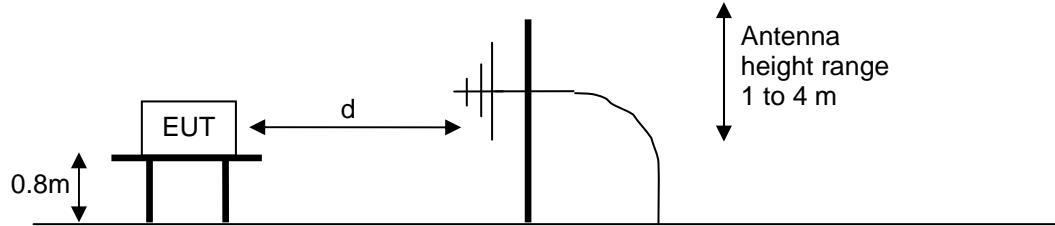
When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.



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.

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:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands¹ (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 _{KHz} @ 300m	67.6-20*log ₁₀ (F _{KHz}) @ 300m
0.490-1.705	24000/F _{KHz} @ 30m	87.6-20*log ₁₀ (F _{KHz}) @ 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

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

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

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).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_f - S = M$$

where:

R_f = 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:

$$F_d = 20 \cdot \text{LOG10} (D_m/D_s)$$

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:

$$F_d = 40 \cdot \text{LOG10} (D_m/D_s)$$

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.

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

$$R_C = R_F + F_d$$

and

$$M = R_C - L_S$$

where:

R_F = 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:

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

3

where P is the eirp (Watts)

Appendix A Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 25,000 MHz, 21-Jul-09**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	12-Mar-10
Hewlett Packard	High Pass filter, 3.5 GHz (Red System)	P/N 84300-80038 (84125C)	1403	28-Aug-09

Conducted Emissions - AC Power Ports, 22-Jul-09**Engineer: Vishal Narayan**

<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
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	812	23-Feb-10
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	14-Apr-10

Radiated Emissions, 30 - 25,000 MHz, 24-Jul-09**Engineer: Joseph Cadigal**

<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
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz-26.5 GHz	8593EM	1141	29-Dec-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10
Hewlett Packard	High Pass filter, 3.5 GHz (Red System)	P/N 84300-80038 (84125C)	1403	28-Aug-09

Radiated Emissions, 30 - 18,000 MHz, 24-Jul-09**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
Hewlett Packard	EMC Spectrum Analyzer, 9 KHz-26.5 GHz	8593EM	1141	29-Dec-09
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	15-Jul-10

Radiated Emissions, 30 - 25,000 MHz, 09-Aug-09**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	12-Mar-10
Hewlett Packard	High Pass filter, 3.5 GHz (Red System)	P/N 84300-80038 (84125C)	1403	29-Jul-10
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts	NRV-Z32	1423	07-Nov-09
Rohde & Schwarz	Power Meter, Single Channel, +1795+1796	NRVS	1534	06-Apr-10

Radio Spurious Emissions, 10-Aug-09**Engineer: Suhaila Khushzad**

<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	12-Mar-10
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	29-Jul-10

Radiated Emissions, 30 - 1,000 MHz, 19-Aug-09**Engineer: Vishal Narayan**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1538	19-Sep-09
Com-Power Corp.	Preamplifier, 30-1000 MHz	PA-103	1632	13-Apr-10
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	23-May-10

Appendix B Test Data

T76154 46 Pages



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez	Project Engineer:	Mark Hill
Emissions Standard(s):	FCC, RSS 210	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Broadcom

Model

BCM92070MD_REF12

Date of Last Test: 8/19/2009



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

FCC 15.247 FHSS - Power, Bandwidth and Spurious Emissions (GFSK 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.

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: 14 °C
	Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1(a-c)	30 - 25000 MHz Radiated Spurious Emissions, Internal Antenna	FCC Part 15.209 / 15.247(c)	Pass	48.8dB μ V/m @ 2483.5MHz (-5.2dB)
2(a-c)	30 - 25000 MHz Radiated Spurious Emissions, External Antenna	FCC Part 15.209 / 15.247(c)	Pass	47.2dB μ V/m @ 2483.5MHz (-6.8dB)
3	30 - 25000 MHz Radiated Spurious Emissions, Conducted	FCC Part 15.209 / 15.247(c)	Pass	> 20dB below the limit
4	Output Power	15.247(b)	-	2.3 dBm (1.7 mW)
5	20dB Bandwidth	15.247(a)	-	1158 kHz
5	99% bandwidth	RSS-GEN	-	1007 kHz
5	Channel Occupancy	15.247(a)	-	2.9ms
5	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:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #1: Transmit Spurious Emissions 30 - 25000 MHz, Internal Antenna

Note: No radio related emissions detected below 1 GHz.

EUT Upright

Date of Test: 8/9/2009

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

Run #1a: Radiated Spurious Emissions, 30 - 25000 MHz. Low Channel @ 2402 MHz
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

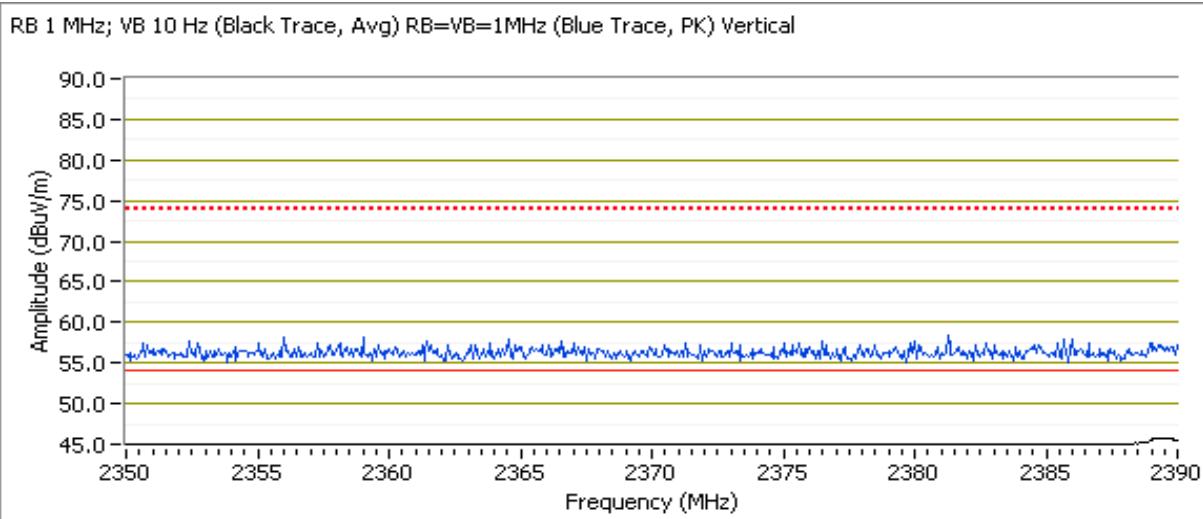
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.030	98.0	V	-	-	AVG	203	1.0	RB 1 MHz; VB: 10 Hz
2402.080	98.3	V	-	-	PK	203	1.0	RB 1 MHz; VB: 1 MHz
2402.040	97.8	V	-	-	PK	203	1.0	RB 100 kHz; VB: 100 kHz
2402.010	95.7	H	-	-	AVG	149	1.1	RB 1 MHz; VB: 10 Hz
2401.880	96.1	H	-	-	PK	149	1.1	RB 1 MHz; VB: 1 MHz

Fundamental emission level @ 3m in 100kHz RBW:	97.8 dB μ V/m
Limit for emissions outside of restricted bands:	77.8 dB μ V/m

Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2388.990	45.9	V	54.0	-8.1	Avg	203	1.0	
2389.020	45.6	H	54.0	-8.4	Avg	149	1.1	
2388.870	58.0	V	74.0	-16.0	PK	203	1.0	
2388.900	58.0	H	74.0	-16.0	PK	149	1.1	





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.020	36.3	V	54.0	-17.7	AVG	261	1.1	MHz; VB: 10 Hz
4803.830	29.8	H	54.0	-24.2	AVG	335	1.0	MHz; VB: 10 Hz
9609.030	49.7	H	74.0	-24.3	PK	162	1.0	MHz; VB: 1 MHz
9609.800	49.6	V	74.0	-24.4	PK	24	1.0	MHz; VB: 1 MHz
7205.910	47.1	V	74.0	-26.9	PK	345	1.9	MHz; VB: 1 MHz
7205.730	46.7	H	74.0	-27.3	PK	218	1.0	MHz; VB: 1 MHz
4804.220	43.9	V	74.0	-30.1	PK	261	1.1	MHz; VB: 1 MHz
4803.710	40.5	H	74.0	-33.5	PK	335	1.0	MHz; VB: 1 MHz
9608.810	37.8	V	74.0	-36.2	AVG	24	1.0	MHz; VB: 10 Hz
9608.920	37.8	H	74.0	-36.2	AVG	162	1.0	MHz; VB: 10 Hz
7206.320	35.4	V	74.0	-38.6	AVG	345	1.9	MHz; VB: 10 Hz
7206.500	35.4	H	74.0	-38.6	AVG	218	1.0	MHz; VB: 10 Hz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	The signal was outside the restricted bands, but more restricted limit (15.209) was used.
Note 3:	The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #1b: Radiated Spurious Emissions, 30 - 25000 MHz. Center Channel @ 2441 MHz

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

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2441.000	95.0	H	-	-	AVG	149	1.1	RB 1 MHz; VB: 10 Hz
2440.840	95.6	H	-	-	PK	149	1.1	RB 1 MHz; VB: 1 MHz
2441.020	94.7	H	-	-	PK	149	1.1	RB 100 kHz; VB: 100 kHz
2441.030	98.3	V	-	-	AVG	214	1.1	RB 1 MHz; VB: 10 Hz
2440.870	98.9	V	-	-	PK	214	1.1	RB 1 MHz; VB: 1 MHz
2441.010	98.1	V	-	-	PK	214	1.1	RB 100 kHz; VB: 100 kHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	94.7	98.1
Limit for emissions outside of restricted bands:	78.1 dB μ V/m	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4881.960	38.0	V	54.0	-16.0	AVG	308	1.0	RB 1 MHz; VB: 10 Hz
7322.590	36.3	H	54.0	-17.7	AVG	193	1.0	RB 1 MHz; VB: 10 Hz
7323.200	36.2	V	54.0	-17.8	AVG	360	1.0	RB 1 MHz; VB: 10 Hz
4881.810	31.1	H	54.0	-22.9	AVG	168	1.0	RB 1 MHz; VB: 10 Hz
9761.860	49.5	H	74.0	-24.5	PK	257	1.0	RB 1 MHz; VB: 1 MHz
9761.790	49.4	V	74.0	-24.6	PK	305	1.0	RB 1 MHz; VB: 1 MHz
7324.270	47.4	H	74.0	-26.6	PK	193	1.0	RB 1 MHz; VB: 1 MHz
7324.810	46.9	V	74.0	-27.1	PK	360	1.0	RB 1 MHz; VB: 1 MHz
4882.270	45.3	V	74.0	-28.7	PK	308	1.0	RB 1 MHz; VB: 1 MHz
4881.940	42.0	H	74.0	-32.0	PK	168	1.0	RB 1 MHz; VB: 1 MHz
9760.500	38.2	H	74.0	-35.8	AVG	257	1.0	RB 1 MHz; VB: 10 Hz
9760.500	37.9	V	74.0	-36.1	AVG	305	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: The signals that were more than 20dB below the limit were not recorded.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #1c: Radiated Spurious Emissions, 30 - 25000 MHz. High Channel @ 2480 MHz
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

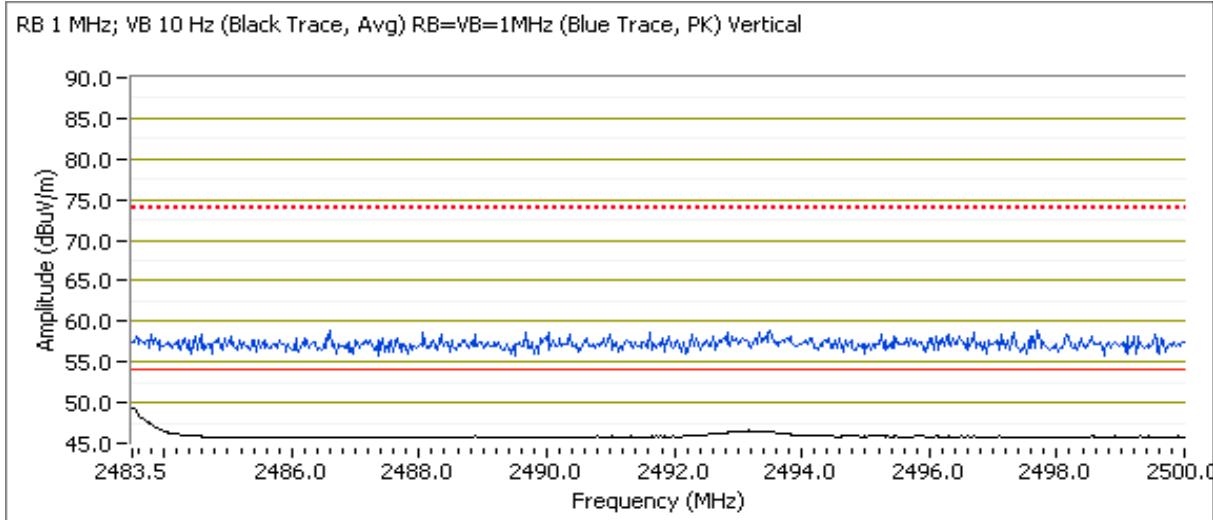
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2480.010	99.4	V	-	-	AVG	212	1.0
2479.970	99.9	V	-	-	PK	212	1.0
2480.000	99.2	V	-	-	PK	212	1.0
2480.020	95.4	H	-	-	AVG	150	1.0
2479.840	95.8	H	-	-	PK	150	1.0

 Fundamental emission level @ 3m in 100kHz RBW: 99.2 dB μ V/m

 Limit for emissions outside of restricted bands: 79.2 dB μ V/m Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	48.8	V	54.0	-5.2	Avg	212	1.0
2483.500	47.3	H	54.0	-6.7	Avg	150	1.0
2483.810	58.5	V	74.0	-15.5	PK	212	1.0
2483.750	58.3	H	74.0	-15.7	PK	150	1.0





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
4961.250	37.9	V	54.0	-16.1	AVG	278	1.0
7438.500	36.6	H	54.0	-17.4	AVG	347	1.4
7438.500	36.6	V	54.0	-17.4	AVG	334	1.0
4960.520	32.1	H	54.0	-21.9	AVG	185	1.6
9919.290	49.7	V	74.0	-24.3	PK	103	1.0
9919.010	49.1	H	74.0	-24.9	PK	344	1.7
7440.200	48.4	V	74.0	-25.6	PK	334	1.0
7439.420	47.9	H	74.0	-26.1	PK	347	1.4
4961.500	45.4	V	74.0	-28.6	PK	278	1.0
4960.020	42.9	H	74.0	-31.1	PK	185	1.6
9918.510	38.2	V	74.0	-35.8	AVG	103	1.0
9918.510	38.1	H	74.0	-35.9	AVG	344	1.7

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #2: Transmit Spurious Emissions 30 - 25000 MHz, External Antenna

Date of Test: 8/10/2009
Test Engineer: Suhaila Khushzad
Test Location: SVOATS #2

Config. Used: 1
Config Change: None
Host EUT Voltage: 120V/60Hz

Run #2a: Radiated Spurious Emissions, 30 - 25000 MHz. Low Channel @ 2402 MHz

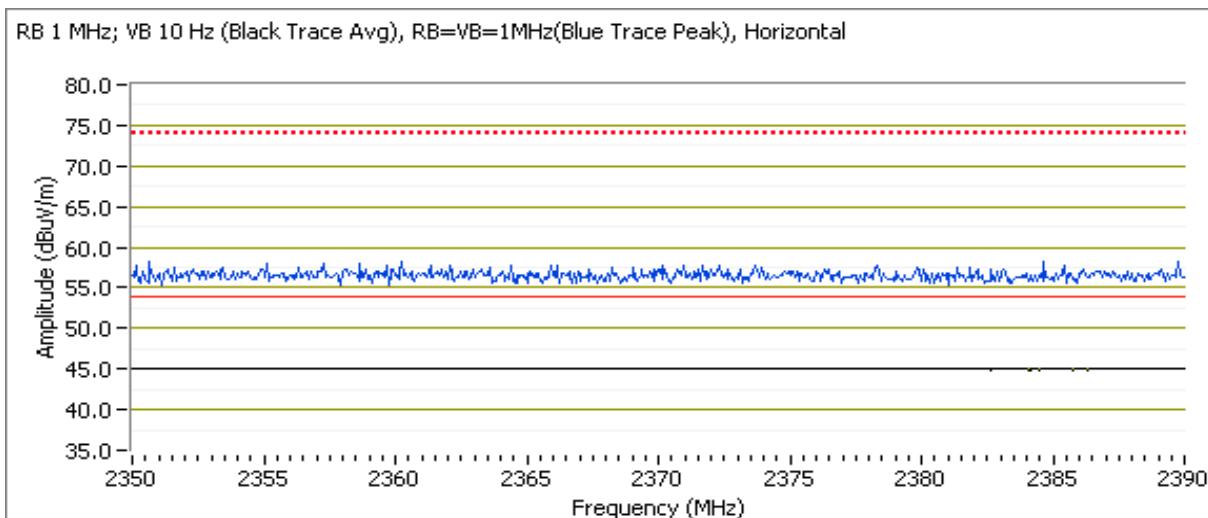
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments	
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.170	90.9	H	-	-	AVG	55	1.0	RB 1 MHz; VB: 10 Hz
2402.100	91.4	H	-	-	PK	55	1.0	RB 1 MHz; VB: 1 MHz
2402.080	87.9	V	-	-	AVG	205	1.0	RB 1 MHz; VB: 10 Hz
2401.950	88.6	V	-	-	PK	205	1.0	RB 1 MHz; VB: 1 MHz
2402.120	87.7	V	-	-	PK	205	1.0	RB 100 kHz; VB: 100 kHz
2402.270	90.5	H	-	-	PK	55	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW:	90.5 dB μ V/m	
Limit for emissions outside of restricted bands:	70.5 dB μ V/m	Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2353.800	46.4	H	54.0	-7.6	AVG	55	1.0	RB 1 MHz; VB: 10 Hz
2350.470	46.3	V	54.0	-7.7	AVG	205	1.0	RB 1 MHz; VB: 10 Hz
2383.600	57.8	H	74.0	-16.2	PK	55	1.0	RB 1 MHz; VB: 1 MHz
2353.530	57.3	V	74.0	-16.7	PK	205	1.0	RB 1 MHz; VB: 1 MHz





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.030	43.2	H	54.0	-10.8	AVG	312	1.0	RB 1 MHz; VB: 10 Hz
4804.100	40.7	V	54.0	-13.3	AVG	285	1.0	RB 1 MHz; VB: 10 Hz
4795.070	53.6	H	74.0	-20.4	PK	312	1.0	RB 1 MHz; VB: 1 MHz
9603.670	48.5	V	74.0	-25.5	PK	194	1.0	RB 1 MHz; VB: 1 MHz
4803.700	48.2	V	74.0	-25.8	PK	285	1.0	RB 1 MHz; VB: 1 MHz
7211.270	45.9	V	74.0	-28.1	PK	325	1.0	RB 1 MHz; VB: 1 MHz
7211.870	45.6	H	74.0	-28.4	PK	145	1.0	RB 1 MHz; VB: 1 MHz
9607.970	38.1	V	74.0	-35.9	AVG	194	1.0	RB 1 MHz; VB: 10 Hz
7196.000	34.7	V	74.0	-39.3	AVG	325	1.0	RB 1 MHz; VB: 10 Hz
7196.000	34.6	H	74.0	-39.4	AVG	145	1.0	RB 1 MHz; VB: 10 Hz

Note 1:	For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.
Note 2:	The signal was outside the restricted bands, but more restricted limit (15.209) was used.
Note 3:	The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #2b: Radiated Spurious Emissions, 30 - 25000 MHz. Center Channel @ 2441 MHz

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

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2441.080	93.5	H	-	-	AVG	124	1.0	RB 1 MHz; VB: 10 Hz
2440.880	94.1	H	-	-	PK	124	1.0	RB 1 MHz; VB: 1 MHz
2441.080	93.9	V	-	-	AVG	150	1.1	RB 1 MHz; VB: 10 Hz
2440.950	94.6	V	-	-	PK	150	1.1	RB 1 MHz; VB: 1 MHz
2441.070	93.5	V	-	-	PK	150	1.1	RB 100 kHz; VB: 100 kHz
2441.050	93.6	H	-	-	PK	124	1.0	RB 100 kHz; VB: 100 kHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	93.6	93.5
Limit for emissions outside of restricted bands:	73.6 dB μ V/m	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4882.050	40.6	V	54.0	-13.4	AVG	318	1.0	MHz; VB: 10 Hz
4882.070	40.0	H	54.0	-14.0	AVG	246	1.0	MHz; VB: 10 Hz
7321.830	35.2	V	54.0	-18.8	AVG	240	1.0	MHz; VB: 10 Hz
7322.420	35.2	H	54.0	-18.8	AVG	171	1.0	MHz; VB: 10 Hz
9764.620	48.5	H	74.0	-25.5	PK	80	1.0	MHz; VB: 1 MHz
4882.200	46.6	V	74.0	-27.4	PK	318	1.0	MHz; VB: 1 MHz
7325.430	46.5	V	74.0	-27.5	PK	240	1.0	MHz; VB: 1 MHz
4882.250	46.4	H	74.0	-27.6	PK	246	1.0	MHz; VB: 1 MHz
7320.300	45.9	H	74.0	-28.1	PK	171	1.0	MHz; VB: 1 MHz
9759.080	36.9	H	74.0	-37.1	AVG	80	1.0	MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the

Note 2: The signals that were more than 20dB below the limit were not recorded.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #2c: Radiated Spurious Emissions, 30 - 25000 MHz. 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 μ V/m	Pol V/H	15.209 / 15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2480.070	92.1	H	-	-	AVG	126	1.9	MHz; VB: 10 Hz
2480.100	92.8	H	-	-	PK	126	1.9	MHz; VB: 1 MHz
2480.100	92.0	V	-	-	AVG	147	1.1	RB 1 MHz; VB: 10 Hz
2479.880	92.6	V	-	-	PK	147	1.1	RB 1 MHz; VB: 1 MHz
2480.100	91.5	V	-	-	PK	147	1.1	RB 100 kHz; VB: 100 kHz
2480.070	91.9	H	-	-	PK	124	1.9	RB 100 kHz; VB: 100 kHz

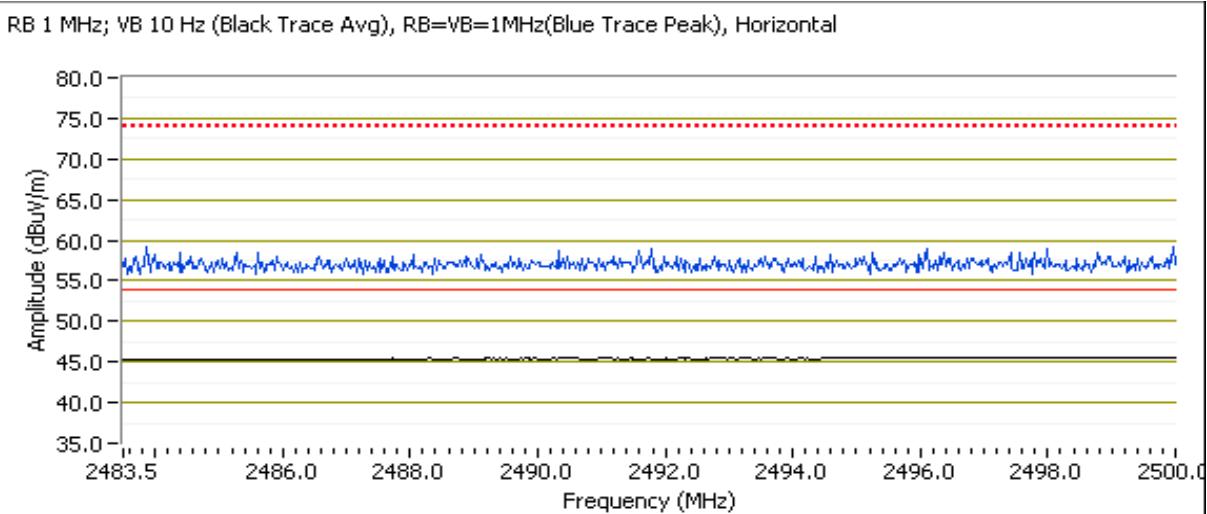
 Fundamental emission level @ 3m in 100kHz RBW: 91.9 dB μ V/m

 Limit for emissions outside of restricted bands: 71.9 dB μ V/m

Limit is -20dBc

Band Edge Signal Field Strength

Frequency MHz	Level dB μ V/m	Pol V/H	15.209 / 15.247 Limit	Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
2483.500	47.2	H	54.0	-6.8	AVG	126	1.9	MHz; VB: 10 Hz
2483.500	47.0	V	54.0	-7.0	AVG	147	1.1	MHz; VB: 10 Hz
2484.190	58.4	V	74.0	-15.6	PK	147	1.1	MHz; VB: 1 MHz
2487.620	58.4	H	74.0	-15.6	PK	126	1.9	MHz; VB: 1 MHz





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4961.470	37.8	H	54.0	-16.2	AVG	245	1.0	RB 1 MHz; VB: 10 Hz
4961.300	36.8	V	54.0	-17.2	AVG	271	1.0	RB 1 MHz; VB: 10 Hz
7430.000	36.0	V	54.0	-18.0	AVG	42	1.0	RB 1 MHz; VB: 10 Hz
7430.170	36.0	H	54.0	-18.0	AVG	269	1.0	RB 1 MHz; VB: 10 Hz
9911.330	48.4	V	74.0	-25.6	PK	126	1.0	RB 1 MHz; VB: 1 MHz
7439.970	47.9	H	74.0	-26.1	PK	269	1.0	RB 1 MHz; VB: 1 MHz
7440.100	47.5	V	74.0	-26.5	PK	42	1.0	RB 1 MHz; VB: 1 MHz
4961.270	45.1	V	74.0	-28.9	PK	271	1.0	RB 1 MHz; VB: 1 MHz
4961.130	44.7	H	74.0	-29.3	PK	245	1.0	RB 1 MHz; VB: 1 MHz
9910.000	37.2	V	74.0	-36.8	AVG	126	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: The signals that were more than 20dB below the limit were not recorded.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #3: Antenna Conducted Spurious Emissions, 30 - 25000 MHz.

Date of Test: 8/13/2009

Config. Used: 1

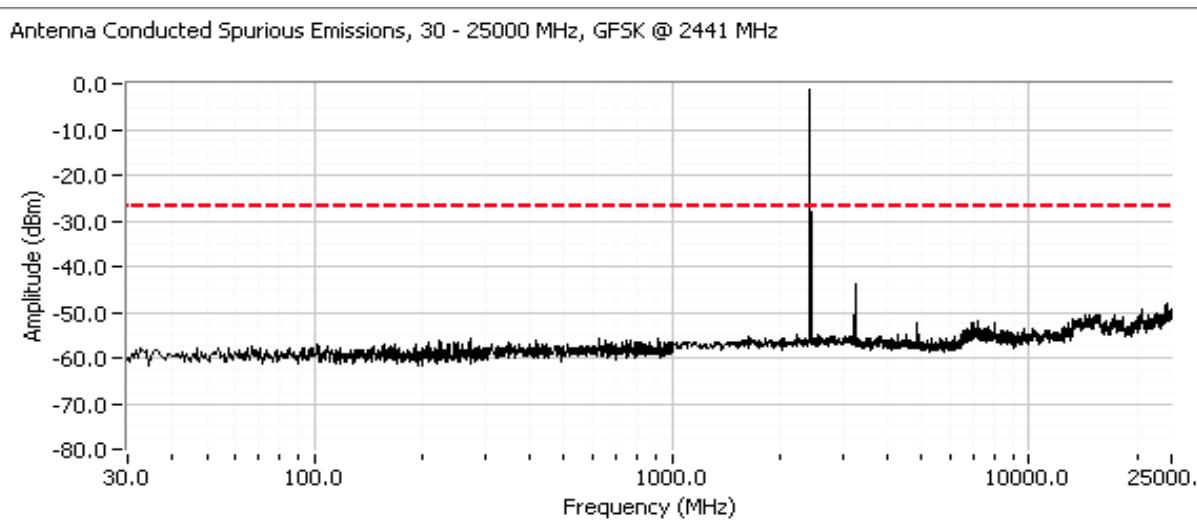
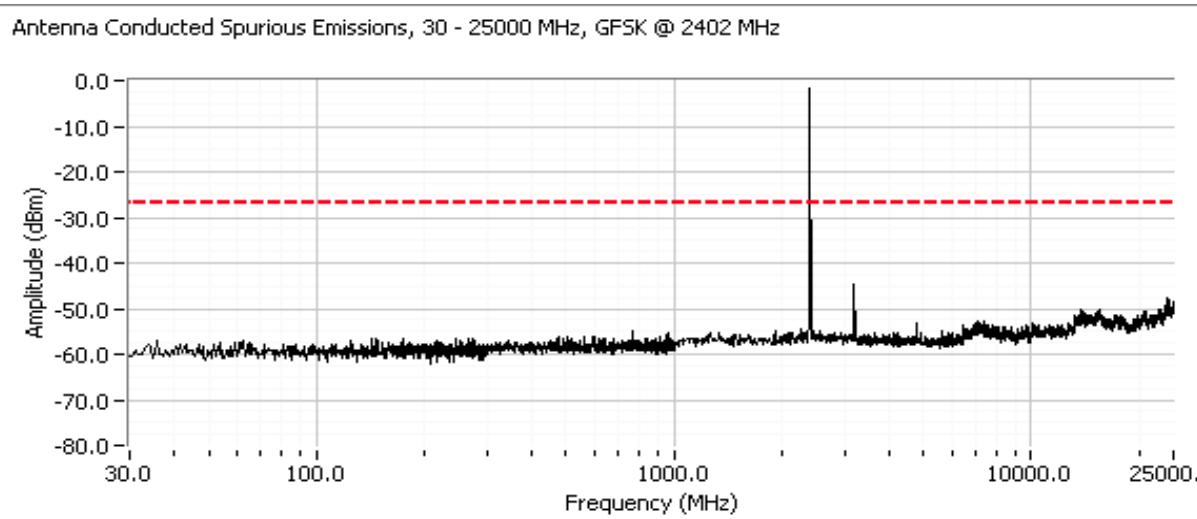
Test Engineer: Suhaila Khushzad

Config Change: None

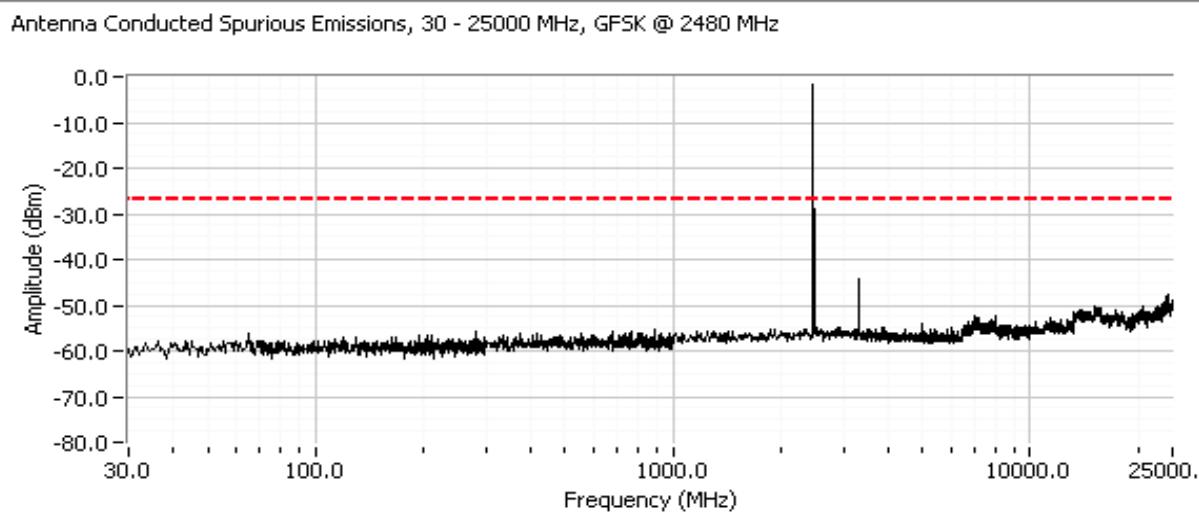
Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

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:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A


Run #4: Output Power

Date of Test: 8/13/2009

Config. Used: 1

Test Engineer: Suhaila Khushzad

Config Change: None

Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

Maximum antenna gain: 3.9 dBi

Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	-	2	0.00158	0.0039
Mid	2441	-	2.3	0.00170	0.0042
High	2480	-	2.3	0.00170	0.0042

Note 1: Power measured using a peak power meter. Cable loss factor included in power meter measurement.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Run #5: Bandwidth, Channel Occupancy, Spacing and Number of Channels

Date of Test: 7/24/2009

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

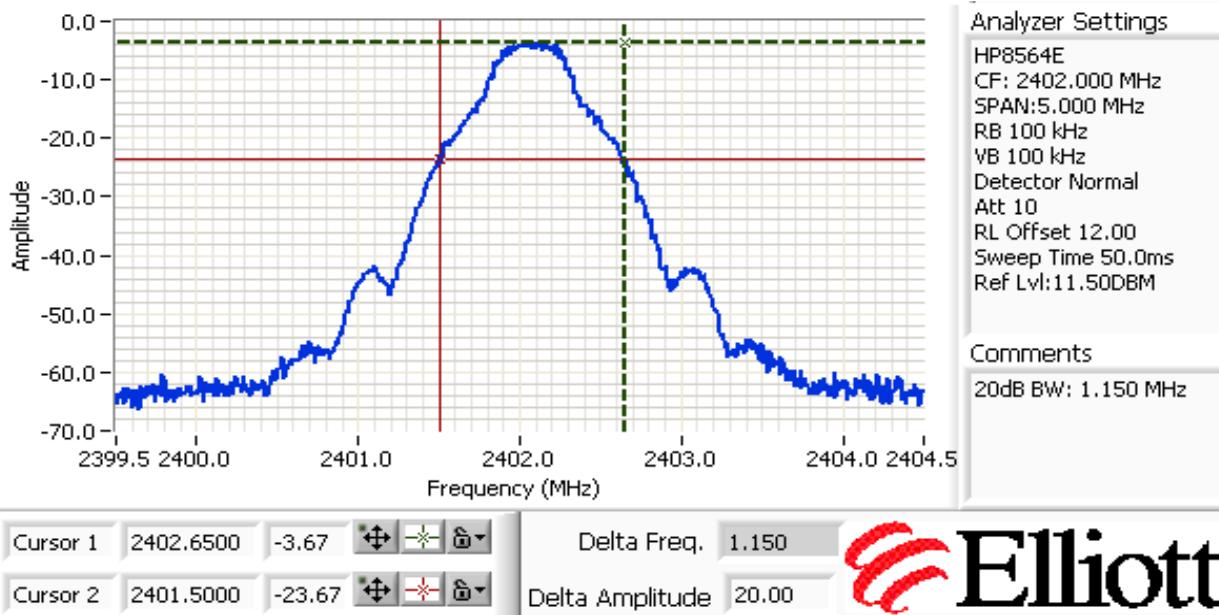
Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

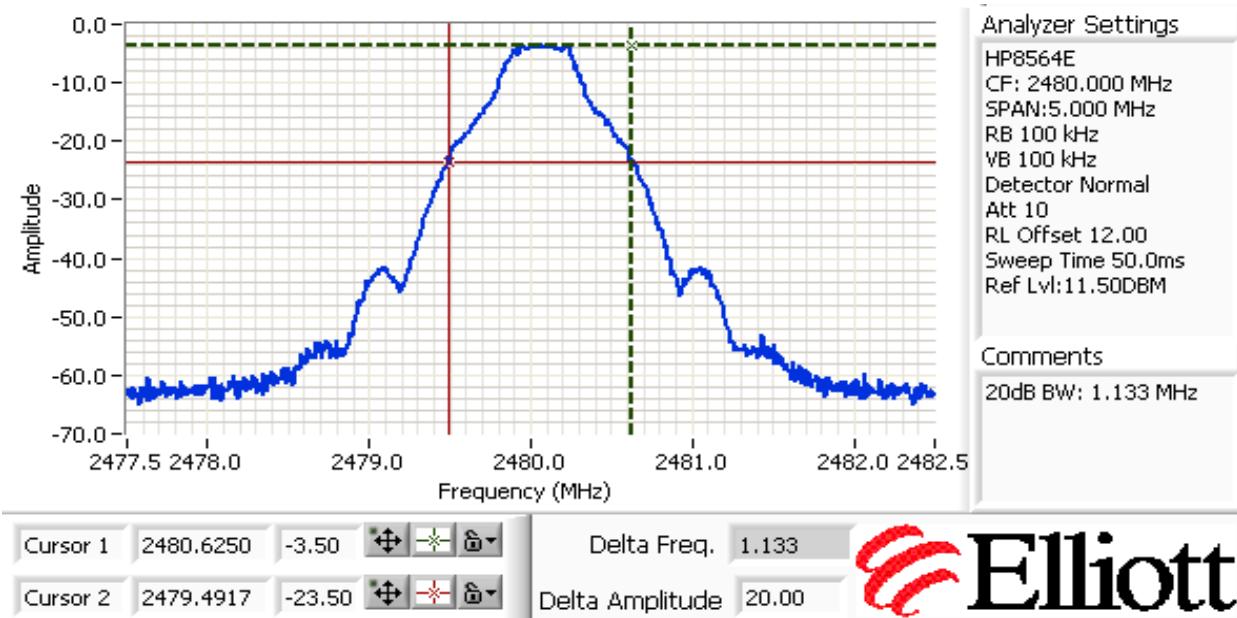
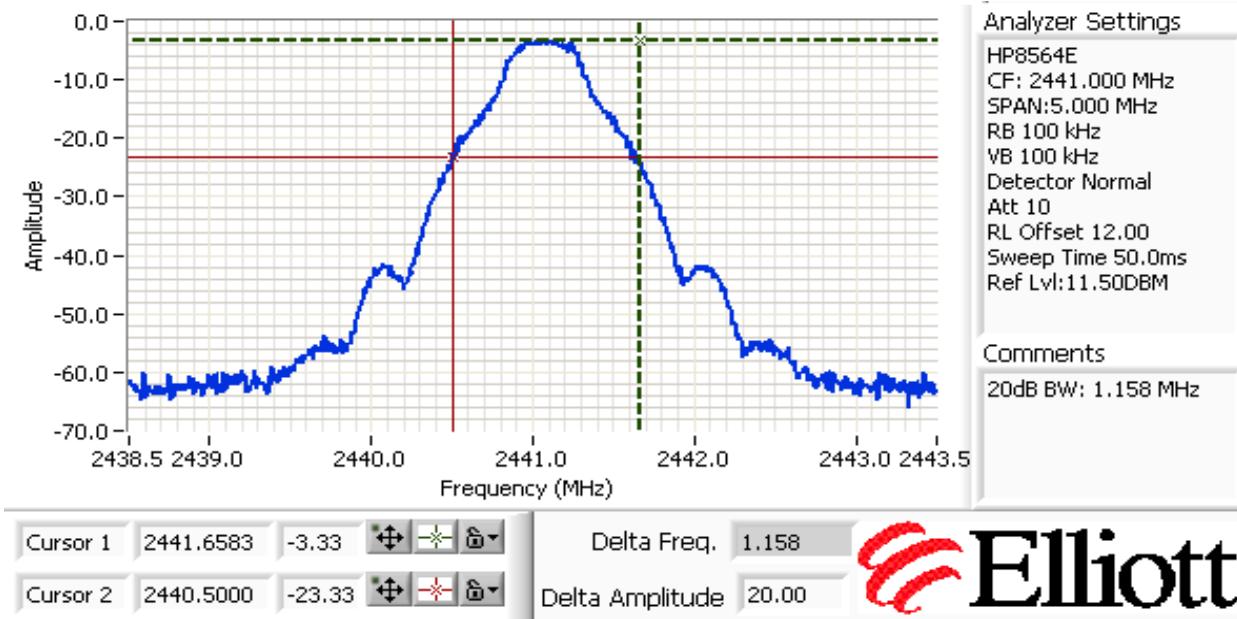
Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (kHz)	Resolution Bandwidth	99% Bandwidth (kHz)
Low	2402	100kHz	1150	100kHz	998
Mid	2441	100kHz	1158	100kHz	1007
High	2480	100kHz	1133	100kHz	990

Note 1: 20dB bandwidth measured using RB = 100kHz, VB = 100kHz (VB > RB)

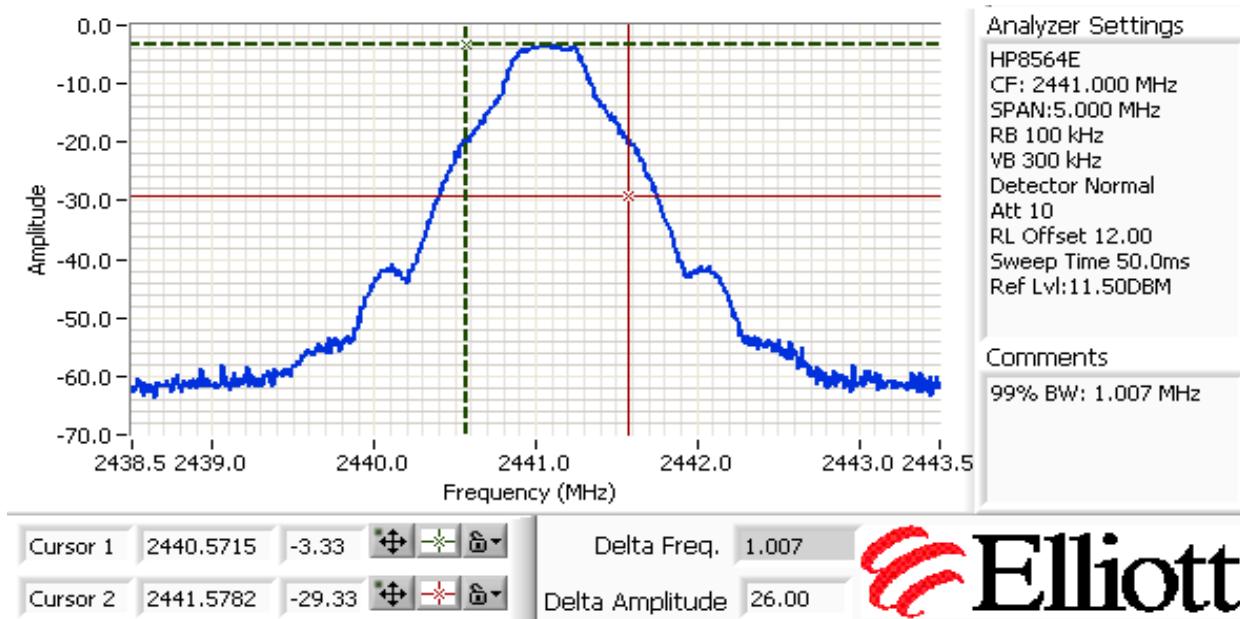
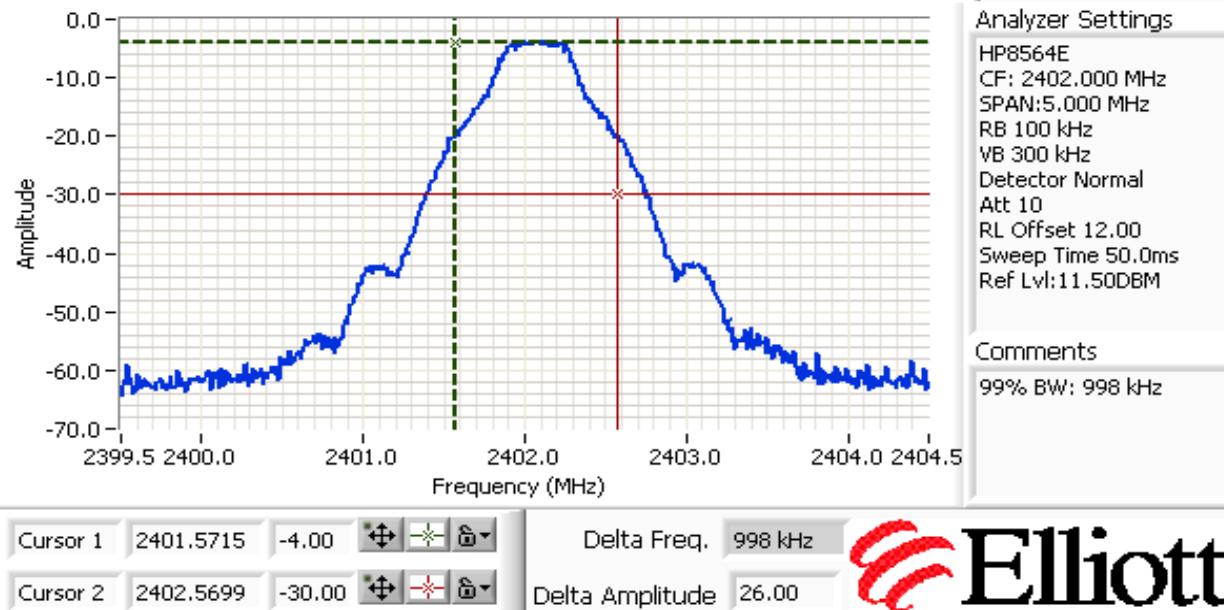
Note 2: 99% bandwidth measured using RB = 100 kHz, VB = 300 kHz (VB >=3RB)



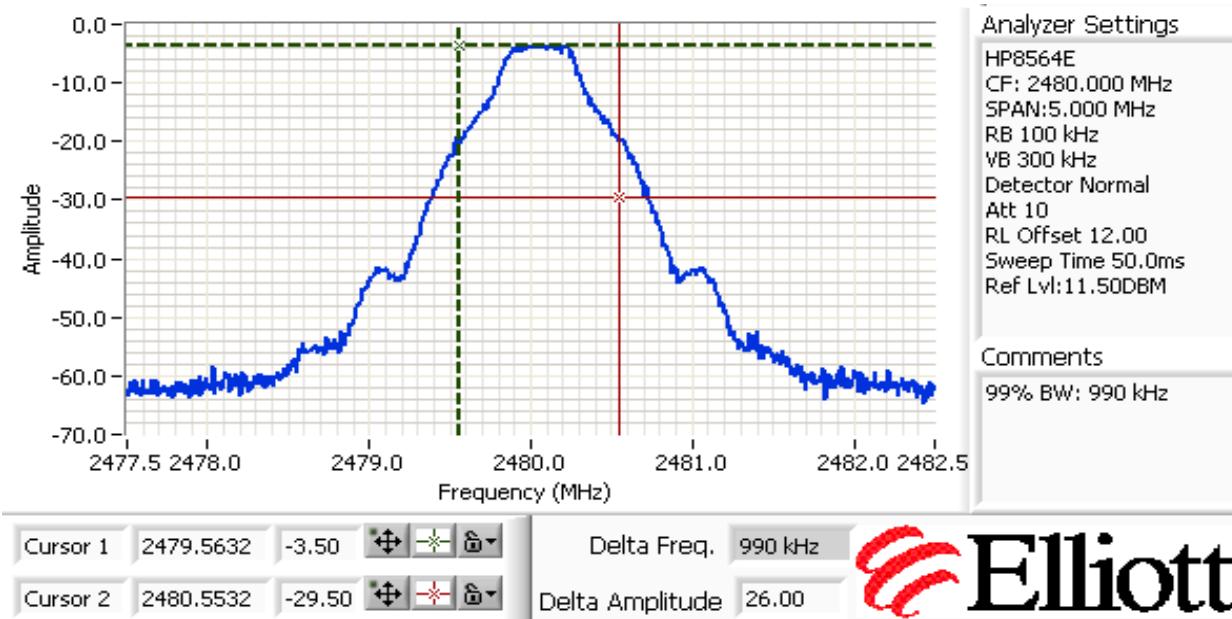
Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:		Account Manager:	Dean Erikson
Standard:	FCC, RSS 210		
Class:	N/A		



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Date of Test: 7/24/2009
 Test Engineer: Rafael Varelas
 Test Location: SVOATS #2

Config. Used: 1
 Config Change: None
 Host EUT Voltage: 120V/60Hz

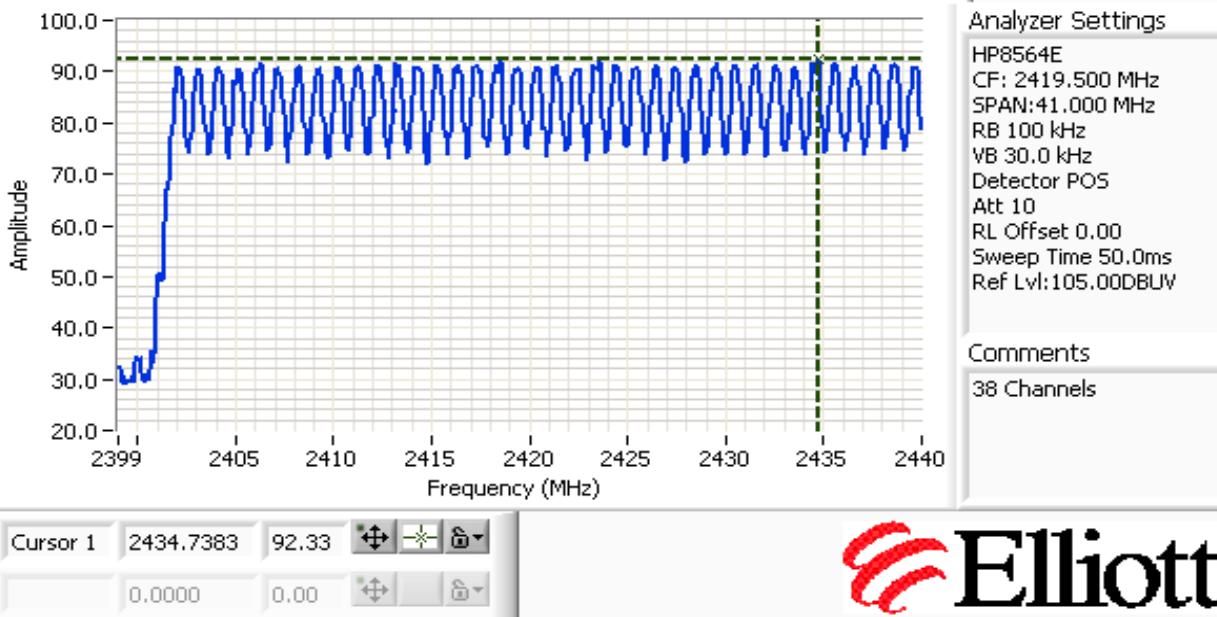
Frequency hopping systems in the **2400-2483.5 MHz** band shall use at least 15 channels.

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.)

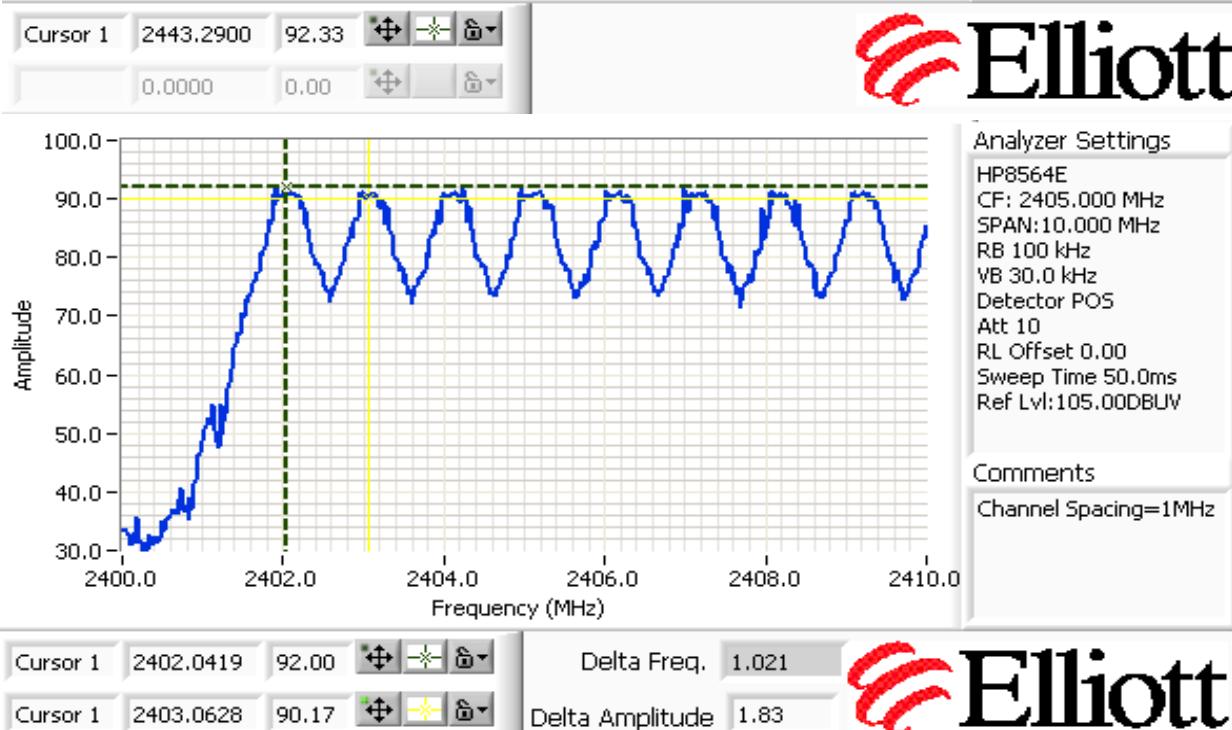
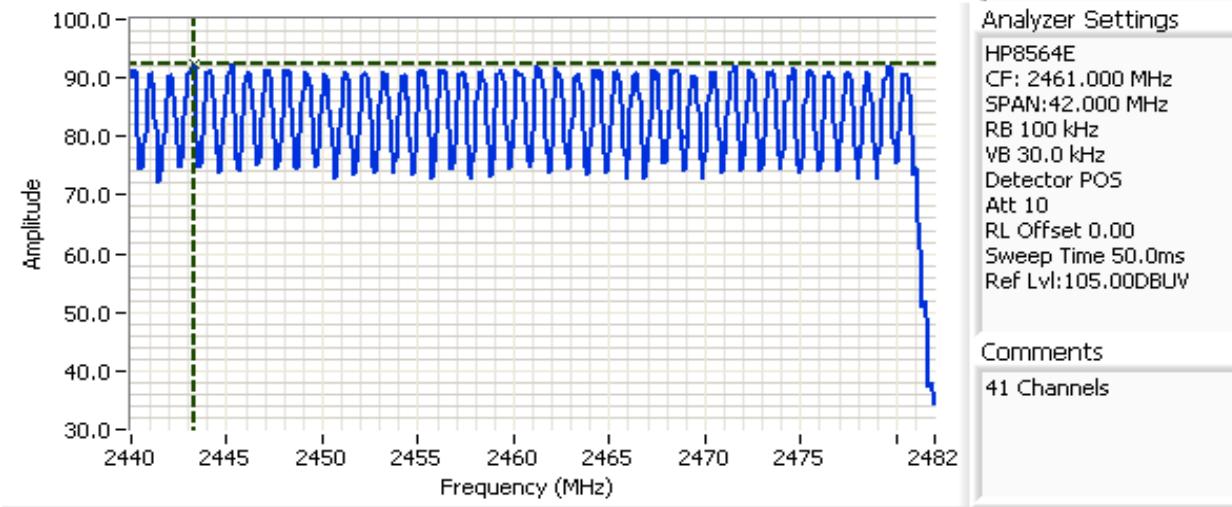
The channel dwell time is calculated from the transmit time on a channel multiplied by the number of times a channel could be used in a period of 0.4 times the number of channels, N (i.e. 0.4N divided by the time between successive hops, rounded up to the closest integer), unless the time between successive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

Maximum 20dB bandwidth: 1158 kHz
 Channel spacing: 1000 kHz Pass
 Transmission time per hop: 2.9 ms
 The time between successive hops on a channel: 15.8 ms
 Number of channels (N): 79 Pass
 Channel dwell time in 31.6 seconds: <400 ms Pass

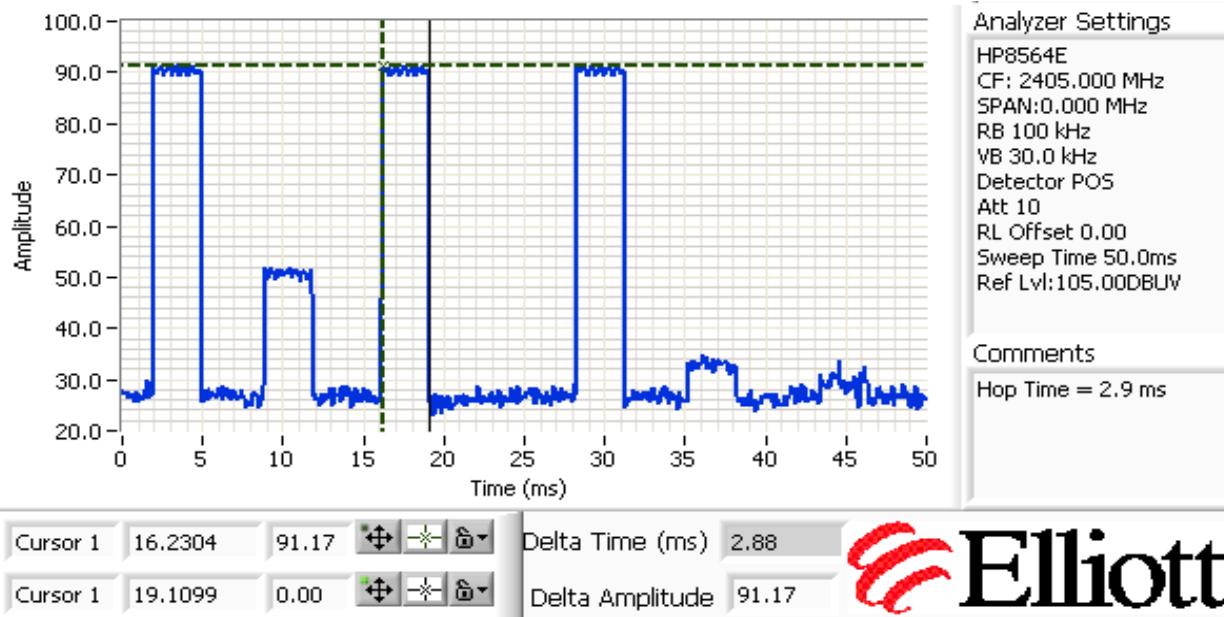
Note: Since the dwell time per hop is less than 0.4 seconds and the operation description details that all channels are used equally, then compliance with the 0.4 s per 0.4 * # of channels is automatic, independent of the time between hops on the same channel.



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A



pulses of lower amplitude were hops on nearby channels not counted in timing measurements



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

FCC 15.247 FHSS - Power, Bandwidth and Spurious Emissions (8PSK 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.

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: 14 °C
Rel. Humidity: 93 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1(a-c)	30 - 25000 MHz Radiated Spurious Emissions, Internal Antenna	FCC Part 15.209 / 15.247(c)	Pass	50.2dB μ V/m @ 2483.5MHz (-3.8dB)
2(a-c)	30 - 25000 MHz Radiated Spurious Emissions, External Antenna	FCC Part 15.209 / 15.247(c)	Pass	47.9dB μ V/m @ 2483.5MHz (-6.1dB)
3	30 - 25000 MHz Radiated Spurious Emissions, Conducted	FCC Part 15.209 / 15.247(c)	Pass	> 20dB below the limit
4	Output Power	15.247(b)	-	4.2 dBm (2.63 mW)
5	20dB Bandwidth	15.247(a)	-	1467 kHz
5	99% bandwidth	RSS-GEN	-	1281 kHz
5	Channel Occupancy	15.247(a)	-	2.9ms
5	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.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #1: Transmit Spurious Emissions 30 - 25000 MHz, Internal Antenna

Note: No radio related emissions detected below 1 GHz.

EUT Upright

Date of Test: 8/9/2009

Test Engineer: Rafael Varelas

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

Host EUT Voltage: 120V/60Hz

Run #1a: Radiated Spurious Emissions, 30 - 25000 MHz. Low Channel @ 2402 MHz

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

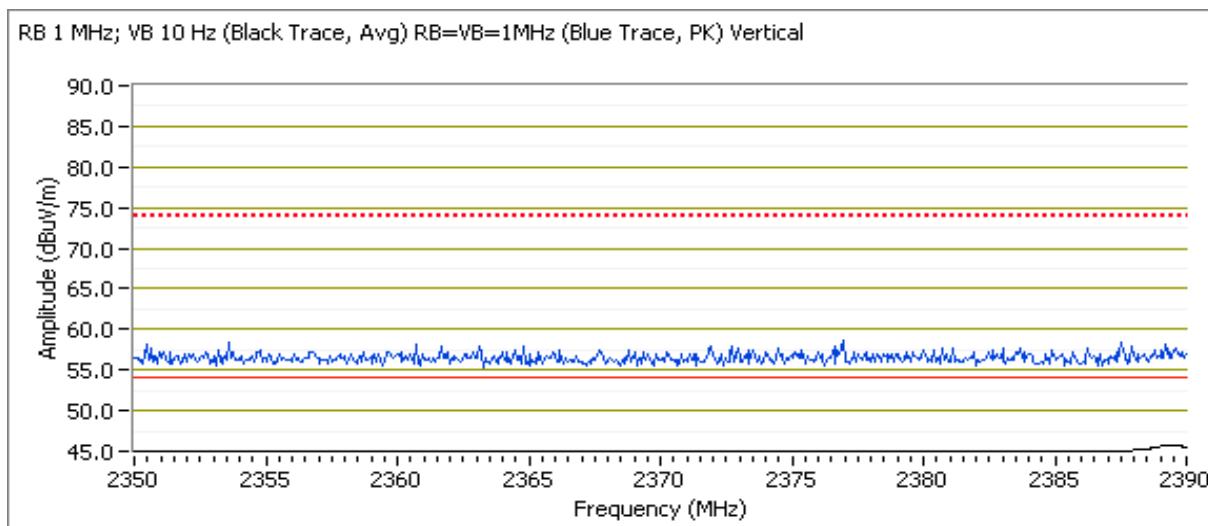
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.090	97.2	V	-	-	AVG	203	1.0	RB 1 MHz; VB: 10 Hz
2401.990	100.7	V	-	-	PK	203	1.0	RB 1 MHz; VB: 1 MHz
2401.870	96.6	V	-	-	PK	203	1.0	RB 100 kHz; VB: 100 kHz
2402.010	94.4	H	-	-	AVG	148	1.1	RB 1 MHz; VB: 10 Hz
2402.040	97.9	H	-	-	PK	148	1.1	RB 1 MHz; VB: 1 MHz

Fundamental emission level @ 3m in 100kHz RBW: 96.6 dB_{UV}/m

Limit for emissions outside of restricted bands: 76.6 dB_{UV}/m Limit is -20dBc

Band Edge Signal Field Strength

Signal Field Strength								
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2388.810	45.7	V	54.0	-8.3	Avg	203	1.0	
2389.030	45.6	H	54.0	-8.4	Avg	149	1.1	
2389.910	58.9	H	74.0	-15.1	PK	149	1.1	
2389.360	57.6	V	74.0	-16.4	PK	203	1.0	





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4803.960	35.6	V	54.0	-18.4	AVG	261	1.1	RB 1 MHz; VB: 10 Hz
4803.880	29.7	H	54.0	-24.3	AVG	335	1.0	RB 1 MHz; VB: 10 Hz
9609.920	49.5	H	74.0	-24.5	PK	162	1.0	RB 1 MHz; VB: 1 MHz
9609.090	49.4	V	74.0	-24.6	PK	24	1.0	RB 1 MHz; VB: 1 MHz
7206.950	47.1	H	74.0	-26.9	PK	218	1.0	RB 1 MHz; VB: 1 MHz
7204.800	46.7	V	74.0	-27.3	PK	345	1.9	RB 1 MHz; VB: 1 MHz
4804.230	44.5	V	74.0	-29.5	PK	261	1.1	RB 1 MHz; VB: 1 MHz
4804.000	40.8	H	74.0	-33.2	PK	335	1.0	RB 1 MHz; VB: 1 MHz
9608.620	37.8	V	74.0	-36.2	AVG	24	1.0	RB 1 MHz; VB: 10 Hz
9609.330	37.8	H	74.0	-36.2	AVG	162	1.0	RB 1 MHz; VB: 10 Hz
7206.980	35.5	V	74.0	-38.5	AVG	345	1.9	RB 1 MHz; VB: 10 Hz
7207.040	35.5	H	74.0	-38.5	AVG	218	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: The signal was outside the restricted bands, but more restricted limit (15.209) was used.

Note 3: The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #1b: Radiated Spurious Emissions, 30 - 25000 MHz. Center Channel @ 2441 MHz

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

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2441.010	93.8	H	-	-	AVG	149	1.1	RB 1 MHz; VB: 10 Hz
2441.040	97.3	H	-	-	PK	149	1.1	RB 1 MHz; VB: 1 MHz
2440.840	93.3	H	-	-	PK	149	1.1	RB 100 kHz; VB: 100 kHz
2440.990	97.3	V	-	-	AVG	214	1.1	RB 1 MHz; VB: 10 Hz
2440.970	100.6	V	-	-	PK	214	1.1	RB 1 MHz; VB: 1 MHz
2440.860	96.6	V	-	-	PK	214	1.1	RB 100 kHz; VB: 100 kHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	93.3	96.6
Limit for emissions outside of restricted bands:	76.6 dB μ V/m	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4882.080	38.0	V	54.0	-16.0	AVG	308	1.0	RB 1 MHz; VB: 10 Hz
7322.910	36.3	H	54.0	-17.7	AVG	193	1.0	RB 1 MHz; VB: 10 Hz
7322.900	36.2	V	54.0	-17.8	AVG	0	1.0	RB 1 MHz; VB: 10 Hz
4882.070	31.5	H	54.0	-22.5	AVG	168	1.0	RB 1 MHz; VB: 10 Hz
9761.040	49.7	H	74.0	-24.3	PK	257	1.0	RB 1 MHz; VB: 1 MHz
9760.750	49.1	V	74.0	-24.9	PK	305	1.0	RB 1 MHz; VB: 1 MHz
7323.620	47.9	H	74.0	-26.1	PK	193	1.0	RB 1 MHz; VB: 1 MHz
7325.250	47.2	V	74.0	-26.8	PK	0	1.0	RB 1 MHz; VB: 1 MHz
4882.600	45.8	V	74.0	-28.2	PK	308	1.0	RB 1 MHz; VB: 1 MHz
4882.440	42.3	H	74.0	-31.7	PK	168	1.0	RB 1 MHz; VB: 1 MHz
9760.670	38.1	H	74.0	-35.9	AVG	257	1.0	RB 1 MHz; VB: 10 Hz
9760.590	38.0	V	74.0	-36.0	AVG	305	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the

Note 2: The signals that were more than 20dB below the limit were not recorded.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #1c: Radiated Spurious Emissions, 30 - 25000 MHz. High Channel @ 2480 MHz
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2480.000	98.5	V	-	-	AVG	212	1.0
2479.970	101.7	V	-	-	PK	212	1.0
2479.840	97.7	V	-	-	PK	212	1.0
2480.060	94.3	H	-	-	AVG	150	1.0
2480.060	97.7	H	-	-	PK	150	1.0

Fundamental emission level @ 3m in 100kHz RBW: 97.7 dB μ V/m

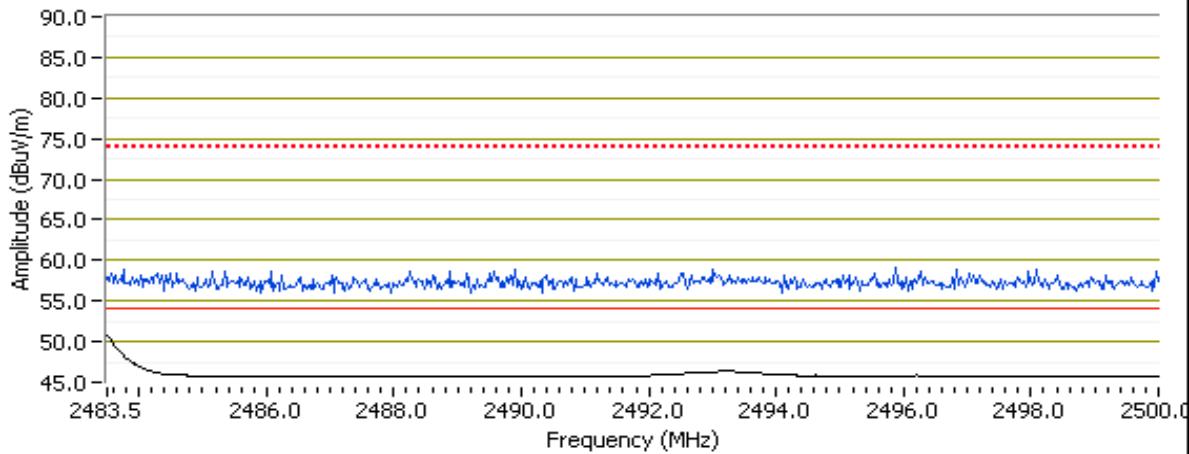
Limit for emissions outside of restricted bands: 77.7 dB μ V/m

Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	50.2	V	54.0	-3.8	Avg	212	1.0
2483.500	48.1	H	54.0	-5.9	Avg	150	1.0
2483.740	59.2	H	74.0	-14.8	PK	150	1.0
2483.660	59.0	V	74.0	-15.0	PK	212	1.0

RB 1 MHz; VB 10 Hz (Black Trace, Avg) RB=VB=1MHz (Blue Trace, PK) Vertical





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4960.650	37.8	V	54.0	-16.2	AVG	278	1.0	RB 1 MHz; VB: 10 Hz
7438.510	36.6	V	54.0	-17.4	AVG	334	1.0	RB 1 MHz; VB: 10 Hz
7438.500	36.5	H	54.0	-17.5	AVG	347	1.4	RB 1 MHz; VB: 10 Hz
4960.020	32.1	H	54.0	-21.9	AVG	185	1.6	RB 1 MHz; VB: 10 Hz
9918.500	49.6	H	74.0	-24.4	PK	344	1.7	RB 1 MHz; VB: 1 MHz
9920.300	49.2	V	74.0	-24.8	PK	103	1.0	RB 1 MHz; VB: 1 MHz
7439.980	48.1	V	74.0	-25.9	PK	334	1.0	RB 1 MHz; VB: 1 MHz
7439.440	47.8	H	74.0	-26.2	PK	347	1.4	RB 1 MHz; VB: 1 MHz
4960.800	46.9	V	74.0	-27.1	PK	278	1.0	RB 1 MHz; VB: 1 MHz
4959.900	43.1	H	74.0	-30.9	PK	185	1.6	RB 1 MHz; VB: 1 MHz
9918.530	38.2	H	74.0	-35.8	AVG	344	1.7	RB 1 MHz; VB: 10 Hz
9918.510	38.1	V	74.0	-35.9	AVG	103	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #2: Transmit Spurious Emissions 30 - 25000 MHz, External Antenna

Date of Test: 8/10/2009 Config. Used: 1
Test Engineer: Suhaila Khushzad Config Change: None
Test Location: SVOATS #2 Host EUT Voltage: 120V/60Hz

Run #2a: Radiated Spurious Emissions, 30 - 25000 MHz. Low Channel @ 2402 MHz

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

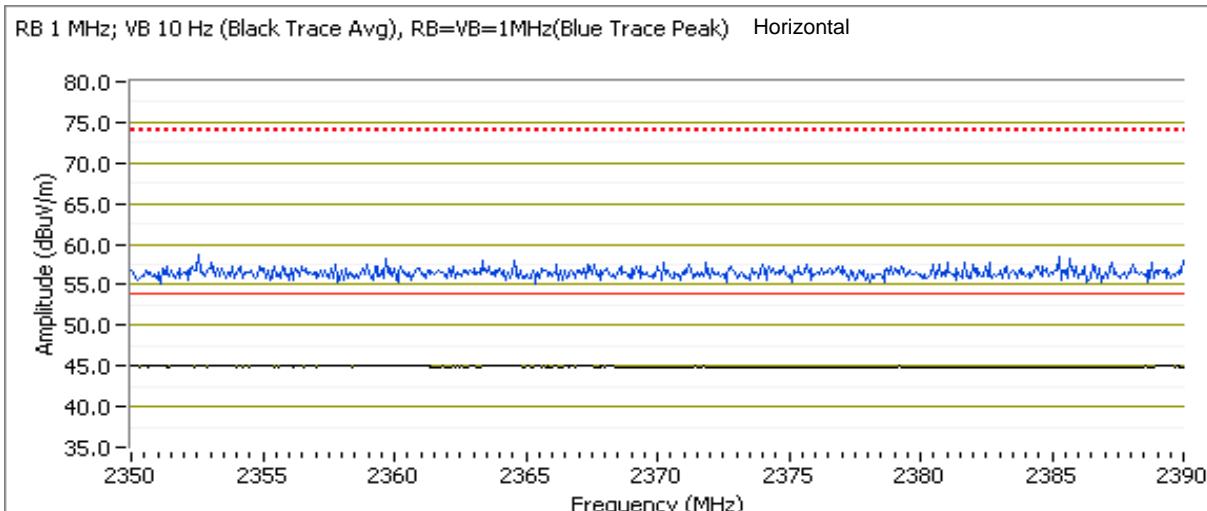
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2402.270	90.5	H	-	-	AVG	56	1.0	RB 1 MHz; VB: 10 Hz
2402.200	94.0	H	-	-	PK	56	1.0	RB 1 MHz; VB: 1 MHz
2402.120	87.1	V	-	-	AVG	207	1.0	RB 1 MHz; VB: 10 Hz
2402.120	90.5	V	-	-	PK	207	1.0	RB 1 MHz; VB: 1 MHz
2402.070	89.6	H	-	-	PK	56	1.0	RB 100 kHz; VB: 100 kHz
2401.950	86.3	V	-	-	PK	207	1.0	RB 100 kHz; VB: 100 kHz

Fundamental emission level @ 3m in 100kHz RBW: 89.6 dB_{UL}/V/m

Limit for emissions outside of restricted bands: 69.6 dB_{UV}/m Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2350.000	46.3	H	54.0	-7.7	AVG	56	1.0	RB 1 MHz; VB: 10 Hz
2350.000	46.3	V	54.0	-7.7	AVG	207	1.0	RB 1 MHz; VB: 10 Hz
2363.200	57.7	H	74.0	-16.3	PK	56	1.0	RB 1 MHz; VB: 1 MHz
2355.600	57.6	V	74.0	-16.4	PK	207	1.0	RB 1 MHz; VB: 1 MHz





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4804.130	43.1	H	54.0	-10.9	AVG	248	1.0	RB 1 MHz; VB: 10 Hz
4804.070	42.7	V	54.0	-11.3	AVG	287	1.0	RB 1 MHz; VB: 10 Hz
4794.130	53.4	H	74.0	-20.6	PK	248	1.0	RB 1 MHz; VB: 1 MHz
4803.900	50.0	V	74.0	-24.0	PK	287	1.0	RB 1 MHz; VB: 1 MHz
9620.530	49.2	H	74.0	-24.8	PK	110	1.0	RB 1 MHz; VB: 1 MHz
7190.200	46.5	H	74.0	-27.5	PK	1	1.0	RB 1 MHz; VB: 1 MHz
7199.770	46.3	V	74.0	-27.7	PK	81	1.0	RB 1 MHz; VB: 1 MHz
9589.930	38.6	H	74.0	-35.4	AVG	110	1.0	RB 1 MHz; VB: 10 Hz
7186.000	35.0	H	74.0	-39.0	AVG	1	1.0	RB 1 MHz; VB: 10 Hz
7196.000	34.8	V	74.0	-39.2	AVG	81	1.0	RB 1 MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the level of the fundamental.

Note 2: The signal was outside the restricted bands, but more restricted limit (15.209) was used.

Note 3: The signals that were more than 20dB below the limit were not recorded.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #2b: Radiated Spurious Emissions, 30 - 25000 MHz. Center Channel @ 2441 MHz

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

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
2441.130	93.5	H	-	-	AVG	127	2.0	RB 1 MHz; VB: 10 Hz
2441.120	97.1	H	-	-	PK	127	2.0	RB 1 MHz; VB: 1 MHz
2441.100	91.6	V	-	-	AVG	152	1.1	RB 1 MHz; VB: 10 Hz
2441.220	95.2	V	-	-	PK	152	1.1	RB 1 MHz; VB: 1 MHz
2441.220	91.1	V	-	-	PK	152	1.1	RB 100 kHz; VB: 100 kHz
2440.930	92.8	H	-	-	PK	127	2.0	RB 100 kHz; VB: 100 kHz

	H	V
Fundamental emission level @ 3m in 100kHz RBW:	92.8	91.1
Limit for emissions outside of restricted bands:	72.8 dB μ V/m	

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4882.100	41.9	V	54.0	-12.1	AVG	280	1.1	MHz; VB: 10 Hz
4882.170	40.3	H	54.0	-13.7	AVG	253	1.0	MHz; VB: 10 Hz
7322.800	35.9	H	54.0	-18.1	AVG	130	1.0	MHz; VB: 10 Hz
7319.870	35.8	V	54.0	-18.2	AVG	134	1.0	MHz; VB: 10 Hz
4881.670	49.4	V	74.0	-24.6	PK	280	1.1	MHz; VB: 1 MHz
9766.600	49.0	V	74.0	-25.0	PK	169	1.0	MHz; VB: 1 MHz
4882.600	48.1	H	74.0	-25.9	PK	253	1.0	MHz; VB: 1 MHz
7328.000	47.3	H	74.0	-26.7	PK	130	1.0	MHz; VB: 1 MHz
7329.900	47.2	V	74.0	-26.8	PK	134	1.0	MHz; VB: 1 MHz
9764.100	38.5	V	74.0	-35.5	AVG	169	1.0	MHz; VB: 10 Hz

Note 1: For emissions in restricted bands, the limit of 15.209 was used. For all other emissions, the limit was set 20dB below the

Note 2: The signals that were more than 20dB below the limit were not recorded.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #2c: Radiated Spurious Emissions, 30 - 25000 MHz. High Channel @ 2480 MHz
Fundamental Signal Field Strength: Peak and average values measured in 1 MHz, and peak value measured in 100kHz

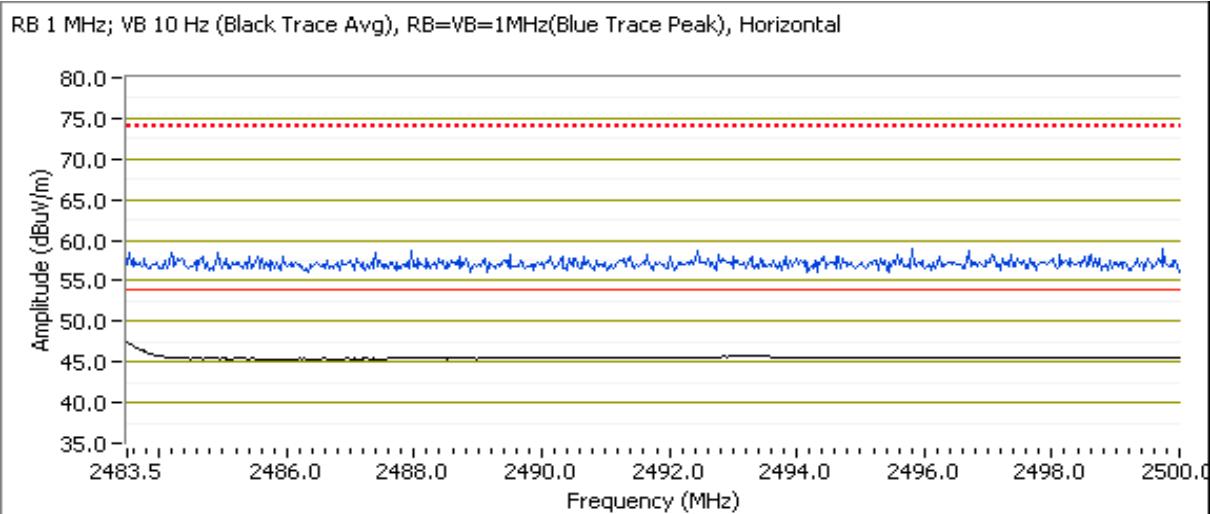
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2480.100	91.7	H	-	-	AVG	124	1.0
2480.070	95.2	H	-	-	PK	124	1.0
2480.080	89.4	V	-	-	AVG	155	1.1
2480.030	92.9	V	-	-	PK	155	1.1
2480.200	88.6	V	-	-	PK	155	1.1
2479.920	91.0	H	-	-	PK	124	1.0

Fundamental emission level @ 3m in 100kHz RBW: 91.0 dB μ V/m

Limit for emissions outside of restricted bands: 71.0 dB μ V/m Limit is -20dBc

Band Edge Signal Field Strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	47.9	H	54.0	-6.1	AVG	124	1.0
2483.500	47.3	V	54.0	-6.7	AVG	155	1.1
2487.650	59.0	H	74.0	-15.0	PK	124	1.0
2493.150	58.2	V	74.0	-15.8	PK	155	1.1





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Other Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
4961.100	38.3	H	54.0	-15.7	AVG	247	1.0	RB 1 MHz; VB: 10 Hz
4962.030	36.9	V	54.0	-17.1	AVG	317	1.0	RB 1 MHz; VB: 10 Hz
7430.000	36.1	V	54.0	-17.9	AVG	1	1.0	RB 1 MHz; VB: 10 Hz
7430.070	36.1	H	54.0	-17.9	AVG	90	1.0	RB 1 MHz; VB: 10 Hz
7446.770	47.8	H	74.0	-26.2	PK	90	1.0	RB 1 MHz; VB: 1 MHz
7431.530	47.7	V	74.0	-26.3	PK	1	1.0	RB 1 MHz; VB: 1 MHz
4961.070	46.3	H	74.0	-27.7	PK	247	1.0	RB 1 MHz; VB: 1 MHz
4961.830	45.8	V	74.0	-28.2	PK	317	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 20dB below the level of the fundamental.

Note 2: The signals that were more than 20dB below the limit were not recorded.

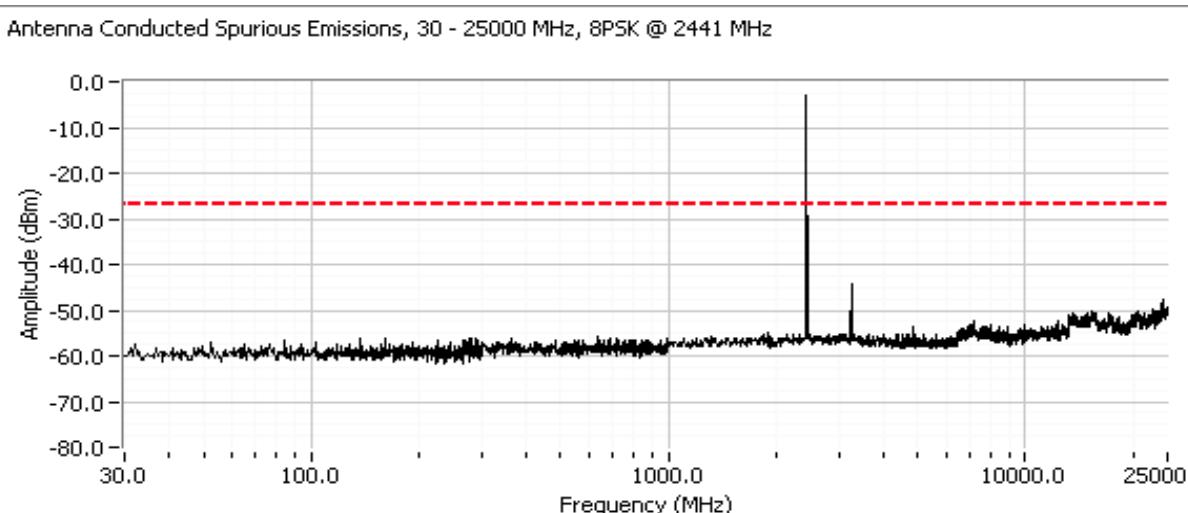
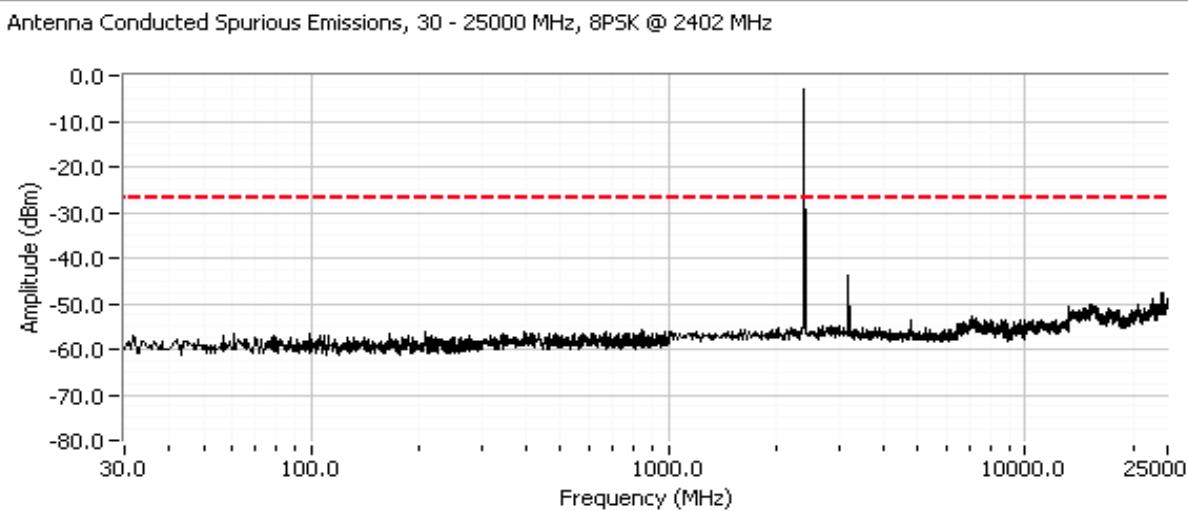
Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #3: Antenna Conducted Spurious Emissions, 30 - 25000 MHz.

Date of Test: 8/13/2009
 Test Engineer: Suhaila Khushzad
 Test Location: SVOATS #2

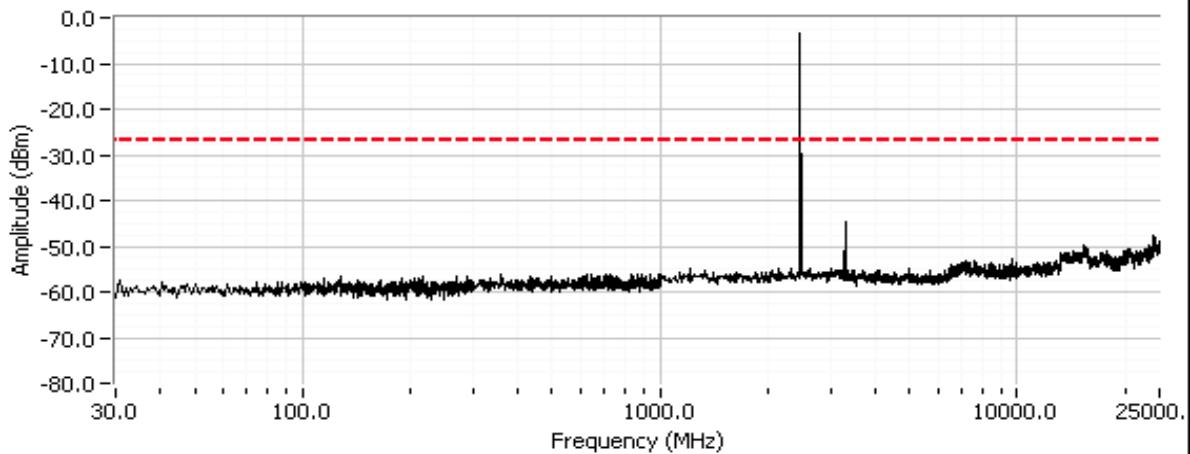
Config. Used: 1
 Config Change: None
 Host EUT Voltage: 120V/60Hz

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:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Antenna Conducted Spurious Emissions, 30 - 25000 MHz, 8PSK @ 2480 MHz



Run #4: Output Power

Date of Test: 8/13/2009

Config. Used: 1

Test Engineer: Suhaila Khushzad

Config Change: None

Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

Maximum antenna gain: 3.9 dBi

Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
Low	2402	-	3.9	0.00245	0.00603
Mid	2441	-	4.2	0.00263	0.00646
High	2480	-	4.2	0.00263	0.00646

Note 1: Power measured using a peak power meter. Cable loss factor included in power meter measurement.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #5: Bandwidth, Channel Occupancy, Spacing and Number of Channels

Date of Test: 7/24/2009

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

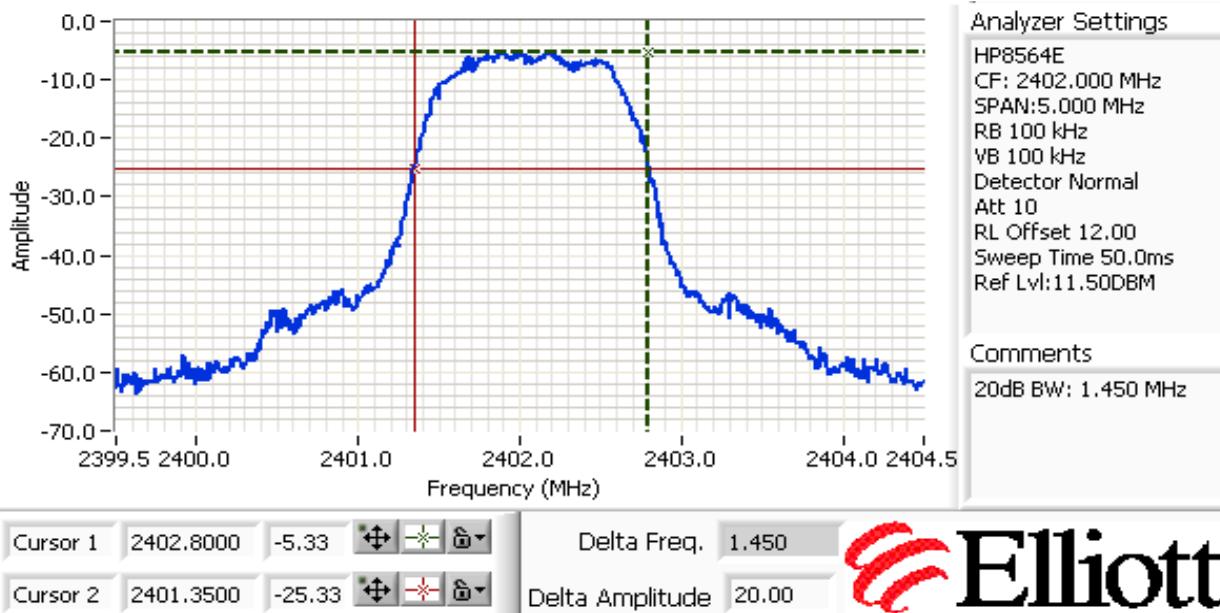
Test Location: SVOATS #2

Host EUT Voltage: 120V/60Hz

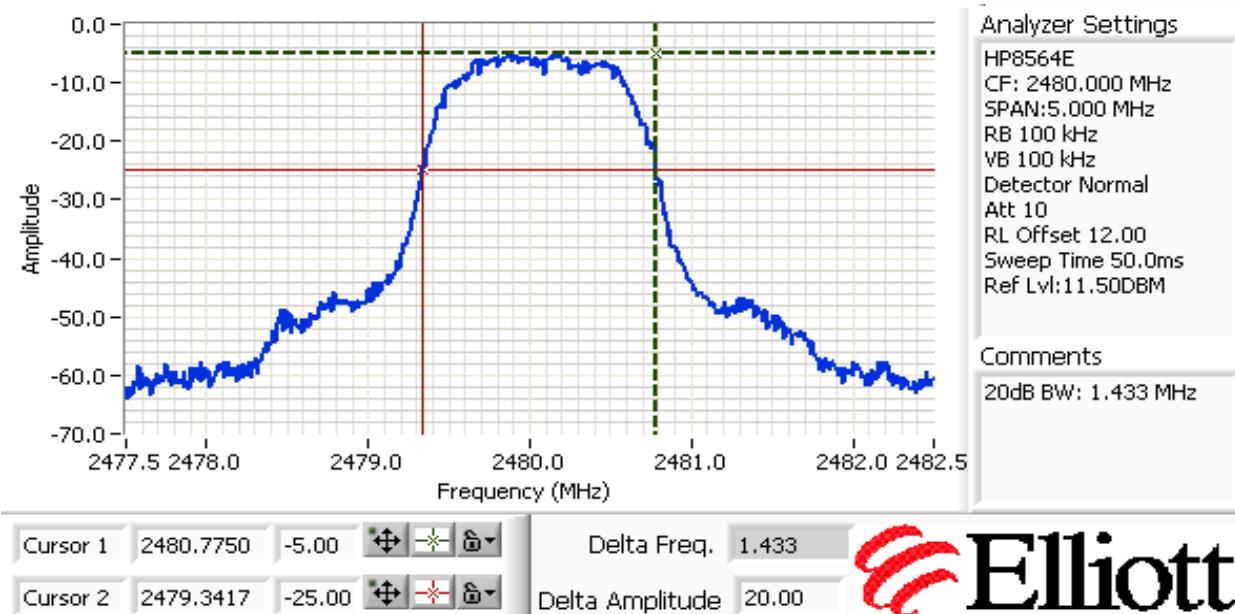
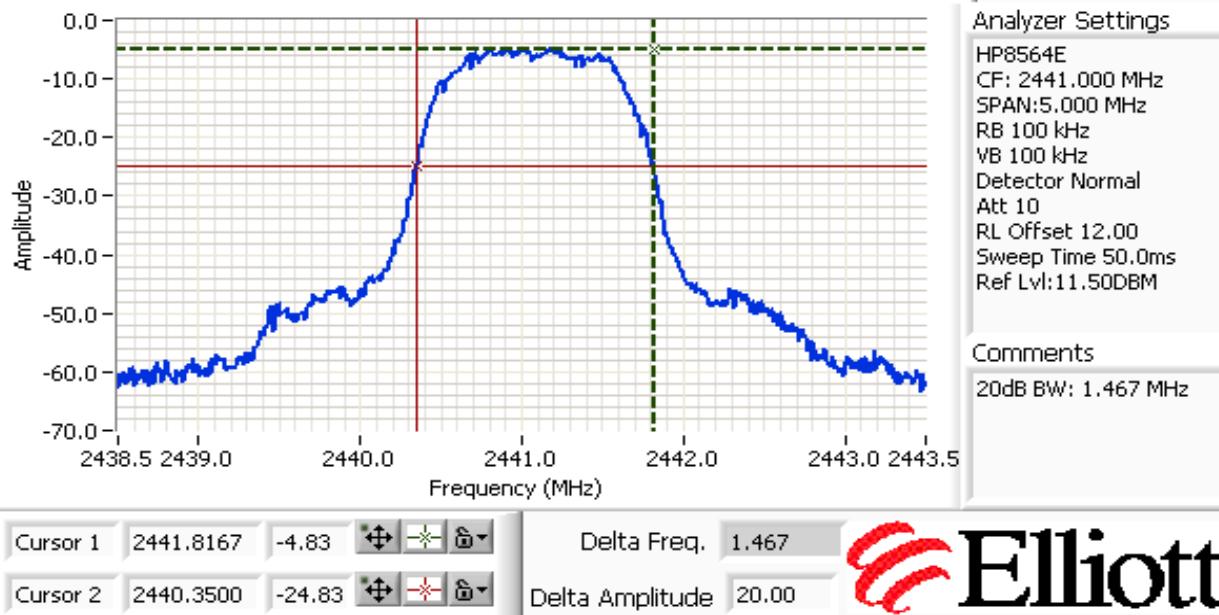
Channel	Frequency (MHz)	Resolution Bandwidth	20dB Bandwidth (kHz)	Resolution Bandwidth	99% Bandwidth (kHz)
Low	2402	100kHz	1450	100KHz	1265
Mid	2441	100kHz	1467	100KHz	1281
High	2480	100kHz	1433	100KHz	1273

Note 1: 20dB bandwidth measured using RB = 100kHz, VB = 100kHz (VB > RB)

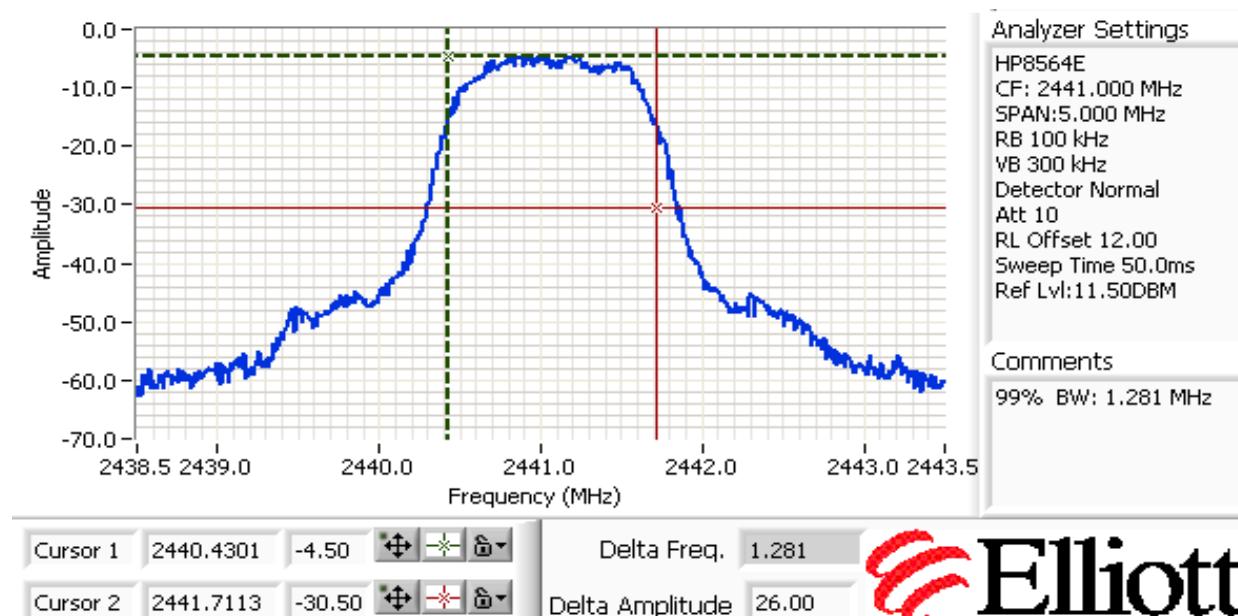
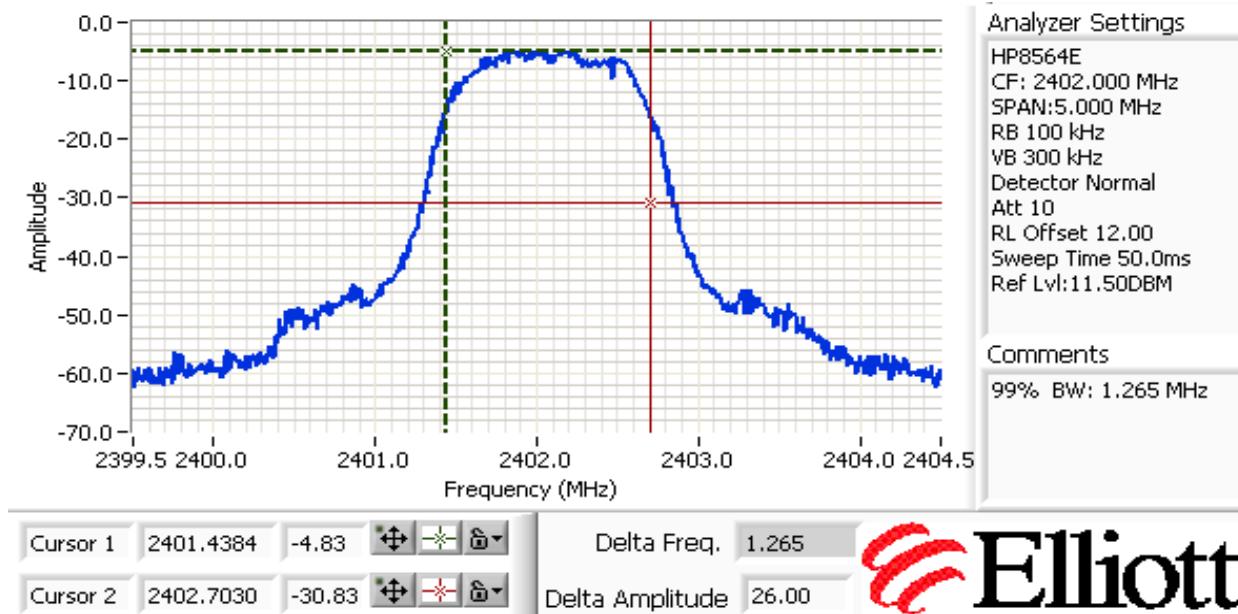
Note 2: 99% bandwidth measured using RB = 100 kHz, VB = 300 kHz (VB >=3RB)



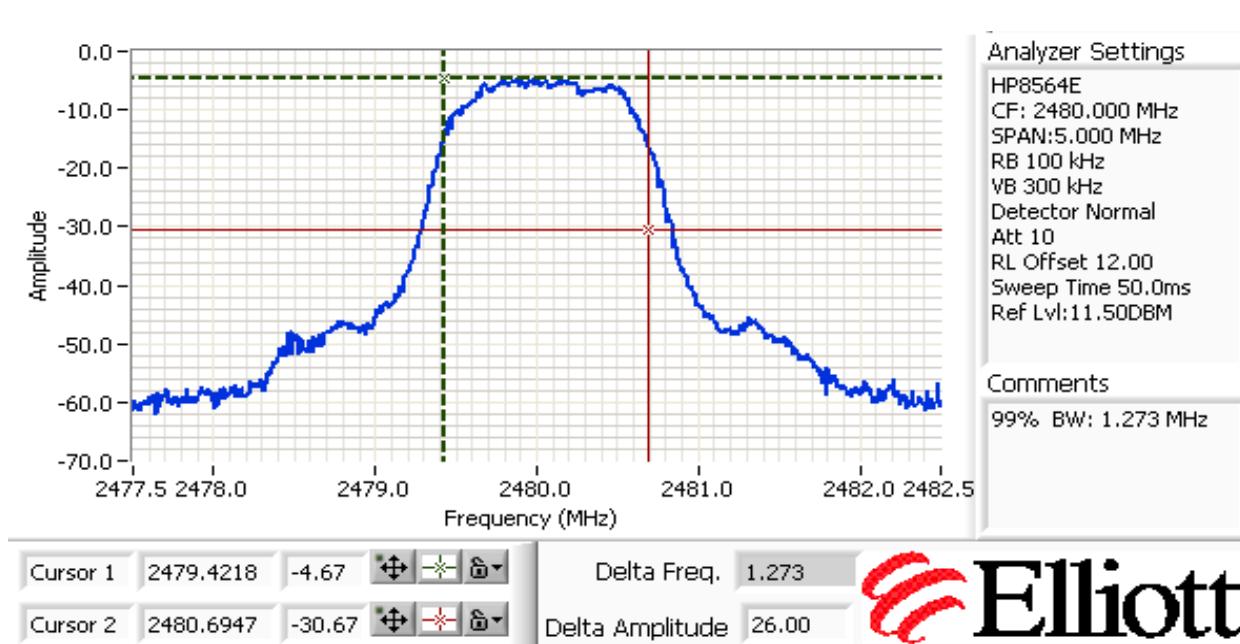
Client: Broadcom	Job Number: J76100
Model: BCM92070MD_REF12	T-Log Number: T76154
Contact: Anne Liang/Juan Martinez	Account Manager: Dean Erikson
Standard: FCC, RSS 210	Class: N/A



Client: Broadcom	Job Number: J76100
Model: BCM92070MD_REF12	T-Log Number: T76154
Contact: Anne Liang/Juan Martinez	Account Manager: Dean Erikson
Standard: FCC, RSS 210	Class: N/A



Client: Broadcom	Job Number: J76100
Model: BCM92070MD_REF12	T-Log Number: T76154
Contact: Anne Liang/Juan Martinez	Account Manager: Dean Erikson
Standard: FCC, RSS 210	Class: N/A



Date of Test: 7/24/2009

Test Engineer: Rafael Varelas

Test Location: SVOATS #2

Config. Used: 1

Config Change: None

Host EUT Voltage: 120V/60Hz

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: 1467 kHz

Channel spacing: 1000 kHz Pass

Transmission time per hop: 2.9 ms

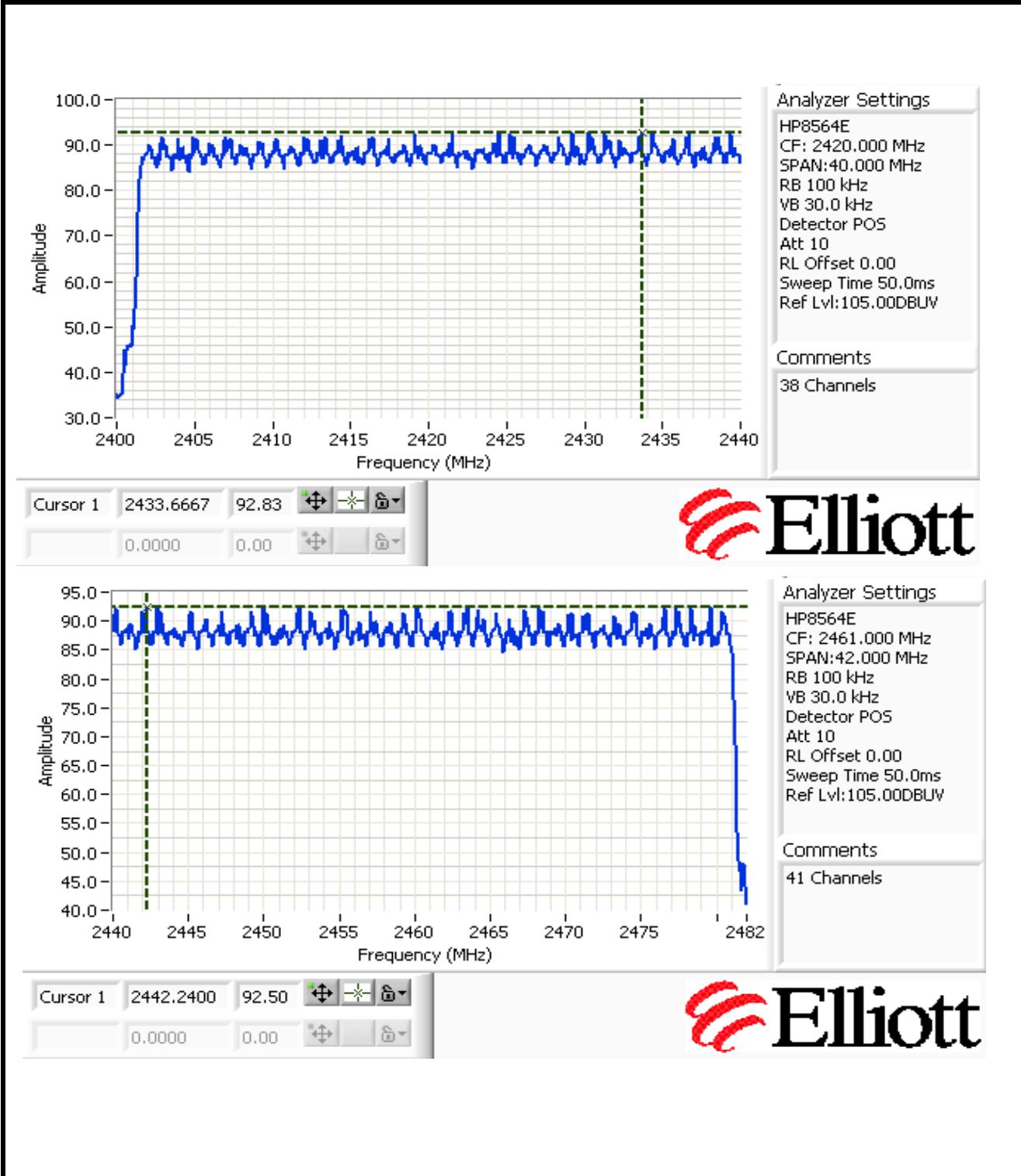
The time between successive hops on a channel: 15.8 ms

Number of channels (N): 79 Pass

Channel dwell time in 31.6 seconds: <400 ms Pass

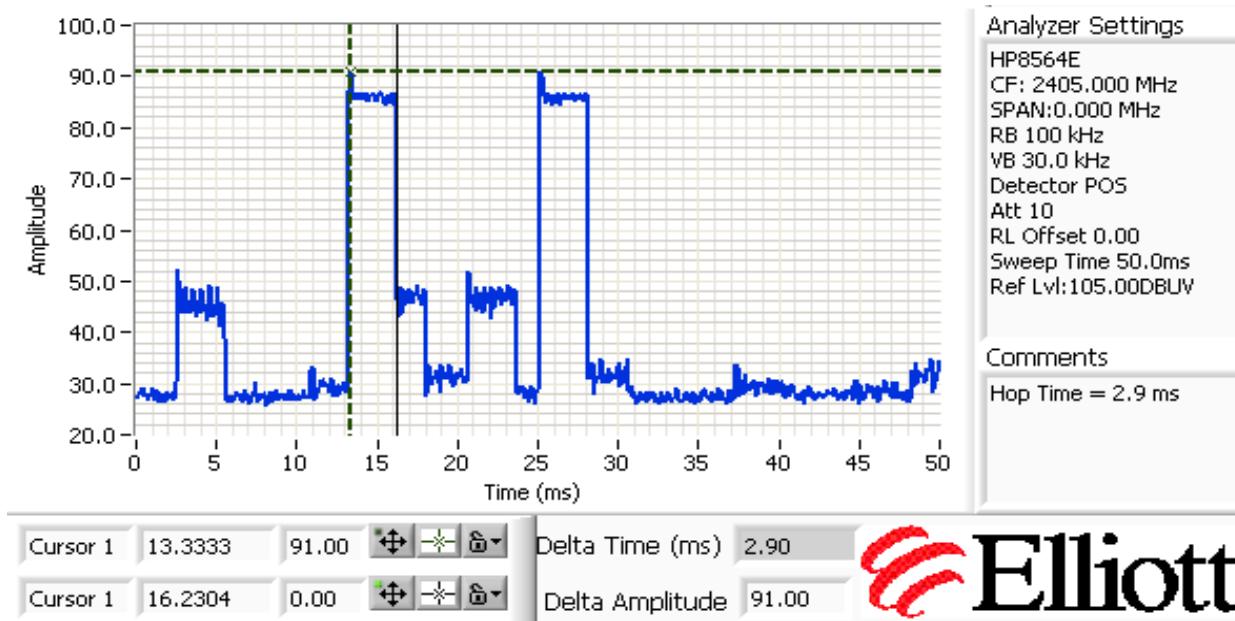
Note: Since the dwell time per hop is less than 0.4 seconds and the operation description details that all channels are used equally, then compliance with the 0.4 s per 0.4 * # of channels is automatic, independent of the time between hops on the same channel.

Client: Broadcom	Job Number: J76100
Model: BCM92070MD_REF12	T-Log Number: T76154
Contact: Anne Liang/Juan Martinez	Account Manager: Dean Erikson
Standard: FCC, RSS 210	Class: N/A



Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
		Account Manager:	Dean Erikson
Contact:	Anne Liang/Juan Martinez		
Standard:	FCC, RSS 210	Class:	N/A

Channel Spacing = See GFSK and operational description. 8PSK channel spacing is the same for all modulations.





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, 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 final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 7/27/2009

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: SVOATS #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. All remote support equipment was located approximately 30 meters from the EUT with all I/O connections running on top of the groundplane or routed in overhead in the GR-1089 test configuration.

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

Ambient Conditions:

Temperature: 14 °C

Rel. Humidity: 93 %

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

Run #	Test Performed	Limit	Result	Margin
1	RE, 1000 -18000 MHz, Maximized Emissions, Internal Antenna	RSS-GEN	Pass	38.1dB μ V/m @ 9762.8MHz (-15.9dB)
2	RE, 1000 -18000 MHz, Maximized Emissions, External Antenna	RSS-GEN	Pass	38.0dB μ V/m @ 9762.8MHz (-16.0dB)

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: No radio related emissions detected below 1 GHz.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

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

Internal Antenna

EUT at 2441 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 -18000 MHz	3	3	0.0

Rx Mode Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters
9762.830	38.1	V	54.0	-15.9	AVG	12	2.0
3257.000	33.7	V	54.0	-20.3	AVG	253	1.9
9764.460	53.1	V	74.0	-20.9	PK	12	2.0
6507.830	33.1	H	54.0	-20.9	AVG	341	1.0
3256.670	53.0	V	74.0	-21.0	PK	253	1.9
6507.830	32.9	V	54.0	-21.1	AVG	188	1.0
4883.290	30.7	H	54.0	-23.3	AVG	96	1.0
4883.220	30.6	V	54.0	-23.4	AVG	275	1.1
3255.840	29.1	H	54.0	-24.9	AVG	316	1.0
6510.660	44.3	H	74.0	-29.7	PK	341	1.0
6510.660	43.5	V	74.0	-30.5	PK	188	1.0
4883.100	42.3	H	74.0	-31.7	PK	96	1.0
3255.550	41.6	H	74.0	-32.4	PK	316	1.0
4880.620	41.4	V	74.0	-32.6	PK	275	1.1

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.



EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	N/A

Run #2: Radiated Spurious Emissions, 1000 - 18000 MHz. Operating Mode: RX

External Antenna

EUT at 2441 MHz

Frequency Range	Test Distance	Limit Distance	Extrapolation Factor
1000 -18000 MHz	3	3	0.0

Rx Mode Spurious Emissions

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	PK/QP/Avg	degrees	meters
9762.790	38.0	V	54.0	-16.0	AVG	360	1.0
8135.230	37.0	V	54.0	-17.0	AVG	219	1.0
3256.140	35.2	V	54.0	-18.8	AVG	91	1.9
6507.860	33.0	H	54.0	-21.0	AVG	206	1.0
6507.830	32.8	V	54.0	-21.2	AVG	0	1.0
3255.350	51.7	V	74.0	-22.3	PK	91	1.9
4882.650	30.8	H	54.0	-23.2	AVG	30	1.0
4882.150	30.6	V	54.0	-23.4	AVG	212	1.0
3255.840	30.3	H	54.0	-23.7	AVG	31	1.1
9763.540	49.7	V	74.0	-24.3	PK	360	1.0
8135.280	48.3	V	74.0	-25.7	PK	219	1.0
6508.090	44.5	H	74.0	-29.5	PK	206	1.0
6507.940	44.0	V	74.0	-30.0	PK	0	1.0
3255.890	42.6	H	74.0	-31.4	PK	31	1.1
4883.480	42.1	V	74.0	-31.9	PK	212	1.0
4881.020	41.9	H	74.0	-32.1	PK	30	1.0

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:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	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: 7/21/2009 21:42

Config. Used: 2

Test Engineer: Vishal Narayan

Config Change: None

Test Location: SVOATS #2

EUT Voltage: 230V/50Hz and 120V/60Hz

General Test Configuration

The host system was located on a wooden table, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located approximately 30 meters from the test area. All I/O connections were running on top of the groundplane.

Ambient Conditions:

Temperature: 16 °C

Rel. Humidity: 83 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	CE, AC Power,120V/60Hz	EN55022 Class B	Pass	45.3dB μ V @ 0.465MHz (-1.3dB)

Modifications Made During Testing

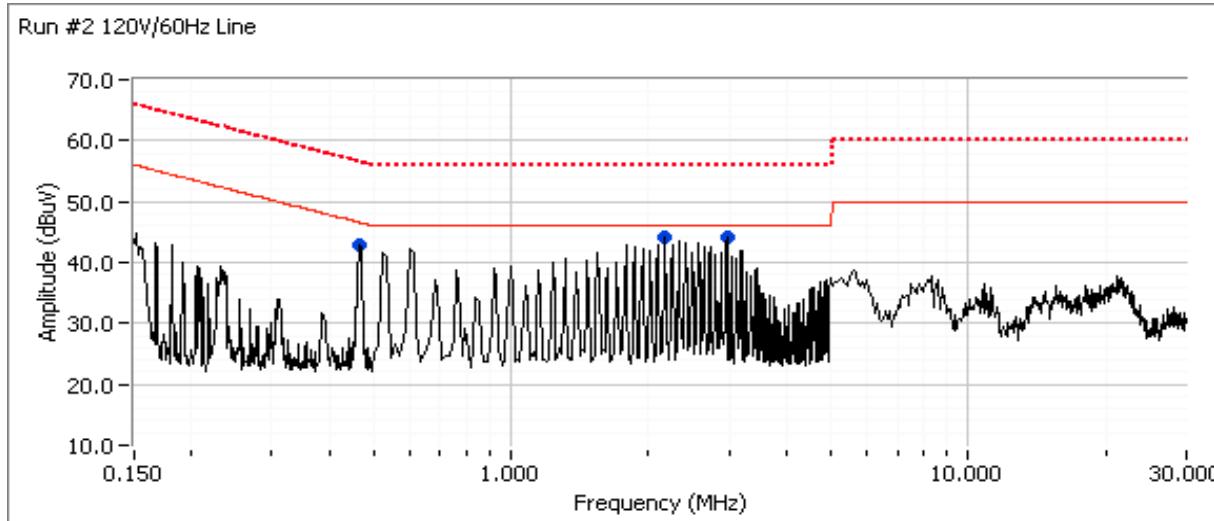
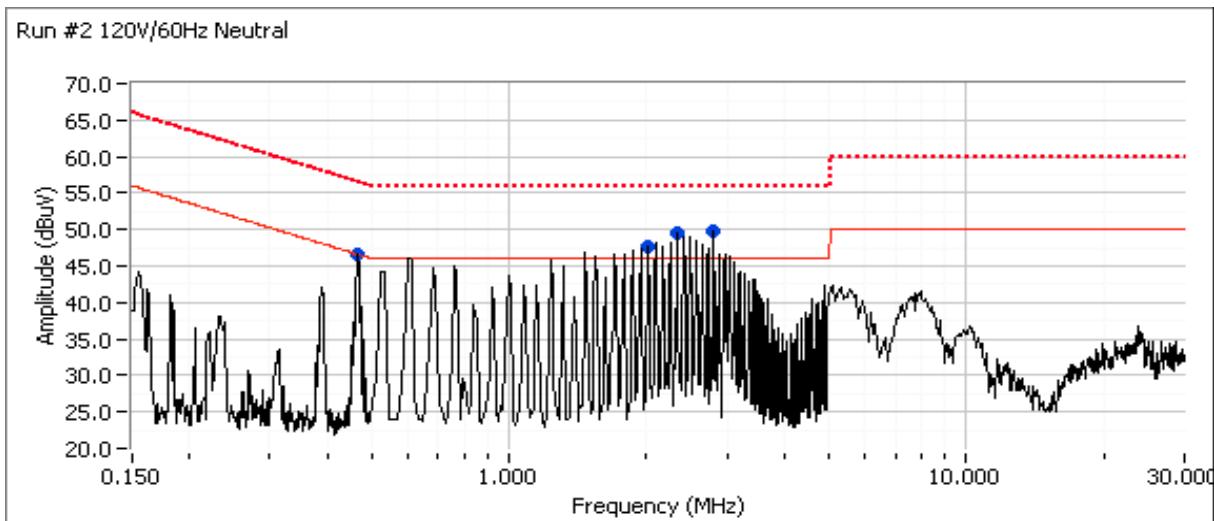
No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





EMC Test Data

Client:	Broadcom	Job Number:	J76100
Model:	BCM92070MD_REF12	T-Log Number:	T76154
Contact:	Anne Liang/Juan Martinez	Account Manager:	Dean Erikson
Standard:	FCC, RSS 210	Class:	B

Continuation of Run #2

Frequency MHz	Level dB μ V	AC Line	EN55022 B		Detector	Comments
			Limit	Margin	QP/Ave	
0.465	45.3	Neutral	46.6	-1.3	AVG	AVG (0.10s)
0.465	41.7	Line	46.6	-4.9	AVG	AVG (0.10s)
2.790	40.2	Neutral	46.0	-5.8	AVG	AVG (0.10s)
2.170	39.5	Line	46.0	-6.5	AVG	AVG (0.10s)
2.327	38.1	Neutral	46.0	-7.9	AVG	AVG (0.10s)
2.017	37.4	Neutral	46.0	-8.6	AVG	AVG (0.10s)
2.945	37.4	Line	46.0	-8.6	AVG	AVG (0.10s)
0.465	45.3	Neutral	56.6	-11.3	QP	QP (1.00s)
2.790	44.2	Neutral	56.0	-11.8	QP	QP (1.00s)
2.327	42.6	Neutral	56.0	-13.4	QP	QP (1.00s)
2.170	41.9	Line	56.0	-14.1	QP	QP (1.00s)
2.017	41.6	Neutral	56.0	-14.4	QP	QP (1.00s)
0.465	41.8	Line	56.6	-14.8	QP	QP (1.00s)
2.945	40.4	Line	56.0	-15.6	QP	QP (1.00s)

Appendix C Photographs of Test Configurations

Uploaded as a separate exhibit

Appendix D Proposed FCC ID Label & Label Location

Uploaded as a separate exhibit

Appendix E Detailed Photographs

Uploaded as a separate exhibit

Appendix F Operator's Manual

Uploaded as a separate exhibit

Appendix G Block Diagram

Uploaded as a separate exhibit

Appendix H Schematic Diagrams

Uploaded as a separate exhibit

Appendix I Theory of Operation

Uploaded as a separate exhibit

Appendix J RF Exposure Information

Uploaded as a separate exhibit