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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 4 / RSS 247 Issue 1
FCC Part 15 Subpart C

Model: SDGOB-1506 and SDGOB-1505

IC CERTIFICATION #:	466D-SDGOB1505 and 466D-SDGOB1506
FCC ID:	B94SDGOB1505 and B94SDGOB1506
APPLICANT:	Hewlett Packard Company 3000 Hanover Street Palo Alto, CA 94304
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-5
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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	August 27, 2015	First release	
1	September 23, 2015	Updated IC number	MEH
2	November 17, 2015	Updated power vs data rate results Added Appendix for justification of test reductions taken	MEH

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SCOPE

An electromagnetic emissions test has been performed on the Hewlett Packard Company model SDGOB-1506 and SDGOB-1505, pursuant to the following rules:

Industry Canada RSS-Gen Issue 4
RSS 247 Issue 1 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices"
FCC Part 15, Subpart E requirements for UNII Devices

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 National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2013
FCC DTS Measurement Guidance KDB558074

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.).

Testing for the 802.11 operation was performed only on model SDGOB-1505. This model was considered representative of the SDGOB-1506.

Only results for the 2.4GHz 802.11 operation is presented in this report.

STATEMENT OF COMPLIANCE

The tested sample of Hewlett Packard Company model SDGOB-1506 and SDGOB-1505 complied with the requirements of the following regulations:

Industry Canada RSS-Gen Issue 4
RSS 247 Issue 1 "Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices"
FCC Part 15, Subpart E requirements for UNII Devices

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 Hewlett Packard Company model SDGOB-1506 and SDGOB-1505 and therefore apply only to the tested sample. The sample was selected and prepared by Tarandeep Kaur of Broadcom Corporation on behalf of Hewlett Packard Company.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz) – 802.11 Operation

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 247 5.2	Digital Modulation	Systems uses OFDM / DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 247 5.2 (1)	6dB Bandwidth	8.1 MHz minimum	>500kHz	Complies
15.247 (b) (3)	RSS 247 5.4 (4)	Output Power (multipoint systems)	11b: 18.5 dBm (71mW) n20: 21.5 dBm (142mW) EIRP = 253mW Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	11b: 1.8 dBm/10kHz n20: 2.2 dBm/10kHz	8dBm/3kHz	Complies
15.247(d)	RSS 247 5.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions below -30dBc limit	< -30dBc Note 2	Complies
15.247(d) / 15.209	RSS 247 5.5 / RSS-GEN	Radiated Spurious Emissions 30MHz – 25 GHz	53.9 dBµV/m @ 2483.6 MHz (-0.1 dB)	15.207 in restricted bands, all others <-30dBc Note 2	Complies

Note 1: EIRP calculated using antenna gain of 2.5 dBi for the highest EIRP system.
Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Uses u.FL connector for external antenna	Unique or integral antenna required	Complies
15.207	RSS GEN Table 3	AC Conducted Emissions	40.3 dBµV @ 0.176 MHz(-14.4 dB)	Refer to page 18	Complies
15.247 (b) (5) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in separate exhibit, RSS 102 declaration and User Manual statements.	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSS GEN 8.3	User Manual	-	Statement for products with detachable antenna	Complies
-	RSP 100 RSS GEN 6.6	Occupied Bandwidth	b: 10.3 MHz g: 16.7 MHz n20: 17.6 MHz	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	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Hewlett Packard Company model SDGOB-1505 is an IEEE 802.11 a/b/g/n wireless network adapter that operates in both the 2.4GHz and 5GHz bands. Model SDGOB-1506 adds BLE functionality. The card supports 802.11n modes in 20MHz and 40MHz.

The sample was received on July 13, 2015 and tested on July 13, 14, 16, 17, 20, 22, 23 and 31 and August 3 and 4, 2015. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	FCC ID
Hewlett Packard Company	SDGOB-1505	802.11abgn	707781772513	B94SDGOB1505
Hewlett Packard Company	SDGOB-1505	802.11abgn	D85DE2000005	B94SDGOB1505
Hewlett Packard Company	SDGOB-1505	802.11abgn	707781772509	B94SDGOB1505

OTHER EUT DETAILS

SDGOB-1505 (FCC ID: B94SDGOB1505)
USB interface
Wifi operation 2.4GHz and 5GHz bands
802.11 a/b/g/n20 2x2 operation
40MHz bandwidths supported in 5GHz bands only
Two configurations: one using fixed internal/onboard antennas, and one with u.FL connectors to allow for external antennas.

SDGOB-1505 is identical to the SDGOB-1506 (FCC ID: B94SDGOB1506), except that the BLE function is disabled via a resistor change.

ANTENNA SYSTEM

There are two antenna options:
PCB trace antenna – 2.5dBi @ 2.4GHz, 3.5dBi @ 5GHz
External antenna, Yageo, ANTX300P002B24553, 0.7dBi @ 2.4GHz, 1.9dBi @ 5GHz

ENCLOSURE

The EUT has no enclosure. It is designed to be installed within the enclosure of a host computer.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as support equipment for testing:

Company	Model	Description	Serial Number	FCC ID
Dell	E6400	Laptop	FN4XJK1	-

No remote support equipment was used during testing.

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop USB	USB Card Adapter	USB	Shielded	1
Card Adapter	EUT Module	-	-	-

Additional on Support Equipment

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Laptop Ethernet	Switch	Cat-5	Unshielded	10
Laptop DC input	AC/DC Output	2Wire	Unshielded	1
AC/DC Adapter	AC Mains	3Wire	Unshielded	0.8

EUT OPERATION

During testing, the EUT was configured to continuously transmit at maximum output power and noted data rate on the channel indicated.

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	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 5	US0027	2845B-5	41039 Boyce Road Fremont, CA 94538-2435

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. 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.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. 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 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

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 C63.10 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 as specified in ANSI C63.4. 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 C63.10, 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.

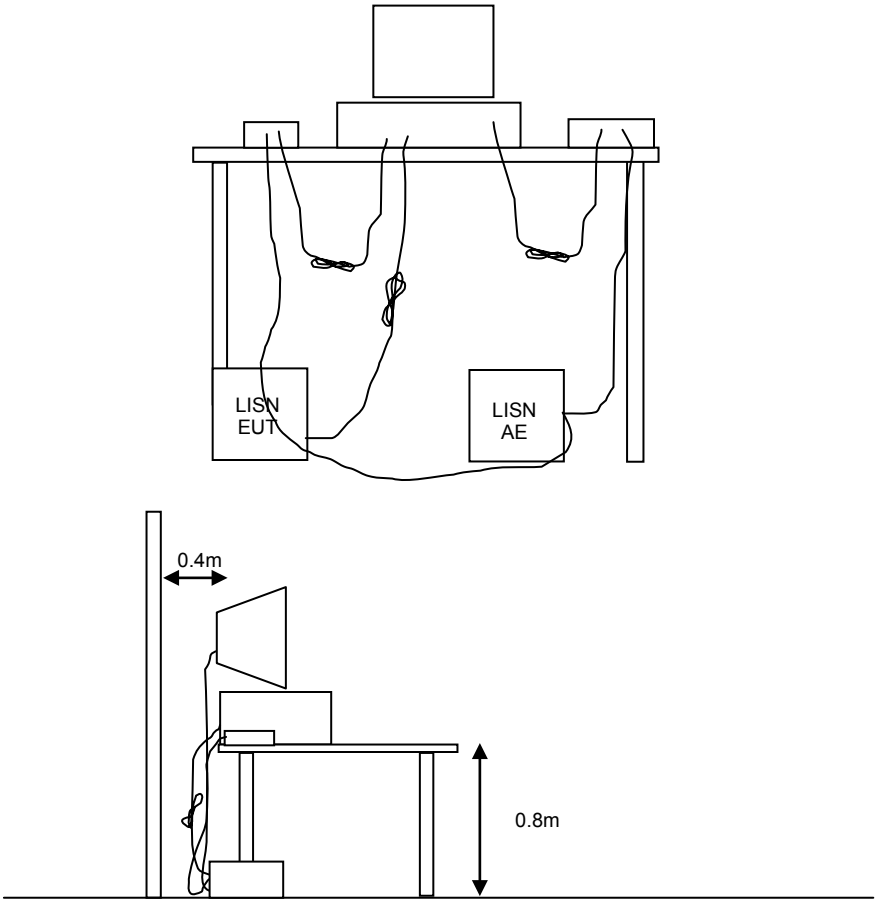


Figure 1 Typical Conducted Emissions Test Configuration

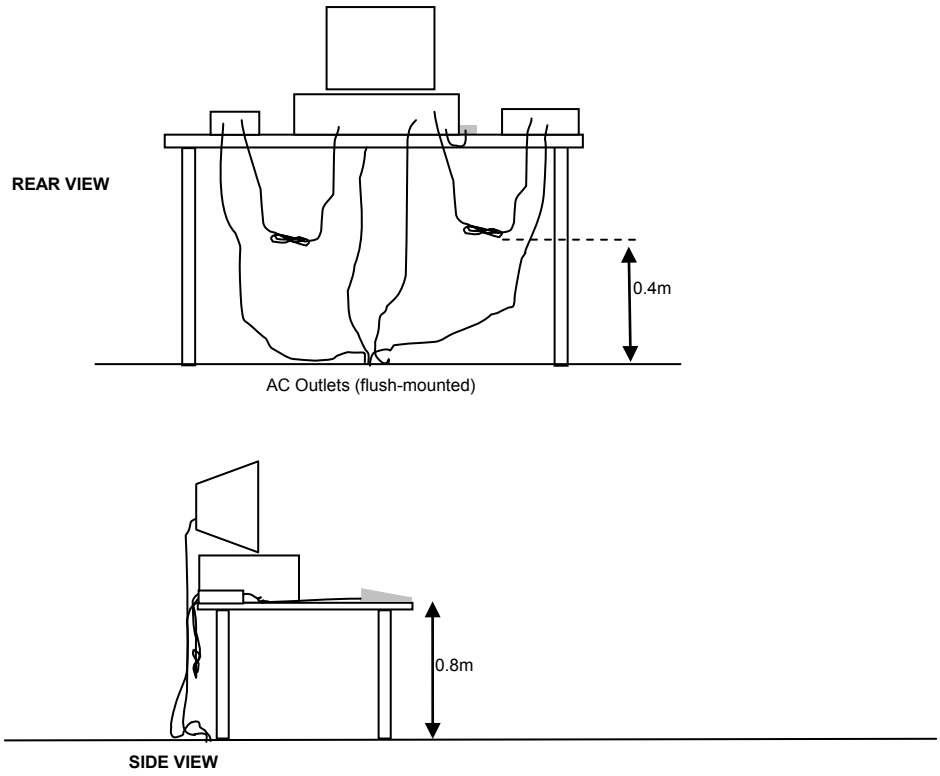
RADIATED EMISSIONS

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.

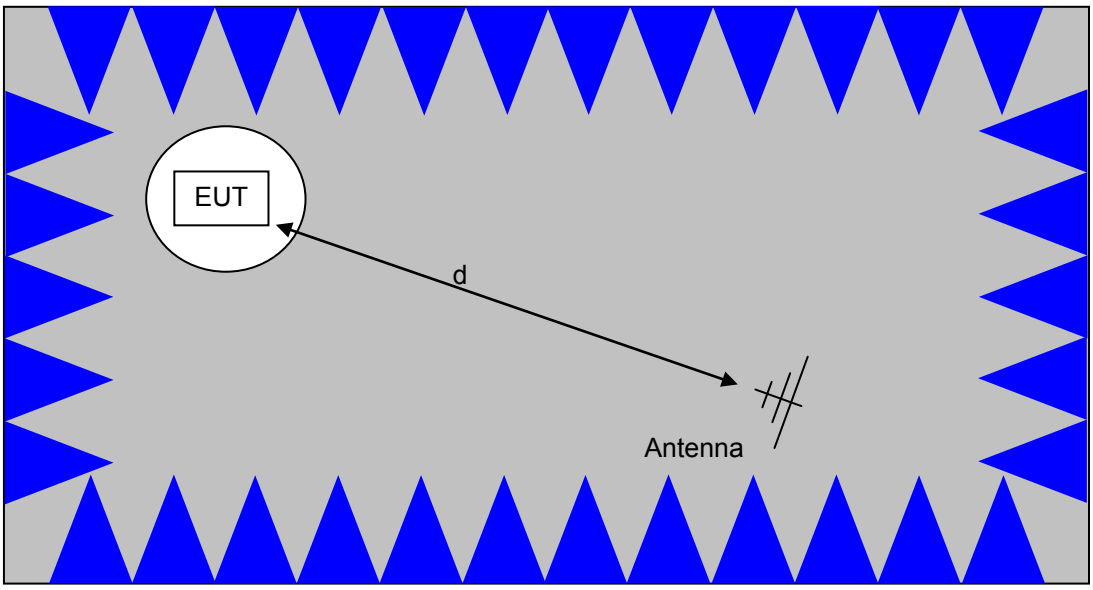
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

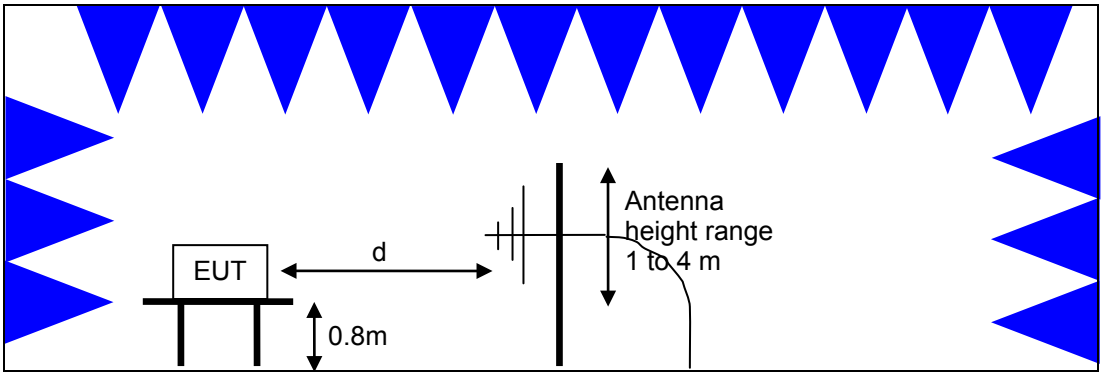


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

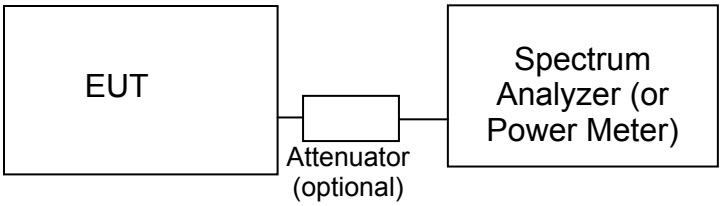
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and 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 bands[1].

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

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density.

Operating Frequency (MHz)	Output Power	Power Spectral Density
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz

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 GEN. 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).

[1] The restricted bands are detailed in FCC 15.205, RSS-GEN Table 3

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = 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:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

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:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

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.

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 d (meters) from the equipment under test:

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

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 1000 - 6,000 MHz, 13-Jul-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radiated Emissions, 1000 - 6,000 MHz, 14-Jul-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radiated Emissions, 1000 - 6,000 MHz, 15-Jul-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radiated Emissions, 1000 - 6,000 MHz, 16-Jul-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radiated Emissions, 1000 - 6,000 MHz, 17-Jul-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radiated Emissions, 1,000 - 6,000 MHz, 20-Jul-15					
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 1000 - 12,000 MHz, 20-Jul-15					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 1000 - 12,000 MHz, 21-Jul-15					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Spurious Emissions, 1,000 - 25,000 MHz, 22-Jul-15					

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Miteq	Preamplifier, 1-18 GHz	AFS44	1346	1/16/2015	1/16/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 1000 - 25,000 MHz, 22-Jul-15					
Miteq	Preamplifier, 1-18 GHz	AFS44	1346	1/16/2015	1/16/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 1000 - 25,000 MHz, 23-Jul-15					
Miteq	Preamplifier, 1-18 GHz	AFS44	1346	1/16/2015	1/16/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	1683	7/13/2015	7/13/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	7/8/2015	7/8/2016
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	7/10/2015	7/10/2016
Radiated Emissions, 1000 - 25,000 MHz, 24-Jul-15					
Miteq	Preamplifier, 1-18 GHz	AFS44	1346	1/16/2015	1/16/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	7/8/2015	7/8/2016
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	7/10/2015	7/10/2016
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/8/2015	7/8/2016
Radiated Emissions, 1000 - 25,000 MHz, 27-Jul-15					
Miteq	Preamplifier, 1-18 GHz	AFS44	1346	1/16/2015	1/16/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	7/8/2015	7/8/2016
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	7/10/2015	7/10/2016
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/8/2015	7/8/2016
Radiated Spurious Emissions, 1000 - 40,000 MHz, 29-Jul-15					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 1000 - 25,000 MHz, 29-Jul-15					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
Hewlett Packard	Head (Inc flex cable, (1742,1743) Blue)	84125C	1620	6/5/2015	6/5/2016
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
A. H. Systems	Red System Horn, 18-40GHz	SAS-574, p/n: 2581	2161	7/16/2015	7/16/2017
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	1729	7/8/2015	7/8/2016
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	1730	7/10/2015	7/10/2016
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	1682	7/8/2015	7/8/2016

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 1000 - 18,000 MHz, 30-Jul-15					
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	10/31/2014	10/31/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, FT (SA40) Blue	8564E (84125C)	1393	5/2/2015	5/2/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Radiated Emissions, 30 - 1,000 MHz, 30-Jul-15					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	9/17/2014	9/17/2016
Com-Power	Preamplifier, 30-1000 MHz	PA-103A	2359	12/22/2014	12/22/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Conducted Emissions - AC Power Ports, 31-Jul-15					
EMCO	LISN, 10 kHz-100 MHz, 25A	3825/2	1292	7/24/2015	7/24/2016
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	5/14/2015	5/14/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	7/6/2015	7/6/2016
Radiated Emissions, 30 - 1,000 MHz, 04-Aug-15					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	9/17/2014	9/17/2016
Com-Power	Preamplifier, 30-1000 MHz	PA-103A	2359	12/22/2014	12/22/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESIB40 (1088.7490.40)	2493	1/23/2015	1/23/2016
Radio Antenna Port (Power and Spurious Emissions), 05-Aug-15					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radio Antenna Port (Power and Spurious Emissions), 06-Aug-15					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radio Antenna Port (Power), 11-Aug-15					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radio Antenna Port (Power and Spurious Emissions), 12-Aug-15					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016
Radio Antenna Port (Frequency Stability), 12-Aug-15					
Watlow	Temp Chamber (w/ F4 Watlow Controller)	F4	2170	7/14/2015	7/14/2016
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016

Appendix B Test Data

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Client:	Hewlett Packard Company	Job Number:	J98746
Product	SDGOB-1505	T-Log Number:	T98753
System Configuration:	-	Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Emissions Standard(s):	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Hewlett Packard Company

Product

SDGOB-1505

Date of Last Test: 8/14/2015

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Power vs. Data Rate

In normal operating modes the card uses power settings stored on EEPROM to set the output power. For a given nominal output power the actual transmit power normally is reduced as the data rate increases, therefore testing was performed at the data rate in the mode with highest power to determine compliance with the requirements.
The following power measurements were made using a GATED average power meter and with the device configured in a continuous transmit mode on Chain 1 at the various data rates in each mode to verify the highest power mode:

Sample Notes

Sample S/N: 707781772509
Driver: 6.37 RC214 .12

Date of Test: 7/13/2015
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Mode	Data Rate	Power (dBm)	Power setting
802.11b	1	**18.3**	q72
	2	18.3	
	5.5	18.2	
	11	18.2	
802.11g	6	**17.0**	q67
	9	17.0	
	12	17.0	
	18	16.9	
	24	16.9	
	36	16.8	
	48	16.8	
	54	16.7	

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Mode	Data Rate	Power (dBm)	Power setting	
802.11n 20MHz	6.5	**18.8**	q72	
	13	18.8		
	19.5	18.7		
	26	18.6		
	39	18.6		
	52	18.6		
	58.5	18.5		
	65	18.5		
	78	N/A		<<-11ac mode only
802.11n/ac 40MHz	13.5	**17.0**	q66	
	27	17.0		
	40.5	16.9		
	54	16.9		
	81	16.8		
	108	16.8		
	121.5	16.7		
	135	16.6		
	162	N/A		<<-11ac mode only
	180	N/A		<<-11ac mode only

Note :	Power setting - the software power setting used during testing, included for reference only.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Duty Cycle

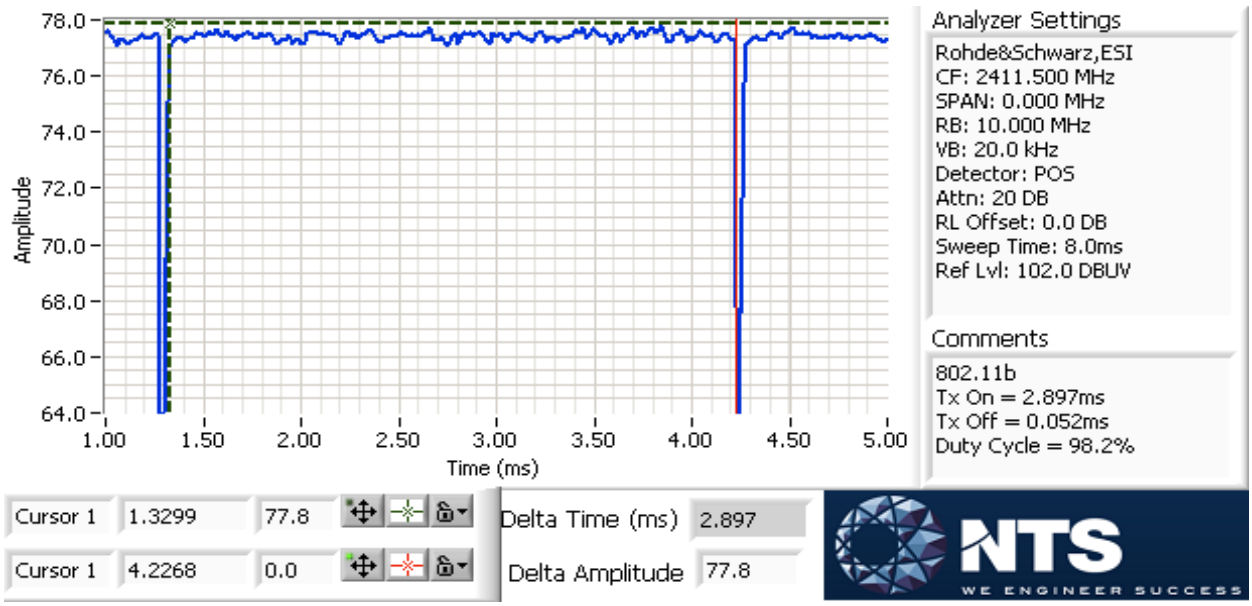
Date of Test: 7/13/2015
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

Duty cycle measurements performed on the worse case data rate for power.

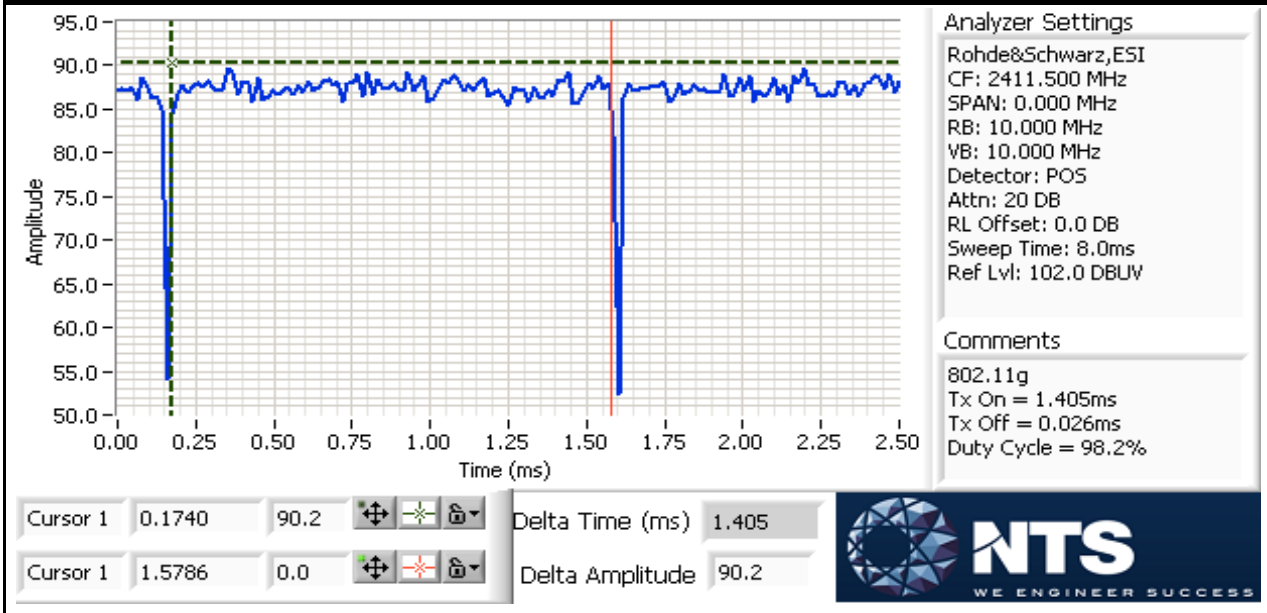
Notes: Measurements taken with maximum RBW/VBW settings allowed.

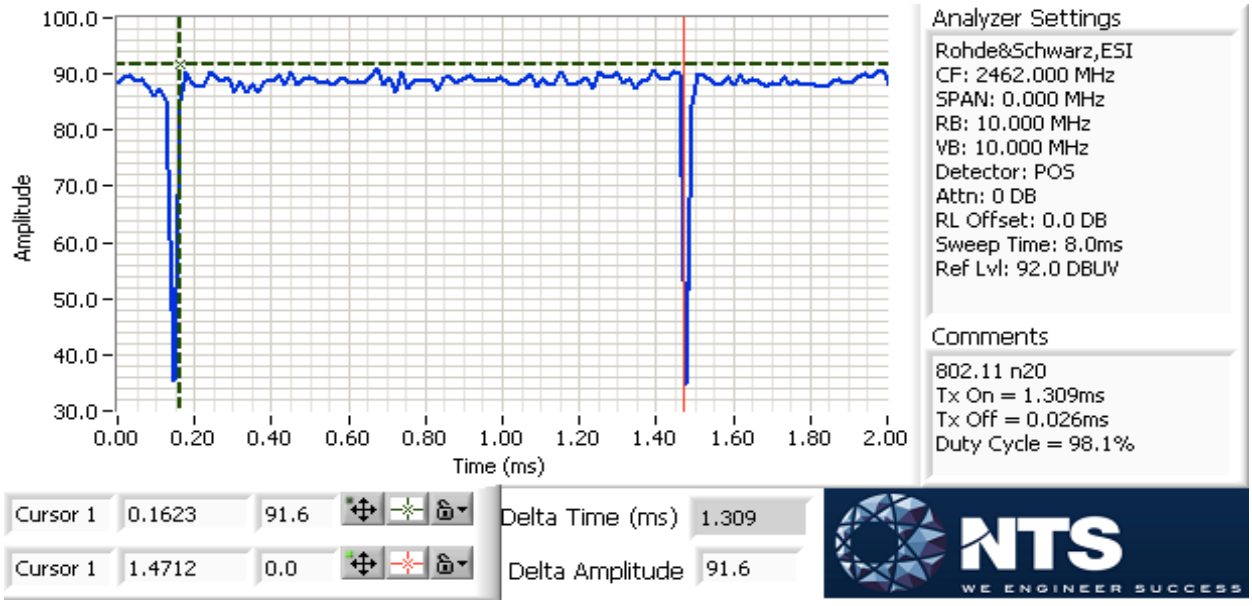
Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	345
11g	6Mb/s	98.2%	Yes	1.405	0	0	712
n20	MCS0	98.1%	Yes	1.309	0	0	764
n40	MCS0	98.0%	Yes	0.932	0	0	1073
n40	MCS0	98.4%	Yes	0.932	0	0	1073

* Correction factor when using RMS/Power averaging - 10*log(1/x)
** Correction factor when using linear voltage average - 20*log(1/x)
T = Minimum transmission duration

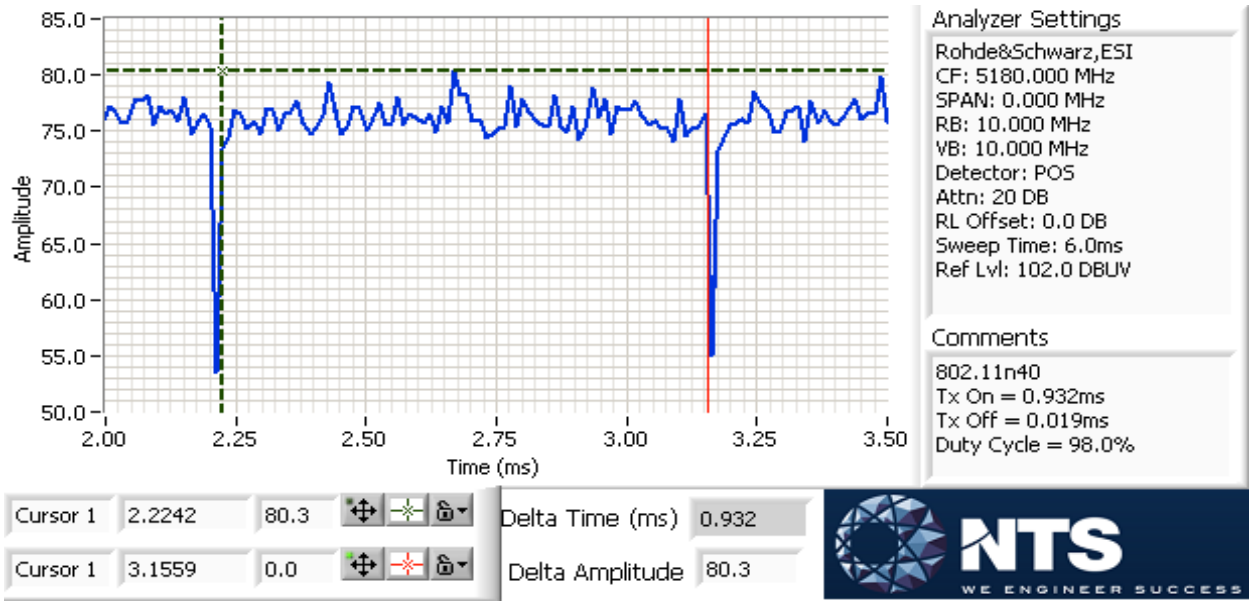


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 247 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.

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, unless otherwise noted.

Ambient Conditions:

Temperature: 21.8 °C
Rel. Humidity: 37 %

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

Run #	Mode	Channel	Target Power	Final Setting	Test Performed	Limit	Result / Margin
1	b (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 2390.0 MHz (-0.4 dB)
	b (1Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.5 dBµV/m @ 2483.8 MHz (-0.5 dB)
	b (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.3 dBµV/m @ 2483.8 MHz (-0.7 dB)
3	g (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2390.0 MHz (-0.2 dB)
	g (1Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.6 dBµV/m @ 2390.0 MHz (-0.4 dB)
	g (1Tx)	3 - 2422MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.3 dBµV/m @ 2390.0 MHz (-0.7 dB)
	g (1Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.4 dBµV/m @ 2483.5 MHz (-0.6 dB)
	g (1Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.9 dBµV/m @ 2483.6 MHz (-0.1 dB)
	g (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.5 dBµV/m @ 2483.5 MHz (-0.5 dB)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #	Mode	Channel	Target Power	Final Setting	Test Performed	Limit	Result / Margin
4	n20 (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.9 dBµV/m @ 2390.0 MHz (-0.1 dB)
	n20 (1Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.5 dBµV/m @ 2390.0 MHz (-0.5 dB)
	n20 (1Tx)	3 - 2422MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.7 dBµV/m @ 2390.0 MHz (-0.3 dB)
	n20 (1Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2483.5 MHz (-0.2 dB)
	n20 (1Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.0 dBµV/m @ 2483.5 MHz (-1.0 dB)
	n20 (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.2 dBµV/m @ 2483.7 MHz (-0.8 dB)
5	n20 (2Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.8 dBµV/m @ 2387.6 MHz (-0.2 dB)
	n20 (2Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.2 dBµV/m @ 2388.4 MHz (-0.8 dB)
	n20 (2Tx)	3 - 2422MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.2 dBµV/m @ 2388.8 MHz (-0.8 dB)
	n20 (2Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.0 dBµV/m @ 2483.6 MHz (-1.0 dB)
	n20 (2Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.7 dBµV/m @ 2486.7 MHz (-0.3 dB)
	n20 (2Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.2 dBµV/m @ 2485.8 MHz (-1.8 dB)

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.

Sample Notes

Sample S/N: D85DE2000005
Driver: 6.37 RC214 .12
Antenna: Internal

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Notes

Testing performed at 1.5m per C63.10
n20 2Tx was tested as representative of 11g 2Tx
Worse case chain for 1Tx operation was determined from preliminary testing

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Emission has duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

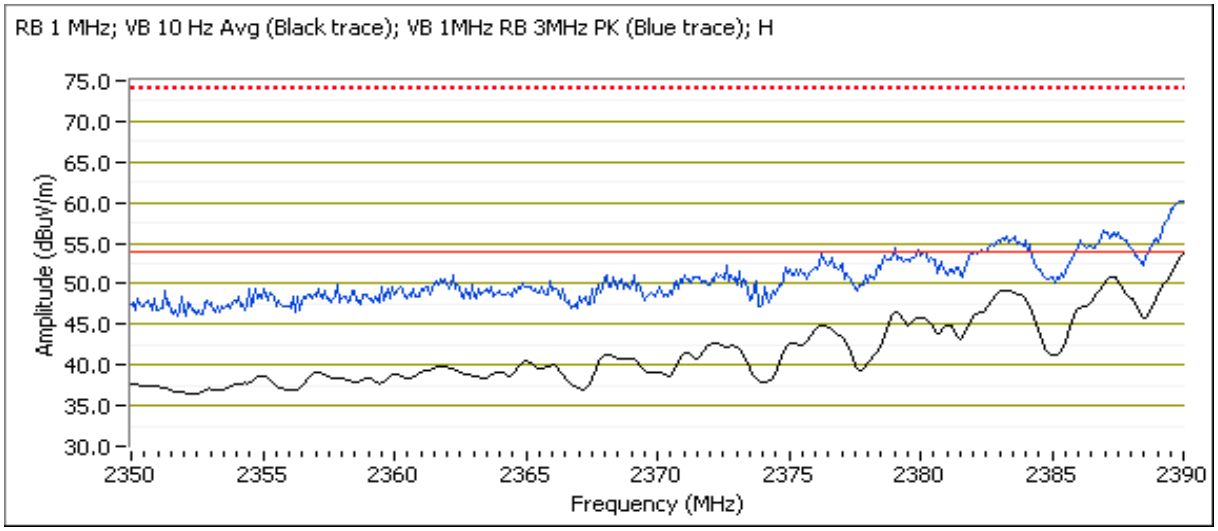
Run #1: Radiated Bandedge Measurements

Date of Test: 7/16/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

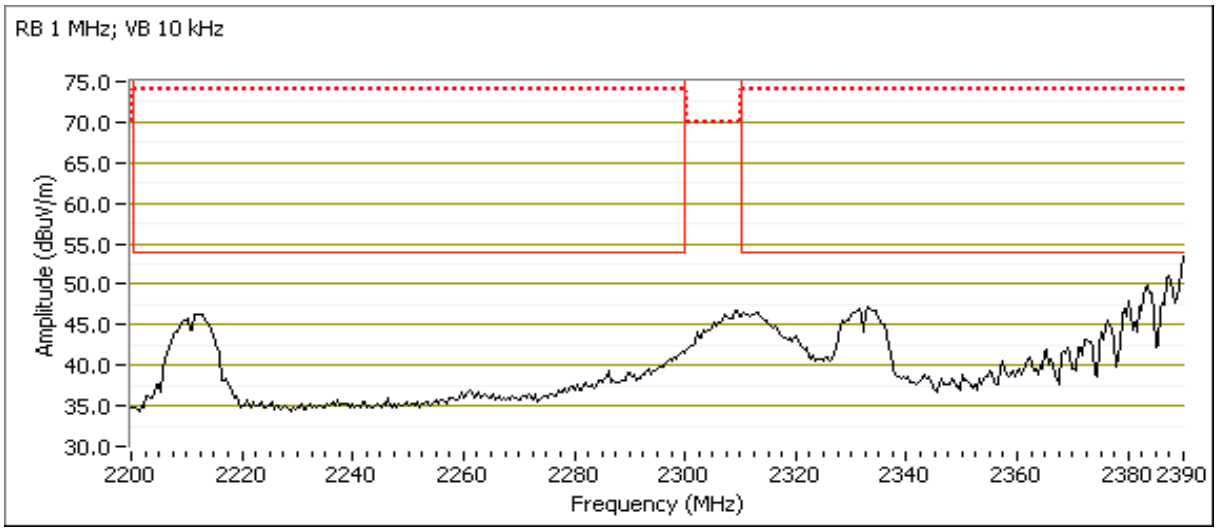
Channel: 1 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
pwr setting = q64								
2390.000	53.6	H	54.0	-0.4	AVG	345	1.0	POS; RB 1 MHz; VB: 10 Hz
2390.000	60.0	H	74.0	-14.0	PK	345	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	45.2	V	54.0	-8.8	AVG	211	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.440	51.5	V	74.0	-22.5	PK	211	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

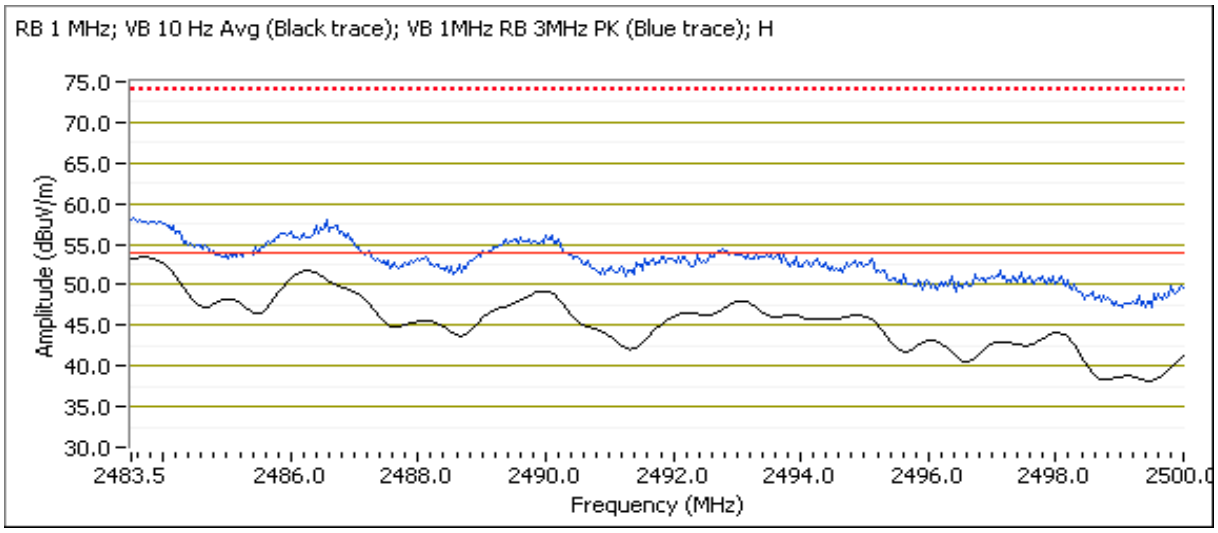


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

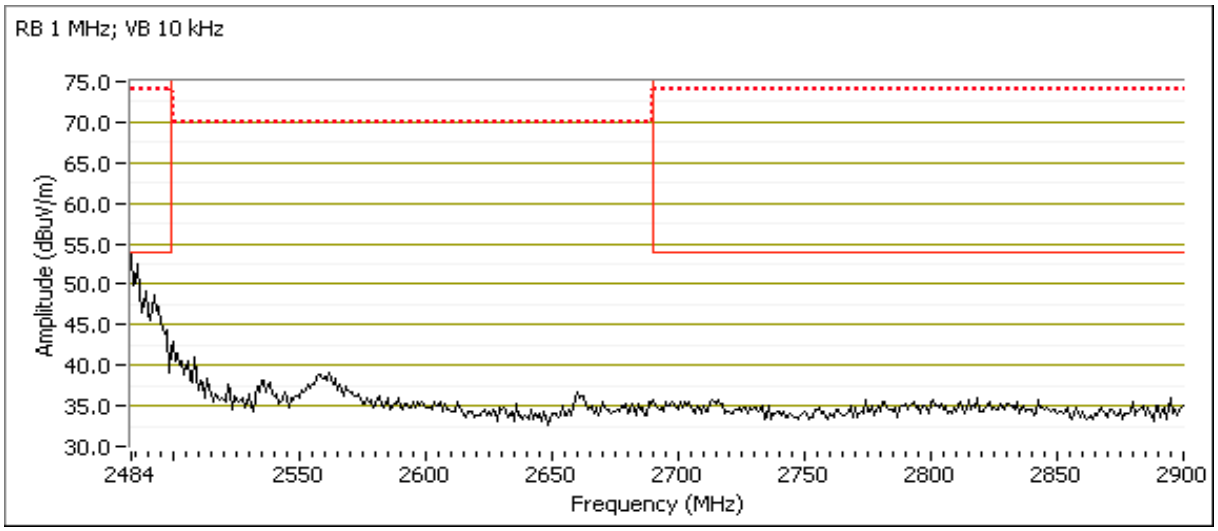
Channel: 10 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.760	53.5	H	54.0	-0.5	AVG	167	1.6	POS; RB 1 MHz; VB: 10 Hz
2483.500	57.6	H	74.0	-16.4	PK	167	1.6	POS; RB 1 MHz; VB: 3 MHz
2483.670	46.1	V	54.0	-7.9	AVG	153	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.060	51.9	V	74.0	-22.1	PK	153	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

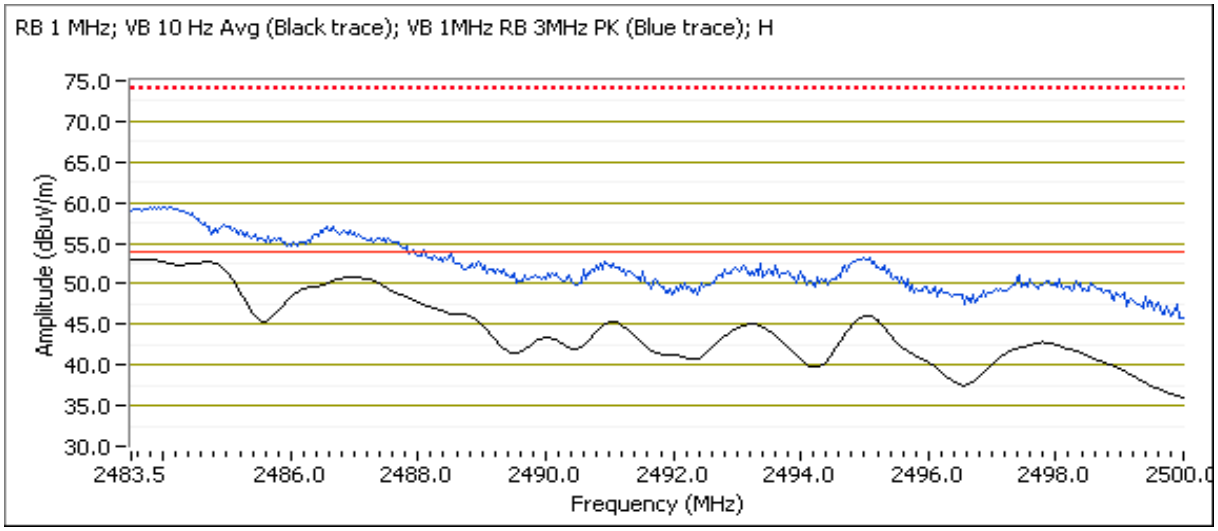


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

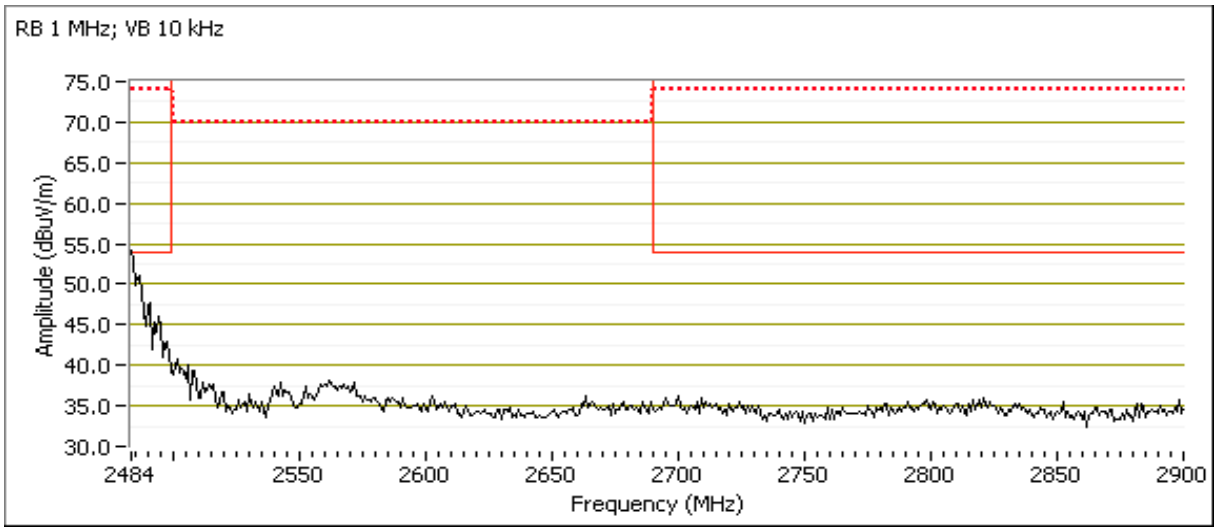
Channel: 11 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.760	53.3	H	54.0	-0.7	AVG	167	1.6	POS; RB 1 MHz; VB: 10 Hz
2483.700	59.2	H	74.0	-14.8	PK	167	1.6	POS; RB 1 MHz; VB: 3 MHz
2483.730	46.5	V	54.0	-7.5	AVG	155	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.030	53.9	V	74.0	-20.1	PK	155	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

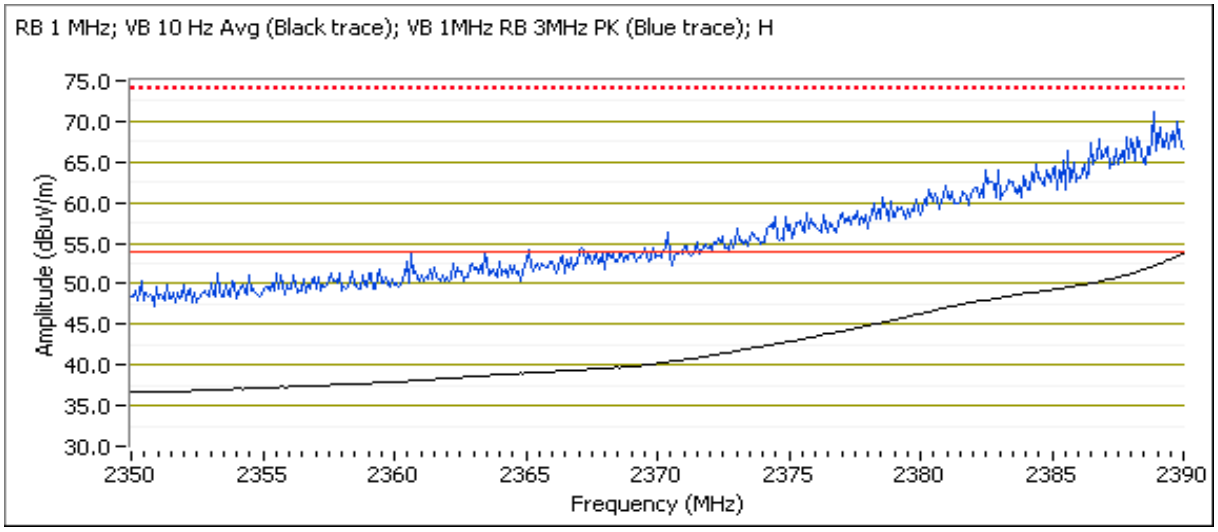
Run #3: Radiated Bandedge Measurements

Date of Test: 7/16/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

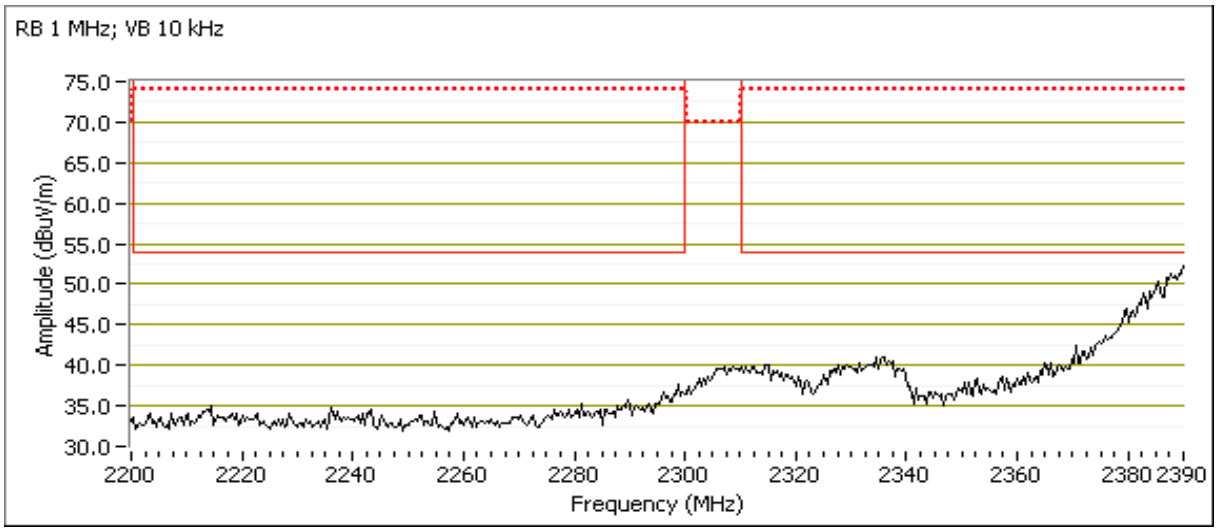
Channel: 1 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.8	H	54.0	-0.2	AVG	321	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.680	71.4	H	74.0	-2.6	PK	321	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	48.9	V	54.0	-5.1	AVG	214	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.280	65.2	V	74.0	-8.8	PK	214	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

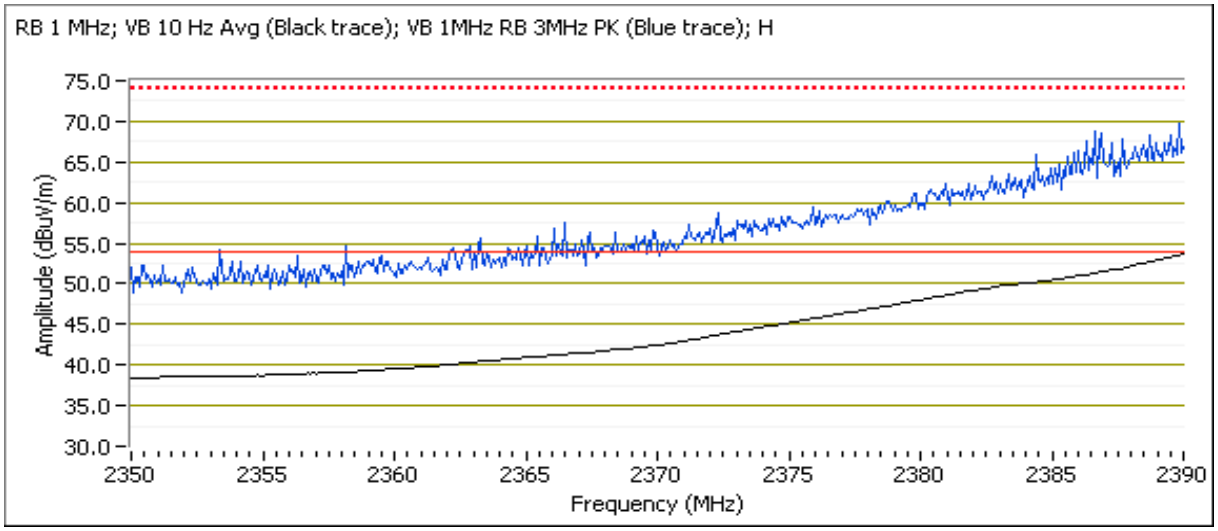


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

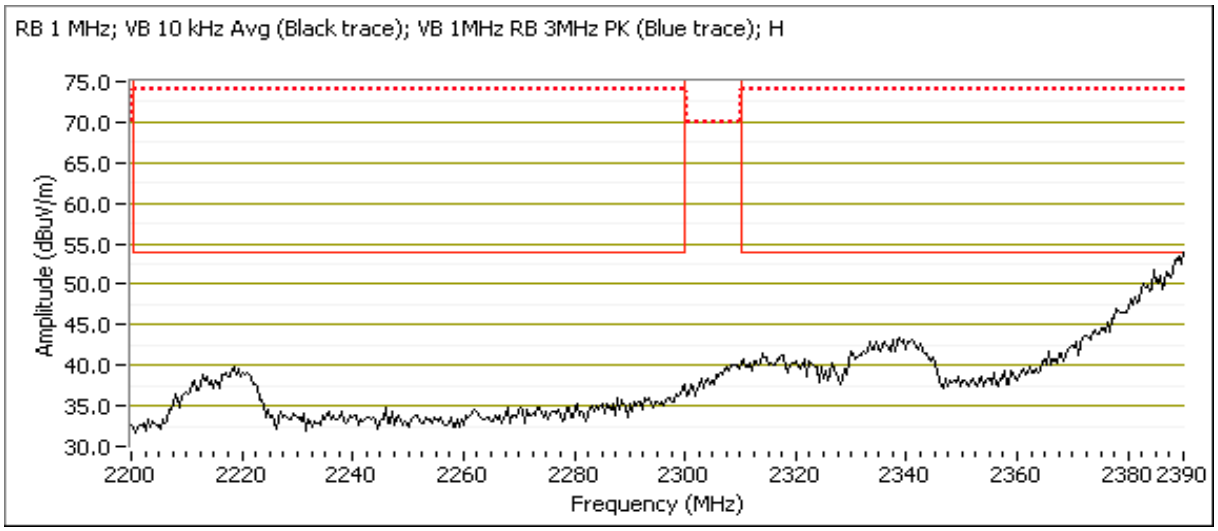
Channel: 2 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.6	H	54.0	-0.4	AVG	331	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.680	69.6	H	74.0	-4.4	PK	331	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	49.2	V	54.0	-4.8	AVG	214	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.760	65.8	V	74.0	-8.2	PK	214	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

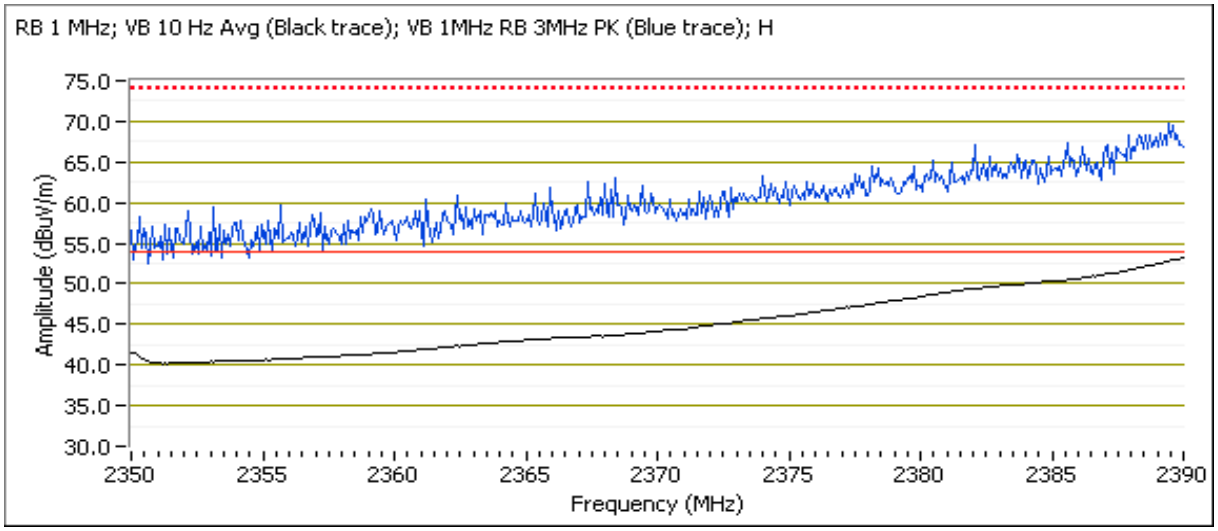


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

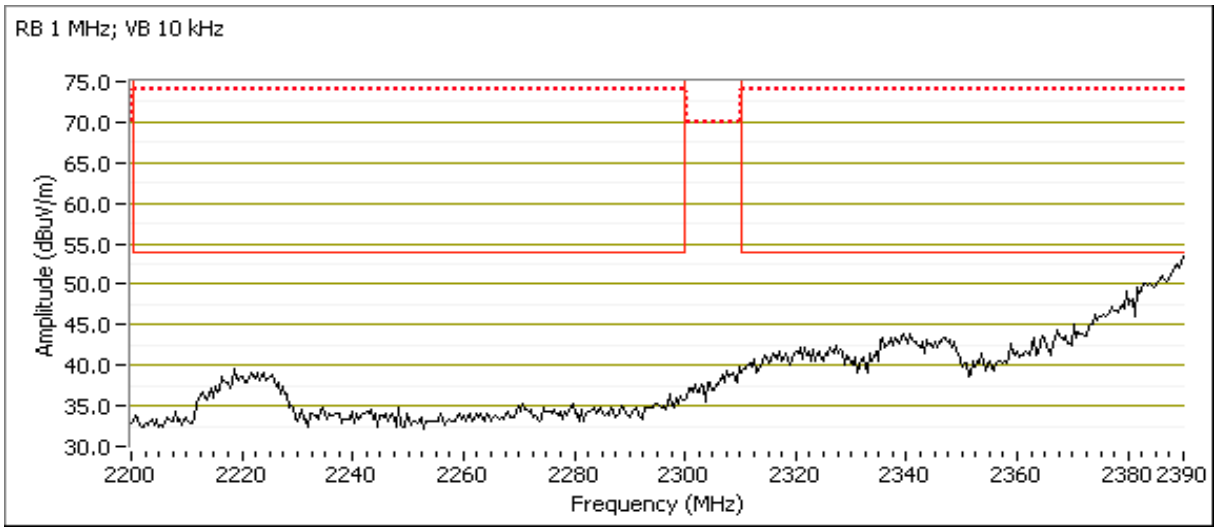
Channel: 3 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.3	H	54.0	-0.7	AVG	328	1.0	POS; RB 1 MHz; VB: 10 Hz
2390.000	69.6	H	74.0	-4.4	PK	328	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	49.7	V	54.0	-4.3	AVG	215	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.040	66.7	V	74.0	-7.3	PK	215	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

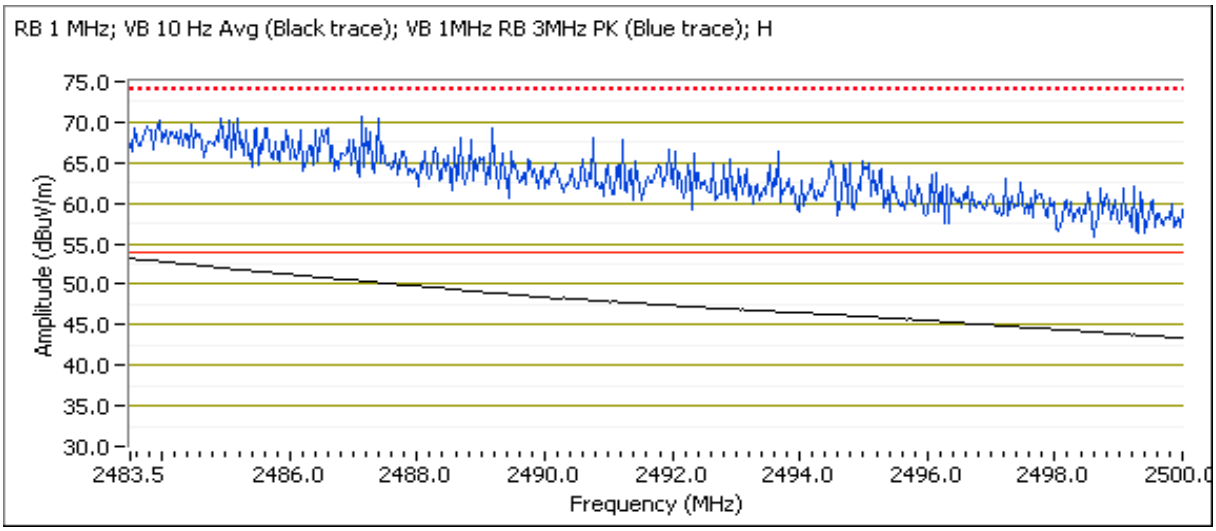


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

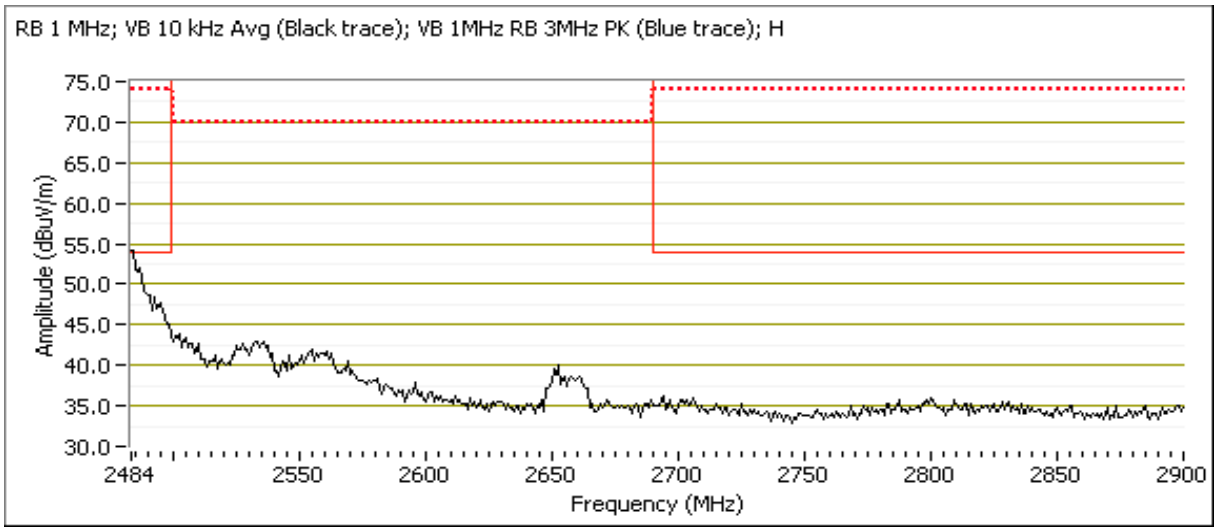
Channel: 9 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.4	H	54.0	-0.6	AVG	360	2.2	POS; RB 1 MHz; VB: 10 Hz
2491.200	71.7	H	74.0	-2.3	PK	360	2.2	POS; RB 1 MHz; VB: 3 MHz
2483.500	47.6	V	54.0	-6.4	AVG	167	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.260	62.1	V	74.0	-11.9	PK	167	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

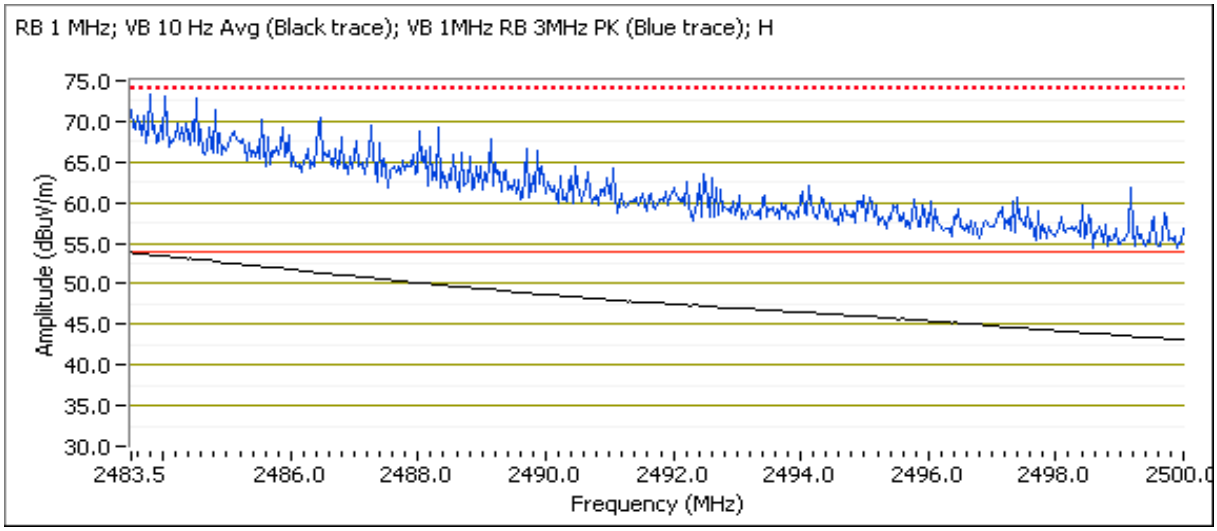


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

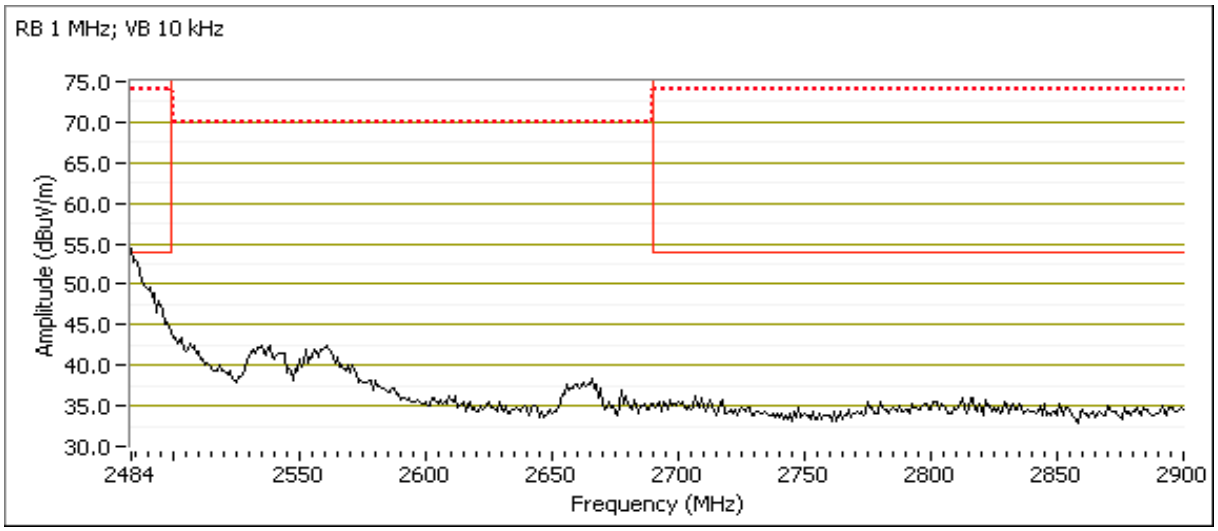
Channel: 10 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.570	53.9	H	54.0	-0.1	AVG	360	2.2	POS; RB 1 MHz; VB: 10 Hz
2484.920	73.3	H	74.0	-0.7	PK	360	2.2	POS; RB 1 MHz; VB: 3 MHz
2483.500	48.1	V	54.0	-5.9	AVG	168	1.1	POS; RB 1 MHz; VB: 10 Hz
2487.010	61.7	V	74.0	-12.3	PK	168	1.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

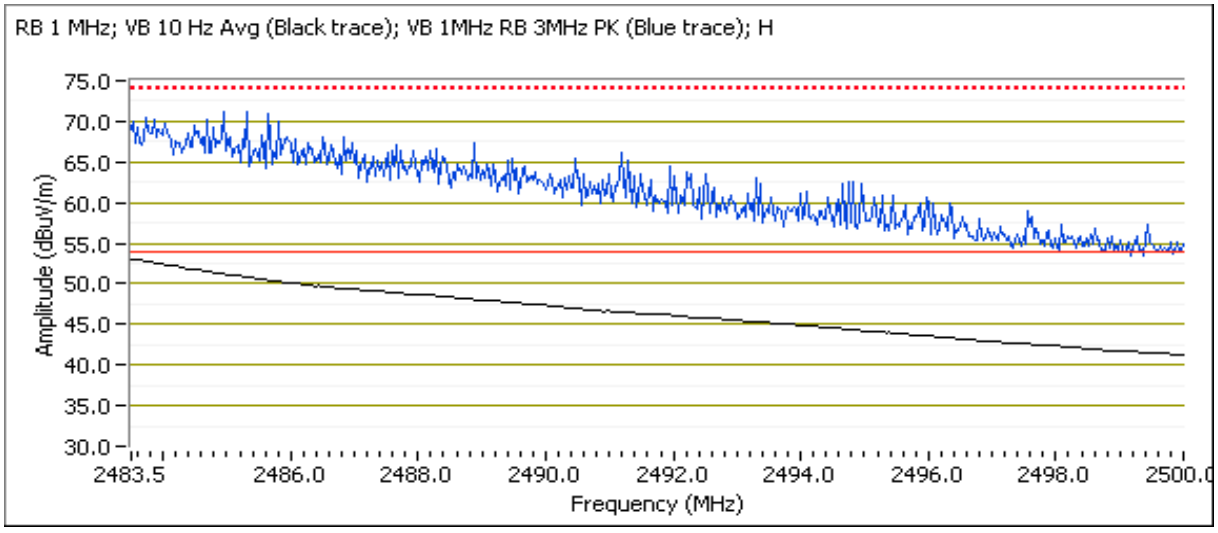


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

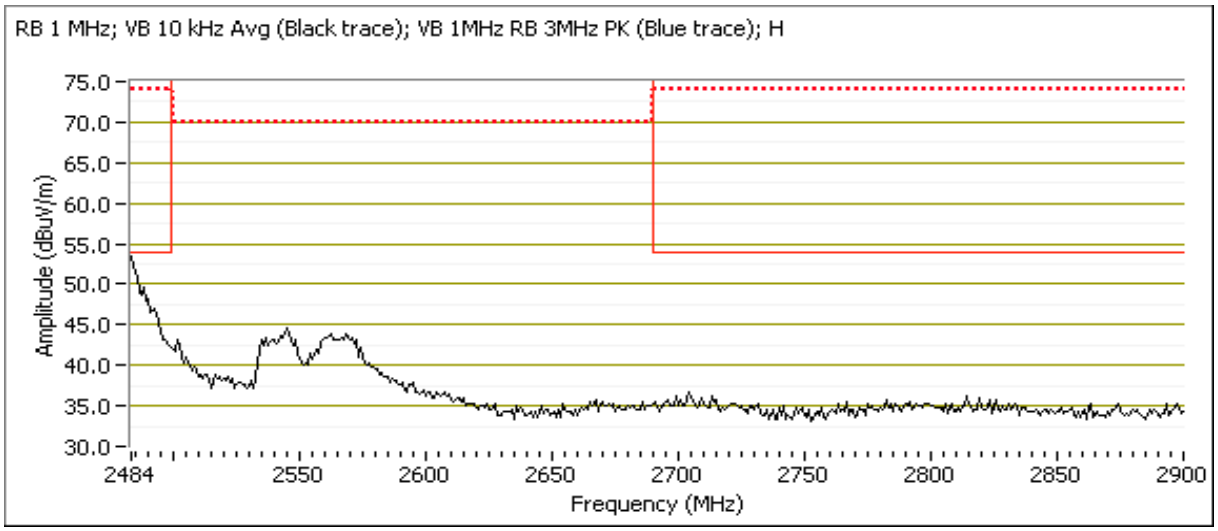
Channel: 11 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.530	53.5	H	54.0	-0.5	AVG	360	1.7	POS; RB 1 MHz; VB: 10 Hz
2485.190	72.5	H	74.0	-1.5	PK	360	1.7	POS; RB 1 MHz; VB: 3 MHz
2483.500	48.6	V	54.0	-5.4	AVG	165	1.0	POS; RB 1 MHz; VB: 10 Hz
2483.570	63.8	V	74.0	-10.2	PK	165	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

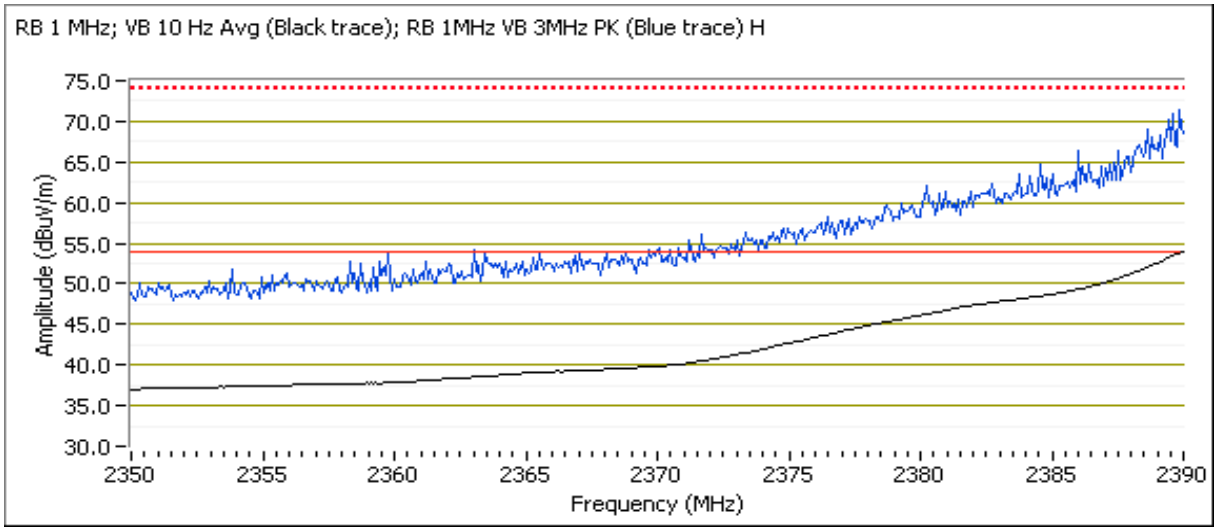
Run #4: Radiated Bandedge Measurements

Date of Test: 7/17/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

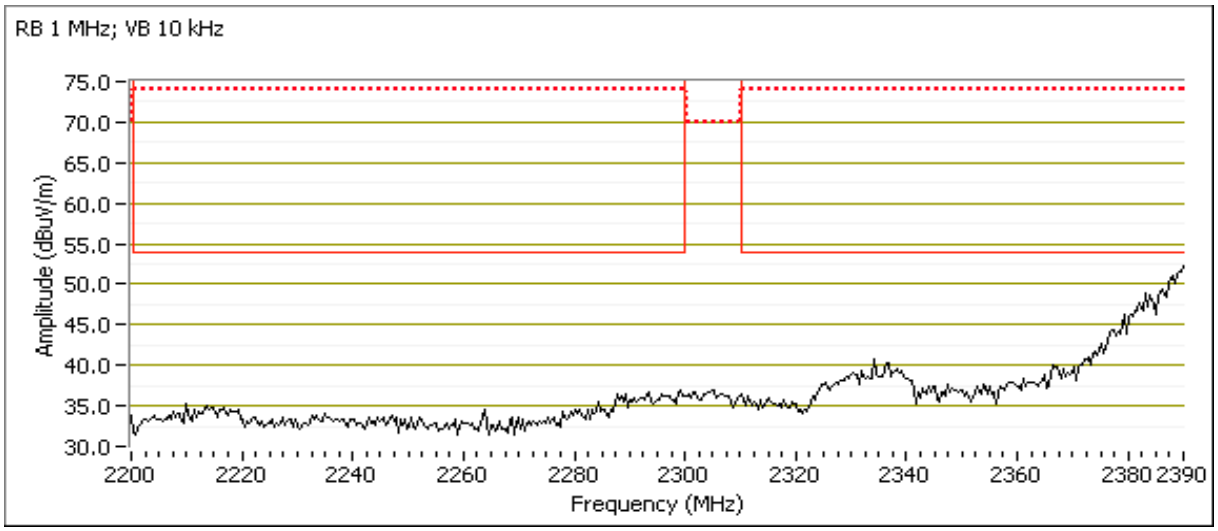
Channel: 1 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.9	H	54.0	-0.1	AVG	137	1.3	POS; RB 1 MHz; VB: 10 Hz
2389.520	70.1	H	74.0	-3.9	PK	137	1.3	POS; RB 1 MHz; VB: 3 MHz
2390.000	50.7	V	54.0	-3.3	AVG	208	1.2	POS; RB 1 MHz; VB: 10 Hz
2389.680	68.3	V	74.0	-5.7	PK	208	1.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

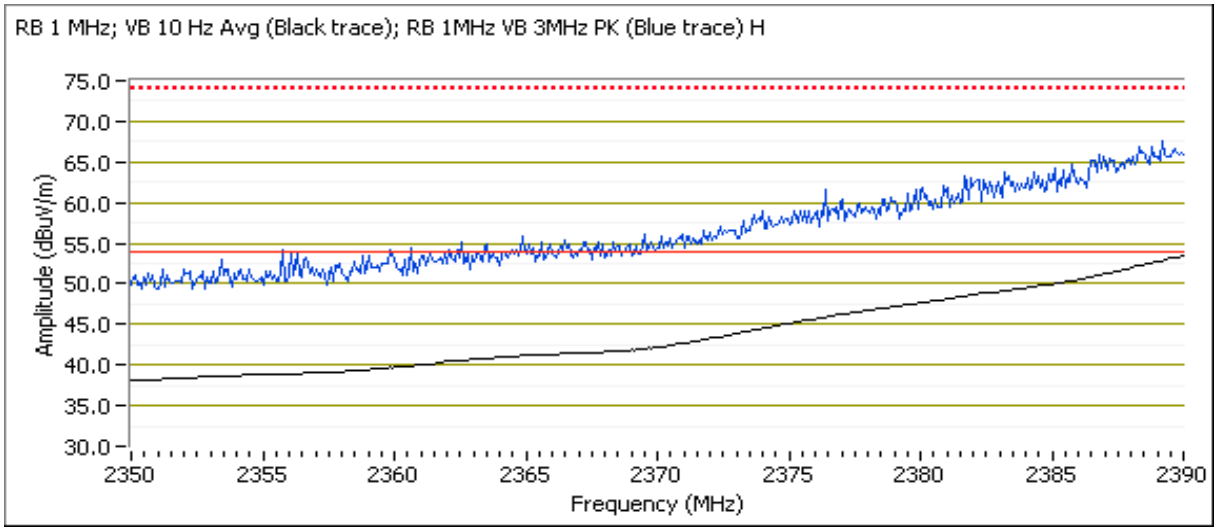


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

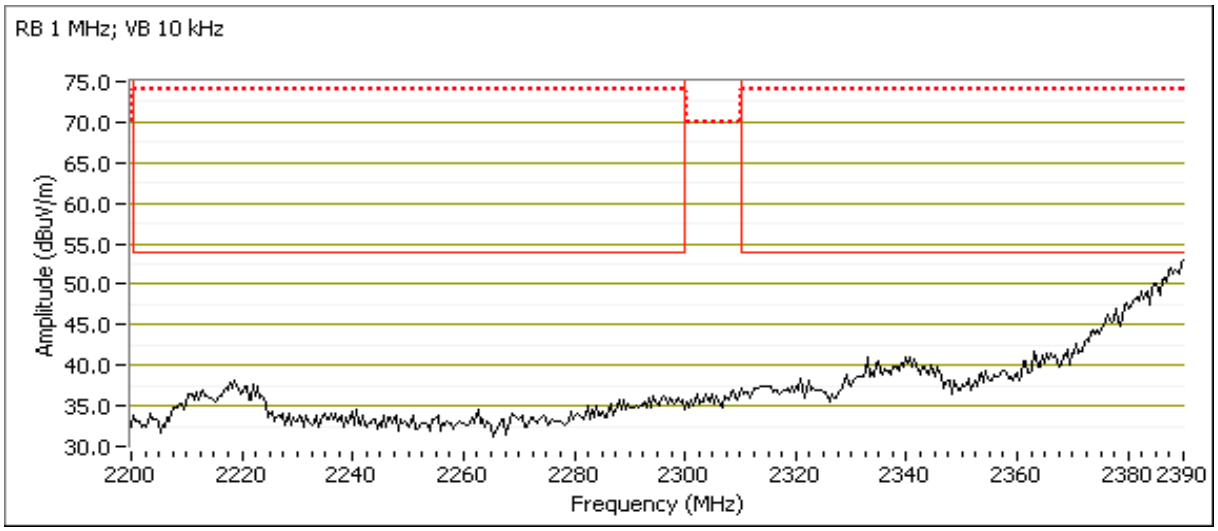
Channel: 2 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.5	H	54.0	-0.5	AVG	142	1.7	POS; RB 1 MHz; VB: 10 Hz
2388.880	68.8	H	74.0	-5.2	PK	142	1.7	POS; RB 1 MHz; VB: 3 MHz
2390.000	47.0	V	54.0	-7.0	AVG	123	1.3	POS; RB 1 MHz; VB: 10 Hz
2387.030	62.8	V	74.0	-11.2	PK	123	1.3	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

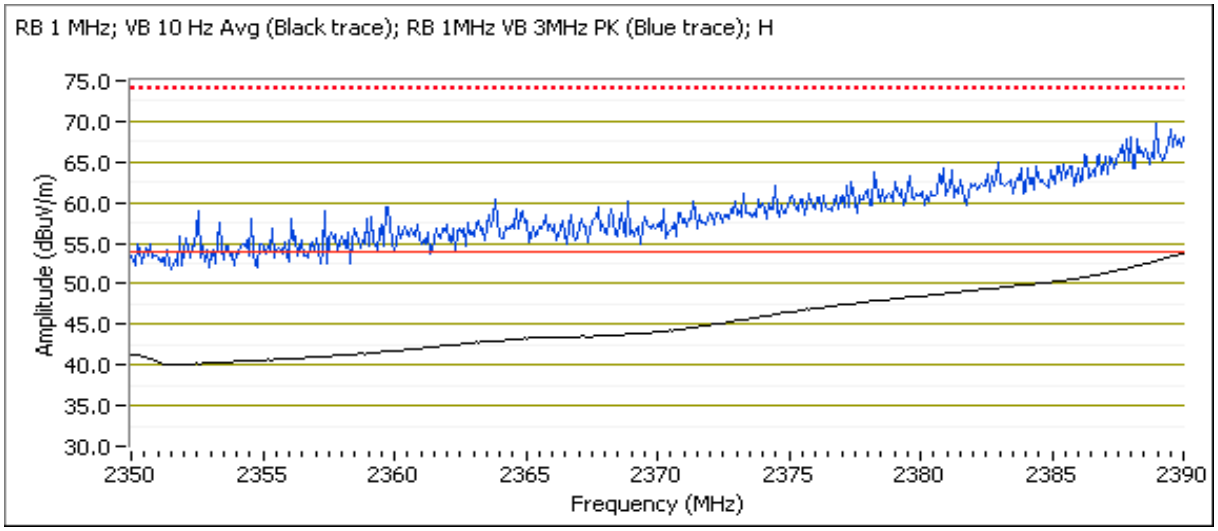


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

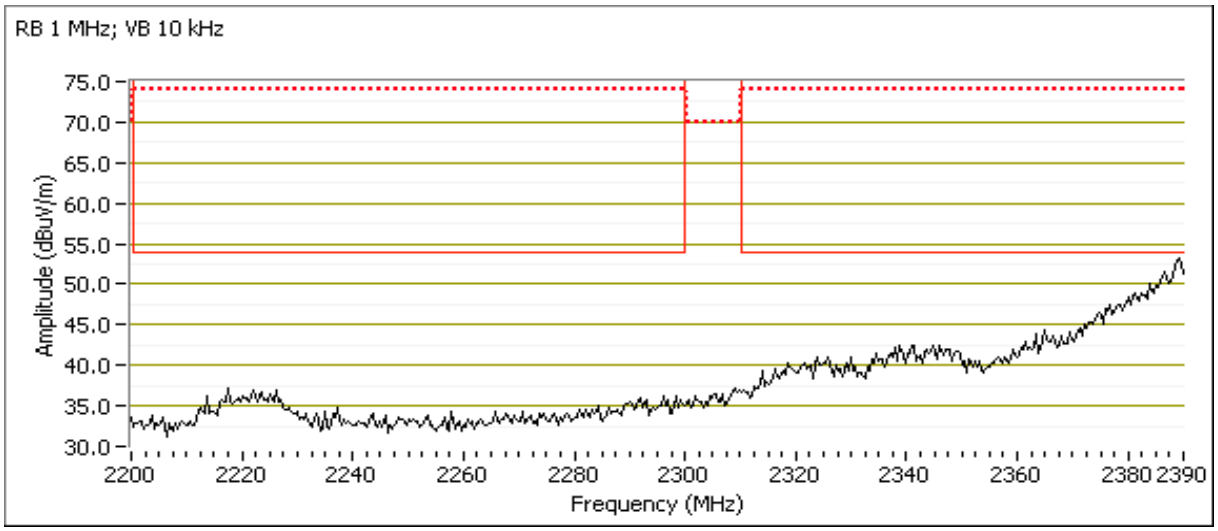
Channel: 3 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.7	H	54.0	-0.3	AVG	143	1.7	POS; RB 1 MHz; VB: 10 Hz
2386.950	69.1	H	74.0	-4.9	PK	143	1.7	POS; RB 1 MHz; VB: 3 MHz
2390.000	48.3	V	54.0	-5.7	AVG	126	1.4	POS; RB 1 MHz; VB: 10 Hz
2389.760	64.9	V	74.0	-9.1	PK	126	1.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

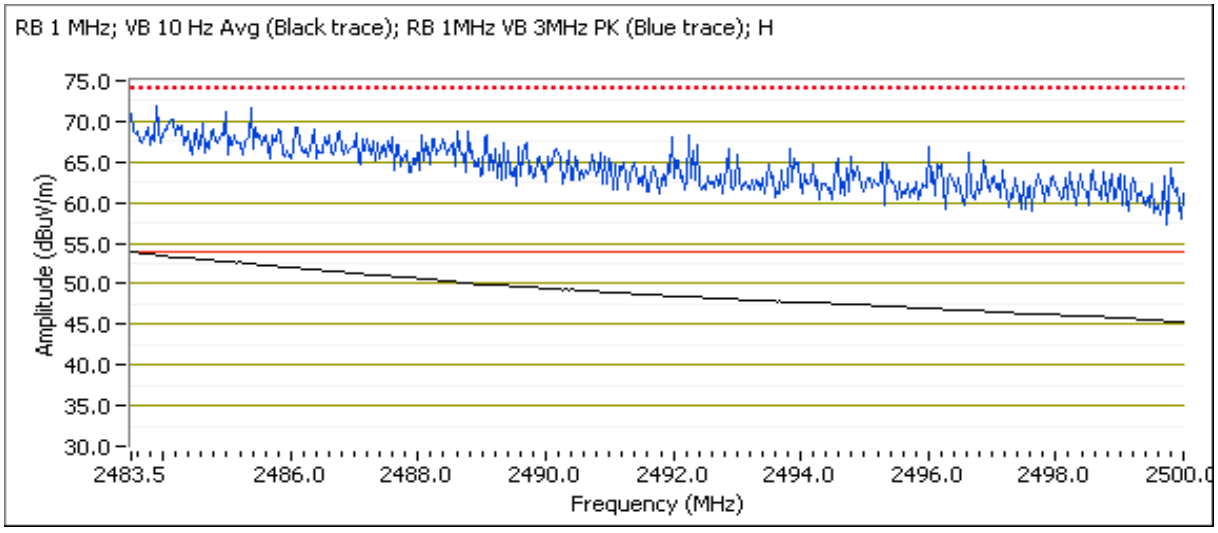


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

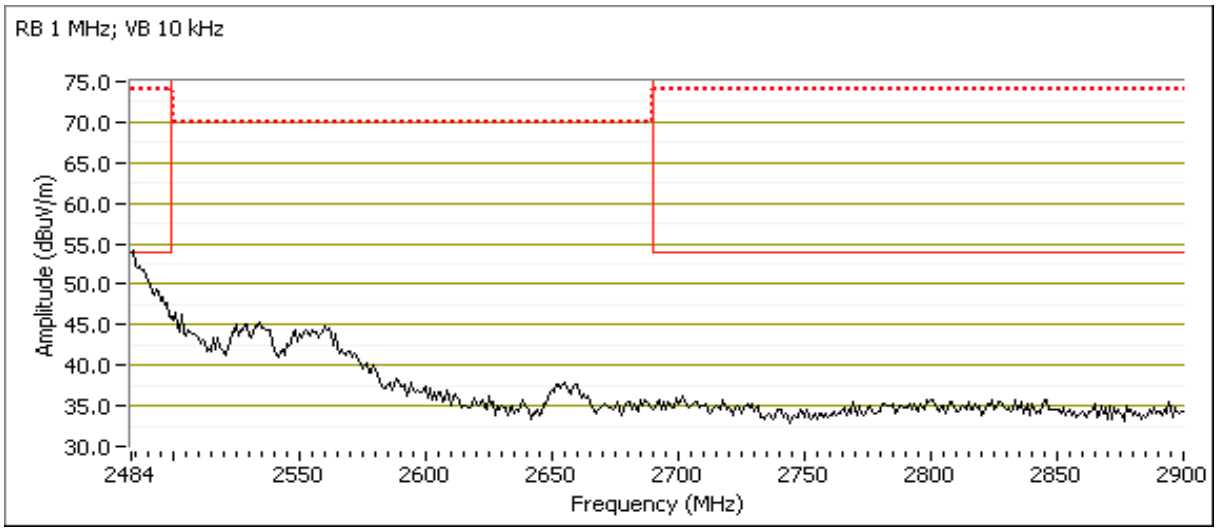
Channel: 9 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.8	H	54.0	-0.2	AVG	9	1.1	POS; RB 1 MHz; VB: 10 Hz
2483.760	73.6	H	74.0	-0.4	PK	9	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	49.6	V	54.0	-4.4	AVG	146	1.0	POS; RB 1 MHz; VB: 10 Hz
2485.290	63.9	V	74.0	-10.1	PK	146	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

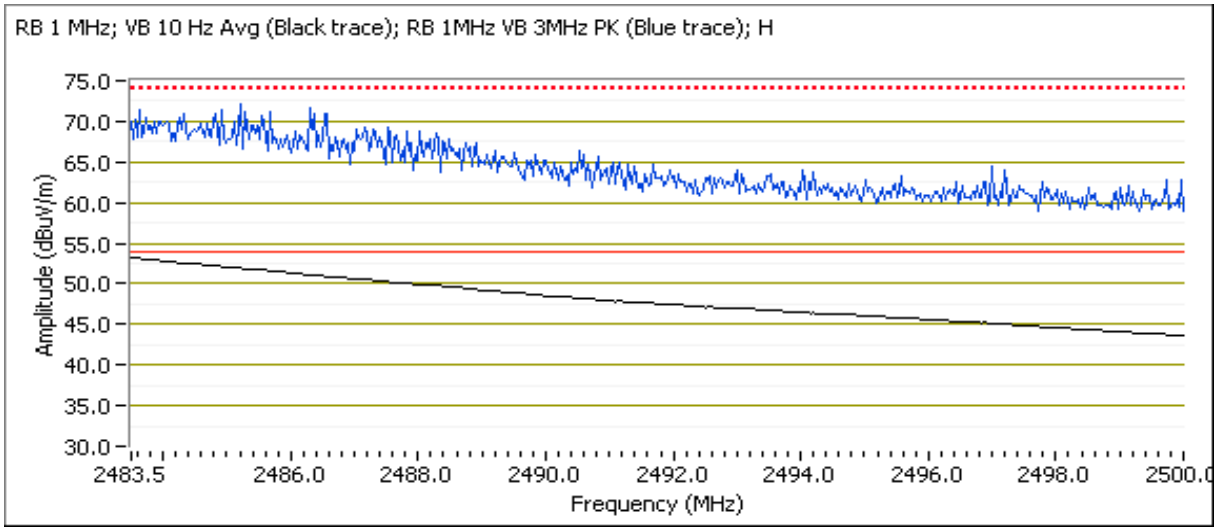


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

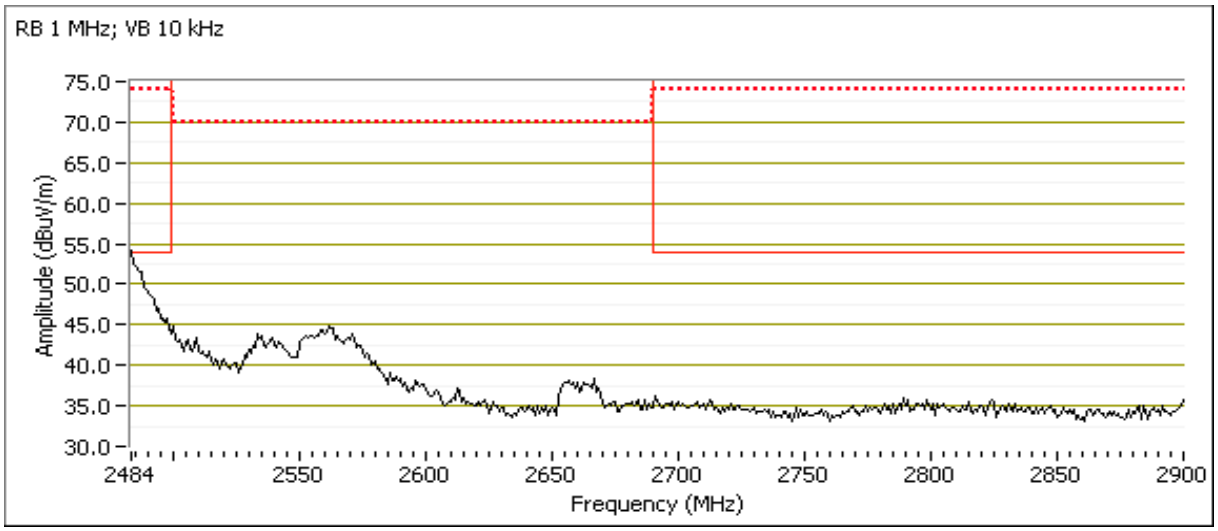
Channel: 10 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.0	H	54.0	-1.0	AVG	10	1.1	POS; RB 1 MHz; VB: 10 Hz
2484.430	71.9	H	74.0	-2.1	PK	10	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	49.6	V	54.0	-4.4	AVG	149	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.160	64.2	V	74.0	-9.8	PK	149	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

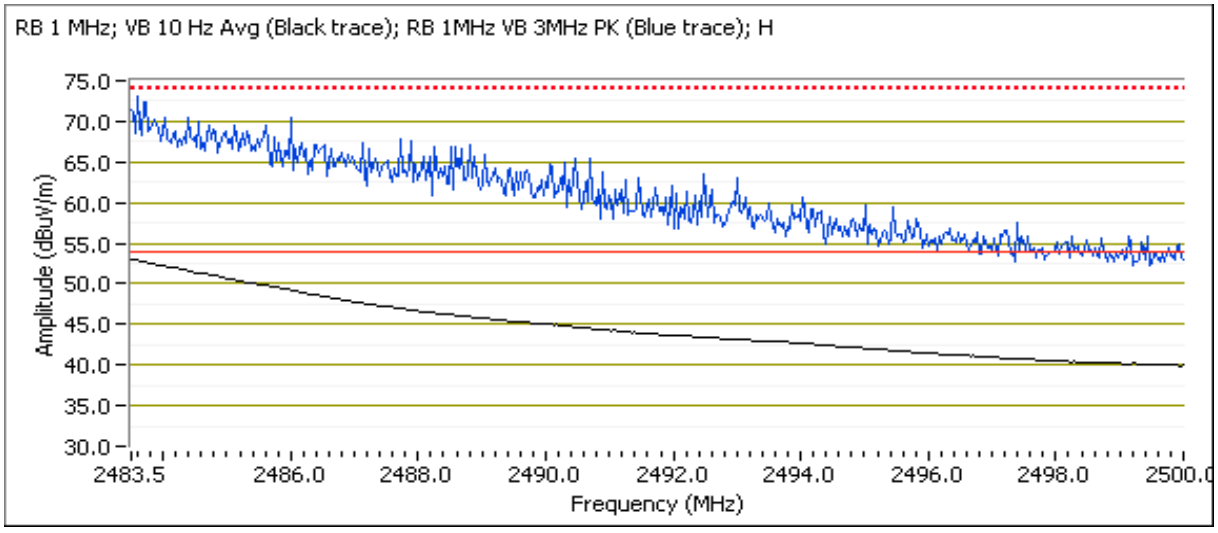


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

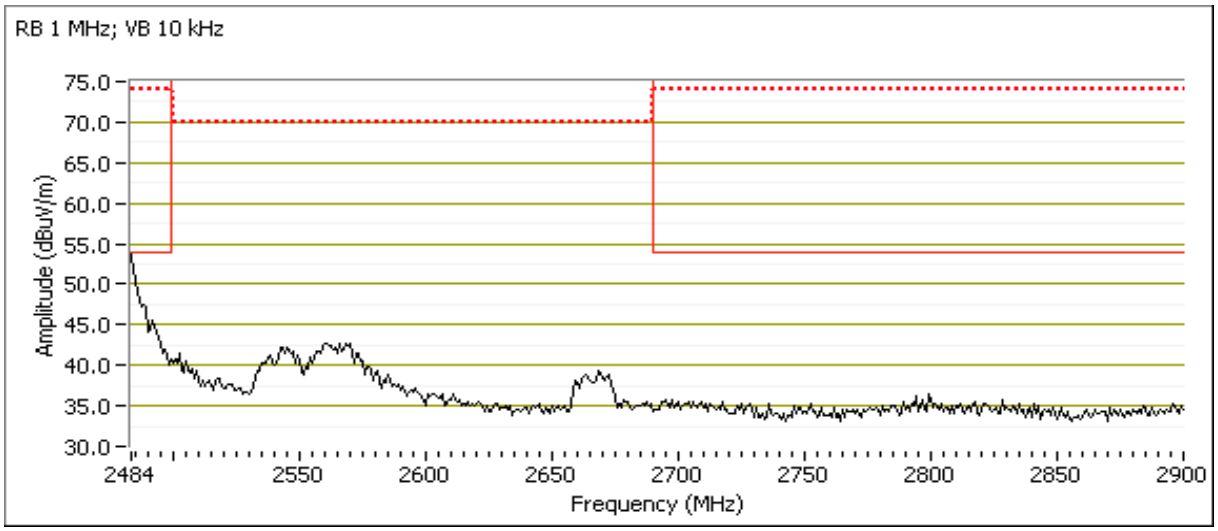
Channel: 11 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	53.0	H	54.0	-1.0	AVG	11	1.6	POS; RB 1 MHz; VB: 10 Hz
2483.730	73.2	H	74.0	-0.8	PK	11	1.6	POS; RB 1 MHz; VB: 3 MHz
2483.500	48.9	V	54.0	-5.1	AVG	151	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.490	65.3	V	74.0	-8.7	PK	151	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

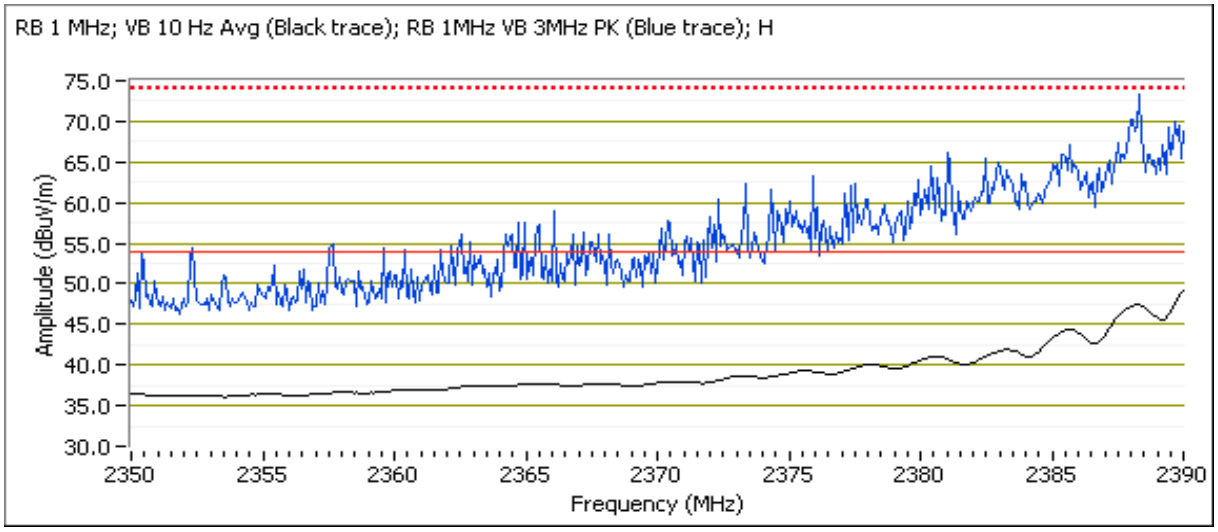
Run #5: Radiated Bandedge Measurements

Date of Test: 7/17/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

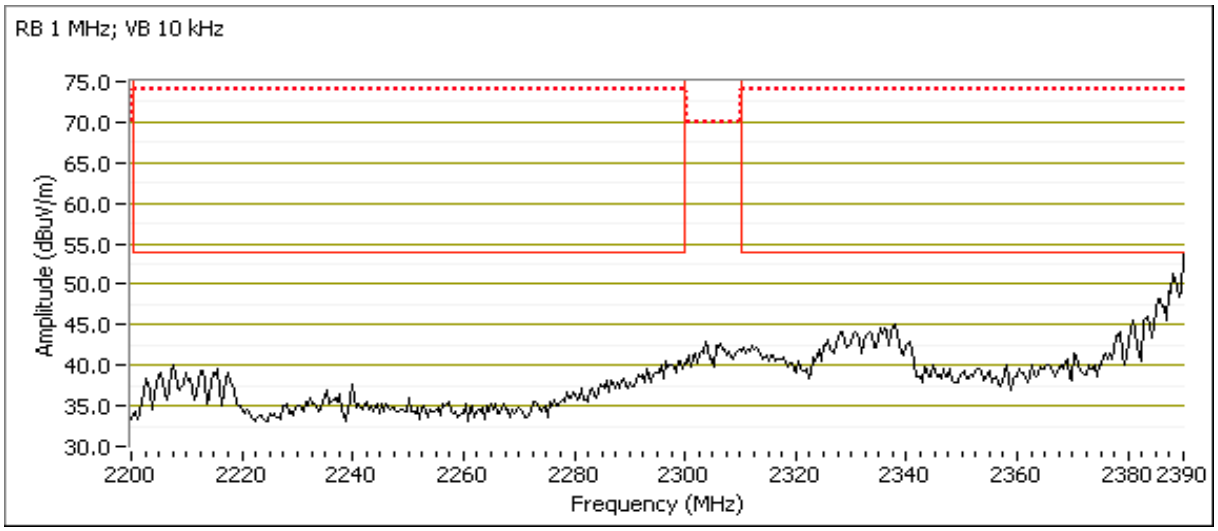
Channel: 1 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	49.7	H	54.0	-4.3	AVG	344	1.4	POS; RB 1 MHz; VB: 10 Hz
2387.600	73.8	H	74.0	-0.2	PK	344	1.4	POS; RB 1 MHz; VB: 3 MHz
2389.360	46.0	V	54.0	-8.0	AVG	270	1.0	POS; RB 1 MHz; VB: 10 Hz
2383.750	68.9	V	74.0	-5.1	PK	270	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

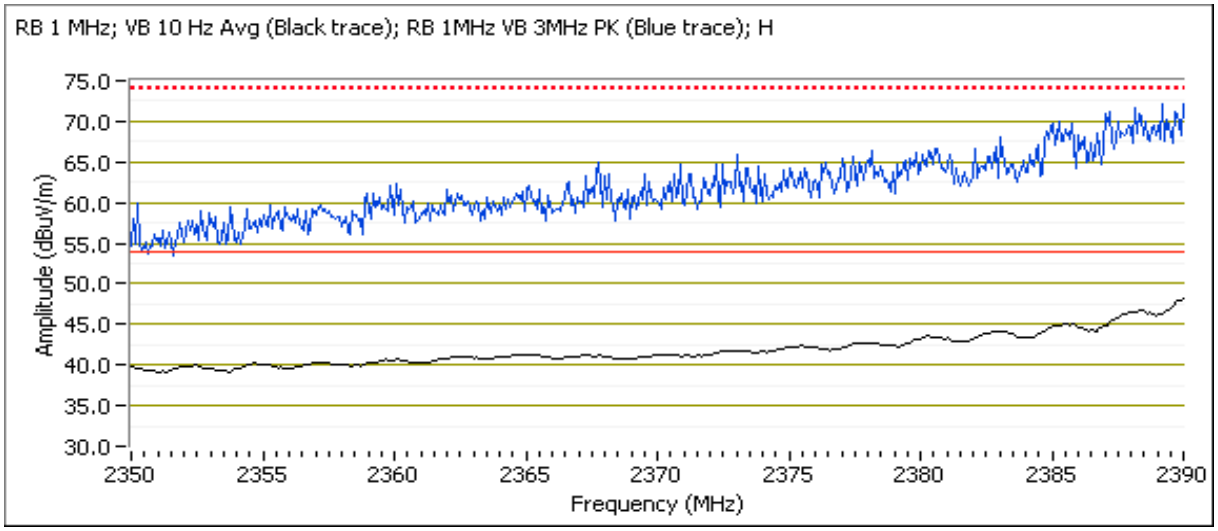


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

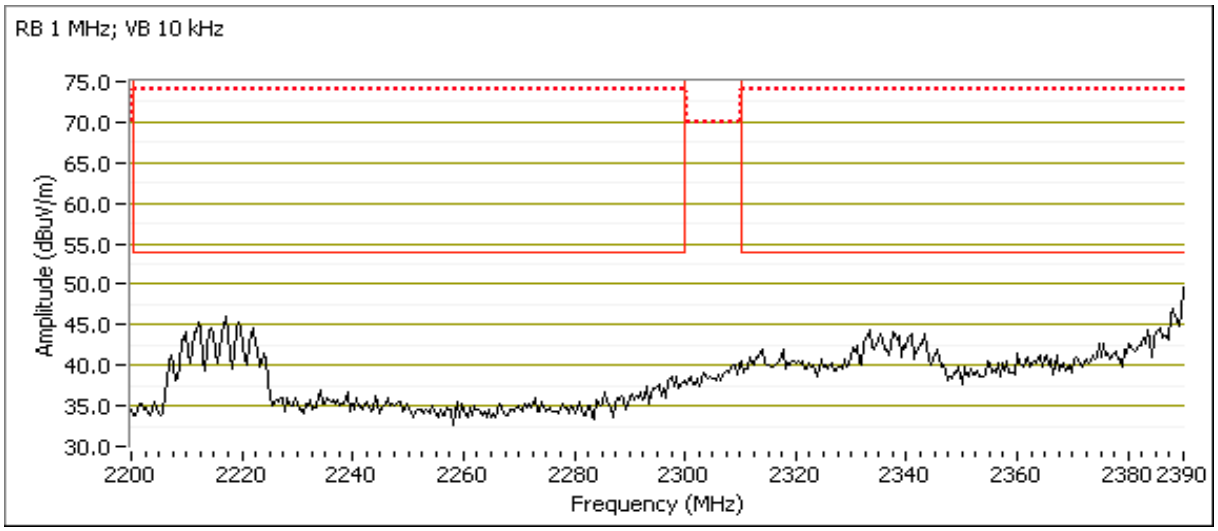
Channel: 2 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	49.8	H	54.0	-4.2	AVG	344	1.8	POS; RB 1 MHz; VB: 10 Hz
2388.400	73.2	H	74.0	-0.8	PK	344	1.8	POS; RB 1 MHz; VB: 3 MHz
2389.280	45.1	V	54.0	-8.9	AVG	271	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.640	68.5	V	74.0	-5.5	PK	271	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

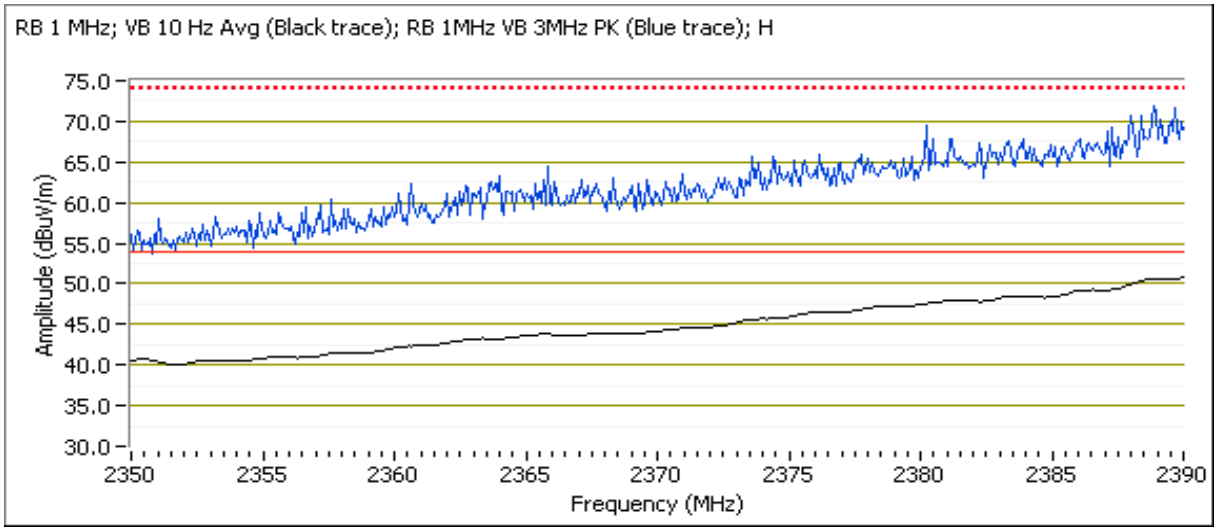


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

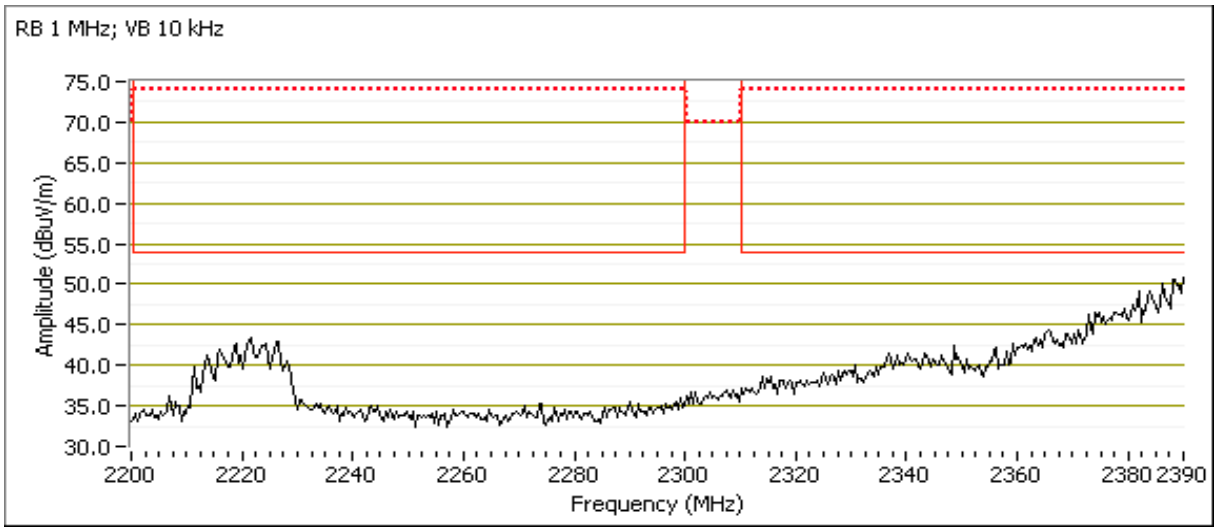
Channel: 3 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	51.2	H	54.0	-2.8	AVG	177	1.7	POS; RB 1 MHz; VB: 10 Hz
2388.800	73.2	H	74.0	-0.8	PK	177	1.7	POS; RB 1 MHz; VB: 3 MHz
2389.120	48.0	V	54.0	-6.0	AVG	269	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.800	66.9	V	74.0	-7.1	PK	269	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

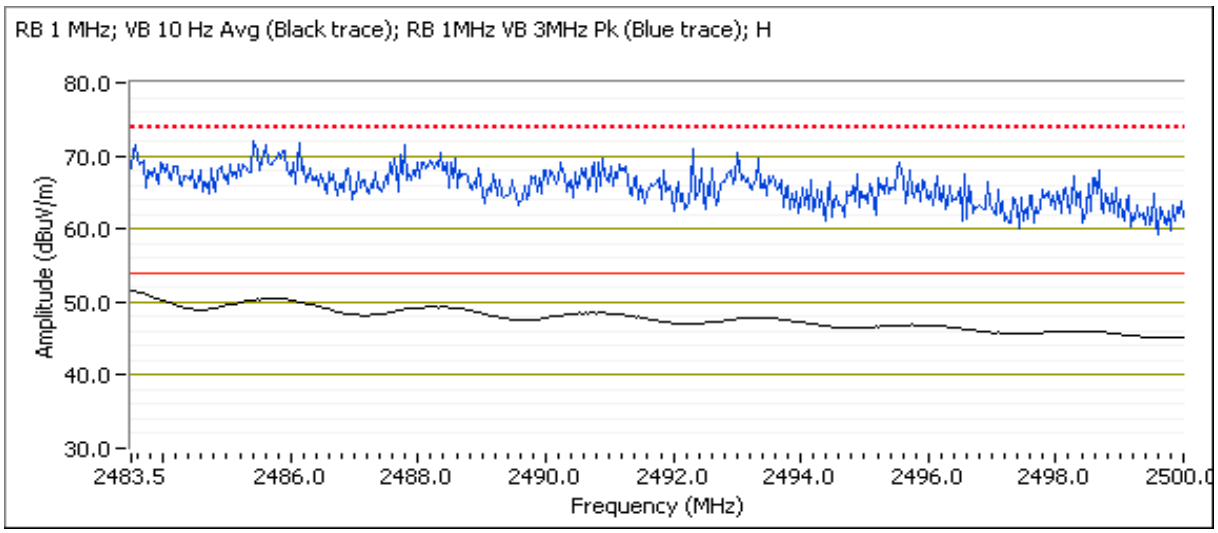


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

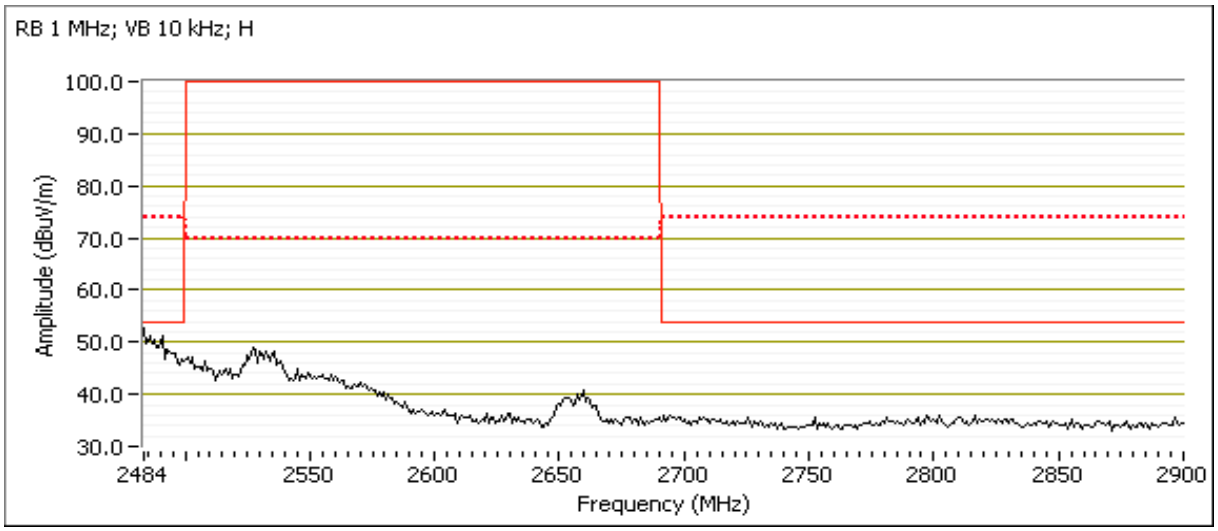
Channel: 9 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.4	H	54.0	-2.6	AVG	16	1.5	POS; RB 1 MHz; VB: 10 Hz
2483.630	73.0	H	74.0	-1.0	PK	16	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

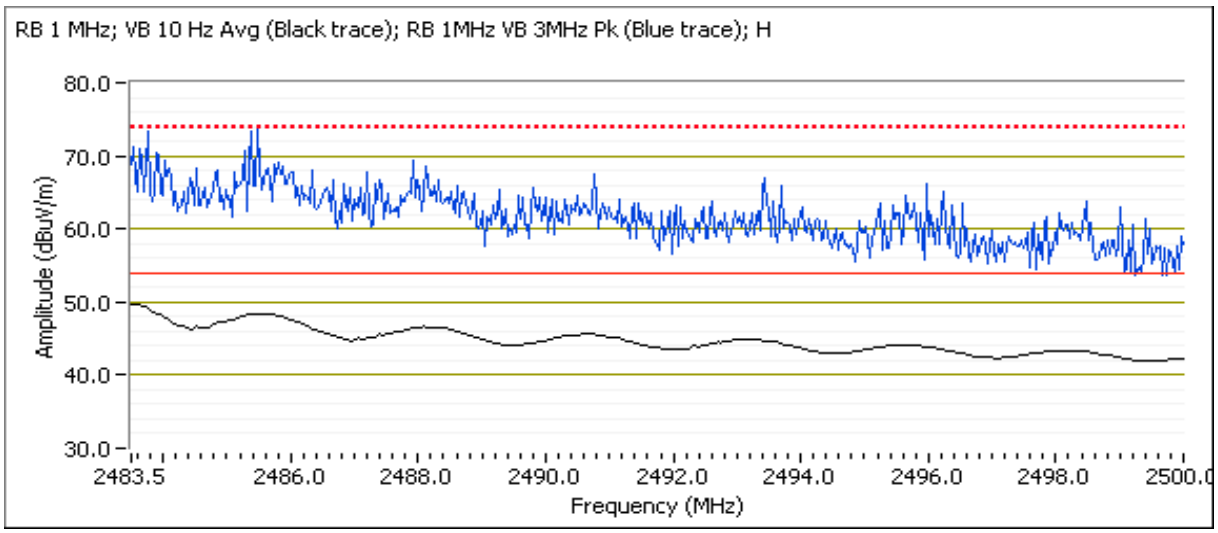


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

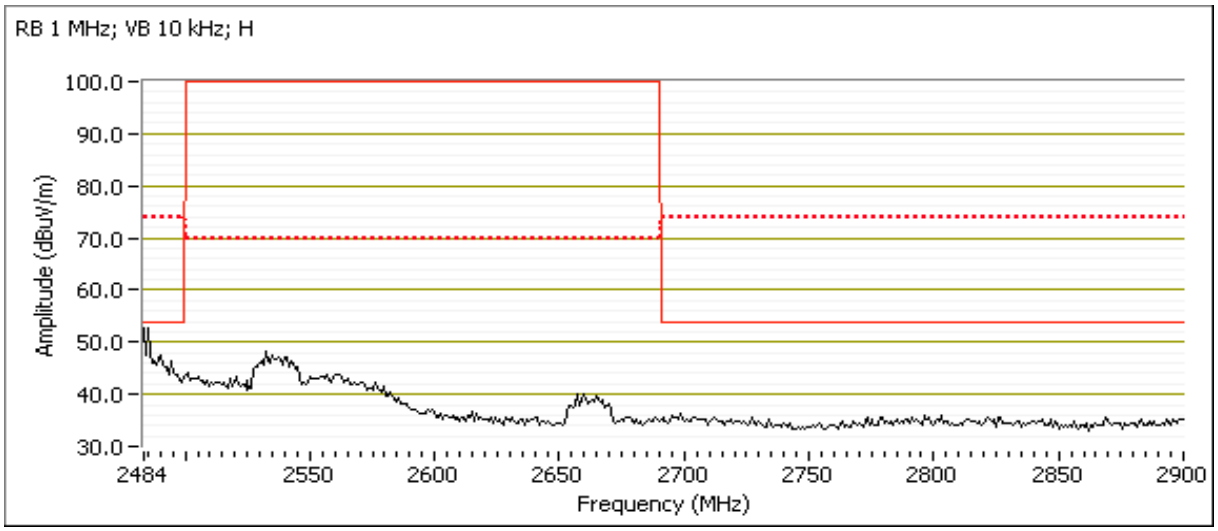
Channel: 10 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	49.9	H	54.0	-4.1	AVG	360	1.5	POS; RB 1 MHz; VB: 10 Hz
2486.740	73.7	H	74.0	-0.3	PK	360	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

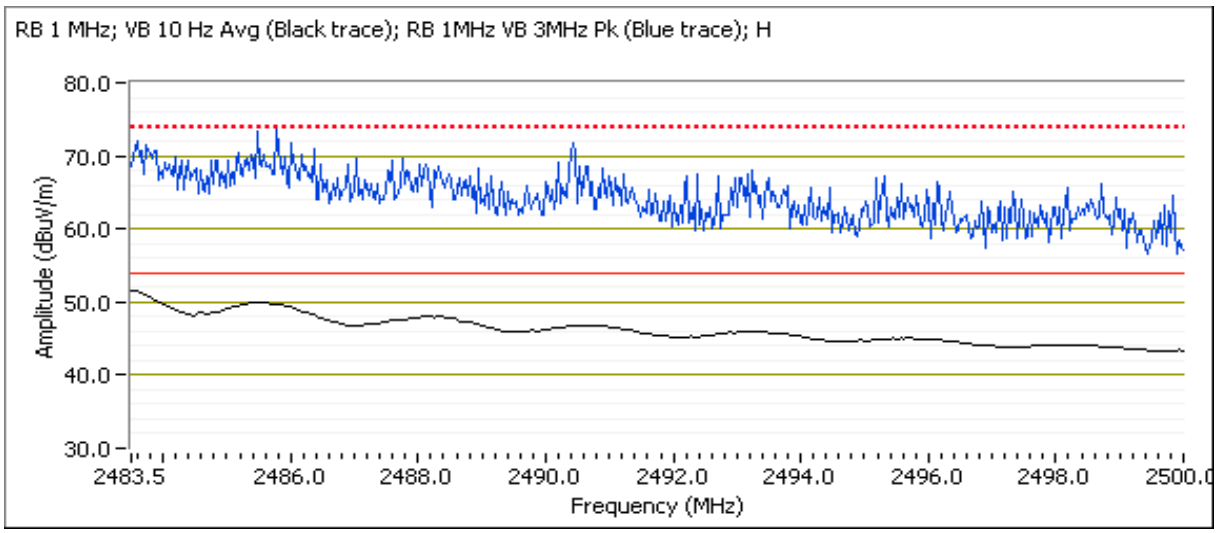


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

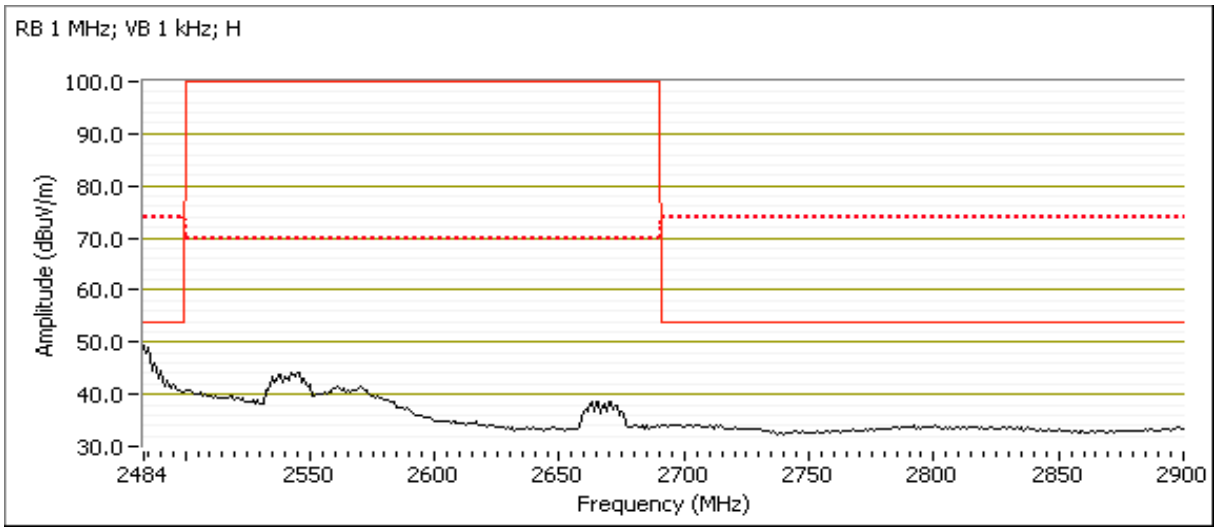
Channel: 11 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	50.2	H	54.0	-3.8	AVG	11	1.5	POS; RB 1 MHz; VB: 10 Hz
2485.780	72.2	H	74.0	-1.8	PK	11	1.5	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 247 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.

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, unless otherwise noted.

Ambient Conditions:

Temperature: 22.6 °C
Rel. Humidity: 38 %

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

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	b (1Tx)	1 - 2412MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.6 dBµV/m @ 7237.0 MHz (-4.4 dB)
	b (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	51.2 dBµV/m @ 7312.0 MHz (-2.8 dB)
	b (1Tx)	11 - 2462MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	50.6 dBµV/m @ 7385.1 MHz (-3.4 dB)
Scans on center channel in all OFDM modes to determine the worst case mode.							
2	g (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	40.0 dBµV/m @ 7313.5 MHz (-14.0 dB)
	n20 (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	42.4 dBµV/m @ 7312.8 MHz (-11.6 dB)
	n20 (2Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	43.0 dBµV/m @ 7310.3 MHz (-11.0 dB)
Measurements on low and high channels in worst-case OFDM mode.							
3	n20 (2Tx)	1 - 2412MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	34.1 dBµV/m @ 4824.1 MHz (-19.9 dB)
	n20 (2Tx)	11 - 2462MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	40.9 dBµV/m @ 7382.9 MHz (-13.1 dB)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

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.

Sample Notes

Sample S/N: D85DE2000005 (MAC ID)
Driver: 6.37 RC214 .12
Antenna: Internal

Notes

Testing performed at 1.5m per C63.10
All testing was performed in 2Tx mode using worse case 1Tx power levels, except for 11b

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.
2.4GHz band reject filter used

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

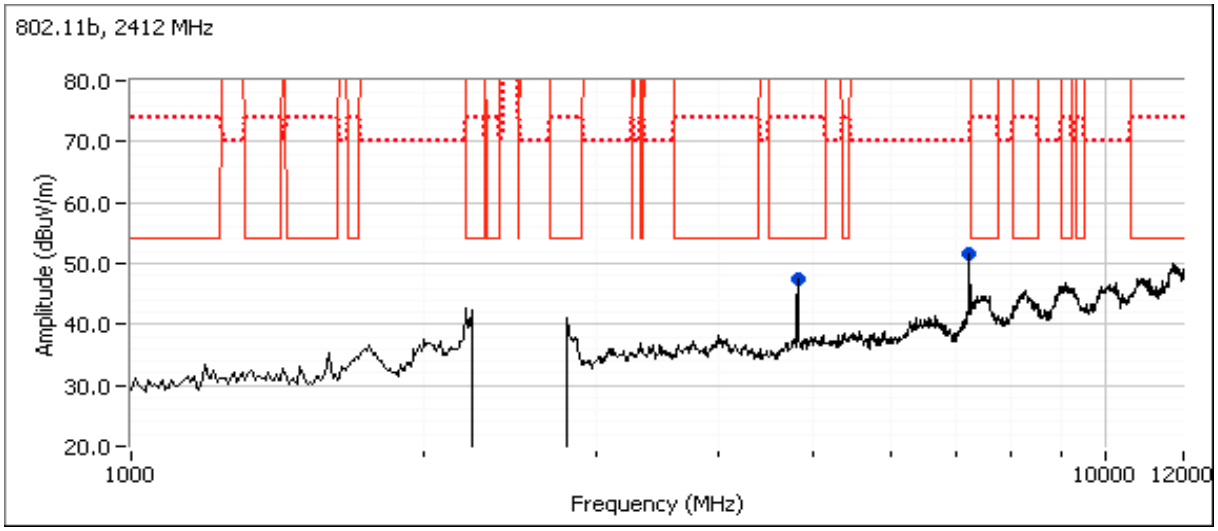
Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11b

Date of Test: 7/20/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

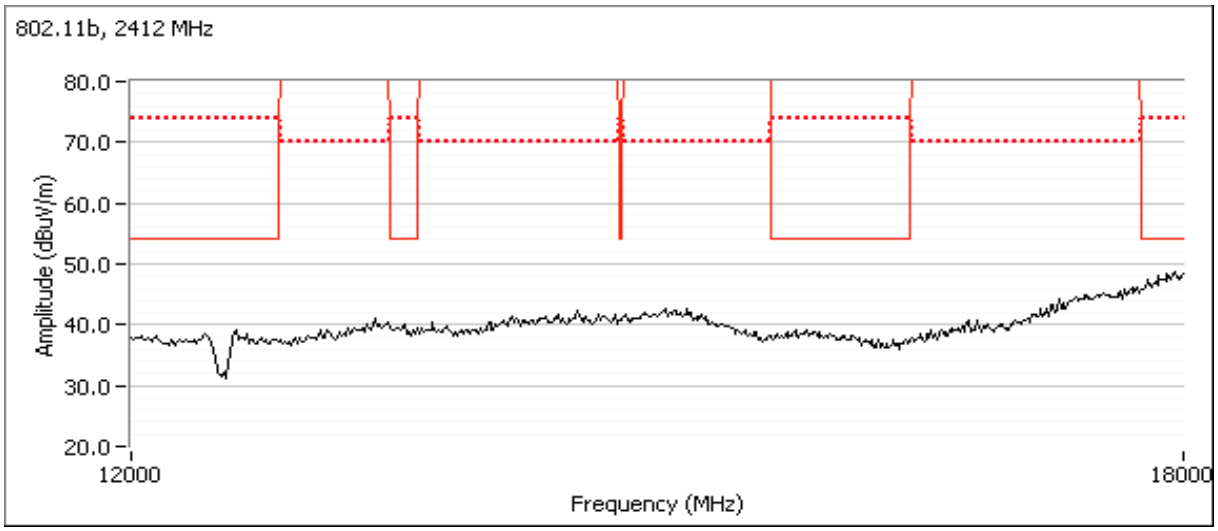
Run #1a: Low Channel

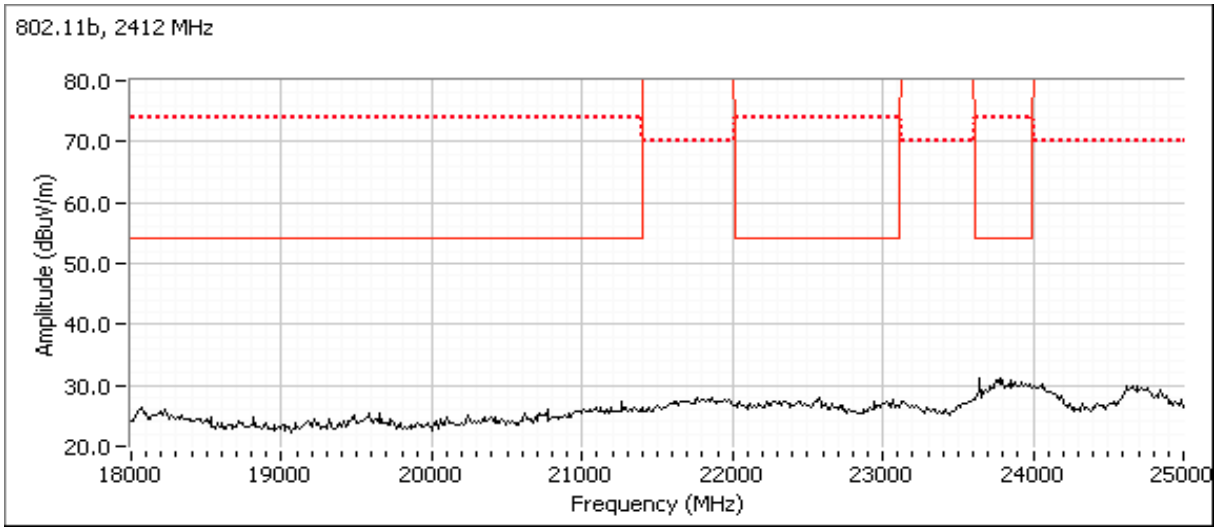
Channel: 1 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7236.970	49.6	H	54.0	-4.4	AVG	218	1.5	Note 1, RB 1 MHz;VB 10 Hz;Peak
7235.110	56.0	H	74.0	-18.0	PK	218	1.5	Note 1, RB 1 MHz;VB 3 MHz;Peak
4823.940	44.2	H	54.0	-9.8	AVG	270	1.3	RB 1 MHz;VB 10 Hz;Peak
4823.880	49.0	H	74.0	-25.0	PK	270	1.3	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



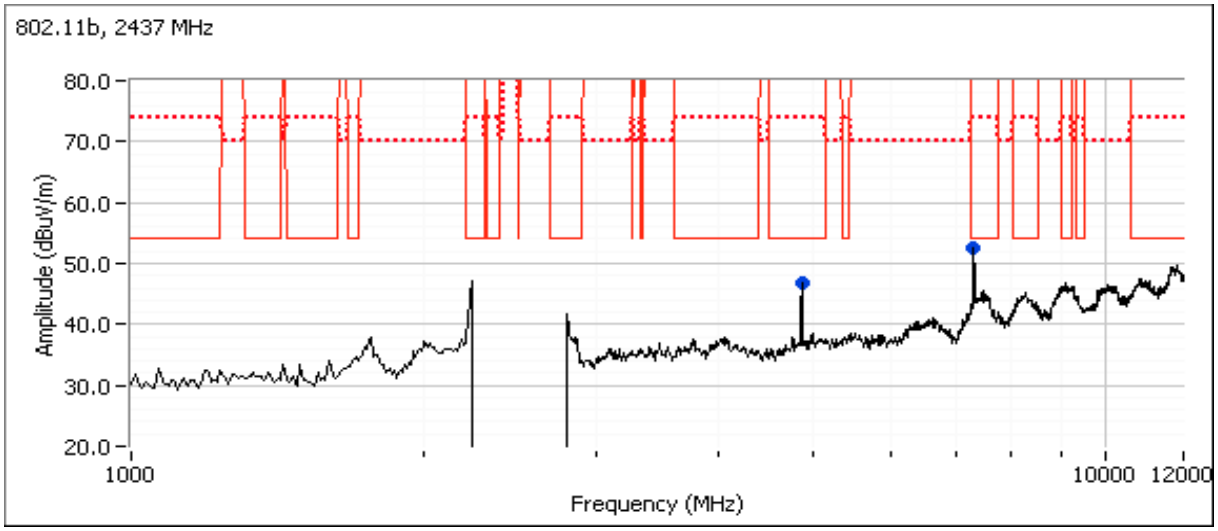


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

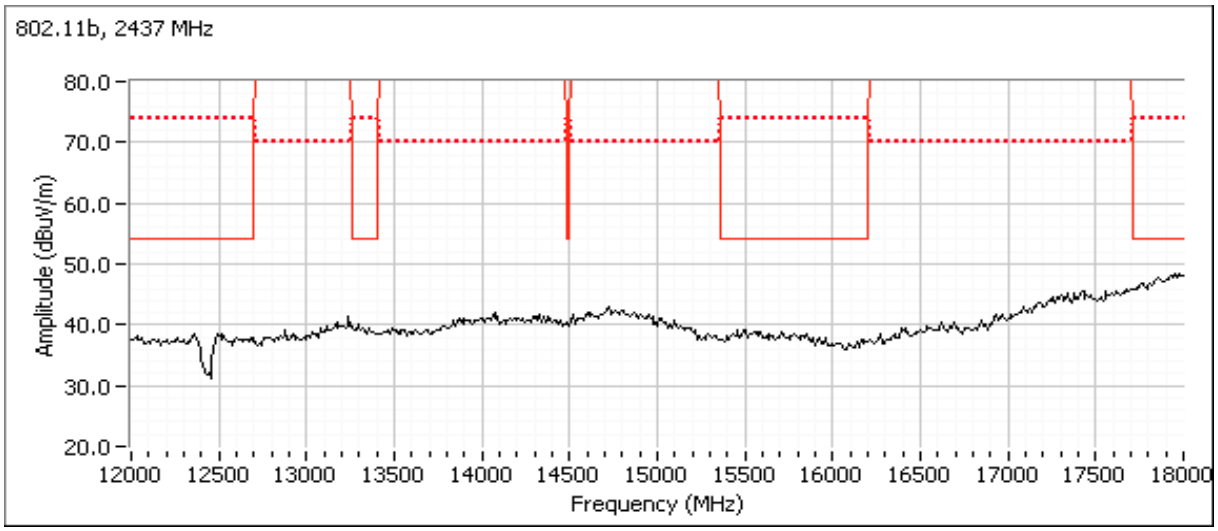
Run #1b: Center Channel

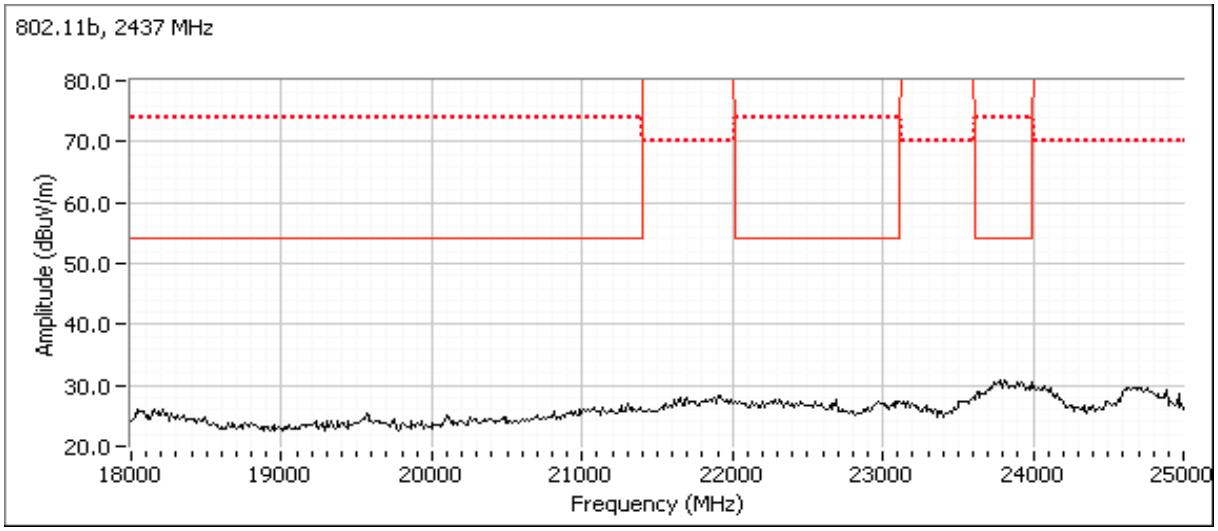
Channel: 6 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7311.960	51.2	H	54.0	-2.8	AVG	233	1.1	RB 1 MHz;VB 10 Hz;Peak
7313.170	57.0	H	74.0	-17.0	PK	233	1.1	RB 1 MHz;VB 3 MHz;Peak
4873.970	45.2	H	54.0	-8.8	AVG	265	1.4	RB 1 MHz;VB 10 Hz;Peak
4873.980	50.0	H	74.0	-24.0	PK	265	1.4	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



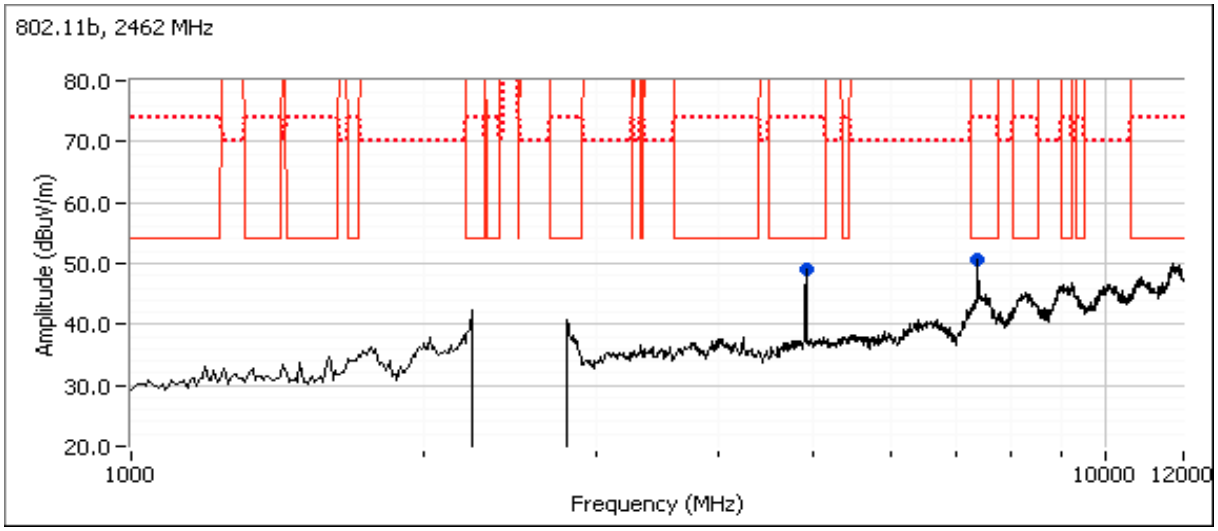


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

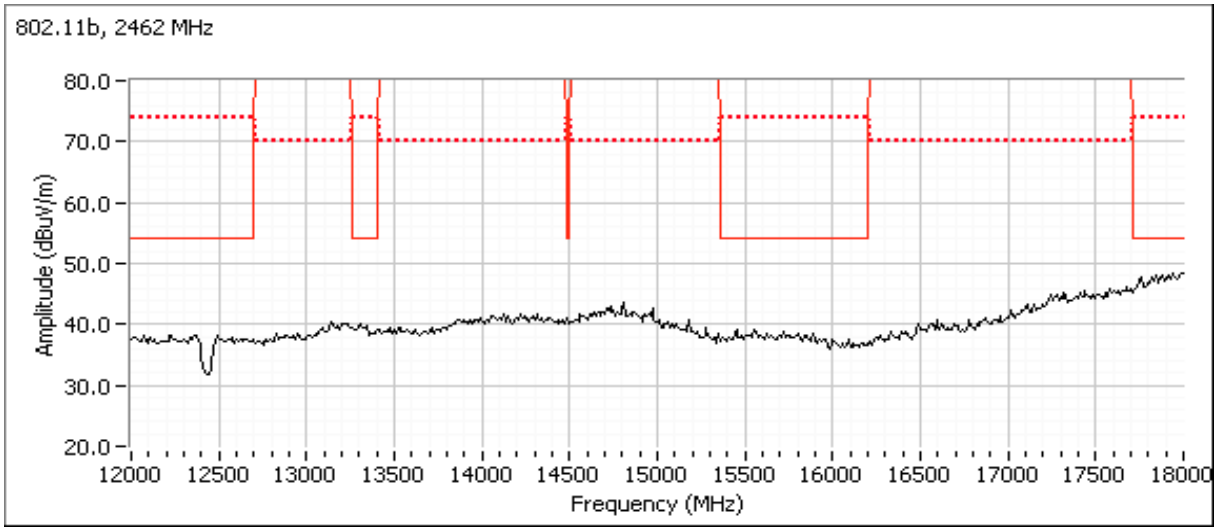
Run #1c: High Channel

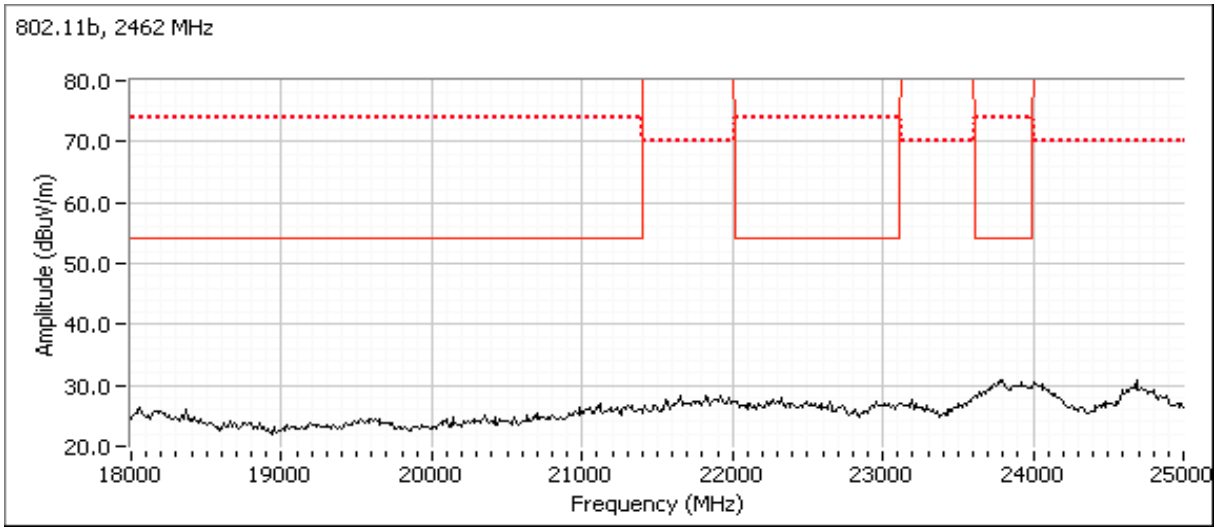
Channel: 11 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7385.070	50.6	H	54.0	-3.4	AVG	229	1.0	RB 1 MHz;VB 10 Hz;Peak
7385.200	56.8	H	74.0	-17.2	PK	229	1.0	RB 1 MHz;VB 3 MHz;Peak
4923.960	46.0	H	54.0	-8.0	AVG	265	1.4	RB 1 MHz;VB 10 Hz;Peak
4924.160	50.5	H	74.0	-23.5	PK	265	1.4	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

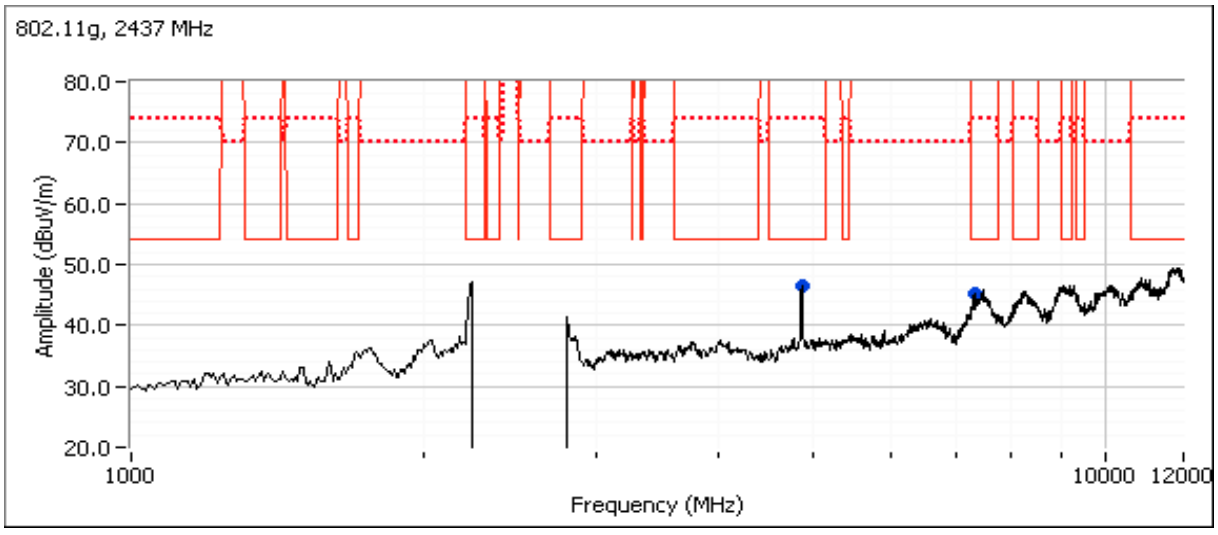
Run #2: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: OFDM

Date of Test: 7/20/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

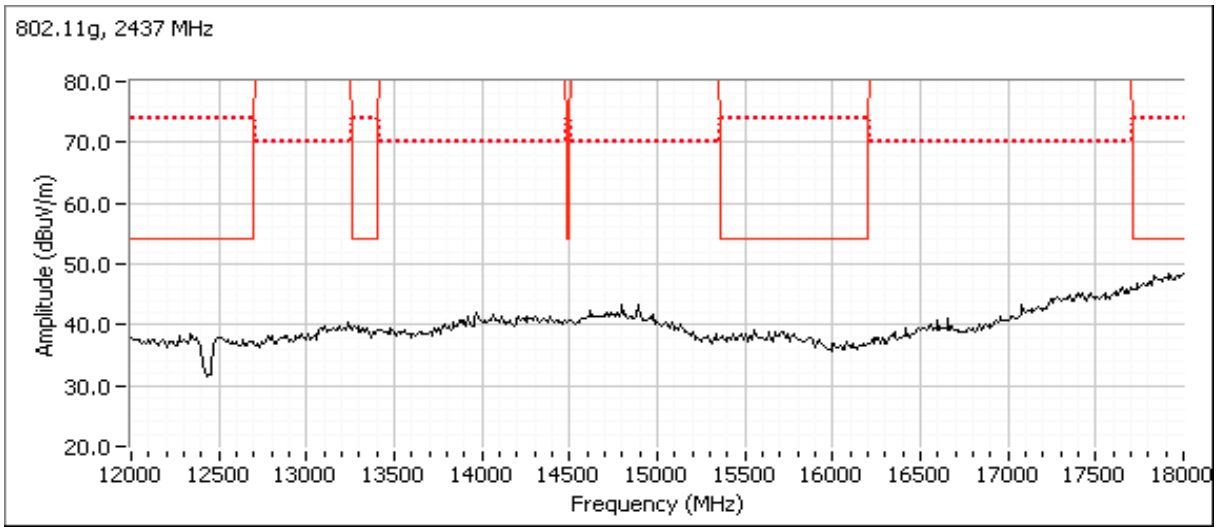
Run #2a: Center Channel

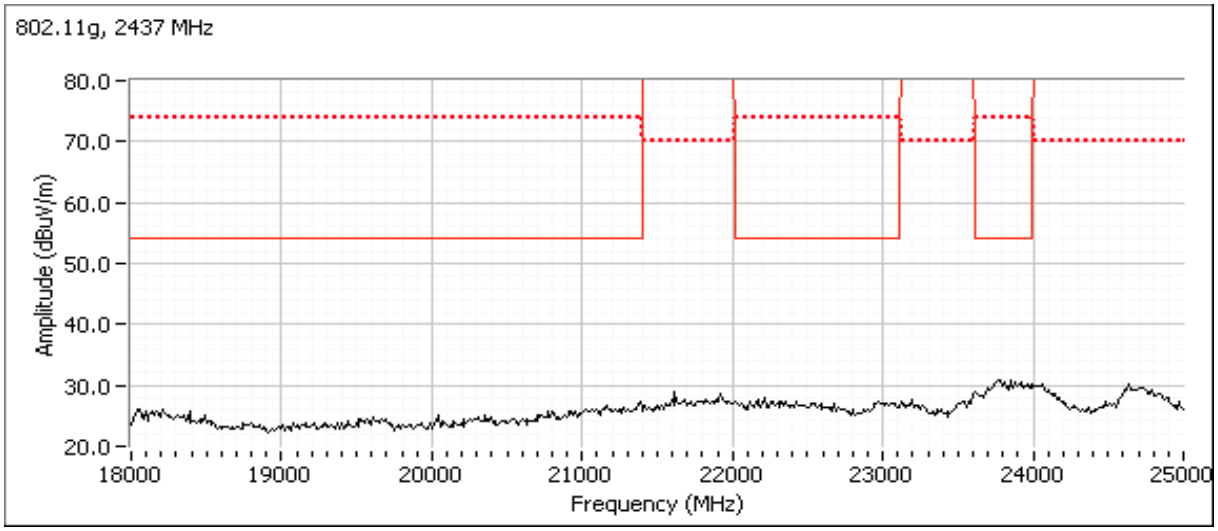
Channel: 6 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.200	39.9	H	54.0	-14.1	AVG	155	1.0	RB 1 MHz;VB 10 Hz;Peak
4873.900	51.5	H	74.0	-22.5	PK	155	1.0	RB 1 MHz;VB 3 MHz;Peak
7313.510	40.0	H	54.0	-14.0	AVG	307	1.0	RB 1 MHz;VB 10 Hz;Peak
7319.580	51.5	H	74.0	-22.5	PK	307	1.0	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



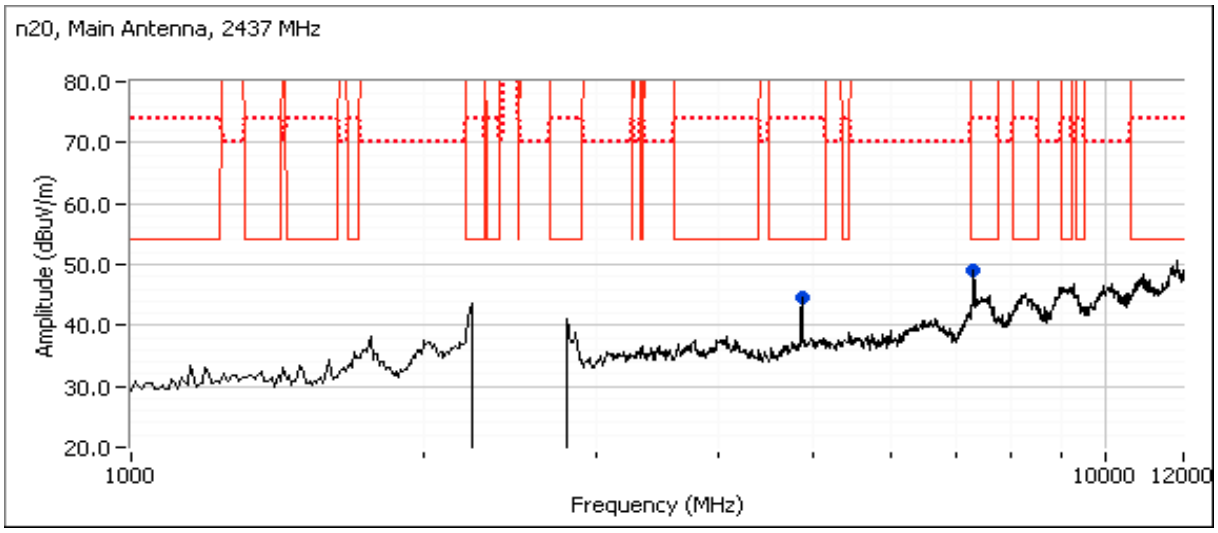


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

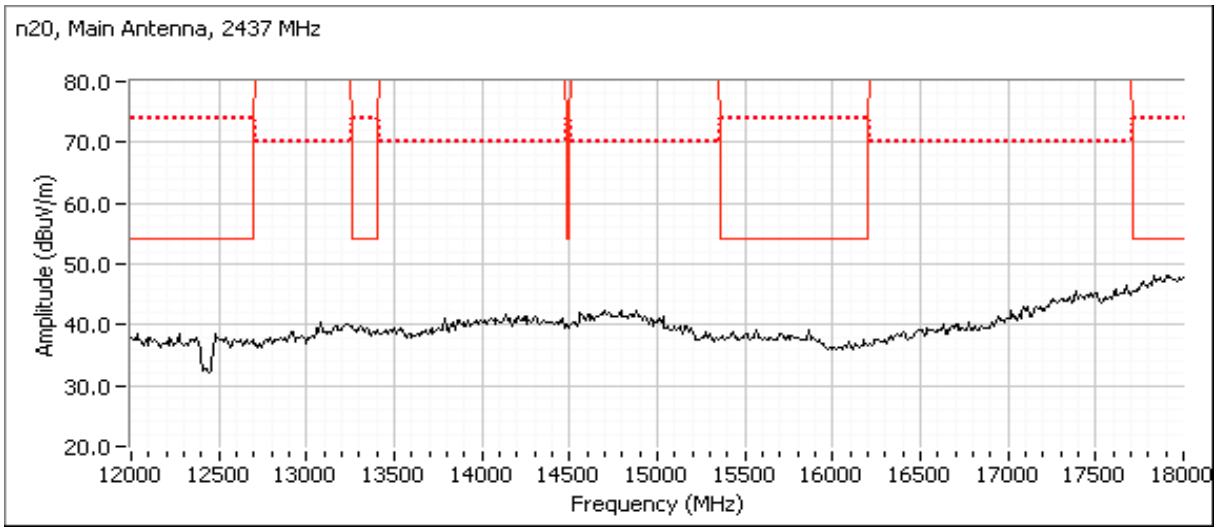
Run #2b: Center Channel

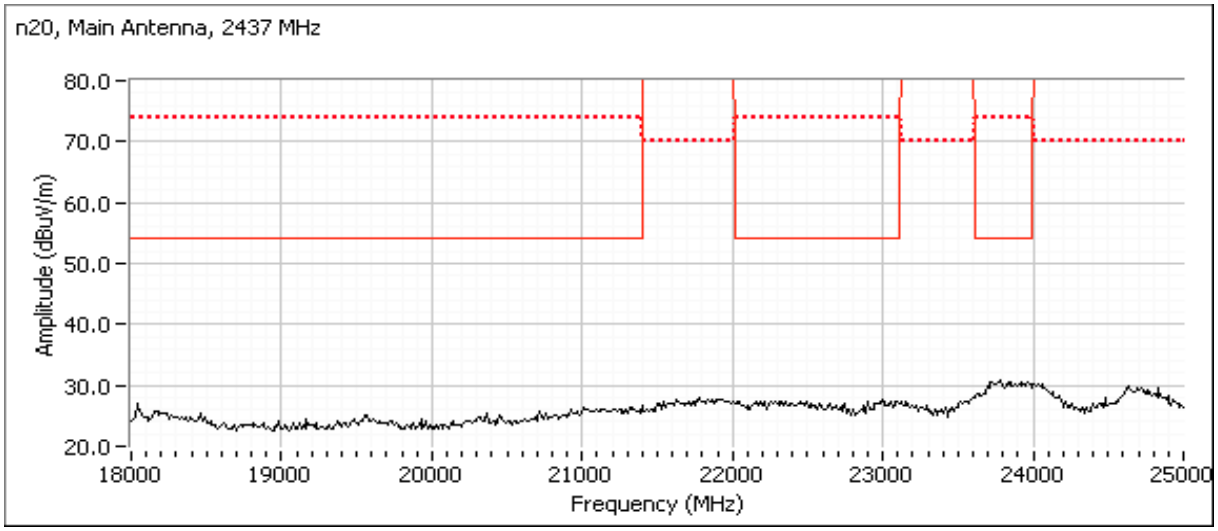
Channel: 6 Mode: n20
Tx Chain: Main Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.990	36.1	H	54.0	-17.9	AVG	266	1.7	RB 1 MHz;VB 10 Hz;Peak
4873.430	47.3	H	74.0	-26.7	PK	266	1.7	RB 1 MHz;VB 3 MHz;Peak
7312.800	42.4	H	54.0	-11.6	AVG	62	1.0	RB 1 MHz;VB 10 Hz;Peak
7317.540	53.9	H	74.0	-20.1	PK	62	1.0	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



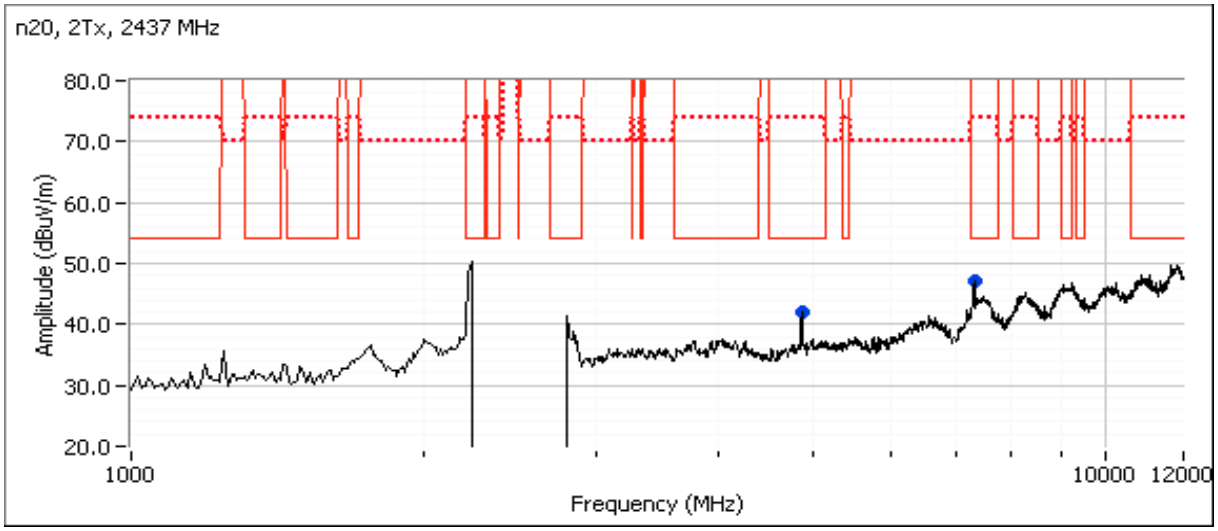


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

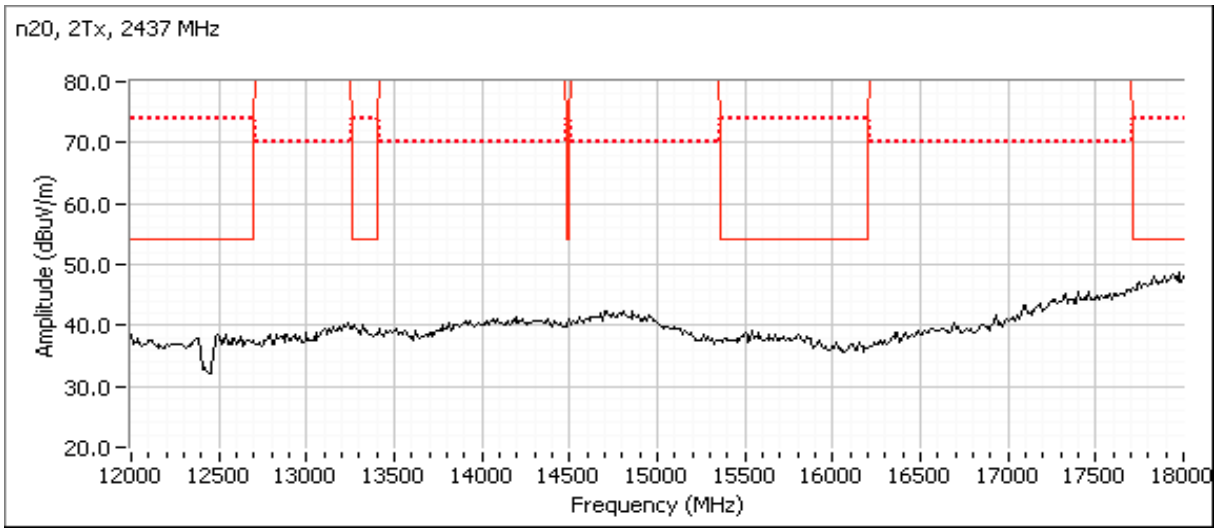
Run #2c: Center Channel

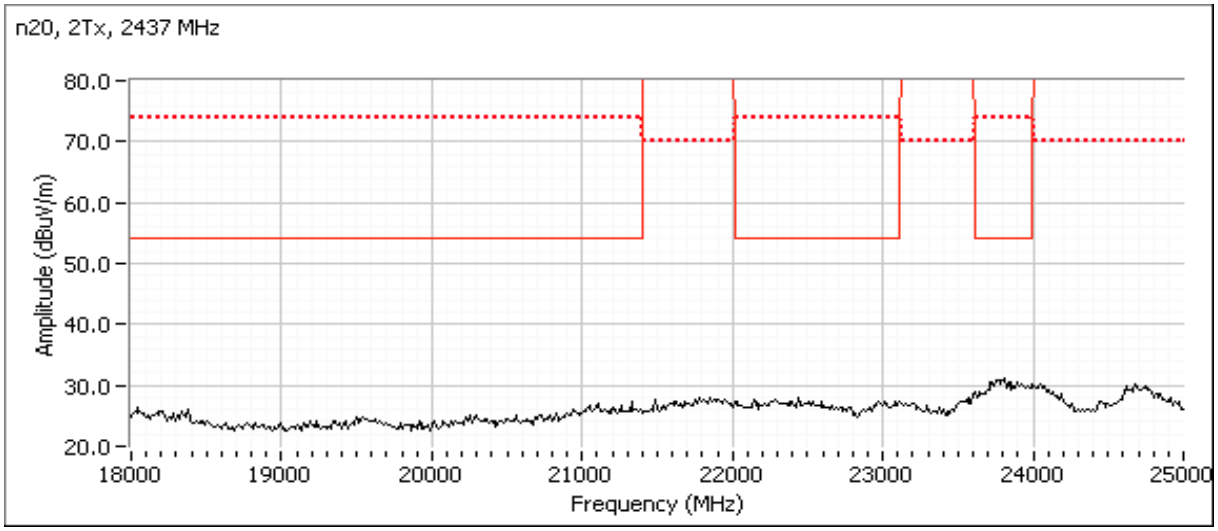
Channel: 6 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7310.260	43.0	V	54.0	-11.0	AVG	246	2.4	RB 1 MHz;VB 10 Hz;Peak
4874.220	35.1	H	54.0	-18.9	AVG	177	1.5	RB 1 MHz;VB 10 Hz;Peak
4874.180	46.4	H	74.0	-27.6	PK	177	1.5	RB 1 MHz;VB 3 MHz;Peak
7310.260	43.0	V	54.0	-11.0	AVG	246	2.4	RB 1 MHz;VB 10 Hz;Peak
7310.790	54.0	V	74.0	-20.0	PK	246	2.4	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

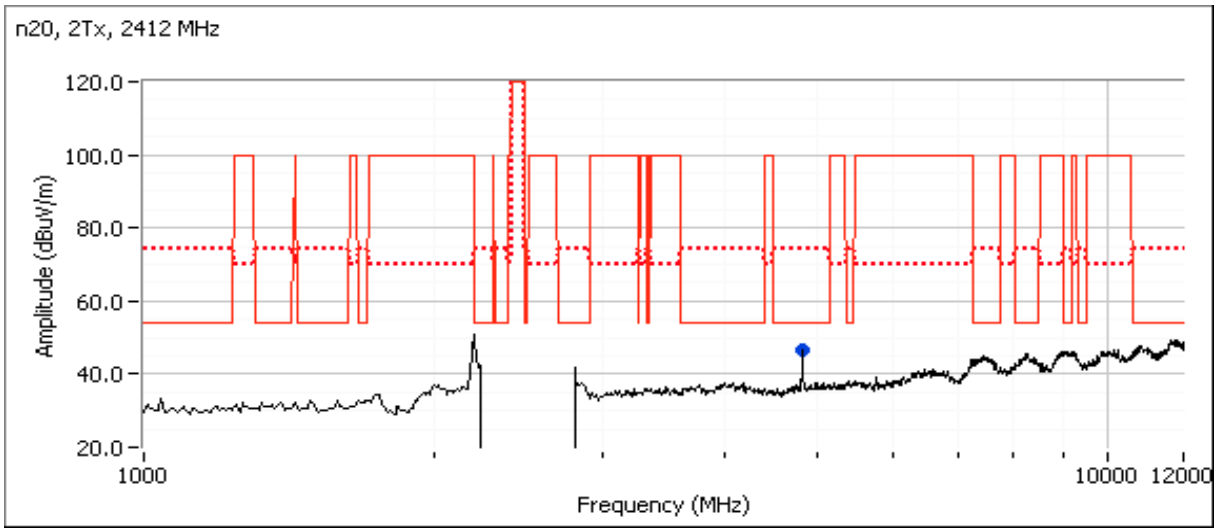
Run #3: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: Worse case from Run #2

Date of Test: 7/22/2015 0:00 Config. Used: 1
Test Engineer: Eddie Mariscal & Alika Hirano Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

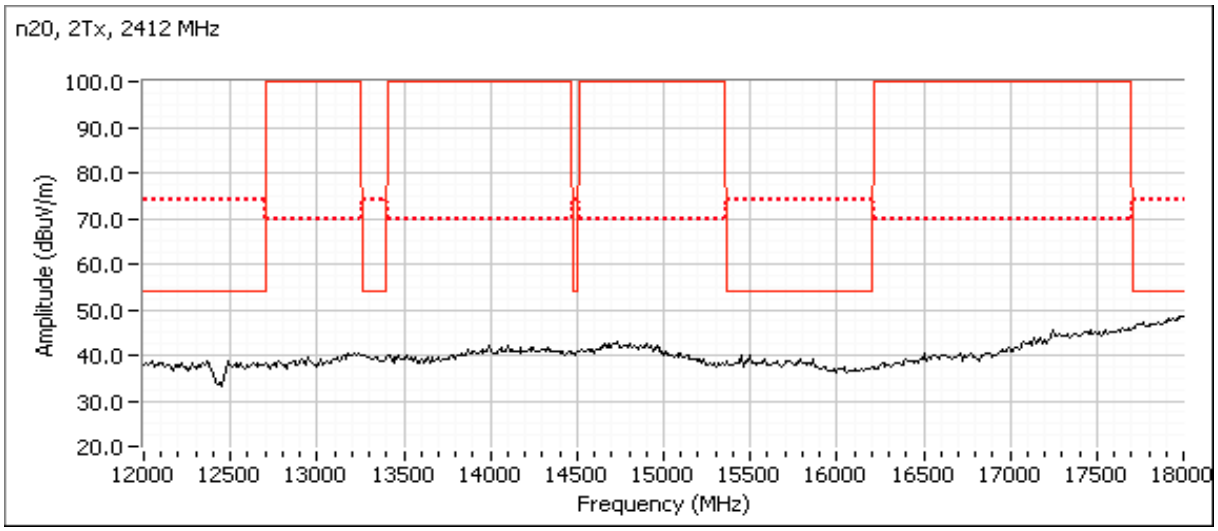
Run #3a: Low Channel

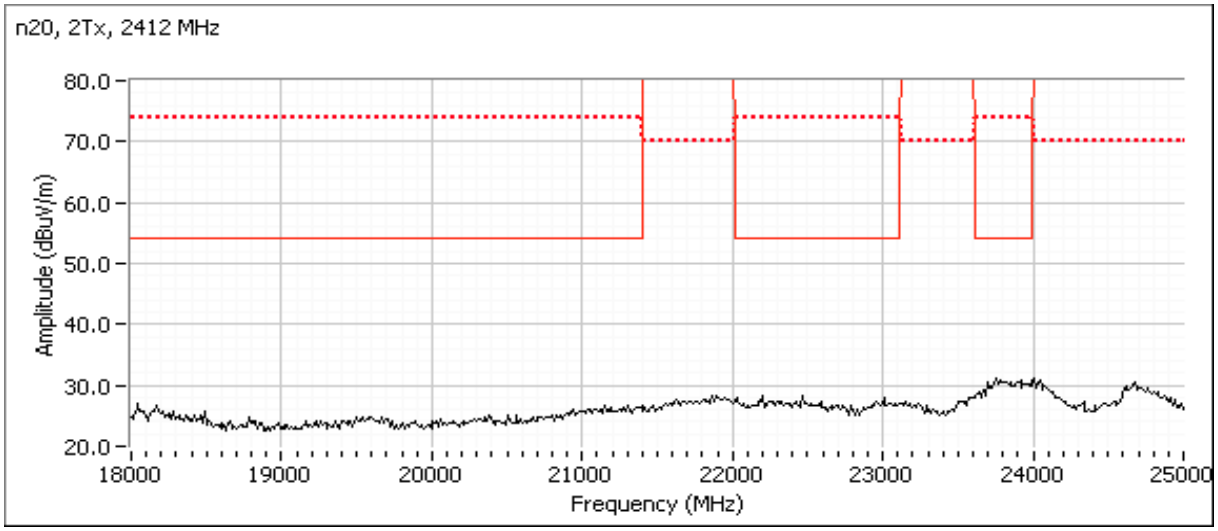
Channel: 1 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4824.070	34.1	H	54.0	-19.9	AVG	182	1.7	Note 1, RB 1 MHz;VB 10 Hz;Peak
4823.800	49.5	H	74.0	-24.5	PK	182	1.7	Note 1, RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



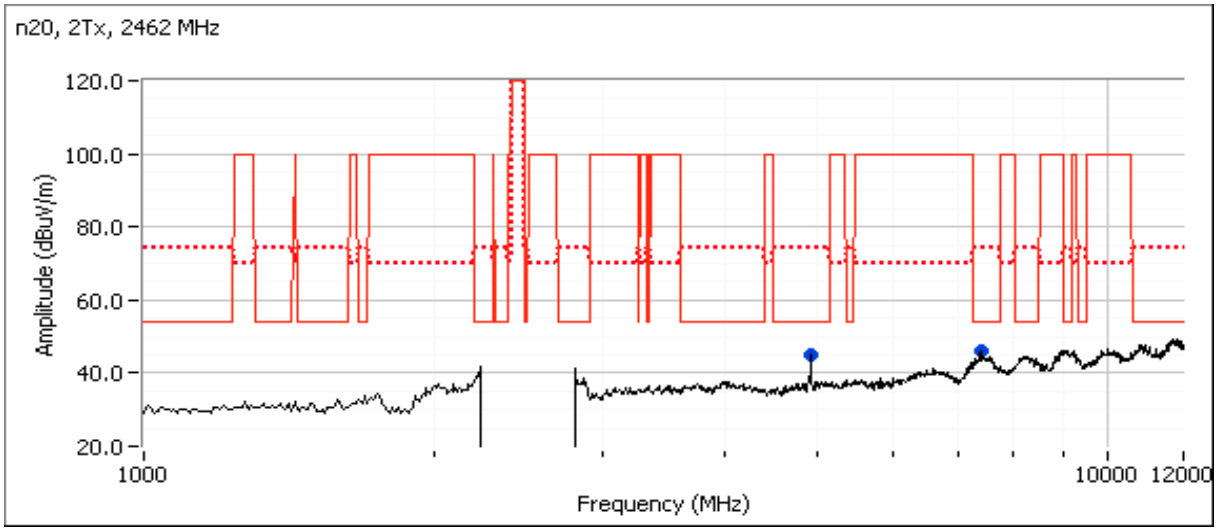


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

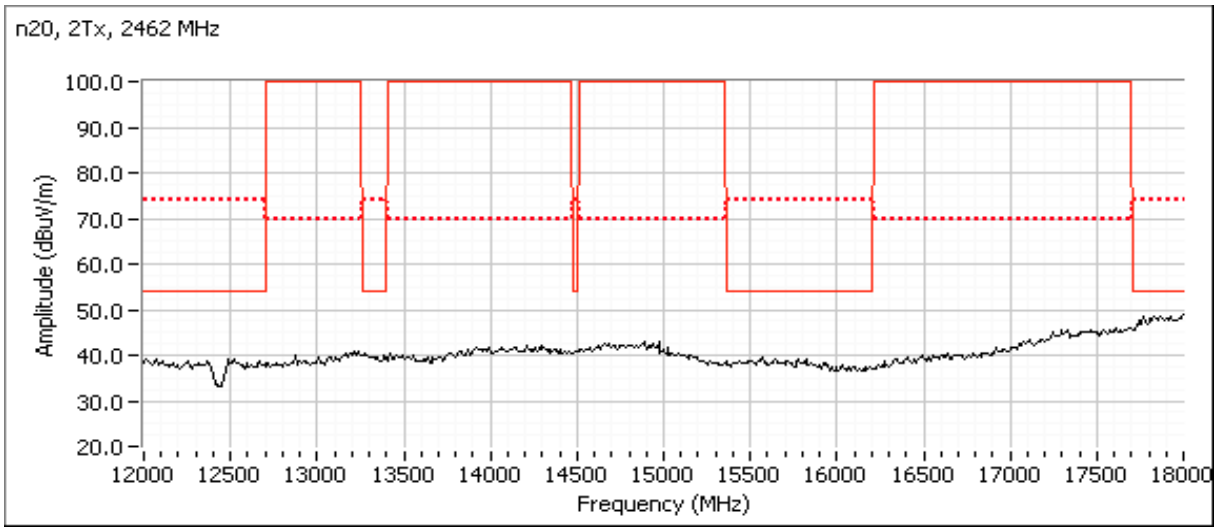
Run #3b: High Channel

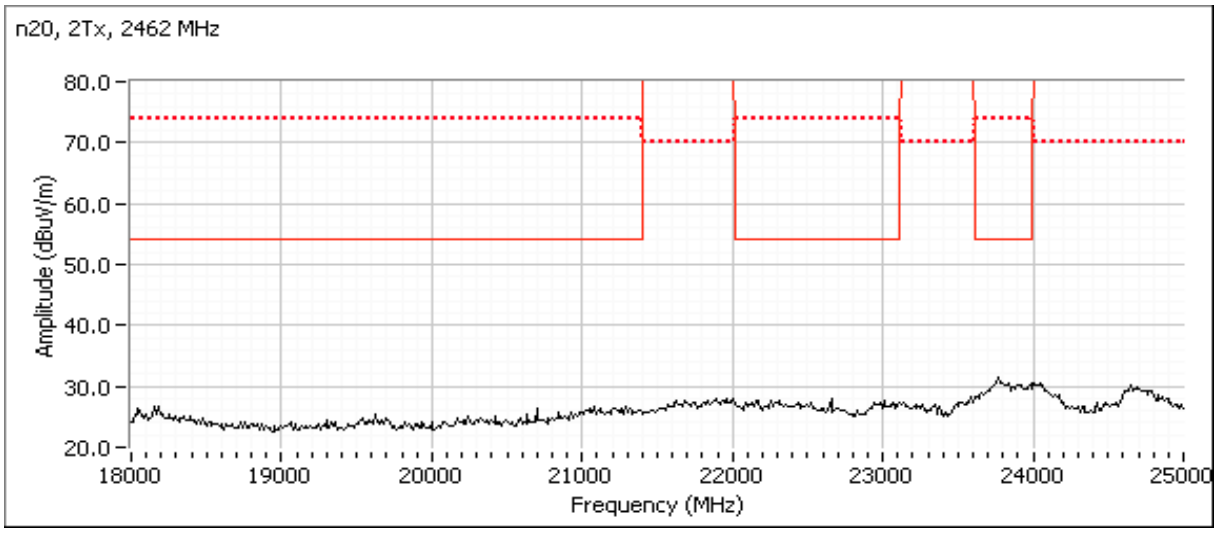
Channel: 11 Mode: n20
Tx Chain: 2TX Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7382.870	40.9	V	54.0	-13.1	AVG	221	1.1	RB 1 MHz;VB 10 Hz;Peak
7387.470	53.4	V	74.0	-20.6	PK	221	1.1	RB 1 MHz;VB 3 MHz;Peak
4924.070	35.0	H	54.0	-19.0	AVG	171	1.7	RB 1 MHz;VB 10 Hz;Peak
4924.000	49.6	H	74.0	-24.4	PK	171	1.7	RB 1 MHz;VB 3 MHz;Peak



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 247 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.

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, unless otherwise noted.

Ambient Conditions:

Temperature: 21.8 °C
Rel. Humidity: 37 %

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

Run #	Mode	Channel	Target Power	Final Setting	Test Performed	Limit	Result / Margin
1	b (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	47.1 dBµV/m @ 2379.9 MHz (-6.9 dB)
	b (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.2 dBµV/m @ 2483.5 MHz (-4.8 dB)
3	g (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2390.0 MHz (-0.2 dB)
	g (1Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.4 dBµV/m @ 2389.3 MHz (-0.6 dB)
	g (1Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.2 dBµV/m @ 2488.6 MHz (-0.8 dB)
	g (1Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.1 dBµV/m @ 2487.4 MHz (-0.9 dB)
	g (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.6 dBµV/m @ 2486.2 MHz (-0.4 dB)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #	Mode	Channel	Target Power	Final Setting	Test Performed	Limit	Result / Margin
4	n20 (1Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.4 dBµV/m @ 2388.4 MHz (-0.6 dB)
	n20 (1Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	53.8 dBµV/m @ 2390.0 MHz (-0.2 dB)
	n20 (1Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.1 dBµV/m @ 2483.6 MHz (-0.9 dB)
	n20 (1Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.1 dBµV/m @ 2485.9 MHz (-0.9 dB)
	n20 (1Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.5 dBµV/m @ 2483.9 MHz (-0.5 dB)
5	n20 (2Tx)	1 - 2412MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.0 dBµV/m @ 2387.8 MHz (-1.0 dB)
	n20 (2Tx)	2 - 2417MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.6 dBµV/m @ 2390.0 MHz (-0.4 dB)
	n20 (2Tx)	3 - 2422MHz	-	-	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.2 dBµV/m @ 2385.0 MHz (-0.8 dB)
	n20 (2Tx)	9 - 2452MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.4 dBµV/m @ 2483.8 MHz (-0.6 dB)
	n20 (2Tx)	10 - 2457MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.0 dBµV/m @ 2486.2 MHz (-1.0 dB)
	n20 (2Tx)	11 - 2462MHz	-	-	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	73.3 dBµV/m @ 2489.1 MHz (-0.7 dB)

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.

Sample Notes

Sample S/N: 707781772509
Driver: 6.37 RC214 .12
Antenna: External

Notes

Testing performed at 1.5m per C63.10
n20 2Tx was tested as representative of 11g 2Tx
Worse case chain for 1Tx operation was determined from preliminary testing

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 2:	Emission has duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear average mode, sweep time auto, max hold. Max hold for 50*(1/DC) traces
Note 5:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor
Note 6:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

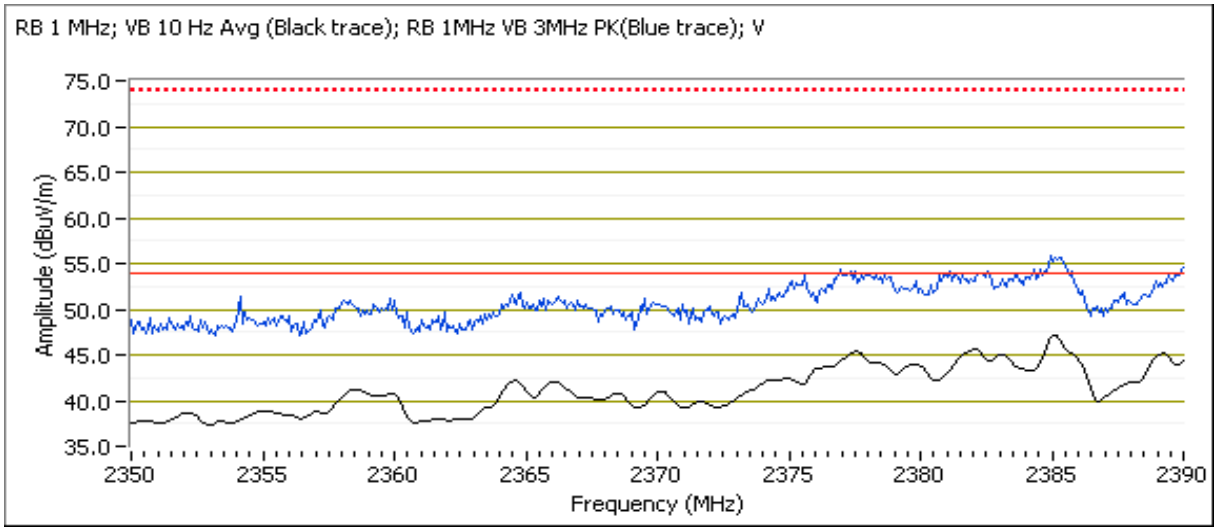
Run #1: Radiated Bandedge Measurements

Date of Test: 7/13/2015 0:00 — Config. Used: 1
Test Engineer: Rafael Varelas — Config Change: None
Test Location: FT Chamber #5 — EUT Voltage: USB

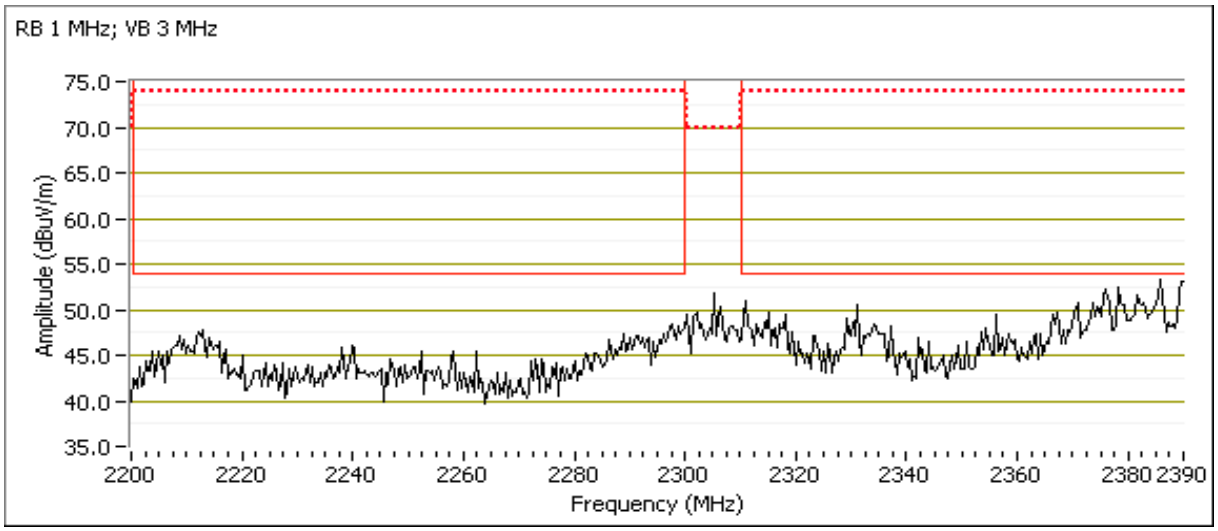
Channel: 1 — Mode: b
Tx Chain: Main — Data Rate: 1Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2379.900	47.1	V	54.0	-6.9	AVG	94	2.5	POS; RB 1 MHz; VB: 10 Hz
2379.380	53.7	V	74.0	-20.3	PK	94	2.5	POS; RB 1 MHz; VB: 3 MHz
2390.000	40.6	H	54.0	-13.4	AVG	139	1.2	POS; RB 1 MHz; VB: 10 Hz
2378.140	48.0	H	74.0	-26.0	PK	139	1.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

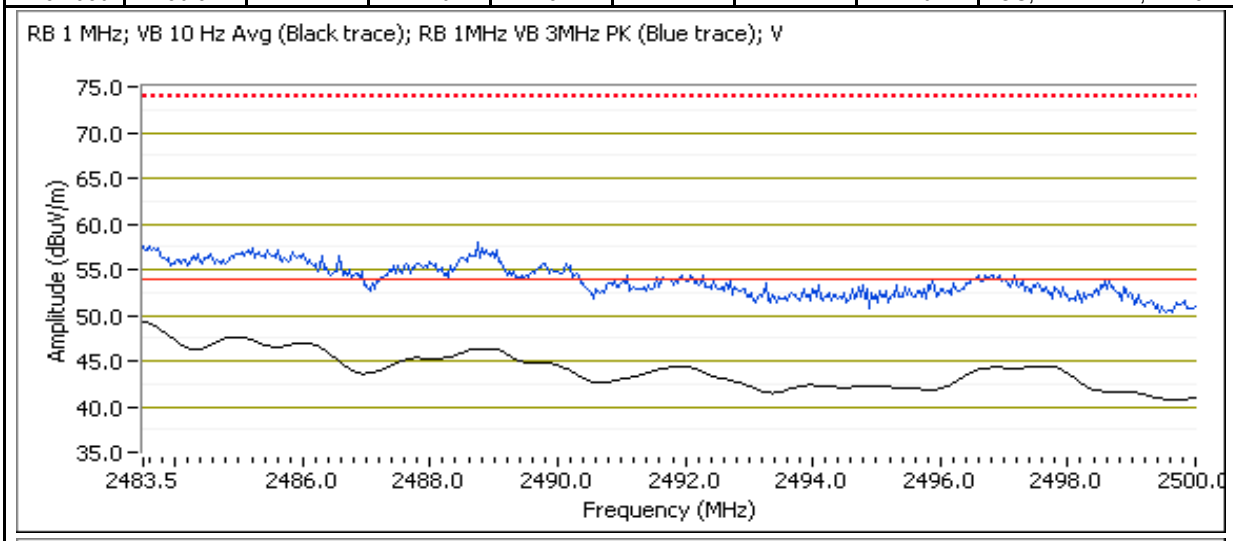


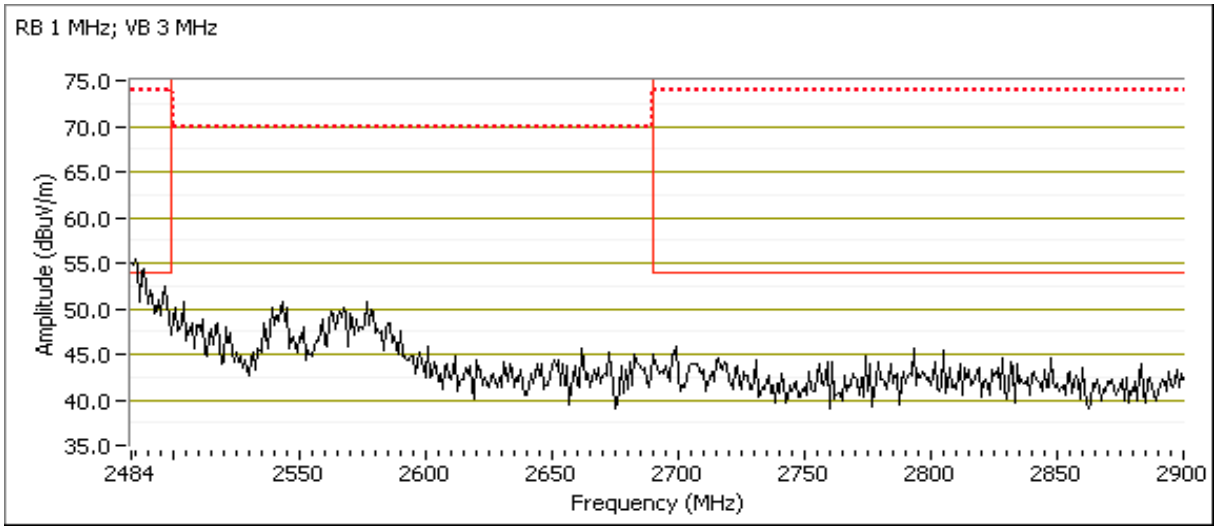
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Channel: 11 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	49.2	V	54.0	-4.8	AVG	259	1.1	POS; RB 1 MHz; VB: 10 Hz
2485.220	57.1	V	74.0	-16.9	PK	259	1.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	41.2	H	54.0	-12.8	AVG	144	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.950	50.3	H	74.0	-23.7	PK	144	1.0	POS; RB 1 MHz; VB: 3 MHz





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

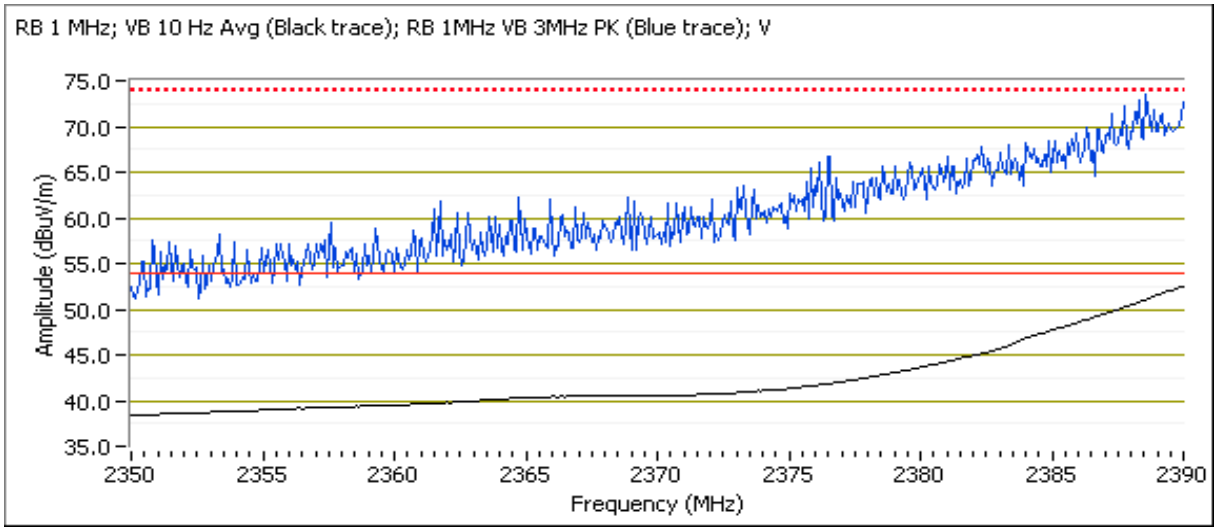
Run #3: Radiated Bandedge Measurements

Date of Test: 7/13/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

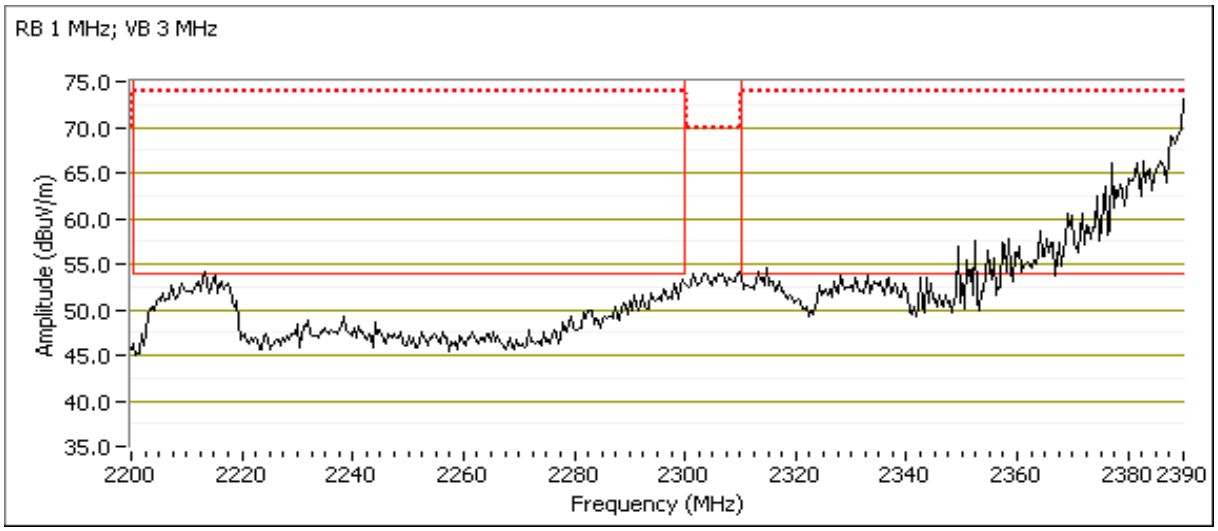
Channel: 1 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.8	V	54.0	-0.2	AVG	271	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.920	73.3	V	74.0	-0.7	PK	271	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	46.9	H	54.0	-7.1	AVG	277	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.760	63.3	H	74.0	-10.7	PK	277	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

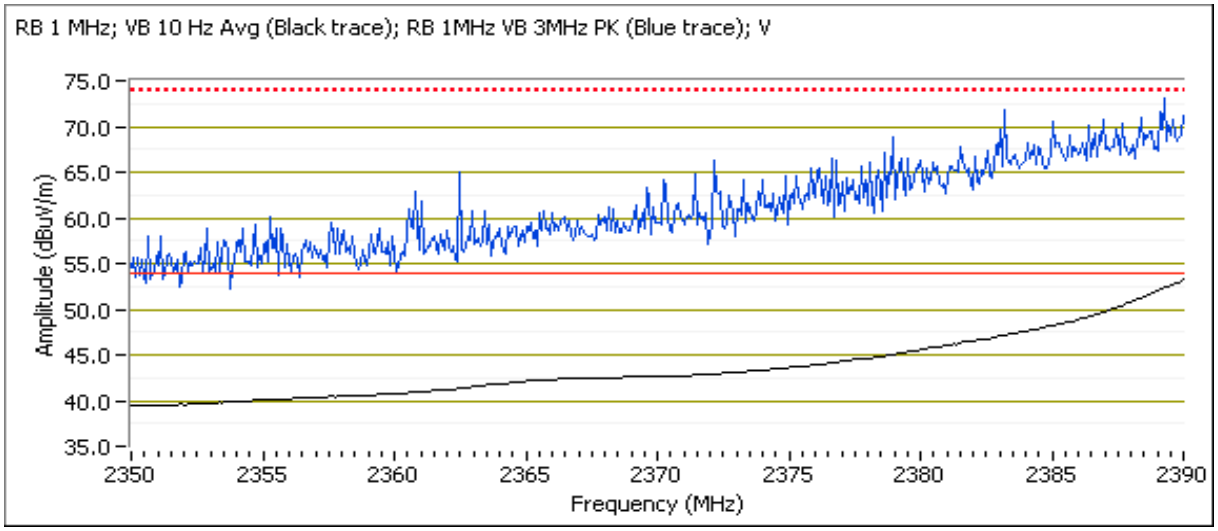


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

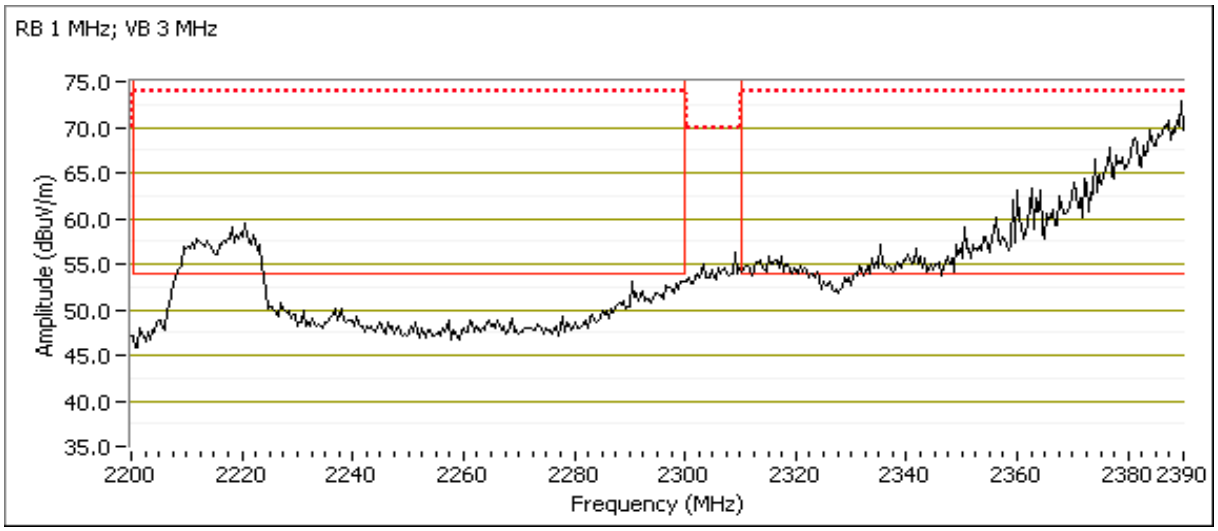
Channel: 2 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.1	V	54.0	-0.9	AVG	280	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.280	73.4	V	74.0	-0.6	PK	280	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	46.8	H	54.0	-7.2	AVG	289	1.0	POS; RB 1 MHz; VB: 10 Hz
2382.300	63.6	H	74.0	-10.4	PK	289	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

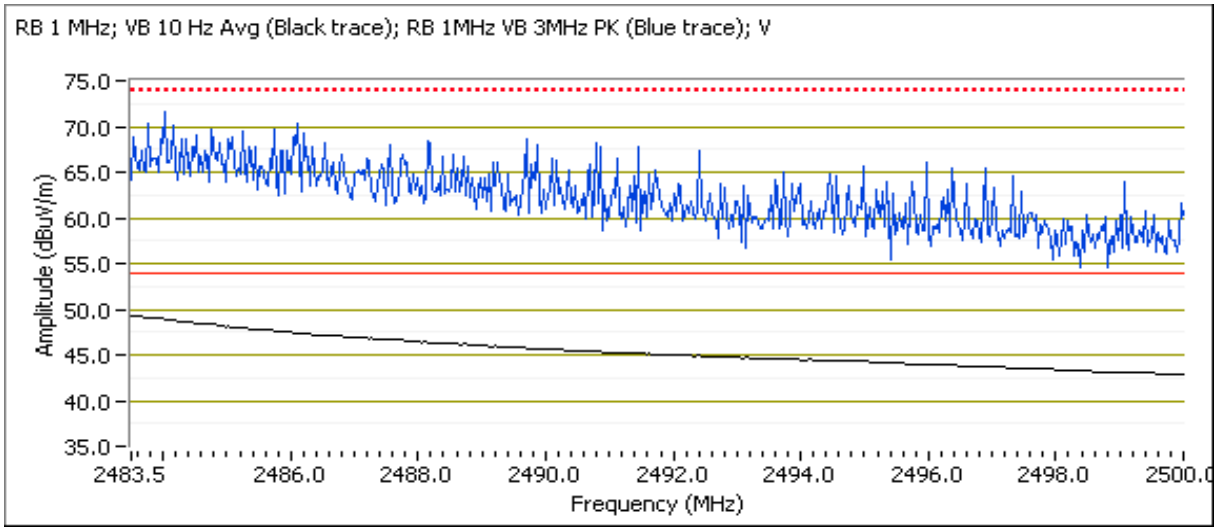


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

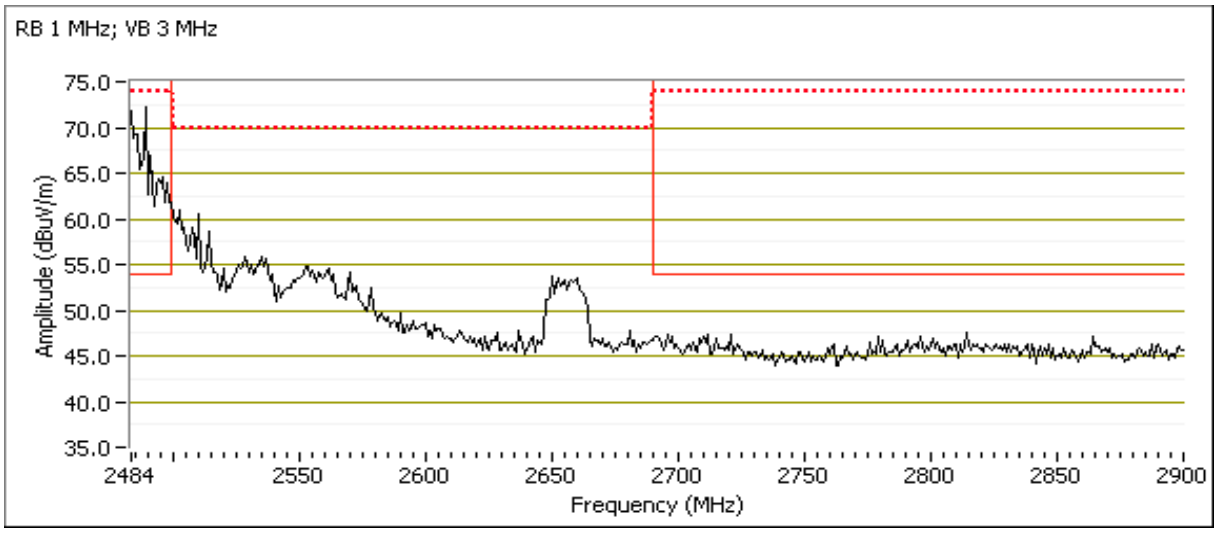
Channel: 9 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	49.6	V	54.0	-4.4	AVG	81	1.9	POS; RB 1 MHz; VB: 10 Hz
2488.560	73.2	V	74.0	-0.8	PK	81	1.9	POS; RB 1 MHz; VB: 3 MHz
2483.570	39.7	H	54.0	-14.3	AVG	328	1.0	POS; RB 1 MHz; VB: 10 Hz
2484.390	61.3	H	74.0	-12.7	PK	328	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

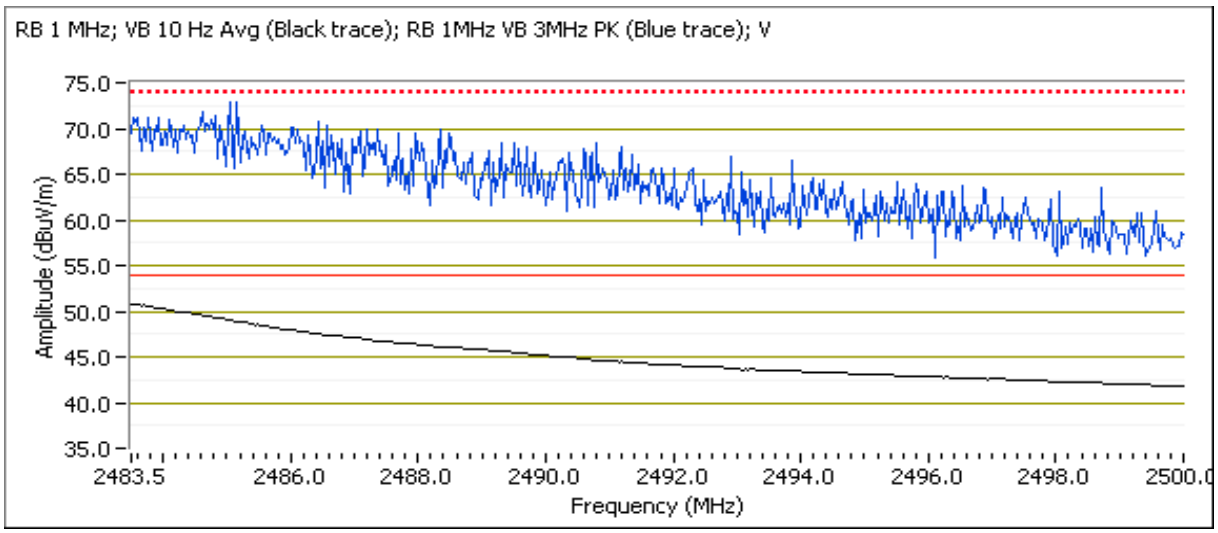


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

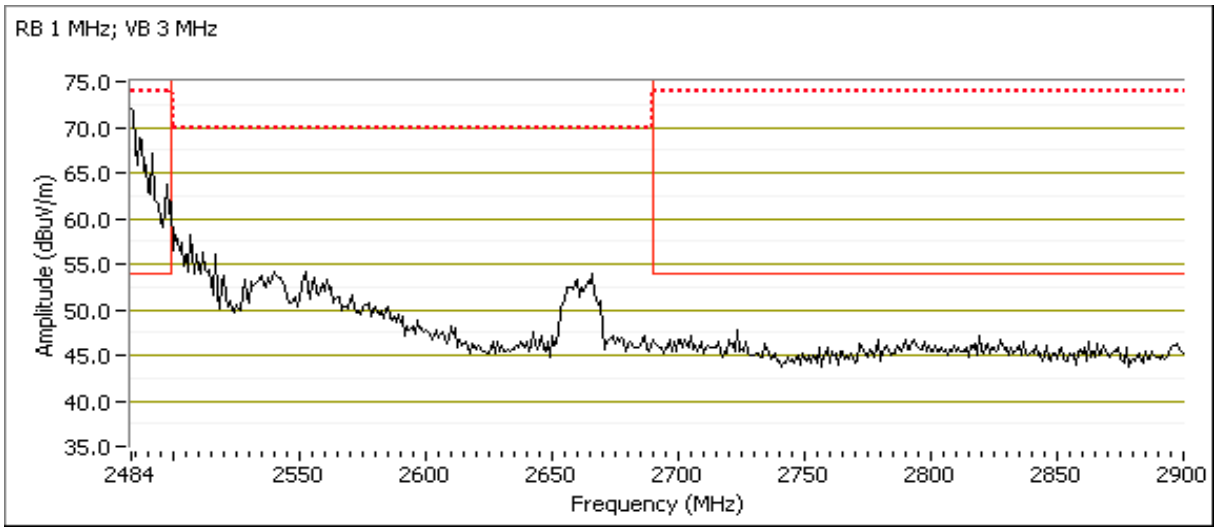
Channel: 10 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	50.9	V	54.0	-3.1	AVG	82	2.1	POS; RB 1 MHz; VB: 10 Hz
2487.430	73.1	V	74.0	-0.9	PK	82	2.1	POS; RB 1 MHz; VB: 3 MHz
2483.570	40.7	H	54.0	-13.3	AVG	328	1.0	POS; RB 1 MHz; VB: 10 Hz
2487.140	62.2	H	74.0	-11.8	PK	328	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

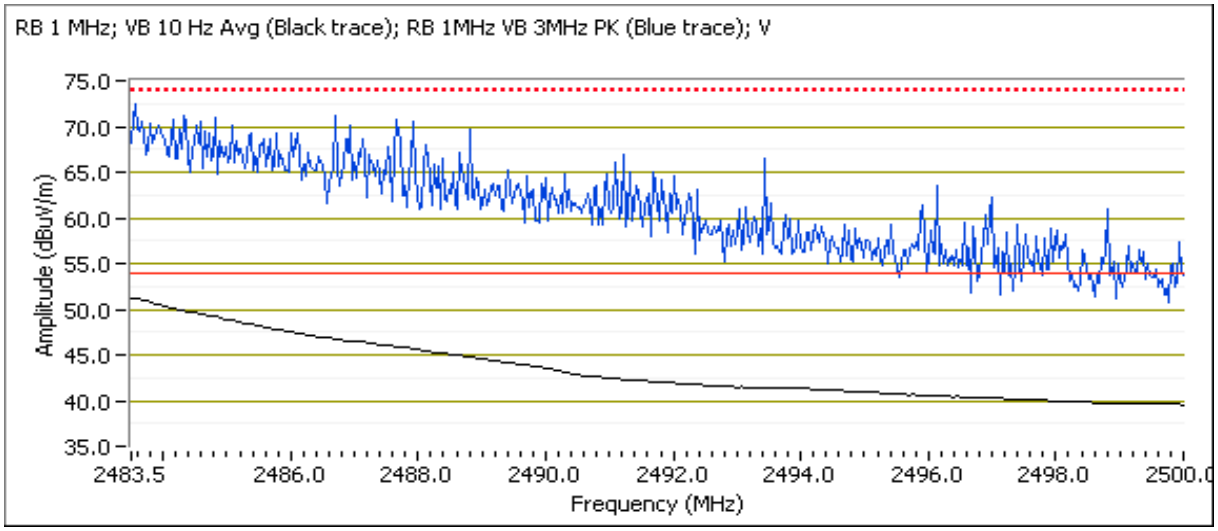


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

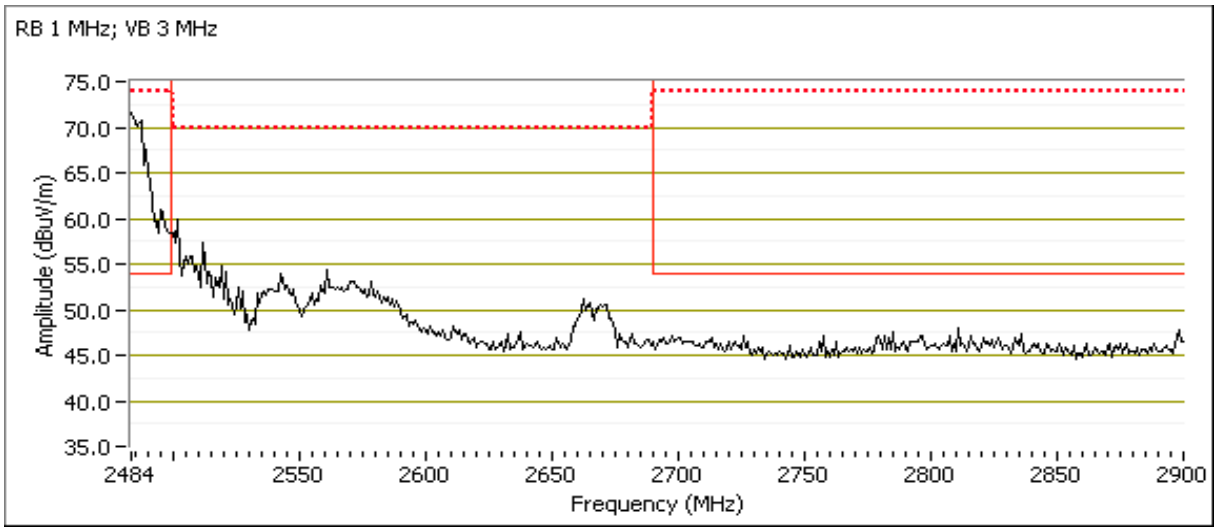
Channel: 11 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.2	V	54.0	-2.8	AVG	82	1.9	POS; RB 1 MHz; VB: 10 Hz
2486.180	73.6	V	74.0	-0.4	PK	82	1.9	POS; RB 1 MHz; VB: 3 MHz
2483.500	41.7	H	54.0	-12.3	AVG	333	1.0	POS; RB 1 MHz; VB: 10 Hz
2483.500	59.5	H	74.0	-14.5	PK	333	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

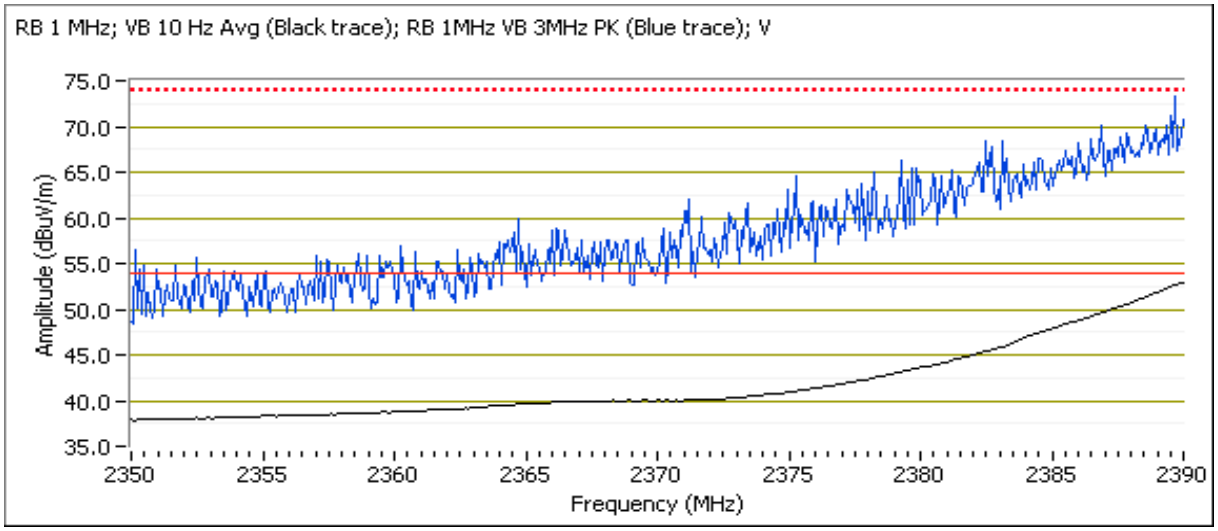
Run #4: Radiated Bandedge Measurements

Date of Test: 7/13/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

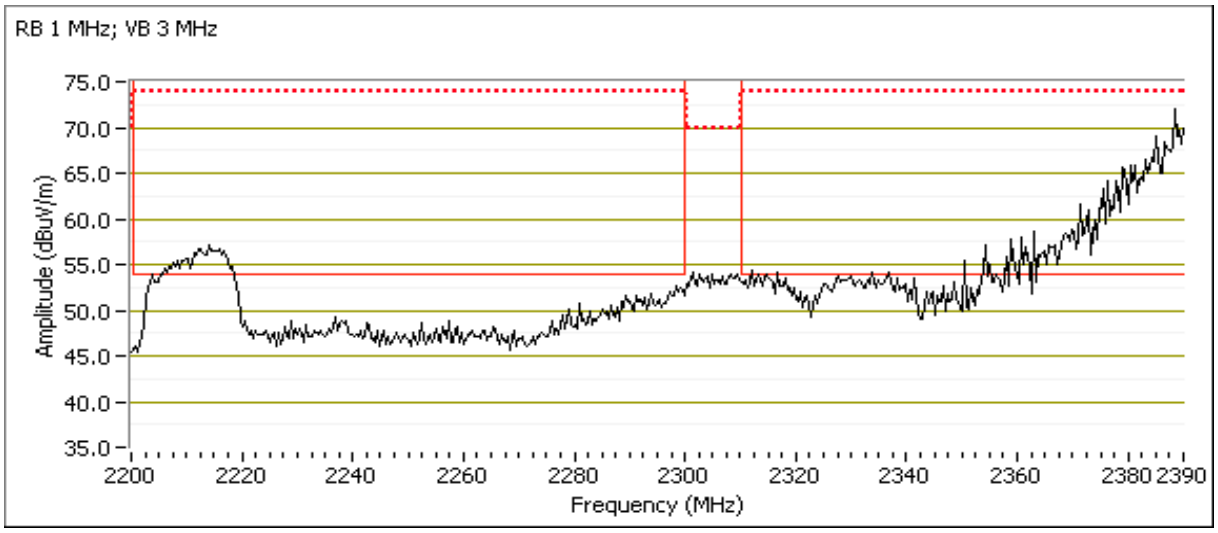
Channel: 1 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	52.9	V	54.0	-1.1	AVG	280	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.400	73.4	V	74.0	-0.6	PK	280	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	46.2	H	54.0	-7.8	AVG	288	1.4	POS; RB 1 MHz; VB: 10 Hz
2389.920	64.6	H	74.0	-9.4	PK	288	1.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

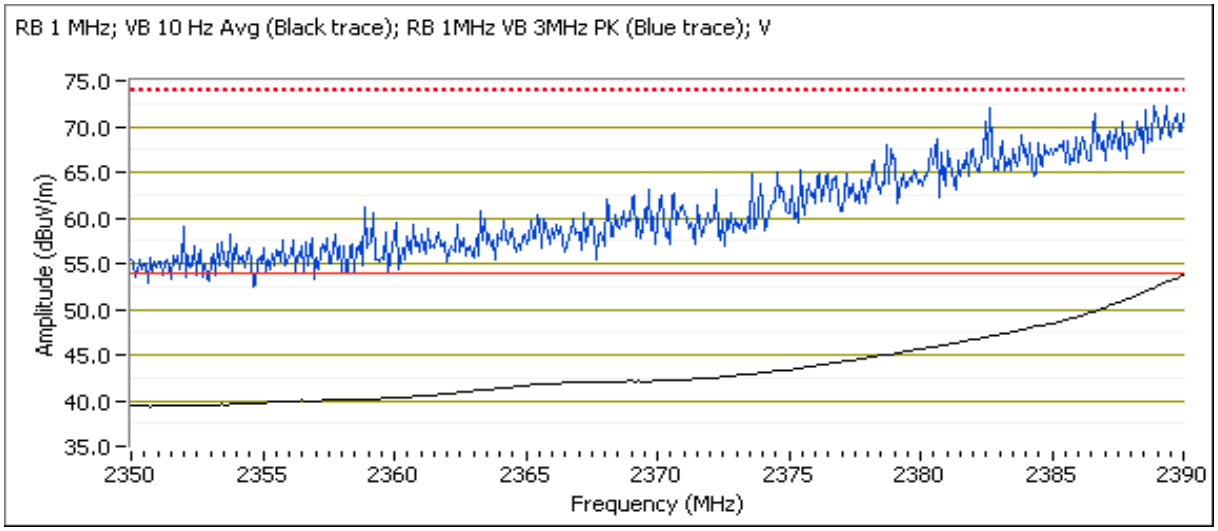


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

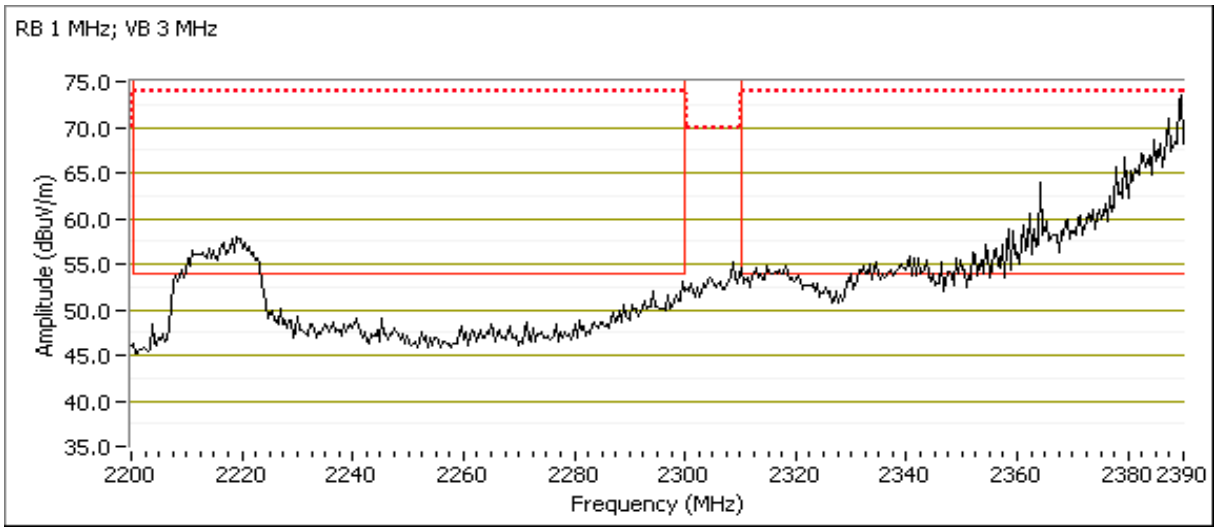
Channel: 2 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2390.000	53.8	V	54.0	-0.2	AVG	280	1.0	POS; RB 1 MHz; VB: 10 Hz
2388.720	73.1	V	74.0	-0.9	PK	280	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	47.1	H	54.0	-6.9	AVG	286	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.840	66.7	H	74.0	-7.3	PK	286	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

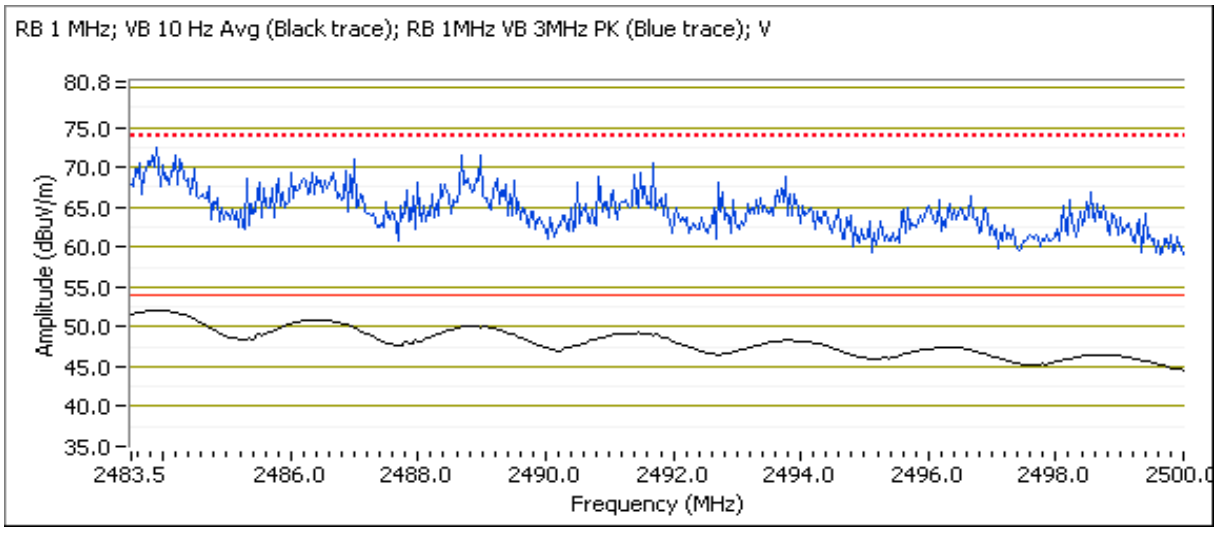


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

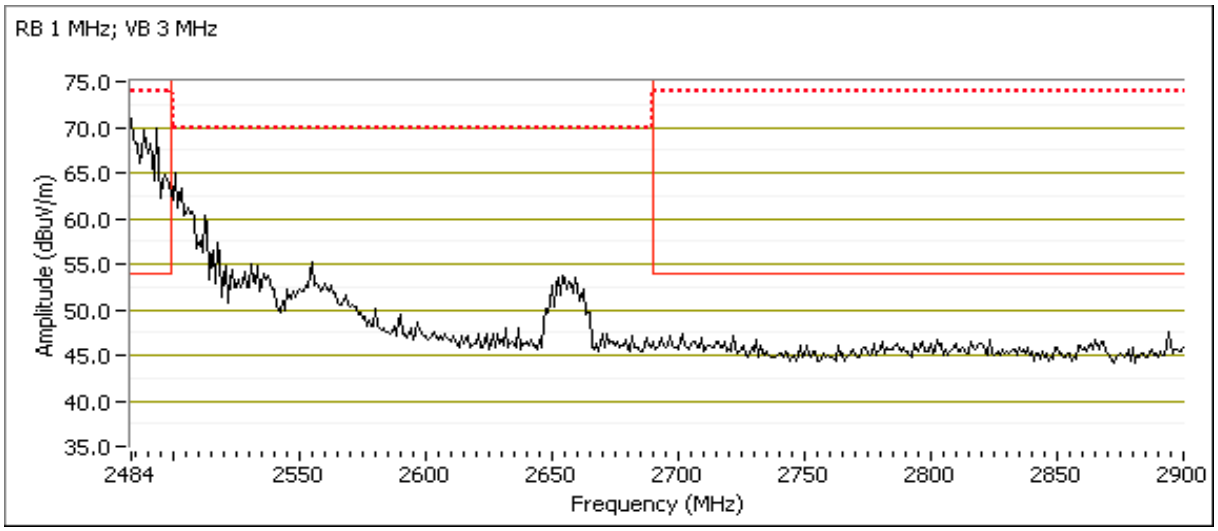
Channel: 9 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2484.060	52.6	V	54.0	-1.4	AVG	71	1.4	POS; RB 1 MHz; VB: 10 Hz
2483.630	73.1	V	74.0	-0.9	PK	71	1.4	POS; RB 1 MHz; VB: 3 MHz
2484.920	45.3	H	54.0	-8.7	AVG	263	2.1	POS; RB 1 MHz; VB: 10 Hz
2490.110	64.2	H	74.0	-9.8	PK	263	2.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

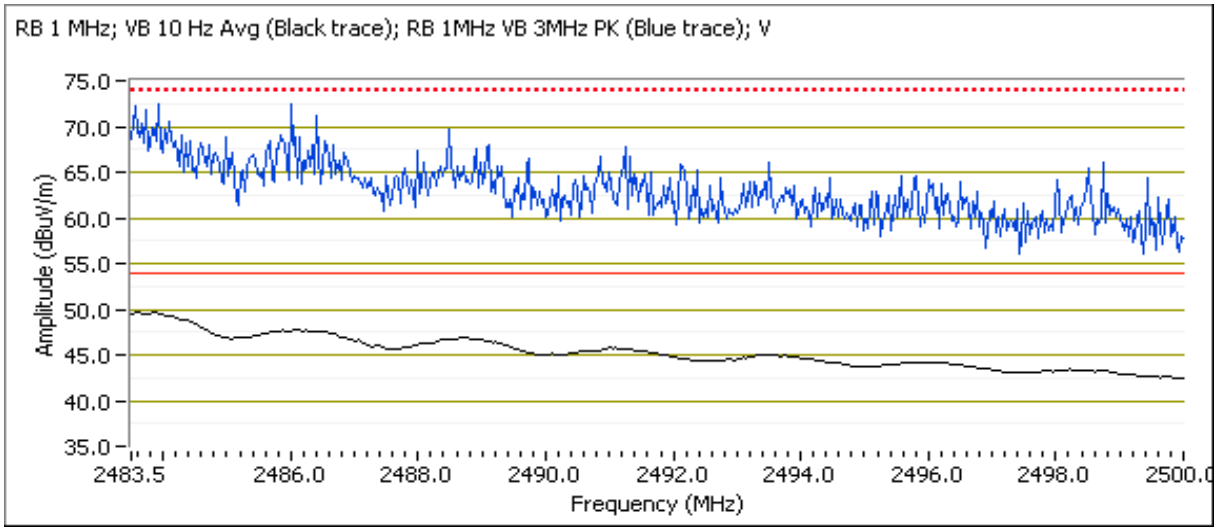


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

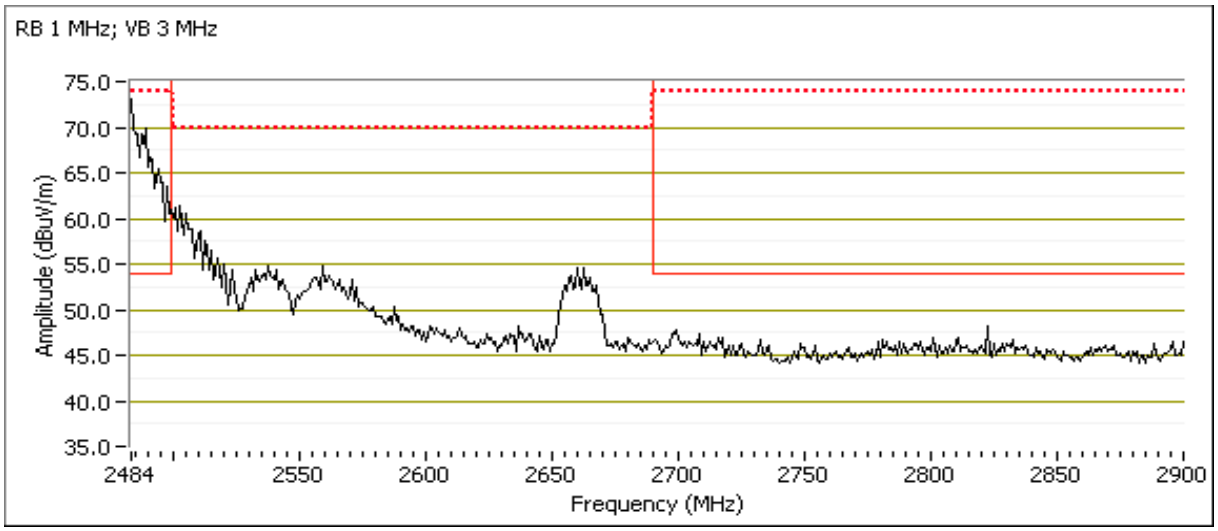
Channel: 10 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.630	49.8	V	54.0	-4.2	AVG	70	1.4	POS; RB 1 MHz; VB: 10 Hz
2485.850	73.1	V	74.0	-0.9	PK	70	1.4	POS; RB 1 MHz; VB: 3 MHz
2484.790	42.0	H	54.0	-12.0	AVG	253	2.1	POS; RB 1 MHz; VB: 10 Hz
2489.720	62.4	H	74.0	-11.6	PK	253	2.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

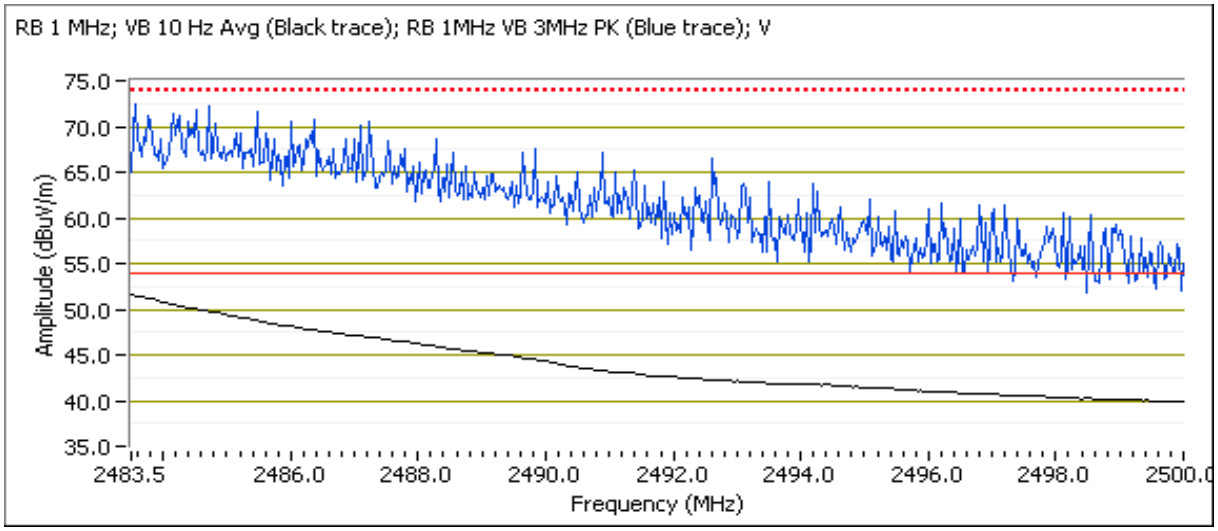


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

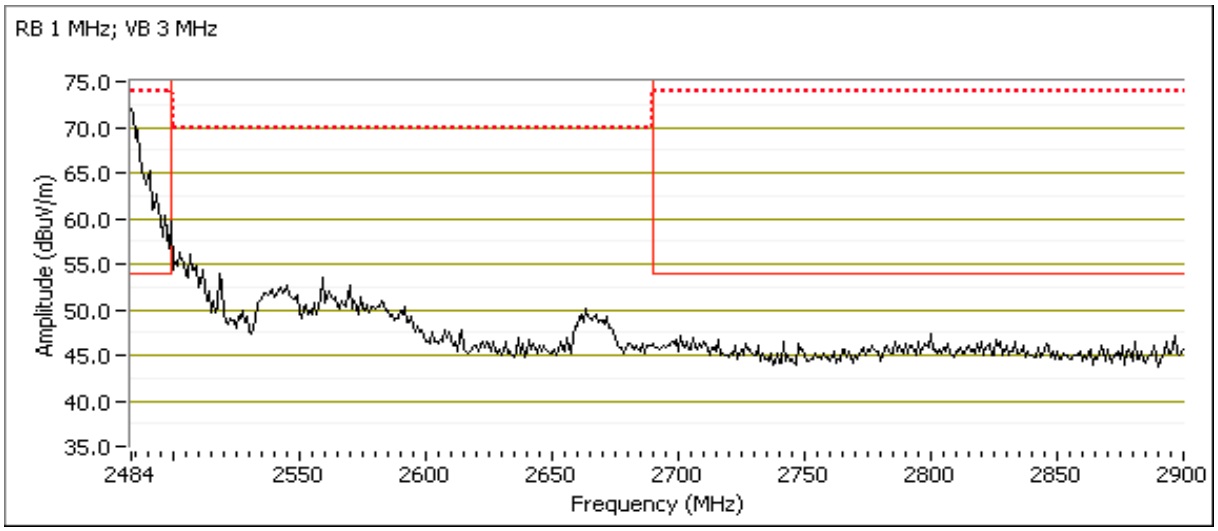
Channel: 11 Mode: n20
Tx Chain: Main Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	51.6	V	54.0	-2.4	AVG	80	2.1	POS; RB 1 MHz; VB: 10 Hz
2483.900	73.5	V	74.0	-0.5	PK	80	2.1	POS; RB 1 MHz; VB: 3 MHz
2483.500	42.6	H	54.0	-11.4	AVG	342	1.0	POS; RB 1 MHz; VB: 10 Hz
2485.650	64.1	H	74.0	-9.9	PK	342	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

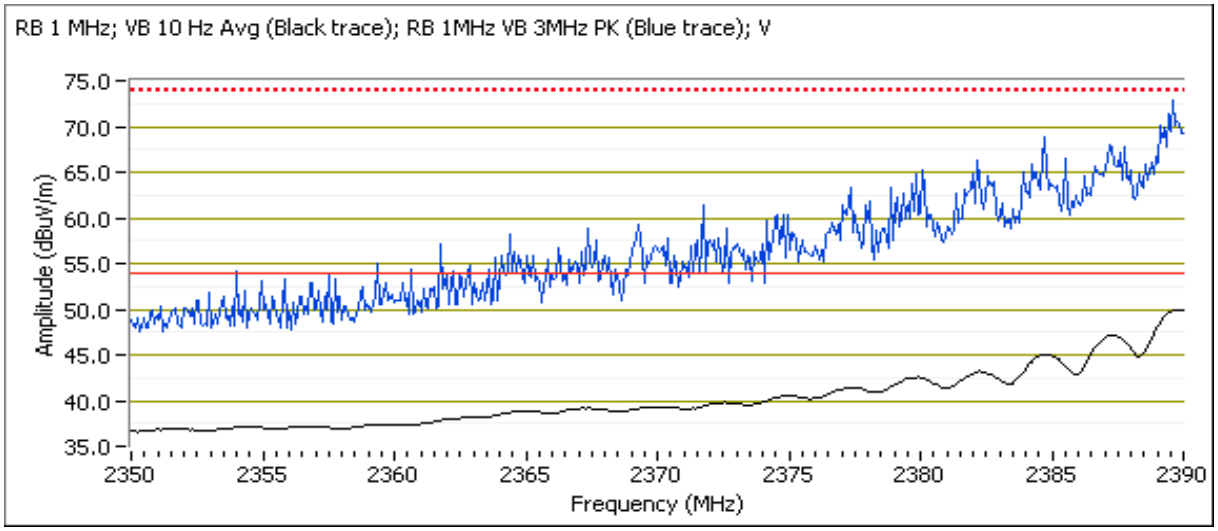
Run #5: Radiated Bandedge Measurements

Date of Test: 7/14/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

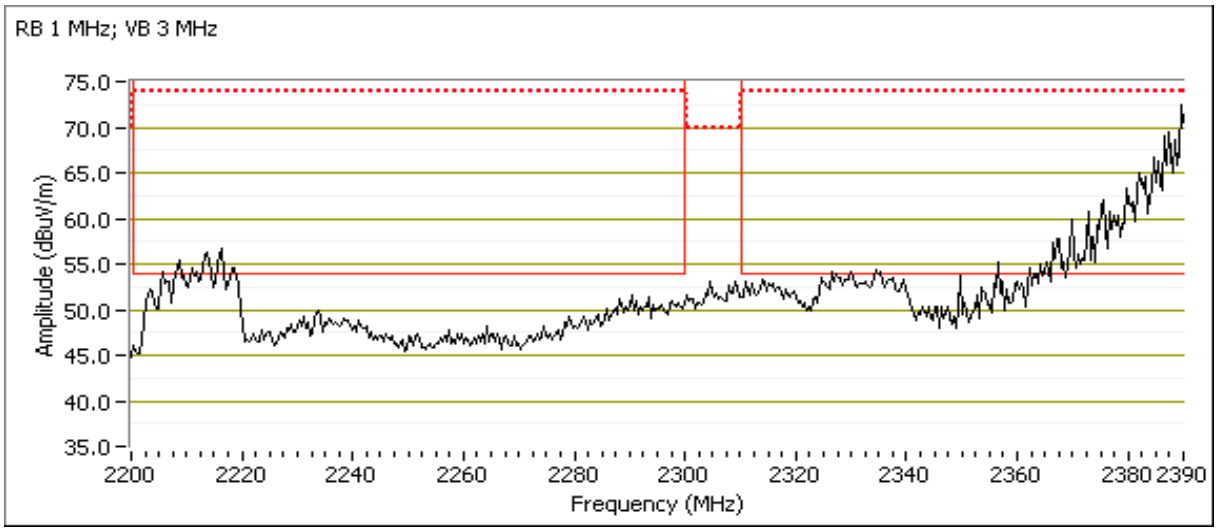
Channel: 1 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.840	51.7	V	54.0	-2.3	AVG	267	1.0	POS; RB 1 MHz; VB: 10 Hz
2387.760	73.0	V	74.0	-1.0	PK	267	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	42.1	H	54.0	-11.9	AVG	250	1.0	POS; RB 1 MHz; VB: 10 Hz
2390.000	62.7	H	74.0	-11.3	PK	250	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

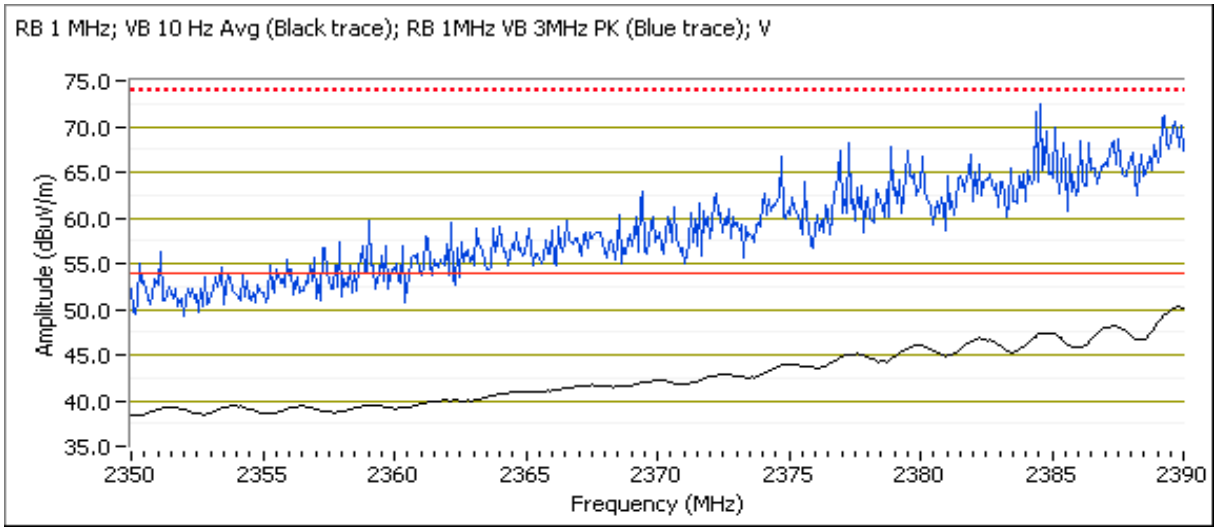


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

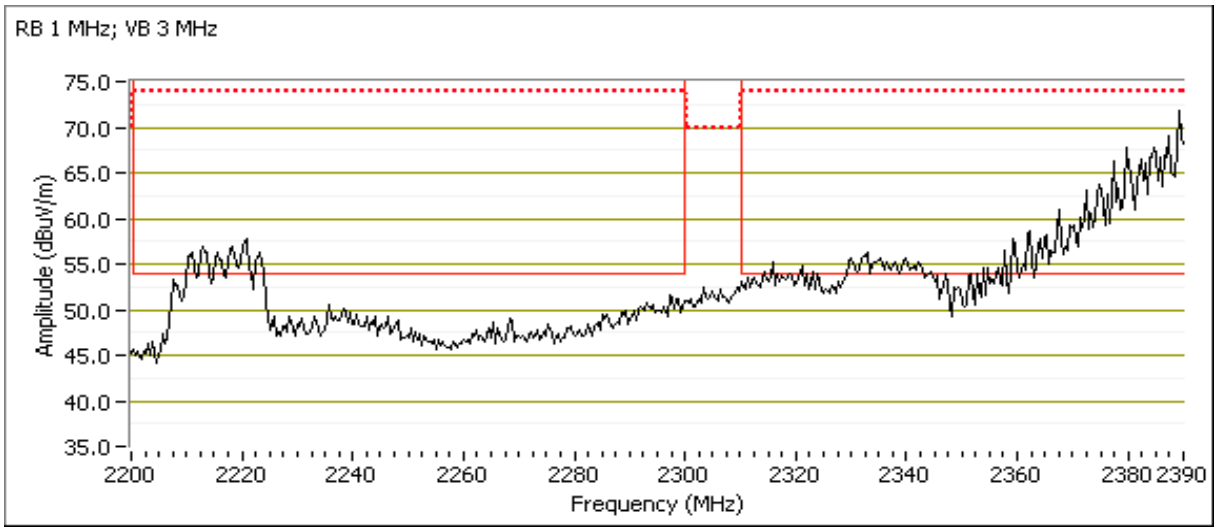
Channel: 2 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.680	50.3	V	54.0	-3.7	AVG	268	1.0	POS; RB 1 MHz; VB: 10 Hz
2390.000	73.6	V	74.0	-0.4	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz
2390.000	40.7	H	54.0	-13.3	AVG	249	1.0	POS; RB 1 MHz; VB: 10 Hz
2389.920	60.7	H	74.0	-13.3	PK	249	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

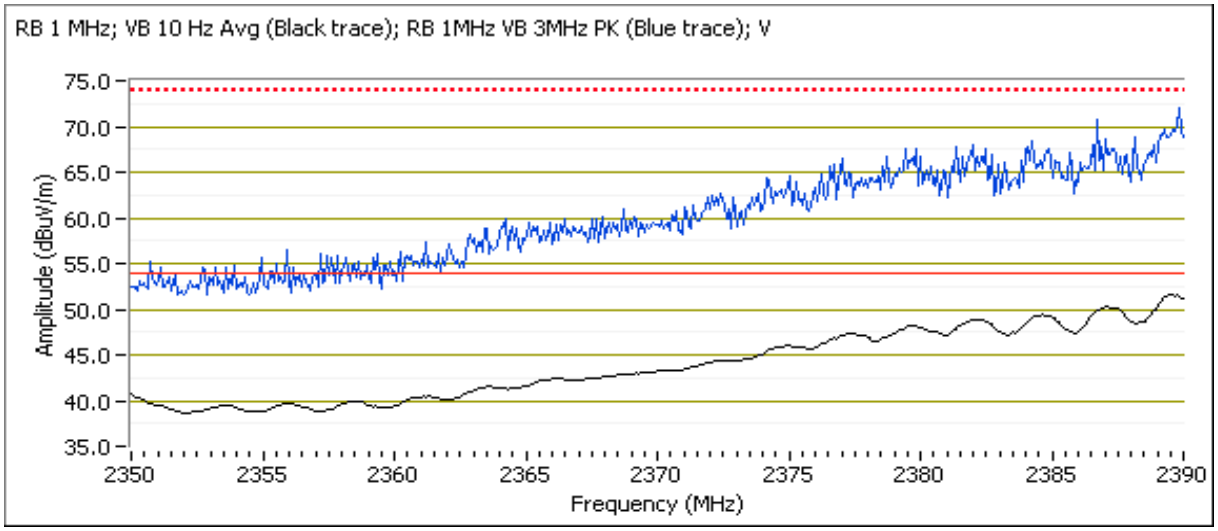


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

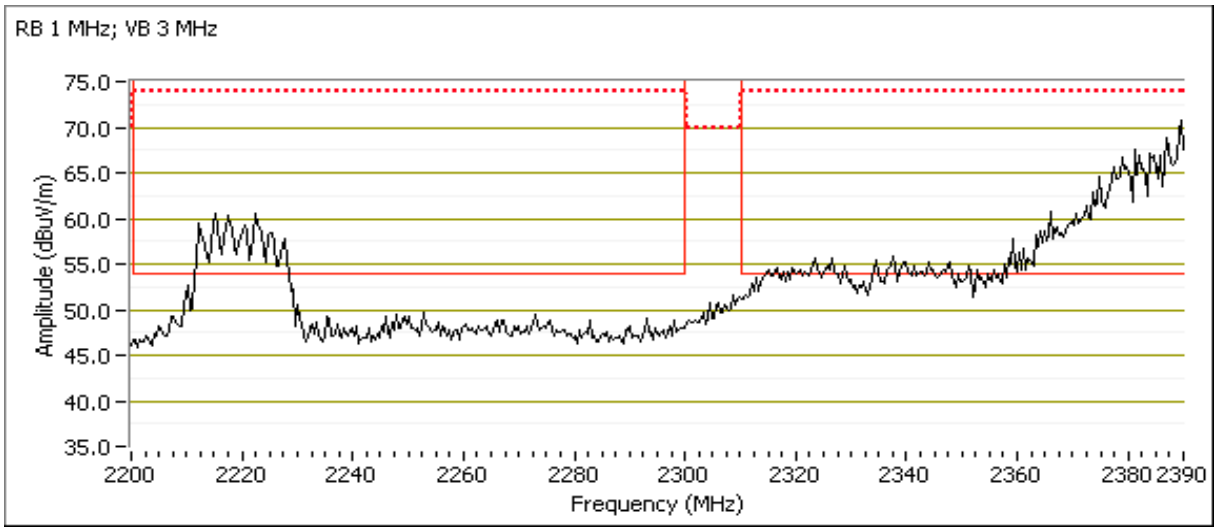
Channel: 3 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2389.680	52.4	V	54.0	-1.6	AVG	87	1.0	POS; RB 1 MHz; VB: 10 Hz
2384.950	73.2	V	74.0	-0.8	PK	87	1.0	POS; RB 1 MHz; VB: 3 MHz
2389.920	43.0	H	54.0	-11.0	AVG	266	2.3	POS; RB 1 MHz; VB: 10 Hz
2389.360	62.2	H	74.0	-11.8	PK	266	2.3	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

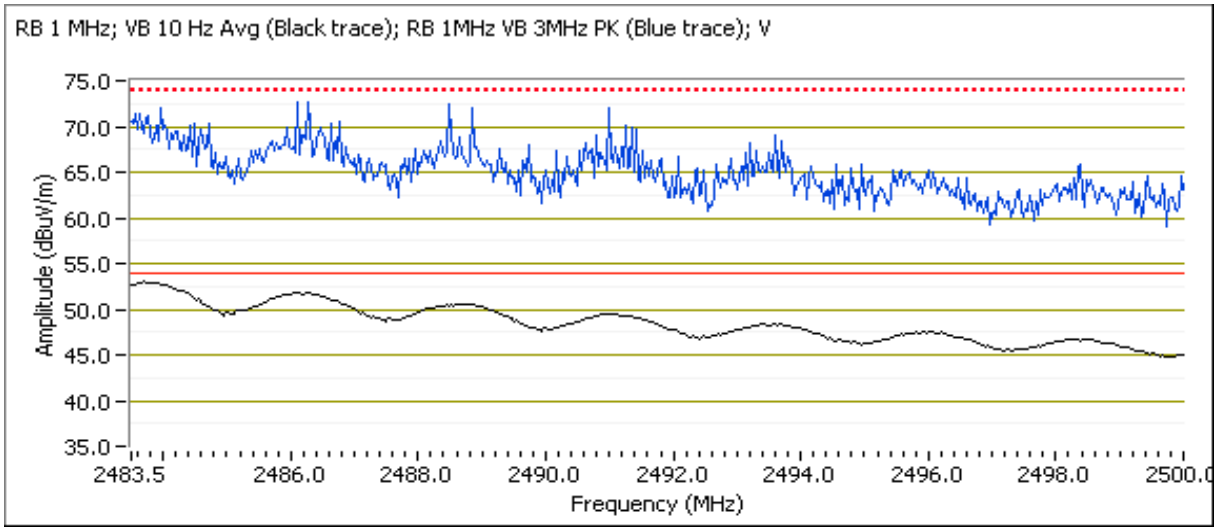


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

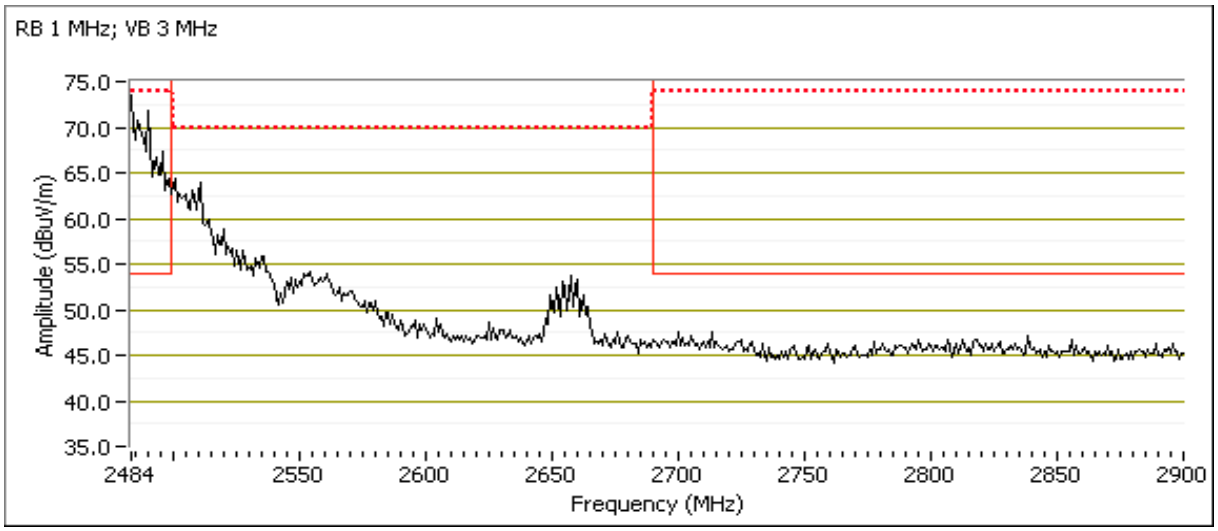
Channel: 9 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.800	53.4	V	54.0	-0.6	AVG	69	1.2	POS; RB 1 MHz; VB: 10 Hz
2488.460	73.3	V	74.0	-0.7	PK	69	1.2	POS; RB 1 MHz; VB: 3 MHz
2484.760	45.1	H	54.0	-8.9	AVG	255	2.1	POS; RB 1 MHz; VB: 10 Hz
2495.300	64.6	H	74.0	-9.4	PK	255	2.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

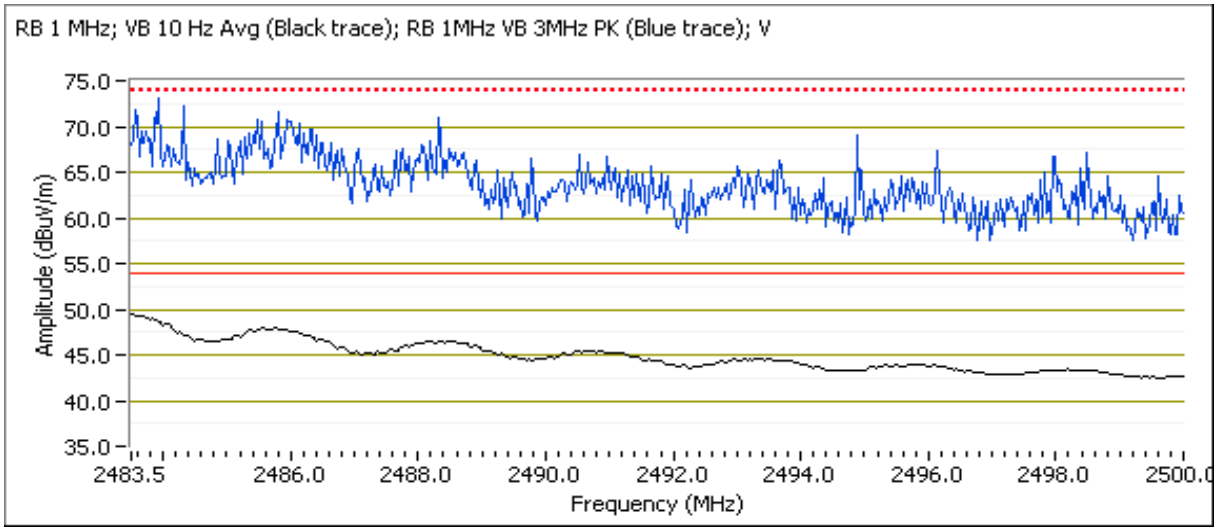


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

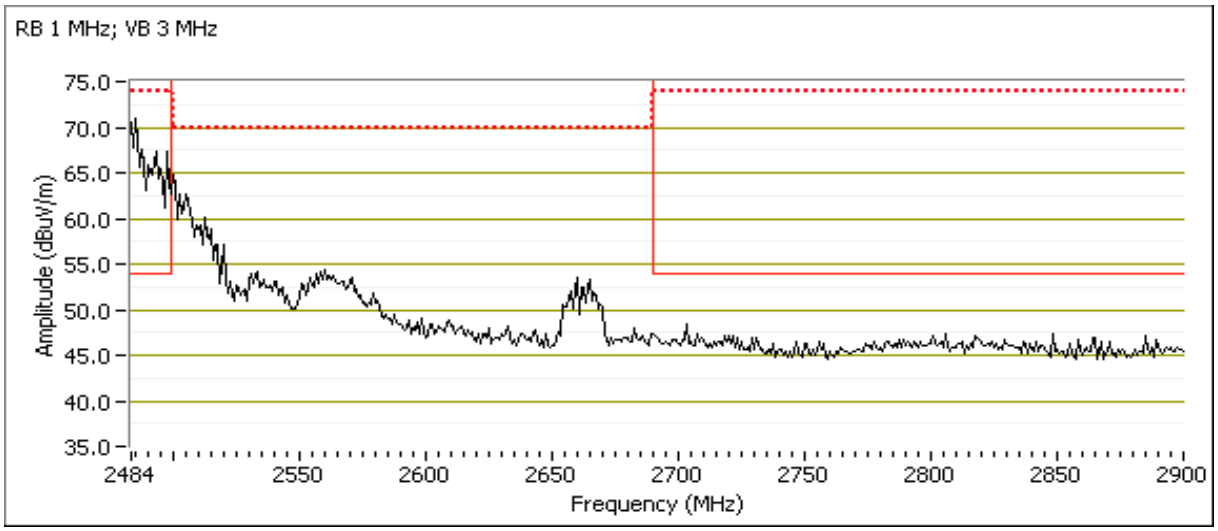
Channel: 10 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.500	49.2	V	54.0	-4.8	AVG	64	1.7	POS; RB 1 MHz; VB: 10 Hz
2486.180	73.0	V	74.0	-1.0	PK	64	1.7	POS; RB 1 MHz; VB: 3 MHz
2485.020	41.6	H	54.0	-12.4	AVG	264	2.2	POS; RB 1 MHz; VB: 10 Hz
2488.330	63.2	H	74.0	-10.8	PK	264	2.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

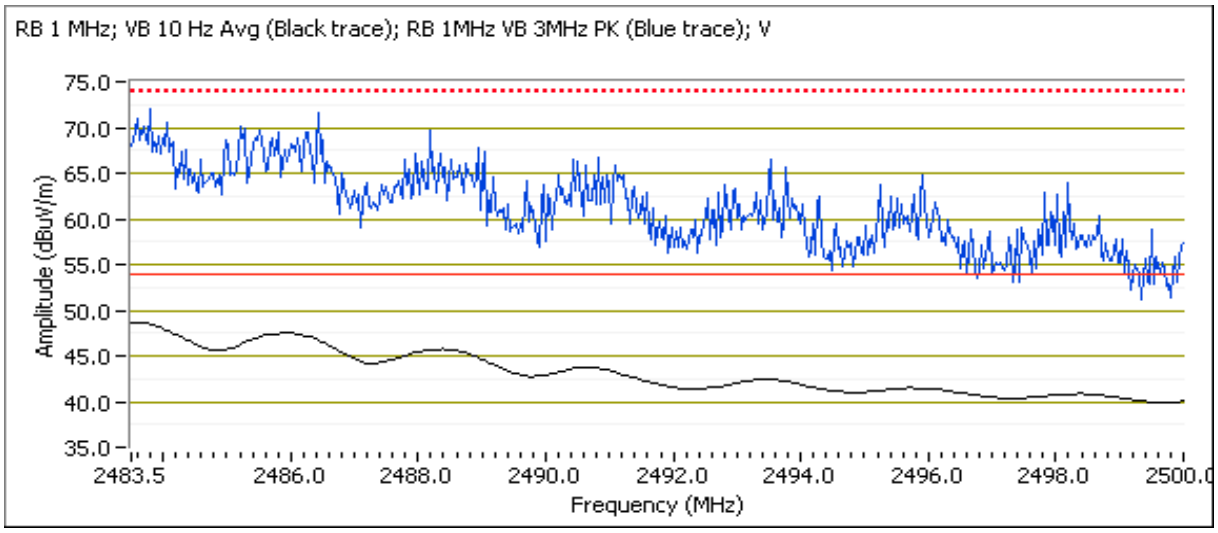


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

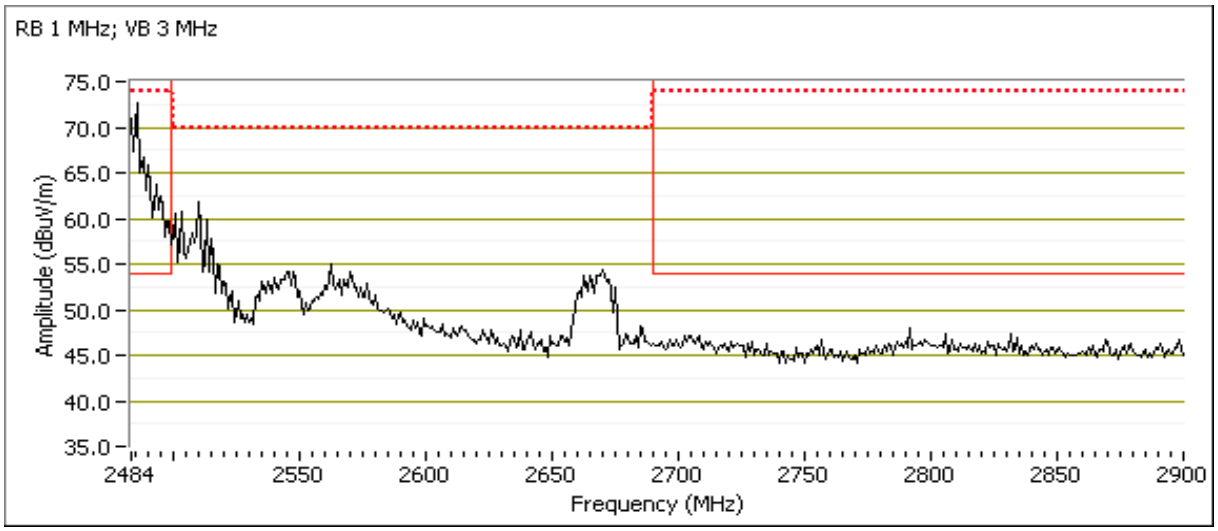
Channel: 11 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2483.530	49.1	V	54.0	-4.9	AVG	67	1.5	POS; RB 1 MHz; VB: 10 Hz
2489.090	73.3	V	74.0	-0.7	PK	67	1.5	POS; RB 1 MHz; VB: 3 MHz
2485.250	41.4	H	54.0	-12.6	AVG	254	2.1	POS; RB 1 MHz; VB: 10 Hz
2485.220	62.2	H	74.0	-11.8	PK	254	2.1	POS; RB 1 MHz; VB: 3 MHz



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 247 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.

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, unless otherwise noted.

Ambient Conditions:

Temperature: 22.4 °C
Rel. Humidity: 37 %

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

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	b (1Tx)	1 - 2412MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	44.3 dBµV/m @ 4824.0 MHz (-9.7 dB)
	b (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	45.4 dBµV/m @ 4873.9 MHz (-8.6 dB)
	b (1Tx)	11 - 2462MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	44.3 dBµV/m @ 4924.0 MHz (-9.7 dB)
Scans on center channel in all OFDM modes to determine the worst case mode.							
2	g (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	47.6 dBµV/m @ 2229.2 MHz (-6.4 dB)
	n20 (1Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	42.8 dBµV/m @ 2228.5 MHz (-11.2 dB)
	n20 (2Tx)	6 - 2437MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.3 dBµV/m @ 2231.8 MHz (-4.7 dB)
Measurements on low and high channels in worst-case OFDM mode.							
3	n20 (2Tx)	1 - 2412MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.7 dBµV/m @ 2212.9 MHz (-4.3 dB)
	n20 (2Tx)	11 - 2462MHz	-	-	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	42.9 dBµV/m @ 7387.2 MHz (-11.1 dB)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

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.

Sample Notes

Sample S/N: 707781772509
Driver: 6.37 RC214 .12
Antenna: External

Notes

Testing performed at 1.5m per C63.10
All testing was performed in 2Tx mode using worse case 1Tx power levels, except for 11b

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.
2.4GHz band reject filter used

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: 802.11b

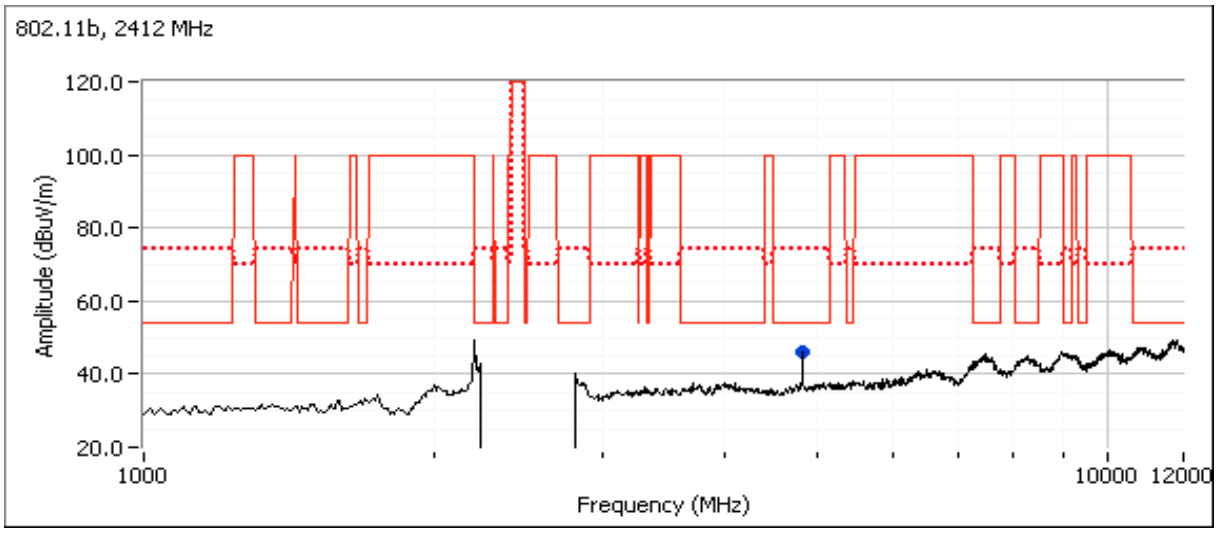
Date of Test: 7/22/2015 0:00 Config. Used: 1
Test Engineer: Alika Hirano Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

Run #1a: Low Channel

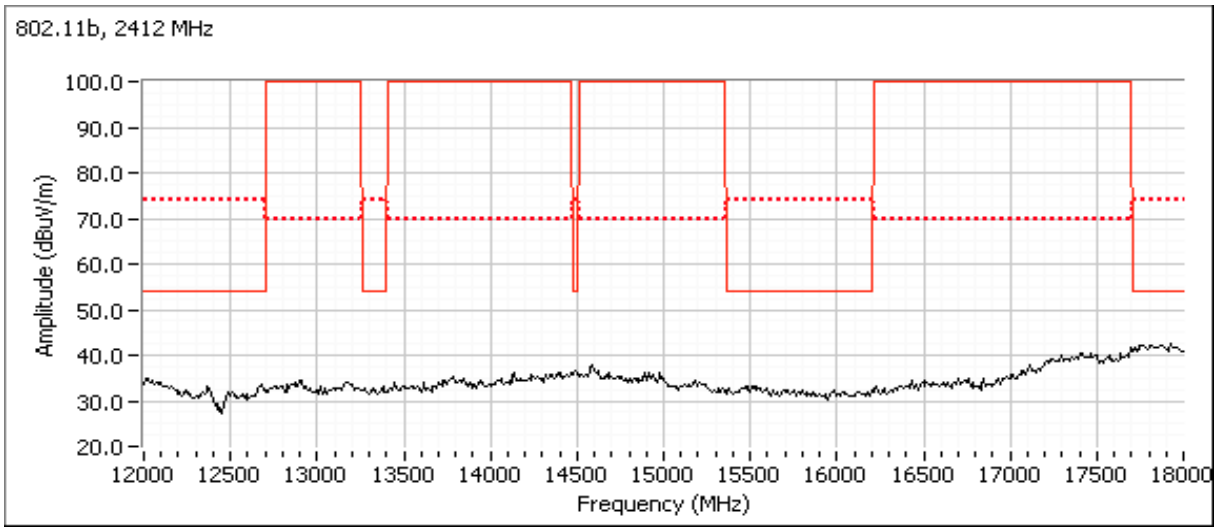
Channel: 1 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4823.980	44.3	V	54.0	-9.7	AVG	270	1.6	RB 1 MHz;VB 10 Hz;Peak
4823.850	49.2	V	74.0	-24.8	PK	270	1.6	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



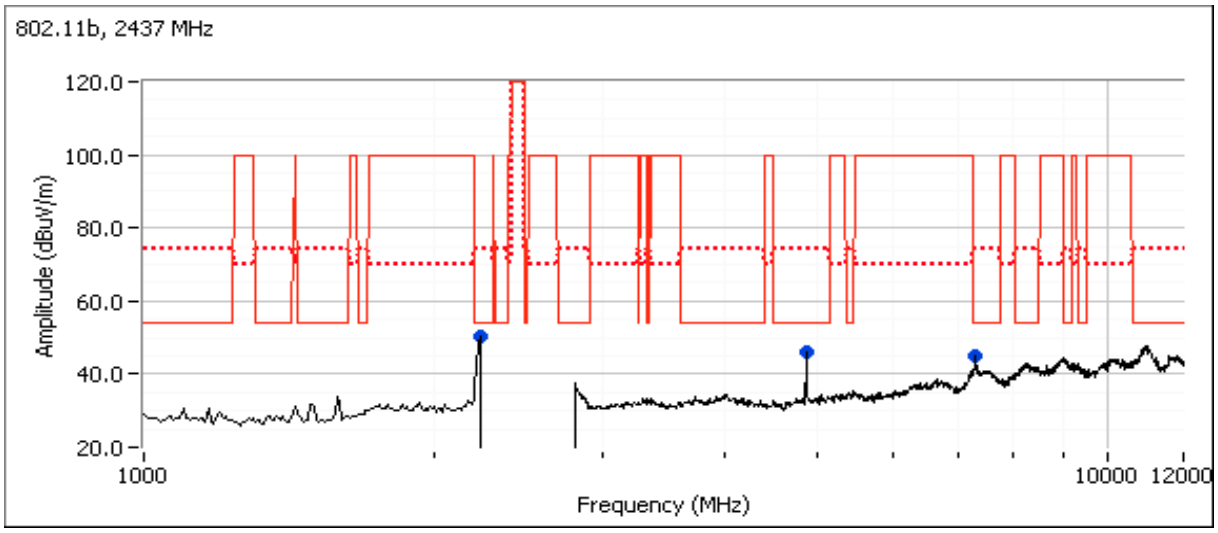
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #1b: Center Channel

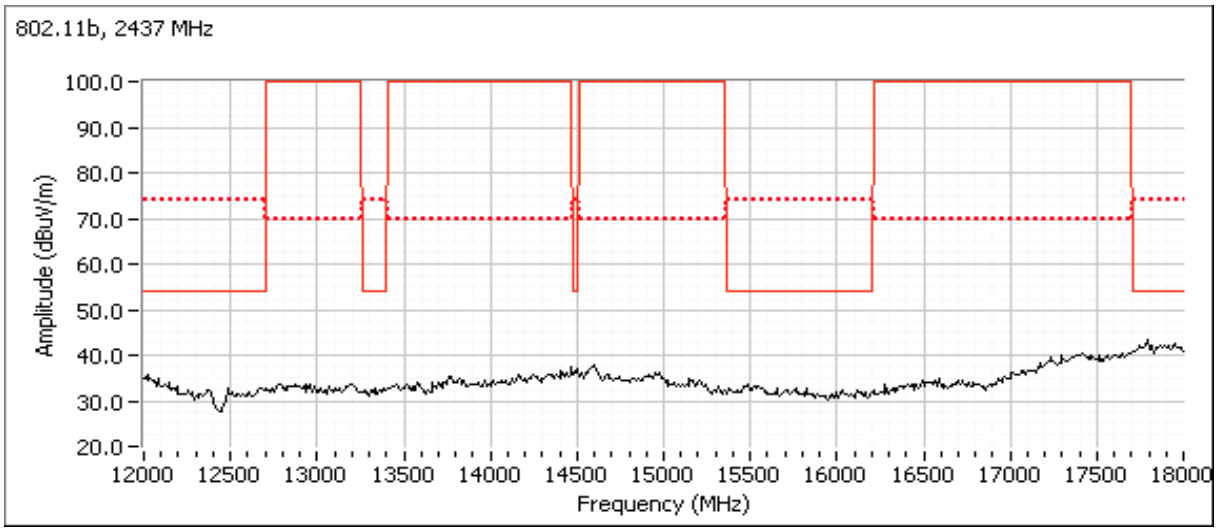
Channel: 6 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4873.920	45.4	V	54.0	-8.6	AVG	114	1.3	RB 1 MHz;VB 10 Hz;Peak
4874.000	49.3	V	74.0	-24.7	PK	114	1.3	RB 1 MHz;VB 3 MHz;Peak
7310.200	42.9	V	54.0	-11.1	AVG	171	1.0	RB 1 MHz;VB 10 Hz;Peak
7309.530	52.7	V	74.0	-21.3	PK	171	1.0	RB 1 MHz;VB 3 MHz;Peak
2232.130	44.8	V	54.0	-9.2	AVG	240	1.9	RB 1 MHz;VB 10 Hz;Peak
2231.630	51.9	V	74.0	-22.1	PK	240	1.9	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



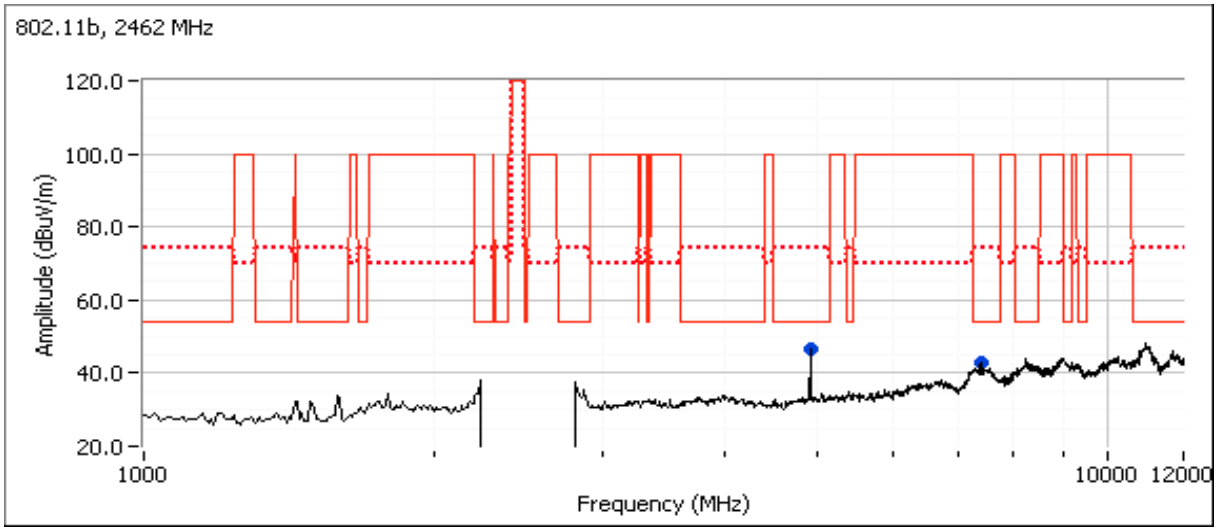
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #1c: High Channel

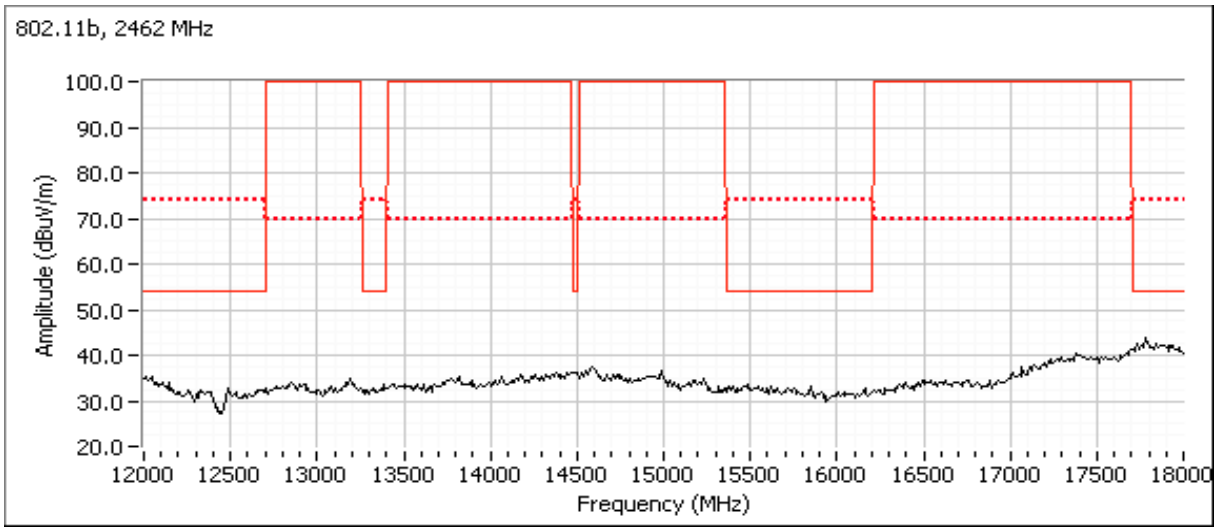
Channel: 11 Mode: b
Tx Chain: Main Data Rate: 1Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4923.950	44.3	V	54.0	-9.7	AVG	124	1.3	RB 1 MHz;VB 10 Hz;Peak
4924.030	48.6	V	74.0	-25.4	PK	124	1.3	RB 1 MHz;VB 3 MHz;Peak
7385.160	41.2	V	54.0	-12.8	AVG	125	1.0	RB 1 MHz;VB 10 Hz;Peak
7385.320	51.7	V	74.0	-22.3	PK	125	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: OFDM

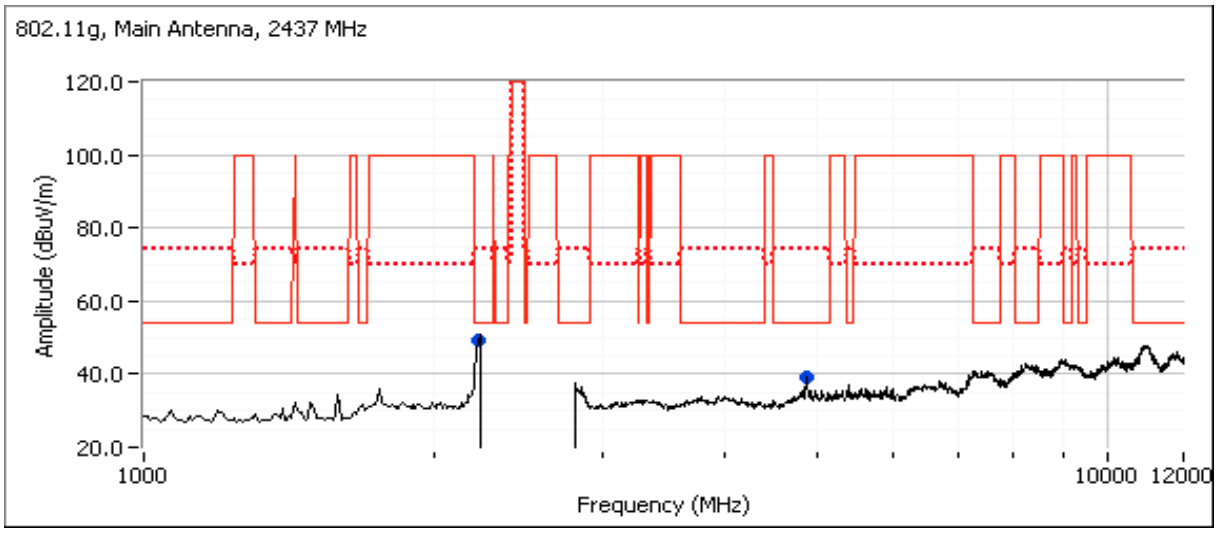
Date of Test: 7/22/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

Run #2a: Center Channel

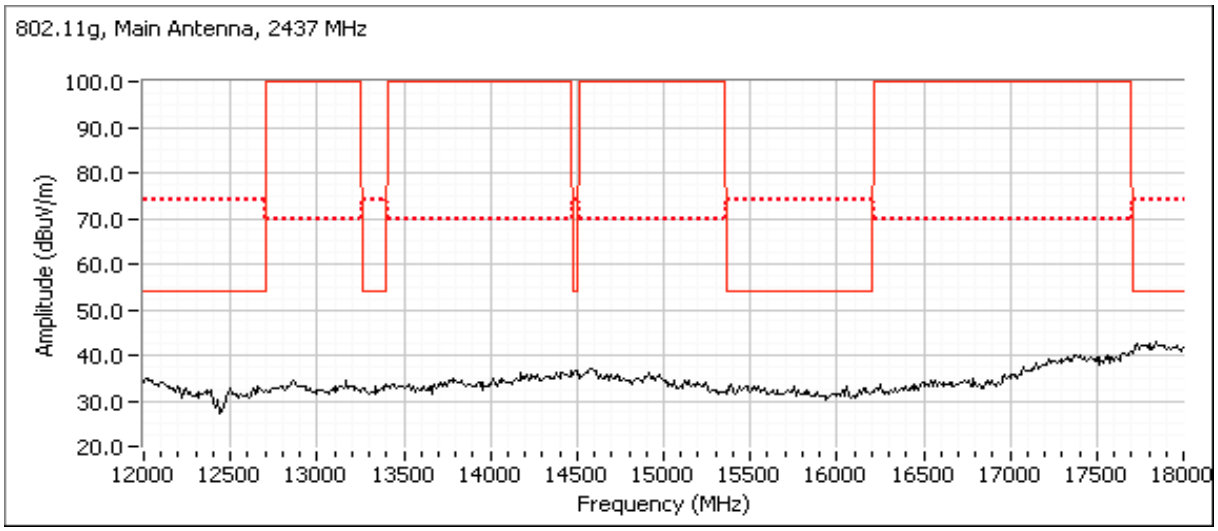
Channel: 6 Mode: g
Tx Chain: Main Data Rate: 6Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2229.200	47.6	V	54.0	-6.4	AVG	176	1.8	RB 1 MHz;VB 10 Hz;Peak
2230.840	60.1	V	74.0	-13.9	PK	176	1.8	RB 1 MHz;VB 3 MHz;Peak
4874.040	32.3	V	54.0	-21.7	AVG	205	1.2	RB 1 MHz;VB 10 Hz;Peak
4873.340	42.8	V	74.0	-31.2	PK	205	1.2	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



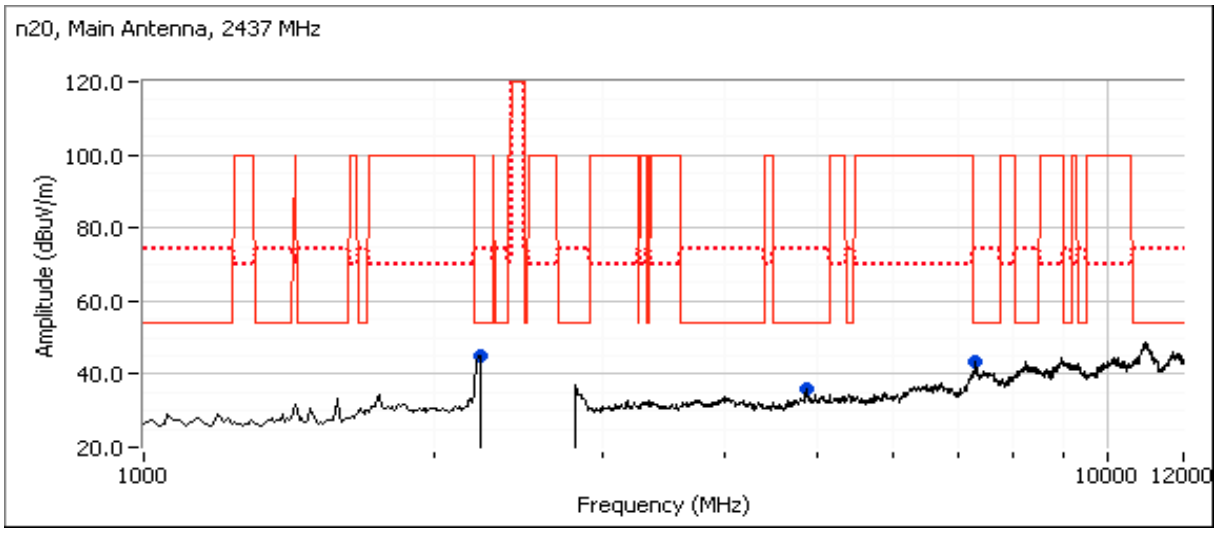
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #2b: Center Channel

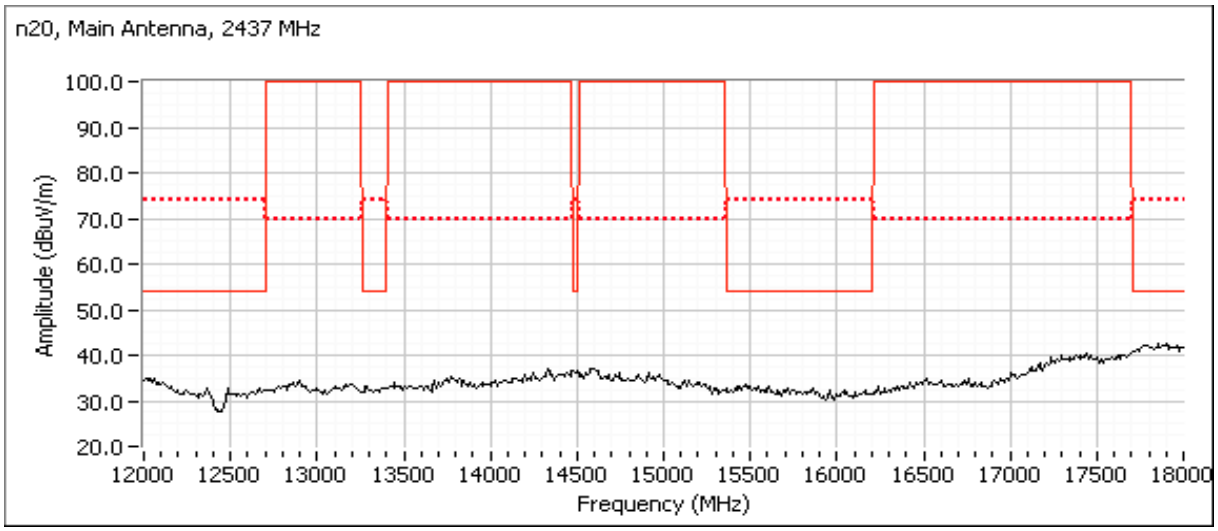
Channel: 6 Mode: n20
Tx Chain: Main Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2228.480	42.8	V	54.0	-11.2	AVG	306	1.0	RB 1 MHz;VB 10 Hz;Peak
2229.380	55.4	V	74.0	-18.6	PK	306	1.0	RB 1 MHz;VB 3 MHz;Peak
4875.080	30.5	V	54.0	-23.5	AVG	128	1.1	RB 1 MHz;VB 10 Hz;Peak
4871.810	40.9	V	74.0	-33.1	PK	128	1.1	RB 1 MHz;VB 3 MHz;Peak
7306.800	40.5	V	54.0	-13.5	AVG	234	1.8	RB 1 MHz;VB 10 Hz;Peak
7312.400	52.1	V	74.0	-21.9	PK	234	1.8	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



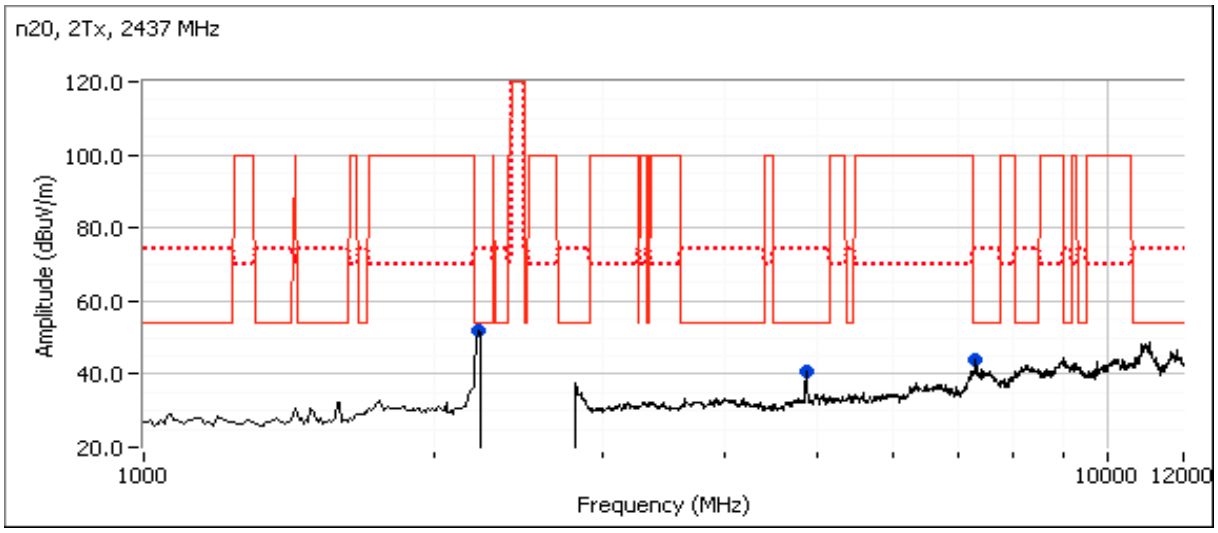
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #2c: Center Channel

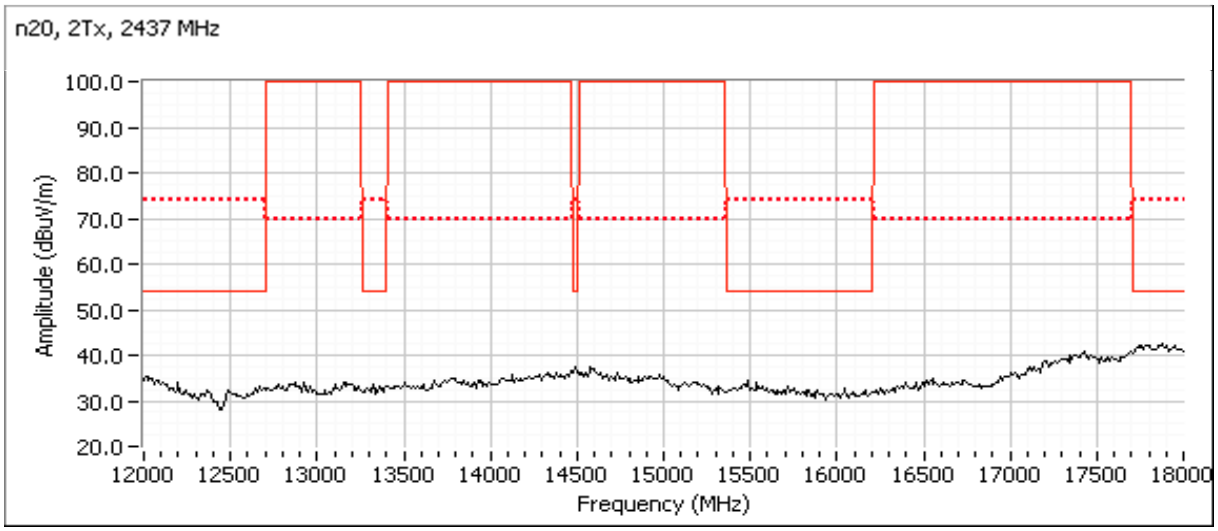
Channel: 6 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2231.770	49.3	V	54.0	-4.7	AVG	84	1.6	RB 1 MHz;VB 10 Hz;Peak
2231.640	62.3	V	74.0	-11.7	PK	84	1.6	RB 1 MHz;VB 3 MHz;Peak
7309.130	40.9	H	54.0	-13.1	AVG	313	1.0	RB 1 MHz;VB 10 Hz;Peak
7306.930	51.1	H	74.0	-22.9	PK	313	1.0	RB 1 MHz;VB 3 MHz;Peak
4872.380	32.2	V	54.0	-21.8	AVG	171	1.3	RB 1 MHz;VB 10 Hz;Peak
4872.320	42.9	V	74.0	-31.1	PK	171	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #3: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: Worse case from Run #2

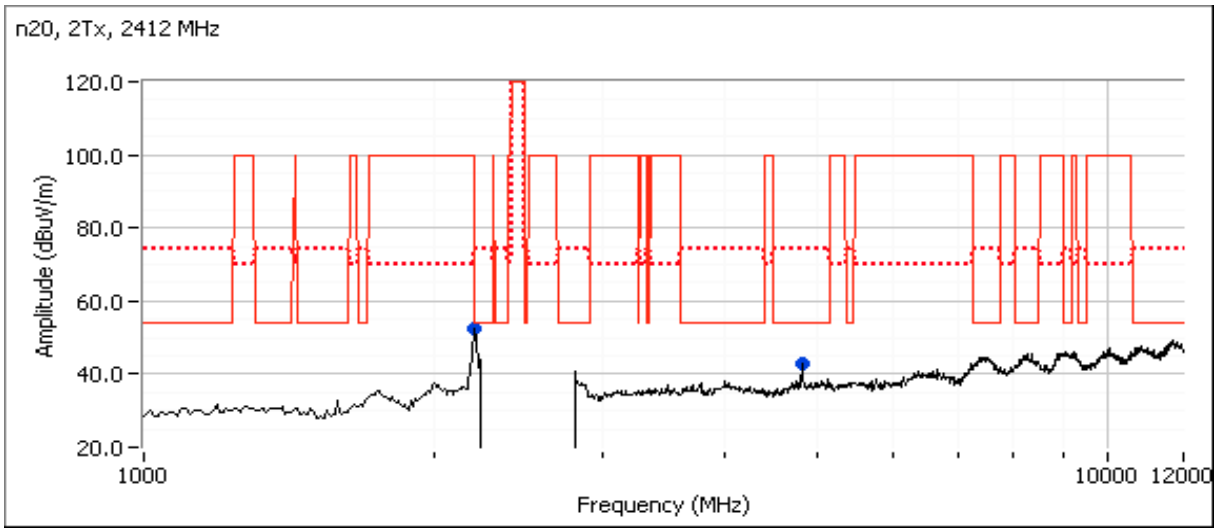
Date of Test: 7/23/2015 0:00 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #5 EUT Voltage: USB

Run #3a: Low Channel

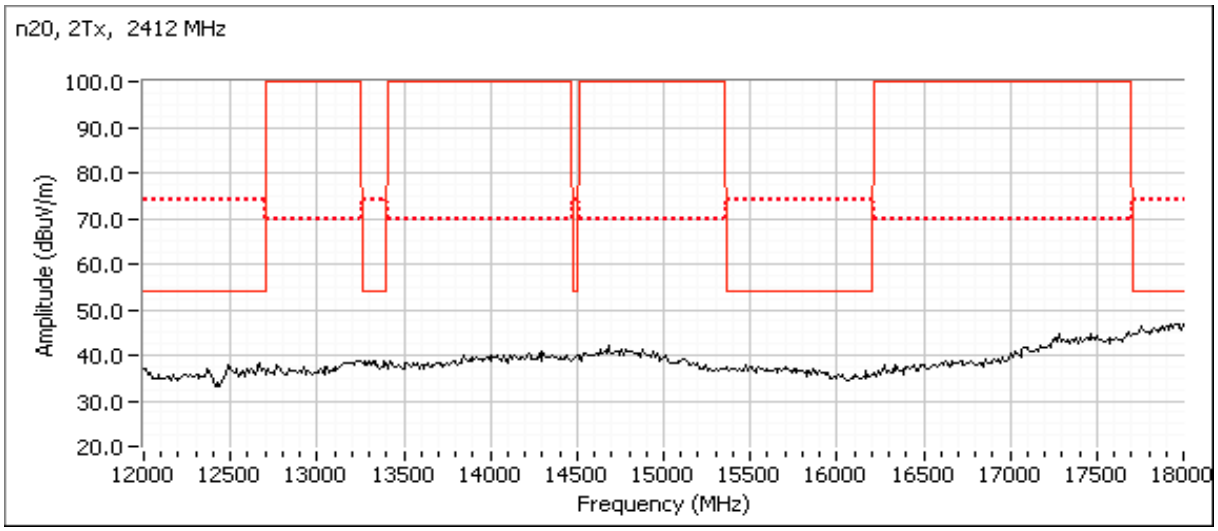
Channel: 1 Mode: n20
Tx Chain: 2Tx Data Rate: MCS0

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2212.930	49.7	V	54.0	-4.3	AVG	73	1.8	RB 1 MHz;VB 10 Hz;Peak
2215.300	61.3	V	74.0	-12.7	PK	73	1.8	RB 1 MHz;VB 3 MHz;Peak
4824.220	34.1	V	54.0	-19.9	AVG	201	1.0	RB 1 MHz;VB 10 Hz;Peak
4821.730	44.8	V	74.0	-29.2	PK	201	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



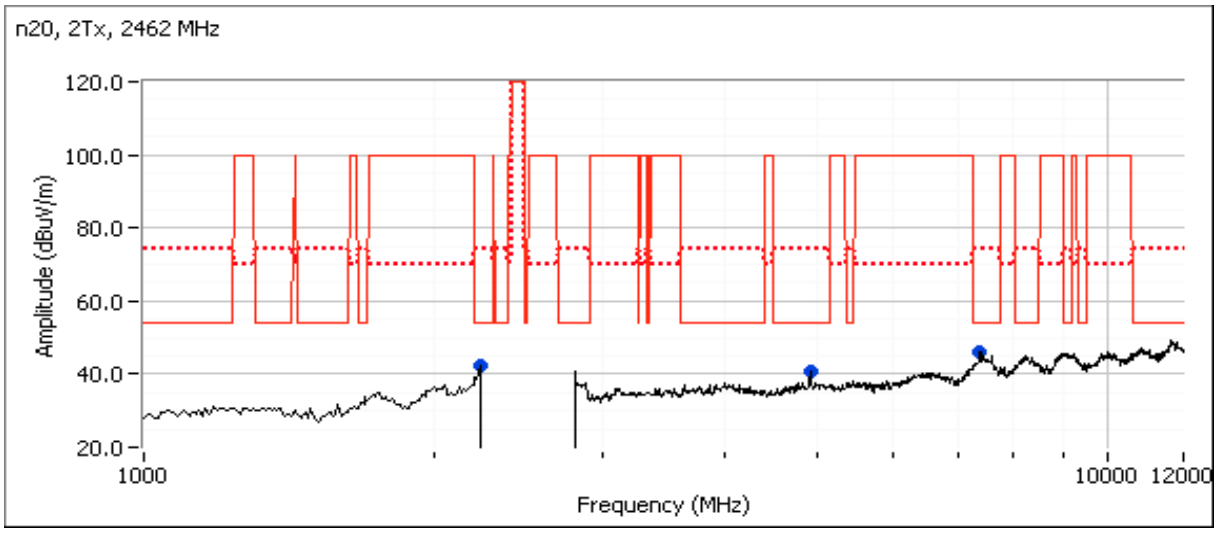
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #3b: High Channel

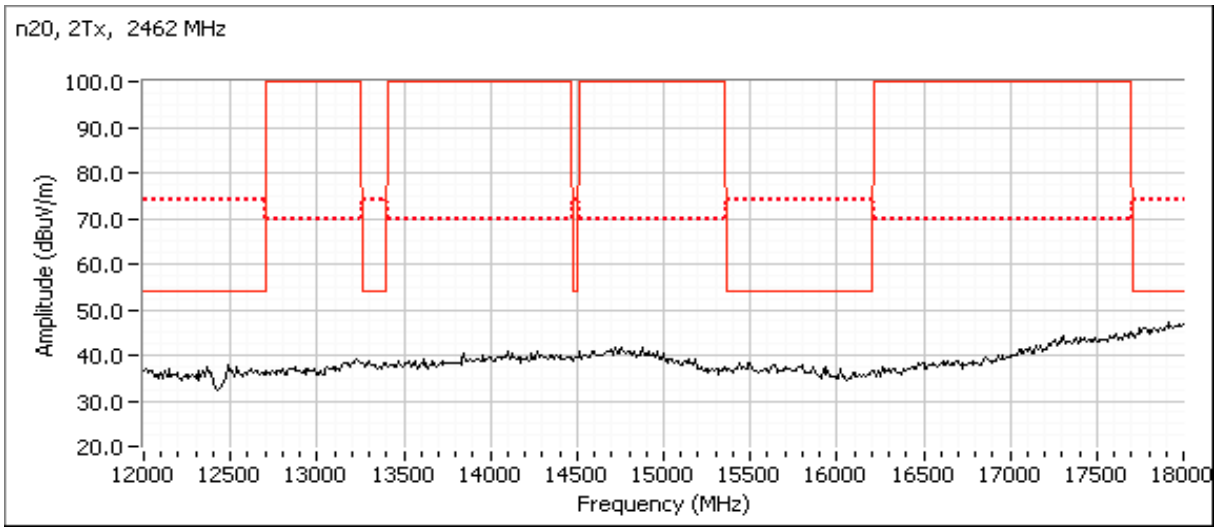
Channel: Mode:
Tx Chain: 2Tx Data Rate:

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7387.210	42.9	V	54.0	-11.1	AVG	73	1.0	RB 1 MHz;VB 10 Hz;Peak
7384.440	54.7	V	74.0	-19.3	PK	73	1.0	RB 1 MHz;VB 3 MHz;Peak
2224.160	38.8	V	54.0	-15.2	AVG	104	1.6	RB 1 MHz;VB 10 Hz;Peak
2228.430	50.0	V	74.0	-24.0	PK	104	1.6	RB 1 MHz;VB 3 MHz;Peak
4923.400	34.3	V	54.0	-19.7	AVG	127	1.2	RB 1 MHz;VB 10 Hz;Peak
4923.200	44.3	V	74.0	-29.7	PK	127	1.2	RB 1 MHz;VB 3 MHz;Peak

Note:	Scans made between 18 - 25 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device indicated there were no significant emissions in this frequency range



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power, PSD, 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.

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 22.6 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1Tx Modes						
1	-	-	Output Power	15.247(b)	Pass	11b: 18.5 dBm (71mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	11b: 1.8 dBm/10kHz
2Tx Modes						
1	-	-	Output Power	15.247(b)	Pass	n20: 21.5 dBm (142mW)
2	-	-	Power spectral Density (PSD)	15.247(d)	Pass	n20: 2.2 dBm/10kHz
MIMO Modes						
3	-	-	Minimum 6dB Bandwidth	15.247(a)	Pass	8.1 MHz
3	-	-	99% Bandwidth	RSS GEN	Pass	17.6 MHz
4	-	-	Spurious emissions	15.247(b)	Pass	All emissions below -30dBc limit

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Sample Notes

Sample S/N: 707781772509
Driver: 6.37 RC214 .12
Antenna: External

Test Reduction Notes:

Power for 11g and n20 (1Tx) was not performed. Covered by n20 2Tx, total power not to exceed 2Tx power levels.
PSD for 11g and n20 (1Tx) was not performed. Covered by n20 2Tx performed at the maximum 1Tx power settings.
Conducted spurious for 11g and n20 (1Tx) was not performed. Covered by n20 2Tx performed at the maximum 1Tx power settings.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
2400-2483.5	0.7	0.7	-	-	No	Yes	Yes	No	0.7	3.7

For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 2

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; Dir G (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power/psd calculated per KDB 662911 D01, v01r02.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
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Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #1: Output Power

Date of Test: 8/3/2015 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Lab #4A Host Unit Voltage 120V/60Hz

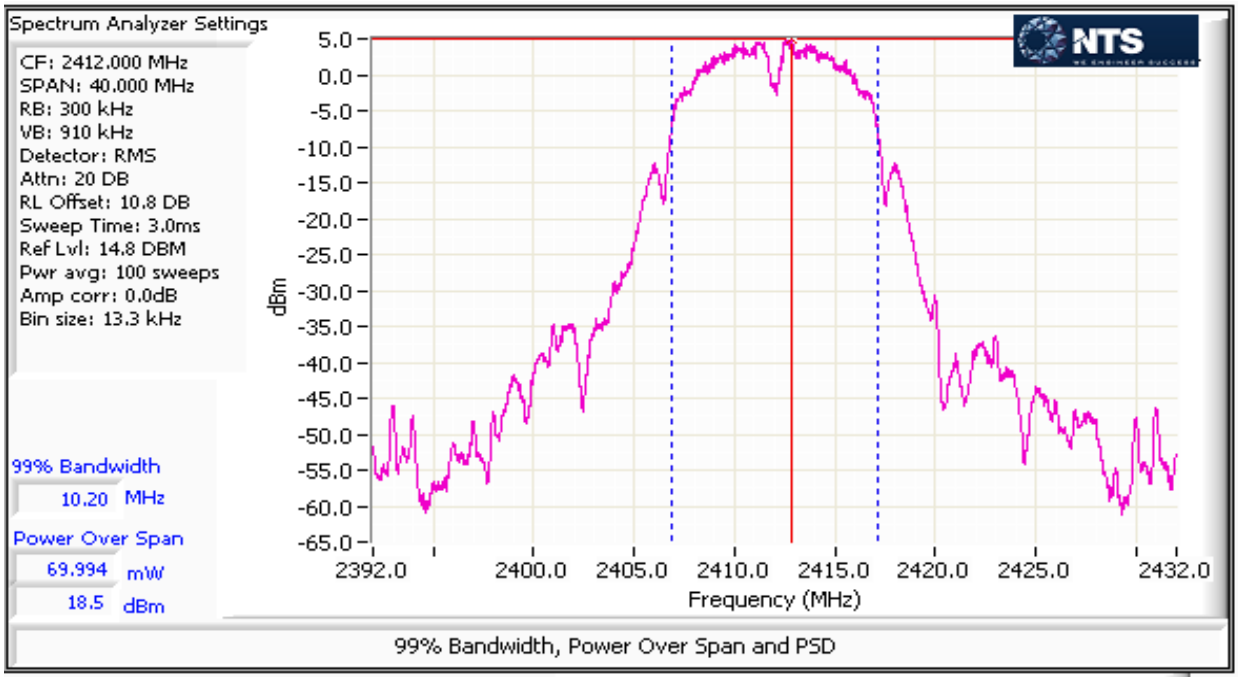
Note 1:	Duty Cycle ≥ 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW (99%BW), VB≥3* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-1, in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.
Note 3:	Power measured using average power meter (non-gated) and is included for reference only.

Operating Mode: 11b
Directional Gain (dBi): 0.7

Max EIRP (mW): 83.2

Frequency (MHz)	Chain	Software Setting	Power[1] dBm	Power[1] mW	Total mW	Total dBm	Max Power (W)	Limit dBm	Result	Power (dBm)[3]
2412	1	-	18.5	70.8	70.8	18.5	0.071	30.0	Pass	18.2
	3									
	4									
	2									
2437	1	-	18.4	69.2	69.2	18.4				18.1
	3									
	4									
	2									
2462	1	-	18.3	67.6	67.6	18.3				17.9
	3									
	4									
	2									

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

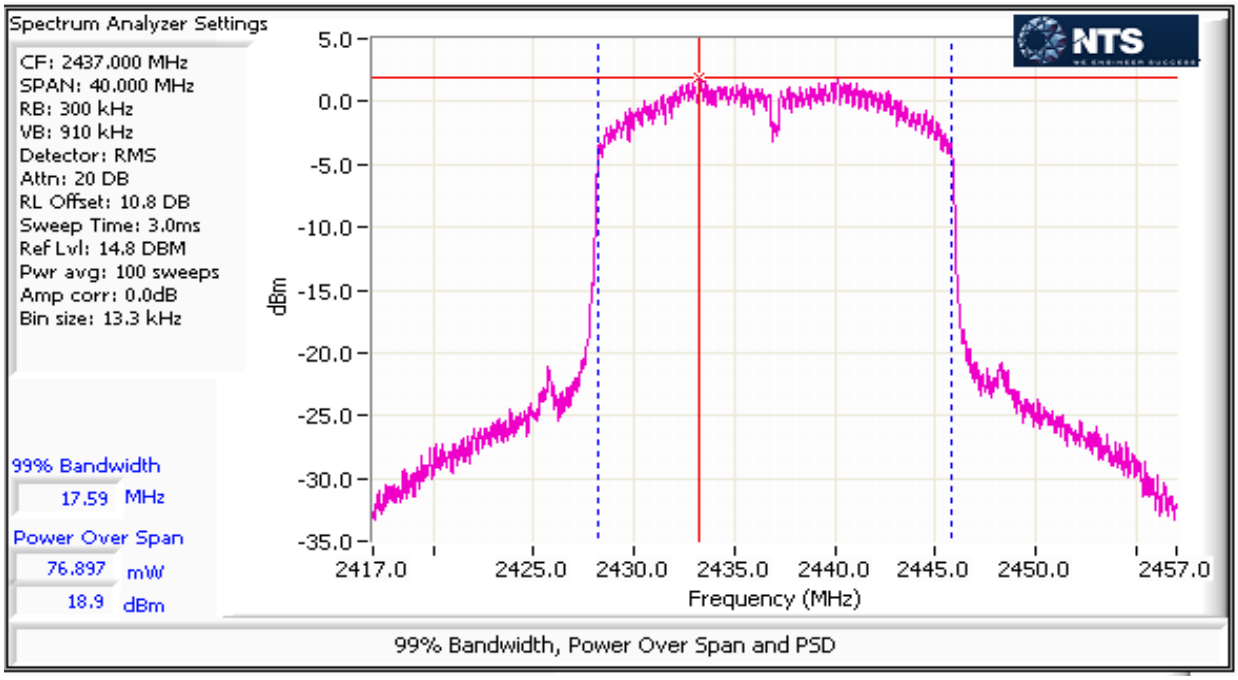


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Operating Mode: n20 (2Tx)
Directional Gain (dBi): 0.7

Max EIRP (mW): 167.1

Frequency (MHz)	Chain	Software Setting	Power[1] dBm	Power[1] mW	Total mW	Total dBm	Max Power (W)	Limit dBm	Result	Power (dBm)[3]
2412	1	-	13.2	20.9	40.4	16.1	0.142	30.0	Pass	12.8
	3									
	4									
	2		12.9	19.5						12.6
2437	1	-	18.9	77.6	142.2	21.5		30.0	Pass	18.4
	3									
	4									
	2		18.1	64.6						17.7
2462	1	-	12.2	16.6	32.8	12.2		30.0	Pass	11.8
	3									
	4									
	2		12.1	16.2						11.8



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #2: Power spectral Density

Mode: 11b

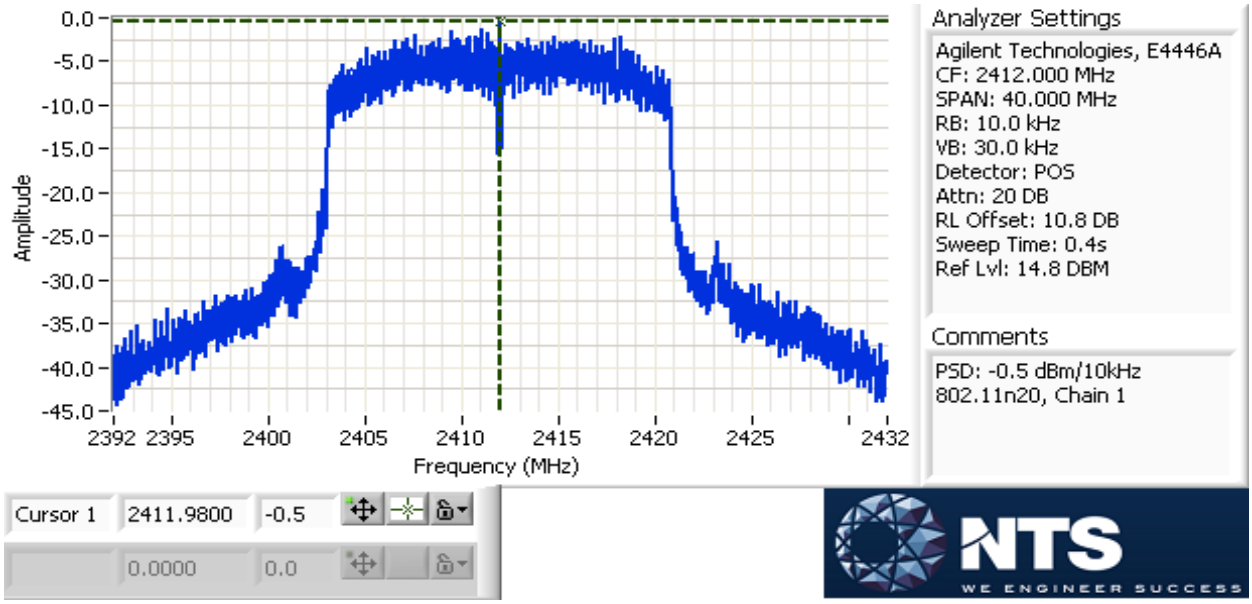
Power Setting	Frequency (MHz)	PSD (dBm/10kHz) Note 1					Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
-	2412	1.4				1.4	8.0	Pass
-	2437	1.8				1.8	8.0	Pass
-	2462	1.6				1.6	8.0	Pass

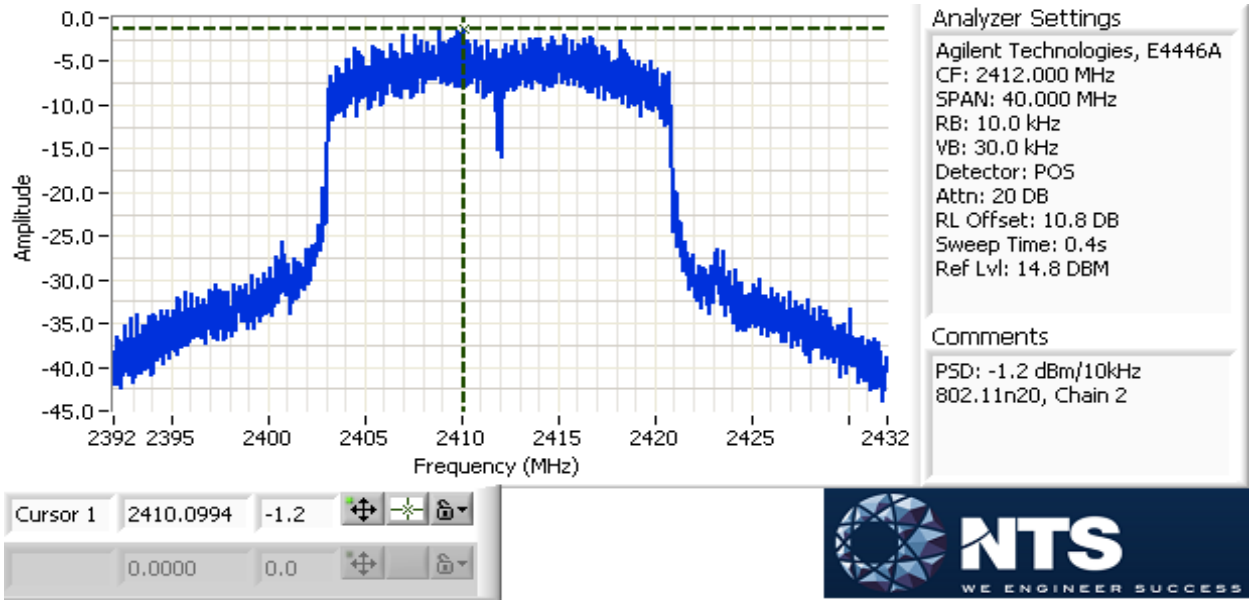
Mode: n20

Power Setting	Frequency (MHz)	PSD (dBm/10kHz) Note 1					Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4	Total		
-	2412	-0.5	-1.2			2.2	8.0	Pass
-	2437	-0.8	-1.4			1.9	8.0	Pass
-	2462	-0.9	-1.3			1.9	8.0	Pass

Note 1:	Test performed per method PKSPD, in KDB 558074. Power spectral density measured using: 3kHz ≤ RBW ≤ 100kHz, VBW=3*RBW, peak detector, span = 1.5*DTS BW, auto sweep time, max hold.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #3: Signal Bandwidth

Mode: 11b

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-	2412	8.1	10.3	100kHz	300kHz
-	2437	8.1	10.3	100kHz	300kHz
-	2462	8.1	10.3	100kHz	300kHz

Mode: 11g

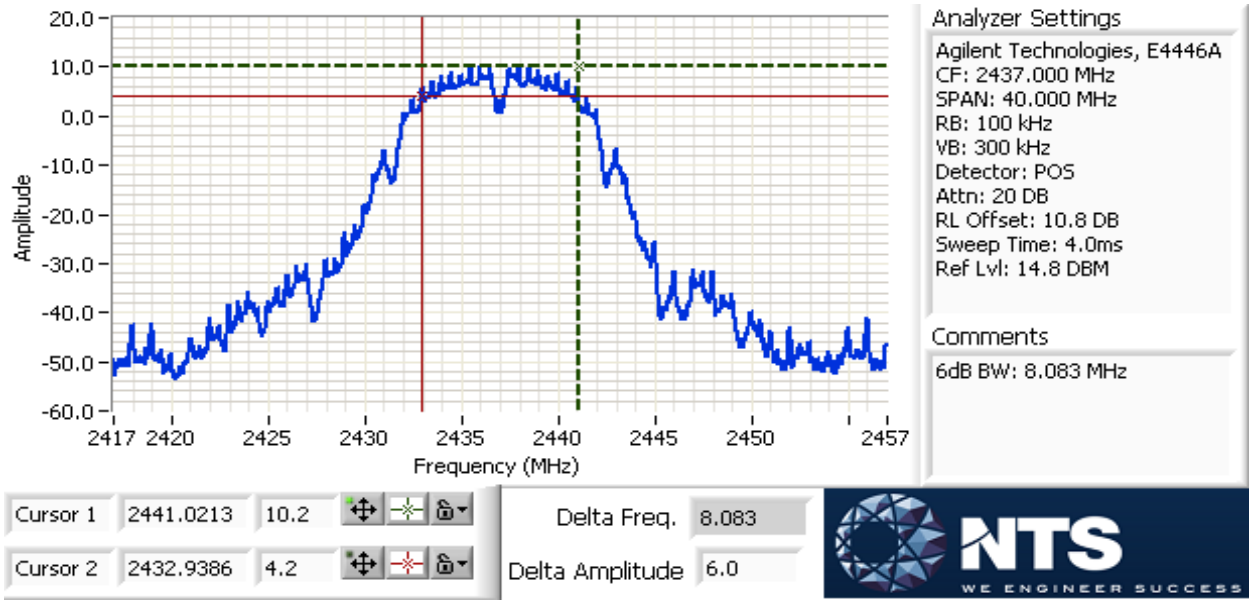
Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-	2412	15.6	16.6	100kHz	300kHz
-	2437	15.4	16.7	100kHz	300kHz
-	2462	15.1	16.7	100kHz	300kHz

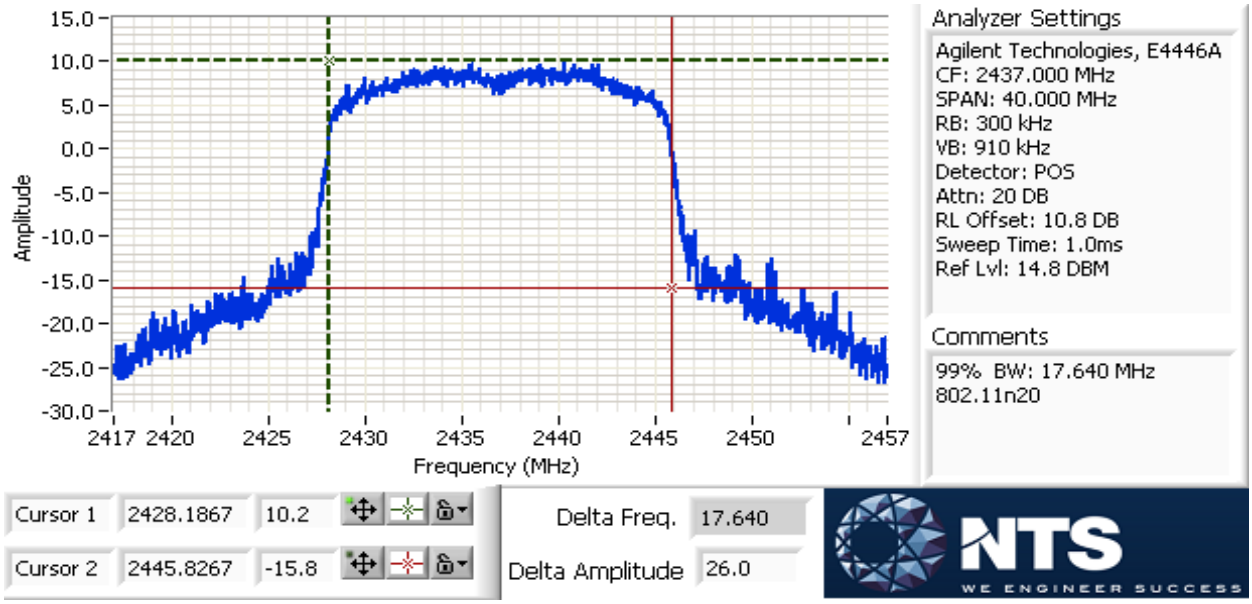
Mode: n20

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
-	2412	15.1	17.6	100kHz	300kHz
-	2437	15.1	17.6	100kHz	300kHz
-	2462	15.1	17.6	100kHz	300kHz

Note 1:	DTS BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time.
Note 2:	Measurements performed on chain 1

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A





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Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

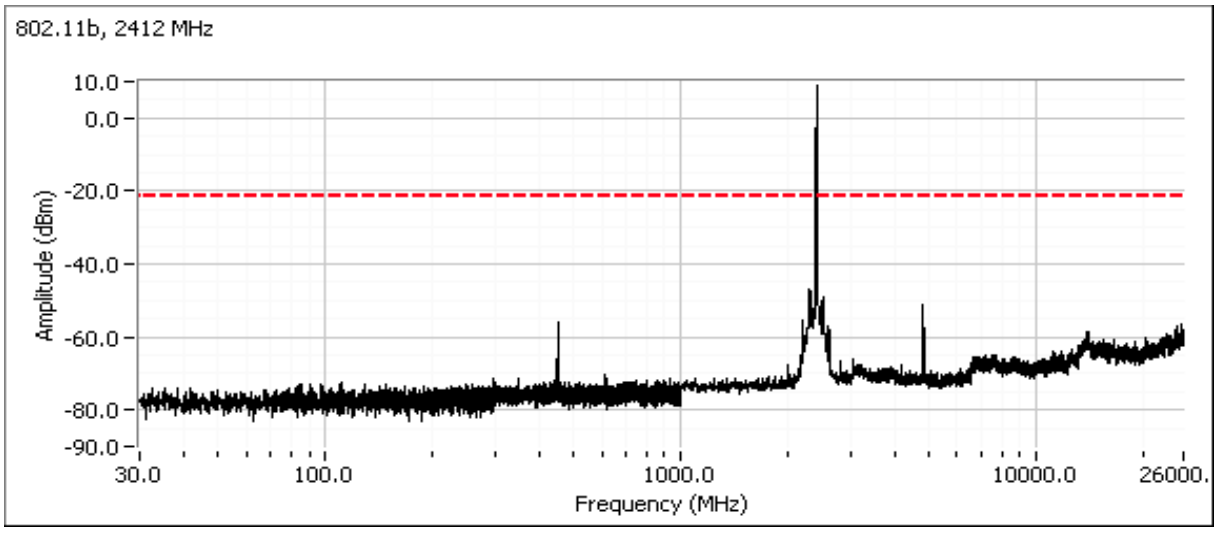
Run #4a: Out of Band Spurious Emissions

Power Setting Per Chain #1	#2	#3	#4	Mode	Frequency (MHz)	Limit	Result
-				11b	2412	-30dBc	Pass
-				11b	2437	-30dBc	Pass
-				11b	2467	-30dBc	Pass
-	-			n20 (2Tx)	2412	-30dBc	Pass
-	-			n20 (2Tx)	2437	-30dBc	Pass
-	-			n20 (2Tx)	2467	-30dBc	Pass

Note 1:	Measured on each chain individually
Note:	All measurements performed RBW=100kHz, VBW=300kHz, peak detector, max hold

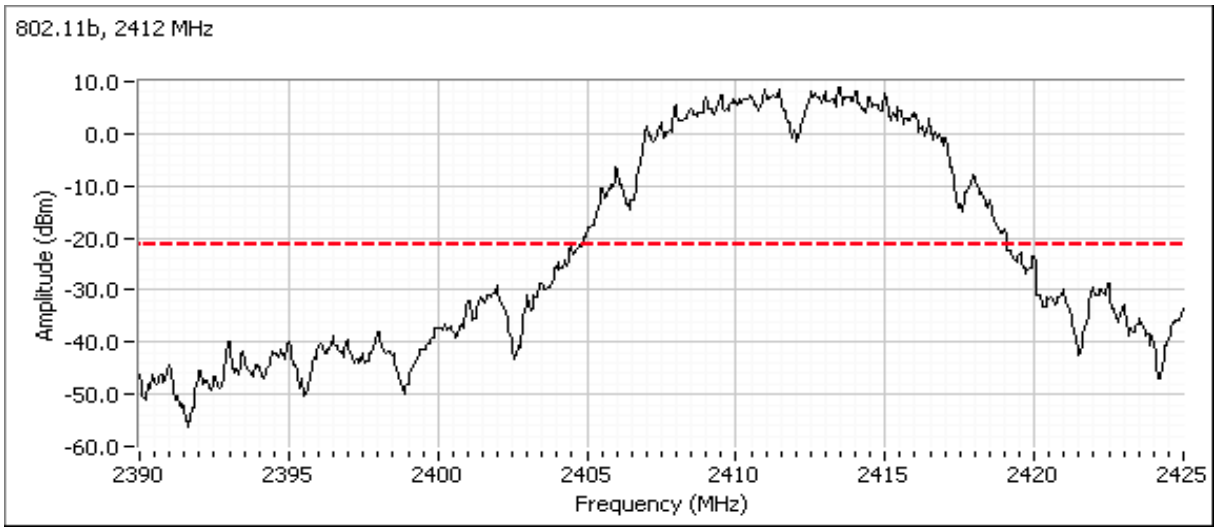
802.11b

Plots for low channel

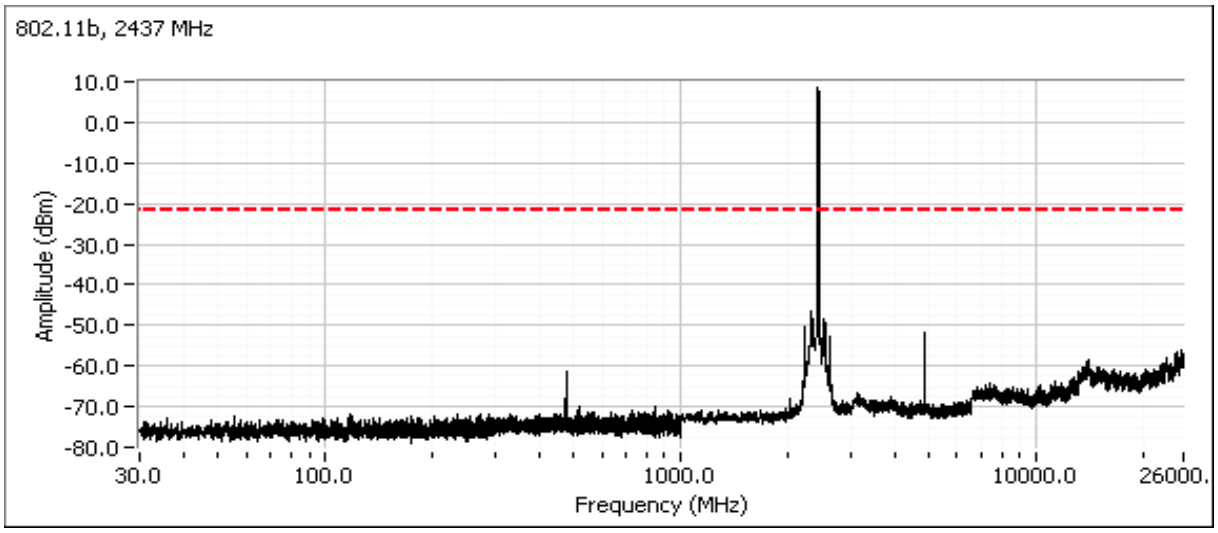


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.

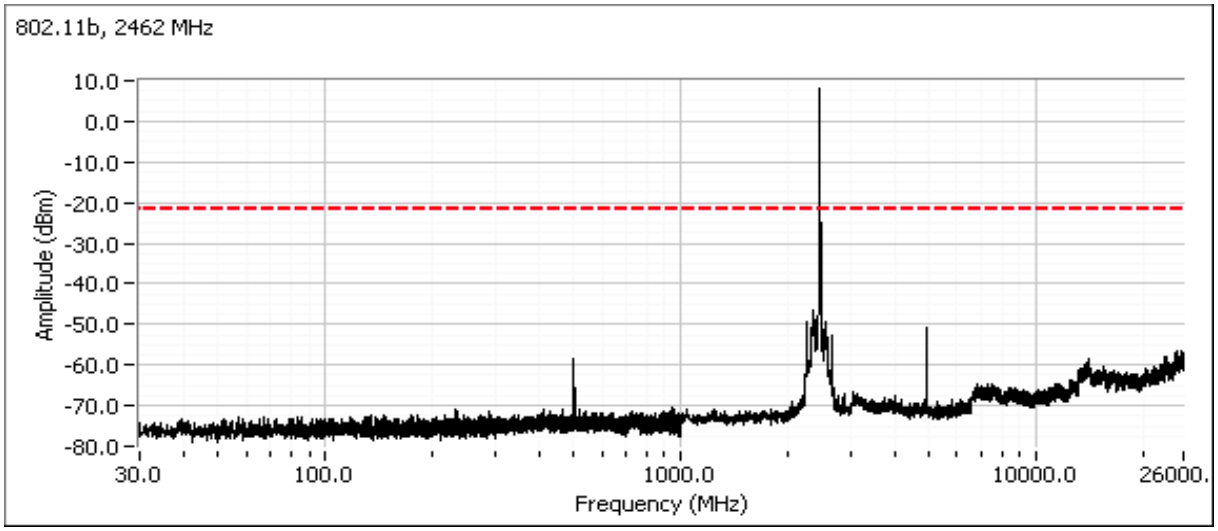


Plots for center channel



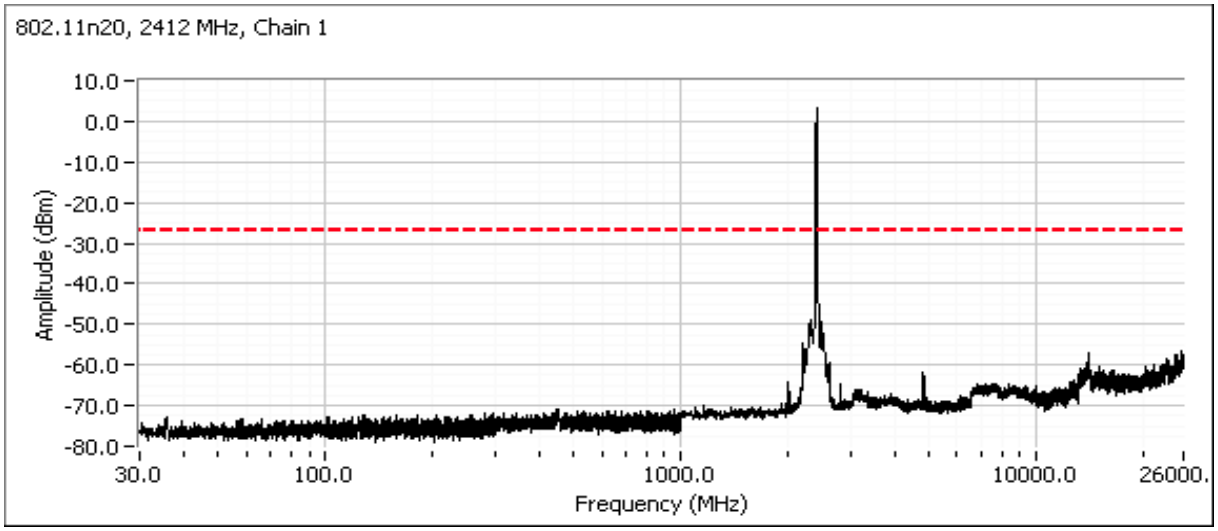
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Plots for high channel

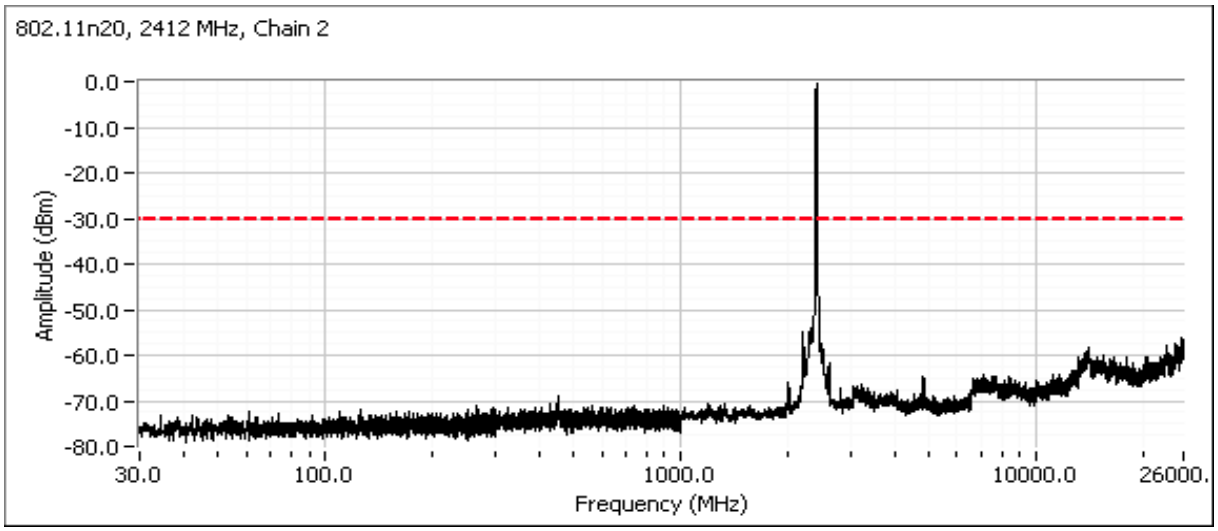


802.11n20

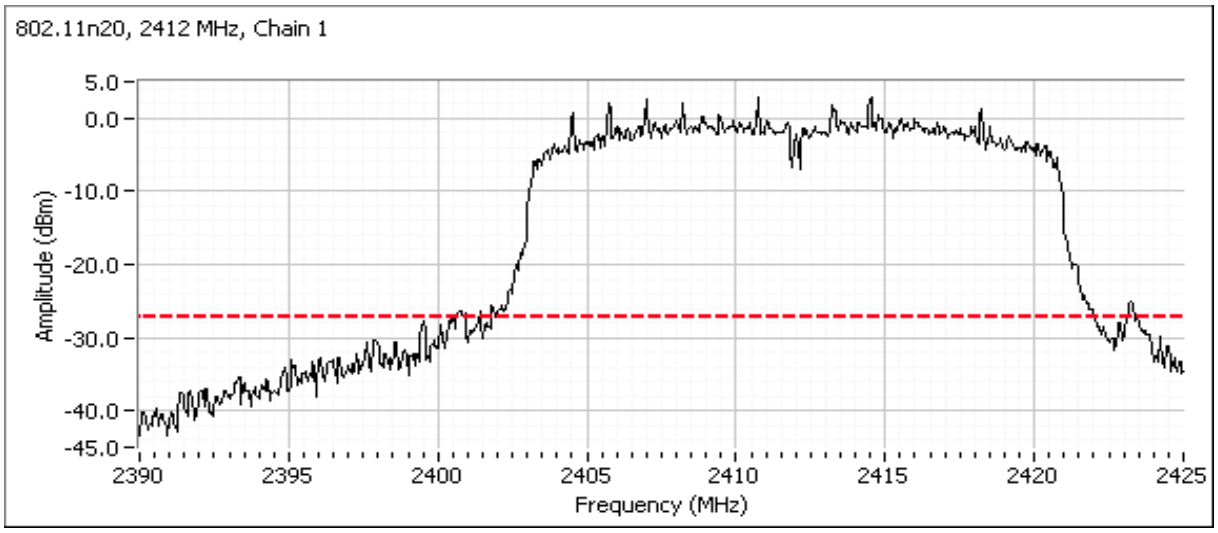
Plots for low channel



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



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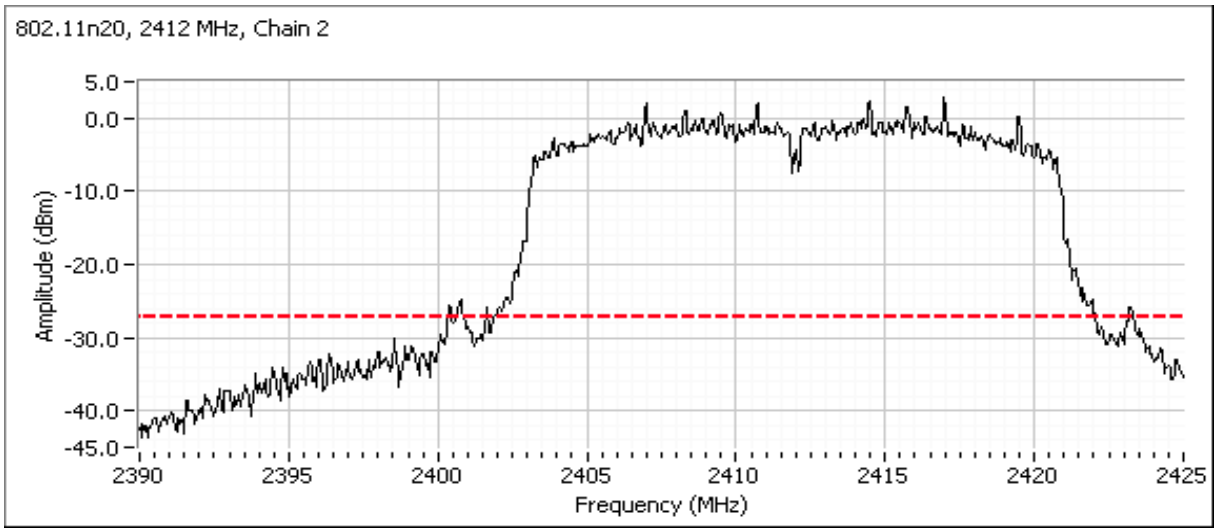
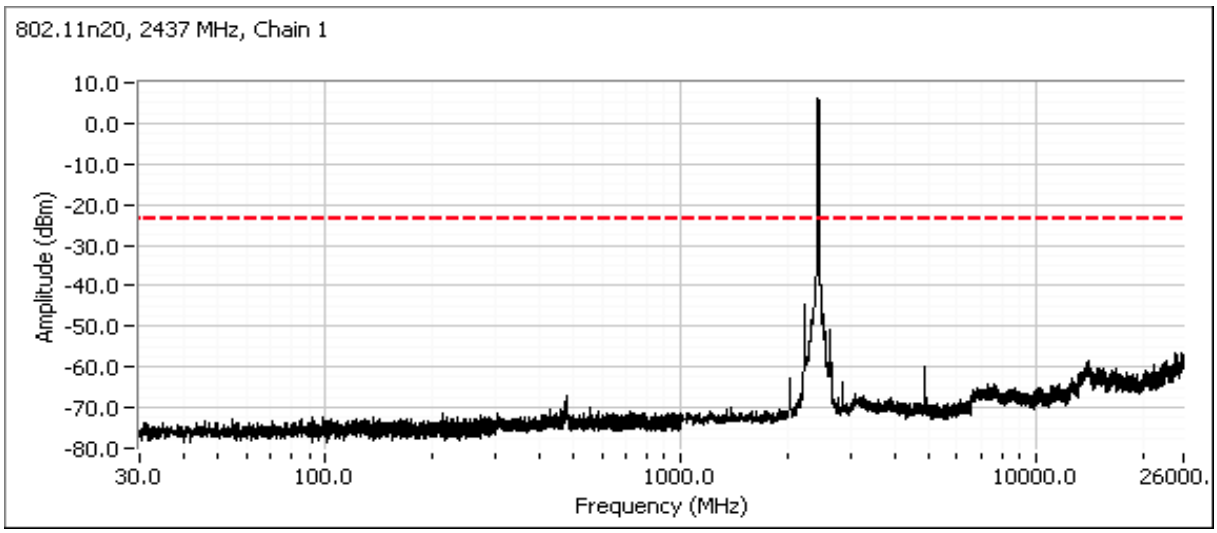
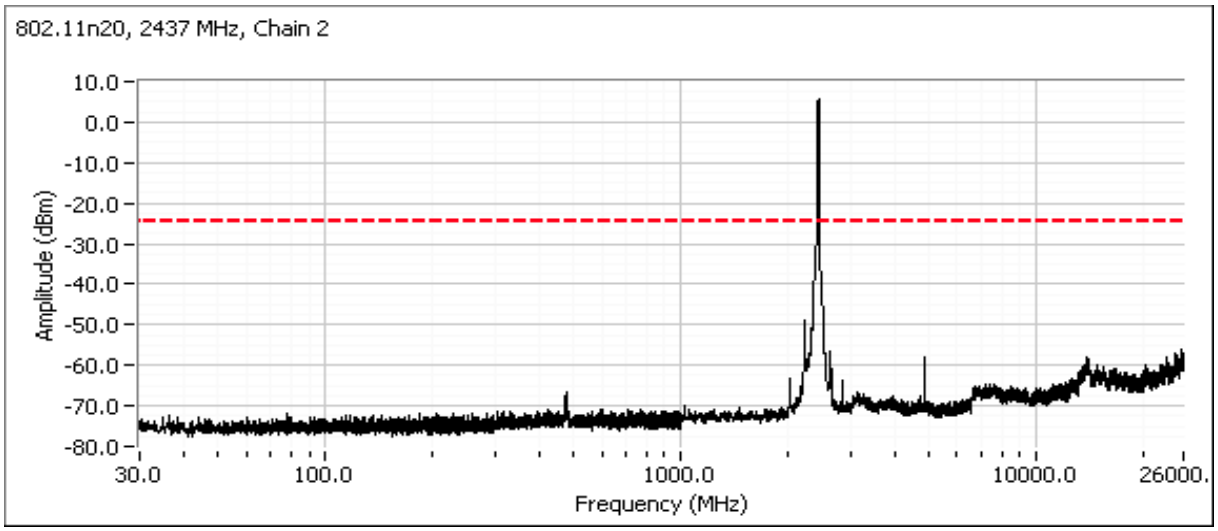
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



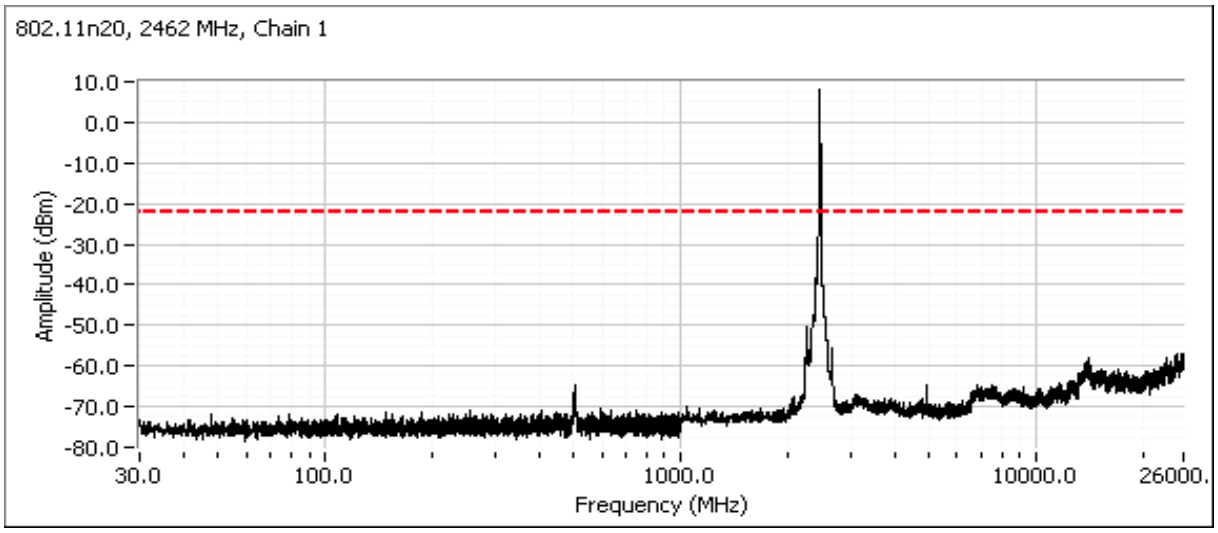
Plots for center channel



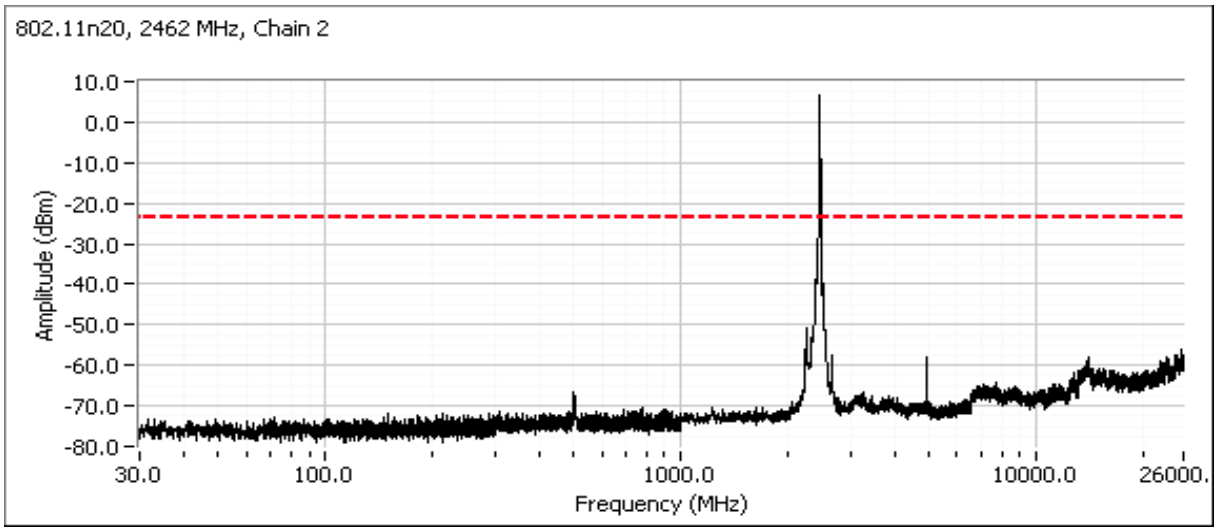
Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



Plots for high channel



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A



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Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements
MIMO and Smart Antenna Systems
Power, PSD, 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.

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 22.4 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1Tx Modes						
1			Output Power	15.247(b)	Pass	11b: 18.4 dBm (69mW)
2Tx Modes						
1			Output Power	15.247(b)	Pass	n20: 21.5 dBm (142mW)

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 Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11g	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10

Sample Notes

Sample S/N: 707781772509 (external antenna sample)
Driver: 6.37 RC214 .12
Antenna: -

Test Reduction Notes:

Power for 11g and n20 (1Tx) was not performed. Covered by n20 2Tx, total power not to exceed 2Tx power levels.

Client:	Hewlett Packard Company	Job Number:	J98746
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Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
2400-2483.5	2.5	2.5	-	-	No	Yes	Yes	No	2.5	5.5

For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 2

Notes:	BF = beamforming mode supported, Multichain Legacy = 802.11 legacy data rates supported for multichain transmissions, CDD = Cyclic Delay Diversity (or Cyclic Shift Diversity) modes supported, Sectorized / Xpol = antennas are sectorized or cross polarized
Notes:	Dir G (PWR) = total gain (Gant + Array Gain) for power calculations; Dir G (PSD) = total gain for PSD calculations based on FCC KDB 662911. Depending on the modes supported, the Array Gain value for power could be different from the PSD value.
Notes:	Array gain for power/psd calculated per KDB 662911 D01, v01r02.

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Run #1: Output Power

Date of Test: 8/4/2015 Config. Used: 1

Test Engineer: Rafael Varelas Config Change: None

Test Location: FT Lab #4A Host Unit Voltage 120V/60Hz

Note 1:	Duty Cycle ≥ 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW (99%BW), VB≥3* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-1, in KDB 558074). Spurious limit becomes -30dBc.
Note 2:	Power setting - if a single number the same power setting was used for each chain. If multiple numbers the power setting for each chain is separated by a comma (e.g. x,y would indicate power setting x for chain 1, power setting y for chain 2.
Note 3:	Power measured using average power meter (non-gated) and is included for reference only.

Operating Mode: 11b

Directional Gain (dBi): 2.5

Max EIRP (mW): 123

Frequency (MHz)	Chain	Software Setting	Power[1] dBm	Power[1] mW	Total mW	Total dBm	Max Power (W)	Limit dBm	Result	Power (dBm)[3]
2412	1	-	16.5	44.7	44.7	16.5	0.069	30.0	Pass	16.2
	3									
	4									
	2									
2437	1	-	18.4	69.2	69.2	18.4				18.1
	3									
	4									
	2									
2462	1	-	15.1	32.4	32.4	15.1				14.8
	3									
	4									
	2									

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
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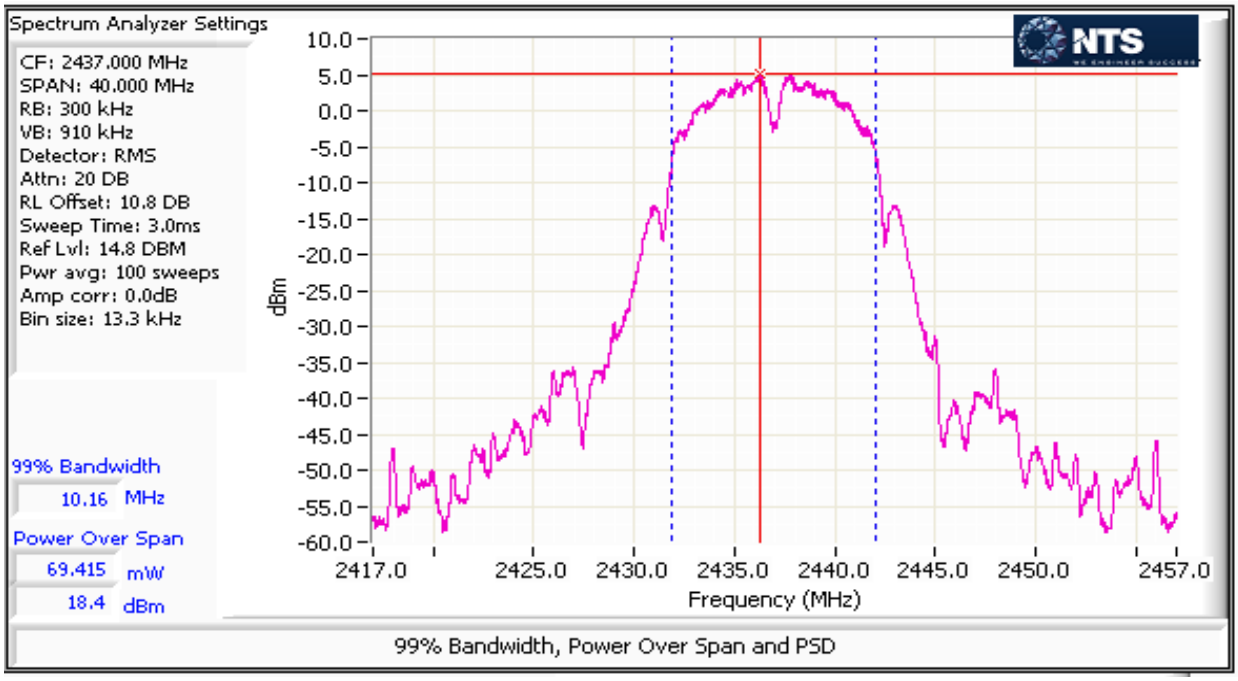
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

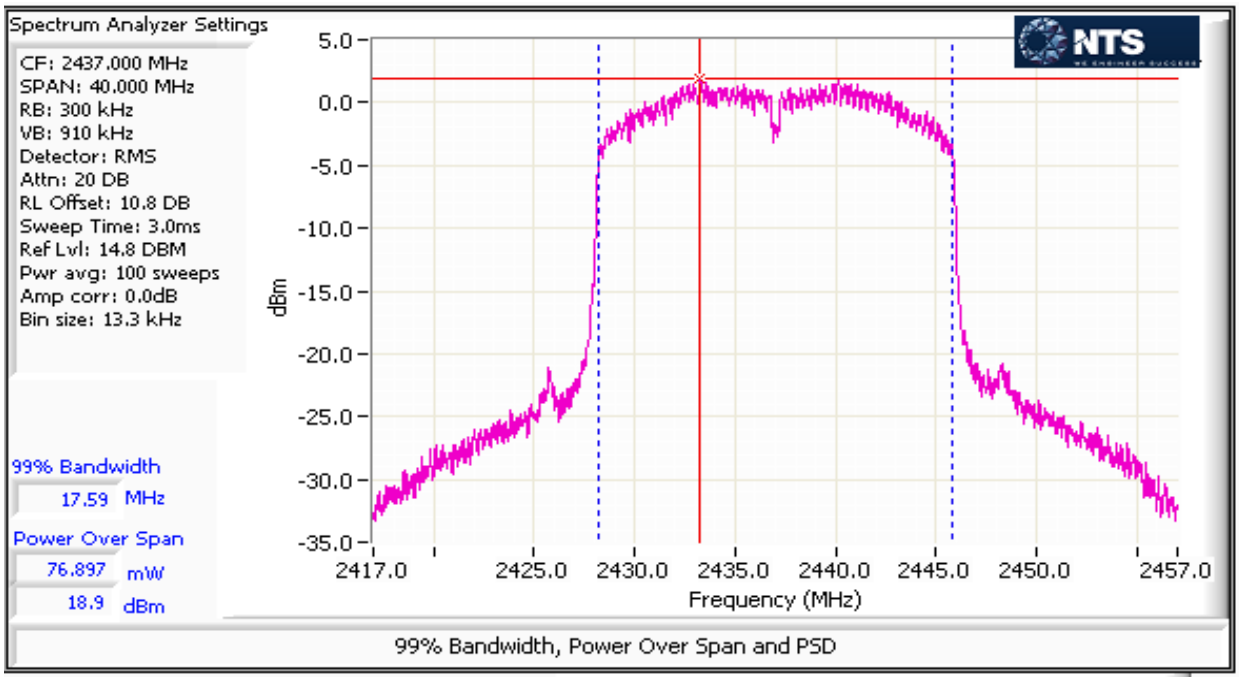


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	N/A

Operating Mode: n20 (2Tx)
Directional Gain (dBi): 2.5

Max EIRP (mW): 252.9

Frequency (MHz)	Chain	Software Setting	Power[1] dBm	Power[1] mW	Total mW	Total dBm	Max Power (W)	Limit dBm	Result	Power (dBm)[3]
2412	1	-	13.4	21.9	43.3	16.4	0.142	30.0	Pass	12.9
	3									
	4									
	2		13.3	21.4						12.8
2437	1	-	18.9	77.6	142.2	21.5		30.0	Pass	18.4
	3									
	4									
	2		18.1	64.6						17.7
2462	1	-	12.2	16.6	32.8	12.2		30.0	Pass	11.8
	3									
	4									
	2		12.1	16.2						11.8



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Model:	SDGOB-1505	T-Log Number:	T98753
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Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Radiated Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

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: 7/30 & 8/4/15
Test Engineer: Rafael Varelas
Test Location: FT Chamber #5

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

General Test Configuration

The EUT and any 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:

	7/30/2015	8/4/2015
Temperature:	20.6 °C	21.4 °C
Rel. Humidity:	38 %	40 %

Summary of Results (ANSI C63.4:2009)

Run #	Test Performed	Limit	Result	Margin
1	Radiated Emissions 30 - 1000 MHz, Transmit	FCC 15.209	Pass	26.0 dBµV/m @ 37.95 MHz (-14.0 dB)
2	Radiated Emissions 30 - 1000 MHz, Transmit	FCC 15.209	Pass	26.1 dBµV/m @ 37.92 MHz (-13.9 dB)
3	Radiated Emissions 30 - 1000 MHz, Receive	LP 0002	Pass	36.2 dBµV/m @ 41.16 MHz (-3.8 dB)
4	Radiated Emissions 30 - 1000 MHz, Receive	LP 0002	Pass	36.5 dBµV/m @ 41.40 MHz (-3.5 dB)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

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.

Sample Notes

Sample S/N: D85DE2000005 (MAC ID)
Driver: 6.37 RC214 .12
Antenna: Internal

Notes

Testing performed at 0.8m per C63.10
All testing was performed in 2Tx mode using worse case 1Tx power levels

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
2.4GHz band reject filter used

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	1Mb/s	98.2%	Yes	2.897	0	0	10
11a	6Mb/s	98.2%	Yes	1.405	0	0	10
n20	MCS0	98.1%	Yes	1.309	0	0	10
n40	MCS0	98.0%	Yes	0.932	0	0	10

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

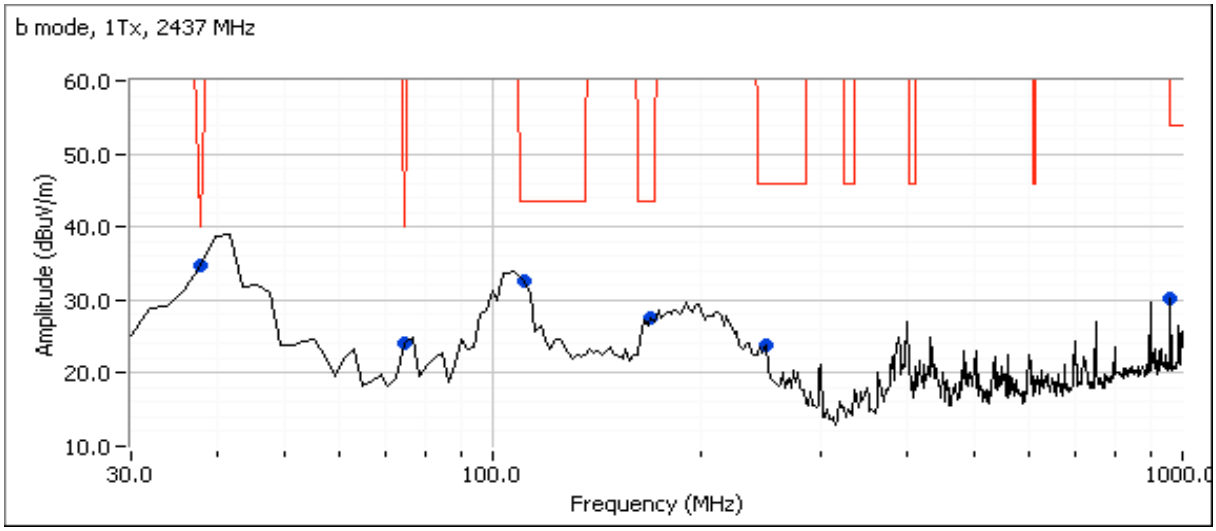
Run #1: Radiated Spurious Emissions, 30 - 1000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Channel: 6 Mode: 802.11b Power: -
Tx Chain: 1Tx Data Rate: 1Mb/s

Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.946	34.7	V	40.0	-5.3	Peak	7	1.0	
74.982	24.2	V	40.0	-15.8	Peak	227	1.0	
112.208	32.7	V	43.5	-10.8	Peak	306	1.0	
170.071	27.6	V	43.5	-15.9	Peak	238	1.0	
249.683	23.7	H	46.0	-22.3	Peak	114	1.0	
960.004	30.2	V	54.0	-23.8	Peak	215	1.0	

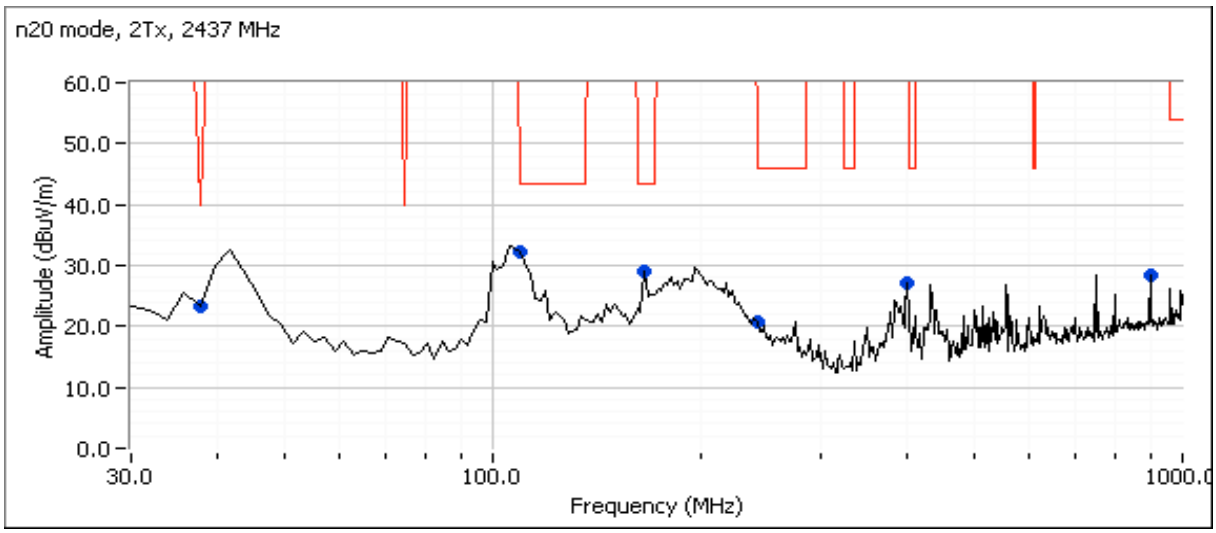


Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Channel: 6 Mode: n20 Power: -
Tx Chain: 2Tx Data Rate: MCS0

Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.776	23.3	V	40.0	-16.7	Peak	326	1.0	
109.699	32.2	V	43.5	-11.3	Peak	140	1.0	
166.072	28.9	H	43.5	-14.6	Peak	282	2.0	
241.884	20.9	V	46.0	-25.1	Peak	245	1.0	
399.339	27.0	V	100.0	-73.0	Peak	346	1.0	
898.918	28.5	V	100.0	-71.5	Peak	221	1.0	



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Maximized quasi-peak readings (includes manipulation of EUT interface cables), Worse case from above runs

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBμV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.946	26.0	V	40.0	-14.0	QP	4	1.0	QP (1.00s)
170.071	23.5	V	43.5	-20.0	QP	235	1.0	QP (1.00s)
74.982	18.9	V	40.0	-21.1	QP	222	1.0	QP (1.00s)
112.208	22.3	V	43.5	-21.2	QP	304	1.0	QP (1.00s)
960.004	30.1	V	54.0	-23.9	QP	212	1.0	QP (1.00s)
249.683	20.1	H	46.0	-25.9	QP	110	1.0	QP (1.00s)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Run #2: Radiated Spurious Emissions, 30 - 1000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Channel: 157 Mode: n20 Power: -
Tx Chain: 2Tx Data Rate: MCS0

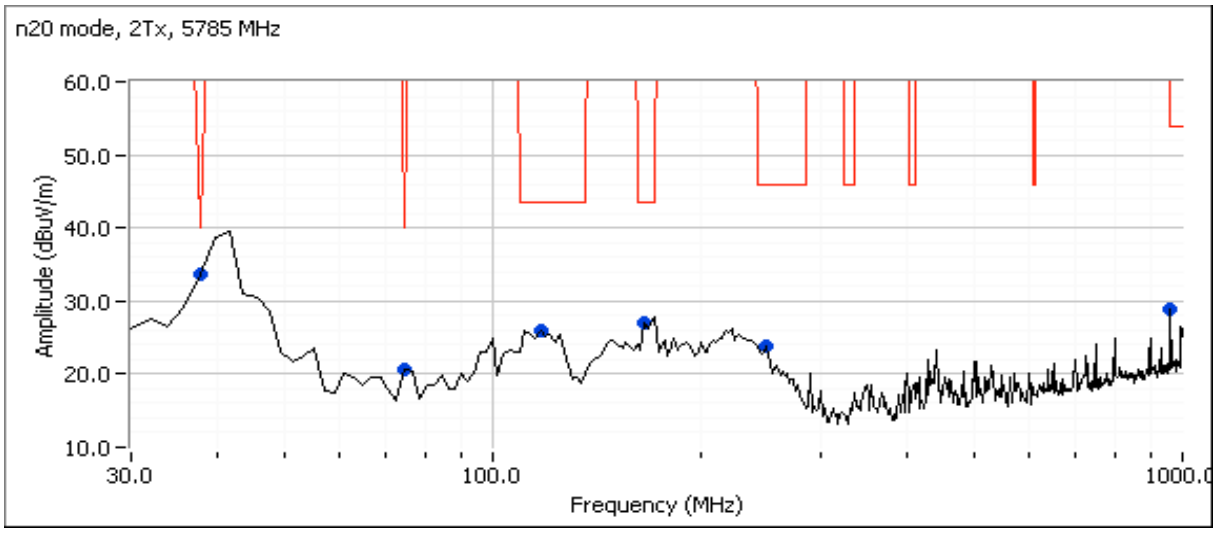
Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.922	33.8	V	40.0	-6.2	Peak	326	1.0	
74.972	20.7	V	40.0	-19.3	Peak	200	2.0	
116.712	26.0	H	43.5	-17.5	Peak	100	3.0	
166.328	27.1	H	43.5	-16.4	Peak	272	1.5	
249.727	23.7	H	46.0	-22.3	Peak	305	2.0	
959.991	28.9	V	54.0	-25.1	Peak	209	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
37.922	26.1	V	40.0	-13.9	QP	327	1.0	QP (1.00s)
166.328	25.0	H	43.5	-18.5	QP	273	1.7	QP (1.00s)
74.972	16.7	V	40.0	-23.3	QP	201	1.0	QP (1.00s)
249.727	21.7	H	46.0	-24.3	QP	305	1.3	QP (1.00s)
959.991	28.4	V	54.0	-25.6	QP	210	1.0	QP (1.00s)
116.712	15.3	H	43.5	-28.2	QP	103	1.0	QP (1.00s)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Run #3: Radiated Spurious Emissions, 30 - 1000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Channel: 6 Mode: Rx Power: N/A
Tx Chain: 2Tx Data Rate: N/A

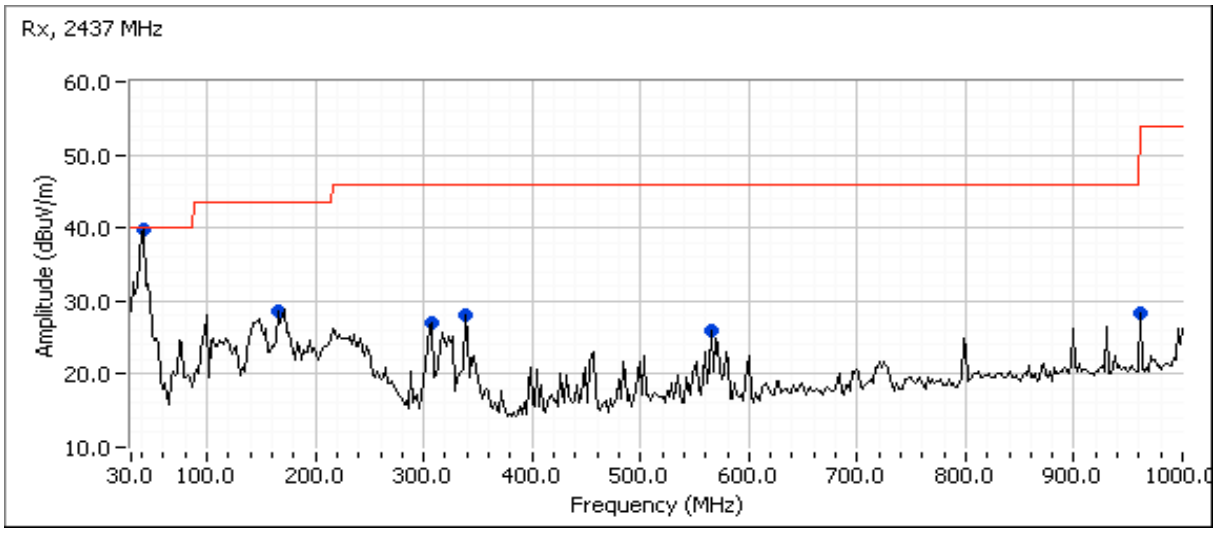
Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	LP0002 2.8		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
41.160	39.7	V	40.0	-0.3	Peak	360	1.5	
165.971	28.6	H	43.5	-14.9	Peak	283	1.5	
306.331	27.0	V	46.0	-19.0	Peak	96	2.0	
342.005	28.0	V	46.0	-18.0	Peak	130	3.5	
563.134	25.9	V	46.0	-20.1	Peak	266	1.5	
960.014	28.3	V	54.0	-25.7	Peak	209	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	LP0002 2.8		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
41.160	36.2	V	40.0	-3.8	QP	360	1.0	QP (1.00s)
165.971	26.4	H	43.5	-17.1	QP	286	1.7	QP (1.00s)
342.005	21.1	V	46.0	-24.9	QP	133	1.0	QP (1.00s)
960.014	28.8	V	54.0	-25.2	QP	211	1.0	QP (1.00s)
563.134	14.2	V	46.0	-31.8	QP	270	1.0	QP (1.00s)
306.331	8.9	V	46.0	-37.1	QP	99	1.0	QP (1.00s)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Run #4: Radiated Spurious Emissions, 30 - 1000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Channel: 157 Mode: Rx Power: N/A
Tx Chain: 2Tx Data Rate: N/A

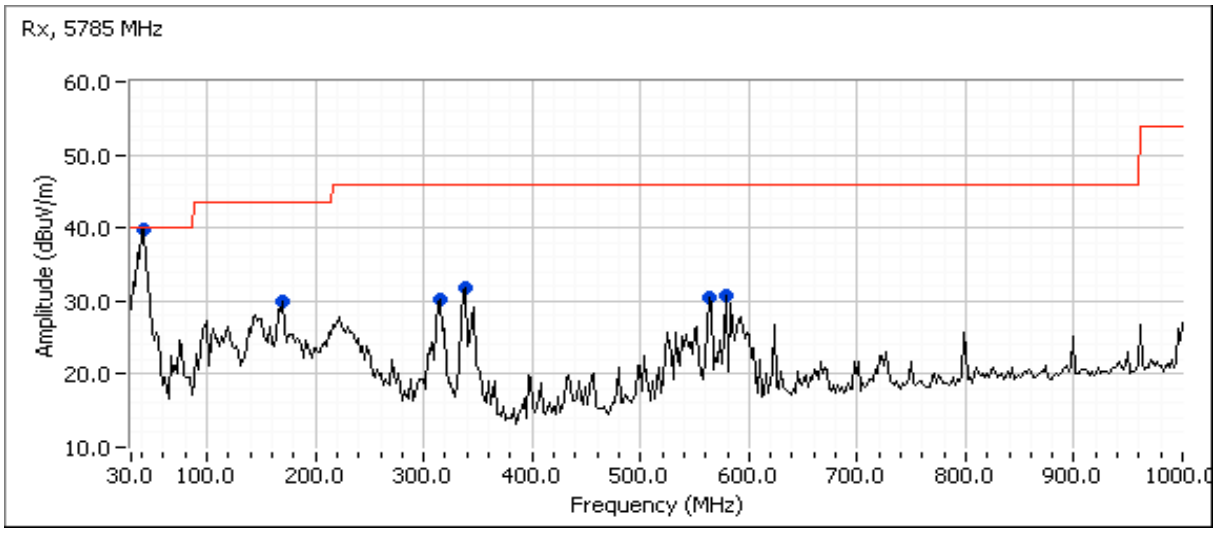
Preliminary peak readings captured during pre-scan

Frequency	Level	Pol	LP0002 2.8		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
41.400	39.8	V	40.0	-0.2	Peak	324	1.0	
170.093	29.9	H	43.5	-13.6	Peak	285	2.5	
315.996	30.1	V	46.0	-15.9	Peak	185	2.0	
340.489	31.9	V	46.0	-14.1	Peak	17	2.0	
561.214	30.5	V	46.0	-15.5	Peak	212	1.0	
575.995	30.8	V	46.0	-15.2	Peak	212	1.0	

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

Frequency	Level	Pol	LP0002 2.8		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
41.400	36.5	V	40.0	-3.5	QP	319	1.0	QP (1.00s)
170.093	26.0	H	43.5	-17.5	QP	279	1.6	QP (1.00s)
340.489	22.0	V	46.0	-24.0	QP	15	1.0	QP (1.00s)
575.995	19.9	V	46.0	-26.1	QP	210	1.0	QP (1.00s)
315.996	17.0	V	46.0	-29.0	QP	181	1.0	QP (1.00s)
561.214	13.3	V	46.0	-32.7	QP	215	1.6	QP (1.00s)

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-



Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Conducted Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

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: 7/31/2015
Test Engineer: Rafael Varelas
Test Location: FT Chamber #4

Config. Used: 2
Config Change: None
EUT Voltage: Laptop USB

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 22.5 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	FCC 15.207	Pass	40.3 dBµV @ 0.176 MHz(-14.4 dB)

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.

Sample Notes

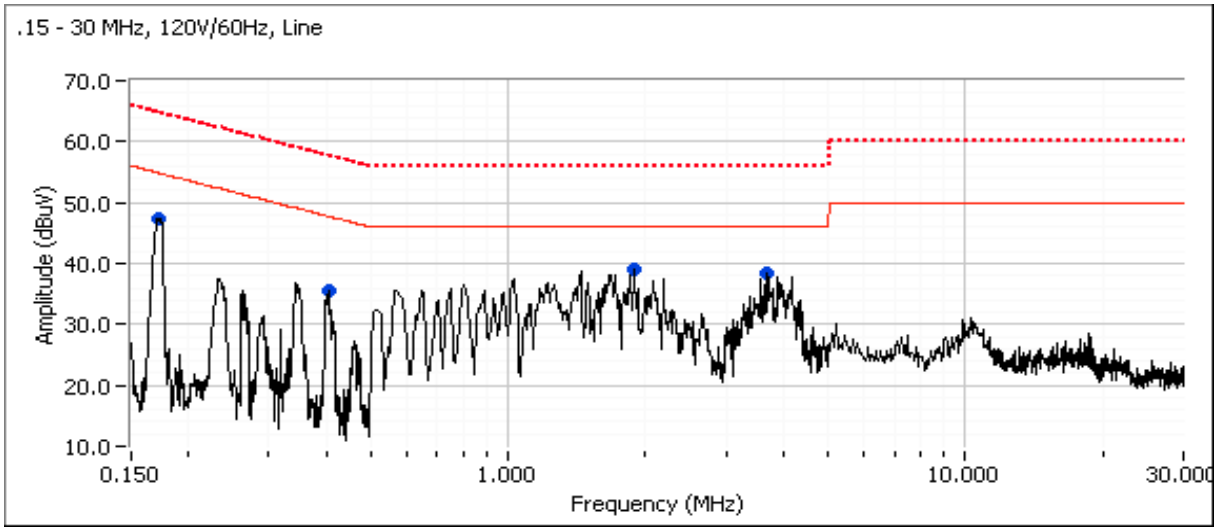
Sample S/N: D85DE2000005 (MAC ID)
Driver: 6.37 RC214 .12
Antenna: Internal

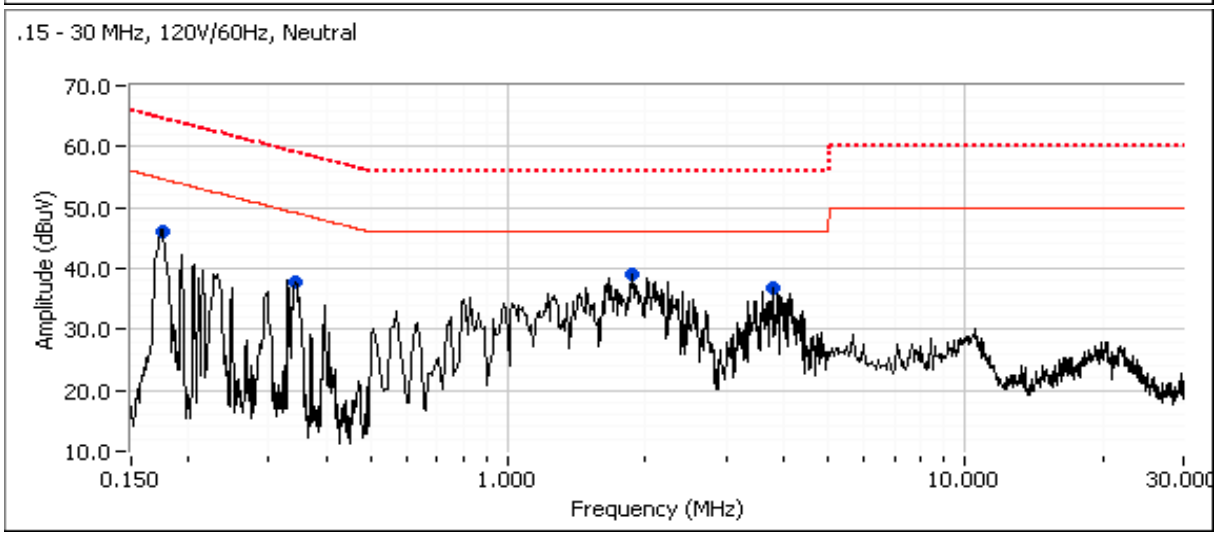
Channel: 6 - 2437MHz
Tx Chain: 2Tx
Mode: n20
Data Rate: MCS0

Power Setting: max 1Tx setting

Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	Hewlett Packard Company	Job Number:	J98746
Model:	SDGOB-1505	T-Log Number:	T98753
		Project Manager:	Sheareen Jacobs
Contact:	Tarandeep Kaur	Project Coordinator:	Irene Rademacher
Standard:	FCC 15.247 / FCC 15.E / RSS-247 / LP0002	Class:	-

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.172	47.5	Line 1	54.9	-7.4	Peak	
0.405	35.5	Line 1	47.7	-12.2	Peak	
1.888	39.0	Line 1	46.0	-7.0	Peak	
3.661	38.5	Line 1	46.0	-7.5	Peak	
0.176	46.0	Neutral	54.7	-8.7	Peak	
0.344	37.9	Neutral	49.1	-11.2	Peak	
1.855	38.9	Neutral	46.0	-7.1	Peak	
3.817	36.8	Neutral	46.0	-9.2	Peak	

Final quasi-peak and average readings

Frequency	Level	AC	FCC 15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.176	40.3	Neutral	54.7	-14.4	AVG	AVG (0.10s)
0.172	40.2	Line 1	54.9	-14.7	AVG	AVG (0.10s)
0.172	47.7	Line 1	64.9	-17.2	QP	QP (1.00s)
1.855	27.6	Neutral	46.0	-18.4	AVG	AVG (0.10s)
0.344	30.3	Neutral	49.1	-18.8	AVG	AVG (0.10s)
0.405	28.6	Line 1	47.8	-19.2	AVG	AVG (0.10s)
0.176	45.5	Neutral	64.7	-19.2	QP	QP (1.00s)
1.888	26.1	Line 1	46.0	-19.9	AVG	AVG (0.10s)
1.888	36.0	Line 1	56.0	-20.0	QP	QP (1.00s)
1.855	36.0	Neutral	56.0	-20.0	QP	QP (1.00s)
3.661	32.9	Line 1	56.0	-23.1	QP	QP (1.00s)
0.344	35.7	Neutral	59.1	-23.4	QP	QP (1.00s)
0.405	34.0	Line 1	57.8	-23.8	QP	QP (1.00s)
3.661	21.5	Line 1	46.0	-24.5	AVG	AVG (0.10s)
3.817	28.4	Neutral	56.0	-27.6	QP	QP (1.00s)
3.817	18.3	Neutral	46.0	-27.7	AVG	AVG (0.10s)

Appendix C Test Reductions

Test Reduction Taken	Justification/Comment
Radiated bandedge and radiated and conducted spurious emissions – n20 2Tx was tested as representative of 11g/11a 2Tx	Total EIRP would be the same given the same output power, as both use CDD. The OBW of n20 is wider. 11g/11a results would be equal to or better than n20.
Power/PSD for 11g/11a and n20 1Tx operation not performed. Output power is based on 2Tx n20.	Power for 1Tx 11a/n20 operation is based on the results from 2Tx and the bandedge results. The power for 1Tx will not exceed the total power from 2Tx, the compliant power from bandedge, or board limitations.
Power/PSD for n40 1Tx operation not performed. Output power is based on n40 2Tx	Power for the 1Tx n40 operation is based on the results from 2Tx and the bandedge results. The power for 1Tx will not exceed the total power from 2Tx, the compliant power from the bandage, or board limitations.
Radiated Spurious performed 2Tx using worse case 1Tx power settings	Testing performed in a worse case condition of power and number of transmitting antennas
Radiated spurious – testing was performed on the center channel for all OFDM modes (11g/a, n20, n40) within a band. Worse case mode tested for low and high channels	Spurious response would be consistent across the different OFDM modes within a given band

End of Report

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